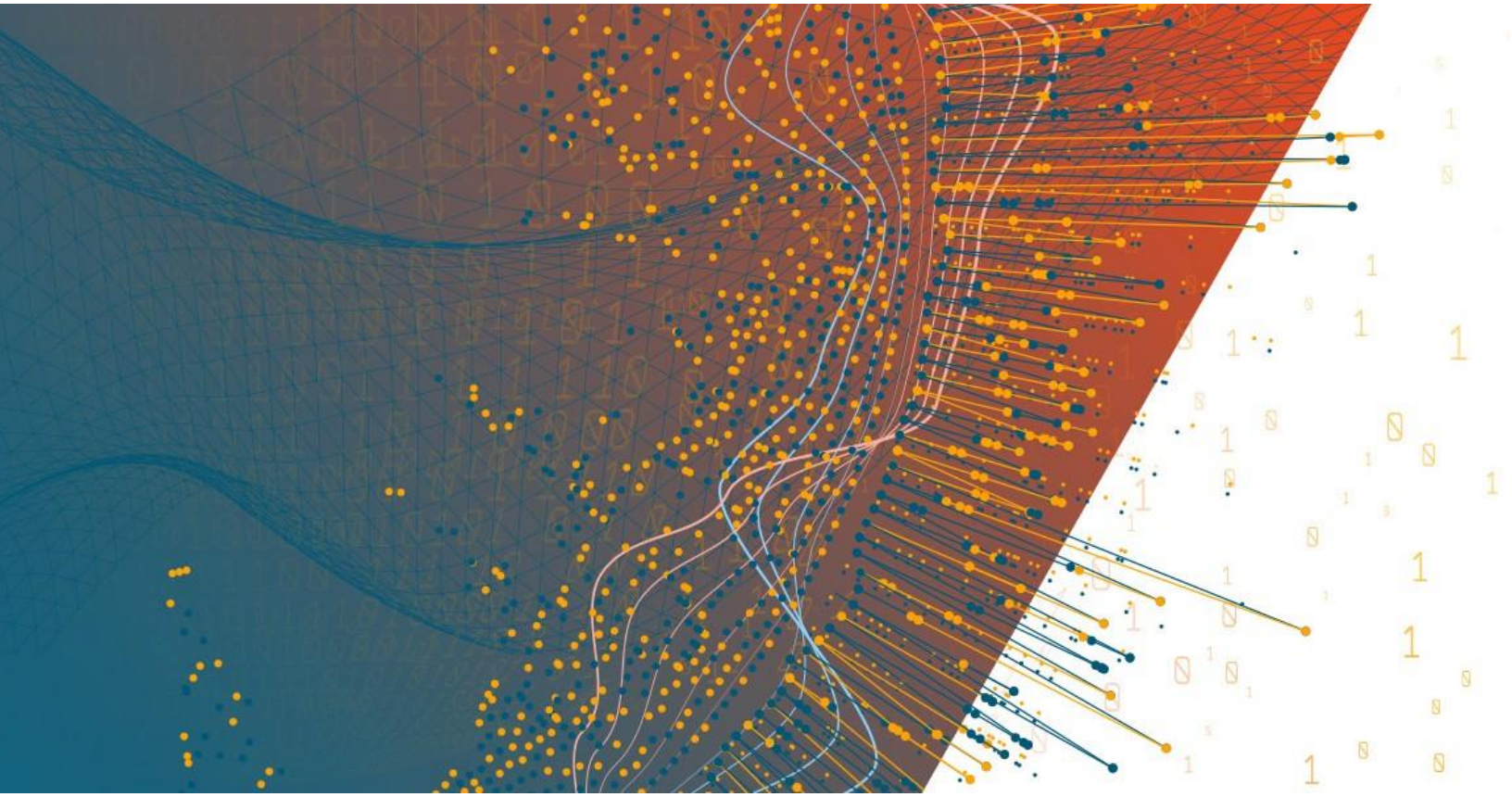


ALTAIR

Altair Panopticon™ v2022.1
WEB AUTHORING GUIDE

TABLE OF CONTENTS

[1] INTRODUCTION 1

Supported Roles in Panopticon Real Time 1
System Requirements 3

[2] WORKING WITH ALTAIR PANOPTICON REAL TIME WITH A DESIGNER ROLE 4

Introduction 4
The Welcome Page 5
Primary Layouts 7

[3] WORKBOOKS AND FOLDERS SUMMARY LAYOUT 11

Folders and Workbooks Display View 12
Creating a Workbook 13

[4] ADDING AND MANAGING DATA TABLES 16

Using the Add Data Table Wizard 18
Using the Data Table Editor Layout 23
- Panopticon Data Types 30
- Date/Time Key Elements 30
- Numeric Field Formats 31

Adding a New Data Table using the Data Table Editor 32
- Adding More Data Tables in the Data Table Editor Layout 38
- Rearranging Data Tables 40
- Selecting a Data Table 41
- Making a Duplicate of a Data Table 42
- Publishing a Data Table Template 44
- Saving a Data Table 46
- Deleting a Data Table 46

Adding Data Table Parameters 47
- Rearranging Data Table Parameters 50
- Manually Entered SQL Queries 51
- Special Server Parameters 52
- Parameter Encoding and Delimiters 54
- Deleting Data Table Parameters 55

Retrieving External Aggregates (Non Additive Data Sets) 56
- Calculations with External Aggregates (Non Additive Calculations) 62

Managing Data Sources 63
Common Data Source Settings 67
- Selecting and Defining the Data Connector File Source 68
- Defining the Message Type in Data Sources 72

Altair Engineering, Inc. All Rights Reserved. / Nasdaq:ALTR / altair.com

Saving or Loading Column Definitions in the Data Sources ... 74
Setting Show in Timezone and Source Timezone of Data Sources ... 76
Setting Row Limit of Data Sources ... 77
Joining Multiple Data Sources ... 80
Modifying the Join Definition ... 91
Union All of Multiple Data Sources ... 92
Grouping and Sorting Columns ... 95
Creating a Custom Sort Order ... 96
Enable Time Series Analysis ... 99
Pivoting and Unpivoting Data ... 106
Pivoting ... 106
Example 1 ... 108
Example 2 ... 112
Example 3 ... 115
Example 4 ... 116
Pivoting and Time Series ... 121
Unpivoting ... 122
R Transform ... 125
Best Practices on Working with R Transform in Panopticon ... 129
Example code in R ... 130
Additional Best Practice Recommendations in Using R with Panopticon ... 130
Python Transform ... 131
Best Practices on Working with Python Transform in Panopticon ... 136
Example code in Python ... 137
Additional Best Practice Recommendations in Using Python with Panopticon ... 137
REST Transform ... 138
Order Book Reconstruction Transform ... 143
Data Connectors ... 147
Connector Availability ... 148
File/URL Connectors ... 148
JSON Connector ... 148
Supported JSON Structures ... 150
MS Excel (Legacy) Connector ... 152
Upgrading Legacy MS Excel XLSX Data Source to the new MS Excel (xlsx) Connector ... 154
MS Excel (xlsx) Connector ... 156
SmartWorks IoT Connector ... 159
SmartWorks IoT Write Connector ... 160
SVG Connector ... 162
Creating Custom Shapes ... 163
Drawing a Circle with Cubic Bézier Curves ... 164
Text Connector ... 165
Web Data Connector ... 167
XML Connector ... 171
Database Connectors ... 173
Apache Cassandra Connector ... 173
Elasticsearch 6.x Connector ... 174
Elasticsearch 7.x Connector ... 176
Elasticsearch Connectors Dependency Installation ... 177

Google Analytics Connector ... 178
Configuring Service Account Authentication for Google Analytics ... 180
2. Enabling Analytics API ... 183
3. Setting Edit Permissions to the Service Account ID ... 185
4. Extracting Profile ID from the URL ... 185
InfluxDB Connector ... 186
JDBC Database Connector ... 188
Migration from Database to JDBC Connector ... 193
JDBC Beta Connector ... 195
Kx kdb+ Connector ... 200
On-Demand Queries ... 204
Kx kdb+ - Deferred Sync Query ... 204
Host Lookup Settings in the Panopticon.properties File ... 205
ksqlDB Connector ... 206
Livy Spark Connector ... 208
MongoDB Connector ... 210
Row-Wise Array Expansion ... 213
Column-Wise Array Expansion ... 213
Bson-Wise Array Expansion ... 213
OneTick Connector ... 213
OneTick Cloud Connector ... 215
Panopticon Data Extract Connector ... 217
Python Connector ... 220
Rserve Connector ... 222
Shakti (Beta) Connector ... 224
Splunk Connector ... 225
Streaming Connectors ... 227
ActiveMQ Connector ... 227
Amazon Kinesis – Data Streams Connector ... 230
AMPS Connector ... 235
Google Cloud Pub/Sub Connector ... 238
JDBC Database – Streaming Connector ... 242
Apache Kafka Connector ... 245
Kafka Publisher Connector ... 250
Kx kdb+tick Connector ... 252
ksqlDB – Streaming Connector ... 256
MQTT Connector ... 259
OneTick CEP Connector ... 263
Panopticon Streams Connector ... 266
RabbitMQ Connector ... 268
Solace Connector ... 271
Stream Simulator Connector ... 275
Stream Simulator – Extract Connector ... 278
StreamBase 7.1 Connector ... 282
StreamBase LiveView Connector ... 284
WebSocket Connector ... 286
Defining Real-Time Settings ... 289
Defining Real-Time Settings for Apache Kafka and Panopticon Streams Connectors ... 293

Previewing Streaming Data ... 296
Highlighting the Latest Data in Real Time Streaming Connectors ... 297
Parameterization of Connection Settings for Data Connectors ... 300
Parameterization of Time Zones in Data Connectors ... 302
Searching Columns ... 306
Making a Duplicate of a Data Source ... 307
Rearranging Data Sources ... 308
Deleting Data Sources ... 309
Adding Calculated Columns ... 310
Adding an Auto Key Column ... 310
Adding a Calculated Column ... 314
Numeric Calculations ... 317
Calculation Aggregation ... 319
Text Calculations ... 320
Calculation Data Type ... 321
Asymmetric Reporting ... 321
Time Series Calculations ... 321
Time Window Calculations ... 322
Time Period Calculations ... 323
Parameterization in Calculated Columns ... 326
Adding Ranking Columns ... 330
Adding Time Buckets – Categorical Time Analysis ... 332
Adding Identity Bucketing ... 336
Adding Numeric Sign Bucketing ... 340
Adding Numeric Equal Distance Bucketing ... 343
Adding Numeric Manual Bucketing ... 347
Adding Numeric Equal Density Bucketing ... 352
Adding Text Groupings ... 357
Modifying User-Defined Columns ... 360
Creating a Duplicate of a Calculated Column ... 361
Removing User-Defined Columns ... 363
Data Table Columns Settings ... 364
Modification of the Column Names ... 364
Modification of the Numeric or Date/Time Column Format ... 367
Setting the Default Aggregation for Numeric Columns ... 373
Setting the Min and Max Range for Numeric Columns ... 379
Filtering Data Source Columns ... 384
Data Storage ... 385

[5] BUILDING A WORKBOOK ... 386

Using the Open Workbook in Design Mode ... 388
Creating a Dashboard ... 389
Setting the Dashboard Properties ... 390
Setting the Workbook Properties ... 392
Rearranging Dashboards ... 396
Making a Duplicate of a Dashboard ... 397
Renaming Dashboards ... 399

Deleting Dashboards ... 400
Adding Dashboard Parameters ... 401
Deleting Dashboard Parameters ... 407
Dashboard Design ... 408
Maximizing Visualizations ... 414
Resizing Visualizations or Parts ... 414
Moving Visualizations or Parts ... 415
Dashboard Part Toolbar and Context Menu ... 416
Cutting or Copying Selected Dashboard Part ... 417
Pasting Selected Dashboard Part ... 419
Deleting Selected Dashboard Part ... 419
Undo or Redo ... 420
Aligning or Distributing Dashboard Parts ... 420
Panopticon Visualizations ... 426
Adding Visualizations to the Dashboards ... 427
Visualization General Settings ... 428
General ... 429
Visualization Title ... 430
Double Click Mode ... 430
Automatic Parameterization ... 431
Help Text ... 433
Modifying the Data Table that is Associated to the Visualization ... 434
Sync ... 436
Synchronization of the Shared Variables in the Visualizations of a Dashboard ... 436
Morphing Visualizations ... 442
Breakdown ... 446
Adding Columns to the Breakdown ... 447
Adding Parameterized Columns to the Breakdown ... 453
Modifying the Columns of the Breakdown ... 458
Sorting the Visualization for Each Level of the Breakdown ... 459
Sorting the Visualization Based on the Breakdown Column Values ... 462
Adding Breakdowns ... 462
Selecting Other Breakdowns ... 465
Deleting Breakdowns ... 465
Level of Details ... 466
Manual ... 467
One Level ... 470
Two Levels ... 472
Three Levels ... 473
Four Levels ... 474
Five Levels ... 475
Cross Tabbing ... 475
Axes ... 481
Cross Tab Axes ... 481
Visualizations Axes ... 482
Table Visualization Axis ... 485
Visualization Static Filter ... 486
Modifying Visualization Static Filter ... 490

Deleting Visualization Static Filter ... 492
Rank Filtering ... 493
Rank Filtering for the Table Visualization ... 502
Select Variables ... 509
Snapshot Visualizations ... 509
Time Series Visualizations ... 510
Combination Visualizations ... 510
Variable Empty State ... 511
Associating Columns to the Variables ... 513
Deleting Variables from a Visualization ... 516
Variables Configuration ... 517
Size Variable Configuration ... 517
X & Y Variables Configuration ... 519
Z Variable Configuration ... 520
Latitude & Longitude Variables Configuration ... 521
Price Variable Configuration ... 521
Change Variable Configuration ... 521
Alpha Variable Configuration ... 522
BoxPlot Variable Configuration ... 528
Shape Variable Configuration ... 531
Reference Variable Configuration ... 537
Spread Variable Configuration ... 537
OHLC Variable Configuration ... 541
Reference Lines Variable Configuration ... 543
Color Variable Configuration ... 548
Color Variable Configuration for Text Columns Using the Palette Color Source ... 548
Color Variable Configuration for Text Columns Using the #RGB Color Source ... 553
Color Variable Configuration for Numeric Columns ... 557
General Colors and Shared Single Configuration ... 563
Icons Variable Configuration ... 567
Records Variable Configuration ... 573
Details Variable Configuration ... 580
Details Variable Configuration for Visualizations with Records or Visuals Variable ... 592
Time Axis Variable Configuration ... 600
Text Axis Variable Configuration for the Text Combination Graph ... 603
Style Variable Configuration for Visualizations ... 605
Supported Parameterized Variable Titles ... 607
Table Visualization ... 609
Records Variable Configuration for the Table Visualization ... 612
Grouping Colums in the Table Visualization ... 631
Aggregation Methods ... 636
Abs ... 638
Abs Sum ... 642
Combinations ... 644
Count ... 646
Count Distinct ... 647
Count Non Zero ... 655
Cumulative Sum ... 656

Cumulative Sum By Max ... 657
Do Not Aggregate ... 659
Harmonic Mean ... 659
Intercept ... 660
Level ... 661
Max ... 668
Mean ... 669
Min ... 671
Neg ... 672
Percentile ... 673
Percent of Parent ... 675
Percent of Total ... 676
Percent of Total Change ... 676
Percent of Parent Reference ... 677
Percent of Total Reference ... 677
Pos ... 678
Product ... 680
Ratio of Sums ... 681
Sibling Rank ... 683
Slope ... 685
Stdev ... 686
Stdevp ... 688
Sum ... 689
Unique ... 690
Text Unique and Text Concat Distinct ... 691
Weighted Harmonic Mean ... 694
Weighted Mean ... 694
Weighted Sample Standard Deviation and Weighted Sample Variance ... 695
Weighted Population Standard Deviation and Weighted Population Variance ... 696
Weighted Sum ... 696
Snapshot Visualization Settings ... 697
Bar Graph Settings ... 697
Box Plot Settings ... 700
Bullet Graph Settings ... 702
Categorical Line Graph Settings ... 709
Circle Pack Settings ... 711
Donut Chart Settings ... 712
Donut Gauge Settings ... 713
Dot Plot Settings ... 714
Funnel Chart Settings ... 717
Heat Matrix Settings ... 718
Map Plot Settings ... 720
Network Graph Settings ... 723
Numeric Line Graph Settings ... 724
Numeric Needle Graph Settings ... 727
Numeric Stacked Needles Graph Settings ... 730
Pareto Chart Settings ... 733
Pie Chart Settings ... 736

Record Graph Settings ... 737
Scatter Plot Settings ... 738
3D Scatter Plot Settings ... 742
Shapes Settings ... 744
Surface Plot Settings ... 744
3D Surface Plot Settings ... 747
Table Visualization Settings ... 749
Ticker Tile Settings ... 751
Treemap Settings ... 751
Waterfall Chart Settings ... 752
Timeseries Visualization Settings ... 754
Candle Stick Graph Settings ... 754
Horizon Graph Settings ... 756
Line Graph Settings ... 758
Needle Graph Settings ... 760
Stacked Needle Graph Settings ... 763
Grouped Needle Graph Settings ... 765
OHLC Graph Settings ... 766
Order Book Graph Settings ... 768
Price Band Graph Settings ... 770
Spread Graph Settings ... 772
Stack Graph Settings ... 775
Timeseries Scatter Plot Settings ... 776
Timeseries Surface Plot Settings ... 778
Combination Visualizations Settings ... 780
Guidelines in Using the Numeric Combination Graph ... 781
Creating Density Plots in the Numeric Combination Graph ... 785
Adding a Numeric Combination Graph ... 789
Text Combination Settings ... 809
Popup Titles in Text Combination Graph and Numeric Combination Graph ... 830
Time Combination Settings ... 831
Legends ... 845
Adding a Color Legend ... 845
Adding an Icon Legend ... 851
Adding a Shape Legend ... 854
Adding a Series Legend ... 858
Filters ... 867
Adding a Filter Box ... 867
Filter Settings ... 878
Deleting Column Filters ... 884
Filter Mode Types ... 885
Free Text ... 886
Multiple Selection ... 888
Multiple Selection Drop Down List ... 891
Single Selection Drop Down List ... 895
Single Selection ... 896
Include/Exclude List ... 897
Include List ... 899

Numeric Range ... 900
Date Time Range ... 900
Modifying the Filter Box Layout ... 901
Adding a Time Filter Box ... 903
Global Filtering ... 906
Deleting Global Filters ... 911
Viewing Active Filters ... 912
Actions ... 913
Interactive Parameters ... 915
Time Parameters ... 917
Zoom Bound Parameters ... 918
Constant Parameters ... 920
Action Scope ... 920
Adding Navigation Actions ... 921
Adding URL Actions ... 927
Adding Script Actions ... 937
Adding Data Update Actions ... 946
Filtering Workbook Actions Based on the Dashboard Scope or Source Data Table ... 956
Adding an Action Form ... 960
Adding a Numeric Action Slider ... 972
Adding a Numeric Range Action Slider ... 977
Adding an Action Button ... 981
Defining Action Parameter Properties ... 989
Adding an Action Date Picker ... 991
Adding an Action Date Range Picker ... 1002
Selecting Relative Dates in Action Date Picker and Action Date Range Picker Controls ... 1015
Adding an Action Dropdown ... 1018
Adding an Action Text Box ... 1023
General Parts ... 1028
Adding a Text Label ... 1028
Panel ... 1033
Adding an Image Box ... 1033
Adding an Iframe Part ... 1035
Adding a JavaScript Part ... 1036
Managing Themes in a Workbook ... 1039
Modifying a Workbook Theme ... 1041
Color Palettes in a Workbook ... 1050
Creating a New Text Color Palette In a Workbook ... 1051
Creating a Sequential or Diverging Numeric Color Palette in a Workbook ... 1052
Modifying Color Palettes in a Workbook ... 1055
Creating a Duplicate of a Color Palette ... 1056
Deleting Color Palettes in a Workbook ... 1057
Shape Palettes in a Workbook ... 1057
Creating a New Shape Palette in a Workbook ... 1058
Modifying Shape Palettes in a Workbook ... 1061
Creating a Duplicate of a Shape Palette ... 1062
Deleting Shape Palettes in a Workbook ... 1063
Workbook Toolbar ... 1064

Copying Dashboard Image 1066
Ad Hoc PDF Generation 1066
Bookmarking 1068
Viewing and Fixing Workbook Issues 1072
Alerting 1076
Setting Up Alerts on the Web Client 1077
Sorting Alerts 1084
Searching for Alerts 1084
Enabling Alerts on the Alerts Page 1085
Displaying Active Alerts 1086
Activating or Deactivating All Alerts 1086
Modifying Alert Settings 1087
Deleting Alerts 1090
Enabling Alerts 1093
Sample Email Alerts 1095
Sample Web Client Alerts 1096
Sample Webhook Alerts 1100
Using the Open Workbook in View Mode 1102
Context Menu 1104
Visualization Filtering 1107
Drilling into Visualizations 1107
Data Export 1108
Rubber Band Zoom and Selection 1110
Zooming In and Out with Mouse Wheel 1114
Panning Around Within the Zoomed Area 1116
Setting Numeric Axis Range 1116
Variable Visibility 1118
Pinning Details Pop-up 1119
Adjust Column Width in the Table Visualization 1120
Hide or Display Columns in the Table Visualization 1123
Displaying a Hierarchy Column in the Table Visualization 1124
Additional Table Operations 1126
Adjust Width of the Text Axis Leaf in Table Visualizations 1126
Move Columns in the Table Visualization 1127
Visual Table Sorting 1128
Setting Snapshot Time in a Time Series Visualization 1129
Visualization Header Controls 1132
Exporting to Excel (TSV-format) of Visualizations 1133
Toggling Between a Visualization and a Table 1133
Maximize 1136
Drilling Into, Sorting, Removing, Adding, and Swapping Columns in a Breakdown and Cross Tab Points 1136
Drilling into Hierarchy Displays 1137
Removing Breakdown or Cross Tab Columns 1140
Adding Breakdown or Cross Tab Columns 1141
Moving Breakdown Columns 1142
Toggling Between Rows and Columns of a Cross Tab 1144

[6] GLOBAL PARAMETERS 1145

Adding Global Parameters 1147
Modifying Global Parameters 1149
Deleting Global Parameters 1151
Refresh Global Parameters 1152
Searching for Global Parameters 1152

[7] ACCESSING WORKBOOKS AND CONTEXT MENU OPTIONS 1154

Accessing Workbooks 1154
Searching for Workbooks 1156
Workbooks Toolbar and Context Menu 1160
Sorting Workbooks 1161
Copying Workbooks 1162
Moving Workbooks 1164
Deleting Workbooks or Folders 1166
Merging or Importing Workbooks 1167
Workbook and Folder Context Menu 1169
Renaming Workbooks or Folders 1170
Creating Folders 1171
Adding Groups and Users with Allowed Authorization 1172
Adding Groups and Users with Denied Access 1175
Creating Subfolders 1178
Updating Folder or Subfolder Properties 1181
Uploading Workbooks 1183
Viewing Workbook History and Republishing 1186
Moving a Workbook 1190
Copying a Workbook 1192
Deleting a Workbook or Folder 1193
Downloading a Workbook 1194
Exporting a Workbook or Folder Bundle 1195
Importing Workbook Bundle 1196
Panopticon Workbook Examples 1198
Visualization Guide 1198
Example Use Cases and Sample Dashboards 1198
Capabilities and How to Guides 1199

[8] DATA EXTRACTS 1203

Folders and Data Extracts Display View 1203
Searching for Data Extracts 1205
Creating Data Extracts 1206
Creating Data Extract from Apache Cassandra 1209
Creating Data Extract from Elasticsearch 6.x 1210
Creating Data Extract from Elasticsearch 7.x 1211
Creating Data Extract from Google Analytics 1212

Creating Data Extract from InfluxDB ... 1213
Creating Data Extract from JDBC Database ... 1214
Creating Data Extract from JDBC Beta ... 1215
Creating Data Extract from JSON ... 1216
Creating Data Extract from Kx kdb+ ... 1217
Creating Data Extract from ksqlDB ... 1218
Creating Data Extract from Livy Spark ... 1220
Creating Data Extract from MongoDB ... 1221
Creating Data Extract from MS Excel (legacy) ... 1221
Creating Data Extract from MS Excel (xlsx) ... 1222
Creating Data Extract from OneTick ... 1223
Creating Data Extract from OneTick Cloud ... 1225
Creating Data Extract from Python ... 1226
Creating Data Extract from Rserve ... 1227
Creating Data Extract from Shakti Beta ... 1228
Creating Data Extract from Splunk ... 1228
Creating Data Extract from Text ... 1229
Creating Data Extract from Web Data ... 1230
Creating Data Extract from XML ... 1231
Data Extract and Folder Context Menu ... 1232
Uploading Data Extracts ... 1233
Renaming a Data Extract ... 1236
Moving a Data Extract ... 1237
Copying a Data Extract ... 1238
Downloading a Data Extract ... 1240
Viewing the Data Extract Usage ... 1240
Refreshing the Data Extract ... 1241
Deleting a Data Extract ... 1242
Data Extracts Toolbar and Context Menu ... 1242
Sorting Data Extracts ... 1243
Copying Data Extracts ... 1244
Moving Data Extracts ... 1246
Deleting Data Extracts ... 1248

[9] WEBHOOKS ... 1249

Folders and Webhooks Display View ... 1250
Searching for Webhooks ... 1251
Creating Webhooks ... 1252
Webhooks Toolbar and Context Menu ... 1254
Sorting Webhooks ... 1255
Renaming a Webhook ... 1256
Moving Webhooks ... 1257
Copying Webhooks ... 1258
Deleting Webhooks ... 1259
Triggering Webhooks ... 1260

[10] MANAGING WORKBOOK THEMES 1261

Folders and Themes Display View 1261
Searching for Themes 1263
Creating a New Theme 1264
Define the Default Style Settings of a Theme 1265
Define the Custom Style Settings of a Theme 1272
Define the Color Palettes Settings of a Theme 1272
Define the General Color Settings of a Theme 1275
Define the Editor Style Settings of a Theme 1279
Define the Shape Palettes of a Theme 1279
Themes Toolbar and Context Menu 1281
Sorting Themes 1282
Renaming a Theme 1283
Moving Themes 1283
Copying Themes 1284
Downloading Themes 1285
Uploading Themes 1286
Deleting Themes 1288
Color Palettes 1289
Creating a New Single Color Palette 1291
Creating a New Sign Color Palette 1292
Creating a New Text Color Palette 1293
Creating a Sequential or Diverging Numeric Color Palette 1295
Modifying Color Palettes 1298
Creating a Duplicate of a Color Palette 1299
Deleting Color Palettes 1300
Shape Palettes 1300
Creating a New Shape Palette 1300
Uploading a Shape Palette 1302
Downloading a Shape Palette 1304
Modifying Shape Palettes 1304
Creating a Duplicate of a Shape Palette 1305
Rearranging Shape Palettes 1306
Deleting Shape Palettes 1307

[11] PANOPTICON RESOURCES 1308

[1] INTRODUCTION

Altair Panopticon™ supports web authoring wherein, a user with a Designer role can assemble, maintain, and publish monitoring and analysis workbooks in the Web client.

SUPPORTED ROLES IN PANOPTICON REAL TIME

There are four roles supported in Panopticon Real Time:

Role	Description

Administrator	Allowed to perform the following:
	• view, rename, move, copy, download, upload, interact, and publish/republish workbooks into folders to which the user has permissions to.
	• add, rename, or remove folders and subfolders and manage users and groups that should be granted or denied access.
	• import or export workbooks bundle.
	• administer the server which includes:
	  ○ manage data templates
	  ○ create data extracts from connectors
	  ○ create and manage alerts and specify the email address of the user or group who will receive the alert
	  ○ view and manage plugin subscriptions
	  ○ manage caches
	  ○ specify logging level and view and copy logs
	  ○ create and manage scheduled tasks
	  ○ create and manage global parameters
	  ○ manage workbook themes
	  ○ view logged in users to the server and log them out
	  ○ view server settings, set the file logging level, and clear cache
	These topics are discussed in the *Altair Panopticon Real Time Installation and Troubleshooting Guide*.

Viewer	Allowed to view and analyze fully interactive dashboards. This is the default role assigned to users that cannot be mapped to other roles.
Designer	Allowed to perform the following: • view, create, upload, rename, move, copy, download, merge, remove workbooks, and publish/republish them into folders to which the user has permissions to. • import or export workbooks bundle. • add, rename, or remove folders and subfolders and manage users and groups that should be granted or denied access.

	• create and manage global parameters. • create and manage alerts and specify the email address of the user or group who will receive the alert. • create, upload, rename, move, copy, download, view workbook usages, refresh, and remove data extracts.
Anonymous	Allowed to view workbooks if `authentication.required` is set to **false**.

Depending on the authentication or user management mechanism used, the role that a user should have is specified and then mapped to a group set in `Panopticon.properties`.

Property	Description	Default Value
access.administrator.groups	The role that is mapped to the administrator group.	**admin**
access.default.roles	The default roles applied to all users of the server. For example, if `access.default.roles`=DESIGNER,ADMINISTRATOR and a user with a VIEWER role logs on to the server, then the user will simultaneously have a VIEWER, DESIGNER, and ADMINISTRATOR roles. However, if no default roles are wanted, then leave the property blank. **NOTE:** The roles that can be assigned in this property can only be ADMINISTRATOR, VIEWER, ANONYMOUS, and/or DESIGNER. This property is case sensitive.	**VIEWER**
access.designer.groups	The role that is mapped to the designer group.	**designer**
access.viewer.groups	The role that is assigned to the viewer group.	

NOTE

- **Group sets can be added for a role, separated by a comma.**
- **To be able to use all of the features of Panopticon Real Time, a user is required to have Designer and Administrator roles.**
- **When using Altair Units licensing, different user roles will check out different numbers of Altair Units.**

Role	Altair Units Draw
Viewer	2
Designer	2 21 when designing workbooks
Administrator	2

For this documentation we will focus on the capabilities of Panopticon Real Time in the *Design Mode* and *Data Table Editor* layouts when creating, building, maintaining, and publishing workbooks using the web authoring tool.

SYSTEM REQUIREMENTS

Panopticon Real Time is supported on these operating systems:

- Linux
- Windows 10 (64-bit) – For Development Environments Only
- Windows Server 2012 (64-bit)
- Windows Server 2016 (64-bit)

Panopticon Real Time also requires:

- Oracle Java SE 8, Oracle Java SE 11, Open JDK 8, and Open JDK 11 are supported after installing the dependency files that are distributed with Panopticon Real Time.

> **NOTE** **Unzip the contents of the dependency package file provided by Panopticon into the `TOMCAT_HOME/lib` folder to be able to run Altair Panopticon software on JRE 8 and Open JDK 8.**

- Apache Tomcat 9.0.x

Panopticon Real Time is supported for deployment on the following cloud providers:

- Amazon Web Services (AWS)
- Microsoft Azure
- Google Cloud Platform
- Oracle Cloud

  Containerized deployment with Docker Linux containers is also supported.

Supported browsers include the latest version of:

- Google Chrome
- Safari

[2] WORKING WITH ALTAIR PANOPTICON REAL TIME WITH A DESIGNER ROLE

INTRODUCTION

Visual Data Discovery is performed through **workbooks**. A workbook is a collection of:

- Dashboards (Visual Layouts)
- Data Tables (Data Query and Schema Definitions)
- Actions (Contextual Interaction Definitions)
- Overall styling

Dashboards may consist of several parts including: visualizations, legends, filters, action controls, labels, and images.

Data tables output both data schemas and data conduits, and define the queries and source data repository definitions, in order to retrieve data. They do not store data but are simply the conduit to which data flows through.

The core of the product is the processing of data, which can range from Real Time Streaming datasets, that are retrieved asynchronously, to static and historical datasets and are retrieved synchronously on a defined periodic basis. It is assumed that data is never at rest, and consequently, data refresh is an automatic operation across all datasets.

Data sources can be connected to directly, with data retrieved on the fly as it is required.

Alternatively, on slower underlying data sources, the data can be extracted locally on a scheduled, or ad hoc basis. This locally extracted data can then be queried, minimizing query latency, but increasing the risk of stale data.

Data can be accessed in a number of methods, depending on the need and source repositories capabilities:

- Retrieve all data into memory

  For example, retrieving an MS Excel spreadsheet.

- Retrieve subsets into memory, which may be summarized, or parameterized

  For example, retrieving a summary view, and then retrieving a detailed dataset, based on the selection in the summary view. This method provides very tightly controlled data retrieval times but requires the paths through data to be pre-specified, with pre-defined data queries (including stored procedures).

- Retrieve only required results into memory, by querying on demand, pushing aggregation and filtering tasks to underlying big data repositories, or queryable data extracts.

This is commonly known as a ROLAP implementation, where the product is dynamically writing data queries to the underlying data repository and retrieving aggregated and filtered datasets. Given the on-demand nature of this method, it is more suitable to exploratory data analysis but requires dynamic query generation.

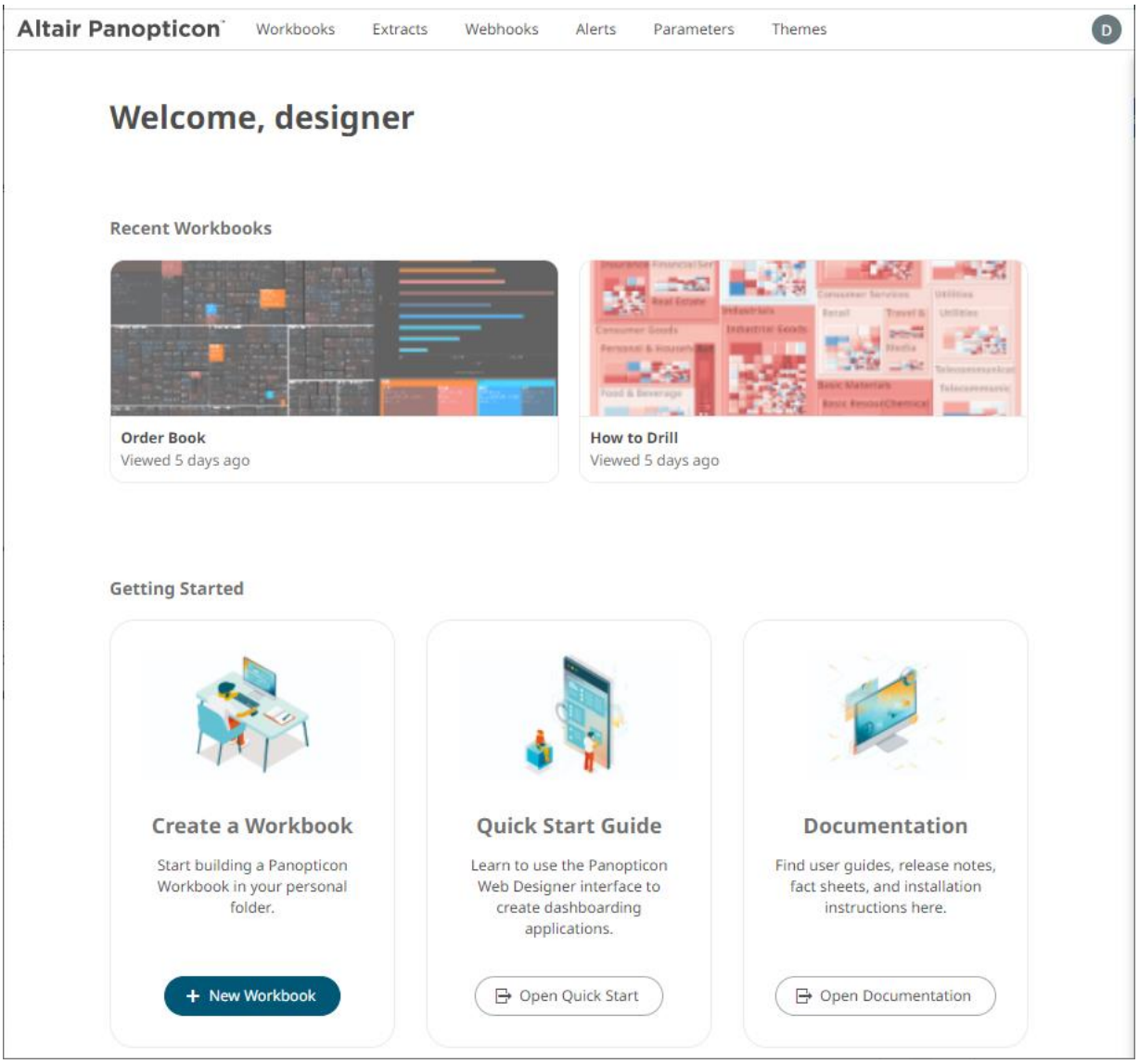
In cases where there is too much data to retrieve into memory, data access can be direct to the underlying source, or through the data extracts created in Panopticon Real Time. As the data extract supports on demand queries, summarization, and parameterization, it can become a more powerful option than a number of underlying data sources.

Data extracting is available for non-streaming data sources and can be used across all workbooks.

In the following sections the product will be demonstrated, starting with the various layouts, the definition of data retrieval and then the building of dashboards.

THE WELCOME PAGE

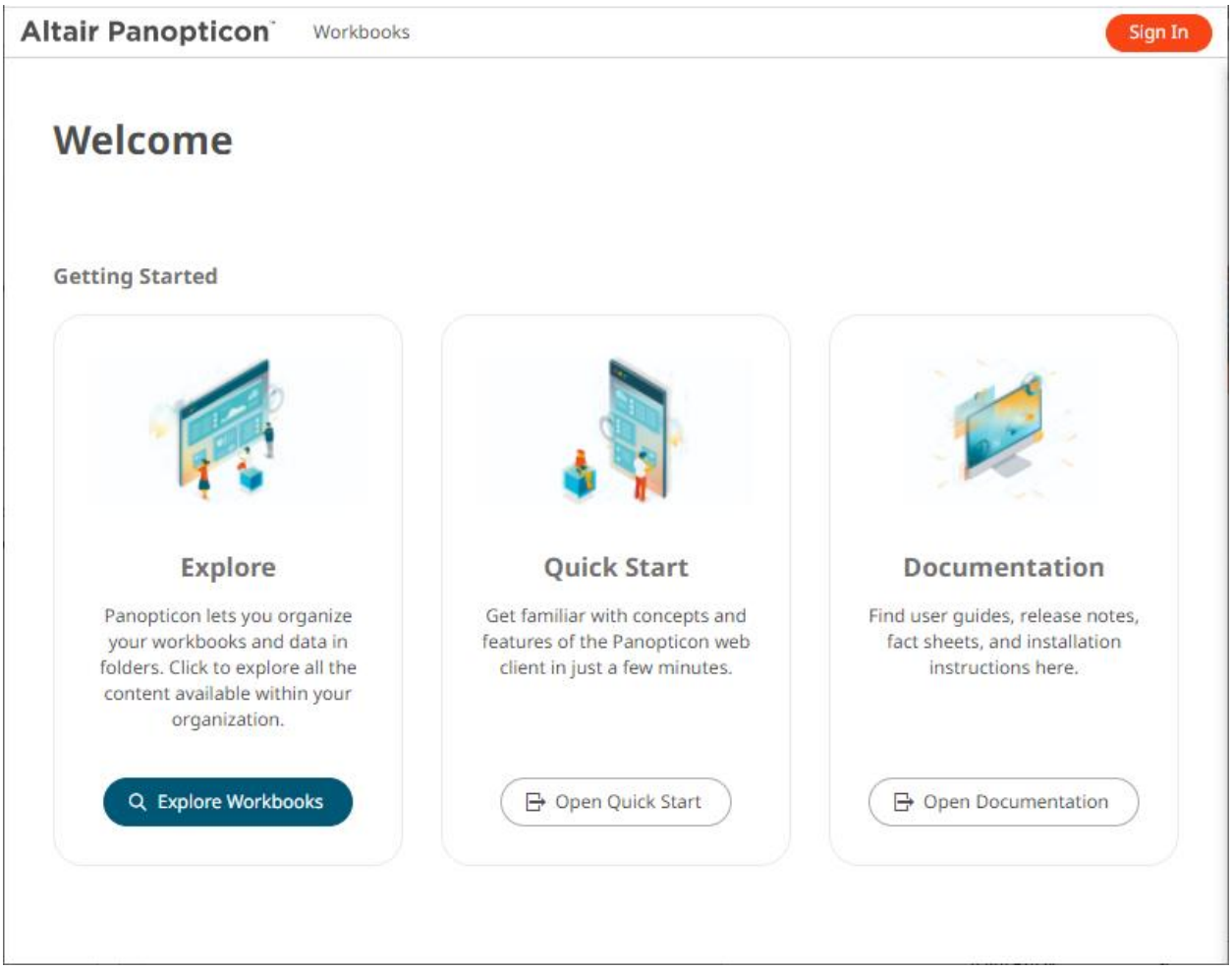
The *Welcome* page is the first screen that displays when you log on to Panopticon Real Time. This page can also be accessed by clicking the **Altair Panopticon** logo on the header.



From this page you can:

- Open recently viewed workbooks (if available)
- Create a new workbook
- Open the Web Authoring Quick Start Guide
- View online documentation and help

Canceling the *Login* page displays this *Welcome* page.



Instead of *Create a Workbook*, the *Explore* section is available where you can explore the workbooks available in your organization.

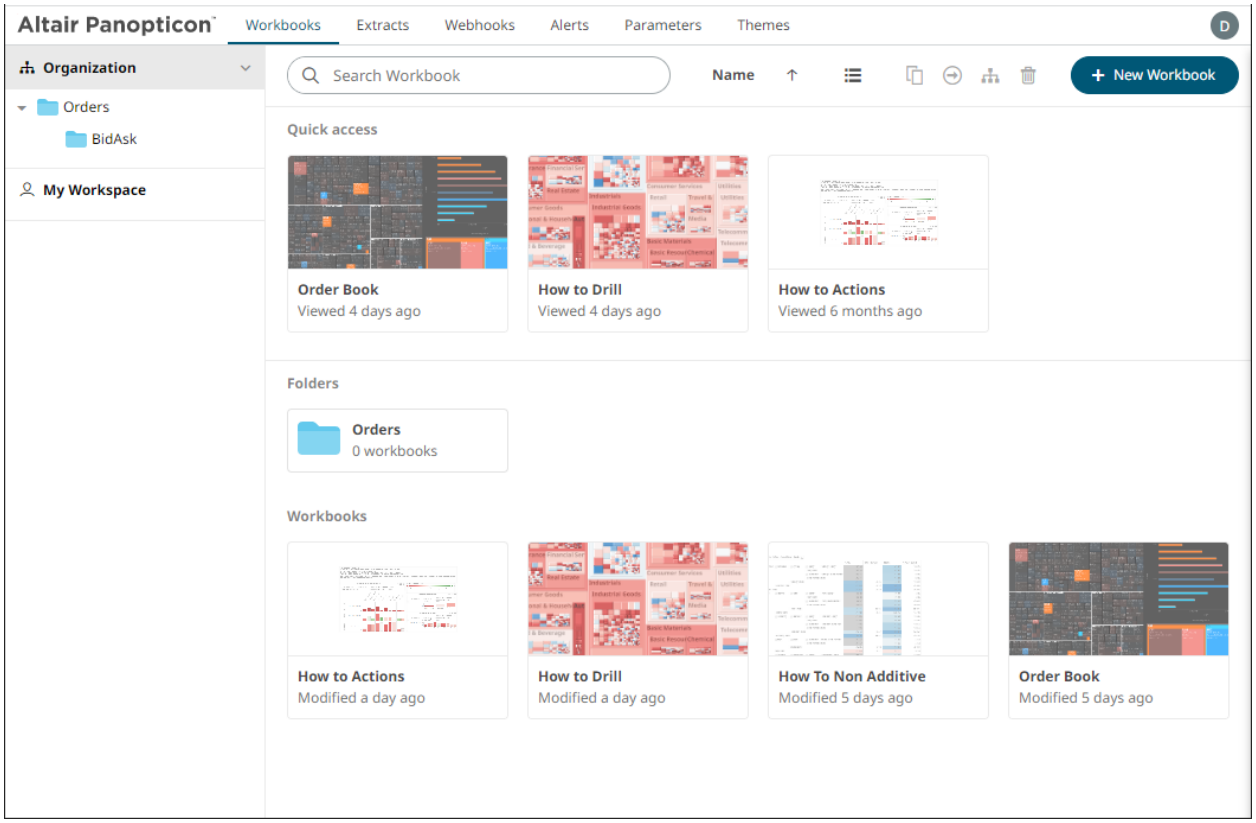
PRIMARY LAYOUTS

In Panopticon Real Time, for a user with a Designer role, there are four primary layouts to define a workbook:

- Workbooks and Folders Summary

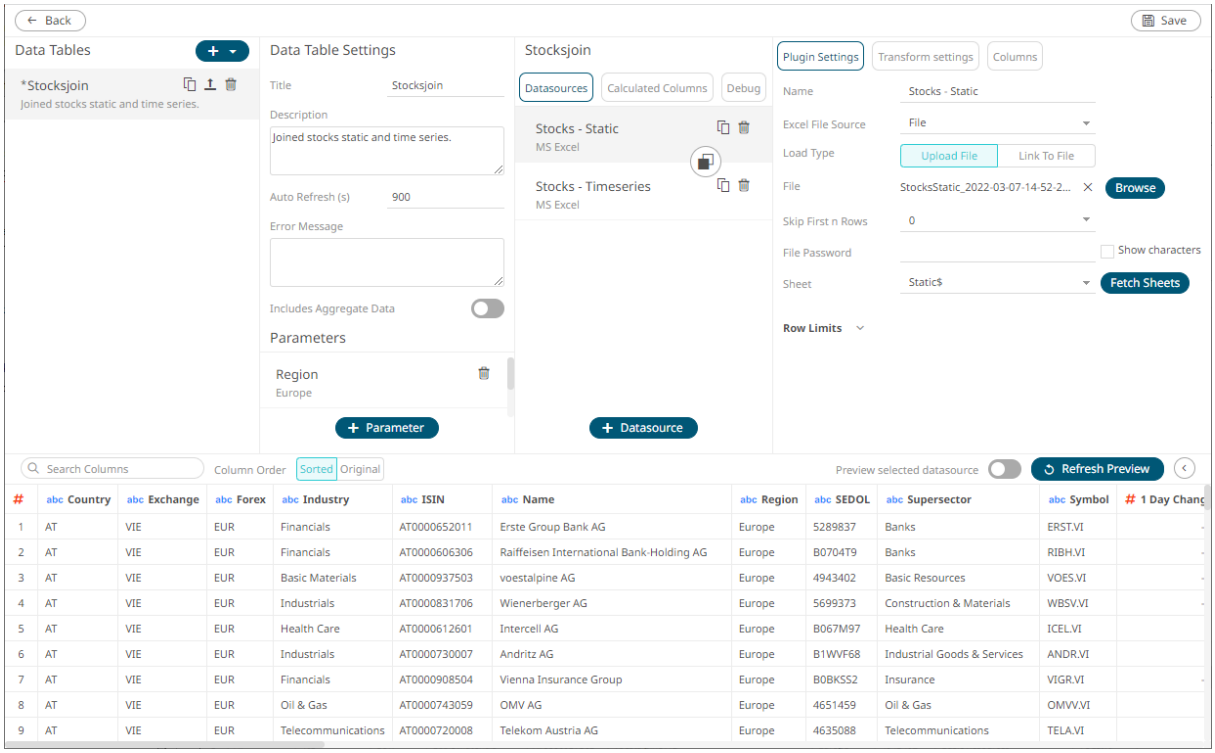
  Allows you to:

  - manage workbook folders
  - create, view, upload, sort, rename, copy, move, merge, delete, download, export bundle, view history and republish workbooks
  - search workbooks



- Data Table Editor

  Allows the process of collecting, cleaning, transforming, and consolidating data into one data table, primarily for use in analysis.



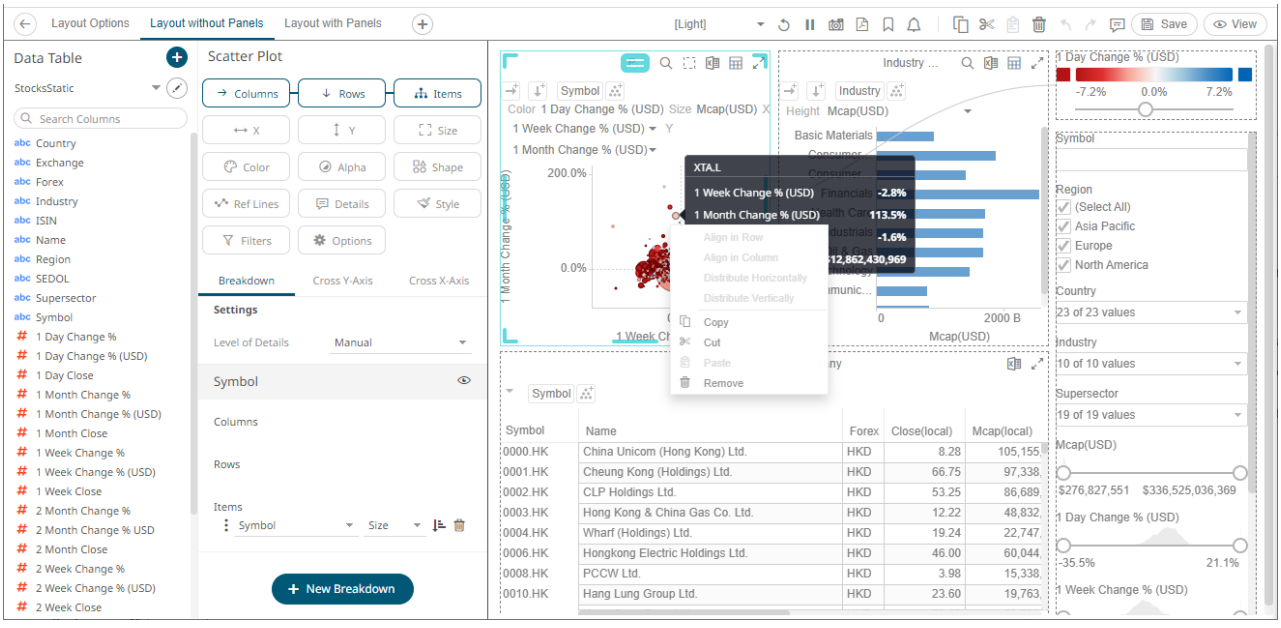
#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol	1 Day Chang
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI	
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI	
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI	
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI	
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI	
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI	
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI	
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI	
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI	

You can also use the Add Data Table wizard to add and manage data tables.

- Open Workbook in Design Mode

  Allows you to build dashboards by adding visualizations, filters, action controls, legends, labels, and images based on the data tables that were added in the *Data Table Editor* layout.

  Here is an example workbook with the components in design mode:



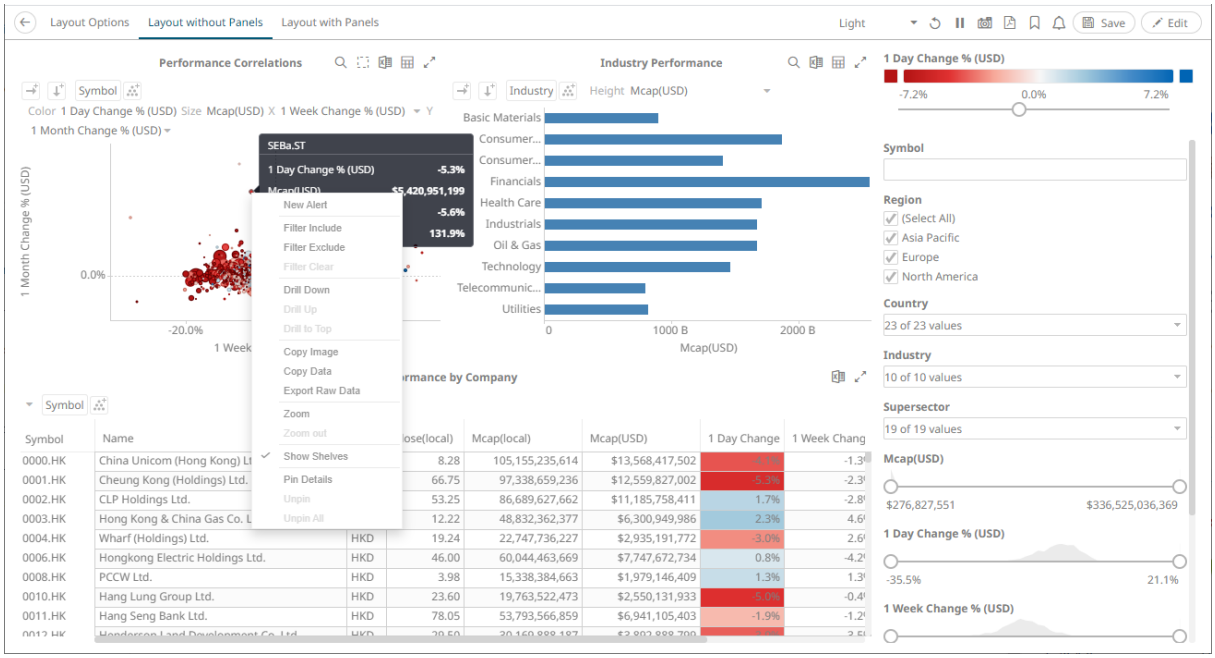
Symbol	Name	Forex	Close(local)	Mcap(local)
0000.HK	China Unicom (Hong Kong) Ltd.	HKD	8.28	105,155
0001.HK	Cheung Kong (Holdings) Ltd.	HKD	66.75	97,338
0002.HK	CLP Holdings Ltd.	HKD	53.25	86,689
0003.HK	Hong Kong & China Gas Co. Ltd.	HKD	12.22	48,832
0004.HK	Wharf (Holdings) Ltd.	HKD	19.24	22,747
0006.HK	Hongkong Electric Holdings Ltd.	HKD	46.00	60,044
0008.HK	PCCW Ltd.	HKD	3.98	15,338
0010.HK	Hang Lung Group Ltd.	HKD	23.60	19,763

Once a workbook is open, it will display all dashboards as separate tabs, and list all data tables it utilizes in the *Data Table* pane to the left of the screen. Selecting a visual will automatically select the linked data table, or alternatively the data table can be manually selected through the drop-down list box.

For more information on how to use the *Open Workbook in Design Mode* view, refer to *Using the Open Workbook in Design Mode*.

- Open Workbook in View Mode

This is how the workbook and its components will be displayed on the Web client that allows users to analyze fully interactive dashboards.



NOTE

On the Open Workbook in View Mode, when the Edit button is clicked, the user will get the DESIGNER role. Consequently, the Save button becomes available in both the Open Workbook in Design and View Modes.

For more information on how to use the *Open Workbook in View Mode* view, refer to *Using the Open Workbook in View Mode*.

NOTE

The Back  **button allows going back to the root folder. It is only available on the toolbar section of the Open Workbook in Design Mode and Open Workbook in View Mode if `startURL` is available in the `workbook.json` file located in `<appdata>/JavaScriptConfiguration/`.**

```
{
  "allowOrigin" : "",
  "baseUrl" : "..",
  "forceClientSelectionHandling" : true,
  "startUrl" : "../",
  "subscriptionCompression" : true,
  "webGlEnabled" : true,
  "dataLoadTransport" : "WEBSOCKET",
  "pdfMultiplePagesEnabled" : true,
  "automaticReconnectOnServerDisconnect" : true,
  "localization" : {
    "defaultLocale" : "en-US"
  }
}
```

However, for the Back button to use the browser history to navigate back despite `startUrl` being set in the file, add `useBrowserHistoryToNavigateBack` and set to true.

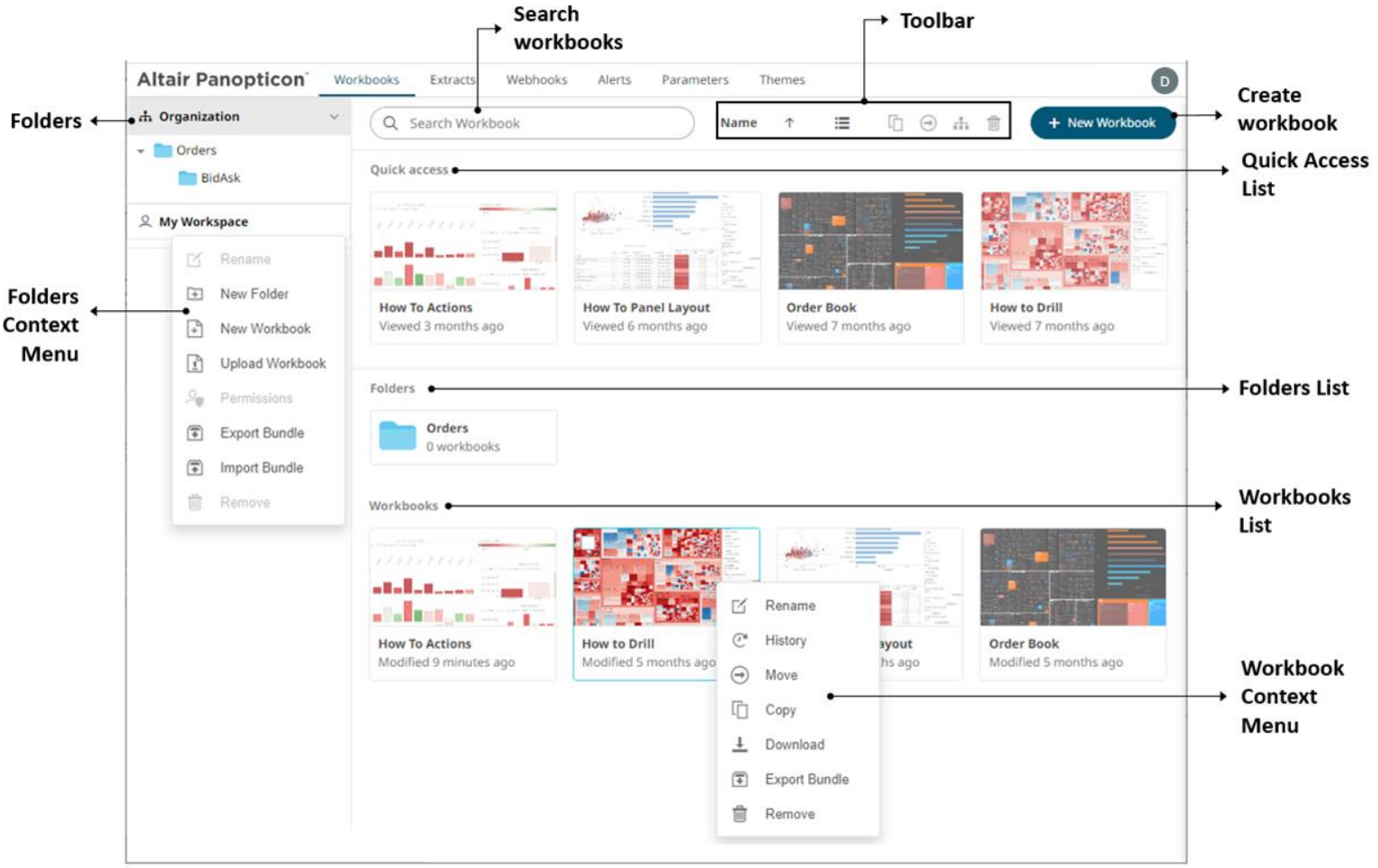
```
{
  "allowOrigin" : "",
  "baseUrl" : "..",
  "forceClientSelectionHandling" : true,
  "startUrl" : "../",
  "useBrowserHistoryToNavigateBack" : true,
  "subscriptionCompression" : true,
  "webGlEnabled" : true,
  "dataLoadTransport" : "WEBSOCKET",
  "pdfMultiplePagesEnabled" : true,
  "automaticReconnectOnServerDisconnect" : true,
  "localization" : {
    "defaultLocale" : "en-US"

  }
}
```

After updating the `workbook.json` file, restart the Panopticon application.

[3] WORKBOOKS AND FOLDERS SUMMARY LAYOUT

After logging on to Panopticon Real Time as a user with a Designer role, the *Workbooks and Folders Summary* layout is displayed.

This is a sample view with a personal folder (i.e., **My Workspace**) and four workbooks.



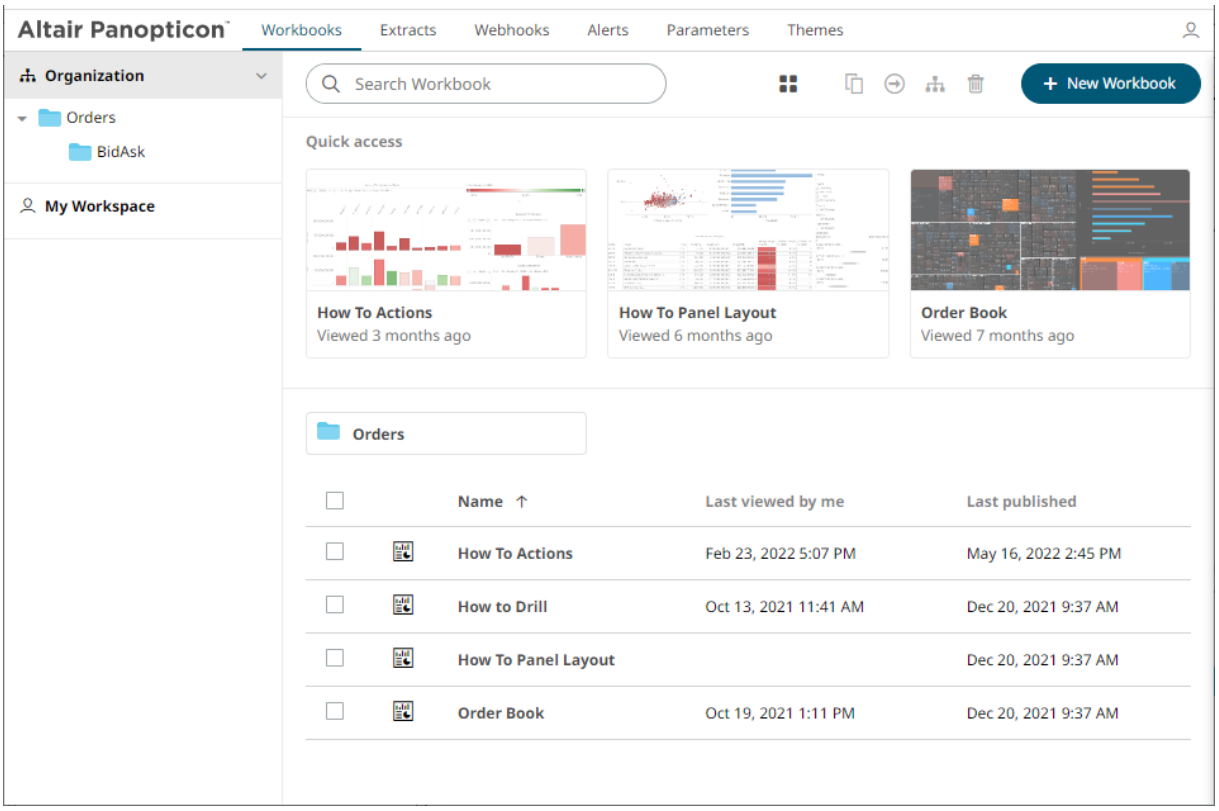
Property	Description
Folders	List of folders where workbooks can be saved or published.
Folder Context Menu	Allows creating, renaming, removing, exporting or importing bundles, and assigning permissions of folders. Also, creating and uploading workbooks.
Search Workbooks	Entering text will filter the returned workbooks.
Toolbar	Allows sorting, copying, moving, merging, and removing of workbooks. Also, to display the workbooks list either on *List View* or *Grid View*.
Create Workbook	Allows creating a new workbook.

Quick Access List	List of recently opened workbooks.
Folders List	Available folders on *List View*.
Workbooks List	Available workbooks on *List View*.
Workbook Context Menu	Allows renaming, viewing history and republishing, moving, copying, downloading, exporting bundles, and removing workbooks.

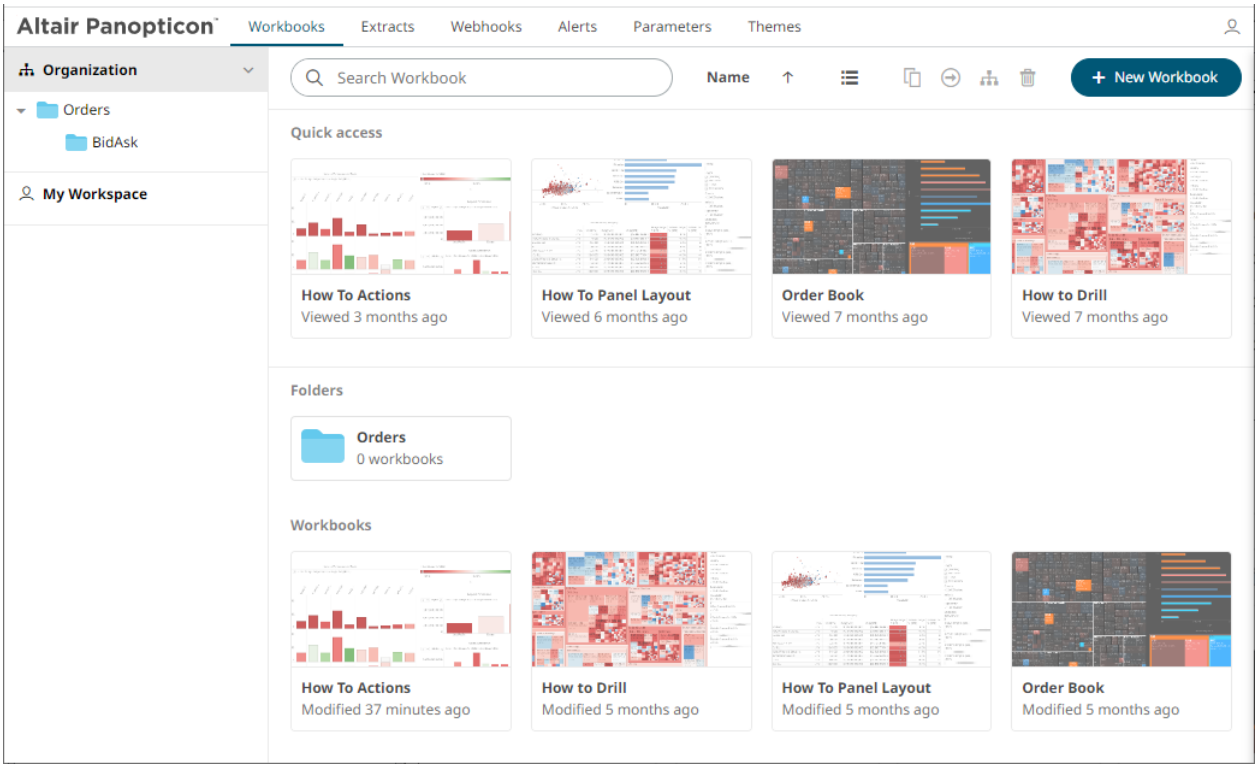
FOLDERS AND WORKBOOKS DISPLAY VIEW

Workbooks can be displayed either on a *List* or *Grid View*.

On the *Toolbar*, click **List View** , the workbooks are displayed in a standard listing.



Or click **Grid View** . The folders and workbooks are displayed as thumbnails.



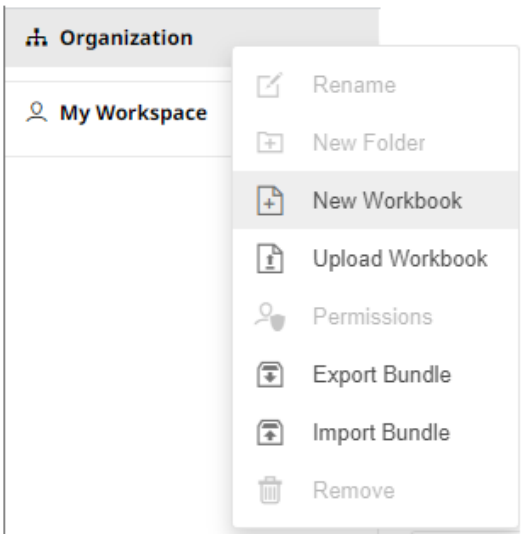
On either display view style, clicking on a workbook title or thumbnail displays the workbook on the Open Workbook in View Mode.

CREATING A WORKBOOK

A user with a Designer role has the ability to create new workbooks and publish them into folders to which the user has permission.

Steps:

1. Create a workbook by doing one of the following:
   - Click  on the *Welcome* or *Workbooks* page.
   - Right-click on a folder or sub-folder then select **New Workbook** in the context menu on the *Workbooks* page.



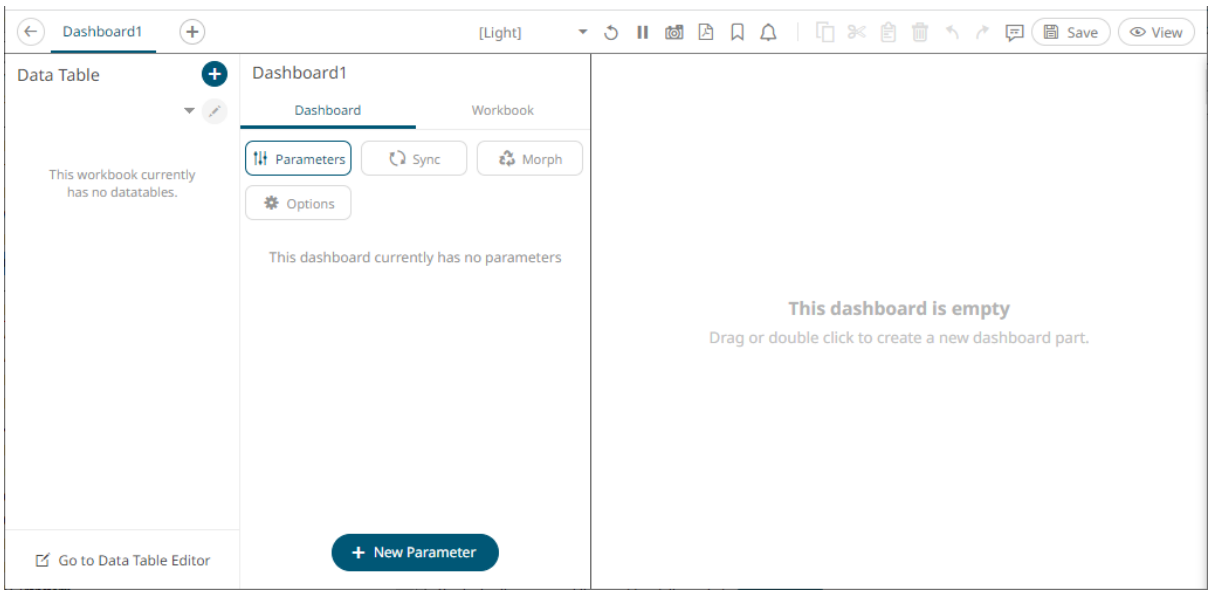
The *New Workbook* dialog displays.



2. Enter the name of the workbook then click 

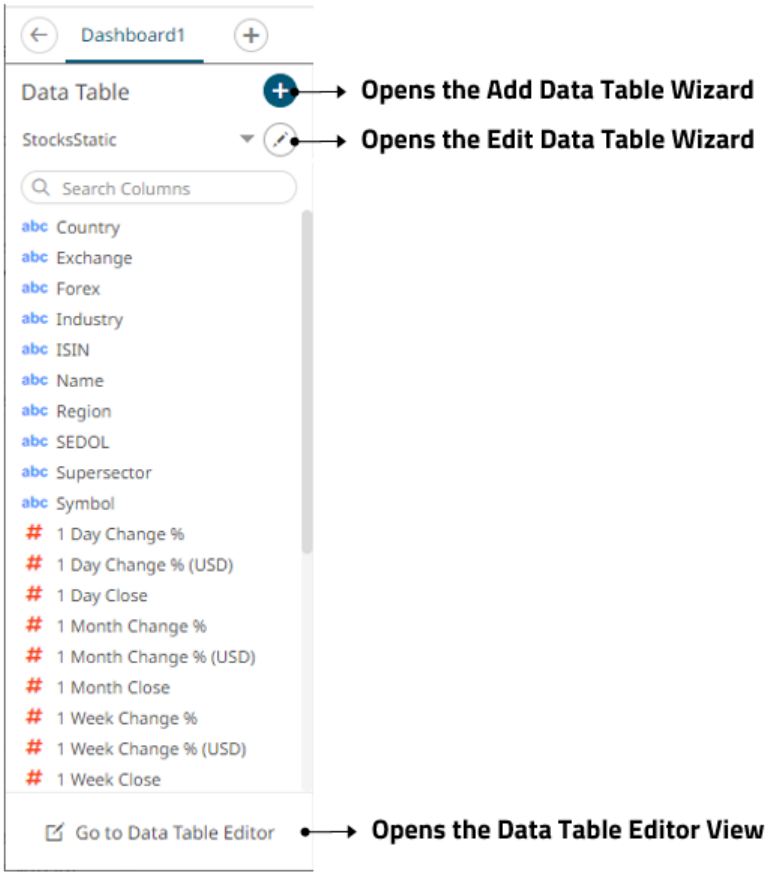
.

The new workbook with a dashboard page (named **Dashboard1**) is displayed on the *Open Workbook in Design Mode*.



The dashboard name by default is editable. You can enter a descriptive dashboard name.

To proceed in creating a workbook, data tables must be added first. On the *Data Table* panel, there are three options to add or edit data tables.



See Adding and Managing Data Tables for more information.

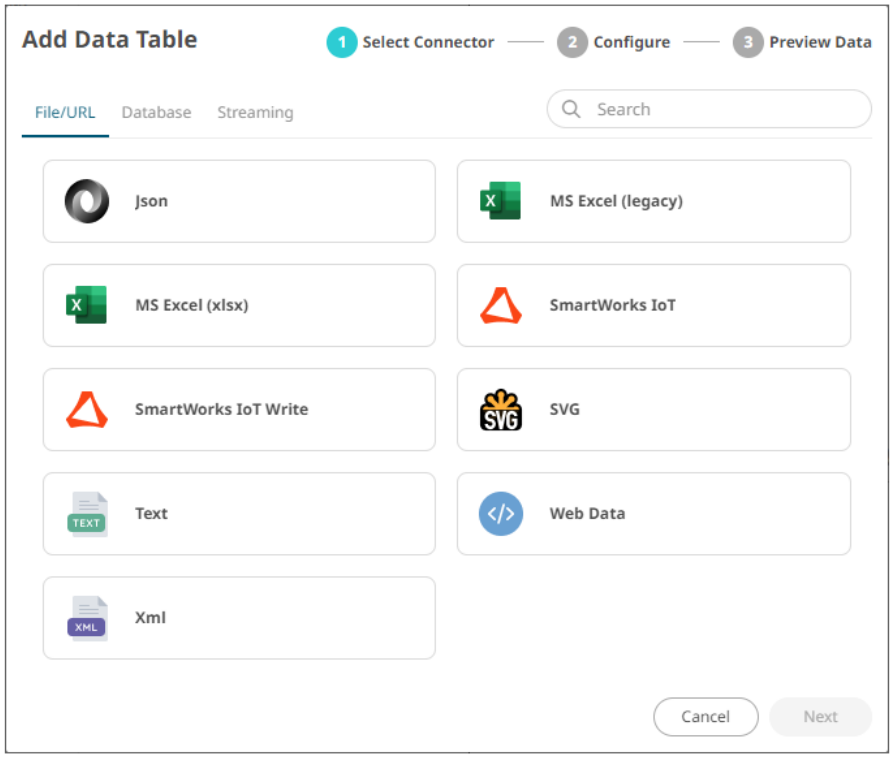
[4] ADDING AND MANAGING DATA TABLES

You must select the data table you want to use in a Panopticon workbook. The data table definition can be unique to a single workbook. You can also save the data table definition locally for other users or publish the data table template.

You can add and manipulate data tables by doing one of the following on the *Data Table* panel:

- Click **Add Data Table** 

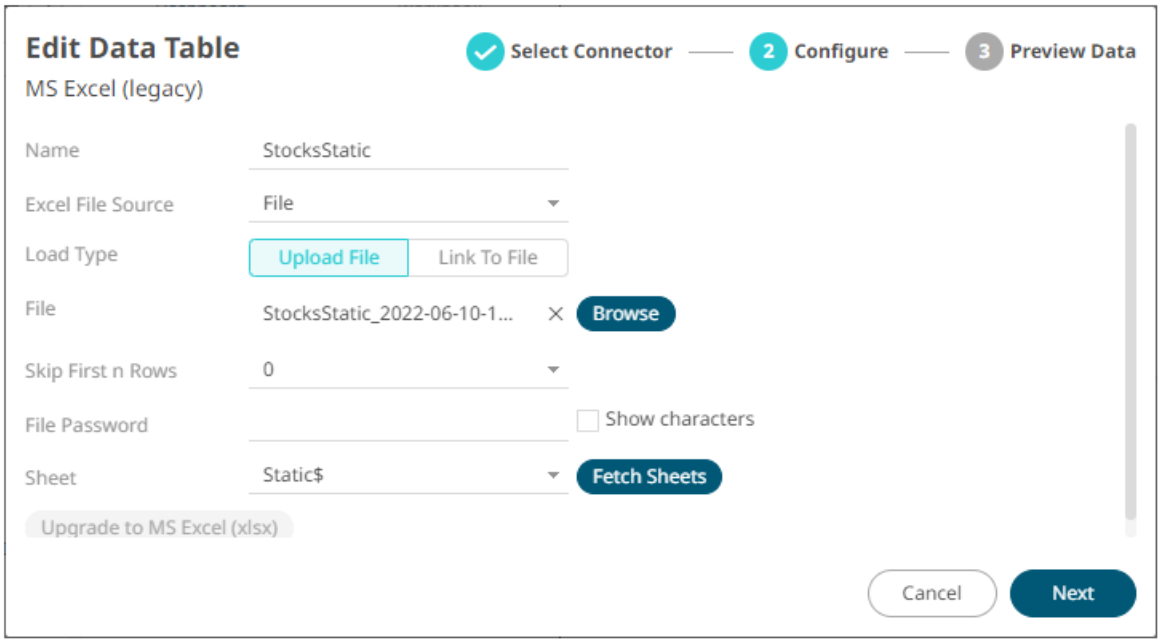
  The *Add Data Table Wizard* displays.



  See Using the Add Data Table Wizard for more information.

- Select a data table in the drop-down list and click **Edit Data Table** 

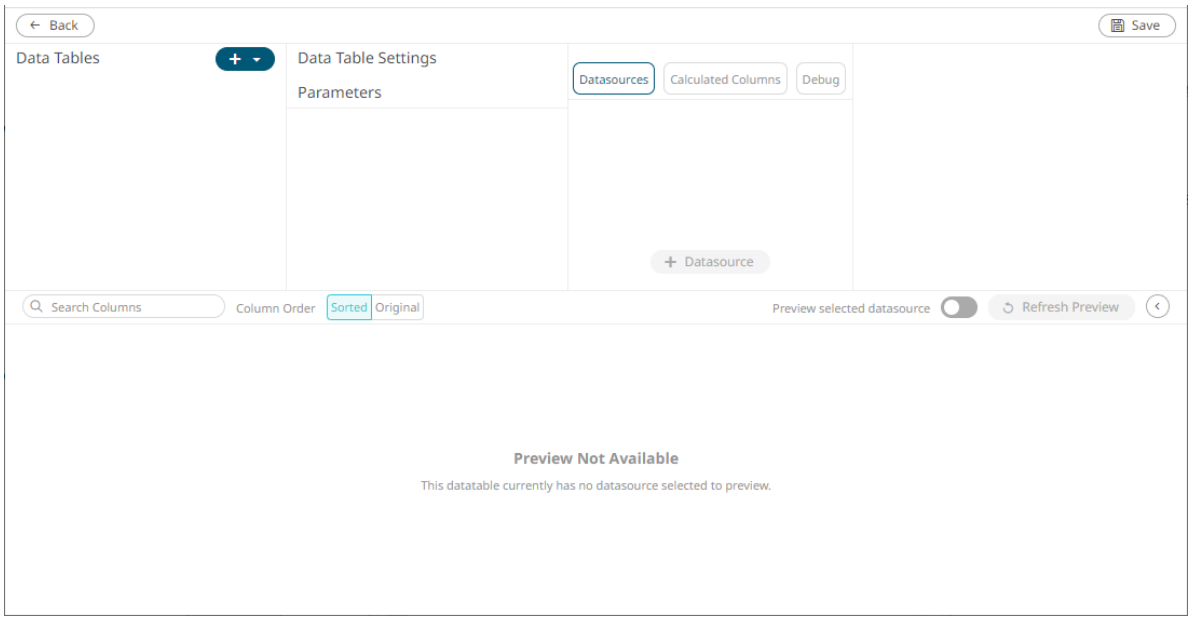
  The *Edit Data Table Wizard* displays.



The **Edit Data Table** icon is disabled if:

- the selected data table is too complex to allow editing in the wizard. In this instance, use the Data Table Editor layout instead.
- a data table has not yet been added.

❑ Click **Go to Data Table Editor** to display the *Data Table Editor* layout



See Using the Data Table Editor Layout for more information.

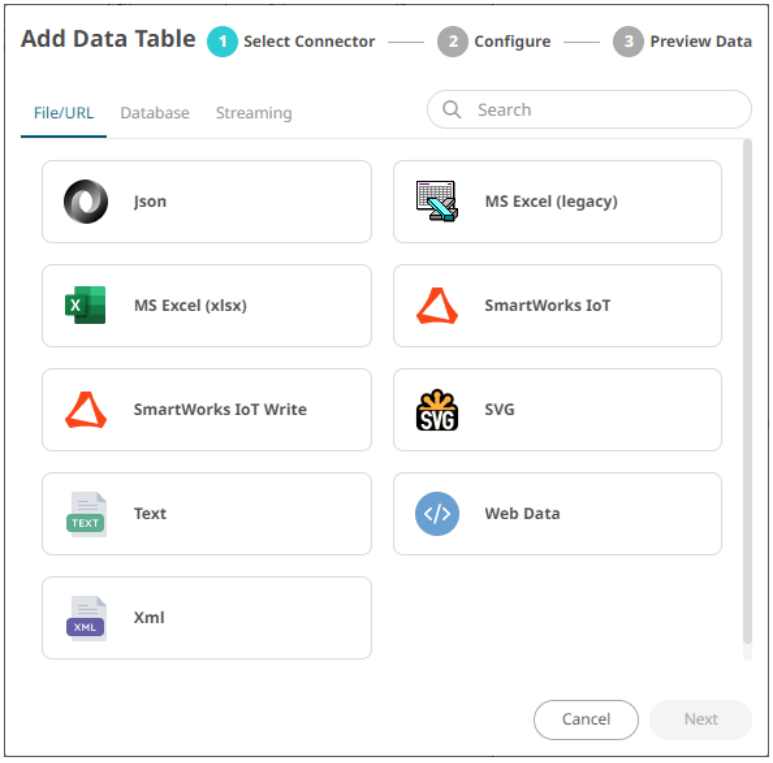
USING THE ADD DATA TABLE WIZARD

The *Add Data Table Wizard* consists of three steps:

1. **Select Connector**.

   Click a connector group tab.

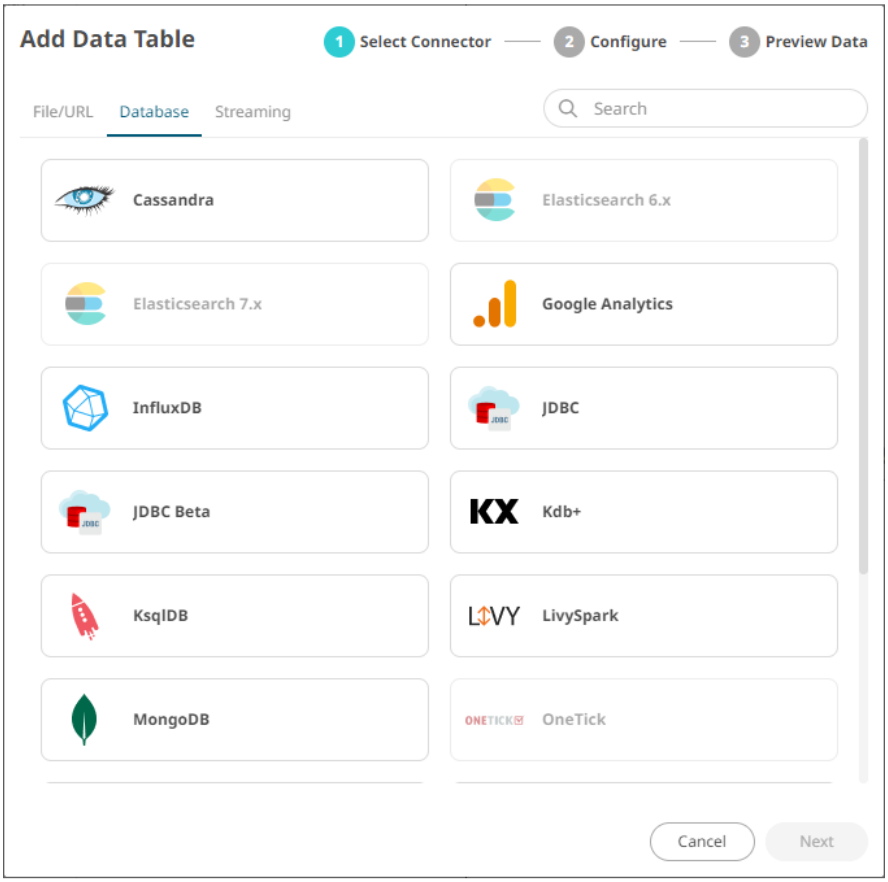
   - **File/URL**



   Then one of the following connectors:

• JSON	• MS Excel (Legacy)	• MS Excel (xlsx)
• SmartWorks IoT	• SmartWorks IoT Write	• SVG
• Text	• Web Data	• XML

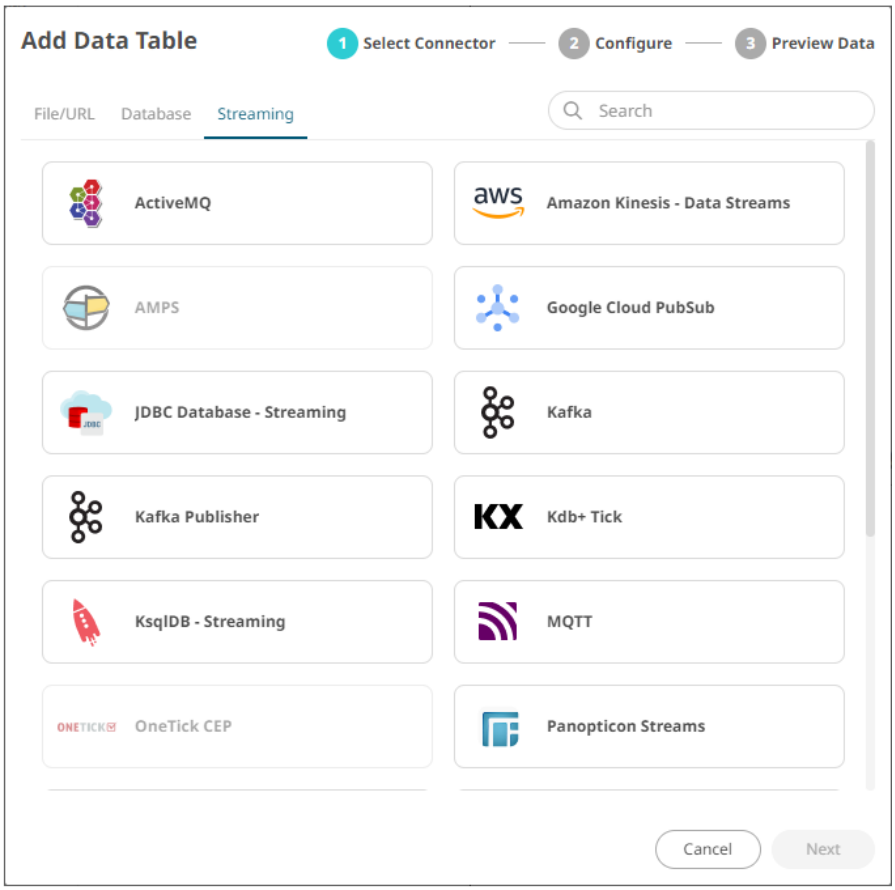
- **Database**



Then one of the following connectors:

• Cassandra	• Elasticsearch 6.x	• Elasticsearch 7.x
• Google Analytics	• InfluxDB	• JDBC
• JDBC Beta	• Kx kdb+	• KsqlDB
• LivySpark	• MongoDB	• OneTick
• OneTick Cloud	• Panopticon Data Extract	• Python
• Rserve	• Shakti Beta	• Splunk

- **Streaming**

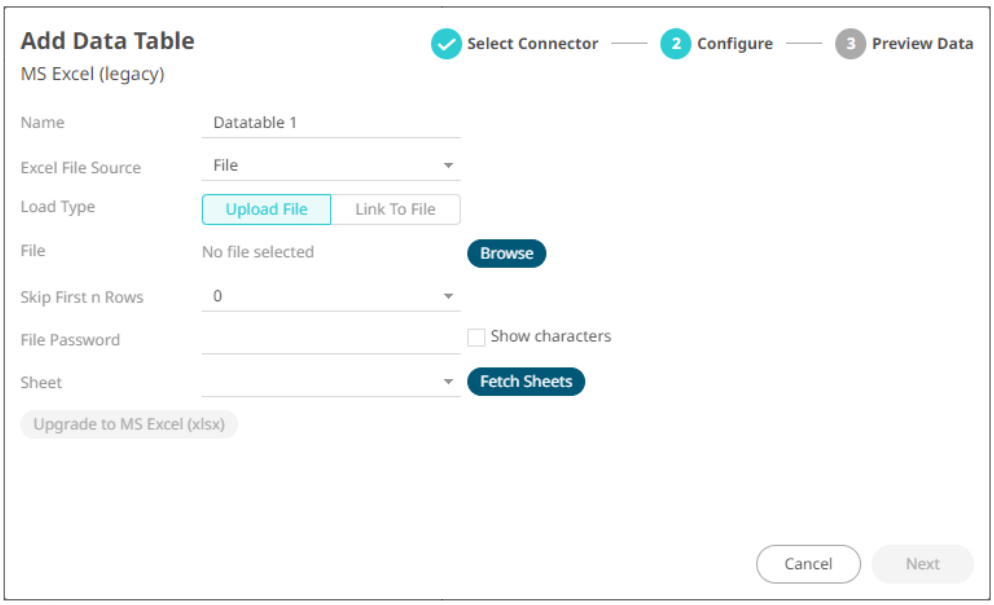


Then one of the following connectors:

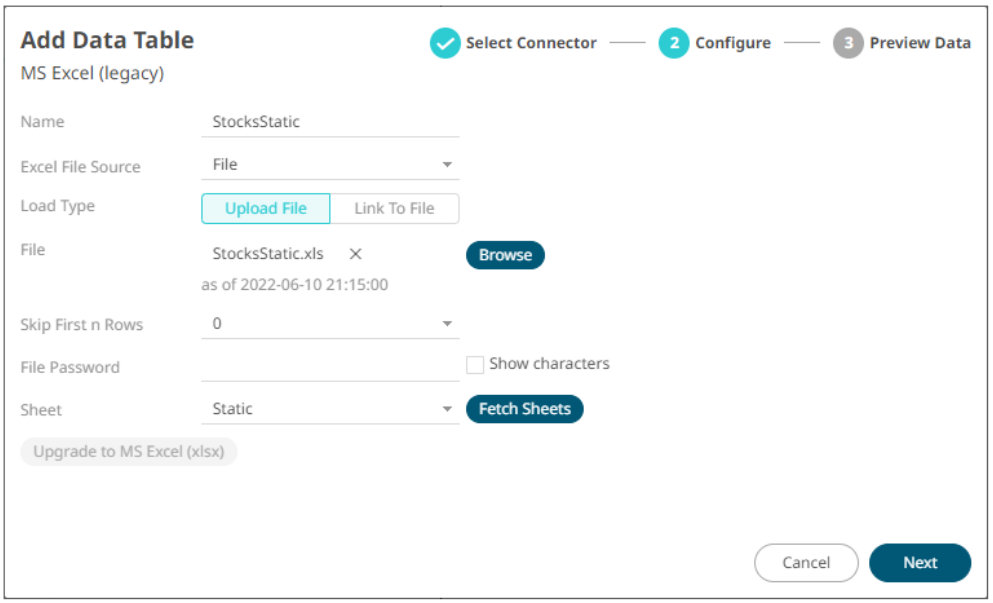
• ActiveMQ	• Amazon Kineses – Data Streams	• AMPS
• Google Cloud Pub/Sub	• JDBC Database - Streaming	• Kafka
• Kafka Publisher	• Kdb+ Tick	• KsqlDB – Streaming
• MQTT	• OneTick CEP	• Panopticon Streams
• RabbitMQ	• Solace	• Stream Simulator
• Stream Simulator - Extract	• StreamBase 7.1	• StreamBase LiveView
• WebSocket		

2. **Configure**.

   Define the settings of the selected connector (e.g., **MS Excel (legacy)**).



When the necessary properties have been defined, the **Next** button is enabled.

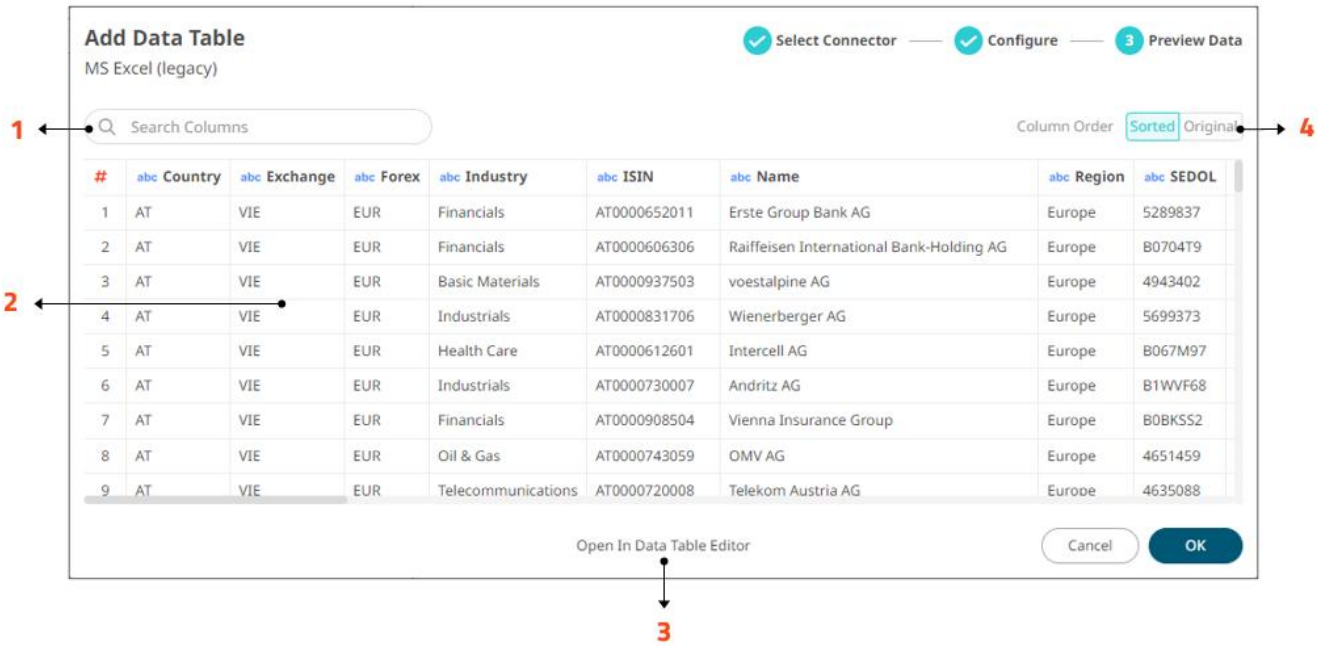


Click 

to move to the next step.

3. **Preview Data**.

Display the preview of the data table you are creating.



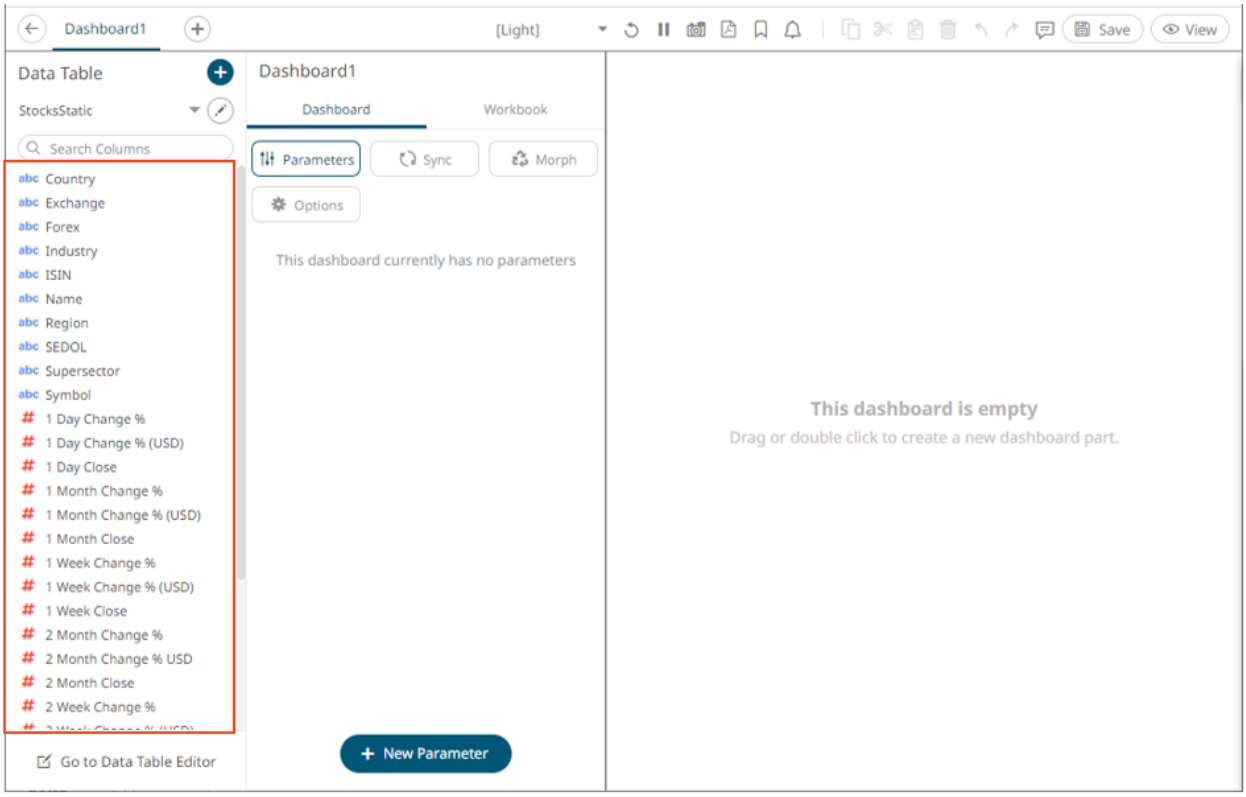
Do one of the following:

Property	Description
1	**Search Columns** Allows searching of columns in the *Data Preview*.
2	**Data Preview** Executes the queries to return and display data.
3	**Open in Data Table Editor** Displays *Data Table Editor* layout where you can further configure the data table.
4	**Group and Sort Columns** Allows grouping and sorting columns.

Click 

to save the changes and close the wizard.

Your data will be displayed in the columns of the *Data Table* panel.



USING THE DATA TABLE EDITOR LAYOUT

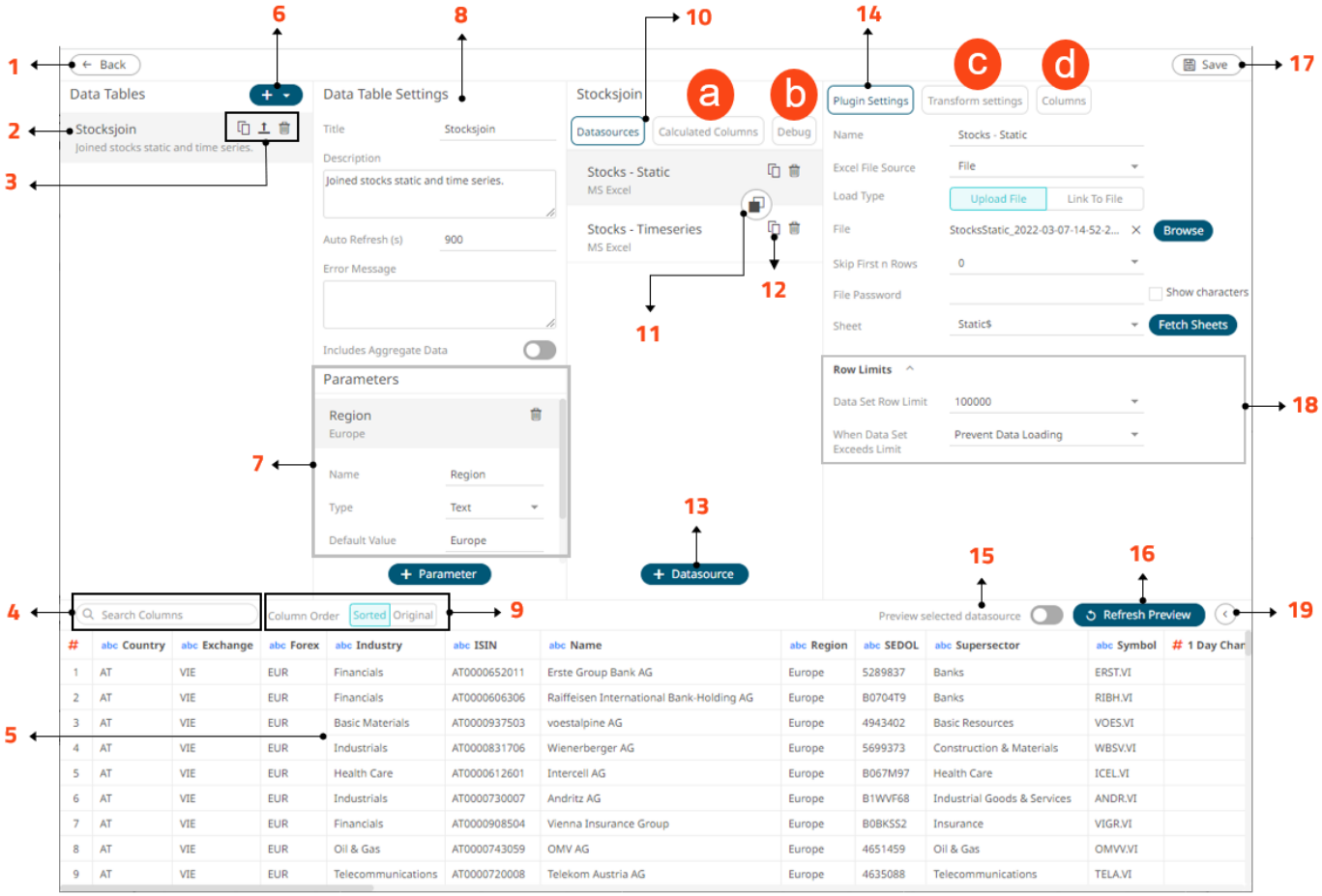
The *Data Table Editor* allows you to quickly connect to any data source and combine data from multiple sources so you can visualize all your data in a single visualization.

Connecting to data environments is easy with pre-built connectors to a wide variety of sources right out of the box.

However, to get the most of these data and produce effective visualizations, they may need to be:

- Integrated with other data sources or files to produce a data with more sense
- Transformed for normalization and aggregation

The *Data Table Editor* layout is displayed as below, where in this example, there are joined data sources:

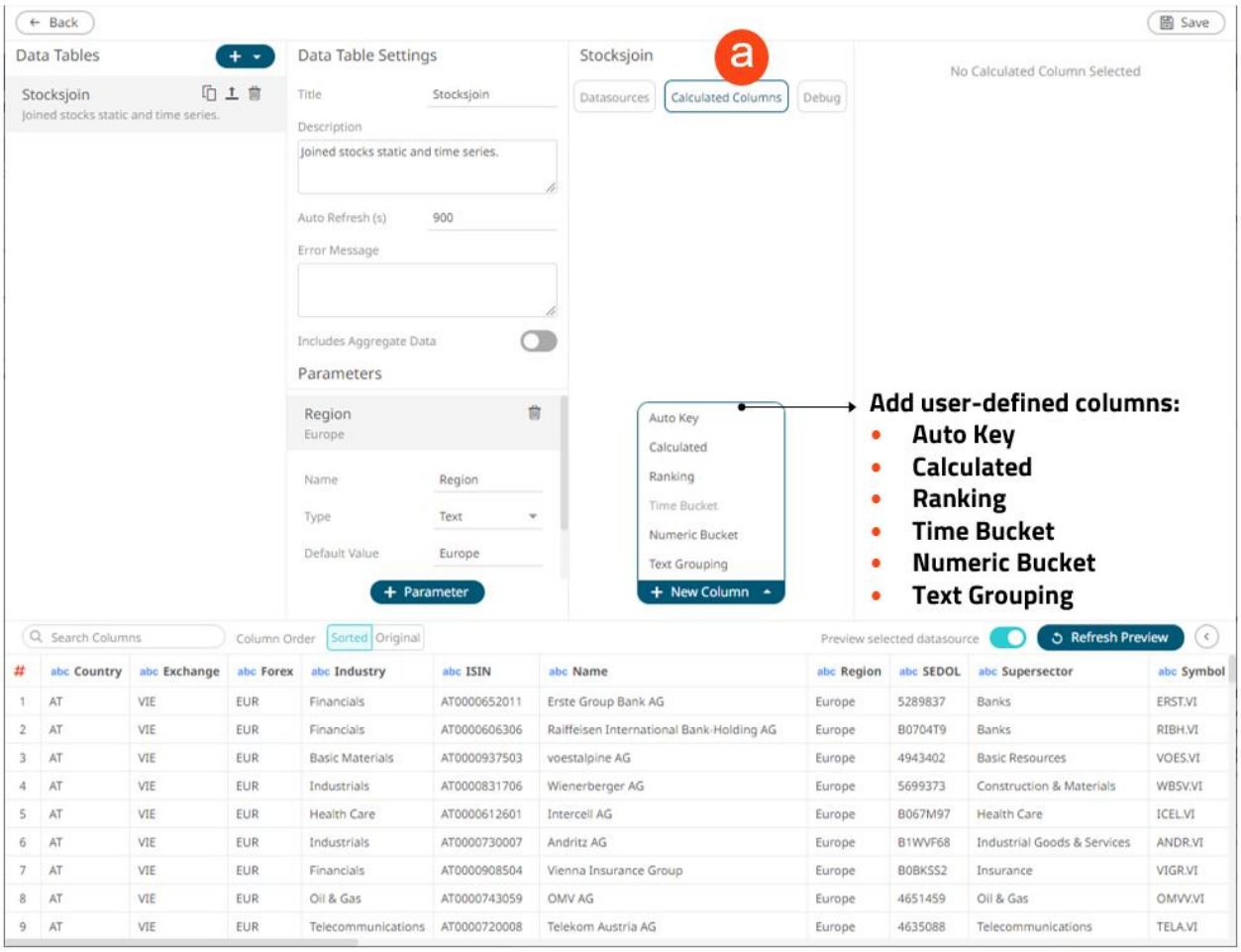


#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol	1 Day Char
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI	
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI	
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI	
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI	
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI	
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI	
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI	
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI	
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI	

Property	Description
1	**Back** Exit the *Data Table Editor* view and go to the *Open Workbook in Design Mode* view.
2	**Data Table** List of data tables. Can be rearranged.
3	**Toolbar** After the data is successfully retrieved, three options on the *Data Table Editor* layout allows: • Making a duplicate of the data table • Publishing the data table template • Deleting the data table
4	**Search Columns** Allows searching of columns on the *Data Sources Preview*.
5	**Data Preview** Executes the queries to return and display preview of the data table you are creating.
6	**Add Data Table or Select Data Template** Add data table or select a data table template.

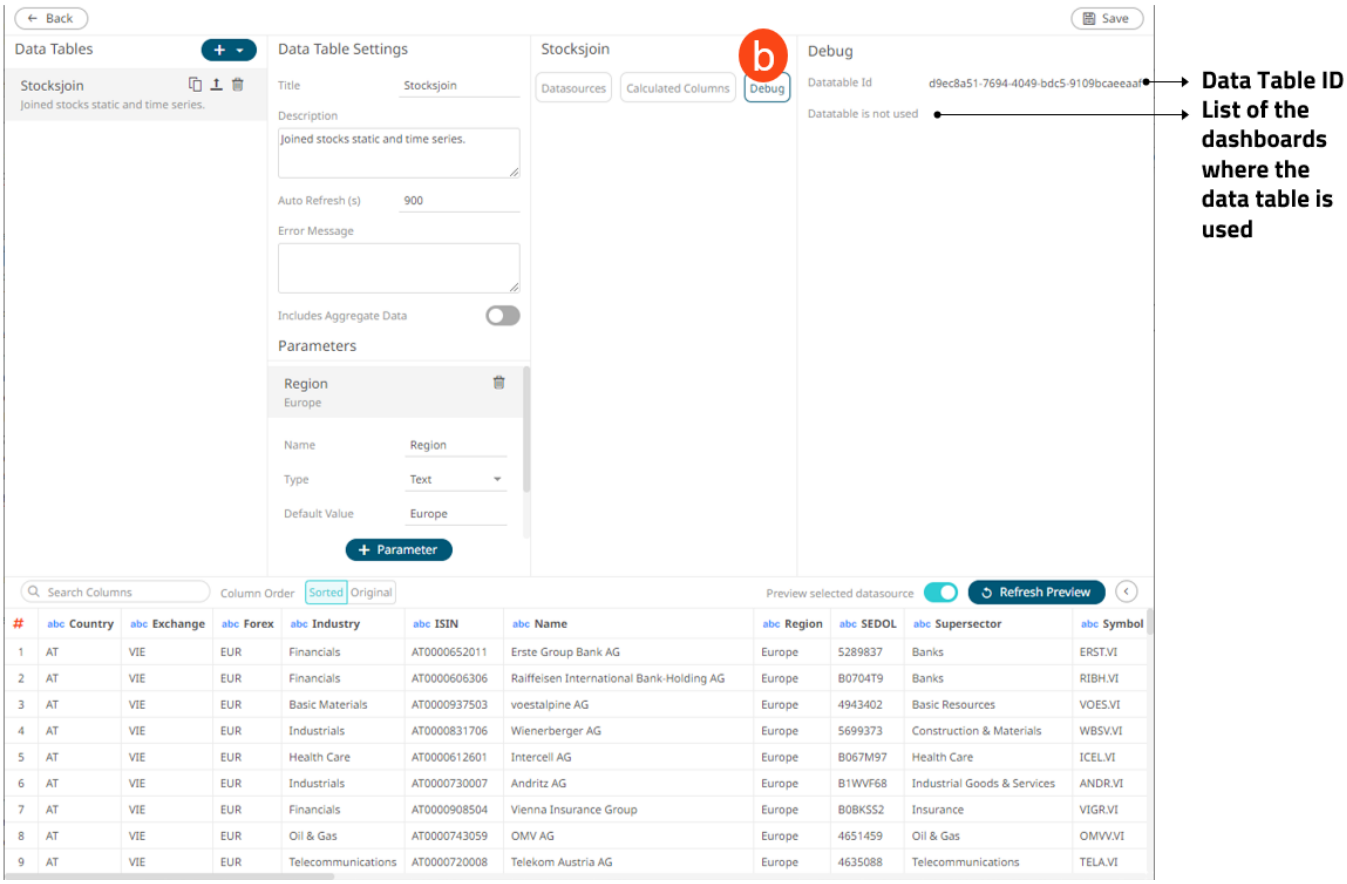
Property	Description
7	**Data Table Parameters** Add or manage data table parameters.
8	**Data Table Settings** Definition of the name of the selected data table, description, and the auto refresh period (in seconds). Also allows the retrieval of external aggregates and set custom message to be displayed upon unsuccessful data connection.
9	**Group and Sort Columns** When the *Column Order* is set to **Sorted**, the columns are grouped by type (Text, Date/Time, then Numeric) and sorted alphabetically.
10	**Data Sources** One or more data sources that can be connected to directly, with data retrieved on the fly as it is required. Can be rearranged.
11	**Join/Union All Definition** Allows definition of a join or union all of multiple data sources.
12	**Duplicate Data Source** Allows creating a duplicate data source
13	**Add Data Source** Allows adding data sources from the available data connectors.
14	**Data Source Settings** Displays the data source settings and allows for limiting the amount of data to be returned.
15	**Preview Selected Data Source** Preview the selected data source on the *Data Preview* panel.
16	**Refresh Preview** Refresh the data sources preview.
17	**Save Data Table** Save the data table definition and go to the *Open Workbook in Design Mode* view.
18	**Row Limits Settings** Allows setting of the row limit of data sources.
19	**Collapse Data Preview** Collapse the *Data Preview* pane. Click  to expand the *Data Preview* pane.

Clicking **Calculated Columns**  displays the *New Column* list box.



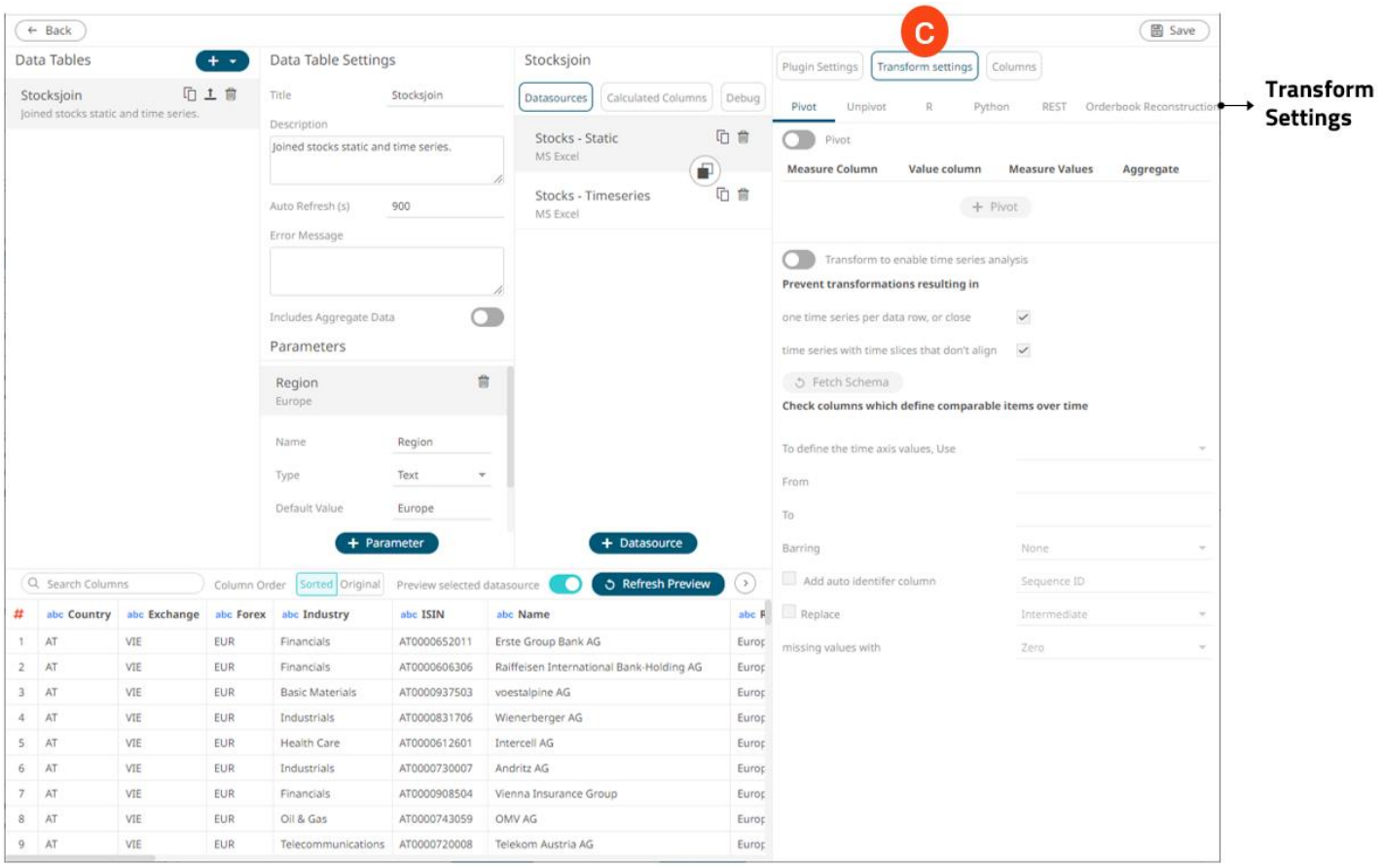
Property	Description
Add Auto Key	Allow creation of an auto key for the data schema on the *Data Sources Preview*.
Add New Calculated Column	Allows creation of a calculated column from the existing columns in the data table.
Add New Ranking Column	Allows creation of a new numeric column based on the ranking of columns in your data.
Add New Time Bucket Column	Allows creation of time buckets (categorical time analysis).
Add New Numeric Bucket Column	Allows creation of Identity, Sign, Manual, Equal Density, and Equal Distance columns.
Add New Text Grouping	Allows creation of a grouping based on source text column.

Clicking **Debug** (b) displays the *Debug* pane.



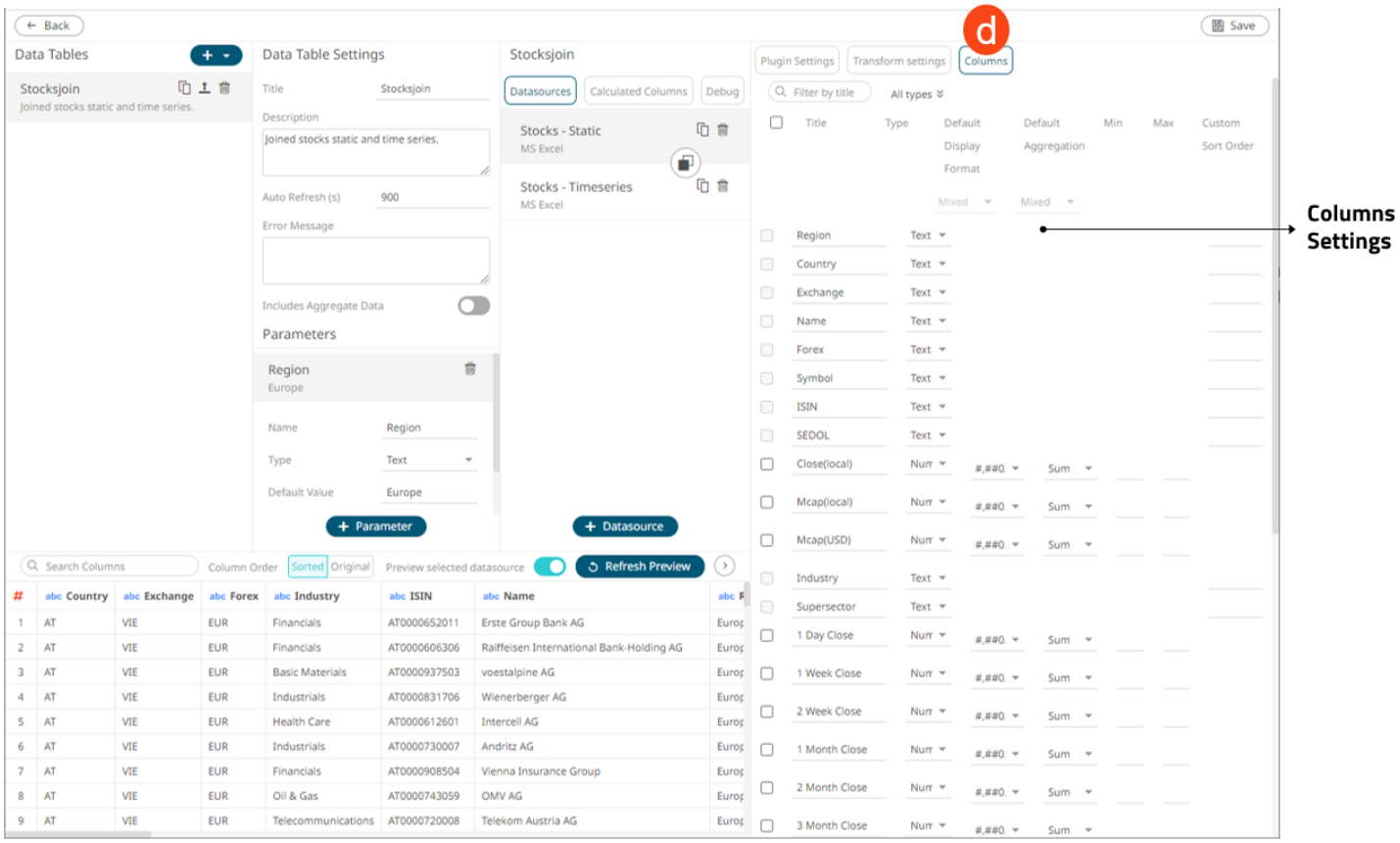
Property	Description
Datatable Id	Id of the data table. Can be used for parsing of server logs.
Datatable is used on dashboard(s)	List of dashboards where the data table is used. If a data table is not used, it can be deleted.

Clicking **Transform Settings** C displays the *Transform Settings* pane.



Property	Description
Transform Settings	Allows you to perform the following: • pivoting or unpivoting retrieved data • transforming data to enable time series analysis including interpolation • running an R or Python script for data transformation • lists of orders to be reconstructed into an Order Book and conflated for output display

Clicking **Columns** (d) displays the *Columns Settings* pane.



Property	Description
Columns Settings	Allows you to perform the following: • view the column data type • rename the column names • select the numeric or Date/Time format • select the numeric default aggregation • define the Min and Max range of numeric columns • define custom sort order

Panopticon Data Types

Panopticon Real Time has three data types:

Data Type	Description
Text	Stored as String.
Time	Stored as java.util.Date + long (64-bit int) picoseconds.
Number	Stored as Double (64-bit float), assuring value precision in at least 15 decimal digits. For integer values loaded from a data source, full precision covers the span from −253 to 253 (−9,007,199,254,740,992 to 9,007,199,254,740,992).

Date/Time Key Elements

The key elements of the Date/Time format include:

Component	Format
Year	yyyy
Month	MM
Month as an abbreviation	MMM
Day	dd
Hour (24-hour clock)	HH
Minute	mm
Second	ss
Hour (12-hour clock; a.m./p.m.)	tt
Millisecond	SSS
Microsecond	SSSSSS
Nanosecond	SSSSSSSSS
Space/separator (required if time is specified)	'T'
Zulu (Greenwich Mean Time)	'Z'
Time zone (ISO 8601 time zone)	X
UNIX Epoch time	POSIX
Milliseconds since UNIX Epoch time	POSIXMILLIS
Seconds since midnight	Seconds
Milliseconds since midnight	Millis
Microseconds since midnight	Micros
Nanoseconds since midnight	Nanos

NOTE

- **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**

  For example: yyyy-MM-dd HH:mm:ss.SSSSSS

- **The "Seconds", "Millis", "Micros", and "Nanos" formats are used for parsing of the data in the data connectors and not for the display of the Date/Time columns.**

Numeric Field Formats

The numeric field formats set in the *Data Table Settings* pane are used in the *Format* field for numbers that will be displayed in the dashboards, either in tables, filters, or in visualization pop-up details.

Useful formats include:

Format	Description
0.0 %	Produces a percentage with a single decimal place. The percentage will be 100 times the original value.
0.0 '%'	Displays a number and adds a percentage suffix. In this case the number will not be multiplied.
#,##0	Produces a number without any decimal places plus the thousand separator
#,##0.00	Produces a number with two decimal places plus the thousand separator.
#,##0.0000	Produces a number with four decimal places plus the thousand separator.
#,##0.##	Produces a number with two decimal places if a decimal exists. Otherwise no decimal will be displayed.
#,##0;(#,##0)	Produces a number without any decimal places, and with a thousand separator, where negative numbers are displayed in parenthesis
n	Produces numbers with two decimal places (for example, #,##0.00).
P	Produces percentages with two decimal places (for example, 0.00 %).
#,##0; #,##0	Similar to #,##0, except that there will be no distinction between negative and positive numbers. This number format can be used to display Ranking on a Line Graph producing a Bump Chart.
0%	Produces a percentage without any decimal place. The percentage will be 100 times the original value.
0.00%	Produces a percentage with two decimal places. The percentage will be 100 times the original value.
0.00%;(0.00%)	Produces a percentage with two decimal places where negative numbers are displayed in parenthesis.
$#,##0	Produces a number without any decimal places, and with a thousand separator with a USD prefix.

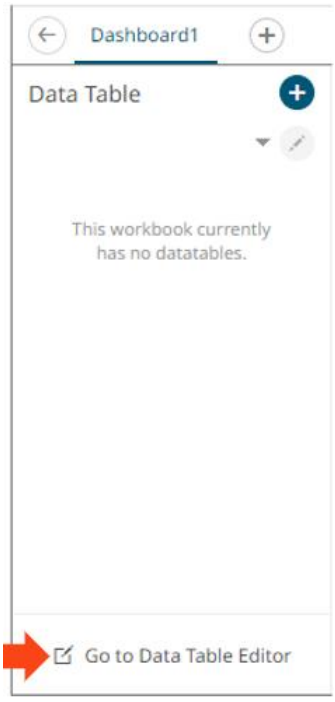
NOTE **You can also specify a customized format.**

ADDING A NEW DATA TABLE USING THE DATA TABLE EDITOR

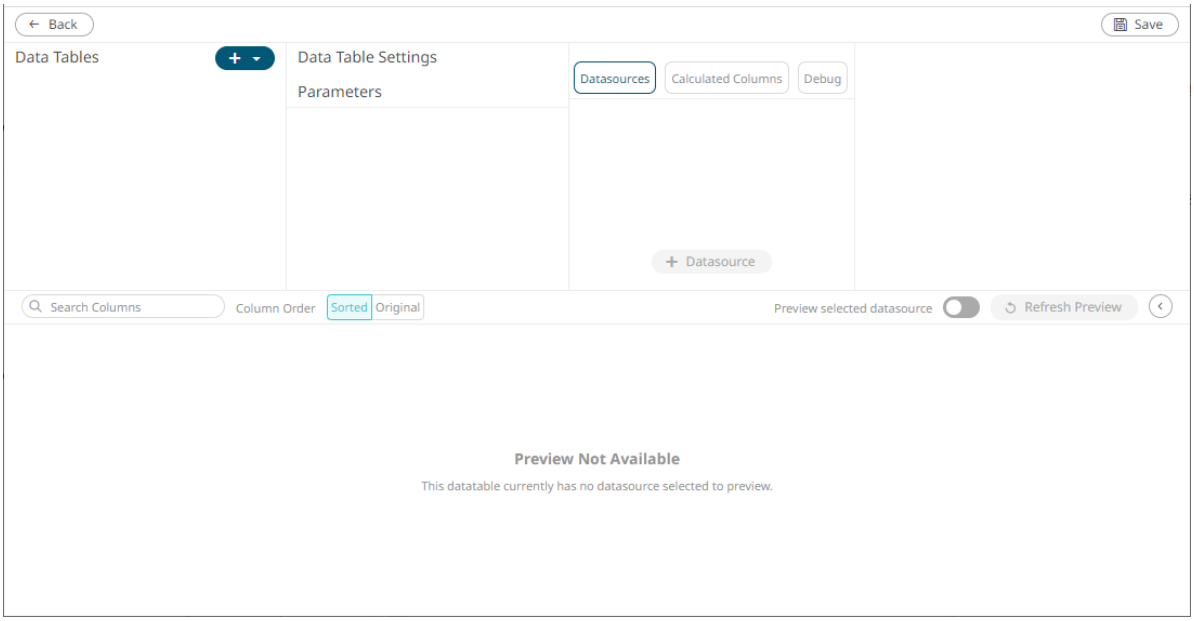
In the *Data Table Editor*, follow the steps below to add data tables.

Steps:

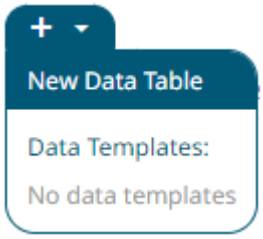
1. On the *Data Table* panel, click Go to Data Table Editor.



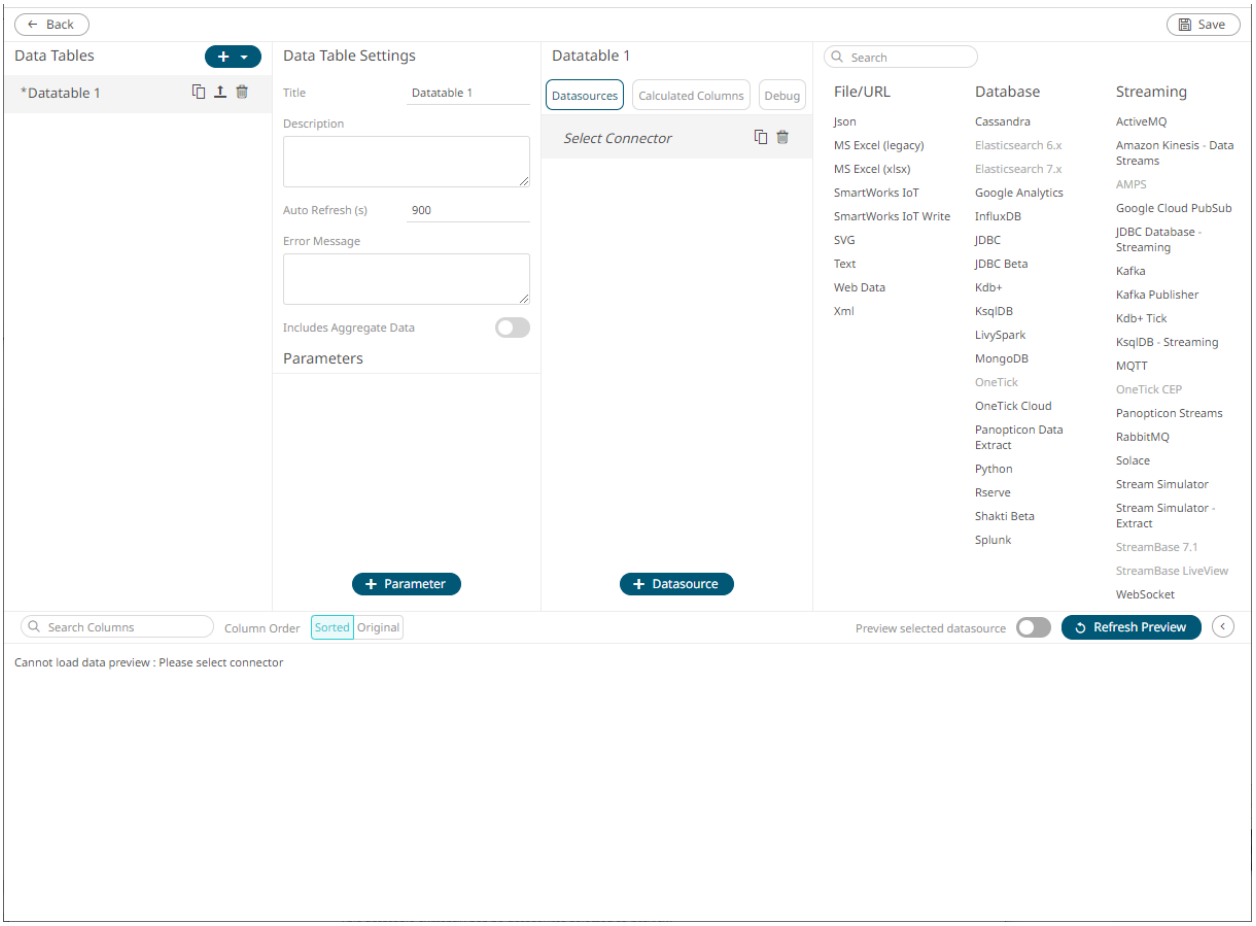
The *Data Table Editor* view displays.



2. On the *Data Tables* panel, click  and select **New Data Table:**

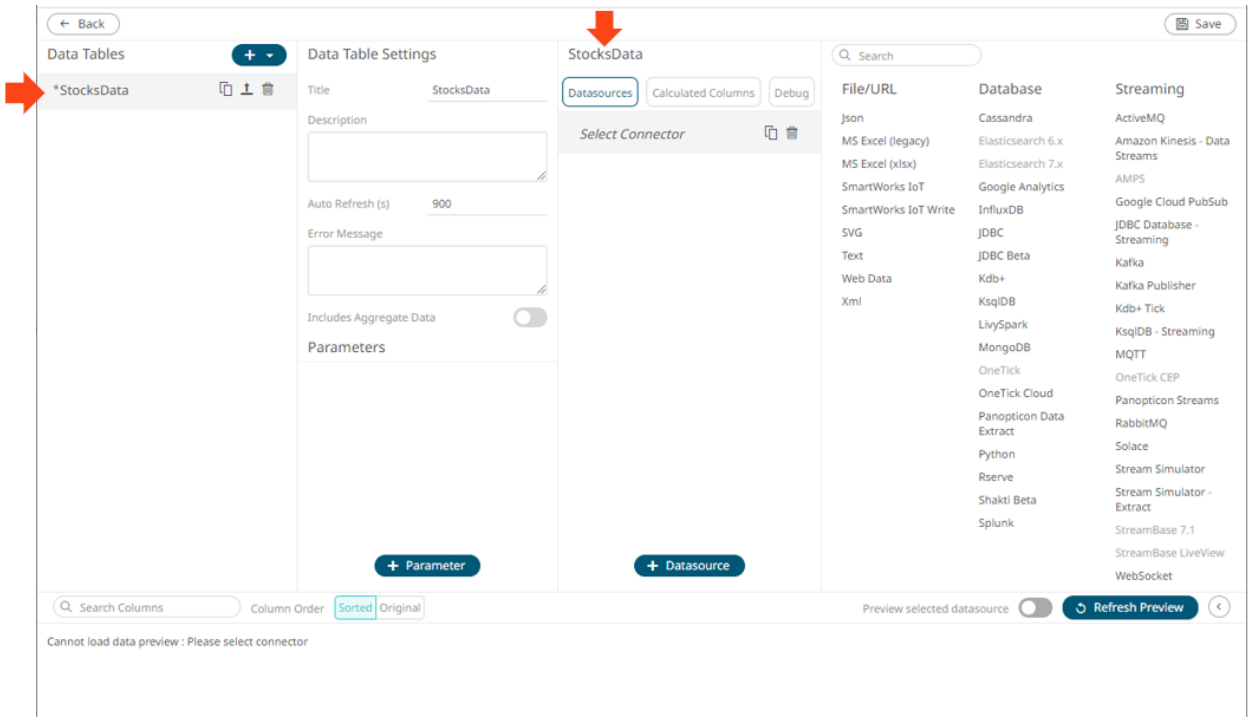


A new data table instance is created (**Datatable 1**).



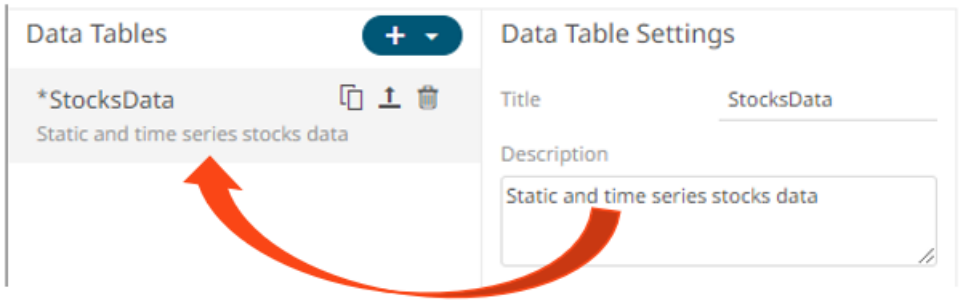
In the *Connector List* pane, some connectors require additional third-party software installation to be enabled. This typically requires adding JAR files to the `Lib` folder of the Tomcat installation and restarting Tomcat. For the supported Elasticsearch connectors, refer to the Elasticsearch Connectors Dependency Installation section. For the other connectors, refer to *Panopticon Real Time Installation and Reference Guide* for more information.

3. On the *Data Table* Settings pane, enter the *Title* of the data table and click ✓. The new name is applied to the data table under the *Data Tables* pane and on the *Data Sources* panel.



4. Enter the *Description* of the data table.

   This is also displayed under the data table instance which can be helpful when selecting among the data tables in the list.



5. You can opt to enter the *Auto Refresh* period.

   This property defines how often the data source is checked for new data, when accessing the source directly. Panopticon will issue new queries at the interval shown in the *Auto Refresh (s)* box and automatically deliver updates to the workbook. The default is **900 seconds** (**15 minutes**). The minimum refresh period depends on the performance of your data repository and the amount of time required executing your data queries.

   If a streaming source is selected, the refresh period is ignored.

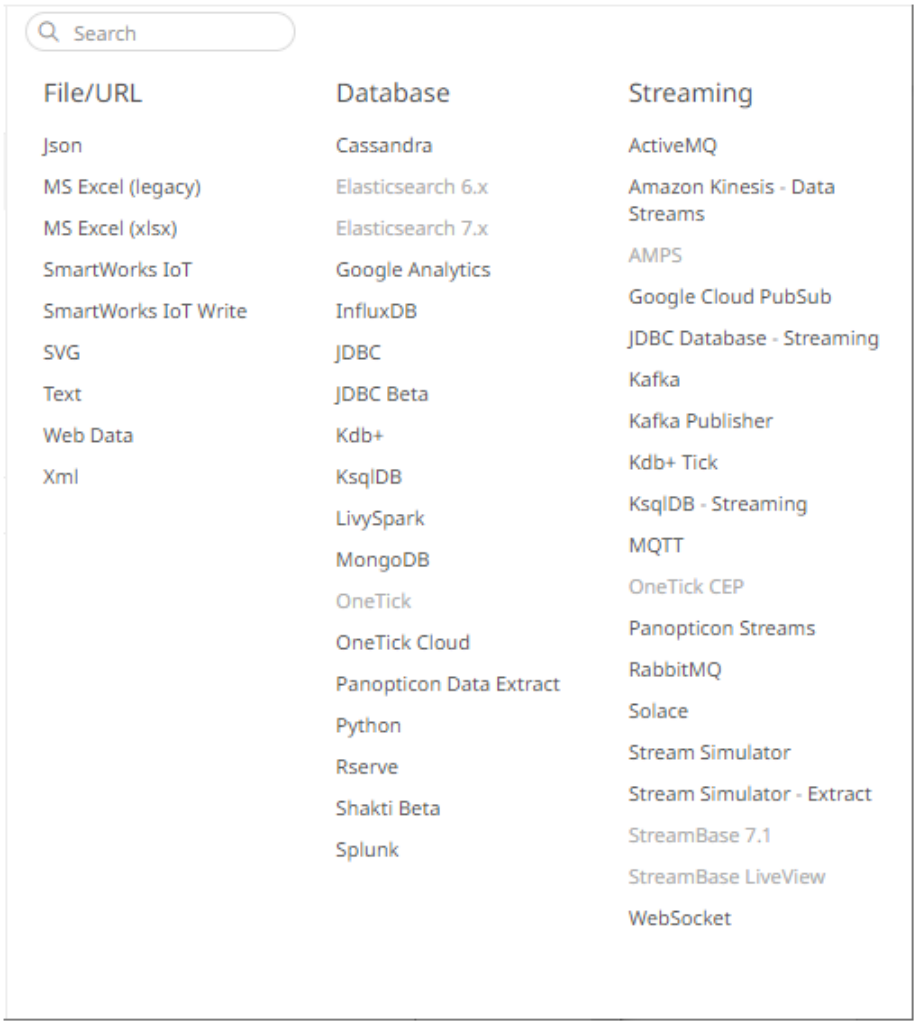
NOTE

- **Setting the *Auto Refresh* field to any value less than or equal to zero will disable the auto refresh for the data table.**
- **The *Auto Refresh* property is a string and can be parameterized.**

6. You can also opt to enter a custom *Error Message* that will be displayed when an error occurs while fetching data.

NOTE **The *Error Message* can be parameterized.**

7. To add a data source, click on a data connector in the *Connectors* list.



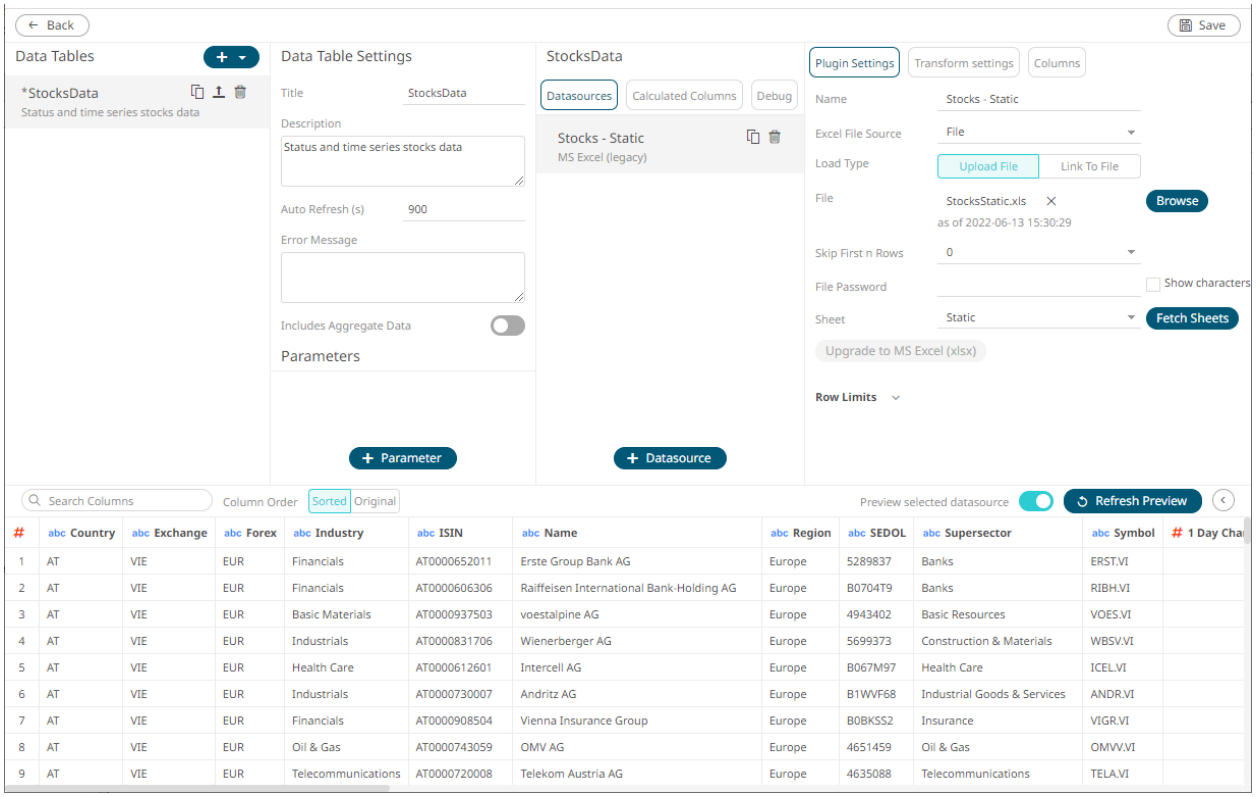
Refer to Data Connectors for more information on the data connector you want to use.

8. Tap the **Preview Selected Data Source** slider to turn it on and display the preview of the selected data source.
9. Then, you can either click:
   - 

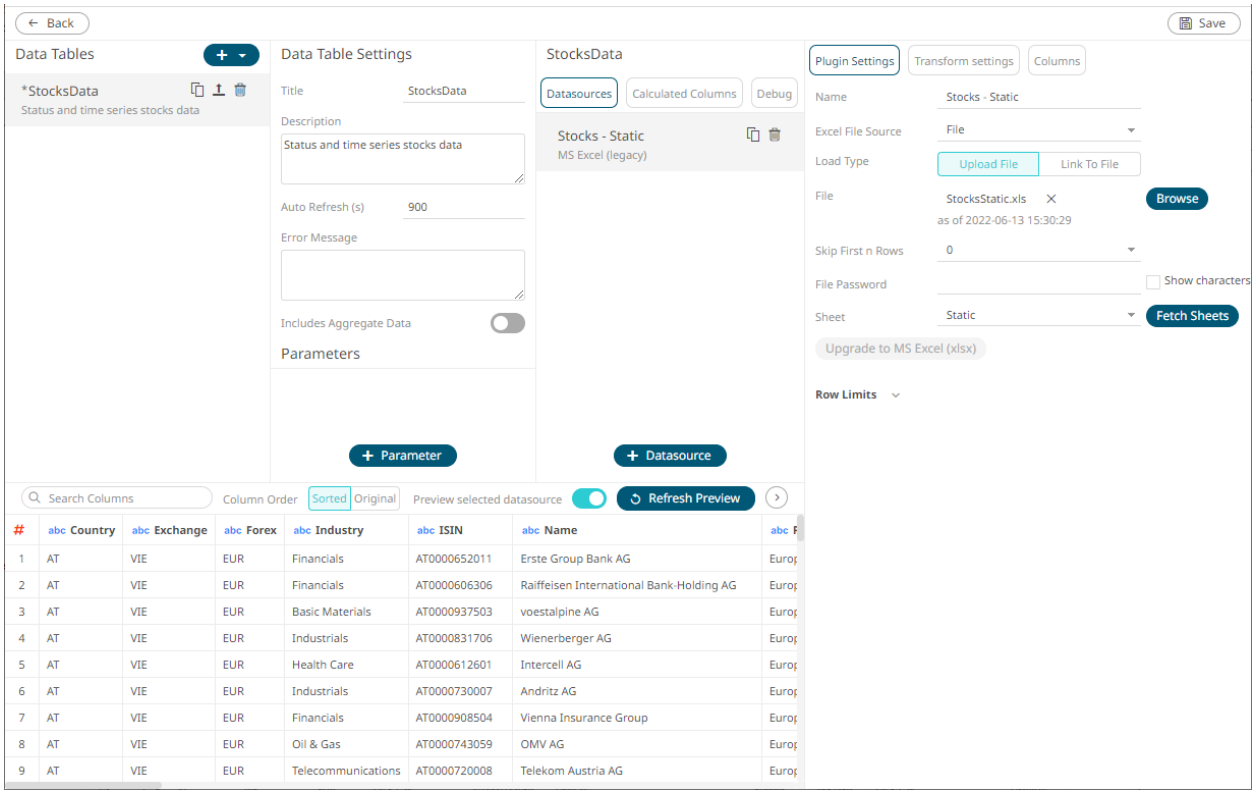
for static connectors
   - 

for streaming connectors

The retrieved query/table/sheet/schema is displayed in the *Data Sources* panel. The system displays the preview data at the bottom of the screen.



Click  to collapse the *Data Preview* pane.

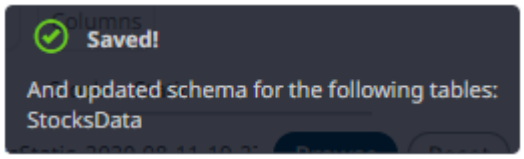


Click  to expand the *Data Preview* pane.

10. After adding data sources, you can also:
    - manage data source properties
    - define transform settings
    - retrieve external aggregates
    - add data table parameters
    - sort columns
    - define a join or union all of the data sources
    - add user defined columns such as:
        - auto key
        - calculated column
        - ranking column
        - time bucketing column
        - numeric bucketing (Identity, Sign, Manual, Equal Density, and Equal Distance)
        - text grouping column
11. Click the **Save** 

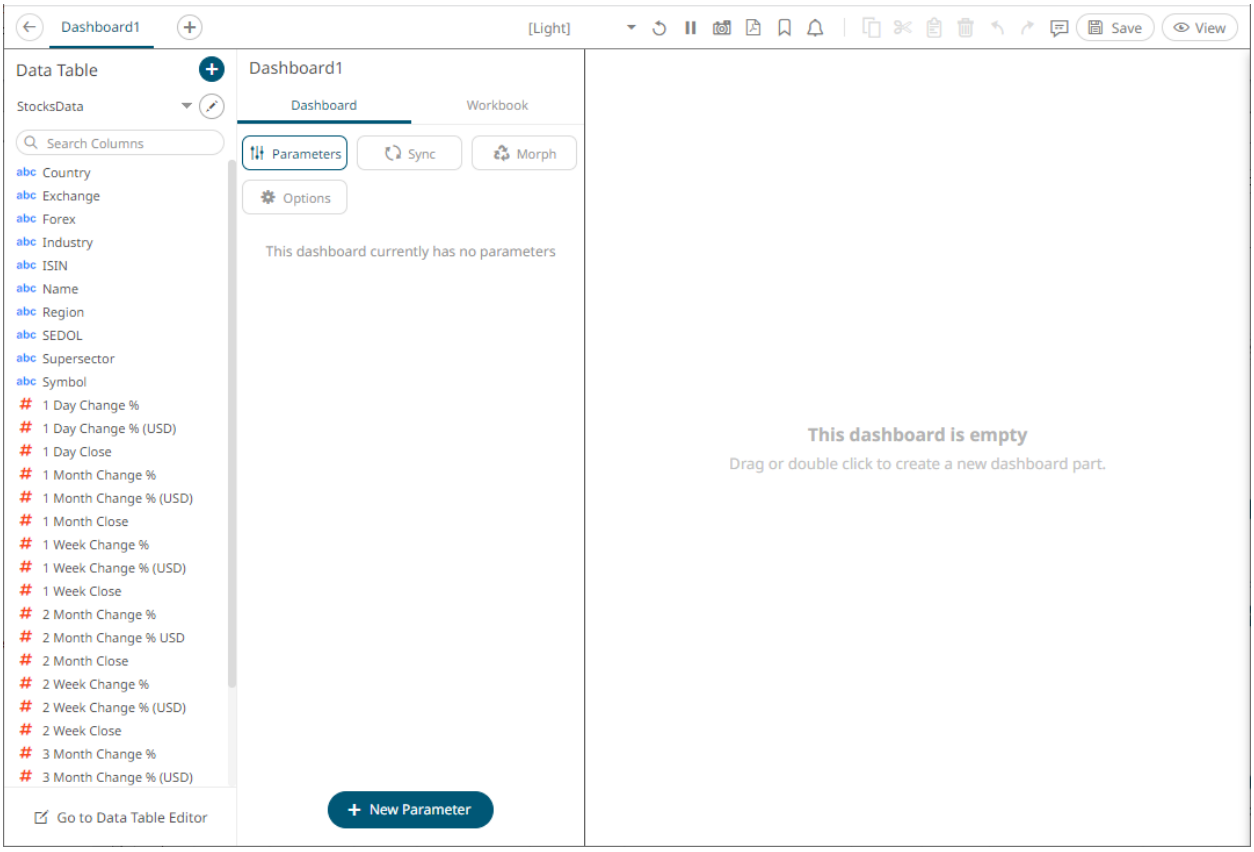
button.

    When saved, the notification displays:



12. Click 

. You are returned to the *Open Workbook in Design Mode*, with the new data table added in the *Data Table* pane drop-down list.



IMPORTANT **The succeeding sections in this chapter mostly apply to the *Data Table Editor* layout.**

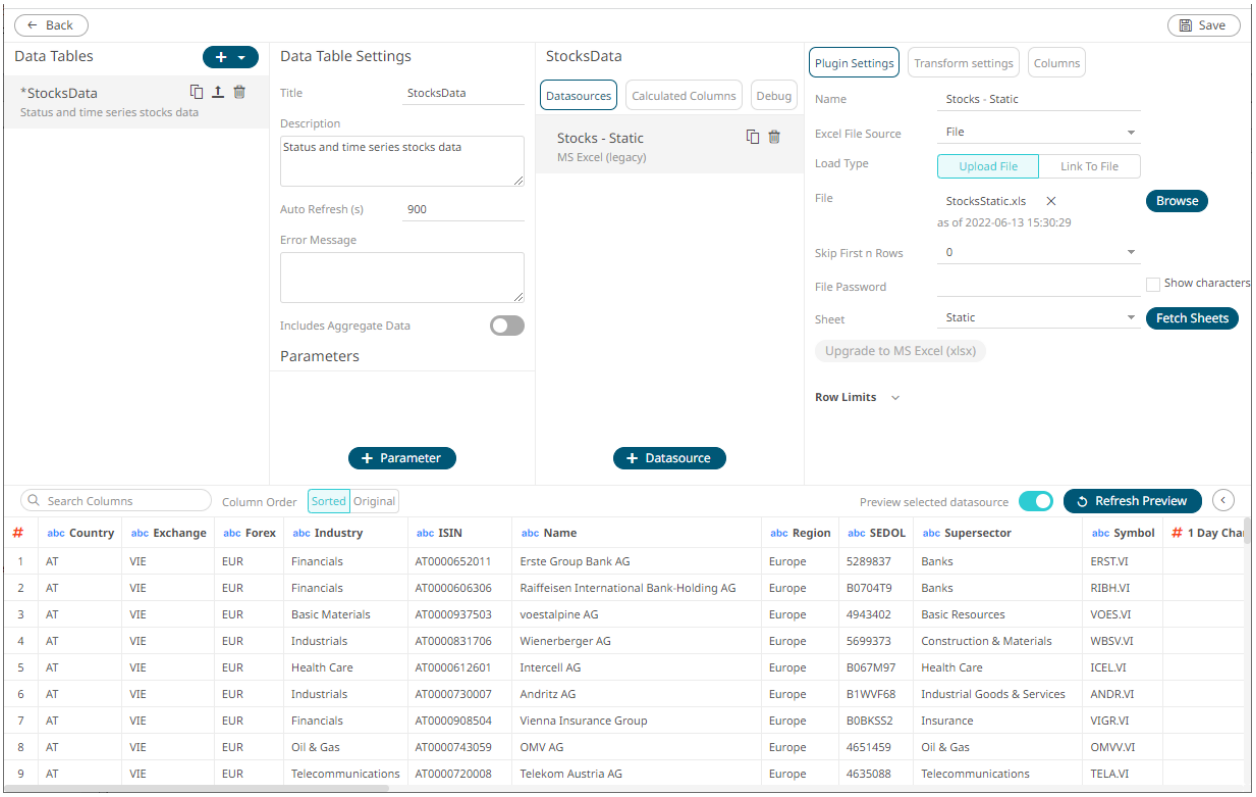
Adding More Data Tables in the Data Table Editor Layout

You can add several data tables that you can use to build the different visualizations and parts in the dashboards of a workbook.

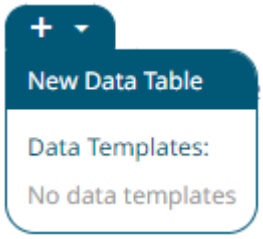
Steps:

1. On the *Data Table* panel, click Go to Data Table Editor.

   The *Data Table Editor* view displays.

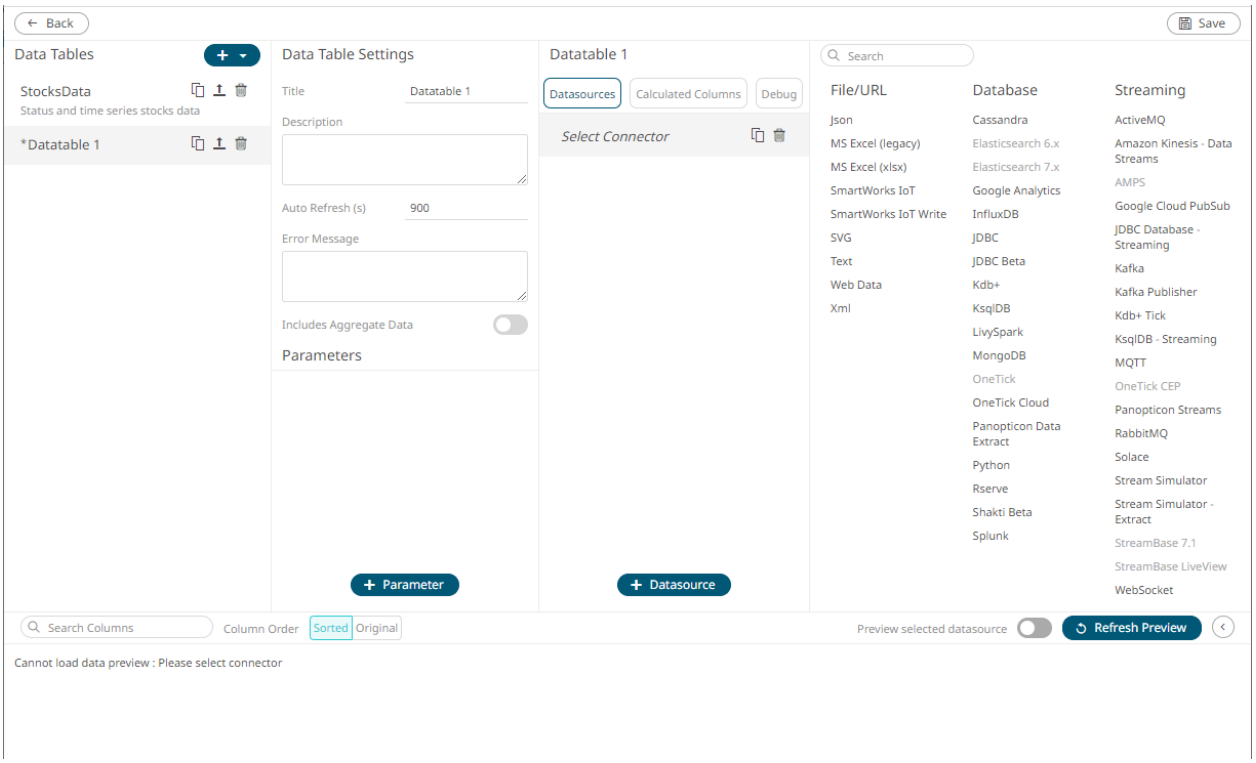


2. On the *Data Tables* pane, click  and select **New Data Table.**



.

A new data table is added in the list (i.e., **Datatable 1**) and the *Data Table Editor* view changes to display the enabled *Data Table Settings* and *Data Sources* panels.



3. Repeat steps 2 to 9 of the Adding a New Data Table section.

Rearranging Data Tables

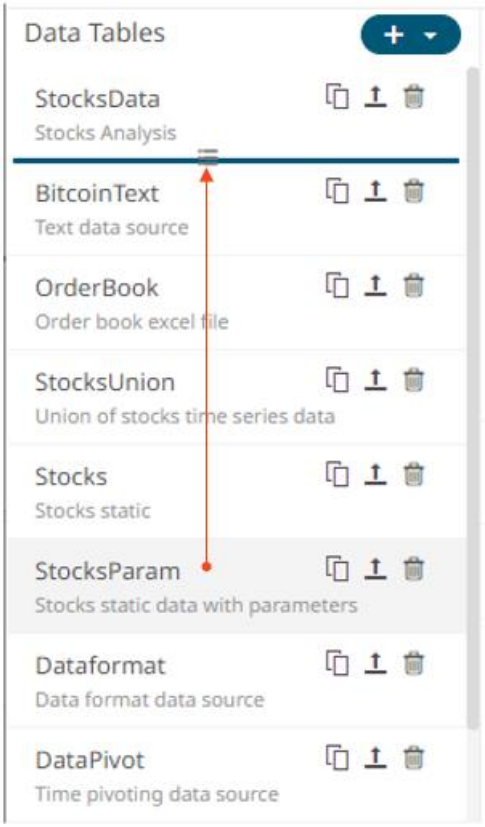
The order of the data tables in the *Data Table Editor* view can be rearranged.

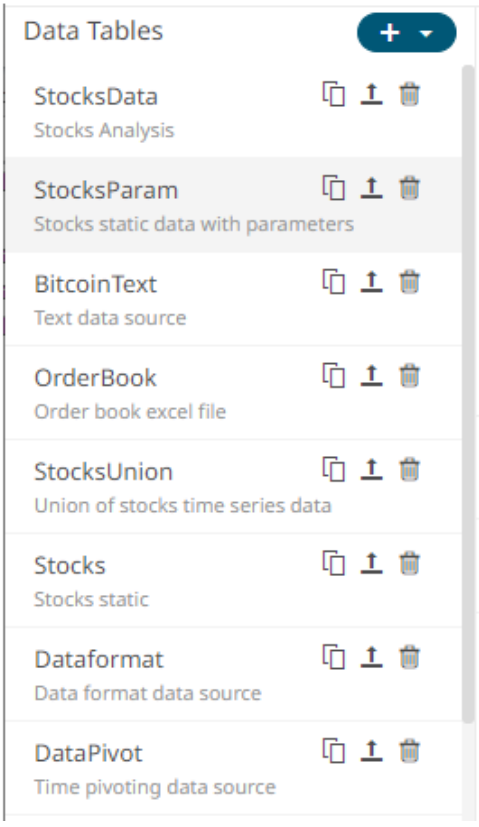
Steps:

1. Click on a data table you want to move.

   The **Hand Hover** icon displays along with the blue marker before or after a data table where you can drop the item.

2. Drag and drop the data table to the desired position.





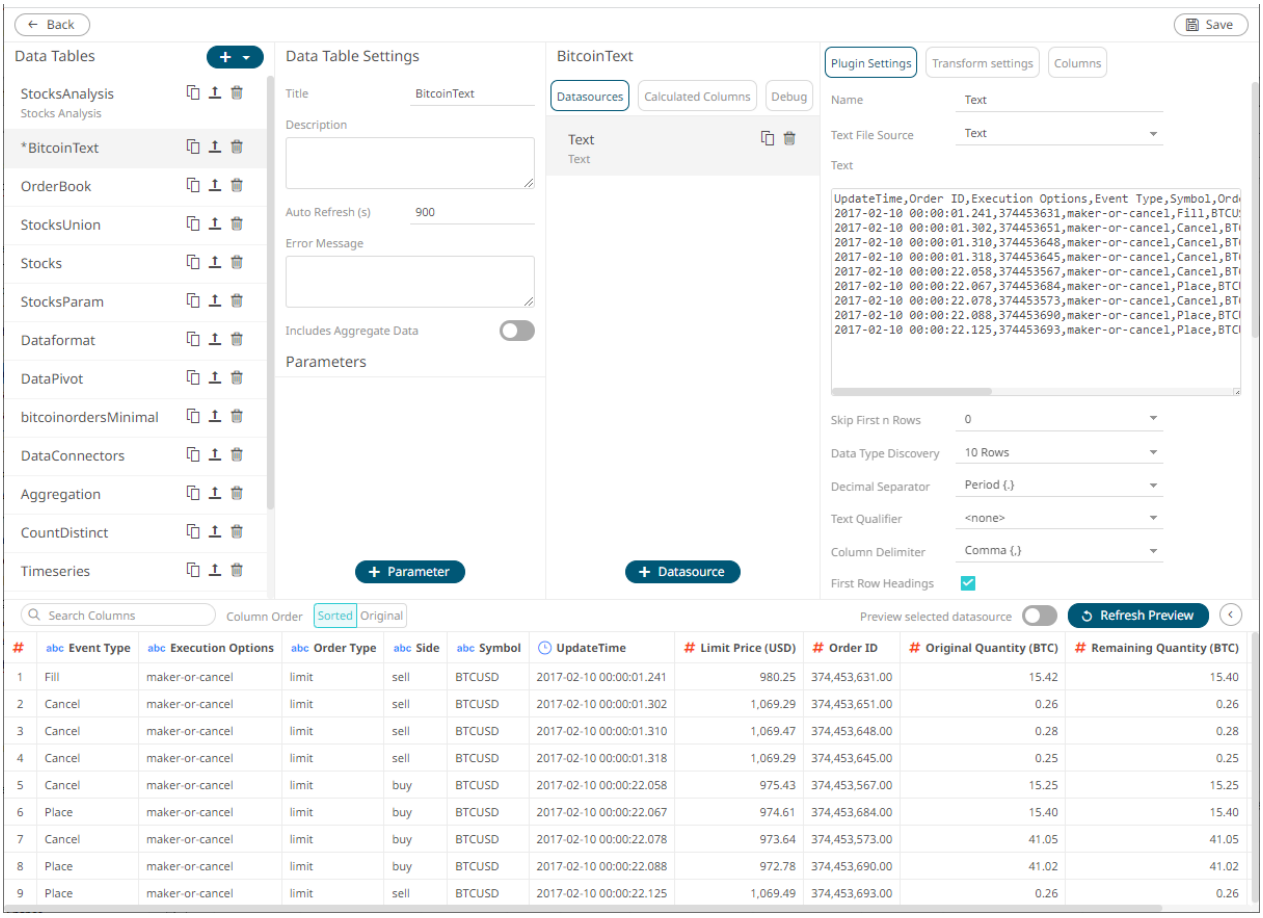
3. Click the **Save** 

button.

   When saved, the notification displays.

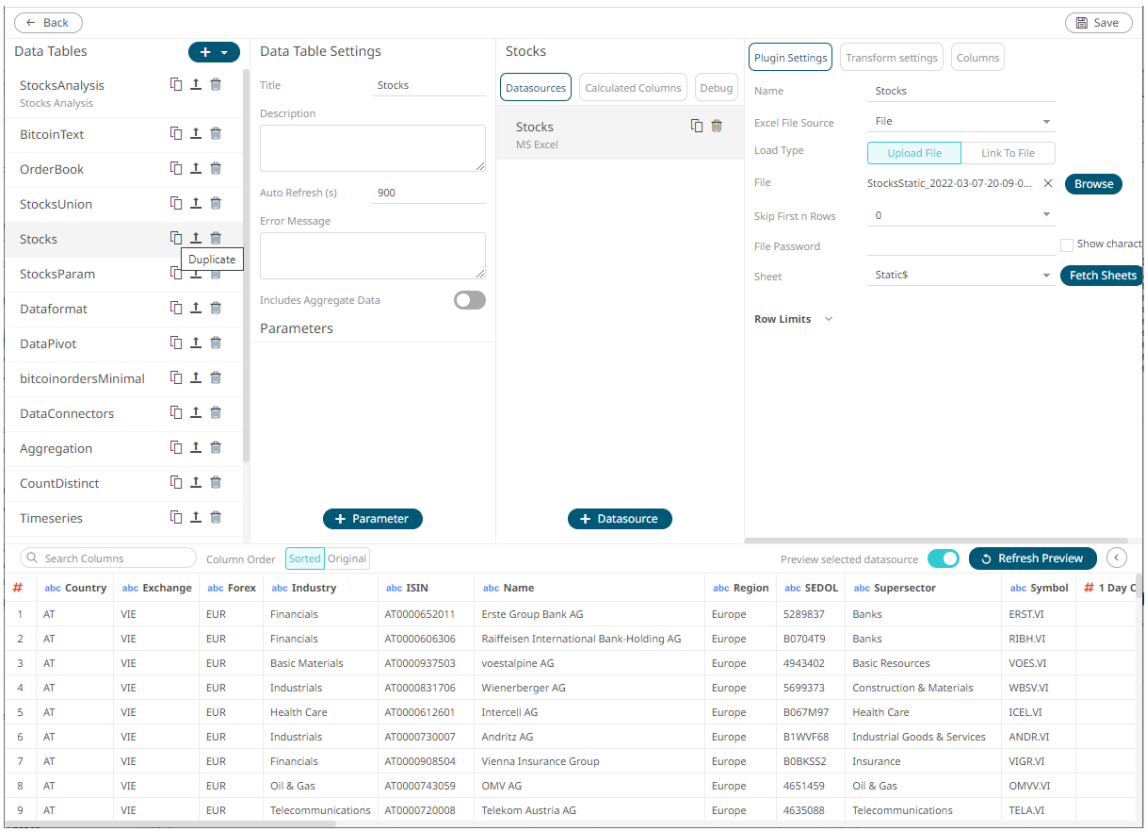
Selecting a Data Table

Click a data table in the *Data Tables* list to display it in the *Data Tables Settings* and *Data Sources Settings* panes.

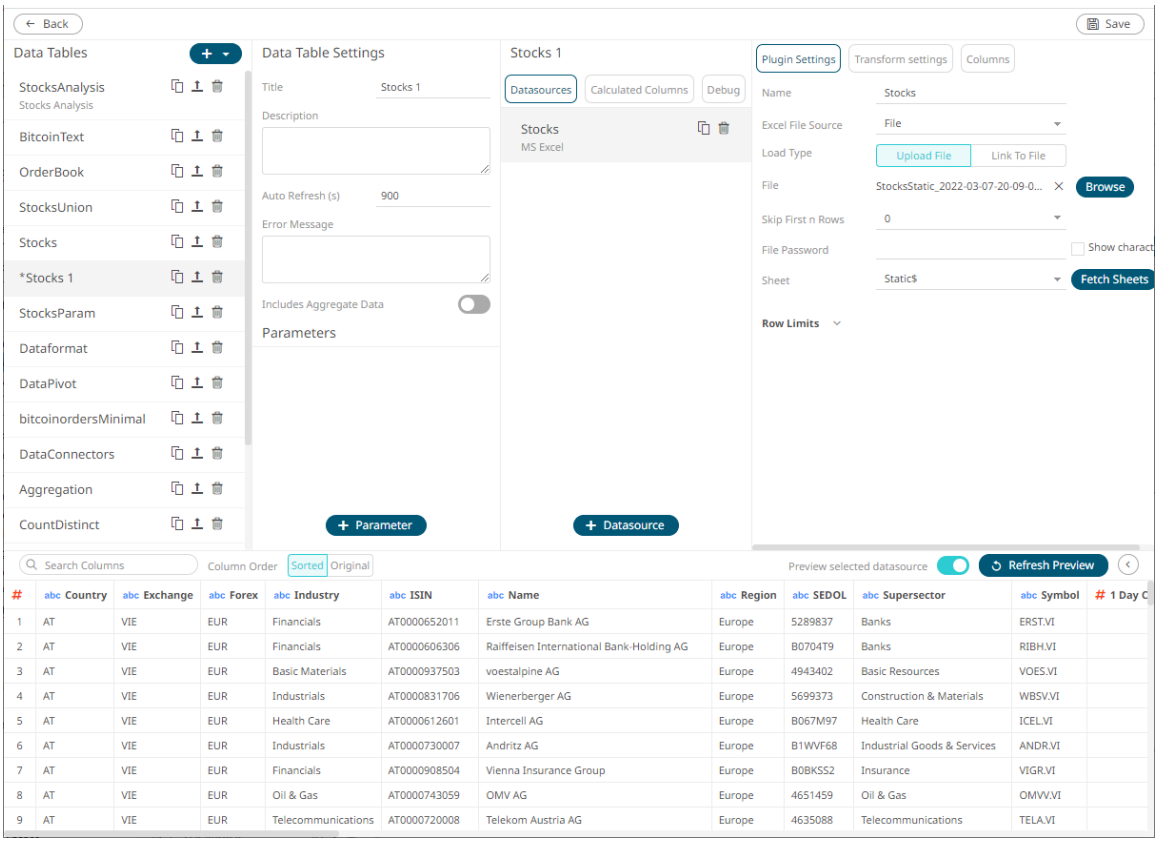


Making a Duplicate of a Data Table

Click the **Duplicate** button of a data table in the *Data Tables* list.



The data table is duplicated.



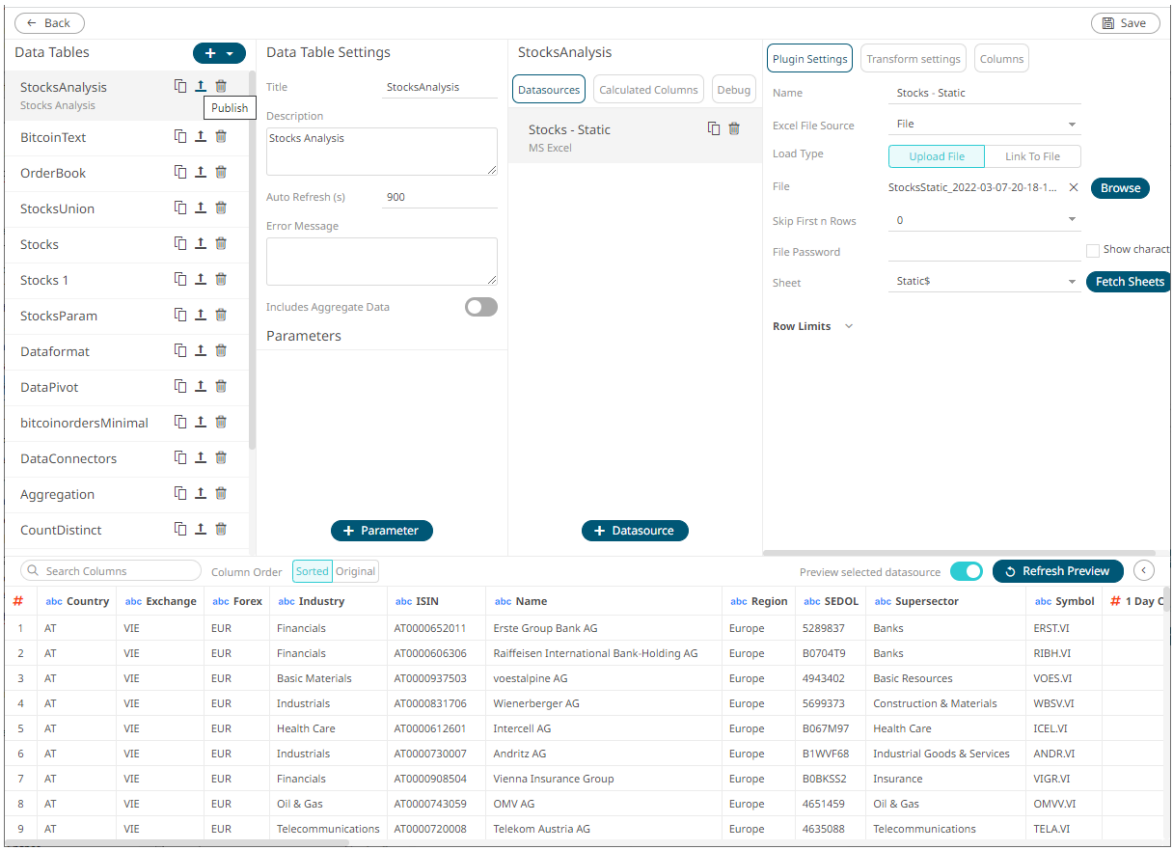
Publishing a Data Table Template

After the user with a Designer role successfully retrieves the data table using the Panopticon connectors and can publish it as a data template that:

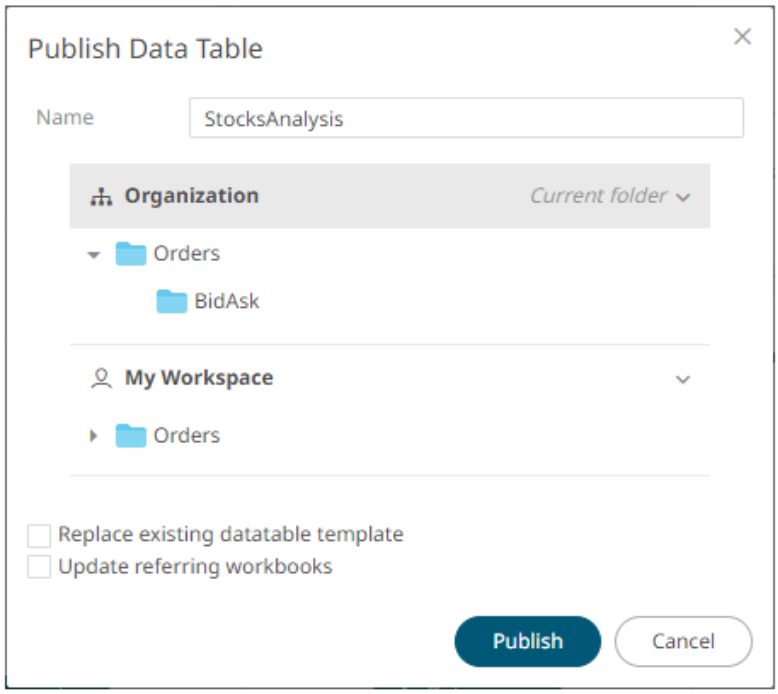
- can be used by other Panopticon designers as a quick way of setting up a similar data table in any workbook.
- allows the changes in the data template to be appended to existing workbooks.

Steps:

1. Click the **Upload Data Table** button of a data table in the *Data Tables* list.



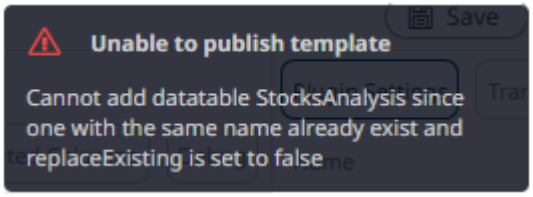
The *Publish Data Table* dialog displays.



2. You can opt to enter a new *Name* of the published data table template.
3. Select the folder or subfolder where the data table template will be published.
4. Check the **Replace existing datatable template** box to replace the previously published data template with the same name to the new one.
5. Check the **Update Referring Workbooks** box to update the workbooks using the data table template.
6. Click 

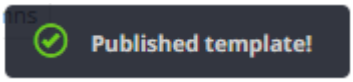
.

   An error message displays if an existing data table with the same name is already available.

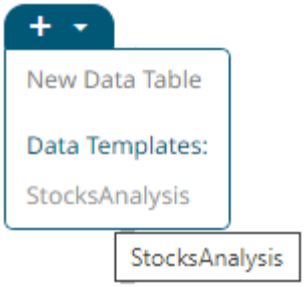


   Enter another name and click 

. The published notification message displays.



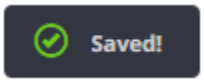
   The published data table template is added on the *Data Templates* list and can be used when creating other workbooks.



Saving a Data Table

Save the settings in the *Data Table Editor* view by clicking 

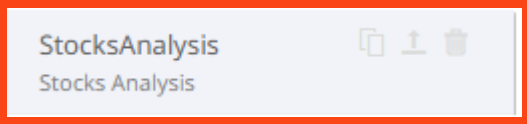
. A notification message displays.



To close the *Data Table Editor* view without saving the changes made, click 

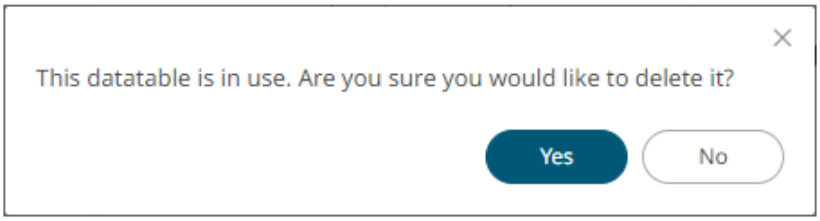
.

NOTE **While the data table is being saved, the Duplicate, Publish Template, and Remove buttons are disabled.**



Deleting a Data Table

Click the **Delete** button of a data table in the *Data Tables* list. A notification message displays when the data table is in use on the dashboard.



Click 

to delete. Otherwise, click 

.

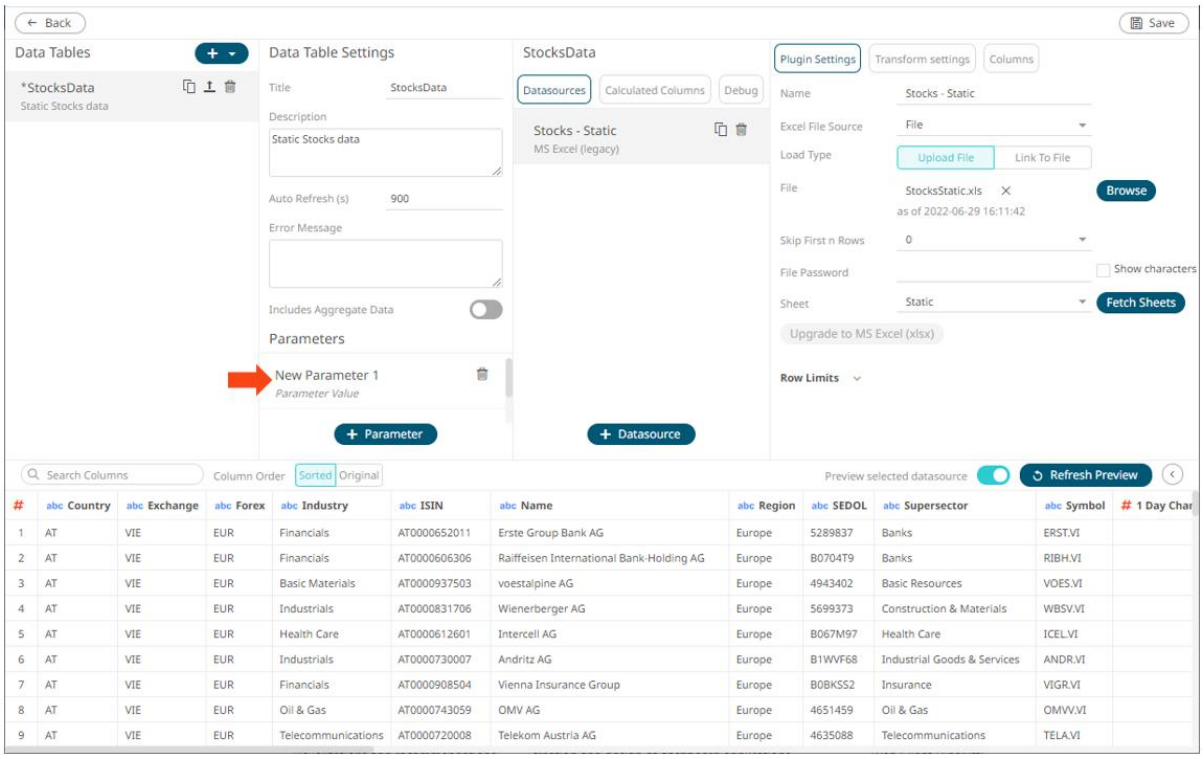
ADDING DATA TABLE PARAMETERS

Parameters filter the data set returned to the visualization. Parameters are especially valuable when programming Actions in a workbook. You can use the parameters function to pull and enter specific data into SQL queries, web searches or other actions that you may wish to program as part of a workbook.

Steps:

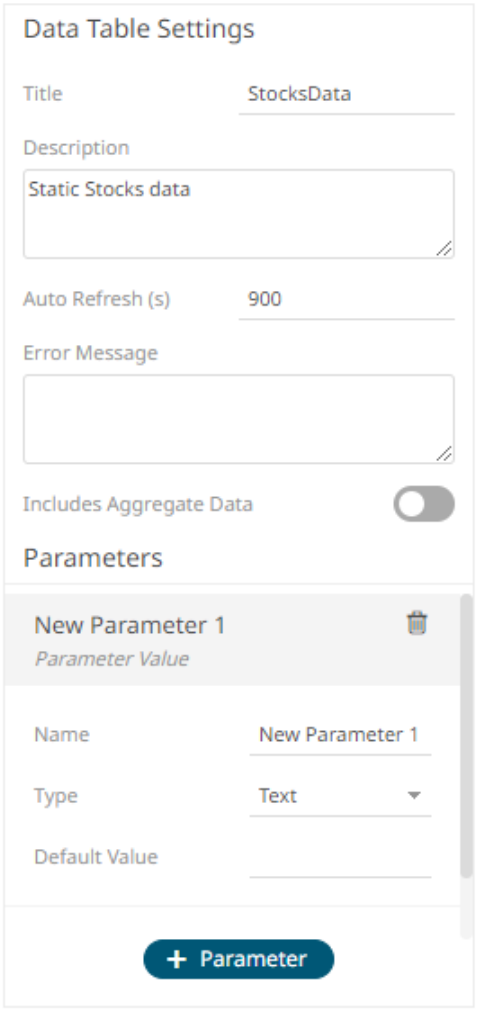
1. On the *Data Table Settings* pane, click + Parameter.

   A new parameter displays (i.e., **New Parameter 1**).

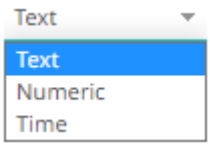


2. Click *New Parameter <number>*.

   The section expands to allow definition of the parameter name and default value.

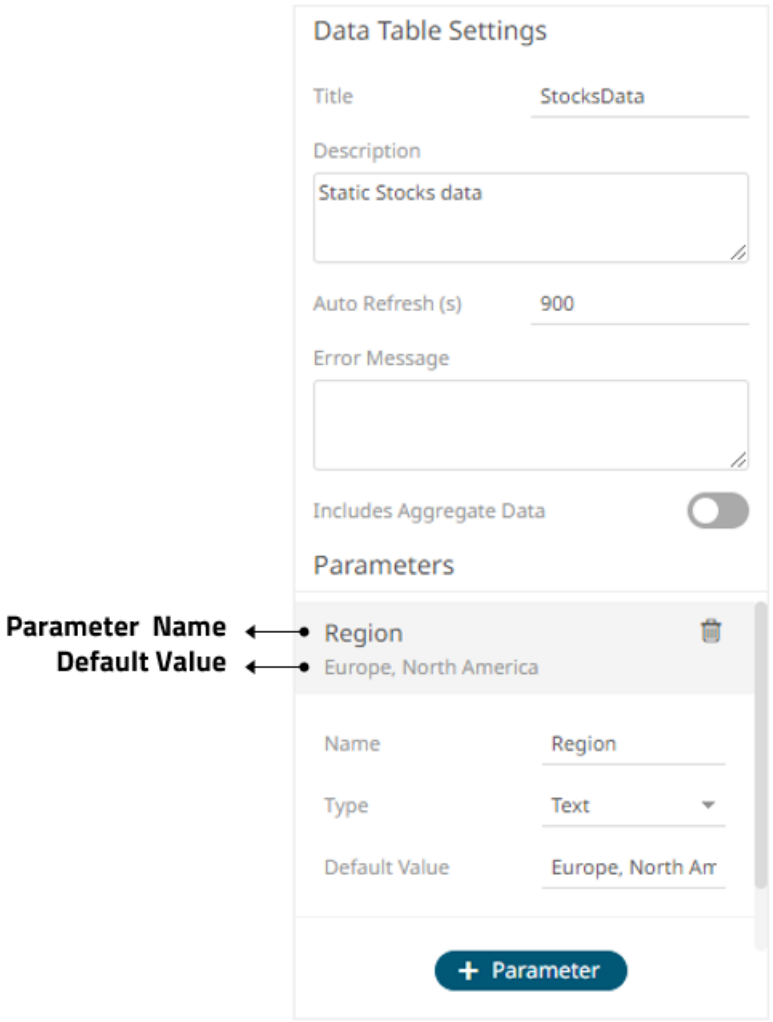


3. Enter the parameter *Name* then click ✓.
4. Select the *Type*: **Text**, **Numeric**, or **Time**.



5. Enter the *Default Value*.

   You can enter several default values, separated by a comma.



NOTE **For the Time type, the following formats for the default value are accepted:**

- **"yyyy-MM-dd"**
- **"yyyy-MM-ddTHH:mm:ss"**
- **"yyyy-MM-ddTHH:mm:ss.SSS"**

6. Repeat steps 1 to 5 to add more parameters.
7. Click the **Save**  button.

   The *Data Sources Preview* at the bottom of the screen updates based on the default parameter values.

NOTE **When adding visualizations or parts on the dashboard, the associated data table is checked for defined parameters that will be applied to the dashboard.**

Rearranging Data Table Parameters

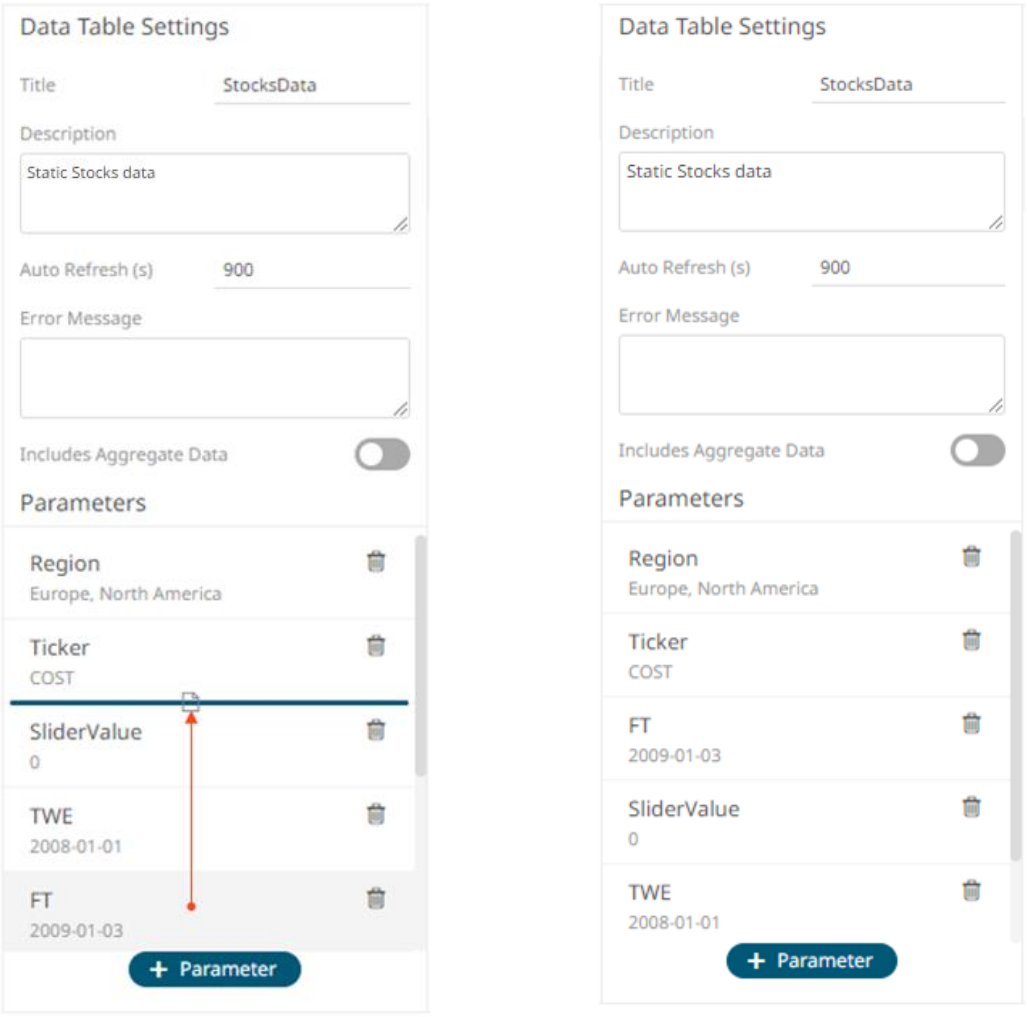
The order of the data table parameters in the *Data Table Editor* layout can be rearranged.

Steps:

1. Click on a parameter you want to move.

   The **Hand Hover** icon displays along with the blue marker before or after a data table parameter where you can drop the item.

2. Drag and drop the parameter to the desired position.



3. Click the **Save** 

button.

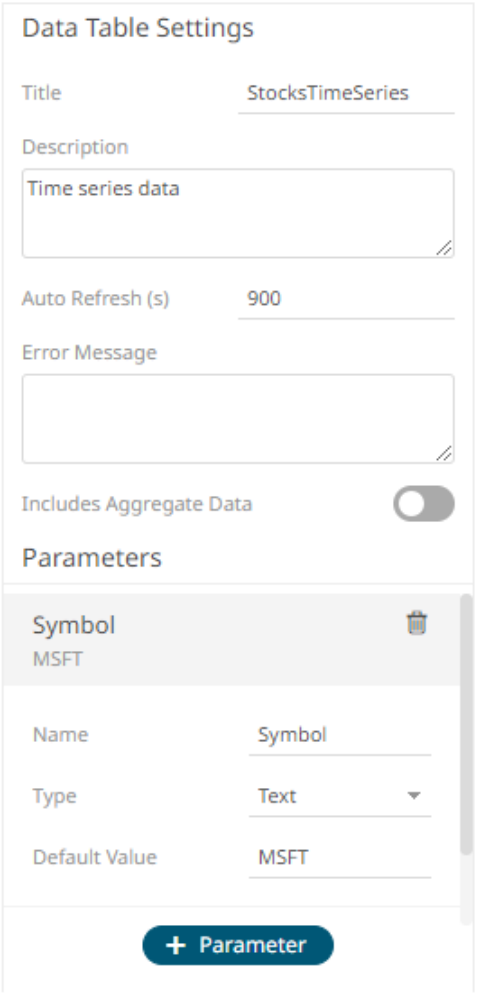
   When saved, the notification displays.

Manually Entered SQL Queries

Panopticon Real Time will dynamically update the SQL query to use the parameters you have set up by putting the parameter name within curly brackets: **{parameter}**. Adding a dollar symbol prefix to the parameter is still supported for backward compatibility.

In this example, the software will replace the **{Symbol}** item in the SQL query with the *Default Value*.

In our example below, the *Default Value* is set to **MSFT**, the stock ticker symbol for Microsoft.



Based on this parameter setup, Panopticon Real Time will dynamically update this SQL Query:

```
SELECT * FROM Static WHERE Ticker = {Symbol}
```

and replace it with this:

```
SELECT * FROM Static WHERE Ticker = MSFT
```

NOTE **Depending on your setting on the data table regarding quotes around parameters, you should – or should not – put the default value of the parameter within quotes.**

As there may be more than one value being returned by the parameter a more appropriate WHERE clause syntax would be:

```
SELECT * FROM Static WHERE Ticker IN ({Symbol})
```

The selection is labeled **Enclose parameters in quotes** and can be selected or unselected.

When this option is selected, the software will automatically put parameter values within quotes, and the default value should be specified *with* quotes, since the SQL query should *not include* quotes:

Default value: **'MSFT'**

```
SELECT * FROM Static WHERE Ticker = {Symbol}
```

When this option is unselected, the software will *not* put parameter values within quotes. Therefore, as required for correct SQL syntax, you should include quotes in your SQL query. As a consequence, your default parameter value must be specified *without quotes:*

Default value: **MSFT**

```
SELECT * FROM Static WHERE Ticker = '{Symbol}'
```

This option is unchecked typically when dynamically parameterizing column selection.

Special Server Parameters

Panopticon supports the following built-in parameters with special usage. The parameters are evaluated strictly server-side. This means that they can be referenced in data source settings, for example in a query statement or a text connector text input, to include them in columns in a data table. However, the parameters cannot be referenced in for example visualization titles or dashboard text boxes, since they are not assigned a value in the web client. Any value passed to the server from the client will be ignored and overridden with the server's value. The special server parameters are all case-sensitive and include:

Parameter Name	Description	Value	Old Name
_current_time	Returns the Date/Time of the current time with millisecond precision.	2021-02-24T05:18:47Z	CurrentTime
_current_time_utc	Same as **_current_time** but in UTC, therefore not dependent on the server's time zone.	2021-02-23T21:18:47	
_dashboard_name	Returns the name of the dashboard.	SysParamsDashboard	
_datatable_name	Returns the name of the data table.	42d8cd06-a99f-4a54-8f1b-378585cf…	
_datatable_title	Returns the title of the data table.	SysParamsTable	
_last_workday	Returns the last business Date/Time with millisecond precision (excludes **Saturdays** and **Sundays**).	2021-02-23T05:18:47Z	LastWorkDay
_quarter_start	Returns the date of the most recent start/first day of the quarter period (i.e., 1st January, 1st April, 1st July, 1st October) with the time set to midnight.	2021-01-01T08:00:00Z	QuarterStart
_user_id	The username stripped of domain information and converted into lower case. (If it contains a back slash, only the part after the first back slash is returned.) The **_user_id** parameter can then be used as the basis for a data	stefan_odelfalk	userid

	query filter clause, limiting the returned results to be specific to the user's profile.		
_user_name	Returns the username exactly as it appears in the Identity.	DWCH\Stefan_Odelfalk	username
_timezone	Returns the name of the system clock timezone.	Europe/Stockholm	
_timezone_offset	Returns the difference, in hours, of (current time) minus (current time UTC).	+01:00	
_week_start	Returns the current Date/Time with millisecond precision of the most recent Monday.	2021-02-23T05:18:47Z	WeekStart
_workbook_folder	Returns the workbook folder.	examples\	
_workbook_name	Returns the workname name.	SysParamsWorkbook	

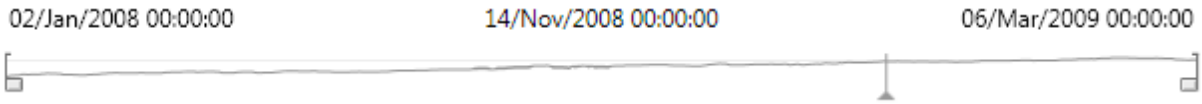
NOTE	The parameter names **userid** and **username** was historically reserved by the system but have now been replaced by **_user_id** and **_user_name**. The old names still function as aliases for these system parameters so that old workbooks do not break.

Other special usage parameters relate to time series analysis and the use of the time filter box which including the following:

- TimeWindowStart
- TimeWindowEnd
- Snapshot

When the time filter box handles are moved to filter on a time window, these special parameters will automatically receive the updated date-times, in ISO UTC format.

For example:



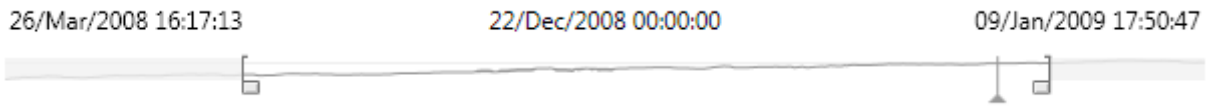
Produces:

TimeWindowStart = 2008-01-02T00:00:00Z

TimeWindowEnd = 2009-03-06T00:00:00Z

Snapshot = 2008-11-14T00:00:00Z

For example:



Produces:

TimeWindowStart = 2008-03-26T16:17:13Z

TimeWindowEnd = 2009-01-09T17:50:47Z

Snapshot = 2008-12-22T00:00:00Z

These parameters can then be used as appropriate to restrict the amount of time series data returned in the resultant dataset.

Typically, when Time parameters are used they are written for visual display, or for input into a data query.

The curly bracket syntax is used to determine the display format.

For example:

{TimeWindowStart} produces: 2008-03-26T16:17:13Z

While:

{TimeWindowStart:yyyy-MM-dd}	produces:	2008-03-26
{TimeWindowStart:dd/MMM/yy}	produces:	26/Mar/08
{TimeWindowStart:HH:mm:ss}	produces:	16:17:13

Parameter Encoding and Delimiters

Parameters should be placed in a query enclosed by curly brackets. For example:

{symbol}

Three types of parameters are available:

- Text (the default)
- Date/Time (through the Time Special Parameters)
- Numeric (through selecting a numeric field, or using a Numeric Action Slider)

Each can be encoded appropriately.

For text parameters, the full syntax is as follows:

```
{[parametername]:[delimiter]}
```

For example:

```
{symbol:,}
```

The colon separates the parameter name from the delimiter string. If there is only a single value, then the delimiter is not utilized.

For numeric and Date/Time parameters the full syntax is as follows:

```
{[parametername]:[display format]}
```

For example:

```
{TimeWindowStart:yyyy-MM-dd HH:mm:ss}
```

```
{volume:#,##0}
```

```
{minresult:#,##0.00}
```

Parameter encoding can be used within:

- data connectors to define a query, subscription, and connection settings
- R Transform to define an R script
- Python Transform to define a Python script
- the resulting dashboard for visualization titles
- Text label controls
- Visualizations to define variable titles

Refer to the sections below for more information.

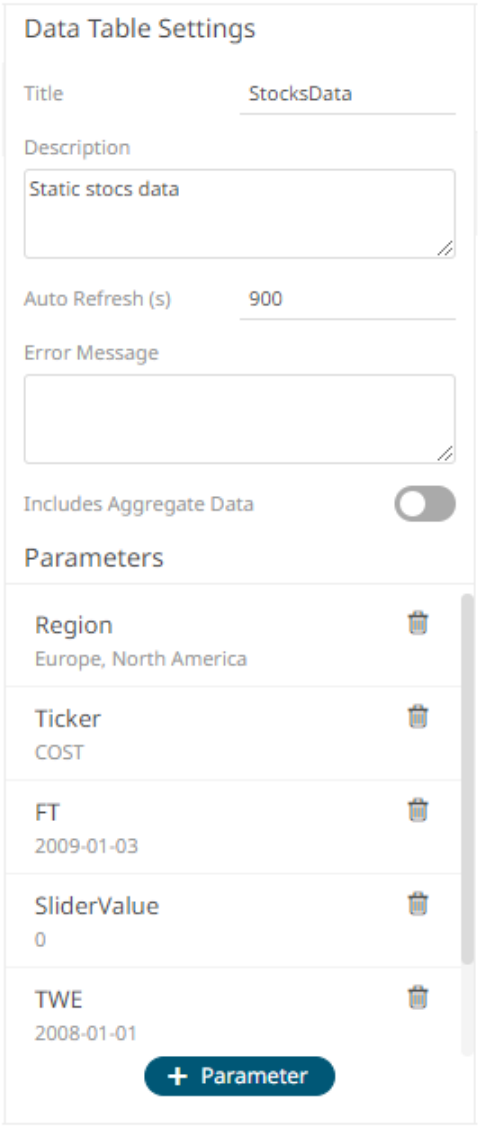
NOTE **The original $ format of prepending a parameter value with the dollar symbol is still supported for backwards compatibility reasons, but it is more limited in what it can achieve and should be avoided.**

Deleting Data Table Parameters

Defined data table parameters can be deleted.

Steps:

1. Hover on a parameter that you want to delete.



2. Click  . The parameter is deleted.

RETRIEVING EXTERNAL AGGREGATES (NON ADDITIVE DATA SETS)

In general, Panopticon Real Time processes data that itself can aggregate through standard aggregation methods, including Sum, Min, Max, Mean, and so on. However, there may be occasions when aggregate values cannot be calculated internally but must be retrieved separately.

When working with financial risk data, especially Value at Risk (VaR) the data will be by definition non-additive and cannot be calculated internally within Panopticon Real Time. As a consequence, we allow aggregates to be retrieved in addition to the base data set. Configuration of the External aggregate can be supplied explicitly by the user or implicitly from the data plug-in.

An example workbook demonstrating this principle for both static snapshots and Time Series named **How to Non Additive** is included with the product.

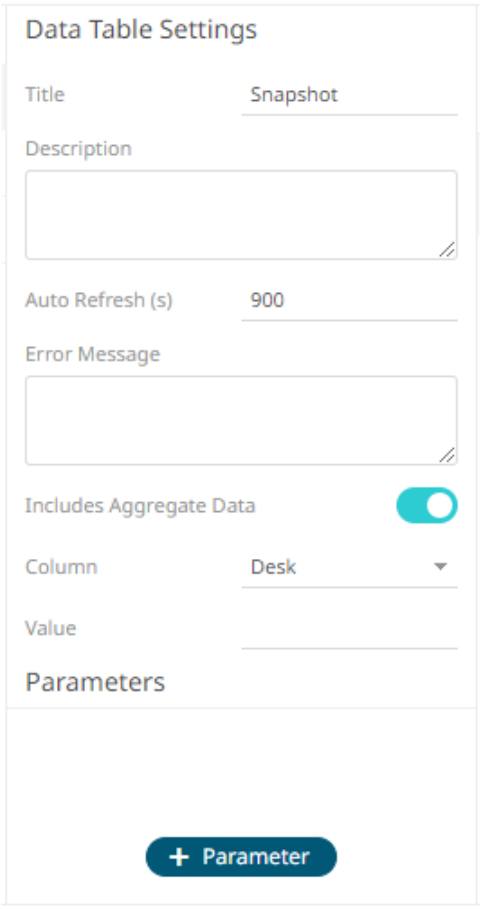
An example data format is included below, which first lists the lowest level data, followed by the aggregates. The Column titled *Desk* defines whether the row is aggregate or a leaf value.

Global	Region	Country	Office	Desk	Exposure	10 VaR	1 VaR
Global	North America	USA	Boston	Boston|Equity	502.5591	96.93133	34.38913
Global	North America	Canada	Toronto	Toronto|Commodities	449.1171	83.44991	26.30474
Global	North America	USA	Chicago	Chicago|Commodities	652.1543	76.20758	2.714785
Global	North America	USA	New York	New York|FX	517.6406	71.2854	37.26238
Global	North America	USA	Los Angeles	Los Angeles|Mutual Funds	182.0767	67.68958	11.1428
Global	North America	USA	New York	New York|Mutual Funds	812.583	64.44671	40.76365
Global	North America	USA	Los Angeles	Los Angeles|Equity	471.5469	39.9832	39.31864
Global	North America	USA	New York	New York|Commodities	369.0428	39.51506	46.6825
Global	North America	USA	Chicago	Chicago|Fixed Income	459.5511	33.45534	17.68969
Global	North America	USA	New York	New York|Fixed Income	701.7921	31.34119	43.45796
Global	North America	USA	New York	New York|Equity	810.3085	30.91666	20.31064
Global	North America	USA	Chicago	Chicago|FX	77.76167	23.44857	41.05015
Global	North America	USA	Los Angeles	Los Angeles|FX	285.2182	22.41497	18.51936
Global	North America	Canada	Toronto	Toronto|Equity	909.3673	16.85309	30.22478
Global	North America	USA	Boston	Boston|Fixed Income	305.9504	12.37541	3.2304

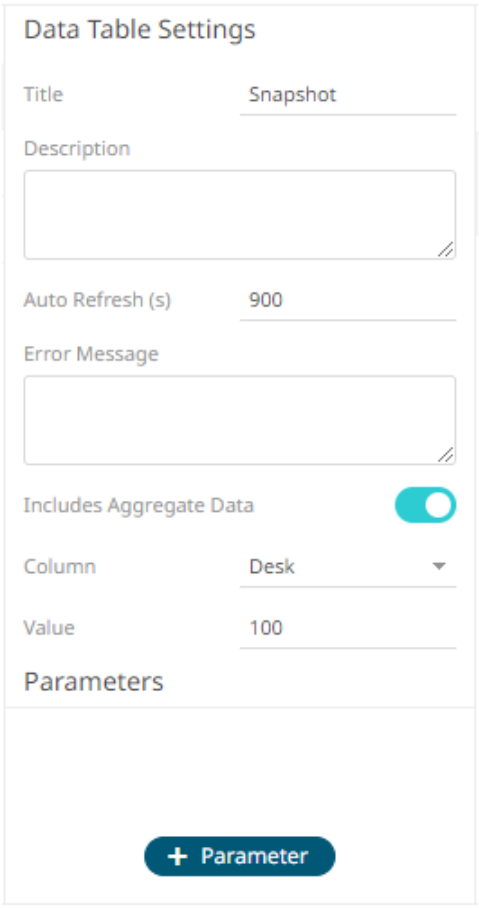
Global	Region	Country	Office	Desk	Exposure	10 VaR	1 VaR
Global	North America	USA	Boston	Boston|Equity	502.5591	96.93133	34.38913
Global	North America	Canada	Toronto	Toronto|Commodities	449.1171	83.44991	26.30474
Global	North America	Canada	Vancouver	Vancouver|Commodities	260.9837	10.91653	13.70787
Global	North America	Canada	Toronto		1358.484	75.7861	51.20194
Global	North America	Canada	Vancouver		260.9837	8.24374	8.960773
Global	North America	USA	Boston		1065.943	130.6419	27.43908
Global	North America	USA	Chicago		1601.07	145.2946	67.41181
Global	North America	USA	Los Angeles		938.8418	82.48388	41.31485
Global	North America	USA	New York		3211.367	122.2747	161.8823
Global	North America	Canada			1619.468	99.31398	54.7861
Global	North America	USA			6817.222	518.8613	289.0221
Global	North America				8436.69	566.3662	392.1354
Global					20990.08	1626.839	1104.829

To retrieve external aggregates:

1. Retrieve your data set including both base data, plus aggregate data.
2. On the *Data Table Settings* pane, tap the **Includes Aggregate Data** slider to turn it on and then select the text column that defines the leaf.

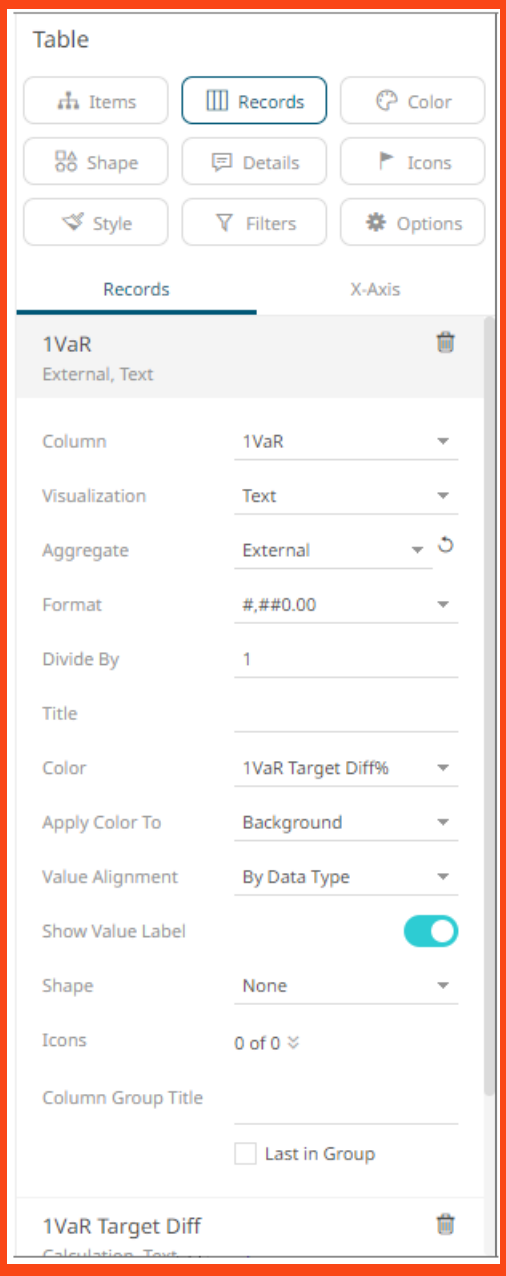


3. Enter the *Value* to determine aggregate rows. The default being blank.



4. Click the **Save**  button.

NOTE **Within the visualization, the default aggregation method for all variables will be set to External.**



As long as the leaf or lowest level of data is identified by selecting a specific categorical column, multiple non-additive hierarchies can be supported. In these cases, the aggregates must be supplied, where every column to the left of the selected column, is defined as a potential aggregate.

For example, the following dataset includes the hierarchy:

Global → Region → Country → Office → Asset Class -- > Desk

It includes the base data for each desk, plus aggregates for:

Global → Region → Country → Office → Asset Class

Global → Region → Country → Office

Global → Region → Country

Global → Region

Global

Additionally, aggregates have been supplied for the different hierarchy:

Global → Asset Class → Region → Country → Office → Desk

Global → Asset Class → Region → Country → Office

Global → Asset Class → Region → Country

Global → Asset Class → Region

Global → Asset Class

Global	Region	Country	Office	AssetClass	Desk	10 VaR	1 VaR
Global	North America	USA	Boston	Equity	Boston|Equity	96.93133048	34.38913175
Global	North America	USA	New York	FX	New York|FX	71.28540032	37.26238164
Global	North America	USA	New York	Fixed Income	New York|Fixed Income	31.34118784	43.45795678
Global	North America	USA	New York	Equity	New York|Equity	30.91665946	20.31063719
Global	North America	Canada	Toronto	Equity	Toronto|Equity	16.85309075	30.22477718
Global	North America	USA	Boston	Fixed Income	Boston|Fixed Income	12.37540616	3.230399924
Global	North America	USA	Boston	Equity	TOTAL	96.93133048	34.38913175
Global	North America	USA	New York	FX	TOTAL	71.28540032	37.26238164
Global	North America	USA	New York	Fixed Income	TOTAL	31.34118784	43.45795678
Global	North America	USA	New York	Equity	TOTAL	30.91665946	20.31063719
Global	North America	Canada	Toronto	Equity	TOTAL	16.85309075	30.22477718
Global	North America	USA	Boston	Fixed Income	TOTAL	12.37540616	3.230399924
Global	North America	Canada	Toronto	TOTAL	TOTAL	75.78610302	51.2019375
Global	North America	USA	Boston	TOTAL	TOTAL	130.6419004	27.43907688
Global	North America	USA	New York	TOTAL	TOTAL	122.2746767	161.882264
Global	North America	Canada	TOTAL	TOTAL	TOTAL	99.31398318	54.78609529

Global	Region	Country	Office	AssetClass	Desk	10 VaR	1 VaR
Global	North America	USA	Boston	Equity	Boston|Equity	96.93133048	34.38913175
Global	North America	USA	New York	FX	New York|FX	71.28540032	37.26238164
Global	North America	USA	TOTAL	TOTAL	TOTAL	518.8613204	289.0221365
Global	North America	TOTAL	TOTAL	TOTAL	TOTAL	566.366159	392.1354295
Global	TOTAL	TOTAL	TOTAL	TOTAL	TOTAL	1626.839172	1104.828695
Global	TOTAL	TOTAL	TOTAL	Equity	TOTAL	606.4144769	329.4784359
Global	TOTAL	TOTAL	TOTAL	Fixed Income	TOTAL	451.081016	178.6103631
Global	North America	TOTAL	TOTAL	Equity	TOTAL	192.2519763	122.2667907
Global	North America	TOTAL	TOTAL	Fixed Income	TOTAL	65.59614378	54.72134119
Global	North America	TOTAL	TOTAL	FX	TOTAL	99.57659408	82.30710941
Global	North America	USA	TOTAL	Equity	TOTAL	188.3931344	102.2566554
Global	North America	Canada	TOTAL	Equity	TOTAL	15.16778167	27.20229946
Global	North America	USA	TOTAL	FX	TOTAL	105.4340408	87.14870408

Calculations with External Aggregates (Non Additive Calculations)

Calculations are built from the underlying data fields within the dataset. For additive datasets, aggregates of calculated fields are either based on:

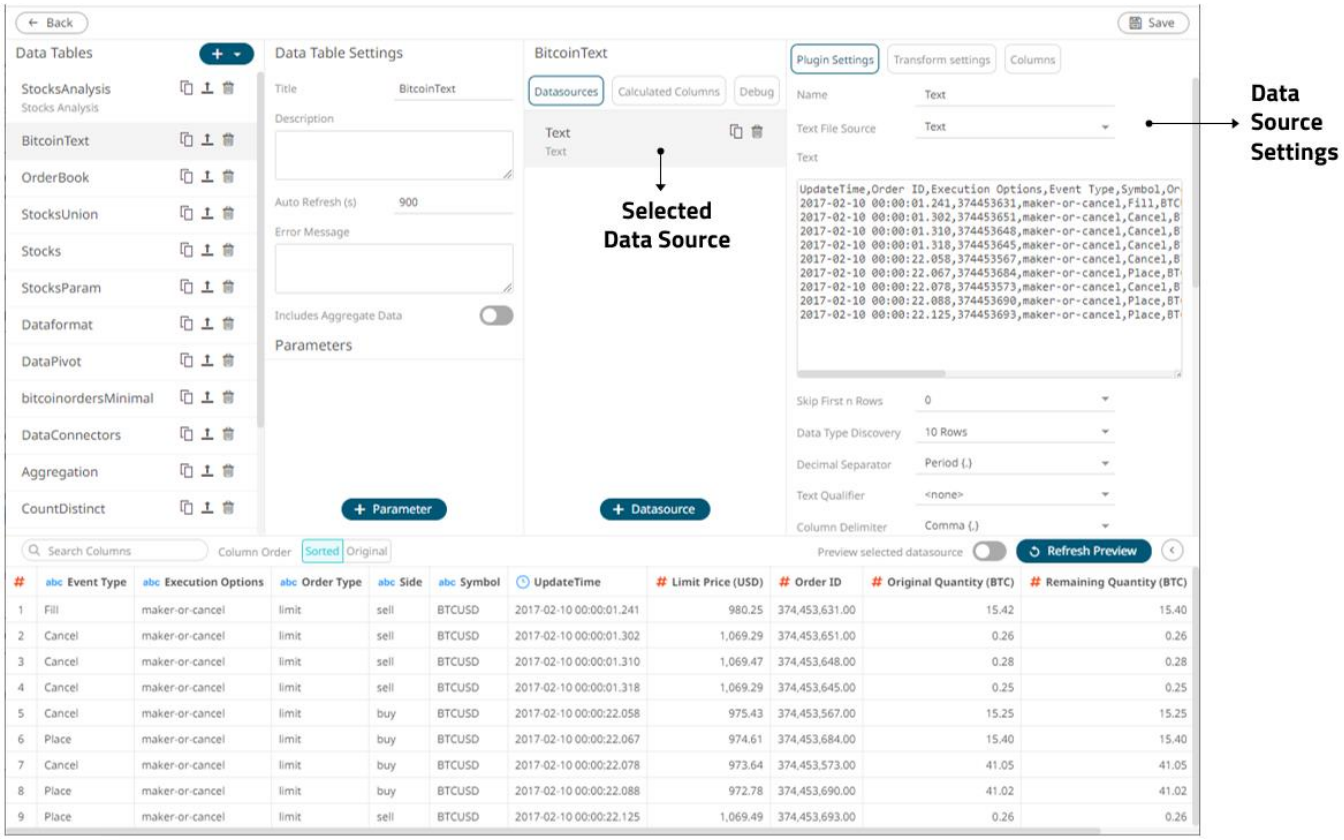
- A defined aggregation method, using the leaf calculation, and aggregating this up the hierarchy.
- The Calculate aggregation method, using the sum of each term in the formula, up the hierarchy.

In the case of external aggregates, and applying the Calculation aggregation method, calculations will use the external aggregate values for each term within the formula, when calculating up the hierarchy.

MANAGING DATA SOURCES

A data table can consist of one or more data sources and can be connected to directly, with data retrieved on the fly as it is required.

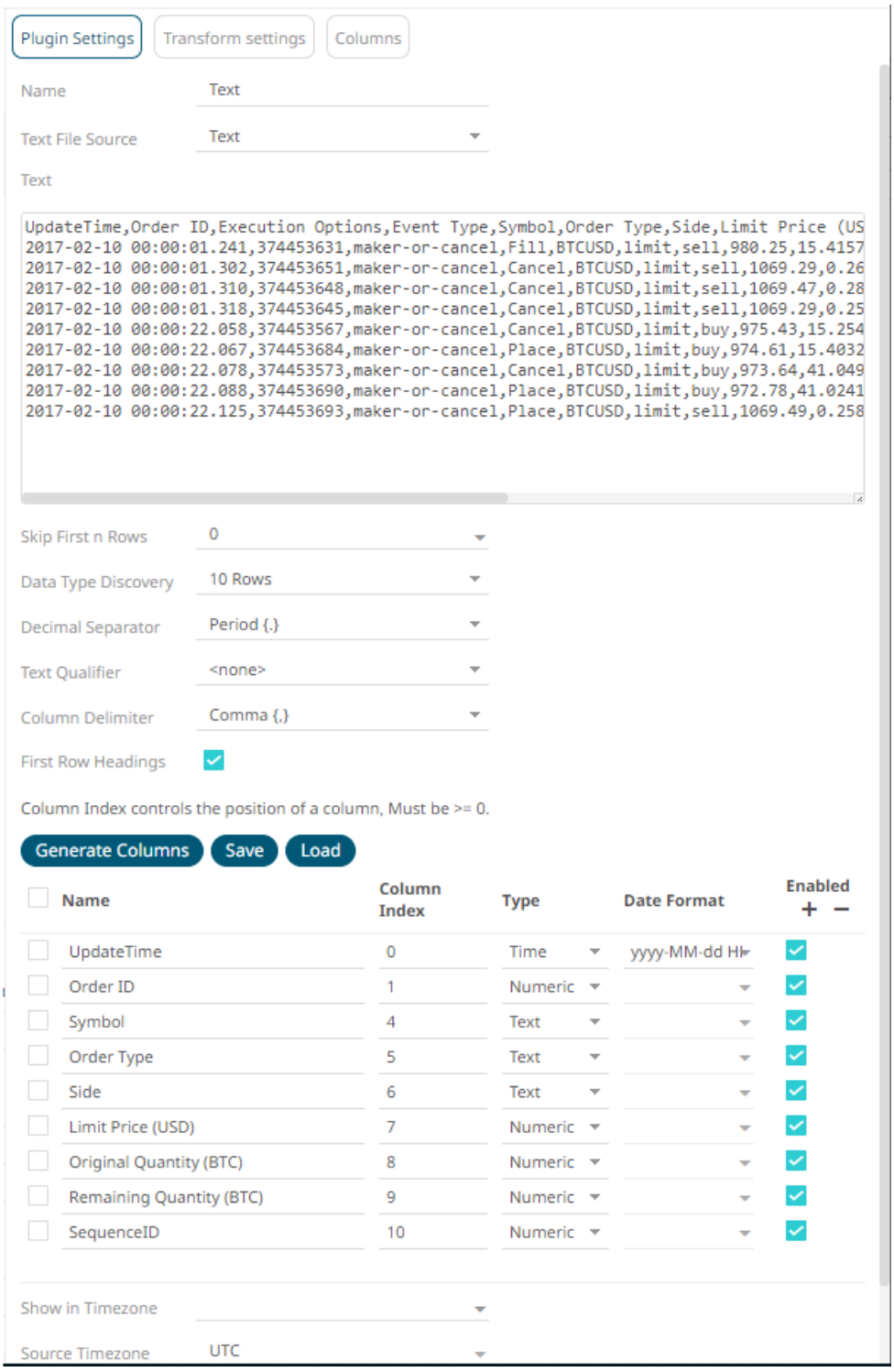
Click on a data source on the *Data Sources* panel. The currently selected data source is highlighted (grey background) and the settings are displayed.



#	Event Type	Execution Options	Order Type	Side	Symbol	UpdateTime	Limit Price (USD)	Order ID	Original Quantity (BTC)	Remaining Quantity (BTC)
1	Fill	maker-or-cancel	limit	sell	BTCUSD	2017-02-10 00:00:01.241	980.25	374,453,631.00	15.42	15.40
2	Cancel	maker-or-cancel	limit	sell	BTCUSD	2017-02-10 00:00:01.302	1,069.29	374,453,651.00	0.26	0.26
3	Cancel	maker-or-cancel	limit	sell	BTCUSD	2017-02-10 00:00:01.310	1,069.47	374,453,648.00	0.28	0.28
4	Cancel	maker-or-cancel	limit	sell	BTCUSD	2017-02-10 00:00:01.318	1,069.29	374,453,645.00	0.25	0.25
5	Cancel	maker-or-cancel	limit	buy	BTCUSD	2017-02-10 00:00:22.058	975.43	374,453,567.00	15.25	15.25
6	Place	maker-or-cancel	limit	buy	BTCUSD	2017-02-10 00:00:22.067	974.61	374,453,684.00	15.40	15.40
7	Cancel	maker-or-cancel	limit	buy	BTCUSD	2017-02-10 00:00:22.078	973.64	374,453,573.00	41.05	41.05
8	Place	maker-or-cancel	limit	buy	BTCUSD	2017-02-10 00:00:22.088	972.78	374,453,690.00	41.02	41.02
9	Place	maker-or-cancel	limit	sell	BTCUSD	2017-02-10 00:00:22.125	1,069.49	374,453,693.00	0.26	0.26

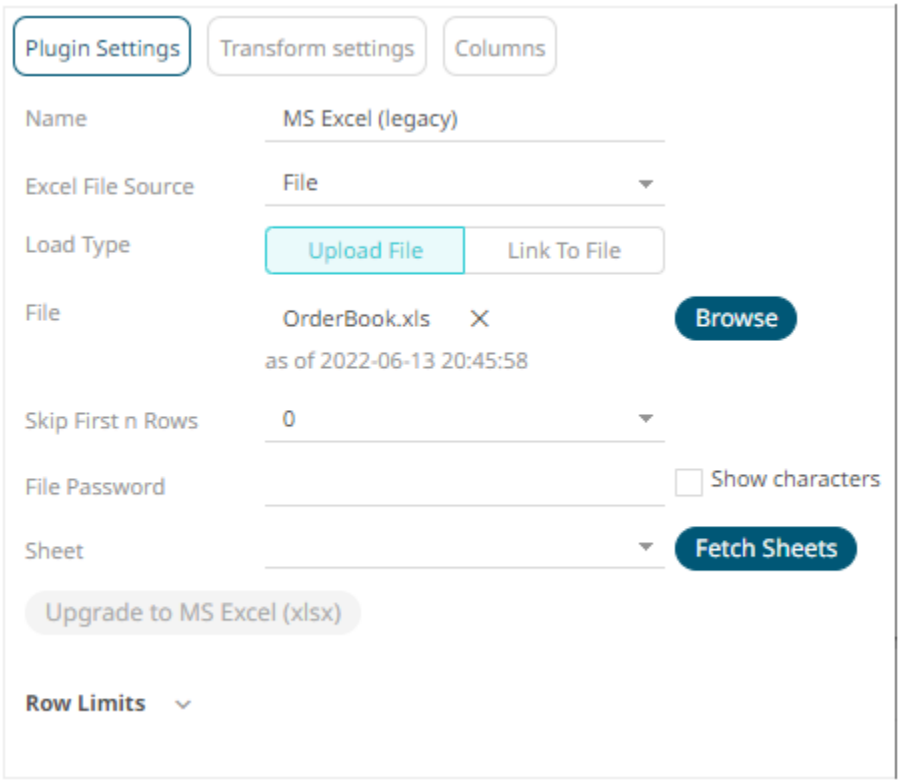
- Data Source or Plugin Settings

Sample 1



Sample 1 (Text Data – Manual Text) displays the text values and the properties of the generated columns based on the set properties (i.e., Skip First n Rows, Data Type Discovery, Text Qualifier, and Column Delimiter)

Sample 2



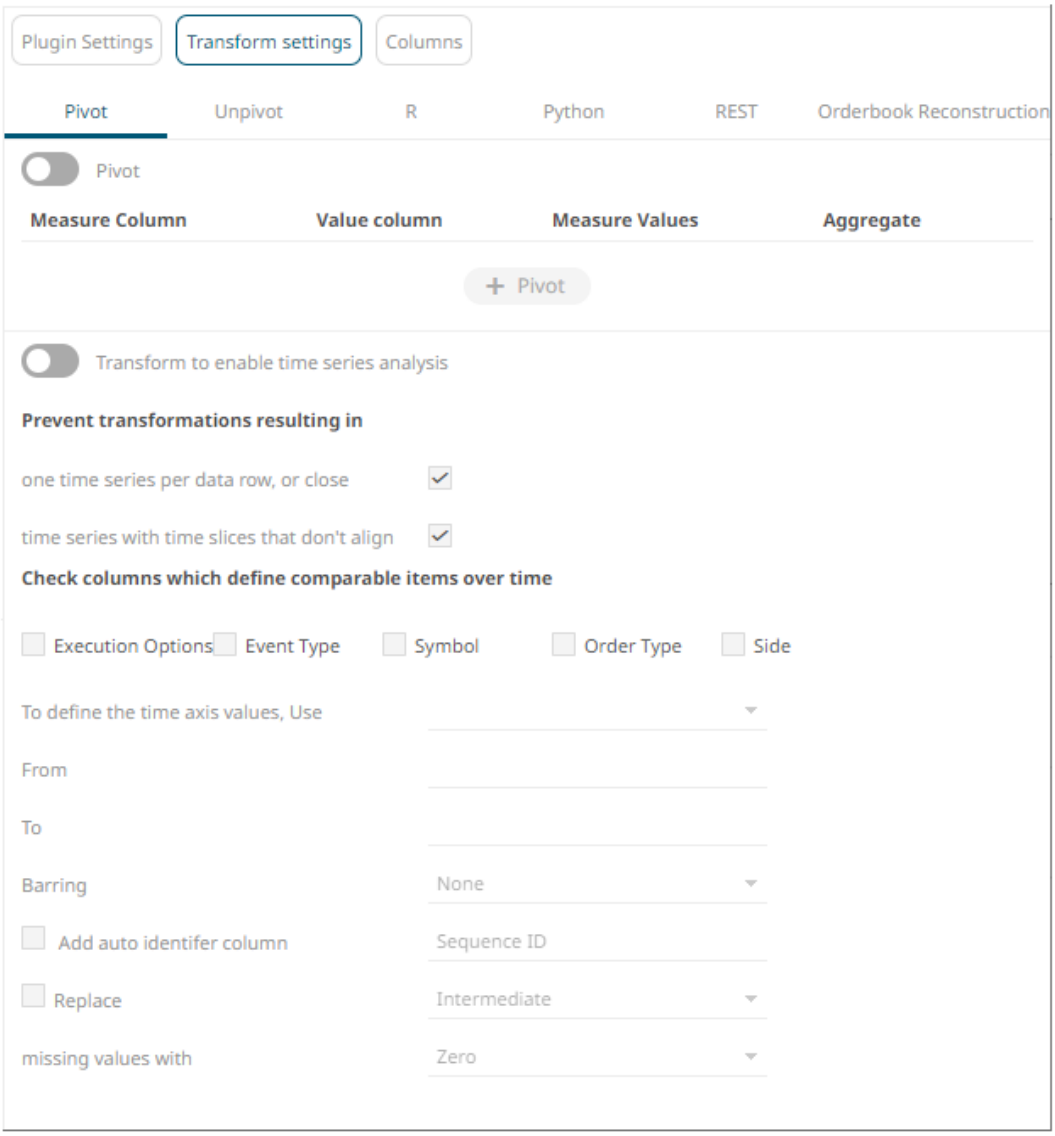
This lists options specific to the data source. In the case above for Sample 1 (MS Excel (legacy)), it lists the file path to the Excel workbook, and the sheet to be used.

In the *Data Sources Settings* pane, the amount of data to be returned can also be specified.

For more information on the data source specific settings, refer to Data Connectors for more information.

- Transform Settings

  Clicking the **Transforms Settings** button displays the transform settings of the currently selected data source.

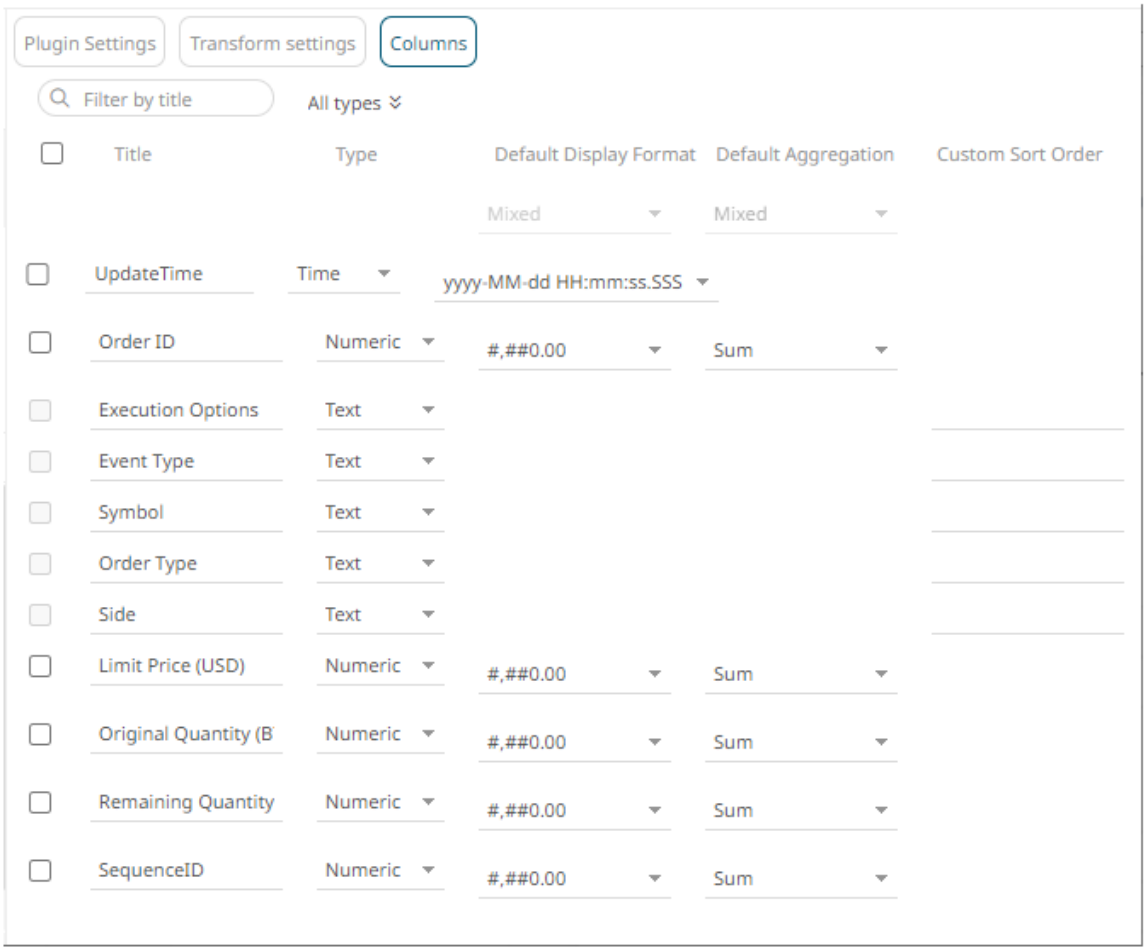


The *Transform Settings* allow for:

- Pivoting retrieved data
- Unpivoting retrieved data
- Transforming data to enable time series analysis including interpolation
- Running an R or Python script for data transformation
- Running a REST Transform
- Lists of orders to be reconstructed into an Order book and conflated for output display

- Columns Settings

  Clicking the **Columns** button displays the retrieved columns from the data source.



  The *Column Settings* allows you to:

  - modify the column data type
  - rename column names
  - select the numeric or Date/Time format
  - select the numeric default aggregation
  - define custom sort order

COMMON DATA SOURCE SETTINGS

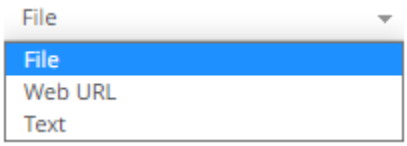
Most of the data sources share the following settings:

- Data Connector File Source
- Load Type for a File Source
- Message Type selection and definition
- Saving and loading of column definitions
- Time zone definition

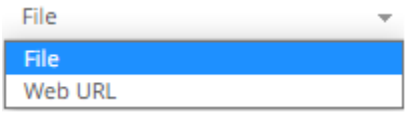
- Row Limits definition

Selecting and Defining the Data Connector File Source

Several connectors including JSON, SVG, Text, XML, and Stream Simulator, allow selection from a File, Web URL, or Text source.



For the MS Excel (legacy) connector, you can select from a File or Web URL source.



Steps:

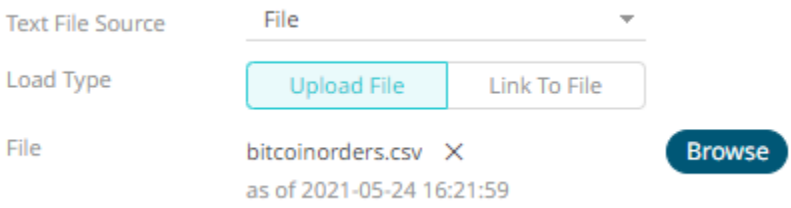
Select the connector file source:

- File

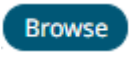
  You can either:

  - Upload a data source snapshot by clicking **Upload File**  then **Browse**  to browse to the file source.

    After selecting the file, it is displayed with the timestamp of the snapshot.

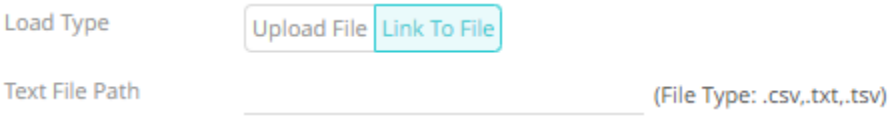
    

    The data source is placed in the repository and locked, synchronized, and bundled with the workbook version.

    To change the data source, click  then **Browse**  to browse to a new version of the file, which is uploaded into the repository, and also create a new version of the workbook that reads it.

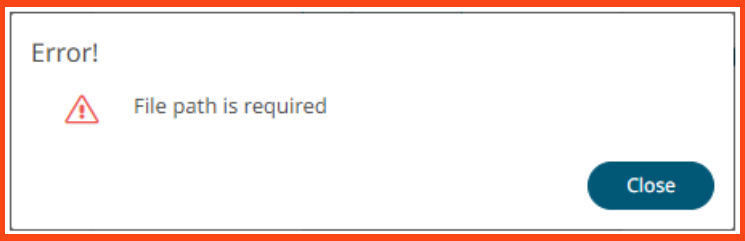
  - Link to a data source file by clicking **Link to File**  and entering a *File Path*.

    The supported file types for the connector are displayed as guide (e.g., for the Text connector they are **.csv, .txt**, and **.tsv**).

    Ensure that in a cluster, you need to use a shared path, or put it on every node and use a path that resolves on every node. You can update its contents whenever you want.

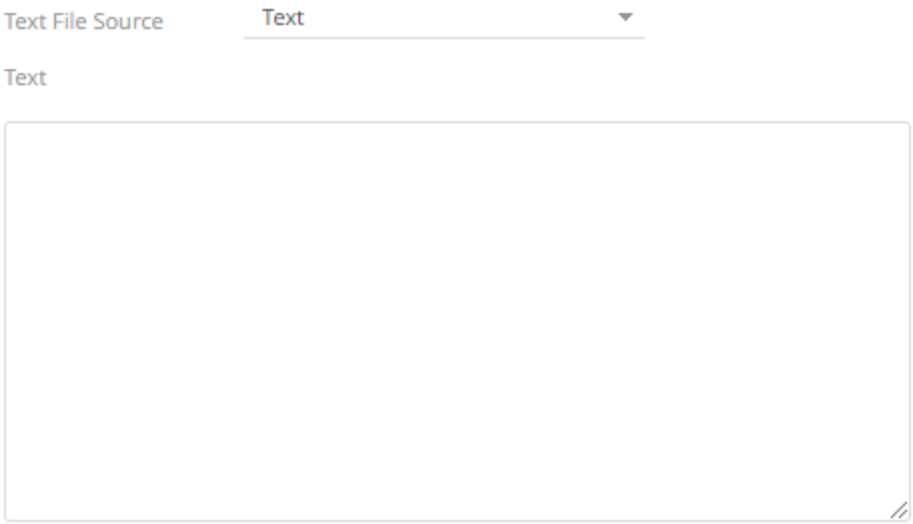
NOTE **An error notification displays upon fetching sheets/column generation when the *File Path* is blank.**



Click Close and enter the file path.

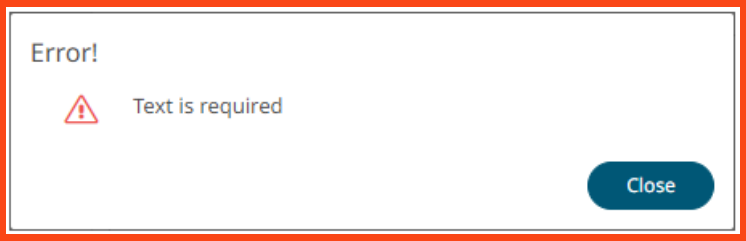
- Text

  Then enter the text block to be parsed.



NOTE

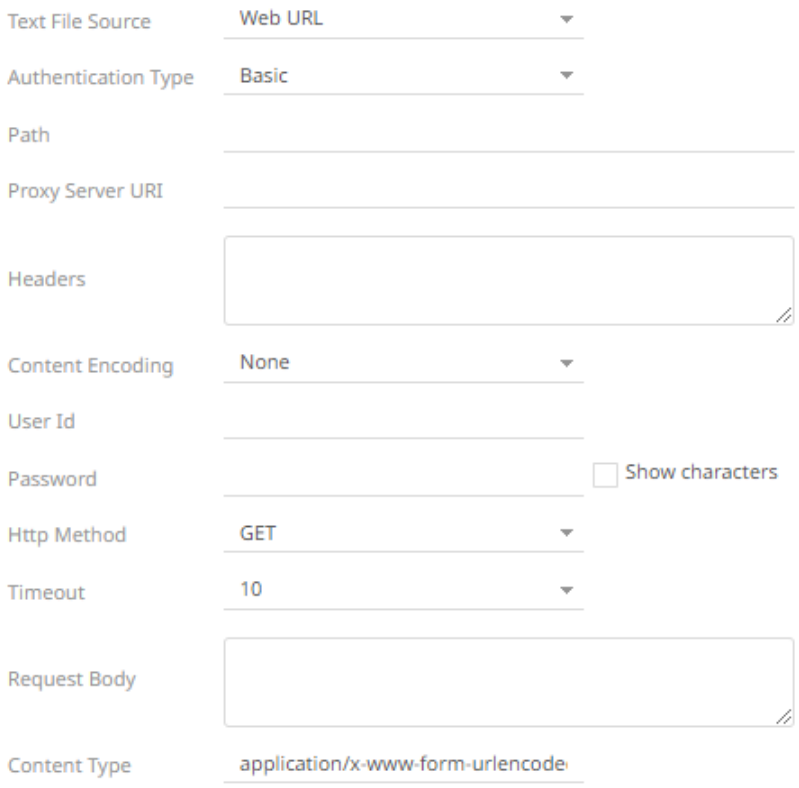
- **The Text file source is not available for the MS Excel connectors.**
- **In the Text connector, the column names can be up to 128 characters. If the length of the column names are more than 128 characters, they are truncated to 128 characters.**
- **An error notification displays upon column generation when the *Text* box is blank.**

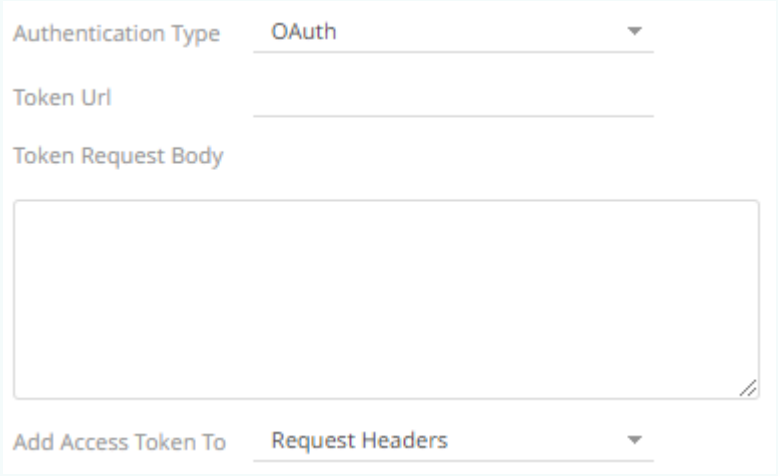


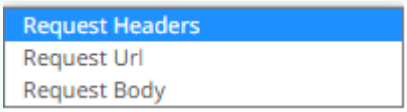
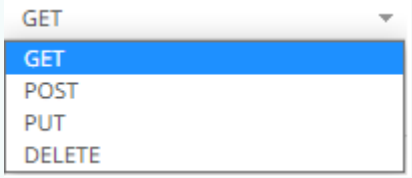
Click Close and enter the text block.

- Web URL

  The dialog changes to allow specification of the following:

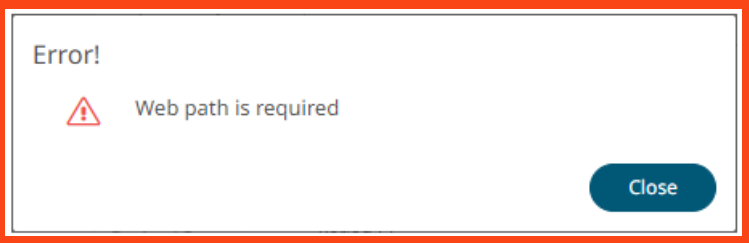


Property	Description
Authentication Type	• **Basic** Basic authentication. • **OAuth**  Then enter the following settings: ○ **Token URL** – The URL to retrieve the access token from. ○ **Token Request Body** – The request body used for access token requests.

	○ **Add Access Token To** - The Access token retrieved from the *Token URL* can be added to headers, URL or request body, depending on how the endpoint needs the token.  ▪ Request Headers - A header is automatically added to the REST API request. ▪ Request URL - The URL needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token. ▪ Request Body - The Request Body needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token. **NOTES:** • The given request body is posted to the Token URL as **application/x-www-form-urlencoded**, so the request body must be formatted like **field1=value1&field2=value2**, e.g., **client_id=xxxx&client_secret=xxxx&grant_type=client_credentials**. • Not available in the Stream Simulator connector. • If you have a pre-generated API token for the service you connect to and want to use the Bearer Authentication (Token Authentication), select the *Authentication Type* **Basic**, and manually type into the *Headers* field: **Authorization="Bearer xxxxyz_some_secret_token"** Leave the *User Id* and *Password* fields blank. The API token in the *Headers* field can be a Panopticon parameter reference, and the API token can be saved as a global server parameter.
Path	The absolute path including the HTTP where the file is located.
Proxy Server URI	The HTTP Proxy setting that will allow the connector to reach the endpoint.
Headers	• Headers are separated by a comma • Each Header is entered as **Name = Value**, where *Name* and *Value* can be enclosed in double quotes to allow inclusion of any character except for double quotes • *Name* and *Value* can also be left unquoted, in which case they may not include comma or equals characters
Content Encoding	Select the *Content Encoding* with the HTTP Header: **None, GZip, Deflate,** or **GZip and Deflate**
User Id	The user Id that will be used to connect to the connector's service.
Password	The password to connect to the connector's service. Check the **Show Characters** box to display the entered characters.
HTTP Method	Select the appropriate HTTP method for the request from the following options:  • GET – retrieve data

	• POST – add new data • PUT – replace existing data • DELETE – remove existing data
Timeout	The length of time to wait for the server response (10 to 300). Default is **10**.
Request Body	The Request Body for the HTTP POST.
Content Type	The required Content Type. Default is **application/x-www-form-urlencoded.**
Record Path	The record path that will be queried by the connector's path (e.g., **myroot.items.item**).

NOTE **An error notification displays upon column generation when the *Path* is blank.**



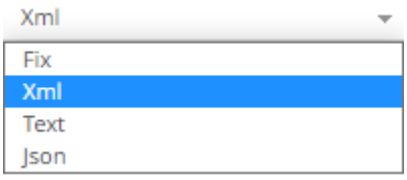
Click Close and enter the web path.

Defining the Message Type in Data Sources

Message types specify the format of the data within the message.

Steps:

1. Select the *Message Type*:

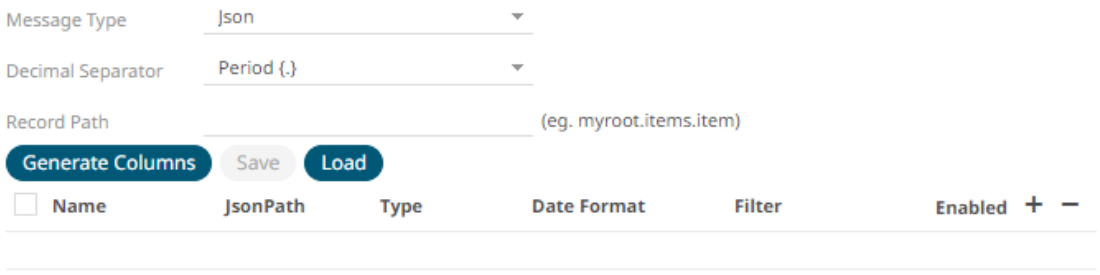


- FIX



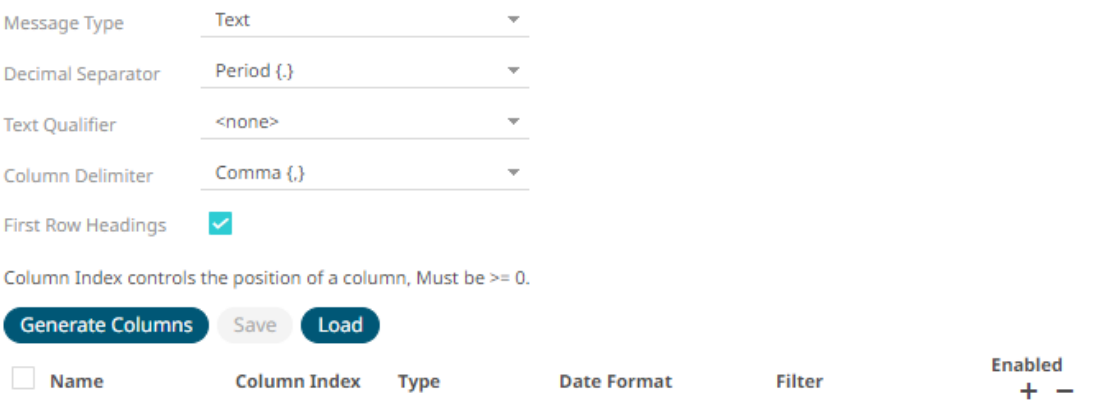
- JSON

  If **JSON** is selected, enter the *Record Path* which allows the identification of multiple records within the JSON document (e.g., **myroot.items.item**).



- Text

  If **Text** has been selected, confirm the **Decimal Separator, Text Qualifier**, **Column Delimiter**, and if the first row of the message includes column headings.



- XML



2. Define or set the columns that represent the sections of the message.

Property	Description
Name	The column name of the source schema.
Fix Tag/JsonPath/Text Column Index/XPath	The Fix Tag/JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.

NOTE **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**

For example: yyyy-MM-dd HH:mm:ss.SSSSSS

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click − .

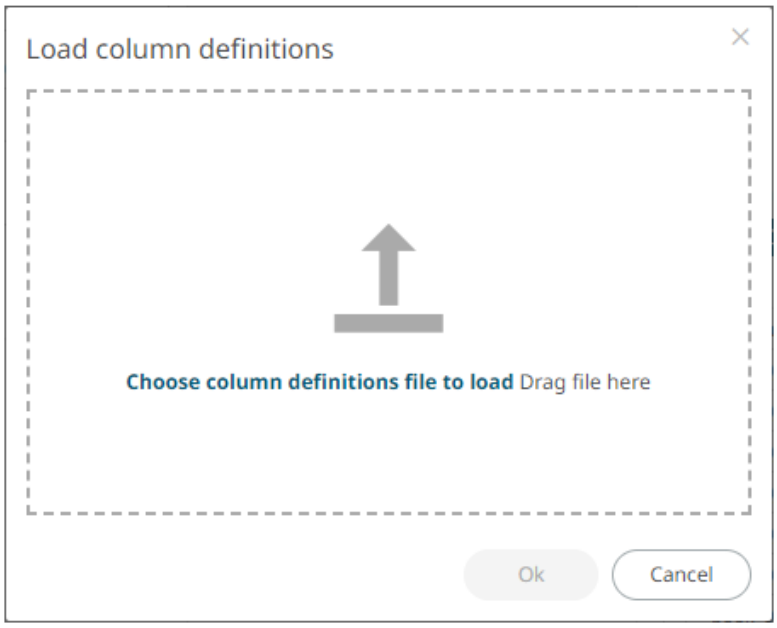
Saving or Loading Column Definitions in the Data Sources

Save or load column definitions in the data sources.

Steps:

1. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
2. Click Save to save a copy of a column definitions file (**.exs**).
3. Instead of generating columns done in step 1, click Load to load a column definitions (.exs) file.

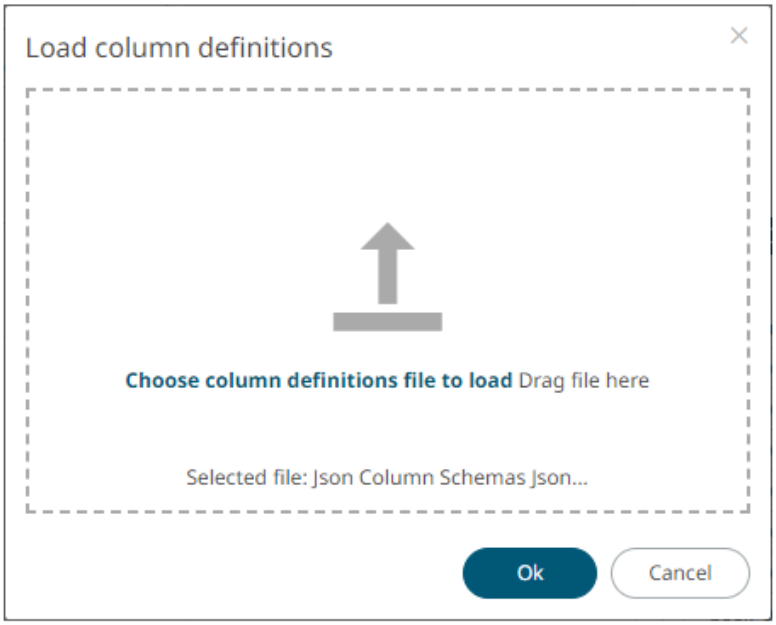
   The *Load Column Definitions* dialog displays.



   3.1. To load column definitions, you can either:

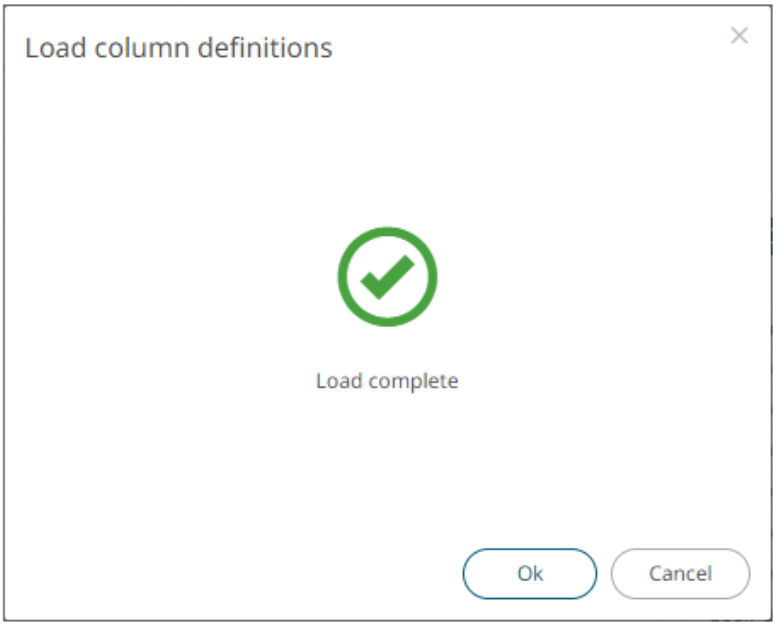
   - drag it from your desktop and drop in the dialog, or
   - click **Choose Column Definitions File to Load** and select one in the *Open* dialog that displays.

     The name of the column definitions is displayed on the loaded column definitions area.



3.2. Click Ok.

A notification displays when the file is loaded.

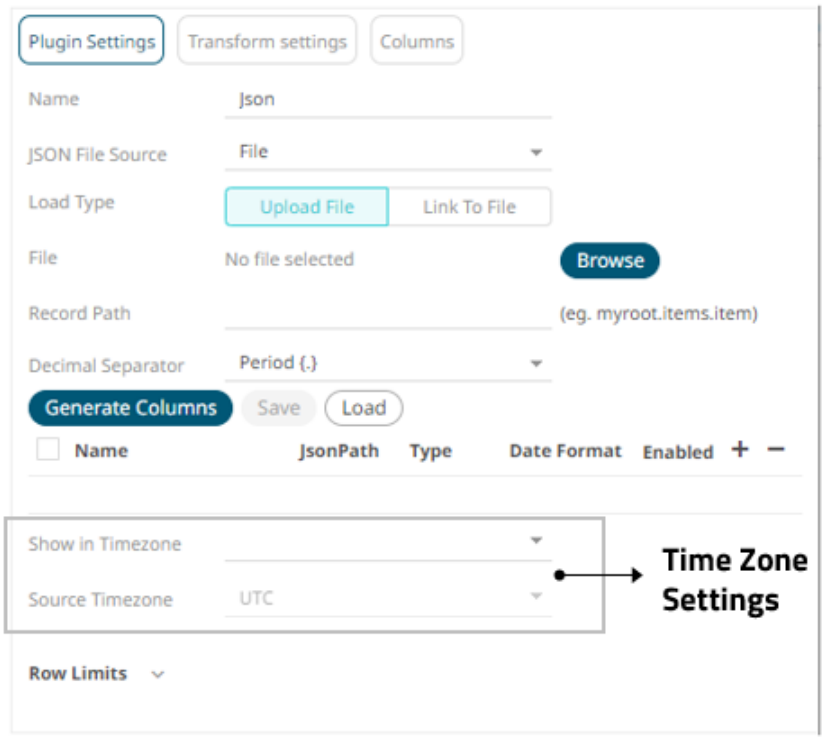


This populates the list of columns from the .exs file.

Setting Show in Timezone and Source Timezone of Data Sources

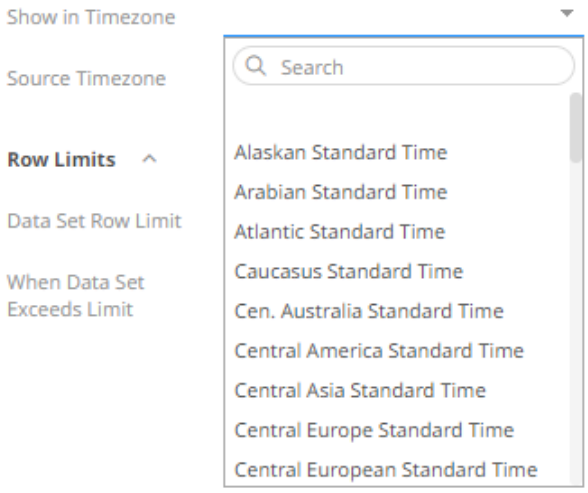
Date/Time values of output data and Date/Time inputs in the data source, where supported, is by default unchanged.

For example, in the JSON data source:



Steps:

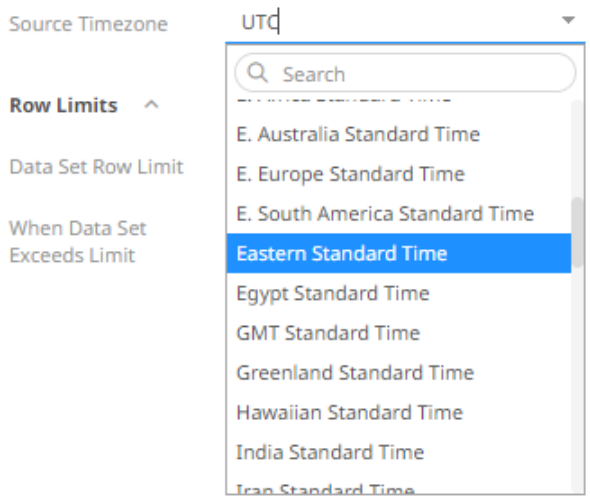
1. To present the outputs in another time zone, select the desired time zone from the *Show in Timezone* drop-down list box.



   In this case, the Date/Time values in the data source is assumed to be in **UTC**. Therefore, for the output data, values are converted from **UTC** to the selected time zone. And inputs (if any) are converted back to **UTC**.

   Use the *Search* box to search for the preferred time zone.

2. This enables the *Source Timezone* drop-down list. Select a new one if the Date/Time values in the data source are not in **UTC**.



In this case, the Date/Time values for the output data are converted from the selected *Source Timezone* to the selected *Show in Timezone*, and inputs (if any) are converted to the selected *Source Timezone*.

3. Click the **Save**  button.

Setting Row Limit of Data Sources

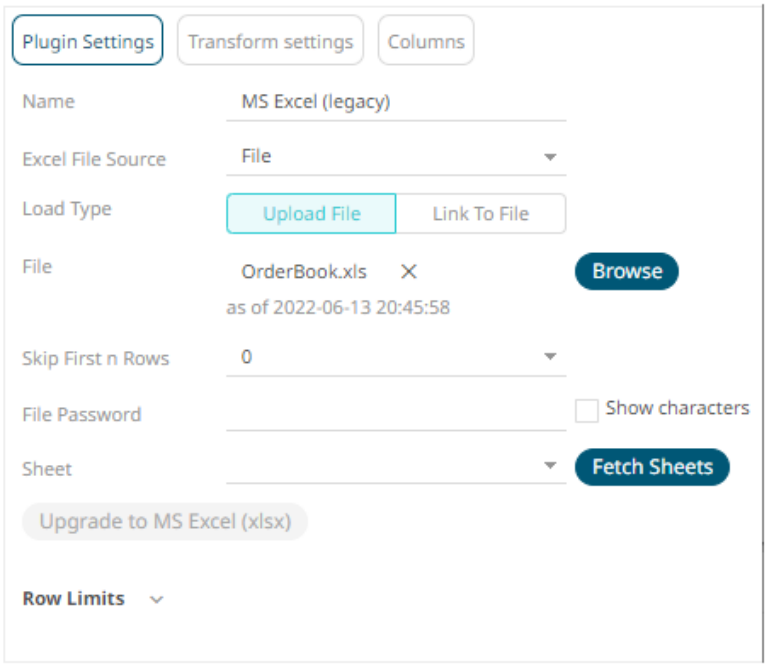
When working with large data sets, you can set the row limit for the amount of reads or loads from the data source.

Steps:

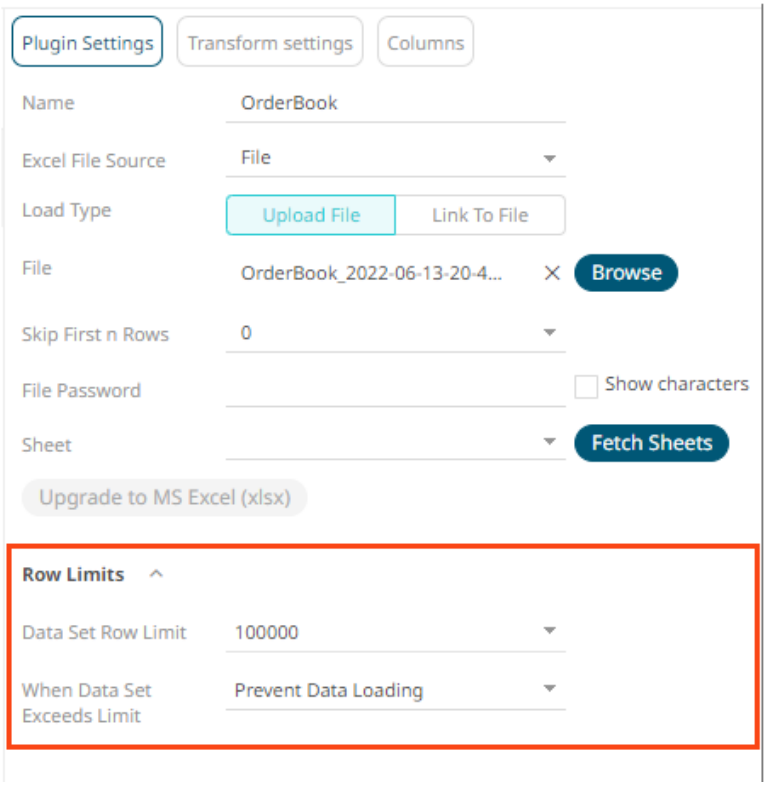
1. Click on a data source on the *Data Sources* panel. The currently selected data source is highlighted (grey background).

   The corresponding *Data Source Settings* pane is displayed.

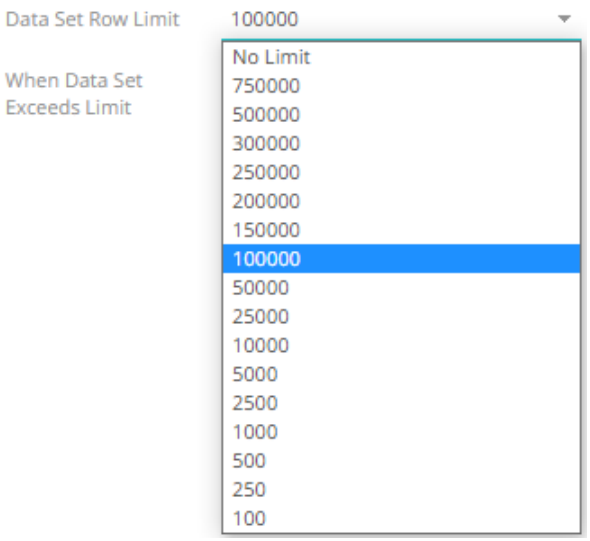
   For an MS Excel (legacy) data source, this will display:



2. Click **Row Limits** to expand and display the properties you can set.

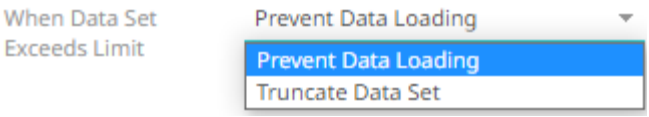


3. Click the *Data Set Row Limit* drop-down and select the value. The range of value is from **100** to **No Limit**.



NOTE ***Data Set Row Limit*** **can be parameterized.**

4. In the *When Data Set Exceeds Limit* drop-down, you can select either:



- Prevent Data Loading

  For example, there are 1000 rows of data, if you set the row limit to 100, no data will be loaded:

  To load data, ensure that the row limit is greater than the data set.

- Truncate Data Set

  This is an efficient method of deleting data (i.e., rows in a table) beyond the data row set limit. For example, if there are 1000 rows of data, if you set the row limit to 100, only 100 rows of data will be loaded. The remaining or the rest of the records/rows in the data set will be truncated.

5. Click the **Save**  button.

JOINING MULTIPLE DATA SOURCES

There are occasions where the desired data is not achieved or available using a single query and table. This is often the case with time series where you want to join a static data set to a time series database.

To join multiple tables, add the source tables in the *Data Table Editor* view and join them using a common field or a join key. Furthermore, you can also perform a transform of a table for time series analysis, if required.

NOTE

- **Joining two data sources can be done using more than one left and right key columns is now supported.**
- **It is no longer needed to modify the data types to text to join data sources.**

In this section, we will discuss how to join the following sample tables using two common fields.

Sample Table 1

Item	isodatetime	ask_price	ask_volume	bid_price	bid_volume
Price	2008/01/17 13:00:00	17.75	2	17.65	1
Rate	2008/01/17 13:00:01	17.70	2	17.64	1
Price	2008/01/17 13:00:00	17.74	1	17.61	1

Sample fields

Sample Table 2

TradeID	RatePrice	ISODateTime	trade_price	trade_volume	Side	AggressivePassiveDark
1	Price	2008/01/17 13:00:00	17.79	200	Buy	Aggressive
2	Rate	2008/01/17 13:00:02	17.65	100	Sell	Dark
3	Price	2008/01/17 13:00:04	17.72	100	Buy	Dark
4	Price	2008/01/17 13:00:06	17.71	200	Sell	Passive

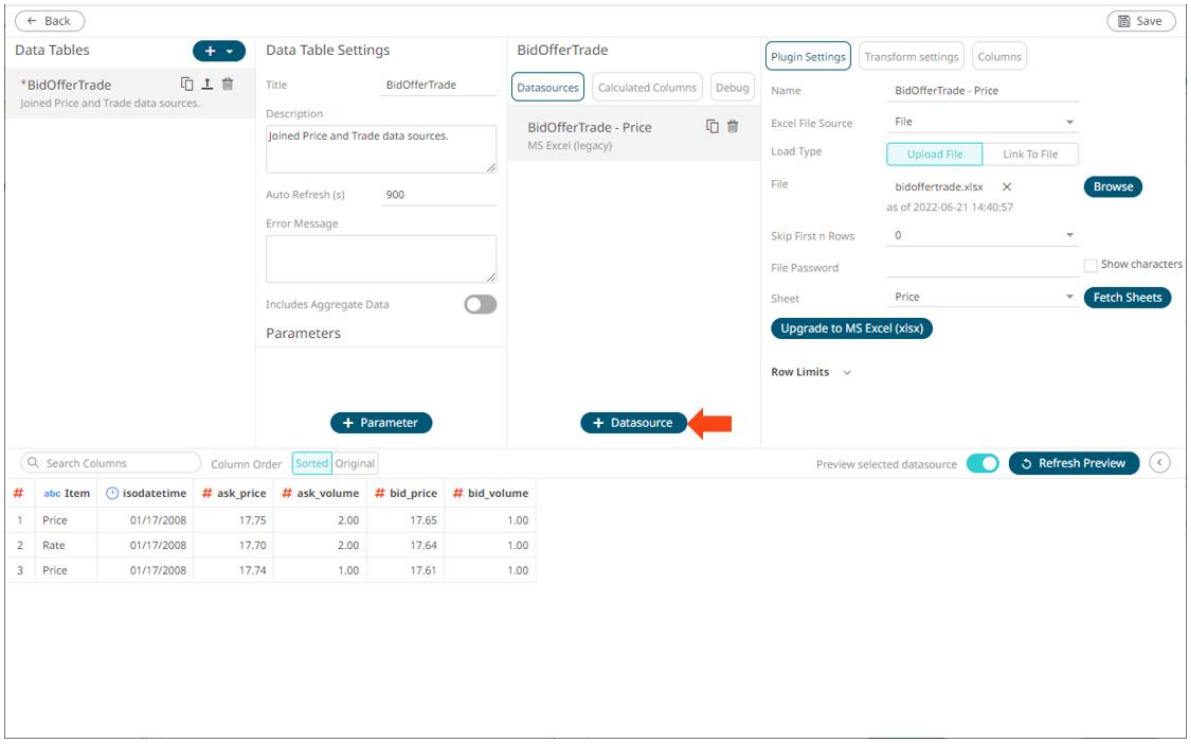
Sample fields

Steps:

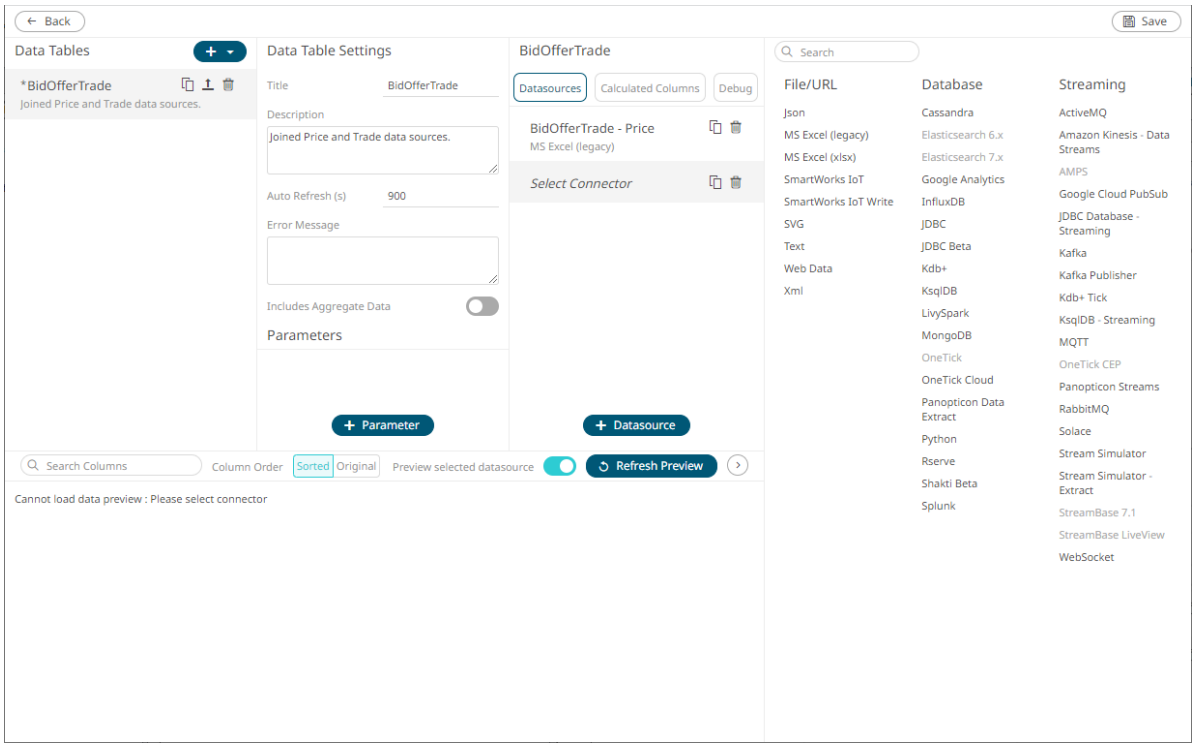
1. On the *Data Sources Settings* pane, add a new data source by clicking the **Add Data Source**



button.

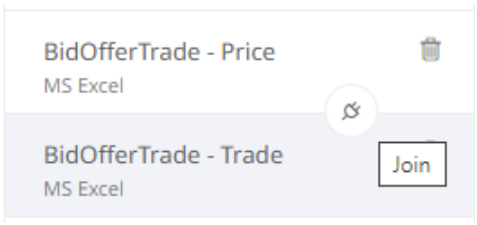


The list of available connectors is displayed on the *Connectors* panel.

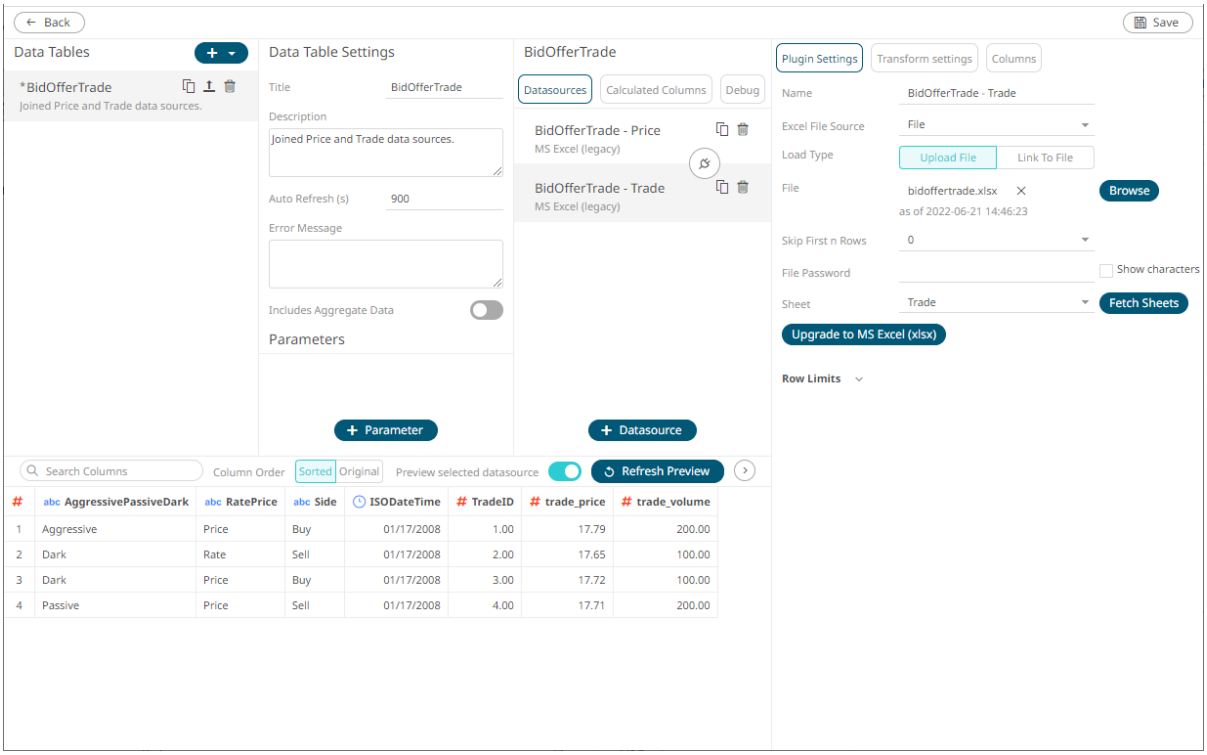


2. Select a data connector to browse the new data source.

When there are two or more data sources on the *Data Sources* area, the **Join** icon is displayed.

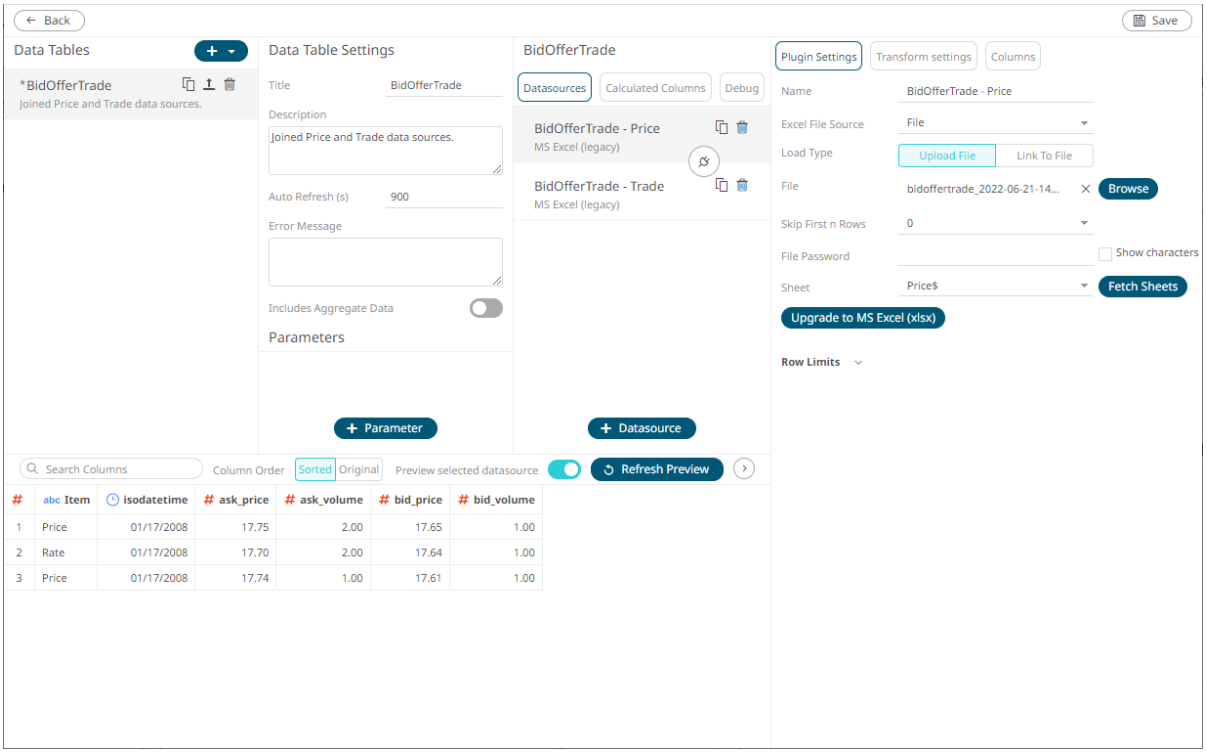


Here is a sample with the `bidoffertrade.xlsx – Price` and `bidoffertrade.xlsx – Trade` data sources:



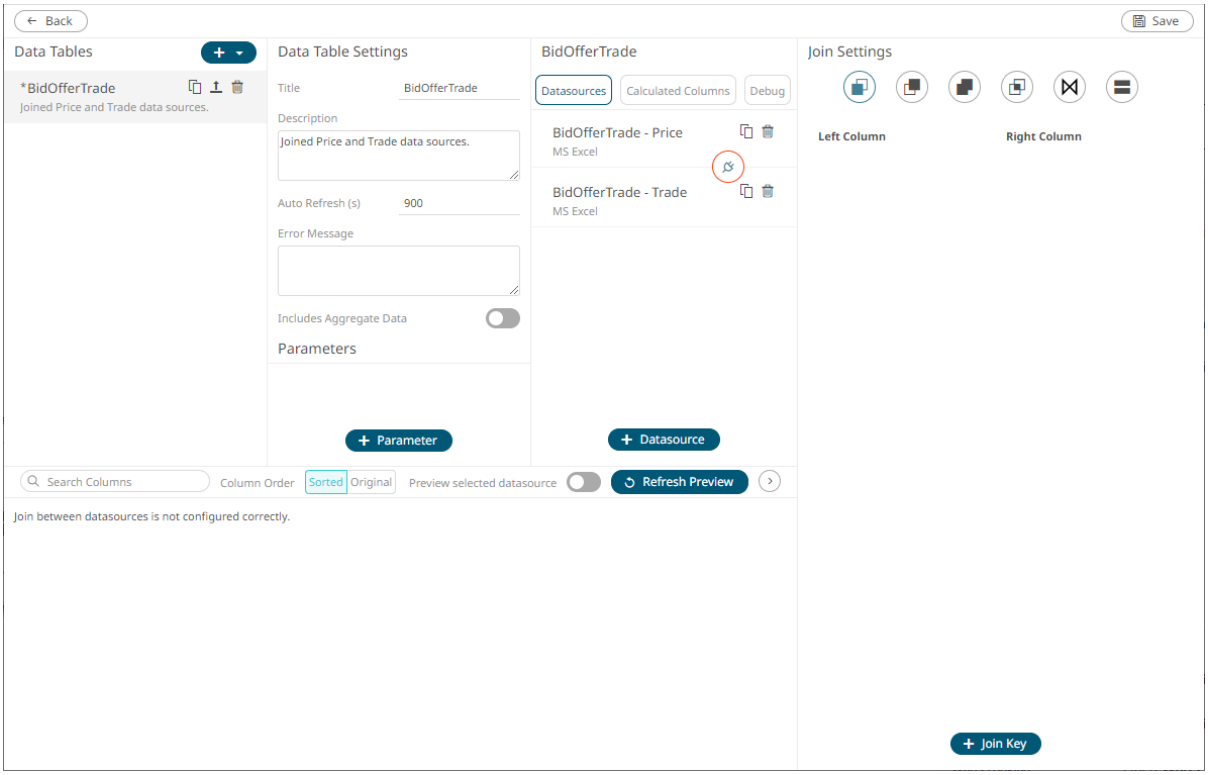
The *Data Preview* area displays the data of the highlighted or selected data source `bidoffertrade.xlsx – Trade`.

To display the other data source (`bidoffertrade.xlsx – Price`) on the *Data Sources Preview* area, click the data source.



3. To join the data sources, click the **Join**  icon.

The icon changes to  and the *Join Settings* pane displays.



4. Select the join *Type*:

   - Left Outer Join 

     Keeps all rows from the left table. When there are no matching values from the right table, empty values will be returned.

   - Right Outer Join 

     Keeps all rows from the right table. When there are no matching values from the left table, empty values will be returned.

   - Full Outer Join 

     Returns all rows from both tables, whether they have a matching row or not.

   - Inner Join 

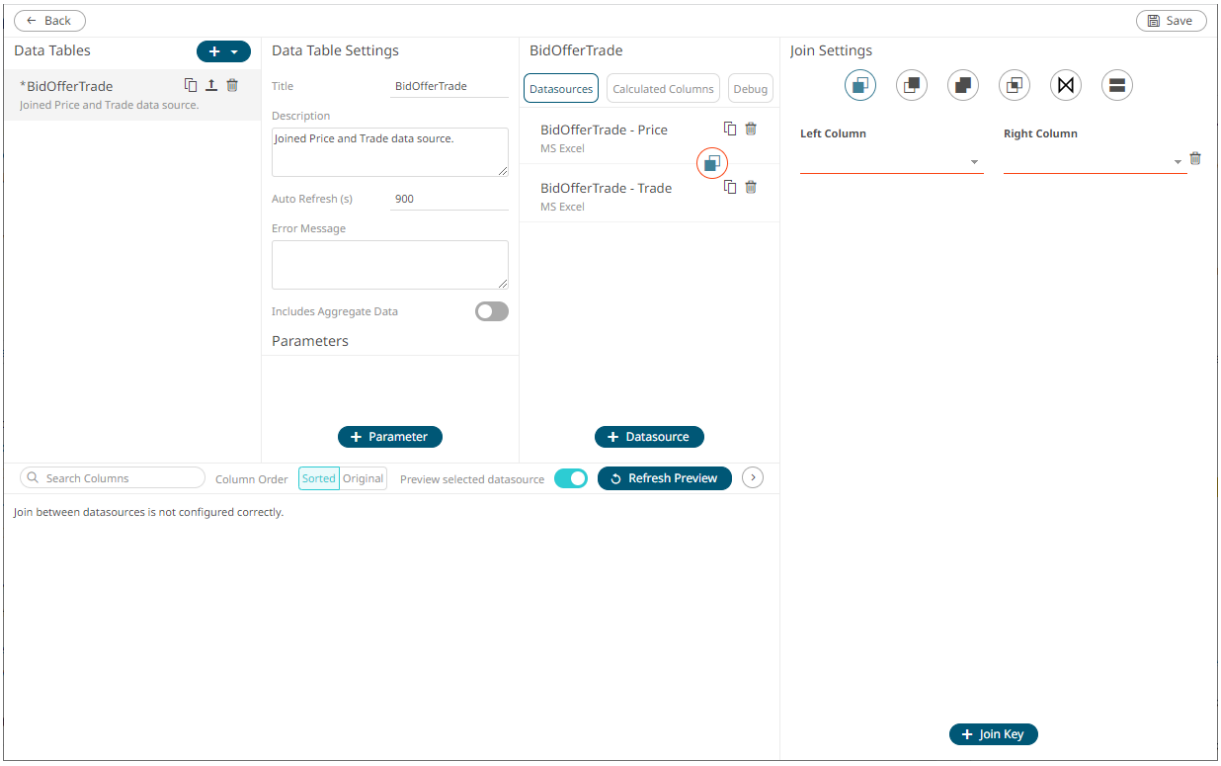
     Selects only rows from both tables for which the join keys match.

   - Cross Join 

     Returns the Cartesian product of rows from tables in the join.

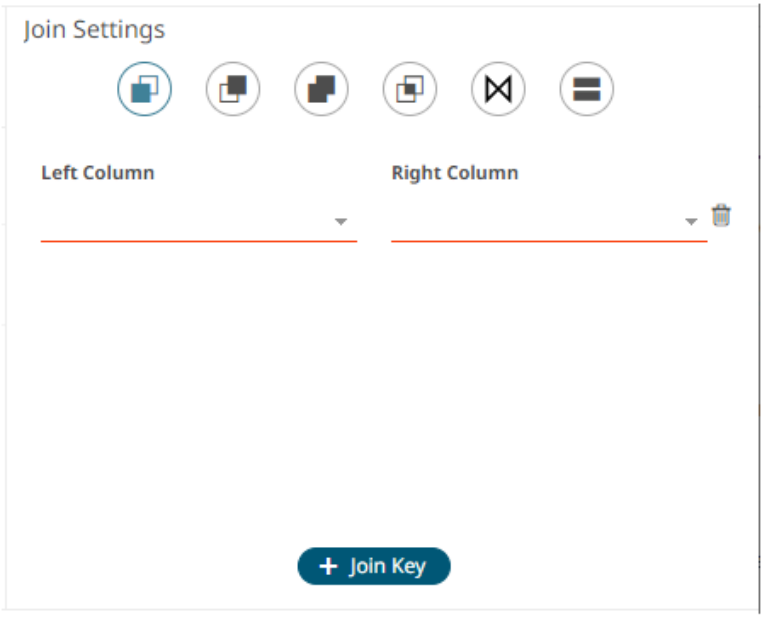
5. Click 

.



6. Select the unique ID from the *Left Column* data source from the drop-down list that will be used to match the unique ID from the *Right Column* data source (e.g., **Item**).

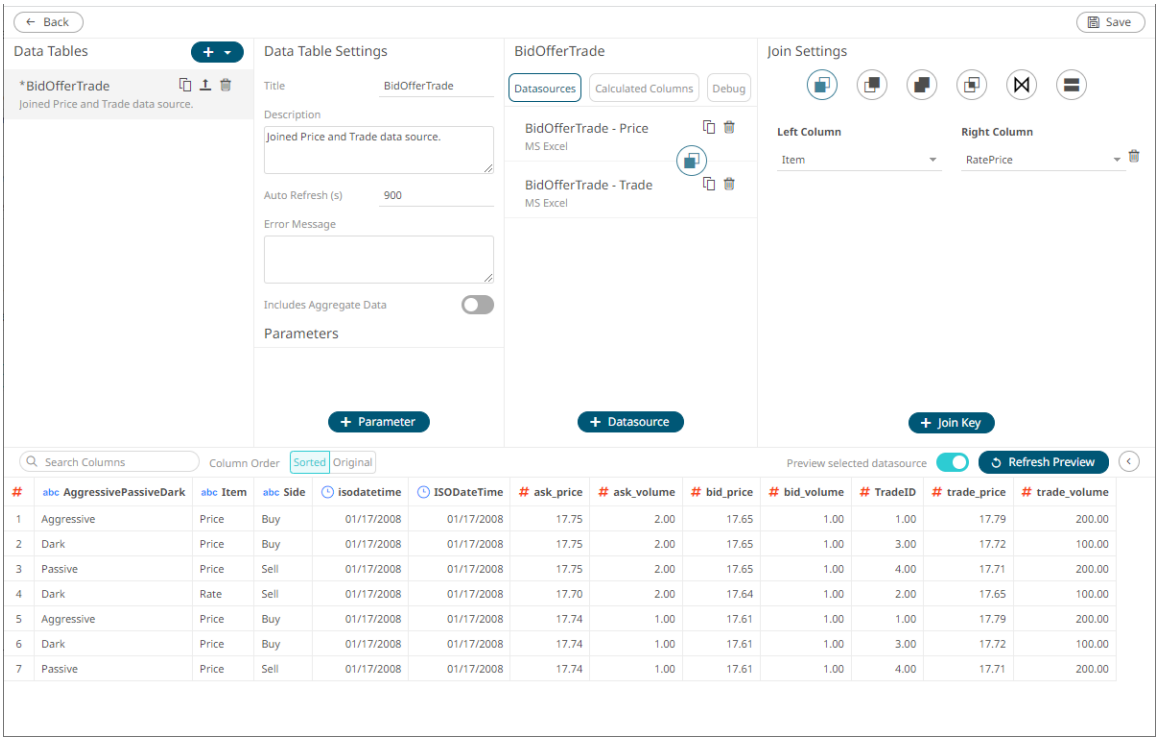
7. Select the unique ID from the *Right* data source from the drop-down list (e.g., **RatePrice**).



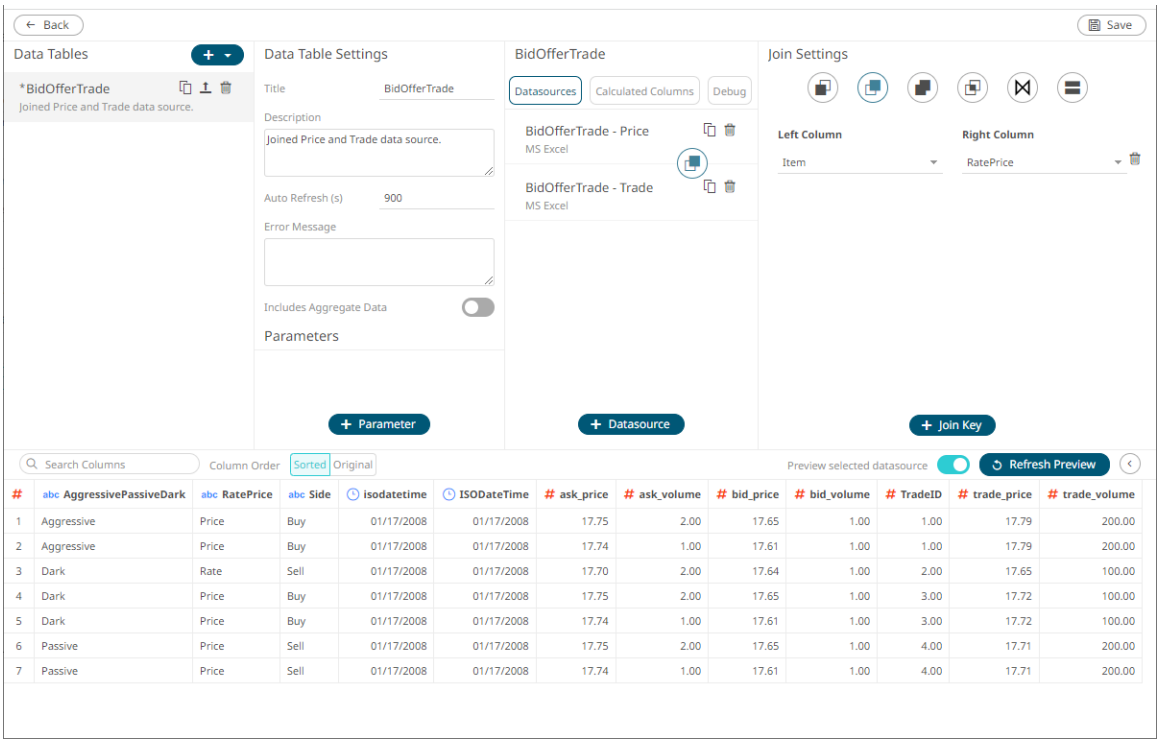
8. Click Refresh Preview then click to expand the *Data Preview* pane.

   The selected join type is displayed in the *Join* definition box and the data table of the joined data sources is loaded on the *Data Sources Preview* area.

   - For the *Left Outer Join*, the joined table now displays seven rows based on the **Item** join key of the left table.

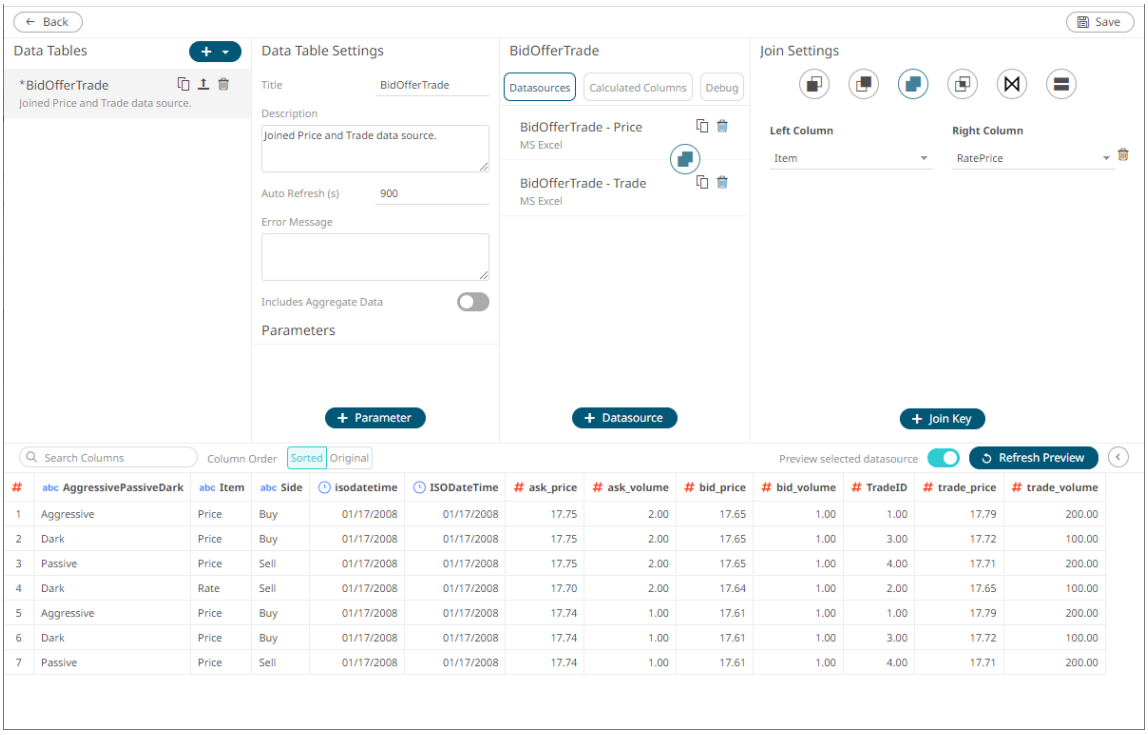


   - For the *Right Outer Join*, the joined table now displays seven rows based on the **RatePrice** join key of the right table.



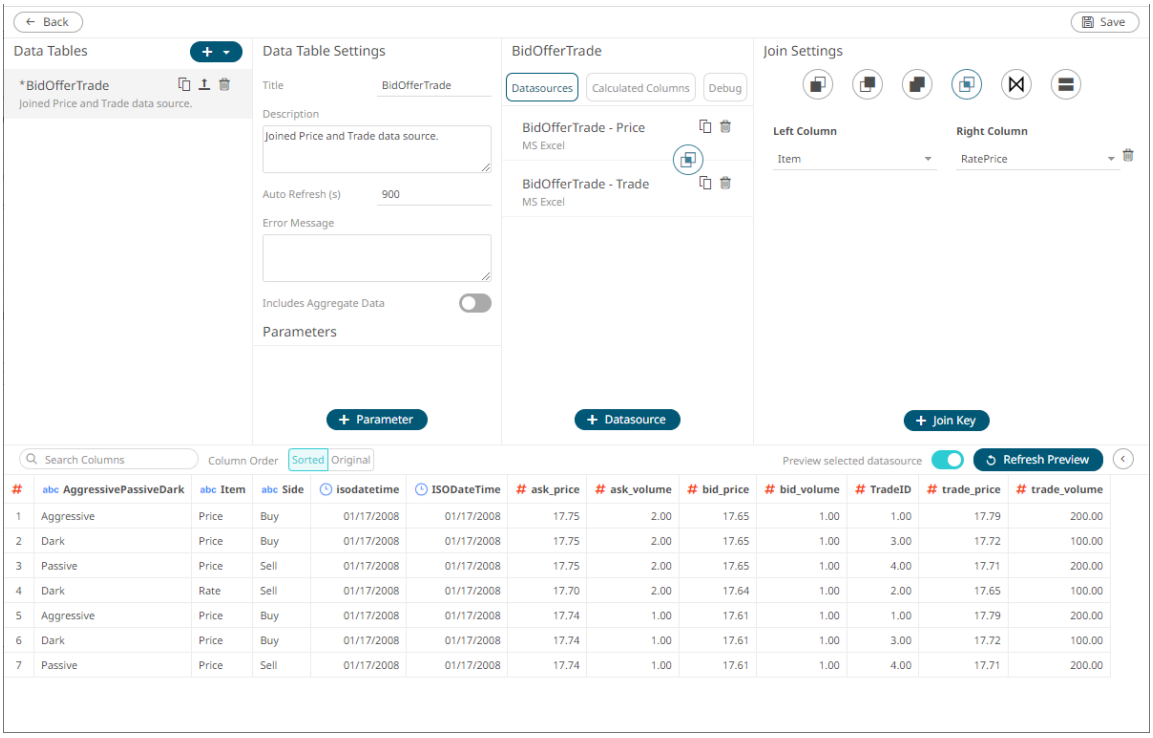
#	AggressivePassiveDark	RatePrice	Side	isodatetime	ISODateTime	ask_price	ask_volume	bid_price	bid_volume	TradeID	trade_price	trade_volume
1	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	1.00	17.79	200.00
2	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	1.00	17.79	200.00
3	Dark	Rate	Sell	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	2.00	17.65	100.00
4	Dark	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	3.00	17.72	100.00
5	Dark	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	3.00	17.72	100.00
6	Passive	Price	Sell	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	4.00	17.71	200.00
7	Passive	Price	Sell	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	4.00	17.71	200.00

- For the *Full Outer Join*, the joined table now displays all rows that are matching or not matching based on the **Item/RatePrice** join keys of both tables.



#	AggressivePassiveDark	Item	Side	isodatetime	ISODateTime	ask_price	ask_volume	bid_price	bid_volume	TradeID	trade_price	trade_volume
1	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	1.00	17.79	200.00
2	Dark	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	3.00	17.72	100.00
3	Passive	Price	Sell	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	4.00	17.71	200.00
4	Dark	Rate	Sell	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	2.00	17.65	100.00
5	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	1.00	17.79	200.00
6	Dark	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	3.00	17.72	100.00
7	Passive	Price	Sell	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	4.00	17.71	200.00

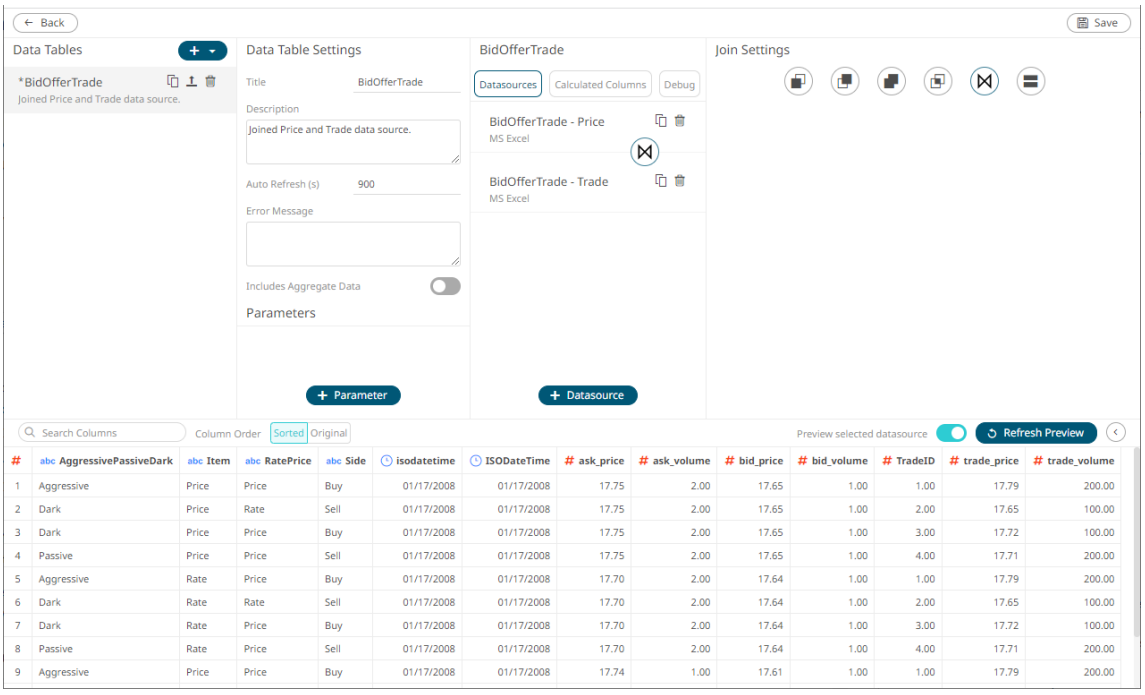
- For the *Inner Join*, the joined table now displays seven rows based on the **Item/RatePrice** join keys of both tables.



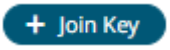
#	AggressivePassiveDark	Item	Side	isodatetime	ISODateTime	ask_price	ask_volume	bid_price	bid_volume	TradeID	trade_price	trade_volume
1	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	1.00	17.79	200.00
2	Dark	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	3.00	17.72	100.00
3	Passive	Price	Sell	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	4.00	17.71	200.00
4	Dark	Rate	Sell	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	2.00	17.65	100.00
5	Aggressive	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	1.00	17.79	200.00
6	Dark	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	3.00	17.72	100.00
7	Passive	Price	Sell	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	4.00	17.71	200.00

- For the *Cross Join*, the joined table now displays twelve rows based on the combination of each row from the first table with each row from the second table.

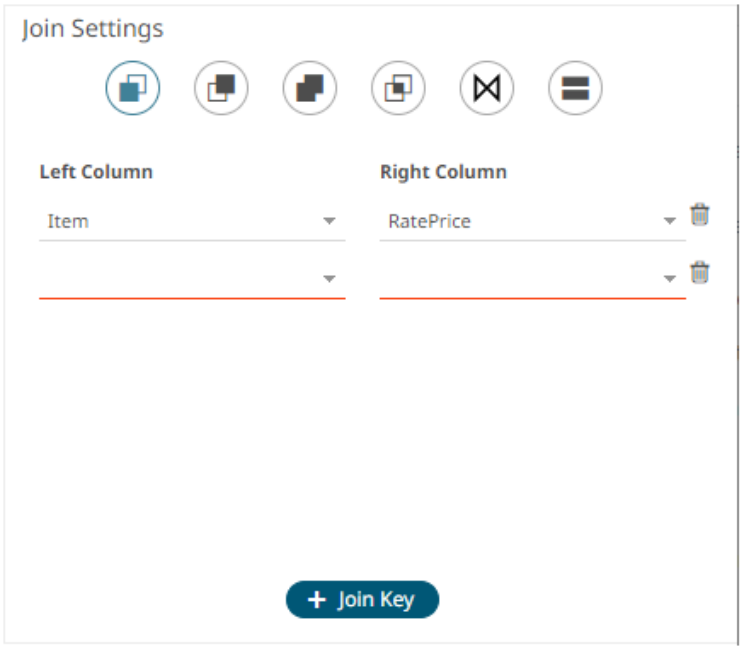
  Note that *Join Keys* definition is not available.



#	AggressivePassiveDark	Item	RatePrice	Side	isodatetime	ISODateTime	ask_price	ask_volume	bid_price	bid_volume	TradeID	trade_price	trade_volume
1	Aggressive	Price	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	1.00	17.79	200.00
2	Dark	Price	Rate	Sell	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	2.00	17.65	100.00
3	Dark	Price	Price	Buy	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	3.00	17.72	100.00
4	Passive	Price	Price	Sell	01/17/2008	01/17/2008	17.75	2.00	17.65	1.00	4.00	17.71	200.00
5	Aggressive	Rate	Price	Buy	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	1.00	17.79	200.00
6	Dark	Rate	Rate	Sell	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	2.00	17.65	100.00
7	Dark	Rate	Price	Buy	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	3.00	17.72	100.00
8	Passive	Rate	Price	Sell	01/17/2008	01/17/2008	17.70	2.00	17.64	1.00	4.00	17.71	200.00
9	Aggressive	Price	Price	Buy	01/17/2008	01/17/2008	17.74	1.00	17.61	1.00	1.00	17.79	200.00

9. Now, let us add new left and right join keys. Click  on the *Join Settings* pane.

   A new *Left Column* and *Right Column* entry displays.

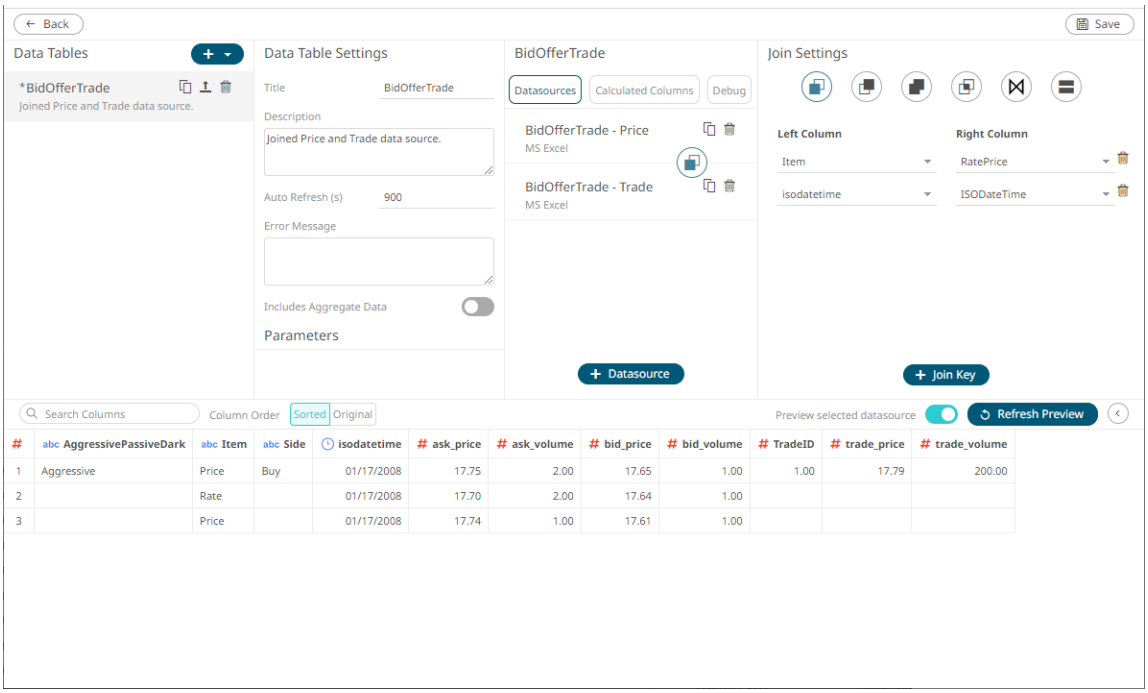


10. Select the left and right join keys (e.g., **isodatetime** and **ISODateTime**)
11. Again, select the join *Type.*
12. Click Refresh Preview.

    The selected join type is displayed in the *Join* definition box and the data table of the joined data sources is loaded on the *Data Sources Preview* area.

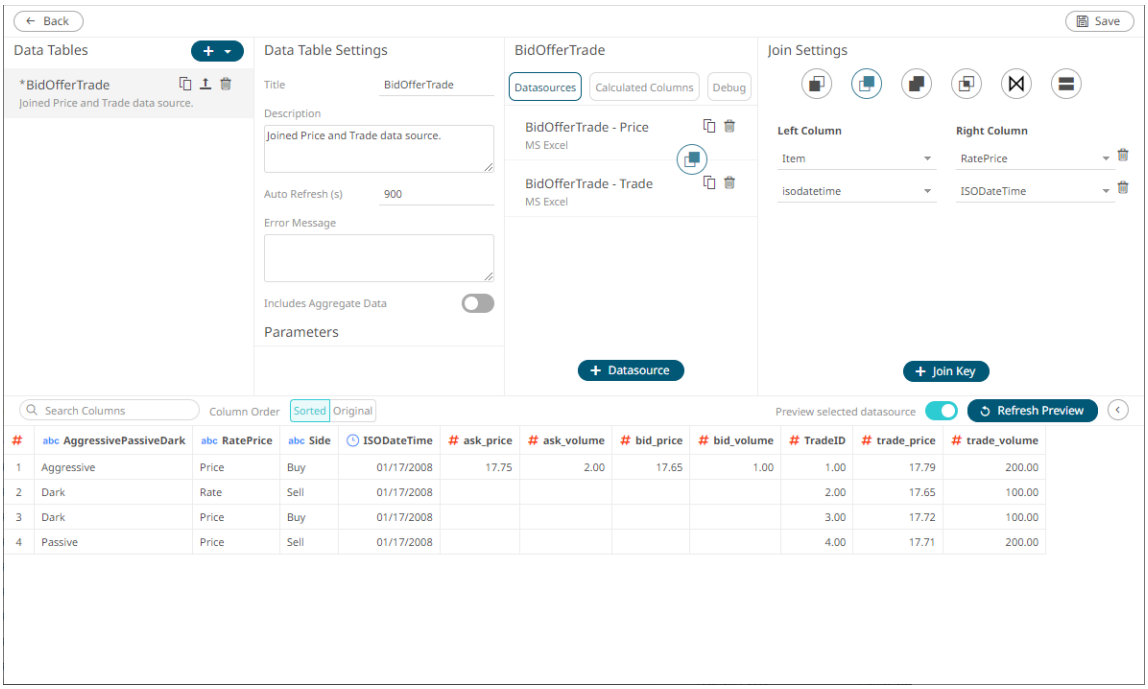
    - For the *Left Outer Join*, the joined table now displays three rows based on the Item and **isodatetime** join keys of the left table.

      All of the rows from the left table are kept. Note that for the rows with no matching values from the right table, empty values are returned.

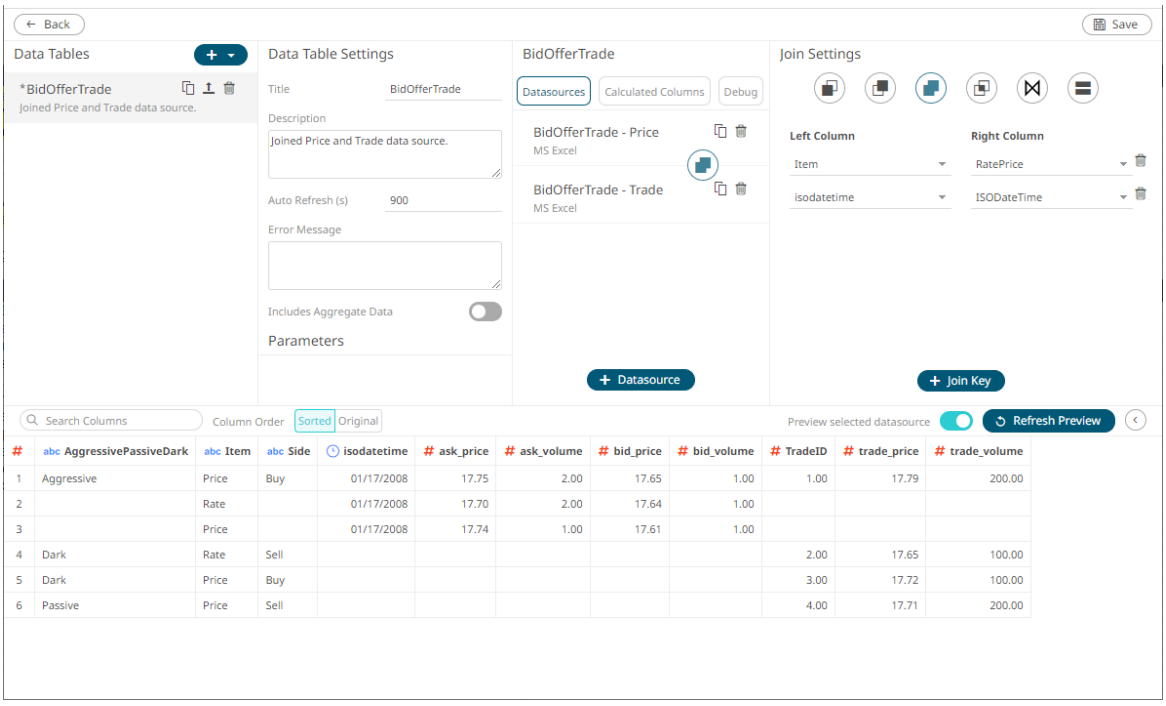


- For the *Right Other Join*, the joined table now displays four rows based on the **RatePrice** and **ISODateTime** join keys of the right table.

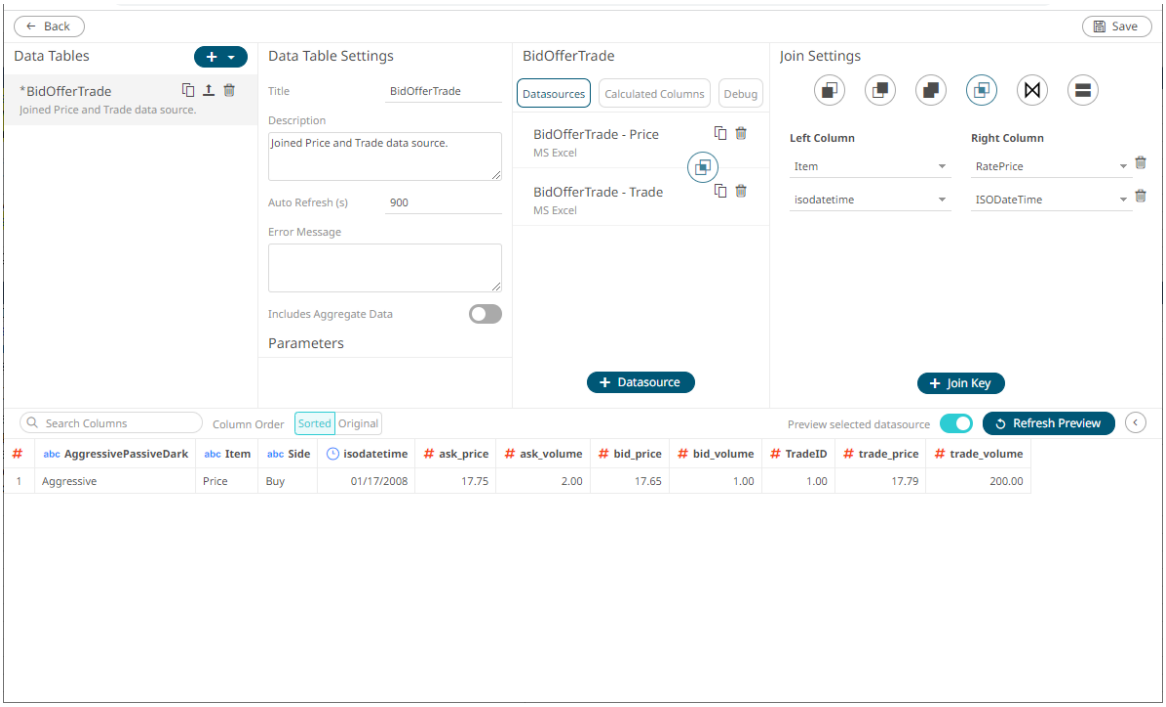
  All of the rows from the right table are kept. Note that for the rows with no matching values from the left table, empty values are returned.



- For the *Full Outer Join*, , the joined table now displays six rows from both tables. The first row is based on the **Item/RatePrice** and **isodatetime/ISODateTime** join keys of both tables while the next five rows are those that did not match the join keys.

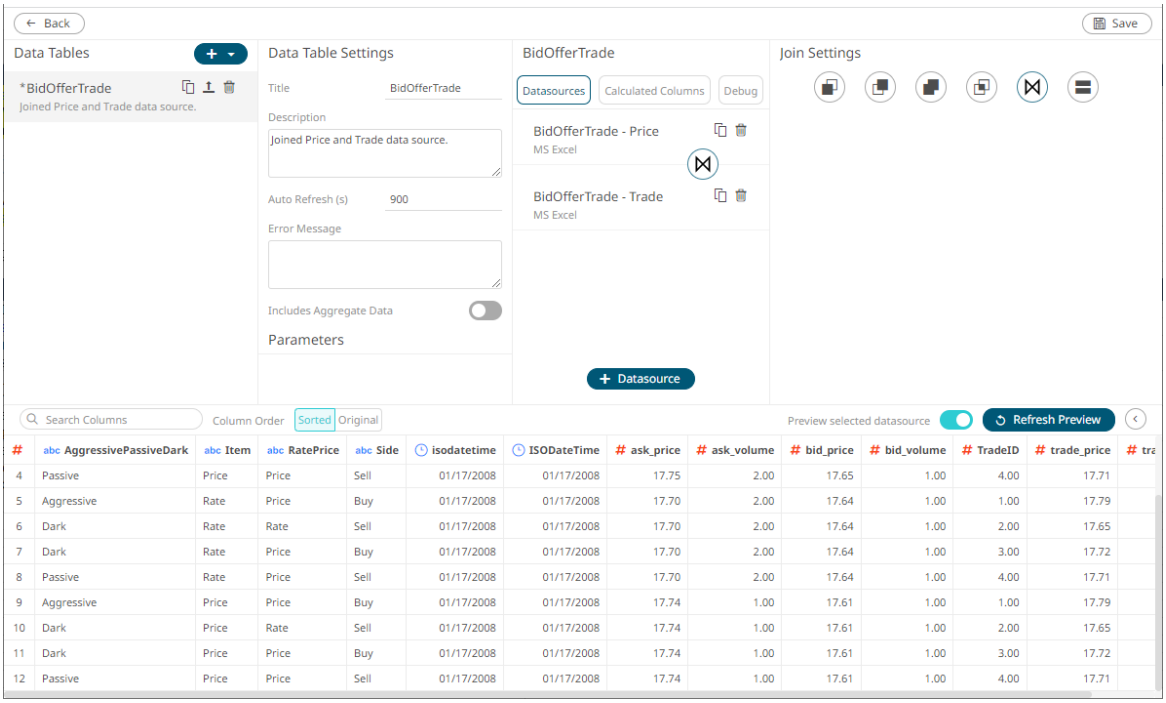


- For the *Inner Join*, the joined table now displays one row based on the **Item/RatePrice** and **isodatetime/ISODateTime** join keys of both tables.



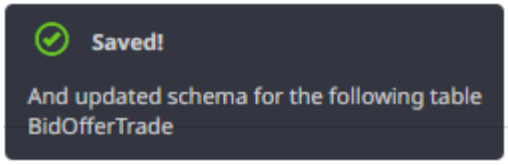
- For the *Cross Join*, the joined table now displays twelve rows based on the combination of each row from the first table with each row from the second table.

  Note that *Join Keys* definition is not available.



13. To delete left and right join keys in the *Join Settings* pane, click .

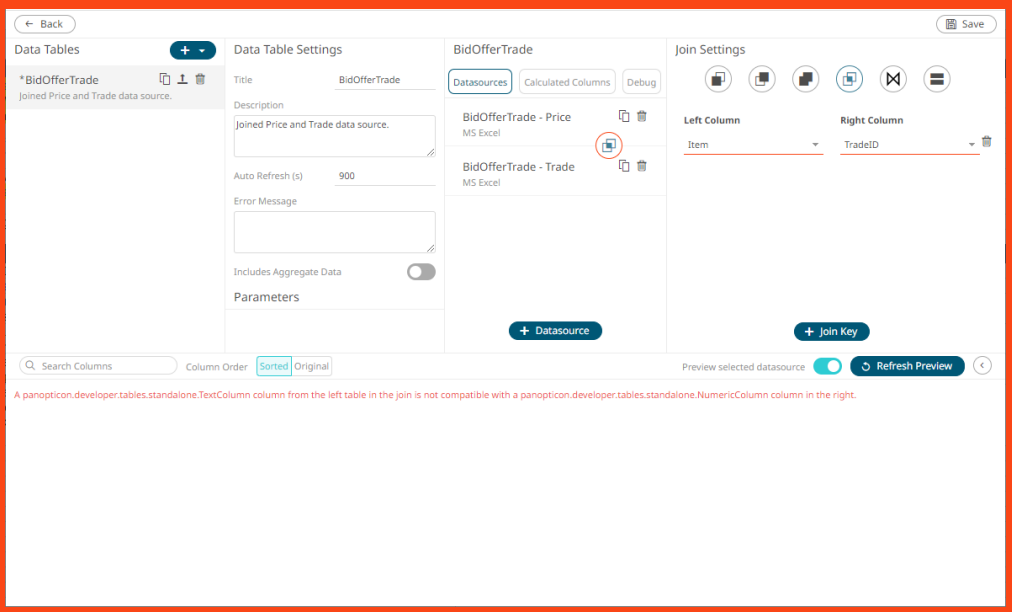
14. Click Save to save the join. Once saved, a notification message displays.



NOTE **If there is an error in the join definition, the Join icon or Left/Right Column drop-down is marked with a red border. Consequently, the preview is not displayed.**

For example, if the join keys have different data types, an error message is displayed:

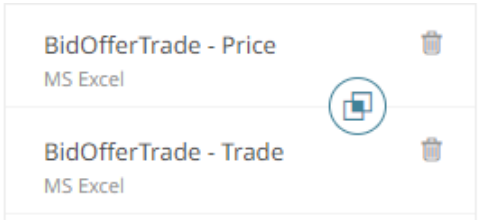
"A panopticon.developer.tables.standalone.TextColumn column from the left table in the join is not compatible with a panopticon.developer.tables.standalone.NumericColumn column in the right."



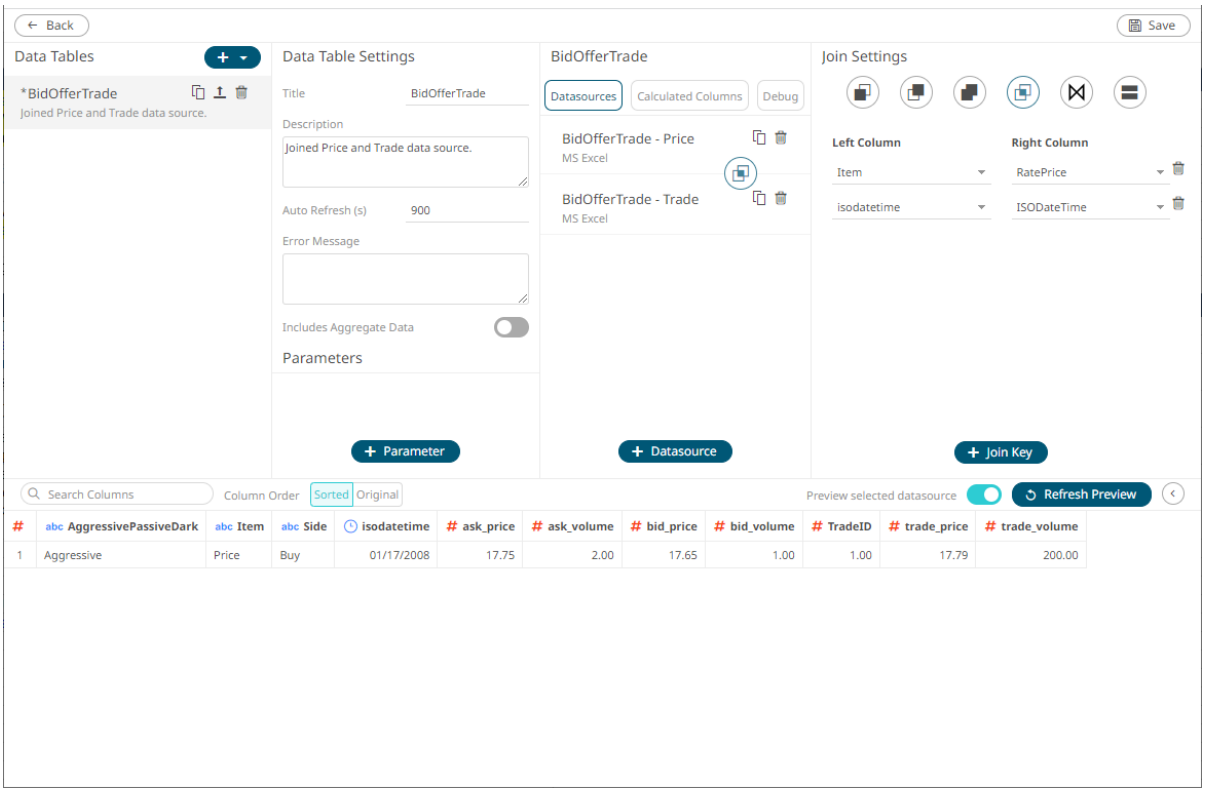
Modifying the Join Definition

Steps:

1. Click the **Join** button.



The *Join Settings* pane displays with the join definition.



2. Modify the join type or select another unique ID from the right or left data source or add new left and right join keys.
3. Click 

.

   The selected join type or union all is displayed in the *Join* or *Union All* definition box and the data table of the joined or combined data sources is loaded on the *Data Sources Preview* area.

UNION ALL OF MULTIPLE DATA SOURCES

There are occasions where the source data is held across multiple disparate repositories so that the rows of the data set are distributed. In this case, instead of doing a Join, perform a Union All.

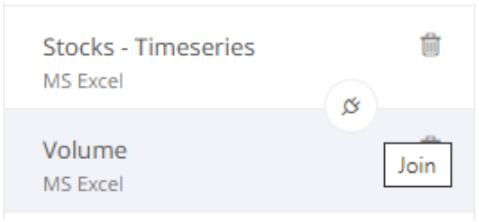
Common use cases for union all include:

- Performance data to its benchmark.
- Historical data from a database to current streaming data from a message bus.

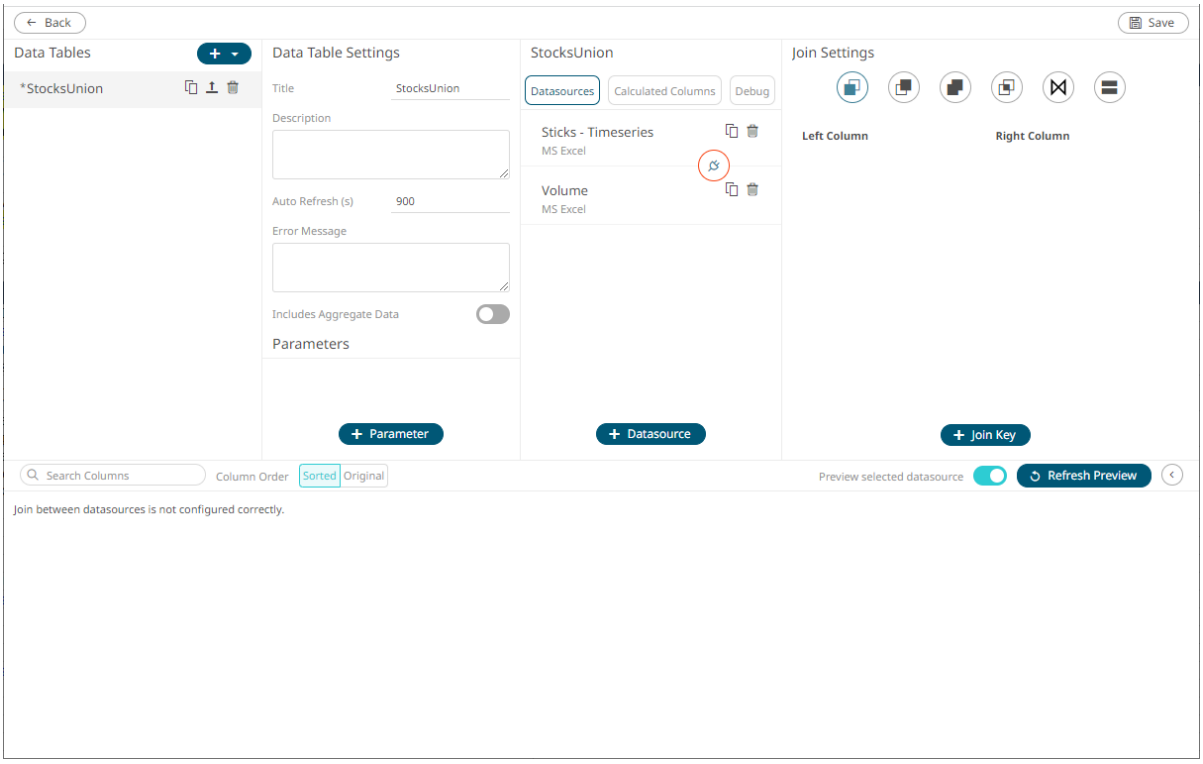
Union All is done based on column position and requires data type match between data sources.

Steps:

1. To join the data sources, click the **Join**  button.



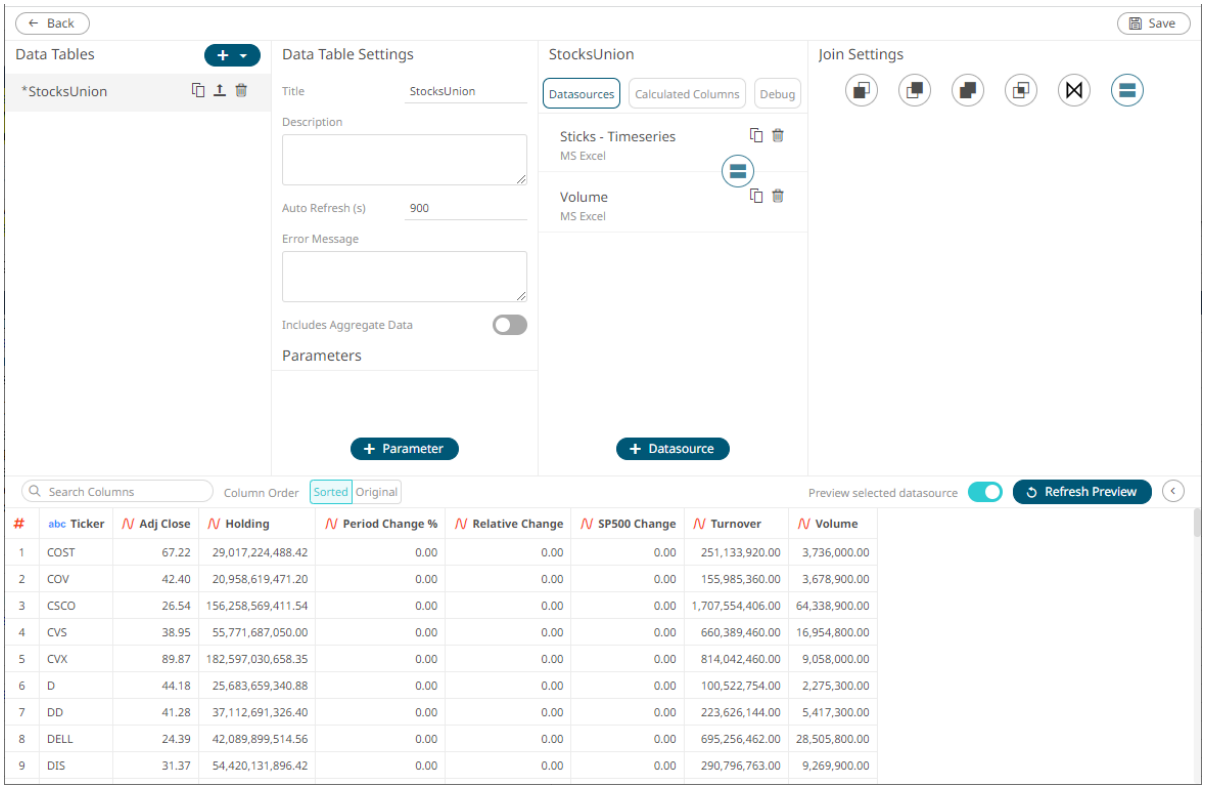
The *Join Settings* pane displays.



2. Select **Union All**  then click 

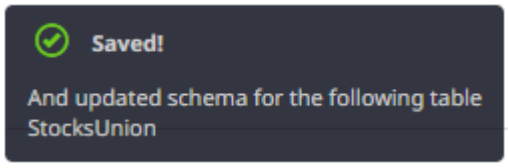
.

   The result of the union all is displayed in the *Data Source Preview*.



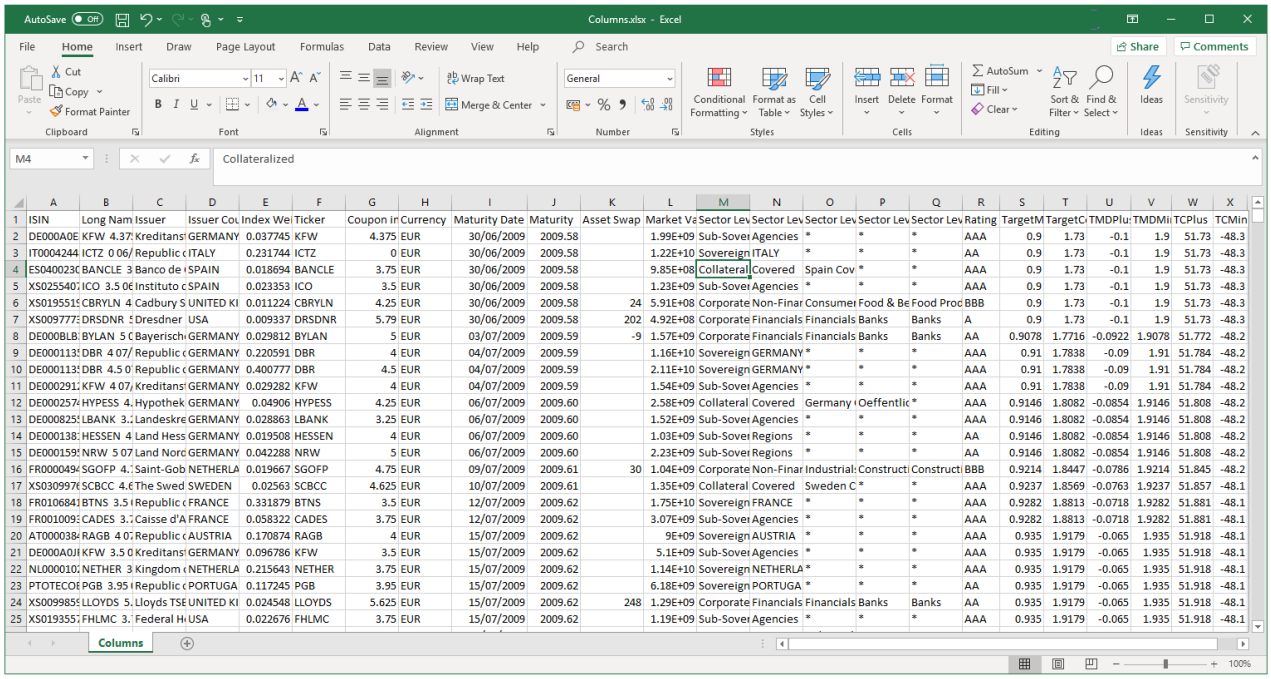
3. Click 

. Once saved, a notification displays.



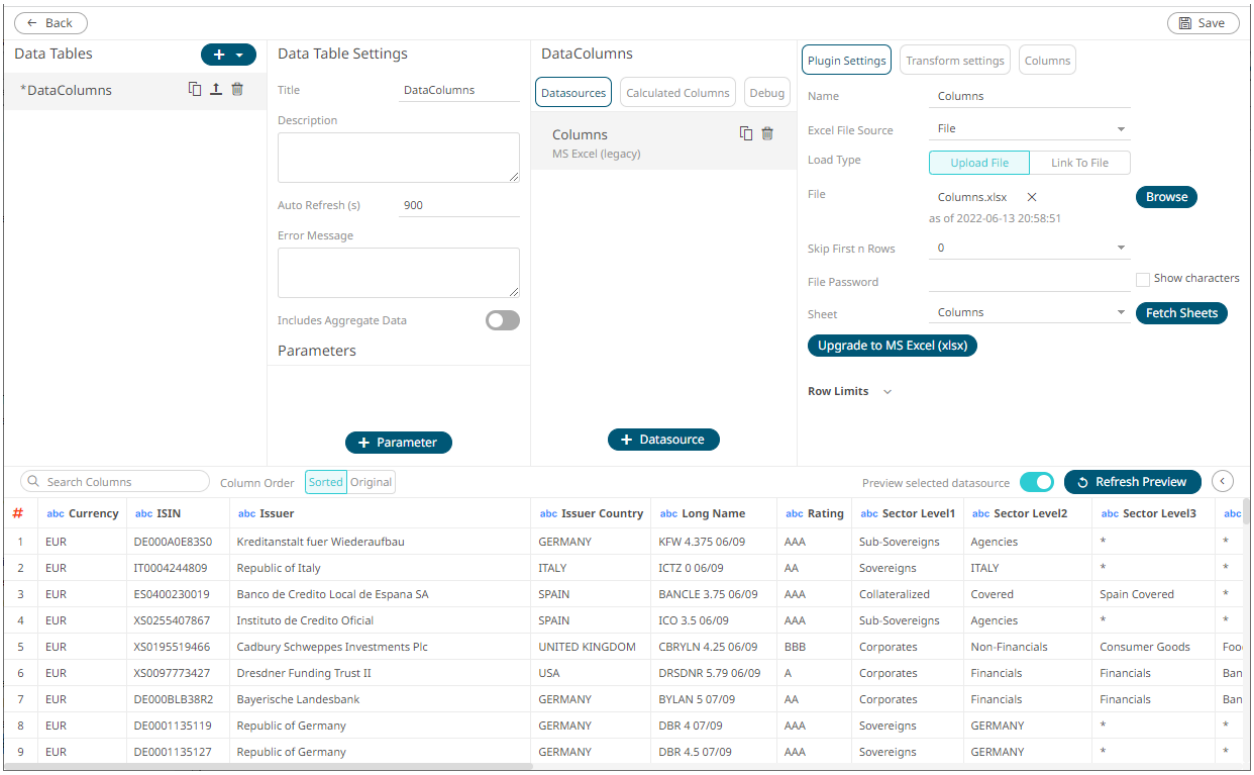
GROUPING AND SORTING COLUMNS

Below is an example of an MS Excel data source with text, numeric, and Date/Time data types.



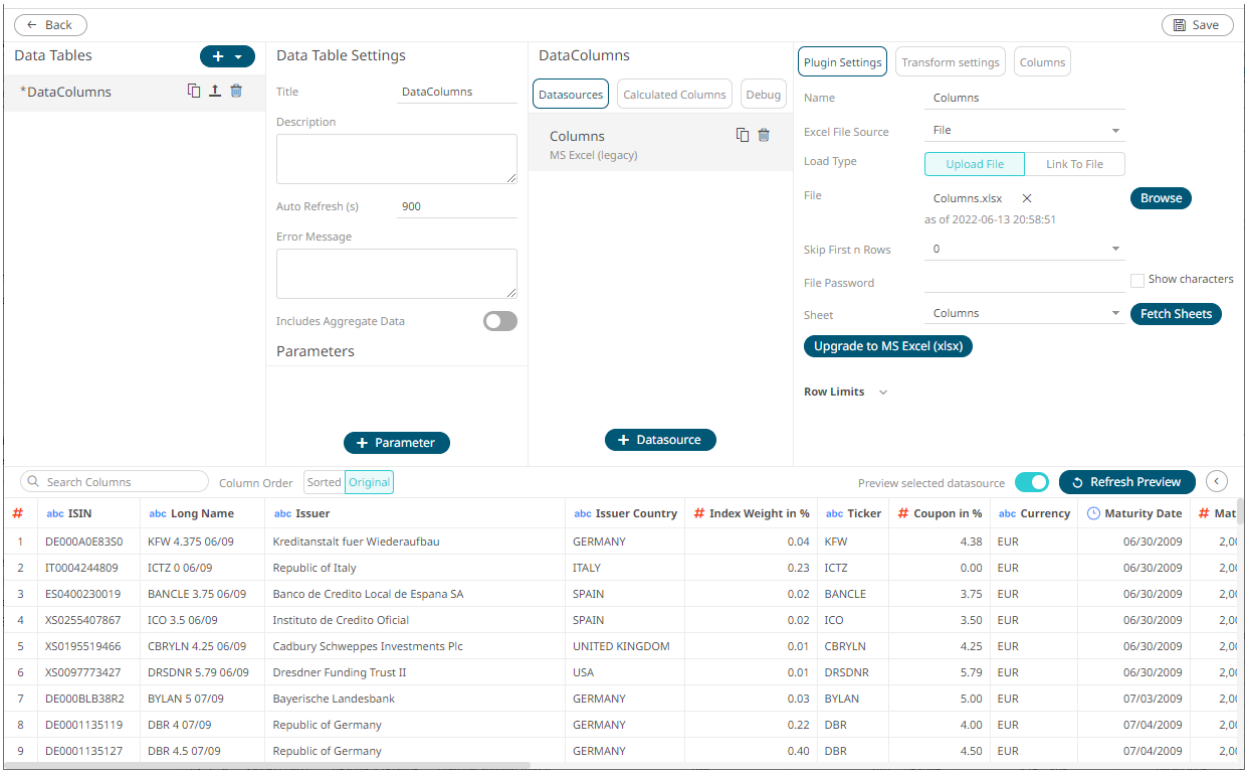
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	ISIN	Long Nam	Issuer	Issuer Cou	Index Wei	Ticker	Coupon in	Currency	Maturity Date	Maturity	Asset Swap	Market Va	Sector Lev	Sector Lev	Sector Lev	Sector Lev	Sector Lev	Rating	TargetM	TargetCo	TMDPlus	TMDMin	TCPlus	TCMin
2	DE000A0E	KFW 4.37	Kreditans	GERMANY	0.037745	KFW	4.375	EUR	30/06/2009	2009.58		1.99E+09	Sub-Sover	Agencies	*	*	*	AAA	0.9	1.73	-0.1	1.9	51.73	-48.3
3	IT0004244	ICTZ 0 06/	Republic (	ITALY	0.231744	ICTZ	0	EUR	30/06/2009	2009.58		1.22E+10	Sovereign	ITALY	*	*	*	AA	0.9	1.73	-0.1	1.9	51.73	-48.3
4	ES040023(	BANCLE 3	Banco de (	SPAIN	0.018694	BANCLE	3.75	EUR	30/06/2009	2009.58		9.85E+08	Collateral	Covered	Spain Cov	*	*	AAA	0.9	1.73	-0.1	1.9	51.73	-48.3
5	XS025540	ICO 3.5 06	Instituto c	SPAIN	0.023353	ICO	3.5	EUR	30/06/2009	2009.58		1.23E+09	Sub-Sover	Agencies	*	*	*	AAA	0.9	1.73	-0.1	1.9	51.73	-48.3
6	XS019551	CBRYLN 4	Cadbury S	UNITED KI	0.011224	CBRYLN	4.25	EUR	30/06/2009	2009.58	24	5.91E+08	Corporate	Non-Finar	Consumer	Food & Be	Food Proc	BBB	0.9	1.73	-0.1	1.9	51.73	-48.3
7	XS009777	DRSDNR 5	Dresdner	USA	0.009337	DRSDNR	5.79	EUR	30/06/2009	2009.58	202	4.92E+08	Corporate	Financials	Financials	Banks	Banks	A	0.9	1.73	-0.1	1.9	51.73	-48.3
8	DE000BLB	BYLAN 5 (	Bayerisch	GERMANY	0.029812	BYLAN	5	EUR	03/07/2009	2009.59	-9	1.57E+09	Corporate	Financials	Financials	Banks	Banks	AA	0.9078	1.7716	-0.0922	1.9078	51.772	-48.2
9	DE000113(	DBR 4 07/	Republic (	GERMANY	0.220591	DBR	4	EUR	04/07/2009	2009.59		1.16E+10	Sovereign	GERMANY	*	*	*	AAA	0.91	1.7838	-0.09	1.91	51.784	-48.2
10	DE000113(	DBR 4.5 0	Republic (	GERMANY	0.400777	DBR	4.5	EUR	04/07/2009	2009.59		2.11E+10	Sovereign	GERMANY	*	*	*	AAA	0.91	1.7838	-0.09	1.91	51.784	-48.2
11	DE000291(	KFW 4 07/	Kreditans	GERMANY	0.029282	KFW	4	EUR	04/07/2009	2009.59		1.54E+09	Sub-Sover	Agencies	*	*	*	AAA	0.91	1.7838	-0.09	1.91	51.784	-48.2
12	DE000257(	HYPESS 4,	Hypothek	GERMANY	0.04906	HYPESS	4.25	EUR	06/07/2009	2009.60		2.58E+09	Collateral	Covered	Germany (	Oeffentlic	*	AAA	0.9146	1.8082	-0.0854	1.9146	51.808	-48.2
13	DE000825(	LBANK 3.:	Landeskre	GERMANY	0.028863	LBANK	3.25	EUR	06/07/2009	2009.60		1.52E+09	Sub-Sover	Agencies	*	*	*	AAA	0.9146	1.8082	-0.0854	1.9146	51.808	-48.2
14	DE000138(	HESSEN 4	Land Hess	GERMANY	0.019508	HESSEN	4	EUR	06/07/2009	2009.60		1.03E+09	Sub-Sover	Regions	*	*	*	AA	0.9146	1.8082	-0.0854	1.9146	51.808	-48.2
15	DE000159(	NRW 5 07	Land Nord	GERMANY	0.042288	NRW	5	EUR	06/07/2009	2009.60		2.23E+09	Sub-Sover	Regions	*	*	*	AA	0.9146	1.8082	-0.0854	1.9146	51.808	-48.2
16	FR000049(	SGOFP 4.:	Saint-Gob	NETHERLA	0.019667	SGOFP	4.75	EUR	09/07/2009	2009.61	30	1.04E+09	Corporate	Non-Finar	Industrial	Construct	Construct	BBB	0.9214	1.8447	-0.0786	1.9214	51.845	-48.2
17	XS030997(	SCBCC 4.(	The Swed	SWEDEN	0.02563	SCBCC	4.625	EUR	10/07/2009	2009.61		1.35E+09	Collateral	Covered	Sweden C	*	*	AAA	0.9237	1.8569	-0.0763	1.9237	51.857	-48.1
18	FR010684(	BTNS 3.5 (	Republic (	FRANCE	0.331879	BTNS	3.5	EUR	12/07/2009	2009.62		1.75E+10	Sovereign	FRANCE	*	*	*	AAA	0.9282	1.8813	-0.0718	1.9282	51.881	-48.1
19	FR001009:	CADES 3.:	Caisse d'A	FRANCE	0.058322	CADES	3.75	EUR	12/07/2009	2009.62		3.07E+09	Sub-Sover	Agencies	*	*	*	AAA	0.9282	1.8813	-0.0718	1.9282	51.881	-48.1
20	AT000038(	RAGB 4 0:	Republic (	AUSTRIA	0.170874	RAGB	4	EUR	15/07/2009	2009.62		9E+09	Sovereign	AUSTRIA	*	*	*	AAA	0.935	1.9179	-0.065	1.935	51.918	-48.1
21	DE000A0J(	KFW 3.5 0	Kreditans	GERMANY	0.096786	KFW	3.5	EUR	15/07/2009	2009.62		5.1E+09	Sub-Sover	Agencies	*	*	*	AAA	0.935	1.9179	-0.065	1.935	51.918	-48.1
22	NL000010(	NETHER 3	Kingdom (	NETHERLA	0.215643	NETHER	3.75	EUR	15/07/2009	2009.62		1.14E+10	Sovereign	NETHERLA	*	*	*	AAA	0.935	1.9179	-0.065	1.935	51.918	-48.1
23	PTOTECO(	PGB 3.95 (	Republic (	PORTUGA	0.117245	PGB	3.95	EUR	15/07/2009	2009.62		6.18E+09	Sovereign	PORTUGA	*	*	*	AA	0.935	1.9179	-0.065	1.935	51.918	-48.1
24	XS009985(	LLOYDS 5.	Lloyds TSE	UNITED KI	0.024548	LLOYDS	5.625	EUR	15/07/2009	2009.62	248	1.29E+09	Corporate	Financials	Financials	Banks	Banks	AA	0.935	1.9179	-0.065	1.935	51.918	-48.1
25	XS019355(	FHLMC 3.:	Federal H	USA	0.022676	FHLMC	3.75	EUR	15/07/2009	2009.62		1.19E+09	Sub-Sover	Agencies	*	*	*	AAA	0.935	1.9179	-0.065	1.935	51.918	-48.1

By default, when displayed on the preview area of the *Data Table Editor* view, the columns are sorted alphabetically and grouped by data type.



#	Currency	ISIN	Issuer	Issuer Country	Long Name	Rating	Sector Level1	Sector Level2	Sector Level3	
1	EUR	DE000A0E83S0	Kreditanstalt fuer Wiederaufbau	GERMANY	KFW 4.375 06/09	AAA	Sub-Sovereigns	Agencies	*	*
2	EUR	IT0004244809	Republic of Italy	ITALY	ICTZ 0 06/09	AA	Sovereigns	ITALY	*	*
3	EUR	ES0400230019	Banco de Credito Local de Espana SA	SPAIN	BANCLE 3.75 06/09	AAA	Collateralized	Covered	Spain Covered	*
4	EUR	XS0255407867	Instituto de Credito Oficial	SPAIN	ICO 3.5 06/09	AAA	Sub-Sovereigns	Agencies	*	*
5	EUR	XS0195519466	Cadbury Schweppes Investments Plc	UNITED KINGDOM	CBRYLN 4.25 06/09	BBB	Corporates	Non-Financials	Consumer Goods	Foo
6	EUR	XS0097773427	Dresdner Funding Trust II	USA	DRSDNR 5.79 06/09	A	Corporates	Financials	Financials	Ban
7	EUR	DE000BLB38R2	Bayerische Landesbank	GERMANY	BYLAN 5 07/09	AA	Corporates	Financials	Financials	Ban
8	EUR	DE0001135119	Republic of Germany	GERMANY	DBR 4 07/09	AAA	Sovereigns	GERMANY	*	*
9	EUR	DE0001135127	Republic of Germany	GERMANY	DBR 4.5 07/09	AAA	Sovereigns	GERMANY	*	*

To display the columns based on how they are displayed on the data source, click **Original**.



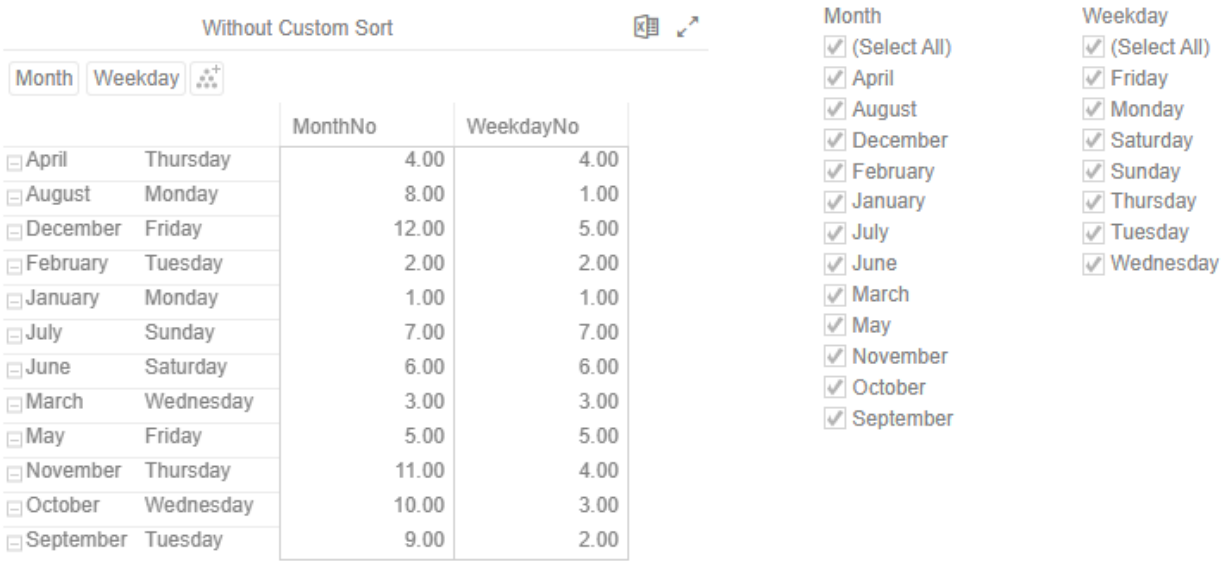
#	ISIN	Long Name	Issuer	Issuer Country	Index Weight in %	Ticker	Coupon in %	Currency	Maturity Date	Mat
1	DE000A0E83S0	KFW 4.375 06/09	Kreditanstalt fuer Wiederaufbau	GERMANY	0.04	KFW	4.38	EUR	06/30/2009	2,0(
2	IT0004244809	ICTZ 0 06/09	Republic of Italy	ITALY	0.23	ICTZ	0.00	EUR	06/30/2009	2,0(
3	ES0400230019	BANCLE 3.75 06/09	Banco de Credito Local de Espana SA	SPAIN	0.02	BANCLE	3.75	EUR	06/30/2009	2,0(
4	XS0255407867	ICO 3.5 06/09	Instituto de Credito Oficial	SPAIN	0.02	ICO	3.50	EUR	06/30/2009	2,0(
5	XS0195519466	CBRYLN 4.25 06/09	Cadbury Schweppes Investments Plc	UNITED KINGDOM	0.01	CBRYLN	4.25	EUR	06/30/2009	2,0(
6	XS0097773427	DRSDNR 5.79 06/09	Dresdner Funding Trust II	USA	0.01	DRSDNR	5.79	EUR	06/30/2009	2,0(
7	DE000BLB38R2	BYLAN 5 07/09	Bayerische Landesbank	GERMANY	0.03	BYLAN	5.00	EUR	07/03/2009	2,0(
8	DE0001135119	DBR 4 07/09	Republic of Germany	GERMANY	0.22	DBR	4.00	EUR	07/04/2009	2,0(
9	DE0001135127	DBR 4.5 07/09	Republic of Germany	GERMANY	0.40	DBR	4.50	EUR	07/04/2009	2,0(

CREATING A CUSTOM SORT ORDER

For this sample data:

Month	Weekday	Date	MonthNo	WeekdayNo
January	Monday	01/01/2021	1.00	1.00
February	Tuesday		2.00	2.00
March	Wednesday		3. 00	3.00
April	Thursday		4. 00	4.00
May	Friday		5. 00	5.00
June	Saturday		6. 00	6.00
July	Sunday		7. 00	7.00
August	Monday		8. 00	1.00
September	Tuesday		9. 00	2.00
October	Wednesday		10. 00	3.00
November	Thursday		11. 00	4.00
December	Friday		12. 00	5.00

When used in a visualization or filters, will be displayed as:

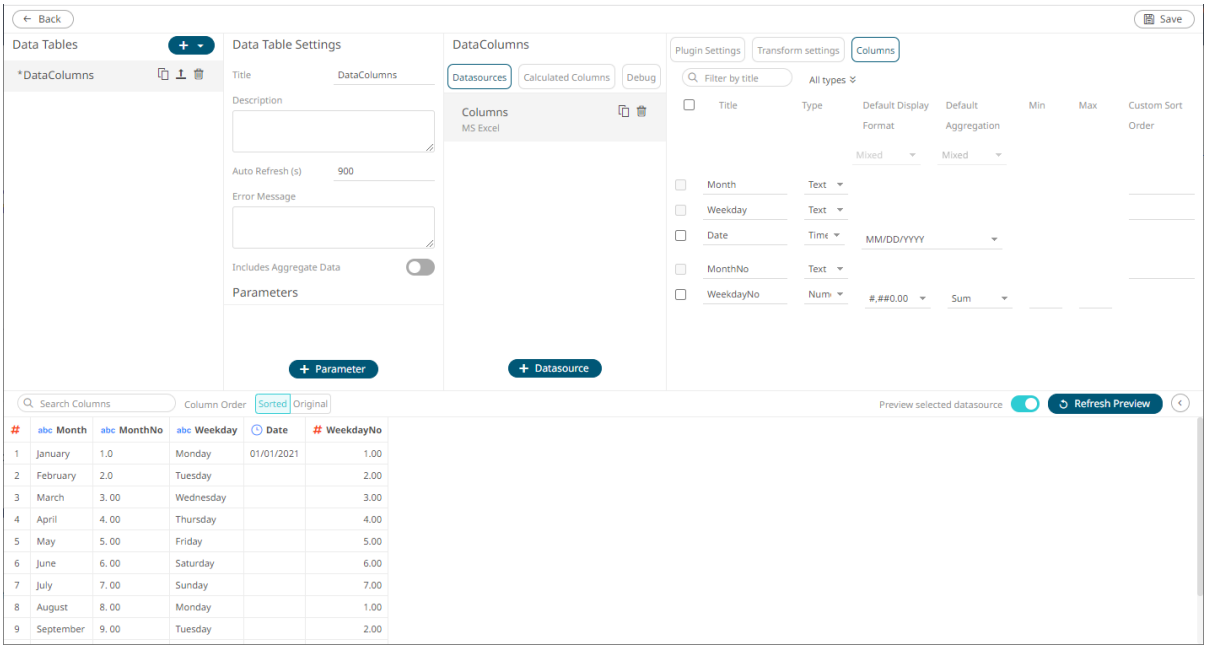


On the *Columns* pane in the *Data Table Editor* layout, you can create the custom sort order of the dimensions or text columns of the selected data source. Consequently, this allows the dimensions to be displayed in a visualization and filter in the correct or desired order.

Steps:

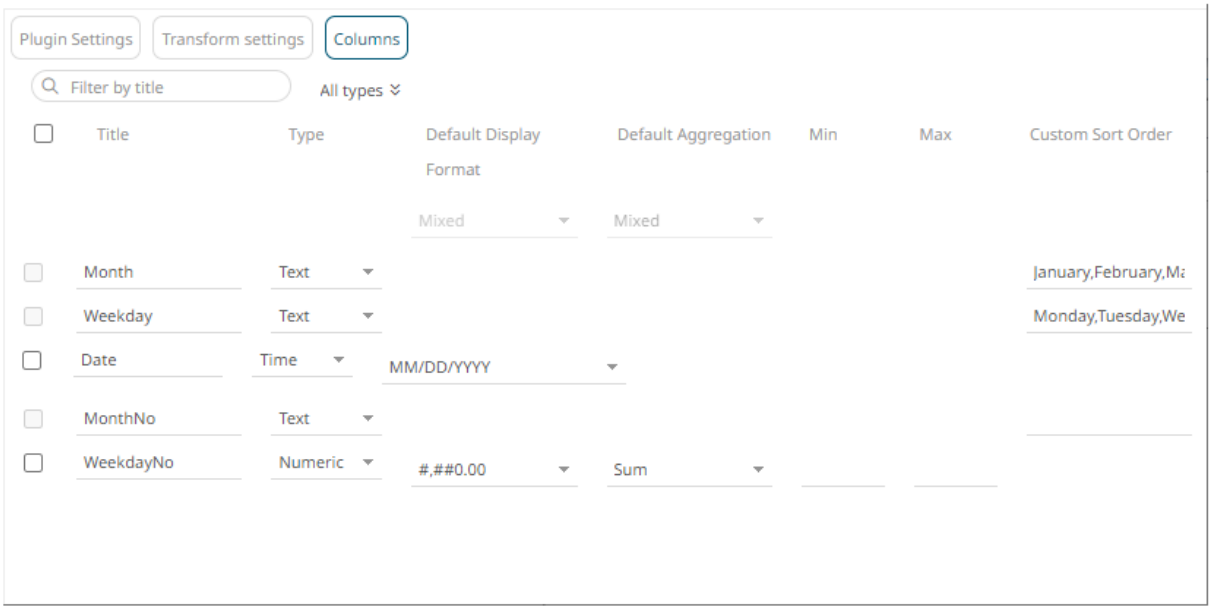
1. Click the **Columns** button.

   The *Columns* pane is displayed.



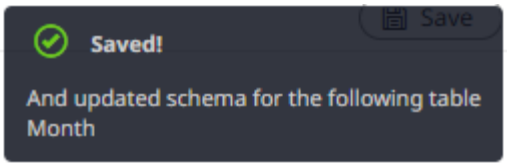
2. Enter the order of the values (separated by a comma) of the dimensions or text columns under the *Custom Sort Order* section.

Title	Custom Sort Order
Month	January,February,March,April,May
Weekday	Monday,Tuesday,Wednesday,Thursday,Friday,Saturday,Sunday



4. Click 

. Once saved, a notification displays.



Using the data with custom sort order, the visualization and filters will now be displayed as:

With Custom Sort

Month Weekday

		MonthNo	WeekdayNo
January	Monday	1.00	1.00
February	Tuesday	2.00	2.00
March	Wednesday	3.00	3.00
April	Thursday	4.00	4.00
May	Friday	5.00	5.00
August	Monday	8.00	1.00
December	Friday	12.00	5.00
July	Sunday	7.00	7.00
June	Saturday	6.00	6.00
November	Thursday	11.00	4.00
October	Wednesday	10.00	3.00
September	Tuesday	9.00	2.00

Month
- (Select All)
- January
- February
- March
- April
- May
- August
- December
- July
- June
- November
- October
- September

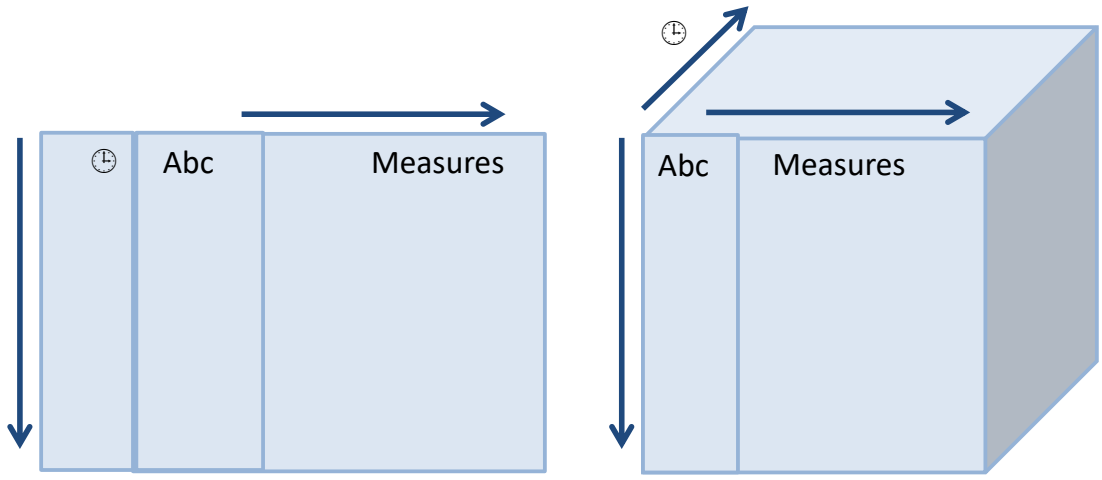
Weekday
- (Select All)
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday

ENABLE TIME SERIES ANALYSIS

Panopticon supports a number of data visualizations that are useful for monitoring and analyzing time series data, including the Line Graph, Needle Graph, Stack Graph, Horizon Graph, and OHLC/Candle Stick visualizations.

All non-time series visualizations will display a selected time slice (the **Snapshot**) of a time series dataset, unless displaying time window calculations.

Your source data must be transformed in order to use time series visualization. The transform converts the dataset into a cube, where the Z axis of the cube represents time, providing a set of time slices to play through and calculate across.



When there is a time slice, but not a value determined by the selected dimensions, the value will be set to null, and in the case of a line graph, a gap in the line will be drawn.

The time slices of the output time series can be identical to the input dataset, or as typically the case with sensor data will be standardized by barring (conflating) into an appropriate granularity for display.

A source table to be used for time series must have the following properties:

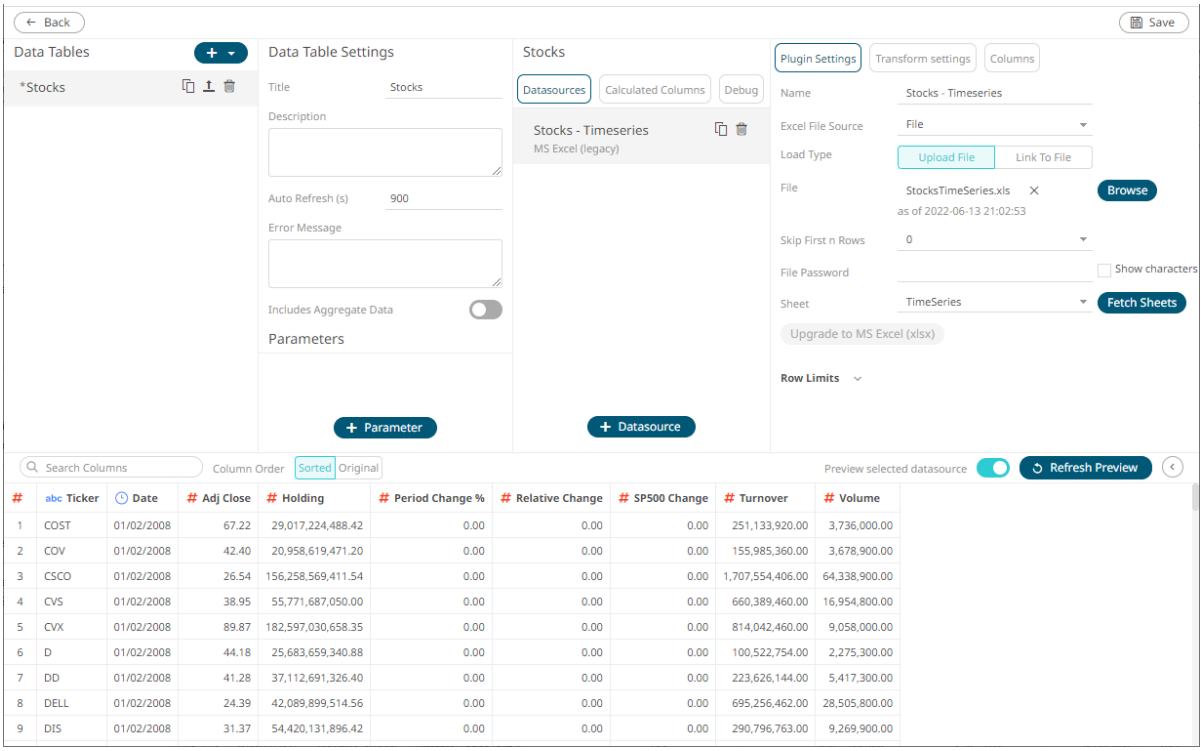
- A unique key or set of keys forming a compound key for each data series. For example, you can use the Stock Symbol as the unique ID in a set of Stock Market data

- A Date/Time stamp of data type Date Time
- A series of numeric or text fields providing values for each unique ID for each available Date/Time stamp

Steps:

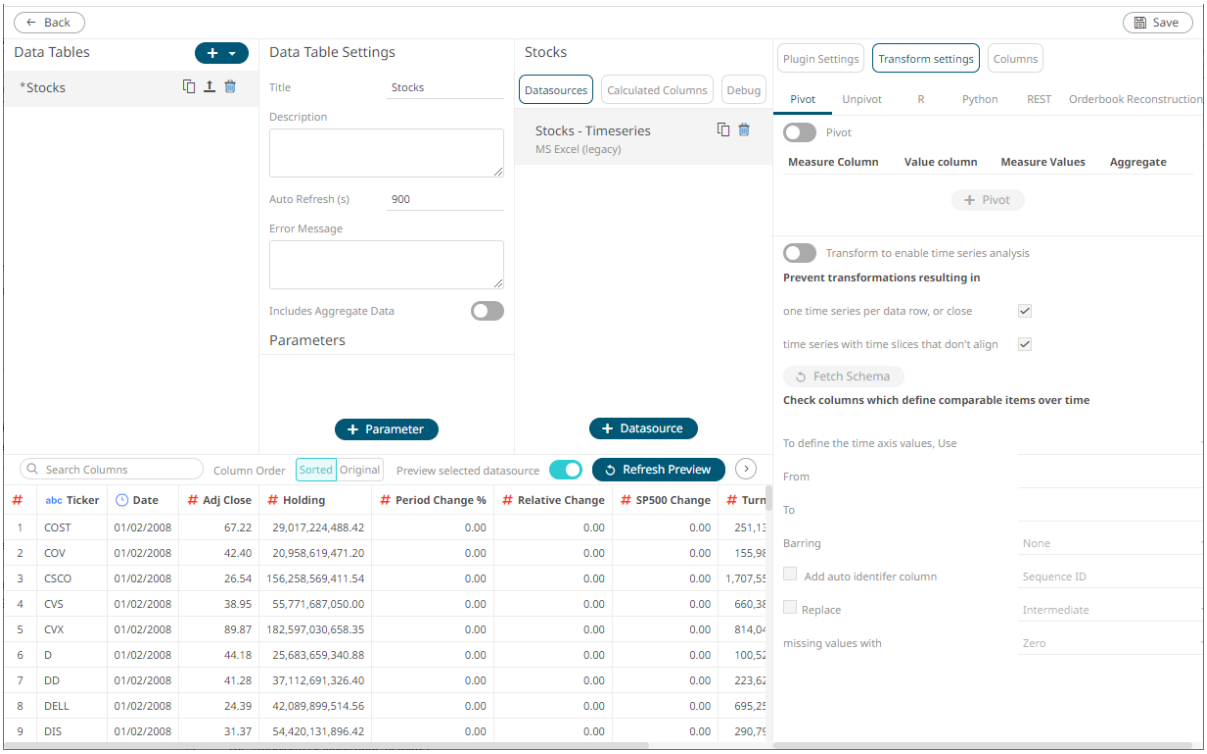
1. Click on a data source on the *Data Sources* panel. The currently selected data source is highlighted (grey background).

   The corresponding *Data Source Settings* pane is displayed.

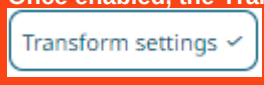


2. Click the **Transform Settings** button.

   The *Transform Settings* pane displays.



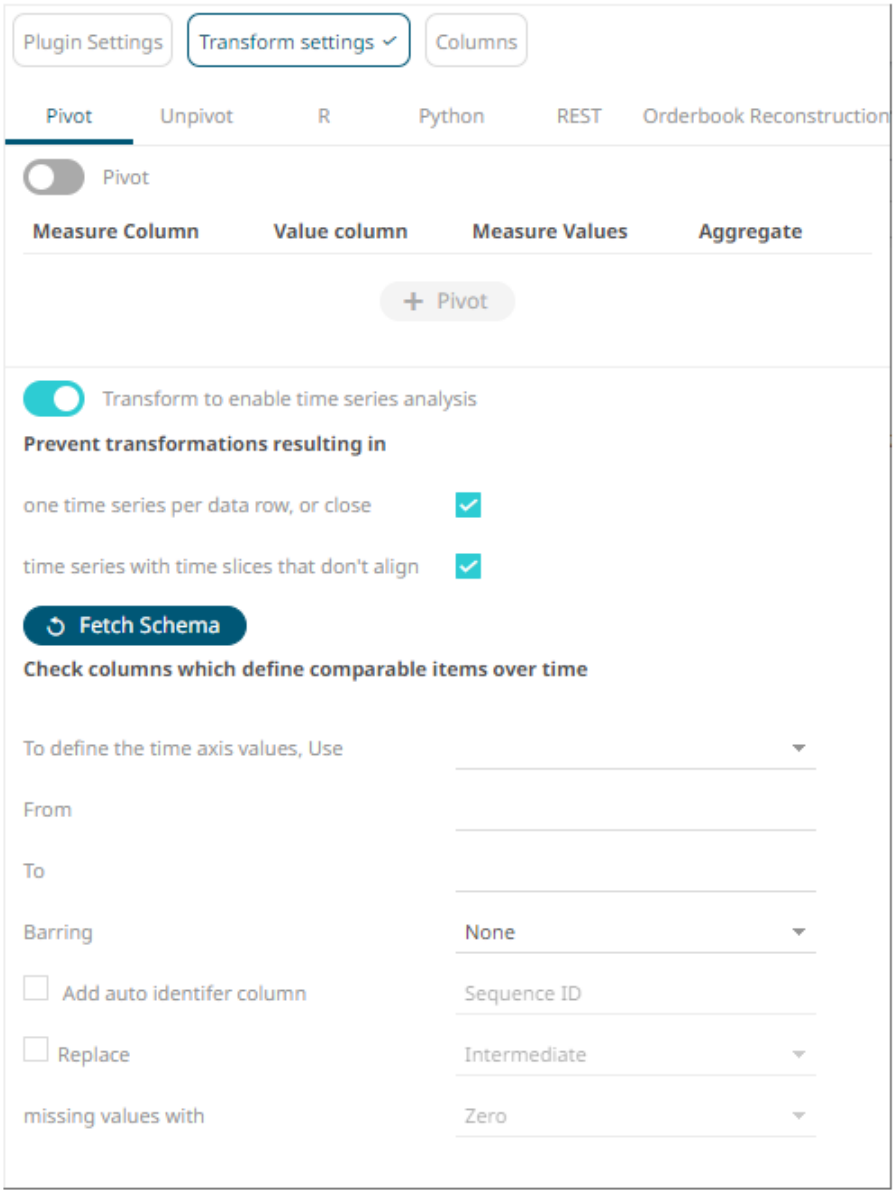
3. Tap the **Transform to enable Time Series analysis** slider to turn it on.

NOTE **Once enabled, the Transform Settings button displays with a check** 

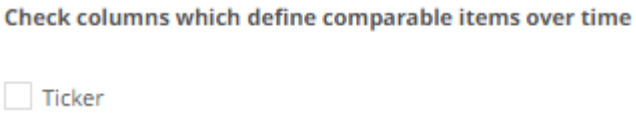
. If the transform leads to change in the schema, the Fetch Schema 

button is also enabled.

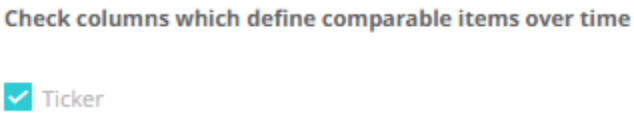
The checkboxes for **one time series per data row, or close** and **time series with time slices that don't align**, ensure that duplicate values are highlighted, and the time cube volume is minimized.



4. Click **Fetch Schema**  to update columns available for time series transform.



5. Select the key or compound key columns from the source list of dimensions to define comparable items over time.



These define each series and correspond to the rows of the generated time cube.

6. Select the column to define the time axis values (Date/Time stamp).

Default value is **Date**.

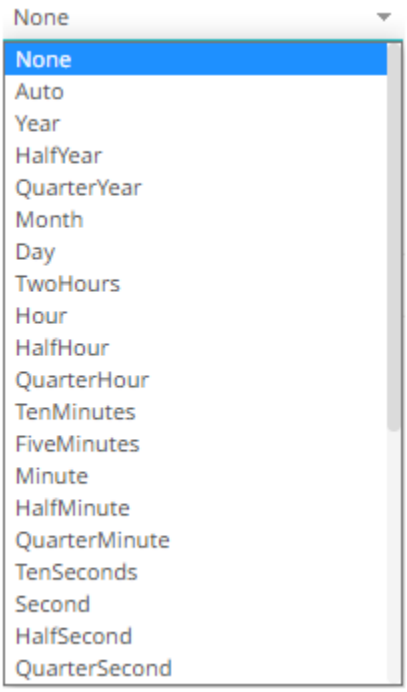


7. Set the Date/Time range of the column set in step 5 in the *From* and *To* text boxes.

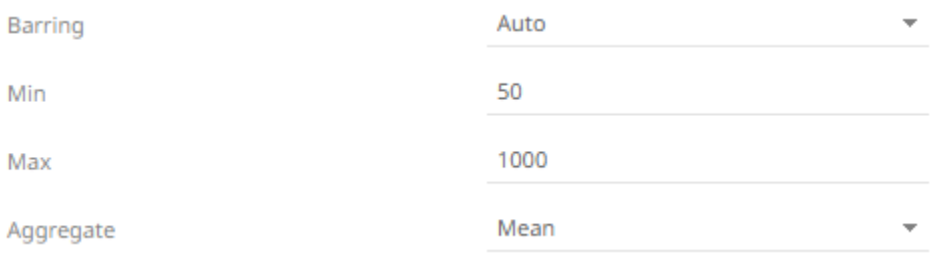
   This filters the time series visualization data causing less data to go over the network to the Web client.

> **NOTE** **The range is not calculated from the start and end values but rather from the Max (the start or the first time slice of the dataset) to Min (the end or the last time slice of the dataset) range. For example, the start and end values can be from 2000-01-01 to 2020-01-01 but the conflation still works as it takes the Date/Time range of the supplied time series.**

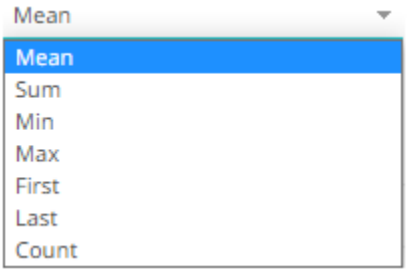
8. Choose whether you want to **Conflate** the dataset by setting the **Barring** period to **Auto**, or a defined value, between **Year** and **Nanosecond.**



Setting the barring period conflates the dataset to a defined granularity, returning a set number of data points, by default being between **50** and **1000** for **Auto**.



As data is potentially being aggregated across time, an *Aggregate* must be selected. The default conflation aggregate is Mean. Other options include: Sum, Min, Max, **First, Last** and **Count**.

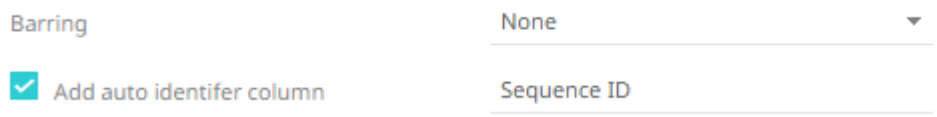


Barring can be useful to standardize sparse time series which is especially common with sensor data, outputting values at defined time intervals, and potentially minimizing the number of rendered data points.

The available barring periods besides **Auto** are:

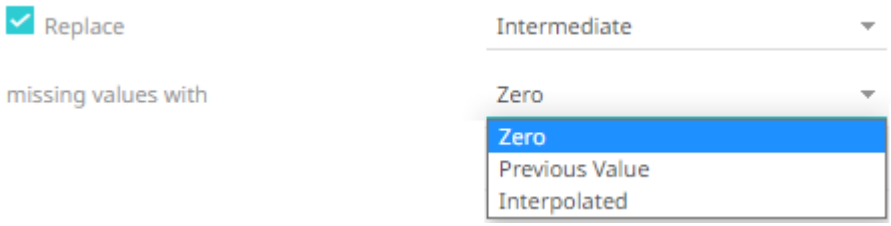
Year, Half Year, Quarter Year, Month, Day, Two Hours, Hour, Half Hour, Quarter Hour, Ten Minutes, Five Minutes, Minute, Half Minute, Quarter Minute, Ten Seconds, Second, Half Second, Quarter Second, Tenth Second, Fifty Milliseconds, Ten Milliseconds, Five Milliseconds, Millisecond, Fifty Microseconds, Ten Microseconds, Five Microseconds, Microsecond, Fifty Nanoseconds, Ten Nanoseconds, Five Nanoseconds, Nanosecond.

However, when the barring period is set to **None**, you can enable *Add Auto Identifier Column: Sequence ID*.



This means that when multiple values are processed at the same time along with selected dimensions, the `seqid` will be added to each unique occurrence per time slice and defined dimensions, incrementing starting from 1.

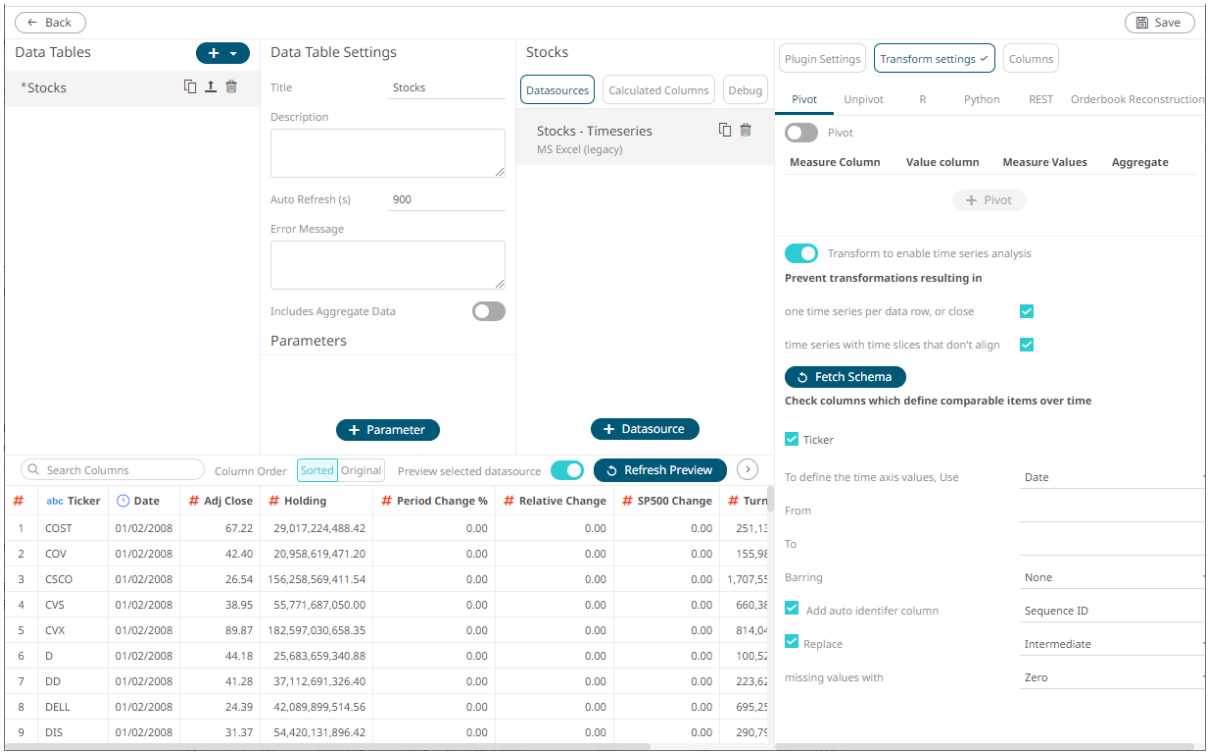
9. Choose whether you want to **interpolate** for missing values.



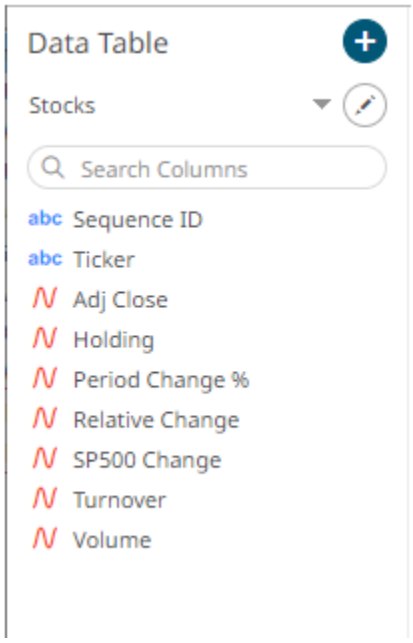
The interpolation can replace missing numeric values with **Zero**, the **Previous Value**, or an **interpolation between known values (Interpolated)**.

10. Click 

.



Click Save then Back to save the data table and exit the *Data Table Editor* layout. On the *Open Workbook in Design Mode*, a time series data table is visually identified by the time series curve to the left of any numeric time series fields.



PIVOTING AND UNPIVOTING DATA

Data comes in two major formats: **long,** where the columns can't be reduced and has many rows vs **wide,** where the columns can't be reduced and fewer rows are needed.

wide

	m	m	f	f
	de	en	de	en
2010	5	5	1	12
2010	43	6	5	2
2011	3	0	34	3
2011	2	4	65	3



long

2010	de	m	A	5
2010	de	m	B	43
2010	de	f	A	1
2010	de	f	B	5
2010	en	m	A	5
2010	en	m	B	6
2010	en	f	A	12
2010	en	f	B	2
2011	de	m	A	3
2011	de	m	B	2
2011	de	f	A	34
2011	de	f	B	65
2011	en	m	A	0
2011	en	m	B	4
2011	en	f	A	3
2011	en	f	B	3

Data can be transformed from long to wide or back again. However, the term pivot and unpivot are sometimes used for either transformation. In Panopticon, we define **pivot** as a movement from long data to wide data and **unpivot** as a movement from wide data to long data.

The use of either pivoting or unpivoting data is based on the ease of calculation or to more easily join the data together.

> **NOTE** **Panopticon's pivoting has special requirements due to the real-time aspect of the product.**

Pivoting

Pivoting in Panopticon is **always with respect to time**. Panopticon finds the first date or Date/Time column from left to right in the dataset and uses that. As an example, in the table below, if you want the Date 2 column to be the one used, transform the data so it will be the first date column in the dataset.

Date	Letter	Value	Date 2
10/1/2015	A	1	1/1/2017
10/1/2015	A	2	1/29/2017
10/29/2015	A	3	2/26/2017
11/26/2015	B	4	3/26/2017
11/26/2015	B	5	4/23/2017
12/24/2015	B	6	5/21/2017
1/21/2016	C	7	6/18/2017
2/18/2016	D	8	7/16/2017
3/17/2016	E	9	8/13/2017
4/14/2016	F	10	9/10/2017
5/12/2016	F	11	10/8/2017
6/9/2016	G	12	11/5/2017

Pivoting in Panopticon is about taking the row values in category and turning them into columns by some operation like:

- Count
- Last
- Min
- Max
- None
- Sum (default)

Mean or median are not used since it is about real time response in Panopticon, and these functions are expensive to calculate. For static data, if you need to pre-calculate those types of transformations, you can use a table visual to determine the value. However, for real-time data and real-time response, the functions Count, Last, Min, Max, and Sum are exactly what you need.

Multiple pivot columns can be defined.

Either different:

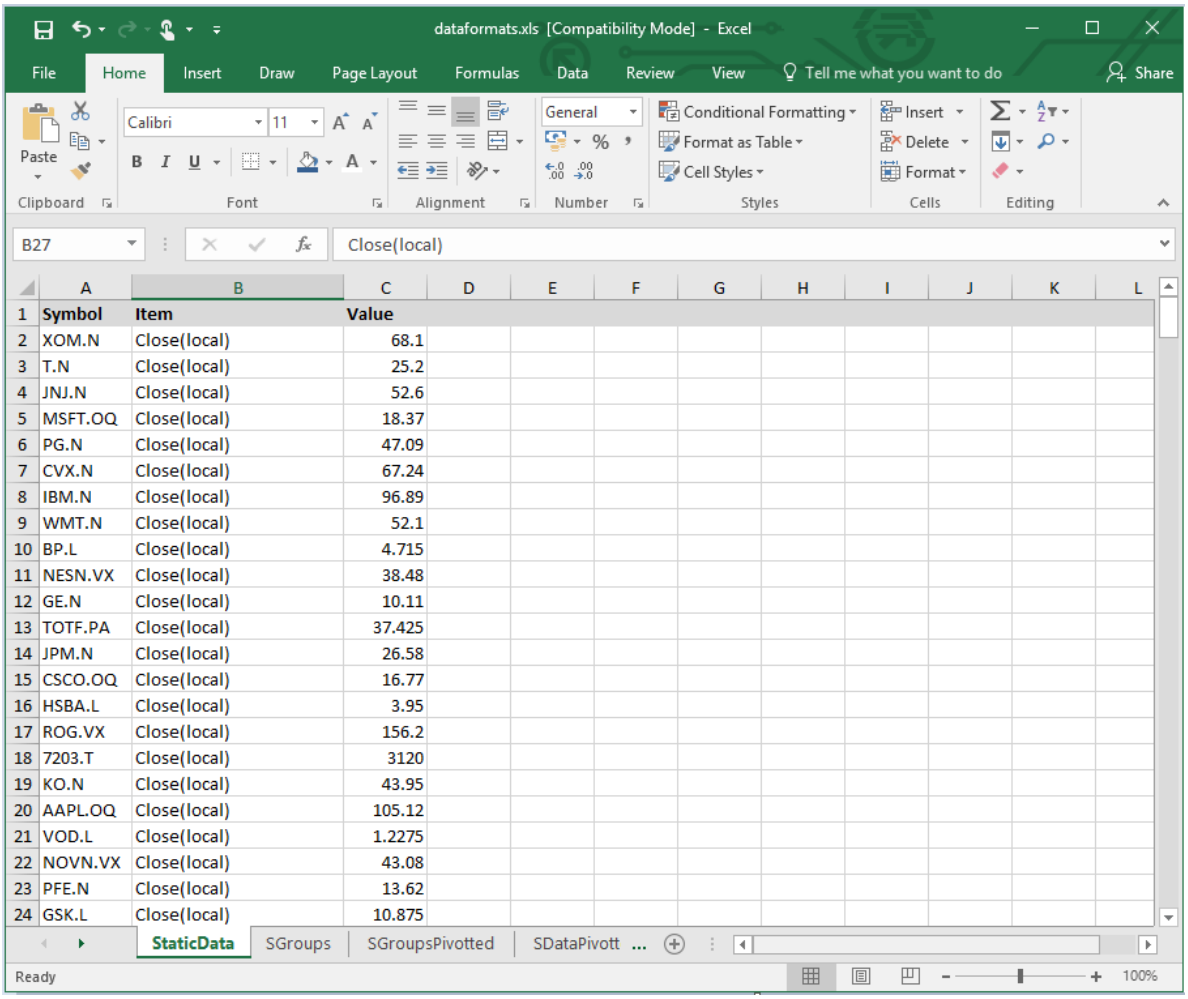
- Measure Columns
- Value Columns
- Aggregates

When this occurs, the resulting pivoted column names will be prepended as appropriate to ensure that each column is uniquely identified.

NOTE **In cases where some columns cannot be aggregated after pivoting, it is recommended to select the None aggregate. For more information, refer to Example 4.**

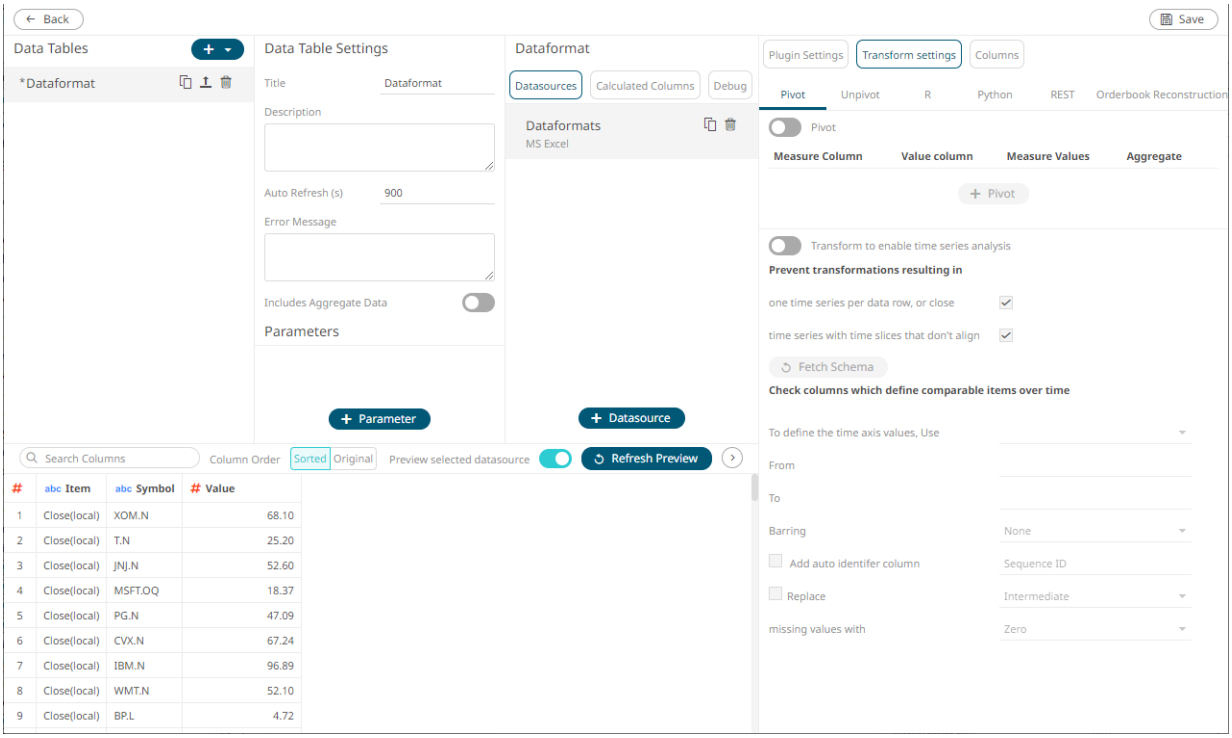
Example 1

A common format for database sourced data is key value pairs. As an example, below; price changes are listed as key value pairs for a set of symbols.



	A	B	C
1	**Symbol**	**Item**	**Value**
2	XOM.N	Close(local)	68.1
3	T.N	Close(local)	25.2
4	JNJ.N	Close(local)	52.6
5	MSFT.OQ	Close(local)	18.37
6	PG.N	Close(local)	47.09
7	CVX.N	Close(local)	67.24
8	IBM.N	Close(local)	96.89
9	WMT.N	Close(local)	52.1
10	BP.L	Close(local)	4.715
11	NESN.VX	Close(local)	38.48
12	GE.N	Close(local)	10.11
13	TOTF.PA	Close(local)	37.425
14	JPM.N	Close(local)	26.58
15	CSCO.OQ	Close(local)	16.77
16	HSBA.L	Close(local)	3.95
17	ROG.VX	Close(local)	156.2
18	7203.T	Close(local)	3120
19	KO.N	Close(local)	43.95
20	AAPL.OQ	Close(local)	105.12
21	VOD.L	Close(local)	1.2275
22	NOVN.VX	Close(local)	43.08
23	PFE.N	Close(local)	13.62
24	GSK.L	Close(local)	10.875

When retrieved, the data table preview displays the same key value pair layout.



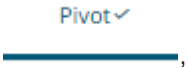
Steps:

1. To pivot the data, click the **Transform Settings** button on the *Data Sources Setting* pane**.**

   The *Transform Settings* pane displays.

2. Tap the **Pivot** slider to turn it on.

   The **Transform Settings** button and **Pivot** tab change to 

and 

, respectively.

3. Click 

.

4. Select the *Measure Column*. This is the column that will be pivoted.

5. Select the *Value Column*.

6. For the *Measure Values*, you can either:

   - enter the possible values of the selected *Measure Column*, or
   - click **Populate Measure Values**  button to populate the text box.

> **NOTE** **The Populate Measure Values**  **button is disabled for streaming connectors/data source.**

   These values will become the output columns of the pivot data transform.

7. Select the *Aggregate* method for the value column.

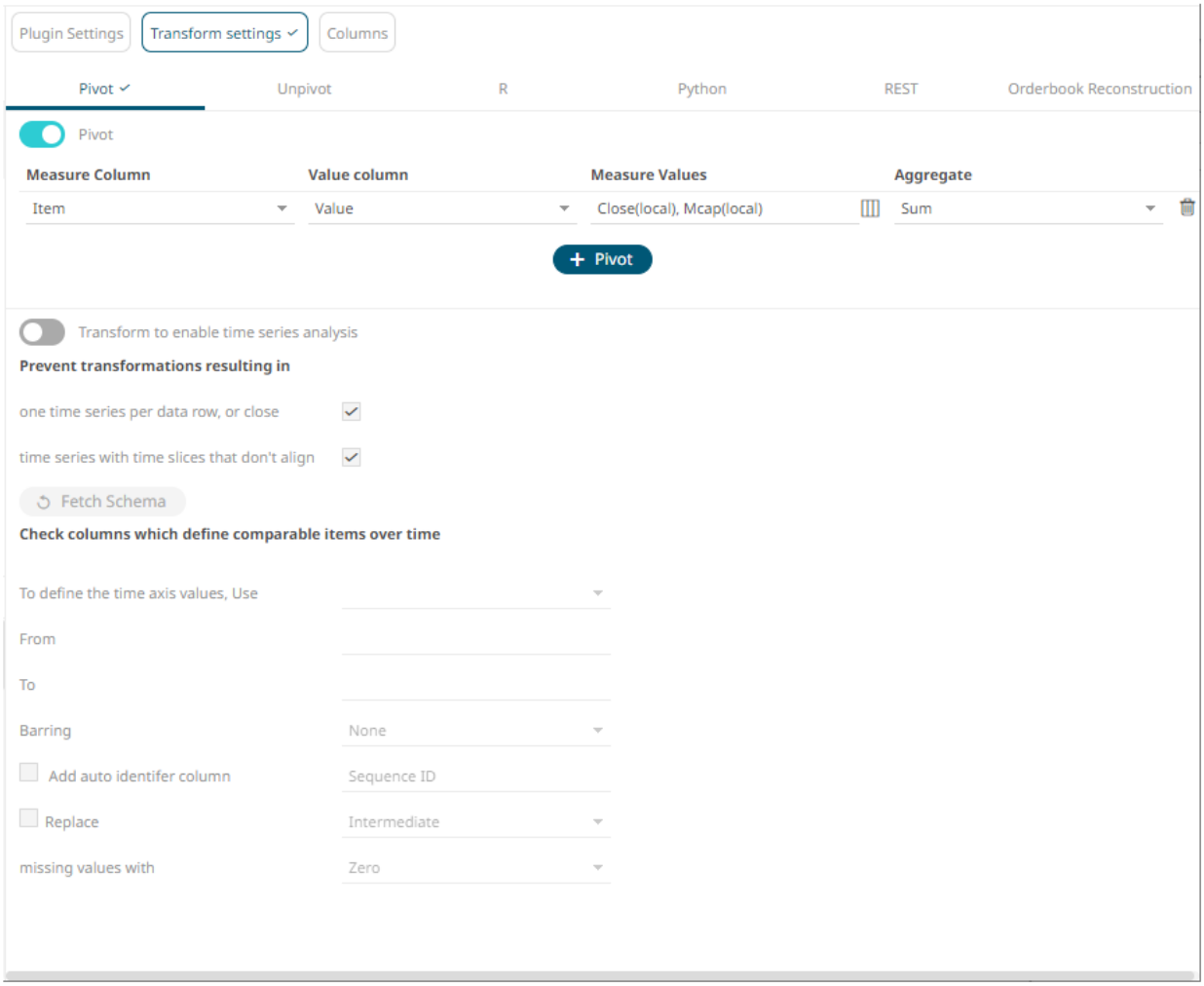
8. Click 

.

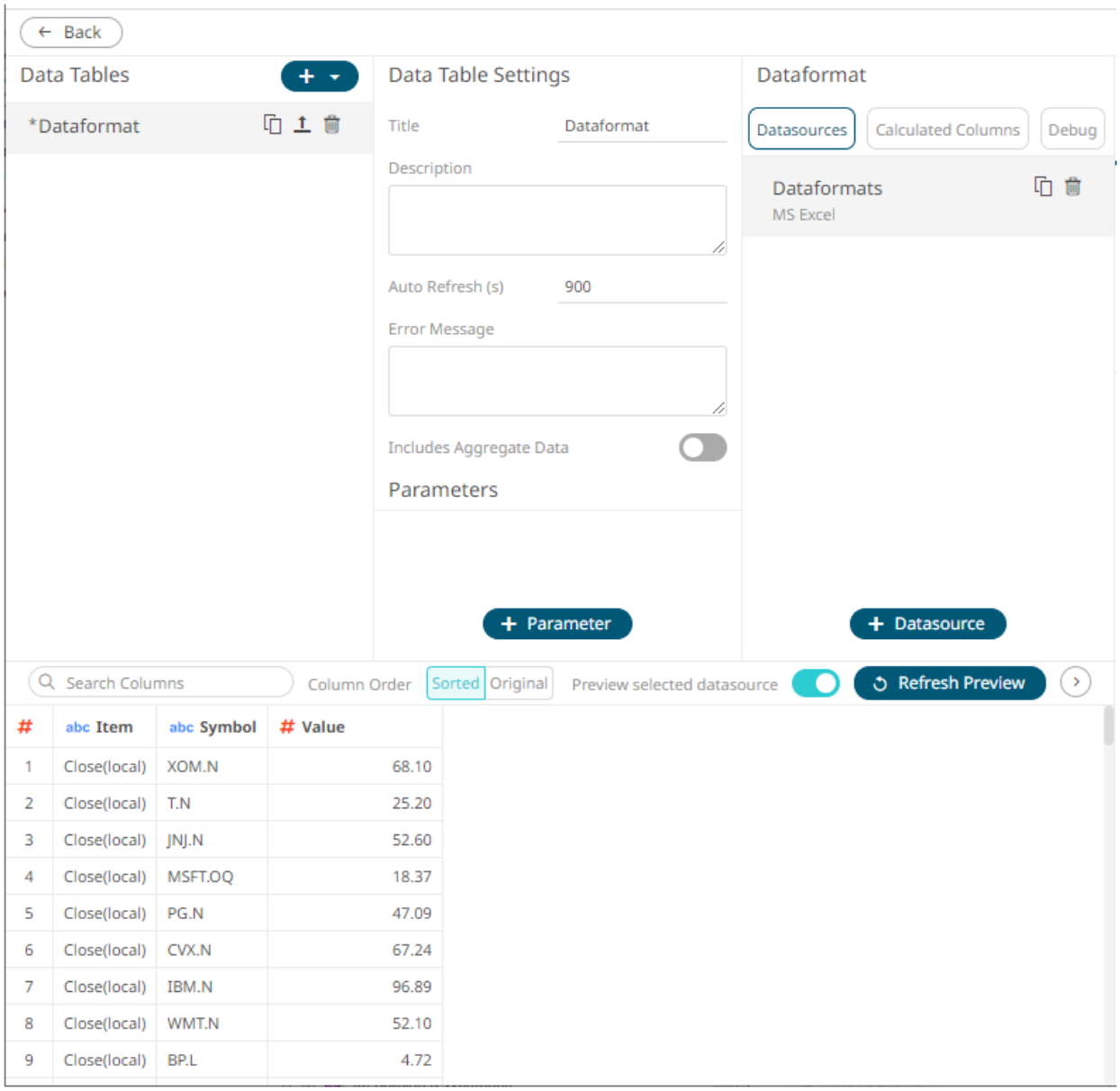
For example:

```
Measure Column = Item
Value Column = Value
Measure Values = Close(local), Mcap(Local)
Aggregate= Sum
```

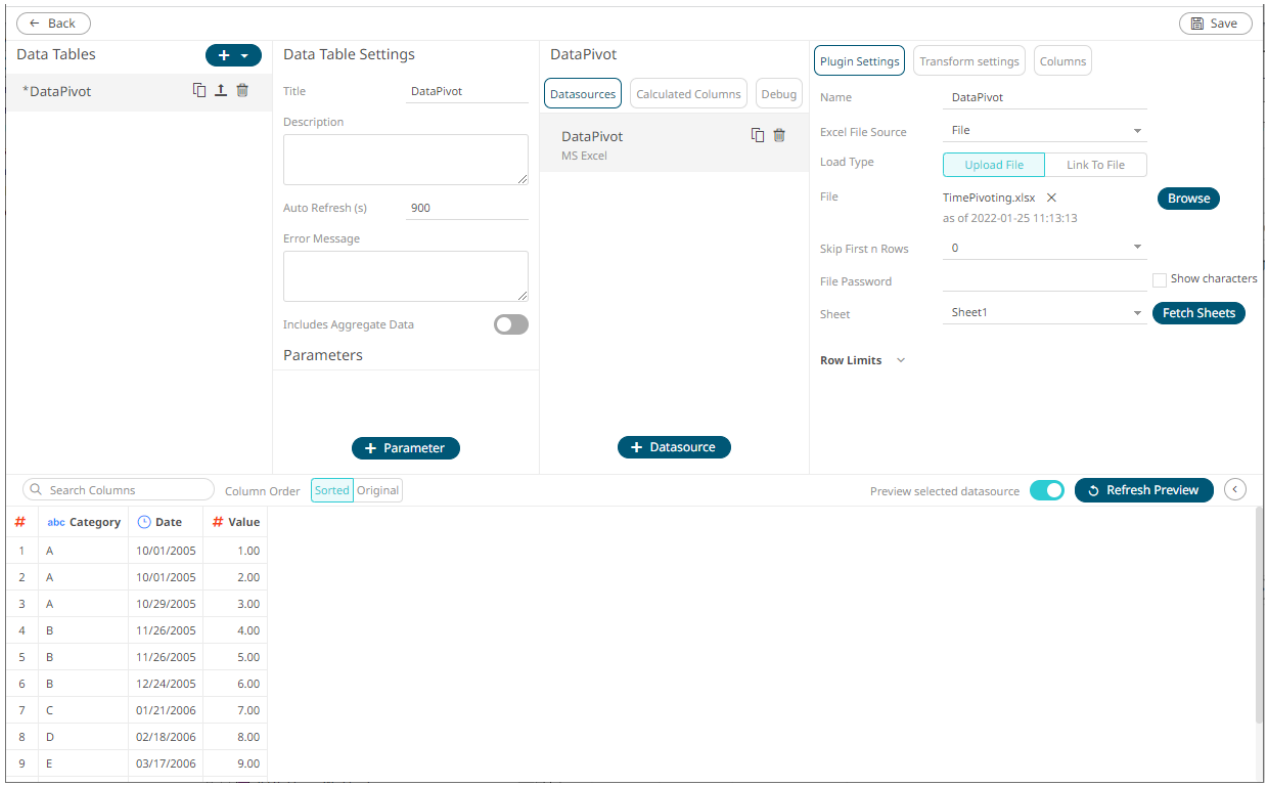
All columns that are not the *Measure* or *Value* columns will be removed from the output data structure.



The preview is updated to show the pivoted layout, which in the case below now shows each change as a separate data column. These pivoted results are additionally available as input into calculated columns.


Back
Data Tables
*Dataformat
Data Table Settings
Title
Dataformat
Description
Auto Refresh (s)
900
Error Message
Includes Aggregate Data
Parameters
+ Parameter
Dataformat
Datasources
Calculated Columns
Debug
Dataformats
MS Excel
+ Datasource
Search Columns
Column Order
Sorted
Original
Preview selected datasource
Refresh Preview
abc Item abc Symbol # Value
1 Close(local) XOM.N 68.10
2 Close(local) T.N 25.20
3 Close(local) JNJ.N 52.60
4 Close(local) MSFT.OQ 18.37
5 Close(local) PG.N 47.09
6 Close(local) CVX.N 67.24
7 Close(local) IBM.N 96.89
8 Close(local) WMT.N 52.10
9 Close(local) BP.L 4.72

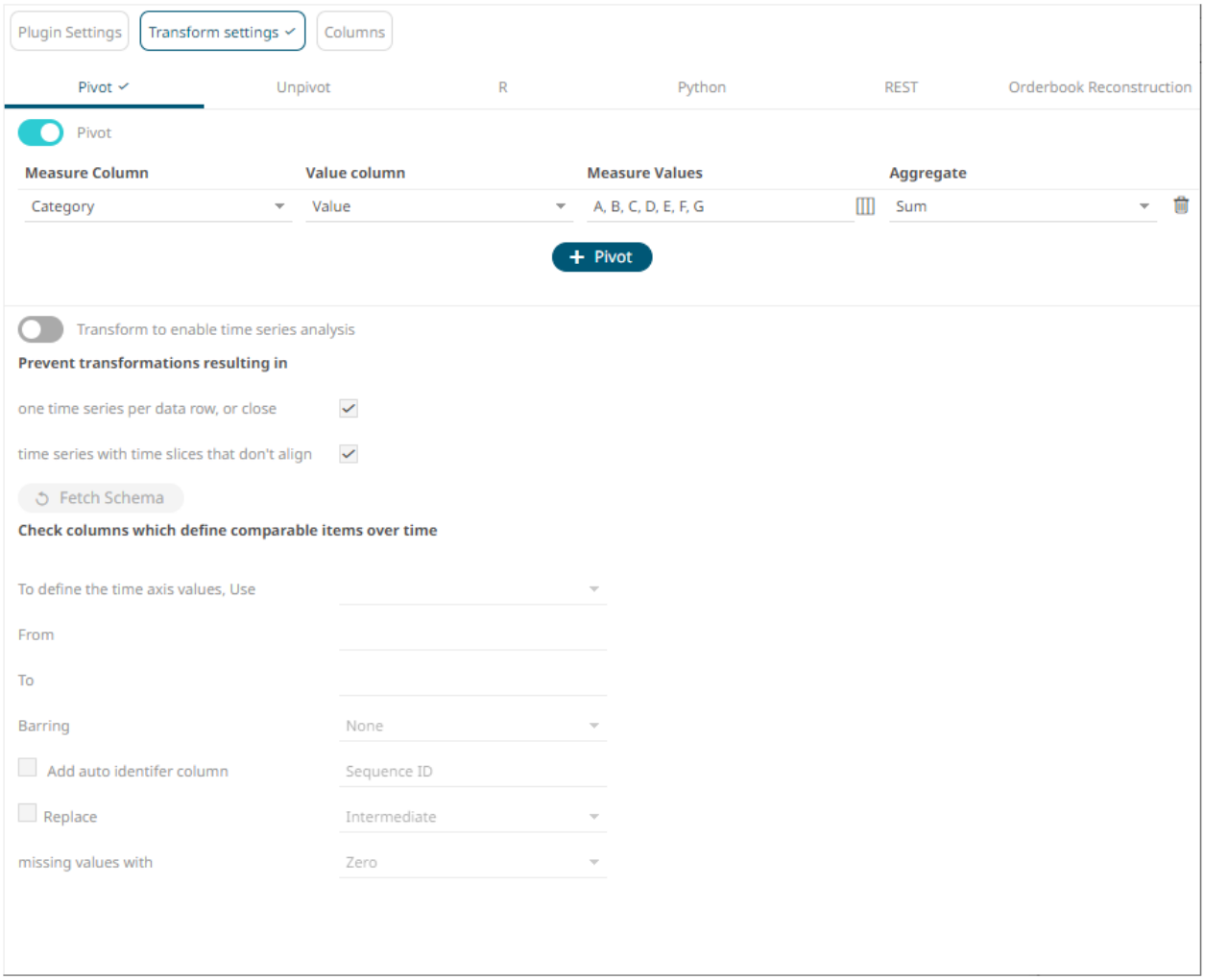
Example 2



For the sample above, the *Measure* column is the one you want to pivot. In this case, you will need to pivot to create a unique **Sum** per date and measure.

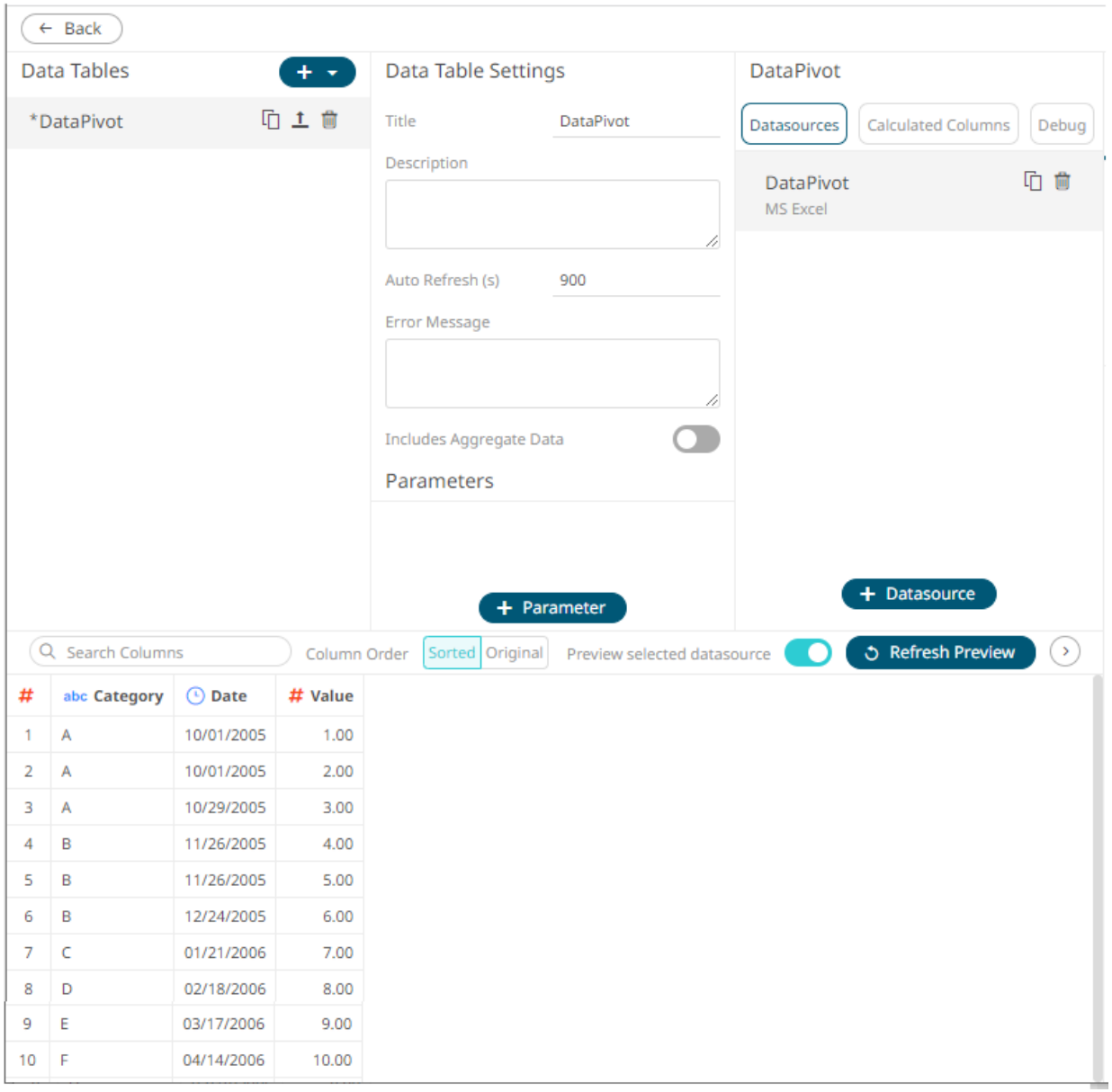
The column named *Category* will be used as the Measure (pivot) column, and value column (*Value*) is the one you will aggregate.

Click the **Populate Measure Values** button to populate the *Measure Values* box that you can aggregate (i.e., **A, B, C, D, E, F, G**). The default **Sum a**ggregation is applied.



Clicking  transforms the data and is displayed on the *Data Sources Preview*.

The expected pivot is achieved as there is only one row per unique date, and the *Letter* and values columns are summed up.



The original dataset had 12 rows, now it is reduced to 10 because the original dataset had the following rows:

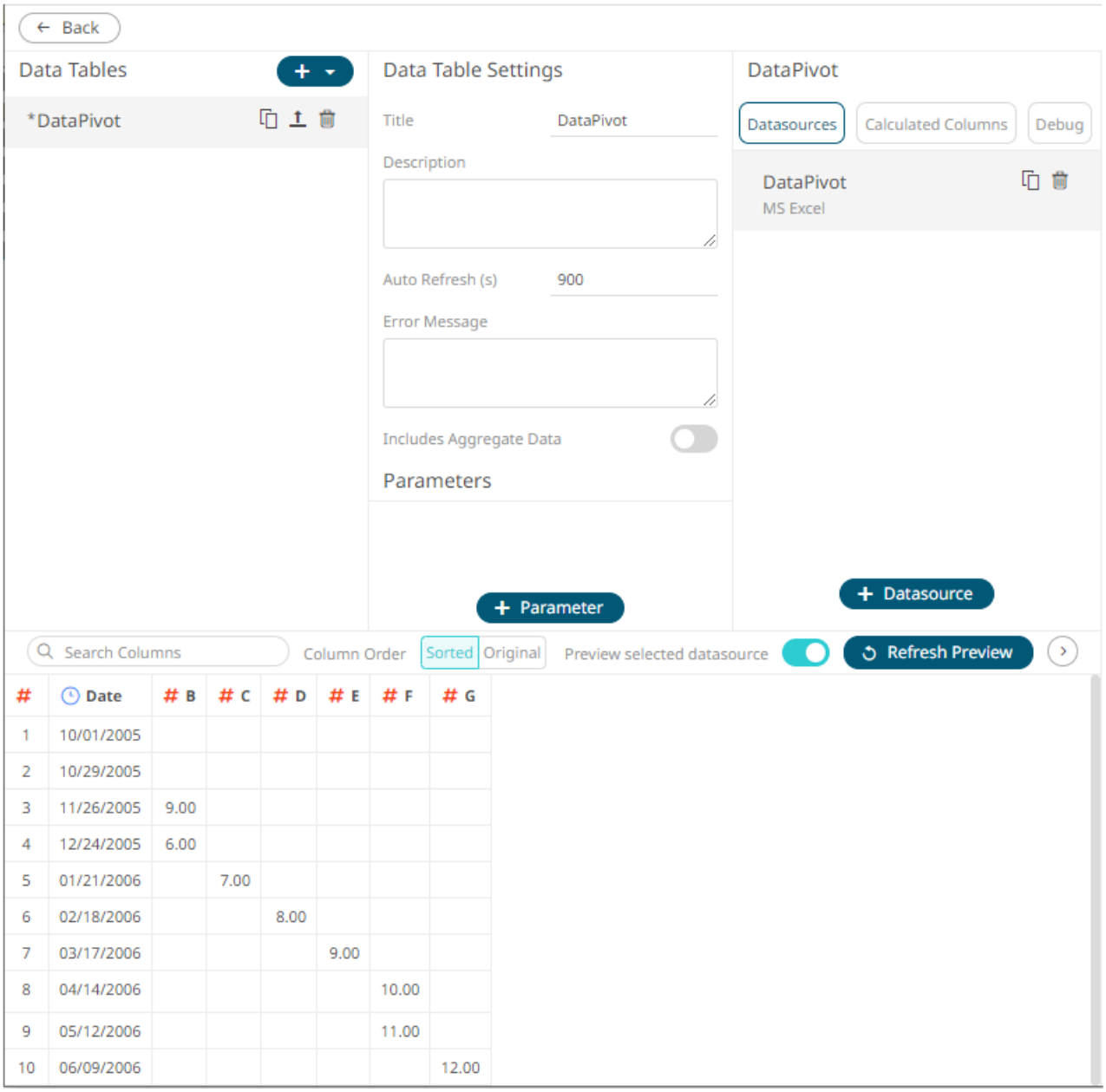
Date	Letter	Value
10/1/2015	A	1
10/1/2015	A	2
11/26/2015	B	4
11/26/2015	B	5

And they have been pivoted by **Sum** to the values in the first and third rows.

#	Date	# A	# B	# C	# D	# E	# F	# G
1	10/01/2005 00:00:00	3.00						
2	10/29/2005 00:00:00	3.00						
3	11/26/2005 00:00:00		9.00					

Example 3

In the example above, you populated the *Measure Values* box with **A, B, C, D, E, F, G**. If you skip a value such as **A**, the transformed data will display as:



#	Date	# B	# C	# D	# E	# F	# G
1	10/01/2005						
2	10/29/2005						
3	11/26/2005	9.00					
4	12/24/2005	6.00					
5	01/21/2006		7.00				
6	02/18/2006			8.00			
7	03/17/2006				9.00		
8	04/14/2006					10.00	
9	05/12/2006					11.00	
10	06/09/2006						12.00

In the original dataset, the three rows with the A value had the dates 10/1/2015 12:00:00 AM and 10/29/2015 12:00:00 AM:

	Abc Category	Date	# Value
1	A	10/1/2005 12:00:00 AM	1.00
2	A	10/1/2005 12:00:00 AM	2.00
3	A	10/29/2005 12:00:00 AM	3.00

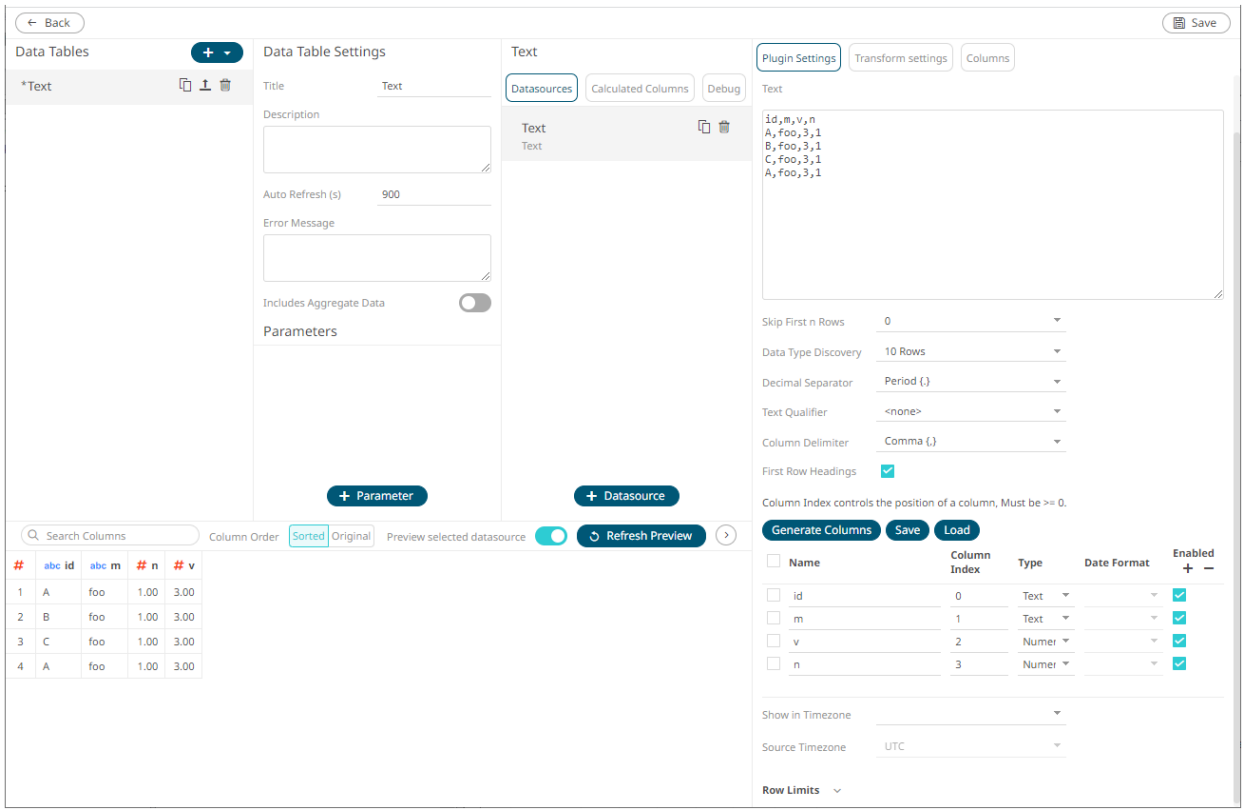
Not including the **A** value in the pivot still displayed the dates but did not include the **A** data since in Panopticon, pivoting is always with respect to time.

#	Date	# B	# C	# D	# E	# F	# G
1	10/01/2005						
2	10/29/2005						

Example 4

When applying a pivot transform, you can select **Sum**, **Min**, **Max**, **Count**, or **Last** aggregation method.

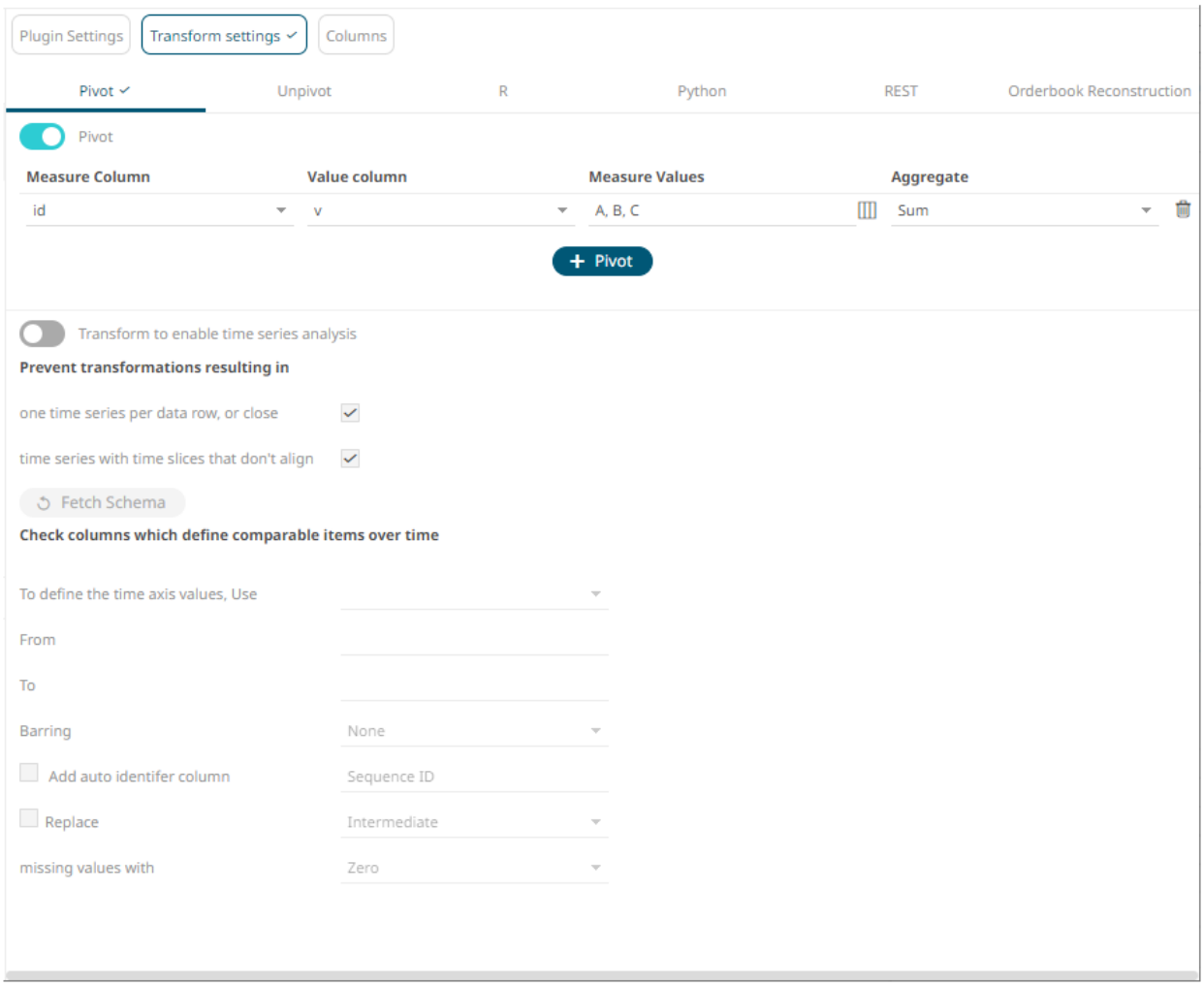
However, when there are two or more non-unique combinations of values in the columns that are not specified as *Measure* or *Value* columns, they may not be aggregated.



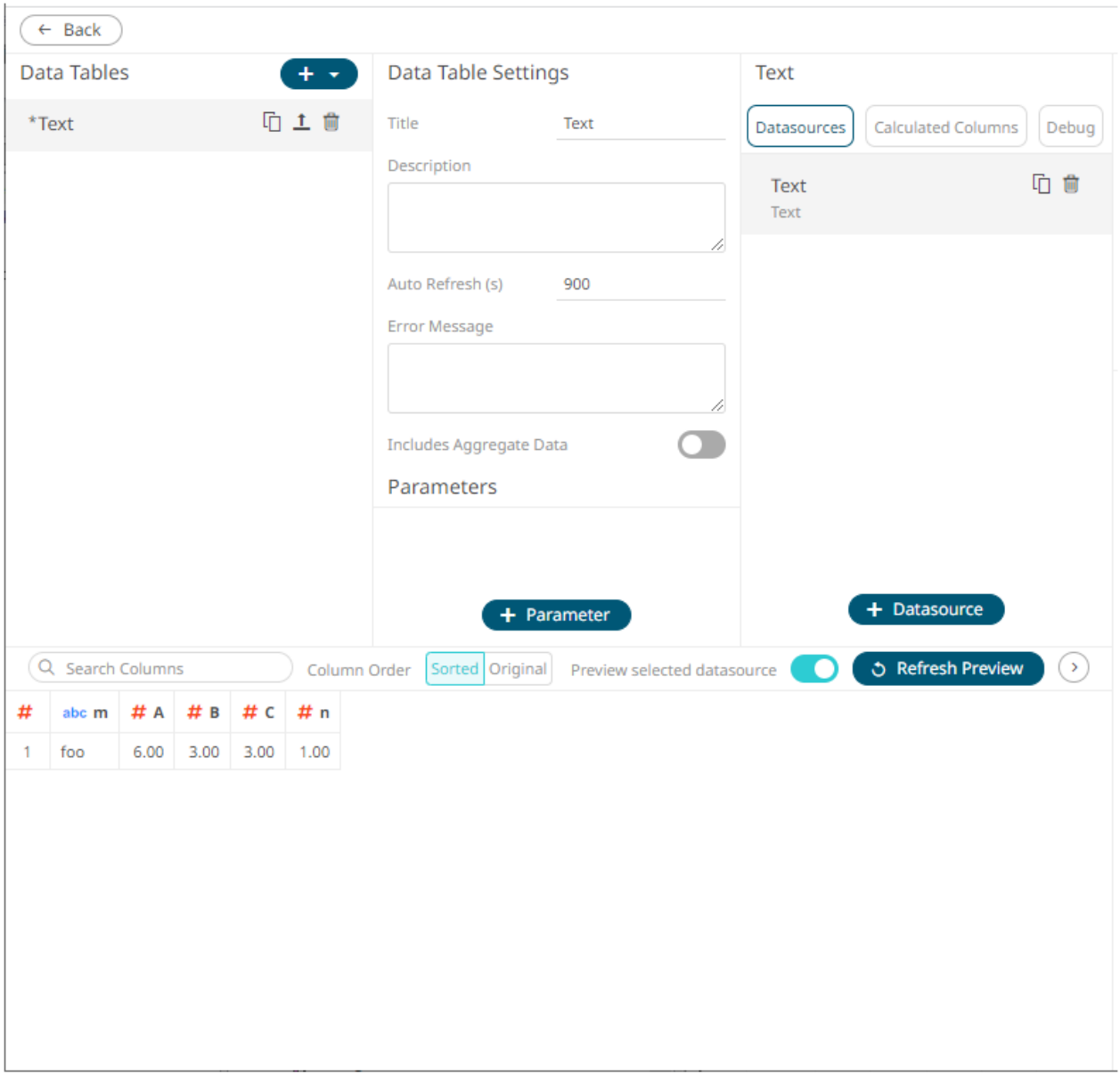
For the sample above, the *Measure* column is the one you want to pivot. In this case, you will pivot to create a unique **Sum** per *v* and measure.

The column named *id* will be used as the Measure (pivot) column, and value column (*v*) is the one you will aggregate.

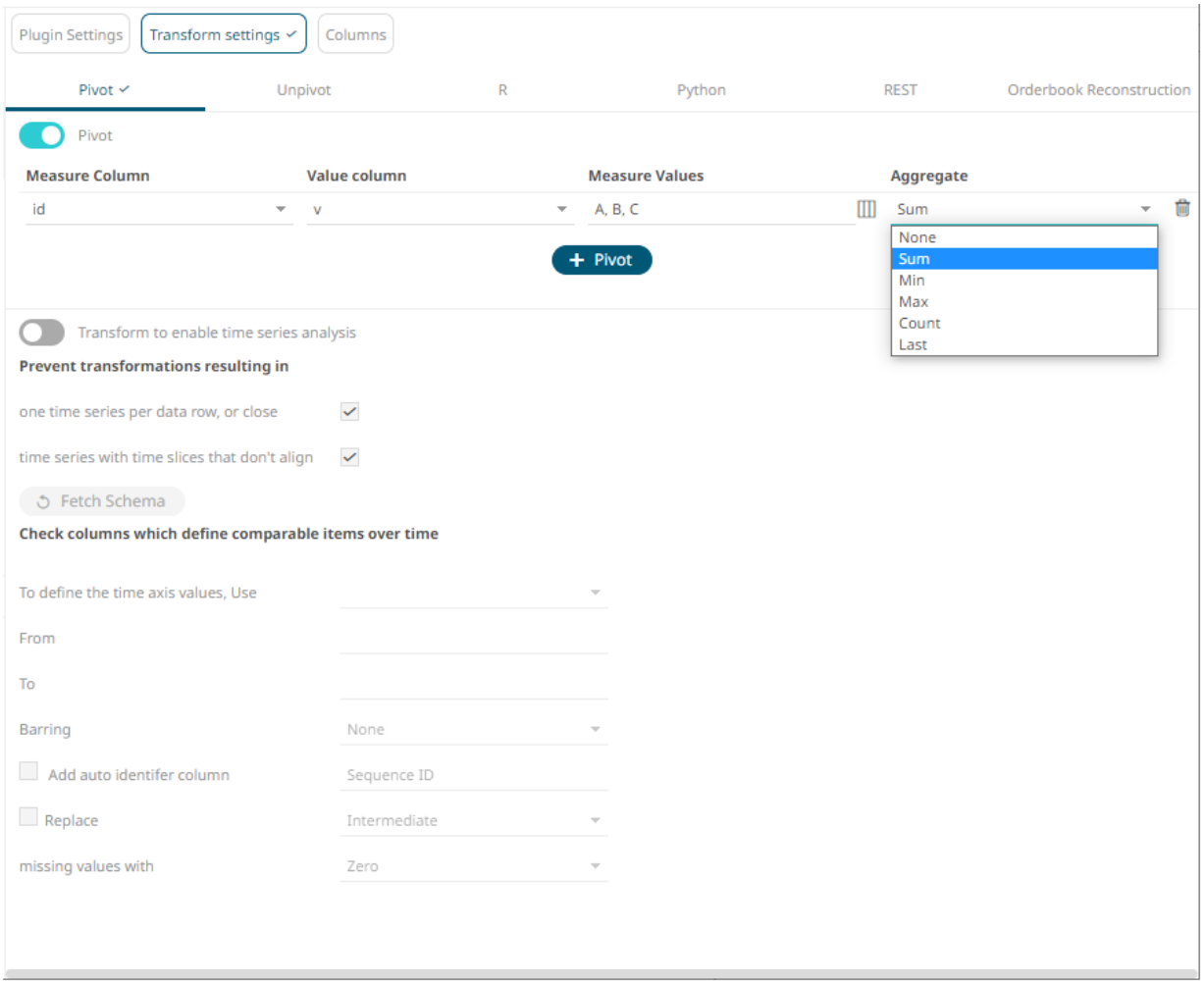
Click the **Populate Measure values** button to populate the *Measure Values* box that you can aggregate (i.e., **A, B, C**). The default **Sum** aggregation is applied.



Clicking  transforms the data and is displayed on the *Data Sources Preview*.

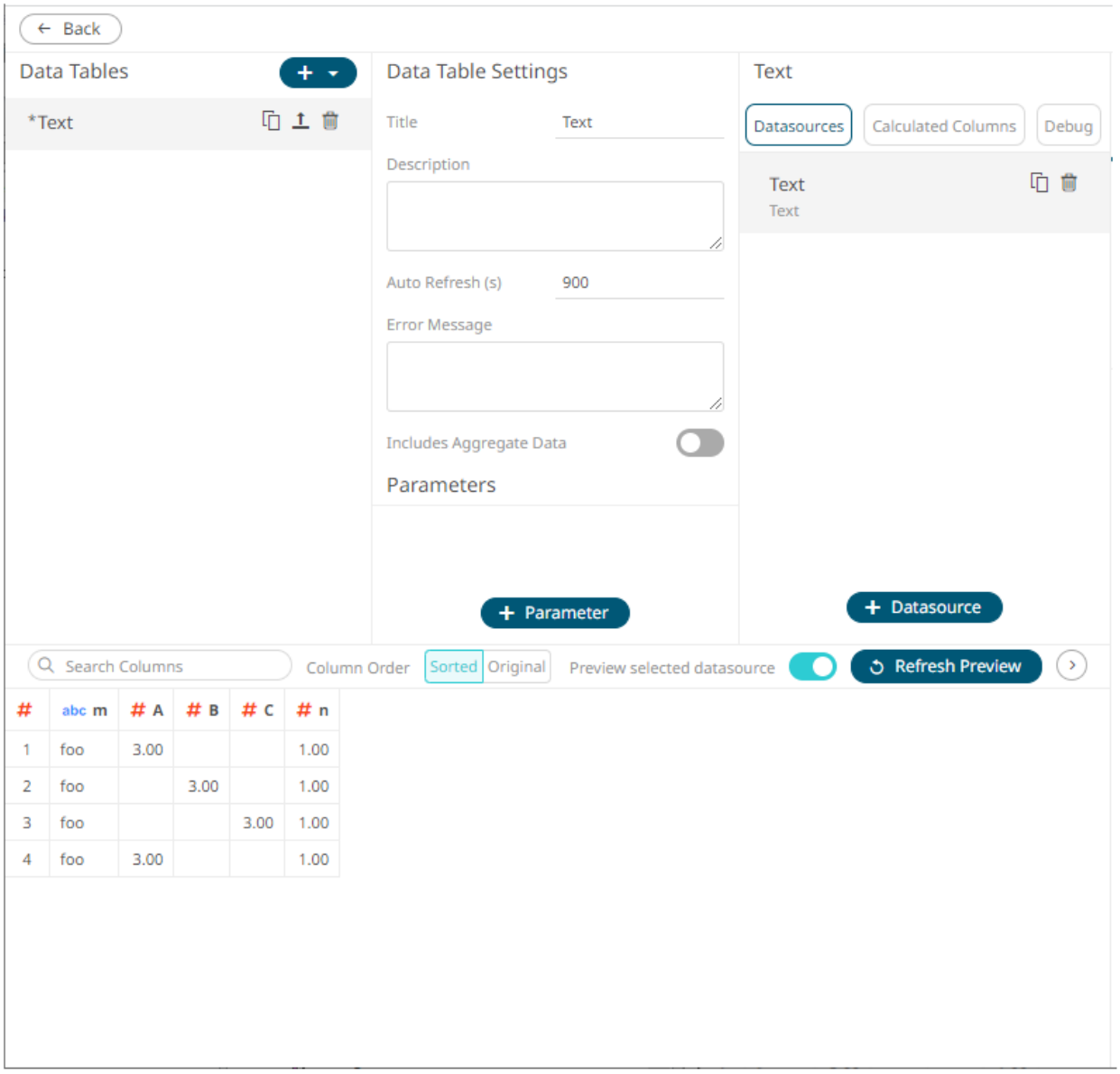


Note that the *n* column is not aggregated after pivoting. To fix this, set the *Aggregate* to **None**.

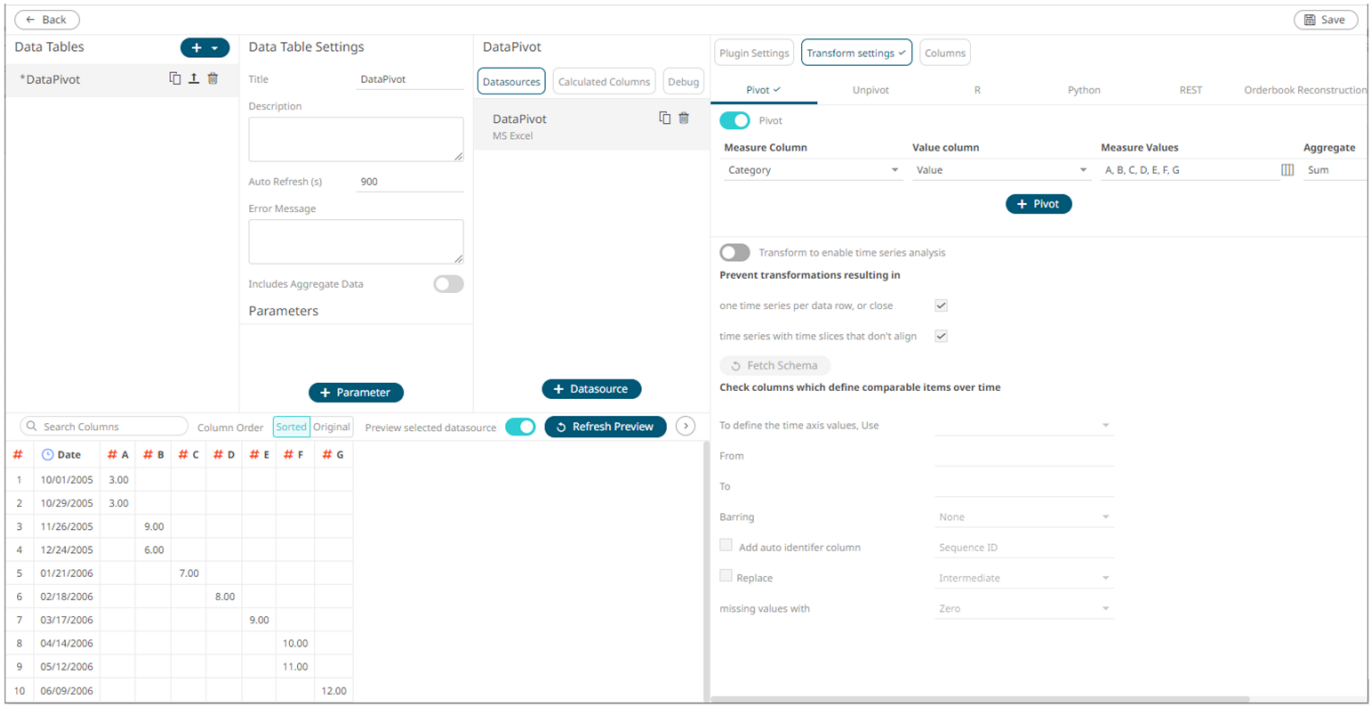


After clicking 

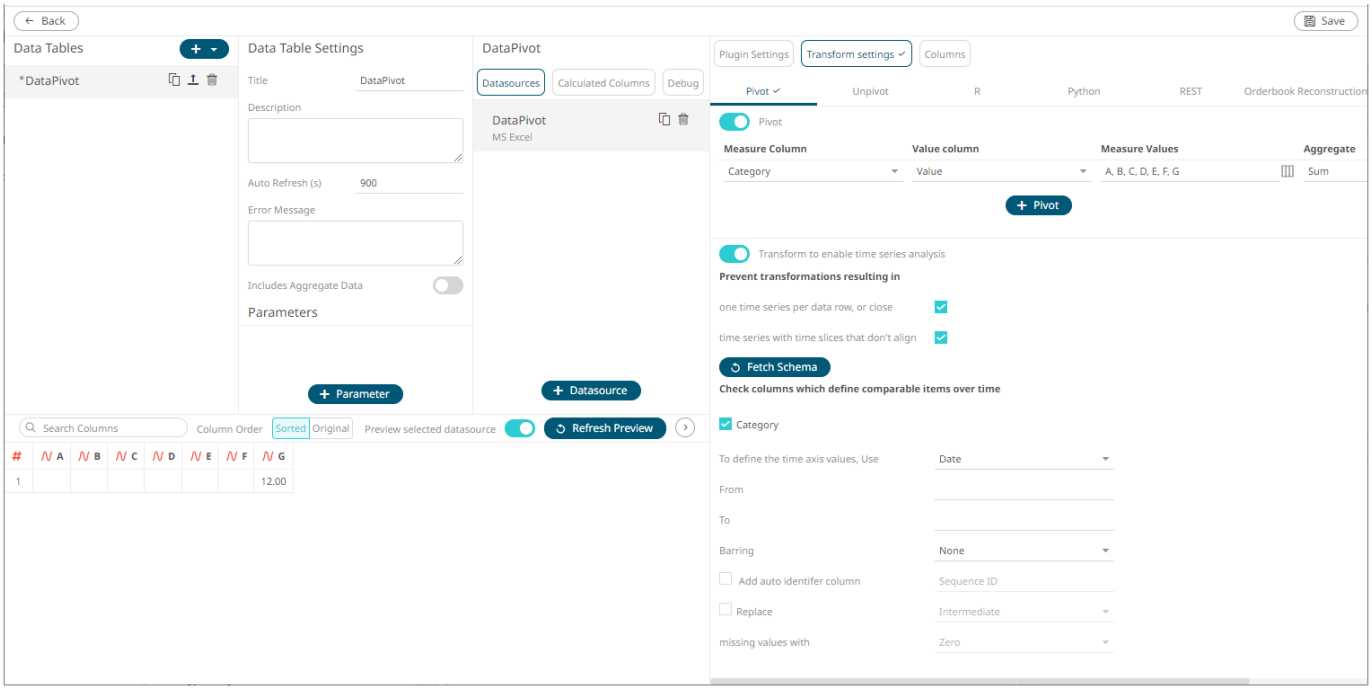
, the expected pivot is achieved and there is no aggregate applied to all of the columns.


Back
Data Tables
*Text
Data Table Settings
Title
Text
Description
Auto Refresh (s)
900
Error Message
Includes Aggregate Data
Parameters
Parameter
Text
Datasources
Calculated Columns
Debug
Text
Text
Datasource
Search Columns
Column Order
Sorted
Original
Preview selected datasource
Refresh Preview
abc m # A # B # C # n
1 foo 3.00 1.00
2 foo 3.00 1.00
3 foo 3.00 1.00
4 foo 3.00 1.00

Pivoting and Time Series

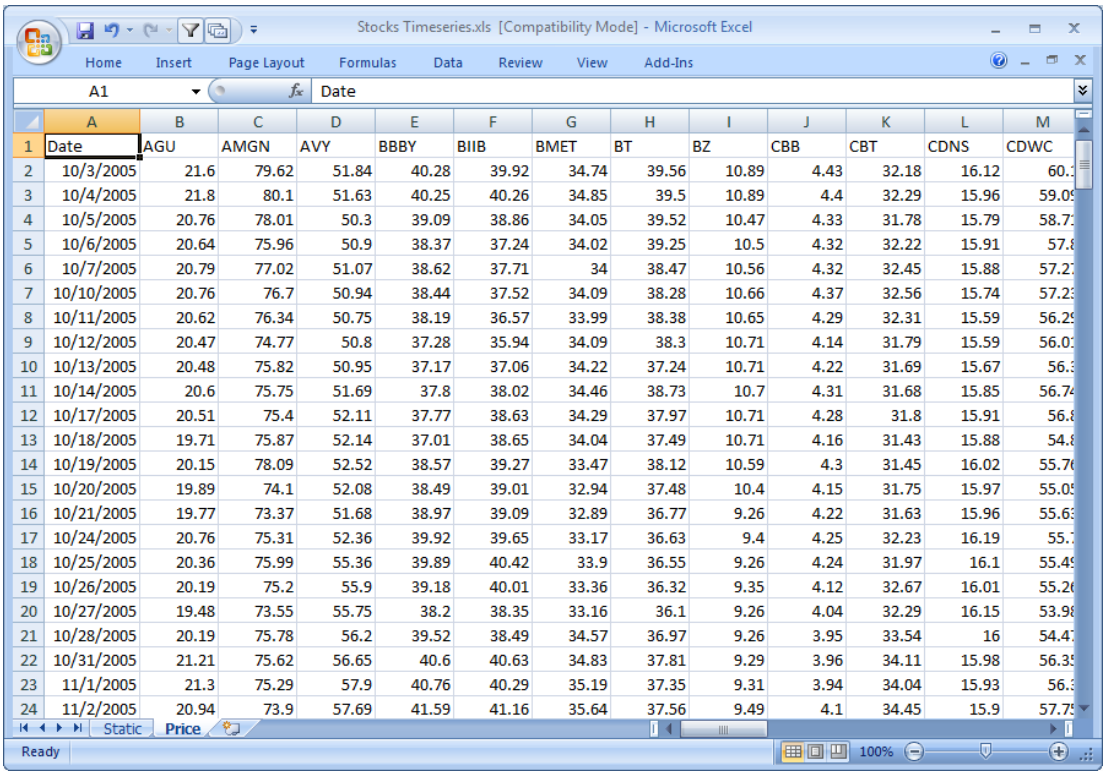


Enabling the time series analysis when you perform a transform solves the problem of having to specify all of the values. It also allows you to choose which Date/Time column should be used to specify the time series.



Unpivoting

A common alternative format for time series data sets is as follows:



Date	AGU	AMGN	AVY	BBBY	BIIB	BMET	BT	BZ	CBB	CBT	CDNS	CDWC
10/3/2005	21.6	79.62	51.84	40.28	39.92	34.74	39.56	10.89	4.43	32.18	16.12	60.
10/4/2005	21.8	80.1	51.63	40.25	40.26	34.85	39.5	10.89	4.4	32.29	15.96	59.0
10/5/2005	20.76	78.01	50.3	39.09	38.86	34.05	39.52	10.47	4.33	31.78	15.79	58.7
10/6/2005	20.64	75.96	50.9	38.37	37.24	34.02	39.25	10.5	4.32	32.22	15.91	57.8
10/7/2005	20.79	77.02	51.07	38.62	37.71	34	38.47	10.56	4.32	32.45	15.88	57.2
10/10/2005	20.76	76.7	50.94	38.44	37.52	34.09	38.28	10.66	4.37	32.56	15.74	57.2
10/11/2005	20.62	76.34	50.75	38.19	36.57	33.99	38.38	10.65	4.29	32.31	15.59	56.2
10/12/2005	20.47	74.77	50.8	37.28	35.94	34.09	38.3	10.71	4.14	31.79	15.59	56.0
10/13/2005	20.48	75.82	50.95	37.17	37.06	34.22	37.24	10.71	4.22	31.69	15.67	56.3
10/14/2005	20.6	75.75	51.69	37.8	38.02	34.46	38.73	10.7	4.31	31.68	15.85	56.7
10/17/2005	20.51	75.4	52.11	37.77	38.63	34.29	37.97	10.71	4.28	31.8	15.91	56.8
10/18/2005	19.71	75.87	52.14	37.01	38.65	34.04	37.49	10.71	4.16	31.43	15.88	54.8
10/19/2005	20.15	78.09	52.52	38.57	39.27	33.47	38.12	10.59	4.3	31.45	16.02	55.7
10/20/2005	19.89	74.1	52.08	38.49	39.01	32.94	37.48	10.4	4.15	31.75	15.97	55.0
10/21/2005	19.77	73.37	51.68	38.97	39.09	32.89	36.77	9.26	4.22	31.63	15.96	55.6
10/24/2005	20.76	75.31	52.36	39.92	39.65	33.17	36.63	9.4	4.25	32.23	16.19	55.7
10/25/2005	20.36	75.99	55.36	39.89	40.42	33.9	36.55	9.26	4.24	31.97	16.1	55.4
10/26/2005	20.19	75.2	55.9	39.18	40.01	33.36	36.32	9.35	4.12	32.67	16.01	55.2
10/27/2005	19.48	73.55	55.75	38.2	38.35	33.16	36.1	9.26	4.04	32.29	16.15	53.9
10/28/2005	20.19	75.78	56.2	39.52	38.49	34.57	36.97	9.26	3.95	33.54	16	54.4
10/31/2005	21.21	75.62	56.65	40.6	40.63	34.83	37.81	9.29	3.96	34.11	15.98	56.3
11/1/2005	21.3	75.29	57.9	40.76	40.29	35.19	37.35	9.31	3.94	34.04	15.93	56.3
11/2/2005	20.94	73.9	57.69	41.59	41.16	35.64	37.56	9.49	4.1	34.45	15.9	57.7

Where the first column represents the Date/Time, and subsequent columns represent the same variable such as Price for a given item. In the MS Excel screen shot above, the price history for a series of stocks are displayed.

By default, this format cannot be used within Panopticon, as it expects each item to occur on a different row, with each variable (such as Price) occupying a single column.

The format is in fact a pivoted version of the format that Panopticon requires.

In general, when unpivoting, individual columns are being converted into additional rows with only two columns, by default named **Measure** and **Value**.

Steps:

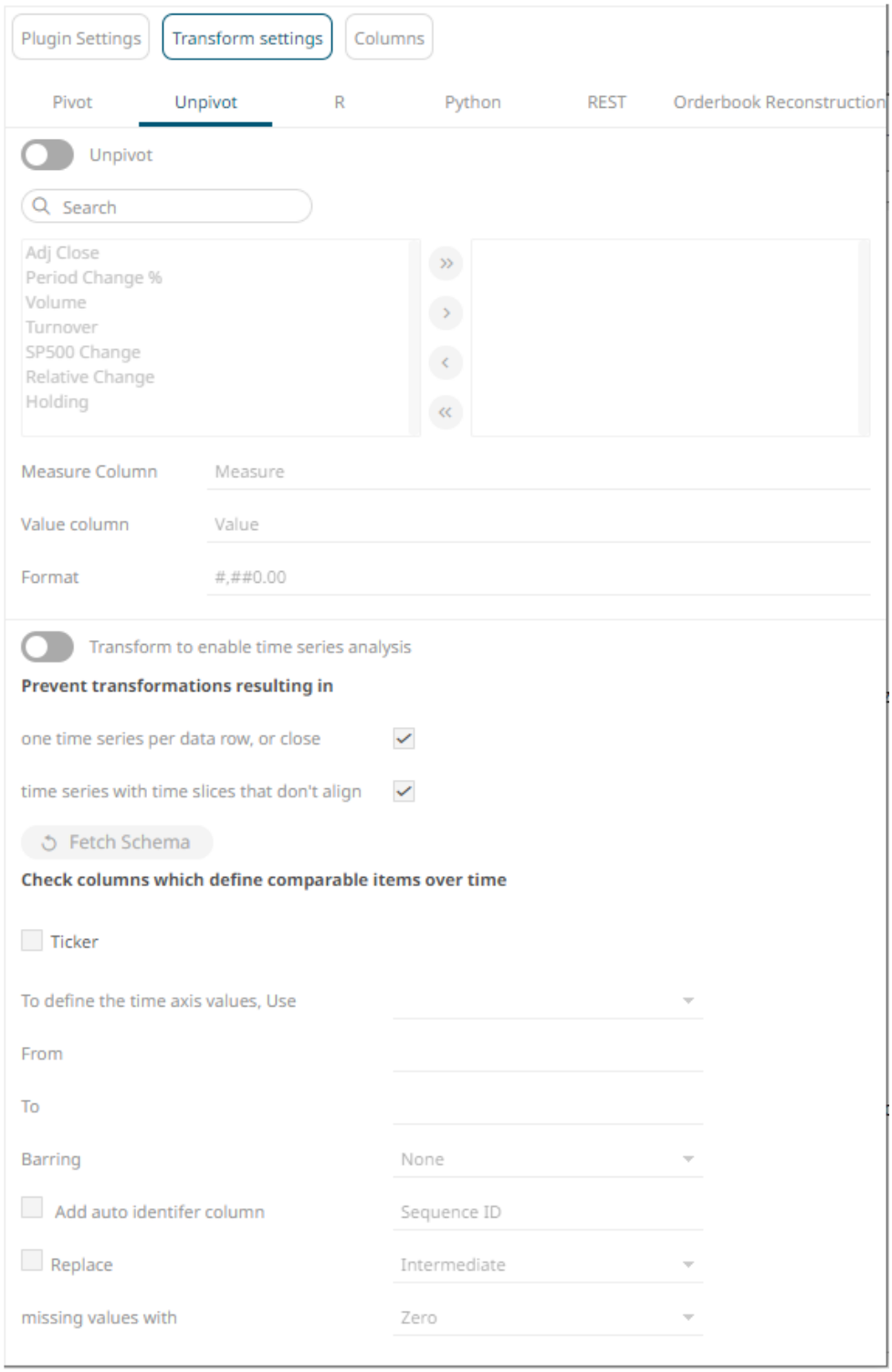
1. To unpivot the data, click the **Transform Settings** button on the *Data Sources Setting* pane**.**

   The *Transform Settings* pane displays.

   Unpivot

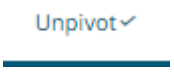
2. Click ▬▬▬**.**

   The *Transform Settings* pane changes to display the *Unpivot Settings*.

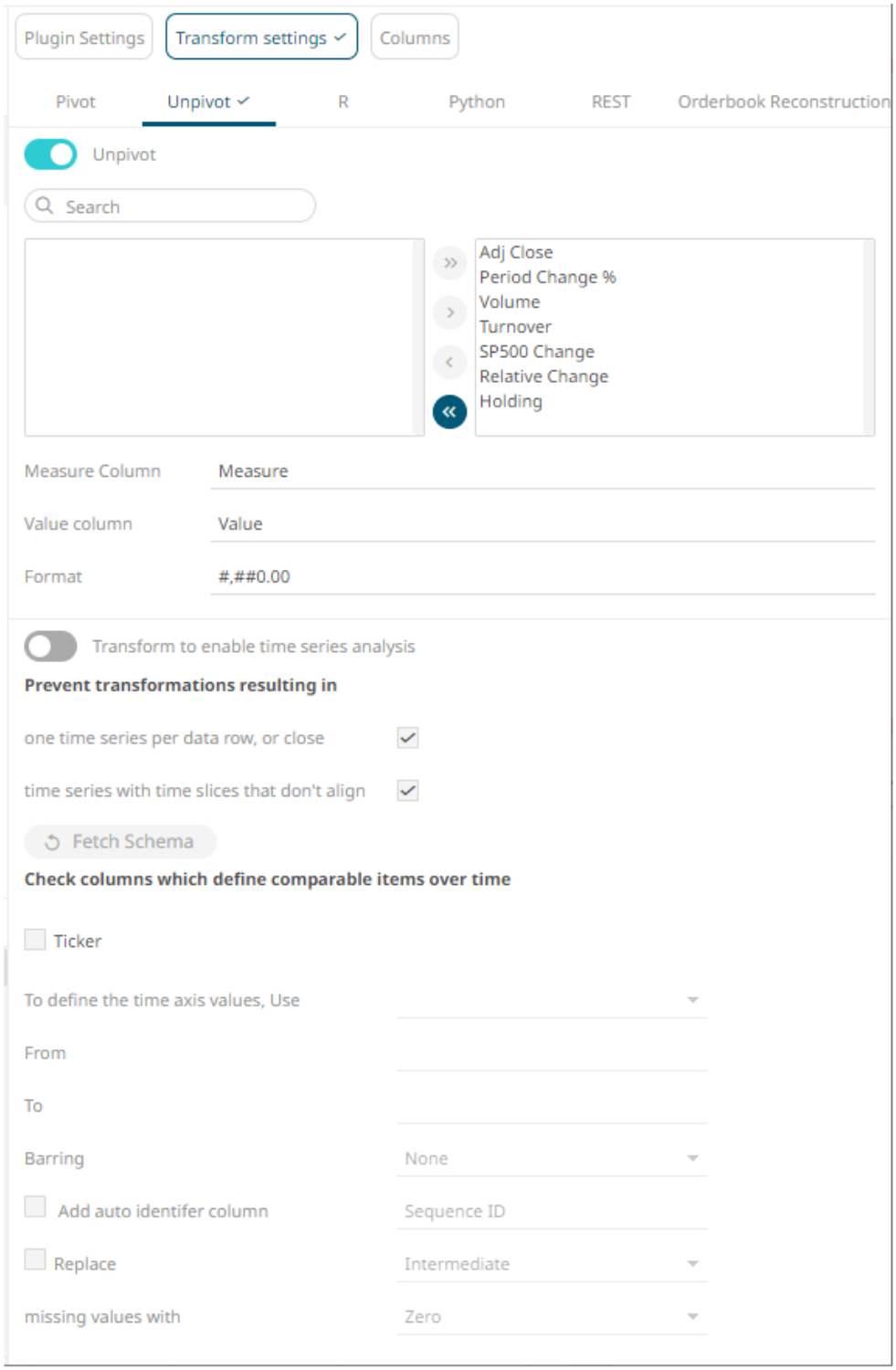


3. Tap the **Unpivot** slider.

   The **Transform Settings** button and **Unpivot** tab change to 

and 

, respectively and all of the columns are moved to the *Unpivot* box.

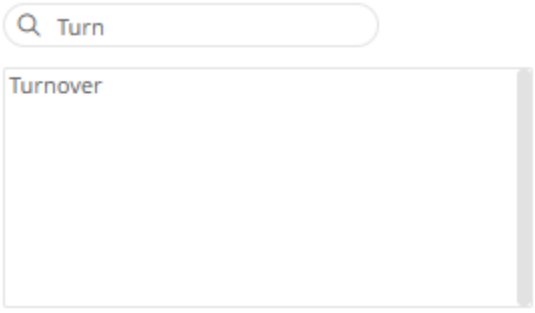


You may opt to move fields from the *Columns* to *Unpivot* box, or vice versa, using the following buttons:

-  - move all fields from the *Columns* to *Unpivot* box
-  - move all fields from the *Unpivot* to *Columns* box

-  - click after selecting one or more fields from the *Columns* box to move to the *Unpivot* box
-  - click after selecting one or more fields from the *Unpivot* box to move to the *Columns* box

You can also filter the list of columns by entering a text in the *Search Columns* search box.



4. Give appropriate names to the *Measure* and *Value* columns.

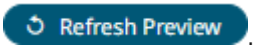
   For example:

   ```
   Measure Column = Return Type
   ```

   ```
   Value Column = Return Value
   ```

5. Define the display formats for numeric fields. The default setting is: **#,##0.00**
6. Refer to Enable Time Series Analysis for more information in enabling this feature.

   Enabling the time series analysis when you perform an unpivot solves the problem of having to specify all of the values. It also allows you to choose which Time column should be used to specify the time series.

7. Click 

.

R TRANSFORM

An R script can be executed as a data transformation step in the data pipeline. Specifically:

- Data is retrieved from an underlying source
- The returned data table is translated into an R data frame
- The R data frame, and supplied R Script are passed to an external R process running Rserve
- The external Rserve process returns a resulting R data frame
- The returned data frame is translated into a Panopticon table for visualization rendering

For this to occur, both R and Rserve must be installed, and initialized.

NOTE

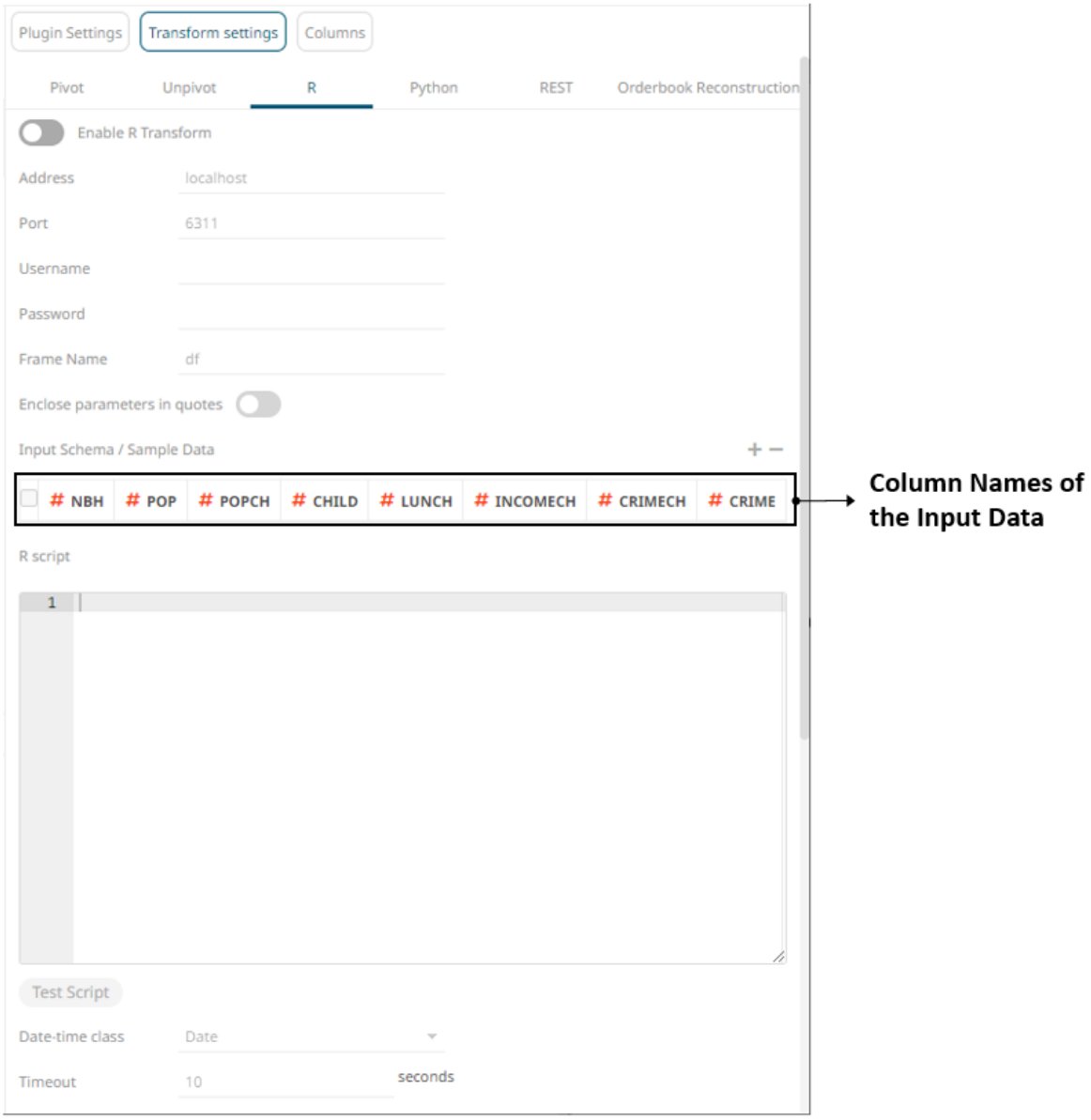
- **When used with streaming data sources (e.g., message bus), the Real Time Limit of a streaming data source should be set to a value longer than the time taken to perform the R data transform.**

  For example, if the transform operation takes 2 seconds, the Real Time Limit should be set to 2500 milliseconds.

- **When used for non-streaming data sources (e.g., Database), the data table Auto Refresh period should be set to a value longer than the time taken to perform the R data transform.**

  For example, if the transform operation takes 2 seconds, the data table Auto Refresh period should be set to 3 seconds.

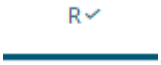
When the **R** button is selected, the *Transform Settings* pane changes to show:



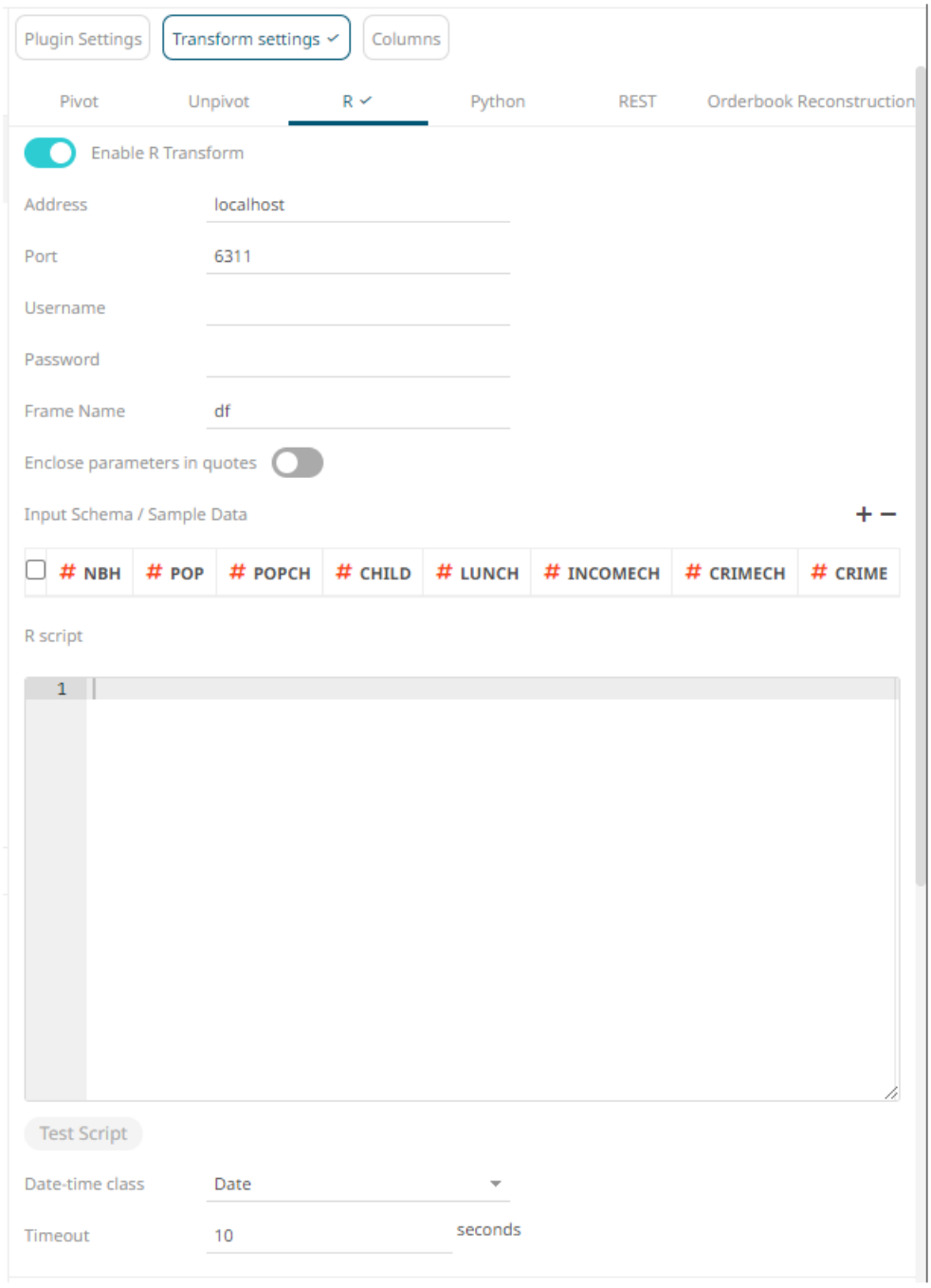
Steps:

1. Tap the **Enable R Transform** slider to turn it on.

   The **Transform Settings** button and **R** tab change to 

and 

, respectively.



   The default *Address* (i.e., **localhost**) and *Port* (i.e., **6311**) fields are displayed.

2. Specify the *Username* and *Password* if authentication is enabled on the Rserve process.

NOTE **The *Address*, *Port*, *Username*, and *Password* fields will be hidden if their corresponding properties are set in the `Panopticon.properties` file.**

Field	Corresponding Property in Panopticon.properies
Address	`connector.rserve.host`
Port	`connector.rserve.port`
Username	`connector.rserve.userid`
Password	`connector.rserve.password`

3. The *Frame Name* that Panopticon will produce, and then be utilized by the R scripts should be specified. Default is **df**.
4. Specify whether to *Enclose Parameters in Quotes*.
5. Enter the *R Script*. This R script should reference the input frame name and return a data frame. Just like an underlying SQL query, the R Script itself can be parameterized.

NOTE **This step will work for small and simple use cases. However, when you have several transforms, or when each transform is applied to several data tables, it is highly recommended to follow the instructions in the Best Practices on Working with R Transform in Panopticon section.**

6. On the *Input Schema/Sample Data* section, the column names of the input data source are displayed. In cases where there are no rows from the input data source and the R script is not handling zero rows, you can add sample data to ensure transform is applied.

   To add or manage the sample data, you can use the following icons:

Icon	Description
+	Add sample data for the input column names.
−	Check a box of a sample data row and click − to delete, or check the topmost box and click − to delete all of the sample data rows.

7. Click Test Script. If successful, the output schema is displayed.

   Otherwise, a notification is displayed with the cause of the error. Update the script.
8. Select the *Date-time class* that will be applied to the transform:
   - Date is the simplest data type to use for calendar dates. It is stored as integers and is represented as the number of days since 1970-01-01, with negative values for earlier dates.
   - chron that can be used for chronological objects which can handle dates and times.
   - POSIXct is built-in POSIXt date-time data type with ct that stands for calendar time. It stores the number of seconds since the origin.
9. The *Timeout* is set to **10** seconds by default to ensure that slow running R scripts do not impact other areas of the product. You can opt to enter a new value.

10. Click  to see the output columns from the R transform.

11. Refer to Enable Time Series Analysis for more information in enabling this feature.

Best Practices on Working with R Transform in Panopticon

When applying a transform with R in Panopticon for small and simple cases, you have the option of typing or pasting the code directly into the *Transforms* window. However, when you have several different transforms, or when each transform is applied in several data tables, it is highly recommended to follow the steps outlined below on how to apply functional programming and the D.R.Y. principle (Don't Repeat Yourself) to the R transforms in Panopticon.

Steps:

1. Save your code in R-files for R. This option gives you the freedom to work on the code in RStudio.
2. Instead of using an imperative coding approach, define one or several functions in the file, which when invoked, runs your code, takes a data frame as an input argument, and then returns the resulting data frame.
3. In the *Transforms* window of Panopticon, reference this external code file at the very top:

   ```
   source("path/to/your/folder/your_R_file.R")
   ```

   You can then invoke (call) any function that you have defined in your code file with a function call in the transform code window. Ideally, the function will return the transformed data frame.
4. The path to the external code file needs to be valid both from the point of view of Panopticon Designer on your local workstation, and from the point of view of Panopticon Real Time you publish to. This can be assured by introducing a global parameter in the Real Time under the **Parameters** tab.

   For example, you can name the parameter **R_code_path** and define its value as the full path to the folder that contains your code files. Next, on Panopticon Real Time, define a global parameter with the same name, but with a value that is the path to the server-side folder containing your code files. Copy the code files to the server-side folder then edit the path specified in your sourcing call in the transform so that it contains the parameter. For example:

   ```
   source(file.path("{R_code_path}", "your_R_file.R"))
   ```

   This will achieve a path reference to your code file which is valid in both the Designer and Server. It is also useful when promoting or migrating a Panopticon workbook from one server environment to another.

NOTE

- **If there is a need to apply different transforms to different data sets, you can solve this by defining several different functions in your code file.**
- **For very similar functions, avoid repeating the same code in a file by factoring out the common parts and placing them in a separate function, which can be invoked by the other functions.**
- **For a transform that needs to have different outputs based on certain conditions or variables, this can be controlled by adding another input parameter to the function. Depending on the argument given to that parameter, you can make the function do things differently by evaluating a condition. In addition, this argument can – if you want to – be supplied via a Panopticon parameter and thereby be put under a dashboard end-user control.**

Example code in R

File: **my_transform_code.R**

```
# minimal example function
add_one = function(df, colname) {
    df[colname] = df[colname]+1
    return(df)
}
```

Panopticon R transform window code:

```
source(file.path("{my_R_code_path}","my_transform_code.R"))
# data set is loaded in dataframe named 'my_data_frame'
add_one(df = my_data_frame, colname = "my_column_name")
# the function returns a data frame
# which is picked up by Panopticon
```

Additional Best Practice Recommendations in Using R with Panopticon

With an R transform or the Rserve connector in Panopticon, it is fairly quick and easy to enter some short code snippet and use the result. However, as a project grows, and if a solution is moved into production and becomes business critical, you need more structure in your use of R and Rserve with Panopticon:

- Code should be made into functions, even if used only in one place and even if the code content is very brief. Thereby, the operations performed by each function will be contained and you avoid the risk of naming conflicts and contamination in the global environment.
- Ensure you handle exceptions in the code you write. For example, when applying an R transform to data, you can do an initial check in your code to see if the dataset is either zero-row or has any rows. In which case, you want to terminate and just return the empty dataset. You should also use tryCatch clauses, whereby in the event of an error or a warning, you could, for example, insert the error/warning message into the designated column in your dataset and then return it to Panopticon. As long as there is no error, the same column could contain a plain "OK" or similar as an indicator of a no-errors result.
- Functions should ideally be turned into a package. The benefit of that is mainly about the possibility of adding unit testing and automating dependency package imports.
- Your package should have unit tests that are run when building the package.
- Your package should import any other packages that you have a dependency on.
- Developing, Testing and Debugging the package should happen in a proper IDE, where proper debugging tools and full error messages can be monitored easily. For testing and debugging, some boiler-plate code snippets and parameter input data can be prepared, to mimic the input which could come from Panopticon parameters when the code is used via Panopticon.
- In Panopticon, the code field of the transform or connector should contain an absolute mininum of code; perhaps as little as a single function call, where the function takes the necessary arguments coming from Panopticon parameters.
- With R and Rserve, it should be configured to load (import) your packages on startup, which will avoid the overhead of repeated loading of the packages upon each call.

PYTHON TRANSFORM

A Python script can be executed as a data transformation step in the data pipeline. Specifically:

- Data is retrieved from an underlying source.
- The returned data table is translated into a Python object; specifically, a list of dictionaries.
- The Python object, and supplied Python Script are passed to an external Python process running Pyro. (Python Remote Objects) e.g., https://pypi.python.org/pypi/Pyro4/
- The external Pyro process returns a list of dictionaries
- The returned list of dictionaries is translated into a Panopticon table for visualization rendering.

NOTE

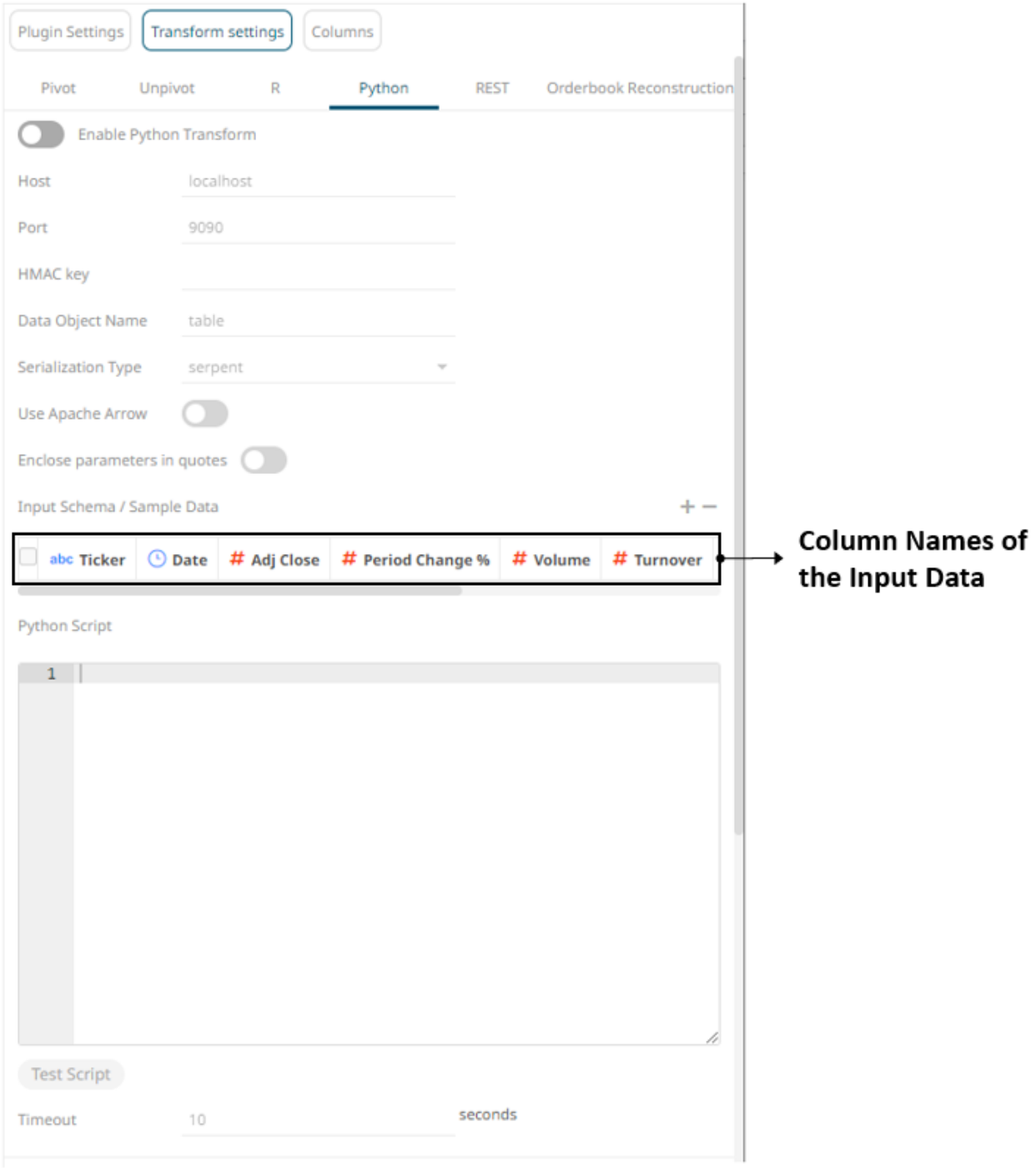
- **When used with streaming data sources (e.g., message bus), the Real Time Limit of a streaming data source should be set to a value longer than the time taken to perform the Python data transform.**

  For example, if the transform operation takes 2 seconds, the Real Time Limit should be set to 2500 milliseconds.

- **When used for non-streaming data sources (e.g., Database), the data table Auto Refresh period should be set to a value longer than the time taken to perform the Python data transform.**

  For example, if the transform operation takes 2 seconds, the data table Auto Refresh period should be set to 3 seconds.

When the **Python** button is selected, the dialog changes to show:



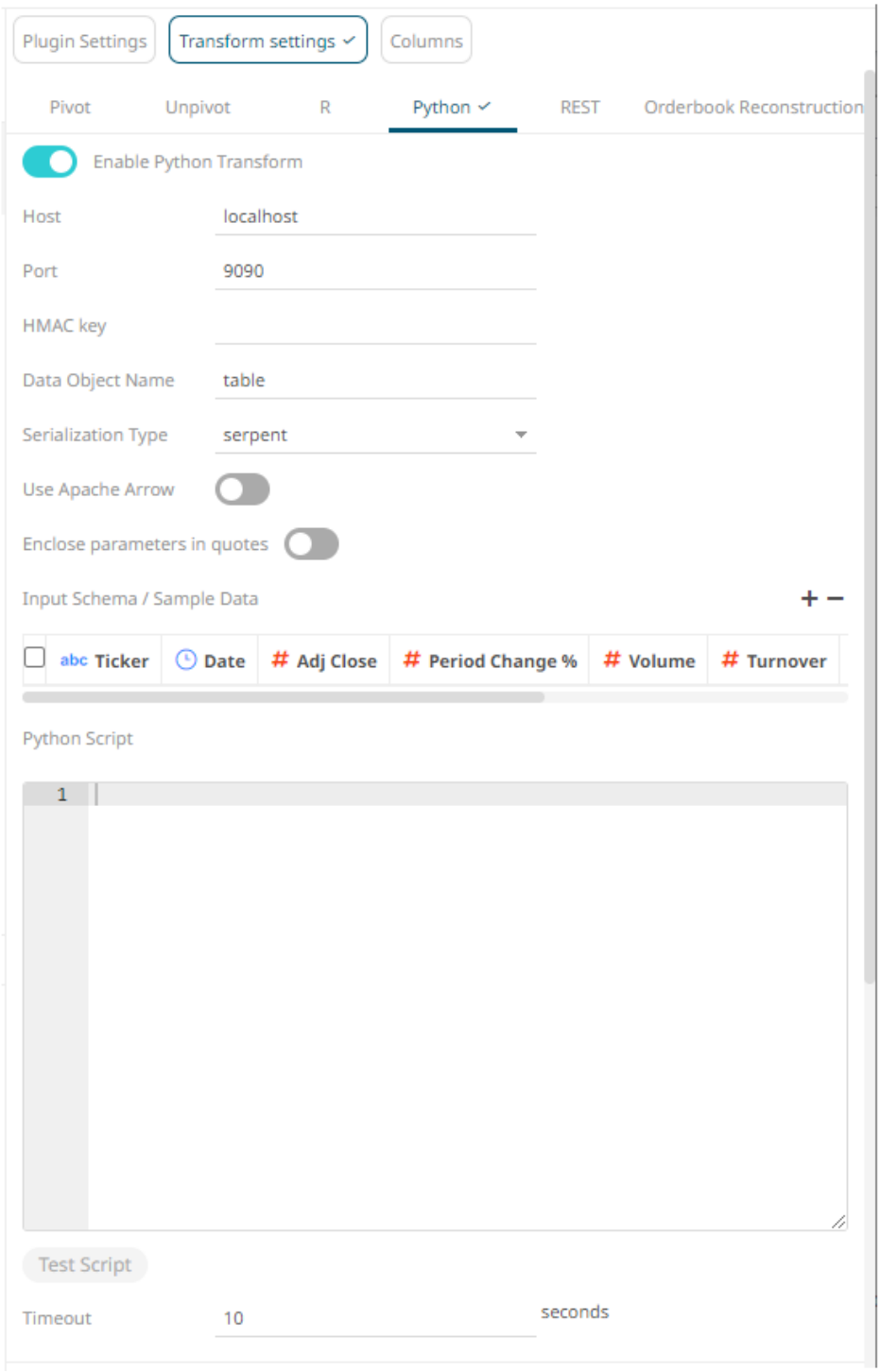
Steps:

1. Tap the **Enable Python Transform** slider.

   The **Transform Settings** button and **Python** tab change to 

and 

, respectively.



2. Specify the *Host* and *Port* of the Pyro process, along with the *HMAC key* (Password).
3. Specify the *Data Object Name*. This defines the data structure (list of dictionaries) that Panopticon Real Time will produce, and then will be utilized by the Python script.
4. Select the *Serialization Type*: **Serpent** or **Pickle**
    - Serpent – simple serialization library based on ast.literal_eval
    - Pickle – faster serialization but less secure

Modify the `configuration.py` file located in `..\Anaconda3\Lib\site-packages\Pyro4` to specify the serialization to be used.

For example, if **Pickle** is selected, `self.SERIALIZER` value should be changed to **pickle** and `self.SERIALIZERS_ACCEPTED` value should be changed to include **pickle**:

```
def reset(self, useenvironment=True):
        """
        Set default config items.
        If useenvironment is False, won't read environment variables settings (useful
if you can't trust your env).
        """
        self.HOST = "localhost"  # don't expose us to the outside world by default
        self.NS_HOST = self.HOST
        self.NS_PORT = 9090  # tcp
        self.NS_BCPORT = 9091  # udp
        self.NS_BCHOST = None
        self.NATHOST = None
        self.NATPORT = 0
        self.COMPRESSION = False
        self.SERVERTYPE = "thread"
        self.COMMTIMEOUT = 0.0
        self.POLLTIMEOUT = 2.0  # seconds
        self.SOCK_REUSE = True  # so_reuseaddr on server sockets?
        self.SOCK_NODELAY = False  # tcp_nodelay on socket?
        self.THREADING2 = False  # use threading2 if available?
        self.ONEWAY_THREADED = True  # oneway calls run in their own thread
        self.DETAILED_TRACEBACK = False
        self.THREADPOOL_SIZE = 16
        self.AUTOPROXY = True
        self.MAX_MESSAGE_SIZE = 0  # 0 = unlimited
        self.BROADCAST_ADDRS = "<broadcast>, 0.0.0.0"  # comma separated list of
broadcast addresses
        self.FLAME_ENABLED = False
        self.PREFER_IP_VERSION = 4  # 4, 6 or 0 (let OS choose according to RFC 3484)
        self.SERIALIZER = "pickle"
        self.SERIALIZERS_ACCEPTED = "pickle,marshal,json"   # these are the 'safe'
serializers
        self.LOGWIRE = False  # log wire-level messages
        self.PICKLE_PROTOCOL_VERSION = pickle.HIGHEST_PROTOCOL
        self.METADATA = True  # get metadata from server on proxy connect
        self.REQUIRE_EXPOSE = False  # require @expose to make members remotely
accessible (if False, everything is accessible)
        self.USE_MSG_WAITALL = hasattr(socket, "MSG_WAITALL") and platform.system()
!= "Windows"      # not reliable on windows even though it is defined
        self.JSON_MODULE = "json"
        self.MAX_RETRIES = 0
```

NOTE **The *Host*, *Port*, *HMAC Key*, and *Serialization Type* fields will be hidden if their corresponding properties are set in the `Panopticon.properties` file.**

Field	Corresponding Property in Panopticon.properies
Host	`connector.python.host`
Port	`connector.python.port`
HMAC Key	`connector.python.password`
Serialization Type	`connector.python.serializertype`

5. Tap the **Use Apache Arrow** slider to enable fast serialization of data frames in the Python transform.
6. Specify whether to *Enclose Parameters in Quotes*.
7. Enter the *Python Script* or load from an associated file (selected by clicking the **Browse** button). This returns the output list of dictionaries. Just like an underlying SQL query, the Python script itself can be parameterized.

NOTE **This step will work for small and simple use cases. However, when you have several transforms, or when each transform is applied to several data tables, it is highly recommended to follow the instructions in Best Practices on Working with Python Transform in Panopticon section.**

8. On the *Input Schema/Sample Data* section, the column names of the input data source are displayed. In cases where there are no rows from the input data source and the Python script is not handling zero rows, you can add sample data to ensure transform is applied.

   To add or manage the sample data, you can use the following icons:

Icon	Description
+	Add sample data for the input column names.
−	Check a box of a sample data row and click − to delete, or check the topmost box and click − to delete all of the sample data rows.

9. Click Test Script. If successful, the output schema is displayed.

   Otherwise, a notification is displayed with the cause of the error. Update the script.
10. The *Timeout* is set to **10** seconds by default to ensure that slow running Python scripts do not impact other areas of the product. You can opt to enter a new value.
11. Click Refresh Preview to see the output columns from the Python transform.
12. Refer to Enable Time Series Analysis for more information in enabling this feature.

Best Practices on Working with Python Transform in Panopticon

When applying a transform with Python in Panopticon for small and simple cases, you have the option of typing or pasting the code directly into the *Transforms* window. However, when you have several different transforms, or when each transform is applied in several data tables, it is highly recommended to follow the steps outlined below on how to apply functional programming and the D.R.Y. principle (Don't Repeat Yourself) to the Python transforms in Panopticon.

Steps:

1. Save your code in py-files for Python. This option gives you the freedom to work on the code using the IDE of your choice (i.e., PyCharm, Spyder, Atom etc.).
2. Instead of using an imperative coding approach, define one or several functions in the file, which when invoked, runs your code, takes a data frame as an input argument, and then returns the resulting data frame.
3. In the *Transforms* window of the Panopticon Designer, reference this external code file at the very top:

   ```
   from sys import path
   path.append("path/to/your/folder/")
   import YourPythonFile
   ```

   You can then invoke (call) any function that you have defined in your code file with a function call in the transform code window. Ideally, the function will return the transformed data frame.
4. The path to the external code file needs to be valid both from the point of view of Panopticon Designer on your local workstation, and from the point of view of Panopticon Real Time you publish to. This can be assured by introducing a global parameter in Panopticon Real Time under the **Parameters** tab.

   For example, you can name the parameter **Python_code_path** and define its value as the full path to the folder that contains your code files. Next, on Panopticon Real Time, define a global parameter with the same name, but with a value that is the path to the server-side folder containing your code files. Copy the code files to the server-side folder then edit the path specified in your sourcing call in the transform so that it contains the parameter. For example:

   ```
   from sys import path
   path.append("{Python_code_path}")
   import YourPythonFile
   ```

   This will achieve a path reference to your code file which is valid in both the Designer and Server. It is also useful when promoting or migrating a Panopticon workbook from one server environment to another.

NOTE

- **If there is a need to apply different transforms to different data sets, you can solve this by defining several different functions in your code file.**
- **For very similar functions, avoid repeating the same code in a file by factoring out the common parts and placing them in a separate function, which can be invoked by the other functions.**
- **For a transform that needs to have different outputs based on certain conditions or variables, this can be controlled by adding another input parameter to the function. Depending on the argument given to that parameter, you can make the function do things differently by evaluating a condition. In addition, this argument can – if you want to – be supplied via a Panopticon parameter and thereby be put under a dashboard end-user control.**

Example code in Python

File: **myTransformCode.py**

```
# minimal example function
def AddOne(df, colname):
    df[colname] = df[colname]+1
    return(df)
```

Panopticon Python transform window code:

```
import pandas as pd
from sys import path
path.append("{my__Python_code_path}")
import myTransformCode as tc
# data set is loaded in a list of dictionaries named 'table'
myDataFrame = pd.DataFrame(table)
tc.AddOne(df = myDataFrame, colname = "value")
return(myDataFrame)
```

Additional Best Practice Recommendations in Using Python with Panopticon

With a Python transform or the Python connector in Panopticon, it is fairly quick and easy to enter some short code snippet and use the result. However, as a project grows, and if a solution is moved into production and becomes business critical, you need more structure in your use of Python with Panopticon:

- Code should be made into functions, even if used only in one place and even if the code content is very brief. Thereby, the operations performed by each function will be contained and you avoid the risk of naming conflicts and contamination in the global environment.
- Ensure you handle exceptions in the code you write. For example, when applying a Python transform to data, you can do an initial check in your code to see if the dataset is either a zero-row or has any rows. In which case, you want to terminate and just return the empty dataset. You should also use try-except clauses, whereby in the event of an error, you could, for example, insert the error message into the designated column in your dataset and then return it to Panopticon. As long as there is no error, the same column could contain a plain "OK" or similar as an indicator of a no-errors result.
- Functions should ideally be turned into a package. The benefit of that is mainly about the possibility of adding unit testing and automating dependency package imports.
- Your package should have unit tests that are run when building the package.
- Your package should import any other packages that you have a dependency on.
- Developing, Testing, and Debugging the package should happen in a proper IDE, where proper debugging tools and full error messages can be monitored easily. For testing and debugging, some boiler-plate code snippets and parameter input data can be prepared, to mimic the input which could come from Panopticon parameters when the code is used via Panopticon.
- In Panopticon, the code field of the transform or connector should contain an absolute mininum of code; perhaps as little as a single function call, where the function takes the necessary arguments coming from Panopticon parameters.

REST TRANSFORM

A REST Transform can be used when you have access to a REST API that accepts a POST or PUT request, containing data in a JSON-formatted request body. The API is expected to apply a specific transform or calculation on the data and returns the resulting data set. Typically, any REST API used this way is created and made available by your own organization, since the owner of the REST API will be able to monitor any data handed to it. Using a REST Transform is an alternative to using a Python Transform or R Transform. There are various cloud services that facilitate the task of exposing your code as a REST API.

Steps:

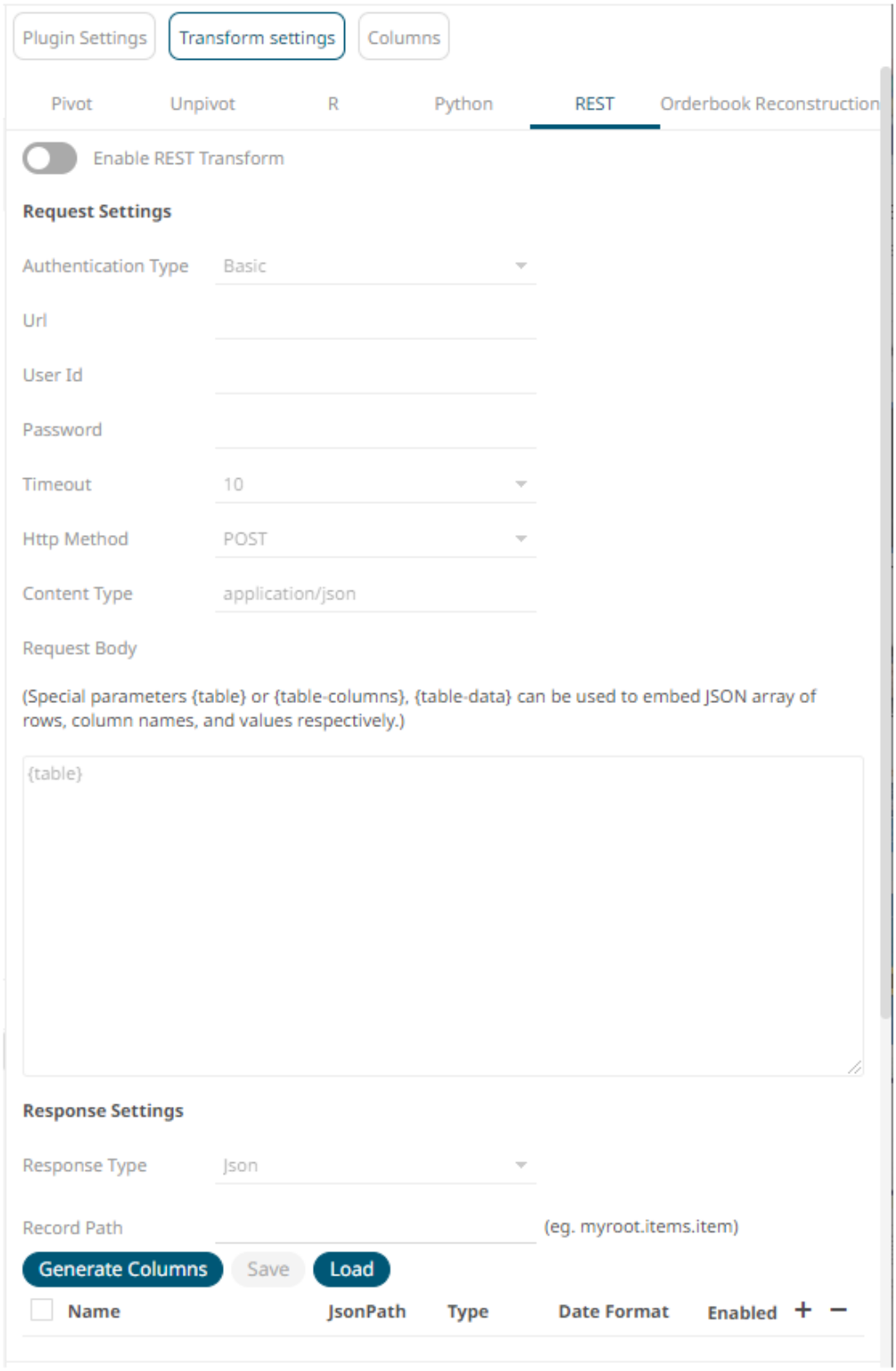
1. Click the **Transform Settings** button on the *Data Sources Setting* pane.

   The *Transform* Settings pane displays.

2. Click 

.

   The *Transform Settings* pane changes to display the *REST Transform Settings*.



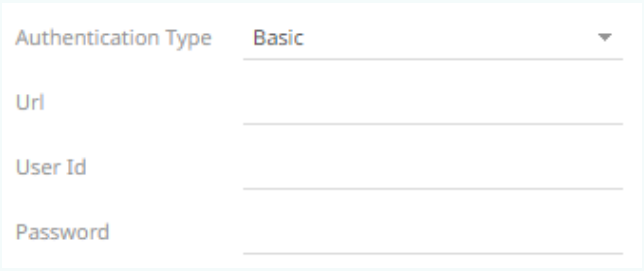
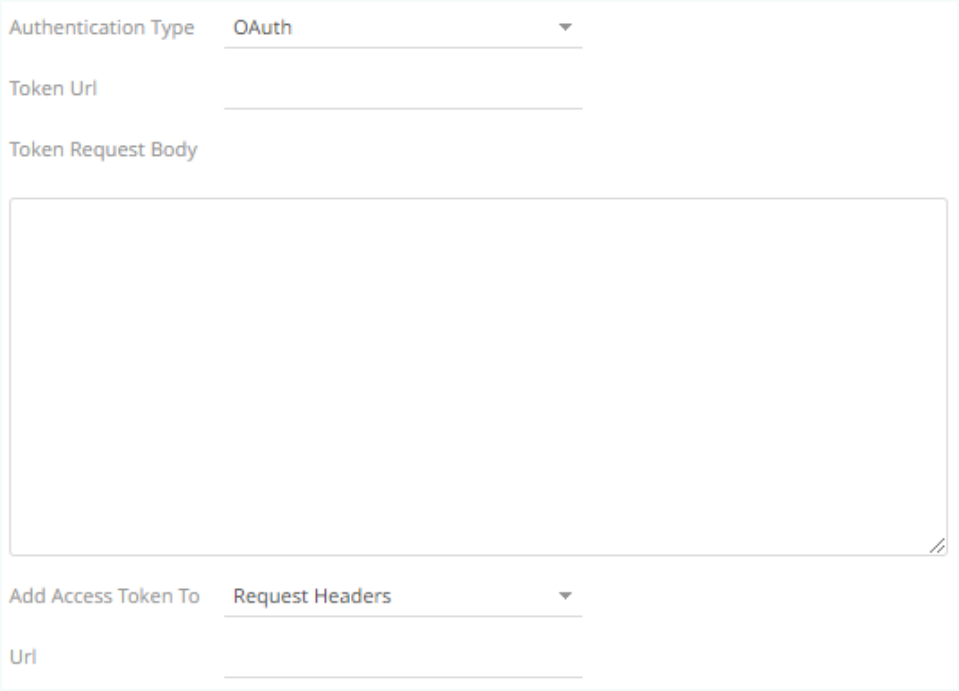
3. Tap the **Enable REST Transform** slider.

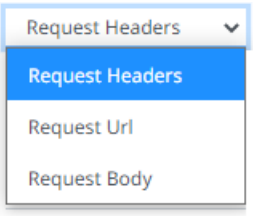
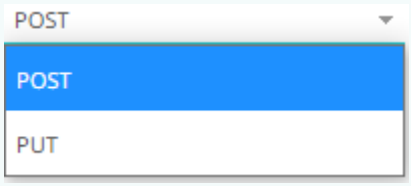
The **Transform Settings** button and **REST** tab change to 

and 

, respectively.

4. On the *Request Settings* section, define or select the following required properties:

Property	Description
Authentication Type	• **Basic**  Enter the *URL* of the REST API. Then enter the *User Id* and the *Password* that will be used to the connect to the REST API. • **OAuth**  Then enter the following settings: ○ **Token URL** – The URL to retrieve the access token from. ○ **Token Request Body** – The request body used for access token requests. ○ **Add Access Token To** - The Access token retrieved from the *Token URL* can be added to headers, URL or request body, depending on how the REST endpoint needs the token.

	 ▪ Request Header - A header is automatically added to the REST API request. ▪ Request URL - The URL needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token. ▪ Request Body - The Request Body needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token. ○ URL – The URL of the REST API.
Timeout	The length of time to wait for the server response (10 to 300). Default is **10**.
HTTP Method	Select the appropriate HTTP method for the request from the following options:  • POST – add new data • PUT – replace existing data
Content Type	The only supported content type is **application/json**. This value cannot be changed.

5. Enter the *Request Body*.

The request body is required to always be JSON formatted. The request body JSON should be structured to conform with what the target REST API is expecting. To the extent that the REST API you are using supports it, you can include any values or Panopticon parameter references in the request body. There are three special parameters to use for referencing the dataset you send as part of your request:

Parameter	Description
{table}	Returns a JSON or Python dictionary along with the KEY and the values. For example, when used, the data in the response is: **[{'ProductIds': 1.0, 'rel': 'a'}, {'ProductIds': 2.0, 'rel': 'b'},** **{'ProductIds': 3.0, 'rel': 'c'}, {'ProductIds': 4.0, 'rel': 'd'},** **{'ProductIds': 5.0, 'rel': 'e'}]**
{table-columns}	Just the column names of the dataset.
{table-data}	Returns rows of pure data in the following form: **[[1.0, 'a'], [2.0, 'b'], [3.0, 'c'], [4.0, 'd'], [5.0, 'e']]** This example is a list of lists in Python.

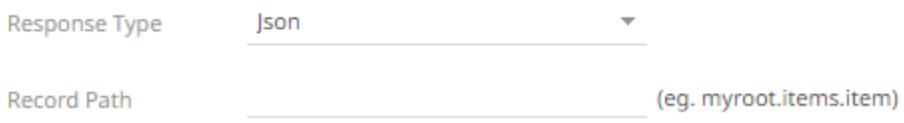
In the example below, a JSON object has been constructed, consisting of three name-value pairs. The first two are referencing a couple of parameters that have also been defined on the data table in Panopticon, and the third one is referencing the {table} parameter. Where {table] is referenced, Panopticon will insert a JSON array of dictionaries (JSON objects of one name-value pair per column, and one such object per row in the dataset).

```
{
  "requestId":{reqId},
  "requestTime":"{_current_time_utc}",
  "data":{table-data}
}
```

6. Select the *Response Type*:

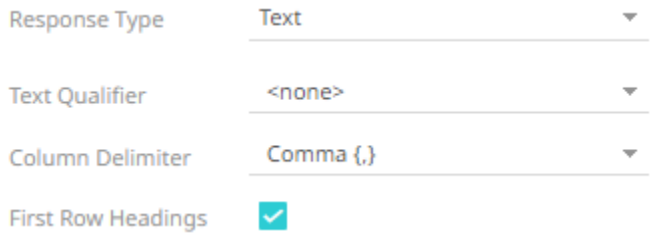
   - JSON

     If **JSON** is selected, enter the *Record Path* which allows the identification of multiple records within the JSON document (e.g., **myroot.items.item**)

   - Text

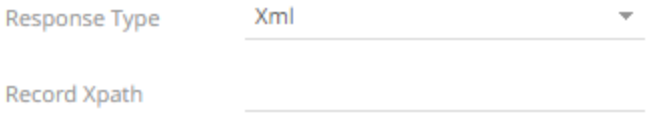
     If **Text** is selected, confirm the **Text Qualifier**, **Column Delimiter**, and if the first row of the message includes column headings.

     The Column Index controls the position of a column, ensure the value is >= 0.

   - XML

     If **XML** is selected, enter the *Record XPath* which allows the selection of records within the XML document (e.g., **//myroot/items/item**).

     Prepend 'default:' for the elements falling under default namespace.

6 Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first ‘n’ rows of the input data source is populated and the **Save** button is enabled.

7. You can also opt to load or save a copy of the column definition.

8. Click  to add columns and specify their properties:

Property	Description
Name	The column name of the source schema.
JsonPath/Text Column Index/XPath	The JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click ▬ .

9. Click Refresh Preview to see the output columns from the REST transform.
10. Refer to Enable Time Series Analysis for more information in enabling this feature.

ORDER BOOK RECONSTRUCTION TRANSFORM

The *Transform* settings allow for orders to be reconstructed into an order book and standardized by conflating into an appropriate granularity for the output display.

The returned data table will be ready for the time series transform.

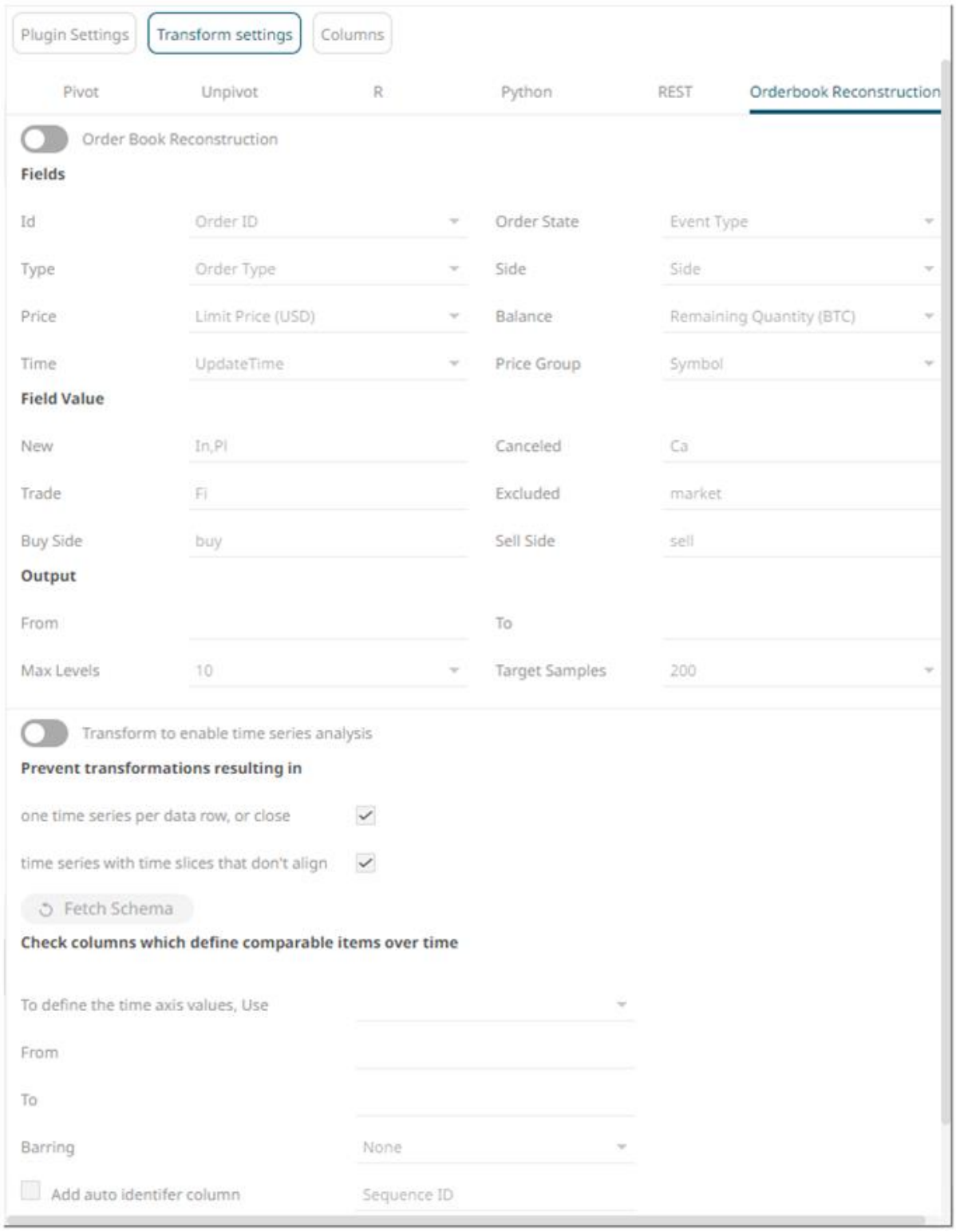
Steps:

1. To reconstruct a list of orders, click the **Transform Settings** button on the *Data Sources Setting* pane.

   The *Transform* Settings pane displays.

2. Click Orderbook Reconstruction.

   The *Transform Settings* pane changes to display the *Order Book Reconstruction Settings*.



3. Tap the **Order Book Reconstruction** slider.

The **Transform Settings** button and **Orderbook Reconstruction** tab change to 

and 

, respectively.

NOTE

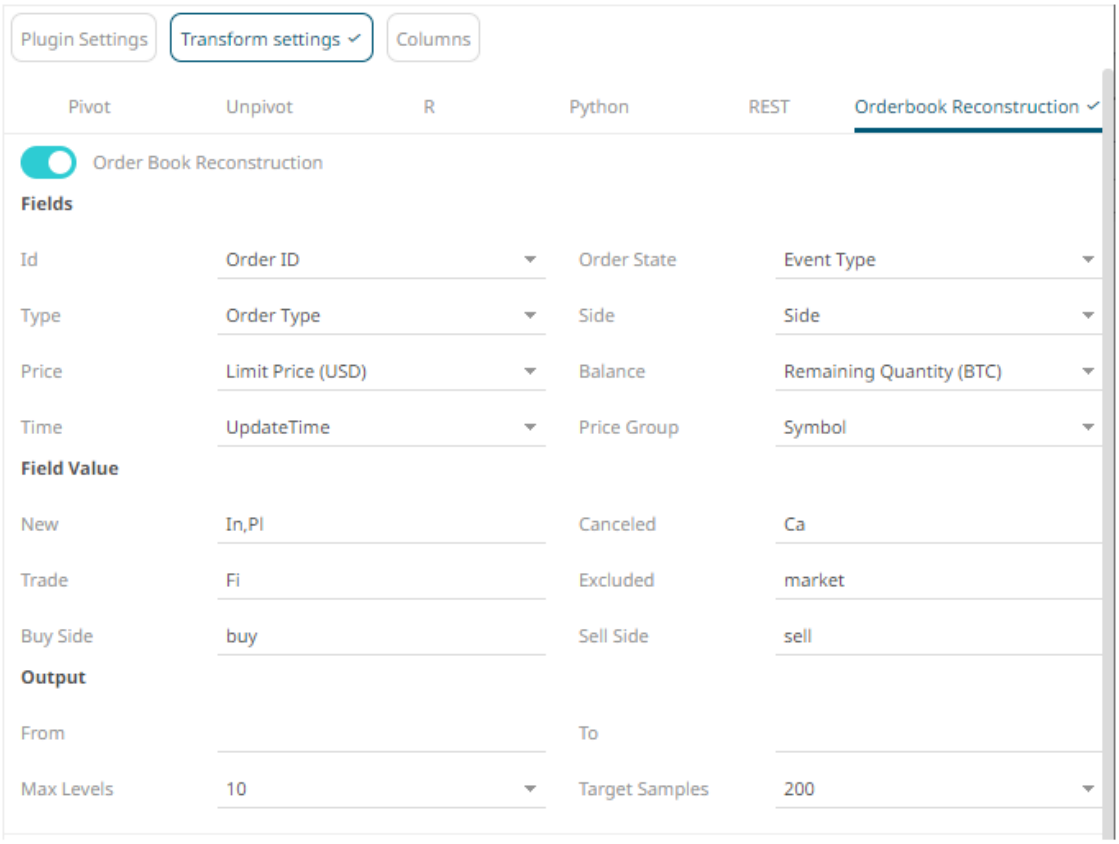
- **The *Field Values* section will have default values from the dataset.**
- **To reconstruct the Order Book from these orders, the data must include the following columns or fields:**
  - **Order ID (Unique Per Order)**
  - **Order State / Event Type (New > Replace > Trade / Cancel)**
  - **Update Time**
  - **Side (Buy or Sell)**
  - **Price**
  - **Balance / Remaining Quantity**

  Certain Order Types may also be excluded from the book reconstruction (e.g., Market Orders).

4. Match a column, from the generated schema of the source file, for the following *Fields*:

- Id = [Order ID]
- Type = [Order Type]
- Price = [Limit Price (USD)]
- Time = [Update Time]
- Order State = [Event Type]
- Side = [Side]
- Balance = [Remaining Quantity (BTC)]
- Price Group = [Symbol]

For example:



In this example, *Price Group* is mapped to **Symbol**. It can also be mapped to **Participant** if available in the data source.

5. Under the *Field Value* section, the default values for this dataset are mapped accordingly:
   - New = [New]
   - Canceled = [Cancelled]
   - Trade = [Trade]
   - Excluded = [Excluded]
   - Buy Side = [Buy Side]
   - Sell Side = [Sell Side]
6. Set the Date/Time range of the *Output* by entering values in the *From* and *To* text boxes. These values can also be parameterized.
7. Set the maximum number of levels of the output. Default is **25**.
8. Set the target number of output time slices. Default is **100**.
9. Click 

to see the output columns from the Orderbook Reconstruction transform.
10. Refer to Enable Time Series Analysis for more information in enabling this feature.

NOTE **Enabling the time series analysis when you perform a Order Book Reconstruction Transform solves the problem of having to specify all of the values. It also allows you to choose which Time column should be used to specify the time series.**

DATA CONNECTORS

Panopticon Real Time can connect to a number of disparate source repositories, including files, databases, and message buses. Although the process of retrieving a data table is similar, each connector has a different user interface.

Data connectivity to third party products is based on general available versions. Typically, new versions are supported within one calendar year of release, although the timing of including the new version in support is dependent on customer demand. New versions of popular data sources within our customer base are generally supported quickly after general availability.

Data is retrieved into Panopticon Real Time and converted into three data types:

- Number (Double)
- Text (Unicode)
- Timestamp (Nanosecond accuracy)

Date type conversion is specific to each data connector, and ODBC/JDBC driver for Database sources. However typical data type mappings are as follows:

- Boolean → Text
- Integer → Number
- Date → Timestamp
- Date/Time → Timestamp
- Time → Timestamp
- GUID → Text

Sources must support Unicode to be able to retrieve Unicode-based text.

NOTE **For streaming connectors, there are two settings that need to be considered:**

- **Real Time Limit**

  This is the period how often Panopticon Real Time in-memory table is updated.

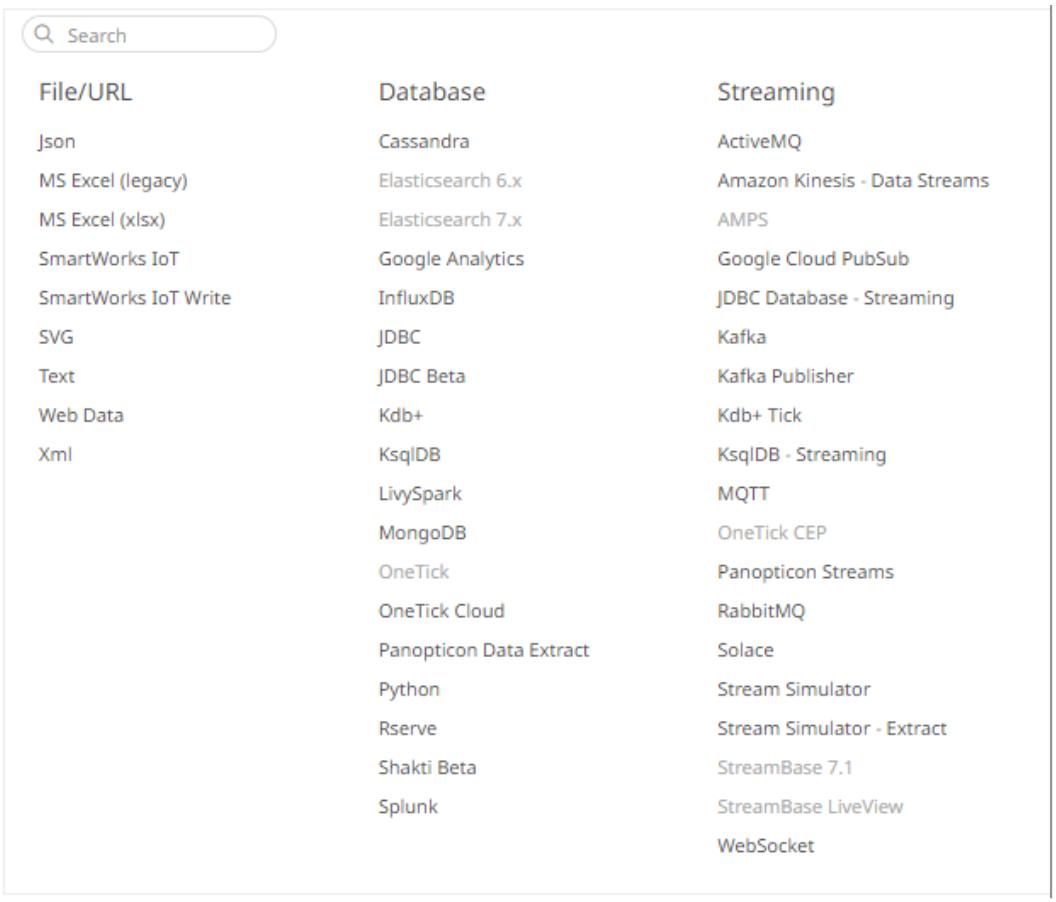
- **Auto Refresh**

  This is the period how often a client (i.e., Web/WPF) receives data from Panopticon Real Time.

Connecting to data connectors may require entering your login credentials. To avoid saving this information in your workbooks, it is recommended to parameterize these connection settings. Refer to *Parameterization of Connection Settings for Data Connectors* for more information.

Connector Availability

Below is the list of connectors that you can use in the *Data Table Editor* layout.



The *Search* box allows you to immediately find a particular connector that you want to use. Just enter the name of the connector in the *Search* box.

FILE/URL CONNECTORS

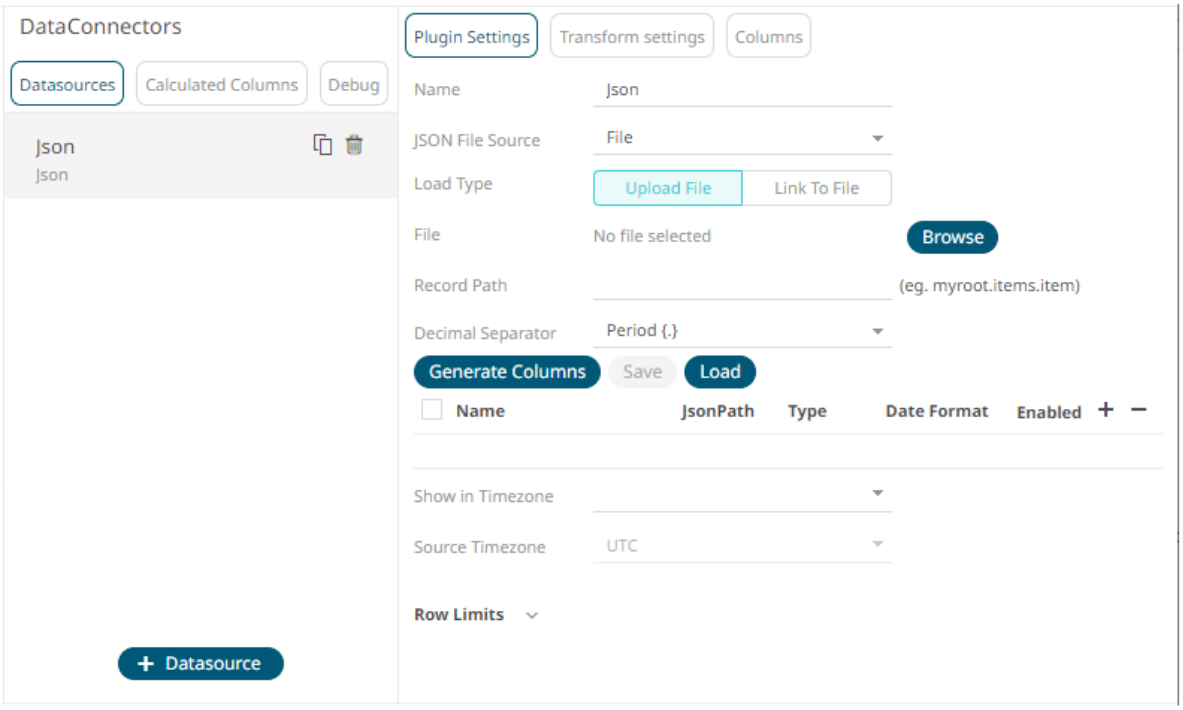
JSON Connector

The JSON connector allows the retrieval and processing of JSON files, either from a disk, a Text, or from a defined URL.

The supported JSON structures are discussed here.

Steps:

1. Select **JSON** from the *Connectors* panel. The *JSON Settings* panel displays.



2. Enter the *Name* of the JSON data source, then click ✓.
3. Select the JSON *File Source*.
4. Enter the *Record Path* which allows the identification of multiple records within the JSON document (e.g., **myroot.items.item**). This property can be parameterized.
5. Select either the dot (.) or comma (,) as the *Decimal Separator*.
6. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
7. You can also opt to load or save a copy of the column definition.
8. Click + to add columns and specify their properties:

Property	Description
Name	The column name of the source schema.
Json Path	The Json Path of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.

   To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.
9. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.
   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
10. Set the row limit of the data set.

11. Tap the **Preview Selected Data Source** slider to turn it on.
12. Click 

to display the data preview.

Supported JSON Structures

Panopticon supports JSON structures that represent one or several records where each record will become a row in a data table. It can be an array of JSON strings, or a set of named JSON string elements. Each record must be on the same record path, e.g., **mydata.people**. Each name in each record must follow hierarchically directly after the record path, e.g., **mydata.people.name**. Each record must be a JSON string of name-value pairs. Each name can have the following as value:

- a single value
- a JSON string of other name-value pairs
- a JSON array of values

Each name that has as value a single value or an array of values will become a column in the data table. In case a name has as value an array of multiple values, then each value in the array will result in a column in the data table.

In case the JSON data has a structure where a name does not contain a single value, but instead an array of several values, you can optionally omit this name from the data table when making the column settings in the Panopticon data connector, by manual deletion. This is typically a preferred option when the array contains a large number of values, or when the different records have a large variety in the values, since this will result in a large number of columns, where many of the rows will have a blank value.

Here are examples of supported JSON structures:

Example 1: An array of JSON strings with name-value pairs, each name with a single value:

```
{
	"mydata": {
		"people": [{
				"Name": "Peter",
				"Age": "20"
			},
			{
				"Name": "Paul",
				"Age": "21"
			},
			{
				"Name": "Mary",
				"Age": "22"
			}
		]
	}
}
```

Example 2: An array of JSON strings with name-value pairs, some names having a single value and some names having a nested JSON string as value:

```
{
	"mydata": {
		"people": [{
				"Name": "Peter",
				"Age": "20",
				"Address": {
					"Street": "Park Avenue",
					"Number": "1"
				}
			},
			{
				"Name": "Paul",
				"Age": "21",
				"Address": {
					"Street": "Mainstreet",
					"Number": "17"
				}
			},
			{
				"Name": "Mary",
				"Age": "22",
				"Address": {
					"Street": "Cedar Road",
					"Number": "5"
				}
			}
		]
	}
}
```

Example 3: Named elements instead of an array, where the element name will be parsed into a column called **KeyColumn** in the data table:

```
{
	"Peter": {
		"Age": "20",
		"Address": {
			"Street": "Park Avenue",
			"Number": "1"
		}
	},
	"Paul": {
		"Age": "21",
		"Address": {
			"Street": "Mainstreet",
			"Number": "17"
		}
	},
	"Mary": {
		"Age": "22",
		"Address": {
			"Street": "Cedar Road",
			"Number": "5"
		}
	}
}
```

Example 4: An array of JSON strings with name-value pairs, where some names have as value an array of multiple values. A column will be created in the data table for each unique value in the arrays:

```
{
	"mydata": {
		"people": [{
				"Name": "Peter",
				"Age": "20",
				"Address": ["Mainstreet", "Whoville"]
			},
			{
				"Name": "Paul",
				"Age": "21",
				"Address": ["Backstreet", "Barnburg"]
			},
			{
				"Name": "Mary",
				"Age": "22",
				"Address": ["Runroad", "Suburbia"]
			}
		]
	}
}
```

MS Excel (Legacy) Connector

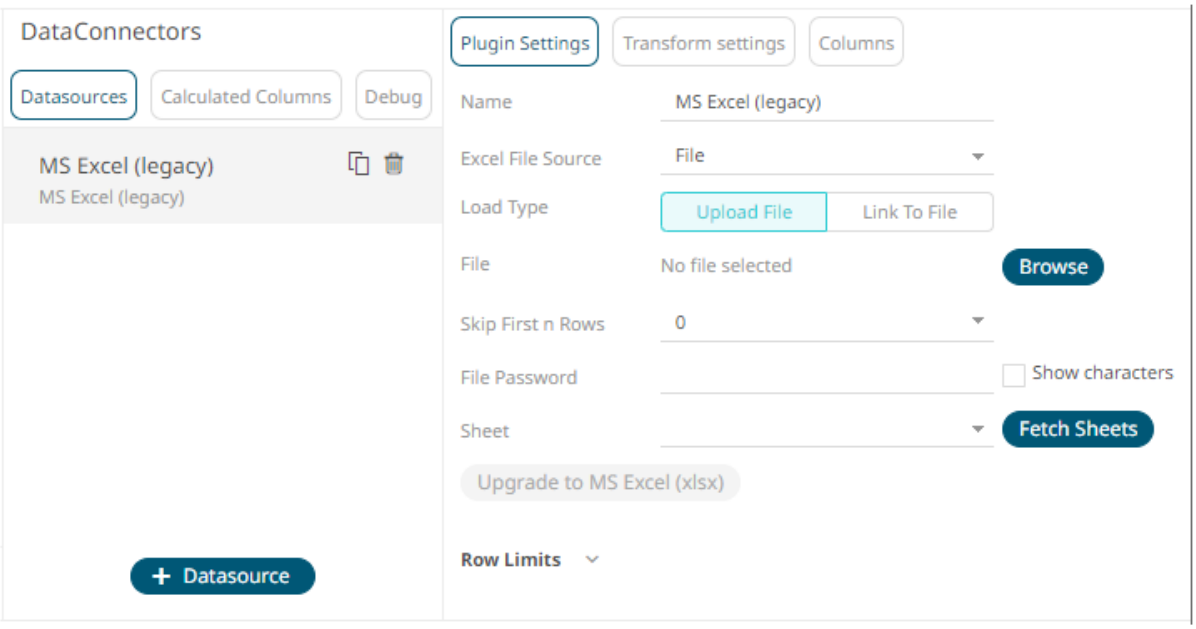
This is the most commonly used data connector when prototyping and is used for retrieving data from MS Excel workbooks or spreadsheets, where for each selected sheet, the first row contains the field/column names, and subsequent rows contain the data.

NOTE **In production use, it is not advised to use a single Excel file as multiple Panopticon data sources. This is because, when using the same Excel file with the data on several sheets, conflicts may occur in reading the file.**

A workaround could be to set up a Data Extract with scheduled refresh for each of the datasets in the Excel file, and then let the data tables in your workbook load the data from the Data Extracts.

Steps:

1. Select **MS Excel (legacy)** from the *Connectors* panel. The *MS Excel (legacy) Settings* panel displays.



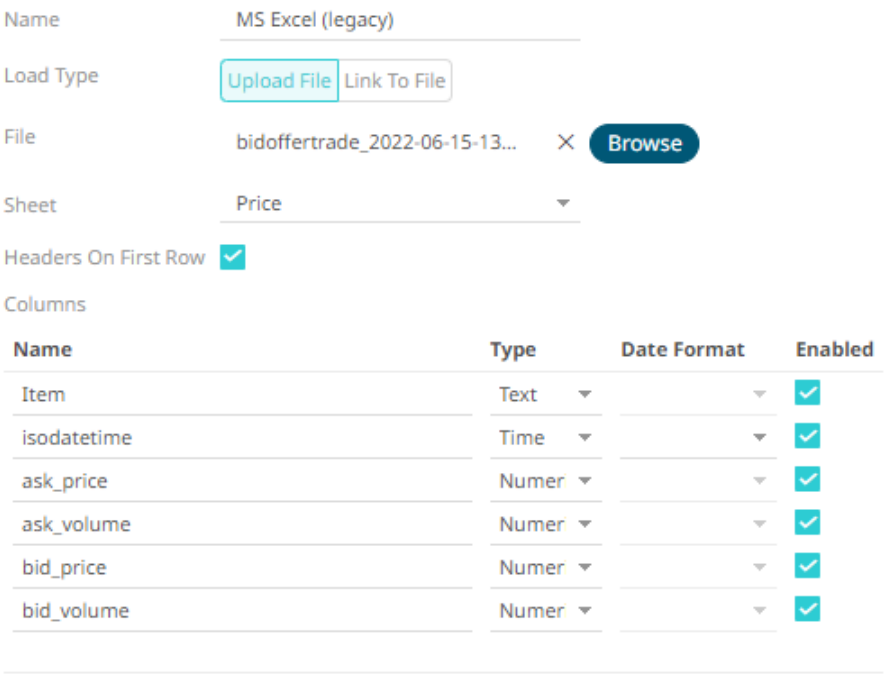
2. Enter the *Name* of the MS Excel data source, then click ✓.
3. Select the MS Excel *File Source*.
4. Select the number of rows that will be skipped in the Excel file from the *Skip First n Rows* drop-down list.
5. If the MS Excel file is password-protected, enter the *File Password*.

   Check the **Show Characters** box to display the entered password characters.

   NOTE **The password is case-sensitive.**

   Otherwise, proceed to step 6.
6. Click Fetch Sheets. This updates the *Sheet* drop-down list box and the **Upgrade to MS Excel (xlsx)** Upgrade to MS Excel (xlsx) button is enabled if the selected file is **XLSX**.
7. You can either:
   - select the required sheet then proceed to step 8, or
   - click Upgrade to MS Excel (xlsx) to upgrade XLSX data source to MS Excel (xlsx).

     Once upgraded, the first available sheet will be automatically selected and the columns will be populated.



See MS Excel (xlsx) Connector for more information.

8. Set the row limit of the data set, if required.
9. Tap the **Preview Selected Data Source** slider to turn it on.
10. Click Refresh Preview to display the data preview.

Upgrading Legacy MS Excel XLSX Data Source to the new MS Excel (xlsx) Connector

The upgrade is only available for MS Excel data sources that are not:

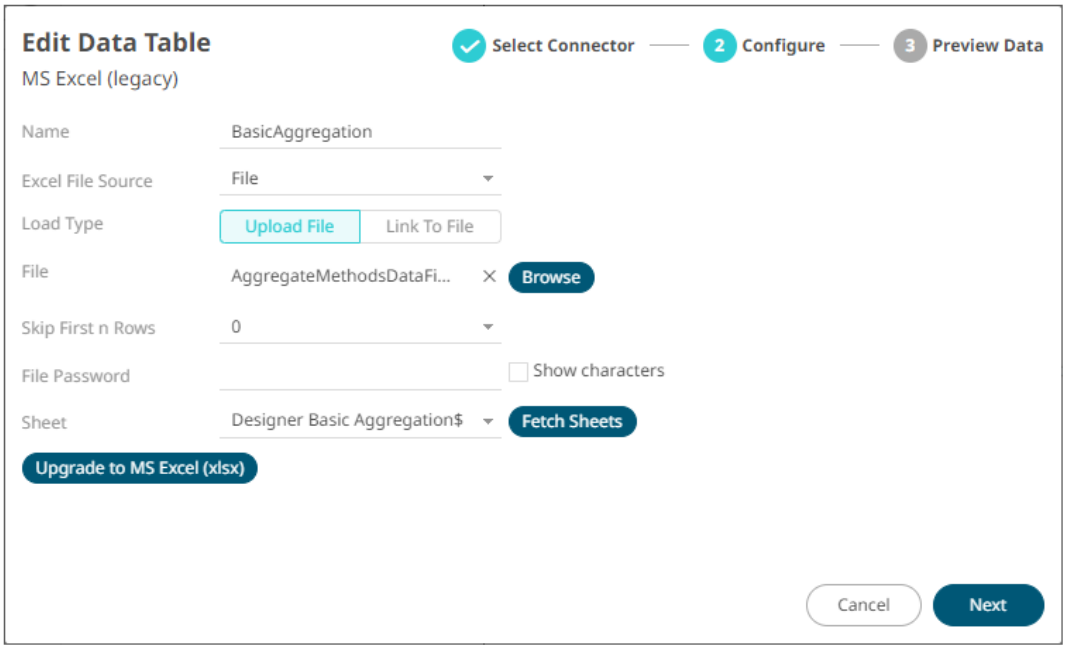
- using a Range since MS Excel (xlsx) only supports selection of a sheet
- using password protection

Steps:

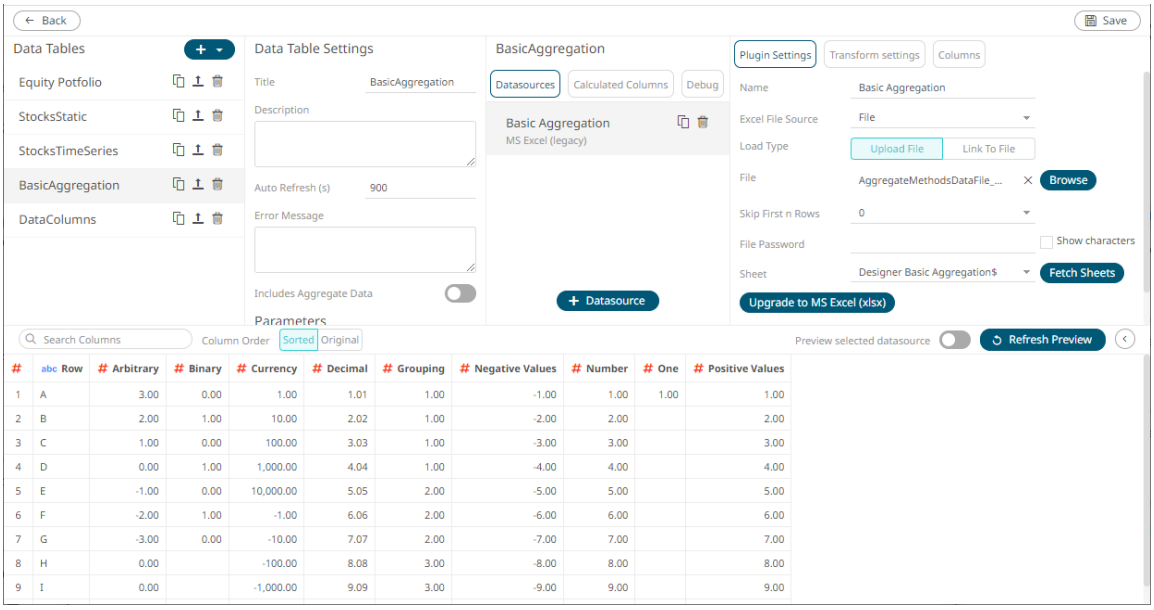
1. On the *Workbooks and Folders Summary* page, click a legacy workbook with an MS Excel XLSX connector data source.

   The workbook is displayed on the *Open Workbook in Edit View* layout.
2. You can either:

   - click **Edit Data Table** to open the *Edit Data Table Wizard*, or



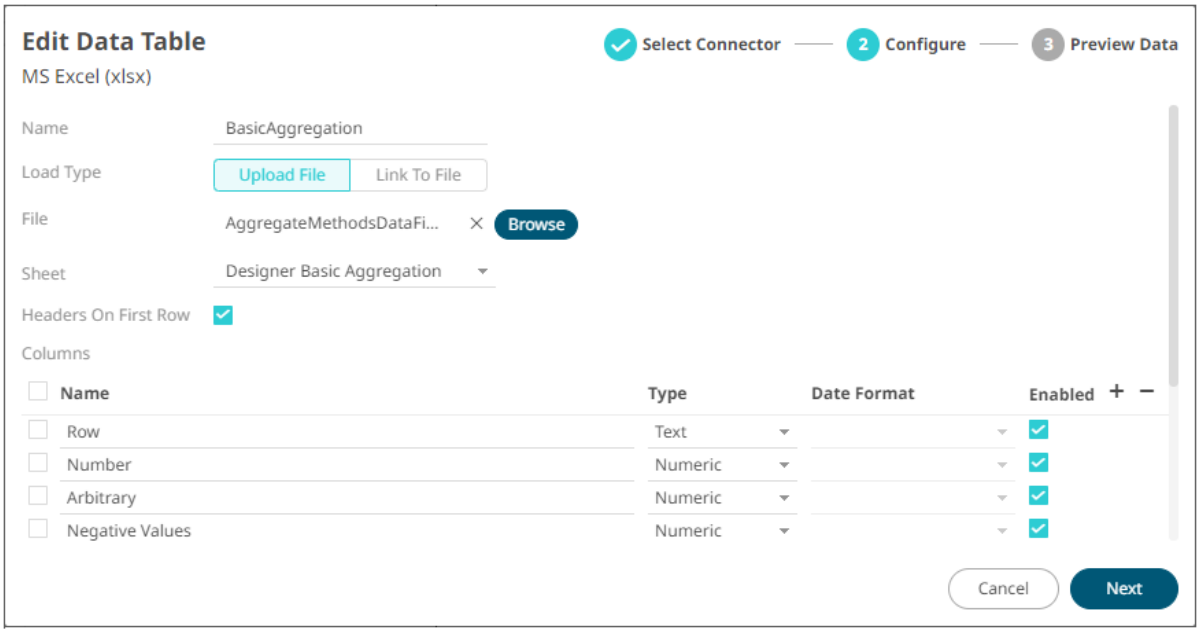
- click **Go to Data Table Editor** to open the *Data Table Editor* view



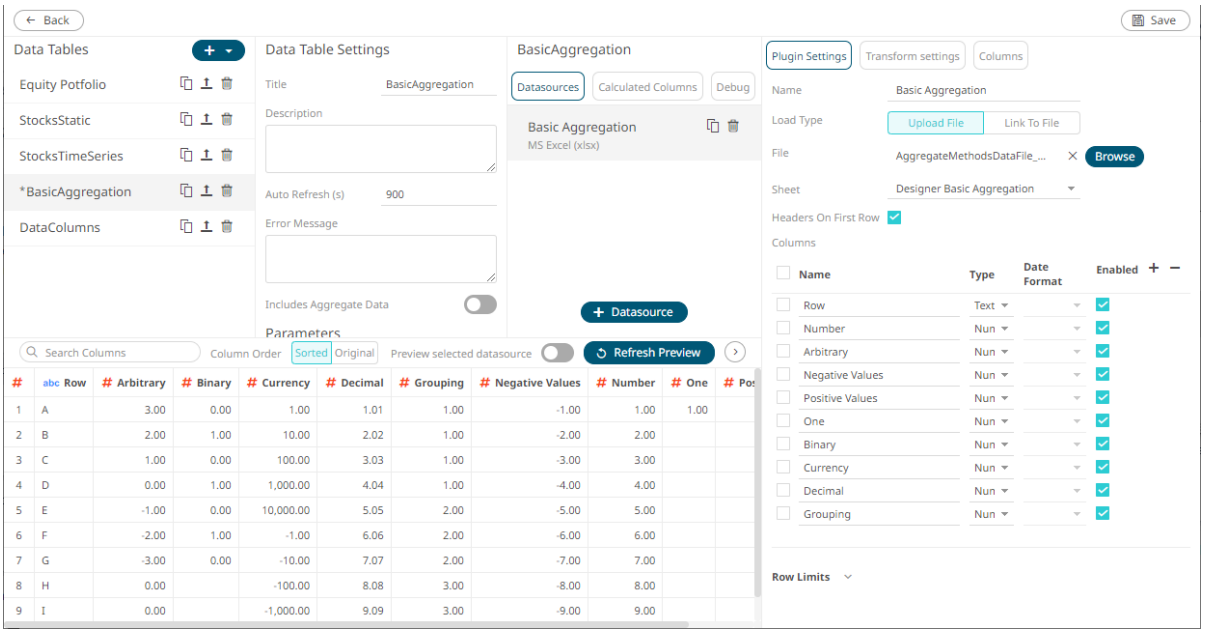
3. click Upgrade to MS Excel (xlsx) .

   The settings are now displayed on the *MS Excel (xlsx)* connector panel.

   On the *Edit Data Table Wizard*:



On the *Data Table Editor* view:



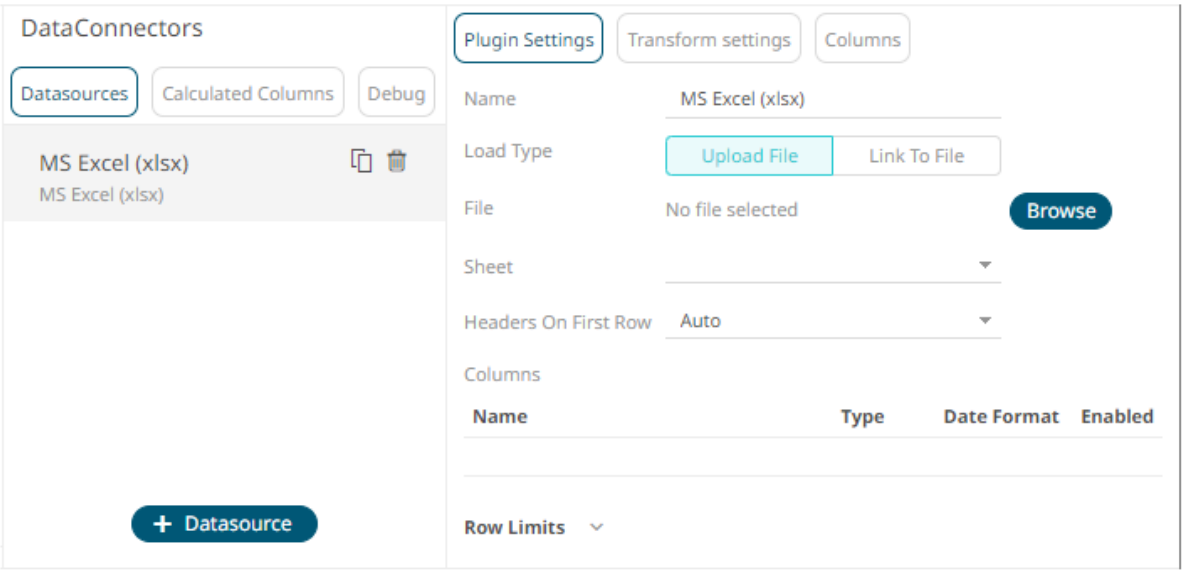
See MS Excel (xlsx) Connector to make the necessary changes.

MS Excel (xlsx) Connector

The MS Excel (xlsx) connector allows for retrieval and processing of MS Excel workbook data stored using the XLSX file format. The MS Excel (xlsx) connector processes data on a row-by-row basis, allowing for better performance and less memory consumption compared to the MS Excel (legacy) connector.

Steps:

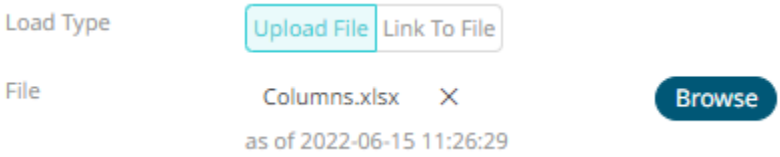
1. Select **MS Excel (xlsx)** from the *Connectors* panel. The *MS Excel (xlsx) Settings* panel displays.



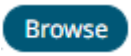
2. Enter the *Name* of the MS Excel (xlsx) data source, then click ✓.
3. Select the MS Excel (xlsx) file source. Do one of the following:

   - Upload a data source snapshot by clicking **Upload File**  then **Browse**  to browse to the file source.

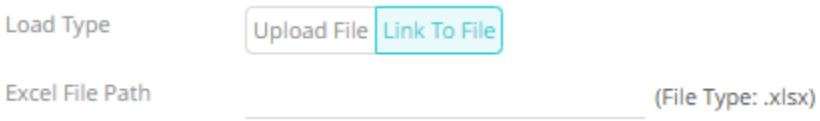
     After selecting the file, it is displayed with the timestamp of the snapshot.

     The data source is placed in the repository and locked, synchronized, and bundled with the workbook version.

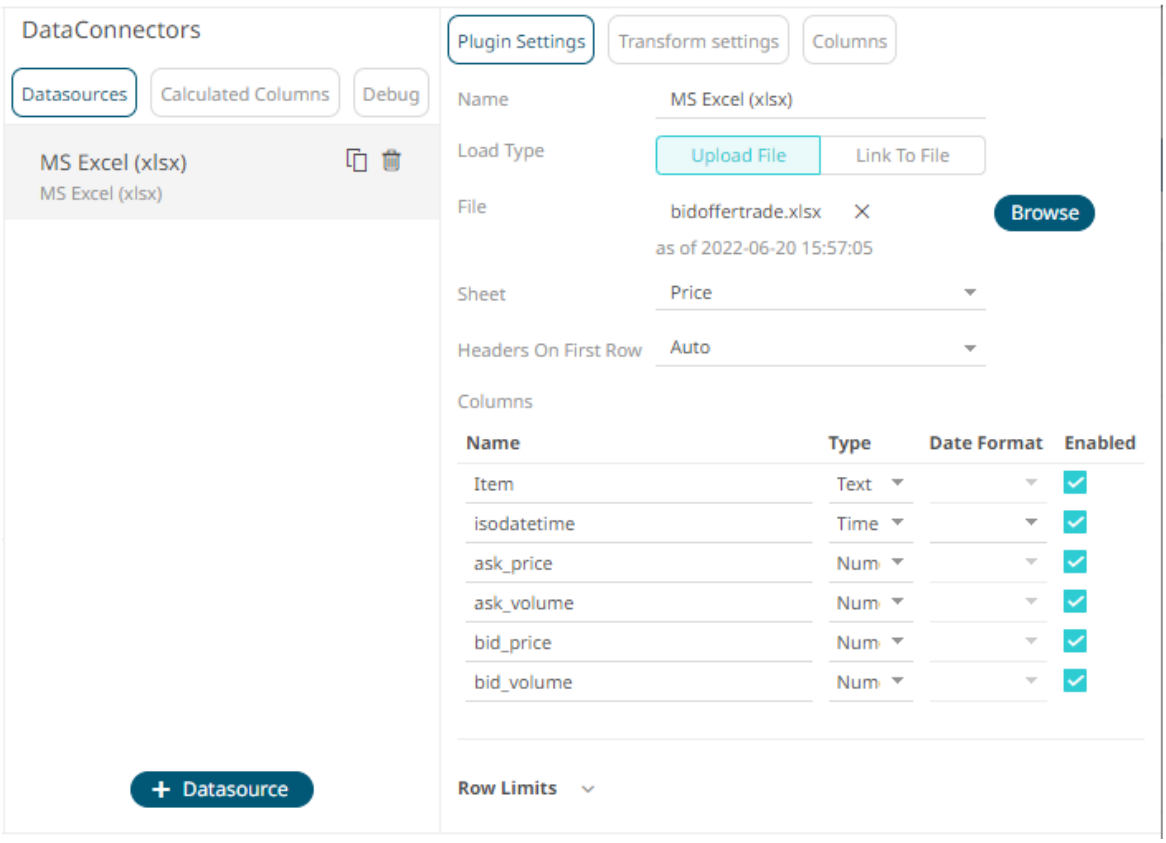
     To change the data source, click ✕ then **Browse**  to browse to a new version of the file, which is uploaded into the repository, and also create a new version of the workbook that reads it.

   - Link to a XLSX data source file by clicking **Link to File**  and entering a *File Path*.

     Ensure that in a cluster, you need to use a shared path, or put it on every node and use a path that resolves on every node. You can update its contents whenever you want.

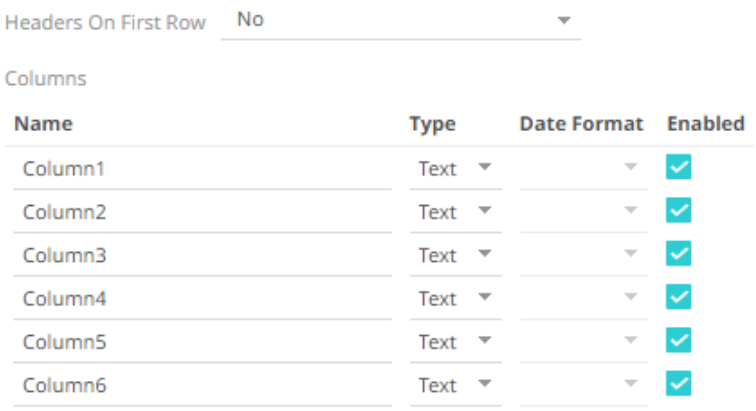
   When a file is selected, the MS Excel (xlsx) connector will automatically select the first available sheet, set the first row as headers, and populate available columns.



4. Adjust *Sheet* selection, if required. Selecting a new sheet will re-populate the *Columns* list.
5. Adjust the **Headers On First Row** if needed. By default the connector will pick up headers from the first row if all cells on the first row contain text data.

   You can opt to select one of the following:

   - Leave headers on first row as **Auto** if you want the connector to automatically pick up column names from sheet.
   - Select **Yes** to force picking first row as headers.
   - Select **No** to force not picking first row as headers. This will auto generate all column names.



6. Adjust column *Type* or *Date Format* to adjust data interpretation.
7. Set the row limit of the data set, if required.
8. Tap the **Preview Selected Data Source** slider to turn it on.

9. Click Refresh Preview to display the data preview.

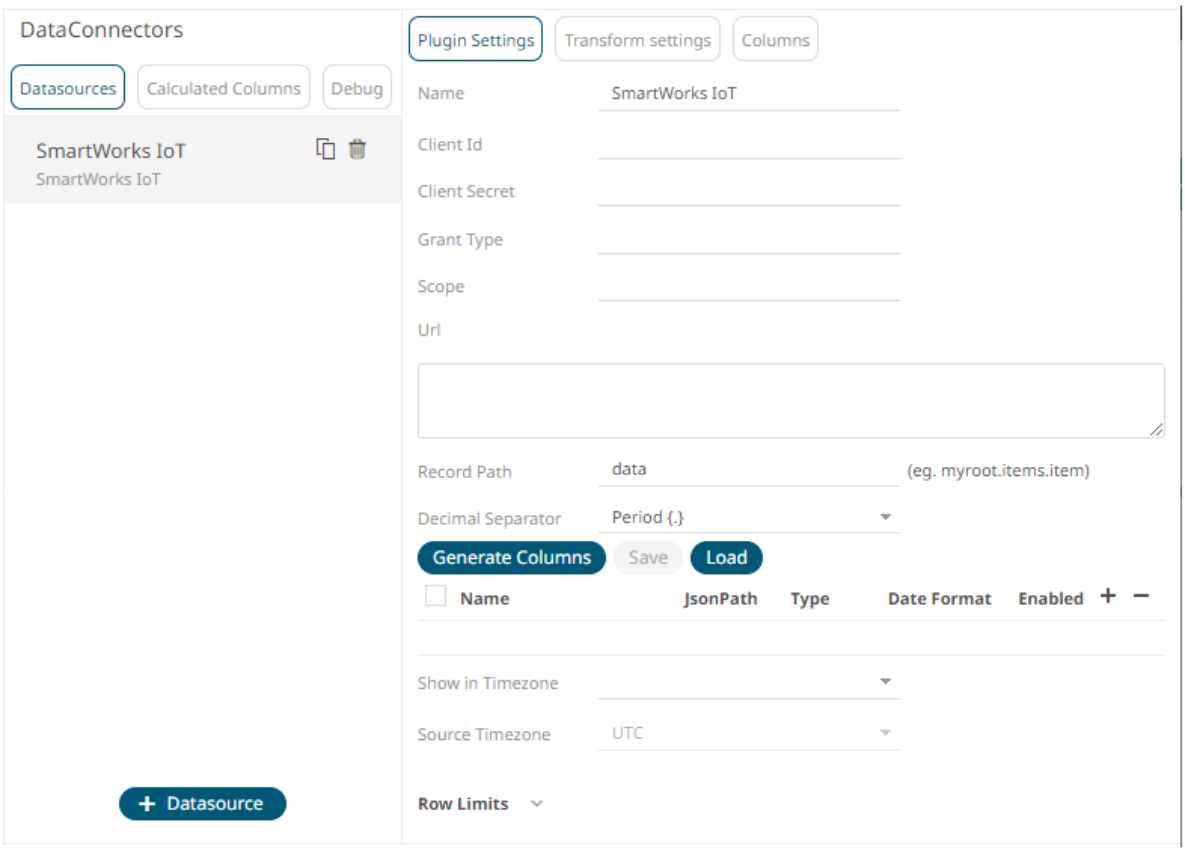
SmartWorks IoT Connector

The SmartWorks IoT connector allows reading data from SmartWorks IoT, mostly from AnythingDB OpenAPI endpoints. This dedicated connector is recommended over the standard JSON connector since it can automatically iterate over all the available data from service using **next_cursor** information in the response. The UI also allows minimal settings required to connect to the SmartWorks IoT OpenAPI endpoints.

NOTE **The Token URL is not visible in the connector. You can set the server-wide token URL in the "connector.oauth.tokenurl" property in the Panopticon.properties file.**

Steps:

1. Select **SmartWorks IoT** from the *Connectors* panel. The *SmartWorks IoT Settings* panel displays.



2. Enter the *Name* of the SmartWorks IoT data source, then click ✓.
3. Enter the *Client ID, Client Secret, Grant Type, and Scope* to connect to the SmartWorks IoT.

   The Panopticon server builds up the request body formatted as **application/x-www-form-urlencoded** from these four fields.
4. Enter the full *URL* including any filter query, limit, etc.

For example:

```
https://api.swx.altairone.com/spaces/altair/collections/ElectronicBoards/things-status?limit=50&property%3Atemp=gt%3A20&property%3Adim=80
```

5. Enter the *Record Path.* Default is **data**.
6. Select either the dot (.) or comma (,) as the *Decimal Separator*.
7. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
8. You can also opt to load or save a copy of the column definition.
9. Click + . A new column entry displays. Enter or select the following properties:

Property	Description
Name	The column name of the source schema.
JsonPath	The JsonPath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐ , then click − .

10. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
11. Set the row limit of the data set. Consequently, the maximum number of records fetched from service is controlled as this setting is used while auto iterarating data from service using the **next_cursor** information in the response.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click Refresh Preview to display the data preview.

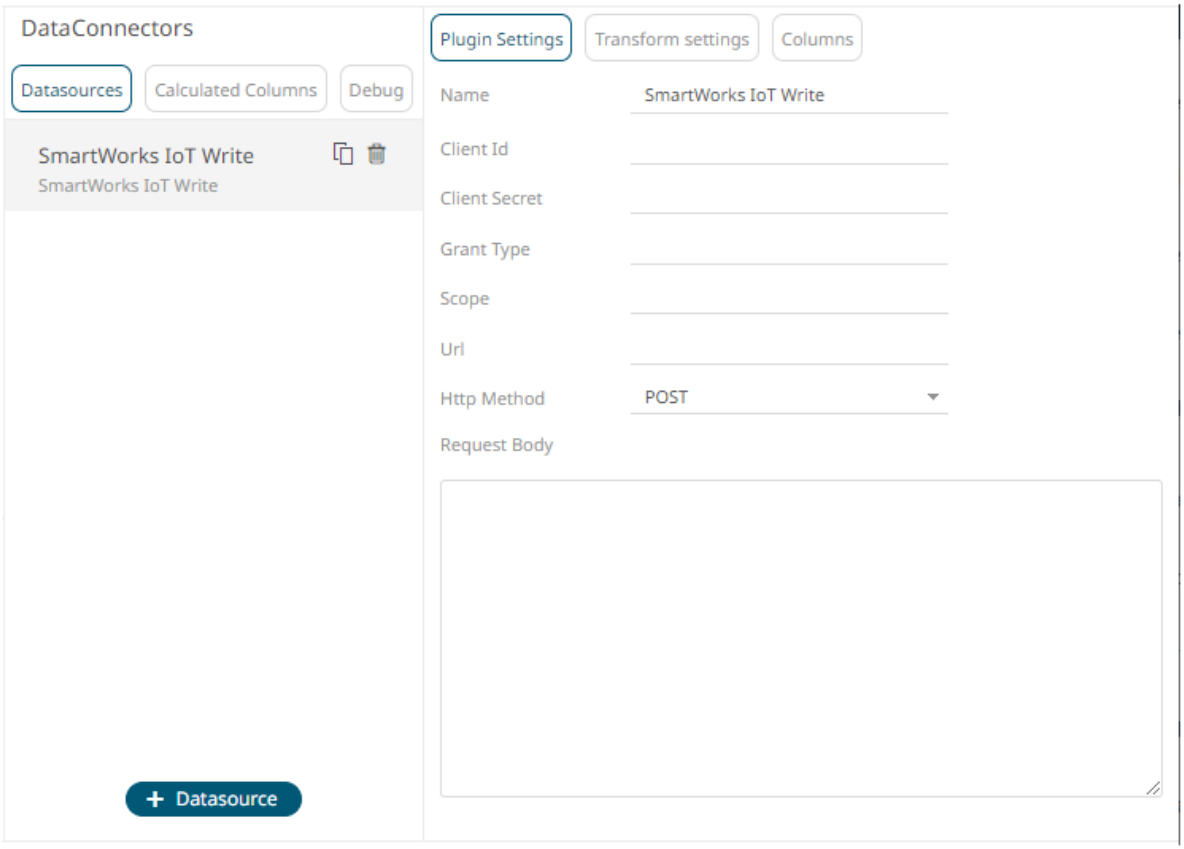
SmartWorks IoT Write Connector

The SmartWorks IoT Write connector allows calling PUT/POST/DELETE requests to SmartWorks IoT services for write back scenarios. A typical use case is to add or update records in AnythingDB from Panopticon. Since this connector is not for reading data, a successful service call will only return a data table with one column called **Result** with **Success** as value.

NOTE **The Token URL is not visible in the connector. You can set the server-wide token URL in the "connector.oauth.tokenurl" property in the Panopticon.properties file.**

Steps:

1. Select **SmartWorks IoT Write** from the *Connectors* panel. The *SmartWorks IoT Write Settings* panel displays.



2. Enter the *Name* of the SmartWorks IoT Write data source, then click ✓.
3. Enter the *Client ID, Client Secret, Grant Type, and Scope* to connect to the SmartWorks IoT Write.

   The Panopticon server builds up the request body formatted as **application/x-www-form-urlencoded** from these four fields.
4. Enter the *URL* that accepts PUT/POST/DELETE request.

   For example:

   ```
   https://api.swx.altairone.com/spaces/altair/collections/ElectronicBoards/things/01edb9j75vymj8p7qppm19h8nx
   ```
5. Specify the appropriate *HTTP Method* for the request from the following options:



   - POST – add new data
   - PUT – replace existing data
   - DELETE – remove existing data
6. Enter the *Request Body* for the HTTP POST/PUT.
7. Click 

to call the service.

NOTE **Use PUT requests carefully to avoid duplicate entries since each data call to this connector will trigger a service call.**

SVG Connector

The SVG connector can provide for:

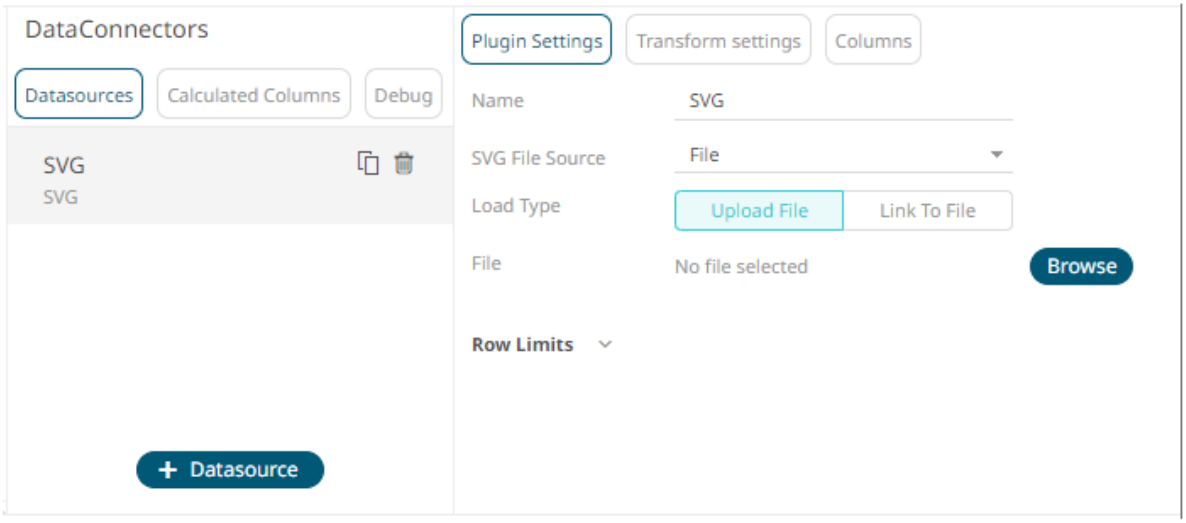
- Maps for Choropleth map visualizations (http://en.wikipedia.org/wiki/Choropleth_map)
- Store plans for visualization of crowd flows, client interaction volumes, and so on
- Schematic drawings of process industry facilities for hardware performance monitoring

The SVG XML is translated and the rendering is done by Panopticon Real Time. For this reason, Panopticon Real Time does not support the full scope of the SVG standard definition.

The only element supported is PATH: http://www.w3.org/TR/SVG/paths.html

Steps:

1. Select **SVG** from the *Connectors* panel. The *SVG Settings* panel displays.



2. Enter the *Name* of the SVG data source, then click ✓.
3. Select the *SVG File Source*.
4. Tap the **Preview Selected Data Source** slider to turn it on.
5. Set the row limit of the data set.
6. Click Refresh Preview to display the data preview.

Creating Custom Shapes

SVG-files with path expressions describing custom shapes are easy to create for simple shapes.

> **NOTE** **The x-y coordinate system in the Panopticon Shapes visualization has positive x-values going right and positive y-values going DOWN, not up. An empty shape visualization has origo (0,0) at the top-left corner.**

In the d-attribute of the path element, the following commands/instructions are supported by the Shapes visualization in Panopticon:

M,m: http://www.w3.org/TR/SVG/paths.html#PathDataMovetoCommands

Z,z: http://www.w3.org/TR/SVG/paths.html#PathDataClosePathCommand

L,l: http://www.w3.org/TR/SVG/paths.html#PathDataLinetoCommands

H,h: http://www.w3.org/TR/SVG/paths.html#PathDataLinetoCommands

V,v: http://www.w3.org/TR/SVG/paths.html#PathDataLinetoCommands

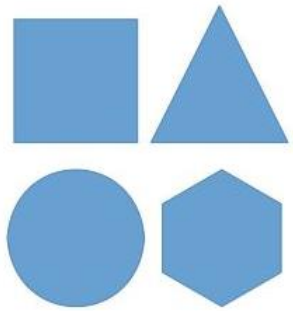
C,c: http://www.w3.org/TR/SVG/paths.html#PathDataCubicBezierCommands

S,s: http://www.w3.org/TR/SVG/paths.html#PathDataCubicBezierCommands

> **NOTE** **Upper case commands set the absolute points, while the lower case commands set the relative points.**

The following code, saved in a text file with the file extension .svg, can be read with the SVG connector in Panopticon and will produce 2 columns: **NodeKey1**, which contains the id-values fof the g-tags, and **ShapeData**, which contains the d-value of the path-tags. The ShapeData column can then be applied to the Shapes variable of the Shapes visualization part.

```
<svg>
<g id="Square Example">
<path d="M 1,1 h 9 v 9 h -9 v -9 z" />
</g>
<g id="Triangle Example">
<path d="M 11,10 h 10 l -5,-10 l -5,10 z" />
</g>
<g id="Circle Example">
<path d="M 0.5,17 c0.5,6.667 9.5,6.667 10,0 -0.5,-6.667 -9.5,-6.667 -10,0 z"
/>
</g>
<g id="Hexagon Example">
<path d="M 20.5,14.5 l -4.33,-2.5 -4.33,2.5 0,5 4.33,2.5 4.33,-2.5 0,-5 z" />
</g>
</svg>
```



The same data can be provided in a tabular form, loaded with the Text connector or from a database. For example:

```
NodeKey1,ShapeData
Square Example,|M 1 1 h 9 v 9 h -9 v -9 z
Triangle Example,|M 11 10 h 10 l -5 -10 l -5 10 z
Circle Example,|M 0.5 17 c 0.5 6.667 9.5 6.667 10 0 c -0.5 -6.667 -9.5 -6.667
-10 0 z
Hexagon Example,|M 20.5 14.5 l -4.33 -2.5 l -4.33 2.5 l 0 5 l 4.33 2.5 l 4.33
-2.5 l 0 -5 z
```

Likewise, this data can be used with the Shapes variable of the Shapes visualization part.

NOTE **When shape paths are loaded from a tabular data, each path must begin with a vertical bar character ("pipe").**

Drawing a Circle with Cubic Bézier Curves

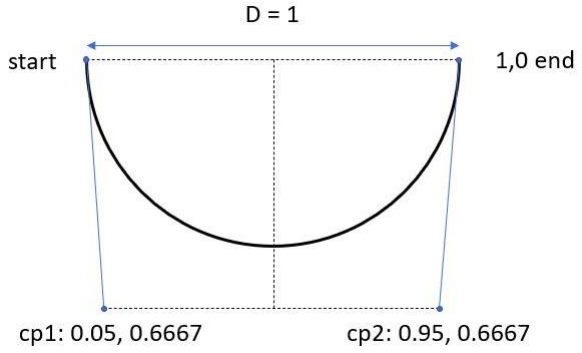
It is not possible to create a perfect circle with cubic Bézier curve commands, i.e., the c/C and s/S commands. A simple to use approximation of a circle that is created with just two Bézier curves is as follows:

The c command takes 3 points (x, y) as arguments: the first two are control points and the third is the end point. To draw the lower half of a circle with a diameter of 1, drawing from left to right, you can use these control point values. All points are expressed relative to the starting position. Remember that the y-axis is positive in the downwards direction.

```
controlpoint 1: x = 0.05, y = 0.6667
controlpoint 2: x = 0.95, y = 0.6667
end point: x = 1, y = 0
```

which makes:

```
c 0.05, 0.6667 0.95, 0.6667 1, 0 z
```



To draw a complete circle with a diameter of 1, you continue the c command with 3 more points, giving the two control points and the end point of the upper half of the circle. Note that you don't need to repeat the c command:

```
c 0.05, 0.6667 0.95, 0.6667 1, 0 -0.05, -0.6667 -0.95, -0.6667, -1, 0 z
```

So, the x-value of the first control point is 5% of the diameter, and the x-value of the second control point is 95% of the diameter.

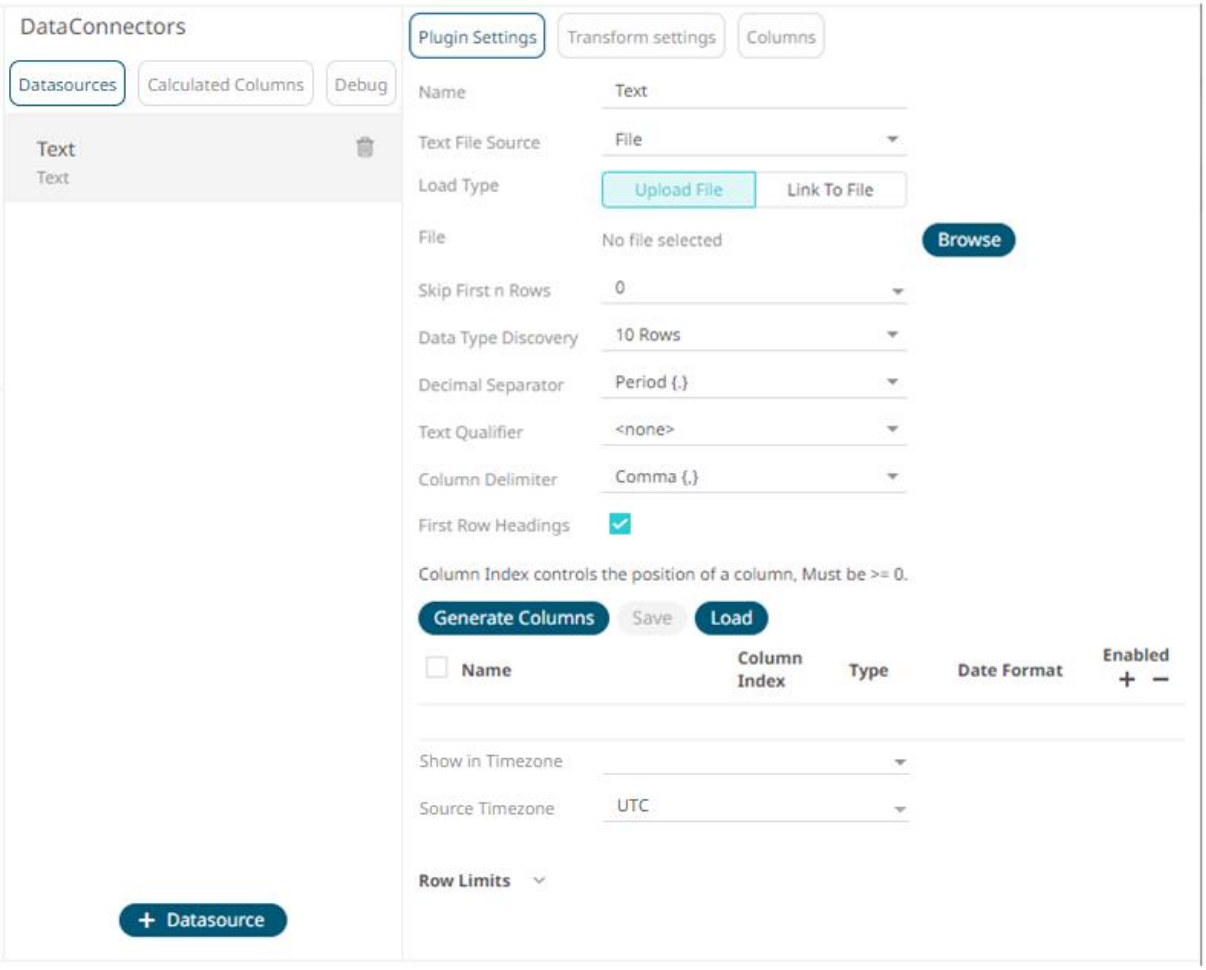
The y-values are 2/3:s of the diameter. The sign of the relative point depends on the direction in which you are moving. Positive y-values are downwards.

Text Connector

The Text connector allows the retrieval and processing of delimited Text files (such as CSV, TSV, and so on), either from a disk or from a defined URL.

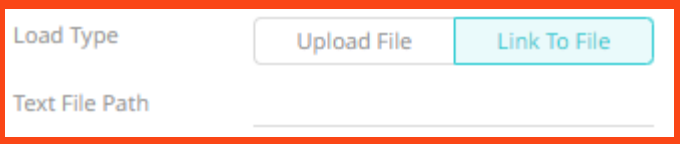
Steps:

1. Select **Text** from the *Connectors* panel. The *Text Settings* panel displays.



2. Enter the *Name* of the Text data source, then click ✓.
3. Select the *Text* *File Source*.

NOTE



The Upload File button, when clicked, allows the user to choose files from their own computer. To choose files that resides on the Panopticon Server machine, use the Link to File option and fill in the *Text File Path*.

The standard settings controlling how the text file is parsed, is listed.

These include:

Property	Description
Skip First N Rows	Specifies the number of rows that will be skipped.
Data Type Discovery	Specifies how many rows from the text file should be used when automatically determining the data types of the resulting columns.
Text Qualifier	Specifies if fields are enclosed by text qualifiers, and if present to ignore any column delimiters within these text qualifiers.
Column Delimiter	Specifies the column delimiter to be used when parsing the text file.
First Row Headings	Determines if the first row should specify the retrieved column headings, and not be used in data discovery.

4. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
5. You can also opt to load or save a copy of the column definition.
6. Click + to add columns and specify their properties:

Property	Description
Name	The column name of the source schema.
Column Index	The column index controls the position of a column. Must be **>= 0**.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

7. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.
   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
8. Tap the **Preview Selected Data Source** slider to turn it on.
9. Set the row limit of the data set.

10. Click 

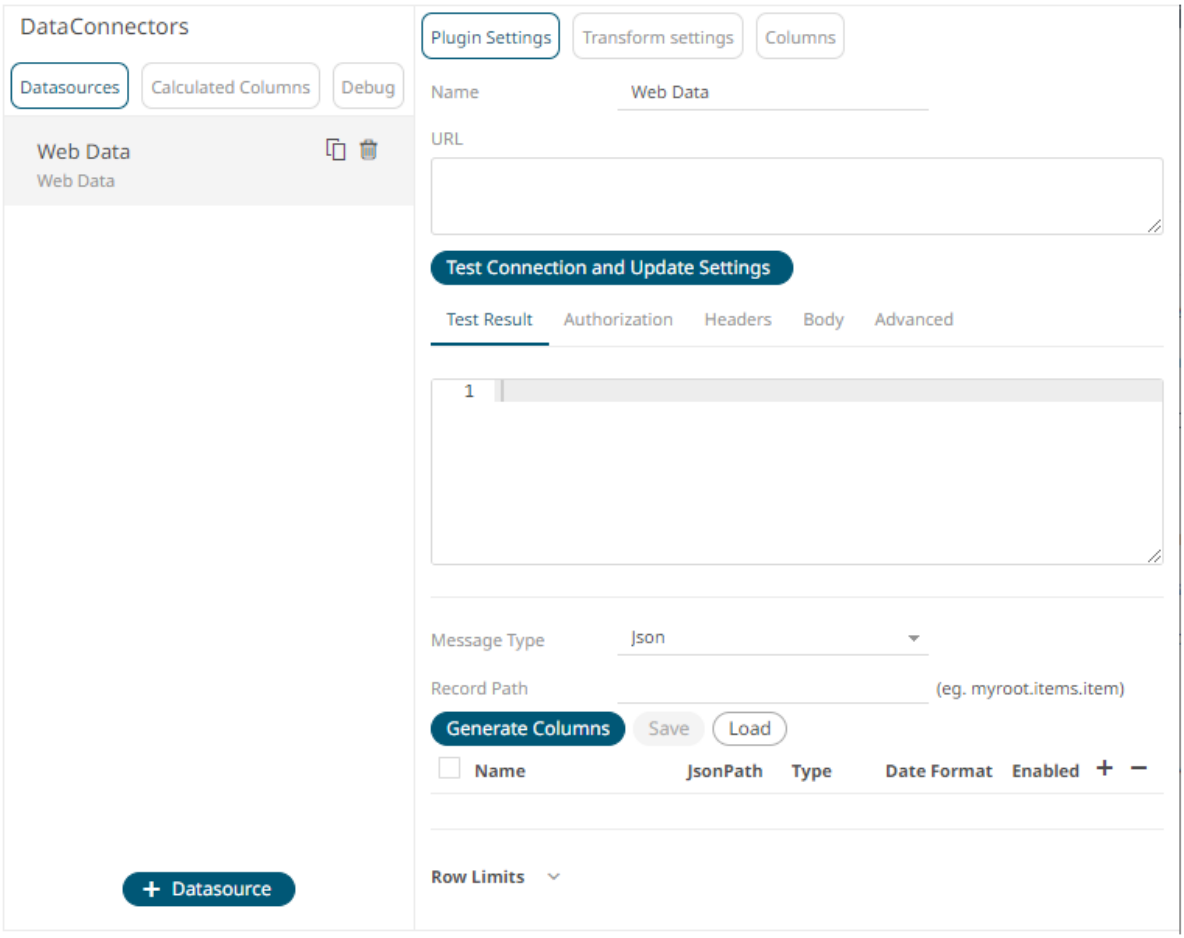
to display the data preview.

Web Data Connector

The Web Data connector allows the retrieval and processing of JSON, delimited Text (such as CSV, TSV), and XML data that is accessible over HTTP/HTTPS.

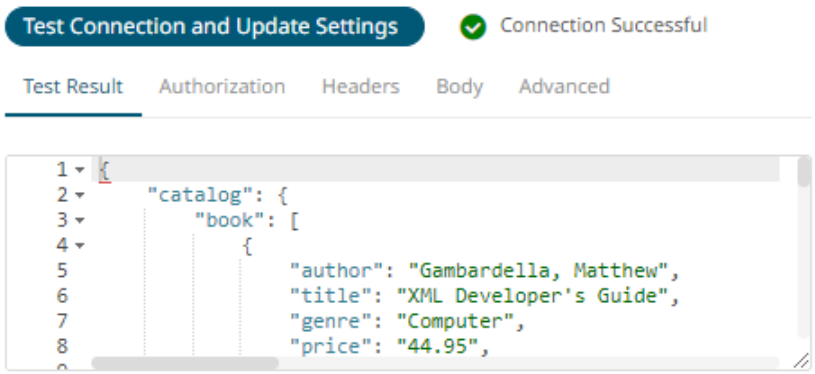
Steps:

1. Select **Web Data** from the *Connectors* panel. The *Web Data Settings* panel displays.

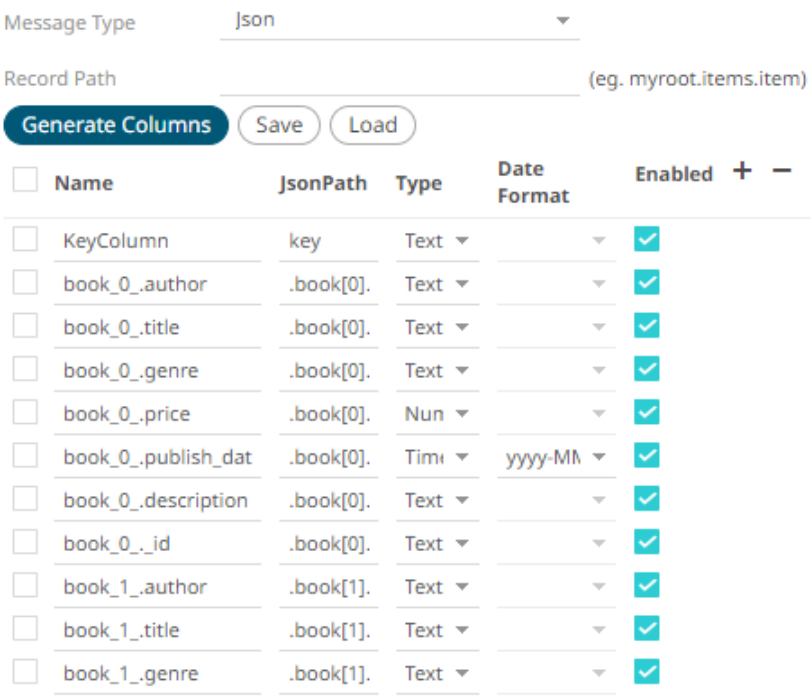


2. Enter the *Name* of the Web Data data source, then click ✓.
3. Enter the absolute URL of the web data including scheme (HTTP/HTTPS) into the *URL* field.
4. Click 

. A successful connection will result to the following:
   - The **Connection Successful** status is displayed along with some raw data returned by the server.



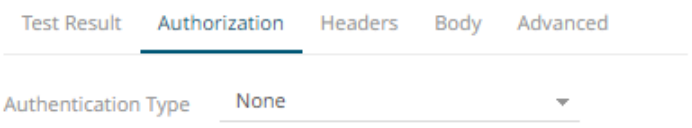
- Connector tries auto discovery of the *Message Type*.



You can also opt to load or save a copy of the column definition.

5. Adjust the *Authentication Type*, if required.

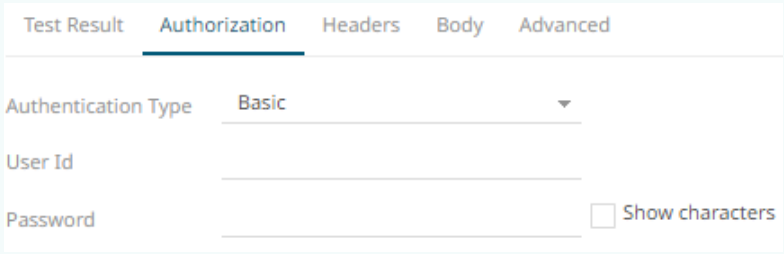
5.1. Select the **Authorization** tab.



5.2. Set the required settings:

Authentication Type	Description
None	No authentication needed.

Basic

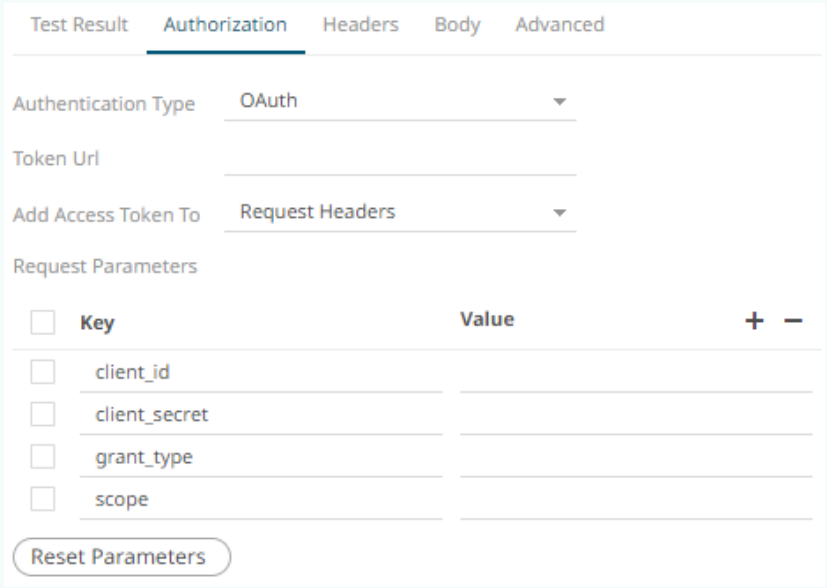


Enter the *User ID* and *Password* to connect to the connector's service.

Select the **Show Characters** box to display the entered characters.

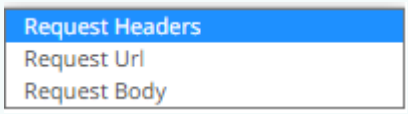
OAuth

Some standard OAuth token request parameters come initialized with empty values. You can set these values and also add/remove any/all of the keys.



Enter or select the following settings:

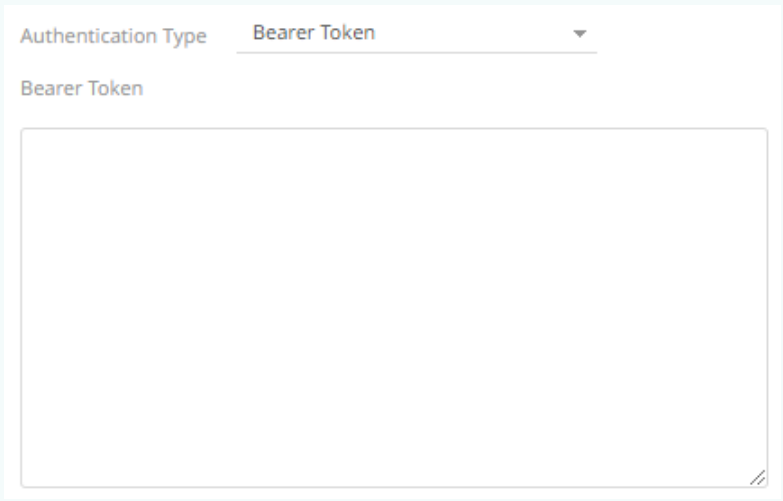
- **Token URL** – The URL to retrieve the access token from.
- **Add Access Token To** - The Access token retrieved from the *Token URL* can be added to headers, URL or request body, depending on how the endpoint needs the token.



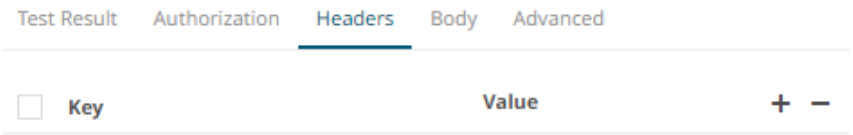
  - Request Headers - A header is automatically added to the REST API request.
  - Request URL - The URL needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token.
  - Request Body - The Request Body needs to be manually parameterised with a {access_token} parameter, before calling the REST API, the parameter is replaced with the actual token.

  NOTE:

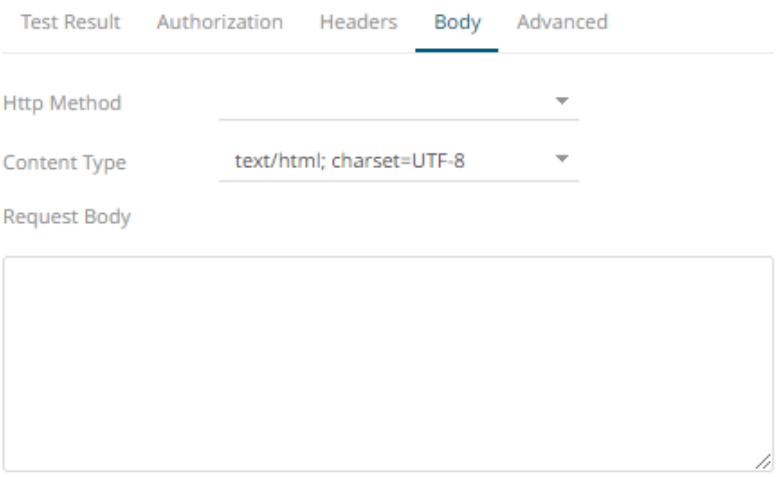
  The given request parameters key/value pairs are formatted by the connector as **application/xwww-form-urlencoded**, and posted to *Token URL*.

Bearer Token	 If you already have a authentication token, enter the token string into *Bearer Token* input box. This can be parameterized also.

6. The **Headers** tab allows you to enter any custom headers required to be passed to the URL endpoint, typically to provide additional metadata. Enter any key/value pairs you need and the connector will send them along with request.



7. Set the *Body*, if a POST/PUT request is required.
   7.1. Select the **Body** tab.

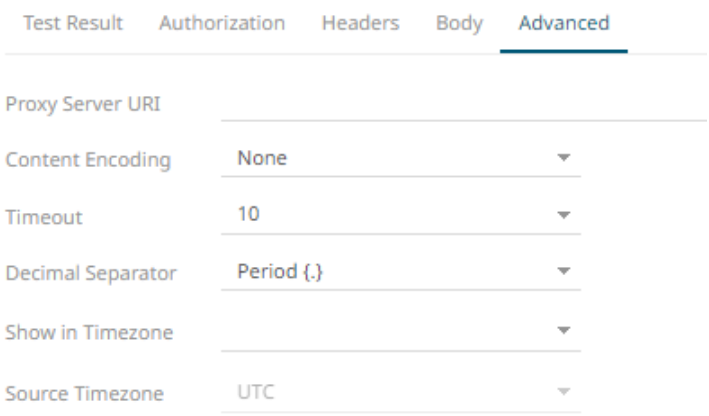


   7.2. Set the required settings:

Property	Description
HTTP Method	Select the appropriate HTTP method for the request from the following options: • POST – add new data

	• PUT – replace existing data
Content Type	Select or enter content-type based on request body (payload) format.
Request Body	The Request Body for the HTTP POST method.

8. Set the *Advanced* settings, if needed.
   8.1. Select the **Advanced** tab.



   8.2. Set the required settings:

Property	Description
Proxy Server URI	The HTTP Proxy setting that will allow the connector to reach the endpoint.
Content Encoding	Select the *Content Encoding* with the HTTP Header: **None, GZip, Deflate,** or **GZip and Deflate**
Timeout	The length of time to wait for the server response (10 to 300). Default is **10**.
Decimal Separator	Select either the dot (.) or comma (,) as the decimal separator.

   8.3. You can opt to define the *Show in Timezone* and *Source Timezone* settings.

9. Set the row limit of the data set.
10. Tap the **Preview Selected Data Source** slider to turn it on.
11. Click 

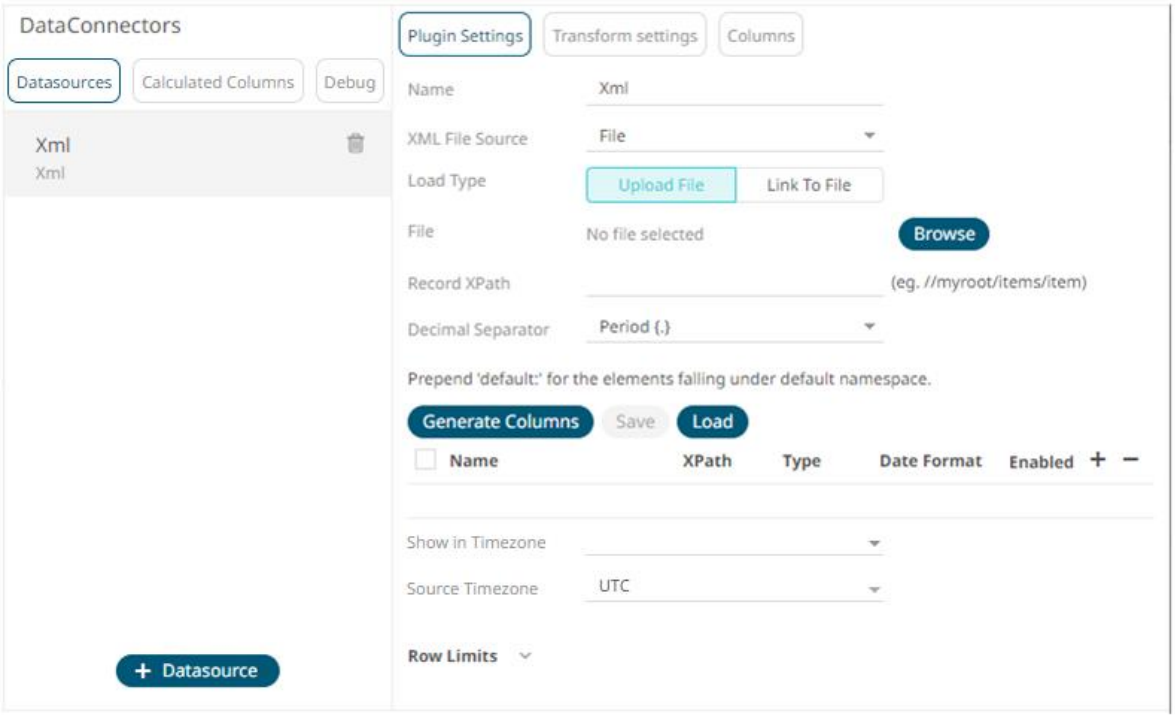
to display the data preview.

XML Connector

The XML connector allows the retrieval and processing of XML files, either from a disk, a Text, or from a defined URL.

Steps:

1. Select **XML** from the *Connectors* panel. The *XML Settings* panel displays.



2. Enter the *Name* of the XML data source, then click ✓.
3. Select the XML *File Source*.
4. Enter the *Record XPath* which allows the selection of records within the XML document (e.g., **//myroot/items/item**). This property can be parameterized.
5. Select either the dot (.) or comma (,) as the *Decimal Separator*.
6. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
7. You can also opt to load or save a copy of the column definition.
8. Click + to add columns and specify their properties:

Property	Description
Name	The column name of the source schema.
XPath	The XPath of the source schema.
Type	The data type of the column. Can be a Text, Numeric, or Time
Date Format	The format when the data type is Time.
Enabled	Determines whether the message should be processed.

   To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.
9. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.

10. Set the row limit of the data set.
11. Tap the **Preview Selected Data Source** slider to turn it on.
12. Click Refresh Preview to display the data preview.

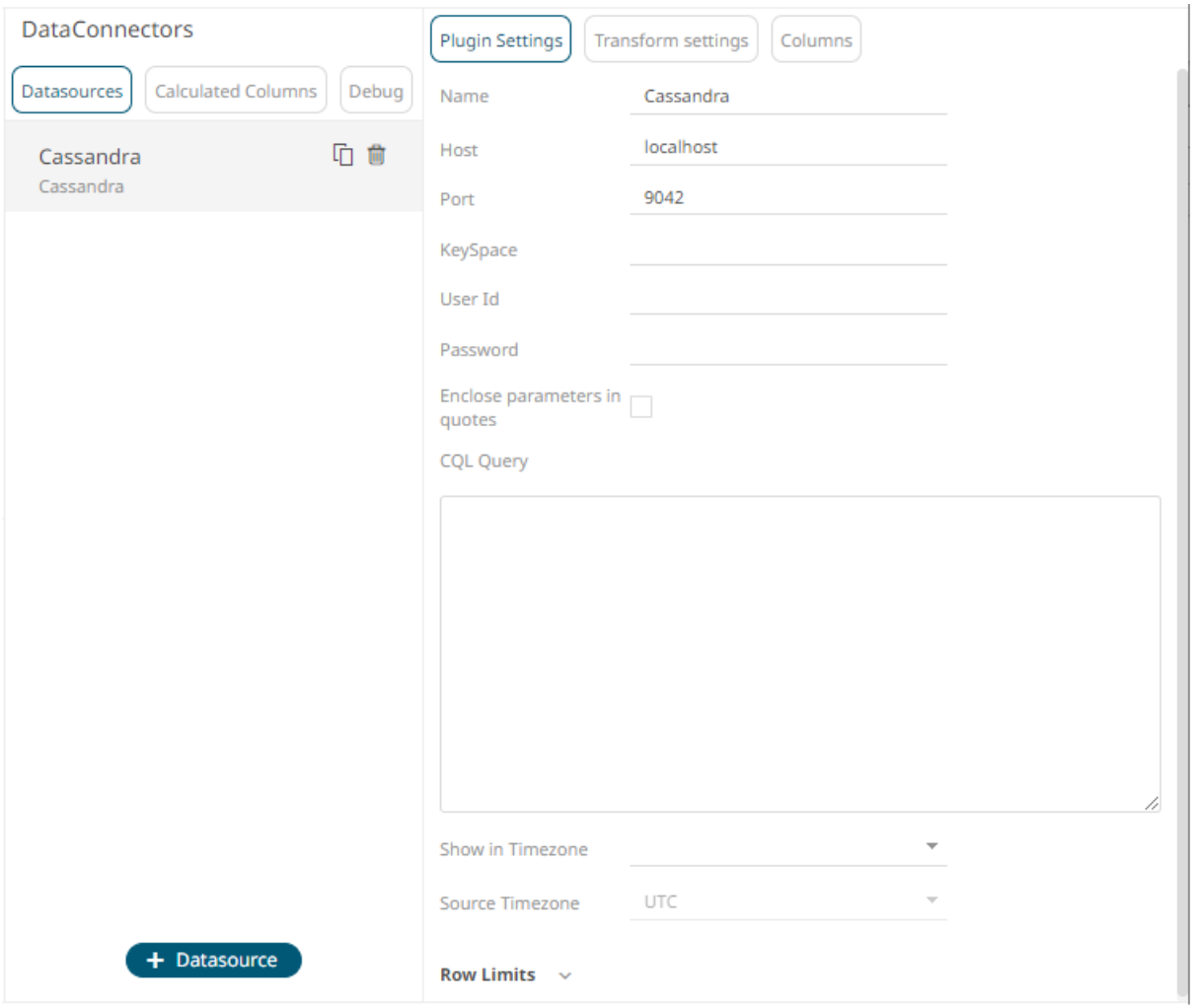
DATABASE CONNECTORS

Apache Cassandra Connector

The Apache Cassandra connector allows connection to Apache and Datastax Cassandra instances, by executing a pre-defined CQL query, and retrieving the resulting data.

Steps:

1. Select **Cassandra** from the *Connectors* panel. The *Cassandra Settings* panel displays.



2. Enter the following information:

Property	Description
Host	Apache Cassandra host address.
Port	Apache Cassandra host port. Default is **9042**.
KeySpace	Namespace that defines data replication in nodes.
User Id	The username used to connect to the Apache Cassandra service.
Password	The password used to connect to the Apache Cassandra service.

3. Select whether the parameters should be automatically enclosed in quotes, by checking the **Enclose parameters in quotes** box.
4. Enter the *CQL Query*, which can contain parameters in a similar manner to the database connector.
5. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
6. Set the row limit of the data set.
7. Tap the **Preview Selected Data Source** slider to turn it on.
8. Click 

to display the data preview.

Elasticsearch 6.x Connector

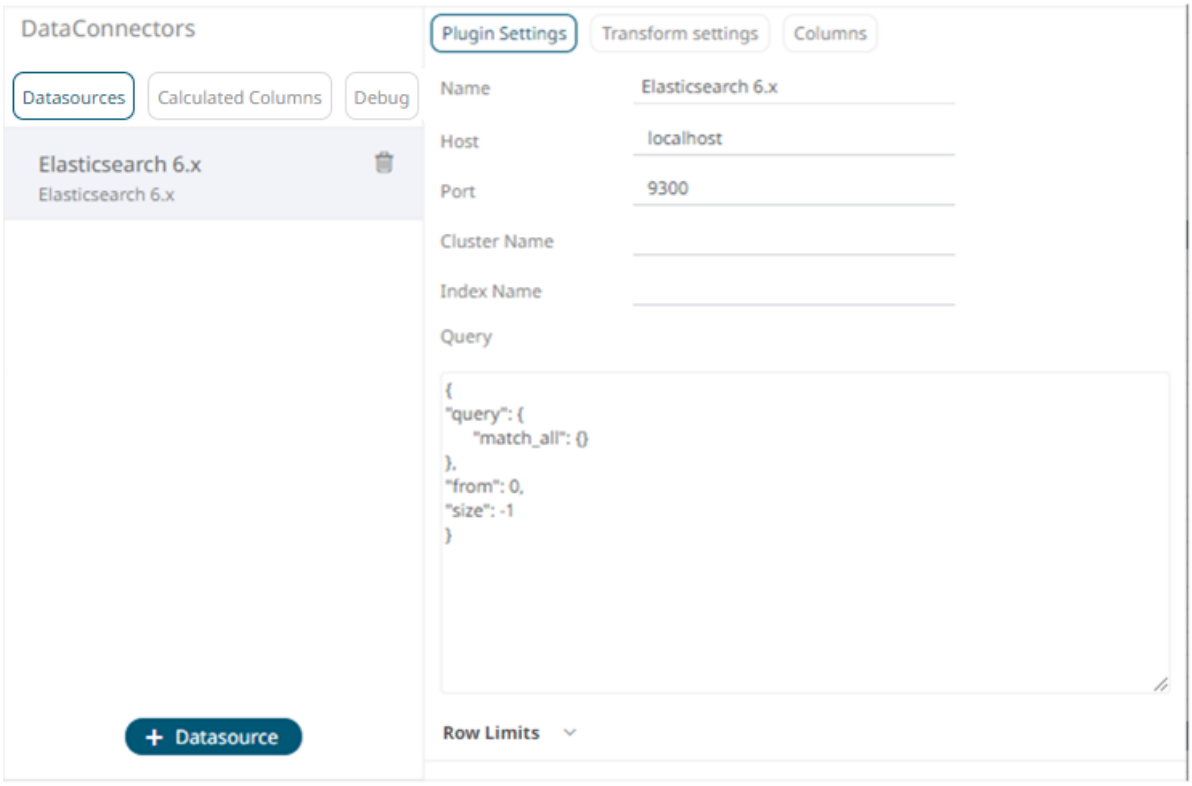
The Elasticsearch 6.x connector allows you to connect and access data from an Elasticsearch cluster using Transport Client.

NOTE

- **To enable the Elasticsearch 6.x connector, refer to Elasticsearch Connectors Dependency Installation for more information on how to copy the provided dependency files to the `Lib` folder.**
- **The Elasticsearch 6.x connector supports Elasticsearch 6.x versions.**
- **Elasticsearch 6.x and Elasticsearch 7.x connectors will not work in a single Panopticon Real Time instance due to conflicting Elasticsearch API dependencies.**

Steps:

1. Select **Elasticsearch 6.x** from the *Connectors* panel. The *Elasticsearch 6.x Settings* panel displays.



2. Enter the *Name* of the Elasticsearch 6.x data source, then click ✓.
3. Enter the following information:

Property	Description
Host	The hostname of any node in your Elasticsearch cluster, or localhost for a node on your local machine.
Port	The port running the Elasticsearch HTTP service (default is 9300). If the port you wish to use is different from the default port, change the value to the correct one.
Cluster Name	The cluster name that can be used to discover and auto-join nodes.
Index Name	The Index name in Elasticsearch. This is some type of data organization mechanism that allows partition of data in a certain way.

4. Enter an optional JSON-encoded request body in the *Query* box.
5. Set the row limit of the data set.
6. Tap the **Preview Selected Data Source** slider to turn it on.
7. Click Refresh Preview to display the data preview.

Elasticsearch 7.x Connector

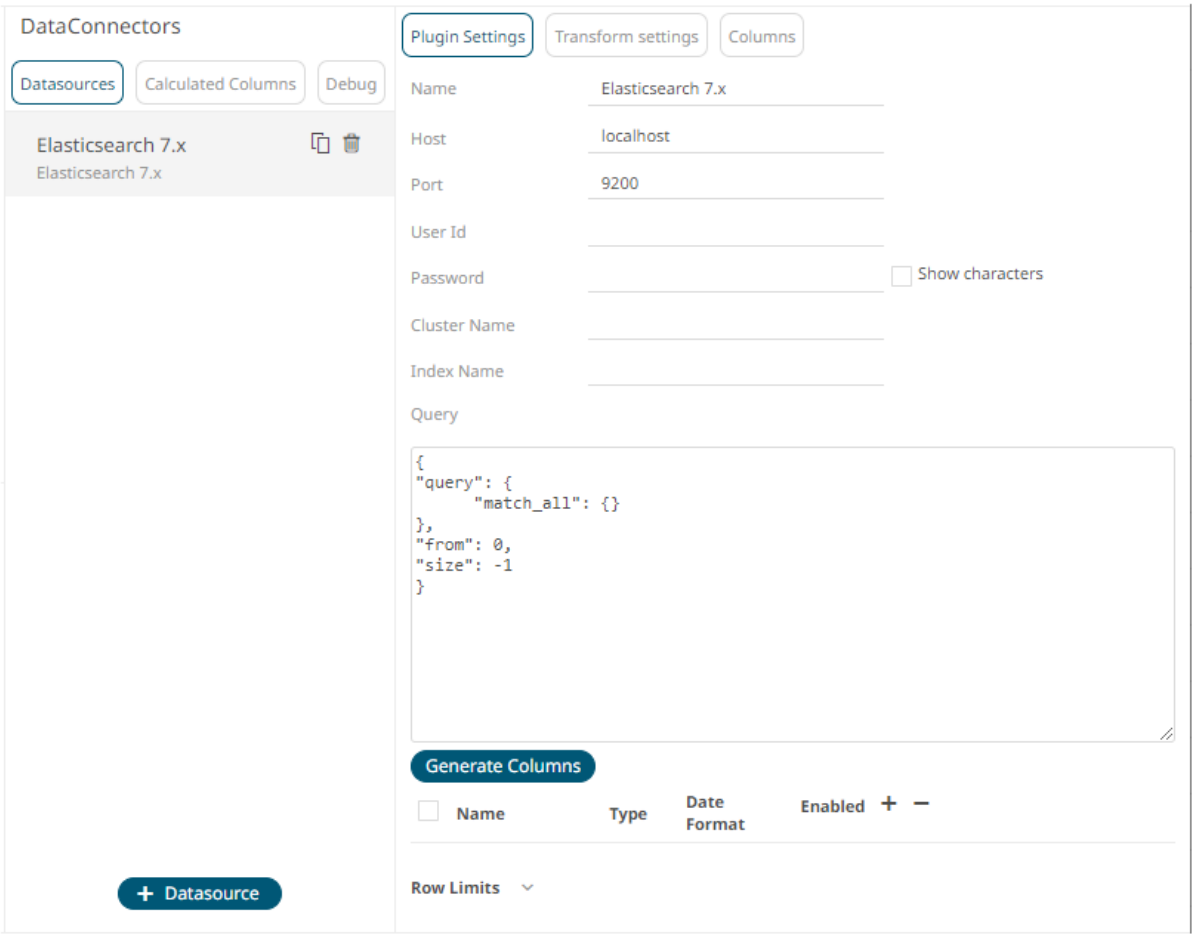
The Elasticsearch 7.x connector allows you to connect and access data from an Elasticsearch cluster using Java High Level REST Client.

NOTE

- **To enable the Elasticsearch 7.x connector, refer to Elasticsearch Connectors Dependency Installation for more information on how to copy the provided dependency files to the `Lib` folder.**
- **The Elasticsearch 7.x connector supports Elasticsearch 7.x versions.**
- **Elasticsearch 6.x and Elasticsearch 7.x connectors will not work in a single Panopticon Real Time instance due to conflicting Elasticsearch API dependencies.**

Steps:

1. Select **Elasticsearch 7.x** from the *Connectors* panel. The *Elasticsearch 7.x Settings* panel displays.



2. Enter the *Name* of the Elasticsearch 7.x data source, then click ✓.
3. Enter the following information:

Property	Description
Host	The hostname of any node in your Elasticsearch cluster, or localhost for a node on your local machine.
Port	The port running the Elasticsearch HTTP service (default is **9300**). If the port you wish to use is different from the default port, change the value to the correct one.
User Id	The username used to connect to the Elasticsearch 7.x service.
Password	The password used to connect to the Elasticsearch 7.x service. Check the *Show Characters* box to display the entered password characters.
Cluster Name	The cluster name that can be used to discover and auto-join nodes.
Index Name	The Index name in Elasticsearch. This is some type of data organization mechanism that allows partition of data in a certain way.

4. Enter an optional JSON-encoded request body in the *Query* box.
5. Click Generate Columns. The columns populate the *Output Column* section.
6. Click + to add columns and specify their properties:

Property	Description
Name	The column name of the source schema.
Type	The data type of the column. Can be a **Text, Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.

   To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.
7. Set the row limit of the data set.
8. Tap the **Preview Selected Data Source** slider to turn it on.
9. Click Refresh Preview to display the data preview.

Elasticsearch Connectors Dependency Installation

Dependencies for each supported Elasticsearch version are included in the Panopticon Real Time zip as individual zip archive files:

- Elastic_6X_Dependencies.zip
- Elastic_7X_Dependencies.zip.

Steps:

1. Select the target Elasticsearch version and unzip the contents of the appropriate dependency zip into the `tomcat/webapps/panopticon/WEB-INF/lib` folder to enable connectivity for a specific server instance.
2. Restart Tomcat.

Google Analytics Connector

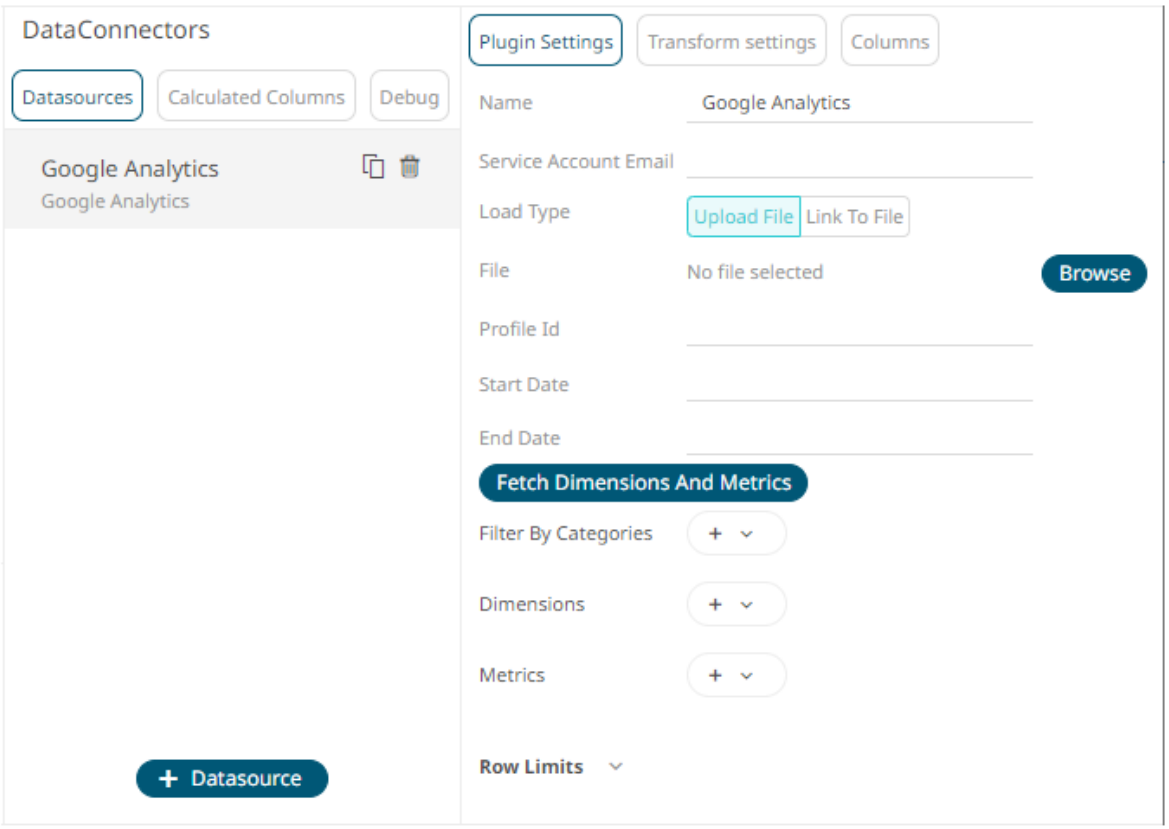
The Google Analytics connector allows you to track and report website traffic using the Google Analytics service. You will need the following to fetch Google Analytics data:

Field	Description
Service Account E-mail	The Service Account ID that is generated while creating credentials for the service account authentication.
Key File	The Key File **(.p12**) furnished by Google Analytics when you created the Service Account.
Profile ID	The Profile ID of the page you want to access in Google Analytics.

Information on how to configure service account authentication for Google Analytics is discussed here.

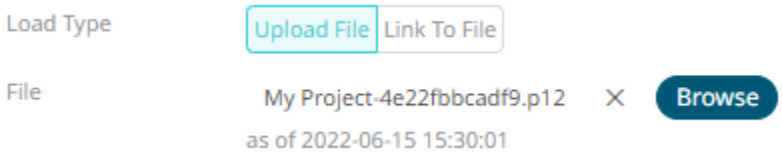
Steps:

1. Select **Google Analytics** from the *Connectors* panel. The *Google Analytics Settings* panel displays.



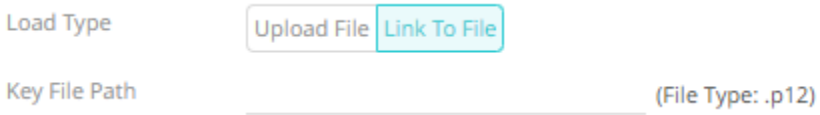
2. Enter the *Name* of the Google Analytics data source, then click ✓.
3. Enter the *Service Account Email* that was generated while creating credentials to the service account authentication.
4. Set the *Key File* that will be used to connect to Google Analytics in Panopticon. Do one of the following:
   - Upload the *Personal Information Exchange* file by clicking **Upload File** Upload File then **Browse** Browse to browse to the file.

After selecting the file, it is displayed with the timestamp.

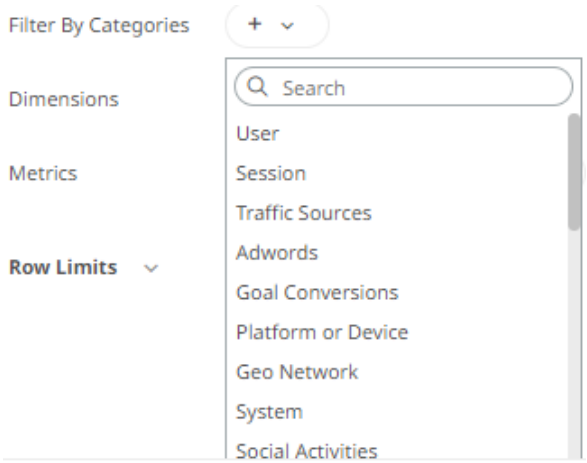


To change the key file, click ✕ then **Browse** Browse to browse to a new version of the file.

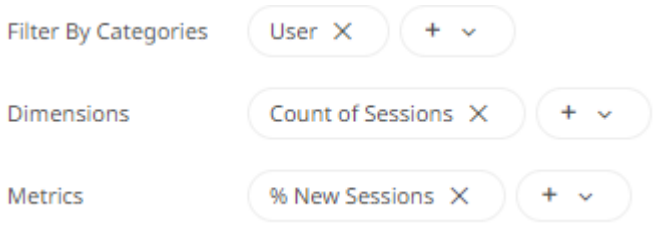
- Link to a *Personal Information Exchange* file by clicking **Link to File** Link To File and entering a *File Path*.



5. Enter the *Profile ID* of the page you want to access in Google Analytics.
6. Enter the *Start Date* and *End Date*, if needed.
7. Click Fetch Dimensions And Metrics. This populates the *Filter By Categories*, *Dimensions*, and *Metrics* list boxes.
8. Click + then select any field from these list boxes.



For example:



Click ✕ to remove a field.

9. Set the row limit of the data set, if required.
10. Tap the **Preview Selected Data Source** slider to turn it on.

11. Click  to display the data preview.

Configuring Service Account Authentication for Google Analytics

Before using the Google Analytics connector, the following steps must be performed:

1. Configure the Google Analytics Service Account Authentication
2. Enable the Analytics API
3. Set Edit Permissions to the Service Account ID
4. Extracting Profile ID from the URL

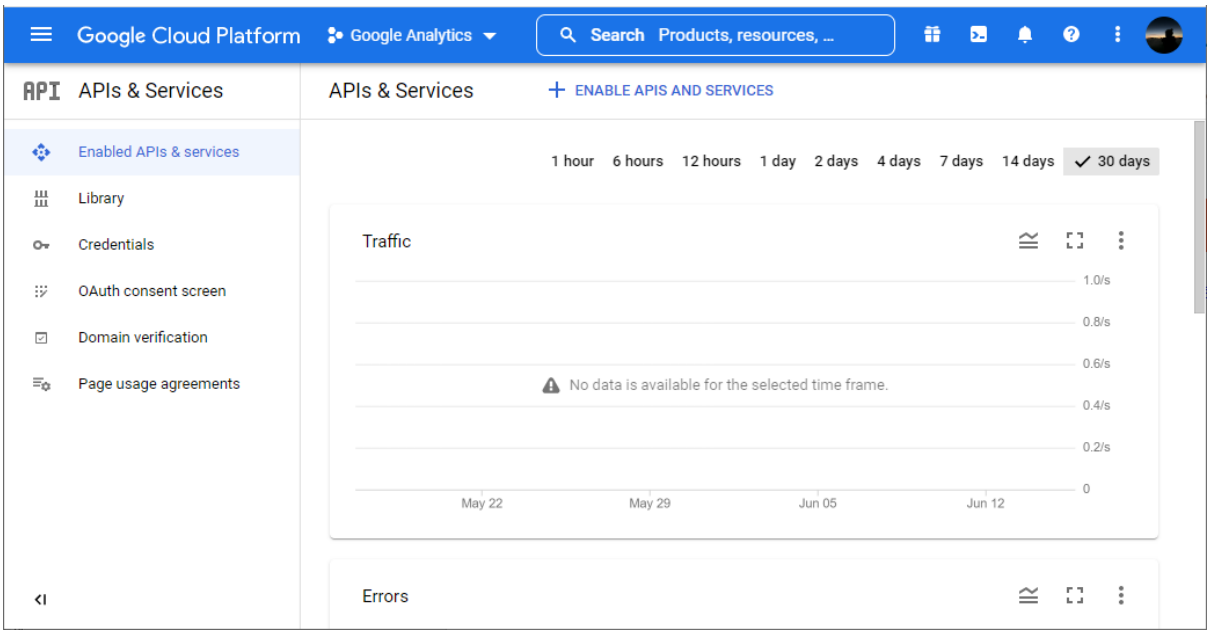
Each step is discussed below.

Steps:

The authentication mode needs to be enabled from the account email that you will use.

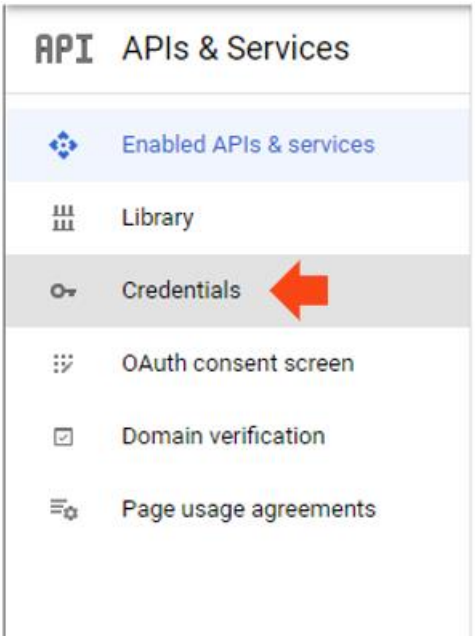
1. Go to `http://console.developers.google.com` and log-on using your credentials.

   The *Google APIs & Services* is displayed.

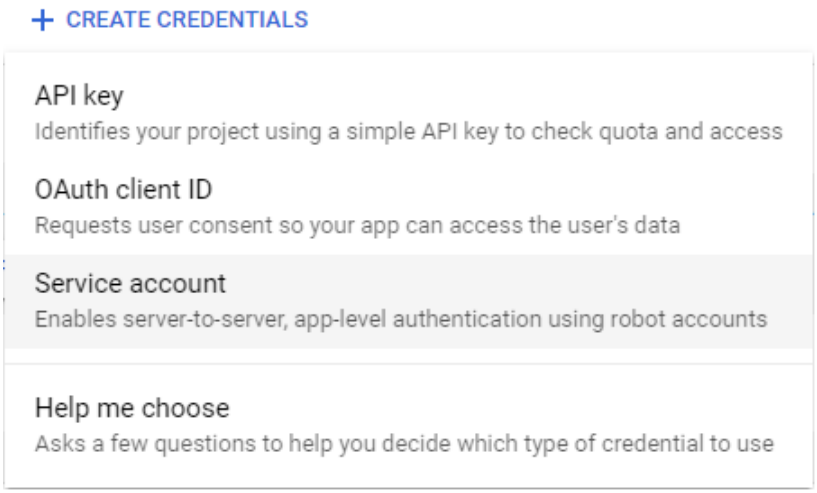


   The Google Analytics connector works on a service account authentication mode. To create a service account, you must first create a project.

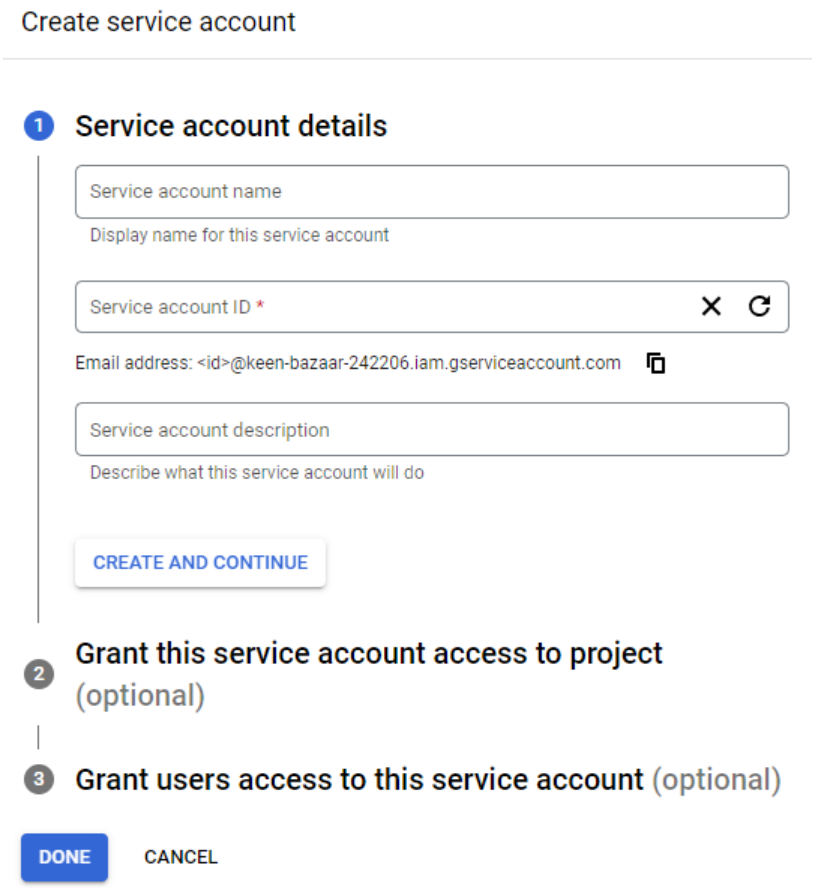
2. On the *APIs & Services* section, click **Credentials**.



3. Click **CREATE CREDENTIALS** and choose **Service Account Key** to create credentials for the service account authentication.



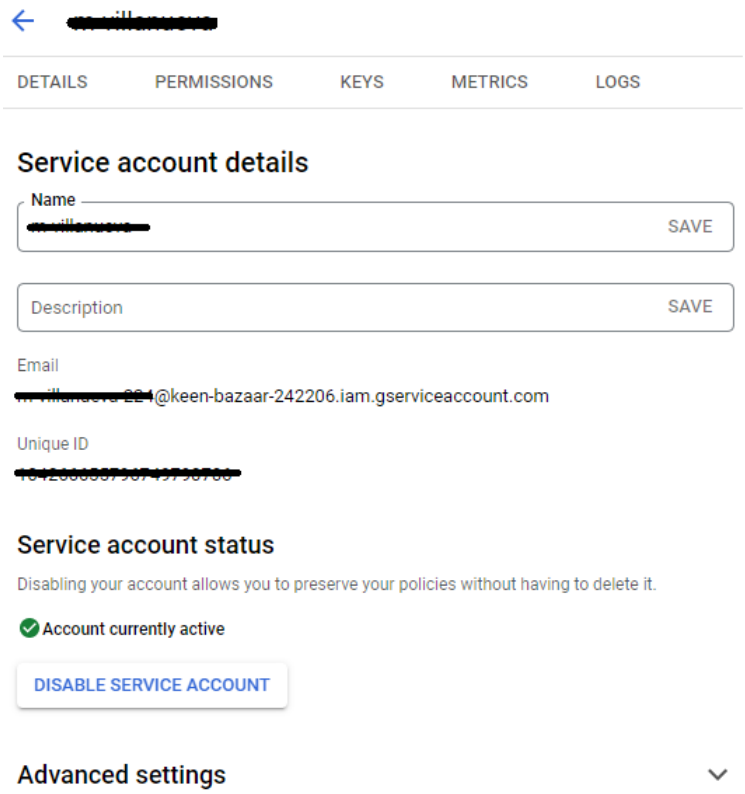
The *Create Service Account* page displays:



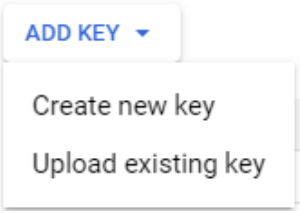
4. Enter the *Service Account Name*. This is displayed in the *Service Account ID* box.

   Click **Copy to Clipboard** to copy the generated *Service Account Email* to clipboard.
5. Click **Create and Continue** to create the service account.
6. You may skip steps 2 and 3 then click **Done**.

   The new service account is listed in the *Credentials* page.
7. To generate the key file, click the service account you created.



8. Select the **Keys** tab, then **Add Key > Create new key**.



The *Create Private Key for "<Service Account>"* dialog displays.

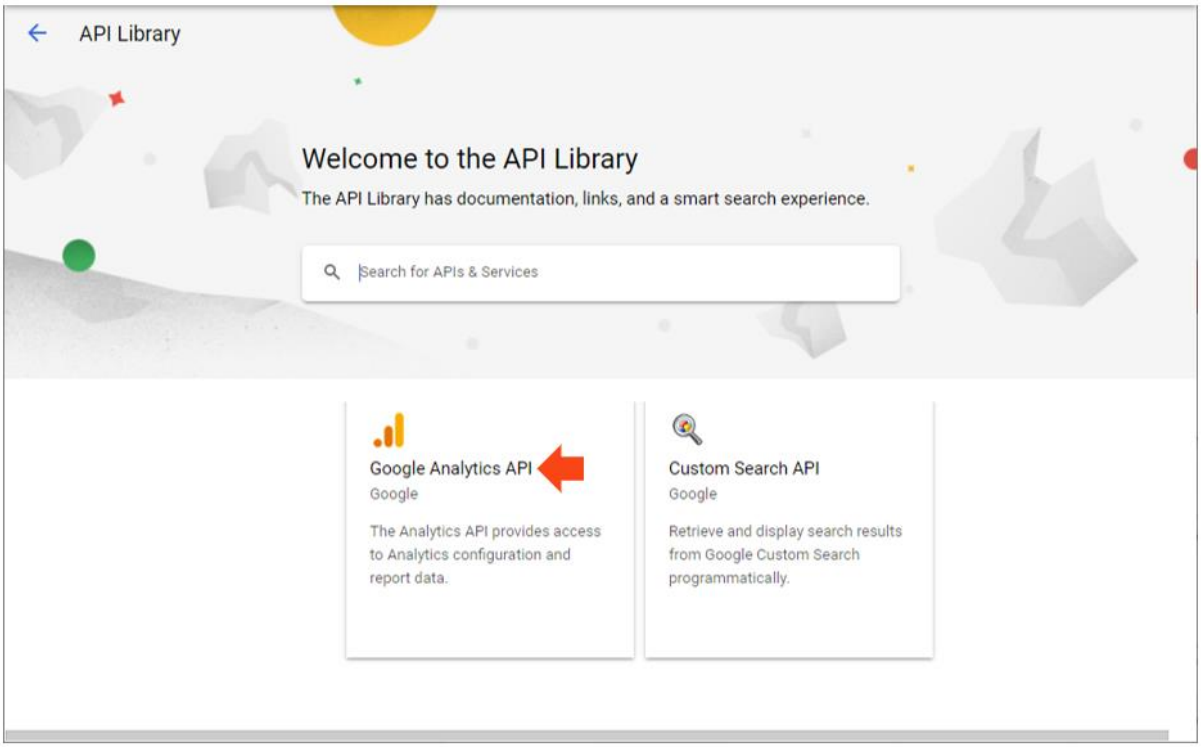
9. Select **P12** *Key Type* and click **Create**.

The private key is downloaded. Ensure to copy the private key password and save a copy of the key file.

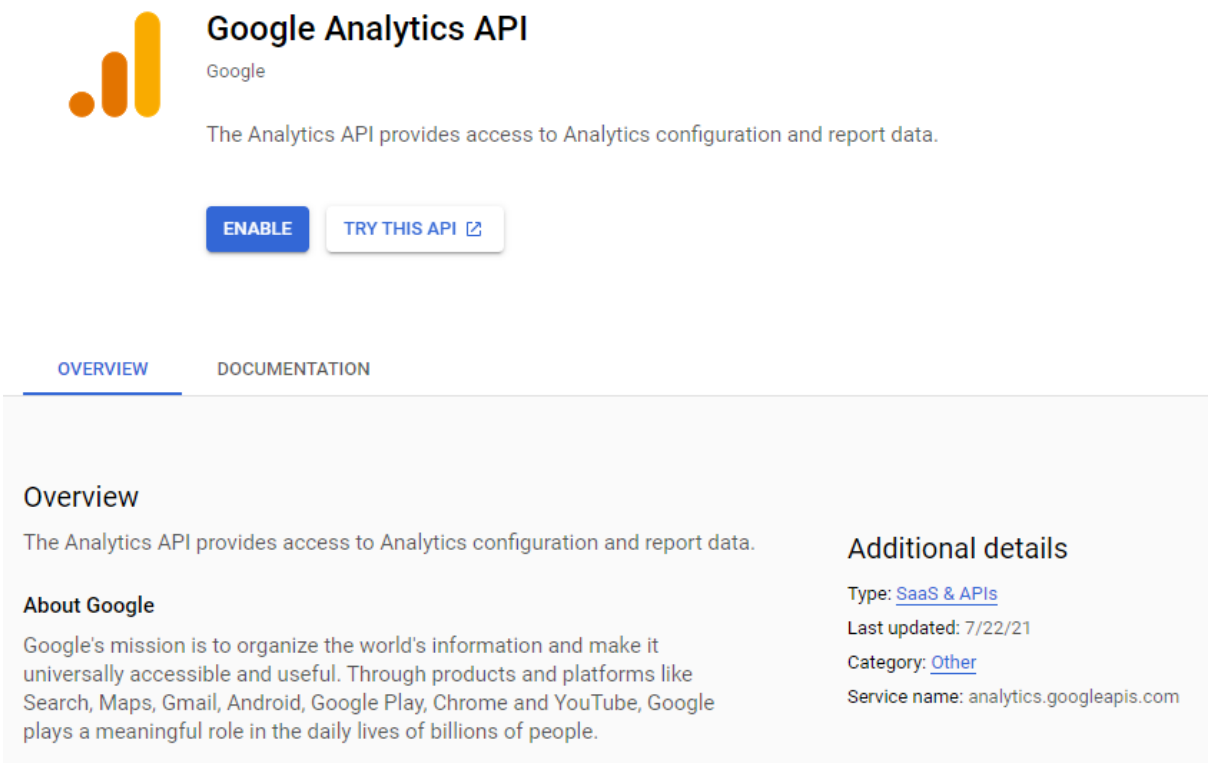
2. Enabling Analytics API

Follow these steps to enable Analytics API:

1. On the *APIs & Services section,* click **ENABLE APIS AND SERVICES** to display the *API Library* page and select **Google Analytics API**.



The *Google Analytics API* page is displayed.

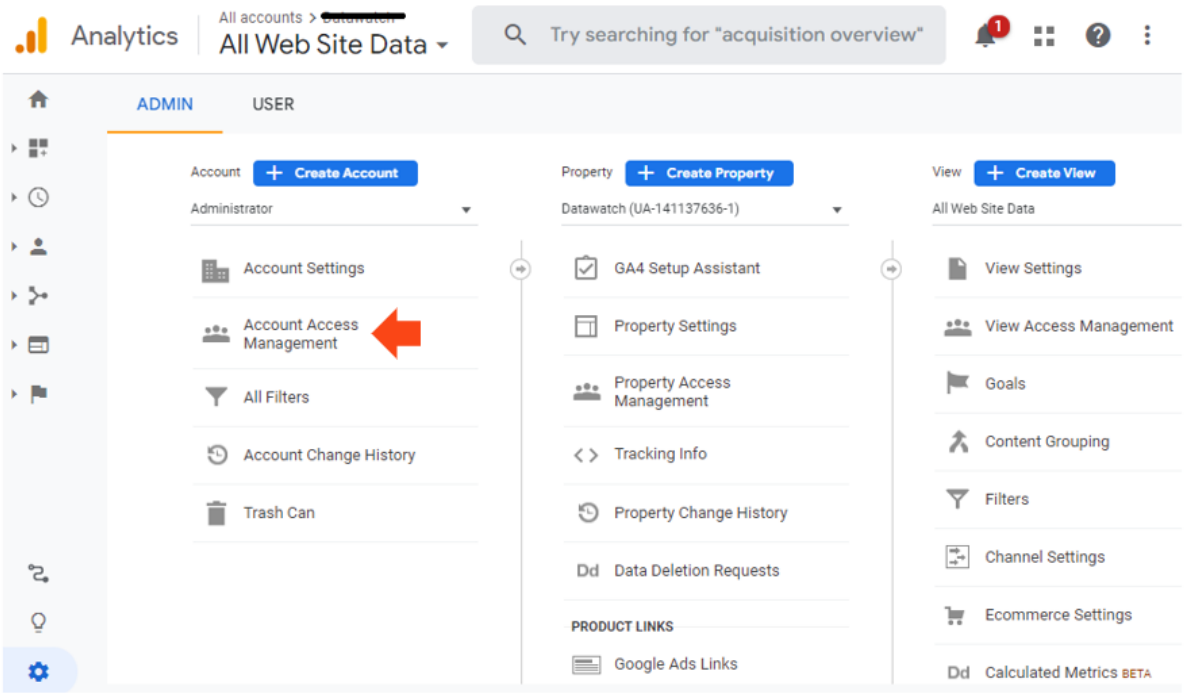


2. Click **ENABLE**.

3. Setting Edit Permissions to the Service Account ID

Before using the Google Analytics connector, users must request for their service provider account access from the administrator.

1. Send the generated service account ID to the Google Analytics administrator.
2. The administrator grants permissions to the user in the **Admin > User Access Management** page in their Google Analytics account.



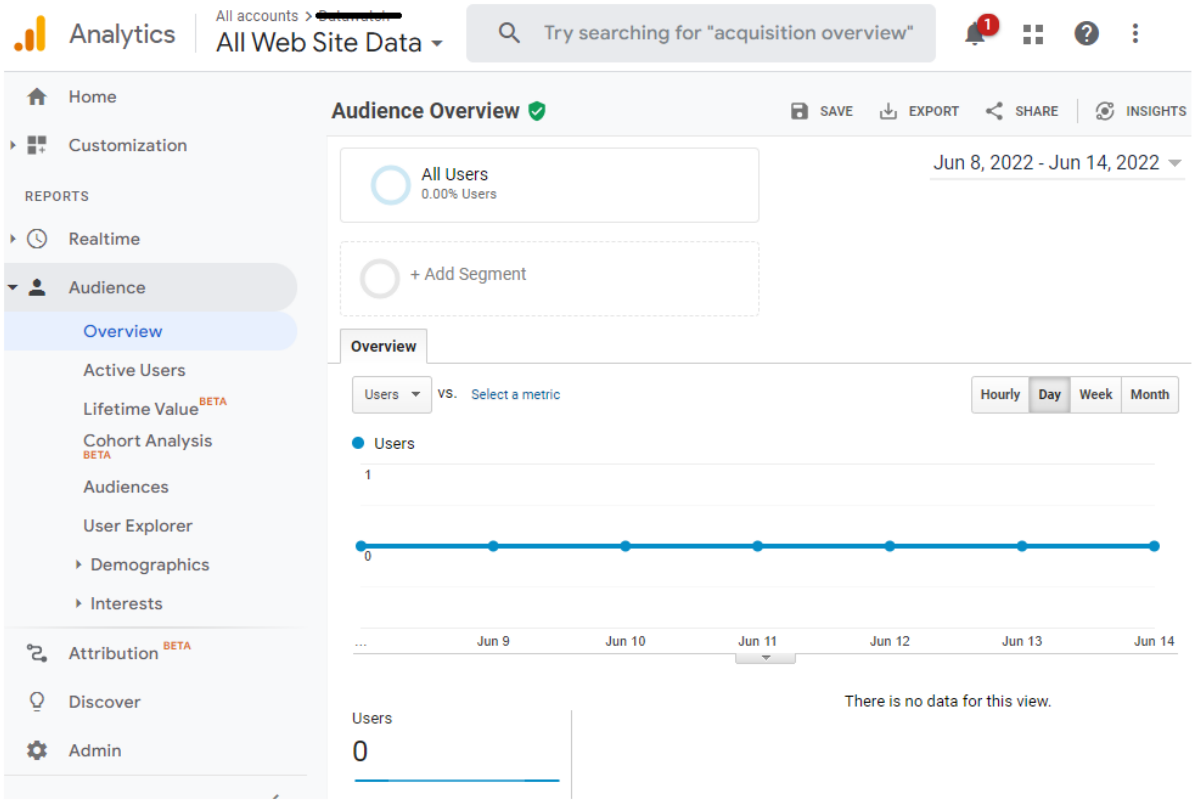
3. The administrator must ensure to give **Edit** permission to the user.

4. Extracting Profile ID from the URL

Aside from the Service Account ID and the Key File, you also need to extract the Profile ID from the URL in order to connect to the Google Analytics connector in Panopticon Real Time.

1. Go to http://analytics.google.com and sign in.

   The Google Analytics account page is displayed.



NOTE **Initially, there is no data displayed on the dashboard.**

2. Check the URL. For example: `https://analytics.google.com/analytics/web/#/report-home/a141137636w202161341`**`p196007843`**

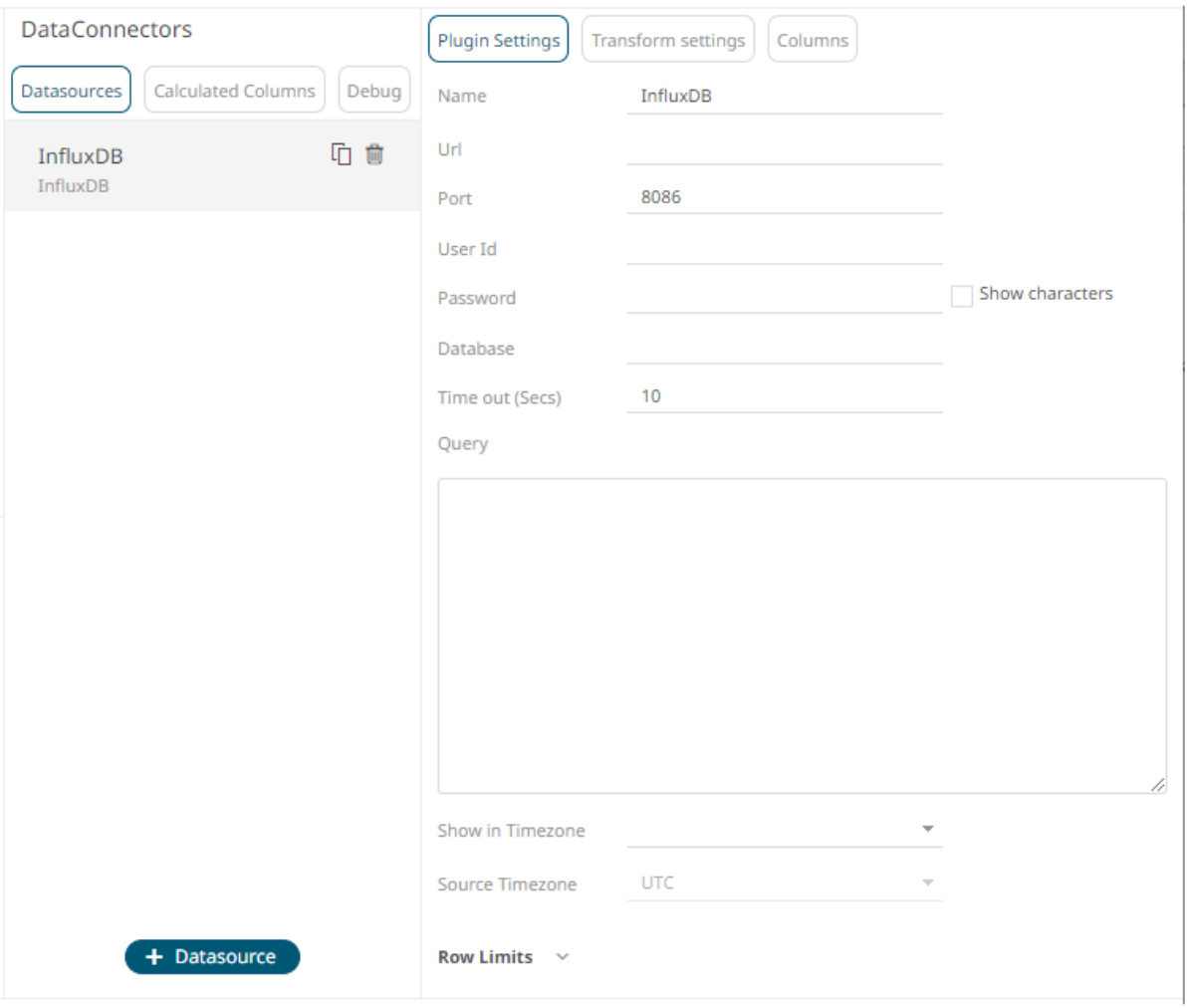
   All of the digits that follow **p** is the Profile ID (e.g., **196007843**)

InfluxDB Connector

The InfluxDB connector allows for the retrieval of a JSON data set from the InfluxDB. The database communicates over HTTP(S) where you can define a query in the URL to return the desired data.

Steps:

1. Select **InfluxDB** from the *Connectors* panel. The *InfluxDB Settings* panel displays.



2. Enter the *Name* of the InfluxDB data source, then click ✓.
3. Enter the following information:

Property	Description
URL	InfluxDB host address.
Port	InfluxDB host port. Default is **8086**.
User Id	The user Id that will be used to connect to the InfluxDB service.
Password	The password to connect to the InfluxDB service. Check the **Show Characters** box to display the entered characters.
Database	The name of the database that will communicate over the HTTP(S).
Time out (Secs)	The time out period applied to both the TCP socket and for individual read IO operations. Default is **10**.

4. Enter an SQL-like query language into the *Query* box.
5. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
6. Set the row limit of the data set.

7. Tap the **Preview Selected Data Source** slider to turn it on.
8. Click  to display the data preview.

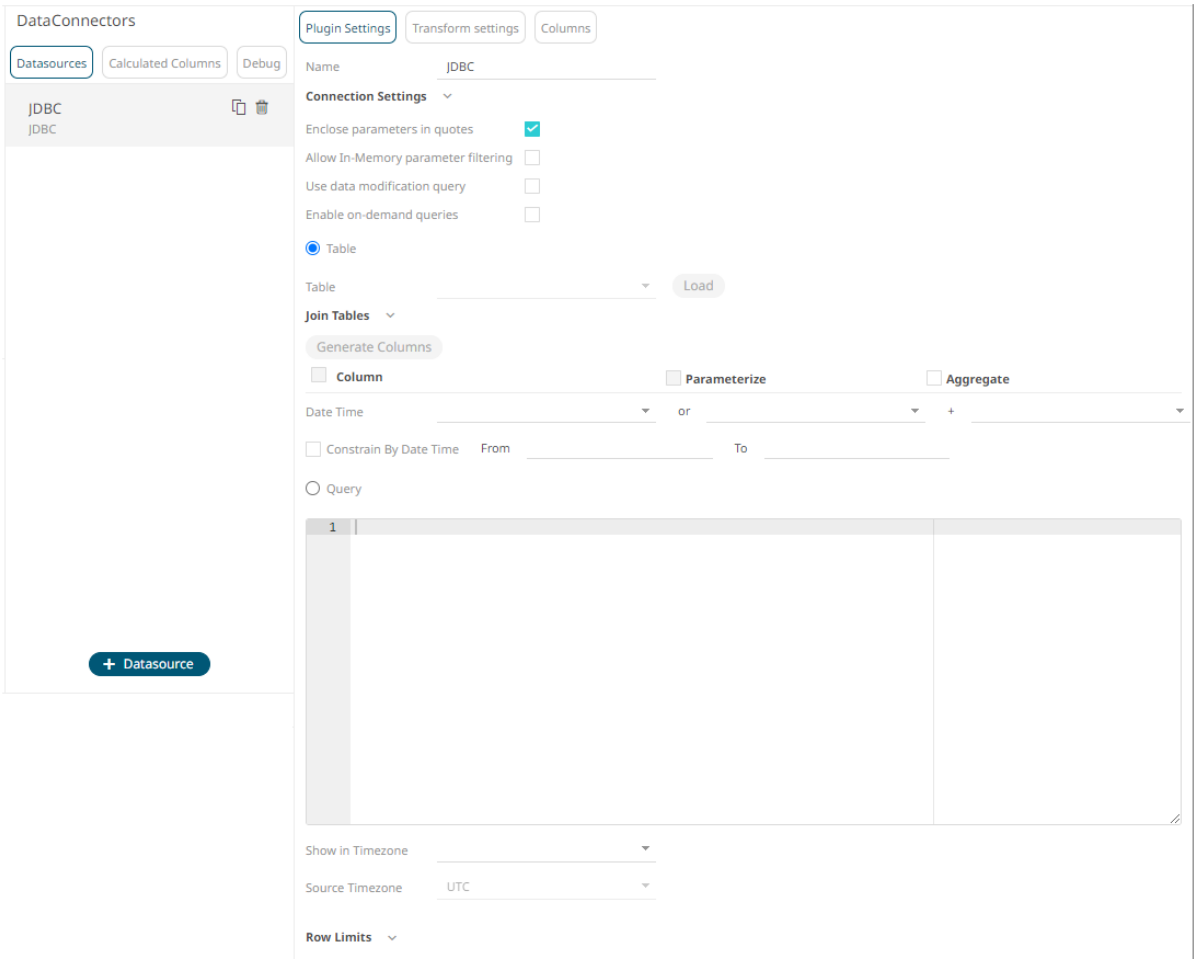
JDBC Database Connector

The JDBC connector allows the retrieval and processing of data from virtually any database, that has a JDBC driver. It can be used If the database you want to connect to is not listed in the *Connectors* panel.

IMPORTANT **For DolphinDB, the query builder is not supported, only the query mode.**

Steps:

1. Select **JDBC** from the *Connectors* panel. The *JDBC Settings* panel displays.



2. Enter the *Name* of the JDBC data source, then click ✓.
3. Click **Connection Settings** to expand and display the properties you can set.



4. You can either select:



- JNDI Name

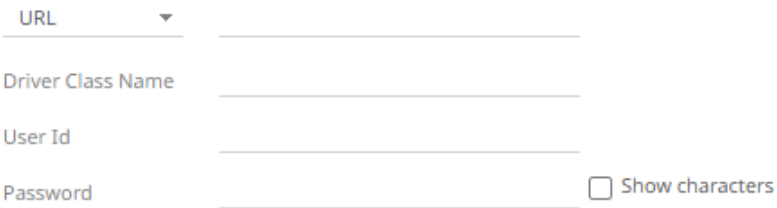


Enter the *JNDI resource name* to be used.

NOTE **The JNDI resource name needs to be on the form:**

`jdbc/[resourcename]`

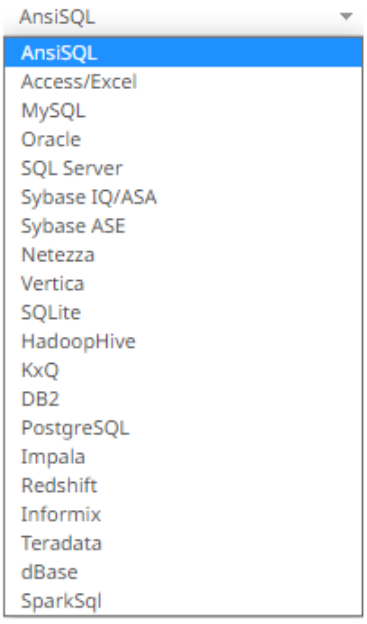
- URL



Enter the *URL* specific to the database's JDBC driver, the *Driver Class Name* specific to the driver, and the *User Id* and *Password*.

Check the **Show Characters** box to display the entered characters.

5. Select the appropriate *SQL Dialect* in the drop-down list to be able to generate the correct SQL for the required data repository.



You can select any of the following *SQL dialects*: AnsiSQL, Access/Excel, MySQL, Oracle, SQL Server, Sybase IQ/ASA, Sybase ASE, Netezza, Vertica, SQLite, HadoopHive, KxQ, DB2, PostgreSQL, Impala, Redshift, Informix, Teradata, dBase, SparkSQL.

Default is **AnsiSQL.**

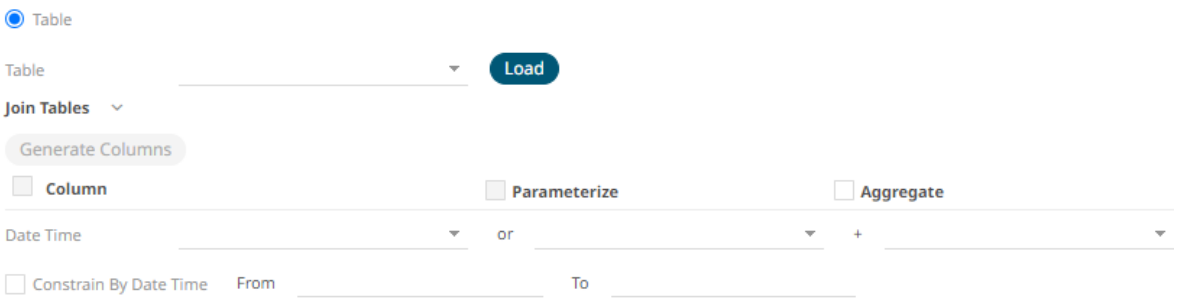
6. Enter the *Timeout*. Default is **60**.
7. Check any of the following options when building the query:
   - Enclose parameters in quotes

     By default, this option is checked, as the common use case for parameters is a filter `WHERE` clause.
   - Allow in-memory parameter filtering

     Allows the whole dataset to be returned, and then filtered in memory. This process is much less efficient than adding the parameter as a `WHERE` clause of the SQL query; however, it may be efficient in cases where small sets of records are returned on a very frequent basis.
   - Use data modification query

     Signals that the table is created for writing data. This property is also used for filtering out target data tables for further data update action configuration
   - Enable on-demand queries

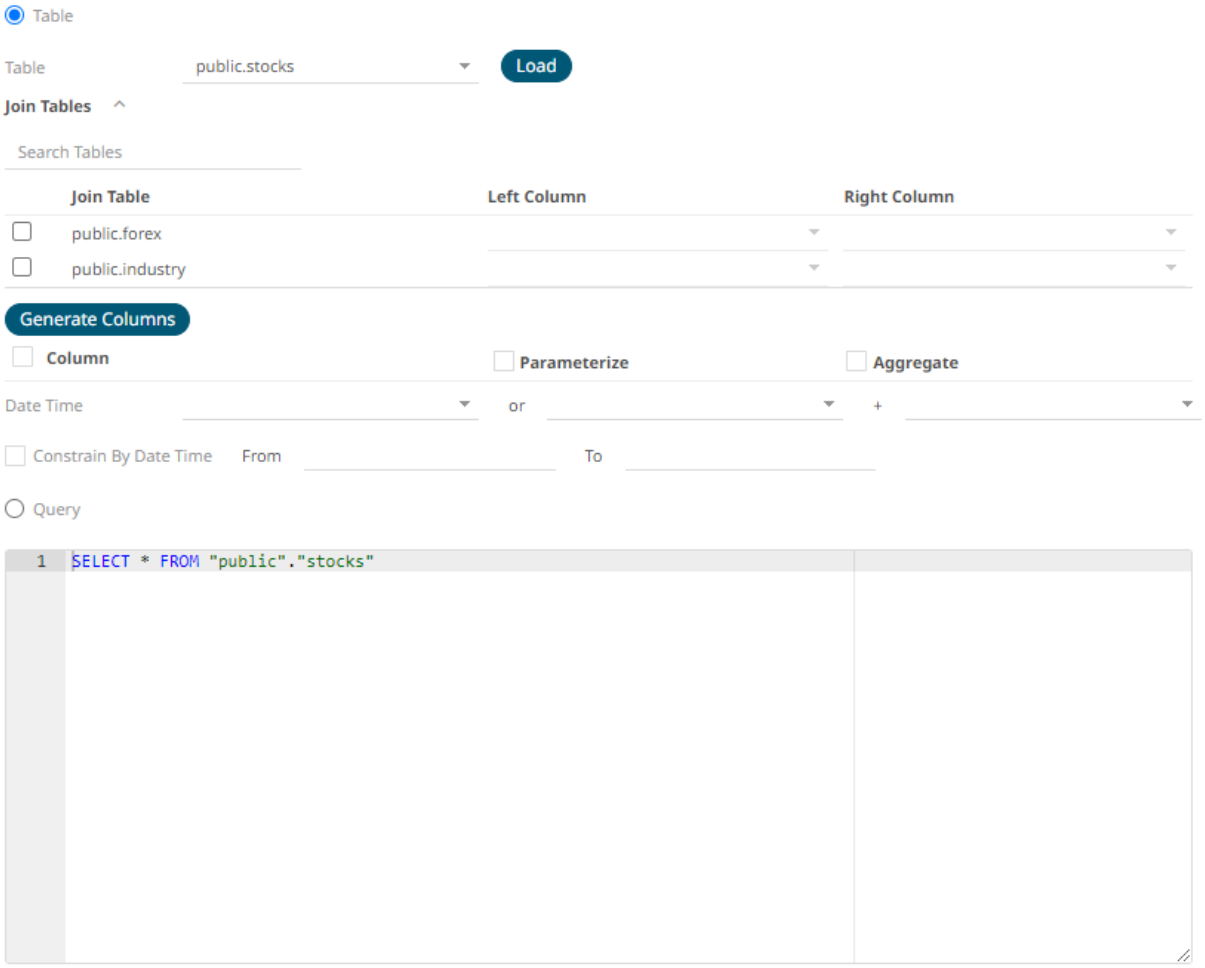
     On-demand queries provide ROLAP functionality to the Altair Visual Data Discovery products, where the aggregation and filtering tasks are largely offloaded to the underlying data repository.
8. When **Table** is selected, the section below is enabled:



9. On the *Table* field, click Load to populate the drop-down list with tables. Select a table.

   The SQL query is generated and displayed in the *Query* text box.

   Also, expanding the *Join Tables* displays the list of tables that you can join.

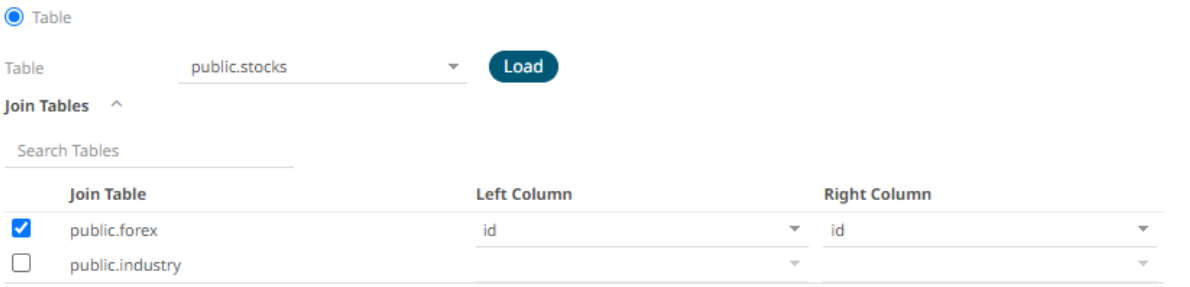


   Use *Search Tables* to filter the list.



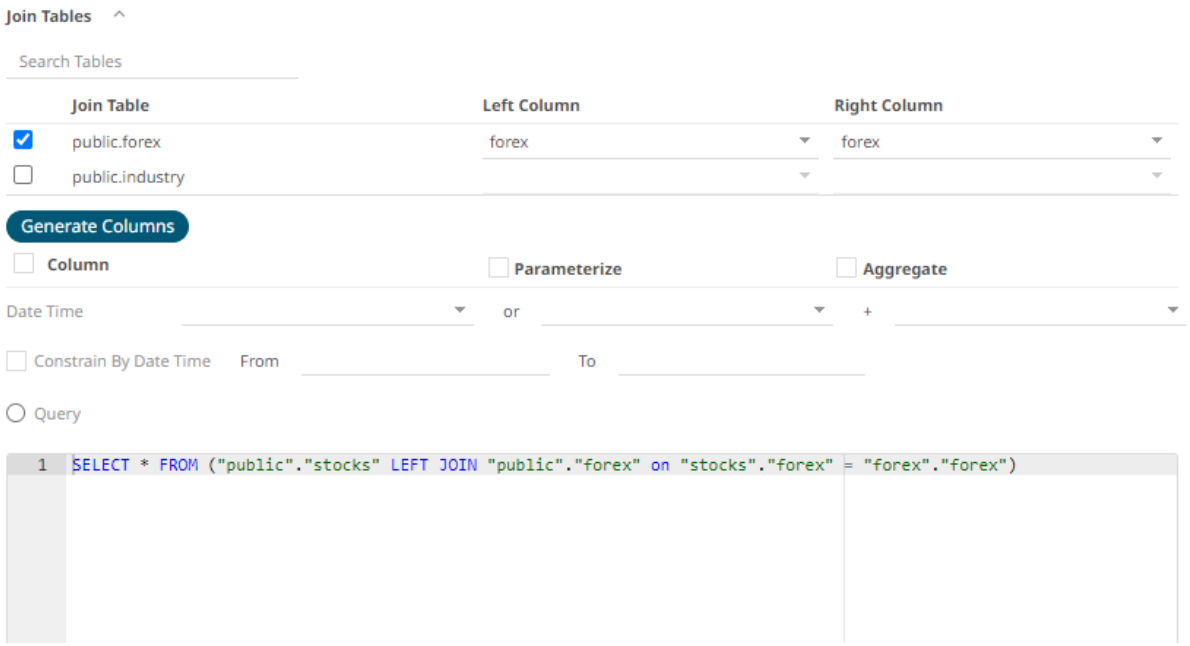
10. Perform a join by checking one or more tables in the list.

    The *Left Column* and *Right Column* fields are automatically filled out with the common fields.



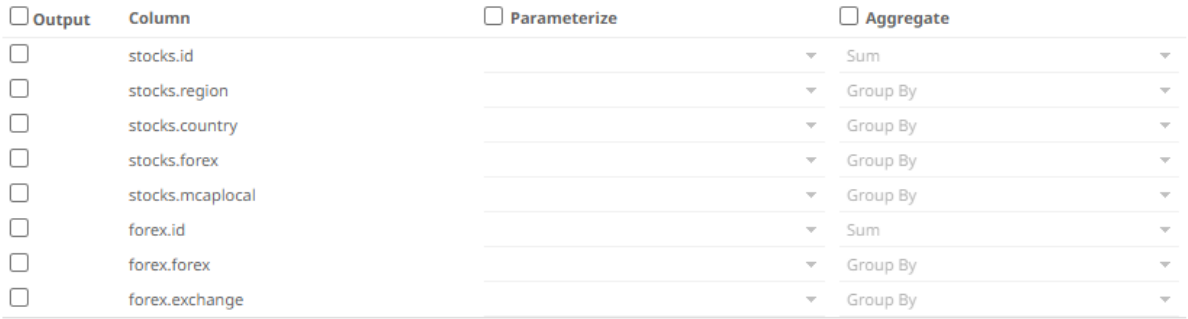
You can also opt to select other common fields.

The SQL query is generated and displayed in the *Query* text box.



11. Click 

. The columns populate the *Output Column* section.



12. Individual columns can be added by checking the corresponding *Column* box in the *Output Column* listing. To select all of the columns, check the topmost box.

    The SQL query is generated and displayed in the *Query* text box.

13. If the data returned is to be aggregated, then the **Aggregate** box should be checked. For each selected column, the possible aggregation methods are listed including:

    - Text Columns: Last, First, Count, Group By
    - Date Columns: Count, Min, Max, Group By

- Numeric Columns: Last, First, Sum, Count, Min, Max, Mean, Group By

The SQL query is generated and displayed on the *Query* text box.

14. Check the **Parameterize** box and match the parameter to the appropriate column. By default, they will be matched by name.

    The appropriate SQL Query is updated in the *Query* text box.

15. If the data is to be filtered or aggregated on Date/Times, then a valid *Date Time* field needs to be selected from either a single Date/Time field, or a compound column created from a selected *Date* and a selected *Time* column.

16. Click the **Query** radio button to enable the text box and modify the SQL-like query language.
17. You can opt to define the *Show in Timezone* and *Source Timezone* settings.

NOTE **The time zone transformation is not applied to Date columns.**

18. Set the row limit of the data set.
19. Tap the **Preview Selected Data Source** slider to turn it on.
20. Click 

to display the data preview.

Migration from Database to JDBC Connector

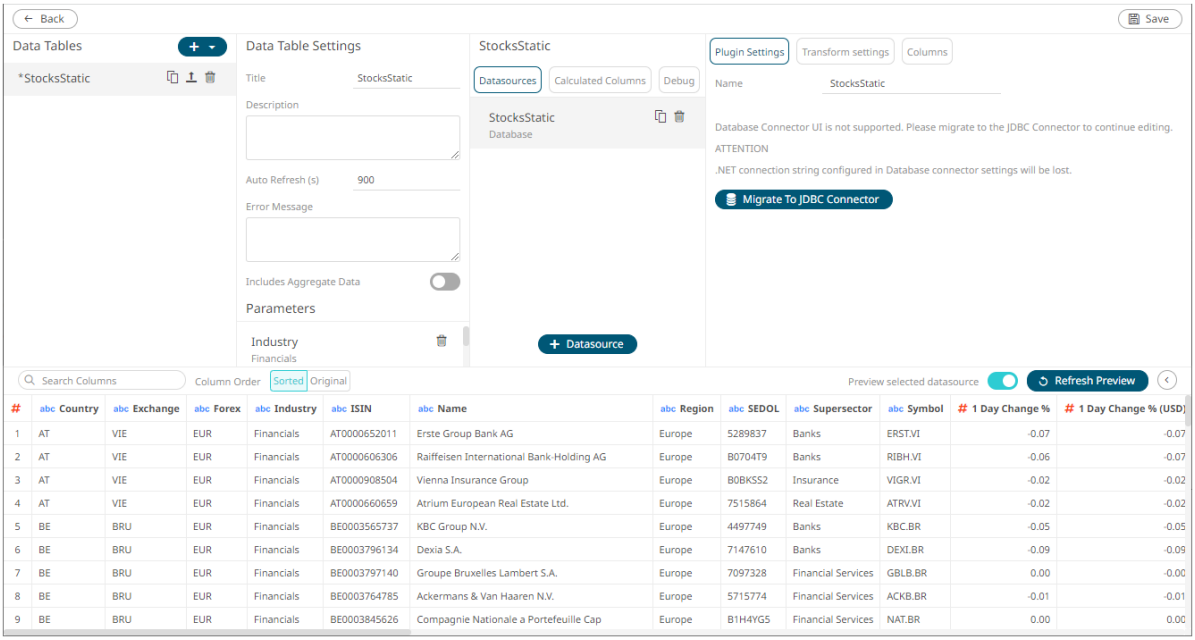
The Database connector from legacy workbooks is not supported in the Web Authoring. To be able to modify the connection settings, you should migrate to the JDBC connector.

Steps:

1. On the *Workbooks and Folders Summary* page, click a legacy workbook with a *Database* connector data source.

   The workbook is displayed on the *Open Workbook in Edit View* layout.

2. Click **Edit Data Table**  to open and view the *Edit Data Table* layout.

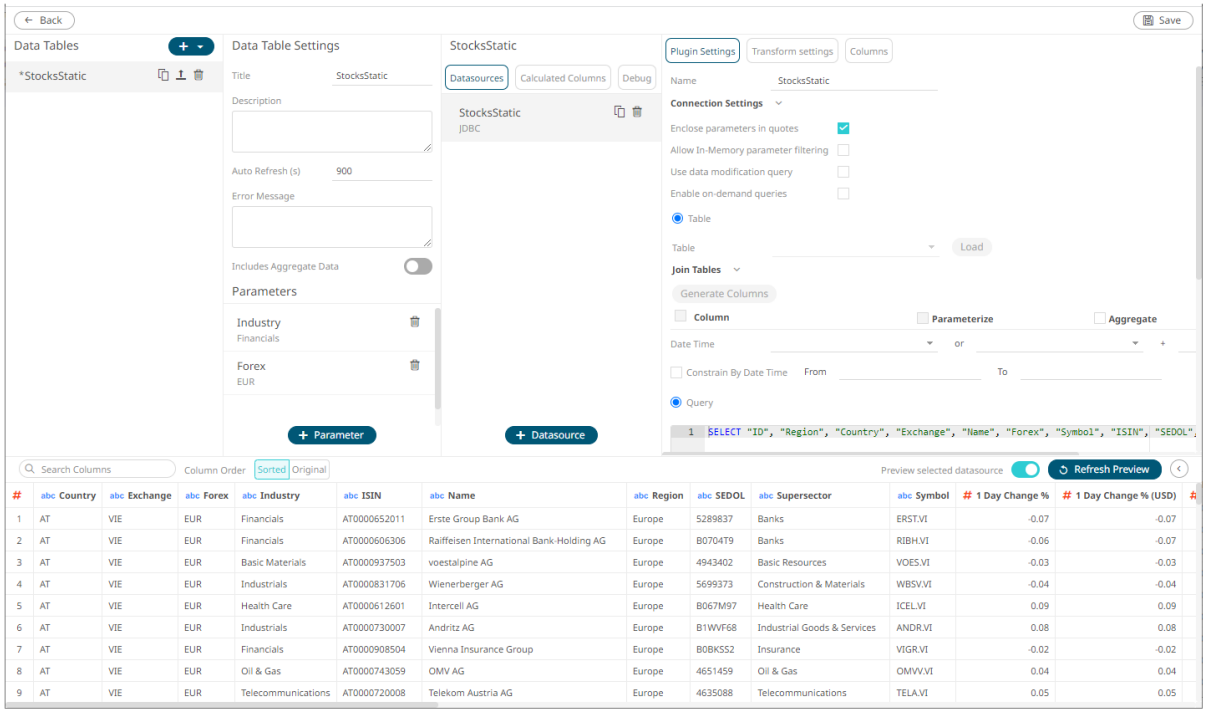


#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol	1 Day Change %	1 Day Change % (USD)
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI	-0.07	-0.07
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI	-0.06	-0.07
3	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI	-0.02	-0.02
4	AT	VIE	EUR	Financials	AT0000660659	Atrium European Real Estate Ltd.	Europe	7515864	Real Estate	ATRV.VI	-0.02	-0.02
5	BE	BRU	EUR	Financials	BE0003565737	KBC Group N.V.	Europe	4497749	Banks	KBC.BR	-0.05	-0.05
6	BE	BRU	EUR	Financials	BE0003796134	Dexia S.A.	Europe	7147610	Banks	DEXI.BR	-0.09	-0.09
7	BE	BRU	EUR	Financials	BE0003797140	Groupe Bruxelles Lambert S.A.	Europe	7097328	Financial Services	GBLB.BR	0.00	-0.00
8	BE	BRU	EUR	Financials	BE0003764785	Ackermans & Van Haaren N.V.	Europe	5715774	Financial Services	ACKB.BR	-0.01	-0.01
9	BE	BRU	EUR	Financials	BE0003845626	Compagnie Nationale a Portefeuille Cap	Europe	B1H4YG5	Financial Services	NAT.BR	0.00	0.00

3. Click **Migrate to JDBC Connector** 

.

The settings are now displayed on the JDBC connector pane.



#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol	1 Day Change %	1 Day Change % (USD)
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI	-0.07	-0.07
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI	-0.06	-0.07
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI	-0.03	-0.03
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI	-0.04	-0.04
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI	0.09	0.09
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI	0.08	0.08
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI	-0.02	-0.02
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI	0.04	0.04
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI	0.05	0.05

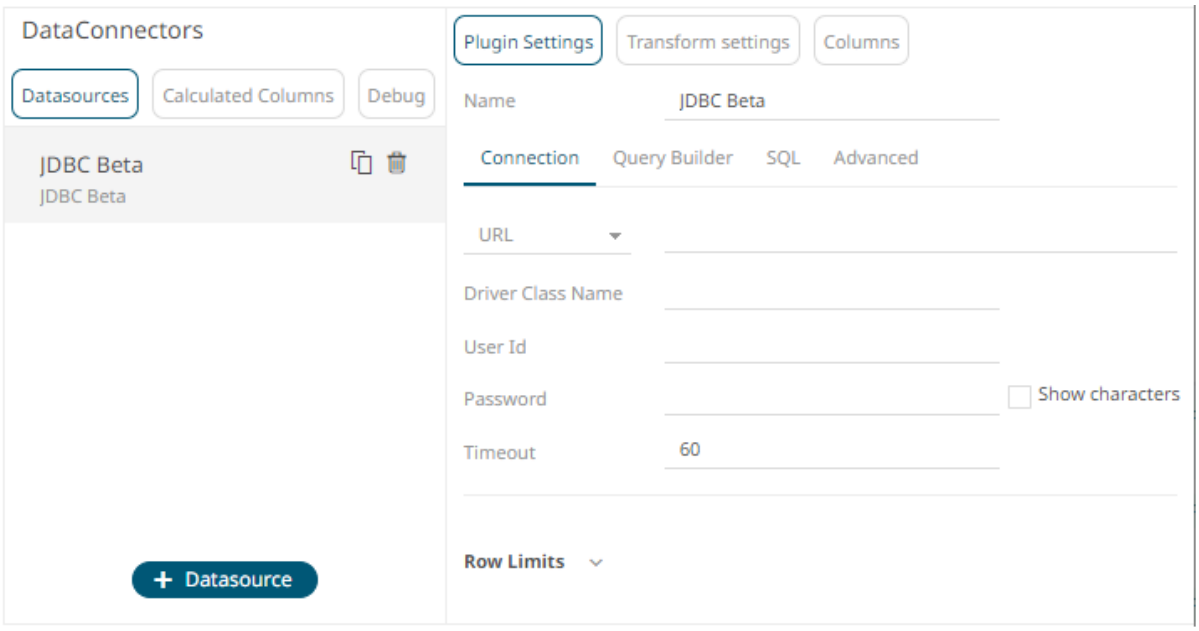
Refer to JDBC Database to make the necessary changes.

JDBC Beta Connector

JDBC Beta connector is the new version of JDBC connector and is the recommended connector for any new JDBC connectivity for better performance and configuration UI. Just like JDBC connector, it also allows the retrieval and processing of data from virtually any database, that has a JDBC driver.

Steps:

1. Select **JDBC Beta** from the *Connectors* panel. The *JDBC Beta Settings* panel displays.



2. Enter the *Name* of the JDBC Beta data source, then click ✓.
3. On the **Connection** tab, set either of the following connection settings:
   - URL



     Enter the *URL* specific to the database's JDBC driver, the *Driver Class Name* specific to the driver, and the *User Id* and *Password*.

     Check the **Show Characters** box to display the entered characters.

   - JNDI Name



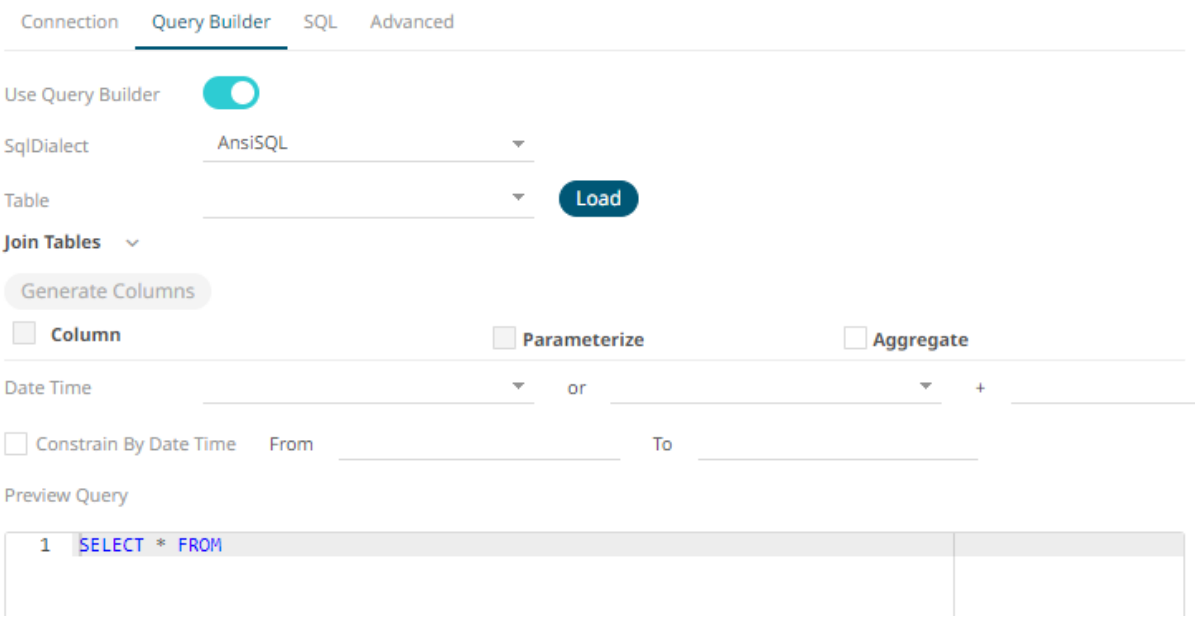
     Enter the *JNDI resource name* to be used.

NOTE **The JNDI resource name needs to be on the form:**

`jdbc/[resourcename]`

4. Adjust the *Timeout,* if needed. Default is **60**.
5. Query definition and execution can be done, using either the query builder or freeform SQL. To use the query builder, select the **Query Builder** tab. Otherwise, proceed to step 6.

   The **Use Query Builder** option is turned on by default.

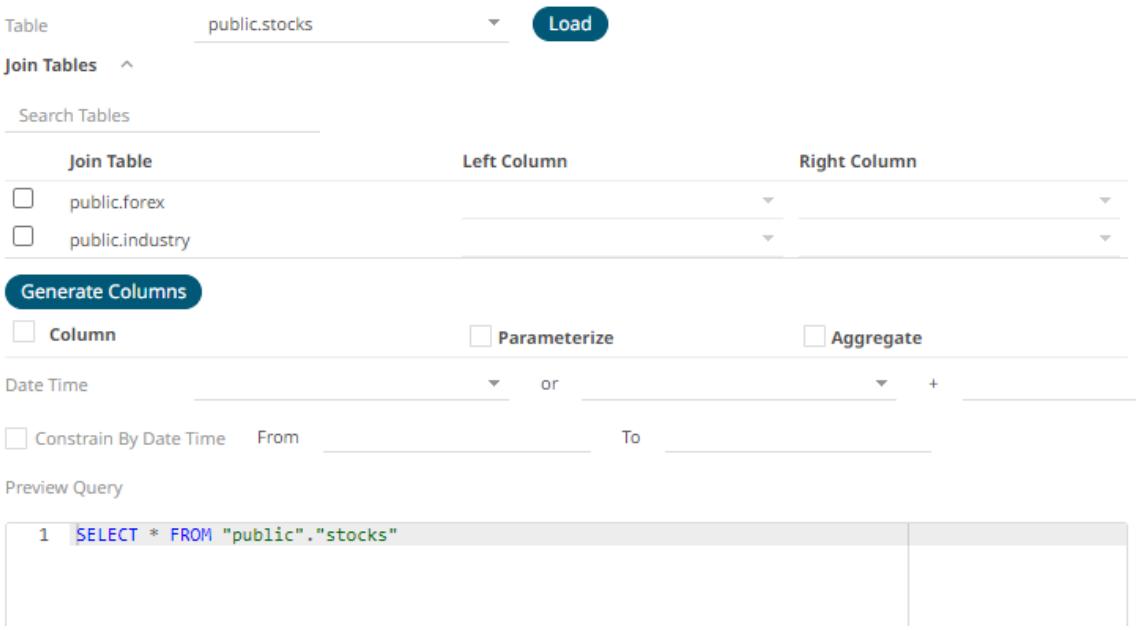


   5.1. Select the appropriate *SQL Dialect* in the drop-down list to be able to generate the correct SQL for the required data repository.

   5.2. In the *Table* field, click Load to populate the drop-down list with tables. Select a table.

   The SQL query is generated and displayed in the *Preview Query* text box.

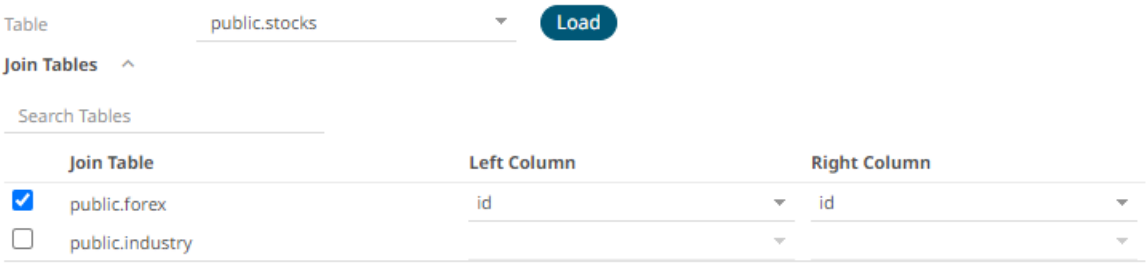
   Also, expanding the *Join Tables* displays the list of tables that you can join.



Use *Search Tables* to filter the list.

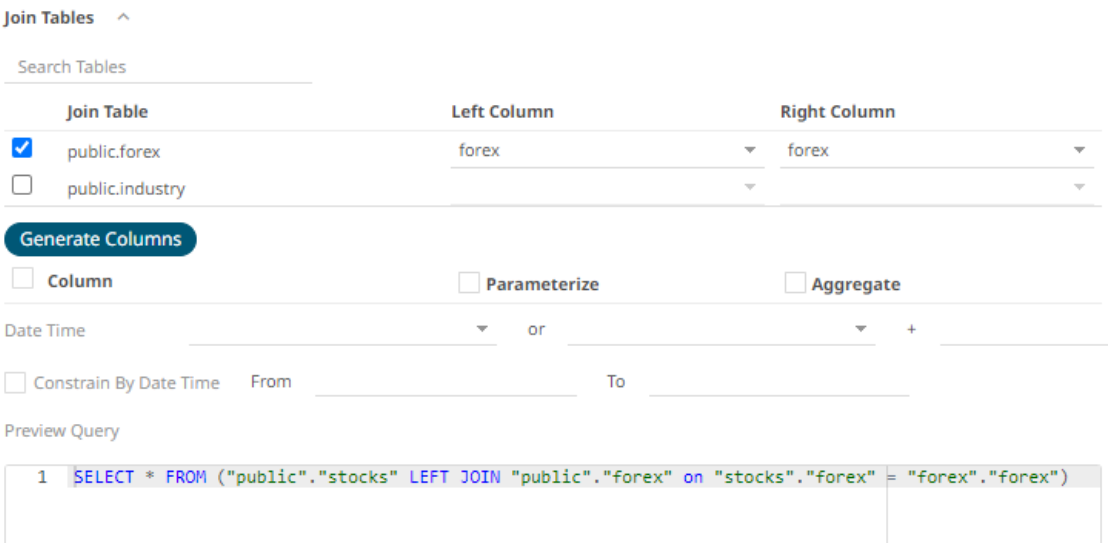


5.3. Perform a join by checking one or more tables in the list.



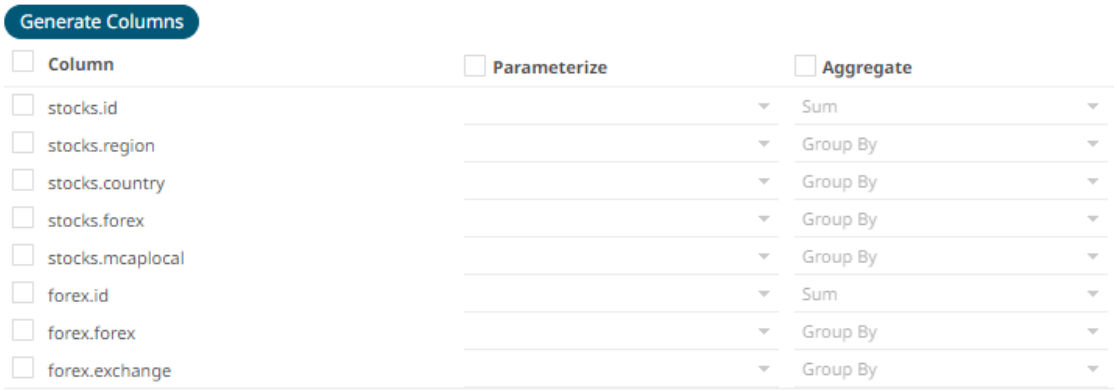
You can also opt to select other common fields.

The SQL query is generated and displayed in the *Preview Query* text box.



5.4. Click 

. The columns populate the *Output Column* section.



5.5. Individual columns can be added by checking the corresponding *Column* box in the *Output Column* listing. To select all of the columns, check the topmost box.

The SQL query is generated and displayed in the *Preview Query* text box.

5.6. If the data returned is to be aggregated, then the **Aggregate** box should be checked. For each selected column, the possible aggregation methods are listed including:

- Text Columns: Count, Group By
- Date Columns: Count, Group By
- Numeric Columns: Sum, Count, Min, Max, Group By

5.7. Check the **Parameterize** box and match the parameter to the appropriate column. By default, they will be matched by name.

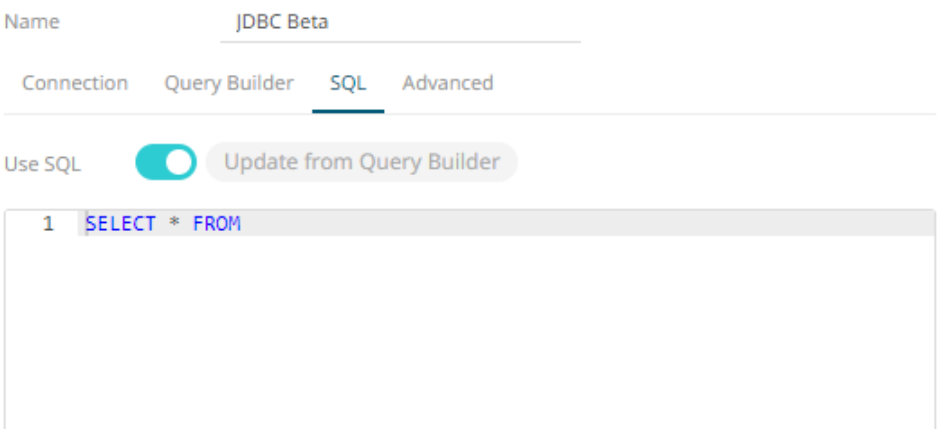
The appropriate SQL Query is updated in the *Preview Query* text box.

5.8. If the data is to be filtered or aggregated on Date/Times, then a valid *Date Time* field needs to be selected from either a single Date/Time field, or a compound column created from a selected *Date* and a selected *Time* column.

5.9. Check the **Constrain by Date Time** box, and enter *From* and *To* Date/Time constraints that are assumed to be in this time zone for incorporation into the query.

If the query is to filter/constrain the results on Date/Time, the constrain sections are completed.

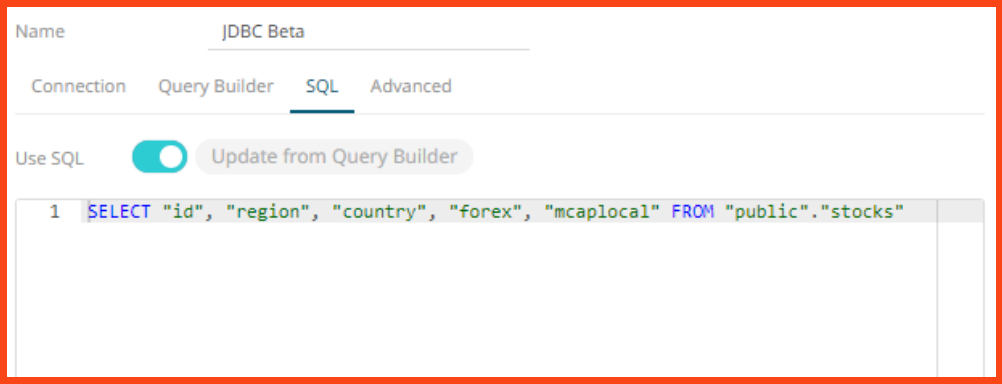
6. To use freeform SQL, select the **SQL** tab and turn on **Use SQL** toggle button.

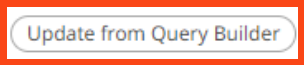


6.1. Modify the SQL-like query language in the *User Query* text box.

NOTE

- **If you initially used the Query Builder then switched to the freeform SQL option, the content of *Preview Query* is copied to the *User Query* text box.**

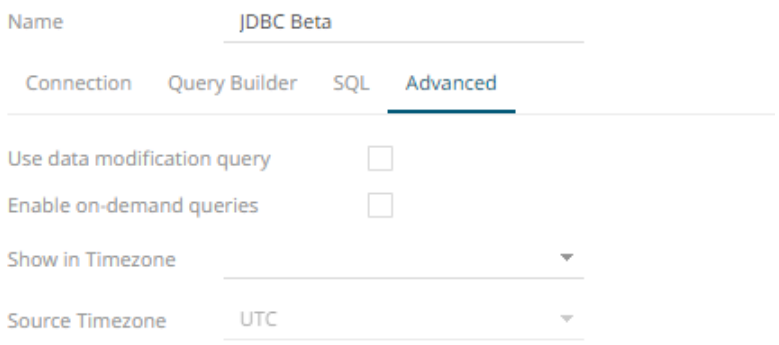


- **Switching back to the Query Builder, the *Preview Query* is updated, keeping the *User Query* unmodified.**
- 

is enabled when *User Query* is non-empty and different from *Preview Query*.

  Click this button to update the *User Query* from the query builder.

7. Select the **Advanced** tab.



Set the following properties, if needed:

Property	Description
Use data modification query	Signals that the table is created for writing data. This property is also used for filtering out target data tables for further data update action configuration
Enable on-demand queries	On-demand queries provide ROLAP functionality to the Altair Visual Data Discovery products, where the aggregation and filtering tasks are largely offloaded to the underlying data repository.

You can opt to define the *Show in Timezone* and *Source Timezone* settings.

NOTE **The time zone transformation is not applied to Date columns.**

8. Set the row limit of the data set.
9. Tap the **Preview Selected Data Source** slider to turn it on.
10. Click 

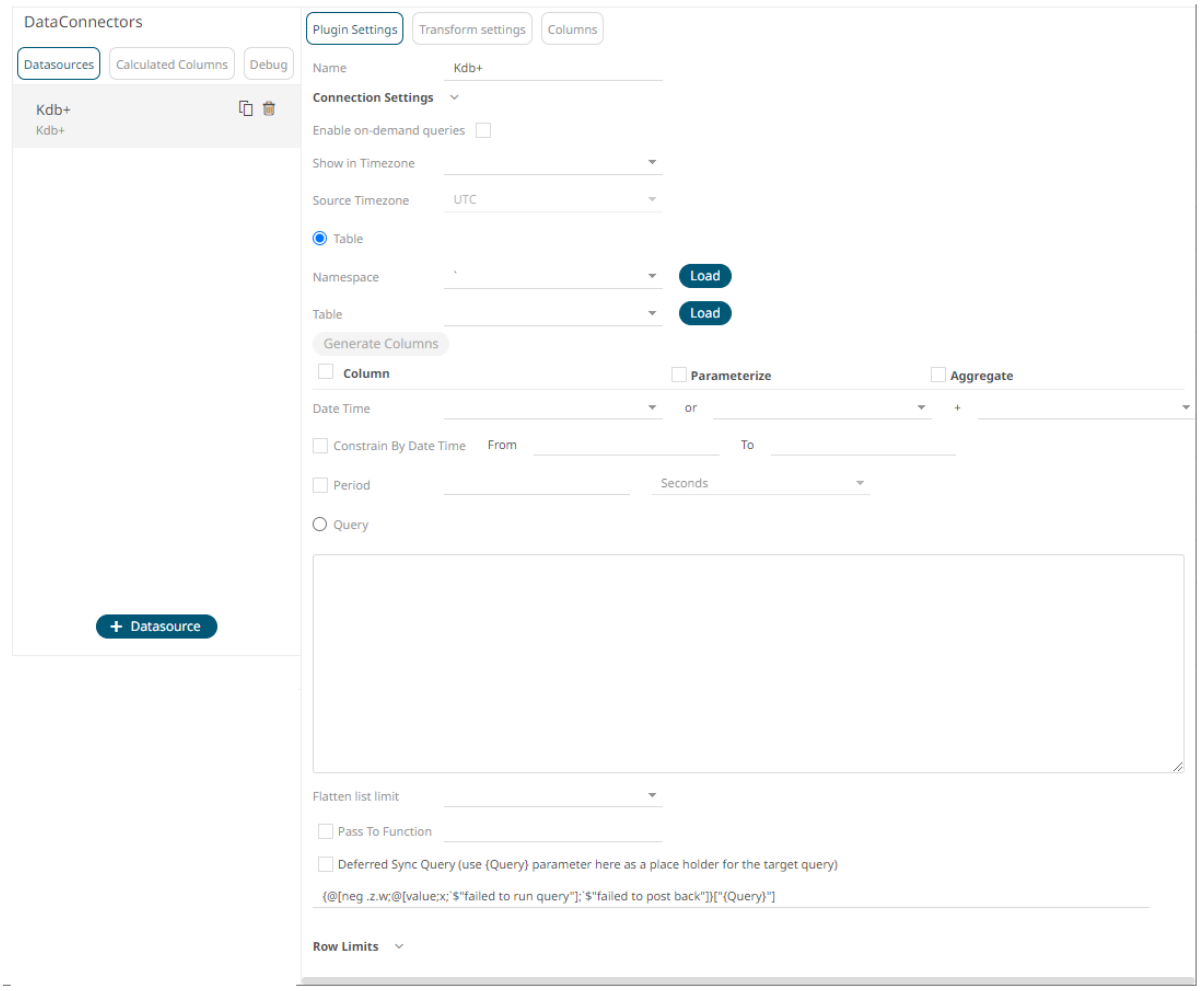
to display the data preview.

Kx kdb+ Connector

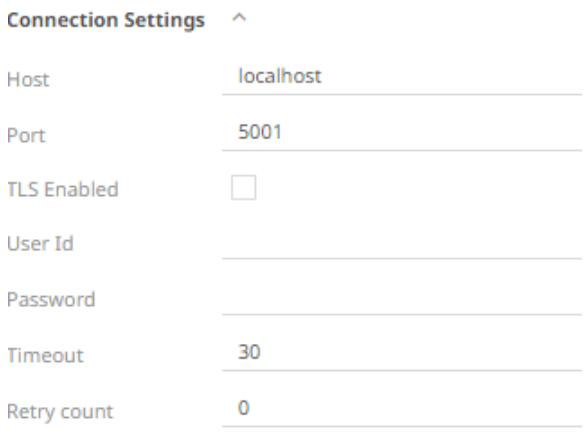
The Kx kdb+ input data source allows connection to the Kx kdb+ databases on a polled basis.

Steps:

1. Select **Kdb+** from the *Connectors* panel. The *Kdb+ Settings* panel displays.



2. Enter the *Name* of the Kx kdb+ data source, then click ✓.
3. Click **Connection Settings** to expand and display the properties you can set.



4. Enter or set the following properties:

Property	Description
Host	Kx kdb+ host address.

Port	Kx kdb+ host port. Default is **5001**.
TLS Enabled	Ensure to check if you have started q with TLS only.
User Id	The user Id that will be used to connect to Kx kdb+.
Password	The password that will be used to connect to Kx kdb+.
Timeout	The length of time to wait for the server response in seconds. Default is **30**.
Retry Count	Number of connection attempts to be done that can be used for busy Kx kdb+ servers. Default is **0**.

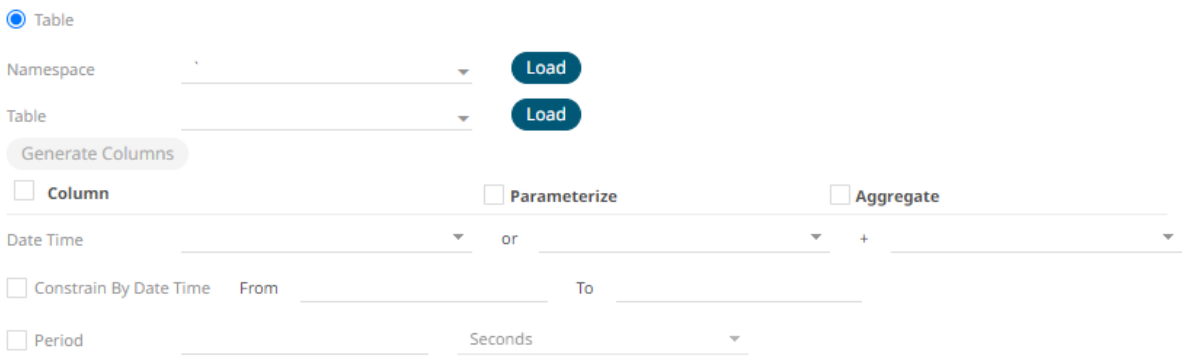
NOTE ***Host***, ***Port***, ***User Id***, **and** ***Password*** **can be parameterized.**

5. Check/uncheck the **Enable on-demand queries** box. See On-Demand Queries for more information.
6. You can opt to define the *Show in Timezone* and *Source Timezone* settings.

NOTE **The time zone transformation is not applied to Date columns.**

7. Check the **Constrain by Date Time** box, and enter *From* and *To* Date/Time constraints that are assumed to be in this time zone for incorporation into the query.

   If the query is to filter/constrain the results on Date/Time, the constrain sections are completed.
8. When **Table** is selected, the section below is enabled:



The *Namespace* drop-down is an editable combo box.



You can either:

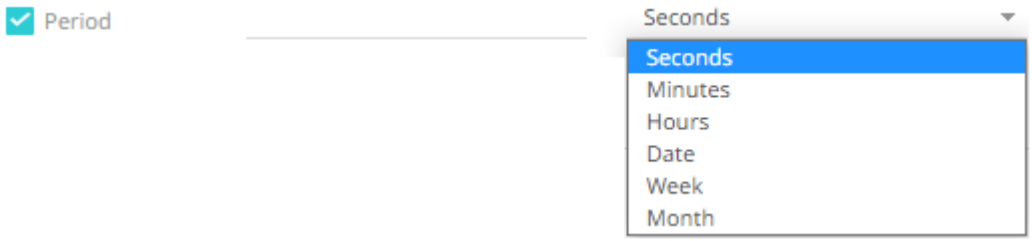
- click Load and select a namespace from the list of all root level namespaces. By default, the selected namespace will be root (backtick `).
- For nested namespaces, enter them in the *Namespace* box (e.g., `panopticon.test`) to get the tables that were created under these namespaces.

9. On the *Table* field, click Load to populate the drop-down list with tables and views. Select a table or view.
10. Click Generate Columns. The columns of the selected table or view populates the *Output Column* section.
11. Individual columns can be added by checking the corresponding *Column* box in the *Output Column* listing.
12. If the data returned is to be aggregated, then the *Aggregate* checkbox should be selected. For each selected column, the possible aggregation methods are listed including:
    - Text Columns: Group By
    - Date Columns: Count, Min, Max, Group By
    - Numeric Columns: Sum, Count, Min, Max, Group By

    In addition, the qSQL query is generated and displayed on the *Query* text box.
13. Check the *Parameterize* checkbox and match the parameter to the appropriate column. By default, they will be matched by name.

    The appropriate qSQL query is updated on the *Query* text box.
14. If the data is to be filtered or aggregated on Date/Times, then a valid *Date Time* field needs to be selected from either a single Date/Time field, or a compound column created from a selected *Date* and a selected *Time* column.

15. In kdb+, you can modify the query to regroup the aggregated data per time units (i.e., Seconds, Minutes, Hours, Date, Week, Month). Check the **Period** box, enter the time duration and click ✓ then select the time unit.



16. Enter a qSQL query language into the *Query* text box.

    If a parameter has been defined, the qSQL entry can refer to it.
17. Select the *Flatten List Limit*.

    This allows retrieval of the first 'n' items in the list and produce new columns in the output schema with a dot notation.

    For example, if there are two nested fields (BidPrices and OfferPrices) and the flatten list limit selected is five, then the output schema will be:

    BidPrices.1, BidPrices.2, BidPrices.3, BidPrices.4, BidPrices.5, OfferPrices.1, OfferPrices.2, OfferPrices.3, OfferPrices.4, OfferPrices.5

    If there are less than five items in the list, then the values will be null.

NOTE **Currently, this feature works for the Service subscription type. Also, it only flattens numeric columns.**

18. Check **Pass to function** box to activate a connection to a server using a proxy. Enter the value.

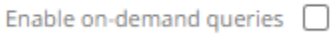
19. You may also define a Deferred Sync Query.
20. Set the row limit of the data set.
21. Tap the **Preview Selected Data Source** slider to turn it on.
22. Click 

to display the data preview.

On-Demand Queries

The default behavior when using data connectors is to retrieve data into memory for visual analysis to then occur, where the data is aggregated and filtered in memory. This retrieval may be the consumption of a whole dataset, or through the use of parameters, the retrieval of a dynamically selected subset of the data. This approach is however limited by the memory of the machine, and the overhead of retrieving and processing large volumes of data on the desktop.

The Kx kdb+ and JDBC Database connector supports on-demand queries.



On-demand queries provide ROLAP functionality to the Panopticon products, where the aggregation and filtering tasks are largely offloaded to the underlying data repository.

The software will dynamically generate q query for:

- Filter domains (Categorical Listing & Min/Max for Numeric Fields)
- Aggregated & Filtered Data returned in the visualizations

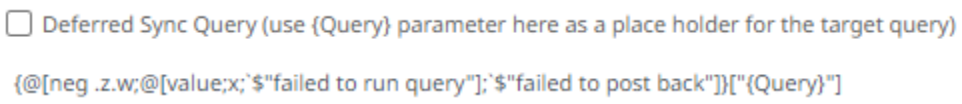
Each filter and visualization are driven by a separately generated q query, ensuing that each query is simplified, and returns the minimum amount of data.

This on-demand capability dramatically reduces the amount of data to be transferred across the network and onto the application and ensures that the heavy data intensive tasks occur in Kx kdb+ instances. However, when using this mode, the following functionality is disabled:

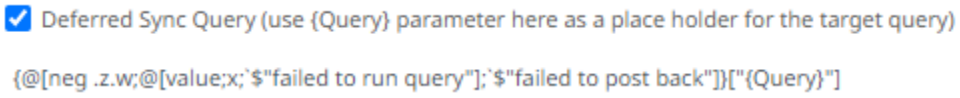
- Percentile Filtering
- Copy Raw Data
- Pivot & Unpivot Data Transforms
- Non-Additive Data support
- Shared selection across visualizations
- Numeric Bucketing
- Date/Time Part Specific Options (Decade, Quarter, Weekday, Millisecond, Nanosecond)
- Ranking
- R Transform
- Python Transform

Kx kdb+ - Deferred Sync Query

The Deferred Sync Query feature allows the Kx kdb+ connector to support synchronous and asynchronous reads. The advantage of using this option is that there is no queue on the Kx kdb+ server side, queries are farmed out to slaves and returned to asynchronous instead.



Checking the **Deferred Sync Query** box would enable the query box:



The {Query} parameter is used as a place holder for the target query that is defined in the *Query* builder.

Host Lookup Settings in the Panopticon.properties File

The `Panopticon.properties` file located in the `AppData` folder (i.e., `c:\vizserverdata`), contains majority of properties for controlling the configuration of Panopticon Real Time. Properties below can be used to control host lookup related settings while the host, port, user, and password information are referred together as host info.

Property	Host Lookup
Attribute	`connector.kdb.host.lookup.script`

Description	Full path of the shell script file that is accessible on the server. When set, before making a new kdb+ connection, this script is executed to get the host info. This property helps in overriding connection details entered inside the kdb+ connector UI centrally, and may help when different authentications are set at kdb+ like Kerberos/Custom etc. The output of this script is expected to be a JSON object like below.
	`{ "host": "localhost", "port": 5001, "username": "", "password": "" }`
	
	NOTE: Starting with the 21.2 release, the the kdb+ connection pool feature of Panopticon (`kdb.connection.pool.xx`) can be used together wth the host lookup. So any new connection request from the pool, will first execute the script set here, to get the host info before the pool is looked up for available connections.
	Examples:
	• For Windows
	`connector.kdb.host.lookup.script=E://Data/host.bat`
	• For Linux
	`connector.kdb.host.lookup.script= /etc/panopticon/appdata/host.sh`

Default Value	
Property	Host Lookup
Attribute	`connector.kdb.host.lookup.script.arguments`
Description	Delimited set of arguments to be passed to the script when it is executed. `'{host},{port},{userid},{password}'` is the default value, and these parameters are mapped to respective settings in the connector UI i.e., the value entered against these settings in the connector UI are passed as arguments to the script. This property can be extended or updated if you want to pass other datatable parameters as arguments. System parameter like `{_user_id}` or `{_workbook_folder}`, if added to the data table, can also be used. If the value of some parameter is null or empty at the time of execution of the script, two single quotes are passed (‘’) against that

	parameter, this is to make sure that arguments count matches the arguments set at this property.
Default Value	**{host},{port},{userid},{password}**
Property	Host Lookup
Attribute	`connector.kdb.host.lookup.script.arguments.delimiter`
Description	Used to split the arguments set at above property.
Default Value	**,**
Property	Host Lookup
Attribute	`connector.kdb.host.lookup.script.timeout`
Description	The timeout (in milliseconds) to wait for the host lookup script to run and return the host info.
Default Value	**5000**

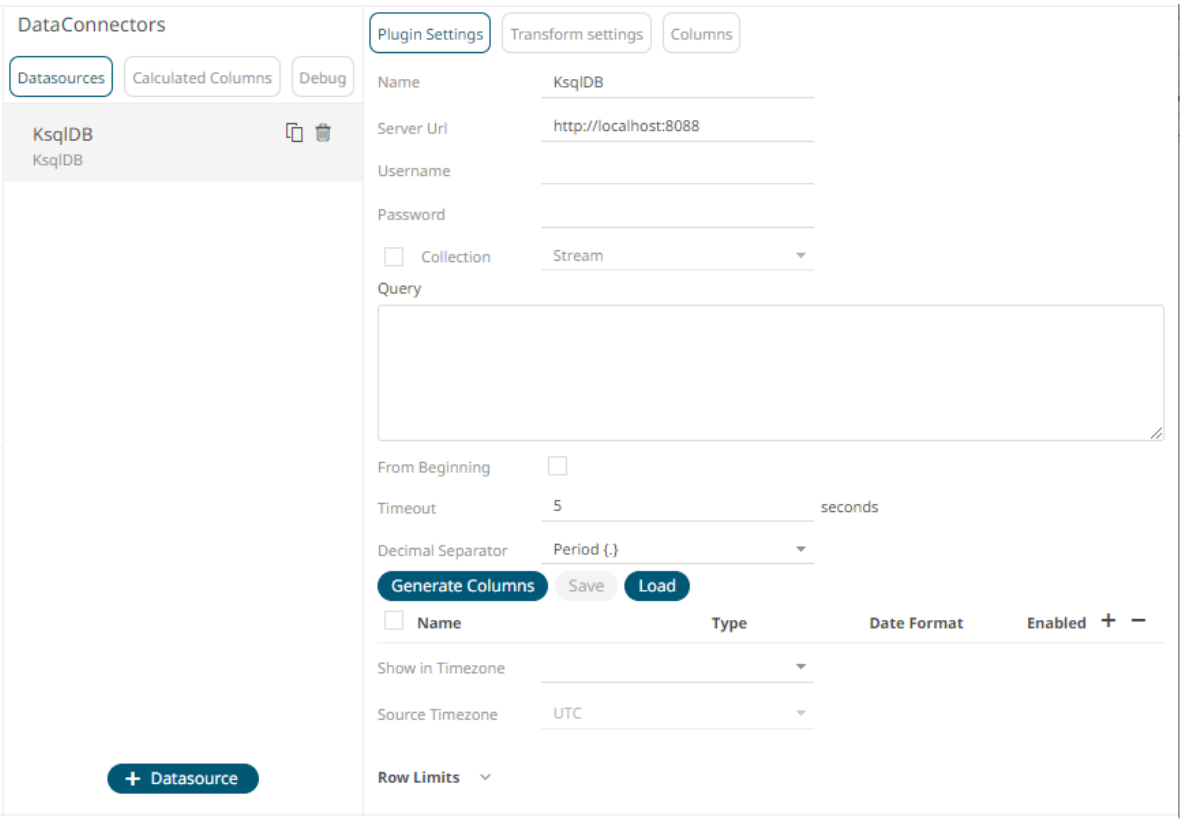
ksqlDB Connector

The ksqlDB connector allows executing ksqlDB pull queries and terminating push queries.

> **NOTE** **Pull queries fetch the current state of a materialized view which is incrementally updated as new events arrive.**

Steps:

1. Select **ksqlDB** from the *Connectors* panel. The *ksqlDB Settings* panel displays.



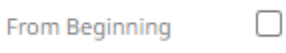
2. Enter the *Name* of the ksqlDB data source, then click ✓.
3. Enter the following properties:

Property	Description
Server URL	ksqlDB host address.
Username	User Id that will be used to connect to ksqlDB.
Password	Password that will be used to connect to ksqlDB.

4. Check the **Collection** box to enable and select either:
   - Stream

     Immutable and append-only collections which are useful for representing a series of historical facts. Adding multiple events with the same key allows these events to be appended to the end of the stream.
   - Table

     Mutable collections. Adding multiple events with the same key allows the table to only keep the value for the last key. This collection is helpful in modeling change over time and often used to represent aggregations.
5. Click Fetch to populate the drop-down list. Select the collection.
6. Enter an SQL-like query language into the *Query* box.
7. Check the *From Beginning* box to subscribe from the beginning to the latest messages.

   If un-checked, you will only be subscribed to the latest messages.

8. Enter the *Timeout*. Default is **5** (in seconds).
9. Select either the dot (.) or comma (,) as the *Decimal Separator*.
10. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
11. You can also opt to load or save a copy of the column definition.
12. Click + . A new column entry displays. Enter or select the following properties:

Property	Description
Name	The column name of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message should be processed.

    To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click − .
13. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
14. Set the row limit of the data set.
15. Tap the **Preview Selected Data Source** slider to turn it on.
16. Click Refresh Preview to display the data preview.

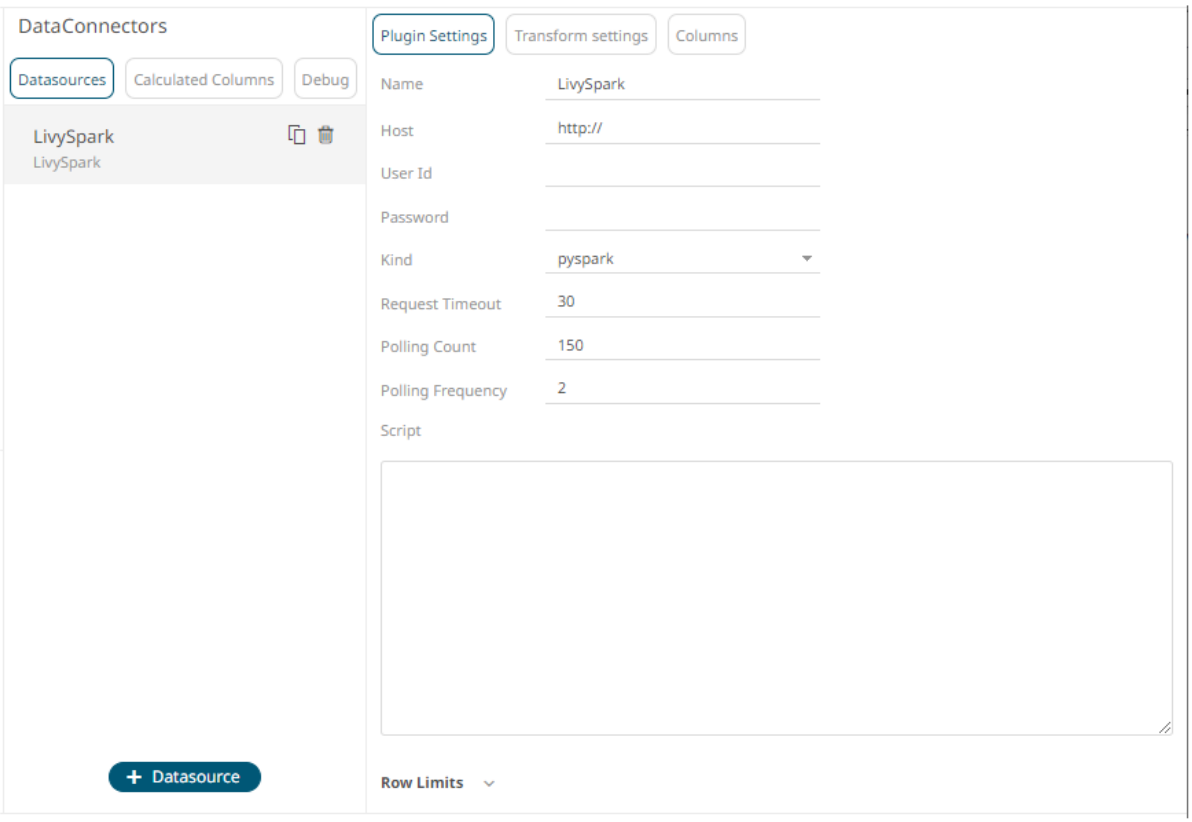
Livy Spark Connector

Livy is an open source REST interface for interacting with Apache Stark. It supports executing snippets of code or programs such as Scala, Python, Java, and R in a Spark context that runs locally or in Apache Hadoop YARN.

The Livy Spark connector allows you to run these codes and fetch the data in Panopticon Real Time.

Steps:

1. Select **LivySpark** from the *Connectors* panel. The *LivySpark Settings* panel displays.



2. Enter the *Name* of the Livy Spark data source, then click ✓.
3. Enter or select the following properties:

Property	Description
Host	Livy Spark host address.
User Id	User Id that will be used to connect to Livy Spark.
Password	Password that will be used to connect to Livy Spark.
Kind	Currently, the supported kind of connection to be used is **pyspark (**Interactive Python Spark session).
Request Timeout	Length of time to wait for the server response. Default is **30**.
Polling Count	The number of polling done to the Livy Spark server to check if the status of the app is successful. Default limit is **150**.
Polling Frequency (in seconds)	Frequency of the polling. Default is **2**.
Script	The script to use.

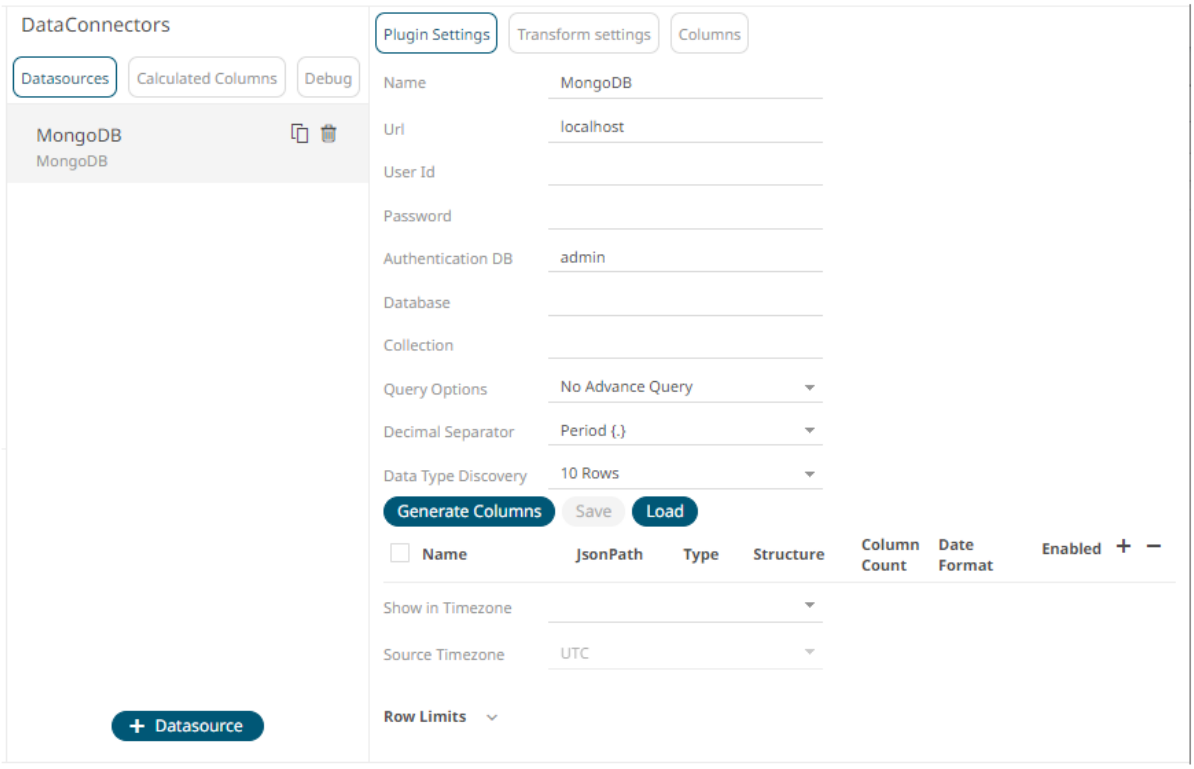
4. Set the row limit of the data set.
5. Tap the **Preview Selected Data Source** slider to turn it on.
6. Click Refresh Preview to display the data preview.

MongoDB Connector

The MongoDB connector is an interface used to import MongoDB's schema-less BSON documents into a table schema that Panopticon can interpret and analyze. It uses many BSON structure types and MongoDB query features.

Steps:

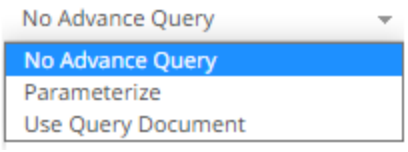
1. Select **MongoDB** from the *Connectors* panel. The *MongoDB Settings* panel displays.



2. Enter the *Name* of the MongoDB data source, then click ✓.
3. Enter the following properties:

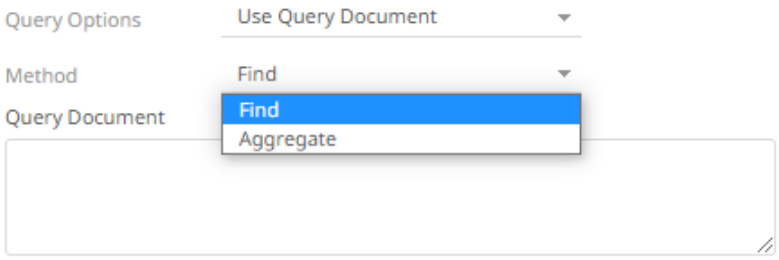
Property	Description
URL	Enter either: • **localhost** if the database resides on the same computer, or • enter the IP address and port of the computer where MongoDB is installed (e.g., 192.168.1.1:27017). If no port is specified, the default is **27017**.
User Id	The user Id if authorization is enabled for MongoDB.
Password	The password if authorization is enabled for MongoDB.
Authentication DB	The database where the user is created (default is **admin**).
Database	The database that will be used.
Collection	The collection that will be used.

4. You can also opt to make the Query Document feature of MongoDB to be available in Panopticon.



Select **Use Query Document** in the *Query Options* drop-down list.

This also displays the *Method* drop-down. Select either **Find** (Default) or **Aggregate**.



When **Aggregate** is selected, you can add all the columns generated by aggregation in the schema.

In addition, the MongoDB command line interface displays query operations with a JSON style syntax.

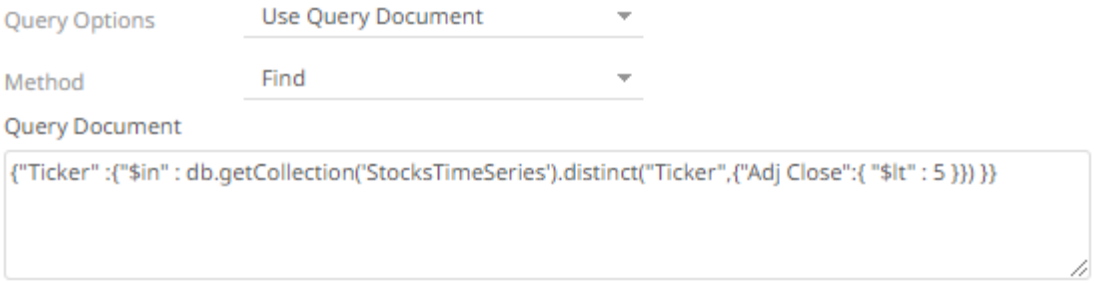
Enter your desired JSON query document. Refer to http://docs.mongodb.org/manual/tutorial/query-documents/ for more information on the Query Documents feature on MongoDB.

For example:

Queries from the documentation look like this: `db.inventory.find ( {type: "snacks"} )`. The database and collection are already defined in the UI and the *Find* operation is handled in the code. The user only needs to enter the query document:

```
{ type : "snacks" }
```

For more advanced query, it must include surrounding curly braces as well as matching internal braces.

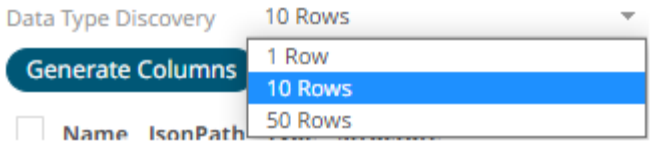


5. Instead of using **Use Query Document**, select the **Parameterize** query option.



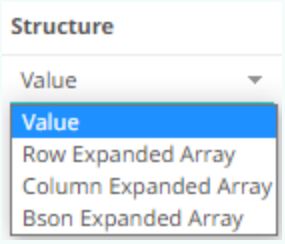
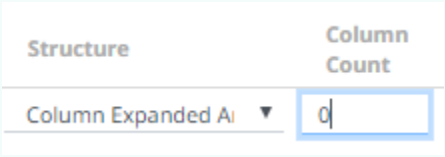
Click **Fetch Parameters** to populate the *Parameter* drop-down and select a value. Then select what column to filter on in the *Filter By* drop-down.

6. Select either the dot (.) or comma (,) as the *Decimal Separator*.
7. Select the *Data Type Discovery*. This property specifies how many rows to fetch from the input data source, when auto generating the schema after clicking Generate Columns.



8. You can also opt to load or save a copy of the column definition.

9. Click + . A new row displays in the JSON list box. Enter the necessary information for each column.

Property	Description
Name	The column name of the source schema. **NOTE:** It is recommended to name the column the same as its JSON path for clarity and uniformity.
JsonPath	The JsonPath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Structure	Used for more advanced features and are covered in the Row-Wise Array Expansion, Column-Wise Array Expansion, and Bson-Wise Array Expansion sections. **Value** is the default structure and will always display data regardless of actual structure. 
Column Count	Enabled when **Column-Expanded Array** structure is selected.  Enter the number of columns for the plugin to generate as columns for that array.
Date Format	The format when the data type is **Time**. **NOTE:** To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them. For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`
Enabled	Determines whether the message field should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐ , then click − .

10. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

11. Set the row limit of the data set.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click 

to display the data preview.

Row-Wise Array Expansion

MongoDB's BSON document structure can store array data types. In order to interpret that data, the user has to decide how they want those multi-value fields to be displayed..

Row-wise array expansion takes an array of values and expands them in a single column creating a new row for each value in the array. If there are multiple row-expanded arrays in the same document, then the number of rows generated is equal to the largest array size. Additionally, an *Automatic x-axis* column is automatically generated for use as an x-axis value for visualizations using array data.

To use the row-wise array expansion feature, select **Row-Expanded Array** from the *Structure* drop-down box.

This feature will only work for an array data type. If the actual data type in MongoDB is not array or the array is empty, the column will not populate.

Column-Wise Array Expansion

MongoDB's BSON document structure can store array data types. In order to interpret that data, the user has to decide how they want those multi-value fields to be displayed.

Column-wise array expansion takes an array of values and expands them into multiple table columns creating a number of columns equal to an array specific number set by the user. If there are multiple column-expanded arrays in the same document, the combined number of new columns is appended to the end of the table with their respective array indices and the original columns are removed.

To use the column-wise expansion feature, select **Column-Expanded Array** in the *Structure* drop-down box.

The corresponding *Column Count* text box will be enabled and the user can enter the number of columns for the plugin to generate as columns for that array.

Bson-Wise Array Expansion

MongoDB's BSON document structure can store array data types. In order to interpret that data, the user has to decide how they want those multi-value fields to be displayed.

Bson-wise array expansion allows parsing of all the fields of a nested hierarchy in a sub document of a JSON array. During data retrieval, the column value is converted to JSON, and nested columns are flattened based on a JSON parser logic.

To use the Bson-wise expansion feature, select **Bson-Expanded Array** in the *Structure* drop-down box.

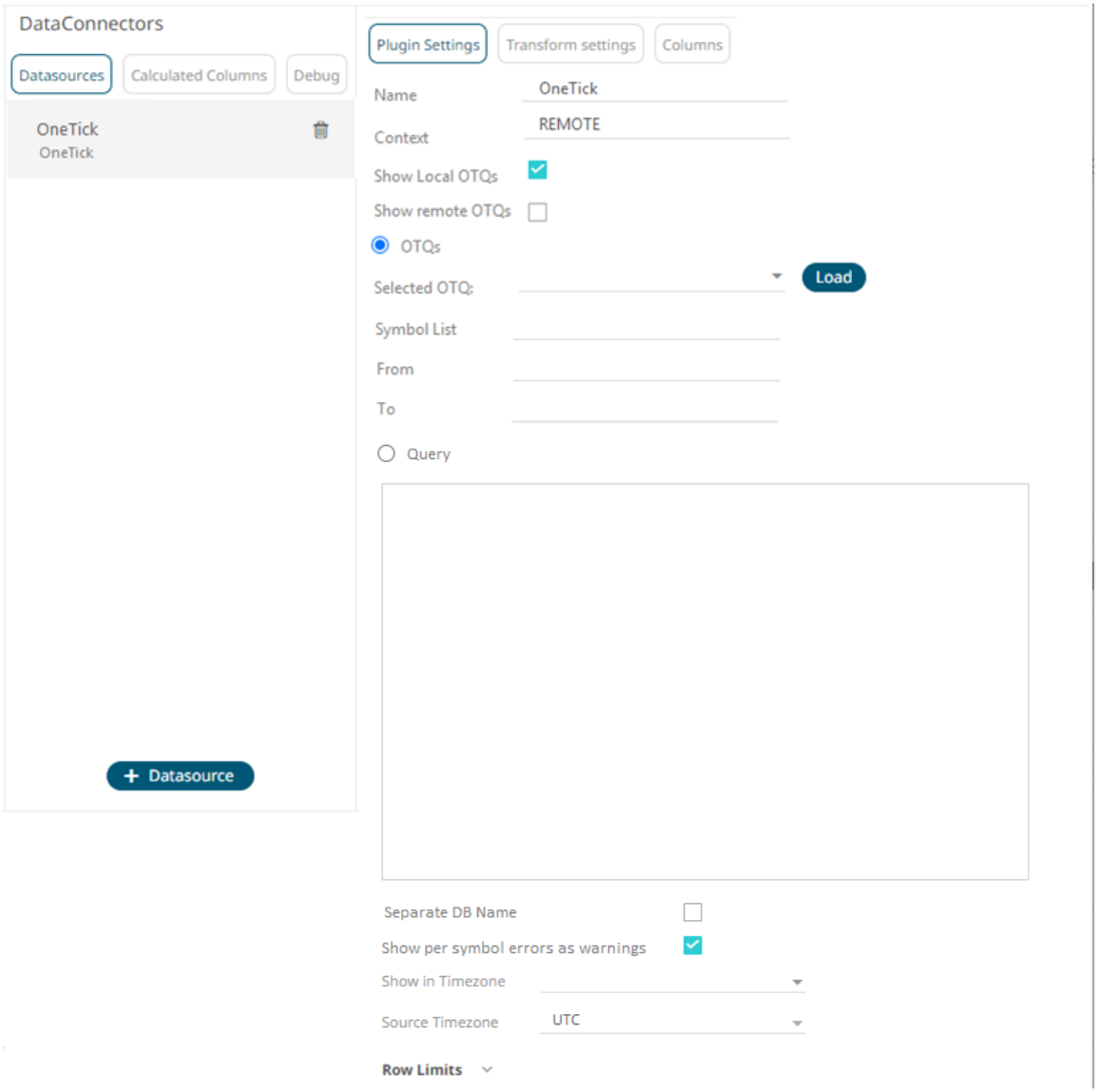
OneTick Connector

The OneTick connector allows connection to OneMarketData OneTick tick history databases on a polled basis. In general, it is used to retrieve conflated time series data sets. The connector supports either:

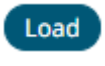
- Execution of a specified OTQ
- Execution of a specified parameterized OTQ
- Execution of a custom SQL Query

Steps:

1. Select **OneTick** from the *Connectors* panel. The *OneTick Settings* panel displays.



2. Enter the *Name* of the OneTick data source, then click ✓.
3. Enter the *Context* (for example, **REMOTE**).
4. You can either check:
   - **Show Local OTQs** box to display the local OTQs in the *Selected OTQ* drop-down list.
   - **Show Remote OTQs** box to display the remote OTQs in the *Selected OTQ* drop-down list.

   An OTQ can be specified for execution, or a custom SQL query can be executed, through selection of the appropriate radio button:
   - OTQs
   - Query
5. Click **Load**  to populate the *Selected OTQ* drop-down list. Select an OTQ.

The list of input parameters that the OTQ expects is displayed. In addition, the basic SQL query is generated allowing the OTQ to be executed and the input parameters specific to the selected OTQ. The following are generic to all OTQs:

- Symbol List

> **NOTE** **This property will accept comma-separated values either hardwired or parameterized.**

- From
- To

These add additional filter criteria such as symbol, and time window onto the basic OTQ.

6. Check the **Separate DB Name** box to generate a separate field for the database name.
7. Check the **Show per symbol errors as warnings** box to proceed with warnings in the log if symbol errors are returned.

   The result is a fully generated OneTick SQL query. This can be edited as required.
8. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
9. Set the row limit of the data set.
10. Tap the **Preview Selected Data Source** slider to turn it on.
11. Click 

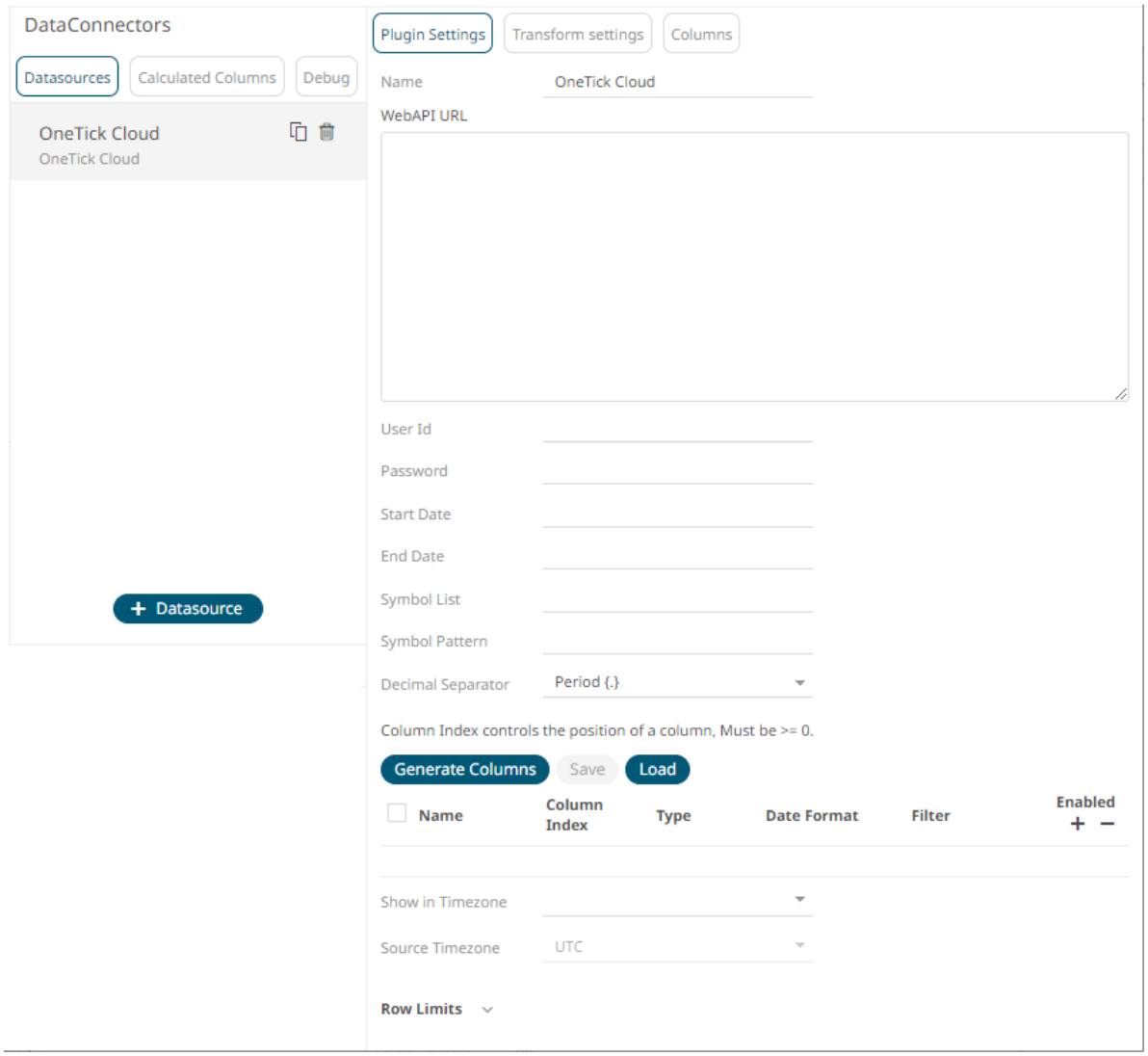
to display the data preview.

OneTick Cloud Connector

The OneTick Cloud connector allows access to historic market data with no software dependencies by using the OneTick Cloud and their web API.

Steps:

1. Select **OneTick Cloud** from the *Connectors* panel. The *OneTick Cloud Settings* panel displays.



2. Enter the *Name* of the OneTick Cloud data source, then click ✓.
3. Enter the OneTick Cloud WebAPI URL into the *WebAPI URL* box with the following form:

```
http://<host>/omdwebapi/rest/?params={"context":"DEFAULT","query_type":"otq",
"otq":"1/12/otq/71b50459-8431-48dc-829f
"s":"20150305130802",
"e":"20150305140805",
"timezone":"America/New_York", "response":"csv",
"compression":"gzip"}
```

Where:

- s, e, timezone – the start and end time of the query YYYYMMDDhhmmss form. The timezone used to interpret this value is taken from the timezone parameter.
- response – the supported response format is csv.

- compression – if available, this option enables gzip compression of the results stream. Large data should always be pulled with compression on.

4. Enter the *User Id* (email) and *Password* to execute the query and retrieve the data. Note that the *User Id* is case sensitive.
5. Enter the time window *Start Date* and *End Date*.
6. Enter the *Symbol List.* This value filters the query output with matching symbols.

   To make it work, ensure to include `Symbol` in the *Query URL*. Consequently, the data will be filtered out for the input (Symbols) provided in the *Symbol List* field.
7. Enter the *Symbol Pattern*. This value filters the query output with the data for all the symbols with matching pattern.

   To make it work, ensure to include `Symbol_Pattern` in the *Query URL*. Consequently, the data will be filtered (for all the Symbols) with matching pattern provided in the *Symbol Pattern* field.
8. Select either the dot (.) or comma (,) as the *Decimal Separator*.
9. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.
10. You can also opt to load or save a copy of the column definition.
11. Click  . A new column entry displays. Enter or select the following properties:

Property	Description
Name	The column name of the source schema.
Column Index	The column index controls the position of a column. Must be **>= 0**.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Filter	Defined parameters that can be used as filter.
Enabled	Determines whether the message should be processed.

   To delete a column, check its  or all the column entries, check the topmost  , then click .
12. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
13. Set the row limit of the data set.
14. Tap the **Preview Selected Data Source** slider to turn it on.
15. Click 

to display the data preview.

Panopticon Data Extract Connector

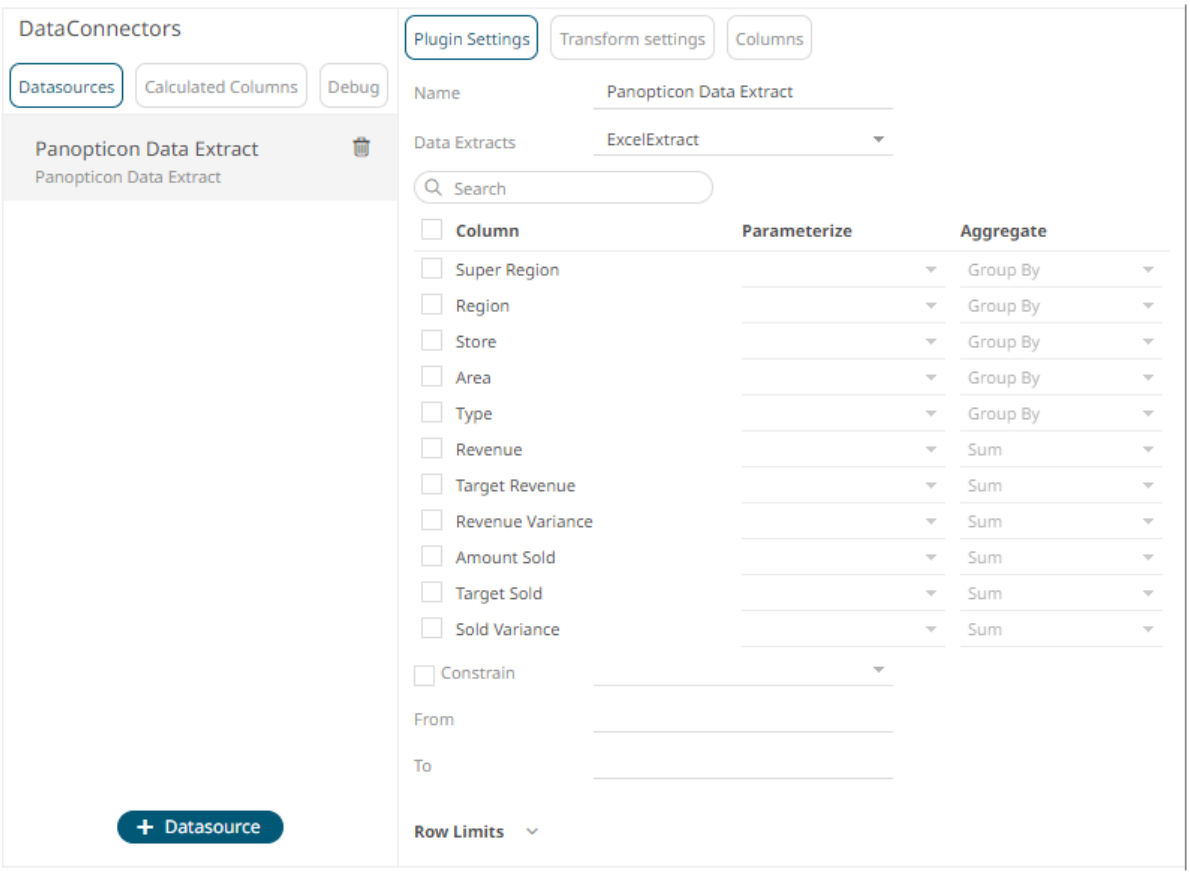
The Panopticon Data Extract connector allows retrieval of data extracts created from non-streaming data sources in Panopticon Real Time.

In cases where there is too much data to retrieve into memory, data extract supports summarization and parameterization, and it can become a more powerful option than a number of underlying data sources.

Steps:

1. Select **Panopticon Data Exract** from the *Connectors* panel. The *Panopticon Data Extract Settings* panel displays with the earliest created data extract (e.g., ExcelExtract).

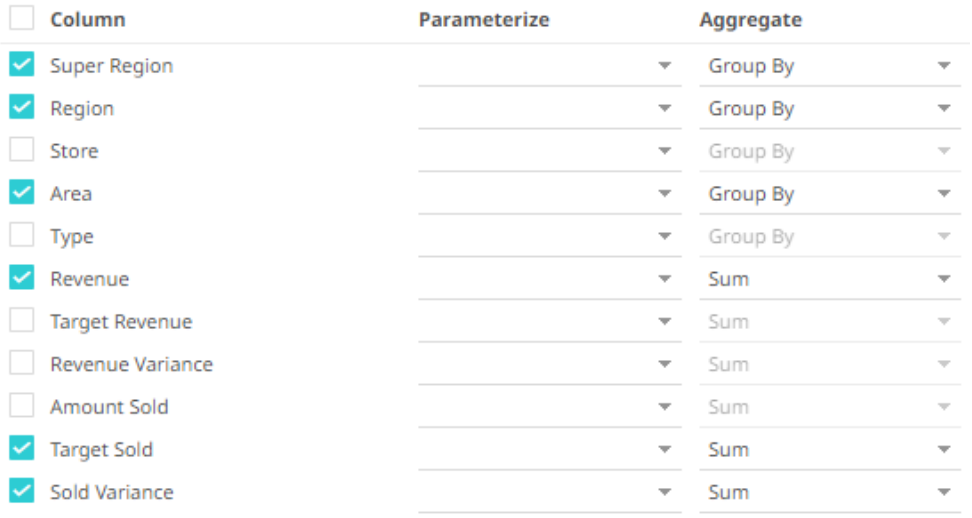
   The list of columns is displayed, with the data type found from inspecting the first 'n' rows of the file.



NOTE **To populate the list of columns, the data extract of a connector must be complete after refreshing the data.**

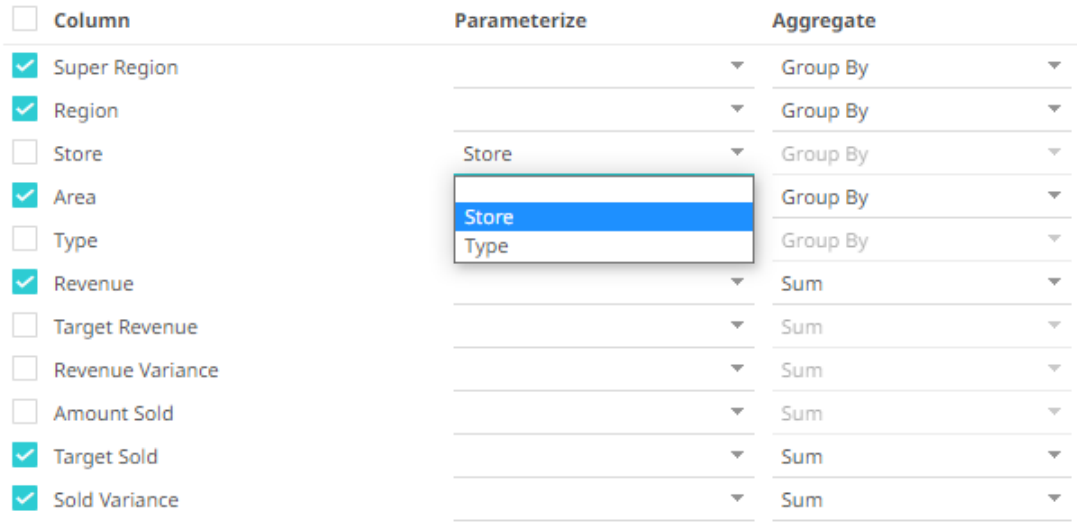
   You can also filter the list of columns by entering a text in the *Search* box.

2. You can opt to select another data extract to display its list of columns.
3. If the data returned is to be aggregated, then check their **Column** box. For each selected column, the possible aggregation methods are listed including:
   - Text Columns: Group By
   - Date/Time Columns: Group By
   - Numeric Columns: Sum, Count, Min, Max, Mean

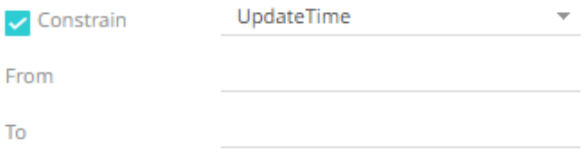


Select the *Aggregate* method in the drop-down list.

4. If you wish to parameterize a specific column, match the parameter to the appropriate column. By default, they will be matched on name.



5. If only a selected Date/Time range of the table/view is to be queried, check the **Constrain** box, and complete the *From* and *To* text boxes, either with values or with parameters.



6. Set the row limit of the data set.
7. Tap the **Preview Selected Data Source** slider to turn it on.
8. Click  to display the data preview.

Python Connector

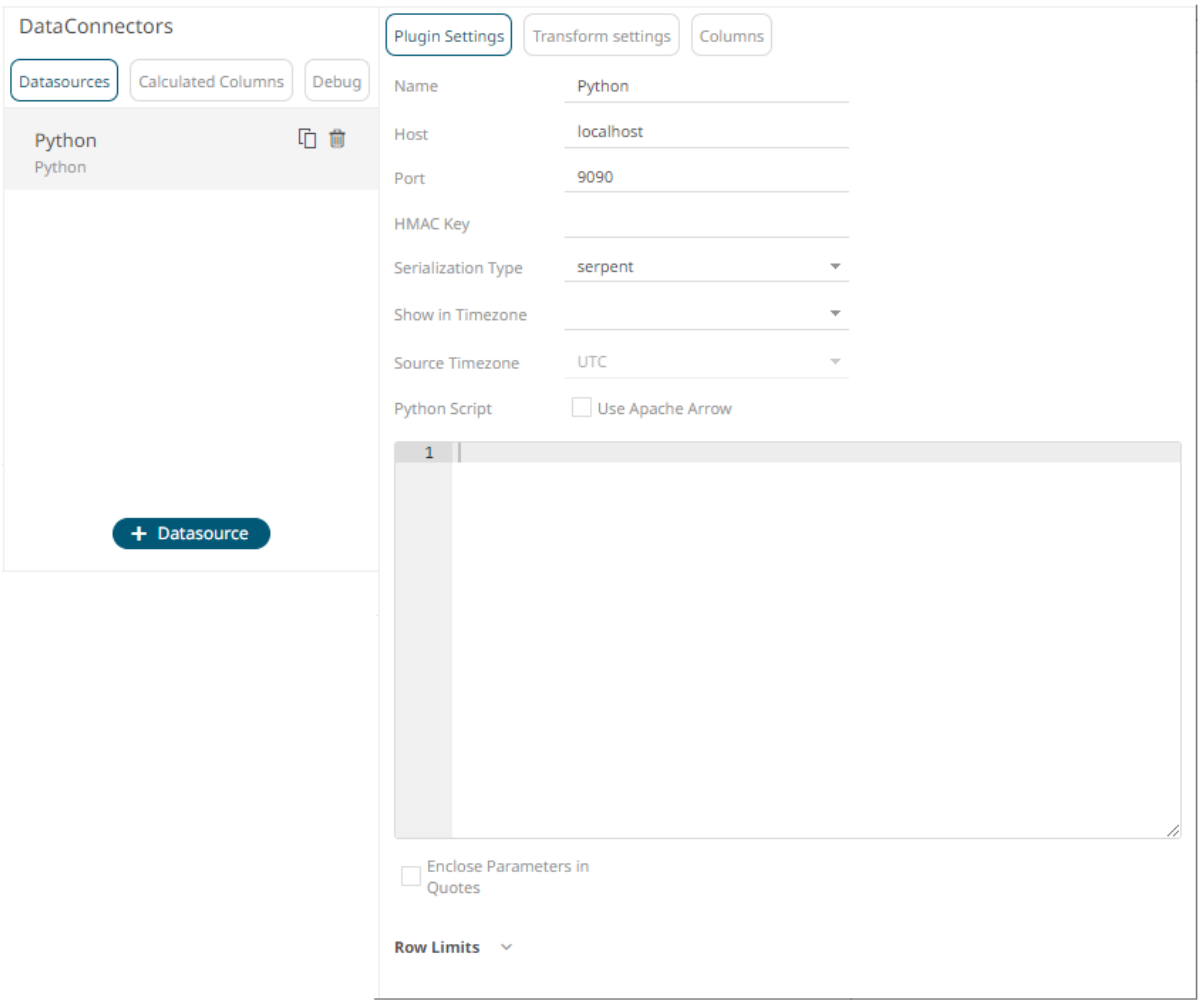
The Python connector allows the retrieval of output data from a Python Pyro (Python Remote Objects) process.

For Python connectivity, Python must be first installed, together with the latest version of Pyro4. In addition, Pyro must be initiated manually or through using the batch file **start_Python_connectivity.bat**.

If the scripts utilize additional modules such as Numpy & Scipy in the shipped example, these also need to be installed into the existing Python installation.

Steps:

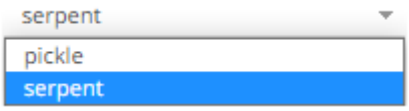
1. Select **Python** from the *Connectors* panel. The *Python Settings* panel displays.



2. Enter the *Name* of the Python data source, then click ✓.
3. Enter the following fields:

Field	Description
Host	Python Pyro instance host address.
Port	Python Pyro host port. Default is **9090**.
HMAC Key	Set to **password**.

4. Select the *Serialization Type*: **Serpent** or **Pickle.**



- Serpent – simple serialization library based on `ast.literal_eval`
- Pickle – faster serialization but less secure

Modify the `configuration.py` file located in `..\Anaconda3\Lib\site-packages\Pyro4` to specify the serialization to be used.

For example, if **Pickle** is selected, `self.SERIALIZER` value should be changed to **pickle** and `self.SERIALIZERS_ACCEPTED` value should be changed to include **pickle**:

```
def reset(self, useenvironment=True):
        """
        Set default config items.
        If useenvironment is False, won't read environment variables settings
(useful if you can't trust your env).
        """
        self.HOST = "localhost"  # don't expose us to the outside world by default
        self.NS_HOST = self.HOST
        self.NS_PORT = 9090  # tcp
        self.NS_BCPORT = 9091  # udp
        self.NS_BCHOST = None
        self.NATHOST = None
        self.NATPORT = 0
        self.COMPRESSION = False
        self.SERVERTYPE = "thread"
        self.COMMTIMEOUT = 0.0
        self.POLLTIMEOUT = 2.0  # seconds
        self.SOCK_REUSE = True  # so_reuseaddr on server sockets?
        self.SOCK_NODELAY = False  # tcp_nodelay on socket?
        self.THREADING2 = False  # use threading2 if available?
        self.ONEWAY_THREADED = True  # oneway calls run in their own thread
        self.DETAILED_TRACEBACK = False
        self.THREADPOOL_SIZE = 16
        self.AUTOPROXY = True
        self.MAX_MESSAGE_SIZE = 0  # 0 = unlimited
        self.BROADCAST_ADDRS = "<broadcast>, 0.0.0.0"  # comma separated list of
broadcast addresses
        self.FLAME_ENABLED = False
        self.PREFER_IP_VERSION = 4  # 4, 6 or 0 (let OS choose according to RFC
3484)
        self.SERIALIZER = "pickle"
        self.SERIALIZERS_ACCEPTED = "pickle,marshal,json"   # these are the 'safe'
serializers
        self.LOGWIRE = False  # log wire-level messages
        self.PICKLE_PROTOCOL_VERSION = pickle.HIGHEST_PROTOCOL
        self.METADATA = True  # get metadata from server on proxy connect
        self.REQUIRE_EXPOSE = False  # require @expose to make members remotely
accessible (if False, everything is accessible)
        self.USE_MSG_WAITALL = hasattr(socket, "MSG_WAITALL") and platform.system()
!= "Windows"      # not reliable on windows even though it is defined
        self.JSON_MODULE = "json"
        self.MAX_RETRIES = 0
```

NOTE **The *Host*, *Port*, *HMAC Key*, and *Serialization Type* fields will be hidden if their corresponding properties are set in the Panopticon.properties file.**

Field	Corresponding Property in Panopticon.properies
Host	`connector.python.host`
Port	`connector.python.port`
HMAC Key	`connector.python.password`
Serialization Type	`connector.python.serializertype`

5. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
6. Enter the required *Python script* to execute on the active Pyro instance.
7. Check the **Use Apache Arrow** box to enable fast serialization of data frames.
8. Select whether the parameters should be automatically enclosed in quotes by checking the **Enclose parameters in quotes** box.
9. Set the row limit of the data set.
10. Tap the **Preview Selected Data Source** slider to turn it on.
11. Click 

to display the data preview.

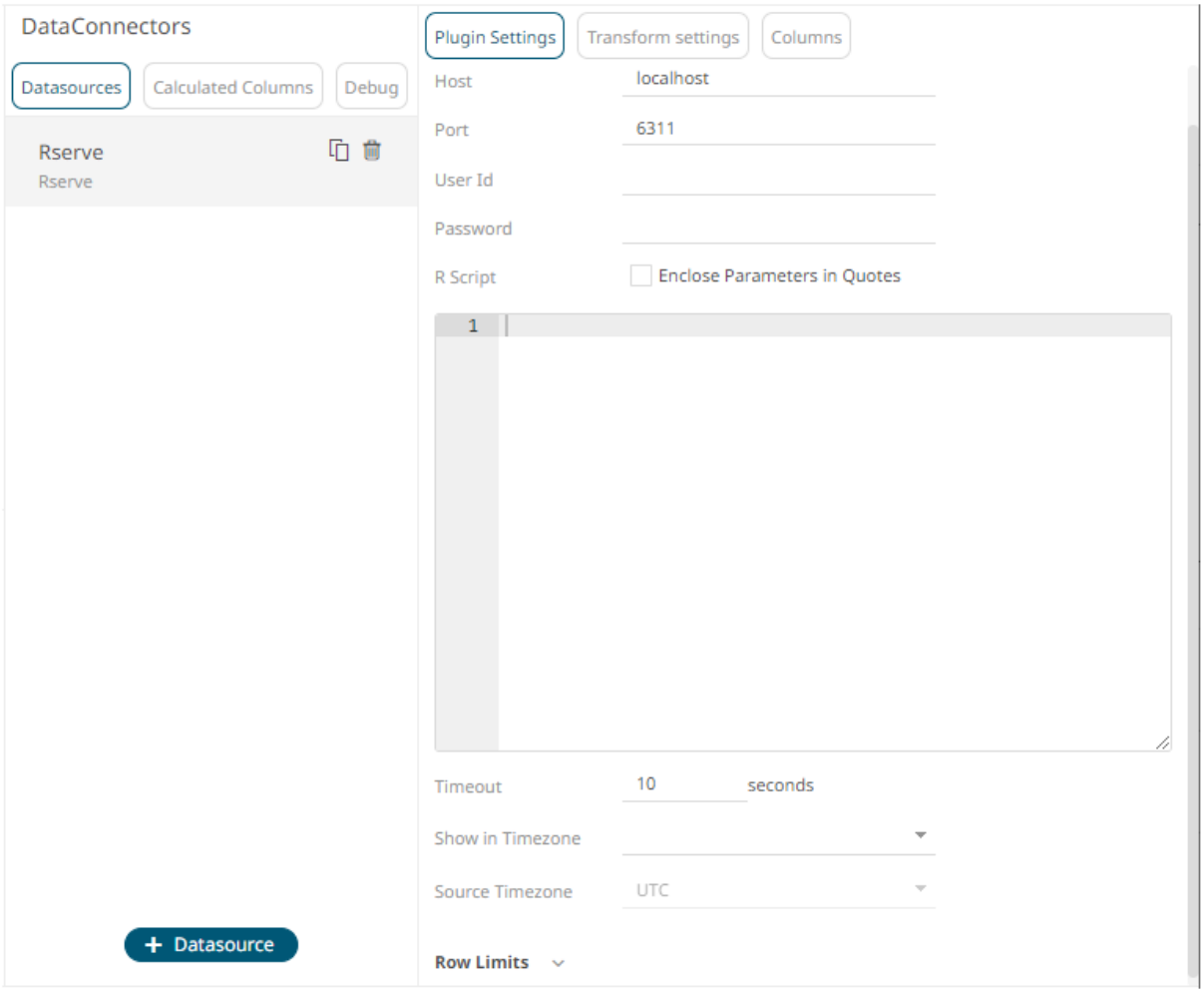
Rserve Connector

The Rserve connector allows the retrieval of an output data frame from a running Rserve process.

For R connectivity, R must be first installed, together with the Rserve library. In addition, R must be open, and the Rserve library must be loaded and initialized.

Steps:

1. Select **Rserve** from the *Connectors* panel. The *Rserve Settings* panel displays.



2. Enter the *Name* of the Rserve data source, then click ✓.
3. Enter the following properties:

Property	Description
Host	Rserve host address. Default is **localhost**.
Port	Rserve host port. Default is **6311**.
User Id	The user Id that will be used to connect to the Rserve service.
Password	The password that will be used to connect to the Rserve service.

NOTE **The *Host*, *Port*, *User Id*, and *Password* fields will be hidden if their corresponding properties are set in the `Panopticon.properties` file.**

Field	Corresponding Property in Panopticon.properies
Host	`connector.rserve.host`
Port	`connector.rserve.port`
User Id	`connector.rserve.userid`
Password	`connector.rserve.password`

4. Enter the required *R Script* to execute on the active Rserve instance.
5. Enter the *Timeout*. Default is **10** (in seconds).
6. Select whether the parameters should be automatically enclosed in quotes by checking the **Enclose parameters in quotes** box.
7. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
8. Set the row limit of the data set.
9. Tap the **Preview Selected Data Source** slider to turn it on.
10. Click 

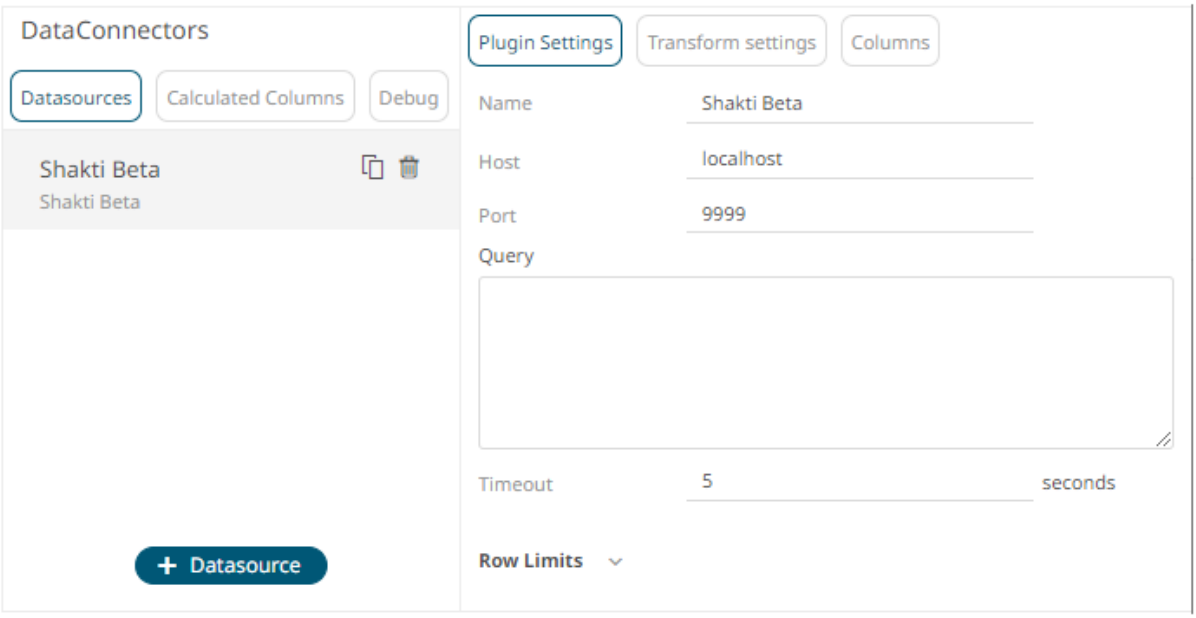
to display the data preview.

Shakti (Beta) Connector

The Shakti connector allows connecting to Shakti databases on a polled basis.

Steps:

1. Select **Shakti Beta** from the *Connectors* pane. The *Shakti Settings* panel displays.



2. Enter the *Name* of the Shakti connector, then click ✓.
3. Enter the following properties:

Property	Description
Host	Shakti host address.
Port	Shakti host port. Default is **9999**.

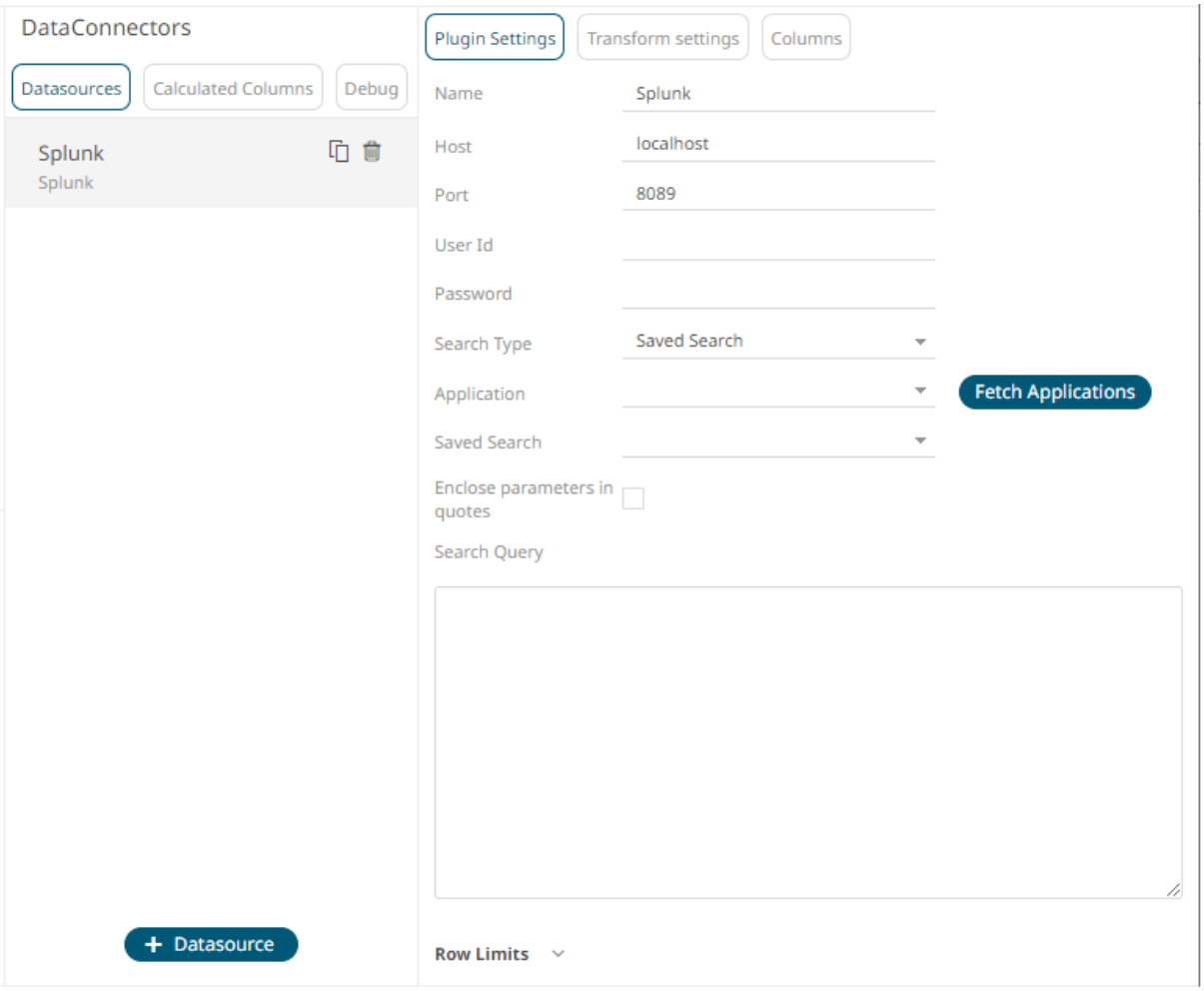
4. Enter a free text *Query*.
5. Adjust the *Timeout,* if needed. Default is **5** (in seconds).
6. Set the row limit of the data set.
7. Tap the **Preview Selected Data Source** slider to turn it on.
8. Click Refresh Preview to display the data preview.

Splunk Connector

The Splunk connector allows the retrieval of data from a Splunk instance.

Steps:

1. Select **Splunk** from the *Connectors* panel. The *Splunk Settings* panel displays.



2. Enter the *Name* of the Splunk data source, then click ✓.
3. Enter the following properties:

Property	Description
Host	Splunk host address.
Port	Splunk host port. Default is **8089**.
User Id	The user Id that will be used to connect to the Splunk service.
Password	The password that will be used to connect to the Splunk service.

4. Select the *Search Type*:

- Manual

  Proceed to step 6 to define a new search query.
- Saved Search

  Allows you to select in the *Saved Search* drop-down list.

5. Click Fetch Applications to populate the *Application* drop-down list and select one.
6. Select whether the parameters should be automatically enclosed in quotes by checking the **Enclose parameters in quotes** box.

7. Enter a *Search Query*.
8. Set the row limit of the data set.
9. Tap the **Preview Selected Data Source** slider to turn it on.
10. Click  to display the data preview.

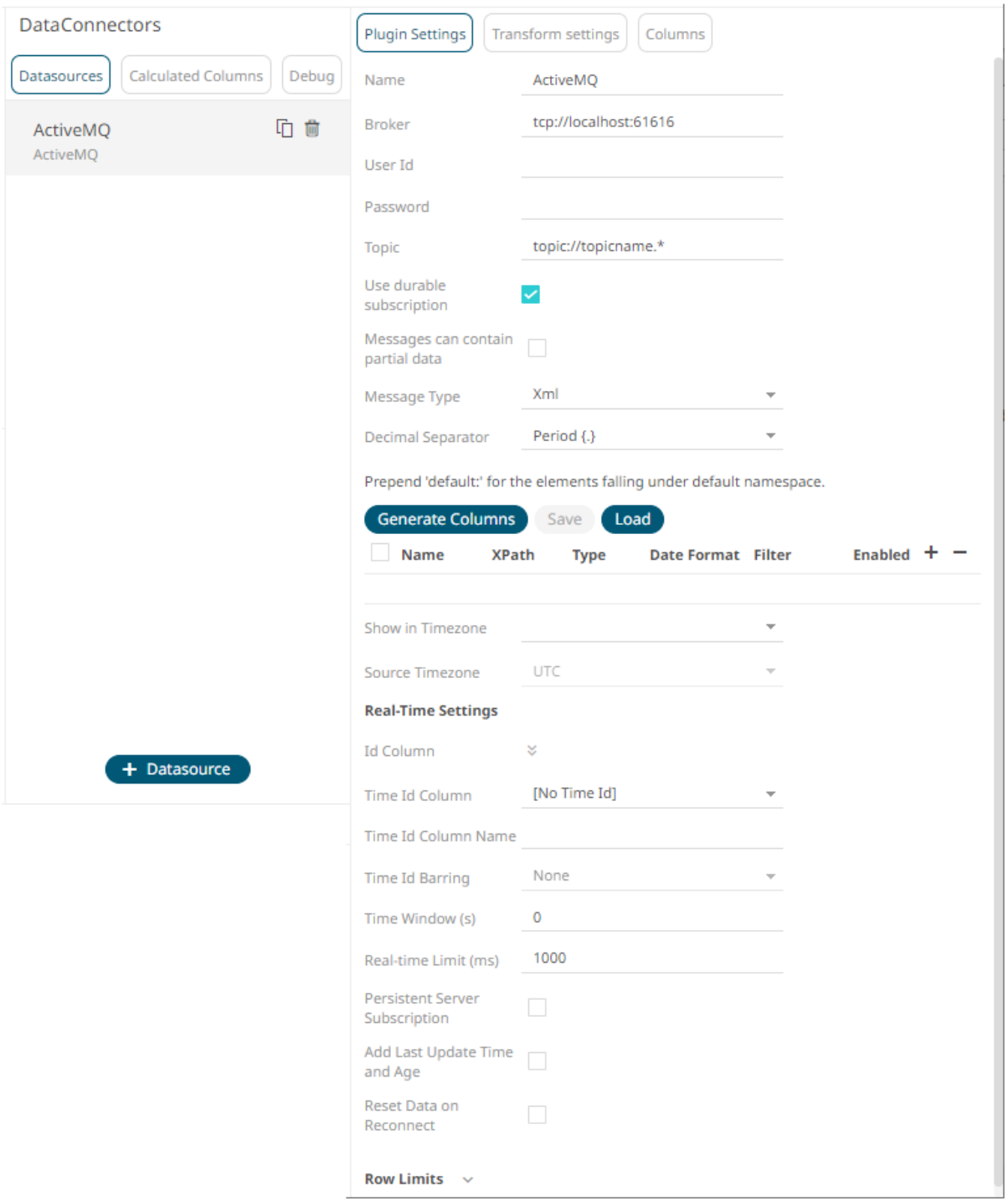
STREAMING CONNECTORS

ActiveMQ Connector

Allows connection to Apache's ActiveMQ message bus on a real-time streaming basis. Specifically, the connector allows Panopticon to subscribe to XML, JSON or FIX based messages that are published on topics. The data format itself is arbitrary, and consequently, the connection includes the message definition.

Steps:

1. Select **ActiveMQ** from the *Connectors* panel. The *ActiveMQ Settings* panel displays.



2. Enter the *Name* of the ActiveMQ data source, then click ✓.
3. Enter the following information:

Property	Description
Broker	The location of the message broker. Default is **tcp://localhost:61616**.
User Id	The user Id that will be used to connect to the ActiveMQ service.
Password	The password to connect to the ActiveMQ service.
Topic	Accepts topic in `topic://topicname.*` format and also `topicname.*`. Therefore, `topic://pano.>` and `pano.>` both will work as topic value. Default is **topic://topicname.***

4. Check/uncheck the **Use durable subscription** box.

> **NOTE** **When connecting to a message bus, it is recommended to** disable **durable messaging. When it is enabled, this puts a heavier load to the server, and slows down the start and stop of subscriptions.**

5. Check/uncheck **Messages can contain partial data** box.
6. Select the *Message Type*.
7. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
8. You can also opt to load or save a copy of the column definition.
9. Click  to add columns to the MQ connection that represent sections of the message. Then enter or select:

Property	Description
Name	The column name of the source schema.
Fix Tag/JsonPath/Text Column Index/XPath	The Fix Tag/JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.
Filter	Defined parameters that can be used as filter. Only available for JSON, Text, and XML message types.

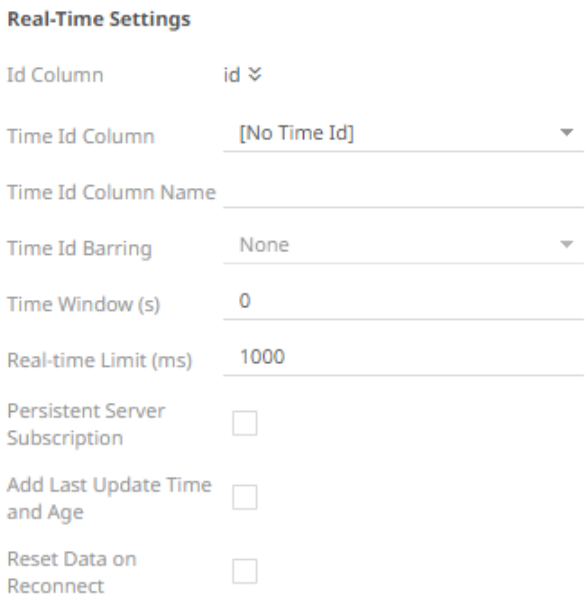
> **NOTE** **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**
>
> **For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`**

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click − .

10. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

11. For this section:



    Refer to Define Real-Time Settings for more information.

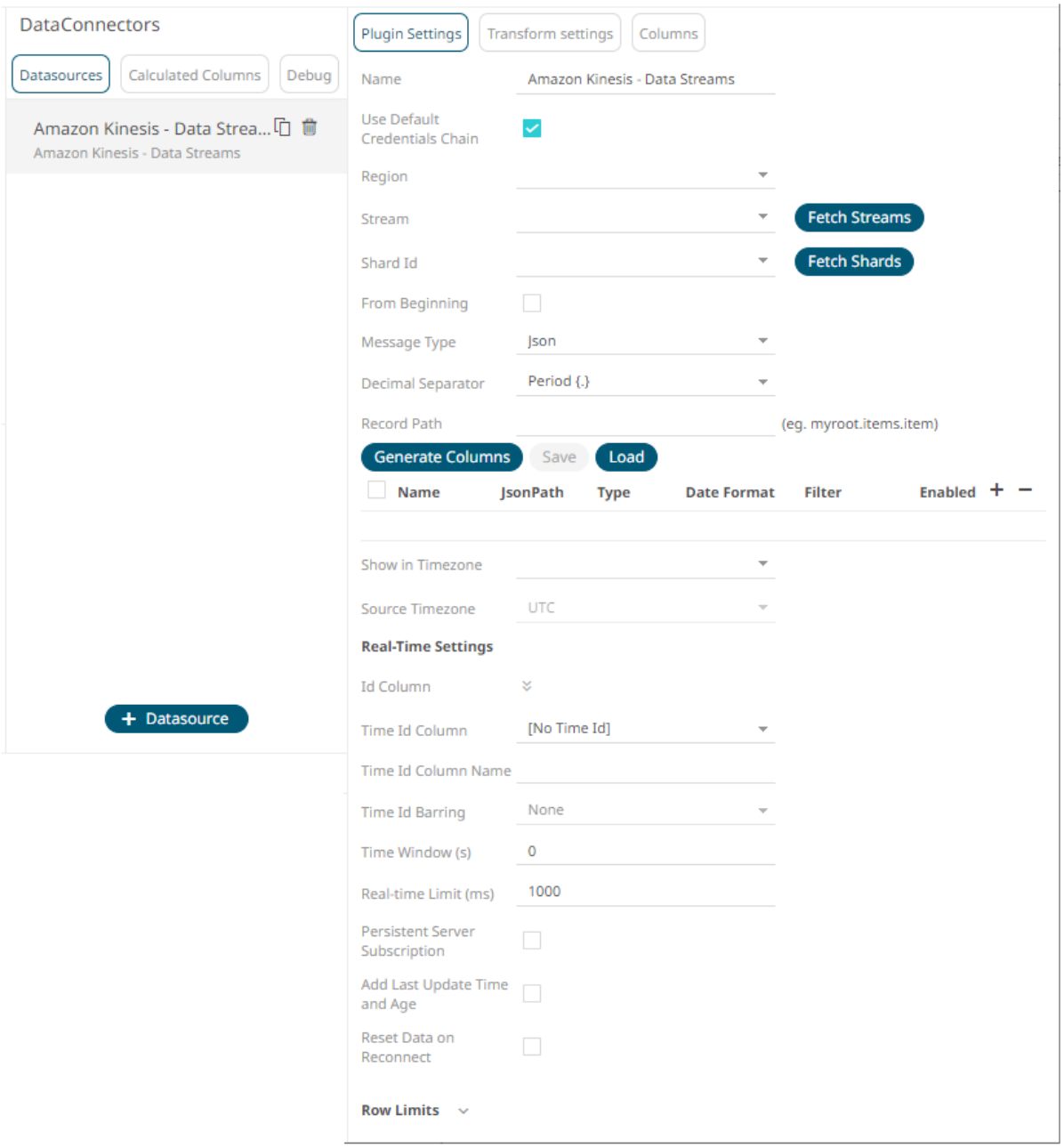
12. Set the row limit of the data set.
13. Tap the **Preview Selected Data Source** slider to turn it on.
14. Click ▶ Start Preview to display the data preview.

Amazon Kinesis – Data Streams Connector

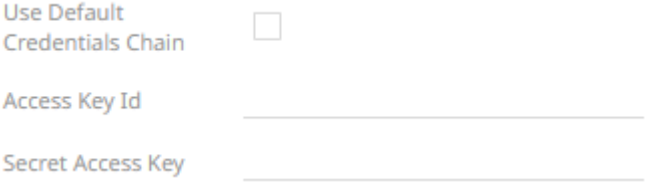
The Amazon Kinesis – Data Streams connector reads records from the given data stream and Shard ID.

Steps:

1. Select **Amazon Kinesis – Data Streams** from the *Connectors* panel. The *Amazon Kinesis – Data Streams* panel displays.



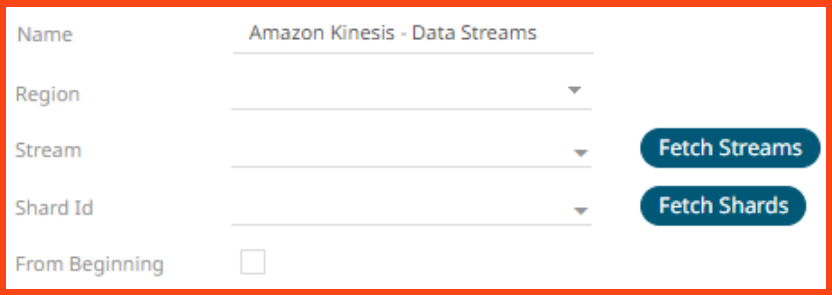
2. Enter the *Name* of the Amazon Kinesis – Data Streams data source, then click ✓.
3. You can either:
   - check the **Use Default Credentials Chain** box to use the default *Access Key ID* and *Secret Key Access*, or
   - uncheck the **Use Default Credentials Chain** box and enter the Access Key ID and Secret Key Access



NOTE The *Access Key ID* and *Secret Key Access* from the AWS account can be configured in three places:

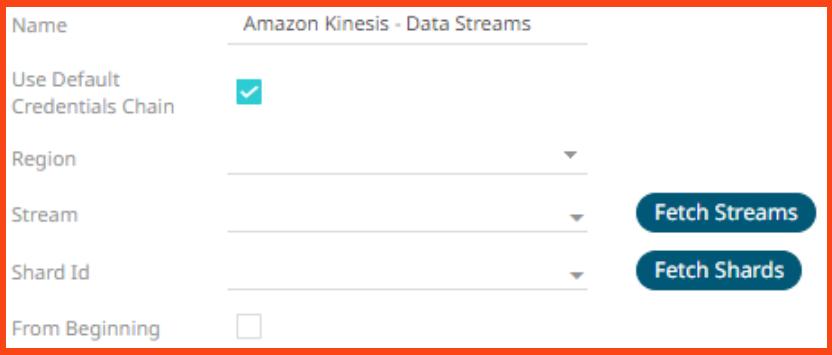
- Two properties at the `Panopticon.properties` file which is available in the `AppData` folder of Panopticon Real Time
  - `connector.kinesis.datastreams.accesskeyid`
  - connector.kinesis.datastreams.secretaccesskey

  If this configuration is used, the Use Default Credentials Chain box is not displayed in the connector UI.



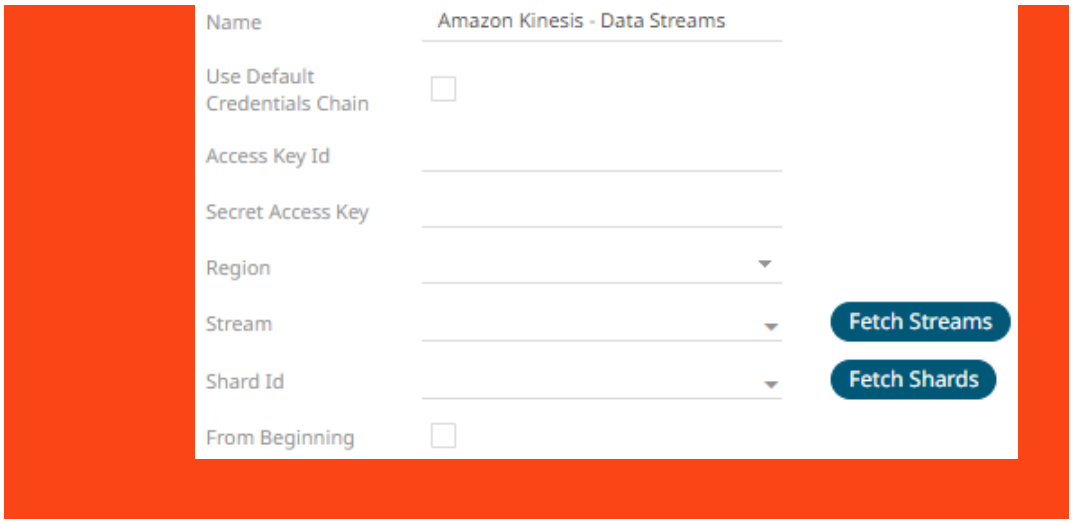
  This is the recommended way to provide the credentials.

- AWS credentials provider chain
  - Environment Variables - `AWS_ACCESS_KEY_ID` and `AWS_SECRET_ACCESS_KEY`
  - Credential profiles file at the default location - `~/.aws/credentials` on Linux, macOS, or Unix, and `C:\Users\USERNAME\.aws\credentials` on Windows.



- Dedicated fields in the connector

  Not the recommended configuration.



4. Select or define the following properties:

Property	Description
Region	Physical location of the data center. The list is picked up from the Amazon Kinesis Data Streams Endpoints and Quotas page.
Stream	Name of the stream from where you want to pull the data. Click **Fetch Streams**  to load all of the available streams from the AWS account.
Shard Id	Each connector instance or data source is connected to only one shard. Click **Fetch Shards**  to pull all of the shards from the selected stream.
From Beginning	The starting position in the data stream from which to start streaming. Default value is unchecked, which means **LATEST.** When checked, the starting position is set to **TRIM_HORIZON**.

NOTE **All of the connection settings can be parameterized.**

5. Select the *Message Type*.

6. Click  to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

7. You can also opt to load or save a copy of the column definition.

8. Click  to add columns to the Amazon Kinesis – Data Streams connection that represent sections of the message. Then enter or select:

Property	Description
Name	The column name of the source schema.
Fix Tag/JsonPath/Text Column Index/XPath	The Fix Tag/JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.
Filter	Defined parameters that can be used as filter. Only available for JSON, Text, and XML message types.

NOTE **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**

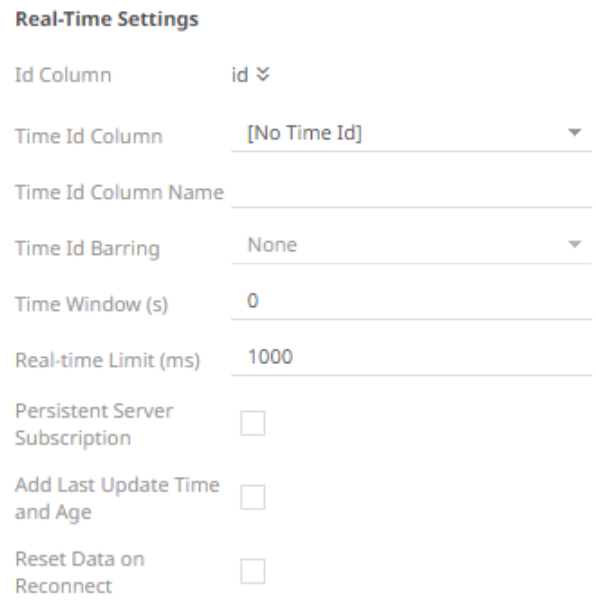
For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

9. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.

10. For this section:



   Refer to Define Real-Time Settings for more information.

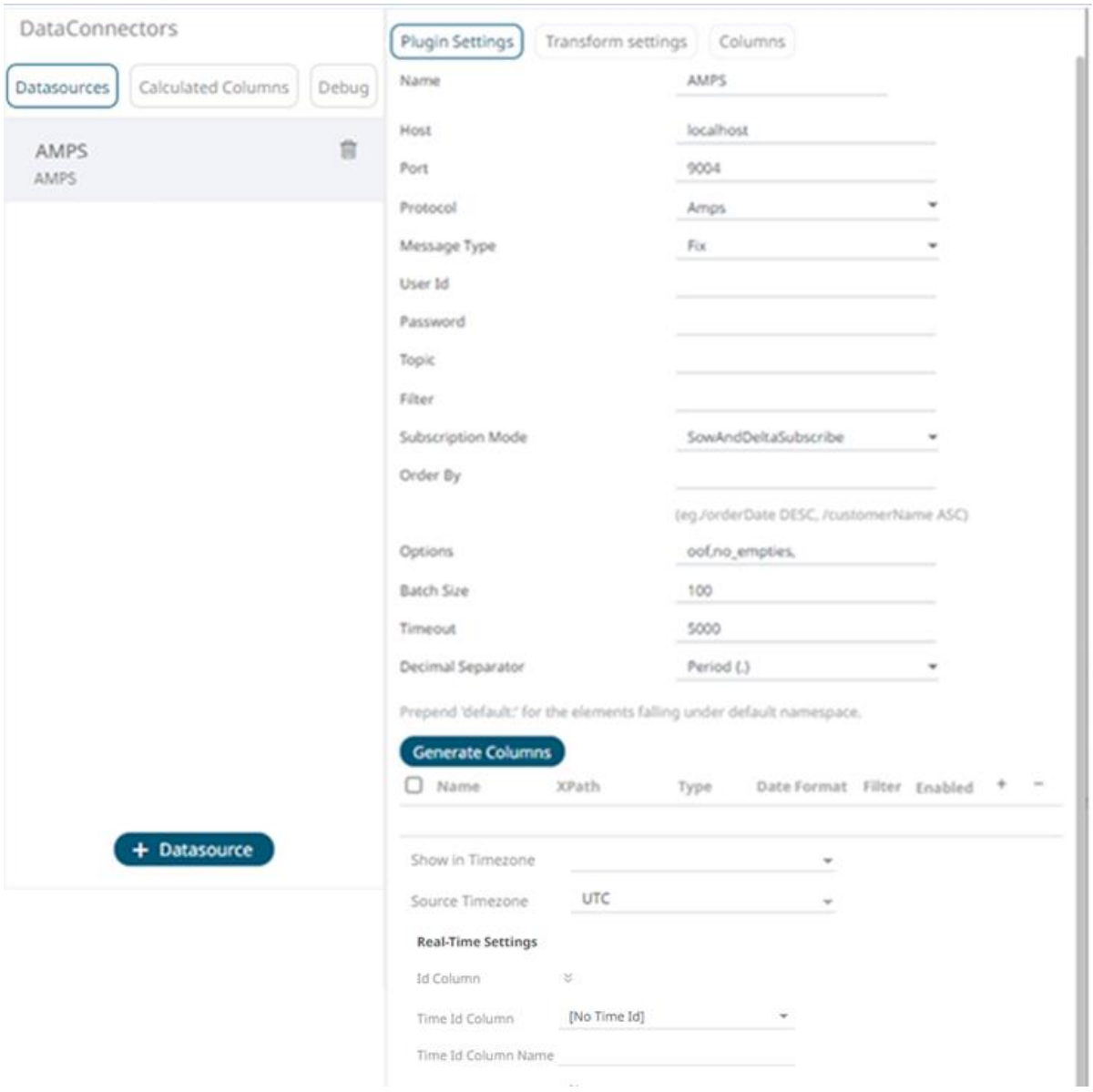
11. Set the row limit of the data set.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click ▶ Start Preview to display the data preview.

AMPS Connector

The AMPS connector allows connection to AMPS message bus on a real-time streaming basis. The connector allows Panopticon to subscribe to the Native FIX and XML message support. The data format itself is arbitrary, and in turn the connection includes the message definition.

Steps:

1. Select **AMPS** from the *Connectors* panel. The *AMPS Settings* panel displays.



2. Enter the *Name* of the AMPS data source, then click ✓.
3. Enter the following information:

Property	Description
Host	AMPS host address.
Port	AMPS host port. Default is 9004.
User Id	The user Id that will be used to connect to the AMPS service.
Password	The password to connect to the AMPS service.
Topic	The topic or queue physical name.
Filter	The filter expression.

4. Select the *Protocol*. This will specify the format of the headers:
   - Amps (default)
   - Fix
   - NvFix
   - XML
5. Select the *Message Type*. This will specify the format of the data within the message:
   - Fix (default)
   - XML
   - NvFix
   - JSON

     If **JSON** is selected, the *Record Path* field is displayed.

     Enter the record path which allows the identification of multiple records within the JSON document (e.g., **myroot.items.item**).
6. Select from any of the following *Subscription Modes*:
   - Sow
   - SowAndSubscribe
   - SowAndDeltaSubscribe (default)
   - Subscribe
   - DeltaSubcribe
7. Enter the *Order By Statement* in order to limit the returned data. For example:

   /orderDate DESC

   /custumerName ASC
8. Enter any of the following *Option/s* for the selected *Subscription Mode*:
   - cancel
   - live
   - no_empties
   - null
   - no_sowkey
   - oof

- pause
- replace
- resume
- send_keys
- timestamp

NOTE **Leave the *Options* box blank if you selected the** Subscribe **subscription mode.**

9. Enter the *Batch Size*. This is the number of messages that will be sent at a time as results are returned. Default is **100**.
10. Enter the *Timeout* for the length of time to wait for the server response. Default is **5000**.
11. Select either the dot (.) or comma (,) as the *Decimal Separator*.
12. Click Generate Columns to the fetch the schema based on the connection details. This populates the list of columns with the data type found from inspecting the first 'n' rows of the input data source.

    This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

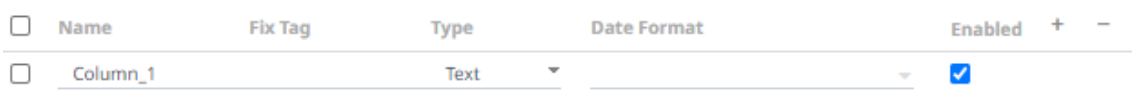
13. Click + to add columns to the AMPS connection that will represent sections of the message.
14. Provide the following information:

Property	Description
Name	The column name of the source schema.
Fix Tag/XPath/Json Path	The Fix Tag/XPath/Json Path of the source schema.
Type	The data type of the column. Can be a Text, Numeric, or Time
Date Format	The format when the data type is Time.
Filter	Defined parameters that can be used as filter. Only available for Fix, JSON, and XML message types.
Enabled	Determines whether the message field should be processed.

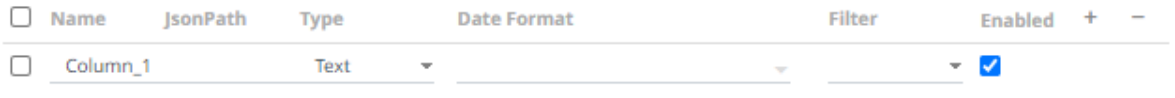
- Fix



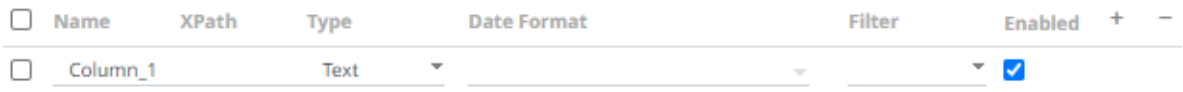
- NvFix



- JSON



- XML

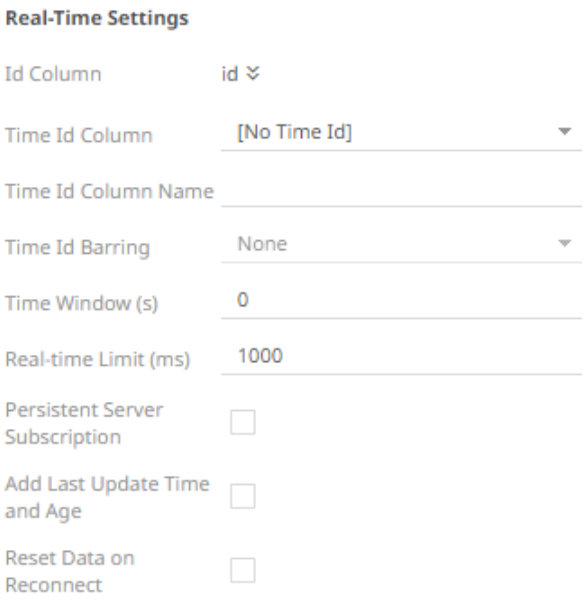


To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

15. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

16. For this section:



    Refer to Define Real-Time Settings for more information.

17. Set the row limit of the data set.
18. Tap the **Preview Selected Data Source** slider to turn it on.
19. Click 

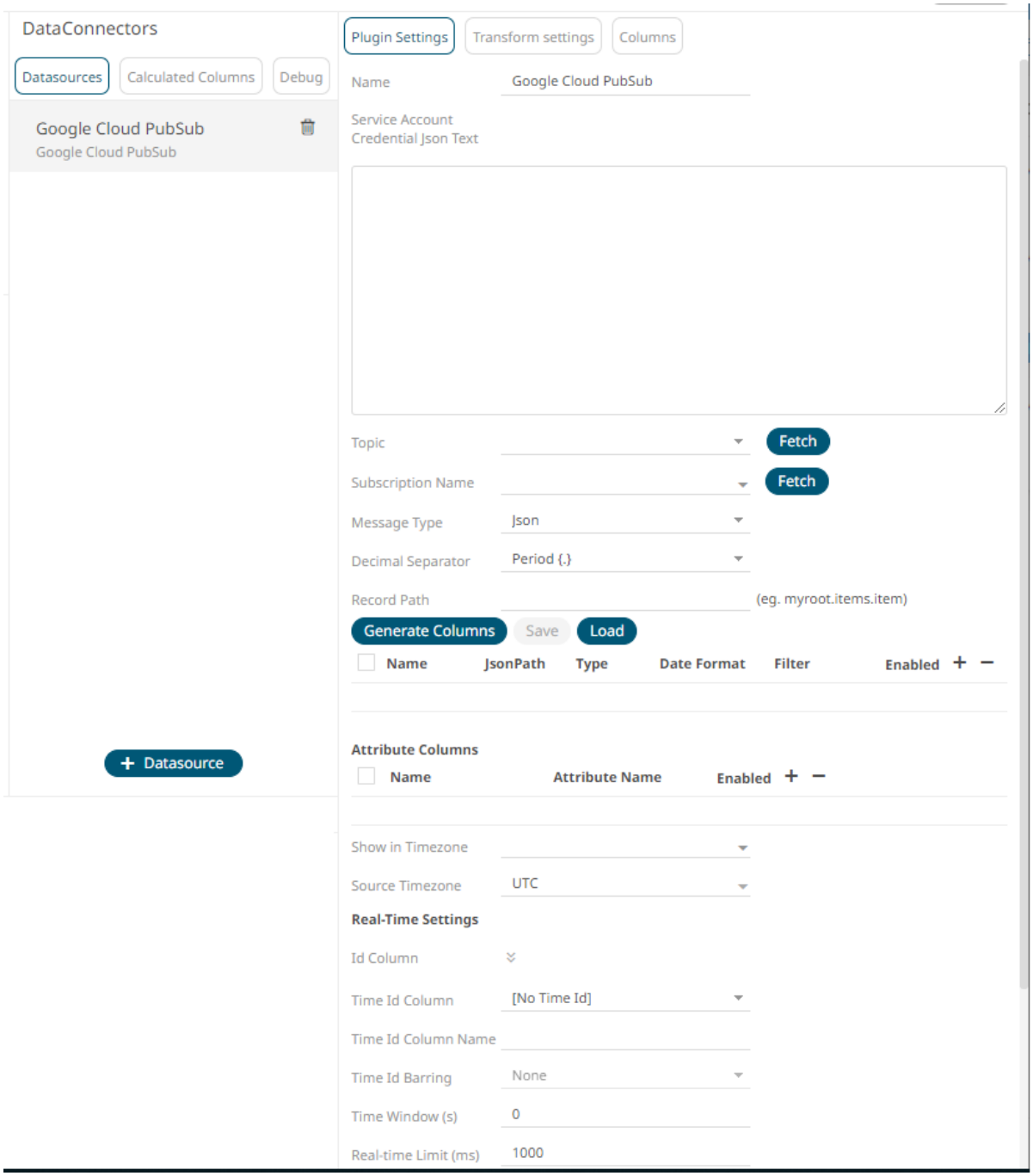
to display the data preview.

Google Cloud Pub/Sub Connector

The Google Cloud Pub/Sub connector allows connection to Google Cloud Pub/Sub's message bus on a real-time streaming basis. Specifically, the connector allows Panopticon to subscribe to XML, JSON, TEXT or FIX based messages that are published on particular topics. The data format itself is arbitrary, and consequently, the connection includes the message definition.

Steps:

1. Select **Google Cloud PubSub** from the *Connectors* panel. The *Google Cloud PubSub Settings* panel displays.



2. Enter the *Name* of the Google Cloud Pub/Sub data source, then click ✓.
3. Enter the *Service Account Credential JSON Text* with the generated JSON key (contains the private key) in the following format:

```
{
  "type": "service_account",
  "project_id": "project-id",
  "private_key_id": "some_number",
  "private_key": "-----BEGIN PRIVATE KEY-----\n....
  =\n-----END PRIVATE KEY-----\n",
  "client_email": "<api-name>api@project-id.iam.gserviceaccount.com",
  "client_id": "...",
  "auth_uri": "https://accounts.google.com/o/oauth2/auth",
  "token_uri": "https://accounts.google.com/o/oauth2/token",
  "auth_provider_x509_cert_url":
"https://www.googleapis.com/oauth2/v1/certs",
  "client_x509_cert_url": "https://www.googleapis.com/...<api-
name>api%40project-id.iam.gserviceaccount.com"
}
```

NOTE **Ensure that when parameterizing the values in the Credential JSON Text, there is no white space as a single line content.**

4. Click Fetch to populate the *Topic* drop-down list. Initially, the first topic in the list is displayed in the *Topic* drop-down box.

   Select a topic.

5. Click Fetch to populate the *Subscription Name* drop-down list and select a subscription name.

   You can also opt to create a subscription by manually entering the value into the *Subscription Name* list box.

NOTE

- **A subscription name will be automatically generated when it is not entered or selected in the drop-down list.**

  This subscription will be created for connection and will be deleted as soon as its work is done. For example, when starting a presentation mode, a subscription will be created. Upon quitting the presentation mode, the subscription will then be deleted.

- **Pub/Sub can automatically delete inactive subscriptions. This can be done by configuring the minimum required time of inactivity to schedule a subscription for deletion. This time must be longer than the message retention duration.**

6. Select the *Message Type*.
7. Select either the dot (.) or comma (,) as the *Decimal Separator*.
8. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

9. You can also opt to load or save a copy of the column definition.

10. Click + to add columns to the Google Cloud Pub/Sub connection that will represent sections of the message.
11. Provide the following information:

Property	Description
Name	The column name of the source schema.
Fix Tag/XPath/Column Index/Json Path	The Fix Tag/XPath/Column Index/Json Path of the source schema.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message field should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

12. Google Cloud Pub/Sub messages can have additional metadata as custom attributes.

Panopticon Google Cloud Pub/Sub connector supports reading these attributes as column values. The generate column logic automatically checks and generates attribute columns if messages received contain attributes.

Additionally, like columns from message data, you can manually add them by clicking +. A new entry displays.



Name can be any unique column name within the data source. The attribute name must match to an attribute name in message otherwise it will be treated as null value. Currently all attribute columns are treated as Text columns, we can't change column type.

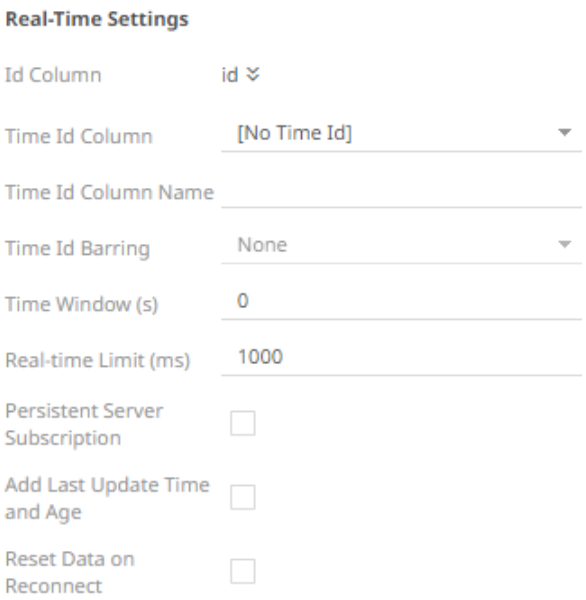
Check the *Enabled* box to enable an attribute column.

To delete an attribute column, check its ☐ or all the column entries, check the topmost ☐, then click −.

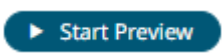
13. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

You can opt to define the *Show in Timezone* and *Source Timezone* settings.

14. For this section:



Refer to Define Real-Time Settings for more information.

15. Set the row limit of the data set.
16. Tap the **Preview Selected Data Source** slider to turn it on.
17. Click 

to display the data preview.

JDBC Database – Streaming Connector

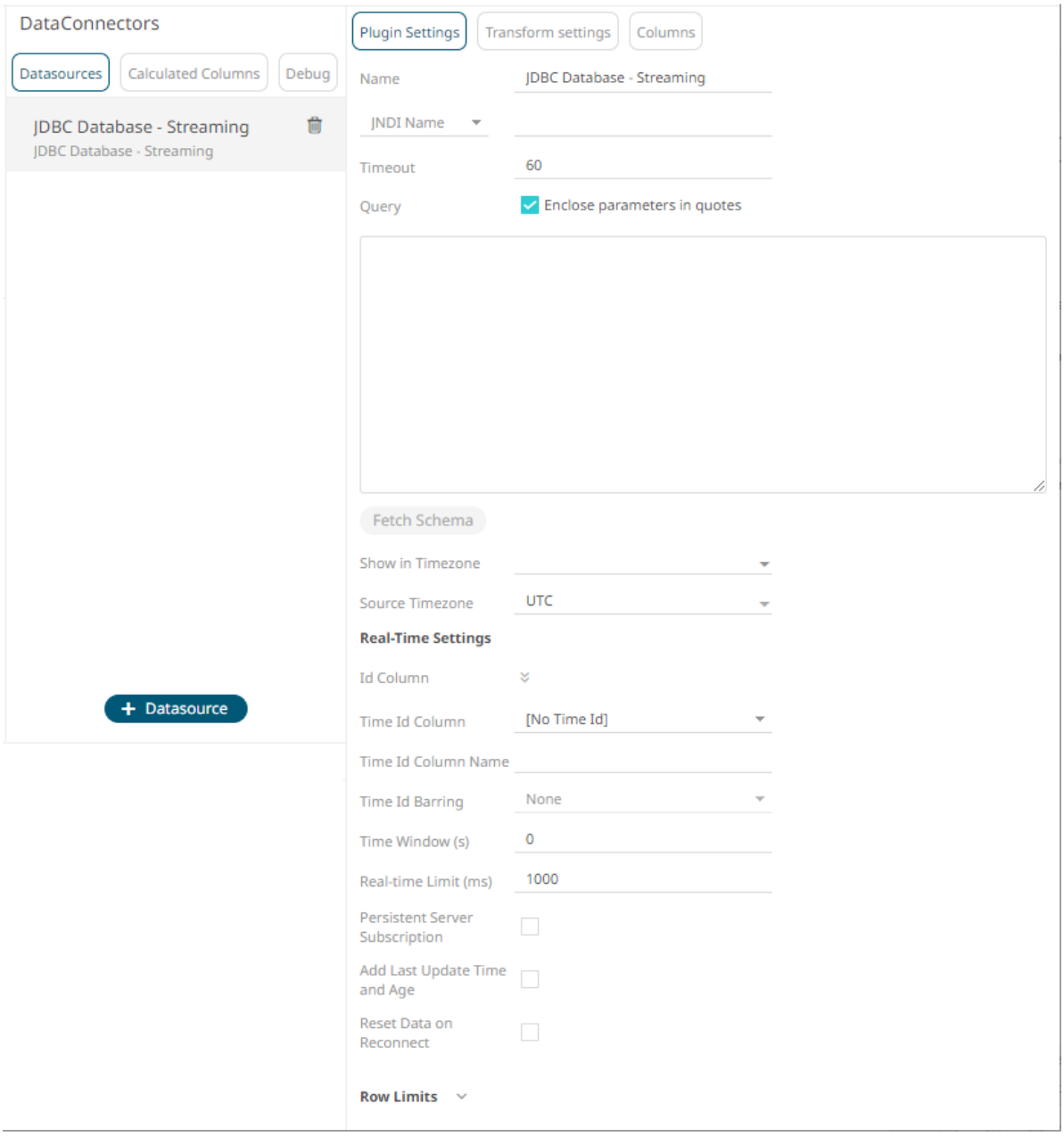
The JDBC Database -Streaming connector allows subscription to a set of data, upserting existing received values in a JDBC SQL Database, by running micro batched queries.

The database must have the appropriate JDBC driver .jar files and JNDI connections.

Refer to the *Database* section in the *Panopticon Real Time Installation and Troubleshooting Guide* for more information.

Steps:

1. Select **JDBC Database - Streaming** from the *Connectors* panel. The *JDBC Database - Streaming* panel displays.



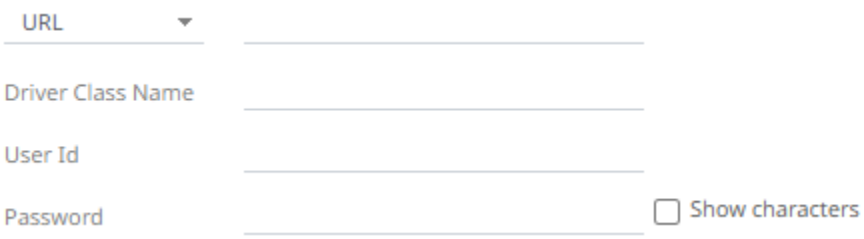
2. Enter the *Name* of the JDBC Database - Streaming data source, then click ✓.
3. You can either select:
   - JNDI Name



NOTE **The JNDI resource name needs to be on the form:**

`java:/comp/env/jdbc/[resourcename]`

- URL



Enter the *URL* specific to the database's JDBC driver, the *Driver Class Name* specific to the driver, and the *User Id* and *Password*.

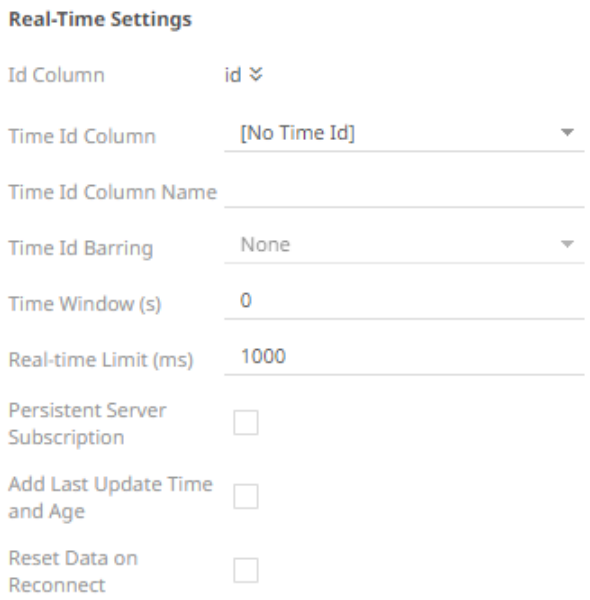
Check the **Show Characters** box to display the entered characters.

4. Enter the *Timeout* or the length of time to wait for the server response. Default is **60**.
5. Enter the *Query*, which can contain parameters in a similar manner to the database connector.
6. Select whether the parameters should be automatically enclosed in quotes, by checking the **Enclose parameters in quotes** box.
7. Click 

to retrieve the schema of the configured subscription.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
8. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
9. For this section:



Refer to Define Real-Time Settings for more information.

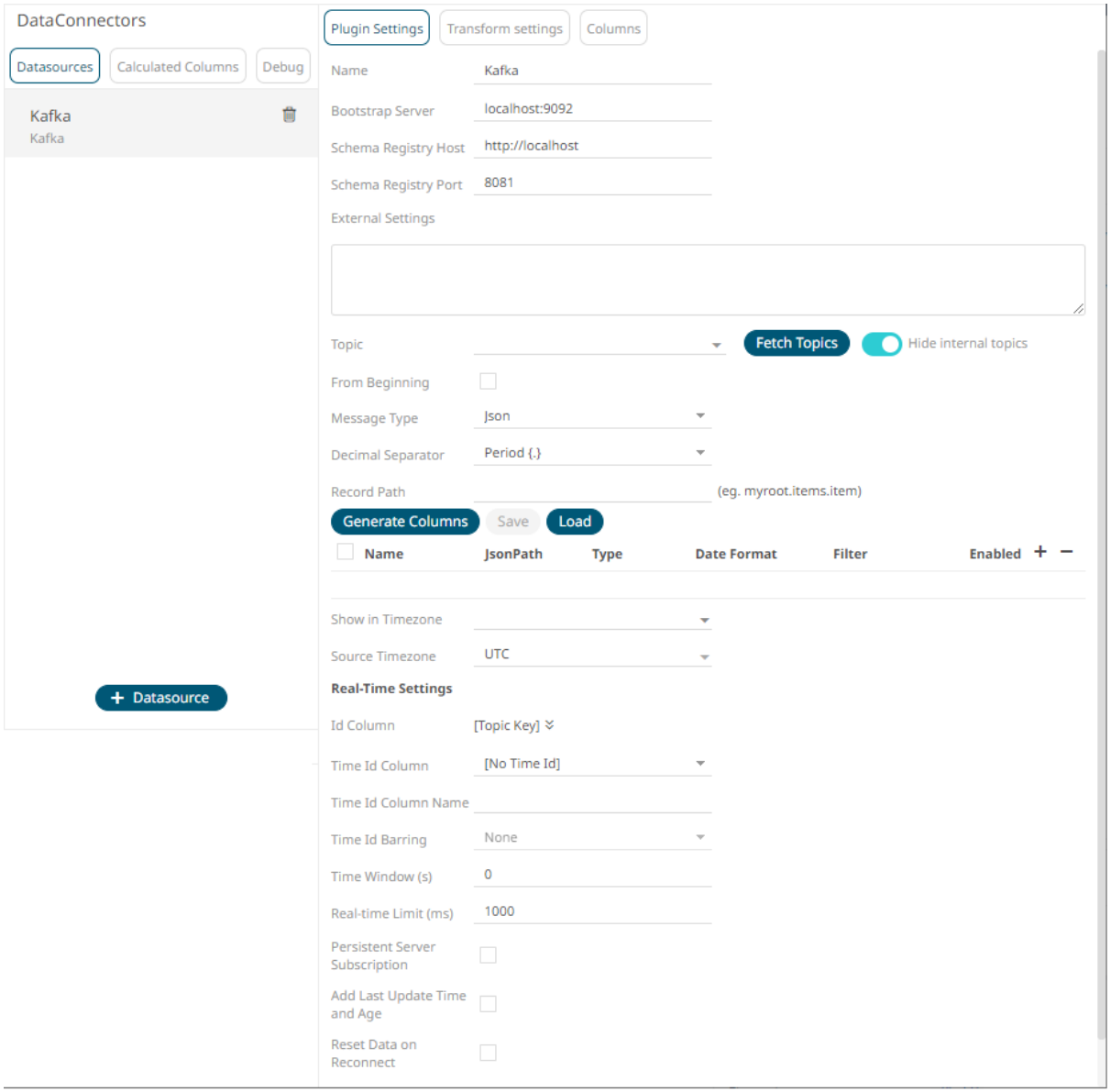
10. Set the row limit of the data set.
11. Tap the **Preview Selected Data Source** slider to turn it on.
12. Click  to display the data preview.

Apache Kafka Connector

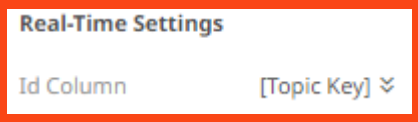
Allows Panopticon to subscribe to Kafka topics on an external cluster.

Steps:

1. Select **Kafka** from the *Connectors* panel. The *Kafka Settings* panel displays.



NOTE **The key provided from the Kafka subscription is automatically selected as the *Id Column*.**



2. Enter the *Name* of the Apache Kafka data source, then click ✓.
3. Enter the connection details:

Property	Description
Bootstrap Server	List of host/port pairs of Kafka servers used to bootstrap connections to a Kafka cluster. By default, the value is `localhost:9092`. However, this can be overridden by specifying another bootstrap server in the *External Settings* text box (as specified in step 4).
Schema Registry Host	Where the Schema Registry is located. This can be in a different location from the Kafka cluster.
Schema Registry Port	The port number of the schema registry which provides the serving layer for the metadata. Default is **8081**.

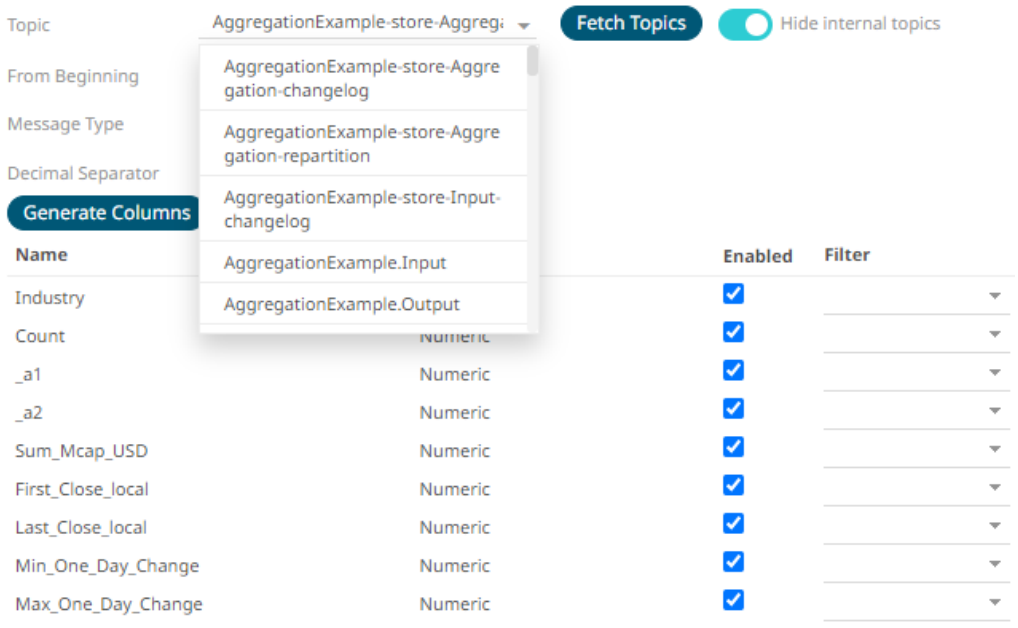
4. Enter the *External Settings* to support authentication (i.e., username and password). Note that if the bootstrap server is not secure, then there is no need to authenticate and you may leave this text box blank.

   Below is an example of system settings for an SASL authentication:

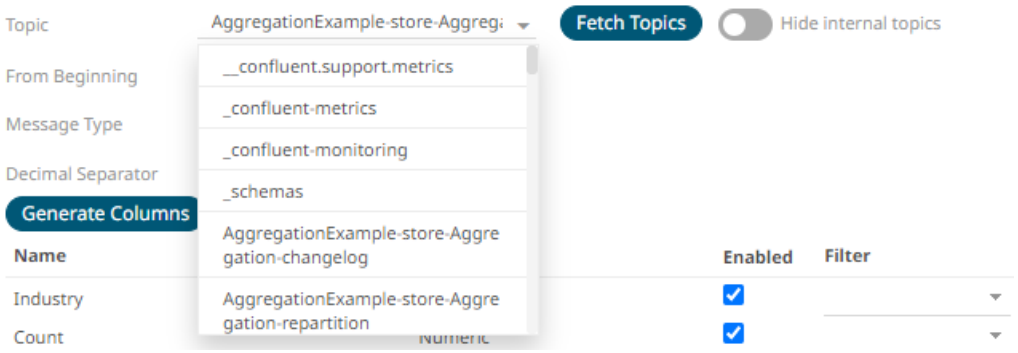
```
bootstrap.servers=localhost:9093
sasl.jaas.config=\
  org.apache.kafka.common.security.plain.PlainLoginModule
required \
    username="dwchuser" \
    password="dwchpwd";
```

5. Click Fetch Topics. The first topic in the *Topic* drop-down list is selected and the schema is displayed.

   By default, the **Hide Internal Topics** toggle button is enabled and the **Avro** message type is selected.



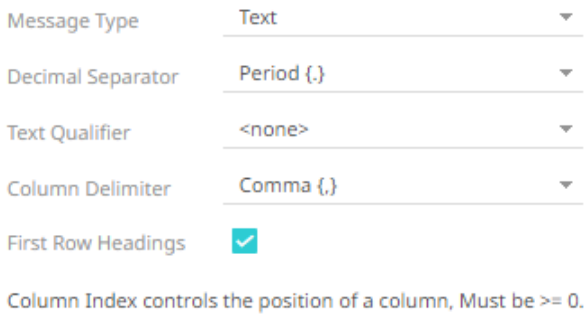
Tap the slider to turn it off. The internal Kafka topics are also displayed in the drop-down list.



6. Click the drop-down list to search and select the desired topic.

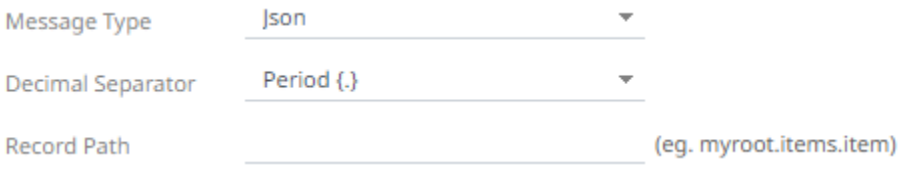
   For non-Avro topics, select the *Message Type*: **Fix**, **JSON**, **Text**, **XML,** or **Protobuf**.

   - If **Text** is selected, confirm the **Decimal Separator, Text Qualifier**, **Column Delimiter**, and if the first row of the message includes column headings.



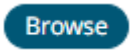
Property	Description
Text Qualifier	Specifies if fields are enclosed by text qualifiers, and if present to ignore any column delimiters within these text qualifiers.
Column Delimiter	Specifies the column delimiter to be used when parsing the text file.
First Row Headings	Determines if the first row should specify the retrieved column headings, and not be used in data discovery.

- If **JSON** is selected, enter *the Record Path* which allows the identification of multiple records within the JSON document (e.g., **myroot.items.item**).

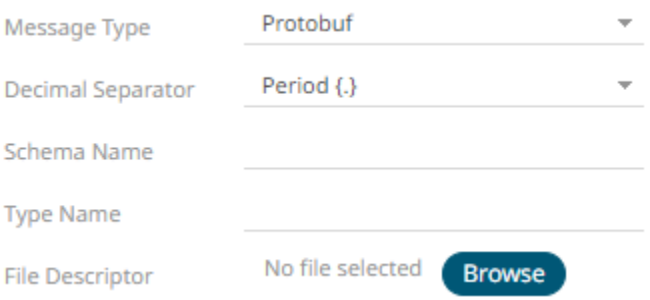


Property	Description
Record Path	The record path that will be queried by the connector's path (e.g., **myroot.items.item**).

- If **Protobuf** is selected, confirm the **Decimal Separator,** and enter the *Schema Name* and *Type Name*.

Then click 

to select the **File Descriptor** (`.desc` file) in the *Open* dialog.



Property	Description
Schema Name	The Protobuf schema.
Type Name	The message of Protobuf type that will be sent to Kafka.
File Descriptor	The `FileDescriptorSet` which: • is an output of the protocol compiler. • represents a set of `.proto` files, using the `--descriptor_set_out` option.

7. Check the **From Beginning** box to subscribe from the beginning to the latest messages.

   If un-checked, you will only be subscribed to the latest messages.
8. Select either the dot (.) or comma (,) as the *Decimal Separator*.

NOTE **Prepend 'default:' for the elements falling under default namespace.**

9. Click Generate Columns to fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

10. You can also opt to load or save a copy of the column definition.

11. For non-Avro message types, except **Protobuf**, click + to add columns to the Kafka connection that represent sections of the message. Then enter or select:

Property	Description
Name	The column name of the source schema.
Fix Tag/JsonPath/Text Column Index/XPath	The Fix Tag/JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Filter	Defined parameters that can be used as filter. Only available for Avro, JSON, Text, and XML message types.
Enabled	Determines whether the message field should be processed.

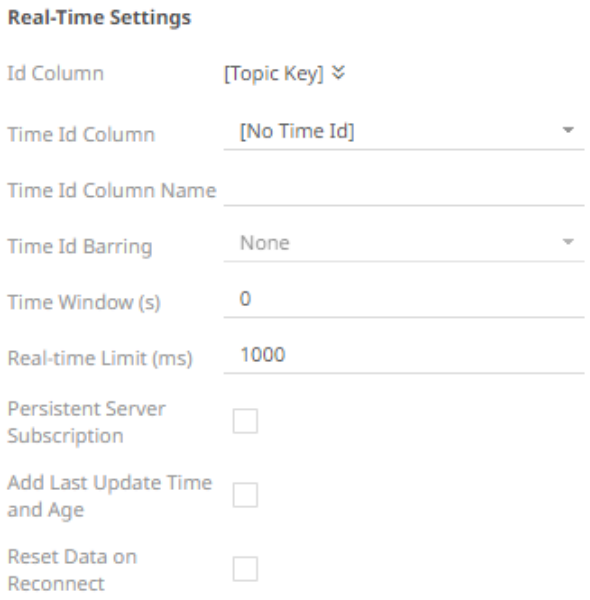
NOTE **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**

For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`

13. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

14. For this section:



Refer to Define Real-Time Settings for more information.

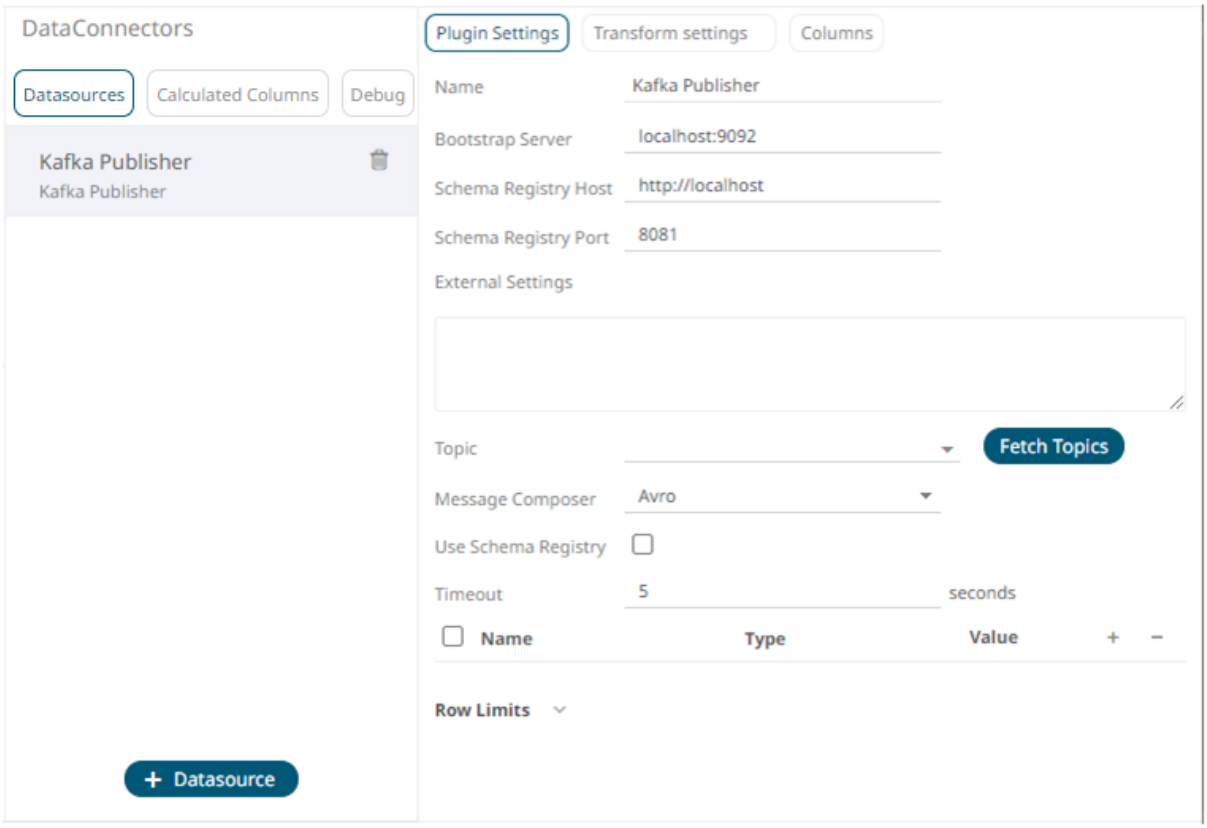
15. Set the row limit of the data set.
16. Tap the **Preview Selected Data Source** slider to turn it on.
17. Click ▶ Start Preview to display the data preview.

Kafka Publisher Connector

The Kafka Publisher connector allows a tuple to be published to a Kafka topic.

Steps:

1. Select **Kafka Publisher** from the *Connectors* panel. The *Kafka Publisher Settings* panel displays.



2. Enter the *Name* of the Kafka Publisher data source, then click ✓.
3. Enter the following properties:

Property	Description
Bootstrap Server	List of host/port pairs of Kafka servers used to bootstrap connections to a Kafka cluster. By default, the value is `localhost:9092`. However, this can be overridden by specifying another bootstrap server in the *External Settings* text box.
Schema Registry Host	Where the Schema Registry is located. This can be in a different location from the Kafka cluster.
Schema Registry Port	The port number of the schema registry which provides the serving layer for the metadata. Default is **8081**.

4. To support authentication (i.e., username and password), enter the system settings in the *External Settings* box.

NOTE **If the bootstrap server is not secure, then there is no need to authenticate and you may leave the *External Settings* blank.**

Below is an example of system settings for an SASL authentication:

```
bootstrap.servers=localhost:9093
sasl.jaas.config=\
  org.apache.kafka.common.security.plain.PlainLoginModule required \
    username="dwchuser" \
    password="dwchpwd";
```

5. Click Fetch Topics to populate the drop-down list and select a *Topic*.

> **NOTE**
> - **Ensure that the ability to ping is enabled in the ZooKeeper Host. Otherwise, if ping is disabled, the Fetch Topics button will not be able to populate the list of topics and you need to manually enter the topic names.**
> - **For Avro format messages, make sure to select an output topic. This populates the list of columns, with the data type found from inspecting the first 'n' rows of the file.**

6. For non-Avro format messages, select **Json** in the *Message Composer* drop-down list box.
7. Check the *Use Schema Registry box* to support Avro and JSON serialization formats.
8. Enter the *Timeout* or the length of time to wait for the server response. Default is **5** (in seconds).
9. Click + to add columns to the Kafka connection that represent sections of the message.
10. Then enter or select:
    - Name
    - Type (Numeric, Text, or Date/Time)
    - Value (can either be a parameter or data entry that can be used as a publish value)

    To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.
11. Set the row limit of the data set.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click Refresh Preview to display the data preview.

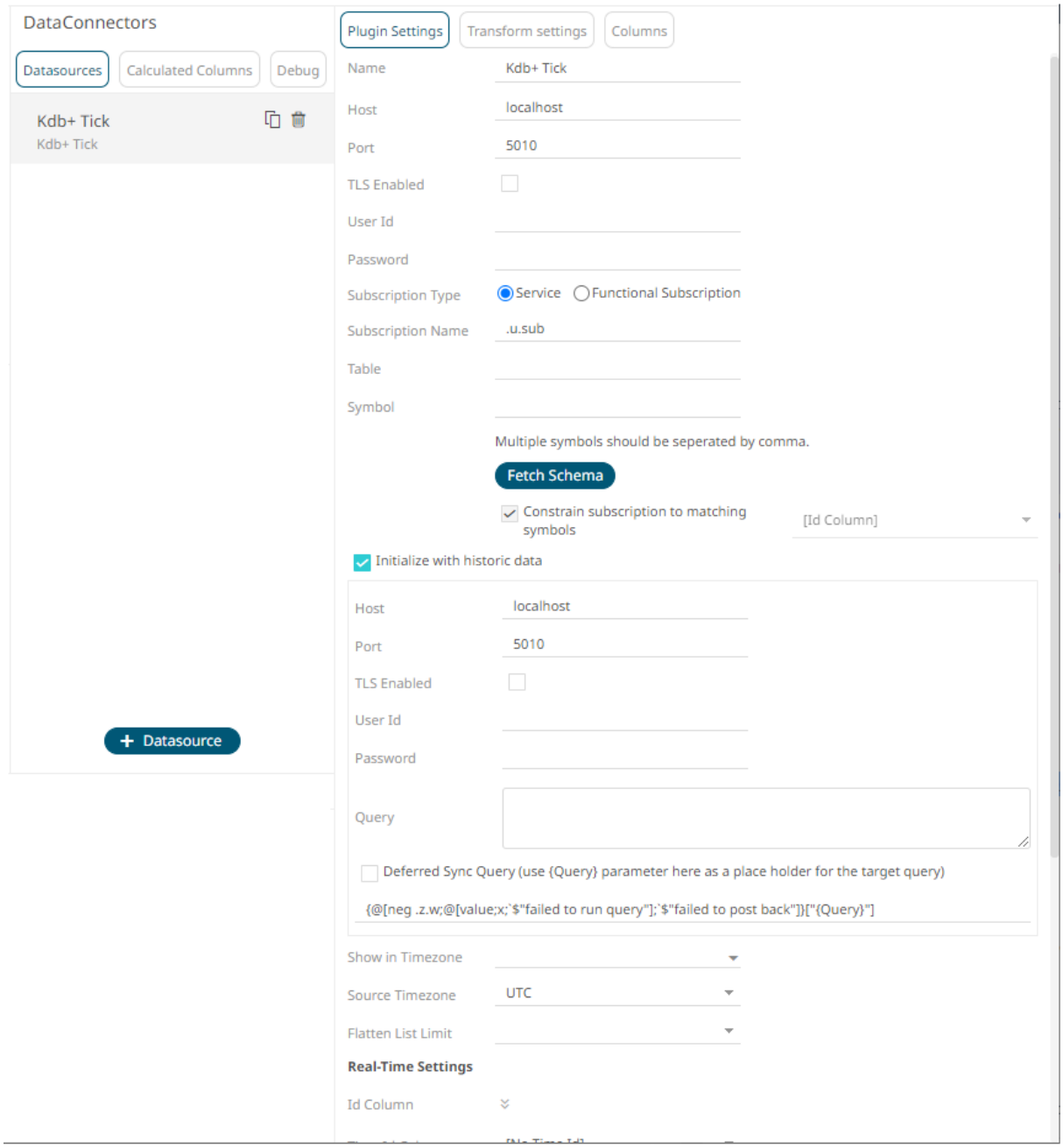
Kx kdb+tick Connector

The Kx kdb+tick input data source allows connection to a Kx kdb+ ticker plant on a real-time streaming basis.

Specifically, it allows Panopticon to subscribe to Kx kdb+tick through the definition of *Service*, *Table*, *Symbol*, or directly through *Functional Subscription*.

Steps:

1. Select **KDB+ Tick** from the *Connectors* panel. The *KDB+ Tick Settings* panel displays.



2. Enter the *Name* of the Kx kdb+ Tick data source, then click ✓.
3. Enter the following properties:

Property	Description
Host	Kx kdb+tick host address.
Port	Kx kdb+tick host port. Default is **5010**.
TLS Enabled	Ensure to check if you have started q with TLS only.
User Id	The user Id that will be used to connect to Kx kdb+tick.
Password	The password that will be used to connect to Kx kdb+tick.

NOTE ***Host***, ***Port***, ***User Id***, and ***Password*** **can be parameterized.**

4. Select either *Subscription Type*:
   - Service

     Enter the following properties:
     - Subscription Name (e.g., **.u.sub**)

NOTE **Instead of entering the table and symbol to subscribe against in the *Table and Symbol* text boxes, you can specify the full subscription syntax in the *Subscription Name* text box. For example:**

.u.sub[`table;`symbol]

To subscribe to the trade table and AAPL, AIG, and DOW symbols, enter this in the *Subscription Name* text box:

.u.sub[`trade;`AAPL`AIG`DOW]

     - Table to subscribe against (e.g., **trade**)

NOTE
- **You may use just a back tick for the table name, intending to subscribe to all available tables.**
- **When a table name is not entered in the *Table* text box, then the *Symbol* text box is disabled meaning it will not be used while doing subscription.**

     - Symbol to subscribe against (e.g., **AAPL**)

NOTE **Multiple symbols should be separated by a comma.**

   - Functional Subscription

     Enter the functional subscription that needs to be issued (e.g., .**u.sub[`trade;`**])
5. Click **Fetch Schema** to retrieve the schema of the configured subscription.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
6. Check *Constrain subscription to matching symbols* to select the column which contains specific symbols. Otherwise, the filtering against these symbols will not take place.

NOTE **The *Constrain subscription to matching symbols* only lists sym fields. Therefore, if you select a non sym type in the *Id Column*, it is not recommended to select the default value [Id Column] in the *Constrain subscription to matching symbols* drop-down list.**

7. Activate or deactivate *Initialize with historic data*. If unchecked, the data source will only be populated with streaming updates that are subscribed against. If checked, the data source is first initialized against a store of data, after which subscribed streaming updates are then applied.
8. Enter the following information:
    - Host
    - Port
    - User Id
    - Password
    - Query

      These entries can be parameterized.
9. Check *Deferred Sync Query* box to allow the Kxkdb+tick data source to support synchronous and asynchronous reads. The advantage of using this option is that there is no queue on the Kx kdb+tick server side, queries are farmed out to slaves and returned to asynchronous instead.

    The {Query} parameter is used as a place holder for the target query that is defined in the Query builder.
10. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
12. Select the *Flatten List Limit*.

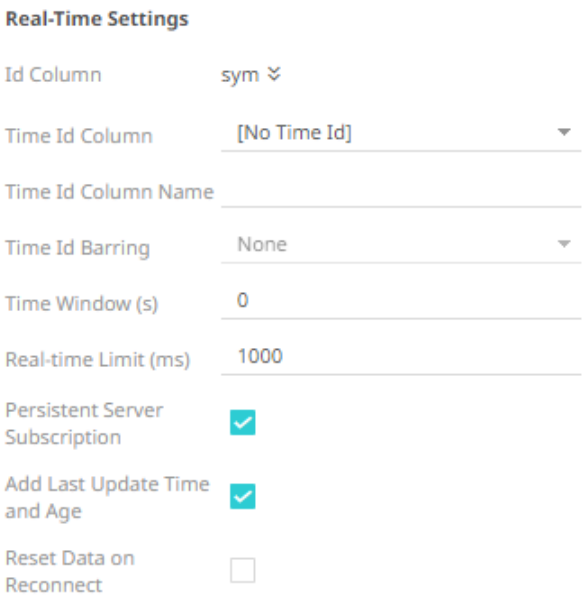
    This allows retrieval of the first 'n' items in the list and produce new columns in the output schema with a dot notation.

    For example, if there are two nested fields (BidPrices and OfferPrices) and the flatten list limit selected is five, then the output schema will be:

    BidPrices.1, BidPrices.2, BidPrices.3, BidPrices.4, BidPrices.5, OfferPrices.1, OfferPrices.2, OfferPrices.3, OfferPrices.4, OfferPrices.5

    If there are less than five items in the list, then the values will be null.

    NOTE **Currently, this feature works for the** Service **subscription type. Also, it only flattens numeric columns.**
13. For this section:



Refer to Define Real-Time Settings for more information.

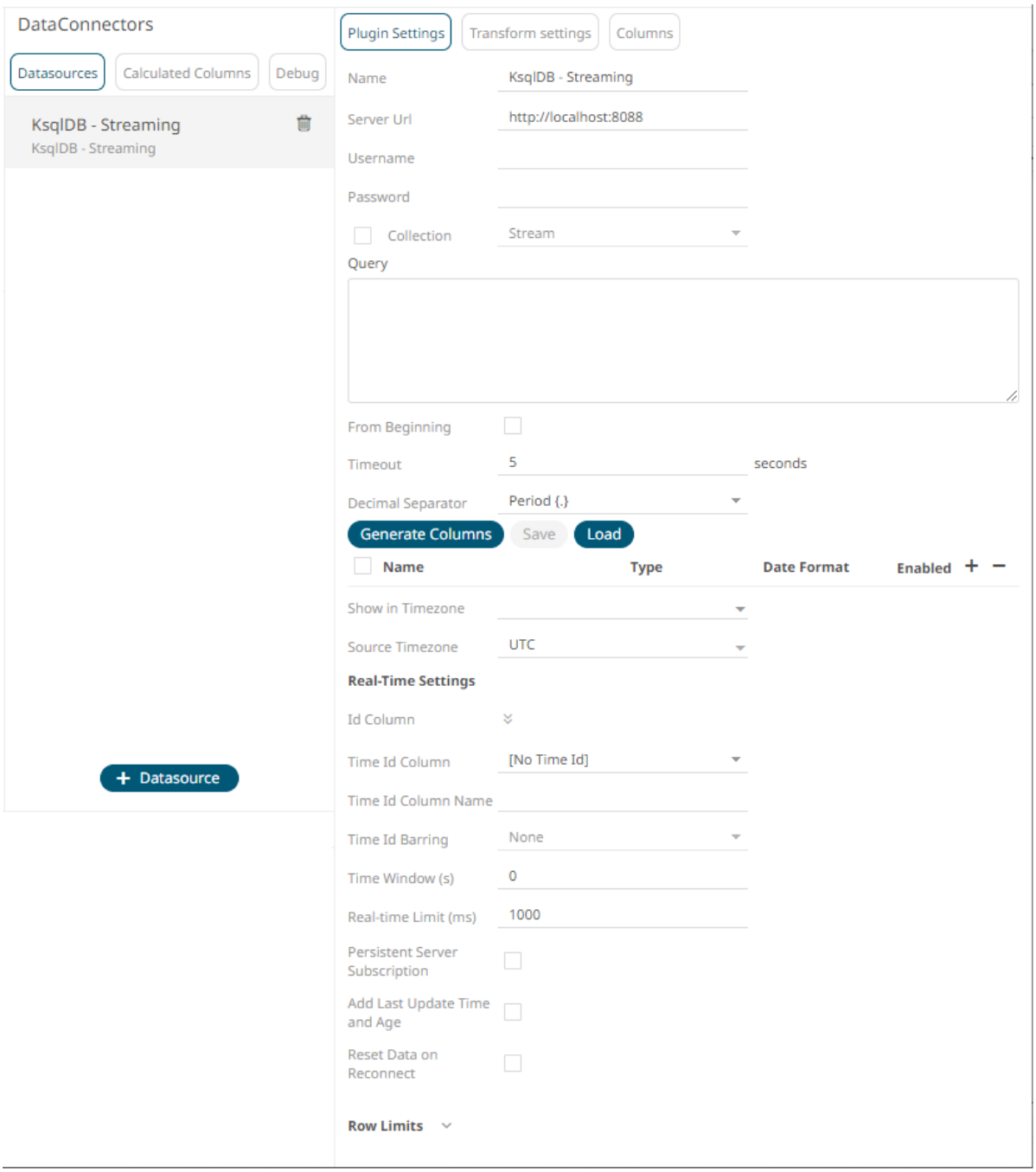
14. Set the row limit of the data set.
15. Tap the **Preview Selected Data Source** slider to turn it on.
16. Click  to display the data preview.

ksqlDB – Streaming Connector

The ksqlDB - Streaming connector allows executing ksqlDB push queries.

Steps:

1. Select **ksqlDB – Streaming** from the *Connectors* panel. The *ksqlDB - Streaming Settings* panel displays.



2. Enter the *Name* of the ksqlDB - Streaming data source, then click ✓.
3. Enter the following properties:

Property	Description
Server URL	ksqlDB - Streaming host address.
Username	User Id that will be used to connect to ksqlDB - Streaming.
Password	Password that will be used to connect to ksqlDB - Streaming.

4. Check the **Collection** box to enable and select either:

   - Stream

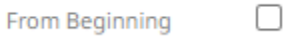
     Immutable and append-only collections which are useful for representing a series of historical facts. Adding multiple events with the same key allows these events to be appended to the end of the stream.

   - Table

     Mutable collections. Adding multiple events with the same key allows the table to only keep the value for the last key. This collection is helpful in modeling change over time and often used to represent aggregations.

5. Click 

to populate the drop-down list. Select the collection.
6. Enter an SQL-like query language into the *Query* box.
7. Check the *From Beginning* box to subscribe from the beginning to the latest messages.

   If un-checked, you will only be subscribed to the latest messages.
8. Enter the *Timeout*. Default is **5** (in seconds).
9. Select either the dot (.) or comma (,) as the *Decimal Separator*.
10. Click 

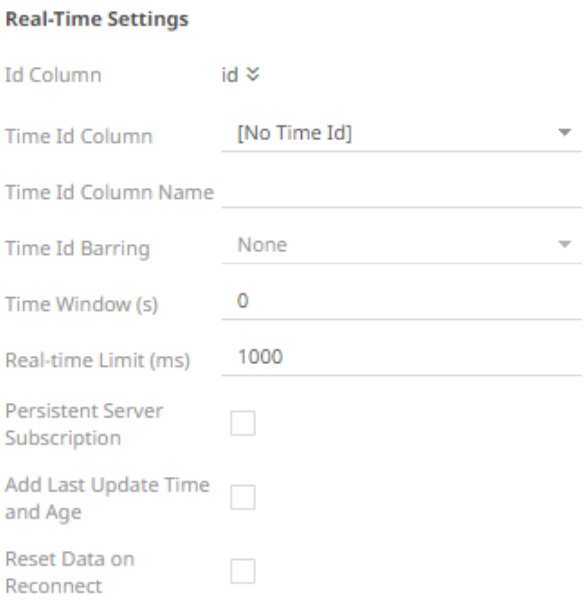
to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

    This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
11. You can also opt to load or save a copy of the column definition.
12. Click  . A new column entry displays. Enter or select the following properties:

Property	Description
Name	The column name of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Enabled	Determines whether the message should be processed.

    To delete a column, check its  or all the column entries, check the topmost  , then click .
13. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
14. For this section:



Refer to Define Real-Time Settings for more information.

15. Set the row limit of the data set.
16. Tap the **Preview Selected Data Source** slider to turn it on.
17. Click  to display the data preview.

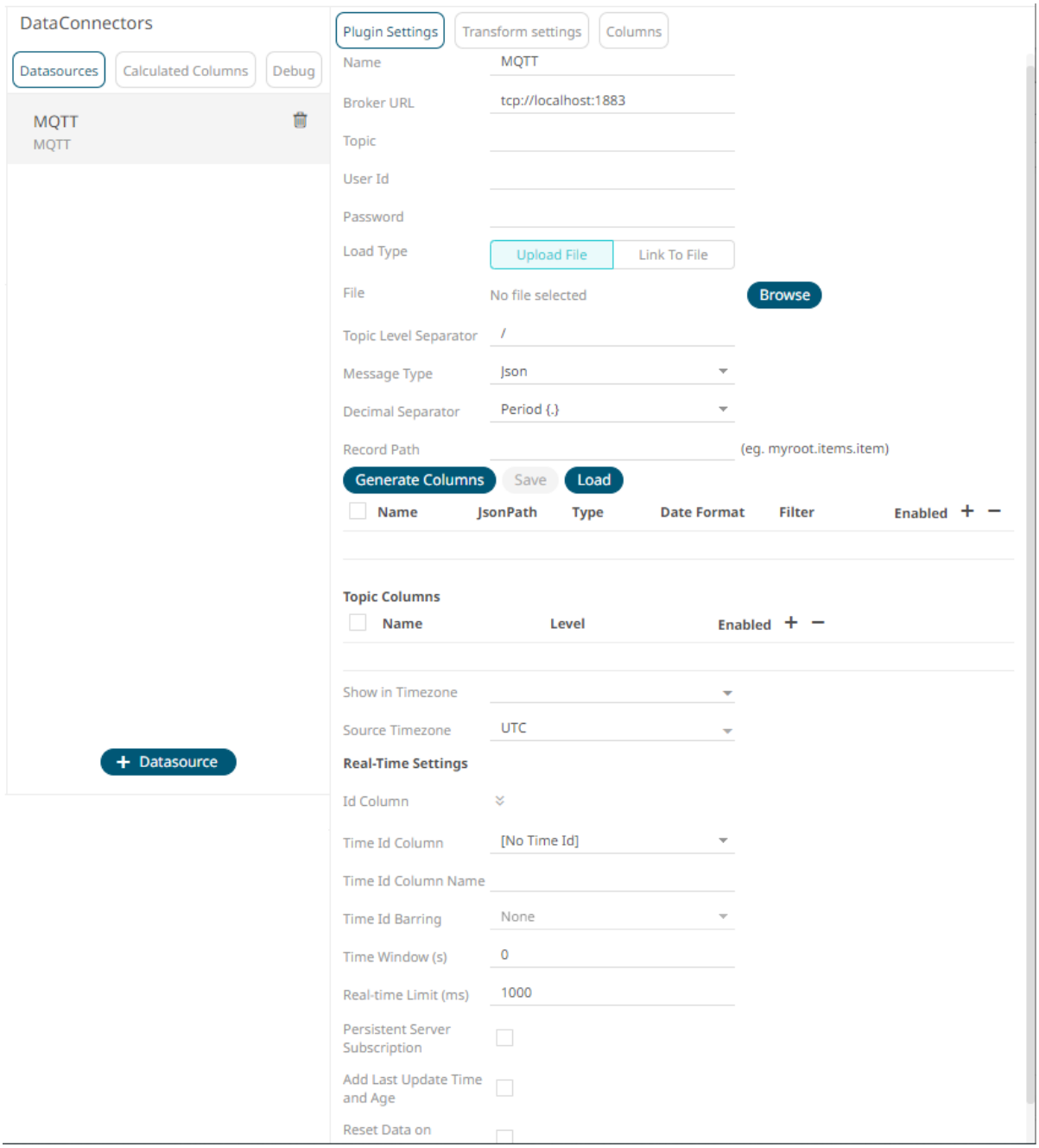
MQTT Connector

The MQTT connector allows:

- connection to MQTT's message bus on a real-time streaming basis.
- Panopticon to subscribe to FIX, JSON, Text or XML based messages that are published on particular topics. The data format itself is arbitrary, and consequently, the connection includes the message definition.
- encrypted/SSL connections using a generated CA certificate file.

Steps:

1. Select **MQTT** from the *Connectors* panel. The *MQTT Settings* panel displays.



2. Enter the *Name* of the MQTT data source, then click ✓.
3. Enter the following properties:

Property	Description
Broker URL	The location of the message broker. Default is `tcp://localhost:1883`
Topic	The topic or the queue physical name. Example: level1/level2/level3/level4 etc. **NOTES:**

	You can also opt to use a wild card in the topic name specification. • The plus sign symbol (+) can be used as a wild card for any value at one specific level. Example: **level1/level2/+/level4** • The hash sign symbol (#) can be used as a wild card for any values across more than one level. Example: **level1/#/level4**
User Id	The user Id that will be used to connect to MQTT.
Password	The password that will be used to connect to MQTT.

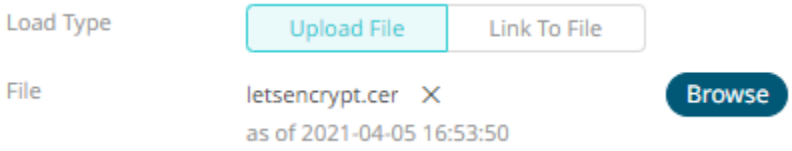
4. To allow encrypted connections, you can either:

   - Upload a CA Certificate file by clicking **Upload File** 

then **Browse** 

to browse to the file source.

     After selecting the file, it is displayed with the timestamp.

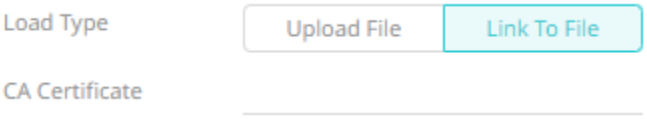
     

     To change the certificate, click  then **Browse** 

to browse to a new version of the file.

   - Link to a CA Certificate file by clicking **Link to File** 

and entering a *File Path*.

5. In MQTT, a topic consists of one or more topic levels. Enter the *Topic Level Separator* to use. Default is / (forward slash).
6. Select the *Message Type*.
7. Select either the dot (.) or comma (,) as the *Decimal Separator*.

   NOTE **Prepend 'default:' for the elements falling under default namespace.**

8. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first ‘n’ rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
9. You can also opt to load or save a copy of the column definition.
10. Click  to add columns to the MQTT connection that represent sections of the message. Then enter or select:

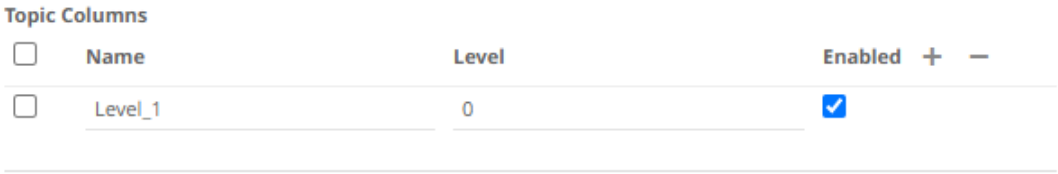
Property	Description
Name	The column name of the source schema.
XPath/JsonPath/Fix Tag/Column Index	The XPath/JsonPath/Fix Tag/Column Index of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**. **NOTE:** To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them. For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`
Filter	Defined parameters that can be used as filter. Only available for JSON, Text, and XML message types.
Enabled	Determines whether the message field should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

11. Text for topic levels can be consumed as additional columns into the data table.

    The *Topic Columns* section shows and allows defining data table columns and mapping them to topic hierarchy levels (index based from left, 0 based).

    Like columns from message data, manually add them by clicking +. A new entry displays.

    Name can be any unique topic level within the topic name. The *Level* is the hierarchy level of the topic column.

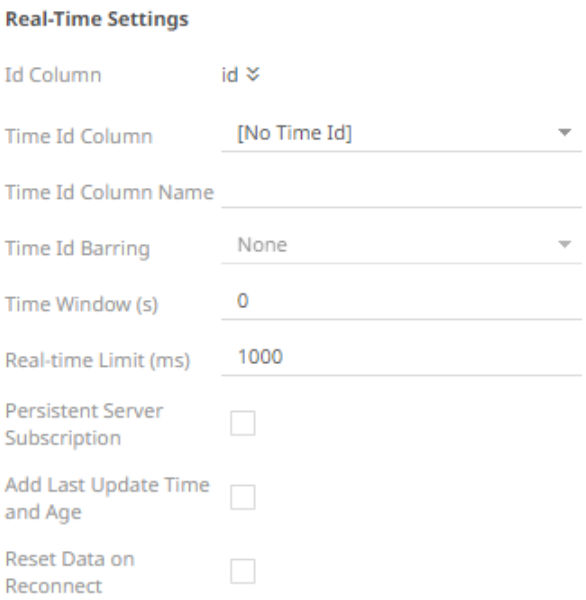
    Check the *Enabled* box to enable a topic column.

    To delete a topic column, check its ☐ or all the topic column entries, check the topmost ☐, then click −.

12. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

13. For this section:



Refer to Define Real-Time Settings for more information.

14. Set the row limit of the data set.
15. Tap the **Preview Selected Data Source** slider to turn it on.
16. Click ▶ Start Preview to display the data preview.

OneTick CEP Connector

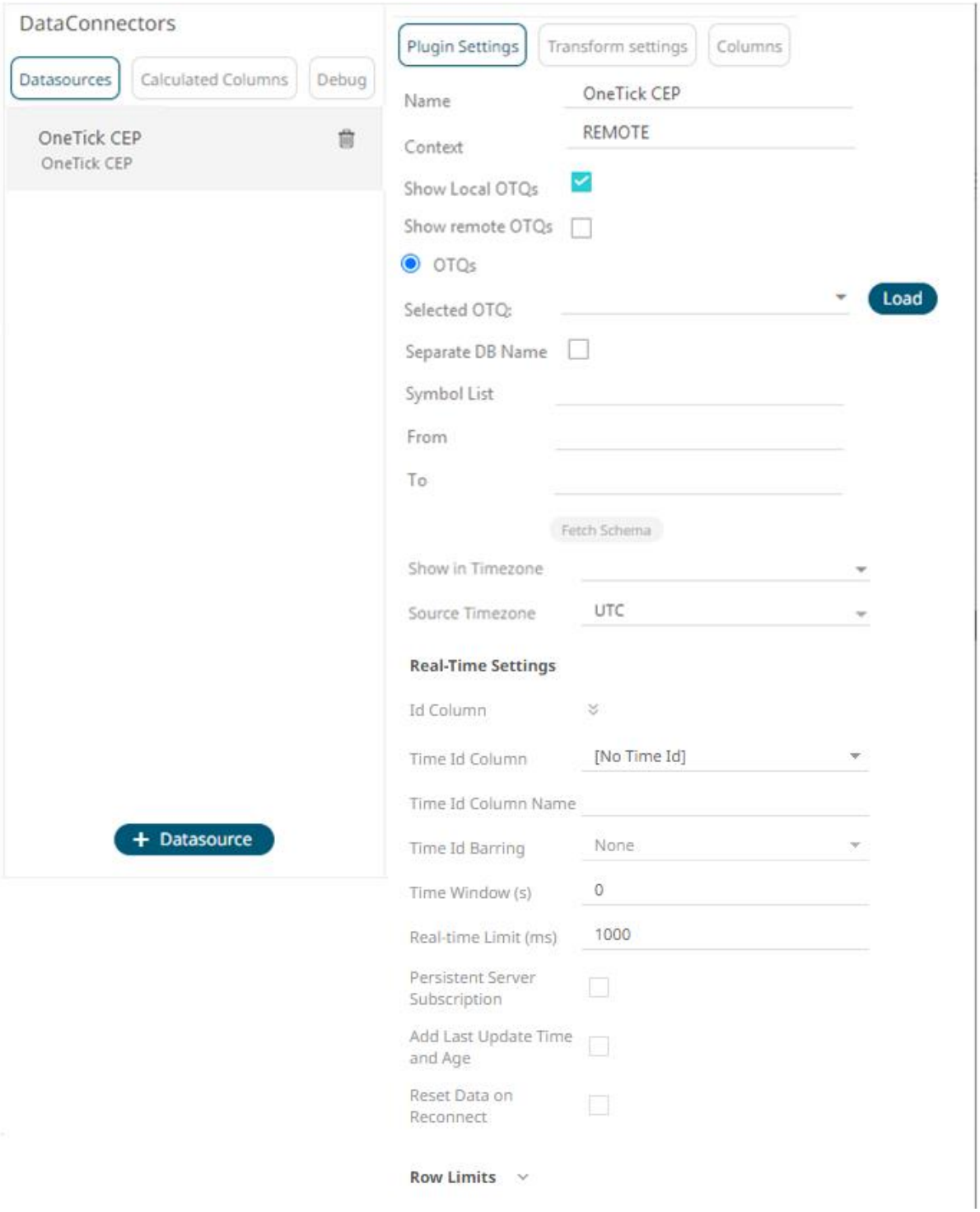
The OneTick CEP connector allows connection to OneMarketData OneTick tick history databases on a streaming subscription basis. The connector supports either:

- Execution of a specified OTQ
- Execution of a specified parameterized OTQ

To use the OneTick CEP connector, it requires a JAR file to be added and some configurations to be performed. Further details are provided in the *Panopticon Real Time Installation and Troubleshooting Guide*.

Steps:

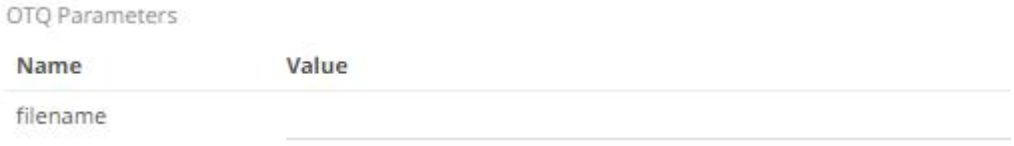
1. Select **OneTick CEP** from the *Connectors* panel. The *OneTick CEP Settings* panel displays.



12. Enter the *Name* of the OneTick CEP data source, then click ✓.
13. Enter the *Context* (for example, **REMOTE**).
14. You can either check:
    - **Show Local OTQs** box to display the local OTQs in the *Selected OTQs* drop-down list.
    - **Show Remote OTQs** box to display the remote OTQs in the *Selected OTQs* drop-down list.

15. Click **Load**  to populate the *Selected OTQ* drop-down list. Select an OTQ.

    The *OTQ Parameters* section displays with the list of input parameters based on the selected OTQ.

16. Check/uncheck the *Separate DB Name* box.
17. Click  to populate the *Id Column* list box.

    From this list box, select the field which will define a unique data record to subscribe against.

    The following are generic to all OTQs:

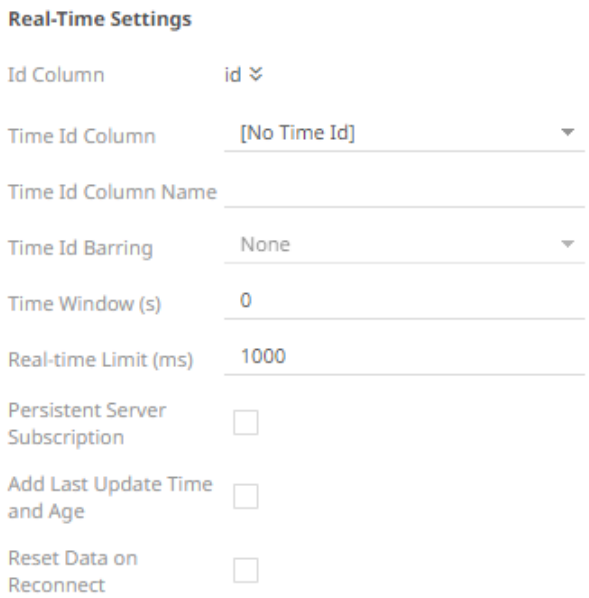
    - Symbol List
    - From
    - To

      These add additional filter criteria such as symbol, and time window onto the basic OTQ.

18. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

19. For this section:

    Refer to Define Real-Time Settings for more information.

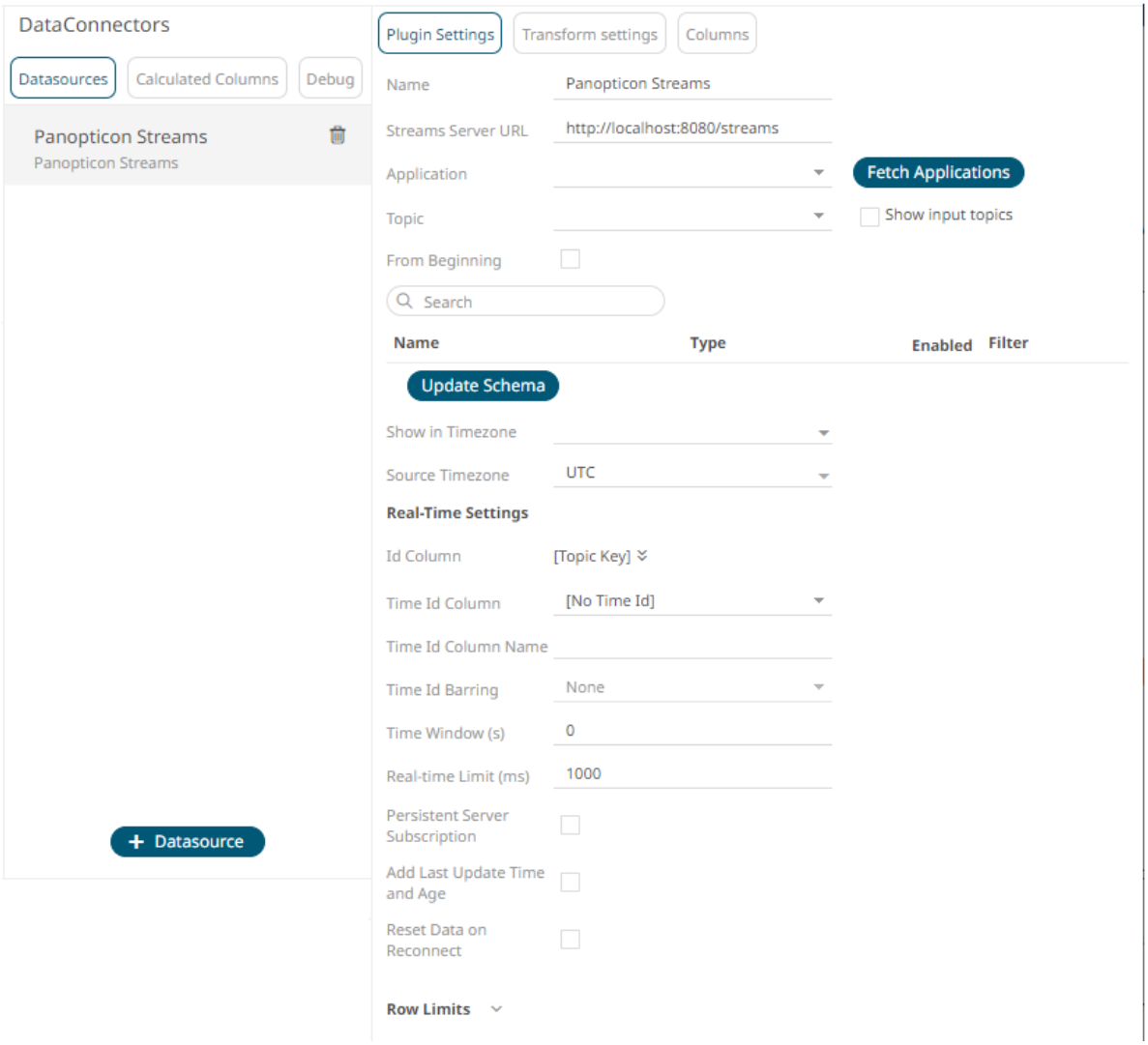
20. Set the row limit of the data set.
21. Tap the **Preview Selected Data Source** slider to turn it on.
22. Click  to display the data preview.

Panopticon Streams Connector

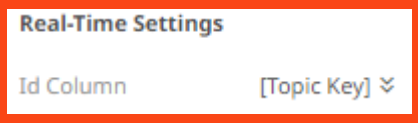
Retrieves topics using the meta data of applications that are provided by Panopticon Streams Server.

Steps:

1. Select **Panopticon Streams** from the *Connectors* panel. The *Panopticon Streams Settings* panel displays.



NOTE **The key provided from the Kafka subscription is automatically selected as the *Id Column*.**



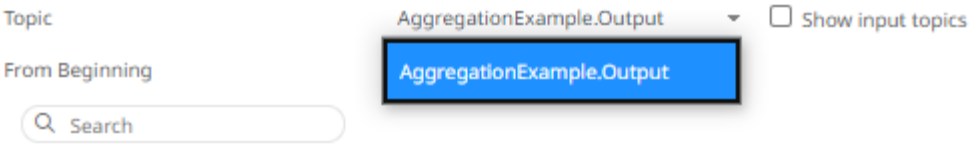
2. Enter the *Name* of the Panopticon Streams data source, then click ✓.
3. Enter the absolute path, including the http where the Panopticon Streams server is located, in the *Streams Server URL* box (i.e., `http://localhost:8080/streams`).

4. Click Fetch Applications. The first application in the *Application* drop-down list is selected and the schema of the output topic is displayed, if it is started in the Panopticon Streams server.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

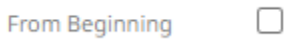
5. Click the *Application* drop-down list box to select another application.

6. Check the *Show Input Topics* box to include input topics in the *Topic* drop-down list.



7. Select a topic. This populates the list of columns, with the data type found from inspecting the first 'n' rows of the file.

8. Check the *From Beginning* box to subscribe from the beginning to the latest messages.



   If un-checked, you will only be subscribed to the latest messages.

9. Click Update Schema to ensure that the latest schema of the topic is being applied.

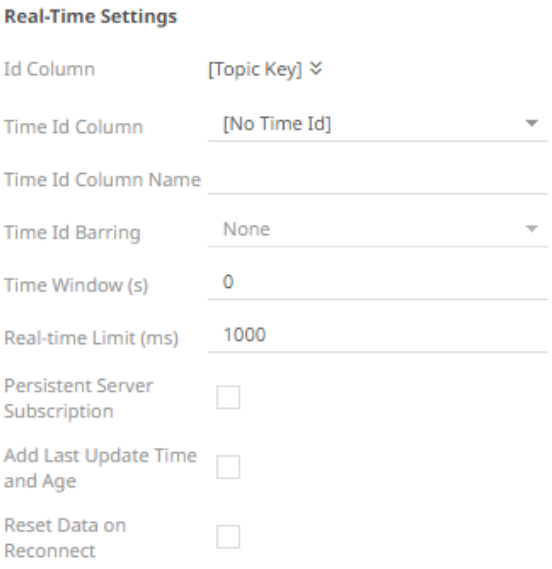
10. Then select:

    - Enabled (determines whether the message field should be processed)
    - Filter (defined parameters that can be used as Filter)

11. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.

12. For this section:



    Refer to Define Real-Time Settings for more information.

13. Set the row limit of the data set.

14. Tap the **Preview Selected Data Source** slider to turn it on.

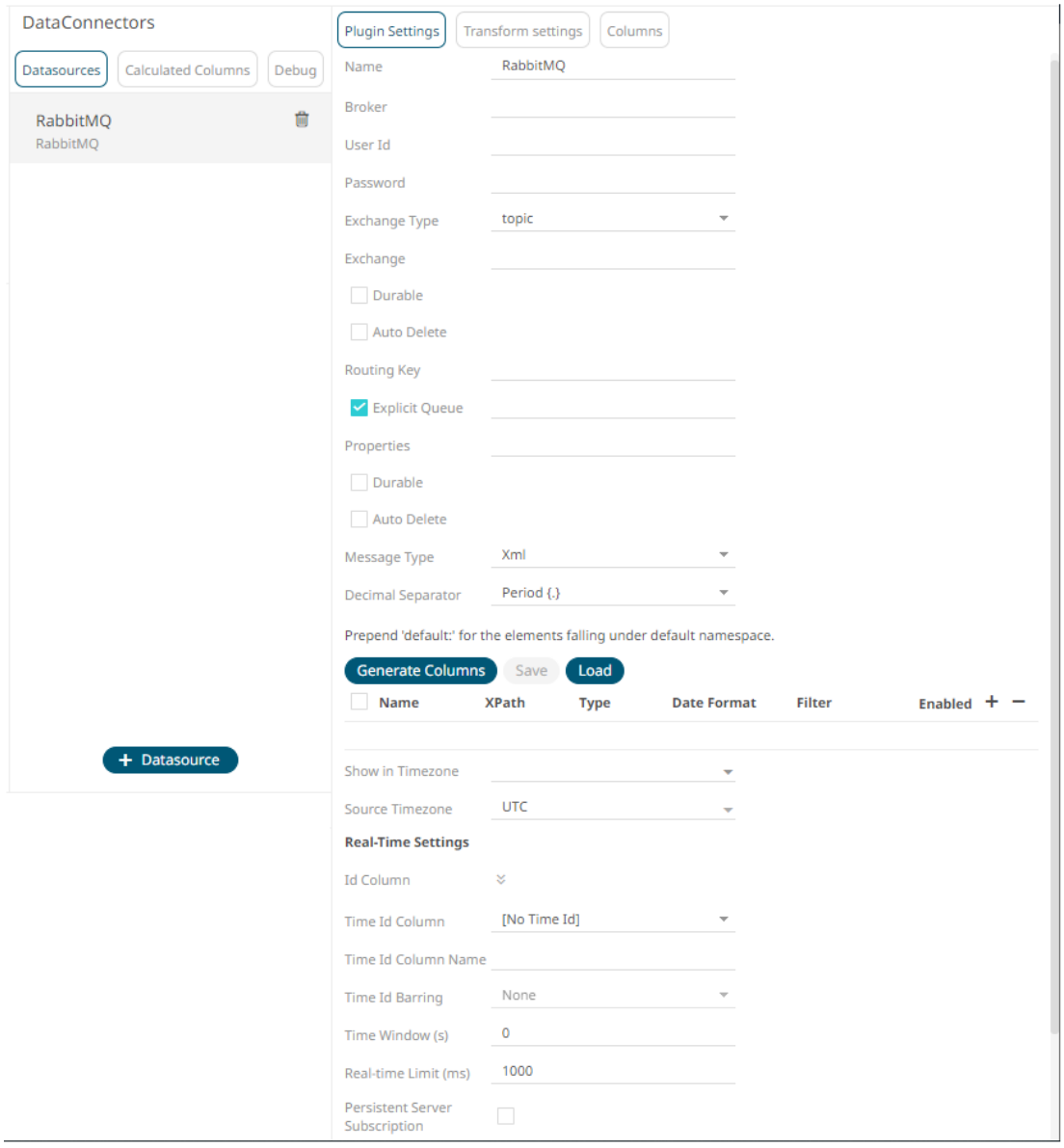
15. Click ▶ Start Preview to display the data preview.

RabbitMQ Connector

The RabbitMQ connector allows connection to RabbitMQ's message bus on a real-time streaming basis. Specifically, the connector allows Panopticon to subscribe to XML, JSON, Text or FIX based messages that are published on particular topics.

Steps:

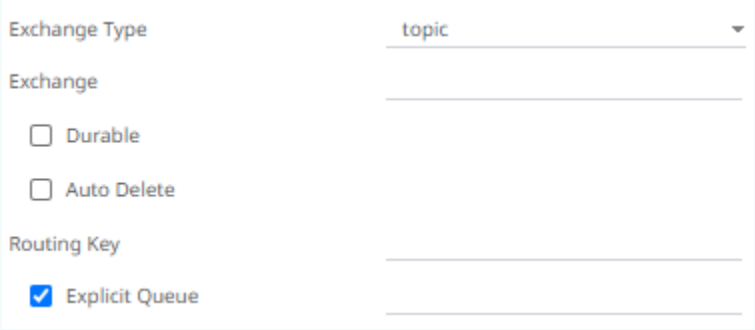
1. Select **RabbitMQ** from the *Connectors* panel. The *RabbitMQ Settings* panel displays.



2. Enter the *Name* of the RabbitMQ data source, then click ✓.
3. Enter the connection details including:

Property	Description
Broker	The location of the message broker.
User Id	The user Id that will be used to connect to RabbitMQ.
Password	The password that will be used to connect to RabbitMQ.

4. Select any of the following *Exchange Types*:

Exchange Type	Description
Default	A direct exchange with no name that is pre-declared by the broker. Selecting this exchange type disables the *Exchange* section (*Exchange* and *Routing Key* properties). 
Fanout	Broadcasts all of the messages it receives to all of the queues it knows and the routing key is ignored (the *Routing Key* field is disabled).
Direct	Delivers messages to queues based on a message routing key. It is ideal for the unicast routing of messages, although it can be used for multicast routing as well.
Topic	A message sent with a particular routing key will be delivered to all of the queues that are bound with a matching binding key.
Headers	Exchanges routed based on arguments containing headers and optional values.

5. Depending on the selected *Exchange Type*, select or define the following:

Property	Description
Exchange	Name of the exchange.
Durable	Enable so the exchange can survive a broker restart.
Auto Delete	Enable so the exchange is deleted when the last queue is unbound from it.
Routing Key	The routing key used to deliver messages to queues.
Headers	This field is only available when the message type is **Header**. Binding a queue to a Headers exchange is possible using more than one header for matching. Setting *x-match* to **any**, means just one matching value is sufficient. Setting it to **all** means that all values must match. Default is **x-match=all**.

6. Check the *Explicit Queue* box and enter the custom queue name. Then enter or enable the following properties:

Queue Property	Description
Properties	The custom queue property.
Durable	Enable so the queue can survive a broker restart.
Auto Delete	Enable so the queue that had the least consumer will be deleted when that connection closes.

7. Select the *Message Type*.
8. Select either the dot (.) or comma (,) as the *Decimal Separator*.

NOTE **Prepend 'default:' for the elements falling under default namespace.**

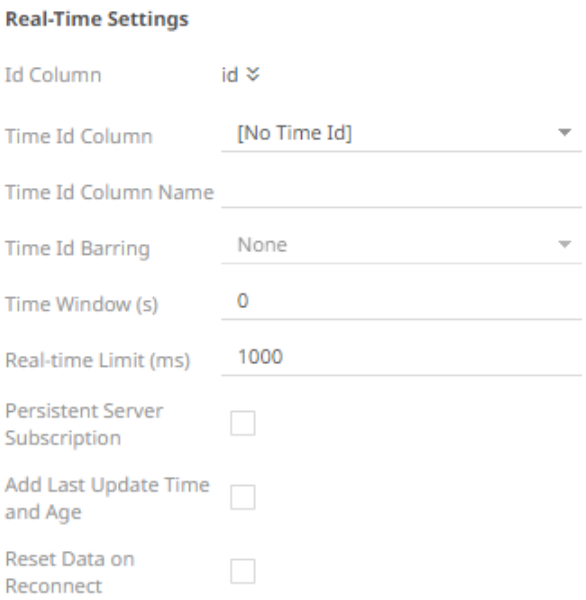
9. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
10. You can also opt to load or save a copy of the column definition.
11. Click + to add columns to the RabbitMQ connection that represent sections of the message. Then enter or select:

Property	Description
Name	The column name of the source schema.
Fix Tag/Json Path/Text Column Index/Xpath	The Fix Tag/Json Path/Text Column Index/Xpath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**. **NOTE:** To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them. For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`
Filter	Defined parameters that can be used as filter. Only available for JSON, Text, and XML message types.
Enabled	Determines whether the message field should be processed.

   To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.
12. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
13. For this section:



Refer to Define Real-Time Settings for more information.

14. Set the row limit of the data set.
15. Tap the **Preview Selected Data Source** slider to turn it on.
16. Click 

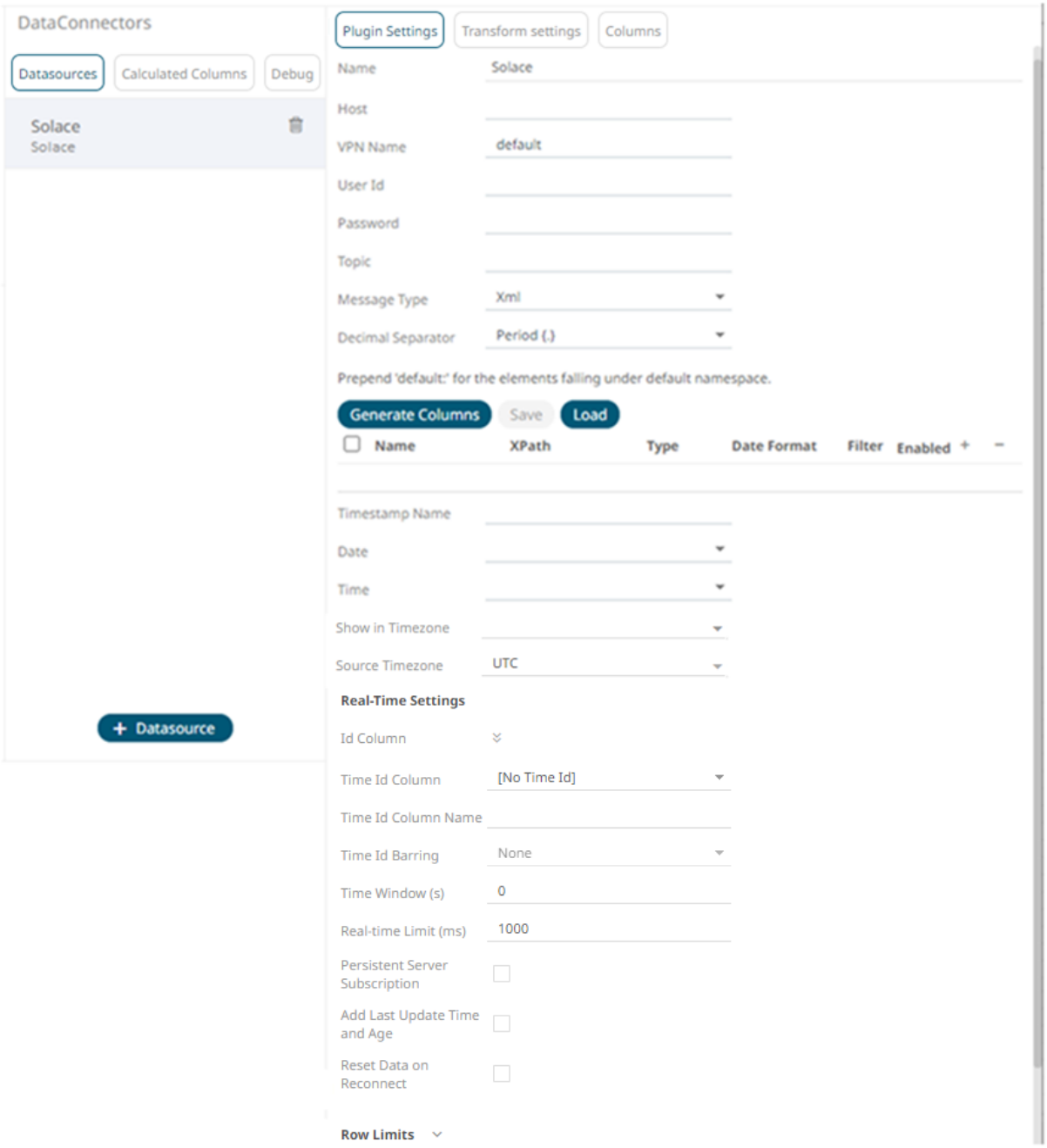
to display the data preview.

Solace Connector

The Solace connector allows connection to Solace's message bus on a real time streaming basis. Specifically, the connector allows Panopticon to subscribe to messages that are published in particular topics in Solace and consequently, perform operational analytics.

Steps:

1. Select **Solace** from the *Connectors* panel. The *Solace Settings* panel displays.



2. Enter the *Name* of the Solace data source, then click ✓.
3. Enter the connection details including:

Property	Description
Host	Solace host address.
VPN Name	Message VPN name. Default is **default**.
User Id	The user Id that will be used to connect to Solace.
Password	The password that will be used to connect to Solace.

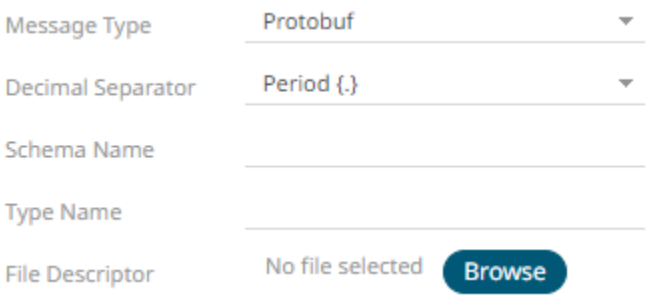
4. Enter the *Topic* or the queue physical name.

5. Select the *Message Type*.

   Aside from the **Fix**, **Json**, **Text**, and **XML** message types, **Protobuf** is also supported in Solace.

   If **Protobuf** is selected, confirm the **Decimal Separator,** and enter the *Schema Name* and *Type Name*.

   Then click Browse to select the **File Descriptor** (`.desc` file) in the *Open* dialog.



Property	Description
Schema Name	The Protobuf schema.
Type Name	The message of Protobuf type that will be sent to Kafka.
File Descriptor	The `FileDescriptorSet` which: • is an output of the protocol compiler. • represents a set of `.proto` files, using the `--descriptor_set_out` option.

6. Select either the dot (.) or comma (,) as the *Decimal Separator*.

   NOTE **Prepend 'default:' for the elements falling under default namespace.**

7. Click Generate Columns to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first ‘n’ rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

8. You can also opt to load or save a copy of the column definition.

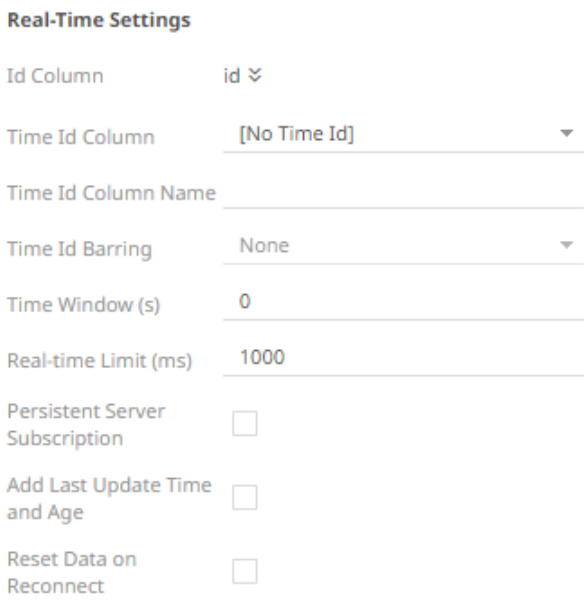
9. Click + to add columns to the Solace connection that represent sections of the message. Then enter or select:

Property	Description
Name	The column name of the source schema.
Type/JsonPath/Column Index/XPath	The SDTMap Type/JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**. **NOTE:** To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them. For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`
Filter	Defined parameters that can be used as filter. Only available for Avro, JSON, Text, and XML message types.
Enabled	Determines whether the message field should be processed.

To delete a column, check its ☐ or all the column entries, check the topmost ☐, then click −.

10. To create a new Timestamp field, enter a new *Timestamp Name* and then select the valid Date/Time from either a single *Date* or *Time* field, or a compound column created from *Date* and *Time* fields.
11. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

    You can opt to define the *Show in Timezone* and *Source Timezone* settings.
12. For this section:



    Refer to Define Real-Time Settings for more information.
13. Set the row limit of the data set.
14. Tap the **Preview Selected Data Source** slider to turn it on.
15. Click ▶ Start Preview to display the data preview.

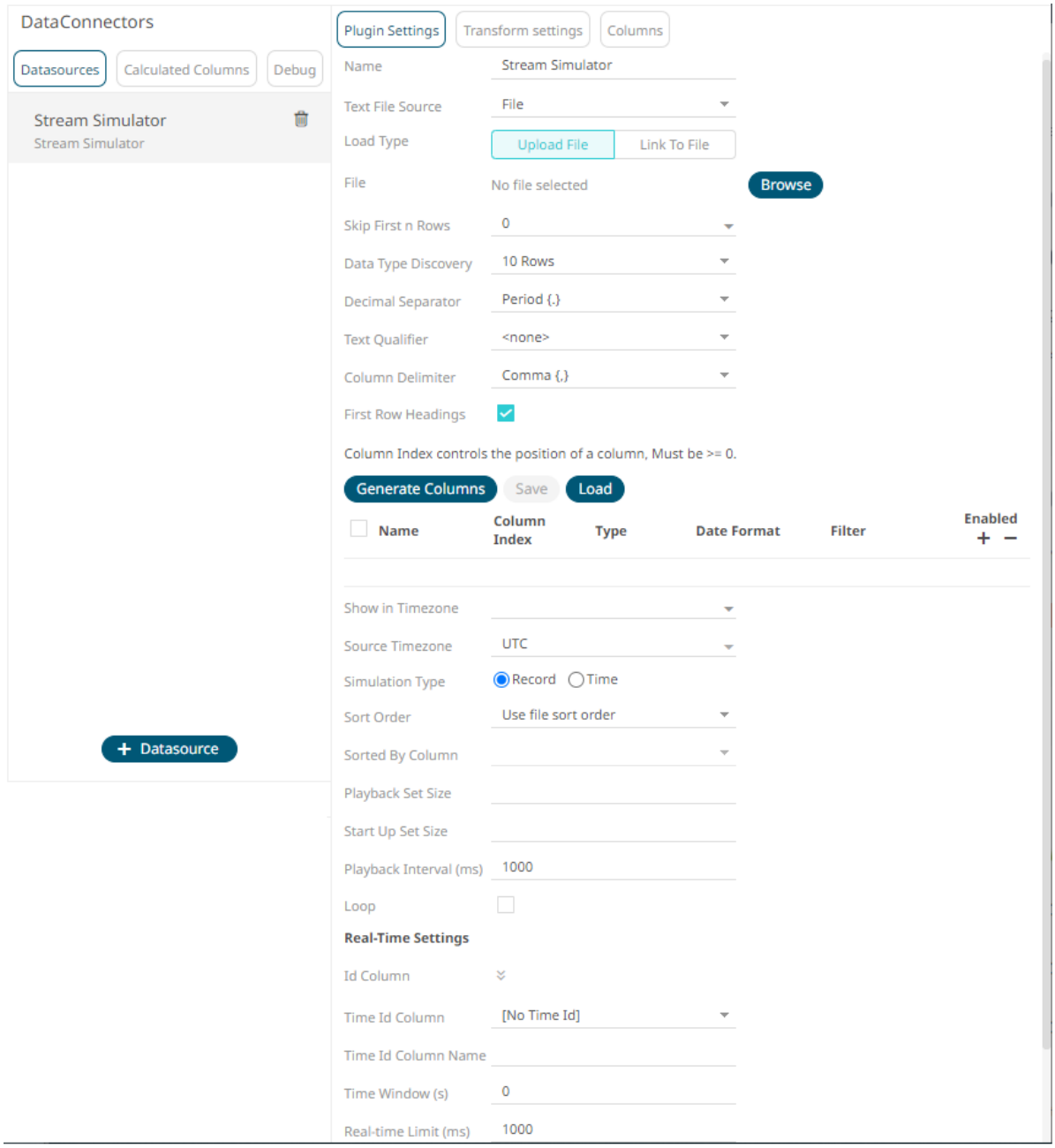
Stream Simulator Connector

The Stream Simulator connector is very similar to the Text connector with the addition of the time windowing of message queue connectors.

Creating the Stream Simulator input data source includes setting for how fast and how many messages are pushed through in each batch.

Steps:

1. Select **Stream Simulator** from the *Connectors* panel. The *Stream Simulator Settings* panel displays.



2. Enter the *Name* of the Stream Simulator data source, then click ✓.
3. Select the Text *File Source*.

The standard settings controlling how the text file is parsed, is listed.

These include:

Property	Description
Skip First N Rows	Specifies the number of rows that will be skipped.
Data Type Discovery	Specifies how many rows from the text file should be used when automatically determining the data types of the resulting columns.
Decimal Separator	Select either the dot (.) or comma (,) as the *Decimal Separator*.
Text Qualifier	Specifies if fields are enclosed by text qualifiers, and if present to ignore any column delimiters within these text qualifiers.
Column Delimiter	Specifies the column delimiter to be used when parsing the text file.
First Row Headings	Determines if the first row should specify the retrieved column headings, and not be used in data discovery.

4. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.

5. You can also opt to load or save a copy of the column definition.

6. Click  . A new column entry displays. Enter or select the following properties:

Property	Description
Name	The column name of the source schema.
Column Index	The column index controls the position of a column. Must be >= 0.
Type	The data type of the column. Can be a **Text, Numeric,** or **Time**
Date Format	The format when the data type is **Time**.
Filter	Defined parameters that can be used as filter.
Enabled	Determines whether the message should be processed.

   To delete a column, check its  or all the column entries, check the topmost  , then click .

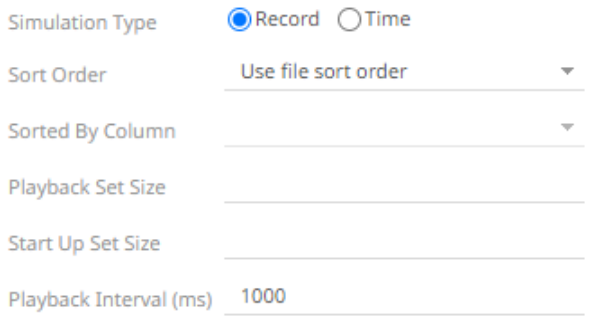
7. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.

8. Select the *Simulation Type*:

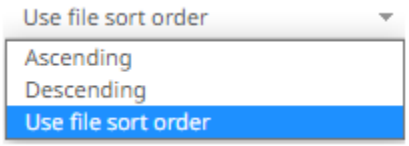
   - Record

     Sends the number of records for each interval of time. By default, records are sent in the same order of the source.



This simulation type allows the specification of the following:

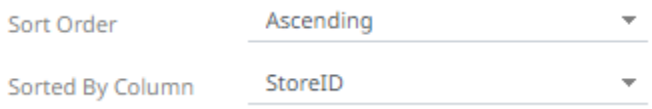
- Sort Order



When you select the **Use file sort order**, it will use the default sorting order of the file.

When you either select **Ascending** or **Descending** as the Sort Order, this enables the *Sorted by Column* drop down list.

Select the column that will be used for the sorting.



- Playback Set Size

  The number of records set to be updated during simulate/playback.

- Start Up Set Size

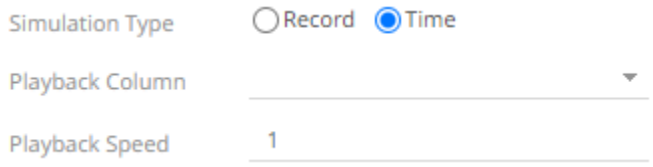
  The number of records set to be published initially (on start-up).

- Playback Interval (ms)

  The update interval period for the record-based playback. Default is **1000 (ms)**.

- Time

Simulates records as they occur in real-time.



This simulation type allows the specification of the following:

- Playback Column

  The playback column which is a Date/Time type.

- Playback Speed

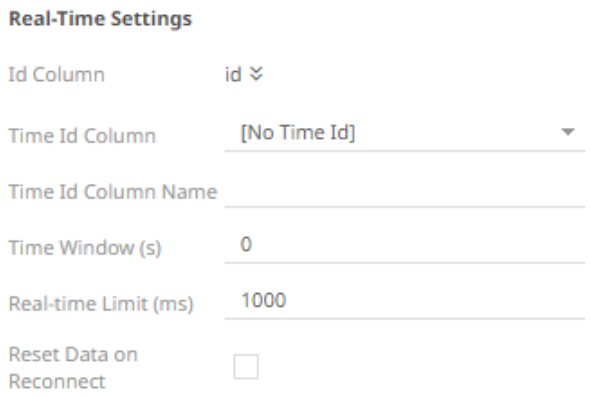
  A multiplier which to either speed up or slow down the playback. Default is **1**.

  - If 0 < value < 1 slow down
  - If value = 1 records will be published as they occur

- if value > 1 speed up

NOTE **For time-based simulation, if the Date/Time column have improper dates, it will fail and stop.**

9. Check the **Loop** box to enable looping through the file.
10. For this section:



Refer to Define Real-Time Settings for more information.

11. Set the row limit of the data set.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click 

to display the data preview.

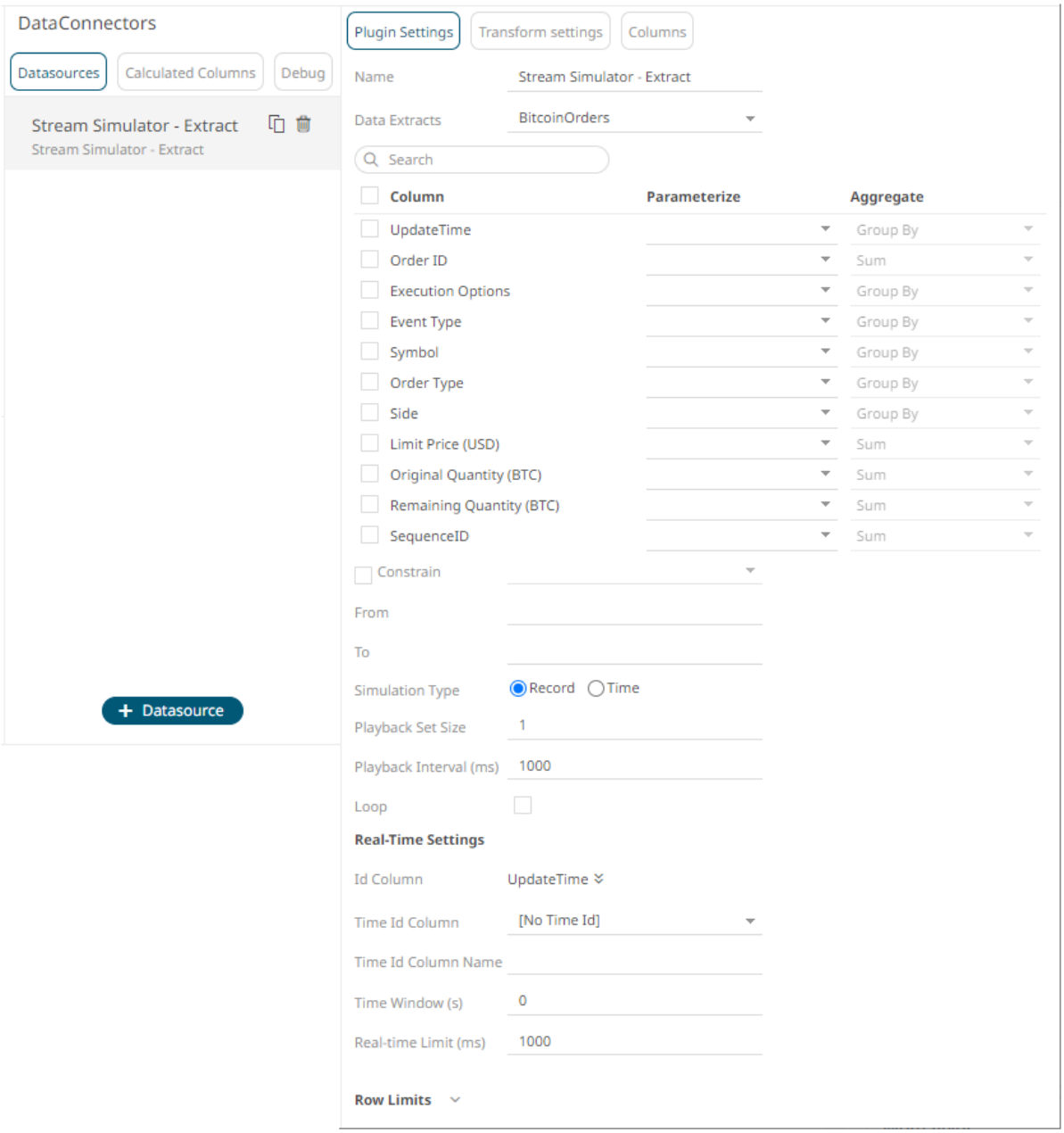
Stream Simulator – Extract Connector

The Stream Simulator – Extract connector reads data extracts and outputs the data as a streaming real-time connector, either in batches or based on the values of a timestamp field in the incoming data.

Steps:

1. Select **Stream Simulator - Extract** from the *Connectors* panel. The *Stream Simulator – Extract Settings* panel displays with the first data extract in the drop-down list (e.g., BitcoinOrders).

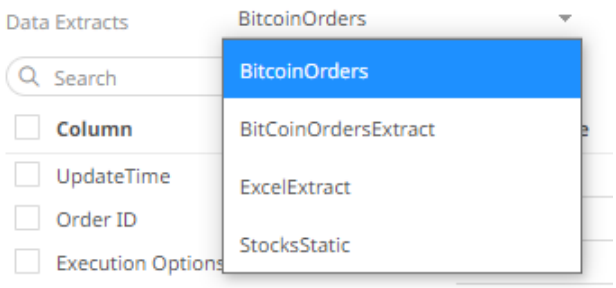
   The list of columns is displayed, with the data type found from inspecting the first 'n' rows of the file. This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.



NOTE **To populate the list of columns, the data extract of a connector must be complete after refreshing the data.**

You can also filter the list of columns by entering a text in the *Search* box.

2. Enter the *Name* of the Stream Simulator – Extract data source, then click ✓.
3. You can opt to select another data extract to display its list of columns.



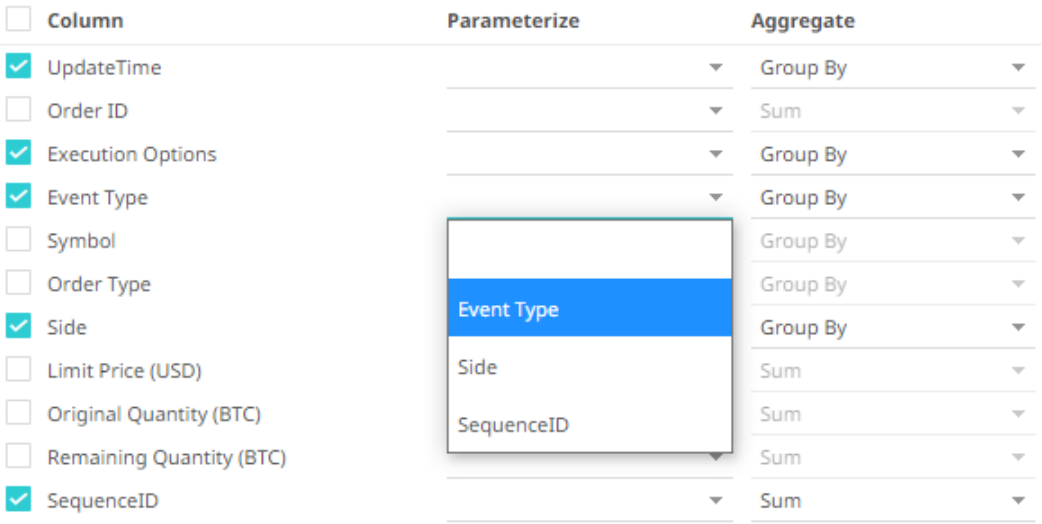
4. If the data returned is to be aggregated, then check their **Column** box. For each selected column, the possible aggregation methods are listed including:

   - Text Columns: Group By
   - Date/Time Columns: Group By
   - Numeric Columns: Sum, Count, Min, Max, Mean

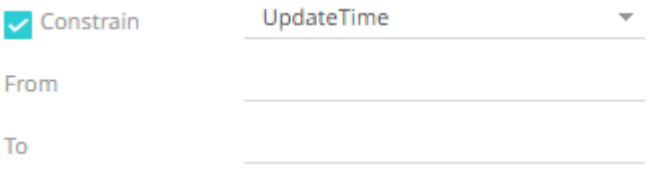


   Select the *Aggregate* method in the drop-down list.

5. If you wish to parameterize a specific column, match the parameter to the appropriate column. By default, they will be matched on name.



6. If only a selected Date/Time range of the table/view is to be queried, check the **Constrain** box, and complete the *From* and *To* text boxes, either with values or with parameters.



7. Select the *Simulation Type*:

- Record

  Sends the number of records for each interval of time. By default, records are sent in the same order of the source.



  This simulation type allows the specification of the following:

  - Playback Set Size

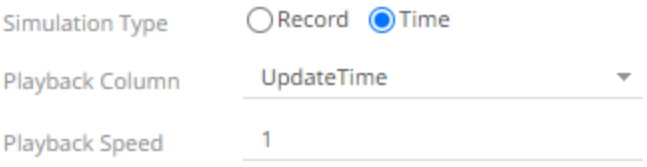
    The number of records set to be updated during simulate/playback.

  - Playback Interval (ms)

    The update interval period for the record-based playback. Default is **1000 (ms)**.

- Time

  Simulates records as they occur in real-time.



  This simulation type allows the specification of the following:

  - Playback Column

    The playback column which is a Date/Time type.

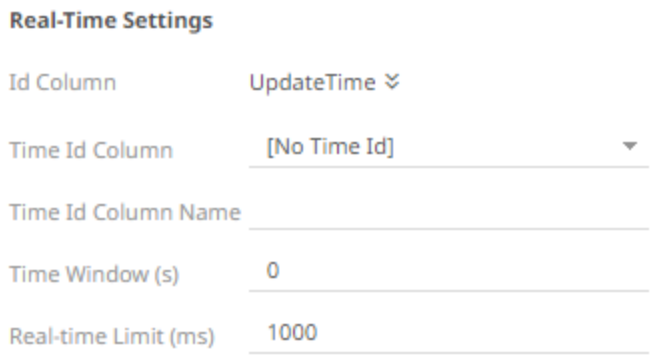
  - Playback Speed

    A multiplier which to either speed up or slow down the playback. Default is **1**.

    - If 0 < value < 1 slow down
    - If value = 1 records will be published as they occur
    - if value > 1 speed up

NOTE **For time-based simulation, if the Date/Time column have improper dates, it will fail and stop.**

8. Check the **Loop** box to enable looping through the file.
9. For this section:



Refer to Define Real-Time Settings for more information.

10. Set the row limit of the data set.
11. Tap the **Preview Selected Data Source** slider to turn it on.
12. Click 

to display the data preview.

StreamBase 7.1 Connector

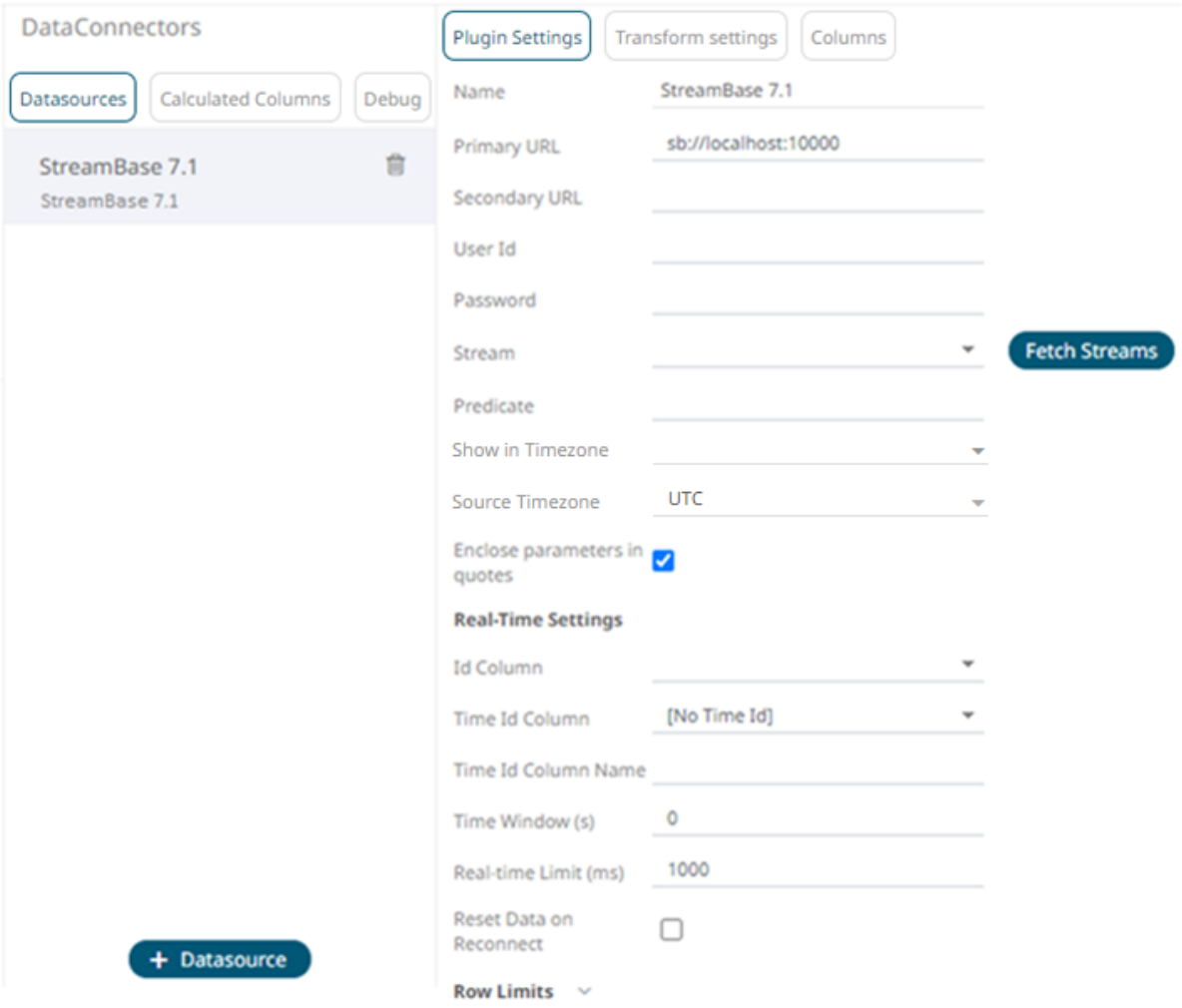
The StreamBase 7.1 connector allows connection to the StreamBase CEP engine instance on a real-time streaming basis.

To use the StreamBase connector, Streambase 7.1 redistributable must be installed.

Refer to http://www.streambase.com/products/streambasecep/download-streambase/ for more information in downloading StreamBase products.

Steps:

1. Select **StreamBase 7.1** from the *Connectors* panel. The *StreamBase 7.1 Settings* panel displays.



2. Enter the *Name* of the StreamBase 7.1 data source, then click ✓.
3. Enter the following properties:

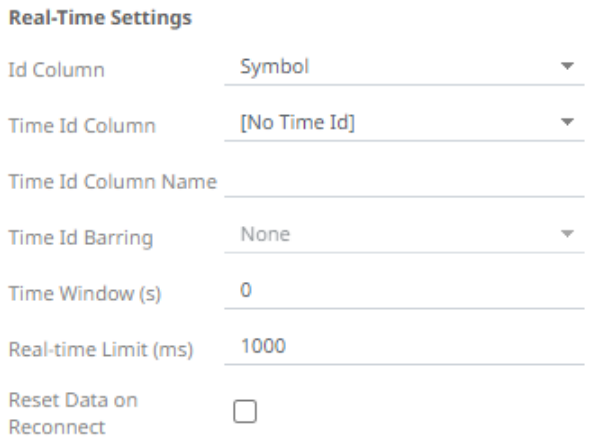
Property	Description
Primary URL	Primary URL of the StreamBase 7.1. Default is **sb://localhost:10000**.
Secondary URL	Secondary URL of the StreamBase 7.1. **NOTE:** More than two StreamBase server URLs can be specified by comma separation.
User Id	User Id that will be used to connect to StreamBase 7.1.
Password	Password that will be used to connect to StreamBase 7.1.

4. Click Fetch Streams to return a list of updated streams. Selection of a stream returns a list of available Id columns for the stream.

   This populates the *Id Column* with the set of columns from the schema of type `sym` and the text array such as Character/Boolean/GUID, etc. The selected *Id Column* can be used to select a key column to manage data updates and inserts.

5. Enter the *Predicate* expression to force emission.
6. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
7. Select whether the parameters should be automatically enclosed in quotes, by checking the **Enclose parameters in quotes** box.
8. For this section:



   Refer to Define Real-Time Settings for more information.
9. Set the row limit of the data set.
10. Tap the **Preview Selected Data Source** slider to turn it on.
11. Click 

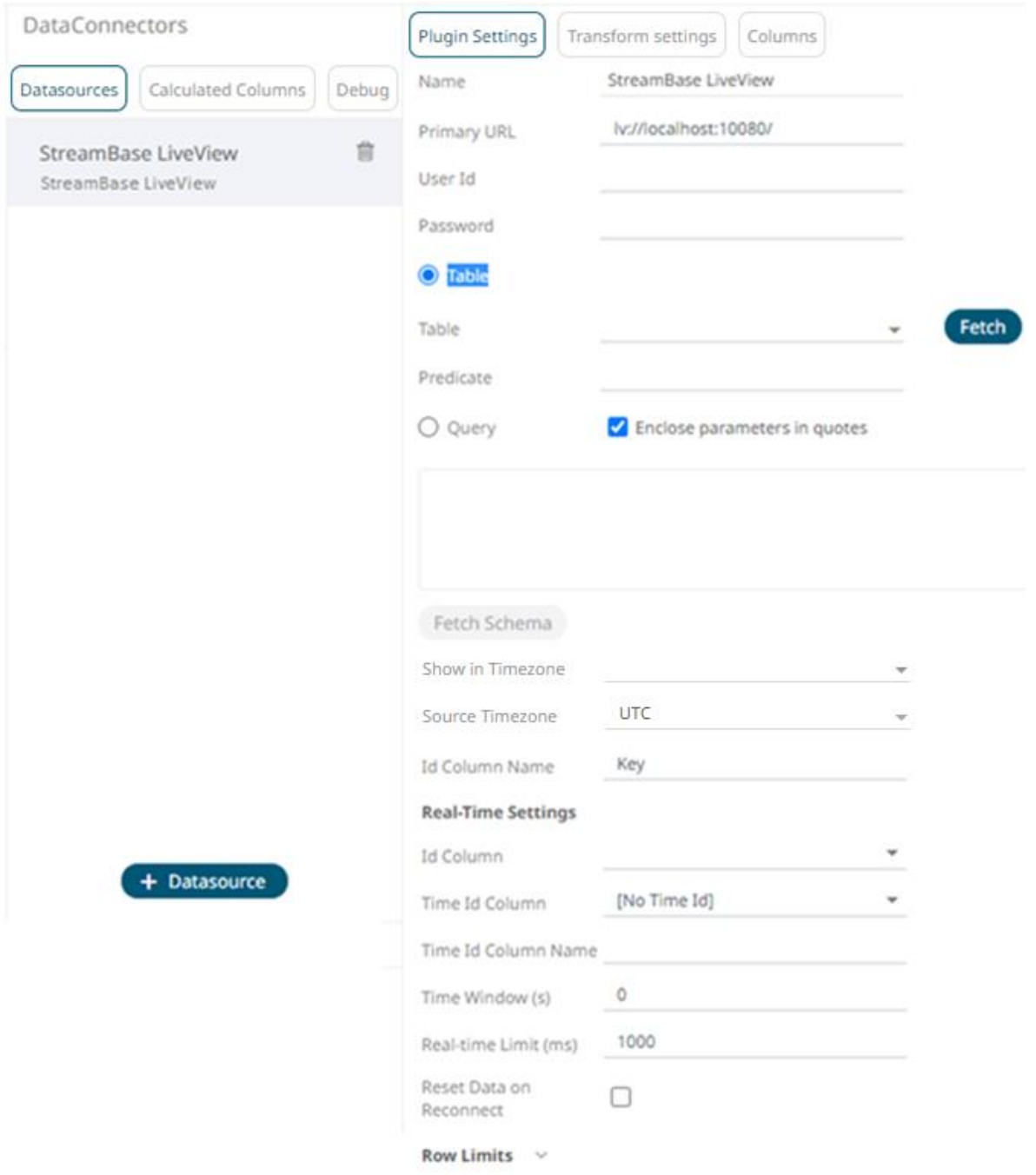
to display the data preview.

StreamBase LiveView Connector

The StreamBase LiveView connector allows connection to the StreamBase LiveView instance on a real-time streaming basis.

Steps:

1. Select **StreamBase LiveView** from the *Connectors* panel. The *StreamBase LiveView Settings* panel displays.



2. Enter the *Name* of the StreamBase LiveView data source, then click ✓.
3. Enter the following properties:

Property	Description
Primary URL	Primary URL of the StreamBase LiveView. Default is **lv://localhost:10080/**.
User Id	User Id that will be used to connect to StreamBase LiveView.
Password	Password that will be used to connect to StreamBase LiveView.

4. You can either:

   - select the **Table** radio button then click Fetch to return a list of updated *Tables*.

     Select the required table.

     By default, the whole table will be subscribed against. To subscribe against a subset, enter a predicate.

     The `IN` syntax is recommended for use of parameters to support multiple values. The square bracket notation should be used for the `IN` clause.

     Example: `color IN [{color}]`

   - select the **Query** radio button, enter a full query, then click Fetch Schema.

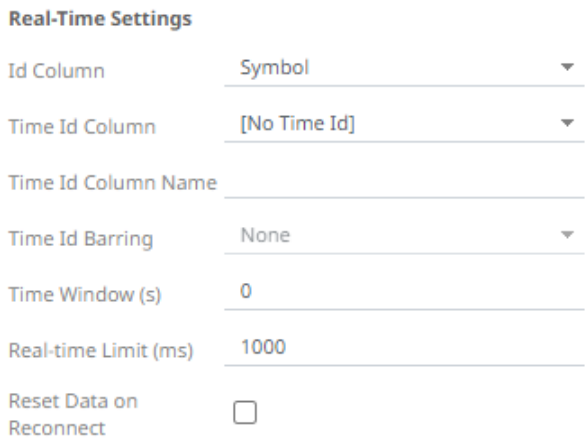
5. Select whether the parameters should be automatically enclosed in quotes by checking the **Enclose parameters in quotes** box.
6. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.
7. Enter the *Id Column Name*.

   LiveView supplies a unique Id for each row. This Id field is by default given a title of **Key**.

8. For this section:

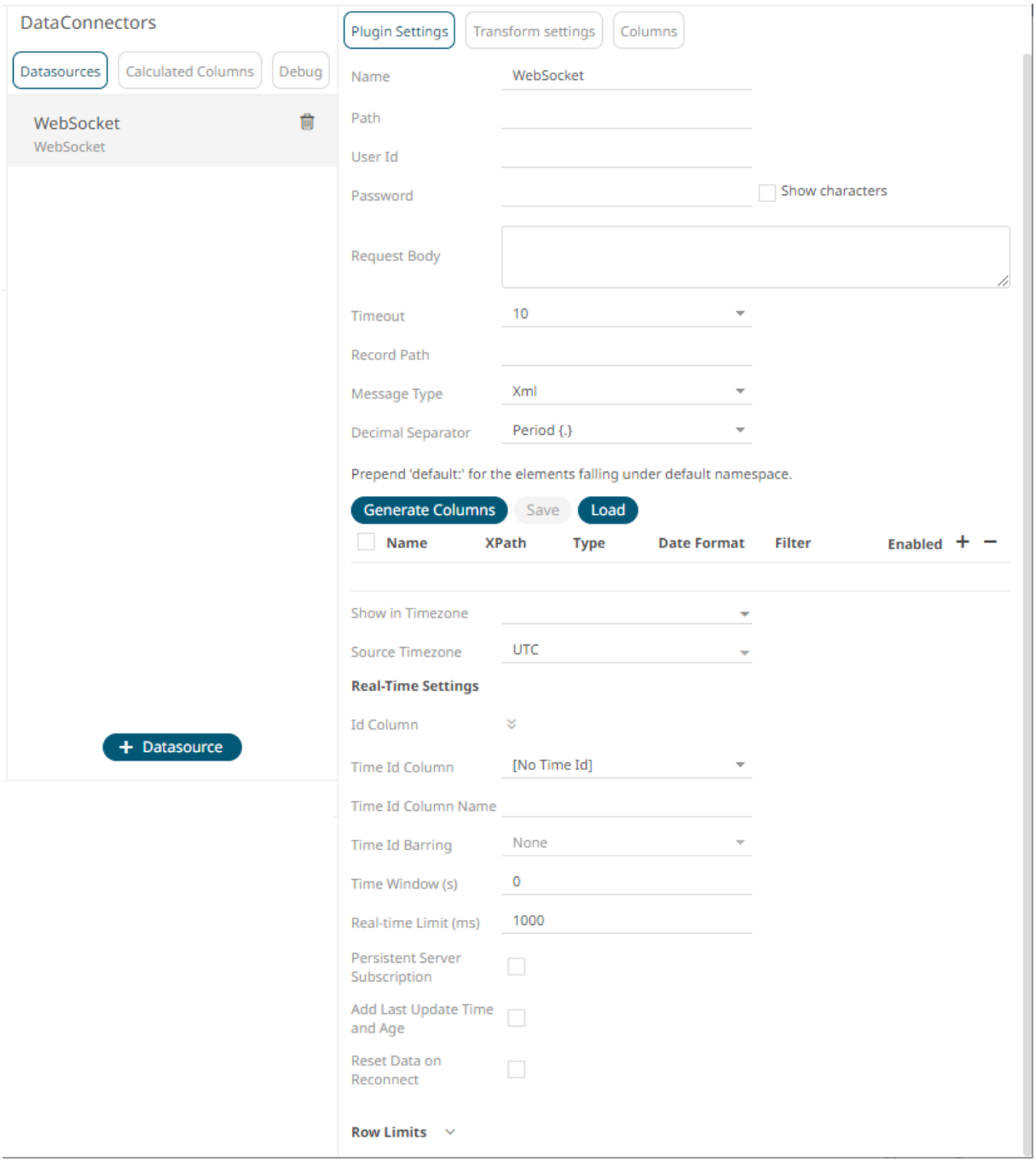
   Refer to Define Real-Time Settings for more information.
9. Set the row limit of the data set.
10. Tap the **Preview Selected Data Source** slider to turn it on.
11. Click ▶ Start Preview to display the data preview.

WebSocket Connector

The WebSocket connector is very similar to the Stream Simulator connector, except that rather than looping through a file, it would either connect through web sockets, long polling, or repeatedly poll an external URL for new records to process.

Steps:

1. Select **WebSocket** from the *Connectors* panel. The *WebSocket Settings* panel displays.



2. Enter the *Name* of the WebSocket data source, then click ✓.
3. Enter the connection details:

Property	Description
Path	The path to which the WebSocket server will respond to.
User ID	The User ID that will be used to connect to the WebSocket server.
Password	The password that will be used to connect to the WebSocket server. Check the **Show Characters** box to display the entered characters.
Request Body	For both the HTTP and ws:// POST requests sent to the WebSocket server.
Timeout	The length of time to wait for the server response (10 to 300). Default is **10**.

4. Select the *Message Type*.
5. Select either the dot (.) or comma (,) as the *Decimal Separator*.

> **NOTE** **Prepend 'default:' for the elements falling under default namespace.**

6. Click 

to the fetch the schema based on the connection details. Consequently, the list of columns with the data type found from inspecting the first 'n' rows of the input data source is populated and the **Save** button is enabled.

   This also populates the *Id Column* with the set of columns, of arbitrary type, that can be concatenated to form a unique row identifier.
7. You can also opt to load or save a copy of the column definition.
8. Click  to add columns to the WebSocket connection that represent sections of the message. Then enter or select:

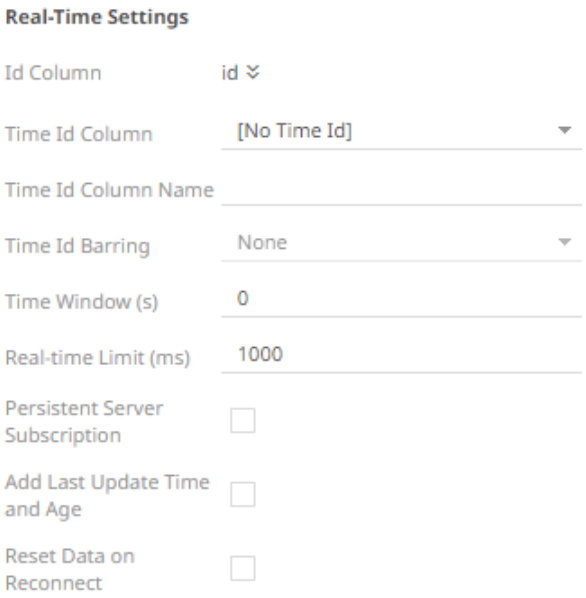
Property	Description
Name	The column name of the source schema.
JsonPath/Text Column Index/XPath	The JsonPath/Text Column Index/XPath of the source schema.
Type	The data type of the column. Can be a **Text**, **Numeric**, or **Time**
Date Format	The format when the data type is **Time**.
Filter	Defined parameters that can be used as filter.
Enabled	Determines whether the message field should be processed.

> **NOTE** **To parse and format times with higher than millisecond precision, the format string needs to end with a period followed by sequence of upper case S. There can be no additional characters following them.**
>
> **For example: `yyyy-MM-dd HH:mm:ss.SSSSSS`**

9. Date/Time values of output data and Date/Time inputs, where supported, is by default unchanged.

   You can opt to define the *Show in Timezone* and *Source Timezone* settings.

10. For this section:



    Refer to Define Real-Time Settings for more information.

11. Set the row limit of the data set.
12. Tap the **Preview Selected Data Source** slider to turn it on.
13. Click 

to display the data preview.

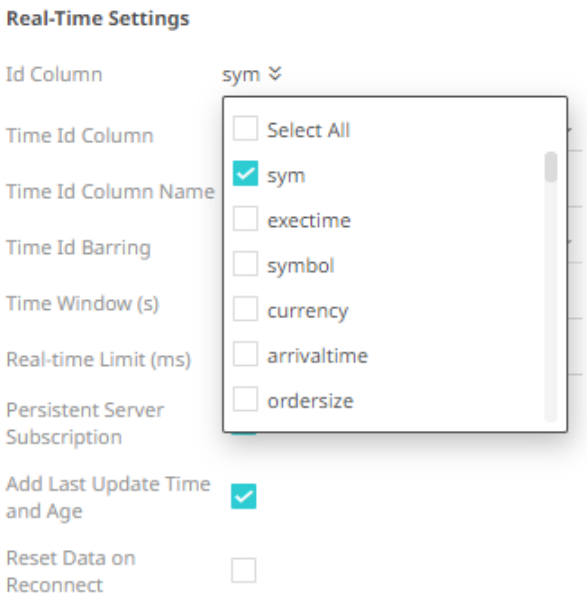
Defining Real-Time Settings

Streaming connectors have a common section for defining real-time settings. Follow the steps below to select a key column or concatenated key for the streaming time series window.

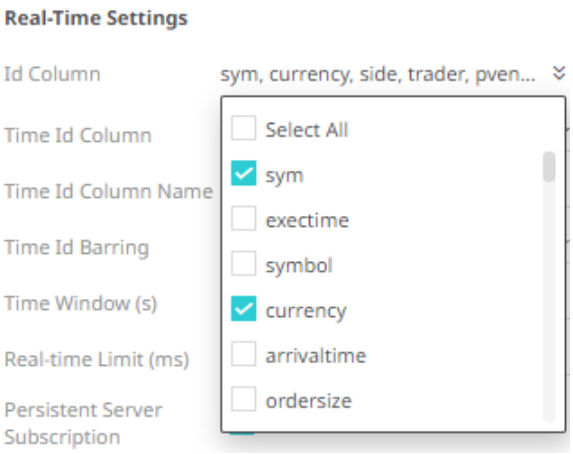
Steps:

1. After generating columns or fetching schema on the streaming connector, the list of columns with the data type found from inspecting the first ‘n’ rows of the input data source is populated.

    Consequently, on the *Real-Time Settings* section, the *Id Column* drop-down list displays with the set of columns, of arbitrary type.

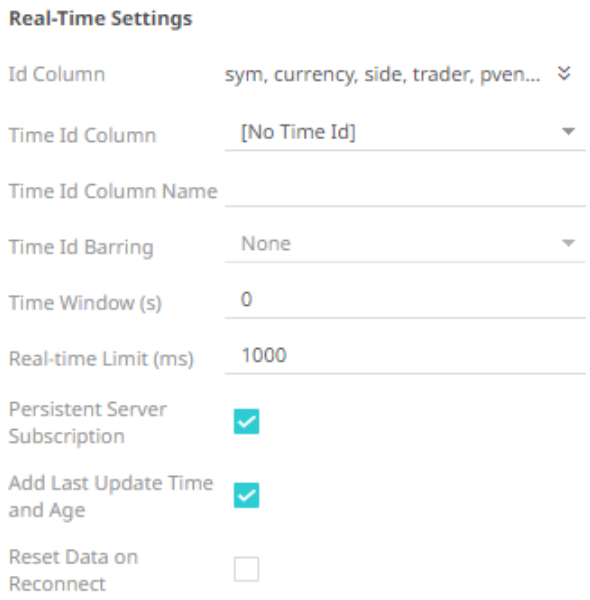


2. Select a key column to manage data updates and inserts. In some cases, select multiple key columns to form a unique row identifier.



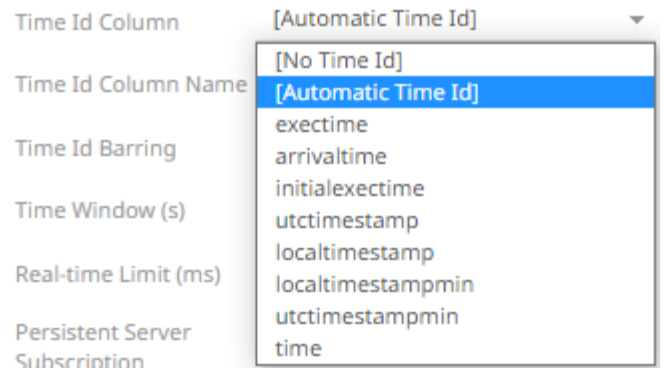
3. You may opt to check the **Add Last Update Time and Age** box.

NOTE **This option is enabled when No Time ID has been selected.**



This allows the latest update time and its age to be highlighted by the defined color range in the output dashboard. Refer to Highlighting the Latest Data in Real Time Streaming Connectors for more information.

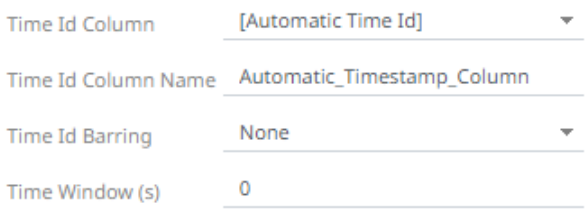
4. A streaming time series window can be generated by creating a compound key with the *Id Column*, plus a separately specified *Time Id* column. The *Time Id* column can be from the source dataset, or alternatively automatically generated.



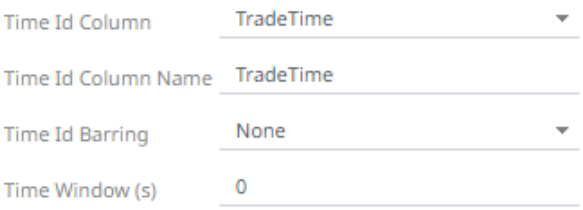
If the Time Id column is selected, then a scrolling time window can be specified. As new data arrives from the subscription, new time slices will automatically be added, and old ones will be deleted.

Select either:

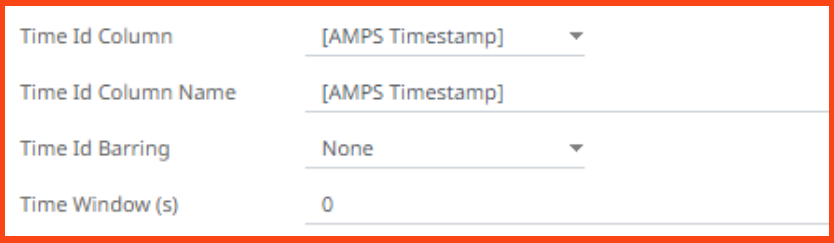
- Automatic Time Id



- Date/Time Id column either from the source data or automatically generated



NOTE **For the AMPS connector, there is also the AMPS Timestamp Time Id column.**



This means that when a message arrives, AMPS calculates its expiration time and stores a timestamp at which the message expires in the SOW.

5. Define or select the following information:
   - Time Id Column Name for Automatic Time Id
   - Time Id Barring

     Select the barring period. This conflates the data set to a defined granularity or any of the following time intervals.
   - Time Window (s). Default is **0**.
6. Modify the *Real-time Limit* to vary the data throttling. This defaults to **1000** milliseconds.

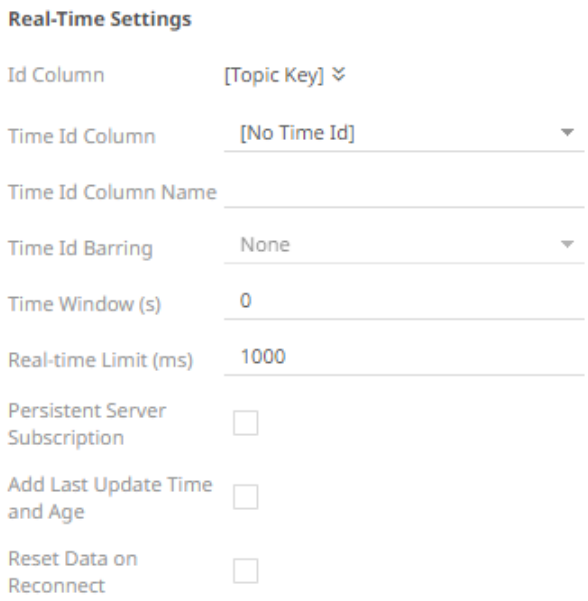
NOTE **The *Real-time Limit* can be parameterized.**

7. Check the **Persistent Server Subscription** box. This means that it will not be purged.

   If not checked, Panopticon Real Time can purge or cancel the subscription if it is orphan and is running out of memory. Note though that it can be purged for other reasons as well, depending on how the user has set it up.
8. Check the **Reset Data on Reconnect** box to flush out the stale data and reload data after reconnection.

Defining Real-Time Settings for Apache Kafka and Panopticon Streams Connectors

For the Apache Kafka and Panopticon Streams connectors, on the *Real-Time Settings* section, the key provided from the Kafka subscription is automatically selected as the *Id Column.*

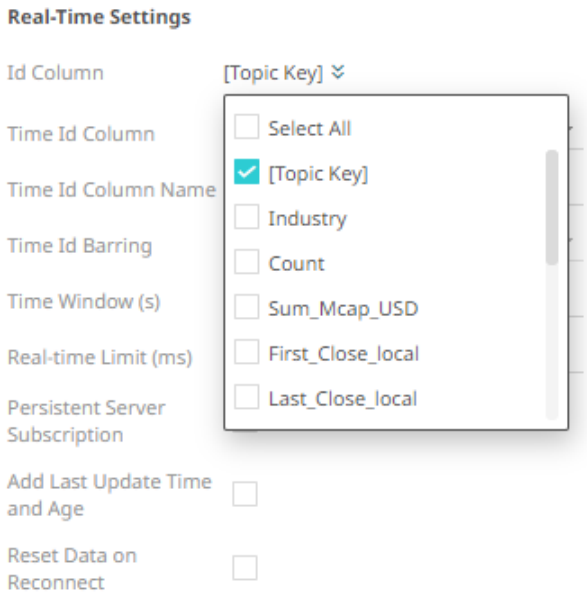


Follow the steps below to select a key column or concatenated key for the streaming time series window.

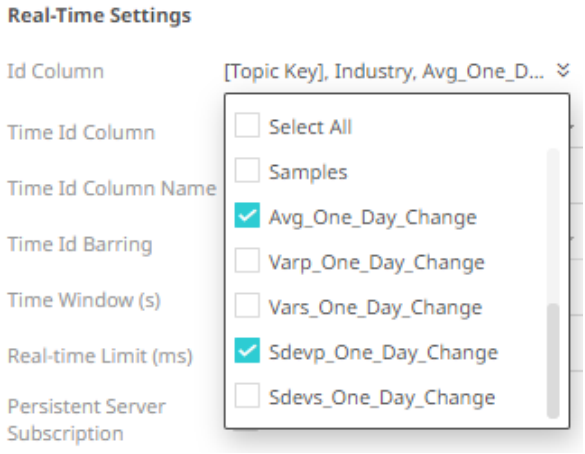
Steps:

1. After generating columns or fetching schema on the streaming connector, the list of columns with the data type found from inspecting the first ‘n’ rows of the input data source is populated.

   Consequently, on the *Real-Time Settings* section, the *Id Column* drop-down list displays with the set of columns, of arbitrary type.

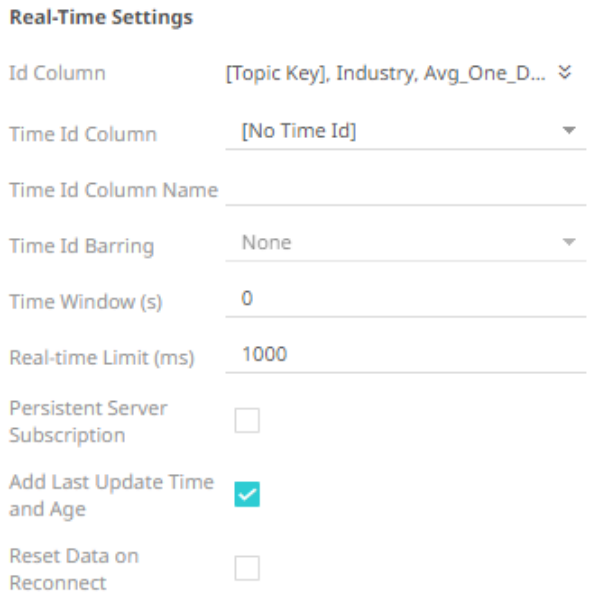


2. Select a key column to manage data updates and inserts. In some cases, select multiple key columns to form a unique row identifier.



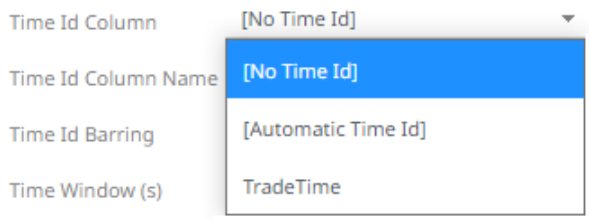
3. You may opt to check the **Add Last Update Time and Age** box.

NOTE **This option is enabled when No Time ID has been selected.**



This allows the latest update time and its age to be highlighted by the defined color range in the output dashboard. Refer to Highlighting the Latest Data in Real Time Streaming Connectors for more information.

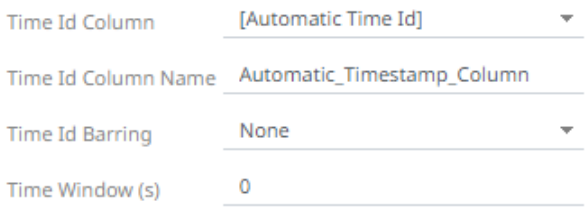
4. A streaming time series window can be generated by creating a compound key with the *Id Column*, plus a separately specified *Time Id* column. The *Time Id* column can be from the source dataset, or alternatively automatically generated.



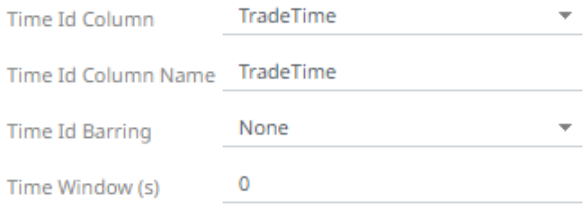
If the Time Id column is selected, then a scrolling time window can be specified. As new data arrives from the subscription, new time slices will automatically be added, and old ones will be deleted.

Select either:

- Automatic Time Id



- Date/Time Id column either from the source data or automatically generated



5. Define or select the following information:
   - Time Id Column Name for Automatic Time Id
   - Time Id Barring

     Select the barring period. This conflates the data set to a defined granularity or any of the following time intervals.
   - Time Window (s). Default is **0**.
6. Modify the *Real-time Limit* to vary the data throttling. This defaults to **1000** milliseconds.

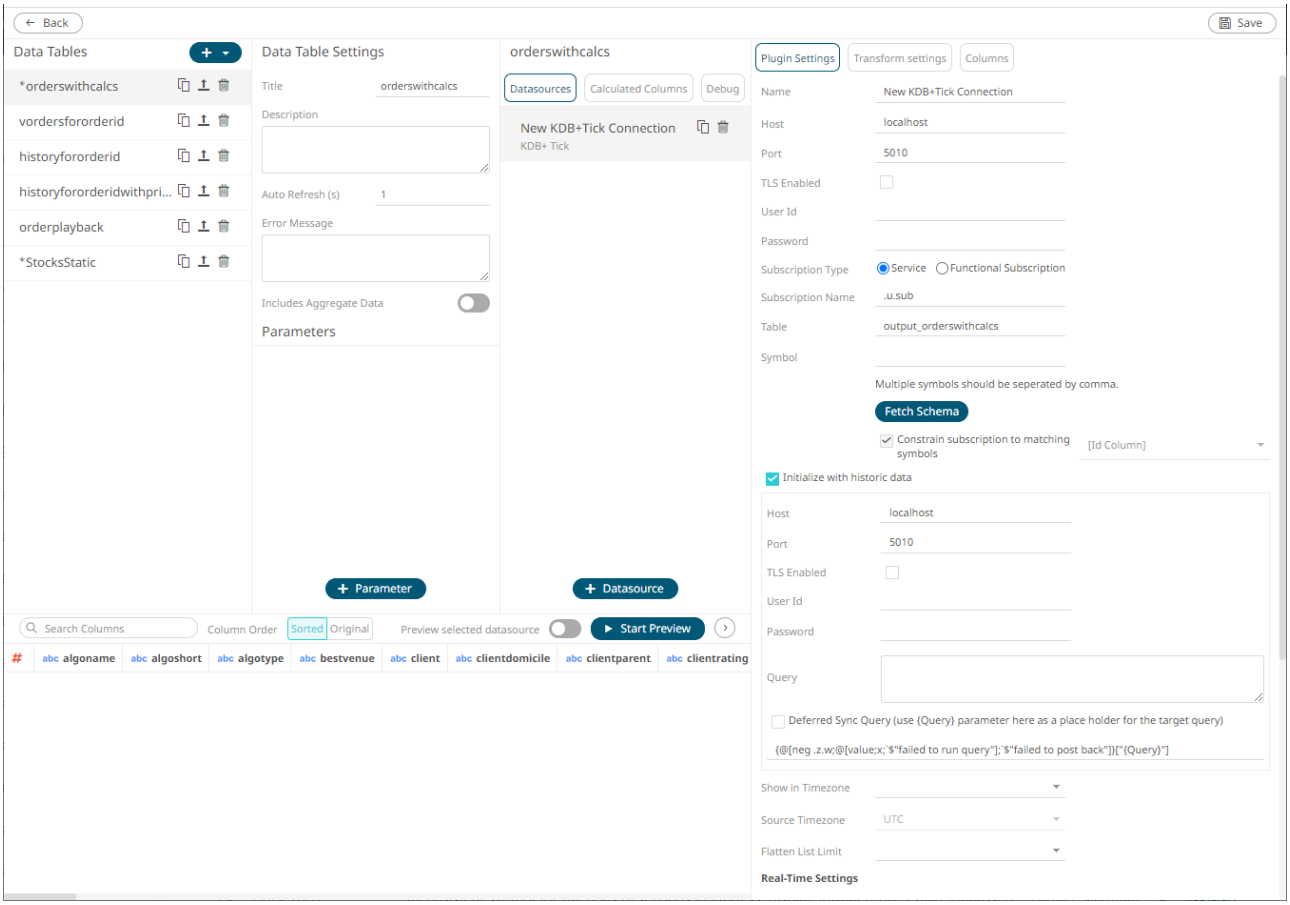
NOTE **The *Real-time Limit* can be parameterized.**

7. Check the **Persistent Server Subscription** box. This means that it will not be purged.

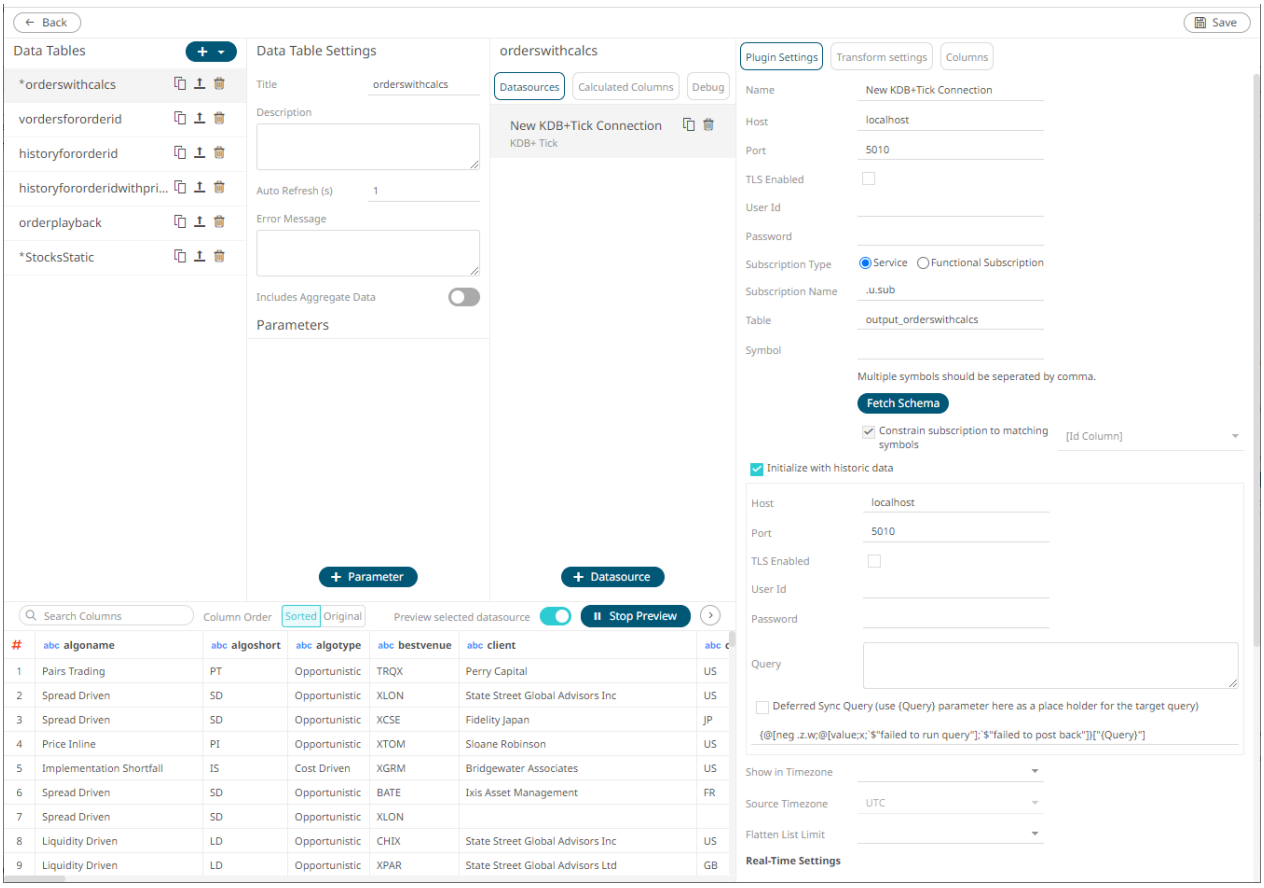
   If not checked, Panopticon Real Time can purge or cancel the subscription if it is orphan and is running out of memory. Note though that it can be purged for other reasons as well, depending on how the user has set it up.
8. Check the **Reset Data on Reconnect** box to flush out the stale data and reload data after reconnection.

Previewing Streaming Data

Opening data through a streaming connector displays the **Start Preview** button on the *Data Source Preview* section. For example, opening a data source using the Kdb+ Tick connector displays the following preview:



Initially there is no data. Clicking the Start Preview button displays the data and refreshes the values depending on the defined Auto Refresh period. The **Start Preview** button eventually changes to Stop Preview.



Click 

to stop refreshing values of the streaming data.

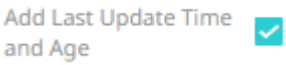
Highlighting the Latest Data in Real Time Streaming Connectors

In the real time streaming connectors, there is an option to force flushes, so that output dashboards can visually highlight the latest and age of data and present whether they are stale or not.

Color is used to highlight when an item has changed. Follow the steps below to on how to configure the visualization of age in real time streaming connectors.

Steps:

1. Open a streaming connector and define the connection details.
2. Check the **Add Last Update Time and Age** box.

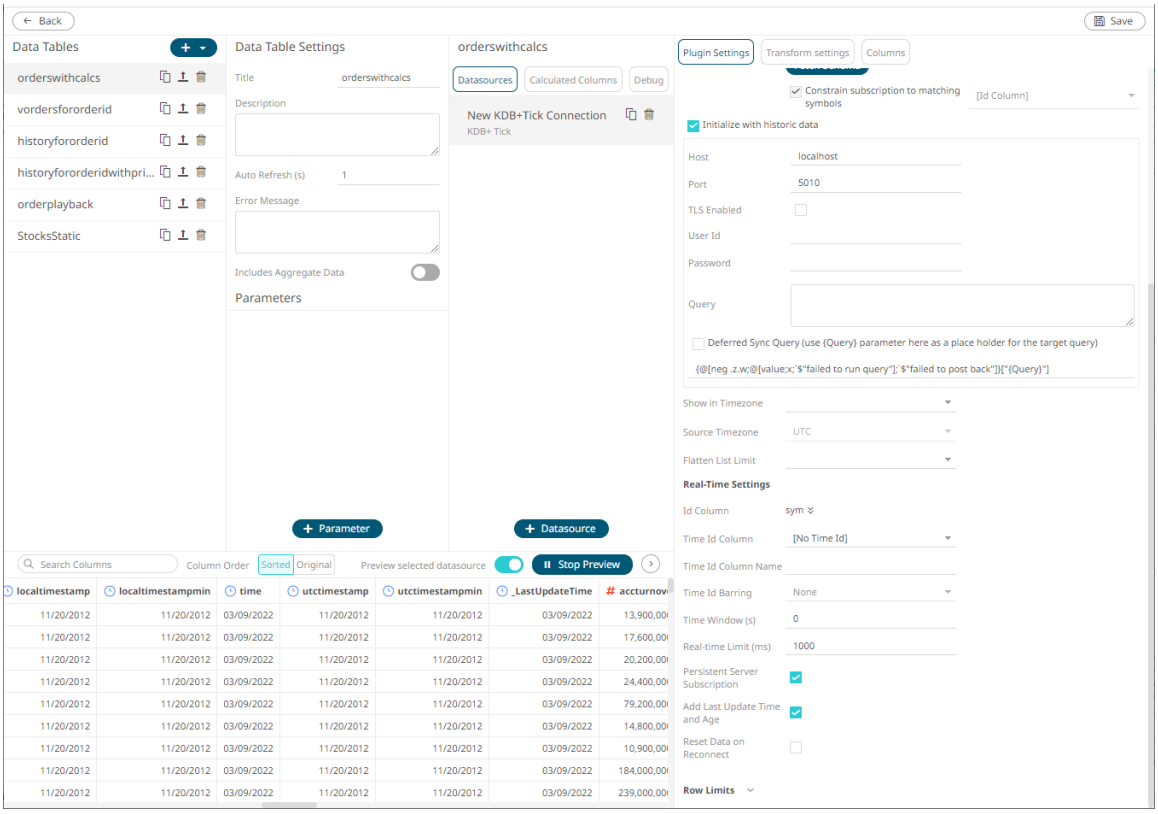


3. Click 

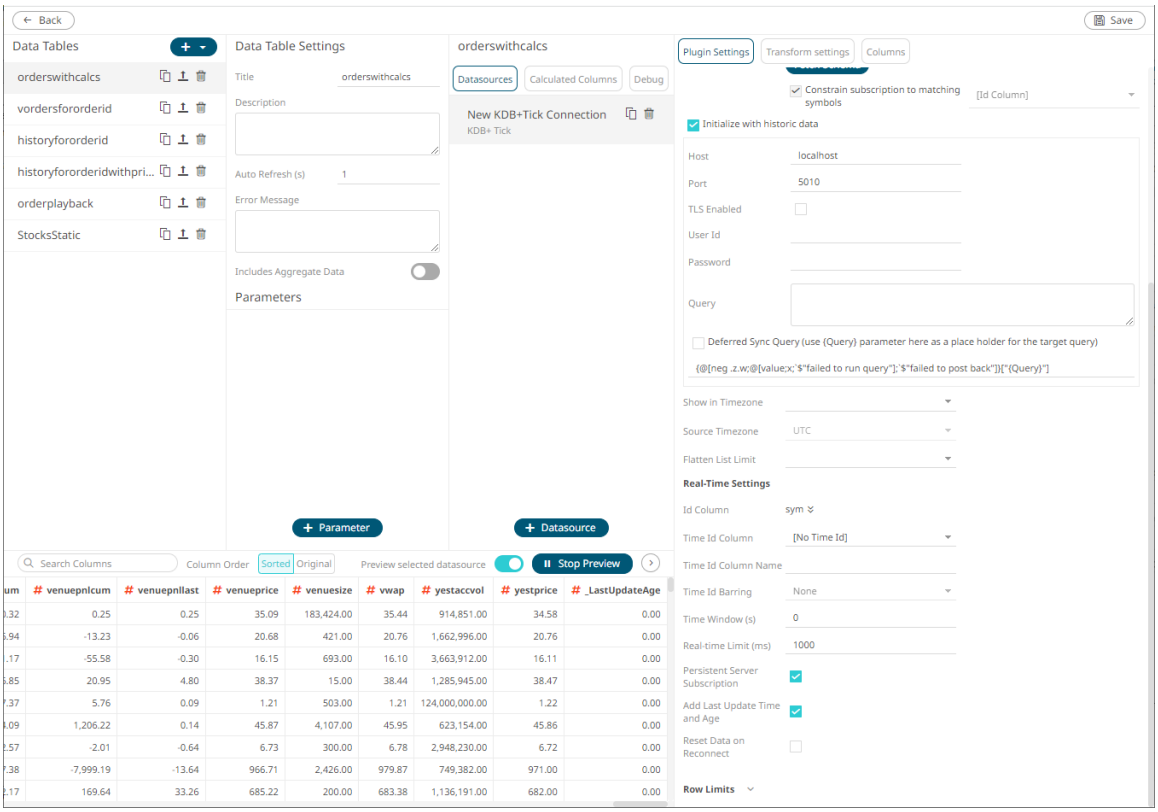
to confirm the selection and retrieve the record set into the *Data Table Editor* layout.

   In the *Data Sources Preview* window, two columns are added:

   - _LastUpdateTime - Date/Time column which updates on all rows that were inserted or updated.



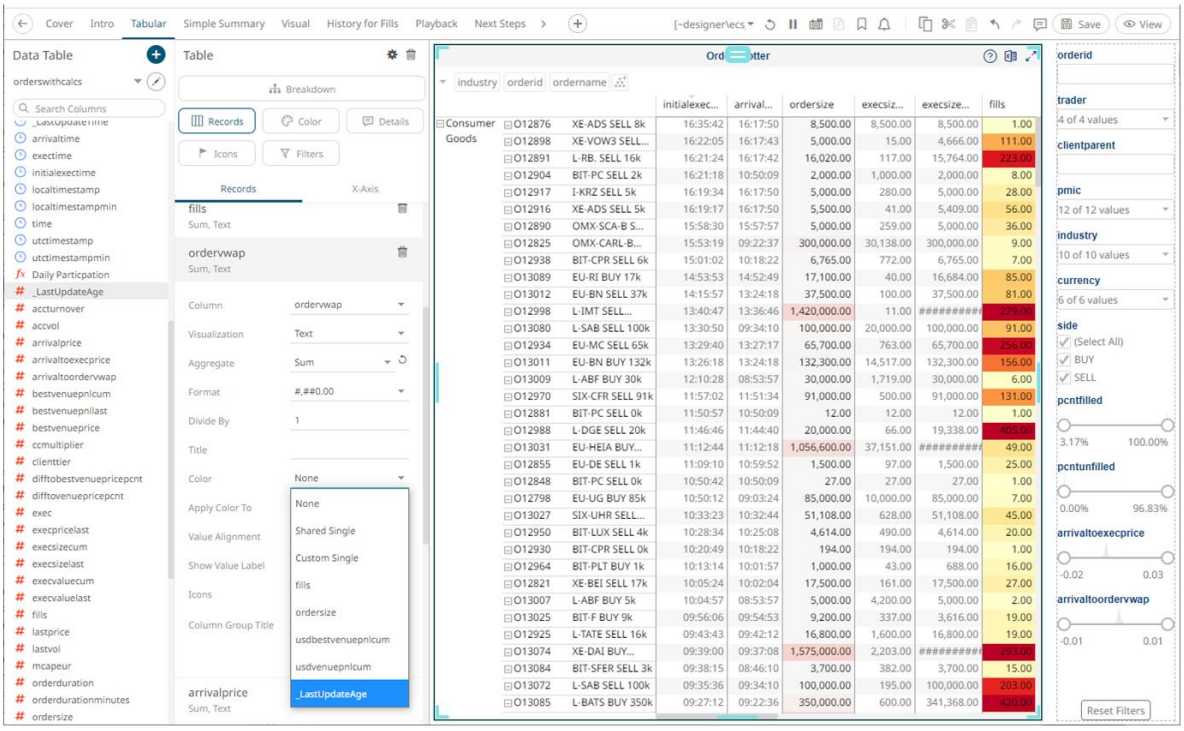
- **_LastUpdateAge** - Numeric column which represents the seconds since rows were last touched in a flush. This is updated on all rows.



4. Click Save then Back to save the data table and exit the *Data Table Editor* layout. The *Open Workbook in Design Mode* layout displays.

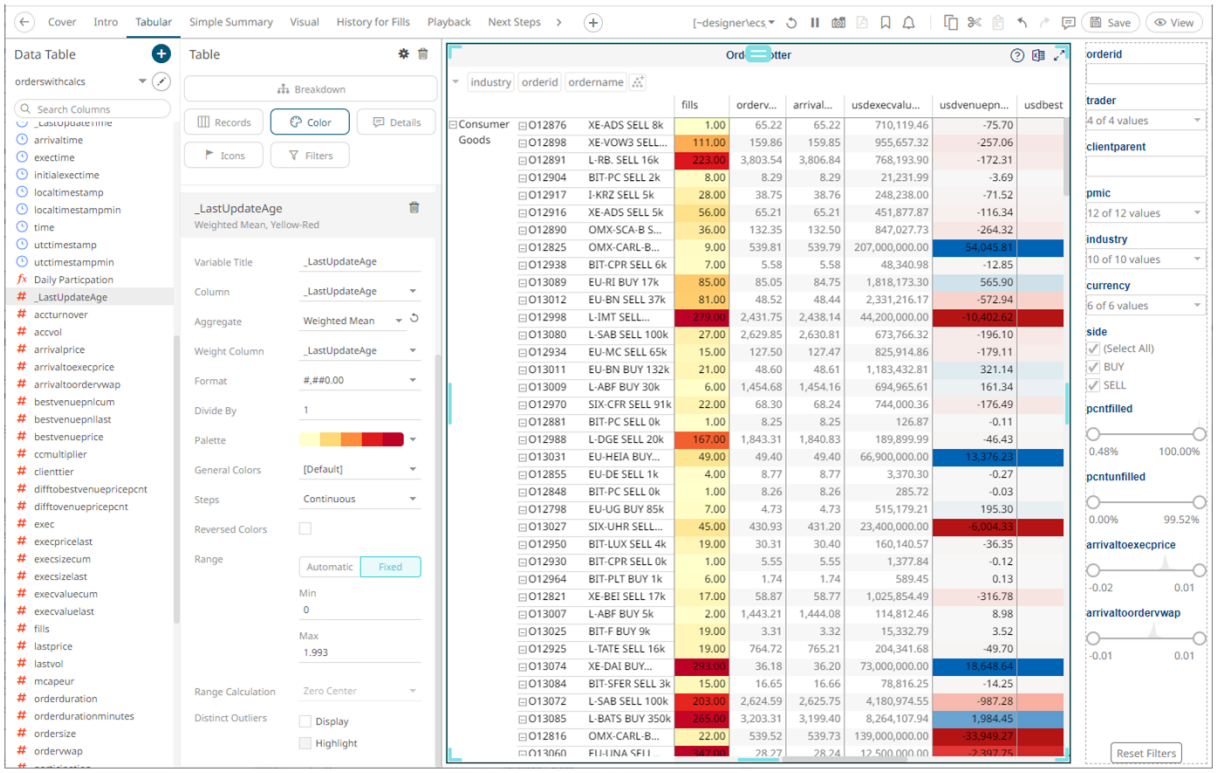
5. Add a visualization and select the column/s that will have the color highlight.

   Example:

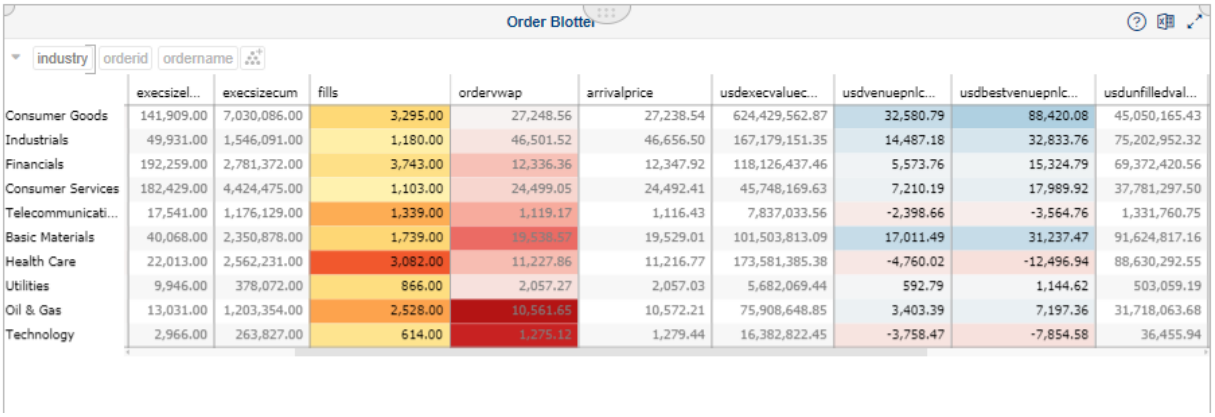


   In this Table visualization, the **_LastUpdateAge** column is added in the Color variable and will be used as the highlight for the **overwrap** record.

6. To define the color settings, select **_LastUpdateAge** under the *Color* variable list.



In the example above the Range is **1** (Min) to **5** (Max) seconds with the color palette **White-Red** and the colors are **Reversed**. This means that when the **_LastUpdateAge** value is updated, the background color of the **overwrap** row will be red and will fade to white over the next 5 seconds.



	execsizel...	execsizecum	fills	ordervwap	arrivalprice	usdexecvaluec...	usdvenuepnlc...	usdbestvenuepnlc...	usdunfilledval...
Consumer Goods	141,909.00	7,030,086.00	3,295.00	27,248.56	27,238.54	624,429,562.87	32,580.79	88,420.08	45,050,165.43
Industrials	49,931.00	1,546,091.00	1,180.00	46,501.52	46,656.50	167,179,151.35	14,487.18	32,833.76	75,202,952.32
Financials	192,259.00	2,781,372.00	3,743.00	12,336.36	12,347.92	118,126,437.46	5,573.76	15,324.79	69,372,420.56
Consumer Services	182,429.00	4,424,475.00	1,103.00	24,499.05	24,492.41	45,748,169.63	7,210.19	17,989.92	37,781,297.50
Telecommunicati...	17,541.00	1,176,129.00	1,339.00	1,119.17	1,116.43	7,837,033.56	-2,398.66	-3,564.76	1,331,760.75
Basic Materials	40,068.00	2,350,878.00	1,739.00	19,538.57	19,529.01	101,503,813.09	17,011.49	31,237.47	91,624,817.16
Health Care	22,013.00	2,562,231.00	3,082.00	11,227.86	11,216.77	173,581,385.38	-4,760.02	-12,496.94	88,630,292.55
Utilities	9,946.00	378,072.00	866.00	2,057.27	2,057.03	5,682,069.44	592.79	1,144.62	503,059.19
Oil & Gas	13,031.00	1,203,354.00	2,528.00	10,561.65	10,572.21	75,908,648.85	3,403.39	7,197.36	31,718,063.68
Technology	2,966.00	263,827.00	614.00	1,275.12	1,279.44	16,382,822.45	-3,758.47	-7,854.58	36,455.94

You can then easily view whether the data are updated or stale.

Parameterization of Connection Settings for Data Connectors

Connecting to data connectors typically requires application login. To be able to connect, you may need to enter the following information, depending on the connector:

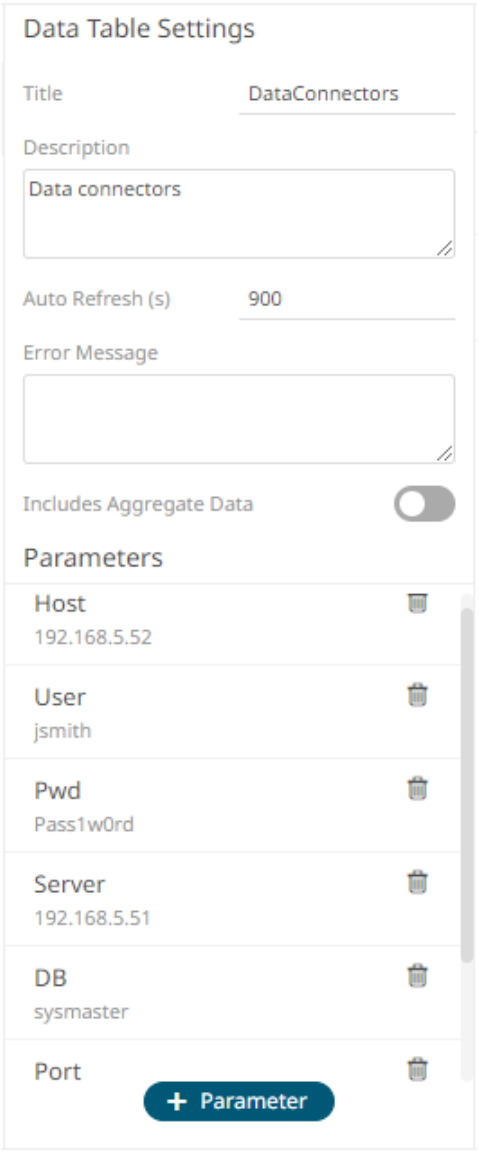
- ❑ Host Name
- ❑ Port
- ❑ Server Name
- ❑ User ID
- ❑ Password

- Database

This information is then stored in XML files detailing user and group permissions in workbooks. To secure data access and avoid storing connection information in the workbook, it is recommended to parameterize these fields in connectors.

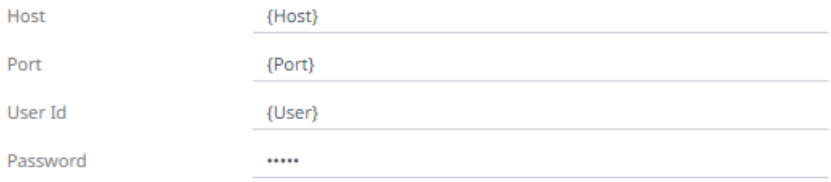
Steps:

1. On the *Parameters* pane of the *Data Table Settings*, define the connection settings you will use for the connector. Such as the following:
    - Host
    - User
    - Pwd
    - Server
    - DB
    - Port



2. Click on a data source. The *Data Source Settings* pane is displayed.
3. Parameterize the entries in the pane.

   For example:



4. Click 

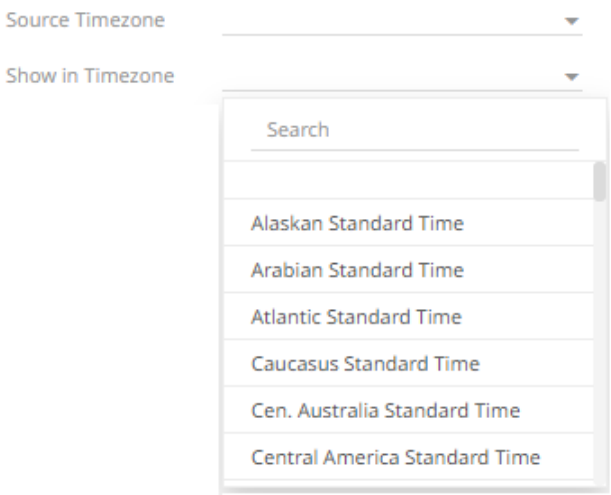
for static connectors or 

for streaming connectors then 

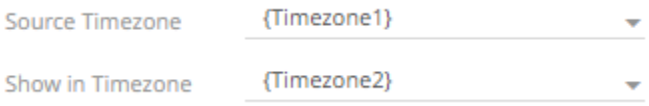
.

Parameterization of Time Zones in Data Connectors

Aside from selecting a Windows time zone name in the *Show in Timezone* field of the following data connectors, you can now parameterize the time zone per connection:



Selecting a Windows time zone



Entering a parameterized time zone

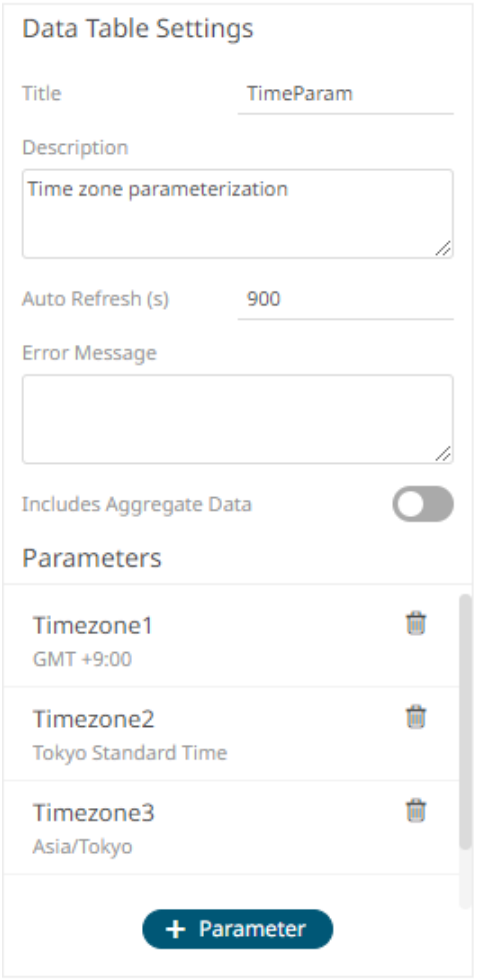
- JSON
- Text
- XML
- Apache Cassandra
- InfluxDB
- JDBC Database

- Kx kdb+
- MongoDB
- OneTick
- OneTick Cloud
- Python
- ActiveMQ
- AMPS
- Google Cloud Pub/Sub
- JDBC Database – Streaming
- Apache Kafka
- Kx kdb+tick
- MQTT
- OneTick CEP
- Panopticon Streams
- RabbitMQ
- Solace
- Stream Simulator
- StreamBase 7.1
- StreamBase LiveView
- WebSocket

In the *Parameters* pane of the *Data Table Editor* layout page, the following dynamic parameterization formats are supported:

- Windows Timezone ID
- IANA
- Custom: GMT +/- hours:minutes

  For example:



Refer to the table below for the list of Windows time zone and IANA names that you can use:

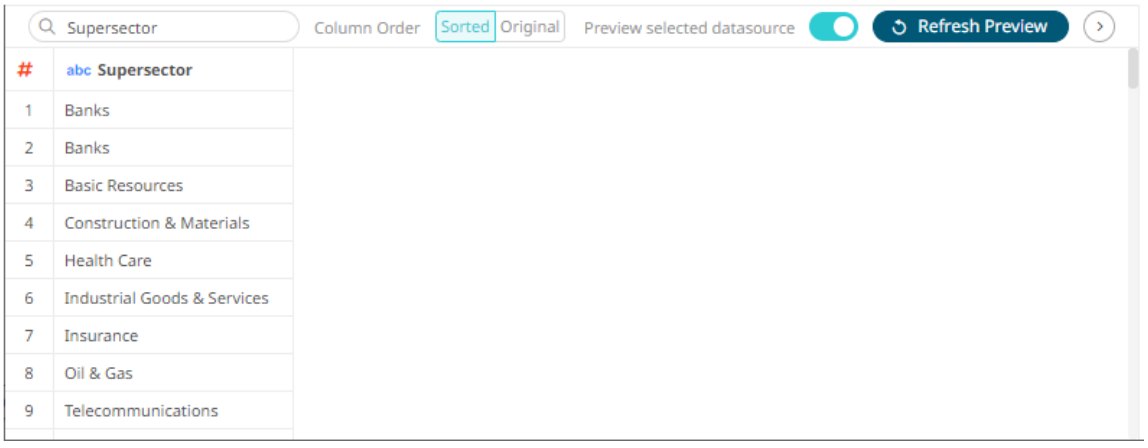
Windows Name	IANA Name
Alaskan Standard Time	"America/Anchorage"
Arabian Standard Time	"Asia/Dubai"
Atlantic Standard Time	"America/Halifax"
Caucasus Standard Time	"Asia/Yerevan"
Cen. Australia Standard Time	"Australia/Adelaide"
Central America Standard Time	"America/Guatemala"
Central Asia Standard Time	"Asia/Almaty"
Central Europe Standard Time	"Europe/Budapest"
Central European Standard Time	"Europe/Warsaw"
Central Pacific Standard Time	"Pacific/Guadalcanal"
Central Standard Time	"America/Chicago"
China Standard Time	"Asia/Shanghai"
Dateline Standard Time	"Etc/GMT+12"
E. Africa Standard Time	"Africa/Nairobi"
E. Australia Standard Time	"Australia/Brisbane"
E. Europe Standard Time	"Asia/Nicosia"
E. South America Standard Time	"America/Sao_Paulo"
Eastern Standard Time	"America/New_York"
Egypt Standard Time	"Africa/Cairo"
GMT Standard Time	"Europe/London"
Greenland Standard Time	"America/Godthab"
Hawaiian Standard Time	"Pacific/Honolulu"
India Standard Time	"Asia/Calcutta"
Iran Standard Time	"Asia/Tehran"
Israel Standard Time	"Asia/Jerusalem"
Korea Standard Time	"Asia/Seoul"
Mountain Standard Time	"America/Denver"
N. Central Asia Standard Time	"Asia/Novosibirsk"
New Zealand Standard Time	"Pacific/Auckland"
Newfoundland Standard Time	"America/St_Johns"
North Asia East Standard Time	"Asia/Irkutsk"
North Asia Standard Time	"Asia/Krasnoyarsk"
Pacific SA Standard Time	"America/Santiago"

Pacific Standard Time	"America/Los_Angeles"
Russian Standard Time	"Europe/Moscow"
SA Eastern Standard Time	"America/Cayenne"
SA Pacific Standard Time	"America/Bogota"
SA Western Standard Time	"America/La_Paz"
Samoa Standard Time	"Pacific/Apia"
SE Asia Standard Time	"Asia/Bangkok"
Singapore Standard Time	"Asia/Singapore"
South Africa Standard Time	"Africa/Johannesburg"
Sri Lanka Standard Time	"Asia/Colombo"
Taipei Standard Time	"Asia/Taipei"
Tasmania Standard Time	"Australia/Hobart"
Tokyo Standard Time	"Asia/Tokyo"
US Eastern Standard Time	"America/Indianapolis"
Vladivostok Standard Time	"Asia/Vladivostok"
W. Australia Standard Time	"Australia/Perth"
W. Central Africa Standard Time	“Africa/Lagos"
W. Europe Standard Time	"Europe/Berlin"
West Asia Standard Time	"Asia/Tashkent"
West Pacific Standard Time	"Pacific/Port_Moresby"
Yakutsk Standard Time	"Asia/Yakutsk"

Searching Columns

Search Columns allows you to immediately find a particular column in the data preview.

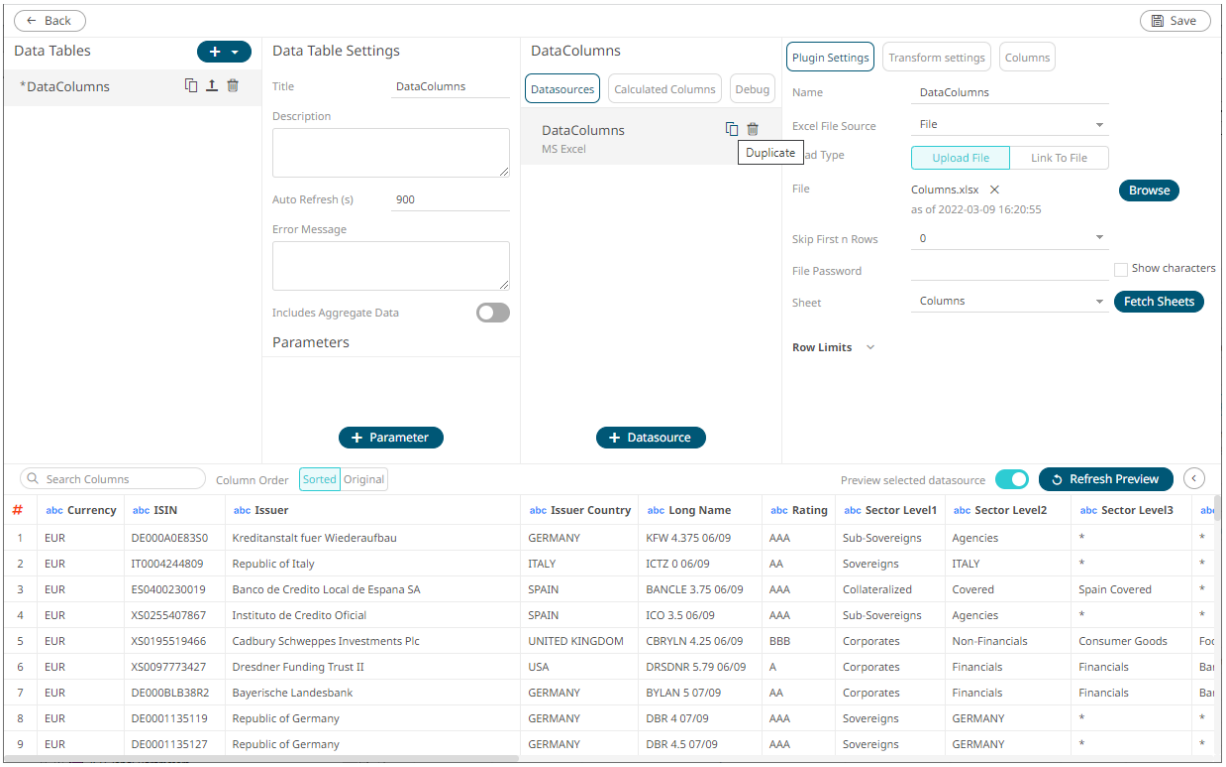
Enter the name of the column in the *Search Columns* box.



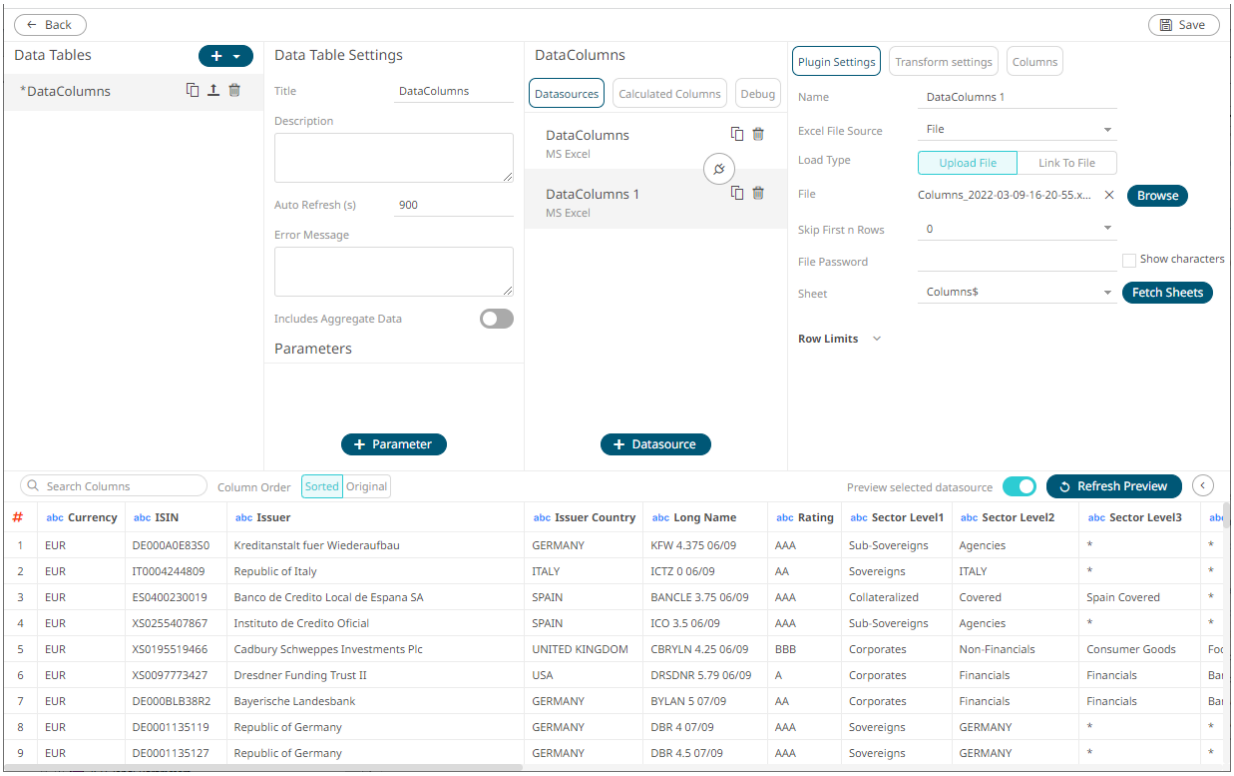
Delete the column name to discard the search and display all of the columns in the data preview.

Making a Duplicate of a Data Source

Click the **Duplicate** icon of a data source in the *Data Sources* list.



The data source is duplicated.



You can use some of the settings of the original data source and modify to create a new one.

Rearranging Data Sources

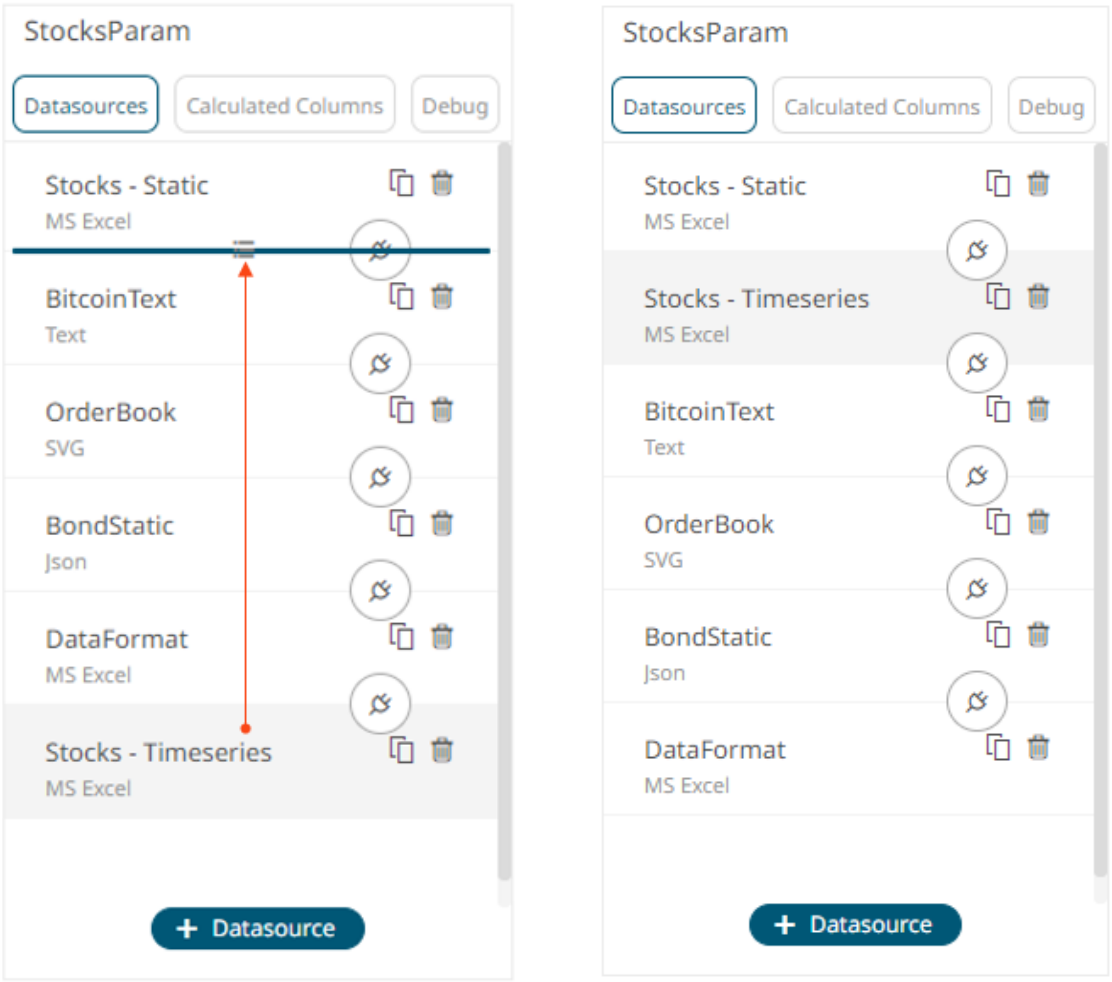
The order of the data sources in the *Data Table Editor* layout can be rearranged.

Steps:

1. Click on a data source you want to move.

   The **Hand Hover** icon displays along with the blue marker before or after a data source where you can drop the item.

4. Drag and drop the data source to the desired position.



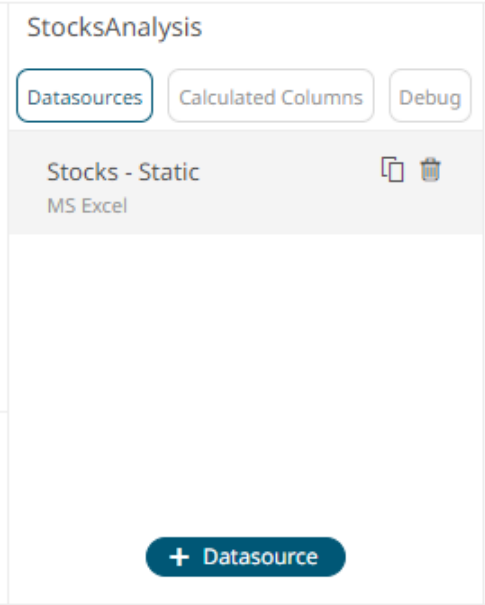
5. Click the **Save** 

button.

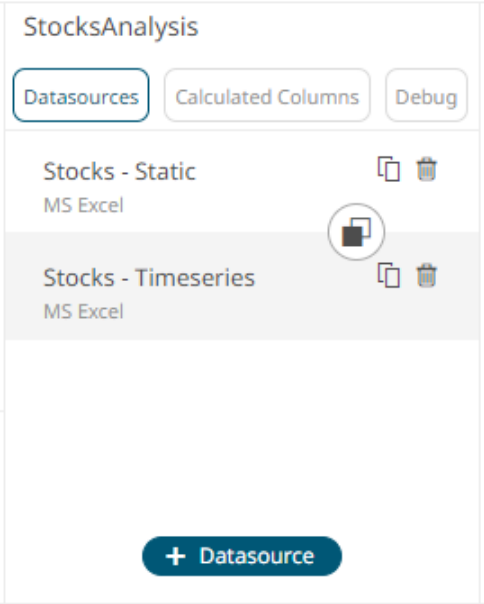
   When saved, the notification displays.

Deleting Data Sources

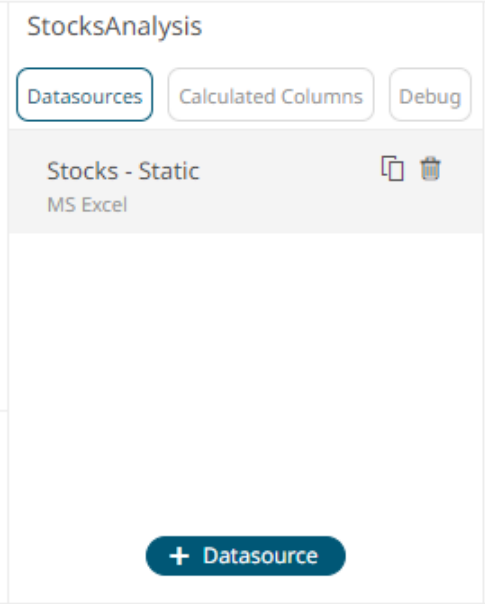
Highlight a data source in the *Data Sources* panel and click  .



A data source used in a joined data table can also be deleted.



After the data source is removed, the join is also deleted.



ADDING CALCULATED COLUMNS

NOTE

- **User defined columns can only be added when there is an available data source.**
- **The user-defined columns are added in the topmost data source in the *Data Sources* list or in the joined or combined data source.**
- **An auto key can only be created once.**
- **Ranking requires a numeric source column.**
- **Time bucketing requires a time source column and each source column can only be used once.**
- **Numeric bucketing requires a numeric source column.**
- **Text grouping requires a text source column.**
- **The added user-defined column displays on the *Data Preview* with a pen symbol which allows its modification.**

Adding an Auto Key Column

An automatic key field simply adds a new text column with a unique value for each row of the data source.

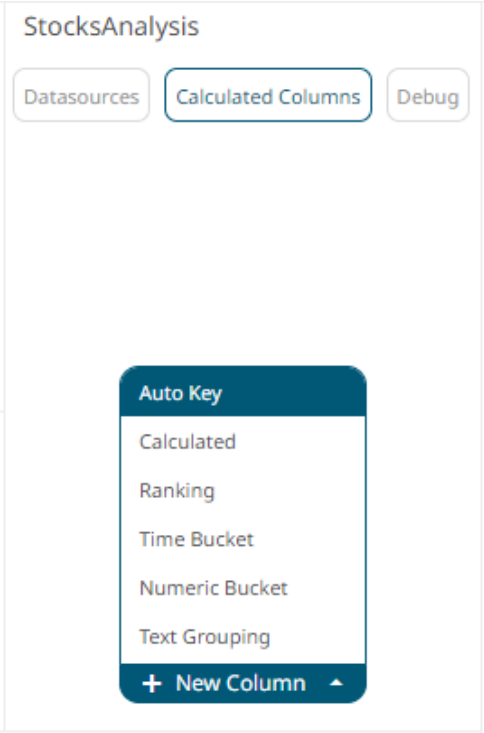
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

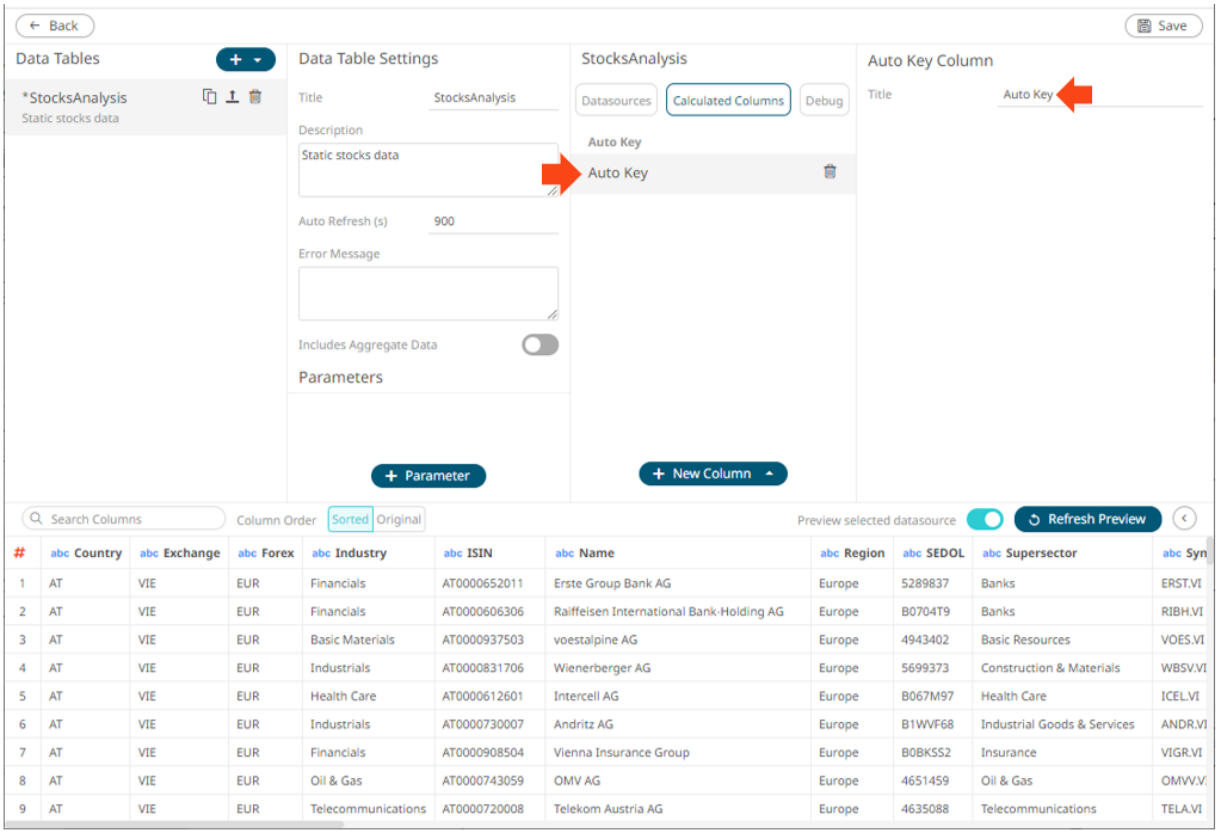
   The *Calculated Columns* pane displays.



2. Click **New Column > Auto Key**.

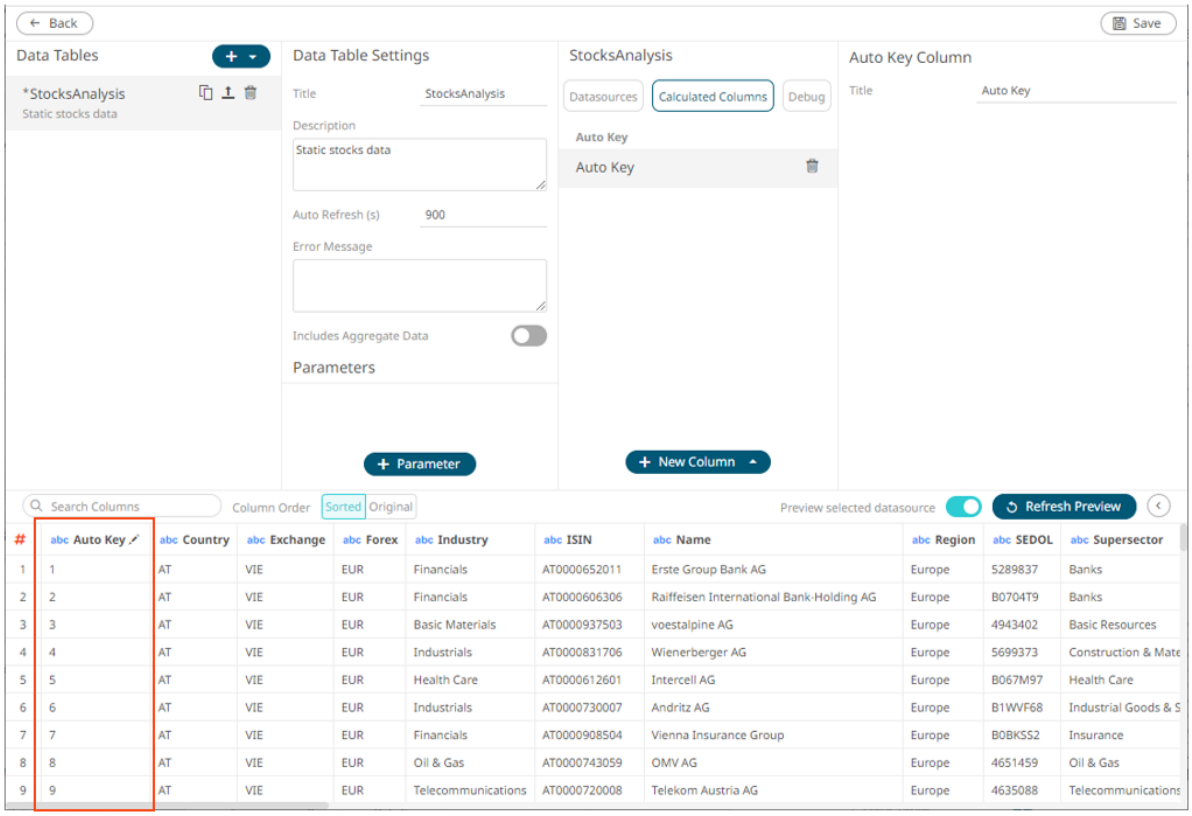


The auto key instance is displayed on the *Data Sources Settings* with **Auto Key** as the default title.

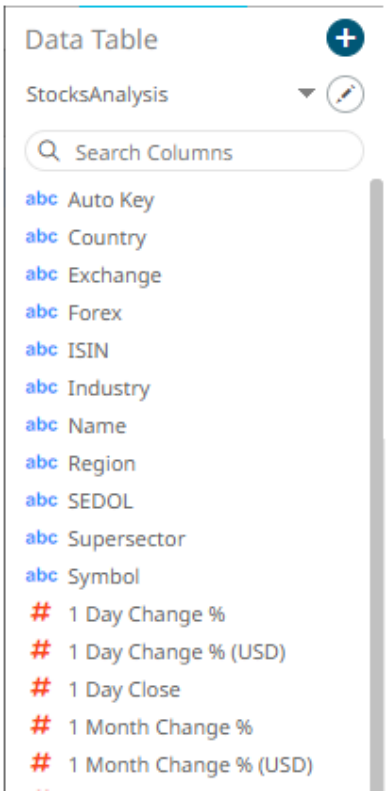


You may opt to modify the auto key *Title*.

3. Click Refresh Preview. The new auto key is added and displayed on the *Data Preview*.



As all visualizations show aggregated data through defined aggregations, the auto-key field can be used to display each individual row, and can be found in the data table:



Adding a Calculated Column

Create new columns based on calculations using data from existing columns in your data table.

In all cases, this new column is calculated for every row in the data set.

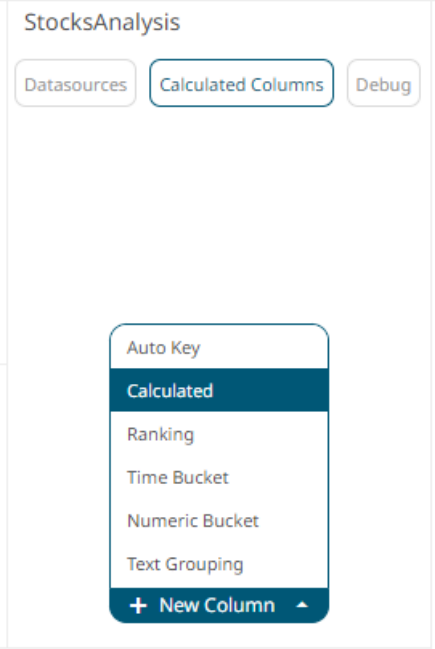
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

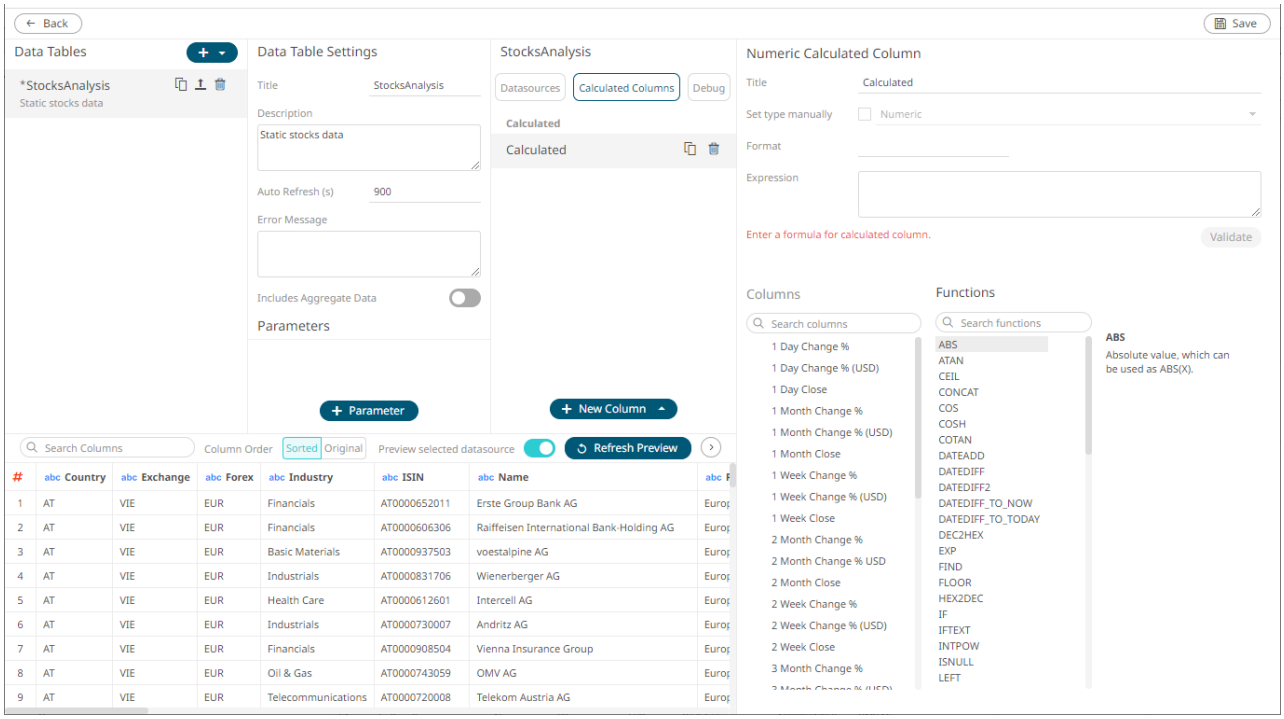
   The *Calculated Columns* pane displays.



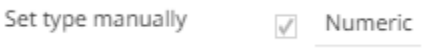
2. Click **New Column > Calculated**.



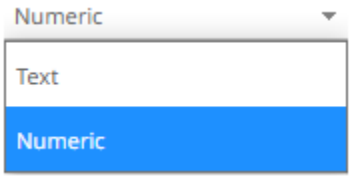
   The *Numeric Calculated Column* pane displays.



3. Fill in the *Title* field.
4. Check the *Set Type Manually* box. The *Type* drop-down list box is enabled.



5. Select either:

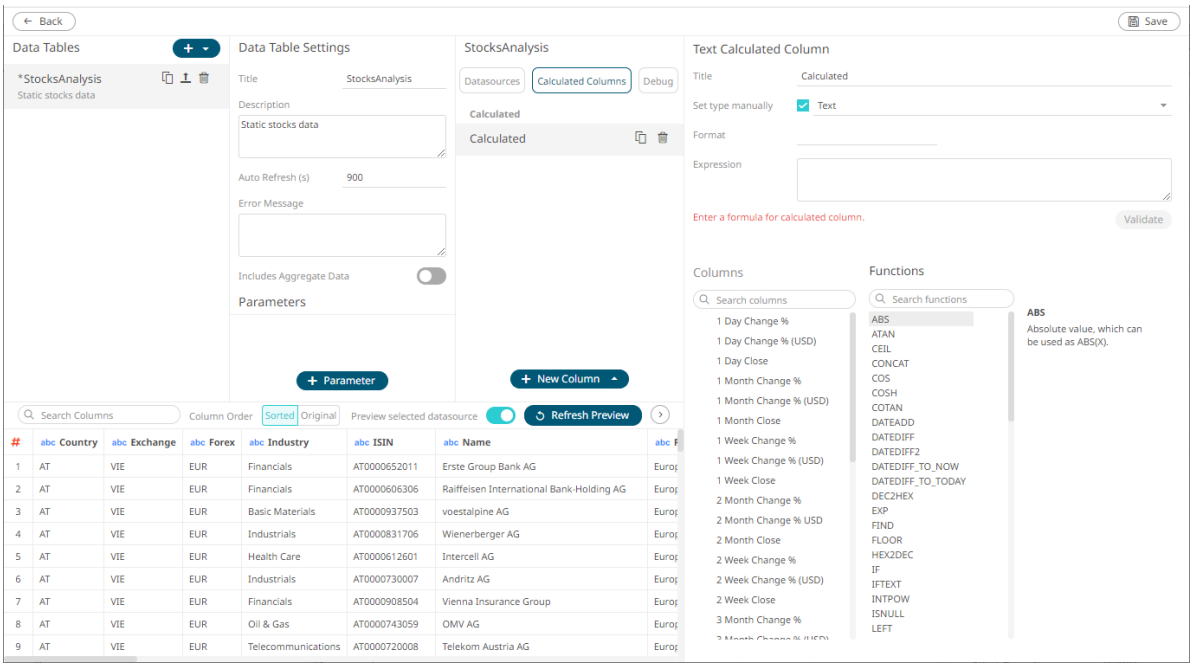


- Numeric

  The most common type of calculation that allows creation of new numeric columns.

- Text

  Allows new text columns to be created based on input string manipulation.



NOTE **Other types of calculations include:**

- **Time Series Calculation**
- **Time Window Calculation**
- **Time Period Calculation**

6. Build an expression by double-clicking in the list of available *Functions* and *Columns*.

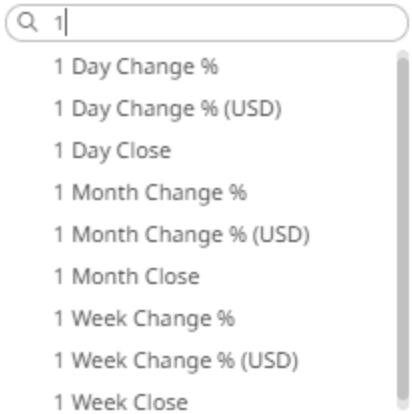
NOTE **You can also use parameters in the expression.**

To search for a particular column or function, enter it in the *Search Columns/Search Functions* box.



Or enter one or more characters/alphabets into the *Search Columns* box and the suggested list of columns that matched the entries will be displayed.

For example, after entering 1, the list will be displayed such as below:



7. Set the designed display *Format* (for example 0.0 %).
8. Click Validate to validate the formula.
9. Click Refresh Preview. The new calculated column is added and displayed in the *Data Preview*.

Numeric Calculations

Numeric calculations allow new numeric columns to be created.

They typically use one or more of the following operators:

Operator	Name	Description
!	Logical NOT	Logical NOT.
%	Integer Division	Integer Division
&	Logical AND	Logical AND.
*	Multiply	Multiplies two numbers.
+	Add	Adds two numbers.
-	Subtract	Subtracts two numbers.
/	Divide	Divides two numbers.
<=	Less than or equals	Less than or equals to.
<>	Not Equals	Not Equals.
=	Equals	Equals.
>=	Greater than or equals	Greater than or equals to.
^	Raises to the power	Raises number to the power of number2, number1 ^ number2.
|	Logical OR	Logical OR

And one or more of the following functions:

Function	Description
ABS	Absolute value, which can be used as ABS(X).
ATAN	ArcTangent function which can be used as ATAN(X).
CEIL	Ceiling function. Examples: CEIL(-3.2) = -3, CEIL(3.2) = 4.
COS	Cosine function which can be used as COS(X), where X is a real-type expression. COS returns the cosine of the angle X in radians.
COSH	Cosine Hyperbolic function which can be used as COSH(X).
COTAN	Cotangent function which can be used as COTAN(X).
EXP	Exponential function which can be used as EXP(X).
FLOOR	Floor function. Examples: FLOOR(-3.2) = -4, FLOOR(3.2) = 3.
HEX2DEC	Converts a hexadecimal number to decimal. Example: HEX2DEC("FF") = 255

IF	Conditional Statement
	The IF(b, case1, case2) function provides branching capability.
	• If b is True, then it returns case 1.
	• If b is False, then it returns case 2.
	• If b is a numeric value 1, it is equal to True.
	• If b is a numeric value 0, it is equal to False.
	NOTE: By default, the function returns a value of data type Text. To force the data type to numeric, you can either use “Set type manually” or do a calculation with a numeric value, such as multiply by 1.
	Examples:
	IF([Actual] >= [Budget], “Good job”, “Not done”)
	IF([Some_Number] = 0, 0, 1/[Some_Number])*1

INTPOW	Raises Base to an integral power. Example: INTPOW(2, 3) = 8. Note that the result of INTPOW(2,3.4) = 8 as well.
ISNULL	If the measure Is Null or NaN, then 1 is returned, else 0 is returned.
LN	Natural Log which can be used as LN(X).
LOG	10 Based Log which can be used as LOG(X).
LOGN	The LogN function returns the log base N of X. Example: LOGN(10, 100) = 2
MAX	Maximum of two input values. Example: MAX(2, 3) = 3
MIN	Minimum of two input values. Example: MIN(2, 3) = 2
MOD	Remainder of division.

	Example: MOD(7, 3) = 1
POW	Raises Base to any power. For fractional exponents or exponents greater than MaxInt, Base must be greater than 0.
RANDOM	RND(X) generates a random INTEGER number such that 0 <= Result < int(X). If X is negative, then result is int(X) < Result <= 0. RANDOM(X) generates a random floating point number such that 0 <= Result < X. If X is negative, then result is X < Result <= 0.
REGEX_EXTRACT	Returns matching data from the value based on regex. Expression is REGEX_EXTRACT("value", "regex")
SIGN	SIGN(X) returns -1 if X<0; +1 if X>0, 0 if X=0; it can be used as SQR(X).
SIN	Sinus function which can be used as SIN(X), X is real-type expression. SIN returns the sine of the angle X in radians.
SINH	Sine Hyperbolic function which can be used as SINH(X).
SQR	Square function which can be used as SQR(X).
SQRT	Square Root function which can be used as SQRT(X).
TAN	Tangent function which can be used as TAN(X).
TRUNC	Discards the fractional part of a number. Examples: TRUNC(-3.2) = -3 and TRUNC(3.2) = 3

Calculation Aggregation

Calculation aggregation is sometimes needed with calculated columns.

If the calculation aggregate is used, any calculated columns will be re-executed up the hierarchy, so that the calculation is done on group-level aggregates instead of row-level values. Furthermore, each term in the calculation will be summed by default, but this can be controlled if a different aggregation is needed.

The aggregation applied to each column included in the calculation expression can be specified using the following syntax:

```
[term:aggregate]
```

For example:

```
[exposure:sum]/[risklimit:mean]
```

`[exposure]/[risklimit:mean]` also has the same result since no aggregation specified defaults to sum.

NOTE **Most of the Panopticon aggregation methods are supported, except those that involve more than one column.**

You can specify any of the following functions:

- abs
- abssum
- count
- countdistinct
- countnonzero

- harmonicmean
- level
- max
- mean
- min
- neg
- percentofweightparent
- percentoftotalreference
- pos
- product
- siblingrank
- stdev
- stdevp
- sum

Text Calculations

Text calculations allow new text columns to be created based on input string manipulation.

They typically use one or more of the following operators:

Function	Description
CONCAT	Concatenates two strings together.
DEC2HEX	Converts a decimal number to hexadecimal. Example: DEC2HEX(255, 2) = "FF"
FIND	Returns the starting position of a text string within another text string.
IFTEXT	Returns a string based on the expression being evaluated to true or false.
LEFT	Returns the left most characters from a string producing a new string.
LEN	Returns the number of characters in a string.
LOWER	Returns the input string in lower case.
MID	Returns the characters from the middle of a text string, given a starting position and length.
PROPER	Converts a text string to proper case; the first letter in each word in uppercase, and all other letters in lower case.
REPLACE_ALL	Replaces all of the instances of the `pattern_to_replace` with the `replacement_text`. For example: replace_All(input_text, pattern_to_replace, replacement_text) replace_All("ABA", "A", "X") = "XBX" **NOTE:** Only `input_text` may be null. Special cases:

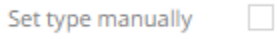
	• If `input_text` is null, the result is null. If `pattern_to_replace` is empty, it's considered to occur at every position in the `input_text` (including before the first and after the last character).
REPLACE_FIRST	Replaces the first instance of the `pattern_to_replace` with the `replacement_text`. For example: Replace_First(input_text, pattern_to_replace, replacement_text) Replace_First("ABA", "A", "X") = "XBA" **Note**: Only `input_text` may be null. Special cases: • If `input_text` is null, the result is null. If `pattern_to_replace` is empty, it's considered to occur at every position in the `input_text` (including before the first and after the last character).
RIGHT	Returns the right most characters from a string producing a new string.
TRIM	Returns the input string stripped of leading or following spaces.
UPPER	Returns the input string in upper case.

In addition, the **IF** calculation can be used on text inputs to define the condition, to produce numeric output.

Example: IF([SIDE]=”BUY”,[SIZE],-[SIZE])

Calculation Data Type

The data type of a calculation will default to text if a text column is used in the calculation. This type can be set manually by checking the “**Set type manually**” checkbox.



And then picking the appropriate output data type.



Asymmetric Reporting

An asymmetric report combines the values of two dimensions or text columns. The combination of these two fields through the text concatenation provides greater flexibility for visual display, whether in a hierarchy, on a text axis, or through cross tabbing into rows and columns.

Time Series Calculations

Calculated fields can be:

- numeric columns or numeric time series
- text time series

If one of the expressions used is a time series measure, then the result will be a new numeric time series calculated column.

As with standard calculated columns, time series calculated columns are calculated for every time slice and every item within the data set.

Example Numeric Calculations

```
Forecast Variance = ( [Actual] - [Forecast] ) / [Forecast]
Holding = [NumberofShares] * [LastPrice]
```

Example Text Time Series Calculation

time	anger	joy	sad
10/12/2020 00:00:00	20.00	100.00	0.00
10/12/2020 00:00:00	60.00	50.00	20.00
10/12/2020 00:00:00	80.00	10.00	30.00
10/12/2020 00:00:00	40.00	0.00	60.00

Sample fields

Transforming to enable time series, the time axis values will be based on the **time** column.

Sample expression for the calculated text column **Dominant,** calculates emotion with highest value at each time point:

```
IFTEXT(([anger] > [joy]) & ([anger] > [sad]), "Anger", IFTEXT([joy] > [sad],
"Joy", "Sadness"))
```

NOTE

- **Text time series columns (calculated or not), cannot be used in the breakdown.**
- **When the time series transform is switched off in time series calculation columns, an error message will be displayed “Can't use time series functions, the time series transform is not enabled.” Switch the time series transform on to fix the issue.**

Time Window Calculations

Time Window calculations allow new columns to be created that are based on a defined time window.

There are several additional functions:

Function	Description
COUNT_TIMEWIN	Like SUM_TIMEWIN, but simply returns the number of time slices between the defined time window, that have non-null values.
CUMSUM_TIMEWIN	The cumulative sum of Time Series value between start and end times. Alias for SUM_TIMEWIN(“Measure”,TimeWindowStart,Now).
LOOKUP	The value of a Time Series measure at a specific time.
MAX_TIMEWIN	The maximum value between the start and end times.
MEAN_TIMEWIN	The mean value of the Time Series between the start and end times.
MIN_TIMEWIN	The minimum value between the start and end times.
NOW	Returns the system Date/Time in default or provided format.

	Example: NOW() or NOW("yyyy MMM dd HH:mm:ss").
PRODUCT_TIMEWIN	The product of the Time Series values between the start and end times.
STDEV_TIMEWIN	The standard deviation of the time series between the start and end times.
STDEVP_TIMEWIN	The population standard deviation of the time series between the start and end times.
SUM_TIMEWIN	The sum of Time Series values between start and end times.

And three additional measures:

Function	Description
SnapshotTime	The time slice at the Snapshot Time
TimeWindowEnd	The Time slice at the end of a time window
TimeWindowStart	The Time slice at the start of a time window

NOTE **When using Time Windows calculations, fields referenced by the calculation should be enclosed in double quotes and NOT square brackets.**

For example, using the Time Series column **PRICE**, the following calculations can be created:

Function	Description
Difference Between Start and End of Time Window	LOOKUP(“PRICE”,TimeWindowStart)-LOOKUP(“PRICE”,TimeWindowEnd)
Time Window Maximum value across	MAX_TIMEWIN(“PRICE”, TimeWindowStart, TimeWindowEnd)
Time Window Standard Deviation	STDEV_TIMEWIN(“PRICE”, TimeWindowStart, TimeWindowEnd)
Variance since Time Window Start	([PRICE] - LOOKUP(“PRICE”,TimeWindowStart)) / LOOKUP(“PRICE”,TimeWindowStart)

Time Period Calculations

Time Period calculations are similar to Time Window calculations but relative to the current time slice.

Function	Description
CONTINUE_NPREV	Checks if there was a value in a previous time slice, N time slices back, and also a value for the current time slice. When you have the case “previous had value, and current has a value”, this function returns 1. Otherwise it returns 0. One use case can be to “mark” that a series has a value (not NULL) in the current time slice, when it also had a value in a previous time slice. CONTINUE_NPREV is related to LEAVE_NPREV and JOIN_NPREV.
COUNT_NPREV	Returns the number of non-null time slice values across the defined range. Otherwise, returns 0.

DATEADD	Adds an integer value to a specified DATEPART of an input date value, returning the modified value. Valid DATEPART values are YEARS, MONTHS, DAYS, HOURS, MINUTES, SECONDS, MILLISECONDS, MICROSECONDS, and NANOSECONDS.
DATEDIFF	The count of the specified DATEPART boundaries crossed between the specified StartDate and EndDate. Valid DATEPART values are YEARS, MONTHS, DAYS, HOURS, MINUTES, SECONDS, MILLISECONDS, MICROSECONDS, and NANOSECONDS.
DATEDIFF2	The total amount of elapsed time between the StartDate and EndDate expressed in a given unit. Valid DATEPART values are YEARS, MONTHS, DAYS, HOURS, MINUTES, SECONDS, MILLISECONDS, MICROSECONDS, and NANOSECONDS.
DATEDIFF_TO_NOW	The total amount of elapsed time from Date until NOW expressed in given unit. Valid DATEPART values are YEARS, MONTHS, DAYS, HOURS, MINUTES, SECONDS, MILLISECONDS, MICROSECONDS, and NANOSECONDS.
DATEDIFF_TO_TODAY	The total amount of elapsed time from Date until Today(start of day) expressed in given unit. Valid DATEPART values are YEARS, MONTHS, DAYS, HOURS, MINUTES, SECONDS, MILLISECONDS, MICROSECONDS, and NANOSECONDS.
DELTA_NPREV	Alias for “Measure”-NPREV(“Measure”,number). Calculates the change from the value N time slices previous, to the current value. For example, the current time slice counts as **1**, the preceding as **2** and the next as **3** time slices previous. That way, the function always considers N consecutive time slices/values – not N consecutive spaces between values. So, if the current value is 2, and the value three steps back (counting the current value as 1) was 5, then DELTA_NPREV is -3. DELTA_NPREV is related to DELTA_PCNT_NPREV
DELTA_PCNT_NPREV	Alias for “Measure”/NPREV(“Measure”,number)-1. Works exactly like DELTA_NPREV, but instead of delivering the nominal value of Value(N=3)-Value(N=1), it calculates the difference divided by Value(N=3), For example, moving from 5 to 2 gives you DELTA=-3 and DELTA_PCNT = -0.60 (-3/5). DELTA_PCNT_NPREV is related to DELTA_PCNT.
FALL_NPREV	Detects if a series has had a decreasing value when comparing the current time slice to a previous time slice. If the current value was lower, then the function returns 1. Otherwise it returns 0. FALL_NPREV is related to GAIN_NPREV.
GAIN_NPREV	Detects if a series has had an increasing value when comparing the current time slice to a previous time slice. If the current value was higher, then the function returns 1. Otherwise it returns 0. GAIN_NPREV is related to FALL_NPREV.
JOIN_NPREV	Checks if there was a null value in a previous time slice, N time slices back, while there is a value for the current time slice. When you have the case “previous was NULL, and current has value”, this function returns 1. Otherwise, it returns 0. One use case can be to “mark” that a series had a NULL in a previous time slice. JOIN_NPREV is related to LEAVE_NPREV and CONTINUE_NPREV.

LEAVE_NPREV	Check if there was a value in a previous time slice, N time slices back, while there is NULL for the current time slice. When you have the case “previous had value, and current is NULL”, this function returns 1. Otherwise it returns 0. One use case can be to “mark” that a series has a NULL in the current time slice, when it had a value in a previous time slice. LEAVE_NPREV is related to JOIN_NPREV and CONTINUE_NPREV.
MAX_NPREV	The maximum value of current time and the value n time slices before that.
MIN_NPREV	The minimum value of current time and the value n time slices before that.
NPREV	The value of a measure n time slices previous of the current time.
PRODUCT_NPREV	The product of the values n time slices previous of the current time.
SMA_NPREV	The Simple Moving Average for the n time slices up to and including the current time slice. Alias for SUM_NPREV(“Measure”,number)/number.
STDEV_NPREV	Calculates the standard deviation for a number of preceding time slices.
STDEVP_NPREV	Calculates the population standard deviation for a number of preceding time slices.
SUM_NPREV	The sum of the values n time slices up to and including the current time slice.
TO_POSIX	Converts timestamp values to posix.
TO_POSIXMILLIS	Converts timestamp values to posixmillis.
WITHIN_PERIOD	If input date is within the period compared to the current timestamp, then the measure is returned, otherwise null is returned. Usage Example: withinperiod(period, date, measure) where period is either of `["WTD","MTD","QTD","YTD"]` "`WTD`" = week to date "`MTD`" = month to date "`QTD`" = quarter to date "`YTD`" = year to date

NOTE **When using Time Period calculations, fields referenced by the calculation should be enclosed in double quotes and NOT square brackets.**

For example, using the Time Series column **PRICE**, the following calculations can be created,

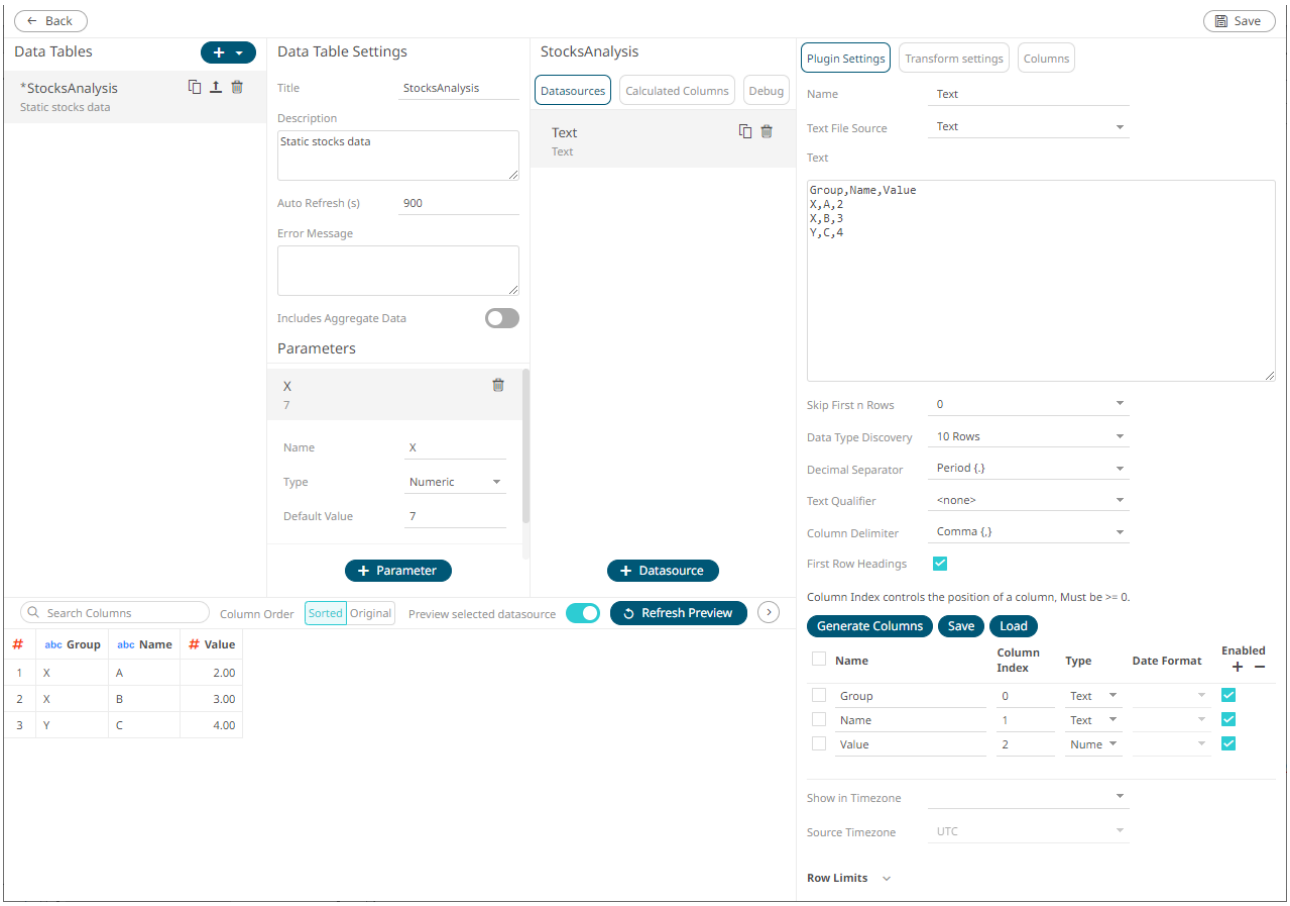
Change in Price compared to previous time slice	[PRICE] - NPREV(“PRICE”,1)
Change in Price compared to 5 time slices previously	[PRICE] - NPREV(“PRICE”,5)
% Change in Price compared to Previous Time slice	([PRICE] - NPREV(“PRICE”,1)) / NPREV(“PRICE”,1)
5 Period Moving Average	SUM_NPREV(“PRICE”,5)/5
20 Period Moving Average	SUM_NPREV(“**PRICE**”,**20**)/**20**

Parameterization in Calculated Columns

Given Table 1:

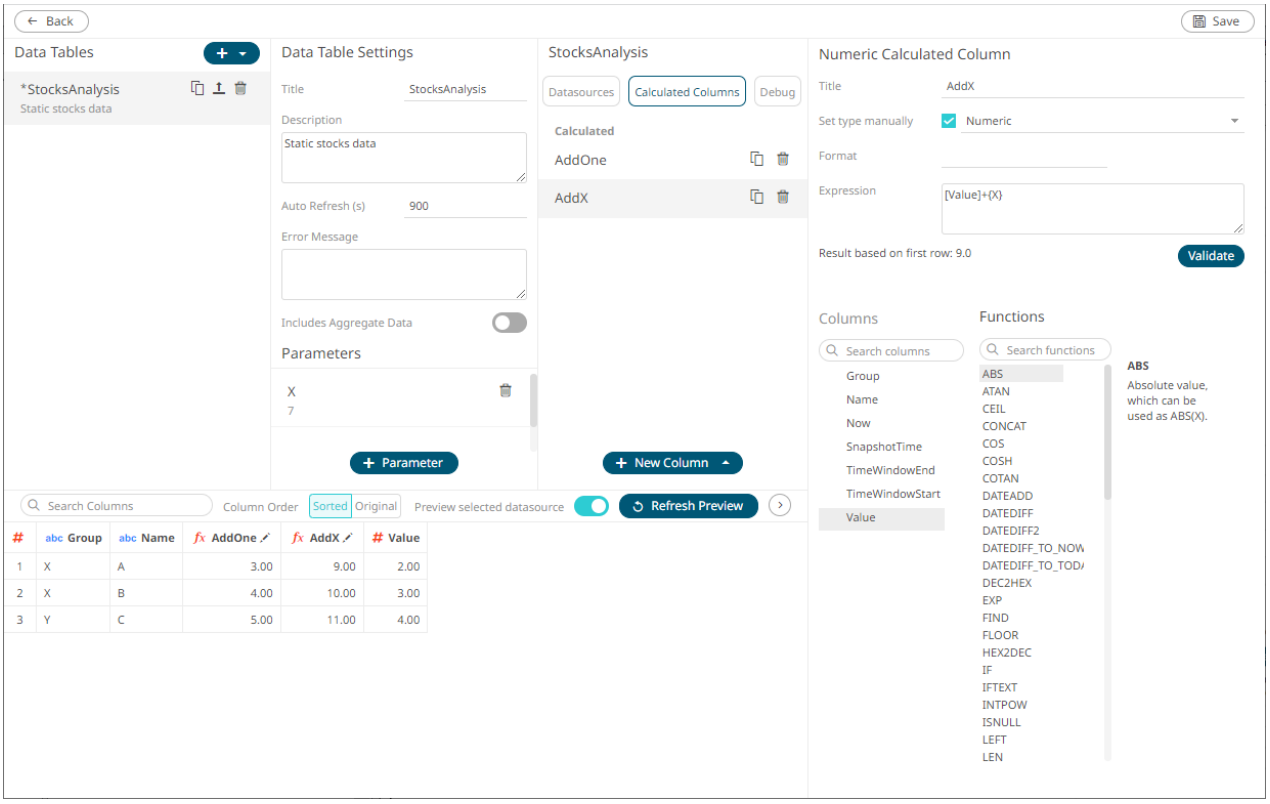
Group	Name	Value
X	A	2.00
X	B	3.00
Y	C	4.00

Creating a new numeric parameter **X** with a value of **7**:



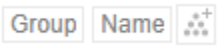
Then adding calculated columns **AddOne = [Value] + 1** and **AddX = [Value] + {X}** will result to:

Group	Name	Value	AddOne	AddX
X	A	2.00	3.00	9.00
X	B	3.00	4.00	10.00
Y	C	4.00	5.00	11.00



Sample 1

Below is the defined breakdown in a Table visualization:



This Table visualization is showing the grouping of the columns based on the breakdown hierarchy with **AddOneSum**, **AddXSum**, **AddOneCalc**, **AddXCalc** as Visual Members with the corresponding aggregates and the **X** value is set to **7**:

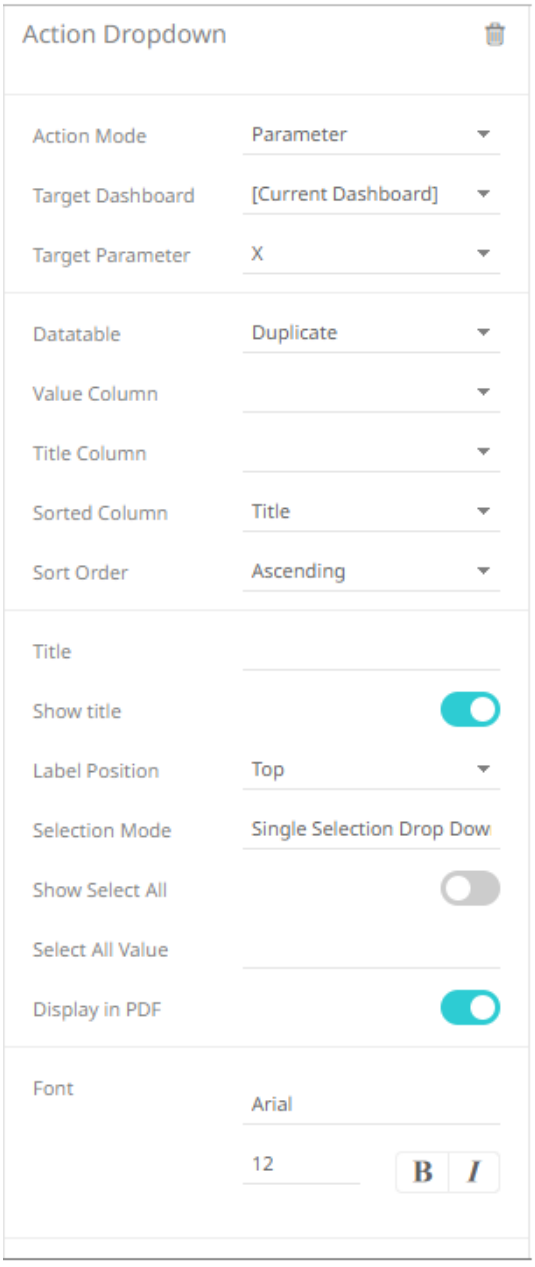
Column	Aggregate
Value	Sum
AddOneSum	Sum
AddXSum	Sum
AddOneCalc	Calculation
AddXCalc	Calculation

x=7

Group Name

	Value	AddOneSum	AddXSum	AddOneCalc	AddXCalc
Grand Total	9.00	12.00	30.00	10.00	16.00
X Total	5.00	7.00	19.00	6.00	12.00
A	2.00	3.00	9.00	3.00	9.00
B	3.00	4.00	10.00	4.00	10.00
Y Total	4.00	5.00	11.00	5.00	11.00
C	4.00	5.00	11.00	5.00	11.00

Adding an *Action Dropdown* in the dashboard with a **Set Parameter** mode:



And given Table 2:

Value
0
1
7
12

Will result to these Table values:

Set X
0

X=0

Group Name

		Value	AddOneSum	AddXSum	AddOneCalc	AddXCalc
X	A	2.00	3.00	2.00	3.00	2.00
	B	3.00	4.00	3.00	4.00	3.00
X Total		5.00	7.00	5.00	6.00	5.00
Y	C	4.00	5.00	4.00	5.00	4.00
Y Total		4.00	5.00	4.00	5.00	4.00
Grand Total		9.00	12.00	9.00	10.00	9.00

Set X
1

X=1

Group Name

		Value	AddOneSum	AddXSum	AddOneCalc	AddXCalc
X	A	2.00	3.00	3.00	3.00	3.00
	B	3.00	4.00	4.00	4.00	4.00
X Total		5.00	7.00	7.00	6.00	6.00
Y	C	4.00	5.00	5.00	5.00	5.00
Y Total		4.00	5.00	5.00	5.00	5.00
Grand Total		9.00	12.00	12.00	10.00	10.00

Set X

12

X=12

Group Name

		Value	AddOneSum	AddXSum	AddOneCalc	AddXCalc
X	A	2.00	3.00	14.00	3.00	14.00
	B	3.00	4.00	15.00	4.00	15.00
X Total		5.00	7.00	29.00	6.00	17.00
Y	C	4.00	5.00	16.00	5.00	16.00
Y Total		4.00	5.00	16.00	5.00	16.00
Grand Total		9.00	12.00	45.00	10.00	21.00

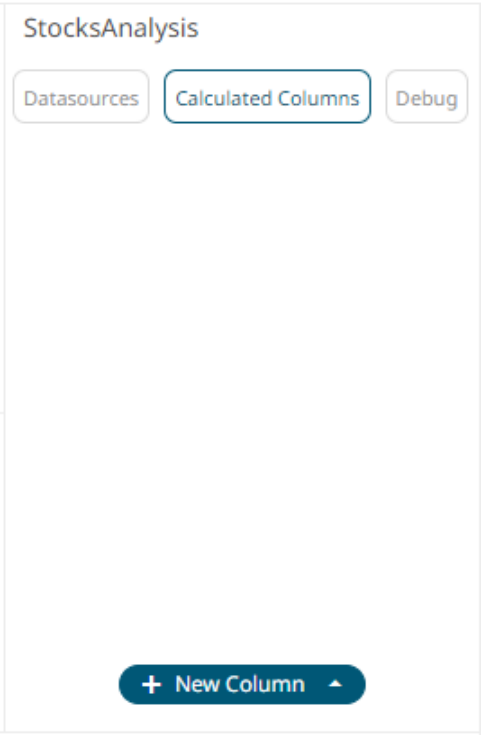
Adding Ranking Columns

Adding a new ranking column requires a numeric source column.

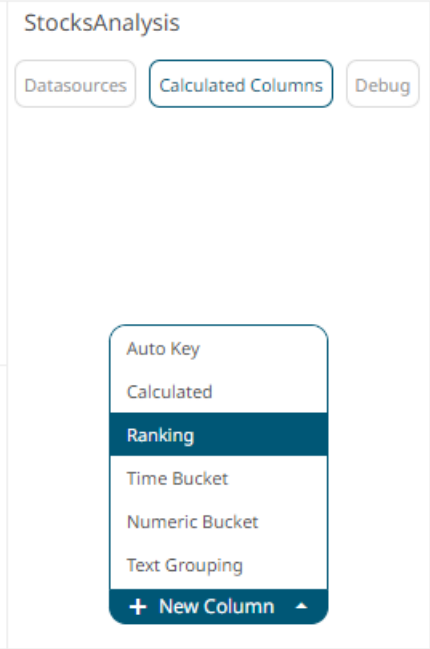
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

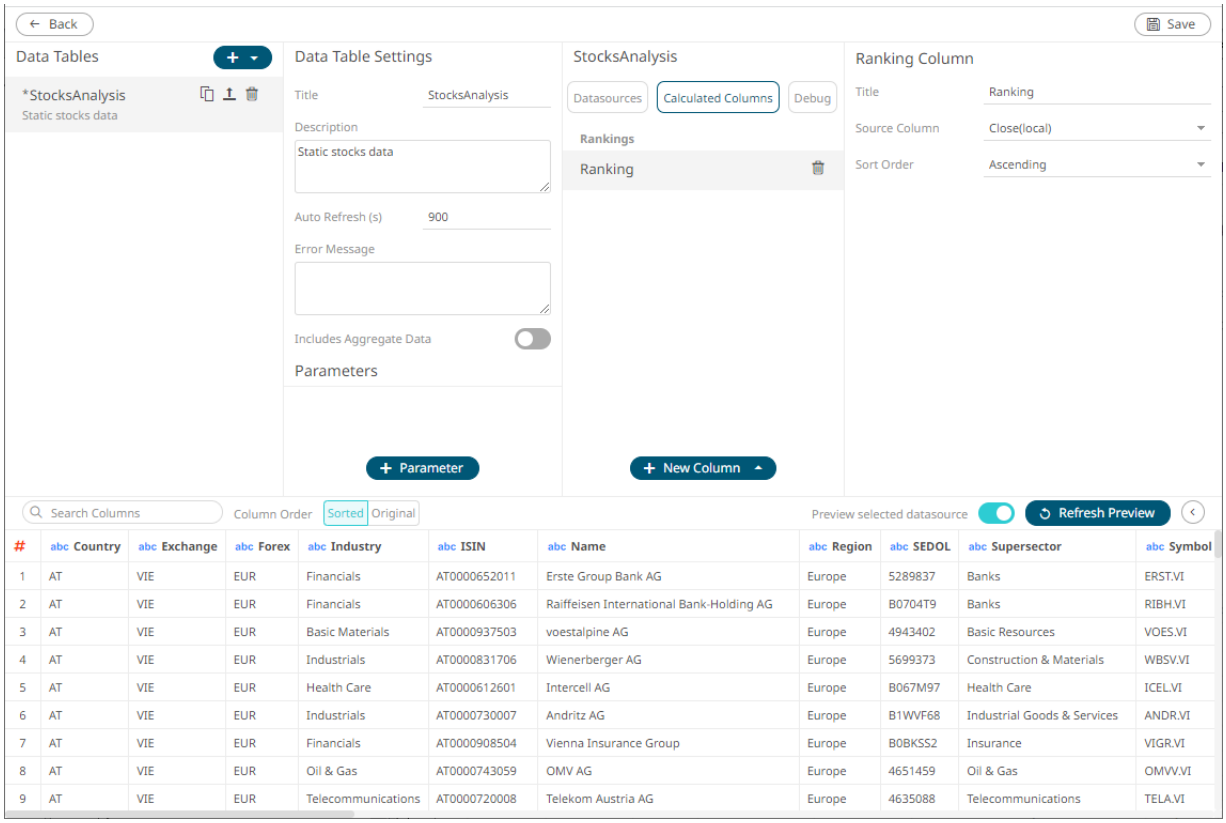
   The *Calculated Columns* pane displays.



2. Click **New Column > Ranking**.



The *Ranking Column* pane displays which lets you create new numeric columns based on ranking other columns in your data source. The rank is calculated for each row across each time period.

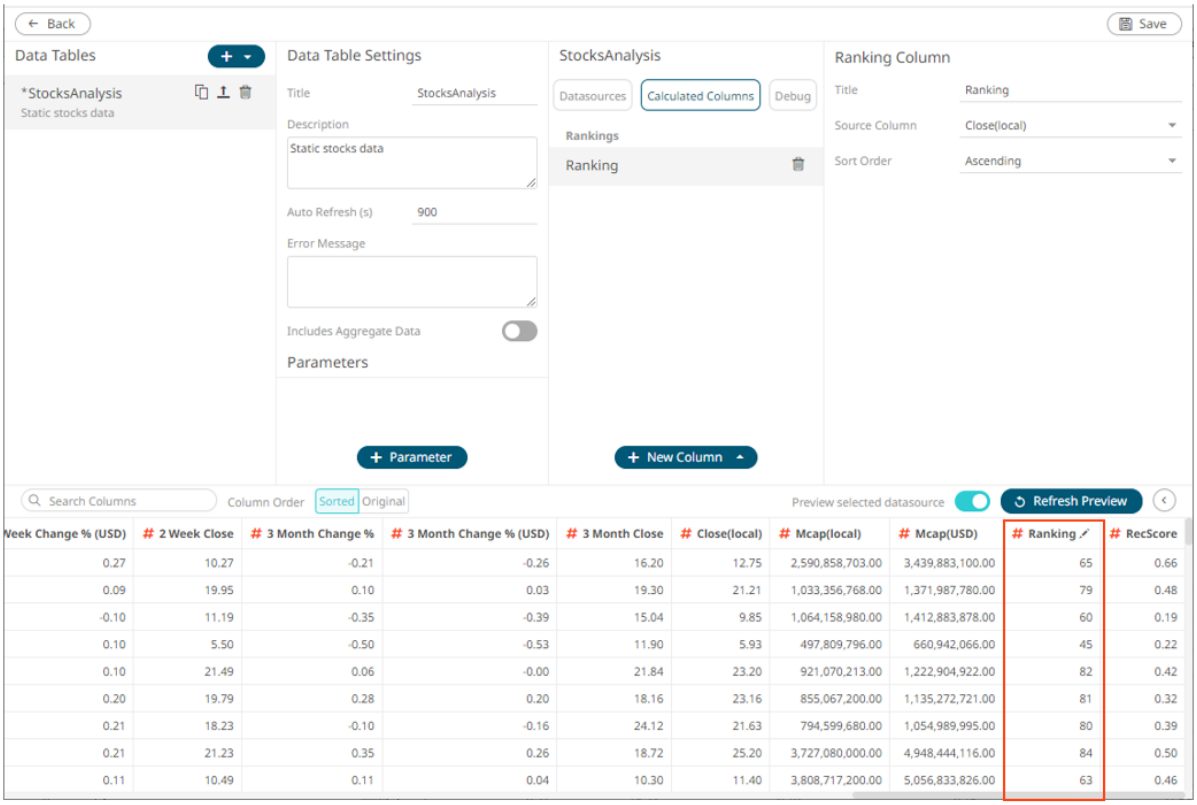


#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI

3. Fill in the *Title* field.
4. Select a numeric *Source Column*.
5. Define whether the column should be ranked:
   - Ascending

- Descending

6. Click Refresh Preview. The new ranking column is added and displayed in the *Data Preview*.



Adding Time Buckets – Categorical Time Analysis

Time based data can be represented as continuous Time Series and displayed in time series visualizations such as the Line Graph. However, there are circumstances when data analysis does not require continuous time, but instead requires time grouping and aggregation. Time parts support this categorical use of time.

To group and aggregate time-based data, a Date/Time column should be present in the data table.

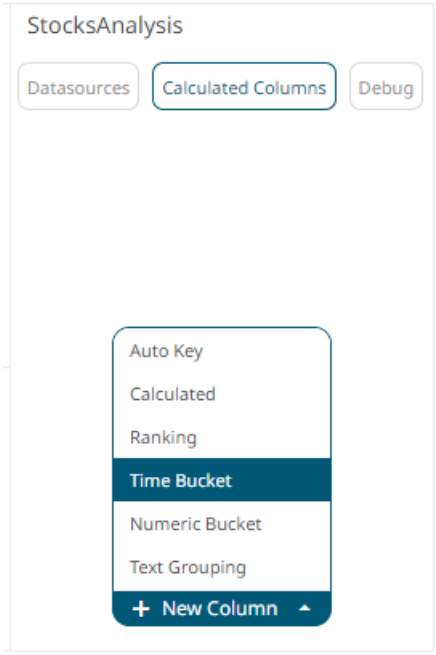
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

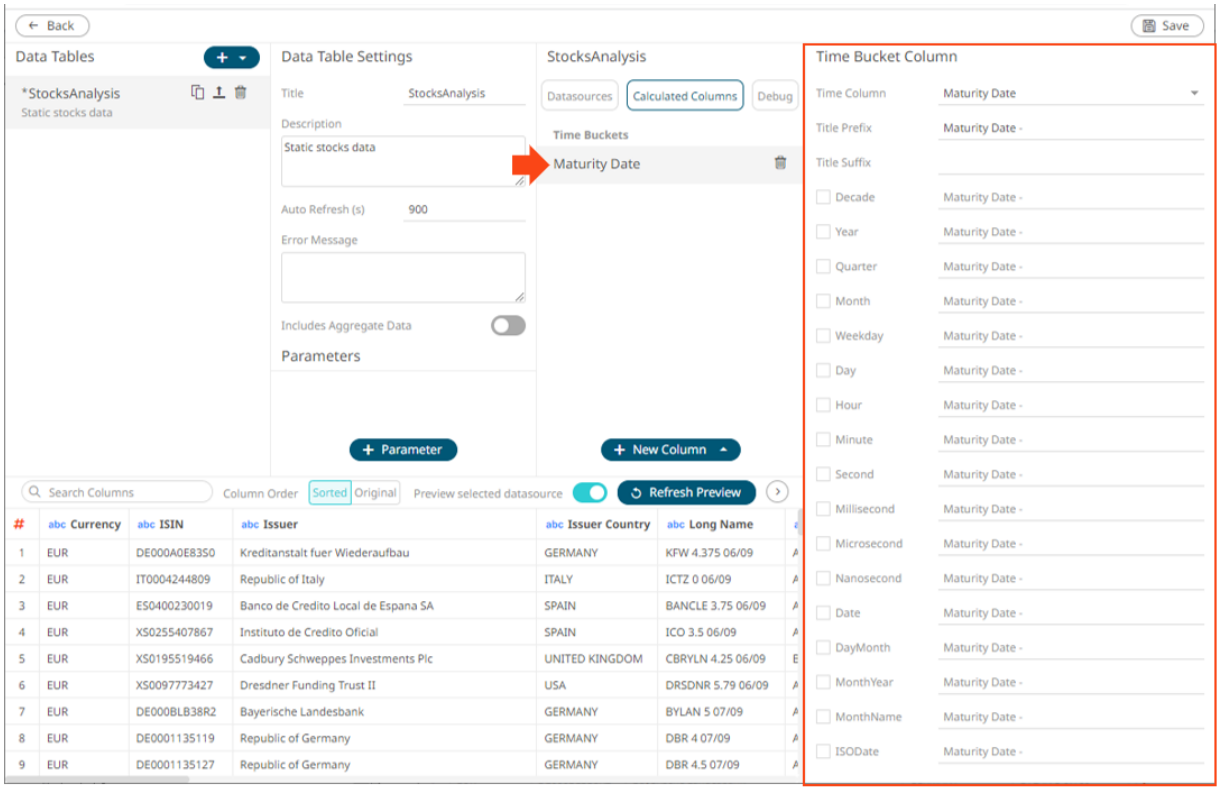
   The *Calculated Columns* pane displays.



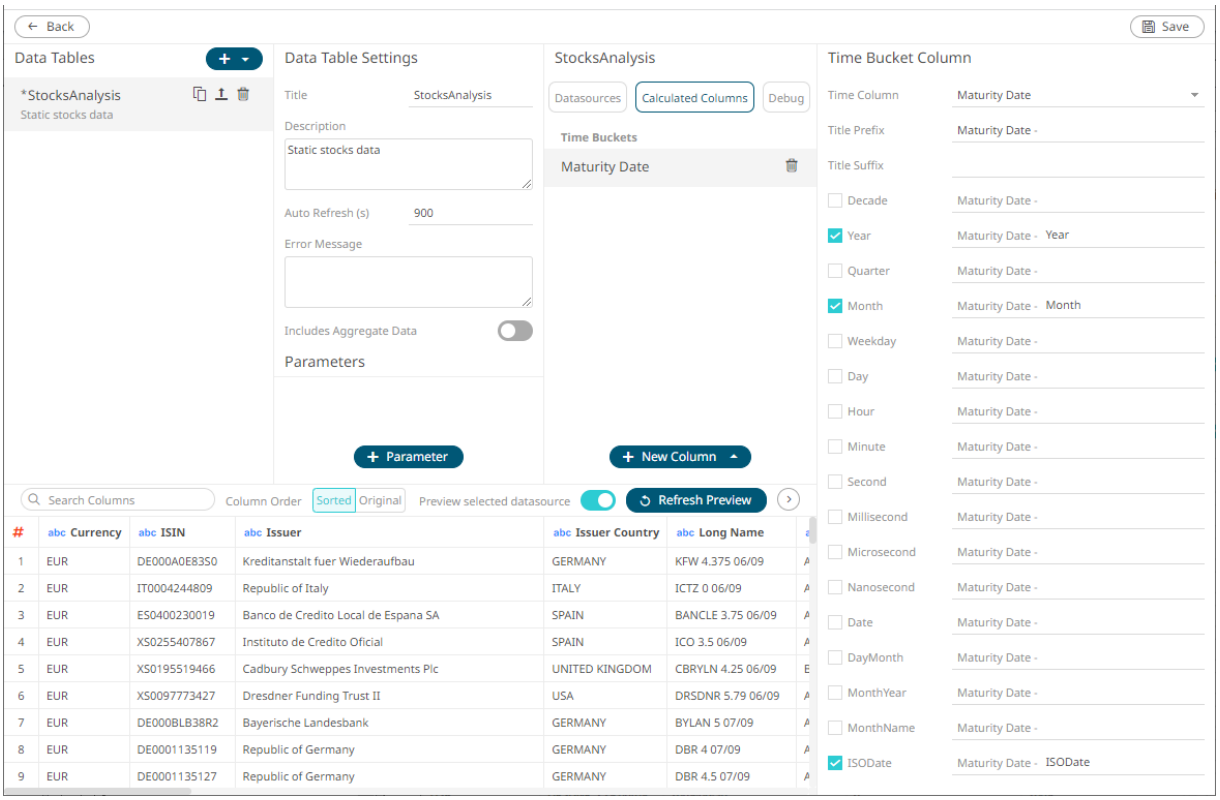
2. Click **New Column > Time Bucket**.



The Date/Time column (e.g., **Maturity Date**) that will be used for the time bucketing is displayed under the *Calculated Columns* pane and the *Time Bucket Column* pane also displays.



3. Enter the *Title Prefix*.
4. Enter the *Title Suffix*.
5. Select the required time buckets.
6. Click Refresh Preview. The new time bucketing column is added and displayed in the *Data Preview*.



This process adds additional text columns to the data table which can be used in:

- Hierarchies / Breakdowns
- Filters
- Color Variables
- Detail Variables

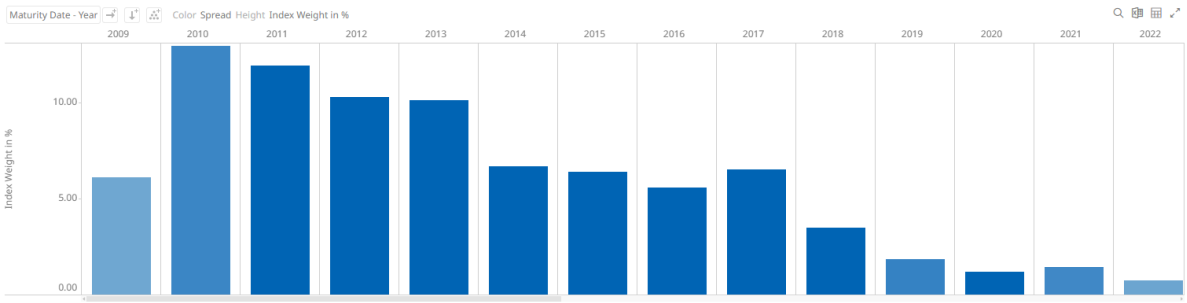
Once selected the new time bucket columns will appear in the data table schema listing.

As an example, the data set below relates to a EURO dominated Bond universe:

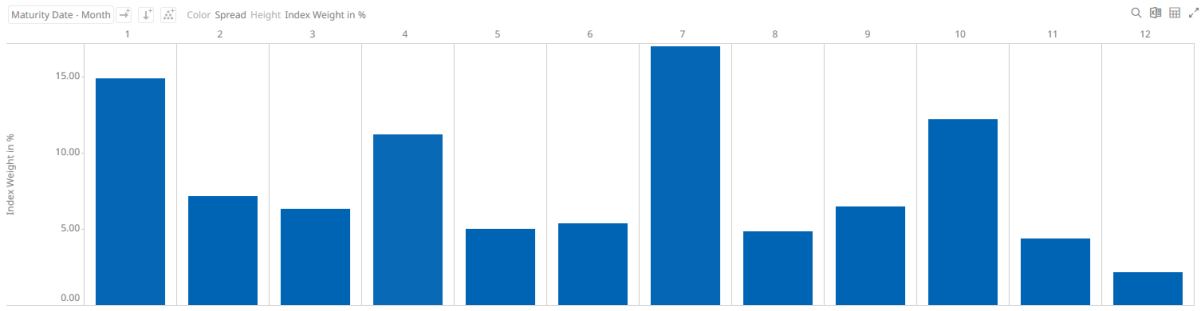
Each individual bond represents a row within the data set and has associated properties represented by each column.

The Maturity Date represents the date to which the Bond matures.

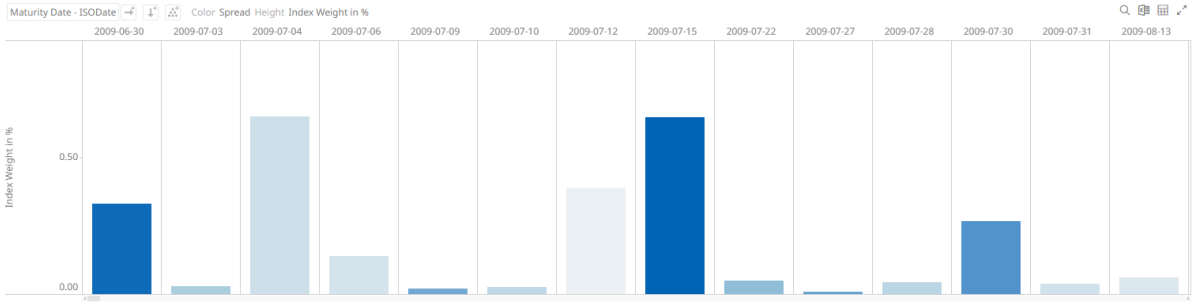
By creating the **Year** Time Part, a Bar graph of Maturity Year can be displayed:



Similarly using the **Month** Time Part, a Bar graph of cumulative issuance by Month can be displayed:



Using the **ISODate** Time Part, a Bar graph of cumulative issuance by ISO Date can be displayed.



Adding Identity Bucketing

Numeric data is represented as a continuous set of values in displays and filters. However, there are circumstances when the numeric values are not continuous, but instead discrete categories, to be grouped and filtered upon.

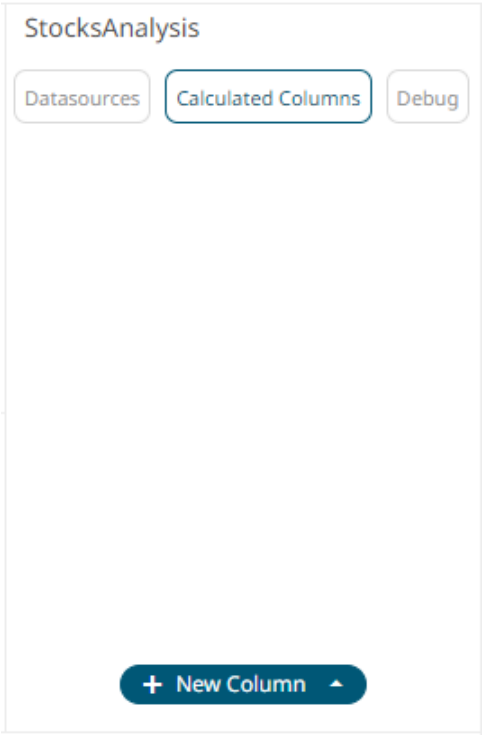
Numeric fields can be converted into text in the underlying data repository, but then sort order is treated as text, rather than numeric.

To group and aggregate numeric data, numeric columns should be present in the data table.

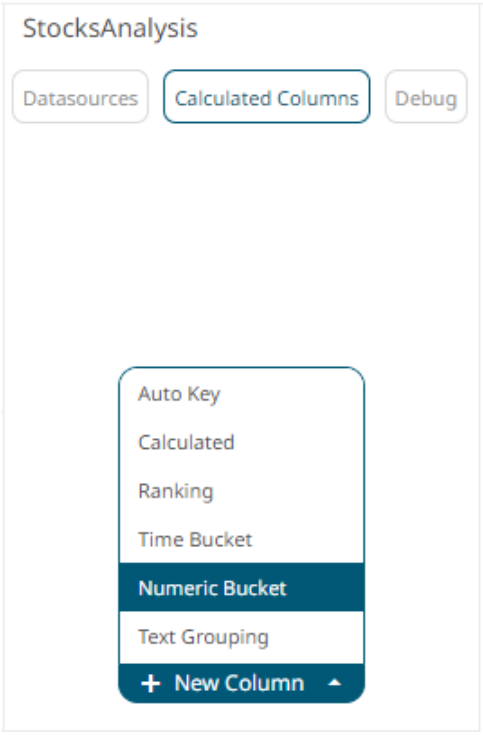
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

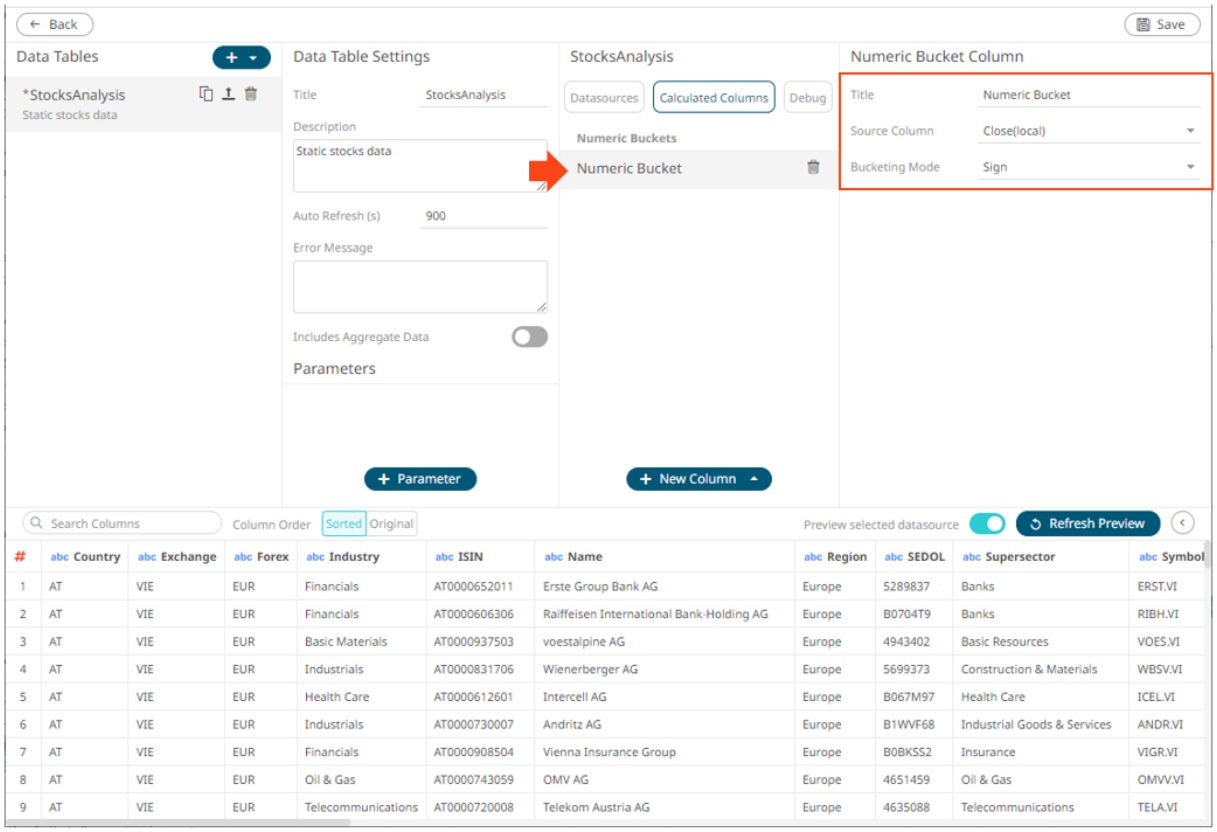
   The *Calculated Columns* pane displays.



2. Click **New Column > Numeric Bucket**.



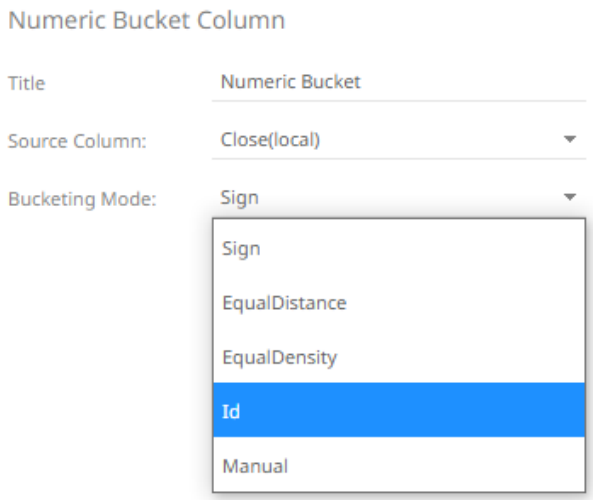
The numeric bucket instance is displayed on the *Data Sources Settings* with **Numeric Bucket** as the default title, also the *Numeric Bucket Column* pane displays.

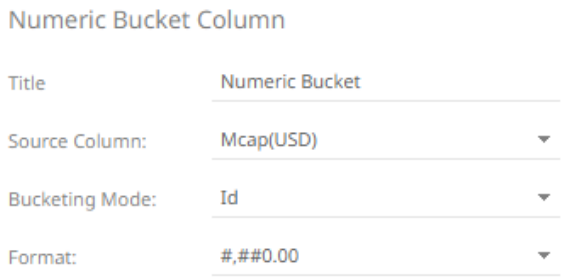


#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI

You may opt to modify the numeric identity bucket *Title*.

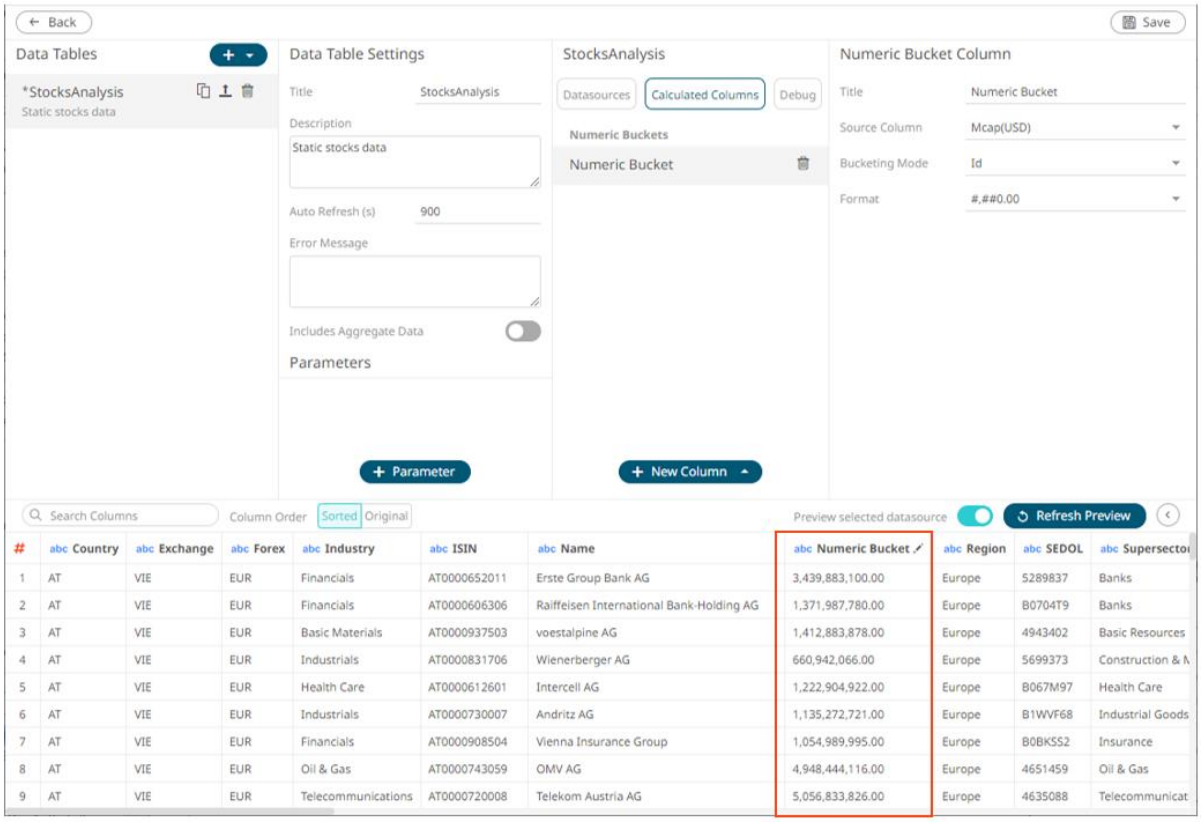
3. Select **Id** in the *Bucketing Mode* drop-down list box.



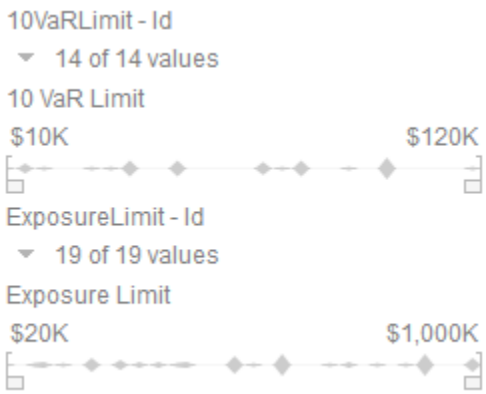


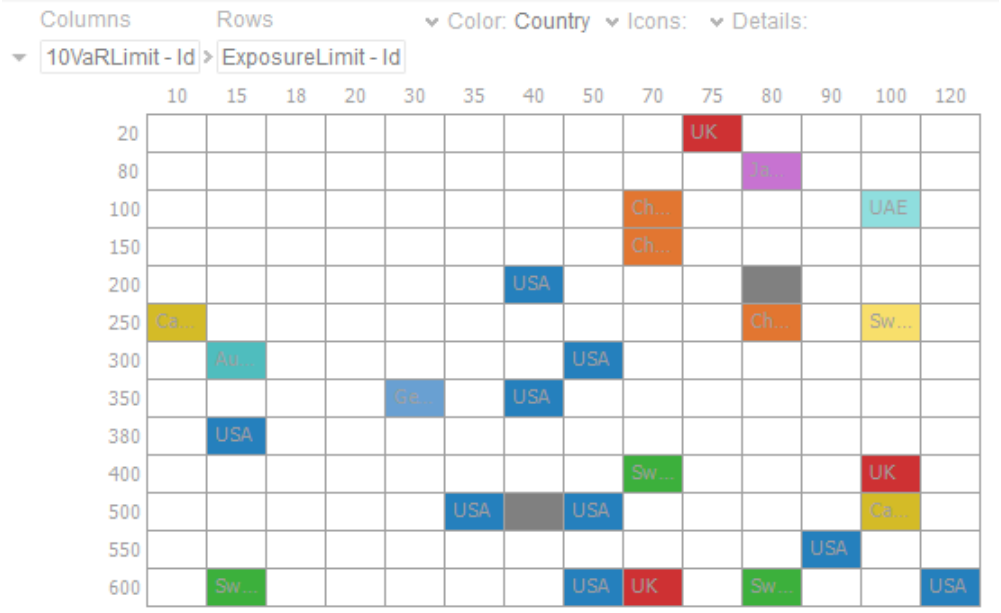
4. Select the numeric *Source Column* and *Format*.

5. Click Refresh Preview . The new numeric identify bucket column is added and displayed in the *Data Preview*.



These new identity columns can then be used as categories in the breakdown, and as categorical filters:





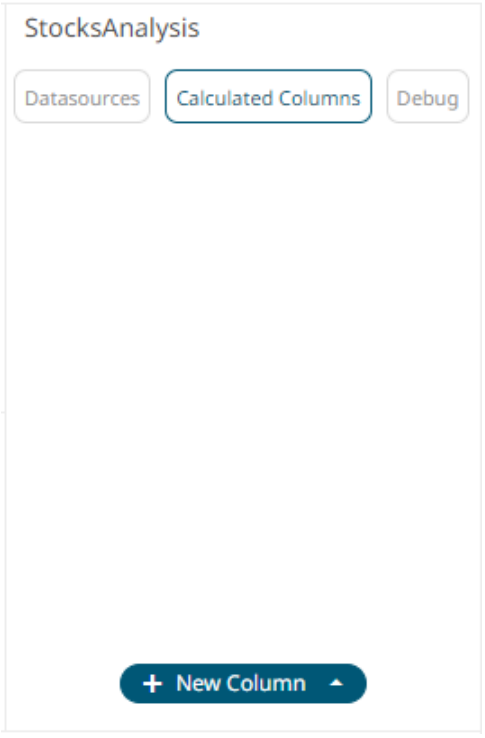
Adding Numeric Sign Bucketing

Numeric data is represented as a continuous set of values in displays and filters. Sometimes it may be necessary to divide the data into positive and negative subsets. This can be achieved with Sign bucketing.

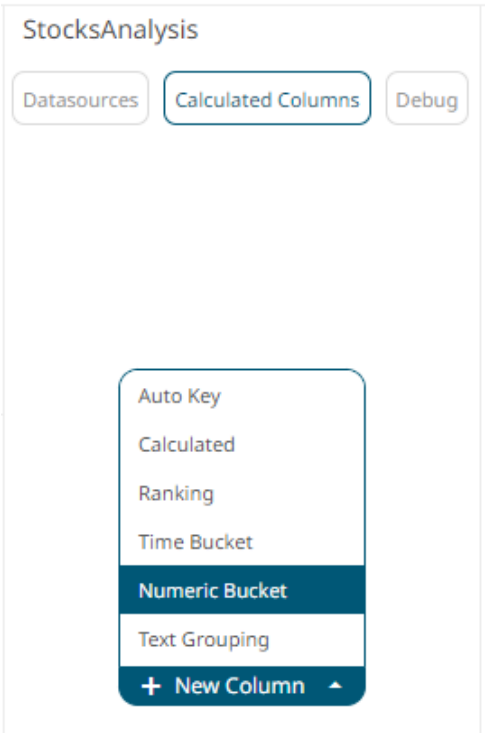
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

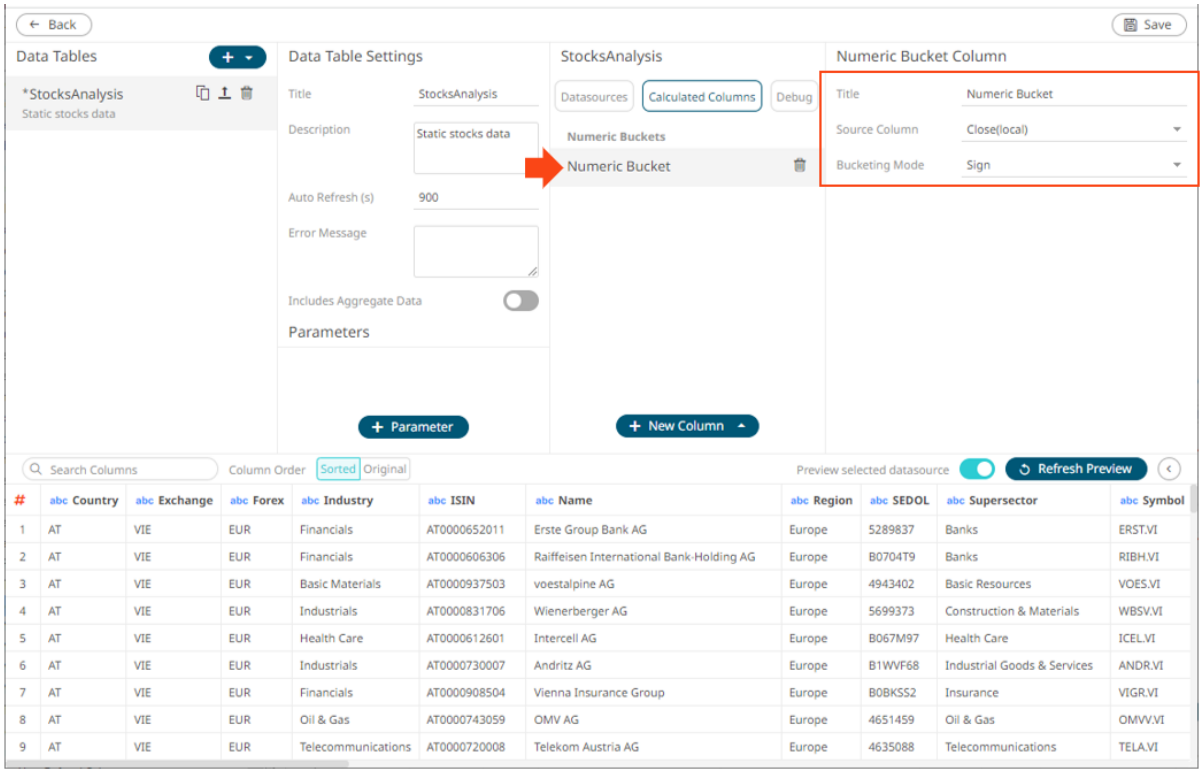
   The *Calculated Columns* pane displays.



2. Click **New Column > Numeric Bucket**.

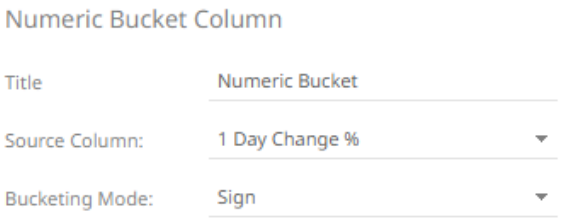


The numeric bucket instance is displayed on the *Data Sources Settings* with **Numeric Bucket** as the default title, also the *Numeric Bucket Column* pane displays.

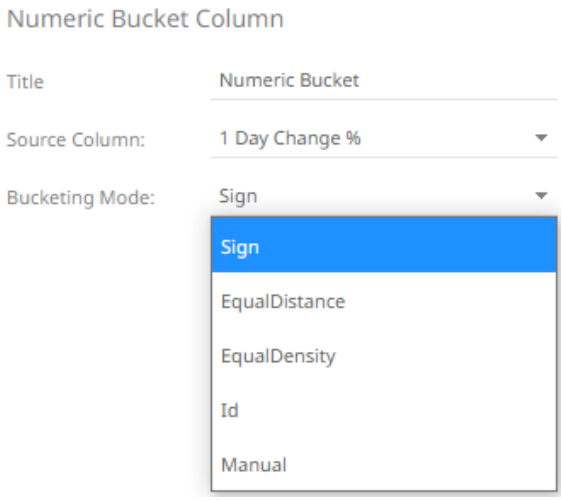


You may opt to modify the numeric sign bucket *Title*.

3. Select the numeric *Source Column*.

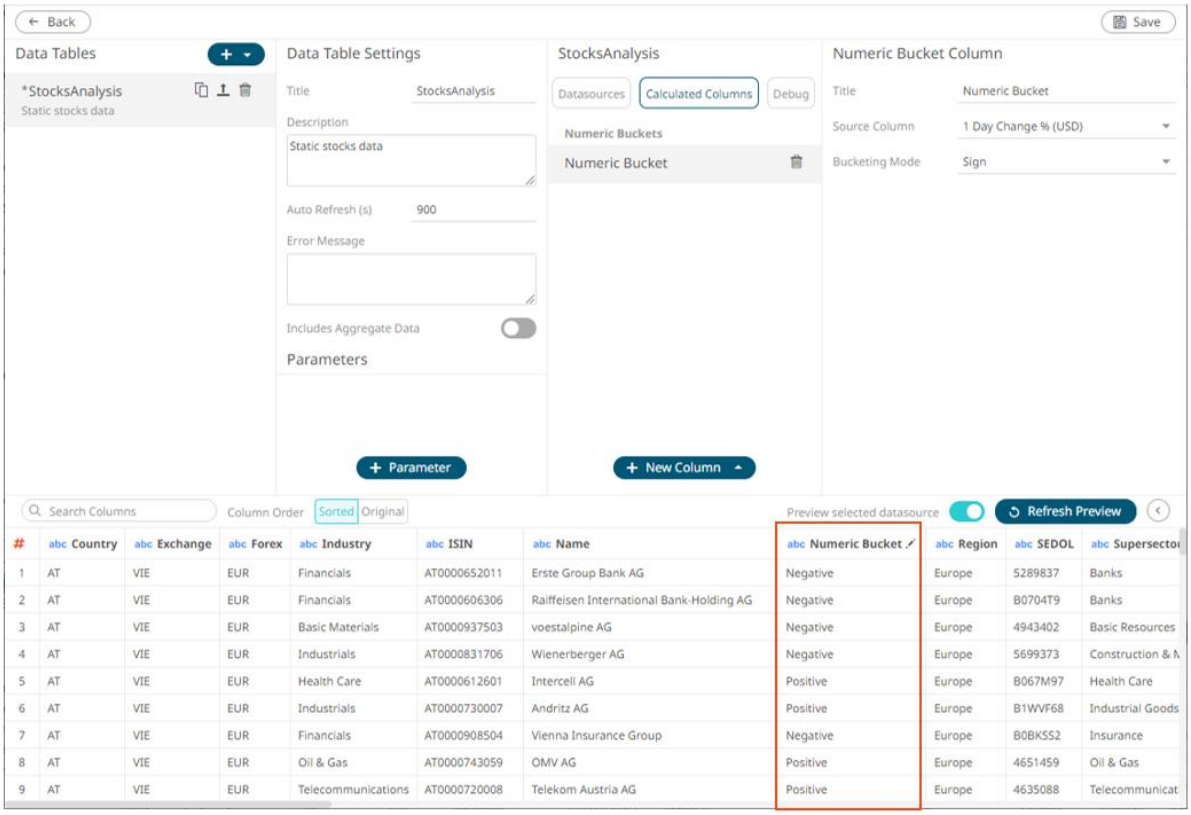


4. Select **Sign** in the *Bucketing Mode* drop-down list box.



5. Click 

. The new numeric sign bucket column is added and displayed in the *Data Preview*.



Adding Numeric Equal Distance Bucketing

Numeric data is represented as a continuous set of values in displays and filters. Sometimes it may be necessary to divide the data into equal sized bucket subsets.

For example, for the 1 Day Change %(USD) column, the minimum value is -0.35 and the maximum value is 0.21 when you specify 2 buckets, the equal distance ranges will be the following:

- -0.35, -0.07
- -0.07, 0.21

Meanwhile, if you specify 3 buckets, the equal distance ranges will be the following:

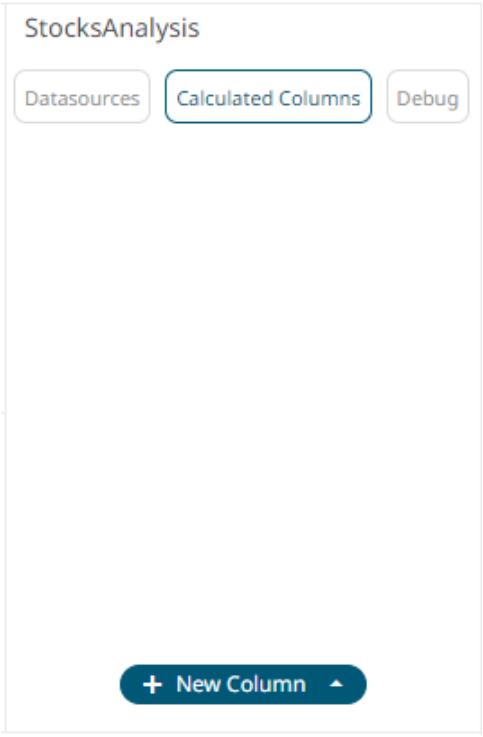
- -0.35, -0.17
- -0.17, 0.02
- 0.02, 0.21

These can be achieved with Equal Distance bucketing and is commonly used when producing histograms.

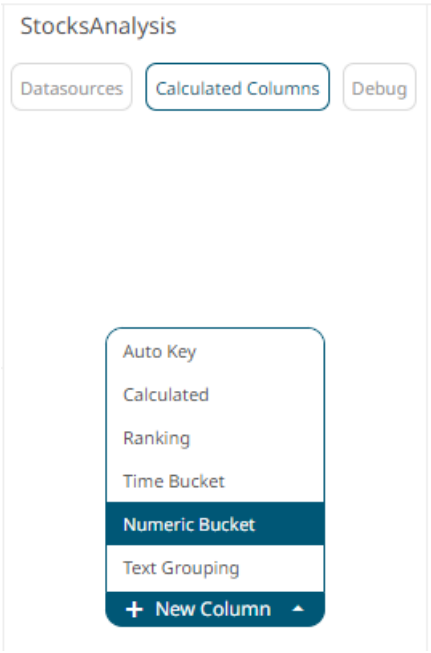
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

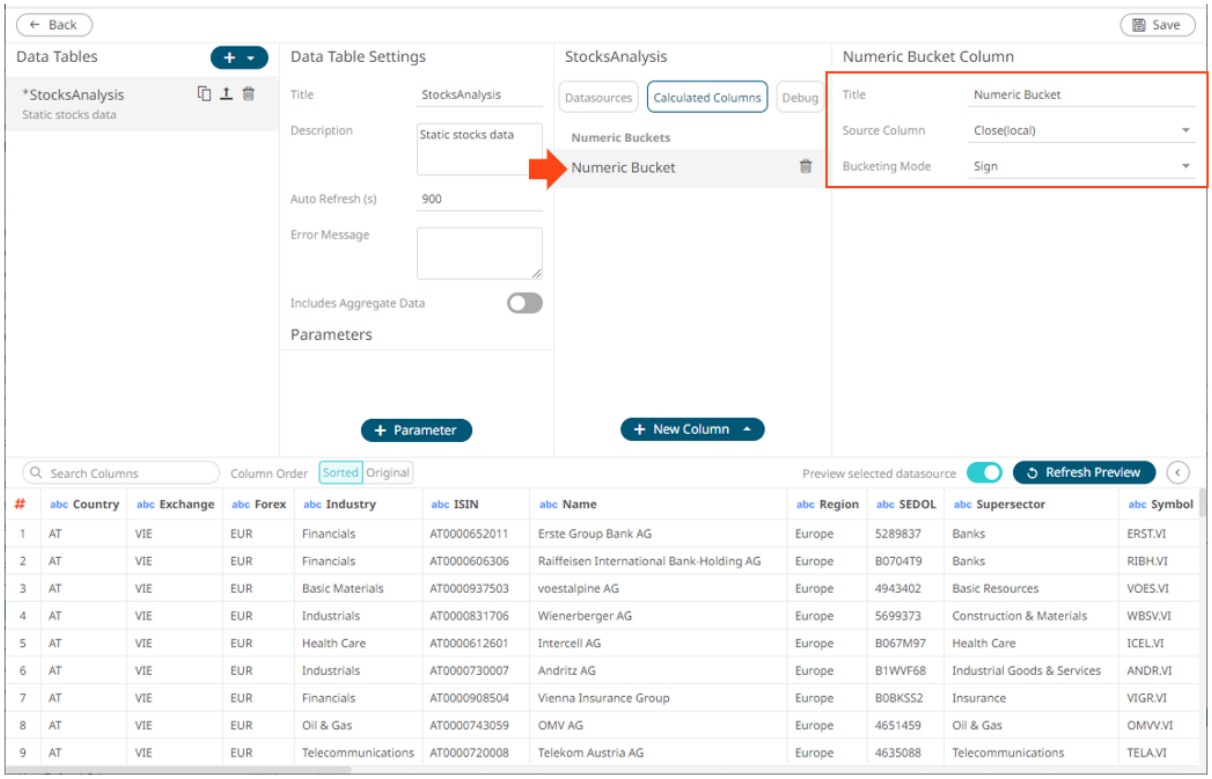
   The *Calculated Columns* pane displays.



2. Click **New Column > Numeric Bucket**.



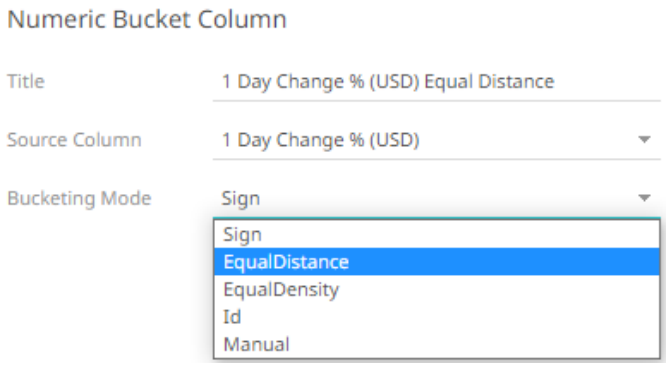
The numeric bucket instance is displayed on the *Data Sources Settings* with **Numeric Bucket** as the default title, also the *Numeric Bucket Column* pane displays.

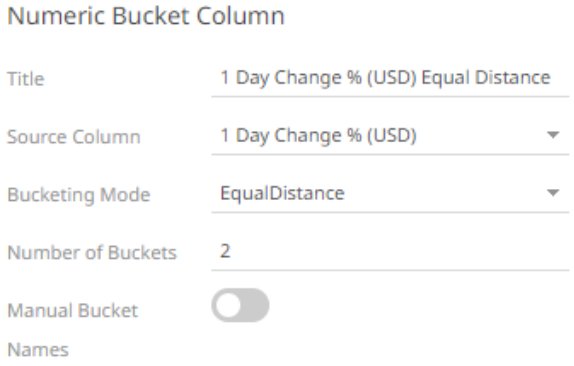


#	Country	Exchange	Forex	Industry	ISIN	Name	Region	SEDOL	Supersector	Symbol
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI

You may opt to modify the numeric equal distance bucket *Title*.

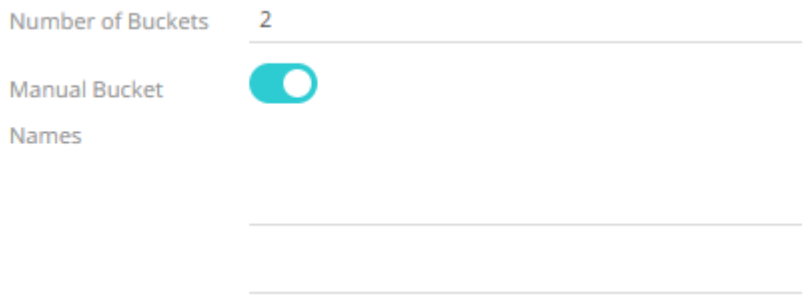
3. Select the numeric *Source Column*.
4. Select **Equal Distance** in the *Bucketing Mode* drop-down list box.



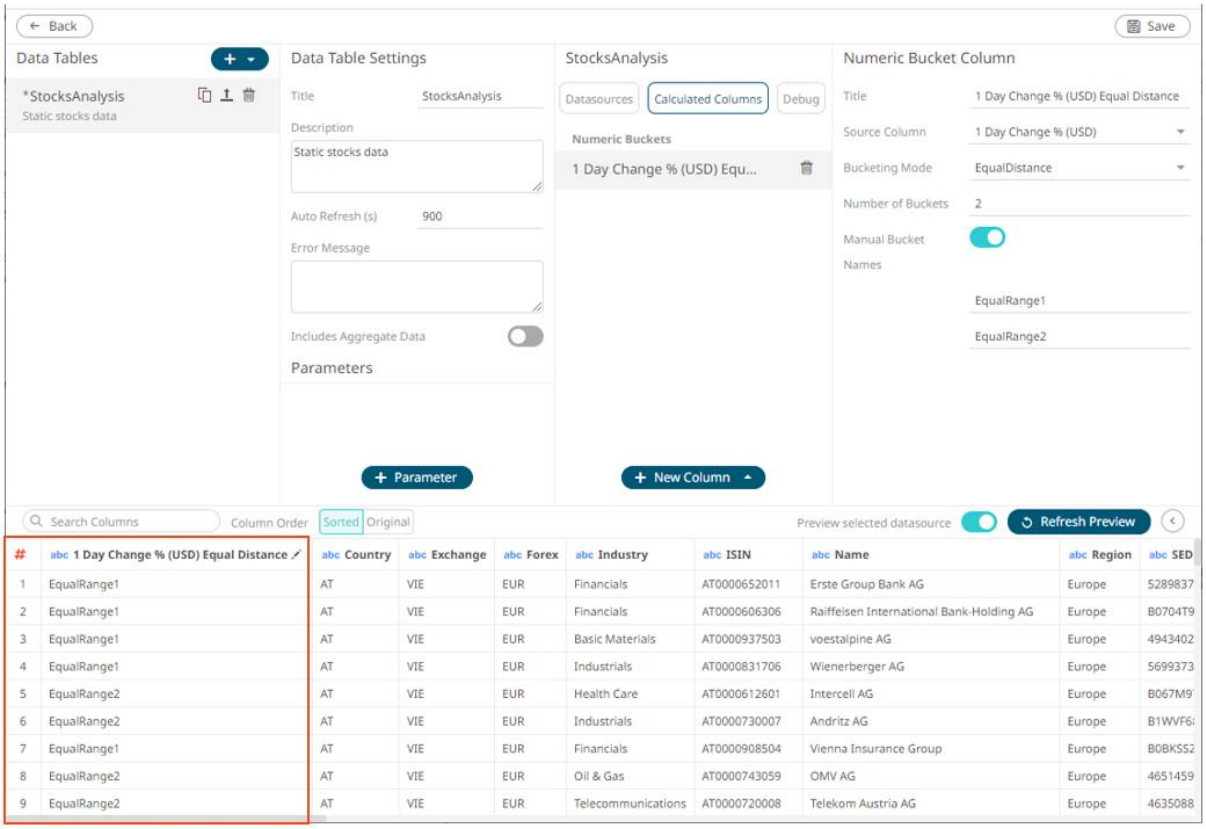


5. Enter the *Number of Buckets*.
6. Tap the **Manual Bucket** slider to turn it on.

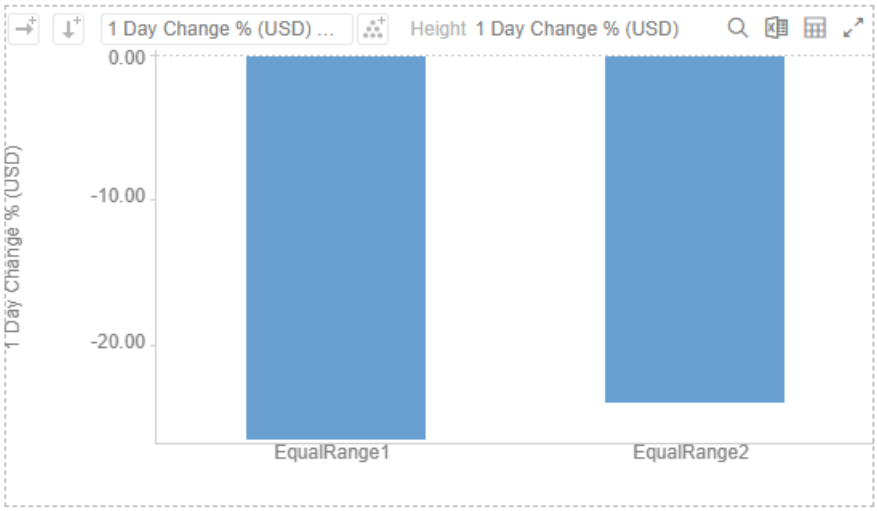
   The *Names* text box are enabled. For this example, 2 text boxes are available based on the specified *Number of Buckets* in step 5.



7. Enter the bucket *Names*.
8. Click Refresh Preview. The new numeric equal distance bucket column is added and displayed in the *Data Preview*.



This new user defined column can be used in a visualizations breakdown to display data samples.



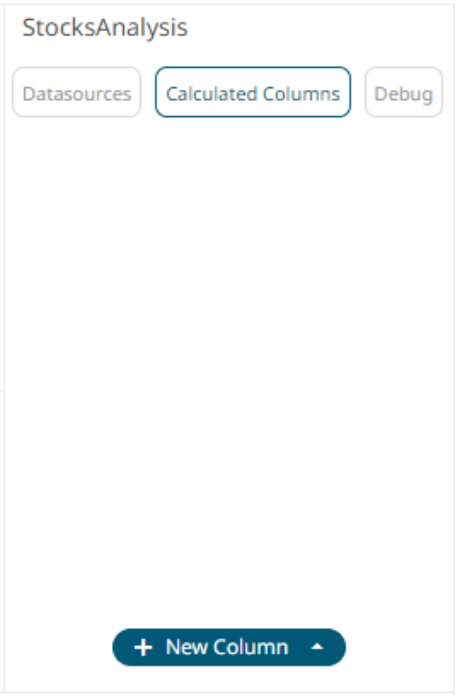
Adding Numeric Manual Bucketing

Numeric data is represented as a continuous set of values in displays and filters. Sometimes it may be necessary to manually specify customized limits. This can be achieved with Manual bucketing.

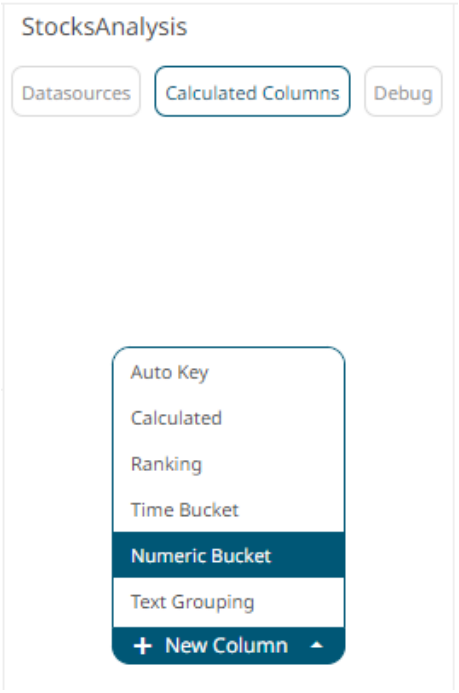
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

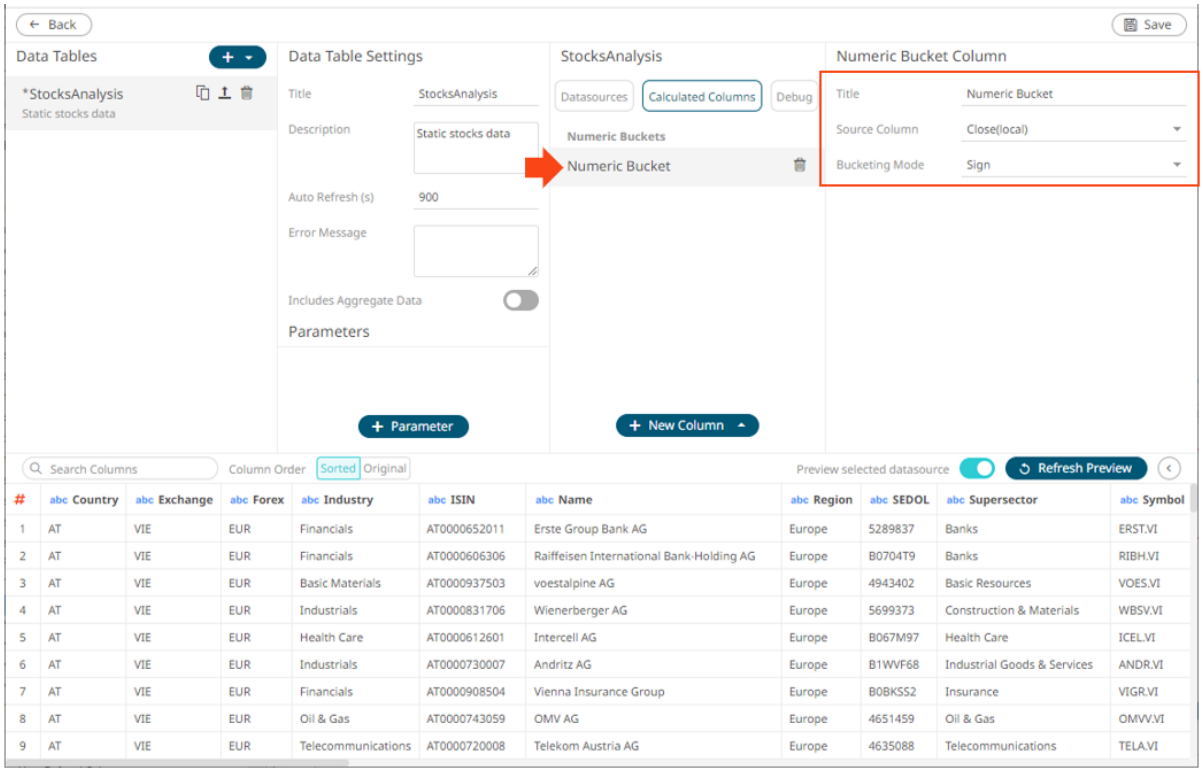
   The *Calculated Columns* pane displays.



2. Click **New Column > Numeric Bucket**.

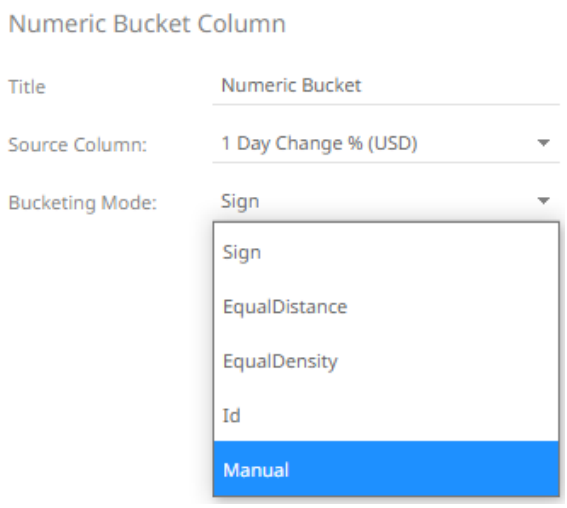


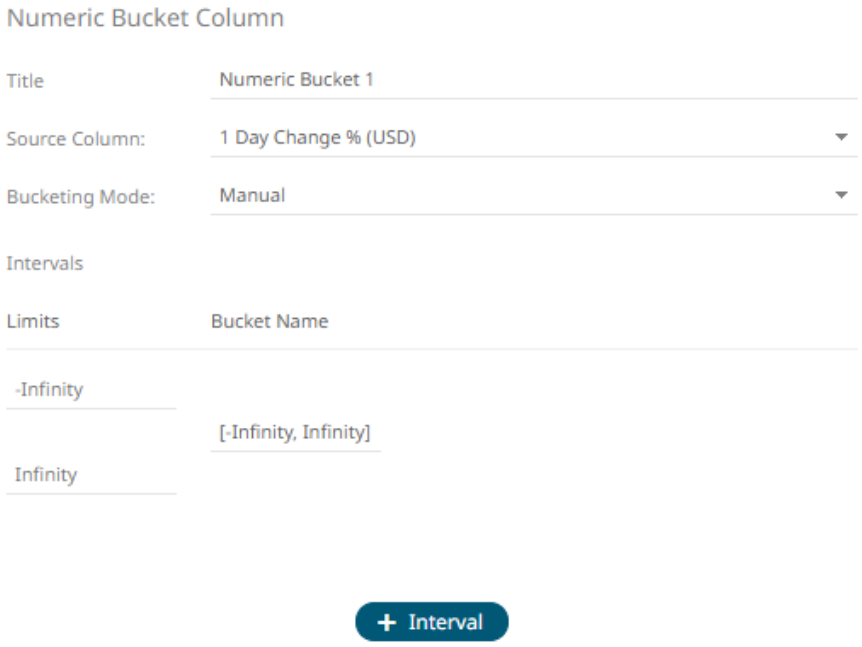
The numeric bucket instance is displayed on the *Data Sources Settings* with **Numeric Bucket** as the default title, also the *Numeric Bucket Column* pane displays.



You may opt to modify the numeric manual bucket *Title*.

3. Select the numeric *Source Column*.
4. Select **Manual** in the *Bucketing Mode* drop-down list box.

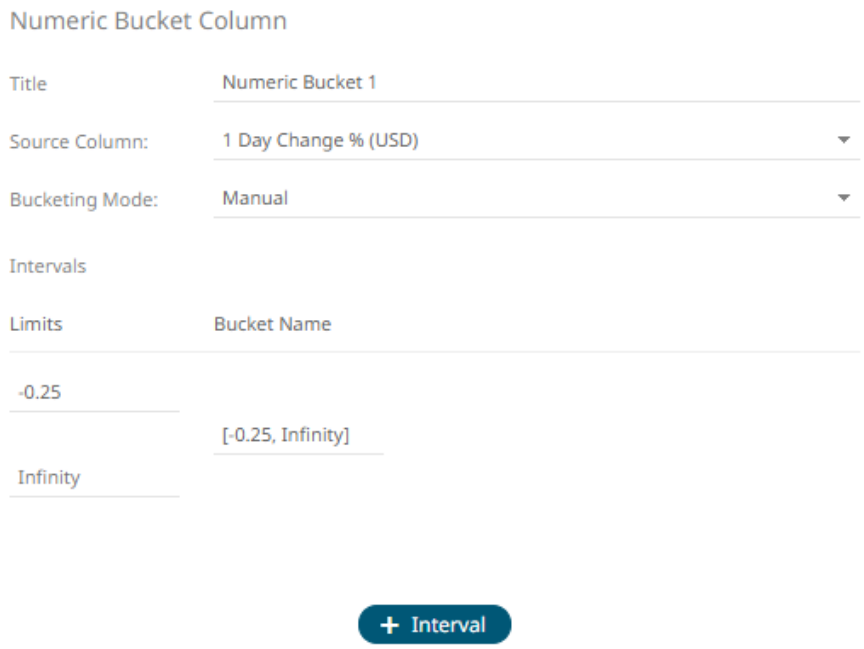




The *Limits* and *Bucket Name* fields are displayed.

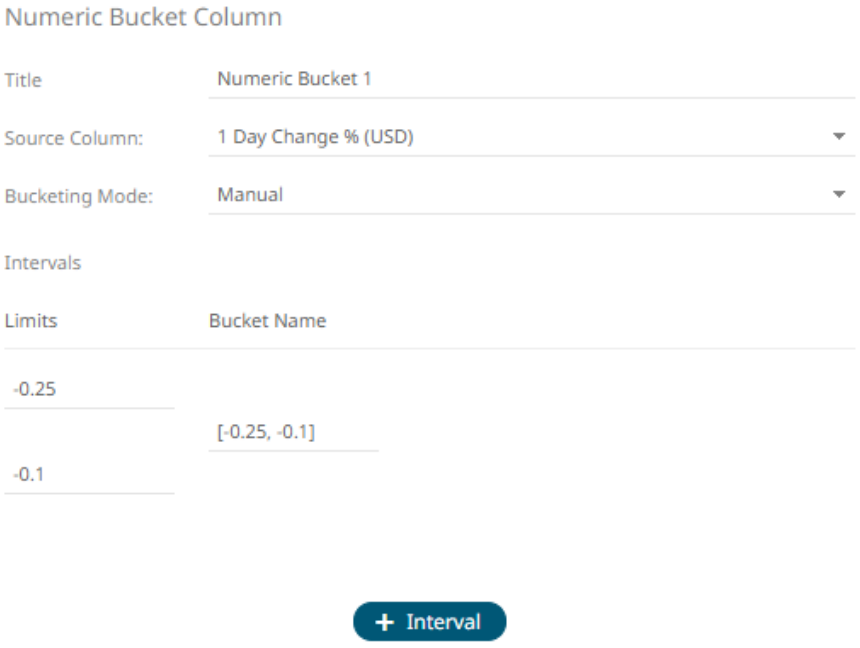
5. Specify the customized limits of a bucket:
   - Enter the *–Infinity* value in the *Limits* box with the minimum limit value of the bucket.

     This value is displayed in the *Bucket Name* box replacing the **–Infinity** value.



- Enter the *Infinity* value in the *Limits* box with the maximum limit value of the bucket.

  This value is displayed in the *Bucket Name* box replacing the **Infinity** value.



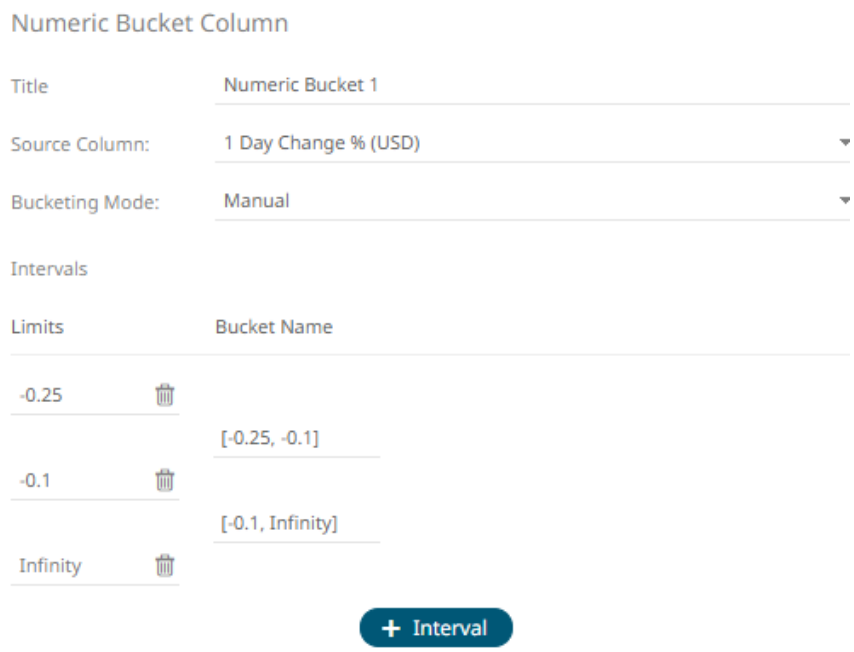
  The range of the limits is now displayed in the *Bucket Name* box.

- You can opt to modify the *Bucket Name*.

6. To add more buckets, click 

.

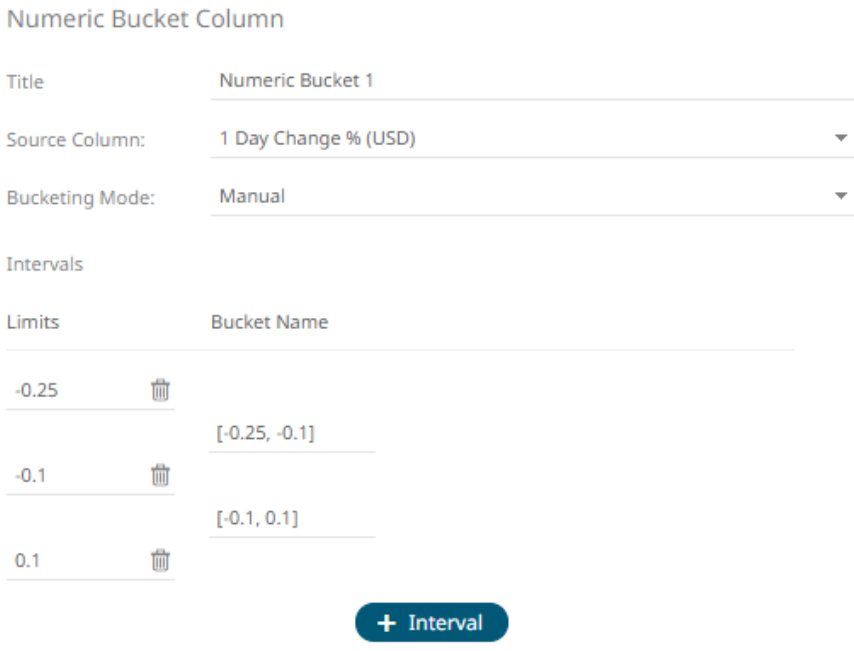
   Another bucket definition box is displayed.



Note that the preceding Infinity bucket value is now the minimum limit value of the new bucket.

7. Replace the *Infinity* value in the *Limits* box with the maximum limit value of the new bucket.

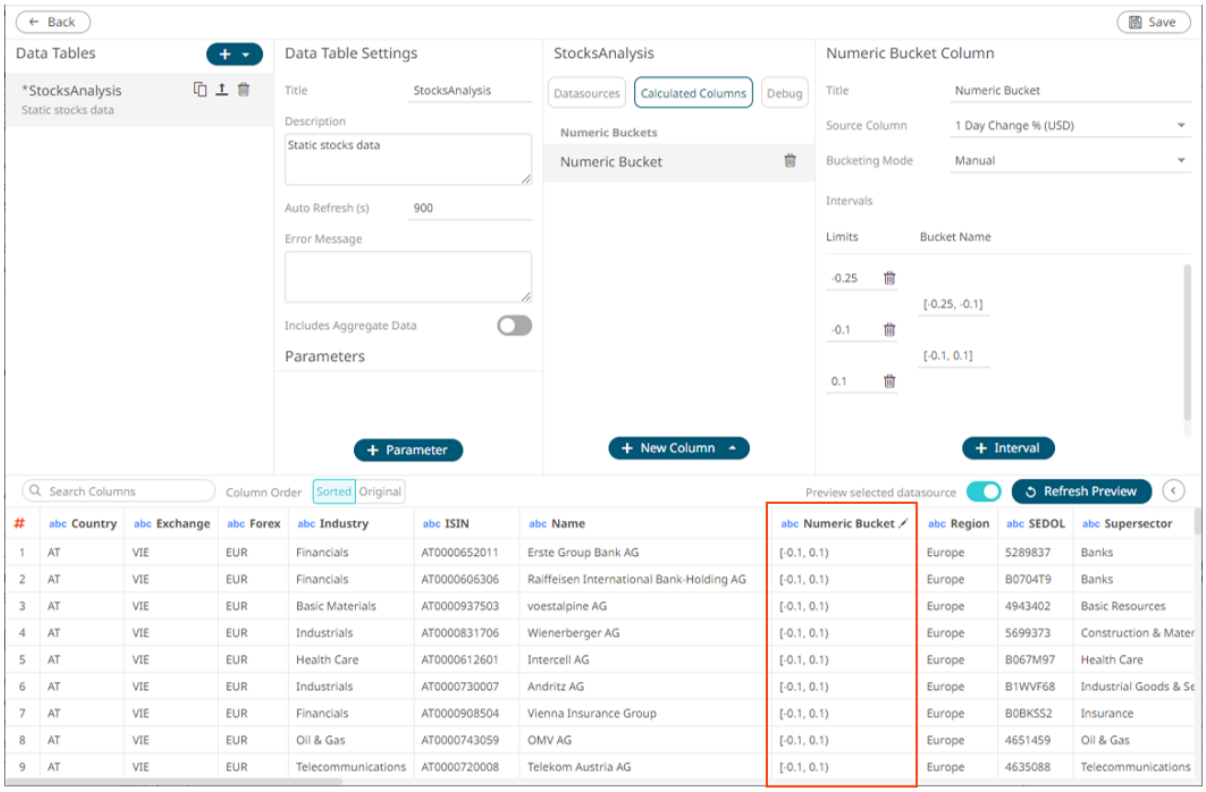
   This value is displayed in the *Bucket Name* box replacing the Infinity value.



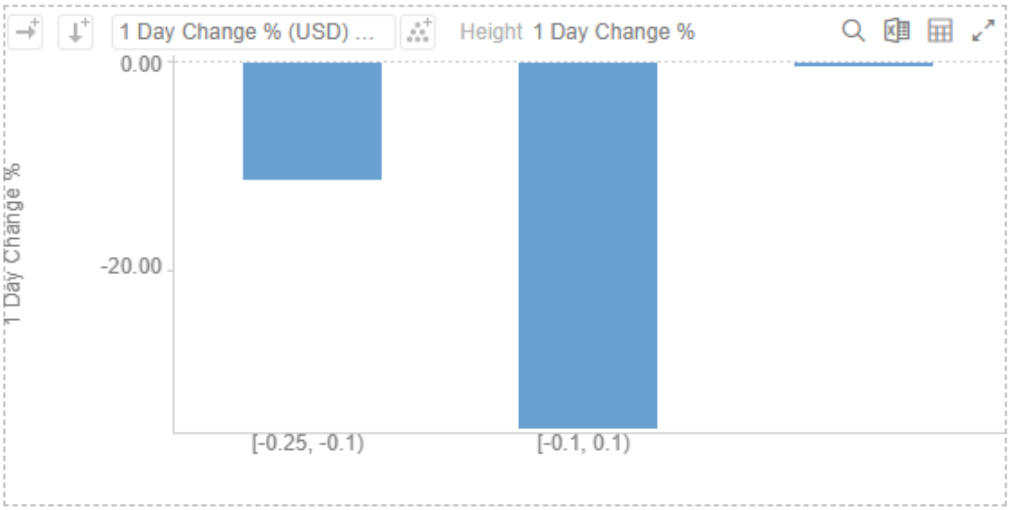
   To delete manual bucket range limits, click their corresponding  button. The *Bucket Name* value is adjusted based on the available limits.

8. After you are done adding buckets, click  . The new numeric manual bucket column is added and displayed in the *Data Preview*.

   The new Manual bucket column will appear in the output data schema.



This new user defined column can be used in a visualizations breakdown to display data samples.



Adding Numeric Equal Density Bucketing

Numeric data is represented as a continuous set of values in displays and filters. Sometimes it may be necessary to divide the data into equal density bucket subsets. This can be achieved with equal density bucketing.

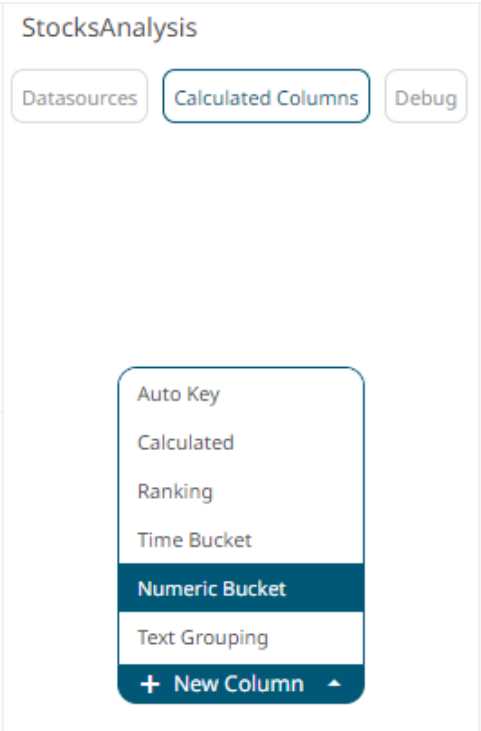
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

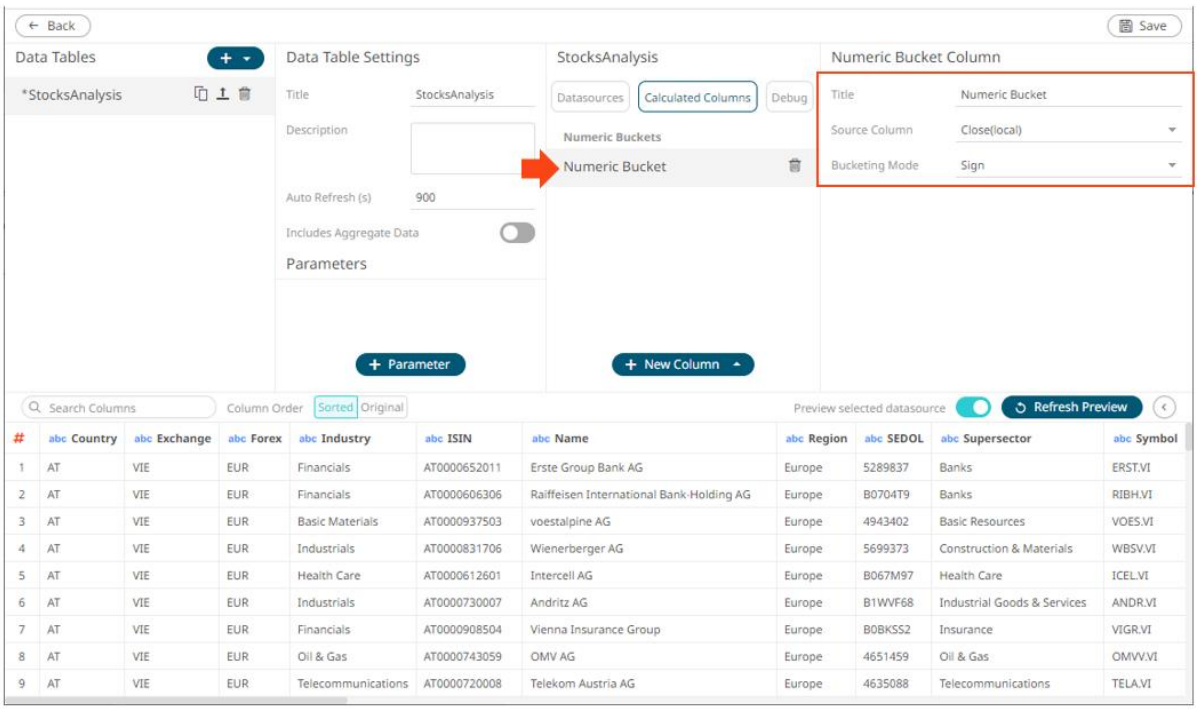
   The *Calculated Columns* pane displays.



2. Click **New Column > Numeric Bucket**.



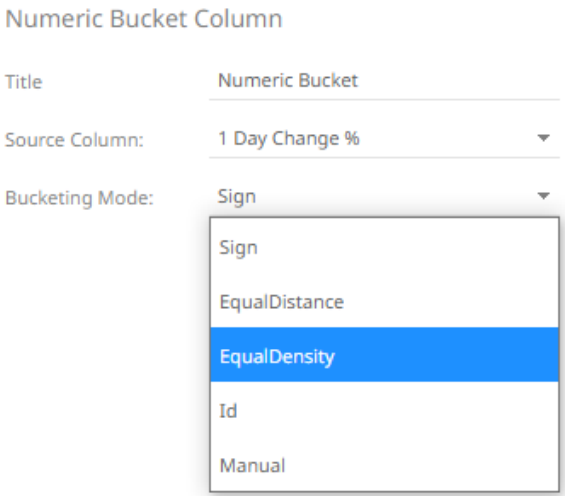
The numeric bucket instance is displayed on the *Data Sources Settings* with **Numeric Bucket** as the default title, also the *Numeric Bucket Column* pane displays.

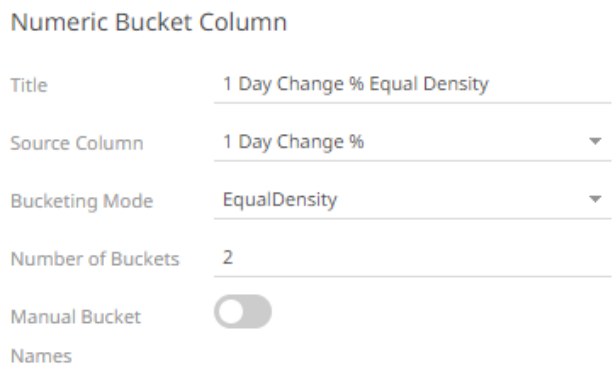


#	abc Country	abc Exchange	abc Forex	abc Industry	abc ISIN	abc Name	abc Region	abc SEDOL	abc Supersector	abc Symbol
1	AT	VIE	EUR	Financials	AT0000652011	Erste Group Bank AG	Europe	5289837	Banks	ERST.VI
2	AT	VIE	EUR	Financials	AT0000606306	Raiffeisen International Bank-Holding AG	Europe	B0704T9	Banks	RIBH.VI
3	AT	VIE	EUR	Basic Materials	AT0000937503	voestalpine AG	Europe	4943402	Basic Resources	VOES.VI
4	AT	VIE	EUR	Industrials	AT0000831706	Wienerberger AG	Europe	5699373	Construction & Materials	WBSV.VI
5	AT	VIE	EUR	Health Care	AT0000612601	Intercell AG	Europe	B067M97	Health Care	ICEL.VI
6	AT	VIE	EUR	Industrials	AT0000730007	Andritz AG	Europe	B1WVF68	Industrial Goods & Services	ANDR.VI
7	AT	VIE	EUR	Financials	AT0000908504	Vienna Insurance Group	Europe	B0BKSS2	Insurance	VIGR.VI
8	AT	VIE	EUR	Oil & Gas	AT0000743059	OMV AG	Europe	4651459	Oil & Gas	OMVV.VI
9	AT	VIE	EUR	Telecommunications	AT0000720008	Telekom Austria AG	Europe	4635088	Telecommunications	TELA.VI

You may opt to modify the numeric equal density bucket *Title*.

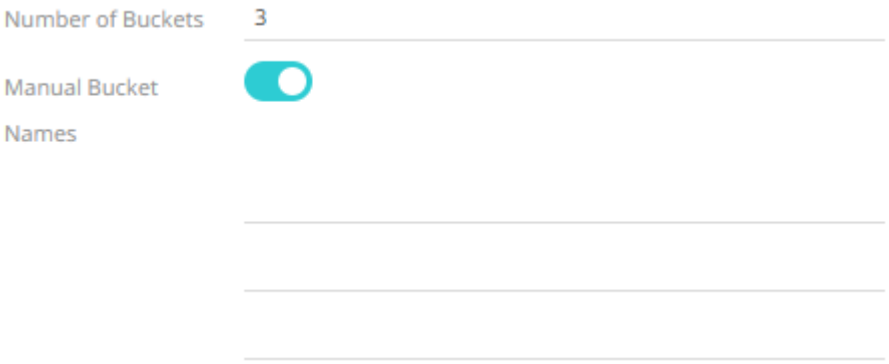
3. Select the numeric *Source Column*.
4. Select **EqualDensity** in the *Bucketing Mode* drop-down list box.





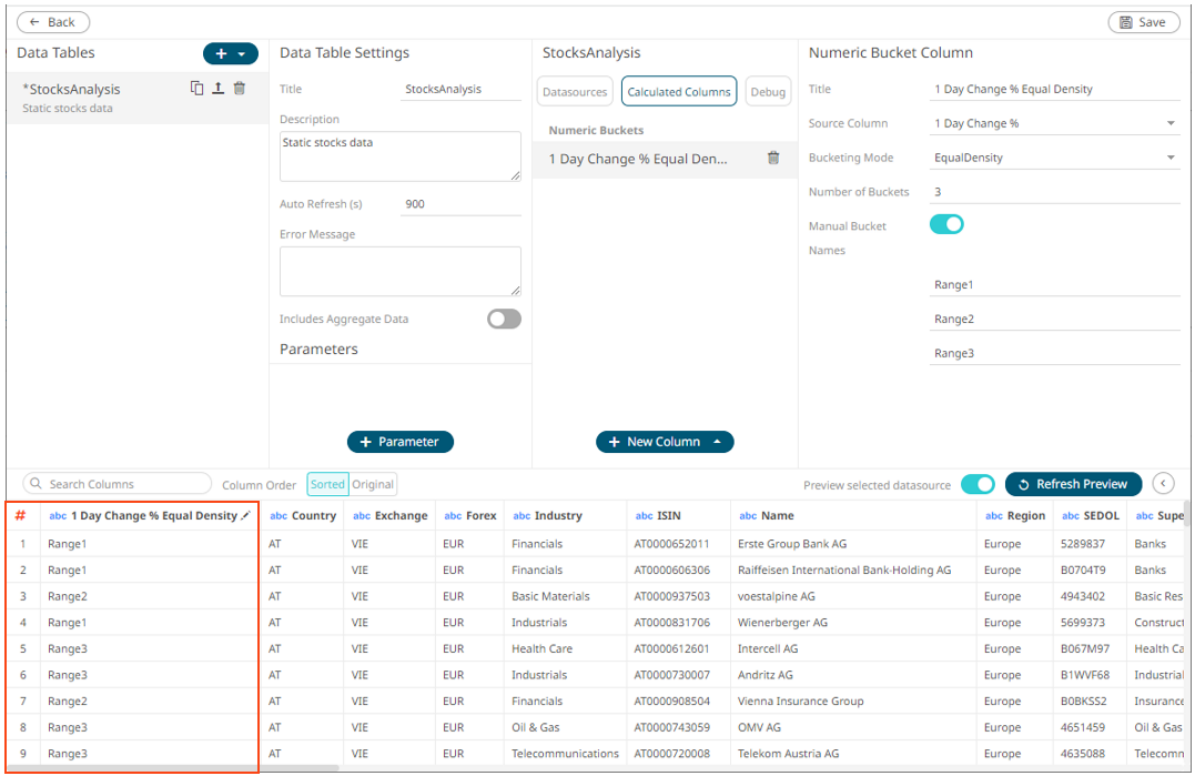
5. Enter the *Number of Buckets*.
6. Tap the **Manual Bucket** slider to turn it on.

   The *Names* text box are enabled. For this example, 3 text boxes are available based on the specified *Number of Buckets* in step 5.



7. Enter the bucket *Names*.
8. Click 

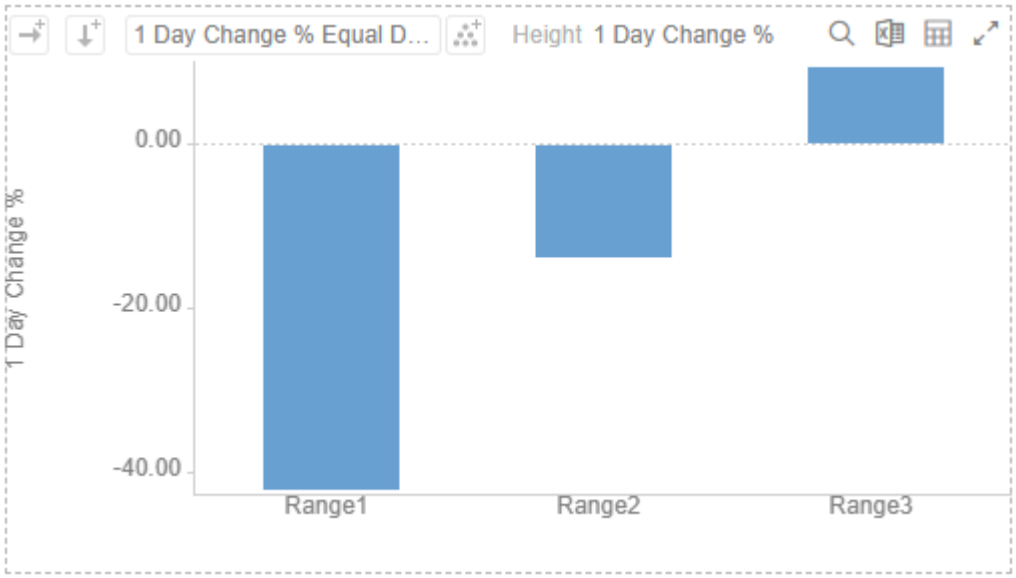
. The new numeric equal density bucket column is added and displayed in the *Data Preview*.



For this example, the minimum value of the Source Column (1 Day Change %) is -0.35 and the maximum value is 0.12. When there are three buckets, the ranges will be:

- Range1: -0.11, -0.03
- Range2: -0.03, -0.01
- Range3: -0.01, 0.09

This can then be used in a visualizations breakdown to display data samples.



Adding Text Groupings

New custom text groupings can be dynamically added to a data source.

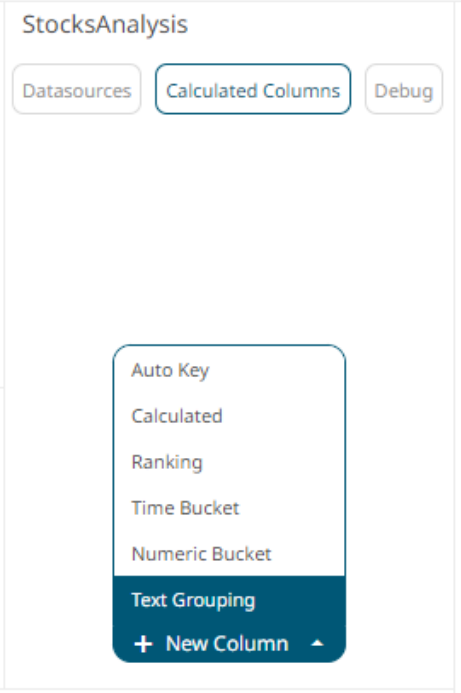
Steps:

1. On the *Data Source Settings* pane, click **Calculated Columns.**

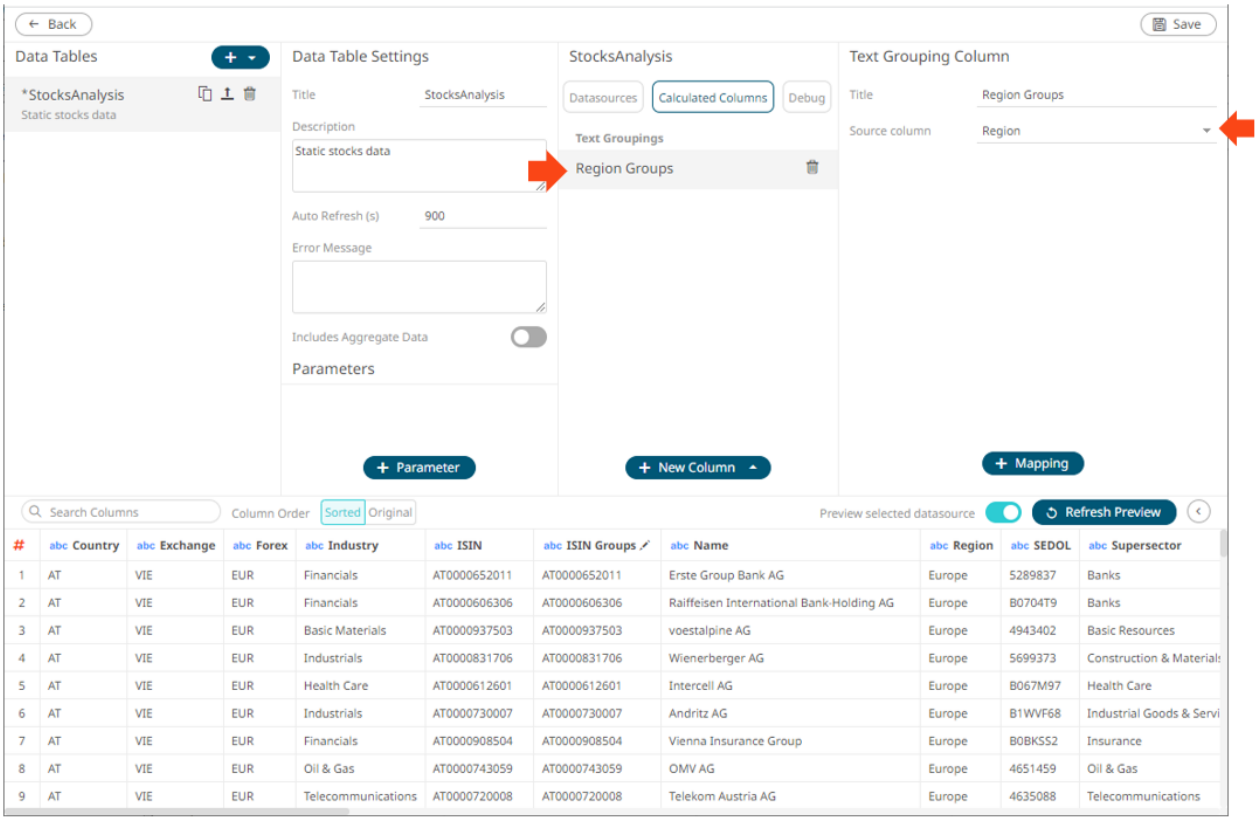
   The *Calculated Columns* pane displays.



6. Click **New Column > Text Grouping**.



The text grouping instance is displayed with the default title (e.g., **Region Groups**) based on the initially selected *Source Column* (e.g., **Region**) on the *Text Grouping Column* pane.

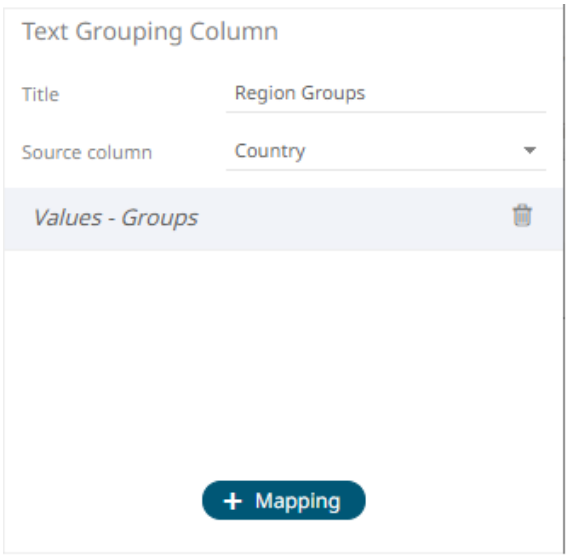


You may opt to modify the text group column *Title*.

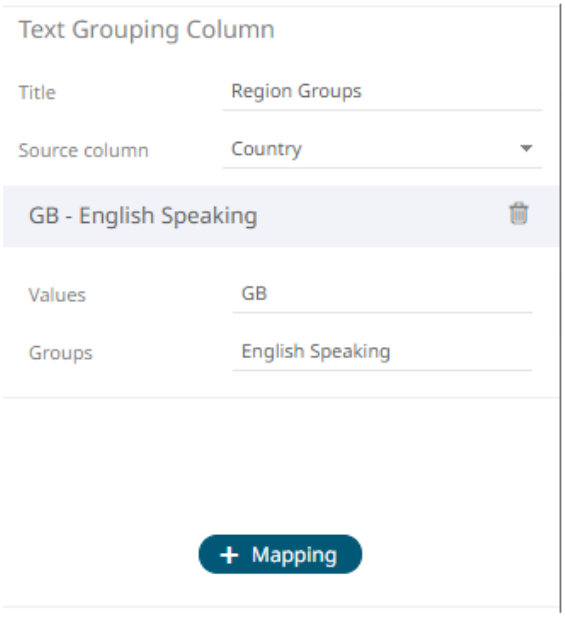
7. Select a *Source Column*.
8. Proceed to adding the custom text groups by clicking 

.

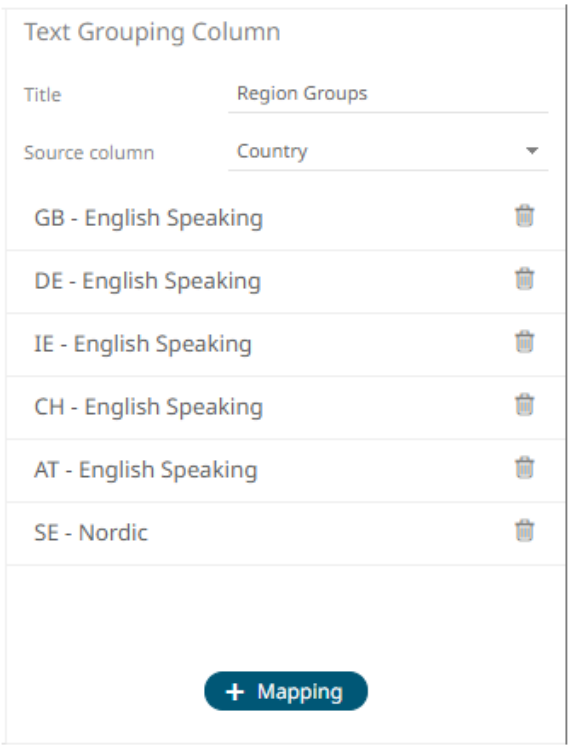
   A new instance of a grouping is displayed.



9. Click this instance and define the *Values* and *Groups*.



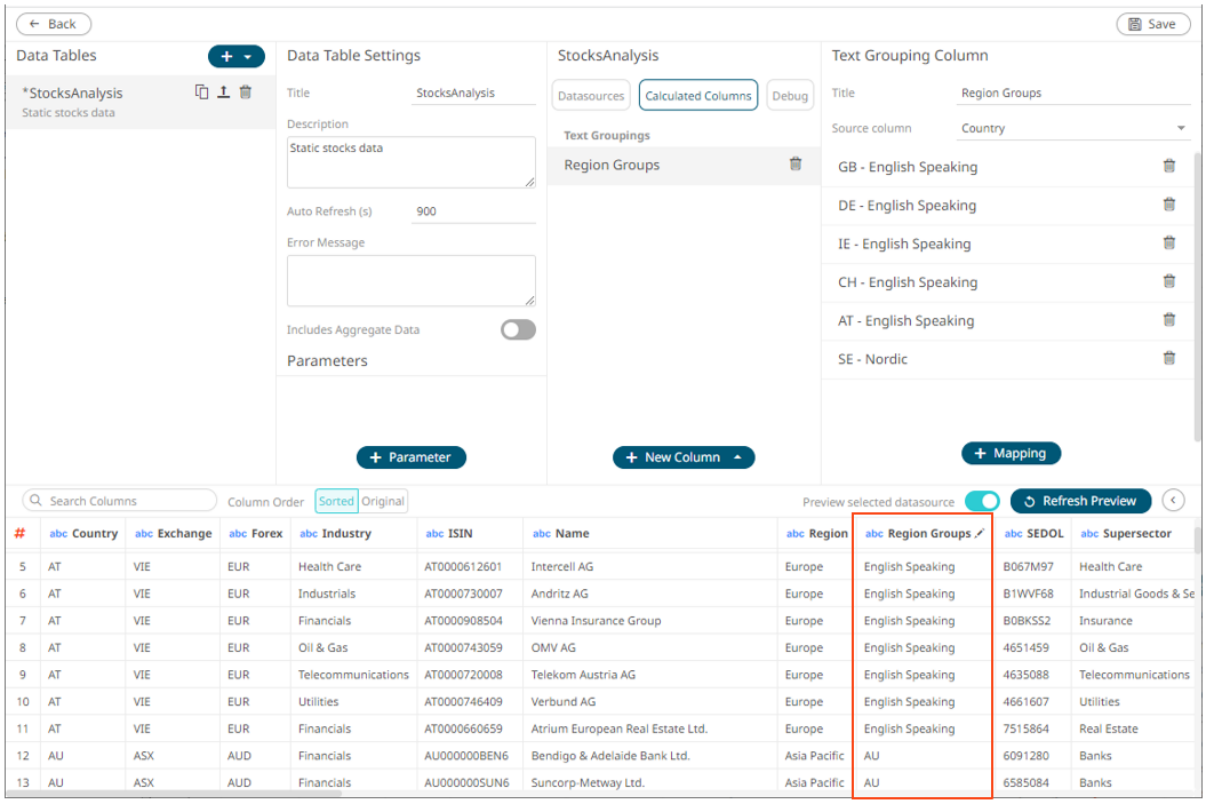
10. Continue adding the *Values* and *Groups*.



Values not mapped to a group, will be assigned the input value.

11. Click 

. The new text grouping column is added and displayed in the *Data Preview*.



These new custom group columns can be used identically to a source text column, categorizing and filtering data.

Modifying User-Defined Columns

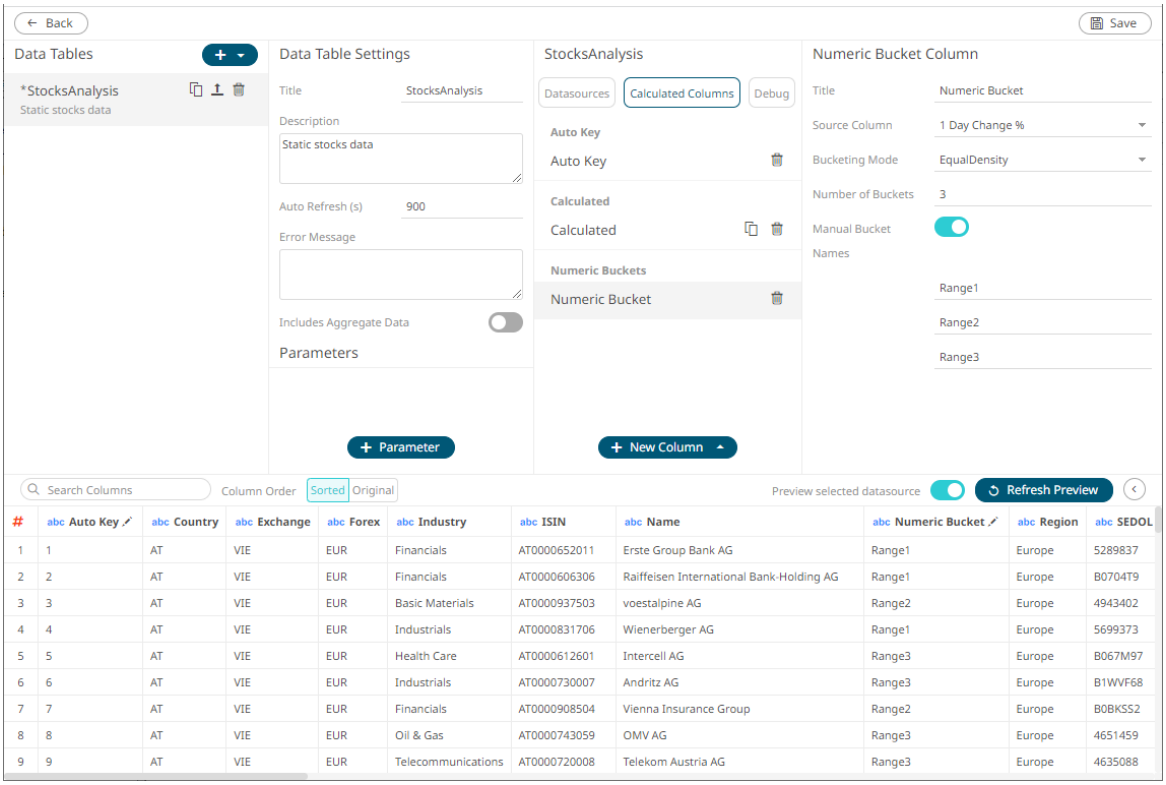
A generated column can be modified.

Steps:

1. Modifying user-defined columns can be done either by clicking:

   - the **Edit** button of a generated column title in the *Data Preview*
   - the **Calculated Columns** button on the *Data Sources Settings* pane and clicking the generated column to be modified.

     The corresponding user-defined settings is displayed.



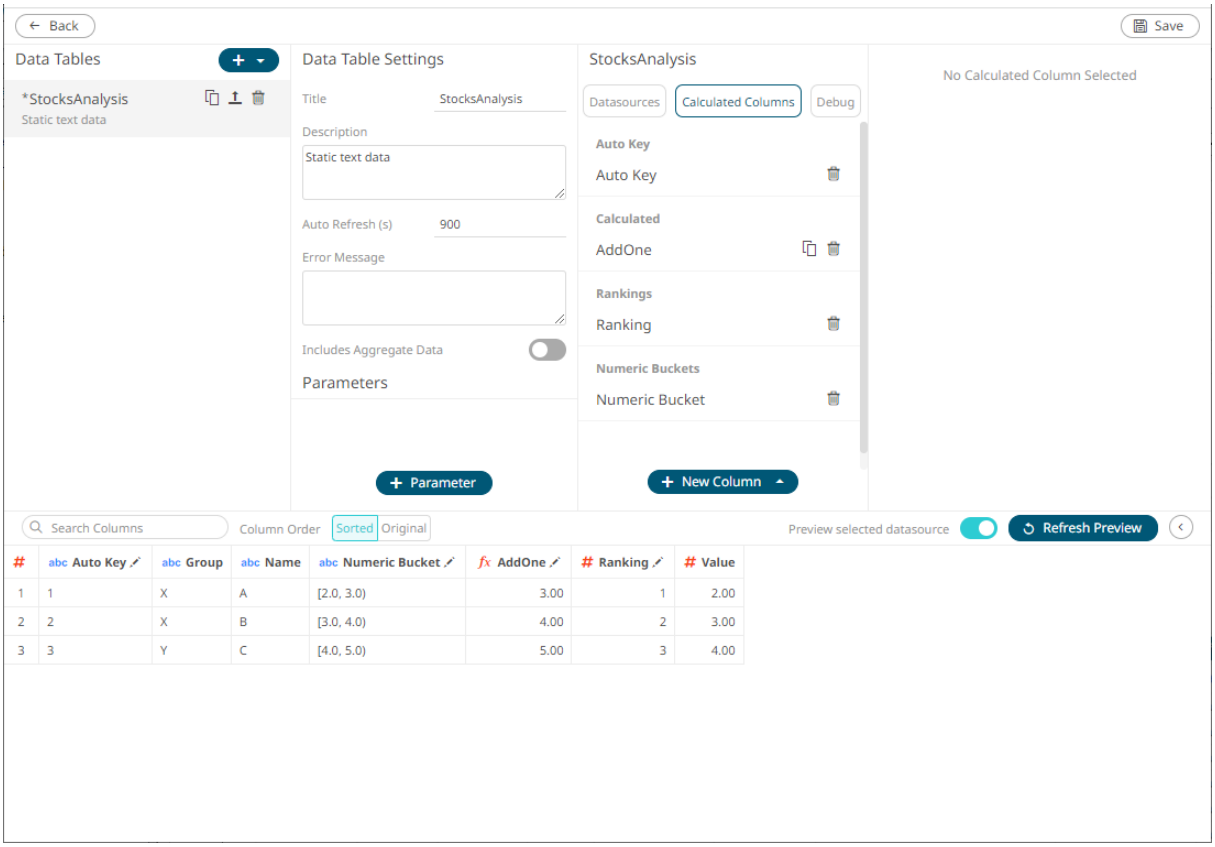
2. Modify the properties or settings and click  to save the changes.

Creating a Duplicate of a Calculated Column

Make a copy of a generated calculated column and modify to create a new one.

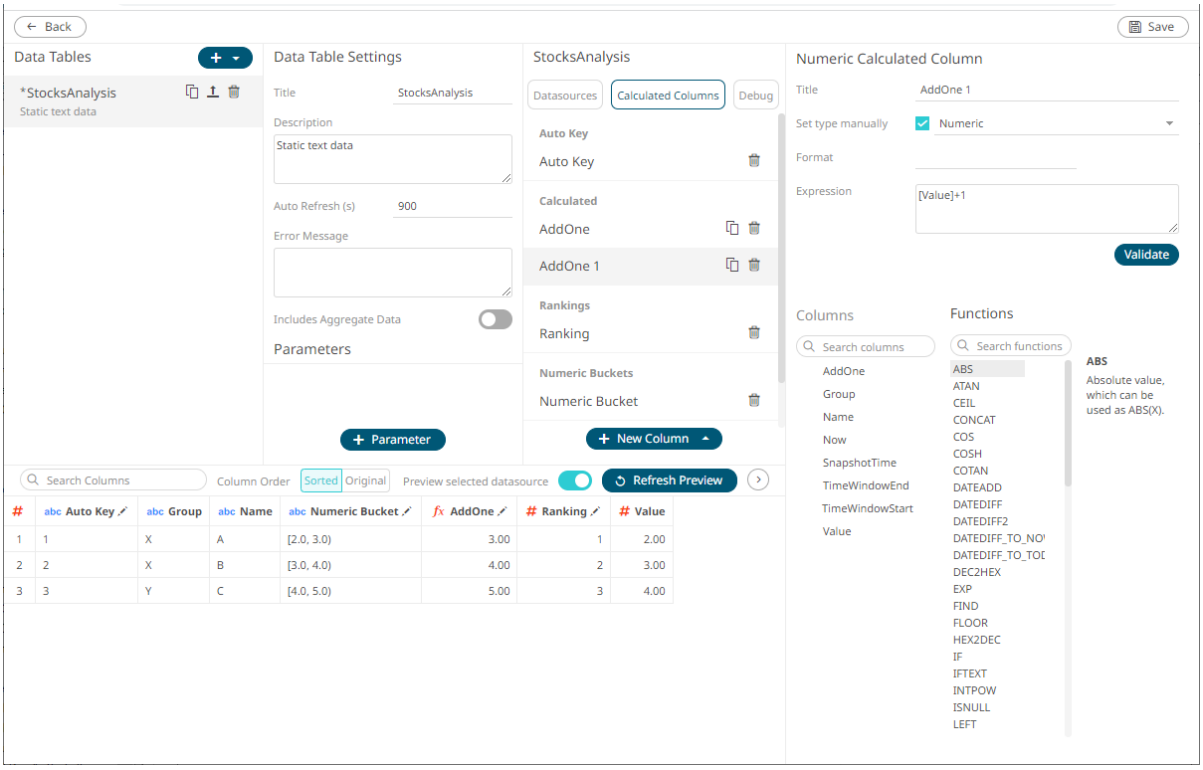
Steps:

1. On the *Data Sources Settings*, click **Calculated Columns** to display the available user-defined columns.

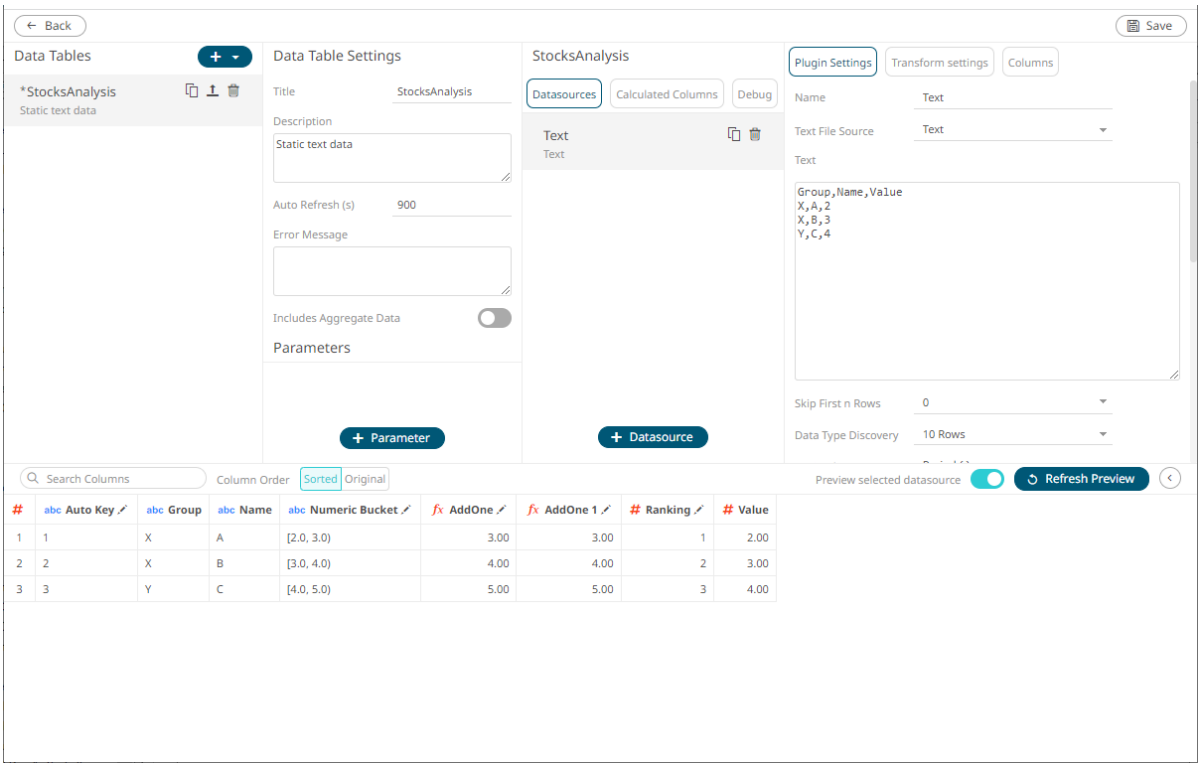


2. Click the **Duplicate** button of a *Calculated Column*.

   A copy of the duplicated calculated column is displayed on the *Calculated Column* pane.



3. You can opt to modify the properties of the duplicate column.
4. Click Refresh Preview. The duplicate calculated column is added and displayed in the *Data Preview*.

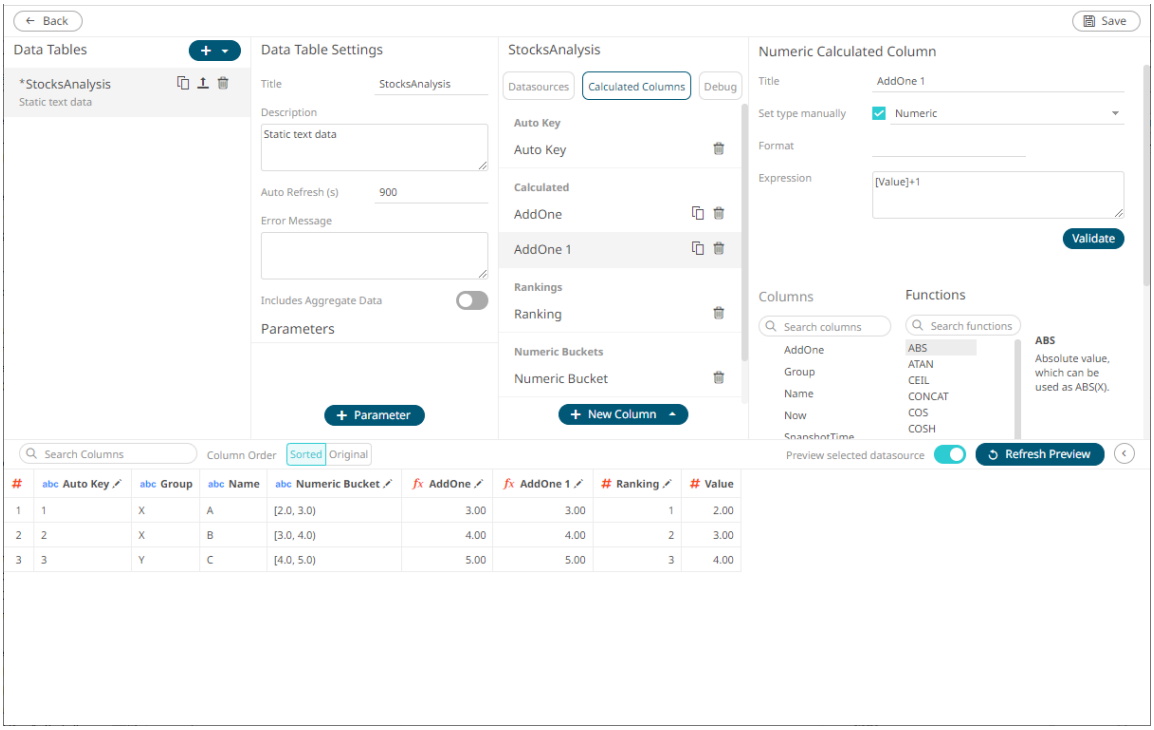


Removing User-Defined Columns

Generated columns can be deleted.

Steps:

1. Deleting user-defined columns can be done either by clicking:
   - the **Edit** button of a generated column title in the *Data Preview.*
     The user-defined column settings are displayed.
   - the **Calculated Columns** button on the *Data Sources Settings* pane
     The list of user-defined columns is displayed.



2. Click  and 

to delete the user-defined column and save the changes.

DATA TABLE COLUMNS SETTINGS

The *Columns* pane in the *Data Table Editor* layout allows:

- modification of the column names
- modification of the numeric or Date/Time format
- setting the numeric default aggregation
- setting the Min and Max range of numeric columns
- creating a custom sort order

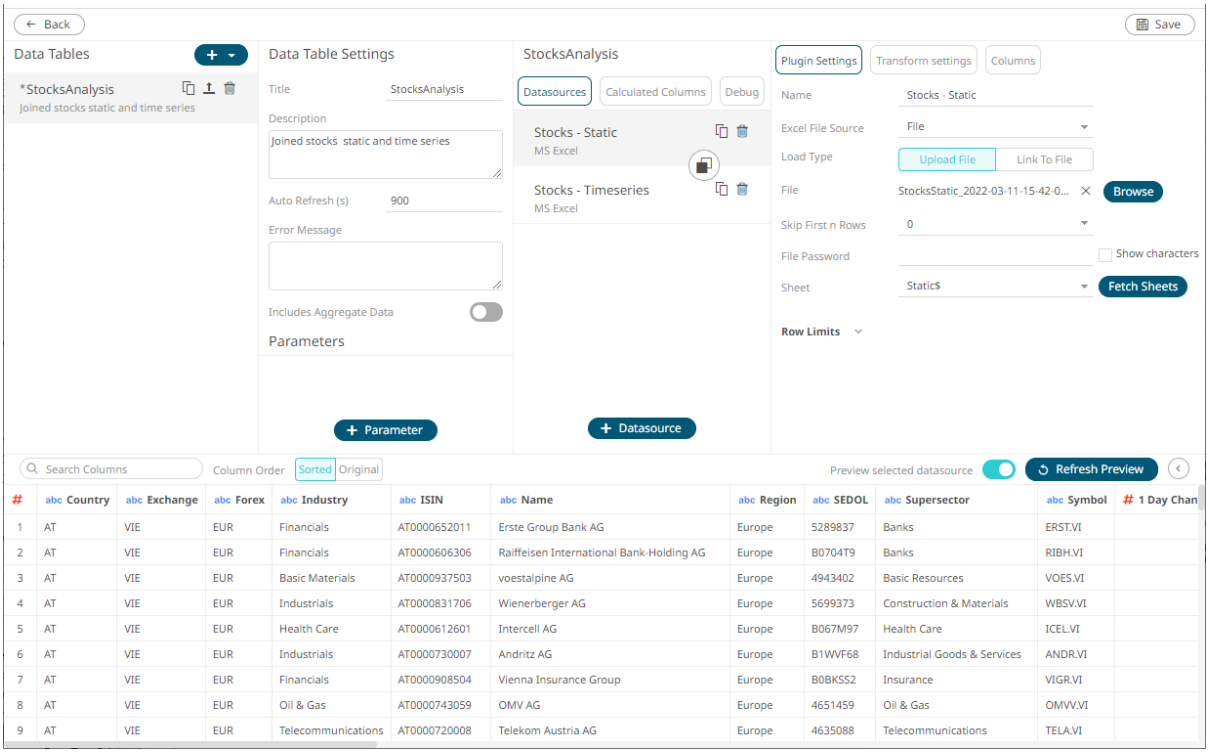
NOTE **User-defined columns are not included in the list.**

Modification of the Column Names

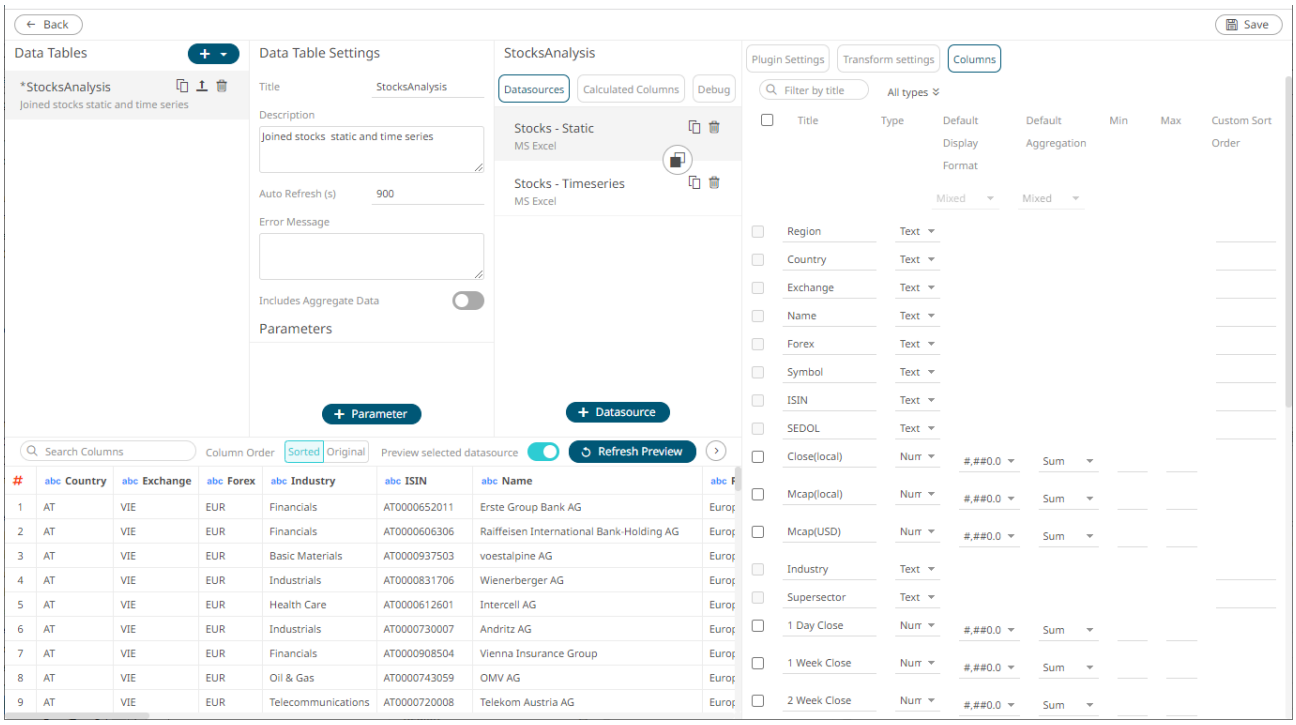
The name of columns retrieved from the data source can be modified.

Steps:

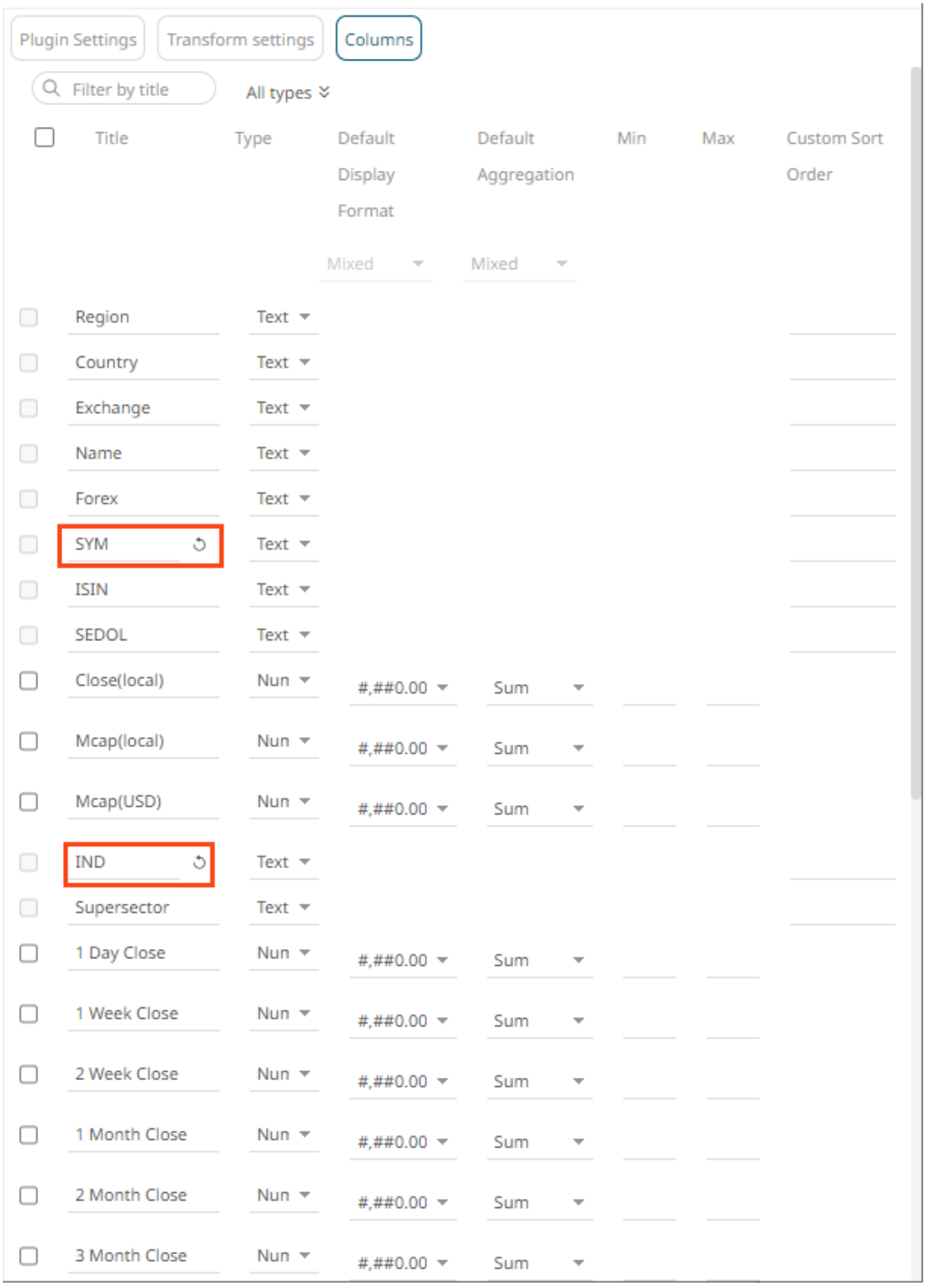
1. On the *Data Sources* panel, click a data source to display its settings.



2. Click **Columns**. The *Columns* pane displays with the list of available columns in the data source.

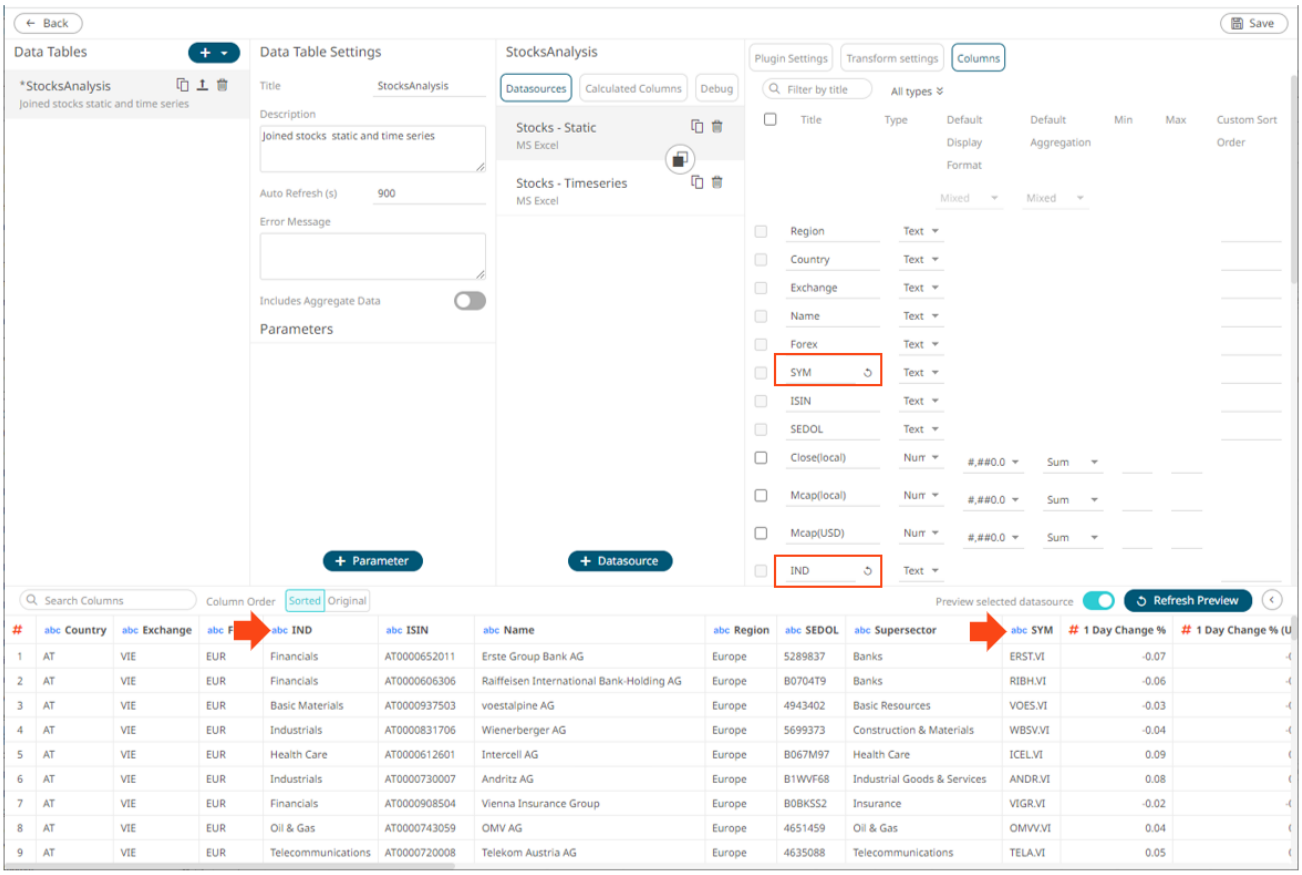


3. Select the column name or names that you want to modify, then enter the new name and click ✓.



Once the column name is modified, the ↻ button is displayed. Click this button to revert to the original column name.

4. Click **Refresh Preview**. The new column names are displayed on the *Data Preview*.

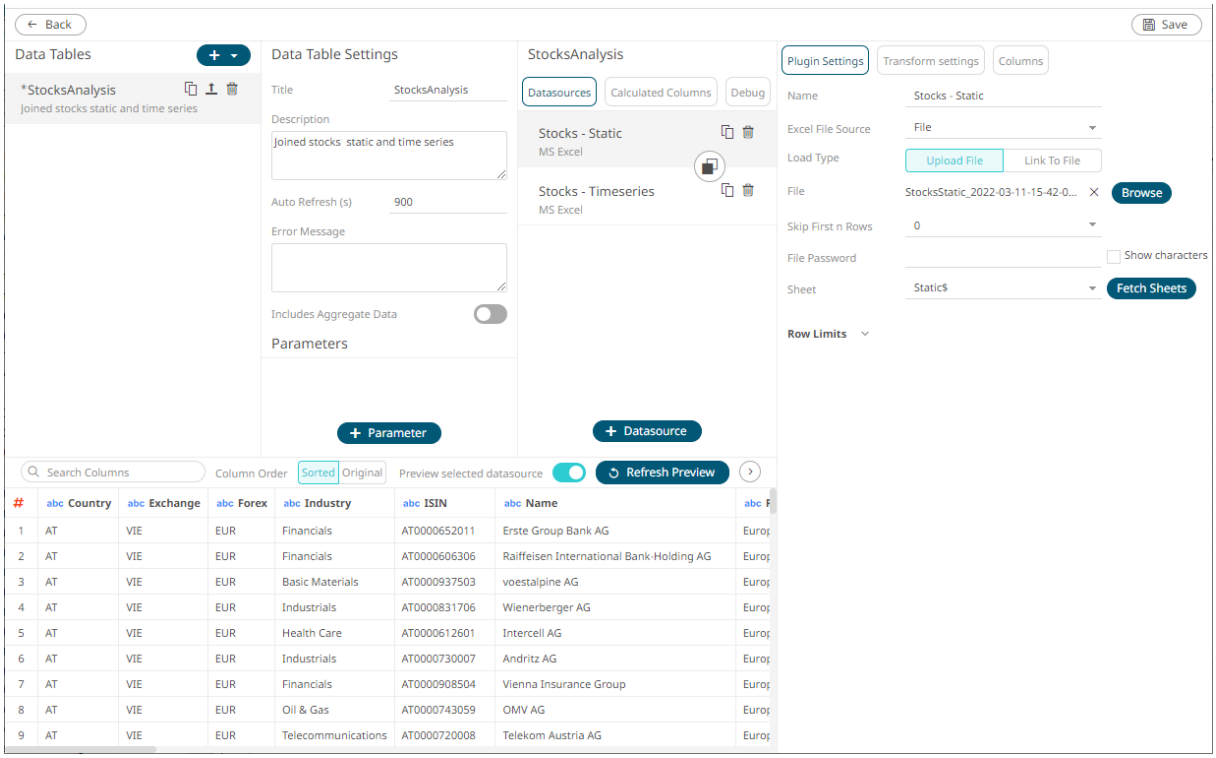


Modification of the Numeric or Date/Time Column Format

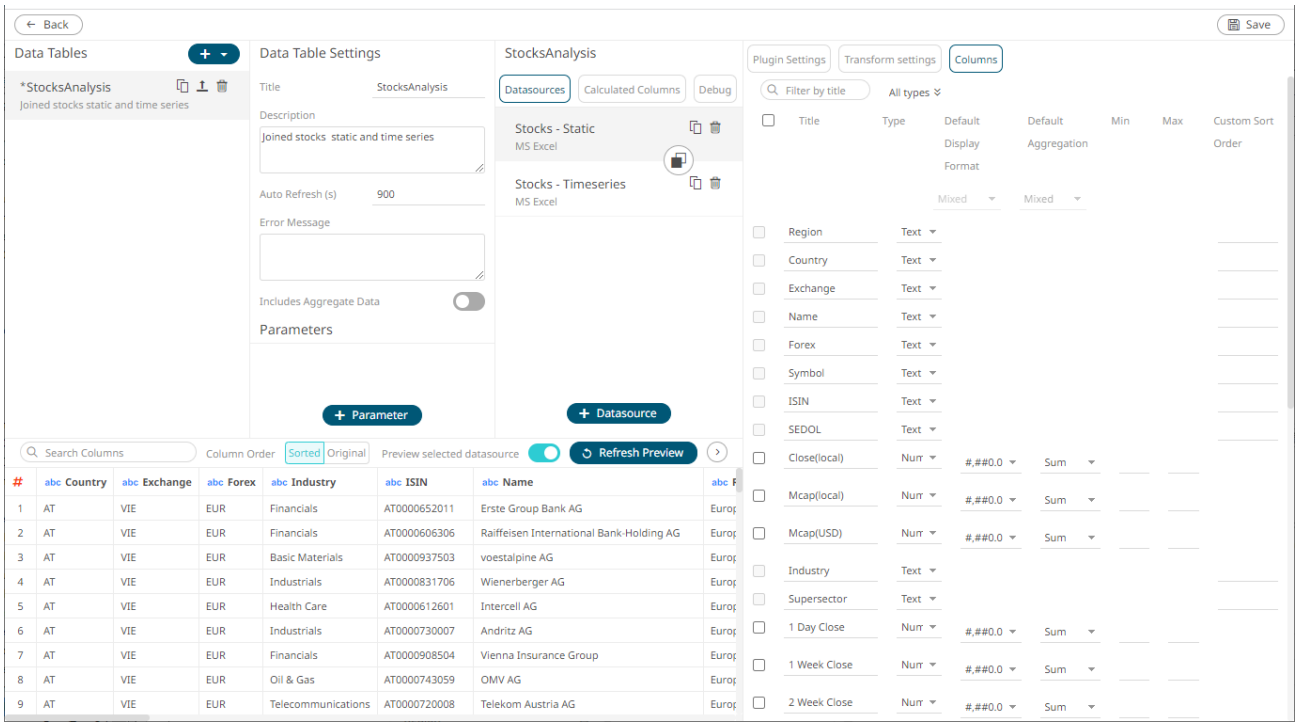
The format of the numeric or Date/Time columns retrieved from the data source can be modified.

Steps:

1. On the *Data Sources* panel, click a data source to display its settings.

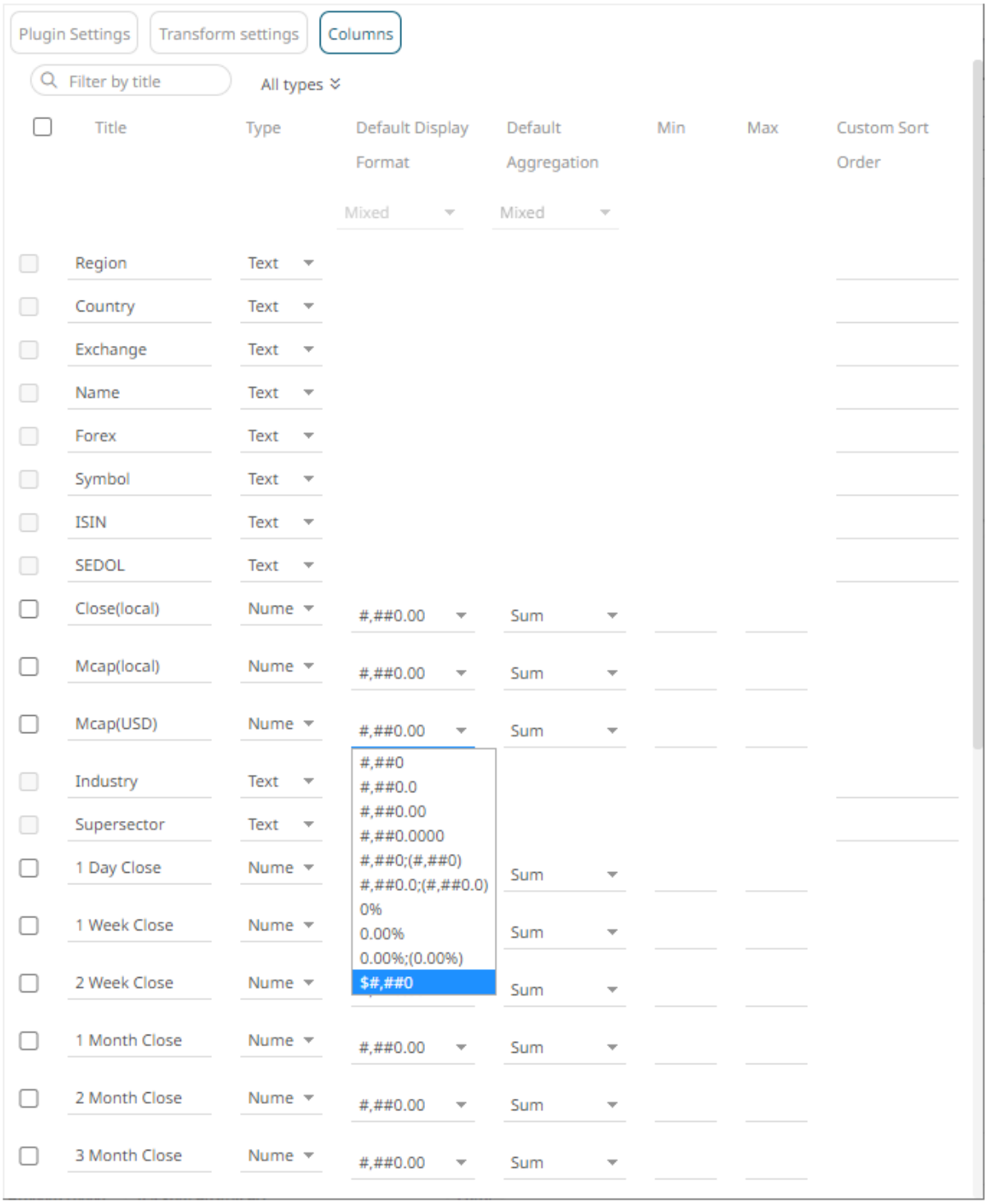


2. Click **Columns**. The *Columns* pane displays with the list of available columns in the data source.

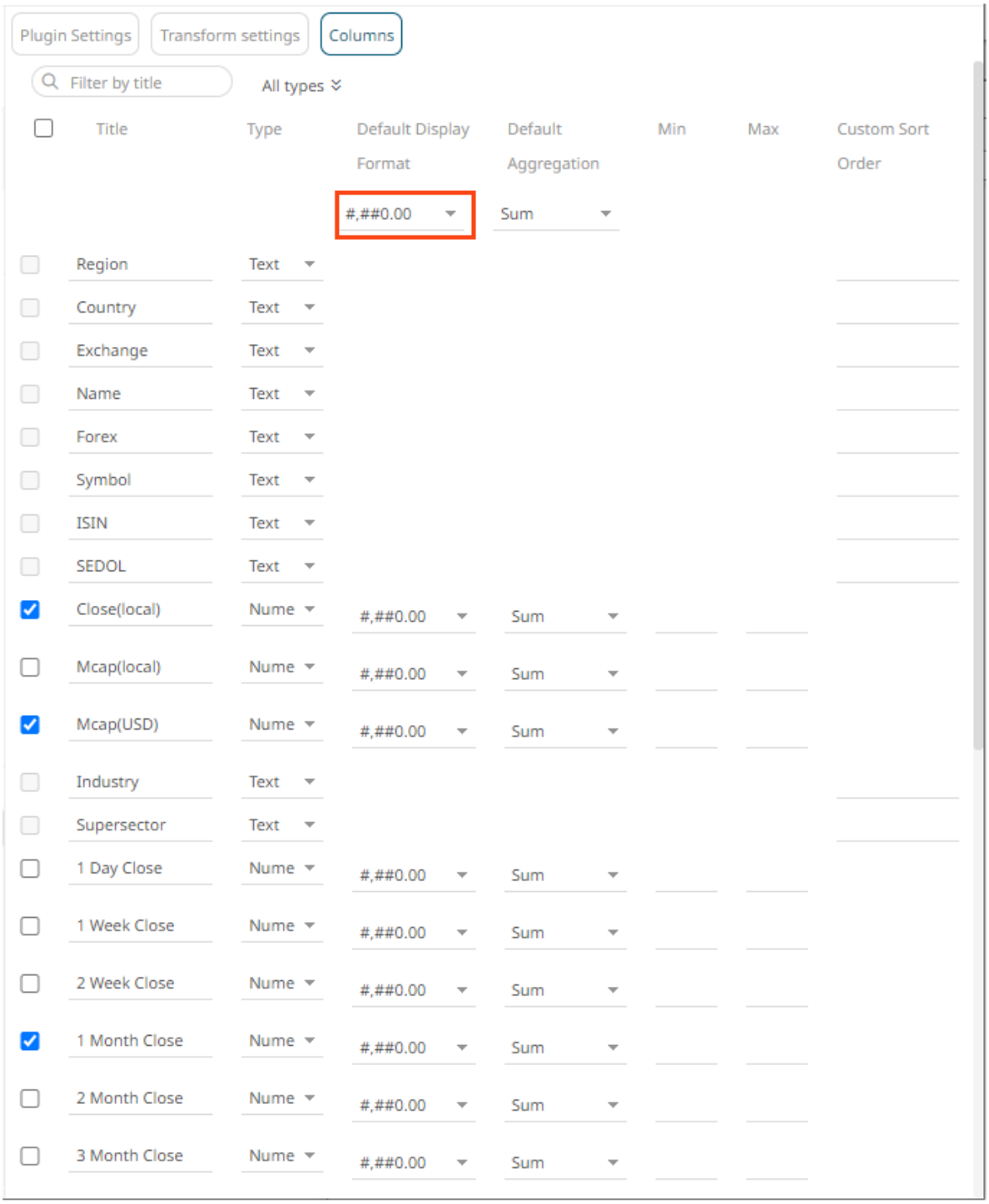


3. Click the drop-down list and select the *Format* for the numeric or Date/Time column.

NOTE **The check box for numeric or Date/Time columns are enabled and can be selected.**

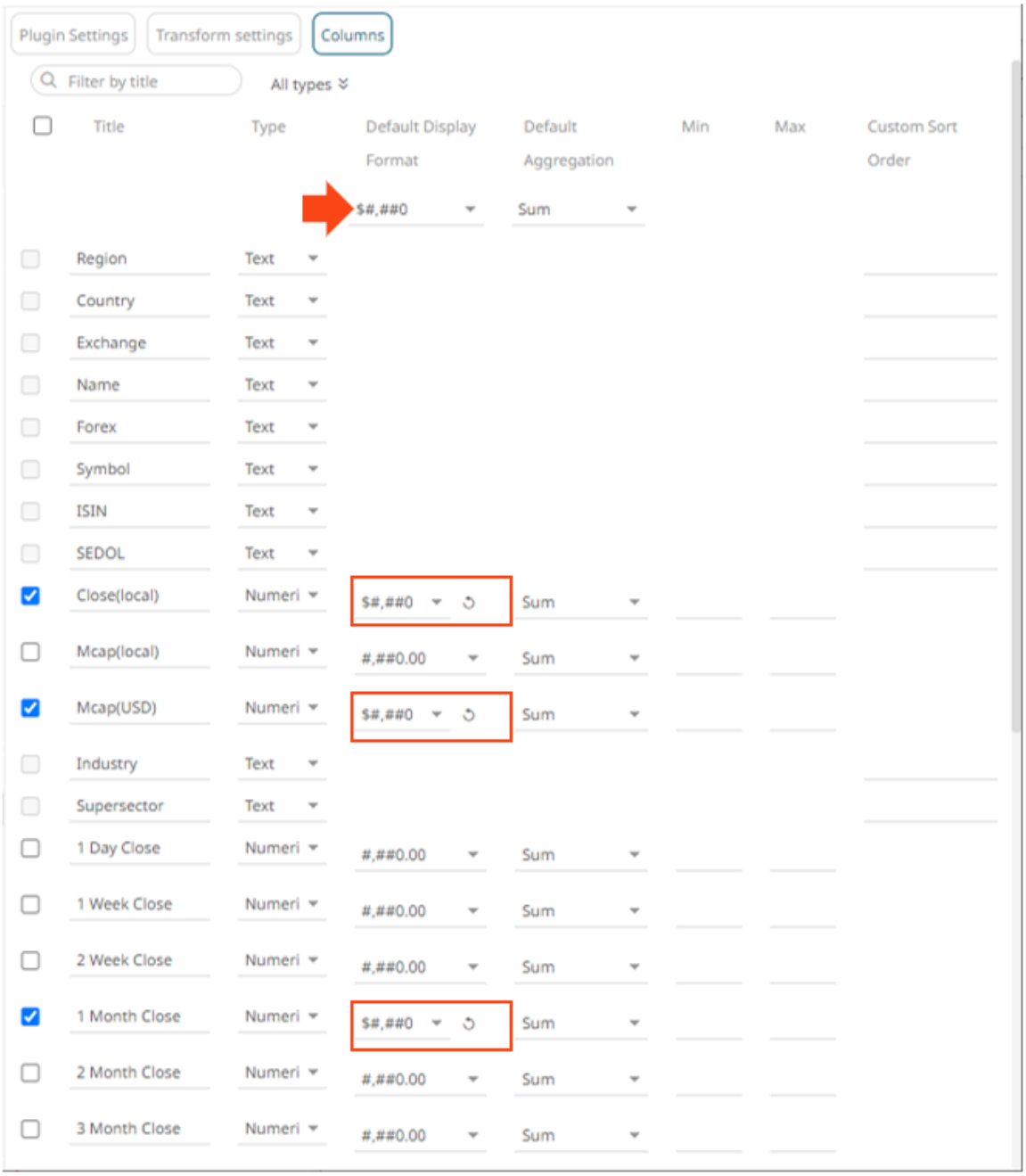


To modify the format of several numeric and/or Date/Time columns, check their corresponding boxes. The *Default Display Format* drop-down list is enabled.

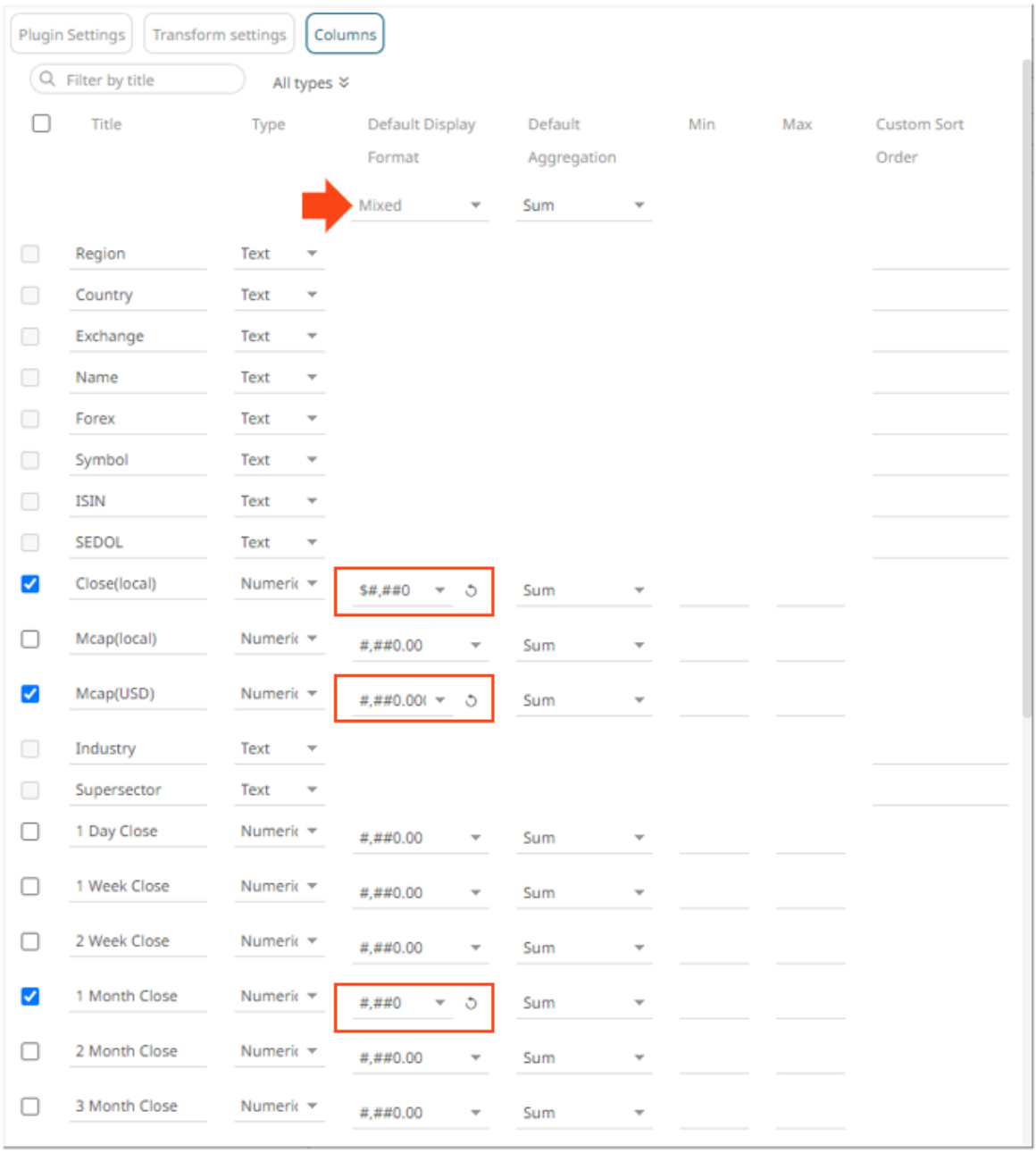


You can either:

- select a format in the *Default Display Format* drop-down list. This format will be applied to all the checked columns.

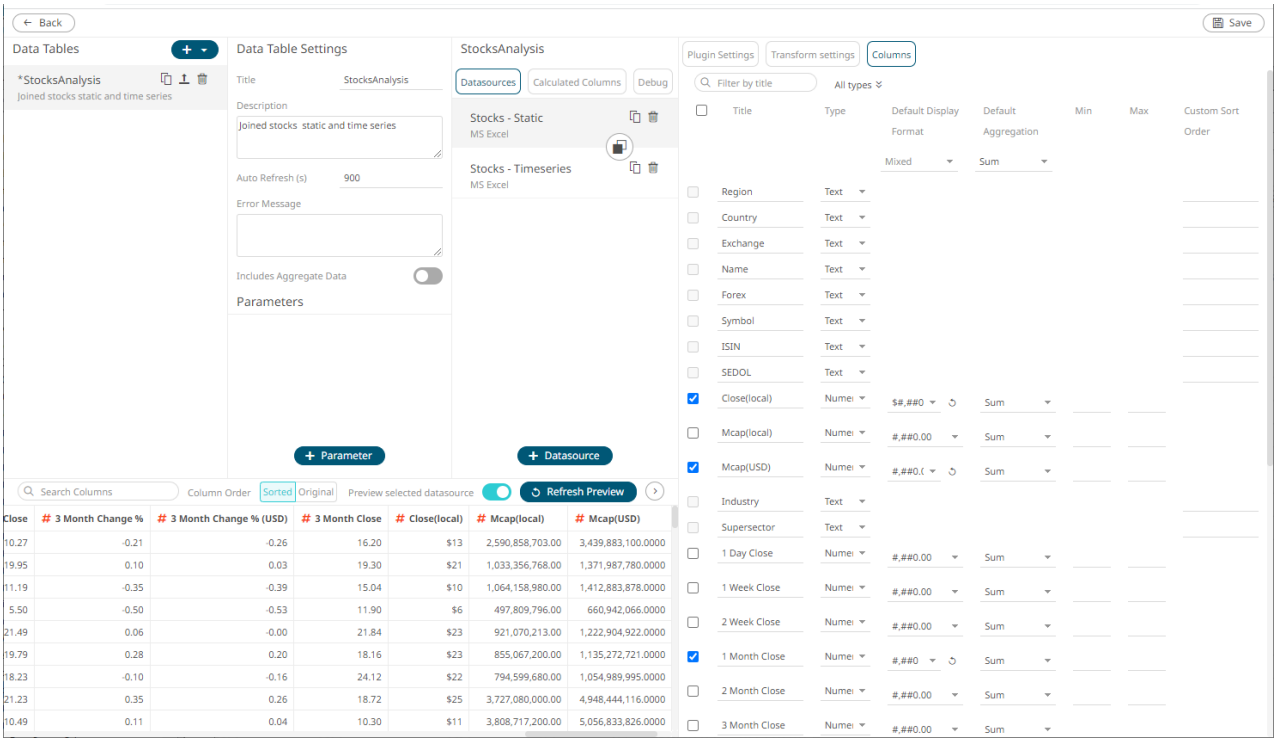

Plugin Settings
Transform settings
Columns
Filter by title
All types
Title
Type
Default Display Format
Default Aggregation
Min
Max
Custom Sort Order
$#,##0
Sum
Region
Text
Country
Text
Exchange
Text
Name
Text
Forex
Text
Symbol
Text
ISIN
Text
SEDOL
Text
Close(local)
Numeri
$#,##0
Sum
Mcap(local)
Numeri
#,##0.00
Sum
Mcap(USD)
Numeri
$#,##0
Sum
Industry
Text
Supersector
Text
1 Day Close
Numeri
#,##0.00
Sum
1 Week Close
Numeri
#,##0.00
Sum
2 Week Close
Numeri
#,##0.00
Sum
1 Month Close
Numeri
$#,##0
Sum
2 Month Close
Numeri
#,##0.00
Sum
3 Month Close
Numeri
#,##0.00
Sum

- modify the format for each checked column. The *Default Display Format* value will be **Mixed**.



Once the column format is modified, the ↻ button is displayed. Click this button to revert to the original column format.

4. Click Refresh Preview. The new column format is applied and displayed on the *Data Preview*.

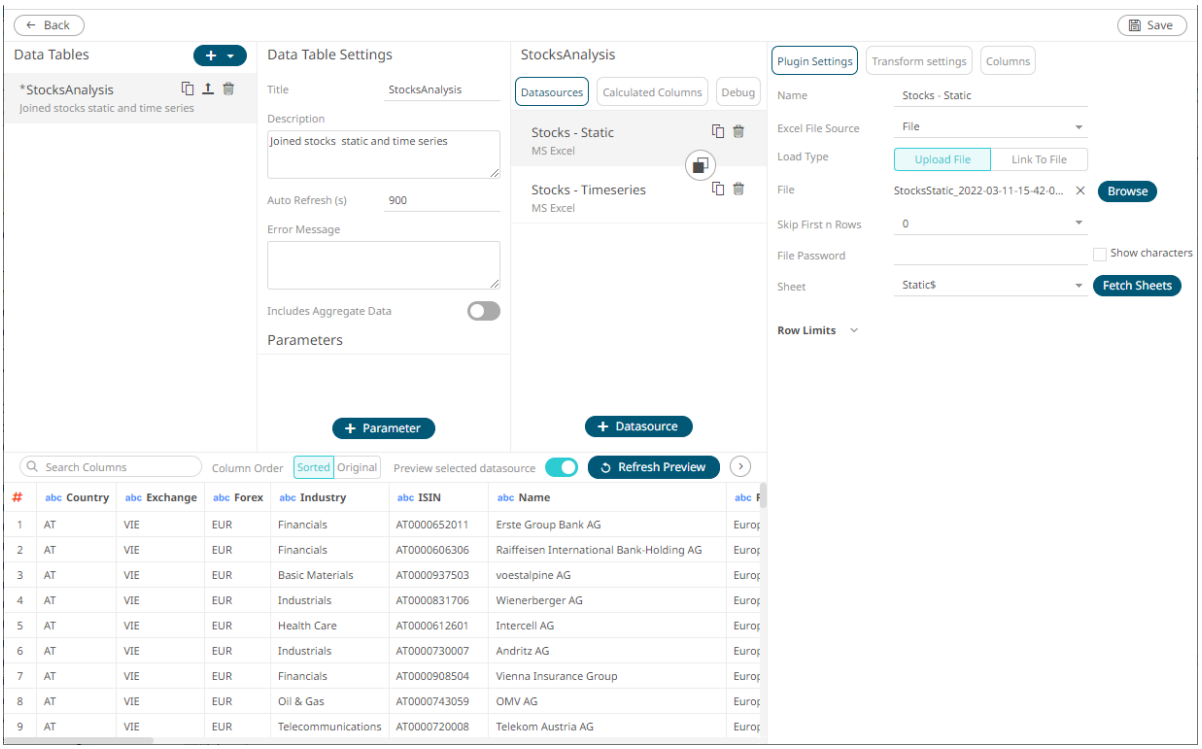


Setting the Default Aggregation for Numeric Columns

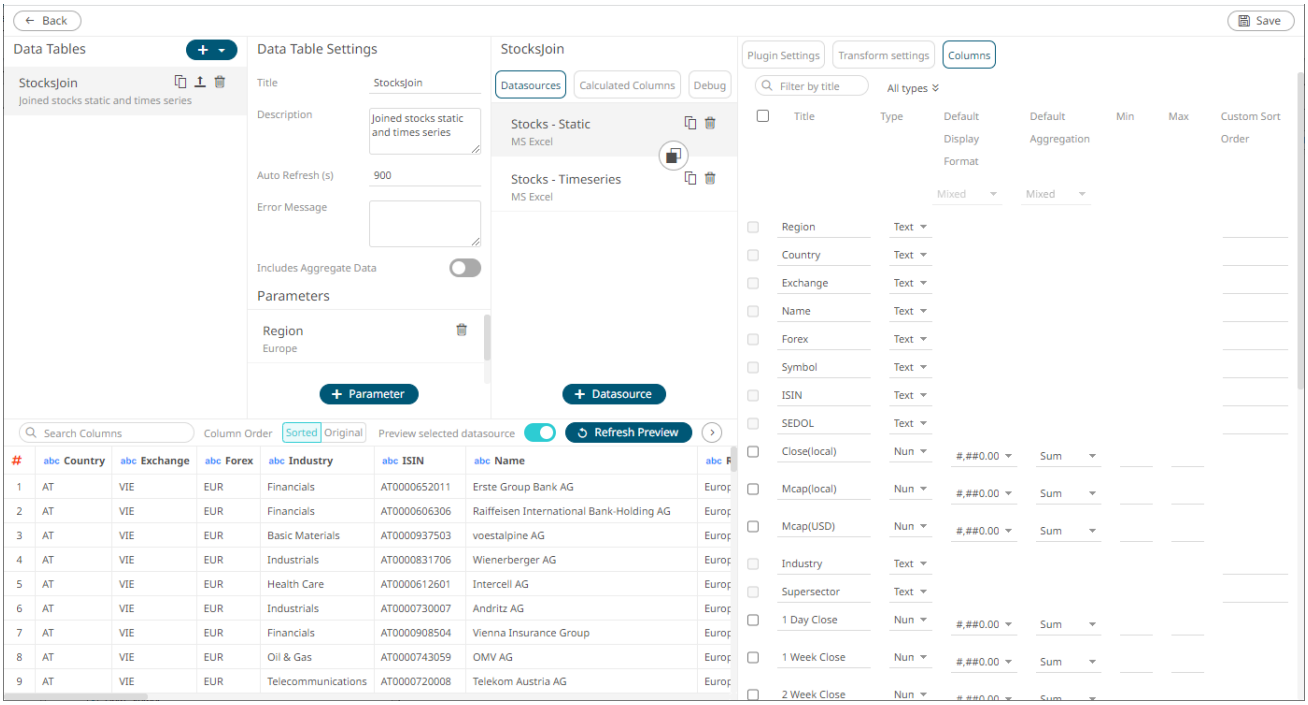
Setting the default aggregation of numeric columns can be done on the *Columns* pane of the *Data Table Editor* layout.

Steps:

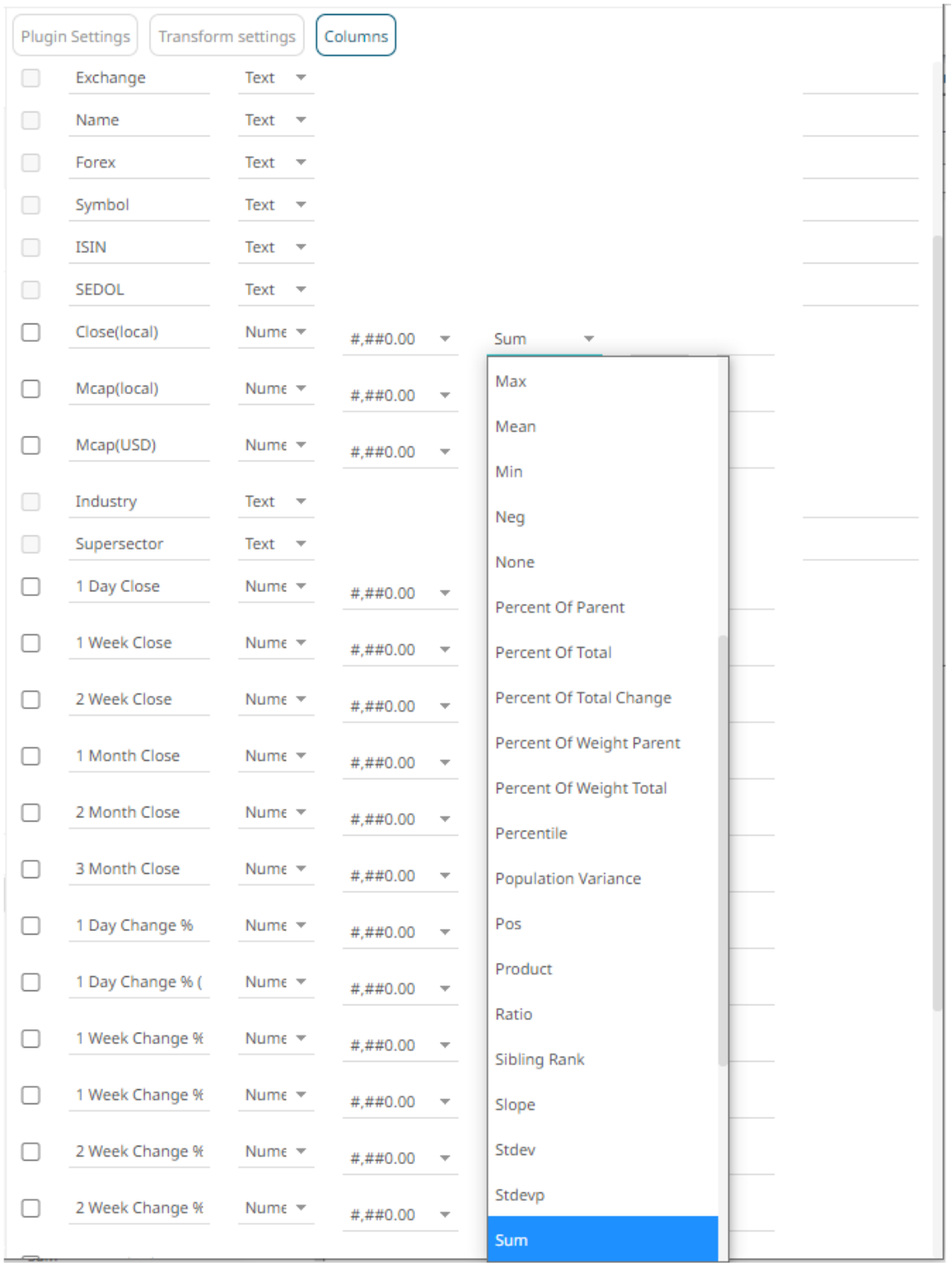
1. On the *Data Sources* panel, click a data source to display its settings.



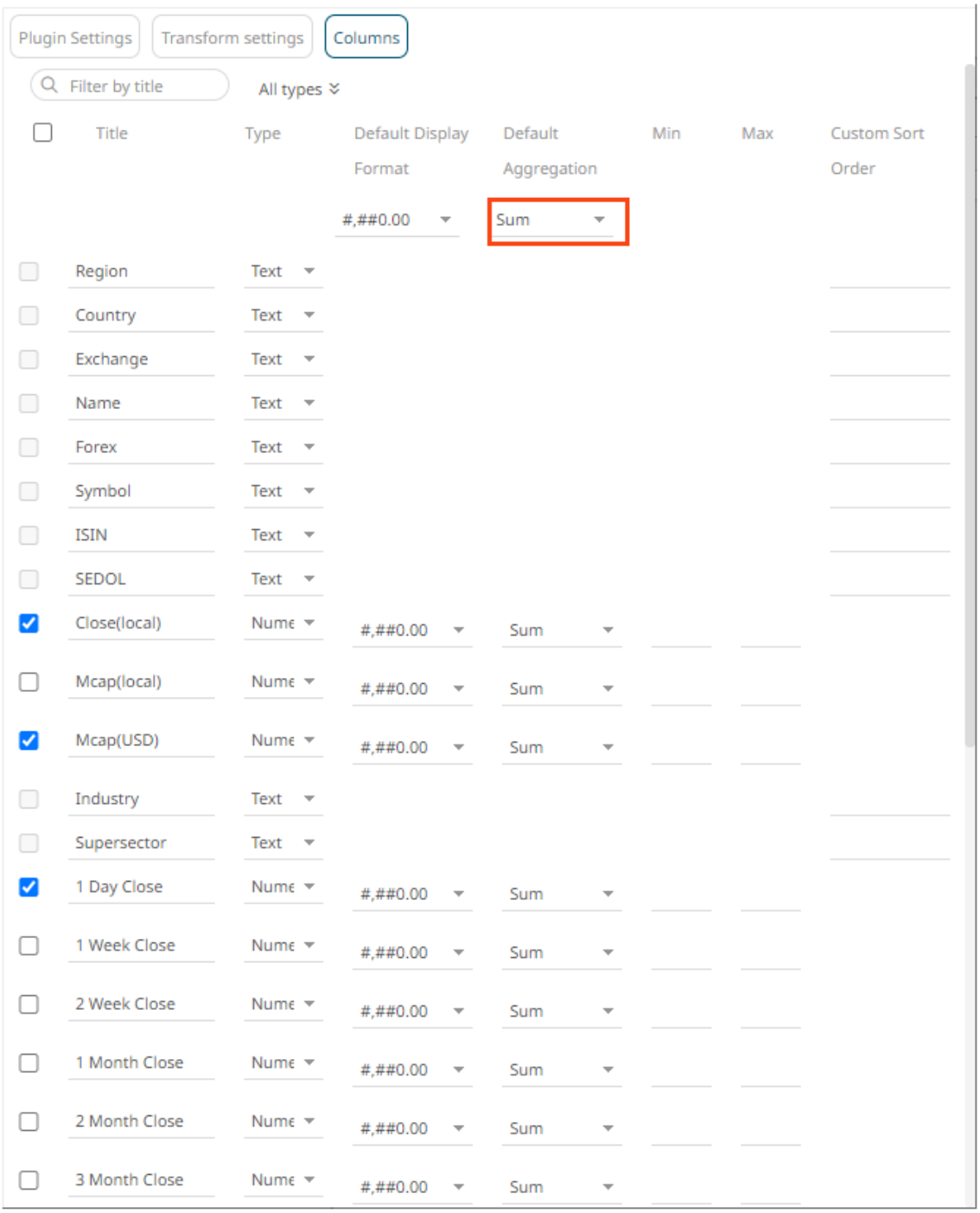
2. Click **Columns**. The *Columns* pane displays with the list of available columns in the data source.



3. Click the drop-down list and select the *Default Aggregation* for the numeric columns. Default is **Sum**.

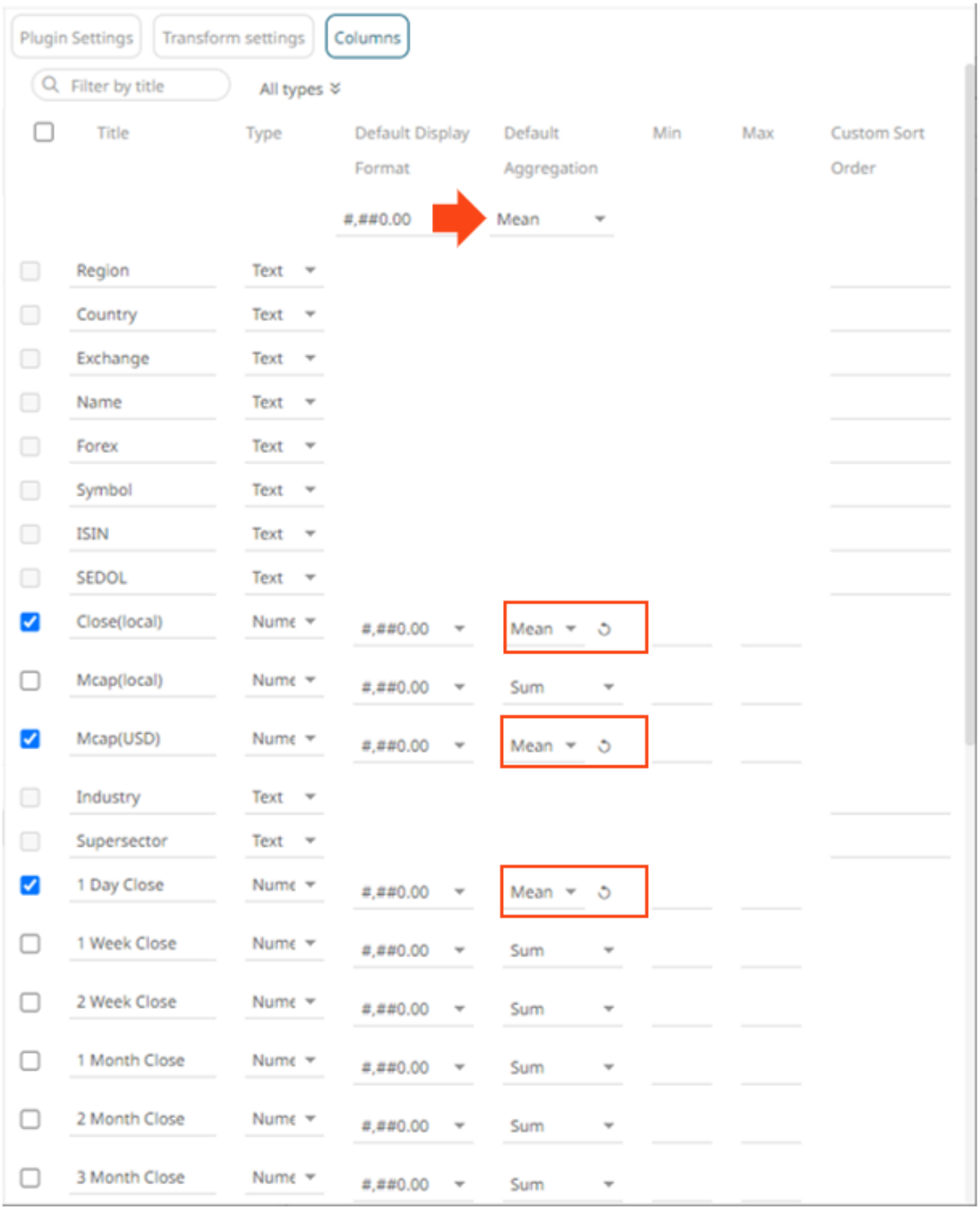


To modify the default aggregation of several numeric columns, check their corresponding boxes. The *Default Aggregation* drop-down list is enabled.

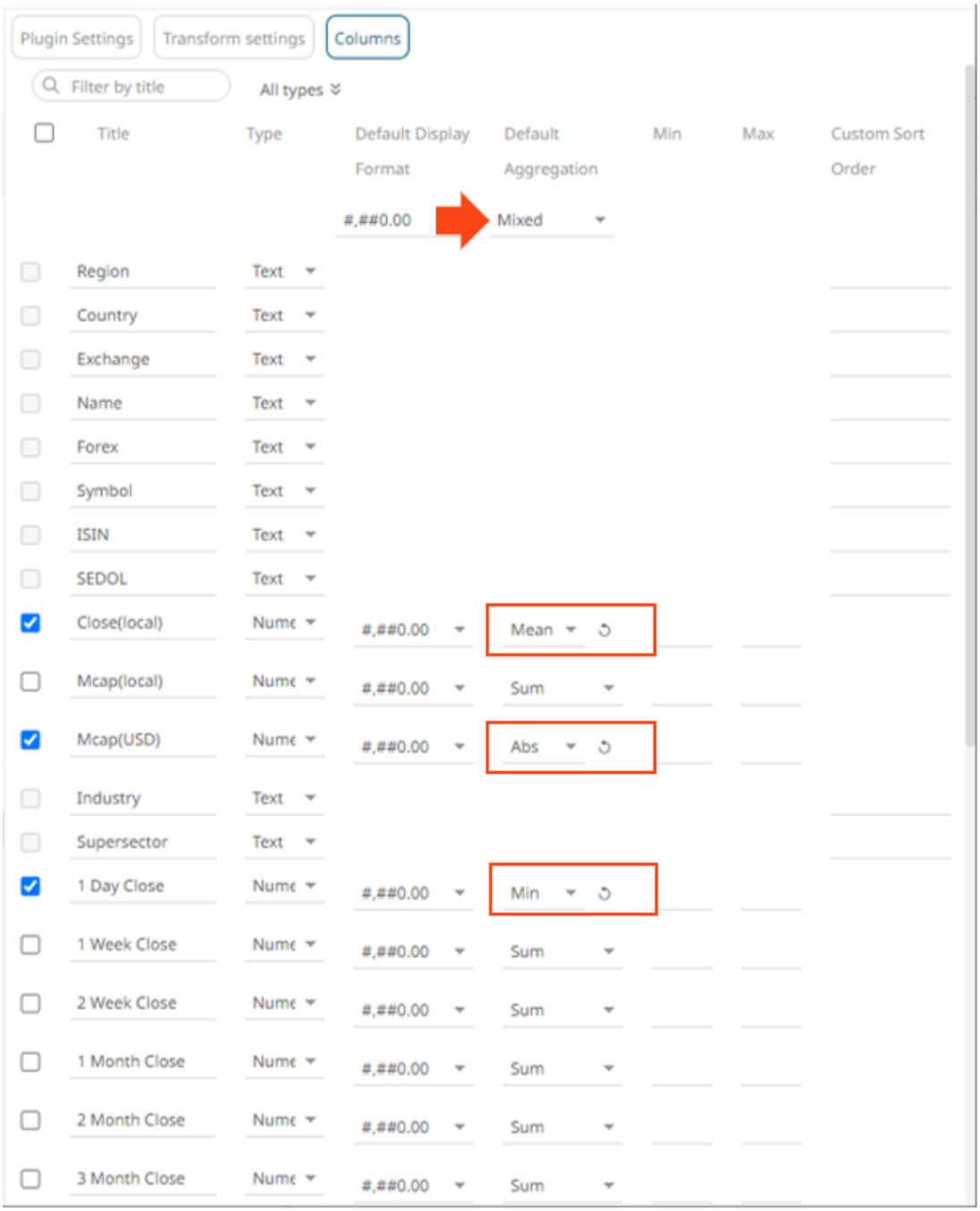


You can either:

- select an aggregation in the *Default Aggregation* drop-down list. This aggregation will be applied to all the checked columns.

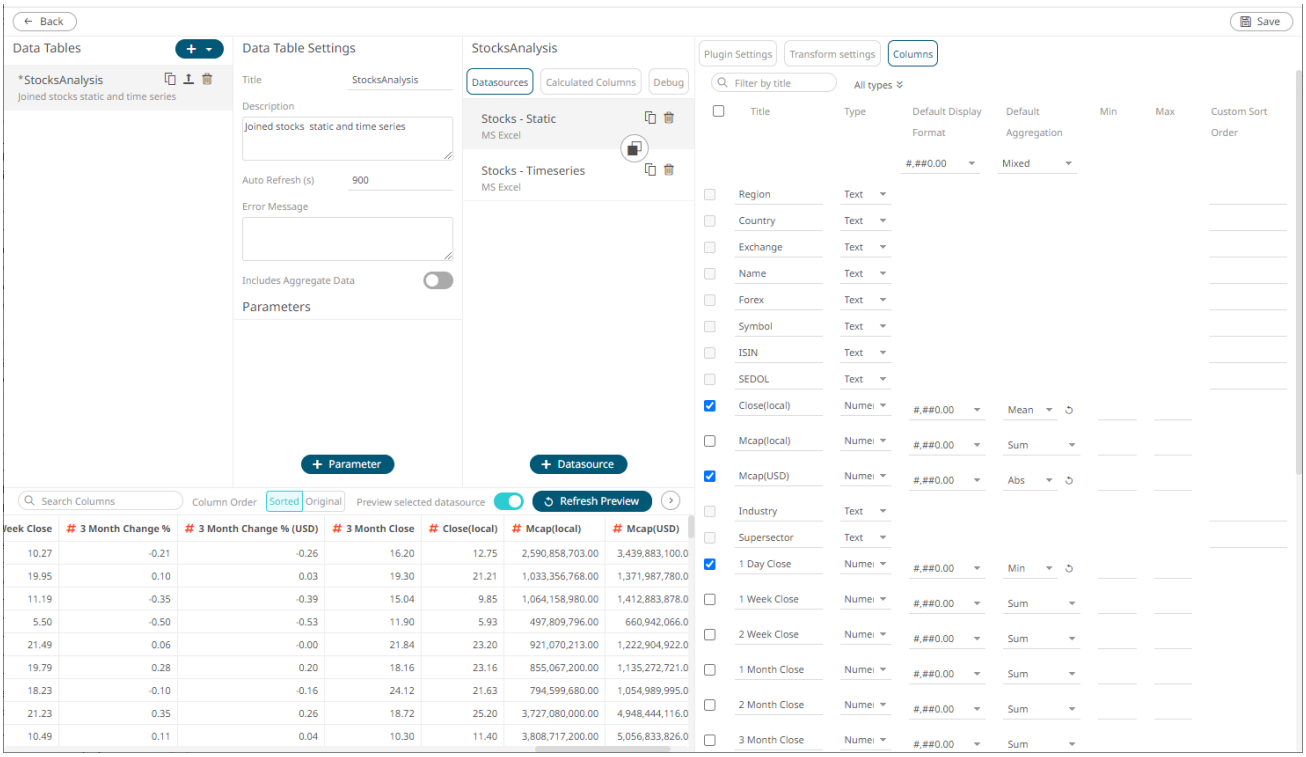

Plugin Settings
Transform settings
Columns
Filter by title
All types
Title
Type
Default Display Format
Default Aggregation
Min
Max
Custom Sort Order
#,##0.00
Mean
Region
Country
Exchange
Name
Forex
Symbol
ISIN
SEDOL
Close(local)
Mcap(local)
Mcap(USD)
Industry
Supersector
1 Day Close
1 Week Close
2 Week Close
1 Month Close
2 Month Close
3 Month Close
Text
Sum

- modify the aggregation for each checked column. The *Default Aggregation* value will be **Mixed**.



To revert to the default original default aggregation (**Sum**), click ↺ .

4. Click Refresh Preview . The new default aggregation for the numeric column is applied and displayed on the *Data Preview*.



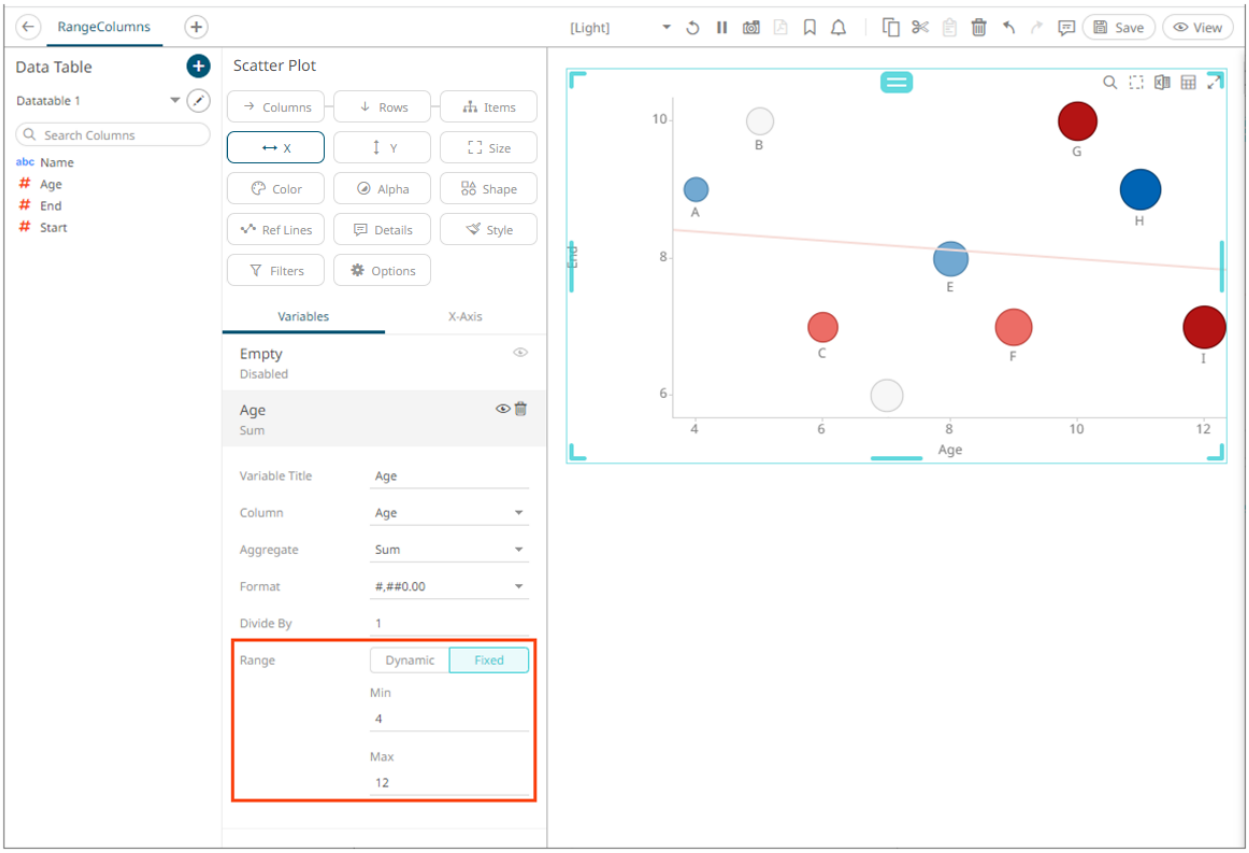
Setting the Min and Max Range for Numeric Columns

Setting the *Min* and *Max* values, for the **Fixed Range** of X and Y variables in visualizations, can be done on the *Columns* pane of the *Data Table Editor* layout.

For example, these numeric columns or fields have the following fixed Min and Max ranges:

Column	Min	Max
Age	4	12
Start	1	5
End	6	10

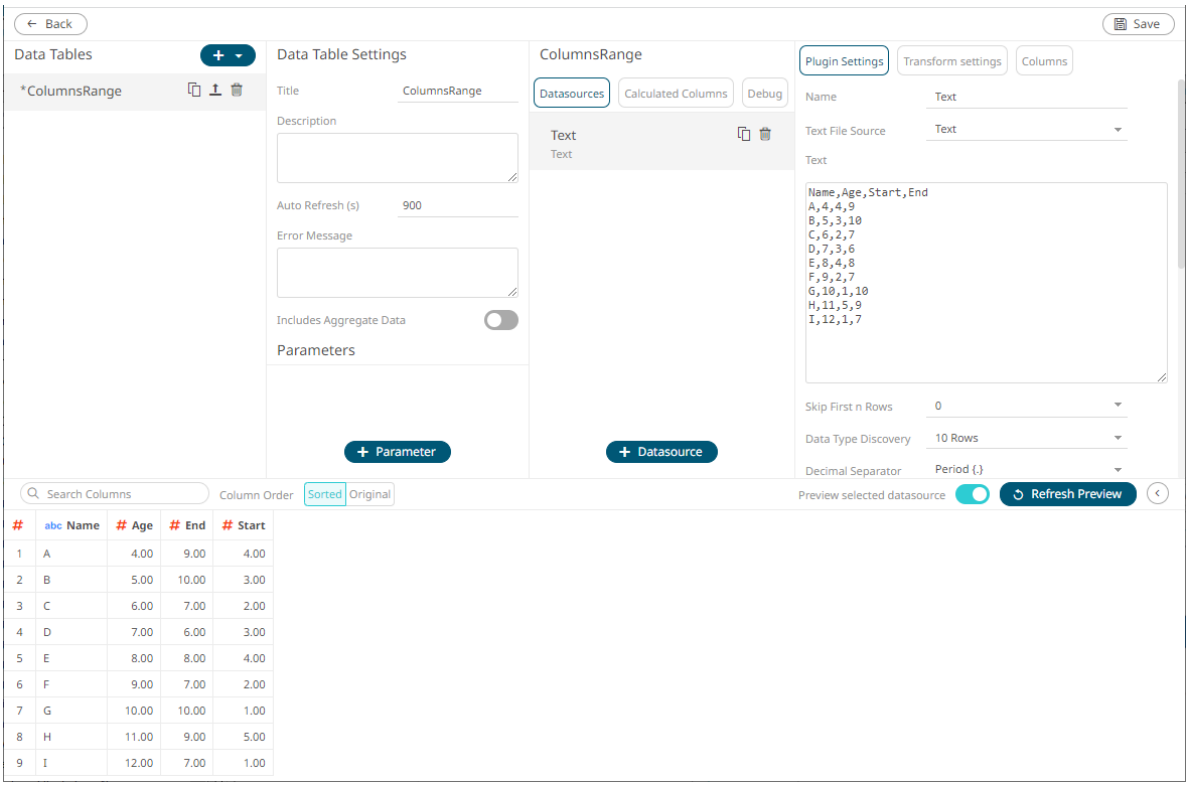
On the visualization, when the **Age** column is dragged to the *X* variable, the *Min* and *Max* values are applied.



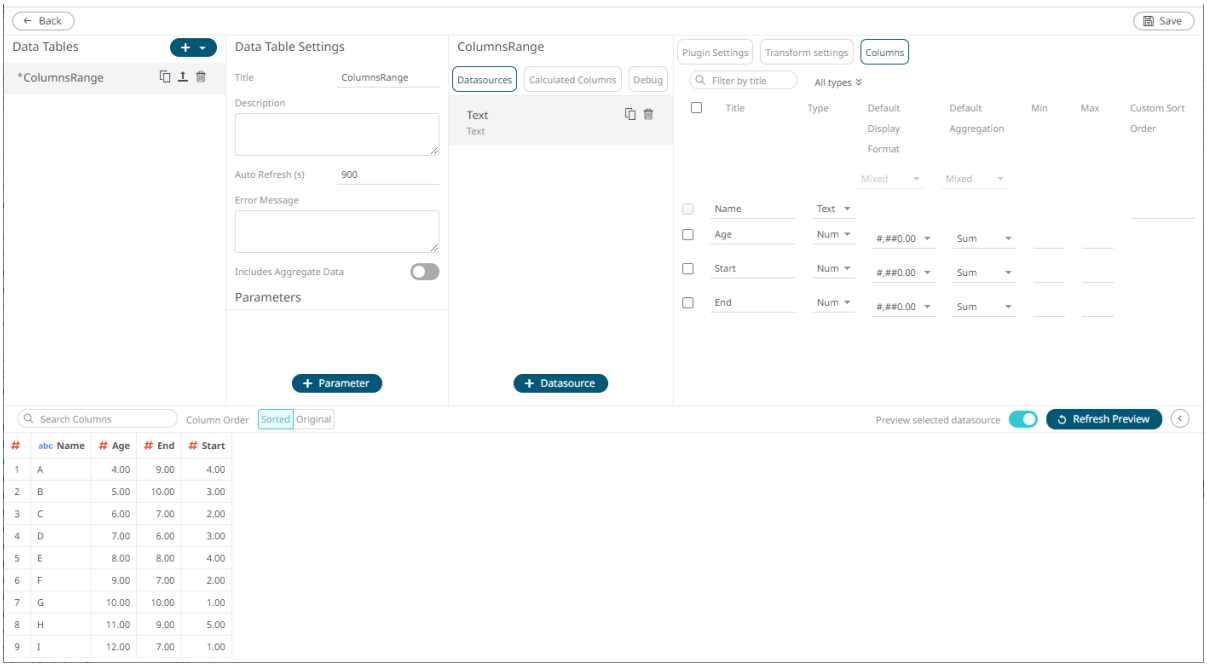
Follow the steps below to modify the *Min* and *Max* fixed range.

Steps:

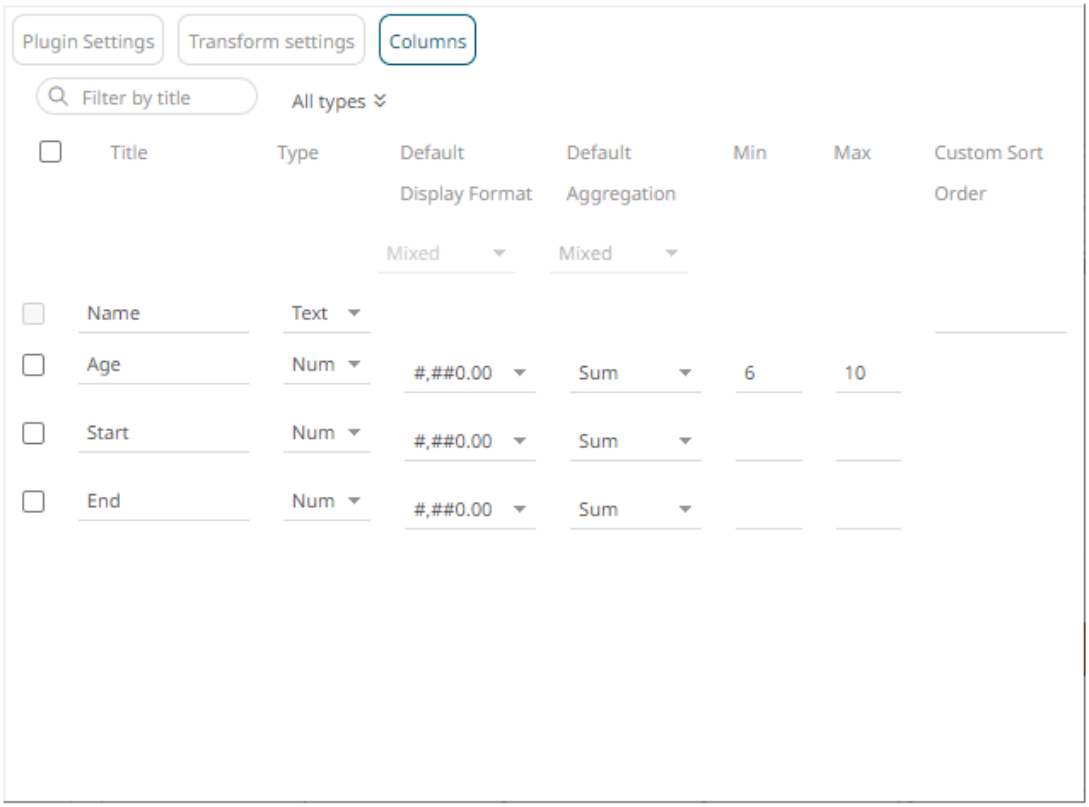
1. On the *Data Sources* panel, click a data source to display its settings.



2. Click **Columns**. The *Columns* pane displays with the list of available columns in the data source.



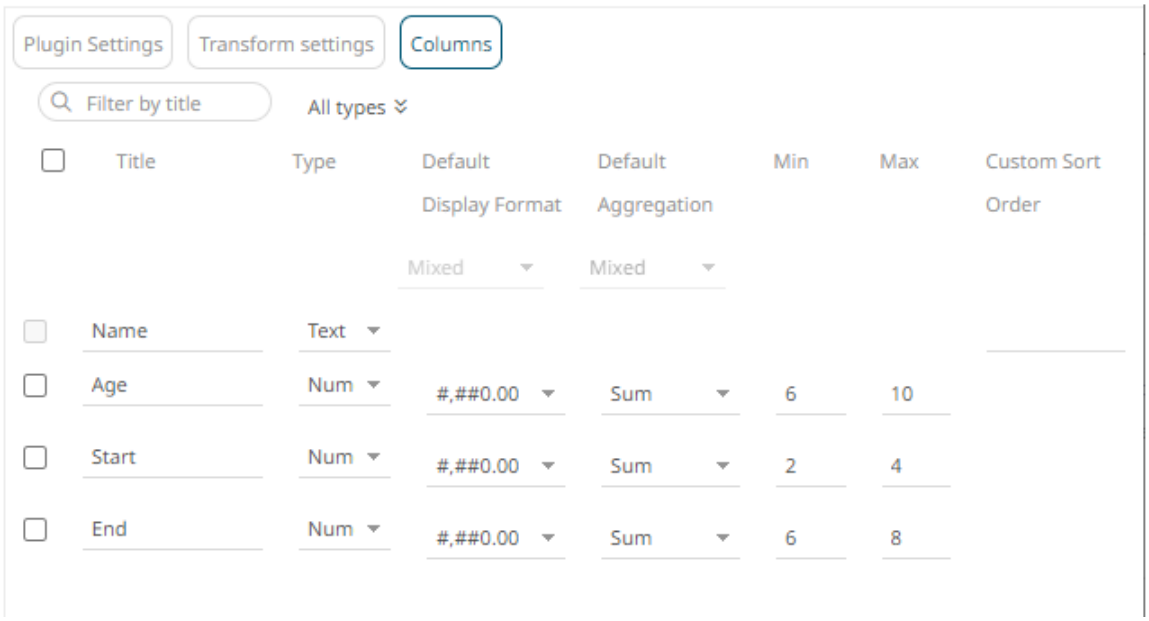
3. To set the fixed range for a single numeric column, enter the *Min* and *Max* values.



To set the fixed range for several numeric columns, check their corresponding boxes and enter their *Min* and *Max* values.

For example:

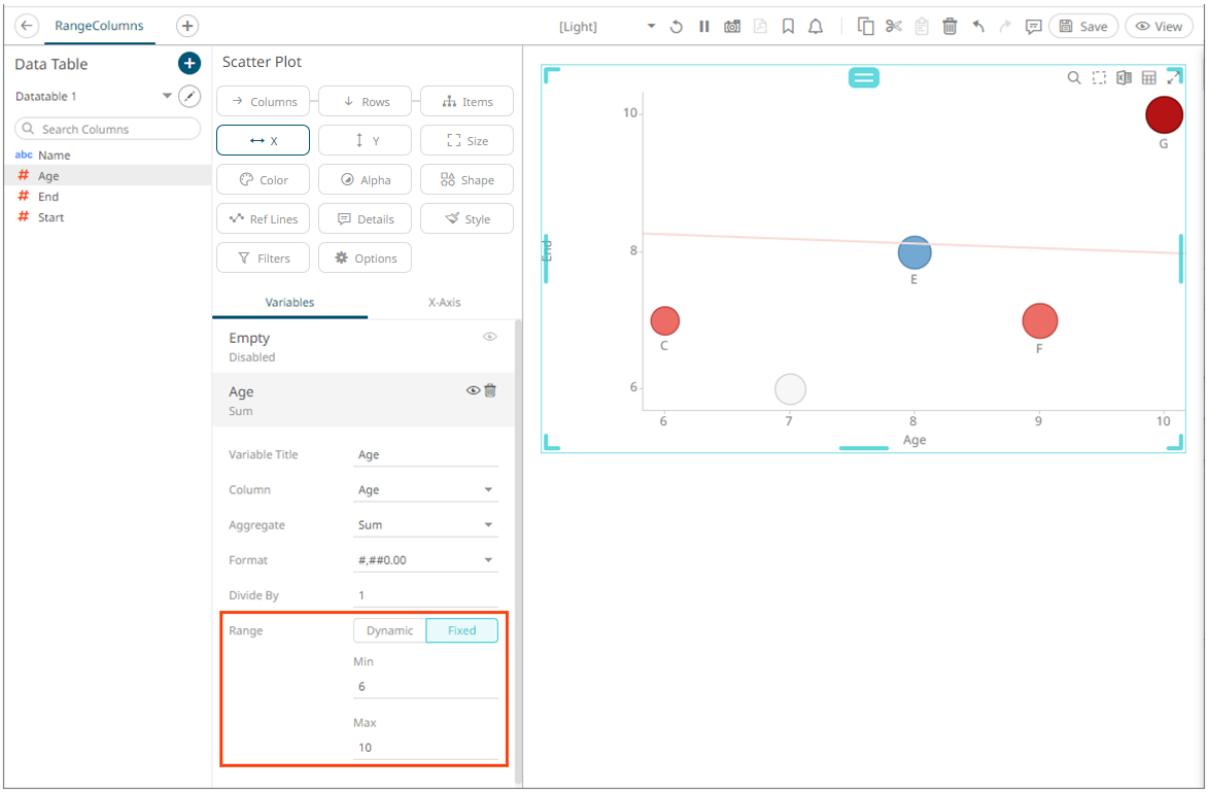
Column	Min	Max
Age	6	10
Start	2	4
End	6	8



4. Click the **Save**  button.

   When saved, the notification displays.

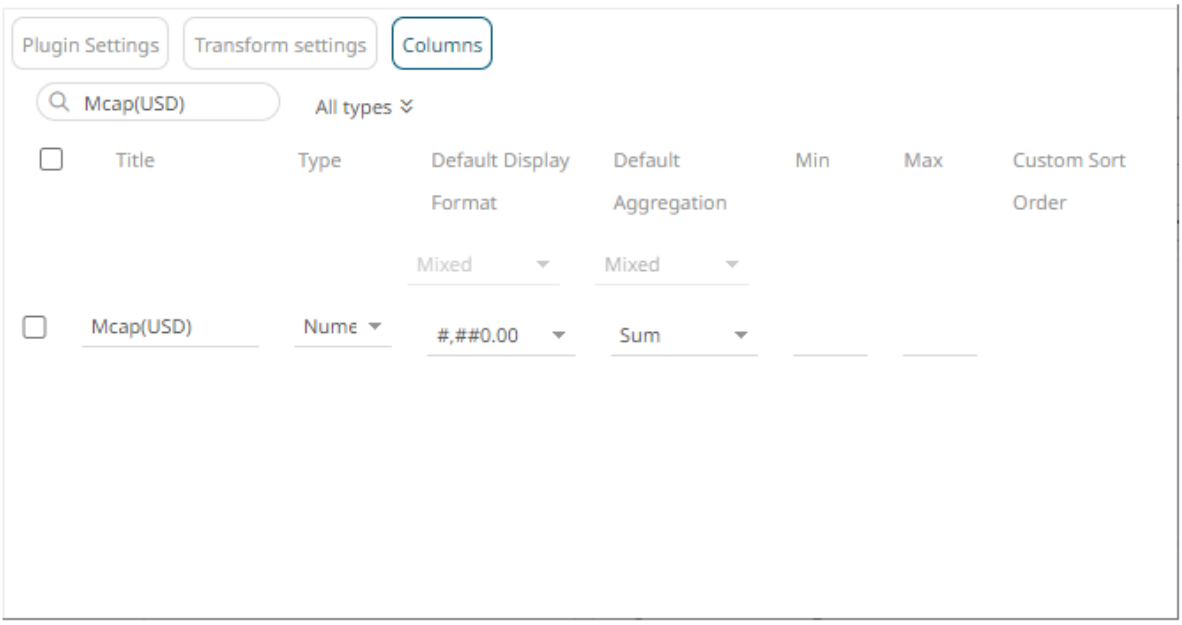
   On the visualization, when the **Age** column is dragged to the *X* variable, the set *Min* and *Max* values are applied.



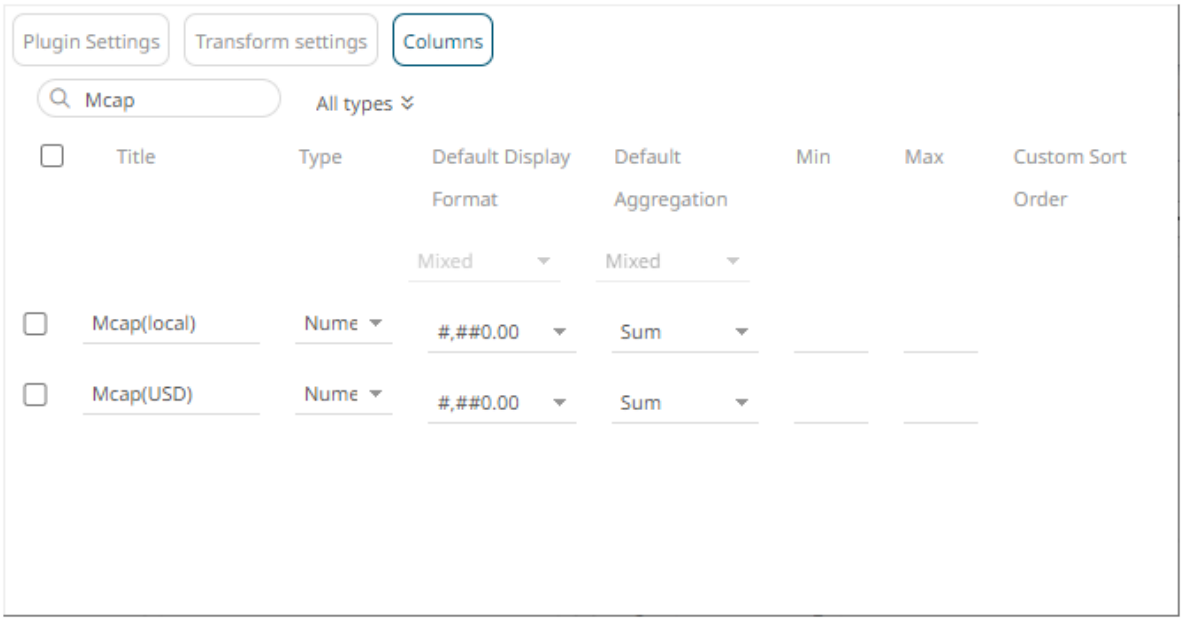
Filtering Data Source Columns

You can limit the data source columns that are being displayed by:

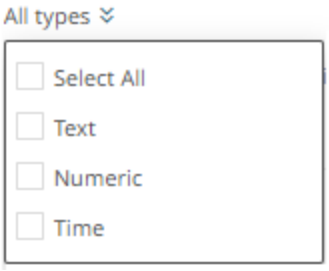
- entering the title of a particular column into the *Filter by Title* box.



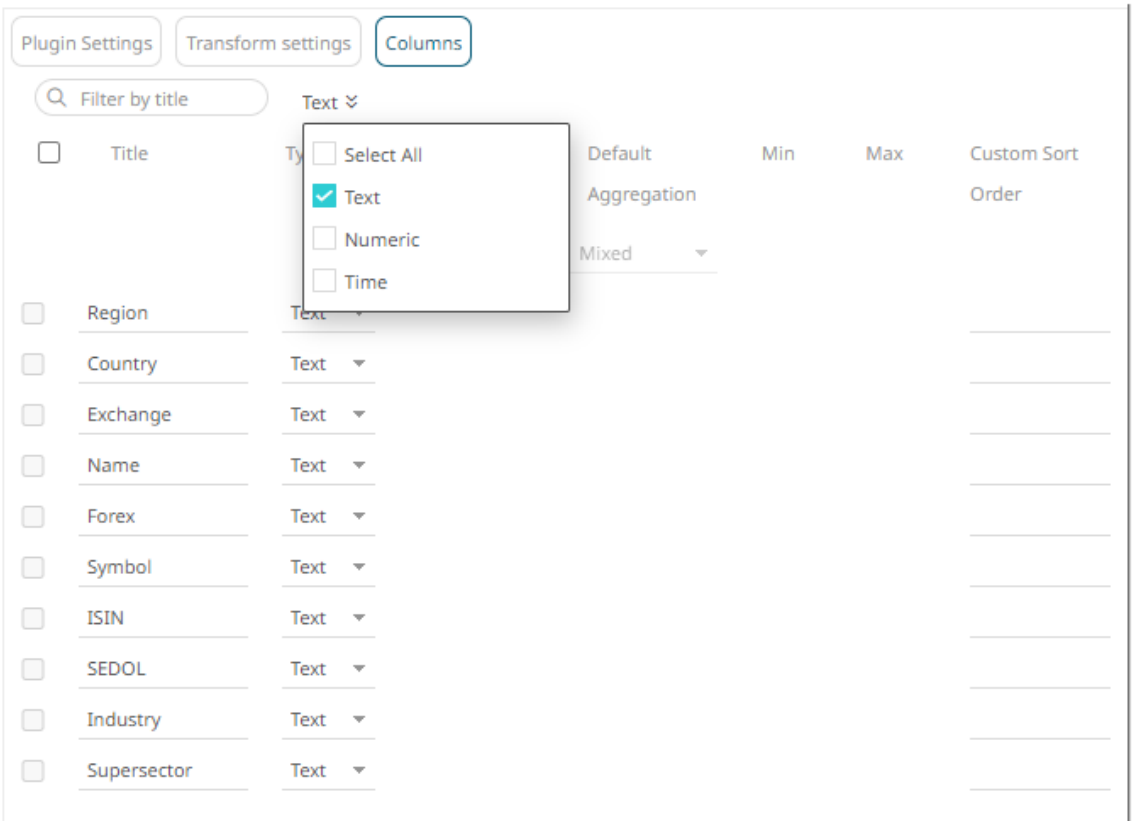
- entering one or more characters into the *Filter by Title* box and the suggested list of columns that matched the entries will be displayed.



- clicking the *All Types* drop-down list and checking the box of the data column type.



The data columns that matched the selected type are displayed.



DATA STORAGE

Data storage depends on the data table type (Published, Saved and so on), and the connection type (Database, Excel, CSV, and so on). Specifically:

- Database (relational and tick history) or Message Queue

  No physical data storage.

- Flat Files (Excel, CSV, Text, XML and SVG)

  If configured as a saved data table / workbook, no copy of the spreadsheet is made; instead the path to the original file is stored, allowing updates to be accessed.

  If the data table / workbook is published, a snapshot of every defined Excel spreadsheet is copied to the server. To update a **published** spreadsheet, the data table must be again connected to the source spreadsheet and then re-published.

[5] BUILDING A WORKBOOK

After all of the data configurations are saved in the *Data Table Editor* layout, the *Workbook* layout is displayed into either any of two modes:

- Design Mode

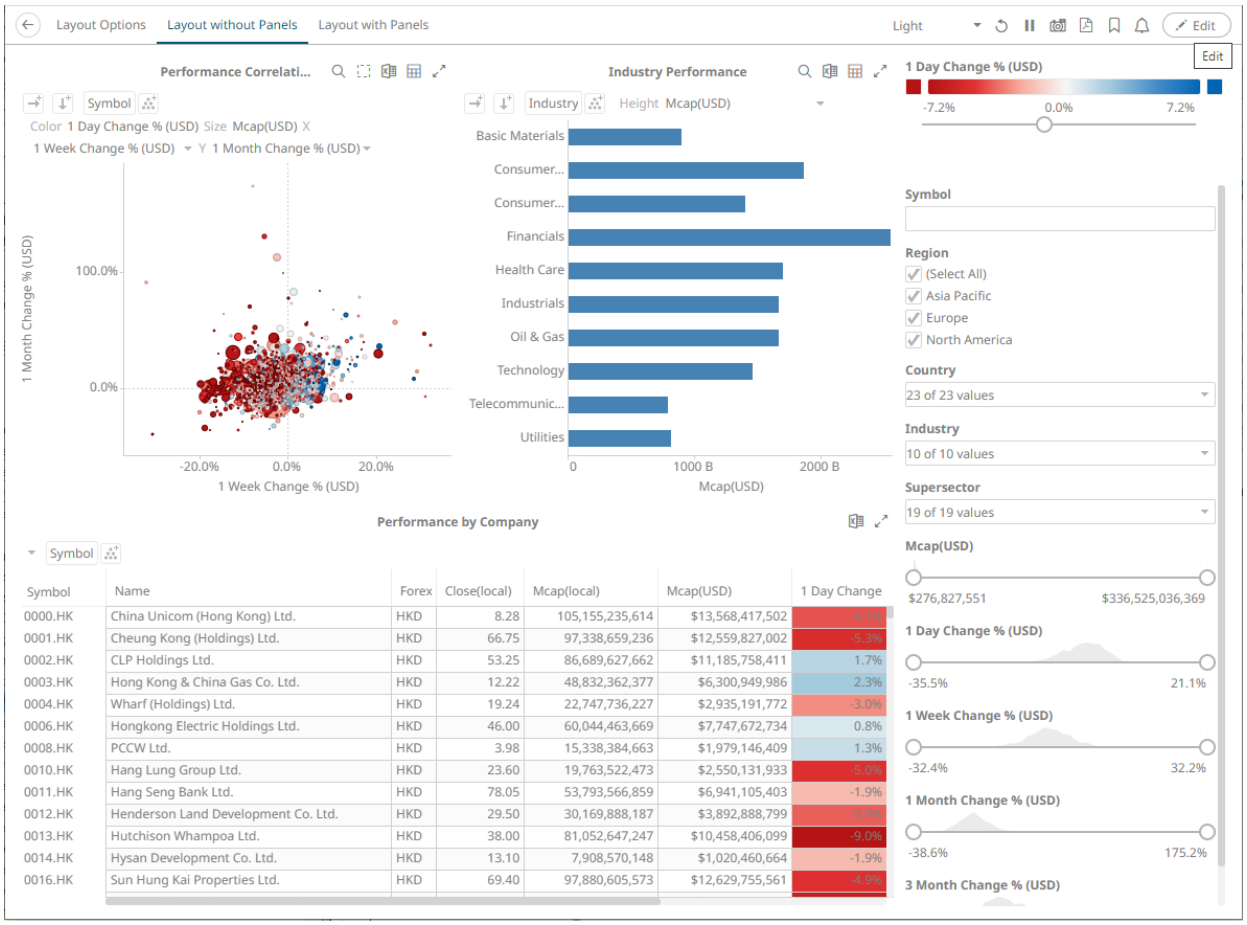
  This mode allows you to create Panopticon workbooks and add or change elements in the dashboards.

- View Mode

  This mode lets you use your Panopticon workbooks and dashboards to analyze data.

It is easy to switch between these modes.

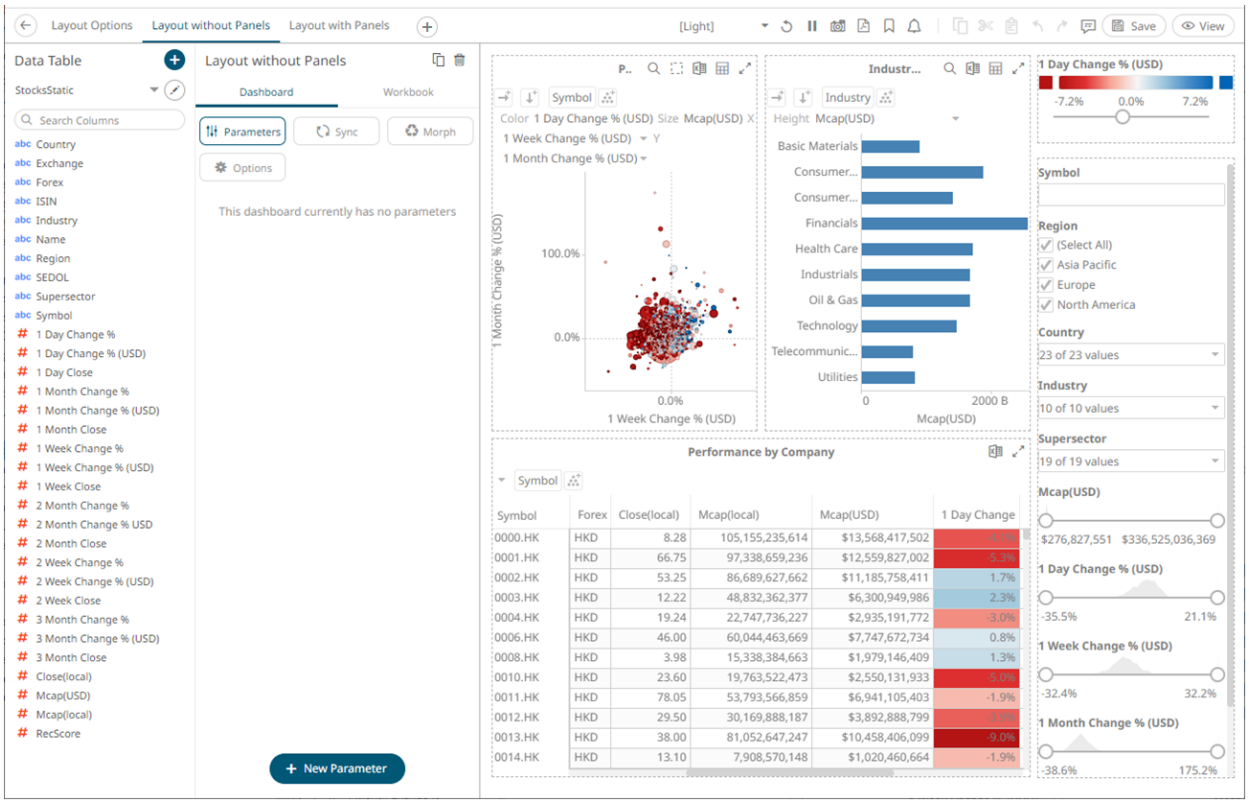
On the *View Mode* view, click the **Edit**  icon.

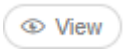


NOTE

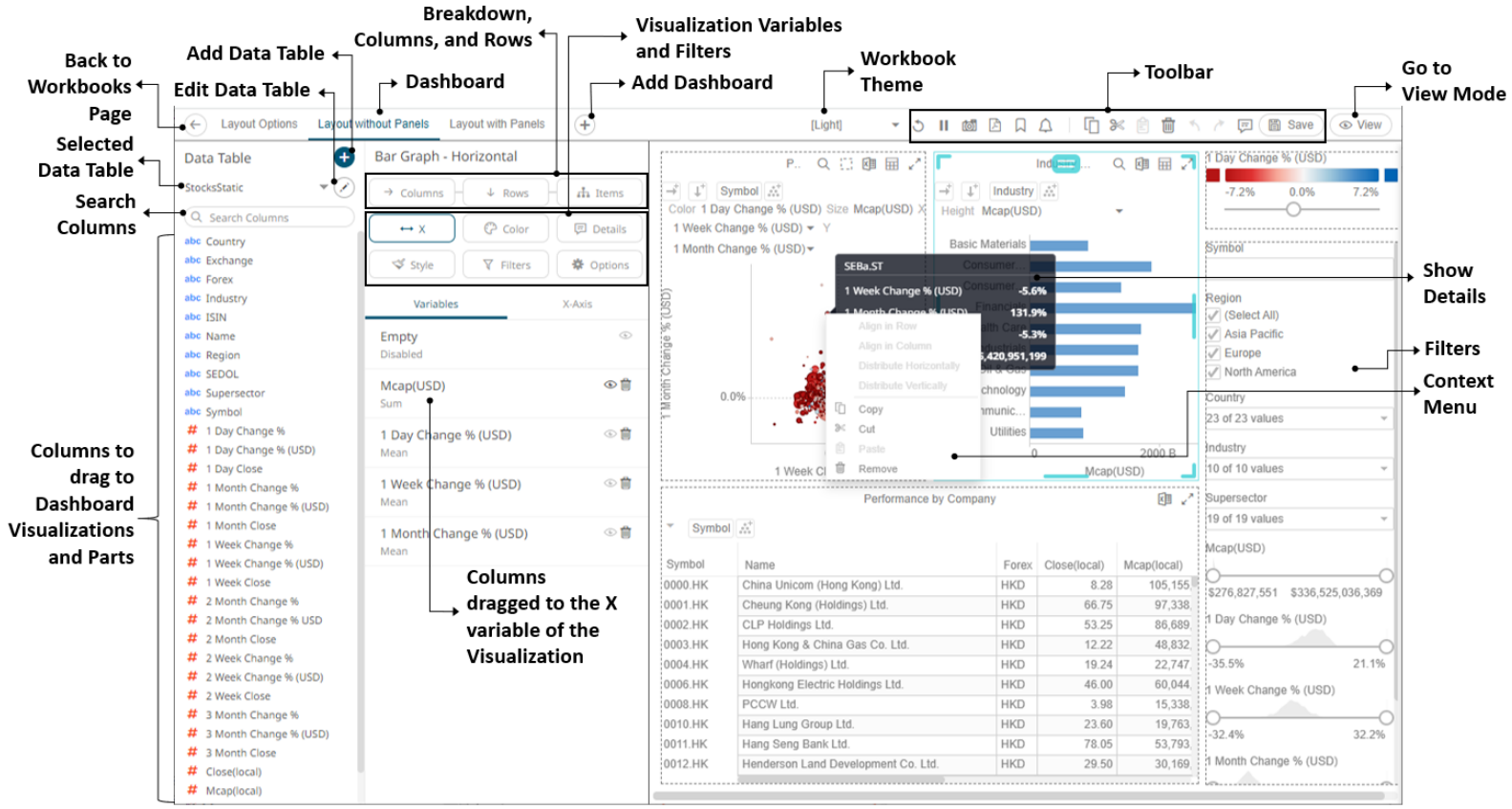
On the Open Workbook in View Mode, when the Edit  **button is clicked, the user will get the DESIGNER role. Consequently, the Save**  **button becomes available in both the Open Workbook in Design and View Modes.**

The *Design Mode* view displays.



To go back to the *View Mode*, click the **View**  icon.

USING THE OPEN WORKBOOK IN DESIGN MODE



In this mode, you can perform the following operations:

- Go back to the *Workbooks and Folders Summary* page
- Create, edit, duplicate, rearrange, and delete dashboards
- Add, edit, and delete visualizations, filters, actions, and general parts on the dashboards
- Add dashboard parameters
- Perform synchronization
- Morph visualizations
- Create actions and global filters for the workbook
- View and clear active filters
- Define the workbook theme
- Interact with the visualizations

These features are discussed in detail below.

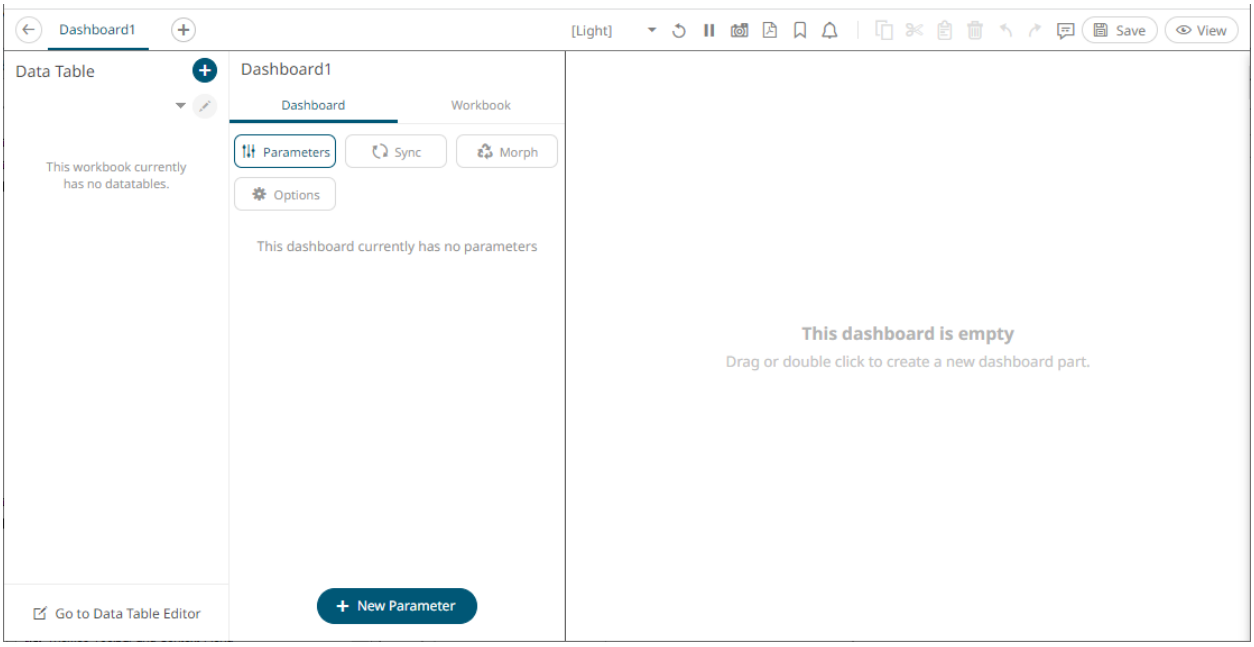
CREATING A DASHBOARD

A dashboard may consist of several parts including: visualizations, legends, filters, action controls, labels, and images.

NOTE

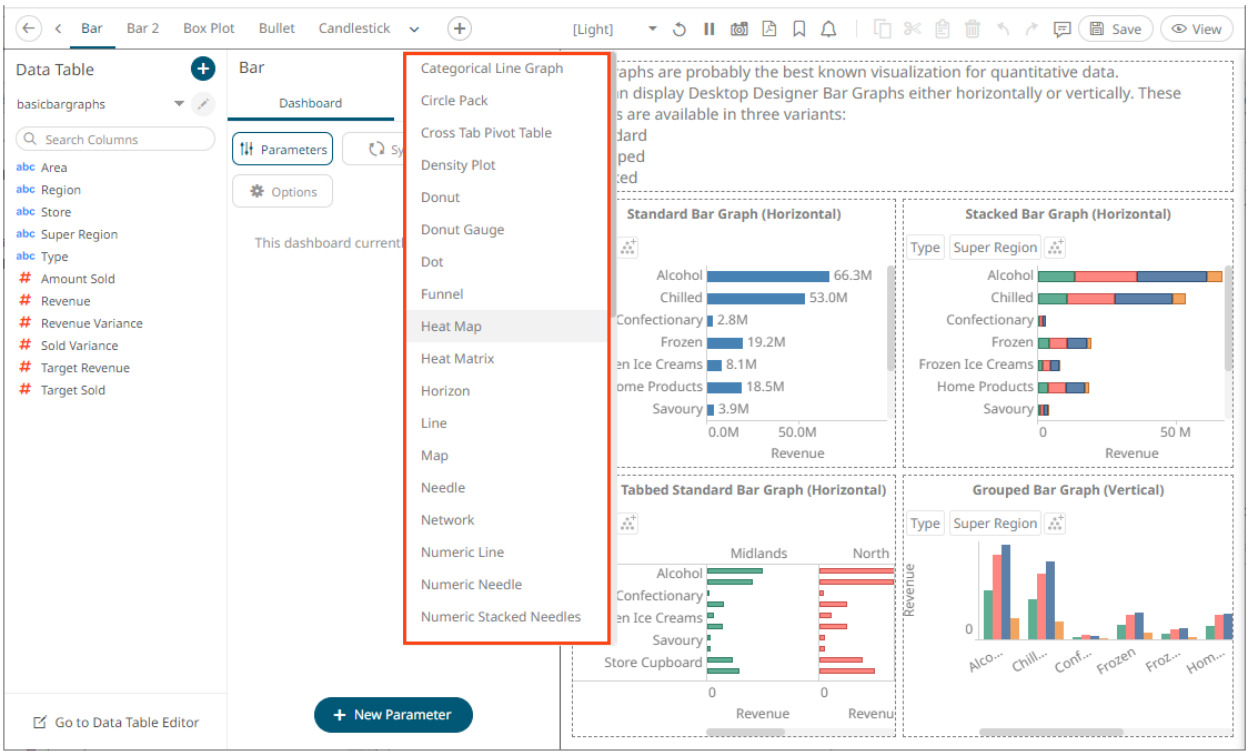
- **You can begin designing your dashboard only after the data is available to the workbook.**
- **You must be in *Design Mode* to create a new dashboard or alter an existing dashboard.**

By default, after creating a workbook, a dashboard (named **Dashboard1**) is displayed on the *Open Workbook in Design Mode* view. The dashboard name by default is editable. You can enter a descriptive dashboard name.



Each blank canvas represents a single dashboard. You can add as many dashboards as you like to a workbook. These appear as tabs at the top of the screen. Switch between dashboards by clicking on the appropriate tab.

If there are several dashboards added, such as the example below, click the icon to expand the drop-down list and display all of the available dashboards and select one to display.

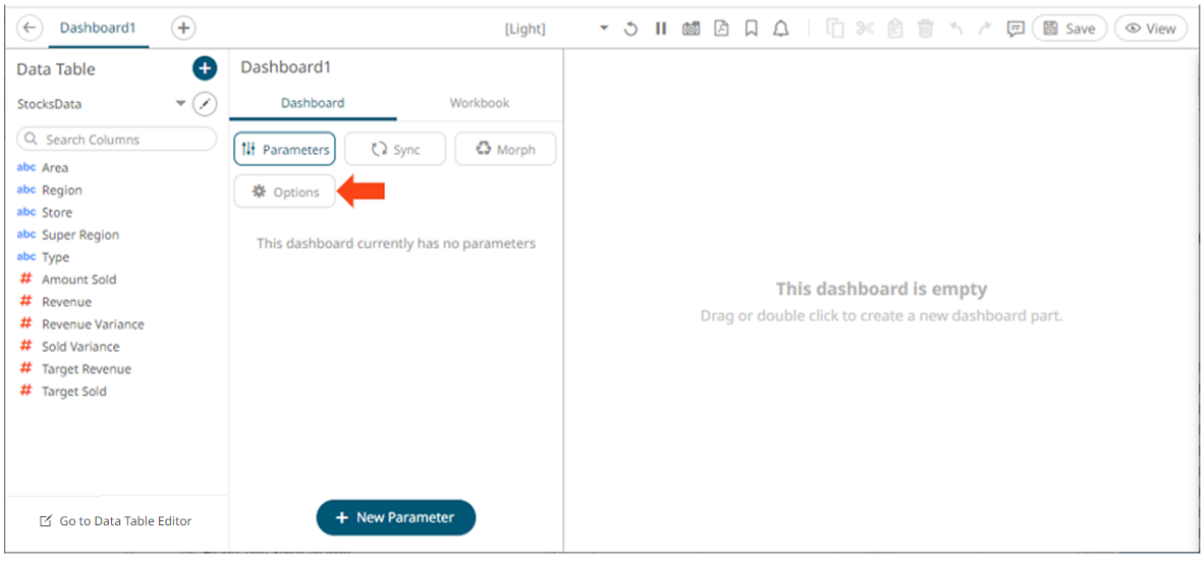


Setting the Dashboard Properties

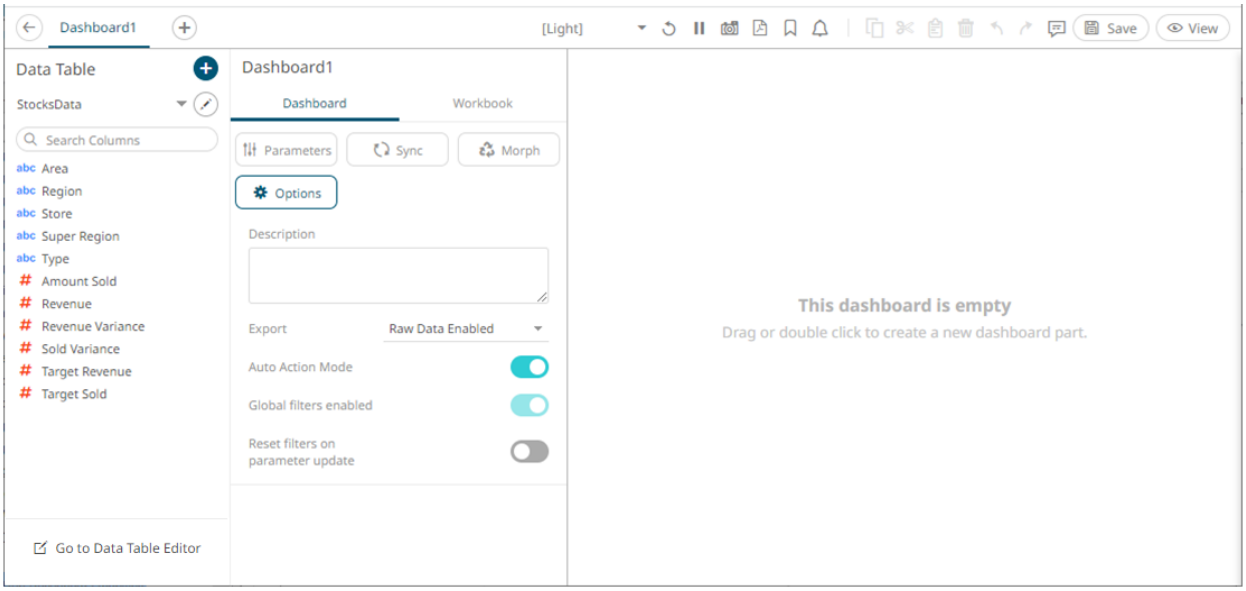
You can set the general settings of a dashboard including the export option, action mode, global filters and resetting filters when parameters are updated.

Steps:

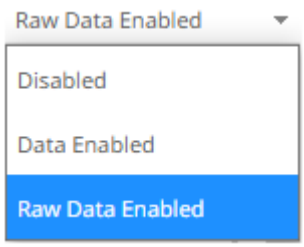
1. On the *Dashboard and Workbook Settings* pane, click the **Dashboard** tab then the **Options** button.



The *Dashboard* pane updates to display the *Dashboard Settings*.



2. Enter a *Description* of the dashboard. Hovering on a dashboard tab displays this description.
3. Set the *Export* option:



   - Disabled

     Disables the ability to copy data in a visualization or export raw data.
   - Data Enabled

     Enables the ability to copy the highlighted data in a visualization and paste into another application such as MS Excel.
   - Raw Data Enabled (default)

     Exports the raw data from the data source.
4. Tap the **Auto Action Mode** slider to turn it on. This means the automatic parameterization on the visualizations on the dashboard is available.
5. Tap the **Global Filters Enabled** slider to turn it on. This means that the global filters defined for the workbook will be applied on the dashboard. This is enabled by default.
6. Tap the **Reset Filters on Parameter Update** slider to turn it on. This means that when the dashboard parameters are updated, the filters in the dashboard are reset accordingly.
7. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

notification is displayed.

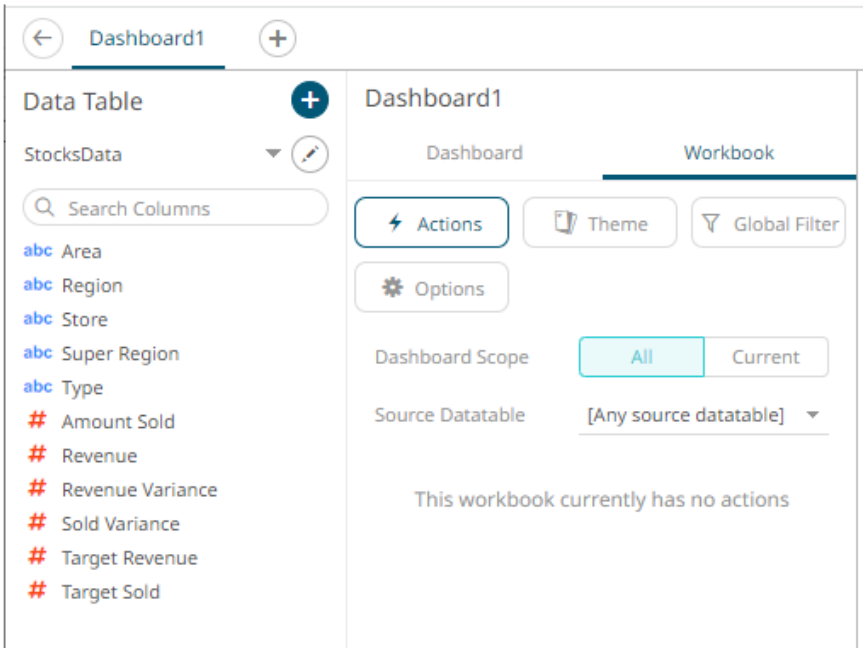
Setting the Workbook Properties

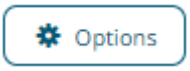
You can set the general settings of a workbook including the layout and PDF output.

Steps:

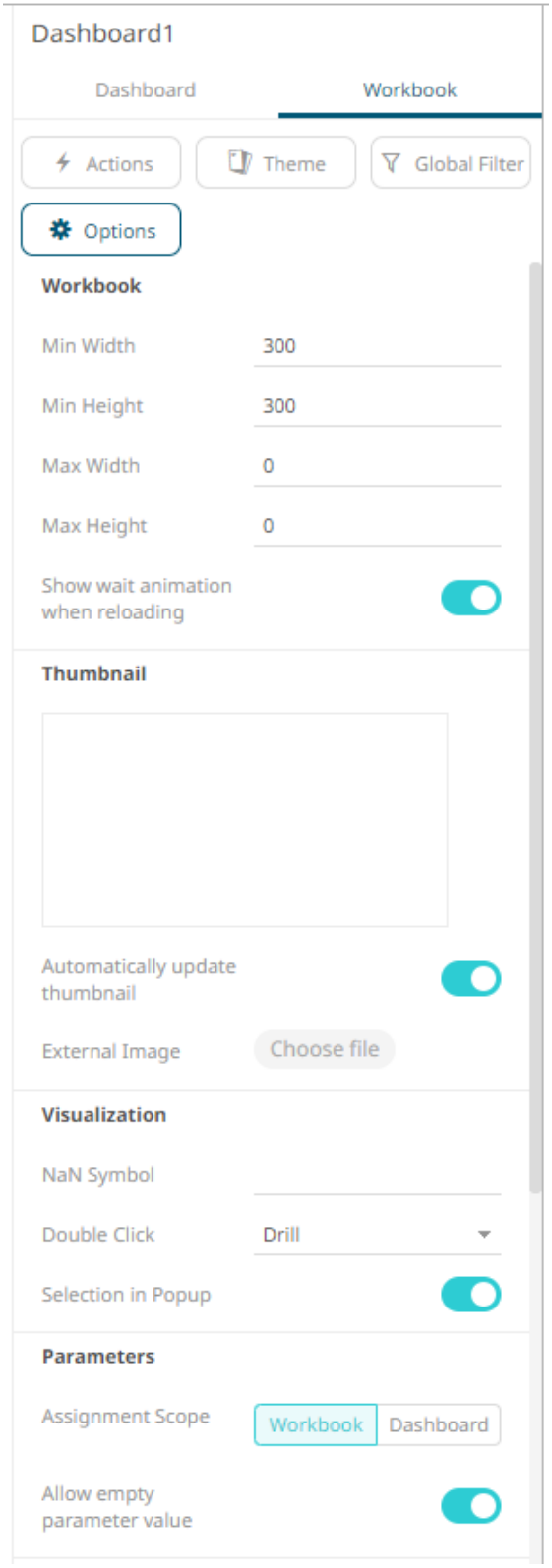
1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

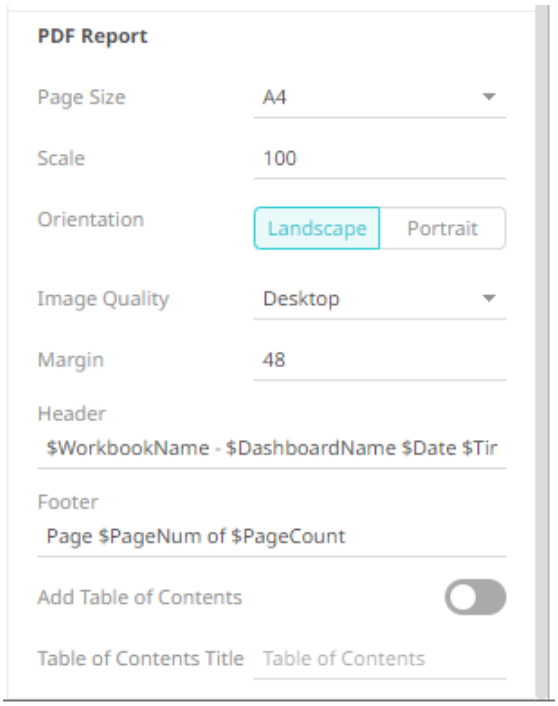
   The *Workbook* pane is displayed.



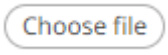
2. Click the **Options**  button.

   The *Workbook Settings* pane is displayed.


Dashboard1
Dashboard
Workbook
Actions
Theme
Global Filter
Options
Workbook
Min Width
300
Min Height
300
Max Width
0
Max Height
0
Show wait animation when reloading
Thumbnail
Automatically update thumbnail
External Image
Choose file
Visualization
NaN Symbol
Double Click
Drill
Selection in Popup
Parameters
Assignment Scope
Workbook
Dashboard
Allow empty parameter value



3. Define the layout properties of the workbook:
   - Min Width – Default is **300.**
   - Min Height – Default is **300.**
   - Max Width – The allowed range value is greater than 0 and less than 2560.
   - Max Height – The allowed range value is greater than 0 and less than 2048.
4. The **Show Wait Animation when Reloading** slider is enabled by default. Tap the slider to turn it off.
5. The **Automatically Update Thumbnail** slider is enabled by default. This means the thumbnail of the workbook will be based on the currently displayed dashboard when saving.

   Other options include:
   - Select a dashboard and save the workbook. To lock this thumbnail image, tap the slider to turn the **Automatically Update Thumbnail** off.
   - Select an *External Image*. To do so, tap the slider to turn the **Automatically Update Thumbnail** off and click the **Choose File** 

button**.** Select the thumbnail image in the *Open* dialog that displays.
6. Enter the *Visualization NaN Symbol*. This value will be used for the not a number (NaN) values in the visualizations.
7. Select the *Double Click* behavior that will be applied to the visualization. The default is **Drill**. Other options are **Filter In**, **Default Action**, or **None**.
8. The **Selection in Popup** slider is enabled by default. Tap the slider to turn it off.
9. Select the Parameters *Assignment Scope*: **Workbook** or **Dashboard**.
10. The **Allow Empty Parameter Value** slider is enabled by default. Tap the slider to turn it off.

NOTE

- **Not all Action parts support empty string character values since they do not work against a string parameter. For example, Action Date Picker, Action Date Range Picker, or the Numeric Action Slider.**
- **Action parts that support empty string parameter values include:**
  - **Action Drop Down Multiple Selection – can deselect all items to get empty string as a parameter value.**
  - **Action Drop Down Include List – can set the parameter to empty if no values are included.**
  - **Action Text Box – setting with no value in the text box will set the parameter to an empty string.**

11. The *PDF Report* settings are defined on a workbook basis. Set the following PDF output properties:

Property	Description
Page Size	Page size. Default is **A4**.
Scale	Page scale. Default is **100**.
Orientation	Select **Landscape** or **Portrait.**
Image Quality	Image resolution. Options include: • **Desktop** – No scaling applied and uses less space. For viewing in the PDF viewer. • **Print** – Higher quality and uses more space. For printing page to the size specified in the report. • **Ultra** – Very high quality and uses a lot of space. For printing large versions.
Margin	Page margin. Default is **48**.
Header	The header to be displayed on the PDF output. Default is: **$WorkbookName - $DashboardName $Date $Time**
Footer	The footer to be displayed on the PDF output. Default is: **Page $PageNum of $PageCount**
Add Table of Contents	Tap the slider to turn it on and add table of contents to the PDF output.
Table of Contents Title	Title of the Table of Contents.

12. Click the **Save** 

icon on the toolbar to save the changes.

When saved, the 

notification is displayed.

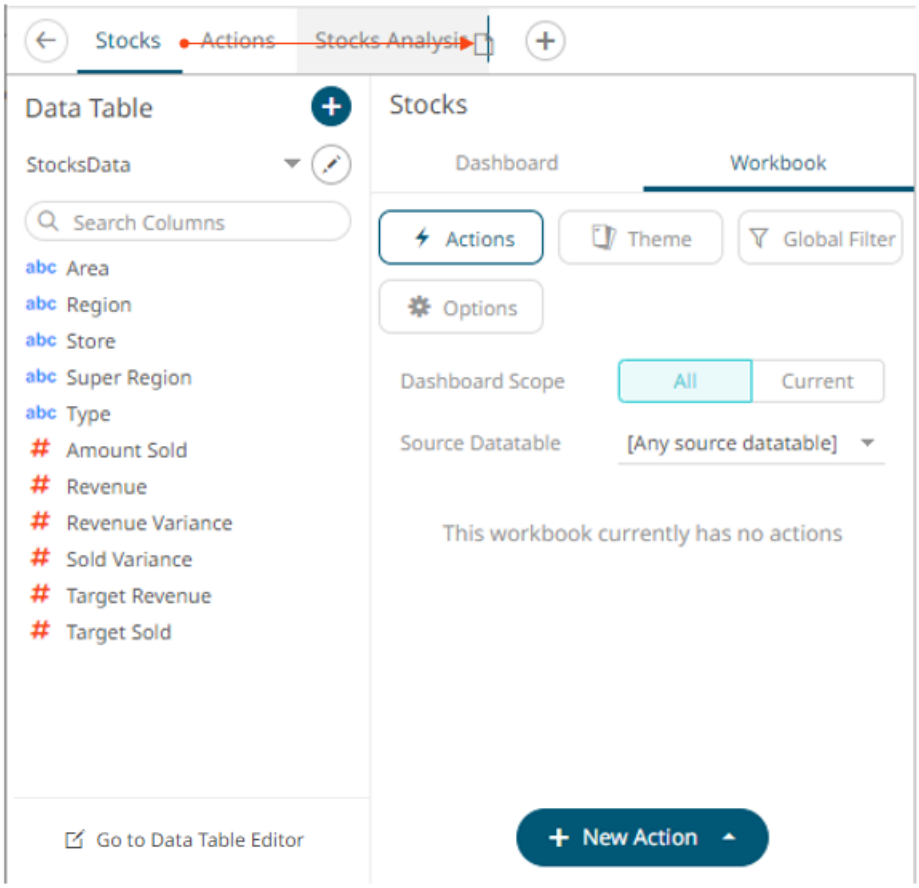
Rearranging Dashboards

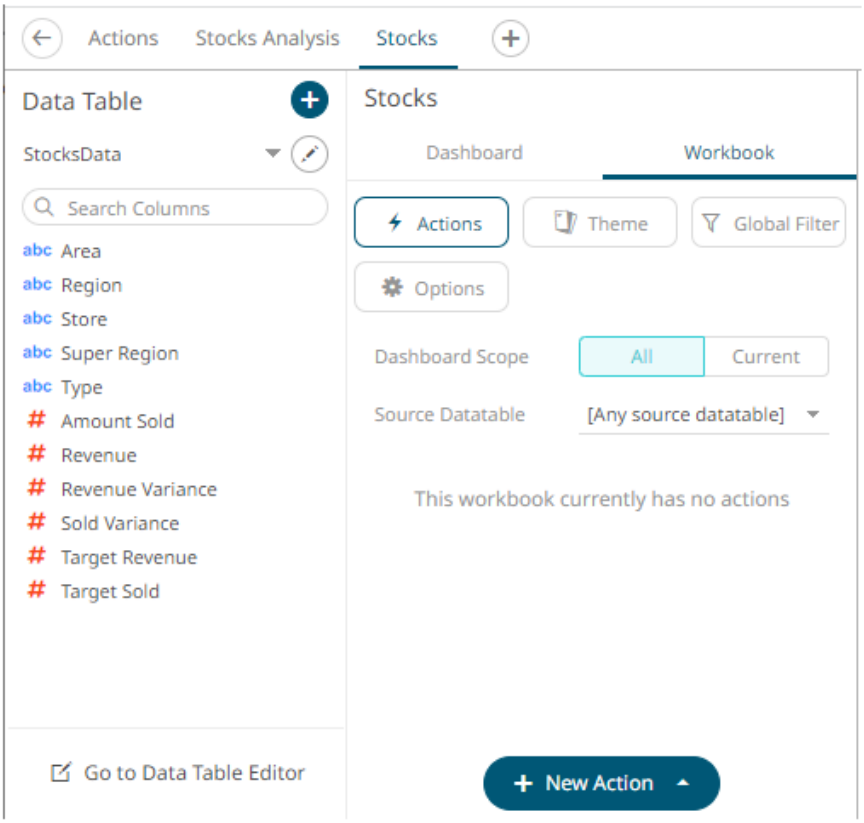
The order of the dashboards in a workbook can be rearranged.

Steps:

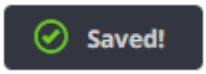
1. Click on a dashboard tab you want to move.

   The icon displays along with the blue marker before or after a dashboard where you can drop the item.
2. Drag and drop the dashboard to the desired position.





3. Click the **Save**  button.

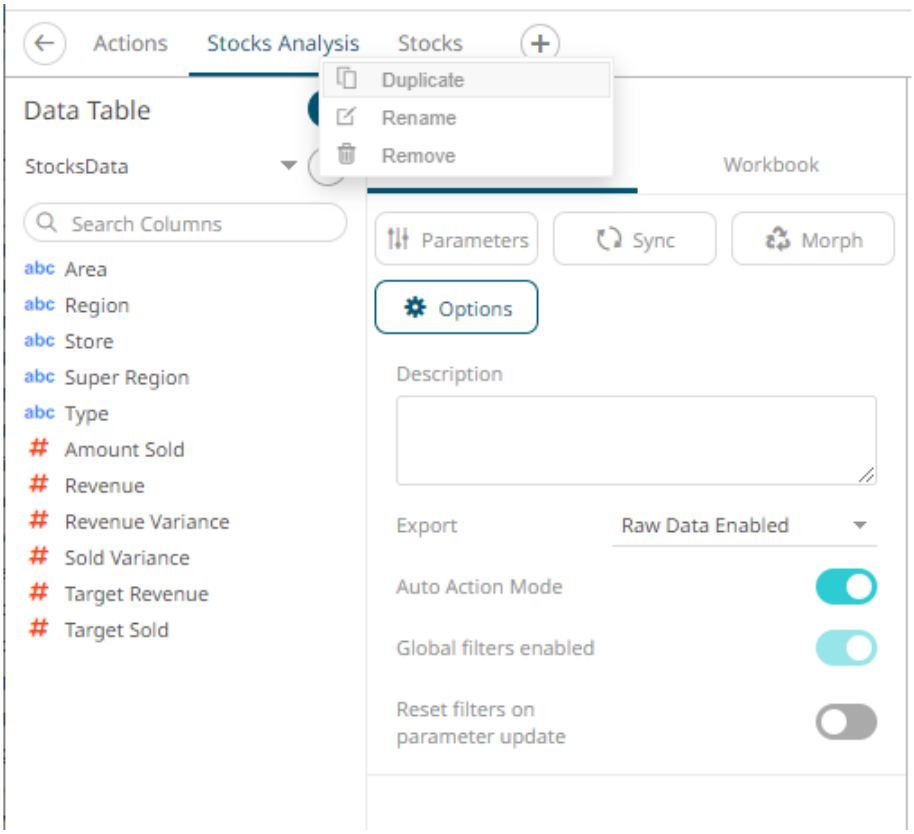
   When saved, the  notification is displayed.

Making a Duplicate of a Dashboard

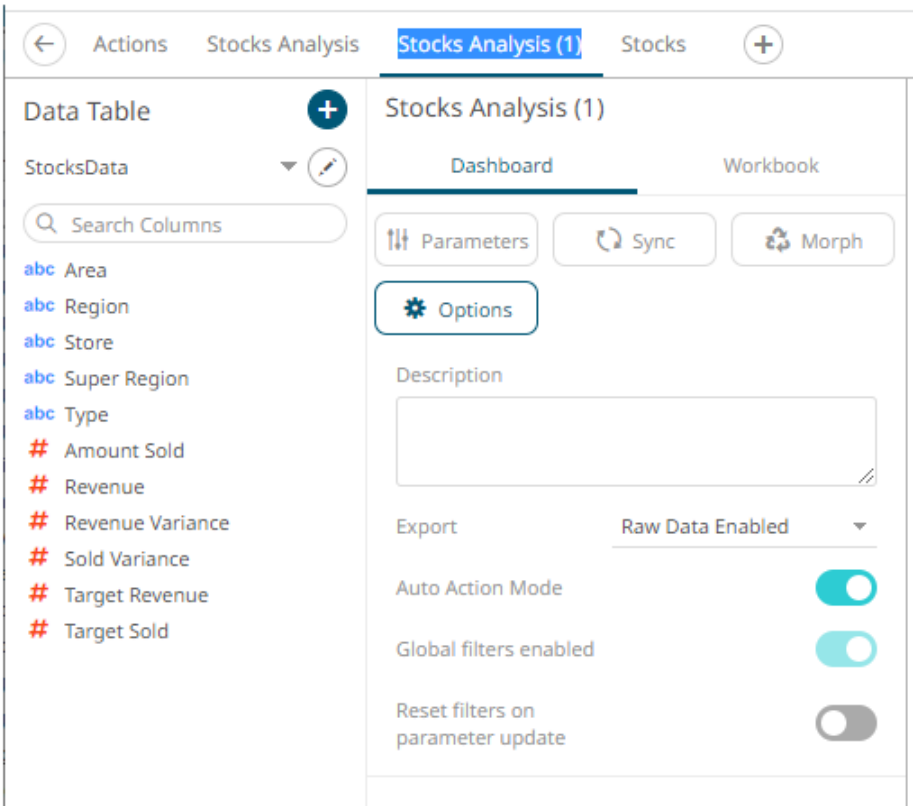
Make a copy of a dashboard and modify to create a new one.

Steps:

1. Right-click on the dashboard tab and select **Duplicate** on the context menu.

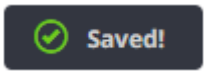


A duplicate of the dashboard is added.



You may opt to rename the dashboard.

2. Click the **Save**  button.

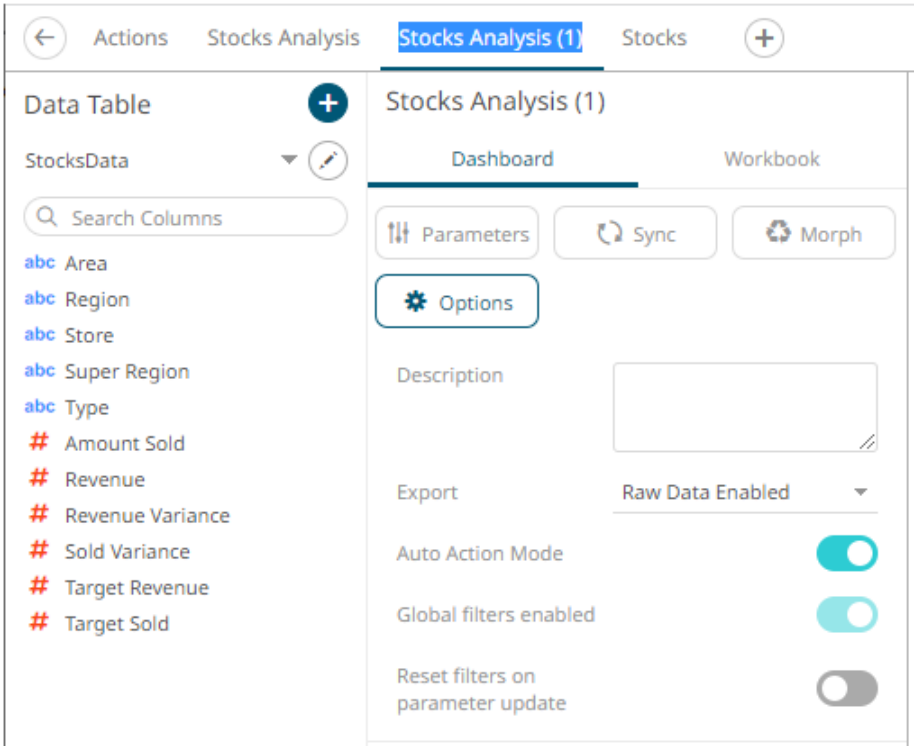
When saved, the  notification is displayed.

Renaming Dashboards

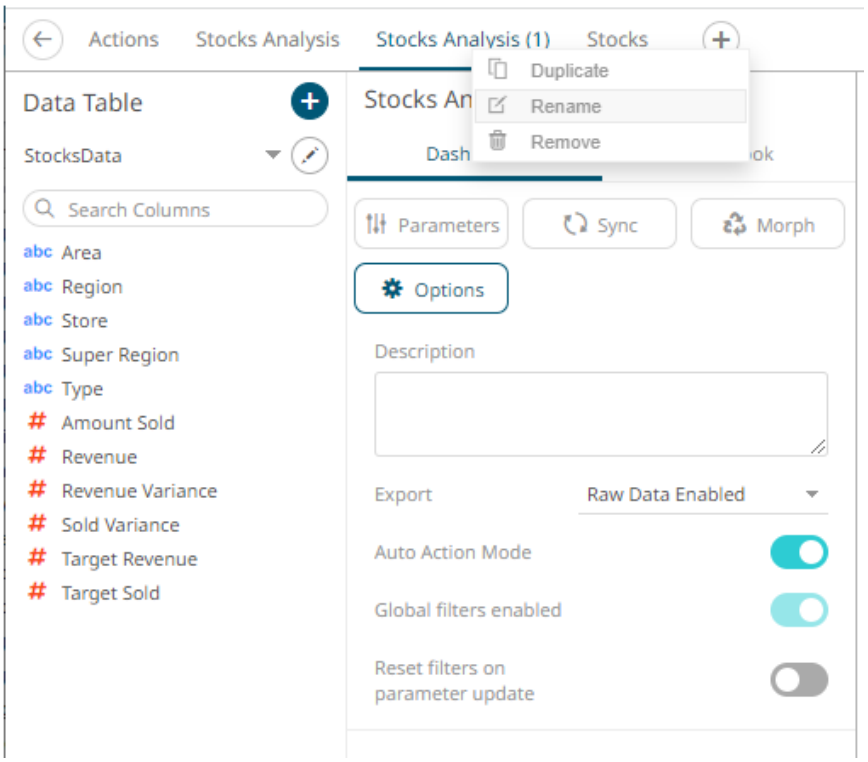
Dashboard names can be modified.

Steps:

1. To rename a dashboard, you can highlight the name either by:
   - double-clicking on the name, or

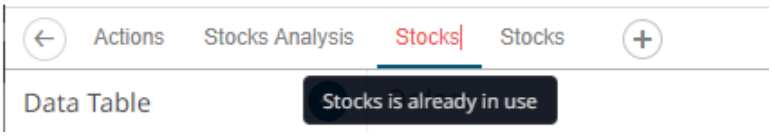


   - right-clicking on the dashboard and selecting **Rename** on the context menu.



2. Enter a unique name and click ✓.

   An error message displays if a dashboard with the same name already exists.



3. Click the **Save** 

icon on the toolbar to save the changes.

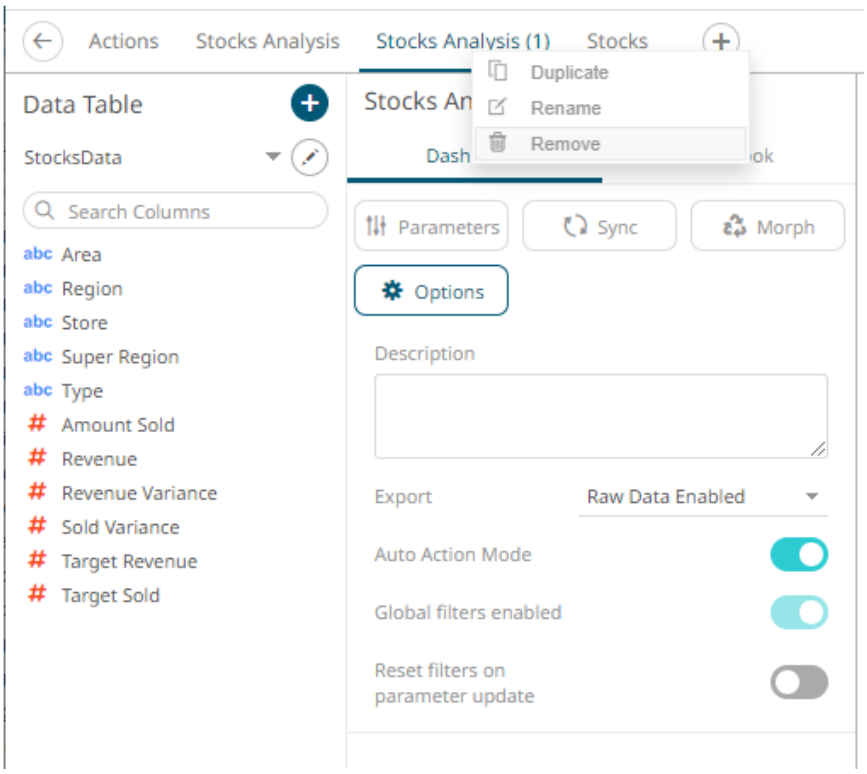
   When saved, the 

notification is displayed.

Deleting Dashboards

Steps:

1. Right-click on the dashboard tab and select **Remove** on the context menu.



The dashboard is deleted.

2. Click the **Save**  icon on the toolbar to save the changes.

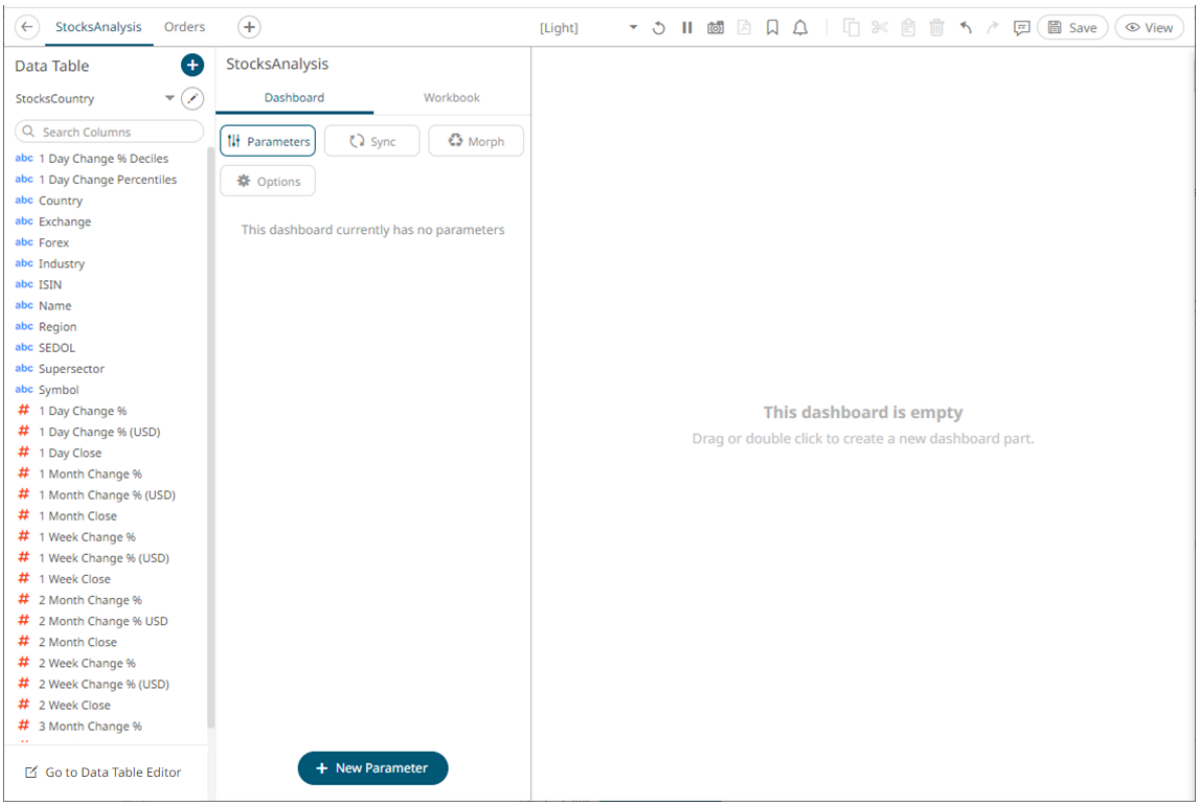
When saved, the  notification is displayed.

Adding Dashboard Parameters

In addition to the parameters of the associated data tables that are used by visualizations and other parts on the dashboard, a Designer user can add new dashboard parameters which can be value sources inside actions and the title of visualizations and parts.

Steps:

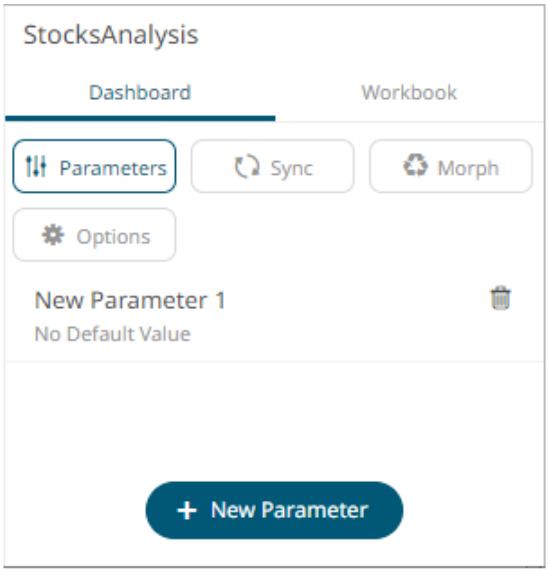
1. On the *Dashboard and Workbook Settings* pane, click the **Dashboard** tab.



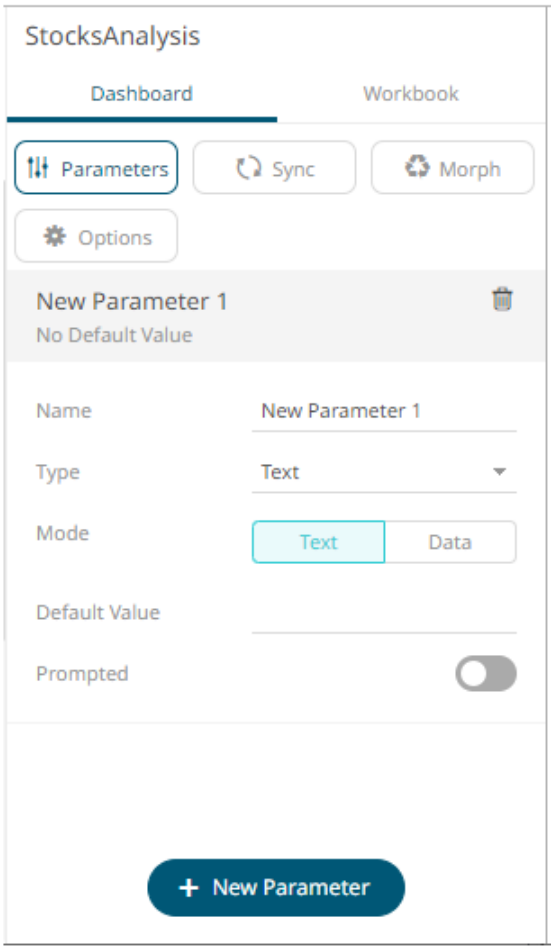
2. Click 

.

   A *New Parameter* instance is displayed.

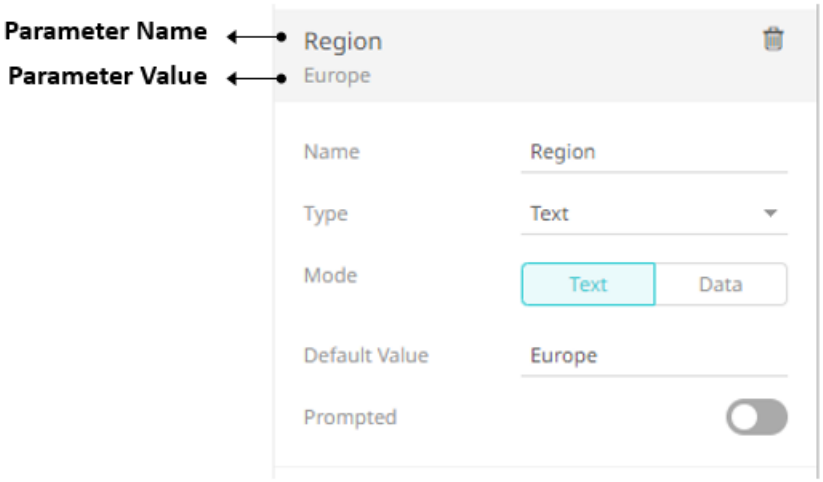


3. Click on this new instance.



4. Enter the *Name* of the parameter then click ✓.
5. Select the data *Type*: **Text**, **Numeric**, or **Time**.
6. Select the *Mode*: **Text** or **Data**

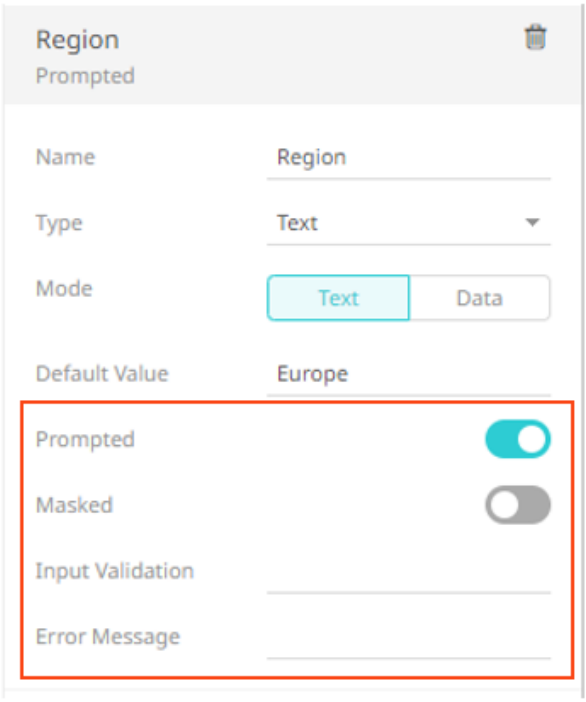
- For the **Text** mode, enter the *Default Value* then click ✓. You can enter several default values, separated by a comma.



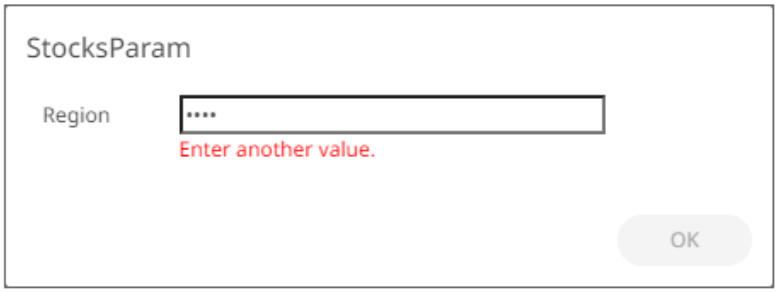
NOTE **For the Time type, the following formats for the default value are accepted:**

- **"yyyy-MM-dd"**
- **"yyyy-MM-ddTHH:mm:ss"**
- **"yyyy-MM-ddTHH:mm:ss.SSS"**

To prompt the parameter input when opening the workbook, tap the **Prompted** slider to turn it on. The dashboard parameter instance changes to allow specification of the following:

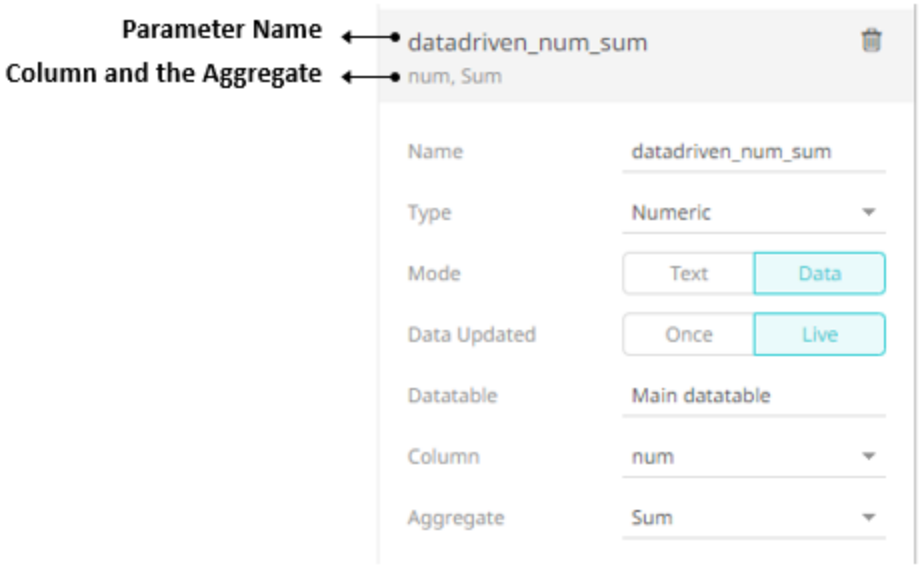


- To encrypt the value upon entry, tap the **Masked** slider to turn it on.
- Add a custom *Input Validation*. This can be any regular expression (e.g., “A-Z{3}”)
- The workbook will not be opened unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., “Enter another value.”)



- For the **Data** mode, the parameter is given a data-driven value either **Once** or **Live.**

  Then select the *Data Table, Column,* and *Aggregate.*

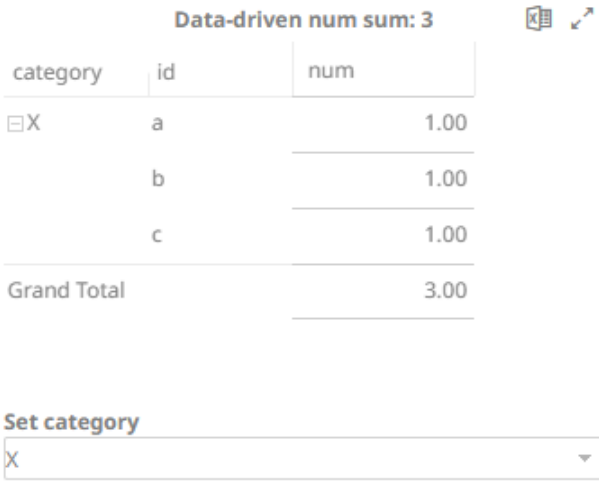


For this sample data table:

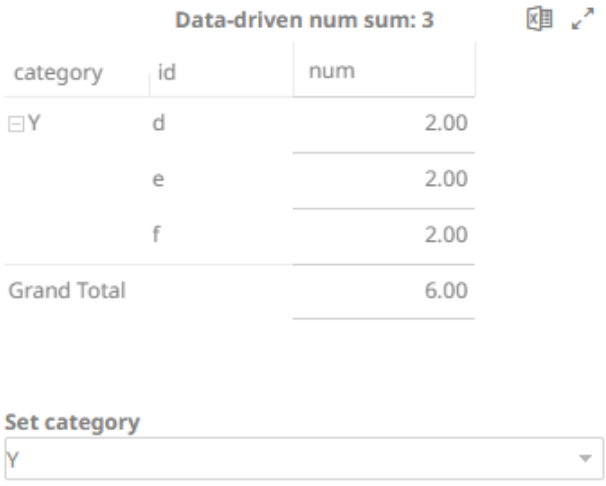
Category	id	num
X	a	1
X	b	1
X	c	1
Y	d	2
Y	e	2
Y	f	2
Z	g	3
Z	h	3
Z	i	3

If **Once** is the selected **Data** mode, the parameter is given a data-driven value once, at workbook startup and open, but it is not repeated when the data table is refreshed.

The first time you open the workbook and **X** is the *category*, the parameter *datadriven_num_sum* is **3**.

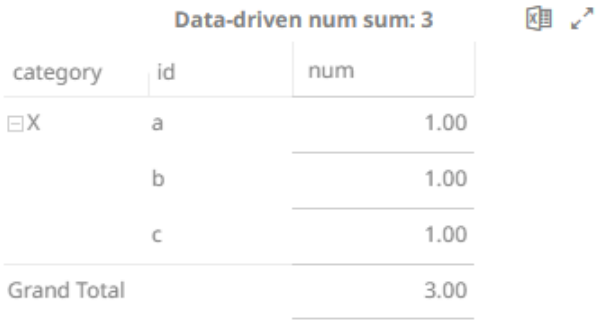


Changing the *category* to **Y**, the parameter *datadriven_num_sum* is still **3**.

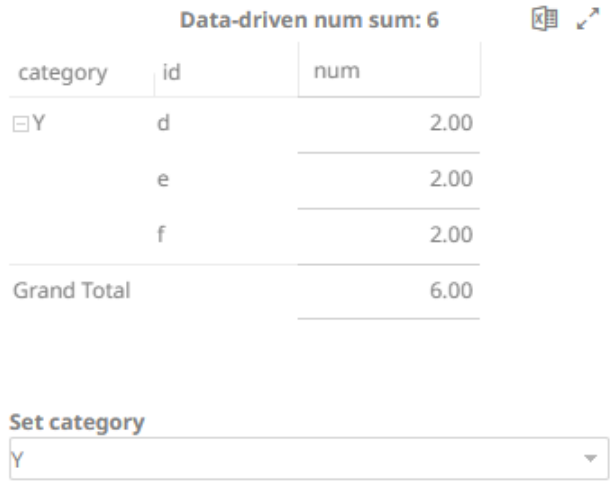


However, if **Live** is the selected **Data** mode, the data-driven parameter is updated “live” and kept in sync with the data value.

The first time you open the workbook and **X** is the *category*, the parameter *datadriven_num_sum* is **3**.



Changing the *category* to **Y**, the parameter *datadriven_num_sum* is updated to **6**.



7. Repeat steps 2 to 6 to add more parameters.
8. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

notification is displayed.

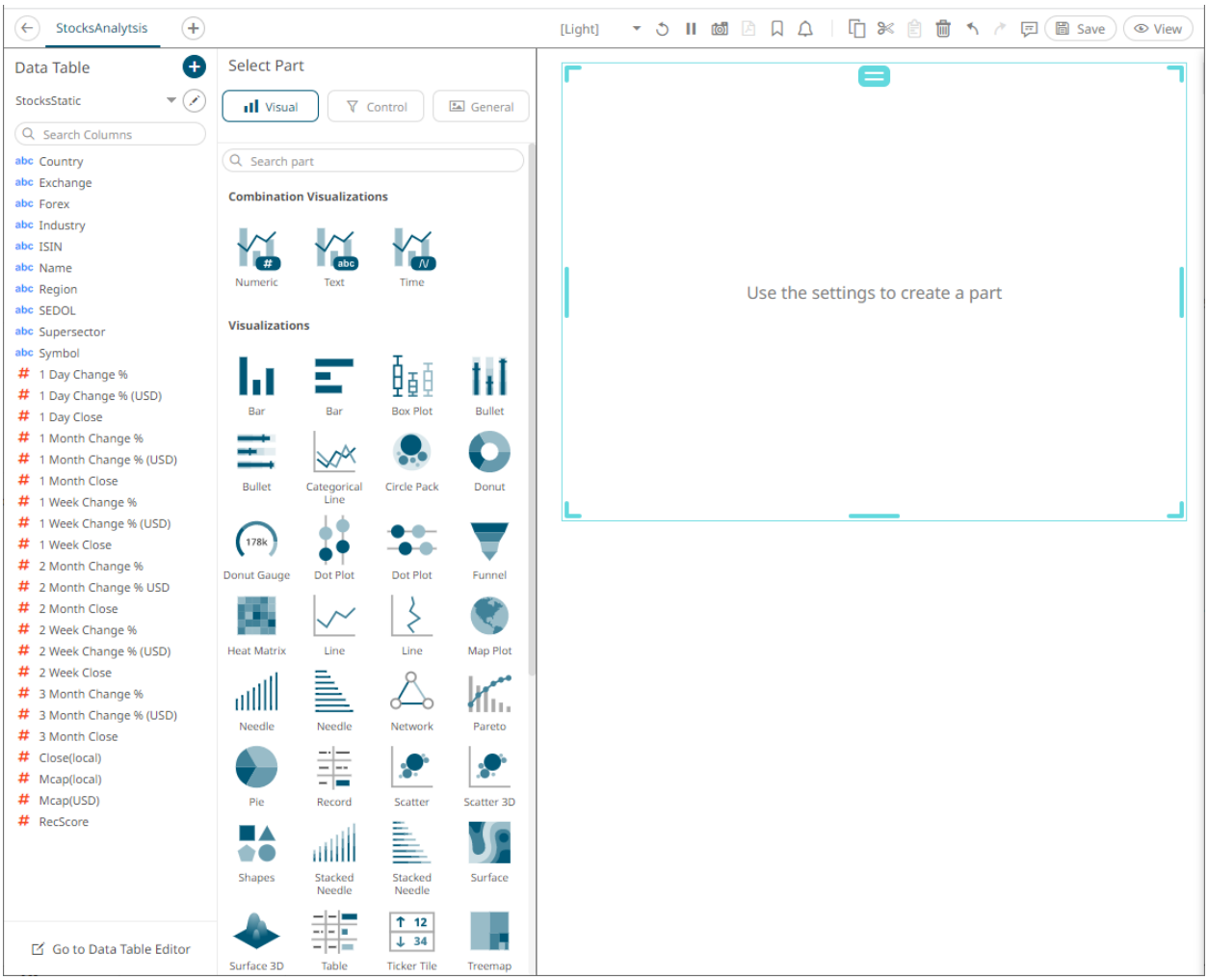
Deleting Dashboard Parameters

To delete a dashboard parameter, click on an instance in the list and then click  .

DASHBOARD DESIGN

Before you can perform the other dashboard settings, you must first add visualizations, controls, or general parts on the dashboard.

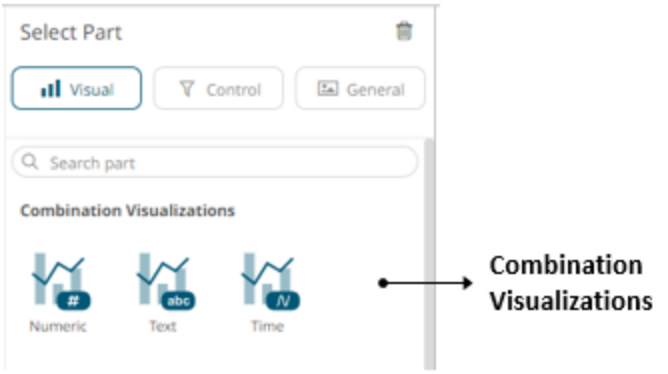
Double-click or draw a rectangle on the dashboard canvas to add these parts, A rectangle shape displays on the dashboard canvas, with an instruction “Use the settings to create a part.” The corresponding definition of the selected part can be done on the *Select Part* pane.



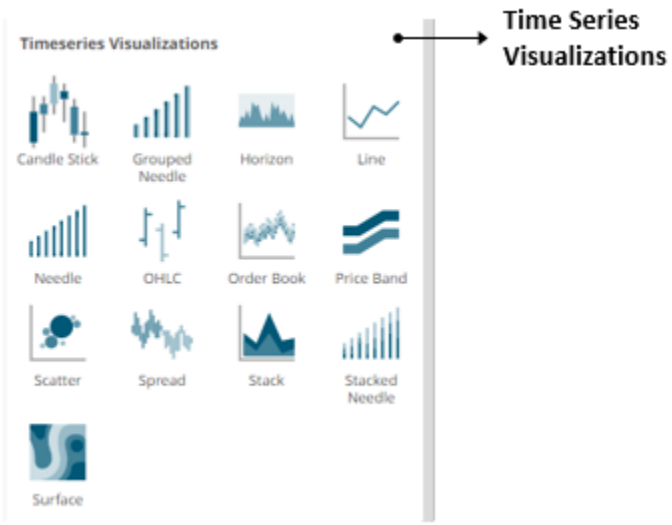
The *Select Part* pane has three tabs to define the settings of the dashboard visualization or part.

- On the **Visual** tab 

:


Select Part
Visual
Control
General
Search part
Combination Visualizations
Numeric
Text
Time
Combination Visualizations

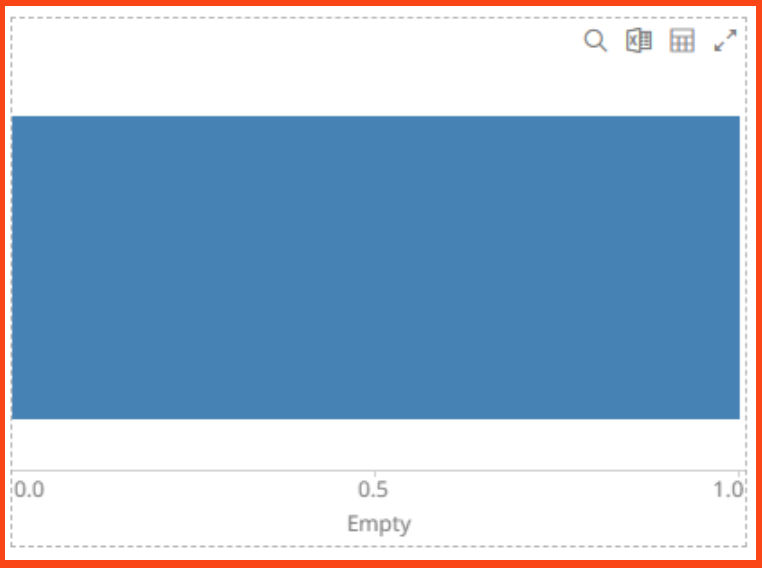

Visualizations
Snapshot Visualizations
Bar
Bar
Box Plot
Bullet
Bullet
Categorical Line
Circle Pack
Donut
178k
Donut Gauge
Dot Plot
Dot Plot
Funnel
Heat Matrix
Line
Line
Map Plot
Needle
Needle
Network
Pareto
Pie
Record
Scatter
Scatter 3D
Shapes
Stacked Needle
Stacked Needle
Surface
Surface 3D
Table
12
34
Ticker Tile
Treemap
Waterfall



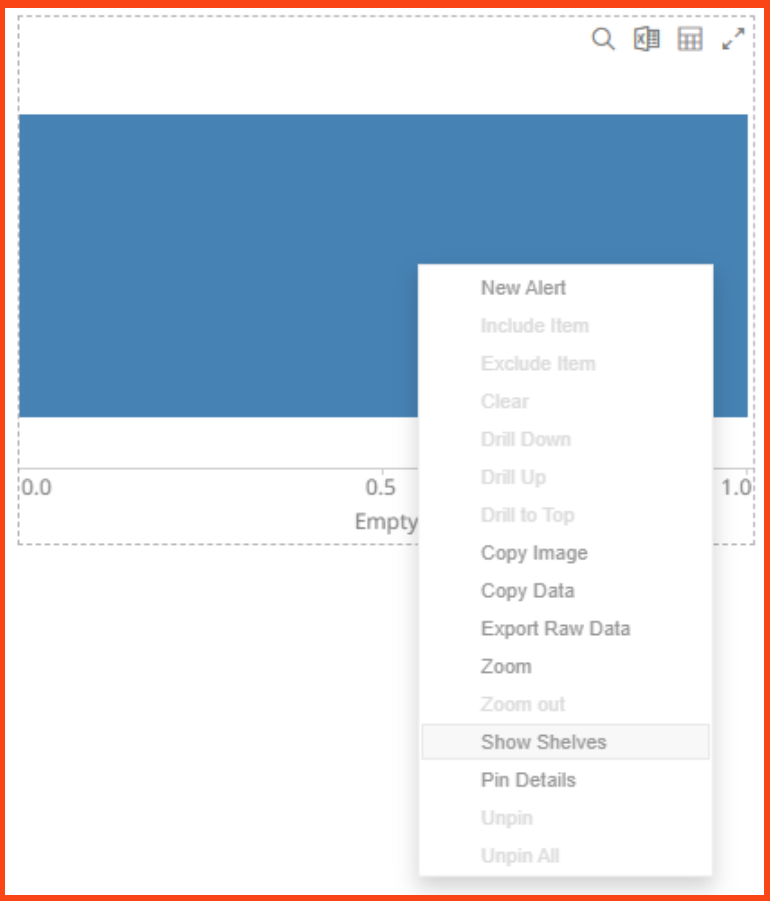
Part	Description
Snapshot Visualizations	Some of the most common use cases for data visualization software require the system to display information about a data set as it exists at a particular point in time. These **snapshot** visualizations are extremely useful for understanding relative quantitative and qualitative measures and enable users to gain a comprehensive understanding of complex data sets very quickly. You must populate visualizations with data columns in order for them to function.
Time series Visualizations	The ability to handle very large quantities of multivariate time series data is an essential element in a complete visual analysis system. Altair Panopticon offers a range of specialized data visualizations, including Horizon Graphs, Stack Graphs, and Line Graphs, designed specifically to make analyzing historical data easier and more efficient. The software's ability to connect to traditional row-oriented relational databases or column-oriented databases is key to supporting fast, responsive multi-dimensional analysis of large data sets. Our time series capabilities are especially important for users in global investment banks, hedge funds, proprietary trading firms, and exchanges.

NOTE

When adding a visualization part, the shelves are turned off by default.



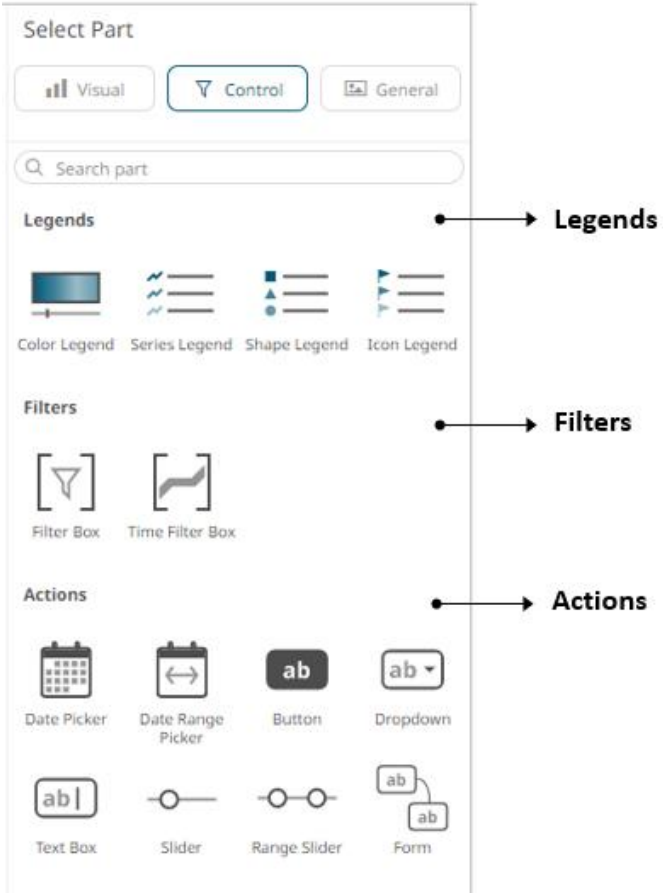
To display the shelves, right-click on the visualization and select Show Shelves on the context menu.



The corresponding shelves of the visualization are displayed (e.g., Columns, Rows, Breakdown).



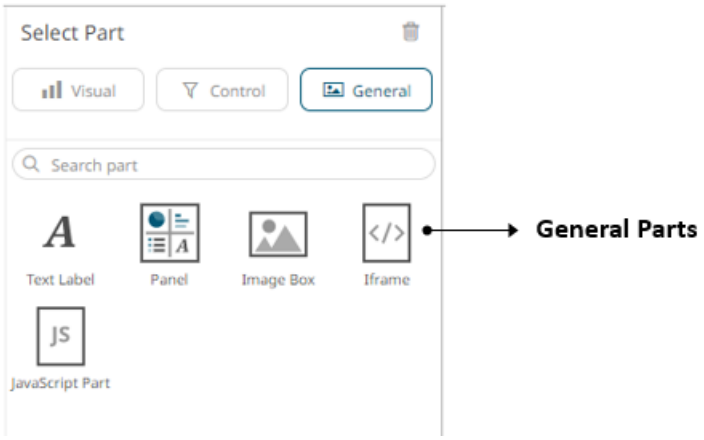
- On the **Control**  tab:



Part	Description
Legends	Link legends to visualizations using drag and drop commands. Four types of legend are supported: Timeseries, Color, Icon, and Shape.
Filters	Filter data in order to highlight outliers, patterns and trends. Filters must be populated with data columns in order for them to function.
Actions	Allow actions to be executed against pre-defined selections and can be used to provide inputs to filtered data sets.

- On the **General** 

tab:



Part	Description
Text Label	These can be completely independent of your data. Add labels and explanatory text to help users better understands how to use a dashboard using text boxes. Or link them up to a data column for dynamic displays.
Relative Layout Pane	Allows resizing of the visualizations in a dashboard.
Iframe	Allows a web page to be displayed within a dashboard or page.
Image Box	These are also independent of your data. Add logos or other graphics to your dashboards using Image Boxes.
JavaScript Part	Allows the designer of a workbook to include a bespoke JavaScript code inside a dashboard.

Once you have items from the *Select Part* pane on the dashboard canvas, you can move them around, resize or remove them.

Maximizing Visualizations

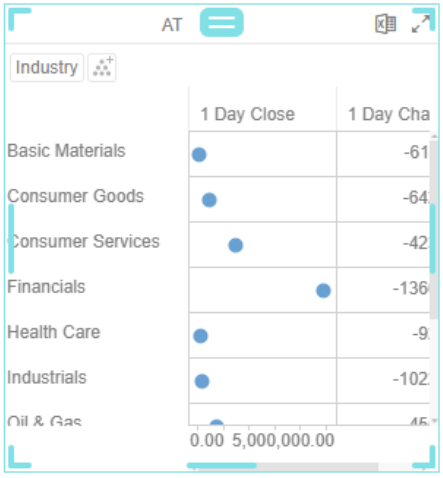
Each visualization includes a **Maximize** icon at the top right of the control.

Clicking on this icon causes the dashboard visualization or part to be maximized, and the icon changes from to .

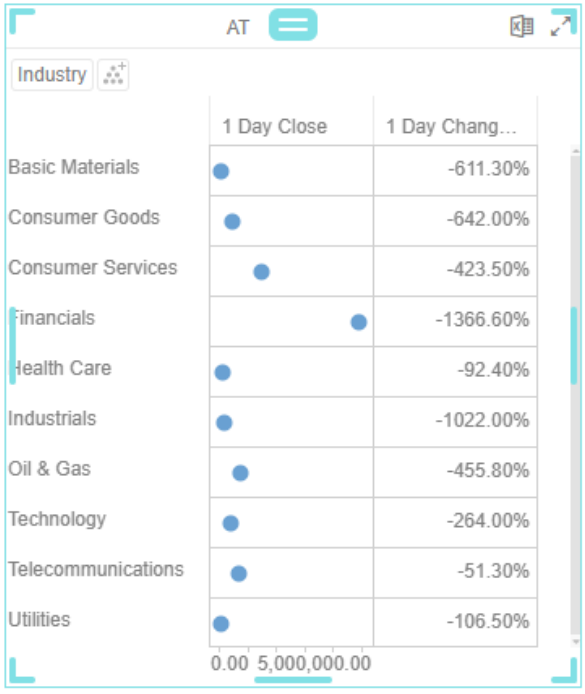
Resizing Visualizations or Parts

Steps:

1. Click on a visualization or part. The border is highlighted.



2. Click on one of the corners and drag to the required size.

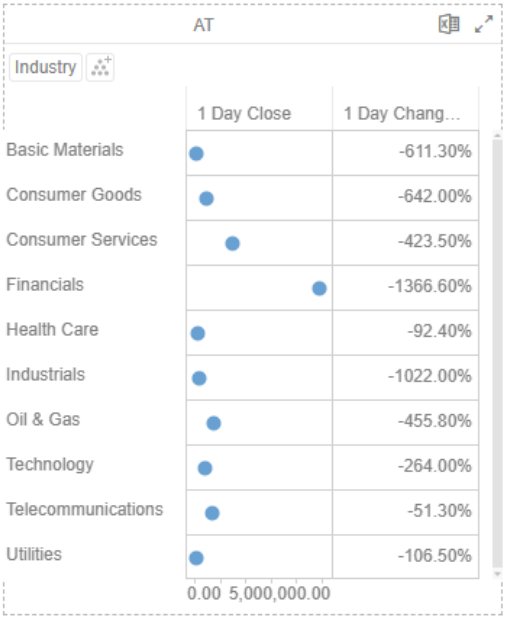


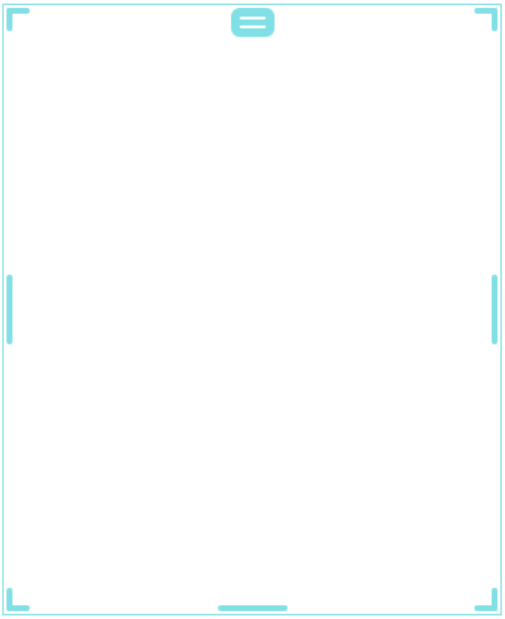
Moving Visualizations or Parts

Steps:

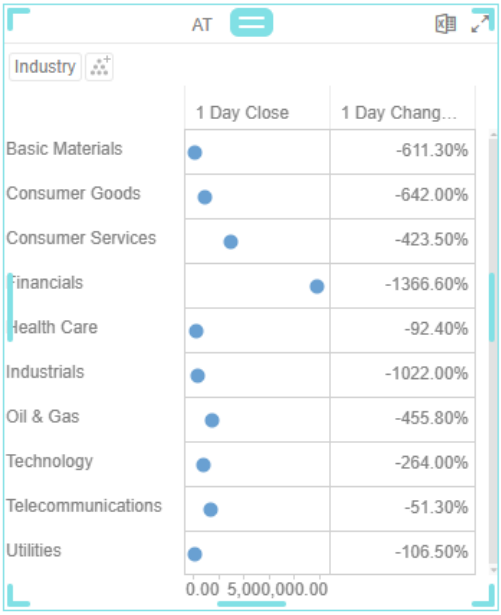
1. Click on a visualization or part. The border is highlighted.
2. Hover on the top middle button. The mouse pointer changes to  .
3. Move the visualization to the new location.

   Note that initially, only the border is moved.





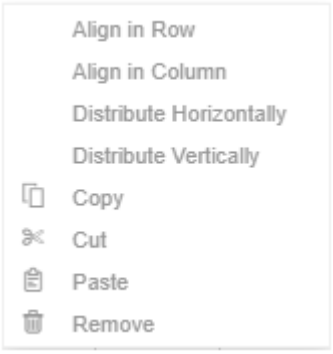
4. Release the mouse.



DASHBOARD PART TOOLBAR AND CONTEXT MENU

Aligning, distributing, copying, pasting, and removing selected dashboard parts can be done on the:

- Context menu



- Toolbar



The toolbar options include:

Toolbar Option	Description	Windows Keyboard Shortcut
Copy	Copy one or several selected dashboard parts.	**Ctrl + C**
Cut	Cut one or several selected dashboard parts.	**Ctrl + X**
Paste	Paste one or several selected dashboard parts.	**Ctrl + V**
Remove	Delete one or several selected dashboard parts.	
Undo	Undo the activity done on the workbook.	**Ctrl + Z**
Redo	Redo the activity done on the workbook.	**Ctrl + Y**

You may also opt to use the Windows keyboard shortcut options.

Additional options in the context menu include:

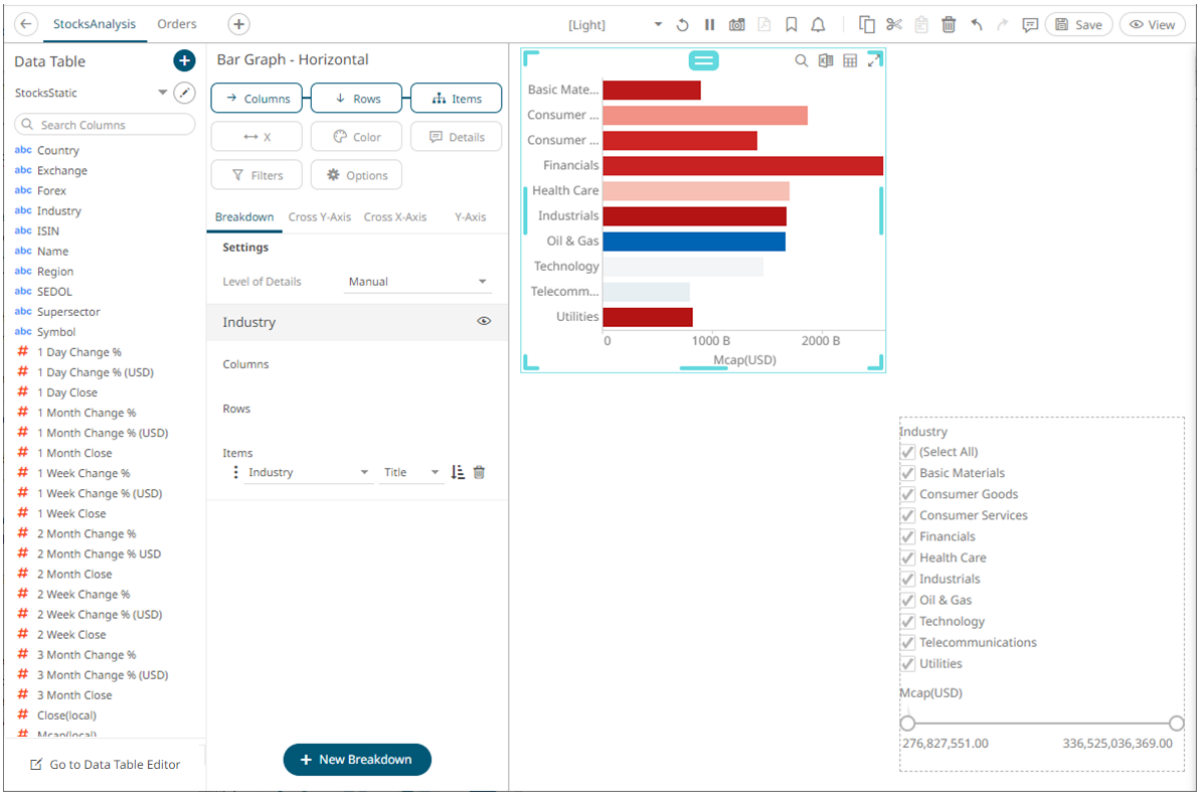
Context Menu Option	Description
Align in Row	Align selected dashboard parts in a row.
Align in Column	Align selected dashboard parts in a column.
Distribute Horizontally	Adjust the size of selected dashboard parts to be distributed horizontally in the dashboard.
Distribute Vertically	Adjust the size of selected dashboard parts to be distributed vertically in the dashboard.

Cutting or Copying Selected Dashboard Part

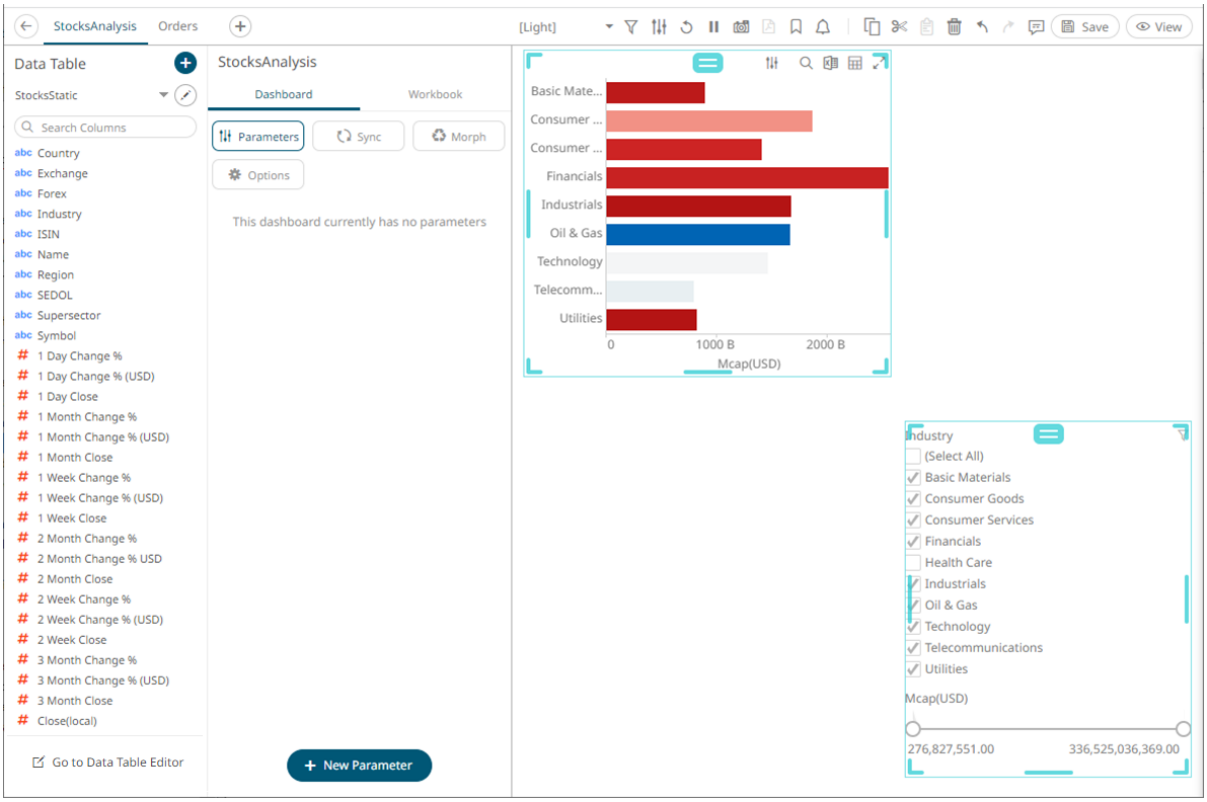
Copy or cut one or more selected parts that can be pasted in the dashboards of the workbook.

Steps:

1. Click on a visualization or part to be copied. The border is highlighted.

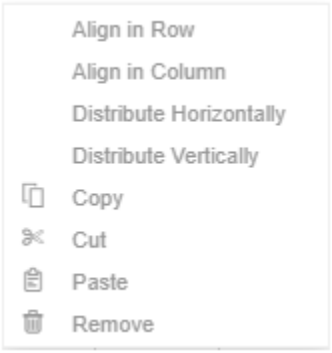


   To copy or cut several parts, click one and then use the **Ctrl** key to select more. The border of the selected parts are highlighted.



2. To copy or cut, you can either:

   - click **Cut** or **Copy** on the toolbar, or
   - click **Copy** or **Cut** on the context menu.

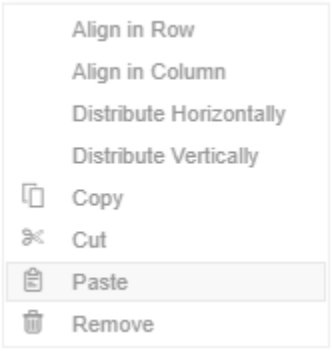


   The **Paste** icon is enabled.

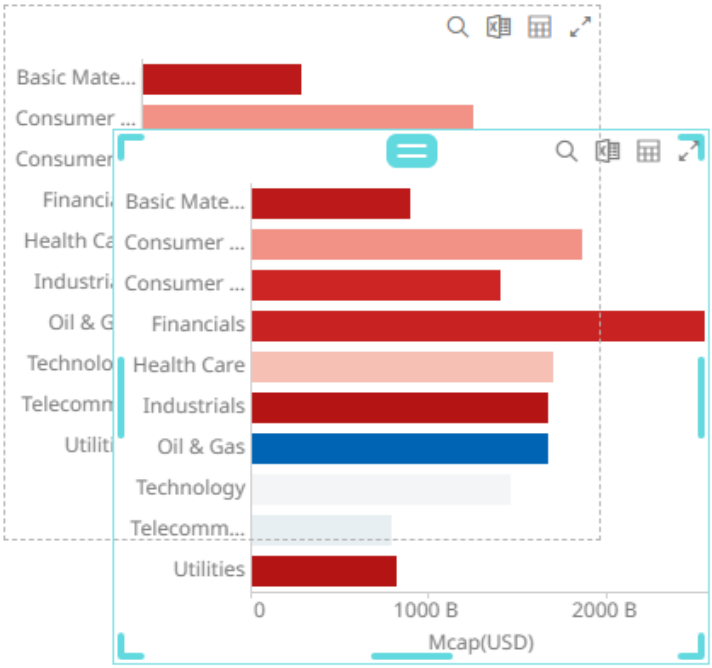
Pasting Selected Dashboard Part

After copying or cutting one or more dashboard parts, you can either:

- click **Paste** on the toolbar, or
- click **Paste** on the context menu.



If you initially chose to copy, a duplicate of the dashboard part is displayed.



You can opt to move the original or duplicate to the desired location of the dashboard or paste to other dashboards in the workbook.

Deleting Selected Dashboard Part

Delete any unwanted dashboard part.

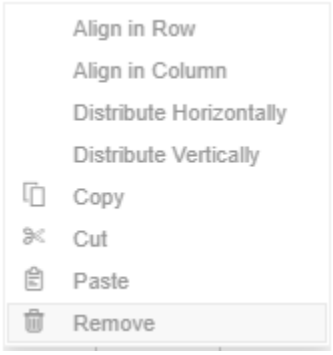
Steps:

1. Click on a visualization or part to be deleted. The border is highlighted.

   To delete several parts, click one and then use the **Ctrl** key to select more. The border of the selected parts are highlighted.

2. To delete, you can:

   - click the **Remove** icon on the toolbar,
   - click **Remove** on the context menu, or



   - click **Delete** on the keyboard.

Undo or Redo

Click the **Undo** toolbar icon



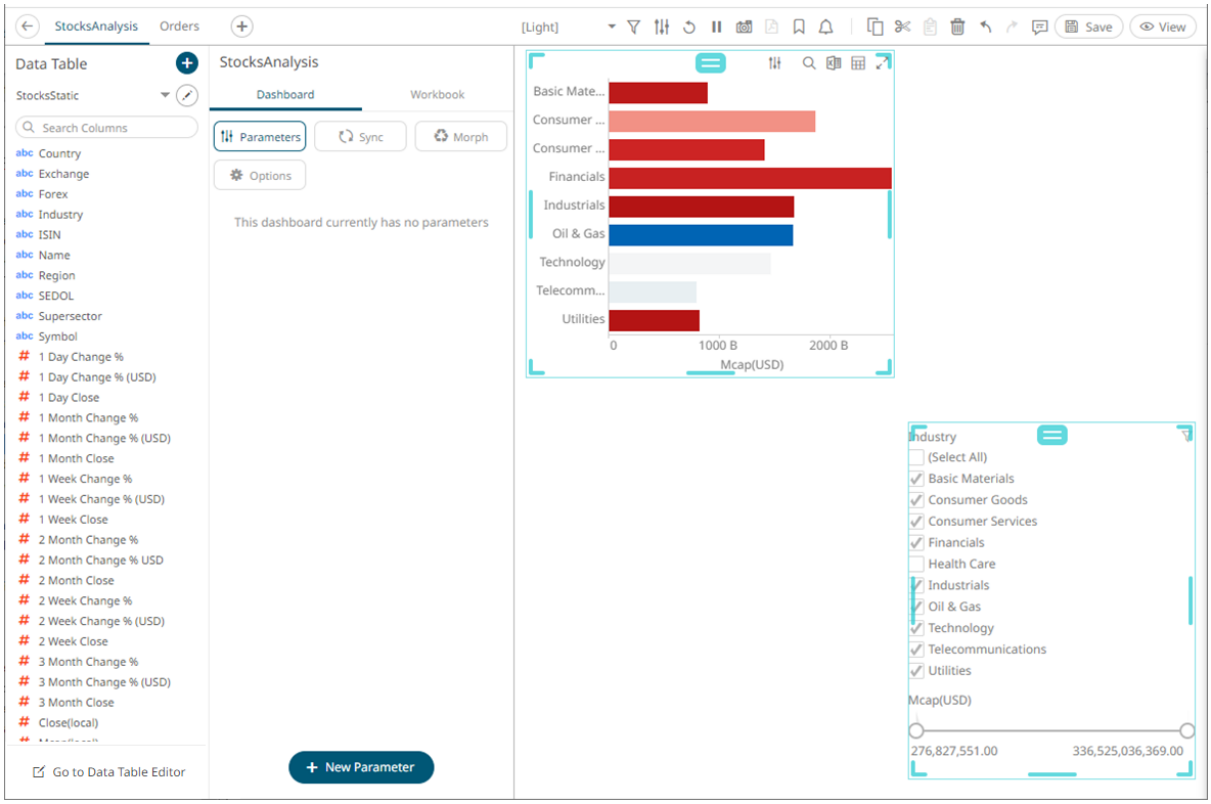
Once you have clicked undo, the **Redo** toolbar icon is enabled, allowing you to reverse the undo.

Aligning or Distributing Dashboard Parts

Selected dashboard parts can be automatically aligned (by row or column) or distributed (horizontally or vertically).

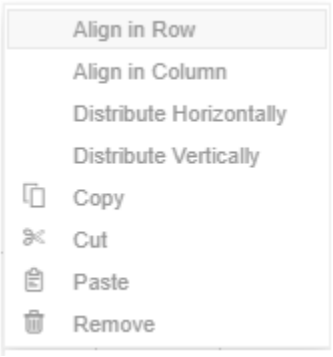
Steps:

1. Click a dashboard part then use then use the **Ctrl** key to select more. The selected dashboard parts are highlighted.

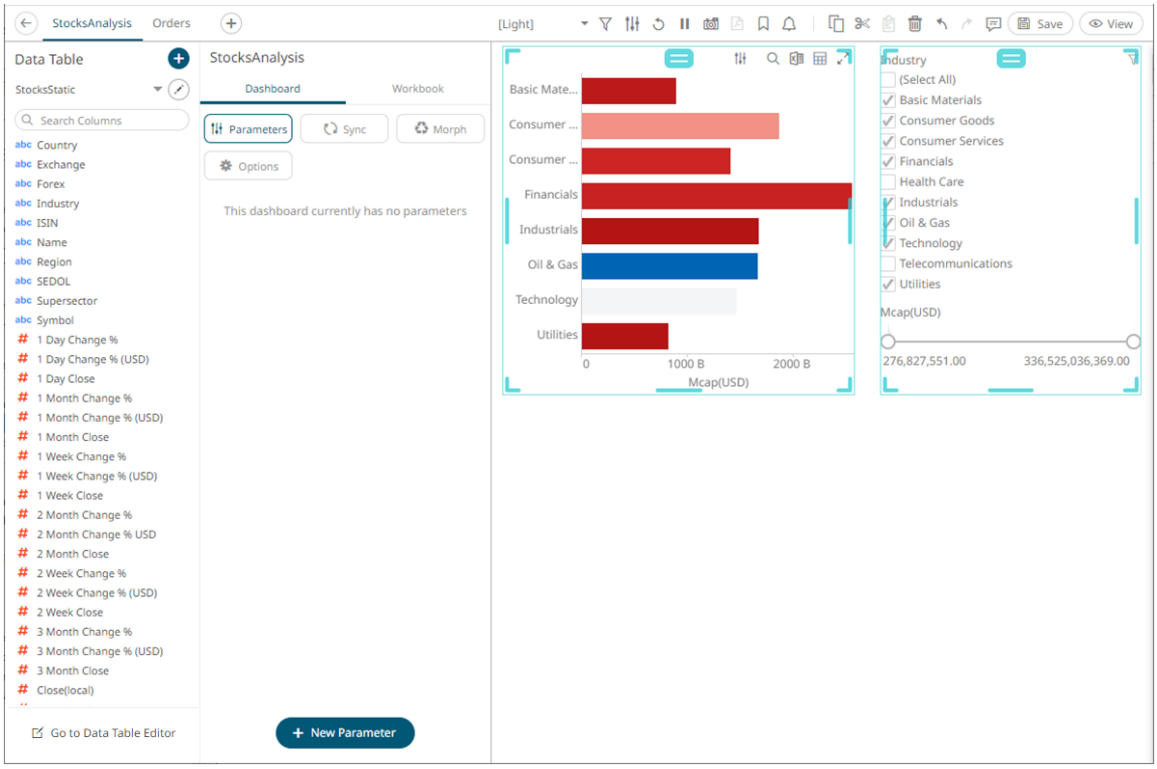


2. Right-click on any of the selected dashboard and click any of these options:

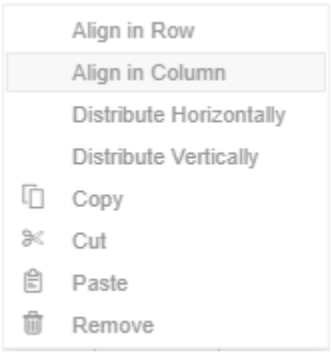
   - Align in Row



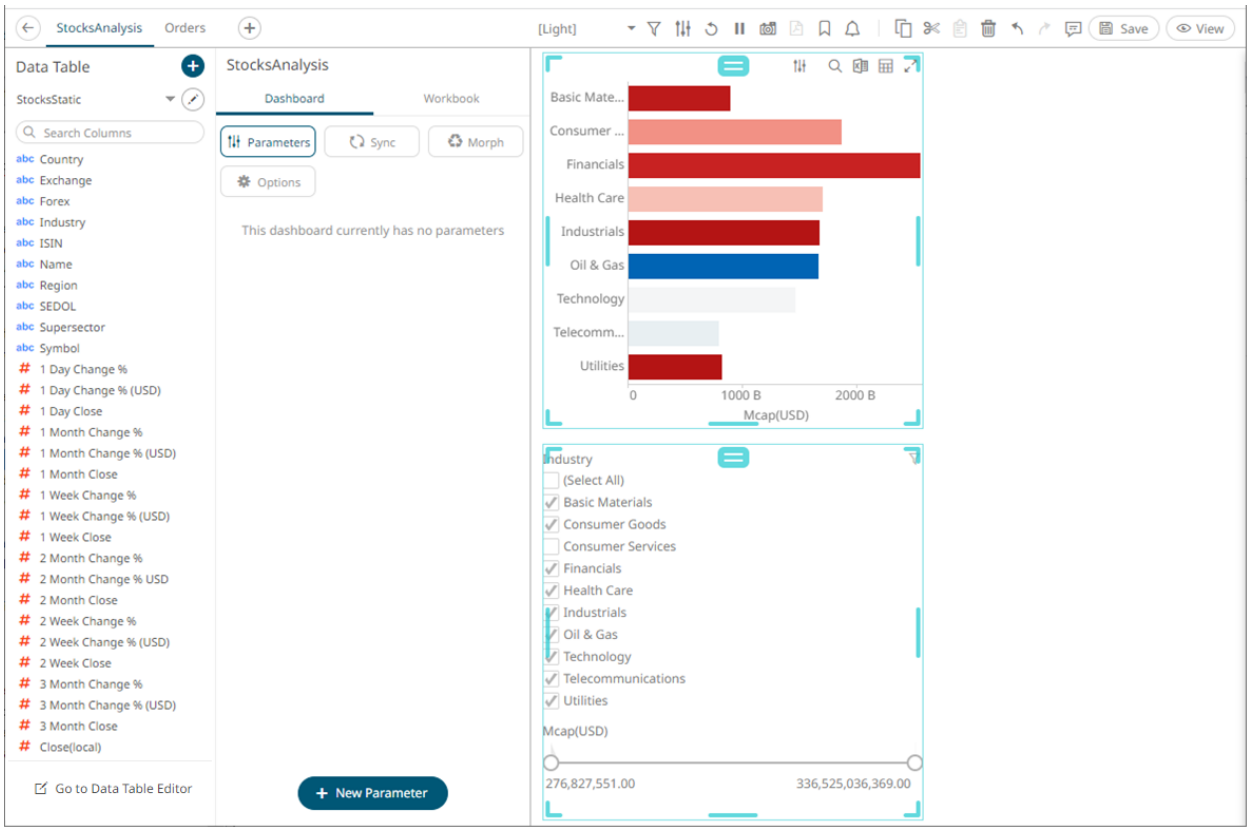
The selected dashboard parts are aligned in a row based on the part where you clicked the **Align in Row**.



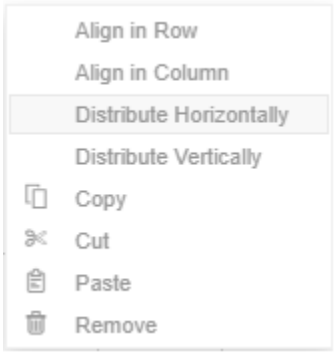
- Align in Column



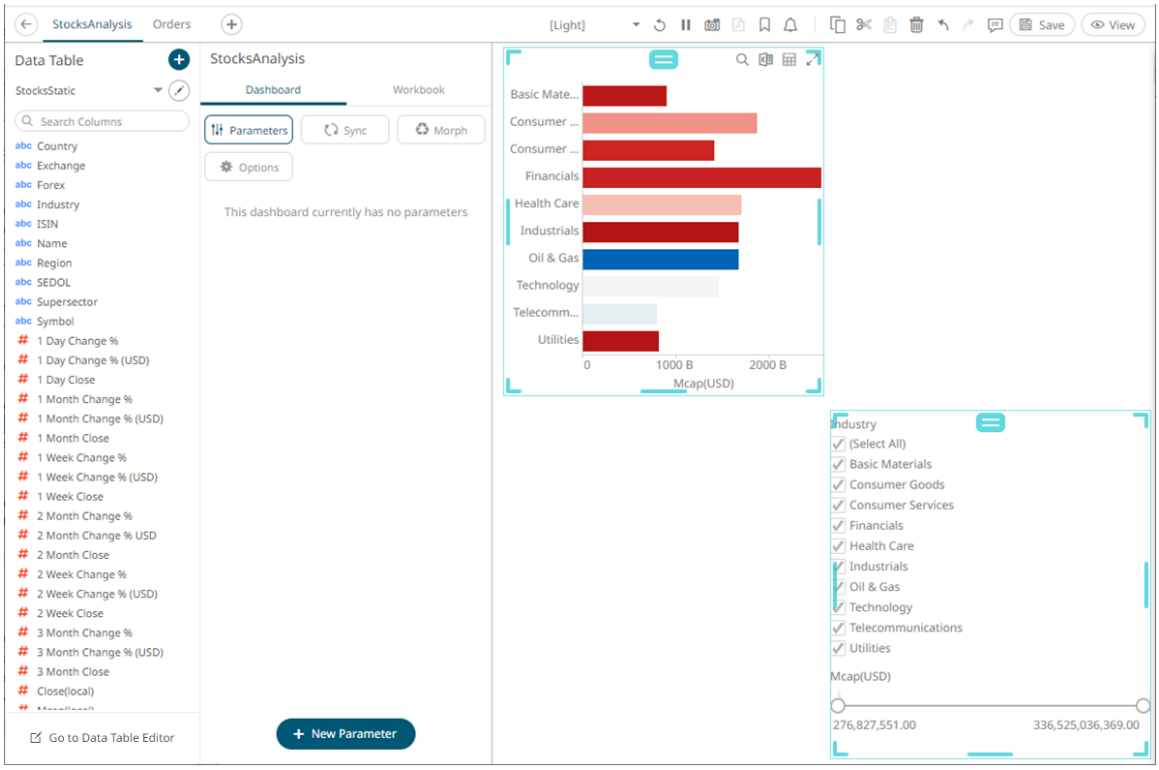
The selected dashboard parts are aligned in a column based on the part where you clicked the **Align in Column**.



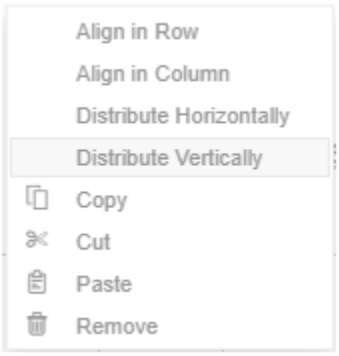
- Distribute Horizontally



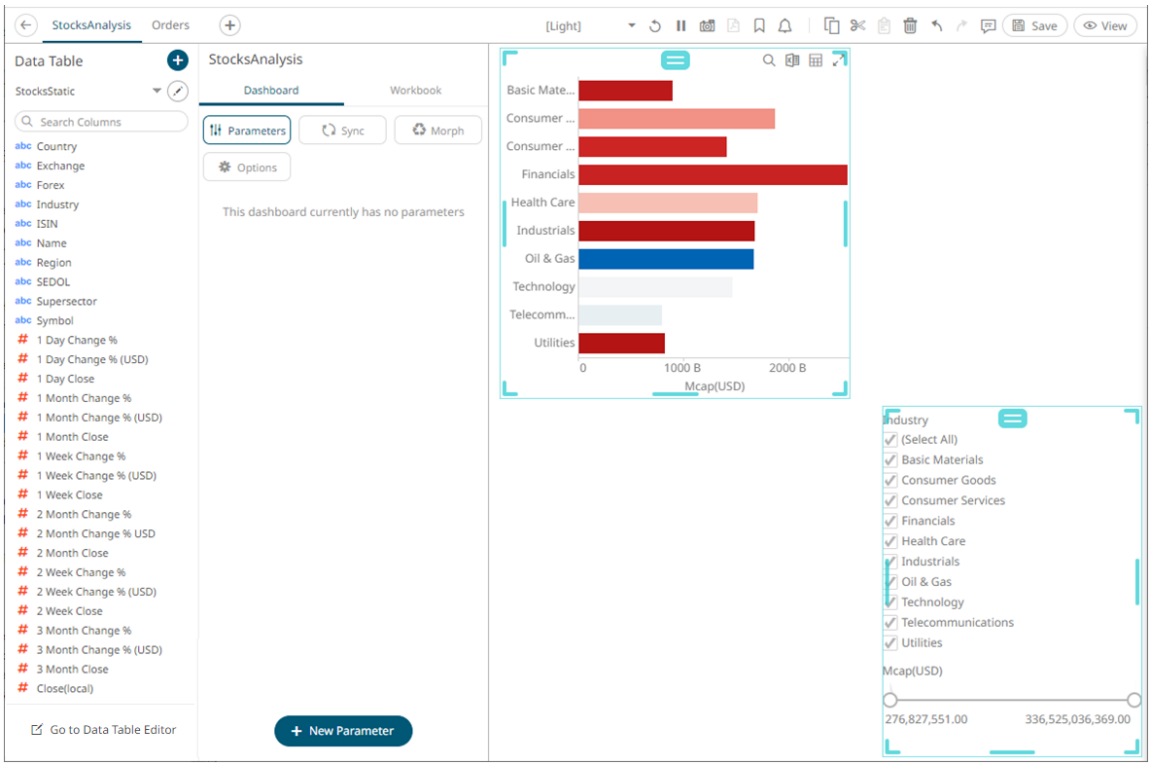
Adjusts the size of dashboard parts to be distributed horizontally in the dashboard. You can then opt to align in row or column.



- Distribute Vertically



Adjusts the size of dashboard parts to be distributed vertically in the dashboard. You can then opt to align in row or column.


StocksAnalysis
Orders
[Light]
Save
View
Data Table
StocksStatic
Search Columns
Country
Exchange
Forex
Industry
ISIN
Name
Region
SEDOL
Supersector
Symbol
1 Day Change %
1 Day Change % (USD)
1 Day Close
1 Month Change %
1 Month Change % (USD)
1 Month Close
1 Week Change %
1 Week Change % (USD)
1 Week Close
2 Month Change %
2 Month Change % USD
2 Month Close
2 Week Change %
2 Week Change % (USD)
2 Week Close
3 Month Change %
3 Month Change % (USD)
3 Month Close
Close(local)
Go to Data Table Editor
StocksAnalysis
Dashboard
Workbook
Parameters
Sync
Morph
Options
This dashboard currently has no parameters
New Parameter
Basic Mate...
Consumer ...
Consumer ...
Financials
Health Care
Industrials
Oil & Gas
Technology
Telecomm...
Utilities
0
1000 B
2000 B
Mcap(USD)
Industry
(Select All)
Basic Materials
Consumer Goods
Consumer Services
Financials
Health Care
Industrials
Oil & Gas
Technology
Telecommunications
Utilities
Mcap(USD)
276,827,551.00
336,525,036,369.00

PANOPTICON VISUALIZATIONS

Panopticon supports a wide range of information visualizations that are designed for fast comprehension and easy interpretation of static, time series, real time streaming, and historic data sets.

As no visualization is ideal for every purpose, the appropriate visualization for the analytical task at hand must be used. Here are some general recommendations:

Analytical Task	Recommended Visualization
Read numeric values quickly	Table / Pivot Table
Performance against a KPI	Bullet Graph, Tile, Ticker Tile, Donut Gauge
Performance across a single variable for a small number of data elements, with different magnitudes	Bar Graph, Tile, Ticker Tile
Performance across a single variable for a small number of data elements, each with similar magnitudes	Dot Plot
Performance across a single variable for a large number of data items	Heat Map
Performance across a single variable for a large number of data items, which have different importance values	Treemap, Circle Pack
Performance across a hierarchical or grouped dataset	Treemap, Circle Pack
Correlation between two categories of data	Heat Matrix, Network Graph
Relationships between categories of data	Network Graph
Correlation between two or more numeric data columns	Scatter Plot
Geographic correlations of data	Map Plot Geographic Scatter Plot
Correlation over both a single numeric data column and various categories of data	Dot Plot
Trending performance across ordered categories	Dot Plot
Trending performance between two numeric variables	Numeric Line Graph
Trending performance between three numeric variables	Surface Plot (& 3D)
Trending performance across time	Line Graph
Time based Ranking	Line Graph with Ranking Axis
Time Based Contributions	Stack Graph
Time Based Correlations between time series	Horizon Graph
Time Based Transactions	Needle Graph
Financial Time Series Distributions	Candle Stick or OHLC Graph
Auction Price & Interest/Volume Distribution	Numeric Needle Graph
Geospatial Area Densities	Shapes
Spread between two time series	Spread Graph
Read numeric values quickly	Table / Pivot Table

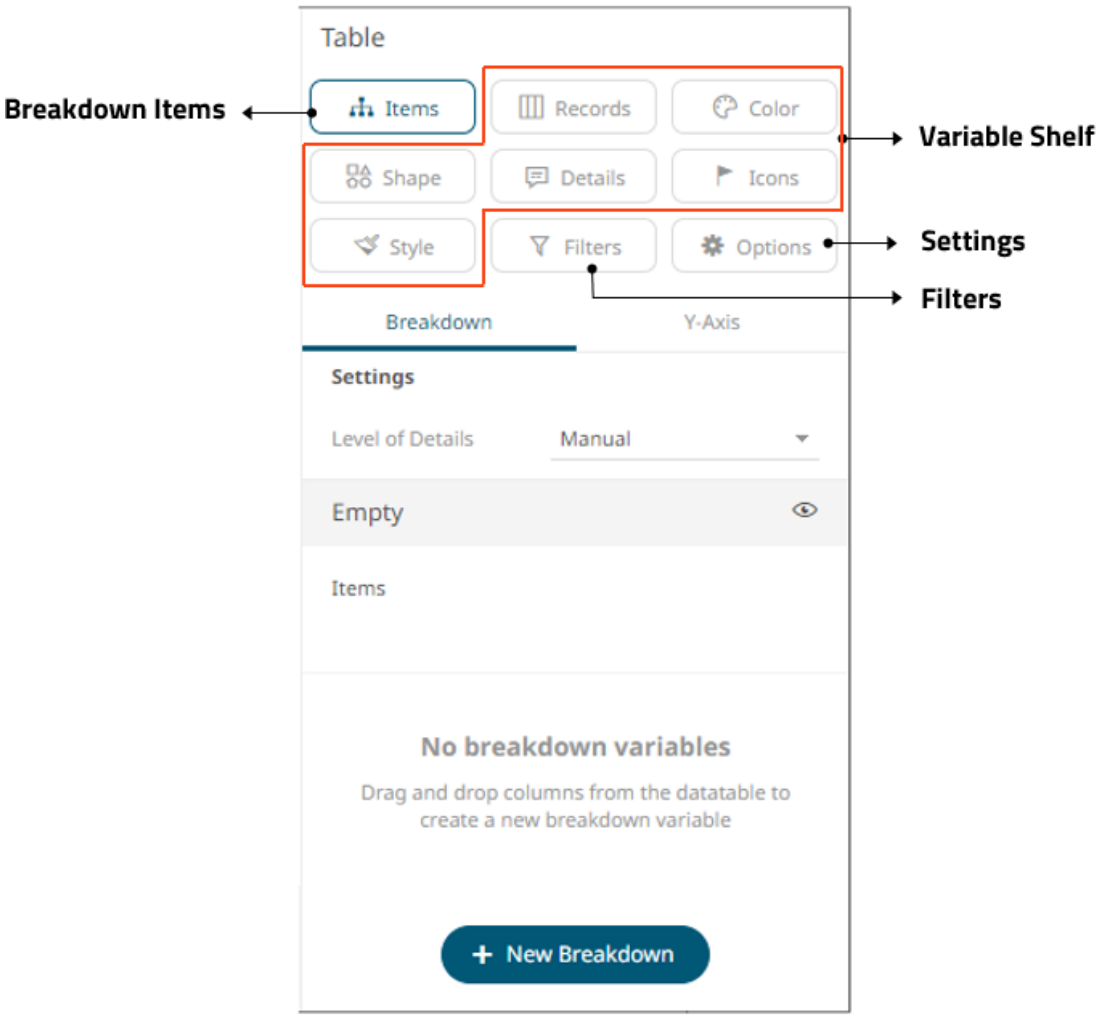
Performance against a KPI	Bullet Graph, Tile, Ticker Tile, Donut Gauge

For more information on these visualizations, refer to the Altair Visualizations document.

Adding Visualizations to the Dashboards

After double-clicking or drawing a rectangle on the dashboard canvas, click on a visualization that you want to add from the *Select Part* pane.

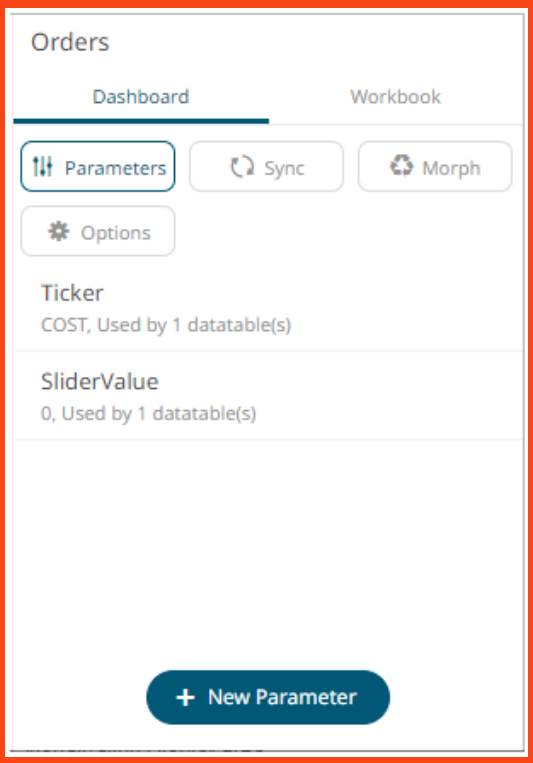
The properties and components of the selected visualization are displayed. For example, here are the properties for the Table visualization:



Each visualization consists of five components:

- Settings section
- Breakdown Items
- Variable Shelf
- Filters
- Visualization Display Area

NOTE **Adding a visualization on the dashboard displays the available parameters of the associated data table on the Dashboard tab. This means the associated data table expects these parameter values to exist on the dashboard. For example:**



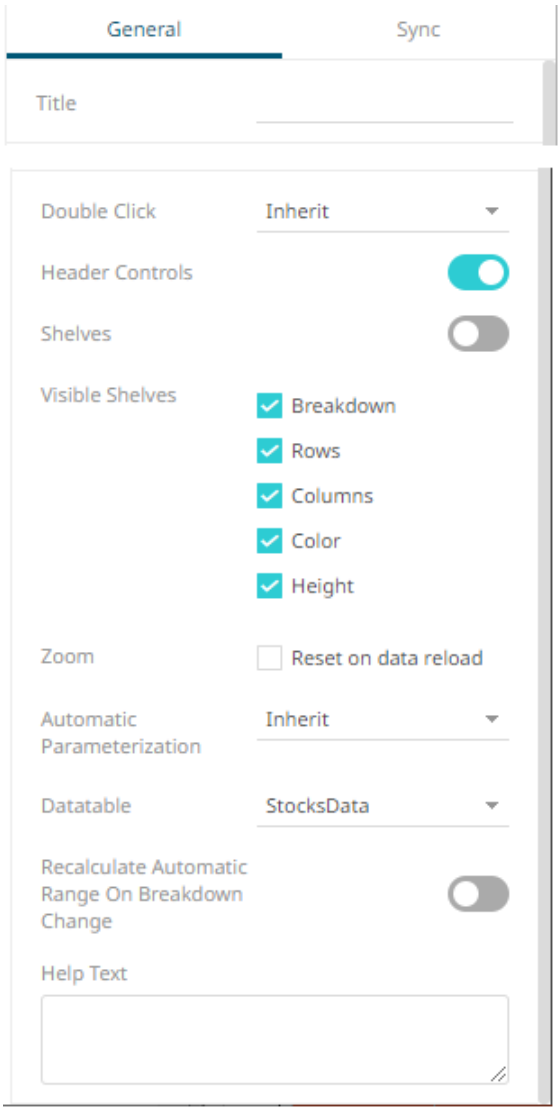
Each component is discussed in detail below.

VISUALIZATION GENERAL SETTINGS

Clicking on a visualization displays the *Visualization Settings* pane which are specific to its capabilities and functions. The settings are grouped into the following sections: Breakdown, Axes, Variables, Filters, Options (General and Sync).

General

All of the visualizations have these general settings:



Property	Description
Title	Title of the visualization.
Double click mode	Sets the behavior to be performed when double-clicking on a visualization value.
Header Controls	Tap the slider to display the header controls such as Export Excel, Toggle Display Mode, Maximize, Rubber Band Zoom, and Rubber Band Selection options.
Shelves	Tap the slider to display the *Shelf Variable* and *Breakdown.*
Zoom	Enable to reset the zoom on data reload.
Visible Shelves	Check the boxes of the shelves that will be displayed in the visualization.

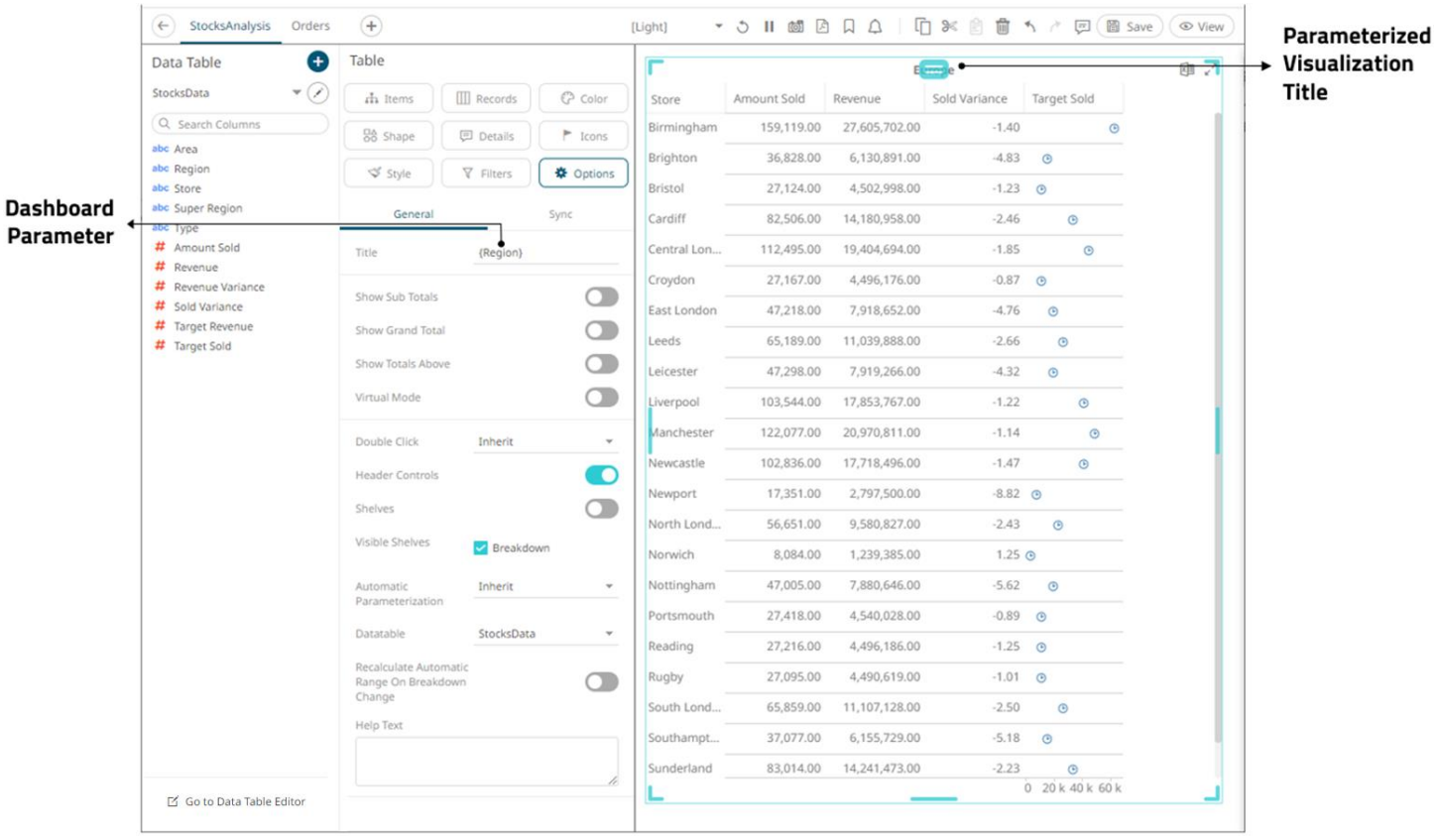
Automatic Parameterization	Select the automatic parameterization status: **On**, **Off**, or **Inherit** (default).
Datatable	Allows you to switch to another data table in the workbook to be used in the visualization.
Recalculate Automatic Range on Breakdown Change	Tap the slider for variables with automatic range/mapping to be recalculated when the visible depth is changed in the visualization.
Help Text	The added Help text can be displayed for the visualization.

Visualization Title

Visualization titles can also be parameterized, displaying the values of dashboard parameters, and for visualizations linked to Time Series data sets, the snapshot time.

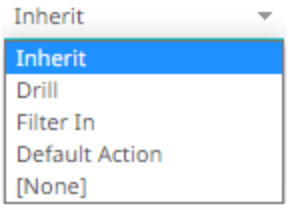
Dashboard parameters are added to the title within curly brackets. For example: **{Company}**.

The snapshot time is added to the title by using **{Snapshot}**.



Double Click Mode

This setting determines the action that will be performed when double-clicking on a visualization value.



- Inherit

  The action is inherited from the set double-click option under **Workbook** properties. The default is **Drill**. Other options are **Filter In**, **Default Action**, or **None**.

- Drill

  Drills into lower level details of the selected item.

- Filter In

  Filters the dashboard to include selected items.

- Default Action

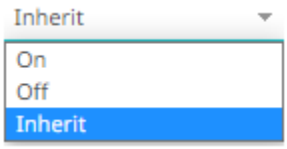
  Performs the default Action that is defined for the selected item.

- None

  Disables the double-click feature.

Automatic Parameterization

Determines whether parameters are to be automatically updated or the setting will be inherited from the workbook property.

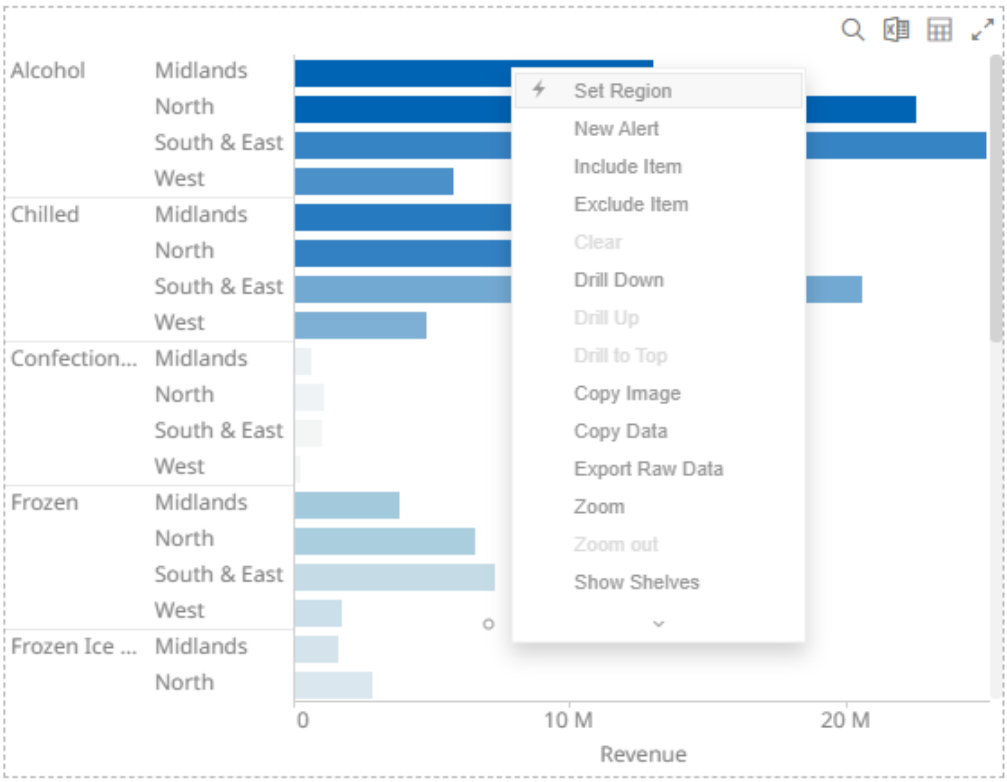


- On

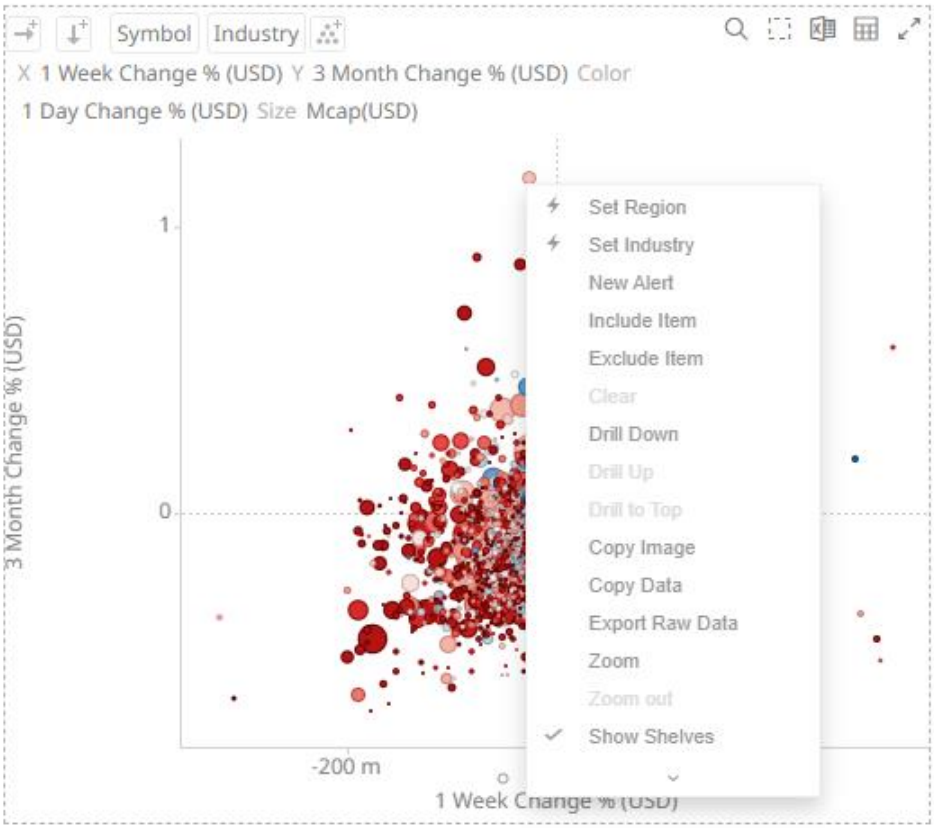
  When turned on, parameters can be automatically updated within a dashboard by right-clicking on a visualization item and selecting it from the context menu with the lightning icon.

  The dashboard parameter values to be passed will include all possible data table values of the selected visualization.

  For example, if there are **Region** and **Industry** dashboard parameters, and the associated data table of the visualization has a **Region** but no **Industry** column, then the *Automatic Parameterization* option will only include:

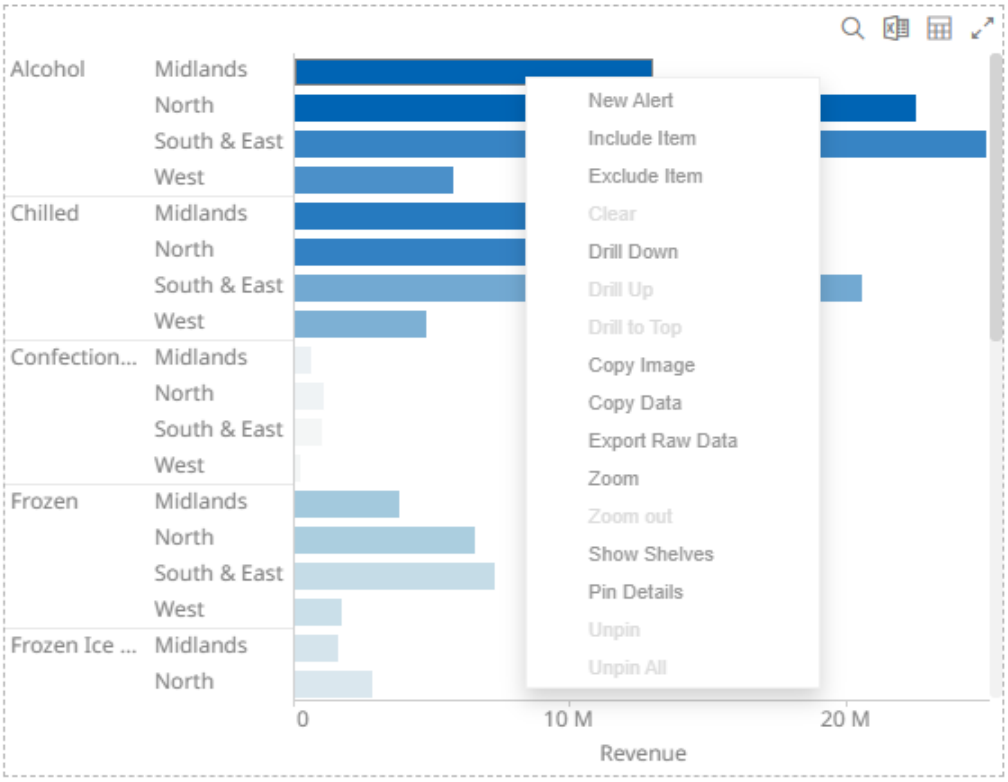


However, if the associated data table of the visualization has Region and Industry columns, then the *Automatic Parameterization* option will include both:



- Off

  Automatic parameterization on the visualization based on the dashboard parameters is turned off.



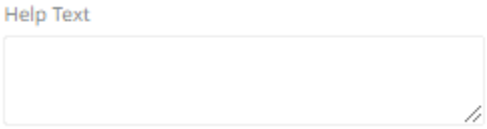
  In some circumstances, it may be appropriate to disable this automatic parameterization, and instead utilize more configurable navigation actions.

- Inherit

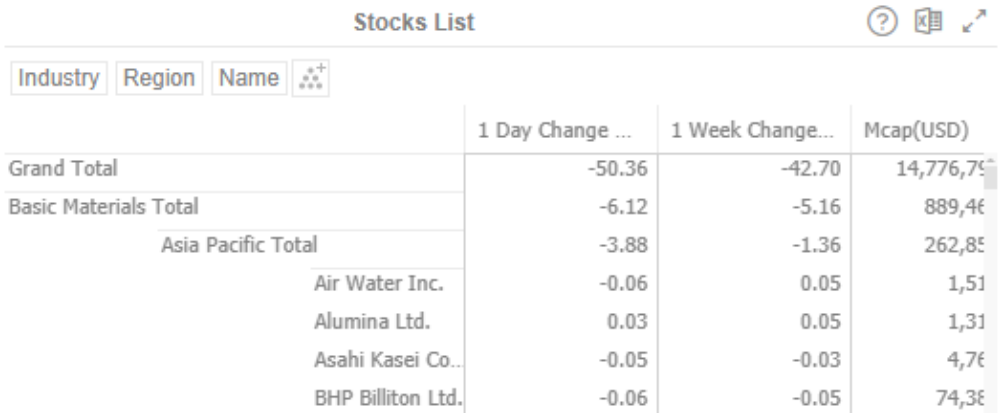
  The automatic parameterization is inherited from the workbook property.

Help Text

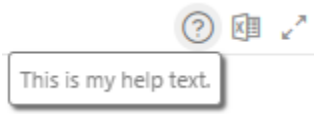
Help text can be entered into a visualization's settings pane.



When the text has been added, the help icon appears to the right of the visualization title.



Clicking on the help icon, displays the associated help text.



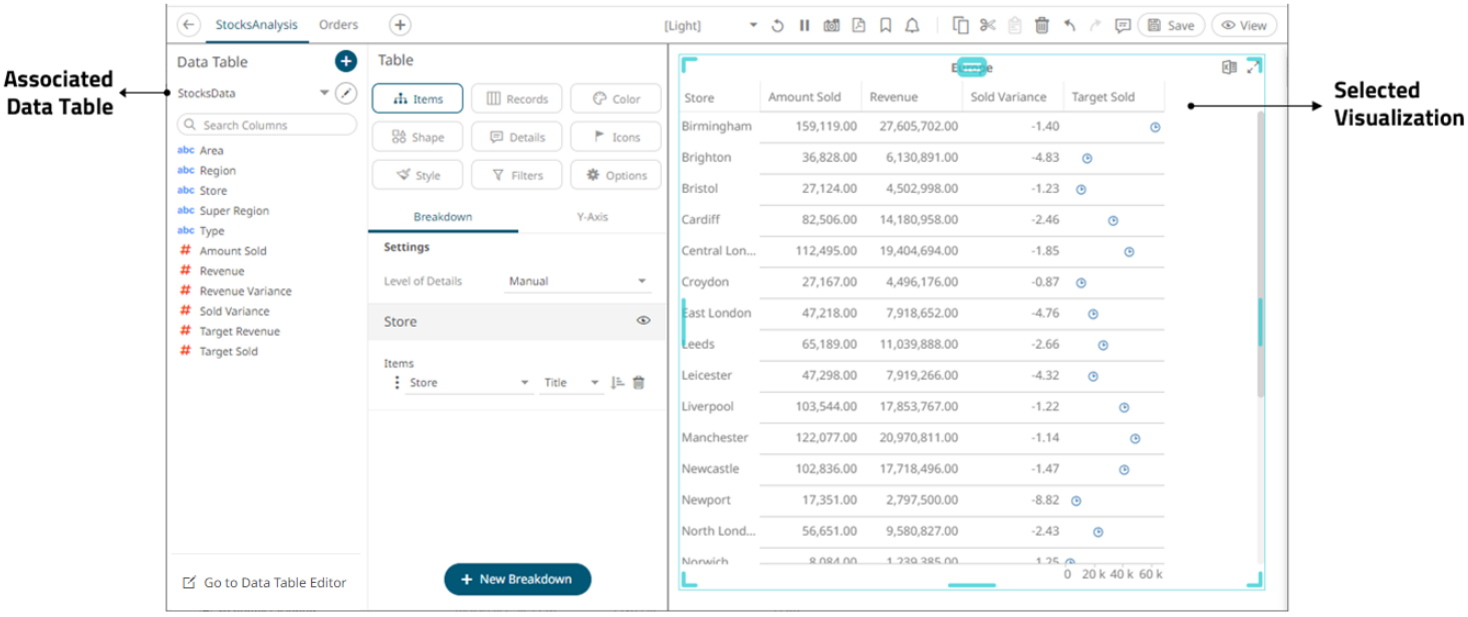
Modifying the Data Table that is Associated to the Visualization

You can easily switch to another data table to use in the visualization.

Steps:

1. Click on a visualization on a dashboard.

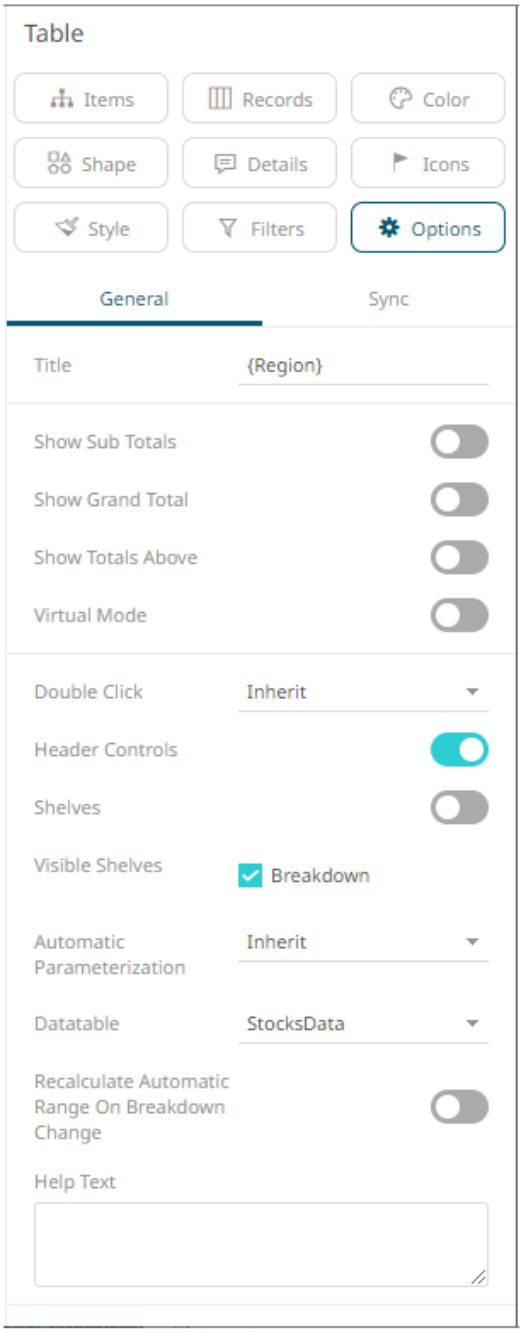
   The associated data table is displayed on the *Data Table* pane.



2. Click the **Options** 

button. The *Visualization Settings* pane is displayed along with the current data table being used.

   For example:

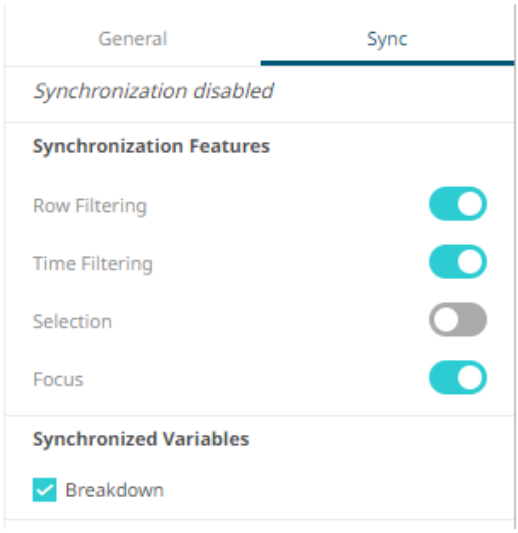


3. Select another data table in the *Datatable* drop-down list.

   The visualization is updated to reflect the data setting in the new associated data table.

NOTE **Any changes in the schema in the newly selected data table will cause variable with missing measures to be invalidated. In addition, breakdowns with missing dimensions will be invalidated.**

Sync



Synchronization determines whether the visualization should interact with other elements on the same dashboard:

Property	Description
Row Filtering	Tap the slider to turn it on. This causes the visualization to use the categorical and numeric filters on the dashboard.
Time Filtering	Tap the slider to turn it on. This causes the visualization to use any time filters on the dashboard.
Selection	Tap the slider to turn it on. This means, the items selected in another visualization will also be selected on this visualization.
Focus	Tap the slider to turn it on. This means, when focus is set on another visualization the system will also set focus on this visualization.

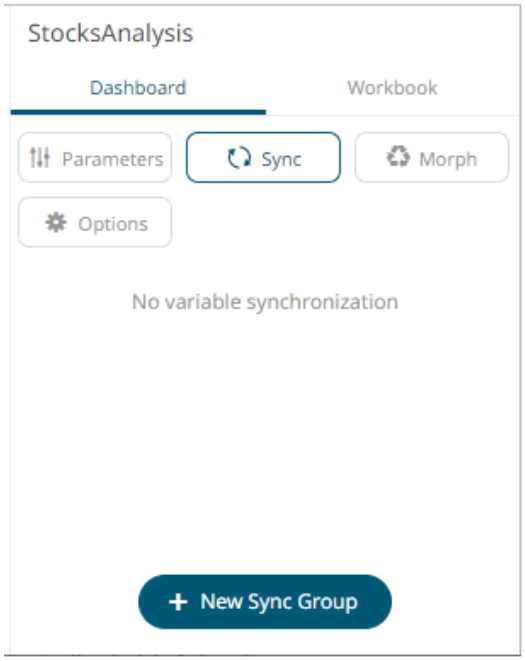
You can also enable the Synchronized Variables of the visualizations in a dashboard.

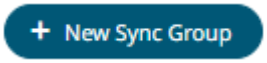
Synchronization of the Shared Variables in the Visualizations of a Dashboard

The synchronized variables of a visualization can be shared with other visualizations using the same data table.

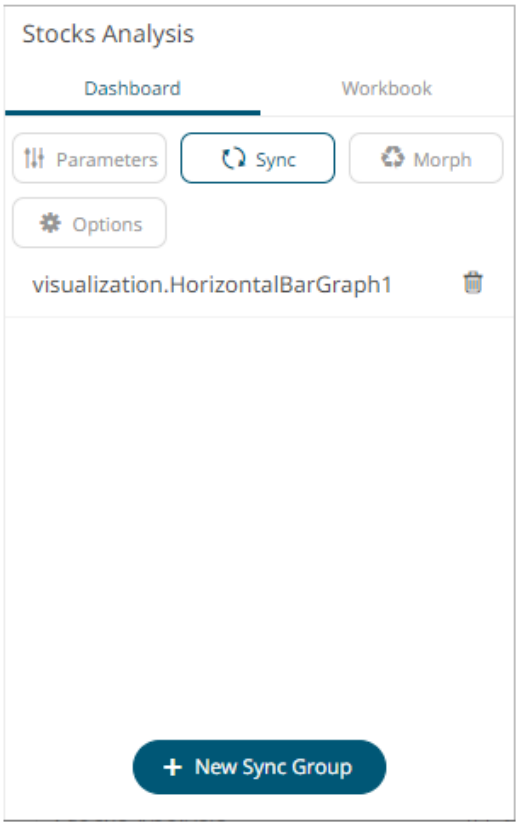
Steps:

1. On the *Dashboard and Workbook Settings* pane, click the **Dashboard** tab and then the **Synch** button.

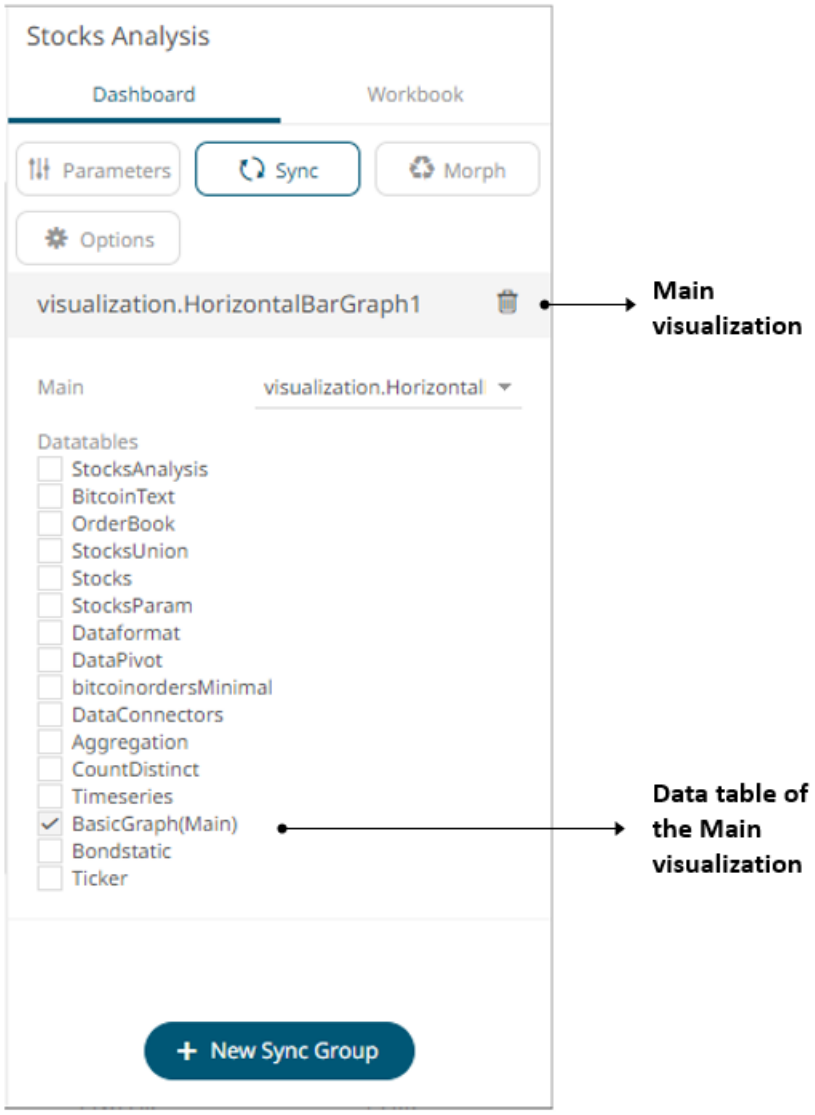


2. Click 

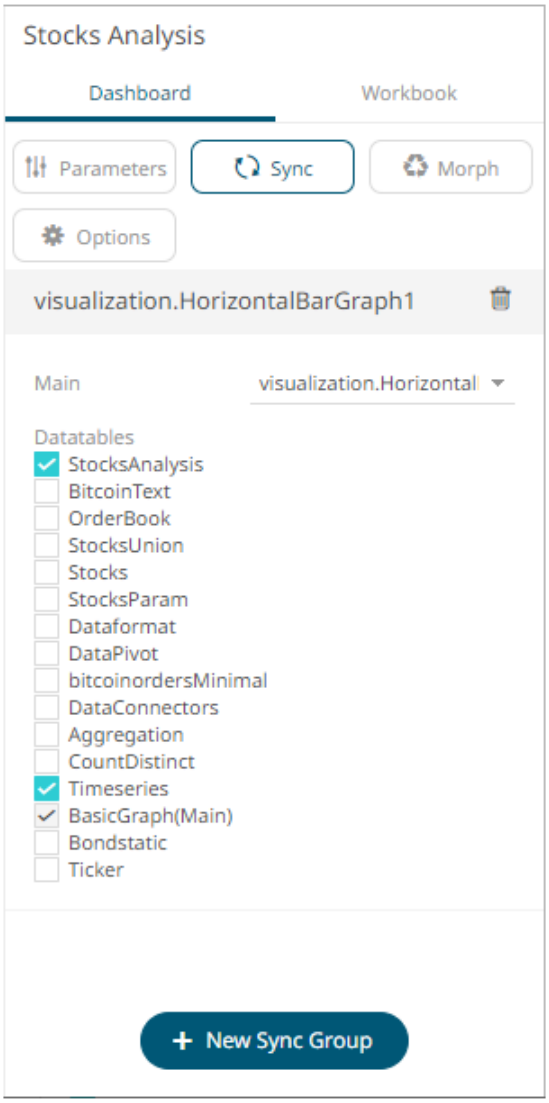
. The *Main* visualization is displayed. By default, this is the first defined visualization of the dashboard. For example:



3. Click on this visualization. All of the available data tables in the workbook are displayed and the corresponding data table of the main visualization is also indicated.



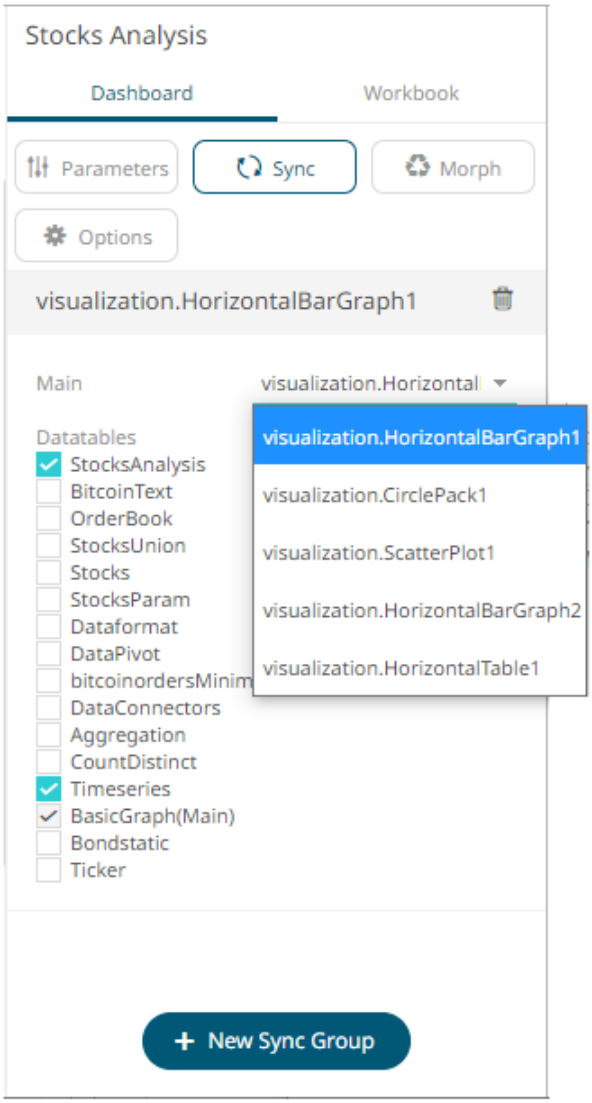
4. You can opt to check one or more data tables.



NOTE **When synchronizing visualizations with different data tables, it is necessary for these data tables to have all of the column names used on the synchronized variables.**

A special case is when a Calculated Column is used on a synchronized variable with synchronization across different data tables. For each data table, aside from having a calculated column of the same name, ensure that they also have the same identity GUID. This can only be achieved by creating the first data table, then the calculated column, and then duplicating the entire data table. From that point, any required changes can be made in the duplicated data table, in terms of data connector settings, data source change, etc., all the while preserving the calculated column.

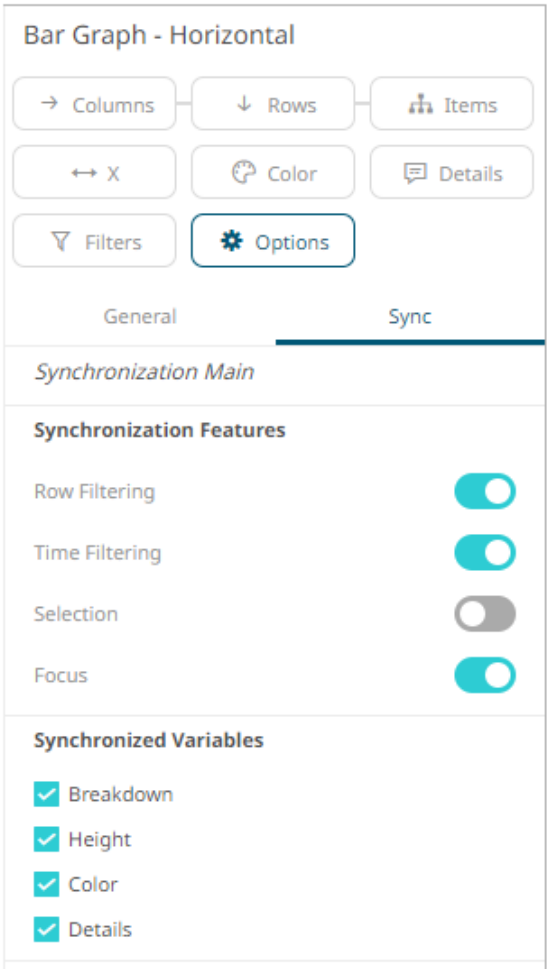
5. Click on the *Main* drop-down list and select the main visualization.



NOTE **The synchronized variables of this visualization will be the basis for the child or dependent visualizations using the selected data tables.**

Delete a main visualization by clicking .

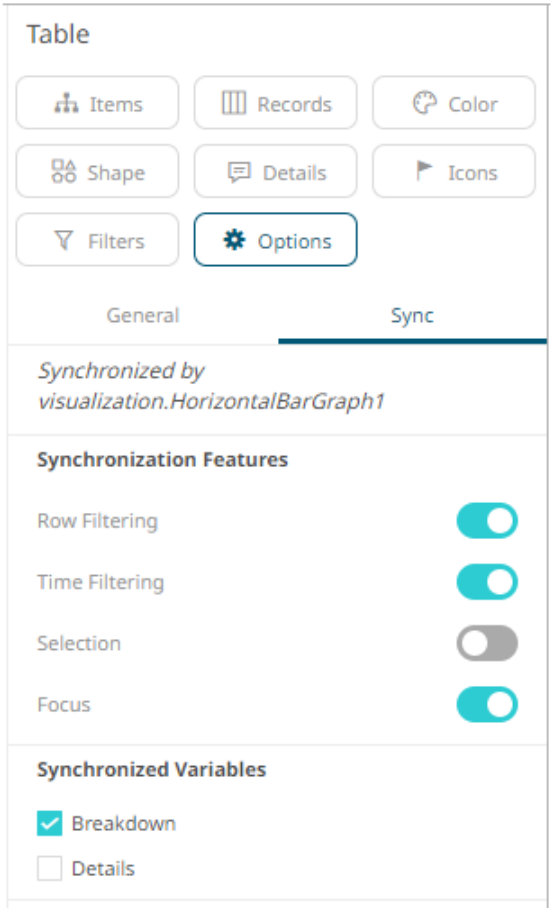
6. To define the shared variables of a main visualization, click its **Settings** icon. The corresponding *Properties* pane displays. Click the **Sync** tab.



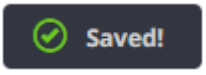
It is indicated at the top section of the tab that this visualization will be the *Synchronization Main* and will be the basis for the shared and visible variables across the selected data table(s).

Check the *Synchronized Variables* boxes of the variables that will be shared by the main visualization to its dependents.

For the child visualizations, the main visualization to which it will be synchronized into is indicated as well. For example "**Synchronized by visualization.HorizontalBarGraph1**".



7. Click the **Save**  icon to save the changes.

   When saved, the  notification is displayed.

   Viewing the dashboard on the *Open Workbook in View Mode*, only the main visualization will have the enabled shelves.

   Also, when a new value is selected in a synchronized variable, the dependent visualizations will be automatically updated.

Morphing Visualizations

You can morph a visualization by simply selecting the required resultant visualization from the available listing.

When used in combination with the copy and paste functionality, dashboards can be quickly created.

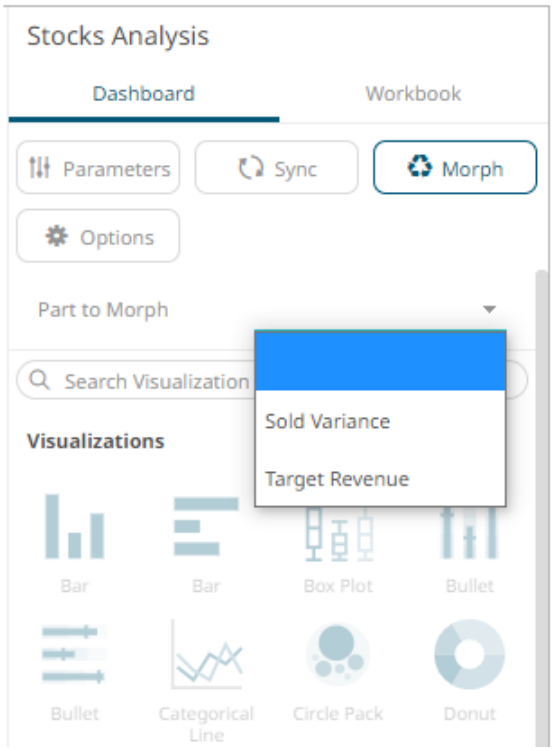
Steps:

1. On the *Dashboard and Workbook Settings* pane, click the **Dashboard** tab and then the  button.

   The *Morph* pane displays.



2. Select the visualization to morph from the drop-down list.



The list of visualizations is enabled.



3. Select another visualization on the list.

   The visualization is changed to the new one.

NOTE **When morphing between visualizations with the same variables, there is no further configuration required. For example, from a Horizontal Bar Graph to a Vertical Bar Graph.**

However, when morphing between visualizations with different variables, the new visualization will need to be configured to include columns for empty variables. For example, when converting from a Pie Chart to a Scatter Plot, the X and Y axis must be defined.

Breakdown

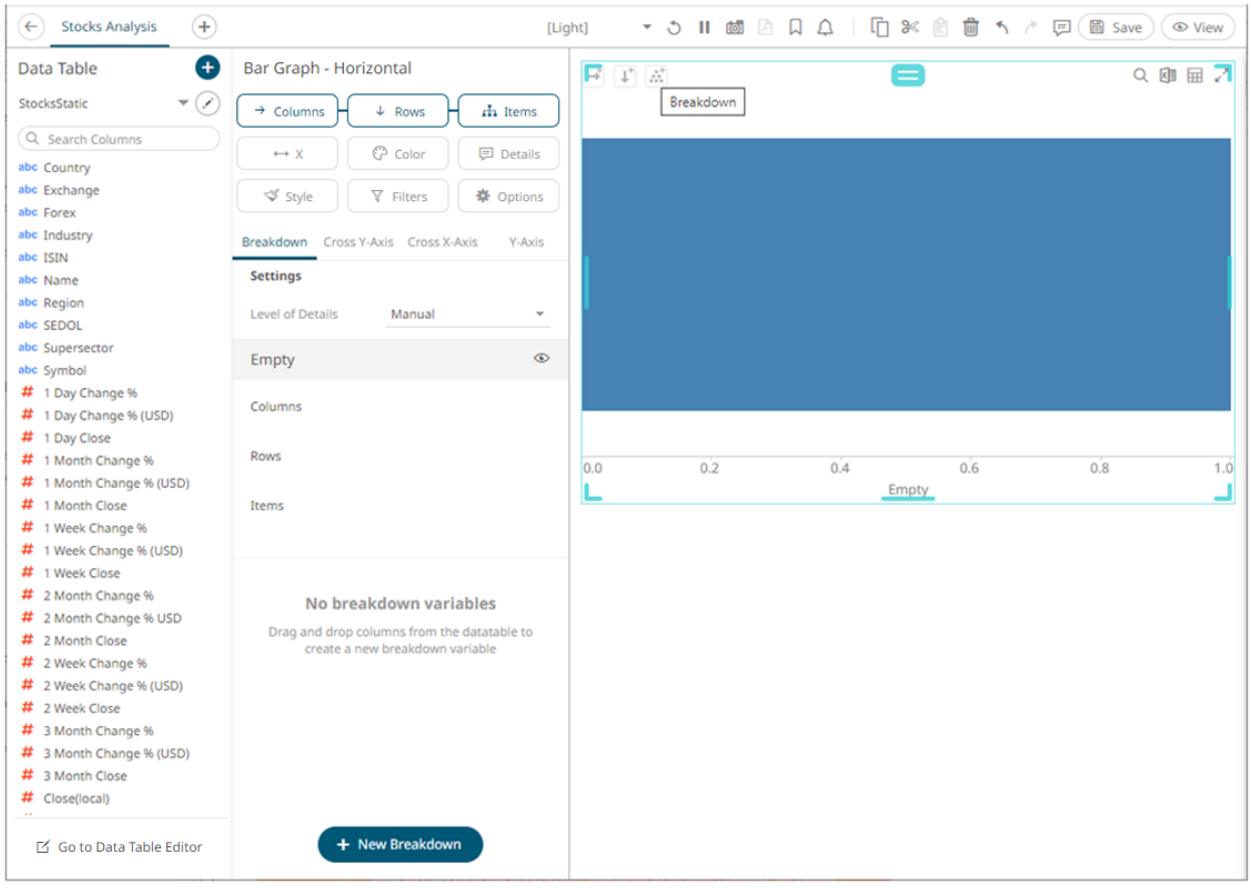
You can define hierarchical structures called breakdowns for each visualization. The hierarchy may be flat (single level) or multi-level. You can also define multiple breakdowns for each visualization so you can readily select the one most appropriate for the analysis task at hand.

The breakdown consists of up to three components:

- Rows which cross tab the visualization into rows.
- Columns which cross tab the visualization into columns.
- Hierarchy which displays the hierarchy within the visualization.

Not all visualizations support all three. If no breakdown is defined, a single aggregated data point will be shown in the visualization.

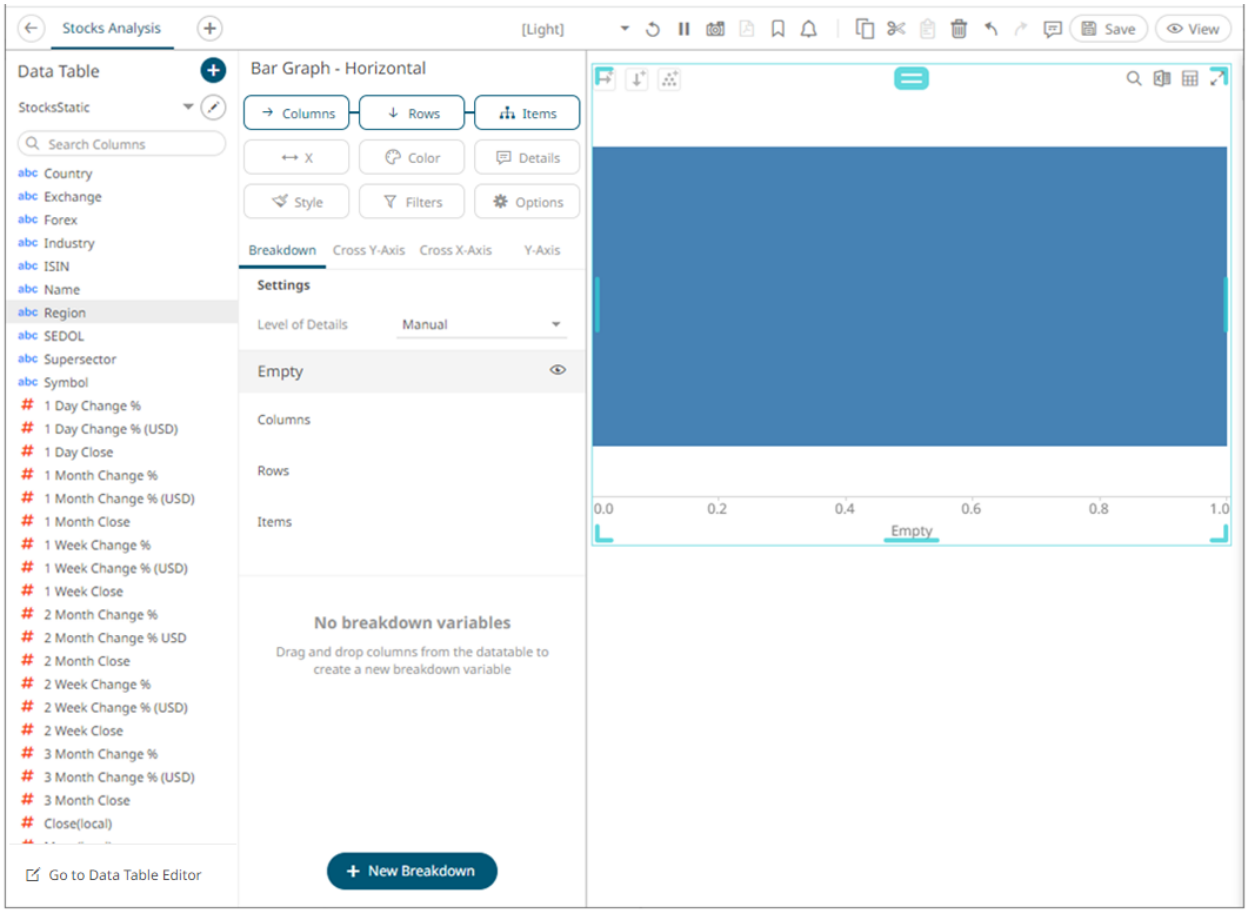
If enabled, the *Breakdown* shelf appears at the top left of each visualization.



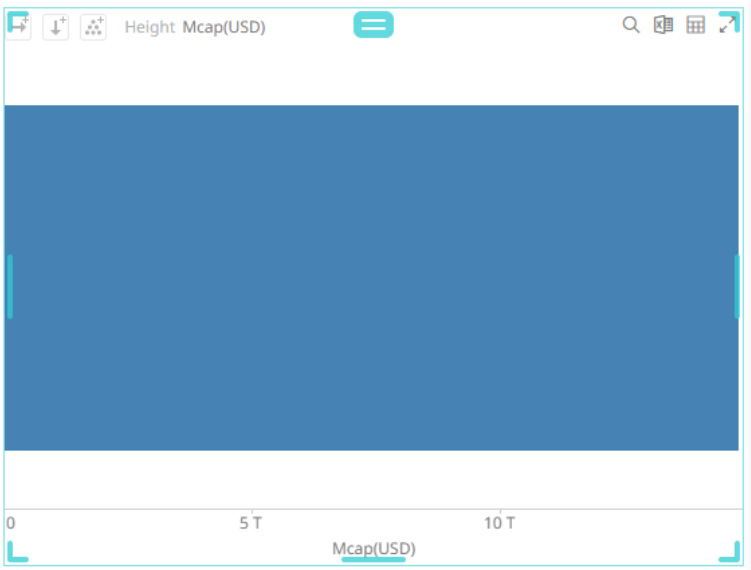
The example above shows that there are no columns added yet as a breakdown **(Empty** state**)** with the *X* variable default values (**0.00** to **1.00)**.

Adding Columns to the Breakdown

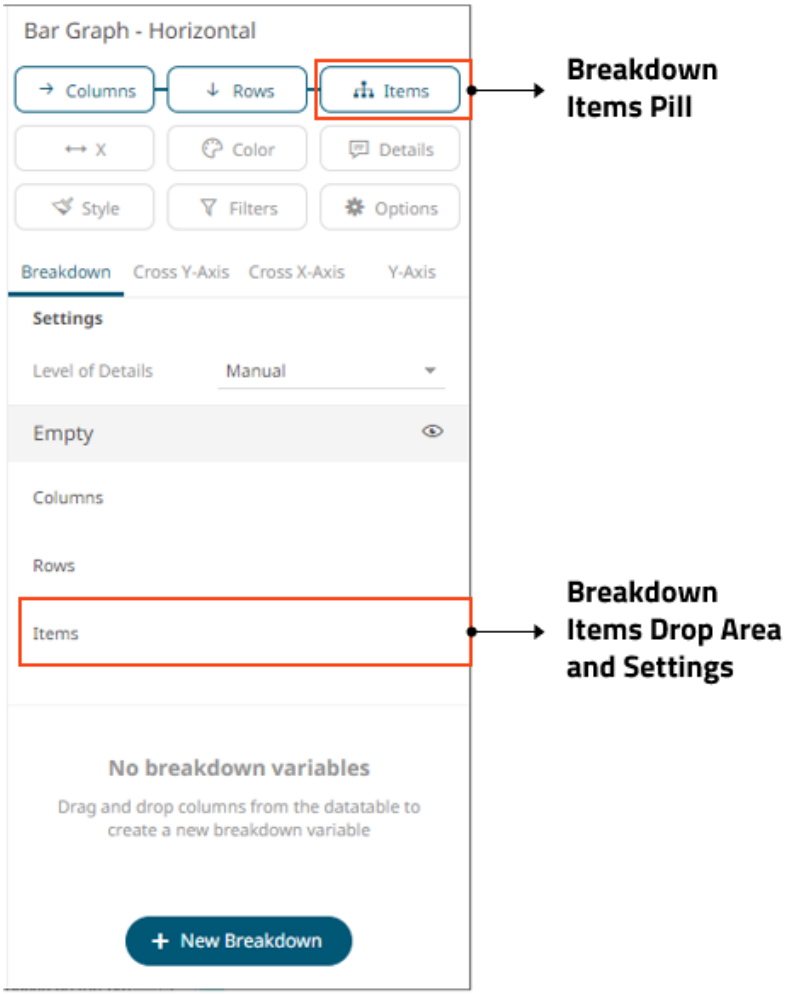
A Bar Graph without a breakdown (Empty) will show a single bar.



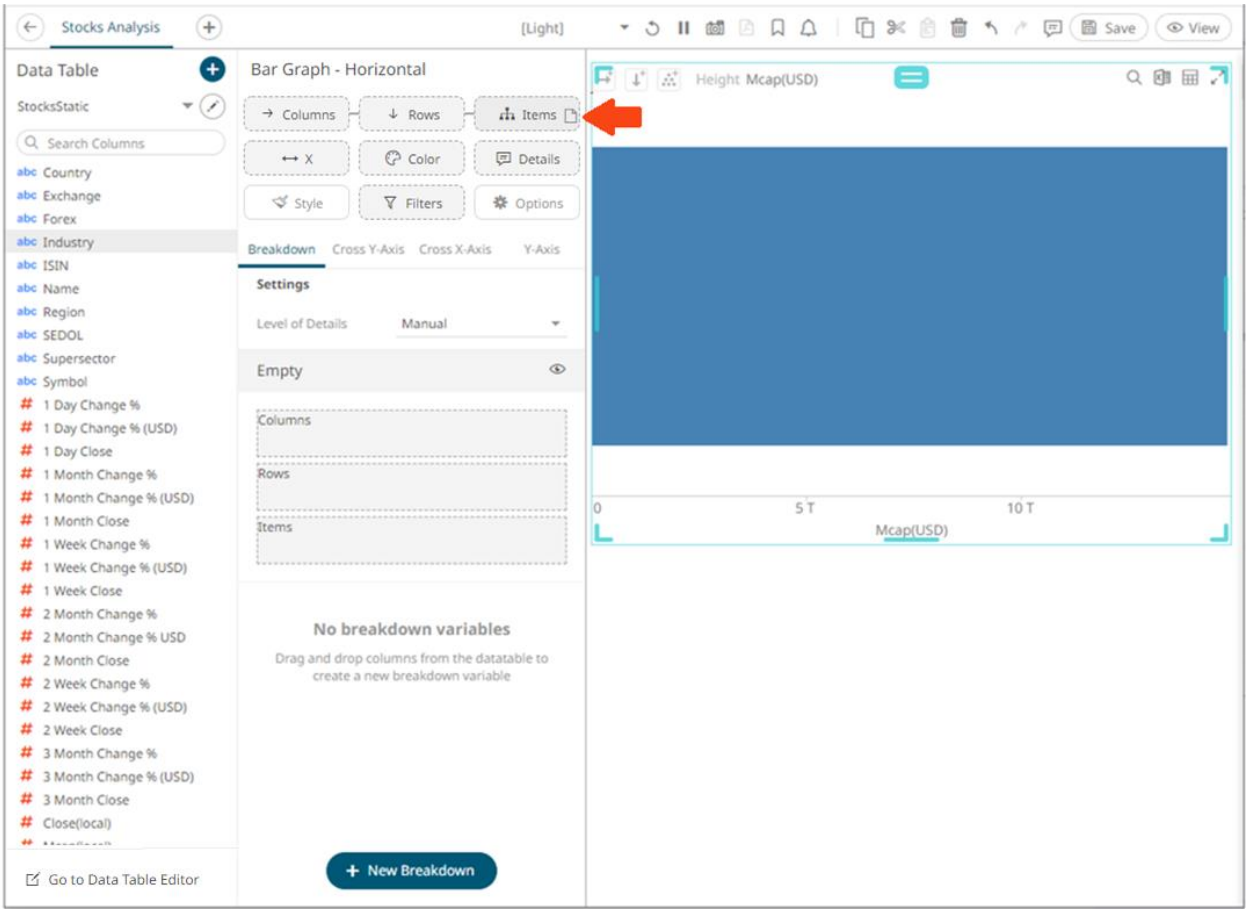
Note that in this sample visualization, there is a column (Mcap (USD)) dragged and dropped to the *X* variable.



To add items to the breakdown, you can drag text columns from the *Data Table* pane to the *Items* pill or drop area under the **Breakdown** tab.

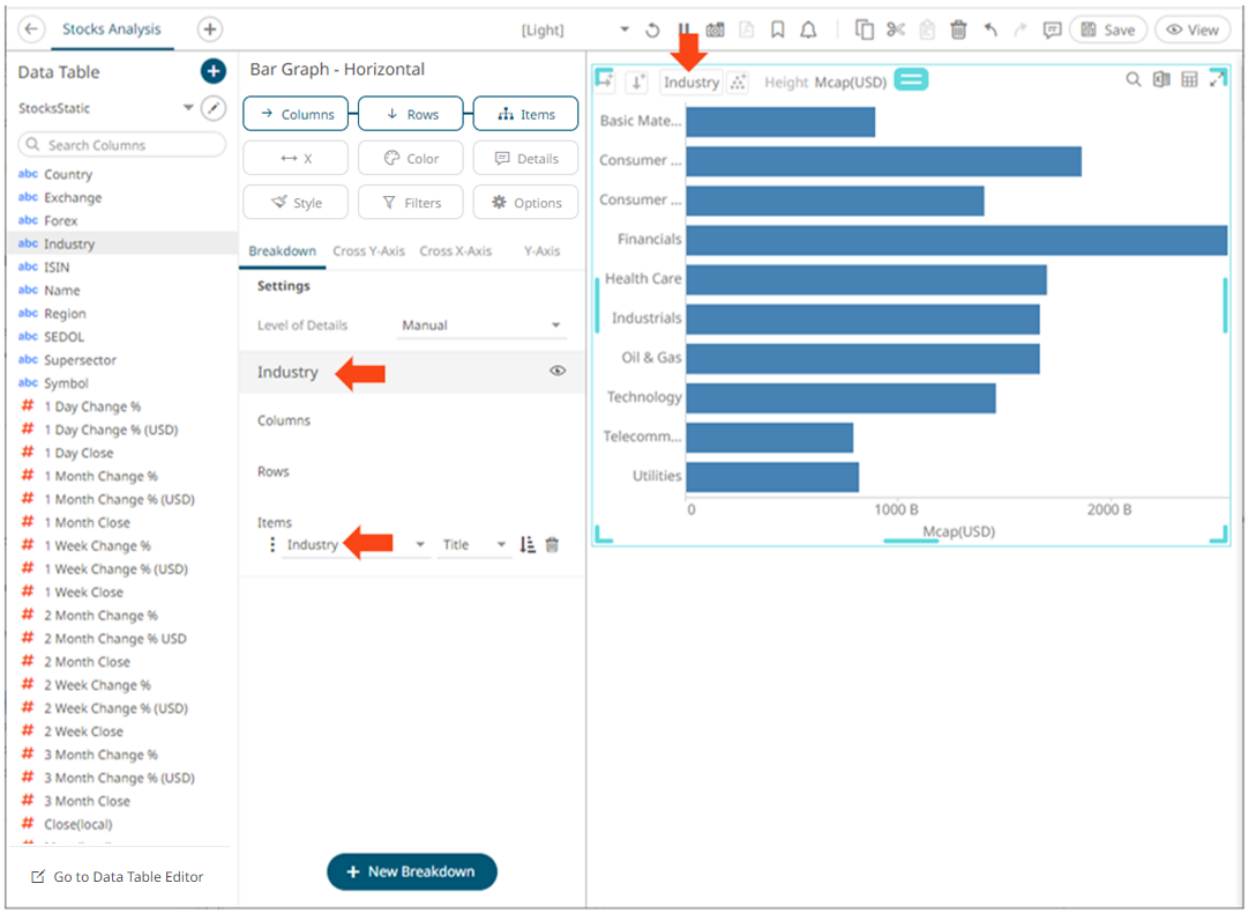


For example:

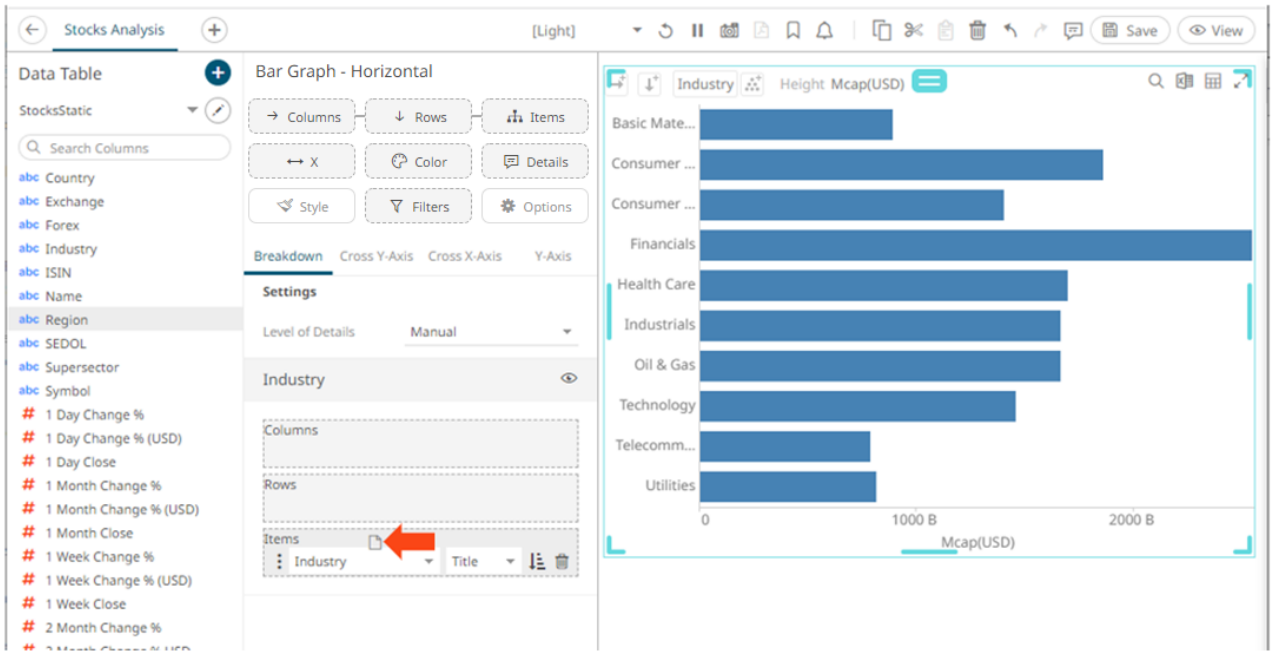


Note that the other controls where you can drop the dragged Text column are highlighted as well (X, Color, Details, Filters, Columns, Rows).

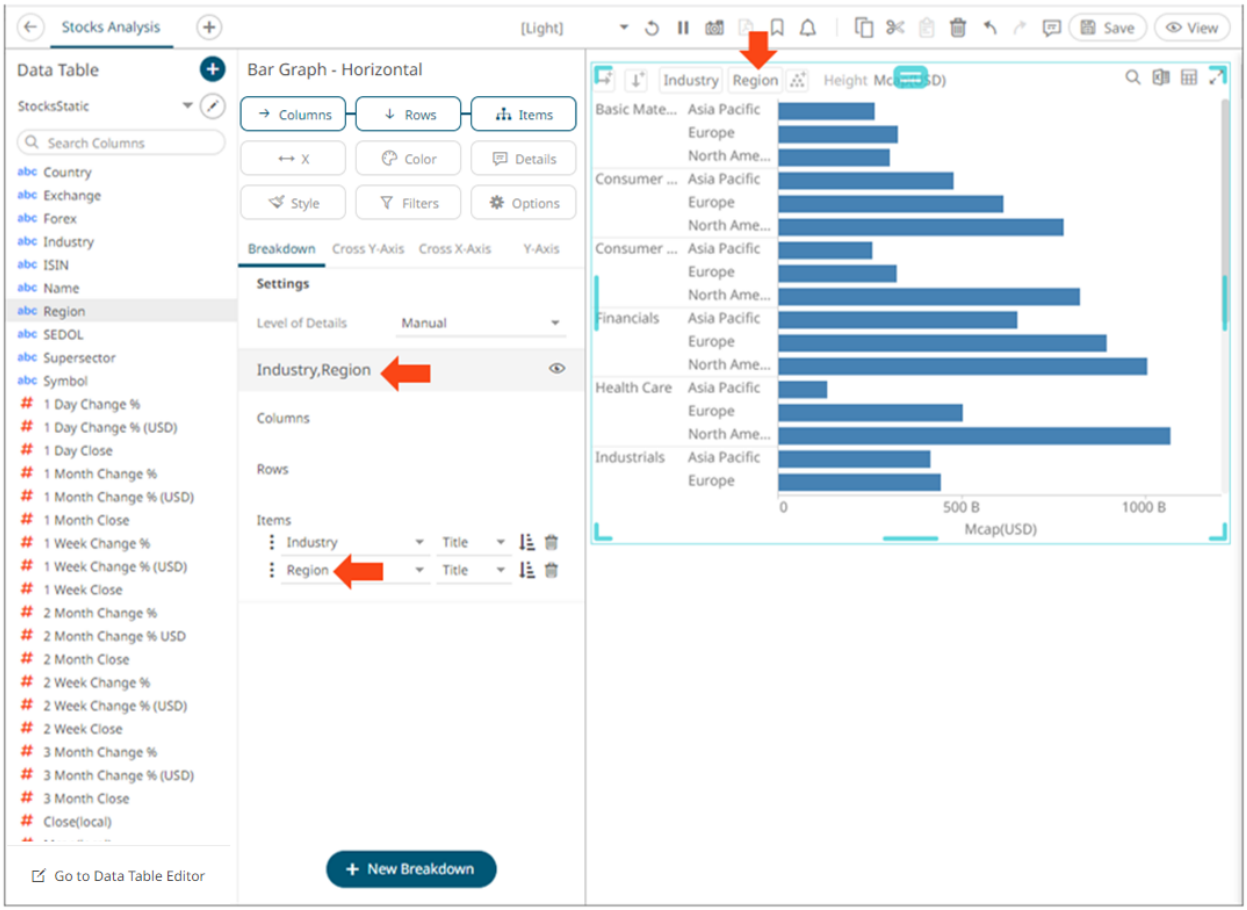
After dragging a data column to a breakdown, this will break apart the aggregated data into separate bars and the column is added under the *Items* drop area of the **Breakdown** tab and *Breakdown* section of the visualization. Also, the dragged column will replace the *Empty* state name.



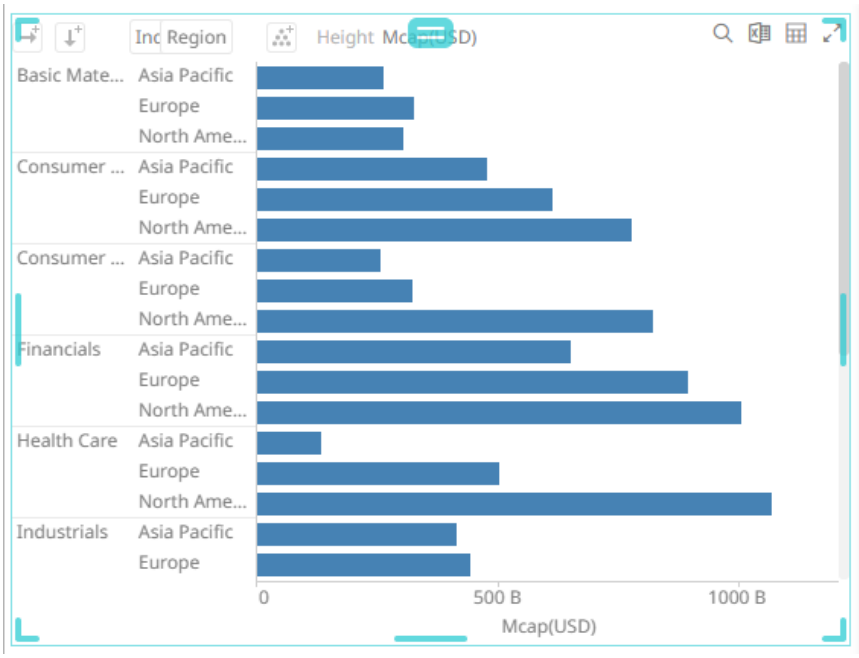
You can opt to drag more columns into the current breakdown.

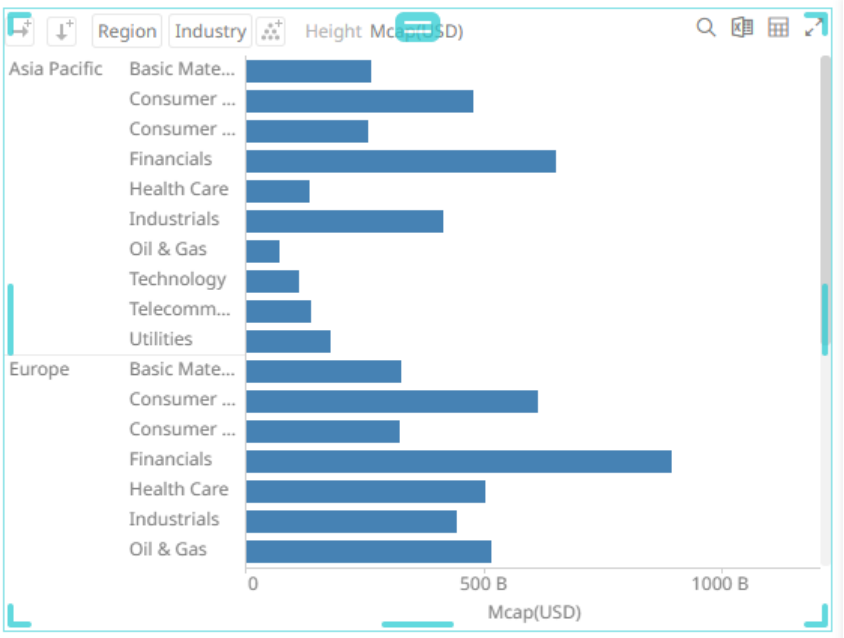


This will produce a multi-level hierarchy and the new column is added to the breakdown.

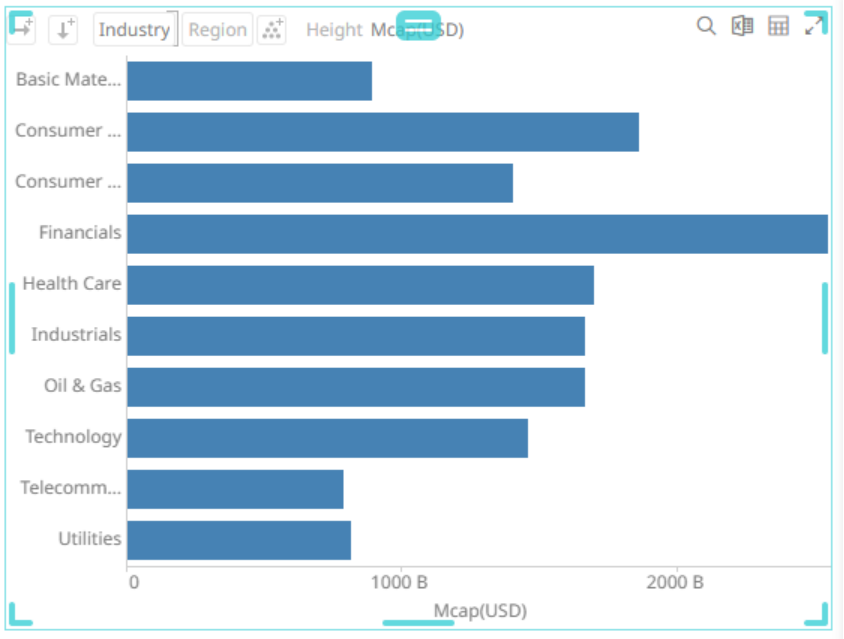


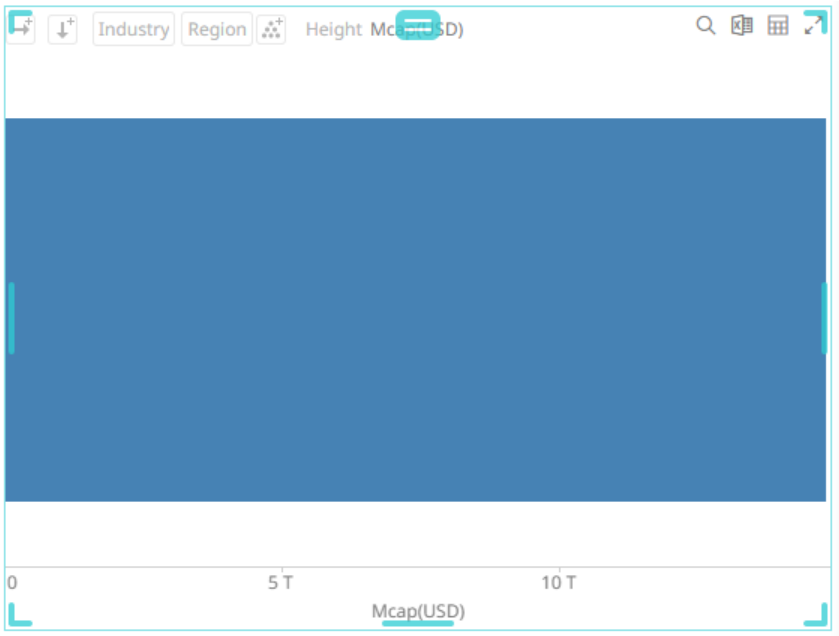
If the column has been dropped into the incorrect position, simply click and drag the column to the correct position in the visualization.





The visible detail level of the multi-level hierarchy can be adjusted by clicking on the breakdown column itself. This will grey out the hierarchy level.





Clicking on the breakdown column will update the display to show the level of detail again.

On the *Visualization Settings* pane, you can also perform the following:

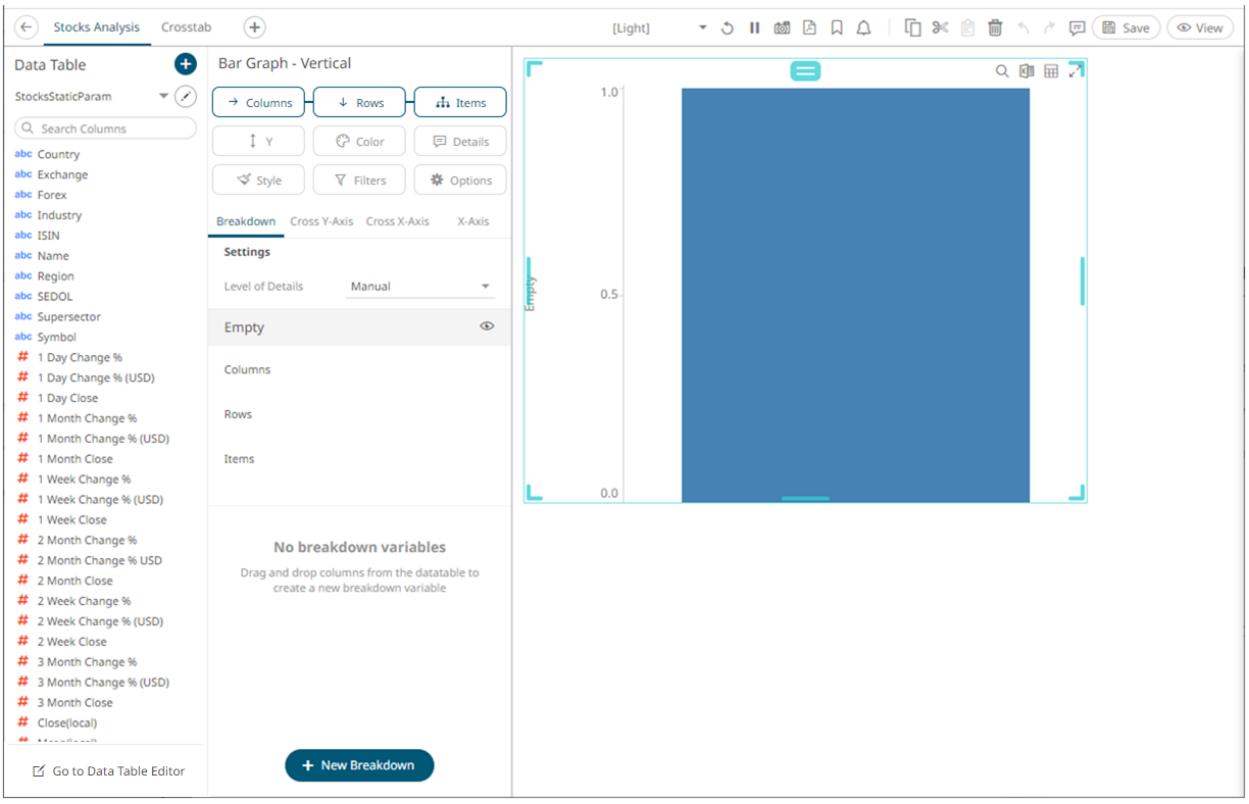
- Modify the breakdown columns
- Sort the visualization for each level of the breakdown
- Sort the visualization based on the breakdown column values
- Add more breakdowns
- Select the breakdown to use
- Delete a breakdown column

Adding Parameterized Columns to the Breakdown

In this section, we will add the following parameterized columns to the breakdown:

Parameter	Value
Region	Europe
Country	BE

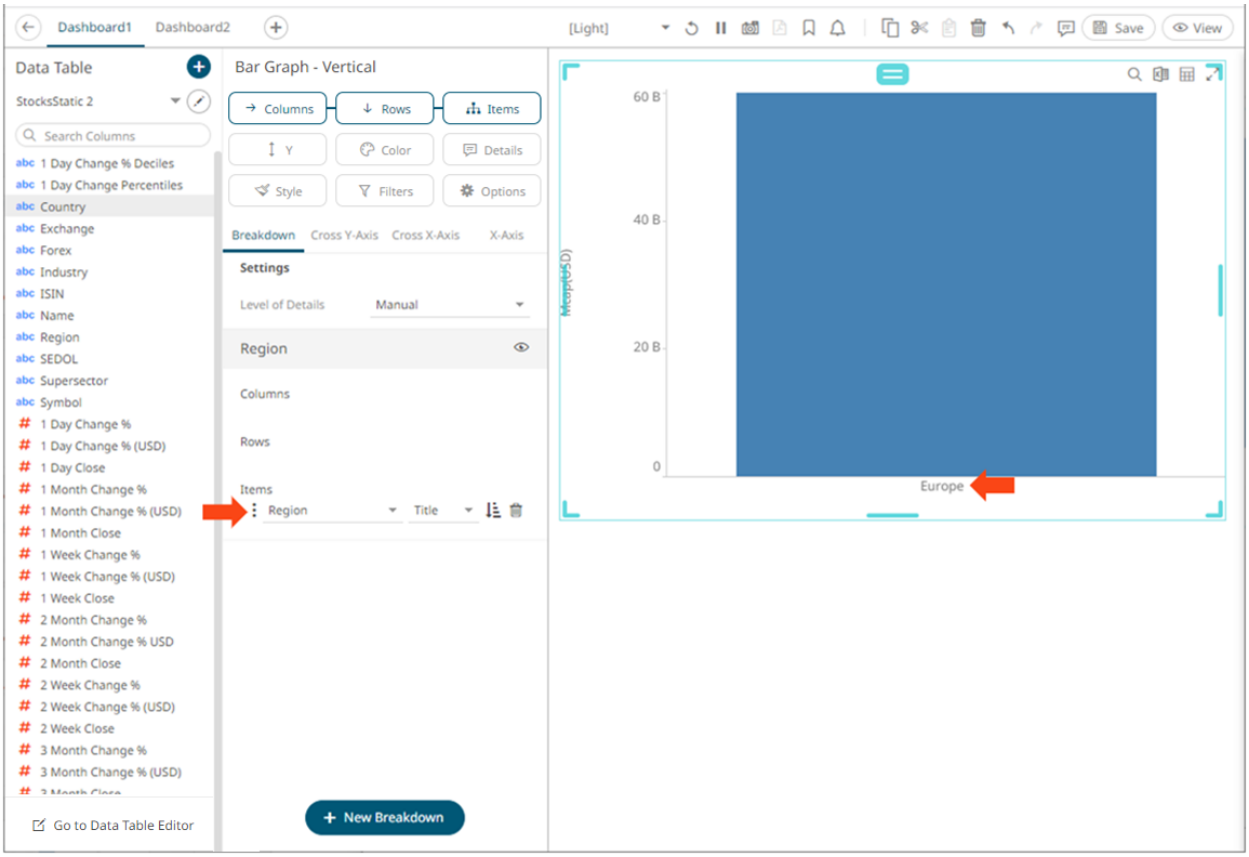
A Bar Graph without a breakdown (Empty) will show a single bar.



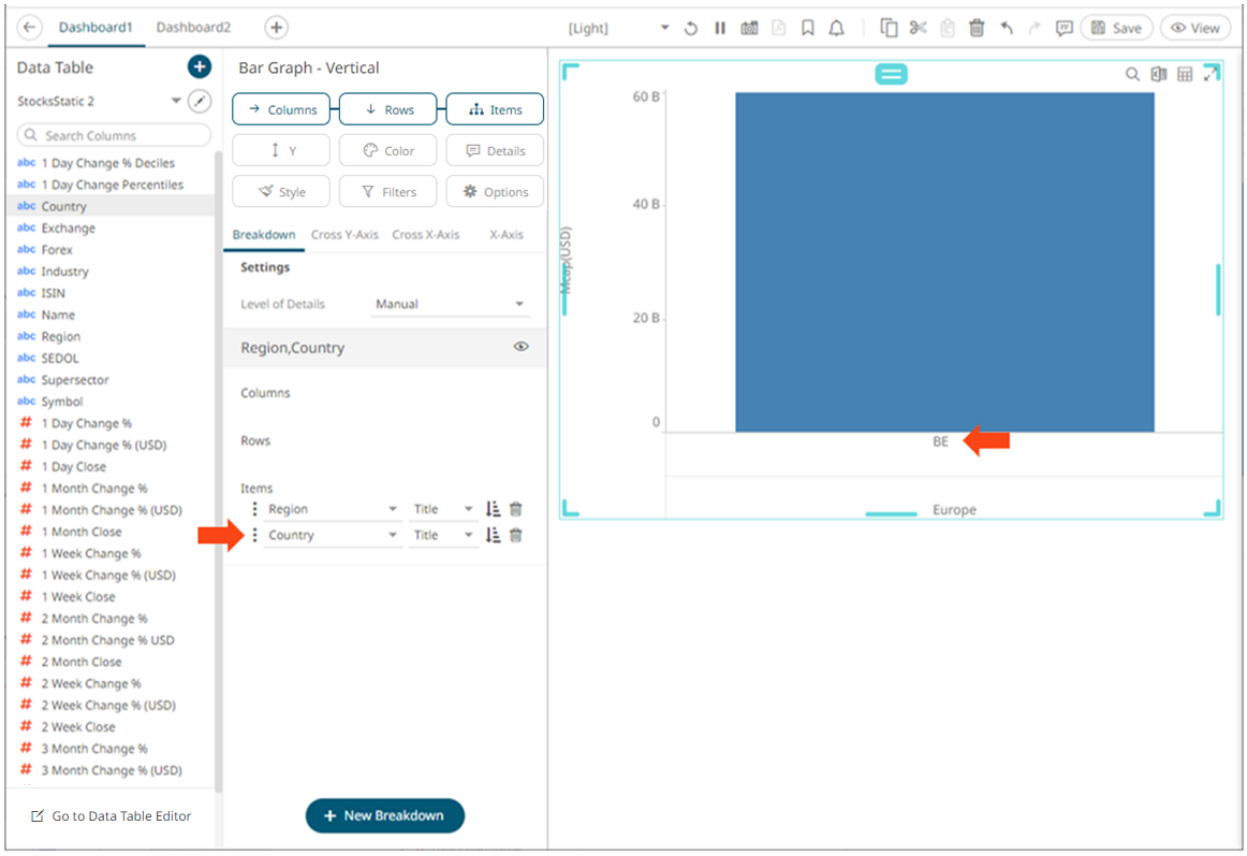
Note that in this sample visualization, there is a column (Mcap (USD)) dragged and dropped to the *Y* variable.



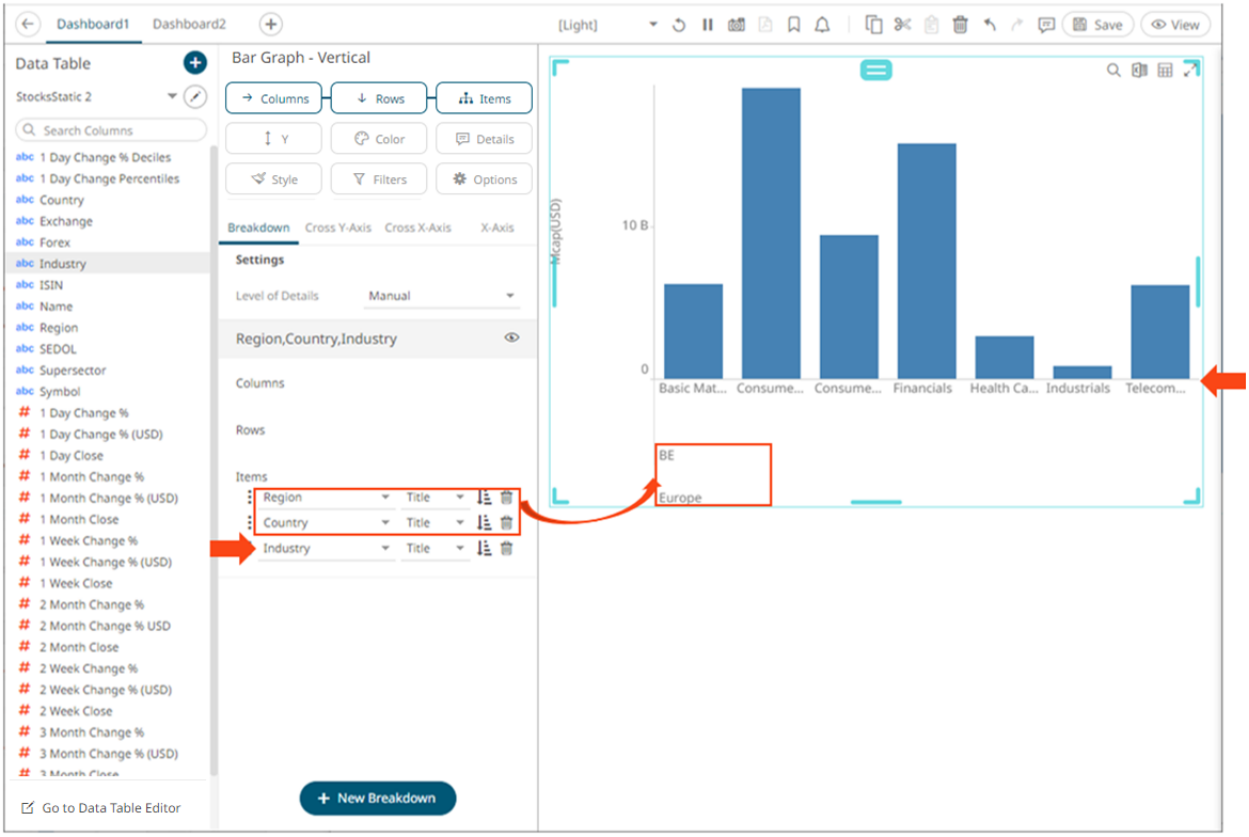
Drag the **Region** field from the *Data Table* pane to the *Items* pill of drop area under the **Breakdown** tab. The value of the parameterized column is used in the breakdown (i.e., **Europe**).



Drag the **Country** field from the *Data Table* pane to the *Items* pill of drop area under the **Breakdown** tab. This will produce a multi-level hierarchy and the new parameterized column (i.e., **BE**) is added to the breakdown.

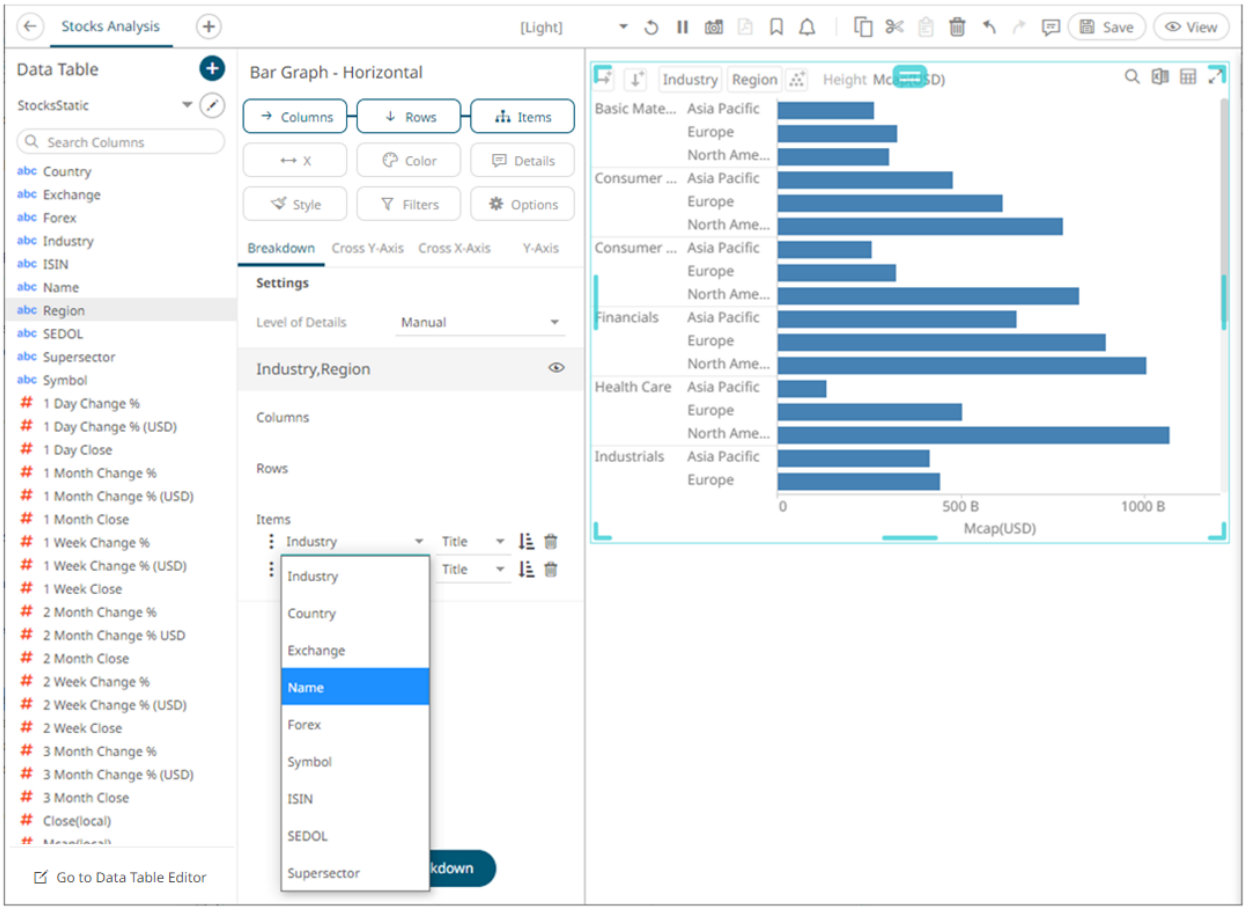


Drag the **Industry** field from the *Data Table* pane to the *Items* pill of drop area under the **Breakdown** tab. This will produce a multi-level hierarchy and the new column with its values is added to the breakdown. The first two levels will display the parameterized values **Europe** and **BE**.

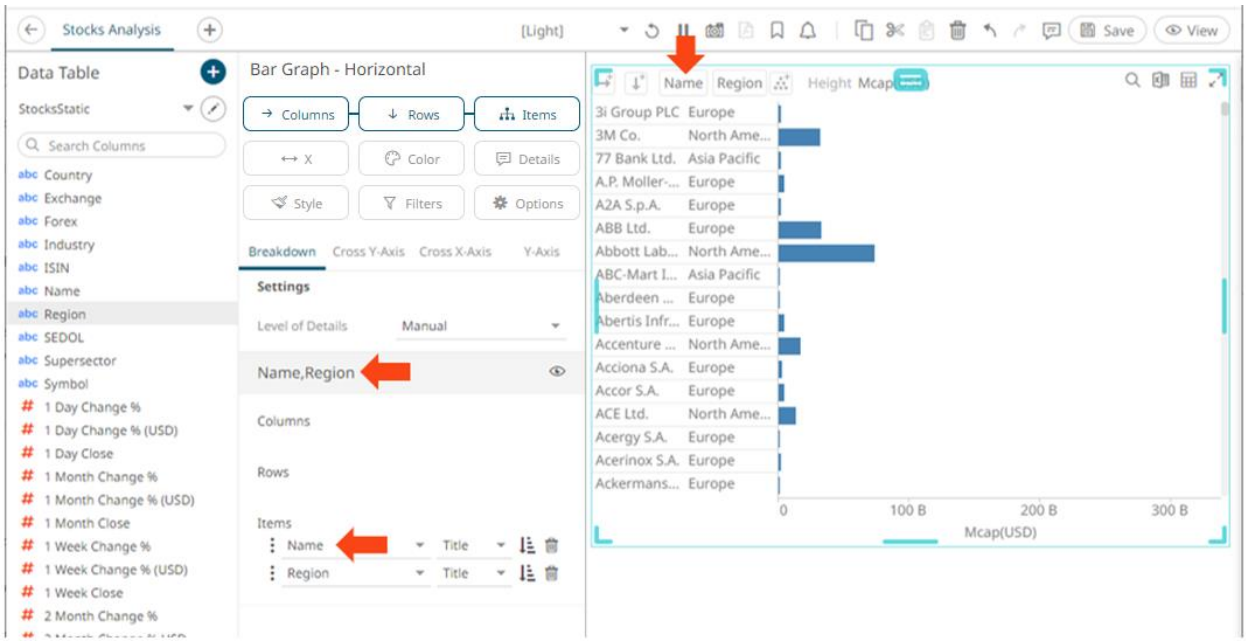

Dashboard1
Dashboard2
[Light]
Save
View
Data Table
StocksStatic 2
Search Columns
1 Day Change % Deciles
1 Day Change Percentiles
Country
Exchange
Forex
Industry
ISIN
Name
Region
SEDOL
Supersector
Symbol
1 Day Change %
1 Day Change % (USD)
1 Day Close
1 Month Change %
1 Month Change % (USD)
1 Month Close
1 Week Change %
1 Week Change % (USD)
1 Week Close
2 Month Change %
2 Month Change % USD
2 Month Close
2 Week Change %
2 Week Change % (USD)
2 Week Close
3 Month Change %
3 Month Change % (USD)
Go to Data Table Editor
Bar Graph - Vertical
Columns
Rows
Items
Y
Color
Details
Style
Filters
Options
Breakdown
Cross Y-Axis
Cross X-Axis
X-Axis
Settings
Level of Details
Manual
Region,Country,Industry
Columns
Rows
Items
Region
Title
Country
Title
Industry
Title
New Breakdown
Mcap(USD)
10 B
0
Basic Mat...
Consume...
Consume...
Financials
Health Ca...
Industrials
Telecom...
BE
Europe

Modifying the Columns of the Breakdown

If the dragged column is incorrect, instead of deleting, you can just select another column in the *Items* drop-down list.



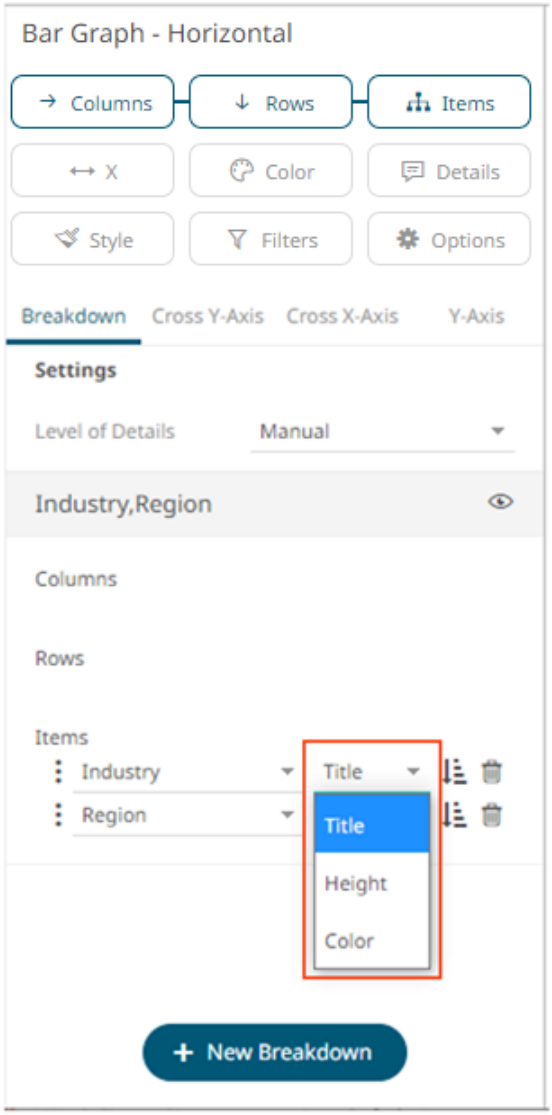
The breakdown settings are modified along with the visualization.



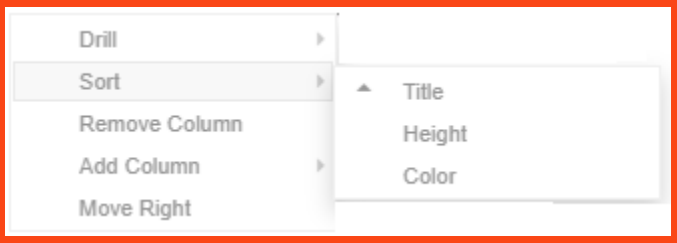
Sorting the Visualization for Each Level of the Breakdown

You can sort visualizations based on the filled variables, plus alphabetically on the breakdown title.

For example, here are the available sorting methods for the Bar Graph – Horizontal visualization:

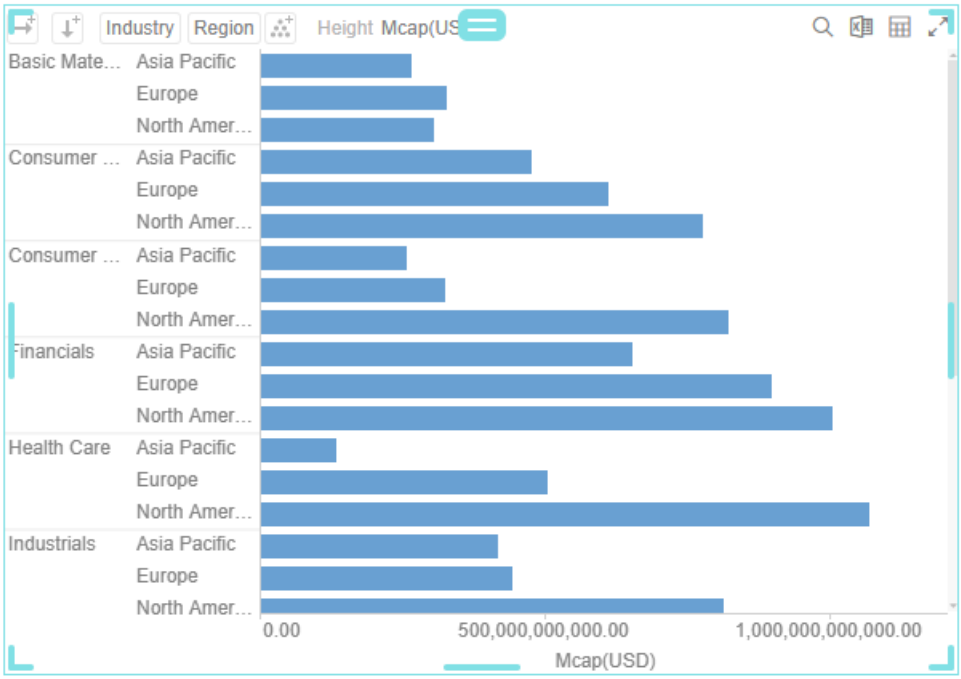


NOTE **These sorting options are also available on the *Breakdown* column and *Pivot* point context menu:**



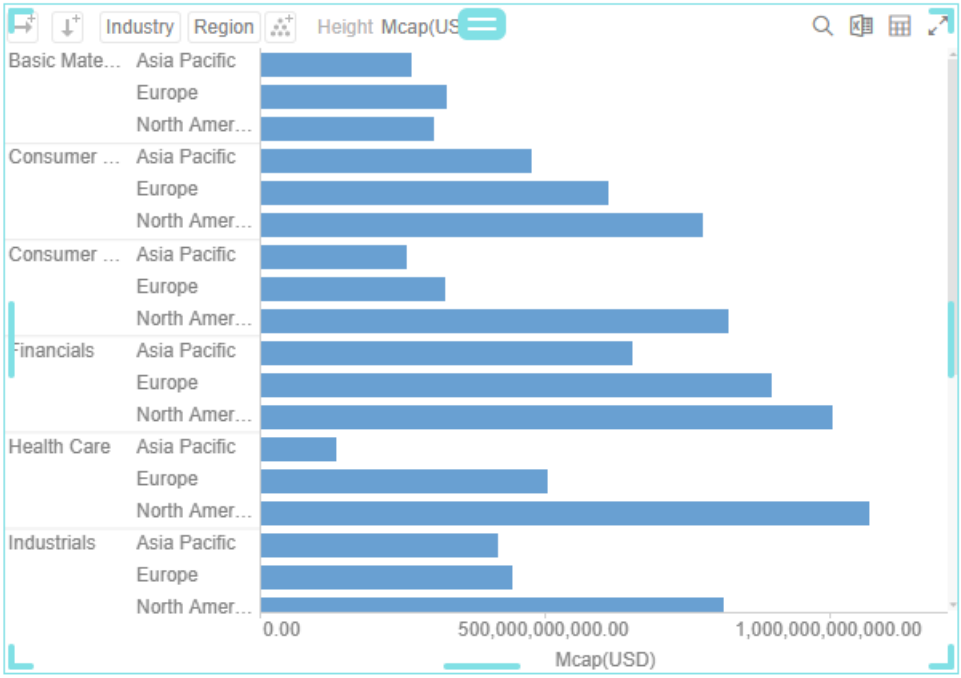
- Sorting by Title (Default)

  Sorting based on the breakdown column name values, in ascending order.



- Sorting by Height

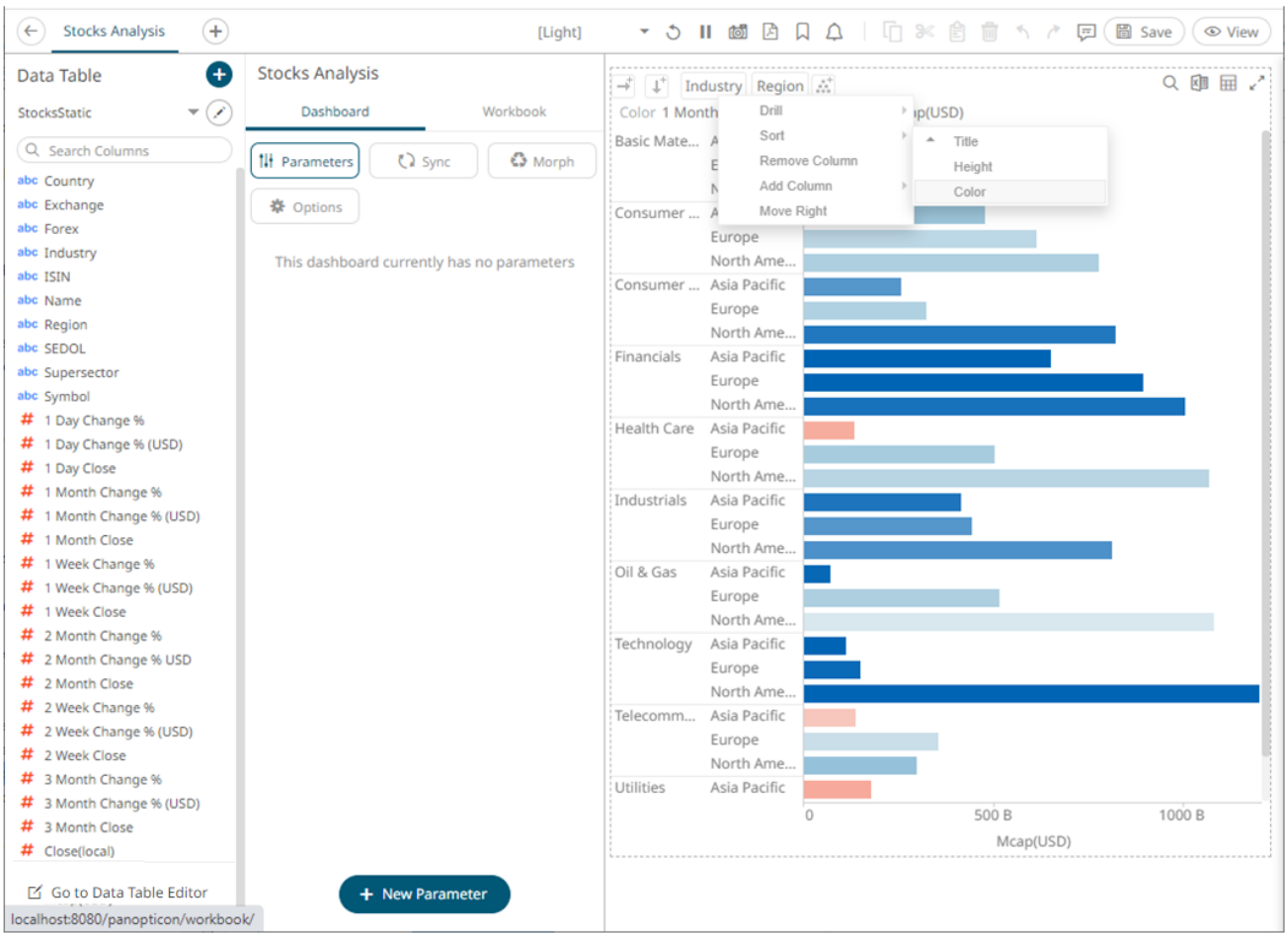
  Sorting based on the height (X) variable values (eg., Mcap(USD).



This type of sorting is most useful in the following visualizations:

- Bar Graphs
- Treemaps (to produce a Heat Map)
- Stack Graphs
- Horizon Graphs
- Sorting by Color

Sorting based on the color variable values (e.g., 1 Month Change % (USD)).



Sorting the Visualization Based on the Breakdown Column Values

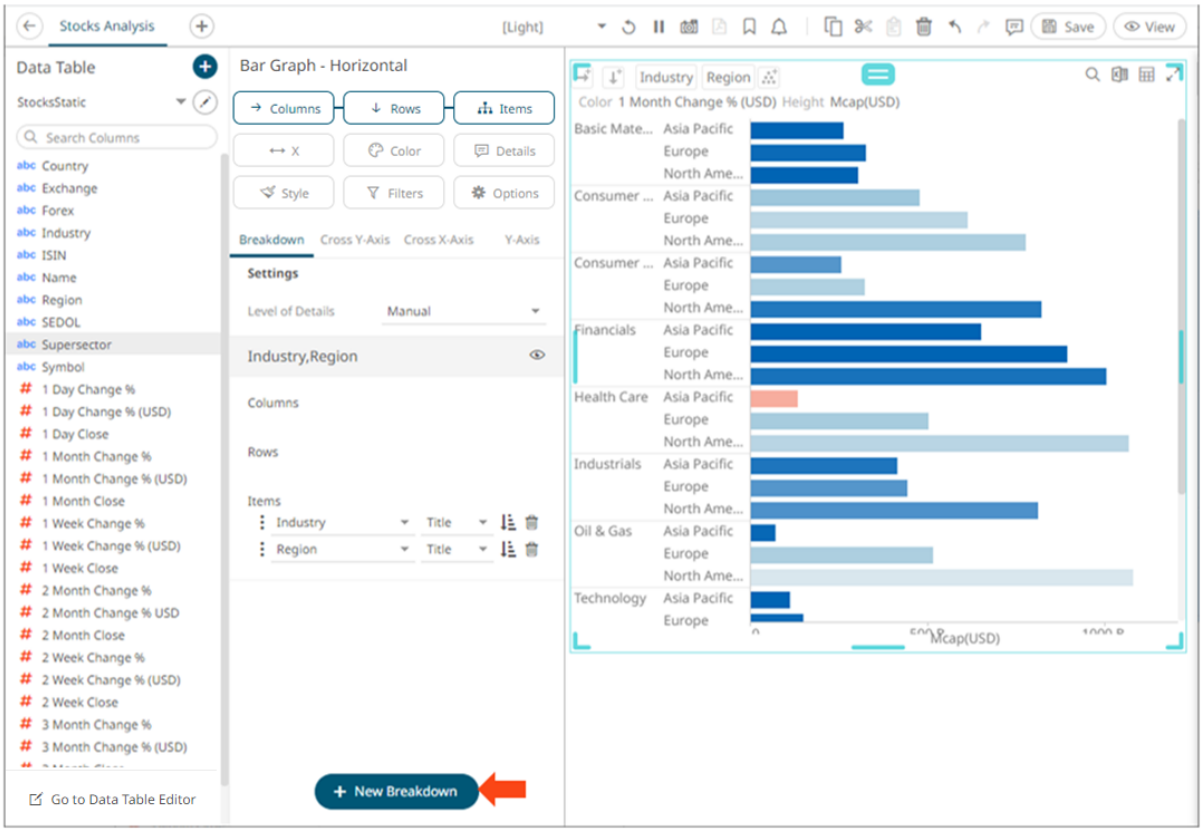
Sort the visualization in an **Ascending** or **Descending** order by clicking on a breakdown level **Sort** icon.

Adding Breakdowns

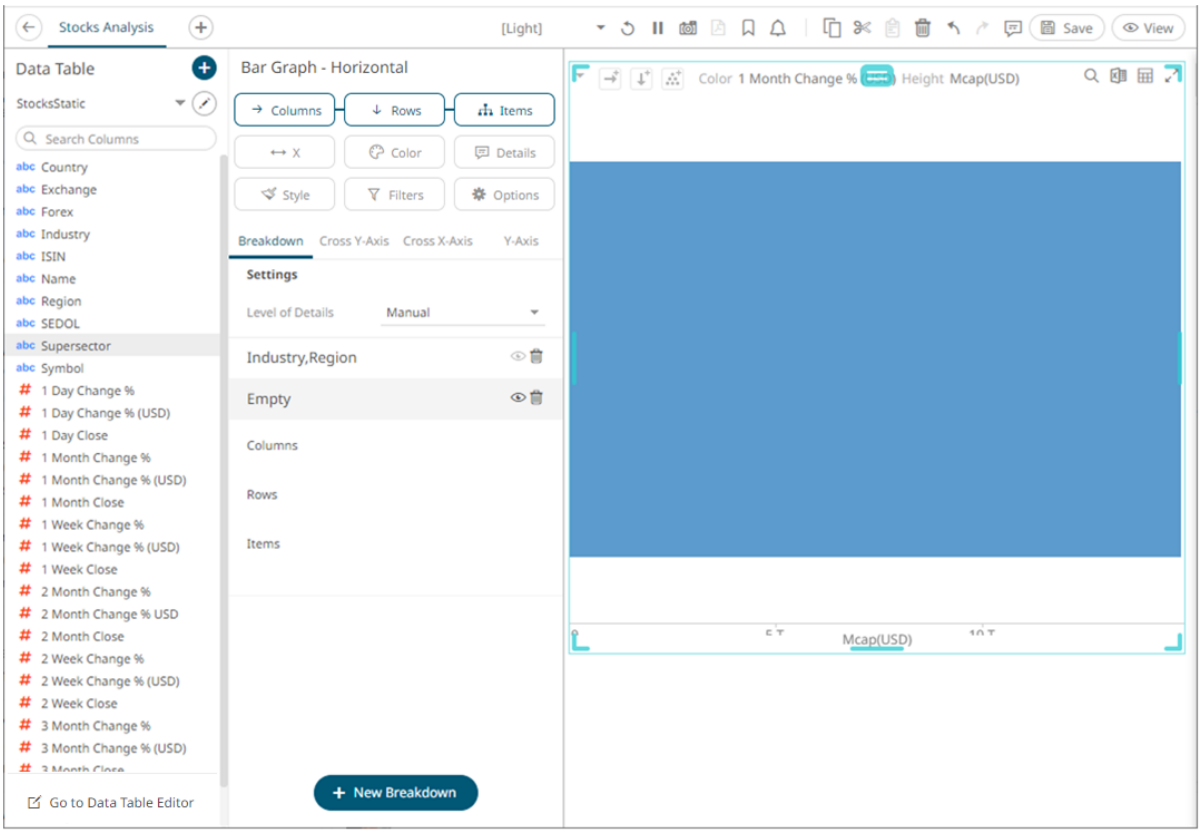
You can define several breakdowns for a visualization.

Steps:

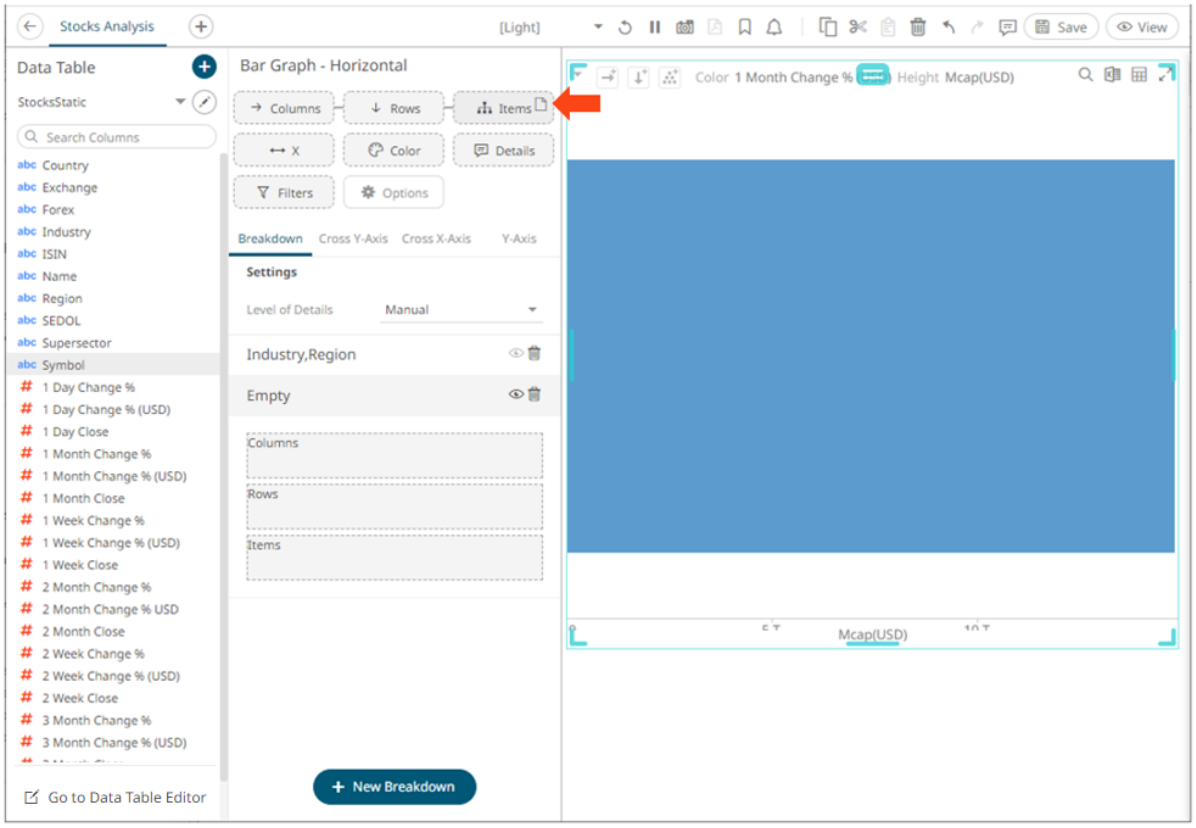
1. Under the **Breakdown** tab, click **New Breakdown** + New Breakdown .



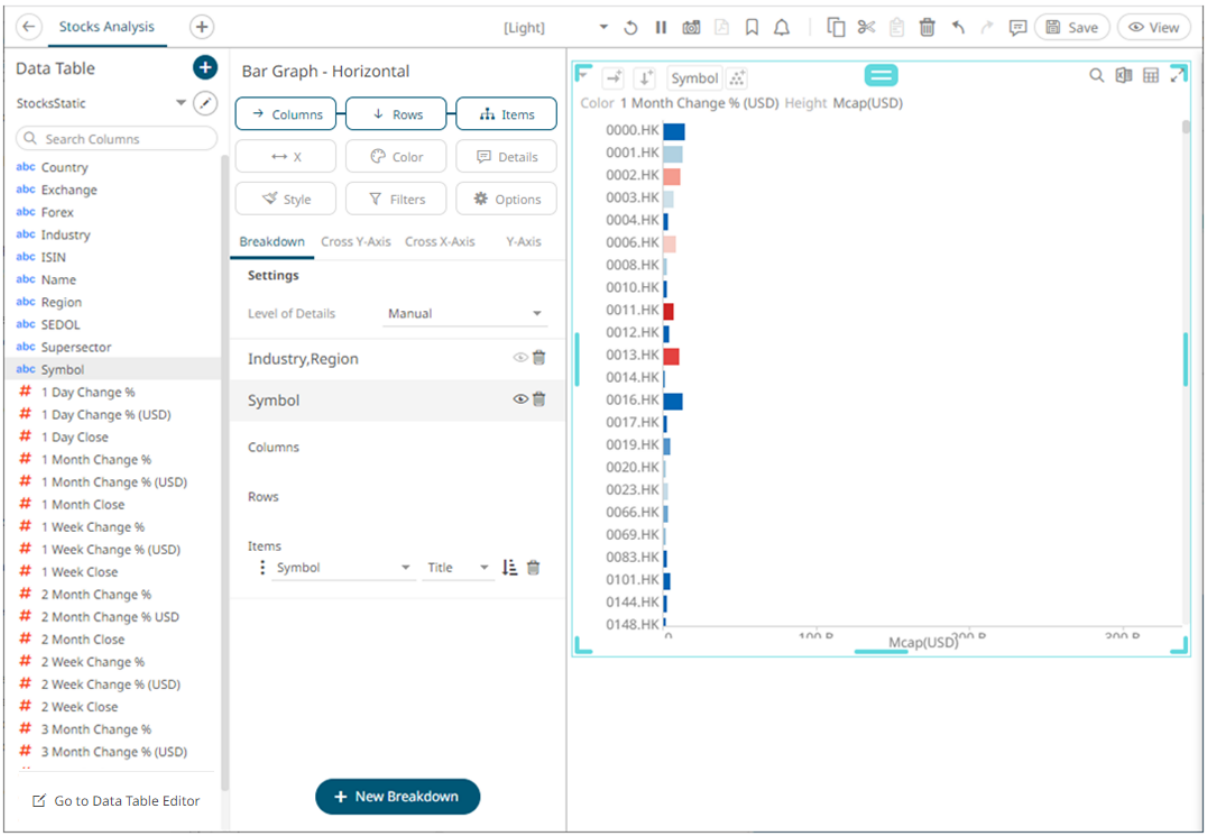
A new **Empty** breakdown definition is added under the **Breakdown** tab with the **View** icon turned on. The visualization also shows a single bar.



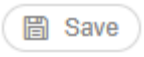
2. To add more breakdown levels, drag text columns to the *Items* pill or drop area.

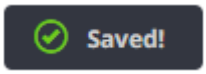


After dragging a data column to a breakdown, this will break apart the aggregated data into separate bars and the column is added under the *Items* drop area of the **Breakdown** tab and *Breakdown* section of the visualization. Also, the dragged column will replace the *Empty* state name.



You can have as many levels in the breakdown as you like, although best practice is to limit the hierarchy to five or fewer levels.

3. Click the **Save**  icon on the toolbar.

When saved, the  notification is displayed.

Selecting Other Breakdowns

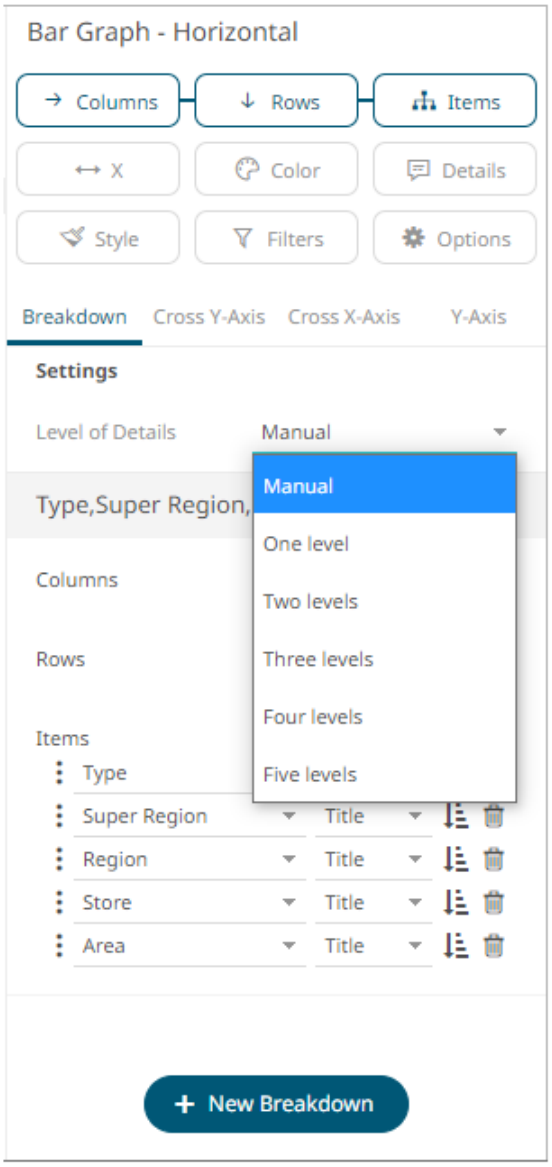
To select the breakdown to use on the visualization, you can either double-click on an instance or click the **View** icon to turn it on  . Note that if there are several breakdowns in a visualization, you must select one to use.

Deleting Breakdowns

Select a breakdown under the **Breakdown** tab of the *Visualization Settings* pane and click  .

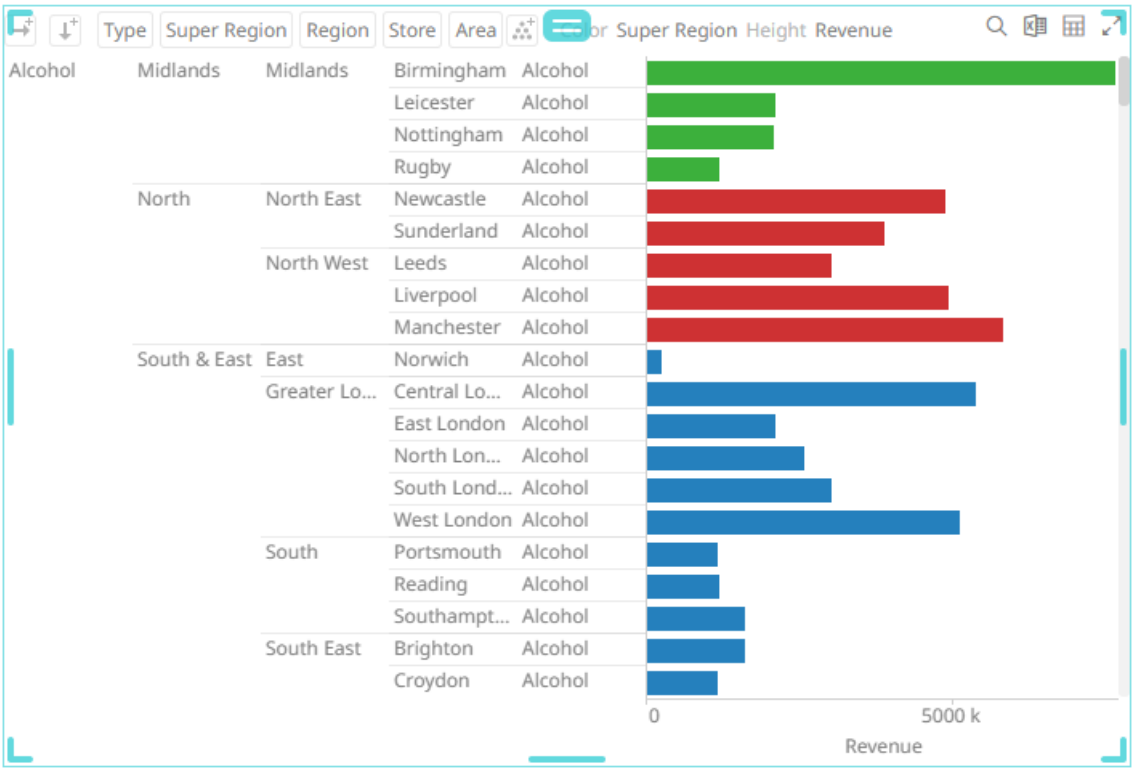
Level of Details

Under the **Breakdown** tab, you can also define the *Level of Details* feature. This setting determines the automatic adjustment of the visible detail when drilling into a hierarchical visualization and restricts how many levels of visible detail can be displayed.



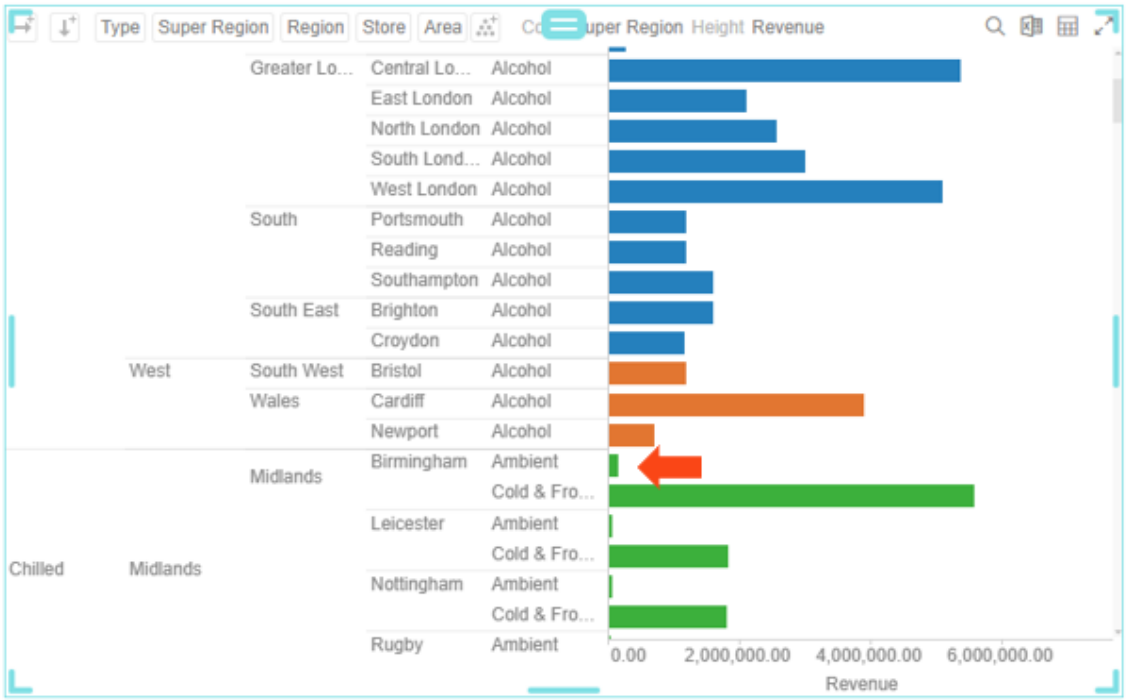
Manual

All levels of the breakdown can be shown.



For the example above, there are five breakdown levels:

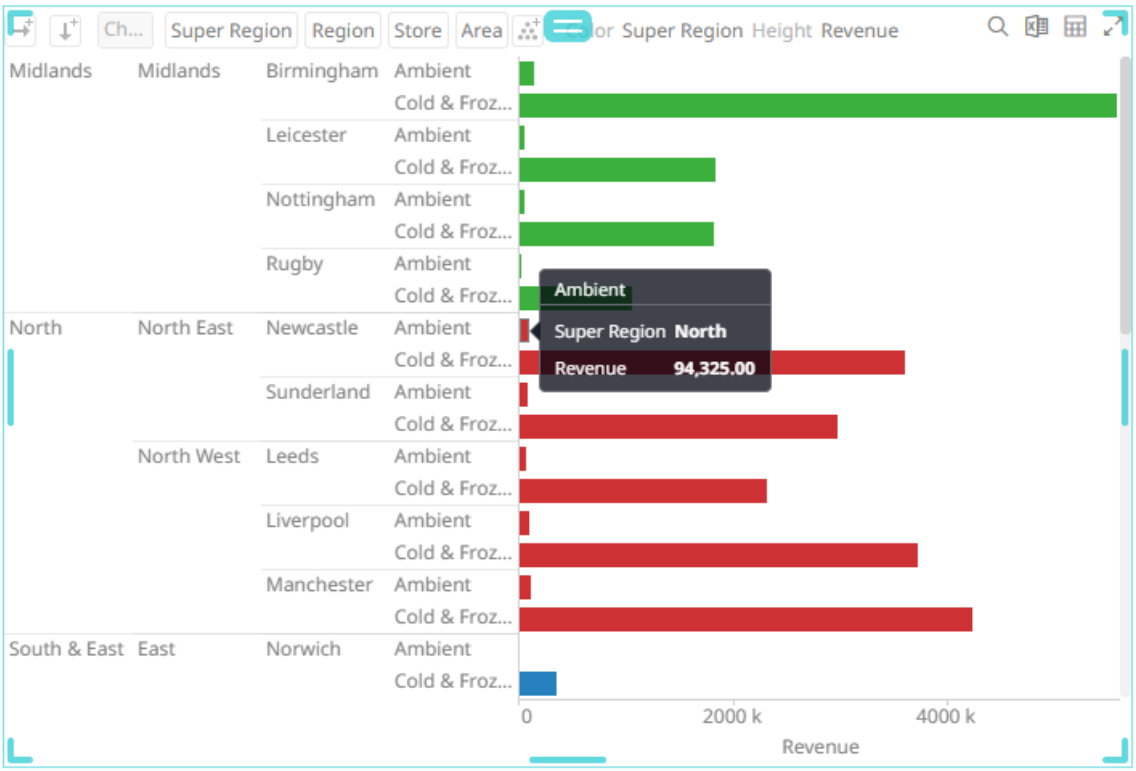
Type > Super Region > Region > Store > Area



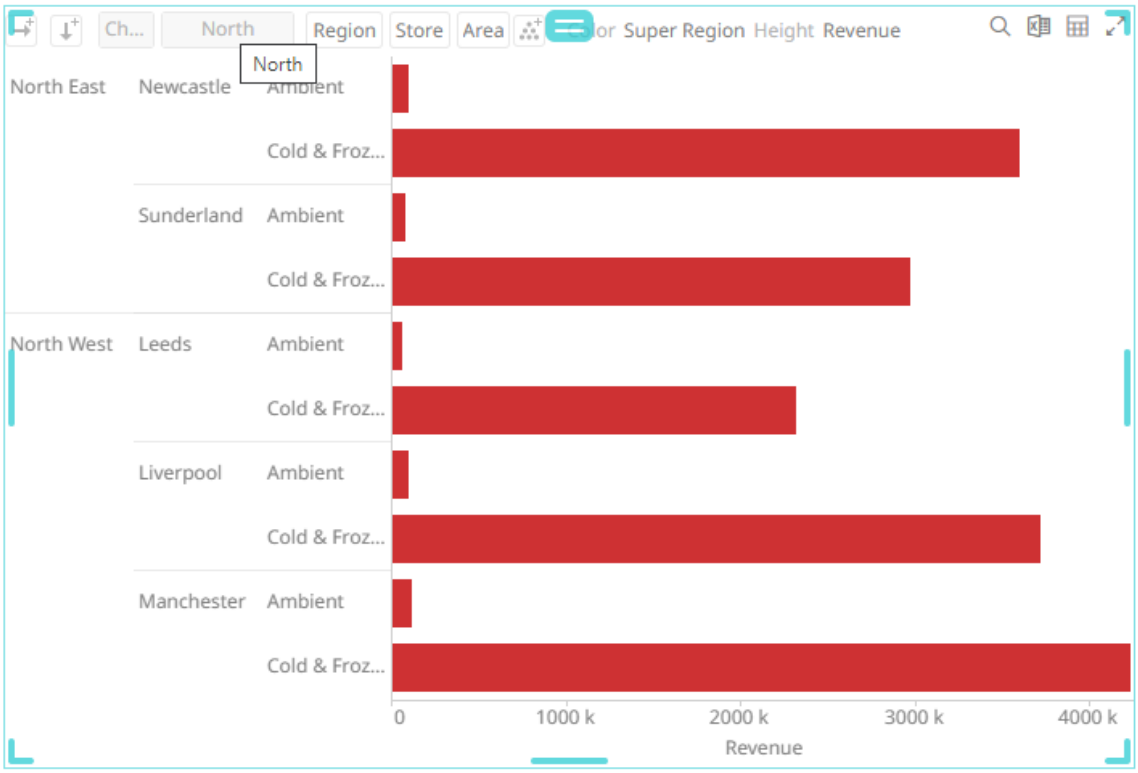
Drilling into the value of the lowest level (**Ambient**) will grey out the topmost level (**Type**) displaying only its value (**Chilled**). Furthermore, the visible details will only display the second to fifth levels (Super Region, Region, Store, and Area):



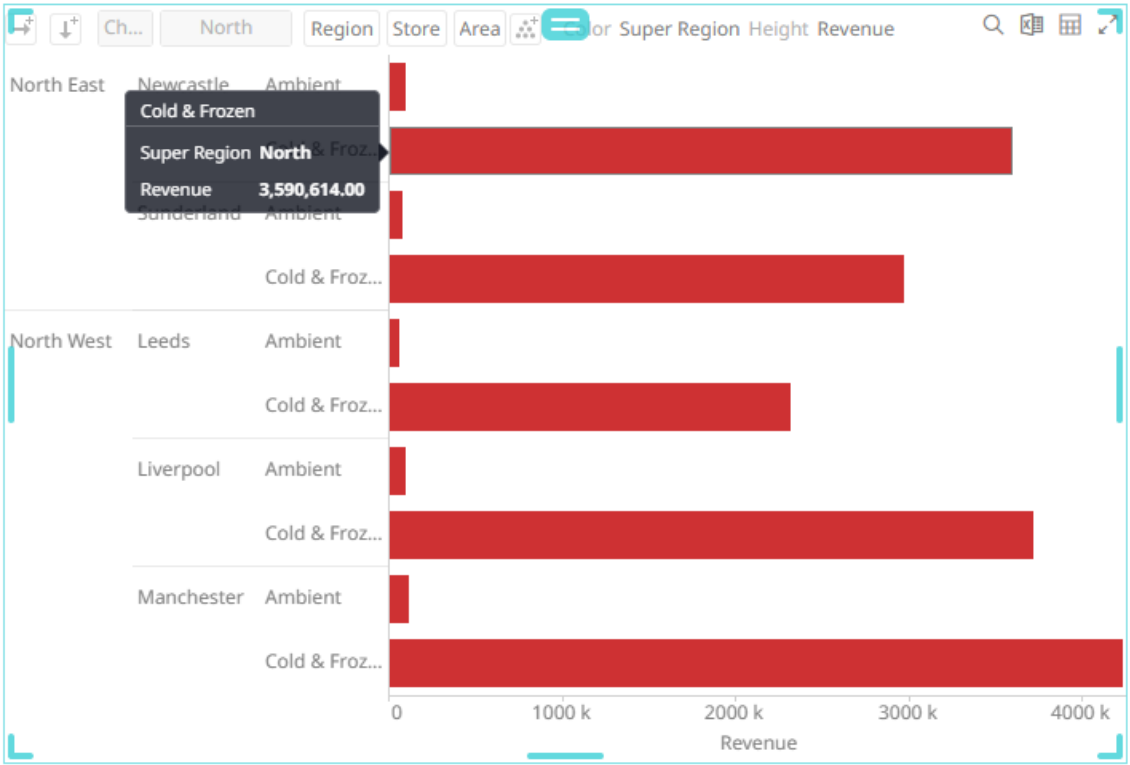
Then drilling into the first **Ambient** value for the **North** Super Region level:



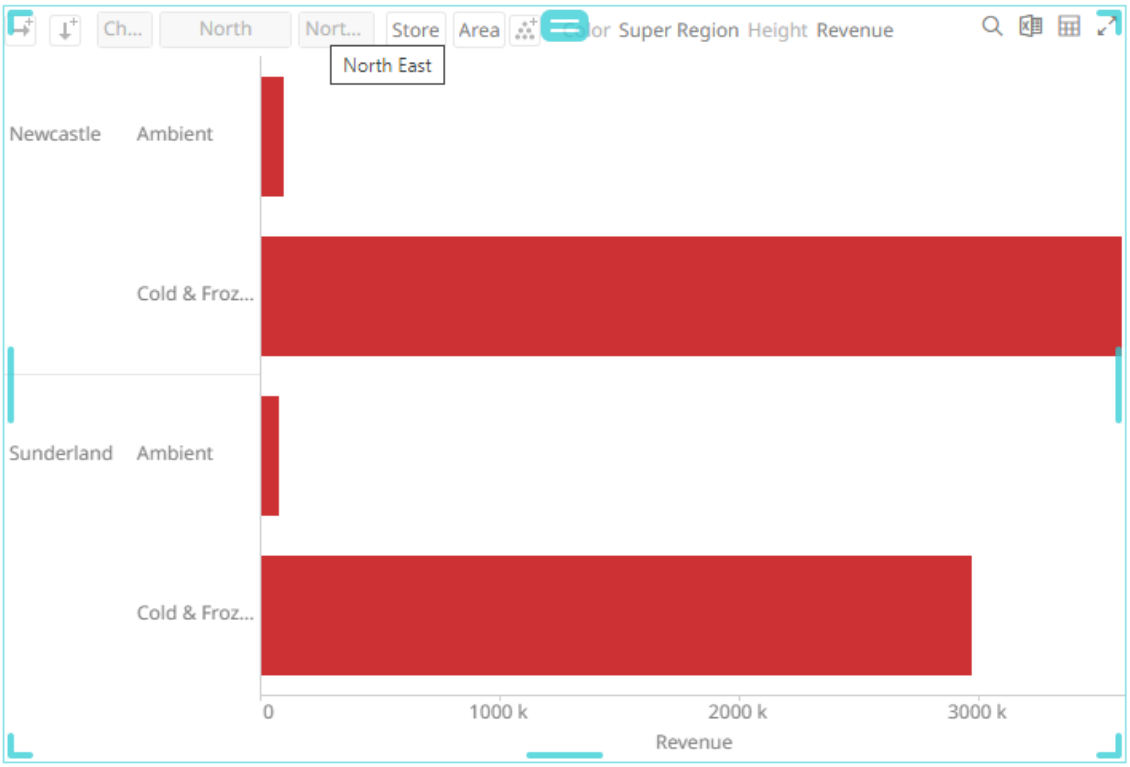
Will grey out the second level (**Super Region**) displaying only its value (**North**). Furthermore, the visible details will only display the third to fifth levels (Region, Store, and Area):



To continue, drilling into the **Cold & Frozen** value for the **North East** Region level:

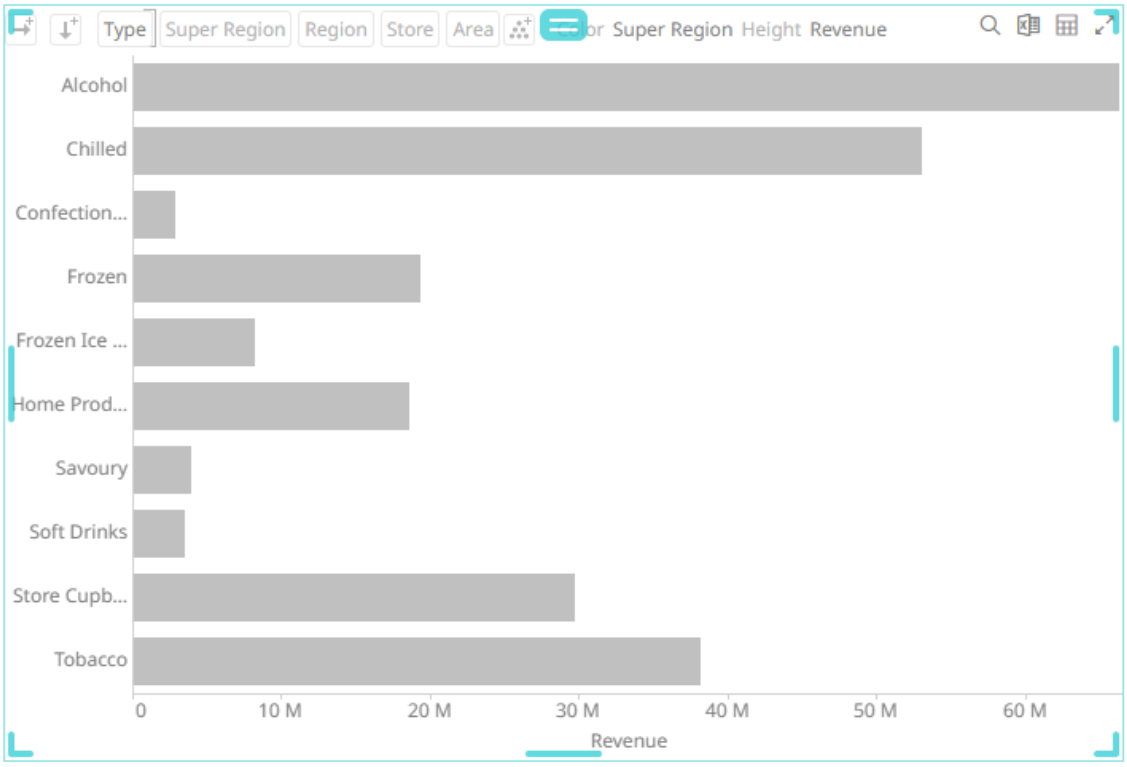


Will grey out the third level (**Region**) displaying only its value (**North East**). Furthermore, the visible details will only display the fourth to fifth levels (**Store** and **Area**):

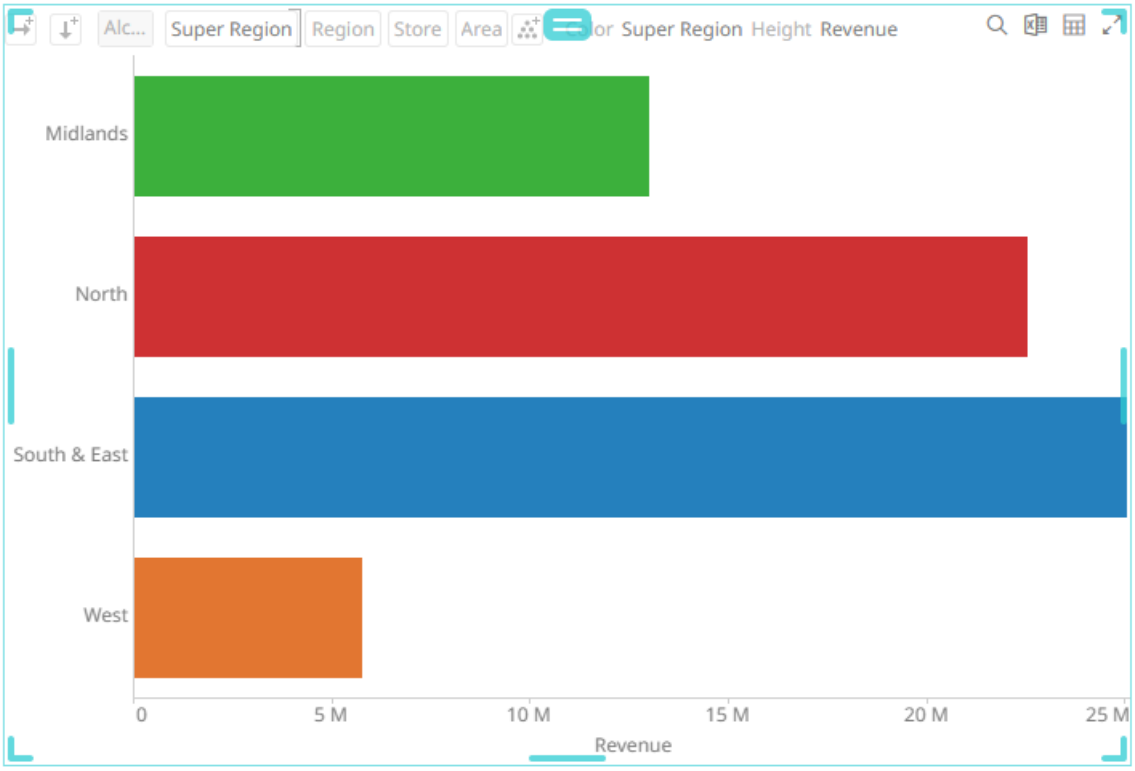


One Level

Only one level will be shown. Initially, the only visible detail will be the topmost level (Type) and the rest of the levels will be greyed out.

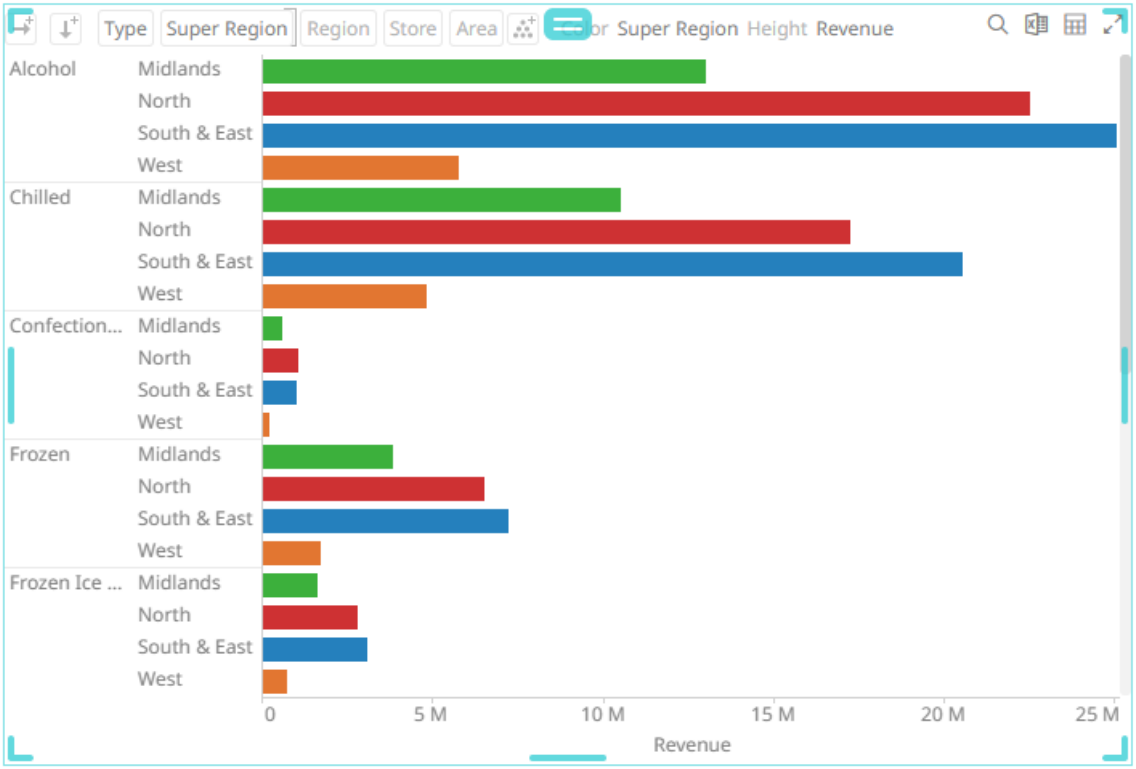


Drilling into an area automatically shows the values of the next level (i.e., Super Region).

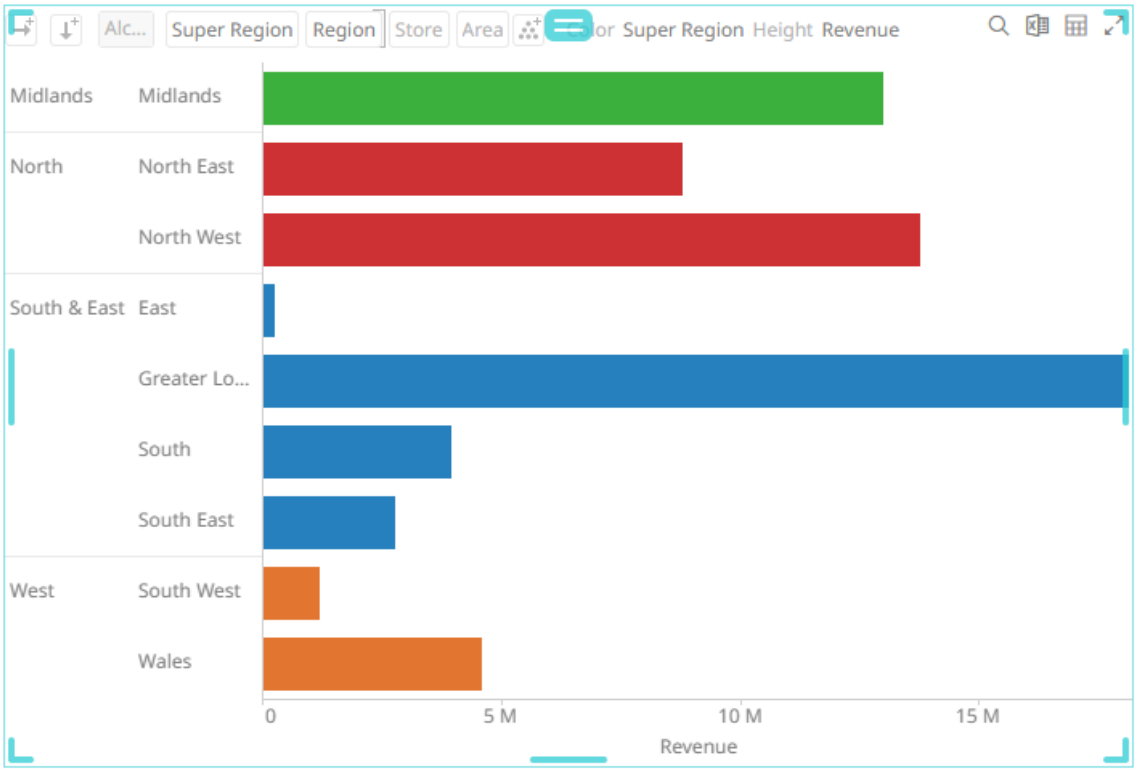


Two Levels

Displays two levels of visible detail.

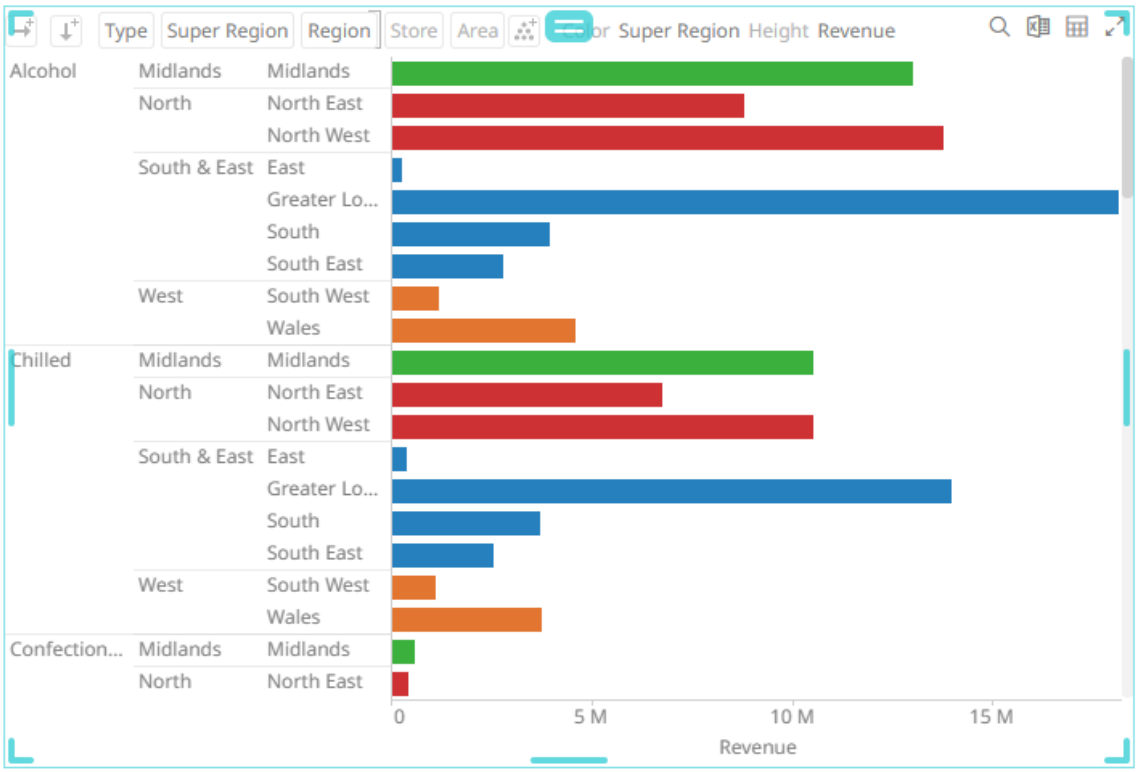


Drilling into an area automatically shows the next two levels of detail.

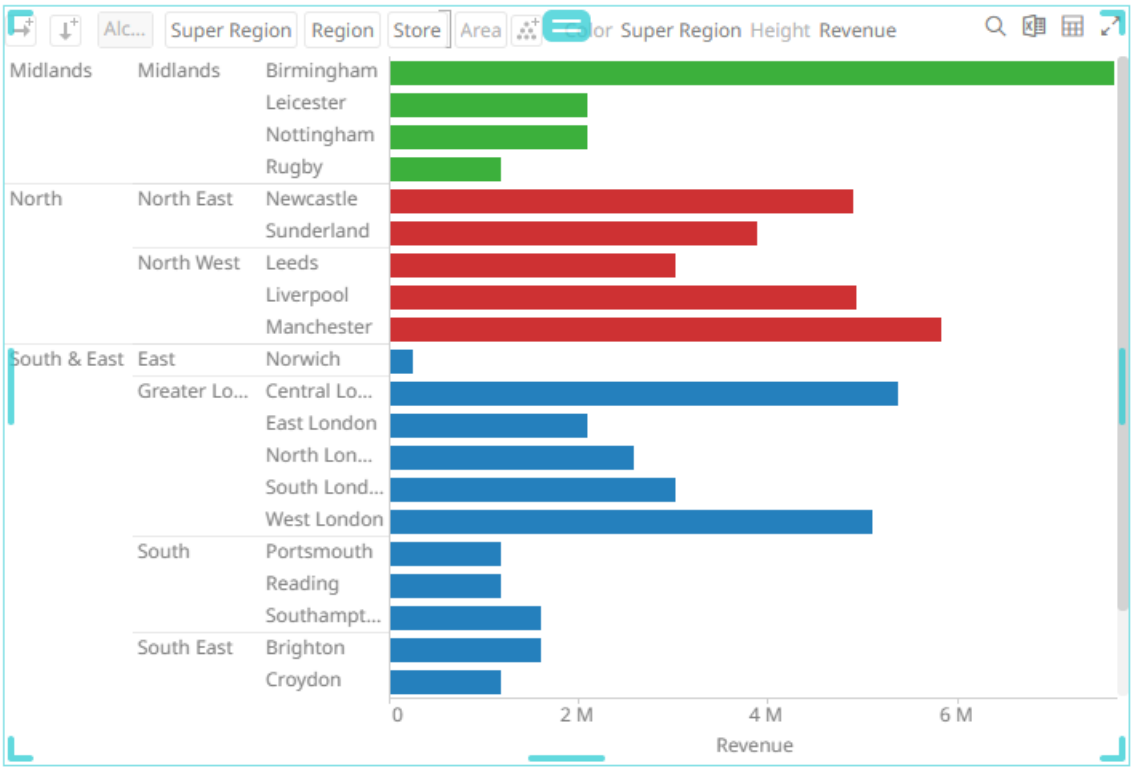


Three Levels

Displays three levels of visible detail.

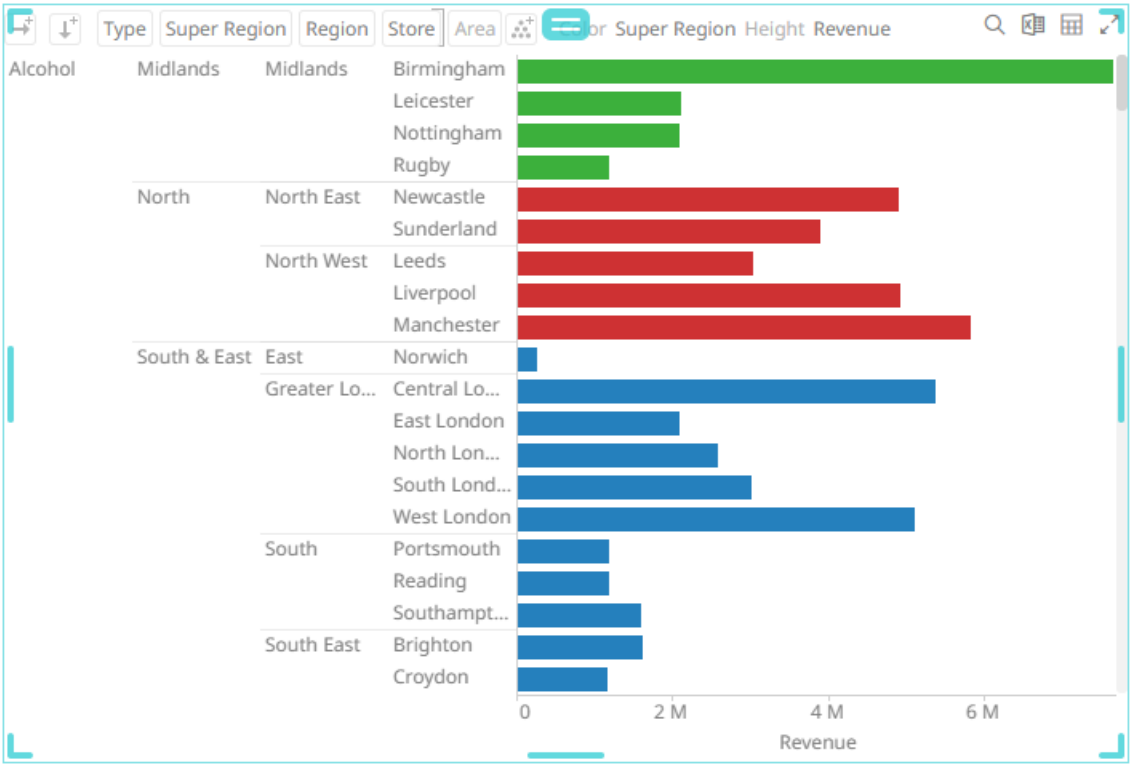


Drilling into an area automatically shows the next three levels of detail.



Four Levels

Displays four levels of visible detail.

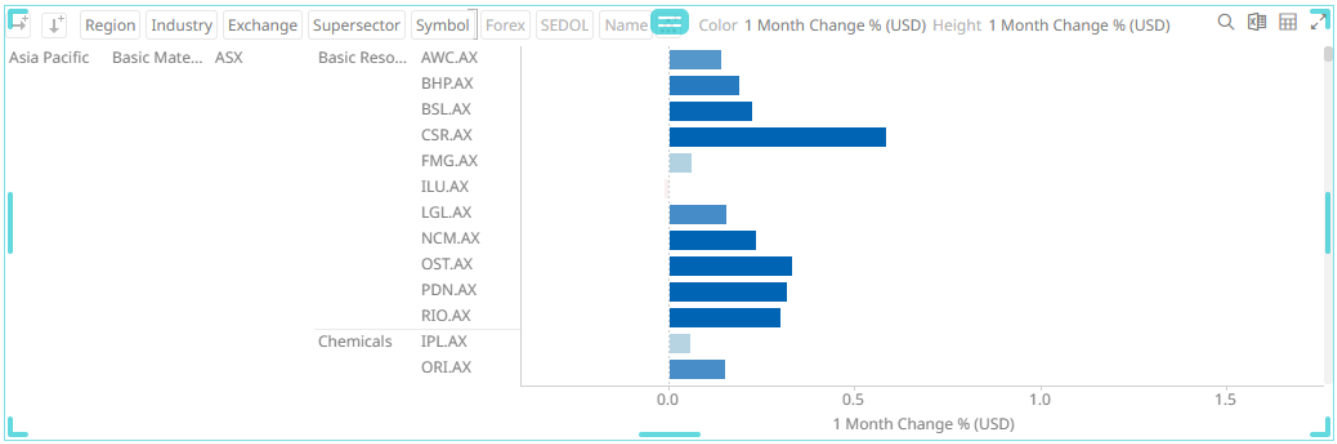


Drilling into an area automatically shows the next four levels of detail.



Five Levels

Displays five levels of visible detail.



Drilling into an area automatically shows the next five levels of detail.



Cross Tabbing

A cross Tab is the division of a single visualization into smaller multiple visualizations across either on rows, columns or both. Each smaller child visualization displays the relevant portion of the data set. It can also be called trellising, or small multiples.

The purpose of a cross tab is to allow comparison across portions of the data set.

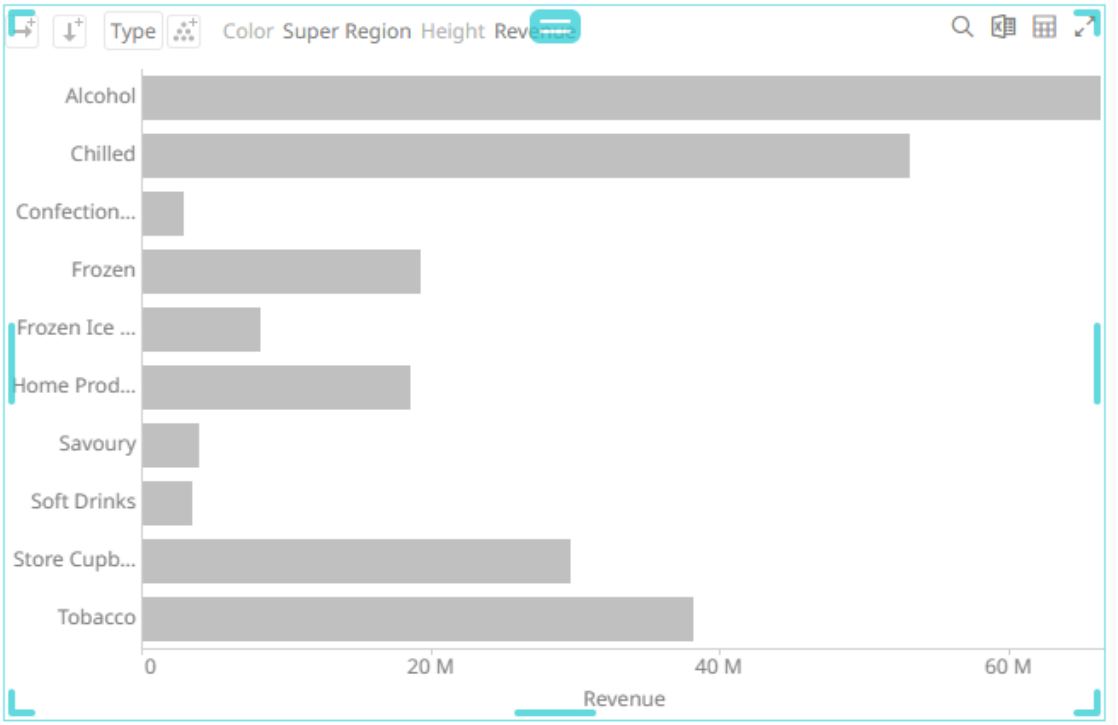
Cross tabbing is available in the following visualizations:

- Bar Graph
- Box Plot
- Bullet Graph
- Candle Stick
- Categorical Line Graph
- Circle Pack
- Donut Chart
- Donut Gauge
- Numeric Stacked Needle
- OHLC Graph
- Order Book
- Pareto Chart
- Pie Chart
- Price Band
- Scatter Plot
- Spread Graph

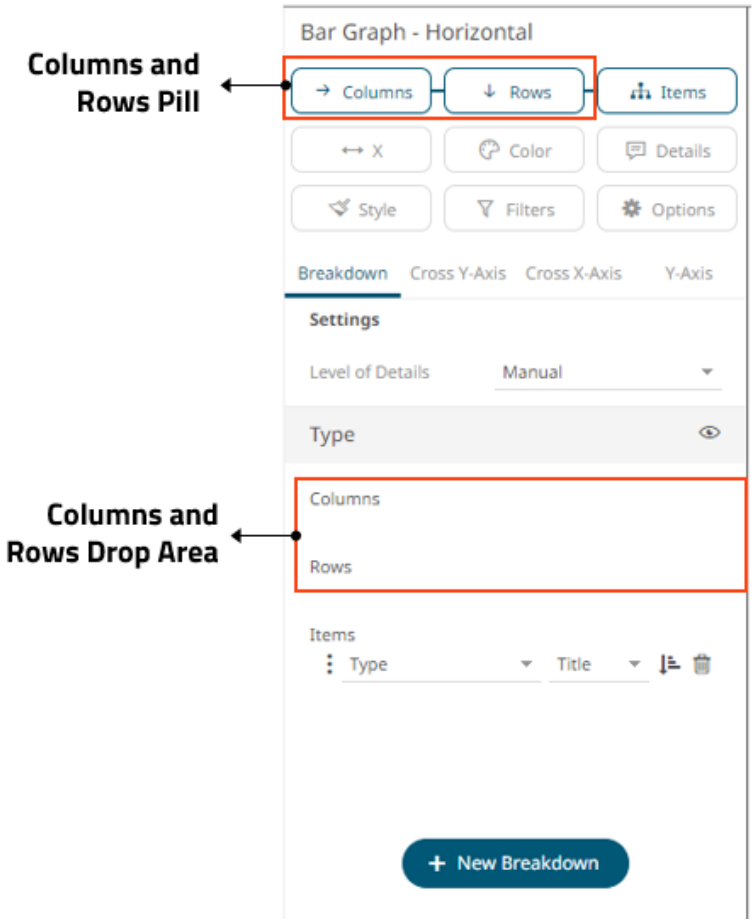
- Dot Plot
- Funnel Chart
- Grouped Needle Graph
- Heat Matrix
- Line Graph
- Needle Graph
- Numeric Needle Graph
- Numeric Line Graph
- Stacked Needle Graph
- Stack Graph
- Ticker Tile
- Treemap
- Time Combination
- Timeseries Scatter Plot
- Waterfall Chart

Steps:

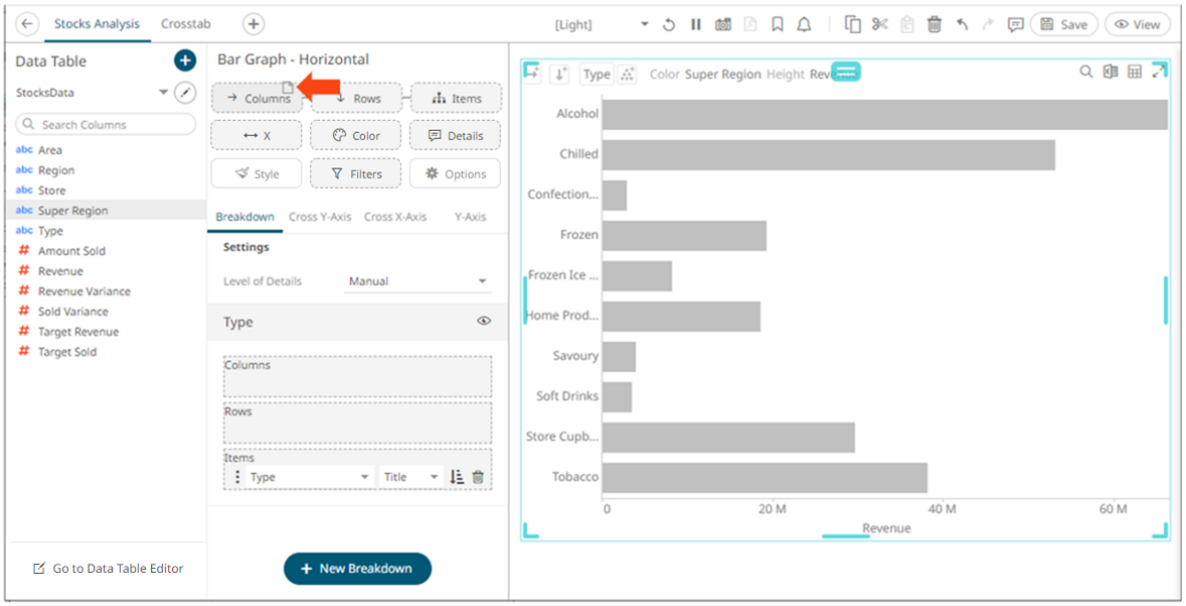
1. Select a visualization that supports cross tabbing like a Bar Graph.



2. To add columns or rows, you can do the following:
   - drag text fields from the *Data Table* pane to the **Columns** or **Rows** pill or on the drop area under the **Breakdown** tab

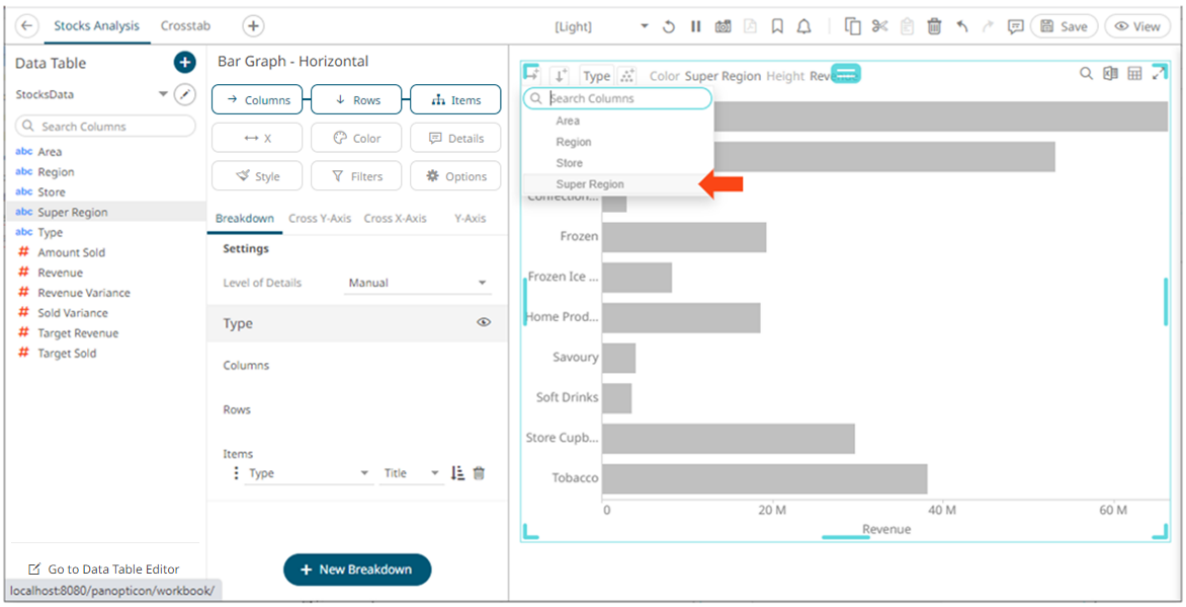


For example:



- or select from the **Rows** or **Columns** buttons on the visualization

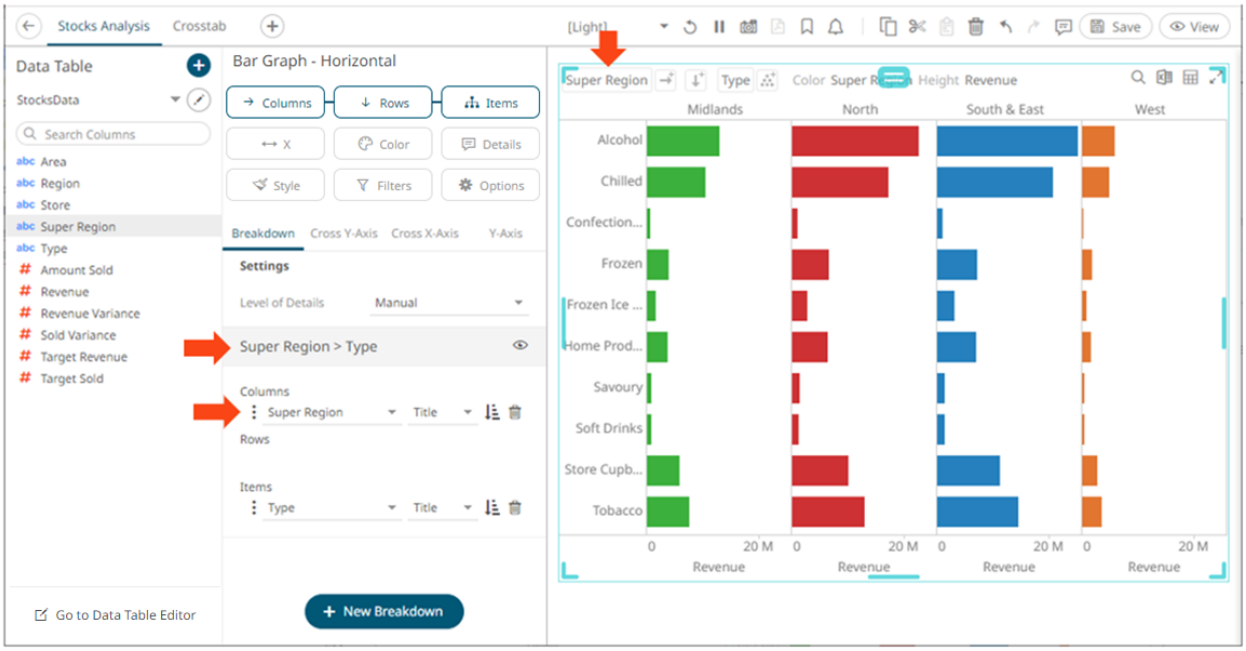
  This example is selecting from the **Columns**  button.



To search for a particular column, enter into the *Search Columns* box. You can also enter one or more characters into the *Search Columns* box and the suggested list of columns that matched the entries will be displayed.

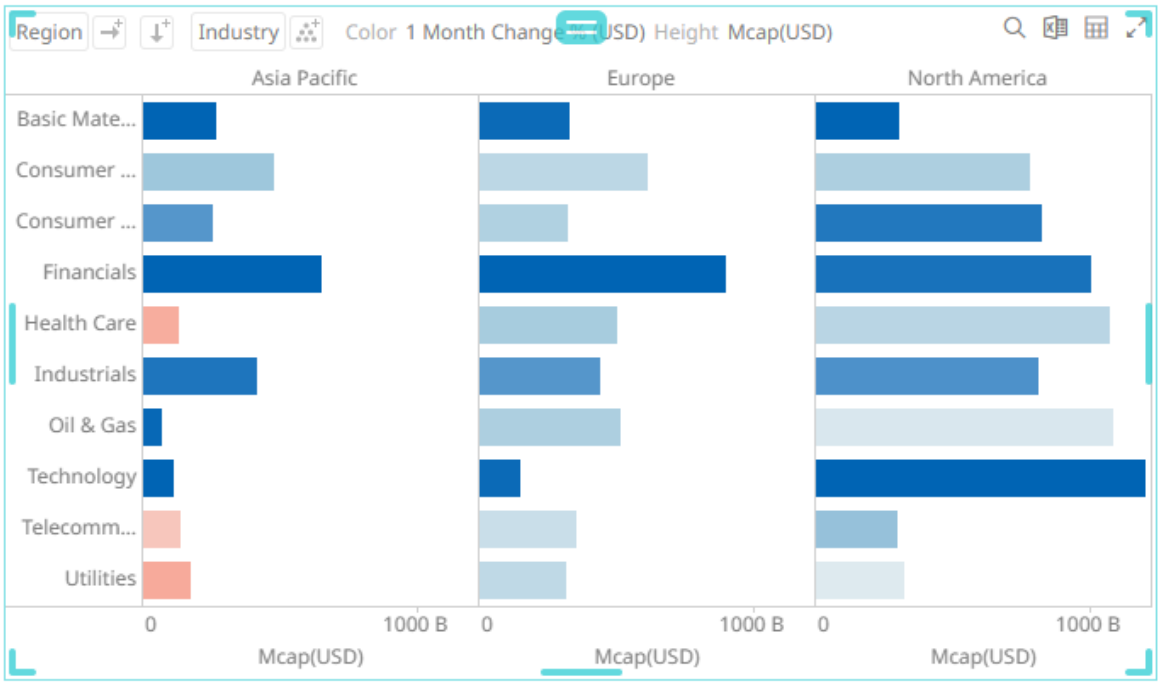
Once dropped or selected, the visualization will be cross tabbed, producing a series of smaller visualizations for each item within the column dropped.

On both instances, the new column is added under the **Breakdown** tab and on the visualization.

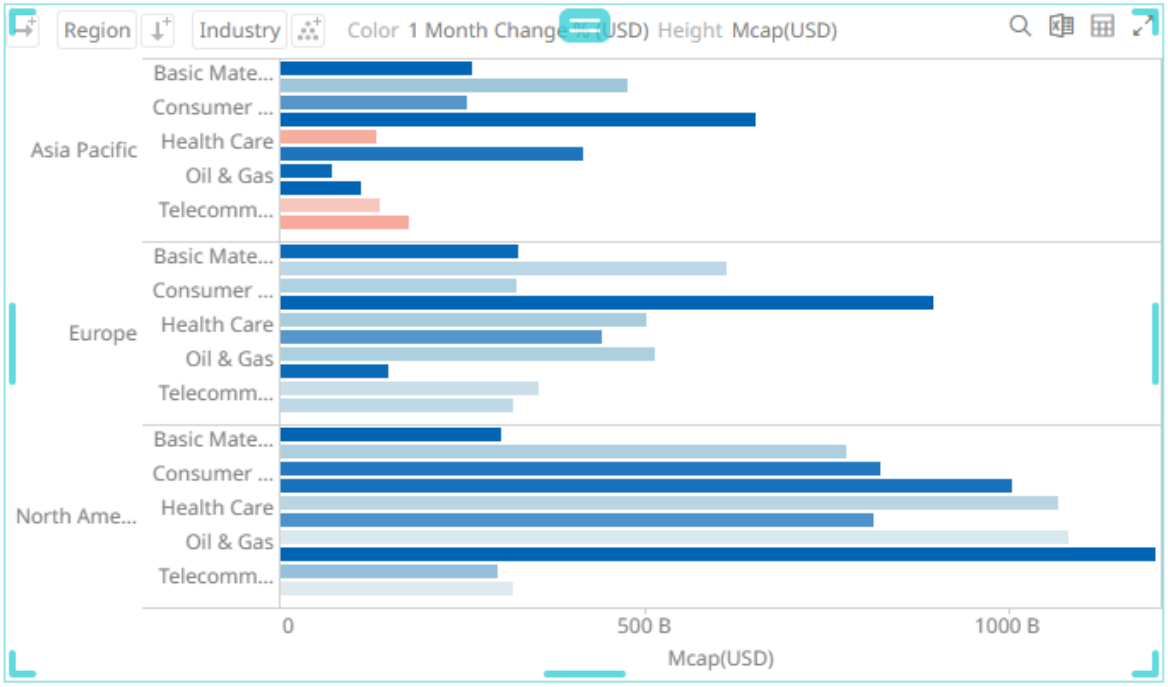


Cross tabs can be across rows, across columns, or across both where two separate cross tabbing dimensions have been selected.

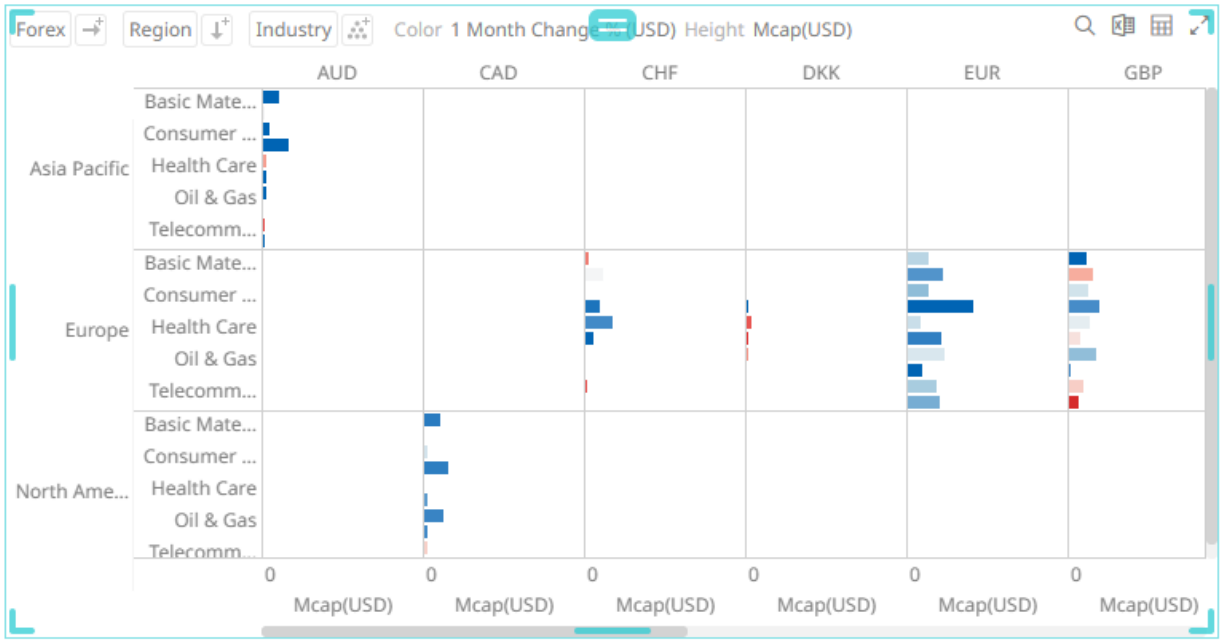
Dropping a text column onto the *Columns* section trellis the visualization horizontally:



While dropping a column onto the *Rows* section trellis the visualization vertically:



And finally dropping columns onto both *Rows* and *Columns* produces a series of smaller trellised visuals. Each showing the specified subset of the overall dataset.


Forex
Region
Industry
Color 1 Month Chang
USD)
Height Mcap(USD)
AUD
CAD
CHF
DKK
EUR
GBP
Asia Pacific
Europe
North Ame...
Basic Mate...
Consumer ...
Health Care
Oil & Gas
Telecomm...
0
Mcap(USD)

AXES

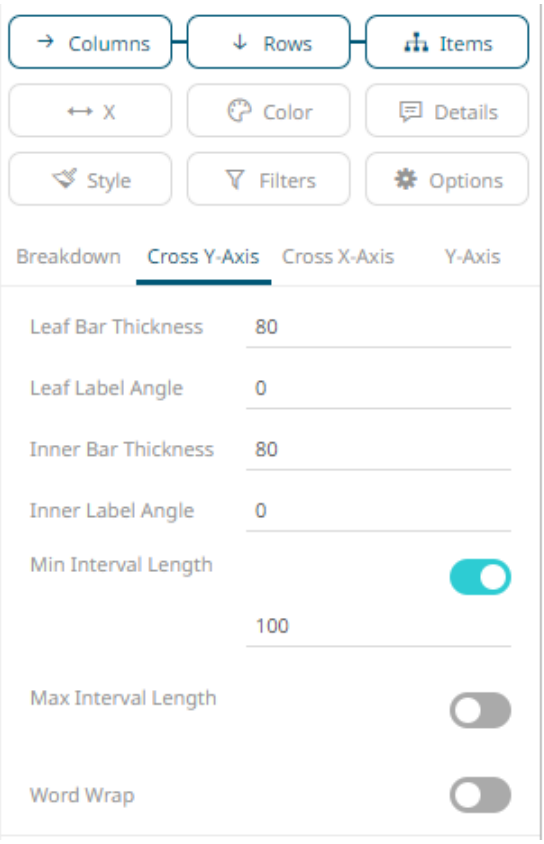
Visualizations have different axes properties, and they can be categorized into:

- Cross Tab Axes
- Visualizations Axes
- Table Visualization Axis

> **NOTE** **Axis definition is not available in the following visualizations: Map Plot, Network Graph, Surface Plot, Surface Plot 3D, Record Graph, Shapes, Timeseries Surface Plot, and Horizon Graph.**

Cross Tab Axes

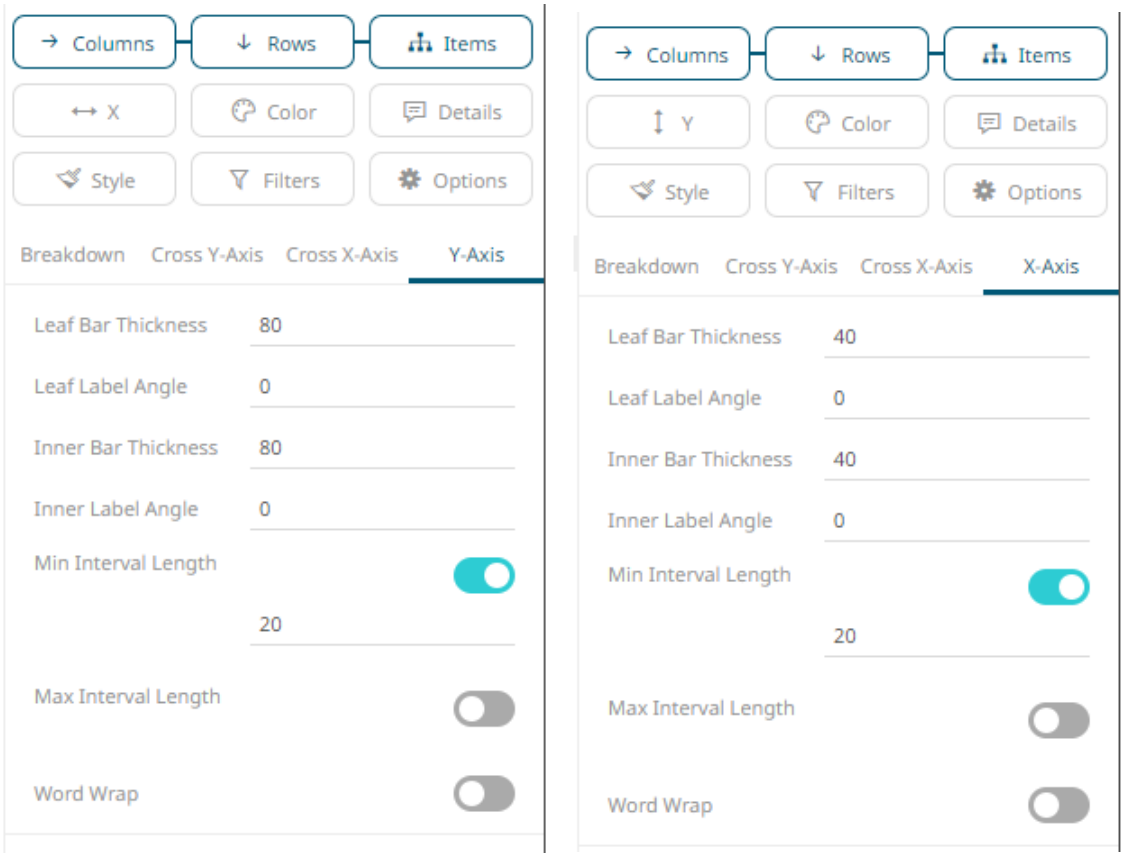
Visualizations that support cross tabbing, include the following settings for both the X and Y axes.



Setting	Description
Leaf Bar Thickness	The thickness of the leaf or lowest level of data. The default value is **80**.
Leaf Label Angle	The Label angle of the leaf or lowest level of data of the crosstab axis. Default is **0**, accepts values between **-90** and **+90**.

Inner Bar Thickness	The width or height allocated for the non-leaf components of the crosstab axis in pixels. Default is **80**.
Inner Label Angle	The angle of the non-leaf labels. Default is **0**, accepts values between **-90** and **+90**.
Min Interval Length	The minimal interval in pixels between cross tabbed visualizations. Default is **100**.
Max Interval Length	The maximum interval in pixels between cross tabbed visualizations. Default is **400**.
Word Wrap	Determines whether to wrap the crosstab axis text.

Visualizations Axes

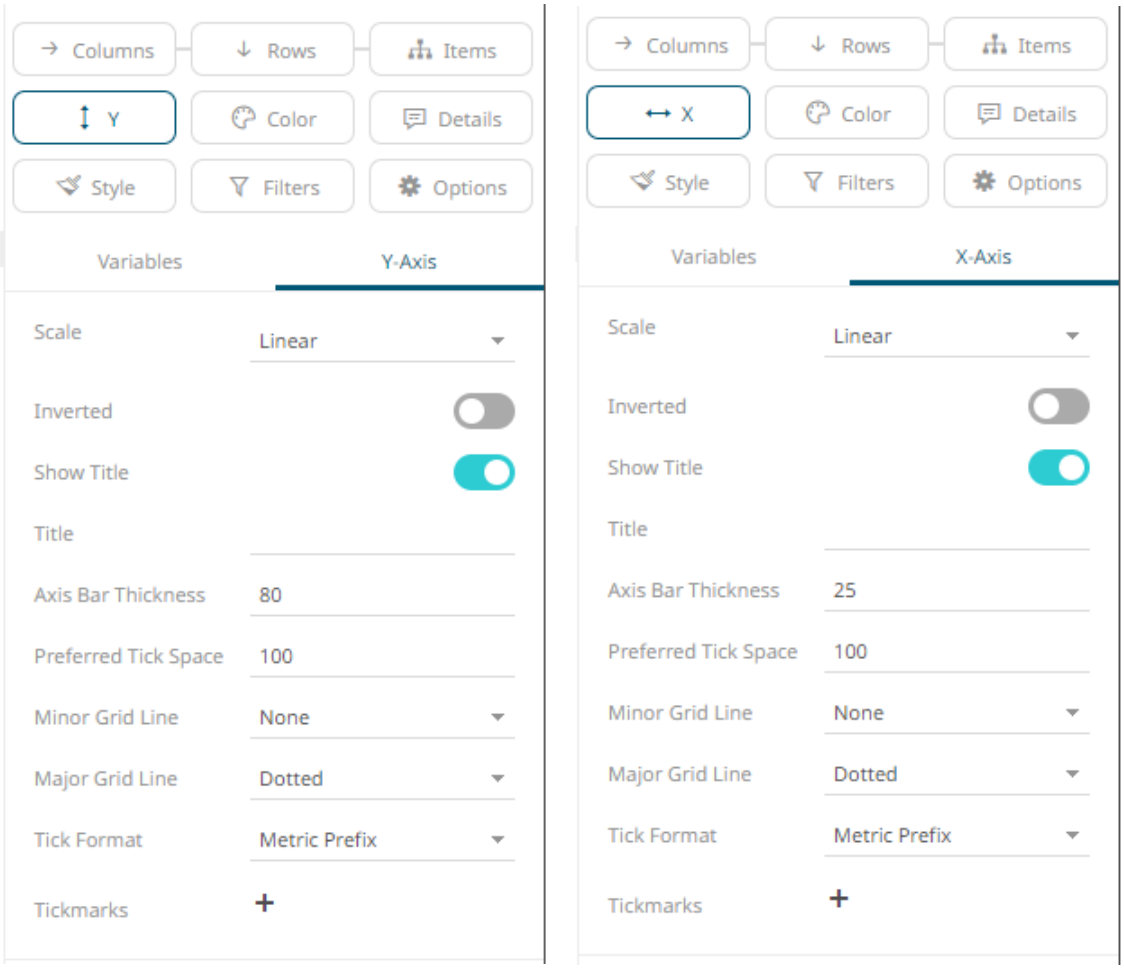


The X and Y axes of visualizations may include the following settings when accessed from the *Breakdown* section:

Setting	Description
Leaf Bar Thickness	The thickness of the leaf or lowest level of data.
Leaf Label Angle	The Label angle of the leaf or lowest level of data of the crosstab axis. Default is **0**, accepts values between **-90** and **+90**.
Inner Bar Thickness	The width or height allocated for the non-leaf components of the crosstab axis in pixels. Default is **80**.

Inner Label Angle	The angle of the non-leaf labels. Default is **0**, accepts values between **-90** and **+90**.
Min Interval Length	The minimal interval in pixels between cross tabbed visualizations. Default is **20**.
Max Interval Length	The maximum interval in pixels between cross tabbed visualizations. Default is **400**.
Word Wrap	Determines whether to wrap the visualization axis text.

Some visualizations may also include the following X and Y axes settings:



Setting	Description
Scale	Determines whether the scale of the axis is **Linear, Log,** or **Power**. • Linear – a change between two values is based on addition e.g., 30, 60, 90, 120, 180, etc. • Log - a change between two values is perceived on the basis of the ratio of the two values or based on multiplication. Once selected, the *Base* control displays with the value of the common base for the logarithmic scale (i.e., **10**).

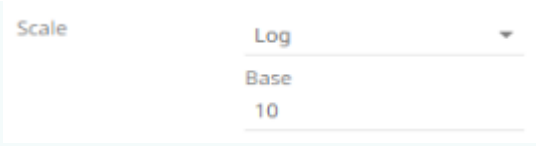
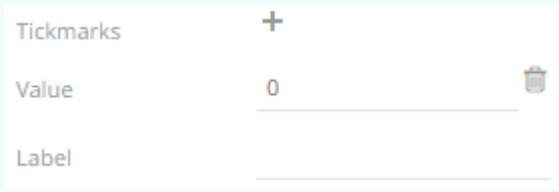
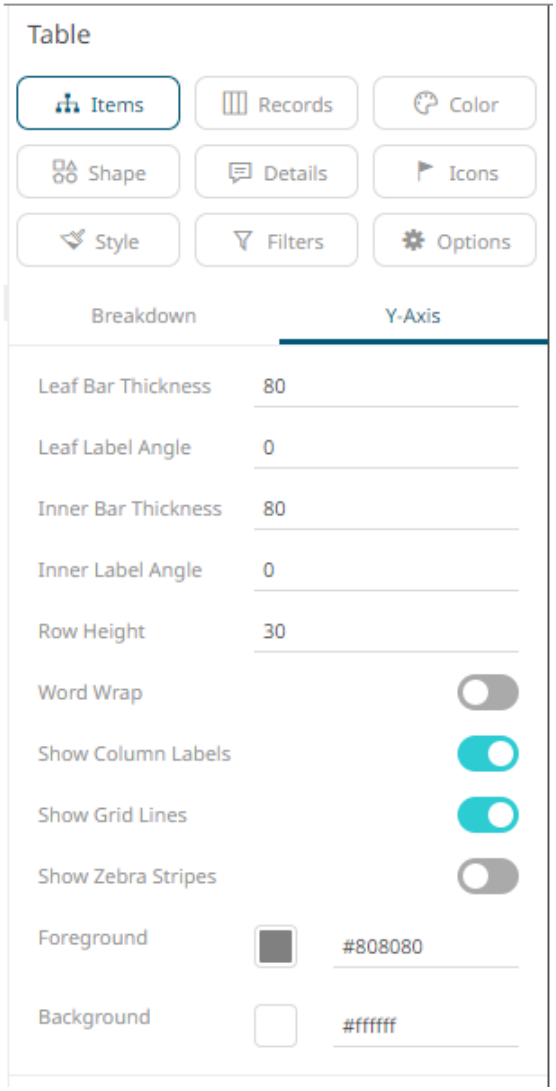
	 For example: `log10(x)` represents the logarithm of x to the base 10 e.g., 1, 10, 100, 1000, etc. You can opt to enter a new *Base* value then click ✓. **NOTE:** Value cannot be lower than 2. • Power – Works according to the `SIGN(MEASURE)*LOG10(MAX(1, ABS(MEASURE)))` formula. Works like the Log scale except it can handle negative values and every value between -1 and 1 is set to 0. For example, for values between -100 and 100, the axis will be: -100, -10, 0, 10, 100
Inverted	Determines whether the Y or Height axis (for Vertical) or X or Width axis (for Horizontal) is inverted.
Show Title	Displays an *Axis Title* label. When enabled, you can opt to enter a custom *Title* for the axis which will override the title of the visualization variable.
Axis Bar Thickness	The margin in pixels for the axis. If set to zero, the axis is removed.
Preferred Tick Space	The preferred space in pixels between the minor grid lines across the axis.
Minor Grid Line	How minor grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Major Grid Line	How major grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Tick Format	Set to **From Variable** to use the format string that is on the current variable displayed in the axis. Set to **Metric Prefix** to format the Tick labels in the numeric axes using the metric prefixes.
Tickmarks	Click + to add and set tick marks.  Enter the *Value* and the *Label*. Click + to add more or 🗑 to delete.

Table Visualization Axis

The Y axis of the Table visualization includes the following settings:



Setting	Description
Leaf Bar Thickness	The thickness of the leaf or lowest level of data. Default is **80**.
Leaf Label Angle	The Label angle of the leaf or lowest level of data of the crosstab axis. Default is **0**, accepts values between **-90** and **+90**.
Inner Bar Thickness	The width or height allocated for the non-leaf components of the Table axis in pixels. Default is **80**.
Inner Label Angle	The angle of the non-leaf labels. Default is **0**, accepts values between **-90** and **+90**.
Row Height	Defines the height of table rows in pixels. For tables created in versions before 2021.1 the configured “Minimum Interval Length” is used. Default is **30**.
Word Wrap	Determines whether to wrap the visualization axis text.

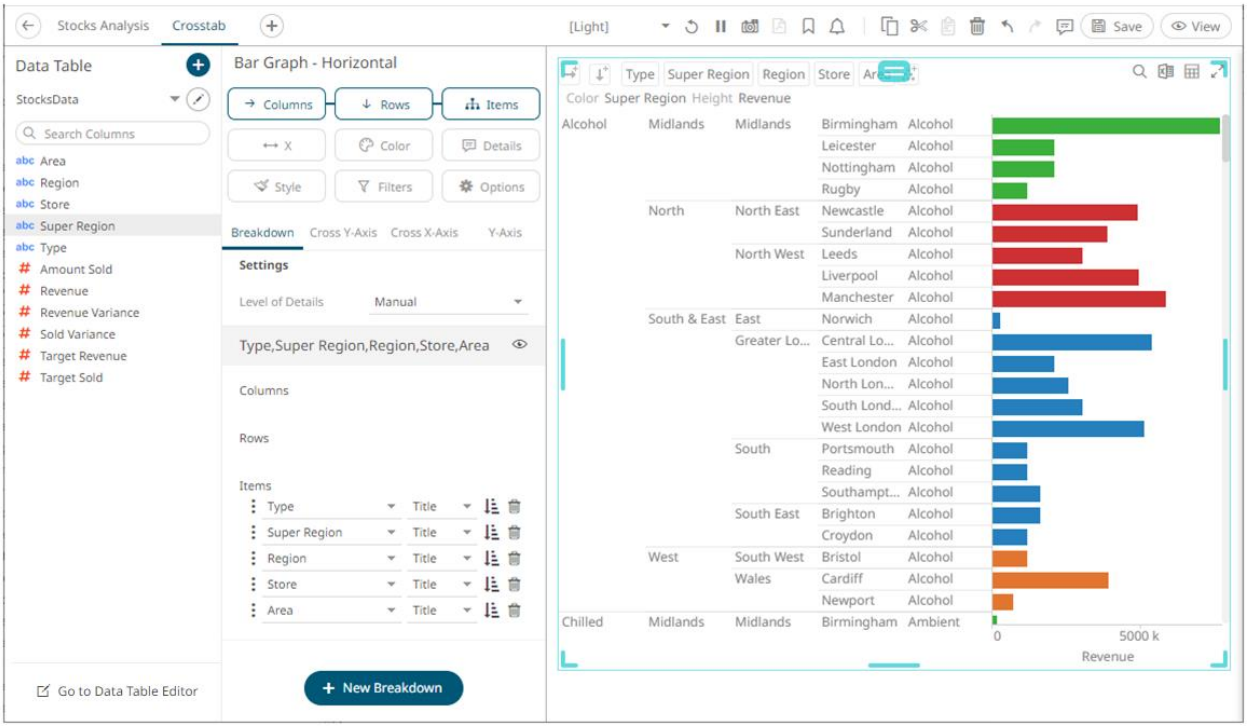
Show All Column Levels	Determines whether the space in the text axis should be allocated to all hierarchy levels, whether visible or not.
Show Column Labels	Determines whether column labels are visible or not. Enabled by default.
Show Grid Lines	Determines whether grid lines are visible or not.
Show Zebra Stripes	Determines whether to display alternating row colors (like zebra stripes) in the table.
Foreground	Foreground color of the Y-axis.
Background	Background color of the Y-axis.

VISUALIZATION STATIC FILTER

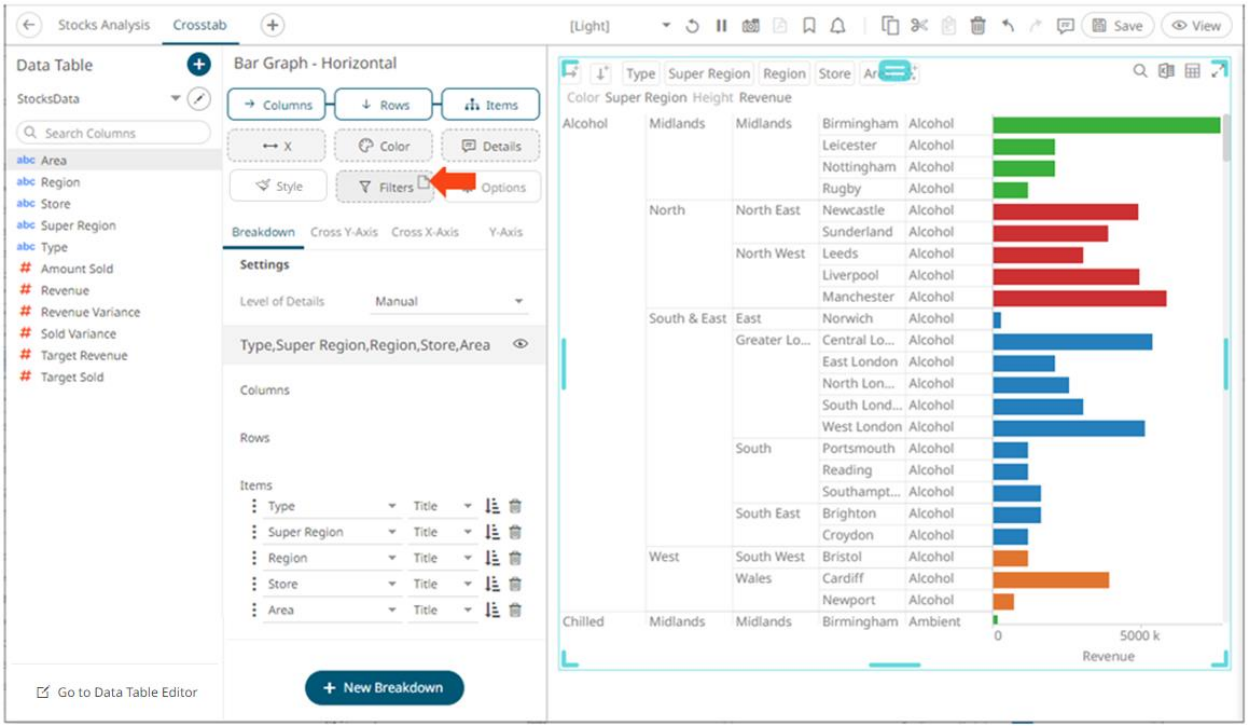
You can define a filter to a visualization based on a specific subset of the available data.

Steps:

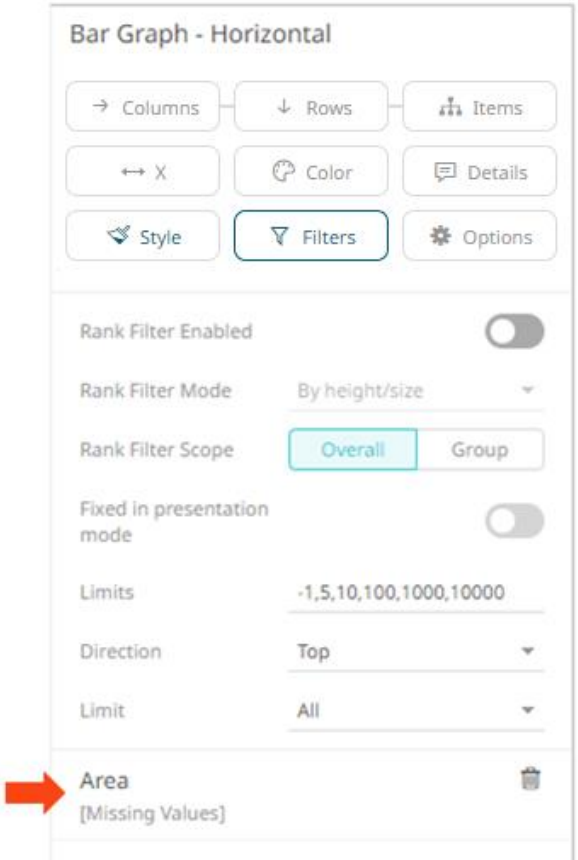
1. Click on a visualization to display its *Properties* pane.



2. To add to the filter, drag text columns from the *Data Table* pane to the **Filter** drop area.

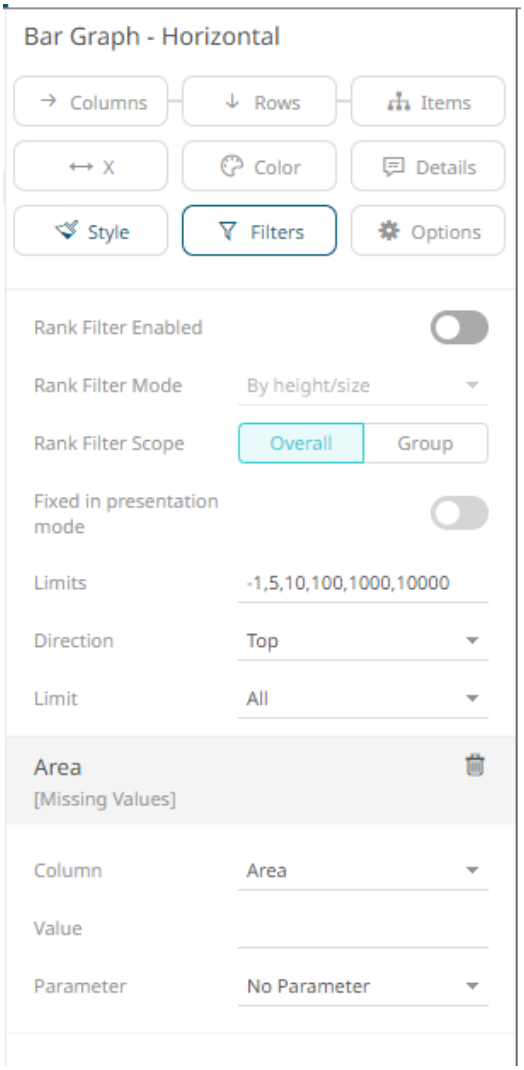


3. The column is added and the *Visualization Settings* pane changes to display the *Filter* properties.



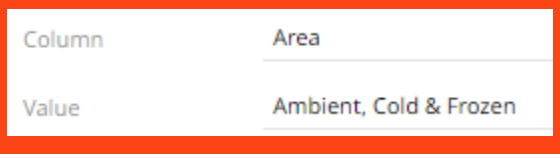
Initially, there are no values added for the filter column.

4. Click on the filter column. The pane changes again.



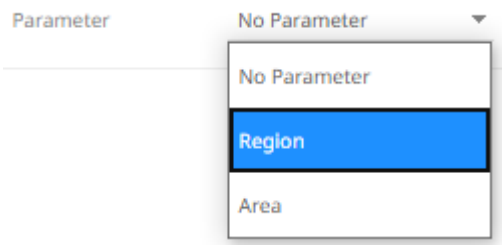
5. Enter the *Value*.

NOTE **You can add more than one value for a column. For example:**

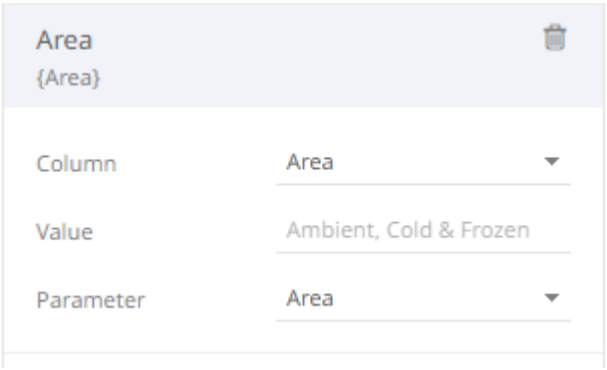


The visualization is updated based on the filter column values.

6. You can opt to select a set dashboard parameter from the *Parameter* drop-down list.

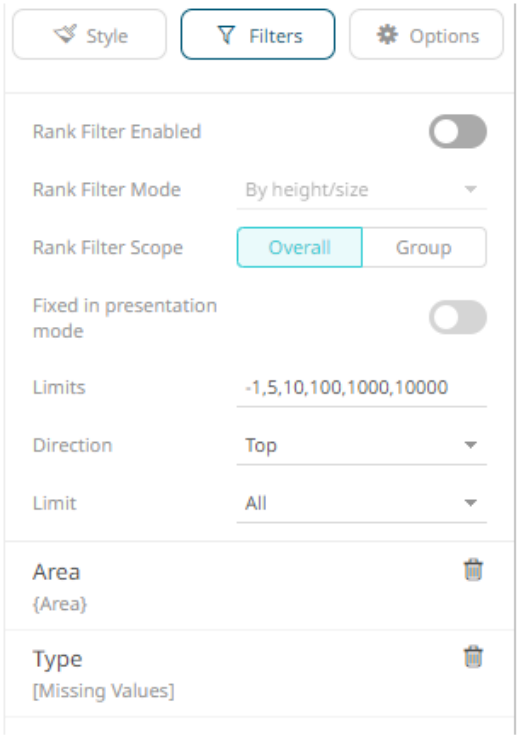


This will overwrite the entered filter values.

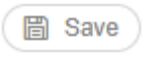


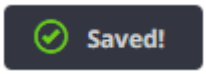
NOTE **The selected parameter must have values that are available on the filter column.**

7. Drag and drop other text columns to add more filters.



8. Repeat steps 4 to 6 to define its value.

9. Click the **Save**  icon on the toolbar.

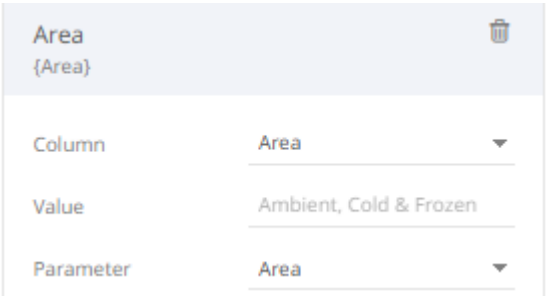
   When saved, the  notification is displayed.

Modifying Visualization Static Filter

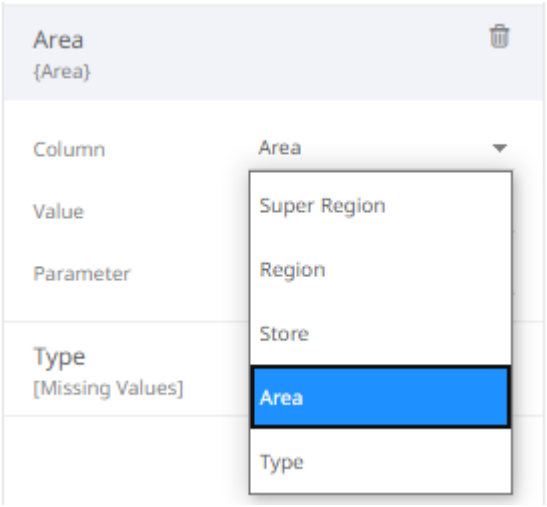
If the column that was dragged and dropped to the **Filter** drop area is incorrect, you can modify it and its value.

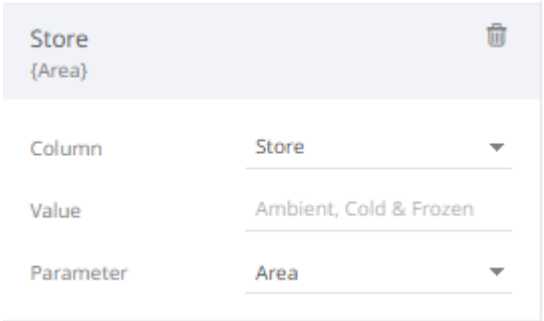
Steps:

1. Click on a filter column.



2. Click on the *Column* drop-down list and select another column.

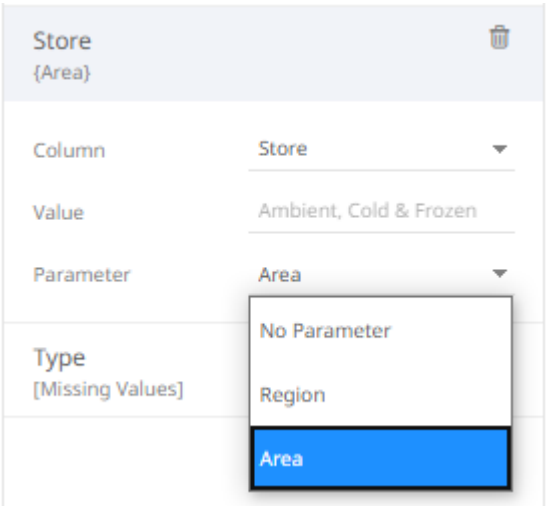




   The visualization now displays a blank graph.



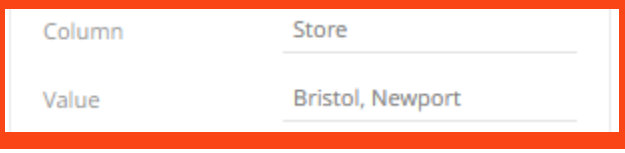
For this example, since the values of the dashboard parameter is not applicable to the new filter column, you can either select **No Parameter** or the applicable parameter in the list.



For this example, select **No Parameter** since the available dashboard parameters (Region and Area) are not applicable to the new filter column (Store).

3. Enter the *Value*.

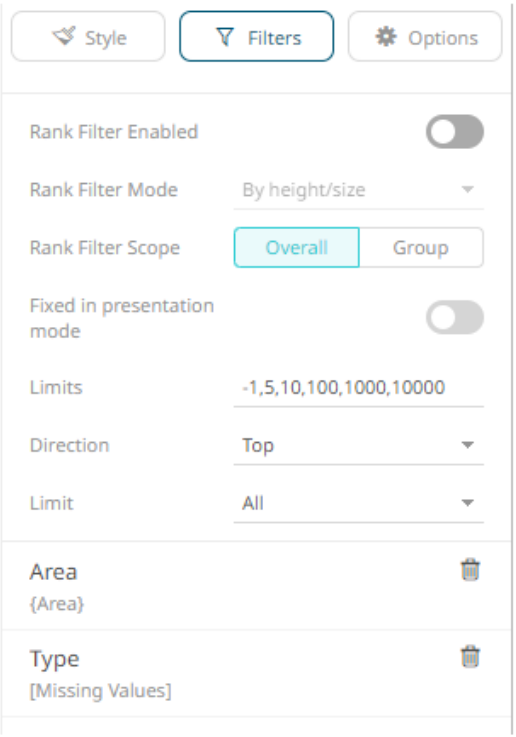
NOTE **You can add more than one value for a column. For example:**



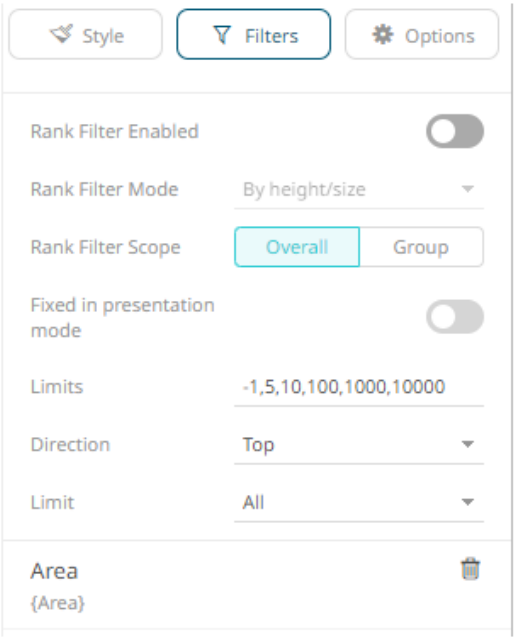
The visualization is updated based on the filter column values.

Deleting Visualization Static Filter

Select a visualization static filter on the list and click the **Delete** button.



The filter is deleted.



RANK FILTERING

Rank filtering only uses the leaf item of the breakdown when creating the ranking. Consequently, this makes the number of items consistent, regardless of the hierarchy. Note that this behavior also applies to crosstabs.

Rank Filter is available in all non-time series visualizations that use the *Size* or *Height* variable:

- Bar Graph
- Bullet Graph – Horizontal & Vertical
- Categorical Line Graph
- Circle Pack
- Dot Plot
- Donut Chart
- Donut Gauge
- Funnel Chart
- Heat Map
- Map Plot
- Network Graph
- Pareto Chart
- Pie Chart
- Scatter Plot
- Treemap
- Waterfall Chart

It is also available in the Record and Table visualizations.

This section discusses the steps and guidelines to set the rank filtering using this sample data table.

Sample Data Table 1: SuperMarket

Region	Area	Type	Amount Sold	Revenue
South West	Ambient	Store Cupboard	4,885.00	550,697.00
South West	Ambient	Home Products	2,314.00	323,094.00
South West	Ambient	Savoury	840.00	67,702.00
South West	Ambient	Confectionary	429.00	33,219.00
South West	Ambient	Tobacco	1,975.00	712,467.00
South West	Ambient	Soft Drinks	619.00	56,493.00
South West	Ambient	Chilled	415.00	22,825.00
South West	Cold & Frozen	Frozen	2,084.00	357,953.00
South West	Cold & Frozen	Chilled	9,478.00	1,059,714.00
South West	Cold & Frozen	Frozen Ice Creams	1,169.00	148,791.00
South West	Alcohol	Alcohol	2,916.00	1,170,043.00
Wales	Ambient	Store Cupboard	3,151.00	352,862.00

Wales	Ambient	Home Products	1,450.00	191,889.00
Wales	Ambient	Savoury	487.00	39,249.00
Wales	Ambient	Confectionary	150.00	8,870.00
Wales	Ambient	Soft Drinks	337.00	29,761.00
Wales	Ambient	Tobacco	1,267.00	454,652.00
Wales	Ambient	Chilled	321.00	17,655.00
Wales	Cold & Frozen	Frozen	1,332.00	226,840.00
Wales	Cold & Frozen	Chilled	6,316.00	702,994.00

Other settings on the Treemap visualization:

Breakdown	Size	Color
Type, Area, Region	Amount Sold	Revenue

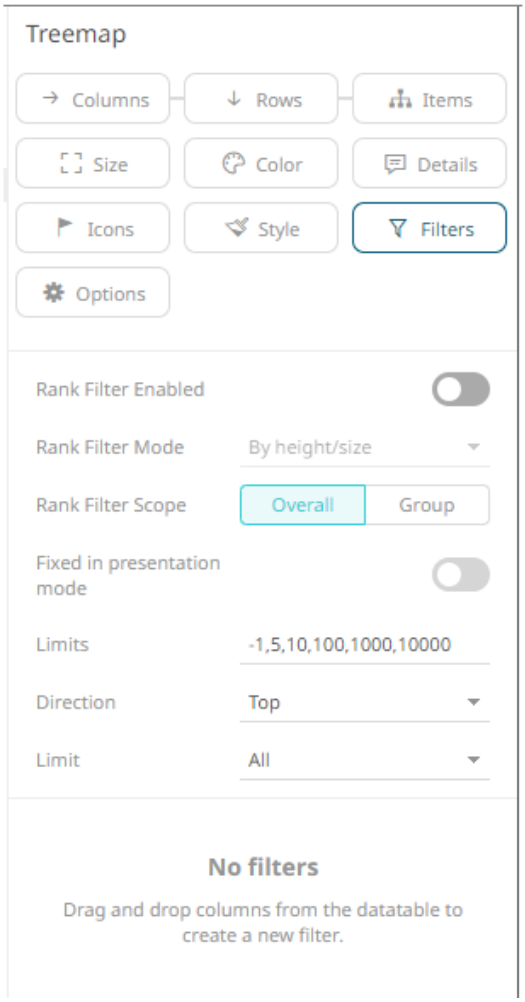
Sample visualization: Treemap before the rank filter



Steps:

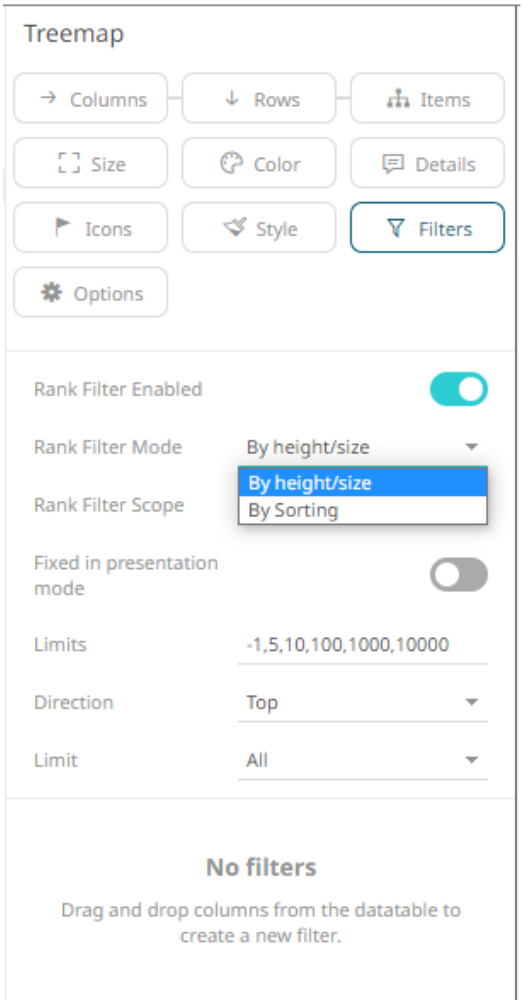
1. Click on a snapshot visualization and then click the **Filters** drop area on the *Visualization Settings* pane.

   The visualization filter properties are displayed.



2. Tap the **Rank Filter Enabled** slider to turn it on.

   The *Rank Filter Mode* drop-down list is enabled.



3. Select either of the *Rank Filter Mode*:
   - By Height/Size

     Allows the visualization to be ranked based on the *Size* or *Height* variable.
   - By Sorting

     Allows the visualization to be ranked based on the top values of the *Size* or *Height* variable.
4. Select either of the *Rank Filter Scope*:
   - Overall

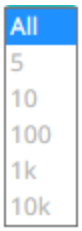
     For the flat rank, including all of the existing leaf nodes.
   - Group

     For the per inner node rank of leaf nodes under the same inner node.
5. Enter the value of the *Limits.*

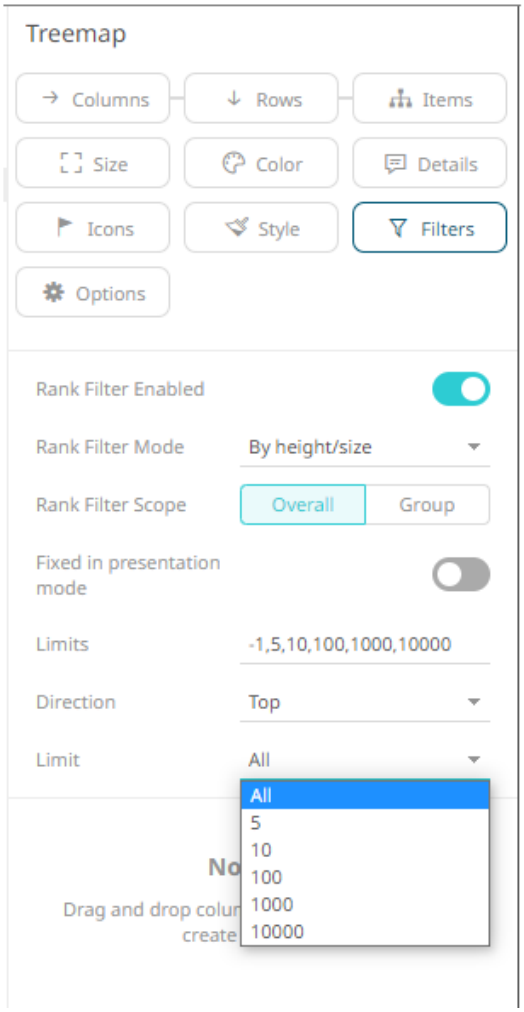
   Default values are **-1,5,10,100,1000,10000**.

   For example, the values are set to **-1,10,100,1000**.

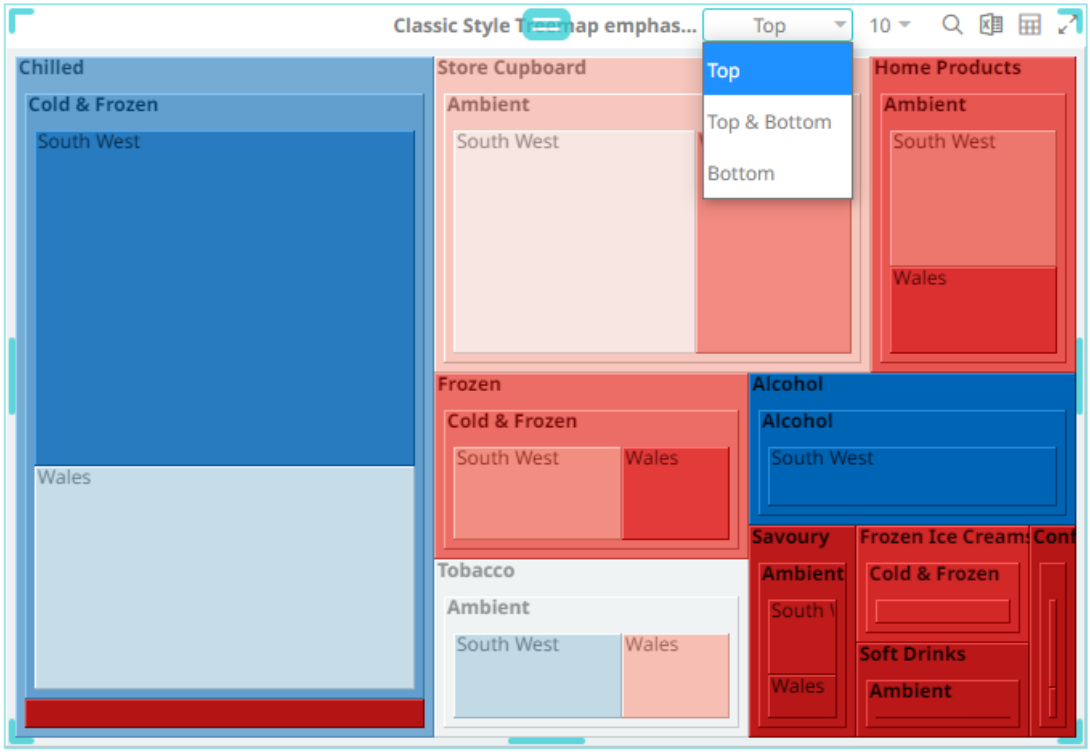
   These limits can be selected either:
   - in the *Limit* drop-down list in the visualization



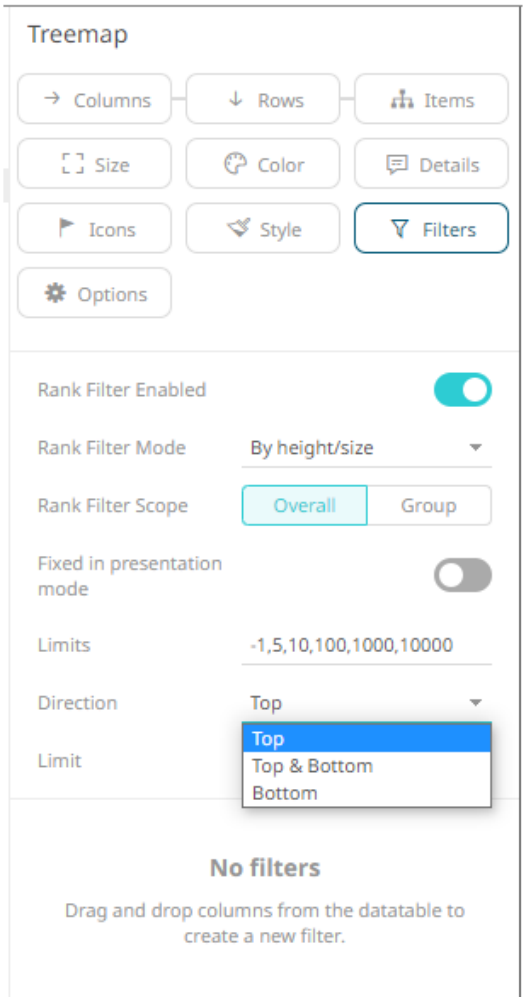
- on the *Filter Settings* pane



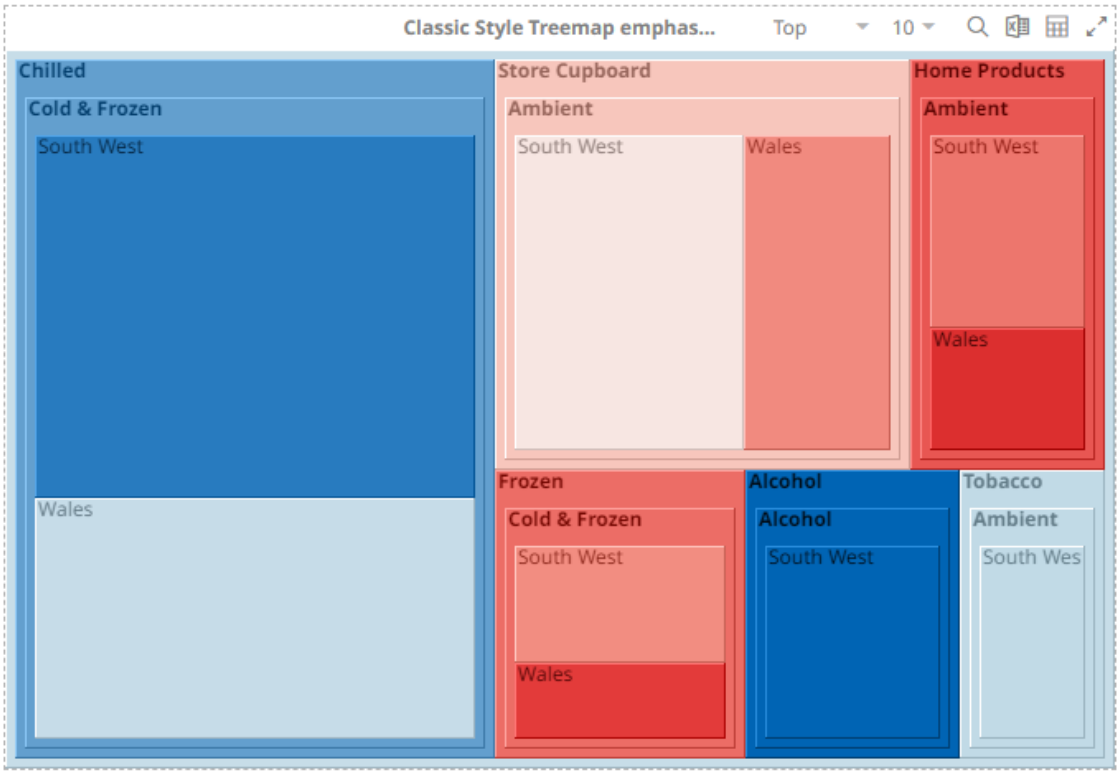
6. Select the ranking *Direction* that can be selected either:
   - in the *Direction* drop-down list in the visualization



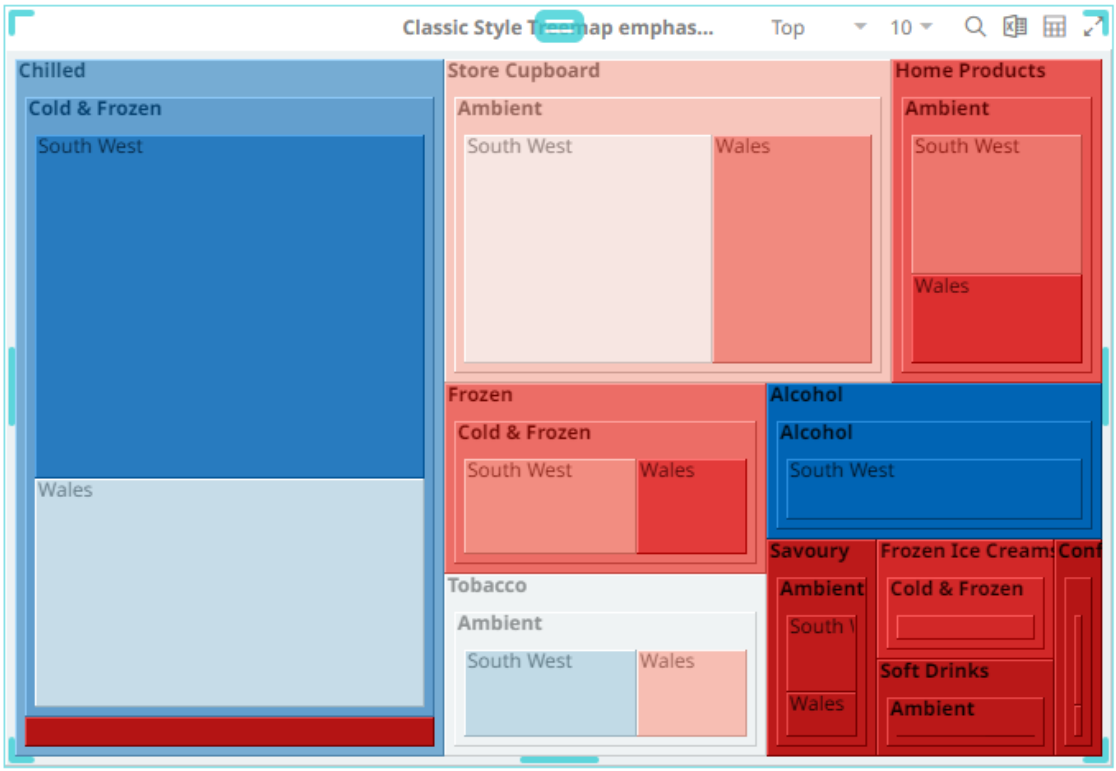
- on the *Filter Settings* pane



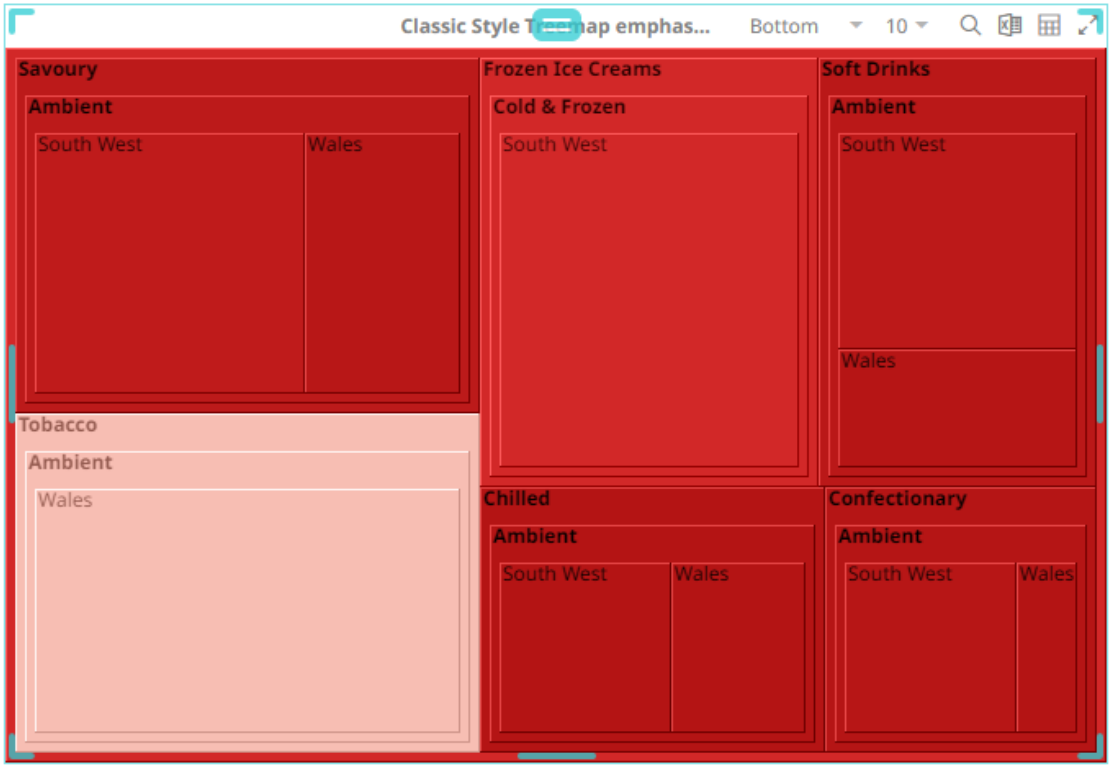
Example 1: Selecting the **Height/Size** mode, **Overall** scope, **Top** direction, **10** as the limit, and **Amount Sold** as the *Size* variable.



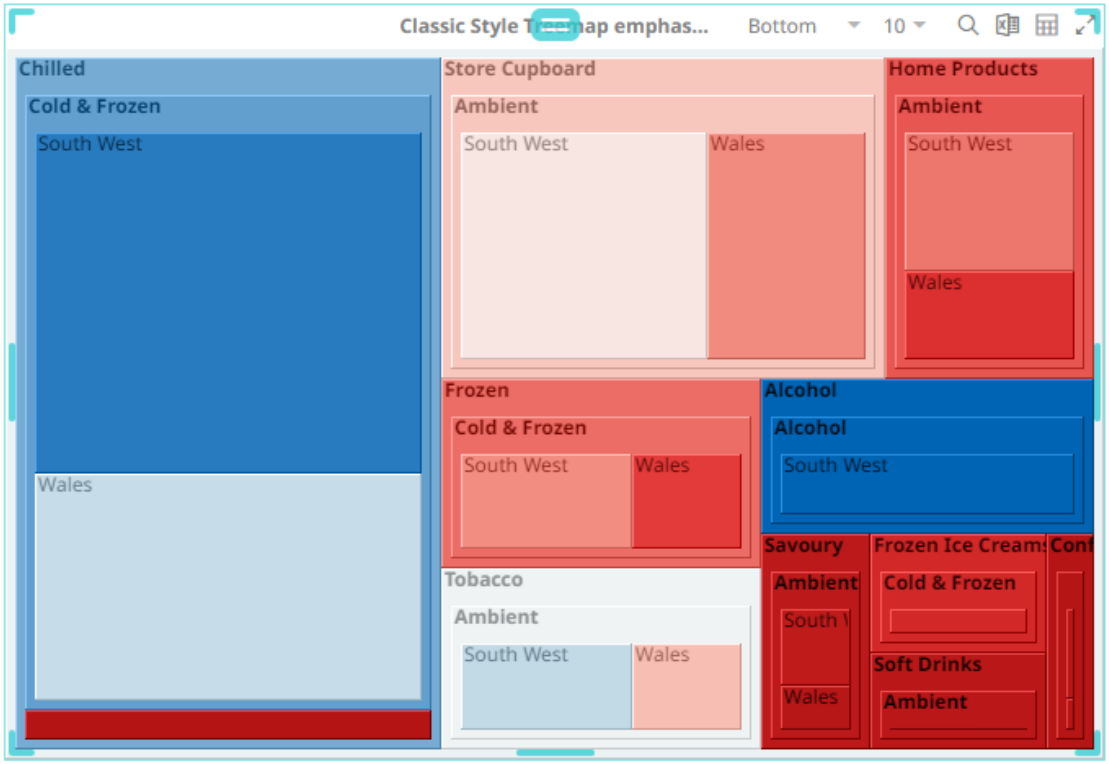
Example 2: Selecting the **Height/Size** mode, **Group** scope, **Top** direction, **10** as the limit, and **Amount Sold** as the *Size* variable.



Example 3: Selecting the **Height/Size** mode, **Overall** scope, **Bottom** direction, **10** as the limit, and **Amount Sold** as the *Size* variable.

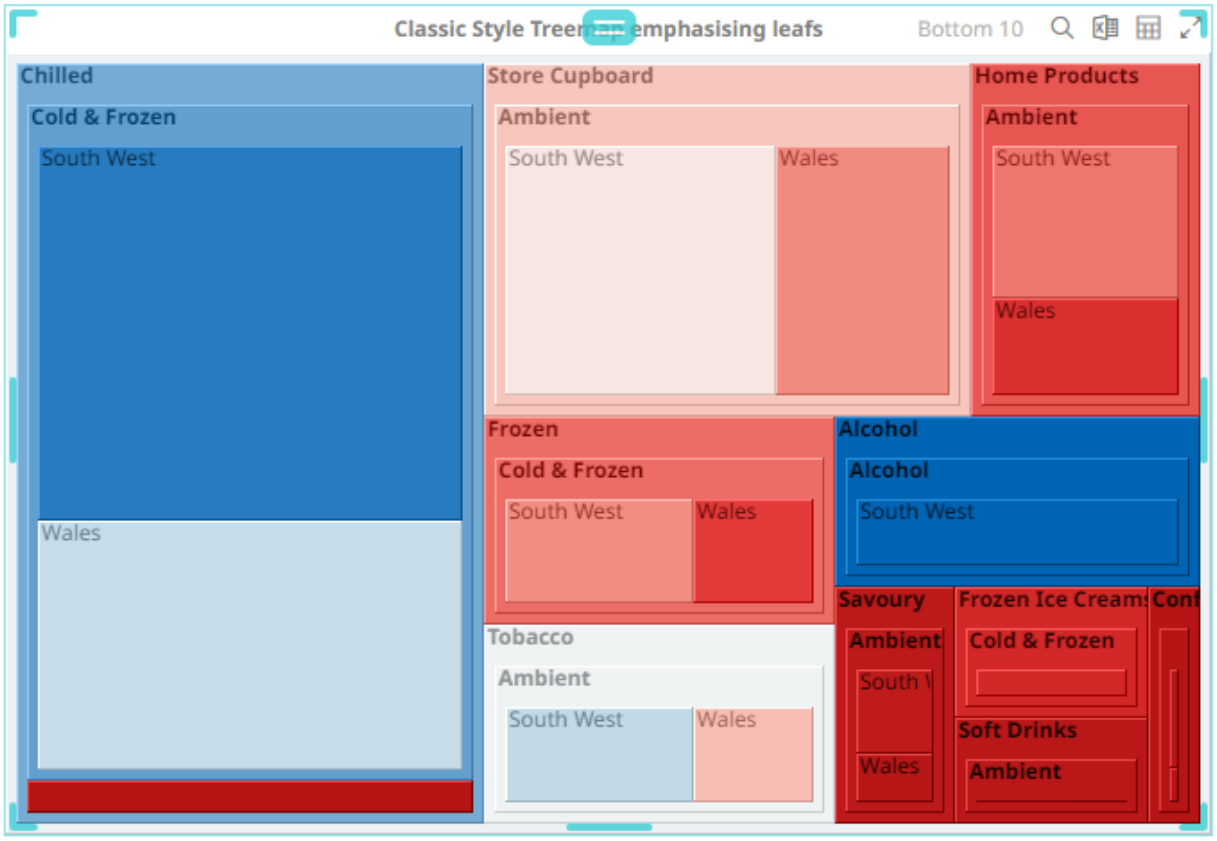


Example 4: Selecting the **Height/Size** mode, **Group** scope, **Bottom** direction, **10** as the limit, and **Amount Sold** as the *Size* variable.



7. Tap the **Fixed in Presentation Mode** slider to turn it on.

   This disables the drop-down lists in the visualization. Only the labels of the options are displayed:



8. Click the **Save**  icon.

   When saved, the  notification is displayed.

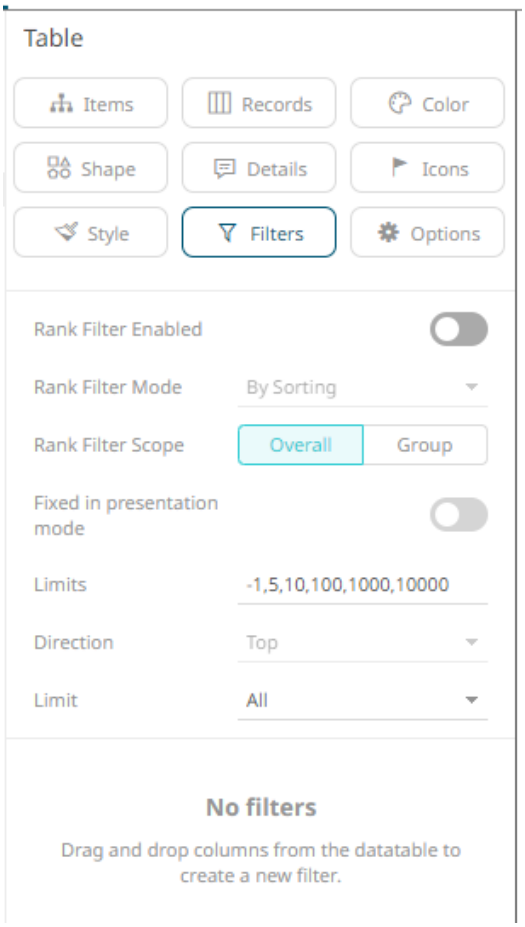
Rank Filtering for the Table Visualization

For the Table visualization, the rank filter only uses the leaf item of the breakdown when creating the ranking. Consequently, this makes the number of items consistent, regardless of the hierarchy.

Steps:

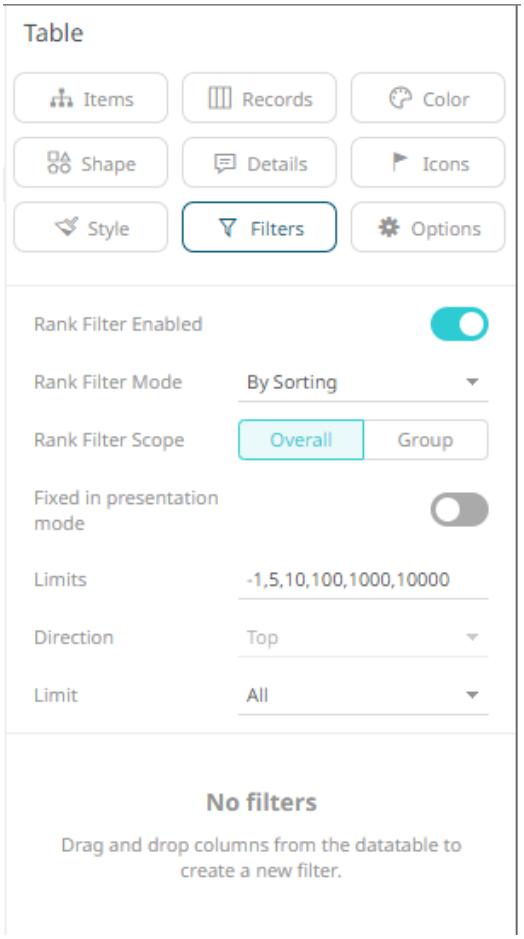
1. Click on a Table visualization and then click the **Filters** drop area on the *Visualization Settings* pane.

   The visualization filter properties are displayed.



2. Tap the **Rank Filter Enabled** slider to turn it on.

   This enables the *Rank Filter Mode* drop-down list and the *Rank Filter Mode* (set to **By Sorting** by default)



The *Direction* is set to **Bottom** by default.

3. Select either of the *Rank Filter Scope*:
   - Overall

     For the flat rank, including all of the existing leaf nodes.
   - Group

     For the per inner node rank of leaf nodes under the same inner node.
4. Enter the value of the *Limits.*

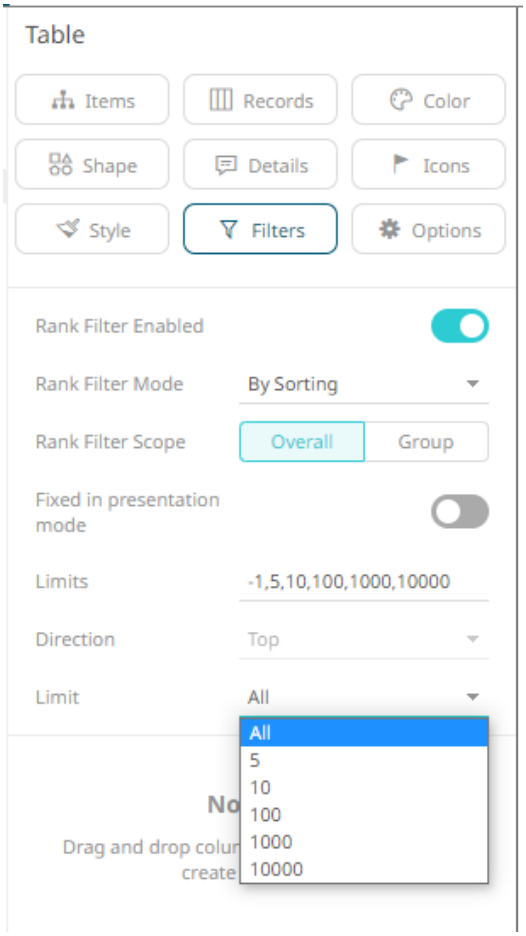
   Default values are **-1,5,10,100,1000,10000**.

   For example, the values are set to **-1,10,100,1000**.

   These limits can be selected either:
   - in the *Limit* drop-down list in the visualization

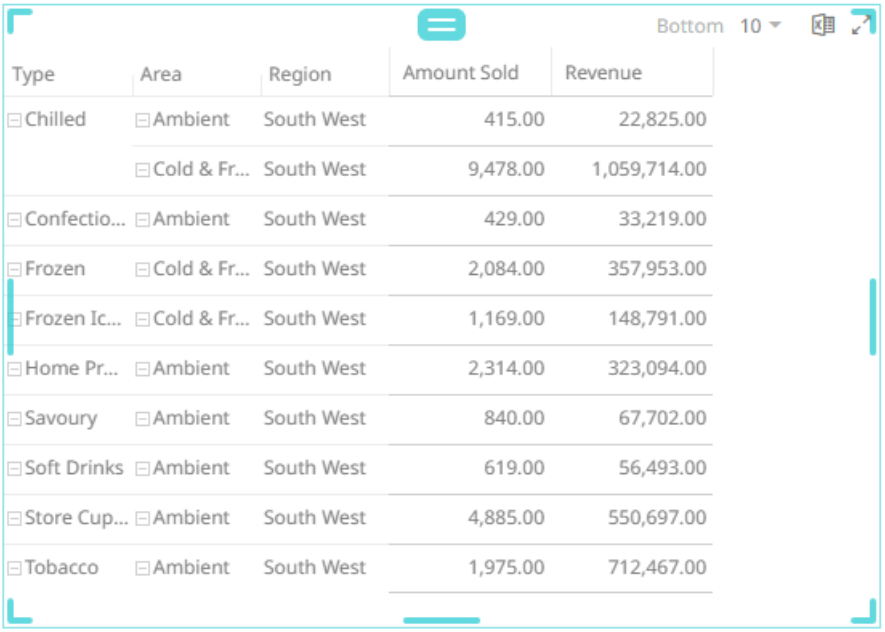
     

   - on the *Filter Settings* pane



The data set will be limited to display the top/bottom `n` based on the sorting of the data. When a column is clicked for sorting, the data set will be limited accordingly.

Example 1: Selecting the **Overall** scope, **10** as the limit, and the breakdown fields are based on the sorting made on the first visual member, **Amount Sold (Bottom)**.



Example 2: Selecting the **Group** scope, **10** as the limit, and the breakdown fields are based on the sorting made on the first visual member, **Amount Sold**.



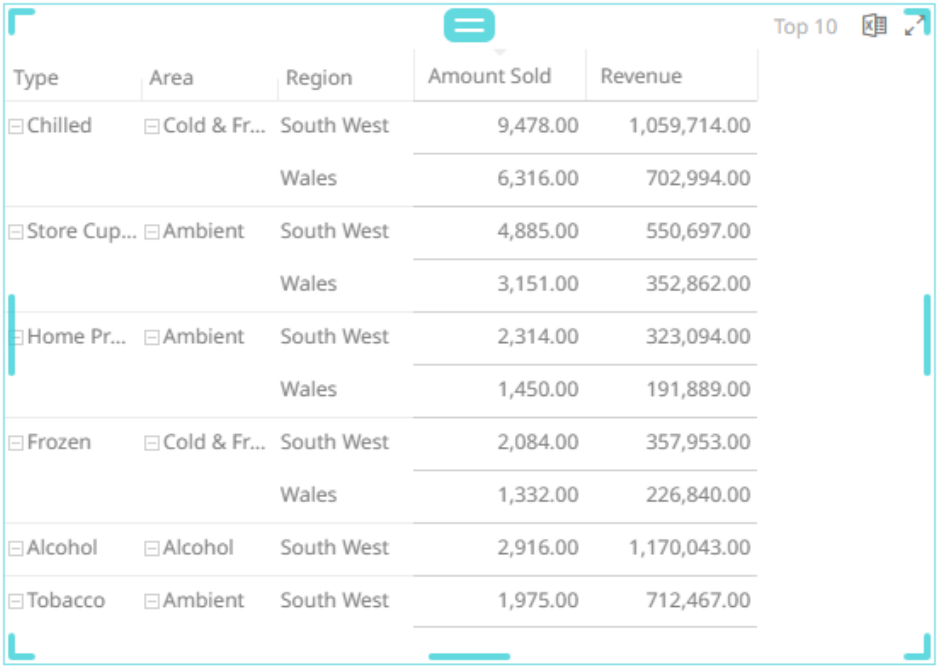
Type	Area	Region	Amount Sold	Revenue
Alcohol	Alcohol	South West	2,916.00	1,170,043.00
Chilled	Ambient	South West	415.00	22,825.00
		Wales	321.00	17,655.00
	Cold & Fr...	South West	9,478.00	1,059,714.00
		Wales	6,316.00	702,994.00
Confectio...	Ambient	South West	429.00	33,219.00
		Wales	150.00	8,870.00
Frozen	Cold & Fr...	South West	2,084.00	357,953.00
		Wales	1,332.00	226,840.00
Frozen Ic...	Cold & Fr...	South West	1,169.00	148,791.00
Home Pr...	Ambient	South West	2,314.00	323,094.00
		Wales	1,450.00	191,889.00
Savoury	Ambient	South West	840.00	67,702.00
		Wales	487.00	39,249.00
Soft Drinks	Ambient	South West	619.00	56,493.00
		Wales	337.00	29,761.00
Store Cup...	Ambient	South West	4,885.00	550,697.00
		Wales	3,151.00	352,862.00
Tobacco	Ambient	South West	1,975.00	712,467.00
		Wales	1,267.00	454,652.00

Example 3: Selecting the **Group** scope, **10** as the limit, and the breakdown fields are based on the sorting made on the second visual member, **Revenue (Top)**.

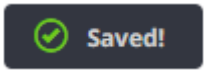


5. Tap the **Fixed in presentation mode** slider to turn it on.

   This disables the drop-down lists in the visualization. Only the labels of the options are displayed.



6. Click the **Save**  icon.

   When saved, the  notification is displayed.

SELECT VARIABLES

Variables are the columns of data used by visualizations. For example, if you have a database of sales information broken down by product, you might associate the total amount of sales for a given with the *Size* variable in a Treemap. You could also associate the difference between this year's sales and last year's sales to the *Color* variable for the same Treemap. This simple configuration will let you see at a glance which products are bringing in the most revenue and which products are increasing and decreasing in sales.

Each visualization uses a different set of variables, depending on the capabilities of the visualization:

Snapshot Visualizations

Visualization	Variables
Bar Graph – Vertical	Y, Color, Details, Style
Bar Graph - Horizontal	X, Color, Details, Style
Box Plot	Y (BoxPlot), Color, Details, Style
Bullet Graph - Vertical	Y, Reference Y, X, Color, Details, Style
Bullet Graph - Horizontal	X, Reference X, Y, Color, Details, Style
Categorical Line Graph	Y, Color, Details, Style
Circle Pack	Size, Color, Details, Style
Donut Chart	Size, Color, Details, Style
Donut Gauge	Size, Color, Details, Style
Dot Plot – Vertical	Y, Color, Alpha, Shape, Details, Style
Dot Plot – Horizontal	X, Color, Alpha, Shape, Details, Style
Funnel Chart	Size, Color, Details, Style
Heat Matrix	Color, Icons, Details, Style
Map Plot	Size, Color, Longitude, Latitude, Details, Style
Network Graph	Size, Color, Details, Style
Numeric Line Graph	X, Y, Color, Details, Style
Numeric Line Graph – Vertical	X, Y, Color, Details, Style
Numeric Needle Graph	X, Y, Size, Color, Details, Style
Numeric Needle Graph – Horizontal	X, Y, Size, Color, Details, Style
Numeric Stacked Needles	X, Y, Size, Color, Alpha, Details, Style
Numeric Stacked Needles – Horizontal	X, Y, Size, Color, Alpha, Details, Style
Pareto Chart	Left Y, Right Y, Color, Reference Color, Details, Style
Pie Chart	Size, Color, Details, Style
Record	Records, Color, Shape, Icons, Details, Style

Scatter Plot 3D	Z, X, Y, Size, Color, Alpha, Shape, Details, Style
Scatter Plot	X, Y, Size, Color, Alpha, Shape, Ref Lines, Details, Style
Shapes	Color, Shapes, Details, Style
Surface Plot	X, Y, Color, Details, Style
Surface Plot 3D	Z, X, Y, Color, Details, Style
Table	Records, Color, Shape, Icons, Details, Style
Ticker Tile	Color, Price, Change, Details, Style
Treemap	Size, Color, Icons, Details, Style
Waterfall Chart	Y, Color, Details, Style

Time Series Visualizations

Visualization	Variables
Candle Stick Graph	Y, Time Axis, Color, Ref Lines, Details, Style
Stacked / Grouped Needle Graph	Y, Time Axis, Color, Alpha, Ref Lines, Details, Style
Horizon Graph	Y, Time Axis, Details, Style
Line Graph	Y, Time Axis, Color, Ref Lines, Details, Style
Needle Graph	Y, Time Axis, Color, Ref Lines, Details, Style
OHLC Graph	Y (OHLC), Time Axis, Color, Ref Lines, Details, Style
Order Book	Y, Time Axis, Size, Color, Ref Lines, Details, Style
Price Band	Y, Time Axis, Color, Ref Lines, Details, Style
Spread Graph	Y, Time Axis, Ref Lines, Details, Style
Stack Graph	Y, Time Axis, Color, Ref Lines, Details, Style
Timeseries Scatter Plot	Y, Time Axis, Size, Color, Alpha, Shape, Ref Lines, Details, Style
Timeseries Surface Plot	Y, Time Axis, Color, Details, Style

Combination Visualizations

Visualization	Variables
Numeric Combination	Visualizations, X, Size, Color, Alpha, Shape, Ref Lines, Details, Style
Text Combination	Visualizations, Text Axis, Size, Color, Alpha, Shape, Ref Lines, Details, Style
Time Combination	Visualizations, Time Axis, Size, Color, Alpha, Shape, Ref Lines, Details, Style

Variable Empty State

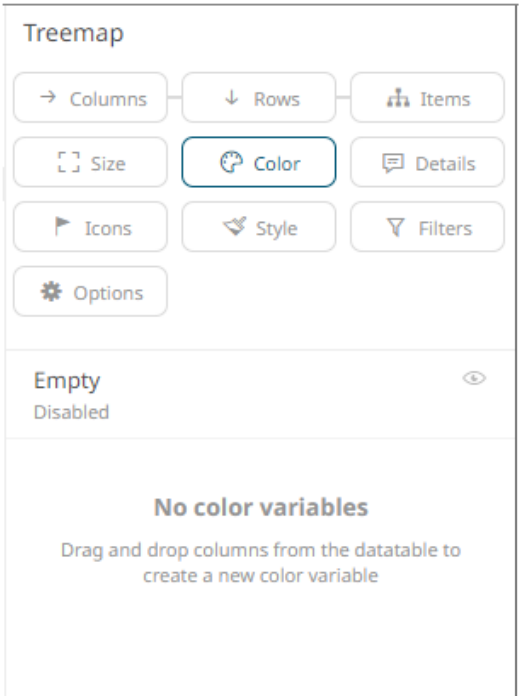
Most of the variables (Size, X & Y, Z, Latitude & Longitude, Price, Change, Alpha, Shape, Spread, OHLC, Color) have an *Empty* state by default. When enabled, the *Empty* state can be used as value for the variable.

Some variables, such as *Color*, may have other properties that you can set.

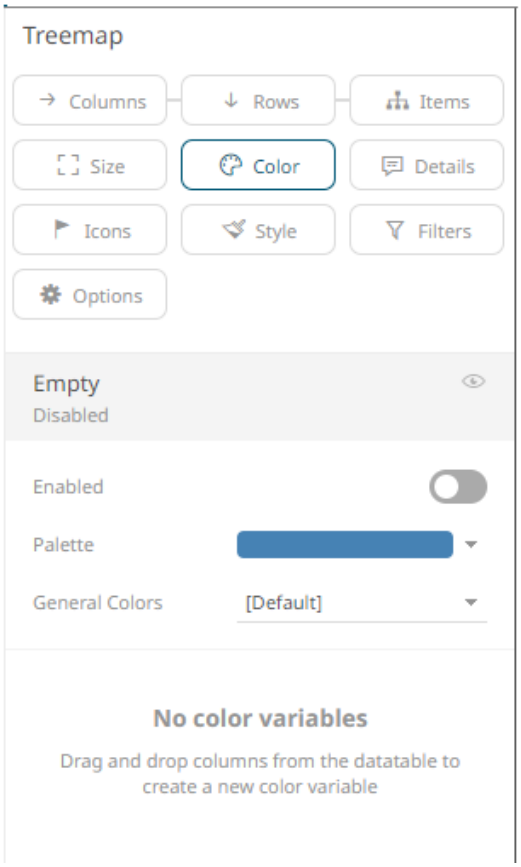
Steps:

1. On the *Visualization Settings* pane, click the *Color* variable.

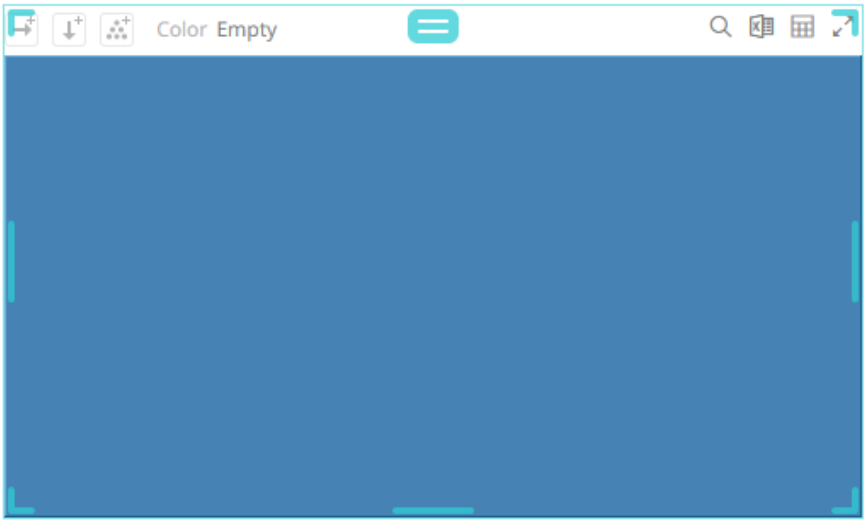
   Initially, the variable has an **Empty** state.



2. Click the **Empty** value to expand its settings.



3. Tap the slider to turn on **Enabled**. *Empty* currently displays as the associated value of the *Color* variable, with the *Palette* color set to  and the *General Colors* set to **[Default]**.



You can opt to modify the following properties:

Property	Description
Palette	The color of the associated variable.
General Colors	General color settings that were defined in the Workbook Theme.

Associating Columns to the Variables

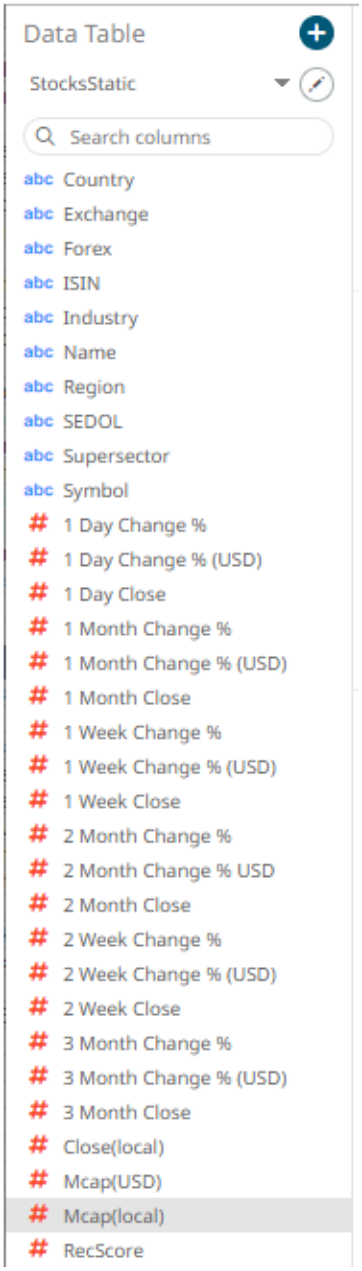
You can associate columns of data from the data table in the *Design* Toolbox with the variables available for the visualizations in your dashboard.

> **NOTE** **You must be in the *Open Workbook in Design Mode* to add variables to visualizations.**

Steps:

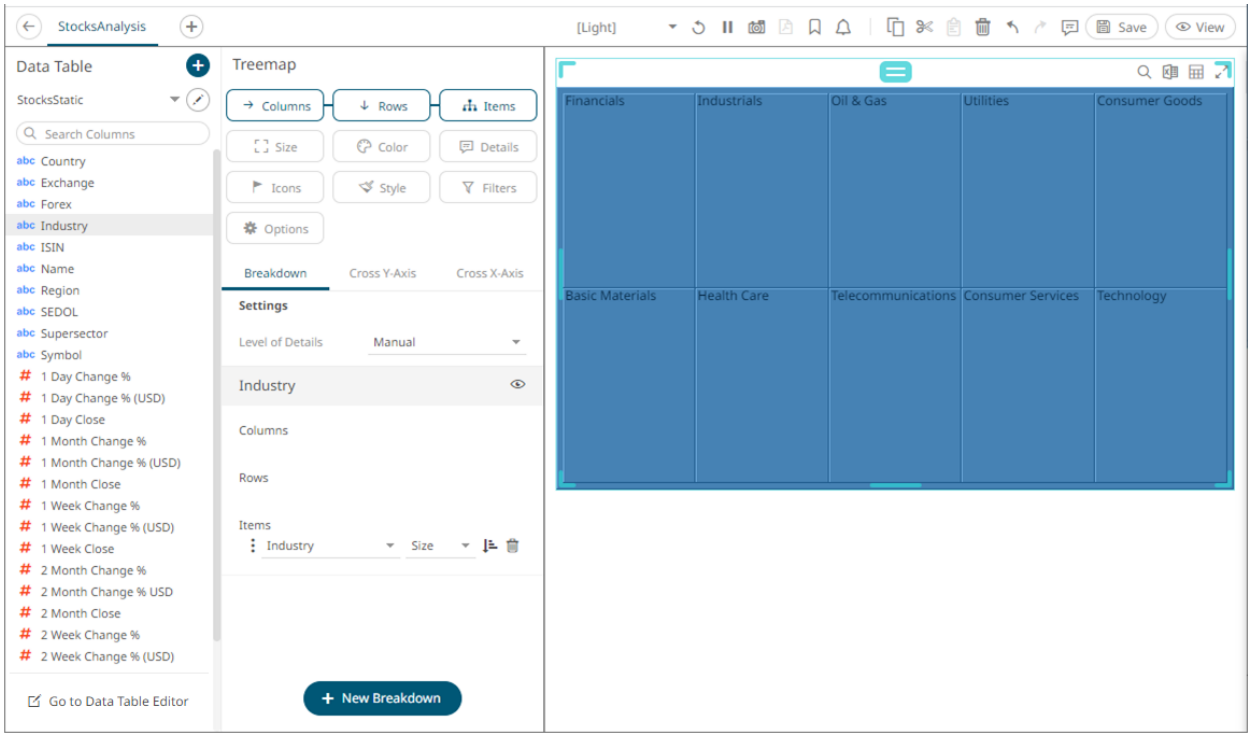
1. In the *Data Table* pane, select the column you want to associate with a variable.

   In this example, we are selecting the **Mcap(local)** data column.



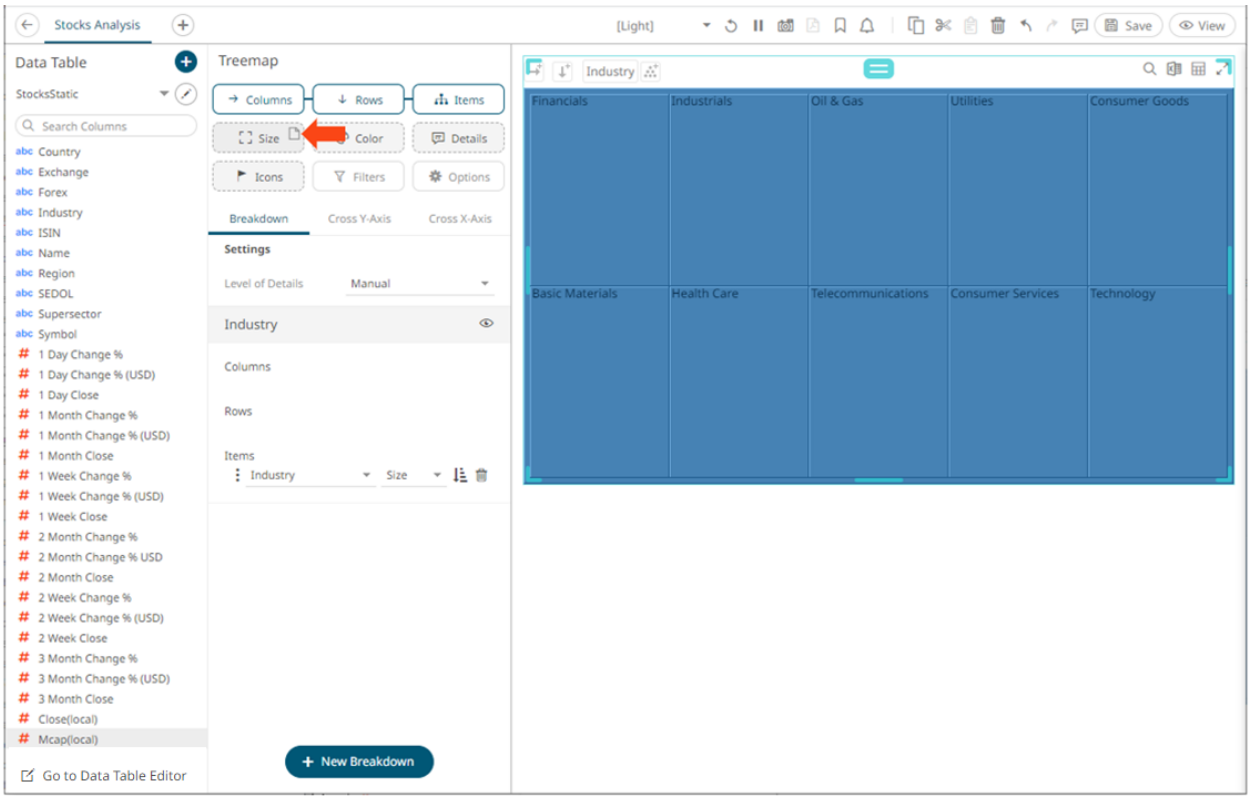
2. Drag the column to the variable you want to use.

   In this example, we are dragging and dropping the **Mcap(local)** data column to the *Size* variable drop area in a Treemap, with the **Industry** column added as the breakdown.



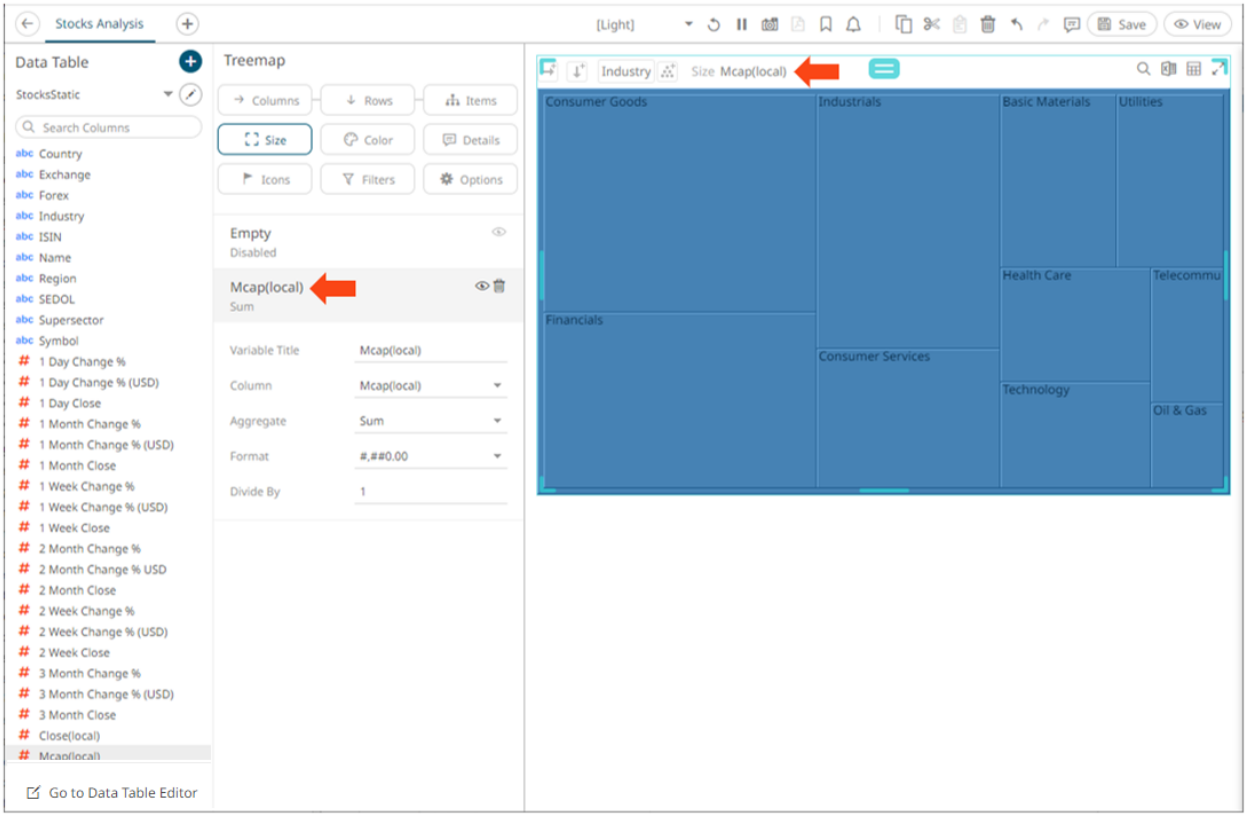
   Note that the default of the Size variable is **[Empty]** which displays the **Industry** values in a uniform size.

3. Drop the column to the *Size* variable drop area.

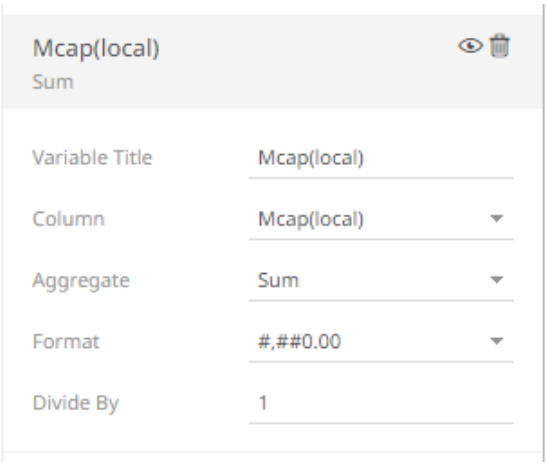


The column is displayed under the *Size* variable list and on the *Size* variable on the visualization. The Treemap also changes to reflect the values of the **Mcap(local)** column as the *Size* variable.

Note that the **[Empty]** state is now disabled.

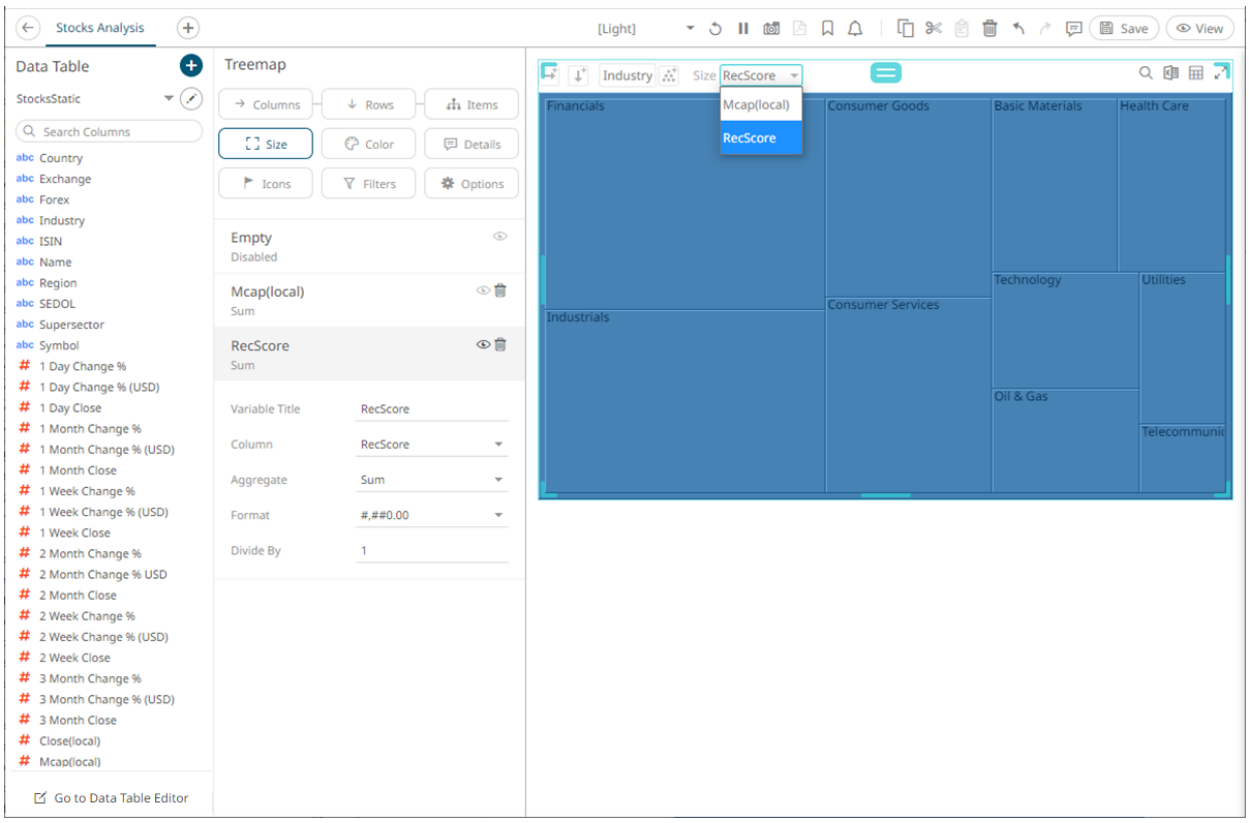


By default, the name of the variable is the dragged column and the aggregate is **Sum**.



4. You can drag more data columns onto the same variable. This produces a list of options that the user can select from.

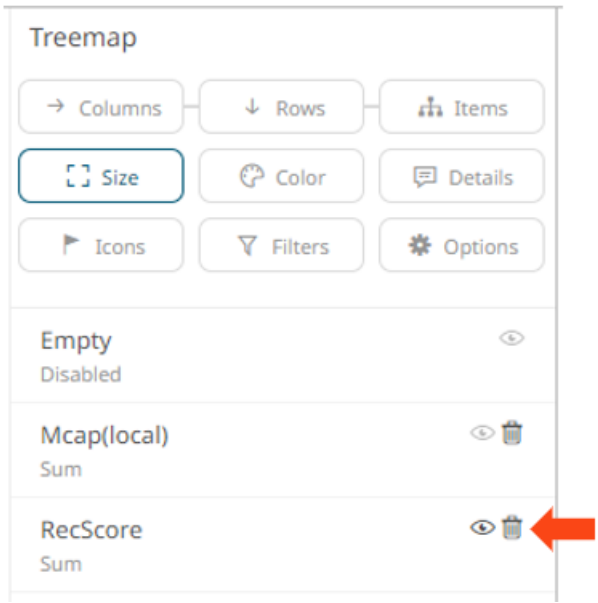
   In our example, we have added the **RecScore** data column to the same *Size* variable for the Treemap.



The user will be able to quickly select between two different views of the data. In one view, the Treemap will associate *Size* with **Mcap (local)** and with **RecScore** in the second view.

Deleting Variables from a Visualization

Click the of a column under the variables list.



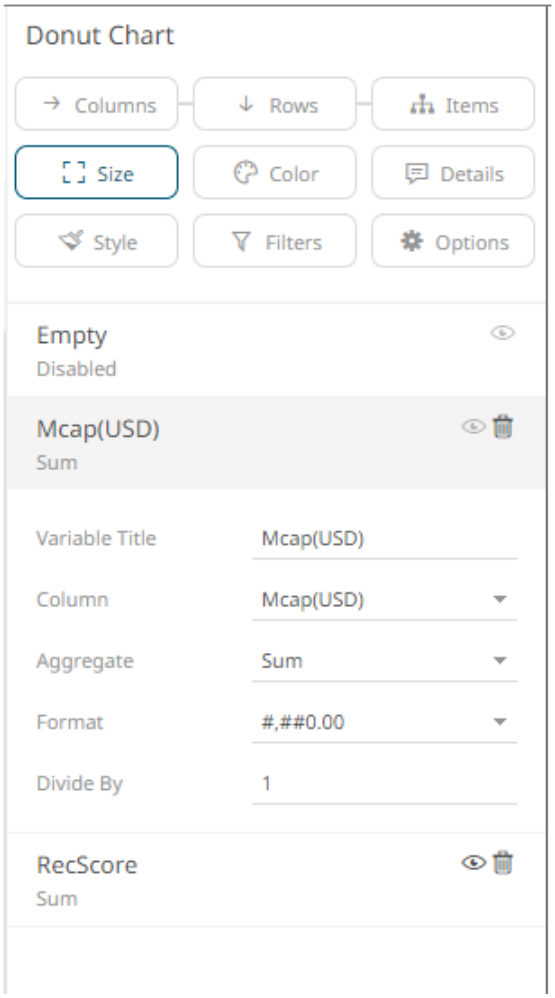
VARIABLES CONFIGURATION

Size Variable Configuration

The *Size* variable is available in Circle Pack, Donut Chart, Donut Gauge, Funnel Chart, Map Plot, Network Graph, Numeric Needle Graph, Numeric Stacked Needle, Pie Chart, Scatter Plot, Scatter Plot 3D, Treemap, Time Combination, Time Series Scatter Plot visualizations.

Steps:

1. On the *Visualization Settings* pane, click the *Size* variable. To associate other columns from the data table, drag and drop them to the *Size* variable drop area. Select one to display the corresponding configuration pane.



2. Enter the label of the *Size* variable in the *Variable Title* field.

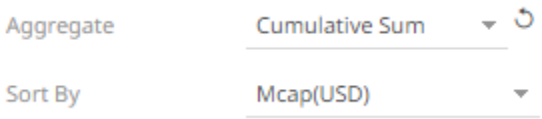
   You can parameterize the variable title to support dynamic schema in the dashboards.

3. You can also change the column to the be used as the *Size* variable from the *Column* drop-down list.
4. Specify an aggregation method in the *Aggregate* field.

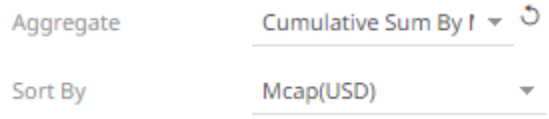
   The default is **Sum**.

   The *Size* variable also supports a number of other aggregate types:

- If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



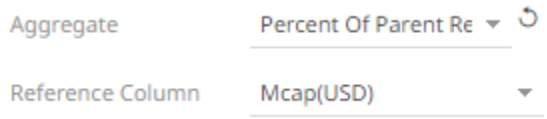
Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



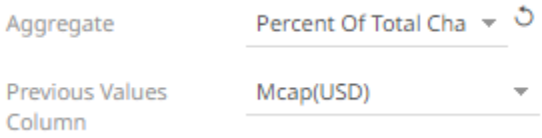
- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



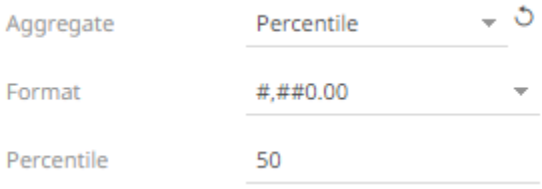
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



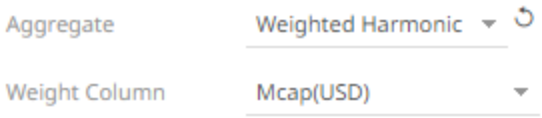
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.

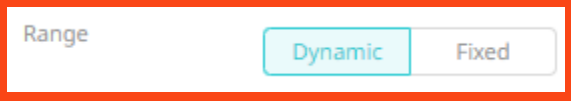


- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.

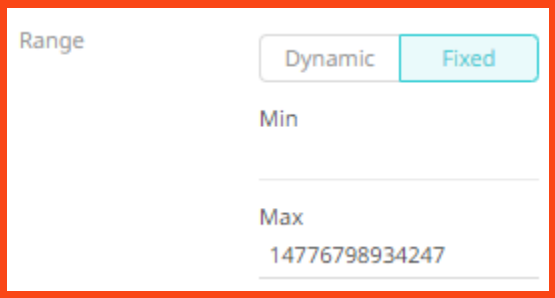


5. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
6. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)

NOTE **For the Funnel Chart, Map Plot, Scatter Plot, Scatter Plot 3D, Stack Graph and Timeseries Scatter Plot visualizations, you can also set the visible range for the *Size* variable which can either be calculated dynamically (the default, enabled Dynamic).**

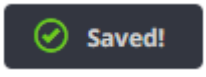


Or set between predefined limits by clicking Fixed. This displays the *Min* and *Max* text boxes that are populated with the default values taken from the data set.



7. Click the **Save** 

icon on the toolbar.

When saved, the 

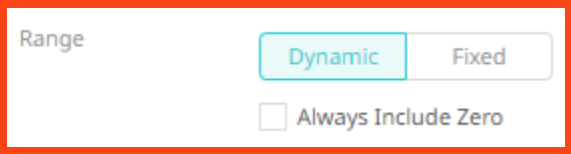
notification is displayed.

X & Y Variables Configuration

The X and/or Y variables are available in Bar Graph, Box Plot, Bullet Graph, Categorical Line Graph, Dot Plot, Numeric Line Graph, Numeric Needle Graph, Numeric Stacked Needle, Scatter Plot, Scatter Plot 3D, Surface Plot, Surface Plot 3D, Waterfall Chart, Candle Stick Graph, Stacked /Grouped Needle Graph, Horizon Graph, Line Graph, Needle Graph, OHLC Graph, Order Book, Pareto Chart, Price Band, Spread Graph, Stack Graph, Timeseries Scatter Plot, Timeseries Surface Plot visualizations.

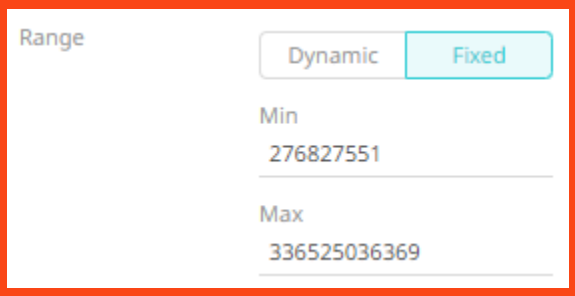
The configuration pane for X & Y Variables is the same as for the Size variable.

NOTE **For most of the visualizations with numeric axis, you can set the visible range for the Y and/or Y variable which can either be calculated dynamically (the default, enabled Dynamic).**



Check Always Include Zero box to let the axis scale start at zero, and grow to any number that may show up in the data.

Or set between predefined limits by clicking Fixed. This displays the *Min* and *Max* text boxes that are populated with the default values taken from the data set.

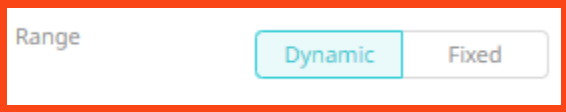


Z Variable Configuration

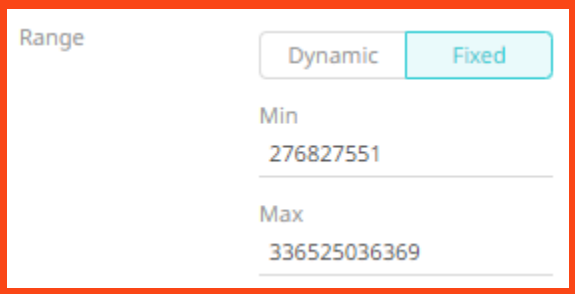
The Z variable is available in the 3D Surface Plot and 3D Scatter Plot visualizations and is used to set the height.

The configuration pane for the Z variable is the same as for the Size variable.

NOTE **For the 3D Surface Plot and 3D Scatter Plot visualizations, you can set the visible range for the Z variable which can either be calculated dynamically (the default, enabled Dynamic).**



Or set between predefined limits by clicking Fixed. This displays the *Min* and *Max* text boxes that are populated with the default values taken from the data set.



Latitude & Longitude Variables Configuration

The Longitude and Latitude variables are available in the Map Plot visualization. These coordinates are used to locate a place on Earth's surface.

The configuration pane for Lat and Long Variables is the same as for the Size variable.

NOTE **Default aggregation for the Latitude and Longitude variables are:**

- **Mean for numeric columns.**
- **Calculation for calculated columns.**
- **External if data table contains external aggregates for the column.**

Price Variable Configuration

The Price variable is available in the Ticker Tile visualization.

The configuration pane for the Price variable is the same as for the Size variable.

Change Variable Configuration

The Change variable is available in the Ticker Tile visualization.

The configuration pane for the Change variable is the same as for the Size variable.

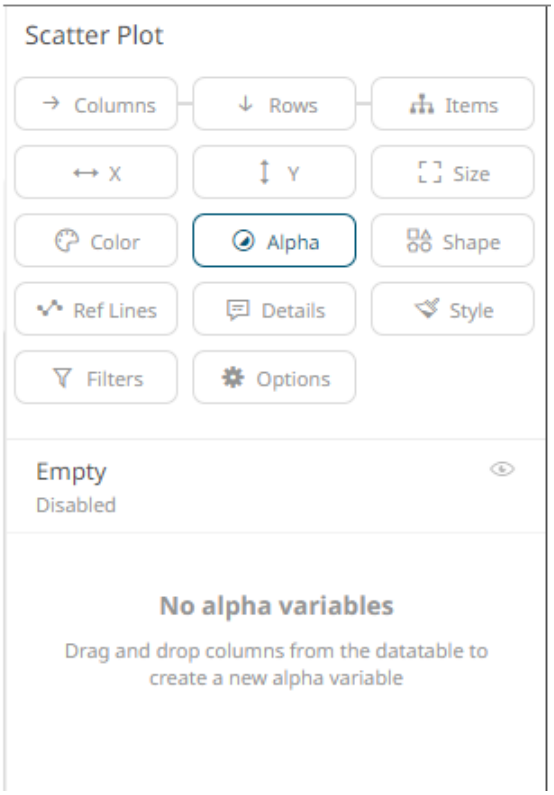
Alpha Variable Configuration

The *Alpha* variable is available in the Dot Plot, Grouped Needle, Line Graph, Map Plot, Needle Graph, Numeric Line Graph, Numeric Needle Graph, Numeric Stacked Needle, Price Band Graph, Scatter Plot, Scatter Plot 3D, Spread Graph, Stacked Needle, Timeseries Scatter Plot, and Timeseries Scatter Plot in the Combination Graph visualizations.

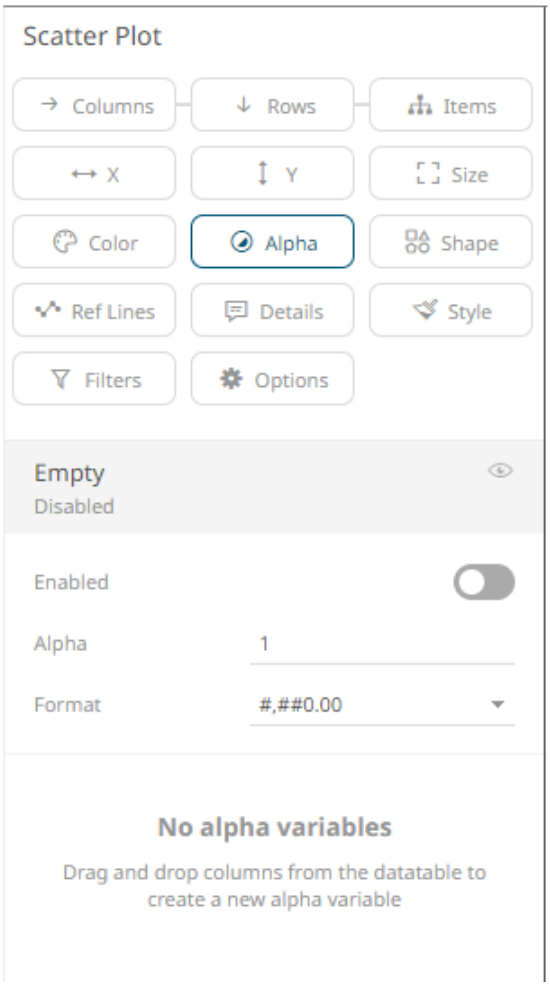
Steps:

1. On the *Visualization Settings* pane, click the *Alpha* variable.

   Initially, the variable has an **Empty** state.



2. Click the **Empty** state value to expand its settings.



NOTE **The Empty alpha variable has a minimum of 0 to maximum of 1 value, and a step of 0.01. The Up and Down buttons have been removed in previous changes to numeric input component, but the mouse wheel can still be used to scroll between values.**

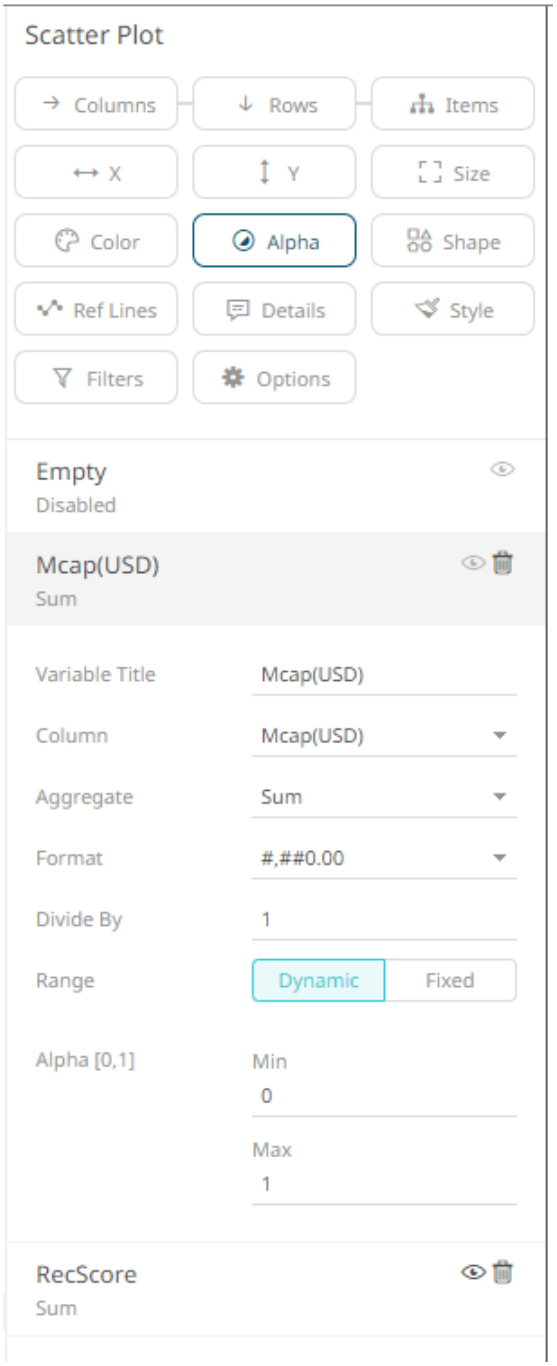
3. Tap the **Enabled** slider to turn it on. *Empty* currently displays as the associated value of the *Alpha* variable.



You can opt to modify the following properties:

Property	Description
Alpha Value	Alpha value of the Alpha variable. The two nearest valid values are 0% and 100%.
Format	Format how numbers will be displayed.

4. To associate other columns from the data table, drag and drop them to the *Alpha* variable drop area. Select one to display the corresponding configuration pane.



5. Enter the label of the *Alpha* variable in the *Variable Title* field.

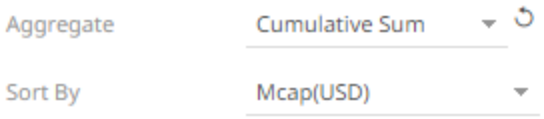
   You can parameterize the variable title to support dynamic schema in the dashboards.

6. You can also change the column to the be used as the *Alpha* variable from the *Column* drop-down list.
7. Specify the aggregation method in the *Aggregate* field.

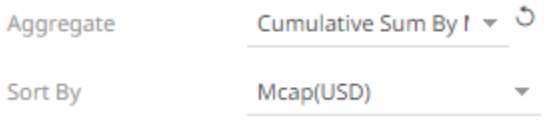
   The default is **Sum**.

   The *Alpha* variable also supports a number of other aggregate types:

   - If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



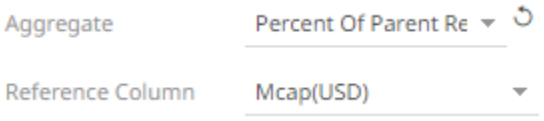
Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



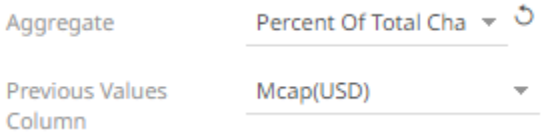
- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



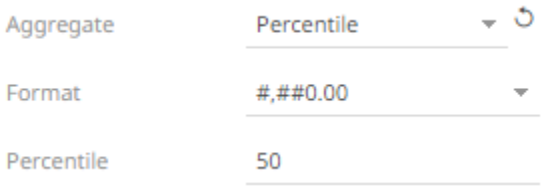
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



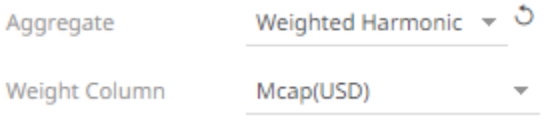
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.



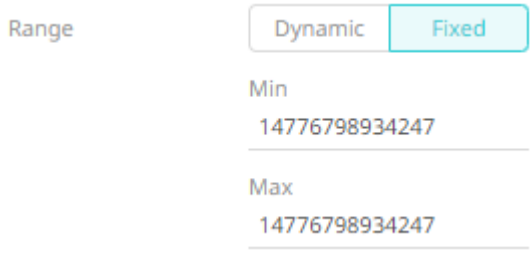
- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.



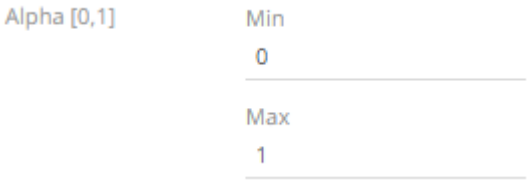
8. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
9. Select the *Divide By* value to divide a number:
    - 1
    - 1000 (by a thousand)
    - 10000
    - 1000000 (by a million)
    - 1000000000 (by a billion)
10. The visible range for the *Alpha* variable can either be calculated dynamically (the default, enabled **Dynamic**).



Or set between predefined limits by clicking **Fixed**. This reveals the *Min* and *Max* text boxes and populates them with default values taken from the data set.



11. Enter the *Min Alpha* (default **0%**) and *Max Alpha* (default **100%**) values.



The *Alpha* variable takes any numeric column and maps the values to their corresponding Alpha values. Consequently, it calculates the values' relative position in the domain of the column, and maps that to the same relative position for the domain of the Alpha values.

NOTE

- **This property is used as the alpha blending value between 0 (transparent) and 1 (opaque).**
- **If an item has an undefined/null value, it will not be drawn.**
- **The Min and Max alpha have a step of 0.01.**

12. Click the **Save** 

icon on the toolbar.

When saved, the 

notification is displayed.

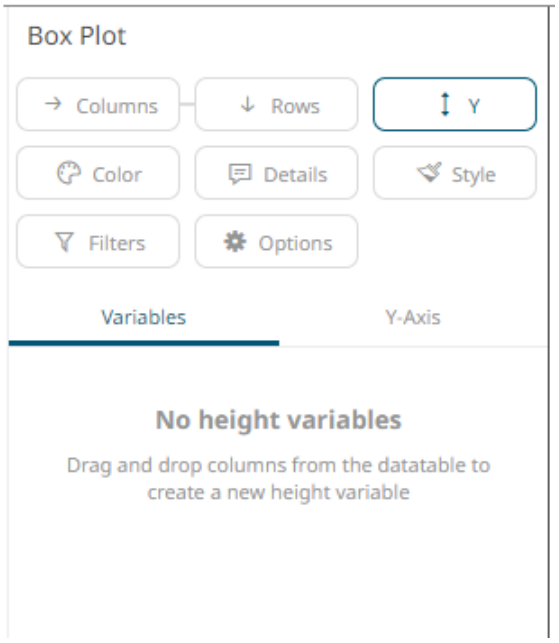
BoxPlot Variable Configuration

The BoxPlot variable is available in the Box Plot visualization.

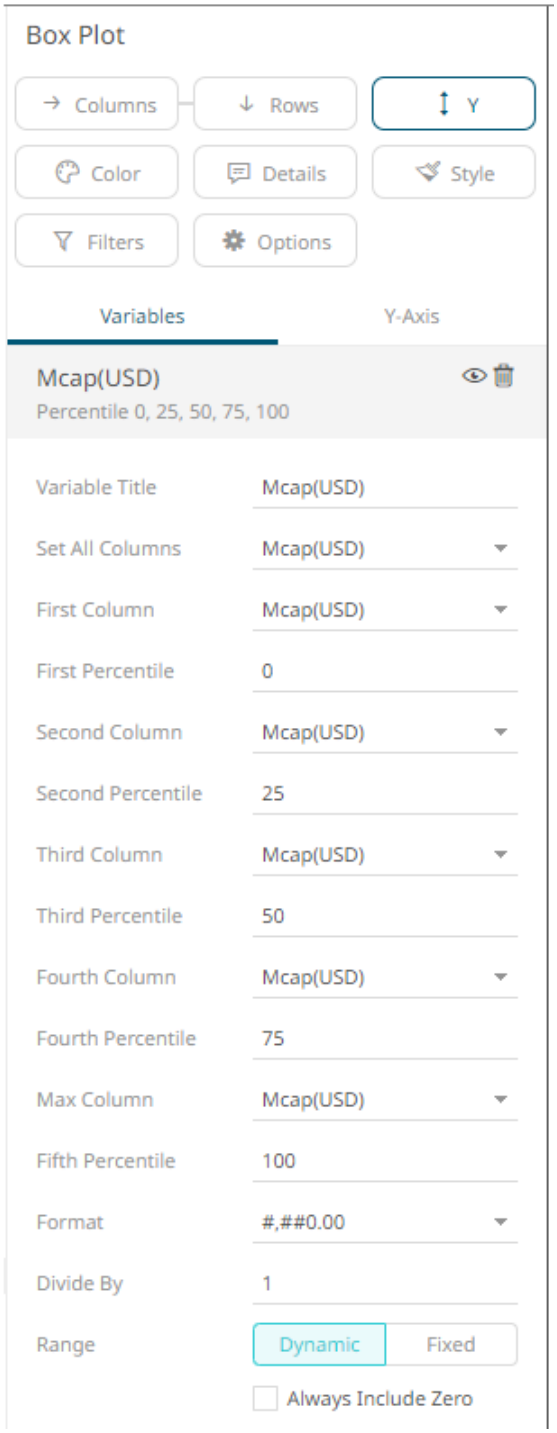
Steps:

1. On the *Visualization Settings* pane, click the *Y (BoxPlot)* variable.

   Initially, the variable has no value.



2. To associate other columns from the data table, drag and drop them to the *BoxPlot* variable drop area. Select one to display the corresponding configuration pane.



3. Enter the label of the *BoxPlot* variable in the *Variable Title* field.

   You can parameterize the variable title to support dynamic schema in the dashboards

4. The associated column is displayed in *Set All Columns* and all of the five sub variables are automatically populated with this column: *First Column*, *Second Column*, *Third Column*, *Fourth Column*, and *Fifth Column*.

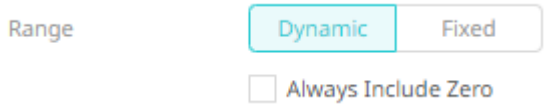
   This allows for automatically drawing a boxplot based on a single column. The variable also allows for changing each column of each sub variables, which can be used in case the values are precalculated.

5. The percentile values of the member variables are configurable. Each percentile can be set to any value between **0** to **100**. The values default to **0** (Min), **25** (First Quartile), **50** (Median), **75** (Third Quartile), **100** (Max), respectively.

   The percentile aggregate is calculated with inclusive median.

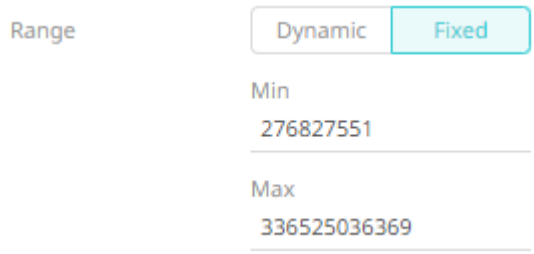
   NOTE **In case the boxplot is compared to the boxplot in MS Excel, ensure it is configured to use the inclusive median.**

6. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
7. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)
8. The visible range for the *BoxPlot* variable can either be calculated dynamically (the default, enabled **Dynamic**).



   Check the **Always Include Zero** box to let the axis scale start at zero, and grow to any number that may show up in the data.

   Or set between predefined limits by clicking **Fixed**. This reveals the *Min* and *Max* text boxes and populates them with default values taken from the data set.



9. Click the **Save** 

icon on the toolbar.

   When saved, the 

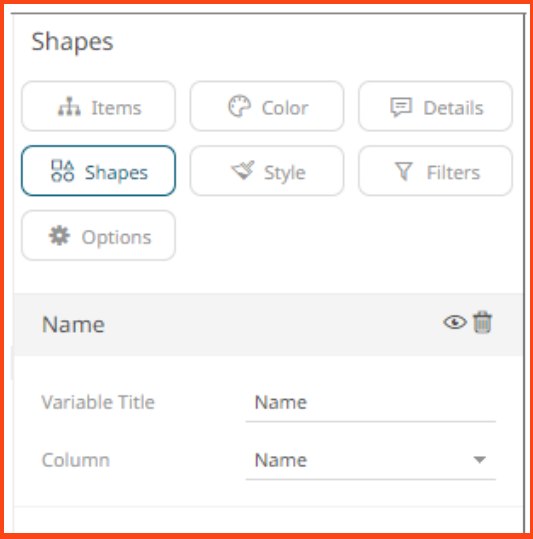
notification is displayed.

Shape Variable Configuration

The *Shape* variable is available in the Dot Plot, Map Plot, Scatter Plot, Scatter Plot 3D, Time Combination, and Timeseries Scatter Plot visualizations.

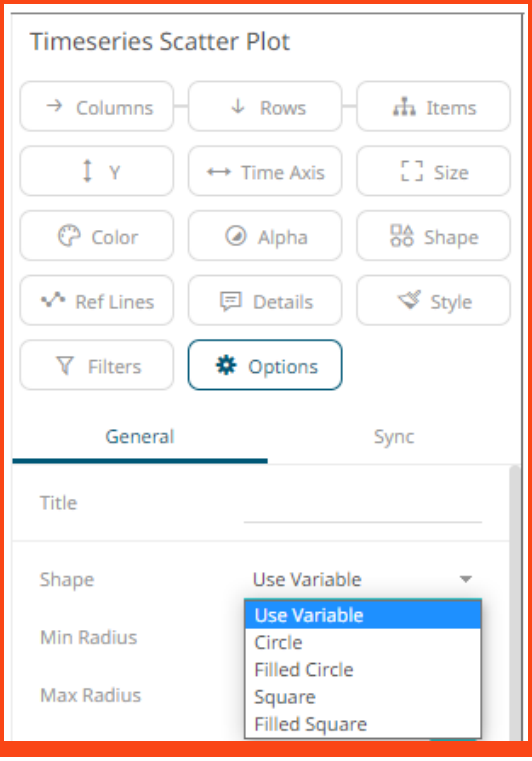
NOTE

- **The *Shape* variable in the Shapes visualization does not contain these properties.**



- **This configuration is applicable when the Use Variable option is selected in the *Shapes* drop-down of the Timeseries Scatter Plot visualization settings pane.**

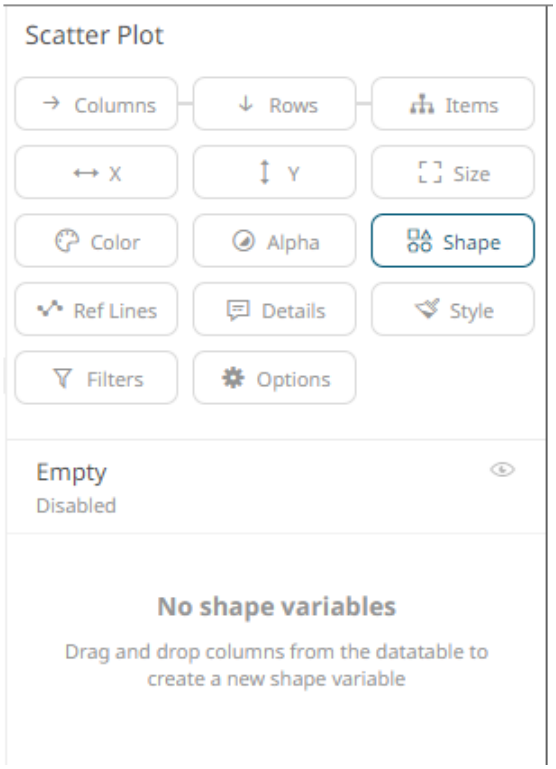
  For example:



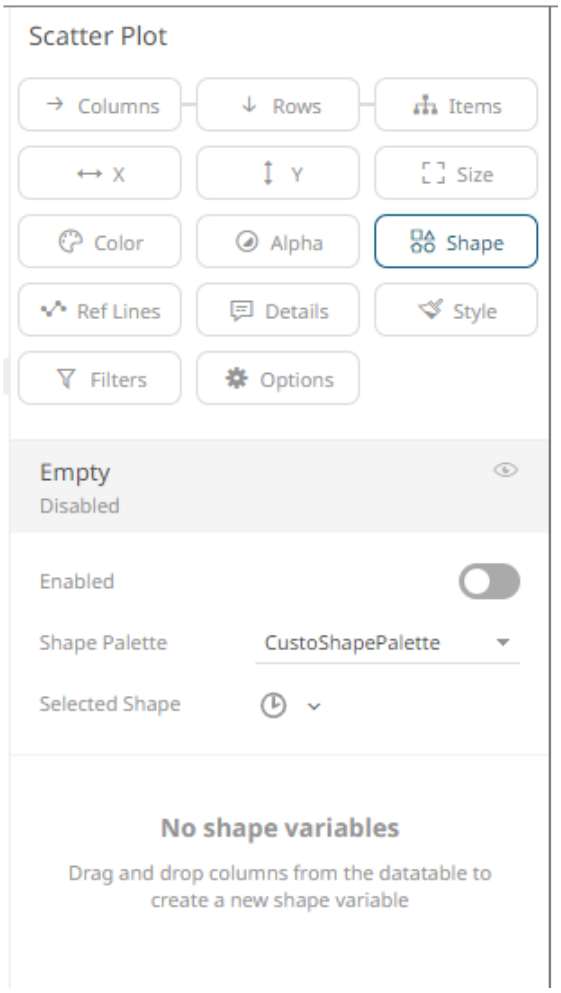
Steps:

1. On the *Visualization Settings* pane, click the *Shape* variable.

   Initially, the variable has an **Empty** state.



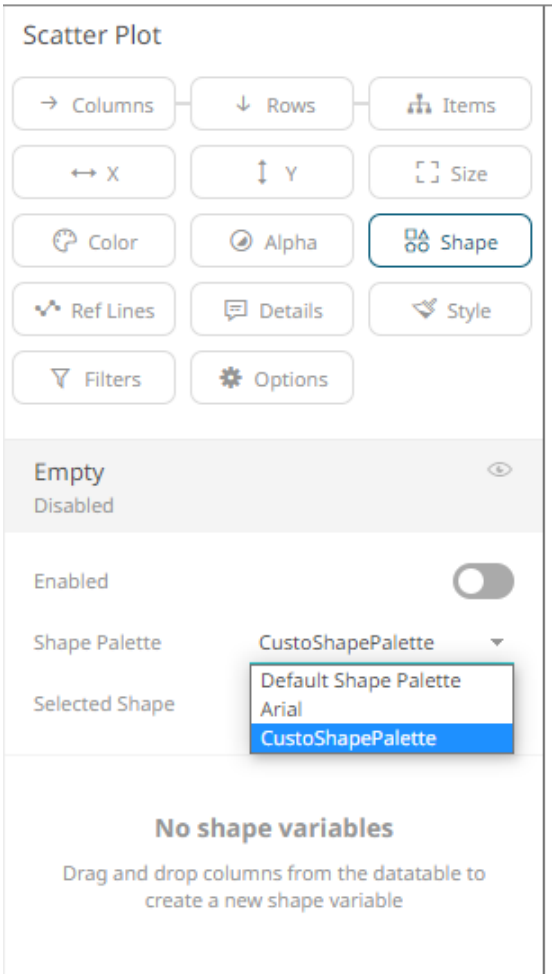
2. Click the **Empty** value to expand its settings.



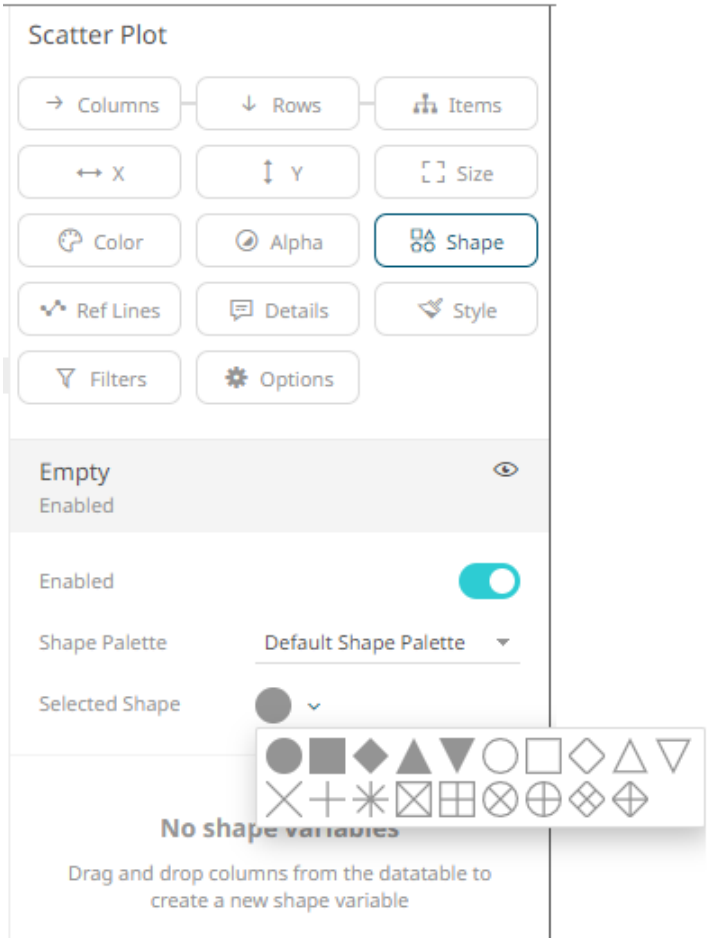
3. Tap the **Enabled** slider to turn it on. [*Empty]* currently displays as the associated value of the *Shape* variable with the *Selected Shape* set to **FilledCircle**.



You can opt to modify the *Shape Palette* settings*:*

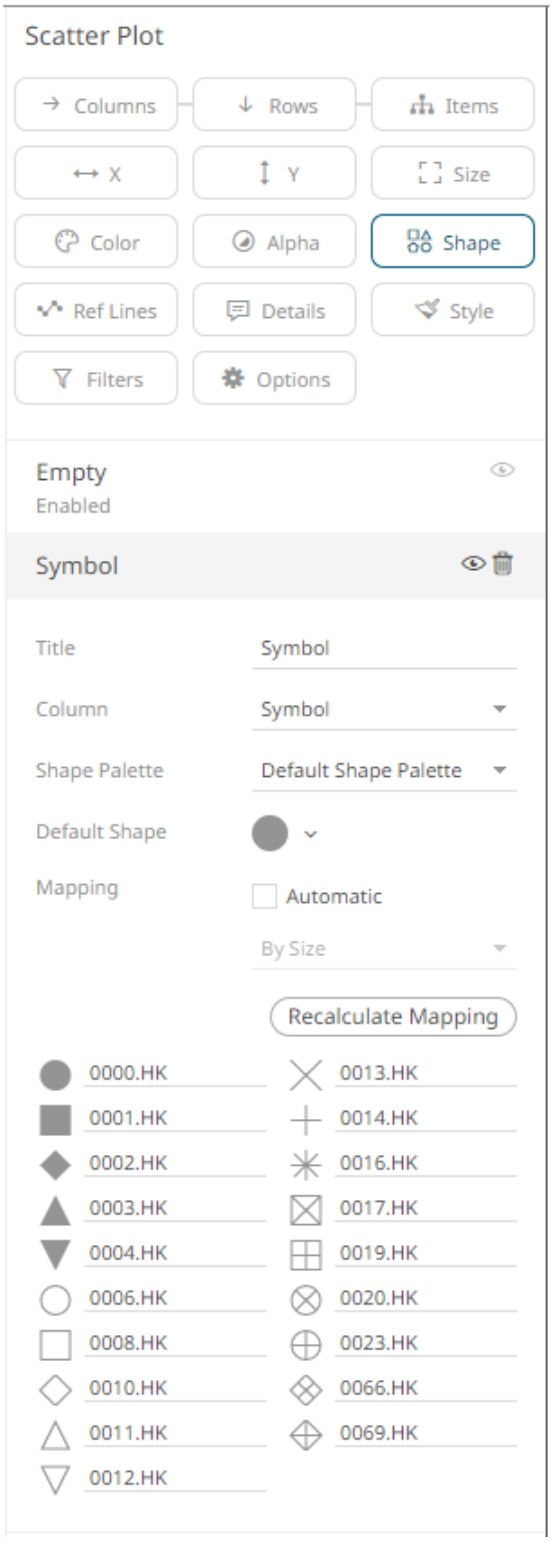


And then the corresponding *Selected Shape*:



NOTE **There is a default shape palette with a set of geometric symbols, and a shape palette named Arial with capital letters A-Z. You can add your own custom shape palettes from SVG files in the Theme-editor of Panopticon Real Time. The SVG files added to a palette must follow the same rules as custom SVG files used with the Shapes visualization.**

4. To associate other columns from the data table, drag and drop them to the *Shape* variable drop area. Select one to display the corresponding configuration pane.



5. Enter the label of the *Shape* variable in the *Title* field.

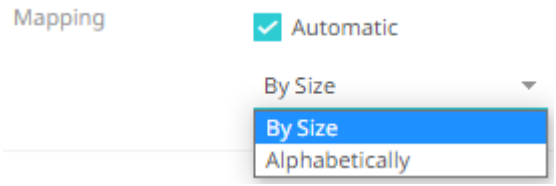
   You can parameterize the variable title to support dynamic schema in the dashboards.

6. You can also change the column to the be used as the *Shape* variable from the *Column* drop-down list.

7. Select the *Shape Palette*.

8. Click 

to recalculate the mapping of the selected column values to the shapes.
9. For columns that are not mapped to a shape, select the *Default Shape* to be used.
10. Checking the *Automatic Mapping* box enables the *Modes* drop-down list:

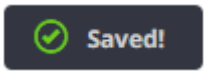


11. You can either assign the shape assignment when new data is dynamically loaded into the visualization:
    - By Size

      The shape assignment is based on the Size variable.
    - Alphabetically

      The shape assignment is done alphabetically.
12. Click the **Save** 

icon on the toolbar.

    When saved, the 

notification is displayed.

Reference Variable Configuration

The Reference variable is available in the Bullet Graph visualization.

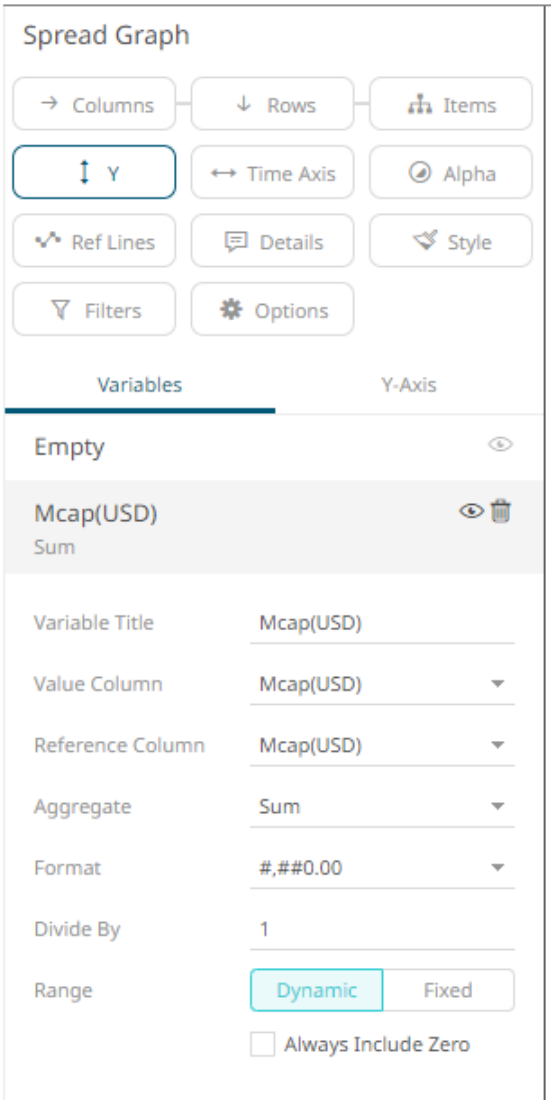
The configuration pane for the Reference variable is the same as for the Size variable.

Spread Variable Configuration

The Spread (Y) variable is available in the Spread Graph visualization.

Steps:

1. On the *Visualization Settings* pane, click the *Spread* variable. To associate other columns from the data table, drag and drop them to the *Spread* variable drop area. Select one to display the corresponding configuration pane.



2. Enter the label of the *Spread* variable in the *Variable Title* field.

   You can parameterize the variable title to support dynamic schema in the dashboards.

3. You can also change the column to the be used as the *Shape* variable from the *Value Column* drop-down list.

4. Select the *Reference Column*. The difference with the *Value Column* will be the basis if the variability or spread of the data is positive or negative.

   For example:

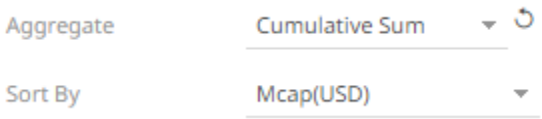
Value Column	Reference Column	Spread
-7.2%	-19.9%	12.7 (Positive)
-8.1%	-6.5%	-1.6% (Negative)

5. You can also specify an aggregation method in the *Aggregate* field.

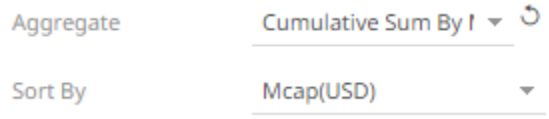
   The default is **Sum**.

   The *Spread* variable also supports a number of other aggregate types:

- If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



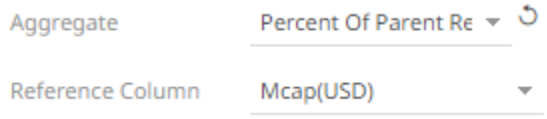
Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



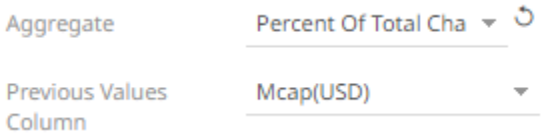
- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



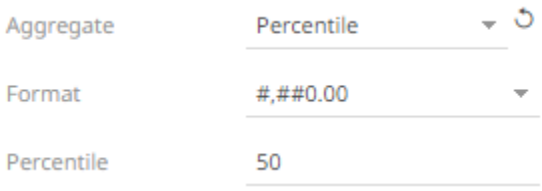
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



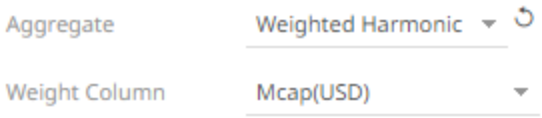
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



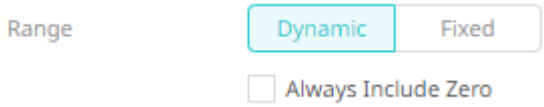
- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.



- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.

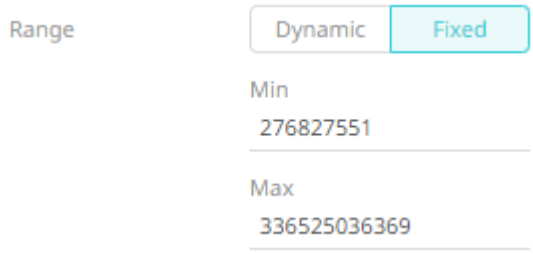


6. The *Format* field lets you to specify the format that numbers will be displayed in Panopticon uses the same formatting as Excel.
7. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)
8. The visible range for the *Spread* variable can either be calculated dynamically (the default, enabled **Dynamic**).



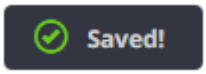
Check the **Always Include Zero** box to let the axis scale start at zero, and grow to any number that may show up in the data.

Or set between predefined limits by clicking **Fixed**. This reveals the *Min* and *Max* text boxes and populates them with default values taken from the data set.



9. Click the **Save** 

icon on the toolbar.

When saved, the 

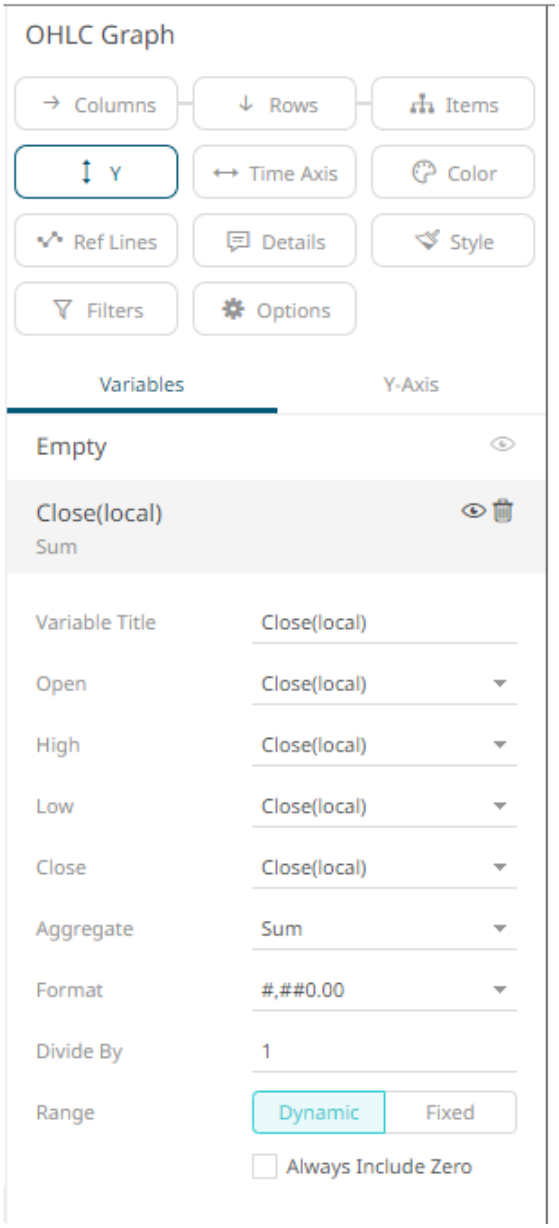
notification is displayed.

OHLC Variable Configuration

This configuration pane for OHLC variable is used by both the OHLC Graph and the Candle Stick Graph.

Steps:

1. On the *Visualization Settings* pane, click the *Y* (*OHLC)* variable. To associate other columns from the data table, drag and drop them to the *OHLC* variable drop area. Select one to display the corresponding configuration pane.



2. Enter the label of the *OHLC* variable in the *Variable Title* field.

   You can parameterize the variable title to support dynamic schema in the dashboards.

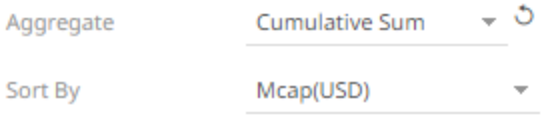
3. Unlike other variables, the OHLC requires four input columns (*Open*, *High*, *Low* & *Close*). These are selectable from list boxes once the **Close** column has been dragged onto the OHLC variable slot.

4. You can also specify an aggregation method in the *Aggregate* field.

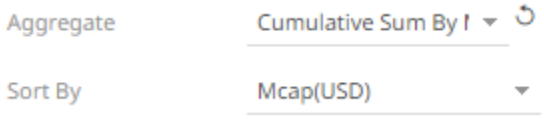
   The default is **Sum**.

The *OHLC* variable also supports a number of other aggregate types:

- If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



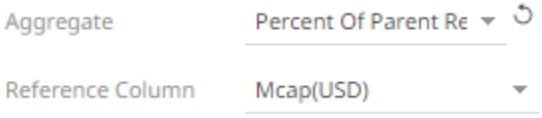
  Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



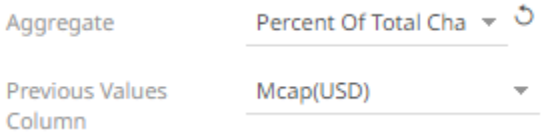
- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



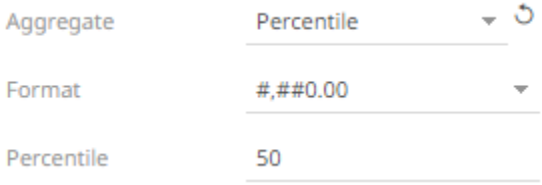
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



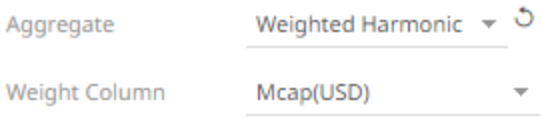
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



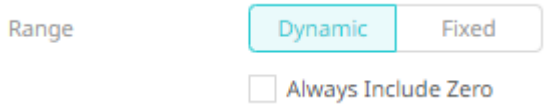
- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.



- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.

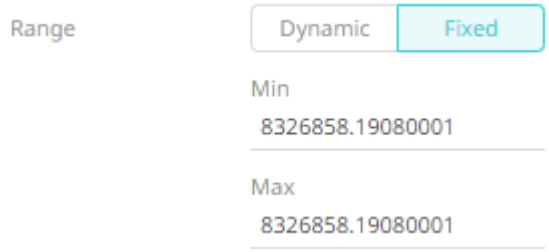


5. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
6. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)
7. The visible range for the *OHLC* variable can either be calculated dynamically (the default, enabled **Dynamic**).



   Check the **Always Include Zero** box to let the axis scale start at zero, and grow to any number that may show up in the data.

   Or set between predefined limits by clicking **Fixed**. This reveals the *Min* and *Max* text boxes and populates them with default values taken from the data set.



8. Click the **Save** 

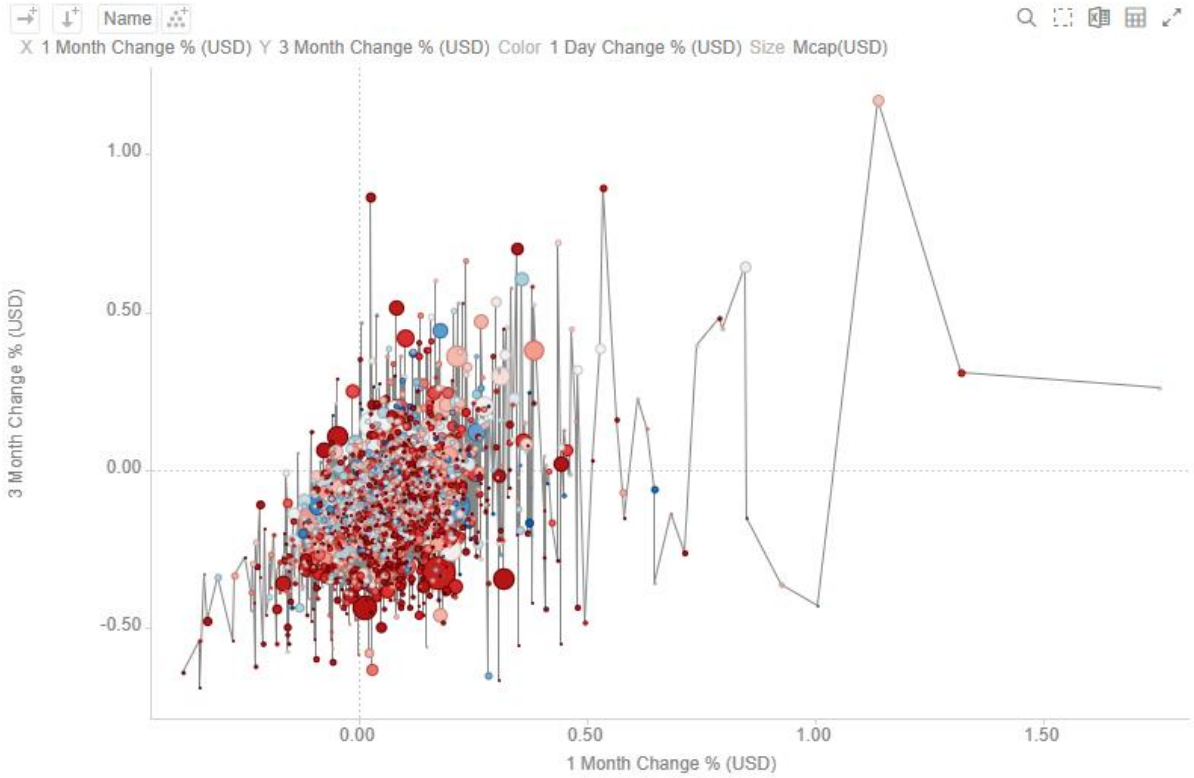
icon on the toolbar.

   When saved, the 

notification is displayed.

Reference Lines Variable Configuration

You can add a horizontal or vertical line to your chart (for this example, Scatter Plot) to indicate key values, important aggregates or dates, etc. Adding the Y column to a Reference Lines variable can produce this visualization:

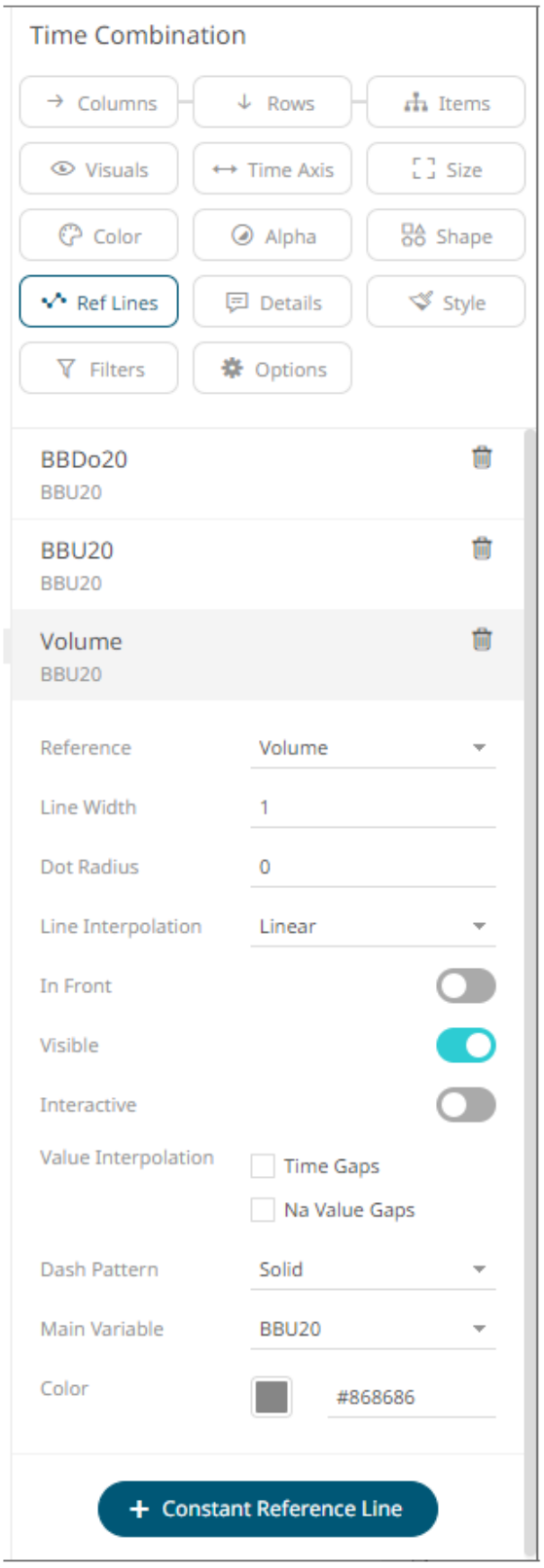


For this sample, after adding the same column used for the Y-axis (3 Month Change % (USD)) as a Reference Line, all of the values on the Scatter plot are then taken and sorted horizontally along the X-axis, then a line is drawn between the values.

The Reference Line variable is available in the Table and all the time series visualizations (except in the Horizon Graph and Timeseries Surface Plot).

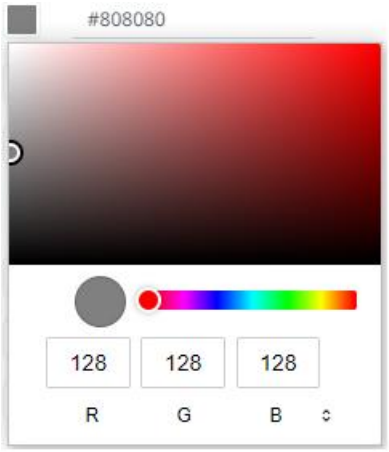
Steps:

1. To associate columns from the data table, drag and drop them to the *Reference Lines* variable drop area. Select one to display the corresponding configuration pane.

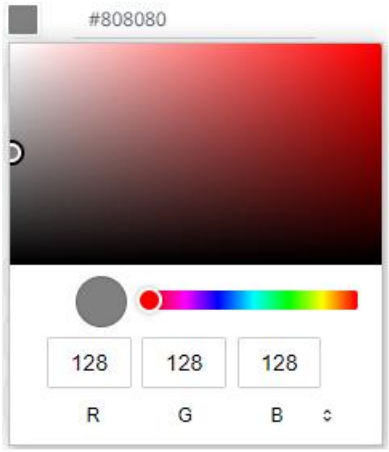


2. You can opt to change the column to the be used as the *Reference Lines* variable from the *Reference* drop-down list.
3. Specify the *Line Width*. Default is **1**.

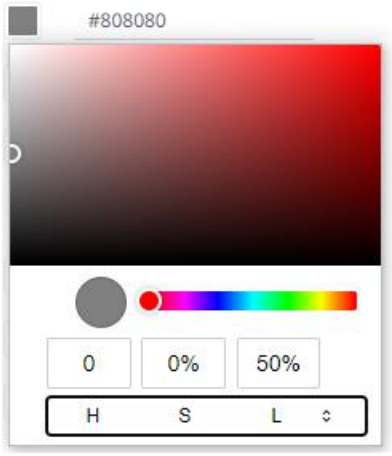
4. Specify the *Dot radius* (in pixels) of each data point. Default is **0**.
5. Select the *Line Interpolation*: **Linear, Stepped,** or **Smooth**.
6. Tap the **In Front** slider to display the lines in front of the scatter points.
7. Tap the **Visible** slider to enable the reference line of added columns. This is enabled by default.
8. Tap the **Interactive** slider to apply the interactive parameters of the column.
9. Enable:
    - Interpolate Time Gaps
    - Interpolate Na Value Gaps
10. Select the *Dash Pattern*: **Dotted, Dashed**, or **Solid**.
11. The *Main Variable* field displays the selected column that will be used as the main variable of the reference line.
12. Set the line color of an added column either by:
    - clicking the corresponding *Color* box to display the *Color* dialog to:



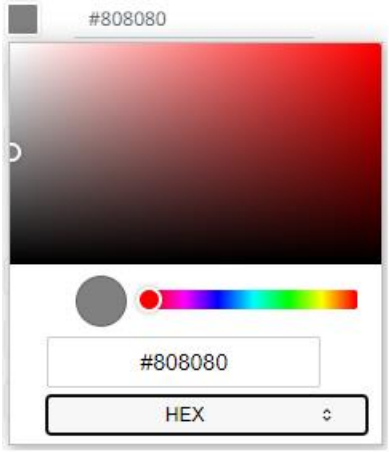
    - ♦ select the color, or
    - ♦ click ⁂ to enter the values for RGB



for HSL

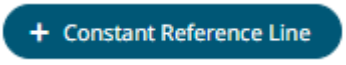


for the Hex color code

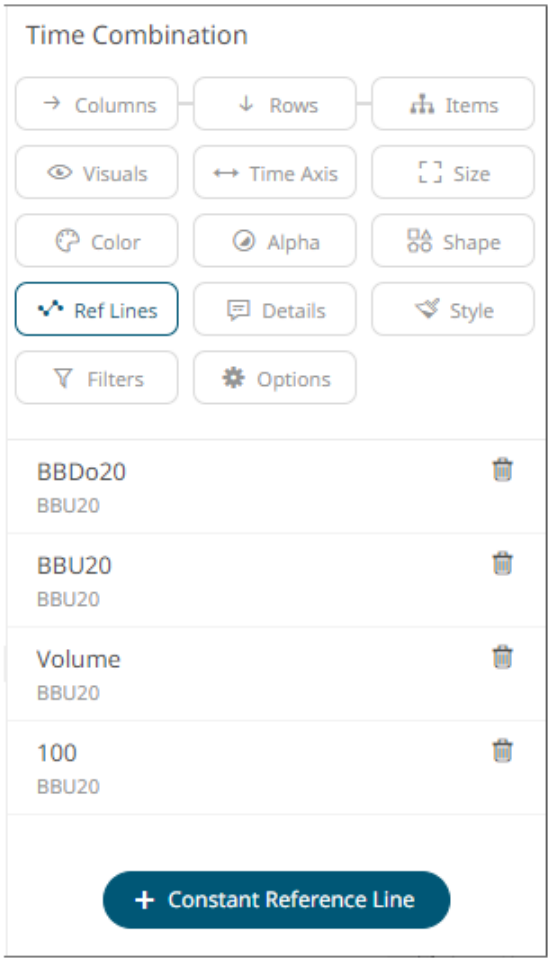


- or enter the *Hex* color code



13. Click 

. A new constant reference line is added under the *Reference Lines* list.



This value (e.g., 100) can be used as point of reference as compared to the column values added in the Y-axis.

You can also perform steps 2 to 13 to the added constants.

8. Click the **Save**  icon on the toolbar.

When saved, the  notification is displayed.

Color Variable Configuration

You can associate either numeric or text columns with the *Color* variable.

All the static and time series visualizations have the *Color* variable except in the Spread and Horizon graphs.

The configuration pane of the *Reference Color* variable in the Pareto Chart visualization is the same as what is discussed in this section.

Color Variable Configuration for Text Columns Using the Palette Color Source

The configuration pane for the *Color* variable changes depending on the column data type.

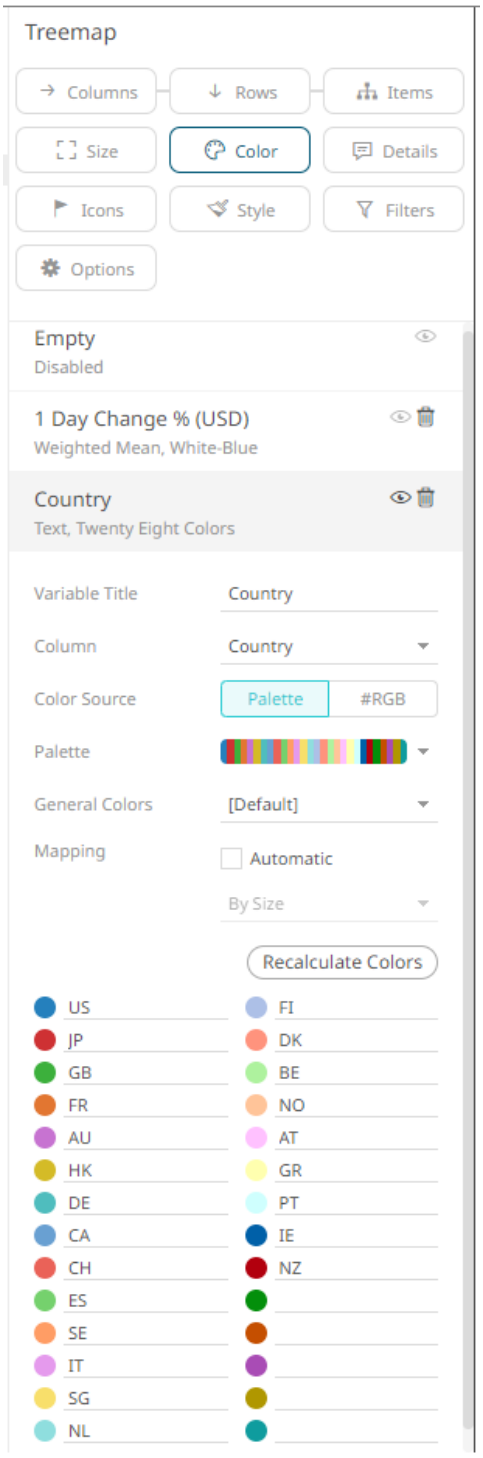
When a text column is added to the *Color* variable, the configuration pane displays the color associated with each categorical item, as specified with a default color palette (e.g., **Twenty Eight Colors**).

Note that since there are only 23 categorical items assigned to the colors of the selected palette, the remaining color palettes are left blank.

To use the **#RGB** *Color Source*, see Color Variable Configuration for Text Columns Using the RGB Color Source.

Steps:

1. On the *Visualization Settings* pane, click the *Color* variable. To associate other columns from the data table, drag and drop them to the *Color* variable drop area. Select one to display the corresponding configuration pane.



2. Enter the label of the *Color* variable in the *Variable Title* field.

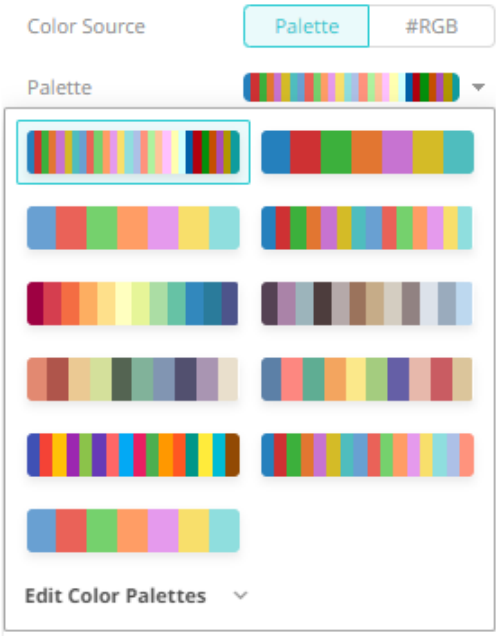
   You can parameterize the variable title to support dynamic schema in the dashboards.

3. You can also change the column to the be used as the *Color* variable from the *Column* drop-down list.

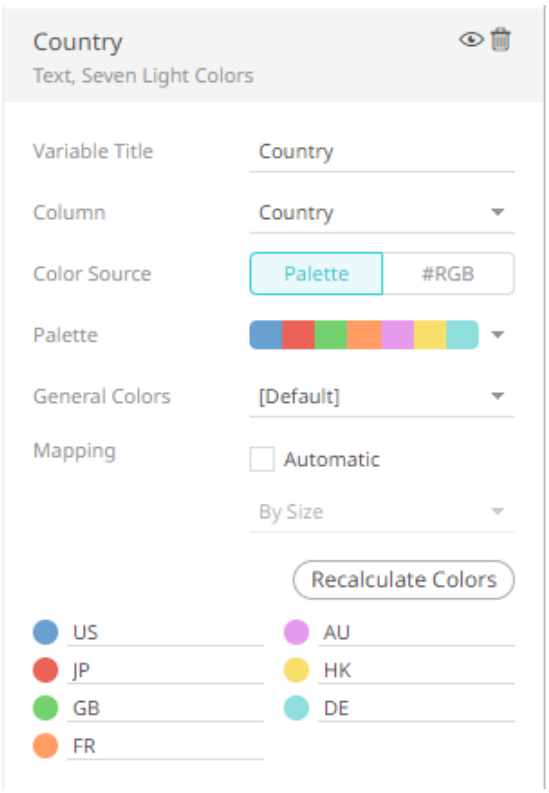
4. Select the **Palette** 

Color Source.

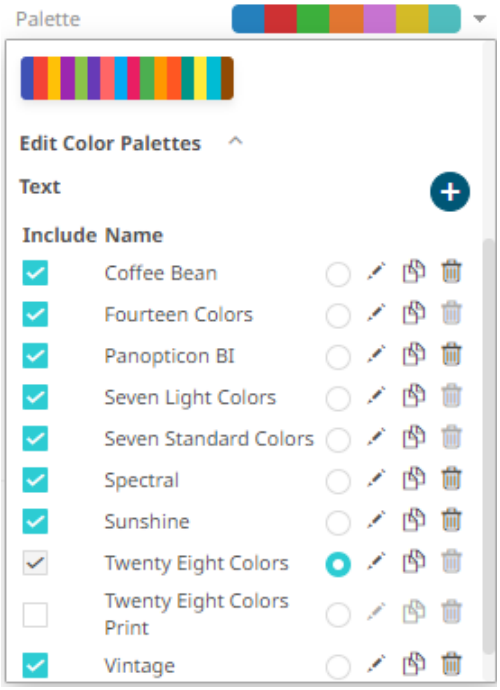
5. Click the *Palette* drop-down list to display and select from the available ones. By default, **Twenty Eight Colors** is selected.



The number of categorical items for a visualization will depend on the selected palette. For example, if you select **Seven Standard Colors**, the list of categorical items will be reduced to seven.



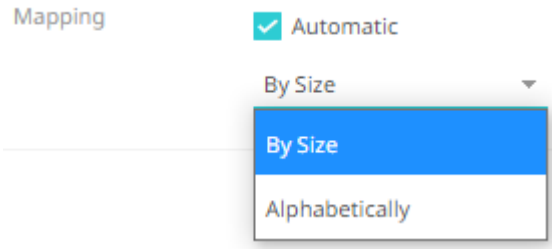
To modify the color palettes, click ⌄ to expand the *Palette* section.



See Color Palettes for more information.

6. Click Recalculate Colors to re-retrieve the categorical items and match them to the color palette.
7. Select the *General Colors* that will be used for the *Color* variable.

8. Checking the *Automatic Mapping* box enables the *Modes* drop-down list:



9. You can either assign the categorical color assignment when new data is dynamically loaded into the visualization:
    - By Size

      The color assignment is based on the Size variable.
    - Alphabetically

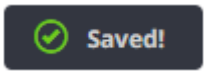
      The color assignment is done alphabetically.

NOTE

- **This would occur as a result of navigation action defining a parameterized data set to be displayed in the visualization.**
- **The following visualizations will now use the selected Height variable:**
    - **Bar Graph (Horizontal and Vertical)**
    - **Bullet Graph (Horizontal and Vertical)**
    - **Dot Plot (Horizontal and Vertical)**
    - **Line Graph**
    - **Numeric Line Graph**
    - **Needle Graph**
    - **Order Book Graph**
    - **Pareto Chart**
- **The following visualizations are using the selected Size variable:**
    - **Circle Pack**
    - **Map Plot**
    - **Network Graph**
    - **Pie Chart**
    - **Scatter Plot**
    - **Stack Graph**
    - **Timeseries Scatter Plot**
    - **Treemap**

The rest of the visualizations will perform as before.

10. Click the **Save**  icon on the toolbar.

When saved, the  notification is displayed.

Color Variable Configuration for Text Columns Using the #RGB Color Source

Aside from assigning the categorical items to the colors of the selected palette, the **color names** (i.e., red, green, blue, etc.) or **Hex Codes** (i.e., #FFFFFF, #000000, etc.) in a column of the data table can be used.

For example, the data table has the following columns:

A	B	BrowserColors	ColorCodes	Mix
a	10.00	red	#70db8c	red
a1	11.00	green	#70dbd4	#70dbd4
a2	12.00	pink	#9437bf	70dbd4
a3	14.00	purple	#70dbd4	ff70dbd4
a4	13.00	blue	#707cdb	Orange
a5	15.00	orange	#c9db70	Orange
a6	16.00	yellow	#db4132	#db4132

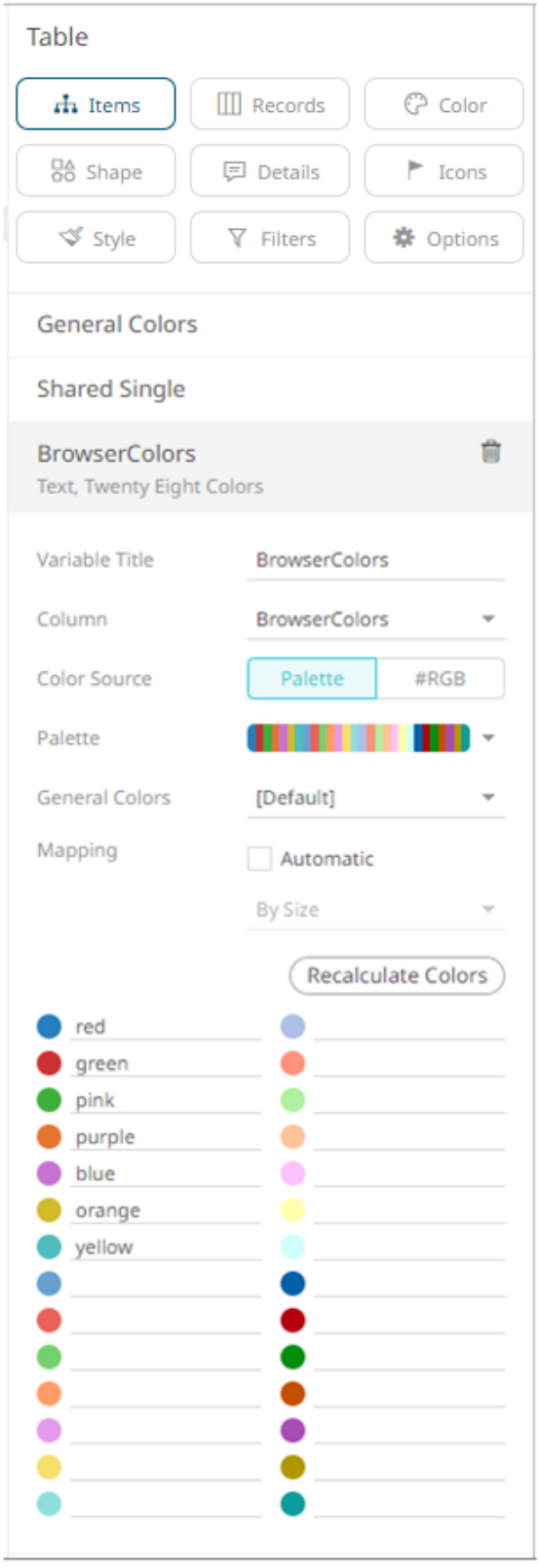
The values of the *BrowserColors*, *ColorCode*, and *Mix* columns can be used as colors (background or text) for a column in the visualization.

NOTE **Color names are case-insensitive. Some color names consist of two or three words, and they must never be entered with spaces. For example, a correct value is 'DarkOliveGreen'.**

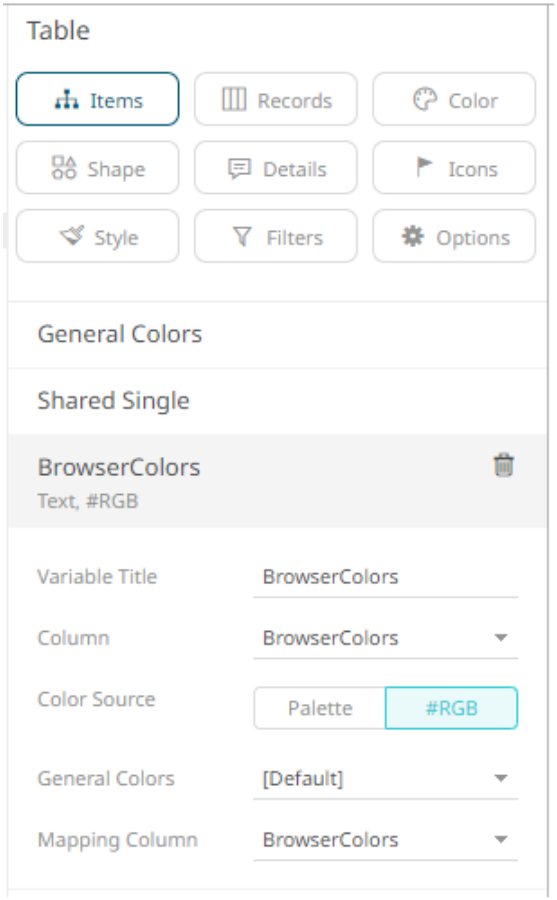
The 140 color names supported by all modern browsers can be used: https://www.w3schools.com/colors/colors_names.asp.

Steps:

1. To associate other columns from the data table, drag and drop them to the *Color* variable drop area. Select one to display the corresponding configuration pane.



Note that the values of the *BrowserColumns* column do not match the associated color palette. To use the color names, select the **#RGB**  *Color Source*.

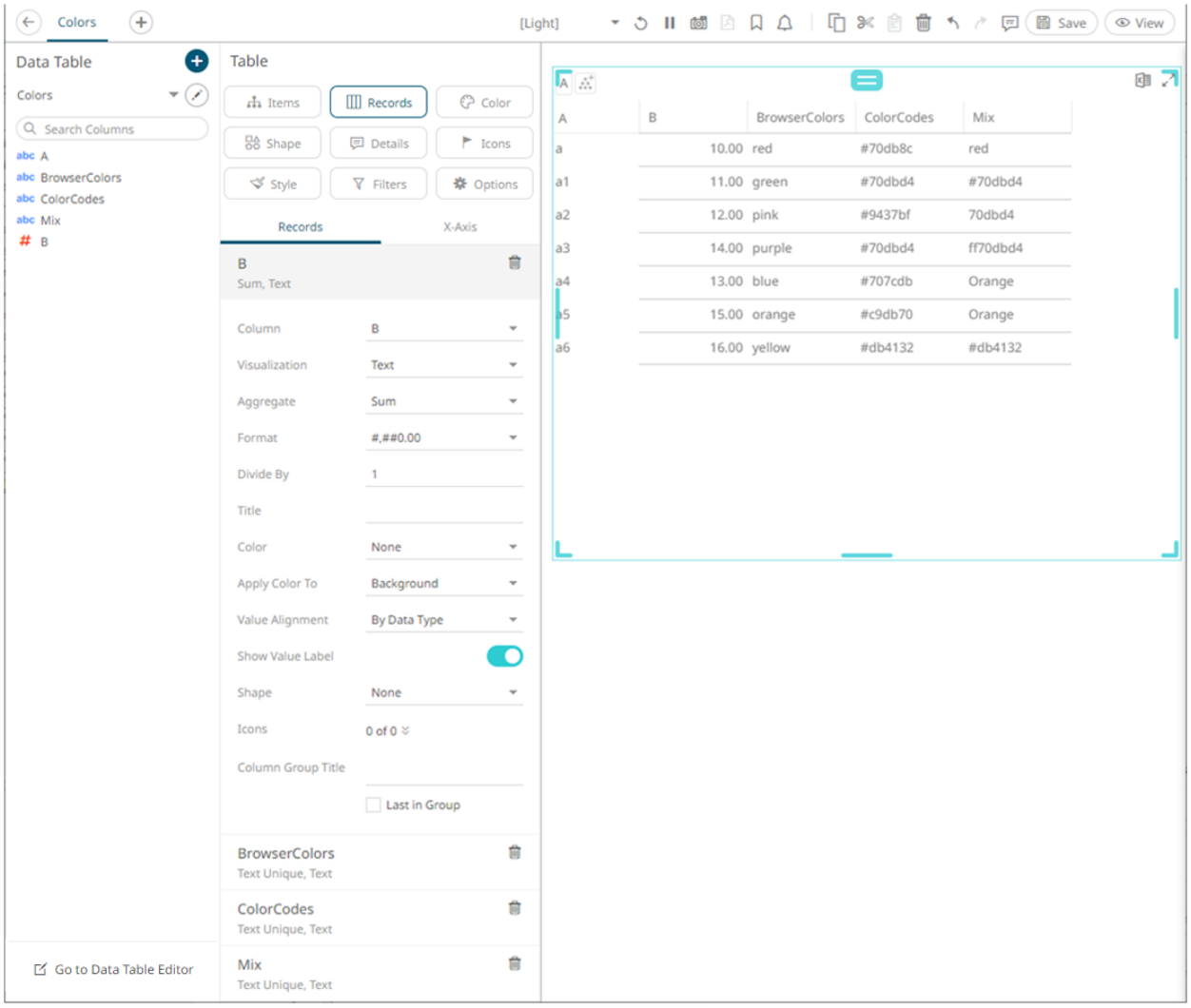


2. Select the *General Colors* that will be used for the *Color* variable.
3. Select the *Mapping Column* that will be used when new data is dynamically loaded into the visualization.

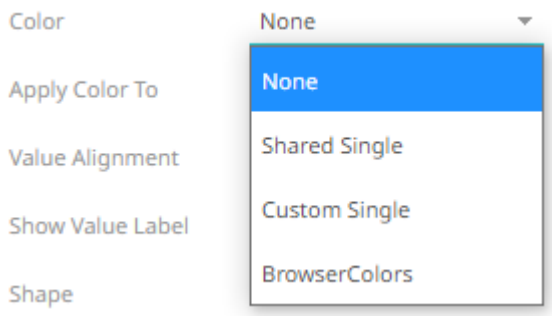
   For this sample table visualization:

A	B	BrowserColors	ColorCodes	Mix
a	10.00	red	#70db8c	red
a1	11.00	green	#70dbd4	#70dbd4
a2	12.00	pink	#9437bf	70dbd4
a3	14.00	purple	#70dbd4	ff70dbd4
a4	13.00	blue	#707cdb	Orange
a5	15.00	orange	#c9db70	Orange
a6	16.00	yellow	#db4132	#db4132

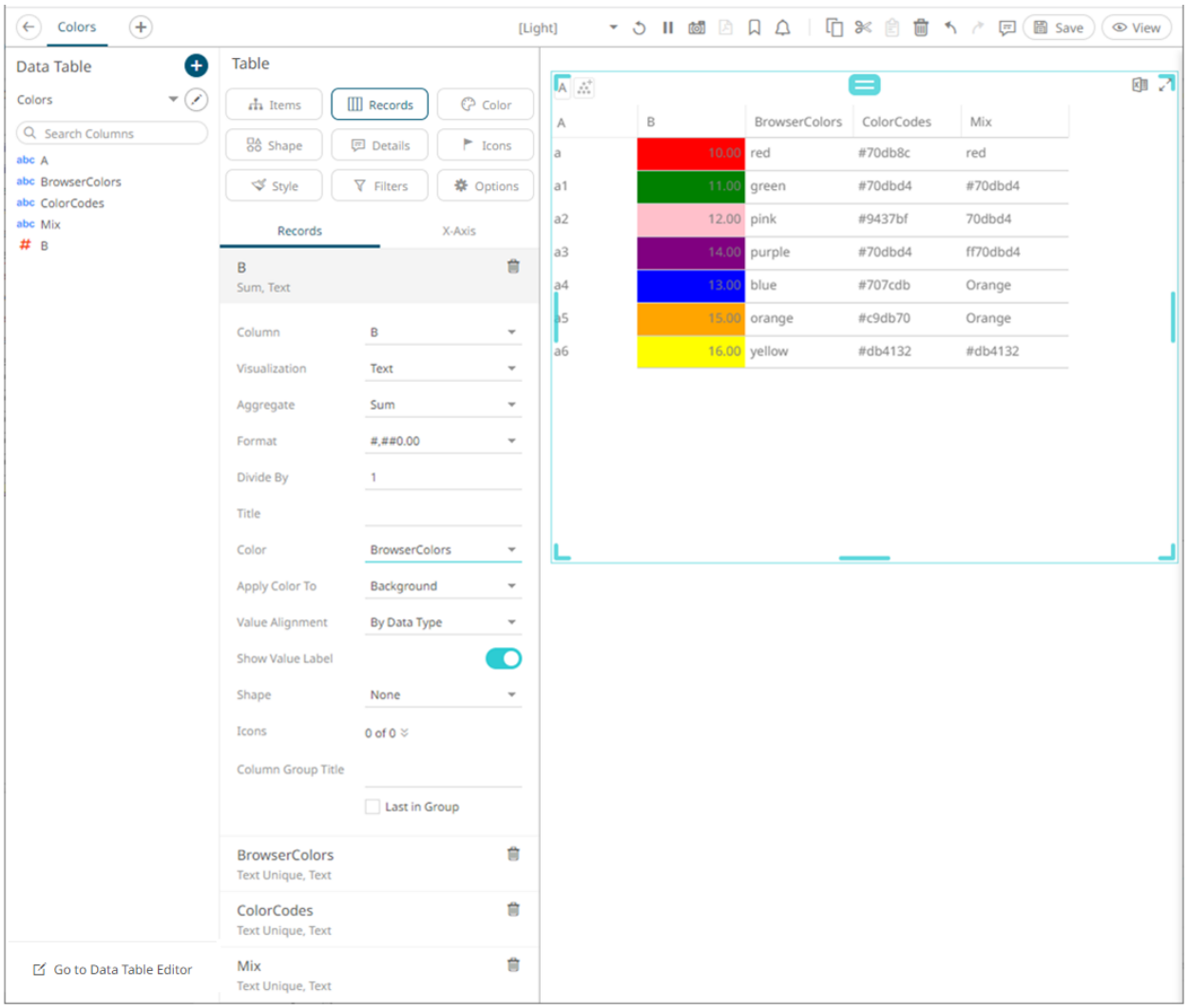
   If you want to use the colors in the *BrowserColors* column as background for the *B* column, you can do so by selecting **B** under the *Records* pane list.



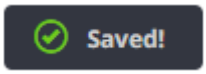
In the *Color* drop-down list, select **BrowserColors**.



The values of *BrowserColors* column are applied as the background color of the *B* column.

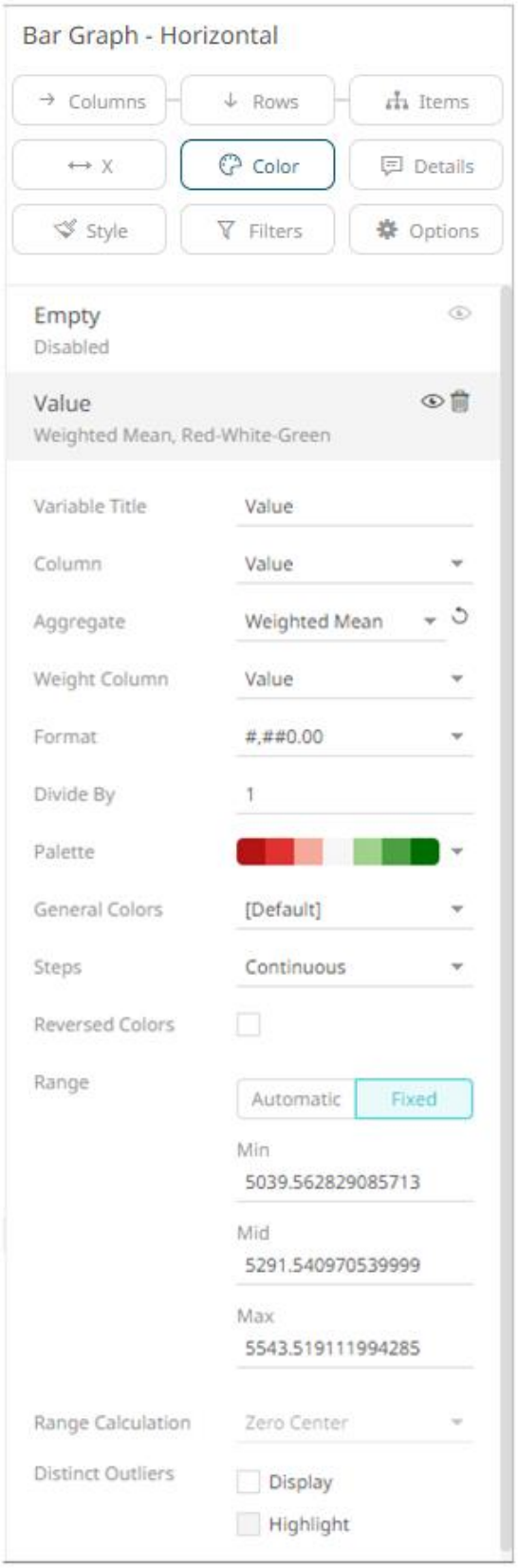


4. Click the **Save**  icon on the toolbar.

   When saved, the  notification is displayed.

Color Variable Configuration for Numeric Columns

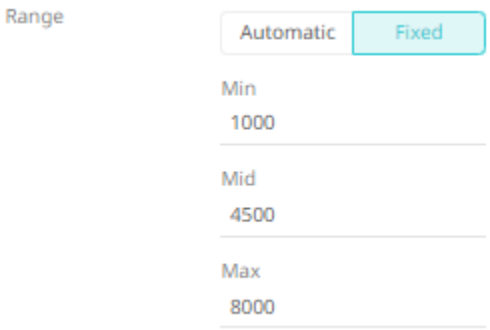
When you add a numeric column to a *Color* variable, the configuration pane displays a set of options similar to the pane for the Size variable. This allows you to define the data display format and aggregation method:



Other configuration options for numeric color variables include:

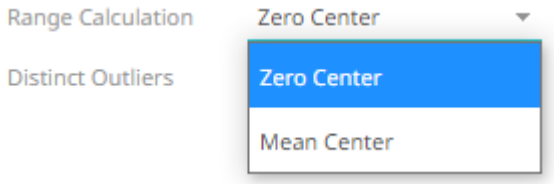
- Range

The *Min* and *Max* text boxes are populated default values from the data set.

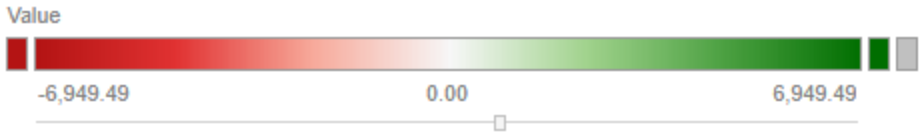


- Automatic Limits/Range Calculation

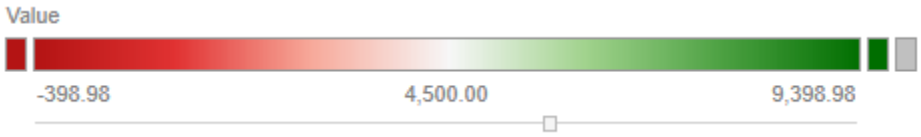
  Disables the *Range* option and supports either:



  - **Zero Center** range calculation



  - **Mean Center** range calculation

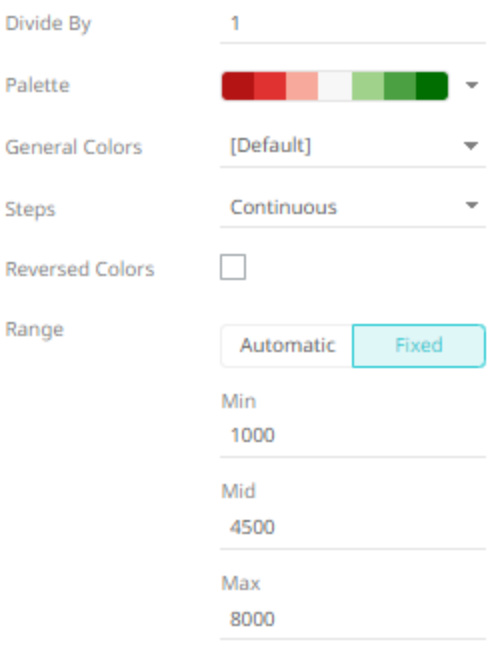


- Divide By

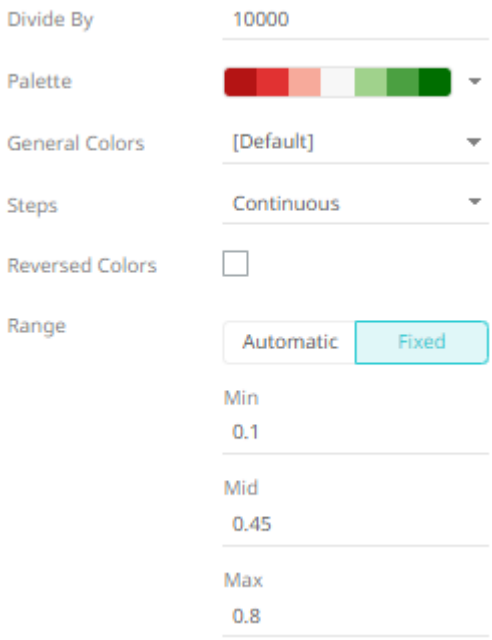


  Enter the *Divide By* value then click ✓ to divide fixed and automatic ranges.

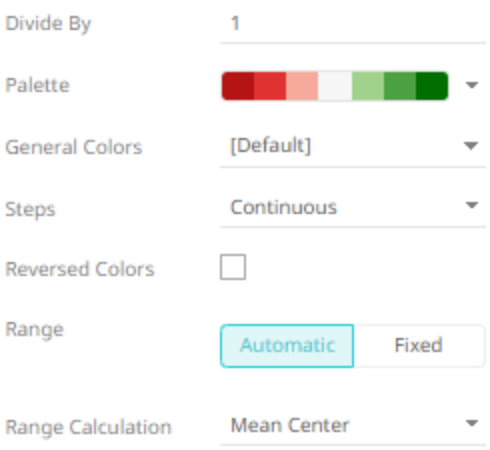
  For example, for this range:

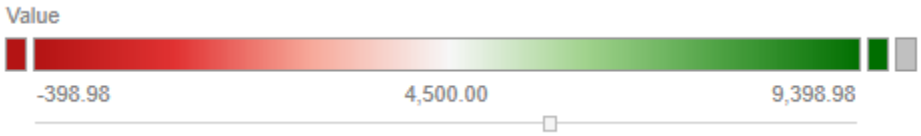


When the *Divide By* is **10000**, then the range values will be:

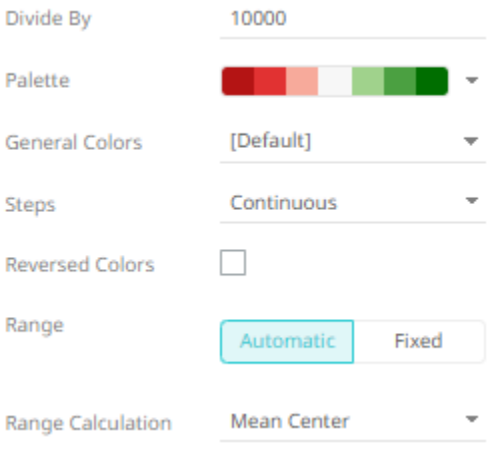


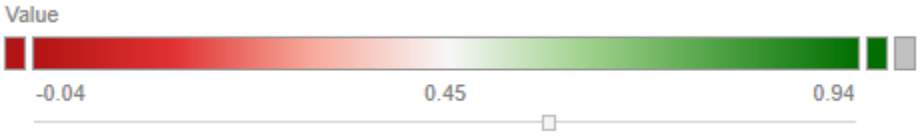
Another example for the *Automatic Range*:





When the *Divide by* is **1000000**, then the automatic range values will be:





- Palette

  The sequential and diverging color palettes that are used in numeric color variables in visualizations
- General Colors

  The general colors to be used for visualizations.
- Continuous/Stepped Colors

  The color palette can either be a continuous color gradient or a stepped color gradient.

  You can define this setting using the appropriate radio button.



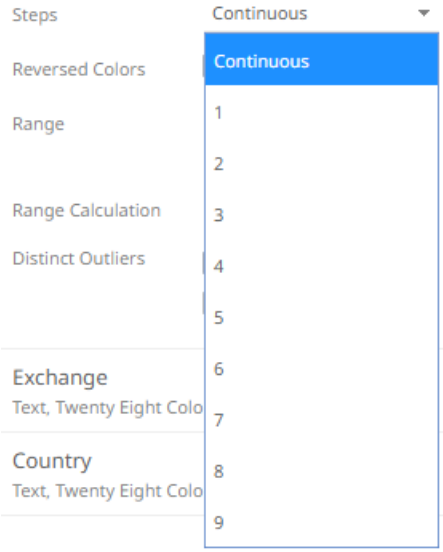
Continuous Colors produces this effect:



Stepped Colors produces this effect:



Select the number of steps in the gradient in the *Steps* list box.



- Reversed Colors

  You can reverse the color palette for cases where a high number indicates poor performance. For example, if your data shows high risk as a high number, it may be more useful to display high risk using **Red** rather than Blue.

  Standard Palette 

  Reversed Palette 

- Distinct Outlier Colors

  When outliers are of particular interest, you can highlight outliers using the Distinct Outlier Colo*r*s function.

  Without Outlier Colors 

  With Outlier Colors 

- Highlighted Outlier Colors

  Where only the outliers are important, the central color range is grayed and only the *Distinct Outlier Colors* are highlighted in the visualization.

  With Outlier Colors 

With Highlighted Outlier Colors

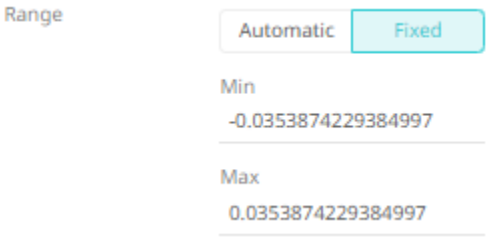


Panopticon supports two types of Numeric Color Palettes: **Sequential** and **Diverging**.

- Sequential Color Palettes

  Sequential Palettes use a two-color gradient between a minimum and a maximum value. Numeric column containing only positive values default to a Sequential Palette using the **White-Blue** color palette.

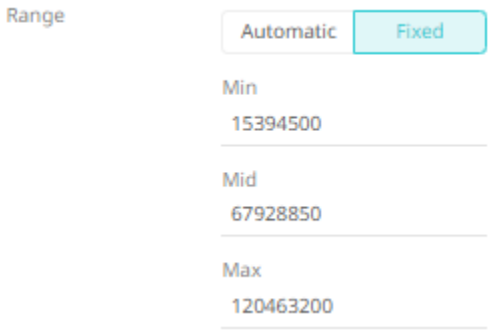
  In this case the range *Mid* point is disabled, and the *Min* and *Max* points are populated with defaults from the data set.



- Diverging Color Palettes

  Diverging Palettes use a three-color gradient between a minimum, middle and a maximum value. Numeric columns containing both positive and negative values default to the Diverging Palette with the **Red White Blue** color palette selected.

  Diverging Palettes use the **Range Midpoint**. The *Min*, *Mid* and *Max* points are populated with defaults from the data set.



General Colors and Shared Single Configuration

For the Table, Record Graph, Time Combination, Numeric Combination and Text Combination visualizations, instead of associating data table columns to the *Color* variable, you can modify the default *General Colors* and *Shared Single* settings.

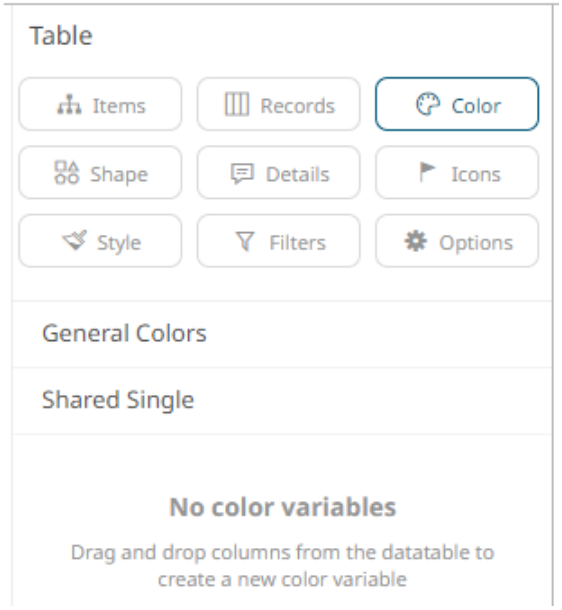
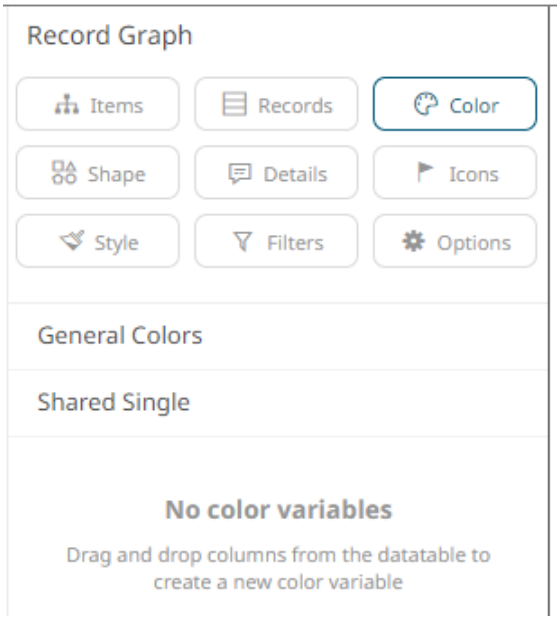
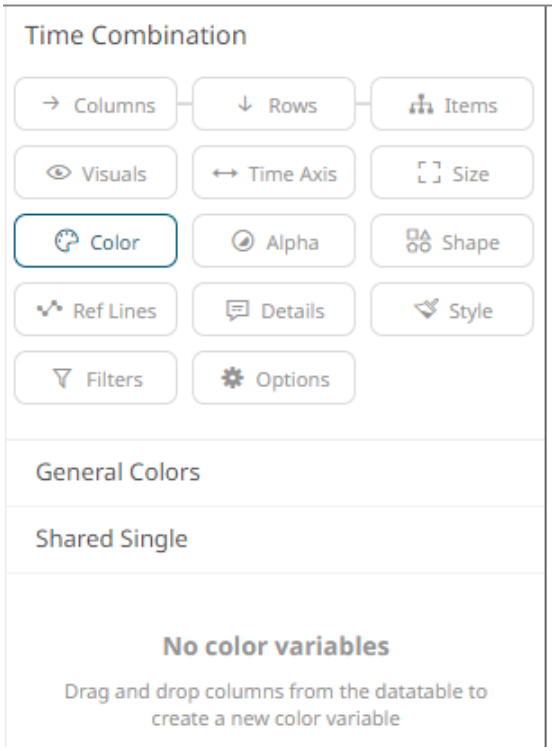


Table
Items
Records
Color
Shape
Details
Icons
Style
Filters
Options
General Colors
Shared Single
No color variables
Drag and drop columns from the datatable to create a new color variable

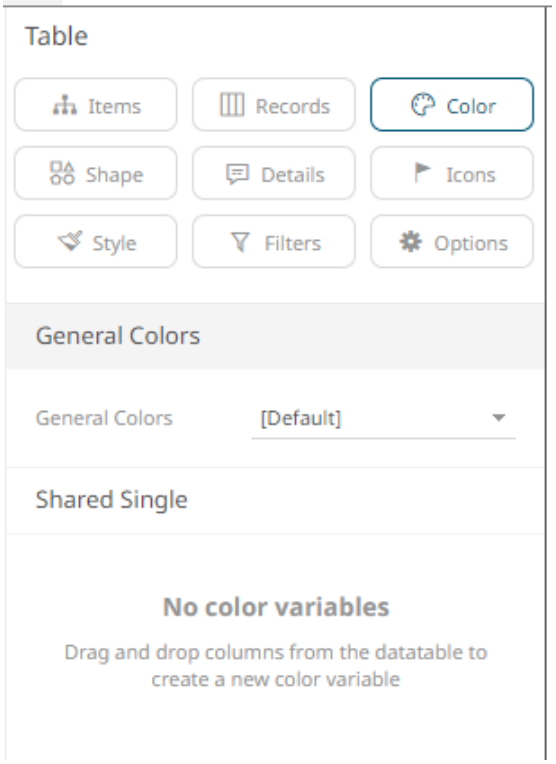

Record Graph
Items
Records
Color
Shape
Details
Icons
Style
Filters
Options
General Colors
Shared Single
No color variables
Drag and drop columns from the datatable to create a new color variable



Steps:

1. Click the **Color**  button.

2. Click *General Colors* to expand.



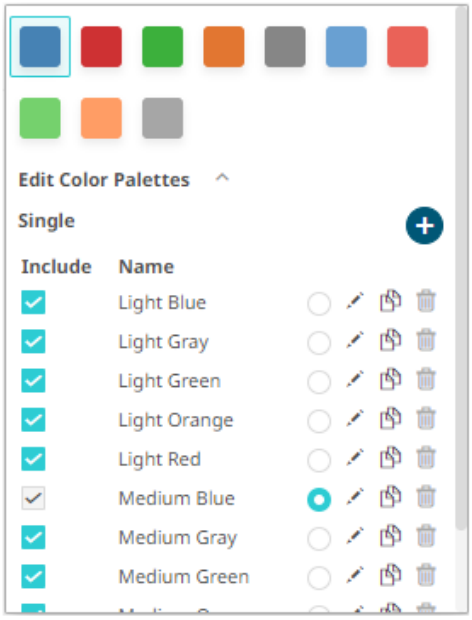
3. Select the *General Colors* such as the axis, background, border, and focus colors, that will be used in the visualization.
4. Click *Shared Single* to expand.

   These are the single colors that will be shared in a workbook for:

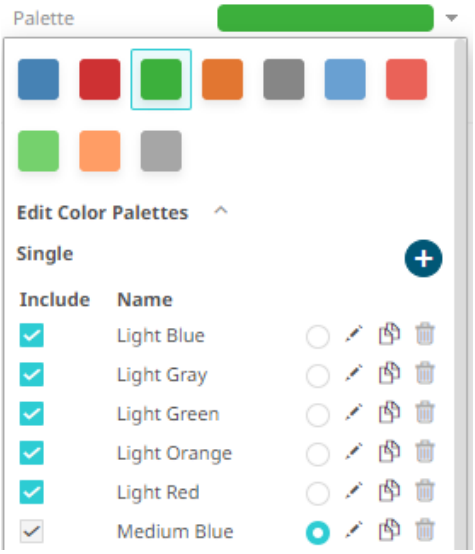
   - records in Table and Record visualizations for the background, text, or shape
   - visual members in Combination visualizations for the background or text

   By default, the color is set to .
5. To edit the color palettes, click the *Palette* drop-down list and Edit Color Palettes .

   The available light and medium single colors are displayed. Note that they are all included and cannot be deleted.



6. You may opt to uncheck any of the **Include** boxes to exclude them in the single color palette options.
7. Click on a single color option to set it as the palette.



8. You can also opt to click:

Icon/Control	Description
	To add a new single color palette.
	To set a single color palette as the default. **NOTE:** The default cannot be deleted.
	To modify the single color palette.
	To create a duplicate. Can be modified to create a new one.
	To delete new or duplicate single color palettes.

9. Click the **Save** 

icon on the toolbar.

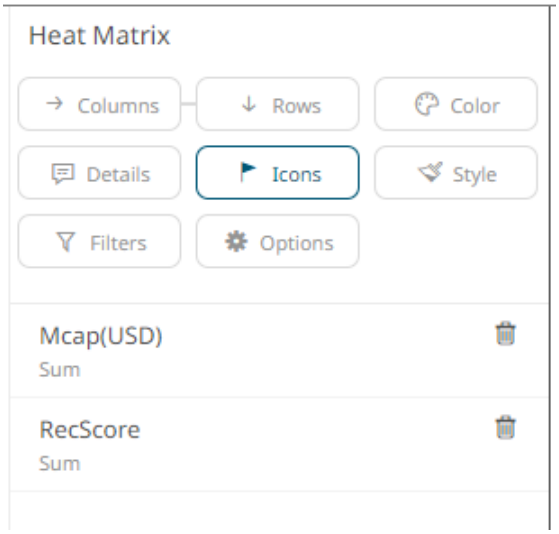
Icons Variable Configuration

You can drag and drop numeric and text columns onto the *Icons* variable. The options available in the configuration pane will depend on the type of data in the column. You can also assign multiple icons for each single source column.

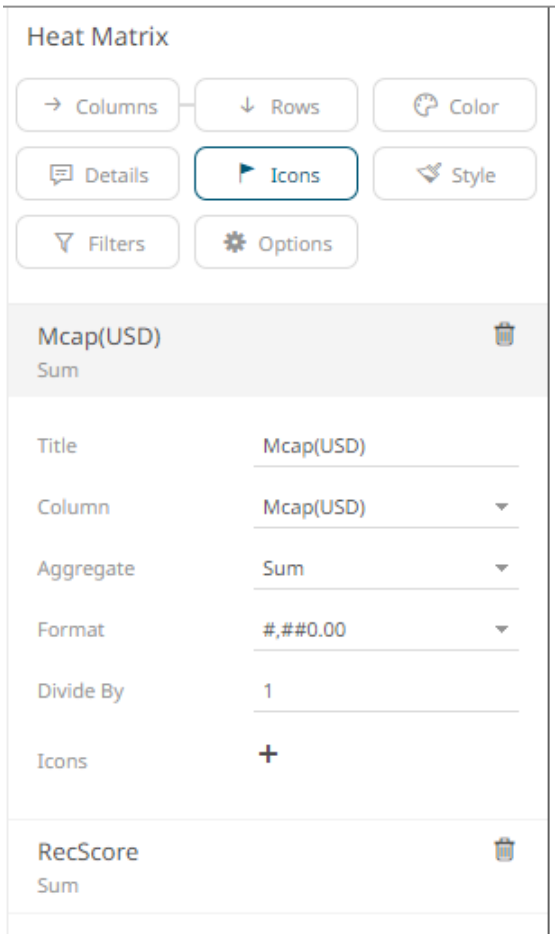
The Heat Matrix, Treemap, and Table visualizations have the *Icons* variable.

Steps:

1. To associate columns from the data table, drag and drop them to the *Icons* variable drop area. Select a numeric column to display the corresponding configuration pane.



This displays the configuration pane.

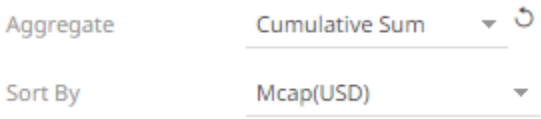


2. Enter the label of the *Icons* variable in the *Variable Title* field.
3. You can also change the column to the be used as the *Icons* variable from the *Column* drop-down list.
4. Specify an aggregation method in the *Aggregate* field.

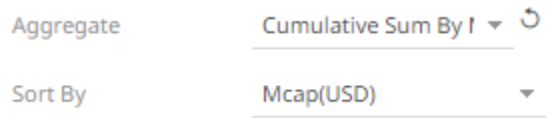
   The default is **Sum**.

   The *Icons* variable also supports a number of other aggregate types:

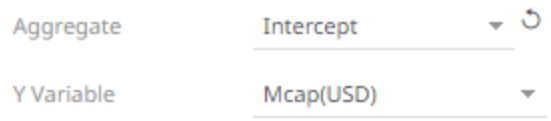
   - If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.

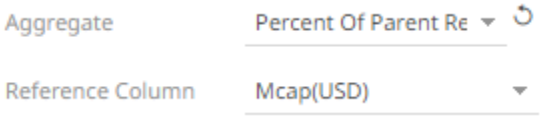
     Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.

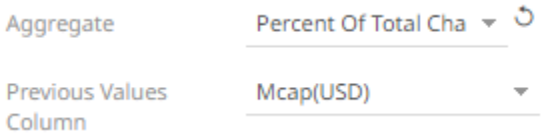
   - If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



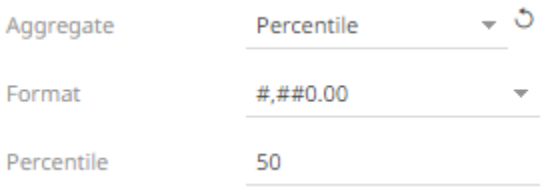
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



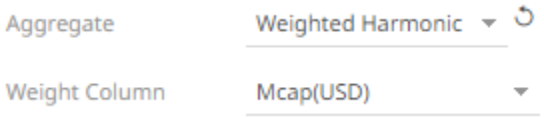
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.

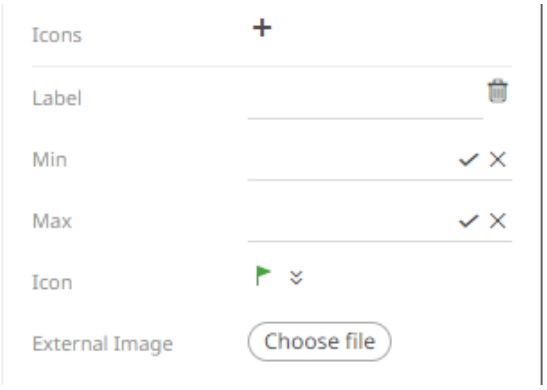


- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.

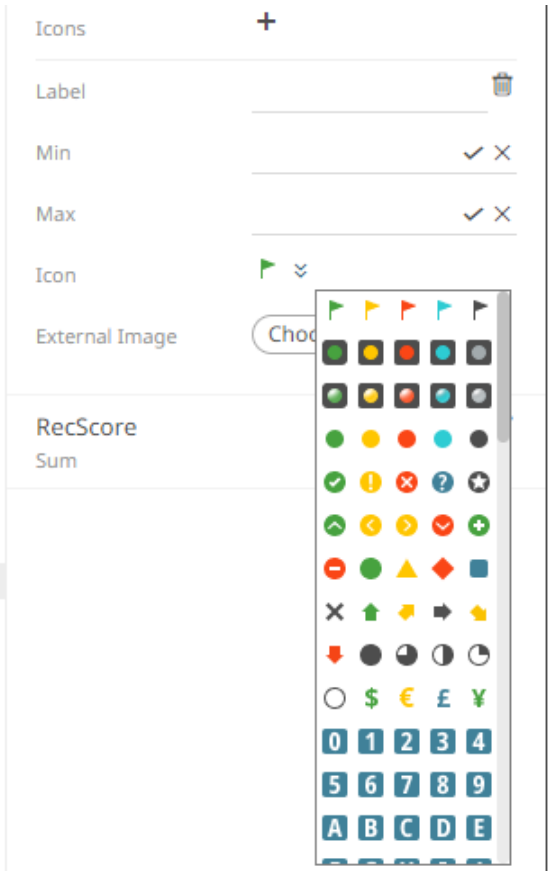


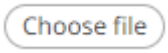
5. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
6. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)
7. Click the **Add Icon** + button to complete the task.

   Clicking the **Add Icon** button with a numeric column displays a new section where you can specify:

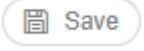


8. Enter the *Label* of the new icon.
9. Specify the numeric range (*Min* and *Max*) to display the icon. Leaving the Min and Max fields empty implies no limit.
10. Select the *Icon* from the drop-down list.



11. You can also opt to select an **External Image**. Click **Choose File**  to display the *Open* dialog and select the icon that will be used.

12. To add more icons, click the **Add Icon**  and repeat steps 8 to 11.

13. Click the **Save**  icon on the toolbar.

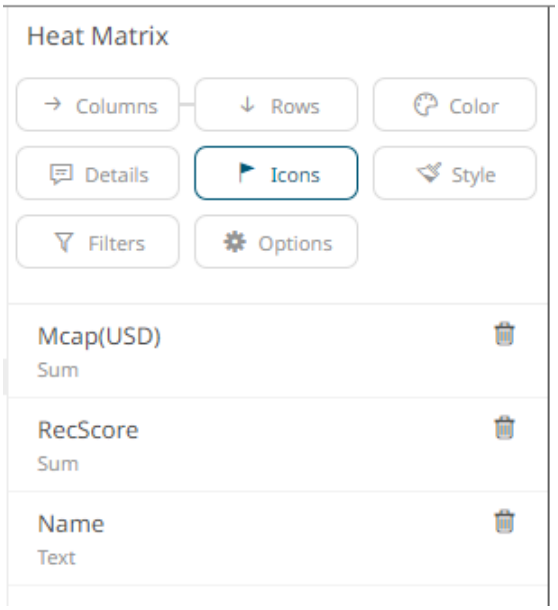
When saved, the 

notification is displayed.

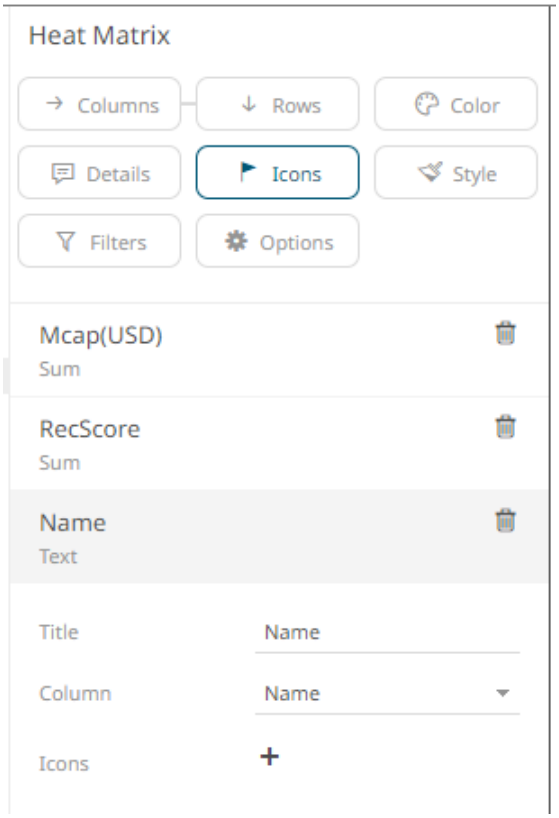
You can add Icons based on text columns in a similar way.

Steps:

1. To associate columns from the data table, drag and drop them to the *Icons* variable drop area. Select a text column to display the corresponding configuration pane.

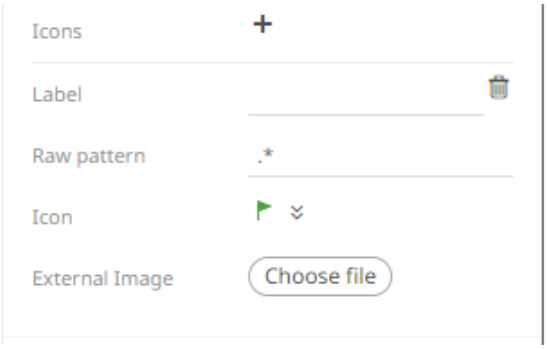


This displays the configuration pane.

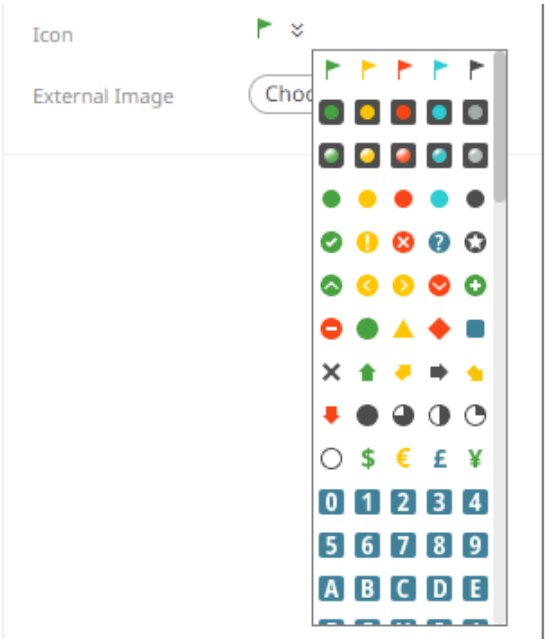


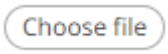
2. Enter the label of the *Icons* variable in the *Variable Title* field.
3. You can also change the column to the be used as the *Icons* variable from the *Column* drop-down list.
4. Click the **Add Icon** + button to complete the task.

   Clicking the **Add Icon** button with a numeric column displays a new section where you can specify:



5. Enter the *Label* of the new icon.
6. The *Raw Pattern* field lets you specify a text string. When a node in the visualization matches the text string, the corresponding icon is displayed. Leaving the *Raw Pattern* field empty creates a match on non-empty strings.
7. Select the *Icon* from the drop-down list.



8. You can also opt to select an **External Image**. Click **Choose File**  to display the *Open* dialog and select the icon that will be used.

9. To add more icons, click the **Add Icon**  and repeat steps 5 to 8.

10. Click the **Save**  icon on the toolbar.

    When saved, the  notification is displayed.

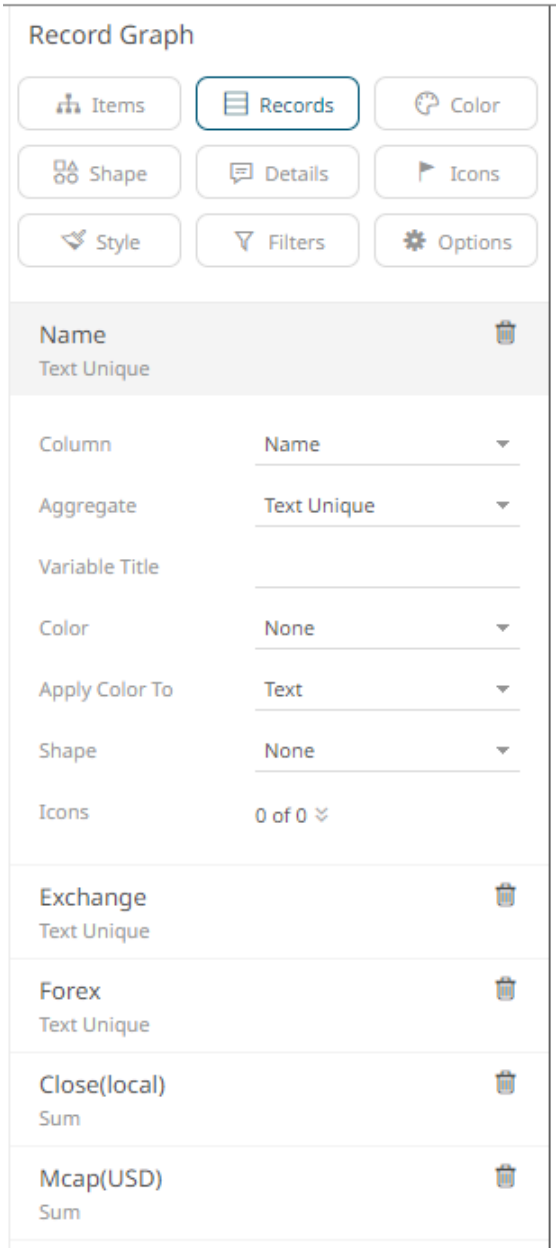
Records Variable Configuration

The *Records* variable is available in the Record Graph and Table visualizations.

Steps:

1. To associate columns from the data table, drag and drop them to the *Records* variable drop area. Select a text column to display the corresponding configuration pane.

   The name of the dragged column and its aggregate (e.g., Text Unique) are displayed as the header.



2. You can opt to change the column to the be used as the *Record* variable from the *Column* drop-down list.
3. Select the text aggregation method from the *Aggregate* field: **Count Distinct**, **Text Unique** (default), or **Text Concat Distinct**.
4. Enter the label of the Record variable in the *Variable Title* field.
5. Select the column that will be used as the *Color* in the *Apply Color To* field.
6. Set how the color variable is displayed in the *Apply Color To* drop-down: **Background, Text,** or **Text.**

   Sample 1: If **1 Day Change % (USD)** column is selected and the *Apply Color To* is set to **Background**, then the visualization will be:



   Sample 2: If **Industry** column is selected and the *Apply Color To* is set to **Text**, then the visualization will be:

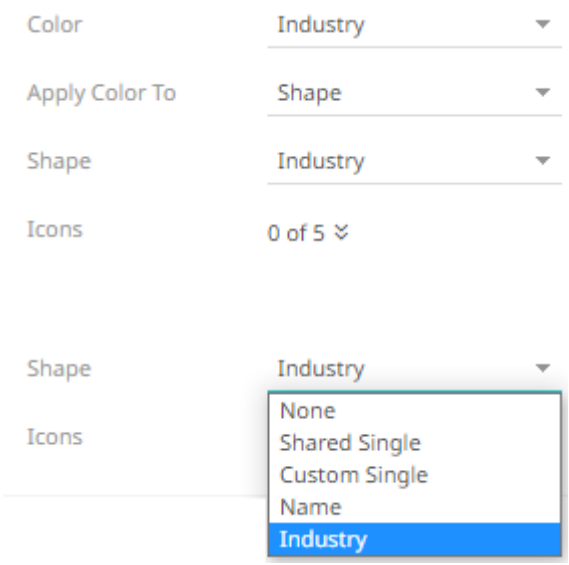
Name	Auckland International Airport Ltd.	Contact Energy Ltd.	Fletcher Building Ltd.	Sky City Entertainment Group Ltd.	Telecom Corp. of New Zealand Ltd.

Sample 3. If **Industry** column is selected and the *Apply Color To* is set to **Shape**, then the visualization will be:

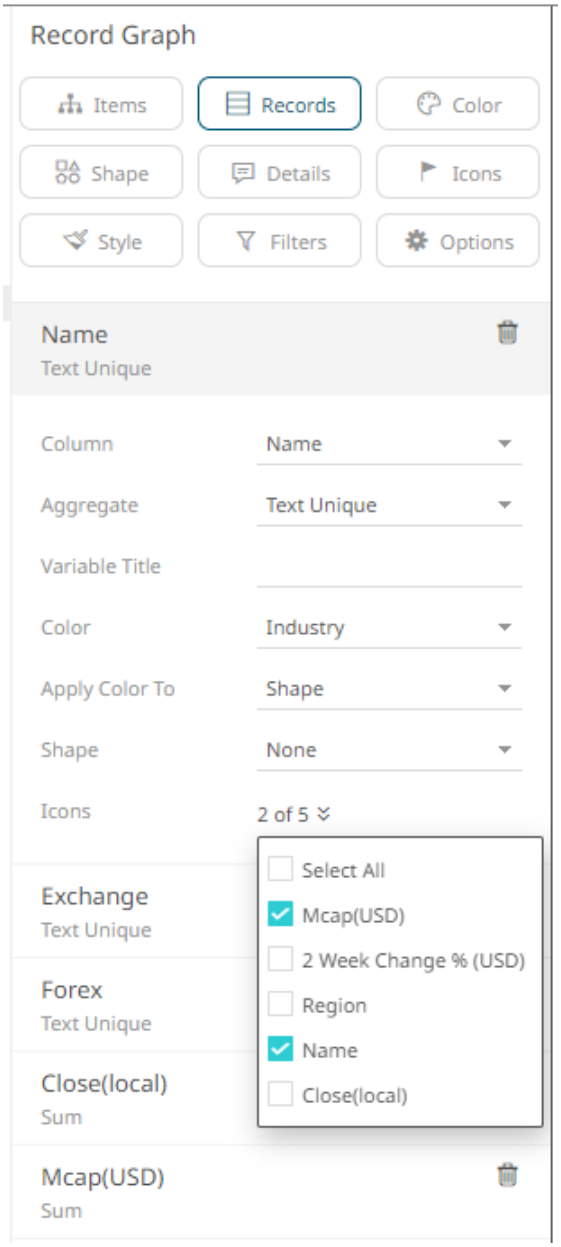
Name	Auckland International Airport Ltd.	Contact Energy Ltd.	Fletcher Building Ltd.	Sky City Entertainment Group Ltd.	Telecom Corp. of New Zealand Ltd.

Displaying the shape is a useful visual cue in a record graph. Users will be able to build a legend that will display each unique combination of shape and color, along with the values from the columns used for the shape and color.

When selecting **Shape** as the *Apply Color To* value, ensure to select the *Shape* value in the drop-down list.



7. Click the *Icons* drop-down and check the boxes of the columns with icons that will be assigned for this particular column.



8. Click the **Save** 

icon on the toolbar.

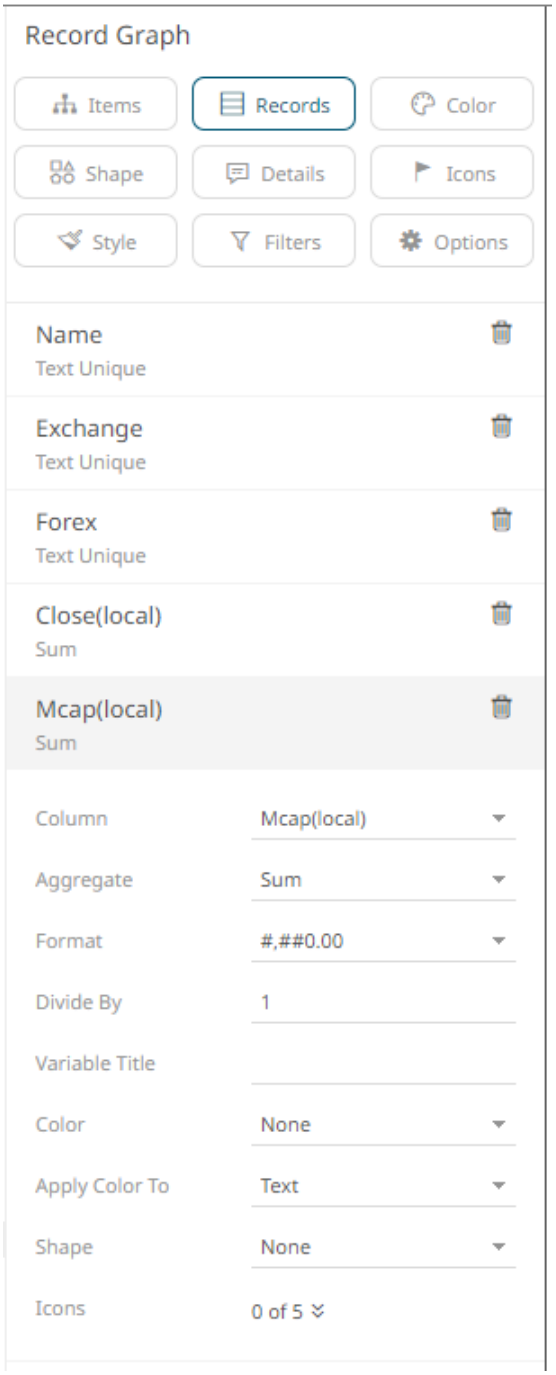
   When saved, the 

notification is displayed.

For numeric records, follow the steps below.

Steps:

1. Select a numeric column to display the corresponding configuration pane.

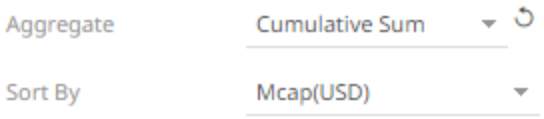


2. You can opt to change the column to the be used as the *Records* variable from the *Column* drop-down list.
3. Specify an aggregation method in the *Aggregate* field.

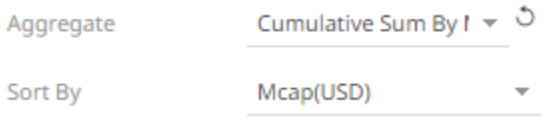
   The default is **Sum**.

   The *Records* variable also supports a number of other aggregate types.

   - If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



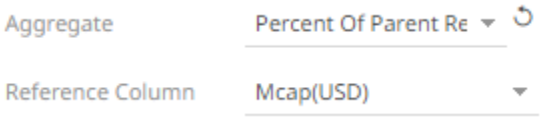
Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



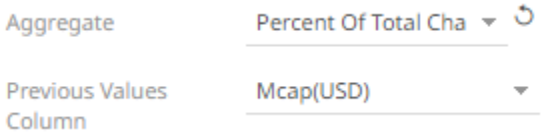
- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



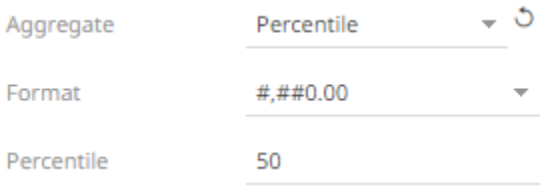
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



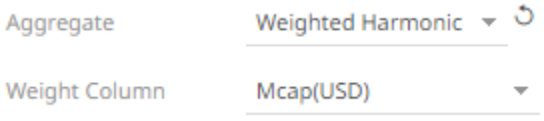
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.



- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.



4. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
5. Select the *Divide By* value to divide a number:
    - 1
    - 1000 (by a thousand)
    - 10000
    - 1000000 (by a million)
    - 1000000000 (by a billion)
6. Enter the label of the Record variable in the *Variable Title* field.
7. Select the column that will be used as the *Color* in the *Apply Color To* field.
8. Sets how the color variable is displayed in the *Apply Color To* drop-down: **Background** or **Text.**

    Sample 1: If **1 Day Change % (USD)** column is selected and the *Apply Color To* is set to **Background**, then the visualization will be:

    Sample 2: If **Industry** column is selected and the *Apply Color To* is set to **Text**, then the visualization will be:

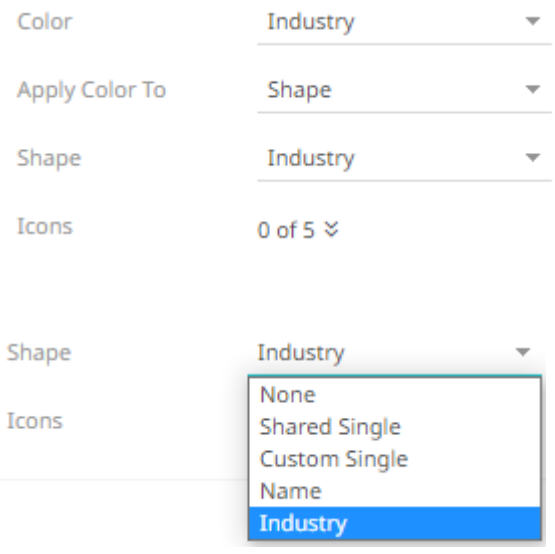
    

    Sample 3. If **Industry** column is selected and the *Apply Color To* is set to **Shape**, then the visualization will be:

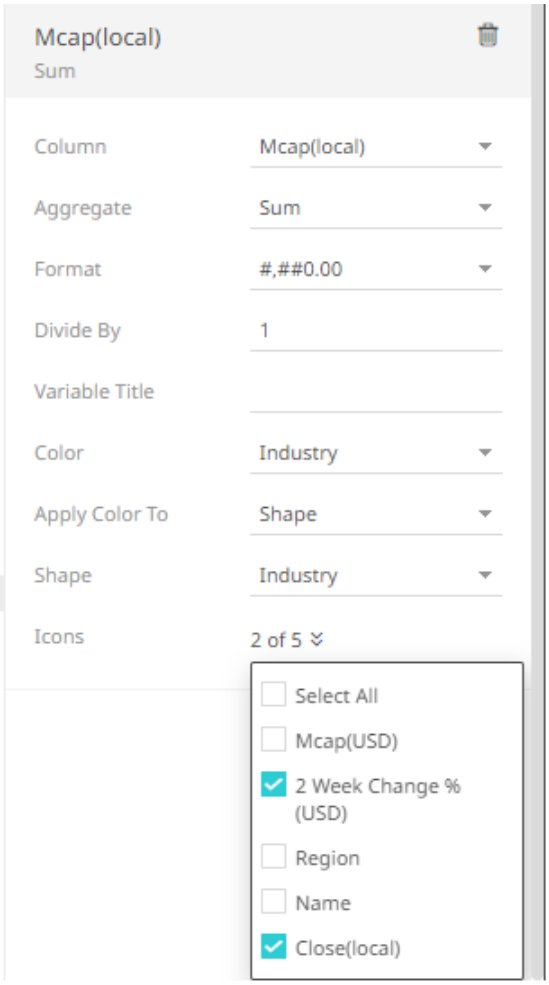
    

    Displaying the shape is a useful visual cue in a record graph. Users will be able to build a legend that will display each unique combination of shape and color, along with the values from the columns used for the shape and color.

    When selecting **Shape** as the *Apply Color To* value, ensure to select the *Shape* value in the drop-down list.

9. Click the Icons drop-down and check the boxes of the columns with icons that will be assigned for this particular column.



10. Click the **Save** 

icon on the toolbar.

    When saved, the 

notification is displayed.

Details Variable Configuration

The *Details* variable controls the information that appears on the pop-up when hovering over a specific item within a visualization. It also controls the information available for export from the visualization.

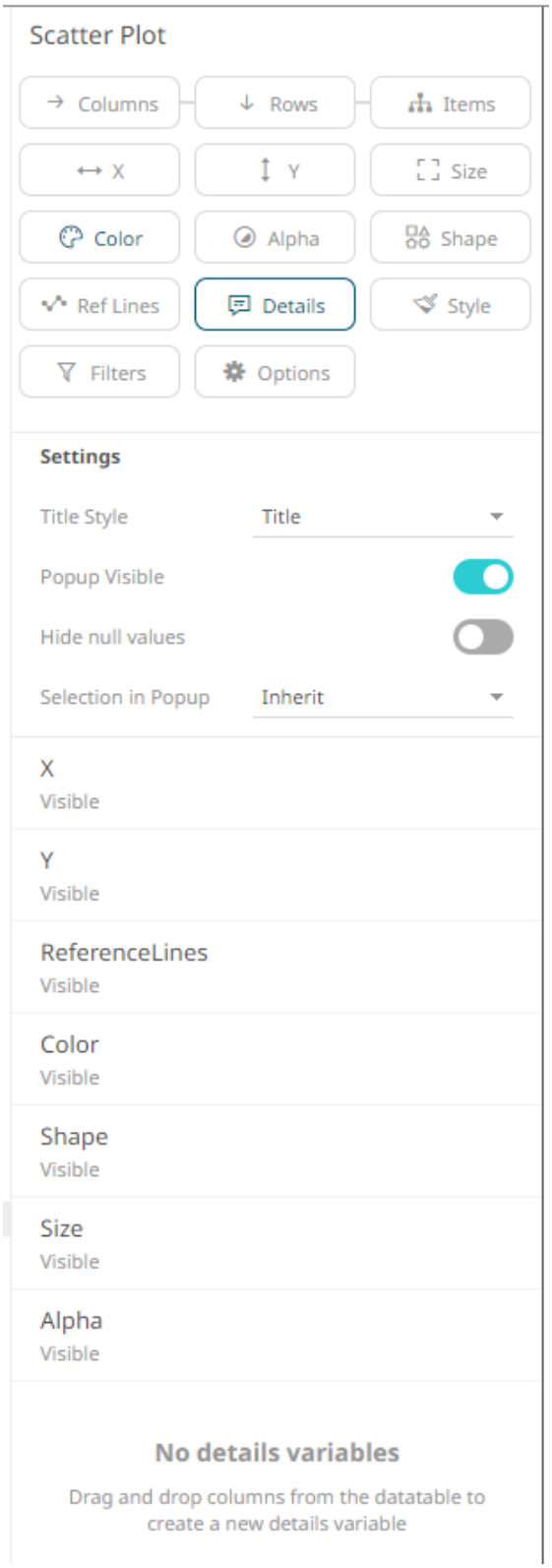
You can also control whether the following items are displayed or hidden in the *Details* pop-up:

- Other visualization variables, including Size, Height, X, Y, Color, and Icon variables
- Time (Current Time period for a Time Series visualization)
- Additional variables specifically added to appear in the *Details* pop-up

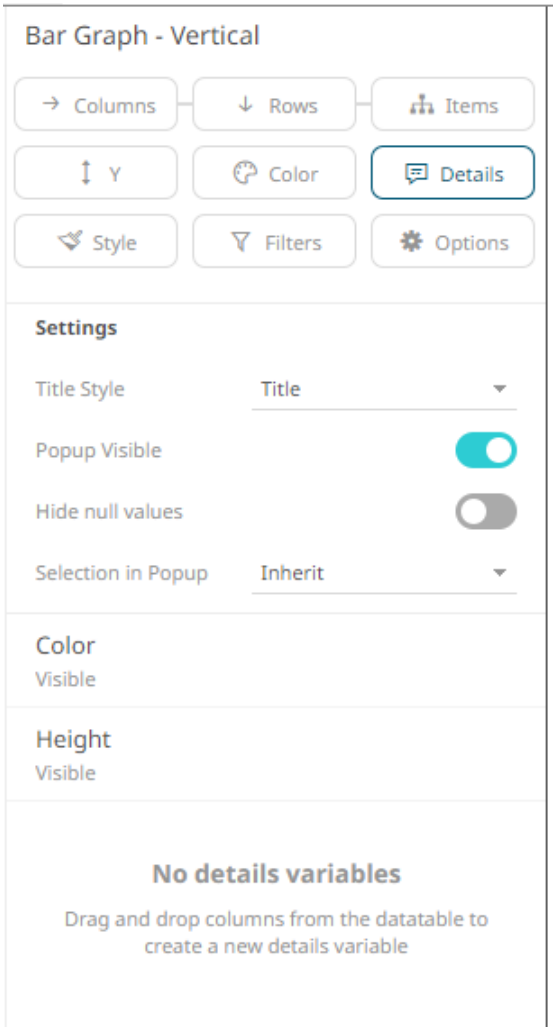
Steps:

1. Click on the **Details** button of a visualization. The *Details Settings* pane displays along with the available variables of the visualization.

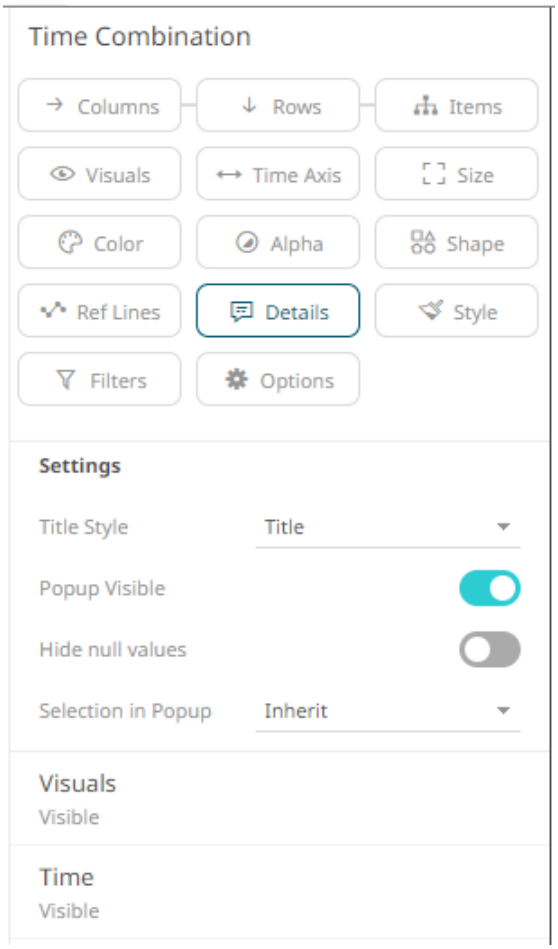
   Sample 1: Scatter Plot visualization has HeightX, HeightY, Size, Color, Alpha, Shape, and Reference Lines variables under the *Details* pane.


Scatter Plot
Columns
Rows
Items
X
Y
Size
Color
Alpha
Shape
Ref Lines
Details
Style
Filters
Options
Settings
Title Style
Title
Popup Visible
Hide null values
Selection in Popup
Inherit
X
Visible
Y
Visible
ReferenceLines
Visible
Color
Visible
Shape
Visible
Size
Visible
Alpha
Visible
No details variables
Drag and drop columns from the datatable to create a new details variable

Sample 2: Bar Graph – Vertical visualization has HeightY and Color variables under the *Details* pane.

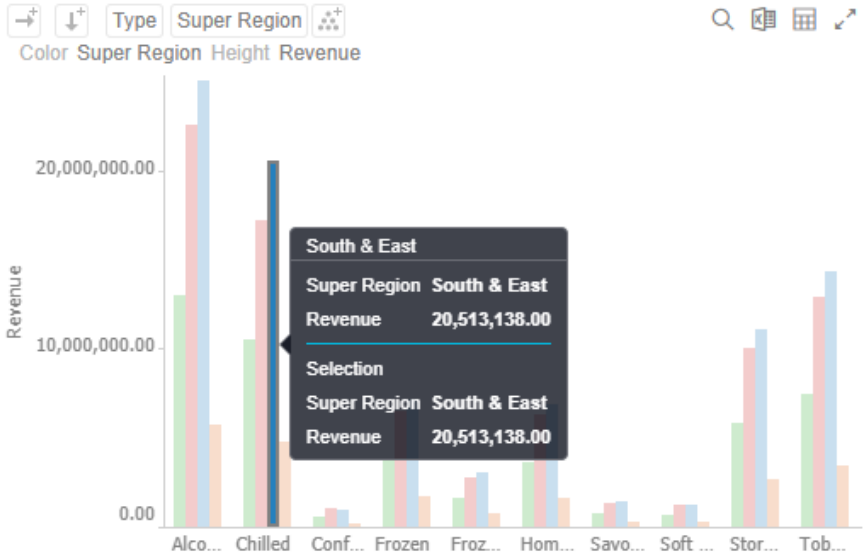


Sample 3: Time Combination visualization has Visuals and Time variables under the *Details* pane.



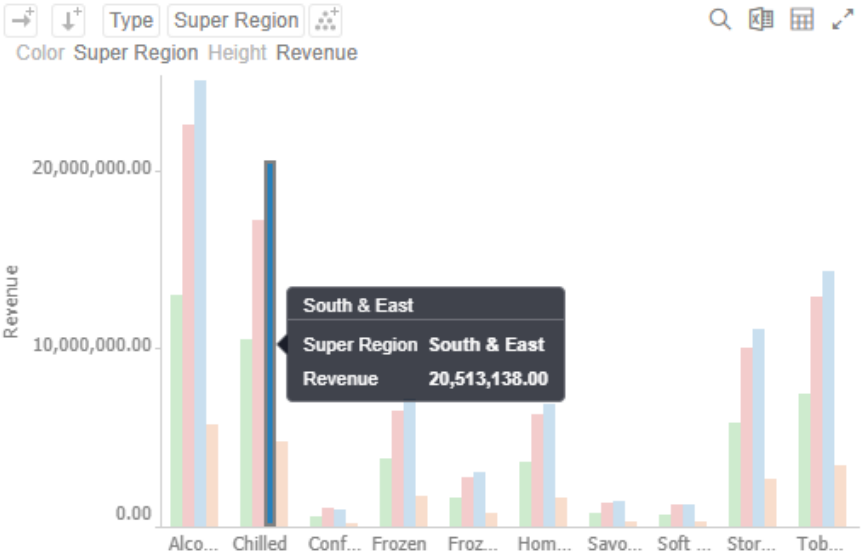
2. Select the *Title Style*: **Title**, **Visible Path**, or **Full Path**.
3. By default, **Popup Visible** is enabled to display the *Details* pop-up. Tap the slider to turn it off.
4. Tap the **Hide Null Values** slider to turn it on.
5. Select the *Selection in Popup*:
   - On

     The *Details* pop-up of the selection in the visualization is displayed.



- Off

  The selection in the *Details* pop-up is turned off.



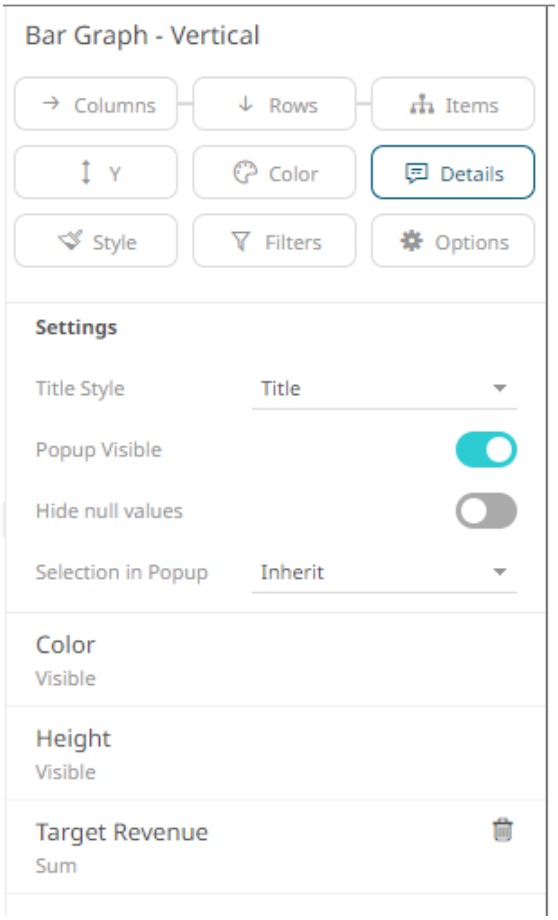
- Inherit

  The selection option in the *Details* pop-up is inherited from the workbook properties.

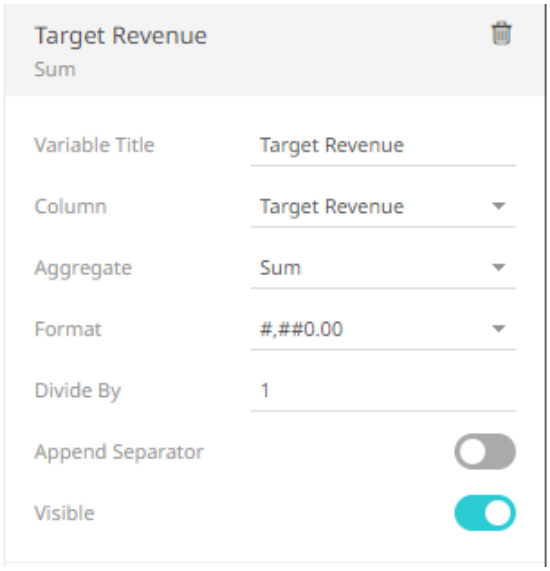
6. You can also drag and drop numeric columns from the *Data Table* pane to the **Details** 

button or on the *Details* pane.

   The column is added under the *Details* pane.



7. Click on the column to display the configuration pane.



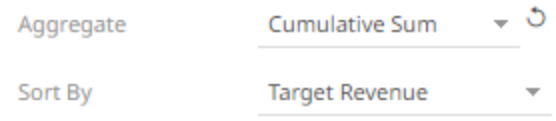
8. Enter the label of the *Details* variable in the *Variable Title* field.

   You can parameterize the variable title to support dynamic schema in the dashboards.

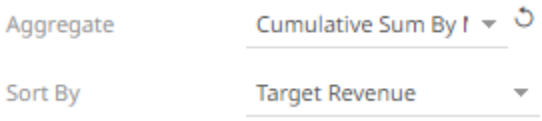
9. You can opt to change the column to the be used from the *Column* drop-down list.
10. Specify an aggregation method in the *Aggregate* field.

The default is **Sum**.

- If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.



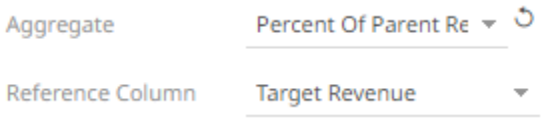
Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.



- If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.



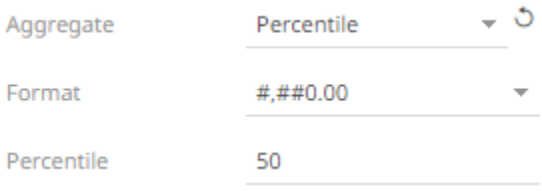
- If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.



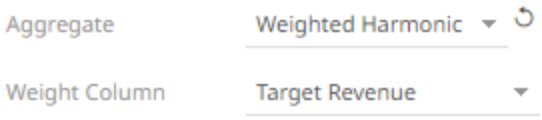
- If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.



- If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.



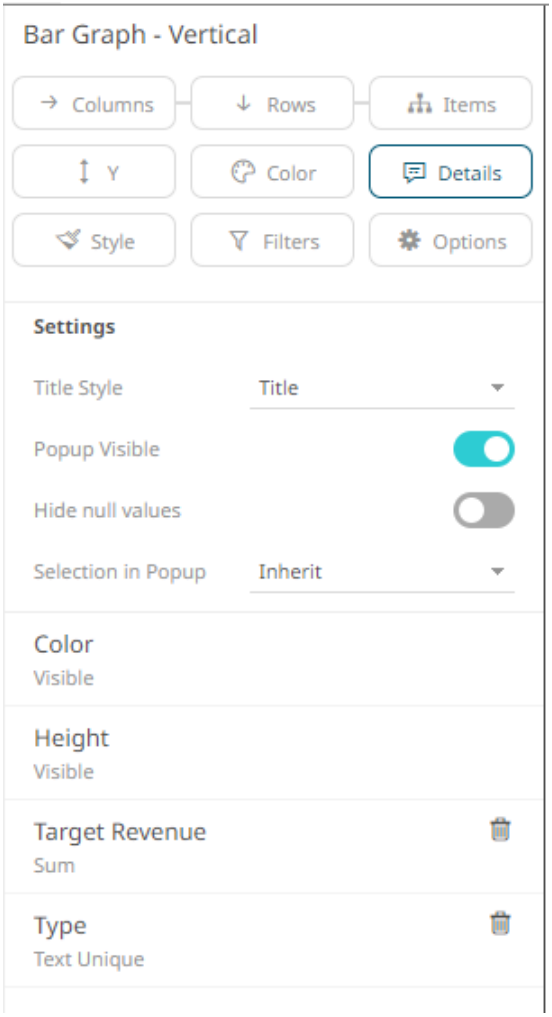
- If you set the aggregation method to **Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum,** or **Weighted Variance**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.



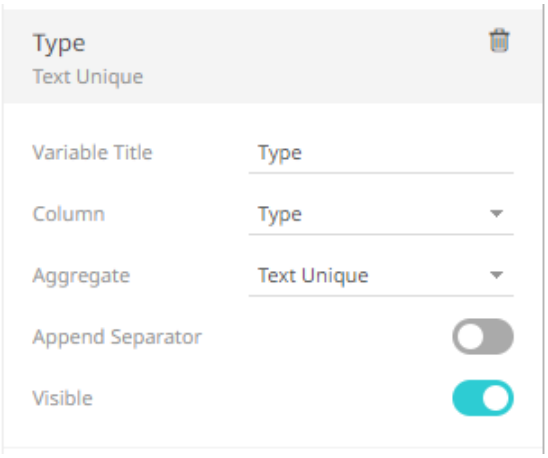
11. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
12. Select the *Divide By* value to divide a number:
    - 1
    - 1000 (by a thousand)
    - 10000
    - 1000000 (by a million)
    - 1000000000 (by a billion)
13. You can also drag and drop text columns from the *Data Table* pane to the **Details** 

button or on the *Details* pane.

    The column is added under the *Details* pane.



14. Click on the column to display the configuration pane.

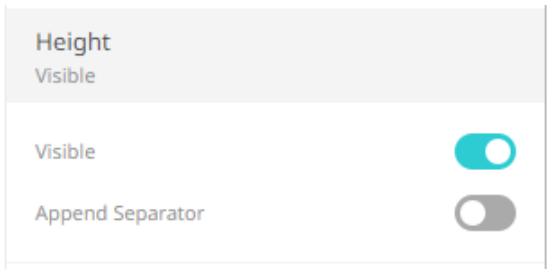


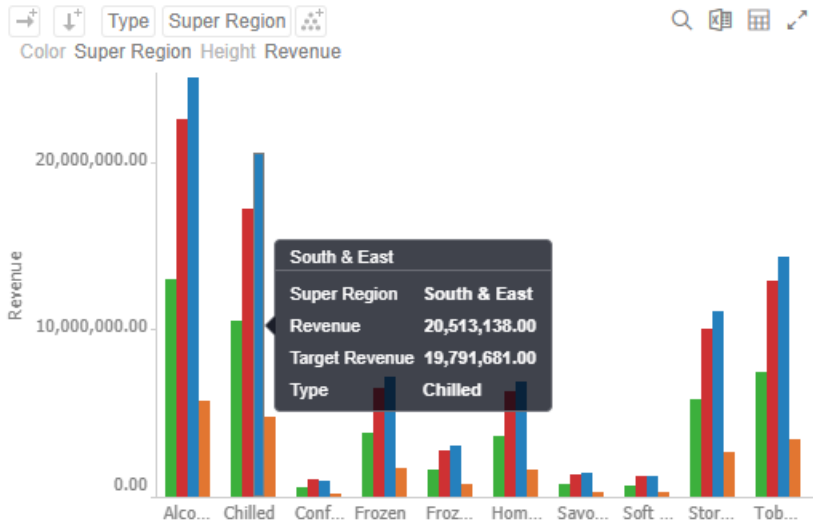
15. Enter the label of the *Details* variable in the *Variable Title* field.

    You can parameterize the variable title to support dynamic schema in the dashboards.

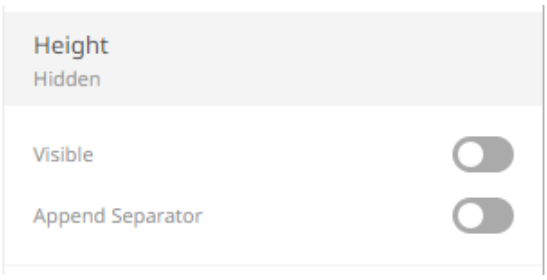
16. You can also change the column to the be used from the *Column* drop-down list.
17. Select the text aggregation method from the *Aggregate* field: **Count Distinct**, **Text Unique** (default), or **Text Concat Distinct**.
18. The *Format* field lets you specify the format that the text will be displayed in. Panopticon uses the same formatting rules as Excel.
19. By default, all of the variables are set to be **Visible** on the *Details* pop-up.

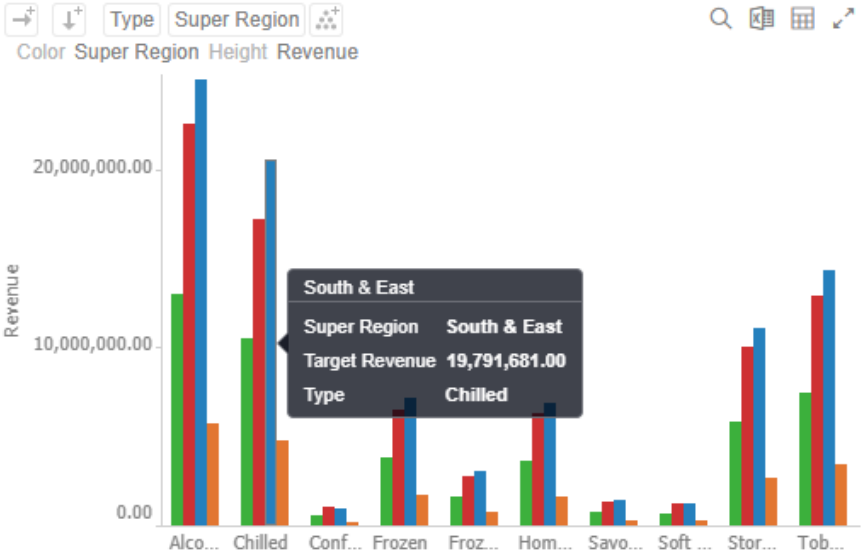
    For example, when the *Height* variable column is **Revenue** and set to **Visible**, the value of *Revenue* is displayed in the *Details* pop-up.



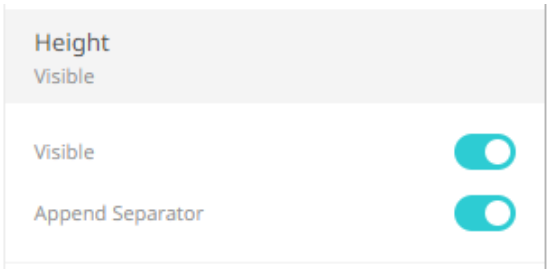


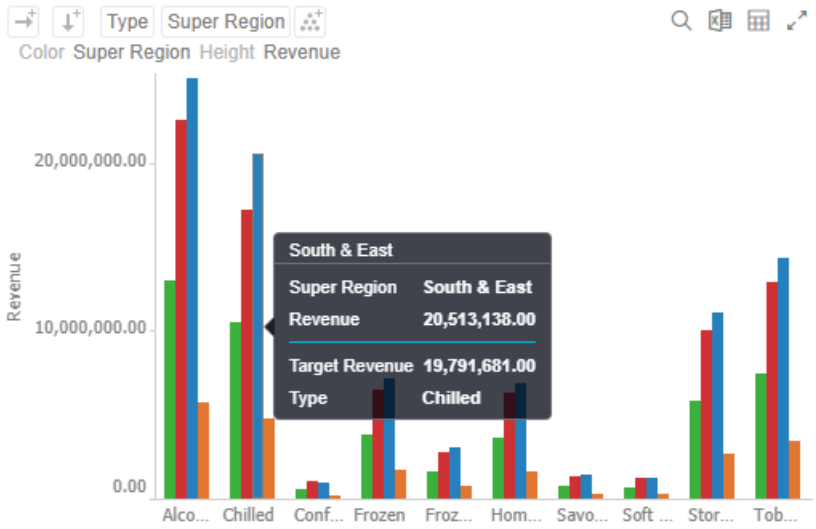
Tap the **Visible** slider to turn it off so the variable detail will not be displayed.



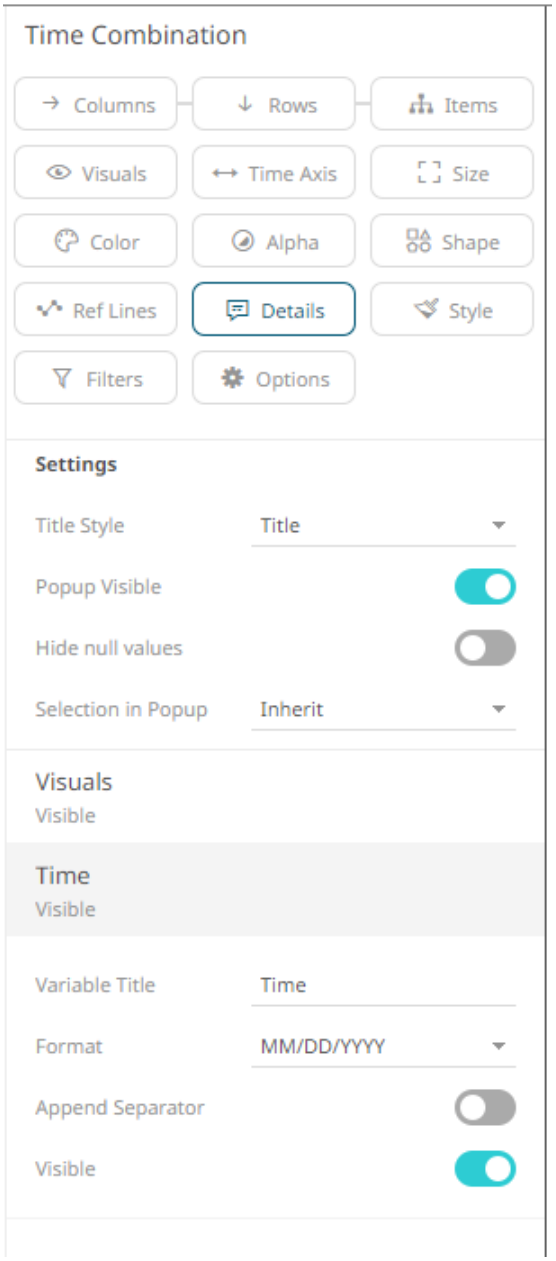


20. Tap the **Append Separator** slider to display the separator of the values.



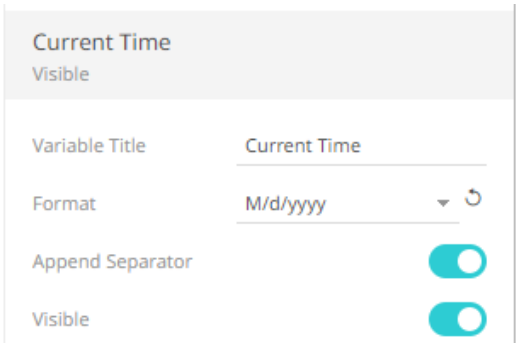


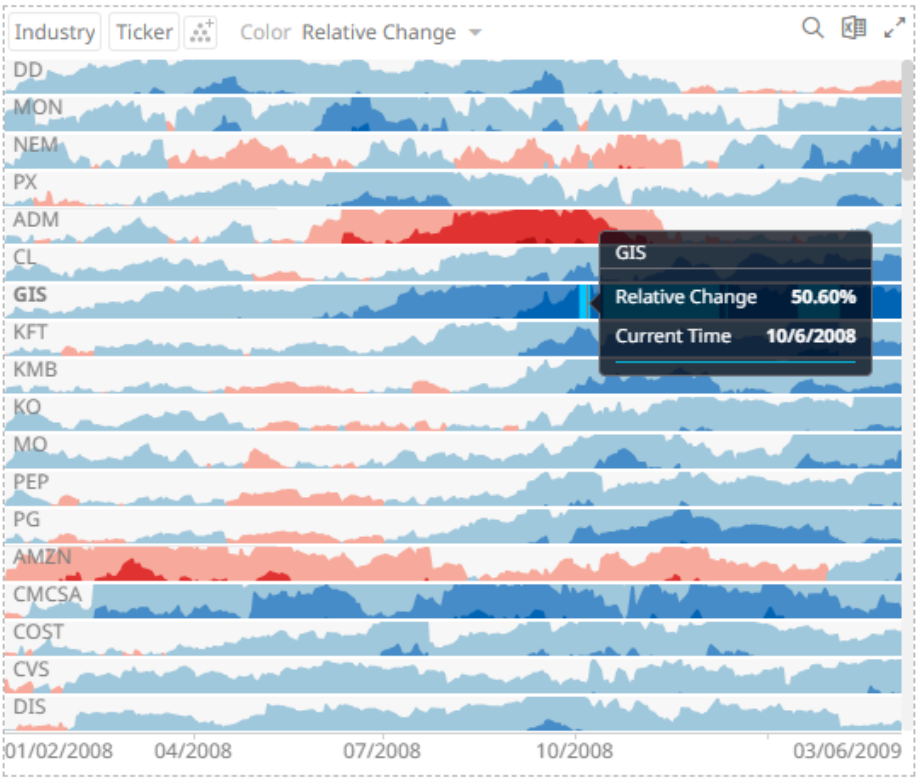
21. For time series visualizations, you can set the current time period that will be displayed on the *Details* pop-up. Otherwise, skip to step 22.



Set the *Variable Title* and *Format* of the time.

For example:





22. Click the **Save**  icon on the toolbar.

    When saved, the  notification is displayed.

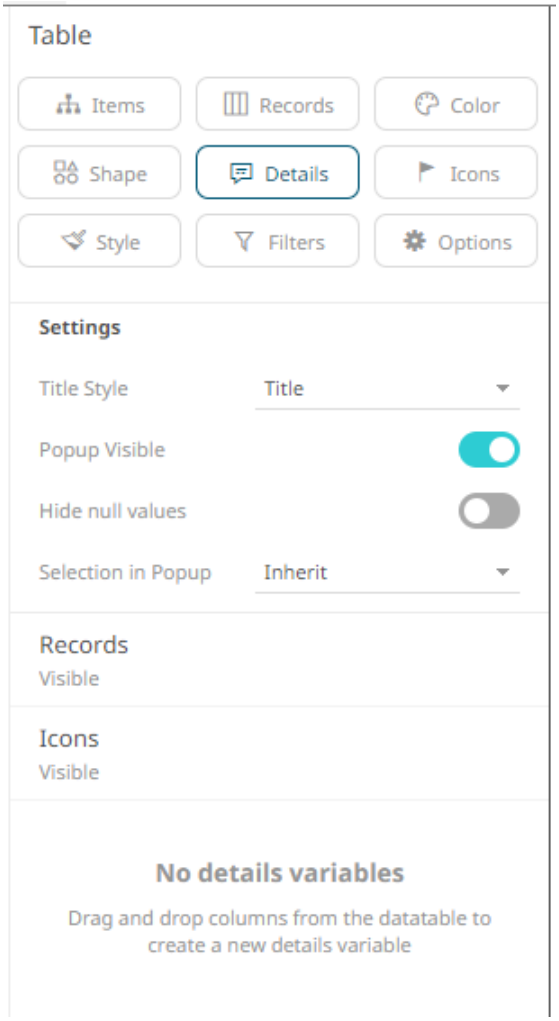
Details Variable Configuration for Visualizations with Records or Visuals Variable

In addition to the *Details* variable configuration discussed in the previous section, you can set the records variable (for Table and Records visualizations) or visuals variable (for Time Combination, Numeric Combination and Text Combination visualizations) that will be displayed on the *Details* pop-up.

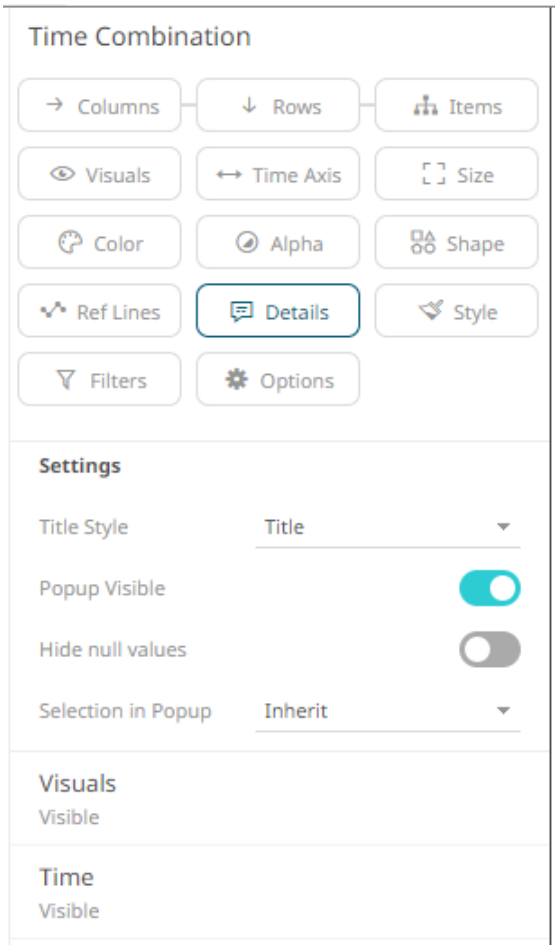
Steps:

1. Click on the **Details** button of a visualization. The *Details Settings* pane displays along with the available variables of the visualization.

   Sample 1: Table visualization has Records and Icons variables under the *Details* pane.

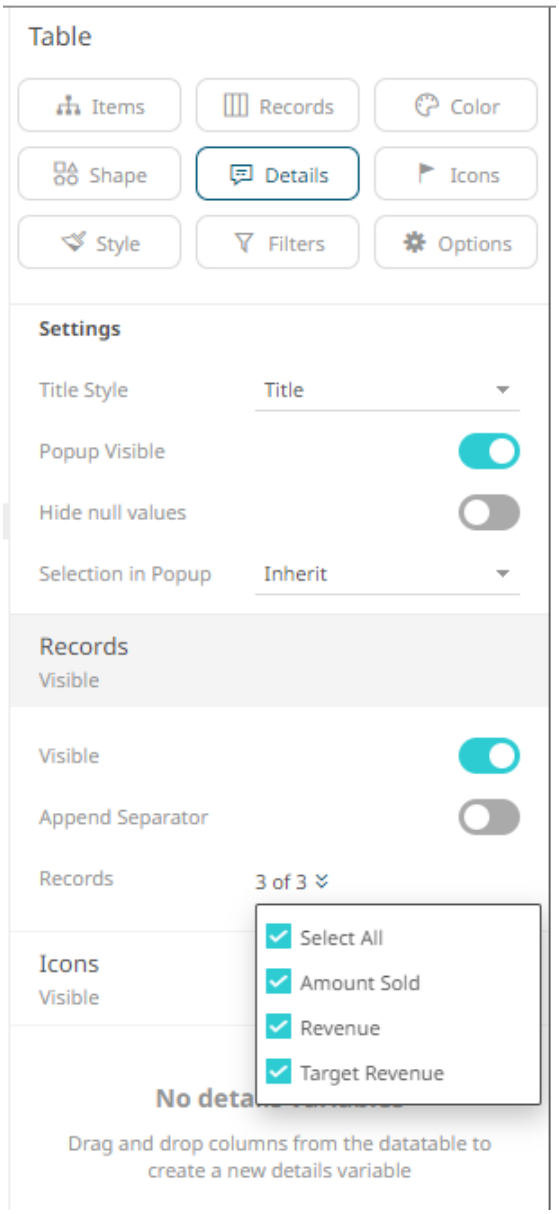


Sample 2: Time Combination visualization has Visuals and Time variables under the *Details* pane.

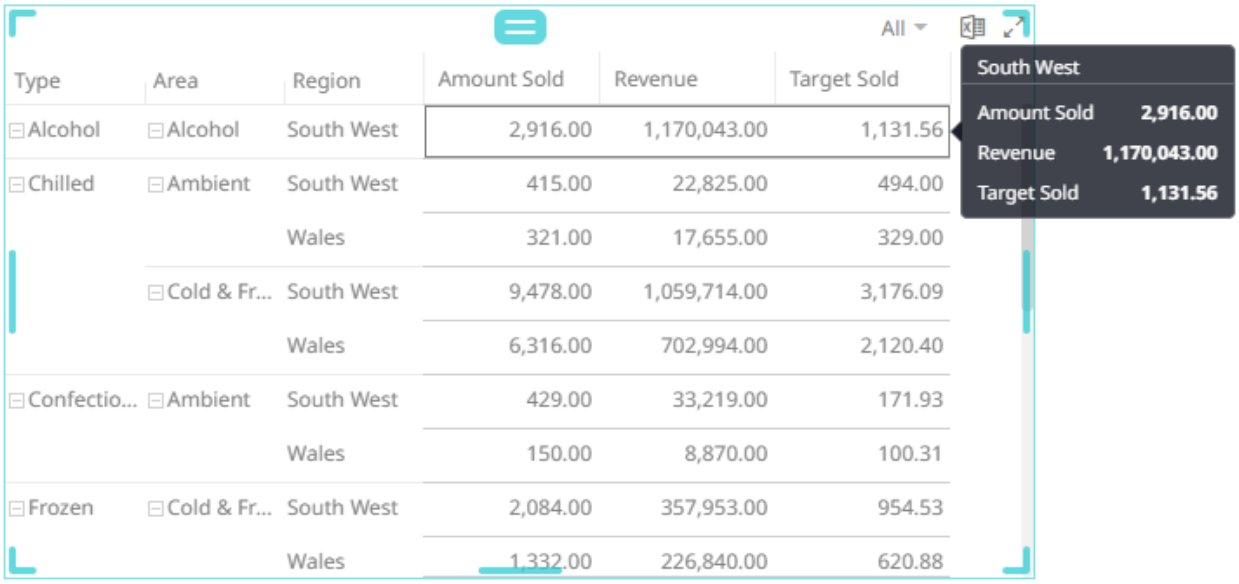


2. Expand the *Visuals* or *Records* variables.

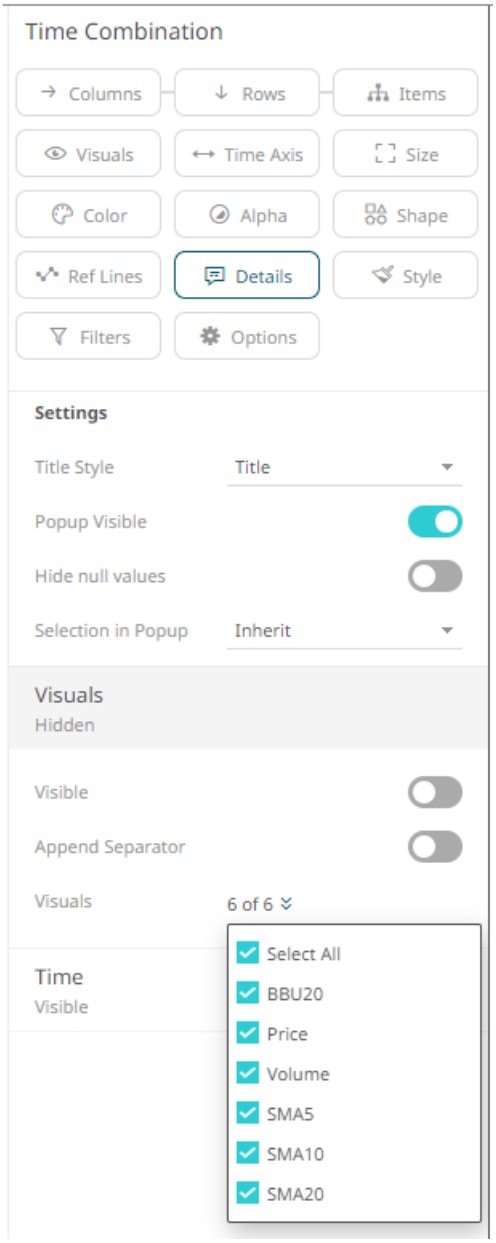
   Sample 3: Table visualization with three records added.



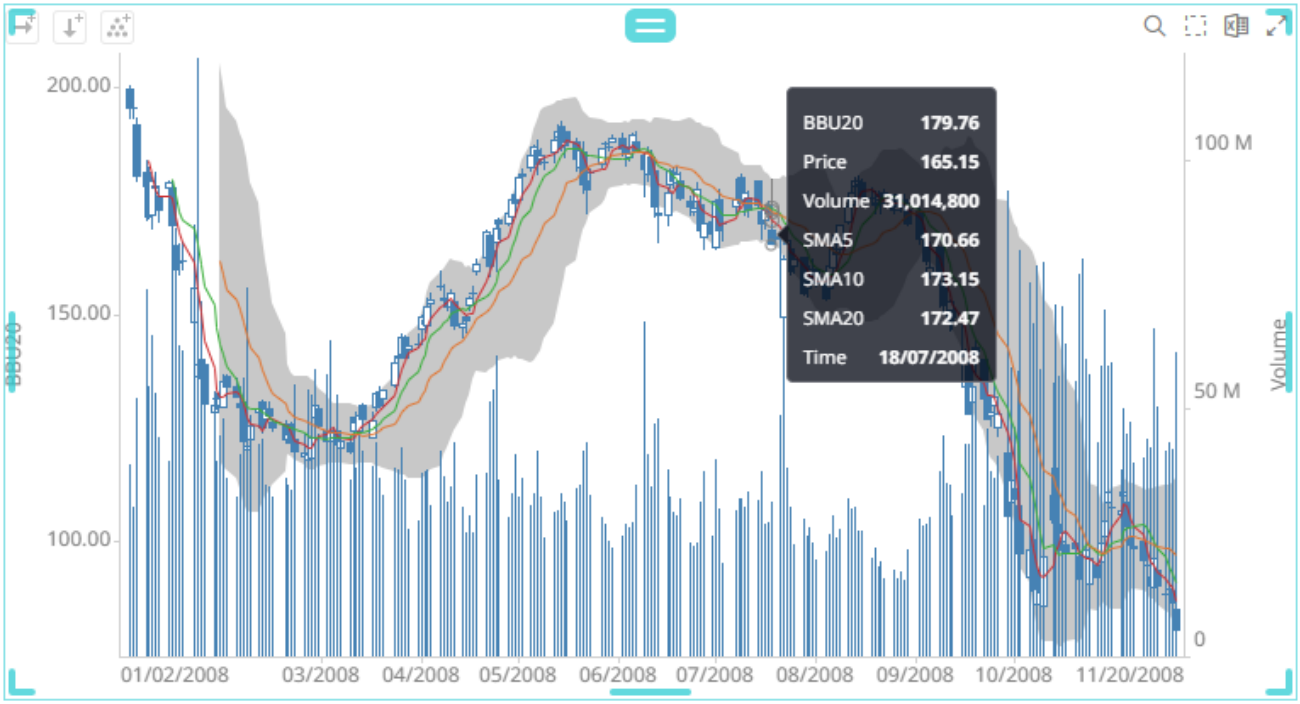
Clicking on an item on the visualization will display the values of the three records on the *Details* pop-up.



Sample 4: Time Combination visualization with six visualization members added.

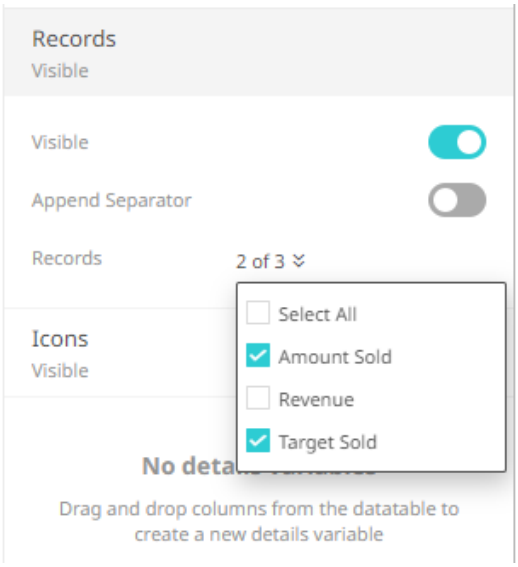


Clicking on an item on the visualization will display the values of the six visualization members along with the Time variable on the *Details* pop-up.

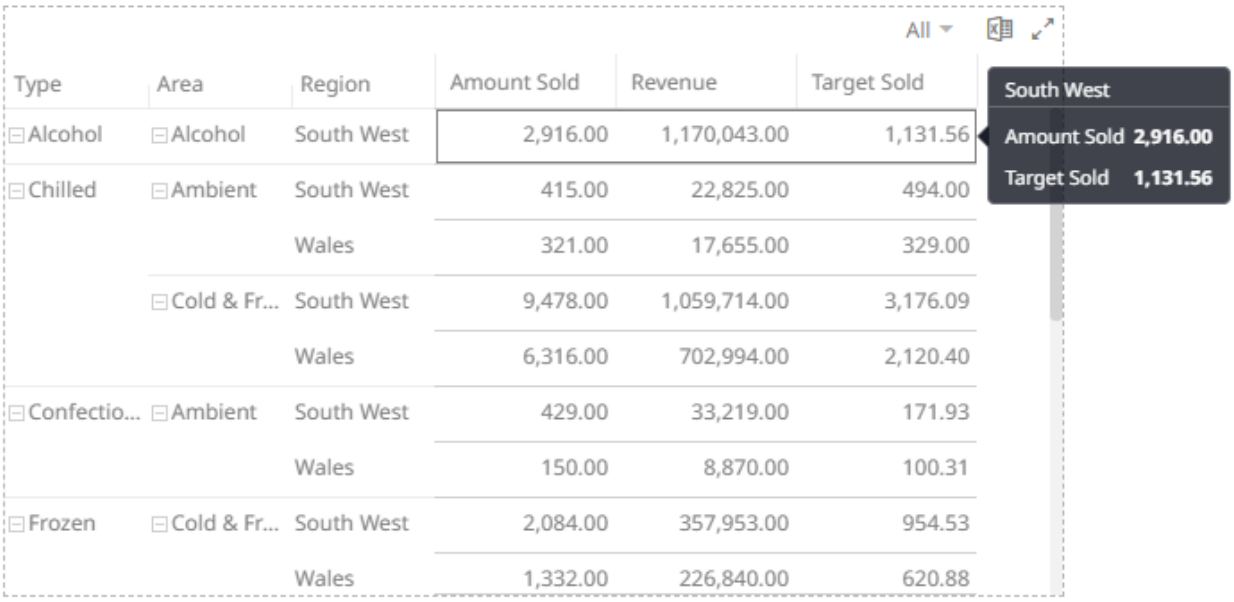


3. Click the corresponding drop down and check the boxes of the records or visualization members that will be displayed on the *Details* pop-up.

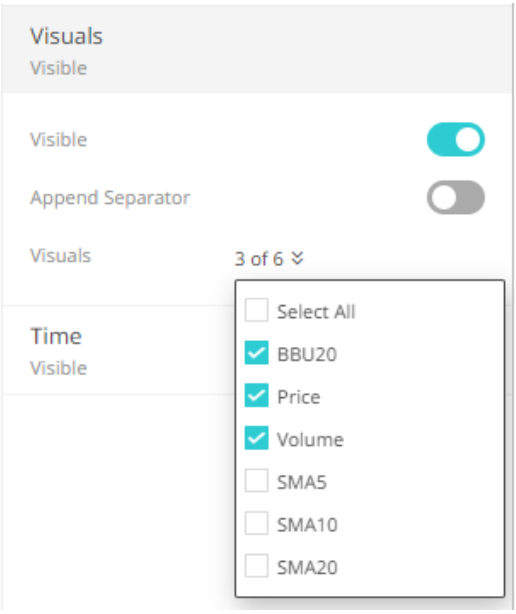
Sample 5: Two records are selected for the Table visualization.



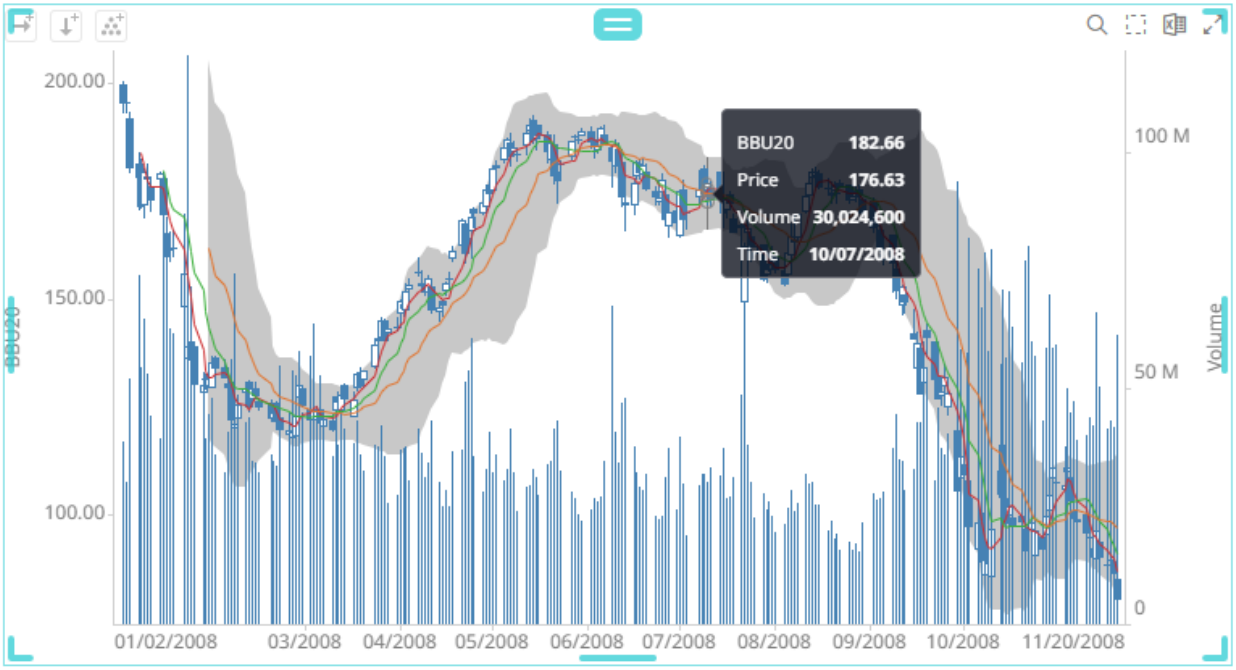
Clicking on an item on the visualization will only display two records on the *Details* pop-up..



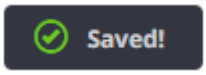
Sample 6: Three visualization members are selected for the Time Combination visualization.



Clicking on an item on the visualization will only display the three visualization members along with the Time variable on the *Details* pop-up.



4. Click the **Save**  icon on the toolbar.

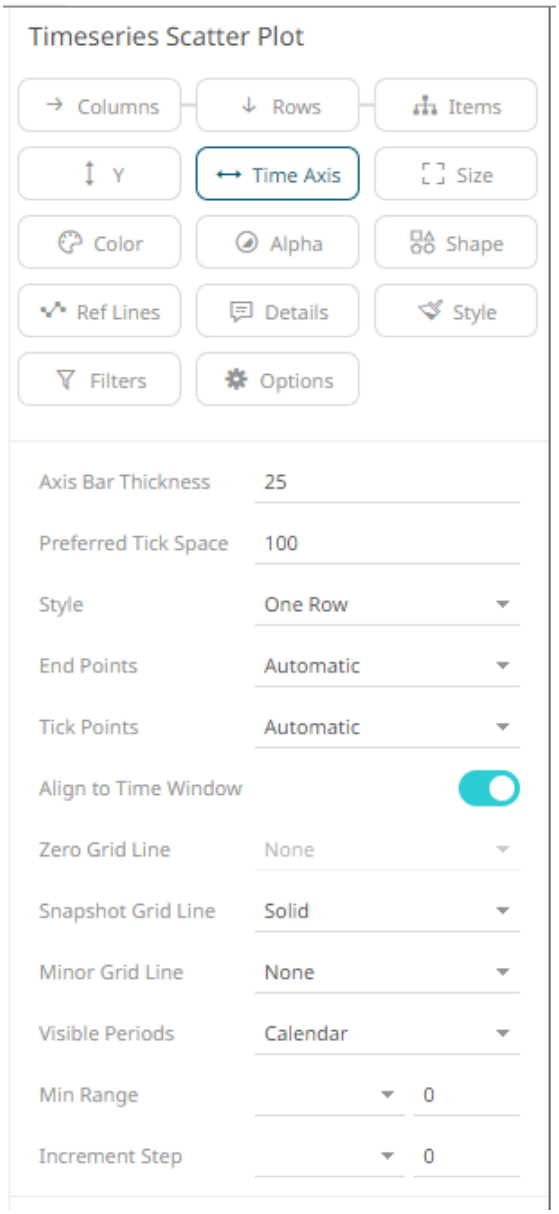
   When saved, the  notification is displayed.

Time Axis Variable Configuration

All of the time series visualizations have the *Time Axis* variable. There is no need to drag and drop columns to this variable.

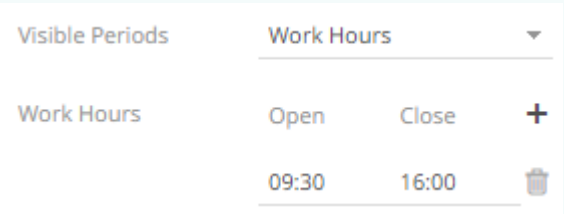
Steps:

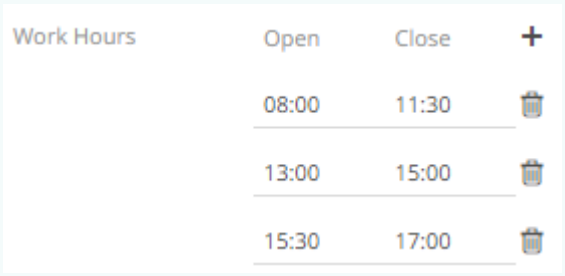
1. Click on the **Time Axis** variable drop area of a time series visualization. The *Time Axis Settings* pane displays.



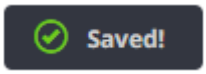
Visualizations supporting time axes include the following settings:

Setting	Description
Axis Bar Thickness	The margin in pixels for the time axis. The time axis is hidden if this is set to **zero**. Default is **25**.
Preferred Tick Space	The preferred space in pixels between minor grid lines across the axis. Default is **100**.
Style	Defines that the time-based axis is displayed across two rows, with the start and end points displayed on the bottom row. When **Relative** is selected, the time forwards and backwards from a set time (i.e., midnight will be shown as 00:00 on the axis) will be displayed. The prior hours/days from midnight at the start of day are negative and the future hours/days are positive. For example: • Last midnight is 00:00

	• Noon yesterday is -12:00 (-12 hours) • Noon today is 12:00 (+12 hours) The axis values can have the following tick mark labels: -12.00, -6.00, 0:00, 6.00, 12:00
End Points	Determines whether to display end points. Allowed values: • Automatic – automatically displays the end points. • None – end points are not displayed. • Custom – allows the selection of the Date/Time format of end points.
Tick Points	Determines whether to display tick points. Allowed values: • Automatic – automatically displays the tick points. • None – tick points are not displayed. • Custom – allows the selection of the Date/Time format of tick points.
Align to Time Window	Align with the time window set in the *Time Filter Box*. Enabled by default when creating a new time series visualization.
Zero Grid Line	For the **Relative Style**, set how a major X axis grid line is drawn:
Snapshot Grid Line	Determines whether a grid line is drawn showing the snapshot location. Allowed values: • None • Dotted • Dashed • Solid When the *Snapshot Grid Line* is rendered, the *Set Snapshot Here* option will be available in the visualization context menu in the web client.
Minor Grid Line	Determines whether minor grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Visible Periods	Determines whether: • a standard calendar time axis is shown (**Calendar**). • weekends are hidden (**Work Week**). • weekends and closed market hours are hidden (**Work Hours**). The settings pane changes to allow the addition and setting of the work hours.  ○ Open – Defines what time the market opens. ○ Close – Defines what time the market closes.

	Click + to add and set the work hours.  Click to remove a work hours instance.
Min Range	The minimum time axis range. Supported units are milliseconds, seconds, minutes, hours, days, months, quarters, and years.
Increment Step	Controls how much the time axis span is extended at the point when the latest value is at the end of the current time axis span. Supported units are milliseconds, seconds, minutes, hours, days, months, quarters, and years. This setting helps in seeing how a real-time data set grows from left to right along the time axis, giving a better impression and understanding of the progress.

2. Click the **Save**  icon on the toolbar.

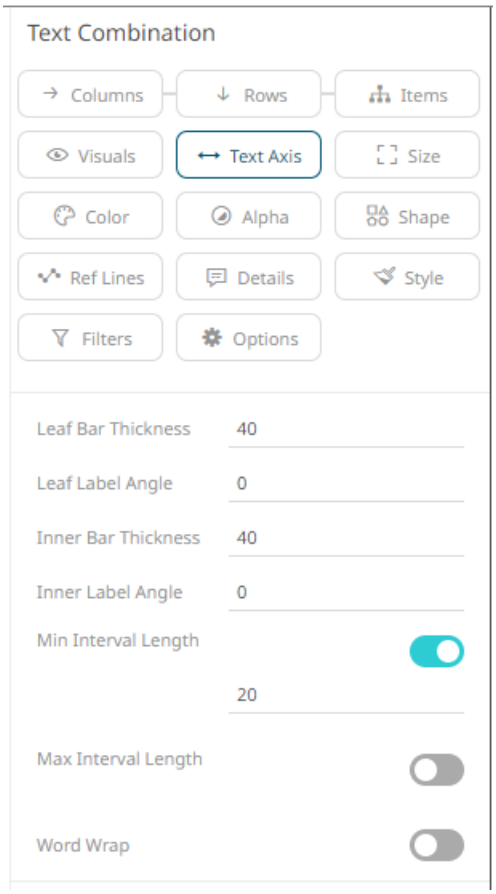
   When saved, the  notification is displayed.

Text Axis Variable Configuration for the Text Combination Graph

The Text Axis Combination graph has a time time axis variable that you can configure. There is no need to drag and drop columns to this variable.

Steps:

1. Click on the **Text Axis** variable drop area of the Text Combination graph. The *Text Axis Settings* pane displays.

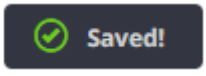


2. Define or select the value of the following settings:

Setting	Description
Leaf Bar Thickness	The thickness of the leaf or lowest level of data. The default value is **40**.
Leaf Label Angle	The Label angle of the leaf or lowest level of data of the crosstab axis. Default is **0**, accepts values between **-90** and **+90**.
Inner Bar Thickness	The width or height allocated for the non-leaf components of the Table axis in pixels. The default value is **40**.
Inner Label Angle	The angle of the non-leaf labels. Default is **0**, accepts values between **-90** and **+90**.
Min Interval Length	The minimal interval in pixels between cross tabbed visualizations. Enabled by default and the value is set to **20**.
Max Interval Length	The maximum interval in pixels between cross tabbed visualizations. Tap the slider to enable. The default value is **400**.
Word Wrap	Determines whether to wrap the visualization axis text.

3. Click the **Save** 

icon on the toolbar.

When saved, the 

notification is displayed.

Style Variable Configuration for Visualizations

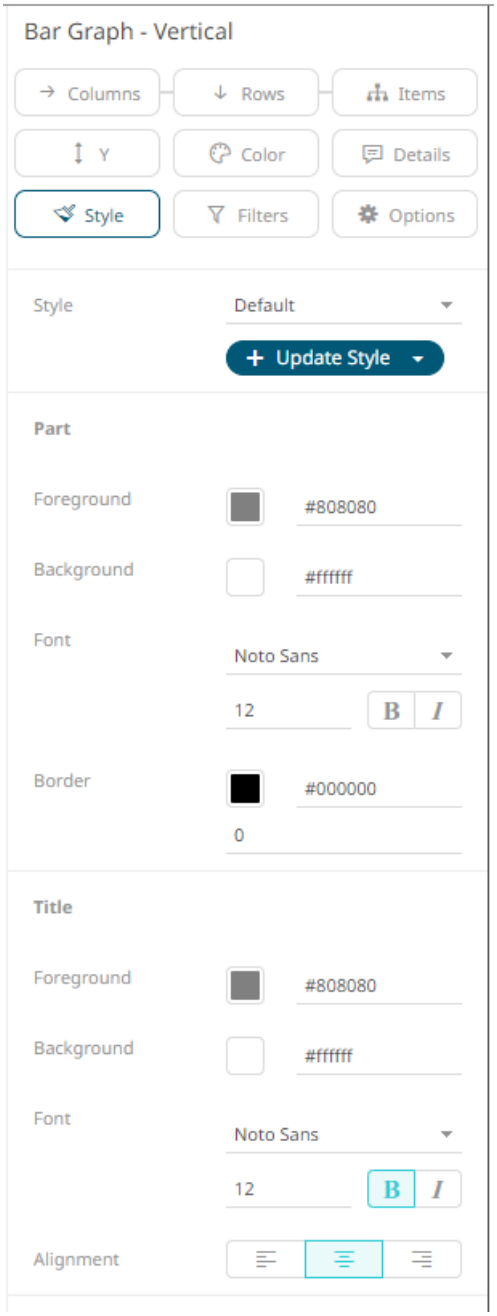
The *Style* variable allows setting the style of the visualization and its title.

Steps:

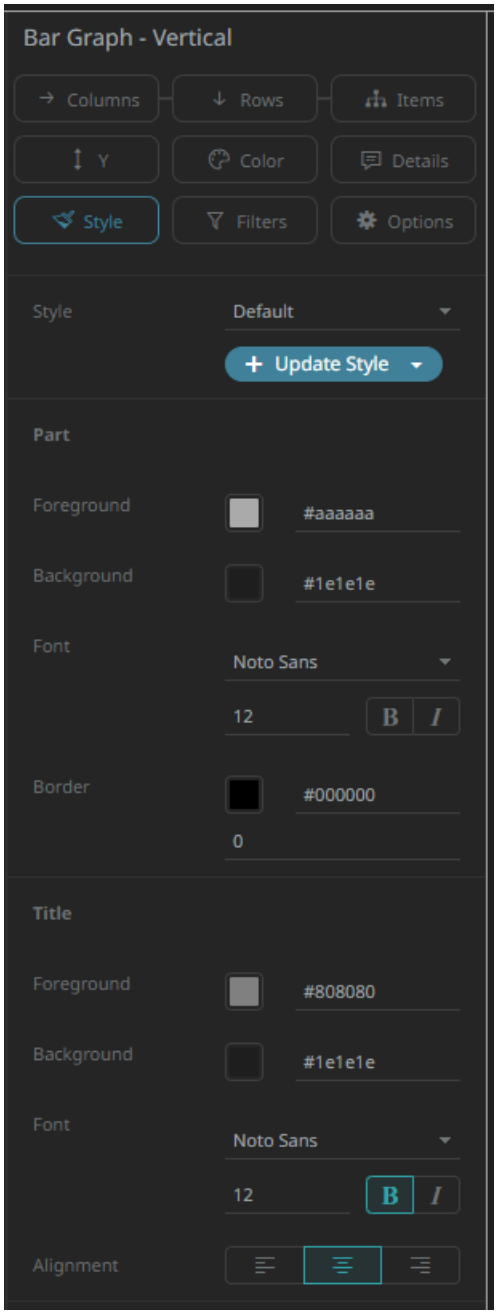
1. On the *Visualization Settings* pane, click the *Style* variable to display the style settings you can configure.

   Initially, the **Default** style will be based on the default visualization style that is set for the selected theme of the workbook.

   For the **Light** theme example:



   For the **Dark** theme example:



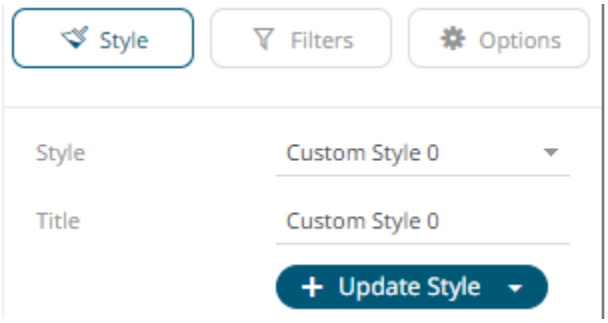
2. You may opt to modify the colors of the following properties:

Property	Description
Foreground	Foreground color of the visualization and title.
Background	Background color of the visualization and title.
Border	Border color of the visualization.

3. Select the visualization and title *Font.*
4. Specify the visualization and title *Font Size*.
5. You may set to **Bold** and **Italic**.
6. Specify the *Border Size* of the visualization.
7. Select the visualization title *Alignment*: **Left, Middle,** or **Center**.
8. Click 

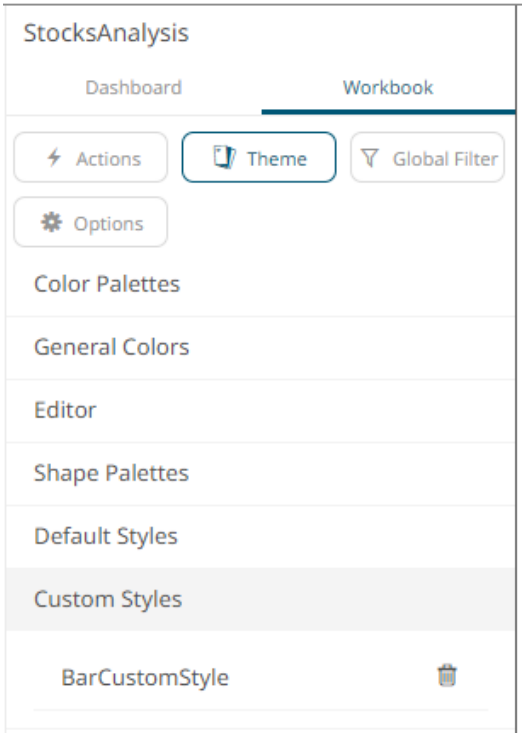
and select any of the following options:
   - **Set current as default** – Save the changes and set it as the default.
   - **Create custom style** – Save the changes and set it as a custom style.

     The *Style* pane updates to display the *Title* control.

     - Enter the custom style *Title*.
     - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

     The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the visualization will be added to the Global custom styles list and can be applied to other visualizations.

- **Reset to default** – Revert to the original default settings.

9. Click the **Save** 

icon on the toolbar.

When saved, the 

notification is displayed.

Supported Parameterized Variable Titles

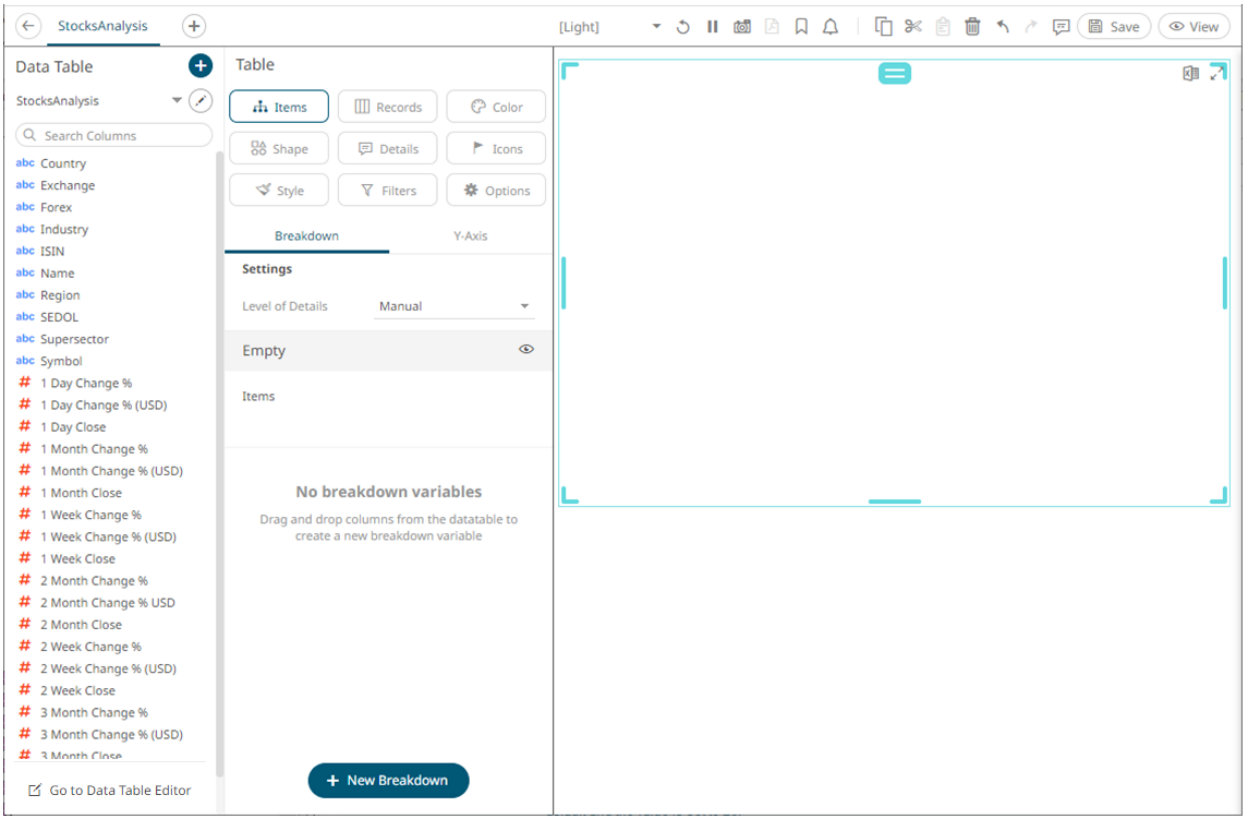
This section discusses the list of variable titles that can be parameterized. For example, you can use a dashboard parameter reference instead of a hardcoded string as the title for the visualization variables.

Variable	Supported Parameterized Title
Size	✔
X	✔
Y	✔
Z	✔
Latitude	✔
Longitude	✔
Price	✔
Change	✔

Alpha	✔
Box Plot	✔
Shape	✔
Reference	✔
Visuals	✔
Spread	✔
OHLC	✔
Color	✔
Records	✔
Details	✔
Icons	X
Reference Line	X
Time Axis	X
Text Axis	X

TABLE VISUALIZATION

The Table visualization warrants a separate explanation; given it can display mini visualizations in each table cell, which are called micro-charts, and unlike other visualizations can display a large number of data variables.



Each row of the Table is defined by the hierarchy, added to the breakdown. If there are too many rows, a vertical scroll bar will be displayed.



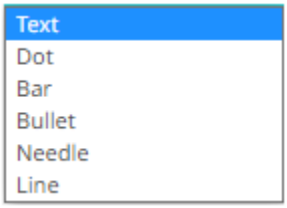
Dragging columns from the *Data Table* pane to the *Records* variable drop area creates the columns of the table. If there are too many columns, a horizontal scroll bar will be displayed:



Industry	Supersector	Mcap(USD)	1 Day Chang...	RecScore
Basic Mat...	Basic Reso...	512,851,697,625.00	-3.21	26.39
	Chemicals	376,614,271,481.00	-2.91	22.77
Consume...	Automobile...	328,426,116,057.00	-3.07	15.86
	Food & Bev...	765,925,707,172.00	-0.95	27.13
	Personal & ...	766,032,370,993.00	-2.40	31.37
Consume...	Media	271,230,902,901.00	-0.83	16.26
	Retail	835,677,756,783.00	-1.93	35.25
	Travel & Lei...	292,510,659,805.00	-1.48	21.91
Financials	Banks	1,366,039,155,277.00	-6.40	50.60
	Financial Se...	405,466,513,220.00	-1.61	28.18
	Insurance	517,128,796,675.00	-3.09	25.04
	Real Estate	258,177,793,139.00	-2.56	29.64
Health Ca...	Health Care	1,698,382,149,841.00	-0.93	41.89
Industrials	Constructio...	205,163,200,091.00	-1.85	23.76
	Industrial G...	1,460,385,743,199.00	-8.37	91.85
Oil & Gas	Oil & Gas	1,661,193,841,291.00	-4.56	34.42
Technology	Technology	1,456,797,585,162.00	-2.64	38.84
Telecom...	Telecommu...	787,667,544,952.00	-0.51	13.21
Utilities	Utilities	811,127,128,583.00	-1.07	29.22

Color and Icons are added as with other visualizations.

Aside from being displayed as Text, visual numeric columns can also be configured to these visualizations:



Static numeric data:

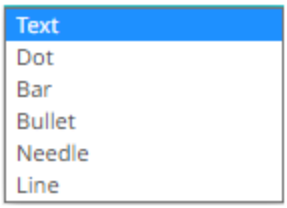
- Dot
- Bar
- Bullet

Time series numeric data:

- Needle
- Line

Records Variable Configuration for the Table Visualization

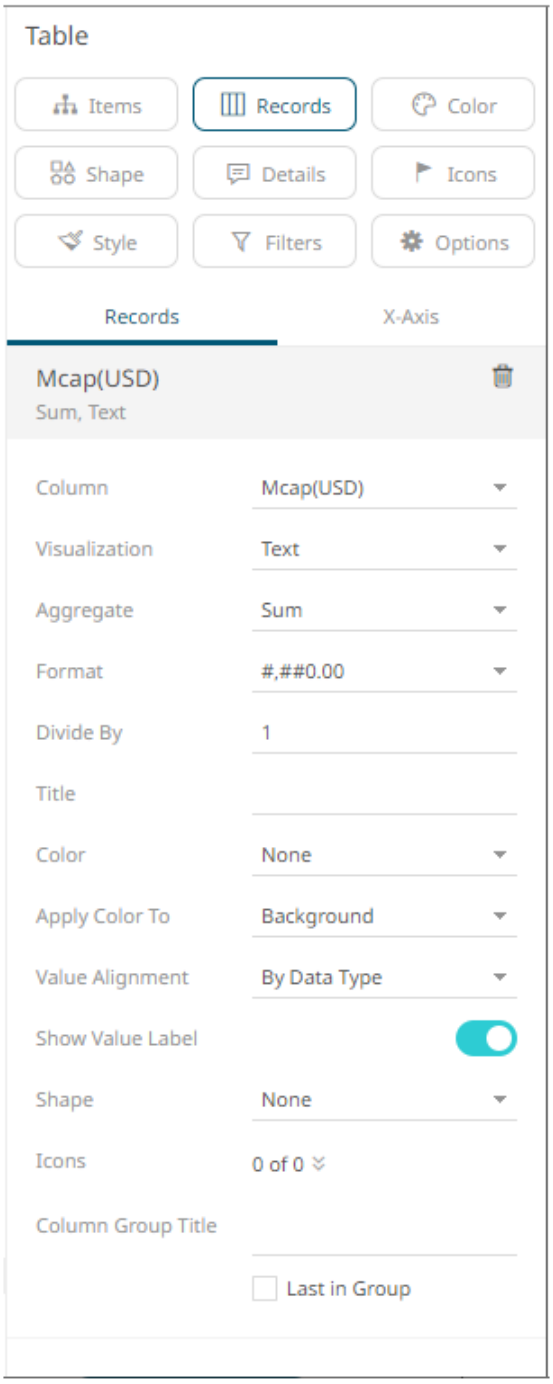
The configuration of the records added to the table visualization will depend on how the numeric or text columns will be displayed:



Steps:

1. Click on a numeric column under the *Records* variable list.

   This displays the configuration pane.

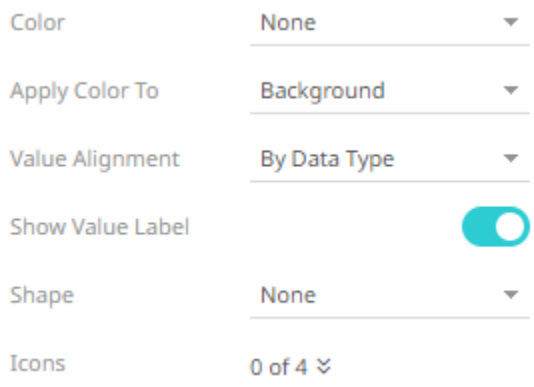


2. You can opt to change the column to the be used as the *Records* variable from the *Column* drop-down list.
3. Select how the column values will be displayed:
   - Text

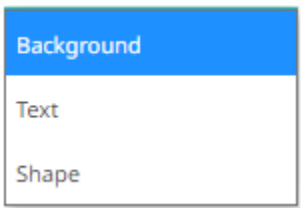


Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36
Abbott Lab...	47.70	73,392,451,232.00	-0.02	-0.00	0.36
ABC-Mart I...	1,892.00	556,753,517.00	-0.03	0.01	0.26
Aberdeen A...	1.28	1,310,061,051.00	-0.09	0.01	0.34
Abertis Infr...	11.77	4,574,542,373.00	-0.04	0.07	0.28
Accenture L...	27.49	17,063,968,693.00	-0.13	-0.01	0.37
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38

This visualization type displays the following configuration settings:

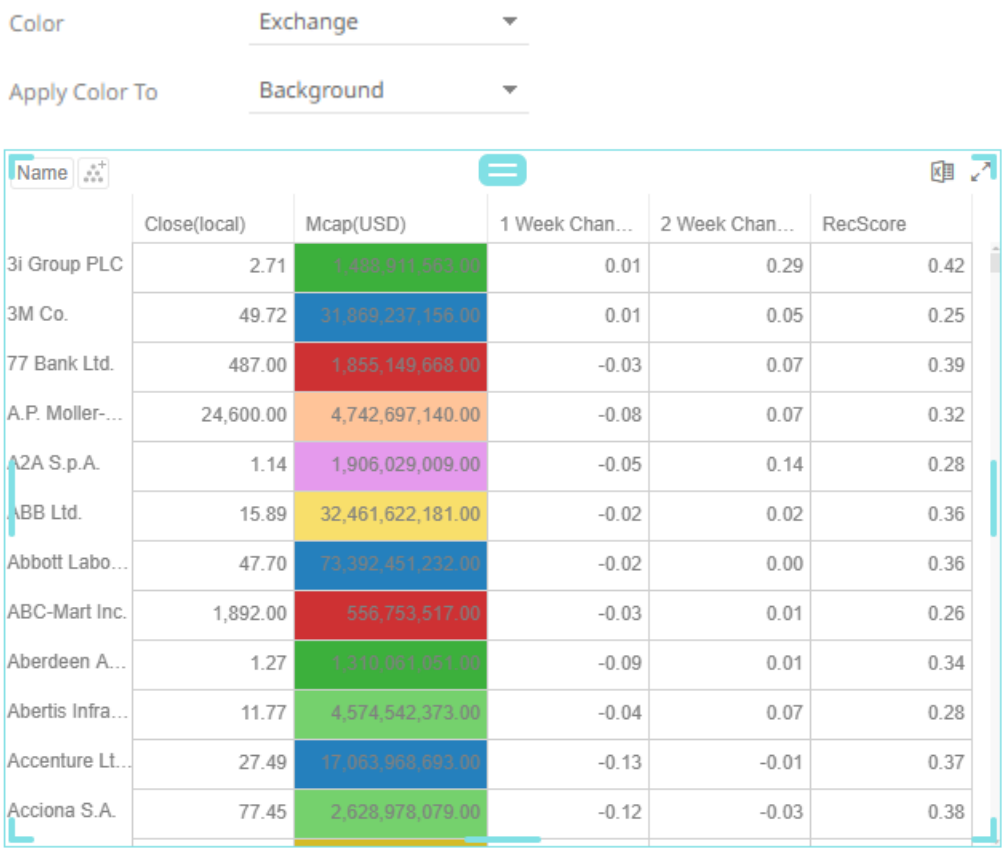


- Specify to what the color variable selected will be applied to:



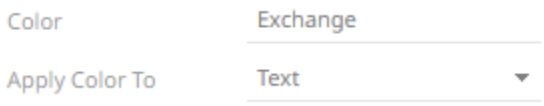
- Background

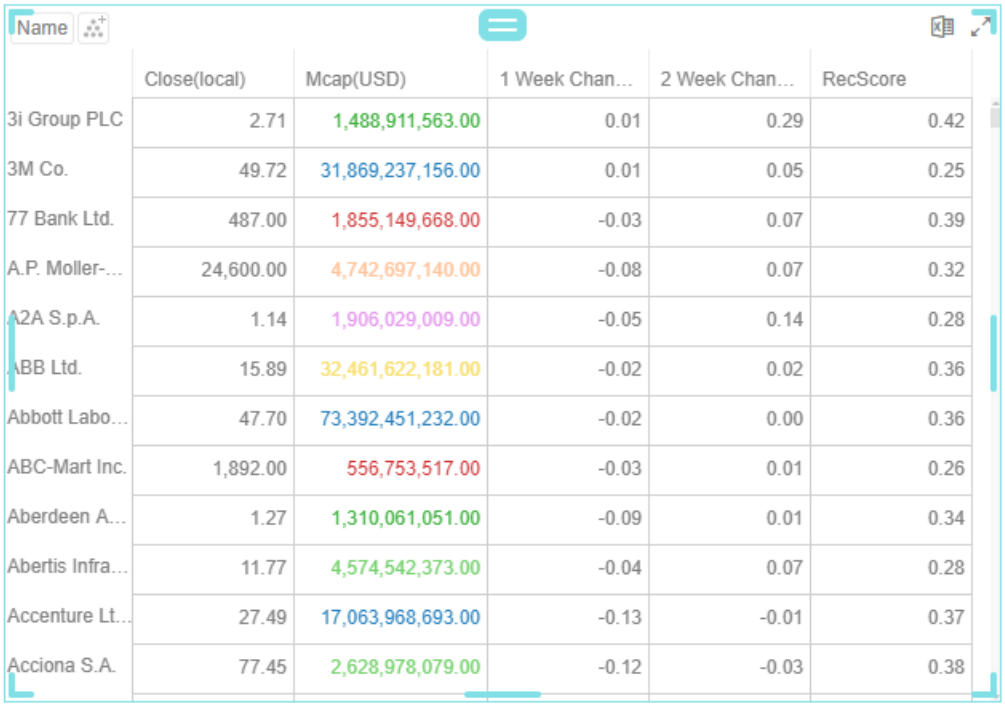
  Applies the color to the background.



- Text

  Applies the color to the text.



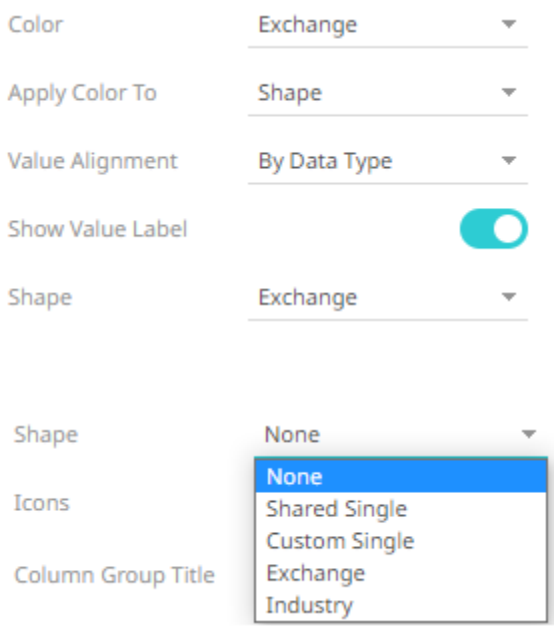


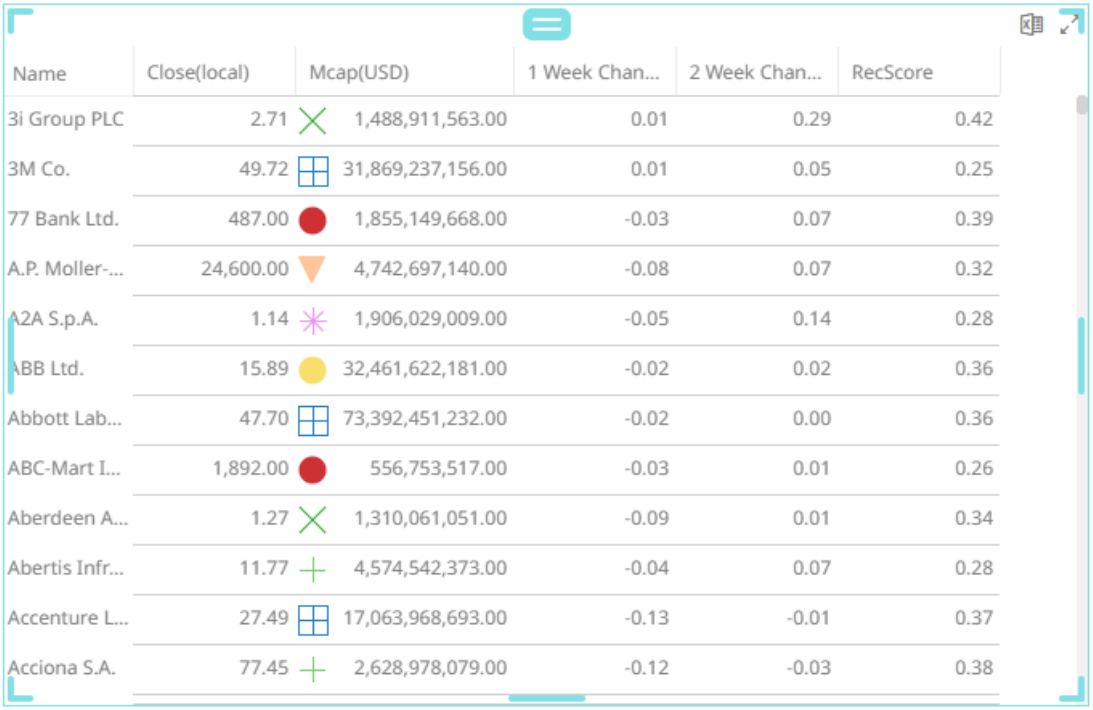
Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36
Abbott Labo...	47.70	73,392,451,232.00	-0.02	0.00	0.36
ABC-Mart Inc.	1,892.00	556,753,517.00	-0.03	0.01	0.26
Aberdeen A...	1.27	1,310,061,051.00	-0.09	0.01	0.34
Abertis Infra...	11.77	4,574,542,373.00	-0.04	0.07	0.28
Accenture Lt...	27.49	17,063,968,693.00	-0.13	-0.01	0.37
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38

- Shape

Displaying the shape is a useful visual cue in a table. Users will be able to build a legend that will display each unique combination of shape and color, along with the values from the columns used for the shape and color.

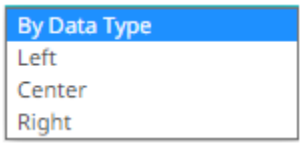
When selecting **Shape** as the *Apply Color To* value, ensure to select the *Shape* value in the drop-down list.





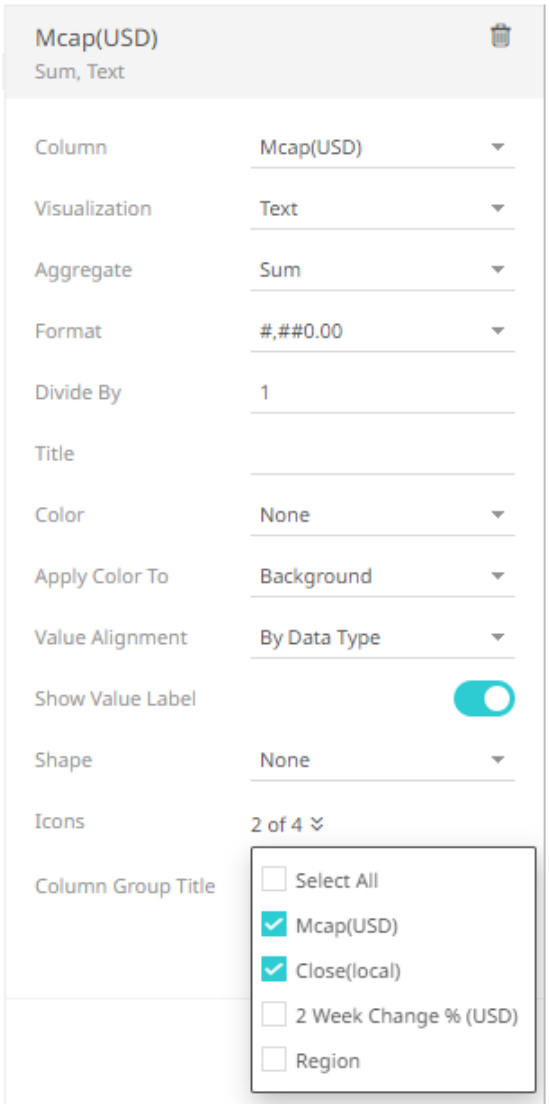
Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36
Abbott Lab...	47.70	73,392,451,232.00	-0.02	0.00	0.36
ABC-Mart I...	1,892.00	556,753,517.00	-0.03	0.01	0.26
Aberdeen A...	1.27	1,310,061,051.00	-0.09	0.01	0.34
Abertis Infr...	11.77	4,574,542,373.00	-0.04	0.07	0.28
Accenture L...	27.49	17,063,968,693.00	-0.13	-0.01	0.37
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38

- Select the *Value Alignment*



By default, **By Data Type** is selected. This means, for text values, it is aligned to the left. For numeric or Data/Time data type, the value is aligned to the right.

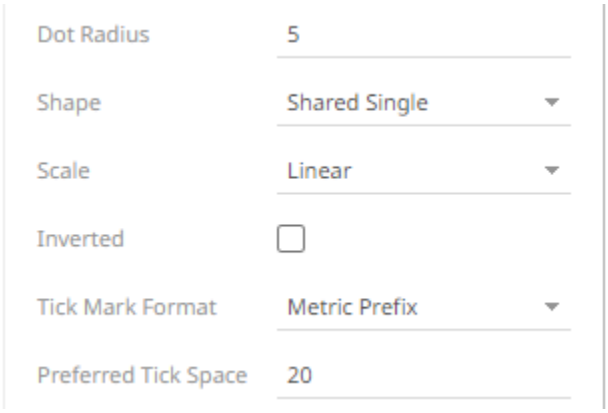
- Tap the **Show Value Label** slider to display the column values.
- Click the *Icons* drop-down and check the boxes of the columns with icons that will be assigned for this particular column.


Mcap(USD)
Sum, Text
Column
Mcap(USD)
Visualization
Text
Aggregate
Sum
Format
#,##0.00
Divide By
1
Title
Color
None
Apply Color To
Background
Value Alignment
By Data Type
Show Value Label
Shape
None
Icons
2 of 4
Column Group Title
Select All
Mcap(USD)
Close(local)
2 Week Change % (USD)
Region

- Horizontal Dot Plot



This visualization type displays the following configuration settings:



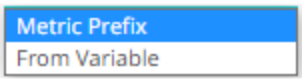
- Set the *Dot Radius*. Default is **5**.
- Select the *Shape* that will be applied to the dot plot.



- Select whether the *Scale* of the axis is **Linear**, **Log10**, or **Power**.

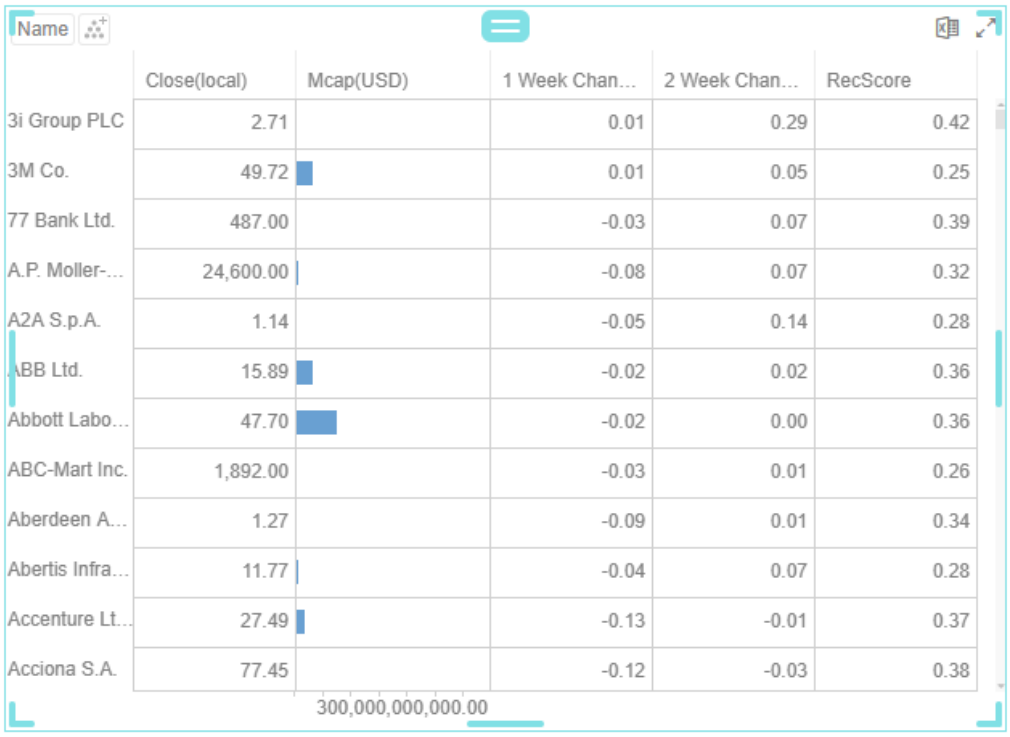


- Check the *Inverted* box. The dot plots on the x-axis is inverted.
- Select whether *Tick Mark Format* will be **Metric Prefix** or **From Variable**.

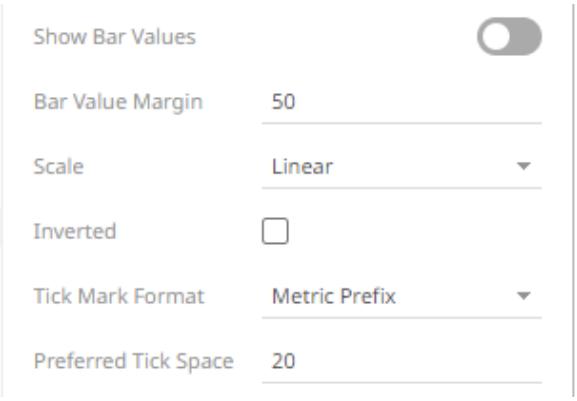


- Enter the *Preferred Tick Space*. Default is **20**.

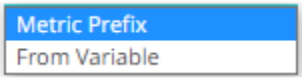
- Horizontal Bar Graph



This visualization type displays the following configuration settings:

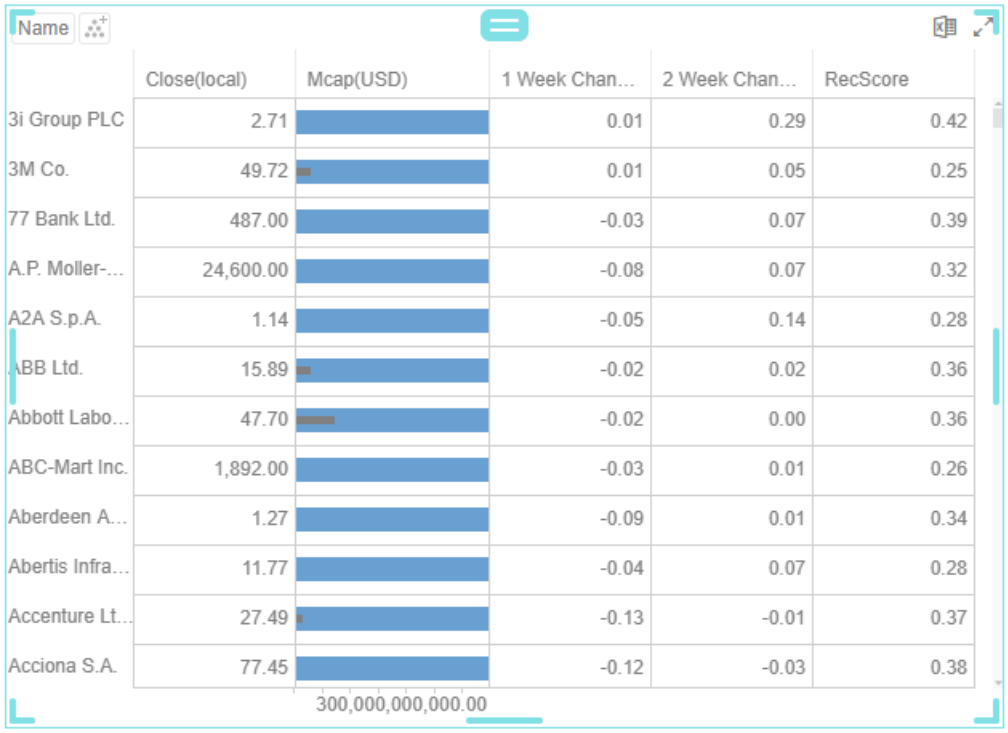


- Tap the **Show Bar Values** slider to display the bar values.
- Set wether the *Scale* will be **Linear** or **Power**.
- Check the *Inverted* box. The bar graph on the x-axis is inverted.
- Select whether *Tick Mark Format* will be **Metric Prefix** or **From Variable**.

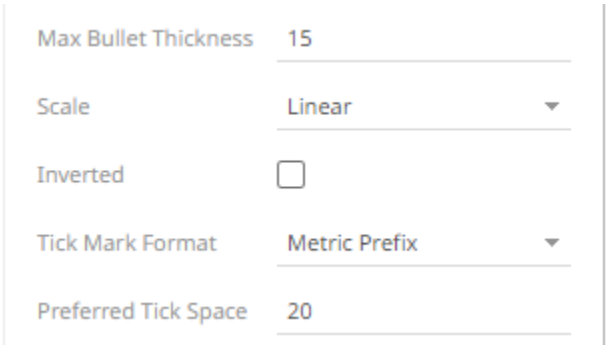


- Enter the *Preferred Tick Space*. Default is **20**.

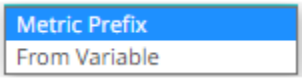
- Horizontal Bullet Graph



This visualization type displays the following configuration settings:

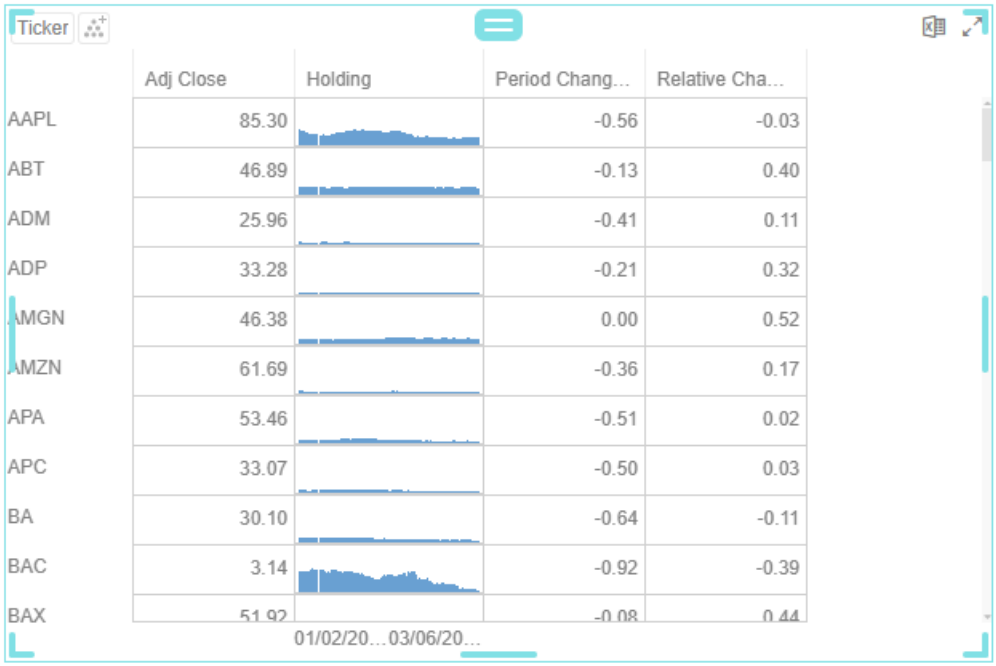


- Enter the *Max Bullet Thickness*. Default is **15**.
- Set wether the *Scale* will be **Linear** or **Power**.
- Check the *Inverted* box. The bullet graph on the x-axis is inverted.
- Select whether *Tick Mark Format* will be **Metric Prefix** or **From Variable**.

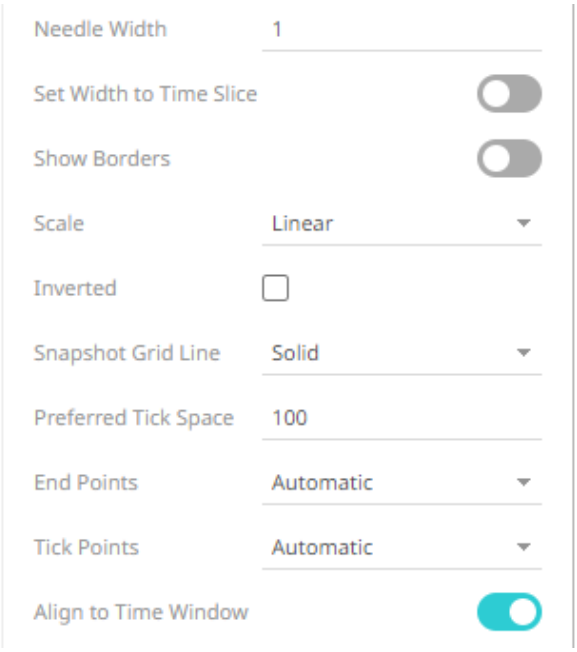


- Enter the *Preferred Tick Space*. Default is **20**.

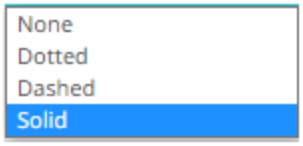
- Needle Graph (time series data)



This visualization type displays the following configuration settings:



- Enter the *Needle Width*. Default is **1**.
- Tap the **Set Width to Time Slice** slider for the needle width to be extended to the width of the time slice.
- Tap the **Show Borders** slider to display the borders.
- Set wether the *Scale* will be **Linear** or **Power**.
- Check the *Inverted* box. The needle graph on the x-axis is inverted.
- Set the *Snapshot Grid Line*.

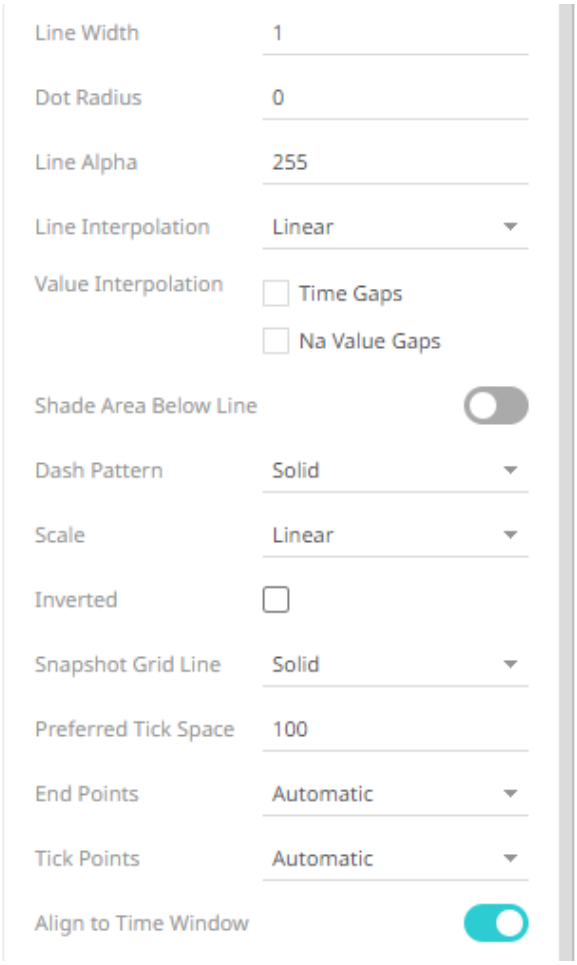


- Enter the *Preferred Tick Space*. Default is **20**.
- Set the *End Points*.
  - Automatic – automatically displays the end points.
  - None – end points are not displayed.
  - Custom – allows the selection of the Date/Time format of end points.
- Set the *Tick Points*.
  - Automatic – automatically displays the tick points.
  - None – tick points are not displayed.
  - Custom – allows the selection of the Date/Time format of tick points.
- Enable **Align to Time Window** to align with the time window of the Time Filter Box.

- Line Graph (time series data)



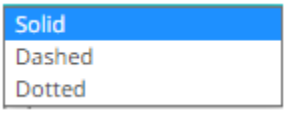
This visualization type displays the following configuration settings:



- Enter the *Line Width*. Default is **1**.
- Enter the *Dot Radius* of each data point.
- Enter the *Line Alpha* which is the level of color transparency/opacity. Default is **255**.
- Select the whether the *Line Interpolation* will be **Linear, Steeped,** or **Smooth**.



- Check the **Time Gaps** box for the time axis gaps to be interpolated.
- Check the **Na Value Gaps** box for the Na value gaps to be interpolated.
- Tap the **Shade Area Below Line** slider to apply the alpha shades between the lines and the zero Y grid line.
- Select wherer the *Dash Pattern* will be **Solid**, **Dashed**, or **Dotted**.



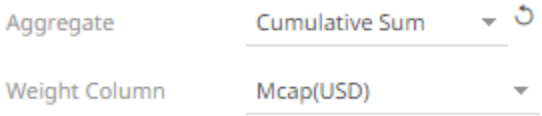
- Set wether the *Scale* will be **Linear** or **Power**.
- Check the *Inverted* box. The line graph on the X axis is inverted.
- Set the *Snapshot Grid Line*.

- Enter the *Preferred Tick Space*. Default is **100**.
- Set the *End Points*.
  - Automatic – automatically displays the end points.
  - None – end points are not displayed.
  - Custom – allows the selection of the Date/Time format of end points.
- Set the *Tick Points*.
  - Automatic – automatically displays the tick points.
  - None – tick points are not displayed.
  - Custom – allows the selection of the Date/Time format of tick points.
- Enable **Align to Time Window** to align with the time window of the Time Filter Box.

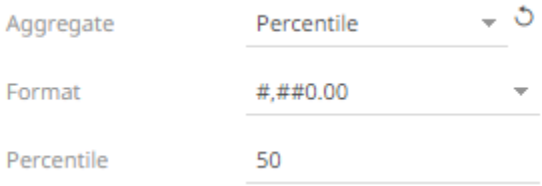
4. Select the aggregation method in the *Aggregate* field.

   The default is **Sum**.

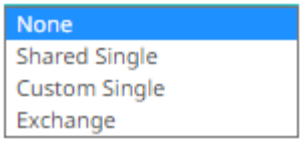
   - If you set the aggregation method to **Intercept, Slope, Weighted Mean, Weighted Harmonic Mean, Percent of Total Reference, Weighted Sum, Percent of Parent Reference, Percent of Total Change**, or **Cumulative Sum by Max**, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.



   - If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.

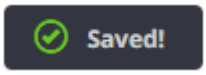


5. The *Format* field lets you specify the format that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.
6. Select the *Divide By* value to divide a number:
   - 1
   - 1000 (by a thousand)
   - 10000
   - 1000000 (by a million)
   - 1000000000 (by a billion)
7. Enter the *Title* of the column.
8. Select the *Color* variable that will be used for the column:



- None
- Shared Single
- Custom Single
- Column added to the *Color* variable (e.g., **Exchange**)

9. You can also opt to group columns in the table visualization.
10. Click the **Save**  icon on the toolbar.

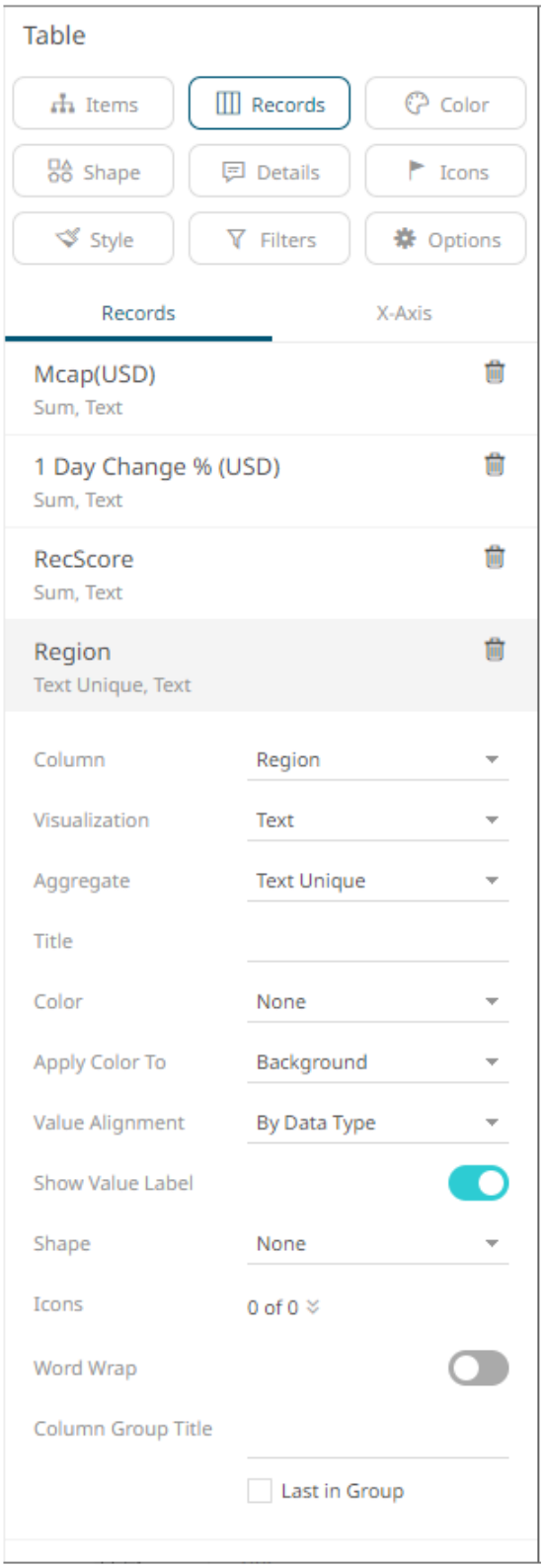
    When saved, the  notification is displayed.

You can add text records in a similar way.

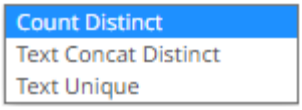
Steps:

1. Click on a text column under the *Records* variable list.

   This displays the configuration pane.

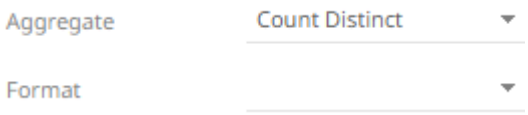


2. You can opt to change the column to the be used as the *Records* variable from the *Column* drop-down list.
3. By default, text colums are displayed as Text. Select the text aggregation method from the *Aggregate* field: **Count Distinct**, **Text Unique**, or **Text Concat Distinct**.

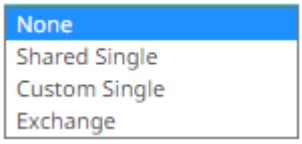


The default is **Text Unique**.

For **Count Distinct**, select the *Format*.

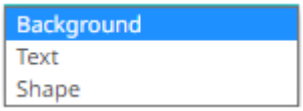


4. Enter the *Title* of the column.
5. Select the *Color* variable that will be used for the column:

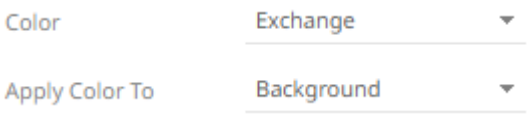


   - None
   - Shared Single
   - Custom Single
   - Column added to the *Color* variable (e.g., **Exchange**)

6. Specify to what the color variable selected will be applied to:



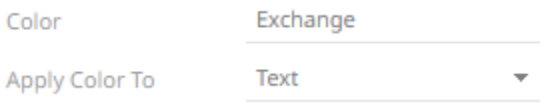
   - Background





Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore	Region
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42	Europe
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25	North America
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39	Asia Pacific
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32	Europe
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28	Europe
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36	Europe
Abbott Lab...	47.70	73,392,451,232.00	-0.02	0.00	0.36	North America
ABC-Mart I...	1,892.00	556,753,517.00	-0.03	0.01	0.26	Asia Pacific
Aberdeen A...	1.28	1,310,061,051.00	-0.09	0.01	0.34	Europe
Abertis Infr...	11.77	4,574,542,373.00	-0.04	0.07	0.28	Europe
Accenture L...	27.49	17,063,968,693.00	-0.13	-0.01	0.37	North America
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38	Europe

- Text



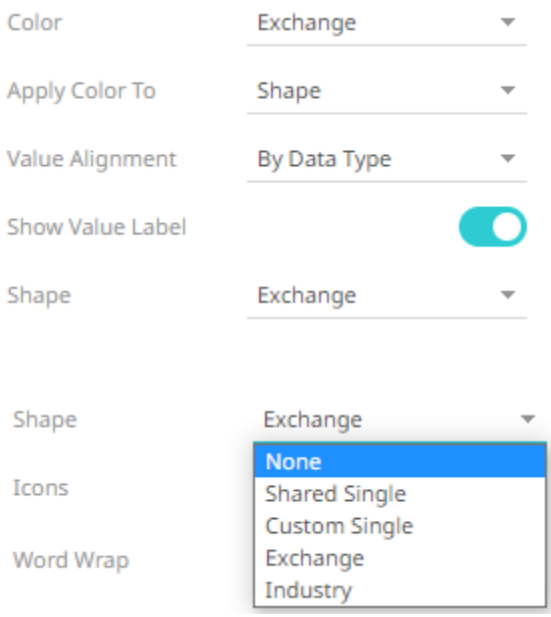


Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore	Region
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42	Europe
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25	North America
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39	Asia Pacific
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32	Europe
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28	Europe
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36	Europe
Abbott Lab...	47.70	73,392,451,232.00	-0.02	0.00	0.36	North America
ABC-Mart I...	1,892.00	556,753,517.00	-0.03	0.01	0.26	Asia Pacific
Aberdeen A...	1.28	1,310,061,051.00	-0.09	0.01	0.34	Europe
Abertis Infr...	11.77	4,574,542,373.00	-0.04	0.07	0.28	Europe
Accenture L...	27.49	17,063,968,693.00	-0.13	-0.01	0.37	North America
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38	Europe

- Shape

Displaying the shape is a useful visual cue in a table. Also, with support for using the shape palettes as icons in the visual table, users will be able to build a legend that will display each unique combination of shape and color, along with the values from the columns used for shape and color.

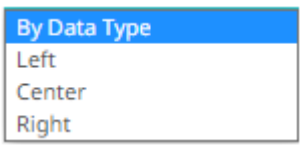
When selecting **Shape** as the *Apply Color To* value, ensure to select the *Shape* value in the drop-down list.





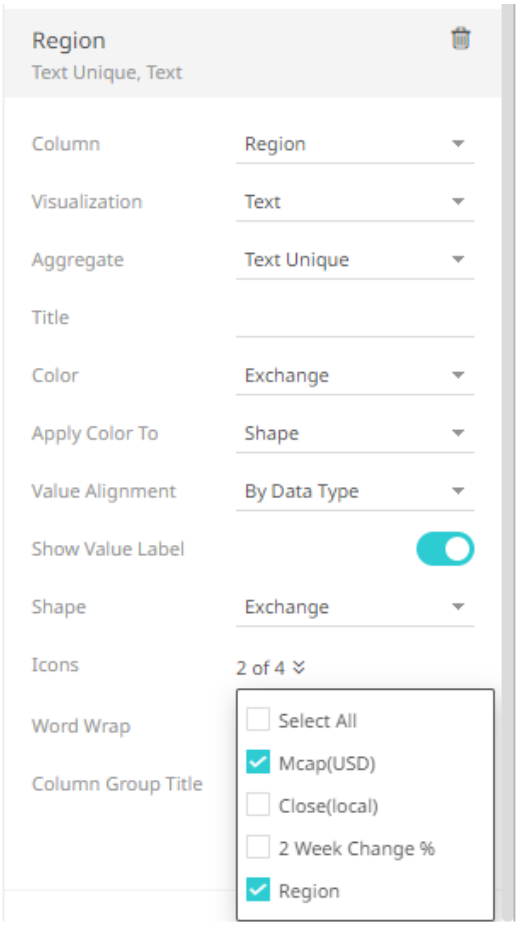
Name	Close(local)	Mcap(USD)	1 Week Chan...	2 Week Chan...	RecScore	Region
3i Group PLC	2.71	1,488,911,563.00	0.01	0.29	0.42	Europe
3M Co.	49.72	31,869,237,156.00	0.01	0.05	0.25	North Ame...
77 Bank Ltd.	487.00	1,855,149,668.00	-0.03	0.07	0.39	Asia Pacific
A.P. Moller-...	24,600.00	4,742,697,140.00	-0.08	0.07	0.32	Europe
A2A S.p.A.	1.14	1,906,029,009.00	-0.05	0.14	0.28	Europe
ABB Ltd.	15.89	32,461,622,181.00	-0.02	0.02	0.36	Europe
Abbott Lab...	47.70	73,392,451,232.00	-0.02	0.00	0.36	North Ame...
ABC-Mart I...	1,892.00	556,753,517.00	-0.03	0.01	0.26	Asia Pacific
Aberdeen A...	1.28	1,310,061,051.00	-0.09	0.01	0.34	Europe
Abertis Infr...	11.77	4,574,542,373.00	-0.04	0.07	0.28	Europe
Accenture L...	27.49	17,063,968,693.00	-0.13	-0.01	0.37	North Ame...
Acciona S.A.	77.45	2,628,978,079.00	-0.12	-0.03	0.38	Europe

7. Select the *Value Alignment.*



By default, **By Data Type** is selected. This means, for text values, it is aligned to the left. For numeric or Data/Time data type, the value is aligned to the right.

8. Tap the **Show Value Label** slider to display the column values.
9. Click the *Icons* drop-down and check the boxes of the columns with icons that will be assigned for this particular column.



10. Tap the **Word Wrap** slider to wrap the text of the column values.
11. You can also opt to group columns in the Table visualization.
12. Click the **Save**  icon on the toolbar.

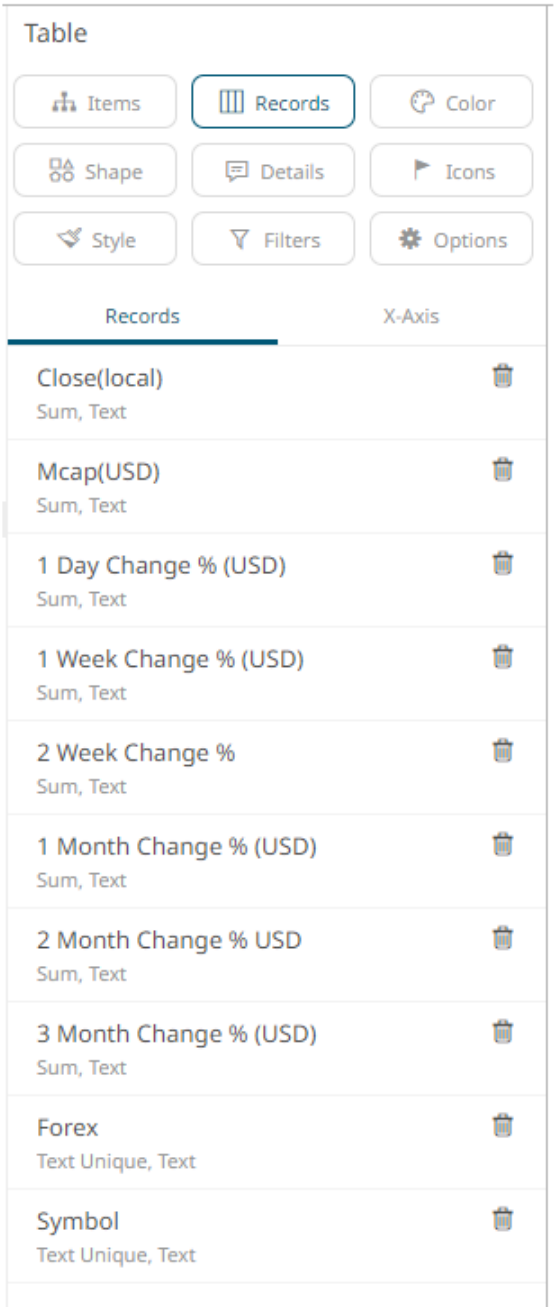
When saved, the  notification is displayed.

Grouping Colums in the Table Visualization

Visual members of a Table visualization can be grouped into sections.

Steps:

1. Open or create a Table visualization and add columns to the *Records* variable.
2. Click the **Records** variable drop area to display the available visual.



NOTE **The inclusion of columns in a group will be based on their sequence in the *Visual Members* list.**

For example, the following groups will be created:

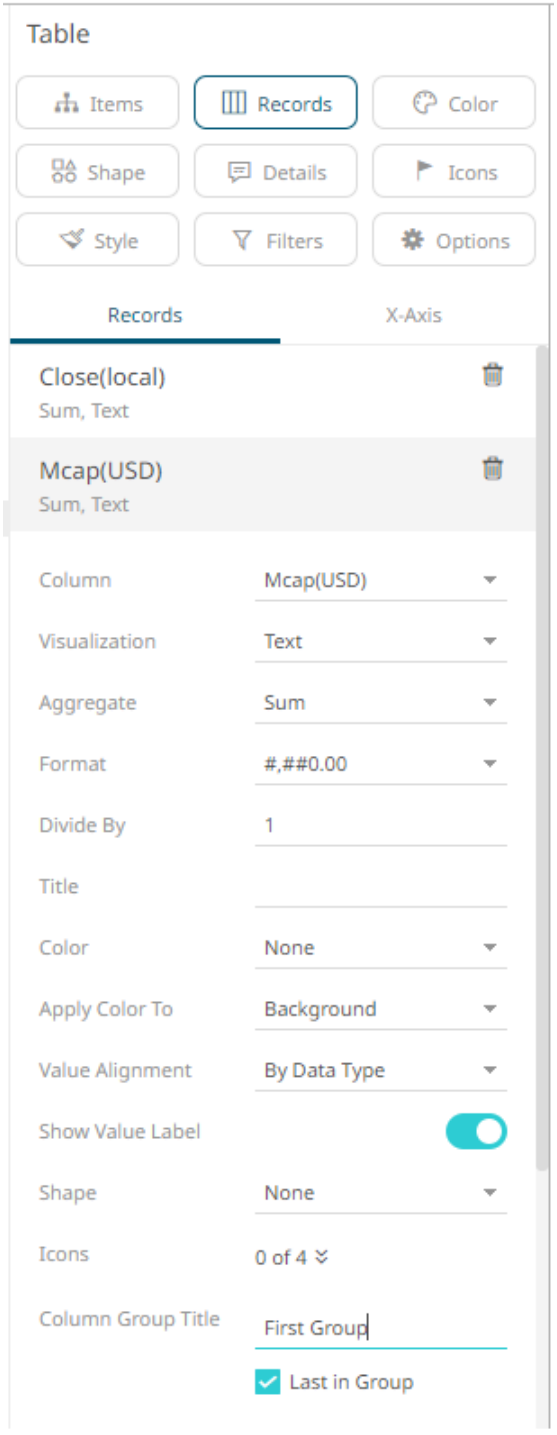
First group: **Close(local)** and **Mcap(USD)**

Second group: **1 Day Change % (USD), 1 Week Change % (USD)**, and **2 Week Change %**

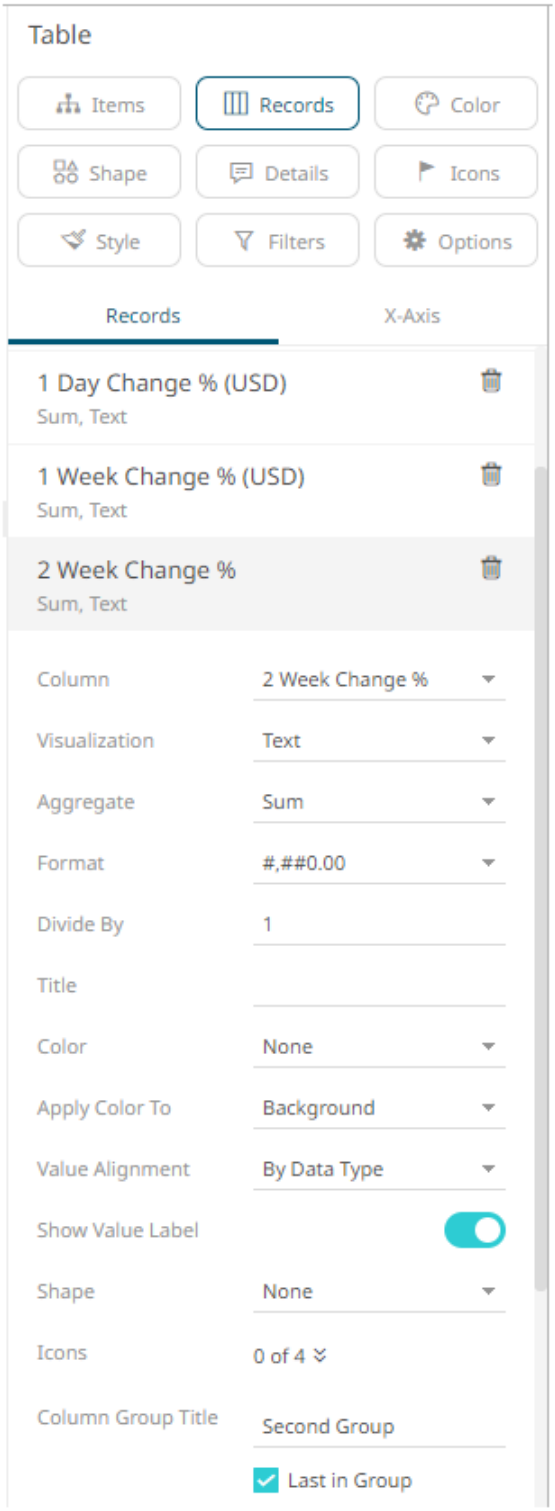
Third group: **1 Month Change % (USD), 2 Month Change % (USD)**, and **3 Month Change % (USD)**

Forex and Symbol will not be included in any group.

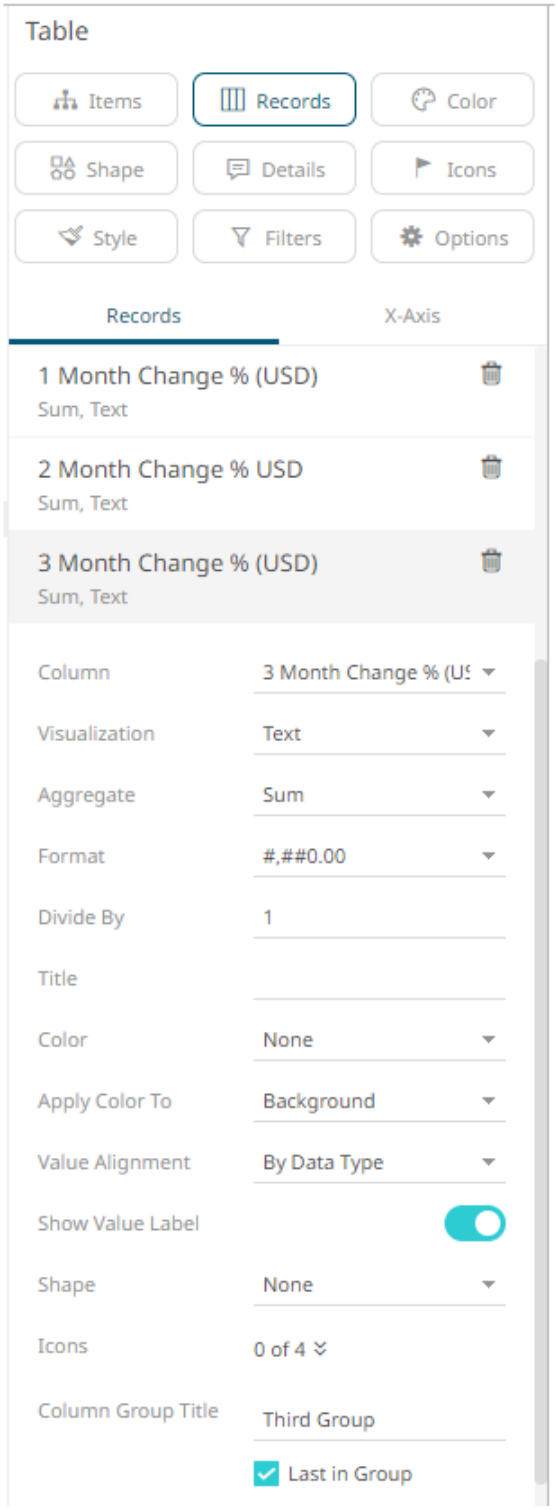
3. For the groupings, click the following columns, check the **Last in Group** box, enter the *Column Group Title,* and click ✓ :
   - First group: **Mcap(USD)**



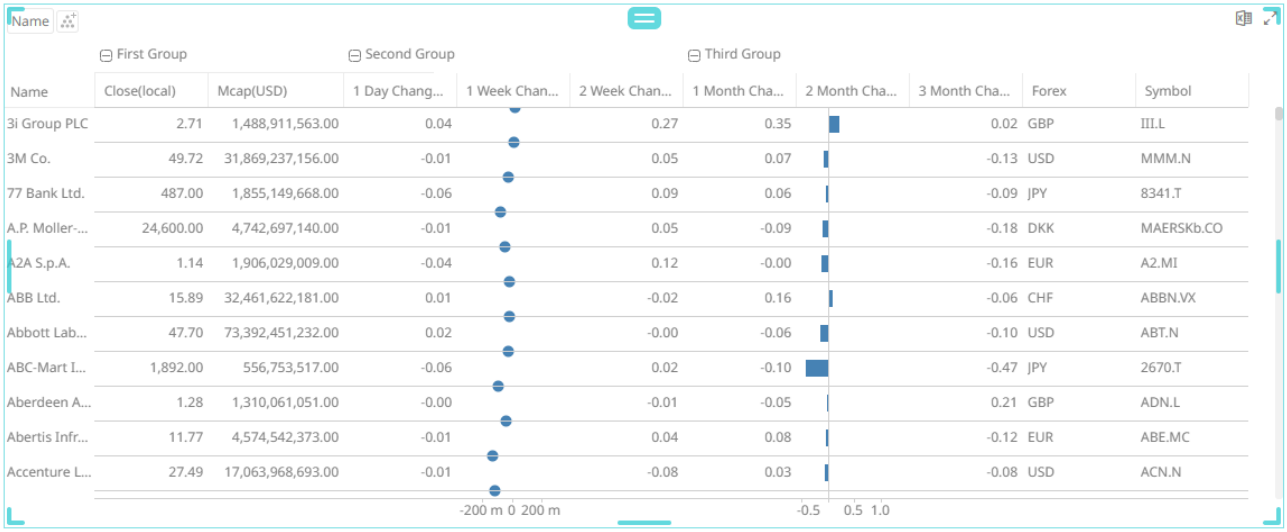
- Second group: **2 Week Change %**



- Third group: **3 Month Change % (USD)**



The groupings are applied to the Table visualization.



AGGREGATION METHODS

Panopticon supports a wide range of aggregation methods. These methods are mathematical computations applied to a set of values. Values may include a group of numbers or numeric field values and variables. The following aggregation methods are available for most variables:

Aggregation Method	Description
Abs	The sum of absolutes of the selection.
Abs Sum	The absolute of the sum of the selection.
Combinations	Returns how many distinct combinations of breakdown column values there are below each node in the hierarchy
Count	The count of the number of rows in the selection.
Count Distinct	Creates numeric aggregated variables based on the distinct count of Text columns.
Count Non Zero	The count of non-zero values.
Cumulative Sum	The cumulative sum based on the currently applied sort order for each leaf node.
Cumulative Sum By Max	The cumulative sum of the sum of the value across siblings ordered by the max of the weight column.
Do Not Aggregate	Returns the value of a single row, otherwise null.
External	Allows aggregates to be supplied from source data. The external aggregate configuration can be supplied explicitly, defined by the user, or implicitly from the data plug-in.
Harmonic Mean	The harmonic mean of the selection.
Intercept	The intercept of the least-squares line.
Level	The level in the hierarchy for the node or numbered from the leaf.
Max	The maximum value from the selection.

Mean	The mean of the selection.
Min	The minimum value from the selection.
Neg	The sum of the negative values in the selection.
Percentile	The selected percentile.
Percent of Parent	For each member item (child node) of a breakdown group (parent node), the percentage share of its value in relation to the parent group value, where the parent group value is calculated as the sum of all group member (child node) values: **[single child node value] / [sum of all child node values in the group]** The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.
Percent of Total	For each group and for each group member at all levels of the breakdown hierarchy, the percentage share of its value in relation to the total data set value, where the total is calculated as the sum across all rows in the dataset. This aggregate is similar to Percent of Parent, with the difference that the denominator or reference is ALWAYS based on the complete dataset: **[single node value] / [sum of all rows in the dataset]** The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.
Percent of Total Change	This aggregate should be understood as “Change in (Percent of Total)”, not as “Percent of (Total Change)”. It is the result of calculating Percent of Total on two different columns, and then calculating the difference between them. The result is presented as the difference in *percentage units*, n.b. This aggregate is typically used for comparing Percent of Total based on current values, to Percent of Total based on previous values. Therefore, the column specified as “Previous Values Column” in the settings, should be the column containing previous values. The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings. Optionally, you can emphasize that the value is a percentage units by customizing the format unit, for example: 0.00%'-units'.
Percent of Parent Reference	This aggregate works like Percent of Parent, with the difference that a value from one column is compared to a parent level sum of values from another column, which is set as the “Reference column”: **[single child node value from a column] / [sum of all child node values from the reference column in the group]** While Percent of Parent will always summarize to 100% at the group (parent) level, this is not the case with Percent of Parent Reference, which can summarize to any number, depending on the differences between the Values and the Reference Values. The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.
Percent of Total Reference	This aggregate works like Percent of Total, with the difference that a value from one column is compared to a total data set level sum of values *from another column*, which is set as the “Reference column”: **[single node value from a column] / [sum of all rows from the *reference column* in the dataset]** While Percent of Total will always summarize to 100% across the whole data set, this is not the case with Percent of Total Reference, which can summarize

	to any number, depending on the differences between the **Values** and the **Reference Values**. The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.
Pos	The sum of the positive values in the selection
Product	The product of the selection.
Ratio of Sums	The comparison between the sum of a selected measure divided by the sum of the selected reference measure.
Sibling Rank	The numeric rank of siblings within a hierarchy branch.
Slope	The slope of the least-squares line.
Stdev	The standard deviation of the selection.
Stdevp	The population standard deviation of the selection.
Sum	The sum of the selection.
Unique	Used with numeric values and will display a number in case all the values in a group are the same , otherwise it will show empty/null. This aggregation can be used as an indicator of a logical test: “if the numeric values in this group and in any subgroups are identical, then show the numeric value, or else show nothing”.
Text Concat Distinct	Aggregates text fields to display all possible text values in a comma delimited list.
Text Unique	Aggregates text fields to display distinct values.
Weighted Harmonic Mean	The weighted harmonic mean of the selection, based on a specified weighting column.
Weighted Mean	The weighted mean of the selection, based on a specified weighting column.
Weighted Sum	The sum of the product of the selected field and the weight field.

Abs

The sum of absolute values of the selection.

This method returns the sum of the absolute values of each item in a set of numbers.

The absolute value of a number refers to the number without its sign.

Adding each item of a set of numbers will produce its total or sum.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

Steps:

1. Compute for the absolute value of each item.

Arbitrary
3
2
1
0
1
2
3
0
0
0

The list of absolute values.

2. Compute the sum of the absolute numbers.

   3 + 2 + 1 + 0 + 1 + 2 + 3 + 0 + 0 + 0 = 12

Sample 2

Assuming that the same list of numbers has multiple groupings or breakdowns as shown below.

Grouping	Arbitrary
1	3
1	2
1	1
1	0
2	-1
2	-2
2	-3
3	0
3	0
3	0

The list of values with groupings.

Steps:

1. Compute for the absolute values of each item based on the Grouping defined.

Grouping	Arbitrary
1	3
1	2
1	1
1	0
2	1
2	2
2	3
3	0
3	0
3	0

The list of absolute values with groupings.

2. Compute the sum of the absolute numbers based on the grouping.

Grouping	Arbitrary
1	6
2	6
3	0

The final result.

Computation Details:

Group 1: 3 + 2 + 1 + 0 = 6

Group 2: 1 + 2 + 3 = 6

Group 3: 0 + 0 + 0 = 0

Sample 3

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

Abs Results:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
55	12	55	45	1	3	12,222.00	45.45

The results per field.

Abs Sum

The absolute of the sum of the selection.

This method returns the absolute value of the sum of each item in a set of numbers.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

Steps:

1. Compute for the sum of the values.

Arbitrary
0

The sum of all values.

2. Compute the absolute of zero, which equals zero.

Sample 2

Assuming that the same list of numbers has multiple groupings or breakdowns as shown below:

Grouping	Arbitrary
1	3
1	2
1	1
1	0
2	-1
2	-2
2	-3

3	0
3	0
3	0

The list of values with grouping.

Steps:

1. Compute the sum of the numbers based on the grouping.

Grouping	Arbitrary
1	6
2	-6
3	0

The sum of values per grouping.

Computation Details:

Group 1: 3 + 2 + 1 + 0 = 6

Group 2: -1 + -2 + -3 = -6

Group 3: 0 + 0 + 0 = 0

2. Compute the absolute value of the summed up numbers above.

Grouping	Arbitrary
1	6
2	6
3	0

Final result.

Sample 3

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08

9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

AbsSum Results:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
55	0	55	45	1	3	10,000.00	45.45

The results per field.

Combinations

Returns how many distinct combinations of breakdown column values there are below each node in the hierarchy.

Given this data table:

Region	Country	1 Day Change % (USD)	Mcap Rank	1 Month Change % (USD)
Europe	AT	-7.4%	32	71.31%
Europe	AT	-6.56%	68	51.07%
Europe	AT	-2.78%	66	-17.28%
Asia Pacific	AU	-0.72%	57	22.35%
Asia Pacific	AU	3.28%	72	13.99%
Europe	BE	-4.94%	45	49.33%
Europe	BE	-9.23%	48	78.89%
Europe	BE	4.19%	28	22.68%
Europe	BE	-2.63%	51	22.60%
North America	CA	-5.19%	25	13.82
North America	CA	12.19%	41	19.11%
North America	CA	1.20%	16	17.14%

Sample 1

Below is the defined breakdown in a Table visualization:



Adding 1 Day Change % (USD) column to the *Records* variable will produce the following table with the aggregate set to **Sum** (default):

		1 Day Change % (USD)
Asia Pacific	AU	0.03
Europe	AT	-0.17
	BE	-0.13
North America	CA	0.08

Changing the aggregate of 1 Day Change % (USD) to **Count** will display how many instance of 1 Day Change % (USD) (rows from the data table) there are in each country:

		1 Day Change % (USD)
Asia Pacific	AU	2
Europe	AT	3
	BE	4
North America	CA	3

Adding Mcap Rank to the *Records* variable will result to the following table with the aggregate set to **Sum** (default):

		1 Day Change % (USD)	Mcap Rank
Asia Pacific	AU	2	129
Europe	AT	3	166
	BE	4	172
North America	CA	3	82

Changing the aggregate of Mcap Rank to **Combinations** will display how many countries (rows in fully expanded visual table) there are.

		1 Day Change % (USD)	Mcap Rank
Asia Pacific	AU	2	1
Europe	AT	3	1
	BE	4	1
North America	CA	3	1

Changing the visible depth in the breakdown to Region should show:



	1 Day Change % (USD)	Mcap Rank
Asia Pacific	2	1
Europe	7	2
North America	3	1

Asia Pacific has 1 (AU), Europe has 2 (AT and BE), and North America has 1 (CA).

Count

The count of the number of rows in the selection. Returns the number of items in a set of numbers.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

The field has 10 rows and therefore the count is equal to 10.

Sample 2

Assuming that the same list of numbers has multiple groupings or breakdowns as below:

Grouping	Arbitrary
1	3
1	2
1	1
1	0
2	-1
2	-2
2	-3
3	0
3	0

3	0

A list of values based on a grouping

Computing for the Count based on the Grouping field yields the following results:

Grouping	Arbitrary
1	4
2	3
3	3

The final result

Sample 3

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Final results.

Count Distinct

Creates numeric aggregated variables based on the distinct count of text columns.

Given this data table:

Country	Industry	Product	Company	1 Day Change % (USD)	Mcap(USD)
AT	Financials	Charleston	Raiffeisen International Bank-Holding AG	-0.07	3439883100
AT	Financials	Soflyy	Raiffeisen International Bank-Holding AG	-0.07	1371987780

AT	Basic Materials	Digital 2TB	Raiffeisen International Bank-Holding AG	-0.03	1412883878
AT	Industrials	Charleston	Wienerberger AG	-0.04	660942066
AU	Basic Materials	Charleston	BHP Billiton Ltd.	-0.06	74380605994
AU	Basic Materials	Soflyy	Lihir Gold Ltd.	0.02	5377974426
AU	Basic Materials	Soflyy	BHP Billiton Ltd.	-0.02	2104618718
BE	Financials	Digital 2TB	KBC Group N.V.	-0.05	2369136539
BE	Financials	Charleston	Dexia S.A.	-0.09	2272408744
BE	Basic Materials	Soflyy	KBC Group N.V.	0.04	4151907147
BE	Basic Materials	Digital 2TB	Umicore S.A.	-0.03	2078266946
CA	Consumer Goods	Canbio HD	Magna International Inc. Cl A	-0.05	2981991456
CA	Financials	Wraith Tri	Canadian Imperial Bank of Commerce	-0.03	13960011146

Country, Industry, Product, and Company are text columns while 1 Day Change % (USD) and Mcap(USD) are numeric columns.

Sample 1

Below is the defined breakdown in a Table visualization:



This Table visualization is showing the grouping of the columns based on the breakdown hierarchy with Product, Company, 1 Day Change % (USD), and Mcap(USD) as Visual Members and with the corresponding aggregates:

Column	Aggregate
Product	TextUnique
Company	TextUnique
1 Day Change % (USD)	Sum
Mcap(USD)	Sum

By default, the aggregates of Product and Company are both set to **TextUnique**.

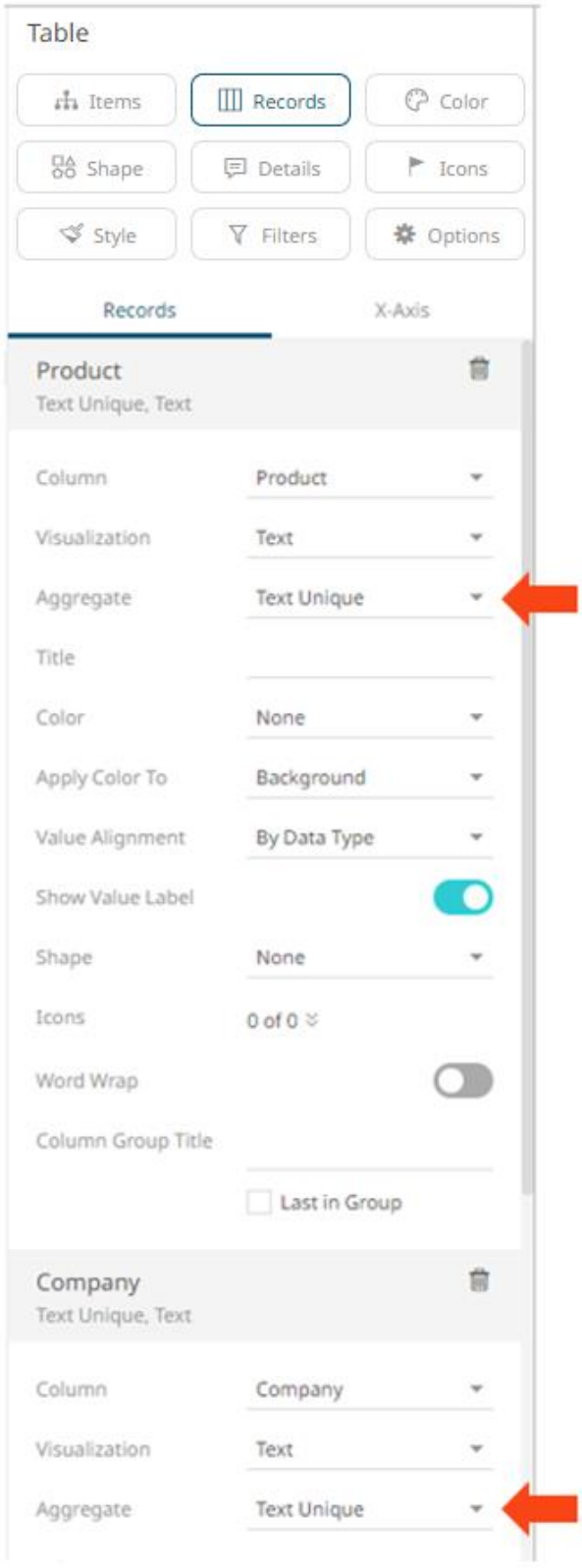
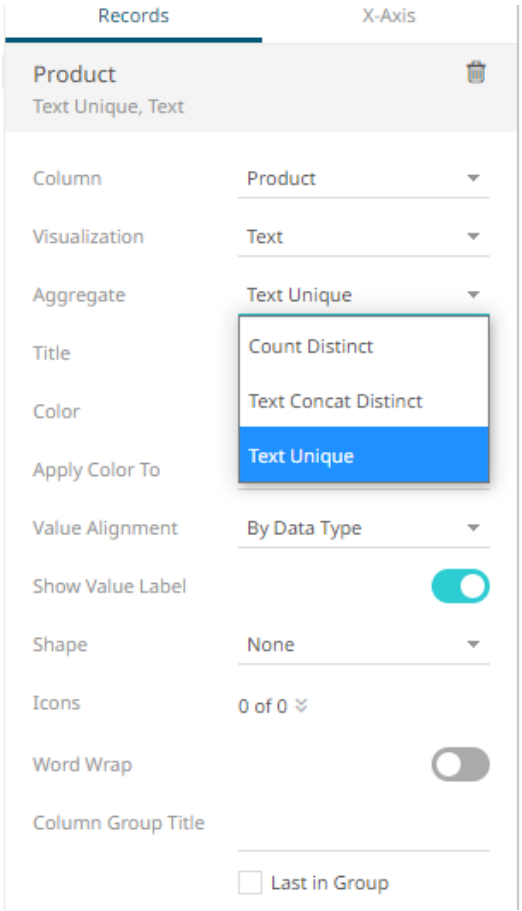


Table
Items
Records
Color
Shape
Details
Icons
Style
Filters
Options
Records
X-Axis
Product
Text Unique, Text
Column
Product
Visualization
Text
Aggregate
Text Unique
Title
Color
None
Apply Color To
Background
Value Alignment
By Data Type
Show Value Label
Shape
None
Icons
0 of 0
Word Wrap
Column Group Title
Last in Group
Company
Text Unique, Text
Column
Company
Visualization
Text
Aggregate
Text Unique

The Table visualization now displays the distinct text values of Product and Company for the breakdown columns, Country and Industry.

		Product	Company	1 Day Change % (USD)	Mcap(USD)
AT	Basic Materials	Digital 2B	Raiffeisen International Bank-Holding AG	-0.03	1412883878
	Financials		Raiffeisen International Bank-Holding AG	-0.14	4811879880
	Industrials	Charleston	Wienerberger AG	-0.04	660942066
AU	Basic Materials			-0.06	81863199138
BE	Basic Materials			0.02	6230174093
	Financials			-0.14	4641545283
CA	Consumer Goods	Canbio HD	Magna International Inc. Cl A	-0.05	2981991456
	Financials	Wraith Tri	Canadian Imperial Bank of Commerce	-0.03	13960011146

To display the Product column as a distinct count, click **Show as Distinct Count**. The dialog changes to show numeric properties with *Aggregate* set to **CountDistinct**:



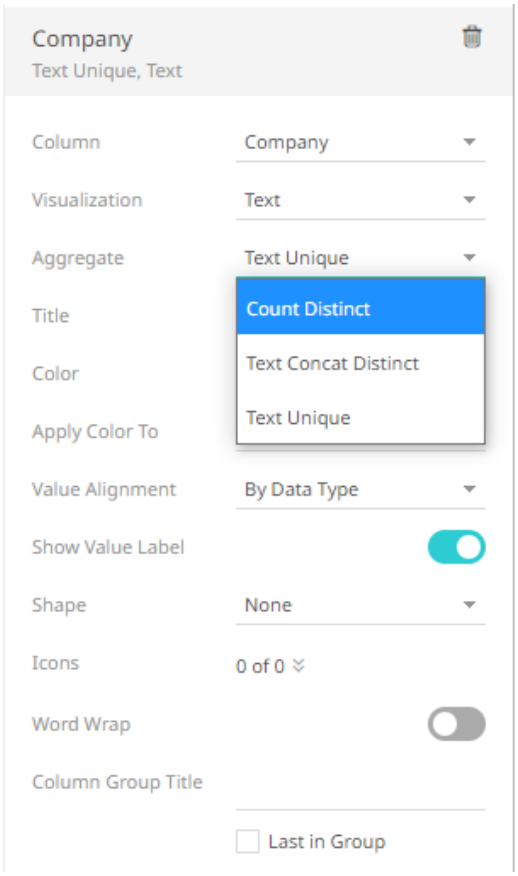
The values of the Product column display in the Table as:

		Product	Company	1 Day Change % (USD)	Mcap(USD)
AT	Basic Materials	1.00	Raiffeisen International Bank-Holding AG	-0.03	1412883878
	Financials	2.00	Raiffeisen International Bank-Holding AG	-0.14	4811879880
	Industrials	1.00	Wienerberger AG	-0.04	660942066
AU	Basic Materials	2.00		-0.06	81863199138
BE	Basic Materials	2.00		0.02	6230174093
	Financials	2.00		-0.14	4641545283
CA	Consumer Goods	1.00	Magna International Inc. Cl A	-0.05	2981991456
	Financials	1.00	Canadian Imperial Bank of Commerce	-0.03	13960011146

For example, for the Country AT and Industry Financials, it shows that there are **2** Product distinct counts for the breakdown columns which are: **Charleston and Soflyy**

While for the Country AU and Industry Basic Materials, there are **2** Product distinct counts for the breakdown columns which are also: **Charleston and Soflyy**

You can also opt display the Company column as a distinct count by clicking **Show as Distinct Count**. The dialog changes to show numeric properties with *Aggregate* set to **CountDistinct**:



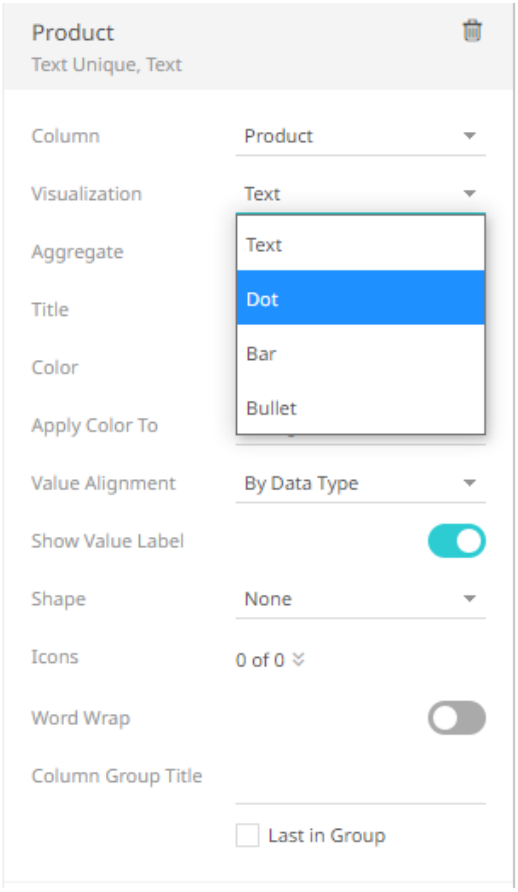
The values of the Company column display in the Table as:

		Product	Company	1 Day Change % (USD)	Mcap(USD)
AT	Basic Materials	1.00	1.00	-0.03	1412883878
	Financials	2.00	1.00	-0.14	4811879880
	Industrials	1.00	1.00	-0.04	660942066
AU	Basic Materials	2.00	2.00	-0.06	81863199138
BE	Basic Materials	2.00	2.00	0.02	6230174093
	Financials	2.00	2.00	-0.14	4641545283
CA	Consumer Goods	1.00	1.00	-0.05	2981991456
	Financials	1.00	1.00	-0.03	13960011146

Note that for the Country AT and Industry Financials, there are **2** Product distinct counts but only **1** Company distinct count which is **Raiffeisen International Bank-Holding AG.**

This aggregation method is initially implemented for the following:

- Ticker Tile, Bar, Dot, and Bullet visualizations

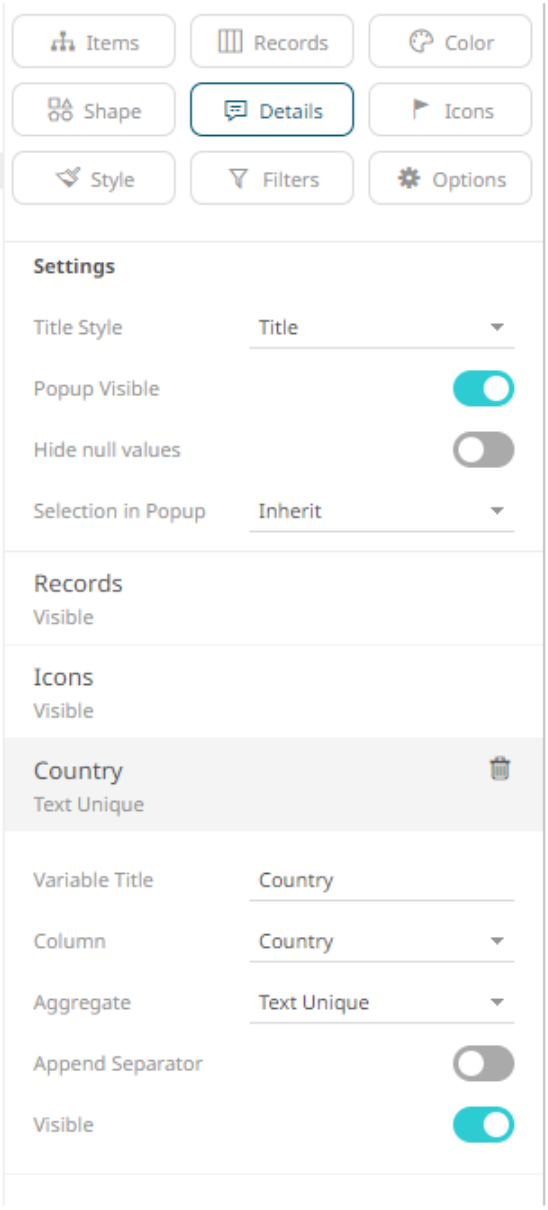


For example:

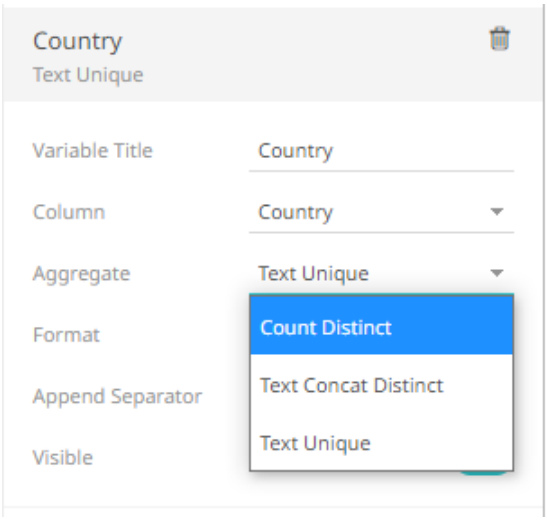


- Height, Size, and Details variables

  For the Details variable, dragging a text column to the *Details* shelf drop area creates a text details member.



  To show as distinct count, select **Count Distinct** as the aggregate.



Count Non Zero

The count of the number of non-zero rows in the selection. Returns the number of items in a set of numbers.

Sample 1

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

The field has 10 rows but the number of non-zero values is 6.

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03

4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

Count Results:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
10	6	10	9	1	3	9	9

Final results.

Cumulative Sum

Returns the cumulative sum based on the currently applied sort order for each leaf nodes, any inner nodes return a null value.

Sample

Below is a table showing **Day** and Amount fields, with **Balance** as the new aggregate column (CumulativeSum) based on **Amount** as the **source** column and Day as the **sorting** column.

The **Key** column serves as the breakdown.

Key	Day	Amount	Balance
A	5	$2.00	$5.50
B	2	$3.00	$7.00
C	7	-$1.00	$9.50
D	3	-$5.00	$2.00
E	1	$4.00	$4.00
F	4	$1.50	$3.50
G	6	$5.00	$10.50
H	10	$1.00	$12.50
I	8	-$2.00	$7.50
J	9	$4.00	$11.50

In the example, you get one row in the visualization per row in the data source since every source row has a unique key. If not, multiple rows roll into each visualization row, and then the CumulativeSum will first sort them on the sums of the **Day** column, then accumulate the sums of the **Amount** column.

To get the correct CumulativeSum values in the **Balance** column, click the **Up/Down** button of the **Day** column to sort the fields in ascending order.

Result

Based on the ascending sort order of the **Day** column and the cumulative sum of the **Amount** column, the results will be:

Key	Day	Amount	Balance
E	1	$4.00	$4.00
B	2	$3.00	$7.00
D	3	-$5.00	$2.00
F	4	$1.50	$3.50
A	5	$2.00	$5.50
G	6	$5.00	$10.50
C	7	-$1.00	$9.50
I	8	-$2.00	$7.50
J	9	$4.00	$11.50
H	10	$1.00	$12.50

Computation details:

Day 1: $4.00

Day 2: $4.00.00 + $3.00 = $7.00

Day 3: $7.00 + -$5.00 = $2.00

Day 4: $2.00 + $1.50 = $3.50

Day 5: $3.50 + $2.00 = $5.50

Day 6: $5.50 + $5.00 = $10.50

Day 7: $10.50 + -$1.00 = $9.50

Day 8: $9.50 + -$2.00 = $7.50

Day 9: $7.50 + $4.00 = $11.50

Day 10: $11.50 + $1.00 = $12.50

Cumulative Sum By Max

The cumulative sum of the sum of the value across siblings ordered by the max of the weight column.

Sample

Given this table showing Key, Date, Value, Day, and RowPerDay fields.

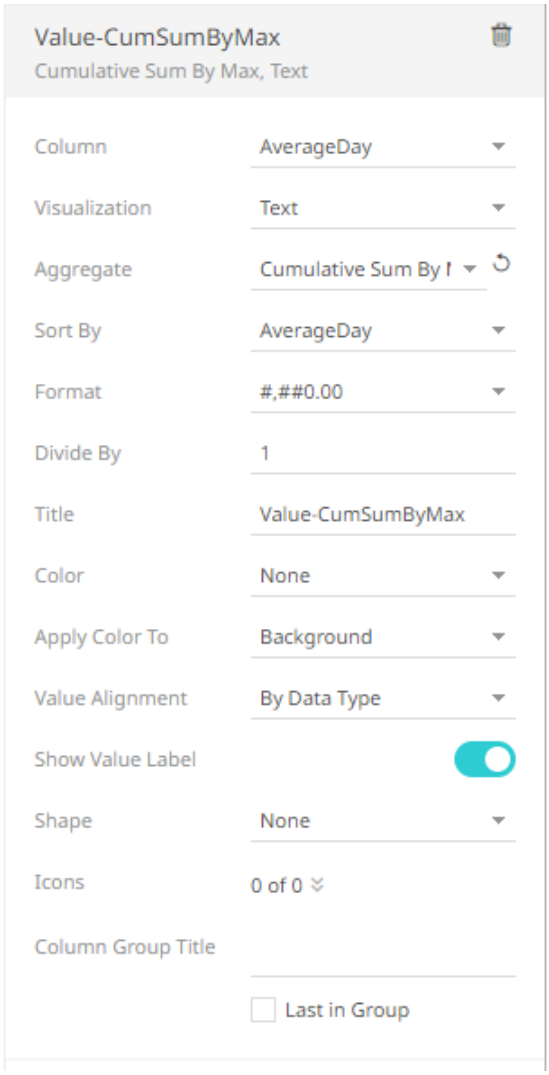
Key	Date	Value	Day	RowsPerDay
A	2018-01-01	1	1	3
B	2018-01-01	2	1	3
C	2018-01-01	4	1	3
D	2018-01-02	4	2	1
E	2018-01-03	5	3	4
F	2018-01-03	6	3	4
G	2018-01-03	7	3	4
H	2018-01-03	8	3	4

Provide a weight column that when summed gives the order of the nodes. For example, create a new calculated column based on this expression:

AverageDay = [Day]/[RowsPerDay]

Make **Value-CumSumByMax** as the new aggregate column (CumulativeSumByMax) based on **Value** as the source column and AverageDay as the weight column.

The Date – Day column serves as the breakdown.



Result

The nodes are sorted on the max of the weight column, and then the sum of the value column is accumulated across.

Date - Day	AverageDay	Day	RowsPerDay	Value	Value-CumSumByMax
1	0.33	3	9	7.00	7.00
2	2.00	2	1	4.00	37.00
3	0.75	12	16	26.00	33.00

Computation details:

Day 1: 7.00

Day 2: 7.00 + 4.00 + 26.00 = 37.00

Day 3: 7.00 + 26.00 = 33.00

Do Not Aggregate

Returns the value of a single row, otherwise null.

This method can be used to display a source table.

Below is a source table showing two fields Number and Arbitrary, with Aggregation set to DoNotAggregate and grouped by the Row field. This means Row is also the Breakdown field.

Row	Number	Arbitrary
A	1	3
B	2	2
C	3	1
D	4	0
E	5	-1
F	6	-2
G	7	-3
H	8	0
I	9	0
J	10	0

Sample table

If there are multiple items or rows without any grouping, then the value of the method is just n/a.

Harmonic Mean

The harmonic mean gives equal weight to each data point, meaning that extreme outlier values will not impact the Harmonic Mean as much as it would an Arithmetic Mean.

Typically, it is appropriate for situations when the average of rates is desired. The Harmonic mean H of the positive real numbers x1, x2, ..., xn > 0 is defined to be:

$$H = \frac{n}{\frac{1}{x_1} + \frac{1}{x_2} + \cdots + \frac{1}{x_n}} = \frac{n}{\sum_{i=1}^{n} \frac{1}{x_i}} = \frac{n \cdot \prod_{j=1}^{n} x_j}{\sum_{i=1}^{n} \frac{\prod_{j=1}^{n} x_j}{x_i}}.$$

Sample 1:

As a simple example, the Harmonic mean of 1, 2, and 4 is

$$\frac{3}{\frac{1}{1}+\frac{1}{2}+\frac{1}{4}} = \frac{1}{\frac{1}{3}\left(\frac{1}{1}+\frac{1}{2}+\frac{1}{4}\right)} = \frac{12}{7}.$$ or 1.7143

Sample 2:

Another example based on the number of hours worked per week:

The table shows the average working hours per week per employee (a rate). Each employee was only required to work 2000 hours but their working hours differs per week:

Employee	Total Hours Worked	Average Working Hours Per Week	Work Weeks
Joy	2000	50	40
Thomas	2000	45	44.4444
Erick	2000	35	57.142857
John	2000	40	50

Employee working hours per week

The total number of working hours by all four employees is 8000 hours. The total number of work weeks is 191.59 weeks. The calculation to compute for the Harmonic mean is:

4/(1/50 + 1/45 + 1/35 + 1/40) = 41.7564 hours

A simple check of dividing 8000 hours by 41.76 will equal 191.59 which is the total number of weeks the employees worked.

Intercept

The intercept of the least-squares line.

The formula:

$$\text{Intercept} = [\sum(x^2)\sum(y) - \sum(x)\sum(xy)] / [n\sum(x^2) - \sum(x)^2]$$

Sample 1:

Given the set of **X** and **Y** values where **X** and **Y** can represent any correlated values below:

X	Y
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	16
9	18
10	20

Sample table of correlated values

Steps:

1. Solve the parts of the formula.

   Intercept = [∑(x²)∑(y) - ∑(x)∑(xy)]/[n∑(x²) - ∑(x)²]

   `n` =count of items, equal to 10

   `∑(x²)` = get the square of all x items and sum up the values. To square a number also means to multiply the number by itself.

   1x1 + 2x2 + 3x3 + 4x4 + 5x5 + 6x6 + 7x7 + 8x8 + 9x9 + 10x10 = 385

   `∑(y)` = sum of y items = 110

   `∑(x)` = sum of x items = 55

   `∑(xy)` = multiply all x and y items and get the sum = 770

   1x2 + 2x4 + 3x6 + 4x8 + 5x10 + 6x12 + 7x14 + 8x16 + 9x18 + 10x20 = 770

   `∑(x)²` = get the sum of all items in x and get the square = 55 * 55 or 3025

2. Substitute the known values in the formula and compute for the intercept:

   Intercept = [385(110) – 55(770)/[10(385) - 3025]

   Intercept = [42350 – 42350]/[3850 – 3025]

   Intercept = `[0]/825]`

   Intercept = `0`

Level

Returns the level in the hierarchy for the node or numbered from the leaf.

Given this data table:

Industry	Supersector	Symbol	3 Month Change %
Financials	Banks	ERST.VI	-0.21
Basic Materials	Basic Resources	VOES.VI	-0.35
Industrials	Construction & Materials	WBSV.VI	-0.50
Health Care	Health Care	ICEL.VI	0.06
Industrials	Industrial Goods & Services	ANDR.VI	0.28
Financials	Insurance	VIGR.VI	-0.10
Oil & Gas	Oil & Gas	OMVV.VI	0.35
Telecommunications	Telecommunications	TELA.VI	0.11
Utilities	Utilities	VERB.VI	-0.12
Financials	Real Estate	ATRV.VI	-0.12
Financials	Banks	BEN.AX	-0.26
Financials	Banks	SUN.AX	-0.28
Financials	Banks	NAB.AX	-0.04

Financials	Banks	ANZ.AX	-0.11
Financials	Banks	CBA.AX	0.03
Basic Materials	Basic Resources	BSL.AX	0.15

Sample 1

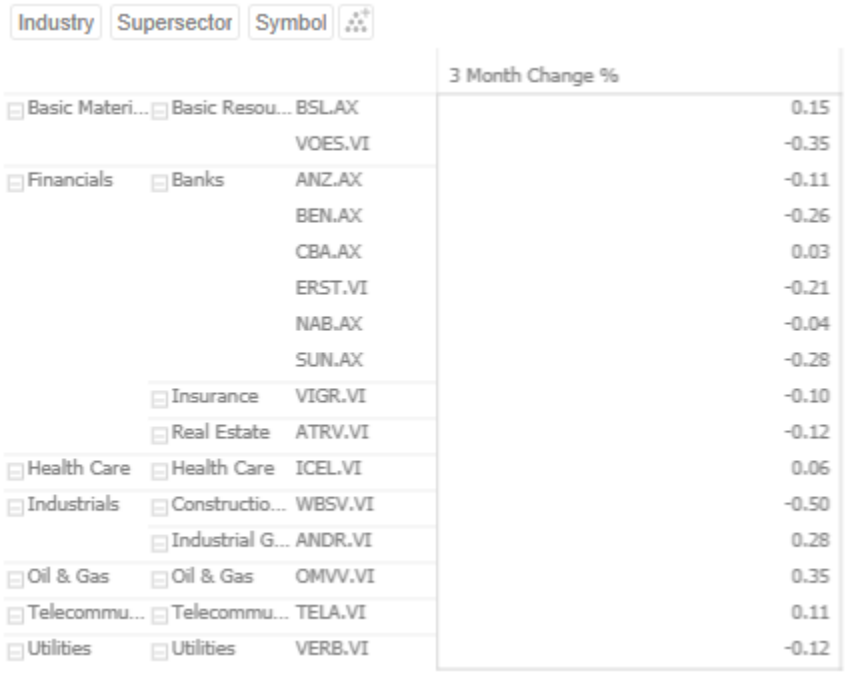
Below is the defined breakdown in a Table visualization:



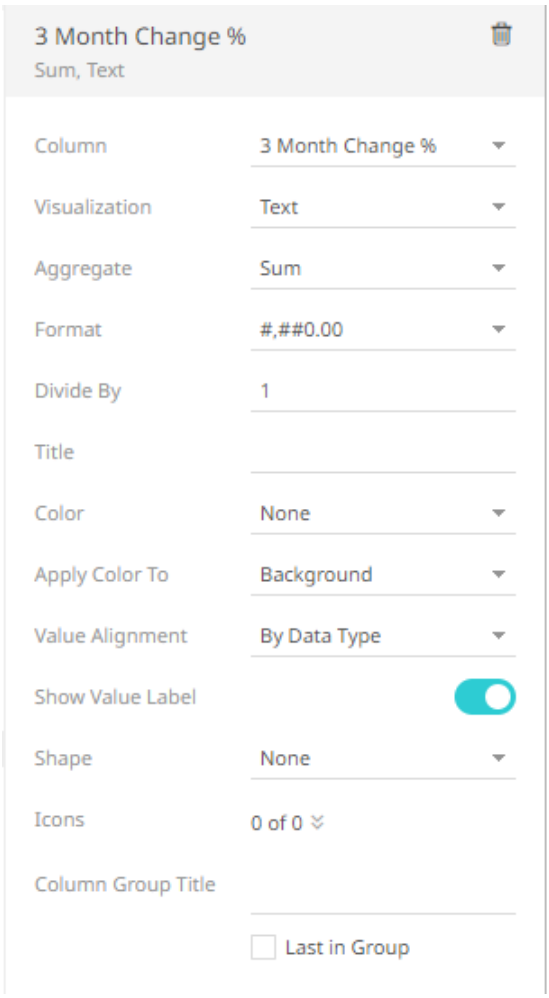
The Levels will be:

Column	Level
Symbol	0
Supersector	1
Industry	2
Root	3

This Table visualization is showing the grouping of the columns based on the breakdown hierarchy with *3 Month Change %*'s aggregate set to **Sum**.



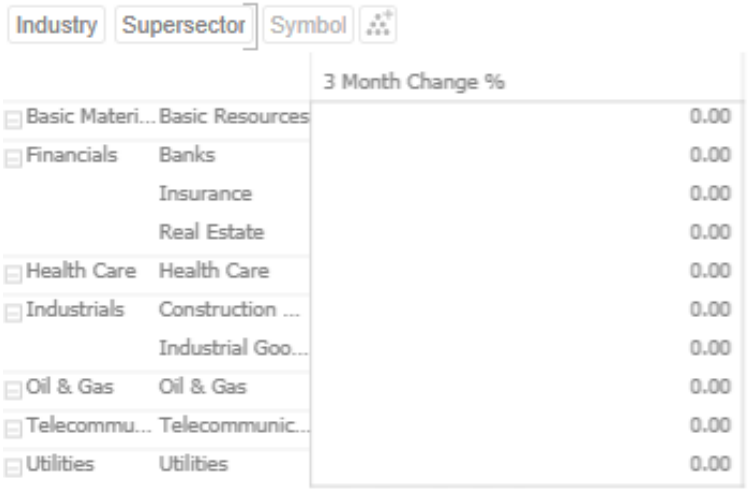
Changing the aggregate to **Level** and the format to **#,##0.00** will produce this table since the *Visible Depth* is set until Symbol:


3 Month Change %
Sum, Text
Column
3 Month Change %
Visualization
Text
Aggregate
Sum
Format
#,##0.00
Divide By
1
Title
Color
None
Apply Color To
Background
Value Alignment
By Data Type
Show Value Label
Shape
None
Icons
0 of 0
Column Group Title
Last in Group



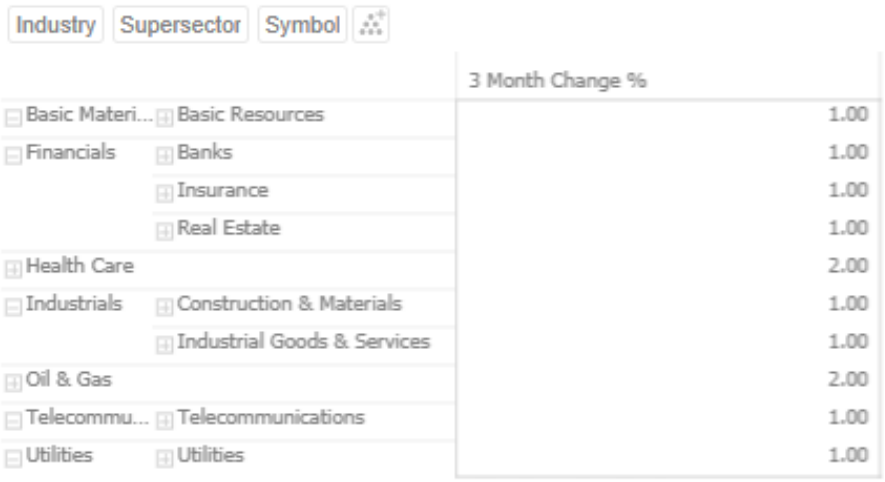
Sample 2

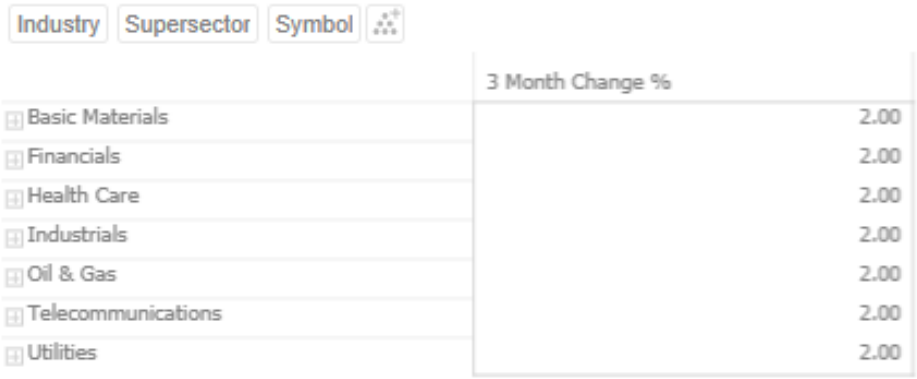
Clicking on **Supersector** will make the **Symbol** breakdown column invisible:



Sample 3

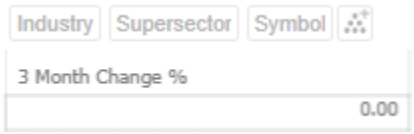
Collapsing columns in the table can also change the Level values:





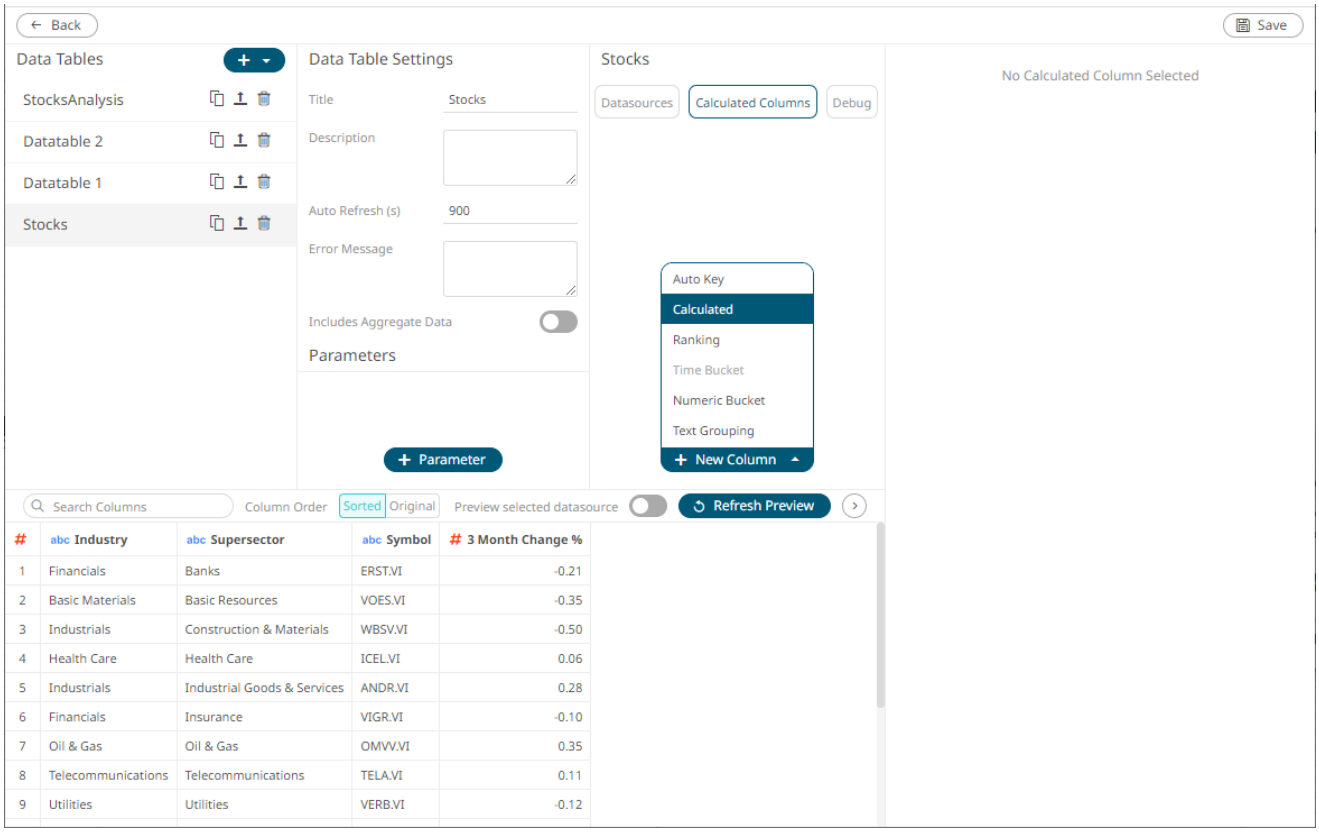
Sample 4

Clicking to the Root in the breakdown hierarchy:

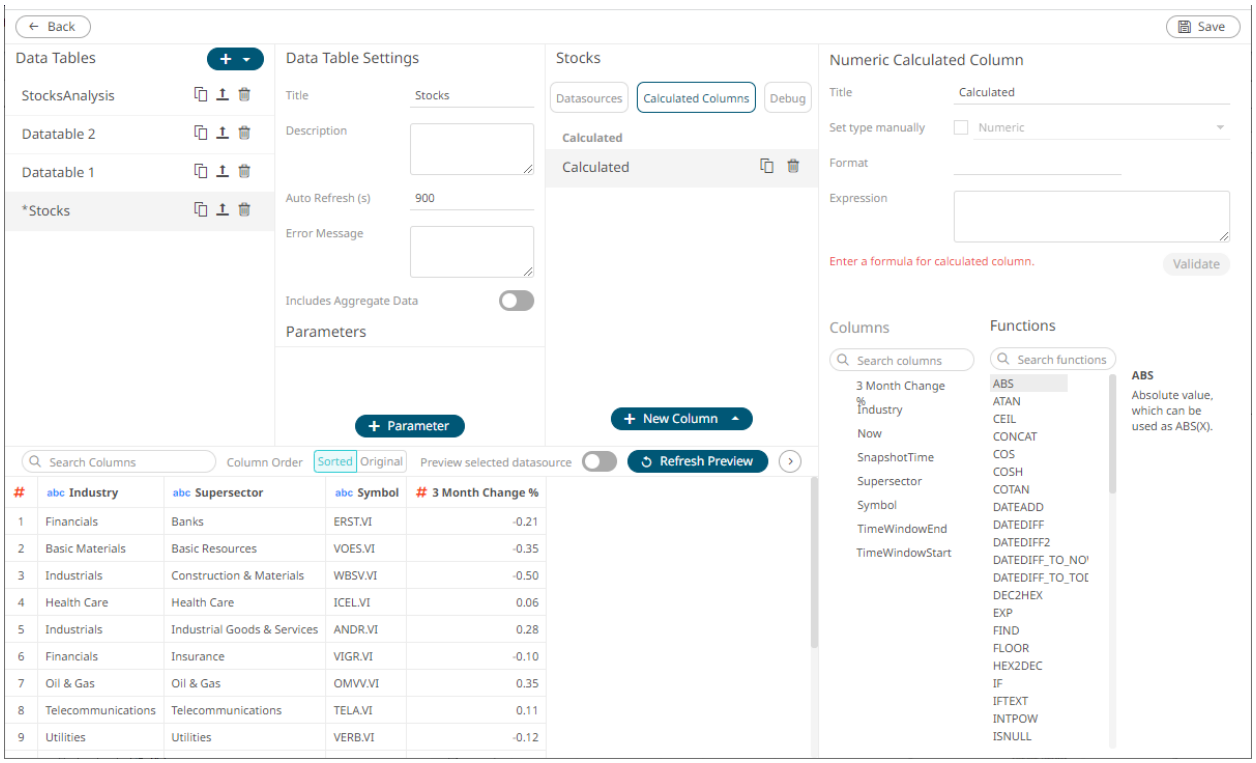


The Level aggregate can also be used when creating calculated columns.

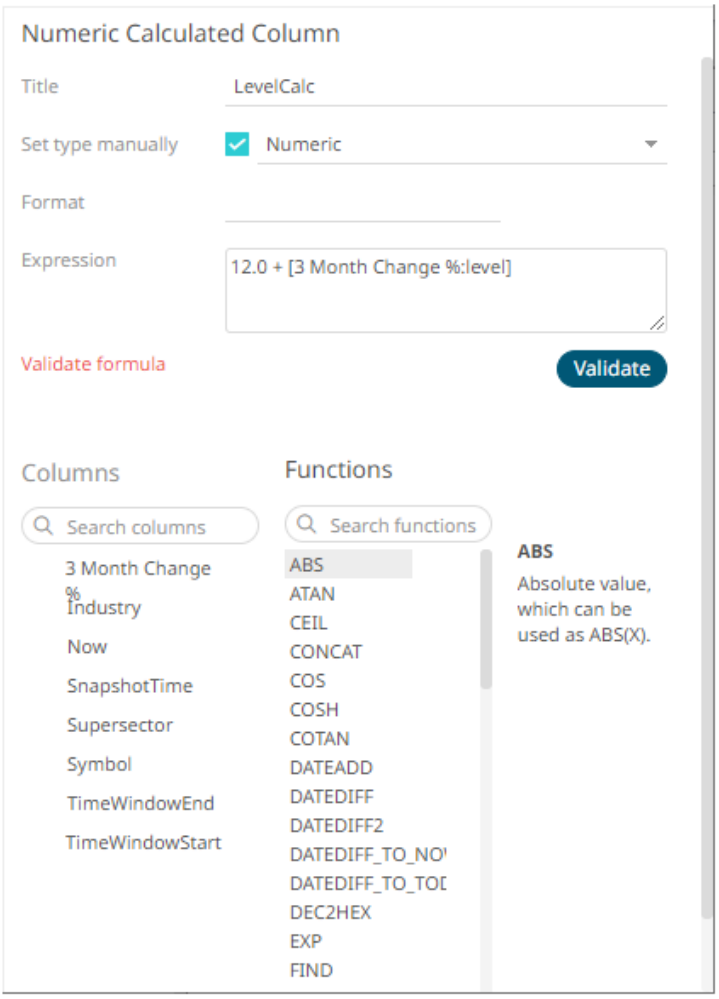
1. On the *Data Table Editor* layout page, click **Calculated Columns** and select **Calculated**.



The *Numeric Calculated Column* pane displays.



2. Build the expression with the *Level* aggregate.



For example: **12.0 + [3 Month Change %:level]**

When all of the levels are visible in the breakdown (Sample 1), the results will be:

Industry	Supersector	Symbol	3 Month Change %	LevelCalc
Basic Materials	Basic Resources	BSL.AX	0	12.0
		VOES.VI	0	12.0
Financials	Banks	ANZ.AX	0	12.0
		BEN.AX	0	12.0
		CBA.AX	0	12.0
		ERST.VI	0	12.0
		NAB.AX	0	12.0
		SUN.AX	0	12.0
	Insurance	VIGR.VI	0	12.0
	Real Estate	ATRV.VI	0	12.0
Health Care	Health Care	ICEL.VI	0	12.0

Industrials	Construction & Materials	WBSV.VI	0	12.0
	Industrial Goods & Services	ANDR.VI	0	12.0
Oil & Gas	Oil & Gas	OMVV.VI	0	12.0
Telecommunications	Telecommunications	TELA.VI	0	12.0
Utilities	Utilities	VERB.VI	0	12.0

Collapsing columns in the table (similar with Sample 3 above) will result to:



Max

The maximum value from the selection.

Returns the maximum value in a given set of numbers.

Sample 1

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08

9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The maximum value for each field in the table:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
10	3	-1	9	1	1	10,000.00	9.09

The results per field.

Mean

The mean of the selection.

Returns the average of a given set of numbers.

The mean is the sum of all the values in a set of numbers, divided by the number of values.

Sample 1:

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

Steps:

1. Compute the sum of the values.

   3 + 2 + 1 + 0 + -1 + -2 + -3 + 0 + 0 = 0
2. Divide it by the number of values.

   0/10 = 0

Sample 2

Assuming that the same list of numbers has multiple groupings or breakdowns as shown below:

Grouping	Arbitrary
1	3
1	2
1	1
1	0
2	-1
2	-2
2	-3
3	0
3	0
3	0

Groupings of numbers

Computing for the mean of the Arbitrary field based on the Grouping field will result in the table below:

Grouping	Arbitrary
1	2
2	-2
3	0

The resulting table

Computation details:

Group 1: 3 + 2 + 1 + 0 = 6/4 = 1.5

Group 2: -1 + -2 + -3 = -6/3 = -2

Group 3: 0 + 0 + 0 = 0/3 = 0

Sample 3

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06

7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

Mean Results:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
6	0	-6	5	1	0	1000.00	4.55

The results per field.

Min

The minimum value from the selection.

Returns the minimum value in a given set of numbers.

Sample 1

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The minimum value for each field in the table:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	-3	-10	0	1	0	$0.00	0.00

The results per field.

Neg

The sum of the negative values in the selection. If a value is positive or zero, the value n/a is returned.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

Steps:

1. Select which values are negative.

Arbitrary
n/a
n/a
n/a
n/a
-1
-2
-3
n/a
n/a
n/a

Negative numbers in the list

2. Add the negative values -1 + -2 + -3 = -6.

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Neg value for each field in the table:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
n/a	-6	-55	n/a	n/a	n/a	$-1,111.00	n/a

The results per field.

Percentile

The selected percentile.

Percentile (v_P) is the value of the *P*-th percentile of an ascending ordered data set containing *N* elements with values $v_1 \leq v_2 \leq \ldots \leq v_N$.

There are two steps to compute for Percentile.

Steps:

1. Calculate the rank:

$$n = \frac{P}{100}(N - 1) + 1$$

   The rank is then split into its integer component *k* and decimal component *d*, such that $n = k + d$.

2. Use the formula below to calculate v_P as:

$$v_P = \begin{cases} v_1, & \text{for } k = 0 \\ v_N, & \text{for } k = N \\ v_k + d(v_{k+1} - v_k), & \text{for } 0 < k < N \end{cases}$$

Sample 1

Consider the ordered list of values 15, 20, 35, 40, 50. What is the 40th percentile of this list?

Steps:

1. Calculate the rank of the 40th percentile as follows.

   $$n = \frac{40}{100}(5 - 1) + 1 = 2.6$$

   Thus, n=2.6, which gives us k=2 and d=0.6.

2. Calculate the value of the 40th percentile.

   $$v_k + d(v_{k+1} - v_k) = v_2 + 0.6(v_3 - v_2) = 20 + 0.6(35 - 20) = 29$$

   Thus, the value of the 40th percentile of the ordered list 15, 20, 35, 40, 50 is 29.

Sample 2

Consider the ordered list 1,2,3,4. What is the 75th percentile of this list?

Steps:

1. Calculate the rank of the 75th percentile as follows.

   N = 75/100(4-1) + 1 = 3.25

   Thus, n=3.25, which gives us k=3 and d=0.25.

2. Calculate the value of the 75th percentile.

   $$v_k + d(v_{k+1} - v_k) = v_3 + 0.25(v_4 - v_3) = 3 + 0.25(4 - 3) = 3.25$$

   Thus, the value of the 75th percentile of the ordered list 1,2,3,4 is 3.25.

Sample 3

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07

8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The 50th Percentile value for each field in the table:

5.50	0.00	-5.50	4.50	1.00	0.00	0.50	4.55
5.50	0.00	-5.50	4.50	1.00	0.00	0.50	4.55

The results per field.

Percent of Parent

For each member item (child node) of a breakdown group (parent node), the percentage share of its value in relation to the parent group value, where the parent group value is calculated as the sum of all group member (child node) values:

[single child node value] / [sum of all child node values in the group]

The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.

Sample

Group (Parent)	Member (Child)	Values	*Group Sum*	Percent of Parent
G1	A	20	*100*	0.20
G1	B	30	*100*	0.30
G1	C	50	*100*	0.50
G2	D	1.5	*5*	0.30
G2	E	1.5	*5*	0.30
G2	F	2	*5*	0.40
G3	G	7	*20*	0.35
G3	H	9	*20*	0.45
G3	I	4	*20*	0.20

Percent of Total

For each group and for each group member at all levels of the breakdown hierarchy, the percentage share of its value in relation to the total data set value, where the total is calculated as the sum across all rows in the dataset. This aggregate is similar to Percent of Parent, with the difference that the denominator or reference is ALWAYS based on the complete dataset:

[single node value] / [sum of all rows in the dataset]

The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.

Sample 1

Group (Parent)	Member (Child)	Value	*Total Sum*	Percent of Total
G1	A	20	*125*	0.16
G1	B	30	*125*	0.24
G1	C	50	*125*	0.40
G2	D	1.5	*125*	0.012
G2	E	1.5	*125*	0.012
G2	F	2	*125*	0.016
G3	G	7	*125*	0.056
G3	H	9	*125*	0.072
G3	I	4	*125*	0.032

Sample 1 Aggregated to Group Level

Group (Parent)		Group Value	*Total Sum*	Percent of Total
G1		100	*125*	0.80
G2		5	*125*	0.04
G3		20	*125*	0.16

Percent of Total Change

This aggregate should be understood as “Change in (Percent of Total)”, not as “Percent of (Total Change)”. It is the result of calculating Percent of Total on two different columns, and then calculating the difference between them. The result is presented as the difference in *percentage units*, n.b.

This aggregate is typically used for comparing Percent of Total based on current values, to Percent of Total based on previous values. Therefore, the column specified as “Previous Values Column” in the settings, should be the column containing previous values.

The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings. Optionally, you can emphasize that the value is a percentage units by customizing the format unit, for example: 0.00%'-units'.

Sample

ID	Current value	Previous value	Total of current	Total of previous	Percent of Total (current)	Percent of Total (previous)	Percent of Total Change
A	25	25	100	125	0.25	0.20	+0.05
B	45	65	100	125	0.45	0.52	-0.07
C	30	35	100	125	0.30	0.28	+0.02

Percent of Parent Reference

This aggregate works like Percent of Parent, with the difference that a value from one column is compared to a parent level sum of values *from another column*, which is set as the "Reference column":

[single child node value from a column] / [sum of all child node values from the *reference column* in the group]

While Percent of Parent will always summarize to 100% at the group (parent) level, this is not the case with Percent of Parent Reference, which can summarize to any number, depending on the differences between the **Values** and the **Reference Values**.

The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.

Sample

Group (Parent)	Member (Child)	Value	Weight value	*Group Sum of Weight value*	Percent of Parent Reference
G1	A	10	20	*100*	0.10
G1	B	15	30	*100*	0.15
G1	C	25	50	*100*	0.25
G2	D	1	1.5	*5*	0.20
G2	E	3	1.5	*5*	0.60
G2	F	2	2	*5*	0.40
G3	G	14	7	*20*	0.70
G3	H	18	9	*20*	0.90
G3	I	8	4	*20*	0.40

Percent of Total Reference

This aggregate works like Percent of Total, with the difference that a value from one column is compared to a total data set level sum of values *from another column*, which is set as the "Reference column":

[single node value from a column] / [sum of all rows from the *reference column* in the dataset]

While Percent of Total will always summarize to 100% across the whole data set, this is not the case with Percent of Total Reference, which can summarize to any number, depending on the differences between the **Values** and the **Reference Values**.

The aggregate value is calculated as a ratio between 0 and 1 and will be presented as a percentage value by applying a percent format string in the aggregation settings.

Sample 1

Group (Parent)	Member (Child)	Value	Weight value	*Total Sum of Weight value*	Percent of Total Reference
G1	A	10	20	*125*	0.08
G1	B	15	30	*125*	0.12
G1	C	25	50	*125*	0.20
G2	D	1	1.5	*125*	0.008
G2	E	3	1.5	*125*	0.024
G2	F	2	2	*125*	0.016
G3	G	14	7	*125*	0.112
G3	H	18	9	*125*	0.144
G3	I	8	4	*125*	0.064

Sample 1 Aggregated to Group Level

Group (Parent)	Member (Child)	Value	Weight value	*Total Sum of Weight value*	Percent of Total Reference
G1		50	100	*125*	0.40
G2		6	5	*125*	0.048
G3		40	20	*125*	0.32

Pos

The sum of the positive values in the selection. If a value is negative or zero, the value n/a is returned.

Sample 1:

Given a list of arbitrary numbers:

Arbitrary
3
2
1
0
-1
-2
-3
0
0
0

A list of positive and negative numbers

Steps:

1. Select which values are positive.

Arbitrary
3
2
1
n/a
n/a
n/a
n/a
n/a
n/a
n/a

Negative numbers in the list

2. Add the values 3 + 2 + 1 = 6

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Pos value for each field in the table:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
55	6	n/a	45	1	3	$11,111.00	45.45

The results per field.

Product

The product of the selection. Returns the result of multiplying the items in a set of numbers.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
1
2
3
4
5
6
7
8
9
10

A list of numbers

The Product of the table above is 1 x 2 x 3 x 4 x 5 x 6 x 7 x 8 x 9 x 10 = 3,628,800

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Product for each field:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
3,628,800	0	3,628,800	0	1	0	$0.00	0

The results per field.

Ratio of Sums

The comparison between the sum of a selected measure divided by the sum of the selected reference measure.

The formula:

```
Ratio of Sums = sum(selected measure) / sum(selected reference measure)
```

Sample

Given the sample data:

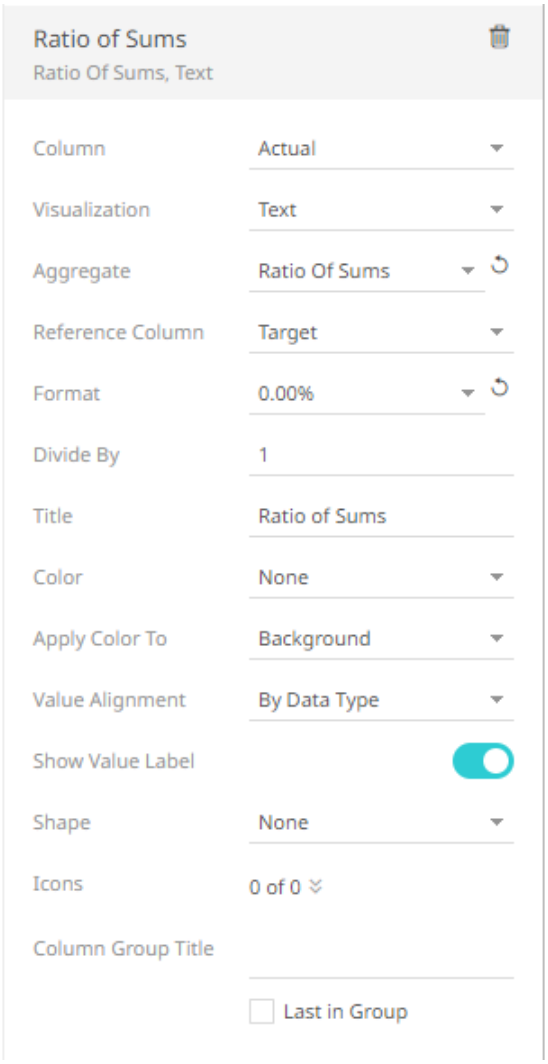
Region	Store	Actual	Target
North	A	$1,300	$2,000
North	B	$750	$1,000
North	C	$2,100	$3,000
South	D	$4,700	$4,000
South	E	$2,000	$2,000

Sample fields

Creating a Table visualization with Breakdowns **Region** and **Store** with subtotals and grand totals produces:

Region	Store	Actual	Target
North	A	$1,300	$2,000
	B	$750	$1,000
	C	$2,100	$3,000
North Total		$4,150	$6,000
South	D	$4,700	$4,000
	E	$2,000	$2,000
South Total		$6,700	$6,000
Grand Total		$10,850	$12,000

Setting the *Column* to **Actual** and the *Reference Column* to **Target** with the format set to **0.00%** results to the following Ratio of Sums values:



Region	Store	Actual	Target	Ratio of Sums
North	A	$1,300	$2,000	65.00%
	B	$750	$1,000	75.00%
	C	$2,100	$3,000	70.00%
North Total		$4,150	$6,000	69.17%
South	D	$4,700	$4,000	117.50%
	E	$2,000	$2,000	100.00%
South Total		$6,700	$6,000	111.67%
Grand Total		$10,850	$12,000	90.42%

The results per row

Computation details:

North A: $1,300 / $2,000 = 65.00%

North B: $750 / $1,000 = 75.00%

North C: $2,100 / $3,000 = 70.00%

North Total: $4,150 / $6,000 = 69.17%

South D: $4,700 / $4,000 = 117.50%

South E: $2,000 / $2,000 = 100.00%

South Total: $6,700 / $6,000 = 111.67%

Grand Total: $10,850 / $12,000 = 90.42%

Collapsing the *North* region results to the following *Ratio of Sums* values:

Region	Store	Actual	Target	Ratio of Sums
North Total		$4,150	$6,000	69.17%
South	D	$4,700	$4,000	117.50%
	E	$2,000	$2,000	100.00%
South Total		$6,700	$6,000	111.67%
Grand Total		$10,850	$12,000	90.42%

The results per row

The rest of the computation details are the same except for the collapsed North region:

North = ($1,300 + $750 + $2,100) / ($2,000 + $1,000 + $3,000) = 69.17%

Or

North = $4,150 / $6,000 = 69.17%

Collapsing the South region results to the following Ratio values:

Region	Actual	Target	Ratio of Sums
North	$4,150	$6,000	69.17%
South	$6,700	$6,000	111.67%
Grand Total	$10,850	$12,000	90.42%

The results per row

The computation details for the collapsed South region:

South = ($4,700 + $2,000) / ($4,000 + $2,000) = 111.67%

Or

South = $6,700 / $6,000 = 111.67%

Sibling Rank

The numeric rank of siblings within a hierarchy branch.

Returns the rank of a number in a list of numbers. The rank of a number is its size relative to other values in a list. If you were to sort the list, the rank of the number would be its position.

Sample 1:

Given a list of numbers, find each number's Sibling Rank:

Number
1
2
3
4
5
6
7
8
9
10

List of numbers.

Steps:

1. Sort the numbers in descending order.

Number
10
9
8
7
6
5
4
3
2
1

Sorted numbers in descending order.

2. The highest number automatically gets the first position with the sibling rank = 1
3. Assign the position as the value of the Sibling Rank

   The second highest number equal to 9 gets the second position or sibling rank = 2

   The third highest number equal to 8 gets the third position or sibling rank = 3

   Repeat this process until there is only one item left.
4. The lowest number automatically gets the last position equal to the number of items or Sibling Rank = 10.

Sample 2:

Given a set of numbers V to Z, the Sibling Ranks are as shown below:

V	W	X	Y	Z	Sibling Rank V	Sibling Rank W	Sibling Rank X	Sibling Rank Y	Sibling Rank Z
1	1	1	1	10	10	10	10	10	1
2	2	2	2	9	8	9	9	9	2
2	3	3	3	8	8	8	8	8	3
4	5	4	4	7	7	6	7	7	4
5	5	5	5	6	6	6	6	6	5
6	6	6	6	5	5	5	5	5	6
7	7	7	7	4	4	4	2	4	7
8	8	7	8	3	2	2	2	3	8
8	8	7	9	2	2	2	2	2	9
10	10	10	10	1	1	1	1	1	10

The first five fields from the left to the right are the sample fields, and the last five fields are the results.

In the case were duplicate items exists in the list. The duplicate items will have the same rank, and the rank will be the position of the first occurrence of the duplicated items. The position where the next duplicate entries fall will no longer be used as a rank and will be skipped.

In the above example, column V has duplicate entries for the numbers 8 and 2. The resulting column Sibling Rank V shows item 8 has a sibling rank of 2, and position 3 was skipped as a rank. Item 2 has a rank of 8, and position 9 was also skipped as a rank.

Slope

The slope of the least-squares line.

The formula:

$$\text{Slope} = [n\sum(xy) - \sum(x)\sum(y)] / [n\sum(x^2) - \sum(x)^2]$$

Sample 1

Given the set of **X** and **Y** values where **X** and **Y** can represent any correlated values below:

V	W
1	2
2	4
3	6
4	8
5	10
6	12
7	14
8	16
9	18
10	20

Sample table

Steps:

1. Solve the parts of the formula:

   Slope = ∑(xy) - ∑(x)∑(y)]/[n∑(x²) - ∑(x)²

   `n` =count of items, equal to 10

   `∑(xy)` = multiply all x and y items and get the sum = 770

   1x2 + 2x4 + 3x6 + 4x8 + 5x10 + 6x12 + 7x14 + 8x16 + 9x18 + 10x20 = 770

   `∑(x)` = sum of x items = 55

   `∑(y)` = sum of y items = 110

   `∑(x²)` = get the square of all x items and sum up the values. To square a number also means to multiply the number by itself.

   1x1 + 2x2 + 3x3 + 4x4 + 5x5 + 6x6 + 7x7 + 8x8 + 9x9 + 10x10 = 385

   `∑(x)²` = get the sum of all items in x and get the square = 55 * 55 or 3025

2. Substitute the known values in the formula and computed for the Slope:

   Slope = [n∑(xy) - ∑(x)∑(y)]/[n∑(x²) - ∑(x)²]

   Slope = [10(770) – 55(110)]/[10(385) – 3025]

   Slope = [7700 – 6050]/3850-3025]

   Slope = `1650/825`

   Slope = `2`

Stdev

The Standard Deviation of the selection.

The Standard Deviation is a measure of how spread out numbers are in a set. The deviation just means how far from the normal.

Stdev is used when the group of numbers being evaluated is only a partial sampling of the whole population.

The formula:

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}$$

Where $\overline{x}$ is the mean computed by getting the sum of all the items and dividing them by the number of items minus one.

Sample 1

Given a set of numbers like 12, 6, 12.

Steps:

1. Compute the mean of the sample.

   Mean = (Sum of items/n), where n is the number of items

   12+6+12/3=10

2. Square the difference between each point and the mean

(12-10)^2 =4

(6-10)^2 =16

(12-10)^2 =4

3. Calculate the average of the results in step 2 above

   4+16+4/3-1=24/2

4. Compute the square root of the result in step 4.

   √12 or 3.4641

Sample 2:

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Stdev for each field:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
3.0277	1.7638	3.0277	3.0277	0	.5345	$3,197.5720	3.0579

The results per field.

Stdevp

The Population Standard Deviation of the selection.

The Stdevp deals with the complete population where as Stdev deals with a population sample only.

The formula:

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}$$

Sample 1:

Population: A set of data that is all inclusive.

Populations are often very large. For simplicity, imagine the following as an example:

12,6,12

Compute the Stdevp:

Steps:

1. Determine the mean of the sample

   12+6+12/3=10
2. Square the difference between each item and the mean

   (12-10)^2 =4

   (6-10)^2 =16

   (12-10)^2 =4
3. Calculate the average

   4+16+4/3=24/3
4. Calculate the square root

   √8 or 2.8284

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03
4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08

9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Stdevp for each field:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
2.8723	1.6733	2.8723	2.8723	0	0.4949	$3,033.4832	2.9010

The results per field.

Sum

The sum or total of the selection.

Computed by adding all the items in a set of numbers.

Sample 1

Given a list of arbitrary numbers:

Arbitrary
1
2
3
4
5
6
7
8
9
10

A list of numbers

The Sum of the table above is 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55

Sample 2

Given the following sample fields:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
1	3	-1	1	1	0	$1.00	1.01
2	2	-2	2		1	$10.00	2.02
3	1	-3	3		0	$100.00	3.03

4	0	-4	4		1	$1,000.00	4.04
5	-1	-5	5		0	$10,000.00	5.05
6	-2	-6	6		1	-$1.00	6.06
7	-3	-7	7		0	-$10.00	7.07
8	0	-8	8			-$100.00	8.08
9	0	-9	9			-$1,000.00	9.09
10	0	-10	0			$0.00	0.00

Sample fields.

The Product for each field:

Number	Arbitrary	Negative Values	Positive Values	One	Binary	Currency	Decimal
3,628,800	0	3,628,800	0	1	0	$0.00	0

The results per field.

Unique

The Unique aggregation is used with numeric values and will display a number in case all the values in a group are the same , otherwise it will show empty/null. This aggregation can be used as an indicator of a logical test: “if the numeric values in this group and in any subgroups are identical, then show the numeric value, or else show nothing”.

Sample 1

Group1	Group2	same_value_all	same_value_in_group	mixed_value
root	a	7	3	2
root	a	7	3	1
root	a	7	3	4
root	b	7	6	5
root	b	7	6	4
root	b	7	6	7

The Unique for each field with Group1 as breakdown item:

Group1	Group2	same_value_all	same_value_in_group	mixed_value
		7		

The Unique for each field with Group1 and Group2 as breakdown items:

Group1	Group2	same_value_all	same_value_in_group	mixed_value
		7	3	
		7	6	

Text Unique and Text Concat Distinct

The Text Unique aggregates text fields to distinct values while Text Concat Distinct aggregates text fields to display all possible text values in a comma delimited list.

Given this data table:

Country	Industry	Company	1 Day Change % (USD)	Mcap(USD)
AT	Financials	Erste Group Bank AG	-0.07	3439883100
AT	Financials	Raiffeisen International Bank-Holding AG	-0.07	1371987780
AT	Basic Materials	voestalpine AG	-0.03	1412883878
AT	Industrials	Wienerberger AG	-0.04	660942066
AU	Basic Materials	BHP Billiton Ltd.	-0.06	74380605994
AU	Basic Materials	Lihir Gold Ltd.	0.02	5377974426
AU	Basic Materials	Fortescue Metals Group Ltd.	-0.02	2104618718
BE	Financials	KBC Group N.V.	-0.05	2369136539
BE	Basic Materials	Solvay S.A.	0.04	4151907147
BE	Basic Materials	Umicore S.A.	-0.03	2078266946
CA	Consumer Goods	Magna International Inc. Cl A	-0.05	2981991456
CA	Financials	Canadian Imperial Bank of Commerce	-0.03	13960011146

The Country, Industry, and Company are text columns while 1 Day Change % (USD) and Mcap(USD) are numeric columns.

Sample 1

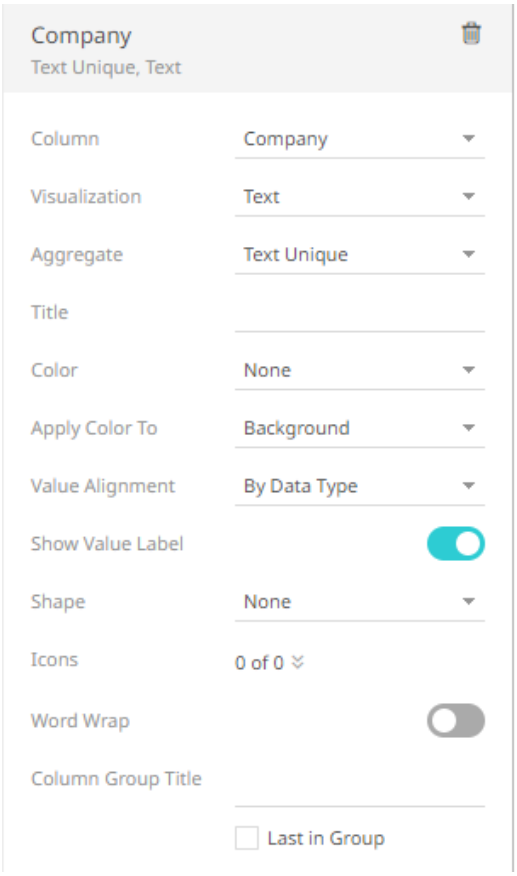
Below is the defined breakdown in a Table visualization:



This Table visualization is showing the grouping of the columns based on the breakdown hierarchy with Company, 1 Day Change % (USD), and Mcap(USD) as Visual Members and with the corresponding aggregates:

Column	Aggregate
Company	Text Unique
1 Day Change % (USD)	Sum
Mcap(USD)	Sum

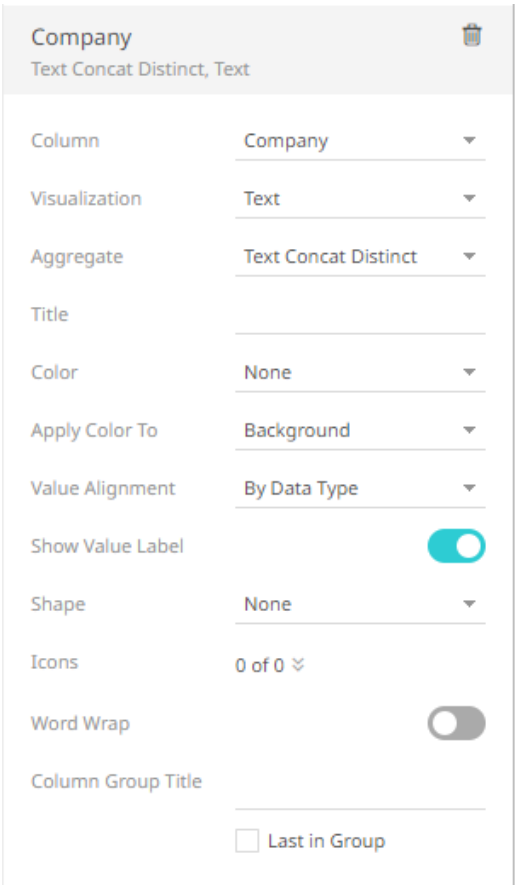
By default, the aggregate of Company is set to **Text Unique**.



The Table visualization now displays the distinct text values of a Company for the breakdown columns, Country and Industry.

		Company	1 Day Change % (USD)	Mcap(USD)
AT	Basic Materials	voestalpine AG	-0.03	1412883878
	Financials		-0.14	4811879880
	Industrials	Wienerberger AG	-0.04	660942066
AU	Basic Materials		-0.06	81863199138
BE	Basic Materials		0.02	6230174093
	Financials		-0.05	2369136539
CA	Consumer Goods	Magna International Inc. Cl A	-0.05	2981991456
	Financials	Canadian Imperial Bank of Commerce	-0.03	13960011146

If the aggregate for the Company column is changed to **Text Concat Distinct**, all of the text values for the corresponding breakdown columns are displayed in a comma delimited list:



		Company	1 Day Change % (USD)	Mcap(USD)
AT	Basic Materials	voestalpine AG	-0.03	1412883878
	Financials	Erste Group Bank AG, Raiffeisen International Bank-Holding AG	-0.14	4811879880
	Industrials	Wienerberger AG	-0.04	660942066
AU	Basic Materials	BHP Billiton Ltd., Lihir Gold Ltd., Fortescue Metals Group Ltd.	-0.06	81863199138
BE	Basic Materials	Solvay S.A., Umicore S.A.	0.02	6230174093
	Financials	KBC Group N.V.	-0.05	2369136539
CA	Consumer Goods	Magna International Inc. Cl A	-0.05	2981991456
	Financials	Canadian Imperial Bank of Commerce	-0.03	13960011146

You can opt to display a text column as a distinct count. Refer to Count Distinct for more information.

Weighted Harmonic Mean

The weighted harmonic mean of the selection based on a specified weighting column.

Weighted Harmonic Mean is calculated the same way as the Harmonic Mean. The Harmonic Mean is defined as a special case where all of the weights are equal to 1, and is equivalent to any weighted harmonic mean where all weights are equal.

The formula:

If a set of weights w_1, ..., w_n is associated to the dataset x_1, ..., x_n, the weighted harmonic mean is defined by $\frac{\sum_{i=1}^{n} w_i}{\sum_{i=1}^{n} \frac{w_i}{x_i}}$.

Sample 1:

As a simple example, the Weighted Harmonic Mean of 1, 2, and 4 given the weights 5, 6, 7 respectively is:

18/ (5/1 + 6/2 + 7/4) = 18/9.75 = 1.8462

Weighted Mean

The weighted mean of the selection based on a specified weighting column.

It is a mean where some values contribute more than others.

Weighted means can help with decisions where some considerations are more important than others.

The formula:

$$\text{Weighted Mean} = \frac{\Sigma wx}{\Sigma w}$$

In other words: multiply each weight w by its matching value x, sum that all up, and divide by the sum of weights.

Sample 1:

Sam wants to buy a new camera, and decides on the following rating system:

- Image Quality 50%
- Battery Life 30%
- Zoom Range 20%

Based on reviews the Cony camera gets 8 (out of 10) for Image Quality, 6 for Battery Life and 7 for Zoom Range

The Sanon camera gets 9 for Image Quality, 4 for Battery Life and 6 for Zoom Range

Which camera is best?

Cony: (50/100) × 8 + (30/100) × 6 + (20/100) × 7 = 4 + 1.8 + 1.4 = 7.2

Sanon: (50/100) × 9 + (30/100) × 4 + (20/100) × 6 = 4.5 + 1.2 + 1.2 = 6.9

Sam decides to buy the Cony.

Sample 2:

A Company sells Mango products with the following Revenue breakdown for the current year:

Products	Revenue
Mango Tarts	45,000
Mango Juice	297,000
Dried Mangoes	975,000
Total	1,317,000

The revenue values per product.

The Company posted an increase in revenue from the previous year with the following Percentage Change:

Products	Revenue Percentage Change
Mango Tarts	50%
Mango Juice	10%
Dried Mangoes	30%

Revenue percentage change values.

Compute for the all-over revenue change percent:

((50/100) x 45,000 + (10/100) x 297,000 + (30/100) x 975,000) / 1,317,000

or

(22,500 + 29,700 + 292,500) / 1,317,000 = .26 or 26%

Weighted Sample Standard Deviation and Weighted Sample Variance

The formula used for calculation of the weighted sample Standard Deviation (“Weighted Stdev”) and weighted sample Variance (“Weighted Variance”) is the following, defined by NIST.gov, National Institute of Standards and Technology:

$$s^2 = \frac{\sum_{i=1}^{N} w_i (x_i - \bar{x}^*)^2}{\frac{(M-1)}{M} \sum_{i=1}^{N} w_i},$$

Where:

N is the number of observations.

M is the number of nonzero weights.

w_i are the weights.

x_i are the observations.

$\bar{x}^*$ is the weighted mean.

Example with sample data:

Value	6	7	8	9	10	11	12	23
Weight	1	1	1	1	1	1	1	100

Mean	Weighted Mean	Sample Standard Deviation	Weighted sample Standard Deviation	Sample Variance	Weighted sample Variance
10.75	22.08	5.34	3.74	28.50	13.99

Weighted Population Standard Deviation and Weighted Population Variance

The formula used for *weighted population variance* is a straight extension of the *population variance*. The population variance fomula is:

var_p = sum($(x_i - \mu)^2$) / N, where μ = sum(x_i) / N

The weighted population variance formula is the above with some extension:

wvar_p = sum(w_i * (x_i - μ')^2) / sum(w_i), where μ' = sum(w_i * x_i) / sum(w_i)

Example with sample data:

Value	6	7	8	9	10	11	12	23
Weight	1	1	1	1	1	1	1	100

Mean	Weighted Mean	Population Standard Deviation	Weighted population Standard Deviation	Population Variance	Weighted population Variance
10.75	22.08	4.99	3.50	24.94	12.25

Weighted Sum

The sum of the product of the selected field and the weight field.

The Formula:

WeightedSum = ∑(x w) where x are the items and w are weights

Sample 1:

Given the weights .20, .15, .40 and .25 compute the weighted sum of the following numbers: 25, 20, 15, 30.

Computation:

WeightedSum = 25 x 0.20 + 20 x 0.15 + 15 x 0.40 + 30 x 0.25 = 21.50

Sample 2:

Alex wants to buy a new camera, and has the following preferences based on a scale of 1 to 10, and 10 being the highest:

- Image Quality: 8

- Battery Life: 8
- Zoom Range: 5

Based on reviews the Cony camera gets 7 (out of 10) for Image Quality, 5 for Battery Life and 6 for Zoom Range

The Sanon camera gets 6 for Image Quality, 5 for Battery Life and 7 for Zoom Range

Which camera is best?

Cony: 8 × 7 + 8 × 5 + 5 × 6 = 56 + 40 + 30 = 126

Sanon: 8 × 6 + 8 × 5 + 5 × 7 = 48 + 40 + 35 = 123

Alex decides to buy the Cony.

NOTE **Weighted columns such as Weighted Mean, Weighted Harmonic Mean, and Weighted Sum have the Weight drop-down list enabled.**

SNAPSHOT VISUALIZATION SETTINGS

Each visualization has specific settings controlling the display. For more information on what is the most appropriate visualization to use, refer to Panopticon Visualizations.

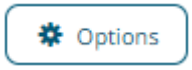
Bar Graph Settings

Bar Graphs are probably the best-known visualization for quantitative data.

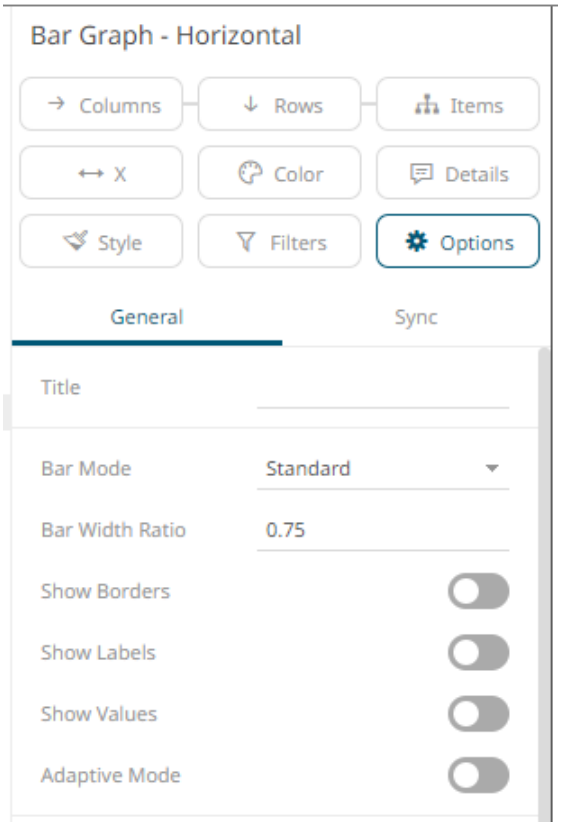
You can display Panopticon Bar Graphs either horizontally or vertically. These graphs are available in three variants:

- Standard
- Grouped
- Stacked

In each case, you can sort the layout of the bar graph according to your requirements, and, with hierarchical data, the graph represents the netted position at each aggregated depth level.

The bar graph settings pane is displayed after clicking the **Options** 

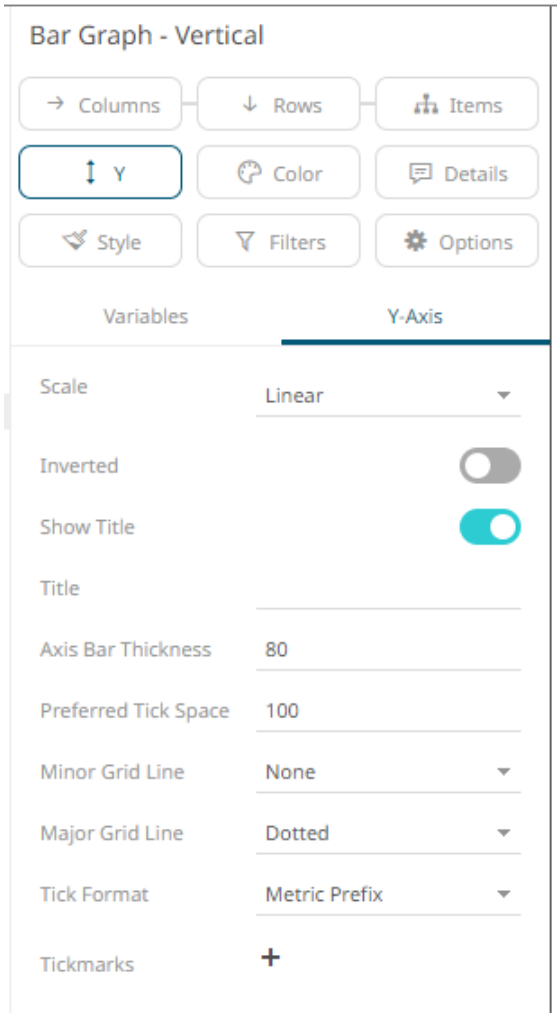
button.



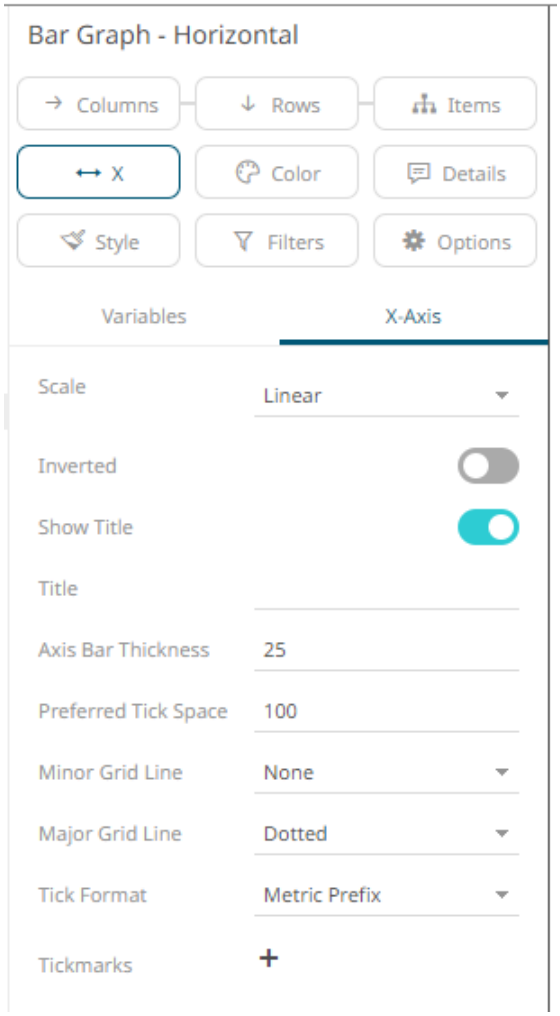
Setting	Description
Bar Mode	Specifies the mode of the bar graph, which can be **Standard**, **Stacked**, or **Grouped**.
Bar Width Ratio (%)	Defines the ratio of the width within the bars. Default is **.75**.
Show Borders	Determines whether borders are drawn around bars or stacks within bars.
Show Labels	Determines whether labels are drawn inside the bars or not.
Show Values	Determines whether values are displayed on each bar or not.
Adaptive Mode	Automatically swaps to the Standard mode when displaying the top items within a hierarchy.
Value Margin	The width of the margin of the Values from the border.

Other visualization-specific properties can be set by clicking on either:

- Y-Axis variable drop area then selecting the **Y-Axis** tab (for Vertical Bar Graphs) or



- X-Axis variable drop area then selecting the **X-Axis** tab (for Horizontal Bar Graphs)



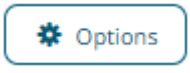
Box Plot Settings

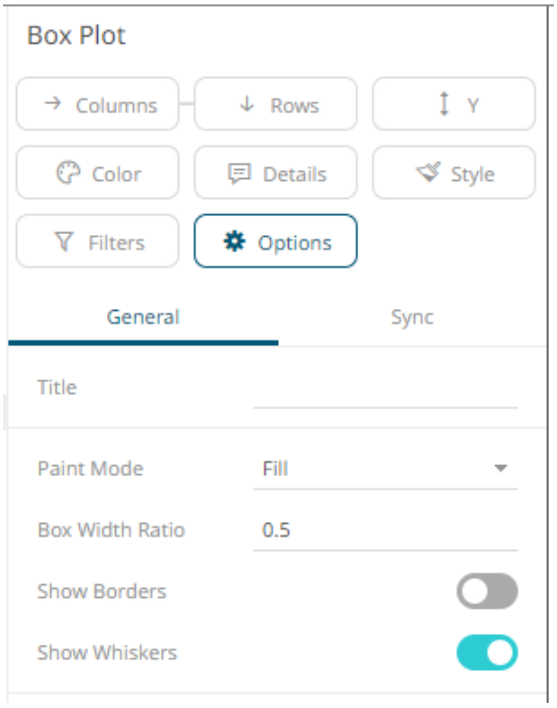
Box Plots are designed to display numeric distributions.

The plot draws the Minimum, 25th Percentile, Median, 75th Percentile, and Maximum of the specified measure by category.

This can be provided as a single measure, where Panopticon performs the aggregation.

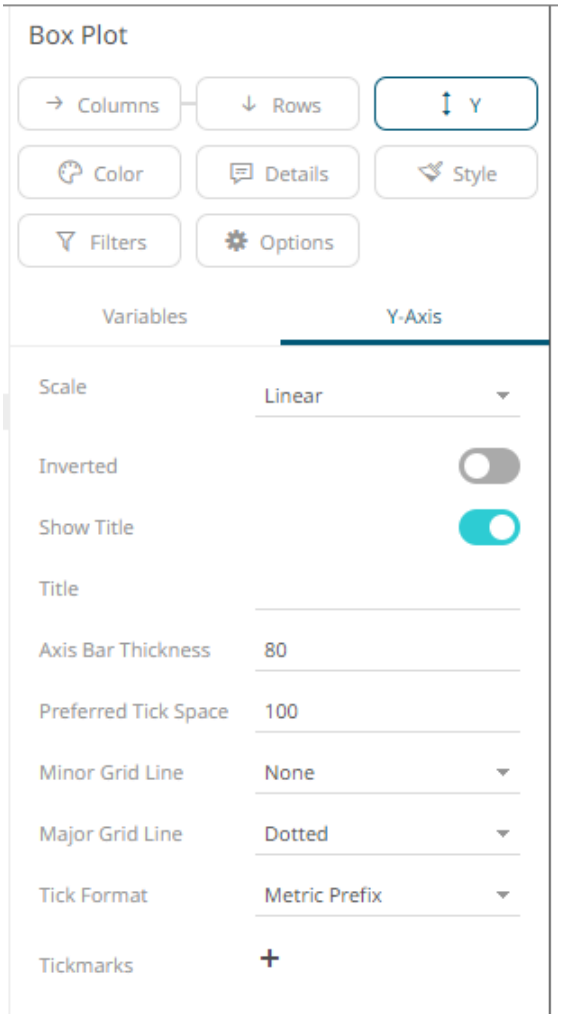
Or as separate measures for each component of the box plot, where the data source performs the aggregation.

The box plot settings pane is displayed after clicking the **Options**  button.



Setting	Description
Paint Mode	The no fill color. Possible values: **Fill** or **Border**.
Box Width Ratio	Defines the ratio between boxes and the space within each box. Default is **0.5**.
Show Borders	Determines whether borders are drawn around the box. Disabled when the *Paint Mode* is set to **Border**.
Show Whiskers	Determines whether to display lines extending vertically from the boxes, indicating variability outside the upper and lower quartiles.

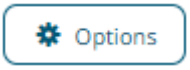
Other visualization-specific properties can be set by clicking on the **Y-Axis** variable drop area and then selecting the Y-Axis tab:



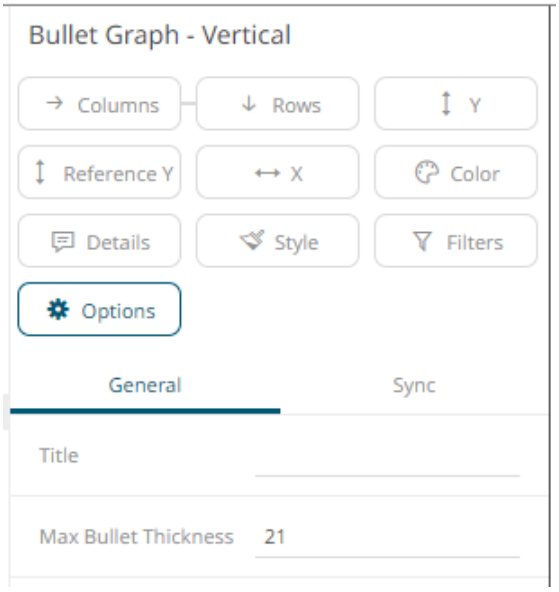
Bullet Graph Settings

Bullet Graphs were designed by Stephen Few to remove unnecessary clutter and instead focus on visualizing metrics like Key Performance Indicators (KPI).

Research has shown that bullet graphs are easier to interpret in less time than the radial gauges or speedometers often seen in BI dashboards.

The bullet graph settings pane is displayed after clicking the **Options** 

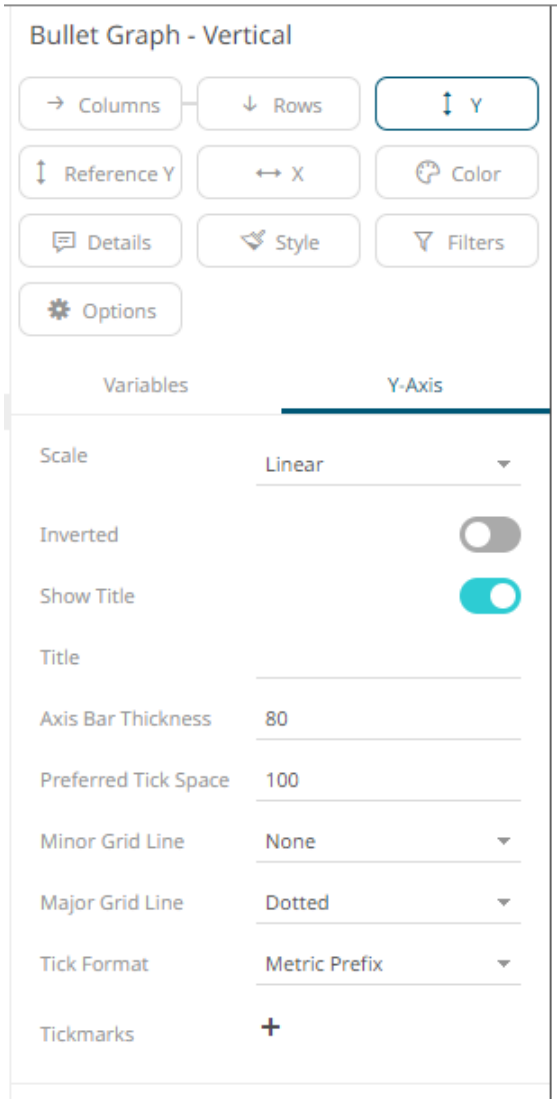
button.



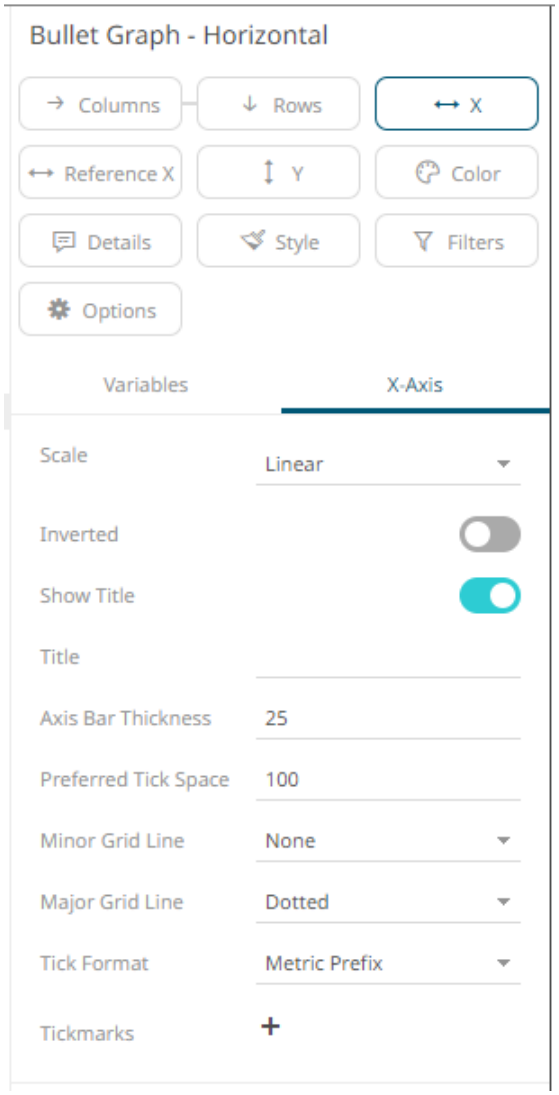
Setting	Description
Max Bullet Thickness	Specifies the thickness of the graph in pixels.

Other visualization-specific properties can be set by clicking on either:

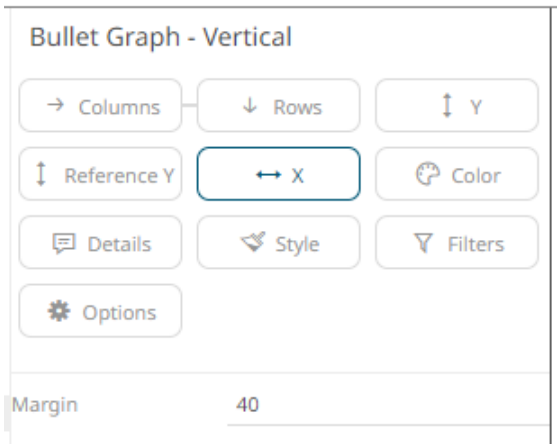
- Y-Axis variable drop area then selecting the **Y-Axis** tab (for Vertical Bullet Graphs) or

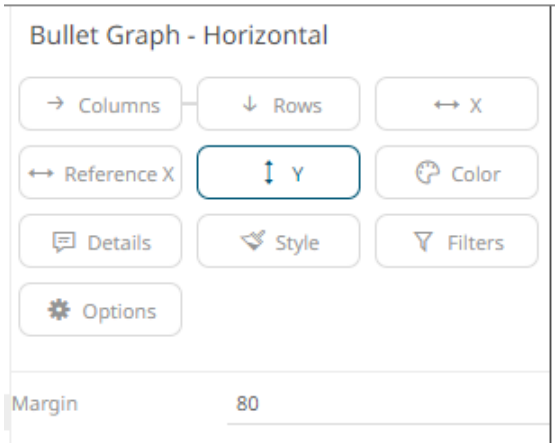


- X-Axis variable drop area then selecting the **X-Axis** tab (for Horizontal Bullet Graphs)



Furthermore, there is the X-axis setting (for Vertical Bullet Graphs) or Y-Axis setting (for Horizontal Bullet Graphs):

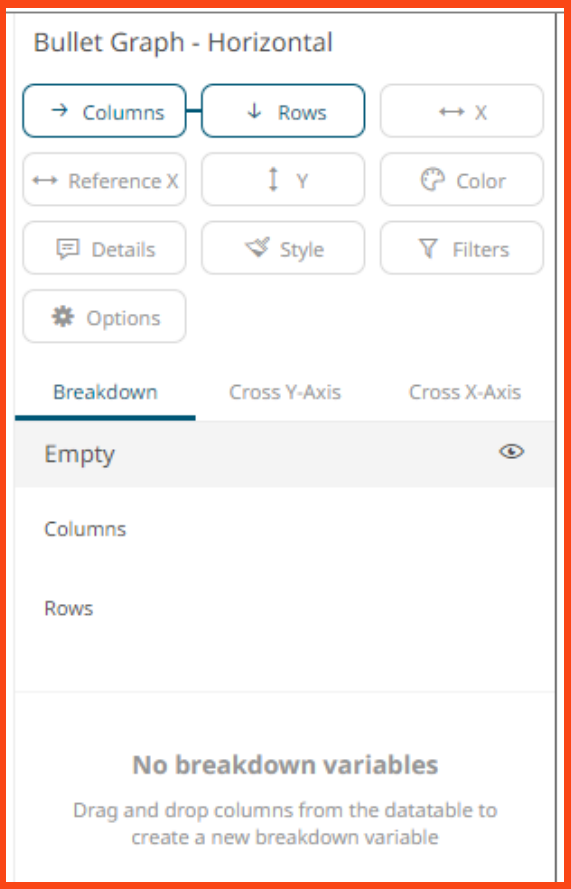




Setting	Description
Margin	The margin in pixels for the axis. If set to zero, the axis is removed.

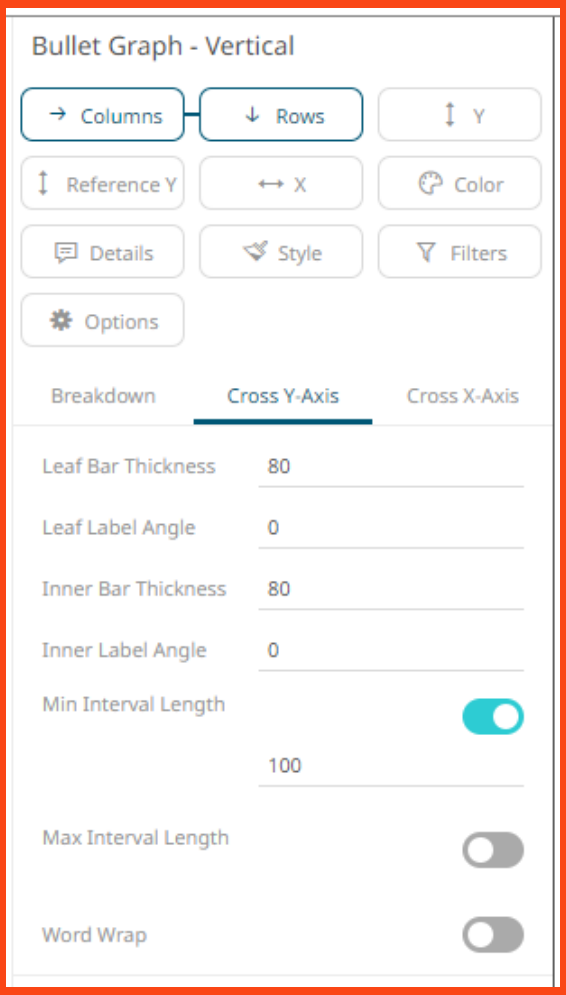
NOTE

- **Breakdown *Items* drop area is not available in the Bullet Graph.**



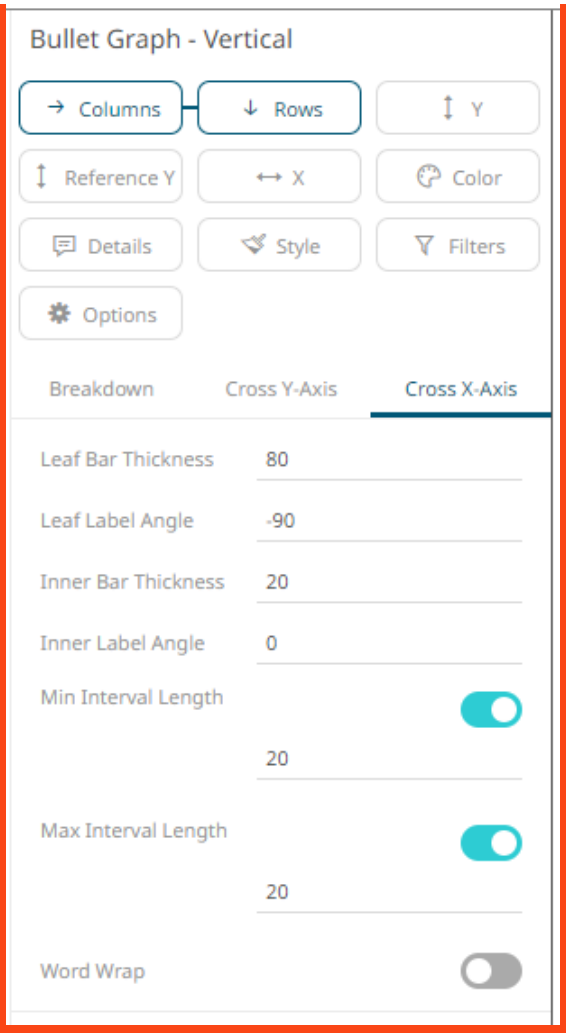
- **Old breakdowns that have text columns in the *Items* drop area of the breakdown will be automatically updated and those text columns will be moved to the *Columns* drop area.**

- **The Bullet Graph – Vertical visualization has the following specialized default properties:**



In the Cross Y-Axis:

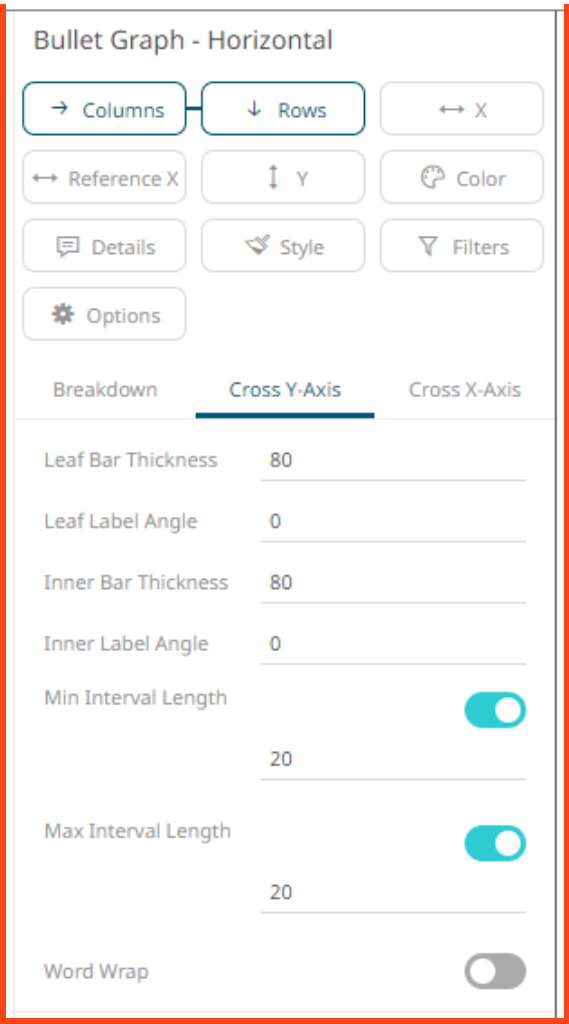
  - **Leaf Bar Thickness – 80**



In the Cross X-Axis:

- **Leaf Label Angle – 90**
- **Min Interval Length – 20**
- **Max Interval Length - 20**

- **The Bullet Graph – Horizontal visualization has the following specialized default properties:**



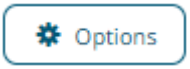
In the Cross Y-Axis:

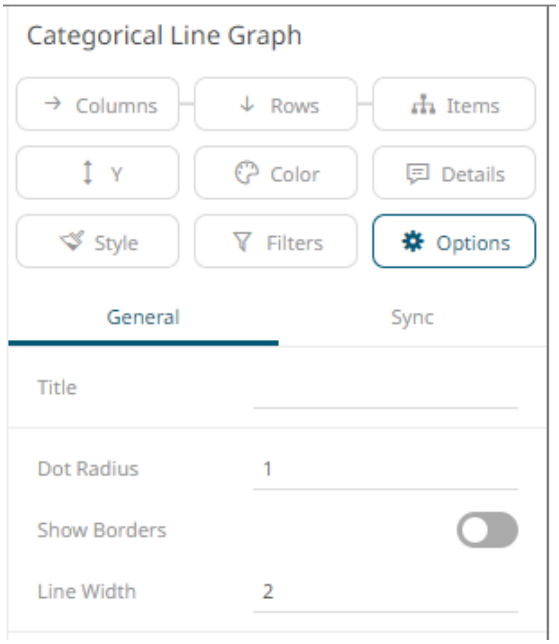
- **Min Interval Length – 20**
- **Max Interval Length - 20**

Categorical Line Graph Settings

Line Graphs are easy to understand and are a great way to communicate important time-based trends, clustering, relative performance and outliers.

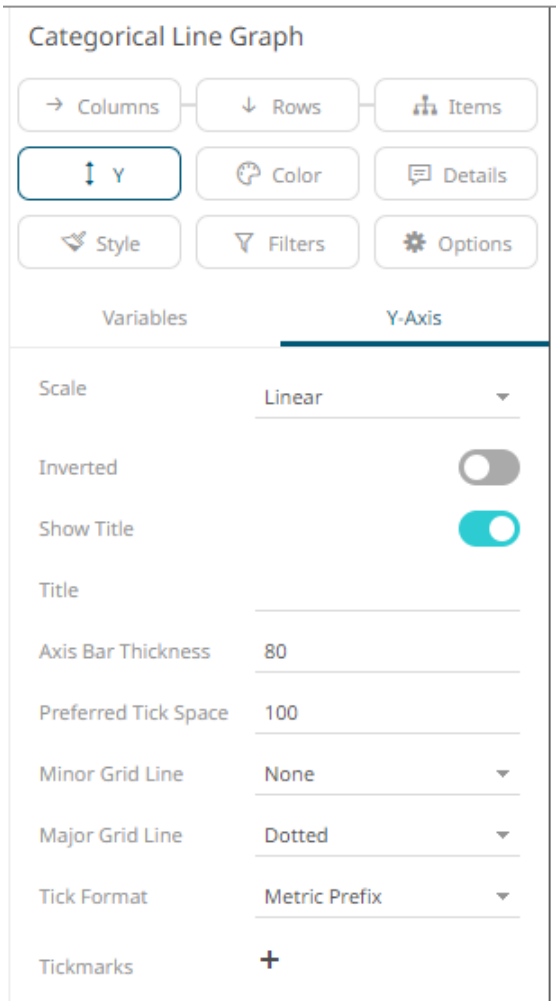
However, on occasion the axis is not time, but instead categorical. In this case a categorical line graph is used.

The categorical line graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Dots Radius	Specifies the radius of each dot in pixels.
Show Borders	Determines whether a border is drawn around each dot.
Line Width	The line width.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



Circle Pack Settings

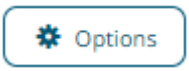
Circle Packs represent hierarchical data sets, showing both each level in the hierarchy and how they interact with each other. They are consequently used for identifying patterns of performance, and outliers within peer groups.

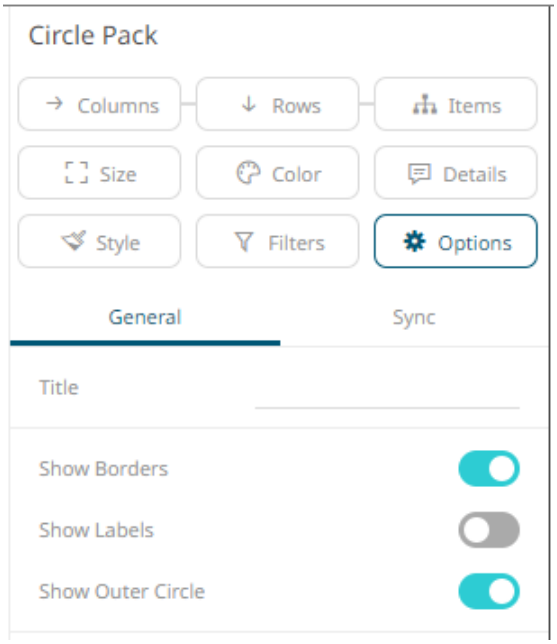
They are represented by a colorful mosaic of enclosed circles based on your data. The size of a circle reflects its importance. The color conveys urgency or variance.

Circle Packs can also be cross tabbed, and offer an alternative to the Heat Matrix, with the added benefit of having both a size (typically relating to importance), and a color variable (typically related to performance variance).

Most people can learn to understand the information presented in a Circle Pack in under a minute – even if that Circle Pack is showing data representing an underlying data set of thousands of records.

A recommended alternative to the Circle Pack is the Treemap, which can display a larger number of data points, and is easier to compare constituent data points.

The circle pack settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Borders	Determines whether a border is drawn around each circle.
Show Labels	Determines whether labels are displayed within each circle.
Show Outer Circle	Determines whether to display the outer circle.

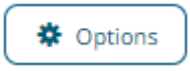
Donut Chart Settings

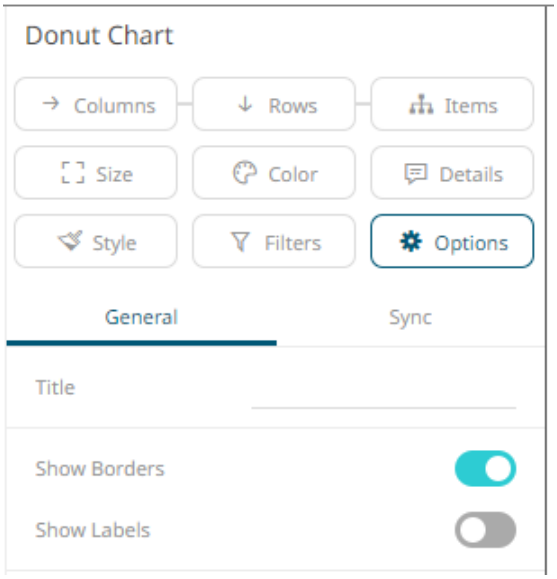
Donut Charts are a derivative of the pie chart and are used in the same manner for displaying contributions to a total.

Panopticon can produce standard Donut Charts in which the donut slice represents a numeric variable that is proportional to the total size of the donut. The color variable can represent either a category or another numeric variable.

Donut Charts can be flat, showing a single set of slices. They can also be hierarchical and display multiple levels of data in a variant called a Multilevel Donut Chart.

A recommended alternative to the Donut Chart is the Treemap, which can display a larger number of data points, and is easier to compare constituent data points.

The donut chart settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Borders	Determines whether a border is drawn around each leaf.
Show Labels	Determines whether labels are displayed within each leaf.

Donut Gauge Settings

Donut Gauge charts display percentage of total based metrics like Key Performance Indicators (KPI), and support values between 0 and 100%.

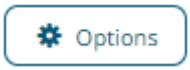
They remove unnecessary clutter and instead focus on best displaying the metric and provide an alternative to the Bullet graph.

Panopticon can produce standard Donut Gauge Charts in which the slice angle represents a percentage.

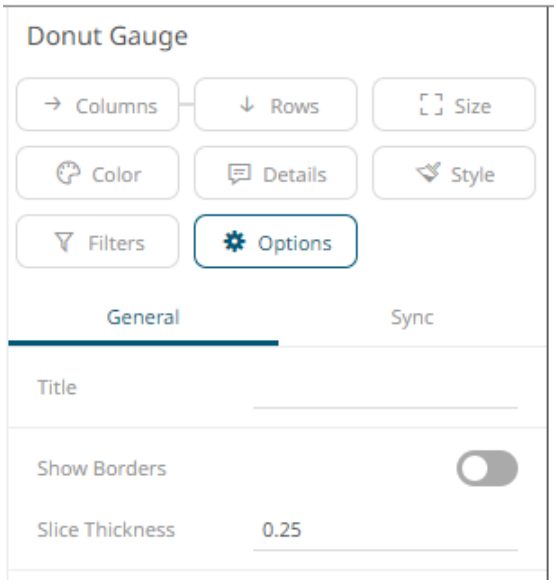
The color variable can represent either a category or another numeric variable.

Donut Gauge Charts can be individual, or displayed in cross tabs, highlighting differences between items.

An alternative visualization to the Donut Gauge to highlight differences between items and contribution to the total may be the Treemap.

The donut gauge chart settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Slice Thickness (%)	Specifies the thickness of the donut slice.
Show Borders	Determines whether a border is drawn around each donut.

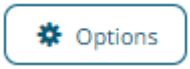
Dot Plot Settings

Dot Plots have two primary use cases:

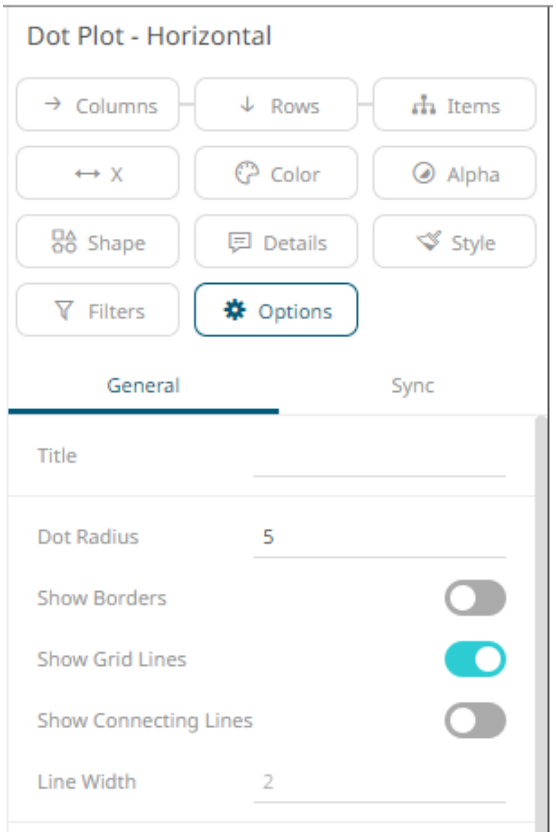
- A more effective alternative to a Bar Graph
- A distribution display similar to a Scatter Plot

Dot Plots are an effective alternative to Bar Graphs, particularly in cases where the data being analyzed contains many similar numeric values.

In comparison with the Bar Graph, Dot Plots do not use a zero baseline and are less cluttered. This makes it easier to add additional data variables to the visualization.

The dot plot settings pane is displayed after clicking the **Options** 

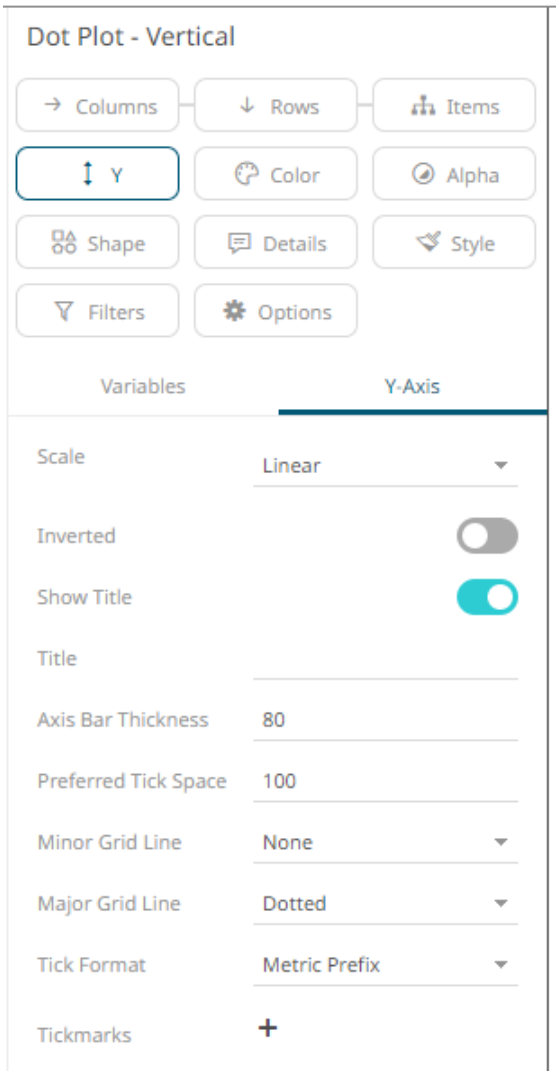
button.



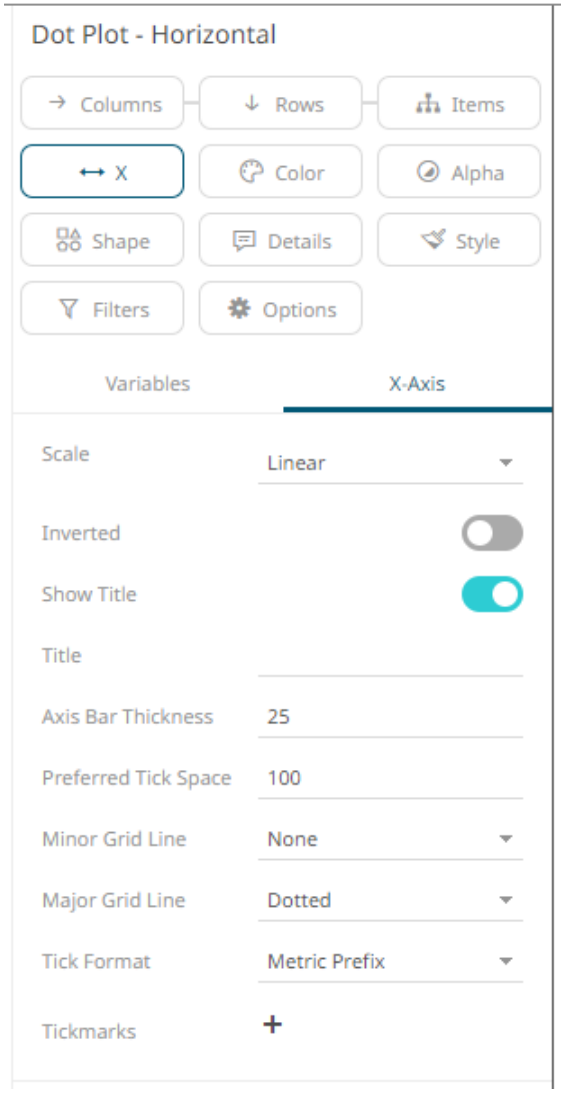
Setting	Description
Dot Radius	Specifies the radius of each dot in pixels.
Show Borders	Determines whether a border is drawn around each dot.
Show Grid Lines	Determines whether grid lines are drawn through each dot.
Show Connecting Lines	Determines whether a line is drawn between the dots category constituents. Allows a categorical line graph to be displayed.
Line Width	Specifies the width in pixels of the line if enabled.

Other visualization-specific properties can be set by clicking on either:

- Y-Axis variable drop area then selecting the **Y-Axis** tab (for Vertical Dot Plots) or



- X-Axis variable drop area then selecting the **X-Axis** tab (for Horizontal Dot Plots)



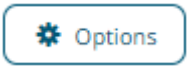
Funnel Chart Settings

Funnel Charts are a type of Bar Graph, often used to represent stages in a sales process or order fulfillment process and can show the amount of potential revenue for each stage.

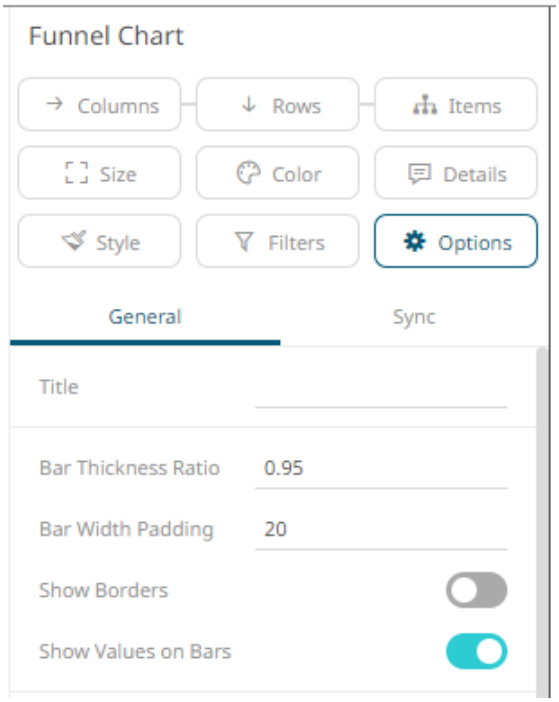
This type of chart can be useful in identifying potential problems in an organization's sales process.

Color can be used to represent either a Stage in the process, or the change in performance for that stage against a prior period.

Alternatives to the Funnel Chart would be a simple Bar Graph, or a Stacked Bar Graph.

The funnel chart settings pane is displayed after clicking the **Options** 

button.



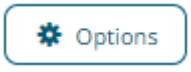
Setting	Description
Bar Thickness Ratio	Specifies the thickness ratio of the bars and spaces between bars.
Bar Width Padding	Specifies the width padding between the bar and the border.
Show Borders	Determines if a border is drawn around each bar.
Show Values on Bars	Determines if values are displayed in bars.

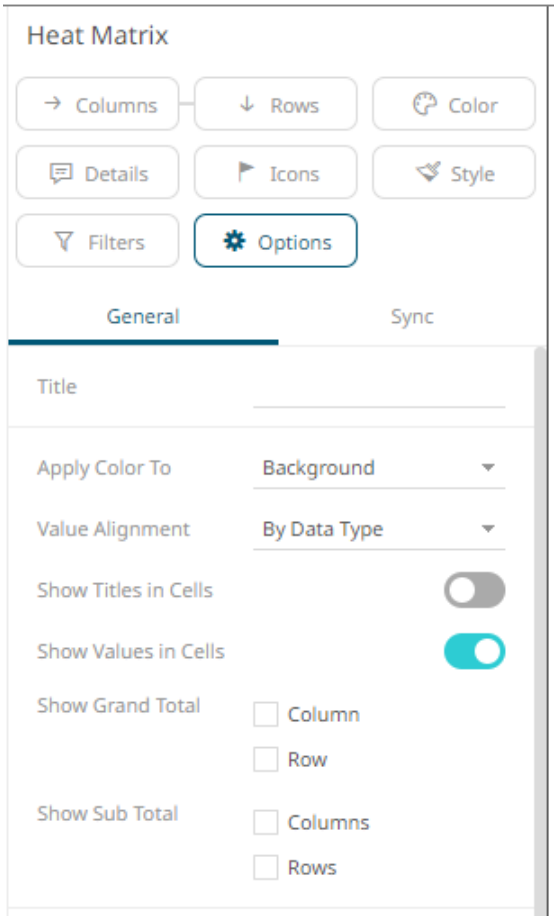
Heat Matrix Settings

A Heat Matrix is similar to both the Heat Map and Treemap in that it displays many different data items and represents the value for each item using colors. However, unlike its cousins, the Heat Matrix has a defined structure where two data attributes define each axis, thus producing a correlation matrix. Within the Heat Matrix, each column and row represent a unique attribute, and the point where two items intersect represents a unique combination of the two attributes.

The matrix can display labels within each intersecting tile or simply display color.

Our Heat Matrix data visualization helps our clients identify correlations within their data sets using an intuitive graphical display.

The heat matrix settings pane is displayed after clicking the **Options**  button.



Setting	Description
Apply Color To	Sets how the color variable is displayed: **Background** or **Text.**
Show Titles in Cells	Determines whether the field Title is shown in the cell.
Show Values in Cells	Determines whether

This visualization also acts as a Pivot Table, like the current cross tabbed tile, with rows and columns. In addition, it is similar with the Table visualization as it displays row totals.

You can set these properties in the following controls:

Setting	Description
Show Grand Total Row	Determines whether to display the grand total of the values of the Color and Detail variables on the X-axis (either as data in the cells or in the Pop-up).
Show Sub Total Row	Determines whether to display the sub totals of the values of the Color and Detail variables on the X-axis (either as data in the cells or in the Pop-up).
Show Grand Total Column	Determines whether to display the grand total of the values of the Color and Detail variables on the Y-axis (either as data in the cells or in the Pop-up).
Show Sub Totals Column	Determines whether to display the sub totals of the values of the Color and Detail variables on the Y-axis (either as data in the cells or in the Pop-up).

Map Plot Settings

Use Map Plots to display geographic data, where you have longitudes and latitudes associated with individual data points. These plots clearly show data correlations and clustering that is geographic in nature.

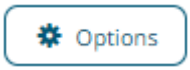
In a Map Plot, the visualization expects Latitude and Longitude measures to be associated. It will then retrieve from the selected map tile provider the appropriate background map to display under the data points. This background map is constructed by retrieving individual map tiles at set zoom levels.

As the background map is provided automatically, it relies on:

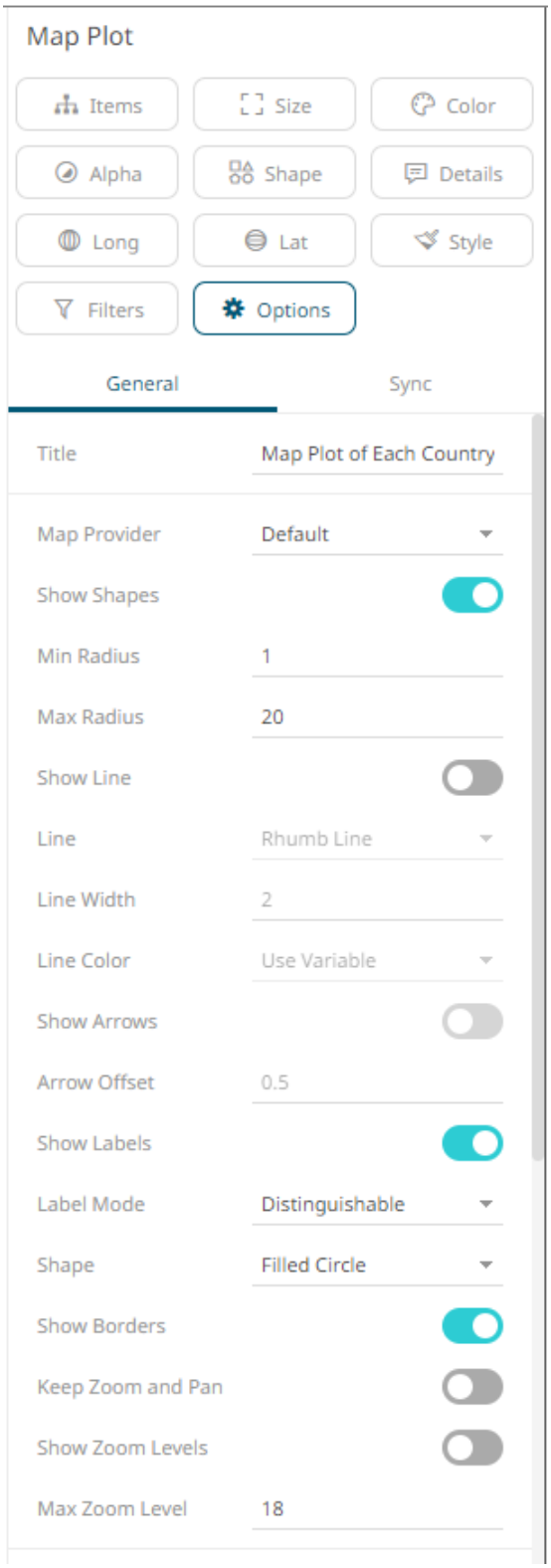
- A range of supplied longitudes & latitudes to provide a bounding area
- An active Internet connection to retrieve the map tile images

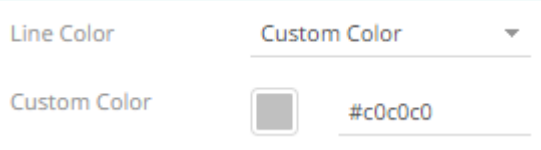
Panopticon ships with a number of cross reference datasets to determine the appropriate latitude/longitude for datasets. These have been provided through subsets of the data available at GeoNames.org. (http://www.geonames.org)

More detailed geo-coding data is available from this website, and many others.

The map plot settings pane is displayed after clicking the **Options** 

button.


Map Plot
Items
Size
Color
Alpha
Shape
Details
Long
Lat
Style
Filters
Options
General
Sync
Title
Map Plot of Each Country
Map Provider
Default
Show Shapes
Min Radius
1
Max Radius
20
Show Line
Line
Rhumb Line
Line Width
2
Line Color
Use Variable
Show Arrows
Arrow Offset
0.5
Show Labels
Label Mode
Distinguishable
Shape
Filled Circle
Show Borders
Keep Zoom and Pan
Show Zoom Levels
Max Zoom Level
18

Setting	Description
Map Provider	Determines which Map Provider should be used for providing Map tiles. Initially only a single map provider is defined, but more can be added by modifying the configuration.
Show Shapes	Determines whether shapes will be displayed. Turned on by default.
Min Radius	The minimum radius in pixels of the data point.
Max Radius	The maximum radius in pixels of the scatter point.
Show Line	Determines whether to plot lines between two positions on the map. Enables the *Line, Line Color*, and *Line Color* properties.
Line	Two ways to plot the line: • Rhumb Lines – straight lines • Great Circle Arc – curve between dots showing the path over the earth spherical surface
Line Width	Width of the plot line.
Line Color	Color of the plot line: • Use Variable - colors can be specified for the elements in the visualization through the Color variable. • Custom Color – displays the *Custom Color* section.  Click the *Color* box to display the *Color* dialog and select the color or enter the *Hex* color code.
Show Arrows	Determines whether to display arrows to indicate where lines start and end.
Arrow Offset	Where the arrows will be positioned in the lines. • 0 – start • 0.5 – middle • 1 - end
Show Labels	Determines whether labels will be displayed.
Label Mode	Enabled when *Show Labels* is checked. This property determines how data point labels are shown. Values can be: • Distinguishable • All
Shape	The shape of the scatter point. This can be: • Filled Circle • Filled Square • Use Variable - - shapes can be specified for the elements in the visualization through the Shape variable.
Show Borders	Determines whether a border is drawn around each data point.
Keep Zoom and Pan	Determines whether the saved zoom and pan state on data refresh and initial dashboard load are kept.

Show Zoom Levels	Determines whether a zoom level indicator should be displayed on the Map Plot.
Max Zoom Level	The maximum zoom to be applied when there is a single data point, rather than a collection, so a latitude / longitude bounding box cannot be established.

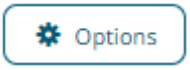
Network Graph Settings

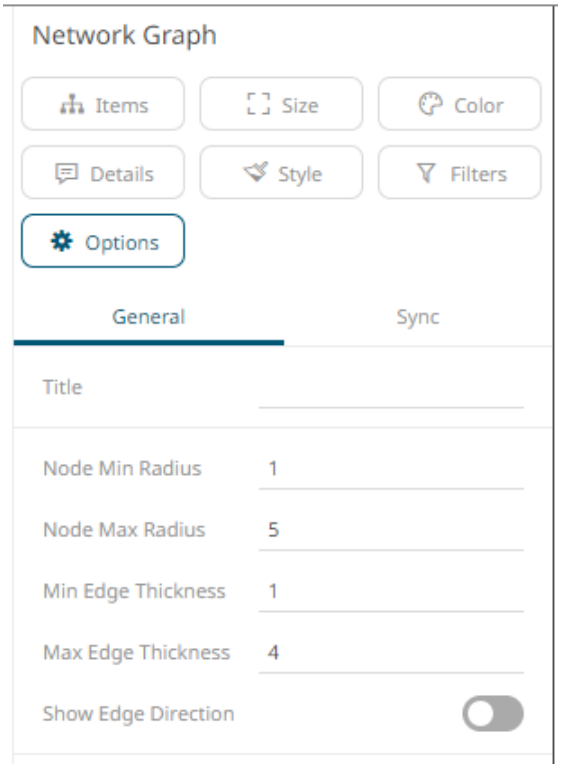
A Network Graph displays relationships between entities and can be used to identify correlations or flows between items.

The Network graph supports a two-level breakdown defining the “From”, and “To”, where each node (vertex / point), is either in the “From”, or “To” levels of the breakdown, and each edge (or line), represents the data specific to this “From → To” relationship.

The size of the node is specific to the number of interactions / relationships it has with other nodes. There can be up to two lines connecting two nodes, which can display arrows to show direction; and represent the “From → To” combinations. E.g. A → B, and B → A. Each line can also be colored to map to a numeric variable.

Customers use network graphs for investigating correlations, transactional flows, latency, and throughput bottlenecks.

The network graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Node Min Radius	The minimum radius of each node.
Node Max Radius	The maximum radius of each node.

Min Edge Thickness	The minimum thickness of each edge that represents the connection between nodes.
Max Edge Thickness	The maximum thickness of each edge that represents the connection between nodes.
Show Edge Direction	Whether to display the direction of the edges.

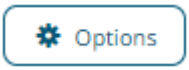
Numeric Line Graph Settings

Numeric Line Graphs differ from the standard line graph in that they have a numeric X axis, rather than one based upon time.

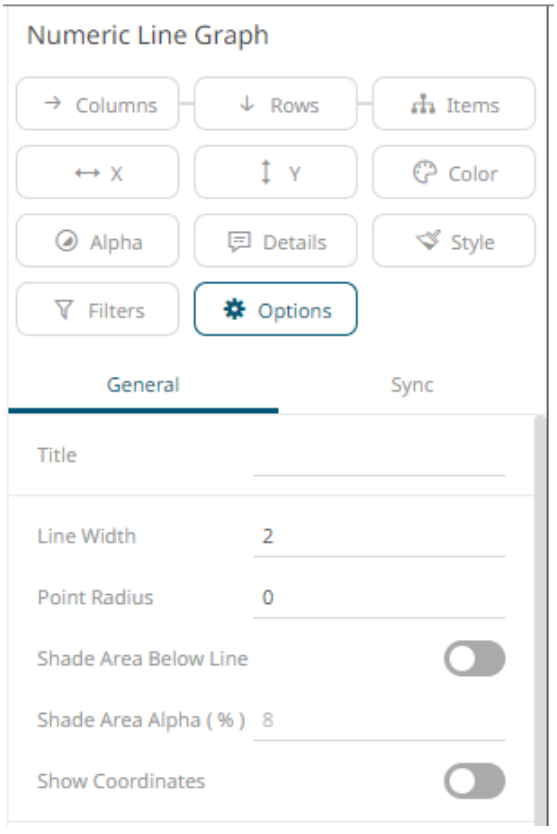
They are commonly used in both scientific and financial scenarios to show trends in functions that are based on two numeric inputs (X and Y).

Common uses include the display of Yield Curves.

Numeric Line Graphs can also be used to display selected cuts through a Surface Plot.

The numeric line graph settings pane is displayed after clicking the **Options** 

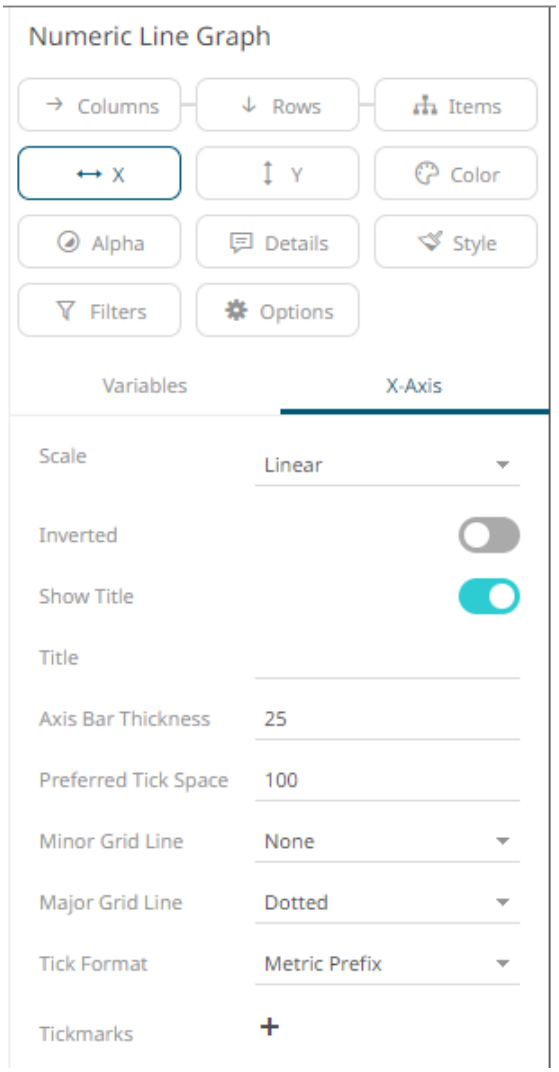
button.



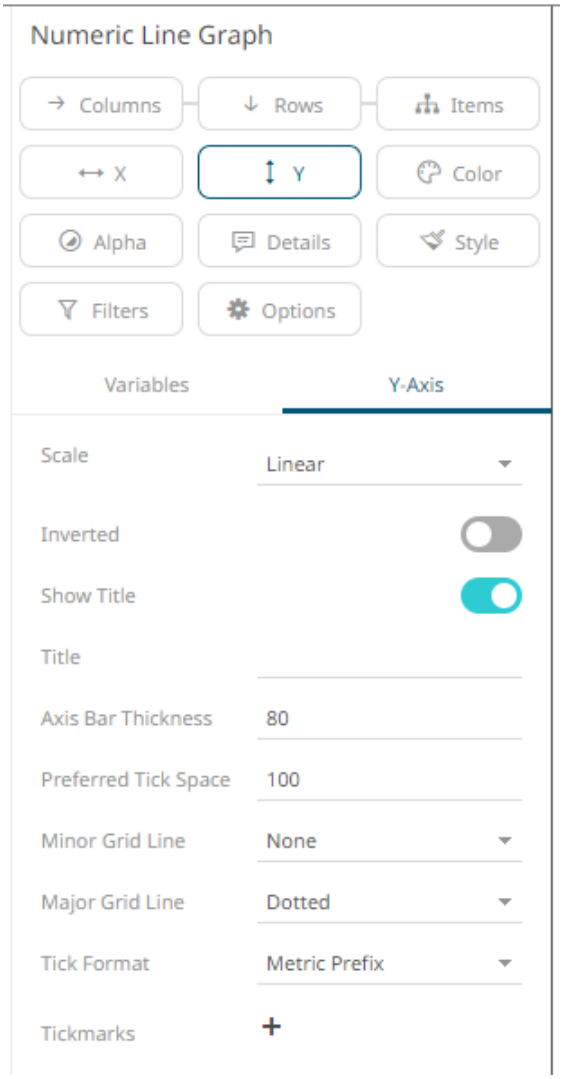
Setting	Description
Line Width	Specifies the width in pixels of the lines.
Point Radius	Specifies the radius of each point in pixels that the line passes through.

Shade Area Below Line	Defines that alpha shades are applied between the lines and the zero Y grid line.
Shade Area Alpha (%)	Specifies the alpha (transparency) of the shaded area, expressed in percent 0-100 of the alpha value currently set on the line.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the X-Axis variable drop area and then selecting the X-Axis tab:



Or also, by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

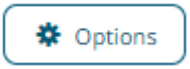


Numeric Needle Graph Settings

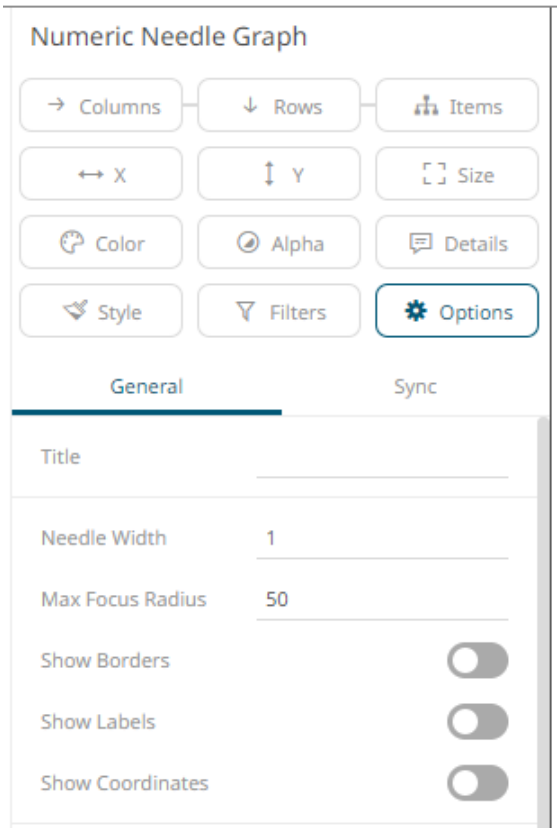
Numeric Needle Graphs display price distributions.

Unlike a traditional Bar Graph, the X Axis is numeric rather than categorical. Bars are positioned along the X axis according to their X value, and their height is determined by their Y values. For the Horizontal variant, the X Axis represents the height, and the Y axis the price.

This allows gaps, and clustering in price to be more accurately identified, and are typically used for displaying price distributions and order book displays.

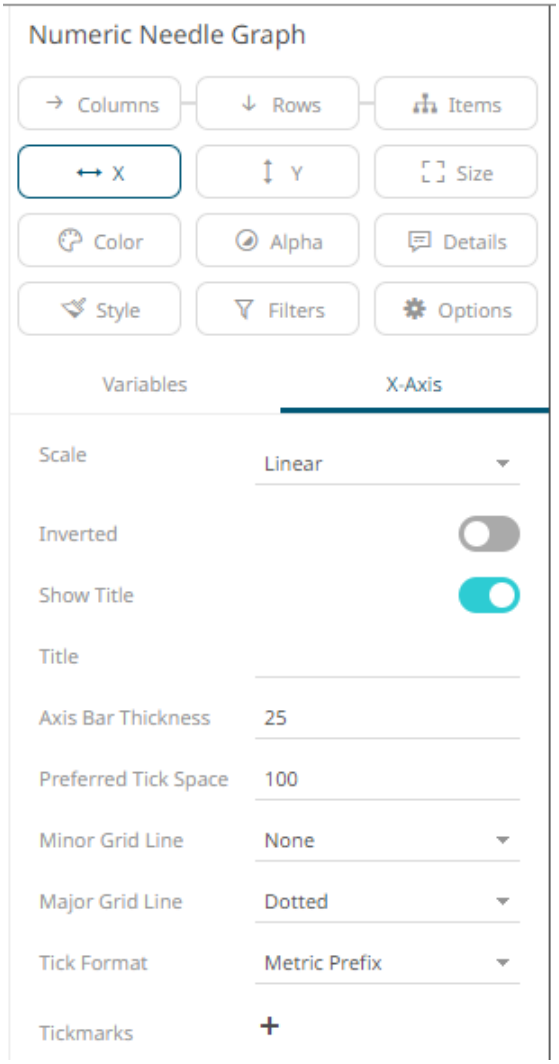
The numeric needle graph settings pane is displayed after clicking the **Options** 

button.

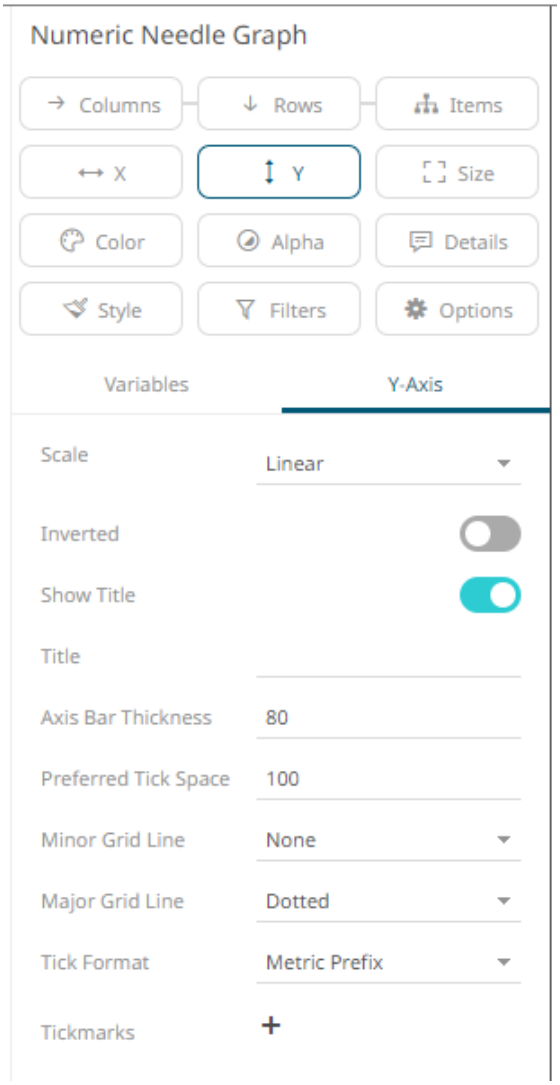


Setting	Description
Needle Width	Specifies the width in pixels of each needle: **NOTE**: This is overridden when a column is added in the *Size* variable. Consequently, the width of the needles will be based on the comparison of their size in relation to where they are located on the X axis.
Max Focus Radius	Determines the maximum radius of the focus circle when hovering on the needles. This also controls the padding of the axis in the direction in which the needles expand, allowing the focus circle to have enough space to be drawn.
Show Borders	Specifies whether a border is drawn around needles. These are only visible if the Needle Width is greater than 1 pixel.
Show Labels	Specifies whether node labels will be displayed.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the X-Axis variable drop area and then selecting the X-Axis tab:



Or also, by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

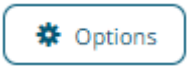


Numeric Stacked Needles Graph Settings

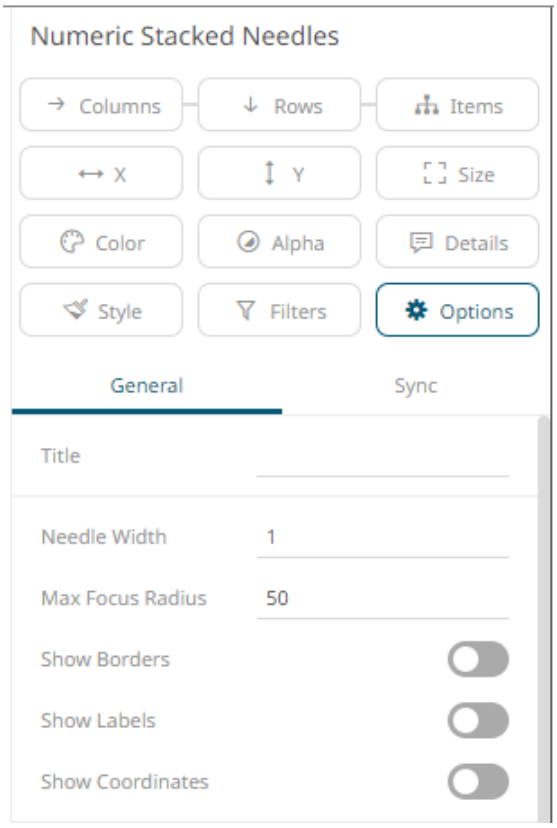
Numeric Stacked Needles again display price distributions.

Unlike the standard Numeric Needle Graph, multiple items can be identified at a single price.

A common usage is displaying client activity within an order book.

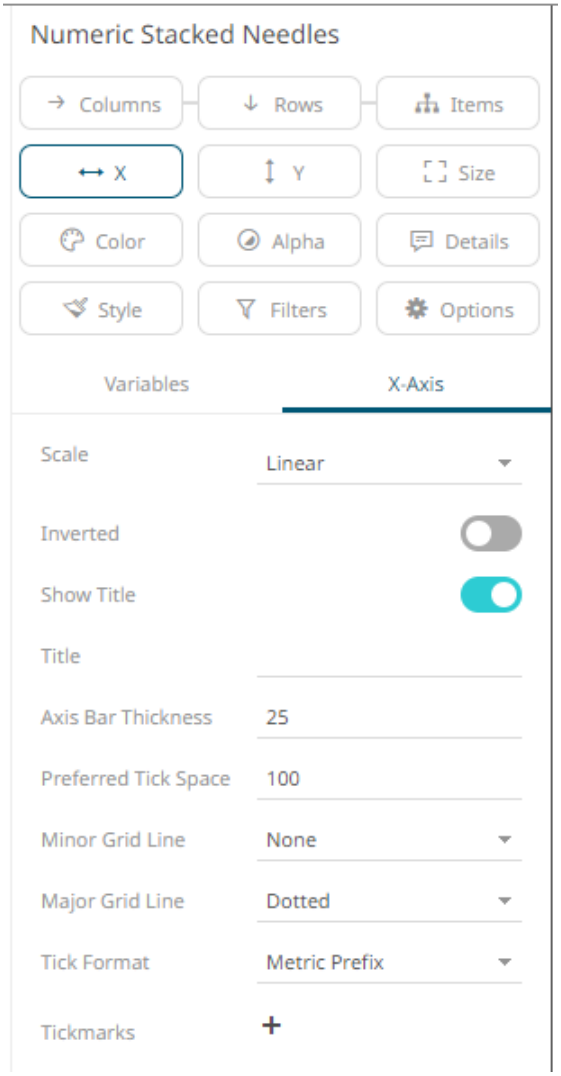
The numeric stacked needle graph settings pane is displayed after clicking the **Options** 

button.

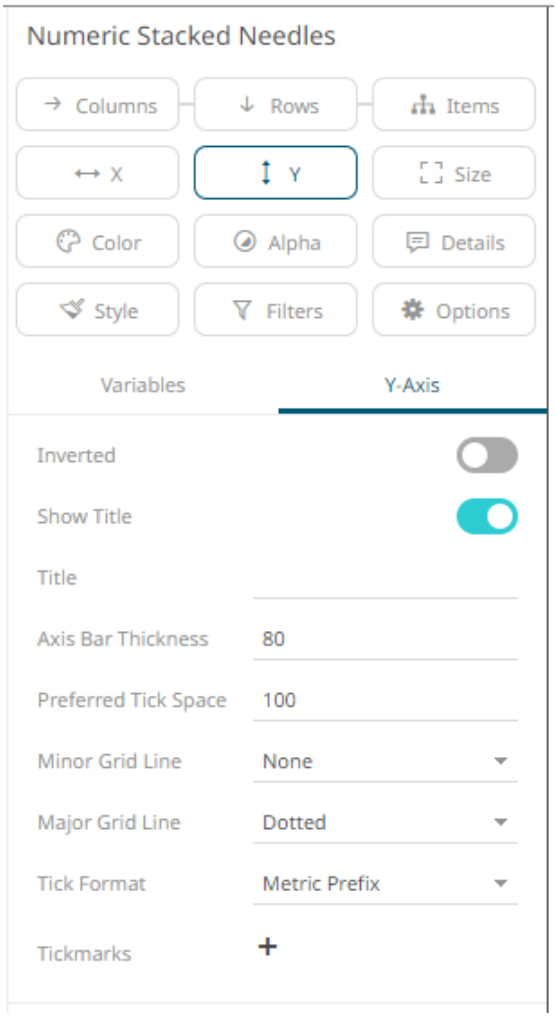


Setting	Description
Needle Width	Specifies the width in pixels of each needle: **NOTE:** This is overridden when a column is added in the *Size* variable. Consequently, the width of the needles will be based on the comparison of their size in relation to where they are located on the X axis.
Max Focus Radius	Determines the maximum radius of the focus circle when hovering on the needles. This also controls the padding of the axis in the direction in which the needles expand, allowing the focus circle to have enough space to be drawn.
Show Borders	Specifies whether a border is drawn around needles. These are only visible if the Needle Width is greater than 1 pixel.
Show Labels	Specifies whether node labels will be displayed.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the X-Axis variable drop area and then selecting the X-Axis tab:



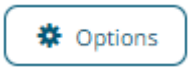
Or also, by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

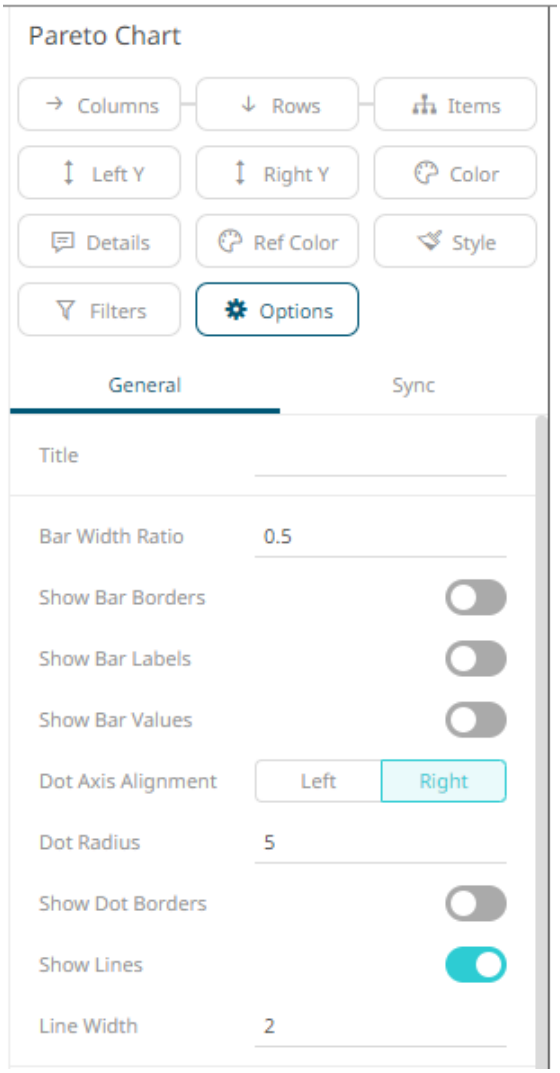


Pareto Chart Settings

The Pareto Chart is a combination of the Bar Graph and Categorical Line Graph, and can be used for comparing actuals to forecasts, and if the dataset is available, comparing individual to cumulative returns.

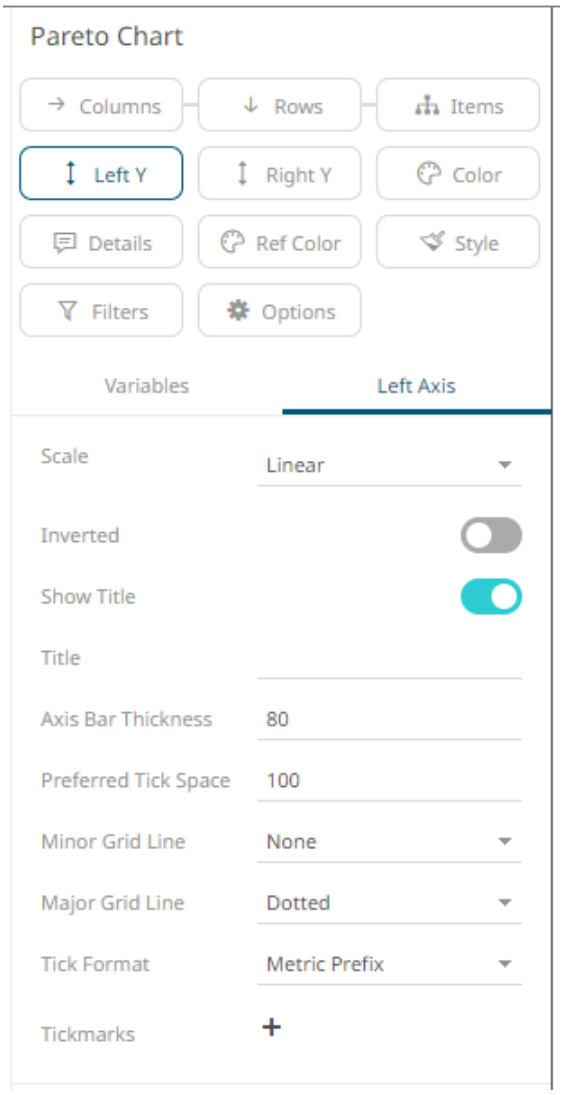
The traditional usage of a Pareto chart displays individual values in a descending order as bars, with the cumulative total represented by the line.

The pareto chart settings pane is displayed after clicking the **Options**  button.

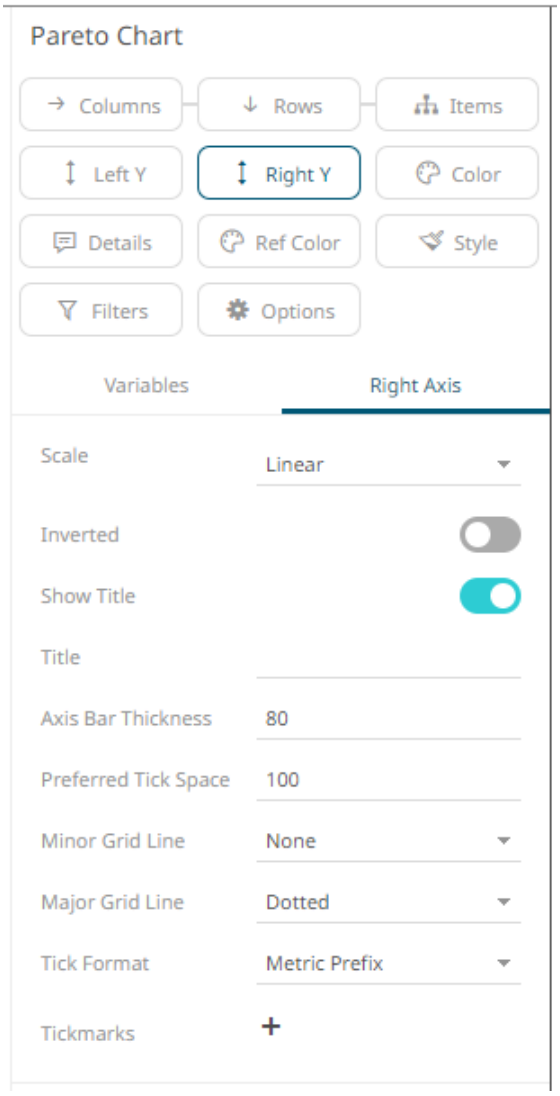


Setting	Description
Bar Width Ratio (%)	Defines the ratio of the width within the bars. Default is **.5**.
Show Bar Borders	Determines whether borders are drawn around bars or stacks within bars.
Show Bar Labels	Specifies whether labels are drawn inside the bars.
Show Bar Values	Specifies whether values are displayed in bars.
Dot Axis Alignment	Determines whether the dot axis is aligned to the **Right** or **Left**.
Dot Radius	Specifies the radius of each data point in pixels.
Show Dot Borders	Determines whether a border is drawn around each dot.
Show Lines	Determines whether a line is drawn between the dots category constituents. Allows a categorical line graph to be displayed.
Line Width	Specifies the width in pixels of the line if enabled.

Other visualization-specific properties can be set by clicking on the Left Y variable drop area and then selecting the Left **Axis** tab:



Or also, by clicking on the Right Y variable drop area and then selecting the Right **Axis** tab:



Pie Chart Settings

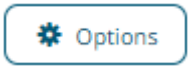
Pie Charts are one of the oldest and best-known visualizations for displaying contributions to a total.

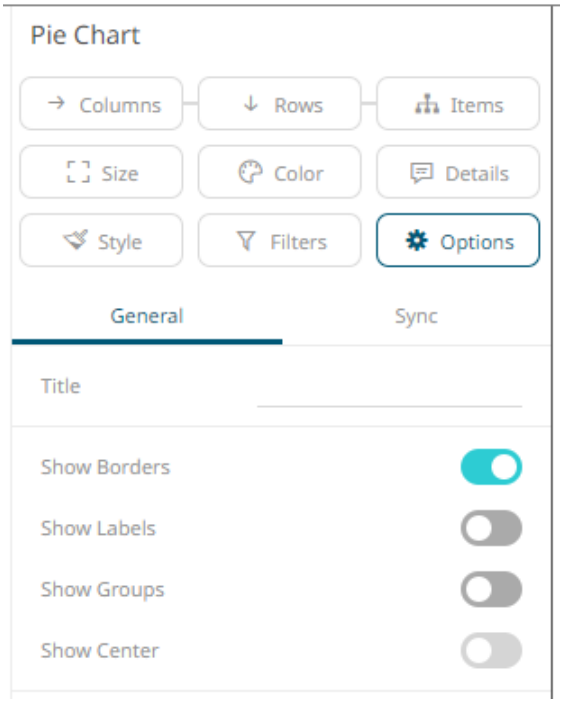
Panopticon can produce standard Pie Charts in which the pie slice represents a numeric variable that is proportional to the total size of the pie. The color variable can represent either a category or another numeric variable.

Pie Charts can be flat, showing a single set of slices. They can also be hierarchical and display multiple levels of data in a variant called a Multilevel Pie Chart. This is also known as a Sun Burst or a Radial Treemap.

The user can modify the visible depth level and drill into particular slices to investigate further detail.

A recommended alternative to the Pie Chart is the Treemap, which can display a larger number of data points, and is easier to compare constituent data points.

The pie chart settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Borders	Determines whether borders are drawn around each pie slice. This is enabled by default.
Show Labels	Determines whether labels are displayed within each pie slice.
Show Groups	Determines whether a multilevel Pie Chart (or Sun Burst) is displayed, where each hierarchy level is represented in a nested group.

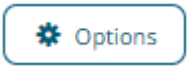
Record Graph Settings

A record visual is effectively a transposed table and can be used to display the metrics for one, or a few individual records (or aggregated records).

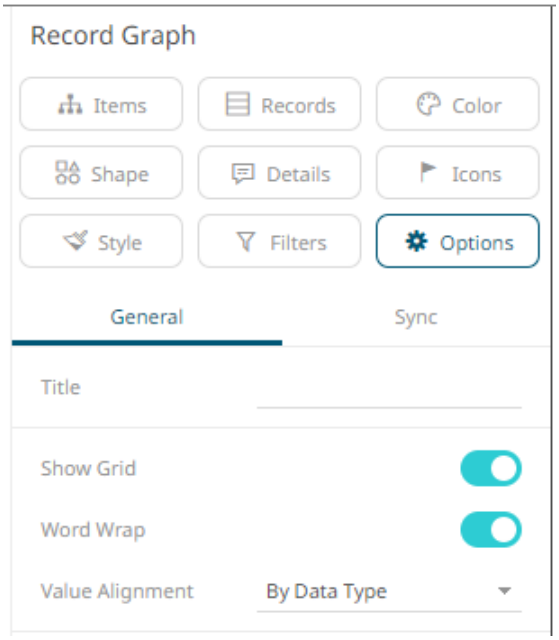
Like the table, metrics are added to “Visual Members”, but correspond to rows in the record (rather than columns in a table).

Row cells display their text value which may wrap into multiple lines.

Text can be colored either with a background or foreground.

The record graph settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Show Grid	Determines whether grid lines are visible or not.
Word Wrap	Determines whether to wrap the text.
Value Alignment	Alignment of the value: • By Data Type • Left • Center • Right

Scatter Plot Settings

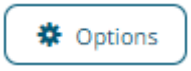
Scatter Plots are used to identify trends, clustering and outliers across a number of numeric variables, especially when investigating large data volumes.

Each scatter point is represented by:

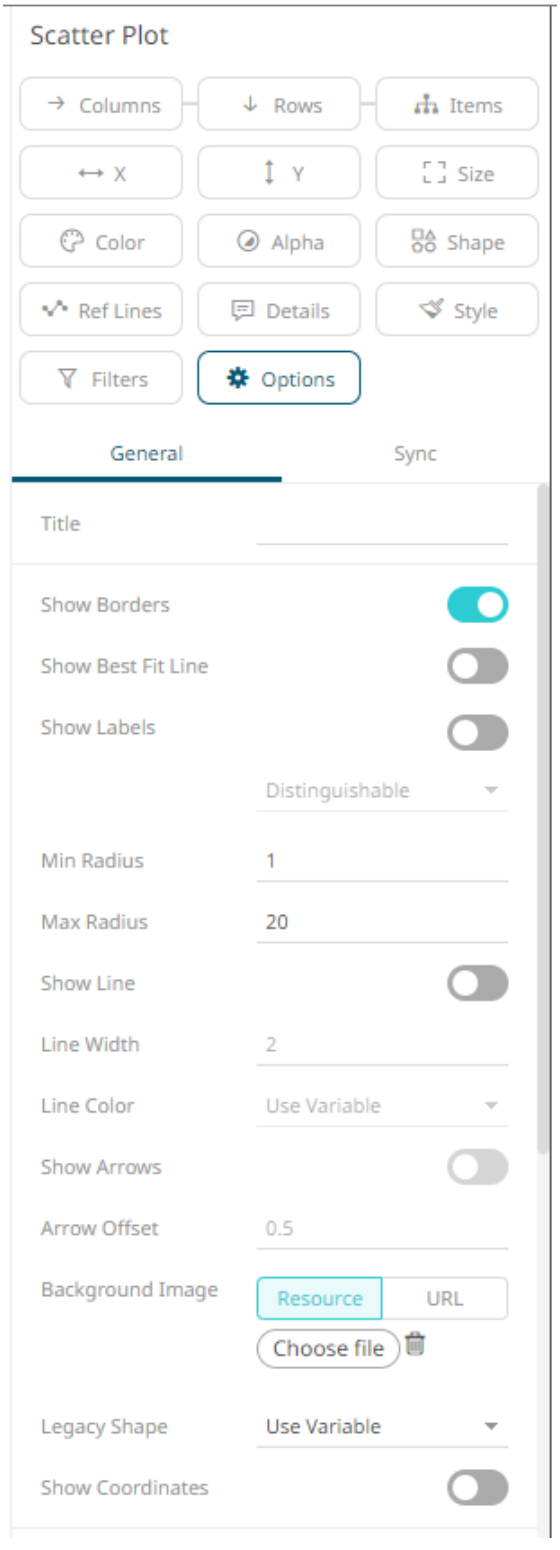
- ❑ X Position
- ❑ Y Position
- ❑ Size
- ❑ Color (numeric or categorical)

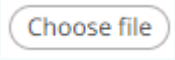
A line of best fit can also be added to highlight outliers.

Panopticon's Scatter Plot data visualizations are easy to set up and highly customizable. You can configure your display in ways that will make the most sense to you and your users, and users have all the tools they need to filter and manipulate the Scatter Plot to concentrate on the most relevant subsets in the data.

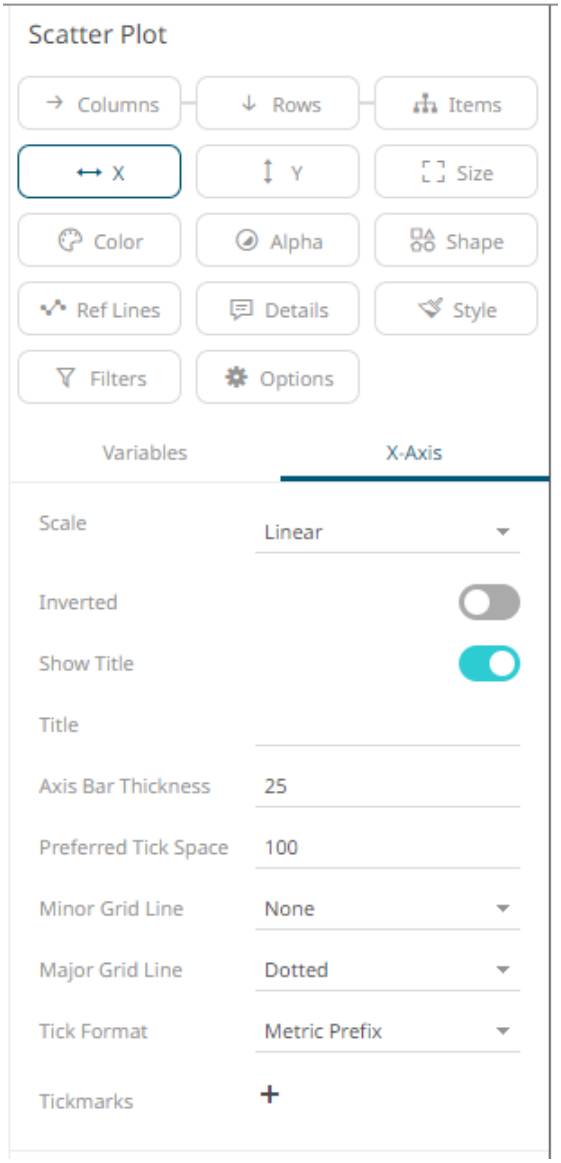
The scatter plot settings pane is displayed after clicking the **Options** 

button.

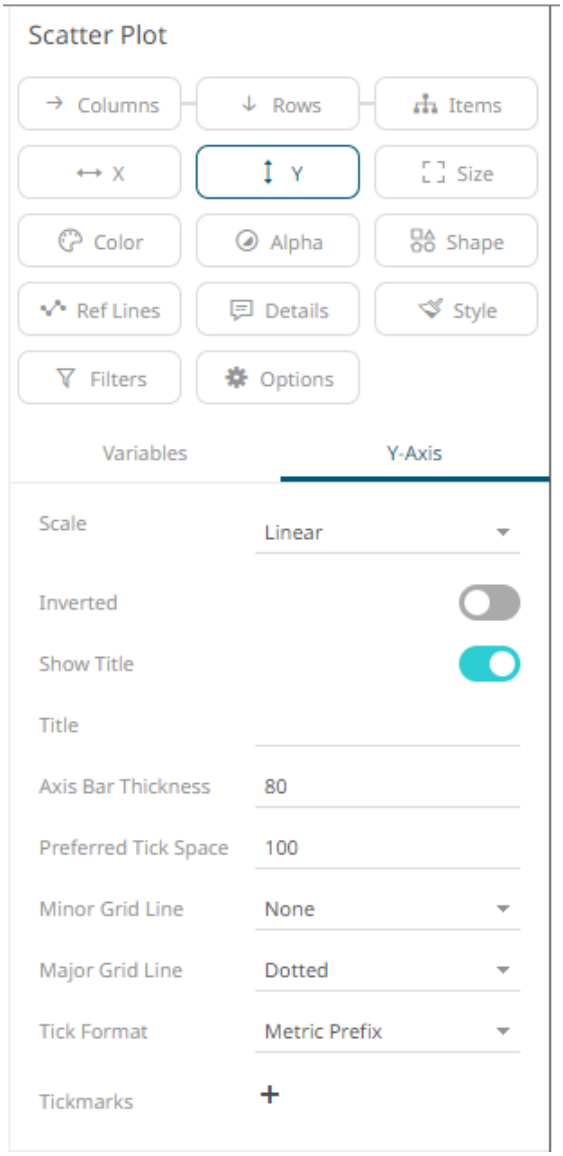

Scatter Plot
Columns
Rows
Items
X
Y
Size
Color
Alpha
Shape
Ref Lines
Details
Style
Filters
Options
General
Sync
Title
Show Borders
Show Best Fit Line
Show Labels
Distinguishable
Min Radius
1
Max Radius
20
Show Line
Line Width
2
Line Color
Use Variable
Show Arrows
Arrow Offset
0.5
Background Image
Resource
URL
Choose file
Legacy Shape
Use Variable
Show Coordinates

Setting	Description
Show Borders	Determines whether a border is drawn around each scatter point.
Show Best Fit Line	Determines whether a Line of Best Fit is added to the Scatter Plot.
Show Labels	Determines whether labels will be displayed. If enabled, select how scatter point labels are shown: • Distinguishable • All
Min Radius	The minimum radius in pixels of the scatter point.
Max Radius	The maximum radius in pixels of the scatter point.
Show Line	Determines whether to plot lines between two positions or dots on the scatter plot. Enables the *Line Width* and *Line Color* properties.
Line Width	Width of the plot line.
Line Color	Color of the plot line: • Use Variable - colors can be specified for the elements in the visualization through the Color variable. • Custom Color – displays the Custom Color section.
Show Arrows	Determines whether to display arrows to indicate where lines start and end.
Arrow Offset	Where the arrows will be positioned in the lines. • 0 – start • 0.5 – middle • 1 - end
Background Image	Defines that a background image is displayed behind the scatter plot. You can either: • click **Resource**  then **Choose File**  and select the background image in the *Open* dialog that displays. • click **URL**  and enter the URL of the image file. This value can be parameterized and use Snapshot, and retrieve the image upon each parameter value change.
Legacy Shape	Allows older workbooks to be updated and use the shape variable. Default is **Use Variable**. Other shapes can also be selected.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the X-Axis variable drop area and then selecting the X-Axis tab:



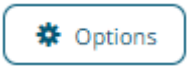
Or also, by clicking on the Y-Axis variable drop area and then selecting the **Y-Axis** tab:

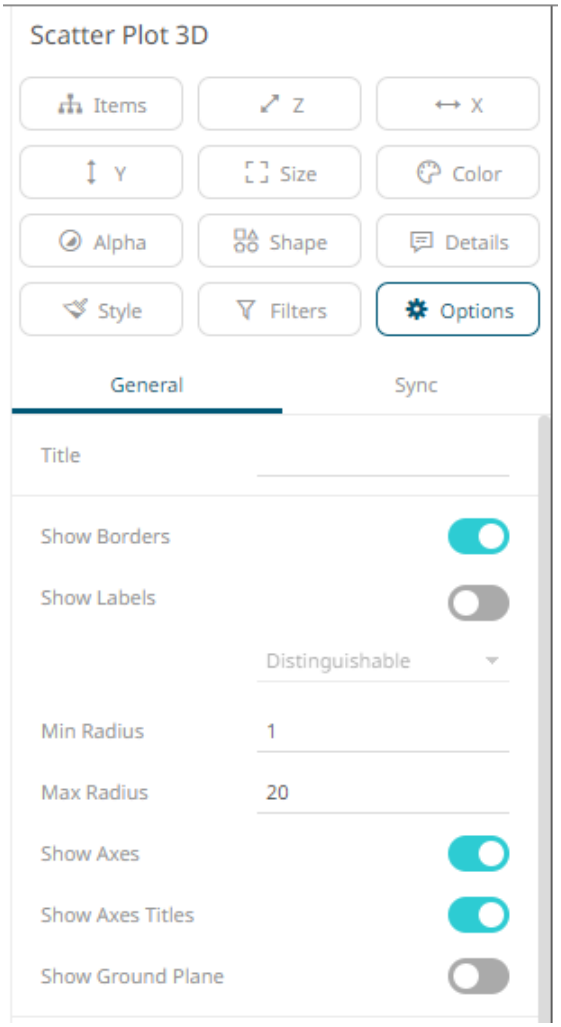


3D Scatter Plot Settings

3D Scatter Plots are a 3D perspective version of the 2D Scatter Plot. They provide a clearer understanding of physical shapes in a 3D space. The Scatter Plot 3D is made up of a series of points where each point has X Position, Y Position and Z Position.

In addition, items can be sized by numeric data values, and colored by numeric or text data values. Items can also be shown as different shapes – either standard shapes available in Panopticon or custom shapes that you add to a custom shape palette.

The 3D Scatter Plot settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Borders	Determines whether borders are visible around each scatter point.
Show Labels	Determines whether labels will be displayed. If enabled, select how scatter point labels are shown: • Distinguishable • All
Min Radius	The minimum radius in pixels of the scatter point.
Max Radius	The maximum radius in pixels of the scatter point.
Show Axes	Determines whether axes are displayed.
Show Axes Titles	Determines whether axes titles are displayed.
Show Ground Plane	Determines whether the ground plane is displayed.

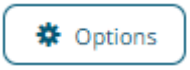
Shapes Settings

The Shapes visualization allows the display of Choropleth Graphs and other displays built from SVG Paths.

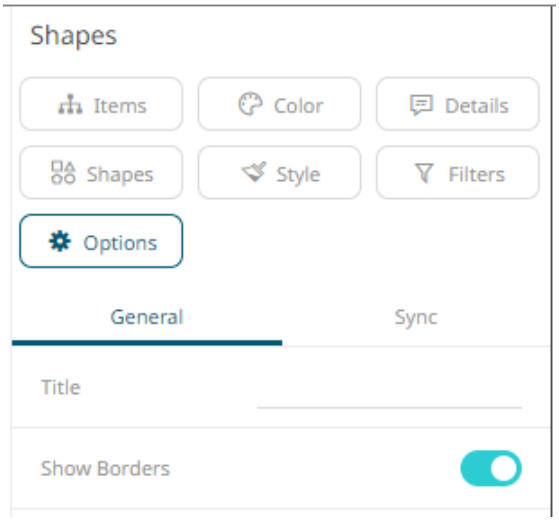
The Shapes visualization can be used to display data where both physical location and size are important.

They clearly show data correlations and clustering that is geospatial in nature.

Unlike the Geographic Scatter Plot, the size of each shape is fixed, imparting the importance of the item. As a consequence, data should be relative to each shape size, such as area densities.

The shapes settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Show Borders	Determines whether borders are visible around each shape.

Surface Plot Settings

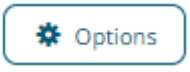
Surface Plots are used to identify trends and outliers within numeric surfaces.

The Surface is made up of a series of points where each point has:

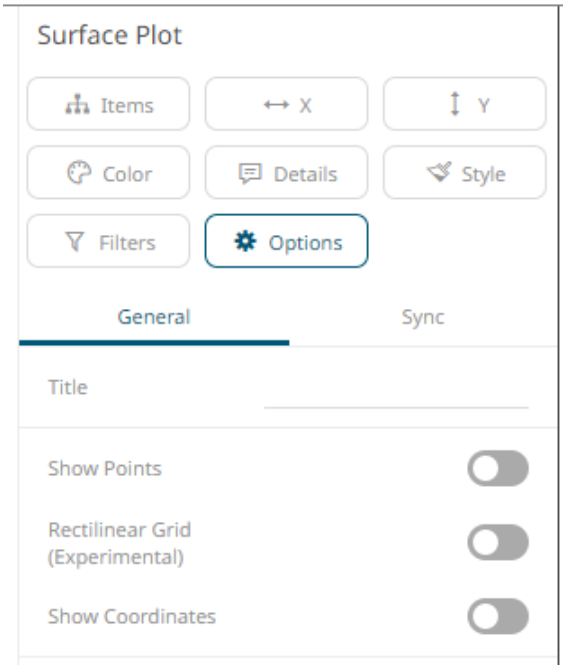
- X Position
- Y Position
- Color (which represents the Z axis).

The Surface Plot can support data sets where the X and Y positions can both be regular and irregular in their distribution.

Additionally, the color scale can be continuous or stepped to show a surface gradient.

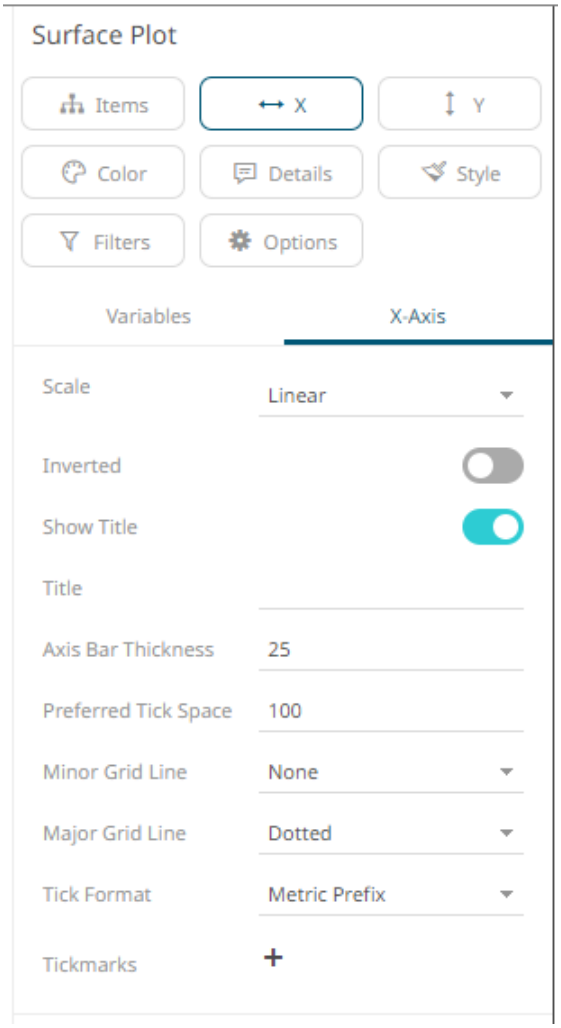
The surface plot settings pane is displayed after clicking the **Options** 

button.

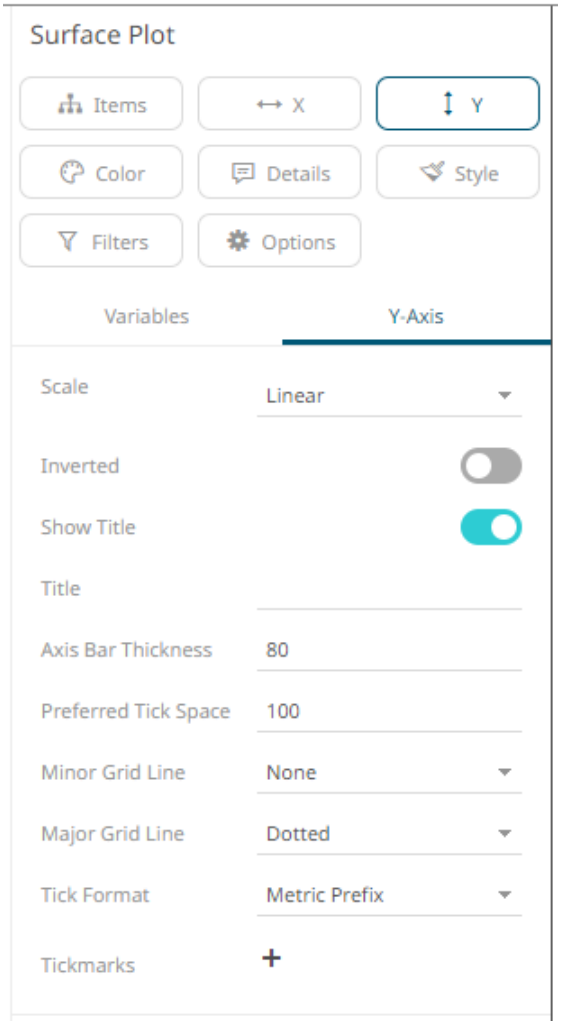


Setting	Description
Show Points	Determines whether surface data points are shown.
Rectilinear Grid	Determines whether distinct X and Y values are changed into a rectilinear grid where missing values are filled in with a default of zero (or the ground level).
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the X-Axis variable drop area and then selecting the X-Axis tab:



Or also, by clicking on the Y-Axis variable drop area and then selecting the **Y-Axis** tab:



3D Surface Plot Settings

3D Surface Plots are a 3D perspective version of the 2D Surface Plot.

They provide a clearer understanding of the overall “shape” of the surface but they also introduce occlusion problems; not all data points can be seen due to the display perspective.

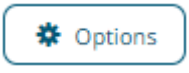
The Surface Plot 3D is made up of a series of points where each point has:

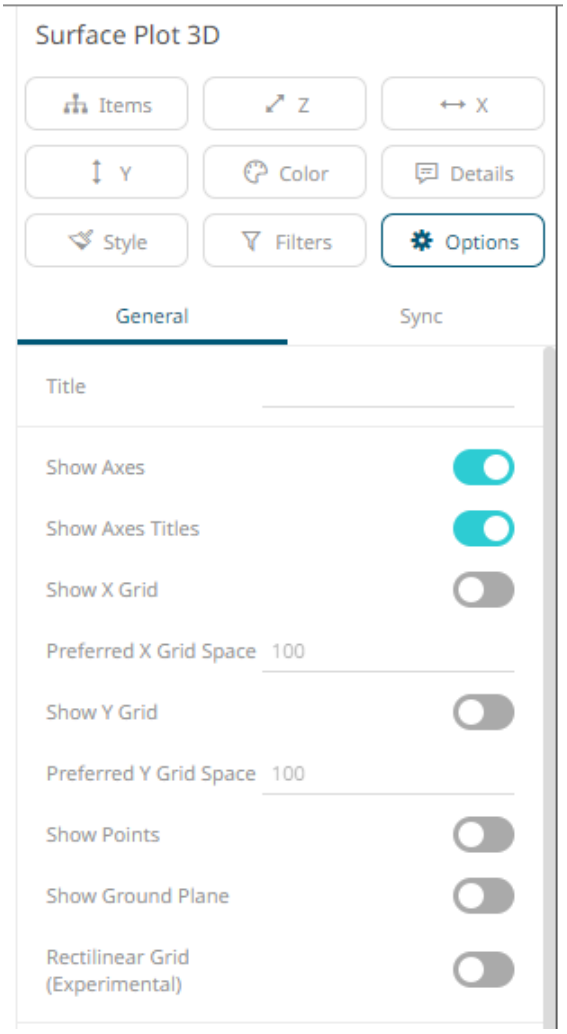
- X Position
- Y Position
- Z Position (encoded by color)

The Surface Plot 3D can support data sets where the X and Y positions can both be regular and irregular in their distribution.

The color scale can be continuous or stepped to show a surface gradient.

Grid lines, a ground plane, and markers for data points can be shown if required.

The 3D surface plot settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Axes	Determines whether axes are displayed.
Show Axes Titles	Determines whether axes titles are displayed.
Show X Grid	Determines whether the X Grid lines are displayed and if checked, the space in pixels between them.
Preferred X Grid Space	Specifies the X Grid lines spacing. Default is **100**.
Show Y Grid	Determines whether the Y Grid lines are displayed and if checked, the space in pixels between them.
Preferred Y Grid Space	Specifies the Y Grid lines spacing. Default is **100**.
Show Points	Determines whether markers are drawn over surface data points.
Show Ground Plane	Determines whether a ground plane should be drawn below the 3D surface
Rectilinear Grid	Determines whether distinct X and Y values are changed into a rectilinear grid where missing values are filled in with a default of zero (or the ground level).

Table Visualization Settings

A table can be used to display a small dataset where all the values are visible or the aggregate values of a larger data set.

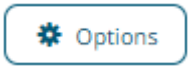
The table can be configured to show hierarchies, allowing sub totals and grand totals to be displayed. Additionally, branches of the hierarchy can be expanded and collapsed.

The table can be sorted by clicking on a column heading, and sorting is applied across the defined hierarchy.

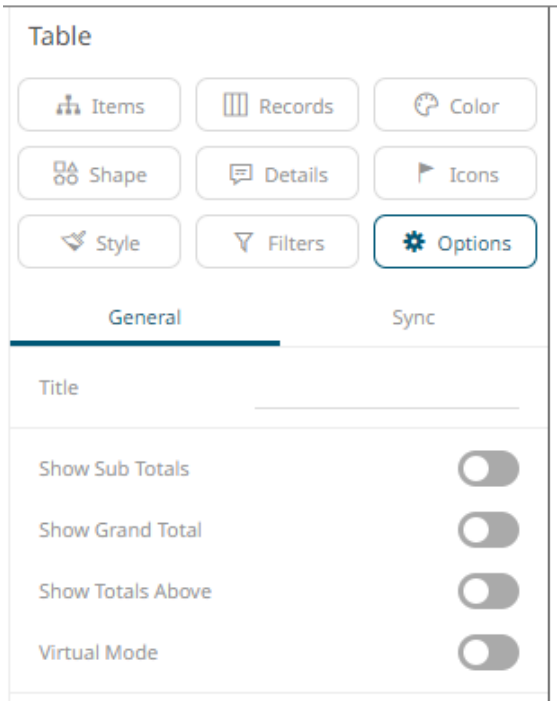
Columns widths can be adjusted manually or automatically, and columns can be hidden when required.

Columns cells can be represented in their value form or, alternatively, graphically as a series of micro-charts including:

- Bullet Graph
- Bar Graph
- Dot Plot

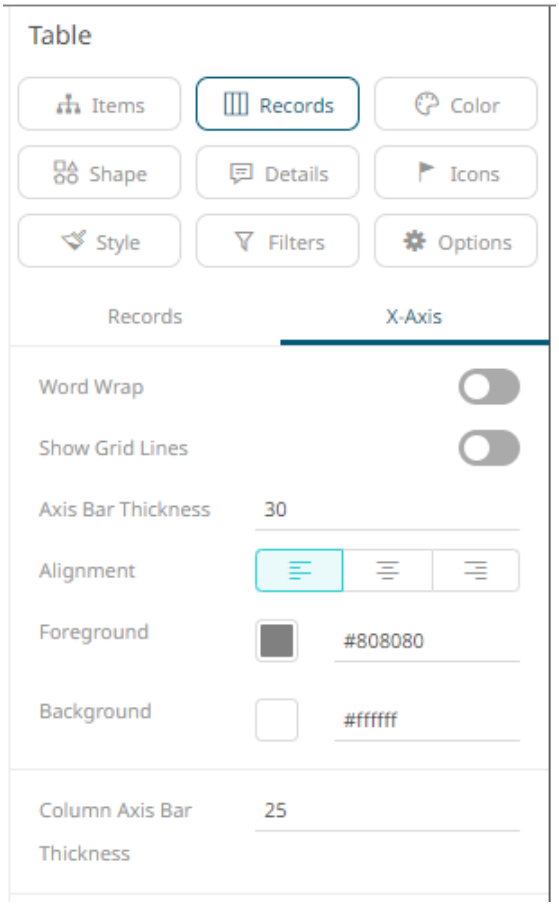
The table settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Show Sub Totals	Determines whether Sub Total aggregate rows are shown in the table.
Show Grand Total	Determines whether the Grand Total aggregate row is shown in the table.
Show Totals Above	Determines whether the Grand Total or Sub Totals are displayed above the rows in the table.
Virtual Mode	Determines whether the table will be in a virtual or flat mode in the Web client. If so, the collapse and expand options will not be available.

Other visualization-specific properties can be set by clicking on the **Records** variable drop area and then selecting the X-Axis tab:



Setting	Description
Word Wrap	Determines whether to wrap the X-axis text.
Show Grid Lines	Determines whether grid lines are drawn on the X-axis.
Axis Bar Thickness	The margin in pixels for the axis. If set to zero, the axis is removed.
Alignment	The alignment of the column text header: **Left**  , **Center**  , or **Right**  .
Foreground	Foreground color of the X-axis.
Background	Background color of the X-axis.
Column Axis Bar Thickness	The thickness of the bar from the column axis.

Ticker Tile Settings

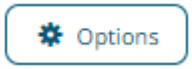
The Ticker Tile is used to display three metrics, typically:

- Price
- Change in Price
- % Change in Price

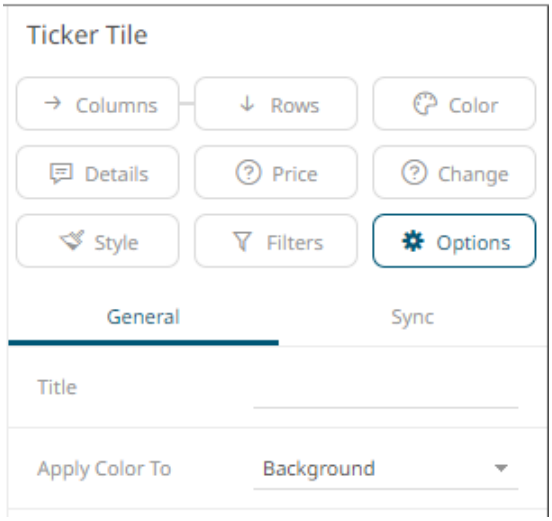
Where the price is displayed in a double height label, the change in price to the bottom left of the tile, and the color shown as the background of the tile, and the numeric value displayed in the bottom right of the tile.

Icons can also be added to the tile to indicate the change in other metrics.

As with all visualizations, as data changes the tile will automatically update.

The ticker tile settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Apply Color To	Sets how the color variable is displayed: **Background** or **Text**

Treemap Settings

Treemaps represent hierarchical data sets, showing both each level in the hierarchy and how they interact with each other.

They are represented by a colorful mosaic of rectangular cells based on your data. The size of a cell reflects its importance. The color conveys urgency or variance:

- White – Target/Benchmark Performance
- Red – Under Performance
- Blue – Over Performance

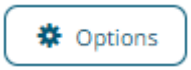
The intensity of the red or blue shades indicates the level of under- or over-performance.

Most people can learn to understand the information presented in a Treemap in under a minute – even if that Treemap is showing data representing an underlying data set of thousands of records.

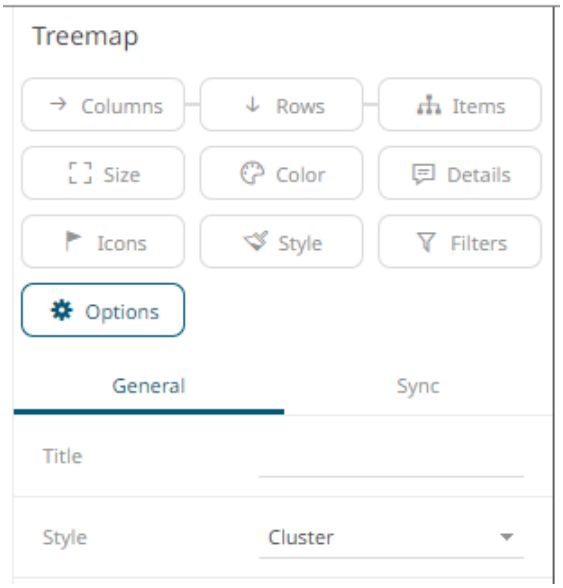
Our Treemaps are not static pictures. The real value of the visualization is quickly apparent when you interact with the data. Users can zoom, filter, and view details on demand, as well as link to and highlight other sources of information. For example, fund managers can link to a trading system directly from within the Treemap.

EX supports two different styles of Treemaps:

- Classic Treemaps
- Cluster Treemaps

The treemap settings pane is displayed after clicking the **Options** 

button.



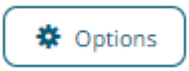
Setting	Description
Style	Specifies the style that will be applied in displaying performance of a Treemap level. Available options are: • Classic Best for displaying performance at leaf level. • Custer Best for simultaneously displaying performance at all levels. This is the default style.

Waterfall Chart Settings

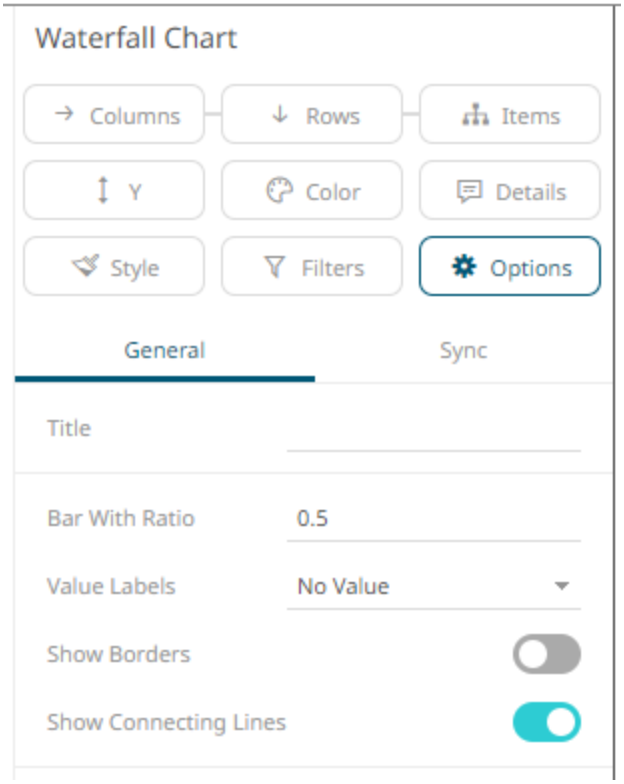
Waterfall Charts are a form of cumulative Bar Chart, showing the cumulative effect across a series of changes.

They can aid in the understanding of how performance changes contribute to a final position.

Color can be used to represent either a Stage in the process, or the change in performance for that stage.

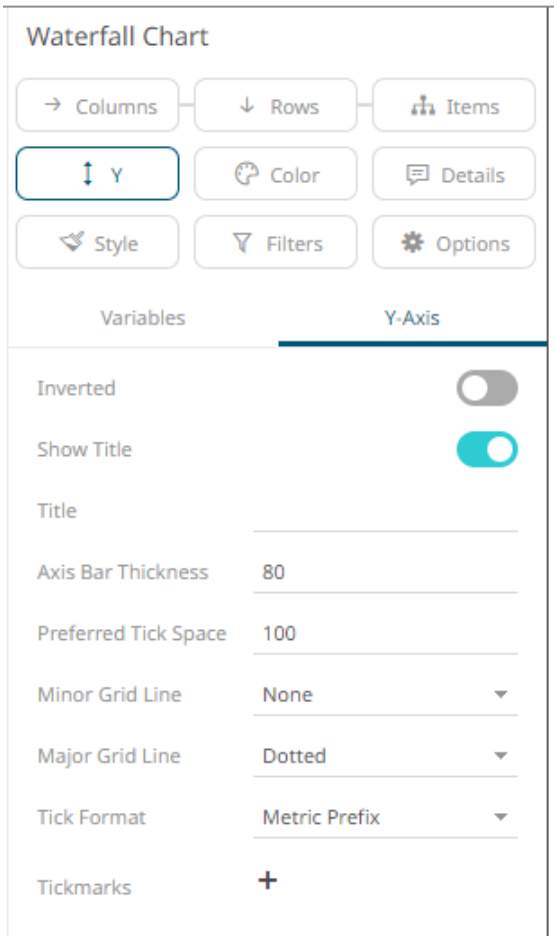
The waterfall chart settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Bar Width Ratio (%)	Defines the ratio of the width within the bars. Default is **.5**.
Value Labels	Defines what type of value labels are shown in bars: **Bar Value** or **Cumulative Value**.
Show Borders	Determines whether borders are drawn around bars.
Show Connecting Lines	Determines whether connecting lines are drawn between bars.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



TIMESERIES VISUALIZATION SETTINGS

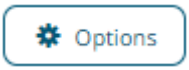
Candle Stick Graph Settings

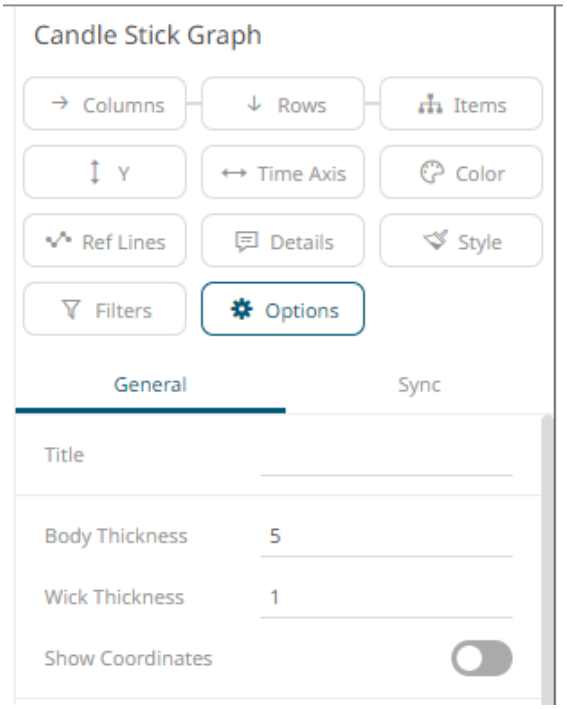
Candle stick graphs are a traditional financial visualization for display of time-based price distributions. Specifically, for each time slice, they display:

- Opening Price
- Highest Price
- Lowest Price
- Closing Price

The Candle is filled if the closing price is lower than the open and empty if the closing price is higher than the open.

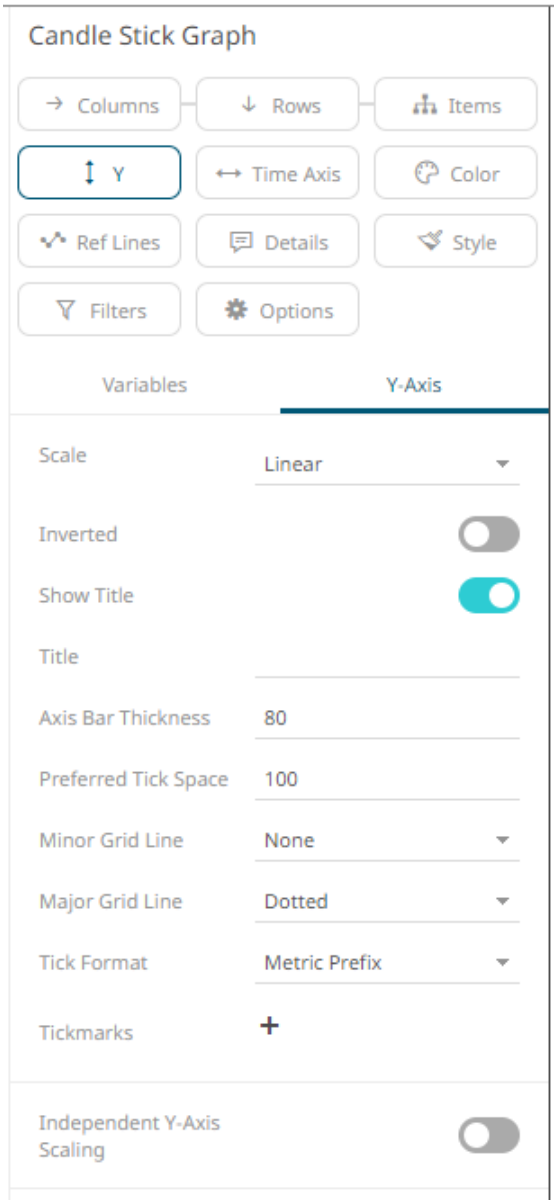
The vertical line (or candle wick) displays the range of traded prices across the period.

The candle stick graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Body Thickness	Specifies the width in pixels of the Candle Stick Body.
Wick Thickness	Specifies the width in pixels of the Candle Stick Wick.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

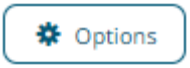


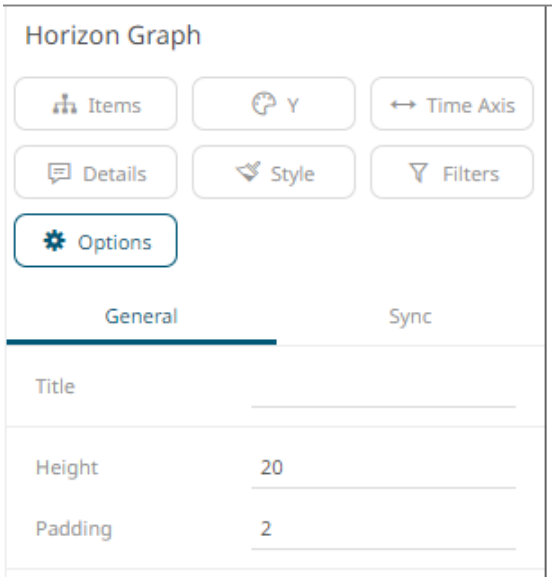
Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

Horizon Graph Settings

Horizon Graphs are a fantastic way to overview a large number of time series in a limited rectangular space. Since this visualization packs the information in a line graph in 1/6th the space through smart pre-attentive color encoding, it allows for an overview of a large number of time series. Users can scan huge amounts of data points across all relevant time series and immediately identify areas of concern that require closer scrutiny.

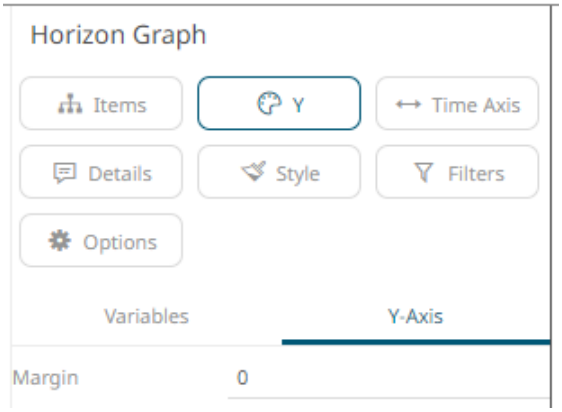
Our Horizon Graph visualization is particularly useful when you need to see a large number of time series on a single screen. This makes it easy to compare trends and spot patterns that would be very difficult or impossible to see in a standard report.

The horizon graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Height	Specifies the vertical height in pixels for an individual Horizon.
Padding	Specifies the vertical space in pixels between adjoining Horizons.

Other visualization-specific properties can be set by clicking on the **Y-Axis** variable drop area and then selecting the Y-Axis tab:

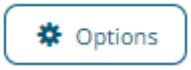


Setting	Description
Margin	Margin from the Y axis.

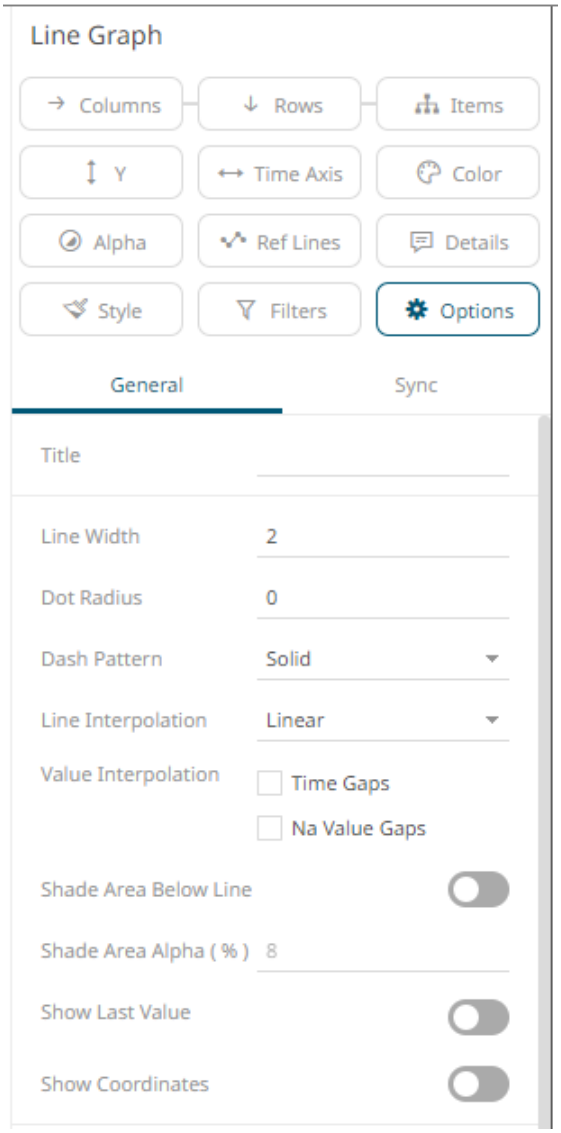
Line Graph Settings

Line Graphs are easy to understand and are a great way to communicate important time-based trends, clustering, and outliers.

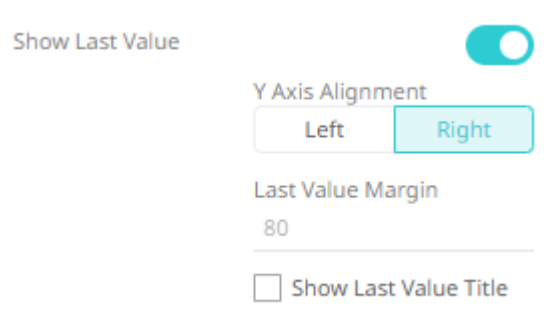
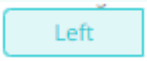
They work especially well when comparing ten or fewer data sets (our Horizon Graph is a good solution for displaying time series data with ten or more data sets).

The line graph settings pane is displayed after clicking the **Options** 

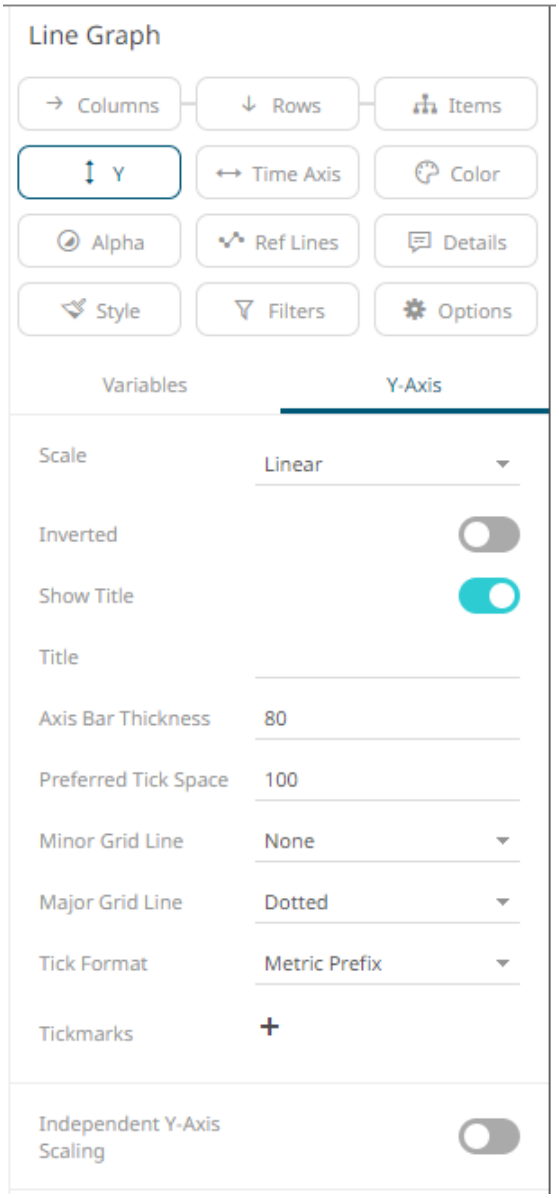
button.



Setting	Description
Line Width	Specifies the line width in pixels.
Dot Radius	Specifies the radius of each data point in pixels.
Dash Pattern	Specifies the line pattern. Available options are: • Dotted • Dashed

	• Solid
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.
Value Interpolation Time Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Shade Area Below Line	Defines that alpha shades are applied between the lines and the zero Y grid line.
Shade Area Alpha (%)	Specifies the alpha (transparency) of the shaded area, expressed in percent 0-100 of the alpha value currently set on the line.
Show Last Value	Determines if the flag of the last value will be displayed. Once enabled, the *Y-Axis Alignment* settings section displays  • Select  to display Y-axis on the left side. • Select  to display the Y-axis on the right side. • Enter the *Last Value Margin*. Default is **80**. • Check the **Show Last Value Title** box to display the title of the last value in the flag.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



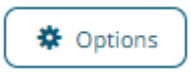
Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

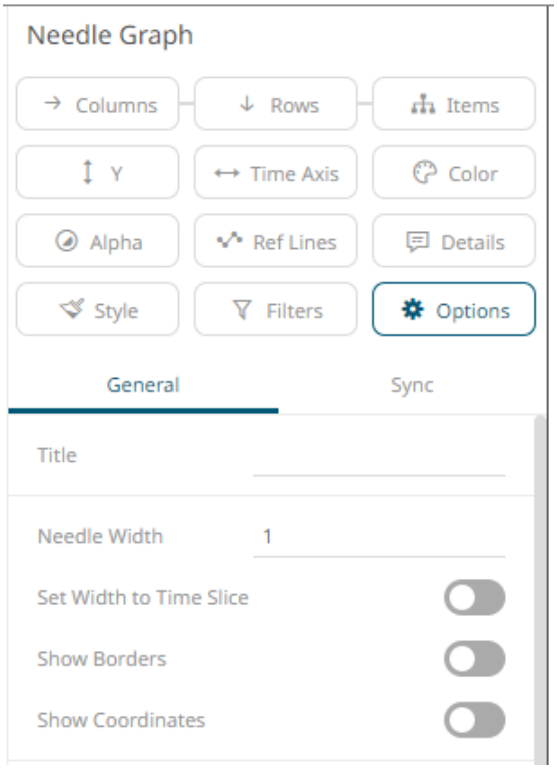
Needle Graph Settings

Needle Graphs display time-based transactions or occurrence frequencies, rather than time-based trends. They are simply time-based Bar Graphs where each bar is located at a particular time point on the axis.

They work especially well when combined with a Line Graph.

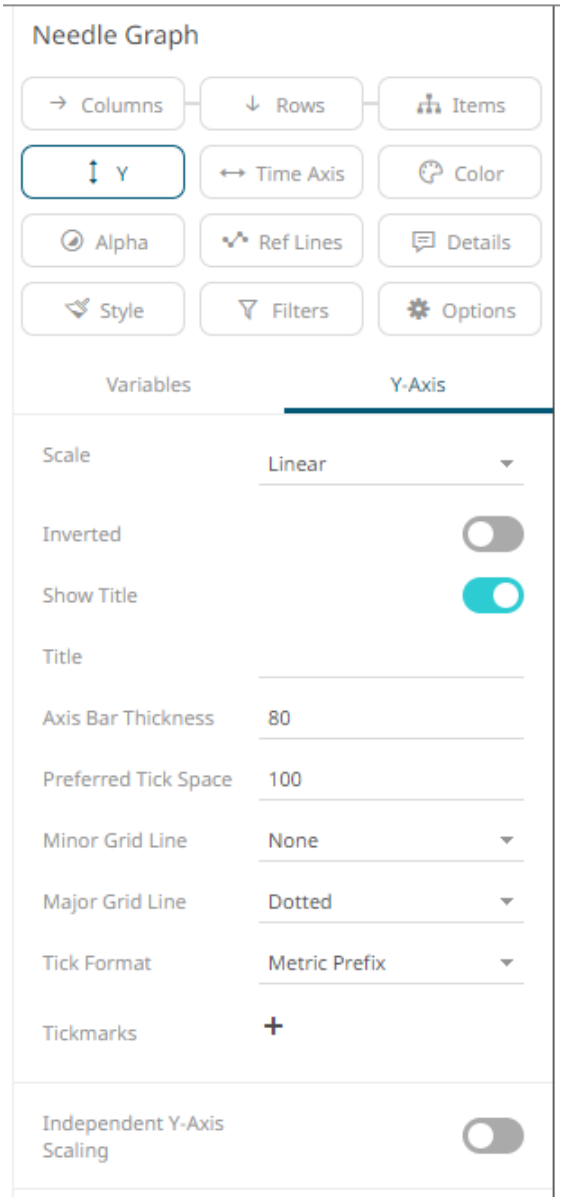
The most common use of a Needle Graph is when showing the trading volume for a stock, typically underneath the price performance.

The needle graph settings pane is displayed after clicking the **Options**  button.



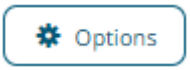
Setting	Description
Needle Width	Specifies the width in pixels for each needle:
Set Width to Time Slice	Determines whether the Needle width will be extended to the width of the time slice. **NOTE:** Will not go past a null/empty time slice.
Show Borders	Determines whether borders are drawn around needles. These are only visible if the Needle Width is greater than 1 pixel.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

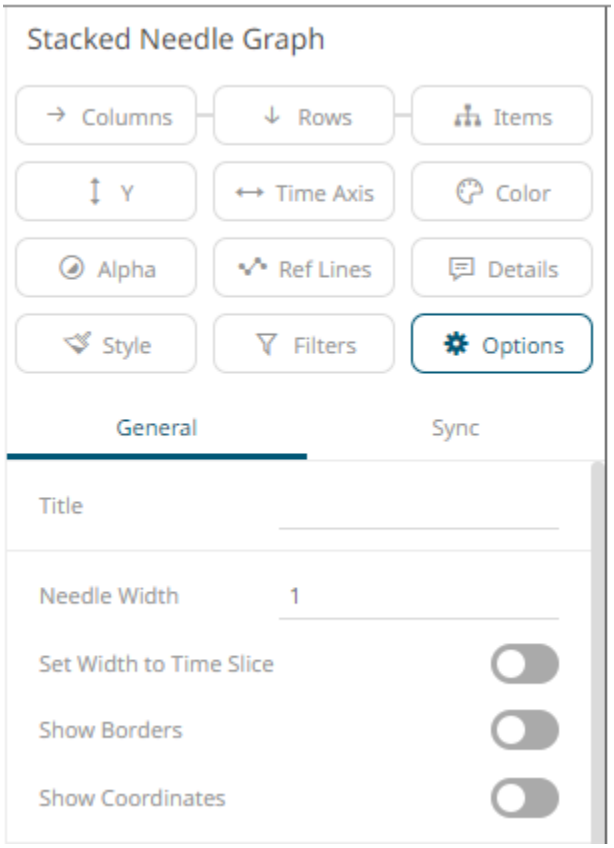
Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

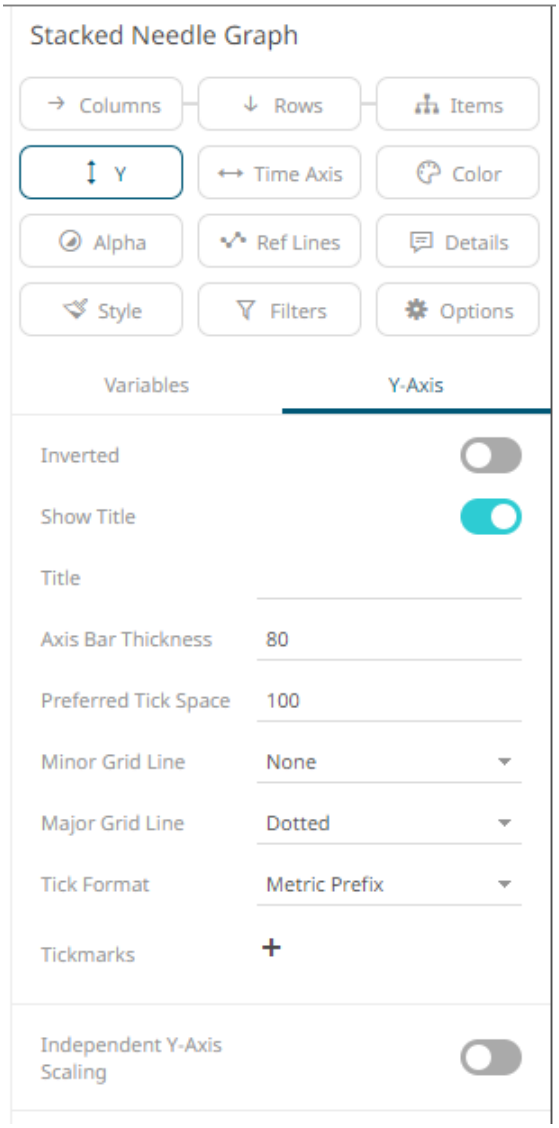
Stacked Needle Graph Settings

The stacked needle graph settings pane is displayed after clicking the **Options**  button.



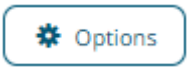
Setting	Description
Needle Width	Specifies the width in pixels for each needle:
Set Needle Width to Time Slice	Determines whether the Needle width will be extended to the width of the time slice. **NOTE:** Will not go past a null/empty time slice.
Show Borders	Determines whether borders are drawn around needles. These are only visible if the Needle Width is greater than 1 pixel.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

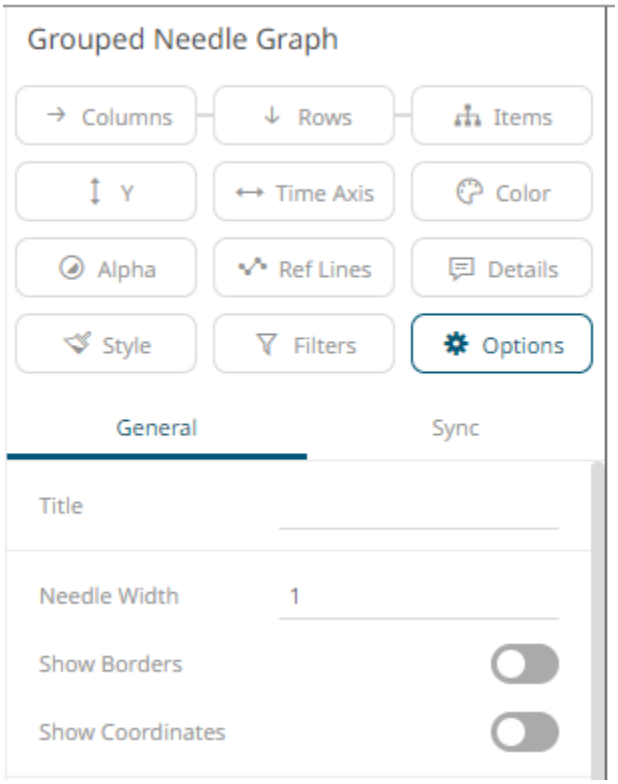
Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

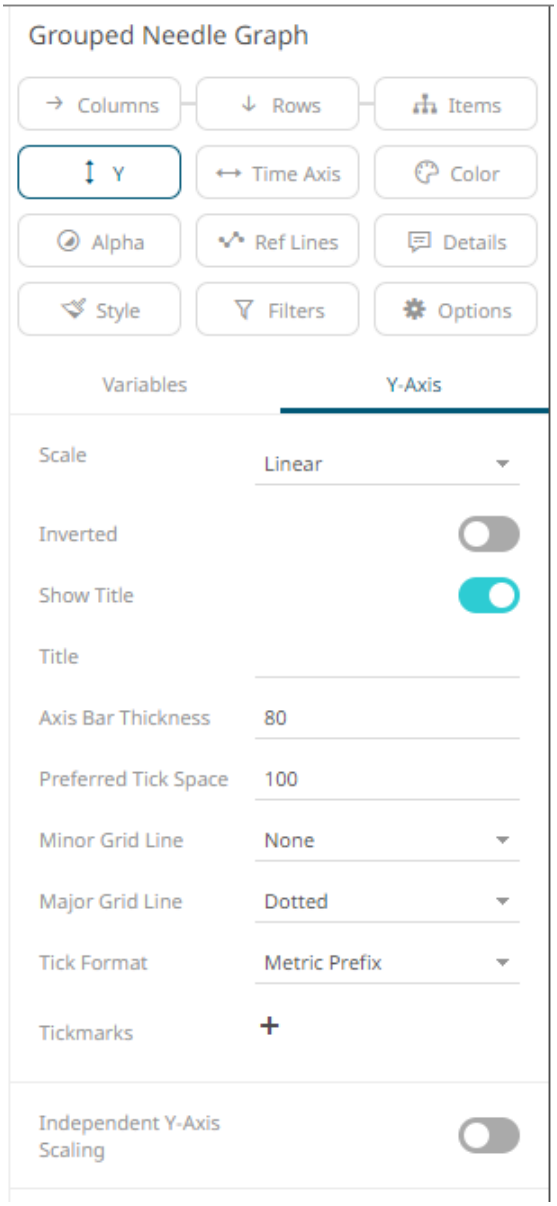
Grouped Needle Graph Settings

The grouped needle graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Needle Width	Specifies the width in pixels for each needle:
Show Borders	Determines whether borders are drawn around needles. These are only visible if the *Needle Width* is greater than 1 pixel.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



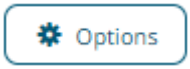
Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

OHLC Graph Settings

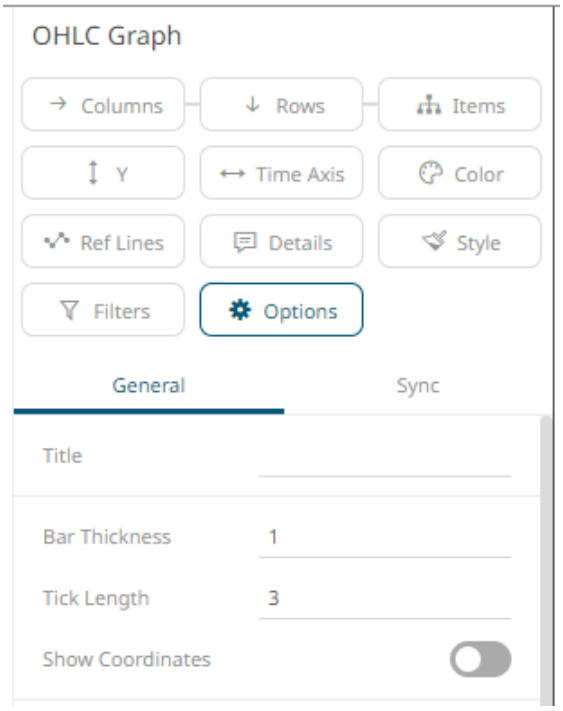
OHLC Graphs also display time-based distributions of price data. For each time slice, they display:

- Opening Price
- Highest Price
- Lowest Price
- Closing Price

Similar with the Candle Stick Graph, a vertical line defines the range of traded prices across the period. However, in this case, the left notch determines the opening price and the right notch determines the closing price.

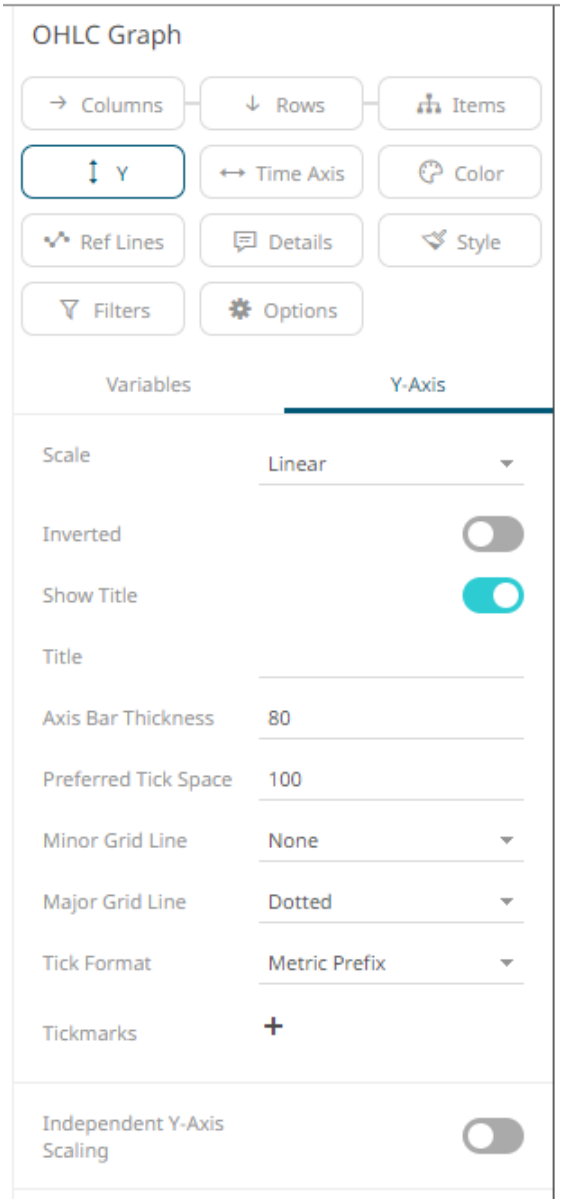
The OHLC graph settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Bar Thickness	Specifies the width in pixels of the OHLC Body.
Tick Length	Specifies the length in pixels of the Open and Close ticks.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

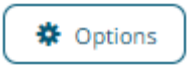


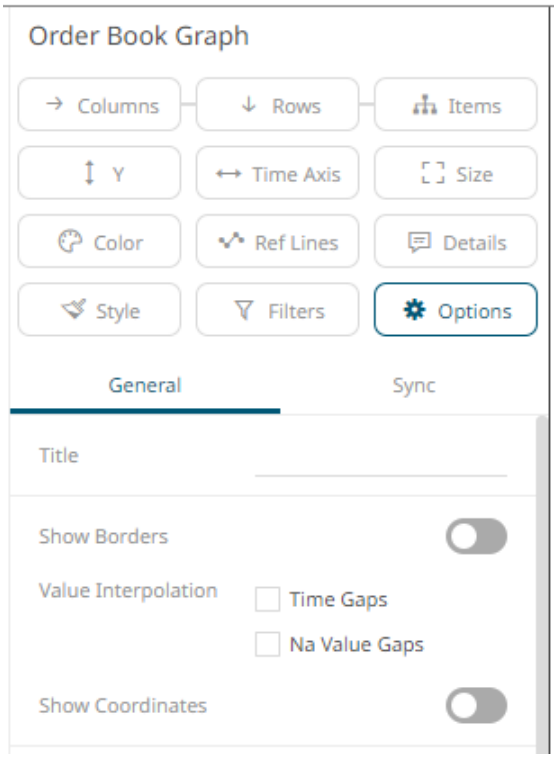
Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

Order Book Graph Settings

The Order Book Graph displays an aggregated order book of prices and associated sizes across time. For each time slice, it displays:

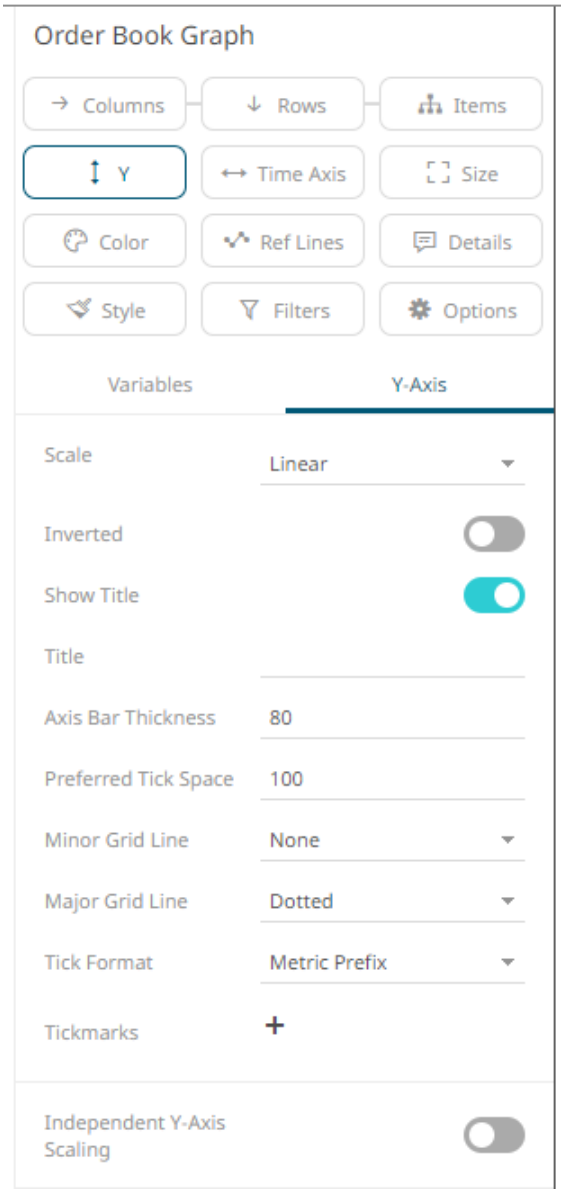
- Price (as Height)
- Tick Size (as Size)
- Order Size (as Color)
- Duration of Aggregated Orders at a given price (time period)

The order book graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Show Borders	Determines whether a border is drawn around each bar.
Interpolate Across Time Axis Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Interpolate Across Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

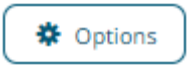
Price Band Graph Settings

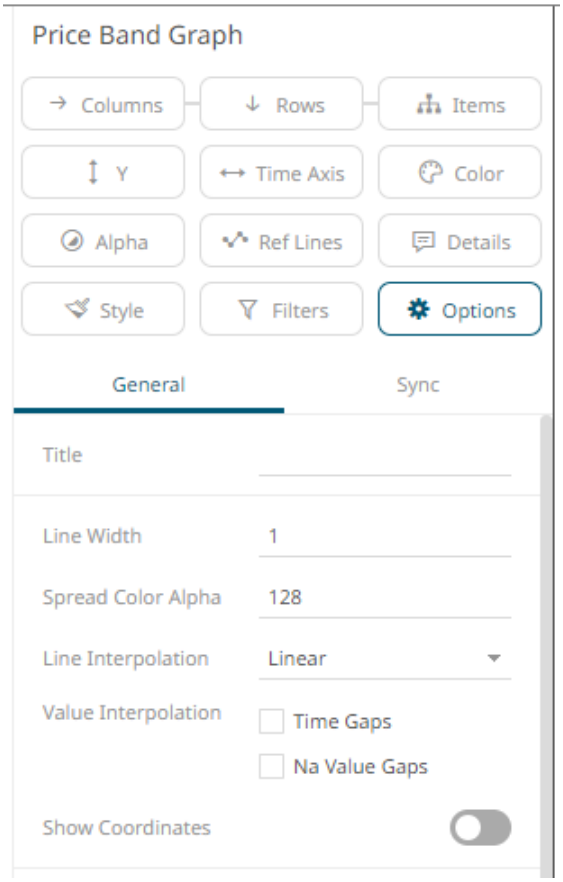
The Pricing Band Graph displays the variance or spread between two time-based metrics.

Each grouping defined in the breakdown will be displayed as a separate layer of the overall graph, where typically color is used to display the category.

As it is expected that spread layers will occlude, the transparency is defaulted to 50% and can be modified as appropriate.

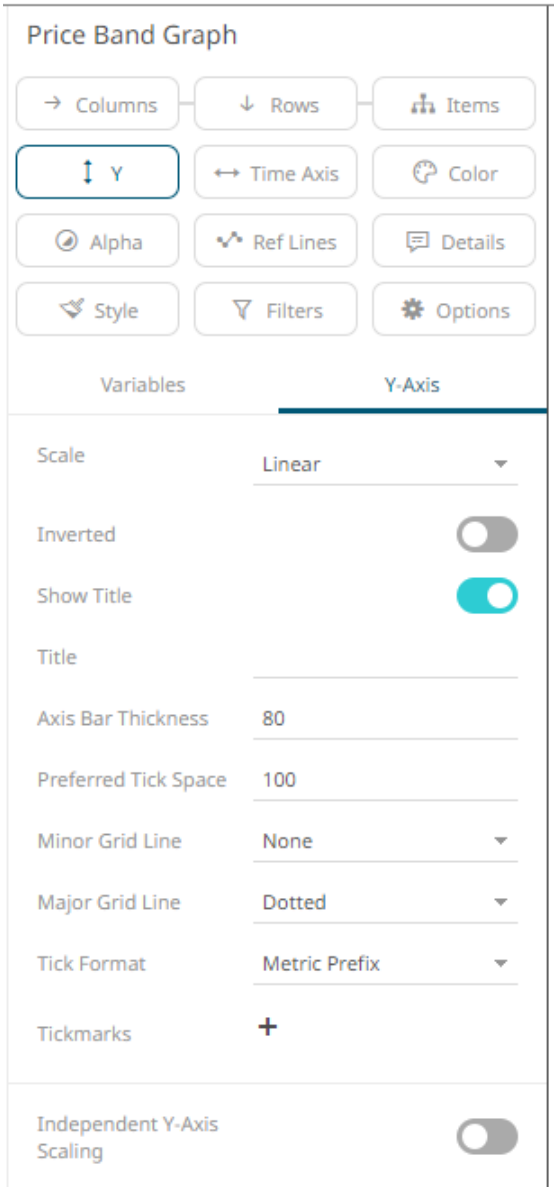
Typical use cases include comparing the pricing bid offer spreads from multiple liquidity providers.

The price band graph settings pane is displayed after clicking the **Options**  button.



Setting	Description
Line Width	Select the line width (in pixels)
Spread Color Alpha	Specifies the level of color transparency/opacity for the Positive and Negative Spread colors. The value is from 0 to 255 with the default set to 128.
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.
Value Interpolation Time Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

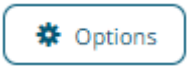


Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

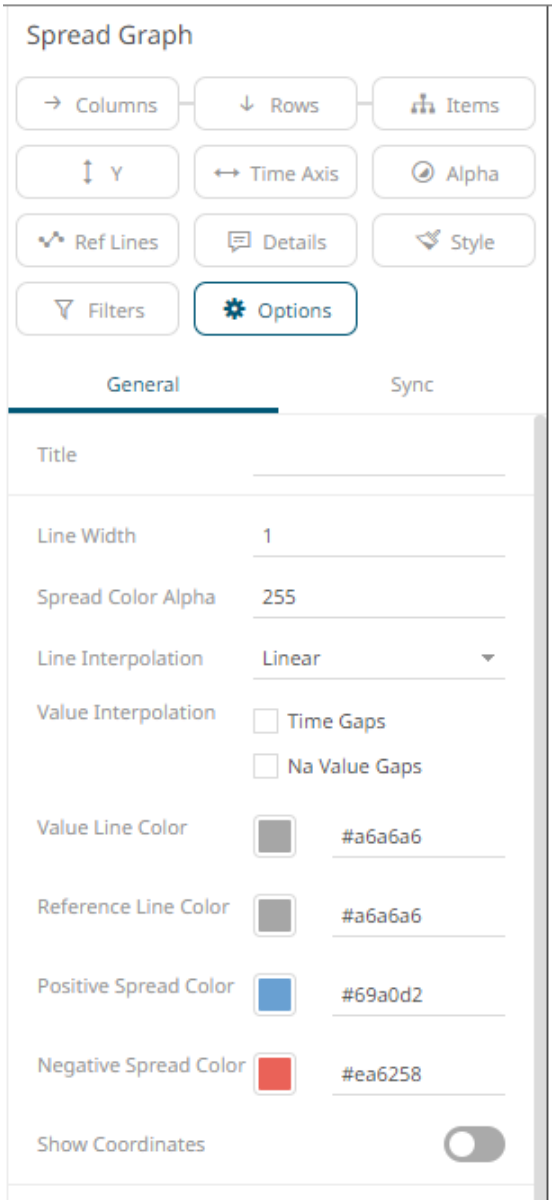
Spread Graph Settings

The Spread Graph displays the variance or spread between two time-based data series.

Typical use cases include comparing a stock's price performance to an Index or a bond's yield to a benchmark rate.

The spread graph settings pane is displayed after clicking the **Options** 

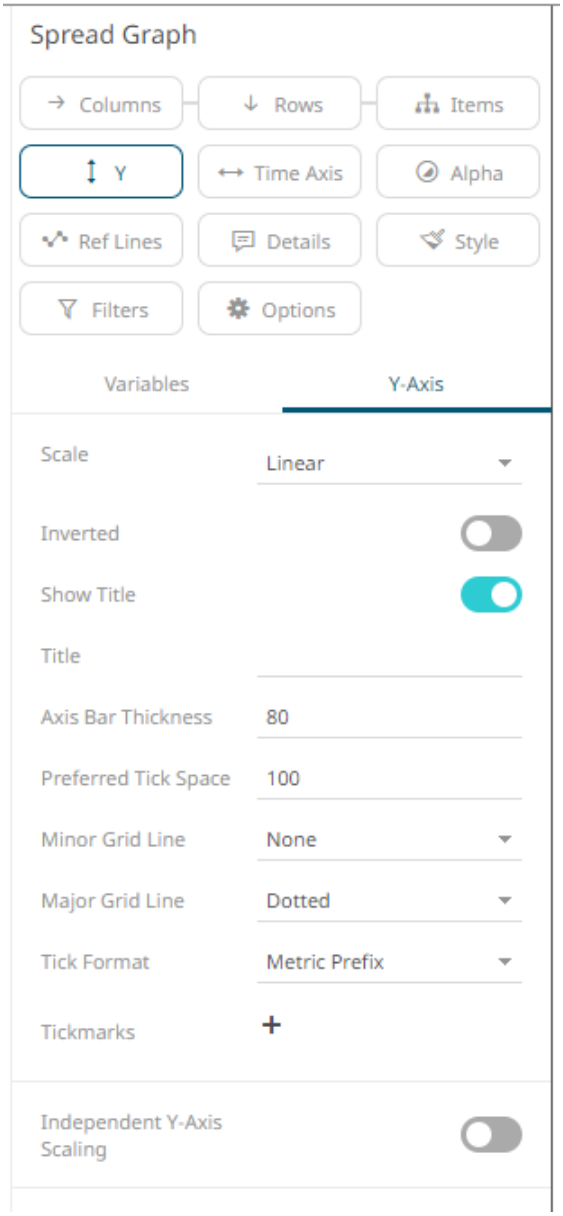
button.



Setting	Description
Line Width	Specifies the width in pixels of the Spread Graph data series lines.
Spread Color Alpha	Specifies the level of color transparency/opacity for the Positive and Negative Spread colors. The value is from 0 to 255 with the default set to **128**.
Line Interpolation	Specifies the interpolation mode as **Linear,** S**tepped,** or **Smooth**.
Value Interpolation Time Gaps	Determines whether to interpolate across weekend and closed period gaps.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Value Line Color	Specifies the color of the value line data series.
Reference Line Color	Specifies the color of the reference line data series.

Positive Spread Color	Specifies the color when the spread between the value and reference is positive.
Negative Spread Color	Specifies the color when the spread between the value and reference is negative.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:

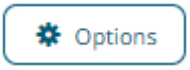


Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

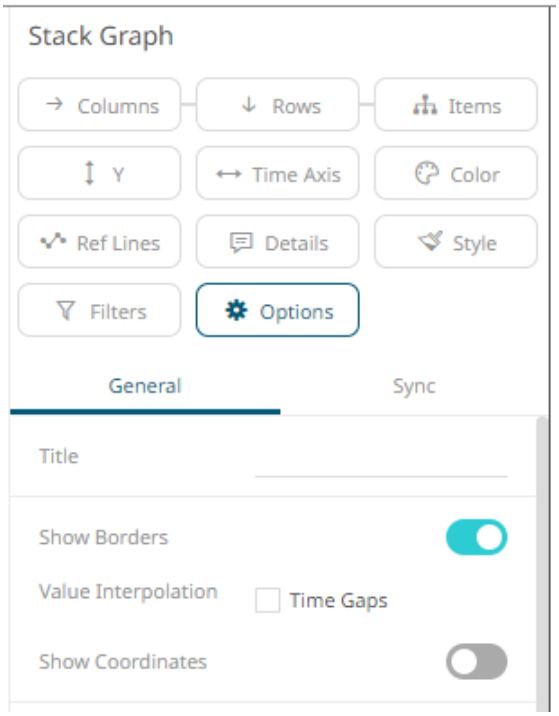
Stack Graph Settings

Stack Graphs let you visualize quantitative changes to several data sets over time, and you can see how each data point contributes to the total. As with the Treemap the Height of the stack relates Importance, while the color relates Urgency or variance.

Stack Graphs are a great way to look at revenue or gross profit figures over time across several product lines. Stack Graphs are also good to use when you have up to ten or eleven time series data sets to look at, especially for data sets that have a large number of data points.

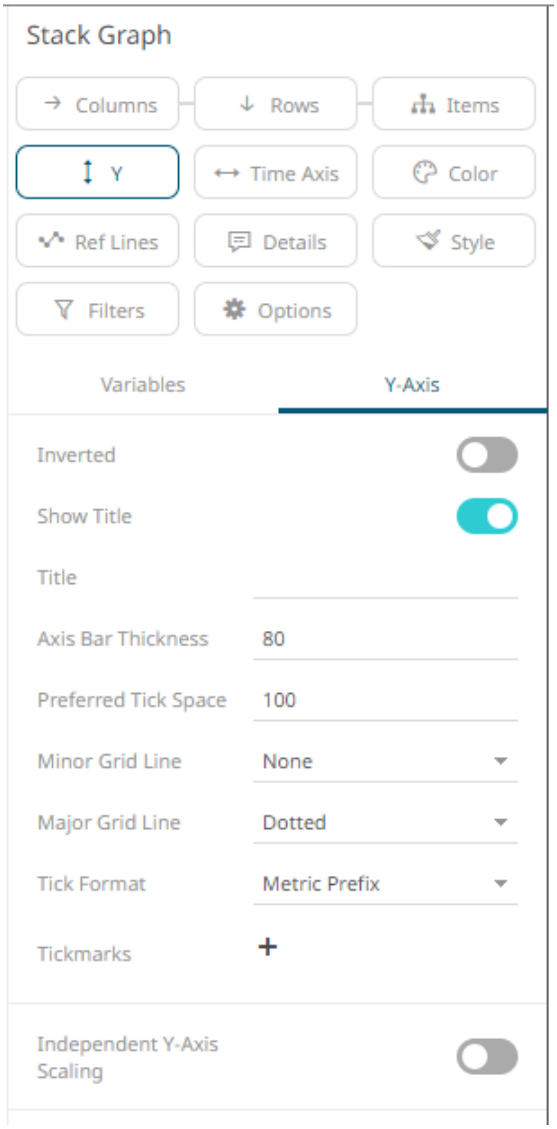
The stack graph settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Value Interpolation Time Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Show Border	Determines whether borders are drawn around stacks.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



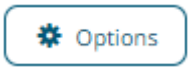
Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

Timeseries Scatter Plot Settings

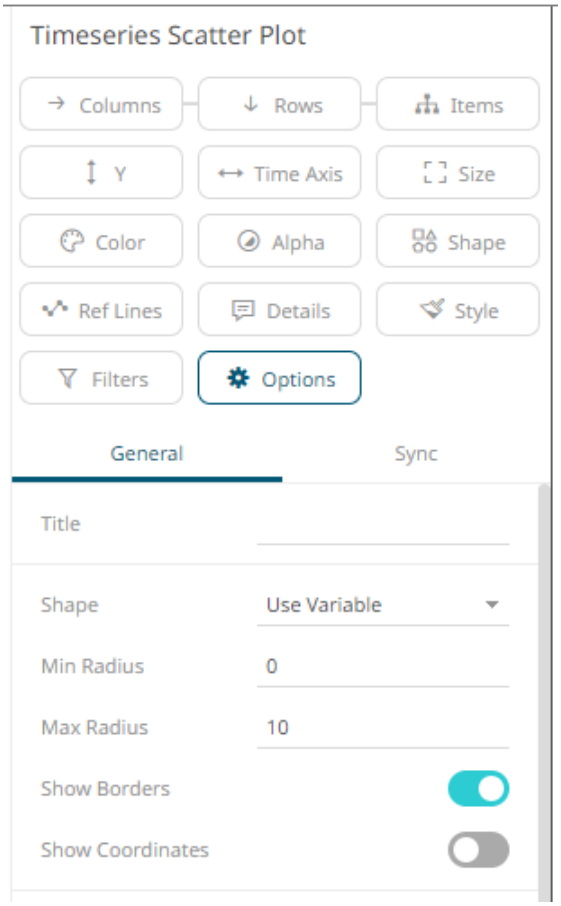
Time Series Scatter Plots display time-based transactions, similar to the Needle graphs. Like the scatter plot, it displays individual data points (or transactions), with a given numeric Y value and a given timestamp X value.

Common uses include displaying transaction volume across time relative to the price at which the volume was executed and displaying order book depth across time.

Typically, the graph is combined with line graphs to show the scatter points relative to defined boundaries.

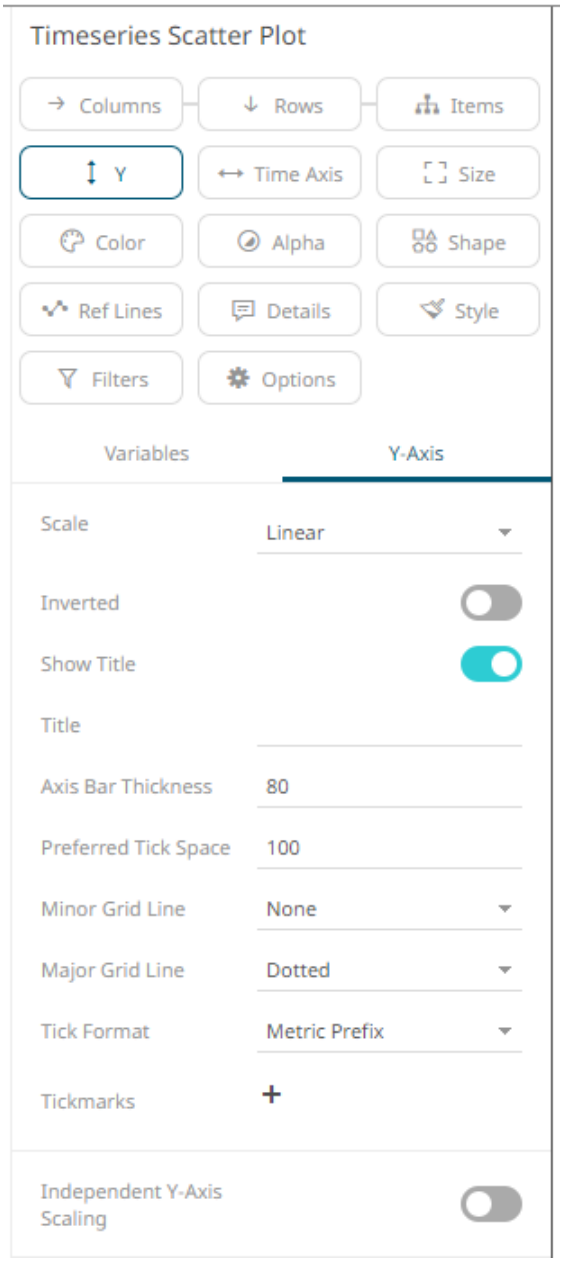
The timeseries scatter plot settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Shape	The shape of the scatter point. This can be: • Filled Circle • Circle • Filled Square • Square • Use Variable – shapes can be specified for the elements in the visualization through the Shape variable
Min Radius	The minimum radius in pixels of the scatter point.
Max Radius	The maximum radius in pixels of the scatter point.
Show Borders	Determines whether a border is drawn around each scatter point.
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



Setting	Description
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.

Timeseries Surface Plot Settings

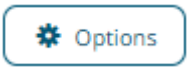
Time Series Surface Plots are used to identify trends and outliers within Time Series surfaces, typically forward curves across time.

The Surface is made up of a series of points where each point has:

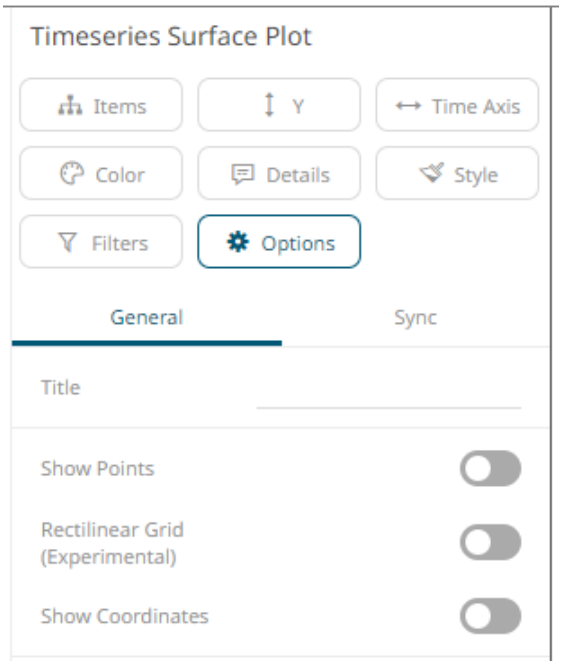
- Time Position
- Y Position

- Color (which represents the Z axis).

The color scale can be continuous or stepped to show a surface gradient.

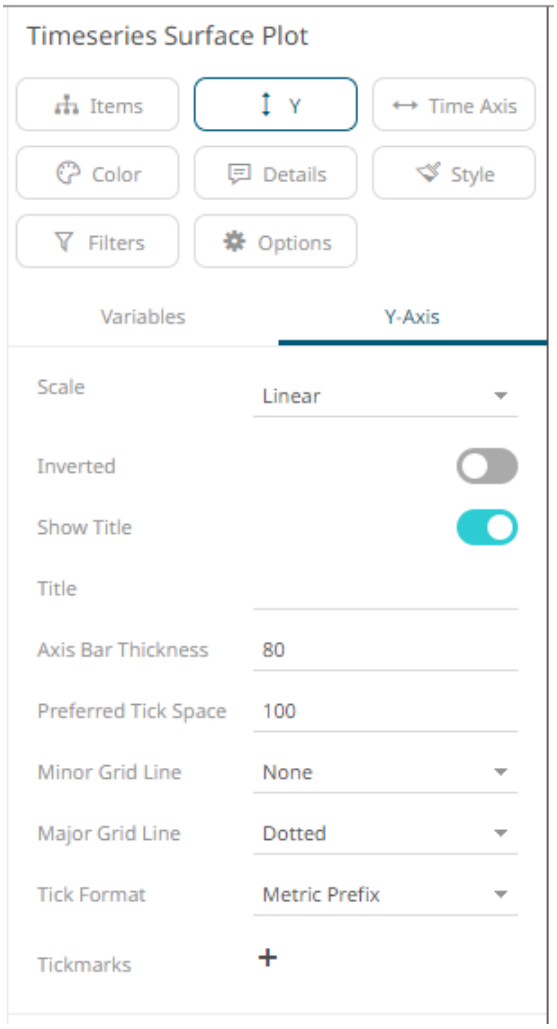
The timeseries surface plot settings pane is displayed after clicking the **Options** 

button.



Setting	Description
Show Points	Determines whether surface data points are shown.
Rectilinear Grid	Determines whether distinct y values and time slices are changed into a rectilinear grid where missing values are filled in with a default of zero (or the ground level).
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization.

Other visualization-specific properties can be set by clicking on the Y-Axis variable drop area and then selecting the Y-Axis tab:



COMBINATION VISUALIZATIONS SETTINGS

The Combination Graphs allow combining multiple variables as layers in a series graph sharing a common x-axis.

Unlike other visualizations, the Text-, Numeric- and Time Combination Graphs allow combination of many variables, based on different columns of a data table, each rendered independently, using a selected visualization.

The Time Combination Graph allows rendering using the following visualizations:

- Line
- Candle Stick
- Bar
- Grouped Bar
- Stacked Bar
- OHLC (Open-High-Low-Close)
- Order Book
- Price Band
- Scatter

- Spread
- Stack

The Text- and Numeric Combination Graphs support the following visualizations:

- Line
- Price Band
- Bar
- Grouped Bar
- Stacked Bar
- Scatter
- Spread
- Stack

All of the combination graphs also support reference lines, left and right y-axis as well as cross-tabbing, to create multiple small visualizations across dimensions.

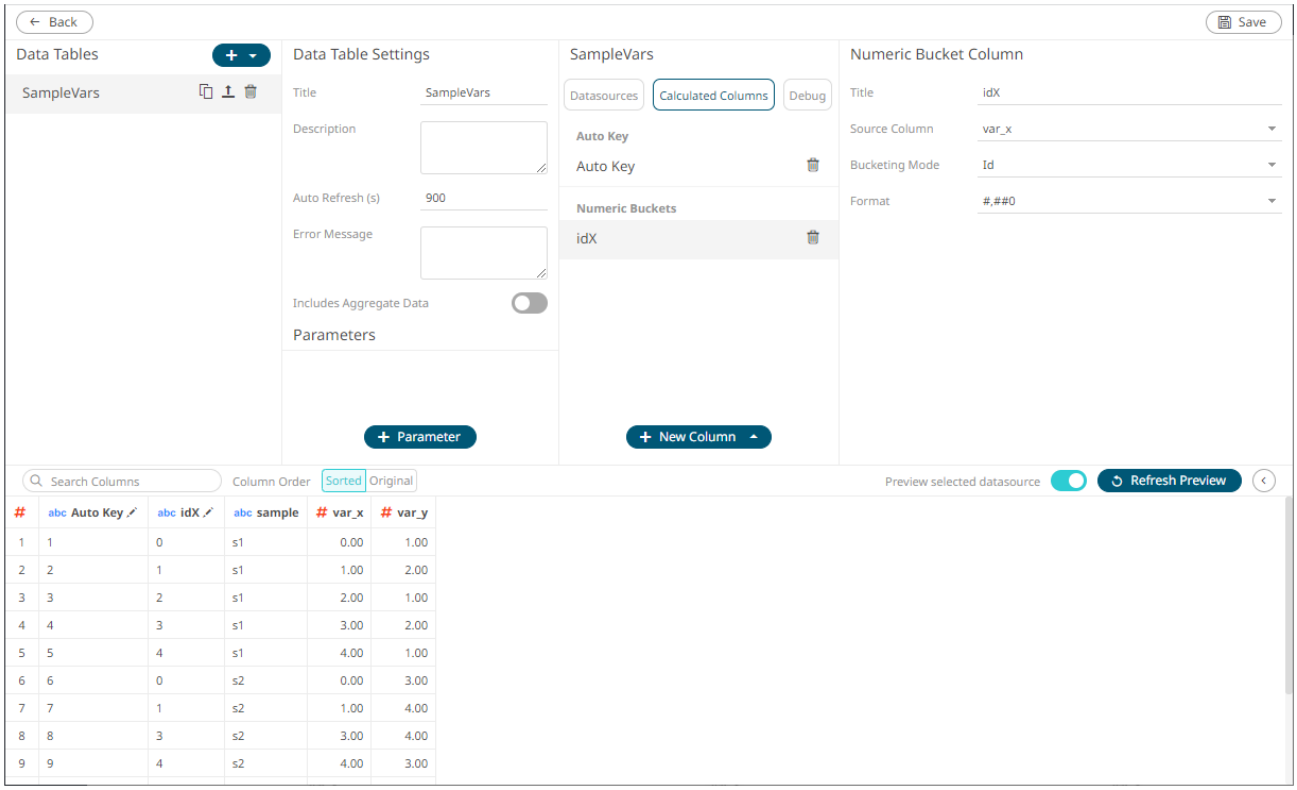
Guidelines in Using the Numeric Combination Graph

Sample data used in this section.

sample	var_x	var_y
s1	0	1
s1	1	2
s1	2	1
s1	3	2
s1	4	1
s2	0	3
s2	1	4
s2	3	4
s2	4	3
s3	0	5
s3	1	6
s3	2	5
s3	3	6
s3	4	5

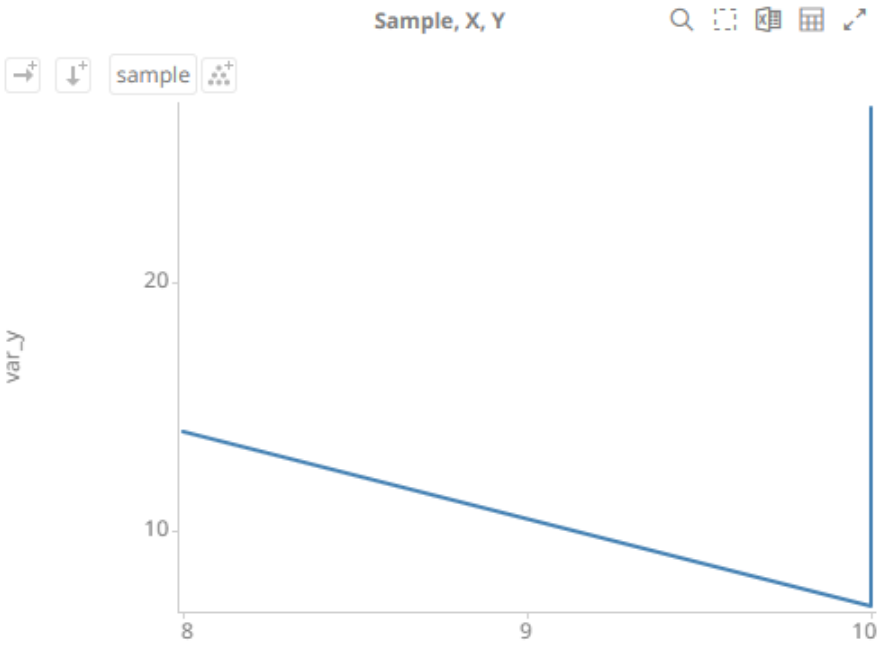
When you want to visualize several samples, or series, as lines of the same numeric variable in the Numeric Combination Graph, there is a requirement that you do the following:

- Create a Numeric Bucket column of type "Id" (unique values), based on the X-variable column

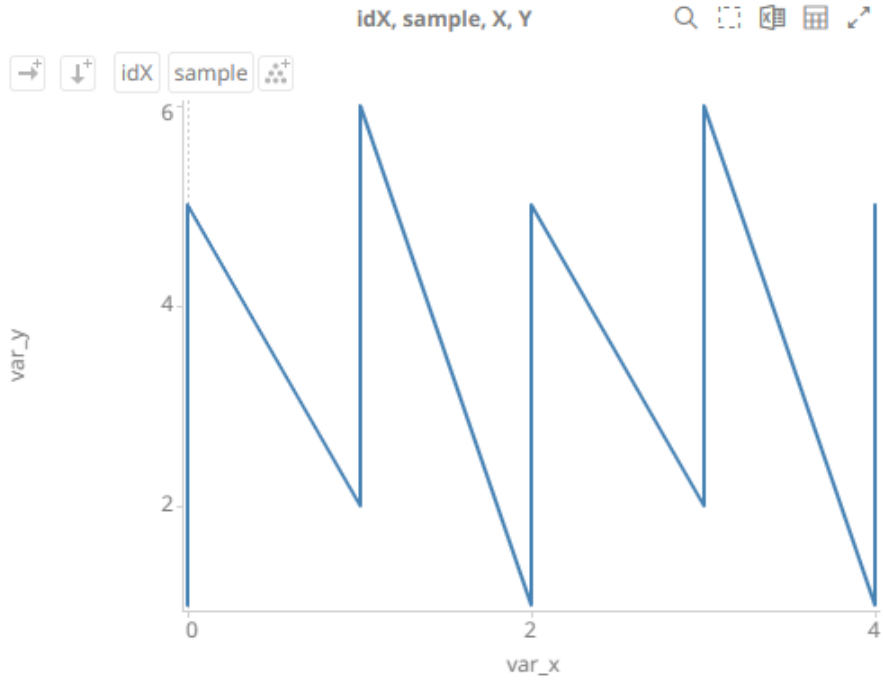


- ❑ Include the X-variable Id Numeric Bucket in the *Items* on the visualization

  Sample 1. Only the **sample** column is added on the *Items* list



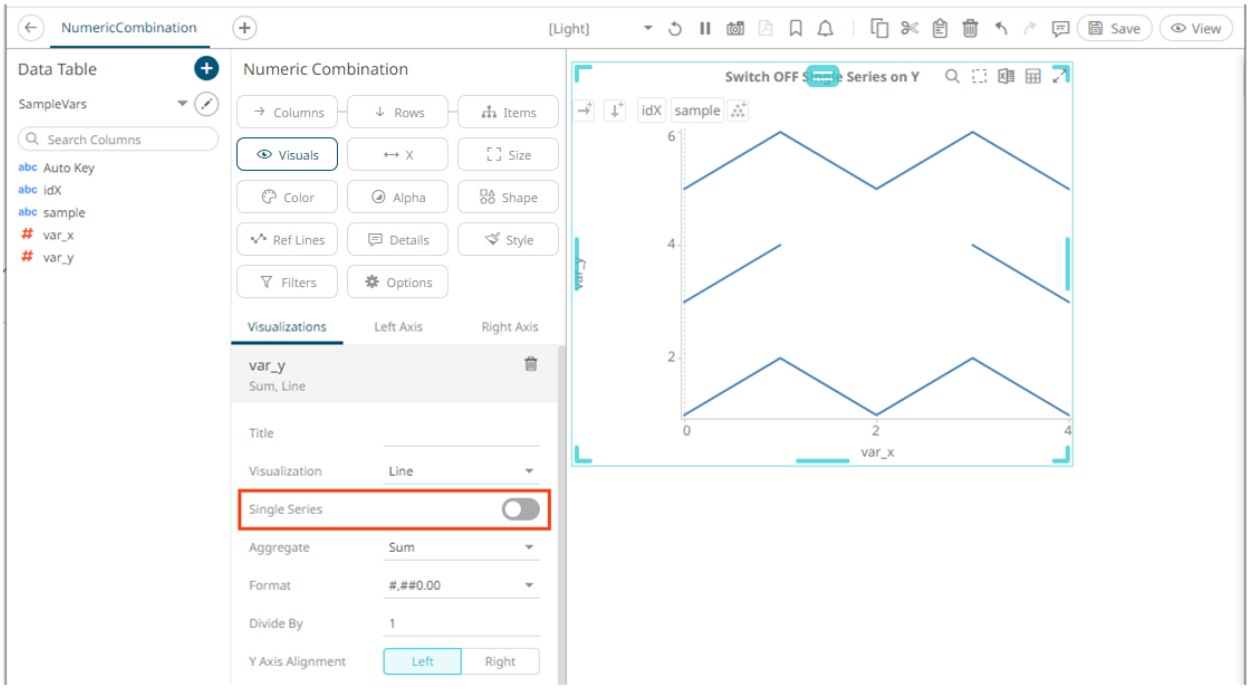
Sample 2. **sample** and **idX** columns are added on the *Items* list.



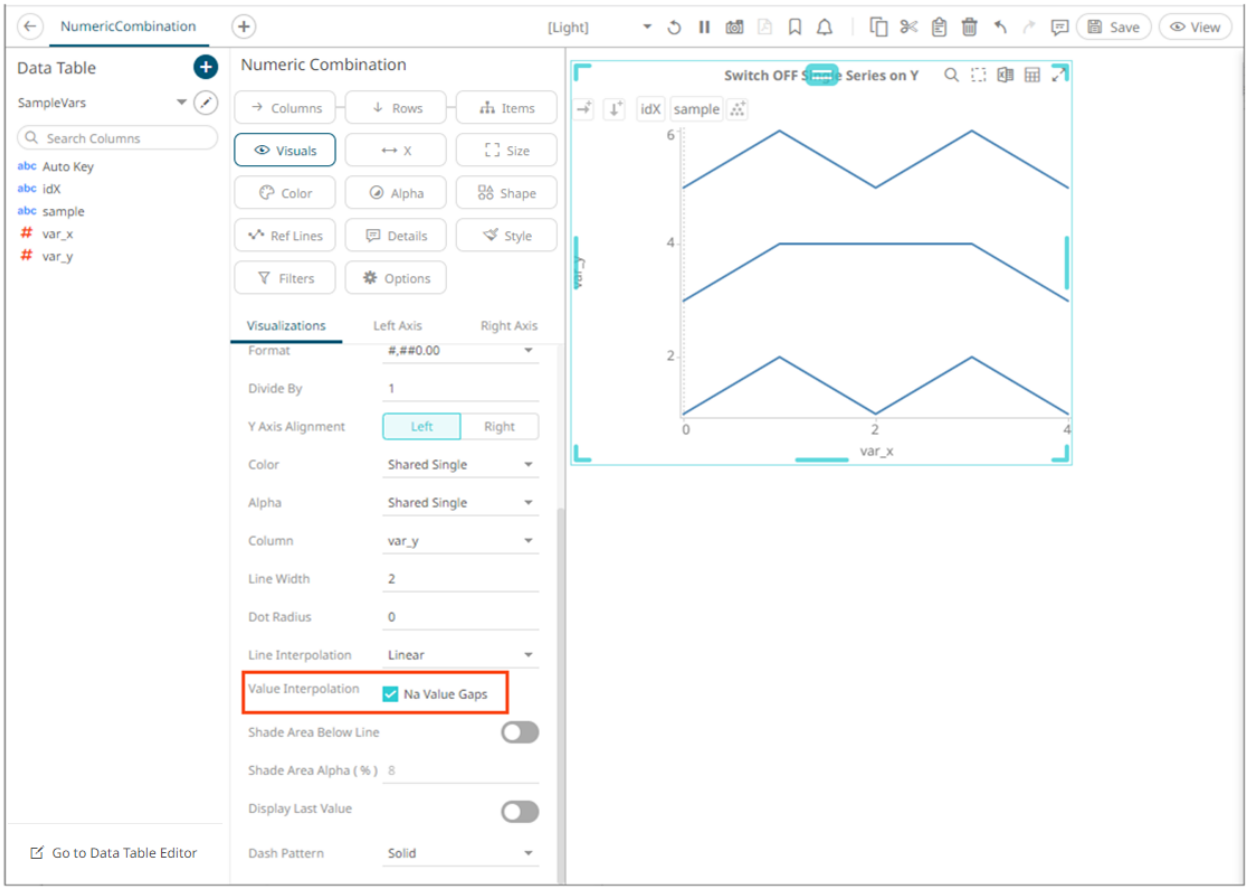
- Switch off Single Series for the Y-axis variable

  With the above settings in place, you will get separate lines per each sample identity. You will then also be able to color those line by the sample identity. If your dataset has missing values, for one or several of the samples/series, you can bridge those value gaps by switching on interpolation of NA value gaps on the Y-variable.

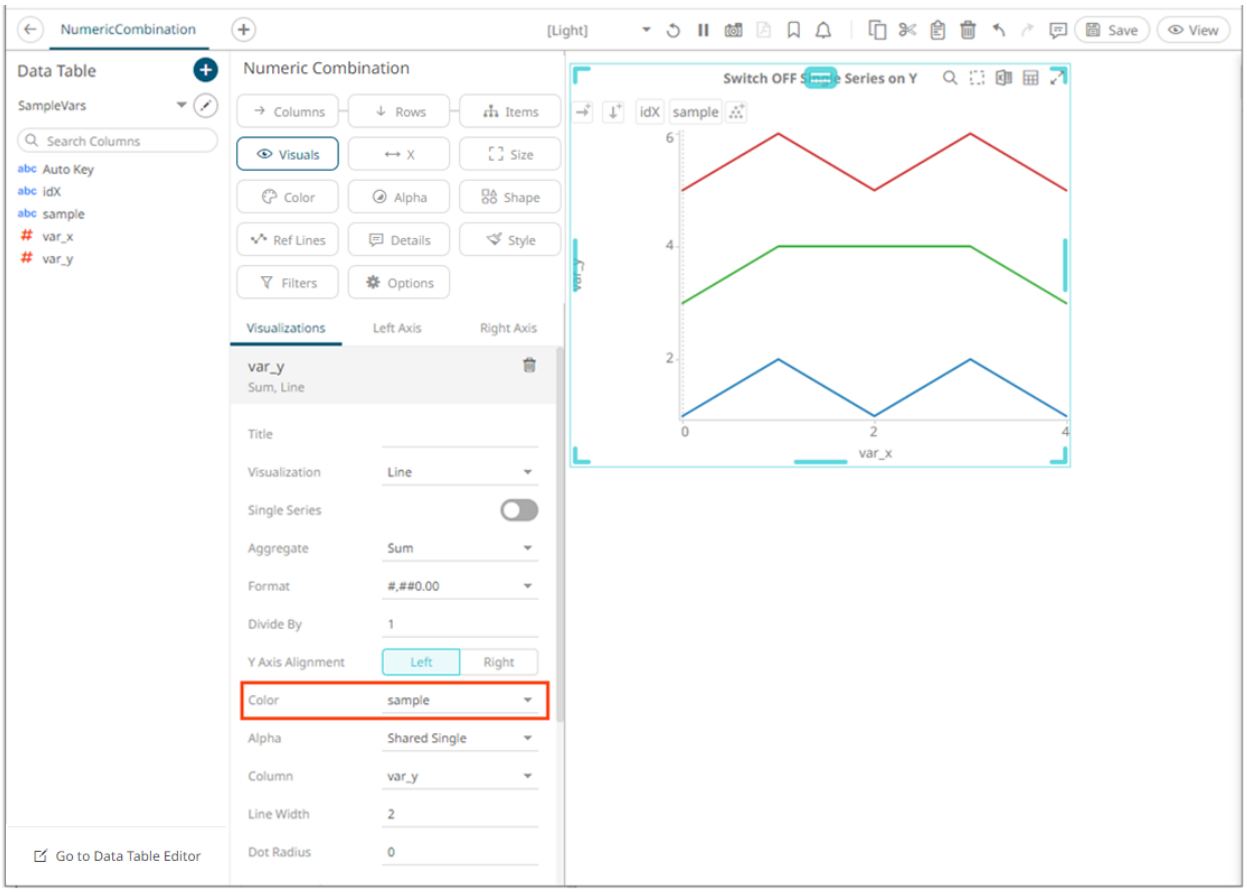
  Sample 3. Single series on Y is turned OFF



Sample 4. Interpolation of NA value gaps on Y is turned ON.



Sample 5. Color line by the sample column



Creating Density Plots in the Numeric Combination Graph

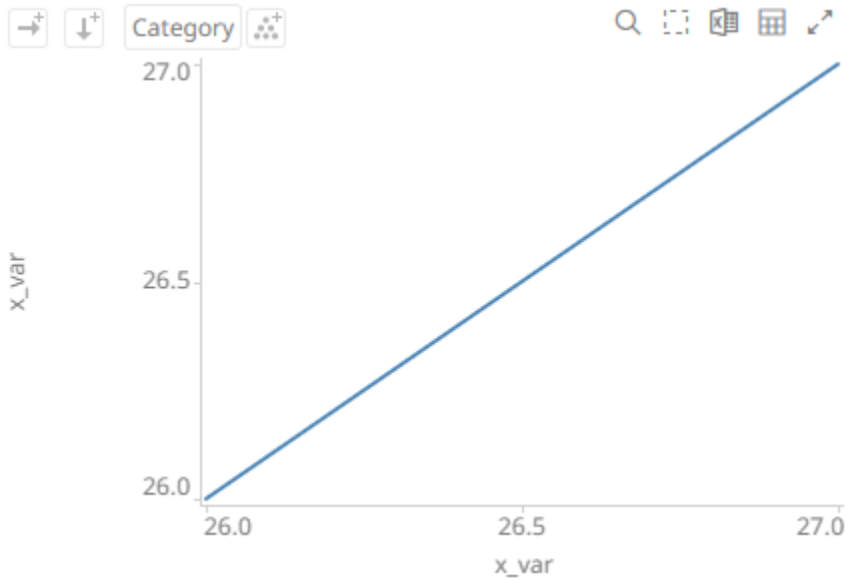
Sample data used in this section.

Category	x_var
A	1
A	1
A	1
A	2
A	3
A	3
A	4
A	4
A	4
A	4
B	1
B	2

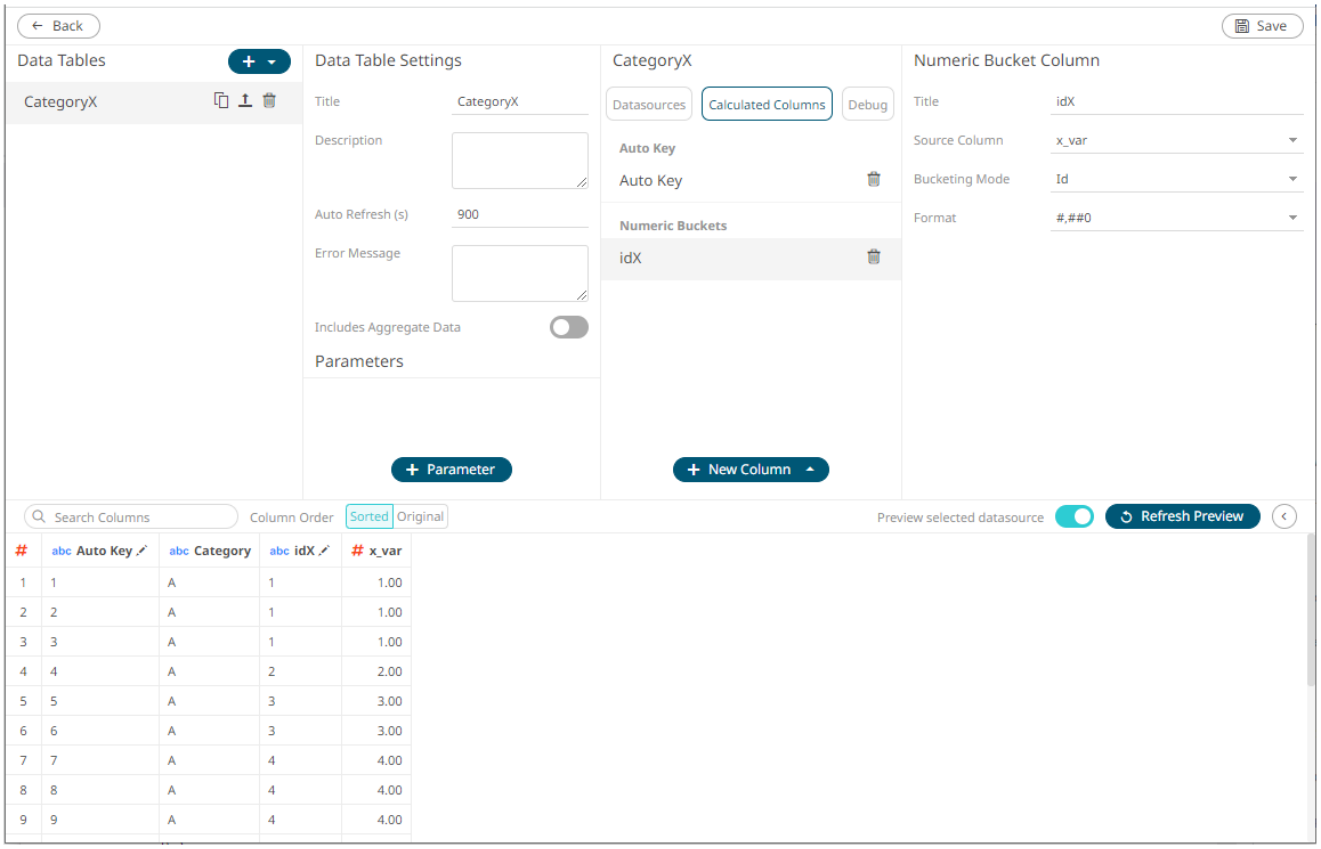
B	2
B	2
B	2
B	3
B	3
B	3
B	4
B	4

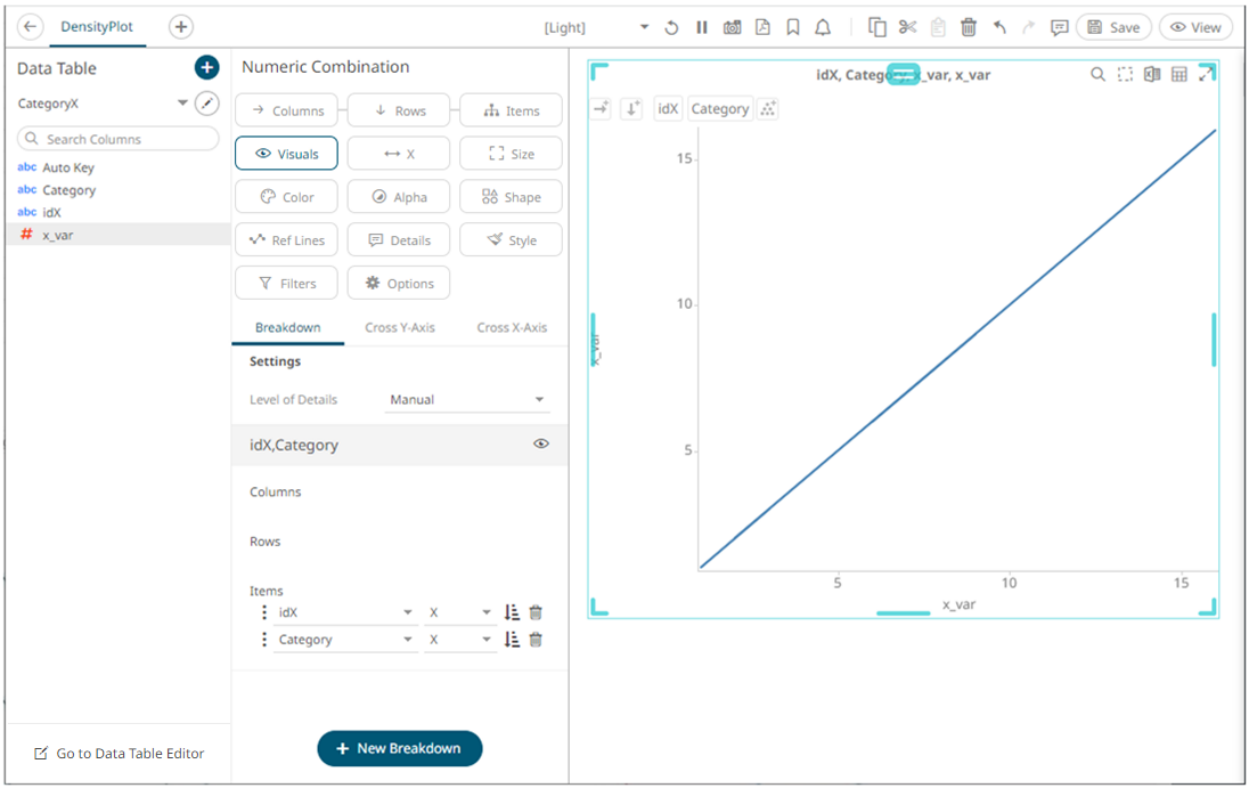
A density plot describes the frequency or count of observations in data for each value along the x-axis. For a data set with a number of X-variable observation and two or more categories in the data, you create a density plot in the following way:

- Put the **Category** text column on *Items*, the x-variable on *X* and the x-variable also on *Visuals*.

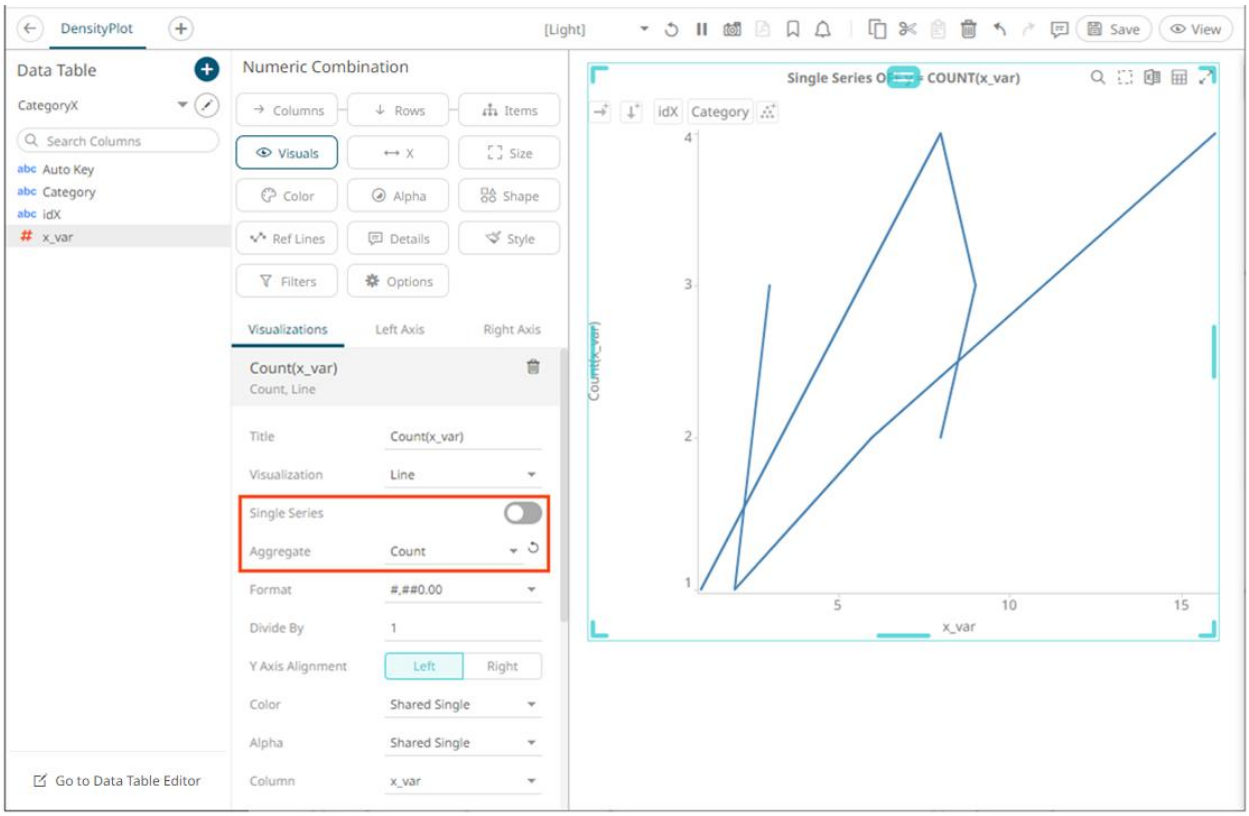


- Create a Numeric Bucket column of typ Id, based on the x-variable column (named **idX**) and add it to *Items*, as the top level.

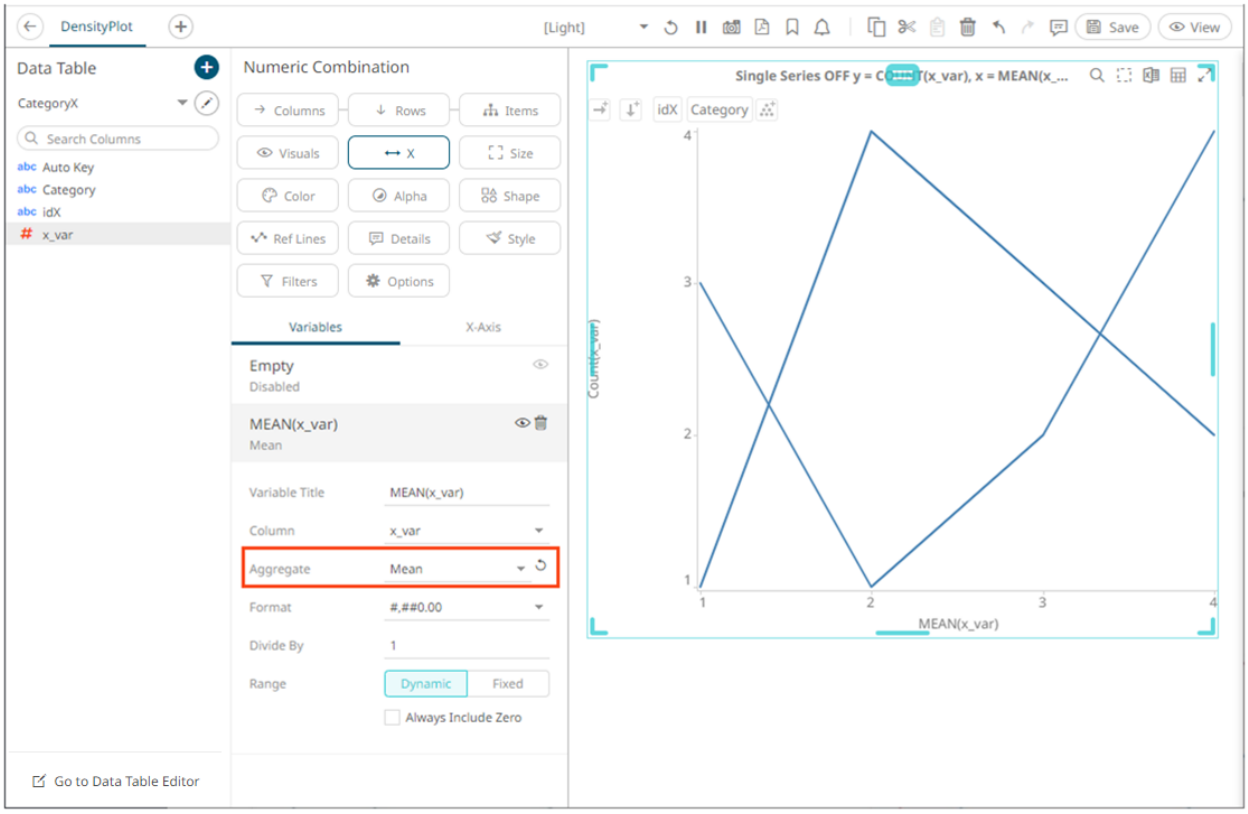

Back
Save
Data Tables
CategoryX
Data Table Settings
Title
CategoryX
Description
Auto Refresh (s)
900
Error Message
Includes Aggregate Data
Parameters
+ Parameter
CategoryX
Datasources
Calculated Columns
Debug
Auto Key
Auto Key
Numeric Buckets
idX
+ New Column
Numeric Bucket Column
Title
idX
Source Column
x_var
Bucketing Mode
Id
Format
#.##0
Search Columns
Column Order
Sorted
Original
Preview selected datasource
Refresh Preview
abc Auto Key abc Category abc idX # x_var
1 1 A 1 1.00
2 2 A 1 1.00
3 3 A 1 1.00
4 4 A 2 2.00
5 5 A 3 3.00
6 6 A 3 3.00
7 7 A 4 4.00
8 8 A 4 4.00
9 9 A 4 4.00


DensityPlot
[Light]
Save
View
Data Table
CategoryX
Search Columns
abc Auto Key
abc Category
abc idX
x_var
Numeric Combination
Columns
Rows
Items
Visuals
X
Size
Color
Alpha
Shape
Ref Lines
Details
Style
Filters
Options
Breakdown
Cross Y-Axis
Cross X-Axis
Settings
Level of Details
Manual
idX,Category
Columns
Rows
Items
idX
X
Category
X
Go to Data Table Editor
+ New Breakdown
idX, Categ_var, x_var
idX
Category
15
10
5
x_var
5
10
15
x_var

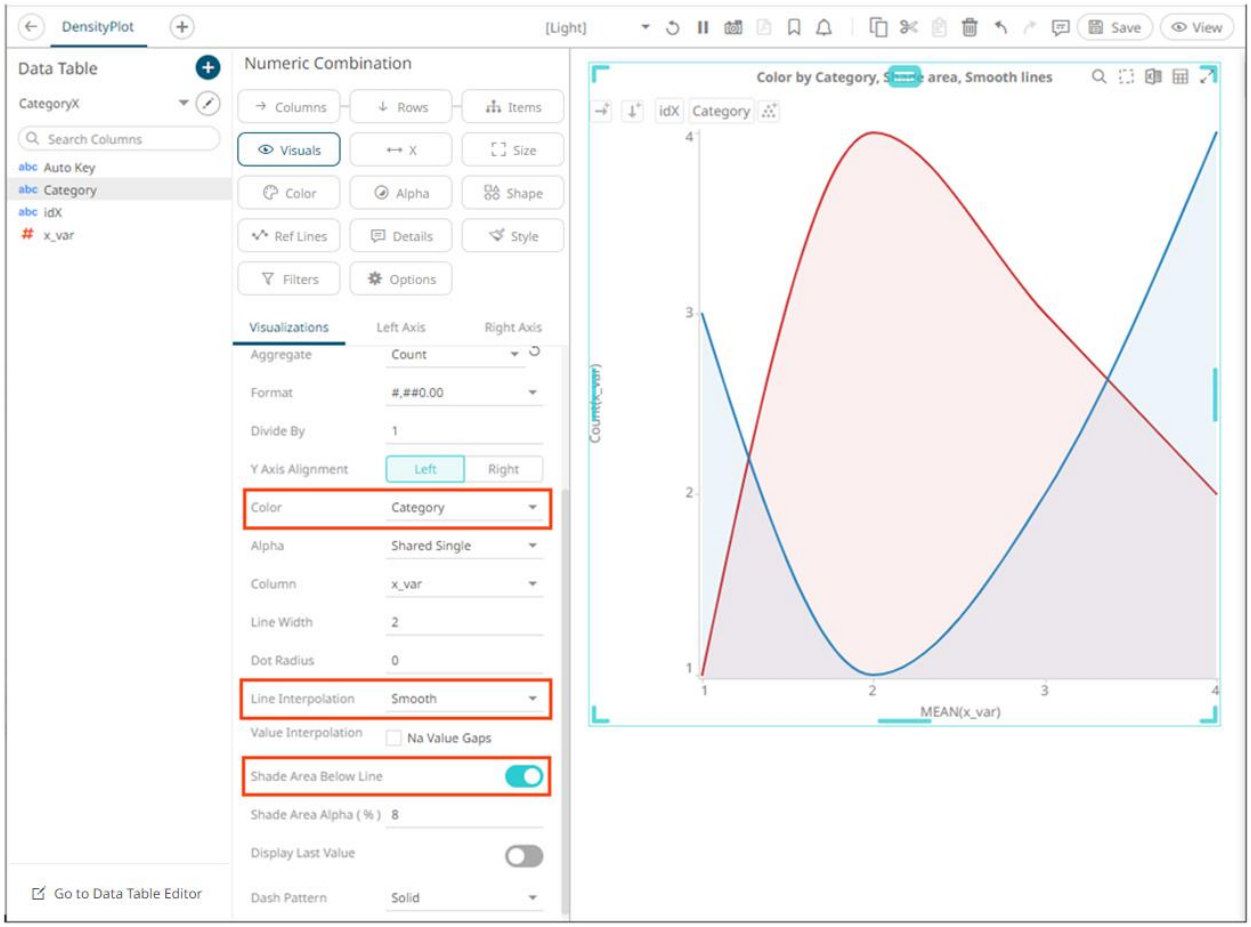
- On the Visuals x-variable column, switch off **Single Series**, and set **Count** as aggregation method.



- On the X-axis x-variable columns, set **Mean** as aggregation method



- Optionally, put the **category** column on *Color*, and select the **category** coloring for the *Visuals* column. Also select **Smooth** as line interpolation, and switch on **Shade Area Below Line**.



Adding a Numeric Combination Graph

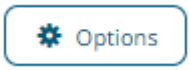
This section discusses the steps to create the numeric combination graph using the following sample dataset, where:

```
cos = COS([deg]*2/360*Pi)
sin = SIN([deg]*2/360*Pi)
```

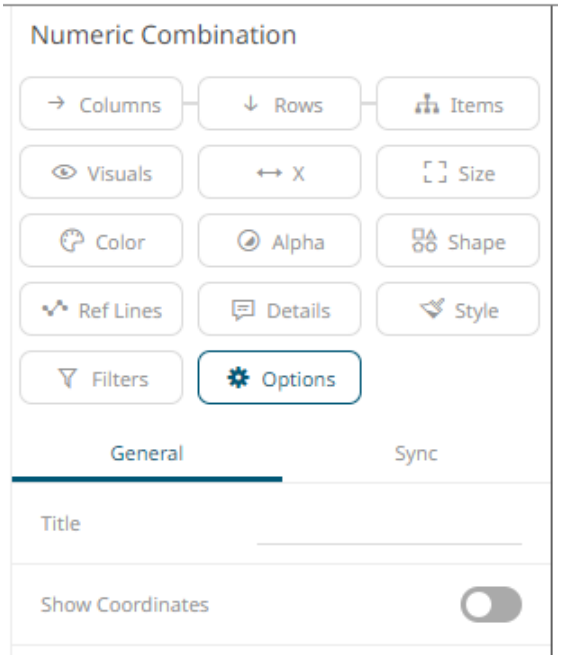
Auto Key	cos	deg	sin
1	1.00	0.00	0.00
2	0.98	10.00	0.17
3	0.94	20.00	0.34
4	0.87	30.00	0.50
5	0.77	40.00	0.64
6	0.64	50.00	0.77
7	0.50	60.00	0.87
8	0.34	70.00	0.94

9	0.17	80.00	0.98
10	0.00	90.00	1.00
11	-0.17	100.00	0.98
12	-0.34	110.00	0.94
13	-0.50	120.00	0.87
14	-0.64	130.00	0.77
15	-0.77	140.00	0.64
16	-0.87	150.00	0.50
17	-0.94	160.00	0.34
18	-0.98	170.00	0.17
19	-1.00	180.00	0.00

Steps:

1. The numeric combination settings pane is displayed after clicking the **Options** 

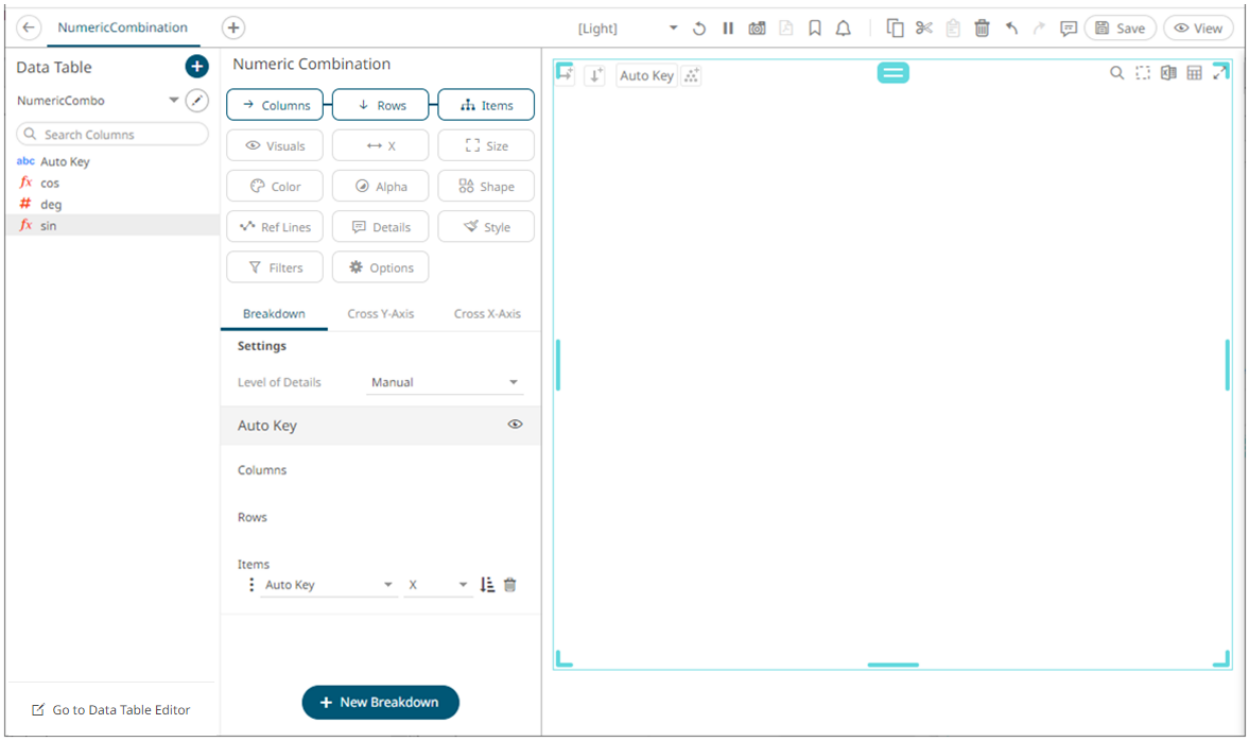
button or the *Visualization Title* (i.e., Numeric Combination):



2. Set the following property:

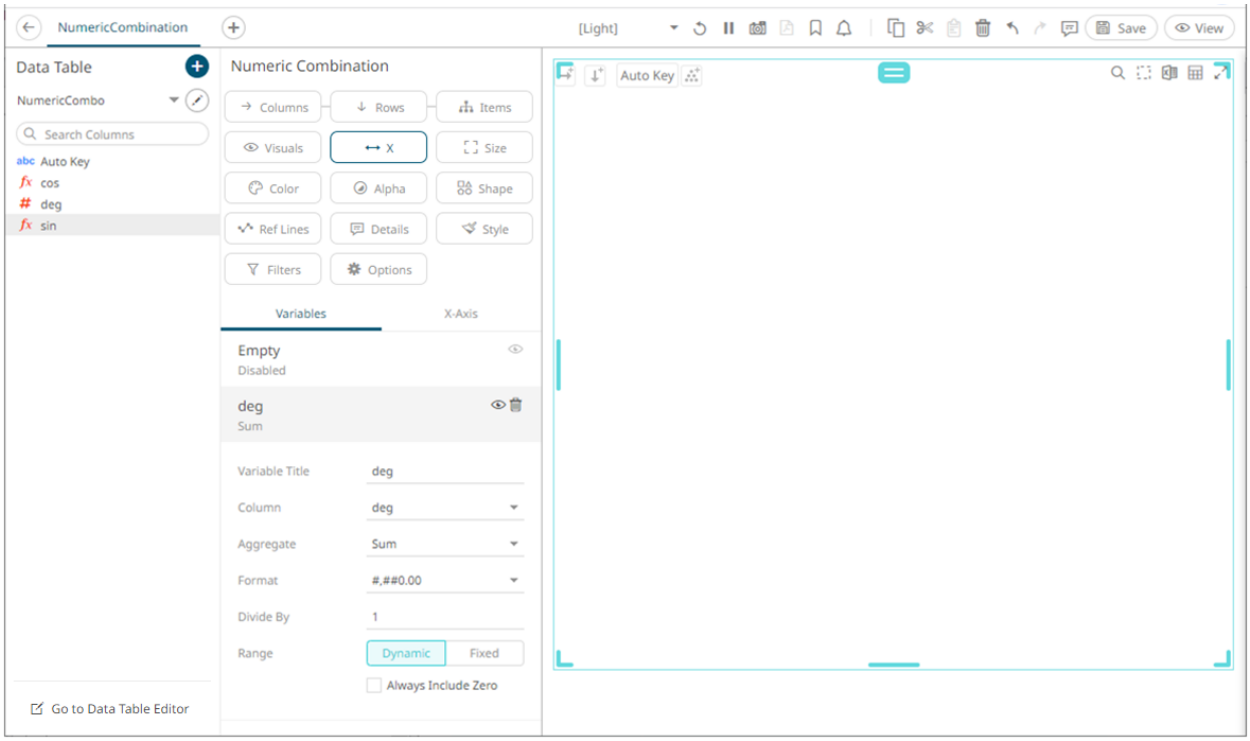
Setting	Description
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization. Tap the slider to turn it on.

3. To build the hierarchical structure in the numeric combination graph, drag text columns to the *Breakdown Items* drop area (e.g., **Auto Key**).



4. To set the X-axis, drag numeric columns from the *Data Table* pane to the **X** variable drop area.

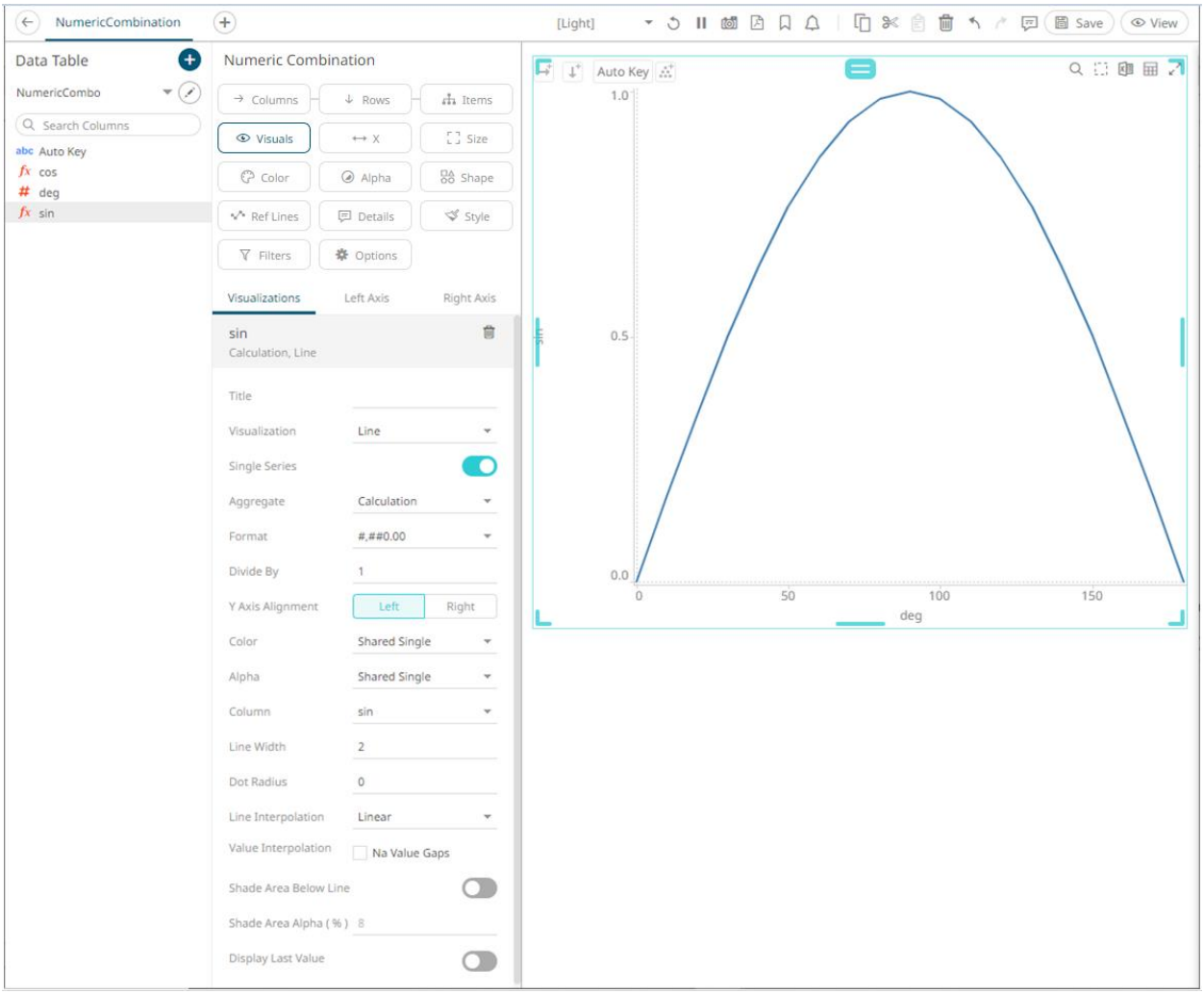
   For this sample visualization, the **deg** column will be the used as the height variable.



5. You can opt to drag columns to the Size, Color, Alpha, Shape, Reference Lines, and Details drop area.

6. Continue designing the visualization by dragging numeric columns from the *Data Table* pane to the **Visuals** variable drop area.

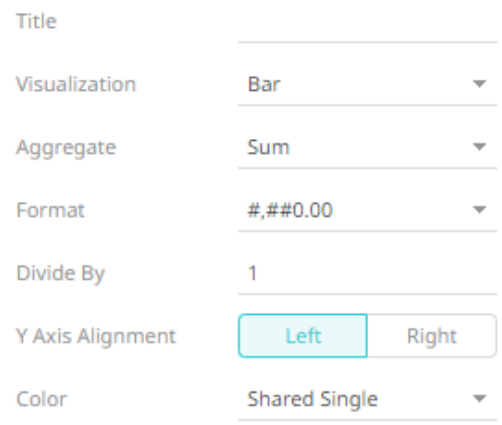
   The column (e.g., **sin**) is added under the **Visualizations** tab list and, by default, uses the Line graph and the Left Y-Axis alignment.



   The graph displays a single series based on the column added in the breakdown.

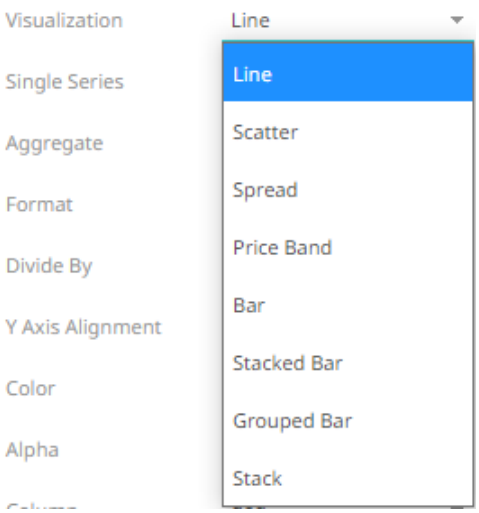
7. The properties that you can set will depend on the visualization type that you will add.

   The general settings include:

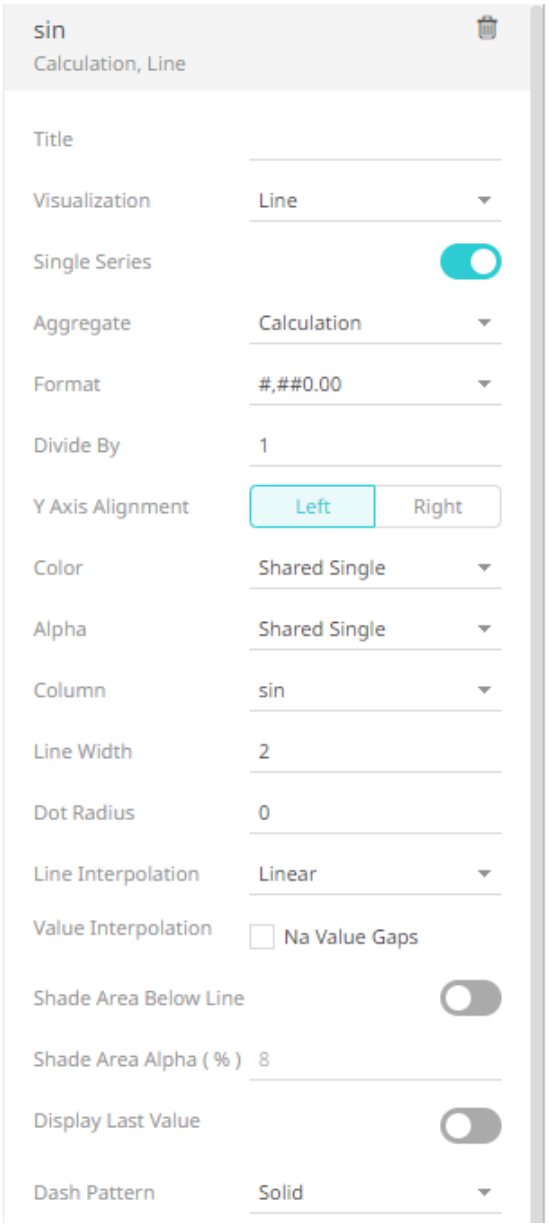


Setting	Description
Title	Title of the visualization.
Visualization	If the visualization is incorrect, instead of deleting, you can just select another one in the *Visualization* drop-down list. The settings pane will be changed to display the corresponding properties of the selected visualization.
Aggregate	Aggregation method to be used. Default is **Sum**.
Format	The format that numbers will be displayed in. Panopticon uses the same formatting rules as MS Excel.
Divide By	Select the *Divide By* value to divide a number: • 1 • 1000 (by a thousand) • 10000 • 1000000 (by a million) • 1000000000 (by a billion)
Y Axis Alignment	The Y-Axis alignment: **Left** or **Right**.
Color	The *Color* variable that will be used for the column: • None • Shared Single • Custom Single • Column added to the *Column* variable
Column/Value Column	The column used for the visualization. If the dragged column is incorrect, instead of deleting, you can just select another column in the *Column/Value Column* drop-down list.

8. Visual members can be set to display any of the following visualizations:

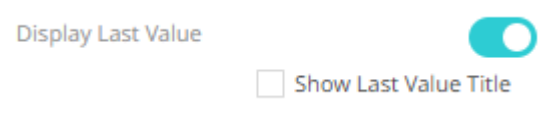

Visualization
Line
Single Series
Aggregate
Format
Divide By
Y Axis Alignment
Color
Alpha
Line
Scatter
Spread
Price Band
Bar
Stacked Bar
Grouped Bar
Stack

- Line

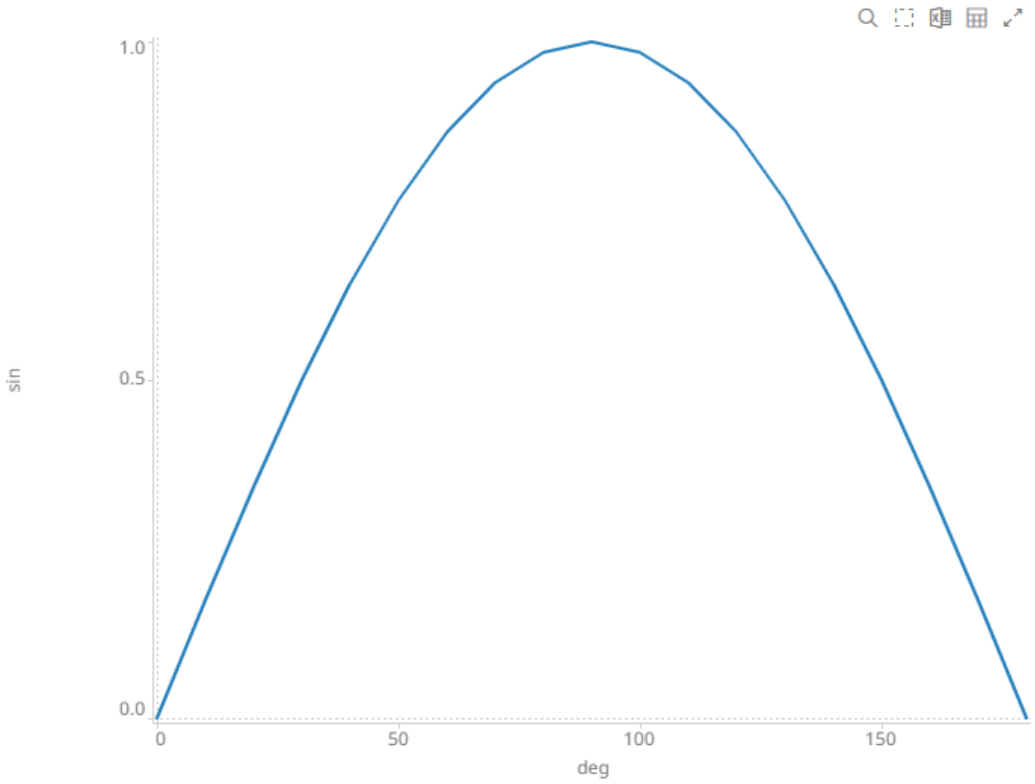


Additional settings include:

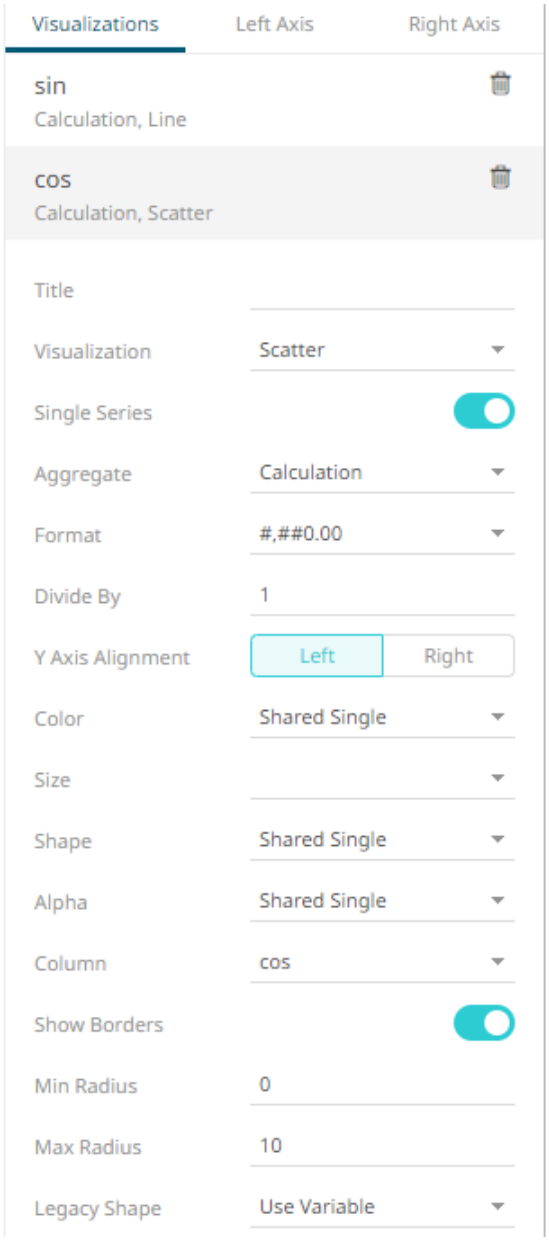
Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Alpha	Select the *Alpha* value.
Line Width	Specifies the line width in pixels.
Dot Radius	Specifies the radius of each data point in pixels.
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.

Value Interpolation Time Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Shade Area Below Line	Defines that alpha shades are applied between the lines and the zero Y grid line.
Shade Area Alpha (%)	Specifies the alpha (transparency) of the shaded area, expressed in percent 0-100 of the alpha value currently set on the line.
Display Last Value	Determines if the flag of the last value will be displayed. Once enabled, the **Show Last Value Title** is displayed.  Check the box to display the title of the last value in the flag.
Dash Pattern	Specifies the line pattern. Available options are: • Dotted • Dashed • Solid

Sample 1. *Single Series* is enabled and the *Color* is set to **Custom Single** (#2580bd).

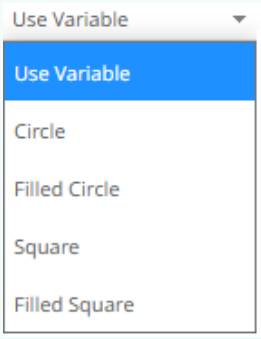


- Scatter

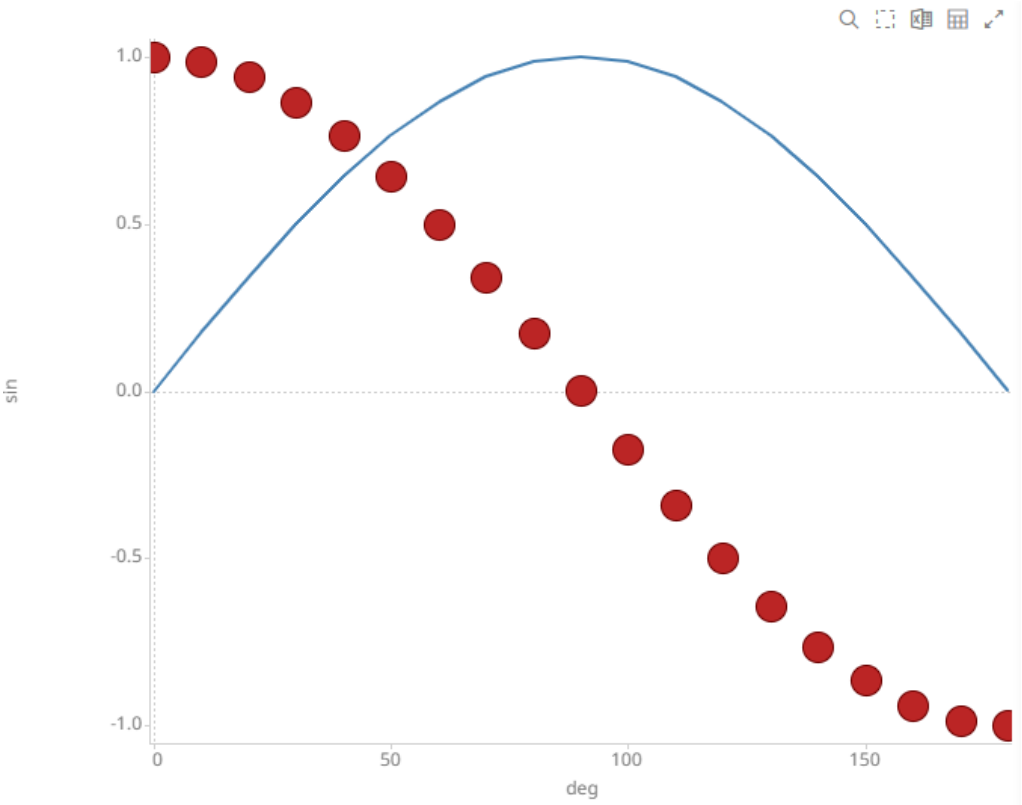


Additional settings include:

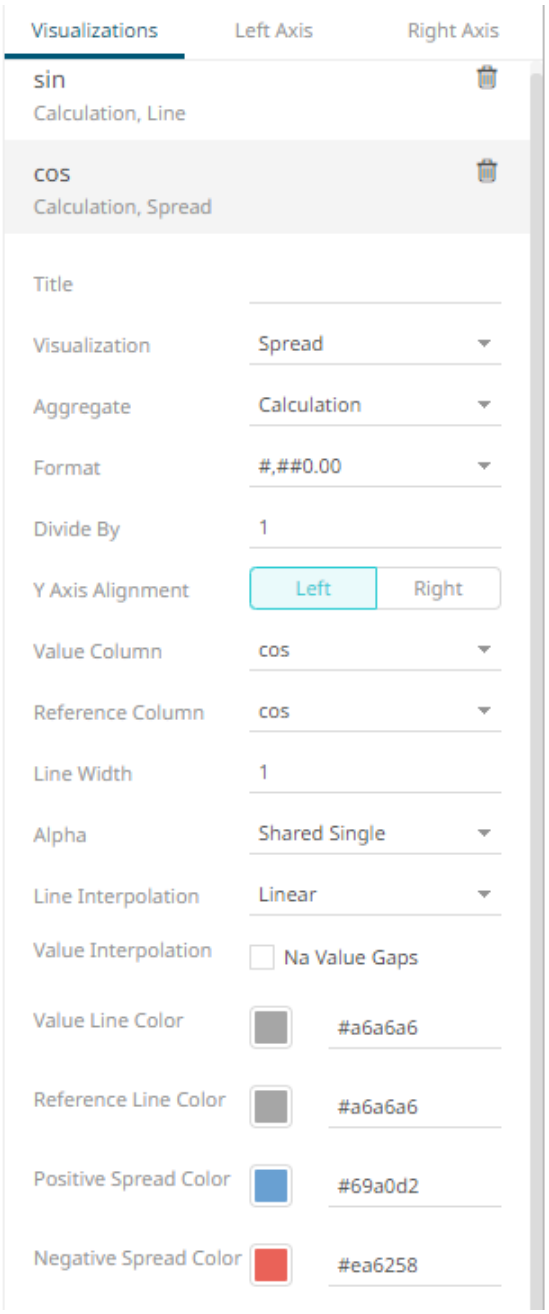
Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Size	Select the *Size* variable that will be used.
Shape	Select the *Shape* value.
Alpha	Select the *Alpha* value.
Show Borders	Determines whether a border is drawn around each scatter point.
Min Radius	The minimum radius in pixels of the scatter point.

Max Radius	The maximum radius in pixels of the scatter point.
Legacy Shape	Allows older workbooks to be updated and use the shape variable. Default is **Use Variable**. Other shapes can also be selected. 

Sample 2. *Single Series* is enabled in the Line and Scatter graphs. In addition, in the Scatter graph, the *Color* is set to **Custom Single** (#bb2525).



- Spread

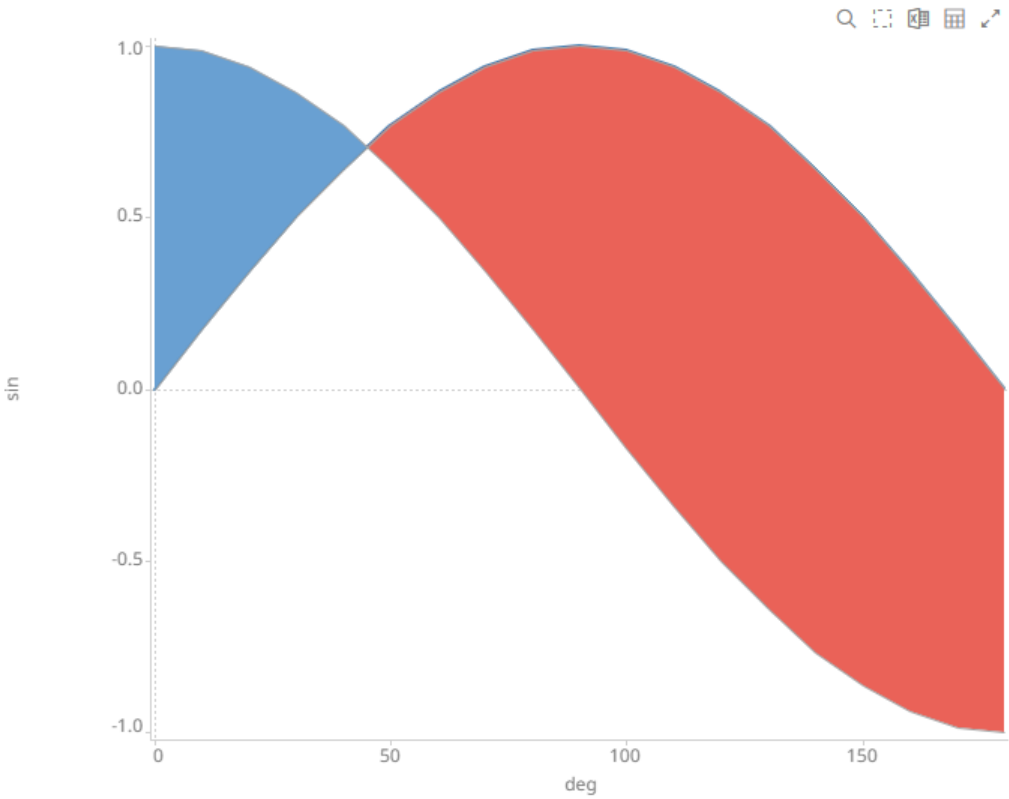


Additional settings include:

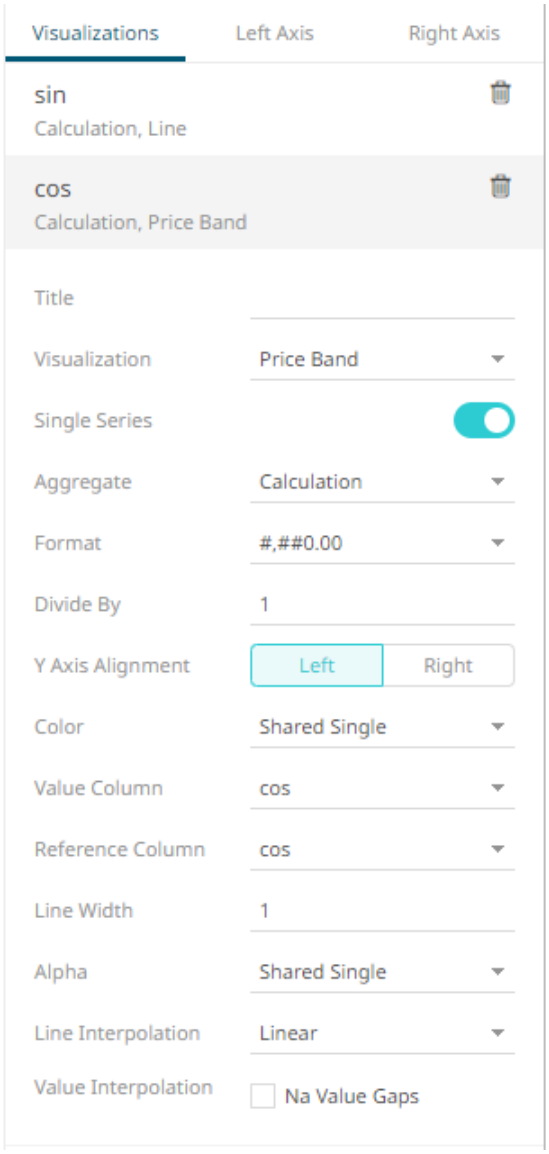
Setting	Description
Reference Column	The field that will be used as the reference line data series.
Line Width	Specifies the width in pixels of the Spread Graph data series lines.
Alpha	Select the *Alpha* value.
Spread Color Alpha	Specifies the level of color transparency/opacity for the Positive and Negative Spread colors. The value is from 0 to 255 with the default set to **128**.

Line Interpolation	Specifies the interpolation mode as **Linear, Stepped,** or **Smooth**.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Value Line Color	Specifies the color of the value line data series.
Reference Line Color	Specifies the color of the reference line data series.
Positive Spread Color	Specifies the color when the spread between the value and reference is positive.
Negative Spread Color	Specifies the color when the spread between the value and reference is negative.

Sample 3. *Single Series* is enabled in the Line graph. In addition, in the Spread graph, the *Value Column* is set to the **cos** column, and the *Reference Column* to the **sin** column.

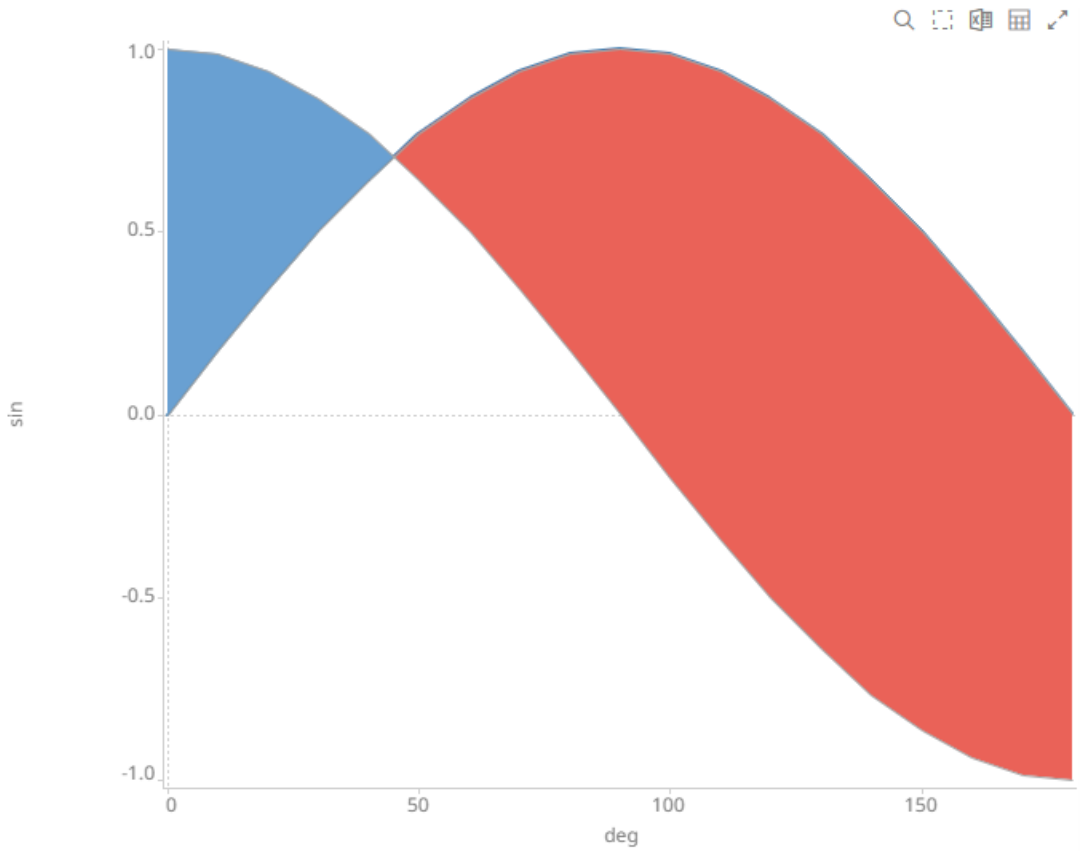


- Price Band

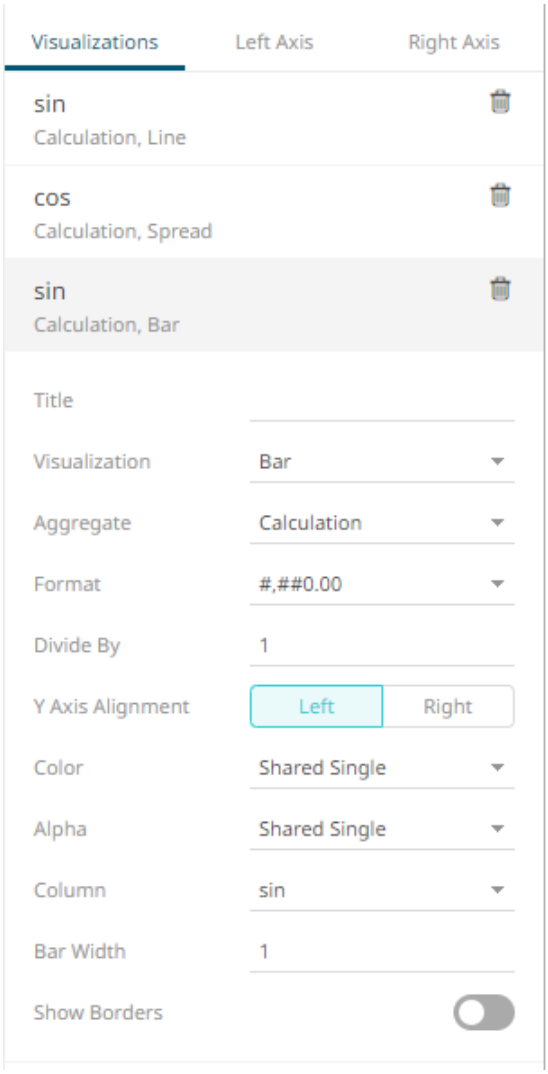


Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Reference Column	The field that will be used as the reference line data series.
Line Width	Specifies the line width in pixels.
Alpha	Select the *Alpha* value.
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.

Sample 4. *Single Series* is enabled in the Line and Price Band graphs. In addition, in the Price Band graph, the *Color* is set to **By Sign**, the *Value Column* is set to the **cos** column, and the *Reference Color* to the **sin** column.


1.0
0.5
0.0
-0.5
-1.0
sin
0
50
100
150
deg

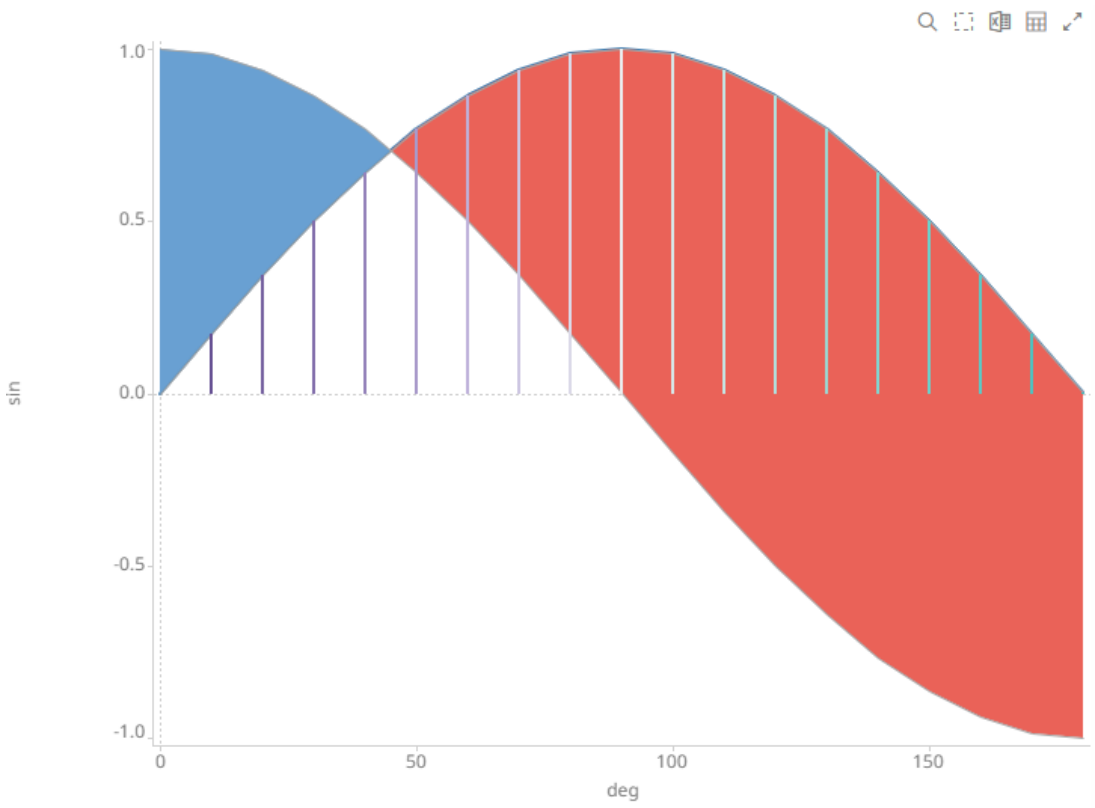
- Bar



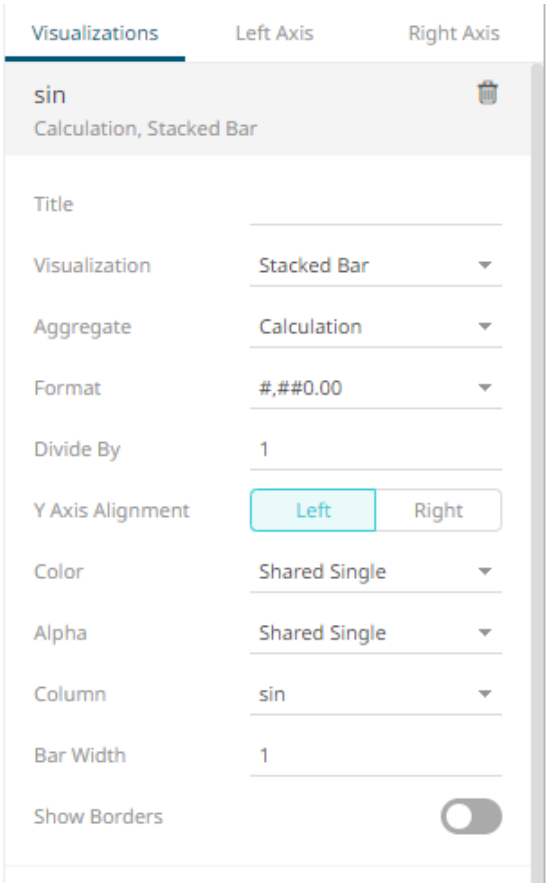
Additional settings include:

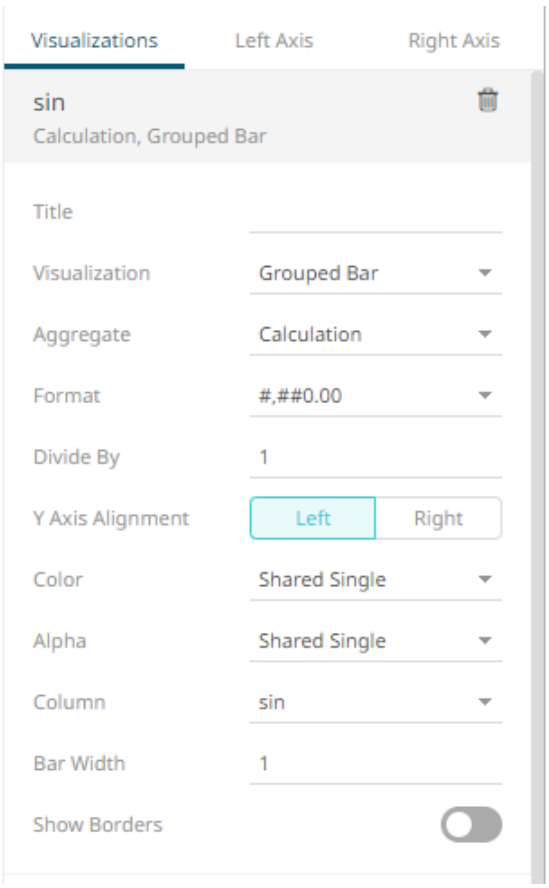
Setting	Description
Alpha	Select the *Alpha* value.
Bar Width	Specifies the width in pixels for each bar.
Show Borders	Determines whether borders are drawn around bars. These are only visible if the Bar Width is greater than 1 pixel.

Sample 5. *Single Series* is enabled in the Line graph. In addition, in the Bar graph, the *Column* is set to the **sin** column, the *Color* to the **deg** column, and the *Bar Width* to **2**.


1.0
0.5
0.0
-0.5
-1.0
sin
0
50
100
150
deg

- Stacked Bar or Grouped Bar

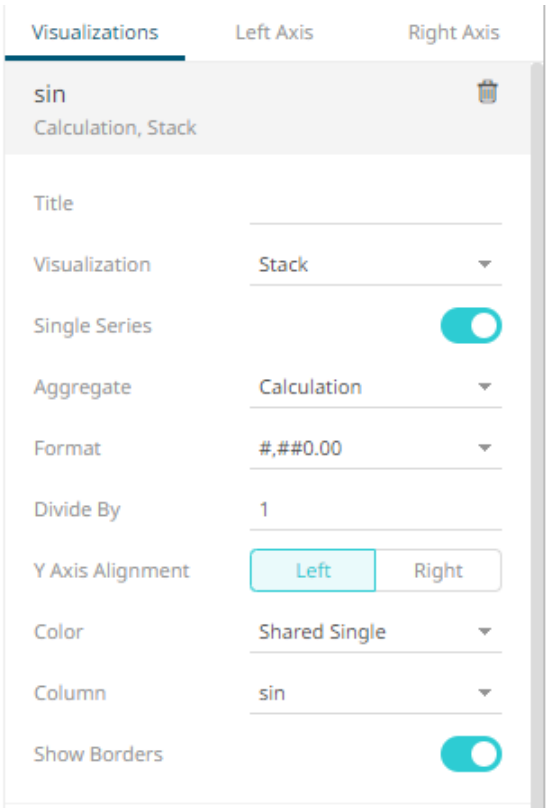




Additional settings include:

Setting	Description
Bar Width	Specifies the width in pixels of each bar. **NOTE:** This is overridden when a column is added in the *Size* variable. Consequently, the width of the bars will be based on the comparison of their size in relation to where they are located on the X axis.
Show Borders	Specifies whether a border is drawn around bars. These are only visible if the Bar Width is greater than 1 pixel.

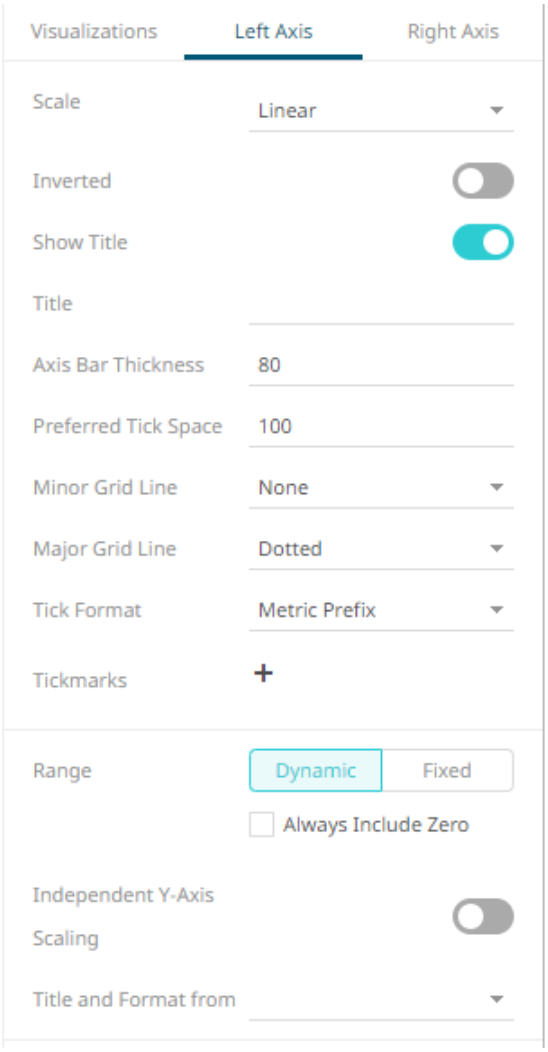
- Stack

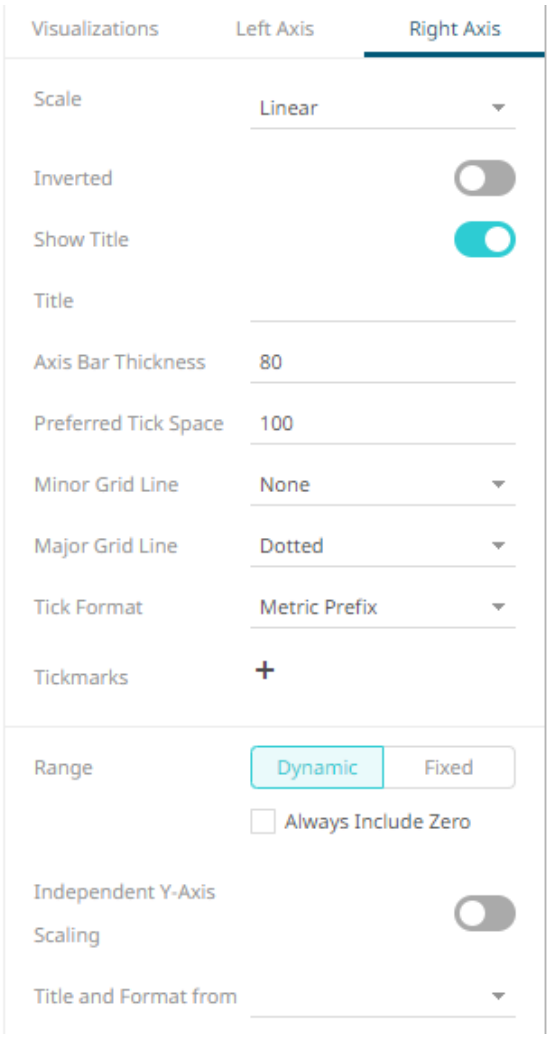


Additional settings include:

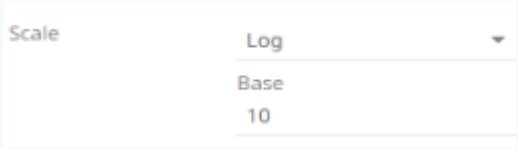
Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Show Borders	Determines whether borders are drawn around stacks.

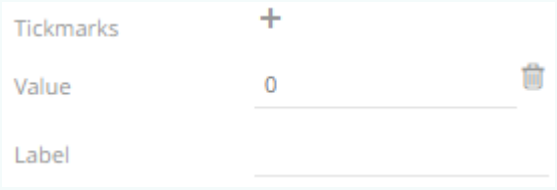
9. The numeric combination visualization includes an expanded axes pane, which includes specification of the properties for both the Left and Right Y axes.





Select or specify the following properties:

Setting	Description
Scale	Determines whether the scale of the axis is **Linear, Log,** or **Power**. • Linear – a change between two values is based on addition e.g., 30, 60, 90, 120, 180, etc. • Log - a change between two values is perceived on the basis of the ratio of the two values or based on multiplication. Once selected, the *Base* control displays with the value of the common base for the logarithmic scale (i.e., **10**).  For example: `log10(x)` represents the logarithm of x to the base 10 e.g., 1, 10, 100, 1000, etc. You can opt to enter a new *Base* value then click ✓.

	NOTE: Value cannot be lower than 2. • Power – Works according to the `SIGN(MEASURE)*LOG10(MAX(1, ABS(MEASURE)))` formula. Works like the Log scale except it can handle negative values and every value between -1 and 1 is set to 0. For example for values between -100 and 100, the axis will be: -100, -10, 0, 10, 100
Inverted	Determines whether the Y or Height axis is inverted.
Show Title	Displays an Axis Title label. When enabled, you can opt to enter a custom *Title* for the axis which will override the title of the visualization variable.
Axis Bar Thickness	The margin in pixels for the axis. If set to zero, the axis is removed.
Preferred Tick Space	The preferred space in pixels between the minor grid lines across the axis.
Minor Grid Line	How minor grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Major Grid Line	How major grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Tick Format	Set to **From Variable** to use the format string that is on the current variable displayed in the axis. Set to **Metric Prefix** to format the Tick labels in the numeric axes using the metric prefixes.
Tickmarks	Click + to add and set tick marks.  Enter the *Value* and the *Label*. Click + to add more or 🗑 to delete.
Range	The visible range for the Left and Right Y-axis variables can either be calculated dynamically (**Dynamic Range**) or set between predetermined limits by selecting **Fixed Range**. This enables the *Min* and *Max* text boxes and populates them with default values taken from the data set.
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.
Title and Format From	The title and format of the Left and Right Axes based on the selected fields.

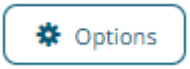
Text Combination Settings

This section discusses the steps and guidelines to create the text combination graph using the following sample dataset.

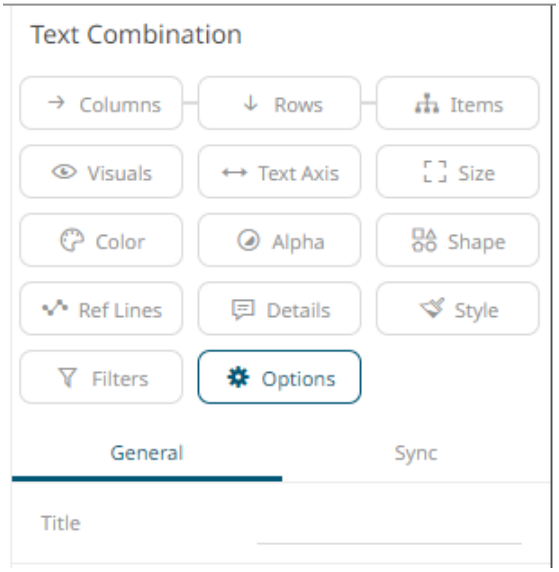
Sample Table

Auto Key	Gr	Id	Line	Bar	Scatter	Spread	SpreadRef	Stack
1	X	A	3.00	4.00	2.00	1.00	3.0	1.0
2	X	B	4.00	5.00	3.00	2.00	3.0	3.0
3	X	C	5.00	6.00	4.00	2.00	4.0	2.0
4	Y	D	3.00	4.00	2.00	5.00	4.0	4.0
5	Y	E	4.00	5.00	3.00	6.00	4.0	1.0
6	Y	F	5.00	6.00	4.00	5.00	4.0	3.0

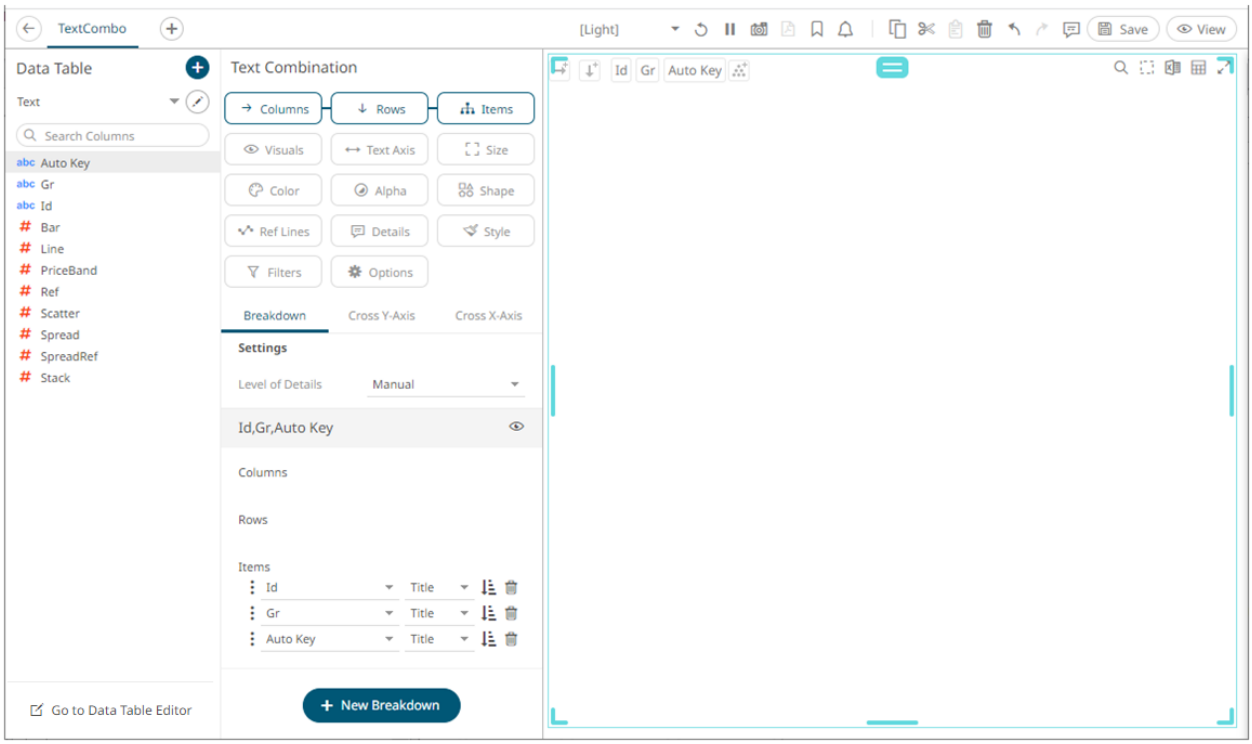
Steps:

1. The text combination settings pane is displayed after clicking the **Options** 

button or the *Visualization Title* (i.e., Text Combination):

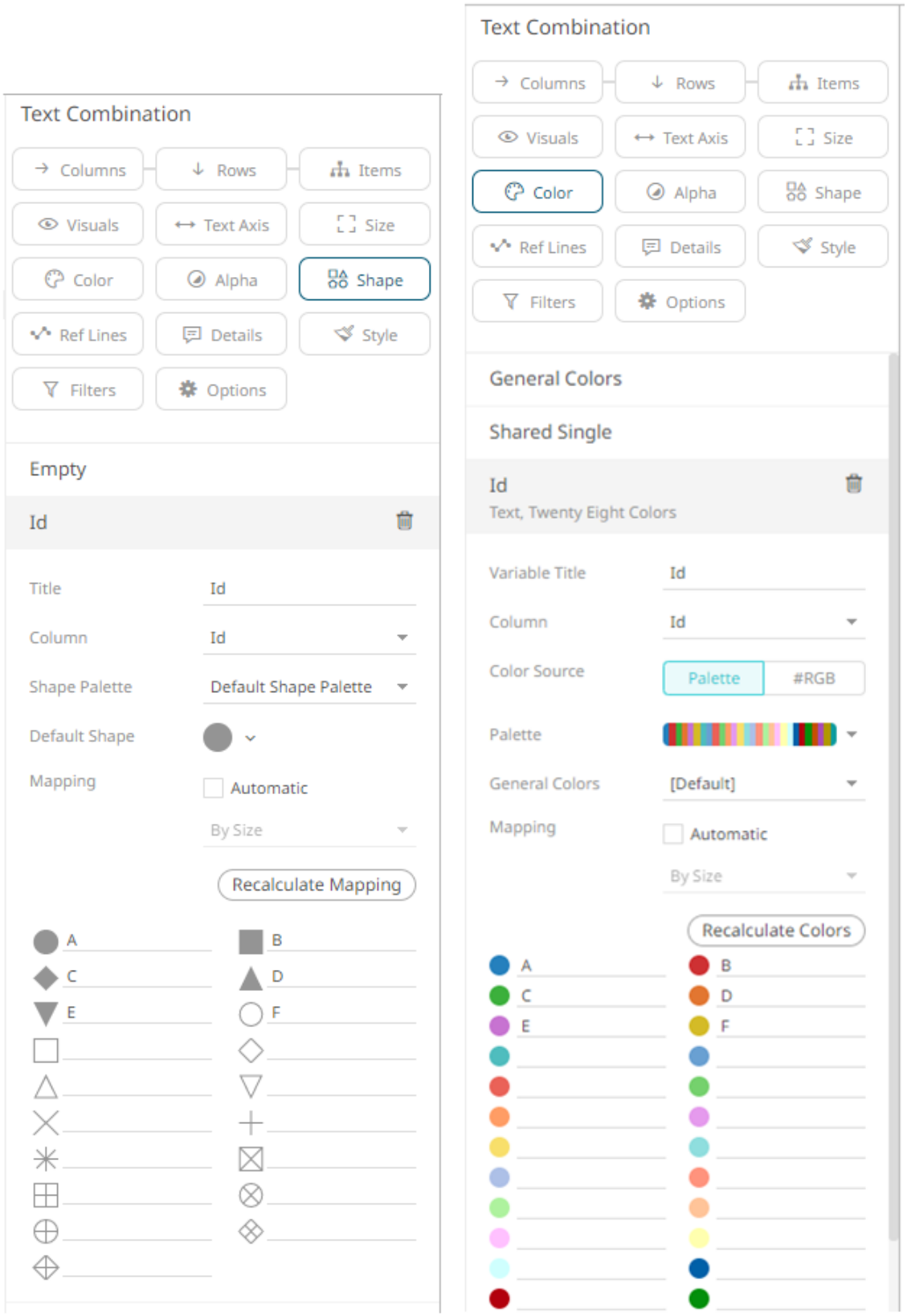


2. To build the hierarchical structure in the text combination graph, drag text columns to the *Breakdown Items* drop area (e.g., **Id**, **Gr**, and **Auto Key**).



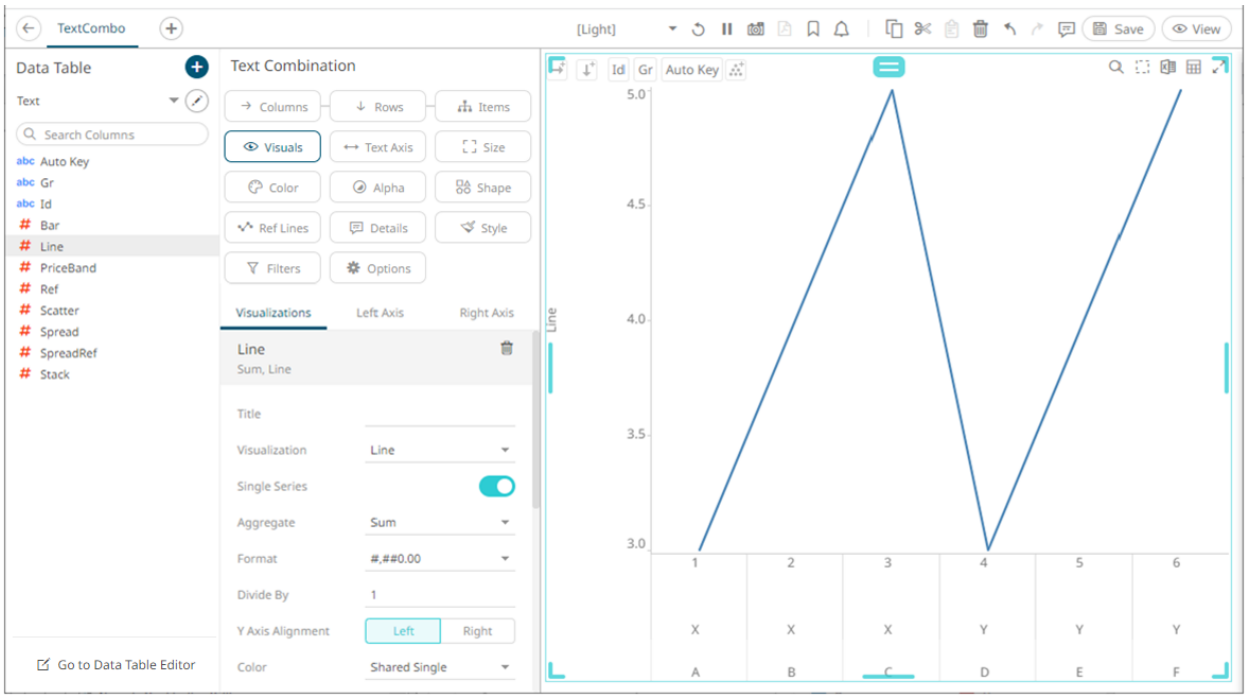
3. You can opt to drag columns to the Size, Color, Alpha, Shape, Reference Lines, and Details drop area.

   For this sample visualization, we dragged the **Id** column to the Color and Shape variables drop areas.



4. Continue designing the visualization by dragging numeric columns from the *Data Table* pane to the **Visuals** variable drop area.

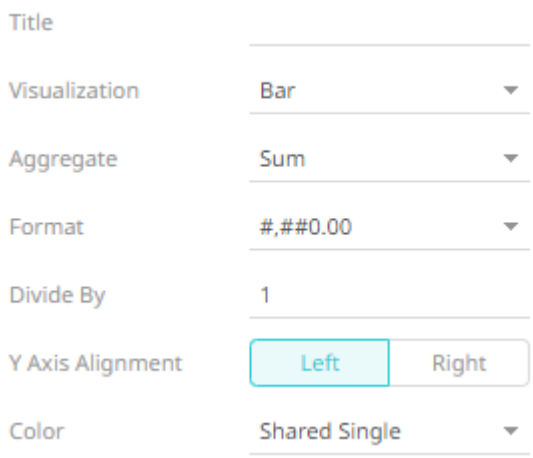
The column (e.g., **Line**) is added under the **Visualizations** tab list and, by default, uses the Line graph and the Left Y-Axis alignment.



The X axis displays the multi-level hierarchy based on the three columns added in the breakdown (e.g., **Id**, **Gr**, and **Auto Key**). The Y axis displays the added visual member (e.g., **Line**).

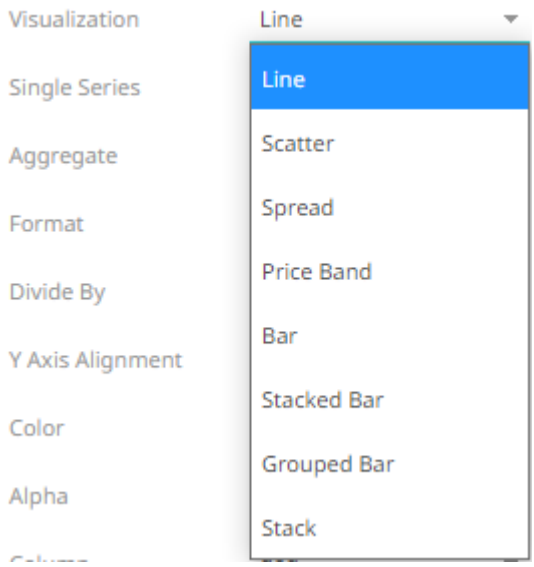
5. The properties that you can set will depend on the visualization type that you will add.

   The general settings include:

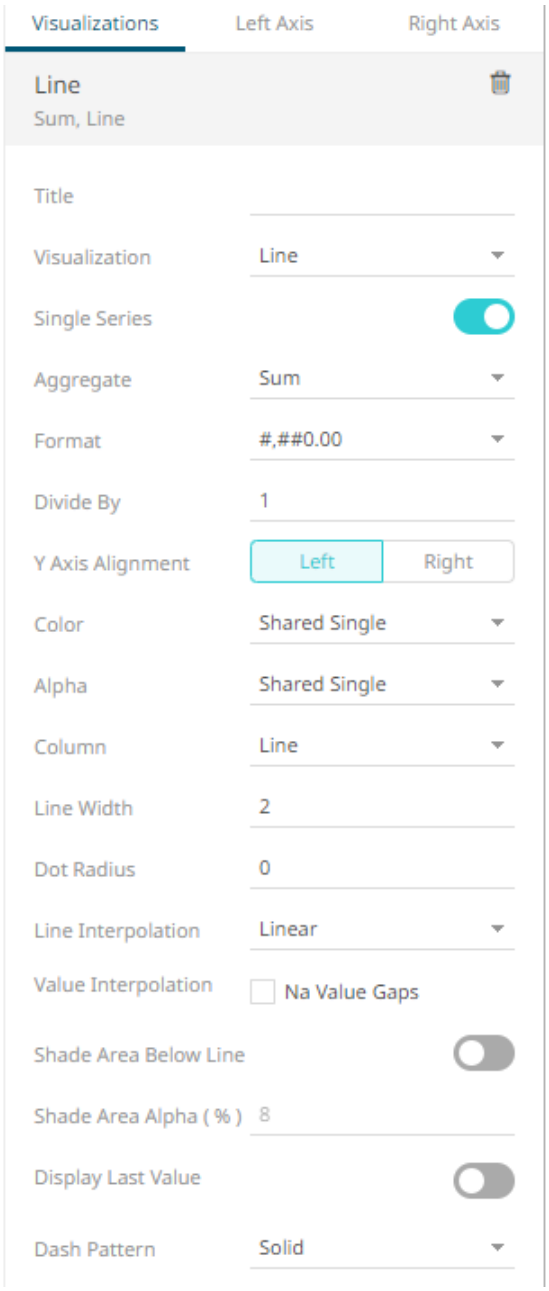


Setting	Description
Title	Title of the visualization.
Visualization	If the visualization is incorrect, instead of deleting, you can just select another one in the *Visualization* drop-down list. The settings pane will be changed to display the corresponding properties of the selected visualization.
Aggregate	Aggregation method to be used. Default is **Sum**.
Format	The format that numbers will be displayed in. Panopticon uses the same formatting rules as MS Excel.
Divide By	Select the *Divide By* value to divide a number: • 1 • 1000 (by a thousand) • 10000 • 1000000 (by a million) • 1000000000 (by a billion)
Y Axis Alignment	The Y-Axis alignment: **Left** or **Right**.
Color	The *Color* variable that will be used for the column: • None • Shared Single • Custom Single • Column added to the *Column* variable
Column/Value Column	The column used for the visualization. If the dragged column is incorrect, instead of deleting, you can just select another column in the *Column/Value Column* drop-down list.

6. Visual members can be set to display any of the following visualizations:

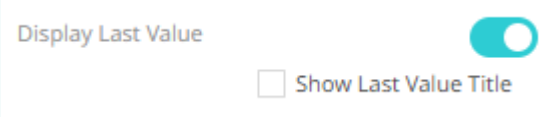


- Line

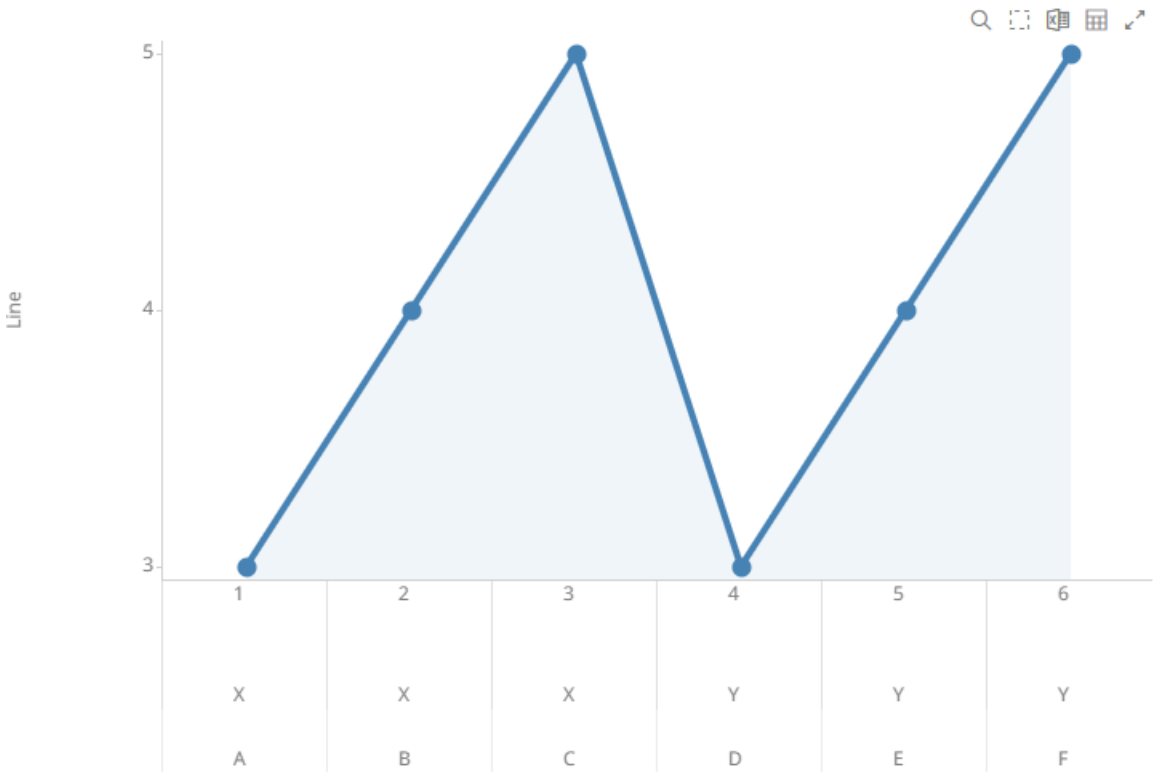


Additional settings include:

Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Alpha	Select the *Alpha* value.
Line Width	Specifies the line width in pixels.
Dot Radius	Specifies the radius of each data point in pixels.

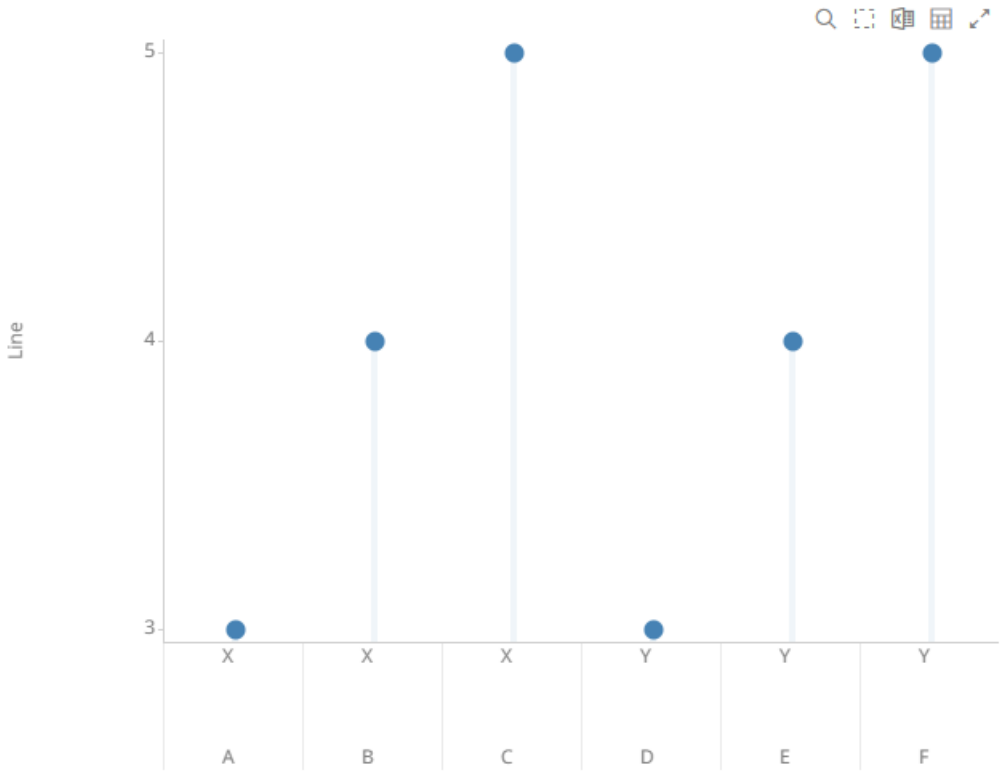
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.
Value Interpolation Time Gaps	Determines whether time axis gaps (Working Week/Time) are interpolated.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Shade Area Below Line	Defines that alpha shades are applied between the lines and the zero Y grid line.
Shade Area Alpha (%)	Specifies the alpha (transparency) of the shaded area, expressed in percent 0-100 of the alpha value currently set on the line.
Display Last Value	Determines if the flag of the last value will be displayed. Once enabled, the **Show Last Value Title** is displayed.  Check the box to display the title of the last value in the flag.
Dash Pattern	Specifies the line pattern. Available options are: • Dotted • Dashed • Solid

Sample 1. *Single Series* is enabled, the *Line Width* is set to **4**, the *Dot Radius* to **6,** and the **Shade Area Below Line** is enabled.



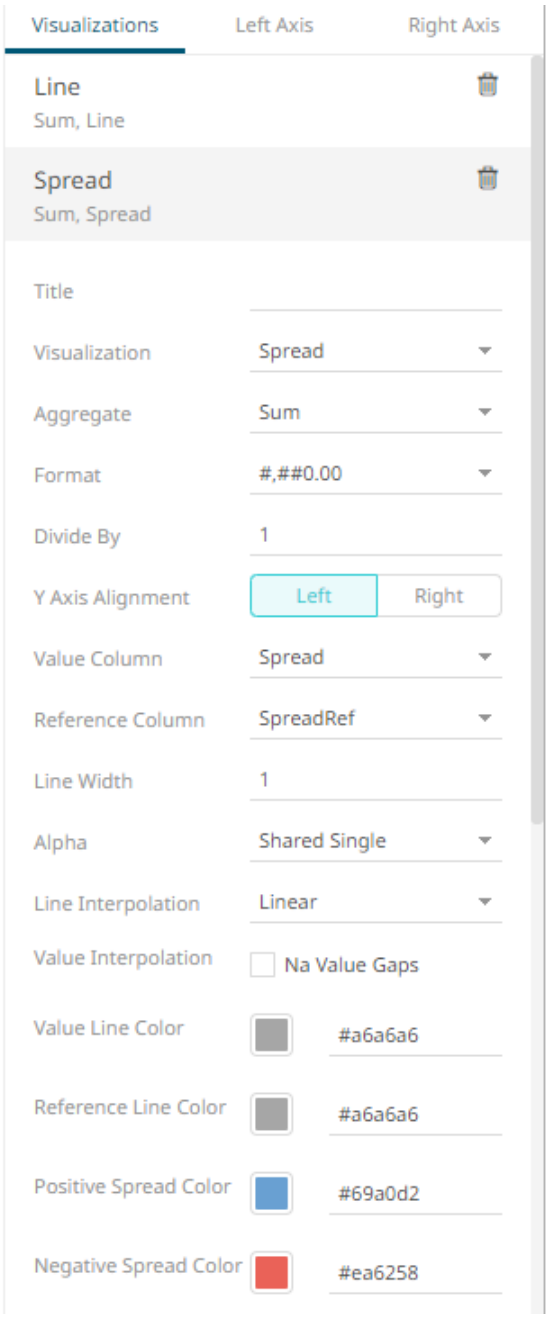
NOTE **When enabling the Single Series, it is recommended to set the Color variable to Shared Single.**

Sample 2. *Single Series* is disabled, the *Line Width* is set to **4**, the *Dot Radius* is set to **6,** and the **Shade Area Below Line** is enabled.



The last column in the breakdown (e.g., **Auto Key**) is used to divide the data into multiple series.

- Spread

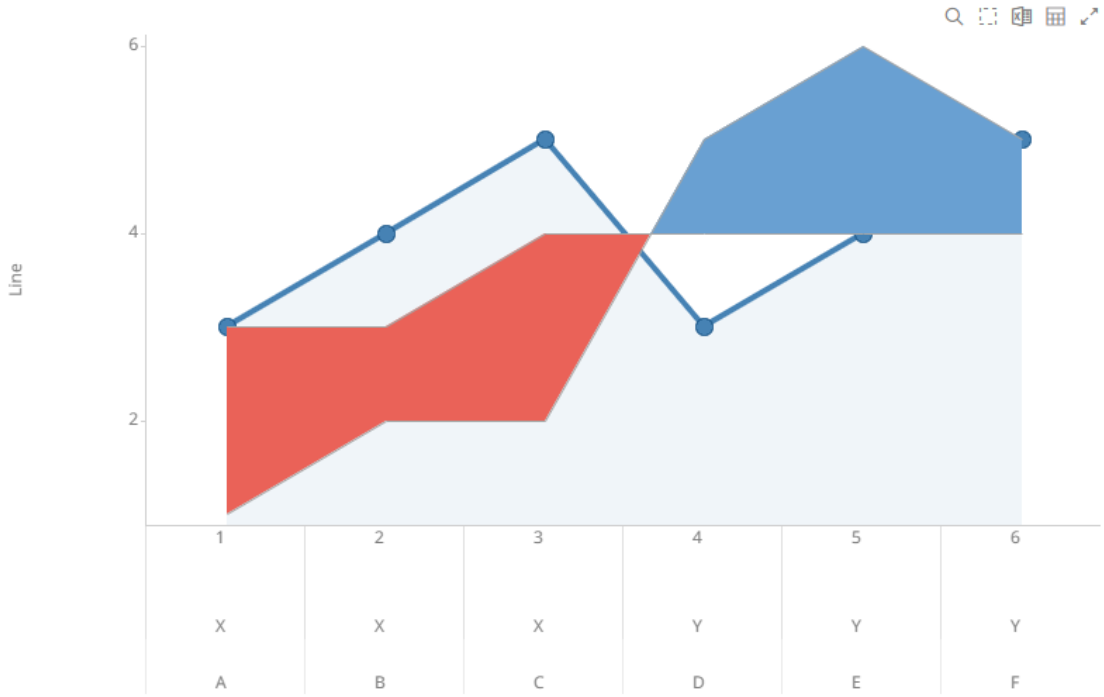


Additional settings include:

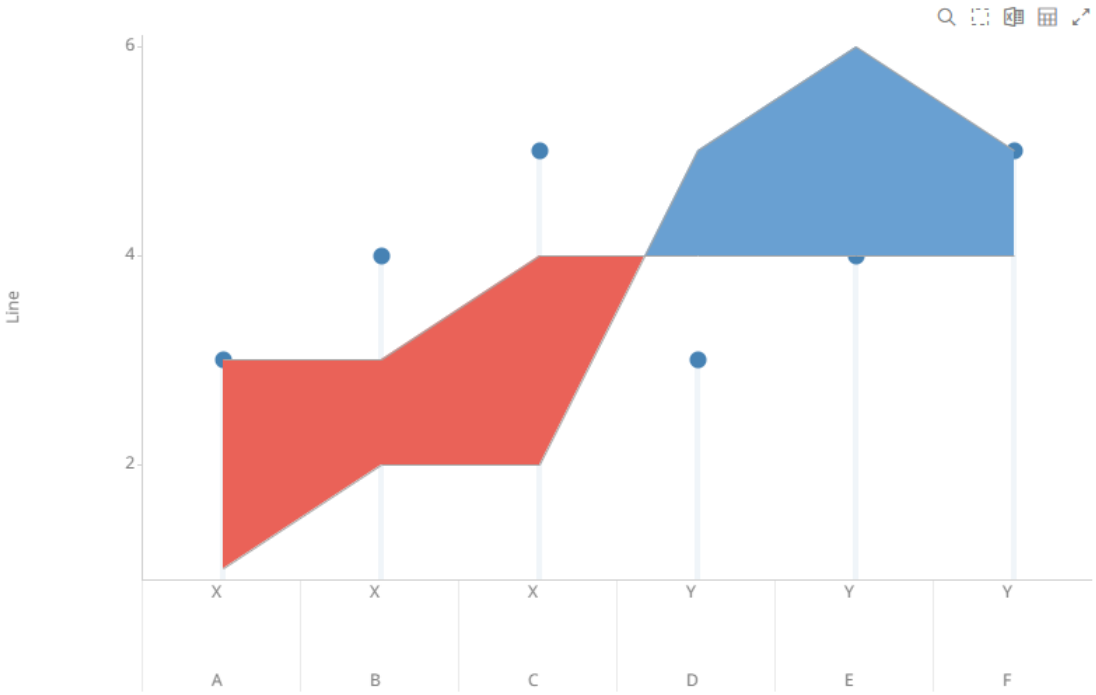
Setting	Description
Reference Column	The field that will be used as the reference line data series.
Line Width	Specifies the width in pixels of the Spread Graph data series lines.
Alpha	Select the *Alpha* value.
Spread Color Alpha	Specifies the level of color transparency/opacity for the Positive and Negative Spread colors. The value is from 0 to 255 with the default set to **128**.

Line Interpolation	Specifies the interpolation mode as **Linear, Stepped,** or **Smooth**.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.
Value Line Color	Specifies the color of the value line data series.
Reference Line Color	Specifies the color of the reference line data series.
Positive Spread Color	Specifies the color when the spread between the value and reference is positive.
Negative Spread Color	Specifies the color when the spread between the value and reference is negative.

Sample 3. *Single Series* is enabled in the Line graph. In addition, in the Spread graph, the *Value Column* is set to **Spread**, and the *Reference Column* to **SpreadRef**.

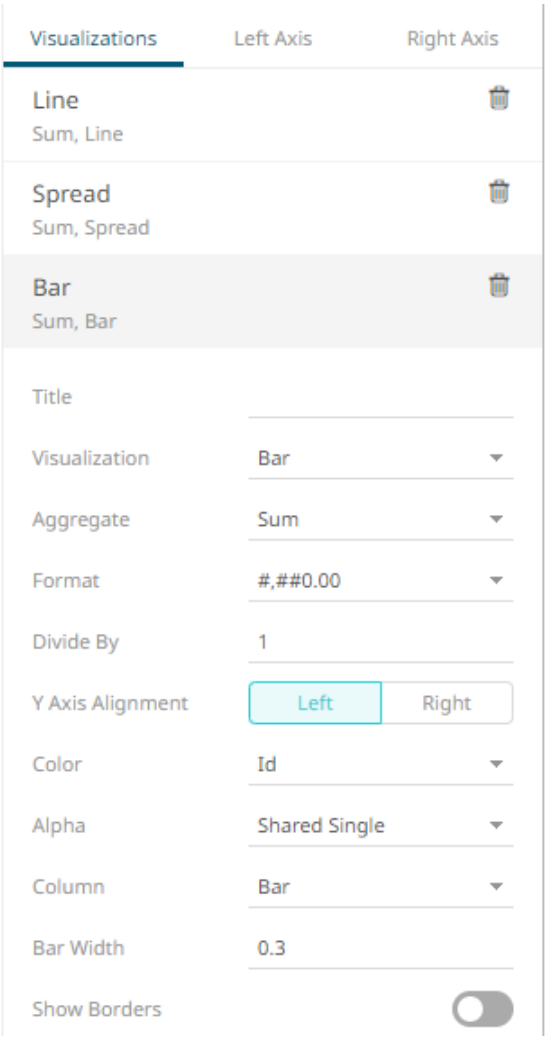


Sample 4. *Single Series* is disabled in the Line graph. In addition, in the Spread graph, the *Value Column* is set to **Spread**, and the *Reference Column* to **SpreadRef**.



The last column in the breakdown (e.g., **Auto Key**) is used to divide the data into multiple series.

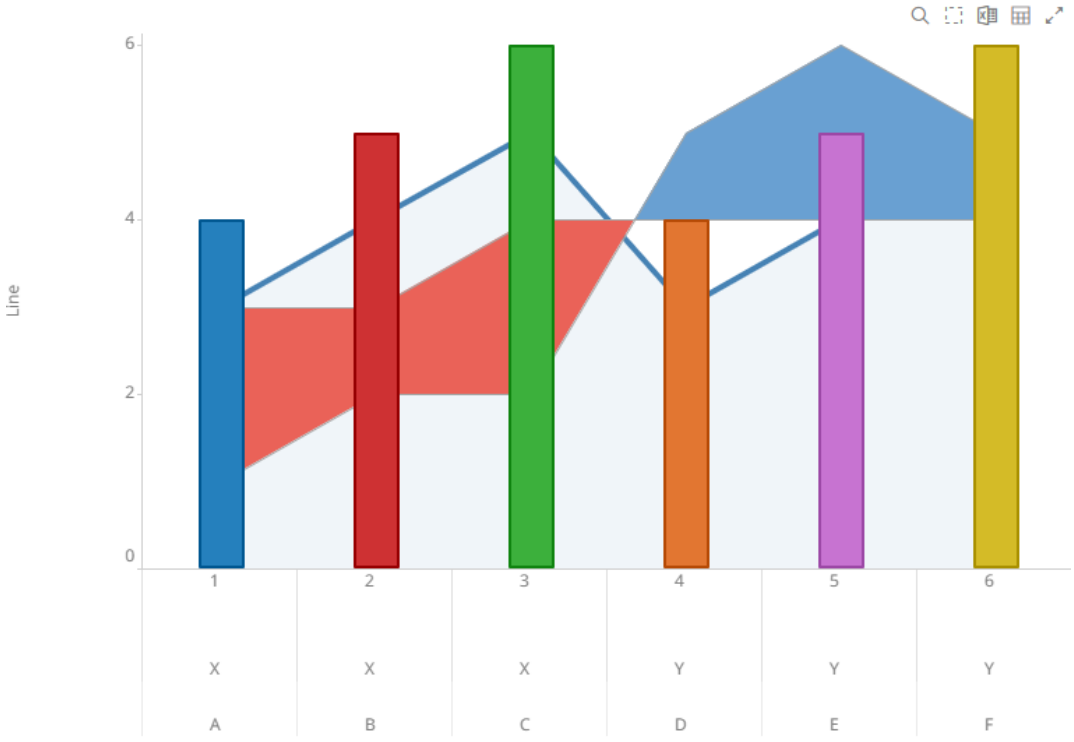
- Bar



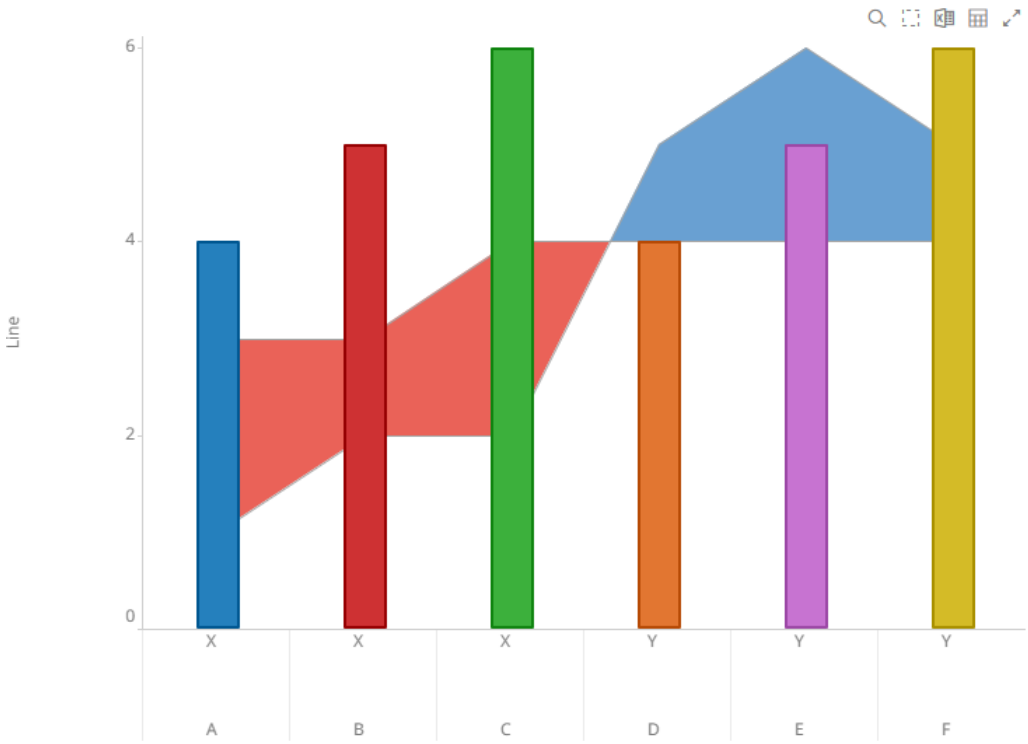
Additional settings include:

Setting	Description
Alpha	Select the *Alpha* value.
Bar Width	Specifies the width in pixels for each bar.
Show Borders	Determines whether borders are drawn around bars. These are only visible if the *Bar Width* is greater than 1 pixel.

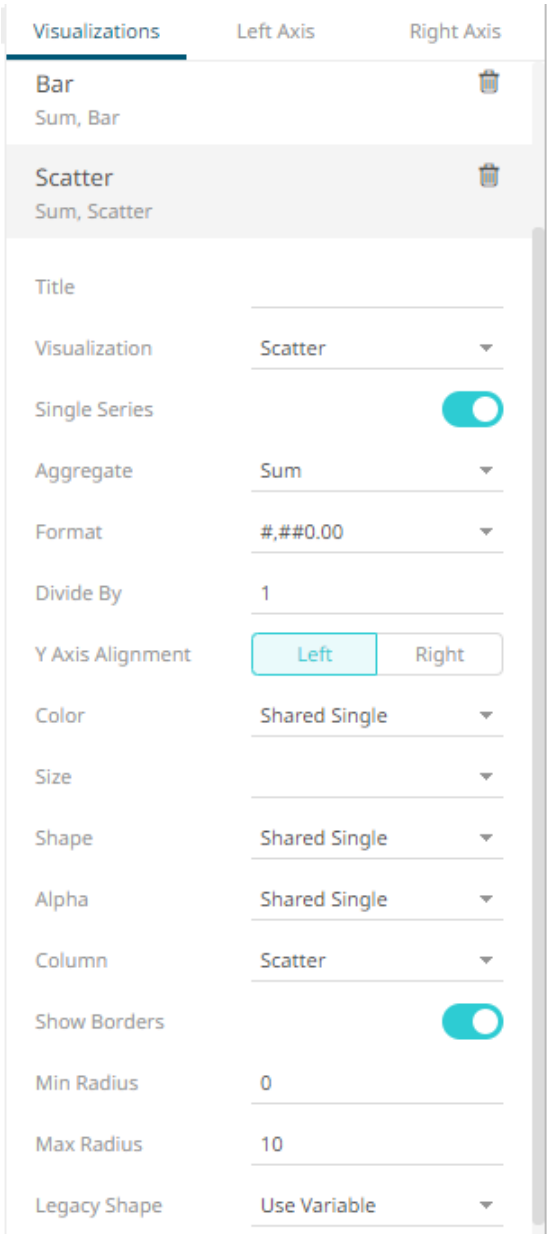
Sample 5. *Single Series* is enabled in the Line graph. In addition, in the Bar graph, the *Color* is set to column **Id,** the *Bar Width* to **0.3**, and the *Show Borders* is enabled.



Sample 6. *Single Series* is disabled in the Line graph. In addition, in the Bar graph, the *Color* is set to column **Id,** the *Bar Width* to **0.3**, and the *Show Borders* is enabled.

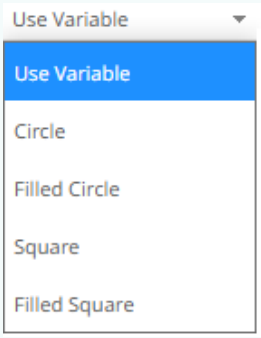


- Scatter

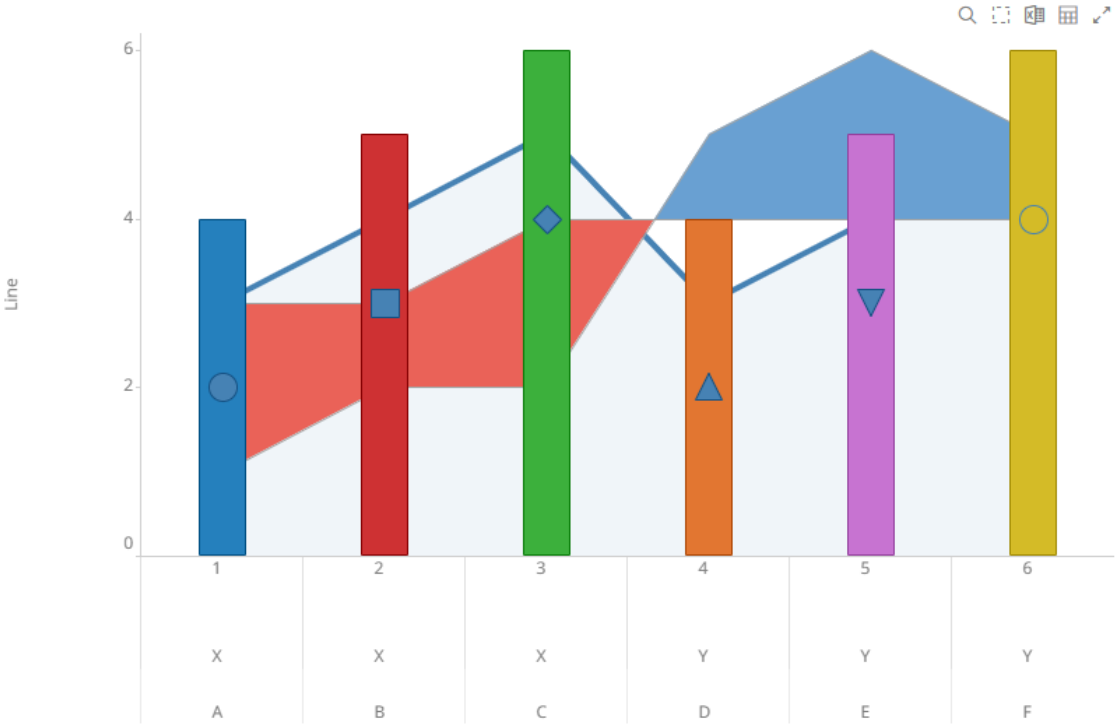


Additional settings include:

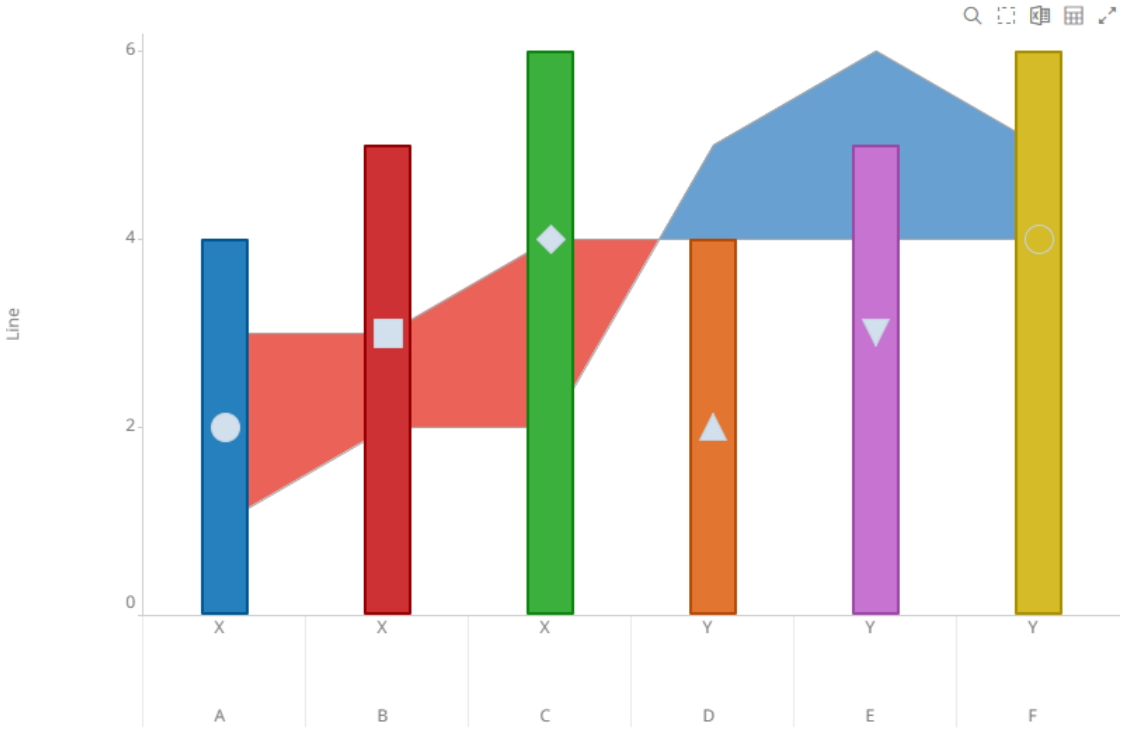
Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Size	Select the *Size* variable that will be used.
Shape	Select the *Shape* value.
Alpha	Select the *Alpha* value.
Show Borders	Determines whether a border is drawn around each scatter point.

Min Radius	The minimum radius in pixels of the scatter point.
Max Radius	The maximum radius in pixels of the scatter point.
Legacy Shape	Allows older workbooks to be updated and use the shape variable. Default is **Use Variable**. Other shapes can also be selected. 

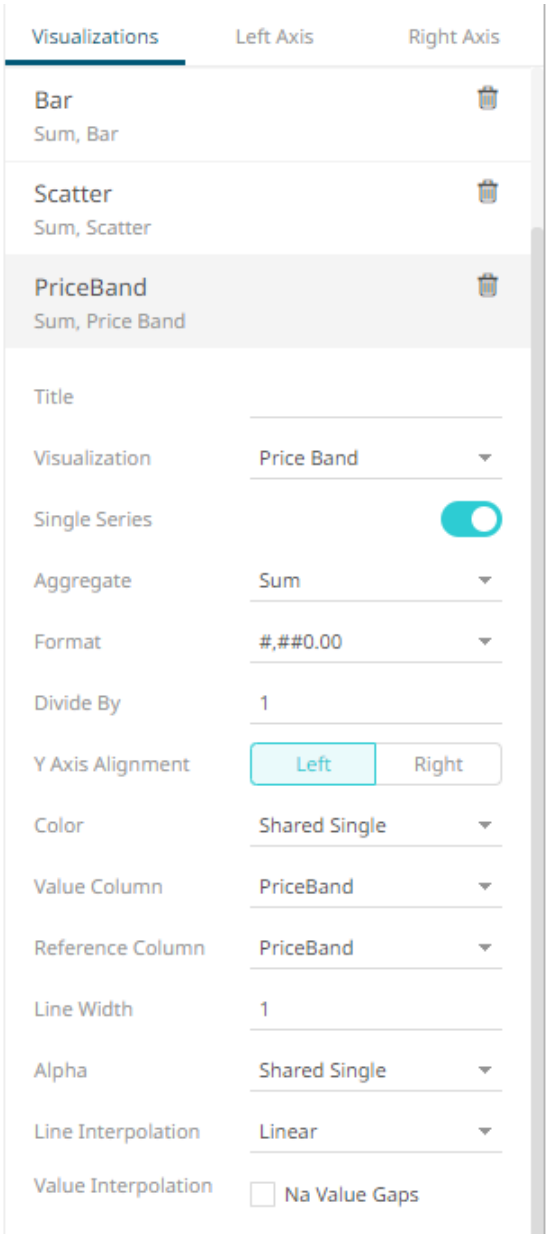
Sample 7. *Single Series* is enabled in the Line and Scatter graphs. In addition, in the Scatter graph, the *Shape* column is set to **Id** and the *Min Radius* to **3**.



Sample 8. *Single Series* is disabled in the Line and Scatter graphs. In addition, in the Scatter graph, the *Shape* column is set to **Id** and the *Min Radius* to **3**.

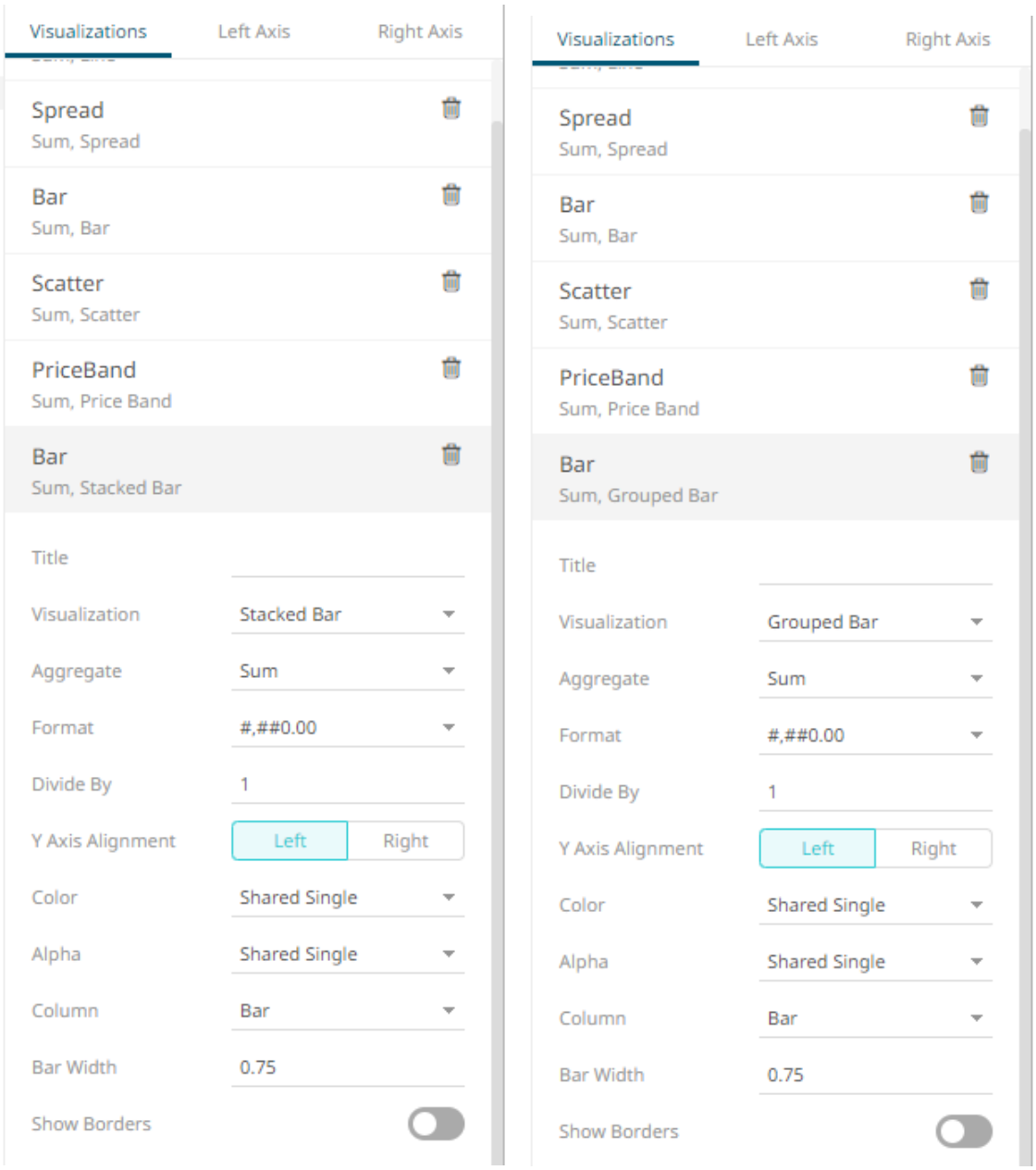


- Price Band



Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Reference Column	The field that will be used as the reference line data series.
Line Width	Specifies the line width in pixels.
Alpha	Select the *Alpha* value.
Line Interpolation	Specifies whether the line is **Stepped**, **Linear,** or **Smooth** interpolation.
Value Interpolation Na Value Gaps	Determines whether Na value (or missing) gaps are interpolated.

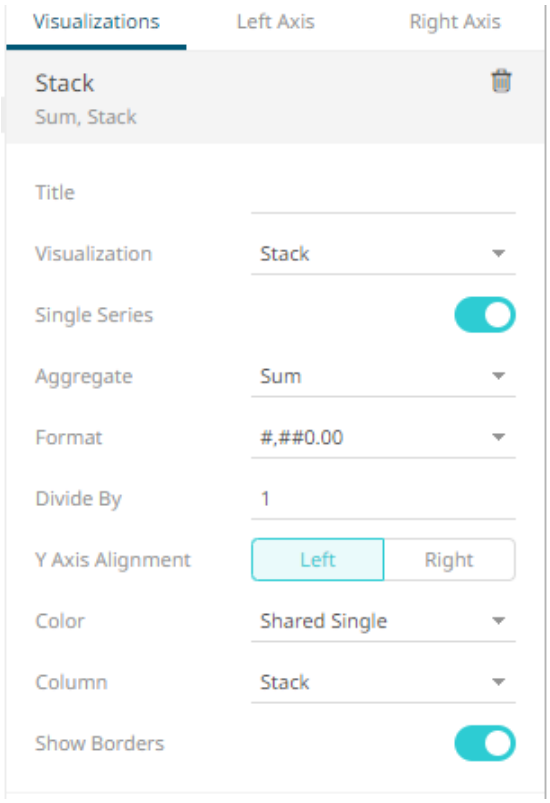
- Stacked Bar or Grouped Bar



Additional settings include:

Setting	Description
Bar Width	Specifies the width in pixels of each bar. **NOTE:** This is overridden when a column is added in the *Size* variable. Consequently, the width of the bars will be based on the comparison of their size in relation to where they are located on the X axis.
Show Borders	Specifies whether a border is drawn around bars. These are only visible if the *Bar Width* is greater than 1 pixel.

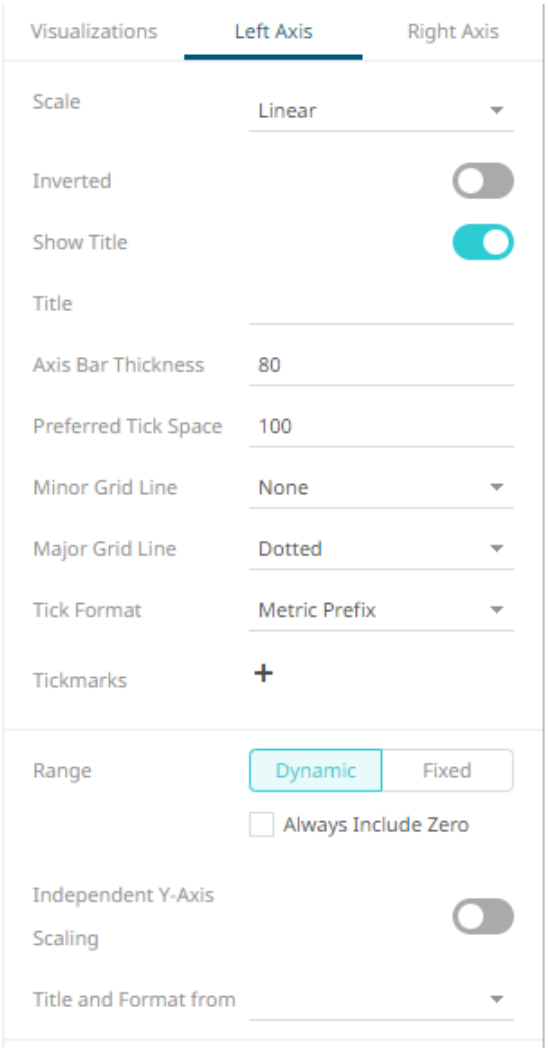
- Stack

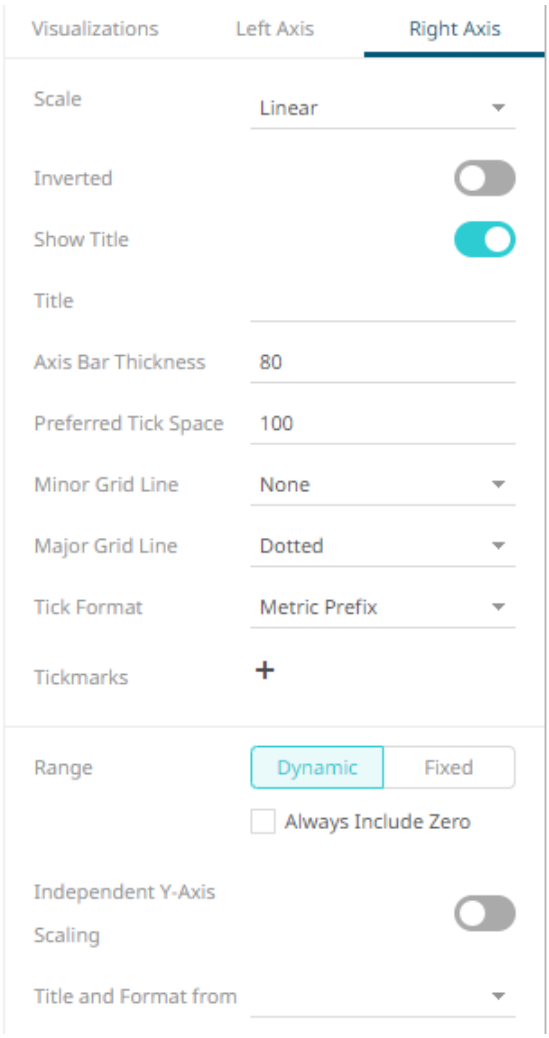


Additional settings include:

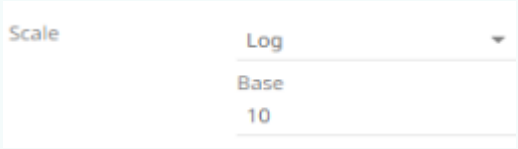
Setting	Description
Single Series	Determines whether to use all columns in the breakdown to create a single series or if one column should be used to divide the data into multiple series.
Show Borders	Determines whether borders are drawn around stacks.

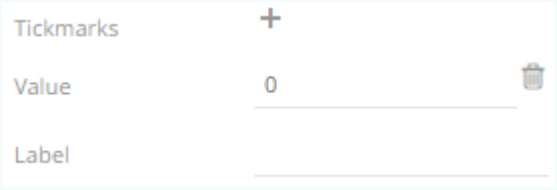
7. The text combination visualization includes an expanded axes pane, which includes specification of the properties for both the Left and Right Y axes.





Select or specify the following properties:

Setting	Description
Scale	Determines whether the scale of the axis is **Linear, Log,** or **Power**. • Linear – a change between two values is based on addition e.g., 30, 60, 90, 120, 180, etc. • Log - a change between two values is perceived on the basis of the ratio of the two values or based on multiplication. Once selected, the *Base* control displays with the value of the common base for the logarithmic scale (i.e., **10**).  For example: `log10(x)` represents the logarithm of x to the base 10 e.g., 1, 10, 100, 1000, etc. You can opt to enter a new *Base* value then click ✓.

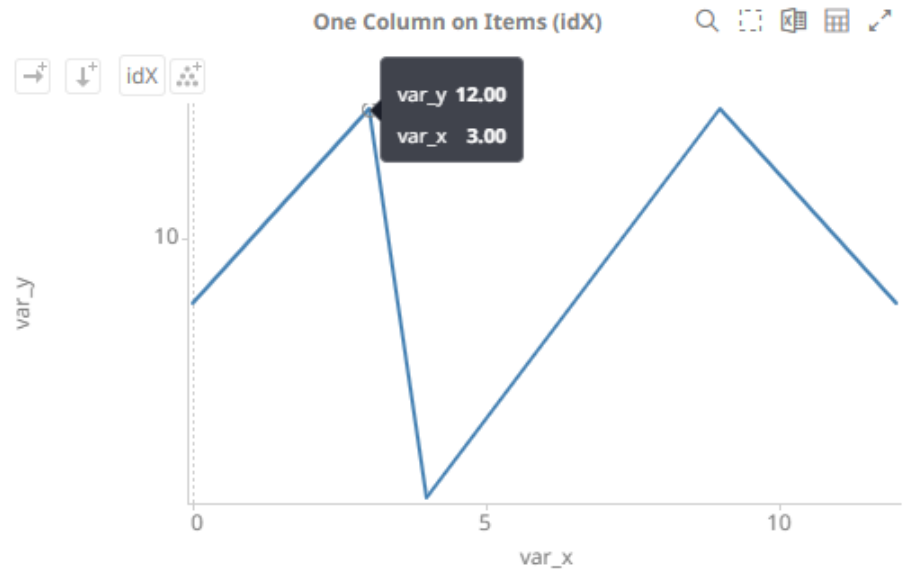
	NOTE: Value cannot be lower than 2. • Power – Works according to the `SIGN(MEASURE)*LOG10(MAX(1, ABS(MEASURE)))` formula. Works like the Log scale except it can handle negative values and every value between -1 and 1 is set to 0. For example for values between -100 and 100, the axis will be: -100, -10, 0, 10, 100
Inverted	Determines whether the Y or Height axis is inverted.
Show Title	Displays an Axis Title label. When enabled, you can opt to enter a custom *Title* for the axis which will override the title of the visualization variable.
Axis Bar Thickness	The margin in pixels for the axis. If set to zero, the axis is removed.
Preferred Tick Space	The preferred space in pixels between the minor grid lines across the axis.
Minor Grid Line	How minor grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Major Grid Line	How major grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Tick Format	Set to **From Variable** to use the format string that is on the current variable displayed in the axis. Set to **Metric Prefix** to format the Tick labels in the numeric axes using the metric prefixes.
Tickmarks	Click + to add and set tick marks.  Enter the *Value* and the *Label*. Click + to add more or 🗑 to delete.
Range	The visible range for the Left and Right Y-axis variables can either be calculated dynamically (**Dynamic Range**) or set between predetermined limits by selecting **Fixed Range**. This enables the *Min* and *Max* text boxes and populates them with default values taken from the data set.
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.
Title and Format From	The title and format of the Left and Right Axes based on the selected fields.

Popup Titles in Text Combination Graph and Numeric Combination Graph

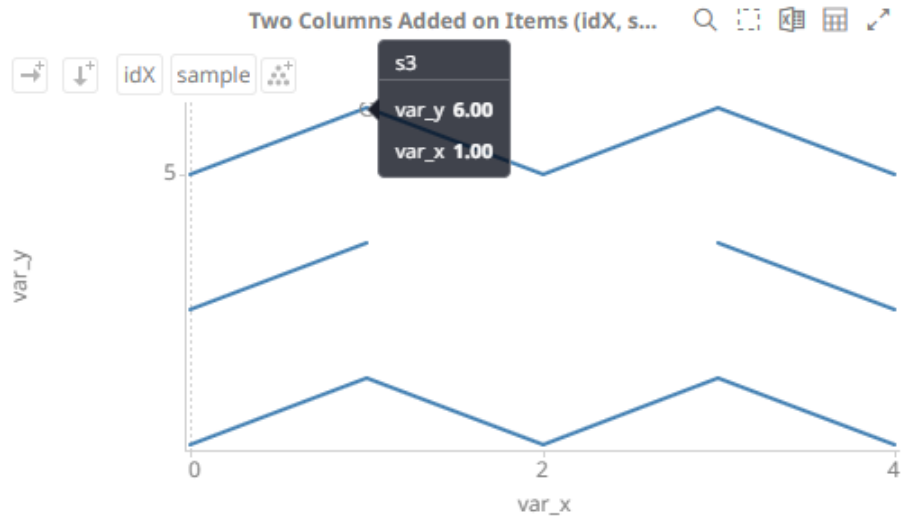
In the Text Combination Graph and Numeric Combination Graph, the first (top level) text column of *Items,* serves as an indexer for the x-axis instead of as a categoric breakdown column.

This is different from the Time Combination Graph, where the x-axis indexer is the time dimension, which is created through the time series transformation.

Therefore, in Text Combination and Numeric Combination, the *Details* popup will never show a category title if the *Items* setting has only one column.



Category titles will appear in the *Details* popup based on the second text column added to *Items*, or added to *Rows* or *Columns*. When a second text column is added to *Items*, there is also a requirement to switch off **Single Series** on *Visuals* where applicable depending on the type of visualization (e.g., line).

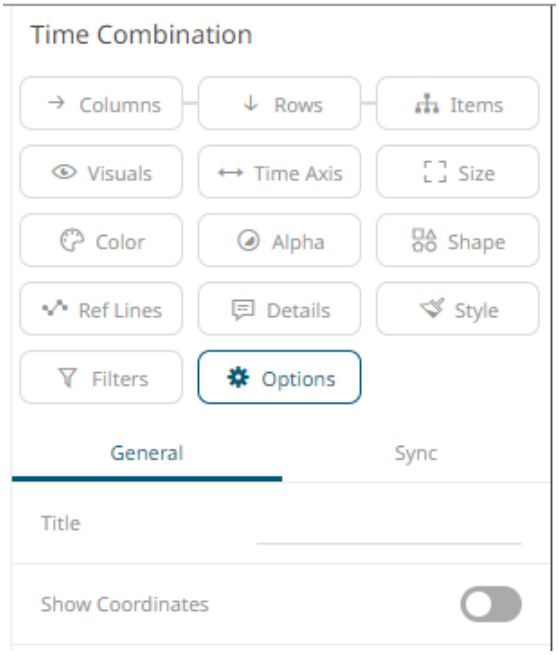


Time Combination Settings

The Time Combination visualization operates in a similar way to the table. Instead of multiple input variables becoming different columns in a table, they become different layers in the time series combination visualization. So unlike other visualizations, it can display a large number of time series variables, which can be rendered as: Line, Candle Stick, Bar, OHLC, Spread, Stack and Stacked Bar.

Steps:

1. The time combination settings pane is displayed after clicking the **Options** button or the *Visualization Title* (i.e., Time Combination):

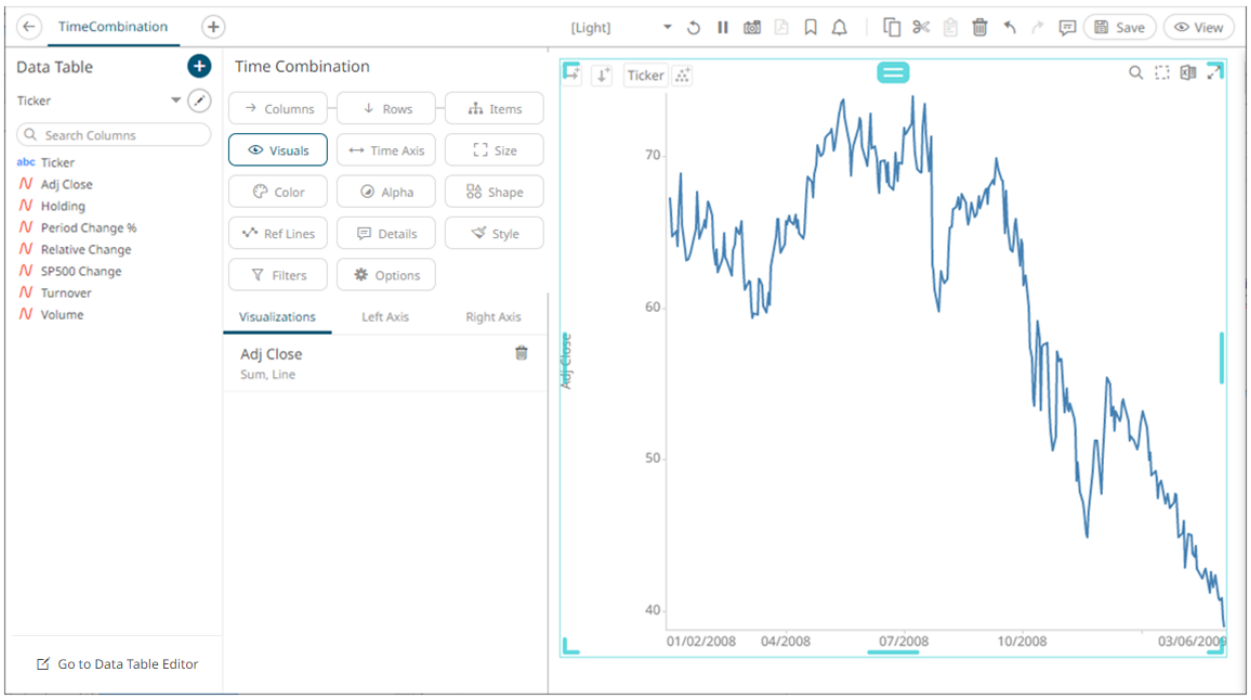


2. Set the following property:

Setting	Description
Show Coordinates	Determines whether the graph coordinates (i.e., X-Y plots, or Date/Time-Y plots) on mouse over are displayed in the visualization. Tap the slider to turn it on.

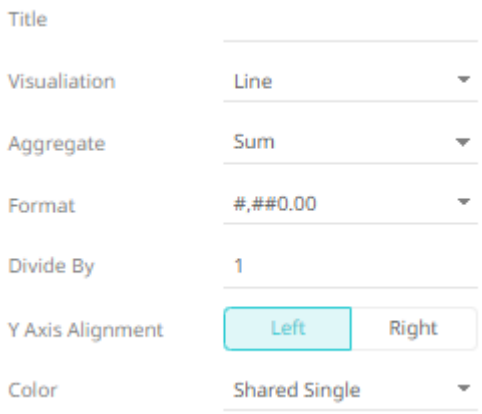
3. Drag and drop time series columns from the *Data Table* pane to the **Visuals** variable drop area.

   The column is added under the **Visualizations** tab list and by default, uses the Line graph and the Left Y-Axis alignment to the time combination visualization.



NOTE **The settings of the time combination visualization will depend on the time series visualization that will be added. Refer to the corresponding Settings section to define their properties.**

4. The properties that you can set will depend on the timeseries visualization that you will add, but the general settings include:

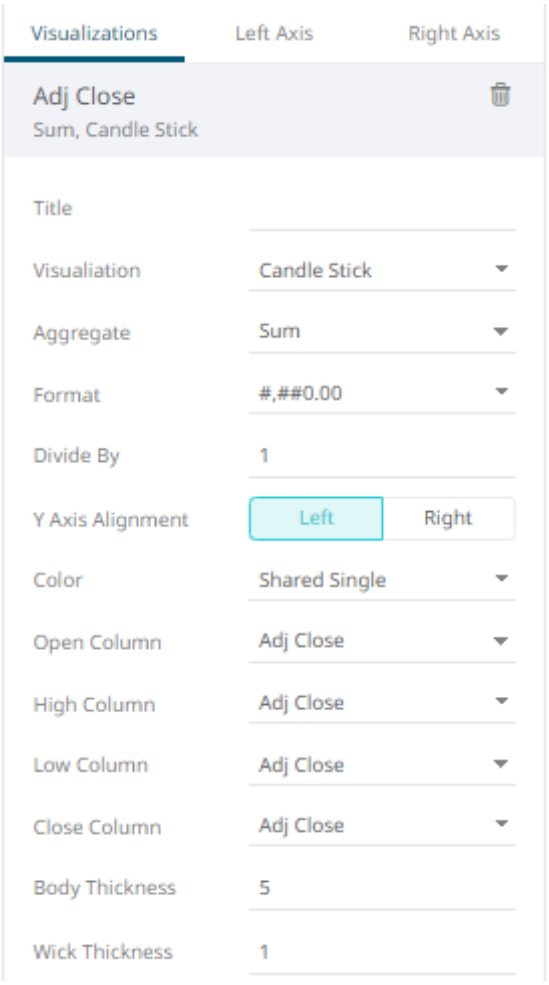


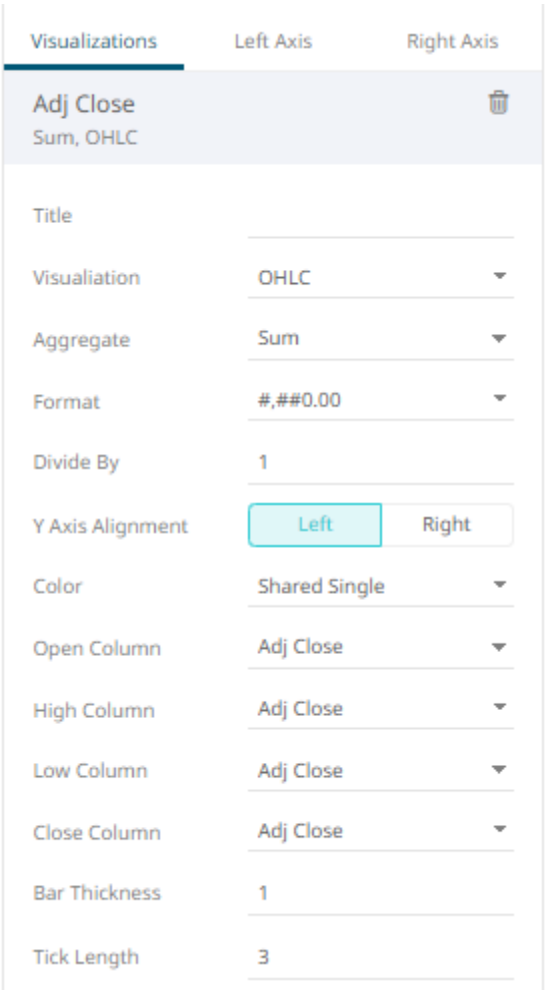
Set or select the following properties:

Setting	Description
Title	Title of the visualization.
Visualization	If the visualization is incorrect, instead of deleting, you can just select another one in the *Visualization* drop-down list. The settings pane will be changed to display the corresponding properties of the selected visualization.

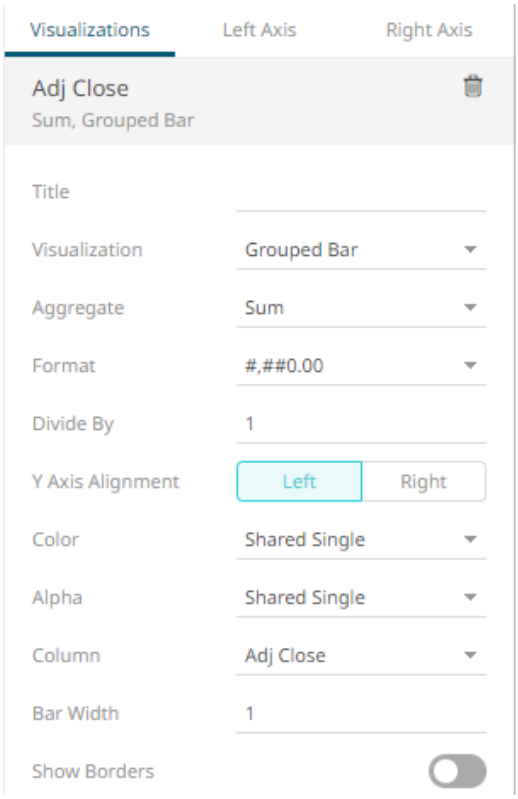
Aggregate	Aggregation method to be used. Default is **Sum**.
Format	The format that numbers will be displayed in. Panopticon uses the same formatting rules as MS Excel.
Divide By	Select the *Divide By* value to divide a number: • 1 • 1000 (by a thousand) • 10000 • 1000000 (by a million) • 1000000000 (by a billion)
Y Axis Alignment	The Y-Axis alignment: **Left** or **Right**.
Color	the *Color* variable that will be used for the column: • None • Shared Single • Custom Single • Column added to the *Column* variable
Column/Value Column	The time series column used for the visualization. If the dragged column is incorrect, instead of deleting, you can just select another column in the *Column/Value Column* drop-down list. **NOTE:** For the OHLC and Candle Stick Graph visualizations there are: *Open Column*, *High Column*, *Low Column*, and *Close Column*.

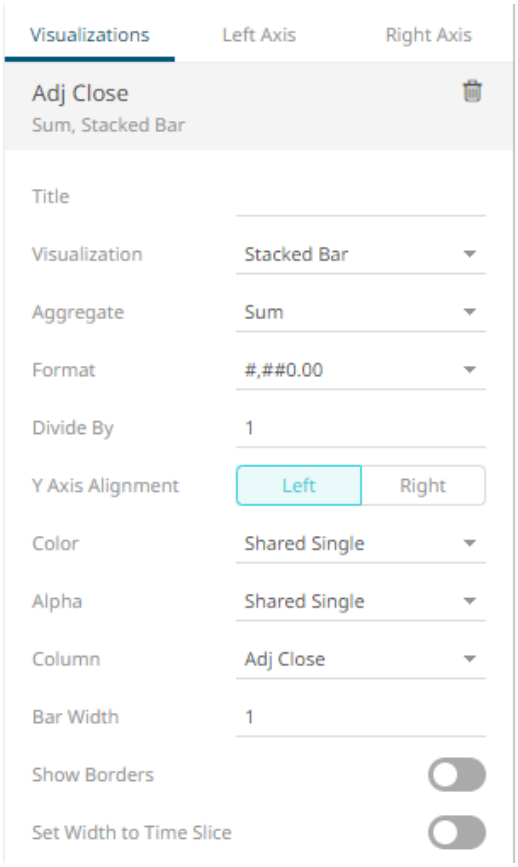
5. Visual members can be set to display any of the following visualizations:
   - Candle Stick or OHLC

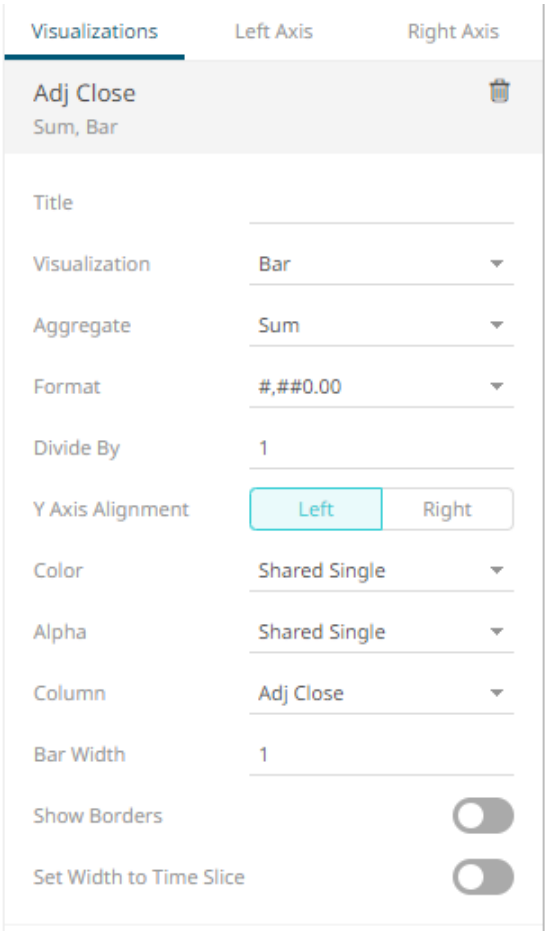

Visualizations
Left Axis
Right Axis
Adj Close
Sum, Candle Stick
Title
Visualiation
Candle Stick
Aggregate
Sum
Format
#,##0.00
Divide By
1
Y Axis Alignment
Left
Right
Color
Shared Single
Open Column
Adj Close
High Column
Adj Close
Low Column
Adj Close
Close Column
Adj Close
Body Thickness
5
Wick Thickness
1


Visualizations
Left Axis
Right Axis
Adj Close
Sum, OHLC
Title
Visualiation
OHLC
Aggregate
Sum
Format
#,##0.00
Divide By
1
Y Axis Alignment
Left
Right
Color
Shared Single
Open Column
Adj Close
High Column
Adj Close
Low Column
Adj Close
Close Column
Adj Close
Bar Thickness
1
Tick Length
3

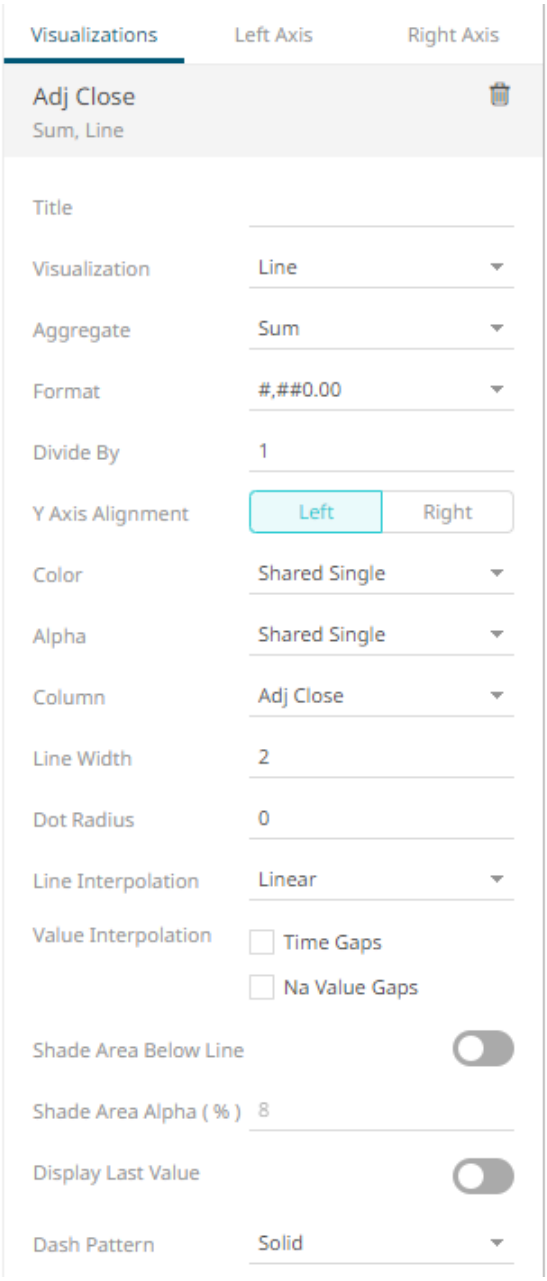
- Grouped, Stacked or Standard Bar



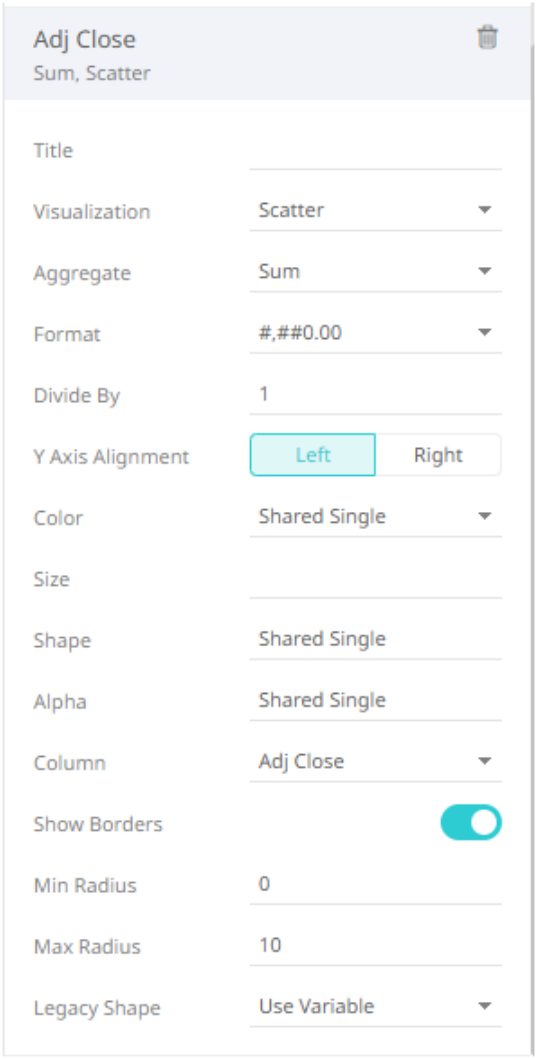



Visualizations
Left Axis
Right Axis
Adj Close
Sum, Bar
Title
Visualization
Bar
Aggregate
Sum
Format
#,##0.00
Divide By
1
Y Axis Alignment
Left
Right
Color
Shared Single
Alpha
Shared Single
Column
Adj Close
Bar Width
1
Show Borders
Set Width to Time Slice

- Line Graph

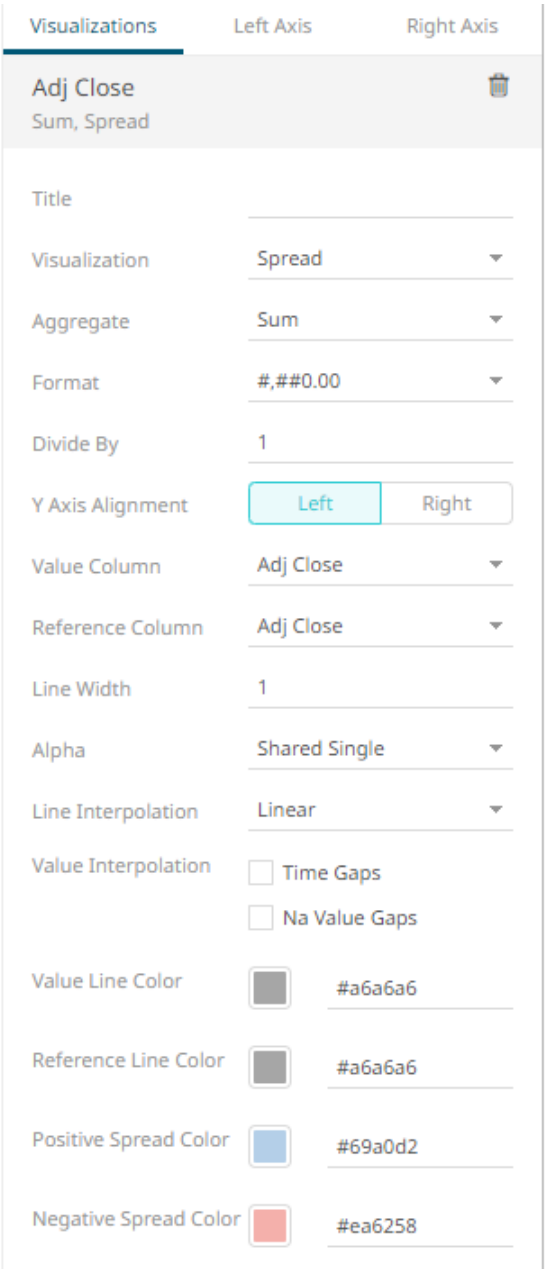

Visualizations
Left Axis
Right Axis
Adj Close
Sum, Line
Title
Visualization
Line
Aggregate
Sum
Format
#,##0.00
Divide By
1
Y Axis Alignment
Left
Right
Color
Shared Single
Alpha
Shared Single
Column
Adj Close
Line Width
2
Dot Radius
0
Line Interpolation
Linear
Value Interpolation
Time Gaps
Na Value Gaps
Shade Area Below Line
Shade Area Alpha (%)
8
Display Last Value
Dash Pattern
Solid

- Scatter Plot



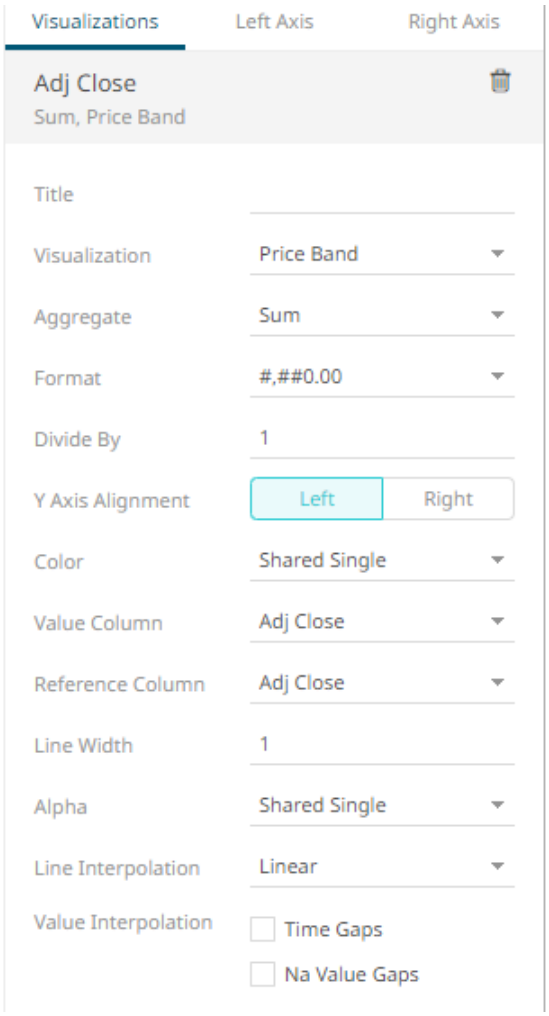
Setting	Description
Size	Select the *Size* variable that will be used.
Shape	Select the *Shape* value.
Alpha	Select the *Alpha* value.

- Spread



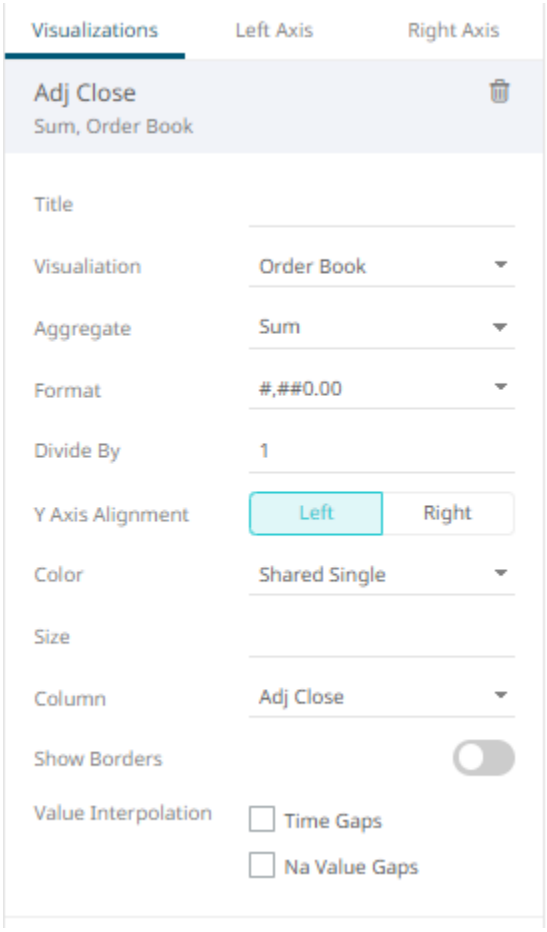
Setting	Description
Reference Column	The field that will be used as the reference line data series.

- Price Band

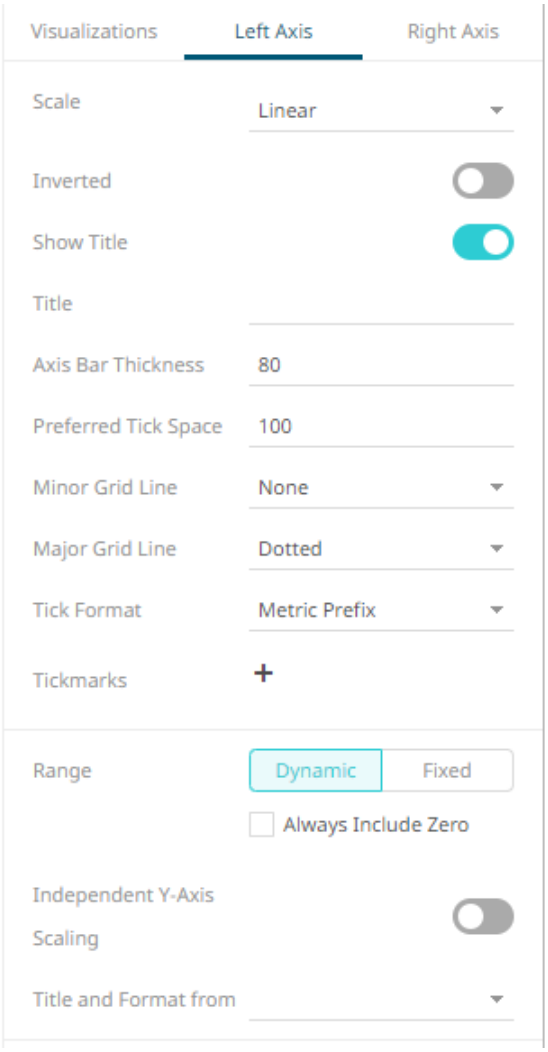


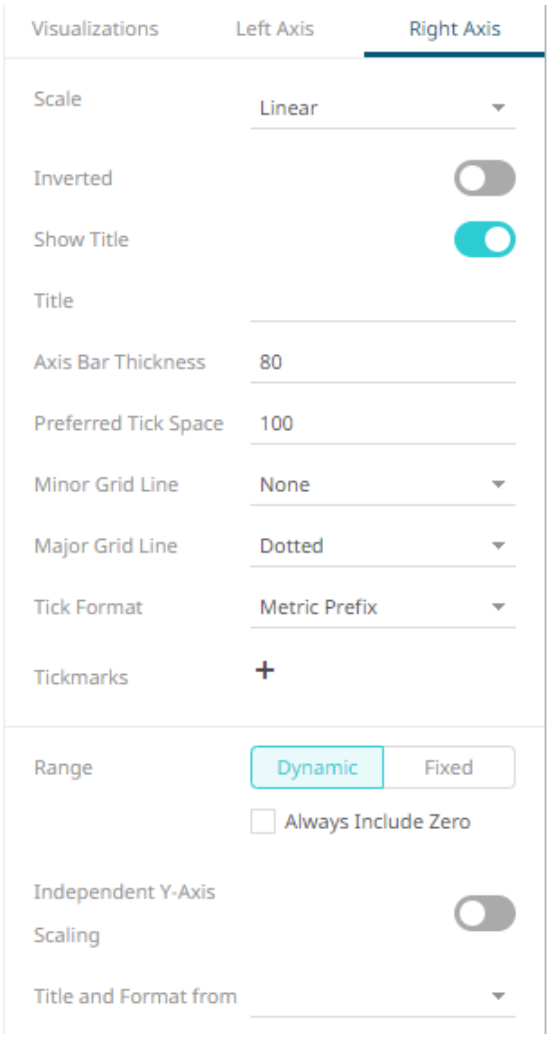
Setting	Description
Reference Column	The field that will be used as the reference line data series.

- Order Book

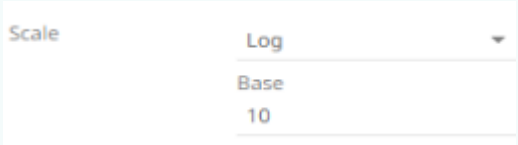


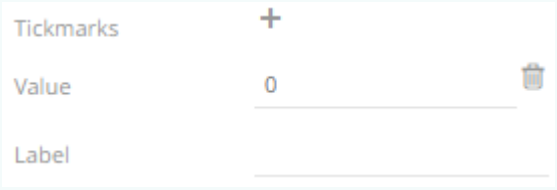
6. The time combination visualization includes an expanded axes pane, which includes specification of the properties for both the Left and Right Y axes.





Select or specify the following properties:

Setting	Description
Scale	Determines whether the scale of the axis is **Linear, Log,** or **Power**. • Linear – a change between two values is based on addition e.g., 30, 60, 90, 120, 180, etc. • Log - a change between two values is perceived on the basis of the ratio of the two values or based on multiplication. Once selected, the *Base* control displays with the value of the common base for the logarithmic scale (i.e., **10**).  For example: `log10(x)` represents the logarithm of x to the base 10 e.g., 1, 10, 100, 1000, etc. You can opt to enter a new *Base* value then click ✓.

	NOTE: Value cannot be lower than 2. • Power – Works according to the `SIGN(MEASURE)*LOG10(MAX(1, ABS(MEASURE)))` formula. Works like the Log scale except it can handle negative values and every value between -1 and 1 is set to 0. For example for values between -100 and 100, the axis will be: -100, -10, 0, 10, 100
Inverted	Determines whether the Y or Height axis is inverted.
Show Title	Displays an Axis Title label. When enabled, you can opt to enter a custom *Title* for the axis which will override the title of the visualization variable.
Axis Bar Thickness	The margin in pixels for the axis. If set to zero, the axis is removed.
Preferred Tick Space	The preferred space in pixels between the minor grid lines across the axis.
Minor Grid Line	How minor grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Major Grid Line	How major grid lines are drawn across the axis. Allowed values: • None • Dotted • Dashed • Solid
Tick Format	Set to **From Variable** to use the format string that is on the current variable displayed in the axis. Set to **Metric Prefix** to format the Tick labels in the numeric axes using the metric prefixes.
Tickmarks	Click + to add and set tick marks.  Enter the *Value* and the *Label*. Click + to add more or 🗑 to delete.
Range	The visible range for the Left and Right Y-axis variables can either be calculated dynamically (**Dynamic Range**) or set between predetermined limits by selecting **Fixed Range**. This enables the *Min* and *Max* text boxes and populates them with default values taken from the data set.
Independent Y-Axis Scaling	Determines whether to have each visualization Y-axis in a cross tab automatically scaled independent of the others.
Title and Format From	The title and format of the Left and Right Axes based on the selected fields.

LEGENDS

Four types of legend can be added to a dashboard:

- Color (For Text & Numeric)
- Icon
- Shape
- Timeseries

NOTE **One or more visualizations must be available on the dashboard that you can link to, before adding a Color, Icon, or Shape legend.**

Adding a Color Legend

The Color Legend displays the color variables of the associated visualization. You can also set the orientation and style or enable the ability to do a filter or to display this part in the PDF output.

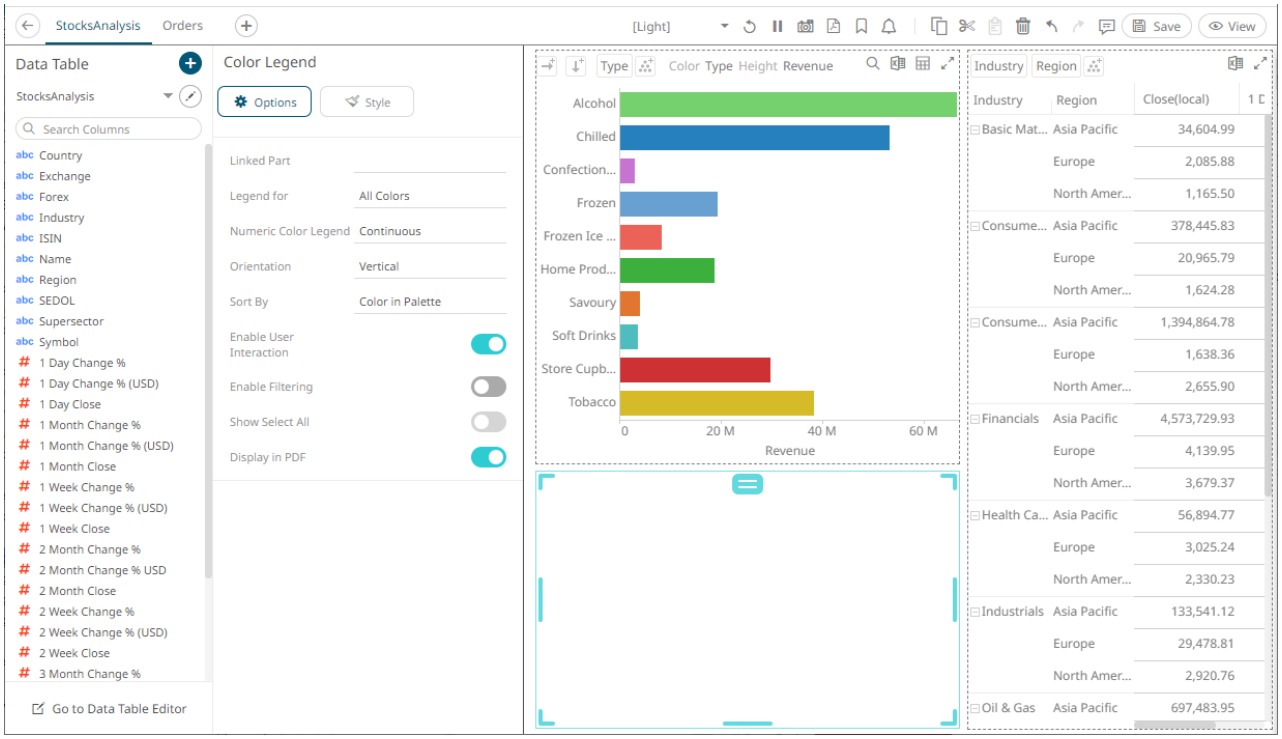
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Color Legend** 

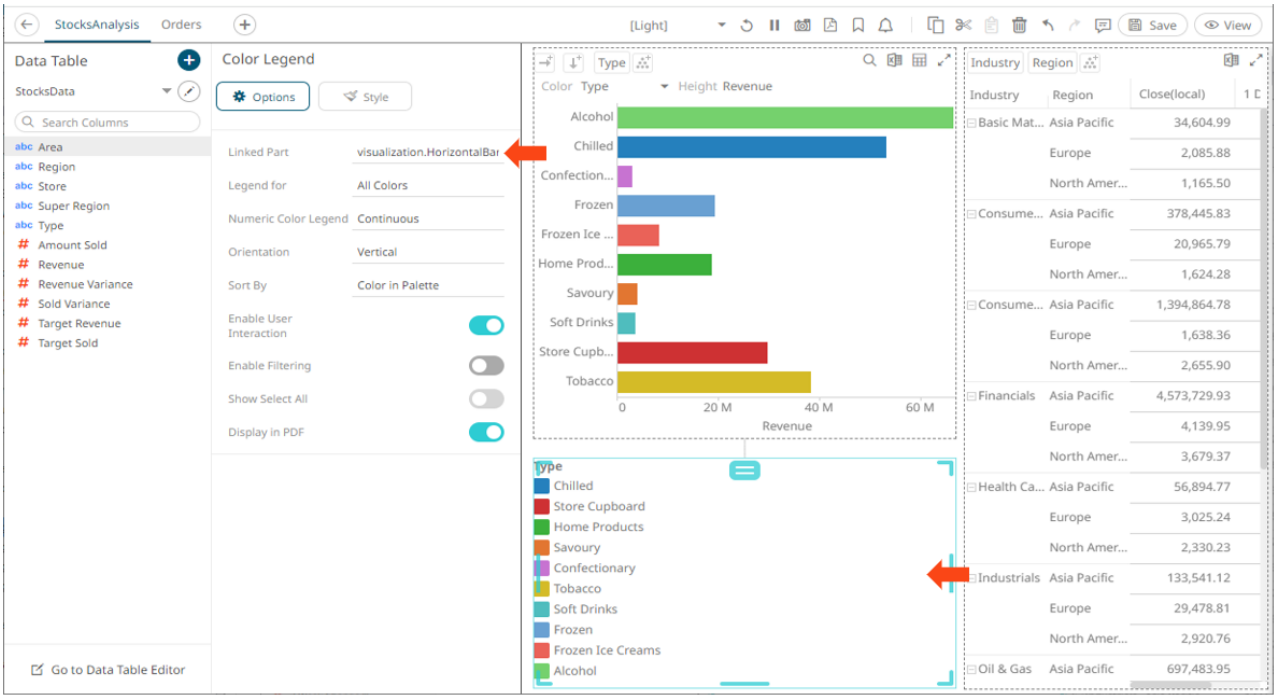
icon.

   The *Color Legend Settings* pane is displayed, and the *Color Legend* part is added on the dashboard canvas.

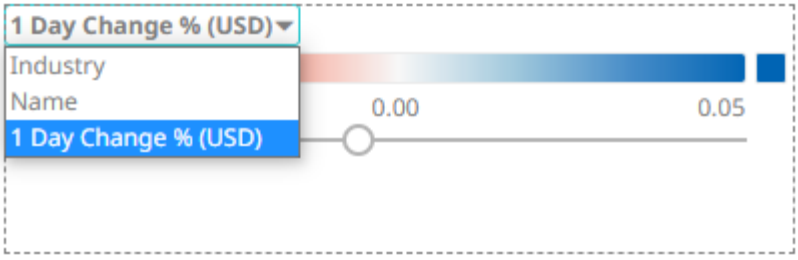


2. Select any of the available parent visualizations with color variable from the *Linked Part* drop-down list.

   The color legend is connected to its parent visualization and the link between them is displayed. The color variables are retrieved from this visualization and displayed in the legend.



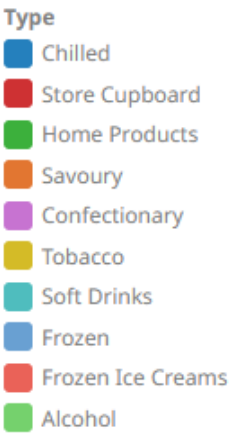
If the visualization can display multiple color variables, which is the case with the Table and Time Combination, then the legend displays a drop list of possible variables to display.



There are two Color Legend styles:

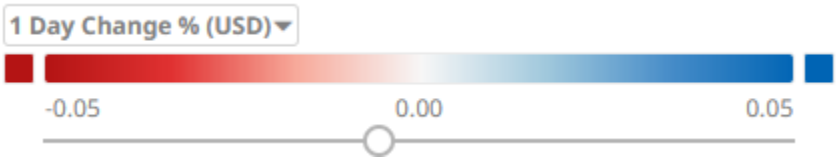
- Categorical

  The categorical style color legend lists all text categories and colors used in the associated visualization for the selected source column.



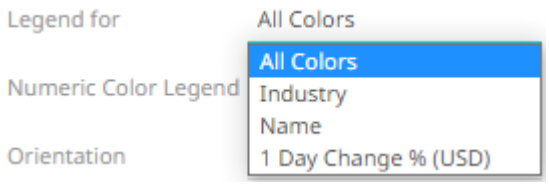
- Numeric

  The numeric style color legend displays the color range used within the associated visualization for the selected numeric source column.



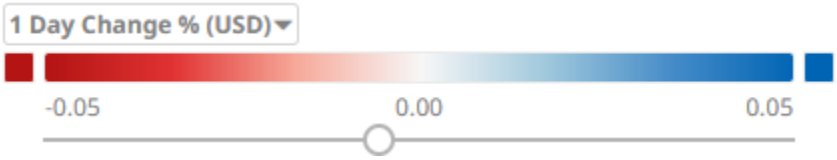
  The style displayed depends on the active color variable of the linked visualization.

3. Set the color legend to **All Colors** or to a specific source column.



4. The style of a numeric color legend can be fixed to either:

   - Continuous

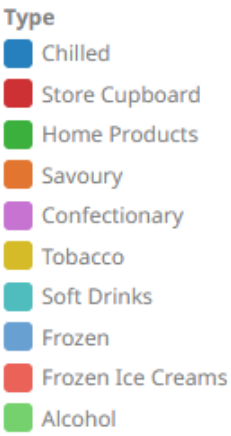


   - Discrete

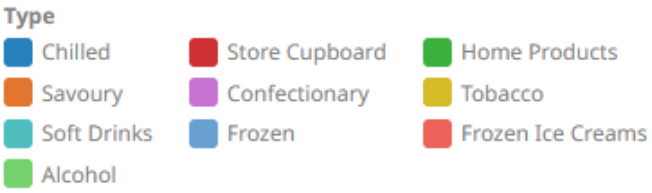


5. Select the *Orientation* for text color legends:

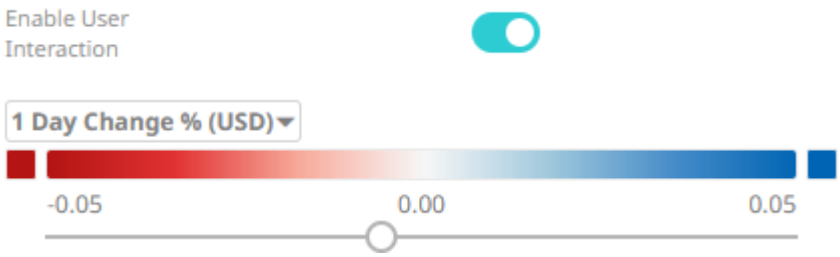
   - Vertical



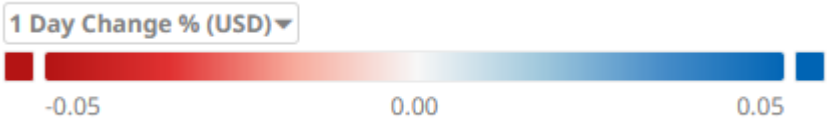
- Horizontal



6. Tap the **Enable User Interaction** slider to turn it on and display the numeric color range slider.

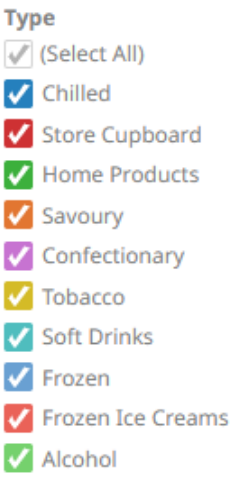


Otherwise, the color legend is read-only and the slider is hidden:



7. For text color legends (Categorical), you can enable filtering and allow selection of all items (*Show Select All*):



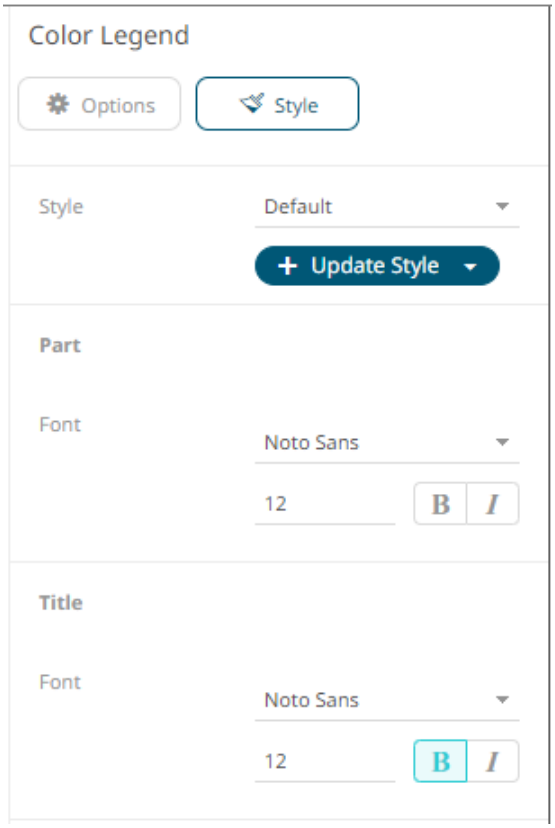


8. Tap the **Display in PDF** slider to turn it on and include this dashboard part in the PDF output.

9. To set the style of the Color Legend, click **Style** 

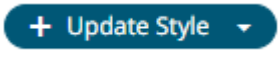
.

   The page updates to display the *Style* pane.



10. Set the *Font* type, size, style (**Bold** and/or **Italic**).

    For the part title, the font is set to **Bold** by default.

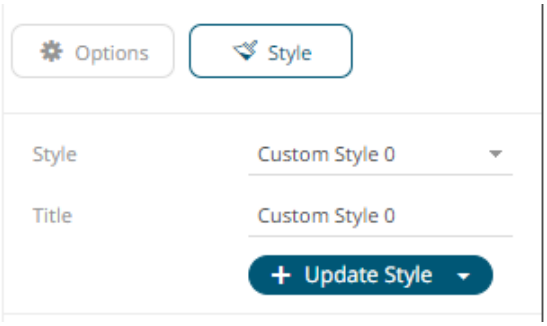
11. Click **Update Style** 

and select any of the following options:

    - **Set current as default** – Save the changes and set it as the default.

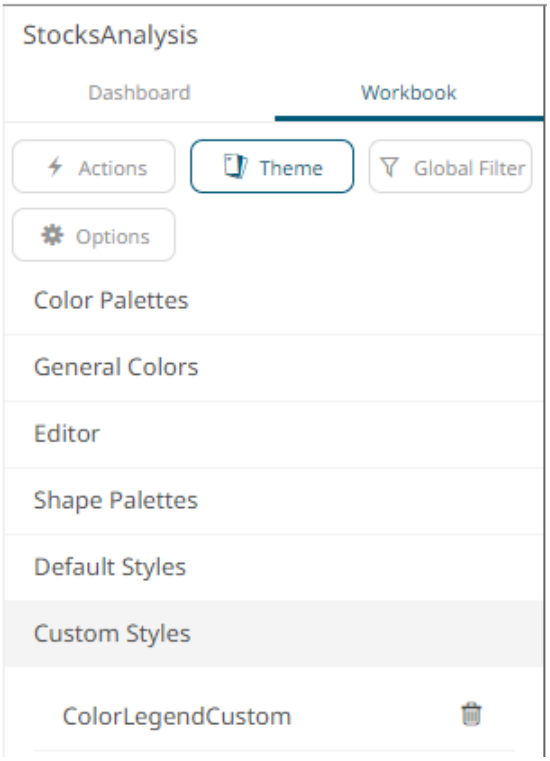
- **Create custom style** – Save the changes and set it as a custom style.

  The *Style* pane updates to display the *Title* control.



  - Enter the custom style *Title*.
  - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

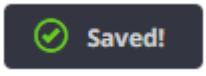
  The new custom style is added in the **Workbook > Theme > Custom Styles** list.



  If published, the custom style configuration of the Color Legend will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

12. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Adding an Icon Legend

The Icon Legend displays the icon variables of the associated visualization.

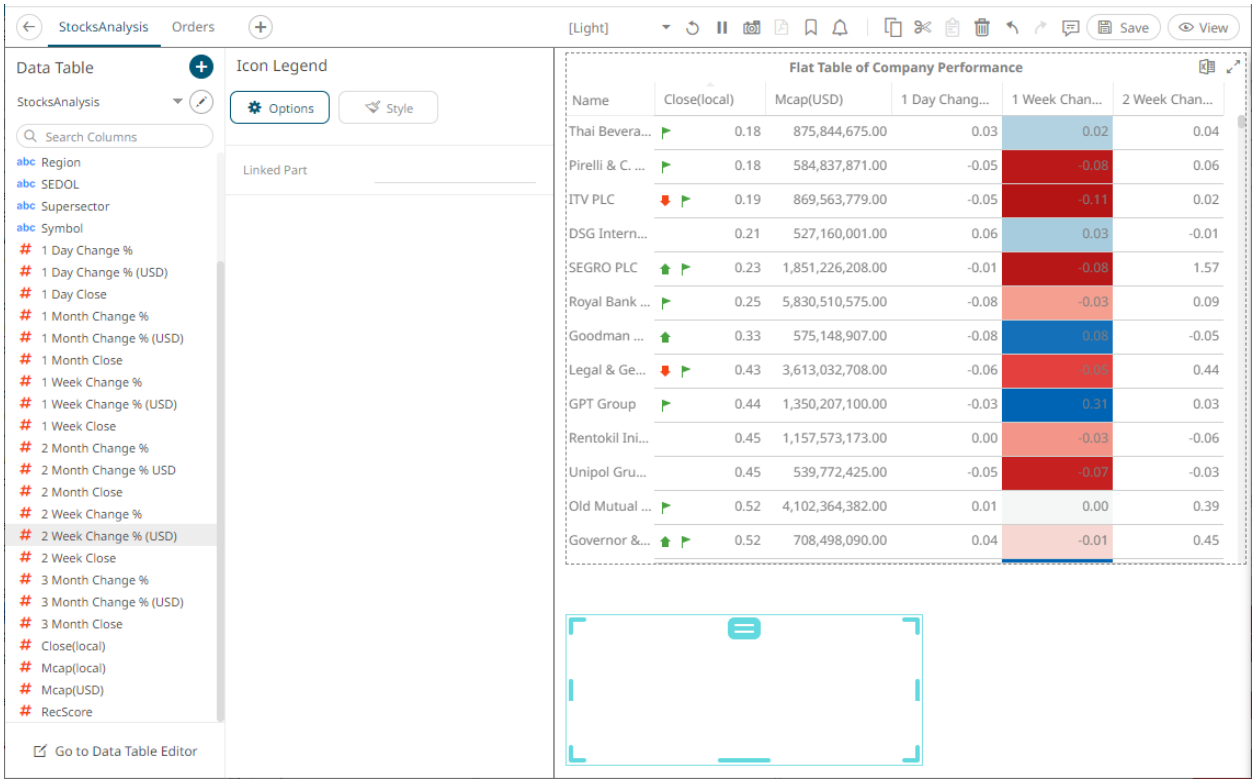
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Icon Legend** 

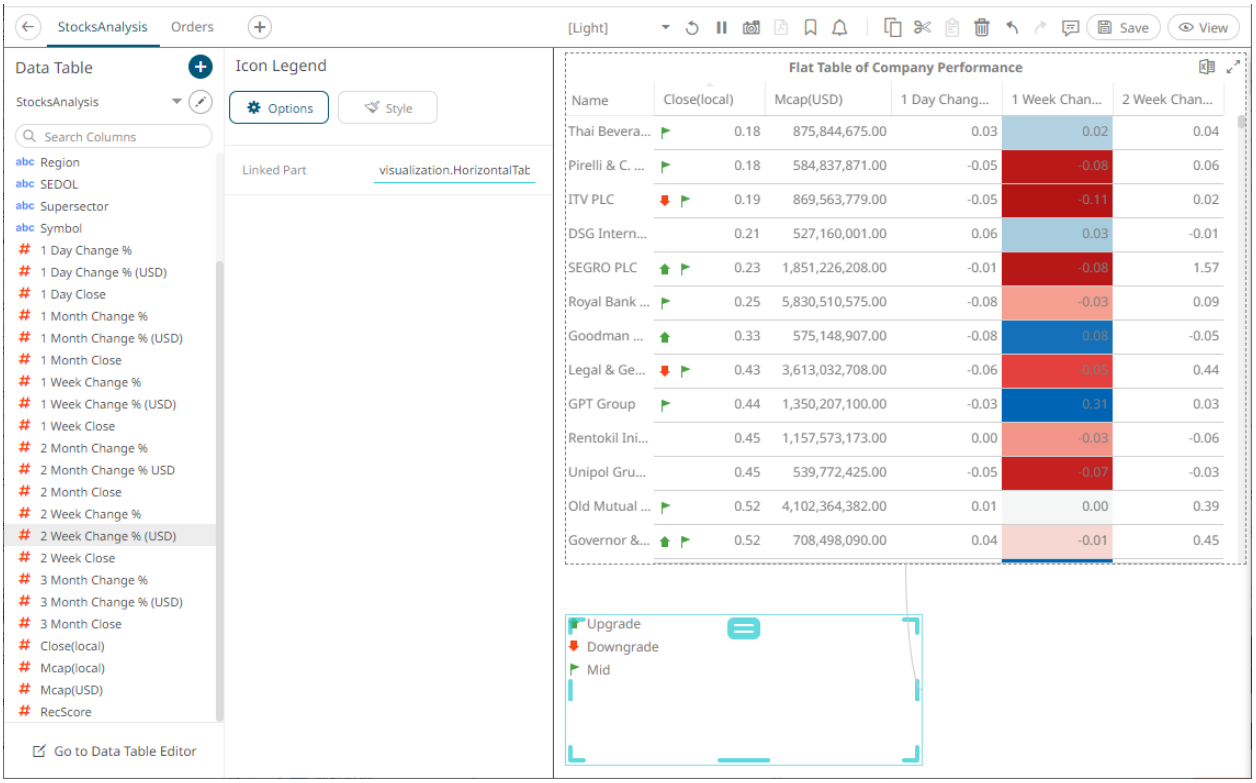
icon.

   The *Icon Legend Settings* pane is displayed, and the *Icon Legend* part is added on the dashboard canvas.



2. Select any of the available parent visualizations with icon variables from the *Linked Part* drop-down list.

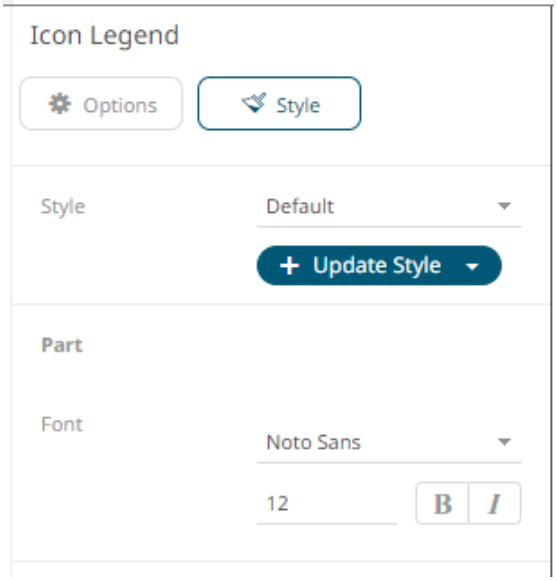
   The icon legend is connected to its parent visualization and the link between them is displayed. The icon variables are retrieved from this visualization and displayed in the legend.



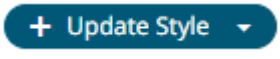
3. To set the style of the Icon Legend, click **Style** 

.

   The page updates to display the *Style* pane.



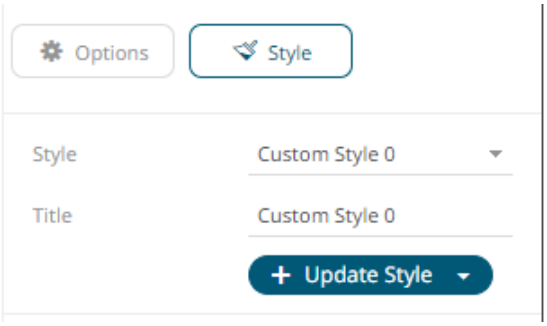
4. Set the *Font* type, size, style (**Bold** and/or **Italic**).

5. Click **Update Style** 

and select any of the following options:

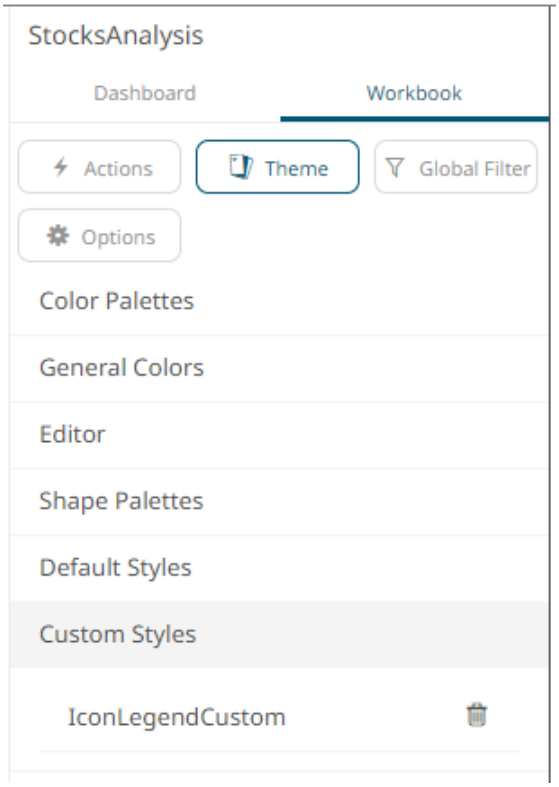
   - **Set current as default** – Save the changes and set it as the default.
   - **Create custom style** – Save the changes and set it as a custom style.

The *Style* pane updates to display the *Title* control.



- Enter the custom style *Title*.
- If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

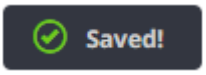
The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Icon Legend will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

6. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Adding a Shape Legend

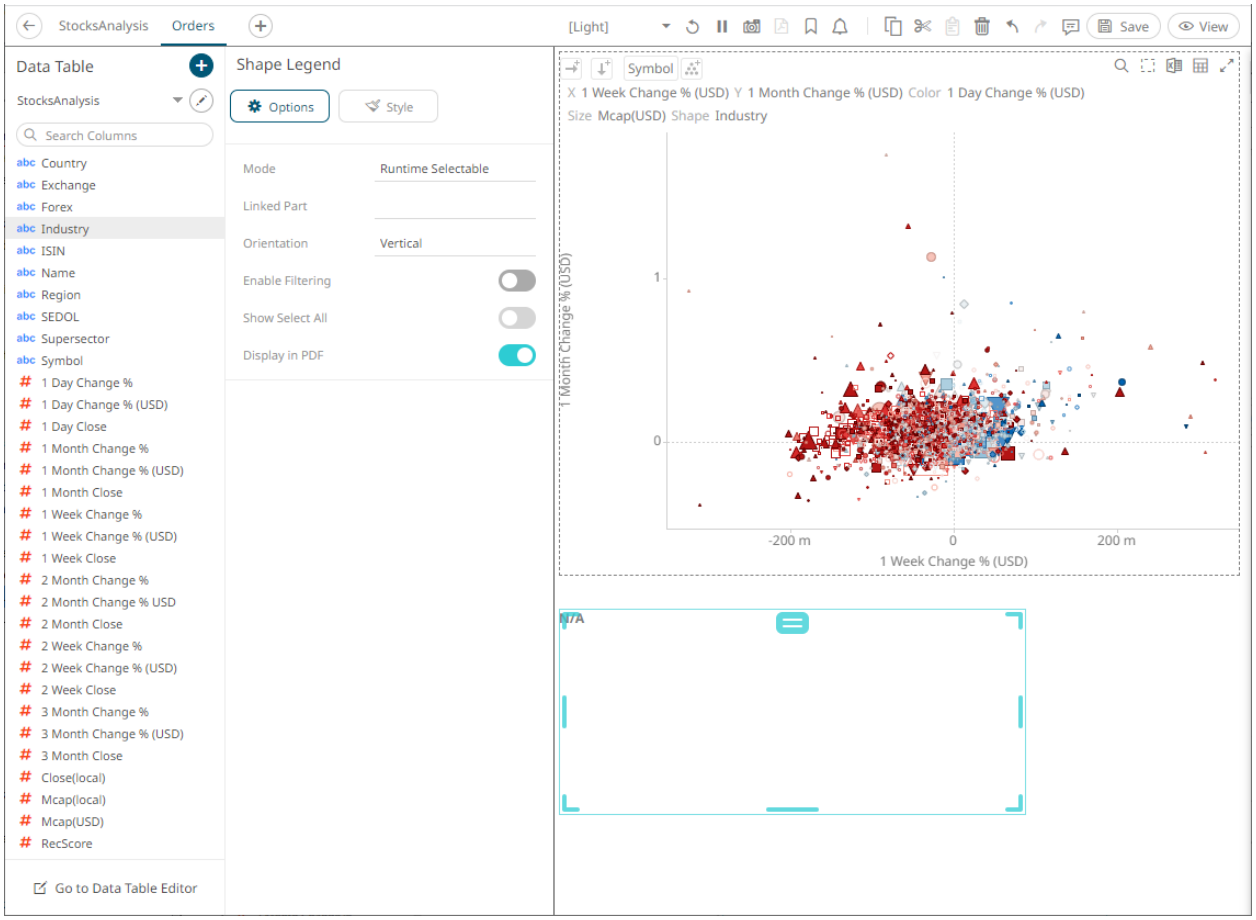
Shape Legend displays the shape variables of the associated visualization (Scatter Plot, Table, Time Combination, and Time series Scatter Plot). You can also set the orientation or enable the ability to do a filter or to display this part in the PDF output.

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Shape Legend** 

icon.

   The *Shape Legend Settings* pane is displayed, and the *Shape Legend* part is added on the dashboard canvas.

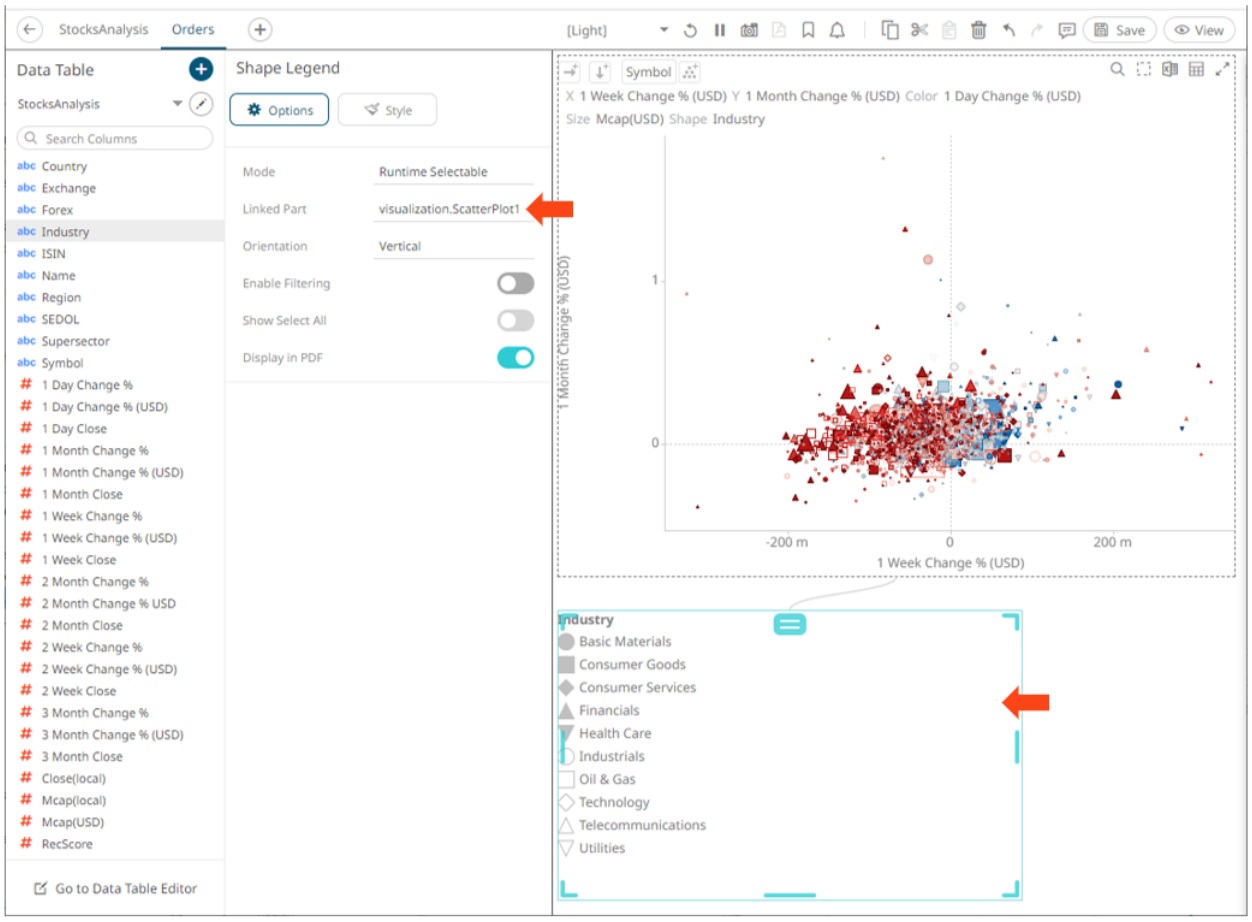


2. Select the legend *Mode*:
   - Runtime Selectable

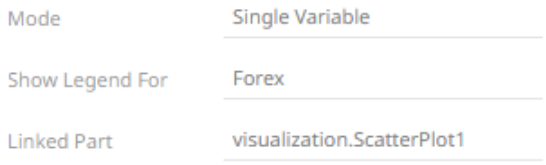
     This mode is only applicable when connecting to a time combination graph.
   - Single Variable

     Sets the shape legend to a specific source column of a parent visualization.
3. Select any of the available parent visualizations with shape variables from the *Linked Part* drop-down list.

   The shape legend is connected to its parent visualization and the link between them is displayed. The shape variables are retrieved from this visualization and displayed in the legend.

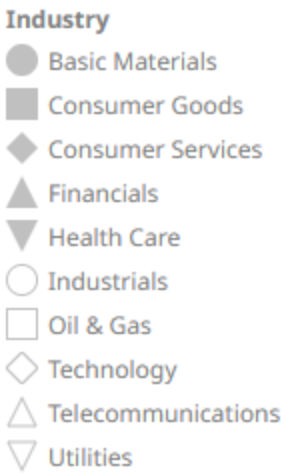


For the **Single Variable** mode, the *Show Legend For* field is automatically filled with the column of the shape variable in the parent visualization.



For the **Runtime Selectable** mode, this automatically maps all of the shapes of the time combination graph to the legend.

4. For test shape legends, you can display them either:
   - Vertical

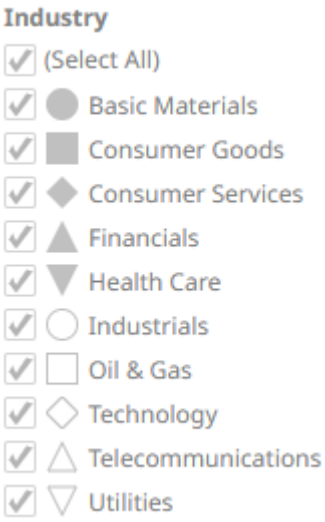


- Horizontal



5. Enable filtering and allow selection of all items (*Show Select All*):

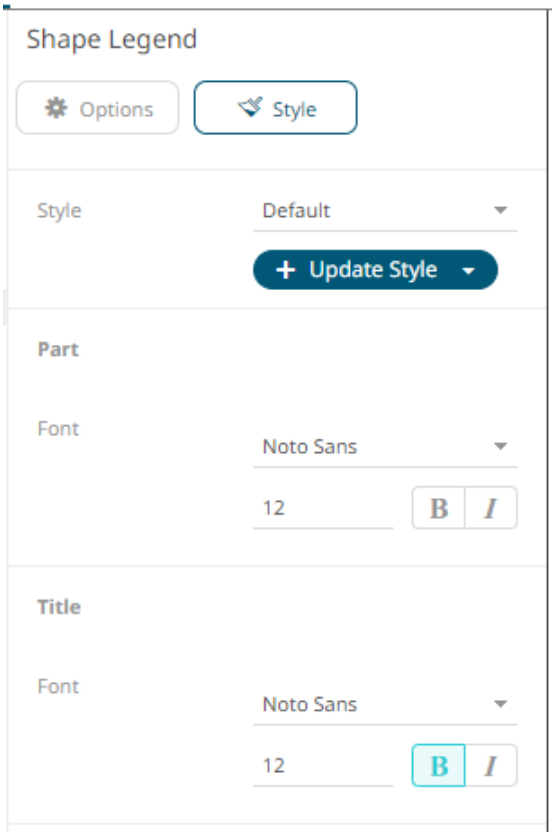




6. Tap the **Display in PDF** slider to turn it on and include this dashboard part in the PDF output.
7. To set the style of the Shape Legend, click **Style** 

.

The page updates to display the *Style* pane.



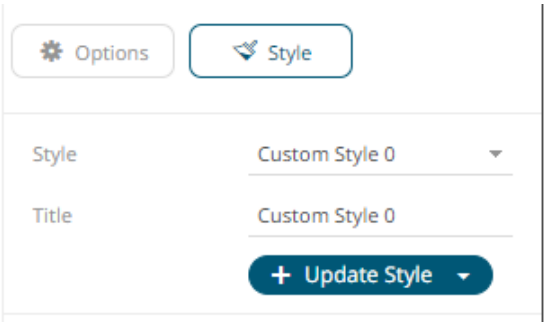
8. Set the *Font* type, size, style (**Bold** and/or **Italic**).

   For the part title, the font is set to **Bold** by default.

9. Click **Update Style**  and select any of the following options:

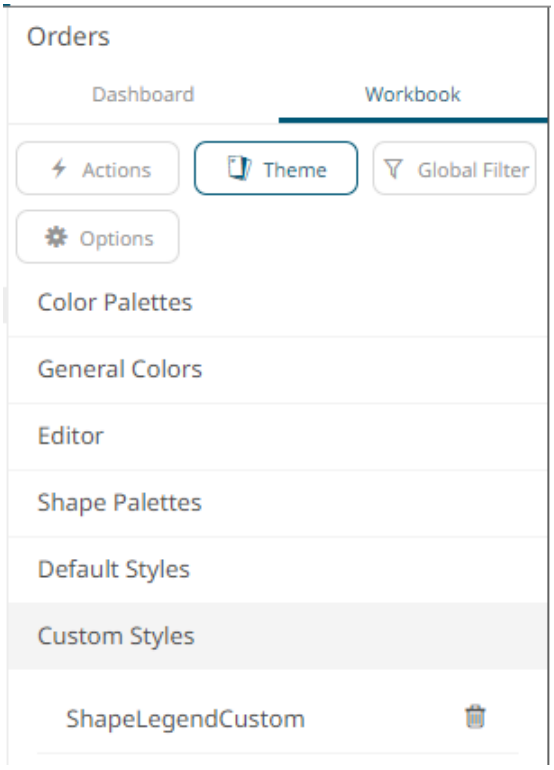
   - **Set current as default** – Save the changes and set it as the default.
   - **Create custom style** – Save the changes and set it as a custom style.

     The *Style* pane updates to display the *Title* control.

     - Enter the custom style *Title*.
     - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

     The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Shape Legend will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

10. Click the **Save** 

icon on the toolbar to save the changes.

    When saved, the 

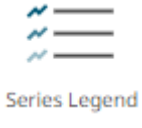
notification is displayed.

Adding a Series Legend

The Series Legend displays configured reference lines, their associated labels, and visual members.

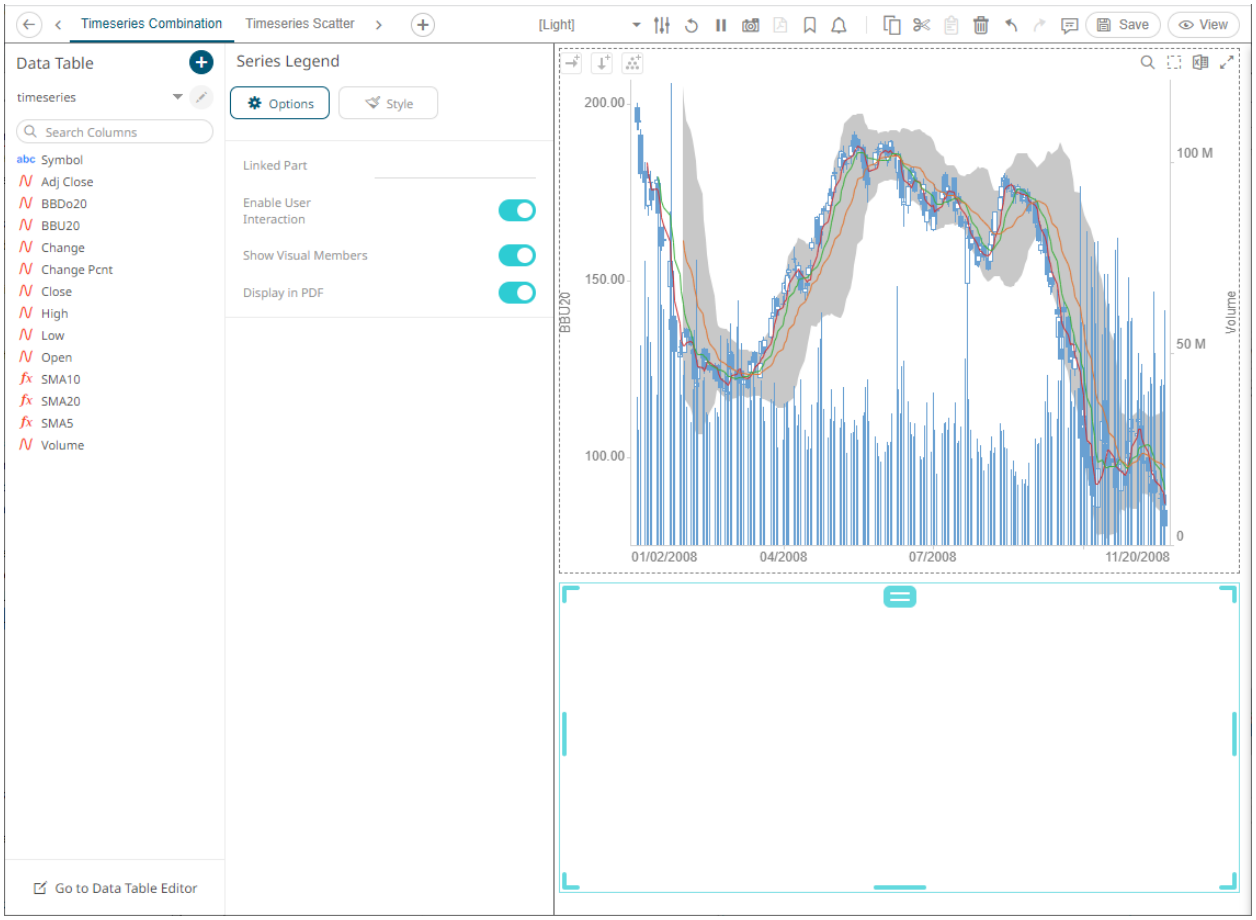
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Series Legend** 

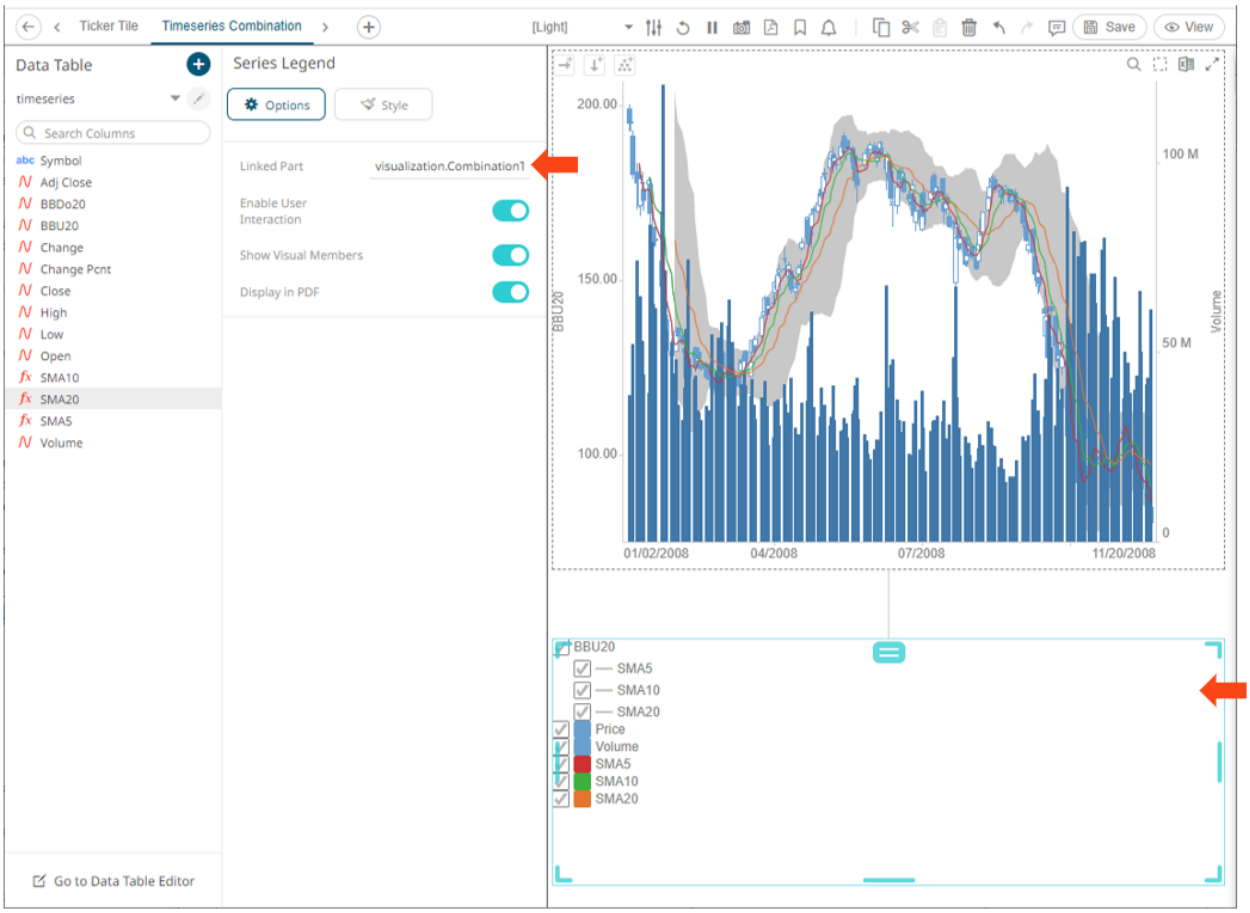
icon.

    The *Series Legend Settings* pane is displayed, and the *Series Legend* part is added on the dashboard canvas.

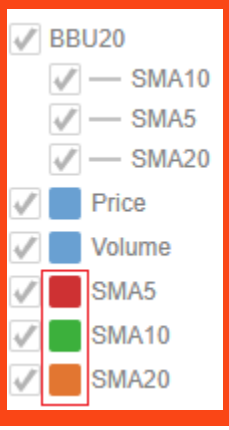


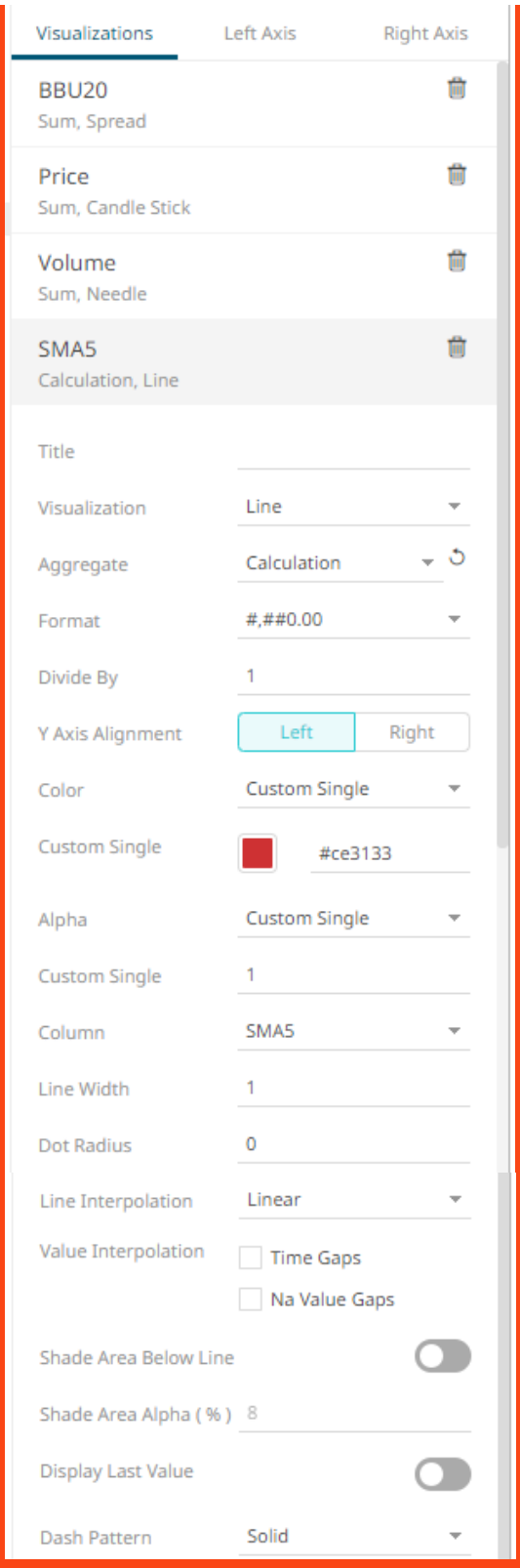
2. Select any of the available parent visualizations from the *Linked Part* drop-down list.

   The series legend is connected to its parent visualization and the link between them is displayed. The reference line listing from this visualization are retrieved and the constituent reference lines in a vertical column along with their associated levels are displayed.

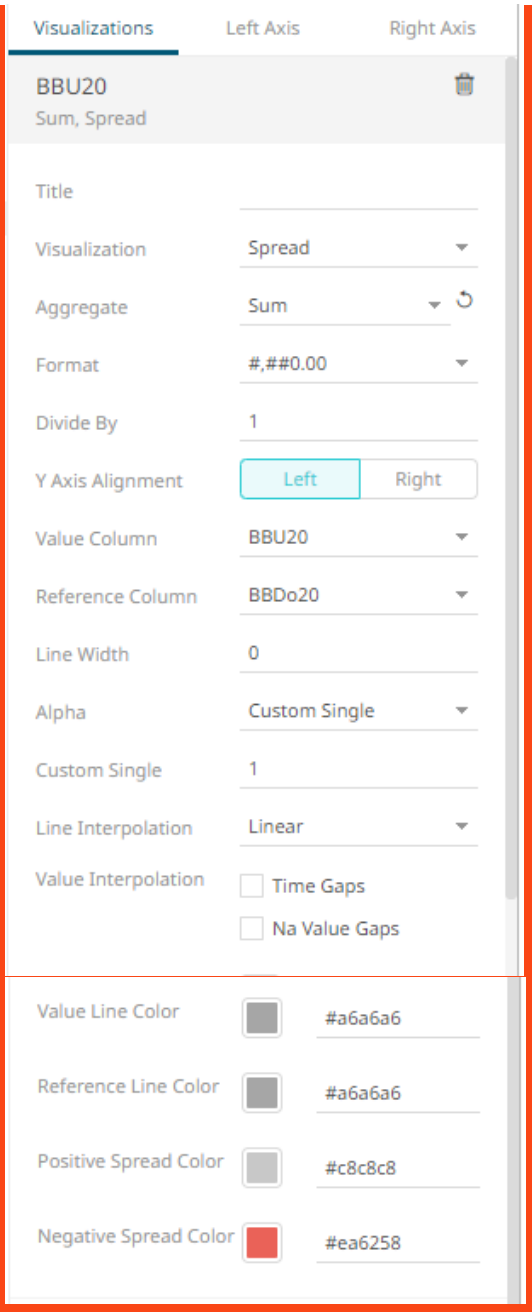


NOTE **In the example above, for SMA5, SMA10, SMA20, the square represents the configured *Custom Single* color for each visual member.**



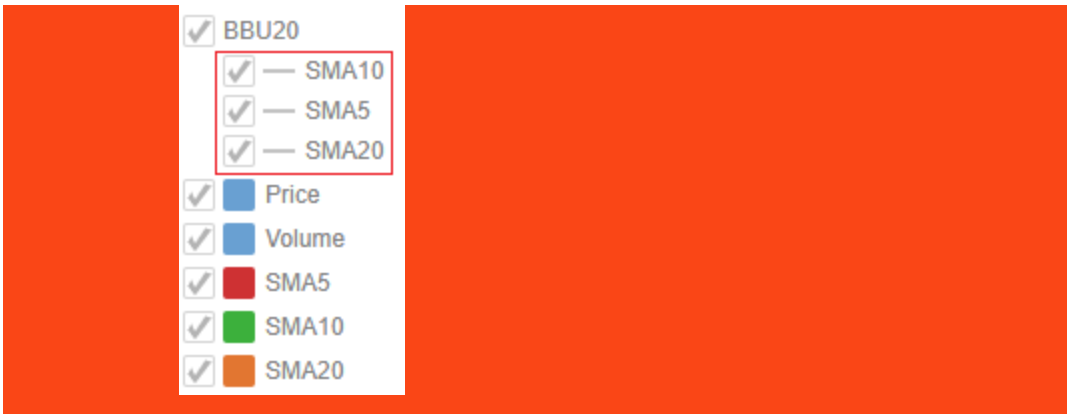


For the BBU20, Price and Volume members, there is no configured *Custom Single* color.



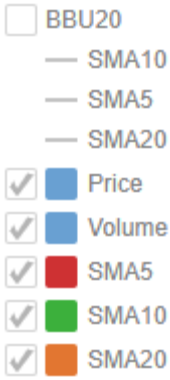
Setting the *Custom Single* color for the visual members helps display the *Color Legend* for layers in the Combination Graph, in cases where the Color variable is not used.

Furthermore, the SMA10, SMA5, and SMA20 are the reference lines added under the BBU20 visual member.

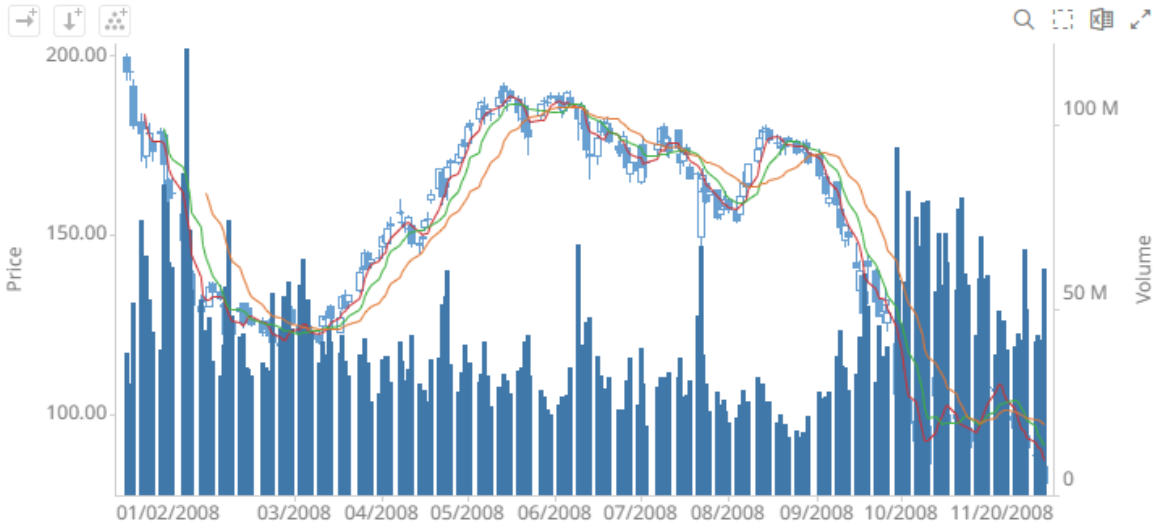


3. On the *Series Legend Settings* pane, tapping the **Enable User Interaction** slider enables check boxes of the visuals and reference lines and users can check or uncheck them to filter which ones to display in the parent visualization.

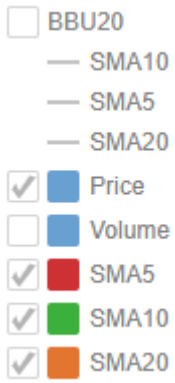
   For example, if **BBU20** is unchecked:



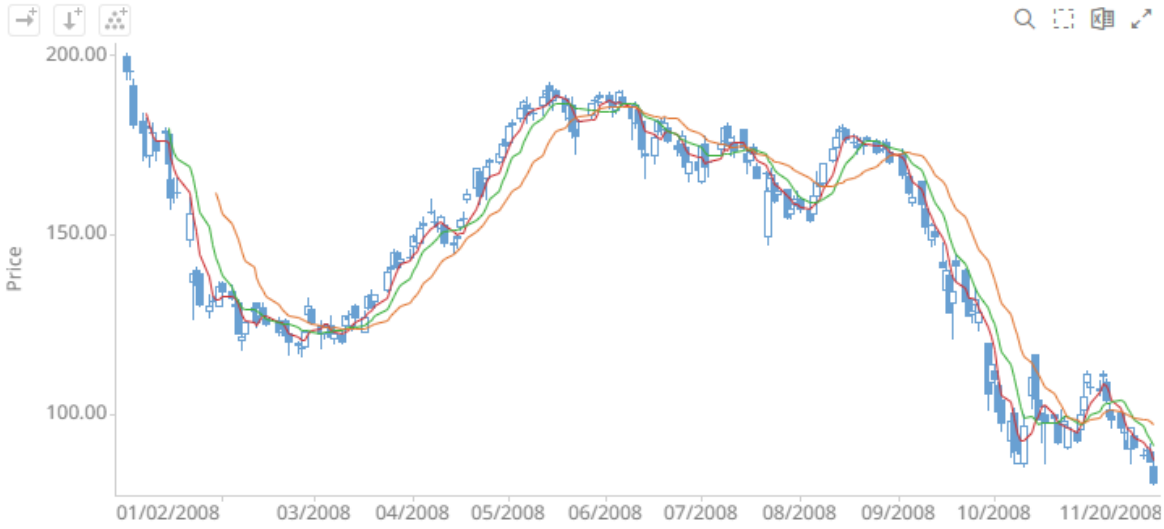
   The visualization and reference lines for BBU20 will not be displayed.



If **Volume** is also unchecked:

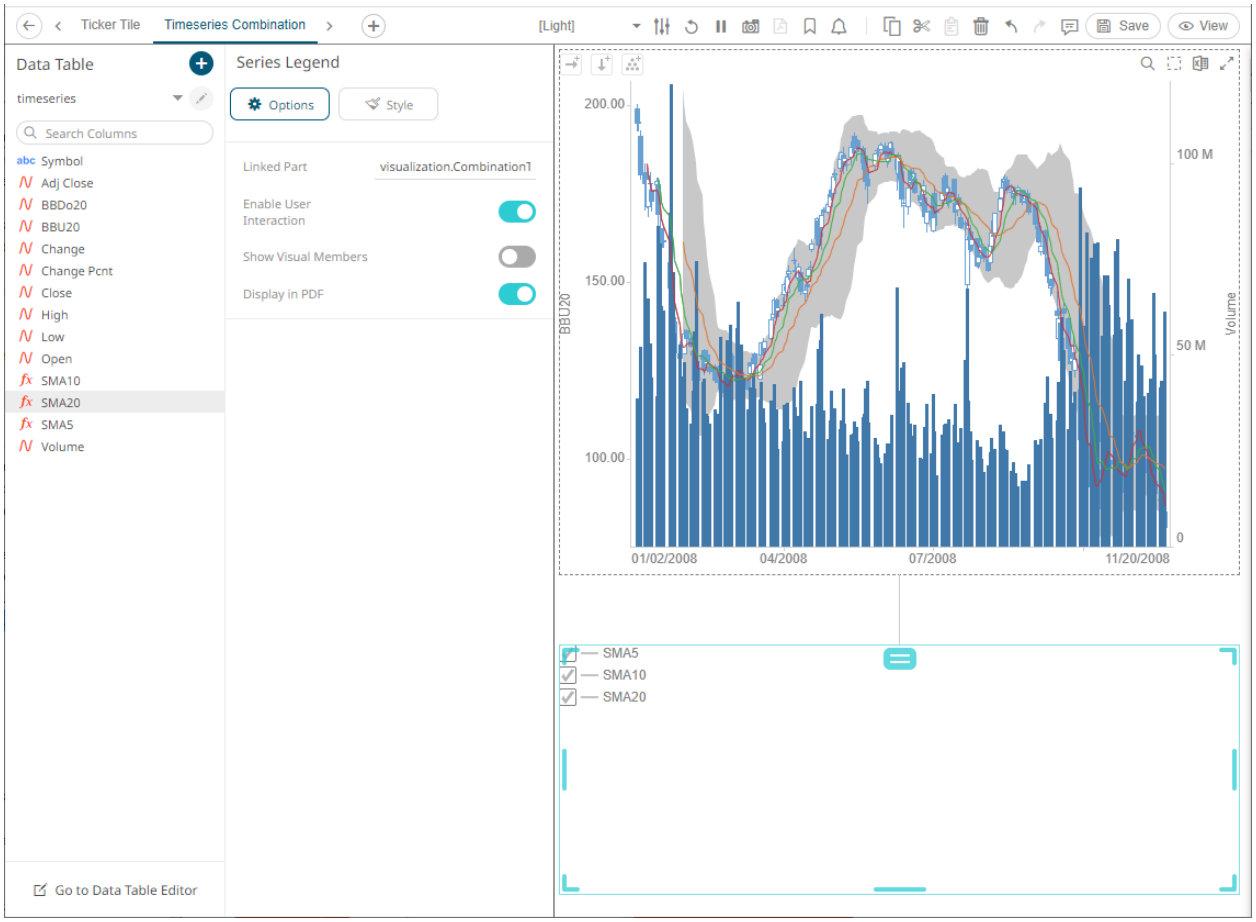


The visualization for **Volume** will also not be displayed.



4. Tapping the **Show Visual Members** slider allows users to display visual members in the series legend.

   Disabling **Show Visual Members** hides the visual members in the series legend. However, the reference lines will still be displayed.

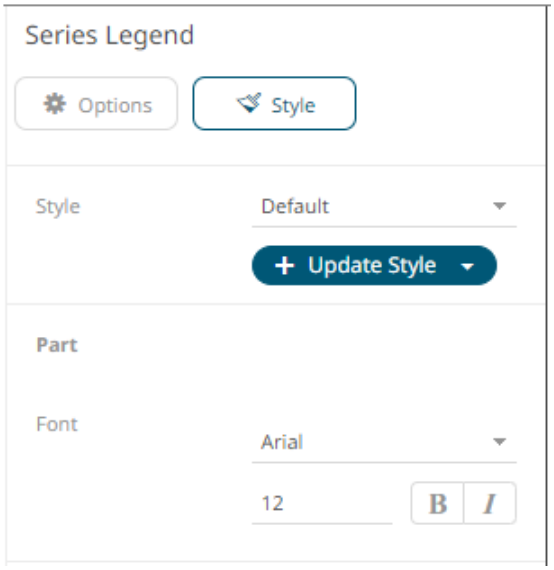


5. Tap the **Display in PDF** slider to include this dashboard part in the PDF output.

6. To set the style of the Series Legend, click **Style** 

.

   The page updates to display the *Style* pane.

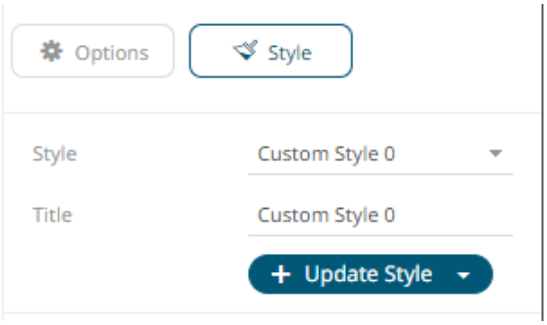


7. Set the *Font* type, size, style (**Bold** and/or **Italic**).

8. Click **Update Style**  and select any of the following options:

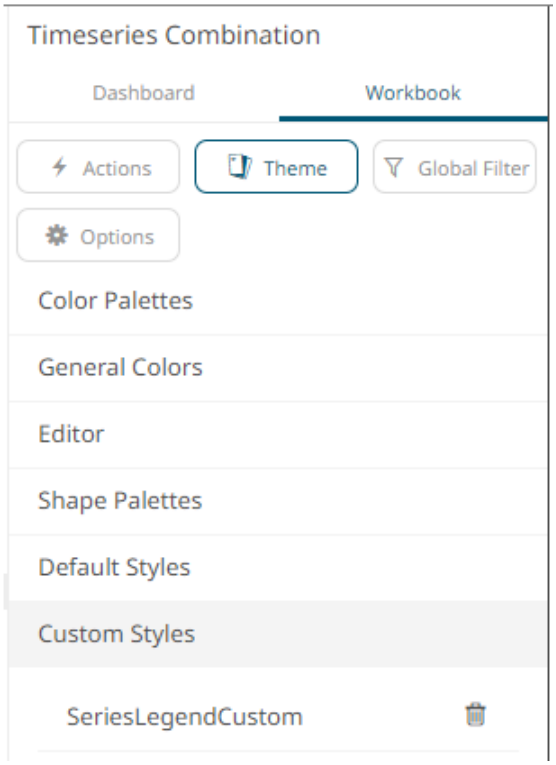
- **Set current as default** – Save the changes and set it as the default.
- **Create custom style** – Save the changes and set it as a custom style.

  The *Style* pane updates to display the *Title* control.



  - Enter the custom style *Title*.
  - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

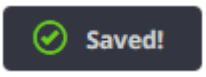
  The new custom style is added in the **Workbook > Theme > Custom Styles** list.



  If published, the custom style configuration of the Series Legend will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

9. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

FILTERS

Filters allow to highlight outliers, patterns, and trends in the data. Filters must be populated with data columns in order for them to function.

Text, time, and numeric filtering can be applied to visualizations in a dashboard.

Filtering across a time window is another type of filter wherein, only the specified window of time is displayed in a time-series visualization. Time window filters are local to a dashboard, and only one filter can be present per dashboard.

Additionally, visualizations can be configured through their settings to ignore defined filters.

NOTE **One or more visualizations must be available on the dashboard, before adding filters on the dashboard.**

Adding a Filter Box

Dashboards specific filters can be applied by adding and populating a filter box which is a container for numeric and categorical (text) filters.

You can add multiple filter boxes to a single dashboard.

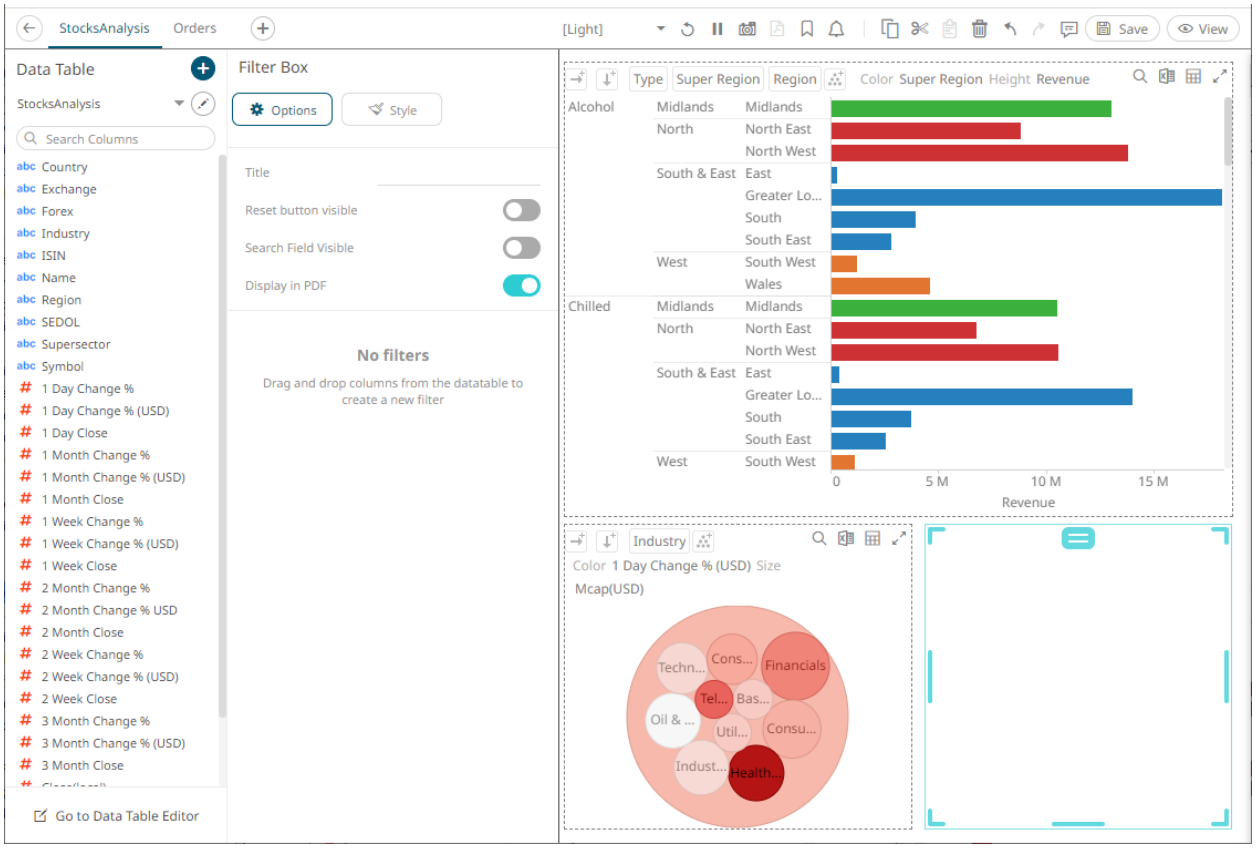
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click on the *Select Part* pane then click

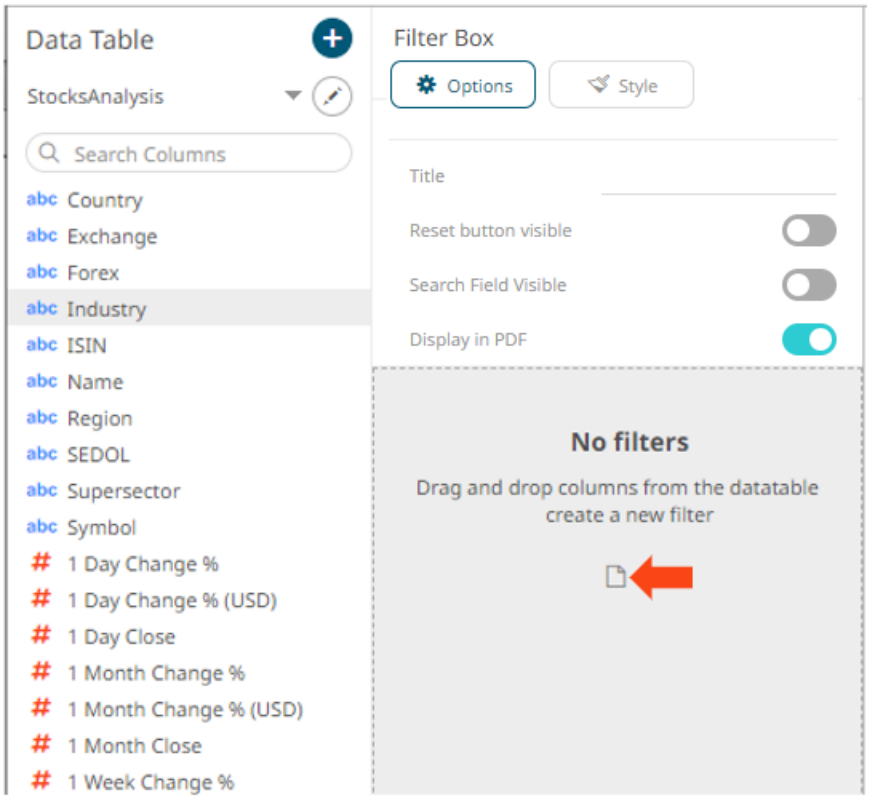
   

   the **Filter Box** Filter Box icon.

   The *Filter Box Settings* pane is displayed, and the *Filter Box* part is added on the dashboard canvas.

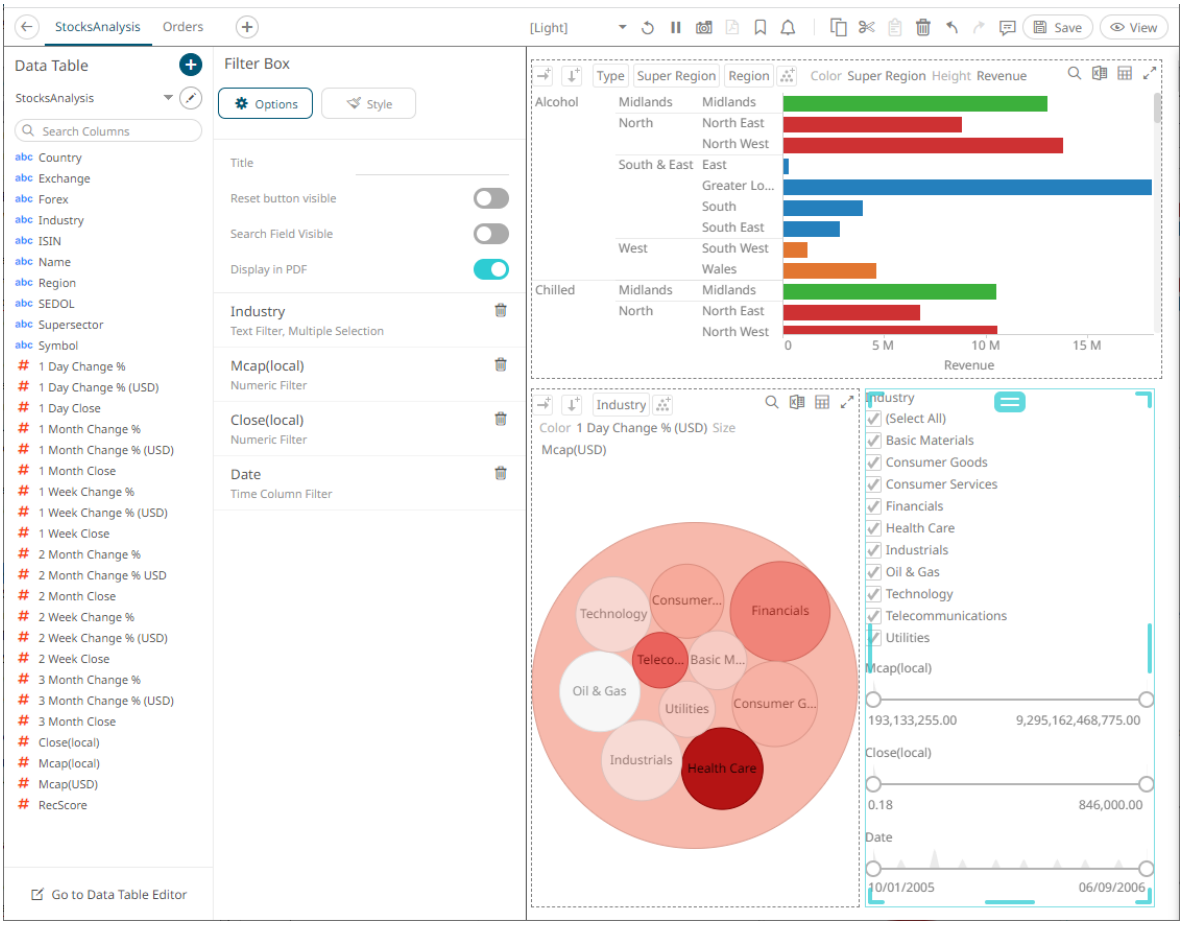


2. Enter the filter box *Title* then click ✓.
3. Drag and drop columns (text, numeric, time, or time series) from the *Data Table* pane to this area:



The columns are added under the *Filter Box* columns list and the filter box is populated by the default filter mode type of the added columns:

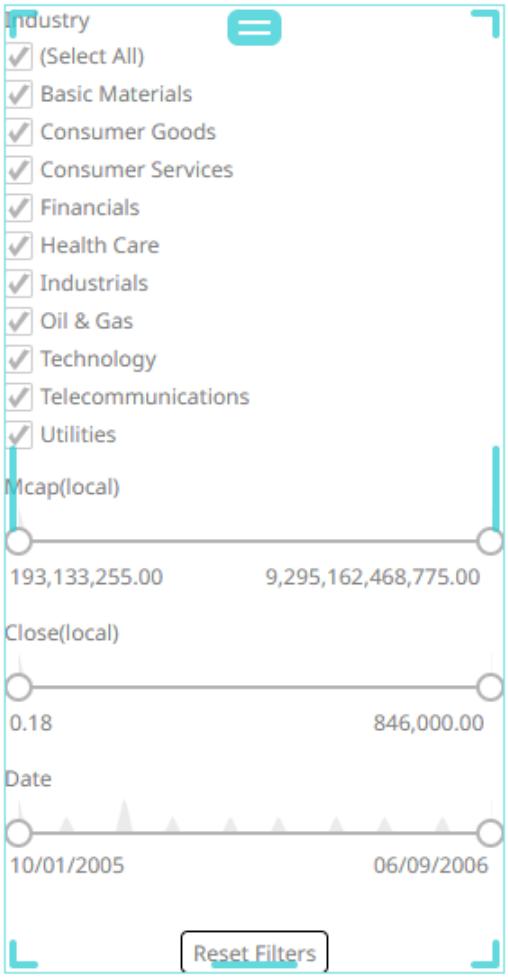
- Multiple Selection for text columns
- Numeric Range for numeric and timeseries columns
- Date/Time Range for time columns



4. You can also configure the filter box to:

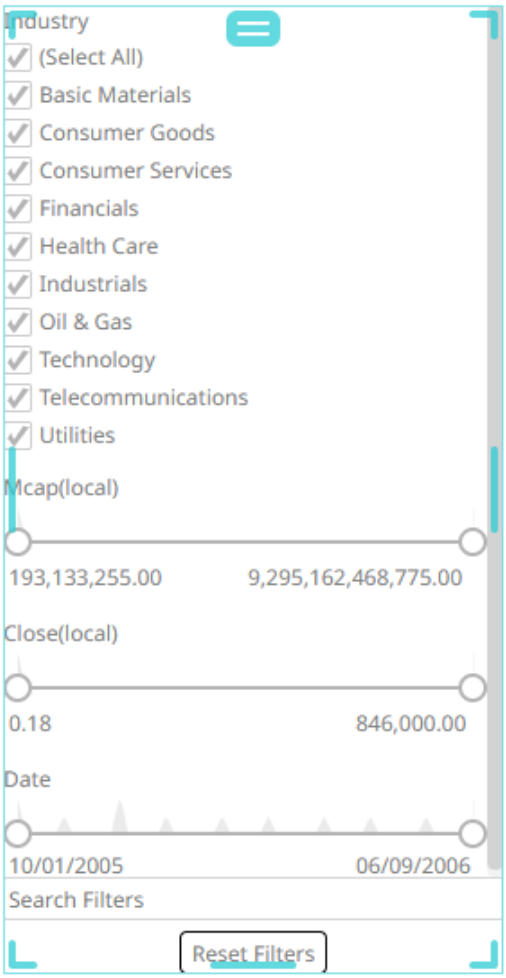
   - Reset Button Visible

     Tap the slider to turn it on and display a reset button at the bottom of the filter box.



- Search Field Visible

  Tap the slider to turn it on and display a search field, to limit the number of displayed filters at the bottom of the filter box.



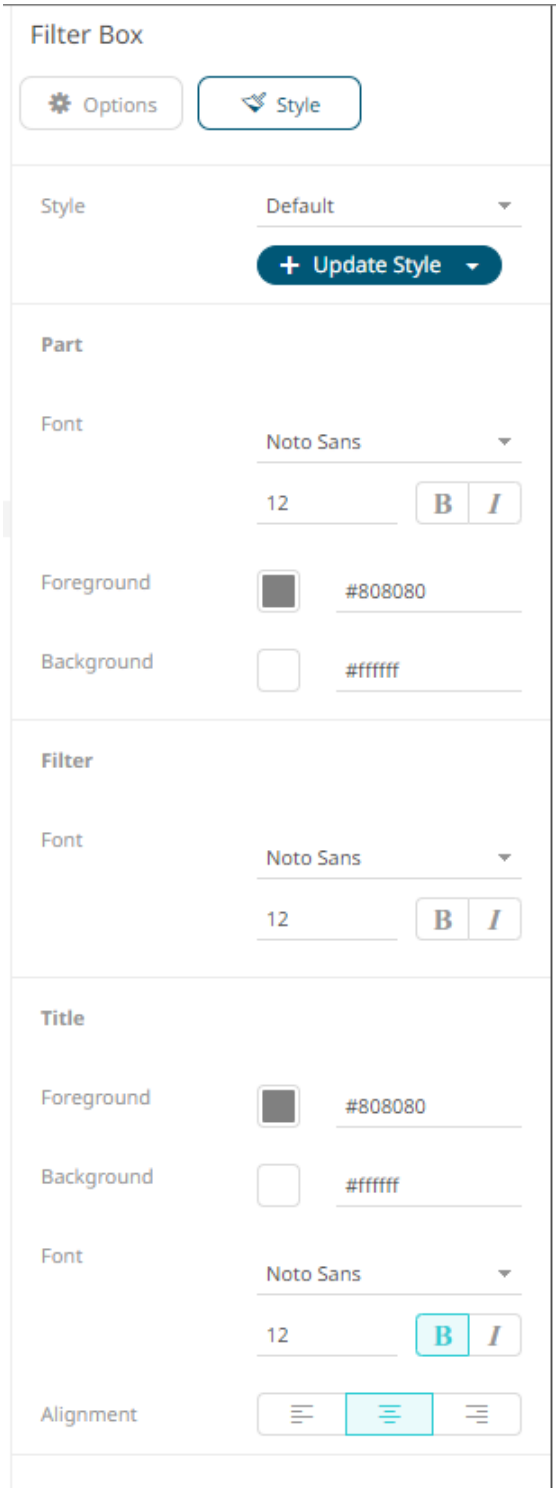
- Display in PDF

  Tap the slider to turn it on and include the filter box in the PDF output.

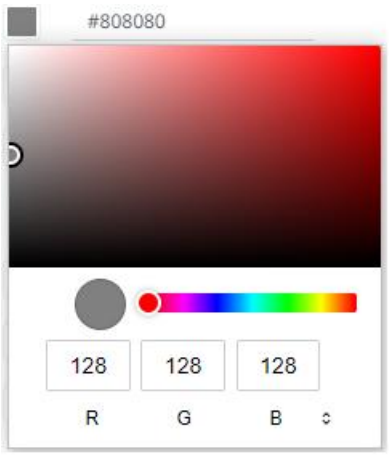
5. To set the style of the Filter Box, click **Style** 

.

   The page updates to display the *Style* pane.

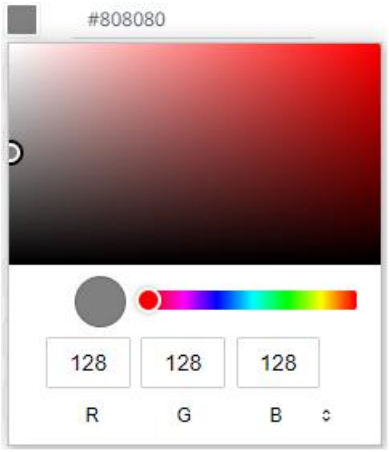


6. To modify the **Foreground** or **Background** color of the part and title:
   - click the corresponding *Color* box to display the *Color* dialog to:

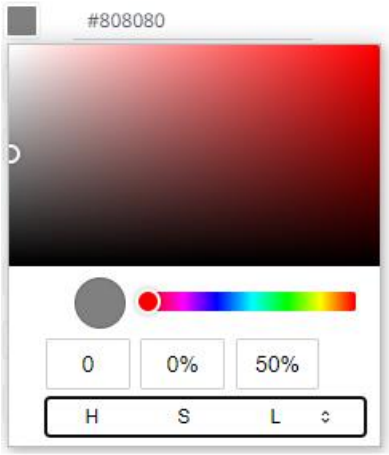


- select the color, or
- click to enter the values

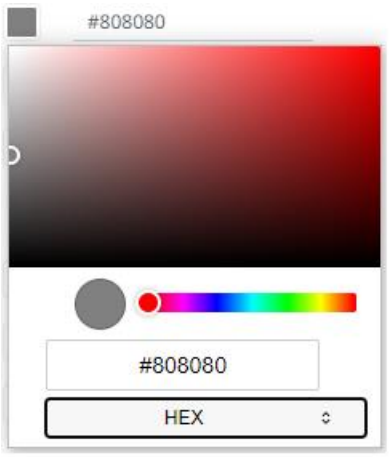
for RGB



for HSL



for the Hex color code



- or enter the *Hex* color code



7. Set the *Font* type, size, style (**Bold** and/or **Italic**).

   The filter box title is set to **Bold** by default.

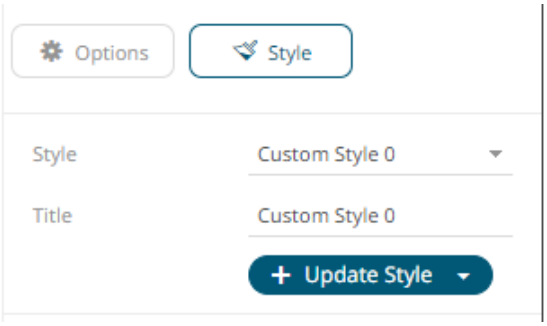
9. Set the filter box title's *Alignment*: **Left**, **Middle**, or **Right**.

10. Click **Update Style** 

and select any of the following options:

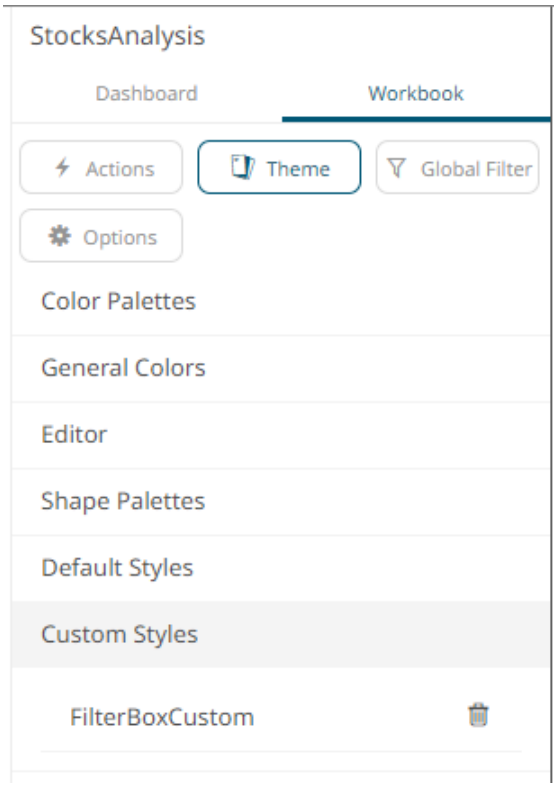
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

      The *Style* pane updates to display the *Title* control.



      - Enter the custom style *Title*.
      - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

      The new custom style is added in the **Workbook > Theme > Custom Styles** list.

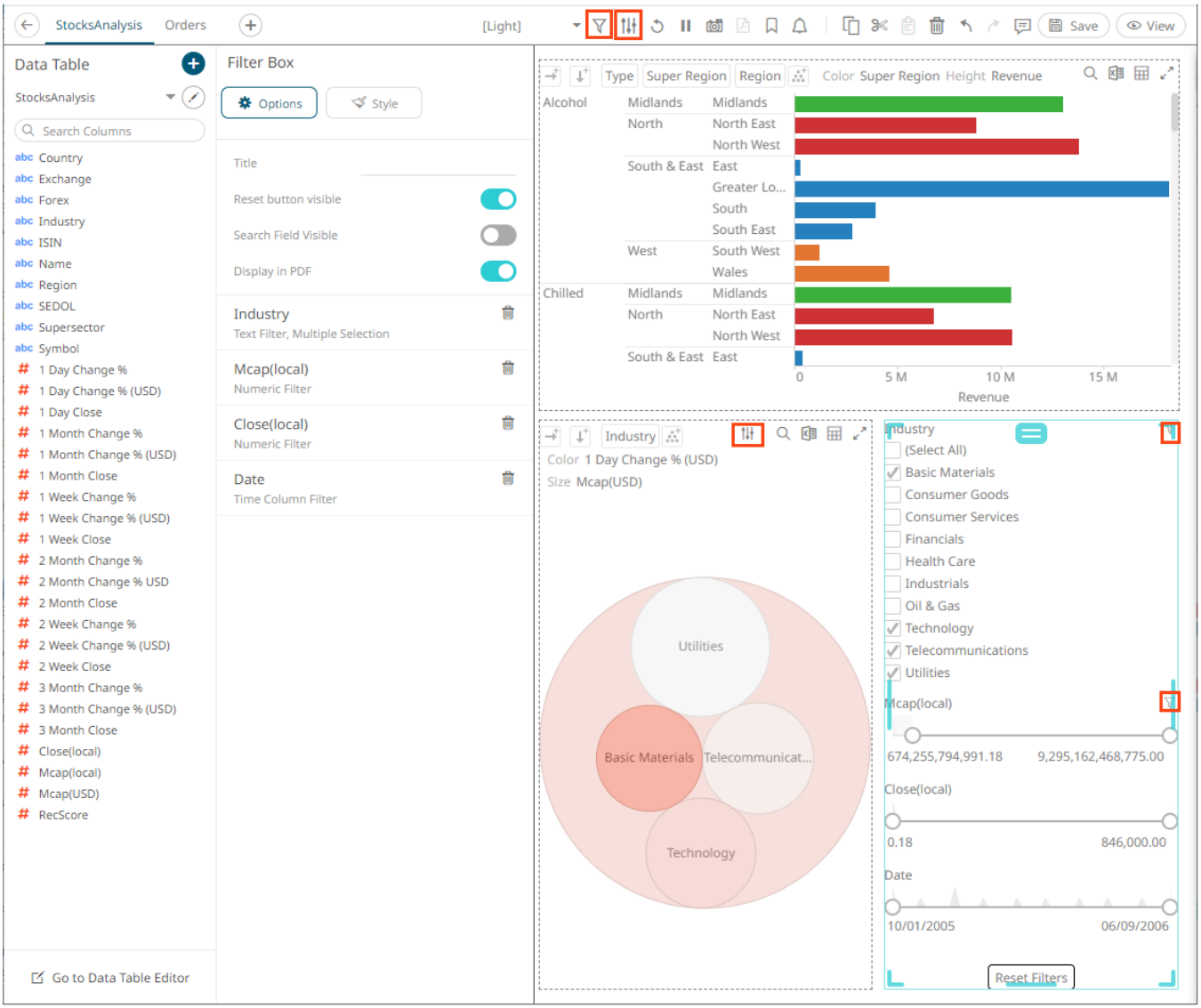


If published, the custom style configuration of the filter box will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

When a filter is applied, filter icons appear to the right of the filter column title and on the toolbar of the dashboard. Clicking will remove the filter.

Also, **Show Active Filters** icon displays on the toolbar. This allows viewing of all the active filters on the dashboard and its visualizations.



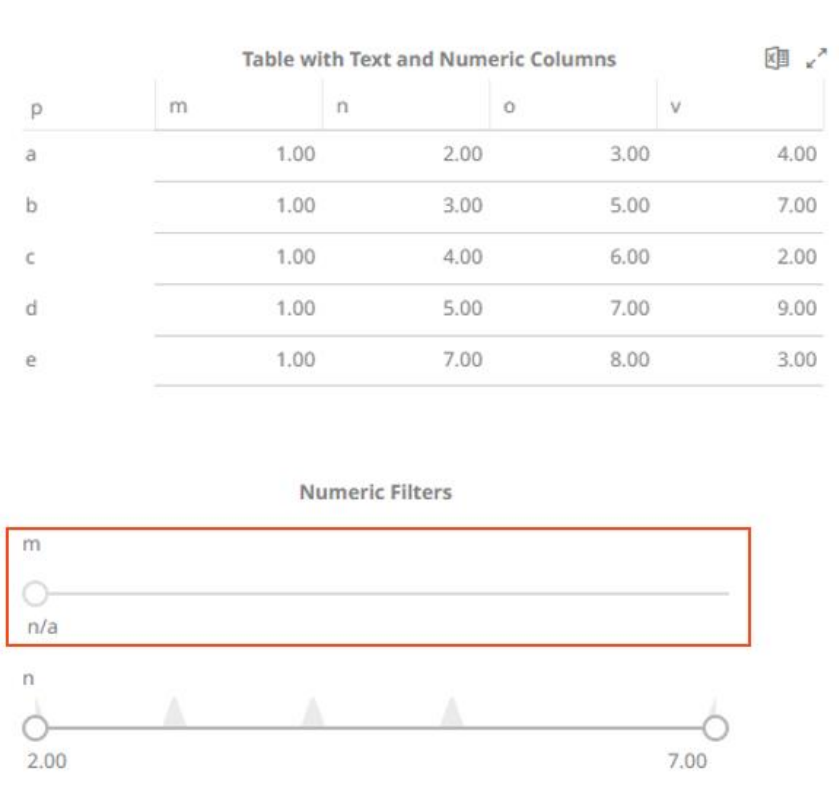
8. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

NOTE

Adding a numeric column with the same values on the filter box will be displayed but the slider is in a fixed position with the single value (NA) at the bottom. This filter is collapsible.

For example:



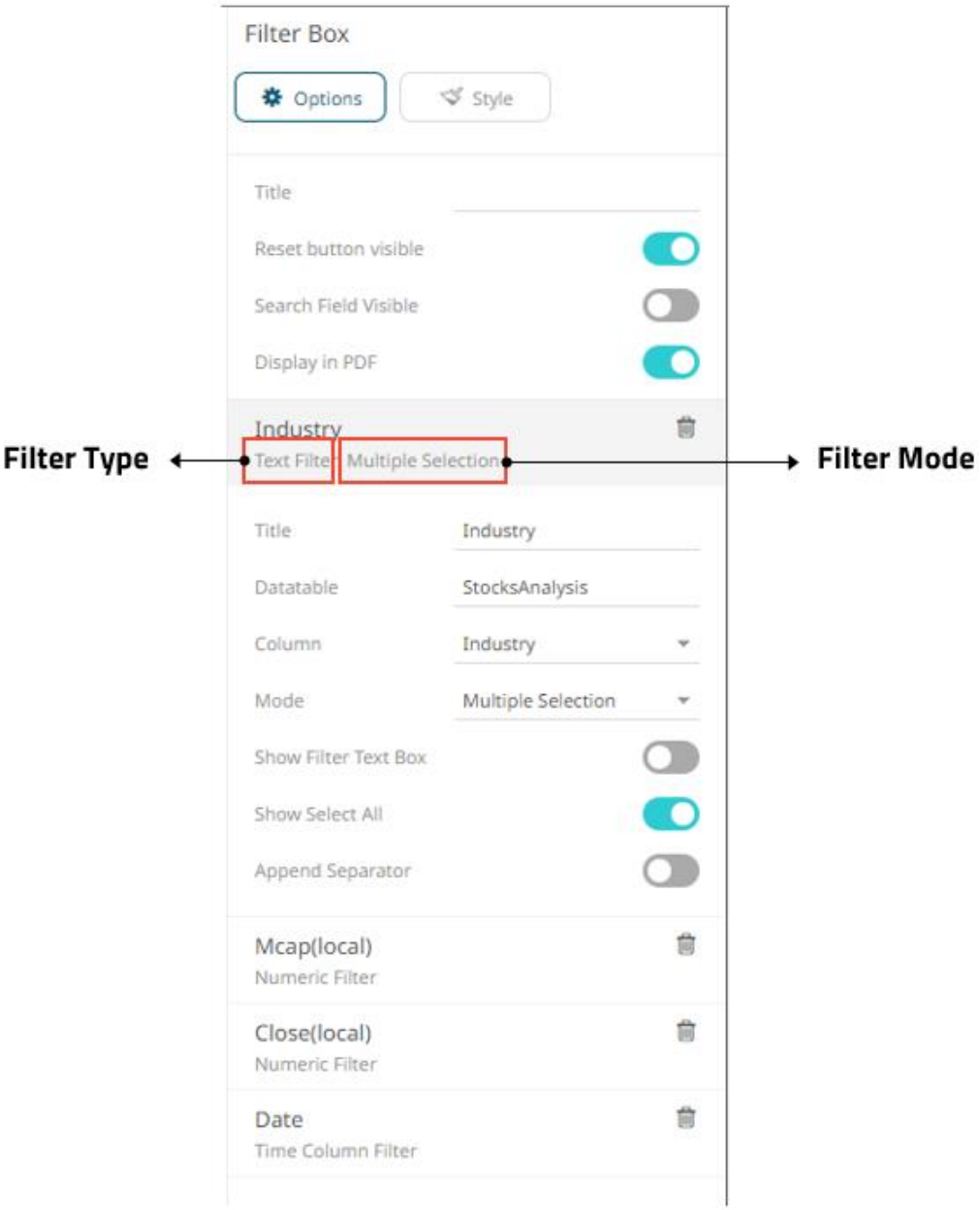
Filter Settings

The filter settings will depend on the column's type and filter mode.

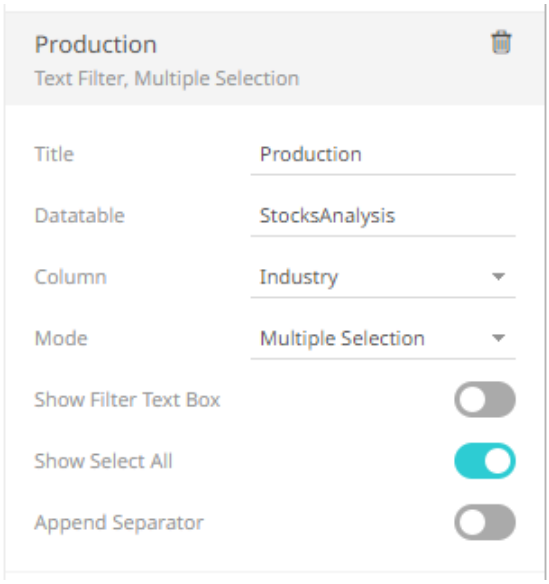
Steps:

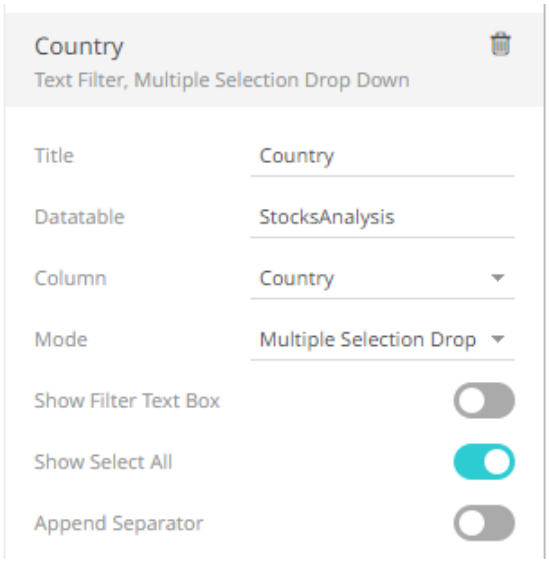
1. Click on a filter column name under the *Filter Box* columns list.

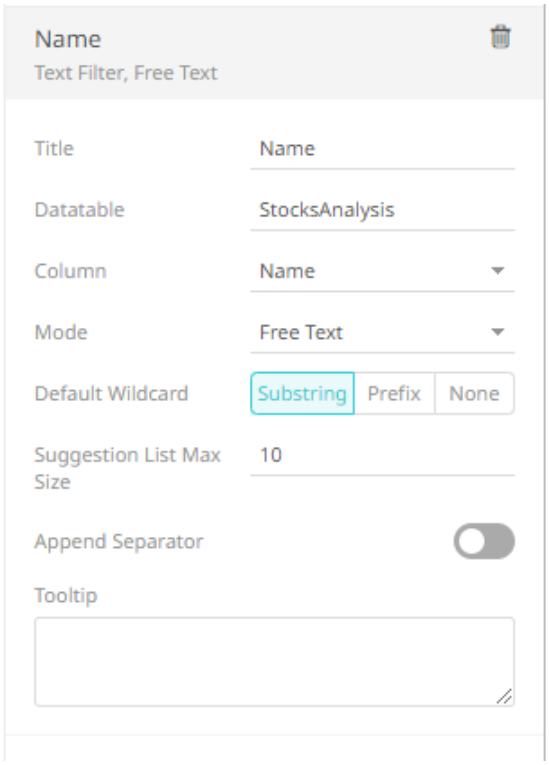
   The filter properties are displayed that you can adjust.



2. By default, the *Title* is the column name added to the filter box. You can opt to modify this value.
3. You can opt to select another *Data Table* from the drop-down list and then select the filter *Column*.
4. The filter properties depend on the column type.
    - For text columns:


Production
Text Filter, Multiple Selection
Title
Production
Datatable
StocksAnalysis
Column
Industry
Mode
Multiple Selection
Show Filter Text Box
Show Select All
Append Separator


Country
Text Filter, Multiple Selection Drop Down
Title
Country
Datatable
StocksAnalysis
Column
Country
Mode
Multiple Selection Drop
Show Filter Text Box
Show Select All
Append Separator



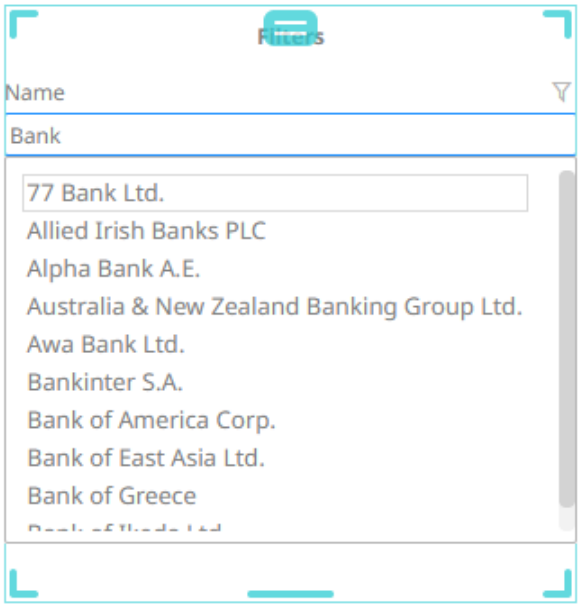
The default *Mode* type depends on the column type and the number of values. Refer to Filter Mode Types for more information.

For text columns with *Free text* filter mode type, select the *Default Wildcard*:

- Substring

  The wildcard character is a substring to search for certain values in the *Free Text* filter box.

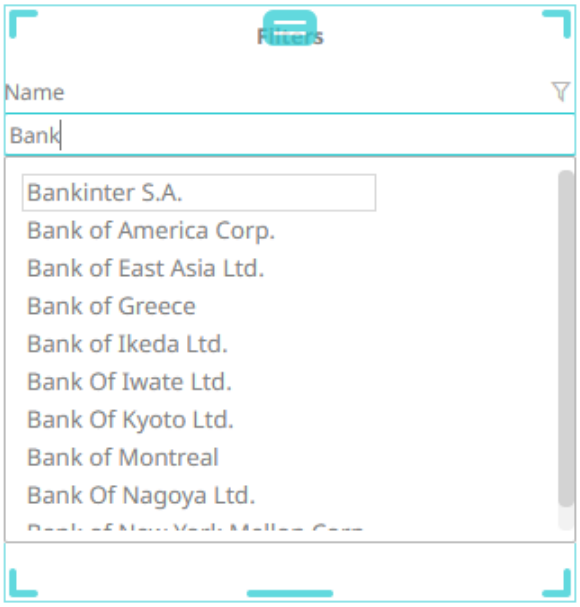
  For example, entering **Bank** displays values (maximum of 10) that contain Bank.



- Prefix

  The wildcard character is a substring to search for certain values in the *Free Text* filter box.

For example, entering **Bank** displays values (maximum of 10) that begin with Bank.



- None

  The predicate used for filtering:

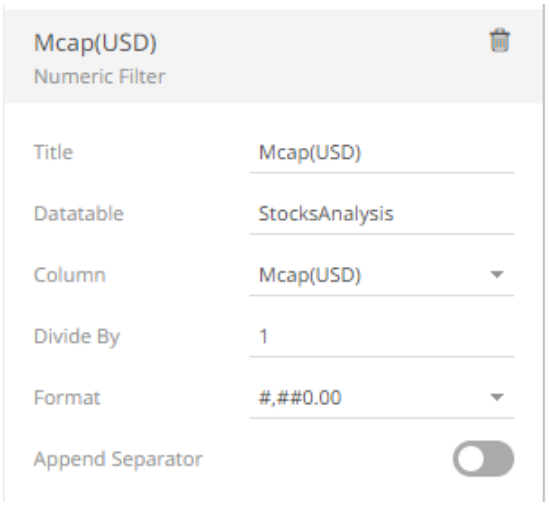
  - data on the dashboard will not have any wildcards automatically appended.
  - items in the suggestion list uses the **Prefix** mode wildcards (see previous example).

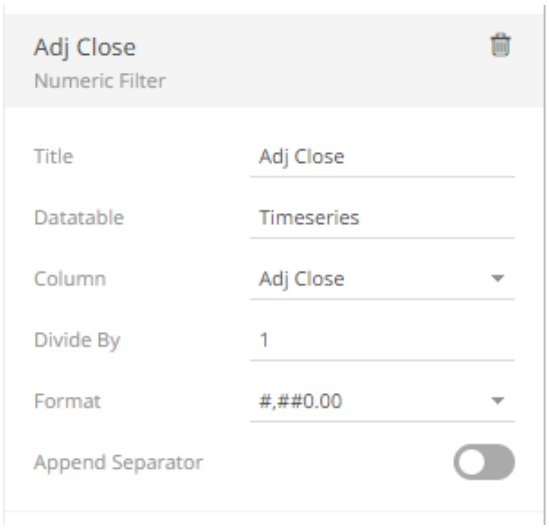
  It is still possible to manually add wildcards into the search string.

Set the *Suggestion List Max Size* with the custom limit on how many options/suggestions should be, at the most, loaded and presented on the drop-down. Default is **10**.

Enter a description or useful information about the filter into the *Tooltip* box.

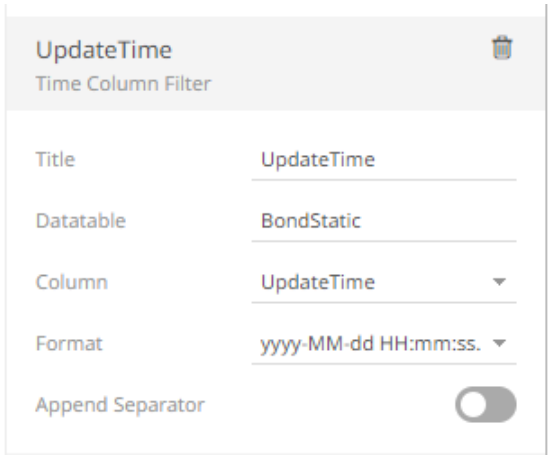
- For numeric and timeseries columns:





- Select the *Divide By* value to divide a number:
  - 1
  - 1000 (by a thousand)
  - 10000
  - 1000000 (by a million)
  - 1000000000 (by a billion)
- Specify the *Format* that numbers will be displayed in. Panopticon uses the same formatting rules as Excel.

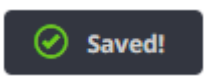
- For Date/Time columns:



  Specify the Date/Time *Format*.

5. Tap the **Append Separator** slider to add a separator after a column filter.
6. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

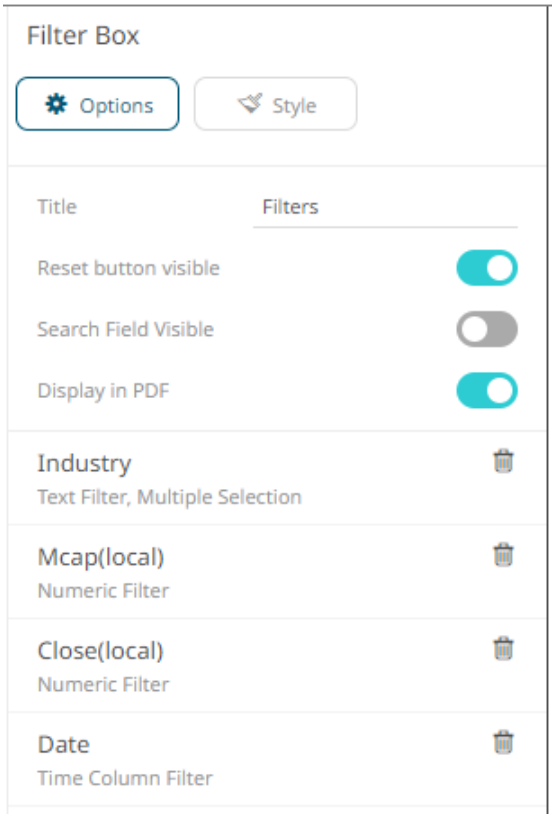
notification is displayed.

Deleting Column Filters

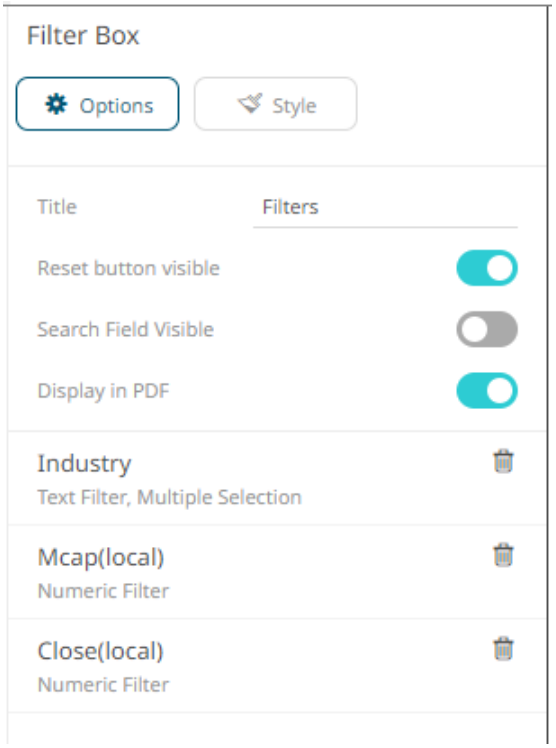
You can delete any defined filters.

Steps:

1. Hover on a filter that you want to delete.

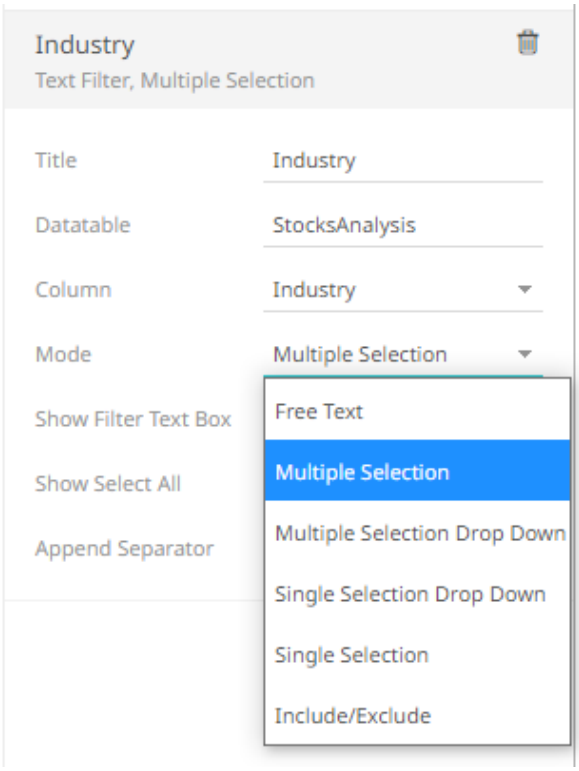


3. Click  . The filter is deleted.



Filter Mode Types

Categorical filters can be one of the following types:



- Free Text Entry
- Multiple Selection List
- Multiple Select Drop Down List
- Single Select Drop Down List
- Single Selection List
- Include/Exclude List

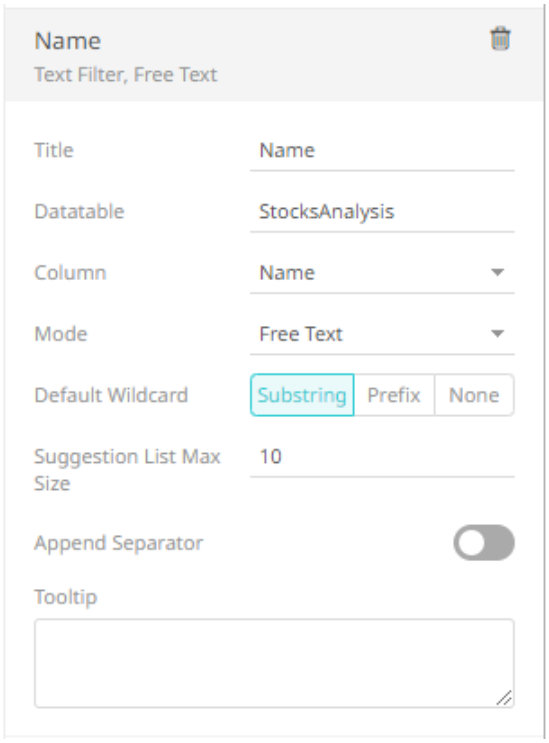
In addition, there are also the following modes:

- Numeric Range
- Date/Time Range

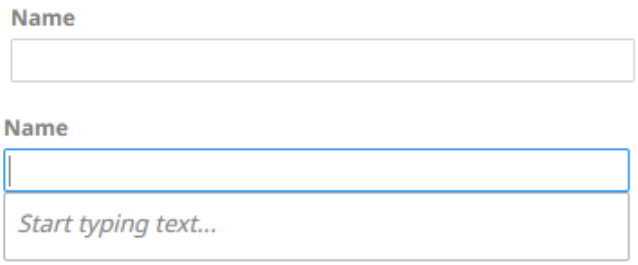
In the Action Dropdown, an additional selection mode named Include List is available.

Free Text

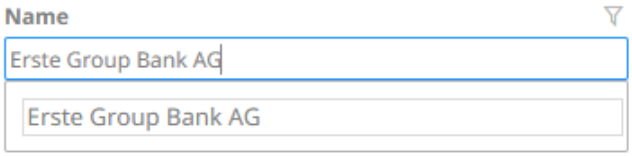
Free Text is the default selection mode when the text filter column has more than 30 values.



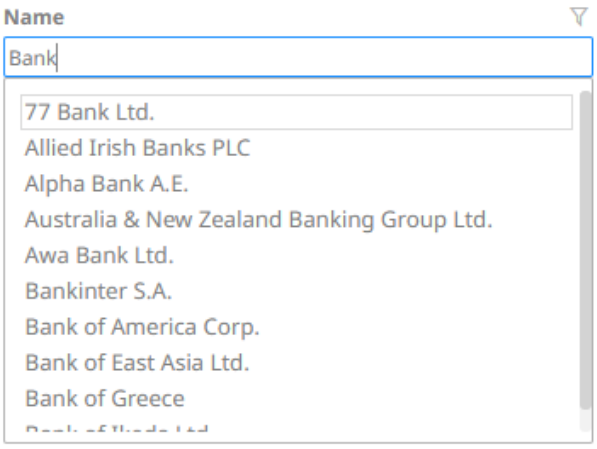
In the dashboard, this mode shows a free text entry box.



When entering a value, matches are displayed allowing you to pick one from the list. You can do so by double-clicking on it.



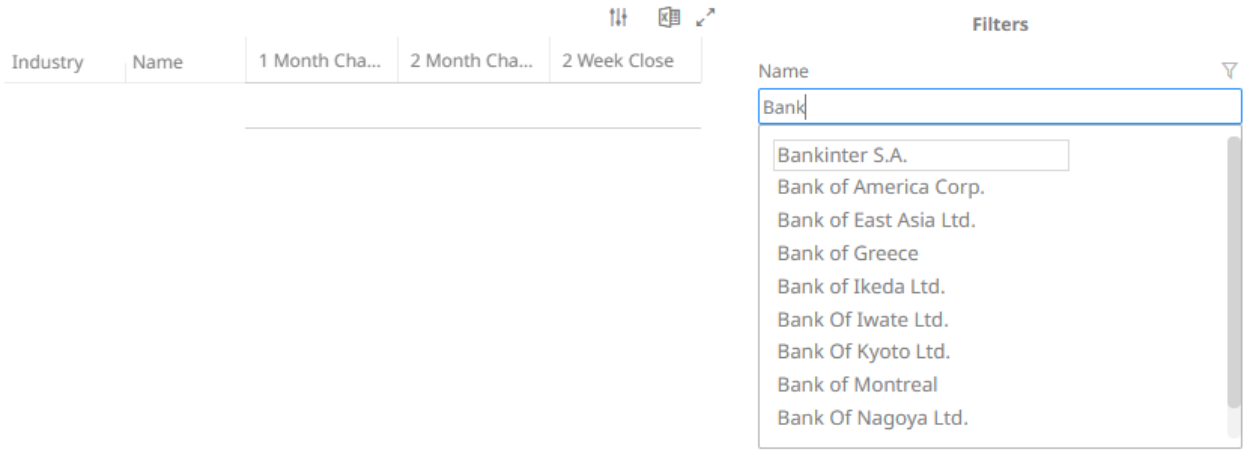
For *Free Text* with **Substring** default wildcard, entering **Bank** for this example displays values in the suggestion list that contain **Bank**.



For *Free Text* with **Prefix** default wildcard, entering **Bank** for this example displays values in the suggestion list that begin with **Bank**.



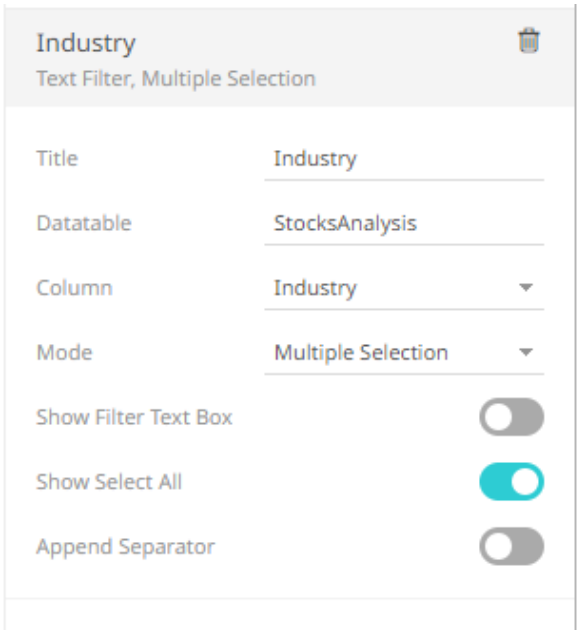
For *Free Text* with **None** default wildcard, entering **Bank** for this example displays values in the suggestion list that begin with **Bank.** Also, there are no automatically appended wildcards on the dashboard.



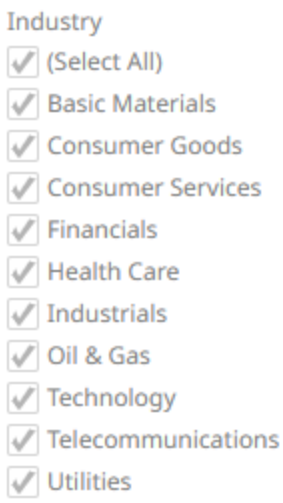
The number of options/suggestions on the drop-down will depend on the *Suggestion List Max Size*. Default is **10**.

Multiple Selection

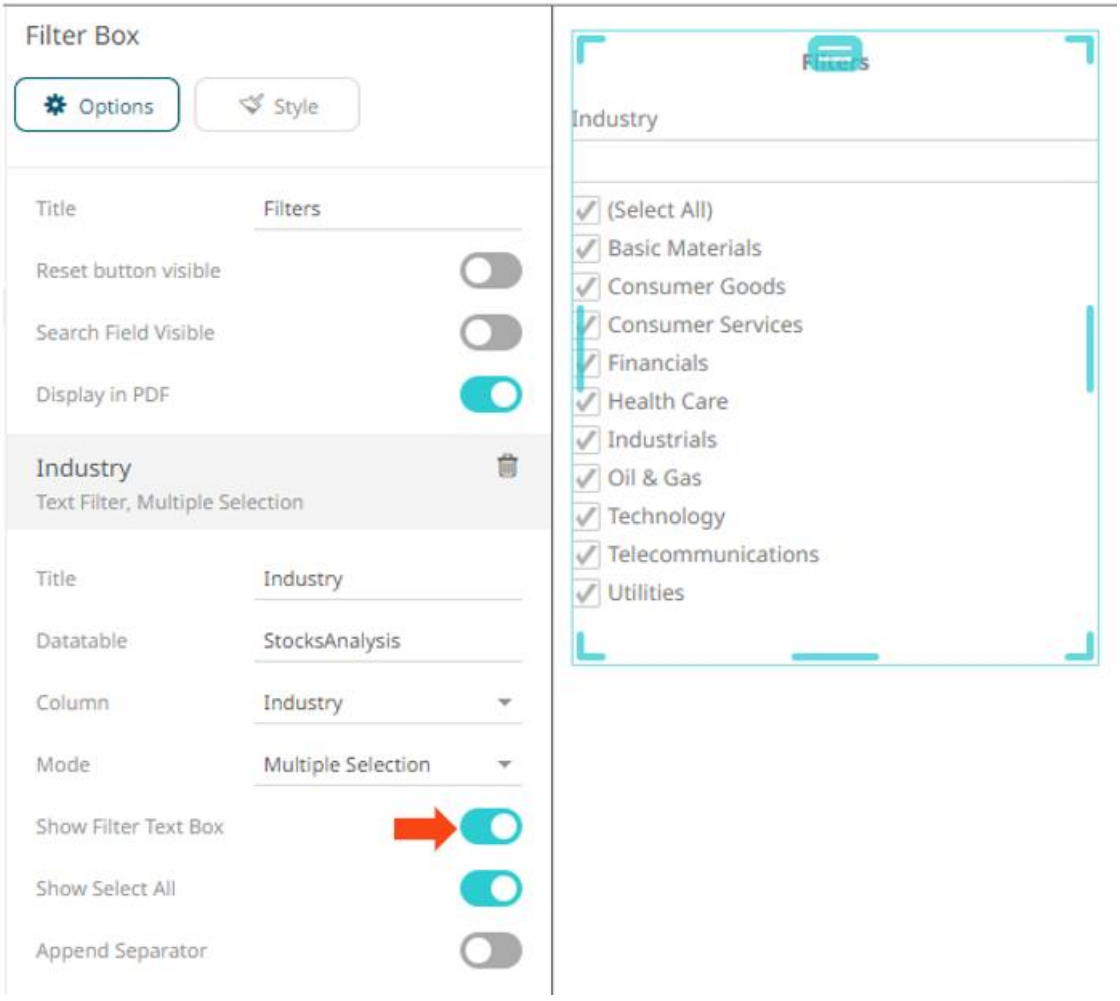
Multiple Selection is the default selection mode when the text filter column has 0 to 15 values.



In the dashboard, this mode shows a list of distinct items that are alphabetically sorted. Multiple items may be selected from the check box list. By default, the **Show Select All** option is enabled.



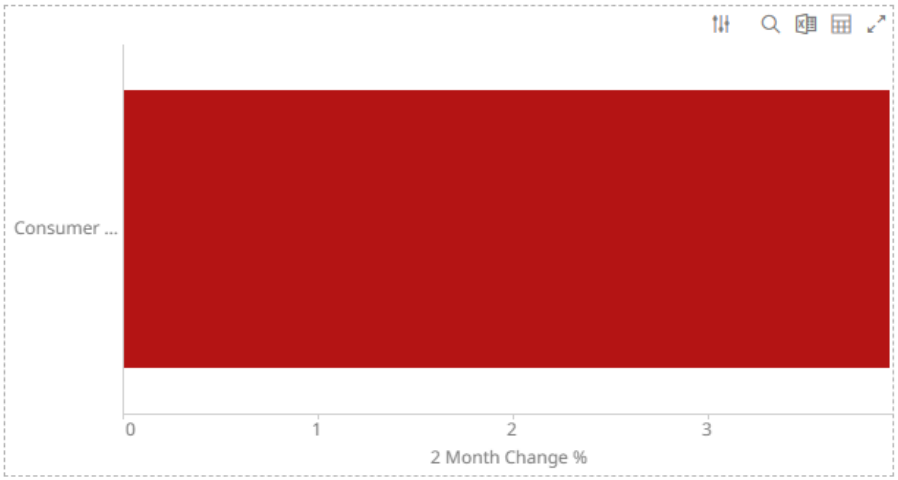
You can also opt to tap the **Show Filter Text Box** slider to turn it on.



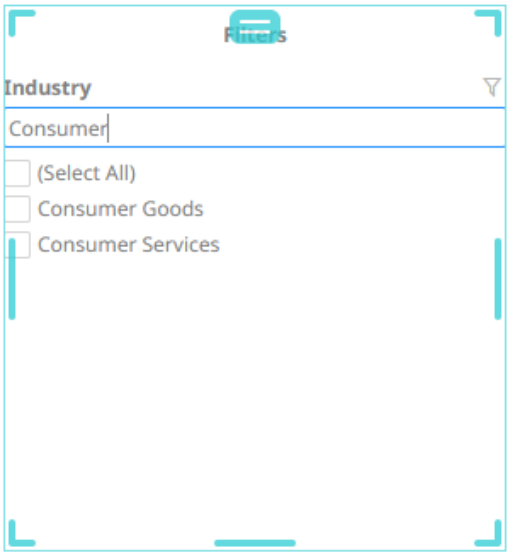
Uncheck the **Select All** box then enter a particular column into the filter text box.



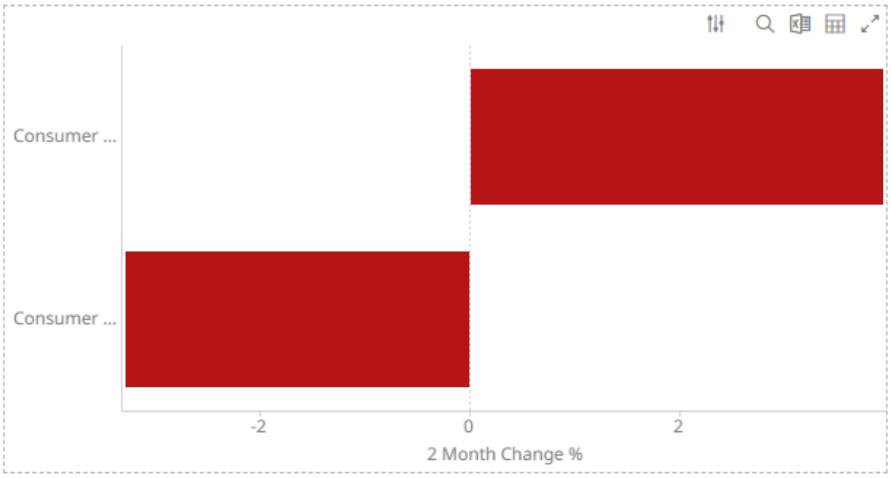
Check the box to apply the fillter to the visualizations in the dashboard.

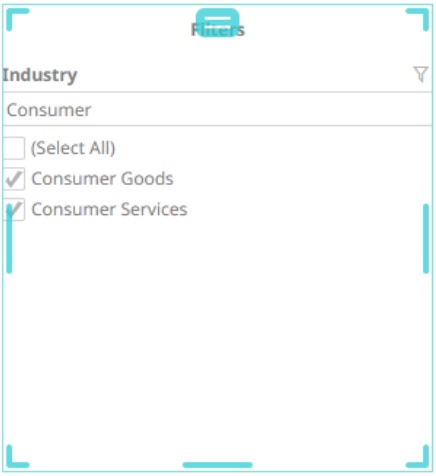


You can also enter one or more characters into the filter text box. The suggested list of columns that matched the entries will be displayed.



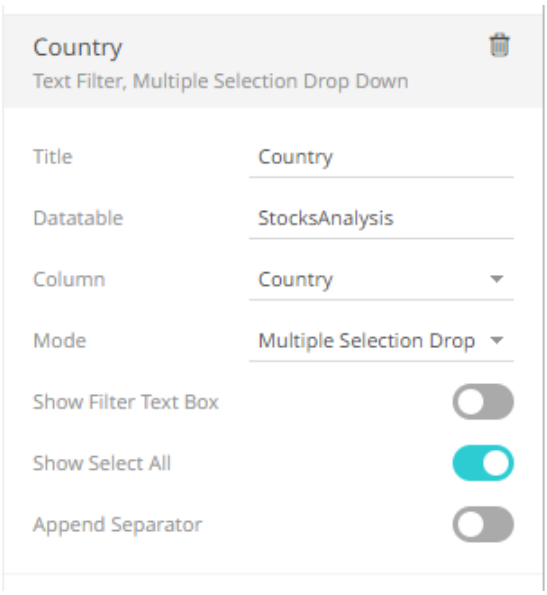
Check the boxes to apply the fillter to the visualizations in the dashboard.



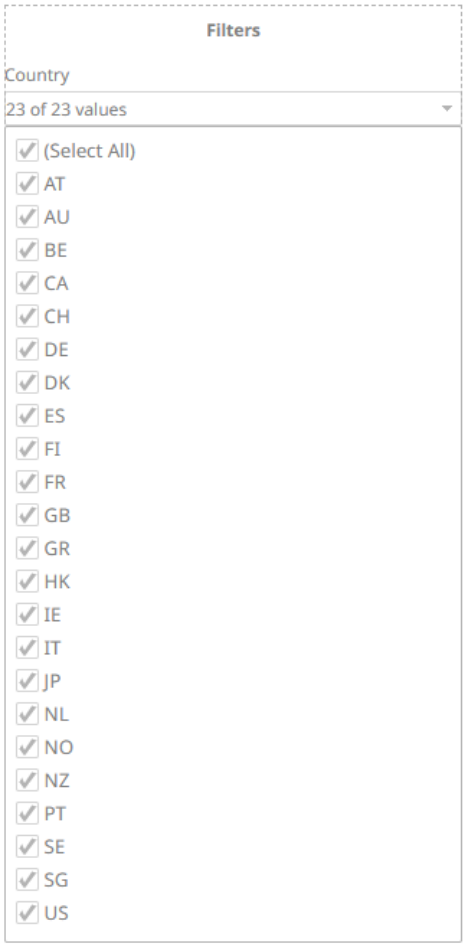


Multiple Selection Drop Down List

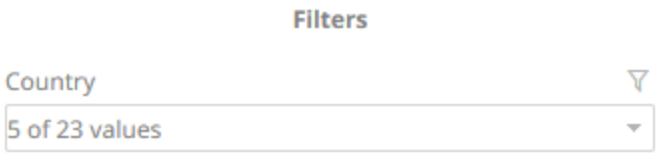
Multiple Select Drop Down List is the default selection mode when the text filter column has 16 to 30 values.



In the dashboard, this mode shows a list of distinct items that are alphabetically sorted when expanded. By default, the **Select All** option is enabled.



Multiple items may be selected. When collapsed, the number of selected items are displayed.

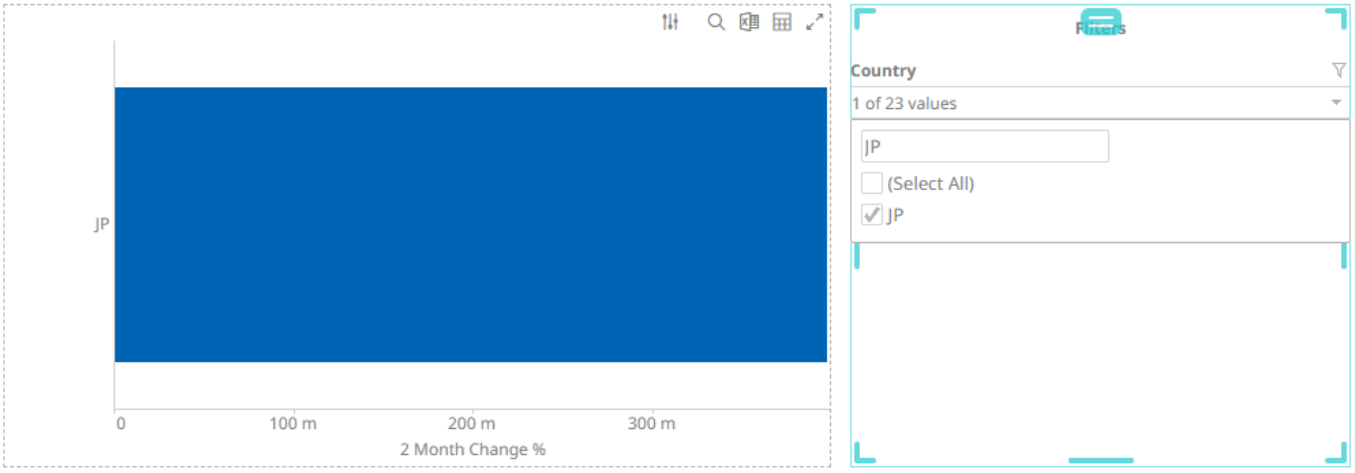


You can also opt to tap the **Show Filter Text Box** slider to turn it on.

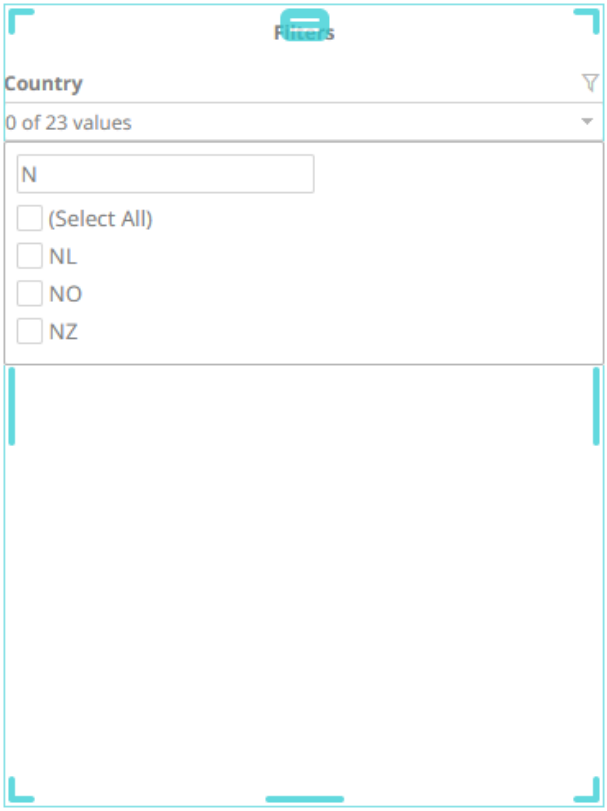
Uncheck the **Select All** box then enter a particular column into the filter text box.



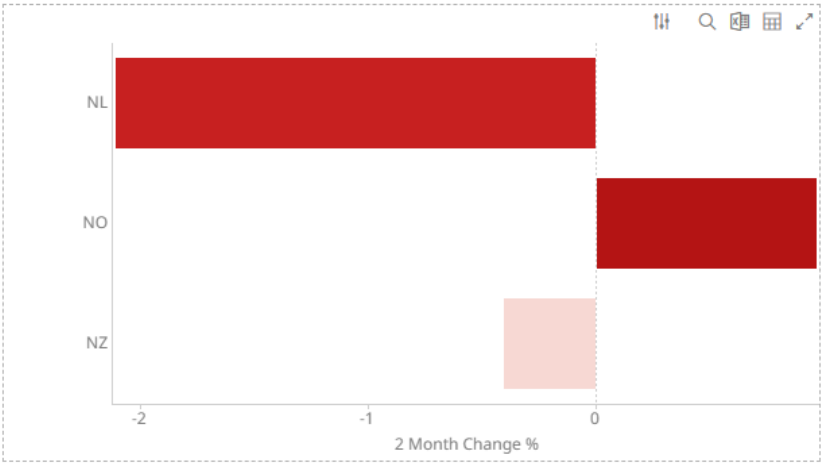
Check the box to apply the filter to the visualizations in the dashboard.

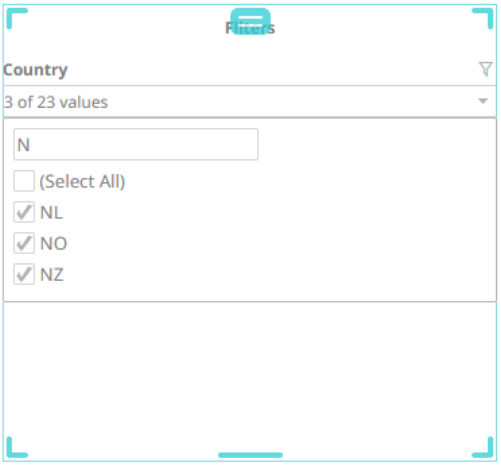


You can also enter one or more characters into the filter text box. The suggested list of columns that matched the entries will be displayed.



Check the boxes to apply the filter to the visualizations in the dashboard.

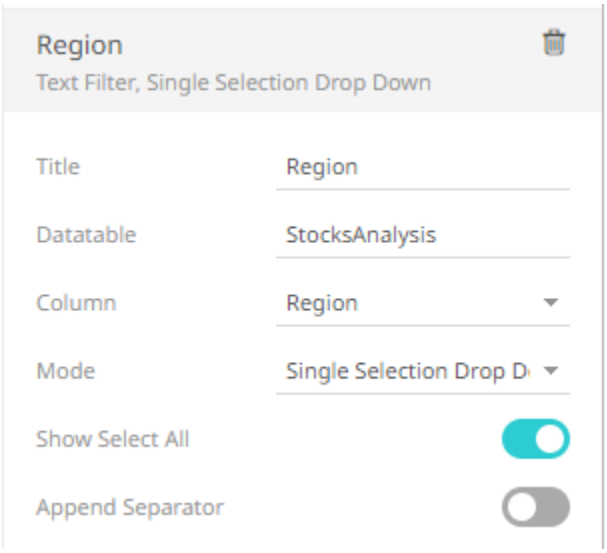




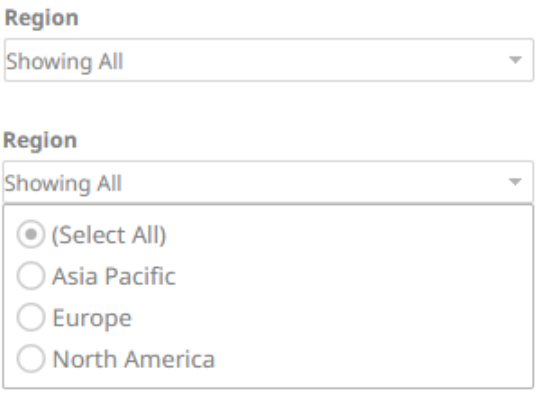
NOTE **Hovering on an active Multiple Selection Drop Down List filter displays the current selected values.**



Single Selection Drop Down List



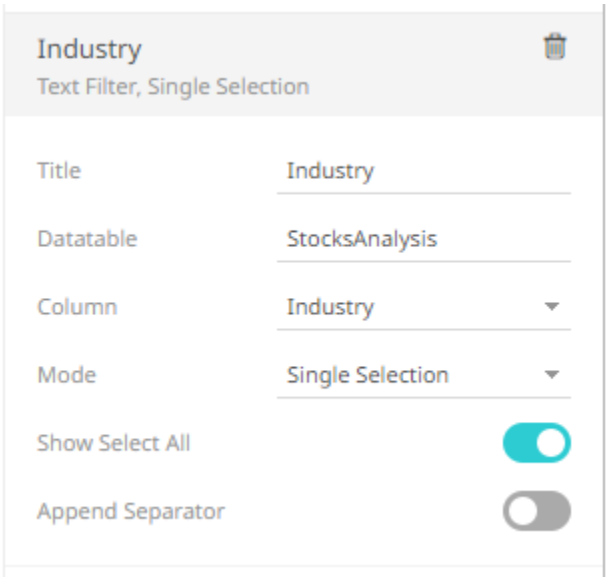
In the dashboard, this mode shows a radio button drop down list of distinct items that are alphabetically sorted when expanded. By default, the **Select All** option is enabled.



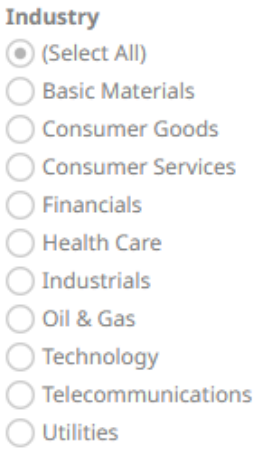
Only a single item or all items may be selected. When collapsed, it shows the summary text or the single selected item. For the example below, the region selected is **Europe**.



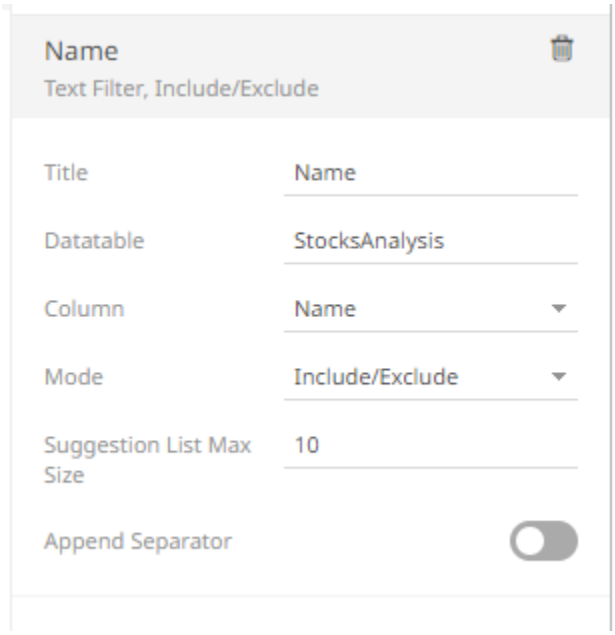
Single Selection



In the dashboard, this mode shows a radio button list of distinct items that are alphabetically sorted. Only a single item or all items may be selected. By default, the **Select All** option is enabled.



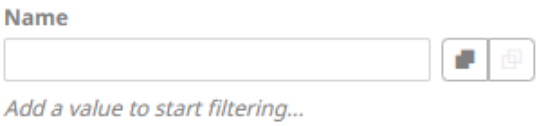
Include/Exclude List



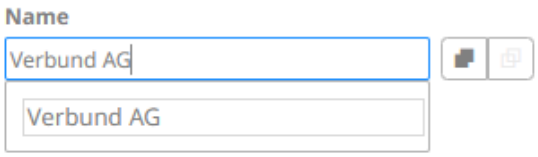
This filter mode allows to include or exclude a set of values from a given column. It consists of a *Free Text* filter used for finding values to include or exclude and a list of values that are currently used in the filter.

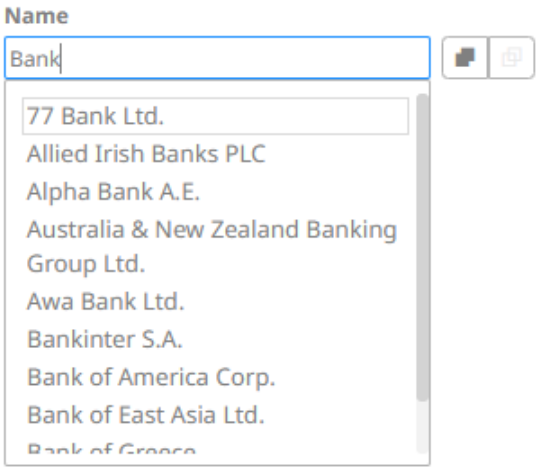
Set the *Suggestion List Max Size* with the custom limit on how many options/suggestions should be, at the most, loaded and presented on the drop-down. Default is **10**.

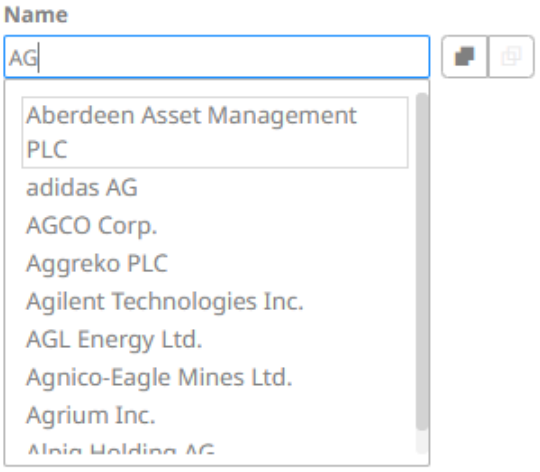
NOTE	**There is no Select All option. When there is no value, this means no filtering will be done in both the *Include or Exclude* mode.**



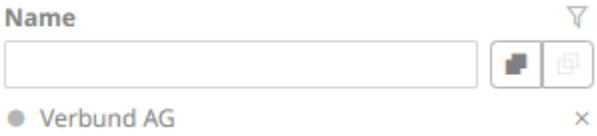
When entering a value, matches are displayed allowing you to pick one from the list.





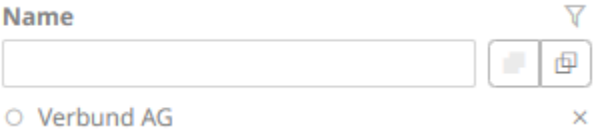


The selected column value is displayed under the **Include/Exclude** button.



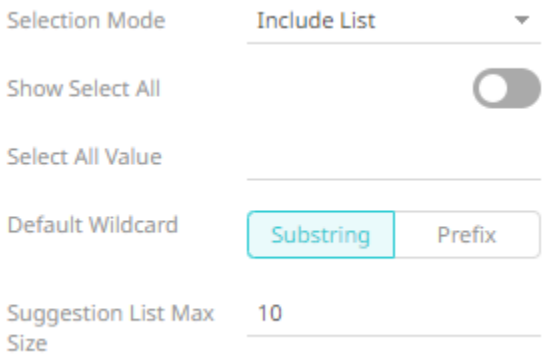
For the example above, the column value is included in the filter.

Click  to exclude this column value in the filter,

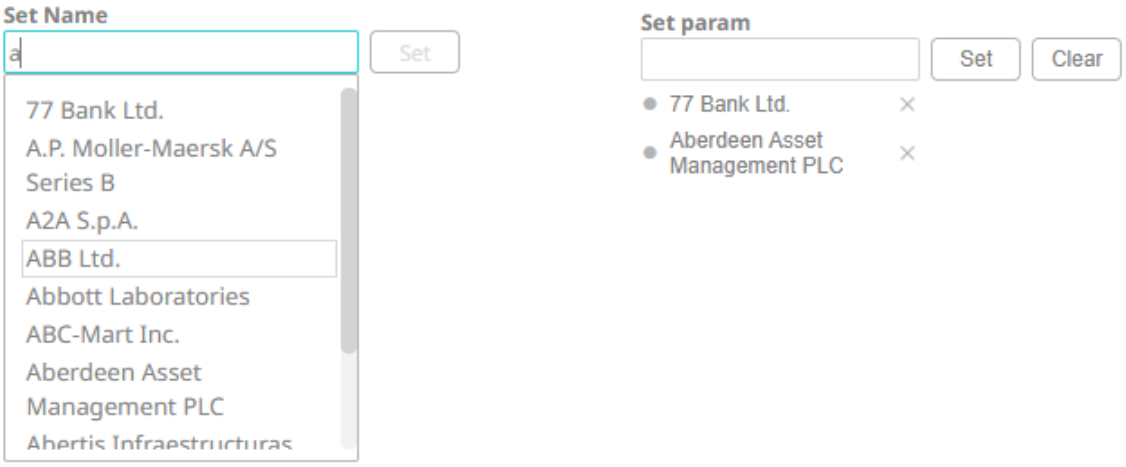


Click to delete a column value from the *Include/Exclude* list.

Include List



The **Include List** selection mode is a combination of the free text and multiple selection modes. In the dashboard, this mode displays as:

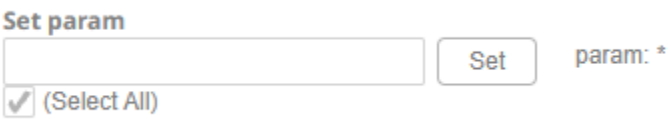


This selection mode supports:

- On demand searching of values and selecting several values. It is useful in cases where there are too many values in the configured column to use a multiple selection mode.
- Selection of all items if there is a configured value for *Select All*.



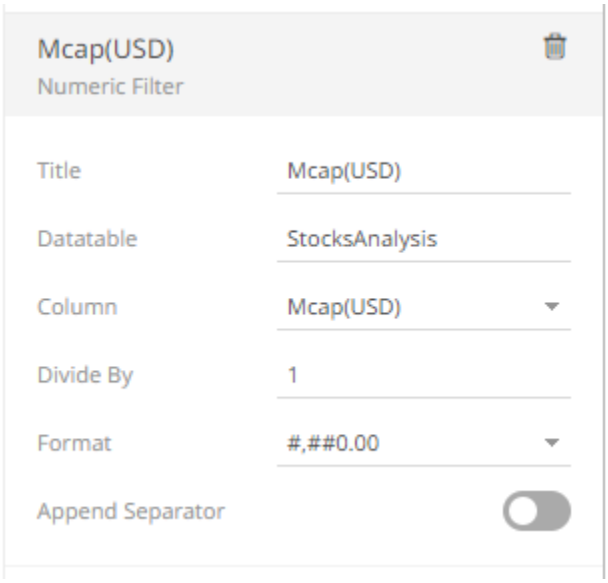
When selecting the select all item in the Include List, the parameter will be set to the configured select all value.



The primary use case of the Include List selection mode is to handle columns with large amounts of values. To avoid having to fetch and set the parameter to every value in the column when selecting all items, the select all value should be configured such that the parameterized query returns all items.

For other include list options, see filter include/exclude.

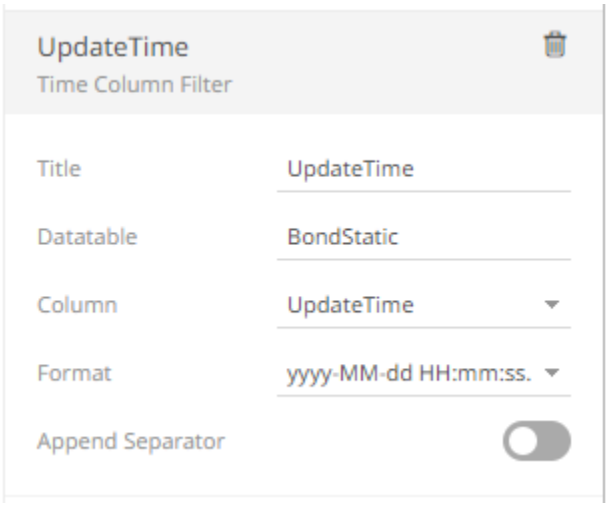
Numeric Range



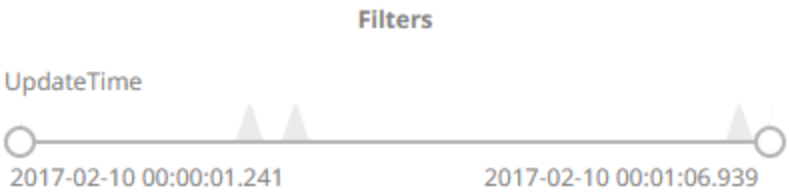
In the dashboard, this mode shows the distribution plus minimum and maximum limits.



Date Time Range

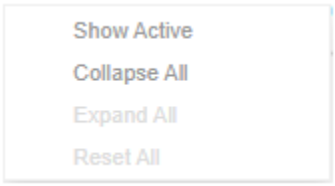


In the dashboard, this mode shows the distribution of a Date/Time field, plus the minimum and maximum limits.



Modifying the Filter Box Layout

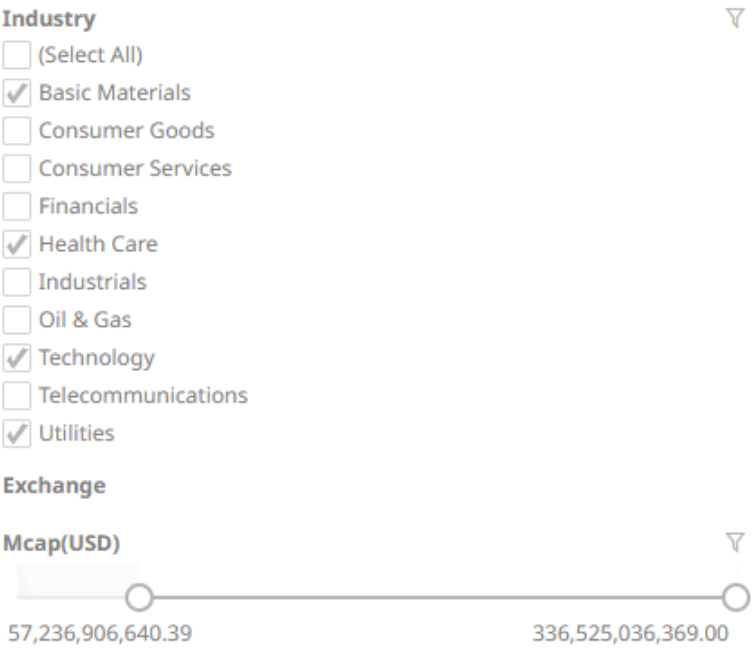
The layout of the filter box can be modified by right-clicking to display its context menu:



Where the items correspond to:

- Show Active

  Displays all of the active filters.



- Collapse All

  Collapse of all the filters.



- Expand All

  Expand all of the filters.



- Reset All

  Reset all of the filters.



In all cases, clicking on a specific filter, allows it to swap from expanded to collapsed.

Adding a Time Filter Box

Time-series visualizations can be filtered to show a specified time window, through the *Time Filter* box. Only one can be added per dashboard.

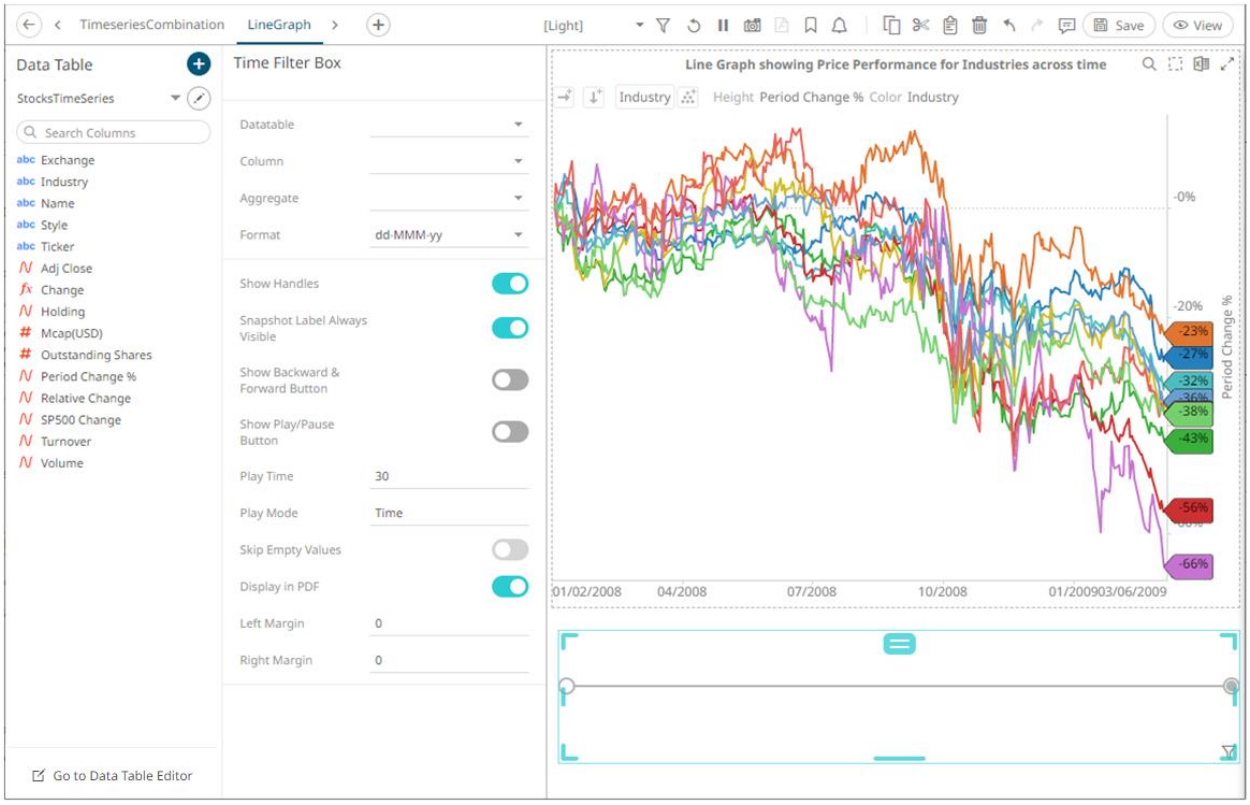
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Time Filter Box** 

icon.

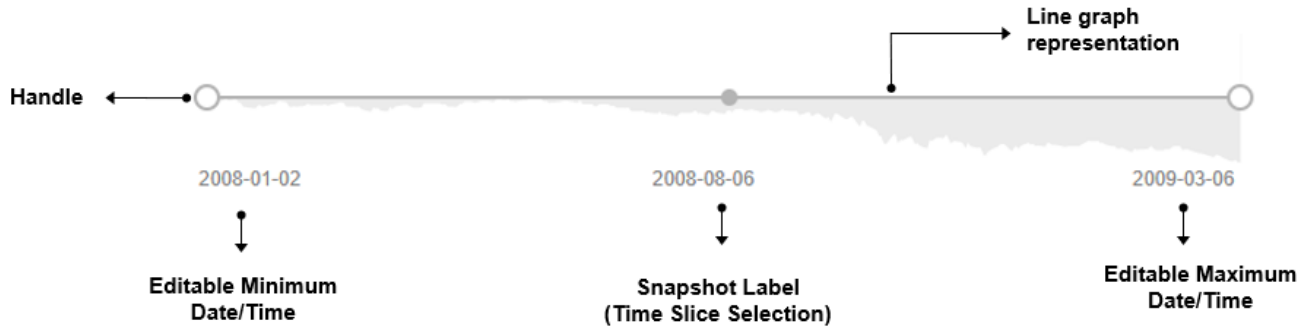
   The *Time Filter Box Settings* pane is displayed, and the *Time Filter Box* part is added on the dashboard canvas.



2. Select a *Data Table* from the drop-down list then select the time series filter *Column*.

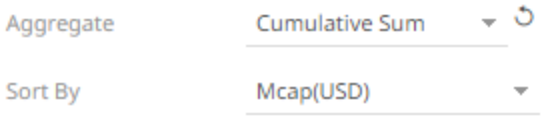
   The *Time Filter Box* now displays:

   - Editable Minimum Date/Time
   - Editable Maximum Date/Time
   - Handles for quick filtering of the time period
   - Time Slice Selection (Snapshot Time)
   - Line Graph representation of the time series column

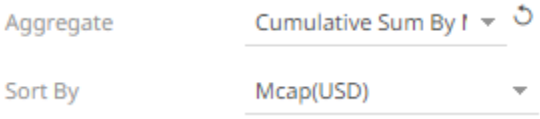


3. Select the *Aggregate* type.

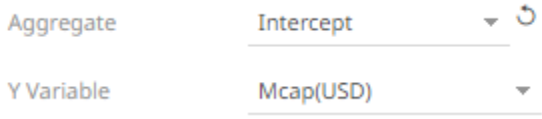
   - If you set the aggregation method to **Cumulative Sum** or **Cumulative Sum by Max**, the *Sort By* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the sorting column for the aggregate.

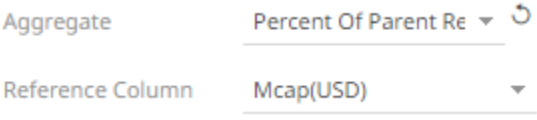
     Cumulative Sum By Max is, in practice, **Cumulative Sum** with a setting to use **Max** as the sort by aggregation.

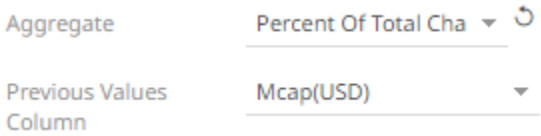
   - If you set the aggregation method to **Intercept** or **Slope**, the *Y Variable* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the Y-axis variable column for the aggregate.

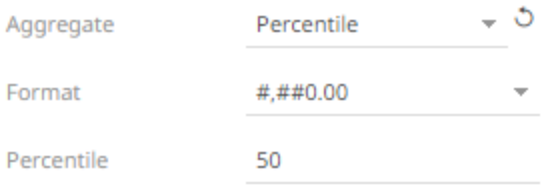
   - If you set the aggregation method to **Percent of Parent Reference**, **Percent of Total Reference**, or **Ratio of Sums**, the *Reference Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the reference column for the aggregate.

   - If you set the aggregation method to **Percent of Total Change**, the *Previous Values Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the previous column for the aggregate.

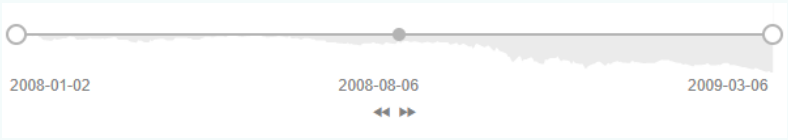
   - If you set the aggregation method to **Percentile,** the *Percentile* field is displayed. Specify the value that can be used to calculate the value of the selected percentile.

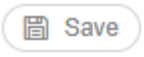


- If you set the aggregation method to Weighted Harmonic Mean, Weighted Mean, Weighted Population Variance, Weighted Stdev, Weighted Stdevp, Weighted Sum, or Weighted Variance, the *Weight Column* drop-down list is enabled and displays a list of numeric data columns in the selected data table that can be used as the weight column for the aggregate.

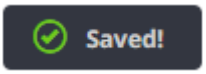


4. The *Format* field lets you specify the format that Date/Time will be displayed in.
5. Proceed to setting the time filter box settings:

Setting	Description
Show Handles	Determines whether handles are displayed. Enabled by default.
Snapshot Label Always Visible	Determines whether to always display the snapshot label. Enabled by default.
Show Backward & Forward Button	Determines whether the **Backward** and **Forward** buttons are displayed to move through time slices. 
Show Play/Pause Button	Determines whether the **Play** or **Pause** button is displayed and adds the ability to automatically play through all the time slices. It subsequently automatically moves through each time slice until it reaches the end of the time window, causing the playback to reset.
Play Time	How long the play time will run if the Pay Mode is **Ticks**. Default is **30**.
Play Mode	Determines whether the play mode is either **Time** or **Ticks** Setting to **Time** will playback the time slices as quickly as possible Setting to **Ticks** will playback a time slice based on the set *Play Time* For example, there are 8 time slices in the Time Series visualization, setting the *Play Time* to **16** will playback a time slice per 2 seconds (i.e., will move the snapshot one step per 2 seconds).
Skip Empty Values	Determines whether to skip empty values.
Display in PDF	Determines whether to include the time filter box in the PDF output.
Left Margin	The margin area on the left side of the time filter box.
Right Margin	The margin area on the right side of the time filter box.

6. Click the **Save** 

icon on the toolbar to save the changes.

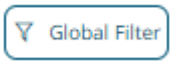
When saved, the 

notification is displayed.

GLOBAL FILTERING

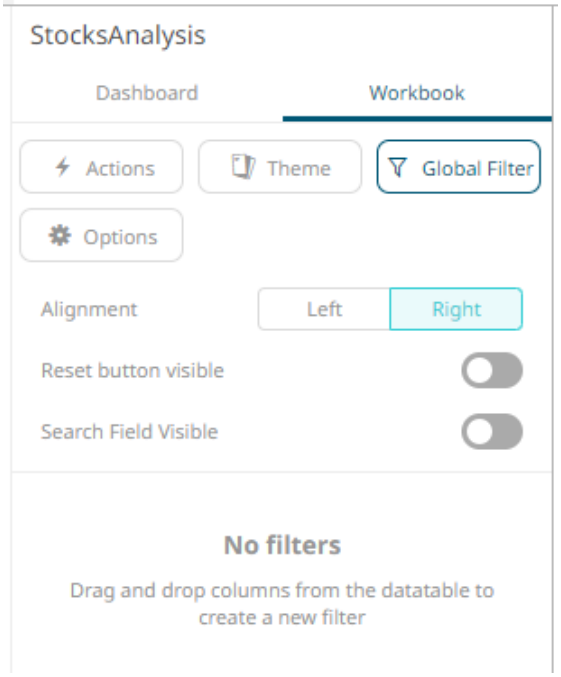
The Global Filters section can be displayed in the workbook layout. Filters added to this section will be applied across all dashboards in a workbook.

Steps:

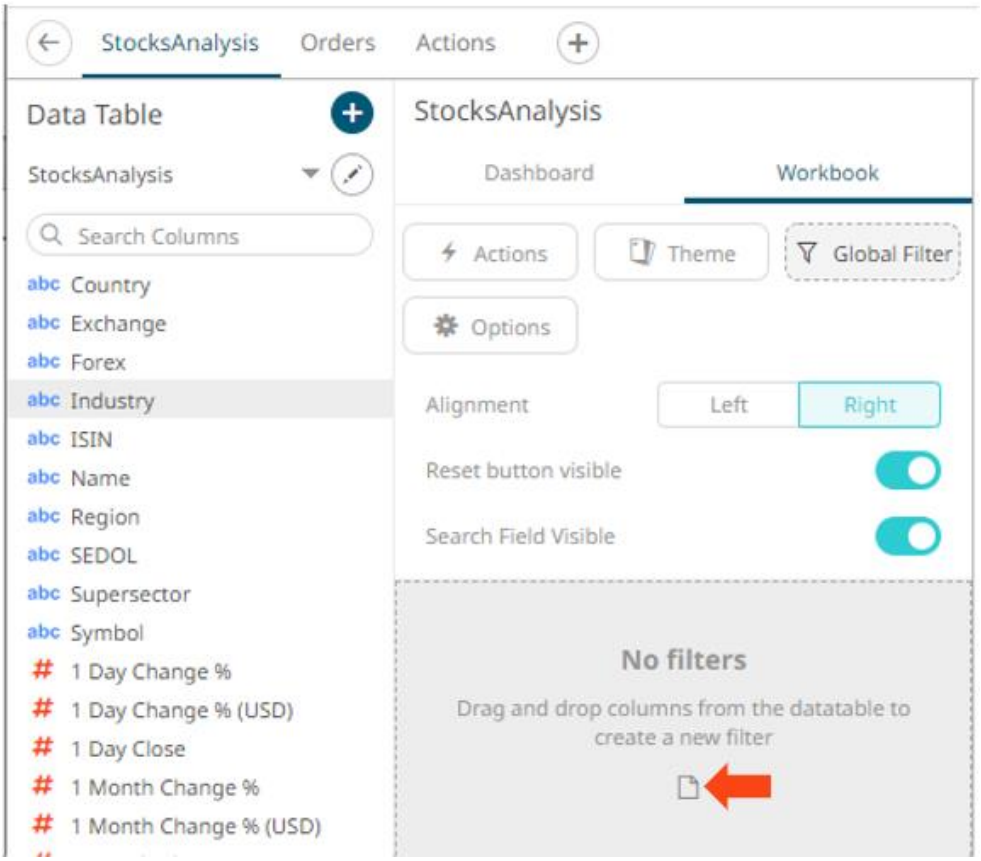
1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab then the 

button.

   The *Global Filter Settings* pane is displayed.

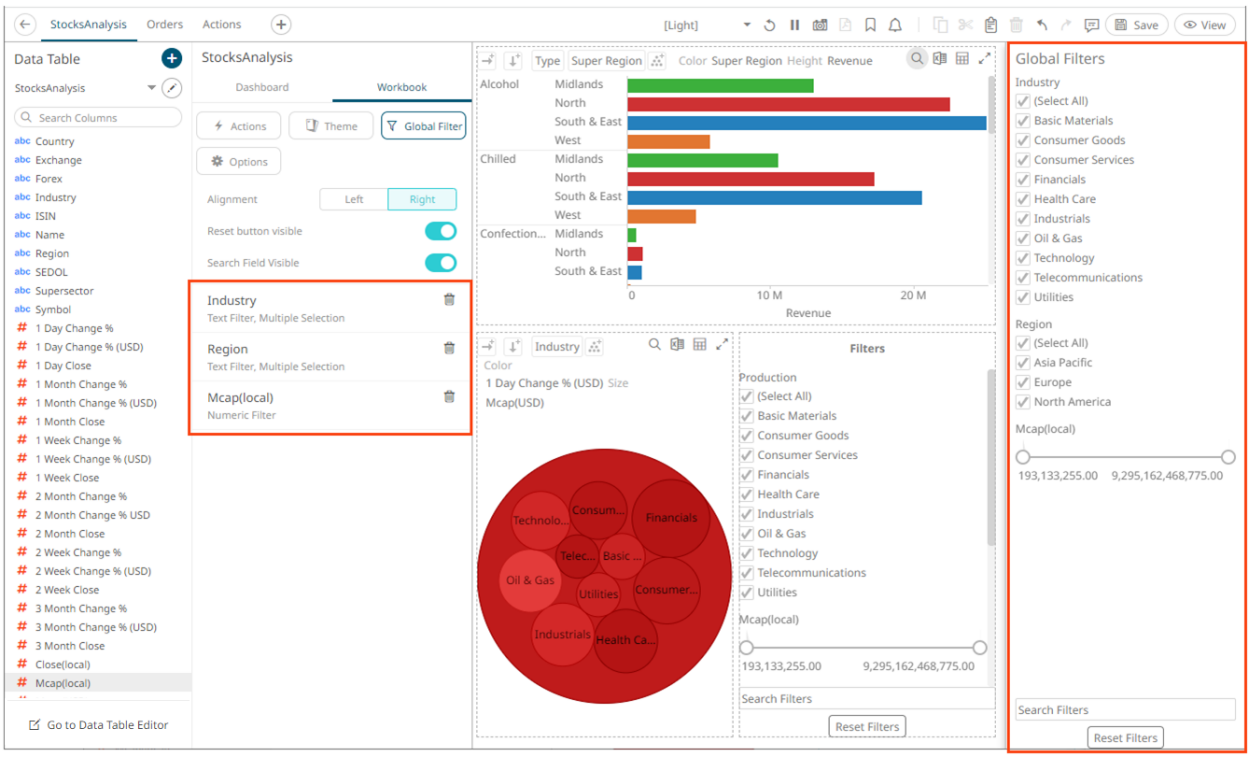


2. Select the Global Filters *Alignment*: **Left** or **Right**.
3. Tap the **Reset Button Visible** slider to turn it on.
4. Tap the **Search Field Visible** slider to turn it on.
5. Drag and drop columns (text, numeric, time, or time series) from the *Data Table* pane to the **Global Filter** pill or drop area:



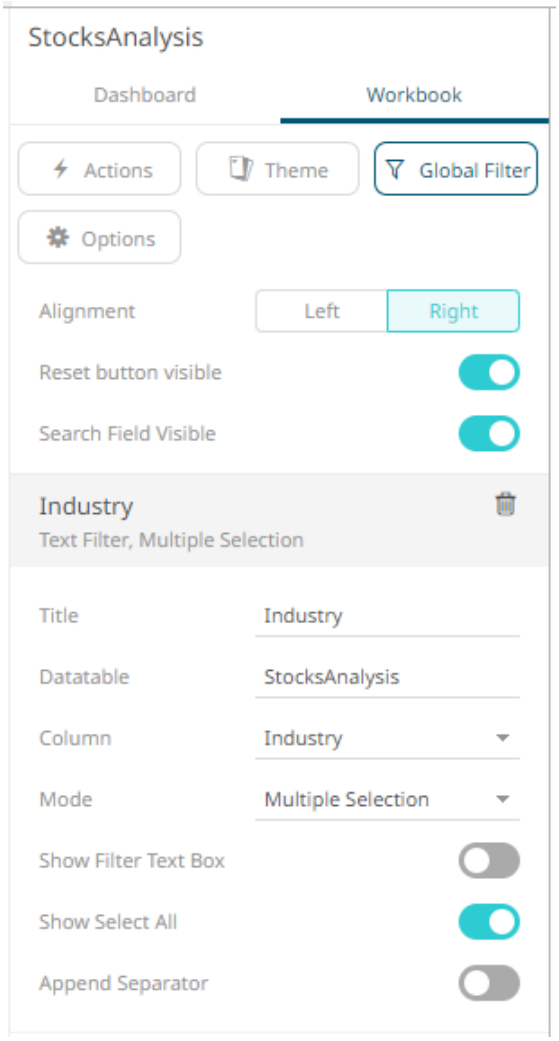
The columns are added under the *Filter Box* columns list and the *Global Filter* box is displayed and populated by the default filter mode type of the added columns:

- Multiple Selection for text columns
- Numeric Range for numeric and timeseries columns
- Date/Time Range for time columns

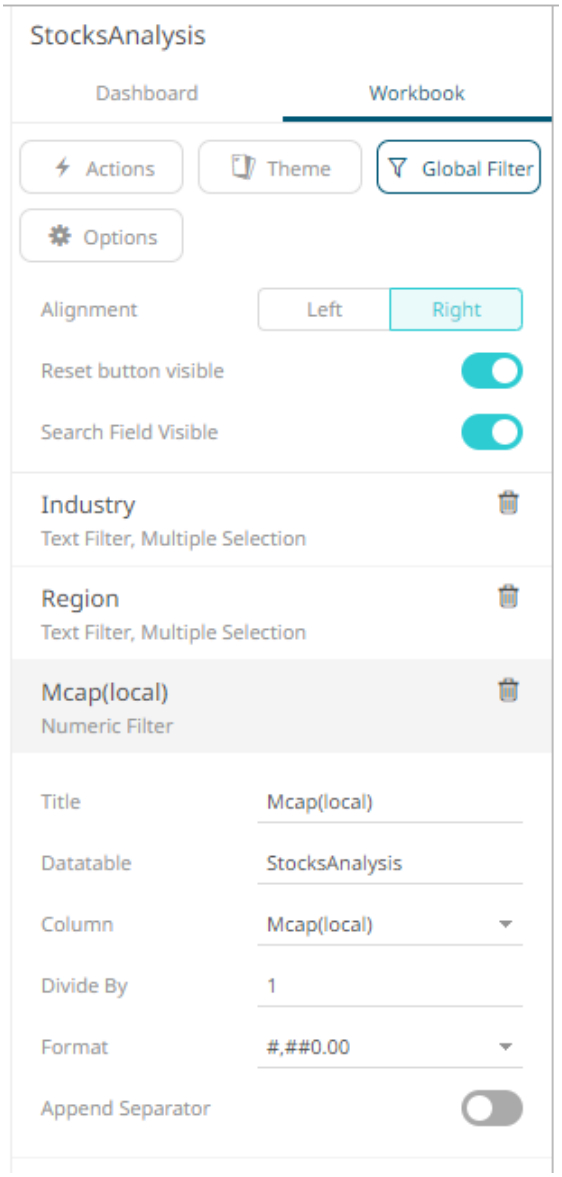


You may modify the settings of the dragged and dropped columns.

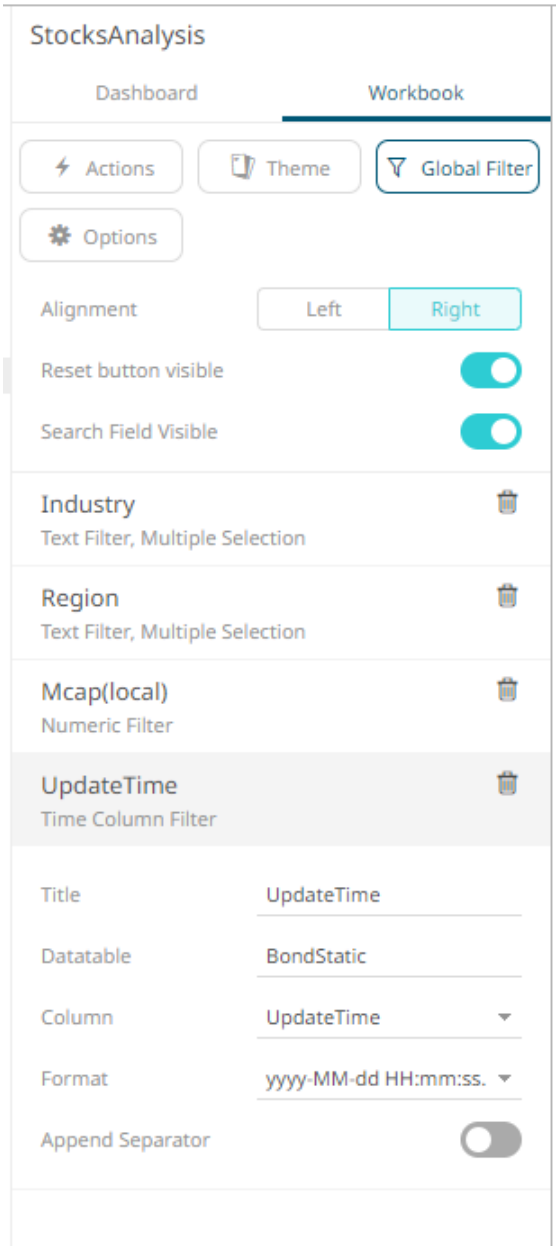
6. For the *Text Filter*, click to expand.

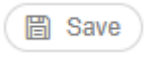


7. Modify any of the *Title*, *Data Table*, *Column*, and *Mode* values.
8. For the *Numeric Filter*, click to expand.



9. Modify any of the *Title*, *Data Table, Column, Divide By,* or *Format* values.
10. For the *Time Column Filter*, click to expand.



11. Modify any of the *Title*, *Data Table, Column,* or Date/Time *Format* values.
12. For any of the global filter types, tap the **Append Separator** slider to add a separator.
13. Click the **Save**  icon on the toolbar.

    When saved, the  notification is displayed.

Deleting Global Filters

Click on a global filter instance under the *Global Filter Settings* pane and then click  .

Viewing Active Filters

Information on active filters applied on the dashboard and its parts can be viewed.

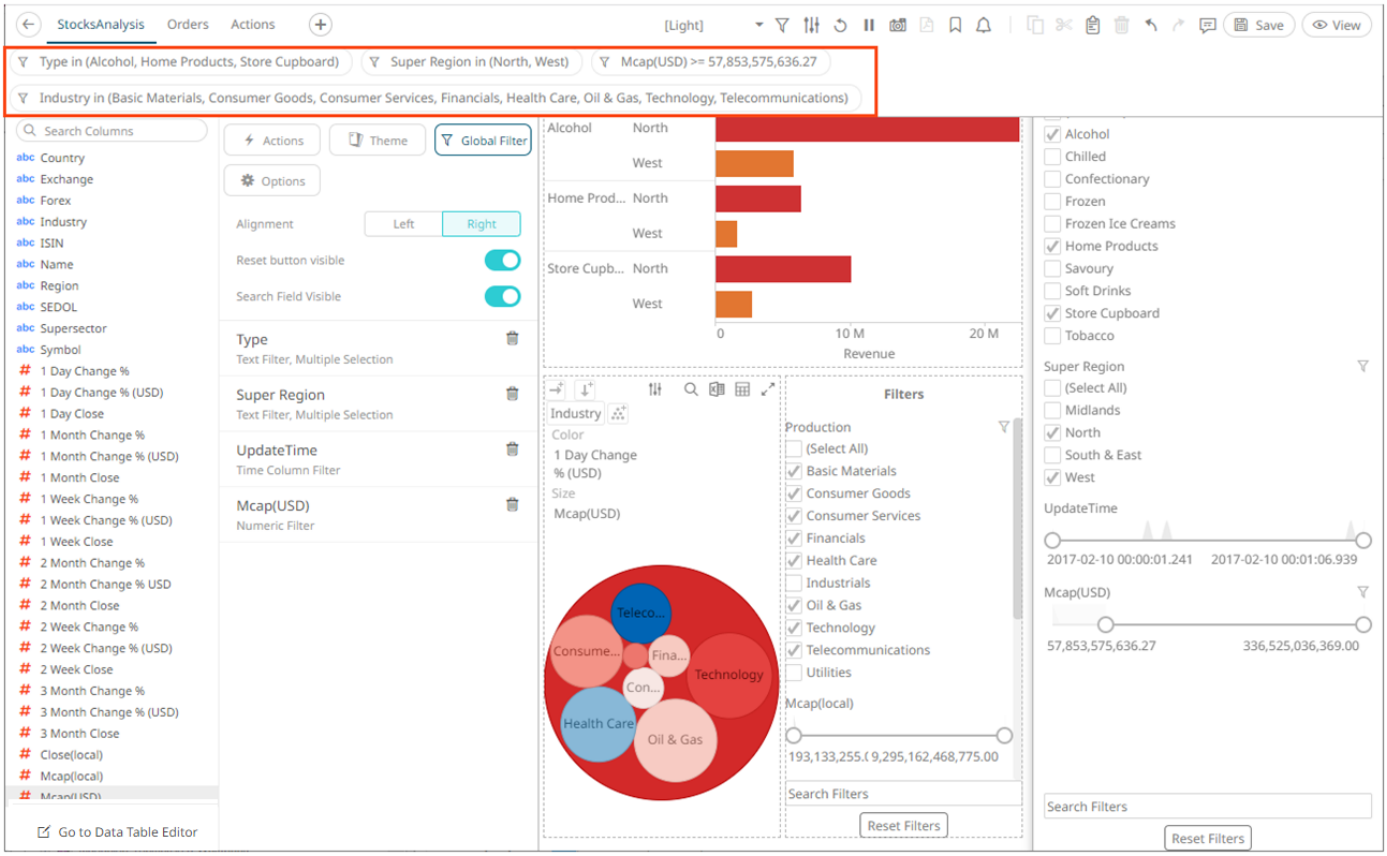
These filters can be done through:

- Filter controls
- Global filter
- Visualization filter

Steps:

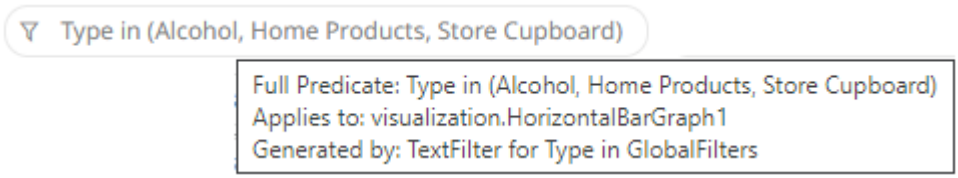
1. Click the **Show Active Filters** icon on the toolbar.

   All of the predicates of the active filters are displayed. For this sample, there are four active filters.

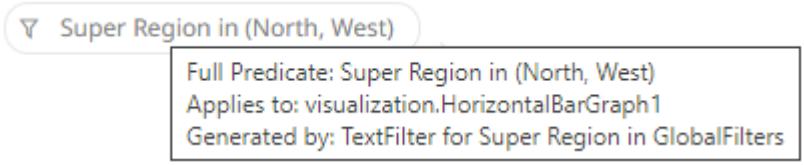


2. Hover on any predicate to display its details.

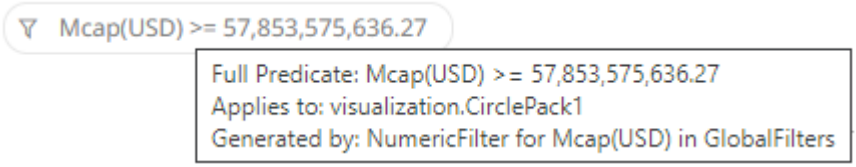
   Predicate 1:



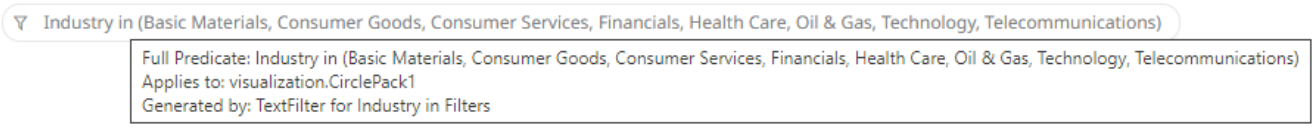
Predicate 2:



Predicate 3:



Predicate 4:



Property	Description
Full Predicate	Predicate details.
Applies To	Parts in the dashboard where the predicate is applied.
Generated By	Source of the predicate which include the filter column data type in the filter control or global filter.

3. To clear any predicate in the list, click .

ACTIONS

Actions allow Panopticon workbooks to be more interactive:

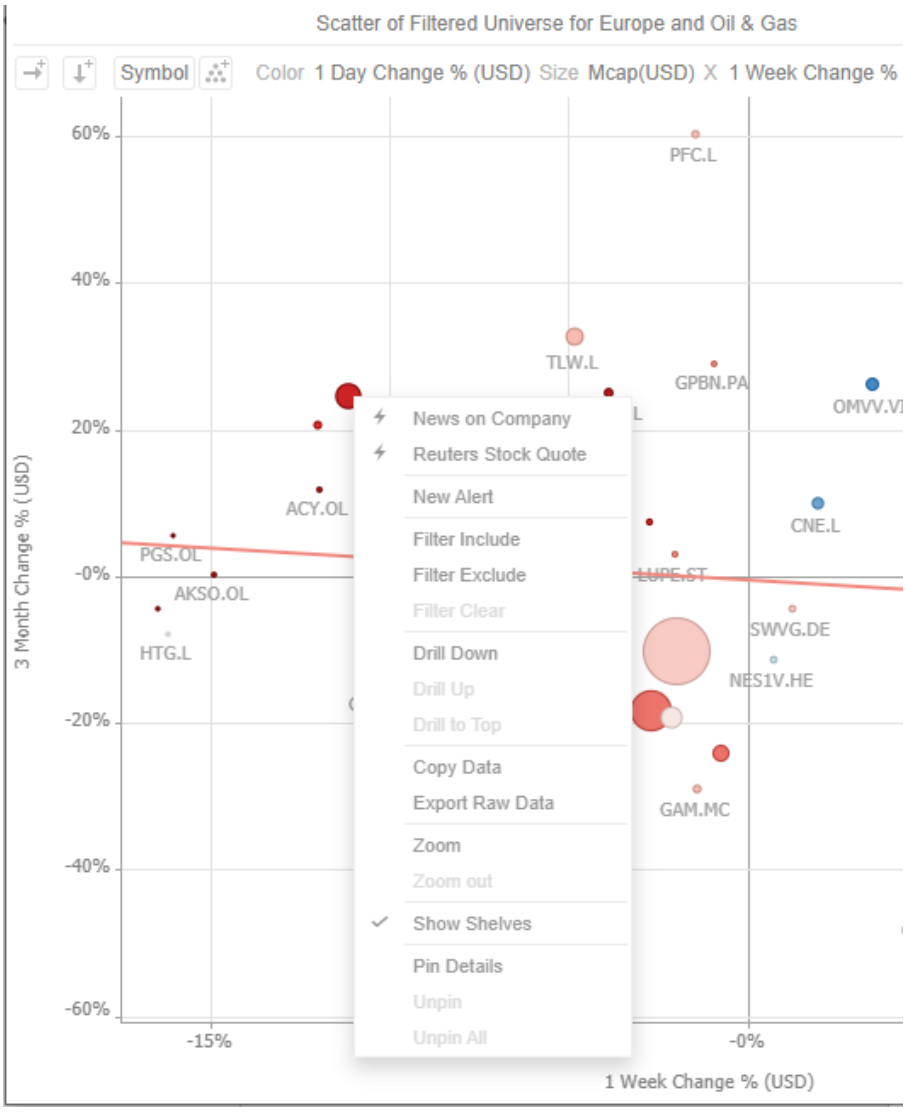
- Link information in dashboards to external systems
- Use Navigation Actions to pre-filter dashboards
- Open web pages contextually through URL Actions
- Execute JavaScript functions in context using Script Actions

Perform all of the above through the Action buttons

Actions use parameters to pass selected text values to external applications, to JavaScript functions and to other dashboards.

All methods provide the ability to view a summary data set, select particular items of interest and then jump to another data set focused on these particular items. This focused data set may be presented through another tab within the workbook (Navigation Action) or through an external system (URL Actions & Script Actions).

Actions are exposed to the user through the right-click context menu, with the **Action** icon to the left of the Action name.



Within Panopticon, the focused data set is achieved through the use of parameters in the data set. See Adding Data Table Parameters section for more details.

Parameters values, must be text and are specified through:

- Default values on the creation of the parameter in the data table
- Default values on the creation of the parameter on the dashboard pane
- Values specified as a result of right-clicking on an item and executing an action
- Values specified externally, when a workbook is accessed via the web browser, and the parent web page includes the specified values as inputs
- In the specific case of the parameter **_user_id**, the authenticated username is retrieved.
- In the other special case for the parameters **$TimeWindowStart**, **$TimeWindowEnd**,and **$Snapshot**
- Other special cases for parameters used for zooming allow for **$XAxisValueMin, $XAxisValueMax, $YAxisValueMin,** and **$YAxisValueMax**

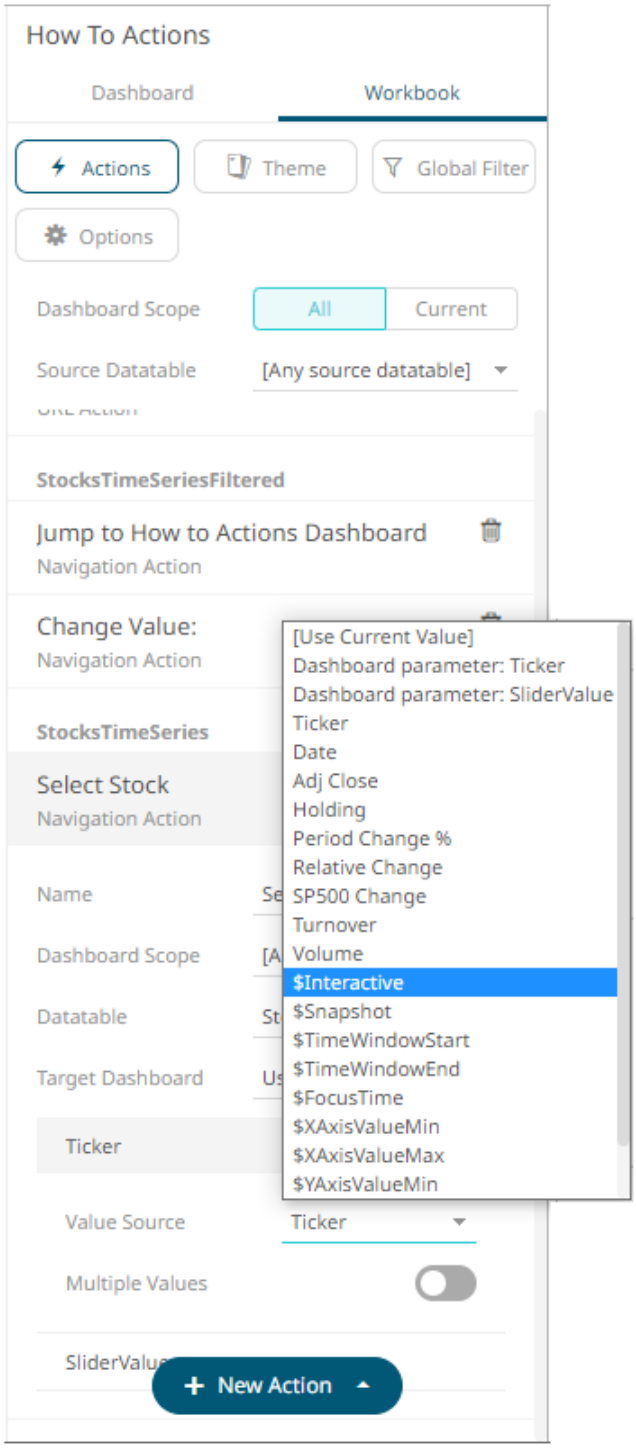
Typically, actions are created once the workbook design has largely been completed, with visualizations added to each **Dashboard** (tab), some being open to all data, and some being parameterized, visualizing data based on the default parameter values.

Interactive Parameters

Parameters are normally supplied from selected columns of the parent data table, or from action controls.

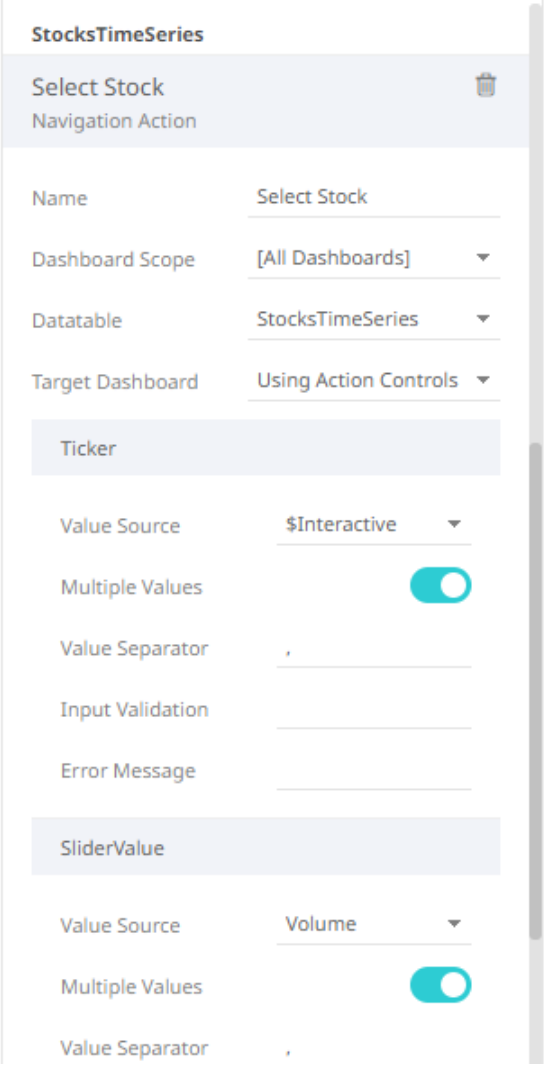
Additionally, actions can be specified to support interactive parameters that are entered when the action is executed.

In this case for a parameter the *Value Source* list box is set to **$Interactive**.



Actions can be constructed with combinations of data source and interactive parameters.

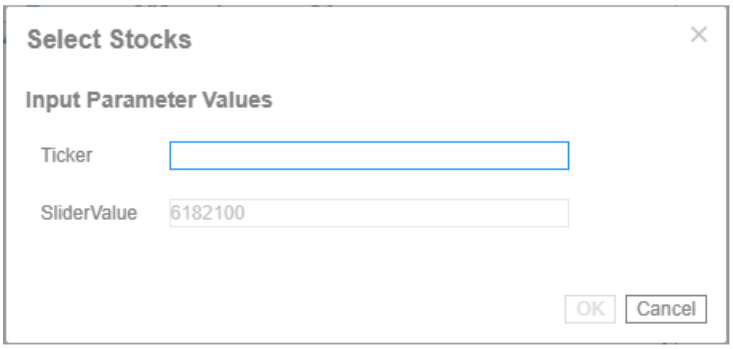
Typically, interactive parameters are used to pass data back to data repositories or external systems.



When interactive parameters are selected, the *Input Validation* and *Error Message* boxes are enabled.

- The *Input Validation* can be any regular expression (e.g., “A-Z{3}”).
- The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., “Please use a 3-letter code.”)

When an action is executed which required an interactive parameter, an associated dialog box will be displayed.



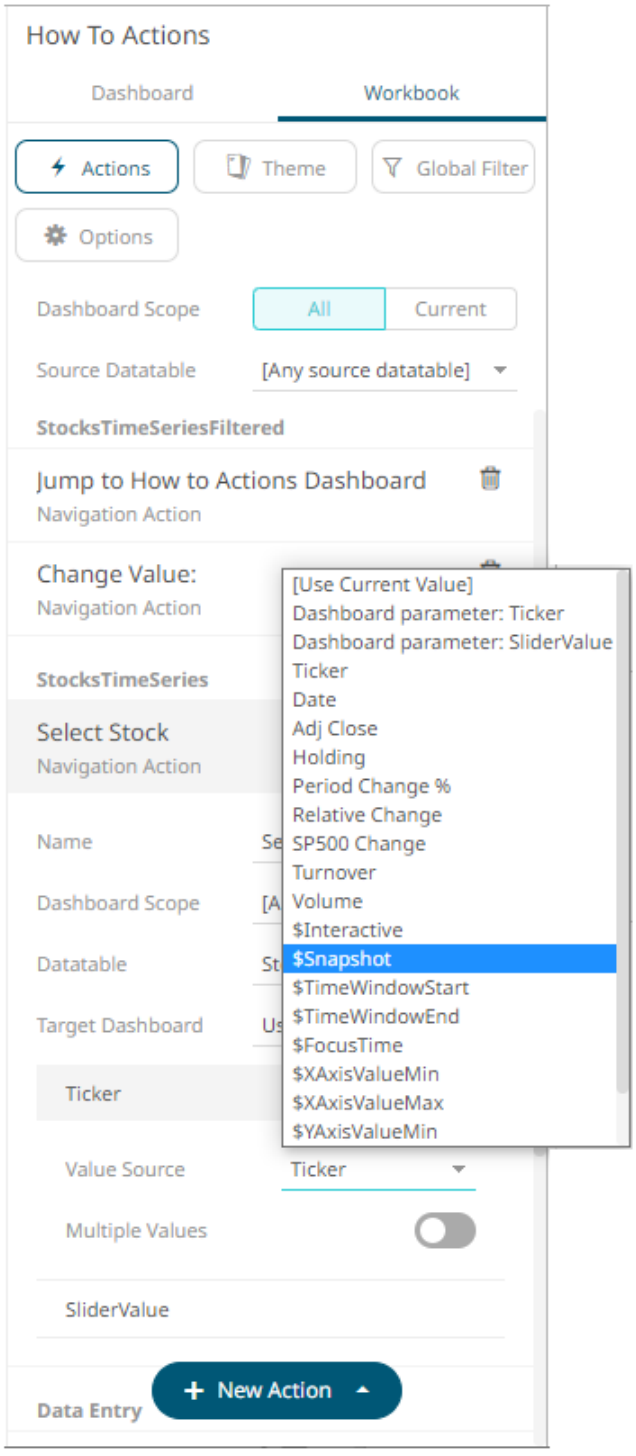
This lists all parameters associated with the action. For the example above, data sourced parameters are listed completed with values. Interactive parameters are listed with text boxes for data entry.

The action is then executed when the **OK** button is clicked. This button is enabled when all interactive parameters have been completed.

If the **Cancel** button is clicked, the action is cancelled.

Time Parameters

Parameters are normally supplied from selected columns of the parent data table, or from action controls:



Time parameters values can also be supplied through using the Time Window filter and selecting one of the three available time parameters.

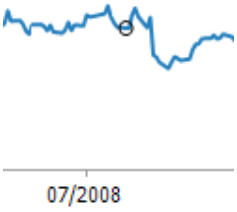
- $Snapshot
- $TimeWindowStart
- $TimeWindowEnd

When one of the time window filters is moved, an action associated with one of these time parameters will be executed.



A final time parameter can also be specified. This is the **FocusTime**.

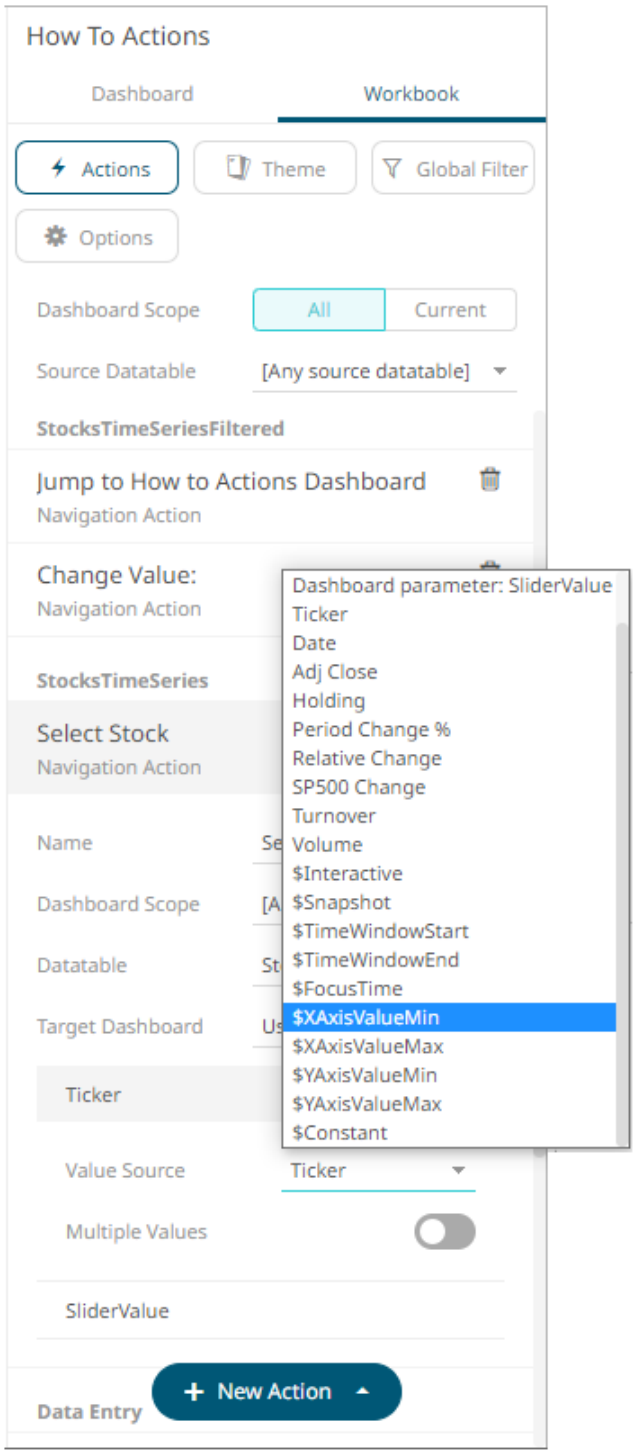
FocusTime is set when executing an action from a time series visualization and highlighting a particular time slice.



Zoom Bound Parameters

Parameters can also be supplied through the visualization zoom bounding box, by selecting one of the four available zoom parameters:

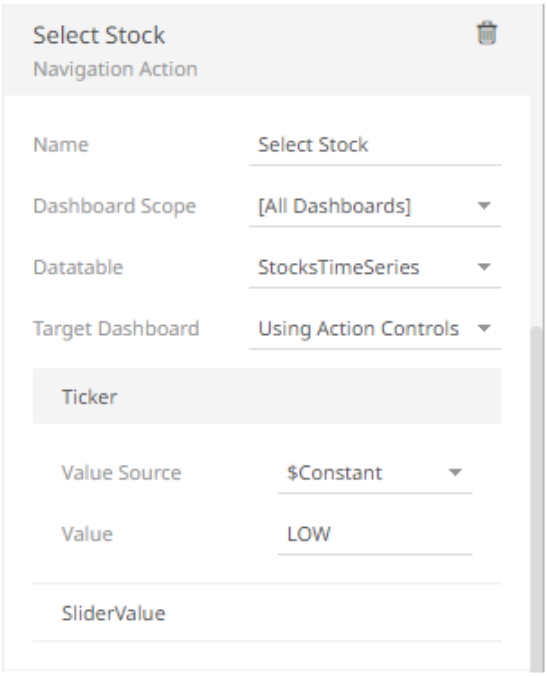
- $XAxisValueMin
- $XAxisValueMax
- $YAxisValueMin
- $YAxisValueMax



These can be used to resample data at increased granularity, by requerying the data source passing the new zoomed range as bounding conditions.

Constant Parameters

Actions support specifying constant (non data-driven) values for parameters inside the action. Set the *Value Source* of the parameter to **$Constant** and specify any text value.



The constant value will then always be used for that parameter whenever the action is executed.

In the above example, whenever **Select Stock** action is executed, the **Ticker** parameter will receive the value **LOW**.

Action Scope

Actions can either be specific to a single dashboard or defined for all dashboards in a workbook.

For the dashboards in a workbook, the following actions can be defined:

- Navigation Action
- URL Action
- Script Action
- Data Update Action

While for a single dashboard, you can define any of the following actions:

- Numeric Action Slider
- Numeric Range Action Slider
- Action Button
- Action Date Picker
- Action Date Range Picker
- Action Drop Down
- Action Form
- Action Text Box

NOTE **Any actions defined with workbook scope will be included on the listing of dashboard-specific actions.**

Each of these actions are discussed in detail below.

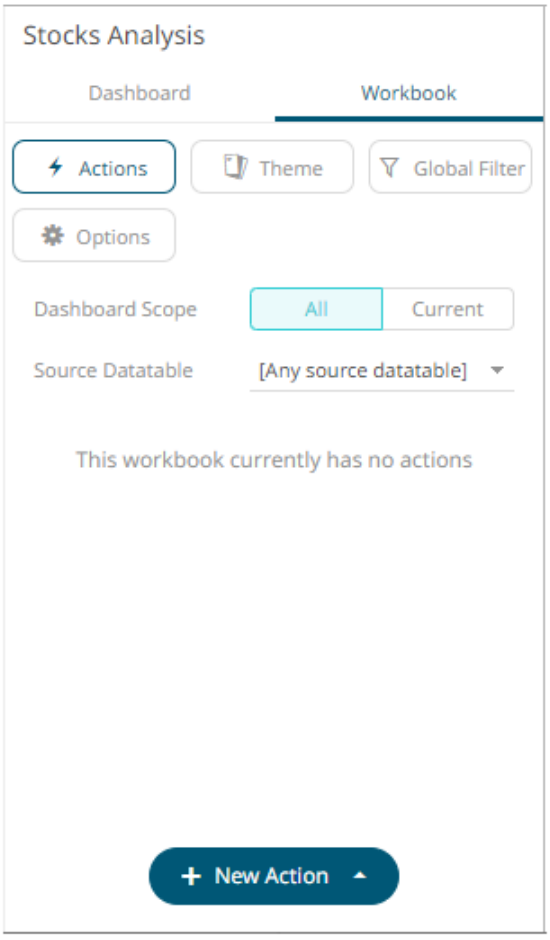
Adding Navigation Actions

Navigation Actions let you pass parameters from one dashboard to another in the same workbook.

Steps:

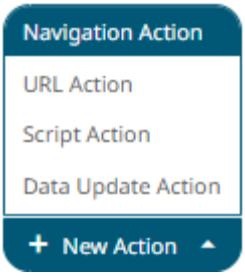
1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

   The *Actions* pane is displayed. Initially, there are no actions defined for the workbook and the selected *Dashboard Scope* is **All**.



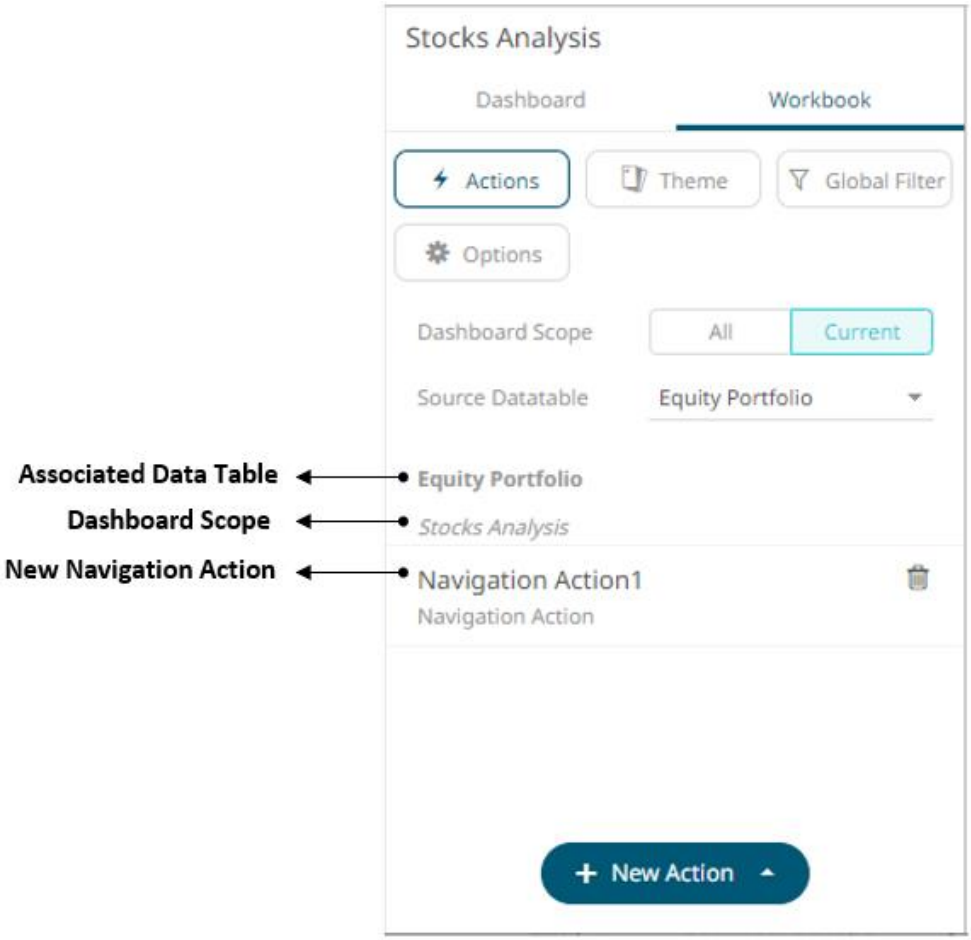
2. Select the *Dashboard Scope* where you will define the dashboard scope data parameters that will be passed to the target dashboard: **All** or **Current**.
3. Select the *Source Datatable* from the drop-down list.
4. Click the 

button then select **Navigation Action** in the drop-down list.

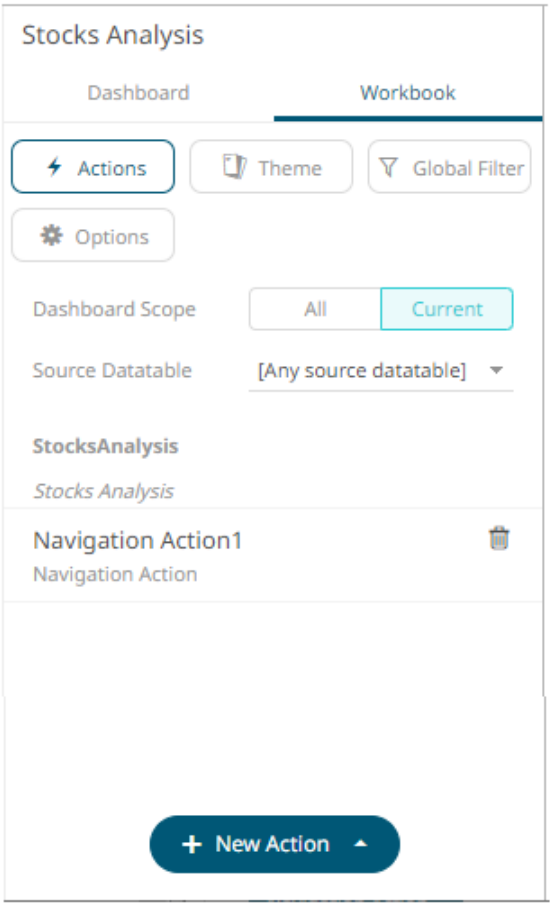


The new navigation action is added under the selected *Dashboard Scope* in the *Actions* list.

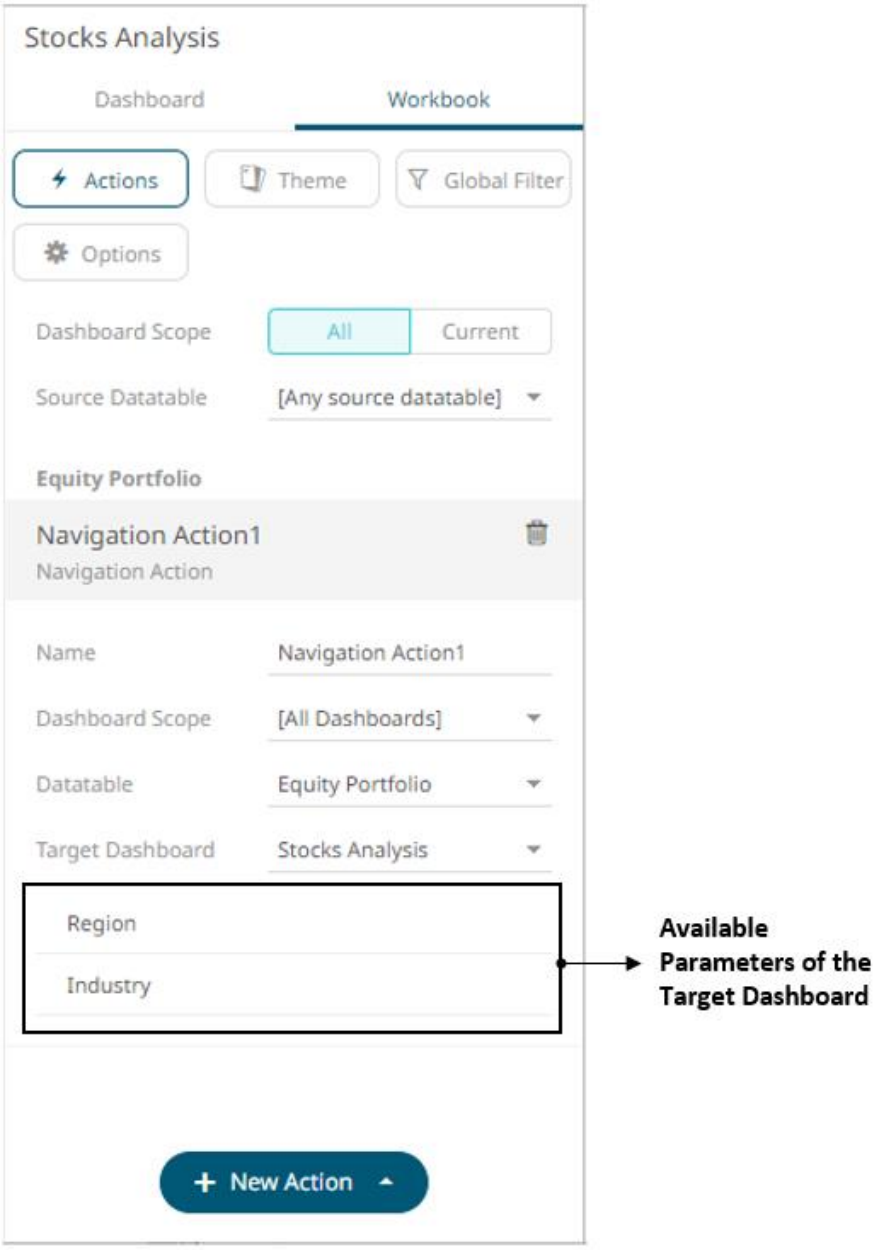
For example, if **Current** is the selected dashboard scope and the source data table is **Equity Portfolio**, then it will be displayed as:



However, if no source data table is selected, then the first one in the *Data Table* pane (i.e., StocksAnalysis) is the default associated to the new navigation action.

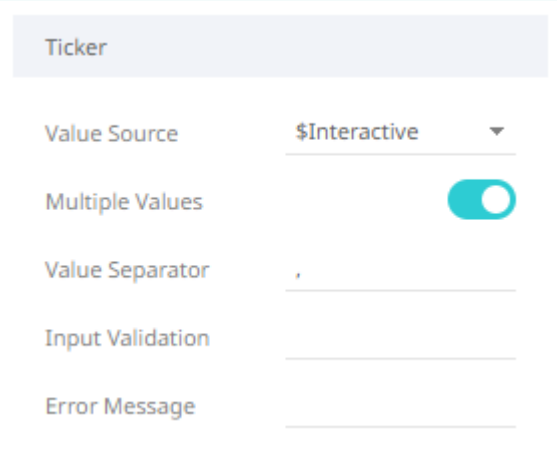
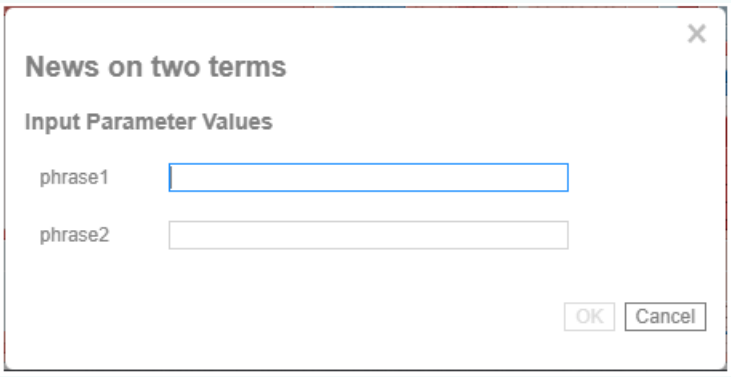


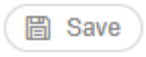
5. Click the new navigation action instance to expand and display the properties that you can define.



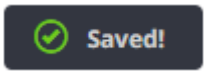
6. Enter or select the following properties:

Setting	Description
Name	The name of the navigation action and then click ✓.
Dashboard Scope	The dashboard where you will define the dashboard scope data parameters that will be passed to the target dashboard. Can either be **[All Dashboard]** or the current dashboard.
Datatable	The source data table. This will eventually be displayed above the navigation action instance.
Target Dashboard	The dashboard where you want to pass the parameters to.
Parameters Name	The available parameters of the selected target dashboard.

Value Source	Select the column value from the source table that will supply the contextual value. If you select **[Use Current Value]**, the current parameter value will be passed to the dashboard.
Multiple Values	This passes multiple values for the parameter to the target area. Tap the slider to turn on. The *Value Separator* field displays.  Specify the value separator to be used.
Input Validation and Error Message	 Both fields are enabled when an interactive parameter (i.e., **$Interactive**) is selected in the *Value Source* drop-down list. Typically, interactive parameters are used to pass data back to data repositories or external systems. When an action is executed which require an interactive parameter, an associated dialog box will be displayed. For example:  Add a custom *Input Validation*. This can be any regular expression (e.g., “A-Z{3}”) The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., “Please use a 3-letter code.”)

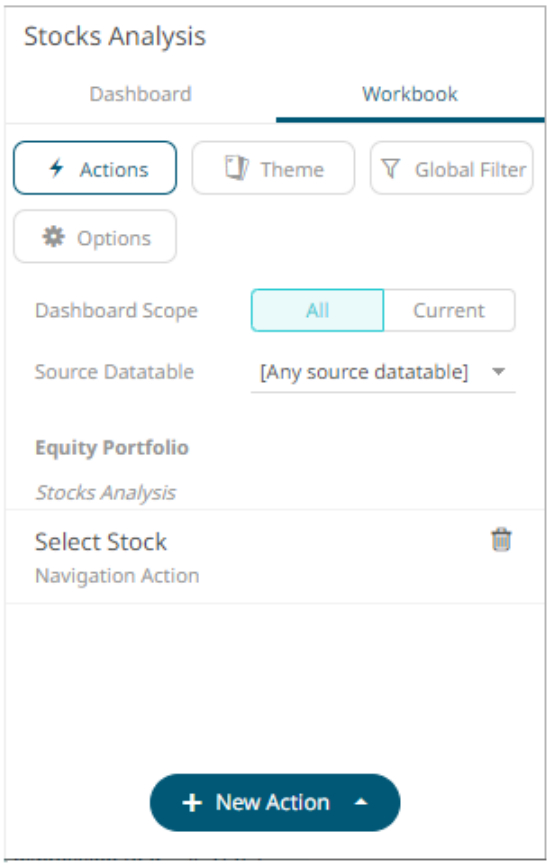
7. Click the **Save** 

icon on the toolbar to save the changes.

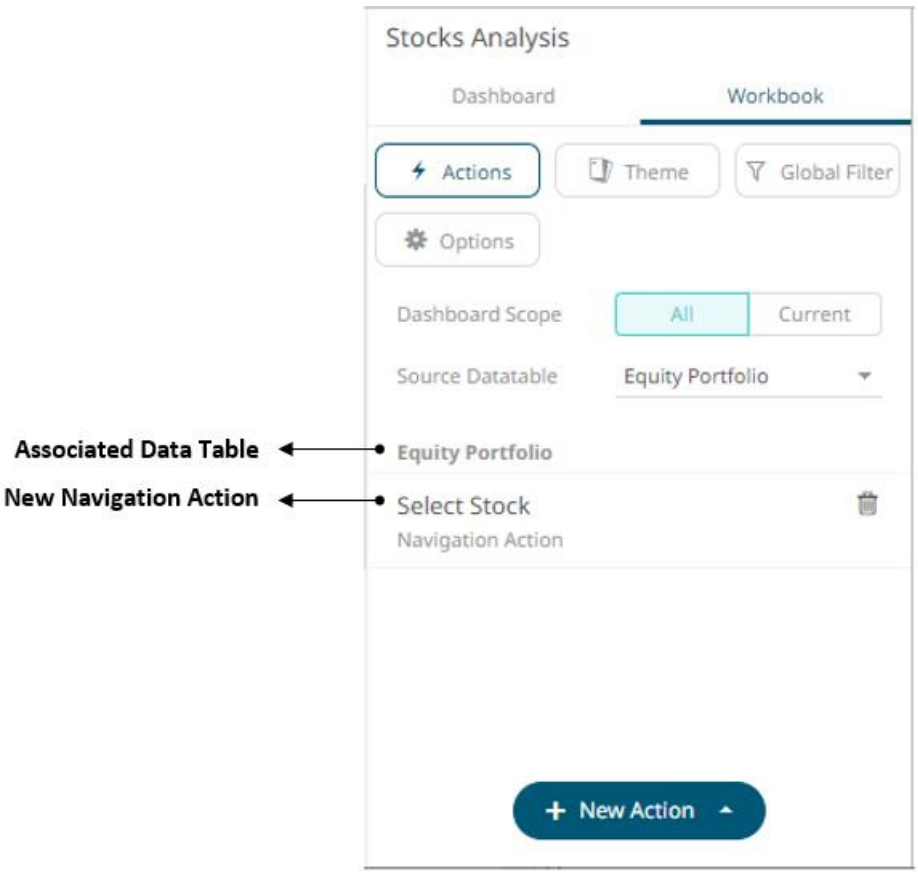
When saved, the 

notification is displayed.

Clicking the **All** *Dashboard Scope*, the new navigation action is available.



If the *Dashboard Scope* is **[All Dashboard]**, the new navigation action will be displayed as:



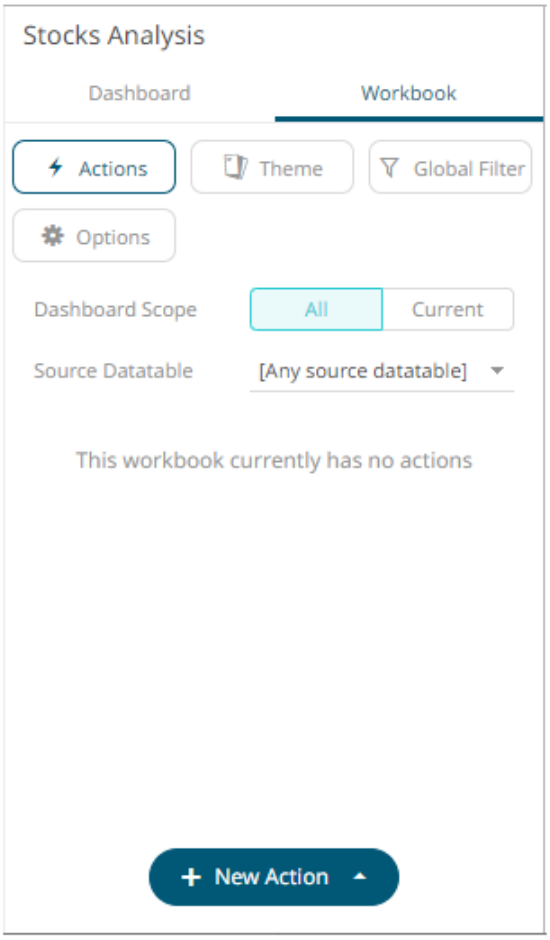
Adding URL Actions

URL Actions lets you access a web page or file or even point to other resources on the web such as database queries and command output. You can also pass parameters to the URL.

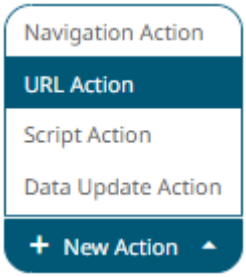
Steps:

1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

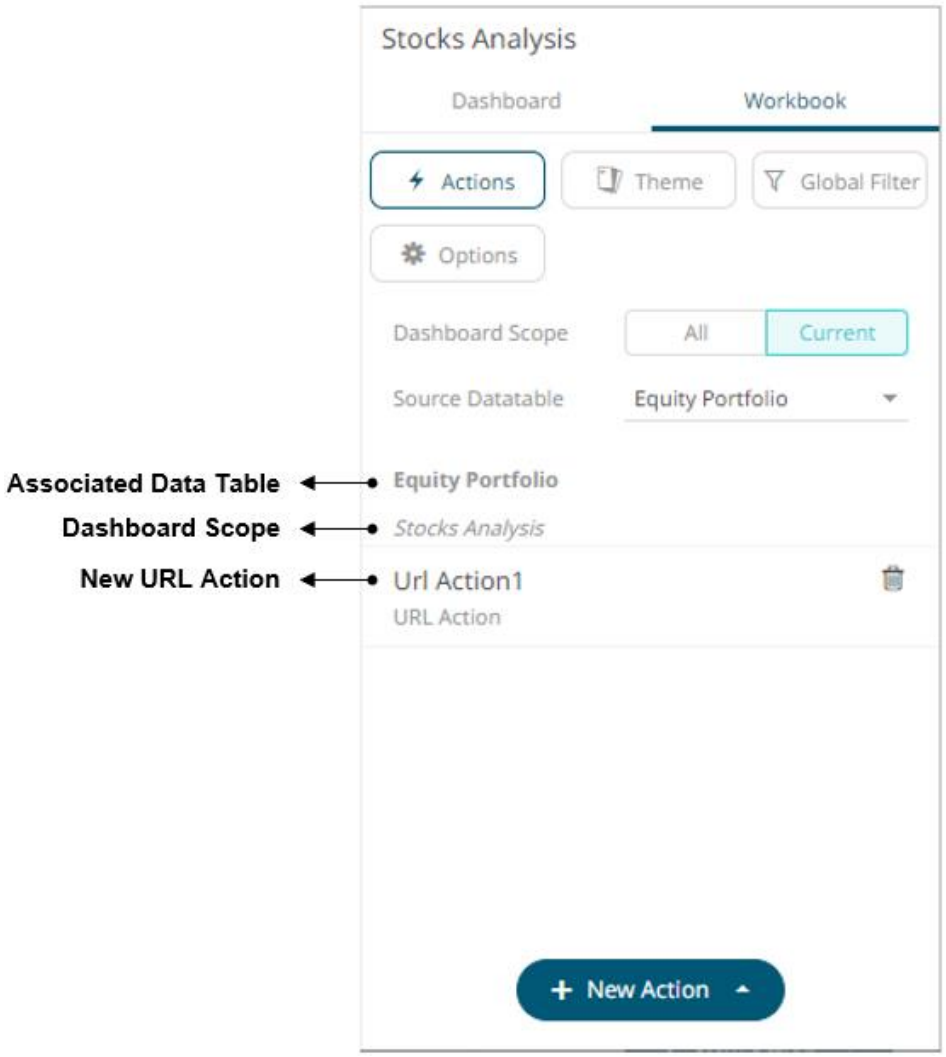
   The *Actions* pane is displayed. Initially, there are no actions defined for the workbook and the selected *Dashboard Scope* is **All**.



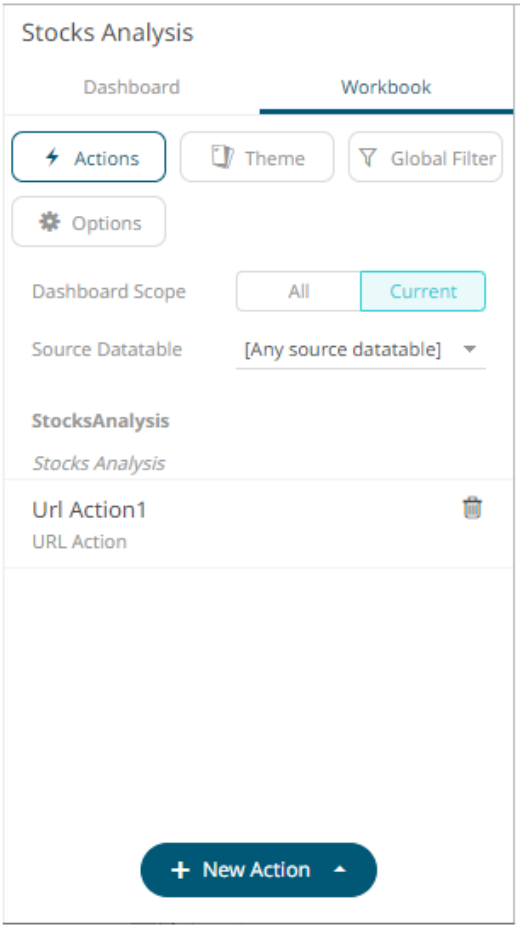
2. Select the *Dashboard Scope* where you will define the dashboard scope data parameters that will be passed to the target dashboard: **All** or **Current**.
3. Select the *Source Datatable* from the drop-down list.
4. Click the  button then select **URL Action** in the drop-down list.



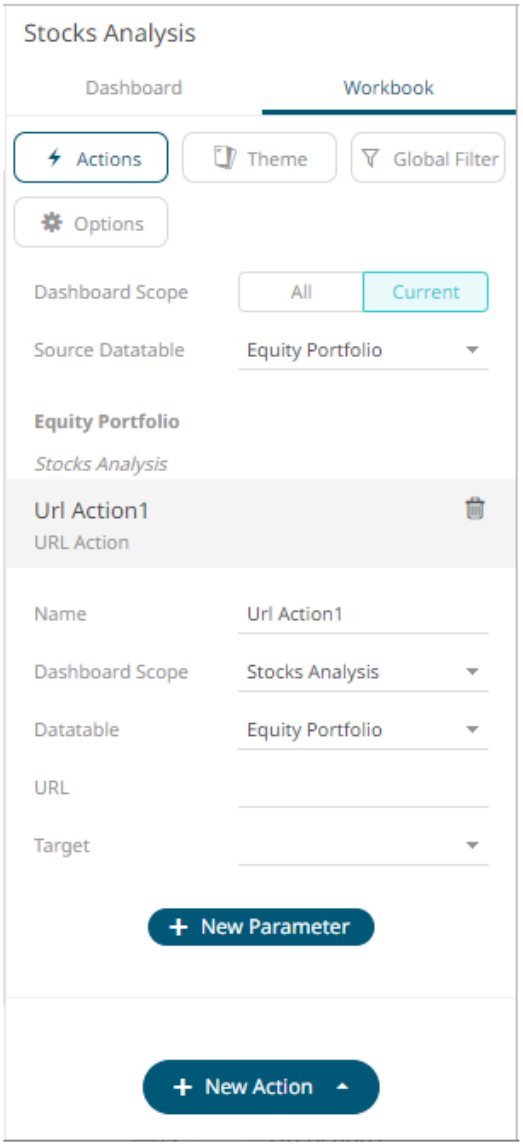
The new URL action is added under the selected *Dashboard Scope* in the *Actions* list. For example, if **Current** is the selected dashboard scope and the source data table is **Equity Portfolio**, then it will be displayed as:



However, if no source data table is selected, then the first one in the *Data Table* pane (i.e., StocksAnalysis) is the default associated to the new URL action.

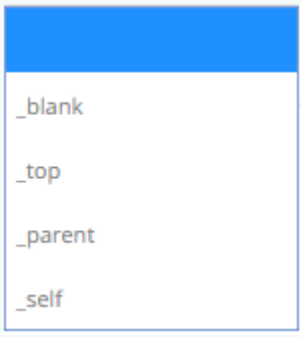


5. Click the new URL action instance to expand and display the properties that you can define.

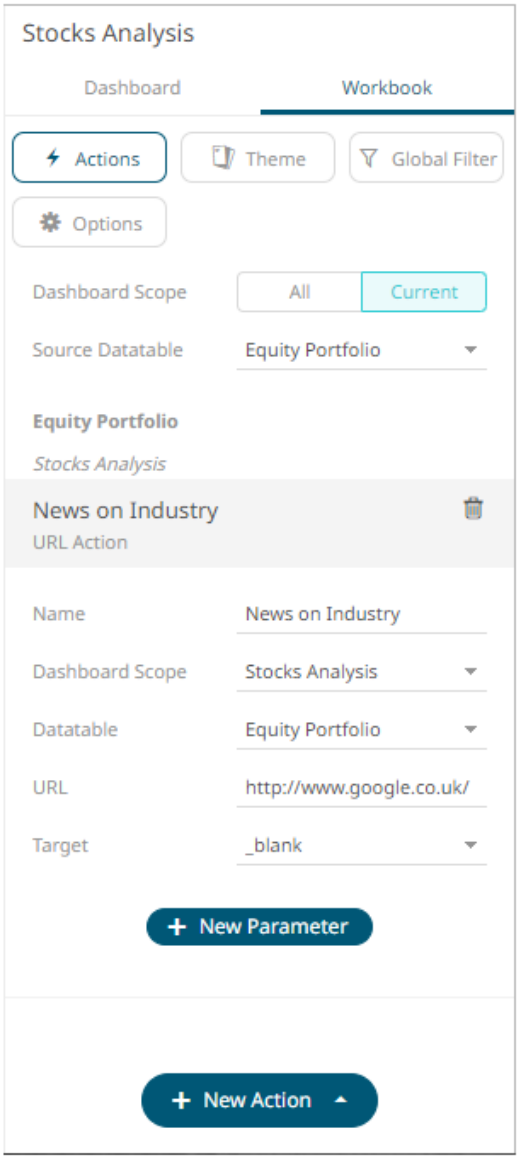


6. Enter or select the following properties:

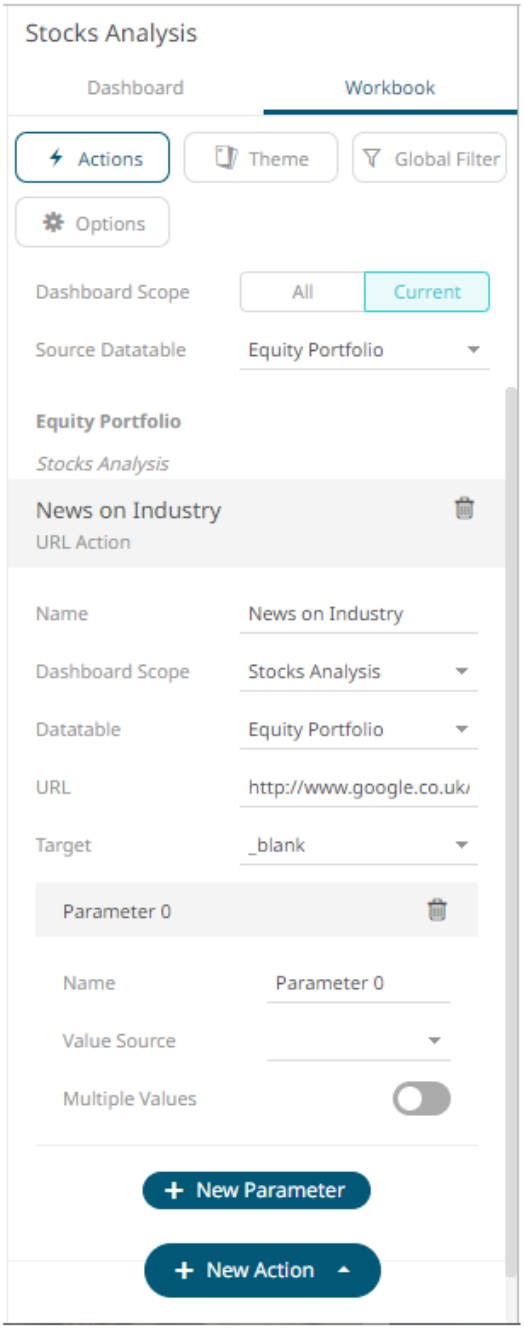
Setting	Description
Name	The name of the URL action and then click .
Dashboard Scope	The dashboard where you will define the dashboard scope data parameters that will be passed to the target dashboard. Can either be **[All Dashboard]** or the current dashboard.
Datatable	The source data table. This will eventually be displayed above the URL action instance.
URL	The parameterized URL and then click . The parameters are written within curly brackets, `{ParameterName}`. For actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows: `{ParameterName:Separator}`

	For example: {Company:+} Default separator is semicolon. Specifying for example a plus sign allows you to do multi search term searches on Google, for example. At execution, the parameter will be replaced with real field values associated with the selected visualization node. The easiest way to create parameterized URLs is to open an example web page and copy the URL. As an example, Yahoo Finance Key Statistics for Microsoft has the following web address: http://finance.yahoo.com/q/ks?s=MSFT If a parameter called Ticker has been set up in the data table, you can generate the URL by removing **MSFT** and replacing it with **{Ticker}**: http://finance.yahoo.com/q/ks?s={Ticker}
Target	The target area of the page where the output URL will be displayed. Available options are: 

7. Click the  button to add parameters to the output URL. A new parameter instance is added.

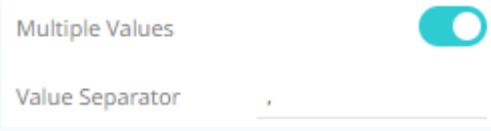


8. Click on the parameter instance to expand and define its properties.



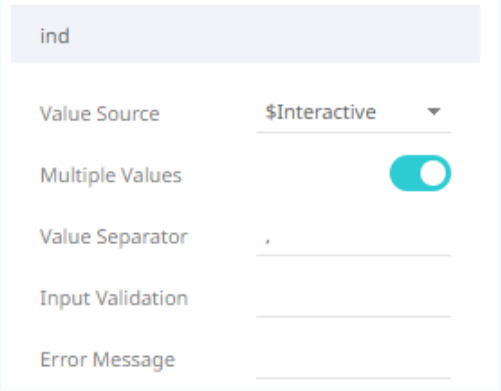
For each parameter added, set or select the following properties:

Setting	Description
Name	Name of the URL action parameter and then click .
Value Source	Column from the data source table that will supply the contextual value. The value of this selected column for rows under the selected visualization node will be passed as the parameter values to the target URL.
Multiple Values	This passes multiple values for the parameter to the target area. Tap the slider to turn on. The *Value Separator* field displays.



Specify the value separator to be used.

Input Validation and Error Message

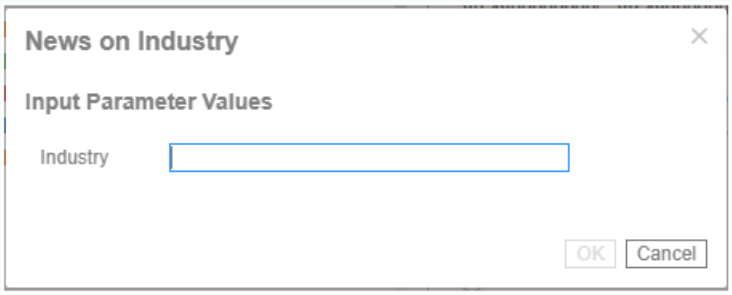


Both fields are enabled when an interactive parameter (i.e., **$Interactive**) is selected in the *Value Source* drop-down list.

Typically, interactive parameters are used to pass data back to data repositories or external systems.

When an action is executed which require an interactive parameter, an associated dialog box will be displayed.

For example:



Add a custom *Input Validation*. This can be any regular expression (e.g., “A-Z{3}”)

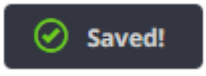
The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., “Please use a 3-letter code.”)

You can delete any of the added parameters by clicking the corresponding **Delete** button.

9. Repeat step 7 to add more parameters.

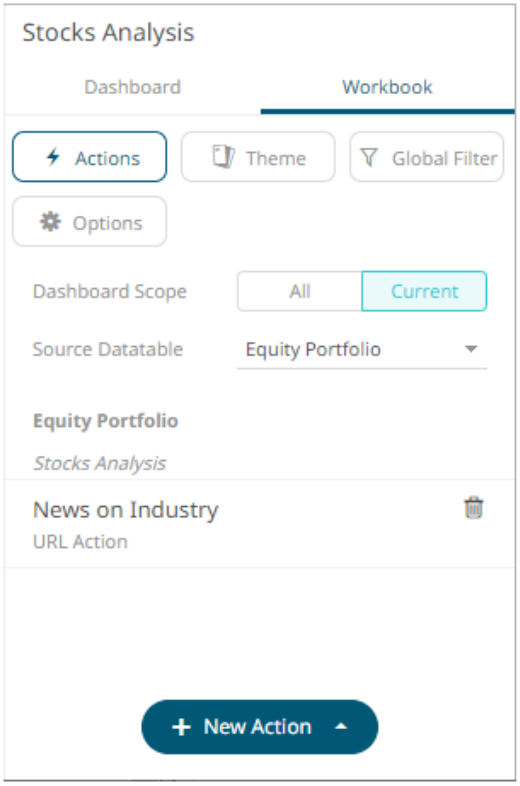
10. Click the **Save** 

icon on the toolbar to save the changes.

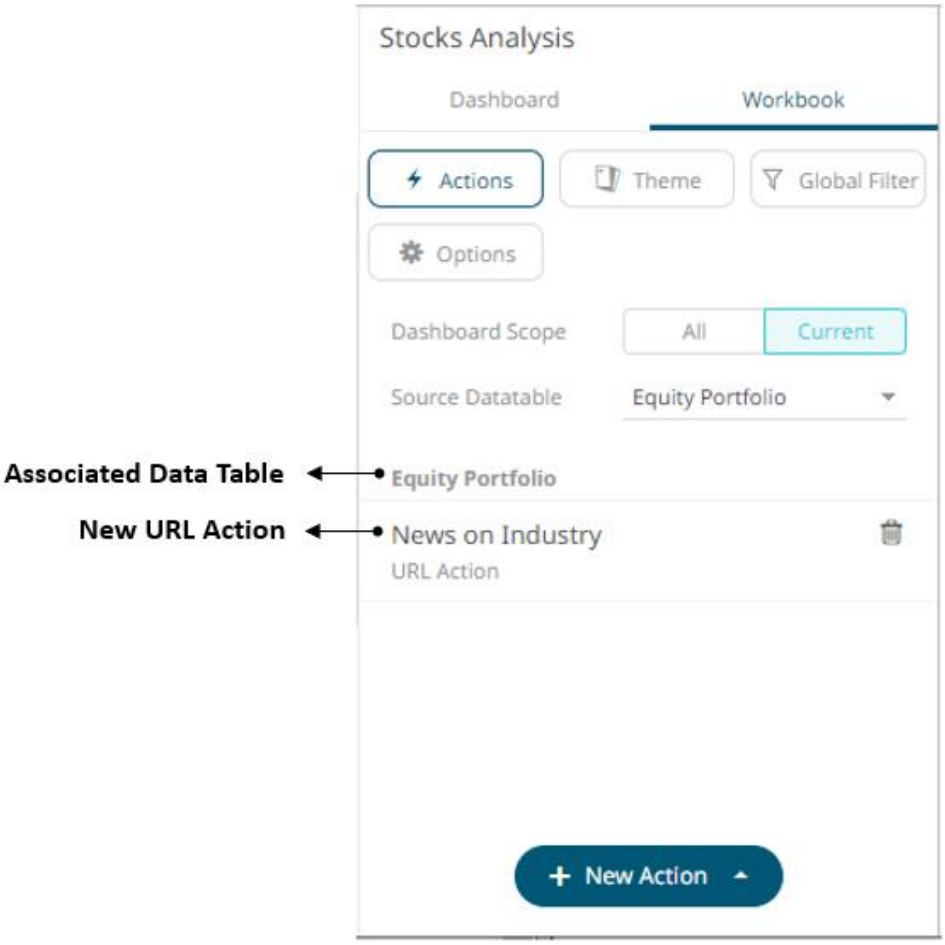
When saved, the 

notification is displayed.

Clicking the **All** *Dashboard Scope*, the new URL action is available.



If the *Dashboard Scope* is **[All Dashboard]**, the new URL action will be displayed as:



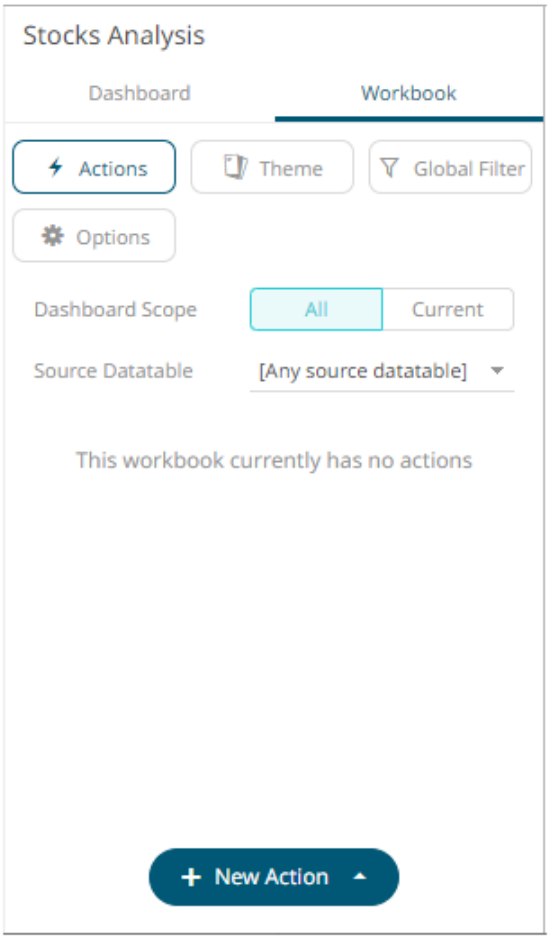
Adding Script Actions

Script actions allow execution of a defined JavaScript.

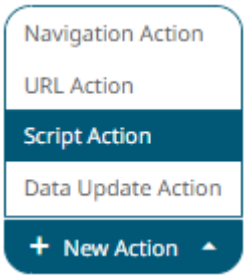
Steps:

1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

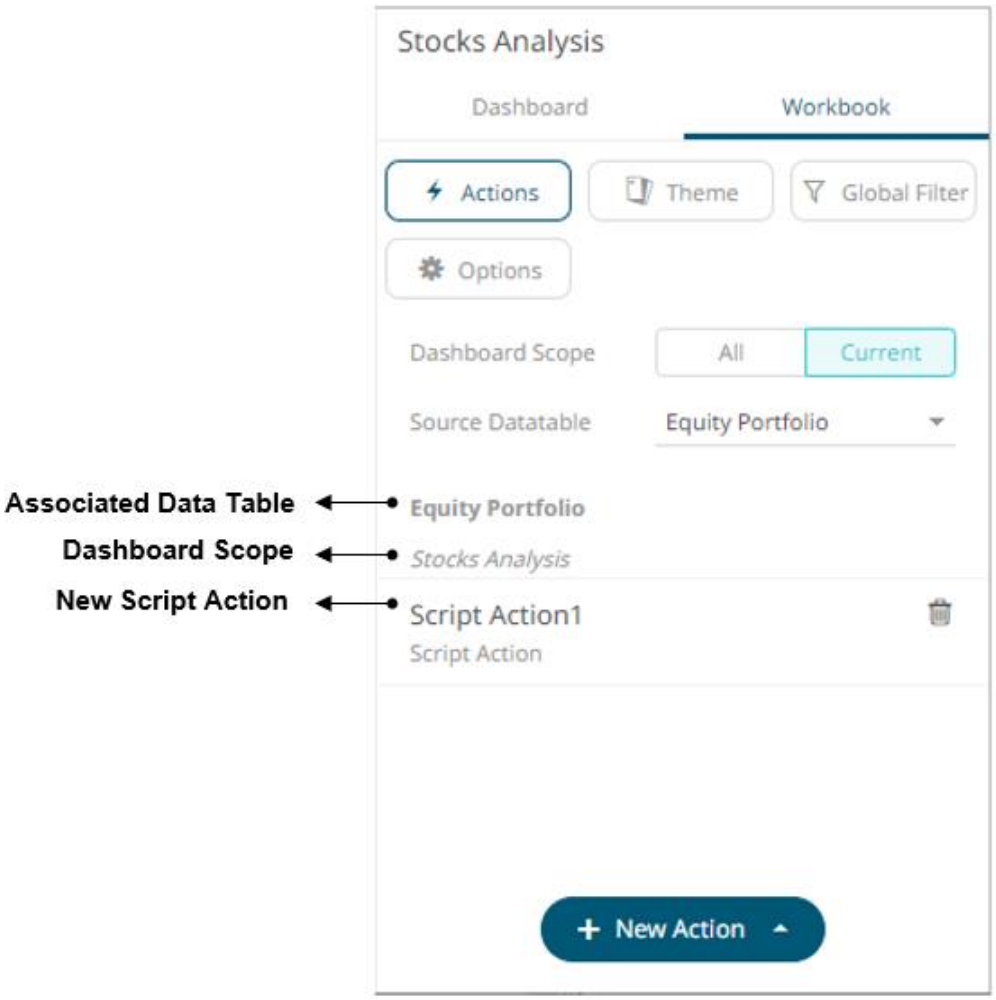
   The *Actions* pane is displayed. Initially, there are no actions defined for the workbook and the selected *Dashboard Scope* is **All**.



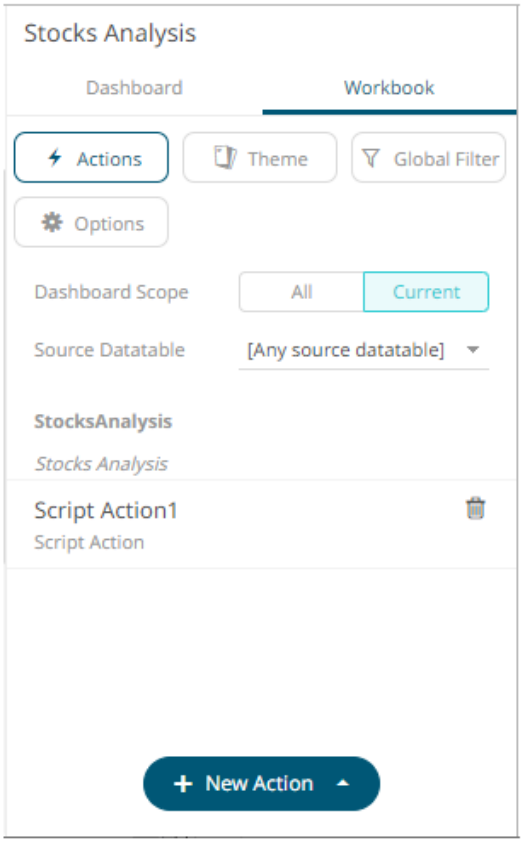
2. Select the *Dashboard Scope* where you will define the dashboard scope data parameters that will be passed to the target dashboard: **All** or **Current**.
3. Select the *Source Datatable* from the drop-down list.
4. Click the **New Action** button then select **Script Action** in the drop-down list.



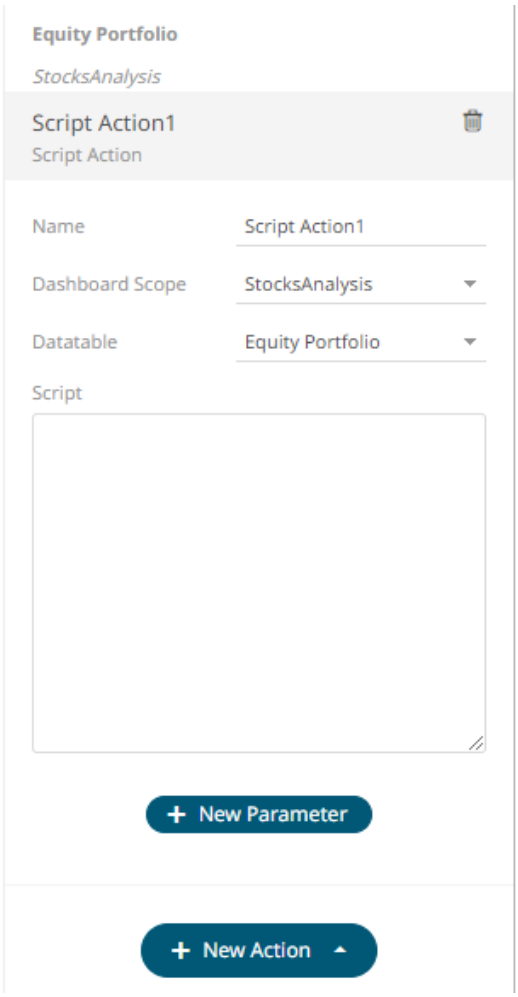
The new script action is added under the selected *Dashboard Scope* in the *Actions* list. For example, if **Current** is the selected dashboard scope and the source data table is **Equity Portfolio**, then it will be displayed as:



However, if no source data table is selected, then the first one in the *Data Table* pane (i.e., StocksAnalysis) is the default associated to the new script action.



5. Click the new script instance to expand and display the properties that you can define.

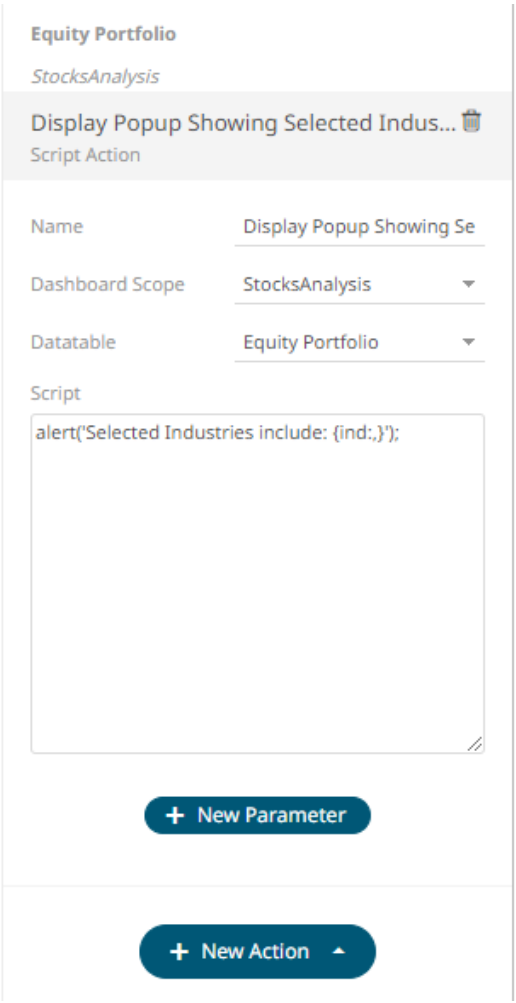


6. Enter or select the following properties:

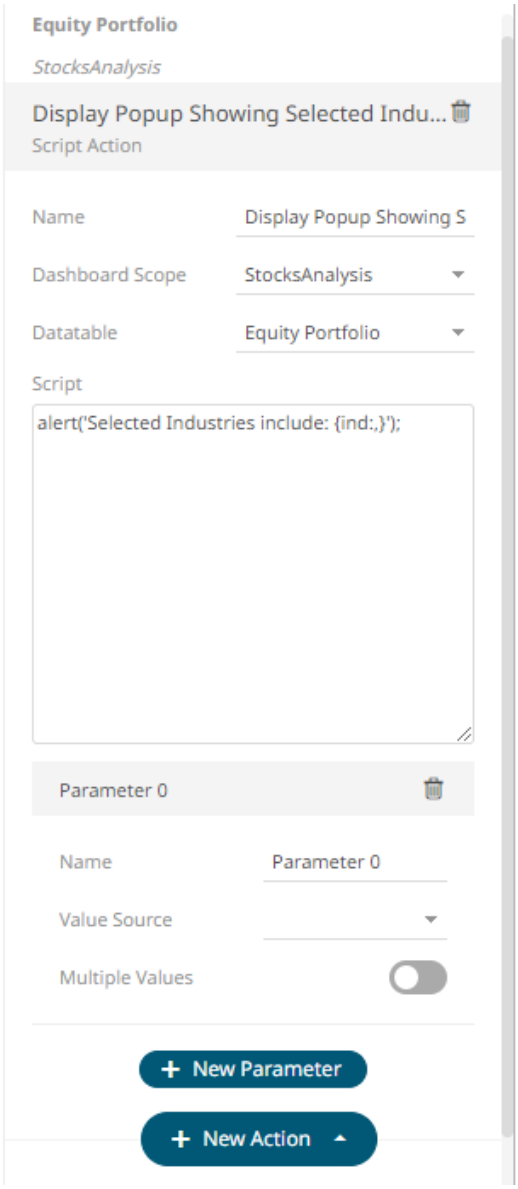
Setting	Description
Name	The name of the script action and then click .
Dashboard Scope	The dashboard where you will define the dashboard scope data parameters that will be passed to the target dashboard. Can either be **[All Dashboard]** or the current dashboard.
Datatable	The source data table. This will eventually be displayed above the script action instance.
Script	The parameterized script. The parameters are written within curly brackets, `{ParameterName}`. For script actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows: `{ParameterName:Separator}` For example: `{Company:|}` Default separator is comma. At execution, the parameter will be replaced with real field values associated with the selected visualization node. **NOTE:** The entered JavaScript should not include constructs that utilize curly brackets, as these are reserved for the processing of parameters.

In addition, the entered JavaScript should not include single line comments

7. Click the + New Parameter button to add parameters to the output script. A new parameter instance is added.

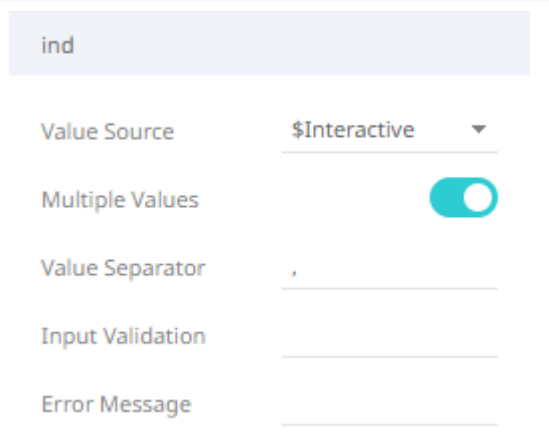
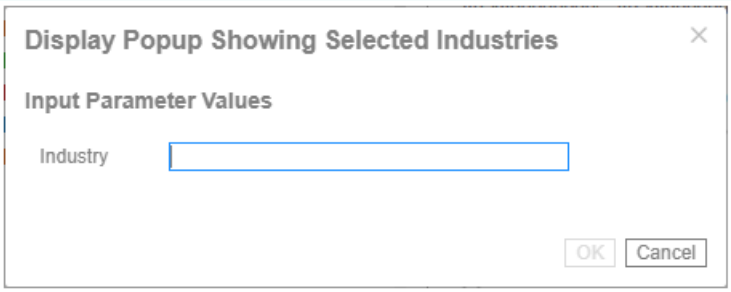


8. Click on the parameter instance to expand and define its properties.



For each parameter added, set or select the following properties:

Setting	Description
Name	Name of the script action parameter and then click .
Value Source	Column from the data source table that will supply the contextual value. The value of this selected column for rows under the selected visualization node will be passed as the parameter values to the target URL.
Multiple Values	This passes multiple values for the parameter to the target area. Tap the slider to turn on. The *Value Separator* field displays.  Specify the value separator to be used.

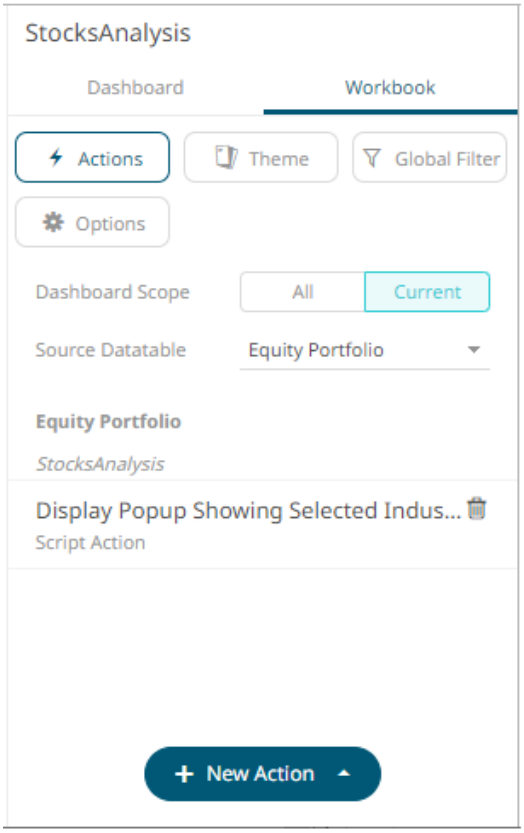
Input Validation and Error Message	 Both fields are enabled when an interactive parameter (i.e., **$Interactive**) is selected in the *Value Source* drop-down list. Typically, interactive parameters are used to pass data back to data repositories or external systems. When an action is executed which require an interactive parameter, an associated dialog box will be displayed. For example:  Add a custom *Input Validation*. This can be any regular expression (e.g., "A-Z{3}") The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., "Please use a 3-letter code.")

You can delete any of the added parameters by clicking the corresponding **Delete** button.

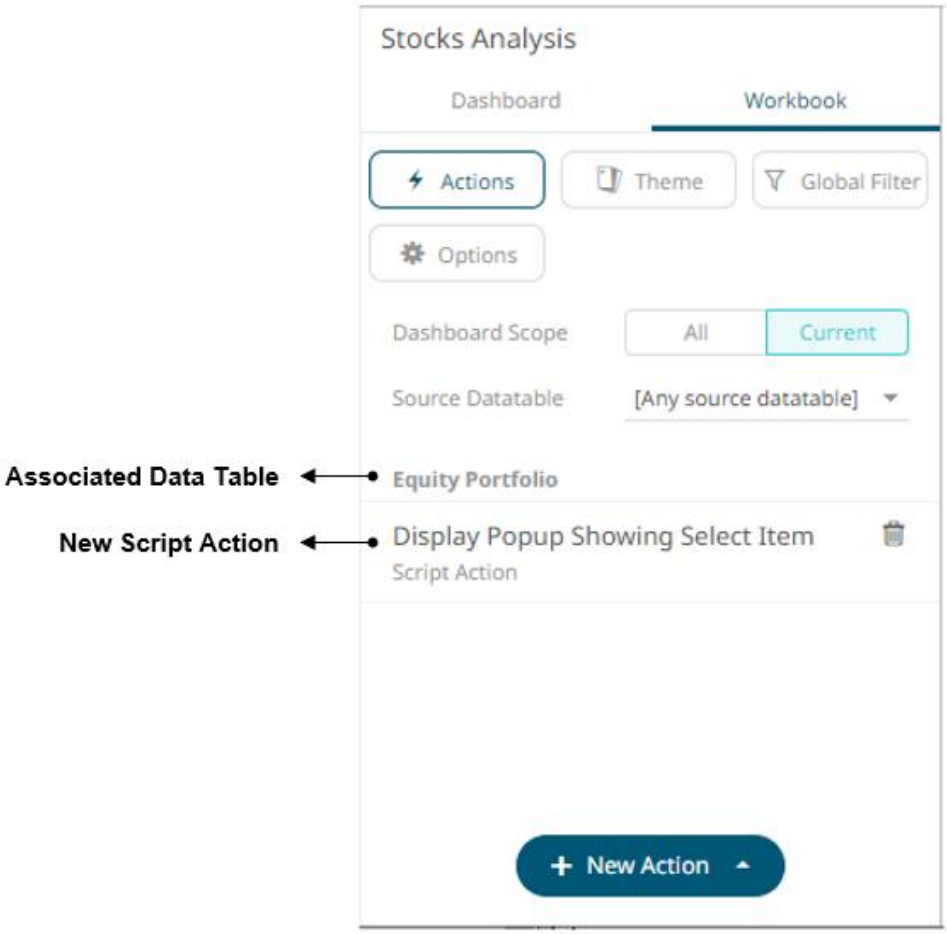
9. Repeat step 7 to add more parameters.
10. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Clicking the **All** *Dashboard Scope*, the new script action is available.



If the *Dashboard Scope* is **[All Dashboard]**, the new script action will be displayed as:



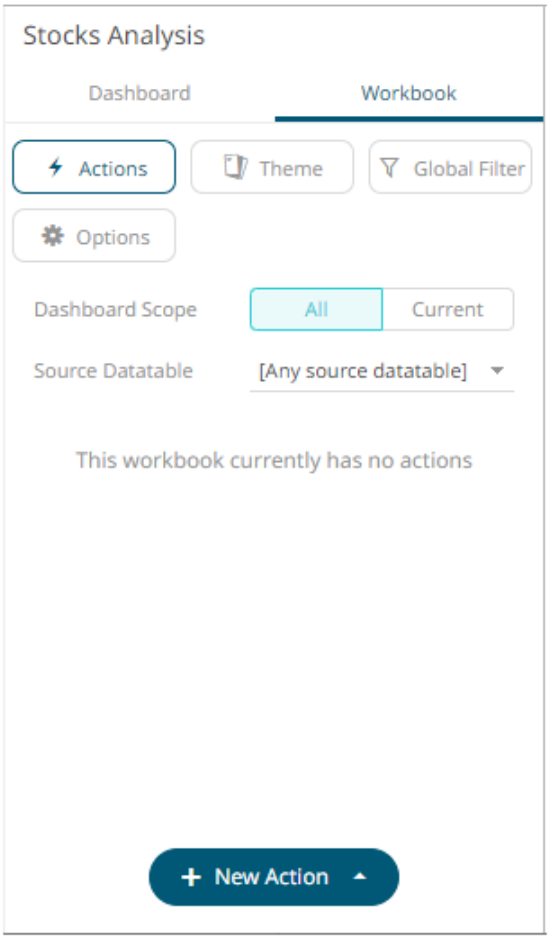
Adding Data Update Actions

Data update action lets you update data (typically in a database) by passing parameters into a data query.

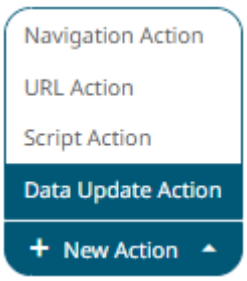
Steps:

1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

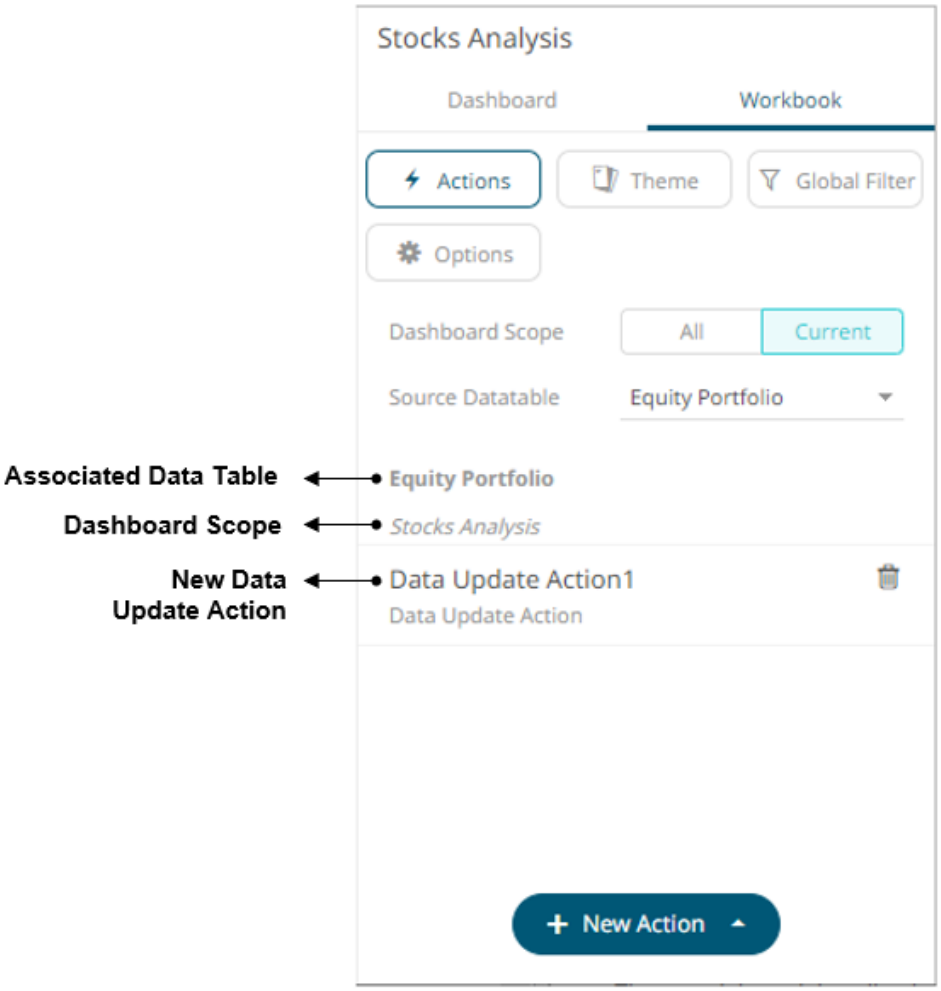
   The *Actions* pane is displayed. Initially, there are no actions defined for the workbook and the selected *Dashboard Scope* is **All**.



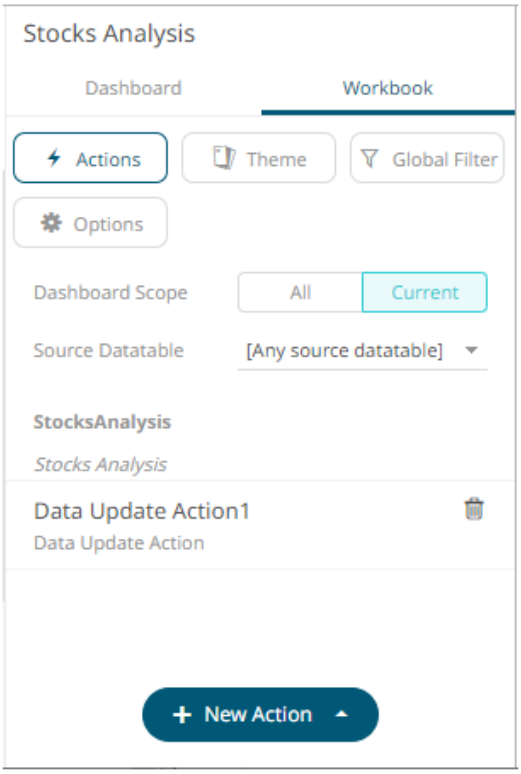
2. Select the *Dashboard Scope* where you will define the dashboard scope data parameters that will be passed to the target dashboard: **All** or **Current**.
3. Select the *Source Datatable* from the drop-down list.
4. Click the **New Action** button then select **Data Update Action** in the drop-down list.



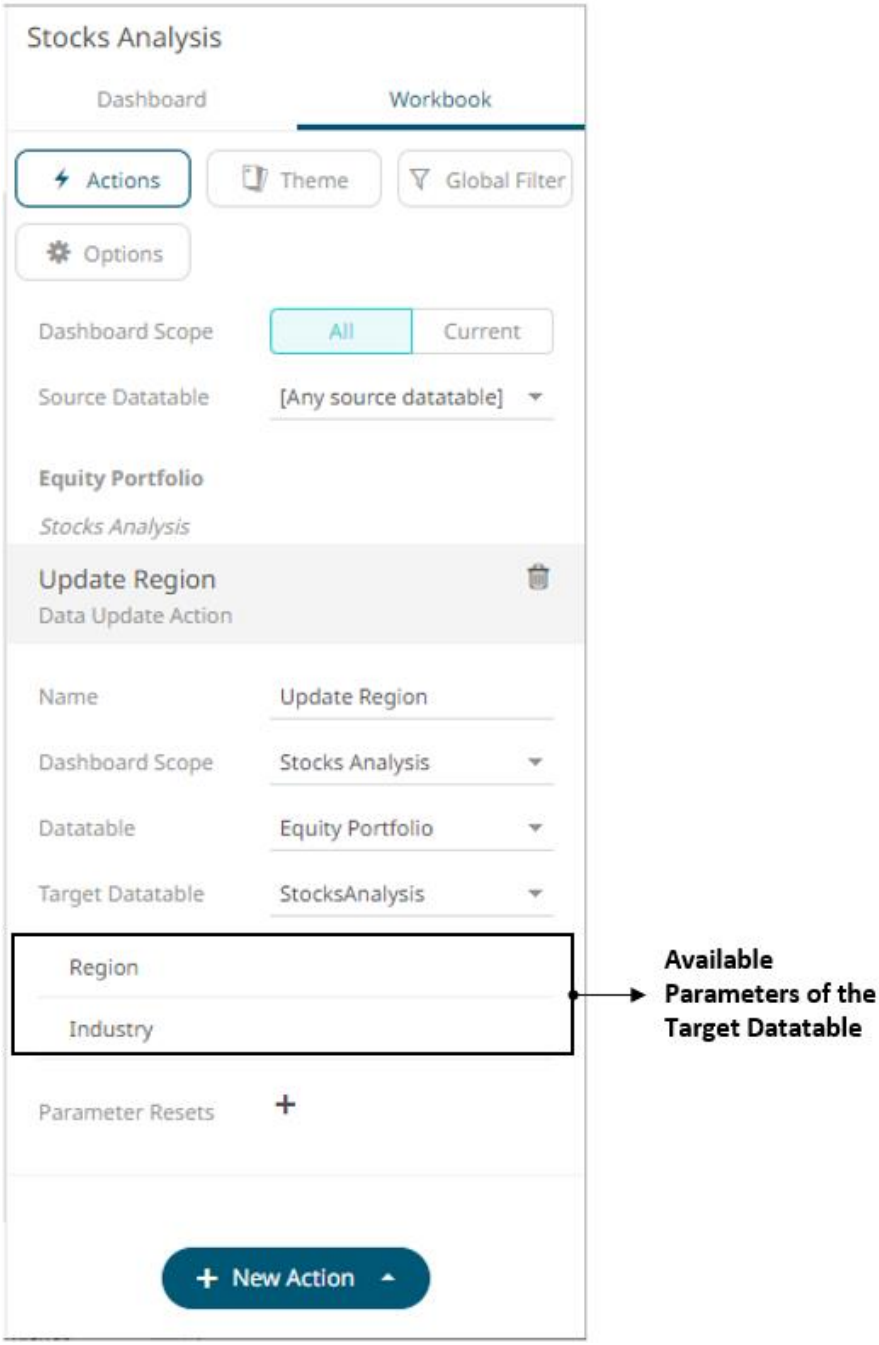
The new data update action is added under the selected *Dashboard Scope* in the *Actions* list. For example, if **Current** is the selected dashboard scope and the source data table is **Equity Portfolio**, then it will be displayed as:



However, if no source data table is selected, then the first one in the *Data Table* pane (i.e., StocksAnalysis) is the default associated to the new data update action.



5. Click the new data update action instance to expand and display the properties that you can define.

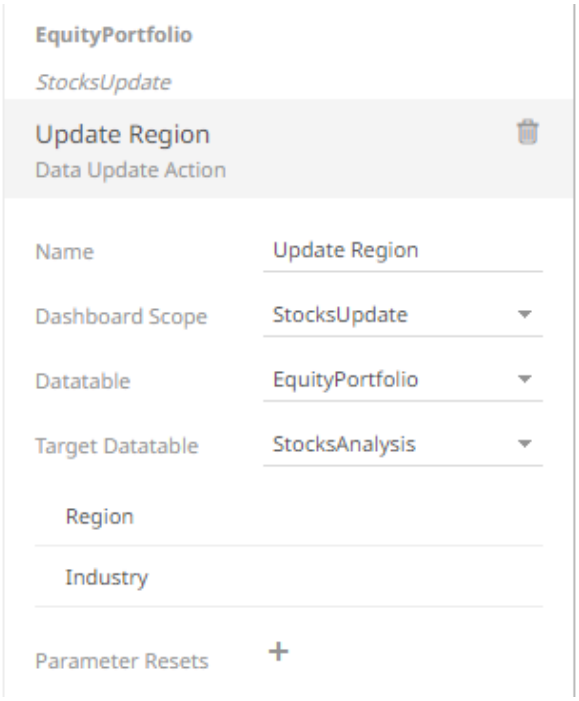


6. Enter or select the following properties:

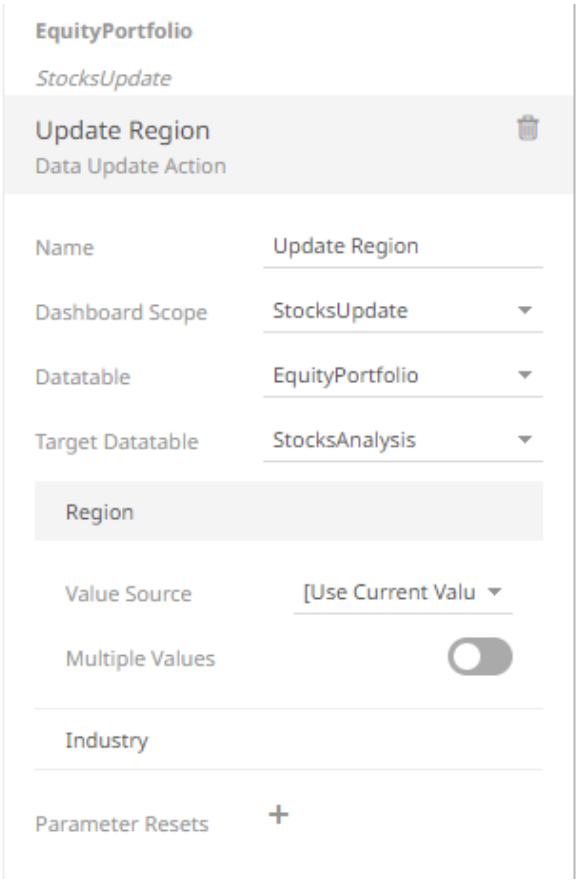
Setting	Description
Name	The name of the data update action and then click .
Dashboard Scope	The dashboard where you will define the dashboard scope data parameters that will be passed to the target dashboard. Can either be **[All Dashboard]** or the current dashboard.
Datatable	The source data table. This will eventually be displayed above the data update action instance.

Target Datatable	The data table where the parameter value will be passed.

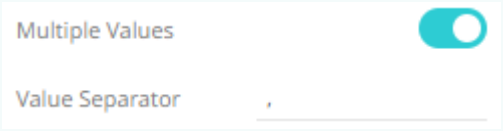
The defined parameters of the selected target data table will be displayed in the *Parameters* section.

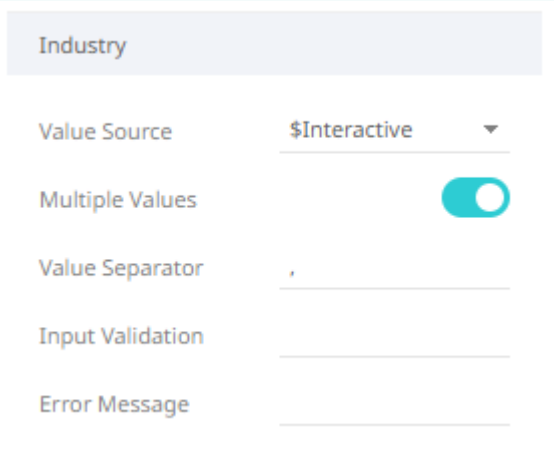
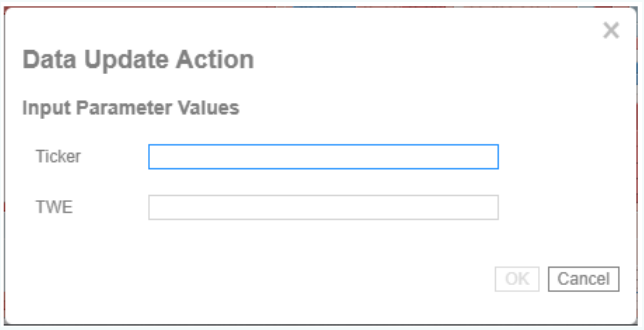


Click on the parameter instance to expand and define its properties.



For each parameter added, set or select the following properties:

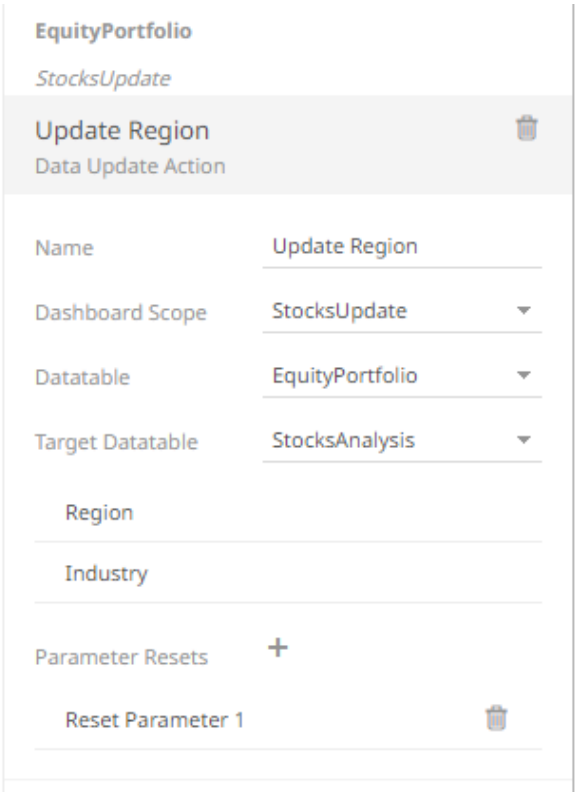
Setting	Description
Value Source	Select the column value from the source table that will supply the contextual value. If you select **[Use Current Value]**, the current parameter value will be passed to the dashboard.
Multiple Values	This passes multiple values for the parameter to the target area. Tap the slider to turn on. The *Value Separator* field displays.  Specify the value separator to be used.

Input Validation and Error Message	 Both fields are enabled when an interactive parameter (i.e., **$Interactive**) is selected in the *Value Source* drop-down list. Typically, interactive parameters are used to pass data back to data repositories or external systems. When an action is executed which require an interactive parameter, an associated dialog box will be displayed. For example:  Add a custom *Input Validation*. This can be any regular expression (e.g., “A-Z{3}”) The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input to match the regular expression (e.g., “Please use a 3-letter code.”)

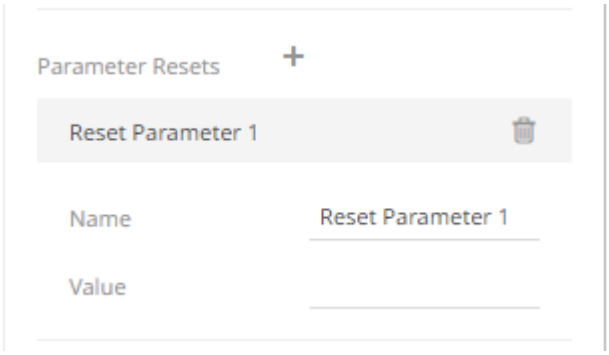
You can delete any of the added parameters by clicking the corresponding **Delete** button.

7. You can also opt to specify one or several existing parameters that will get a new value when the Data Update Action is executed. You can do so by clicking + on the *Parameter Resets* section.

   A new *Reset Parameter* instance is added.



8. Click on the parameter instance to expand and define its properties.



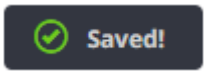
9. For each reset parameter added, set the following properties:

Setting	Description
Name	Any existing parameter that will get a new value when the Data Update Action is executed.
Value	A static value or a reference of another parameter. **NOTES:** • **$ClientTime** is a special string parameter value in the Data Update Action that must be manually entered (no drop-down option). The browser current time will be used and formatted to look like the following string `2020-11-23T18:44:32.386000000000`. • Setting the *Parameter Reset Value* as **$ClientTime** is a valid solution for achieving a data refresh of the data table that uses the parameter. The parameter does not need to be included in any query statement or connection settings. It is enough that the parameter exists in the data

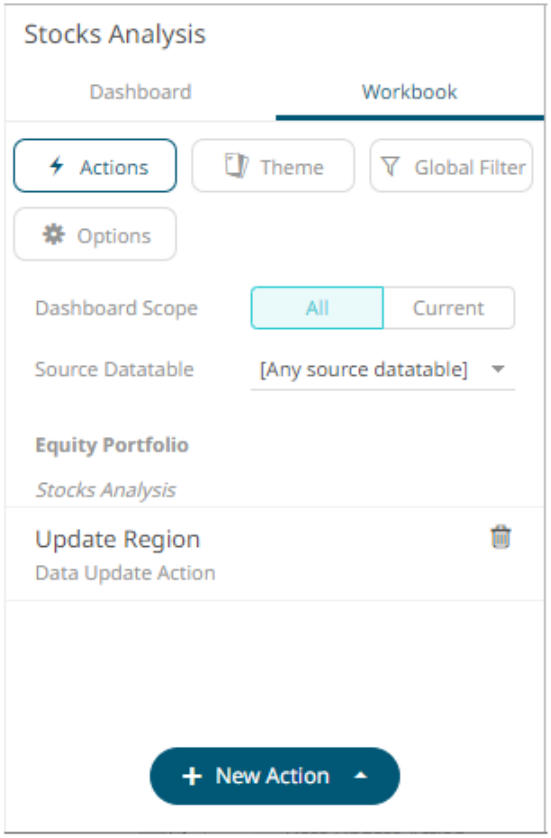
	table settings for the data table to reload each time the parameter value changes.

Repeat steps 7 to 9 to add more reset parameters.

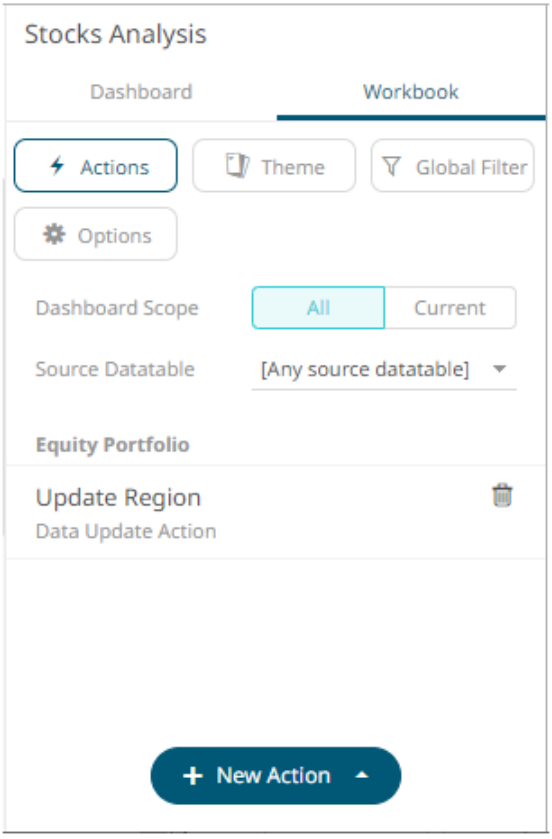
10. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Clicking the **All** *Dashboard Scope*, the new data update action is available.



If the *Dashboard Scope* is **[All Dashboard]**, the new data update action will be displayed as:

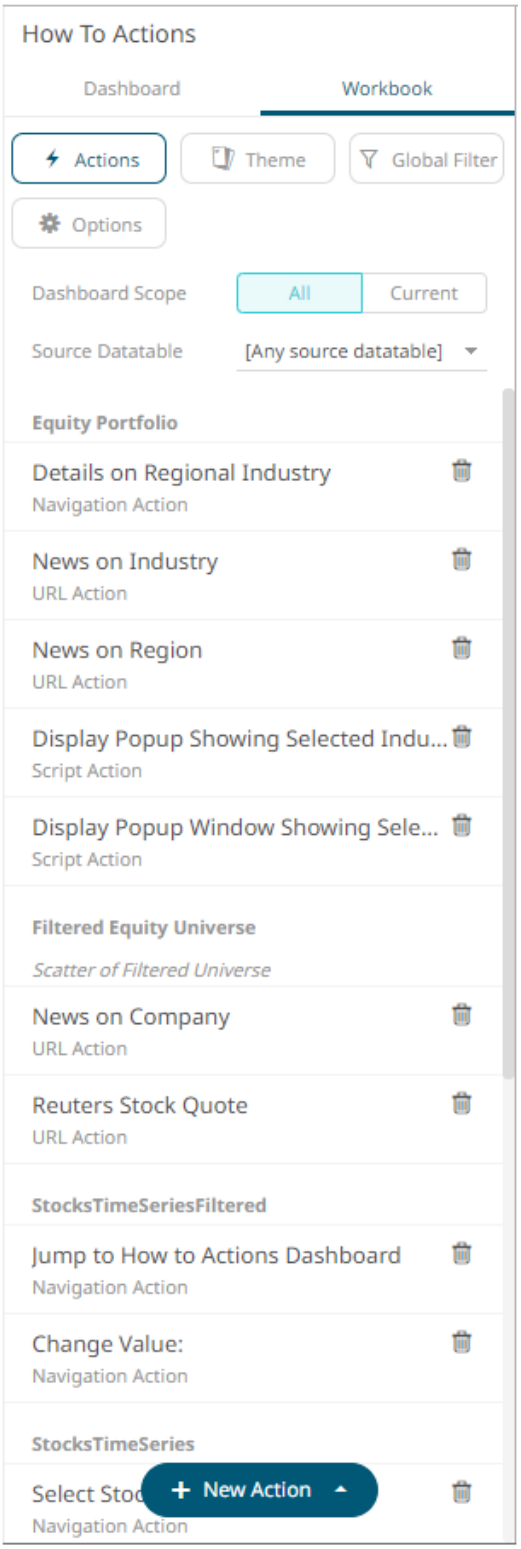


Filtering Workbook Actions Based on the Dashboard Scope or Source Data Table

Steps:

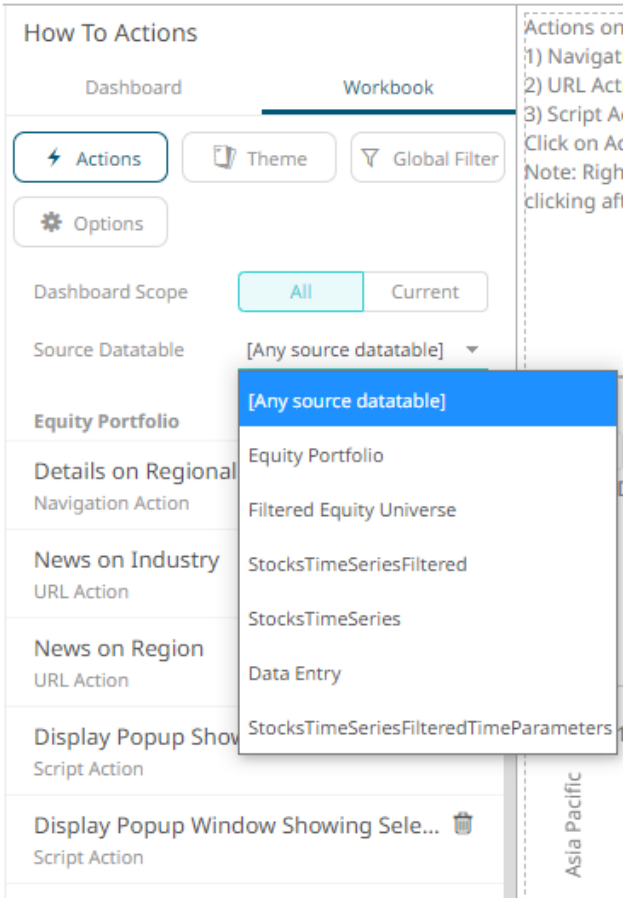
1. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab.

   The *Actions* pane is displayed with the list of all workbook actions set to the **All** *Dashboard Scope*.



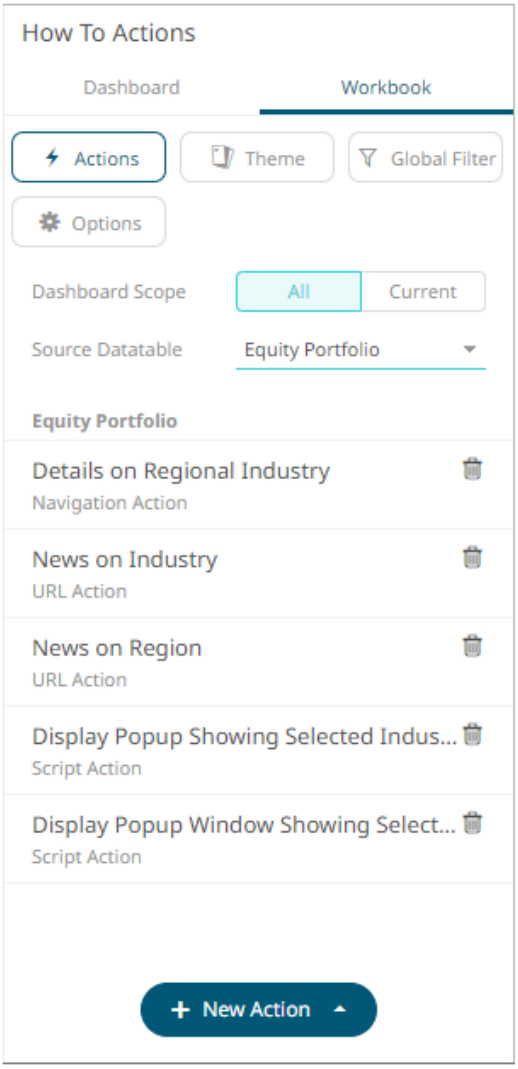
NOTE **Workbook actions are grouped based on their associated source data table.**

2. To filter based on the source data table, select one from the *Source Datatable* drop-down list.

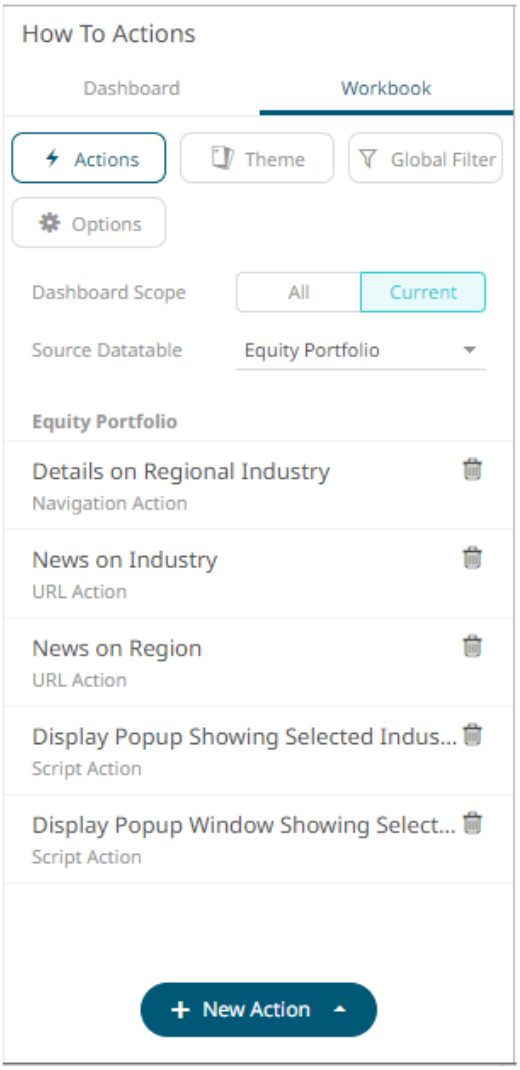


The workbook actions are displayed with the selected source data table.

With the **All** dashboard scope:


How To Actions
Dashboard
Workbook
Actions
Theme
Global Filter
Options
Dashboard Scope
All
Current
Source Datatable
Equity Portfolio
Equity Portfolio
Details on Regional Industry
Navigation Action
News on Industry
URL Action
News on Region
URL Action
Display Popup Showing Selected Indus...
Script Action
Display Popup Window Showing Select...
Script Action
New Action

With the **Current** dashboard scope (e.g., **How to Actions**):



Adding an Action Form

The Action Form enables binding multiple action controls to a single action. In cases where multiple parameters that affect data loading are used, this allows for setting of all the parameters at once instead of once per action control.

The form part can be configured to use five different action modes. However, unlike the Action Button, the parts tied to the action form are the ones that dictate the set of parameters for the mode. These components can be any of the existing action parts, except the action button.

NOTE **The parameter that the action part controls is used in the action the form executes. This means that the action part parameter will no longer affect the dashboard parameter. Parameter changes and data updates will still happen, but only within the context of the form.**

Furthermore, action parts as form components are only allowed to configure their target parameters based on the mode of the form part. For *Navigate* and *Set Parameter* modes, the action parts can target the dashboard parameters. For the other modes, the set of targetable parameters is not known, so they can set a parameter of any name.

This section discusses the steps and guidelines to add an action form using the following dashboard parameters and data tables.

Sample Data Table 1: Result

Text	Num	From	To
{p_text}	{p_numeric}	{p_timefrom}	{p_timeto}

Sample Data Table 2: TextOptions

Option	Type	Qty
Apple	Fruit	5
Banana	Fruit	11
Pear	Fruit	3
Orange	Fruit	6
Lemon	Fruit	5
Grape	Fruit	12
Kiwi	Fruit	5
Red	Color	3
Blue	Color	7
Green	Color	10
Yellow	Color	3

Sample Data Table 3: TextType

Type
Color
Fruit

Sample Parameters

Parameter Name	Type	Default Value
p_text	Text	Default
p_numeric	Numeric	0
p_timefrom	Time	2021-01-01T00:00:00.000
p_timeto	Time	2021-02-01T00:00:00.000
Type	Text	Fruit

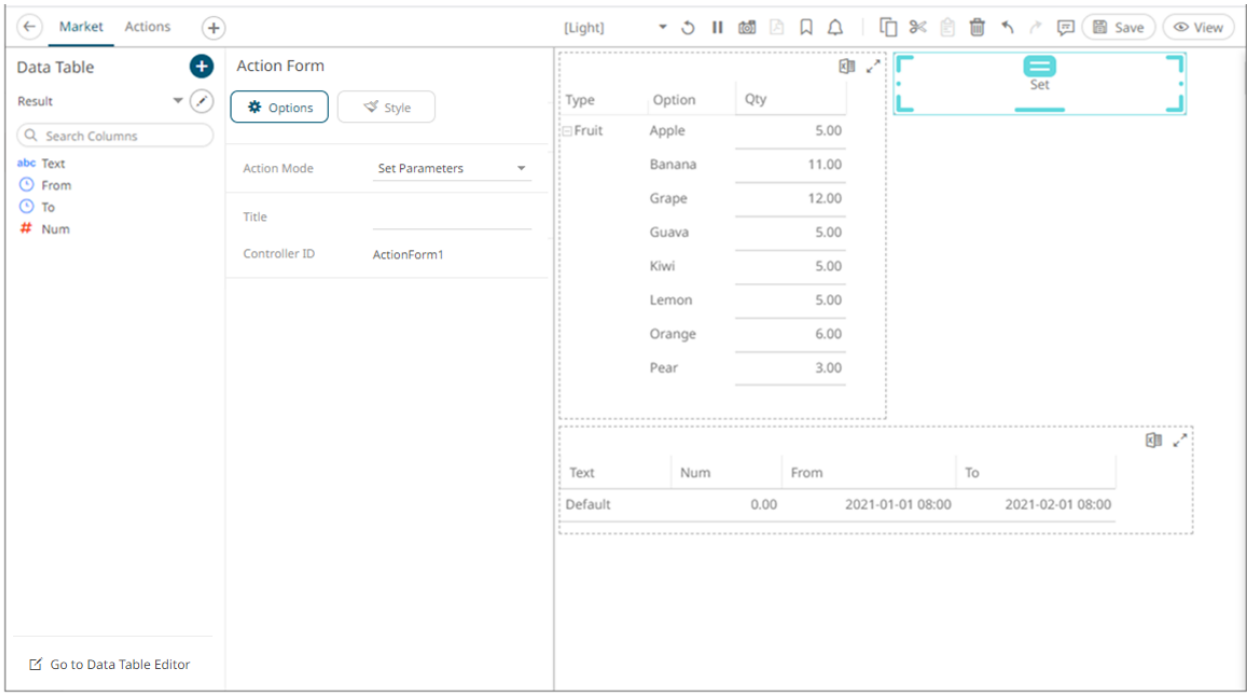
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

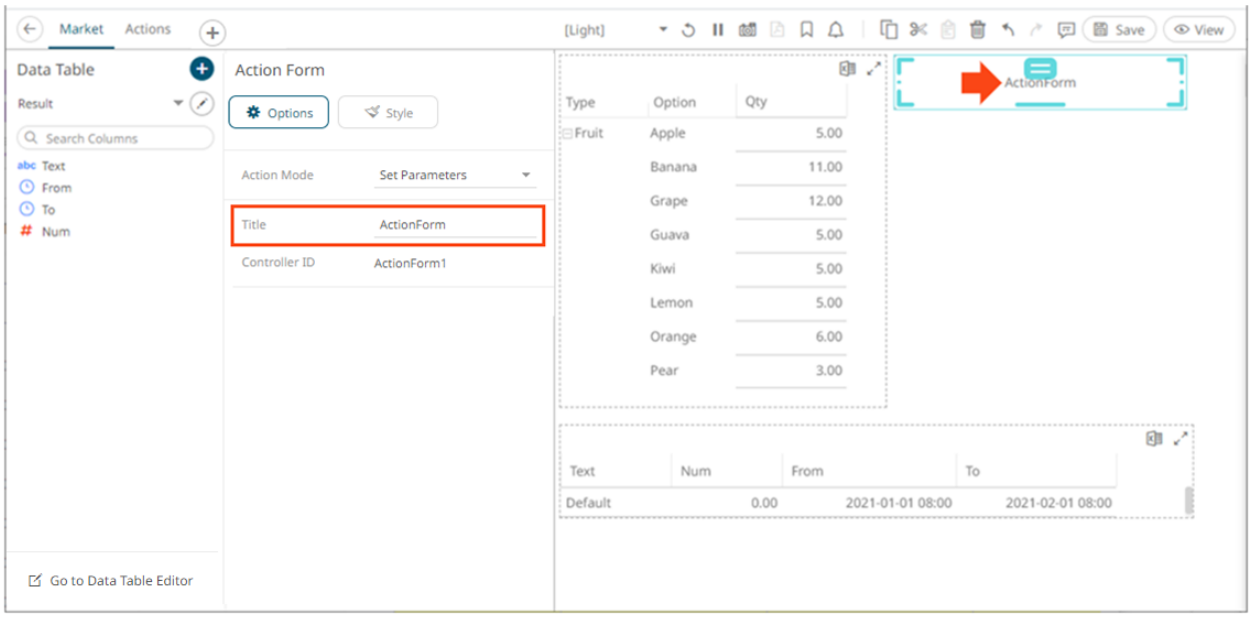
on the *Select Part* pane then click the **Numeric Action Slider** 

icon.

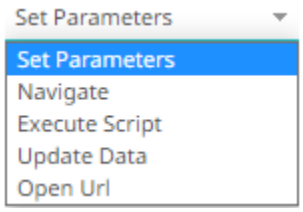
   The *Action Form* pane is displayed, and the *Action Form* part is added on the dashboard canvas. The *Controller ID* is automatically generated (e.g., **ActionForm1**) which is used when associating the form to other action parts.



2. Optionally enter the action form *Title*. The title of the form on the dashboard is updated.



3. Select any of the *Action Modes*:

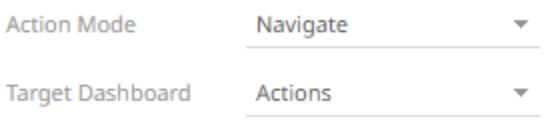


- Set Parameters

  Updates parameters on the current dashboard. The connected action parts can select any parameter on the current dashboard to set.

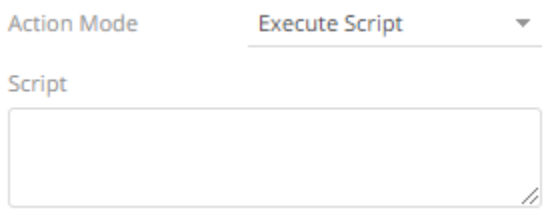
- Navigate

  Updates the parameters on the target dashboard. The connected action parts can select any parameter on the target dashboard.

- Execute Script

  Allows the execution of a script.

  Enter the parameterized *Script*.

  The parameters are written within curly brackets, `{ParameterName}`.

The connected action parts define which parameters will be available in the script. If a connected action defines a parameter by name “ParameterName”, this value ca be used in the script in the form.

For script actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows:

```
{ParameterName:Separator}
```

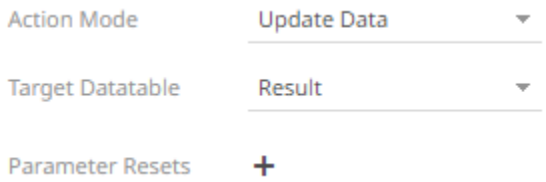
For example: `{Company:|}`

Default separator is comma. At execution, the parameter will be replaced with real field values associated with the selected visualization node.

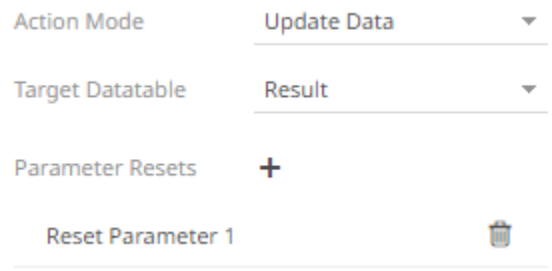
- Update Data

  Allows data update (typically in a database) by passing parameters into a data query.

  The connected action parts will be able to select any parameter of the configured target datatable.



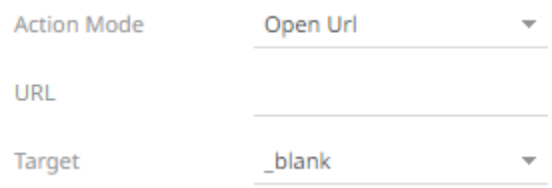
  You can opt to specify one or several existing parameters that will get a new value when the **Update Data** action is executed. You can do so by clicking + on the *Parameter Resets* section.



  Click on the parameter instance to expand and define its properties.

- Open URL

  Allows access to a web page or file or even point to other resources on the web such as database queries and command output.



  - Enter the parameterized URL.

    The parameters are written within curly brackets, `{ParameterName}`.

    Similar to the script mode, the required parameters need to be defined by the connected action parts.

    For actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows:

    ```
    {ParameterName:Separator}
    ```

    For example: `{Company:+}`

Default separator is semicolon. Specifying for example a plus sign allows you to do multi search term searches on Google, for example.

At execution, the parameter will be replaced with real field values associated with the selected visualization node.

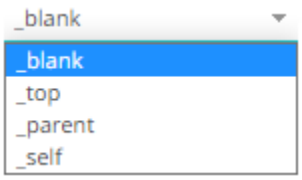
The easiest way to create parameterized URLs is to open an example web page and copy the URL. As an example, Yahoo Finance Key Statistics for Microsoft has the following web address:

`http://finance.yahoo.com/q/ks?s=MSFT`

If a parameter called Ticker has been set up in the data table, you can generate the URL by removing **MSFT** and replacing it with **{Ticker}**:

`http://finance.yahoo.com/q/ks?s={Ticker}`

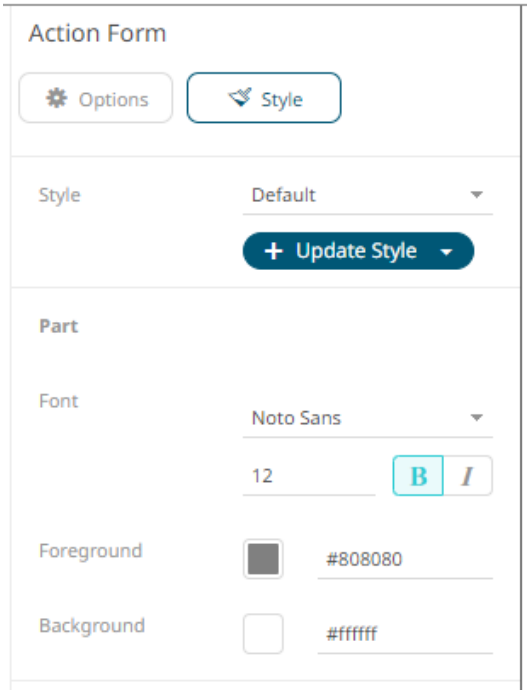
- Select the *Target* area of the page where the output URL will be displayed.



4. To set the style of the Action Form, click **Style** 

.

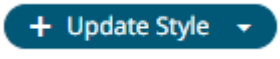
   The page updates to display the *Style* pane.



5. Set the *Font* type, size, style (**Bold** and/or **Italic**).

   The part's font is set to **Bold** by default.

6. Click the **Foreground** or **Background** box to display the *Color* dialog and set the color or enter the Hex color code.

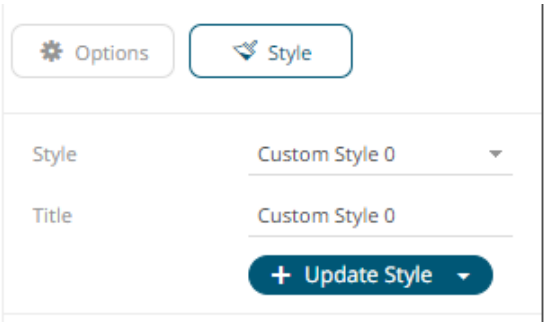
7. Click **Update Style** 

and select any of the following options:

   - **Set current as default** – Save the changes and set it as the default.

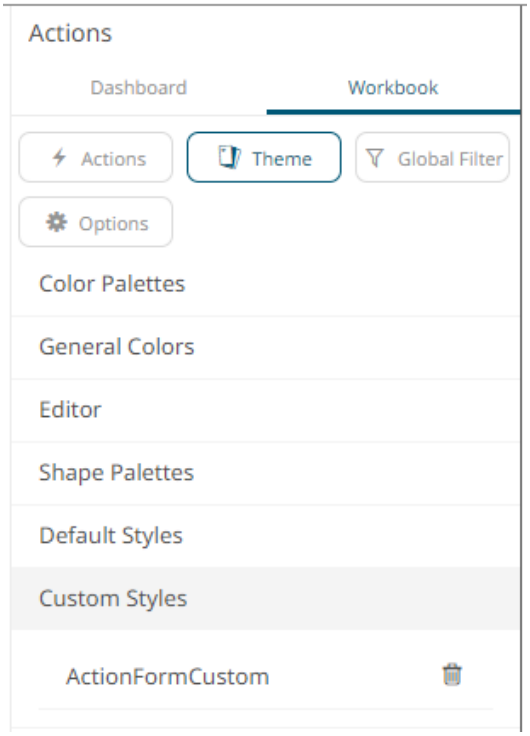
- **Create custom style** – Save the changes and set it as a custom style.

  The *Style* pane updates to display the *Title* control.



  - Enter the custom style *Title*.
  - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

  The new custom style is added in the **Workbook > Theme > Custom Styles** list.

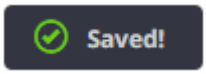


  If published, the custom style configuration of the Action Form will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

8. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

notification is displayed.

   The Action Form can now be used as the form controller of the following action parts:

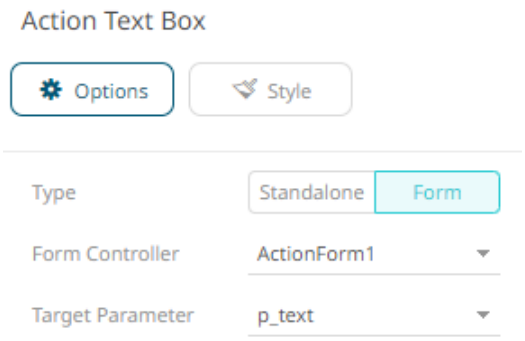
   - Action Date Picker
   - Action Date Range Picker

- Action Dropdown
- Action Text Box
- Numeric Action Slider
- Numeric Range Action Slider

Sample 1: Using the **Set Parameter** mode and adding Action Text Box and Action Dropdown components to **ActionForm1** with the following target parameters.

Action Part	Target Parameter	Default Value
Action Text Box	p_text	Default
Action Dropdown	Type	Fruit

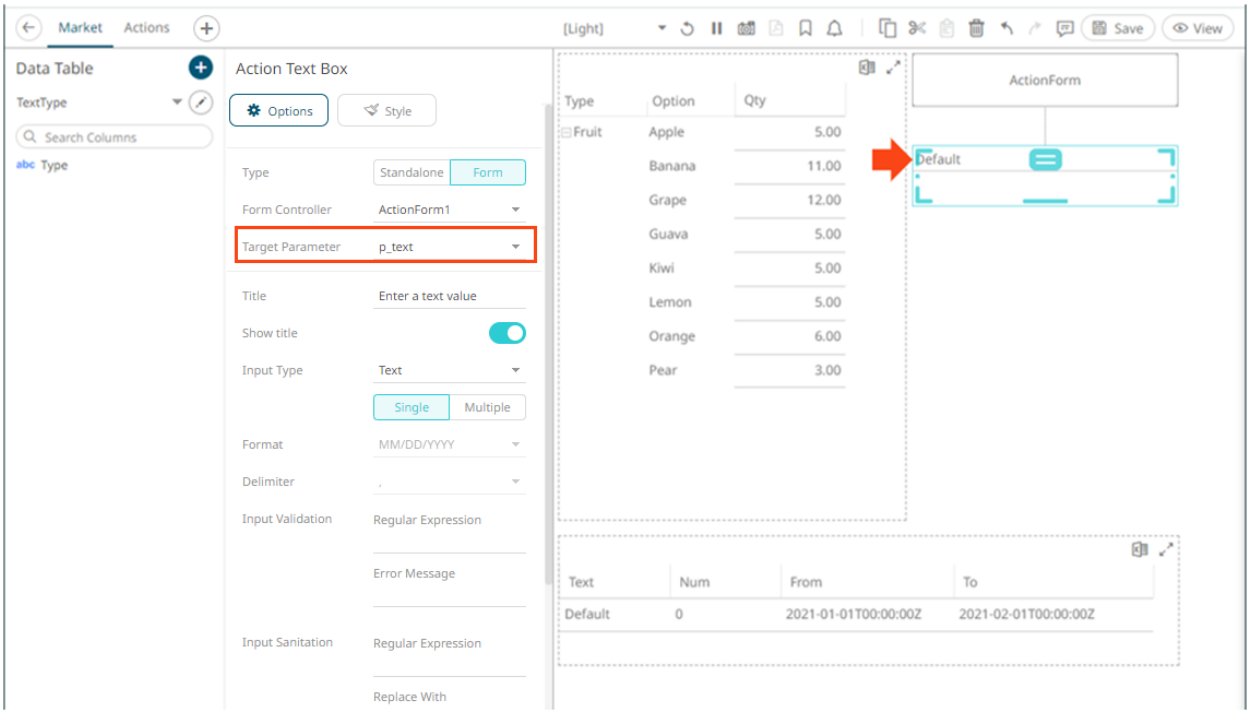
The action parts can be configured to either be a **Standalone** or a **Form** component.



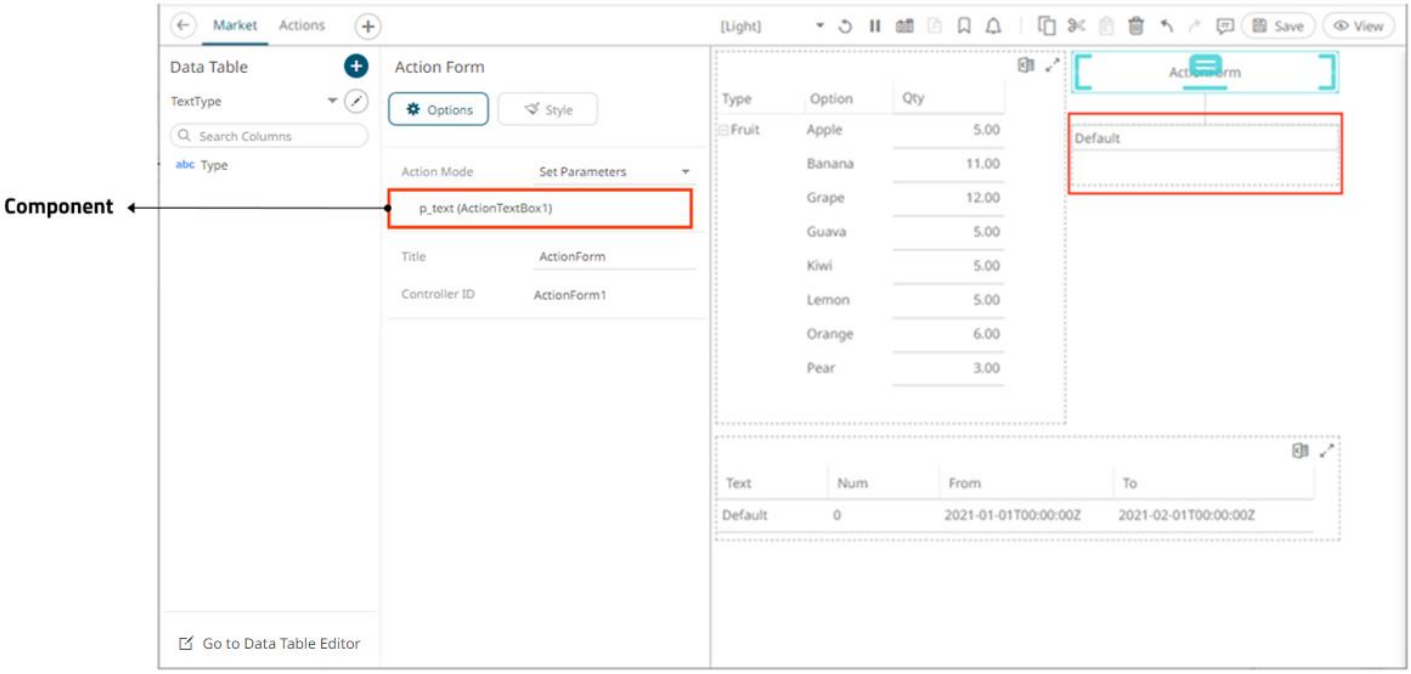
When an action part is set to **Form,** it can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

If a part should not be connected to a form, it can be set to **Standalone** instead.

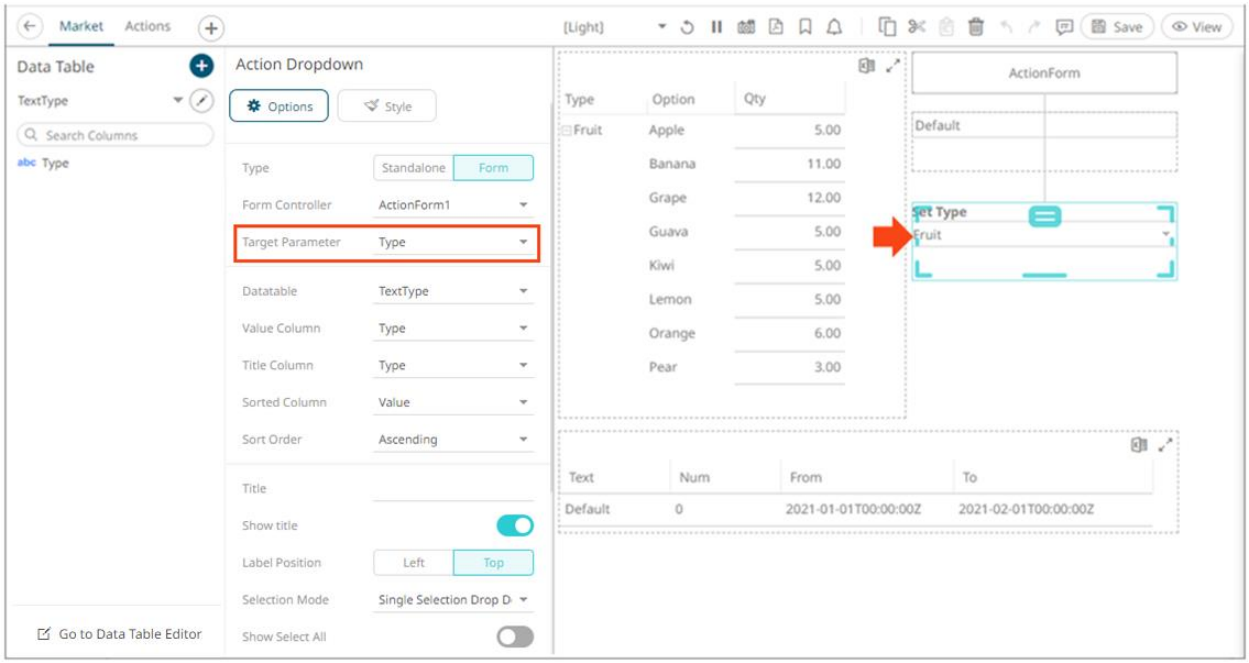
A line connects the component to the associated action form.



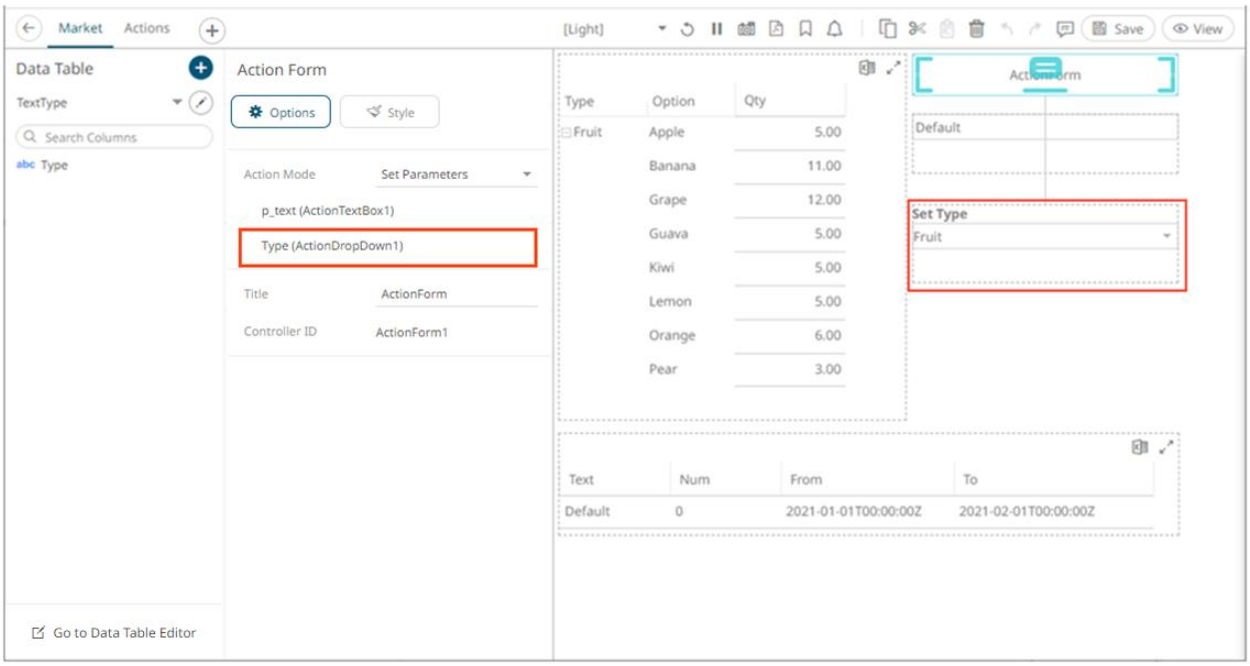
Upon selection of the action form, it lists **p_text(ActionTextBox1)**. This means that the parameter **p_text** is being set by the connected action part **ActionTextBox1.**



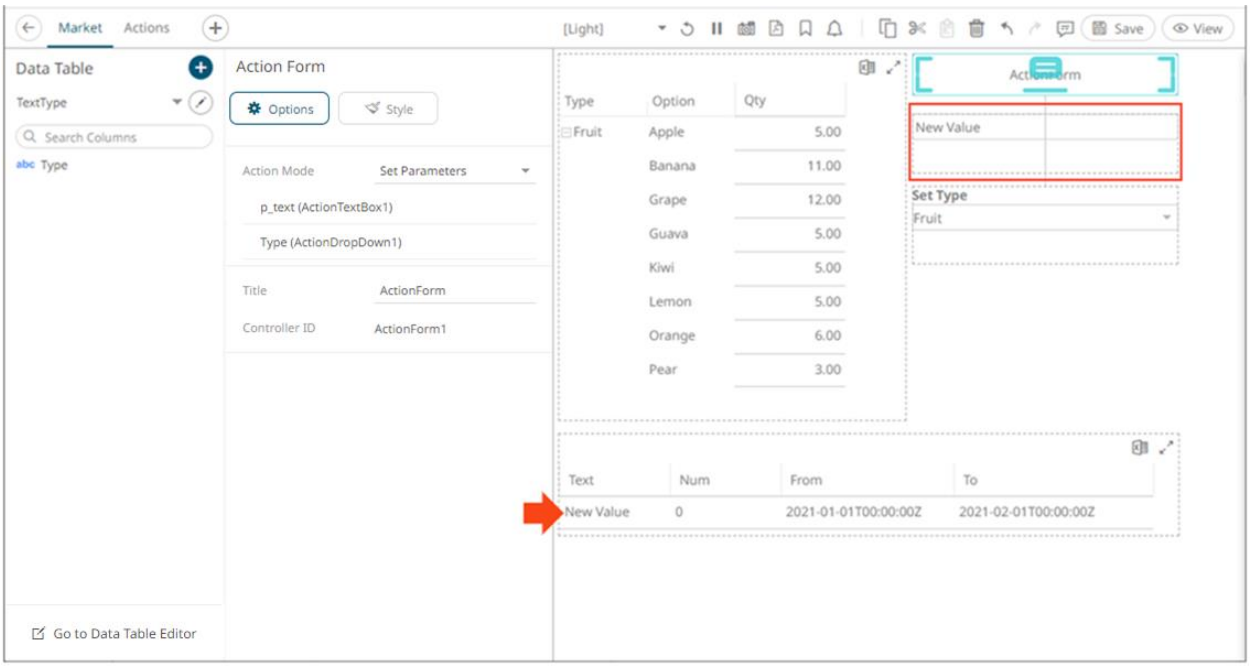
For the second component, again a line connects it to **ActionForm1**.



Upon selection of the action form, it additionally lists that the **Type** parameter is being set by the newly connected **ActionDropDown1** part.



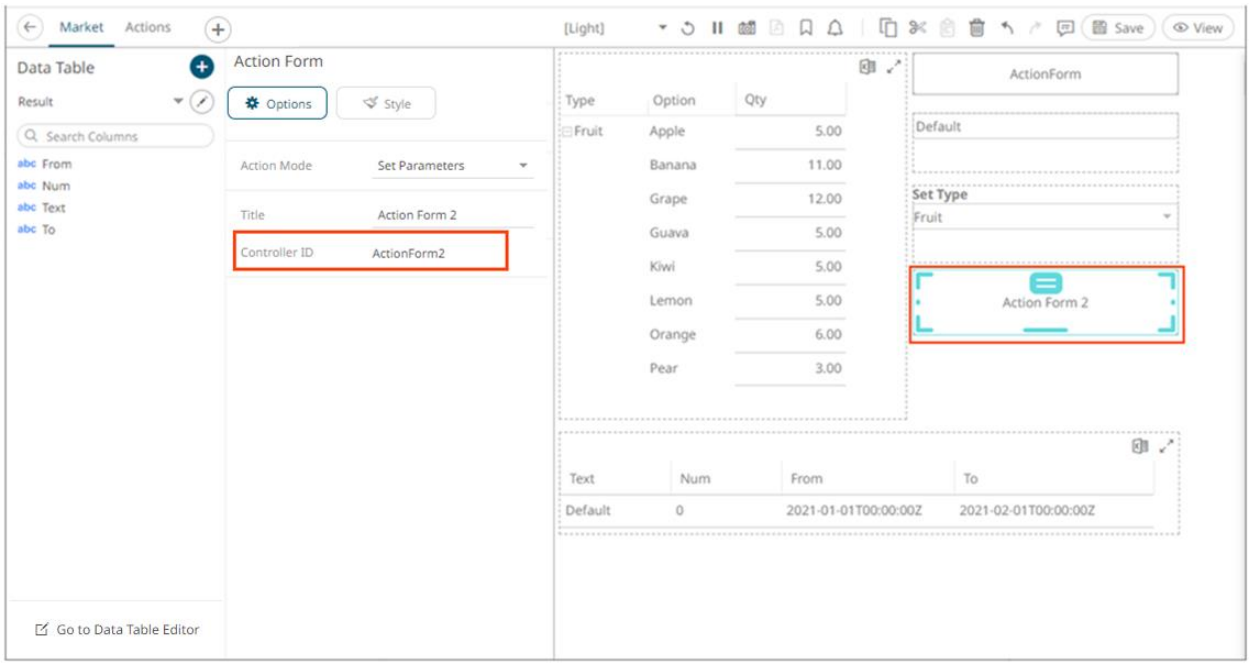
Changing the value in the action text box from **Default** to **New Value** and clicking the form button will trigger the *Set Parameter* action and set the value of **p_text** on the dashboard.



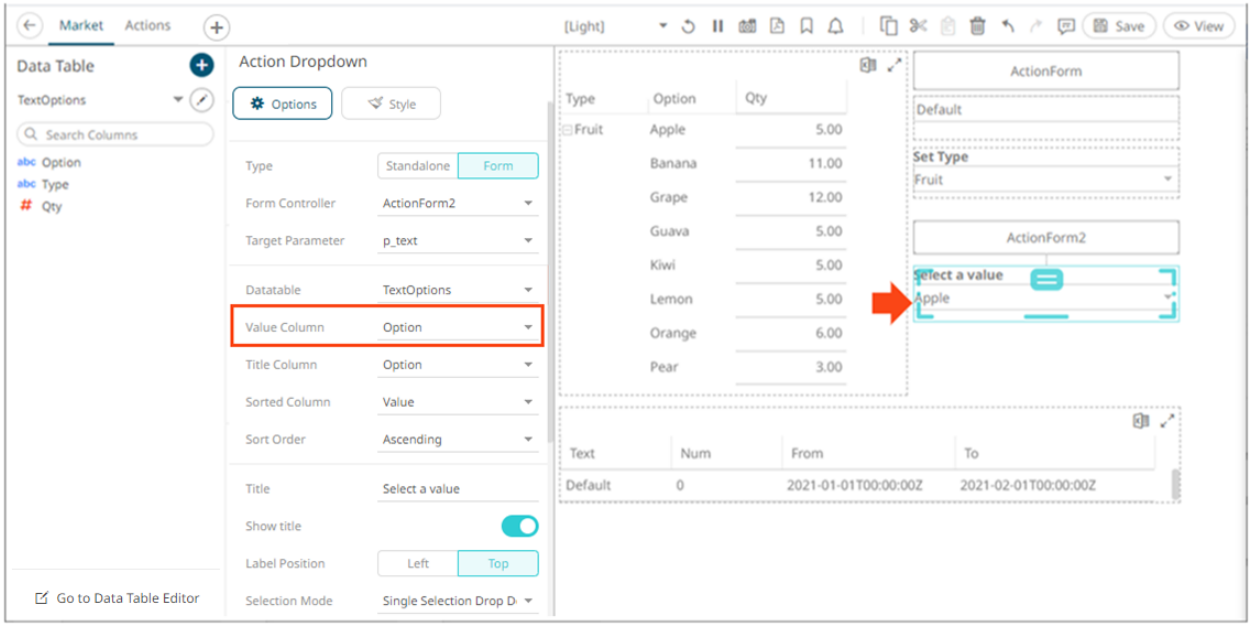
Sample 2. Using the **Set Parameter** mode and adding a new Action Form (**ActionForm2**) with an Action Drop Down component:

Action Part	Value Column	Target Parameter	Default Value
Action Dropdown	Option	p_text	Default

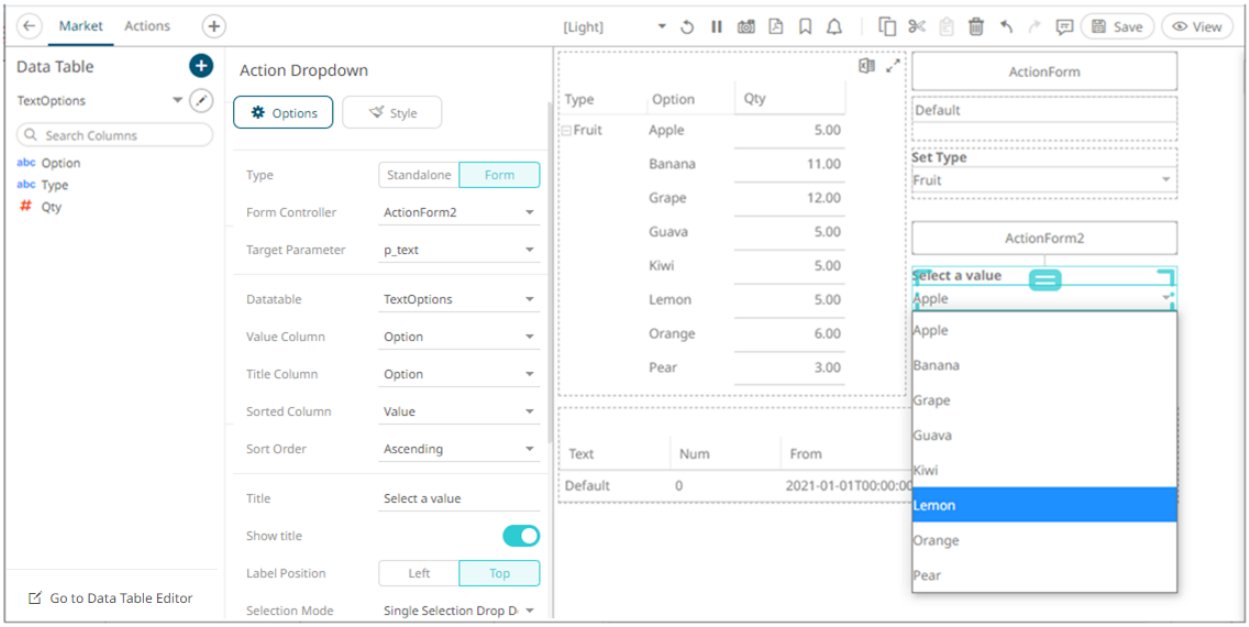
The *Controller ID* is automatically generated (e.g., **ActionForm2**) for the new action form.



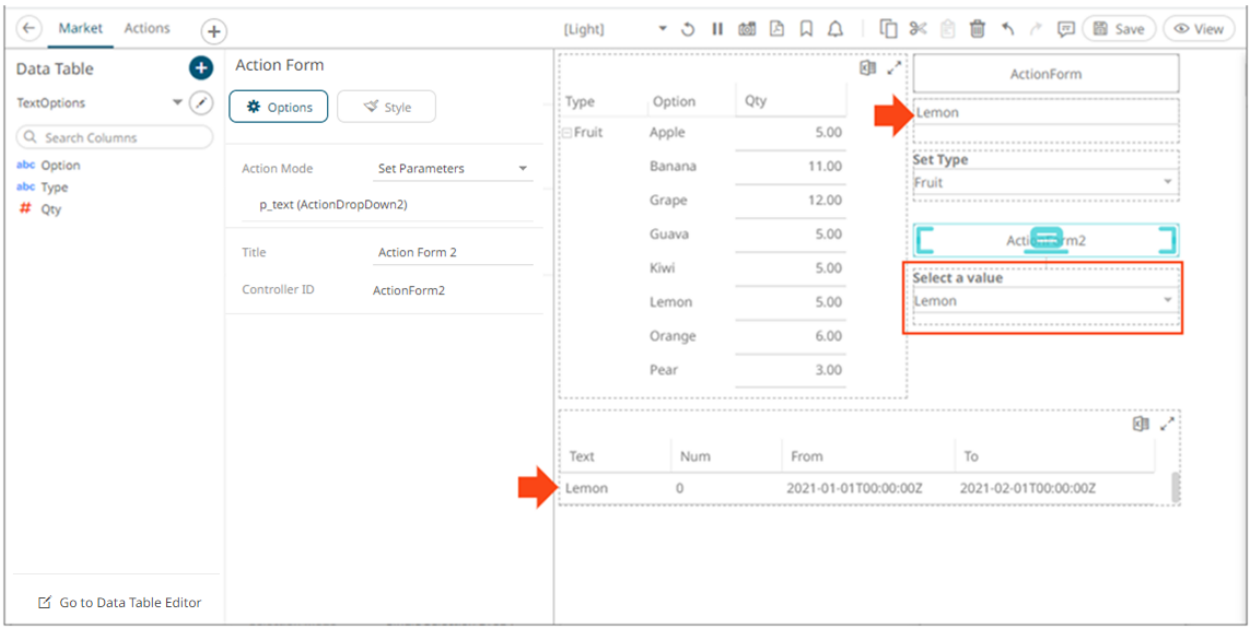
For the action dropdown component, the target parameter is **p_text** and the value column is **Option**.



This means that the value selected in the dropdown list will update the **p_text** parameter on the dashboard after clicking **ActionForm2**.



For example, when selecting **Lemon** in the dropdown, it sets the **p_text** parameter for all action parts connected to the form without updating the parameter on the dashboard. The parameter will only be set on the dashboard after clicking the form button.



Adding a Numeric Action Slider

The Numeric Action Slider allows the entry of a numeric parameter.

Whenever the slider value is changed, the associated action is executed.

Steps:

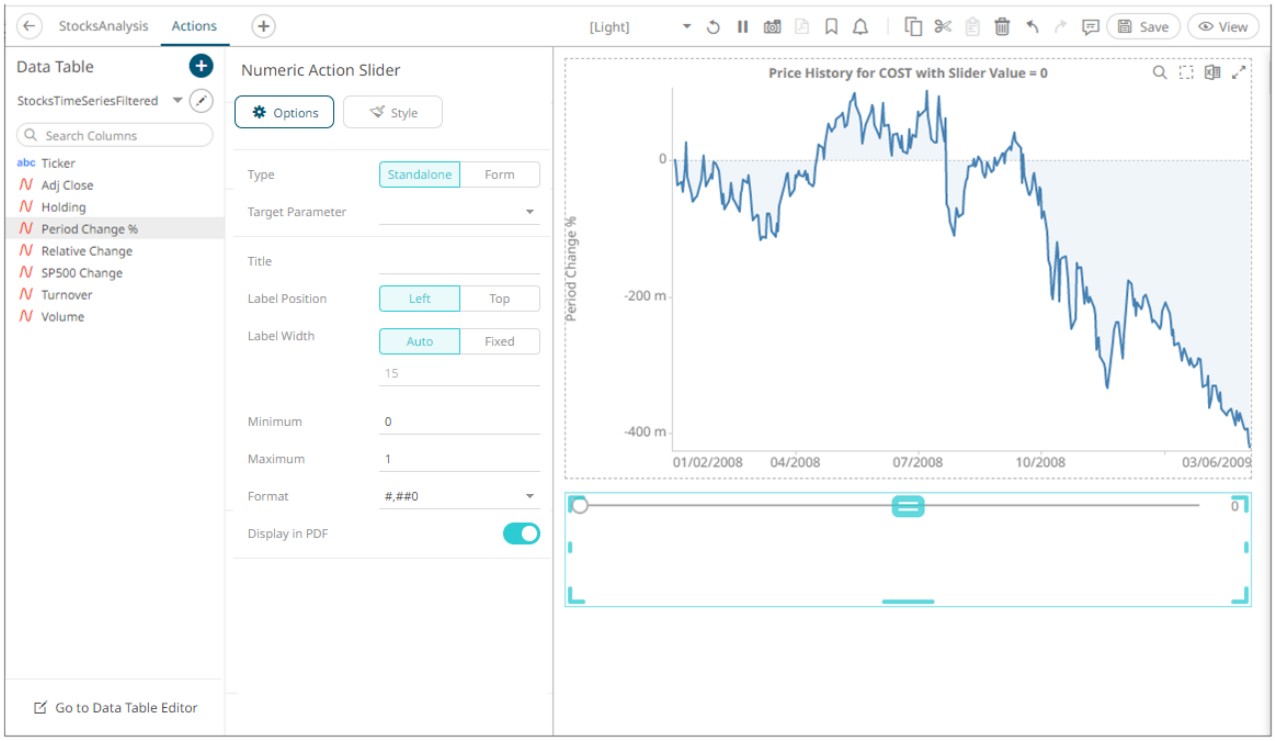
1. After double-clicking or drawing a rectangle on the dashboard canvas, click Control on the *Select Part* pane then click the **Numeric Action Slider** Slider icon.

   The *Numeric Action Slider* pane is displayed, and the *Numeric Action Slider* part is added on the dashboard canvas.

   For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
Slider Value	Text	0

   These parameters are used on the *Title* of the Line graph (e.g., **Price History for {Ticker} with Slider Value = {Slider Value:0.00%}**).

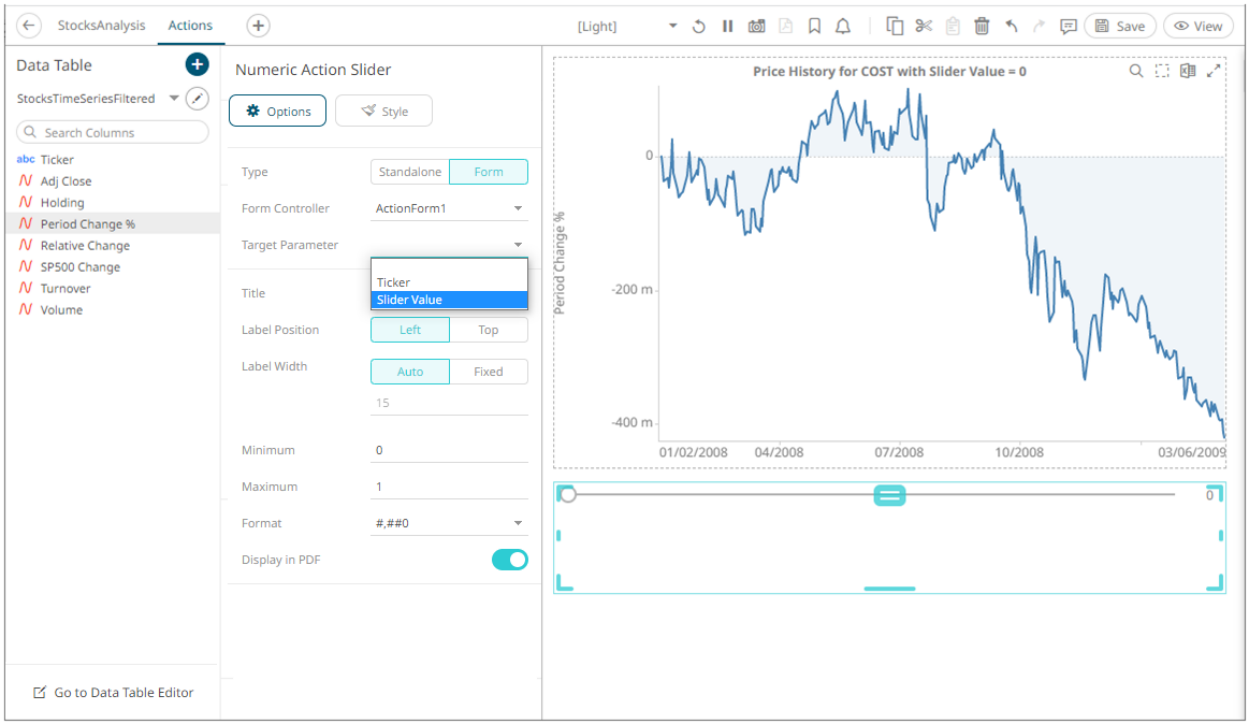


2. The numeric action slider can be configured to either be a **Standalone** or a **Form** component.

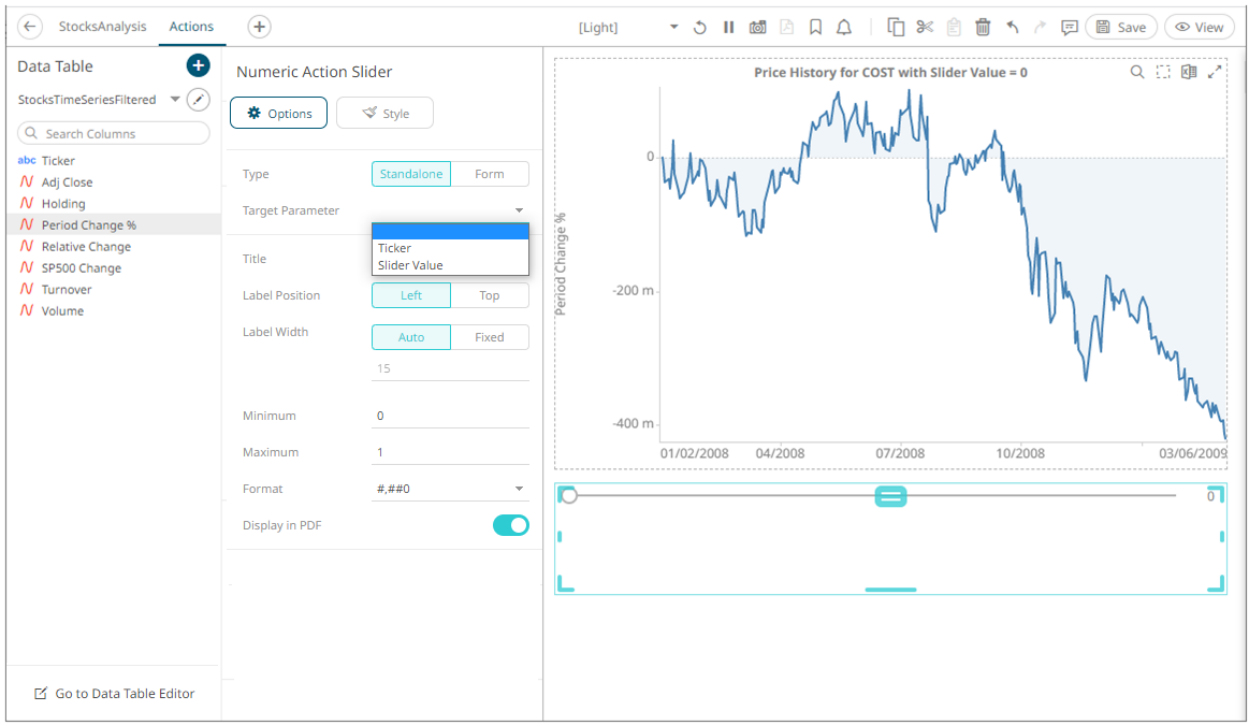
   When set to **Form**, the numeric action slider can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

   NOTE **An action form part must be defined first to associate the numeric action slider as a component. Refer to Adding an Action Form more information.**

   A line connects the component to the associated form.



If the numeric action slider should not be connected to a form, it can be set to **Standalone** instead. Select the *Target Parameter* that will be updated by this action part.



3. Enter the *Title* of the numeric action slider.

   Otherwise, if left blank, the title of the control will be **Set <Target Parameter>**.

4. Select the *Label Position*: **Left** or **Top**.

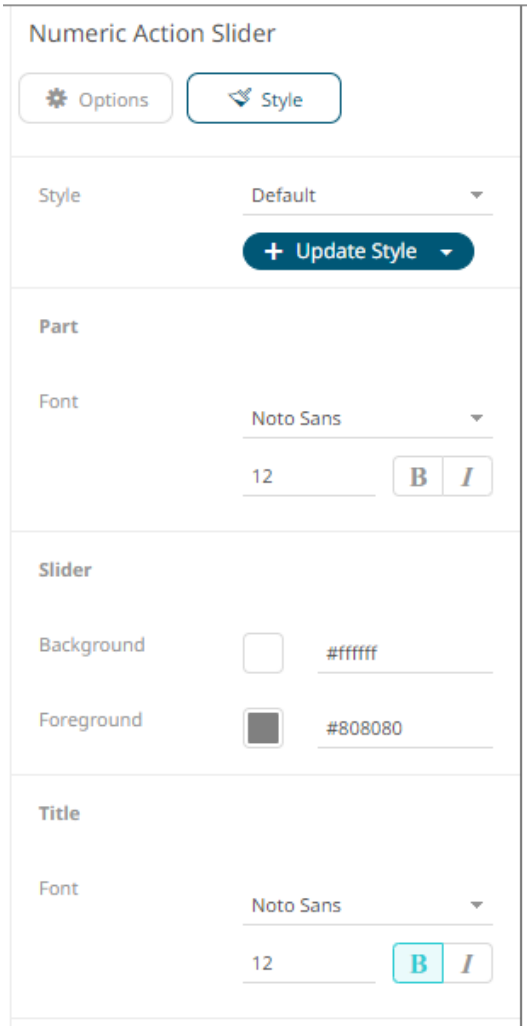
5. Select the *Label Width*:

- **Auto**, or
- **Fixed** then enter the width (default is **15**).

6. You can opt to enter the allowed *Minimum* and *Maximum* values.
7. Enter the *Format* that the numeric value will be displayed.
8. Tap the **Display in PDF** slider to turn it on and include the numeric action slider in the PDF output.
9. To set the style of the Numeric Action Slider, click **Style** 

.

   The page updates to display the *Style* pane.

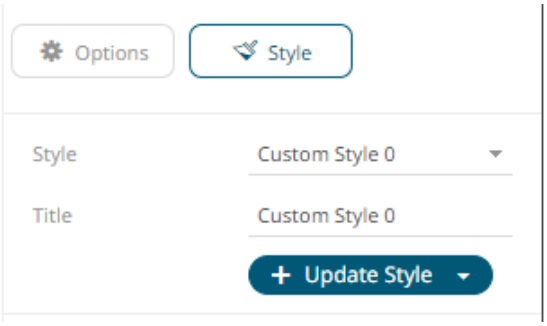


10. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and title.

    The part title's font is set to **Bold** by default.
11. Click the **Foreground** or **Background** box to display the *Color* dialog and set the slider color or enter the Hex color code.
12. Click **Update Style** 

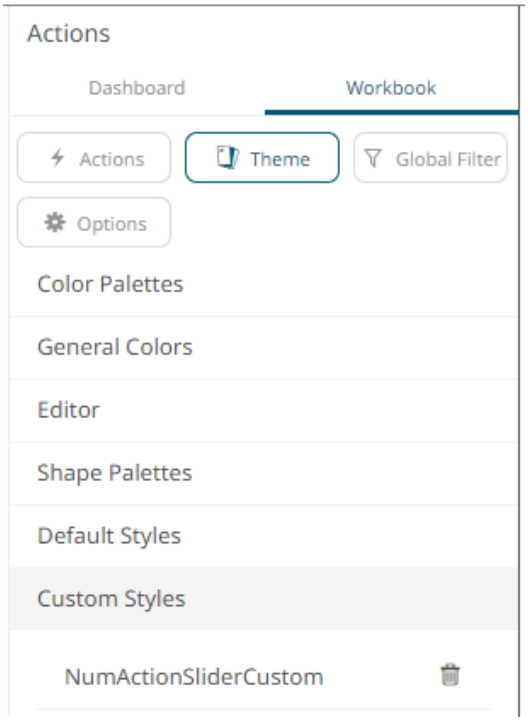
and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

The *Style* pane updates to display the *Title* control.



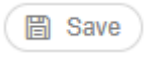
- Enter the custom style *Title*.
- If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Numeric Action Slider will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

9. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Adding a Numeric Range Action Slider

The Numeric Range Action Slider allows sliders of two parameters.

Whenever the slider values are changed, the associated action is executed.

Steps:

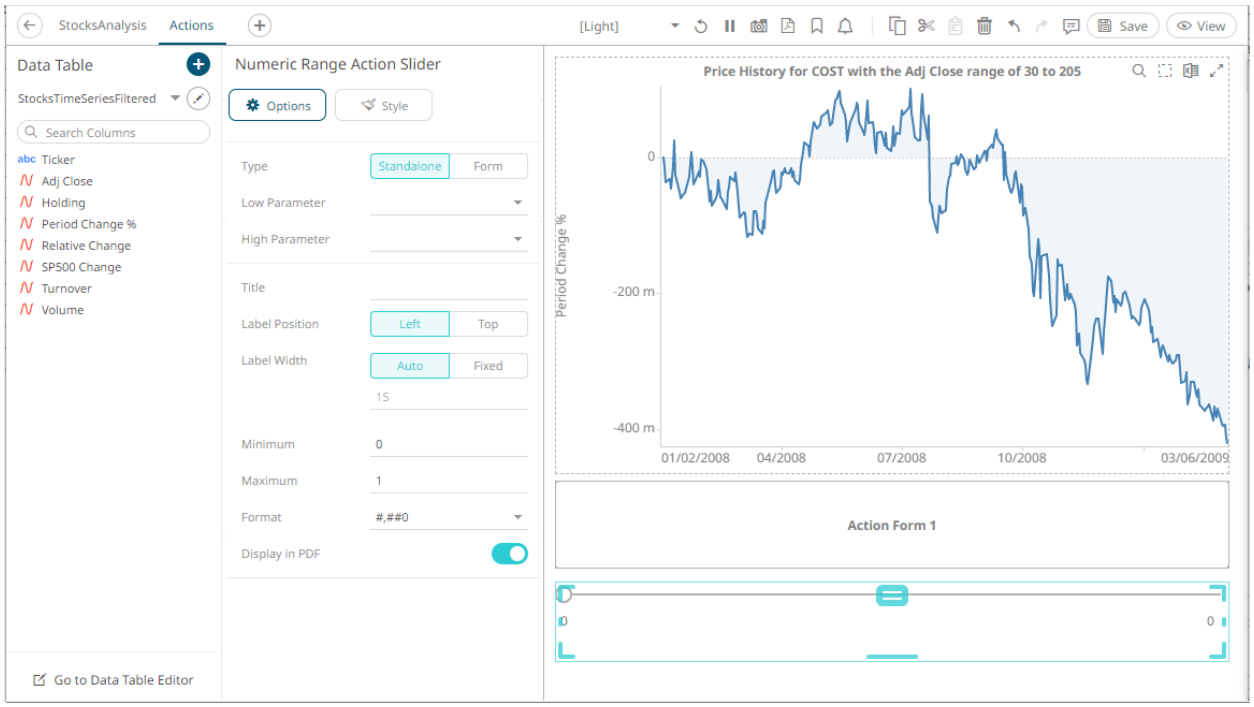
1. After double-clicking or drawing a rectangle on the dashboard canvas, click Control on the *Select Part* pane then click the **Numeric Range Action Slider** Range Slider icon.

   The *Numeric Range Action Slider* pane is displayed, and the *Numeric Range Action Slider* part is added on the dashboard canvas.

   For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
AdjCloseMin	Numeric	30
AdjCloseMax	Numeric	205

   These parameters are used on the *Title* of the Line graph (e.g., **Price History for {Ticker} with the Adj Close range of {AdjCloseMin} to {AdjCloseMax}**).

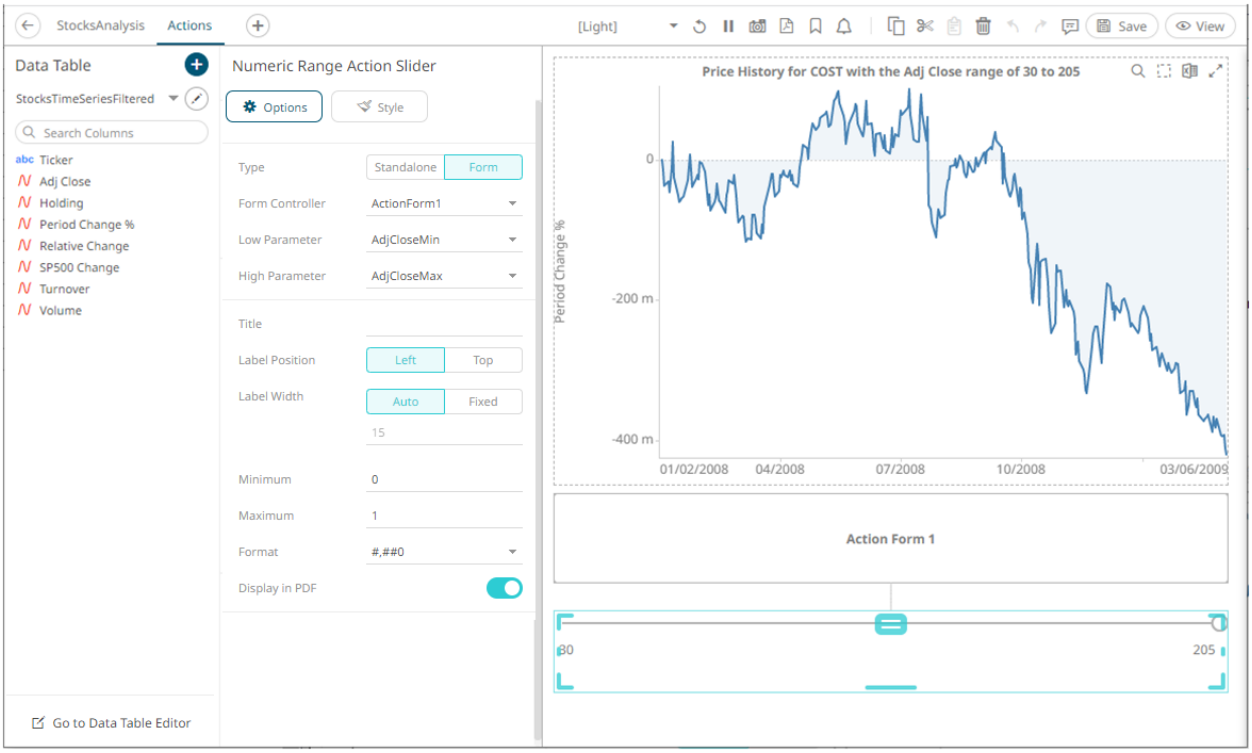


2. The numeric range action slider can be configured to either be a **Standalone** or a **Form** component.

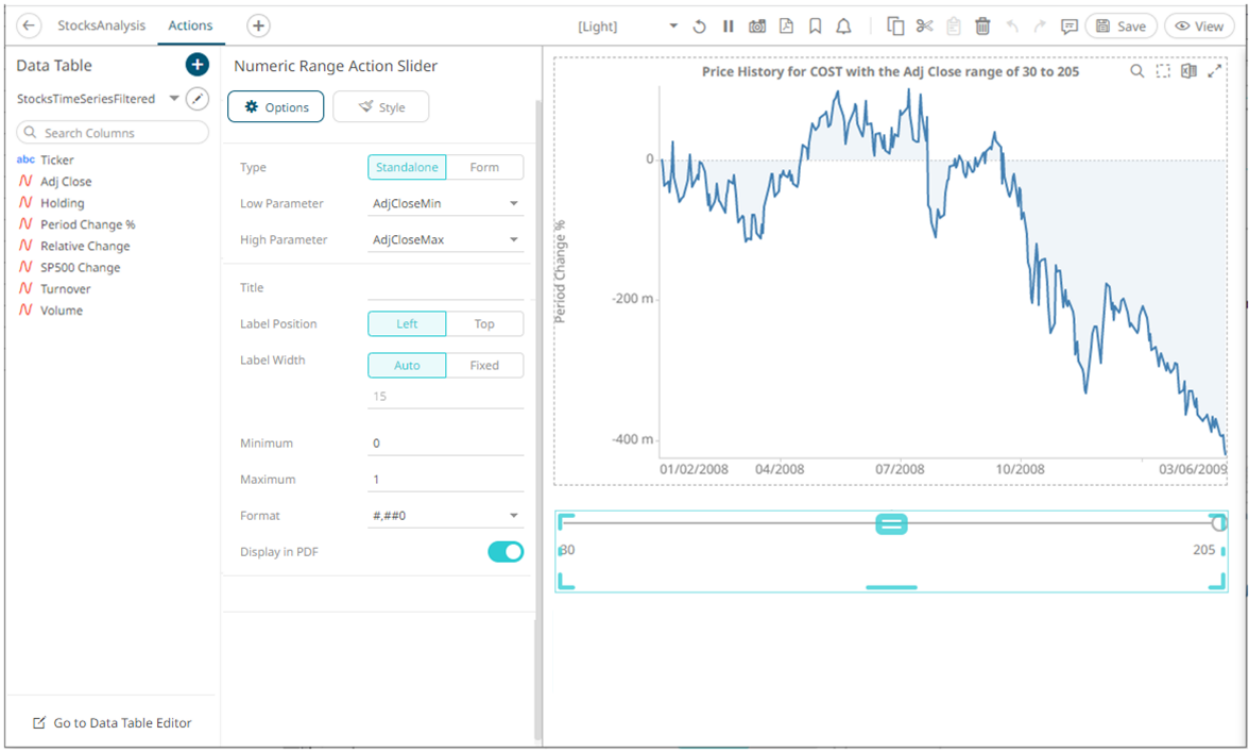
   When set to **Form**, the numeric range action slider can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

NOTE **An action form part must be defined first to associate the numeric range action slider as a component. Refer to Adding an Action Form more information.**

A line connects the component to the associated form.



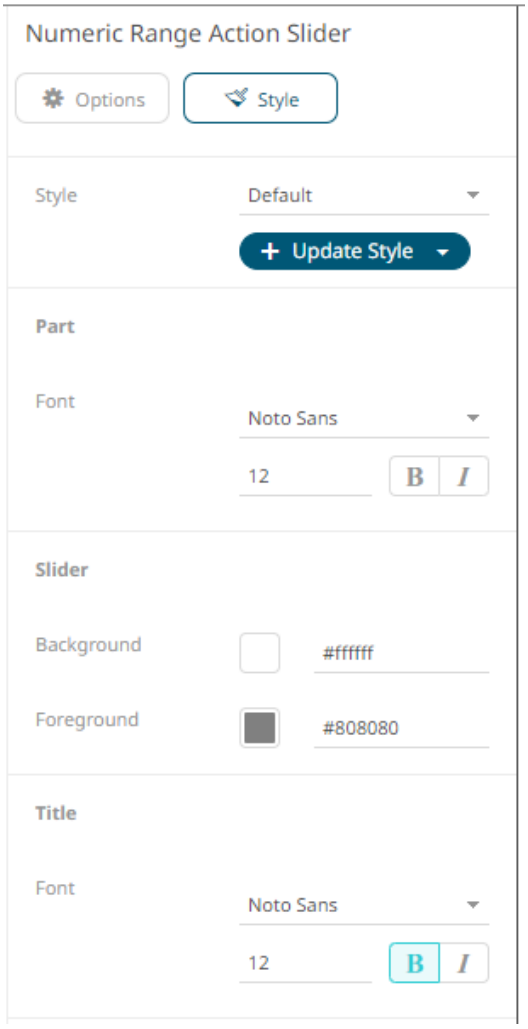
If the numeric action slider should not be connected to a form, it can be set to **Standalone** instead. Select the *Low Parameter* and *High Parameter* that will be updated by this action part.



3. Enter the *Title* of the numeric range action slider.
4. Select the *Label Position*: **Left** or **Top**.
5. Select the *Label Width*:
   - **Auto**, or
   - **Fixed** then enter the width (default is **15**).
6. You can opt to enter the allowed *Minimum* and *Maximum* values.
7. Enter the *Format* that the numeric value will be displayed.
8. Tap the **Display in PDF** slider to turn it on and include the numeric action slider in the PDF output.
9. To set the style of the Numeric Range Action Slider, click **Style** 

.

   The page updates to display the *Style* pane.



10. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and title.

    The part title's font is set to **Bold** by default.

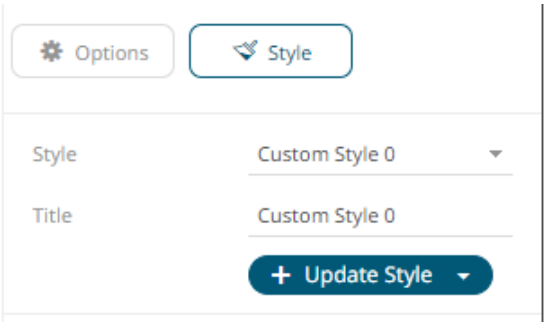
11. Click the **Foreground** or **Background** box to display the *Color* dialog and set the slider color or enter the Hex color code.

12. Click **Update Style** 

and select any of the following options:

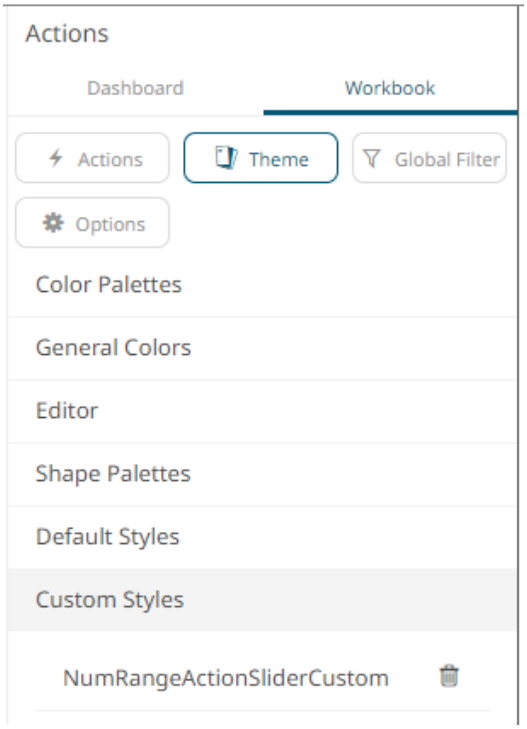
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

      The *Style* pane updates to display the *Title* control.



- Enter the custom style *Title*.
- If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

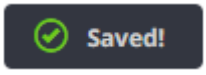
The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Numeric Range Action Slider will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

13. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

Adding an Action Button

The action button control allows users to execute an action. It can also just pass the entered parameter value if the string is exactly equal to the {parameter-name}.

Steps:

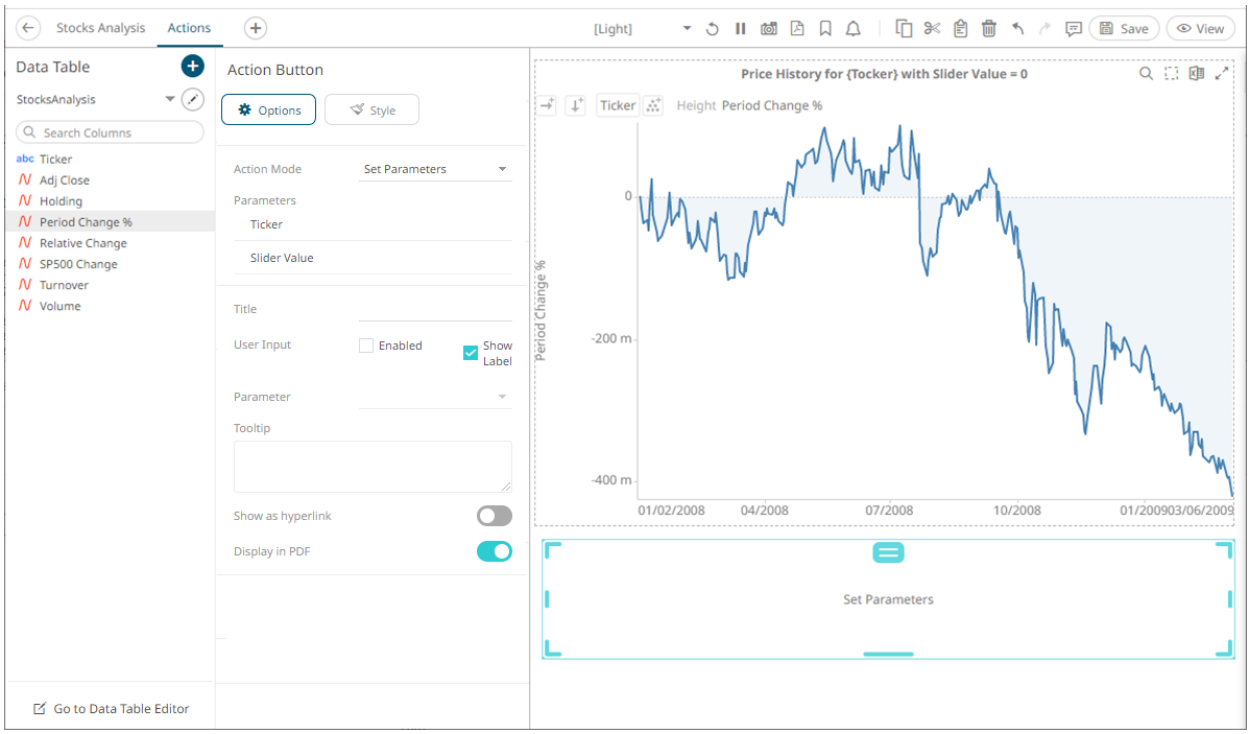
1. After double-clicking or drawing a rectangle on the dashboard canvas, click  on the *Select Part* pane then click the **Action Button**  icon.

The *Action Button* pane is displayed, and the *Action Button* part is added on the dashboard canvas.

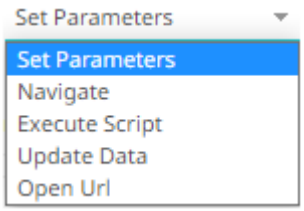
For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
Slider Value	Text	0

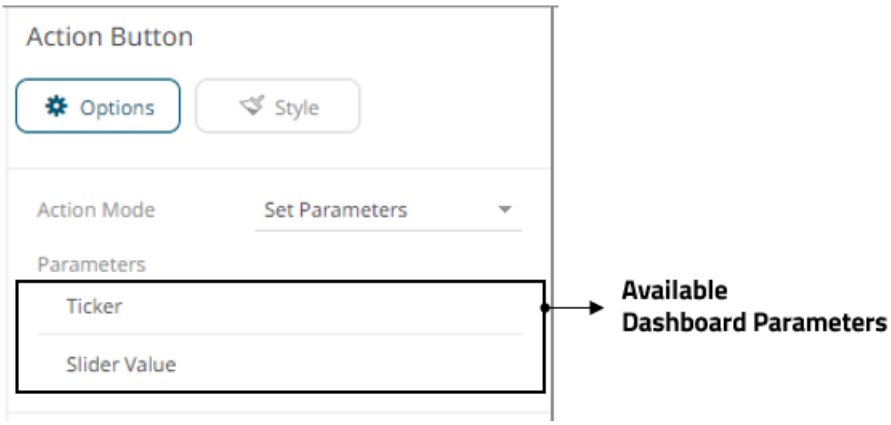
These parameters are used on the *Title* of the Line graph (e.g., **Price History for {Ticker} with Slider Value = {Slider Value:0.00%}**).



2. Select any of the *Action Modes*:



- Set Parameters



The *Parameters* pane lists the available parameters to set the data loading for each interaction with the Action Button.

Click on a parameter instance to expand and set the values that the action requires.

- Navigate

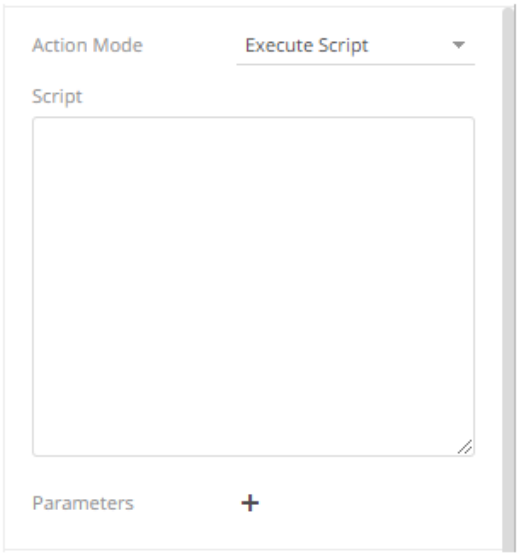
  Allows the selection of the dashboard where you want to pass the parameters.



  Click on a parameter instance to expand and set the values that the action requires.

- Execute Script

  Allows the execution of a script.



  Enter the parameterized *Script*.

  The parameters are written within curly brackets, `{ParameterName}`.

  For script actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows:

  `{ParameterName:Separator}`

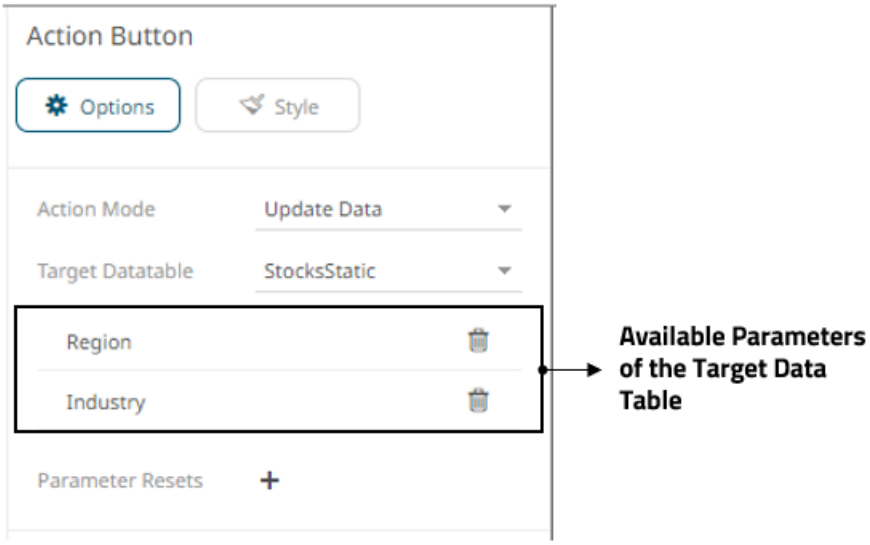
  For example: `{Company:|}`

  Default separator is comma. At execution, the parameter will be replaced with real field values associated with the selected visualization node.

You can opt to add new parameters by clicking + and define the parameter values that the action requires.

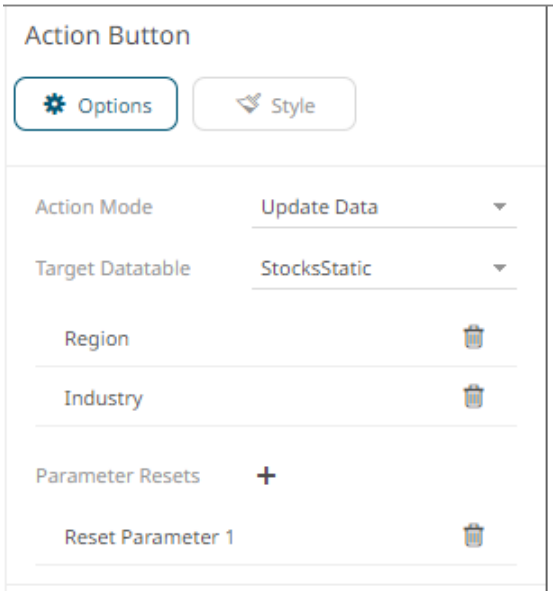
- Update Data

  Allows data update (typically in a database) by passing parameters into a data query.



  Click on a parameter instance to expand and set the values that the action requires. You can also opt to click 🗑 to delete a parameter.

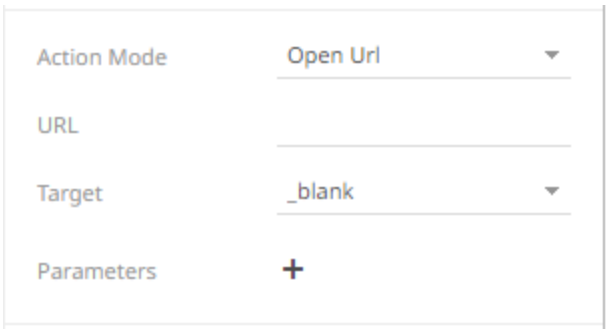
  You can also opt to specify one or several existing parameters that will get a new value when the **Update Data** action is executed. You can do so by clicking + on the *Parameter Resets* section.



  Click on the parameter instance to expand and define its properties.

- Open URL

  Allows access to a web page or file or even point to other resources on the web such as database queries and command output.



- Enter the parameterized URL.

  The parameters are written within curly brackets, `{ParameterName}`.

  For actions allowing multiple value input, you can optionally specify a value separator within the curly brackets where you put the parameter name. The syntax is as follows:

  `{ParameterName:Separator}`

  For example: {Company:+}

  Default separator is semicolon. Specifying for example a plus sign allows you to do multi search term searches on Google, for example.

  At execution, the parameter will be replaced with real field values associated with the selected visualization node.

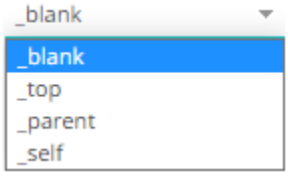
  The easiest way to create parameterized URLs is to open an example web page and copy the URL. As an example, Yahoo Finance Key Statistics for Microsoft has the following web address:

  `http://finance.yahoo.com/q/ks?s=MSFT`

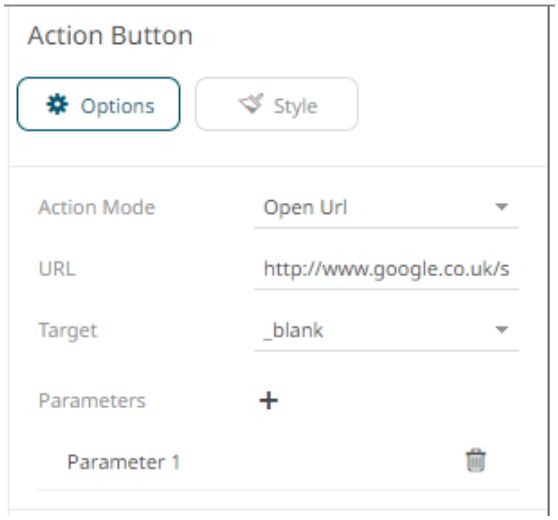
  If a parameter called Ticker has been set up in the data table, you can generate the URL by removing **MSFT** and replacing it with **{Ticker}**:

  `http://finance.yahoo.com/q/ks?s={Ticker}`

- Select the *Target* area of the page where the output URL will be displayed.

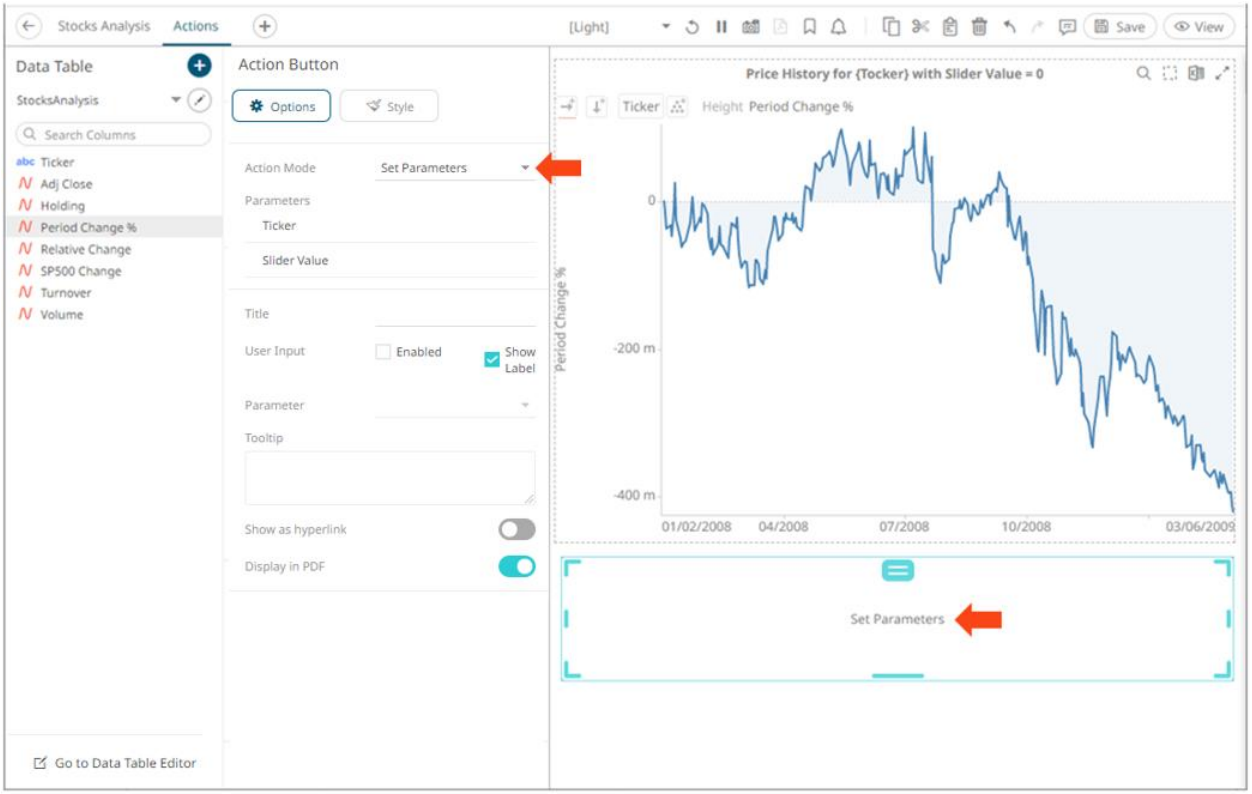


- Click + to add parameters to the output URL.



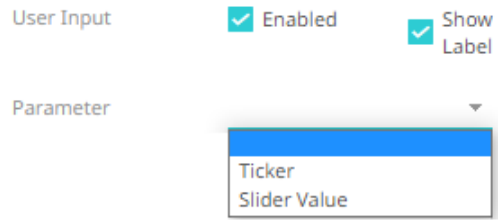
Click on the parameter instance to expand and define its properties.

The title of the action button defaults to the selected action mode.



3. Enter the new *Title* of the action button.
4. For the *User Input*, you can:
   - check the **Enabled User Input** box to allow the entry of parameter value that will be executed once the action button is clicked.

     Then, select the parameter.



This will be displayed on the dashboard as:

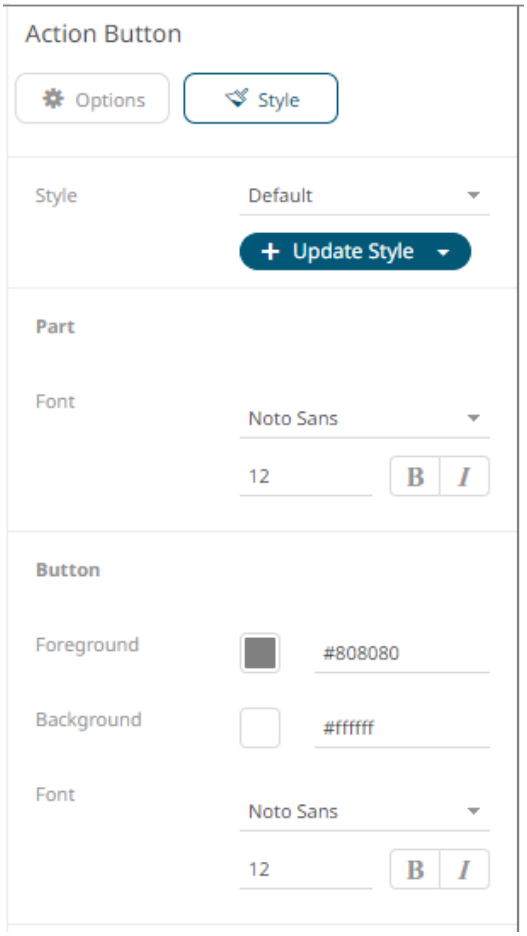


- check the **Show Label** box to display the label (selected by default).
  When unchecked, the parameter name is not displayed before the input field.



5. Enter a description or useful information about the action button into the *Tooltip* box.
6. Tap the **Show as Hyperlink** slider to turn it on and display the layout style of the button to a hyperlink.
7. Tap the **Display in PDF** slider to turn it on and include the action button in the output PDF.
8. To set the style of the Action Button, click **Style** 

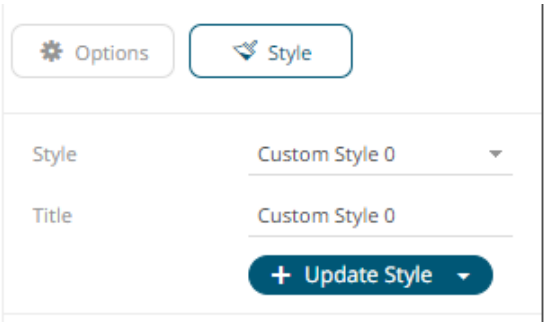
.
   The page updates to display the *Style* pane.



9. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and button.
10. Click the **Foreground** or **Background** box to display the *Color* dialog and set the color or enter the Hex color code.
11. Click **Update Style** 

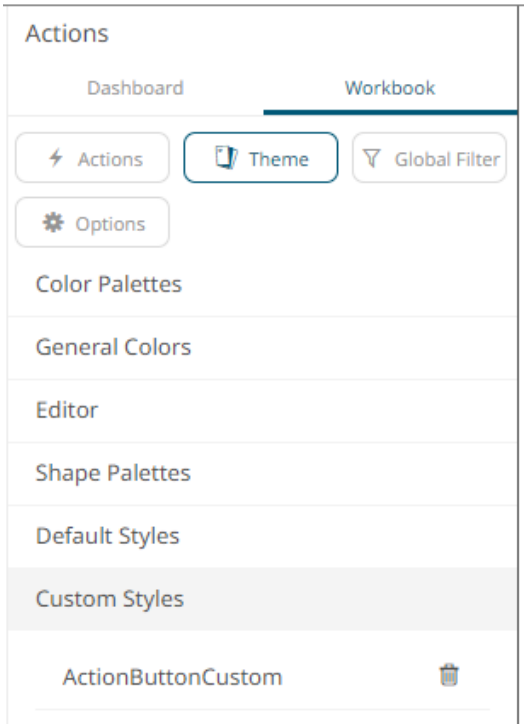
and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

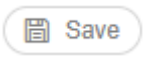
      The *Style* pane updates to display the *Title* control.

      - Enter the custom style *Title*.
      - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

      The new custom style is added in the **Workbook > Theme > Custom Styles** list.

      If published, the custom style configuration of the Action Button will be added to the Global custom styles list and can be applied to other parts.
    - **Reset to default** – Revert to the original default settings.
12. Click the **Save** 

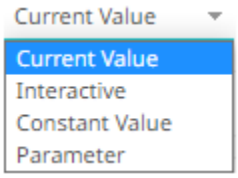
icon on the toolbar to save the changes.

When saved, the 

notification is displayed.

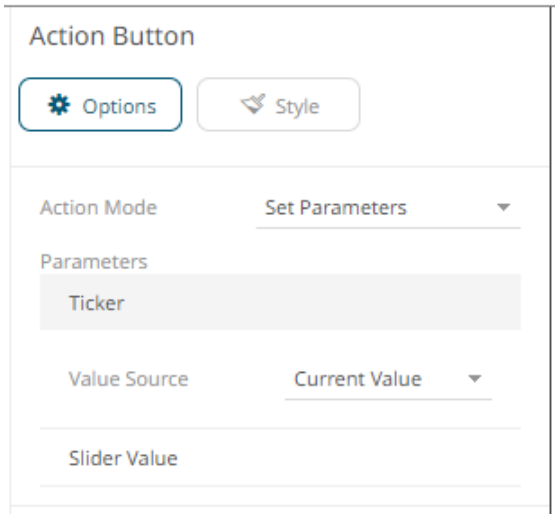
Defining Action Parameter Properties

For each parameter added or defined in the actions, you can set their *Value Source*:



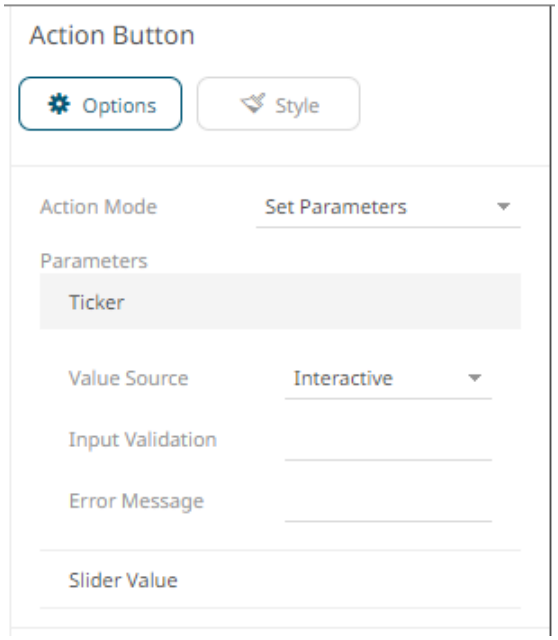
- Current Value

  The current value of the parameter is used.



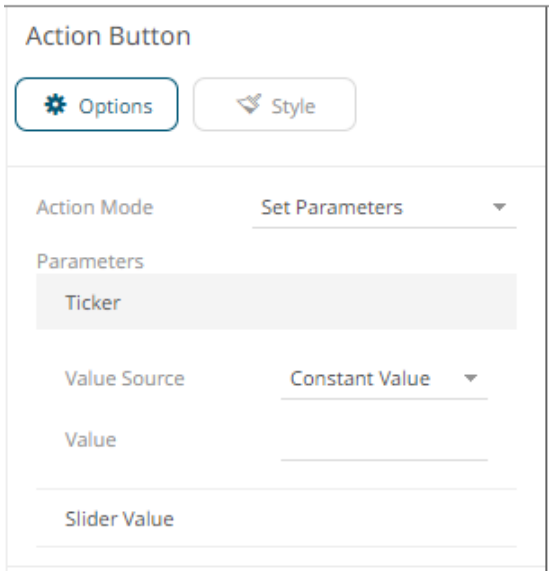
- Interactive

  Allows values to be entered when the action is executed.



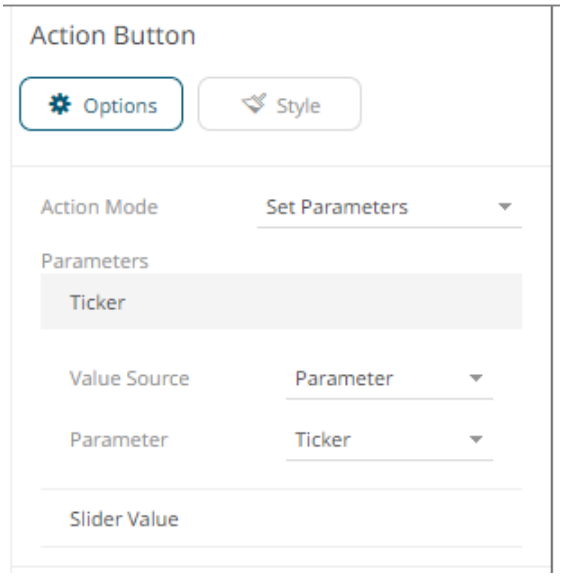
- Constant Value

  Allows the constant value of the parameter to be defined.



- Parameter

  Allows the selection of the source parameter.



Adding an Action Date Picker

The Action Date Picker allows the entry of a Date/Time parameter.

Whenever the date picker value is changed, the associated action is executed.

Steps:

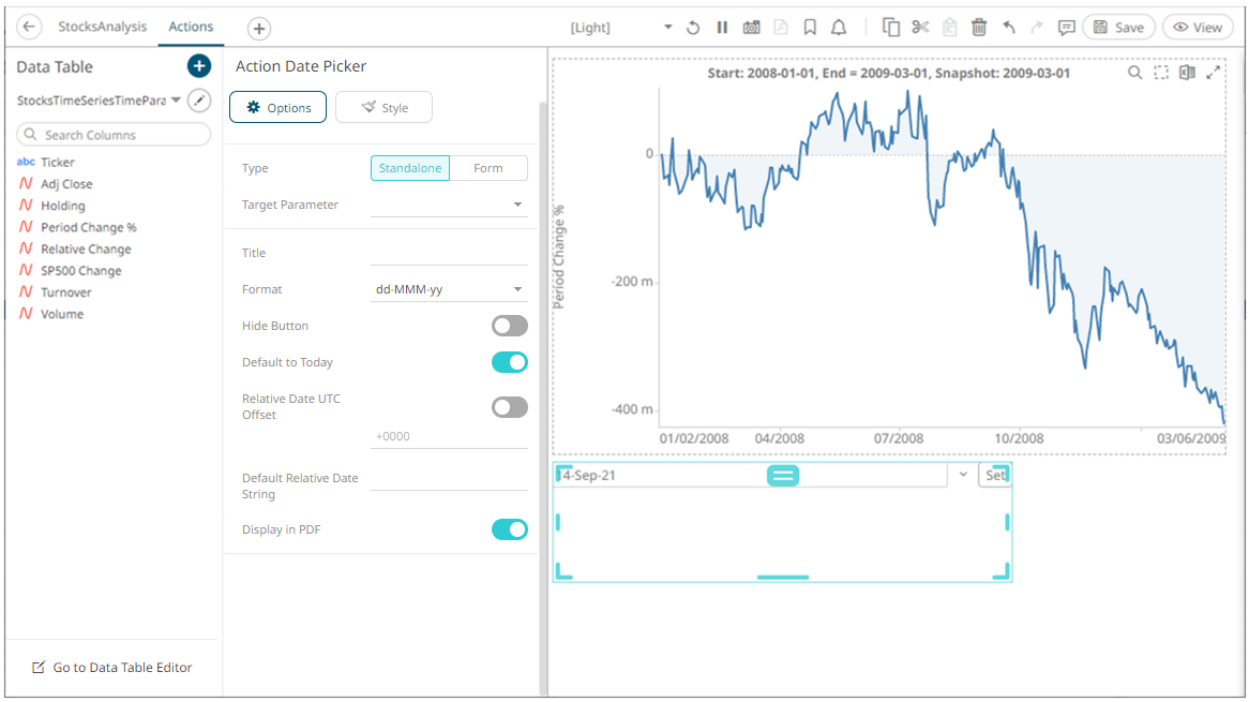
1. After double-clicking or drawing a rectangle on the dashboard canvas, click Control on the *Select Part* pane then click the **Action Date Picker** Date Picker icon.

   The *Action Date Picker* pane is displayed, and the *Action Date Picker* part is added on the dashboard canvas with the current date and the **Set** button to the right.

   For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
TWS	Text	2008-01-01
TWE	Text	2009-03-01
SS	Text	2009-03-01

   These parameters are used on the *Title* of the Line graph (e.g., **Start: {TWS: yyyy-MMM-dd HH:mm:ss}, End = {TWE: yyyy-MMM-dd HH:mm:ss}, Snapshot: {SS: yyyy-MMM-dd HH:mm:ss}**).

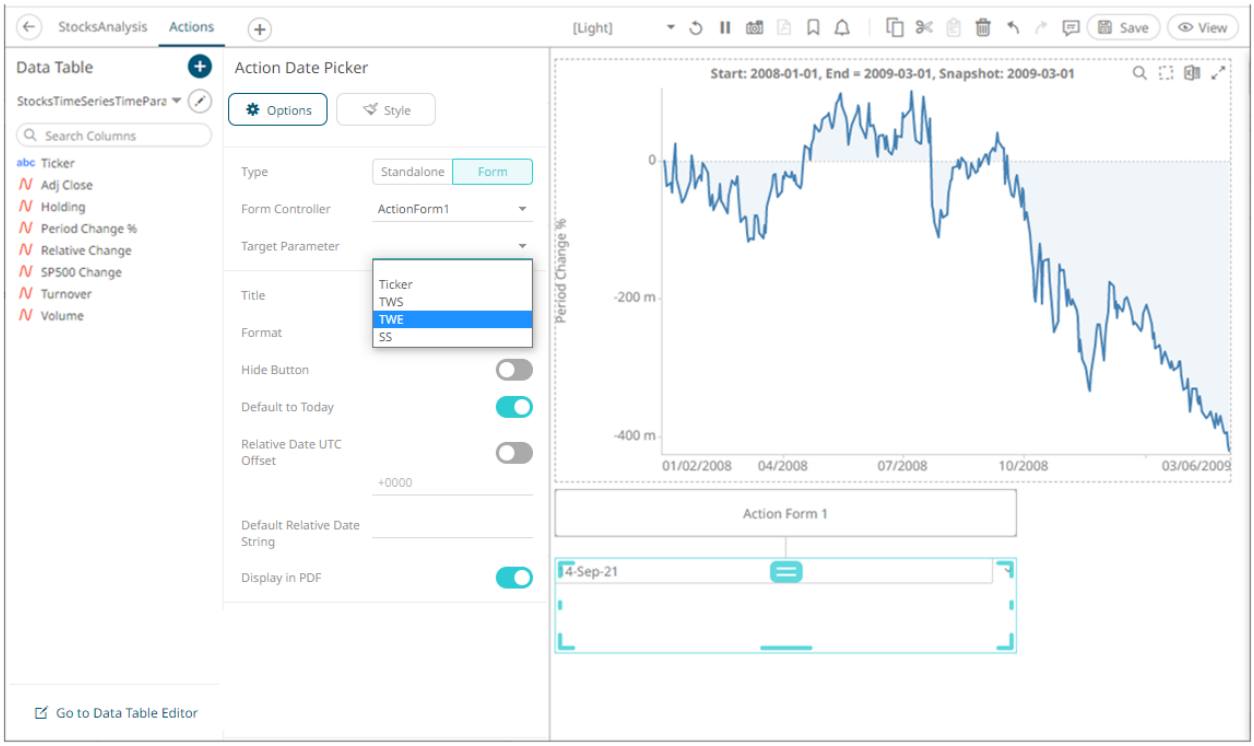


2. The action date picker can be configured to either be a **Standalone** or a **Form** component.

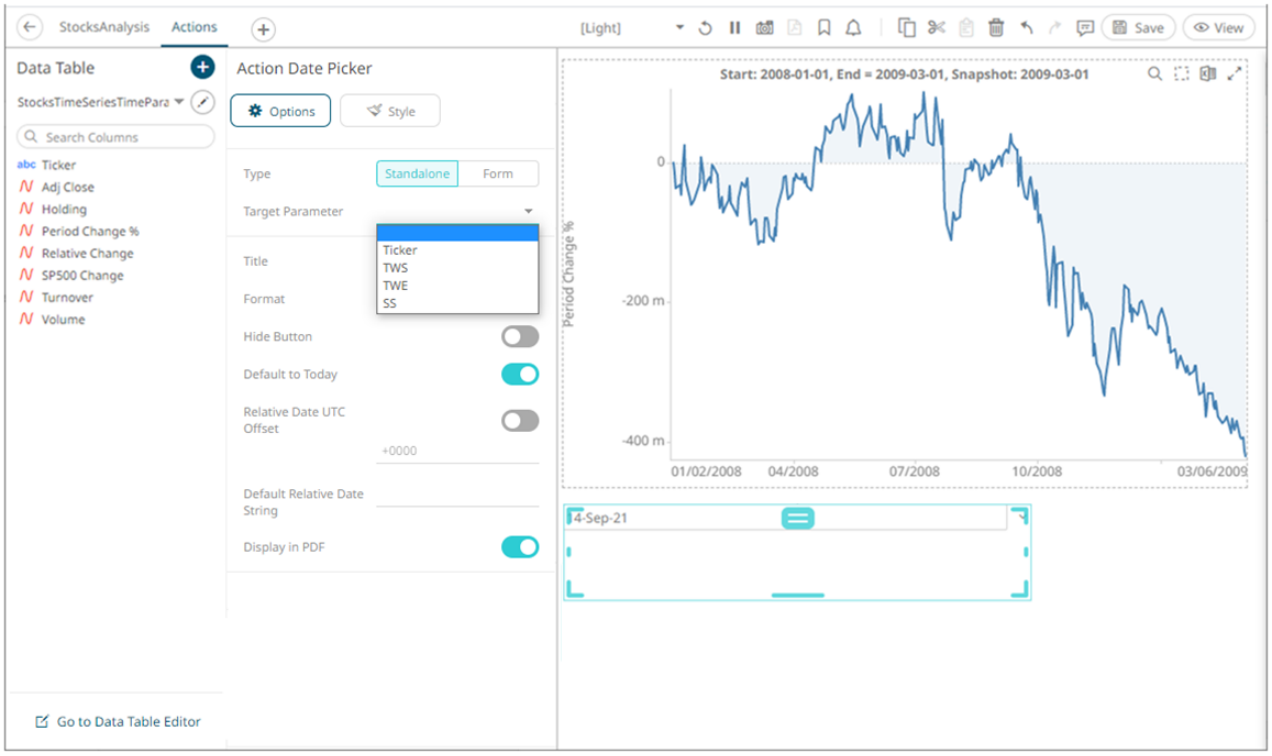
   When set to **Form**, the action date picker can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

   NOTE **An action form part must be defined first to associate the action date picker as a component. Refer to Adding an Action Form more information.**

   A line connects the component to the associated form.



If the action date picker should not be connected to a form, it can be set to **Standalone** instead. Select the *Target Parameter* that will be updated by this action part.

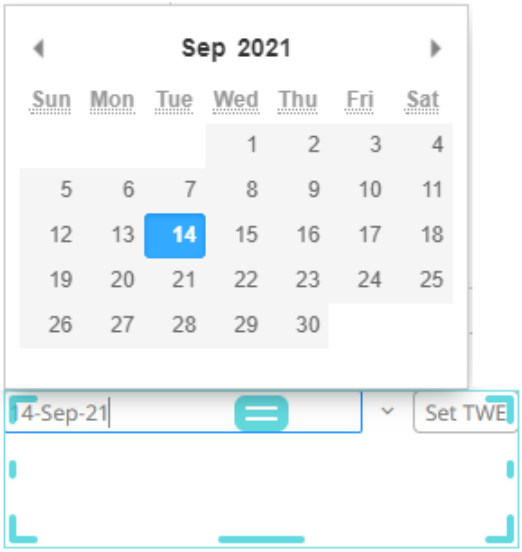


3. Enter the *Title* of the action date picker button.

   If set to the **Standalone** type and the *Title* is blank, the button will be **Set <Target Parameter>.**

4. Select the Date/Time *Format*.

Clicking on the *Date/Time* box displays the date picker in calendar mode.



The text of the date can be directly entered, or alternatively it can be clicked on, to bring up a date picker in the Web client.

5. Tap the **Hide Button** slider to turn it on. This means the action control will update the parameter whenever the value of the date picker changes.
6. Tap the **Default to Today** slider to turn it on. This allows the action date picker to check the current value of the dashboard parameter. If it is set to null/empty, an action is executed to update the parameter and trigger the loading of the parameterized data with the current date.
7. Tap the **Relative Date UTC Offset** slider to turn it on then enter the *UTC Offset* value (default is **+0000**).

   By default, when an action date picker performs a relative date calculation, the point in time that the calculation is relative to will be based on the time zone picked up from the browser (i.e., the timezone the user is in). Since parameters do not encode the time zone information, the resulting value from the relative date calculation will be affected by the time zone the relative calculation is performed in.

   Example:

   User timezone: UTC+0200
   Expression: now
   UTC Offset: none
   Current time: 2001-01-01T00:00:00.000+0000
   Evaluated time: 2001-01-01T02:00:00.000+0200
   Parameter value: 2001-01-01T02:00:00.000

   The **now** expression is evaluated in relation to the current time and when formatted, the time zone information is no longer encoding, resulting in a parameter value offset from UTC by **+0200**.

   The UTC offset setting allows for configuring an offset from UTC for the time the calculation is relative to, independent of the timezone the user is in.

   Example:

   User timezone: UTC+0200
   Expression: now
   UTC Offset: +0600
   Current time: 2001-01-01T00:00:00.000+0000
   Evaluated time: 2001-01-01T02:00:00.000+0200
   Parameter value: 2001-01-01T06:00:00.000

   Since the UTC offset is **+0600**, the resulting parameter value is formatted with the offset from UTC rather than as the time zone the user is in.

   This allows the parameter values generated by date pickers to target a specific UTC offset instead of generating values based on the time zone the user is currently in.

8. Instead of turning the **Default to Today** slider on, enter the *Default Relative Date String* then click ✓. This allows the relative date calculation (based on today's date), by parsing the input text string.

   This method uses the following pattern:

   SIGN NUMBER UNIT

   Where:

   - **SIGN** is either a '+' or '-'
   - **NUMBER** is any number
   - **UNIT** which can be any of the following:
     - m - minute
     - H – hour
     - D – day
     - B – business day
     - M – month
     - Y – year

   For example:

Pattern	Description
-5m	Back 5 minutes from current time.
-1D	Back 1 day from today.
+D	Forward 1 day from today.
-1B	Back 1 business day from today (ignore Saturday and Sunday).
+1B	Forward 1 business day from today (ignore Saturday and Sunday).
-1M	Back 1 month from today.
-1Y	Back 1 year from today.
-7D	Back 7 days from today.
-14D	Back 14 days from today.

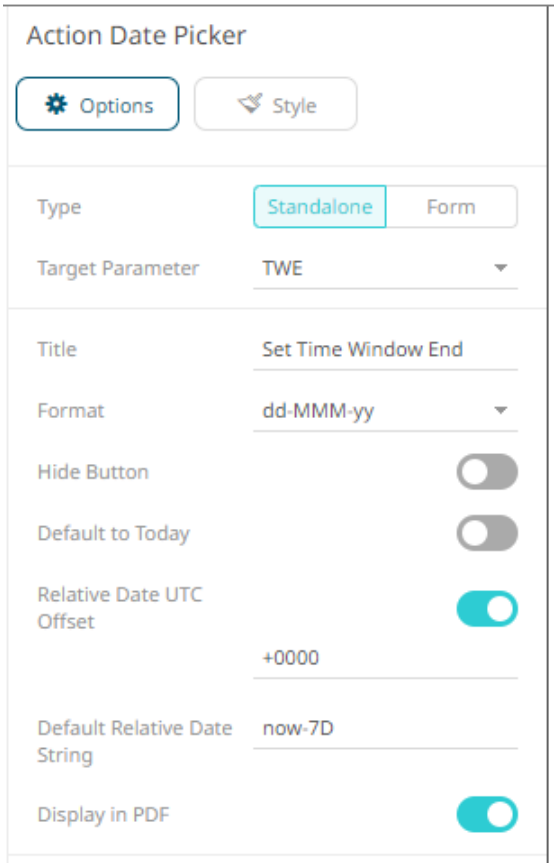
   When these values are entered, the correct date should be selected, and then the data requests are executed based on this date.

   The special **now** term can also be used, this represents the current Date/Time. For example:

   - Using **now** will set the date picker to the current Date/Time
   - **now-7D** will set the date picker to 7 days ago. This is the same as specifying

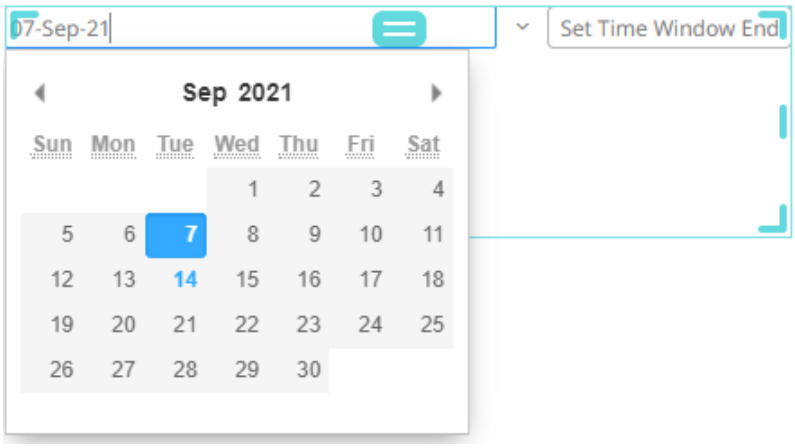
     -7D

     For example:



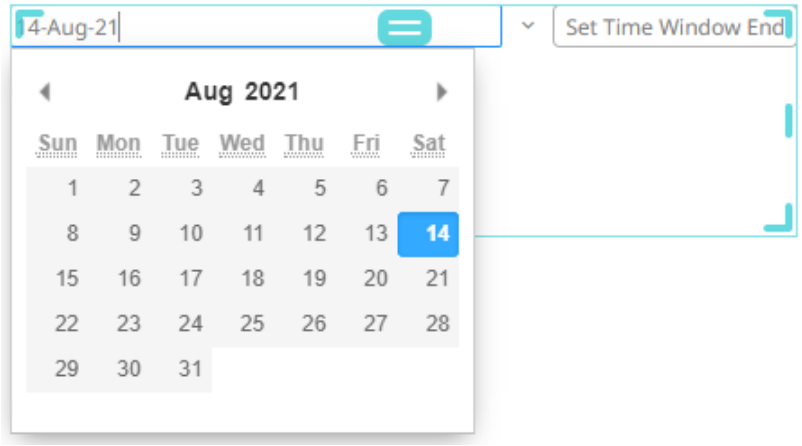
The date will be **now-7D** by default.

For example, **now** is September 14, it will go back 7 days (September 7) and then the date will be recalculated along with the Date/Time format.



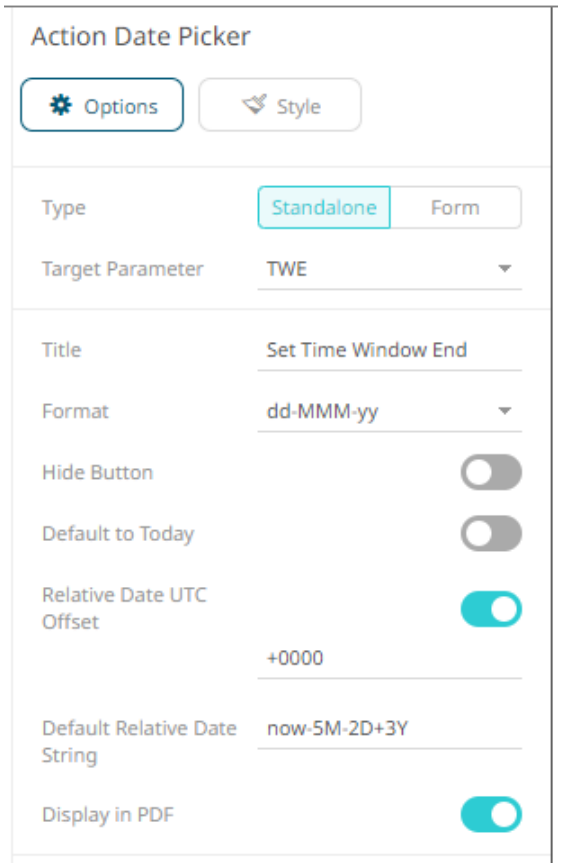
In addition, you can use the **SIGN UNIT NUMBER** pattern to modify the relative date calculation.

For example, if you enter **-1M**, the recalculated relative date will be August 14.

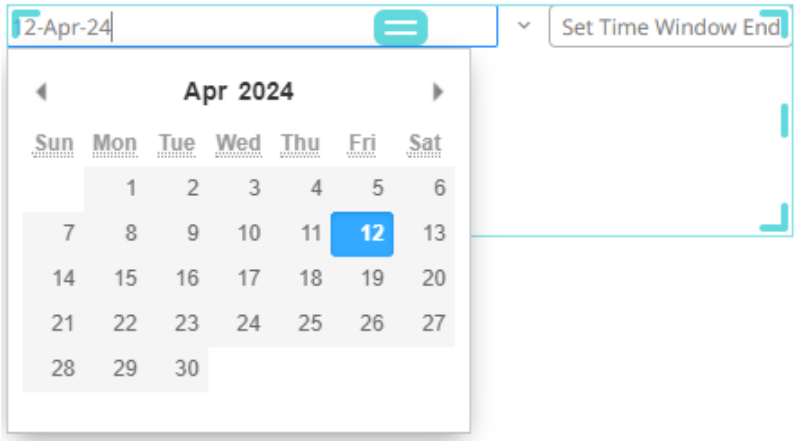


Complex expressions can also be entered to recalculate the relative date. These expressions are evaluated from the left to right pattern. The **now** term can also be used as a pointer to the currently evaluated value of the relative time expression.

For example, if you enter **now-5M-2D+3Y** in the *Action Date Picker Settings* pane:

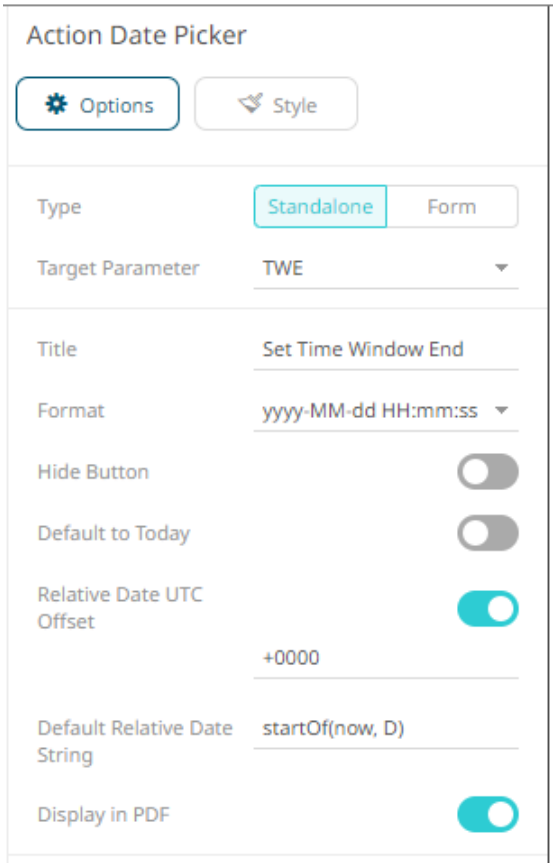


The date will be **now-5M-2D+3Y** by default.

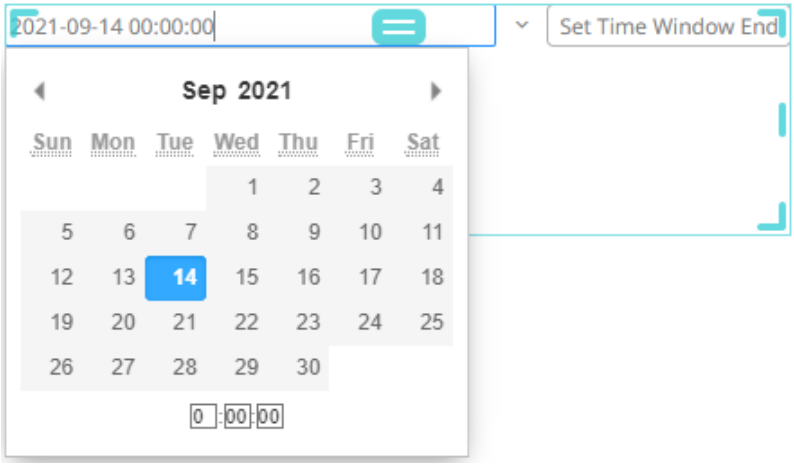


In the expression, you can also use **startOf** and **endOf** functions. Both functions take the same arguments, a relative time string, and a unit.

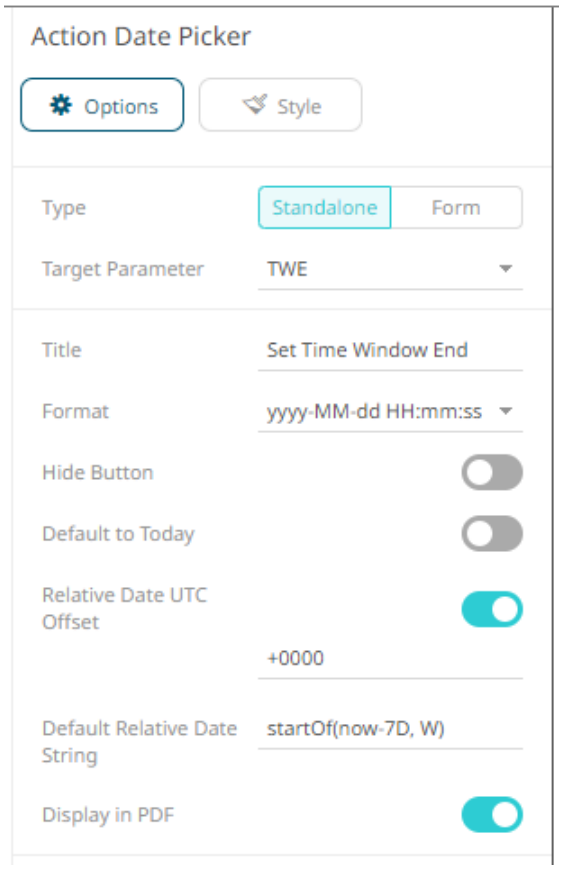
For example, if you enter **startOf(now, D)**:



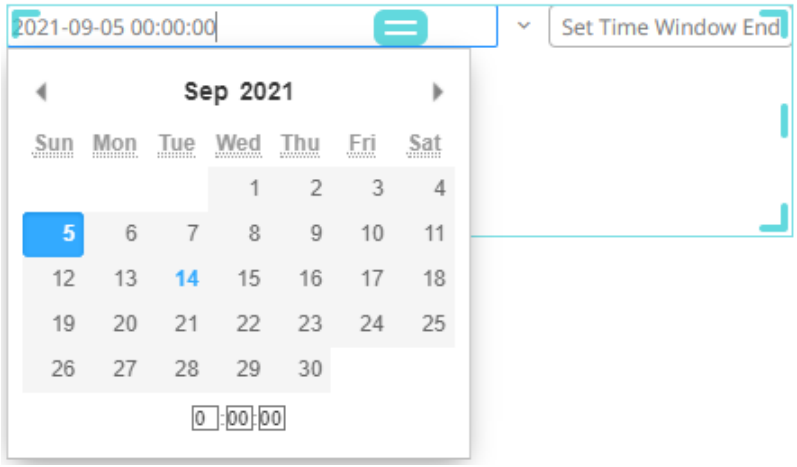
The date will display the start of the current day:



Lastly, you can define a complex expression with the functions. For example, if you enter **startOf(now-7D, W)**:

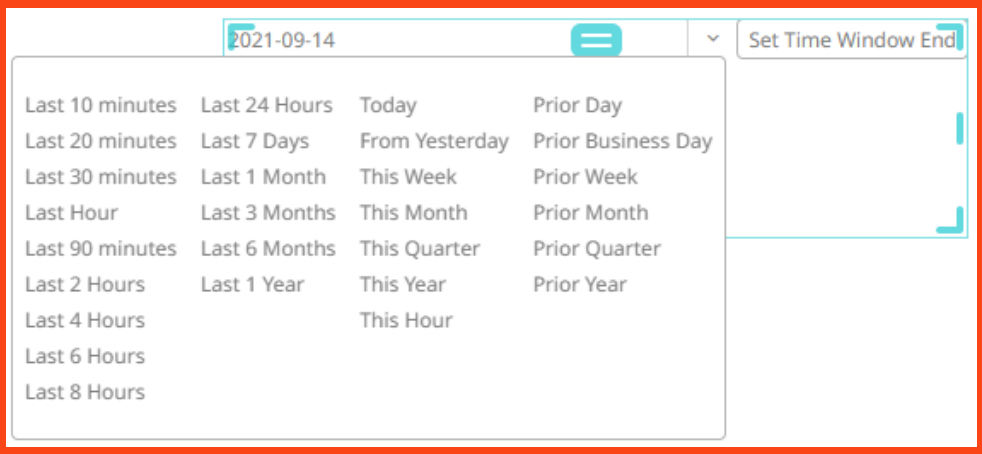


The date will display the start of the previous week:



NOTE

- **The *Default Relative Date String* will be used if the dashboard parameter is null/empty.**
- **The relative Date/Time string is case sensitive.**
- **You can also opt to select from pre-populated date ranges:**



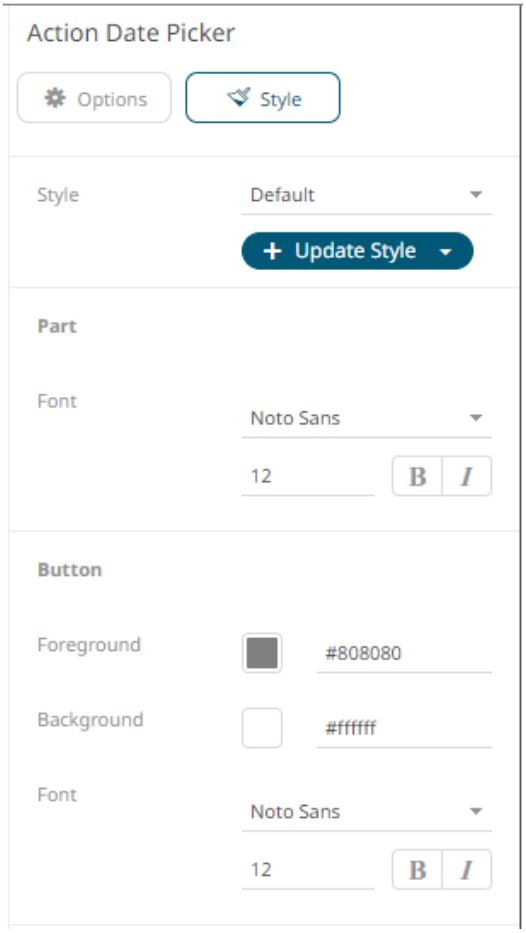
Refer to *Selecting Relative Dates in Action Date Picker and Action Date Range Picker Controls* for more information.

9. Tap the **Display in PDF** slider to turn it on and include the action date picker in the PDF output.

10. To set the style of the Action Date Picker, click **Style** 

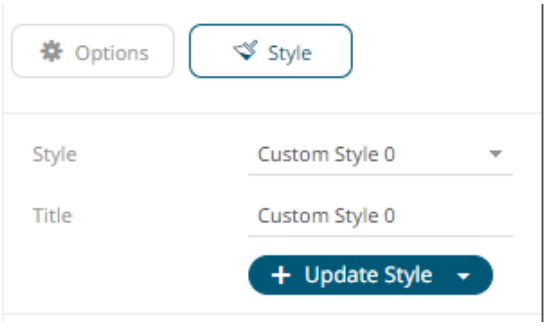
.

    The page updates to display the *Style* pane.



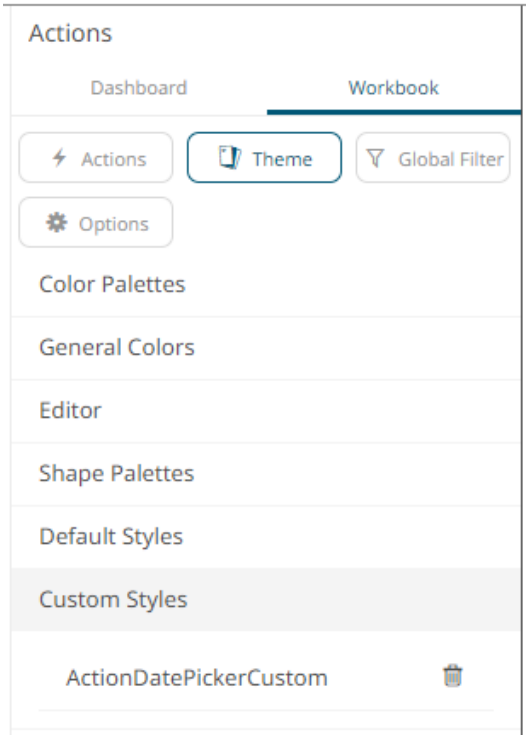
11. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and button.
12. Click the **Foreground** or **Background** box to display the *Color* dialog and set the color or enter the Hex color code.
13. Click **Update Style**  and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

      The *Style* pane updates to display the *Title* control.

      - Enter the custom style *Title*.
      - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

      The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Action Date Picker will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

14. Click the **Save** 

icon on the toolbar to save the changes.

When saved, the 

notification is displayed.

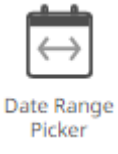
Adding an Action Date Range Picker

The Action Date Range Picker allows setting a date range (*From Date* and *To Date*) and triggering an action.

Whenever the date range picker values are changed, the associated action is executed.

Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Action Date Range Picker** 

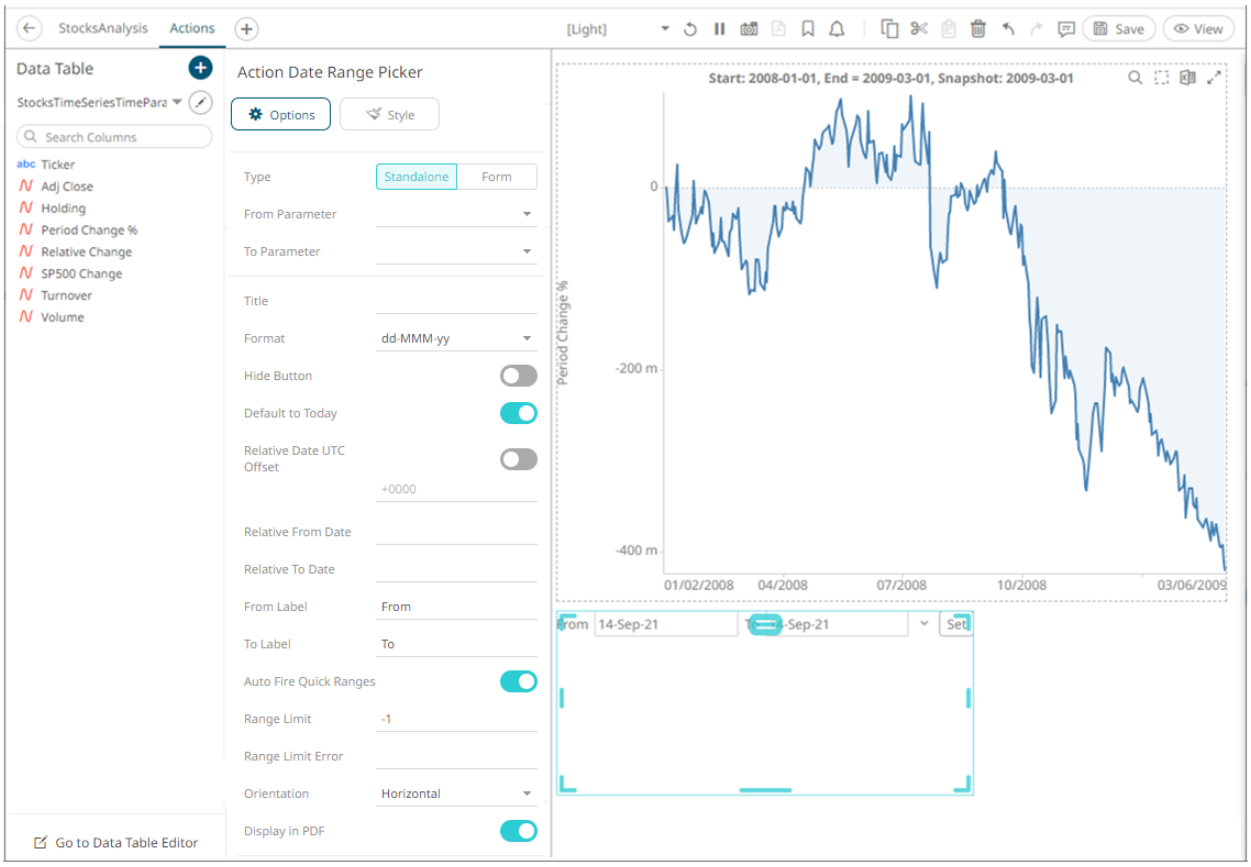
icon.

   The *Action Date Range Picker* pane is displayed, and the *Action Date Range Picker* part is added on the dashboard canvas with the current date range (parameters *From Date* to *To Date*) and the **Set** button.

For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
TWS	Text	2008-01-01
TWE	Text	2009-03-01
SS	Text	2009-03-01

These parameters are used on the *Title* of the Line graph (e.g., **Start: {TWS: yyyy-MMM-dd HH:mm:ss}, End = {TWE: yyyy-MMM-dd HH:mm:ss}, Snapshot: {SS: yyyy-MMM-dd HH:mm:ss}**).

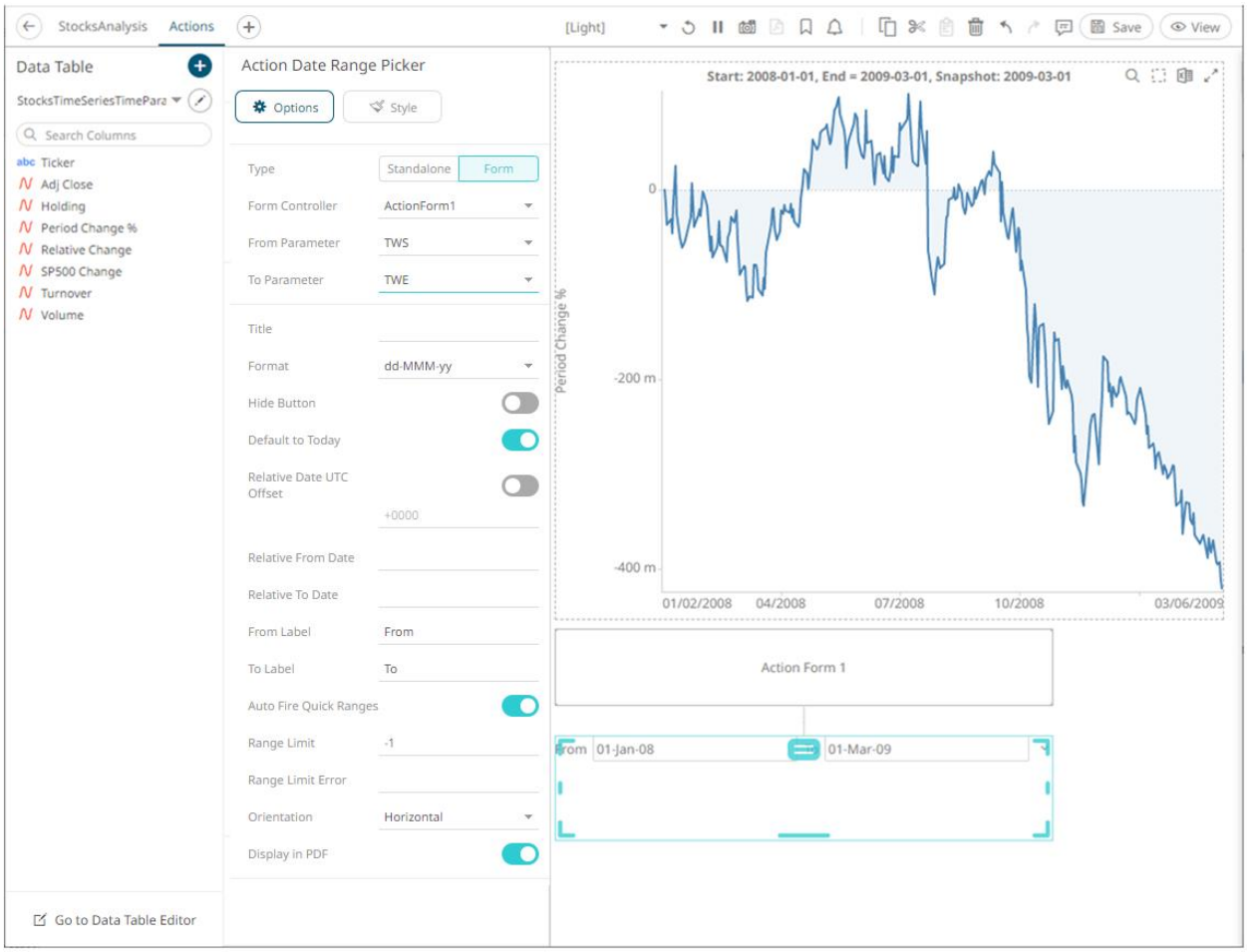


2. The action date range picker can be configured to either be a **Standalone** or a **Form** component.

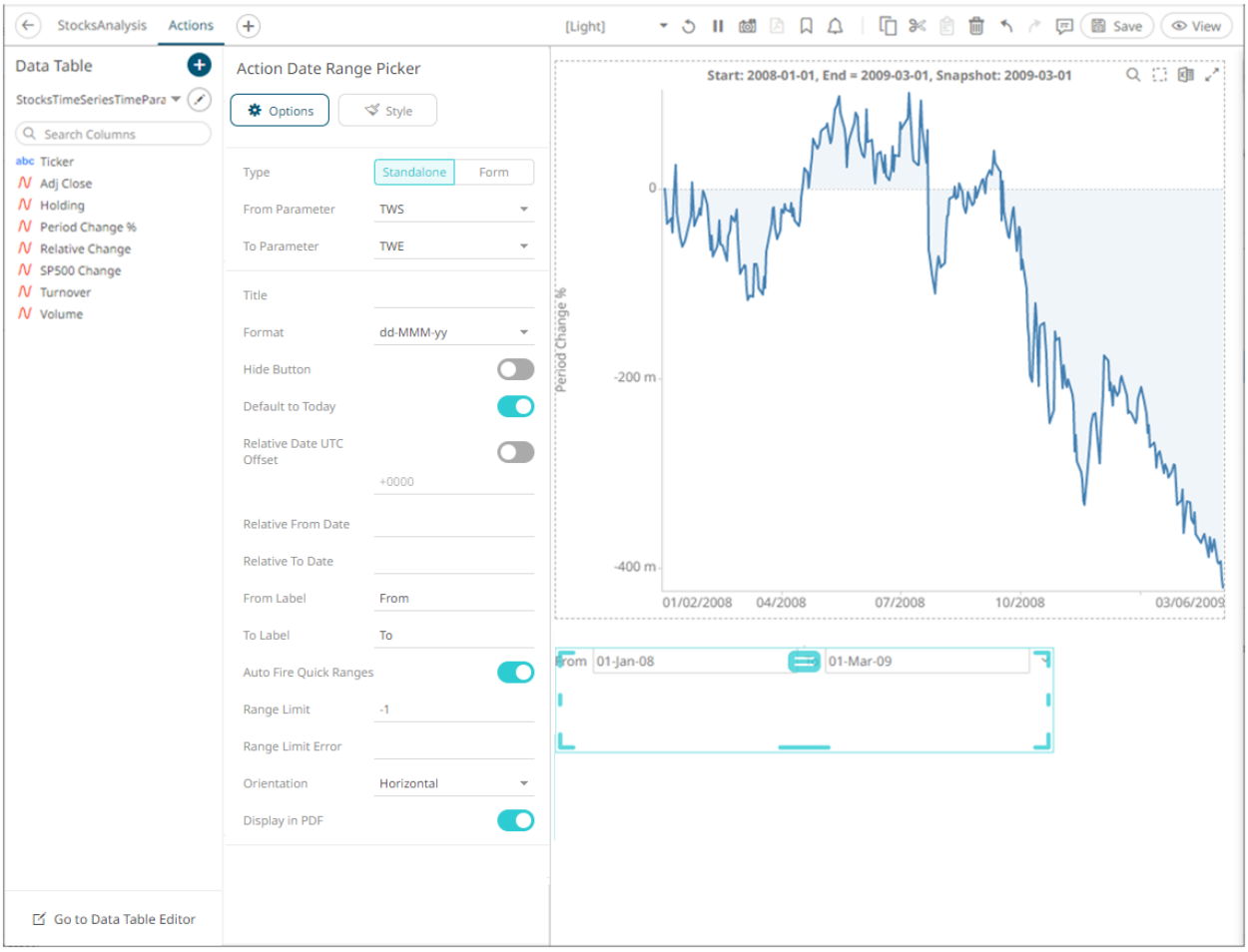
   When set to **Form**, the action date range picker can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

   NOTE **An action form part must be defined first to associate the action date range picker as a component. Refer to Adding an Action Form more information.**

   A line connects the component to the associated form.

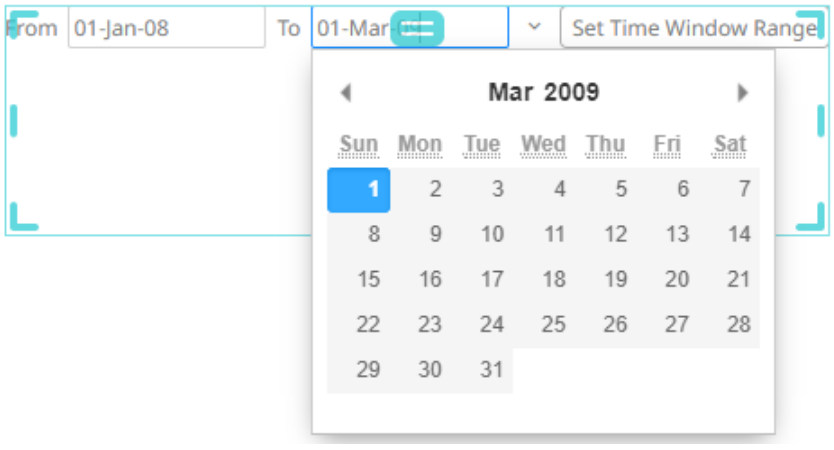


If the action date picker should not be connected to a form, it can be set to **Standalone** instead. Select the parameters that will be used for the *From Parameter* and *To Parameter* dates range.



3. Enter the *Title* of the action date range picker button.
4. Select the Date/Time *Format*.

   Clicking on the *Date/Time* box displays the date picker in calendar mode.



   The text of the date can be directly entered, or alternatively it can be clicked on, to bring up a date picker in the Web client.

5. Tap the **Hide Button** slider to turn it on. This means the action control will update the parameter whenever the value of the data picker changes.

6. Tap the **Default to Today** slider to turn it on. This allows the action date range picker to check the current value of the dashboard parameter. If it is set to null/empty, an action is executed to update the parameter and trigger the loading of the parameterized data with the current date.
7. Tap the **Relative Date UTC Offset** slider to turn it on then enter the *UTC Offset* value (default is **+0000**).

   By default, when an action date range picker performs a relative date calculation, the point in time that the calculation is relative to will be based on the time zone picked up from the browser (i.e., the timezone the user is in). Since parameters do not encode the time zone information, the resulting value from the relative date calculation will be affected by the time zone the relative calculation is performed in.

   Example:

   User timezone: UTC+0200
   Expression: now
   UTC Offset: none
   Current time: 2001-01-01T00:00:00.000+0000
   Evaluated time: 2001-01-01T02:00:00.000+0200
   Parameter value: 2001-01-01T02:00:00.000

   The **now** expression is evaluated in relation to the current time and when formatted, the time zone information is no longer encoding, resulting in a parameter value offset from UTC by **+0200**.

   The UTC offset setting allows for configuring an offset from UTC for the time the calculation is relative to, independent of the timezone the user is in.

   Example:

   User timezone: UTC+0200
   Expression: now
   UTC Offset: +0600
   Current time: 2001-01-01T00:00:00.000+0000
   Evaluated time: 2001-01-01T02:00:00.000+0200
   Parameter value: 2001-01-01T06:00:00.000

   Since the UTC offset is **+0600**, the resulting parameter value is formatted with the offset from UTC rather than as the time zone the user is in.

   This allows the parameter values generated by date pickers to target a specific UTC offset instead of generating values based on the time zone the user is currently in.
8. Instead of turning the **Default to Today** slider on, enter the following date range values:
   - *Relative From Date* or the start Date/Time
   - *Relative To Date* or the end Date/Time

     This allows the relative date calculation (based on today's date), by parsing the input text string.

     This method uses the following pattern:

     SIGN NUMBER UNIT

     Where:

     - **SIGN** is either a '+' or '-'
     - **NUMBER** is any number
     - **UNIT** which can be any of the following:
       - m - minute
       - H - hour
       - D - day
       - B - business day
       - M - month
       - Y - year

For example:

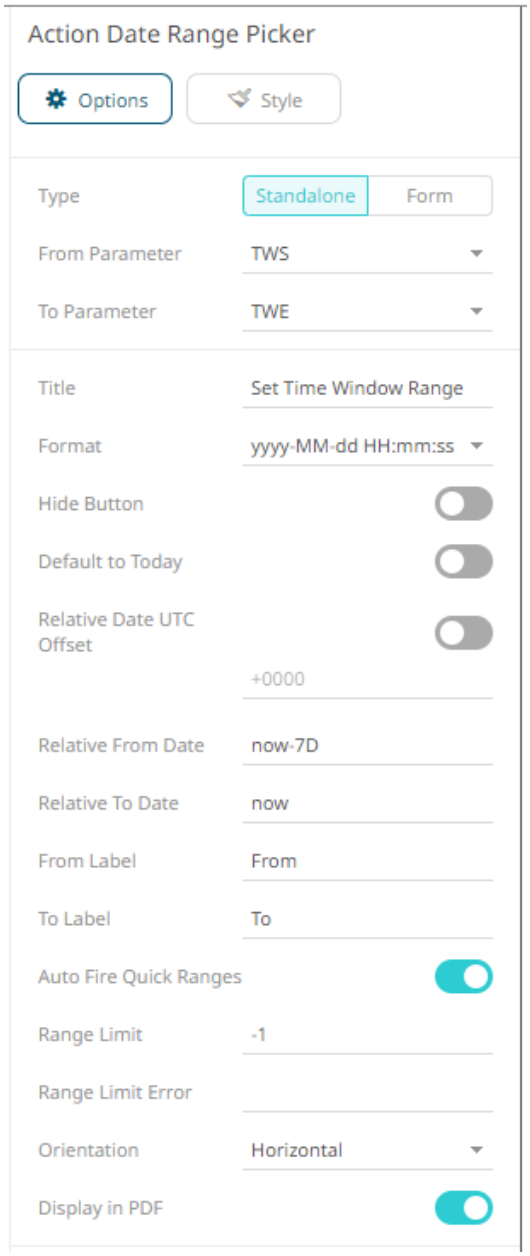
Setting	Description
-5m	Back 5 minutes from current time.
-1D	Back 1 day from today.
+D	Forward 1 day from today.
-1B	Back 1 business day from today (ignore Saturday and Sunday).
+1B	Forward 1 business day from today (ignore Saturday and Sunday).
-1M	Back 1 month from today.
-1Y	Back 1 year from today.
-7D	Back 7 days from today.
-14D	Back 14 days from today.

When these values are entered, the correct date should be selected, and then the data requests are executed based on this date.

The special **now** term can also be used, this represents the current Date/Time. For example:

- Using **now** will set the date picker to the current Date/Time
- **now-7D** will set the date picker to 7 days ago. This is the same as specifying -**7D**

  For example:



The *From* date will be **now-7D** and the *To* date will be **now** by default.

For example, **now** is September 14, it will go back 7 days (September 7) and then the date will be recalculated.

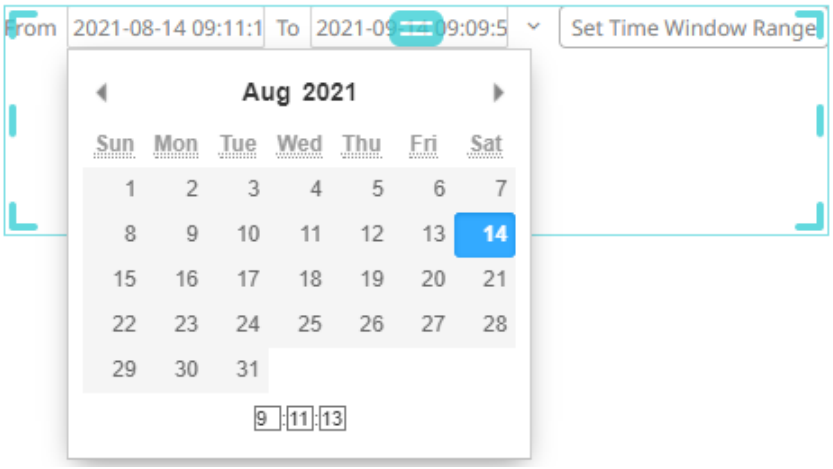


In addition, you can use the **SIGN UNIT NUMBER** pattern to modify the relative date calculation.

For example, if you enter **-1M**:

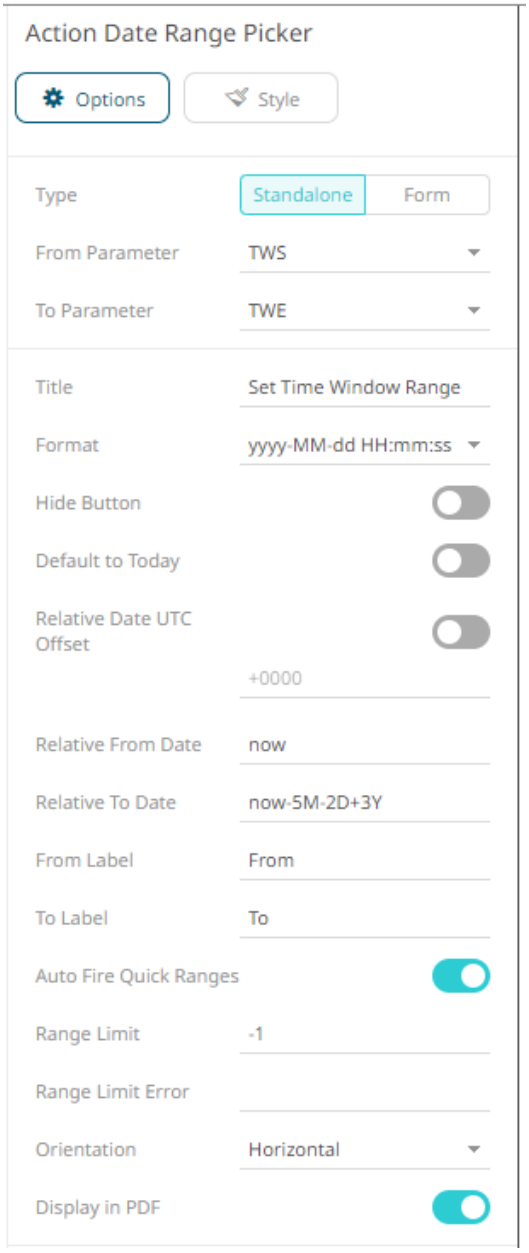


The recalculated relative date will be August 14:

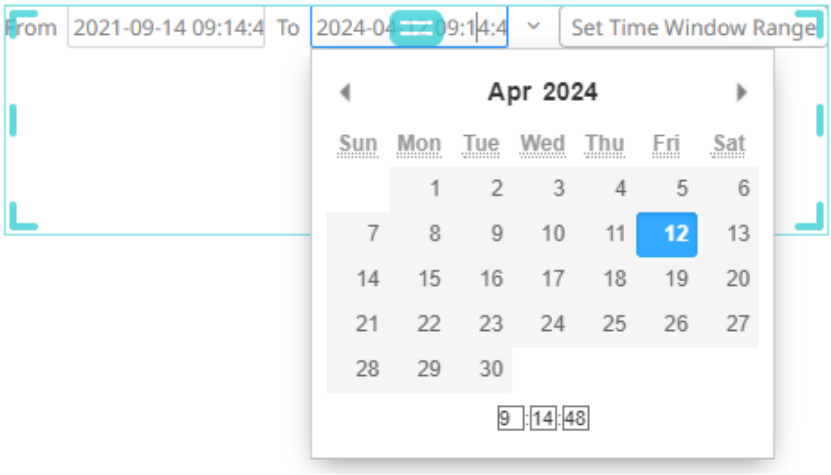


Complex expressions can also be entered to recalculate the relative date. These expressions are evaluated from the left to right pattern. The **now** term can also be used as a pointer to the currently evaluated value of the relative time expression.

For example, if you enter **now-5M-2D+3Y** as the *Relative To Date* and **now** as the *Relative From Date*:

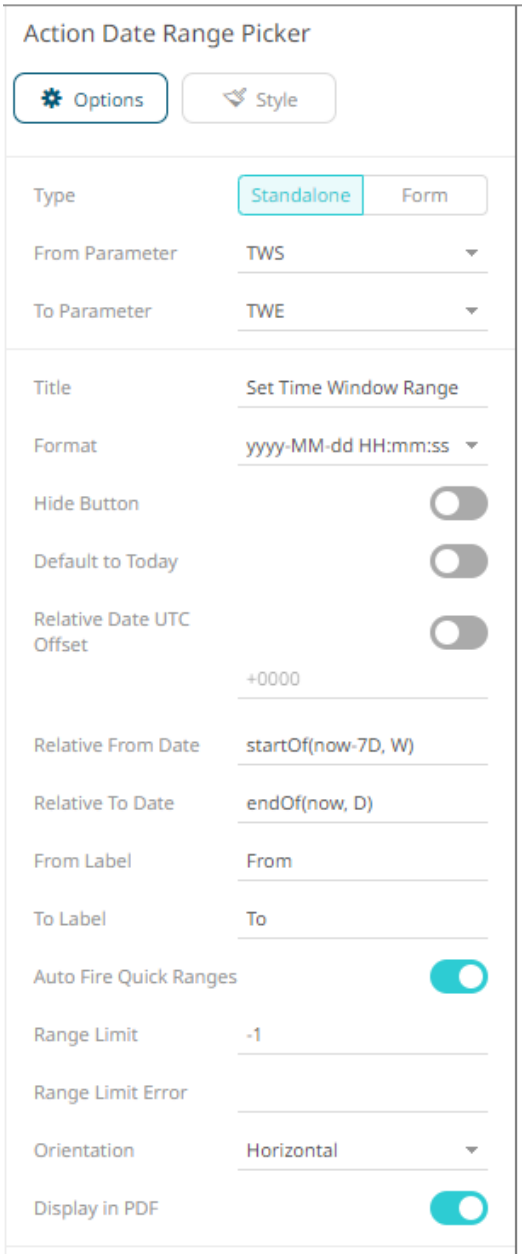


The date will be **now-5M-2D+3Y** by default.

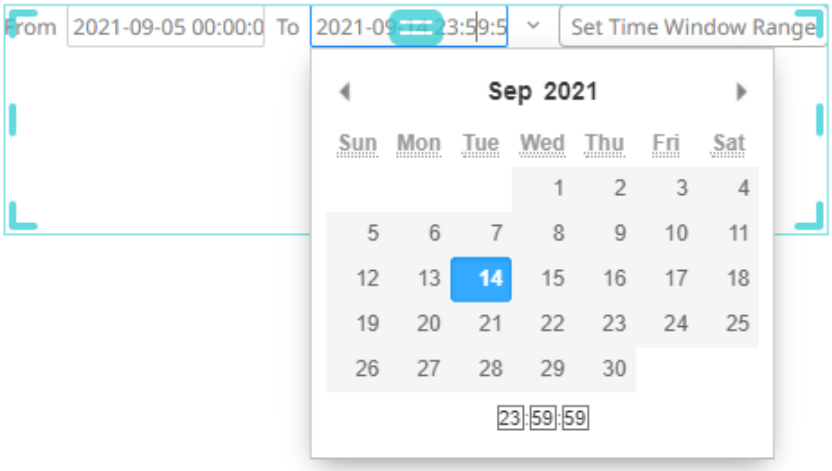


In the expression, you can also use **startOf** and **endOf** functions. Both functions take the same arguments, a relative time string, and a unit.

Lastly, you can define a complex expression with the functions. For example, if you enter **startOf(now-7D, W)** as the *Relative From Date* and **endOf(now, D)** as the *Relative To Date*:

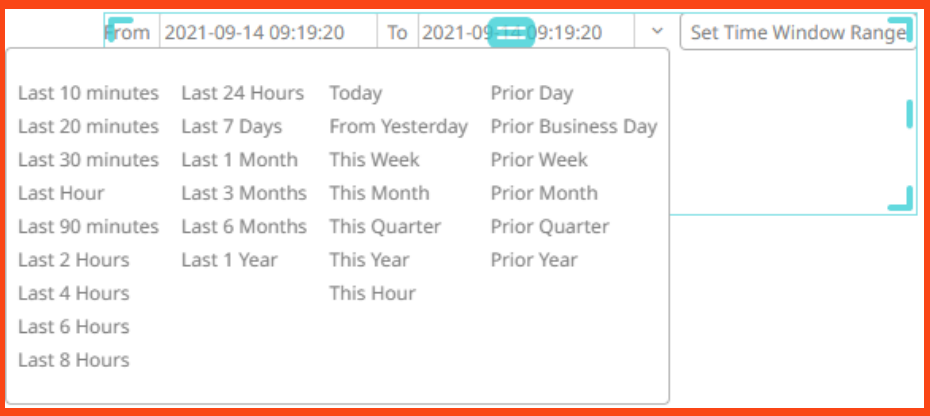


The *From* date will display the start of the previous week and the *To* date will display the end of the current day:



NOTE

- **The *Default Relative Date* will be used if the dashboard parameter is null/empty.**
- **The relative Date/Time string is case sensitive.**
- **You can also opt to select from pre-populated date ranges:**



Refer to *Selecting Relative Dates in Action Date Picker and Action Date Range Picker Controls* for more information.

9. You may opt to set new *From Label* and *To Label*.
10. Tap the **Auto Fire Quick Ranges** slider to turn it on. This automatically updates the date ranges as you click in the drop-down in the Web client. Otherwise, you have to select a date range first in the drop-down and then click  to update.
11. Set the *Range Limit* of the date by selecting the number of days. By default, the range limit is **-1**.

NOTE **Selecting a shorter date range limit can help in having a faster response time.**

12. When a *Range Limit* has been set, the *Range Limit Error* box is enabled. It is mandatory to enter an error message to help in defining a better input to match the set limit.

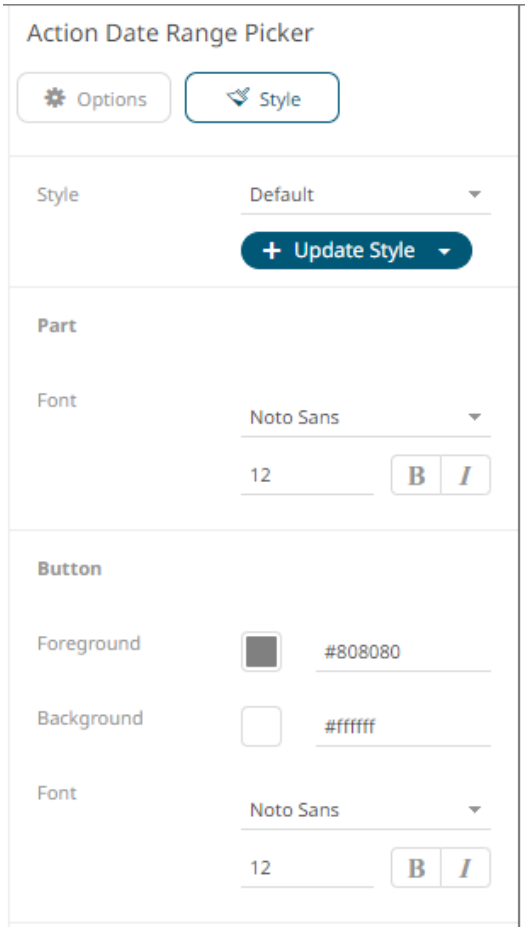
    For example: “The Range Limit is set to 30 days. Modify the To date within this limit.”

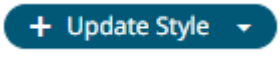


13. Tap the **Display in PDF** slider to turn it on and include the action date picker in the PDF output.
14. To set the style of the Action Date Range Picker, click **Style** 

.

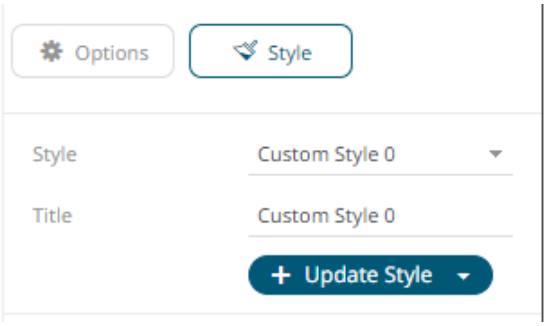
    The page updates to display the *Style* pane.



15. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and button.
16. Click the **Foreground** or **Background** box to display the *Color* dialog and set the color or enter the Hex color code.
17. Click **Update Style** 

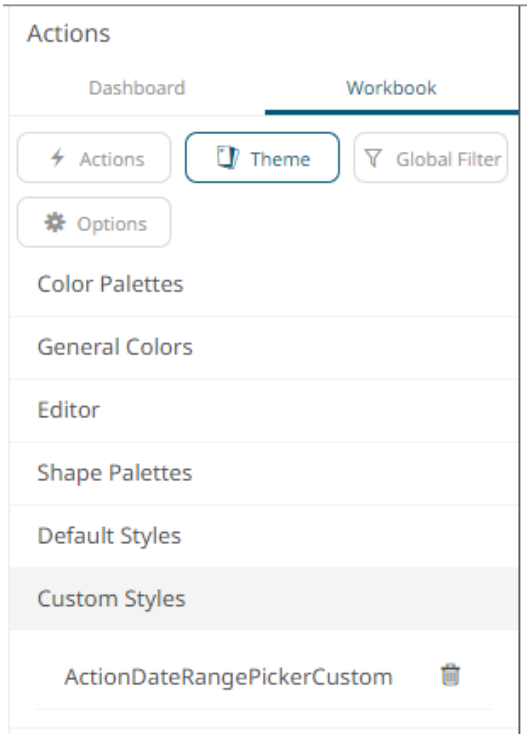
and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

      The *Style* pane updates to display the *Title* control.



- Enter the custom style *Title*.
- If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

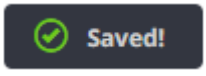
The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the action date range picker will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

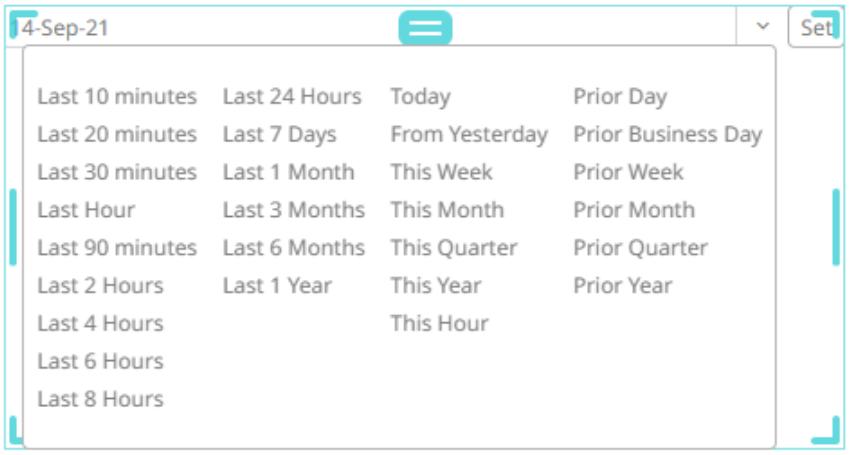
18. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

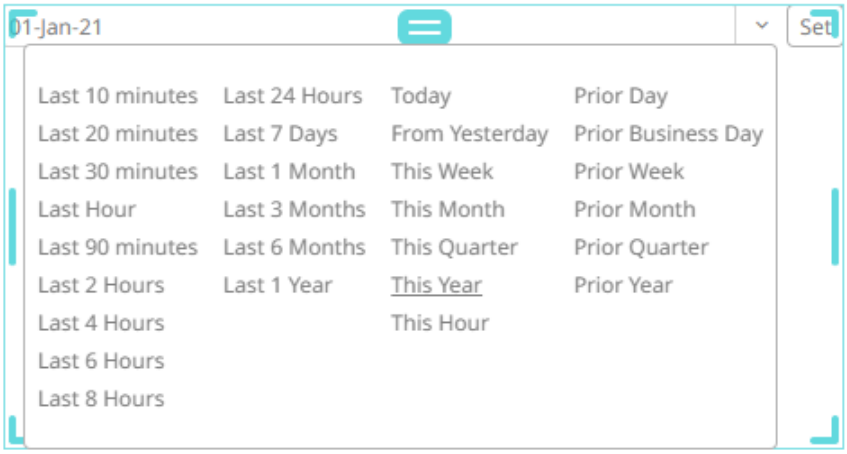
Selecting Relative Dates in Action Date Picker and Action Date Range Picker Controls

Both the *Action Date Picker* and *Action Date Range Picker* controls have pre-populated quick ranges that allow you to readily select a date range.

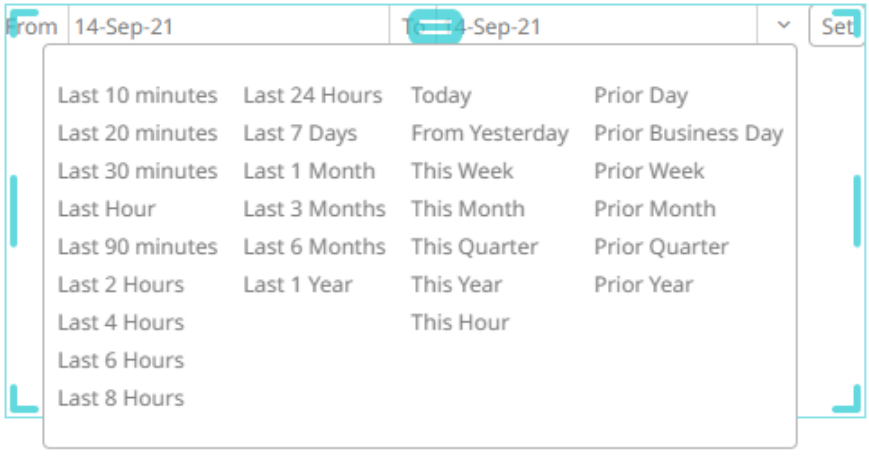
For example, for an Action Date Picker, if the current date is September 14, 2021 clicking  will display:



Clicking **This Year** will recalculate the current date to the start of the current year (January 1, 2021):

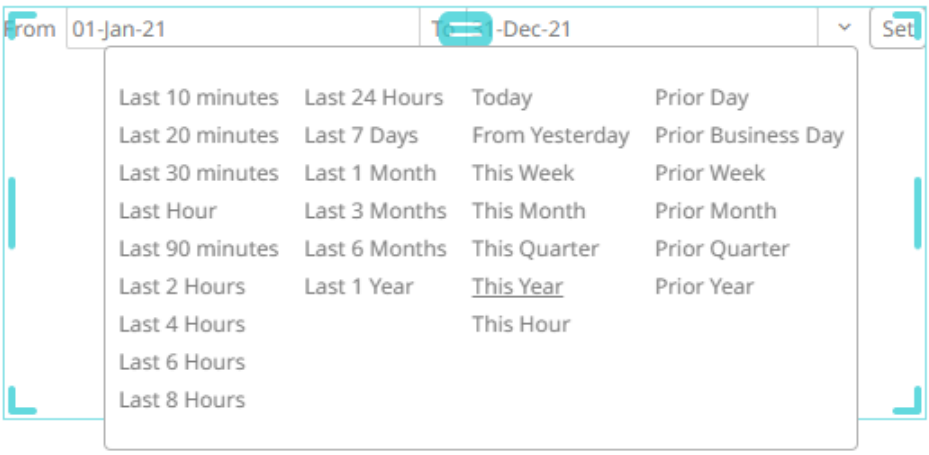


For the Action Date Range Picker, clicking ⌄ will display:



The recalculated date range will include the start and end dates based on the selected quick range.

For example, clicking **This Year** will recalculate the current date range from the start of the current year (January 1, 2021) to the end of the current year (December 31, 2021):



Select any of the following quick ranges:

Setting	Description
Last 10 minutes	Back 10 minutes from current time.
Last 20 minutes	Back 20 minutes from current time.
Last 30 minutes	Back 30 minutes from current time.
Last Hour	Back 1 hour from current time.
Last 90 minutes	Back 90 minutes from current time.
Last 2 Hours	Back 2 hours from current time.
Last 4 Hours	Back 4 hours from current time.
Last 6 Hours	Back 6 hours from current time.
Last 8 Hours	Back 8 hours from current time.
Last 24 Hours	Back 1 day from today.
Last 7 Days	Back7 days from today.
Last 1 Month	Back 1 month from today.
Last 3 Months	Back 3 months from today.
Last 6 Months	Back 6 months from today.
Last 1 Year	Back 1 year from today.
Today	Start of current day.
From Yesterday	Start of 1 day from today.
This Week	Start of the week from today.
This Month	Start of the month from today.
This Quarter	Start of the quarter from today.
This Year	Start of the year from today.
Prior Day	Start of 1 day from today.
Prior Business Day	Back 1 business day from today (ignore Saturday and Sunday).

Prior Week	Start of the prior week from today.
Prior Month	Start of the prior month from today.
Prior Quarter	Start of the prior quarter from today.
Prior Year	Start of the prior year from today.

NOTE **If the preferred quick range is not available, it is always possible to enter a relative date inside the date picker.**

Adding an Action Dropdown

The Action Dropdown allows the selection of the parameter value that will be used by the action.

Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Action Dropdown** 

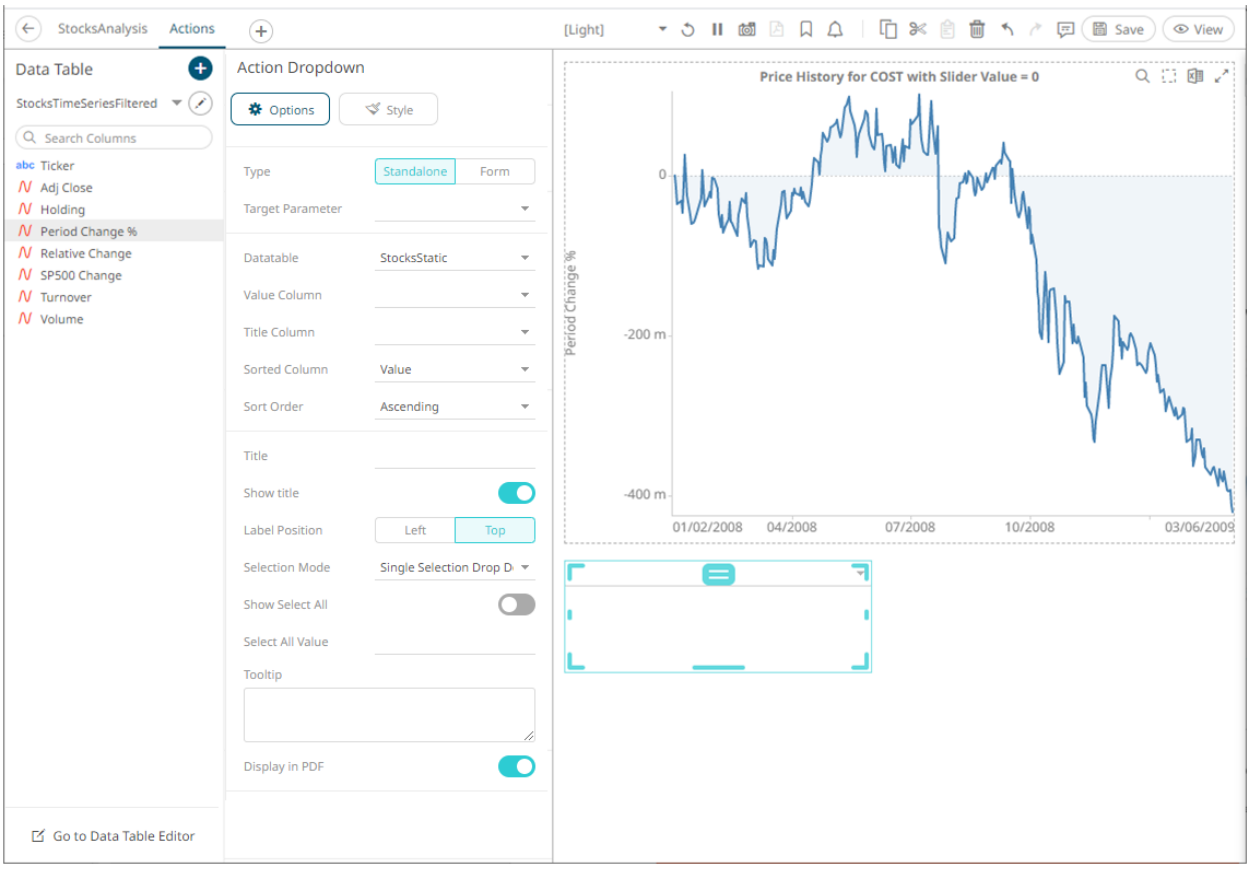
icon.

   The *Action Dropdown* pane is displayed, and the *Action Dropdown* part is added on the dashboard canvas.

   For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
Slider Value	Text	0

   These parameters are used on the *Title* of the Line graph (e.g., **Price History for {Ticker} with Slider Value = {Slider Value:0.00%}**).

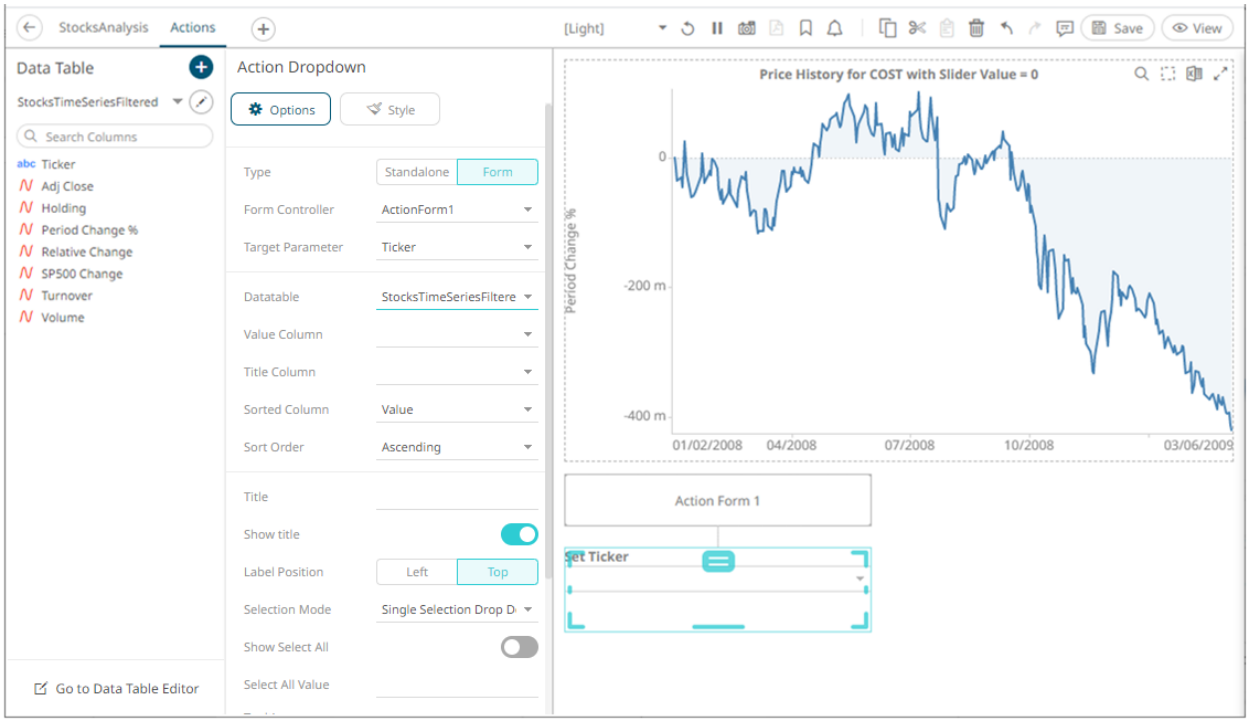


2. The action dropdown can be configured to either be a **Standalone** or a **Form** component.

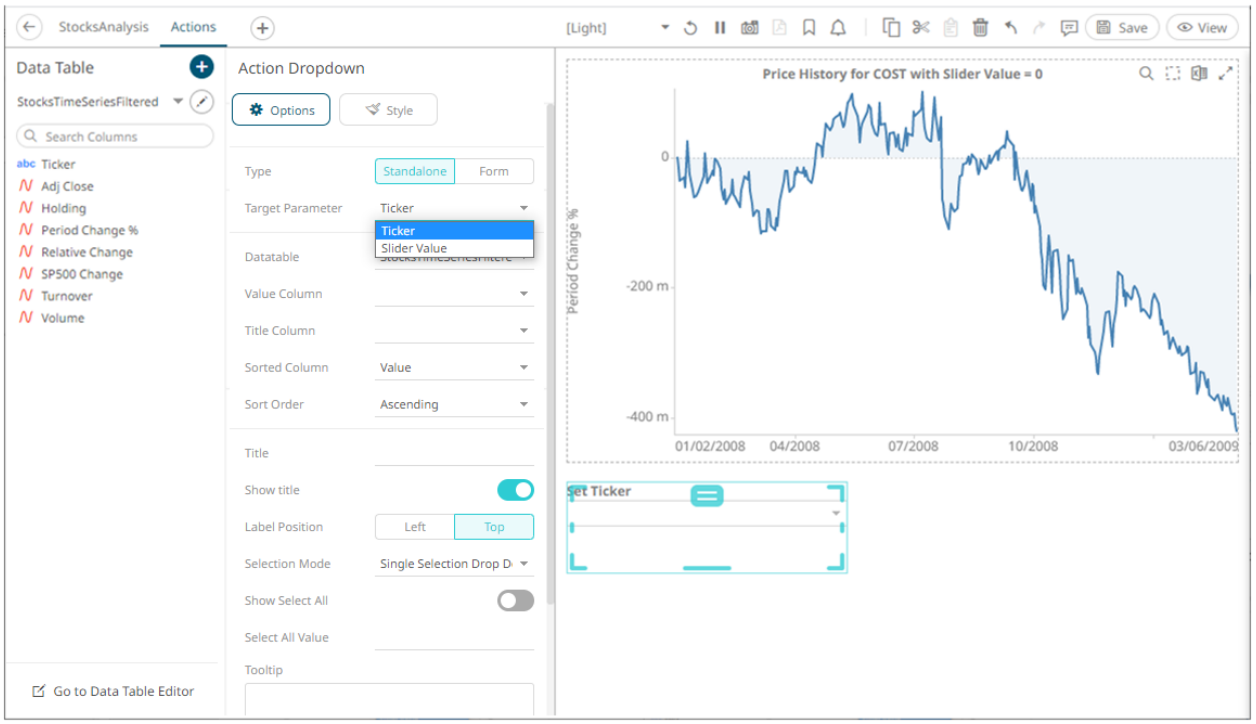
   When set to **Form**, the action dropdown can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

   NOTE **An action form part must be defined first to associate the action dropdown as a component. Refer to Adding an Action Form more information.**

   A line connects the component to the associated form.



If the action dropdown should not be connected to a form, it can be set to **Standalone** instead. Select the *Target Parameter* that will be updated by this action part.



3. Select the *Data Table* that will be source of the *Value Column* and *Title Column*.
4. Select a *Value Column*.
5. Select a *Title Column*.
6. For the *Sorted Column*, select either **Value** or **Title**. If you did not select a *Title Column*, the *Sorting* drop-down is disabled and the *Value Column* is automatically used for sorting.

7. Optionally, specify a sorting mode for the values: **Ascending**, **Descending**, or **None**.

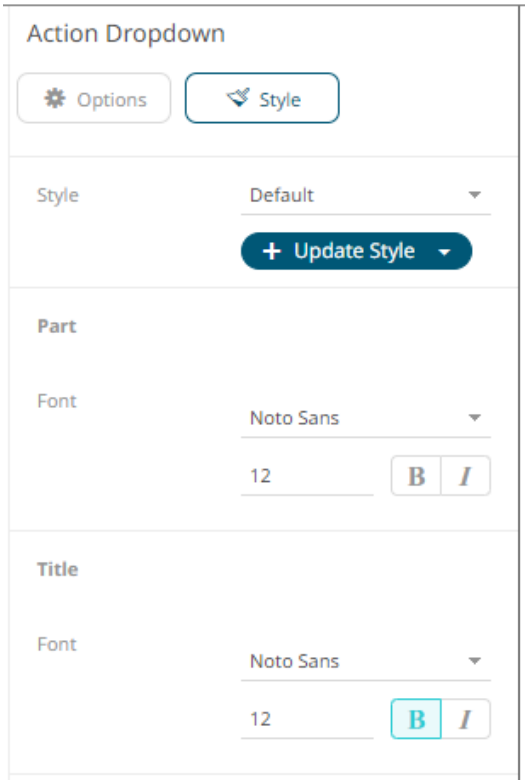
> **NOTE** **The Sort order setting is based on "Sorting" + Value/Title drop-down and "Order" + Ascending/Descending.**

8. Enter the drop-down *Title*.

   Otherwise, if left blank, the tile of the control will be **Set <Target Parameter>**.
9. Tap the **Show Title** slider to display the *Title* in the drop-down.
10. Select the *Label Position*: **Top** or **Left**.
11. Select the *Selection Mode*.
12. Tap the **Show Select All** slider to allow selection of all items. Consequently, this causes an array of parameter values to be passed to the action or auto parameterization.
13. Enter the *Select All Value*.
14. Enter a description or useful information about the action drop down into the *Tooltip* box.
15. Tap the **Display in PDF** slider to turn it on and include the action button in the output PDF.
16. To set the style of the Action Dropdown, click **Style** 

.

    The page updates to display the *Style* pane.

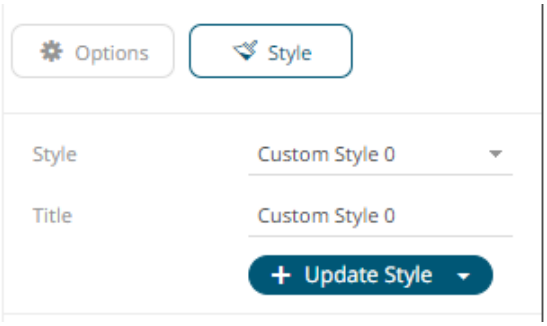


17. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part and title.
18. Click **Update Style** 

and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.

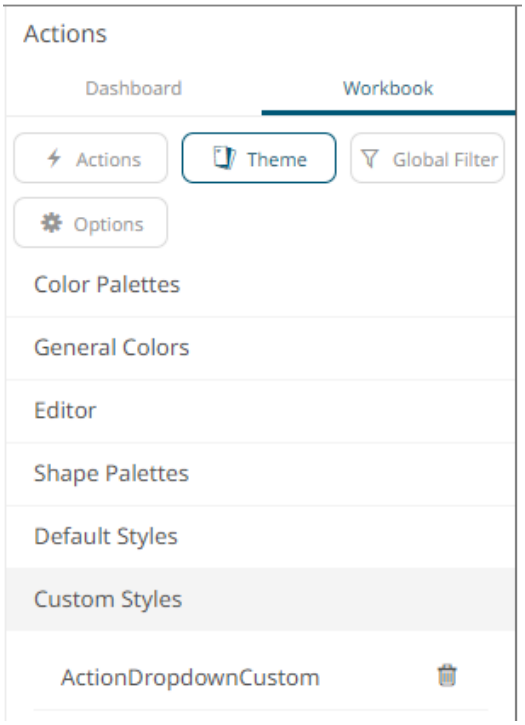
- **Create custom style** – Save the changes and set it as a custom style.

  The *Style* pane updates to display the *Title* control.



  - Enter the custom style *Title*.
  - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

  The new custom style is added in the **Workbook > Theme > Custom Styles** list.



  If published, the custom style configuration of the Action Dropdown will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

19. Click the **Save** 

icon on the toolbar to save the changes.

    When saved, the 

notification is displayed.

Adding an Action Text Box

The Action Text Box allows users to submit free-text input values for a parameter associated with the action part. It can also be used for entering password parameters.

The currently applied parameter value will be displayed in the action text box.

Steps:

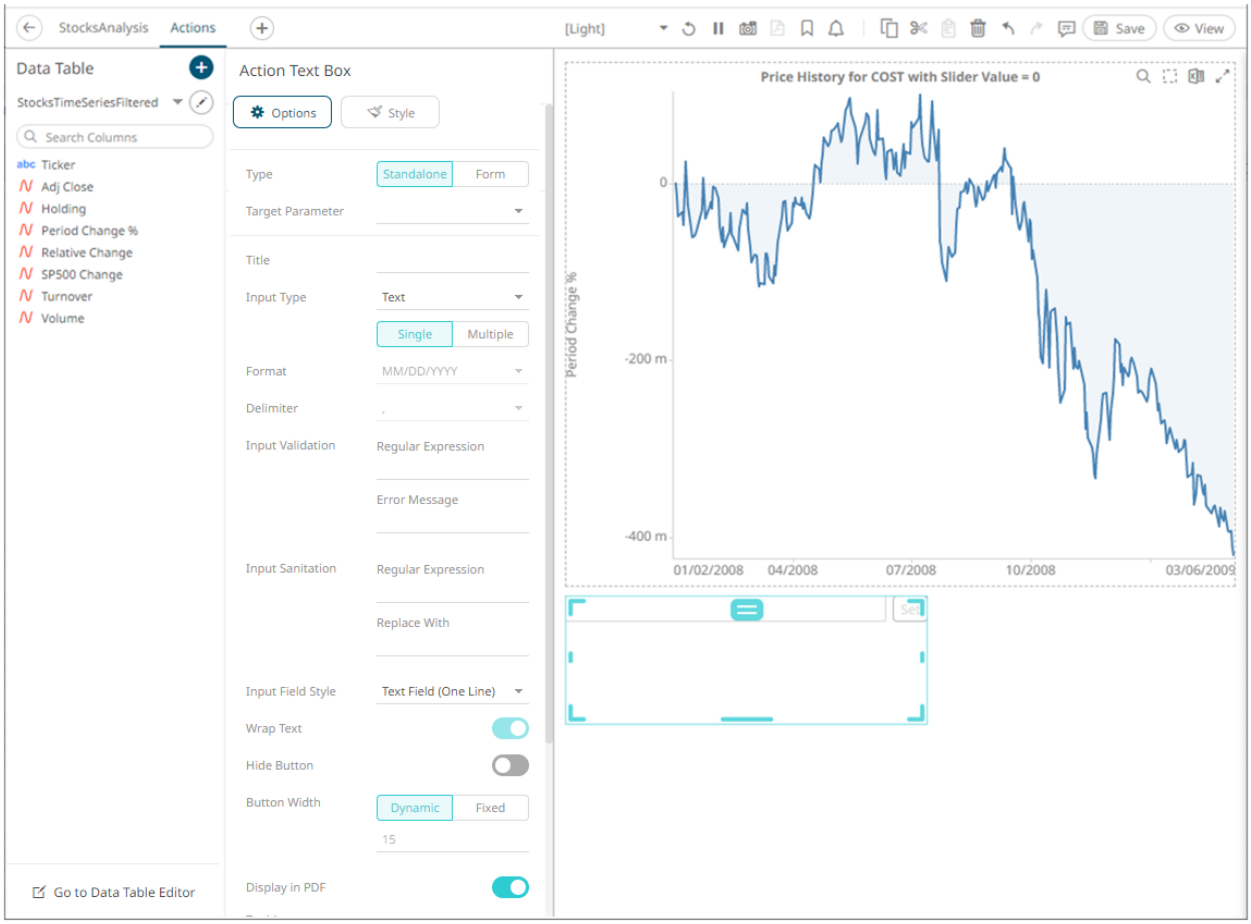
1. After double-clicking or drawing a rectangle on the dashboard canvas, click Control on the *Select Part* pane then click the **Action Text Box** Text Box icon.

   The *Action Text Box* pane is displayed, and the *Action Text Box* part is added on the dashboard canvas.

   For this example, the following parameters are defined:

Parameter Name	Type	Default Value
Ticker	Text	COST
Slider Value	Text	0

   These parameters are used on the *Title* of the Line graph (e.g., **Price History for {Ticker} with Slider Value = {Slider Value:0.00%}**).

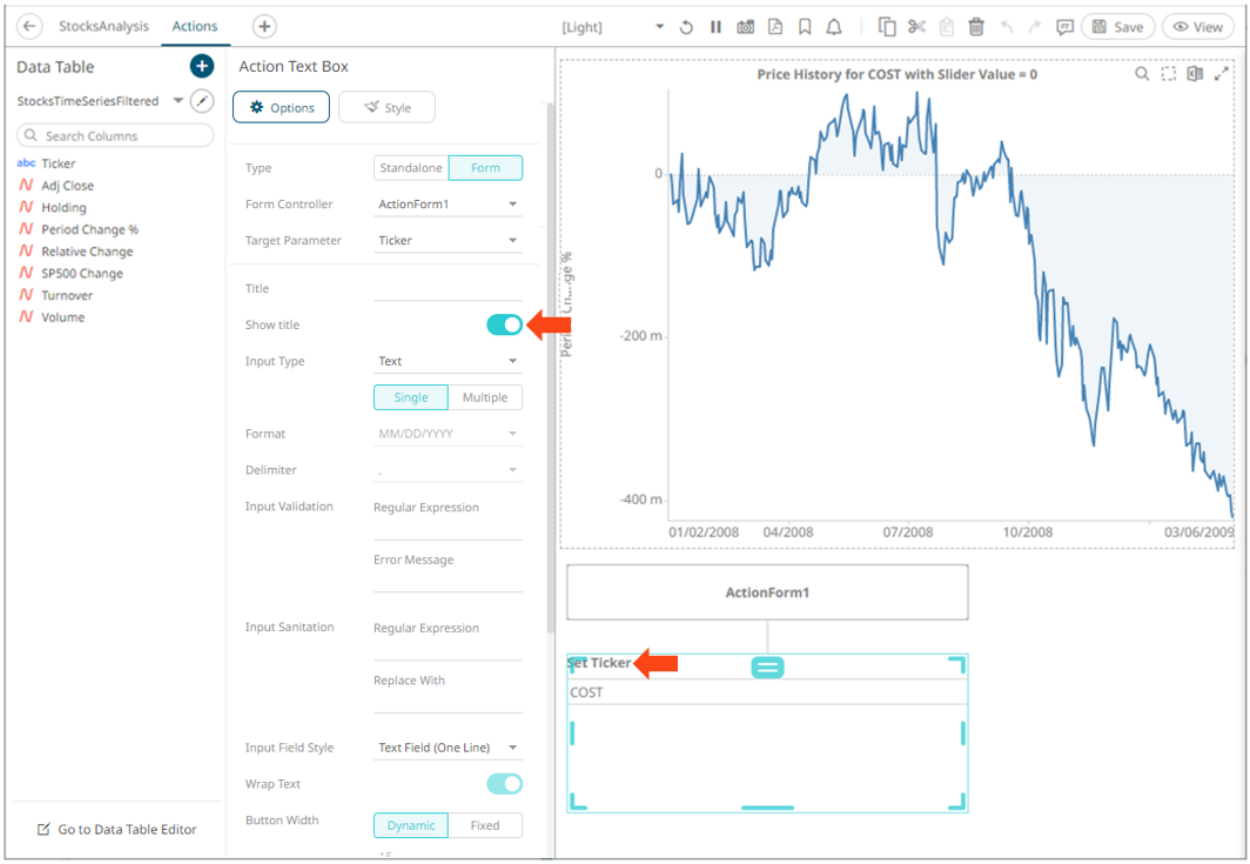


2. The action text box can be configured to either be a **Standalone** or a **Form** component.

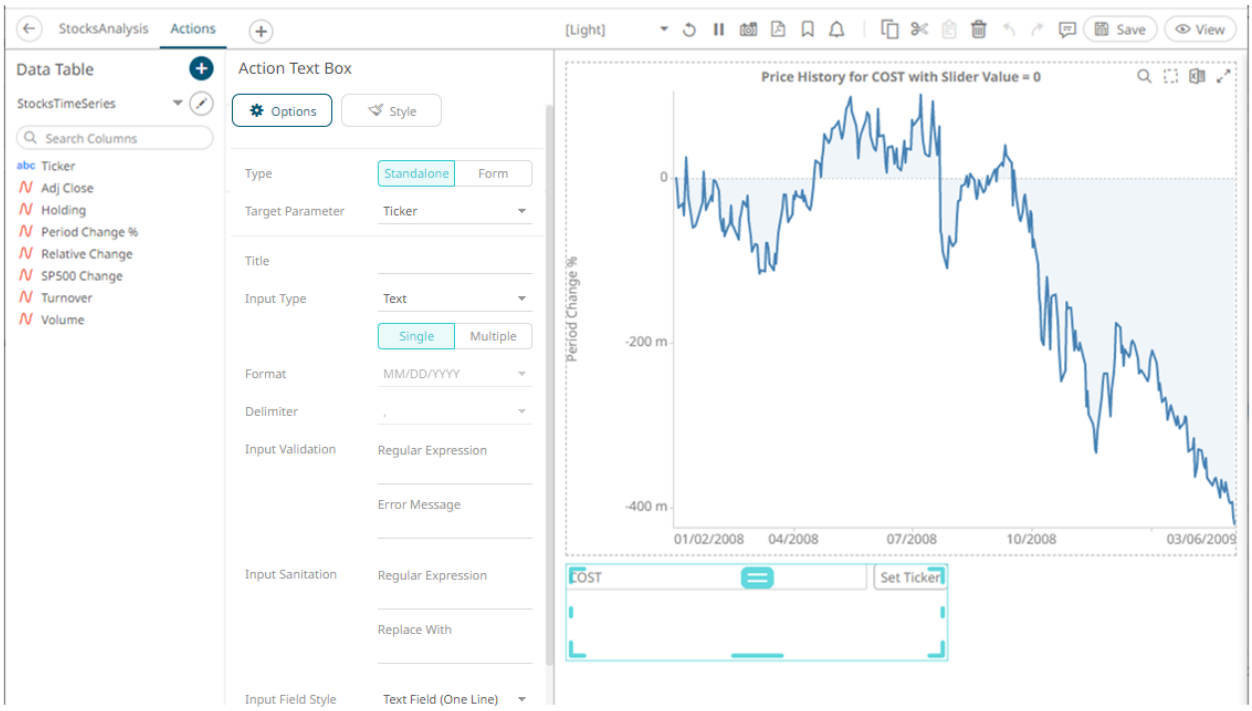
   When set to **Form**, the action text box can be connected to any form controller on the same dashboard. The parameters that the action part can set depends on how the form is configured.

> **NOTE** **An action form part must be defined first to associate the action text box as a component. Refer to Adding an Action Form more information.**

   A line connects the component to the associated form. By default, the *Show Title* slider is turned on and the title is displayed to describe what parameter the text box is setting (e.g., **Set Ticker**). Tap to slider to turn it off.



   If the action text box should not be connected to a form, it can be set to **Standalone** instead. Select the *Target Parameter* that will be updated by this action part.



3. Enter the *Title* of the text box button.

   If set to the **Standalone** type and the *Title* is blank, the button will be **Set <Target Parameter>.**

4. Select the *Input Type*: **Text**, **Numeric**, or **Time**.

   If **Time** is selected, the *Format* field is enabled. Select the Date/Time format.

5. Select the *Input Value Type*: **Single** or **Multiple**.

   If the *Input Value Type* selected is **Multiple**, you can opt to select e *Delimiter* character:

6. Set the custom *Input Validation*:

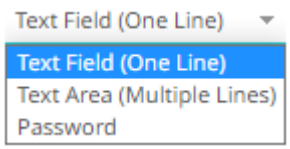
   - Enter a *Regular Expression* to match the input data.
   - The parameter will not be updated unless it passes the validation. Enter an *Error Message* to help in defining a better input in the Action Text Box.

7. Set the *Input Sanitation*:

   - Enter a *Regular Expression* to match the input data.
   - Enter a *Replace Value* which is the value to replace all matches from the regex with.

   Whenever changing the text inside the action text box, this sanitation will be applied to whatever value is entered.

8. Select the *Input Field Style*: **Text Field (One Line)**, **Text Area (Multiple Lines)**, or **Password**.

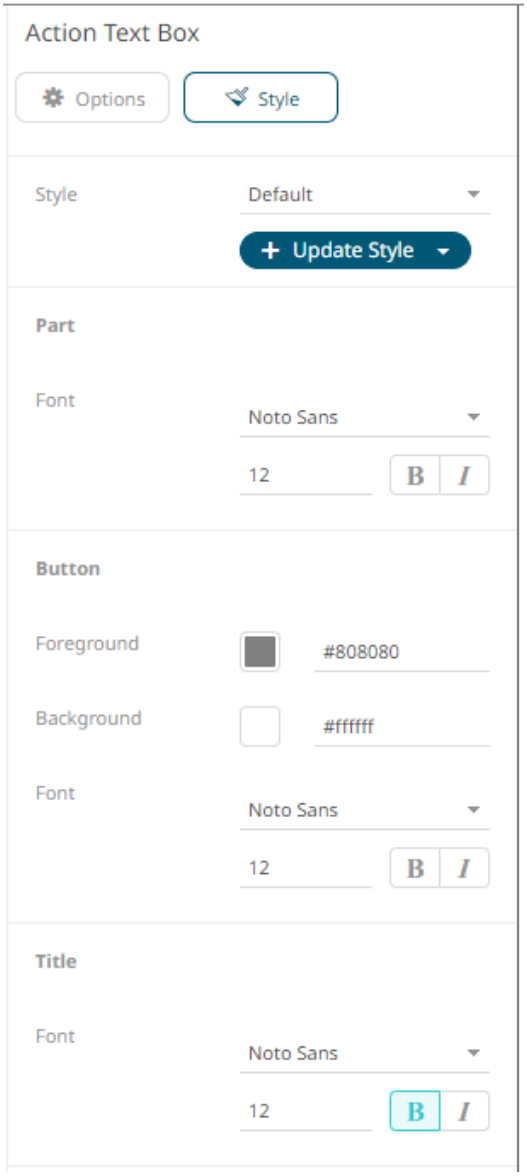


9. Tap the **Wrap Text** slider (applies to **Text Area**).
10. Tap the **Hide Button** slider for the action control to update the parameter whenever the value of the text box changes.
11. Set the *Button Width*. The value can either be calculated dynamically (default is **Dynamic**) or set to a fixed value (**Fixed**).

12. Tap the **Display in PDF** slider to turn it on and include the action button in the output PDF.
13. Enter a description or useful information about the action text box into the *Tooltip* box.
14. To set the style of the Action Text Box, click **Style** 

.

    The page updates to display the *Style* pane.

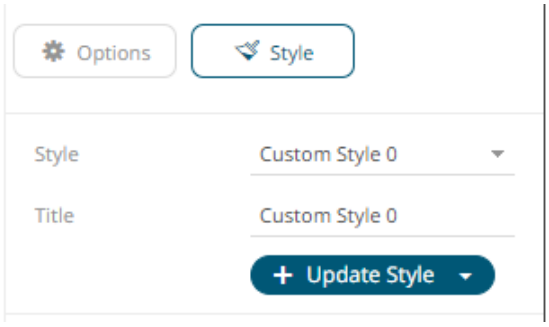


15. Set the *Font* type, size, style (**Bold** and/or **Italic**) of the part, button, and title.

    The title's font is set to **Bold** by default.
16. Click the **Foreground** or **Background** box to display the *Color* dialog and set the button's color or enter the Hex color code.
17. Click **Update Style** 

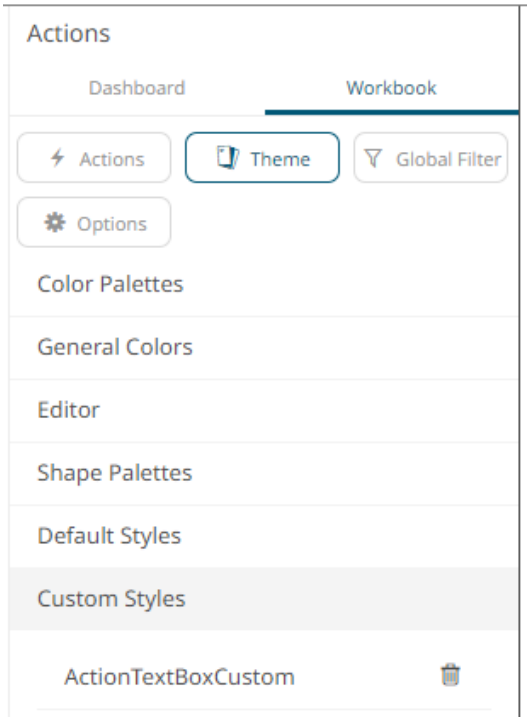
and select any of the following options:
    - **Set current as default** – Save the changes and set it as the default.
    - **Create custom style** – Save the changes and set it as a custom style.

The *Style* pane updates to display the *Title* control.



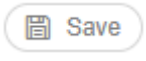
- Enter the custom style *Title*.
- If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

The new custom style is added in the **Workbook > Theme > Custom Styles** list.



If published, the custom style configuration of the Action Text Box will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

18. Click the **Save**  icon on the toolbar to save the changes.

When saved, the  notification is displayed.

GENERAL PARTS

Dashboards can be enhanced by adding or setting the following general parts:

- Text Label
- Panel
- Image Box
- Iframe
- JavaScript Part

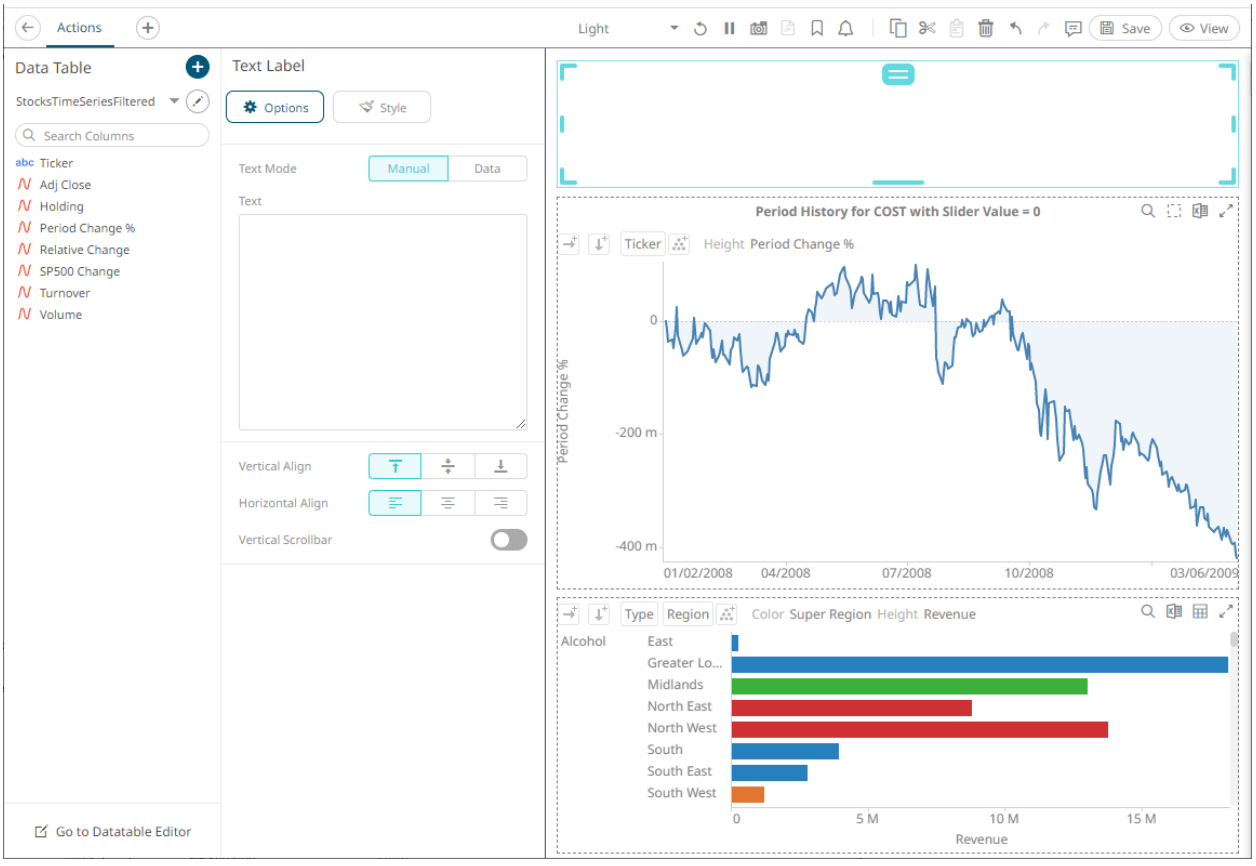
Adding a Text Label

You can add labels or explanatory text to a dashboard using a text label.

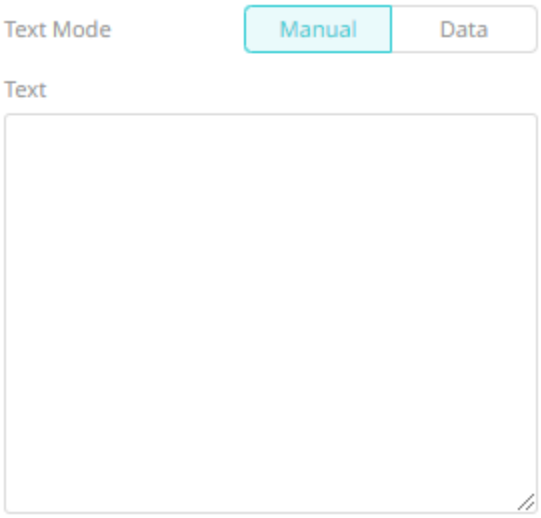
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click General on the *Select Part* pane then click the **Text Label** Text Label icon.

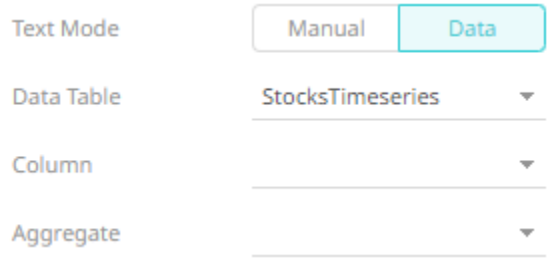
   The *Text Label* pane is displayed, and the *Text Label* part is added on the dashboard canvas.



2. Select the *Text Mode*:
   - Manual



     Enter the text.
   - Data



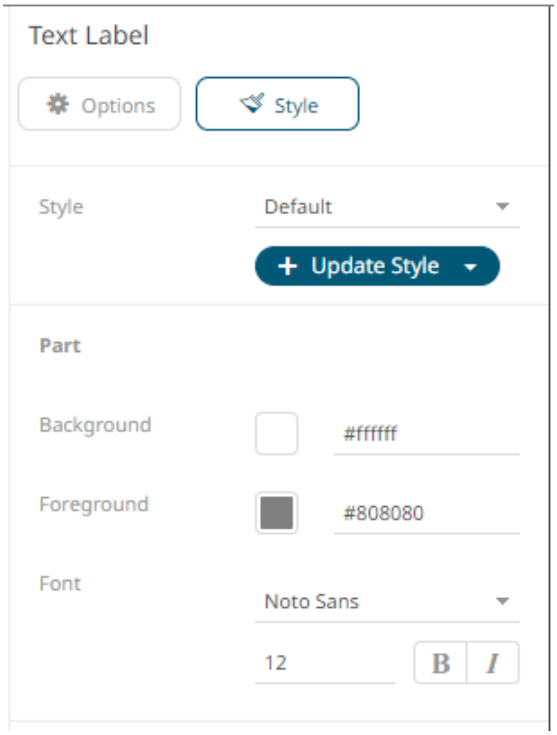
     Select the source *Data Table*, *Column,* *Aggregate*, and specify the *Format*.

> **NOTE** **For text time series columns, only TextUnique and TextContactDistinct aggregates are supported.**

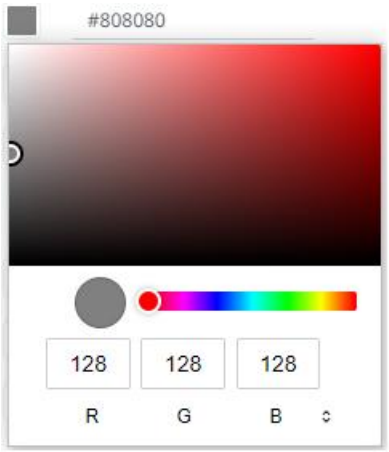
3. Select the *Vertical Align*: **Bottom**  , **Middle**  , or **Top** 
4. Select the *Horizontal Align*: **Left**  , **Center**  , or **Right** 
5. Tap the **Vertical Scrollbar** slider to turn it on.
6. To set the style of the Text Label, click **Style** 

.

   The page updates to display the *Style* pane.

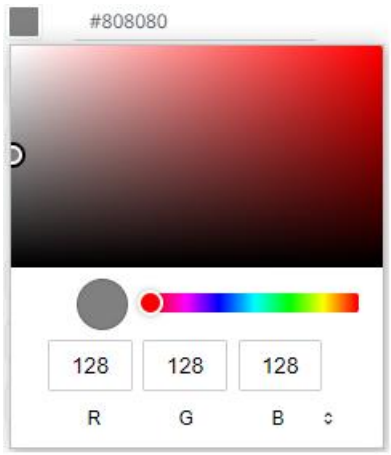


7. To modify the **Foreground** or **Background** color:
   - click the corresponding *Color* box to display the *Color* dialog to:

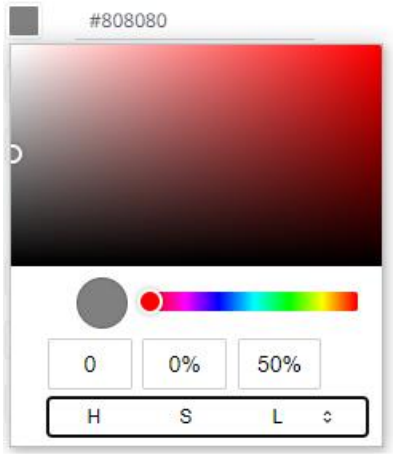


     - select the color, or
     - click to enter the values

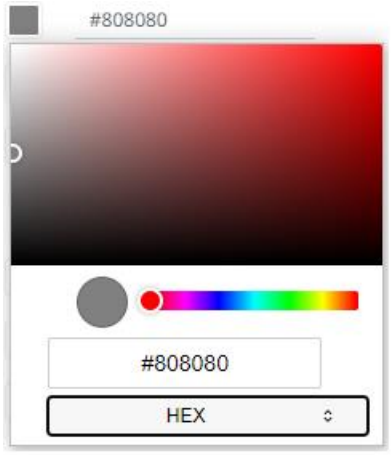
     for RGB



for HSL



for the Hex color code



- or enter the *Hex* color code

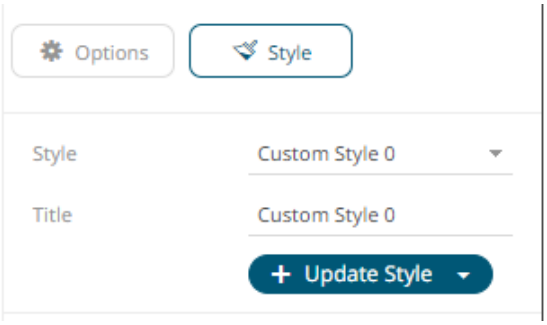


8. Set the *Font* type, size, style (**Bold** and/or **Italic**).
9. Click **Update Style** 

and select any of the following options:

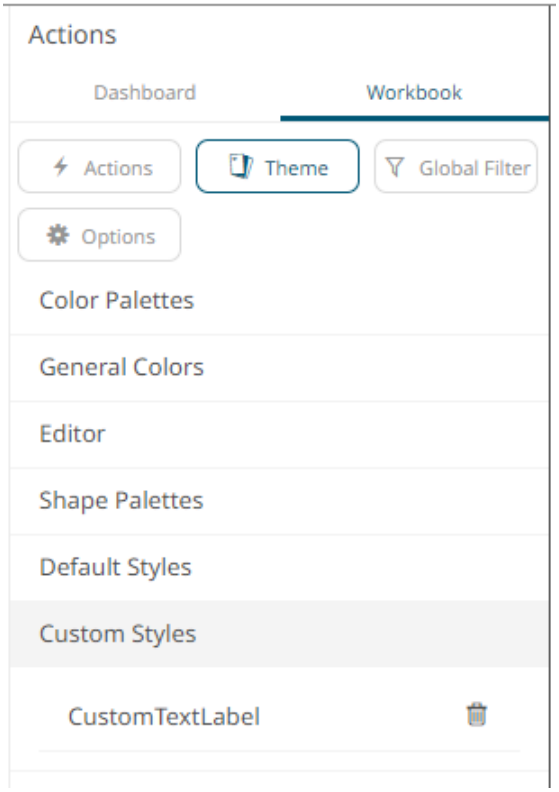
- **Set current as default** – Save the changes and set it as the default.
- **Create custom style** – Save the changes and set it as a custom style.

  The *Style* pane updates to display the *Title* control.



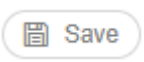
  - Enter the custom style *Title*.
  - If there are additional changes made, click **Update Current Style** in the *Update Style* drop-down.

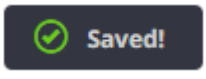
  The new custom style is added in the **Workbook > Theme > Custom Styles** list.



  If published, the custom style configuration of the text label will be added to the Global custom styles list and can be applied to other parts.

- **Reset to default** – Revert to the original default settings.

10. Click the **Save**  icon on the toolbar to save the changes.

    When saved, the  notification is displayed.

Panel

Dashboards can be flat or consist of groups of dashboard parts. Grouping of parts can be done by adding them in a panel.

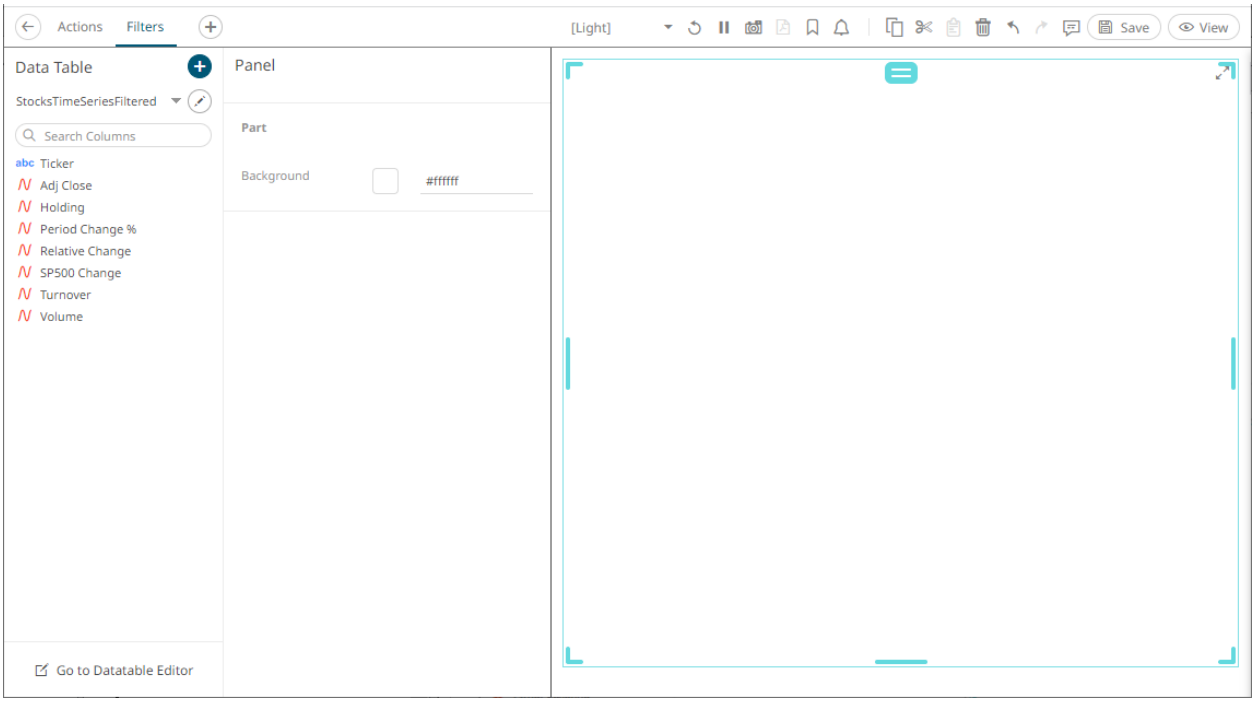
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Panel** 

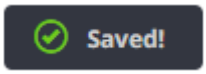
icon.

   The *Panel* pane is displayed, and the *Panel* part is added on the dashboard canvas.



2. Click the **Background** box to display the *Color* dialog and set the background color or enter the Hex color code.
3. Add more parts or visualization in the panel.
4. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

notification is displayed.

Adding an Image Box

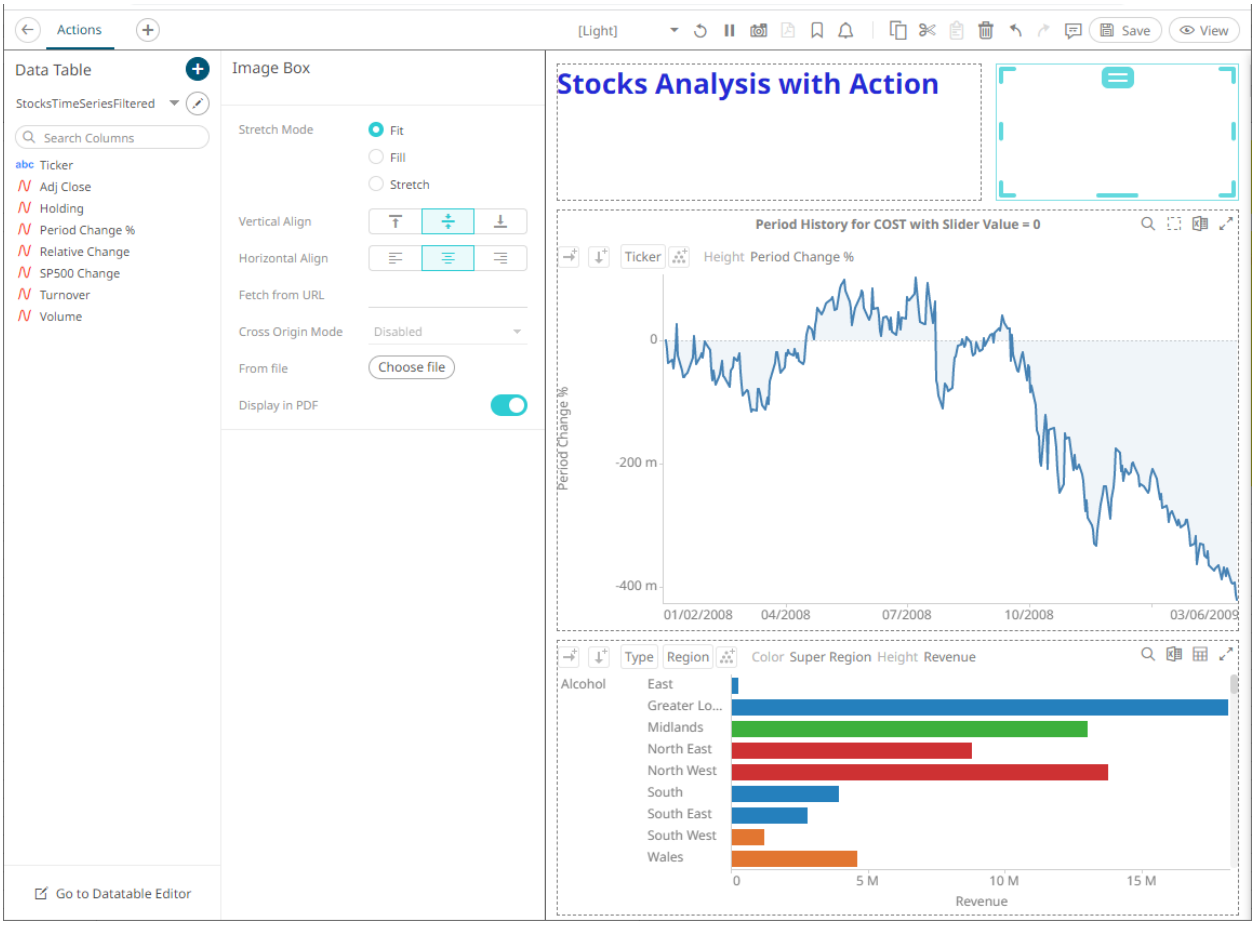
You can add logos or other graphics to a dashboard using an Image Box.

These can be retrieved from disk or retrieved at display time from an external URL.

Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click General on the *Select Part* pane then click the **Image Box** Image Box icon.

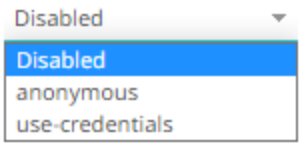
   The *Image Box* pane is displayed, and the *Image Box* part is added on the dashboard canvas.

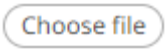


2. Select the *Stretch Mode*: **Fit, Fill,** or **Stretch.**
3. Select the *Vertical Align*: **Top** , **Middle** , or **Bottom**
4. Select the *Horizontal Align*: **Left** , **Center** , or **Right**
5. You can either:

   - enter the URL of the image file in the *Fetch from URL* text box and click .

     This enables the *Cross Origin Mode* drop-down list which allows for cross-origin attribute configuration on the image when doing a *Copy Dashboard Image*. Available states include:



- click 

to browse the image file in the *Open* dialog.

6. Tap the *Display in PDF* slider to include the image in the PDF output.
7. Click the **Save** 

icon on the toolbar to save the changes.

   When saved, the 

notification is displayed.

Adding an Iframe Part

The Iframe Part allows a web page to be displayed within a dashboard or page.

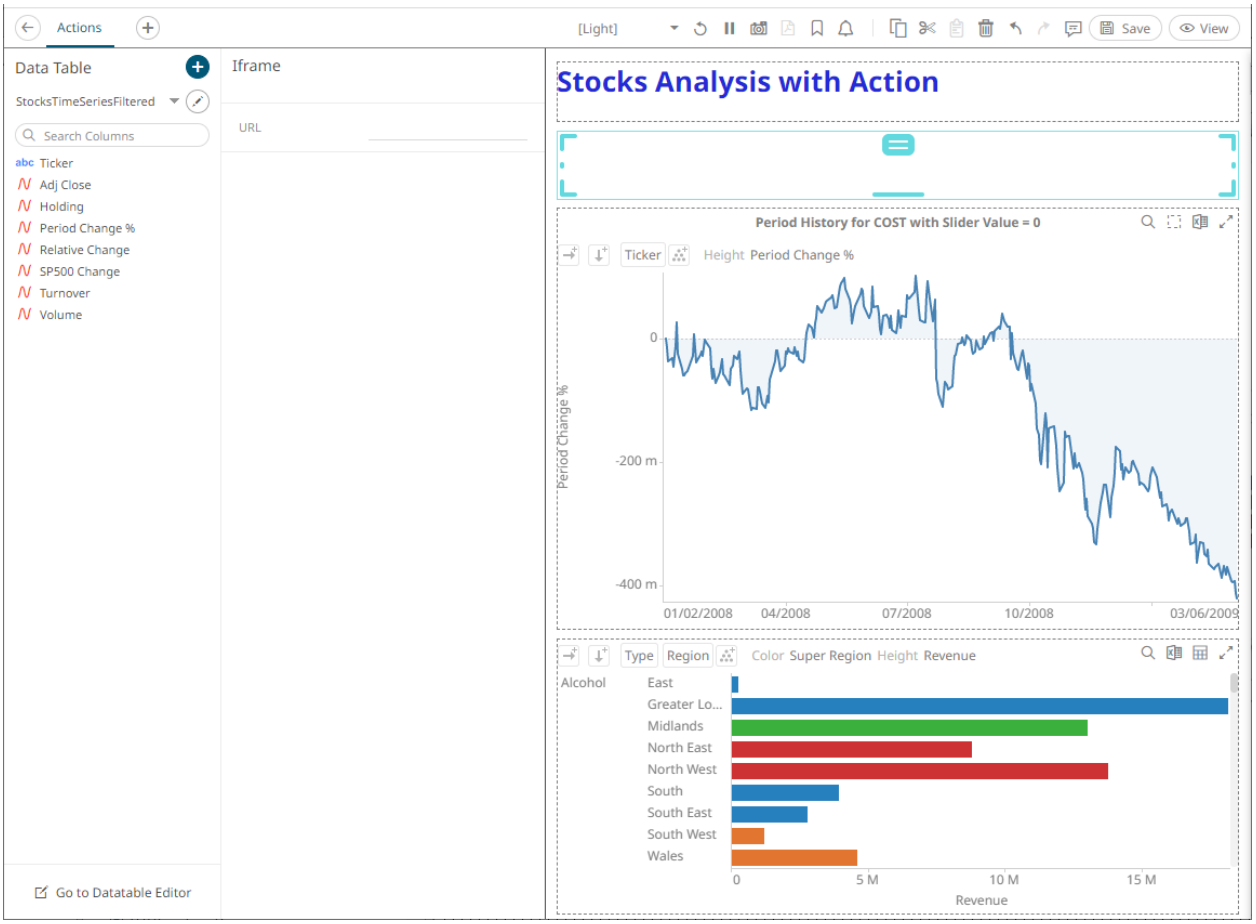
Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click 

on the *Select Part* pane then click the **Iframe** 

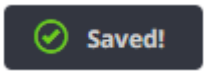
icon.

   The *Iframe* pane is displayed, and the *Iframe* part is added on the dashboard canvas.



2. Enter the *URL* of the page you want to embed in the dashboard.

3. Click the **Save**  icon on the toolbar to save the changes.

   When saved, the  notification is displayed.

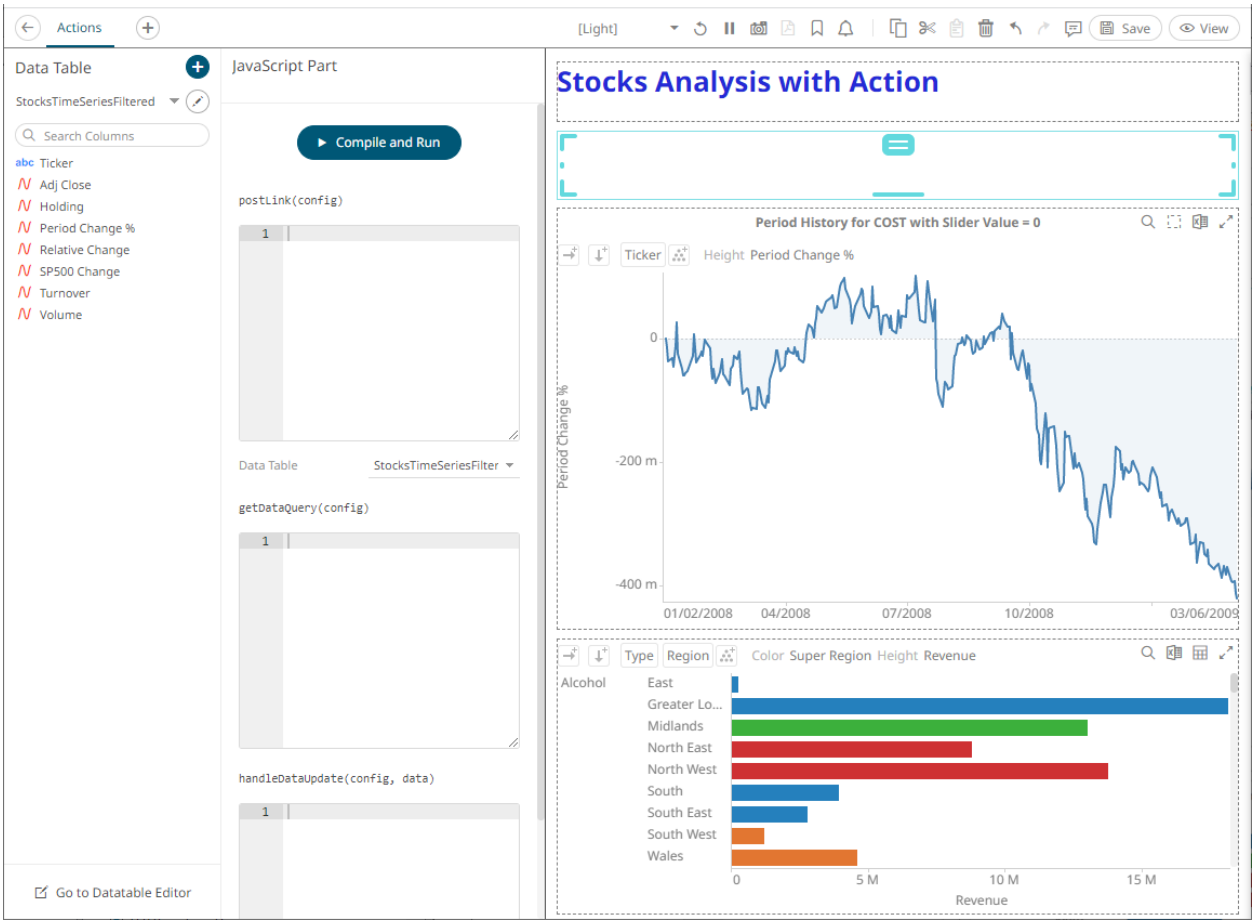
Adding a JavaScript Part

The JavaScript dashboard part allows the designer of a workbook to include a bespoke JavaScript code inside a dashboard.

Steps:

1. After double-clicking or drawing a rectangle on the dashboard canvas, click  on the *Select Part* pane then click the **JavaScript Part**  icon.

   The *JavaScript* pane is displayed, and the *JavaScript* part is added on the dashboard canvas.



The JavaScript part settings support the following functions:

- postLink(config)
- getDataRequestObject(config)
- handleDataUpdate(config, data)

The argument config in all of the three functions will be an object with a single property **element**. `config.element` is the DOM element that is to be used if a UI is required. The same instance of config will be used throughout the lifetime of the JavaScript dashboard part. This means it can also be used to save references to other DOM elements, functions, or data.

2. Define the functions, as required:

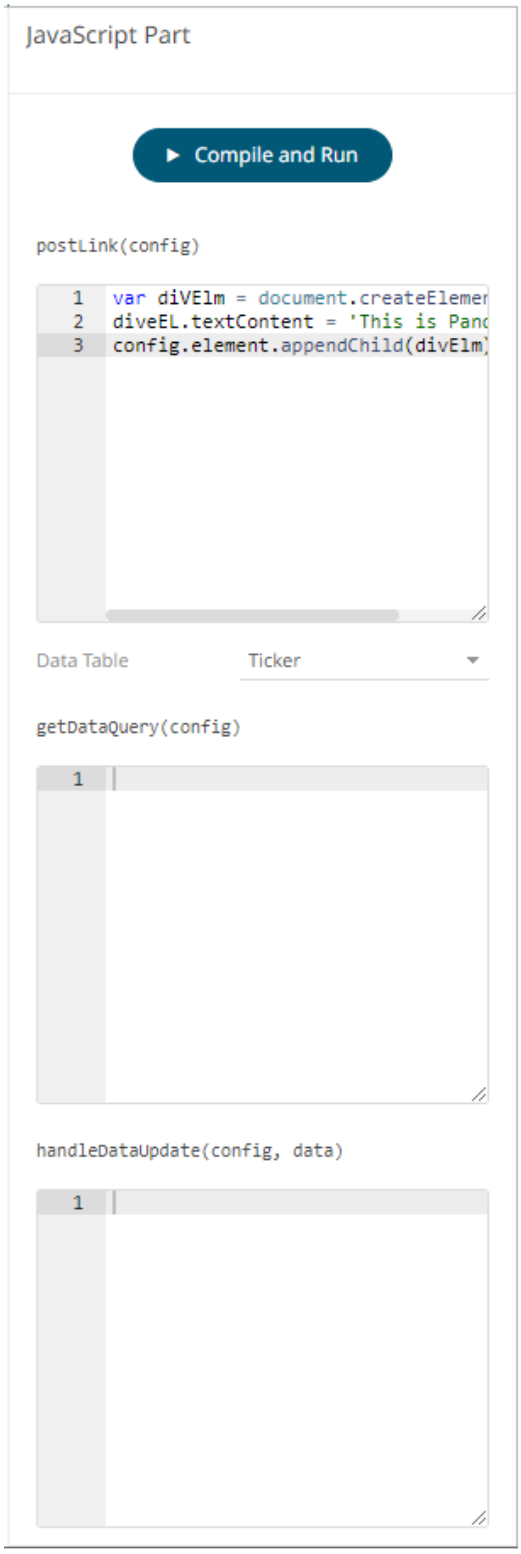
   - `postLink(config)` is called after the dashboard part is added to the DOM. The function can optionally return a destroy function. The return value is called when the dashboard part is disposed and removed from the DOM. This will happen when the user switches to another dashboard. Note that this is the only function that is required to implement this dashboard part.

     Then select the *Data Table*.

   - `getDataRequestObject(config)` is optional, and only used if the dashboard part needs to load data. The function specifies which columns to load, aggregation, and the shape of the data. The data table used for the dashboard part is selected in the Designer, in the drop-down list.

   - `handleDataUpdate(config, data)` is the callback used when the data has finished loading from Panopticon Real Time. If the data table consists of a realtime data source then this function will be called for each update from Panopticon Real Time.

Below is a very simple JavaScript example, with no data loading:



3. Click  .

4. Click the **Save**  icon on the toolbar to save the changes.

When saved, the 

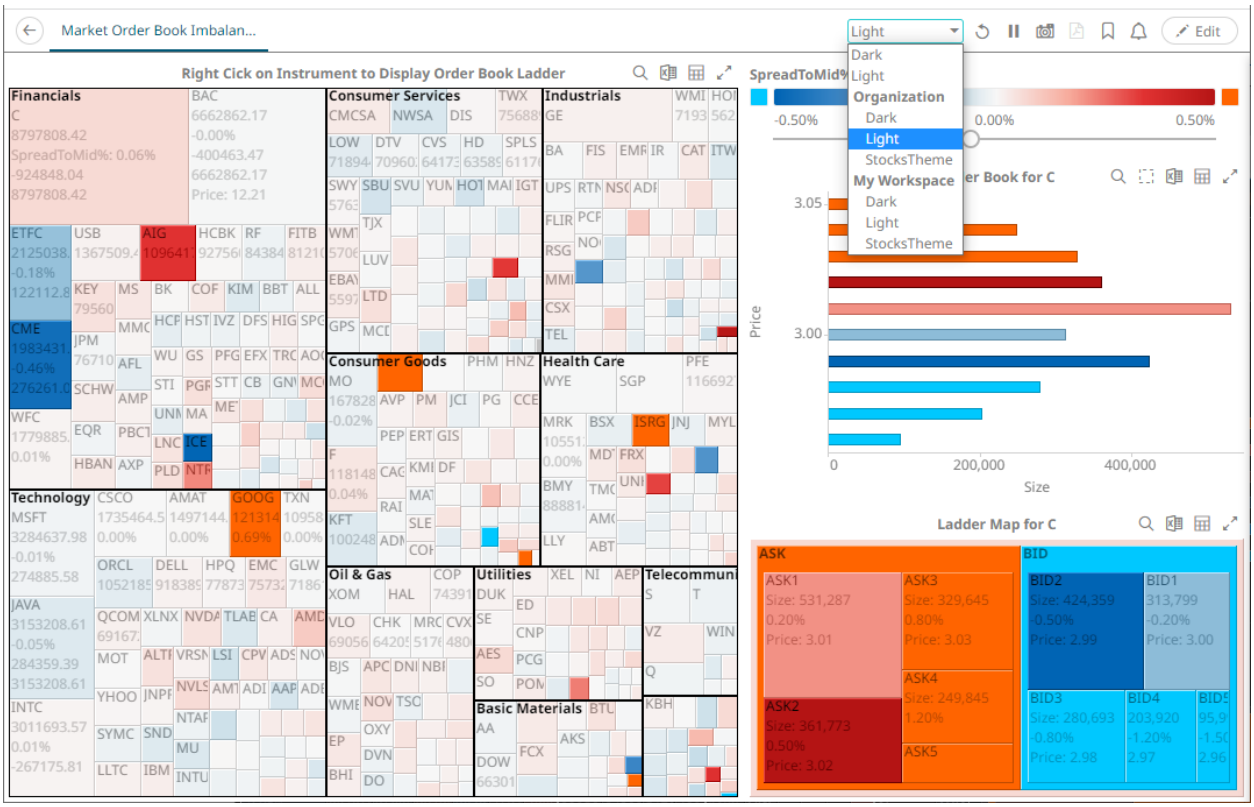
notification is displayed.

MANAGING THEMES IN A WORKBOOK

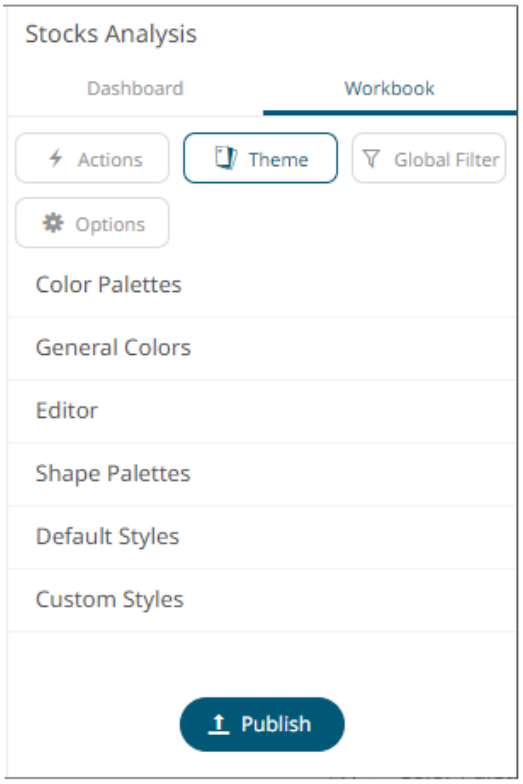
Workbook themes are set of configurable settings that affect all colors and fonts of dashboards and visualizations in a workbook. This configuration also includes setting which among the color palettes will be available for the Color variable in the visualizations. Furthermore, the general colors to be used in visualizations such as axis, background, border, and focus colors can be defined.

On an opened workbook, users can dynamically switch between the two provided default workbook themes: **Light** or **Dark**. These default themes are independent of workbooks and can be stored externally (e.g., *Themes* folder in the `AppData`).





Management of the workbook theme is done in the *Theme Settings* pane.

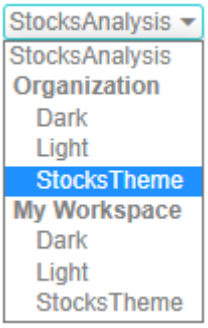


Modifying a Workbook Theme

A user with a Designer role can modify the available themes in a workbook.

Steps:

1. Select the theme to be used in the workbook.

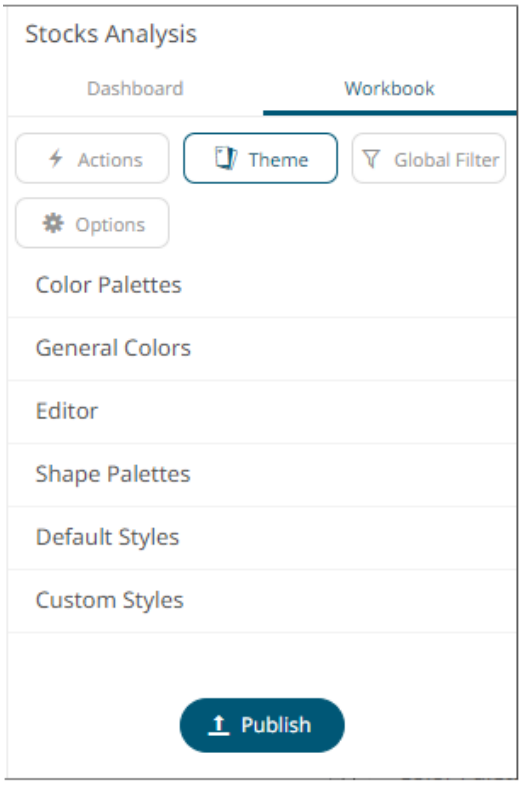


   The properties of this theme can be modified on the *Theme Settings* pane.

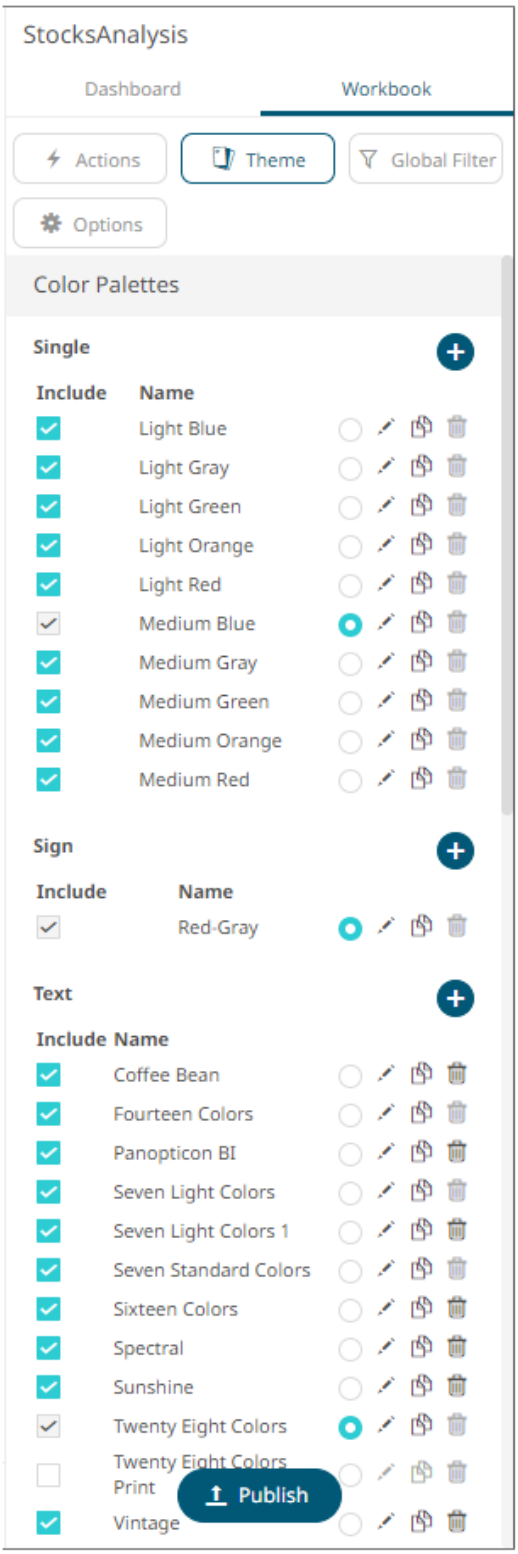
2. On the *Dashboard and Workbook Settings* pane, click the **Workbook** tab and then the 

button.

   The *Theme Settings* pane displays.

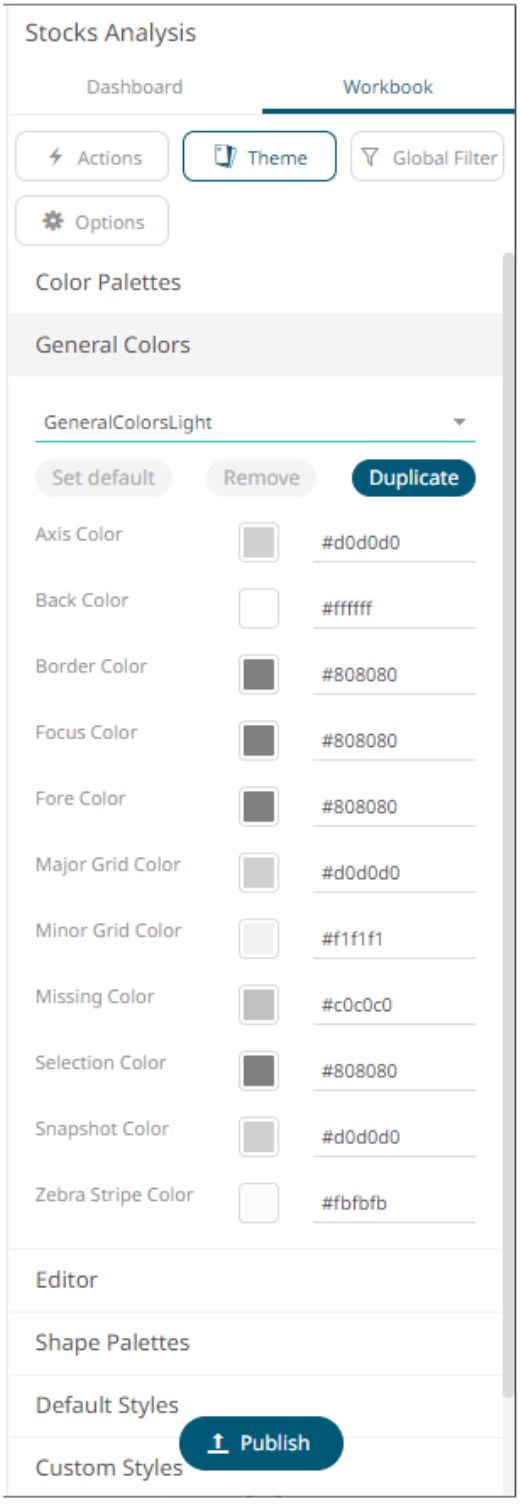


3. To select the *Diverging*, *Sequential*, and *Text* color palettes to use within the workbooks, click the **Color Palettes** section to expand.



NOTE **For more information on how to create, modify, duplicate, or delete *Single*, *Sign*, *Text*, *Sequential*, or *Diverging* palettes, refer to the sections below.**

4. Check the boxes of the provided color palettes that will be included for each category.
5. Click the radio button of the preferred *Default* color palette for each category.
6. To set the general colors to be used for visualizations, click the **General Colors** section to expand.



The default general colors will be based on the theme being modified. For the **Light** theme, it is named **GeneralColorsLight,** for the **Dark** theme, it is named **GeneralColorsDark,** for the styles of older workbooks, it is named **GeneralColors<Workbook>** (e.g., **GeneralColorsHow To Actions**), and for the new themes, it is named **General<theme name>**. These default general colors cannot be deleted.

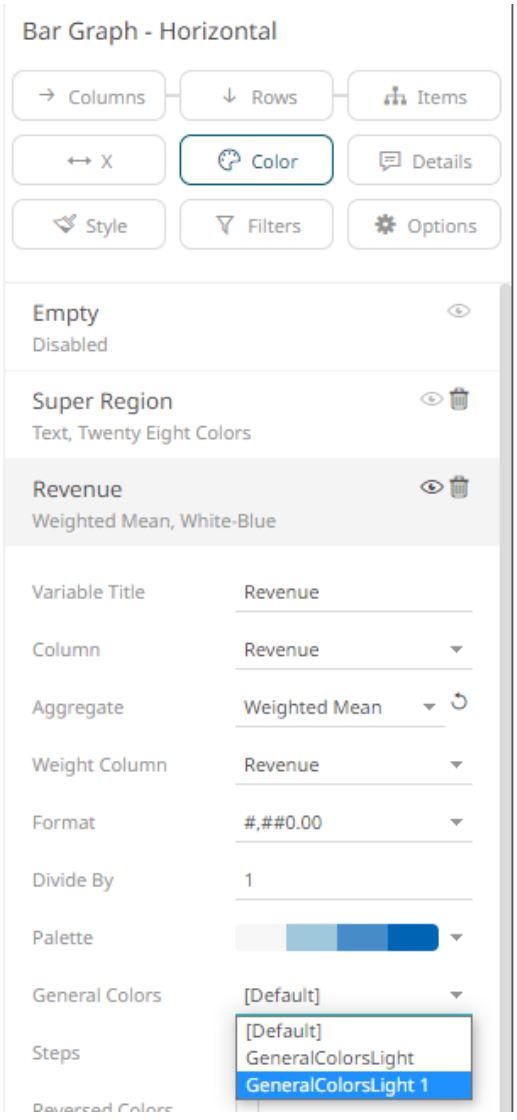
For this example, we will modify the general colors for the *Light* workbook theme (**GeneralColorsLight**).

7. Click on any of the color boxes to display the *Color* dialog and select or enter the preferred color.

8. However, instead of modifying the settings of the default general colors, click Duplicate to make a duplicate. It will be added in the *General Colors* drop-down list.

   Once saved, in the *Open Workbook layout in Design mode*, when the **Light** workbook theme is selected on the opened workbook, all of the defined general colors will be added as options in the *General Colors* drop-down list of a Color variable in a visualization.

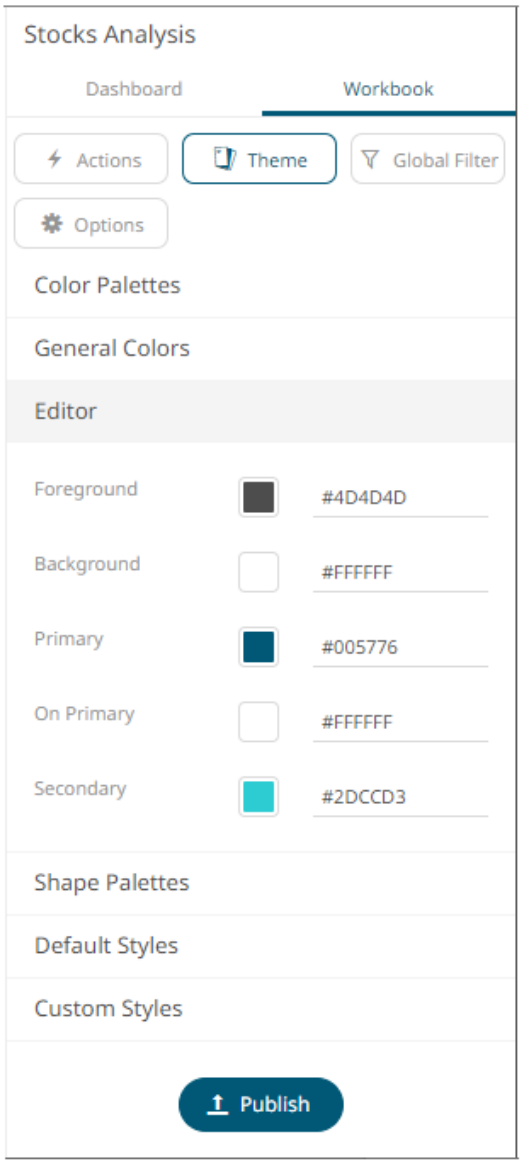
   For example:



9. Select any of the duplicate general colors and click Set default to make it the default.

10. To delete any of the duplicate general colors, select it in the *General Colors* drop-down list and click Remove.

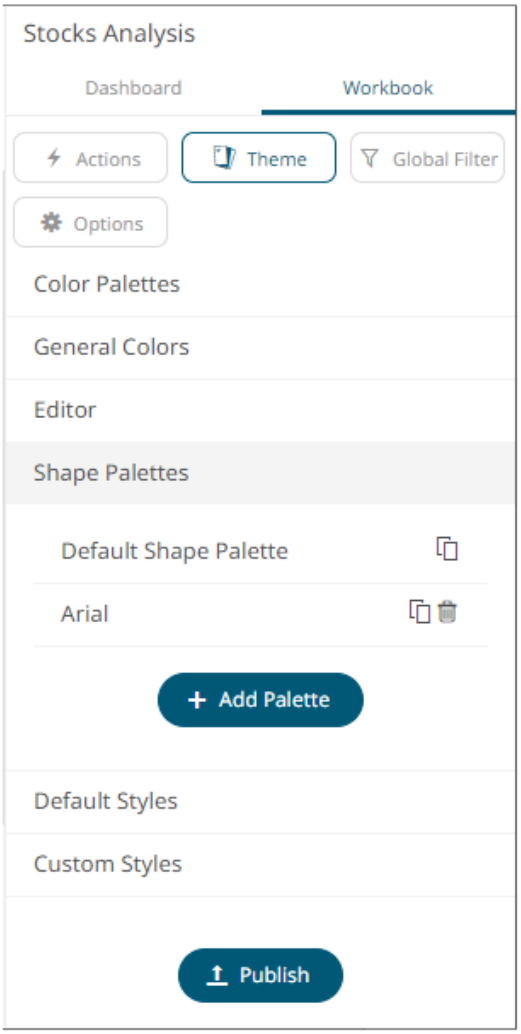
11. To set the *Foreground*, *Background*, *Primary*, *On Primary*, and *Secondary* colors for the editor style of the **Dark** theme, click the **Editor** section to expand.



You may opt to modify the colors of the following properties:

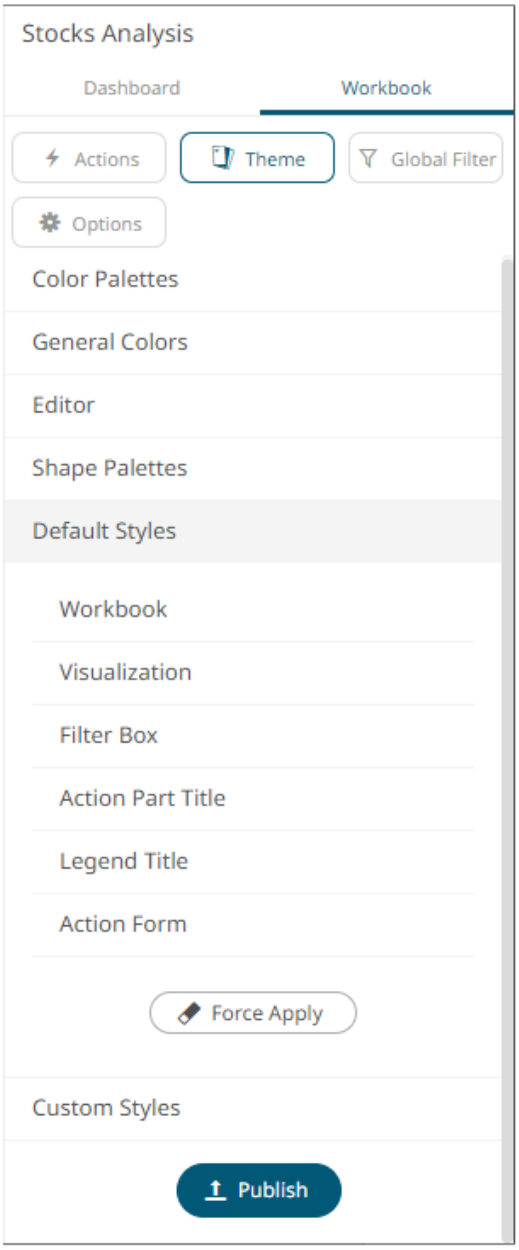
Property	Description
Foreground	Foreground color of the workbook.
Background	Background color of the workbook.
Primary	Primary color of the workbook.
Secondary	Secondary color of the workbook.
On Primary	Foreground color within the primary color.

12. Click on any of the color boxes to display the *Color* dialog and select or enter the preferred color.
13. To set the shape palettes that can be used with the workbook theme, click the **Shape Palette** section to expand.



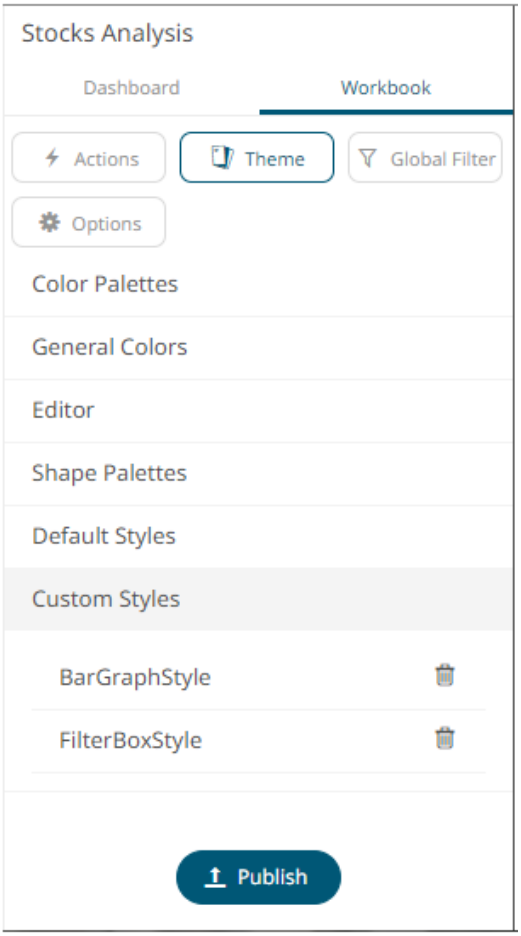
For more information in how to create, modify, duplicate, or delete shape palettes, refer to the sections below.

14. To define the default styles of the workbook theme, click **Default Styles** section to expand**.**



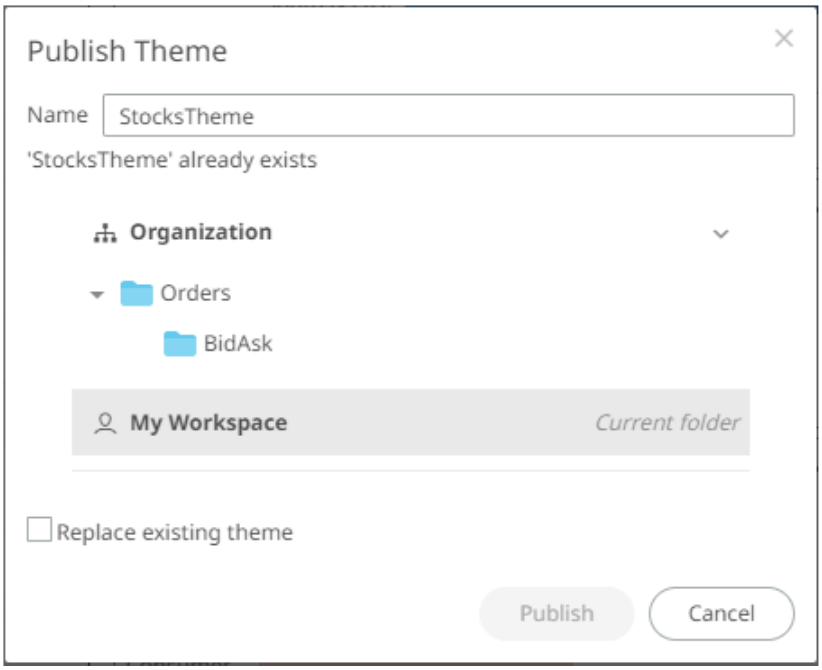
See Default Style Settings of a Theme for more information.

15. Click **Force Apply**  to reset all local part styles in the workbook.
16. To modify the custom style configuration of the parts in the workbook, click **Custom Styles** to expand.



17. Click on a custom style of a part to modify the settings.
18. Click **Remove**  of a custom style to delete.
19. Click **Publish**  to publish the workbook theme.

    The *Publish Theme* dialog displays.



20. Select the folder or subfolder that you have a permission to publish the workbook theme.
21. To replace an existing workbook theme, check the **Replace existing theme** box.
22. Click **Publish** 

.
23. Click the **Save** 

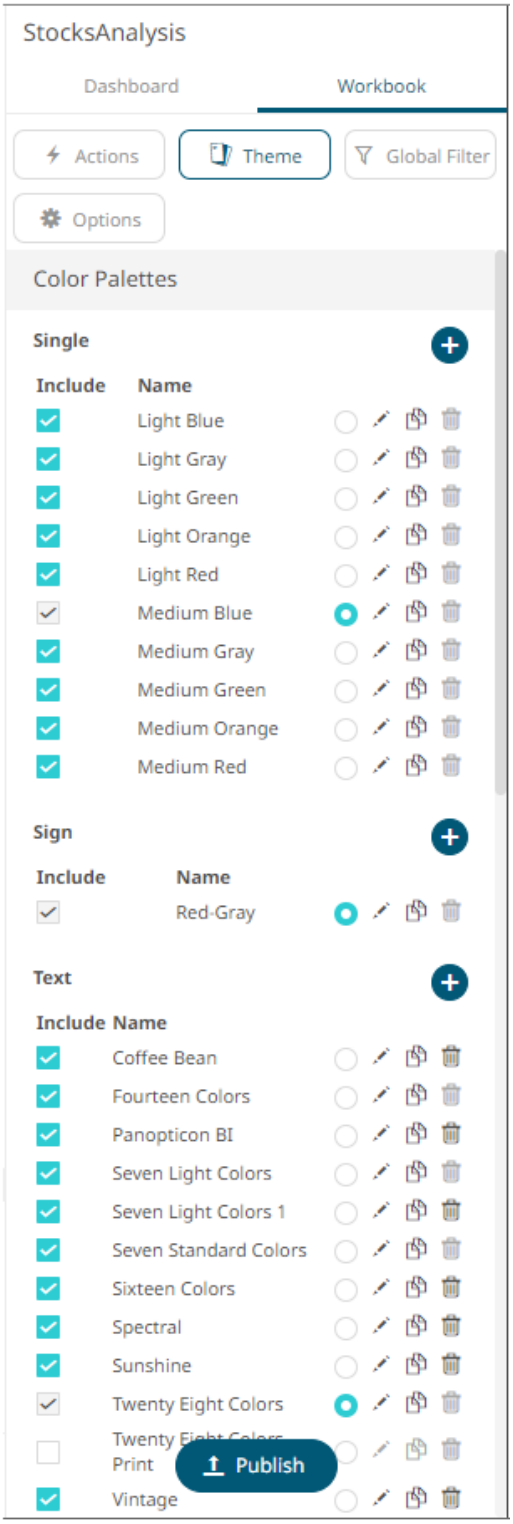
icon on the toolbar.

    When saved, the 

notification is displayed.

COLOR PALETTES IN A WORKBOOK

The single, sign, text, sequential, and diverging color palettes that are used in text or numeric color variables in visualizations can be created, modified, duplicated, or deleted on the *Color Palettes* section of the *Theme Settings* panel.



NOTE

- **A user with a Designer role, can also create, modify, duplicate, or delete color palettes in a workbook on the Color Palettes tab of the *Themes* page.**
- **Changes made on the *Color Palettes* section of the *Theme Settings* pane will only be associated with the inline theme of the workbook in the Web client and will not be reflected on the Color Palettes tab of the *Themes* page.**

Creating a New Text Color Palette In a Workbook

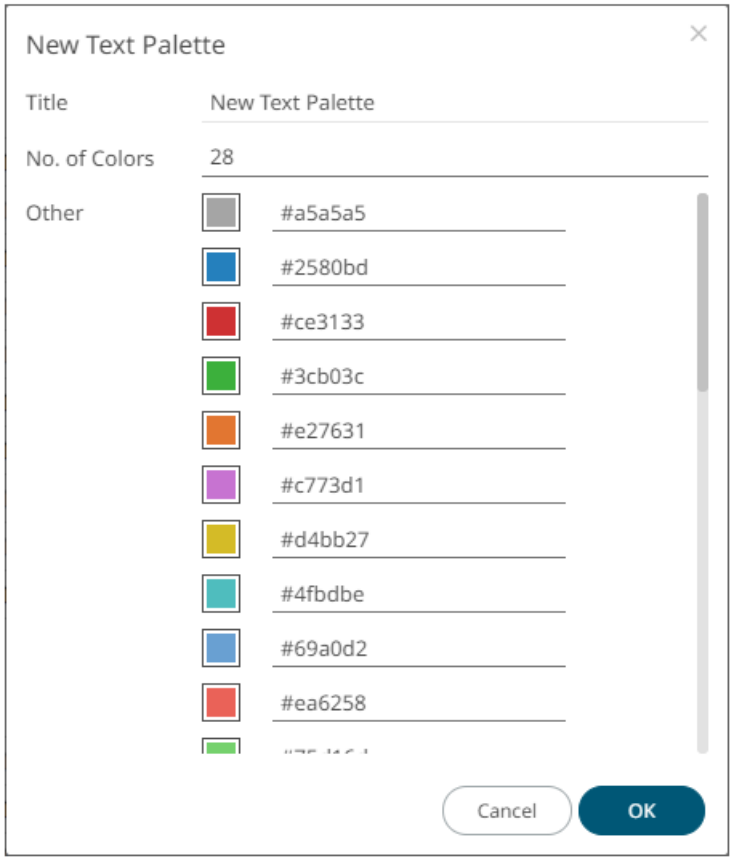
The configuration pane for the *Color* variable changes depending on the column data type.

When a text column is added to the *Color* variable, the configuration pane displays the color associated with each categorical item, as specified with a default color palette (e.g., **Twenty Eight Colors**).

Steps:

1. On the *Text* section, click the **New** + icon.

   The *Next Text Palette* dialog displays.

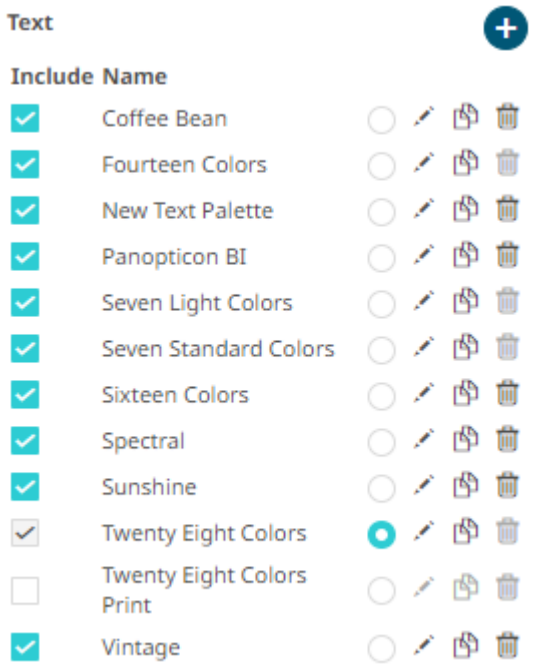


2. Enter the *Title*.
3. Select the *Number of Colors* in the drop-down list. Default is **28** colors.

   The *Other* list is updated accordingly.

4. Click the **Color** box to display the *Color* dialog and set the other colors or enter the Hex color code.
5. Click Ok.

   The new text color palette is added in the list (e.g., **Sixteen Colors**). Note that it can be deleted.



Creating a Sequential or Diverging Numeric Color Palette in a Workbook

Panopticon visualizations support two types of Numeric Color Palettes: Sequential and Diverging.

- Sequential Color Palettes

  Sequential palettes use a two-color gradient between a minimum and a maximum value. Numeric column containing only positive values default to a Sequential Palette using the **White-Blue** color palette.

  In this case the range *Mid* point is disabled, and the *Min* and *Max* points are populated with defaults from the data set.

- Diverging Color Palettes

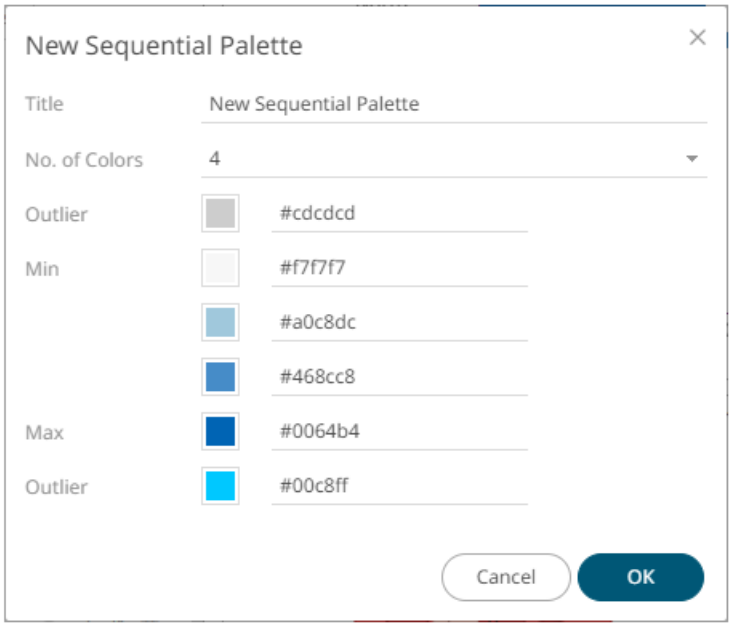
  Diverging Palettes use a three-color gradient between a minimum, middle and a maximum value. Numeric columns containing both positive and negative values default to the Diverging Palette with the **Red White Blue** color palette selected.

  Diverging Palettes use the **Range Midpoint**. The *Min*, *Mid* and *Max* points are populated with defaults from the data set.

To create a new sequential numeric color palette:

1. On the *Sequential* section, click the **New** + icon.

   The *New Sequential Palette* dialog displays.

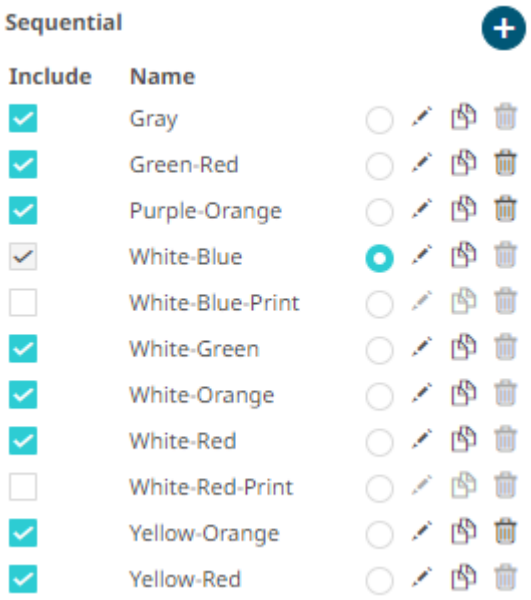


2. Enter the *Title* and click ✓ .
3. Select the *Number of Colors* in the drop-down list. Default is **4** colors.

   The number of colors from *Min* to *Max* is updated accordingly.
4. Set the *Outliers*, *Min*, and *Max* colors. Click the **Color** box to display the *Color* dialog and set the colors or enter the Hex color code.
5. Click 

.

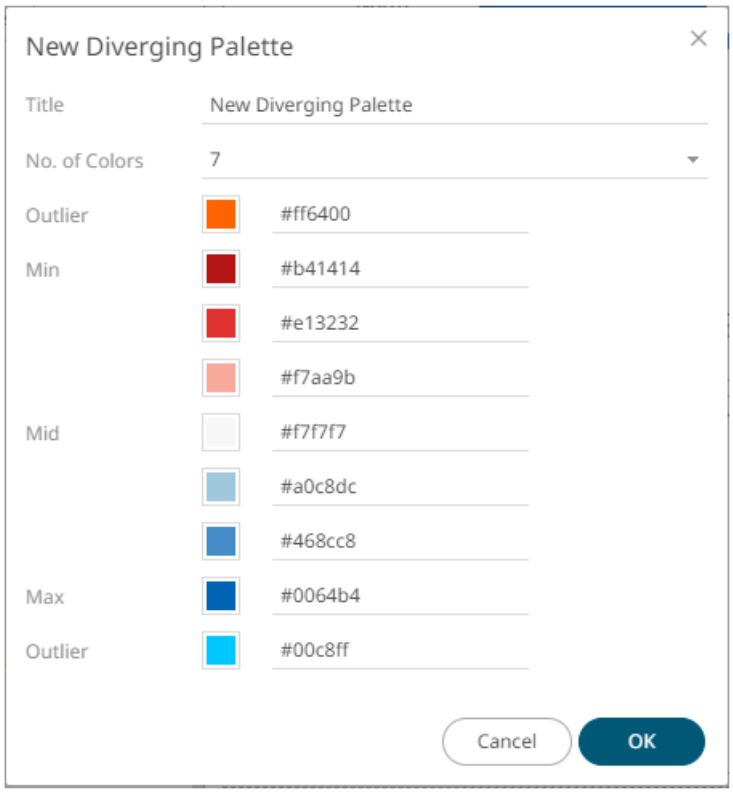
   The new sequential numeric color palette is added in the list and can be deleted (e.g., **Yellow-Orange**).



To create a new diverging numeric color palette:

1. On the *Diverging* section, click the **New** icon.

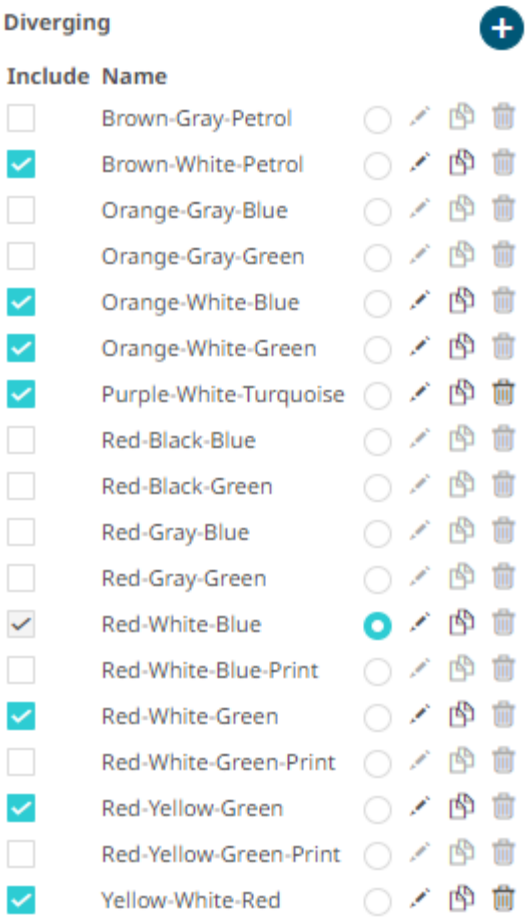
   The *New Diverging Palette* dialog displays.



2. Enter the *Title* and click .
3. Select the *Number of Colors* in the drop-down list. Default is **7** colors.

   The number of colors from *Min, Mid,* to *Max* is updated accordingly.
4. Set the *Outliers*, *Min*, and *Max* colors. Click the **Color** box to display the *Color* dialog and set the colors or enter the Hex color code.
5. Click Ok.

   The new diverging numeric color palette is added in the list and can be deleted (e.g., **Yellow-White-Red**).



Modifying Color Palettes in a Workbook

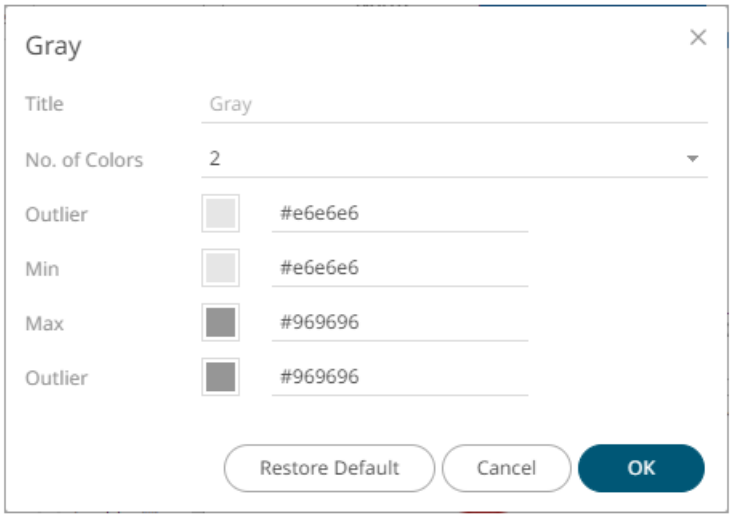
Any of the included or checked color palettes can be modified.

NOTE

- **For the selected default color palette, only the *Number of Colors* and assigned colors can be modified.**
- **Color palettes that are not selected cannot be modified.**

Steps:

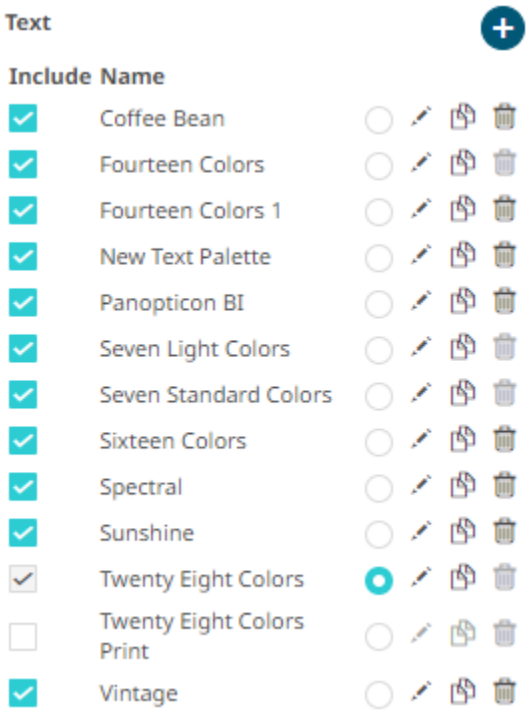
1. Click the **Edit** icon of an included or checked color palette.
   The corresponding dialog box displays.



2. Modify the *Title*, *Number of Colors*, and colors.
3. Click Ok to commit the changes or for the standard color palettes click Restore Default to revert to the original settings.

Creating a Duplicate of a Color Palette

Click the **Duplicate** icon of a color palette. A copy of the color palette is added in the list (e.g., **Fourteen Colors 1**).



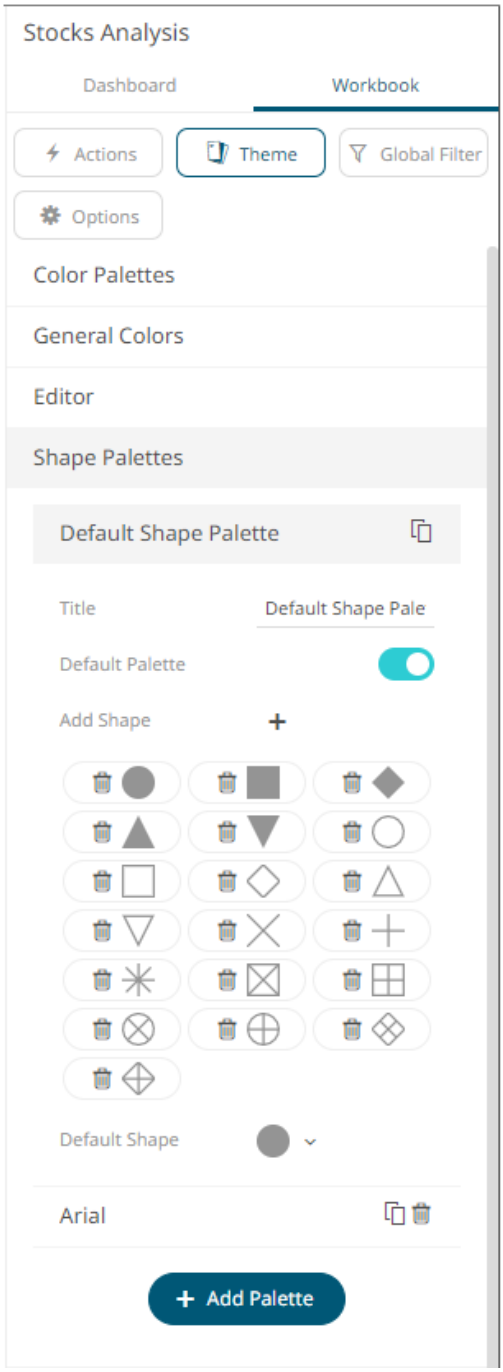
You can opt to modify the settings.

Deleting Color Palettes in a Workbook

New or duplicate color palettes can be deleted. Click the **Delete** icon to remove the color palette in the list.

SHAPE PALETTES IN A WORKBOOK

Shape palettes that can be used with the workbook theme can be created, modified, duplicated, or deleted on the *Shape Palettes* section of the *Theme Settings* pane.



NOTE

- **A user with a Designer role, can also create, modify, duplicate, or delete shape palettes in a workbook on the Shape Palettes tab of the *Themes* page.**
- **Changes made on the *Shape Palettes* section of the *Theme Settings* pane will only be associated with the inline theme of the workbook in the Web client and will not be reflected on the Shape Palettes tab of the *Themes* page.**
- **Panopticon is shipped with two shape palettes (Default Shape Palette and Arial) for the Dark and Light themes.**

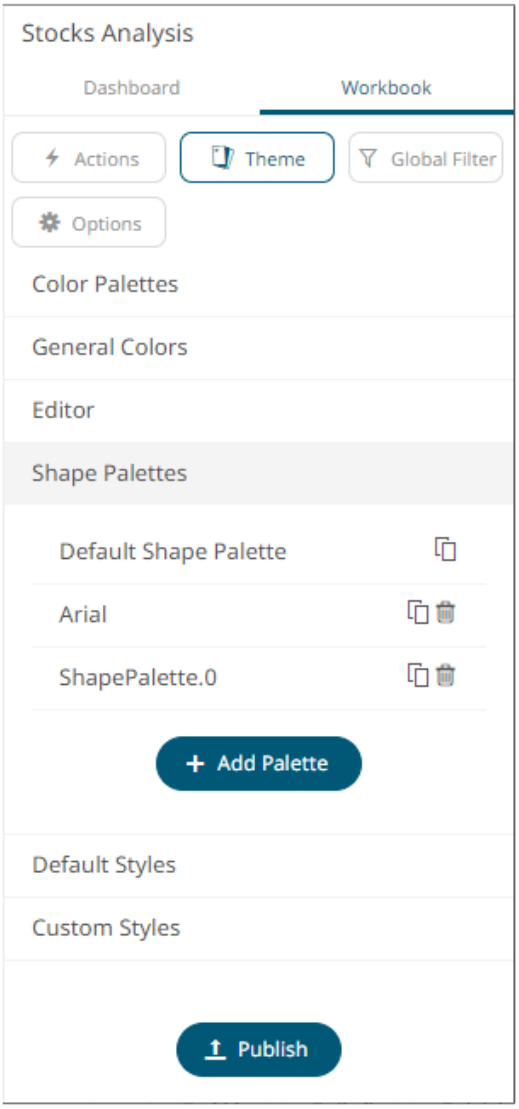
Creating a New Shape Palette in a Workbook

Steps:

1. Click **Add Palette** 

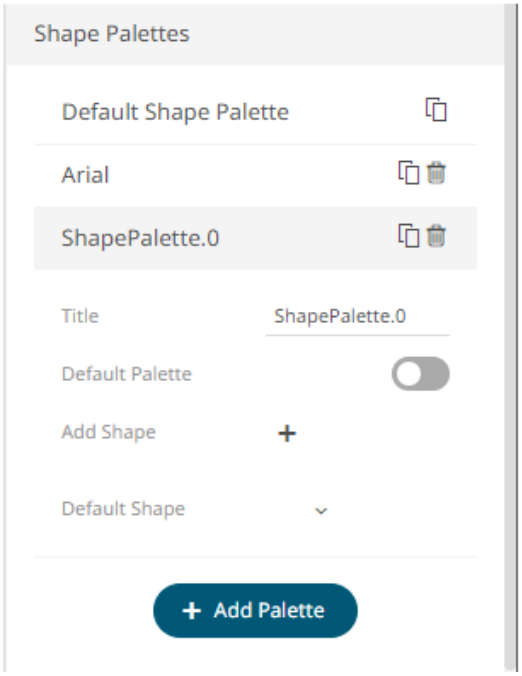
.

   A new shape palette displays (i.e., **ShapePalette.0**).



2. Click *ShapePalette.<Number>*.

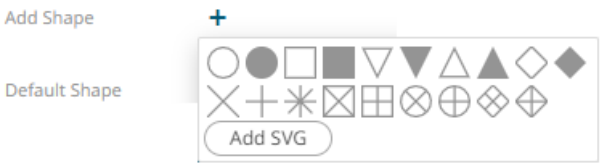
   The section expands to allow its definition.



3. Enter the shape palette *Title* and click ✓.
4. To make this shape palette the default for the workbook theme, tap the **Default Palette** slider to turn it on.

NOTE **The default shape palette can not be deleted.**

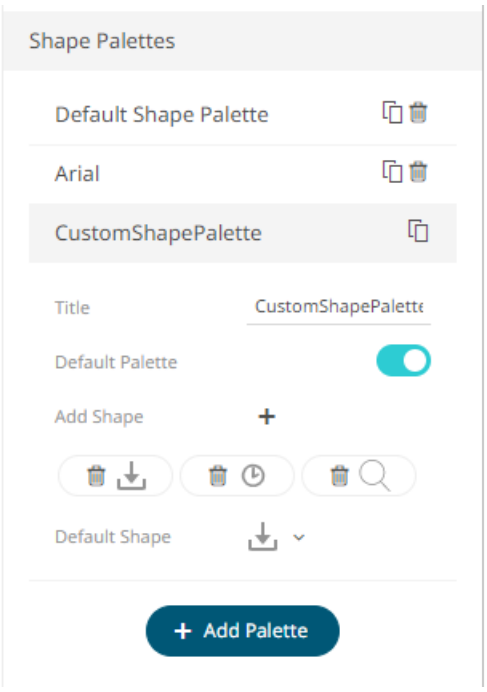
5. To add the shapes, click +.



You can either:

- click on a shape.
- click Add SVG. Select one or more SVG files in the *Open* dialog box that displays.

The added shapes are displayed.



To delete a shape, click it's corresponding **Delete** icon.

6. Select the *Defaulit Shape* in the drop-down list.
7. Click the **Save** Save icon on the toolbar.
8. When saved, the Saved! notification is displayed.

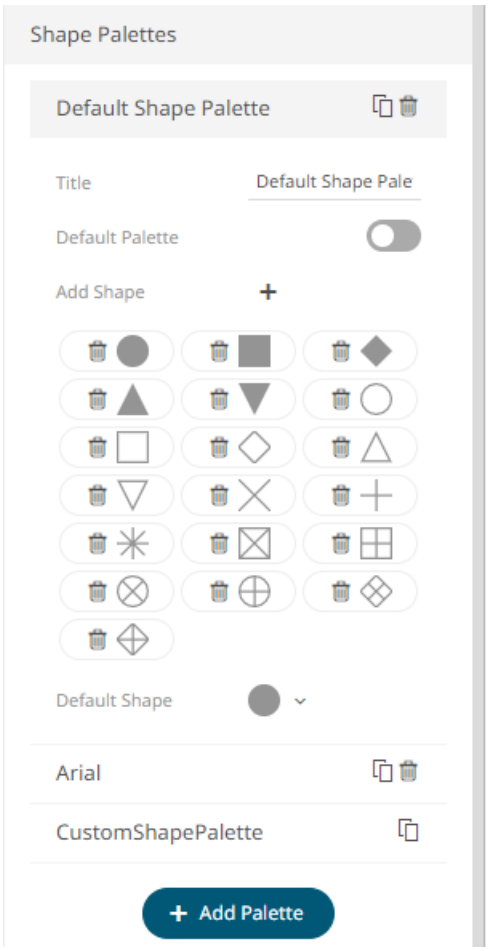
   The new shape palette is available in the *Shape Palette* drop-down list in the *Shape* variable when the workbook theme, where it is added, is used (i.e., **Light**).

Modifying Shape Palettes in a Workbook

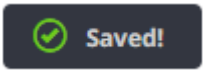
Any of the shape palettes can be modified.

Steps:

1. Click on a shape palette to expand.



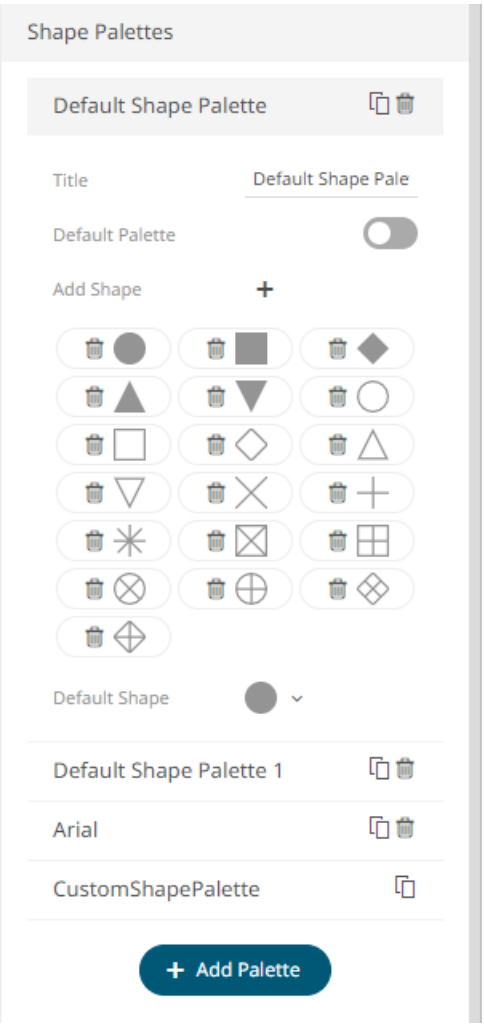
2. You can modify the following properties:
   - Title
   - Default Palette. Tap to enable or disable.
   - Add Shapes
   - Default Shape
3. Click the **Save** 

icon on the toolbar to save the changes.
4. When saved, the 

notification is displayed.

Creating a Duplicate of a Shape Palette

Click the **Duplicate** icon of a shape palette. A copy of the shape palette is added in the list (e.g., **Default Shape Palette 1**).



You can opt to modify the settings of this duplicate copy.

Deleting Shape Palettes in a Workbook

Any shape palette can be deleted except the default. Click the **Delete** icon to remove the shape palette in the list.

WORKBOOK TOOLBAR

Panopticon Designer provides several toolbar options:

- on the *Open Workbook in Design Mode*



- on the *Open Workbook in View Mode*



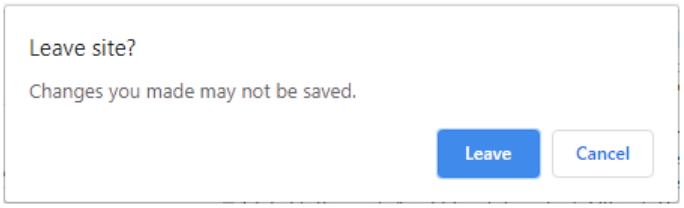
NOTE

On the Open Workbook in View Mode, when the Edit 

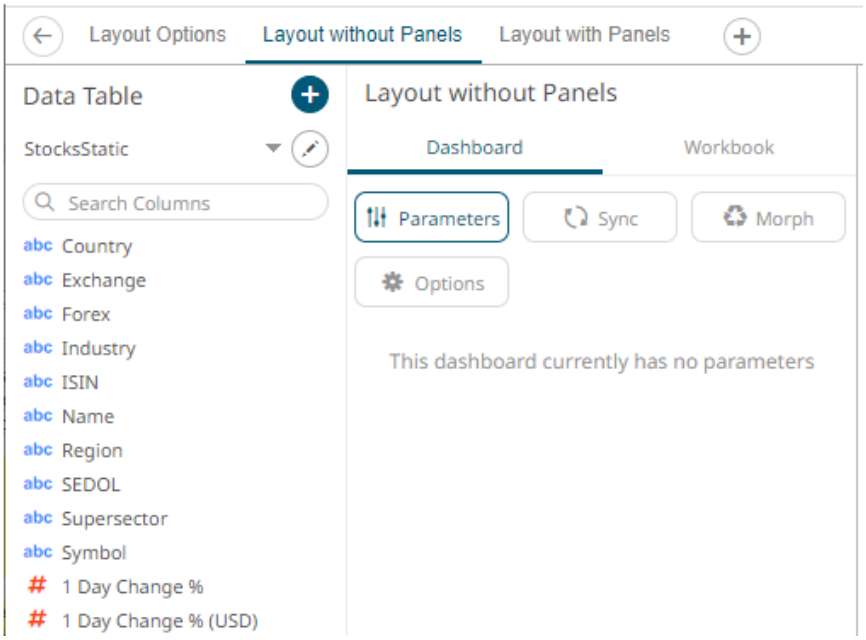
button is clicked, the user will get the DESIGNER role. Consequently, the Save 

button becomes available in both the Open Workbook in Design and View Modes.

Setting	Description
Data Refresh	Manually refreshes the data.
Pause Real-Time	Clicking the icon changes it to and pauses the streaming data sources.
Copy Image	Exports the whole dashboard image to the clipboard.
Create PDF Report	Set the dashboards that will be included in the PDF report. **NOTE:** This feature is enabled when the workbook changes are saved.
Bookmarks	Add and manage bookmarks.
Alerts	Manage alerts and notifications.
Copy	Copy a visualization or part.
Cut	Cut a visualization or part.
Paste	Paste a copied or cut visualization or part.
Undo / Redo	Once **Undo** is clicked, the **Redo** icon is enabled, which allows the reversal of the undo.
Workbook Issues	Lists the issues in the workbook.
Save	Save the changes made on the workbook.

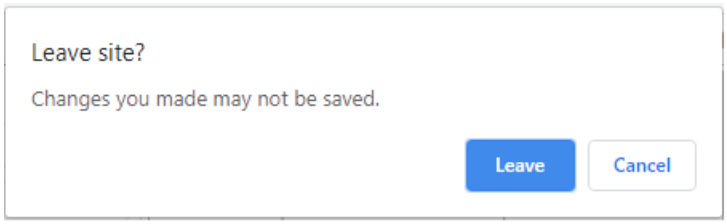
	When going to the *Workbooks and Folders Summary* page from the *Open Workbook in Design Mode*, a notification displays when the changes done are not yet saved.  Click Cancel and then to save before leaving the page.
View View	Go to the *Open Workbook in View Mode*.
Edit Edit	Go to the *Open Workbook in Design Mode*.

Also, before the list of available dashboards in the workbook is the **Back** icon.



Click this icon to go back to the *Workbooks and Folders Summary* page.

If the workbook is not yet saved, a notification displays.



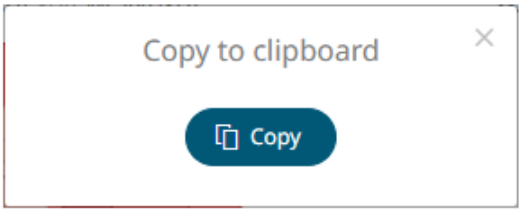
You can either click:

- Leave to leave the page without saving and go back to the *Workbooks and Folders Summary* page.
- Cancel, then click Save to save the changes done on the workbook. Then click to go back to the *Workbooks and Folders Summary* page

Copying Dashboard Image

Steps:

1. Click the **Copy Image** icon on the toolbar.
   The **Copy to Clipboard** button displays.



2. Click Copy to copy and paste the whole dashboard image to another application.

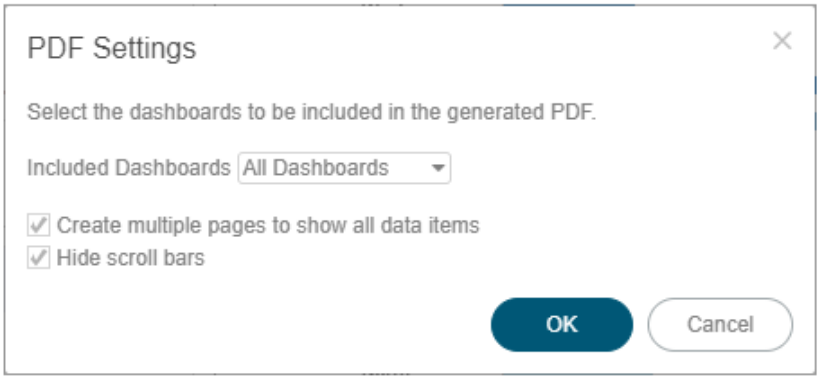
Ad Hoc PDF Generation

Select the dashboards to be included in the generated PDF.

> **NOTE** **Before exporting to PDF, ensure the workbook is saved first.**

Steps:

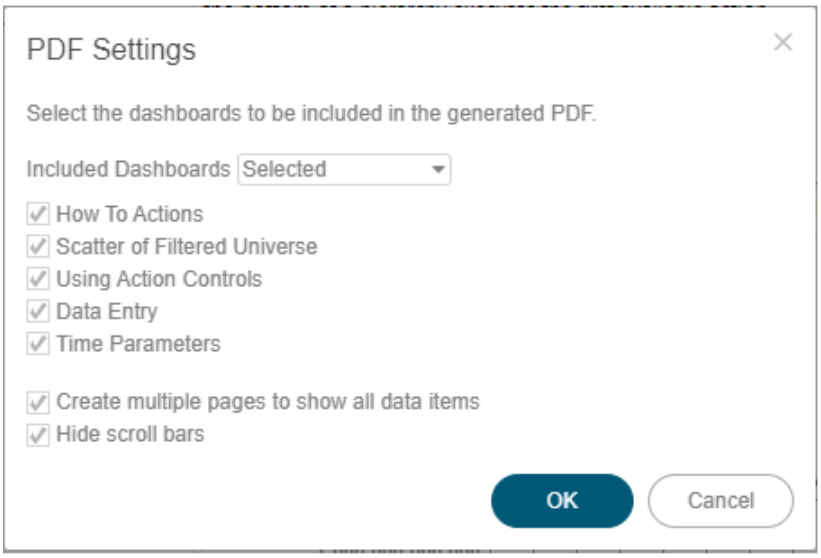
3. Click the **Create PDF Report** icon on the toolbar.
   The *PDF Settings* dialog displays.



4. Select the dashboards to be included:

- All dashboards
- Current dashboard
- Selected

  The check boxes are enabled and all the dashboards are checked by default.



  Check only those that will be included in the generated PDF.

Some visualizations show a portion of the available content adding scroll bars. E.g., table, horizon graph, etc.

The final two options of the dialog relate to these visualizations.

5. To output all the content within a visualization that has scroll bars, for example, to output all the rows within a table, check the **Create multiple pages to show all data items** box.
6. To hide scroll bars from the output PDF pages, check the **Hide scroll bars** box.
7. Click 

button to start the PDF generation.



This will allow Panopticon Real Time to read all the datasets necessary to output the dashboard and produce the PDF file.

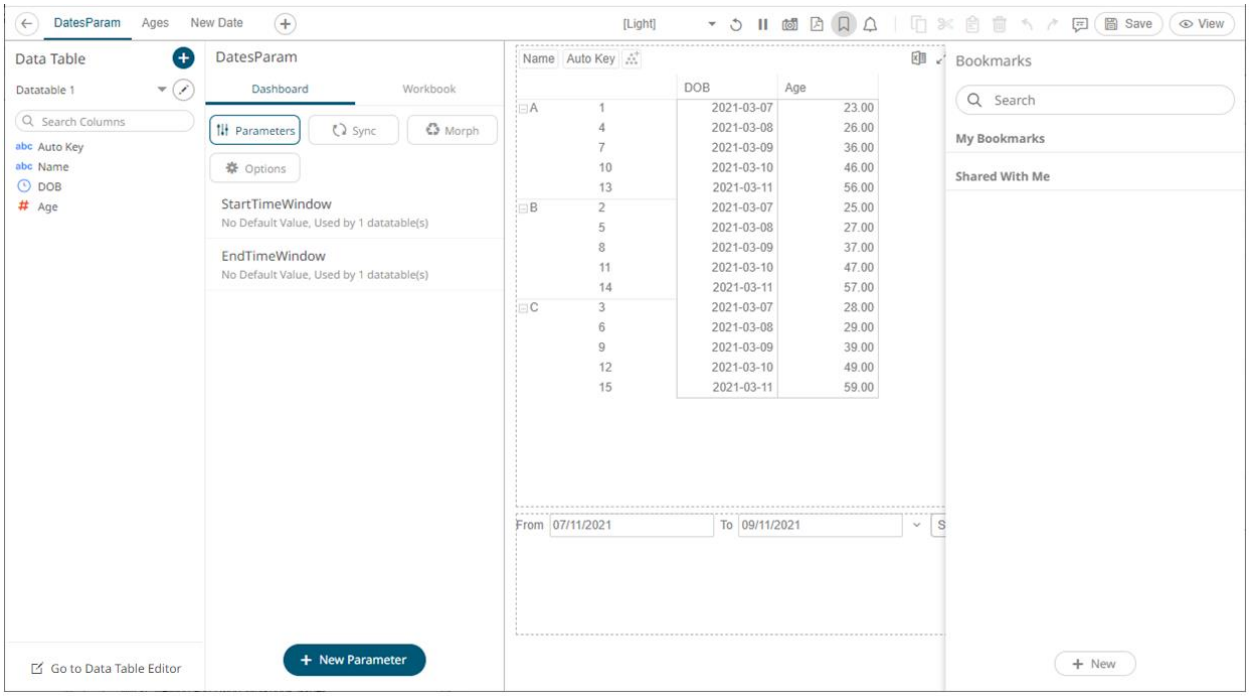
NOTE **Ad hoc PDF generation in the Web client using Google Chrome (or other browsers) may be hindered by the AdBlock Extension.**

To remove the AdBlock Extension in Google Chrome, perform these steps:

1. **Click the Chrome Menu icon on the browser toolbar.**
2. **Highlight *Tools*, then click Extensions from the sub-menu.**
3. **Click Remove in the AdBlock Plus entry (e.g., uBlockOrigin).**
4. **Click Remove in the confirmation message that displays.**

Bookmarking

Bookmarks are saved configurations of the active dashboard and workbook. A bookmark can be added, by authenticating, and clicking on the **Bookmarks** icon.



Bookmarks are not available with anonymous access workbooks.

Bookmarks do not save data, but do save the selected:

- Dashboard
- Parameters
- Filters
- Breakdowns, Hierarchies, Visible Depth, and Drill Level
- Variables (Size, Color, X, Y, etc.)

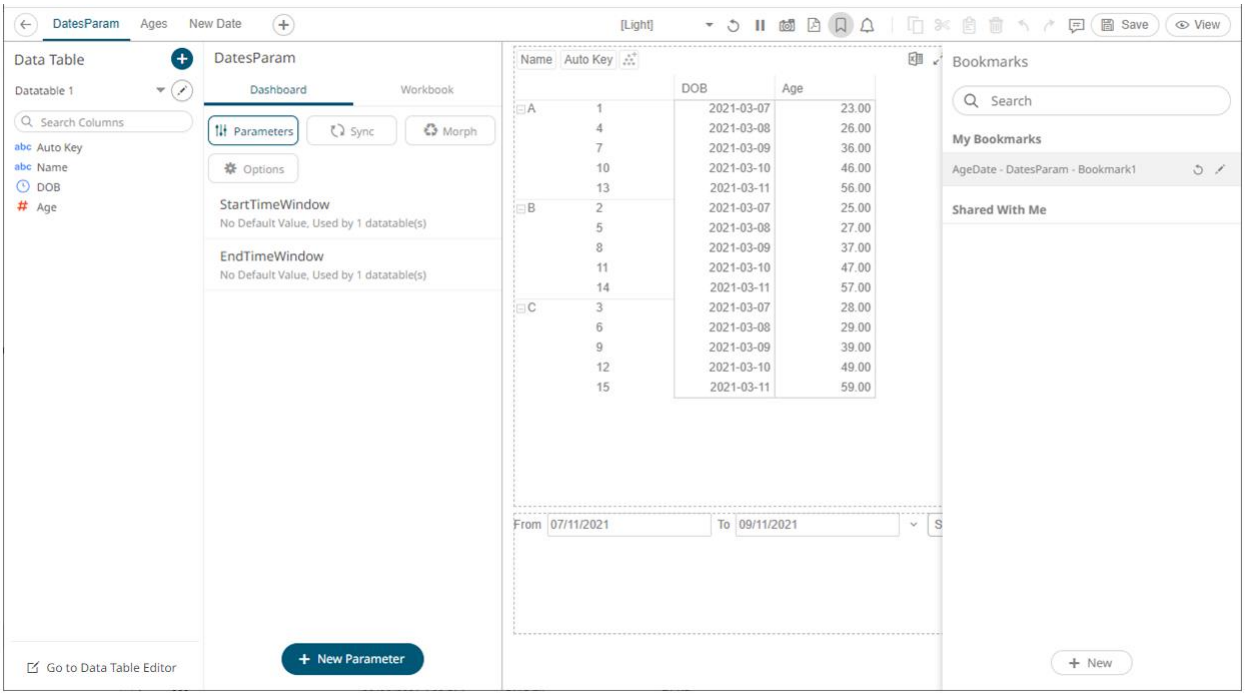
Consequently, although the underlying data may change, a specific view of that data can be specified and bookmarked for future usage.

Bookmarks can be added and are available to all authenticated users of the workbook.

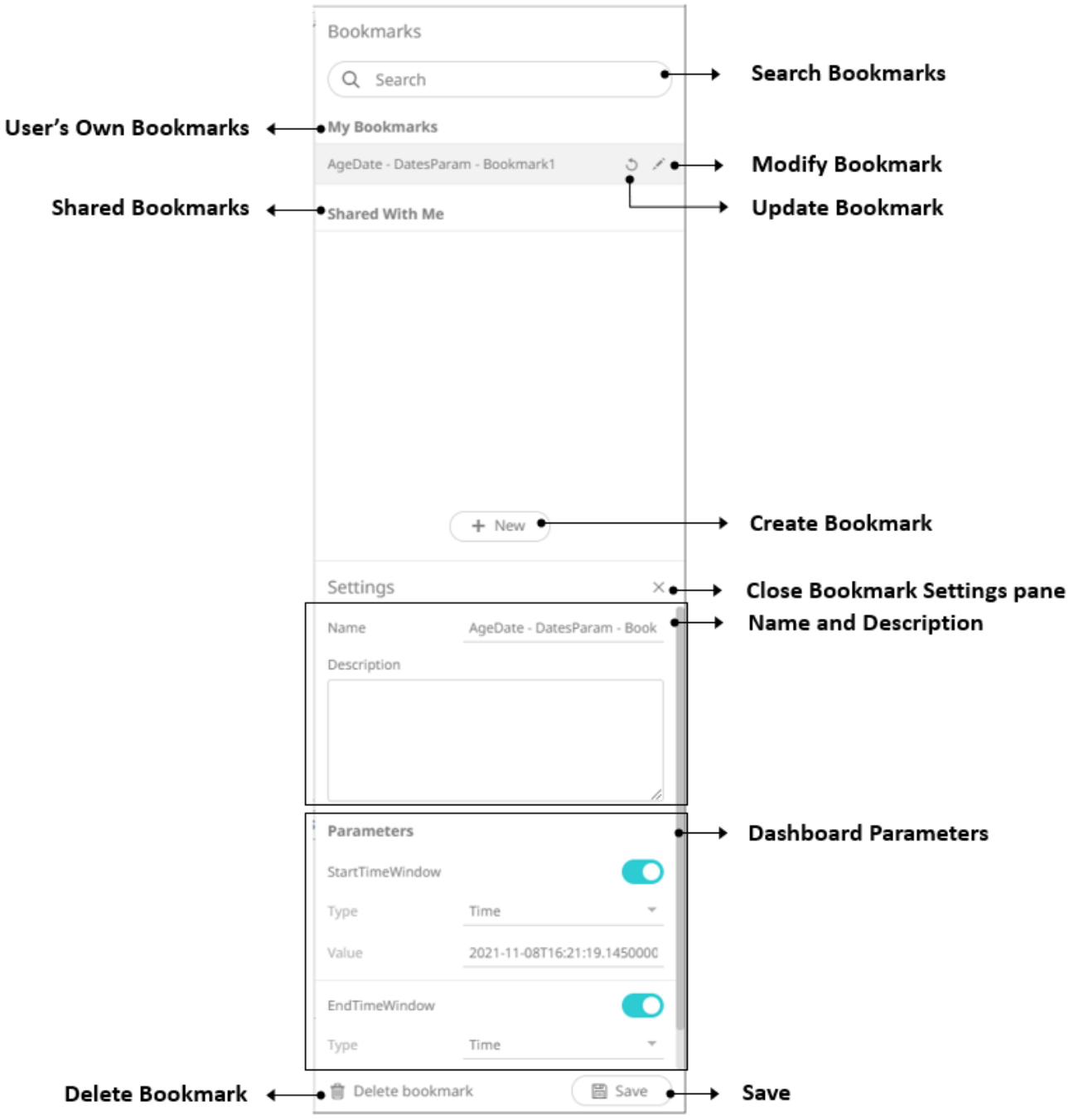
Bookmarks also generate a unique URL, which can be sent to another individual with access, allowing them to see exactly the same view of the selected dashboard.

New bookmarks can be added by clicking the **New**  button.

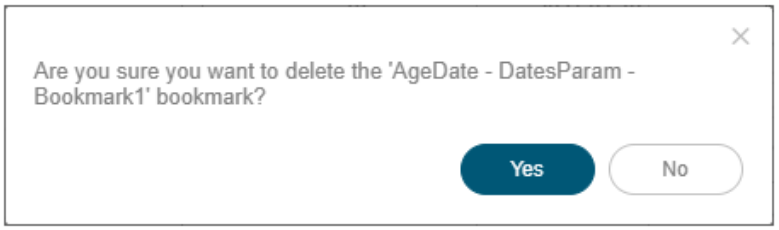
A new instance of the bookmark is added under the *My Bookmarks* section in the *Bookmarks* pane. The bookmark is initially named **<Workbook> - <Dashboard> - Bookmark<number>**.



Click **Modify**  icon to define the settings of the bookmark. The *Bookmark Settings* pane is displayed.



Property	Description
My Bookmarks	User's own bookmarks.
Shared Bookmarks	Bookmarks shared to the user.
Delete Bookmark	Remove the bookmark.

	 Click **Yes** on the notification message to delete the bookmark.
Search Bookmark	To search for a particular bookmark, enter it in the *Search* box. You can also enter one or more characters into the *Search* box and the suggested list of bookmarks that matched the entries will be displayed.
Modify Bookmark	Display the *Bookmark Settings* pane for the modification of the bookmark settings.
Update Bookmark	Update the bookmark settings.  Click **Yes** on the notification message to update.
Create Bookmark	Allows the creation of a new bookmark.
Close	Close the *Bookmark Settings* pane.
Name	Name of the bookmark.
Description	Description of the bookmark.
Dashboard Parameters	Available dashboard parameters. **NOTES:** • Excluding a parameter value sets its value in the bookmark to type Text and empty string value. This will allow the dashboard logic to dictate the parameter value that should be used when opening the bookmark. For example, if the dashboard contains an Action Date Picker that defaults to **now**, and that same parameter value is excluded from the bookmark, then the Action Date Picker default value will be the value when the bookmark is opened. • Directly modifying the parameter value in the bookmark (such as entering **now**, **today**, or **yesterday**) is not supported.
Save	Enabled when a change is made in the bookmark settings. Click to save.

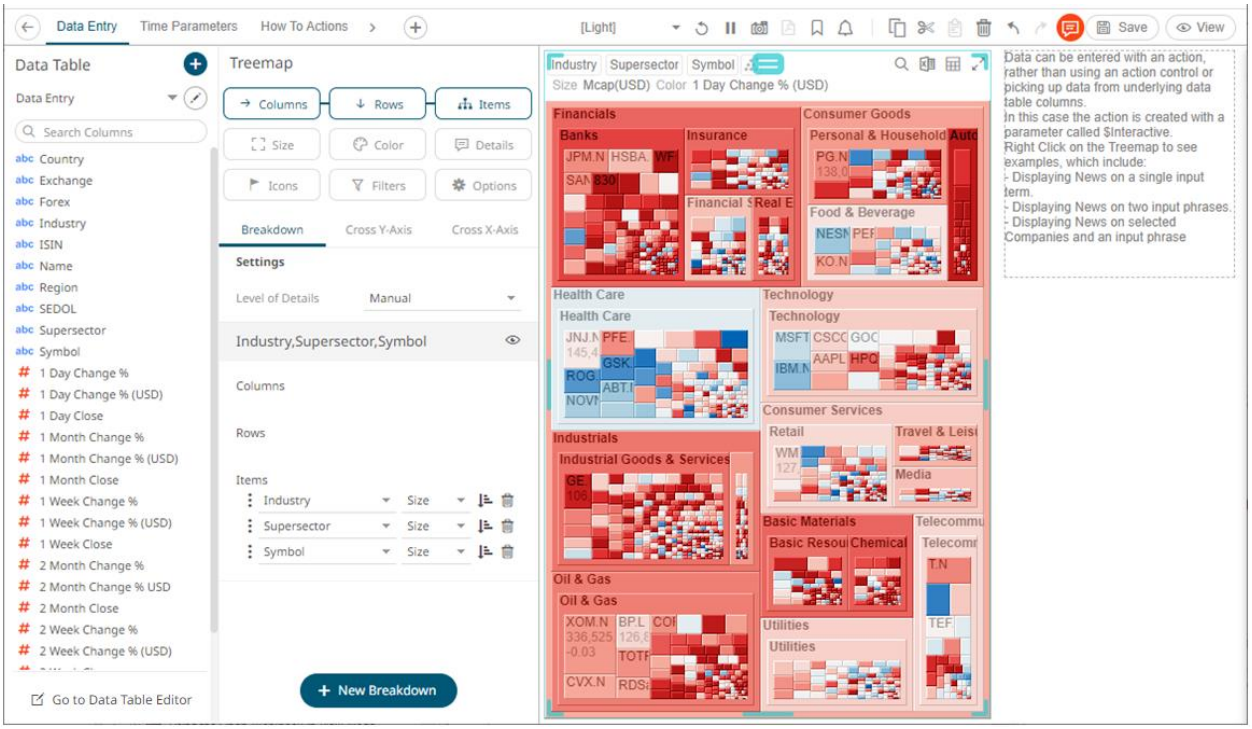
Viewing and Fixing Workbook Issues

You can view and fix workbook detected issues which may include:

- wrong column type, missing column values, or missing columns in a data table used in a visualization
- missing data table in Actions

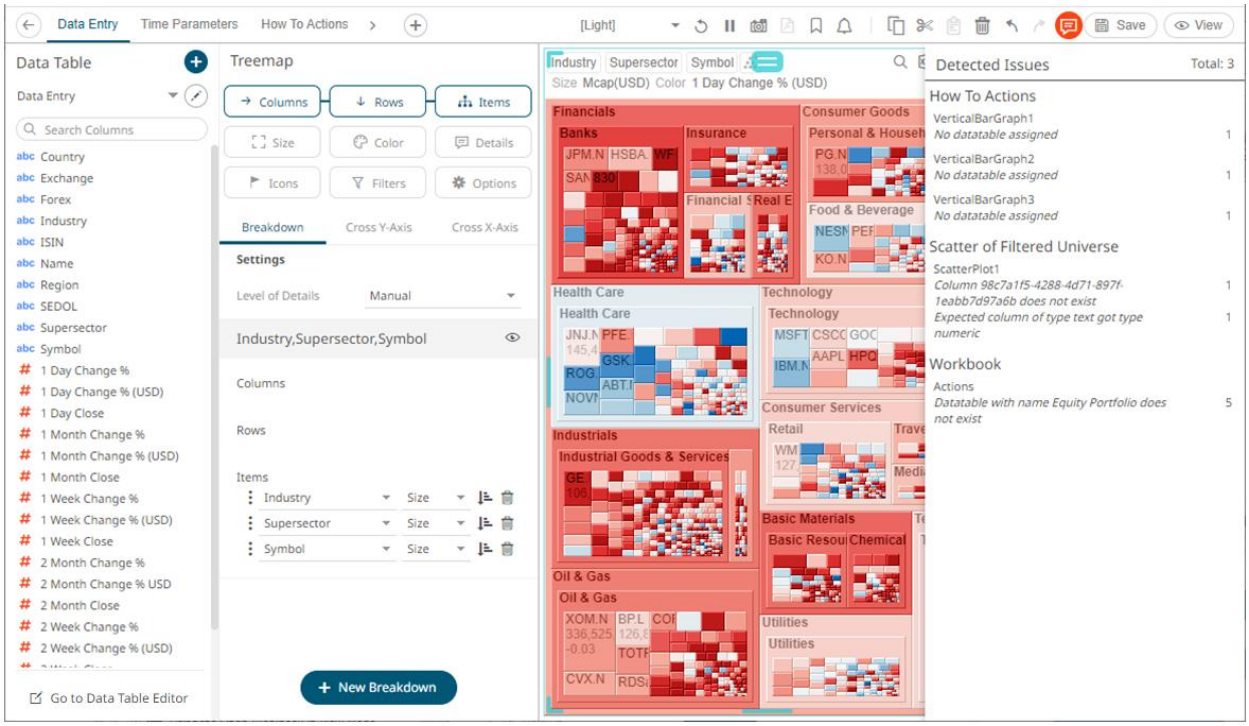
Steps:

1. Workbook issues are signified with  icon on the toolbar.



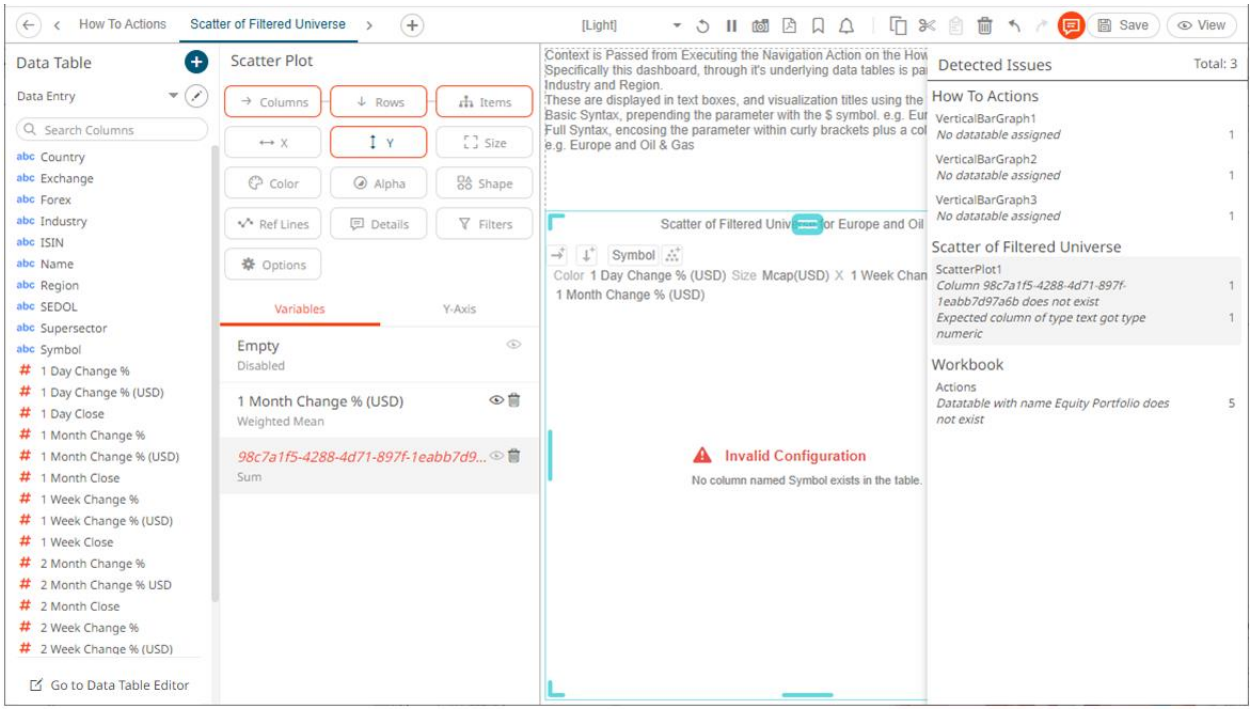
2. Click  . The list of all of the detected workbook issues is displayed.

   For this example, there are three issues.



3. Click on an issue. The variables or parts with detected issues are highlighted with red font or border. For parts or visualizations, an **Invalid Configuration** error and its cause are displayed.

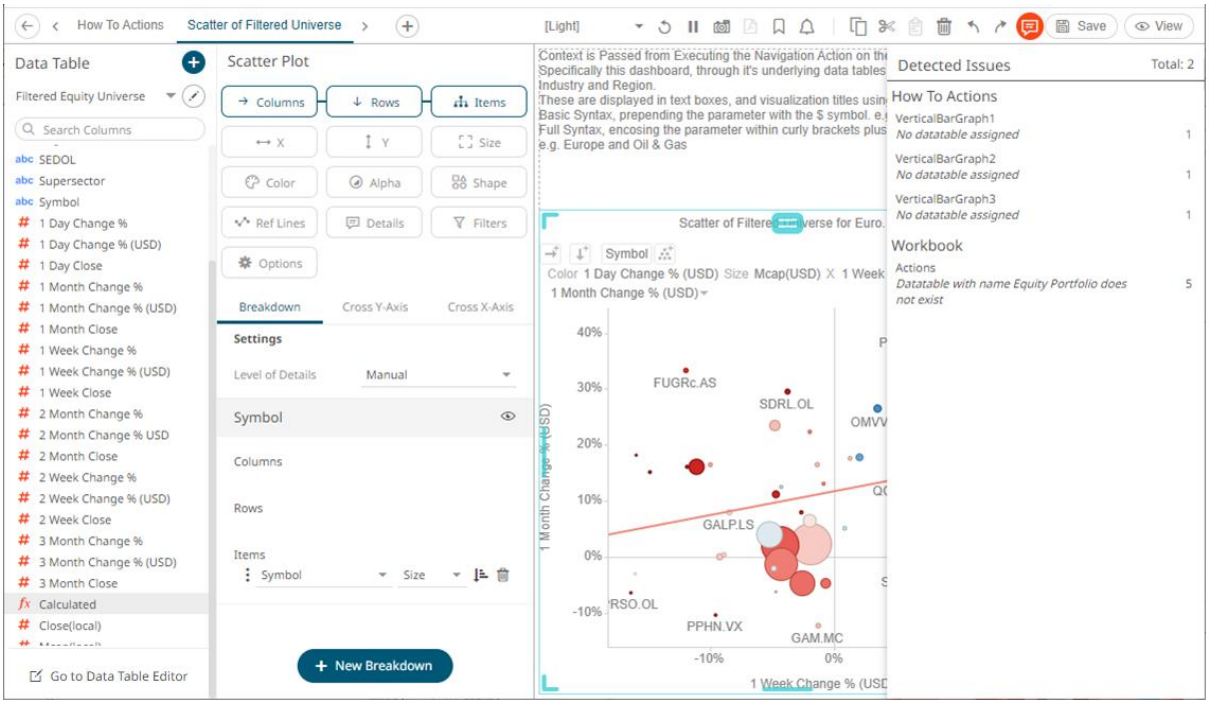
Example 1: Missing column issue



3.1. Click on the variable to view the missing or invalid column value.

For this example, the *Column* (**Symbol**) is not available for the Y variable.

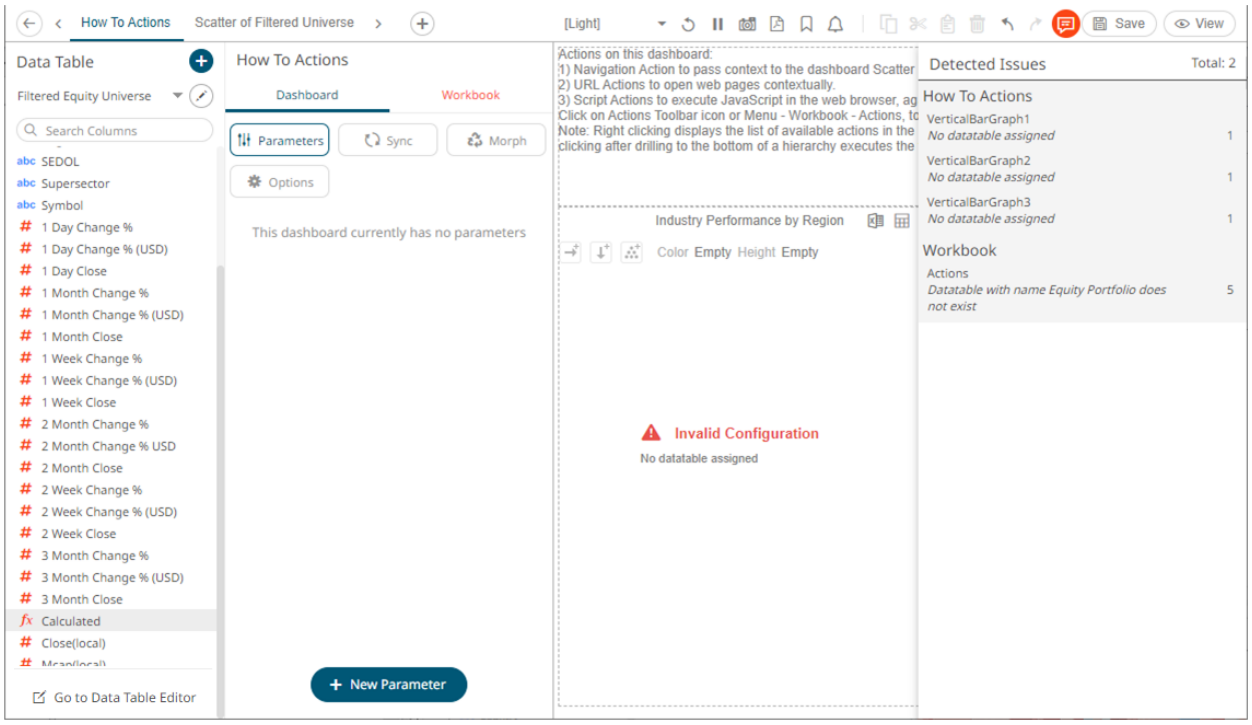
3.2. Select or define the missing or invalid column. Once fixed, the issue is removed from the list.



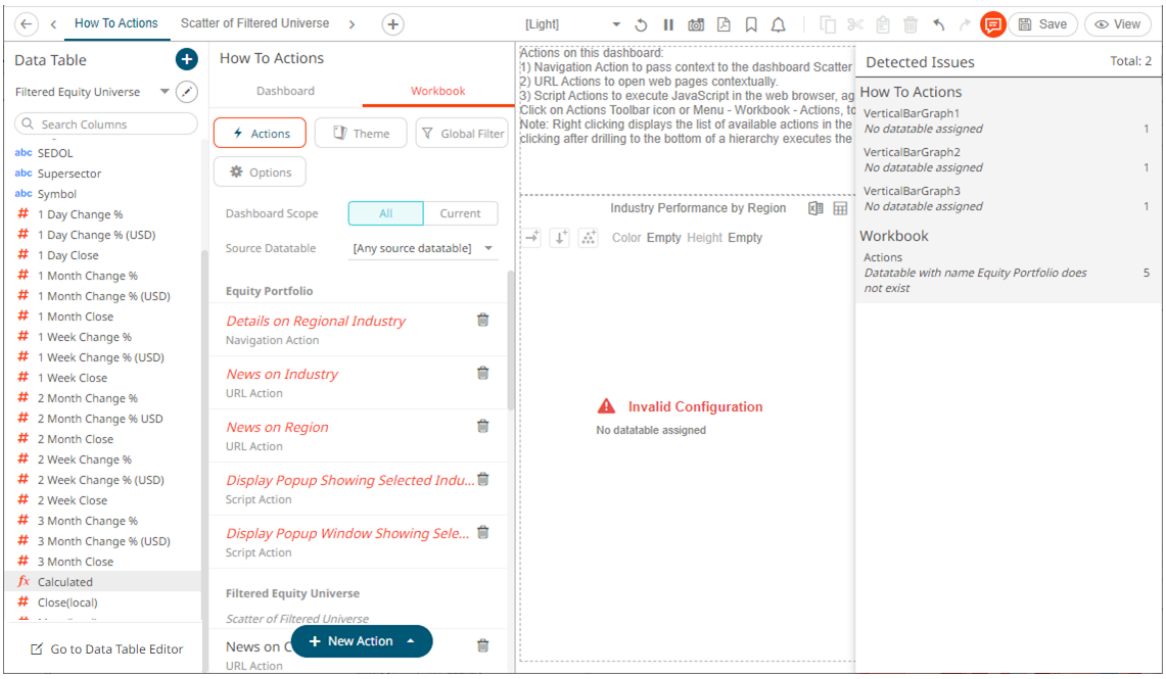
4. Click on a *Workbook* issue, if available.

   Example 2: Missing data table in Actions issue

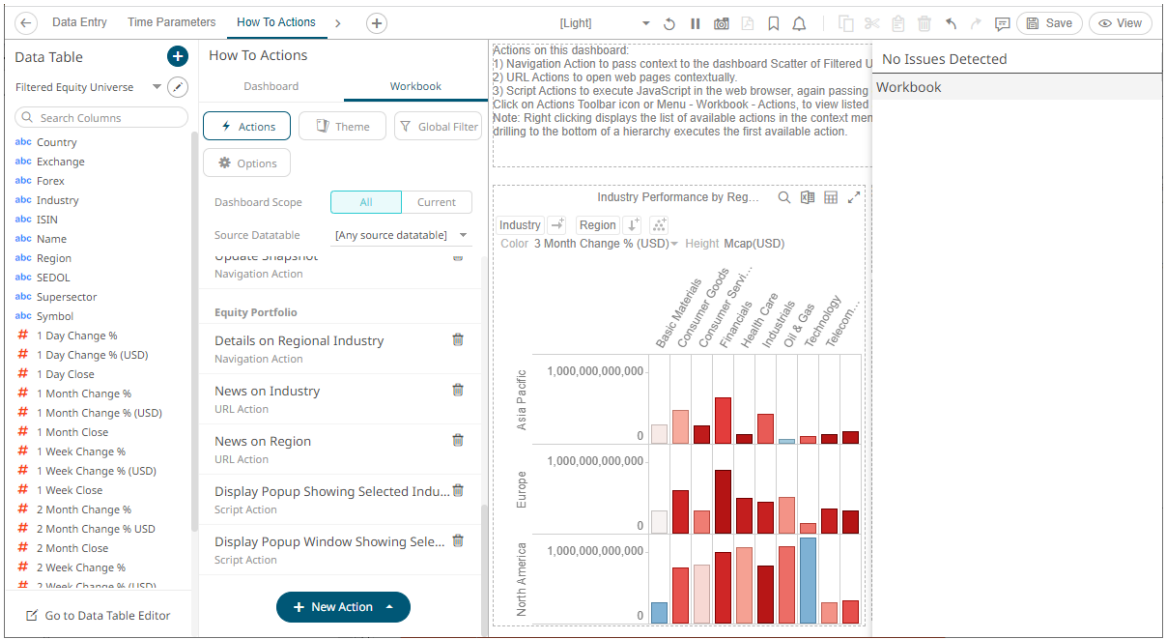
   All of the actions along with visualizations with missing data table are highlighted.



   4.1. Click the **Workbook** tab on the *Dashboard* pane. The **Actions** pill is displayed with a red border and the actions with missing data table are displayed in red. The part or visualization is also displayed with an **Invalid Configuration** error and its cause.



4.2. You may need to define the missing data table and select for the actions and visualizations which are marked with an error. Once fixed, the corresponding issues are removed from the list.



ALERTING

The Alerts function allows a notification to be sent when the data in a visualization has met the predefined settings.

If alerts are required to be sent via email, the following properties must be configured first in the `Panopticon.properties` file.

Property	Alert
Attribute	`alert.creation.only.by.administrators`
Description	Enable or disable whether only Administrators can create alerts.
Default Value	**false**
Property	Alert
Attribute	`email.address`
Description	The email address where the alert will be sent from.
Default Value	
Property	Alert
Attribute	`email.password`
Description	The email password, if available.
Default Value	
Property	Email
Attribute	`email.host`
Description	The host name used by the email server.
Default Value	
Property	Email
Attribute	`email.port`
Description	The port number used by the email server.
Default Value	

Otherwise, when trying to enable an alert, this error will be displayed:



Save the updated file and restart Tomcat.

NOTE **Alerts are not supported in the Combination Graphs.**

Setting Up Alerts on the Web Client

Alerts can be defined against:

- Streaming data sources (including CEP Engines and message queues)
- Periodically refreshed data sources (like Oracle, SAP Sybase, SQL Server, and so on)

Alert definition can be done by right-clicking on a streaming numeric or text data in a visualization in the Web client and setting the limits, duration, what will be included, how many and when an email will be sent.

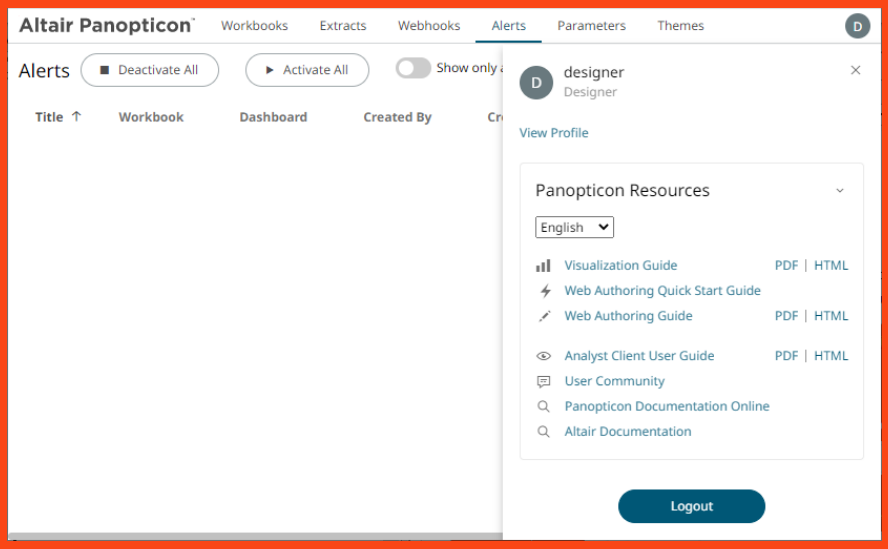
NOTE **Before setting up the visualization alert, enter the email of the user or group who will receive the alert on the *User Profile*:**

Steps:

1. **On the *Workbooks and Folders Summary page*, click D.**

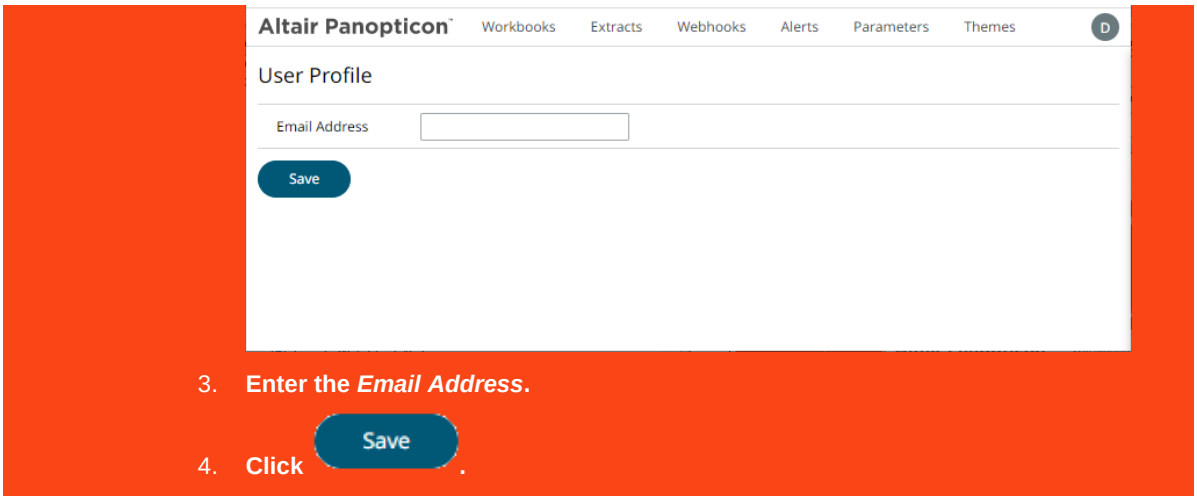


The *Profile* pane displays with the name of the user and the role.



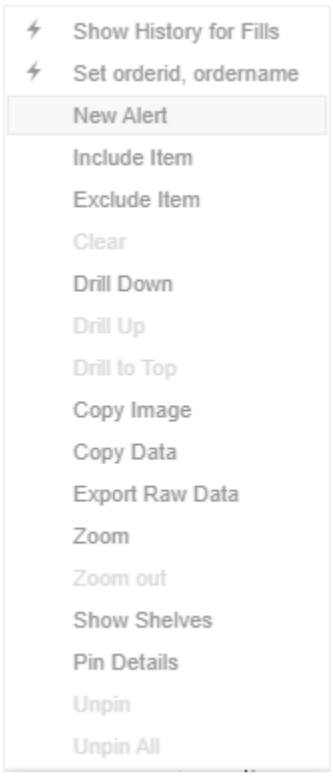
2. **Click *View Profile*.**

   The *User Profile* page displays.

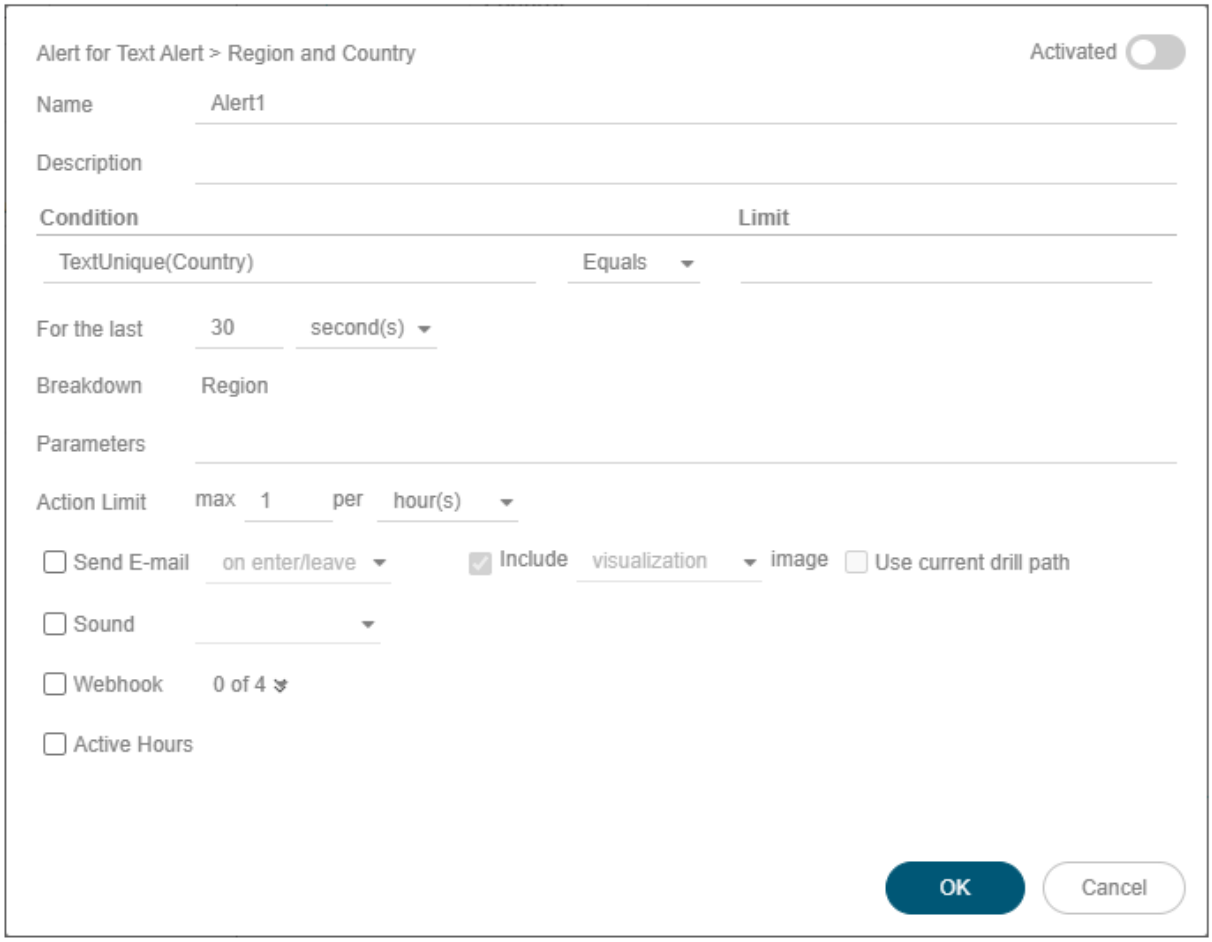


Steps:

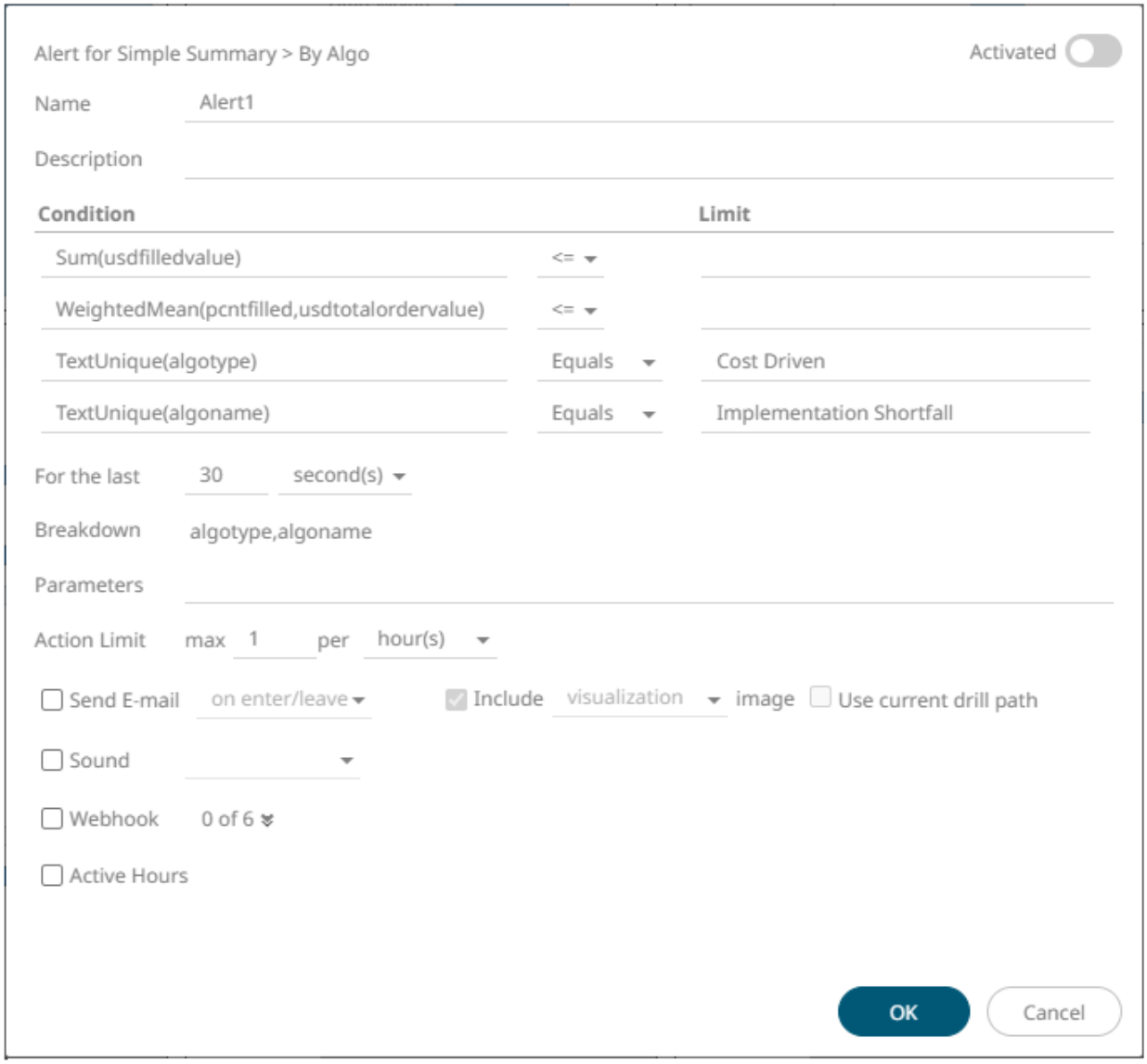
1. Open a workbook on the *Workbook and Folders Summary* page and right-click on a streaming numeric or text data in a visualization. Select *New Alert* on the context menu.



The *Alerts* dialog displays with the name of the visualization where the alert will be set.



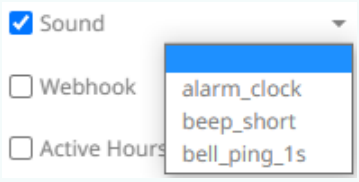
Sample Text Alerting



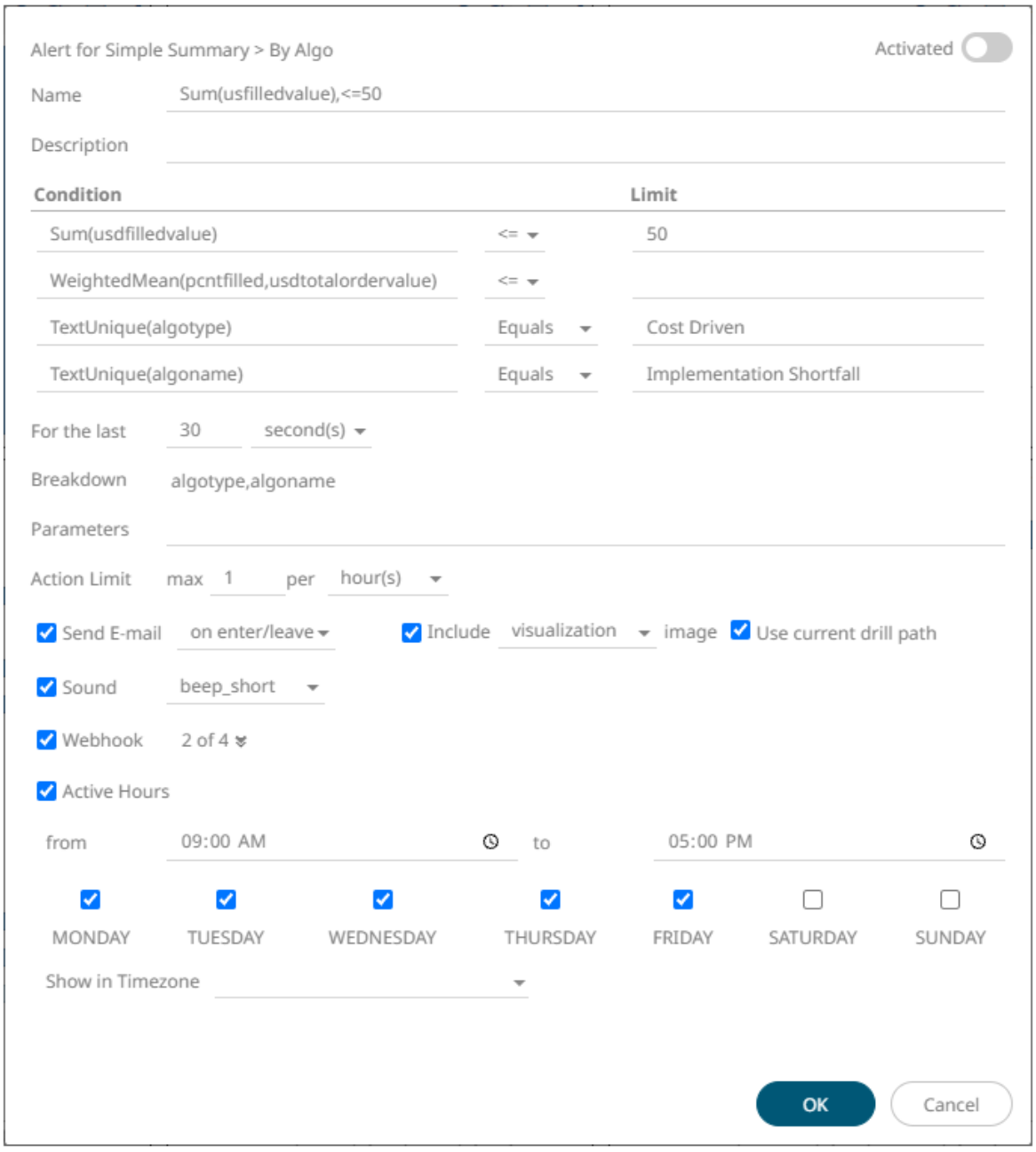
Sample Numeric Alerting

2. Enter or select the following properties:

Setting	Description
Name	Name of the alert.
Description	Description of the alert.
Condition	Allows setting the Upper (<= or Lower (>=) *Limit* of all the available numeric variables in the visualization. For text variables, there are three types of conditions: • Equals - The string is equal to another string, e.g., Country=Sweden • Wildcard: The string matches a wildcard expression, e.g., Country=Norwa* would match Country=Norway • Regex: The string matches a regex expression, e.g., Country=I[a-zA-Z]+a would match Country=India and Country=Indonesia
For the Last	Checks if a value has reached the limit on the set Date/Time unit:

	• second(s) • minute(s) • hour(s) • day(s)
Breakdown	Current breakdown of the visualization.
Parameters	Available parameters in the visualization.
Action Limit	The maximum number of times an alert will be sent on the set Date/Time unit: • second(s) • minute(s) • hour(s) • day(s)
Send E-mail	Determines when an alert email will be sent: • on enter • on leave • on enter/leave If unchecked, the notification will only be displayed on the Web client.
Include	Determines whether the image of the visualization or dashboard will be included in the alert email. For the included image of the visualization, check the **Use current drill path** box to generate a drilled image in the email.
Sound	The sound that will be played for a triggered alert. The available sounds are mp3 files placed in the `AppData/Sounds` folder (i.e., `C:\vizserverdata\Sounds`). Panopticon is shipped with one sound (i.e., bell_ping_1s.mps).  Default is **None**.
Webhook	Webhooks that will executed when the alert is triggered.
Active Hours	Determines when an alert should be active. Proceed to step 3.

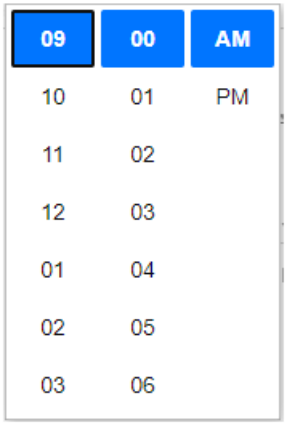
3. Check the **Active Hours** box. The dialog changes to display:



By default, the duration is from **9:00 AM** to **5:00 AM** on **Monday**, **Tuesday**, **Wednesday**, **Thursday**, and **Friday**.

4. To modify the *Active Hours*, click .

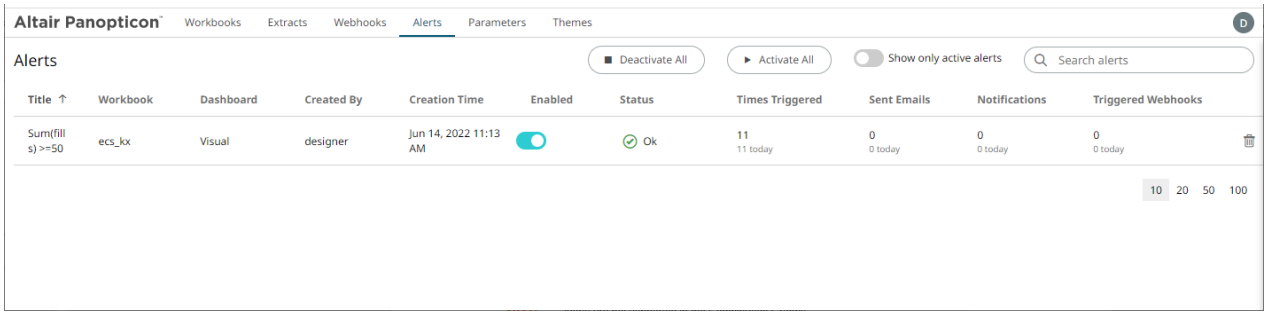
   The *Clock* settings display.



5. Select the *Hour*, *Minutes*, and *AM/PM* settings.
6. To modify the *Active Days*, check the boxes of the desired days.
7. To apply the active hours in another time zone, select the desired value from the *Show in Timezone* drop-down list box.

   Once set, the *From* and *To* limits will be applied for that time zone. If not set, the server default time zone will be used.
8. Tap the **Activated** slider to turn it on.
9. Click 

. The new alert is added on the *Alerts* page.



NOTE **When creating alerts for grand total, ensure that no breakdown is set.**

An alert displays with the following properties or settings:

Property	Description
Title	Name of the alert that was entered in the *Alerts* dialog.
Workbook	The path and name of the workbook where the alert was set.
Dashboard	The dashboard name where the alert was set.
Created By	The author of the alert.
Creation Time	The Date/Time when the alert was set.
Enabled	Determines if the alert is enabled (or active).
Status	Status of the alert.

Times Triggered	The number of times the alert was triggered.
Sent Emails	The number of emails sent.
Notifications	The number of notifications sent.
Triggered Webhooks	The number of triggered webhooks.

You can then opt to perform any of the following operations:

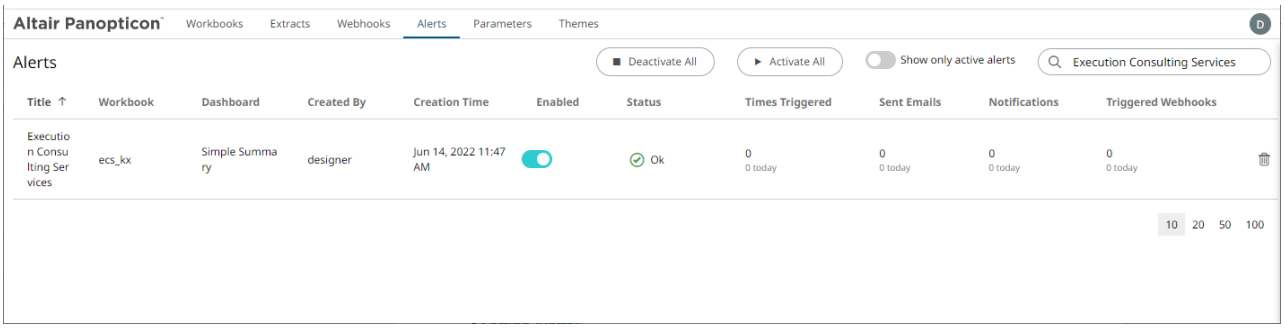
- Sort alerts
- Search for alerts
- Enable an alert
- Modify alerts
- Delete alerts
- Display active alerts
- Deactivate/activate all alerts

Sorting Alerts

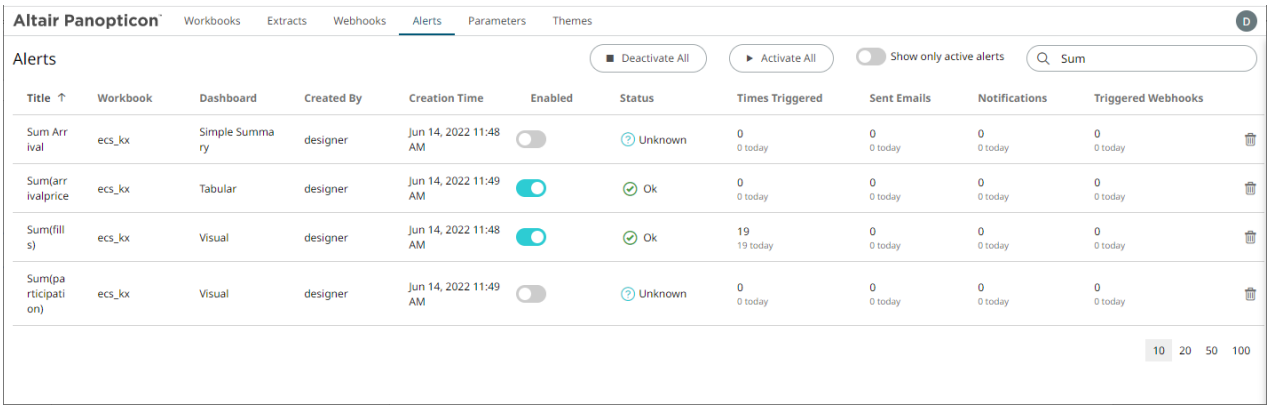
By default, the list of alerts is sorted by *Title* in an ascending order. You can modify the sorting of the list by clicking the ↓ or ↑ button of the *Title, Workbook, Dashboard, Created By, Creation Time, Enabled, Status, Triggered, or Triggered Today* columns. The icon beside the column that was used for the sorting will indicate if it was in an ascending or descending order.

Searching for Alerts

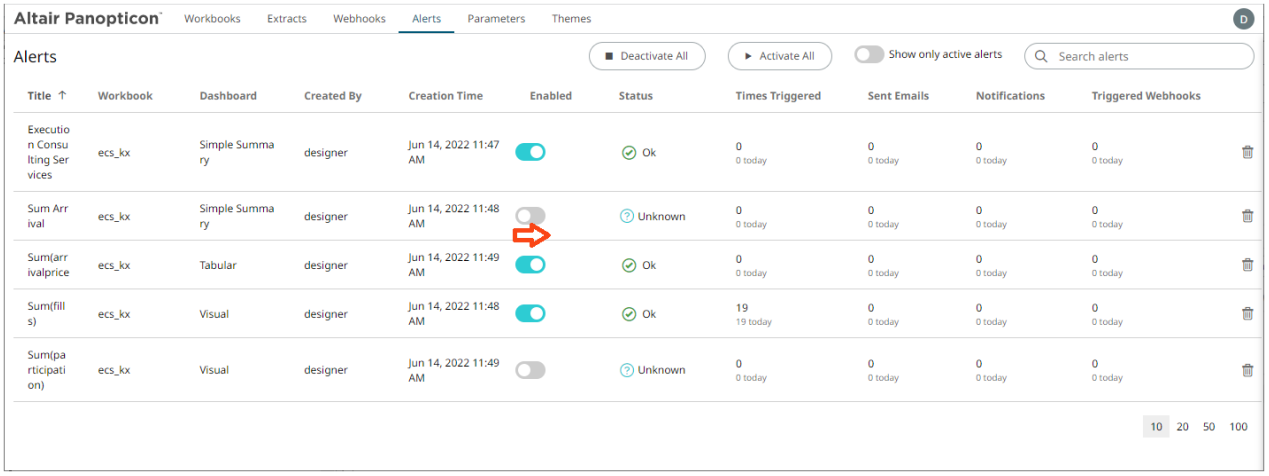
To search for a particular alert, enter it in the *Search* box.



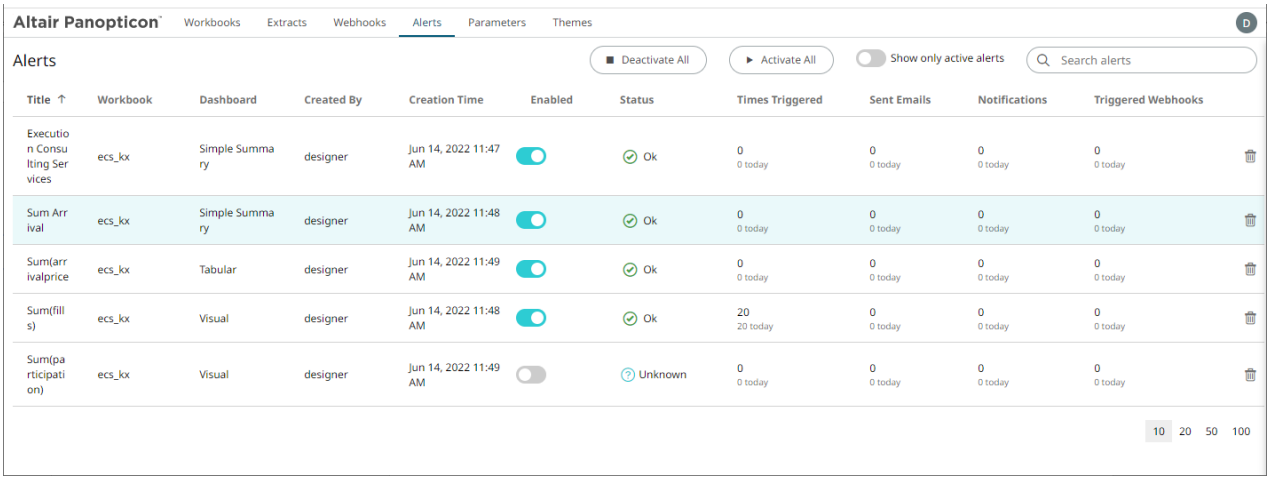
You can also enter one or more characters into the *Filter Applications* box and the suggested list of alerts that matched the entries will be displayed.



Enabling Alerts on the Alerts Page



Tap the **Enabled** slider to turn it on.

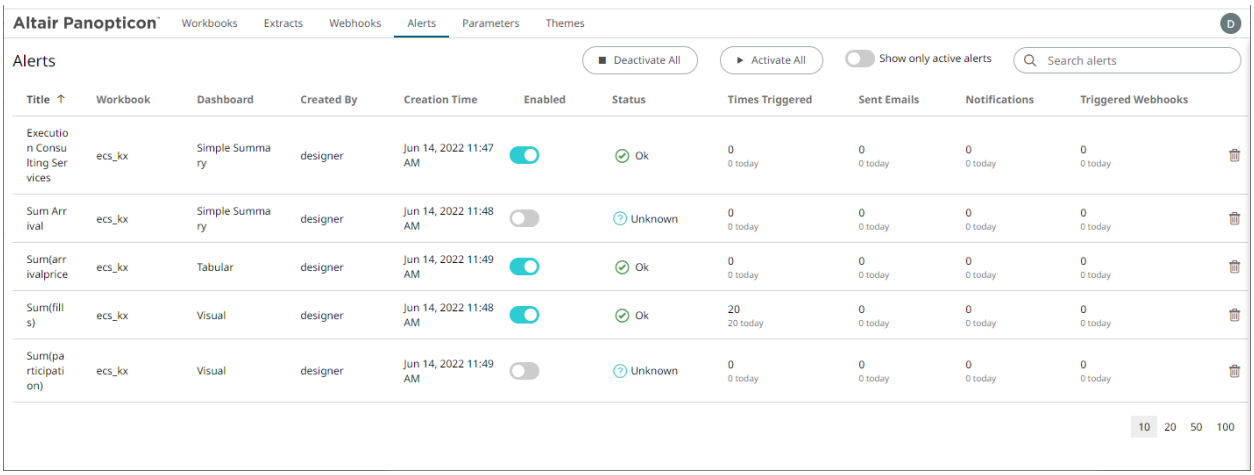


Enabling alerts can also be performed on a visualization's Alerts panel.

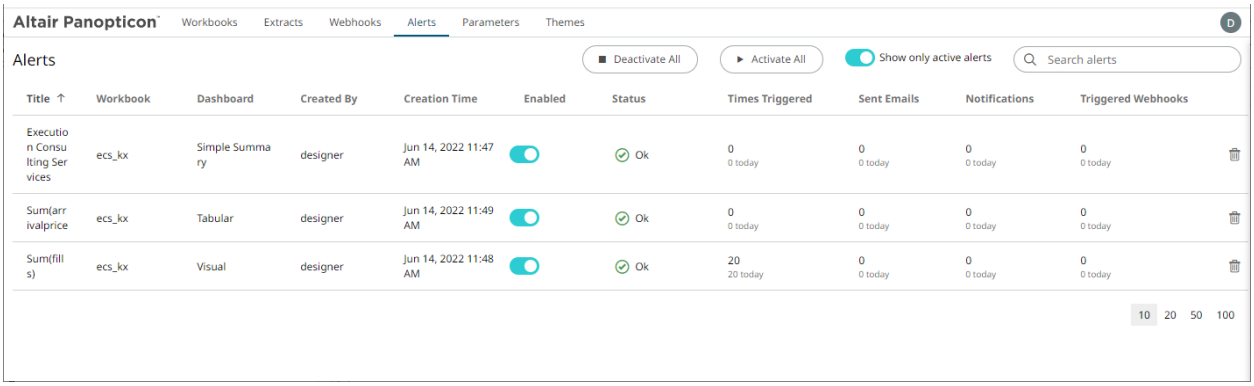
Other Alerts operations can be modified, enabled, and deleted in the workbook where it was set.

Displaying Active Alerts

Tap the **Show only active alerts** slider to turn it on.

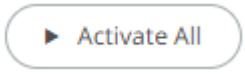


Only the active or enabled alerts are displayed on the **Alerts** tab.

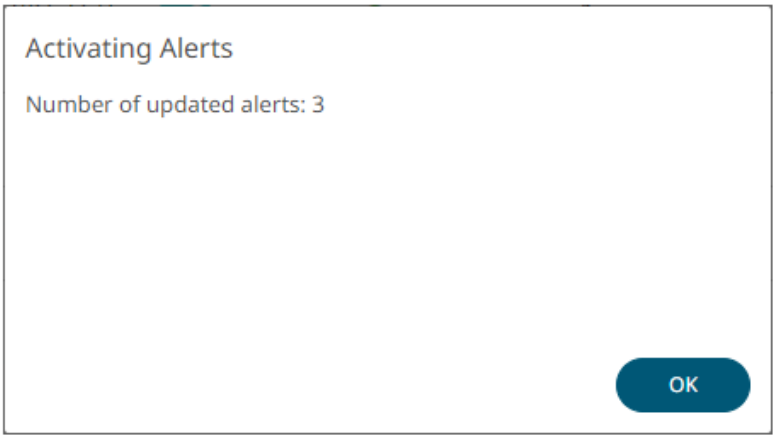


Activating or Deactivating All Alerts

Alerts can be activated or deactivated in one click.

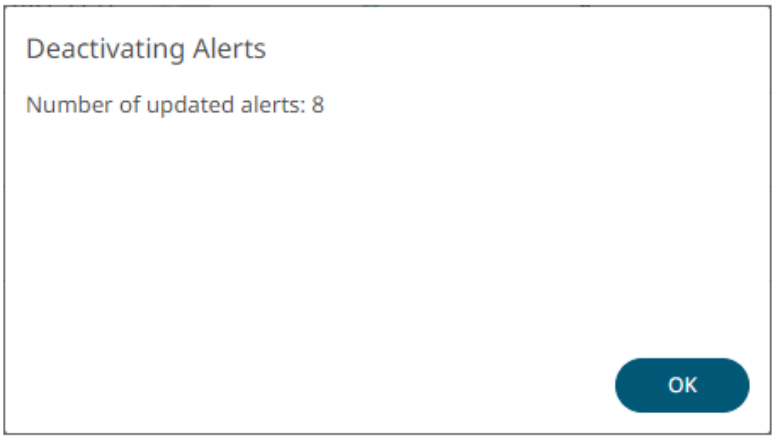
To activate all deactivated alerts, click **Activate All** 

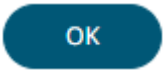
. All of the deactivated alerts are activated.



To deactivate all activated alerts, click **Deactivate All** 

. All of the activated alerts are deactivated.



Click 

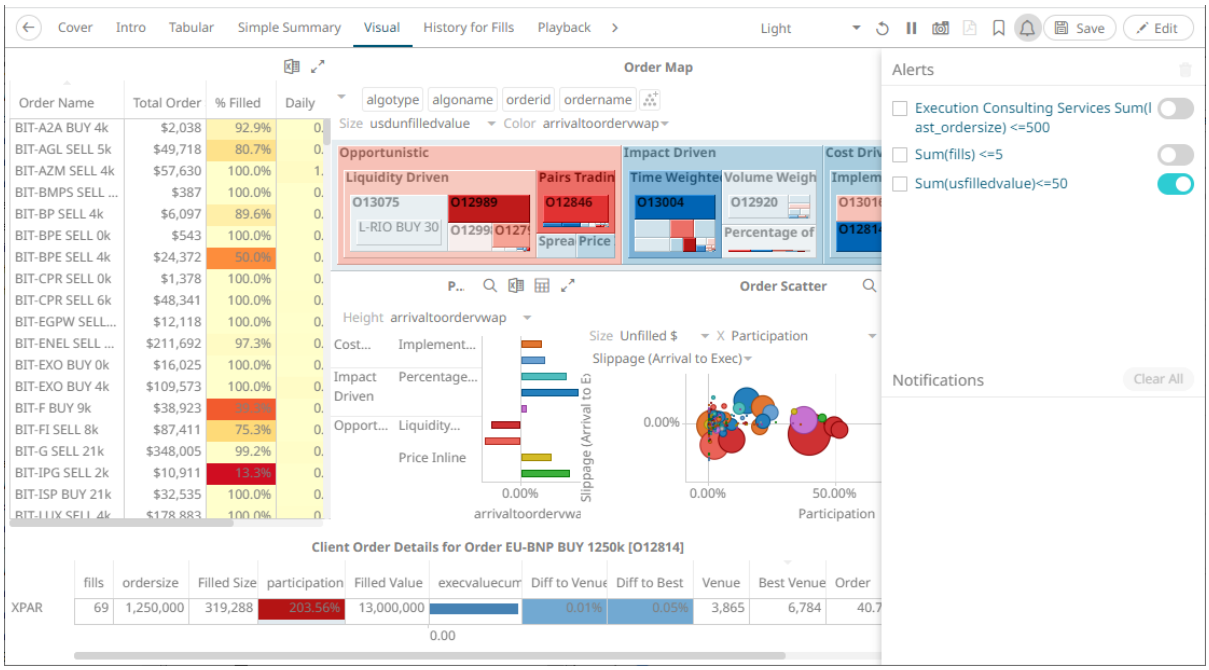
to close the dialog.

Modifying Alert Settings

Steps:

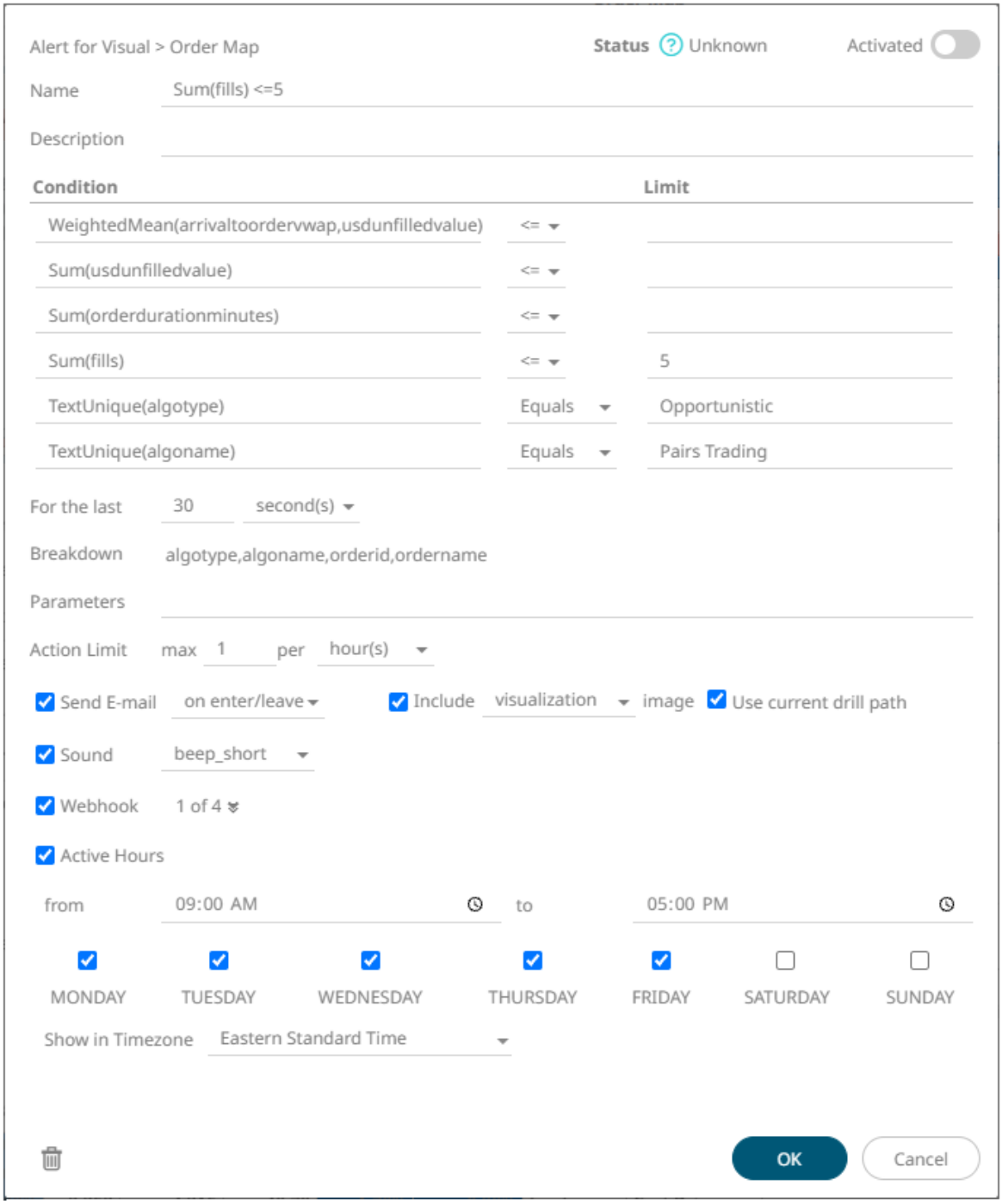
1. Open a workbook with an alert and click on the **Alerts** icon.

   The *Alerts* panel displays with the list of alerts.



2. Click an alert to modify.

   The *Alerts* dialog displays.



3. Make the necessary changes then click OK to save them.

Deleting Alerts

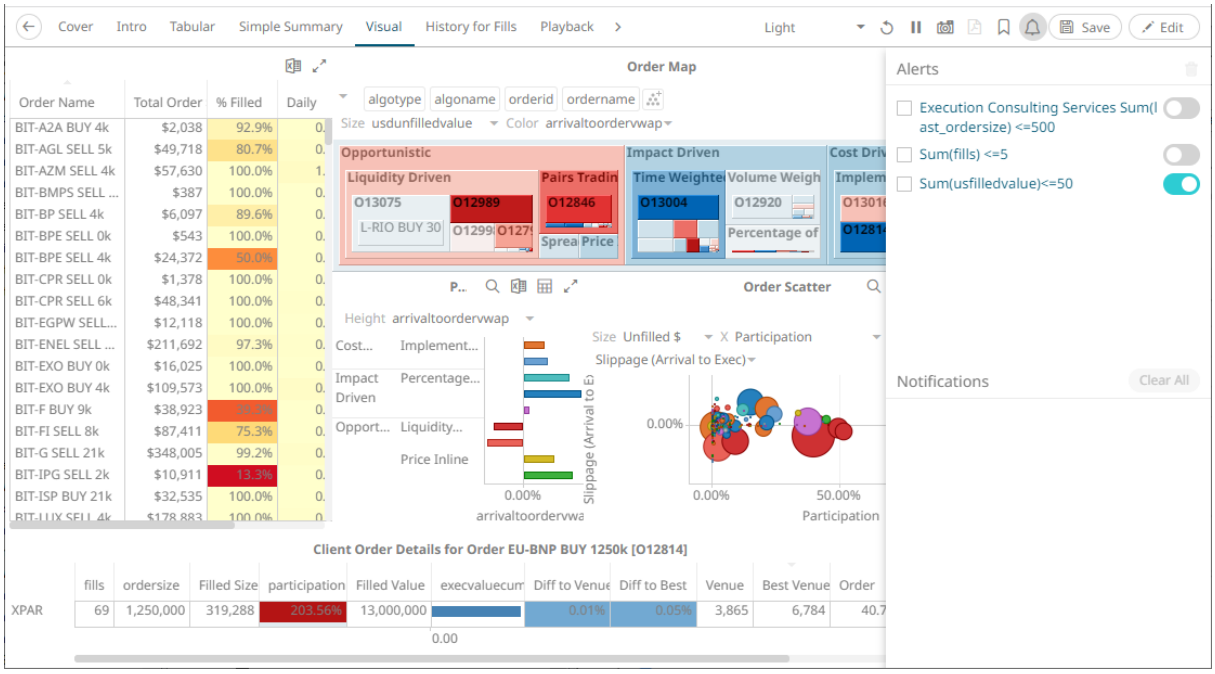
Alerts can be deleted on:

- the Alerts panel
- an Alerts dialog
- the Alerts tab

Deleting Alerts on the Alerts Panel:

1. Open a workbook with an alert and click on the **Alerts** icon.

   The *Alerts* panel displays with the list of alerts.

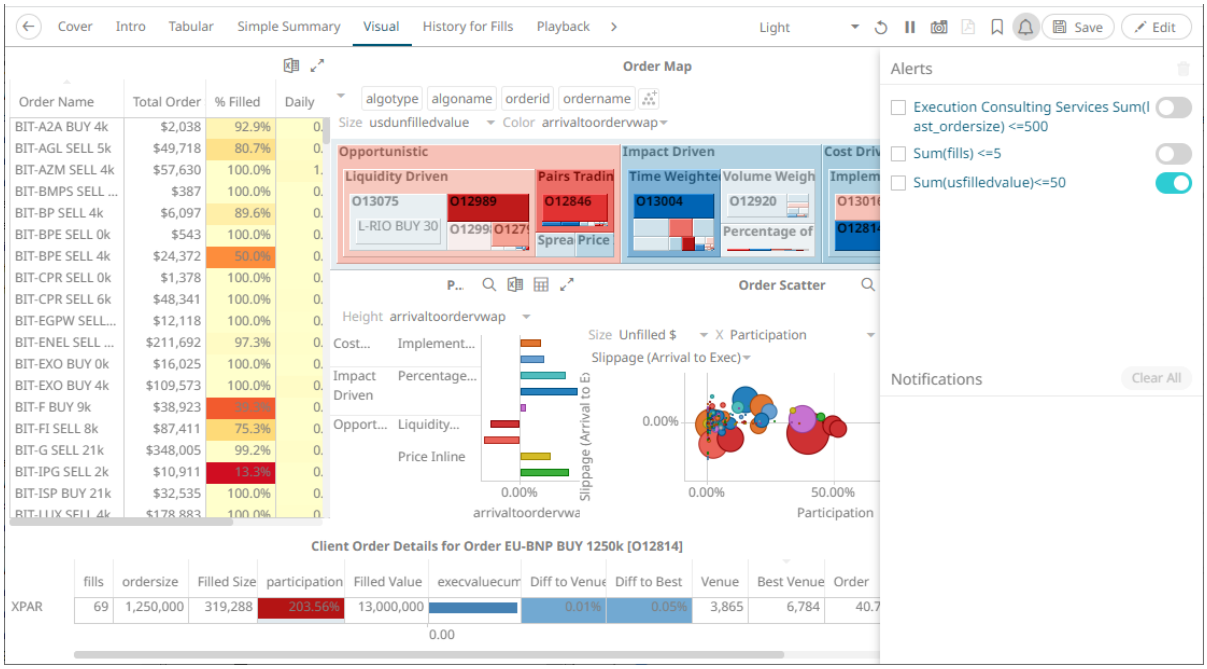


2. Check the box of an alert and click the **Delete** icon. You can also check several boxes to delete multiple alerts.

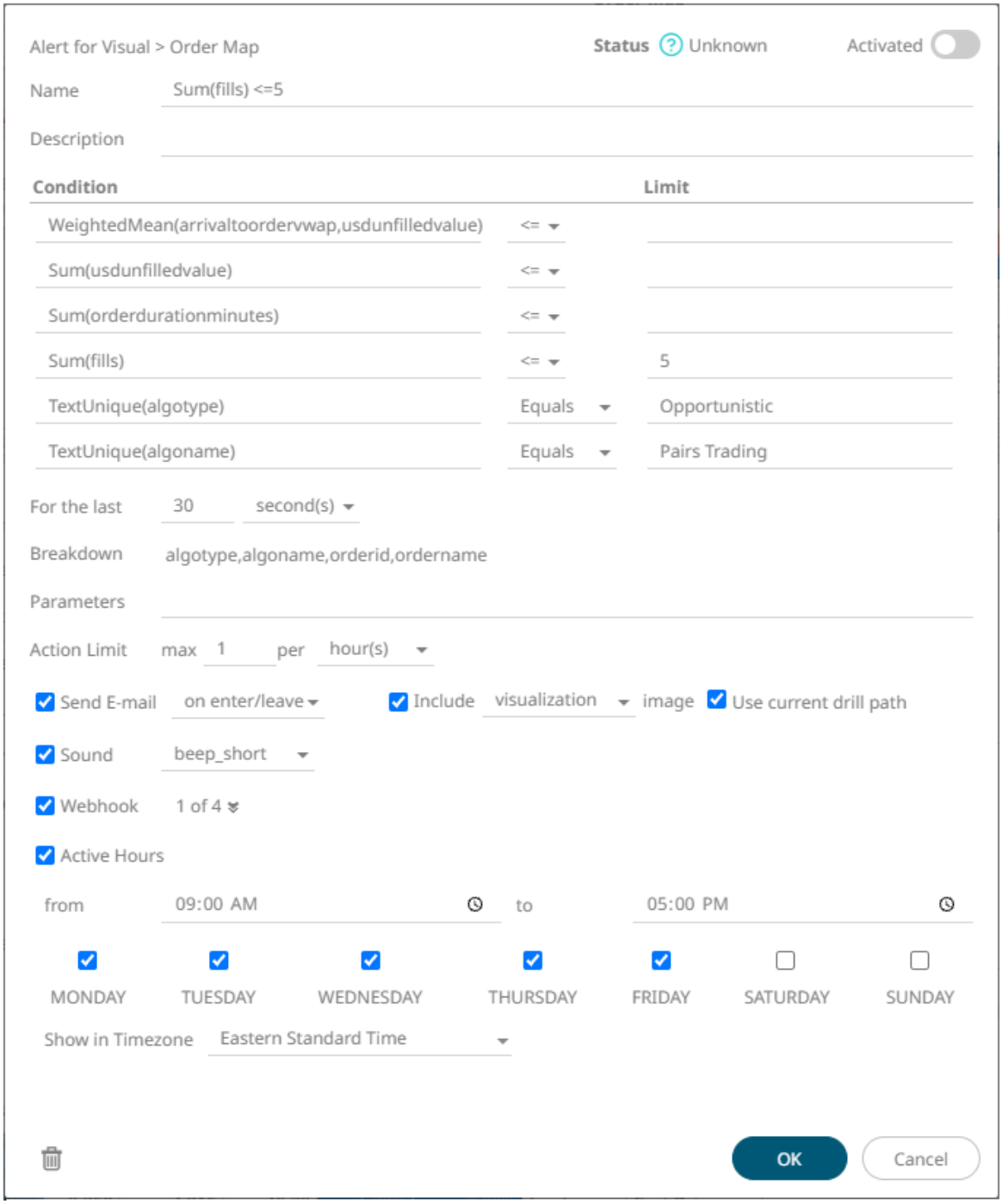
Deleting Alerts on an Alerts Dialog:

1. Open a workbook with an alert and click on the **Alerts** icon.

   The *Alerts* panel displays with the list of alerts.



2. Click an alert. The *Alerts* dialog displays.

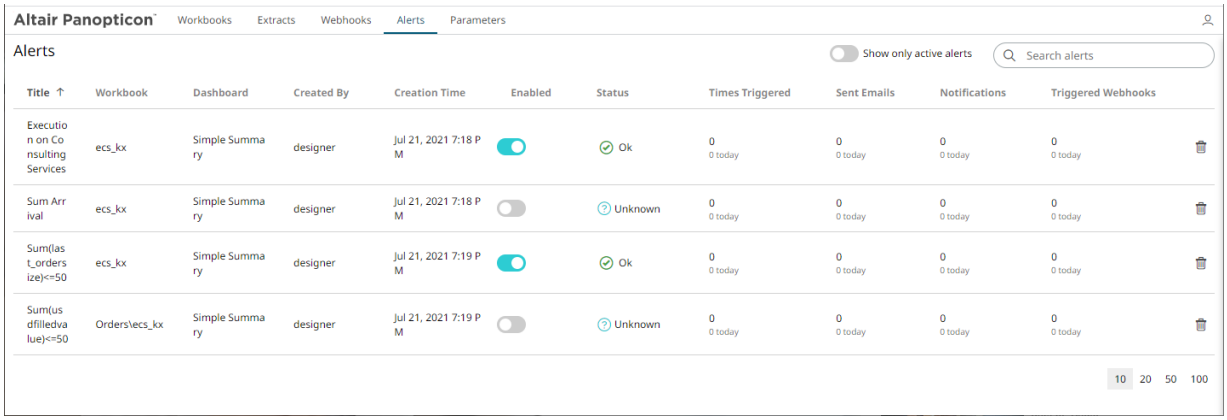


3. Click the **Delete** icon.

Deleting Alerts on the Alerts tab:

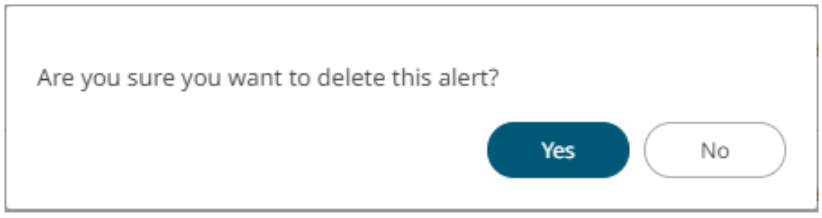
1. Go to the **Alerts** tab.

   The **Alerts** tab displays the list of alerts.



2. Click the of an alert to delete.

   A confirmation message displays.



3. Click Yes .

Enabling Alerts

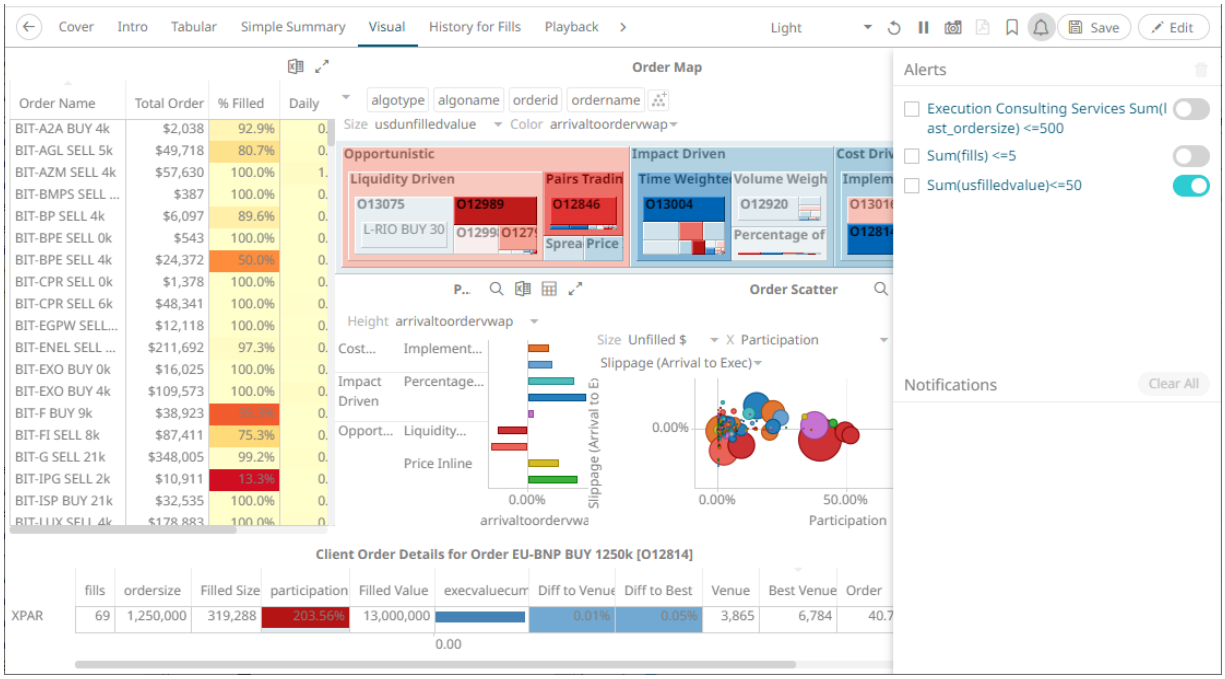
Alerts can be enabled either on:

- the Alerts panel
- an Alerts dialog

Enabling Alerts on the Alerts Panel:

1. Open a workbook with an alert and click on the **Alerts** icon.

   The *Alerts* panel displays with the list of alerts.

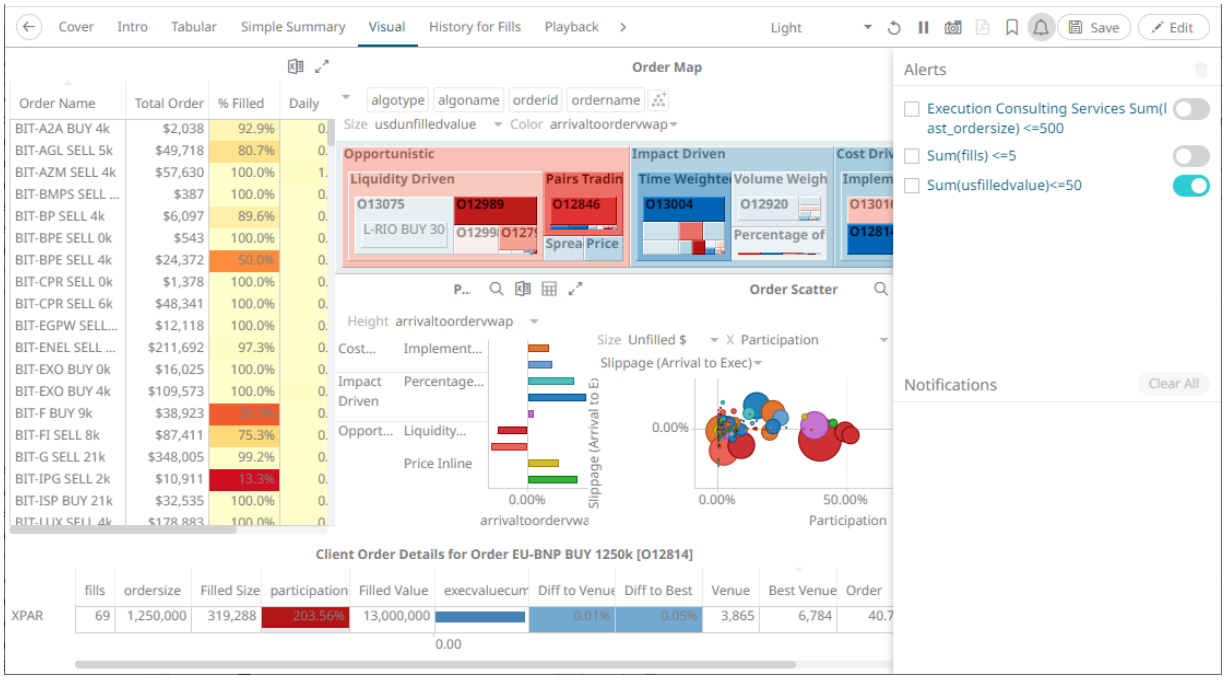


2. Tap the **Activated** slider to turn it on.

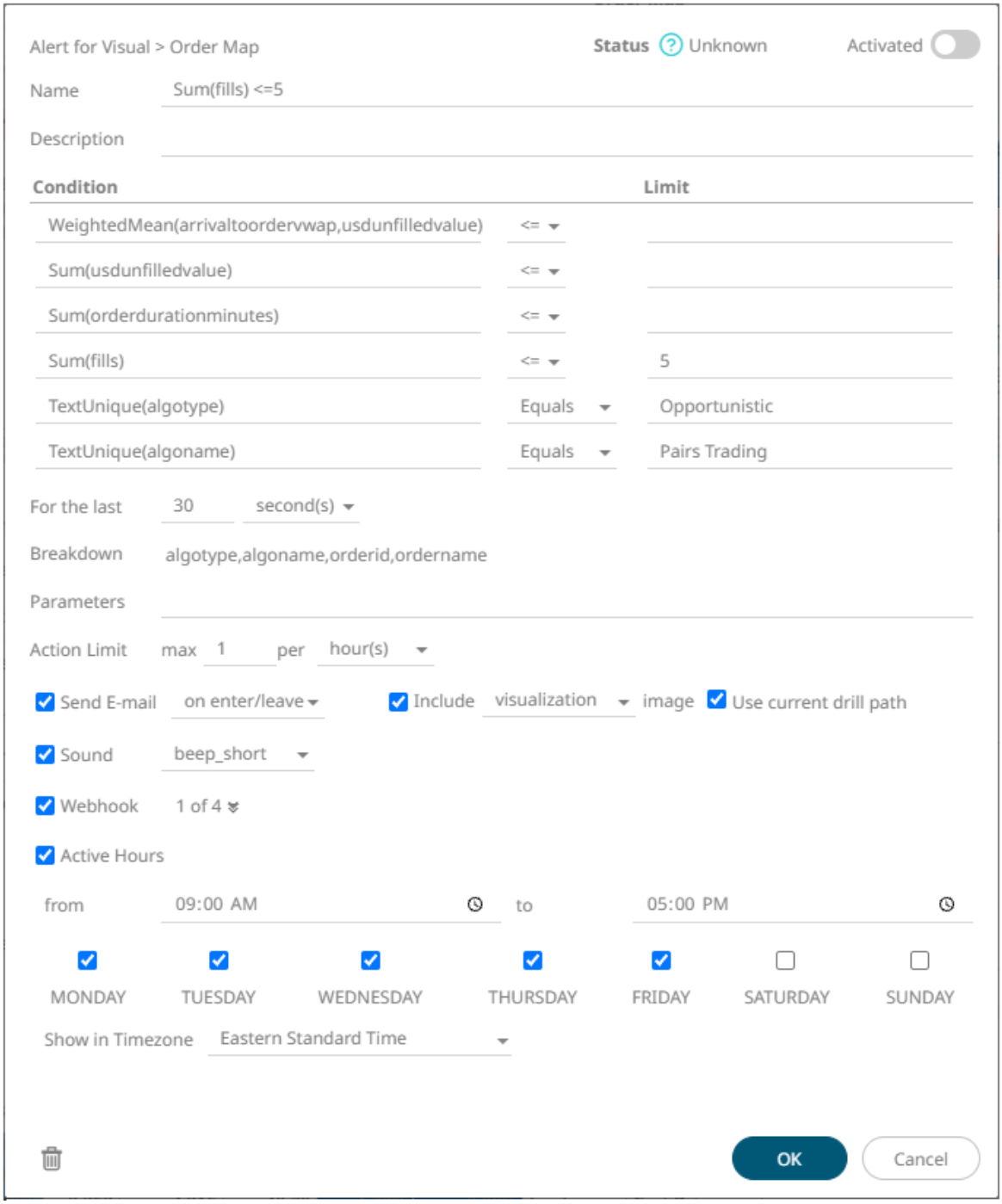
Enabling Alerts on an Alerts Dialog:

1. Open a workbook with an alert and click on the **Alerts** icon.

   The *Alerts* panel displays with the list of alerts.



2. Click an alert. The *Alerts* dialog displays.



3. Tap the **Activated** slider to turn it on and click **OK**.

Sample Email Alerts

An alert is generated when the alert set state changes from **Off** to **On** and recorded in the alert history.

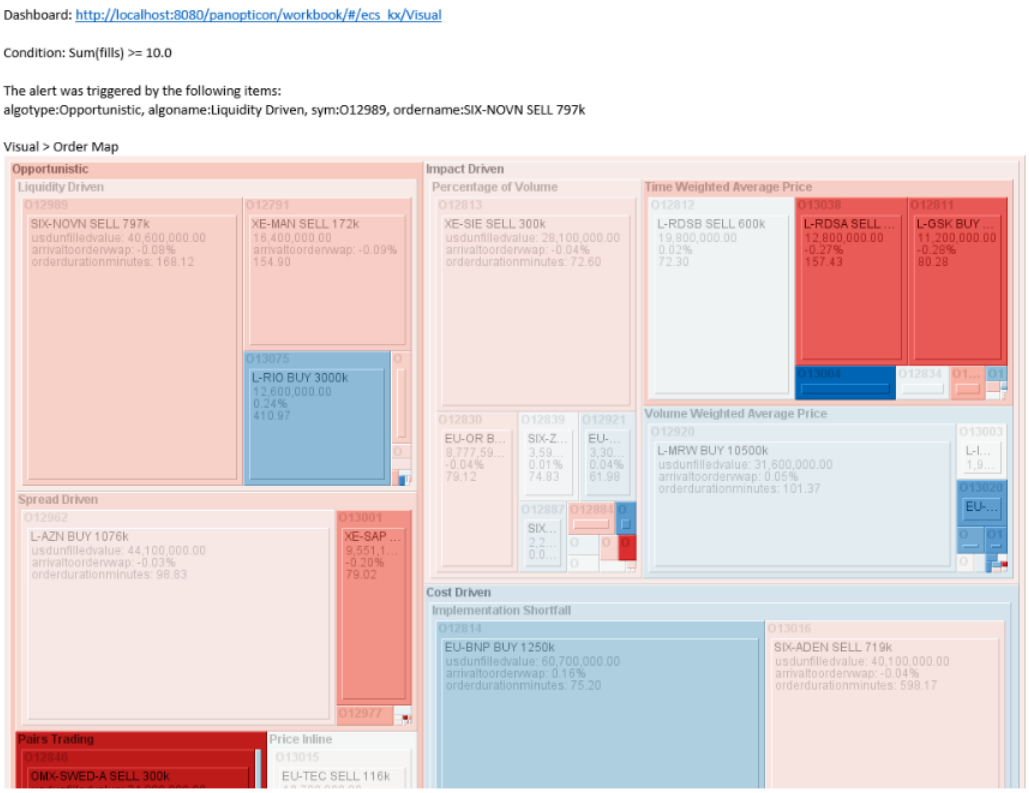
An alert is only issued by email if the alert has not already been sent in the last 'n' minutes as defined in the *Alerts* dialog.

When an alert is issued, an email is sent to the defined email address.

The email includes:

- Link to the workbook or dashboard
- Condition and limit value
- Breakdown
- Name of the visualization where the alert was set
- PNG image of the visualization or dashboard

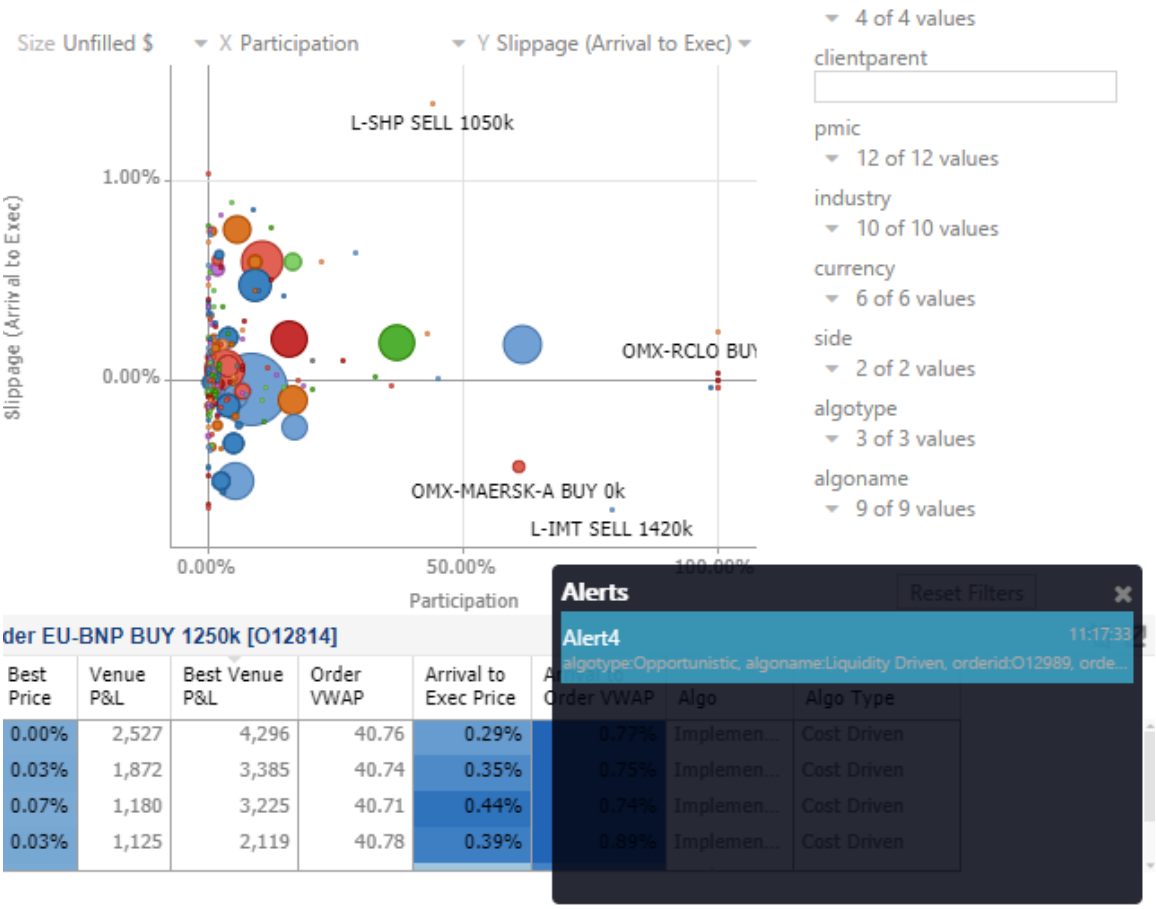
  All items that do not match the criteria are excluded from the display.



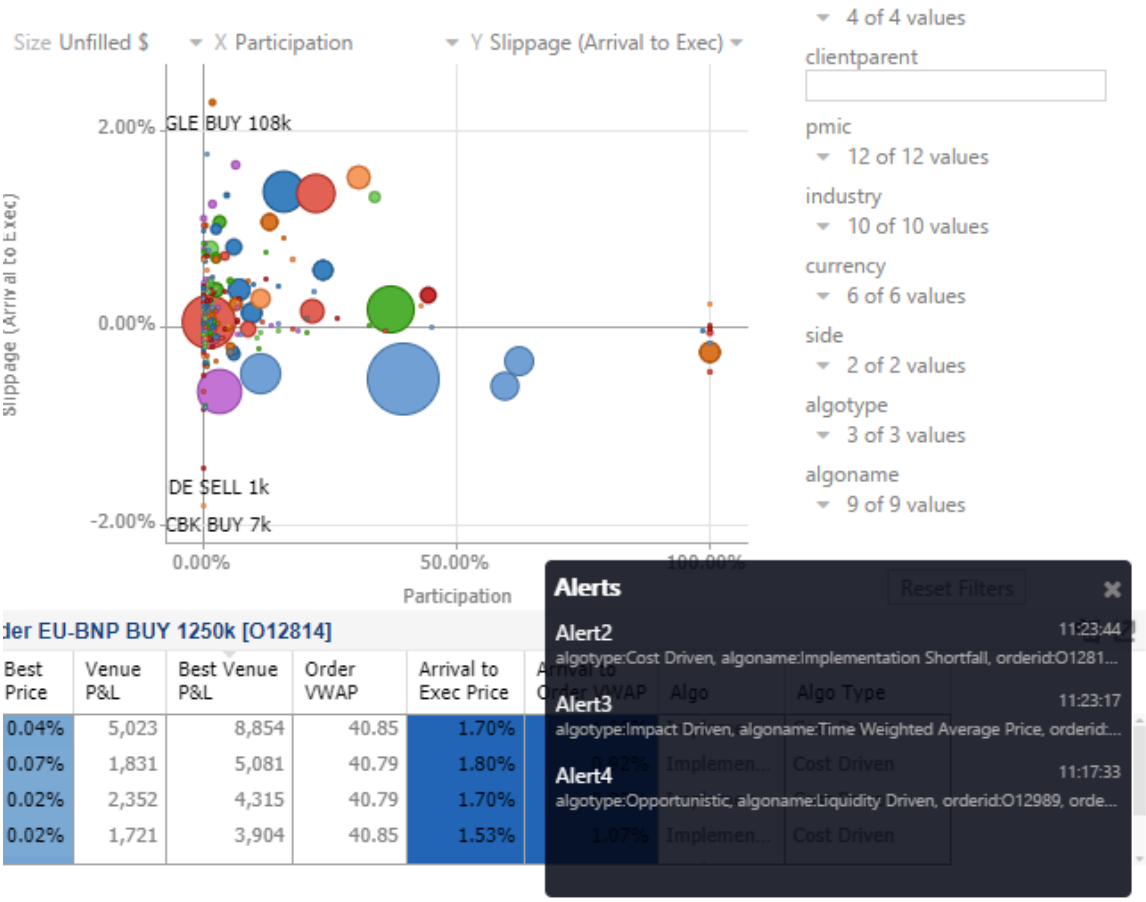
Sample Web Client Alerts

When an alert is triggered, aside from the email notifications, a visual indication or pop-up in active Web clients will draw attention to the alerting visualization or dashboard.

In the example below, an alert initially displays highlighted in blue:

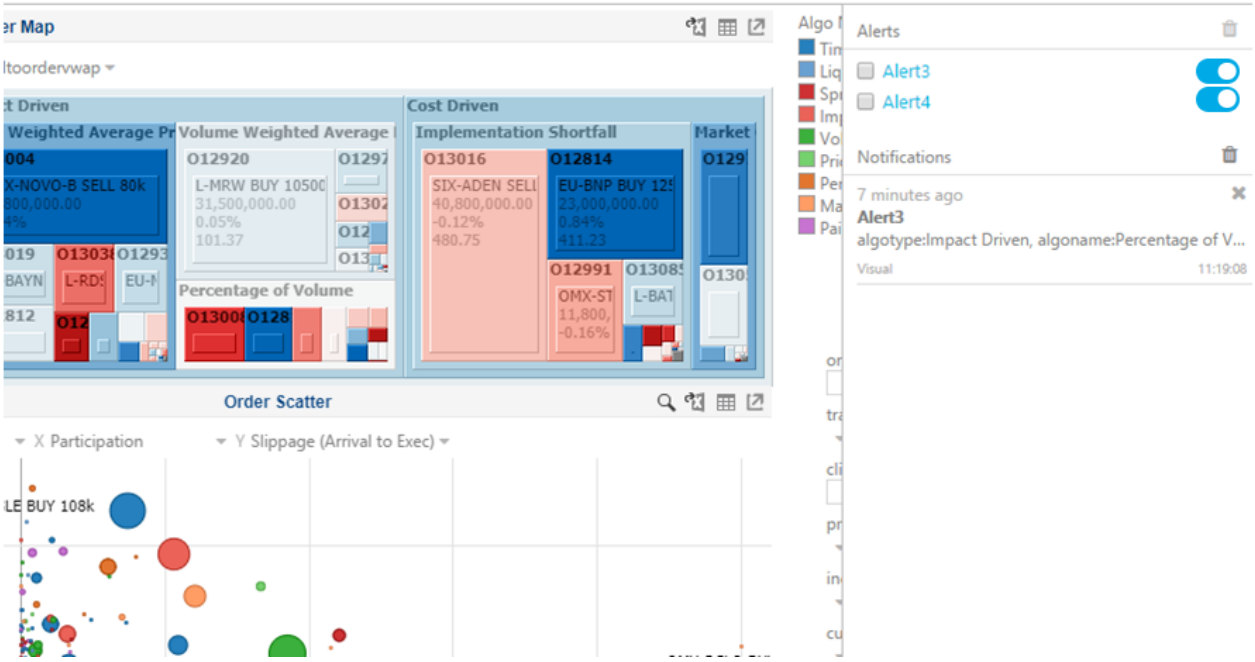


The alert eventually fades away and the pop-up screen fills up with the four latest triggered alerts.

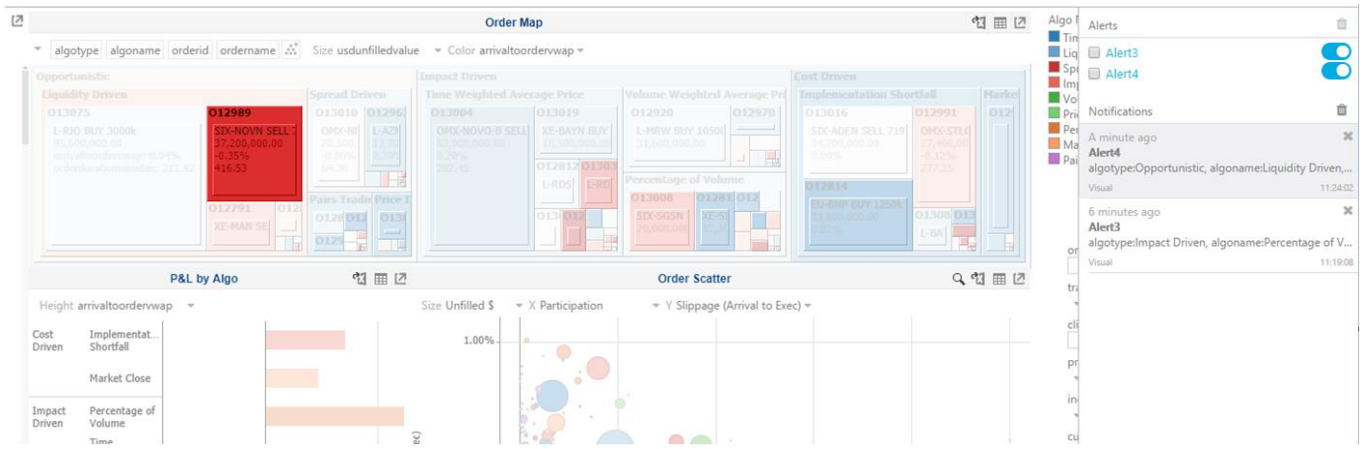


The pop-up stays on screen until it is closed by clicking the button.

Saved alert notifications can be opened on the *Notifications* panel by clicking the icon.



Clicking on a notification highlights the item in the workbook that triggered the alert.

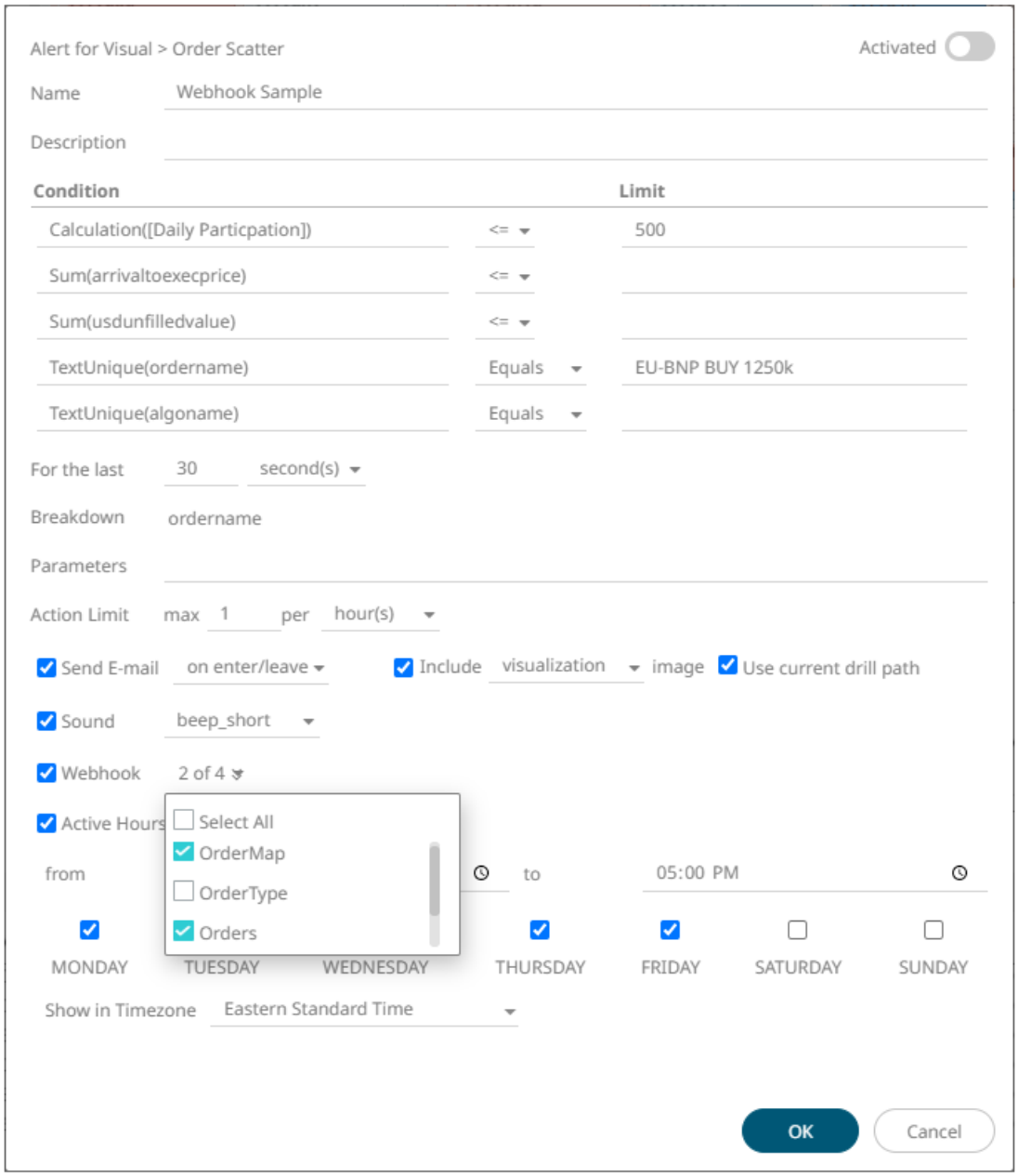


Click the button to delete a notification or click to delete all of the notifications.

Sample Webhook Alerts

In Panopticon, outgoing webhooks can be added (based on incoming webhook URLs from other systems) and used as a channel for sending messages about triggered alerts, similar to how such messages can also be sent by email.

Webhooks that will be executed when the alert is triggered, can be selected in the *Alert* dialog.



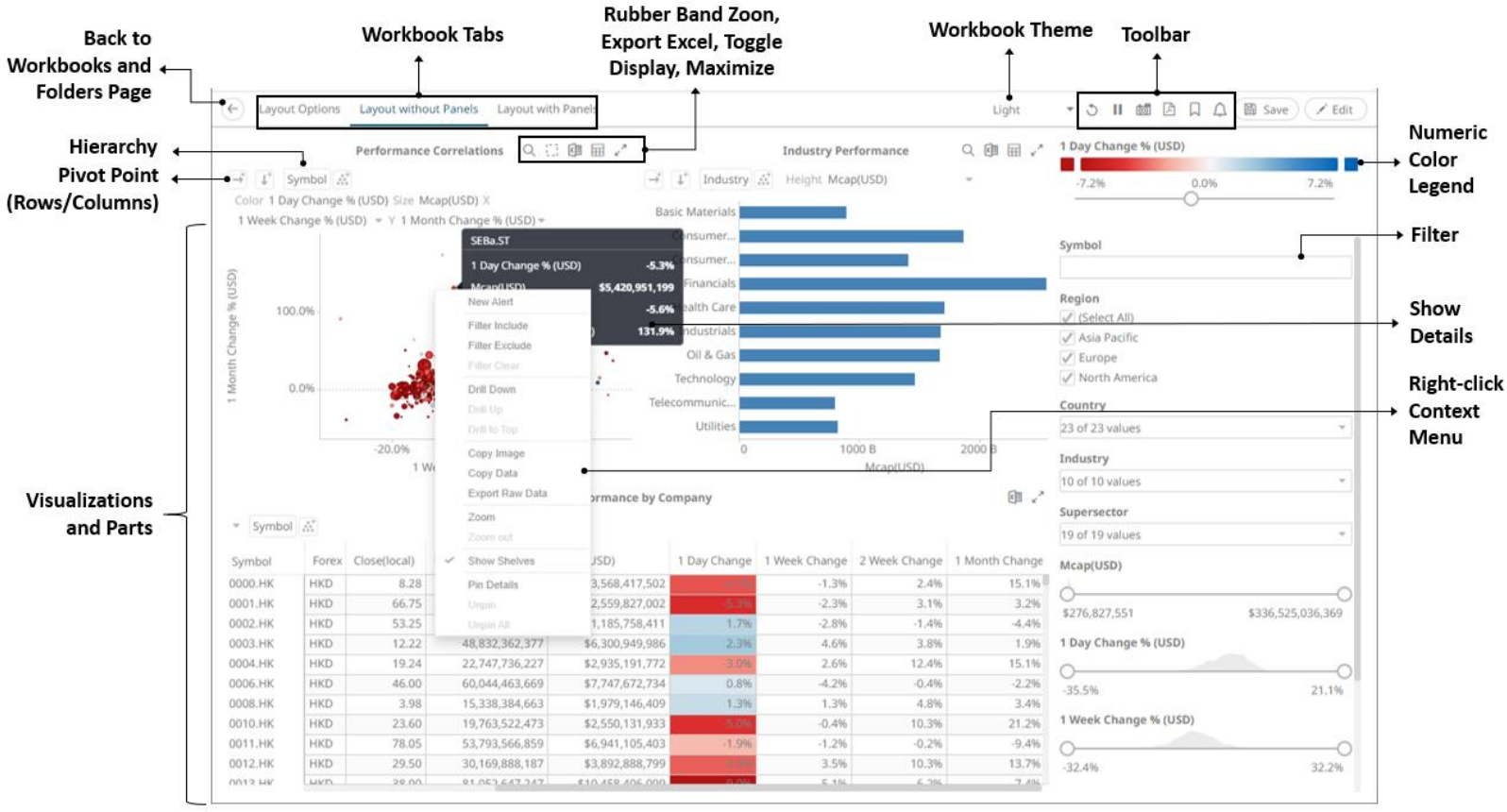
Below is the list of special server parameters available for webhooks that are attached to an alert.

Parameter Name	Description	Value
_alert_title	Returns the alert title.	Alert1
_alert_dashboard_url	Returns the URL to the dashboard where the alert was created.	http://localhost:8080/panopticon/workbook/#/Workbook1/Dashboard1

_alert_description	Returns the alert description.	Example alert description.
_alert_reason	Returns the reason(s) the alert was triggered. The reasons are presented as all alert conditions and their limits.	Sum(usdunfilledvalue) >= 1.0, Sum(fills) >= 1.0
_alert_triggering_items	Returns all items that caused the alert to be triggered. The items are comma separated and each individual item is presented in square brackets.	[algotype:Opportunistic, algoname:Liquidity Driven, sym:O13052, ordername:L-BP. SELL 40k], [algotype:Opportunistic, algoname:Liquidity Driven, sym:O12828, ordername:L-SRP SELL 6k]

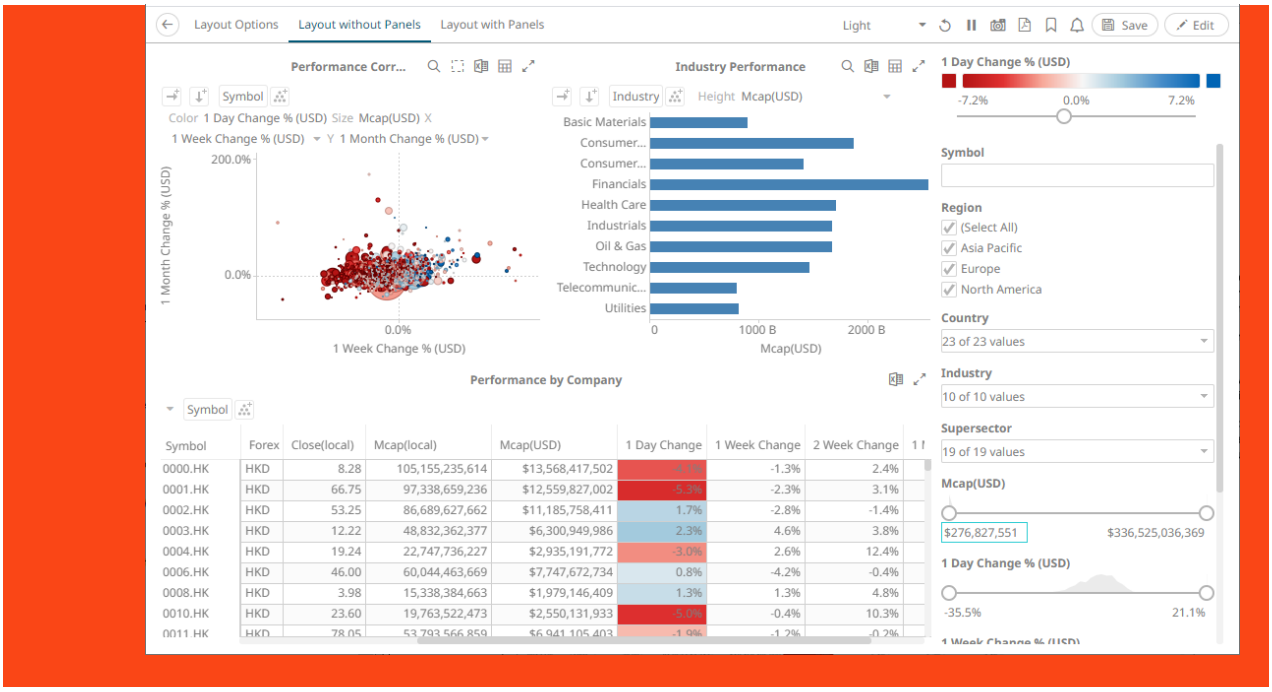
USING THE OPEN WORKBOOK IN VIEW MODE

Users with a Designer role will have the following toolbar options on the *Open Workbook in View Mode*.

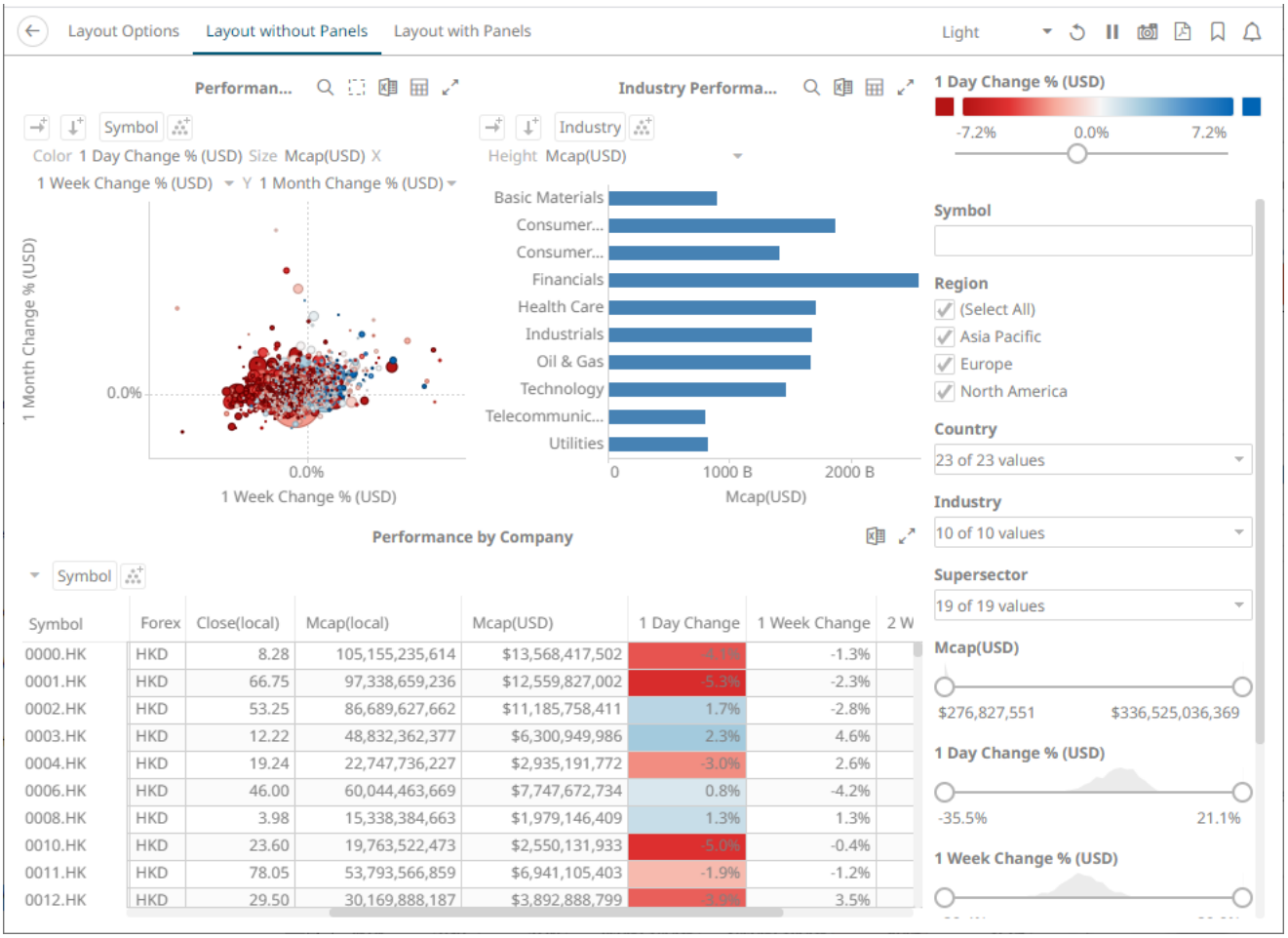


NOTE

On the Open Workbook in View Mode, when the Edit button is clicked, the user will get the DESIGNER role. Consequently, the Save button becomes available in both the Open Workbook in Design and View Modes.



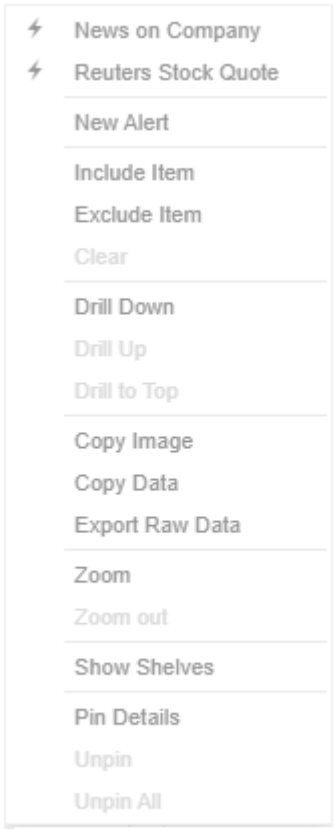
For users with an Administrator, Viewer, or Anonymous role, the toolbar options will only include:



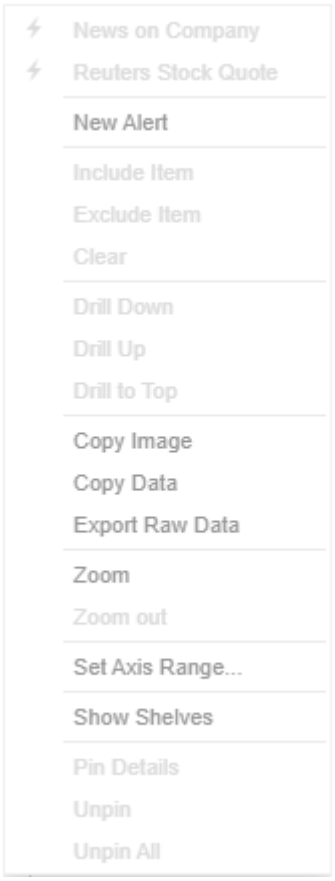
On the *View Mode*, users can interact with the workbook using the visualization right-click context menu, header controls, shelves, variables and cross tab options. Most of these controls and the amount of interactivity are also available in the *Design Mode*.

Context Menu

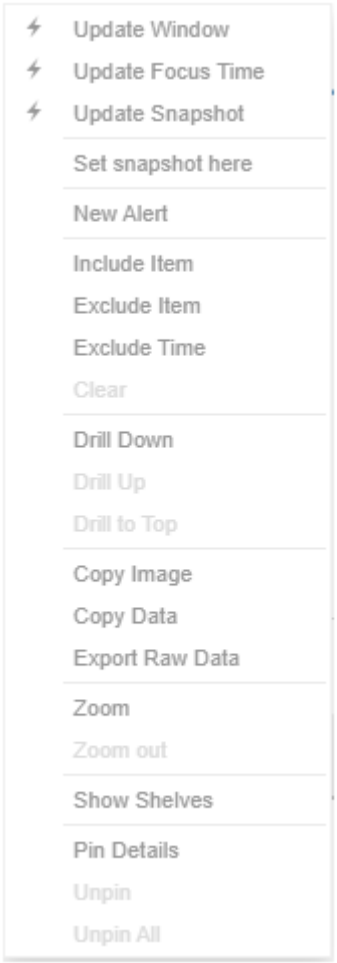
Panopticon provides a right-click *Context Menu* in each visualization.



Visualization Context Menu



Visualization Context Menu of the Numeric Axis



Time Series Visualization Context Menu of the Time Axis

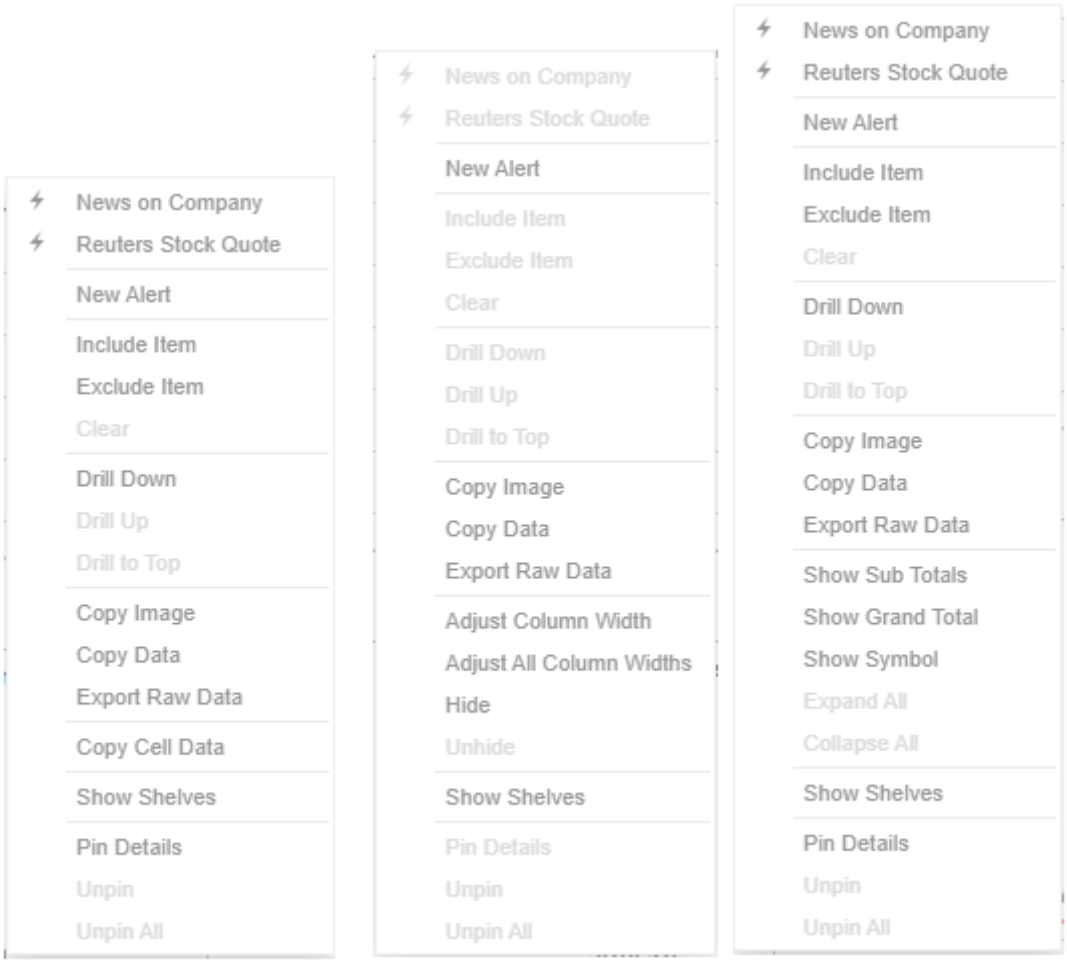


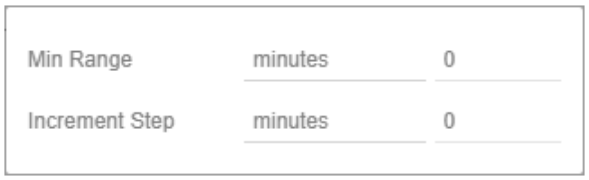
Table visualization context menus depending on where you click on the visualization

The visualization context menu options include:

Setting	Description
Automatic Parameterization	Run an automatic parameterization.
Action	Run a workbook action on the visualization.
New Alert	Create an alert.
Visualization Filtering	Allows visualization filtering. Options include: • Include Item • Exclude Item • Exclude Time • Clear
Drilling	Allows drilling into visualizations. Options include: • Drill Down • Drill Up • Drill to Top
Data Export	Allows exporting of data. Options include:

	• Copy Image • Copy Data • Export Raw Data • Copy Cell Data
Zooming	Allows zooming in and out of visualization sections.
Set Axis Range	Allows setting the numeric axis range (**Dynamic** or **Fixed**).
Show Shelves	Turned off by default. Check to allow the cross tab, breakdown, and variables to be displayed.
Pinning	Allows pinning of the *Details* pop-up. Options include: • Pin Details • Unpin • Unpin All

The additional time series visualization context menu options include:

Setting	Description
Set Snapshot Here	Available in the time series visualization context menu when the Snapshot Grid Line is rendered or set to **Dotted**, **Dashed**, or **Solid** in the Time Axis variable.
Set Axis Range	Allows setting of the time axis range:  • Min Range The minimum time axis range. Supported units are milliseconds, seconds, minutes, hours, days, months, quarters, and years. • Increment Step Controls how much the time axis span is extended at the point when the latest value is at the end of the current time axis span. Supported units are milliseconds, seconds, minutes, hours, days, months, quarters, and years. This setting helps in seeing how a real-time data set grows from left to right along the time axis, giving a better impression and understanding of the progress.

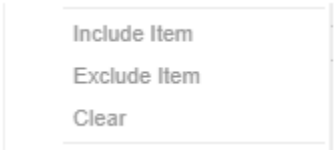
The additional Table visualization context menu options include:

Setting	Description
Adjust Columns	Adjust column width in the table visualization.
Hide / Unhide Columns	Hide or display columns in the table visualization.
Show Hierarchy Column	Display the hierarchy column.
Expand / Collapse Hierarchy	Expand or collapse sections of the hierarchy.
Show Grand Total	Determines whether the Grand Total aggregate row is shown in the table.

Show Sub Totals	Determines whether Sub Total aggregate rows are shown in the table.
Show <Column>	Display the breakdown column.

Visualization Filtering

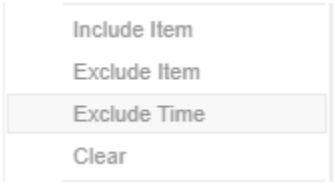
Visualizations themselves can be used as filters by selecting items, and right-clicking to display the context menu with these three options:



- **Include Item** filters the dashboard to include the selected items.
- **Exclude Item** filters the dashboard to exclude the selected items.
- **Clear** removes any visualization filters.

> **NOTE** **In the Web client, the *Include Item* and *Exclude Item* options are disabled when there is no breakdown or the root is selected in visualizations.**

For time series visualizations, an additional option is available.



Exclude Time filters all the series to exclude the time point/s.

When a visualization filter is applied, filter icons appear at the left of the filter column title and on the toolbar of the dashboard. Clicking or will remove the filter.

Also, the **Show Active Filters** icon displays on the toolbar. This allows viewing of all the active filters on the dashboard and its visualizations.

Drilling into Visualizations

Visualizations themselves can be used to drill into lower or upper details by selecting items, and right-clicking to display the context menu with three options:



- Drill Down – Drills down to the lower level of the selected value.

NOTE **Drilling without filter (or soft drill) is turned on for all aggregates that refer to:**

- **Nodes above the node like the parent or root**
- **Siblings of the node**

Applicable to the following aggregates in the *Aggregate* drop-down list:

- **Sibling Rank**
- **Percent of Total**
- **Percent of Total Reference**
- **Percent of Parent**
- **Percent of Parent Reference**
- **Percent of Total Change**
- **Cumulative Sum**
- **Cumulative Sum By Max**

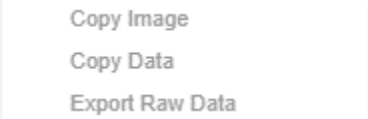
- Drill Up – Enabled when the lower level of the selected item is displayed. Click to drill to the upper level.
- Drill to Top – Drills to the top level of the selected value.

Drilling into visualizations can also be done by double-clicking on a value. Refer to Double Click Mode Options for more information.

Data Export

The data in a visualization can be exported and copied to a clipboard for future use in another application. In addition, the raw data of the visualization can also be exported.

Visualization Level data is exported by right-clicking on the visualization to display the context menu with two options:



For the Table visualization, **Copy Cell Data** is also available which allows copying of a single cell.

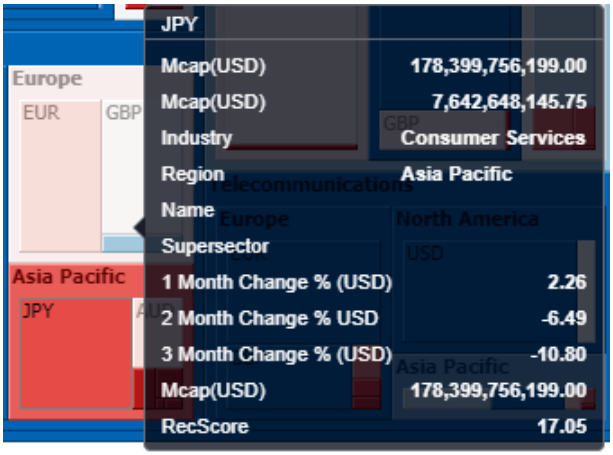


The data exported will be what appears on screen, or in a linked table. Specifically, all the columns that appear in the Detail pop-up, including:

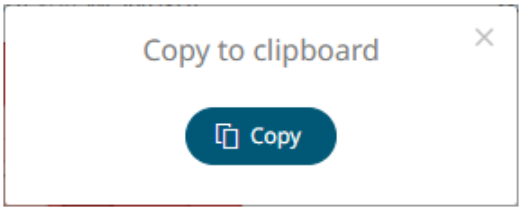
- Only those items that are visible (for example, items that have not been filtered)
- Same Visible detail (or depth) level displayed in the visualization.

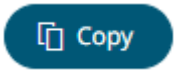
		1 Day Change ...	1 Month Chang...	1 Week Change...	Mcap(USD)	RecScore	Target
3i Group PLC	Financials	0.04	0.35	0.01	1,488,911,563.00	0.42	12.00
3M Co.	Industrials	-0.01	0.07	0.01	31,869,237,156.00	0.25	12.00
77 Bank Ltd.	Financials	-0.06	0.06	-0.03	1,855,149,668.00	0.39	12.00
A.P. Moller-...	Industrials	-0.01	-0.09	-0.08	4,742,697,140.00	0.32	12.00
A2A S.p.A.	Utilities	-0.04	0.00	-0.05	1,906,029,009.00	0.28	12.00
ABB Ltd.	Industrials	0.01	0.16	-0.02	32,461,622,181.00	0.36	12.00
Abbott Labo...	Health Care	0.02	-0.06	-0.02	73,392,451,232.00	0.36	12.00
ABC-Mart Inc.	Consumer Go...	-0.06	-0.10	-0.03	556,753,517.00	0.26	12.00
Aberdeen A...	Financials	0.00	-0.05	-0.09	1,310,061,051.00	0.34	12.00
Abertis Infr...	Industrials	-0.01	0.08	-0.04	4,574,542,373.00	0.28	12.00
Accenture L...	Industrials	-0.01	0.03	-0.13	17,063,968,693.00	0.37	12.00
Acciona S.A.	Industrials	-0.05	0.02	-0.12	2,628,978,079.00	0.38	12.00

Data for a single item can be exported by selecting the item.



Right-clicking and selecting **Copy Data** on the context menu displays the **Copy to Clipboard** button.



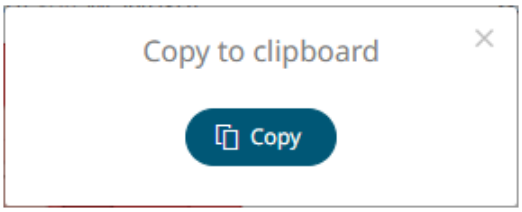
Click 

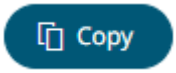
to copy and paste the data to another application such as MS Excel.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Industry	Region	Forex	Mcap(USD)	Mcap(USD)	Industry	Region	Name	Supersector	1 Month C	2 Month C	3 Month C	Mcap(USD)	RecScore
2	Consumer Services	Asia Pacific	JPY	178,399,756,199.00	7,642,648,145.75	Consumer Services	Asia Pacific			2.26	-6.49	-10.8	178,399,756,199.00	17.05
3	Consumer Services	Asia Pacific	AUD	50,133,333,497.00	12,936,271,602.96	Consumer Services	Asia Pacific			2.6	1.97	-0.18	50,133,333,497.00	4.97
4	Consumer Services	Asia Pacific	HKD	13,911,773,856.00	3,591,228,903.73	Consumer Services	Asia Pacific			0.12	-0.25	-0.2	13,911,773,856.00	1.7
5	Consumer Services	Asia Pacific	SGD	11,526,400,942.00	2,272,641,412.37	Consumer Services	Asia Pacific			0.57	-0.1	-0.5	11,526,400,942.00	2.22
6	Consumer Services	Asia Pacific	USD	1,290,851,336.00	1,290,851,336.00	Consumer Services	Asia Pacific	Dairy Farm Intern	Retail	0.01	0.01	0.03	1,290,851,336.00	0.32
7	Consumer Services	Asia Pacific	NZD	764,739,495.00	764,739,495.00	Consumer Services	Asia Pacific	Sky City Entertain	Travel & Leisure	0.18	0.02	-0.09	764,739,495.00	0.4

If **Export Raw Data** is selected, all the data from the source data table is exported, and not just the actively displayed nodes within a visualization.

Right-clicking and selecting **Copy Image** on the context menu displays the **Copy to Clipboard** button.



Click  to copy and paste the whole dashboard image to another application.

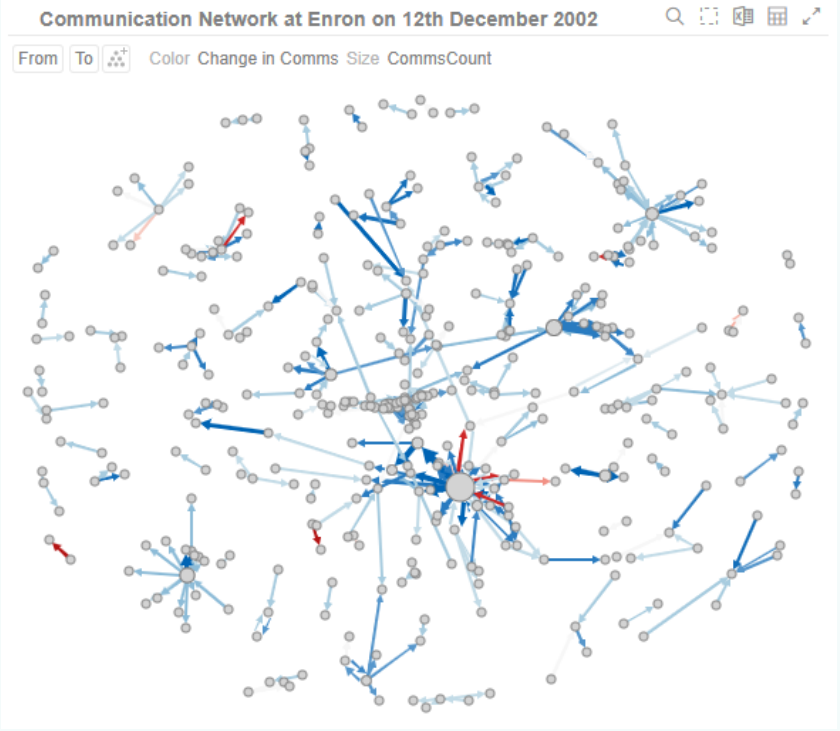
Rubber Band Zoom and Selection

Rubber Band Selection allows multiple items to be selected or lassoed by defining an area with the mouse. When selected, the mouse pointer is displayed as a crosshair. Clicking and dragging the mouse defines the selected area in grey. Once confirmed the selected items are highlighted.

Rubber Band Selection is supported for the Network Graph and other visualizations that have:

- Numeric X and Y axes
- Date/Time X and Y axes

Before

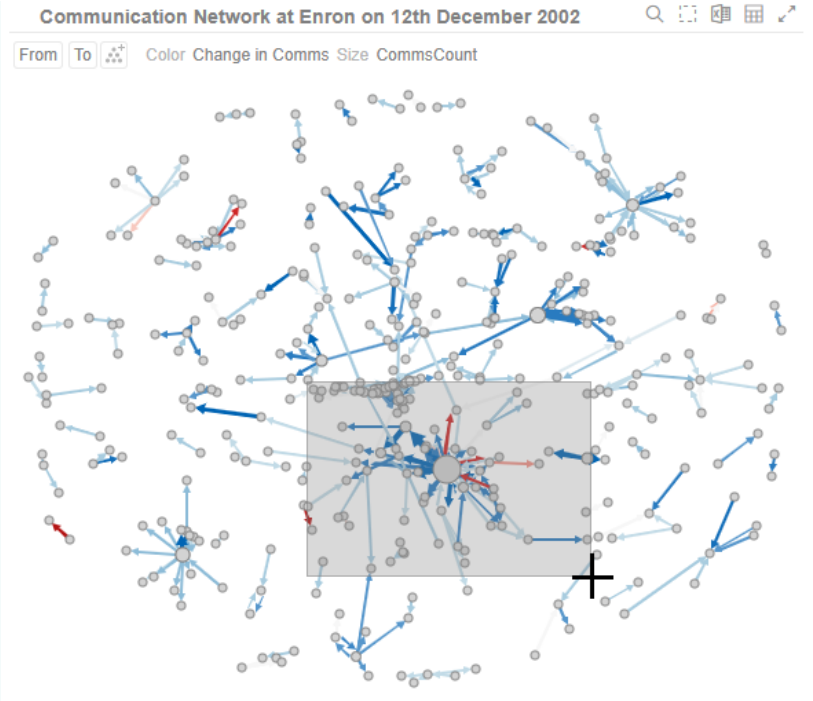


Before selection

Click the **Rubber Band Selection** icon on the header control. The mouse turns into a crosshair.

During

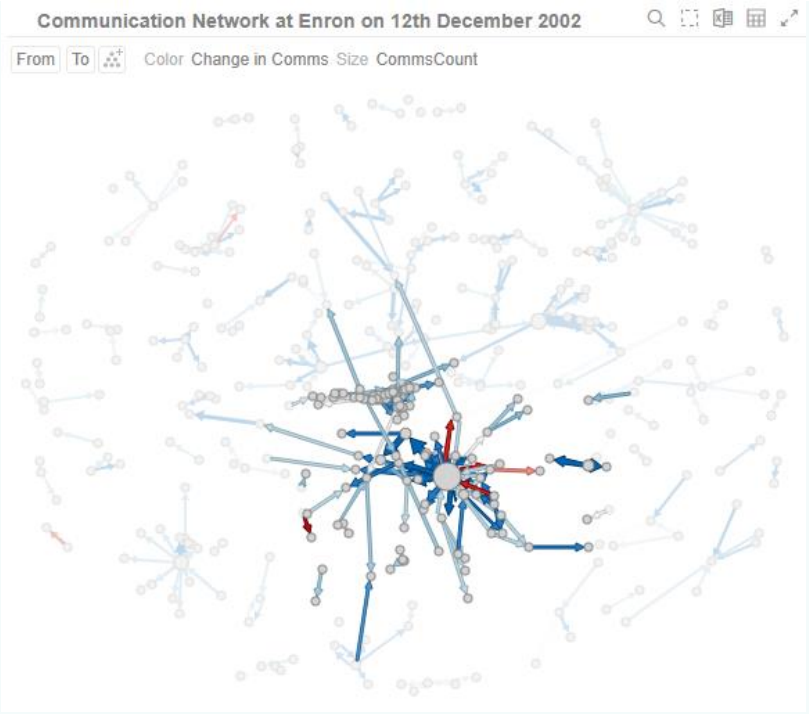
Mouse pointer has been dragged to define an area of interest.



During selection

After

The selected items are highlighted.



After selection

To unselect, click on any part of the visualization

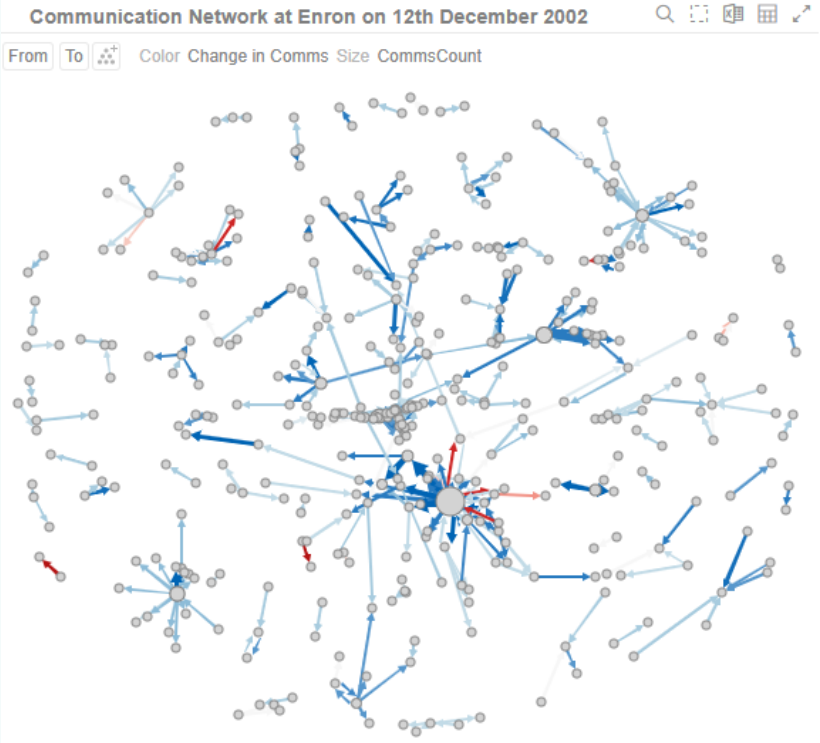
Rubber Band Zoom is supported for visualizations that have:

- Text axes
- Numeric X and Y axes
- Date/Time X and Y axes

NOTE

- **Rubber band zoom is available on all visualizations except Shapes.**
- **When the cross tab consists of two Text axes, Rubber Band Zoom is not available.**

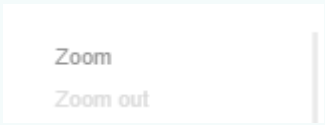
Before



Before zooming

You can either:

- select **Zoom** in the context menu, or

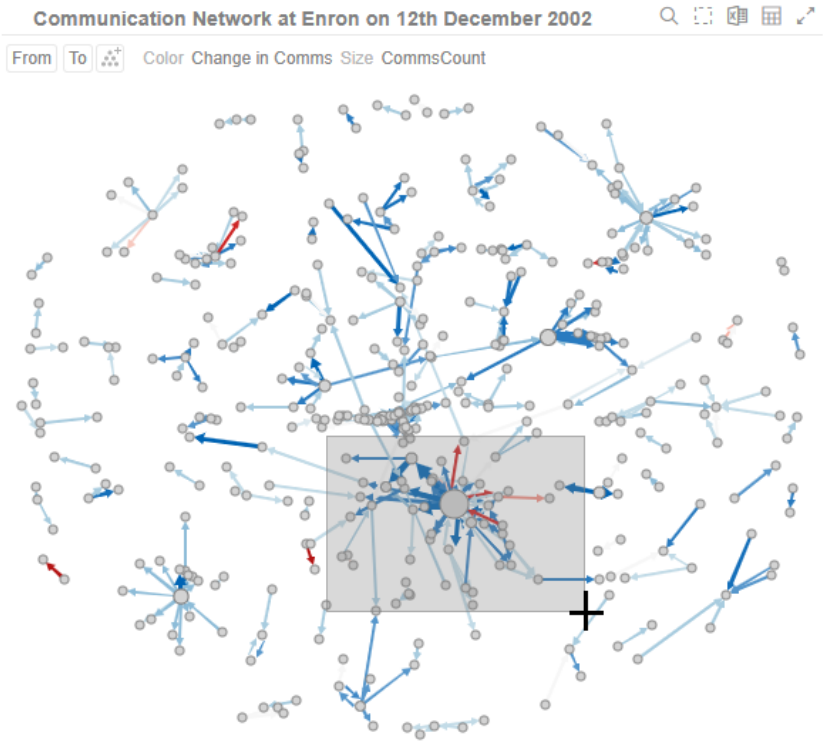


- click the **Rubber Band Zoom** icon on the header control

The mouse turns into a crosshair .

During

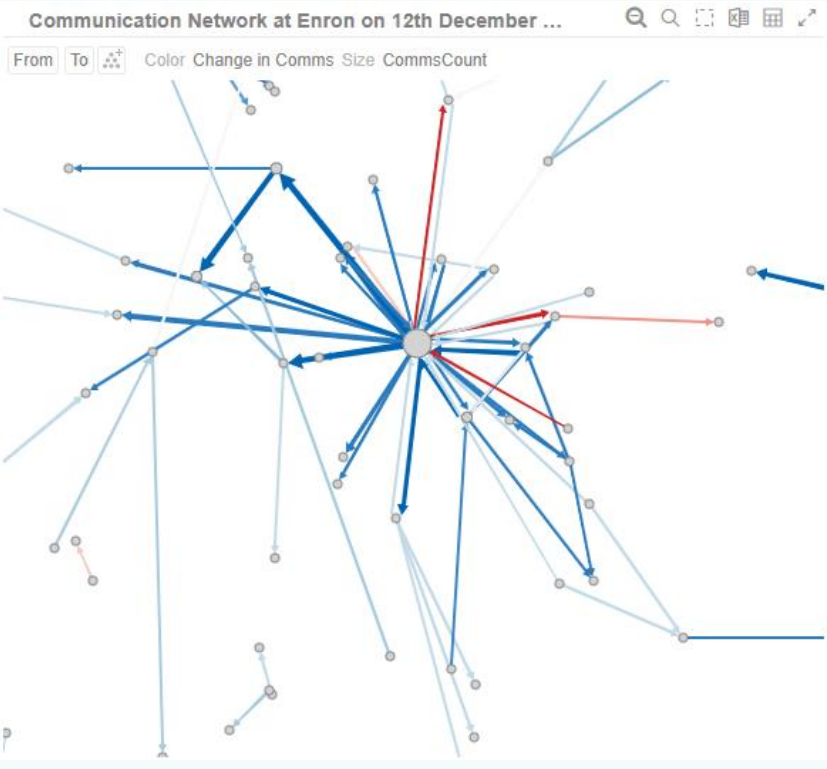
Mouse pointer has been dragged to define an area of interest.



During selection for zooming

After

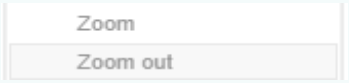
Selected items are zoomed in and the **Zoom Out** icon has is displayed.



After zooming

To revert to the original state of the visualization you can either:

- click the **Zoom Out** icon at the top right of the visualization
- select **Zoom Out** in the context menu

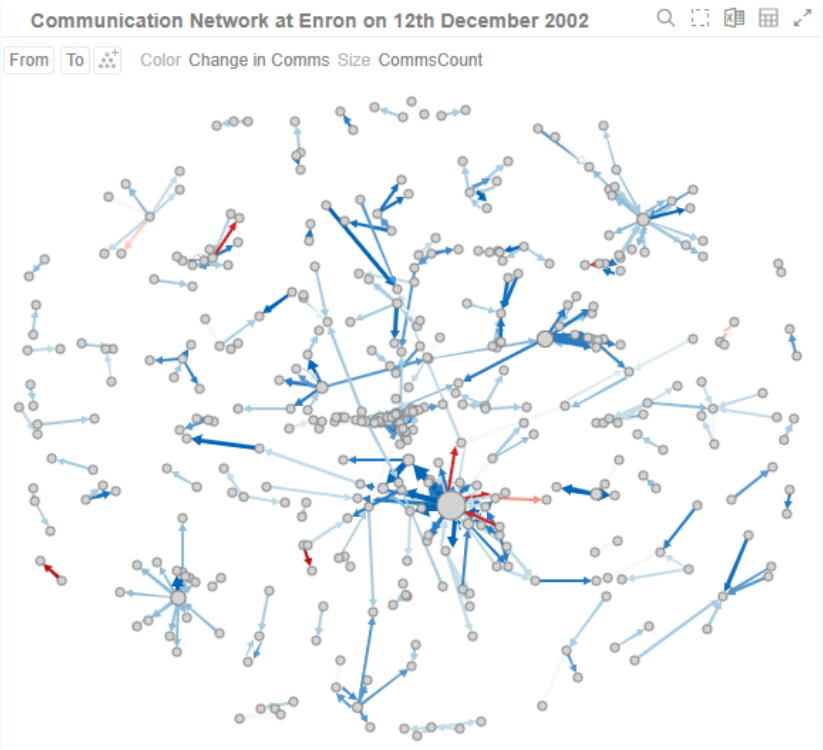


Zooming In and Out with Mouse Wheel

You can use the mouse wheel to zoom in and out on the visualization.

Examples:

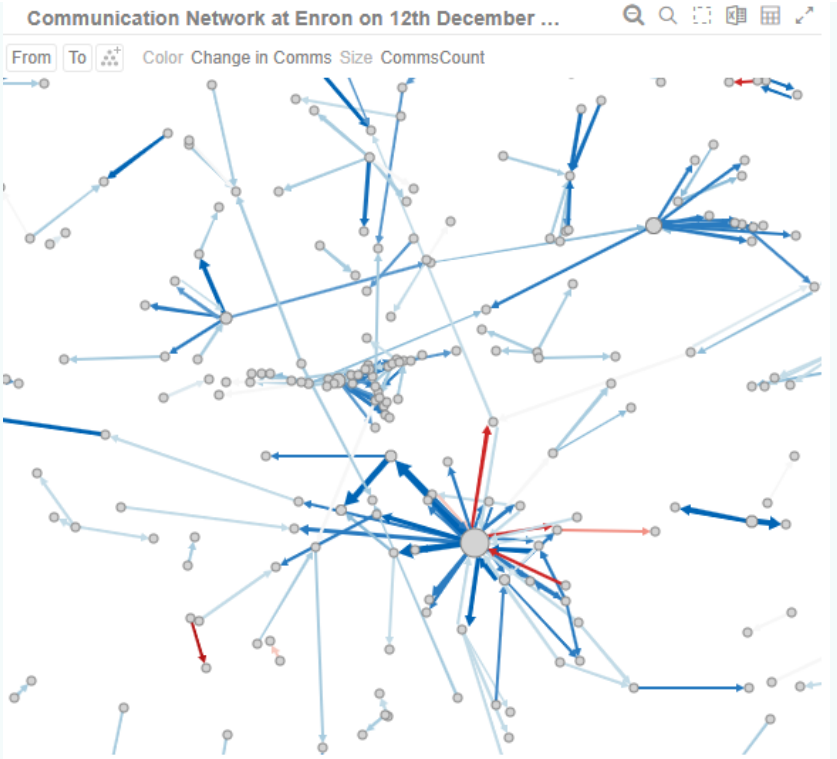
No Zoom



No zoom

Slight Zoom

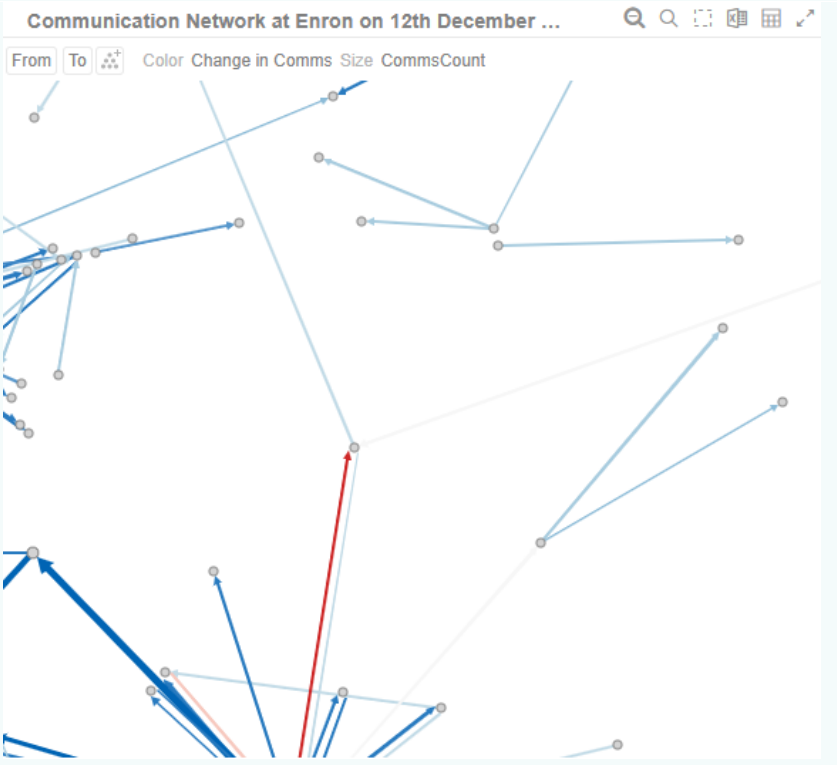
One mouse wheel rotation.



Slight zoom

Detailed Zoom

Several mouse wheel rotations.



Detailed zoom

Panning Around Within the Zoomed Area

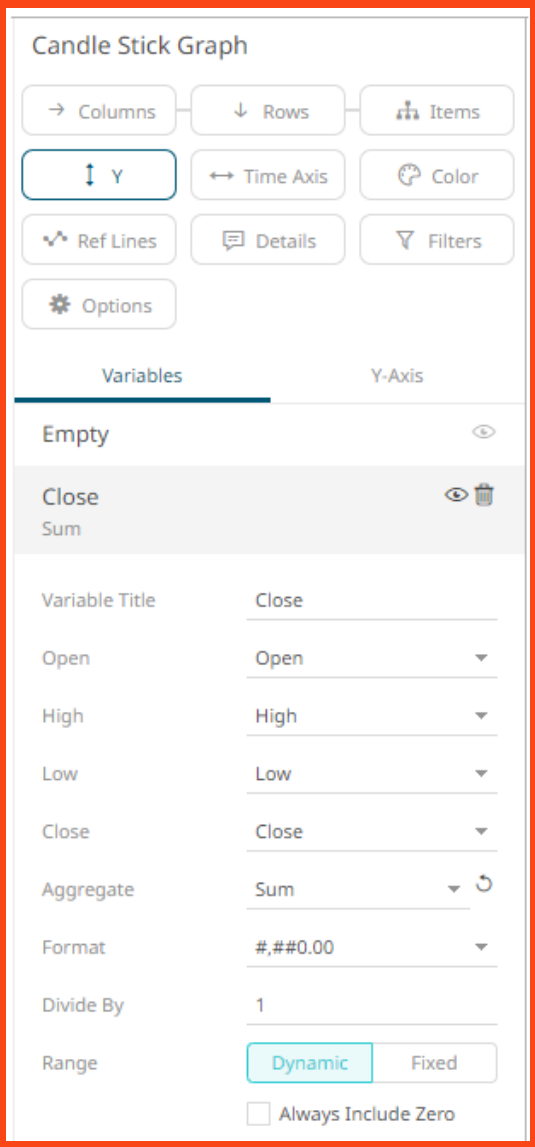
Clicking on the zoomed area turns the mouse pointer into  . Drag the mouse to pan around the zoomed area.

Setting Numeric Axis Range

NOTE

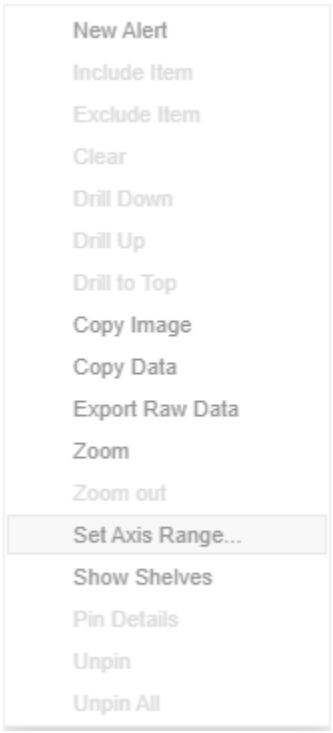
- **Users with an Administrator, Designer, or Viewer role can set the numeric axis range.**
- **Setting the numeric axis range can also be done on the X or Y variable pane.**

  For example, in the Candle Stick Graph visualization:

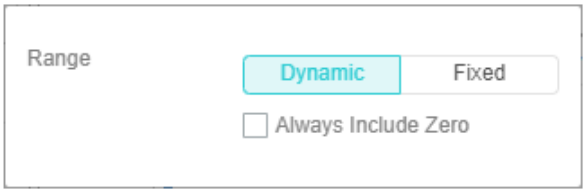


For most of the visualizations with numeric axis, you can set the visible range for the Y and/or Y variable which can either be calculated dynamically (the default, enabled **Dynamic**).

Right-click on a Y or X axis and select **Select Axis Range** in the context menu.

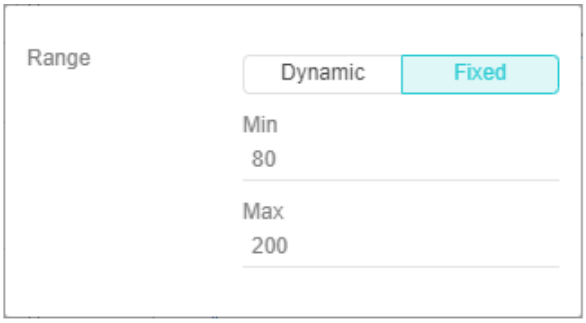


The *Range* dialog displays.



NOTE **Some of the visualizations have the Always Include Zero box. Check to let the axis scale start at zero, and grow to any number that may show up in the data.**

Or set between predefined limits by clicking **Fixed**. This displays the *Min* and *Max* text boxes that are populated with the default values taken from the data set.

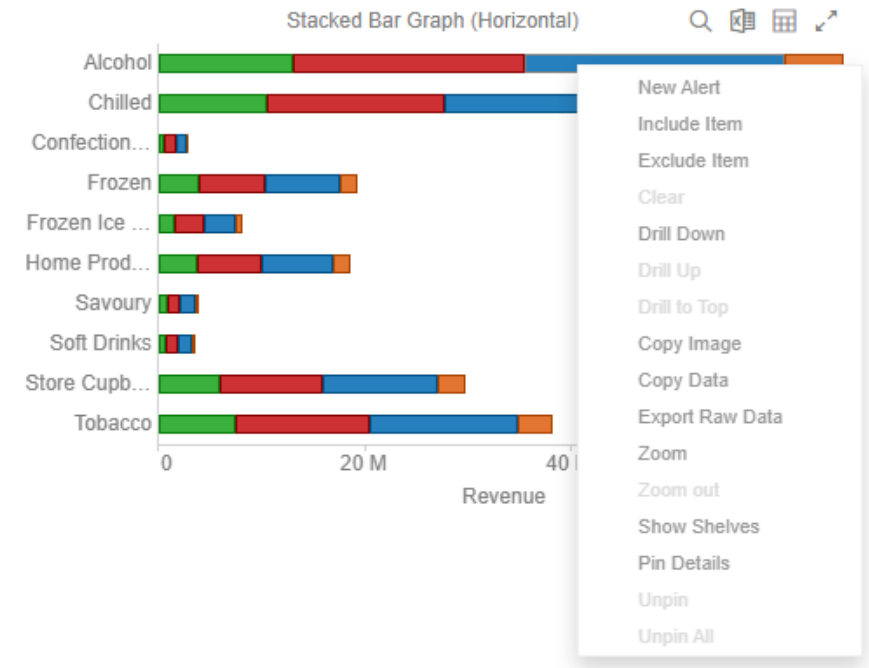


You can opt to enter new *Min* and *Max* values.

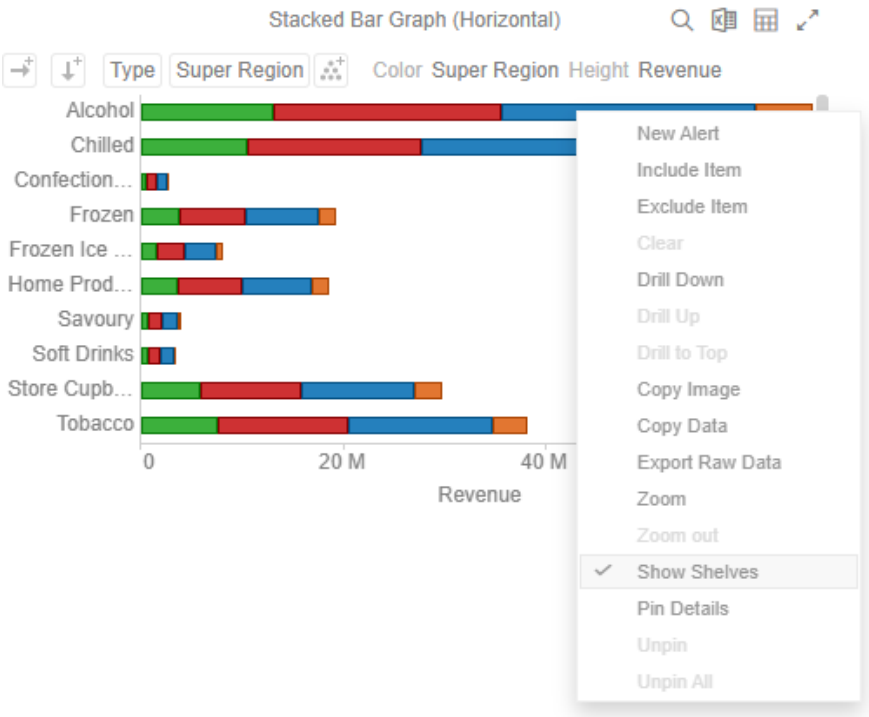
Variable Visibility

Variable visibility defines whether the visualization cross tab, breakdown, and variable shelves are displayed. This function is often useful in creating simple views for public websites or executive dashboards.

By default, *Show Shelves* is turned off.



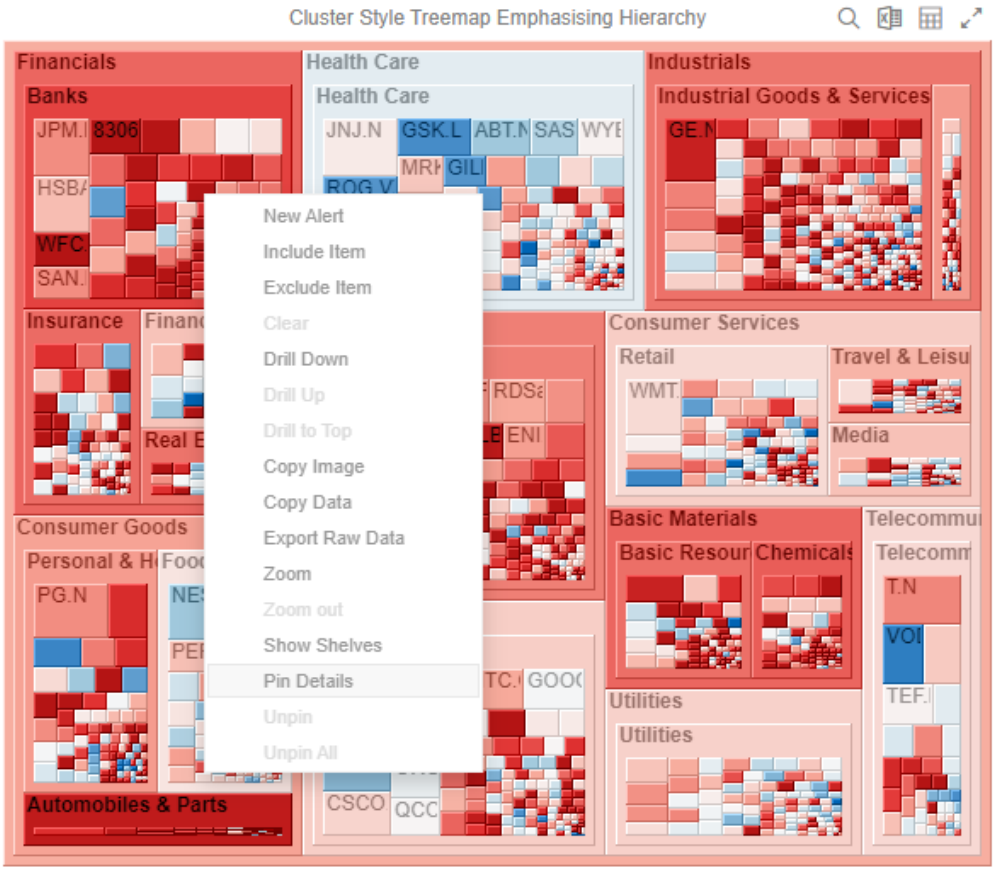
Click *Show Shelves* to turn it on. The shelves are displayed.



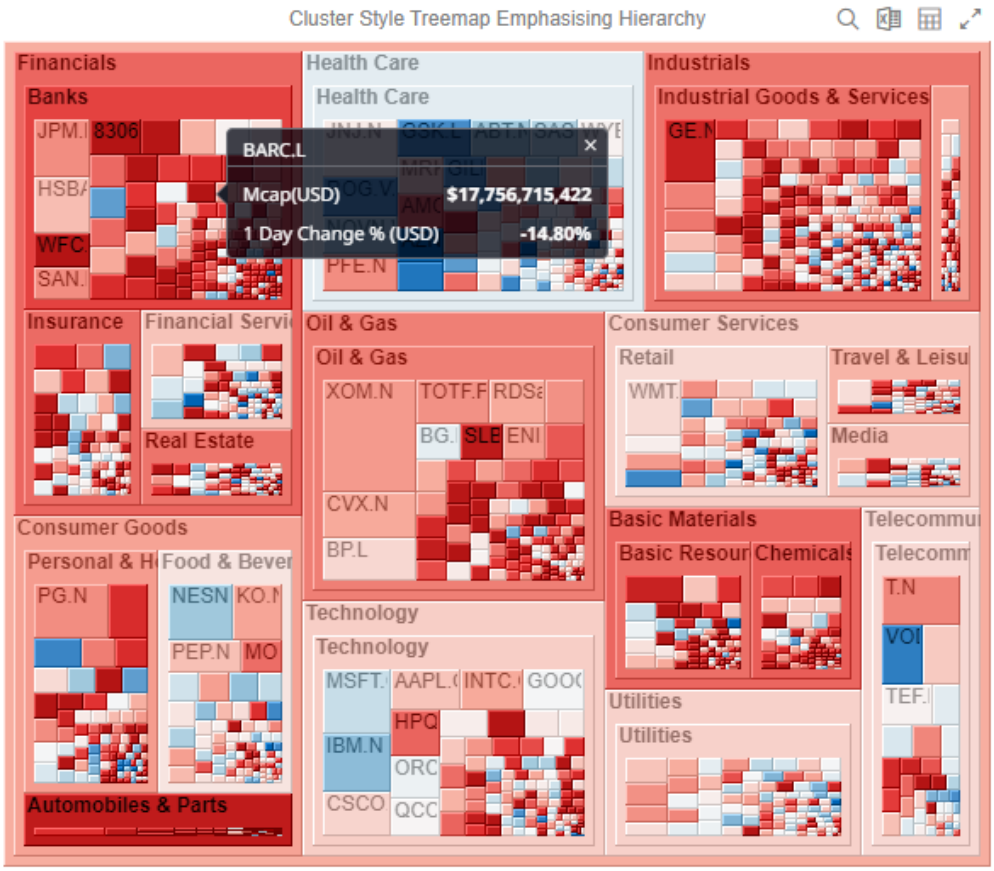
Pinning Details Pop-up

Pinning keeps *Details* pop-up displayed in visualizations which supports easy tracking of some items of interest.

Right-click on a visualization item and select **Pin Details** in the context menu.

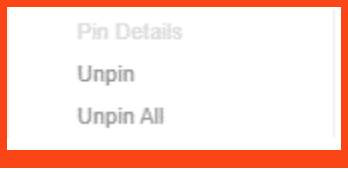


The *Details* pop-up is displayed and pinned.



Repeat until you pin all of the *Details* pop-up that you want to display.

NOTE **The *Pin Details* option in the context menu is disabled once the details of a visualization item or data point is pinned.**



To unpin, you can either click ✖ or right-click on the item and select **Unpin** on the context menu.

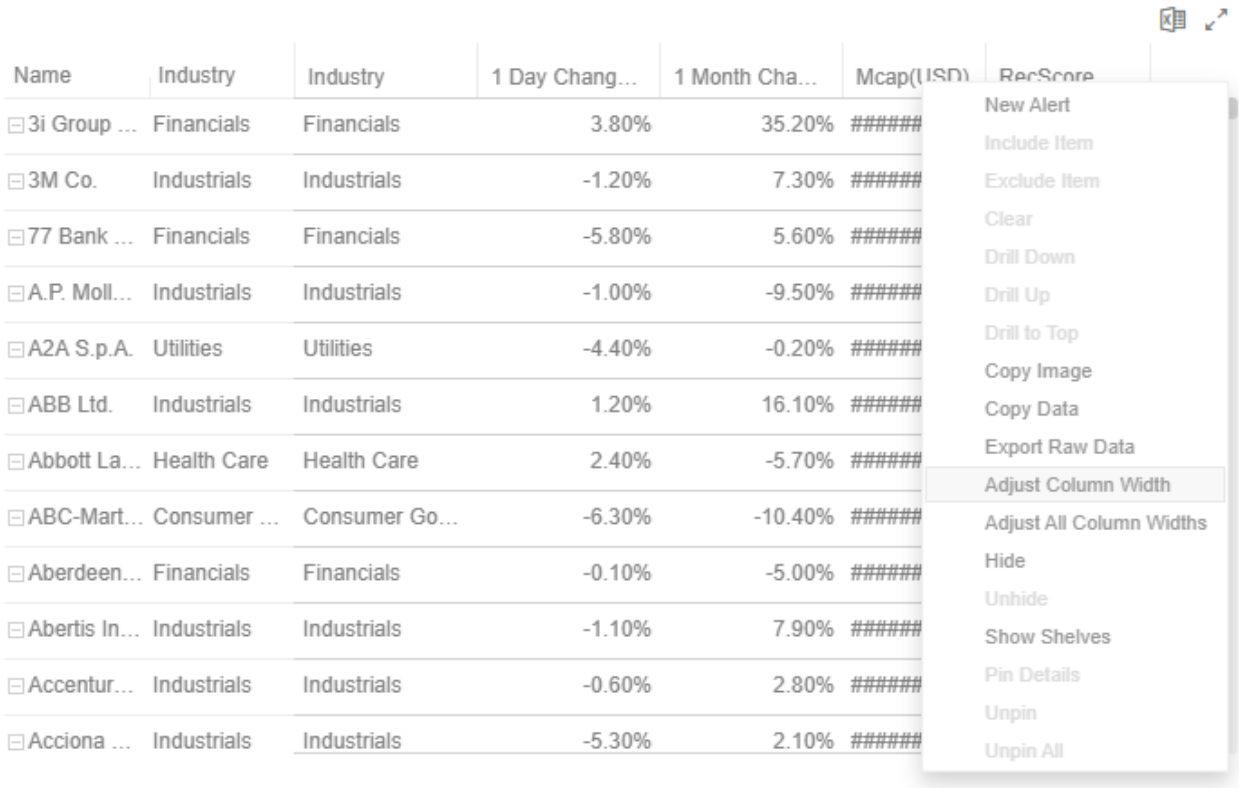
Select **Unpin All** in the context menu to remove all of the pinned *Details* pop-up.

Adjust Column Width in the Table Visualization

For the table visualization, the width of the columns can be automatically adjusted to fit the contents of a column or all of the columns.

Right-click on a column name and then select either:

- Adjust Column Width



The column width is adjusted.



Name	Industry	1 Day Chang...	1 Month Cha...	1 Week Chan...	Mcap(USD)	RecScore
3i Group ...	Financials	0.04	0.36	0.01	1,488,911,563.00	0.42
3M Co.	Industrials	-0.01	0.07	0.01	31,869,237,156.00	0.25
77 Bank L...	Financials	-0.06	0.07	-0.03	1,855,149,668.00	0.39
A.P. Molle...	Industrials	-0.01	-0.13	-0.08	4,742,697,140.00	0.32
A2A S.p.A.	Utilities	-0.04	-0.04	-0.05	1,906,029,009.00	0.28
ABB Ltd.	Industrials	0.01	0.13	-0.02	32,461,622,181.00	0.36
Abbott La...	Health Care	0.02	-0.06	-0.02	73,392,451,232.00	0.36
ABC-Mart...	Consumer ...	-0.06	-0.10	-0.03	556,753,517.00	0.26
Aberdeen...	Financials	0.00	-0.05	-0.09	1,310,061,051.00	0.34
Abertis In...	Industrials	-0.01	0.04	-0.04	4,574,542,373.00	0.28
Accentur...	Industrials	-0.01	-0.05	-0.13	17,063,968,693.00	0.37

- Adjust All Column Widths



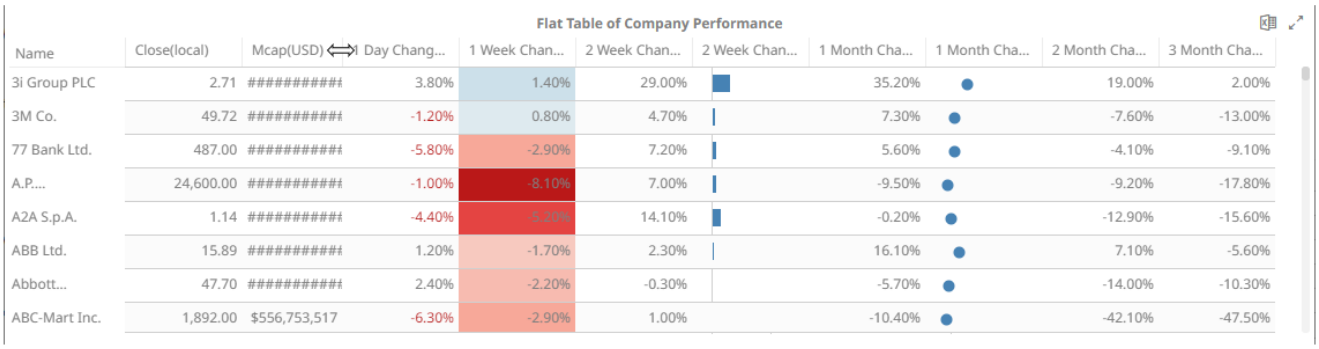
All of the column widths of the table are adjusted.



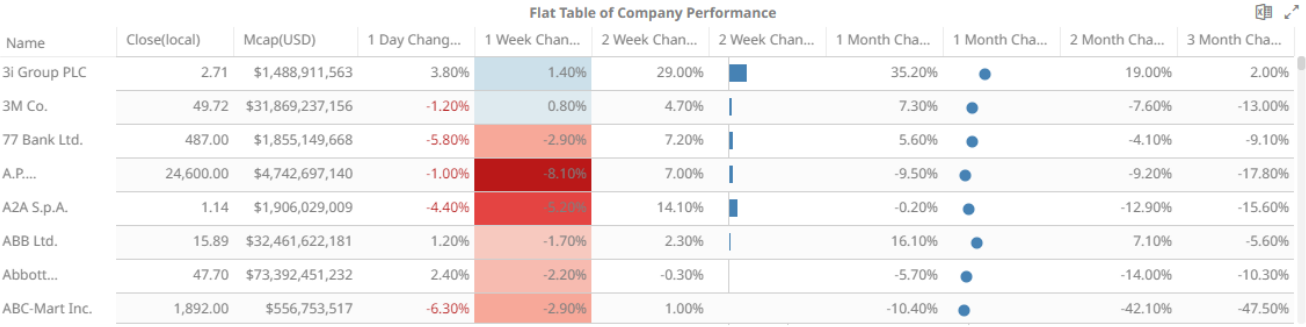
Name	Industry	1 Day Change % (USD)	1 Month Change %	1 Week Change % (USD)	Mcap(USD)	RecScore	Mcap(local)
3i Group ...	Financials	0.04	0.36	0.01	1,488,911,563.00	0.42	1,038,763,431.00
3M Co.	Industrials	-0.01	0.07	0.01	31,869,237,156.00	0.25	31,869,237,156.00
77 Bank L...	Financials	-0.06	0.07	-0.03	1,855,149,668.00	0.39	183,233,133,458.00
A.P. Molle...	Industrials	-0.01	-0.13	-0.08	4,742,697,140.00	0.32	26,605,819,548.00
A2A S.p.A.	Utilities	-0.04	-0.04	-0.05	1,906,029,009.00	0.28	1,435,587,112.00
ABB Ltd.	Industrials	0.01	0.13	-0.02	32,461,622,181.00	0.36	36,909,178,148.00
Abbott La...	Health Care	0.02	-0.06	-0.02	73,392,451,232.00	0.36	73,392,451,232.00
ABC-Mart...	Consumer ...	-0.06	-0.10	-0.03	556,753,517.00	0.26	54,990,545,128.00
Aberdeen...	Financials	0.00	-0.05	-0.09	1,310,061,051.00	0.34	913,985,455.00
Abertis In...	Industrials	-0.01	0.04	-0.04	4,574,542,373.00	0.28	3,445,463,864.00
Accentur...	Industrials	-0.01	-0.05	-0.13	17,063,968,693.00	0.37	17,063,968,693.00

Aside from selecting either of these context menu options, you can also manually drag the **Left-Right** arrow ⟺ to widen or reduce the width of the columns.

Hover on a column border, the **Left-Right** arrow displays.

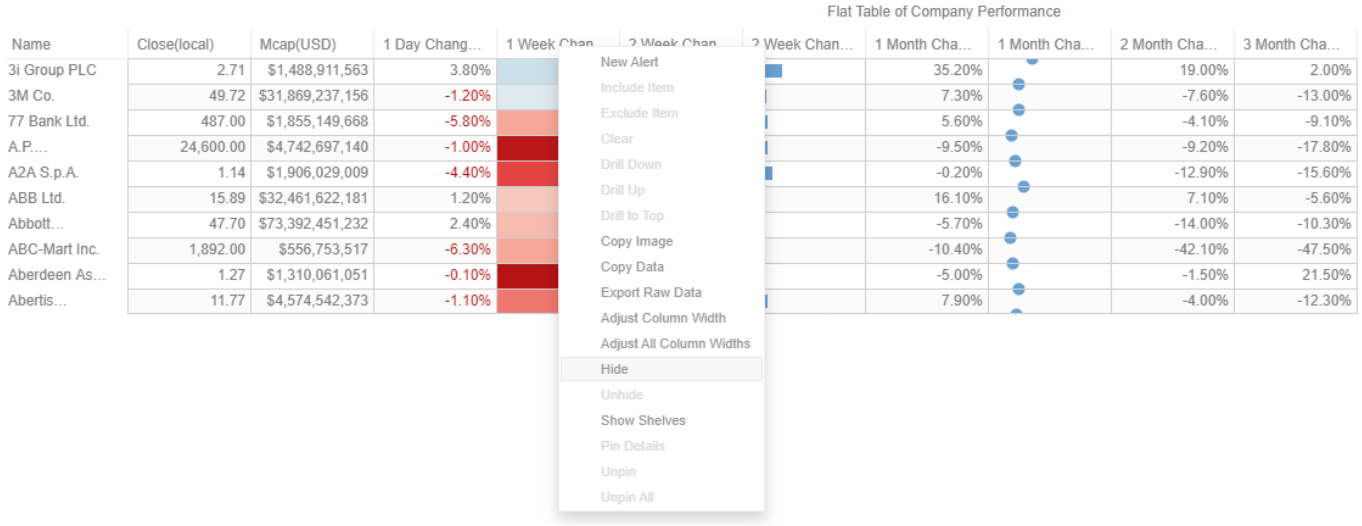


Drag the arrow to the desired width.

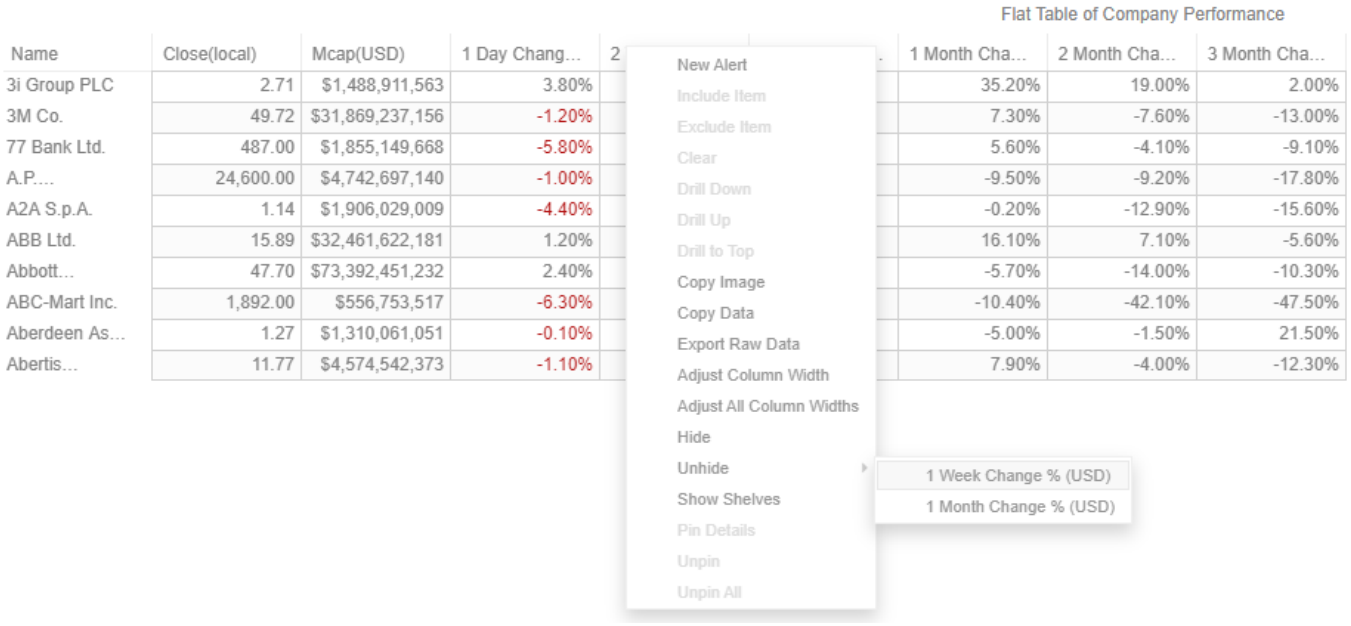


Hide or Display Columns in the Table Visualization

Table visual members can be hidden and displayed again. To hide a column, right-click on a column name and select **Hide**.

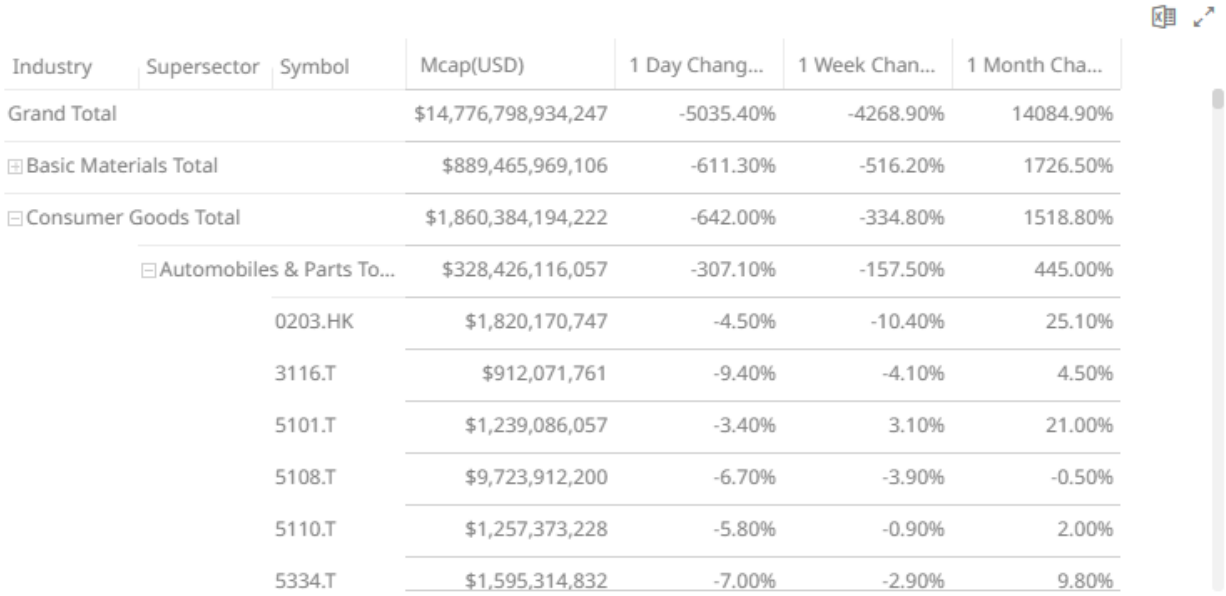


To display the hidden columns, right-click any of the visual members and select **Unhide** ▸ **<Column>**

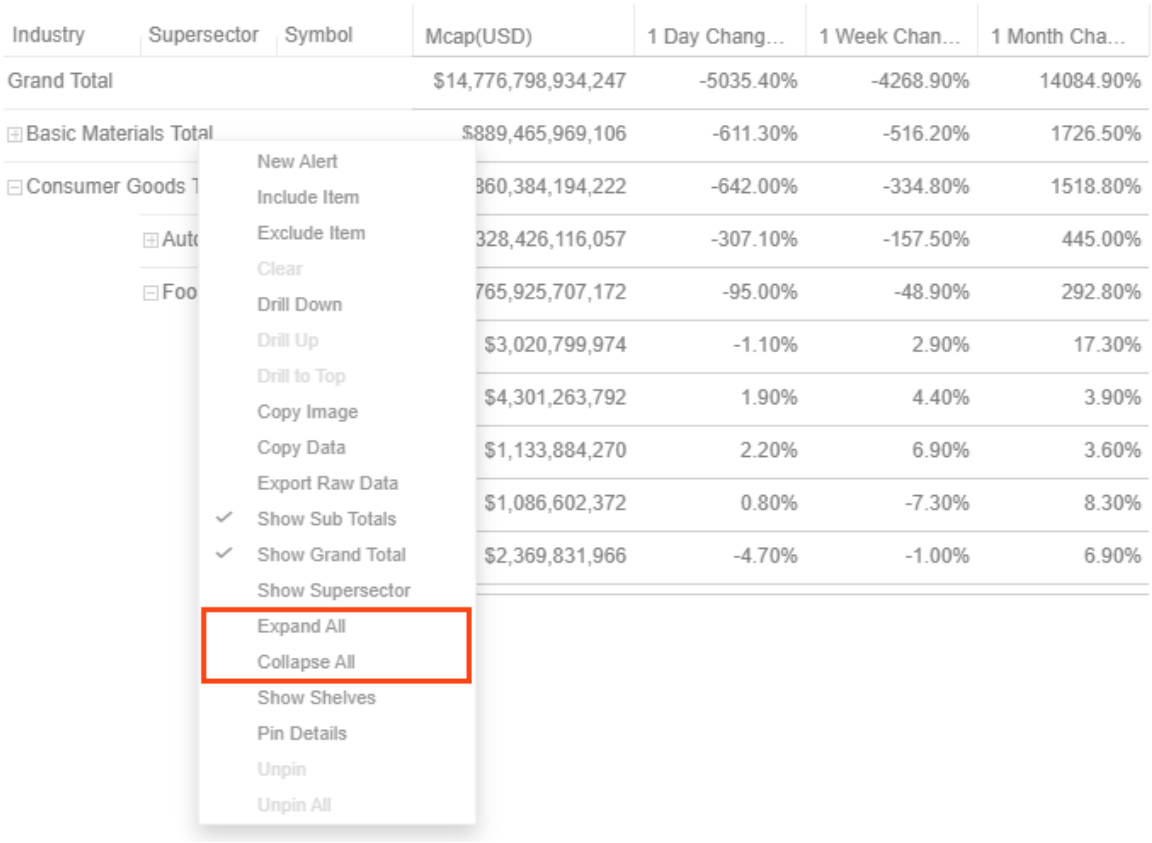


Displaying a Hierarchy Column in the Table Visualization

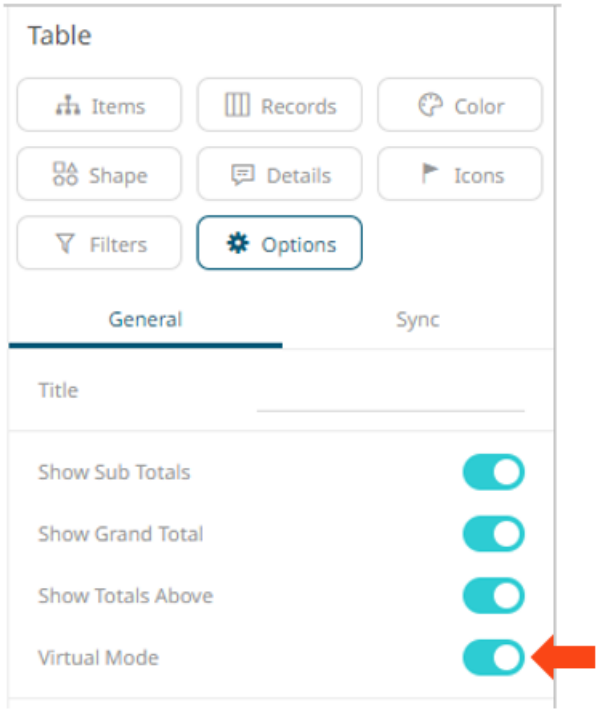
Expand or collapse sections of the hierarchy by clicking on the ⊞ to expand, and ⊟ to collapse.



Additionally, the right click context menu includes options for **Expand All** and **Collapse All**



However, when the **Virtual Mode** option is turned on in the *Table Settings*, the table will be in a flat mode and the expand and collapse options will no longer be available.





Industry	Supersector	Symbol	Mcap(USD)	1 Day Chang...	1 Week Chan...	1 Month Cha...
Grand Total			$14,776,798,934,247	-5035.40%	-4268.90%	14084.90%
Basic Materials Total			$889,465,969,106	-611.30%	-516.20%	1726.50%
	Basic Resources Total		$512,851,697,625	-320.30%	-316.10%	1060.30%
		3861.T	$4,001,748,811	-8.70%	-0.50%	13.30%
		3880.T	$1,027,634,142	-7.90%	0.50%	12.90%
		3893.T	$2,716,290,523	-10.00%	-3.50%	9.50%
		5401.T	$16,755,368,568	-8.40%	-3.70%	4.40%
		5405.T	$7,506,354,513	-10.30%	-6.20%	9.70%
		5406.T	$3,830,391,198	-11.90%	-2.20%	10.20%
		5407.T	$1,368,007,544	-7.50%	-7.60%	10.40%

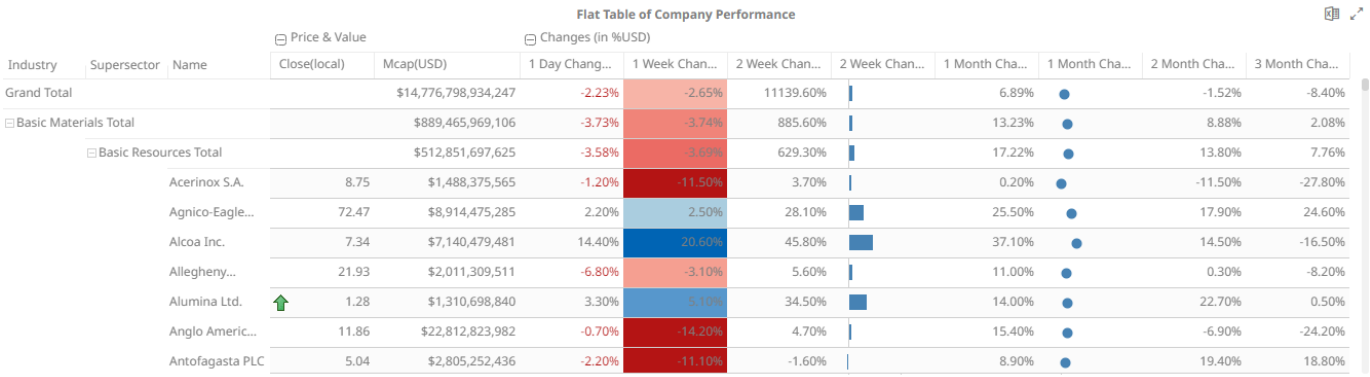
Expanding and collapsing can also be done by selecting specific items to display. Right-click on the item and then select *Show* <*Item*> on the context menu.

Additional Table Operations

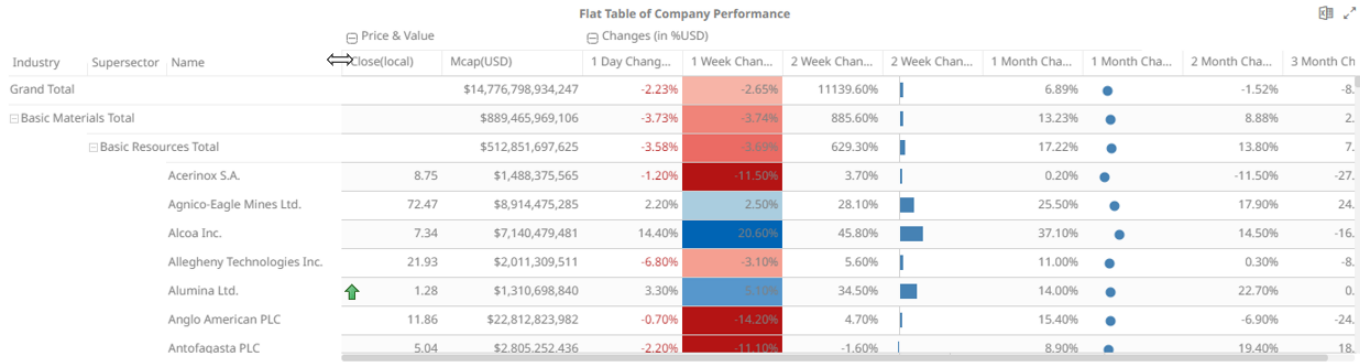
Adjust Width of the Text Axis Leaf in Table Visualizations

In the Table visualization, you can adjust the width of the Text axis leaf by dragging the **Left-Right** arrow ⟺.

For example, in the Table below, the data or fields of the leaf are not fully displayed.



Hover on the border of the Text axis leaf and drag the **Left-Right** arrow to the desired width.

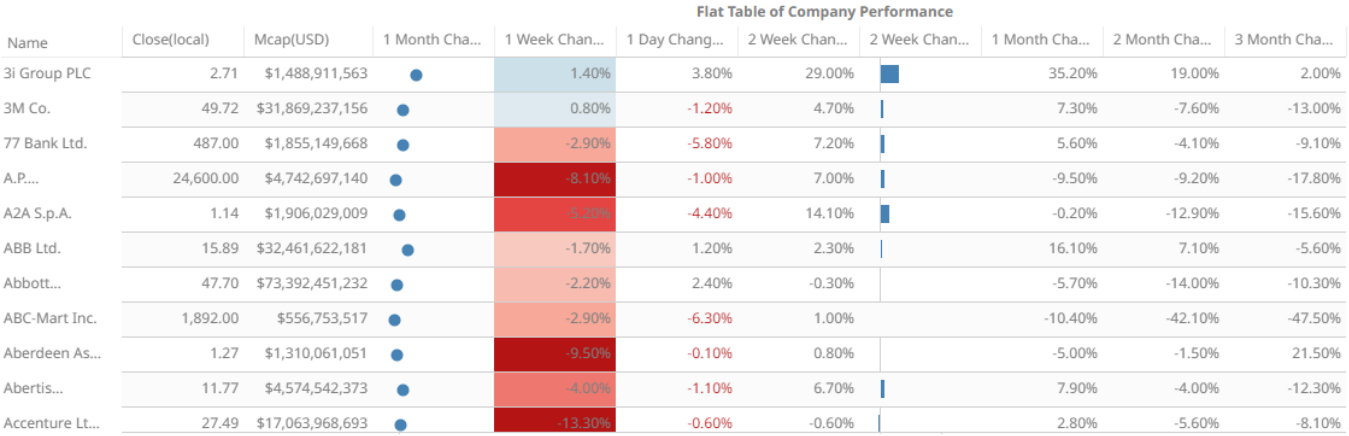


Flat Table of Company Performance

Industry	Supersector	Name	Price & Value: Close(local)	Price & Value: Mcap(USD)	Changes (in %USD): 1 Day Chang...	1 Week Chan...	2 Week Chan...	2 Week Chan...	1 Month Cha...	1 Month Cha...	2 Month Cha...	3 Month Ch
Grand Total				$14,776,798,934,247	-2.23%	-2.65%	11139.60%		6.89%		-1.52%	-8.
Basic Materials Total				$889,465,969,106	-3.73%	-3.74%	885.60%		13.23%		8.88%	2.
	Basic Resources Total			$512,851,697,625	-3.58%	-3.69%	629.30%		17.22%		13.80%	7.
		Acerinox S.A.	8.75	$1,488,375,565	-1.20%	-11.50%	3.70%		0.20%		-11.50%	-27.
		Agnico-Eagle Mines Ltd.	72.47	$8,914,475,285	2.20%	2.50%	28.10%		25.50%		17.90%	24.
		Alcoa Inc.	7.34	$7,140,479,481	14.40%	20.60%	45.80%		37.10%		14.50%	-16.
		Allegheny Technologies Inc.	21.93	$2,011,309,511	-6.80%	-3.10%	5.60%		11.00%		0.30%	-8.
		Alumina Ltd.	1.28	$1,310,698,840	3.30%	5.10%	34.50%		14.00%		22.70%	0.
		Anglo American PLC	11.86	$22,812,823,982	-0.70%	-14.20%	4.70%		15.40%		-6.90%	-24.
		Antofagasta PLC	5.04	$2,805,252,436	-2.20%	-11.10%	-1.60%		8.90%		19.40%	18.

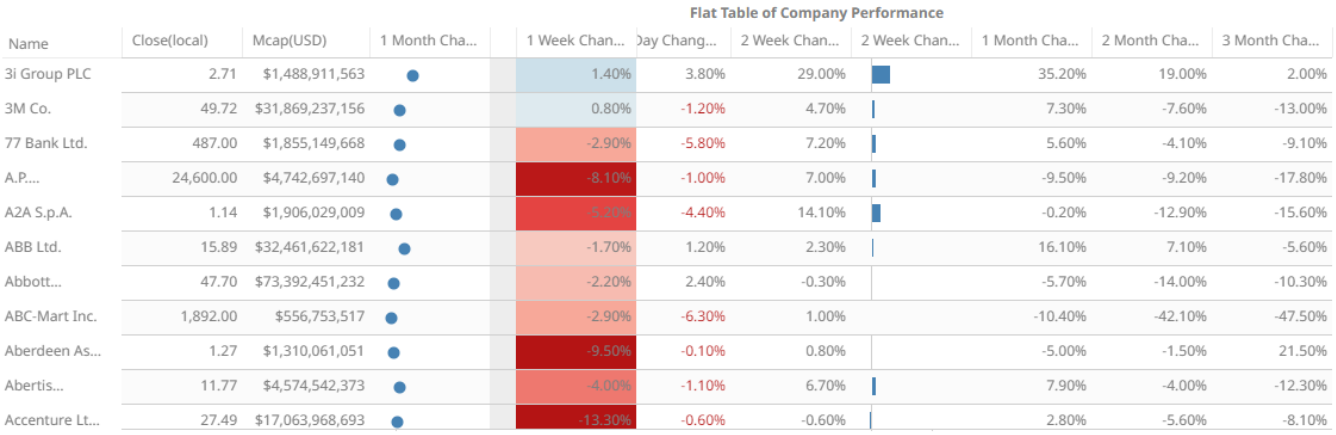
Move Columns in the Table Visualization

Move or re-arrange the columns by dragging them either to the left or to the right.



Flat Table of Company Performance

Name	Close(local)	Mcap(USD)	1 Month Cha...	1 Week Chan...	1 Day Chang...	2 Week Chan...	2 Week Chan...	1 Month Cha...	2 Month Cha...	3 Month Cha...
3i Group PLC	2.71	$1,488,911,563		1.40%	3.80%	29.00%		35.20%	19.00%	2.00%
3M Co.	49.72	$31,869,237,156		0.80%	-1.20%	4.70%		7.30%	-7.60%	-13.00%
77 Bank Ltd.	487.00	$1,855,149,668		-2.90%	-5.80%	7.20%		5.60%	-4.10%	-9.10%
A.P....	24,600.00	$4,742,697,140		-8.10%	-1.00%	7.00%		-9.50%	-9.20%	-17.80%
A2A S.p.A.	1.14	$1,906,029,009		-5.20%	-4.40%	14.10%		-0.20%	-12.90%	-15.60%
ABB Ltd.	15.89	$32,461,622,181		-1.70%	1.20%	2.30%		16.10%	7.10%	-5.60%
Abbott...	47.70	$73,392,451,232		-2.20%	2.40%	-0.30%		-5.70%	-14.00%	-10.30%
ABC-Mart Inc.	1,892.00	$556,753,517		-2.90%	-6.30%	1.00%		-10.40%	-42.10%	-47.50%
Aberdeen As...	1.27	$1,310,061,051		-9.50%	-0.10%	0.80%		-5.00%	-1.50%	21.50%
Abertis...	11.77	$4,574,542,373		-4.00%	-1.10%	6.70%		7.90%	-4.00%	-12.30%
Accenture Lt...	27.49	$17,063,968,693		-13.30%	-0.60%	-0.60%		2.80%	-5.60%	-8.10%



Flat Table of Company Performance

Name	Close(local)	Mcap(USD)	1 Month Cha...	1 Week Chan...	Day Chang...	2 Week Chan...	2 Week Chan...	1 Month Cha...	2 Month Cha...	3 Month Cha...
3i Group PLC	2.71	$1,488,911,563		1.40%	3.80%	29.00%		35.20%	19.00%	2.00%
3M Co.	49.72	$31,869,237,156		0.80%	-1.20%	4.70%		7.30%	-7.60%	-13.00%
77 Bank Ltd.	487.00	$1,855,149,668		-2.90%	-5.80%	7.20%		5.60%	-4.10%	-9.10%
A.P....	24,600.00	$4,742,697,140		-8.10%	-1.00%	7.00%		-9.50%	-9.20%	-17.80%
A2A S.p.A.	1.14	$1,906,029,009		-5.20%	-4.40%	14.10%		-0.20%	-12.90%	-15.60%
ABB Ltd.	15.89	$32,461,622,181		-1.70%	1.20%	2.30%		16.10%	7.10%	-5.60%
Abbott...	47.70	$73,392,451,232		-2.20%	2.40%	-0.30%		-5.70%	-14.00%	-10.30%
ABC-Mart Inc.	1,892.00	$556,753,517		-2.90%	-6.30%	1.00%		-10.40%	-42.10%	-47.50%
Aberdeen As...	1.27	$1,310,061,051		-9.50%	-0.10%	0.80%		-5.00%	-1.50%	21.50%
Abertis...	11.77	$4,574,542,373		-4.00%	-1.10%	6.70%		7.90%	-4.00%	-12.30%
Accenture Lt...	27.49	$17,063,968,693		-13.30%	-0.60%	-0.60%		2.80%	-5.60%	-8.10%

Flat Table of Company Performance

Name	Close(local)	Mcap(USD)	1 Day Chang...	2 Week Chan...	2 Week Chan...	1 Month Cha...	1 Week Chan...	1 Month Cha...	2 Month Cha...	3 Month Cha...
3i Group PLC	2.71	$1,488,911,563	3.80%	29.00%		35.20%	1.40%		19.00%	2.00%
3M Co.	49.72	$31,869,237,156	-1.20%	4.70%		7.30%	0.80%		-7.60%	-13.00%
77 Bank Ltd.	487.00	$1,855,149,668	-5.80%	7.20%		5.60%	-2.90%		-4.10%	-9.10%
A.P....	24,600.00	$4,742,697,140	-1.00%	7.00%		-9.50%	-8.10%		-9.20%	-17.80%
A2A S.p.A.	1.14	$1,906,029,009	-4.40%	14.10%		-0.20%	-5.20%		-12.90%	-15.60%
ABB Ltd.	15.89	$32,461,622,181	1.20%	2.30%		16.10%	-1.70%		7.10%	-5.60%
Abbott...	47.70	$73,392,451,232	2.40%	-0.30%		-5.70%	-2.20%		-14.00%	-10.30%
ABC-Mart Inc.	1,892.00	$556,753,517	-6.30%	1.00%		-10.40%	-2.90%		-42.10%	-47.50%
Aberdeen As...	1.27	$1,310,061,051	-0.10%	0.80%		-5.00%	-9.50%		-1.50%	21.50%
Abertis...	11.77	$4,574,542,373	-1.10%	6.70%		7.90%	-4.00%		-4.00%	-12.30%
Accenture Lt...	27.49	$17,063,968,693	-0.60%	-0.60%		2.80%	-13.30%		-5.60%	-8.10%

Visual Table Sorting

The table visualization additionally supports easy column sorting. Clicking on the column heading will sort on that column throughout the selected hierarchy. Clicking again will reverse the sort order (Ascending → Descending).

Performance by Company

Symbol	Name	Forex	Close(local)	Mcap(local)	Mcap(USD)	1 Day Chang...	1 Week Chan...	2 Week Chan...	1 Month Cha...
III.L	3i Group PLC	GBP	2.71	1,038,763,431	$1,488,911,563	3.80%	1.40%	29.00%	35.20%
MMM.N	3M Co.	USD	49.72	31,869,237,156	$31,869,237,156	-1.20%	0.80%	4.70%	7.30%
8341.T	77 Bank Ltd.	JPY	487.00	183,233,133,458	$1,855,149,668	-5.80%	-2.90%	7.20%	5.60%
MAERSKb.CO	A.P. Moller-Ma...	DKK	24,600.00	26,605,819,548	$4,742,697,140	-1.00%	-8.10%	7.00%	-9.50%
A2.MI	A2A S.p.A.	EUR	1.14	1,435,587,112	$1,906,029,009	-4.40%	-5.20%	14.10%	-0.20%
ABBN.VX	ABB Ltd.	CHF	15.89	36,909,178,148	$32,461,622,181	1.20%	-1.70%	2.30%	16.10%
ABT.N	Abbott Labora...	USD	47.70	73,392,451,232	$73,392,451,232	2.40%	-2.20%	-0.30%	-5.70%
2670.T	ABC-Mart Inc.	JPY	1,892.00	54,990,545,128	$556,753,517	-6.30%	-2.90%	1.00%	-10.40%
ADN.L	Aberdeen Ass...	GBP	1.27	913,985,455	$1,310,061,051	-0.10%	-9.50%	0.80%	-5.00%
ABE.MC	Abertis Infrae...	EUR	11.77	3,445,463,864	$4,574,542,373	-1.10%	-4.00%	6.70%	7.90%
ACN.N	Accenture Ltd....	USD	27.49	17,063,968,693	$17,063,968,693	-0.60%	-13.30%	-0.60%	2.80%
ANA.MC	Acciona S.A.	EUR	77.45	1,980,099,479	$2,628,978,079	-5.30%	-12.00%	-2.90%	2.10%

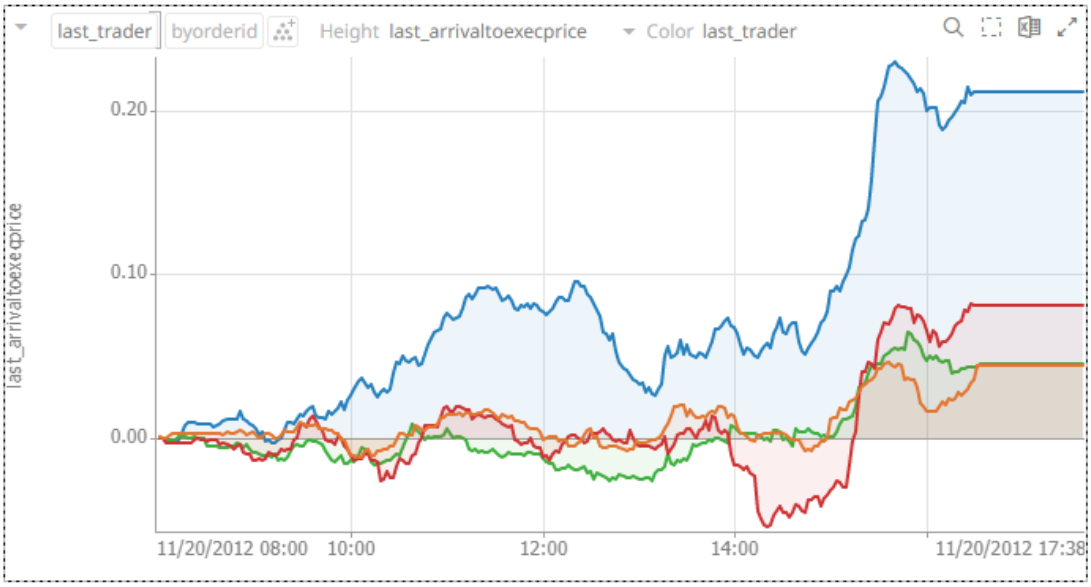
Performance by Company

Symbol	Name	Forex	Close(local)	Mcap(local)	Mcap(USD)	1 Day Chang...	1 Week Chan...	2 Week Chan...	1 Month Cha...
ZURN.VX	Zurich Financi...	CHF	180.10	25,595,996,783	$22,511,679,170	-1.70%	-6.10%	22.40%	6.70%
ZON.LS	ZON Multime...	EUR	4.01	751,743,577	$998,089,947	3.10%	-3.00%	6.80%	5.90%
ZODC.PA	Zodiac Aerosp...	EUR	19.09	843,062,436	$1,119,333,997	-1.00%	-2.50%	-21.00%	-18.10%
ZMH.N	Zimmer Holdi...	USD	36.50	8,220,929,858	$8,220,929,858	-3.50%	0.60%	-0.90%	-1.80%
ZOT.MC	Zardoya Otis S...	EUR	13.77	1,654,924,327	$2,197,243,029	4.40%	2.10%	6.60%	7.40%
YUM.N	Yum! Brands I...	USD	27.48	12,711,093,703	$12,711,093,703	-4.60%	-3.90%	3.10%	2.90%
0551.HK	Yue Yuen Indu...	HKD	17.66	10,961,561,553	$1,414,395,039	5.40%	-0.20%	13.20%	21.00%
5101.T	Yokohama Ru...	JPY	409.00	122,384,530,326	$1,239,086,057	-3.40%	3.10%	2.90%	21.00%
6841.T	Yokogawa Ele...	JPY	394.00	96,944,052,922	$981,513,137	-8.00%	-2.90%	10.30%	18.60%
YTY1V.HE	YIT Oyj	EUR	5.05	578,101,957	$767,545,969	-6.30%	-9.30%	-8.10%	-3.60%
6506.T	Yaskawa Electr...	JPY	425.00	106,998,829,600	$1,083,313,042	-12.10%	-7.10%	-1.30%	9.70%
YAR.OL	Yara Internati...	NOK	147.25	27,392,192,701	$4,056,840,493	-6.10%	-11.50%	0.40%	-4.30%

Setting Snapshot Time in a Time Series Visualization

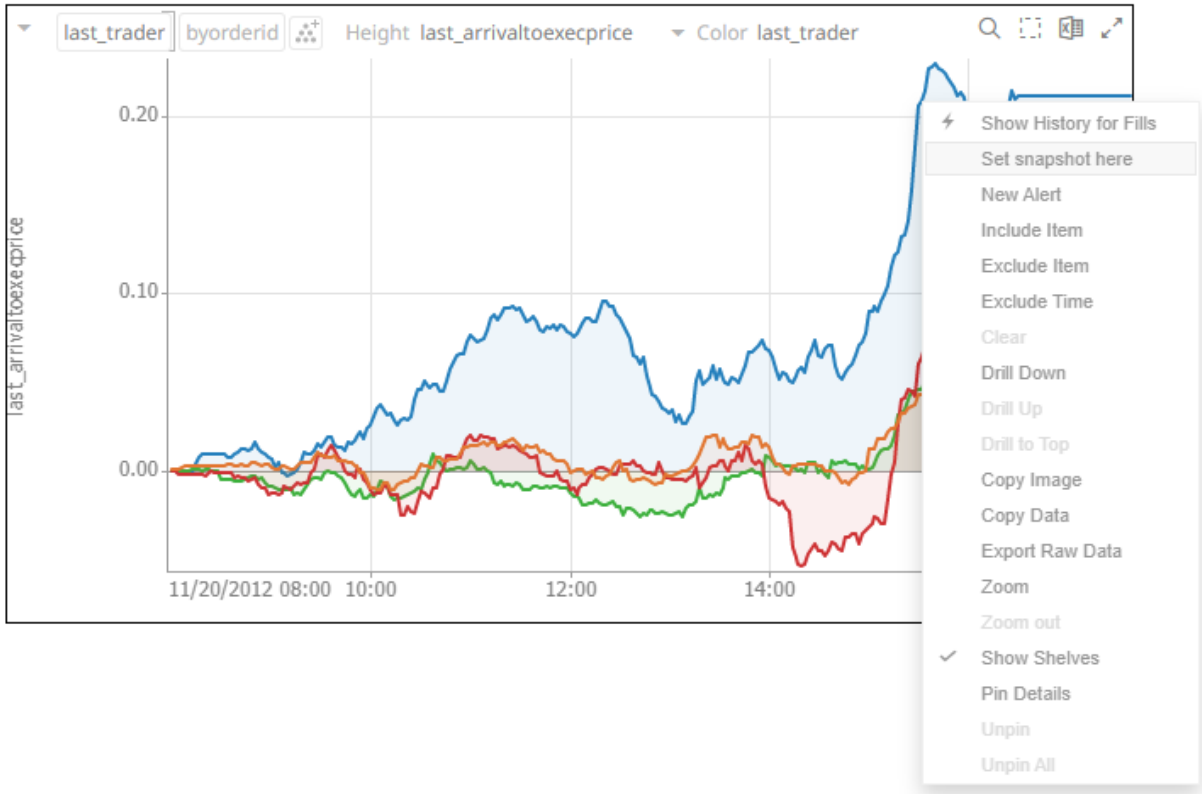
A time series visualization consists of a series of time slices, within a defined time window. The snapshot time identifies a particular slice, which can be highlighted further in separate visualizations.

The snapshot is highlighted on the time series visualization through the aid of a vertical grid line.



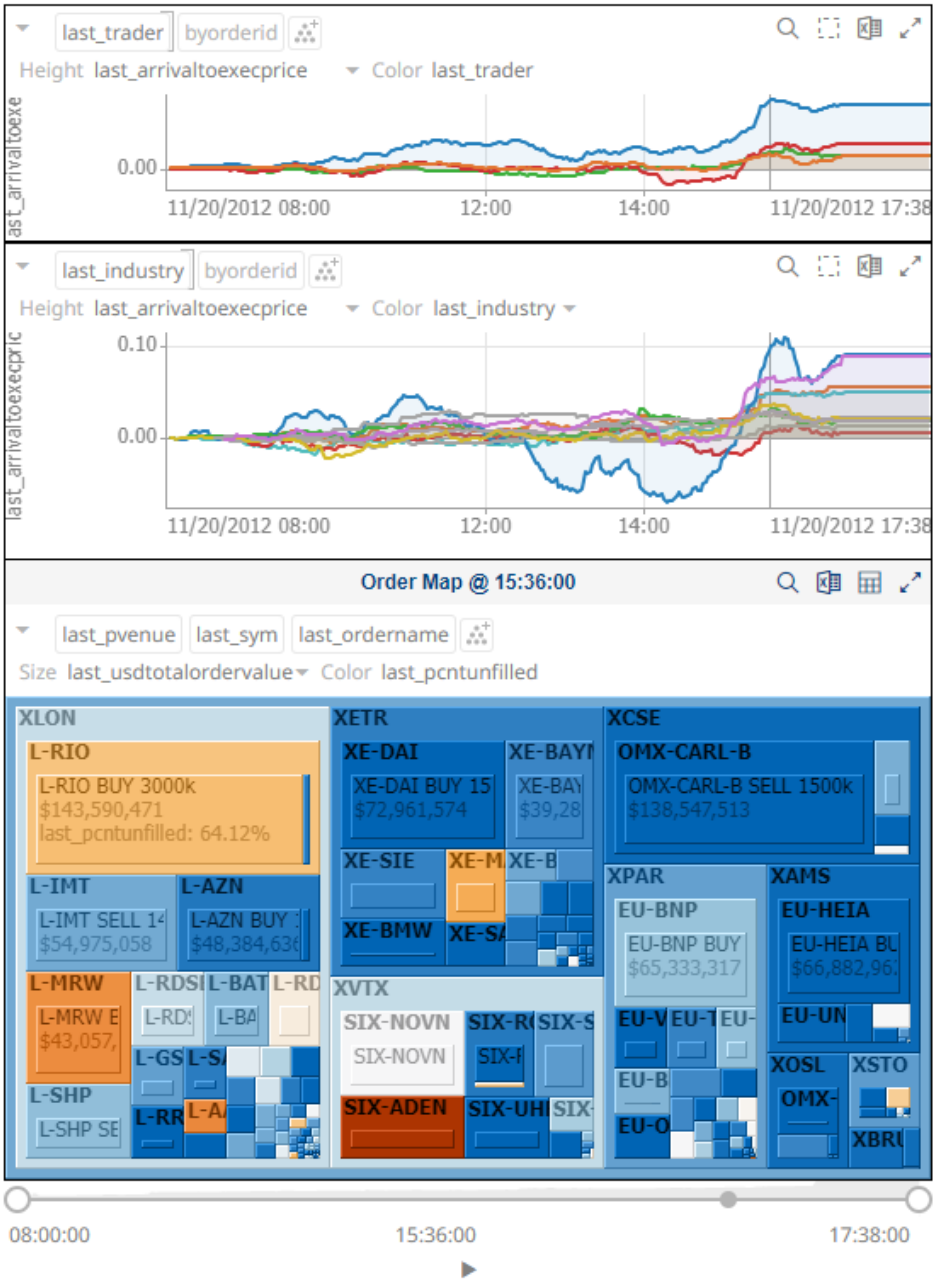
The snapshot can be selected to focus on particular spikes or abnormalities in the data through either:

- Moving the snapshot on the time filter
- Right-clicking on the graph, and selecting **Set snapshot here**

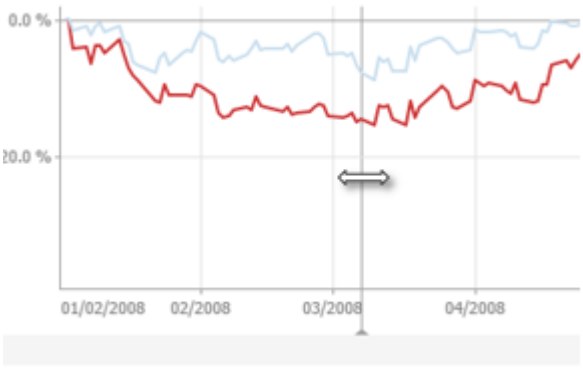


The snapshot will be set for the selected time.

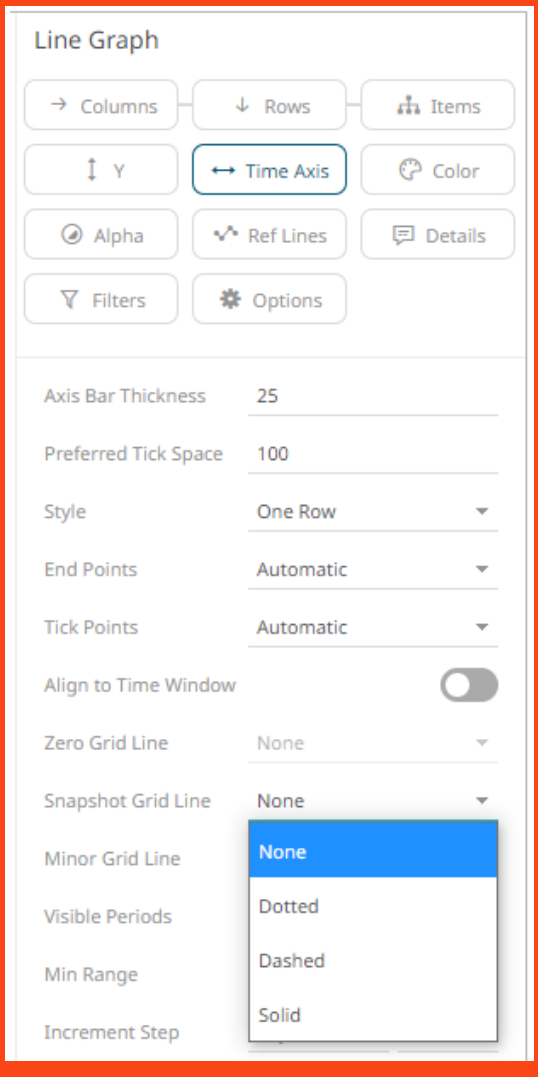
Setting the snapshot can also be displayed on the associated Time Filter Box of a time series visualization.



You can also drag the snapshot line anywhere in the visualization. Hover your mouse on the snapshot line and move it either to the left or to the right.

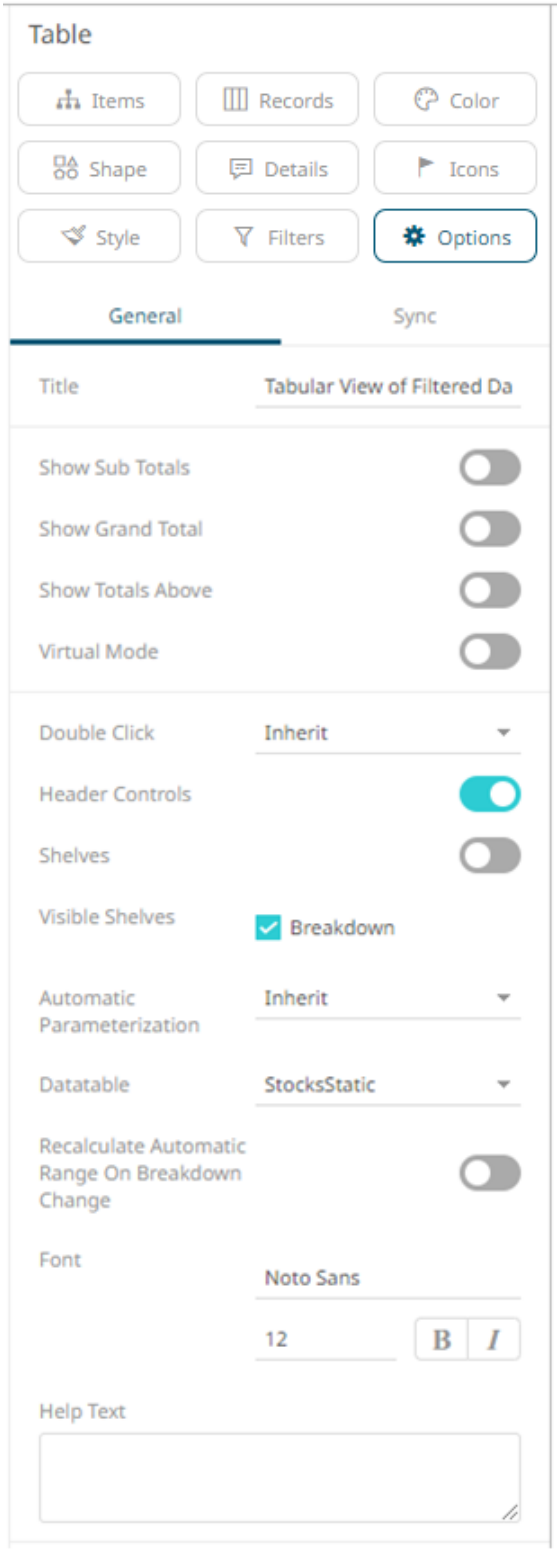


NOTE **The Set Snapshot Here option is only available in the time series visualization context menu when the *Snapshot Grid Line* is rendered or set to Dotted, Dashed, or Solid in the Time Axis variable.**



Visualization Header Controls

Header controls are made available in visualizations when the **Header Controls** option is turned on.



Header controls may include:

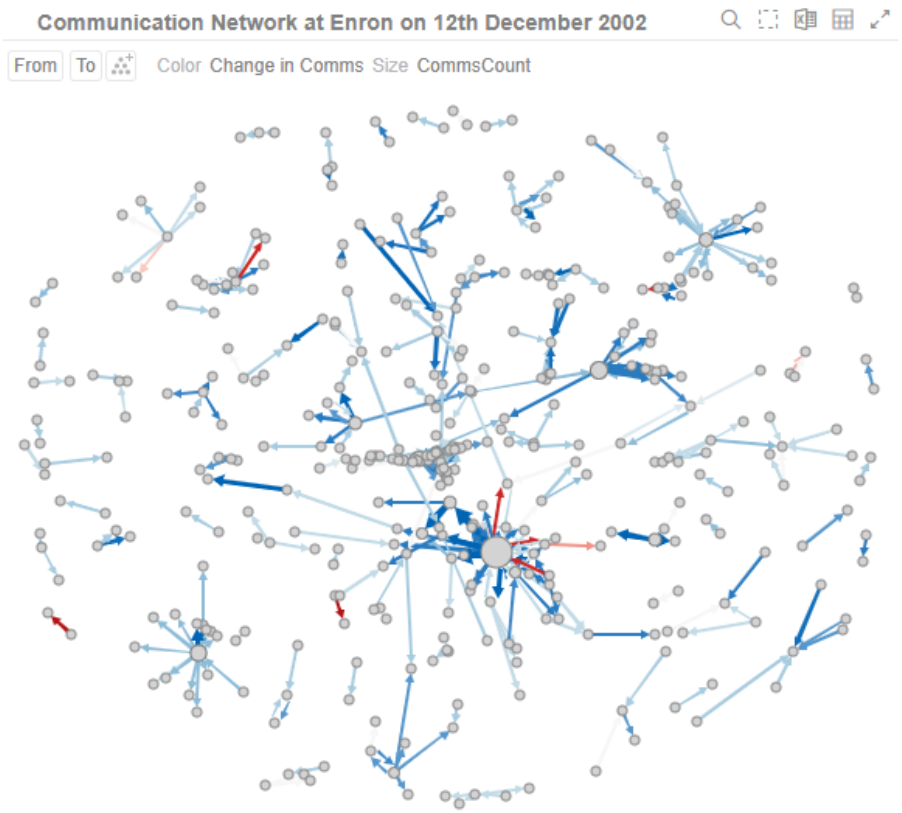
Header Control	Description
Rubber Band Zoom	Allows zooming in on multiple items of interest in a visualization.
Rubber Band Selection	Allows multiple items in a visualization to be selected or lassoed.
Export Excel	Exports snapshot visualizations to a CSV-format file.
Toggle Display Mode	Displays a visualization as a table and vice versa.
Maximize	Maximizes the visualization to be displayed on the full dashboard area.

Exporting to Excel (TSV-format) of Visualizations

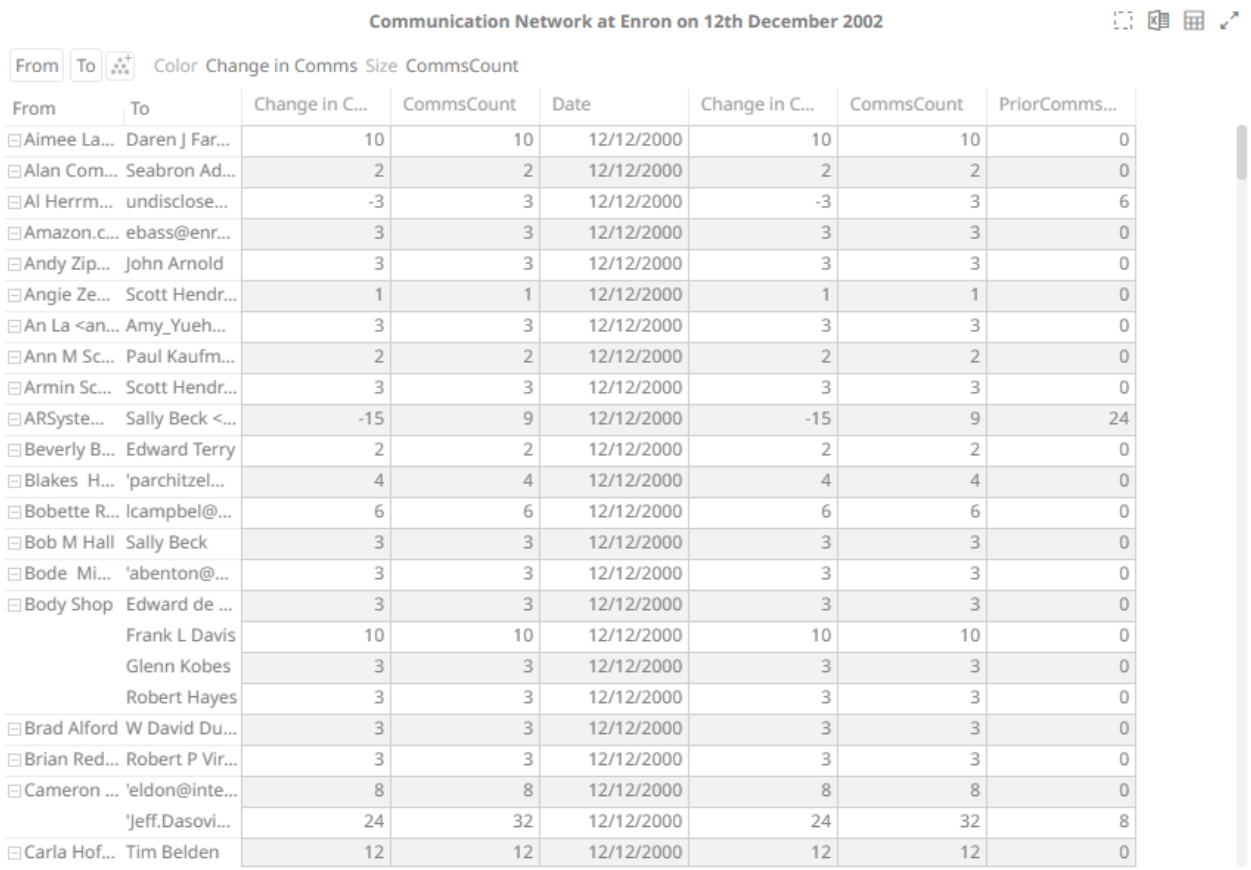
Click the **Export Excel** icon of a snapshot visualization. A copy of the CSV-format tile is downloaded.

Toggling Between a Visualization and a Table

Click the **Toggle Display Mode** icon of a visualization.



It will be replaced with a Table visualization.



From	To	Change in C...	CommsCount	Date	Change in C...	CommsCount	PriorComms...
Aimee La...	Daren J Far...	10	10	12/12/2000	10	10	0
Alan Com...	Seabron Ad...	2	2	12/12/2000	2	2	0
Al Herrm...	undisclose...	-3	3	12/12/2000	-3	3	6
Amazon.c...	ebass@enr...	3	3	12/12/2000	3	3	0
Andy Zip...	John Arnold	3	3	12/12/2000	3	3	0
Angie Ze...	Scott Hendr...	1	1	12/12/2000	1	1	0
An La <an...	Amy_Yueh...	3	3	12/12/2000	3	3	0
Ann M Sc...	Paul Kaufm...	2	2	12/12/2000	2	2	0
Armin Sc...	Scott Hendr...	3	3	12/12/2000	3	3	0
ARSyste...	Sally Beck <...	-15	9	12/12/2000	-15	9	24
Beverly B...	Edward Terry	2	2	12/12/2000	2	2	0
Blakes H...	'parchitzel...	4	4	12/12/2000	4	4	0
Bobette R...	lcampbel@...	6	6	12/12/2000	6	6	0
Bob M Hall	Sally Beck	3	3	12/12/2000	3	3	0
Bode Mi...	'abenton@...	3	3	12/12/2000	3	3	0
Body Shop	Edward de ...	3	3	12/12/2000	3	3	0
	Frank L Davis	10	10	12/12/2000	10	10	0
	Glenn Kobes	3	3	12/12/2000	3	3	0
	Robert Hayes	3	3	12/12/2000	3	3	0
Brad Alford	W David Du...	3	3	12/12/2000	3	3	0
Brian Red...	Robert P Vir...	3	3	12/12/2000	3	3	0
Cameron ...	'eldon@inte...	8	8	12/12/2000	8	8	0
	'Jeff.Dasovi...	24	32	12/12/2000	24	32	8
Carla Hof...	Tim Belden	12	12	12/12/2000	12	12	0

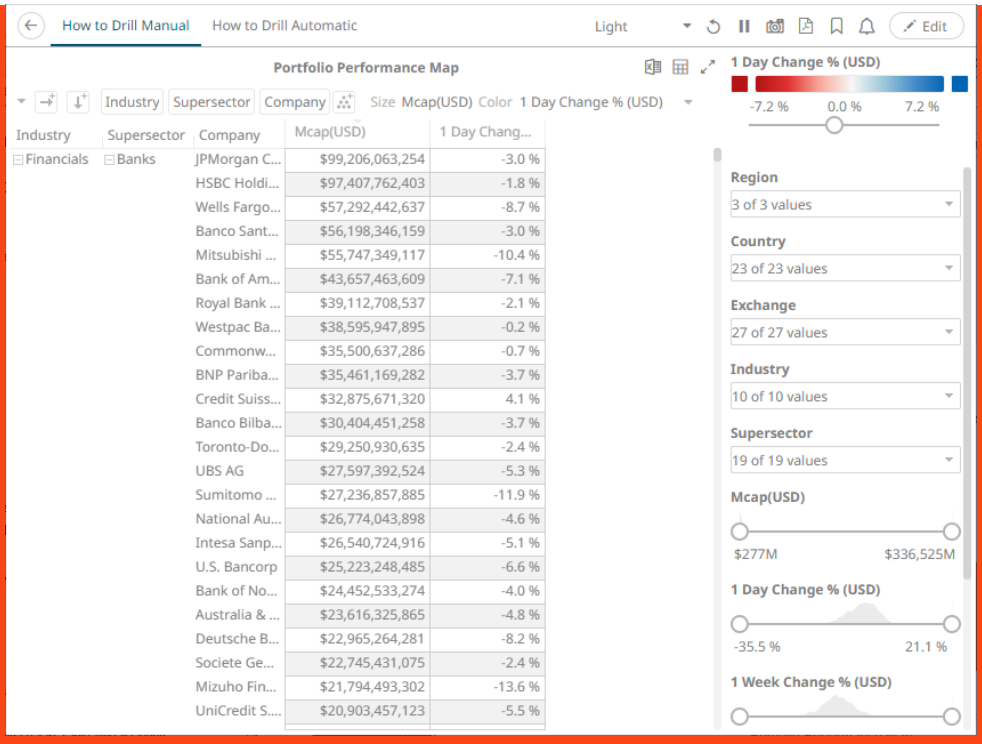
The Table details display the same breakdowns of the original visualization and all the visualization detail variables as visible members of the Table.

NOTE **The Table will default to displaying zebra stripes.**

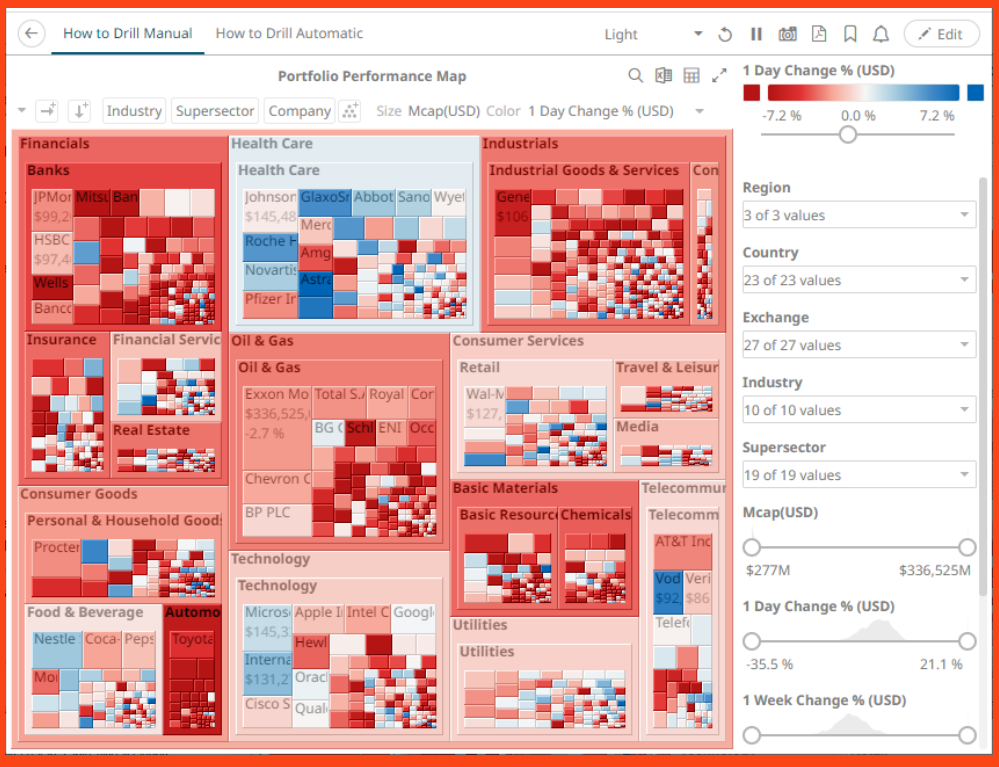
When the **Toggle Display Mode** icon is clicked again, the Table will toggle back to the original visualization.

NOTE

- **Closing and opening the dashboard will revert to the original visualization.**
- **Changing dashboard tabs will revert to the original visualization.**
- **Applying filters on the dashboard will not cause the Table to be toggled back to a visualization but will display the filtered view of the Table. For example: Industry = Basic Materials and Telecommunications**

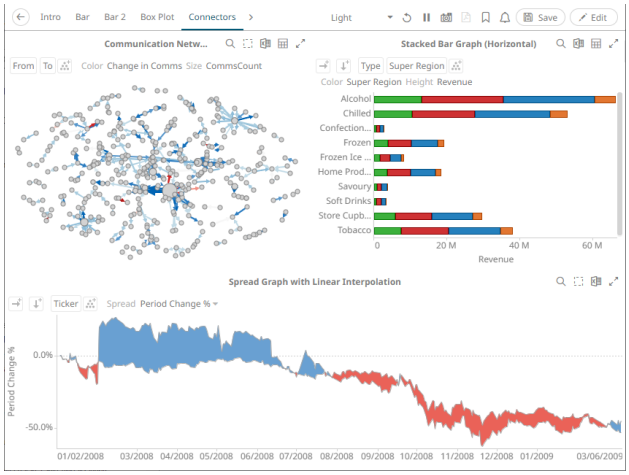


Consequently, toggling back will then display the filtered view of the visualization. The example below will only display Basic Materials and Telecommunications.

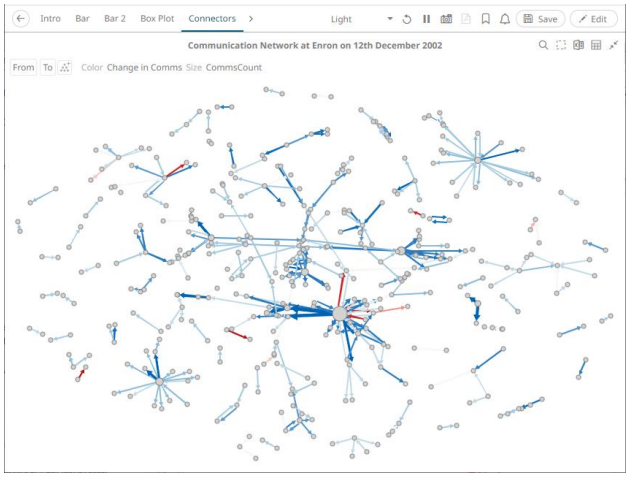


Maximize

Visualizations can be maximized to display the full dashboard area by clicking the **Maximize** icon. To return to normal, click the visualization **Restore** icon.



Before clicking Maximize

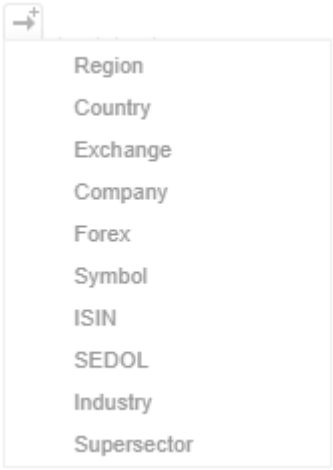


After clicking Maximize

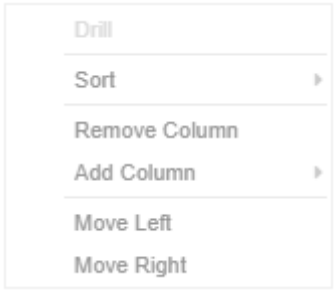
Drilling Into, Sorting, Removing, Adding, and Swapping Columns in a Breakdown and Cross Tab Points

If there are no available columns added as a breakdown or cross tab *Row* or *Column*, click the corresponding icon to display and select from the list of text columns available on the associated data table of the visualization.

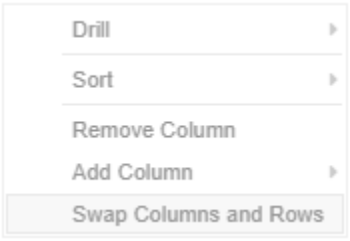
For example:



Right-clicking on a *Breakdown* column displays this context menu.



Right-clicking on a cross tab *Row* or *Column* displays this context menu.

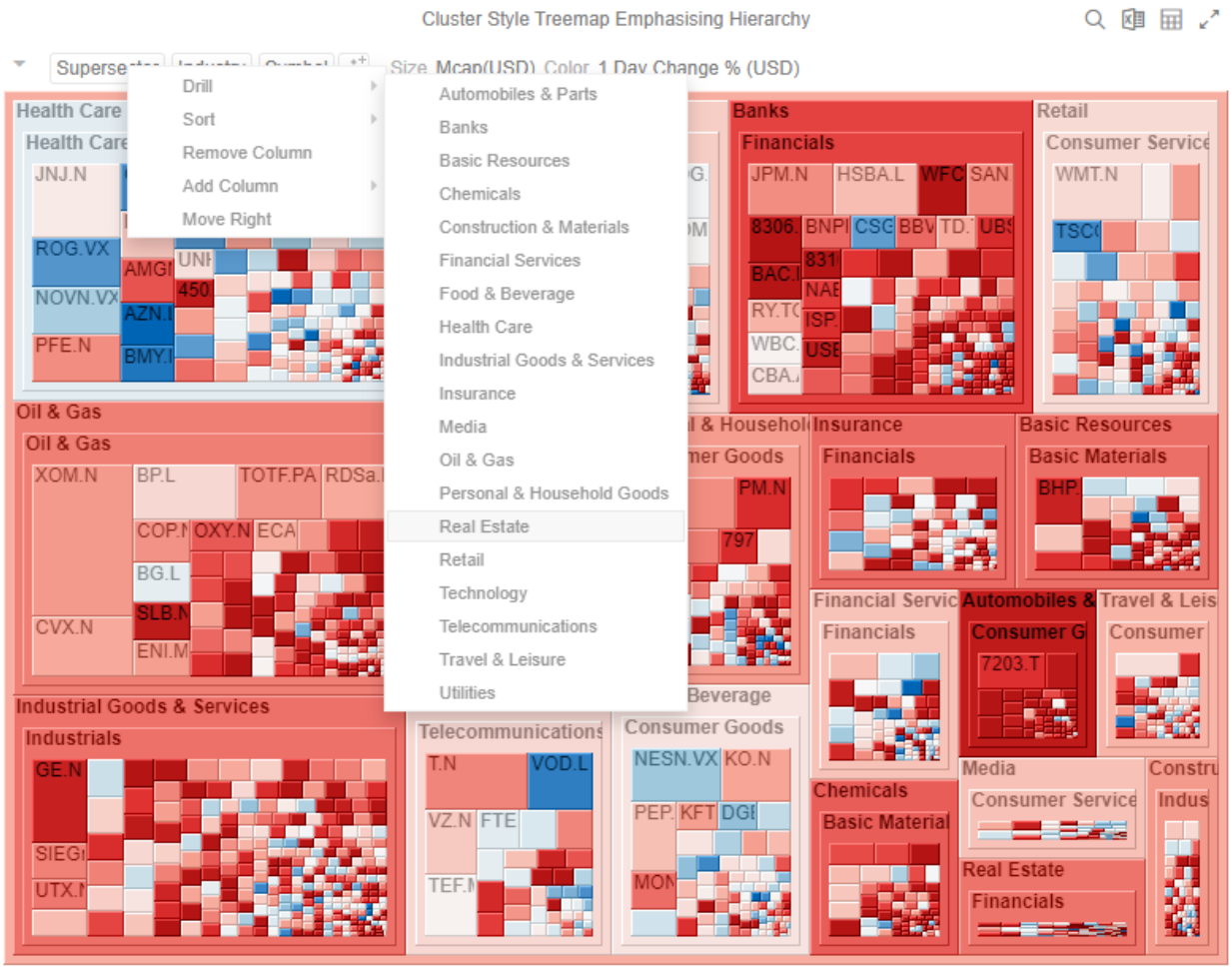


Drilling into Hierarchy Displays

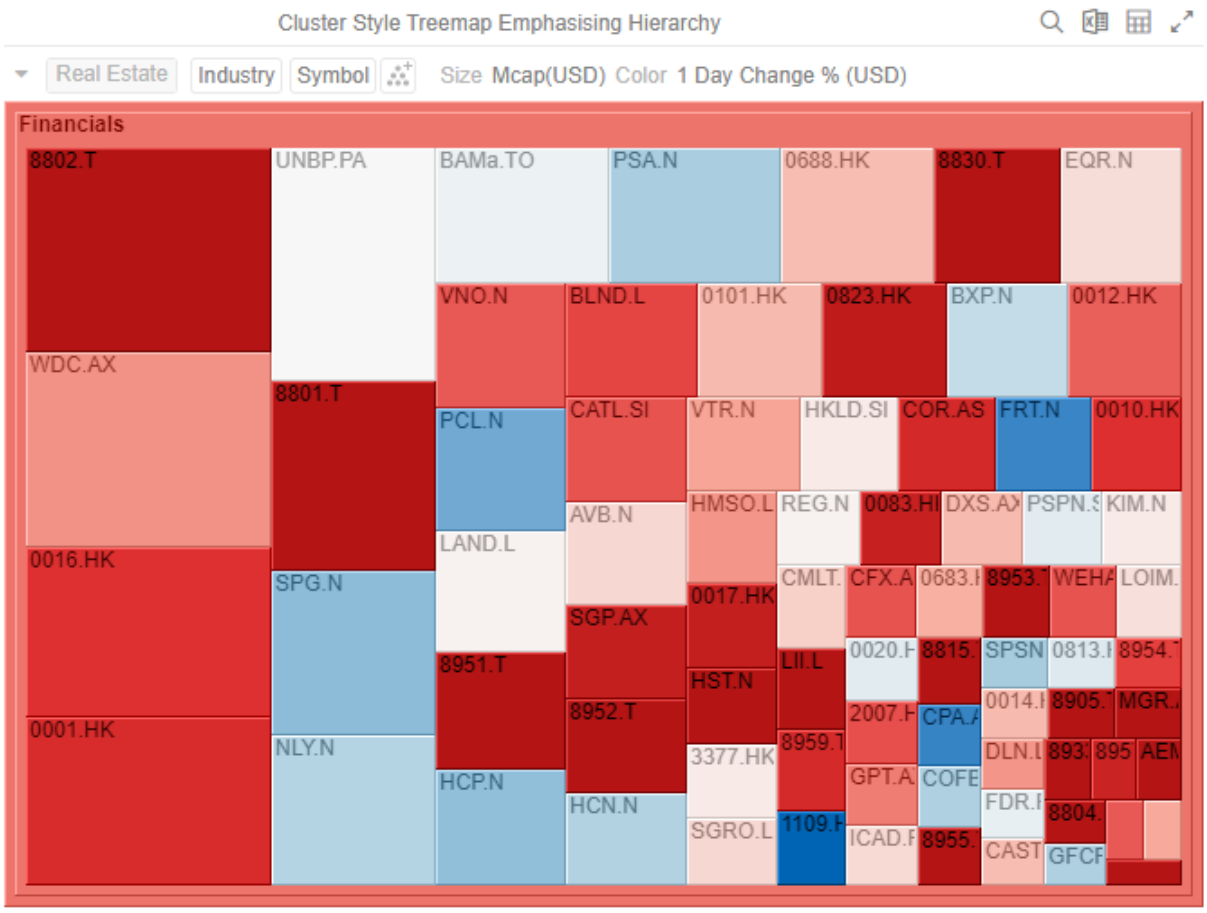
You can drill into cross tab columns, cross tab rows, and breakdown columns.

Steps:

1. Right-click on a column, select **Drill** and then the level you want to drill down into.



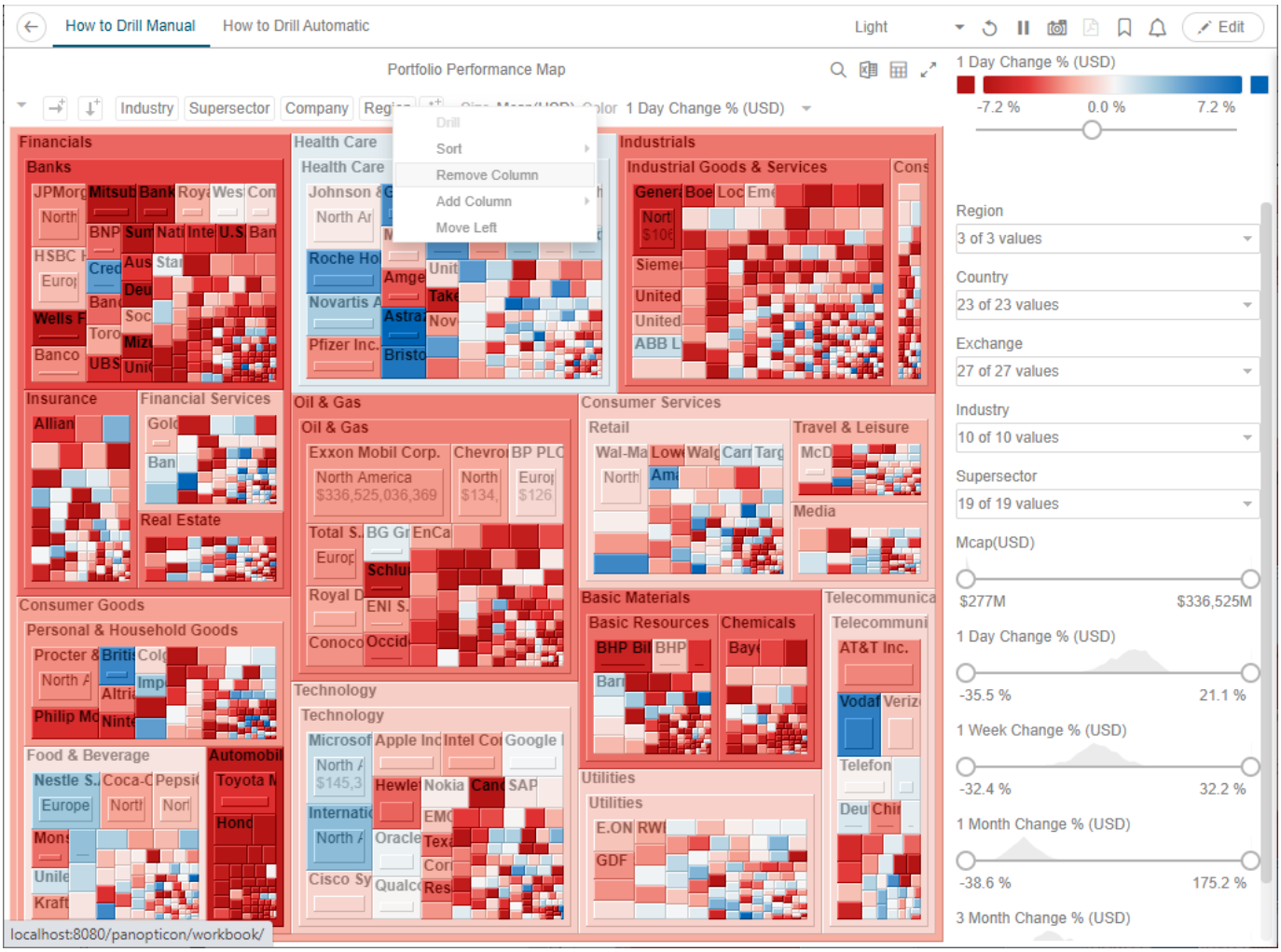
The selected level will appear gray.



2. Click the gray item to return to the default view that includes all categories in the data.

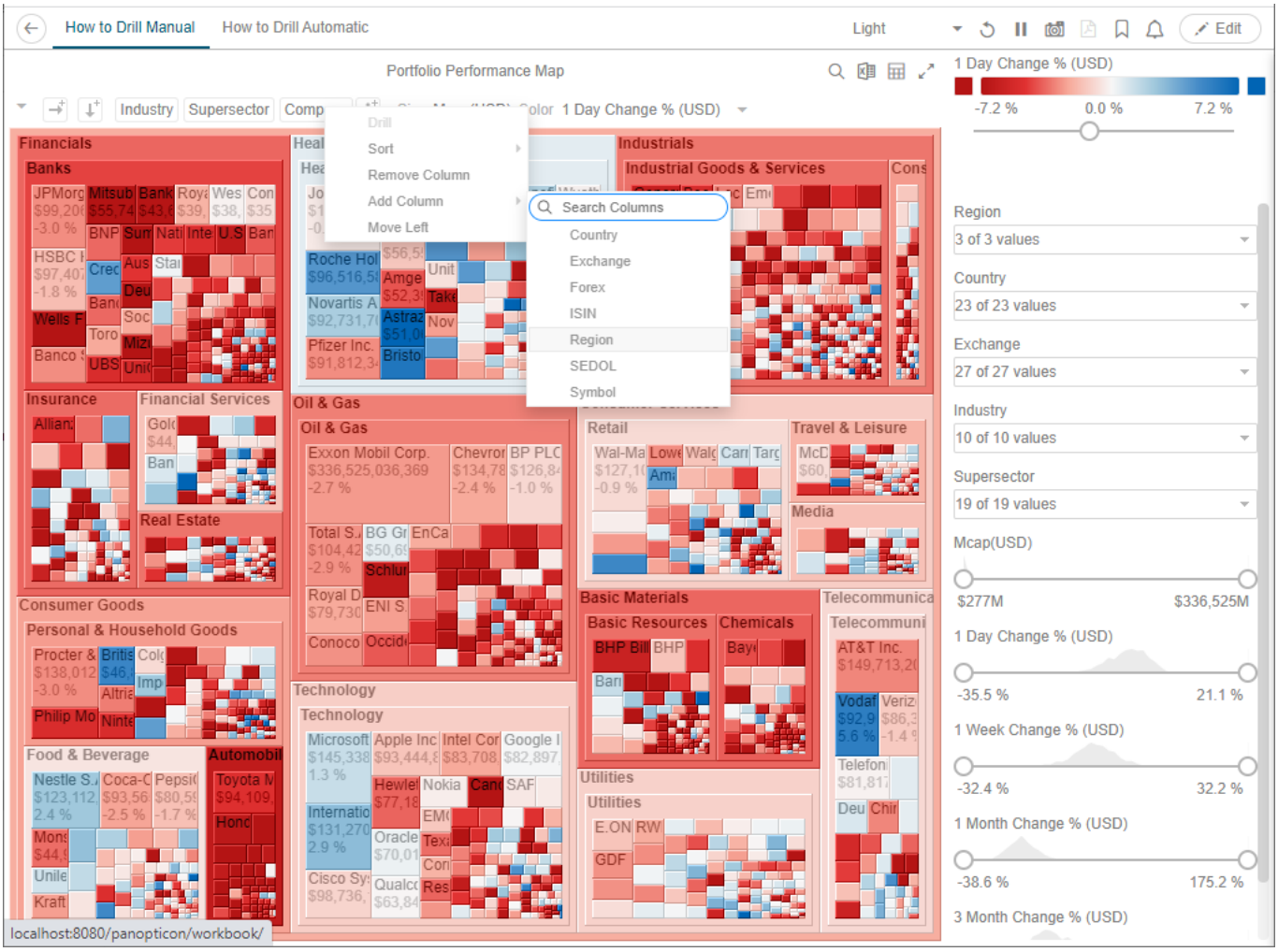
Removing Breakdown or Cross Tab Columns

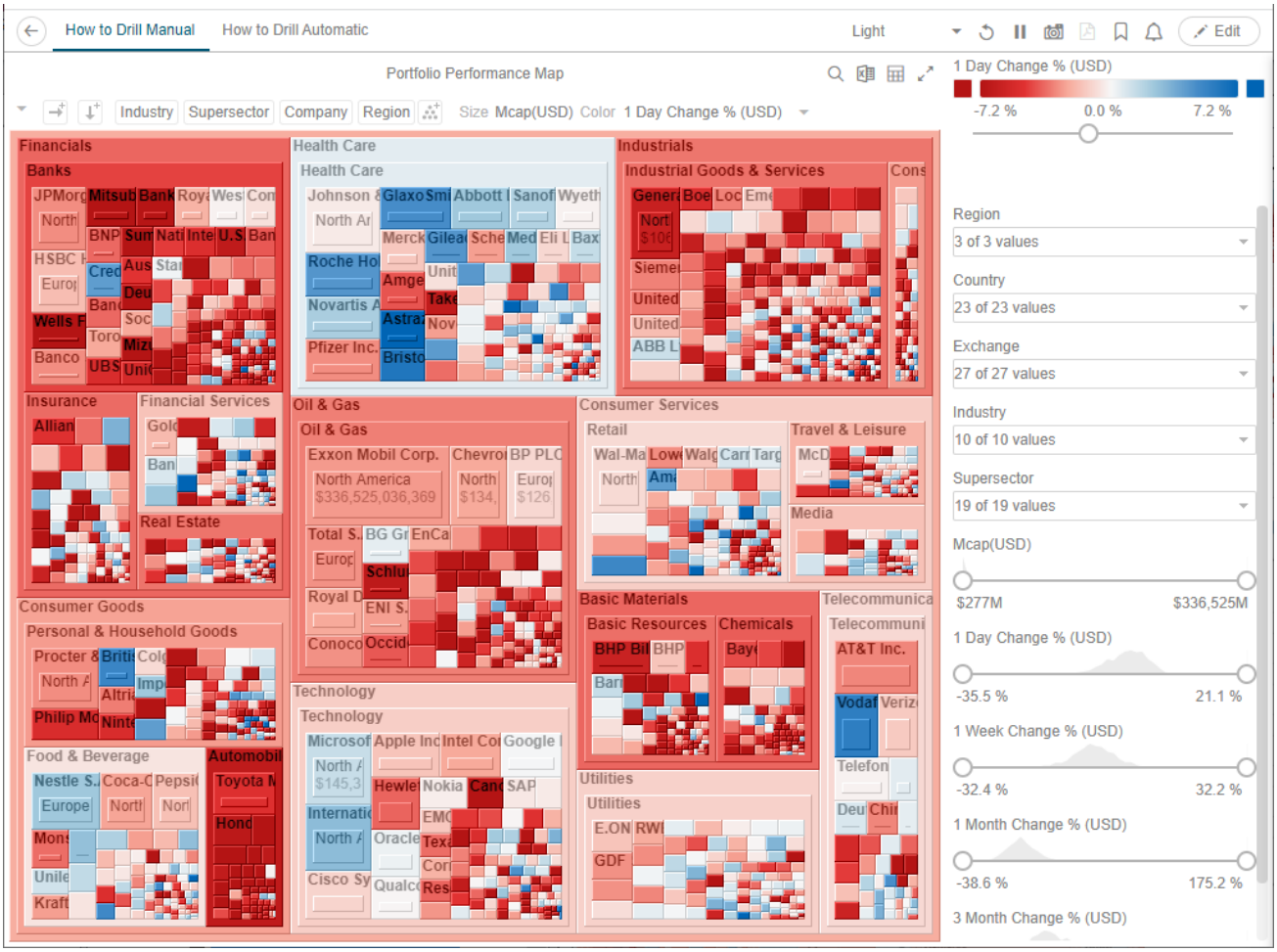
Right-click on a column and select **Remove Column** on the context menu.



Adding Breakdown or Cross Tab Columns

Right-click on a column, select **Add Column** on the context menu and then the column to add. You can filter the list by entering a column into *Search Columns*.





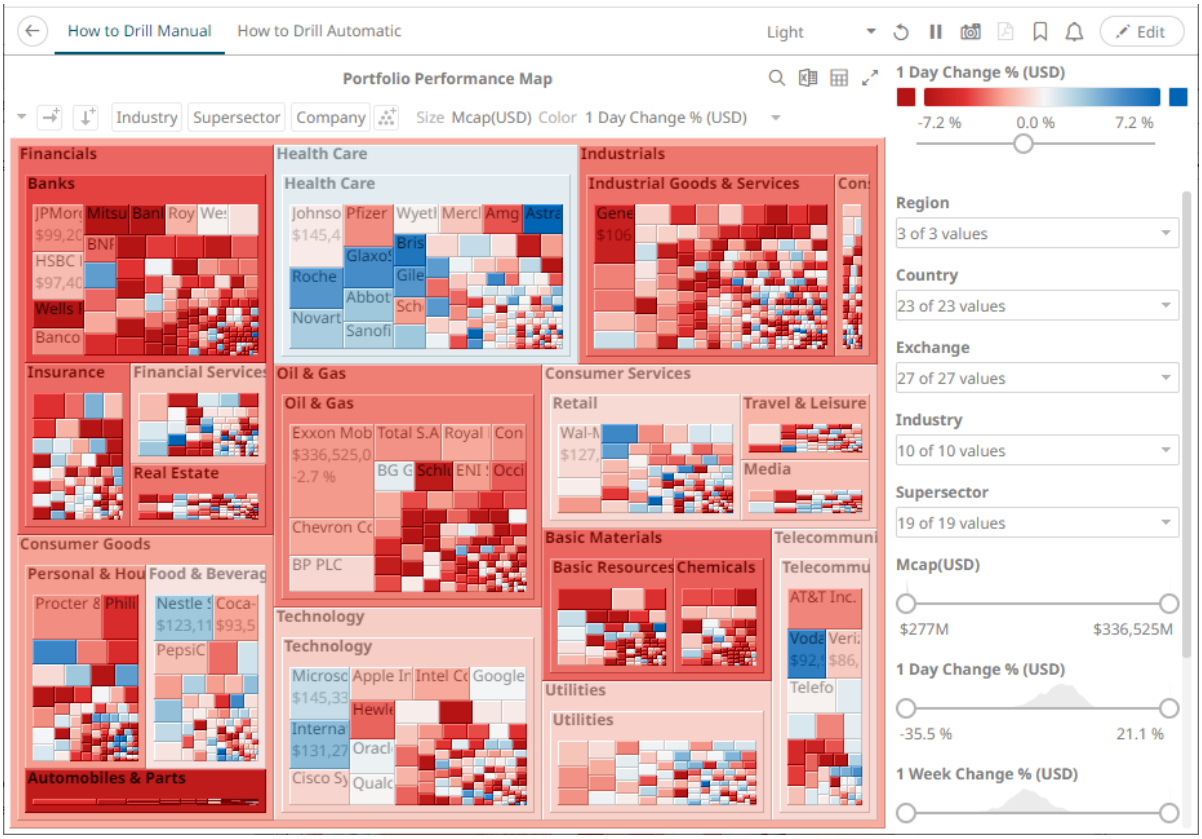
Moving Breakdown Columns

The **Move Right** or **Move Left** options are only available when there is more than one breakdown column.

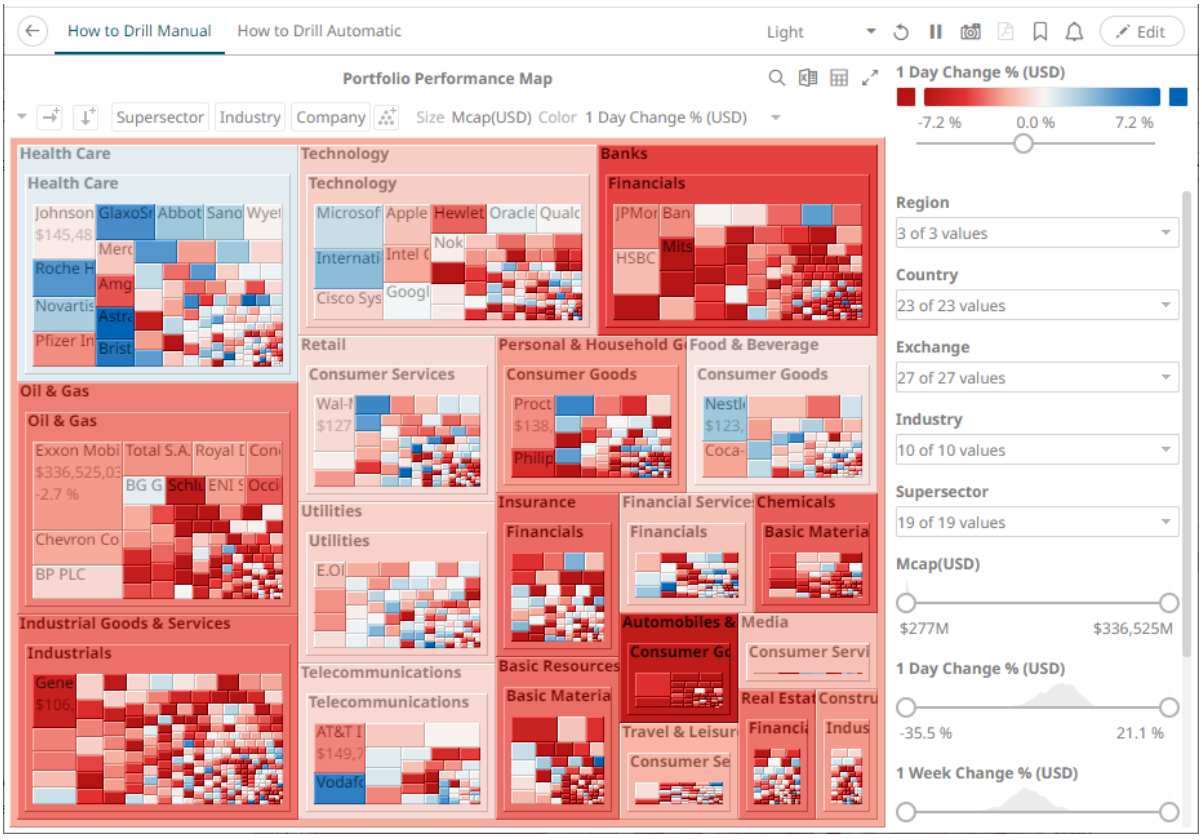
Right-click on a breakdown column and select **Move Right** or **Move Left** on the context menu.

You can also swap or move columns by selecting and dragging them to the preferred hierarchy level.

From: **Industry > Supersector > Company**



To: **Supersector > Industry > Company**



Toggling Between Rows and Columns of a Cross Tab

This feature supports the easy swapping between rows to columns, and vice versa in, the pivot points of a cross tab.

In a visualization that is cross tabbed, right-click on row or column and select **Swap Columns and Rows** on the context menu.

The rows and columns will be swapped in the *Columns* or *Rows* section of the visualization.

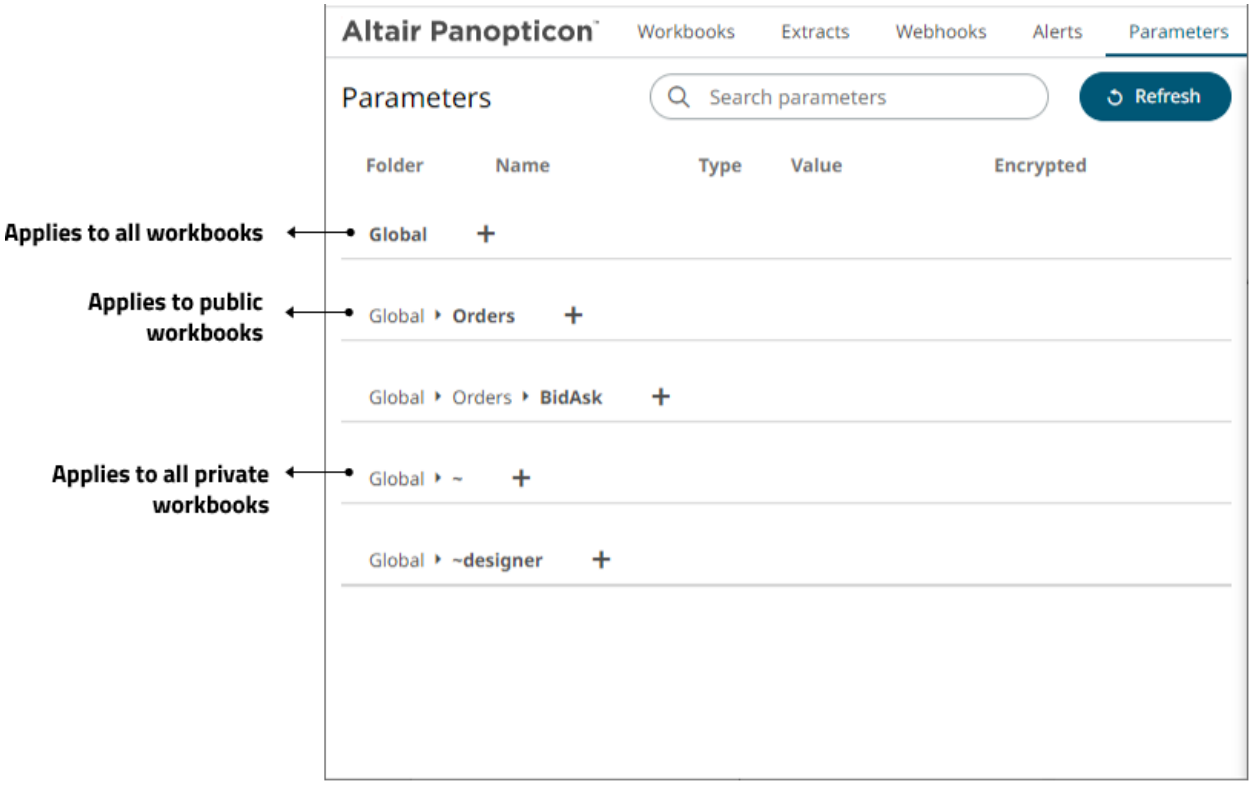
You can opt to revert to the original columns of the *Columns* and *Rows* by selecting the **Swap Columns and Rows** on the context menu.

[6] GLOBAL PARAMETERS

Global Parameters are applied by default to open workbooks. It is commonly used for storing parameterized data source connection details, so that they are maintained outside of the workbook.

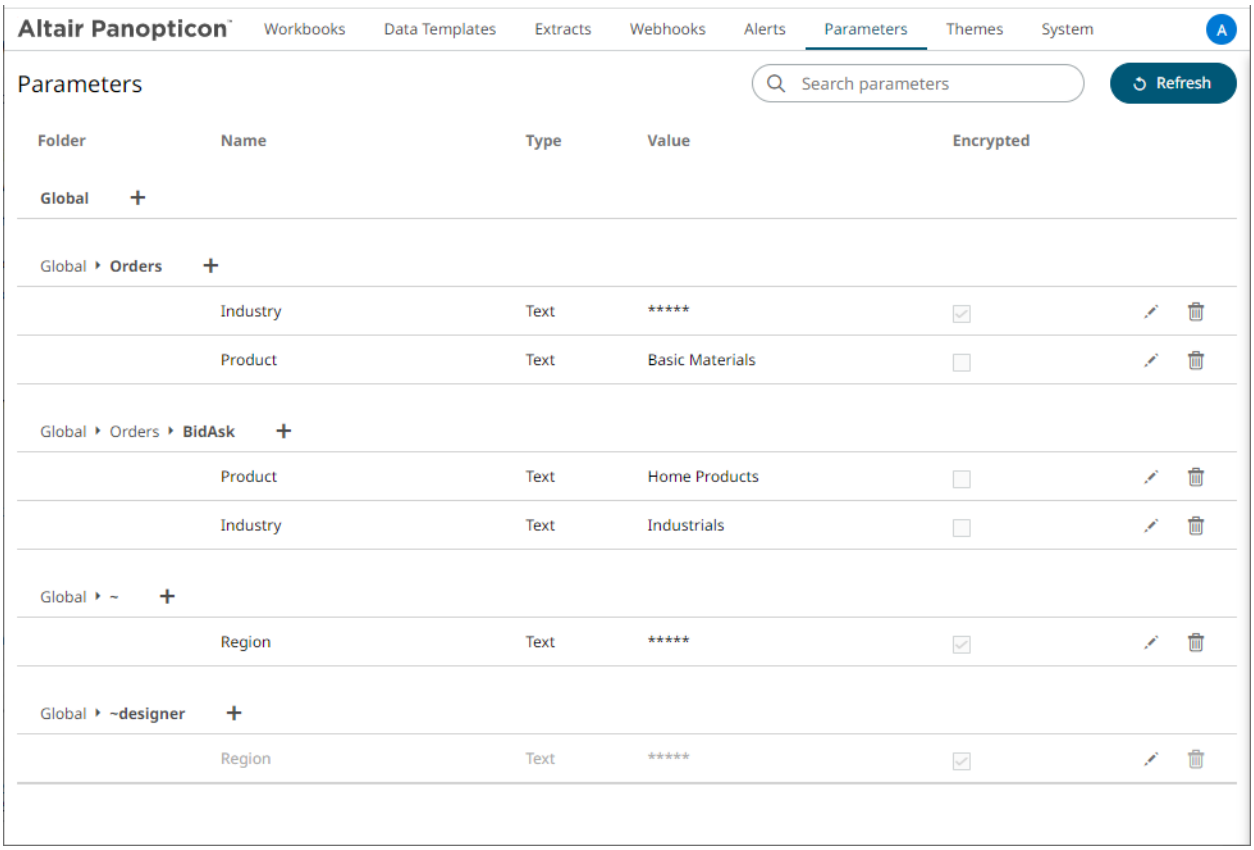
Users with an Administrator or Designer role can add, modify or delete global parameters that will pull and enter specific data into the different sets that are assigned to workbook folders, as well as user specific folders for Designers.

For example:

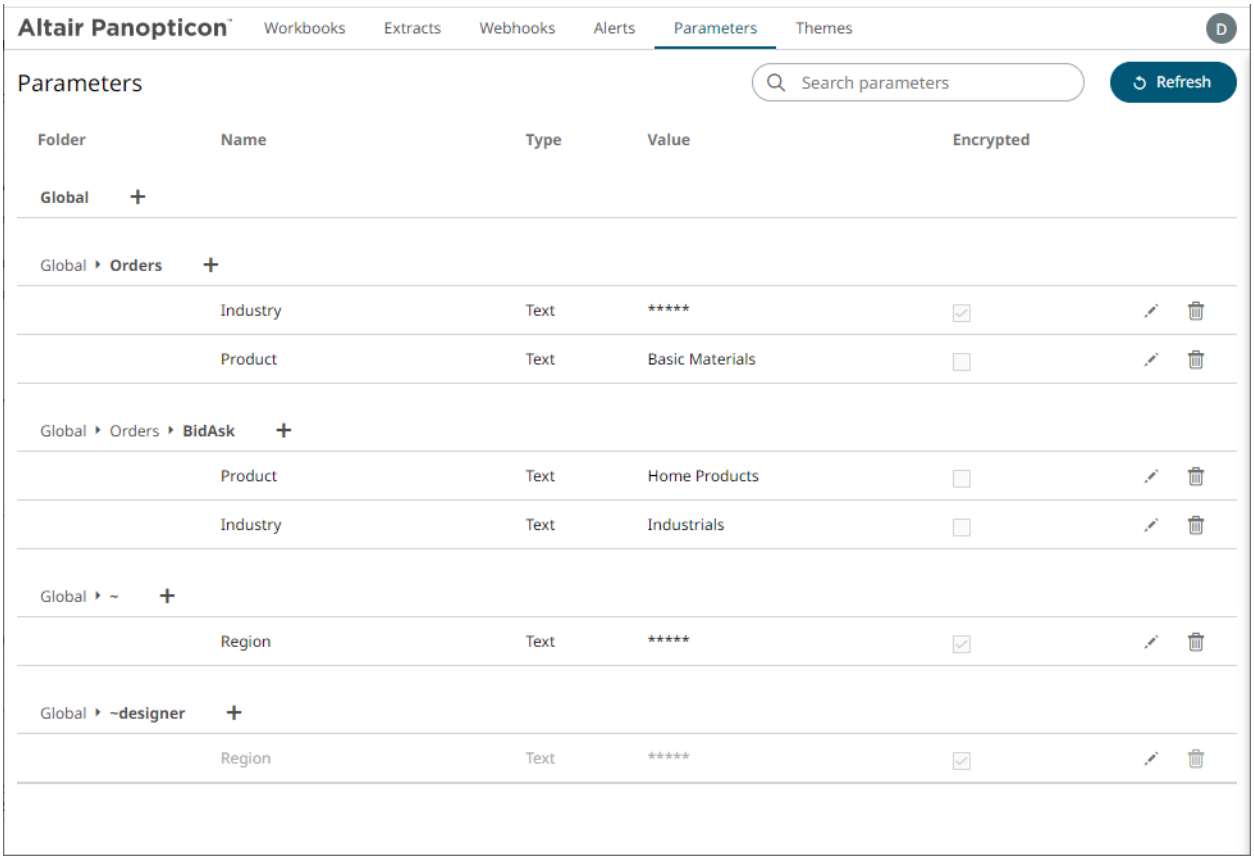


Parameters Set In	Description
Organization's root folder (i.e., **Global**)	Inherited by all of the available folders and applied to all workbooks
Public root folder (e.g., **Global > Orders**)	Inherited by the public root folder's subfolders and applied to all public workbooks.
User's root folder (i.e., **Global > ~**)	Inherited by the user root folder's subfolders and applied to all private workbooks.

For example, an Administrator added these global parameters:



The same global parameters are inherited and displayed for a Designer user:

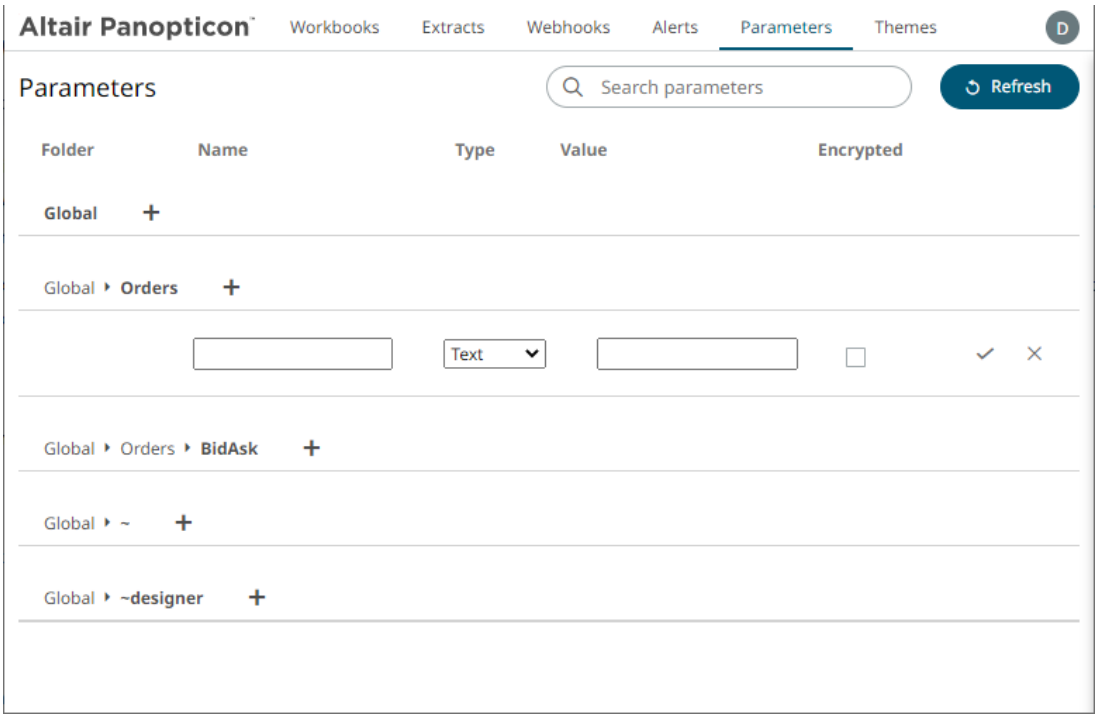


ADDING GLOBAL PARAMETERS

Follow the steps below to add global parameters with a Designer role.

Steps:

1. On the **Parameters** tab, click the Add + icon of a global folder (root or subfolder).
   A new parameter entry displays.



2. Enter a *Name* for the new parameter.
3. Select the *Type*: **Text**, **Numeric**, or **Time**.
4. Enter the *Default Value*.

NOTE	

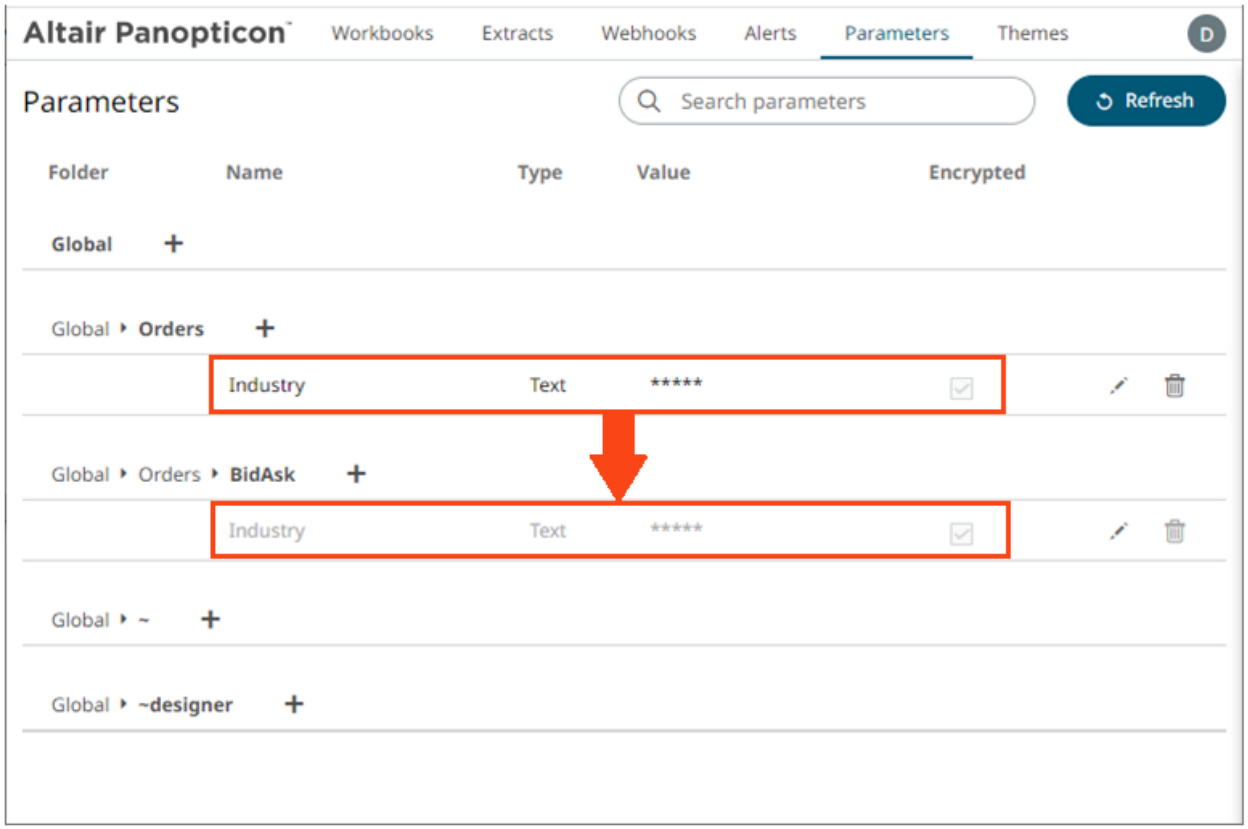
	• You can enter several default values, separated by a comma.
	• Single quotes on parameter value/s are removed when saving global parameters.
	• For the **Time** type, the following formats for the default value are accepted:
	  ○ "yyyy-MM-dd"
	  ○ "yyyy-MM-ddTHH:mm:ss"
	  ○ "yyyy-MM-ddTHH:mm:ss.SSS"

5. Check the *Encrypted* box to encrypt the value, if required.

NOTE	Encryption is only supported for text parameters.

6. Click ✓. The new parameter is added in the list.

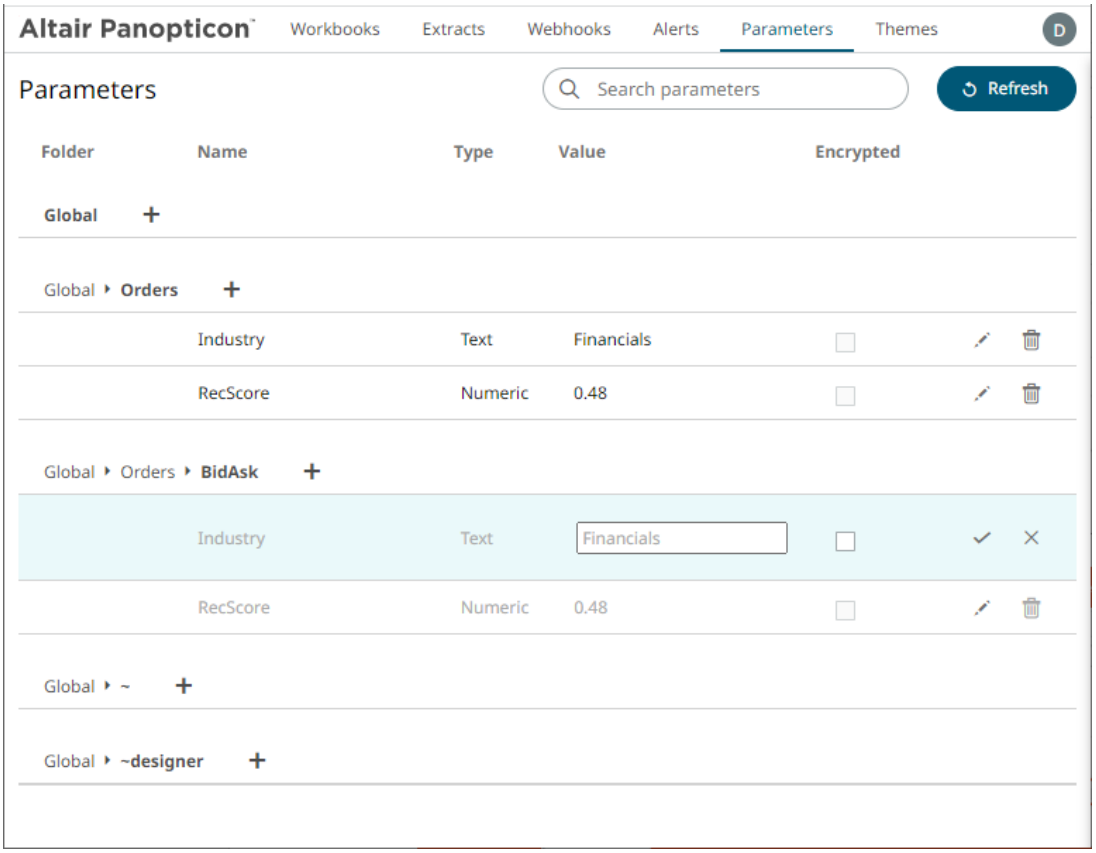
   Global parameters added in the parent/root folder are inherited by the corresponding subfolders.



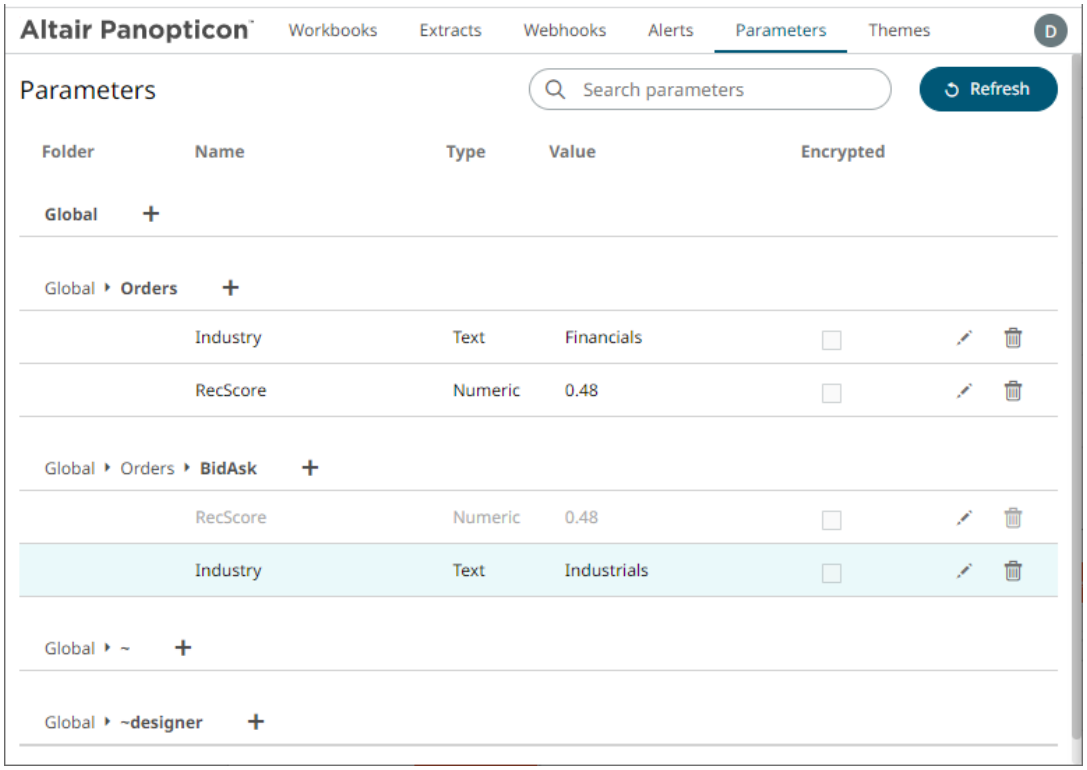
MODIFYING GLOBAL PARAMETERS

Steps:

1. On the **Parameters** tab, click the **Edit** icon of a parameter.
   The *Name, Value, and Encrypted* controls are enabled.

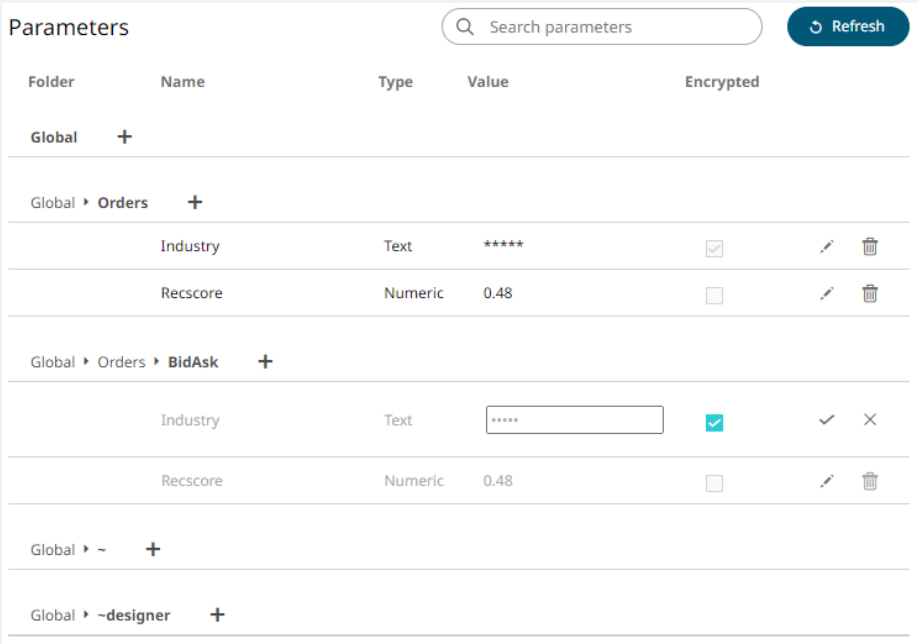


2. Make the necessary changes then click ✓.

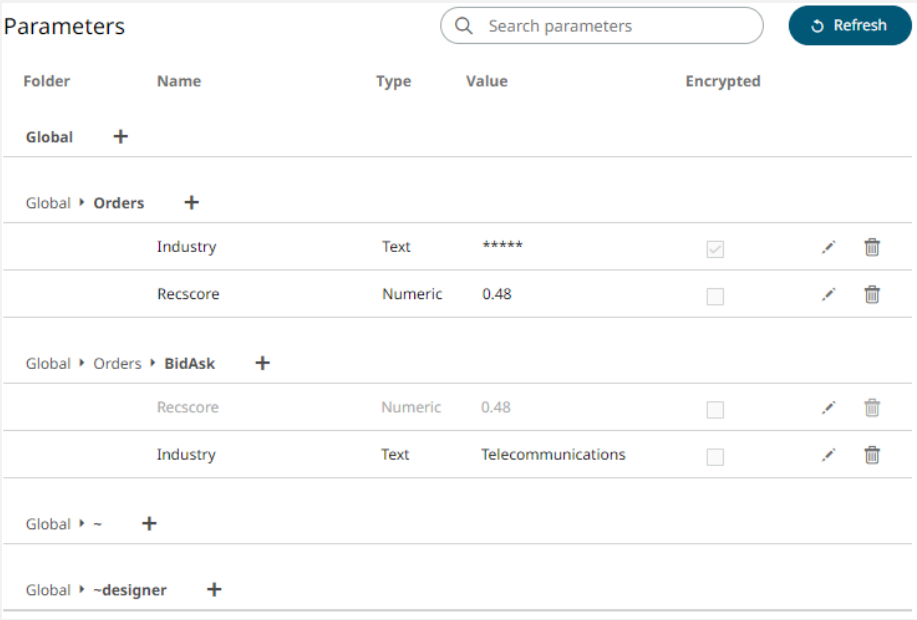


NOTE

For the inherited parameters, the *Name* and *Type* are not editable.



Once the value of the inherited parameter is changed, it is displayed as a global parameter and can also be deleted.



Deleting Global Parameters

Steps:

1. On the **Parameters** tab, click the **Remove** icon of a global parameter.

   A confirmation message displays.



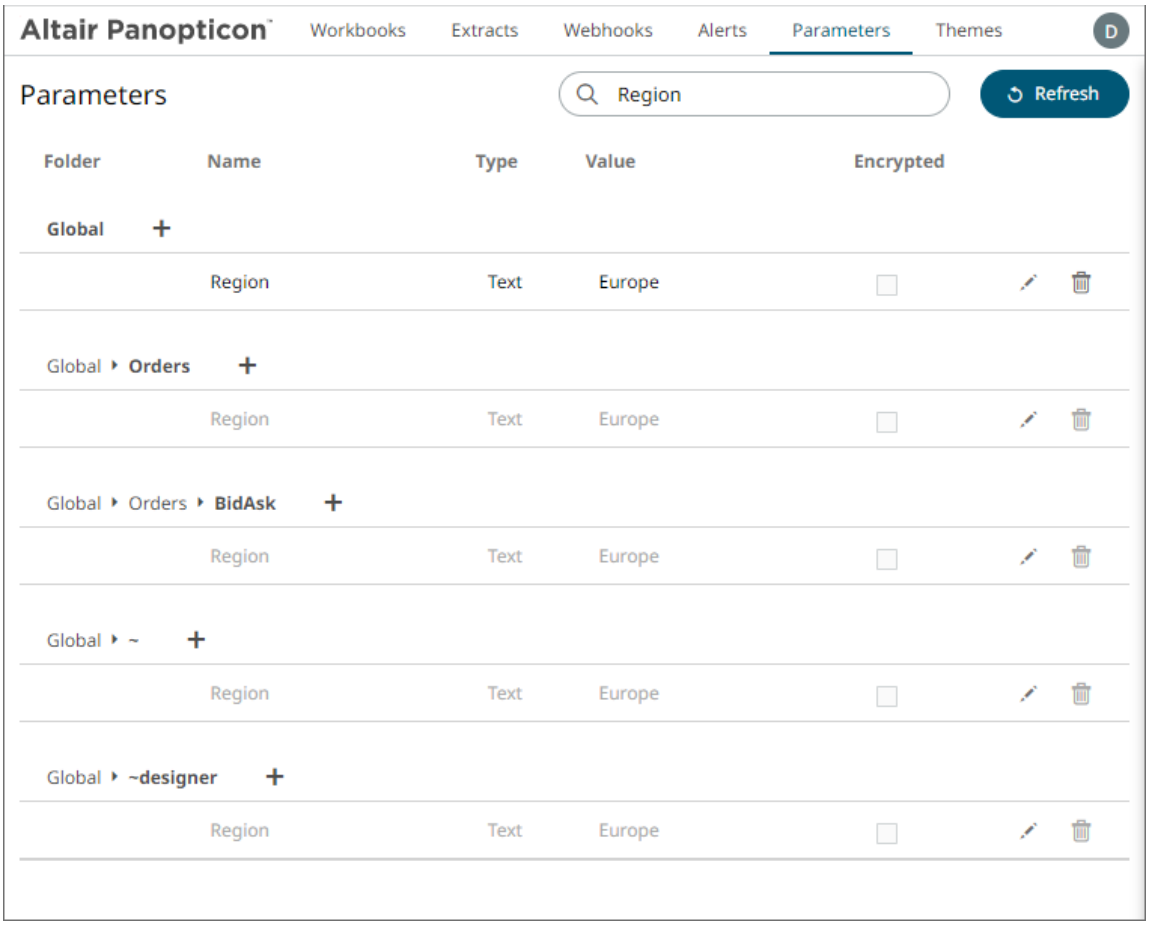
2. Click Yes to delete.

Refresh Global Parameters

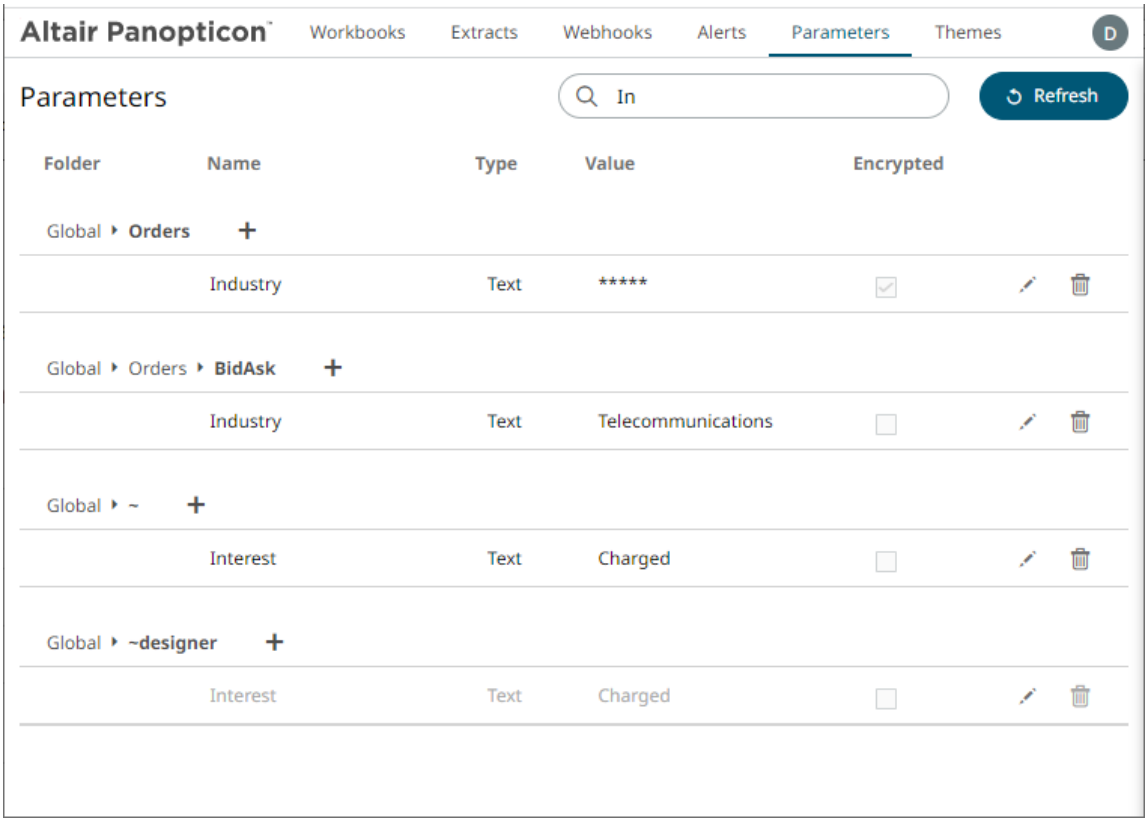
Click Refresh to refresh the values that are being pulled by the workbook models.

Searching for Global Parameters

To search for a particular global parameter, enter it in the *Search* box. All of the instances are displayed.



You can also enter one or more characters into the *Search* box and the suggested list of global parameters that matched the entries will be displayed.


Altair Panopticon
Workbooks
Extracts
Webhooks
Alerts
Parameters
Themes
D
Parameters
In
Refresh
Folder
Name
Type
Value
Encrypted
Global ▸ Orders +
Industry
Text
*****
Global ▸ Orders ▸ BidAsk +
Industry
Text
Telecommunications
Global ▸ ~ +
Interest
Text
Charged
Global ▸ ~designer +
Interest
Text
Charged

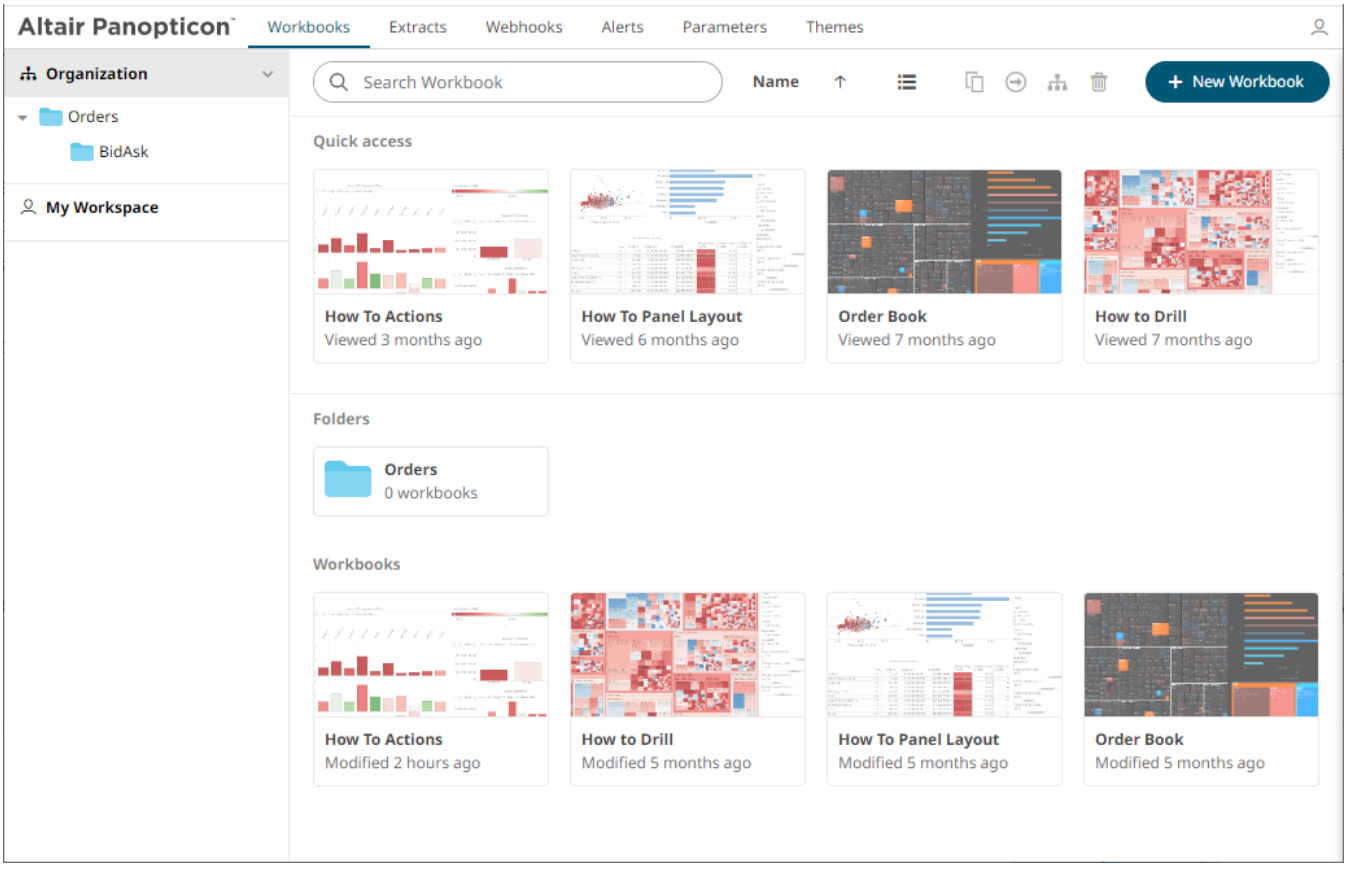
[7] ACCESSING WORKBOOKS AND CONTEXT MENU OPTIONS

ACCESSING WORKBOOKS

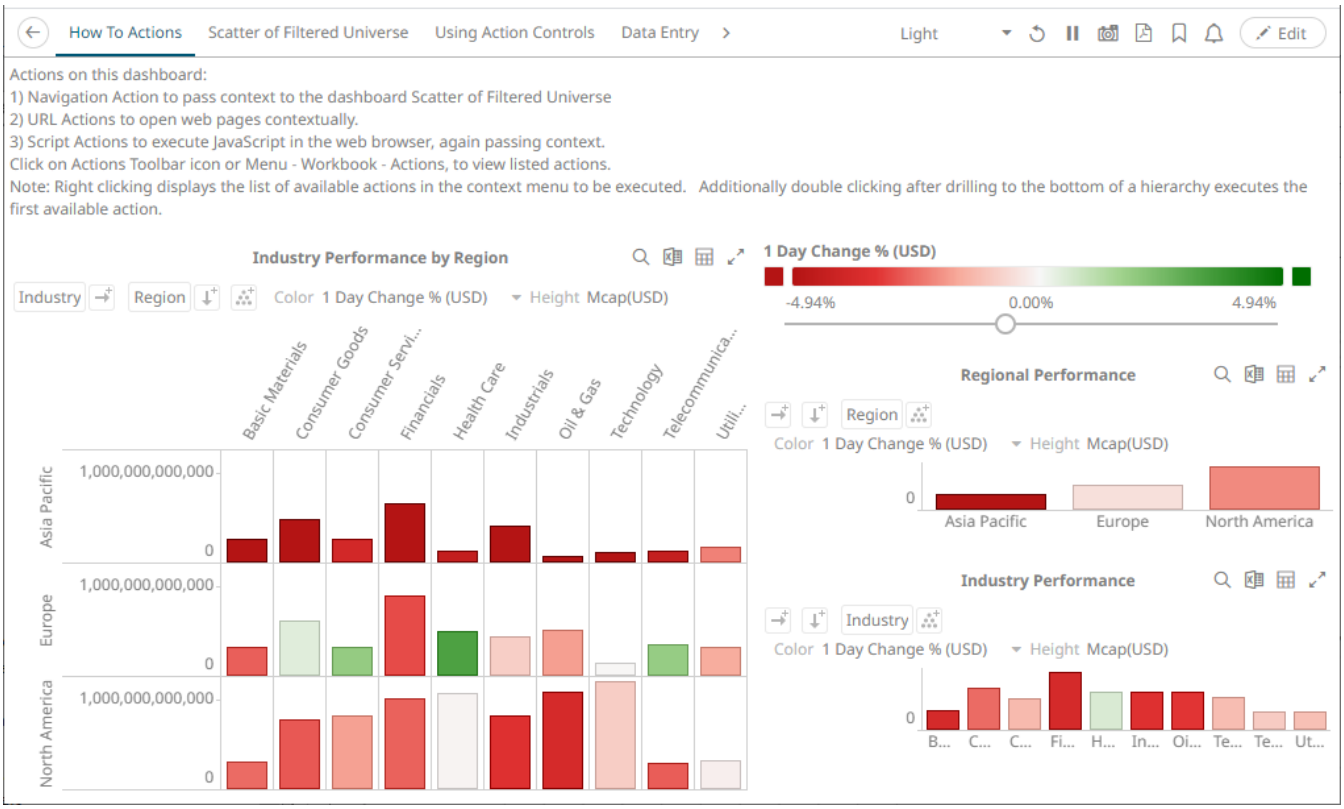
The *Workbooks* page lists available folders and uploaded or published workbooks in *Grid View*.

- The *Folders* include their names and the number of available workbooks.
- The *Workbooks* include their titles, thumbnail images, and when they were last updated.

  Refer to Workbooks and Folders Summary Layout for more information.

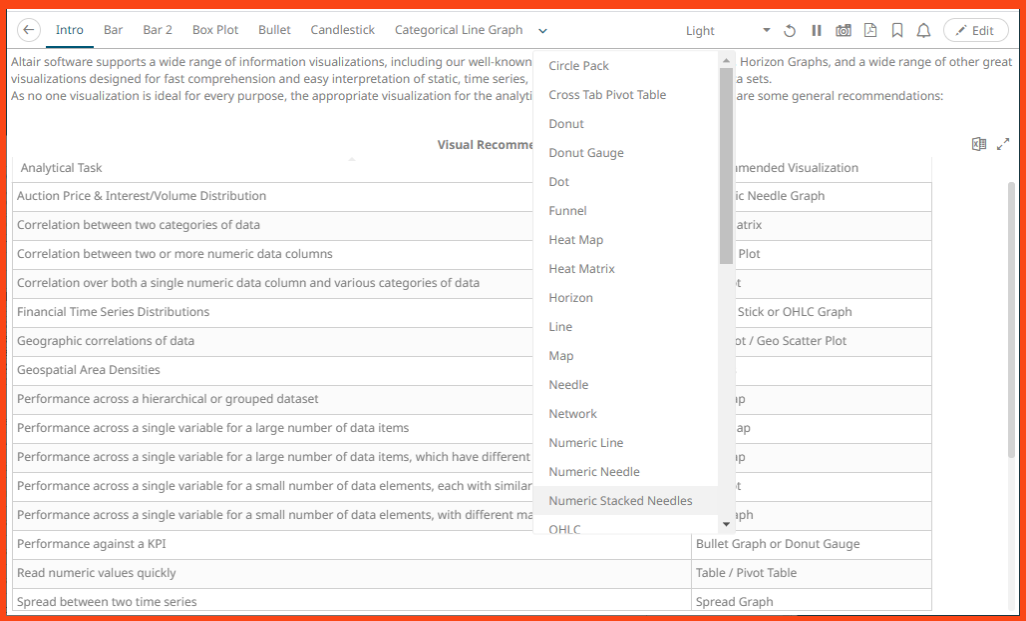


Clicking on the workbook thumbnail opens it on the *Open Workbook in View Mode*:



NOTE

The ▶ signifies there are more dashboards in a workbook that can be opened. Click this icon to expand the drop-down list and display all of the available dashboards and select one to display.



Opened workbooks are then displayed on the *Quick Access* pane.

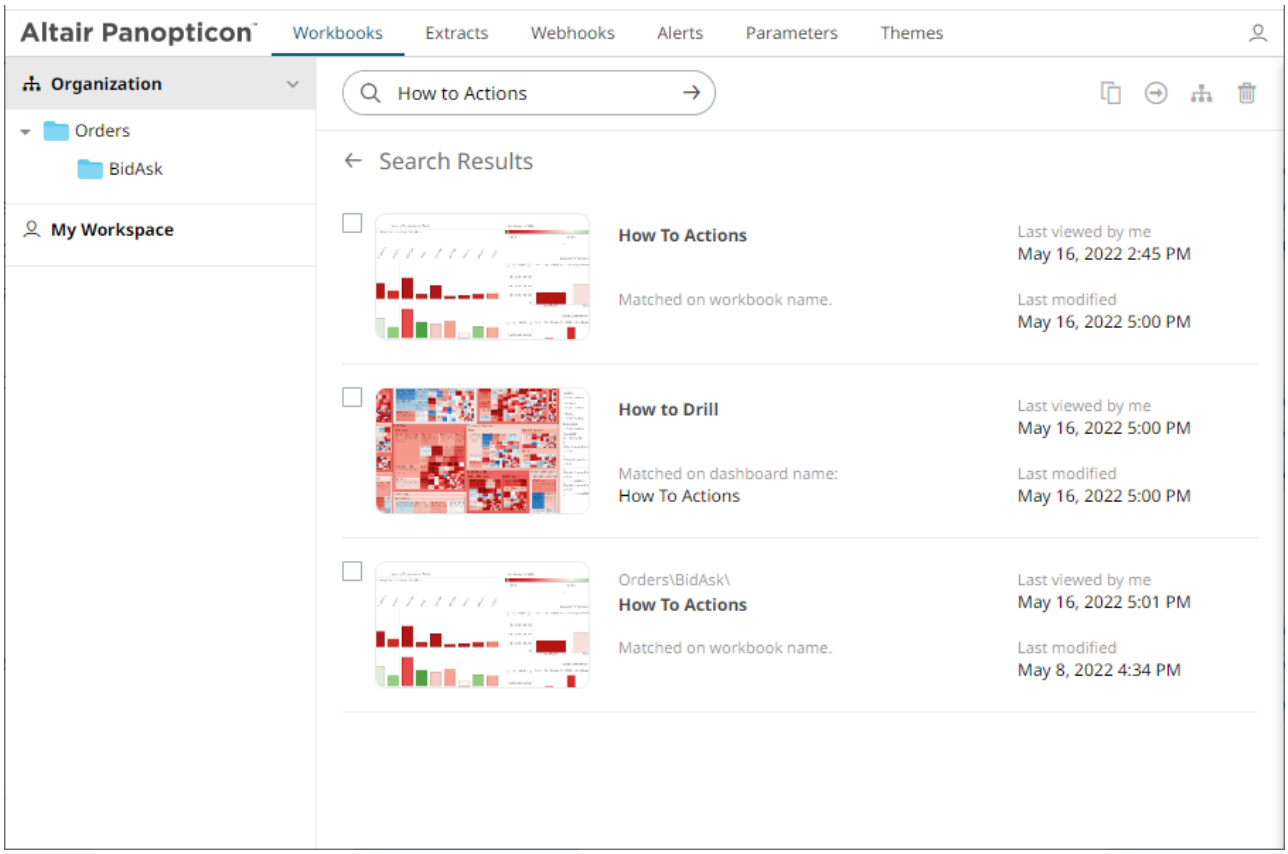
SEARCHING FOR WORKBOOKS

Search for particular workbooks that may be located in different folders and perform other operations like merge, copy, download, or remove.

Steps:

1. On the *Workbooks and Folders Summary* layout, click on a workbook folder then enter a workbook name or dashboard name in the *Search Workbook* box.

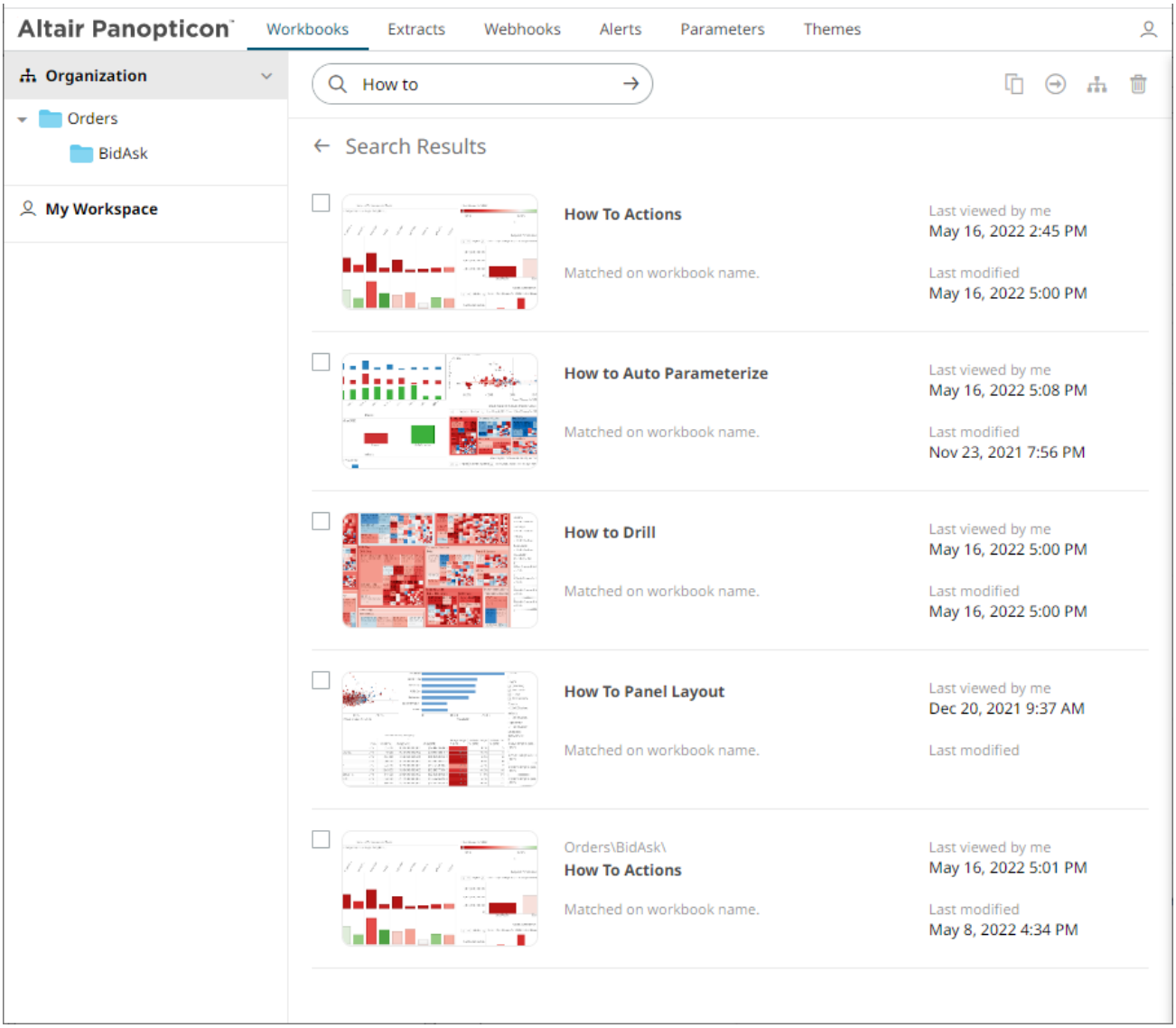
2. Click → .



The following information are displayed for each workbook:

- Folder where the workbook is located.
- What the search match was based on: workbook or dashboard name.
- Date/Time when the workbook was last viewed
- Date/Time when the workbook was last modified

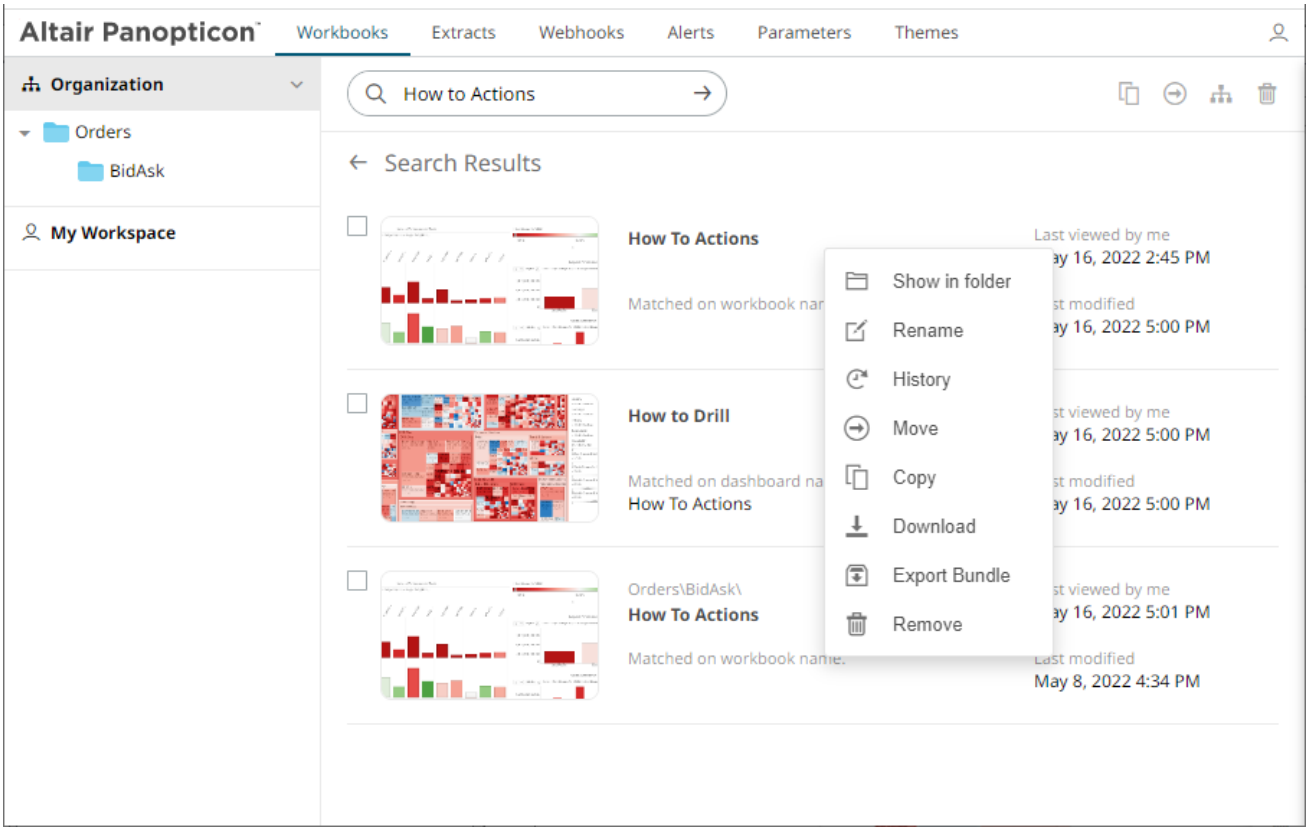
You can also enter one or more characters into the *Search Workbook* box then click **Enter**. The list of workbooks that matched the entries will be displayed.

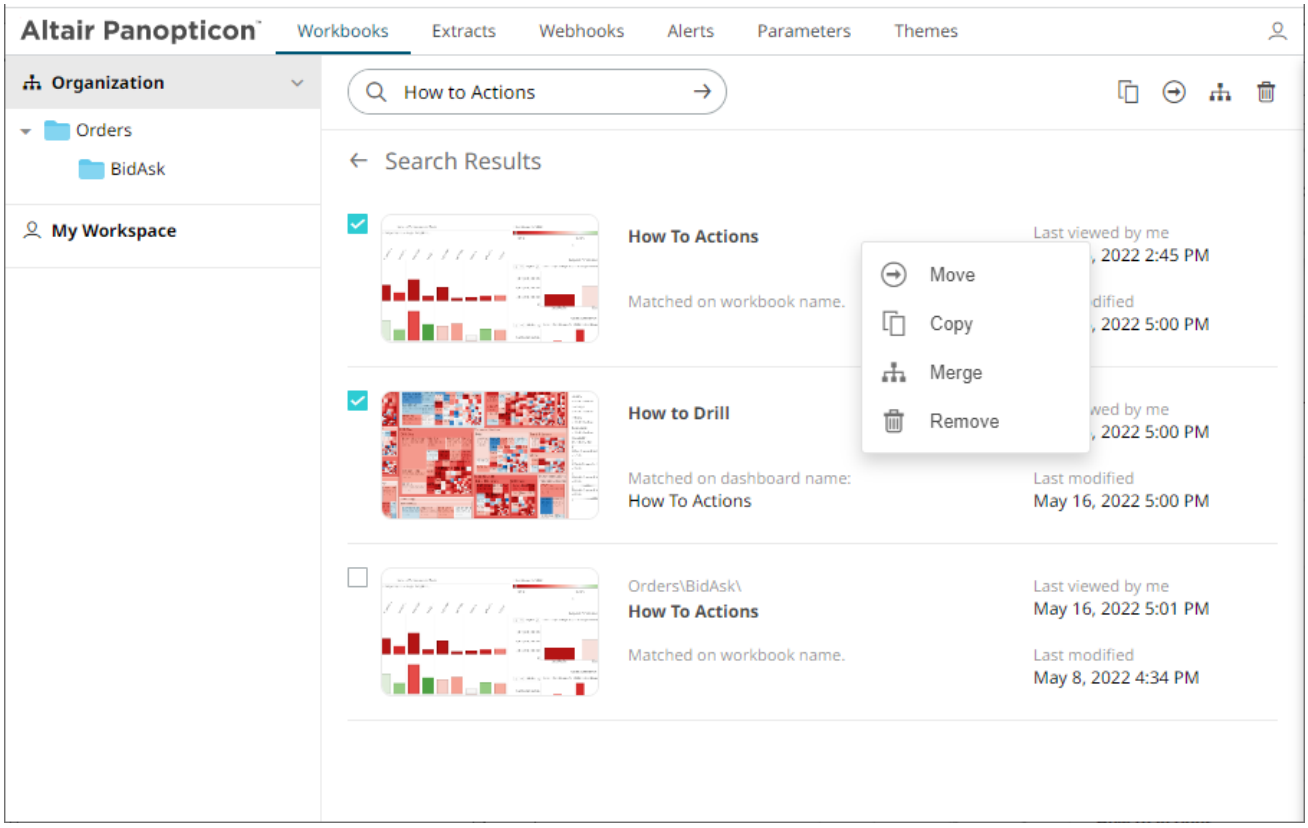


Click on a workbook thumbnail to open and display it on the Open Workbook in View Mode.

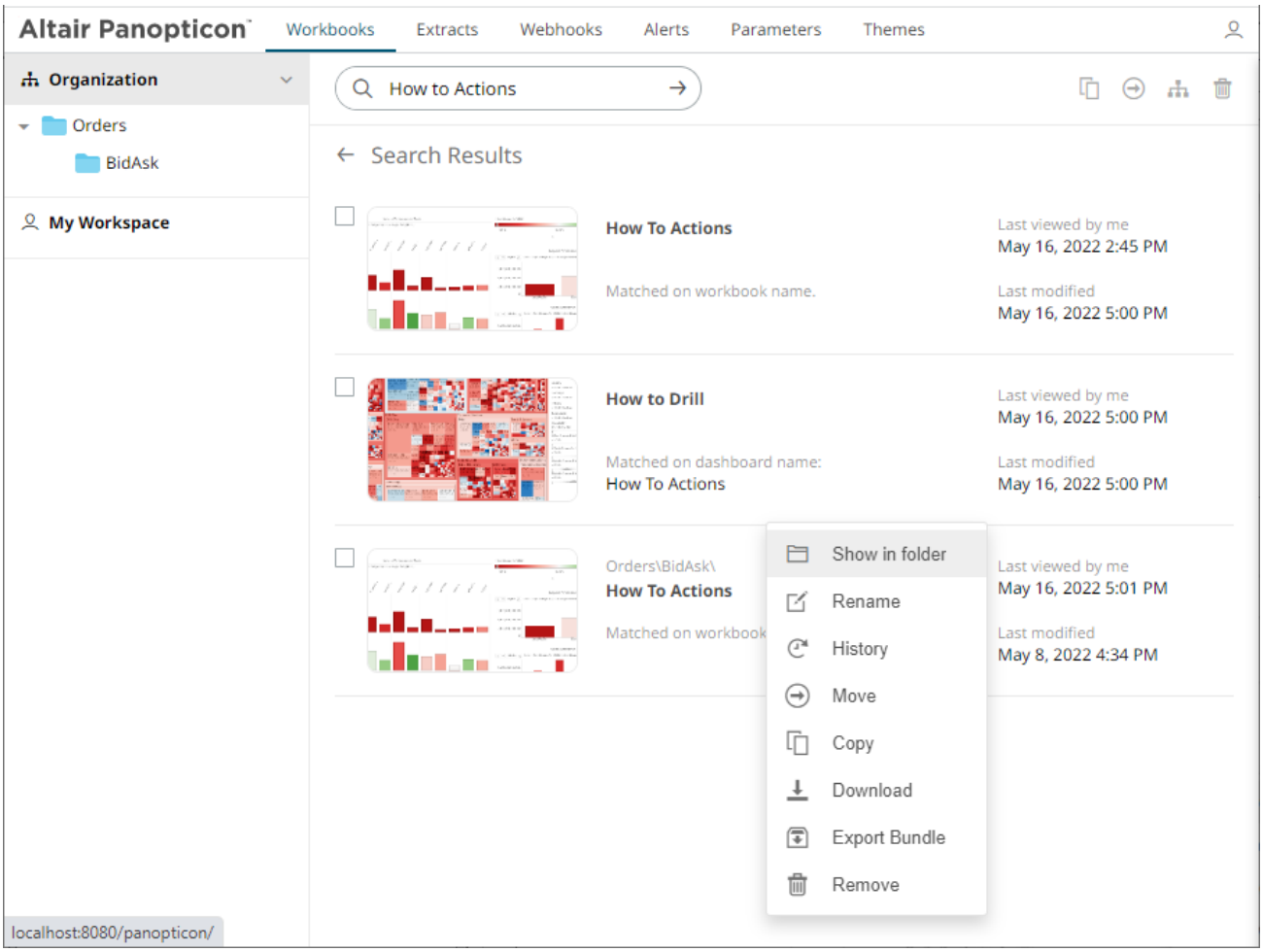
To go back to the *Workbooks and Folders Summary* layout, click ← .

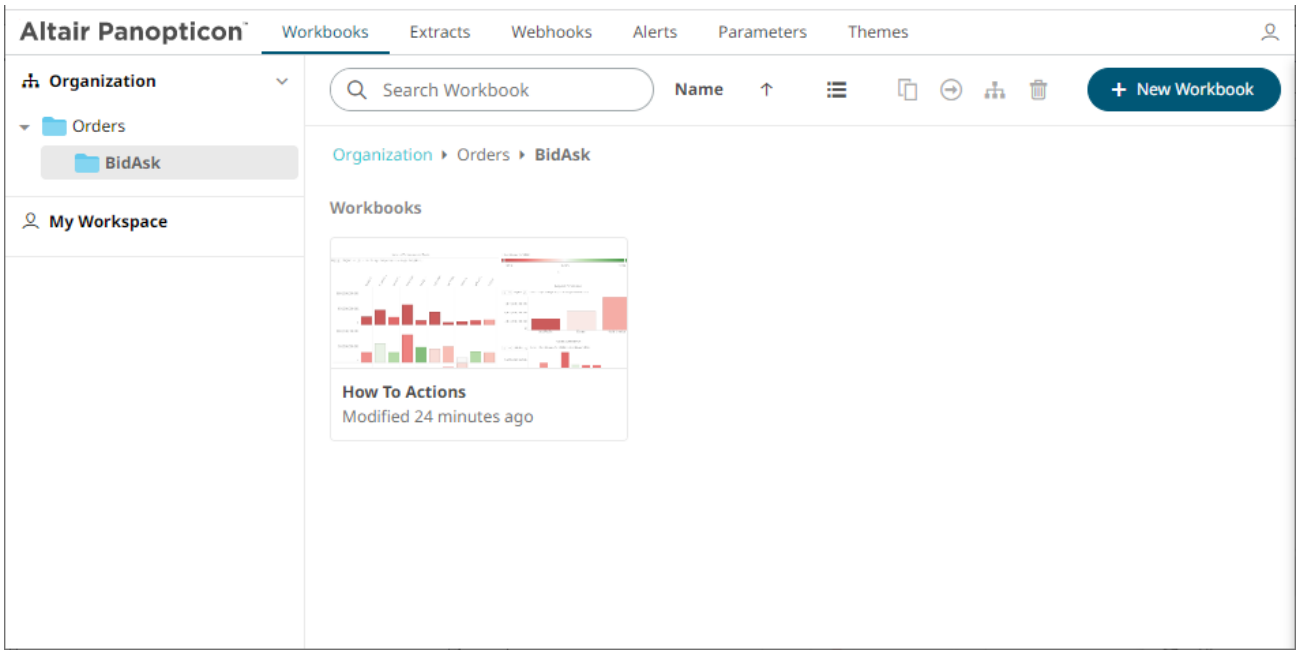
You may opt to right-click on a workbook or select several workbooks to display the context menu.





To display the workbook in its location, click **Show in Folder** on the context menu.



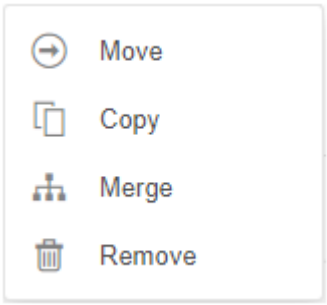


The other context menu options are discussed in the sections below.

WORKBOOKS TOOLBAR AND CONTEXT MENU

Moving, copying, merging, and removing workbooks can either be done using:

- Context menu



- Toolbar



The *Workbooks* toolbar options include:

Toolbar Option	Description
Sort By / Sort Order	Allows sorting workbooks by *Name* or what was *Last Viewed*.
Display View	Display workbooks either by *List View* or *Grid View*.
Copy	Copy a workbook to another folder or subfolder the user has permission to.
Move	Move a workbook to another folder or subfolder the user has permission to.
Merge	Import or merge workbooks.
Remove	Remove workbooks or folders.

The *Context Menu* options include:

Toolbar Option	Description
Copy	Copy a workbook to another folder or subfolder the user has permission to.
Move	Move a workbook to another folder or subfolder the user has permission to.
Merge	Import or merge workbooks.
Remove	Remove workbooks or folders.

Sorting Workbooks

Sorting workbooks can be done by *Name*, *Last Modified/Last Published*, or *Last Viewed by Me*.

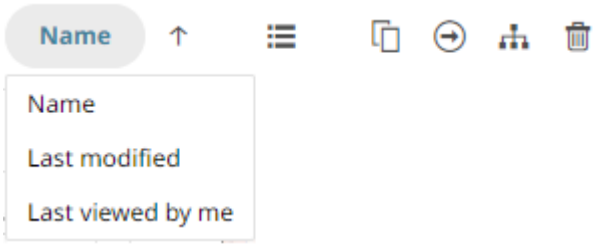
Sorting Option/Column	Default Sort Order
Name	Ascending
Last Modifed	Descending
Last Viewed By Me	Descending
Last Published	Descending

Steps:

On the *Folders and Workbooks Summary* layout, either:

- click the **Sort By** option on the *Toolbar* of the *Grid View*

  By default, the sorting is by **Name** in ascending order.

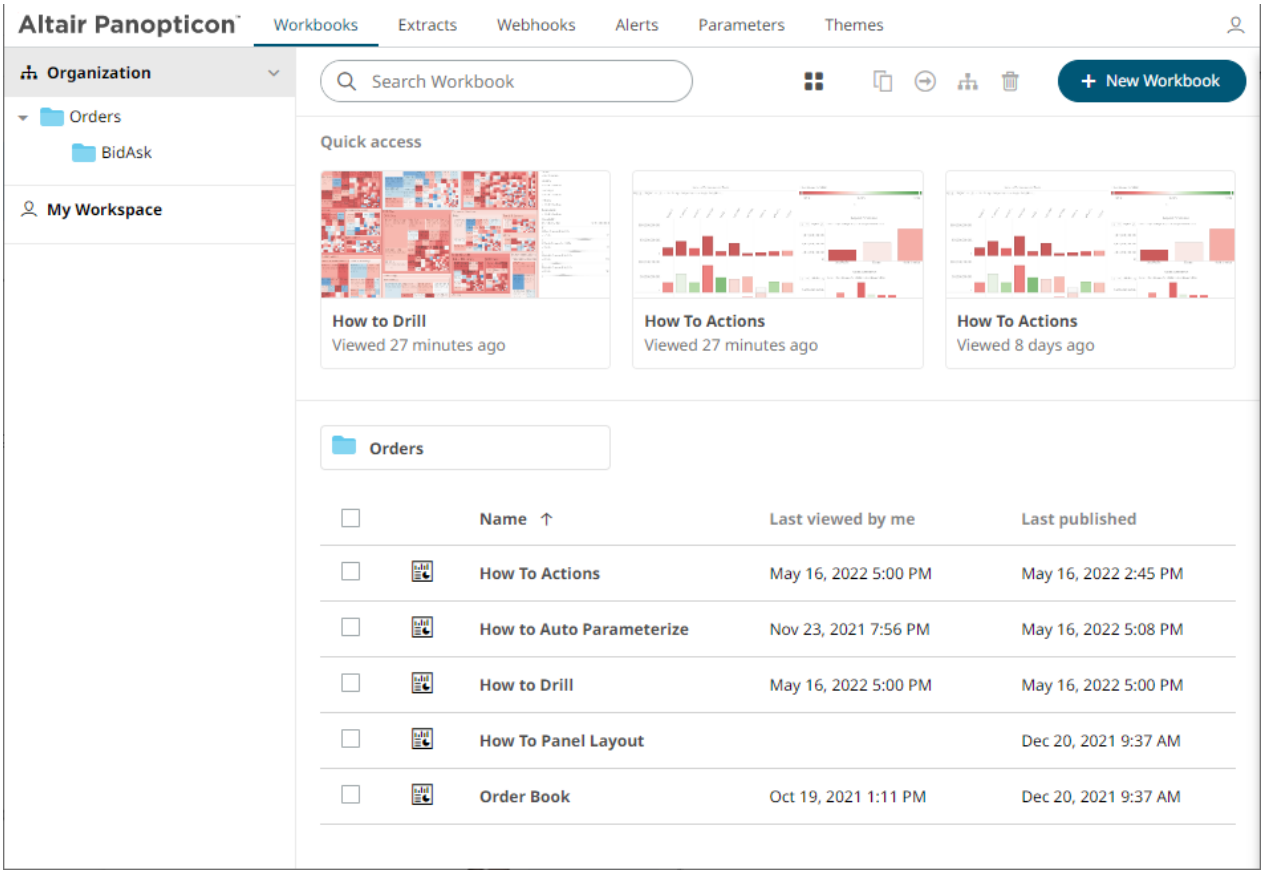
  

  - Name
  - Last Modified
  - Last Viewed By Me

  Then click the *Sort Order*:

  -  Ascending
  -  Descending

- click on the **Name**, **Last Viewed By Me**, or **Last Published** column header of the *List View*



Then click the *Sort Order*:

- Ascending
- Descending

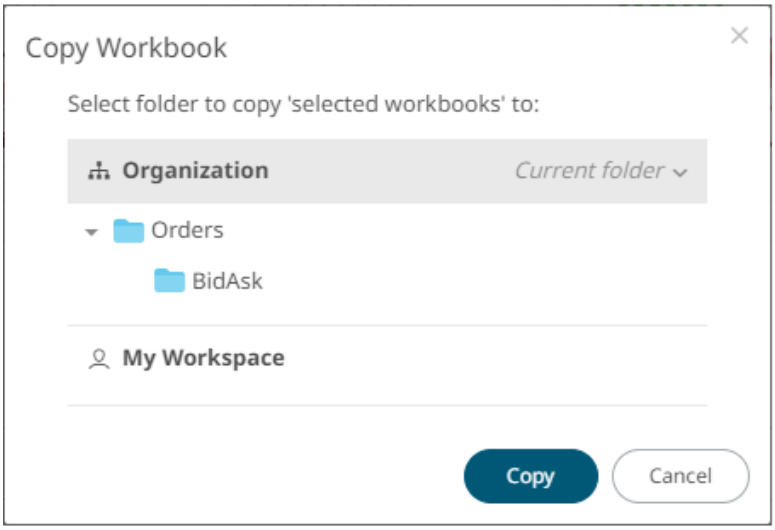
Copying Workbooks

Users with a Designer role are allowed to copy workbooks to another folder or subfolder that they have permission.

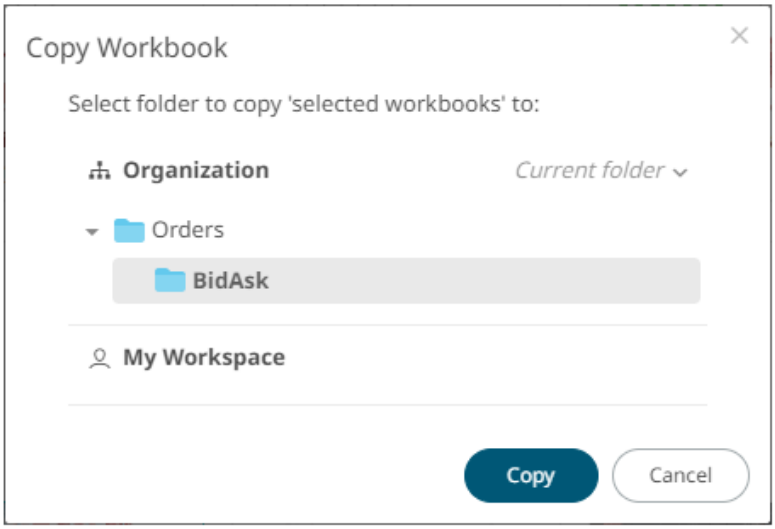
Steps:

1. On the *List* or *Grid* view, select one or several workbooks then:
   - right-click and select **Copy** on the context menu, or
   - click the **Copy** icon on the toolbar.

   The *Copy Workbook* dialog displays with the folder or subfolders the user is allowed to copy the workbooks to.



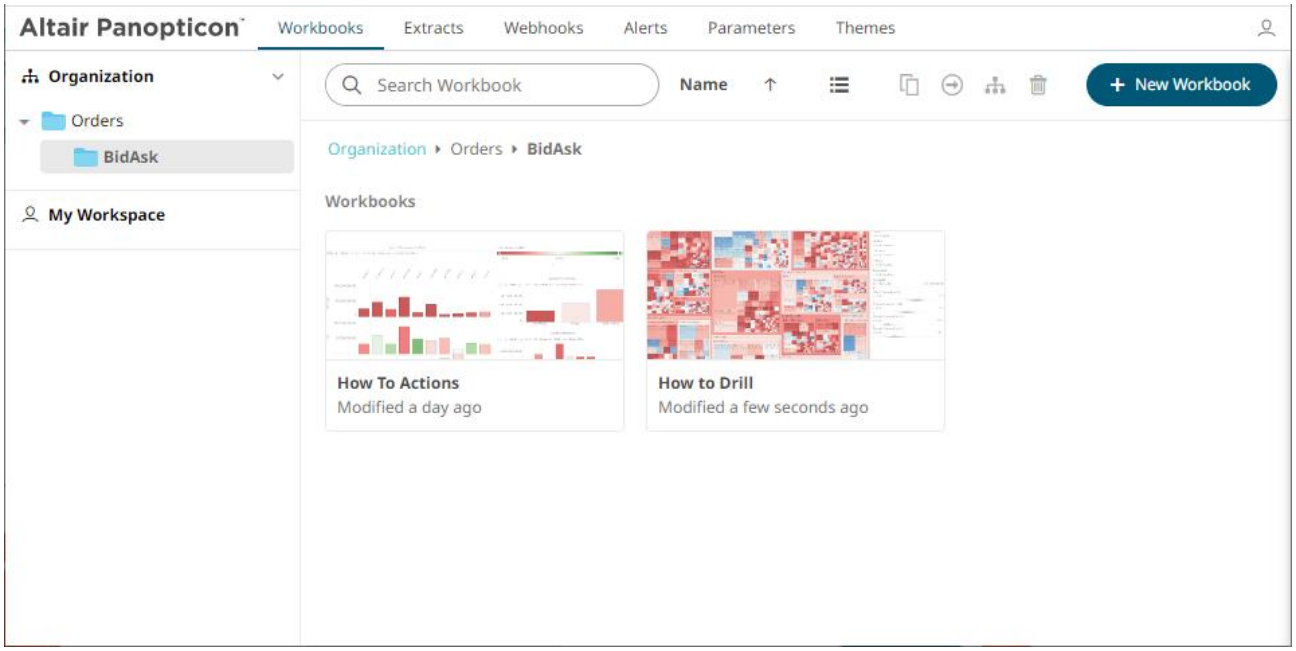
2. Select the folder or subfolder.



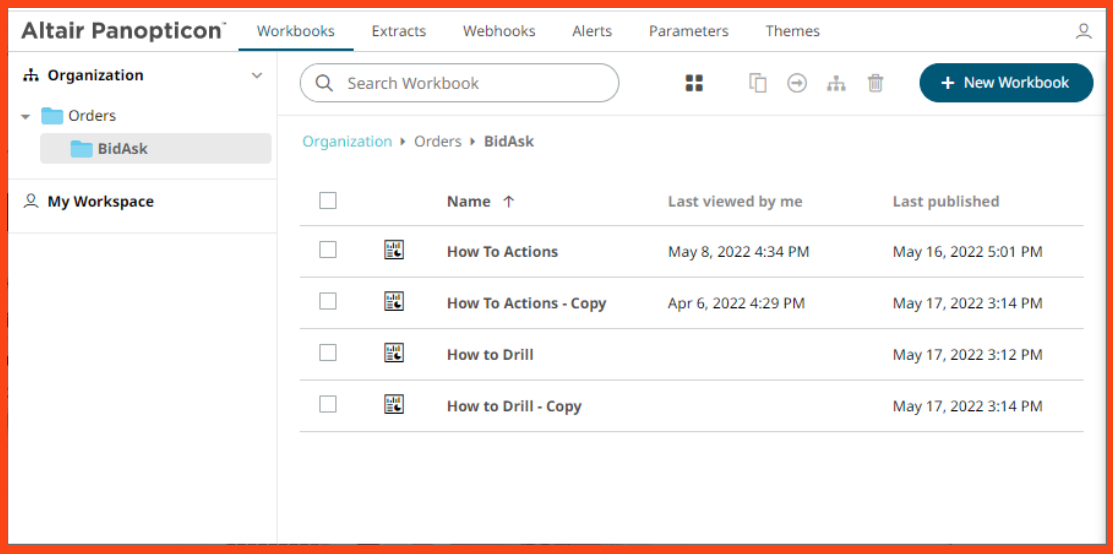
3. Click 

.

The workbooks are copied to the selected folder.



NOTE **If workbooks with the same name are already in the selected folder, a copy of the workbooks are added.**



Moving Workbooks

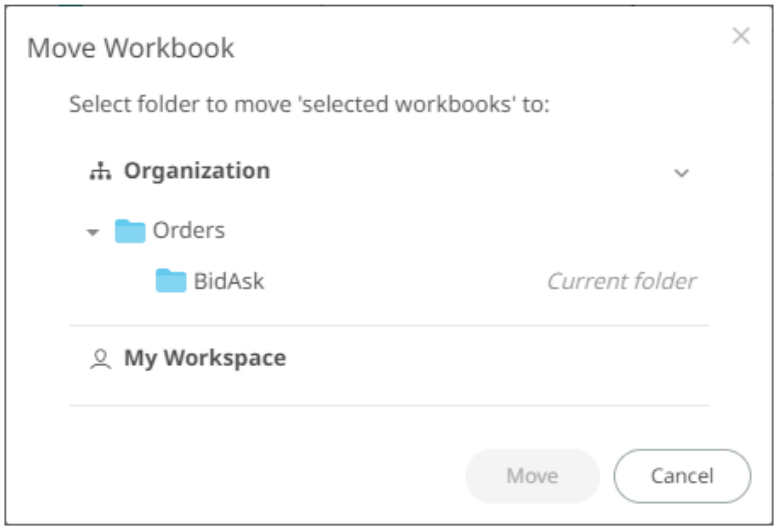
Users with a Designer role are allowed to move workbooks to another folder or subfolder that they have permission.

Steps:

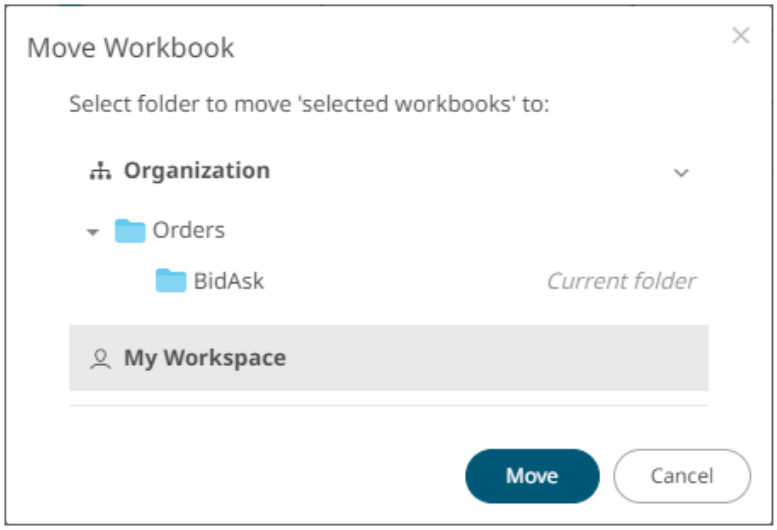
1. On the *List* or *Grid* view, select one or several workbooks then:
   - right-click and select **Move** on the context menu, or

- click the **Move**  icon on the toolbar.

The *Move Workbook* dialog displays with the folder or subfolders that the user is allowed to move the workbook.

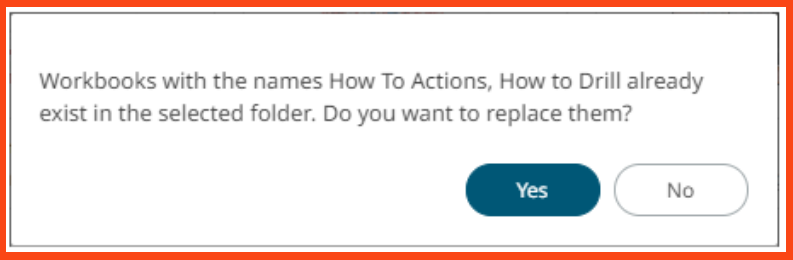


2. Select the folder or subfolder.



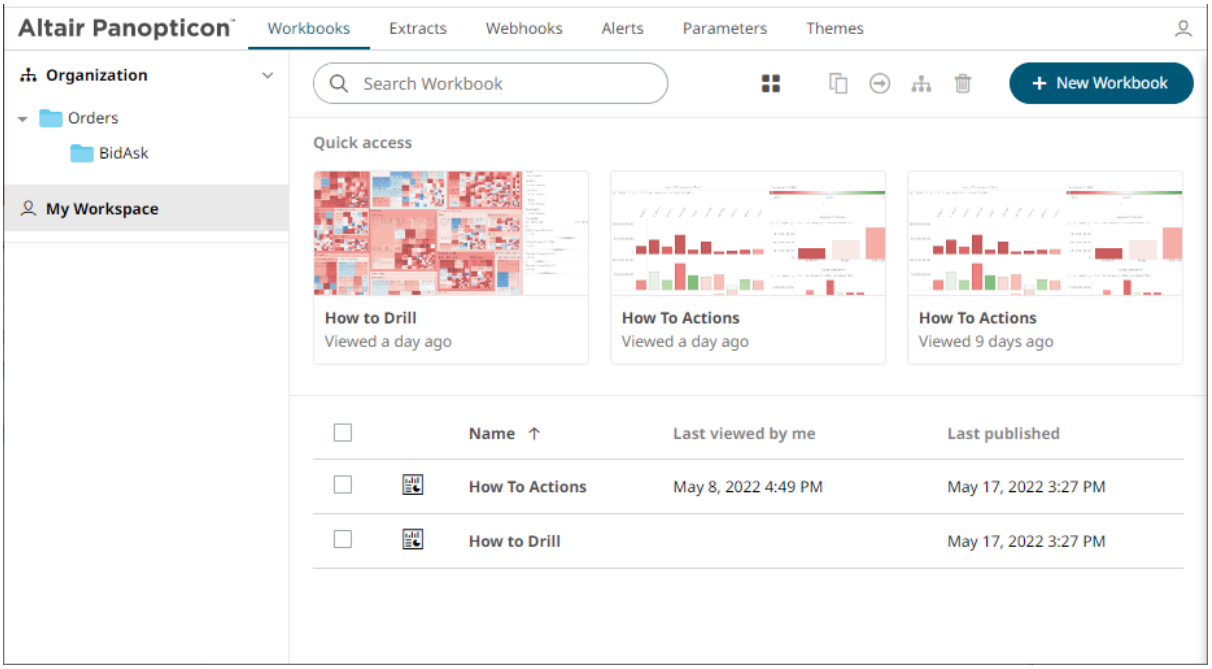
3. Click  .

NOTE **If workbooks with the same name are already in the selected folder, a notification message displays if they will be replaced.**



Click Yes to replace a copy of the same workbooks.

The workbook is moved to the selected folder.



Deleting Workbooks or Folders

Users with a Designer role have the ability to remove workbooks or folders.

NOTE

- **Folders and subfolders can be deleted as long as they do not contain workbooks.**
- **Removing folders and workbooks cannot be done simultaneously.**

Steps:

1. On the *List* or *Grid* view, check the box of workbooks or folders then:
   - right-click and select **Remove** on the context menu, or

- click the **Remove** icon on the toolbar.

2. Click on the toolbar.

   A notification message displays.





3. Click Yes to remove.

Merging or Importing Workbooks

Existing workbooks can be imported into another open workbook, merging their dashboards together.

For example, the *How to Actions* workbook has eight dashboards, while *How to Drill* has two dashboards. Follow the steps below to import the eight dashboards and the associated data tables of *How to Actions* to *How to Drill*.

Steps:

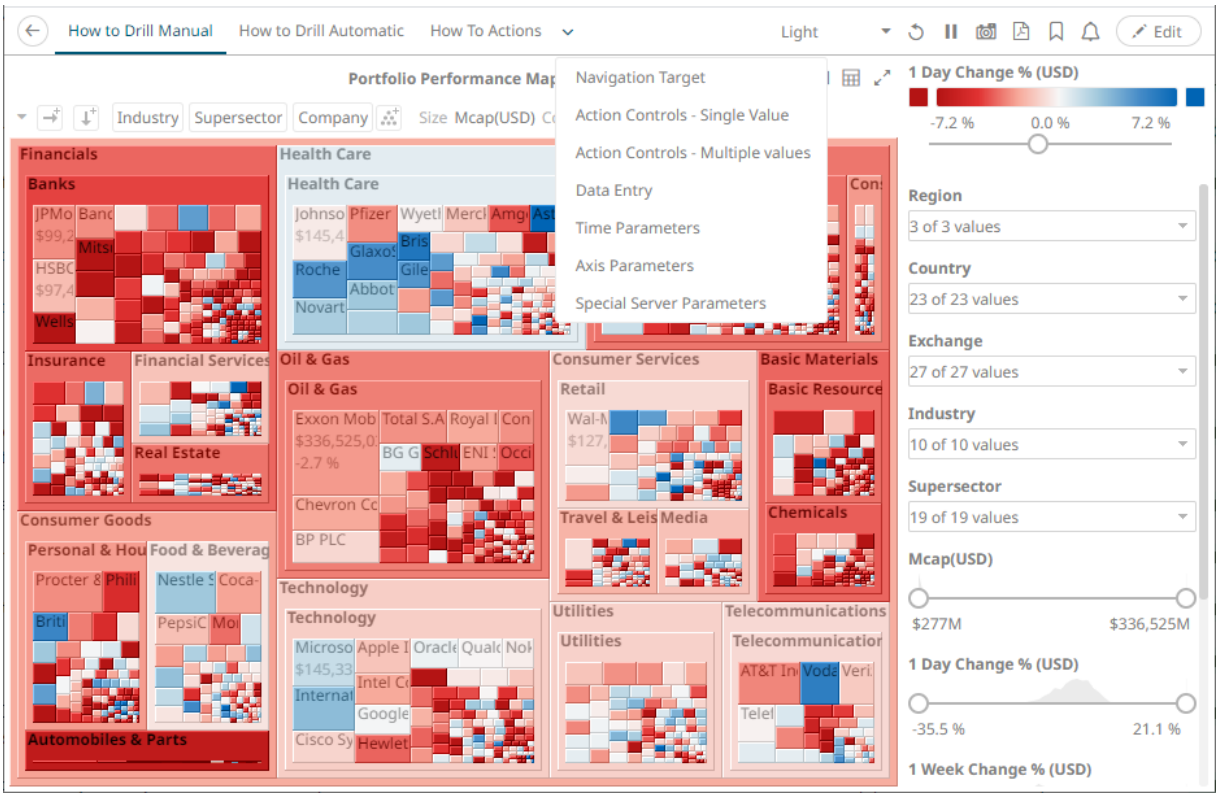
1. On the *List* or *Grid* view, check the boxes of multiple workbooks then:
   - right-click and select **Merge** on the context menu, or
   - click the **Merge** icon on the toolbar.

   The *Select Merge Target* dialog displays.



2. Select the target workbook (i.e., **How to Drill**) where the dashboards will be imported.
3. Click Merge.

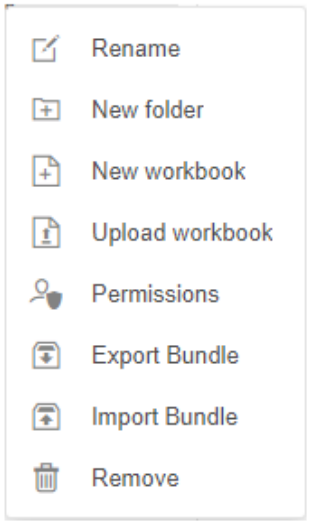
   The dashboards and data tables from *How to Actions* are now added to the *How to Drill* workbook.



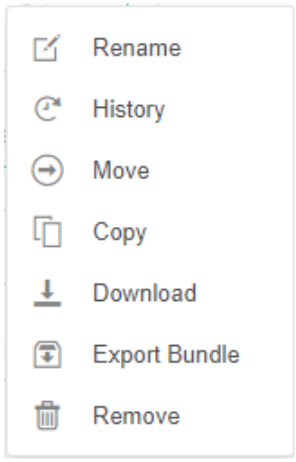
NOTE **Dashboard parts and actions, that reference a data table that needs a new Id/name, will update the data table reference to point to the correct one.**

WORKBOOK AND FOLDER CONTEXT MENU

The *Workbooks* page provides context menu in each folder or subfolder and the workbooks.



Workbook Folder or Subfolder Context Menu



Workbook Context Menu

The *Workbooks* page context menu options include:

Menu Option	Description
Rename	Rename the workbook or subfolder.
History	View workbook history and republish.
Move	Move a workbook to another folder or subfolder the user has permission to.
Copy	Copy a workbook to another folder or subfolder the user has permission to.
Download	Download a copy of the workbook.
Export Bundle	Export a bundle of the workbook including the data files.
Remove	Delete the workbook or folder.

Additional context menu options are available for the workbook or subfolder:

Menu Option	Description
New Folder	Create a new workbook folder and assign the allowed or denied groups and users.
New Workbook	Create a new workbook.
Upload Workbook	Upload workbooks.
Permissions	Define the allowed or denied subfolder or personal folder permissions.
Import Bundle	Import the folder or subfolder bundle.

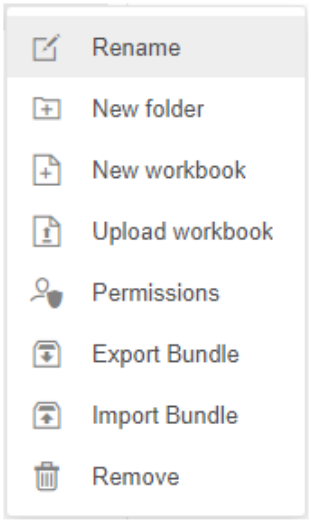
Renaming Workbooks or Folders

A user with Designer role can rename workbooks and folders.

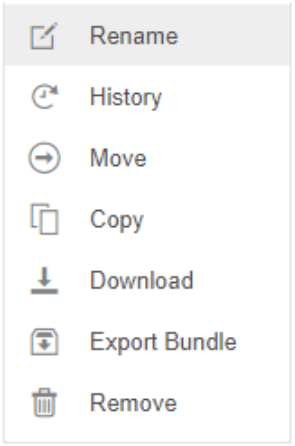
NOTE **The root folder cannot be renamed.**

Steps:

1. Right-click on a workbook or folder then select **Rename** on the context menu.

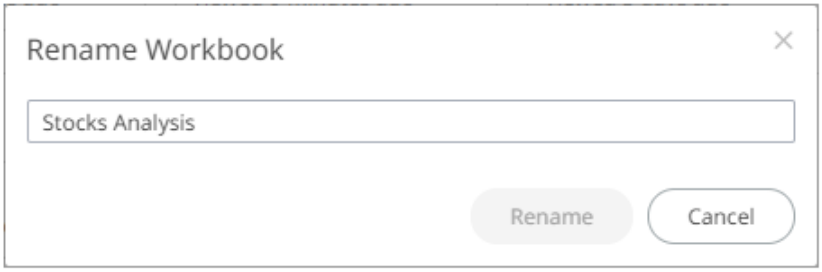


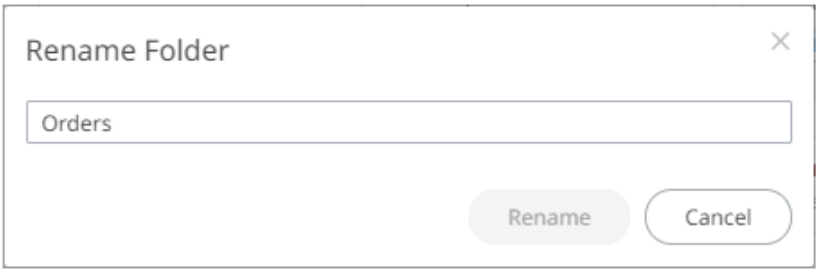
Workbook Folder or Subfolder Context Menu



Workbook Context Menu

The *Rename Workbook* or *Rename Folder* dialog displays, respectively.





2. Enter a new name then click 

.

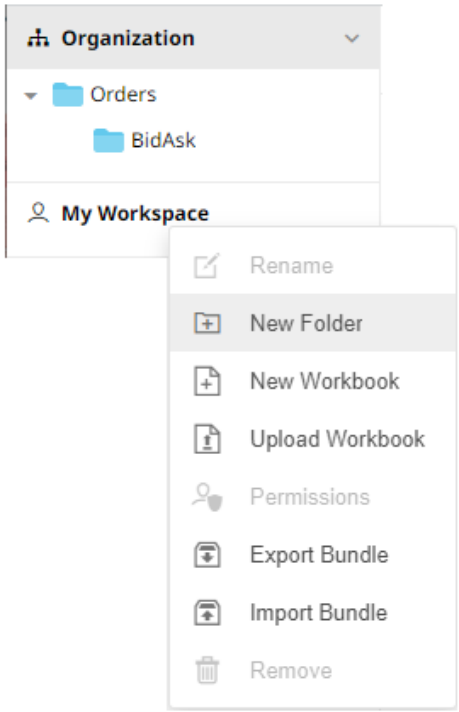
Creating Folders

A user with a Designer role can create folders.

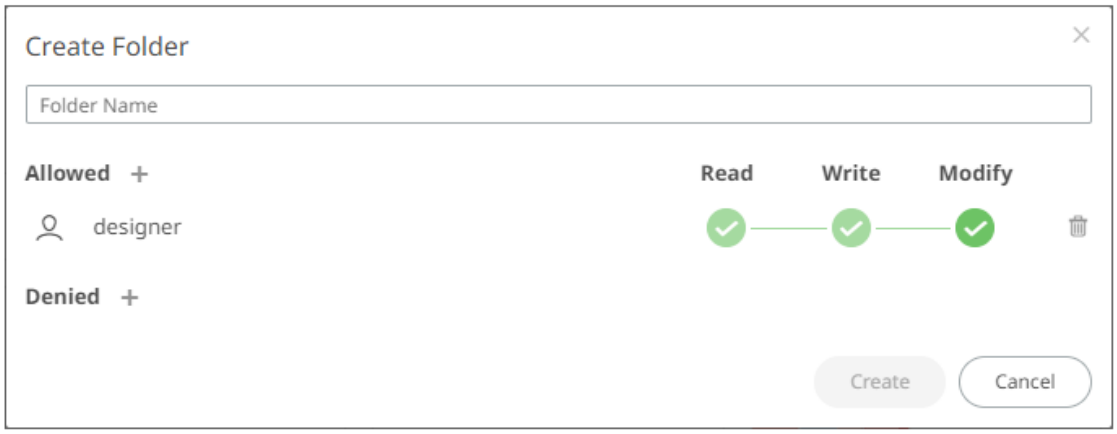
> **NOTE** **Users that log on with a Designer role:**
>
> - **will have their own personal folder created and displayed on the *Workbooks* page (e.g., ~designer). This personal folder is where Designers can create workbooks and build dashboards.**
> - **is not allowed to create a folder on the root folder.**

Steps:

1. On the **Workbooks** tab, right-click on the personal folder, and select **New Folder**.



The *Create Folder* dialog displays.

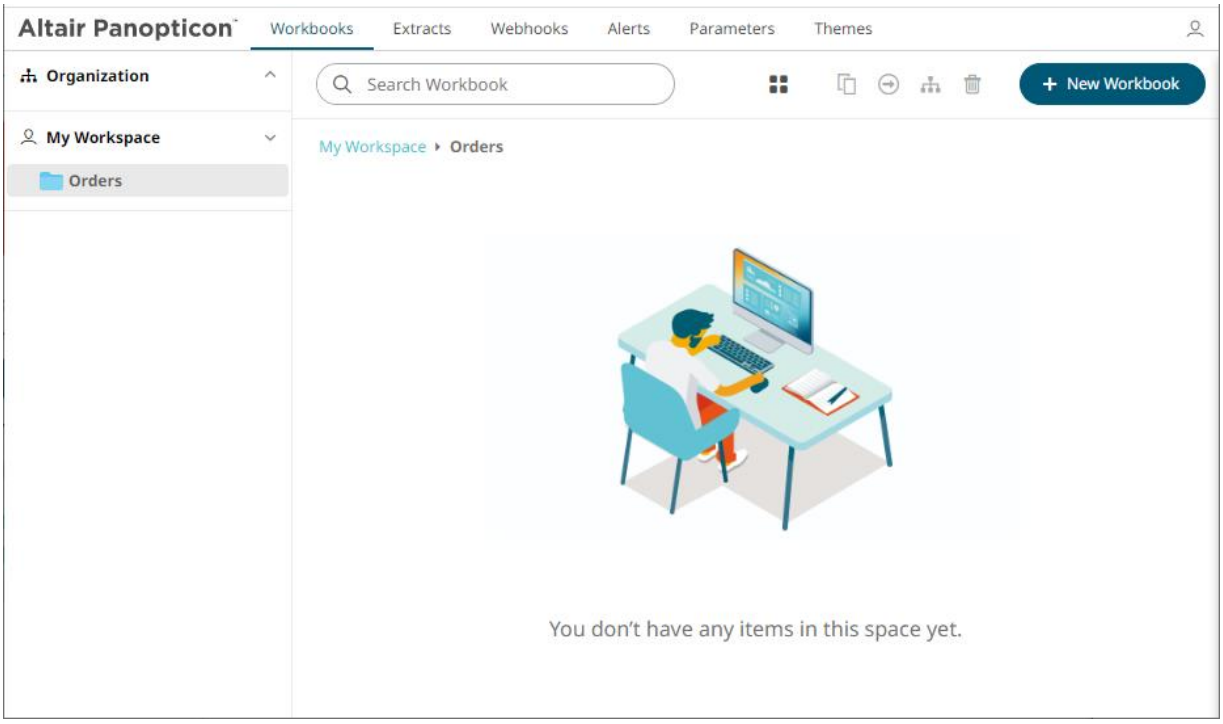


NOTE

- **The Designer user is available under the *Allowed* section by default with Read, Write, and Modify permissions.**
- **Removing the Designer user will mean they will not have access to this folder and its subfolders.**

2. Enter a *Folder Name*.
3. Proceed to defining the authorization to *Allowed* or *Denied* groups and users.
4. Click Create.

   The new folder is displayed on the expanded *Folder* hierarchy list and on the *Folders/Workbooks* list.



NOTE

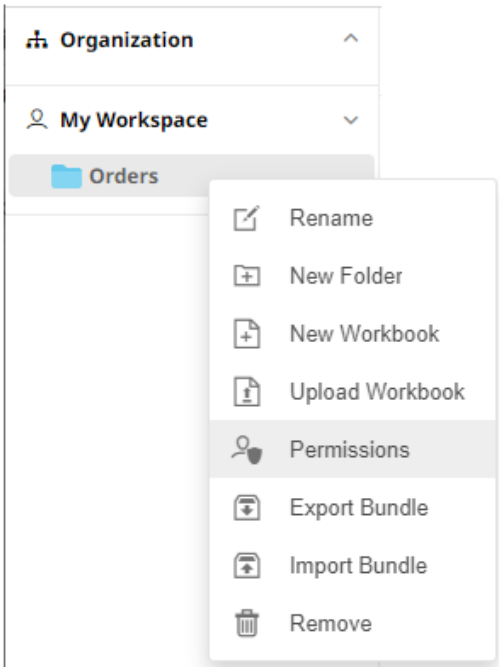
- **Folders and subfolders can be deleted as long as they do not contain published workbooks.**
- **The folders and subfolders on the Workbooks tab will also be available on the Extracts and Webhooks tabs.**

Adding Groups and Users with Allowed Authorization

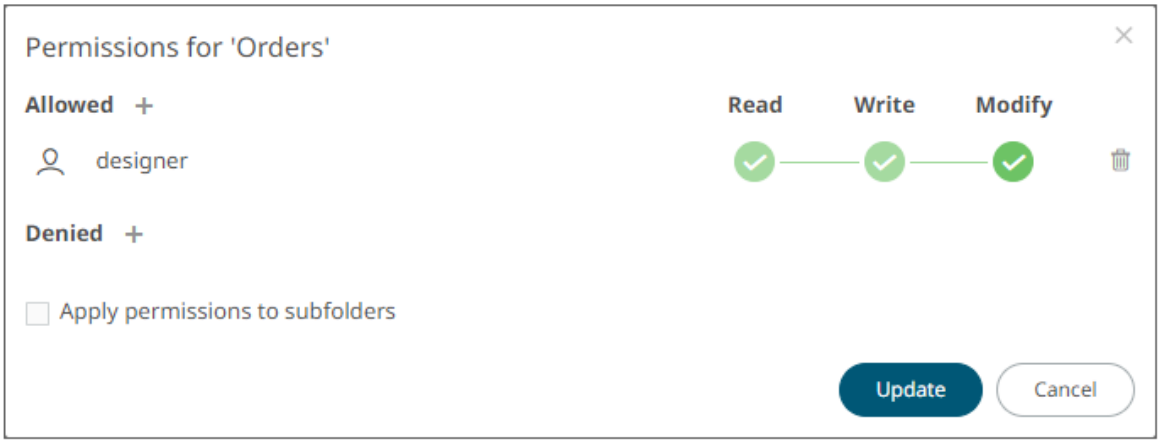
A user with a Designer role can grant permissions for users or groups to a workbook folder or subfolder.

Steps:

1. Right-click on a folder and select **Permissions** on the context menu.



The *Permissions* dialog displays.



2. Under the *Allowed* section, click the **Add** icon.

   A new *User/Group Allowed* section is displayed.



3. Select **User** or **Group** to be given permission in the drop-down list.



4. Enter the user or group *Name*.
5. Select the permission level that will be granted to the user or group:
   - READ

     Permission to read the folder.
   - READ + WRITE

     Permission to write to the folder and read.
   - MODIFY + WRITE + READ

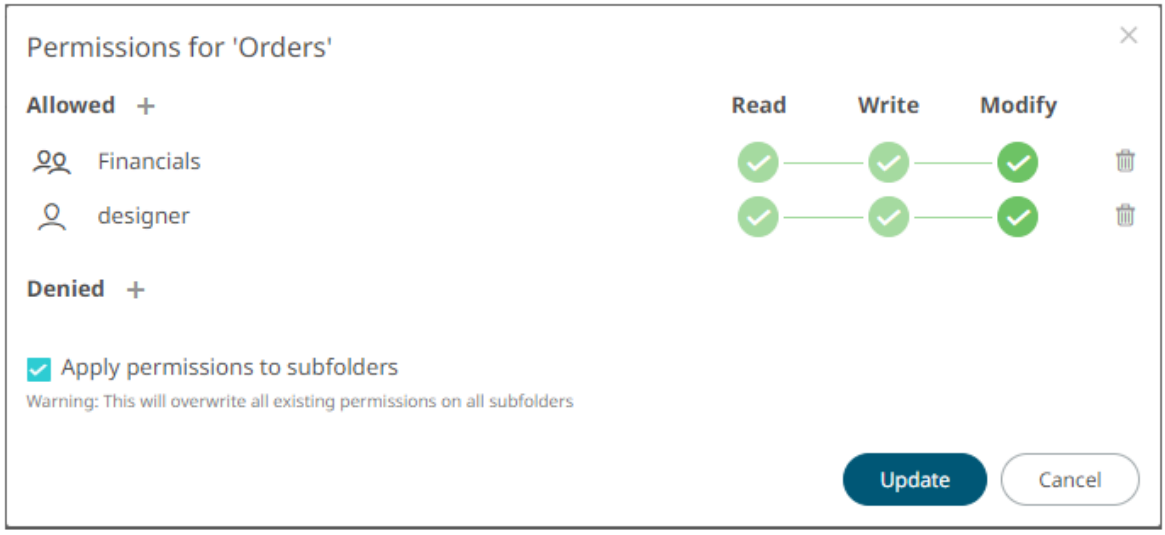
     Permission to read, modify, and write to the folder as well as create subfolders.



6. Click ✓ . The user or group is added under the *Allowed* list.



7. You can either:
   - check the **Apply Permissions to Subfolders** box



This means the permissions that will be used on all of the subfolders will be fetched from the parent folder.

NOTE **The Apply Permissions to Subfolders check box is only enabled when there is an existing subfolder.**

- leave the **Apply Permissions to Subfolders box** unchecked and modify the permission properties of the subfolders

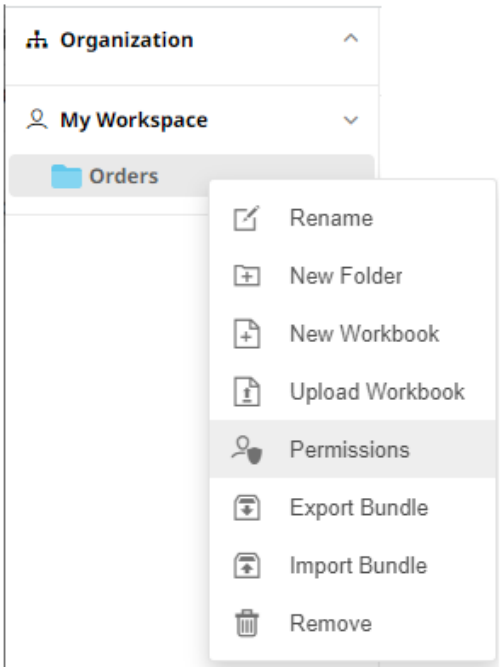
8. Click Update to save the changes.

NOTE **A user with a Designer role is allowed not to grant himself permission to have access on folders or subfolders. This can be done either by granting permission to users or groups that they are not included or adding himself to the list of denied users or groups.**

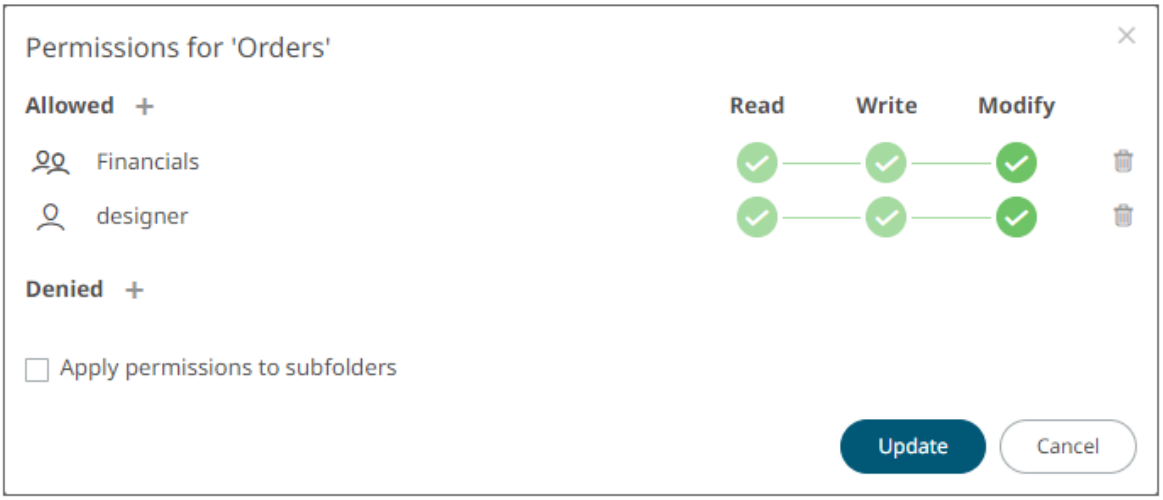
Adding Groups and Users with Denied Access

Steps:

1. Right-click on a folder and select **Permissions** on the context menu.

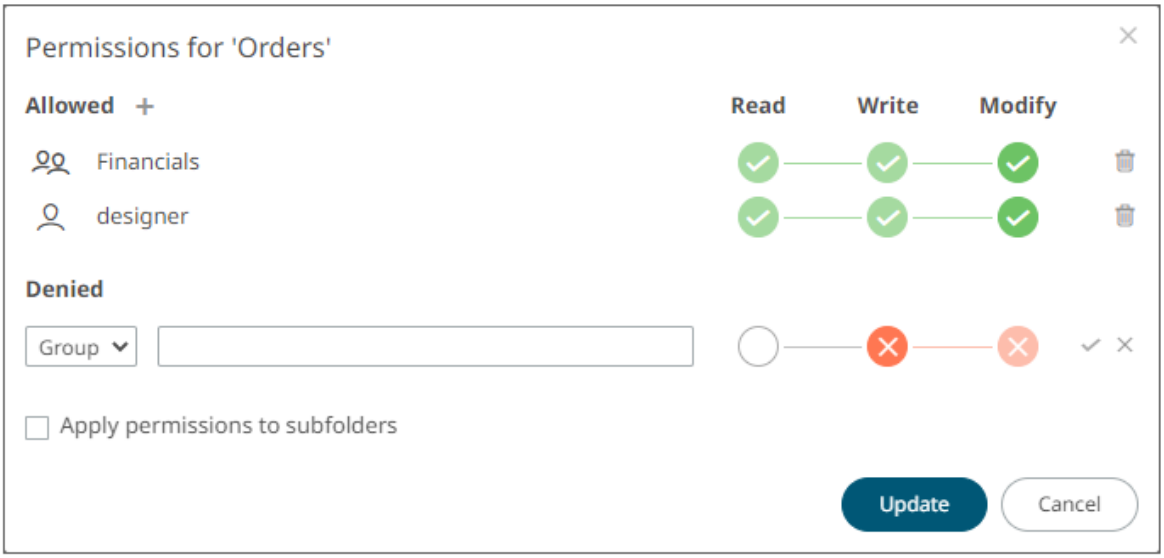


The *Permissions* dialog displays.



2. Under the *Denied* section, click the **Add** icon.

   A new *User/Group Denied* section is displayed.



3. Select **User** or **Group** that will be given denied permission in the drop-down list.
4. Enter the user or group *Name*.
5. Select the denied permission level that will be grated to the user or group:
   - MODIFY

     Prevent user or group to modify and create subfolders.
   - WRITE + MODIFY

     Prevent user or group to modify and write to the folder.
   - READ + WRITE + MODIFY

     Prevent user or group to modify and create subfolders, modify and write to the folder, as well as read the folder.



6. Click ✓ . The user or group is added under the *Denied* list.



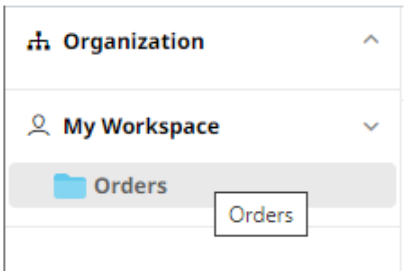
Repeat until all of the users with denied access are added.

7. Click Update to save the changes.

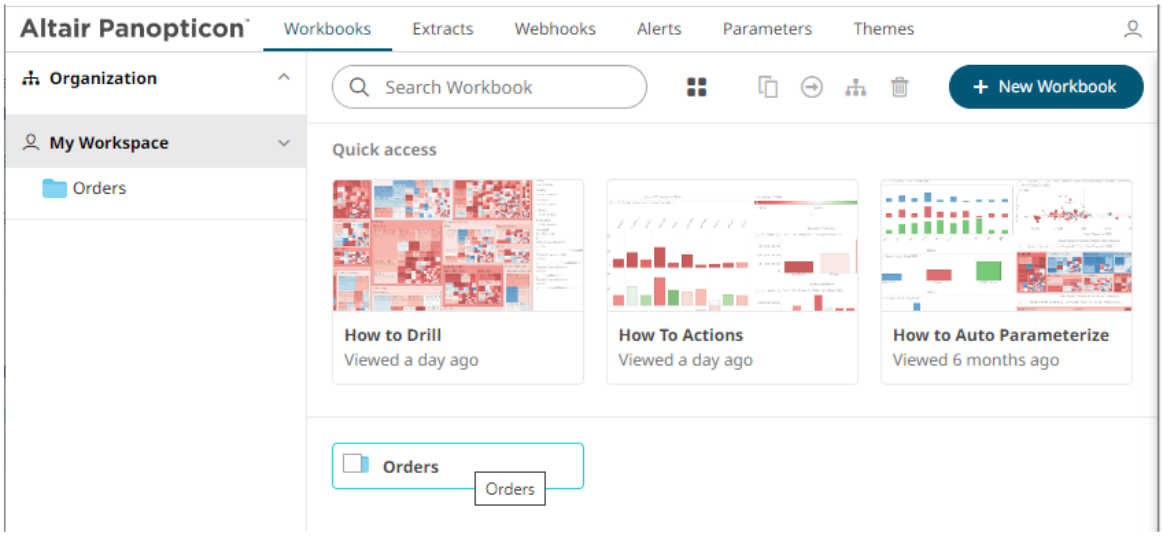
Creating Subfolders

Steps:

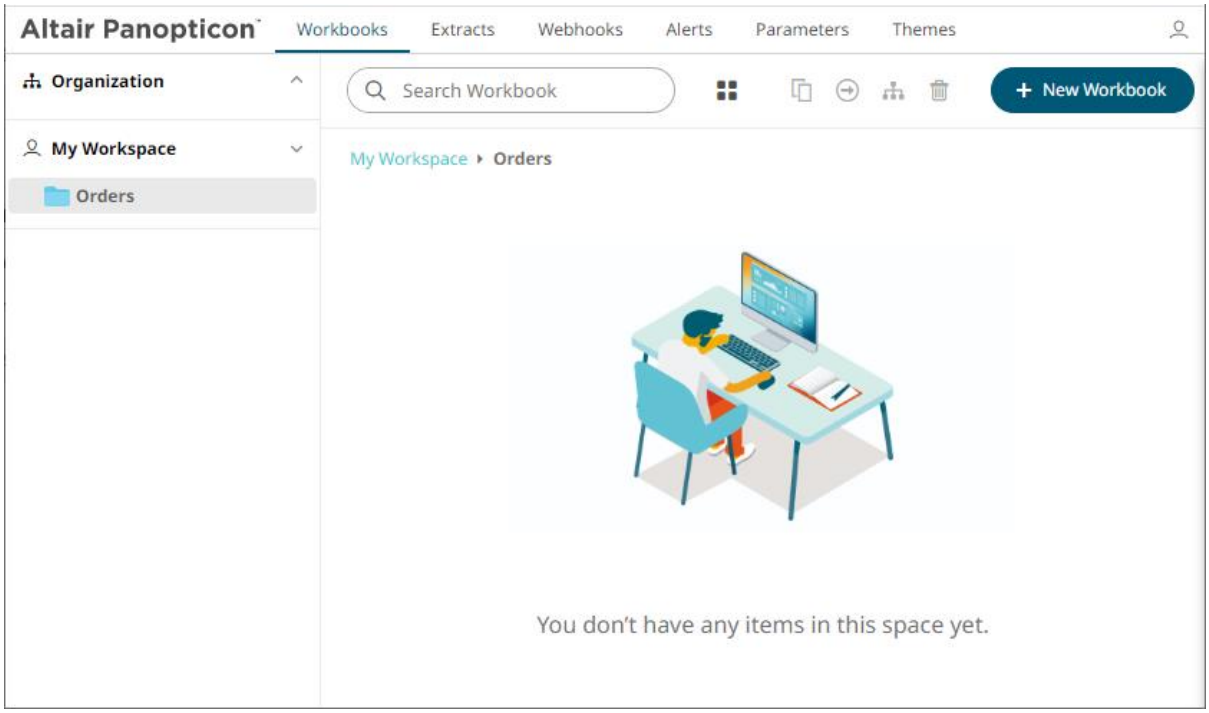
1. To create subfolders, you can either click a folder:
   - on the expanded *Folder* hierarchy list



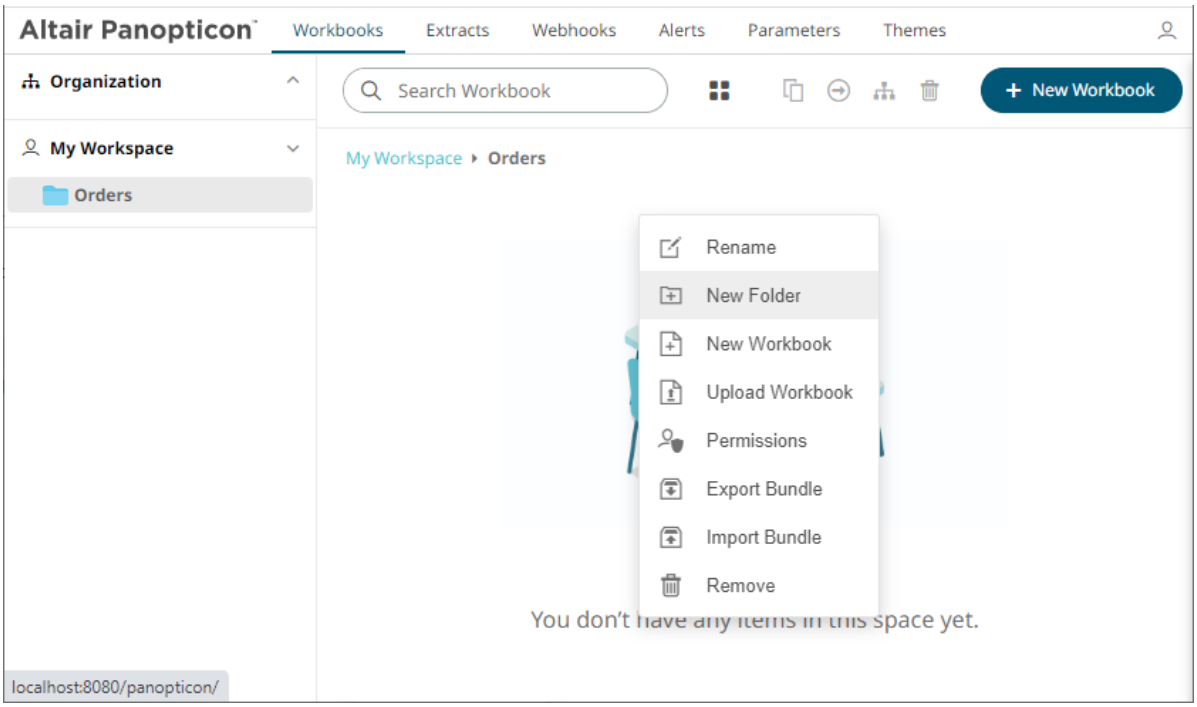
   - on the workbooks/folders list



The *Folders* page is displayed.

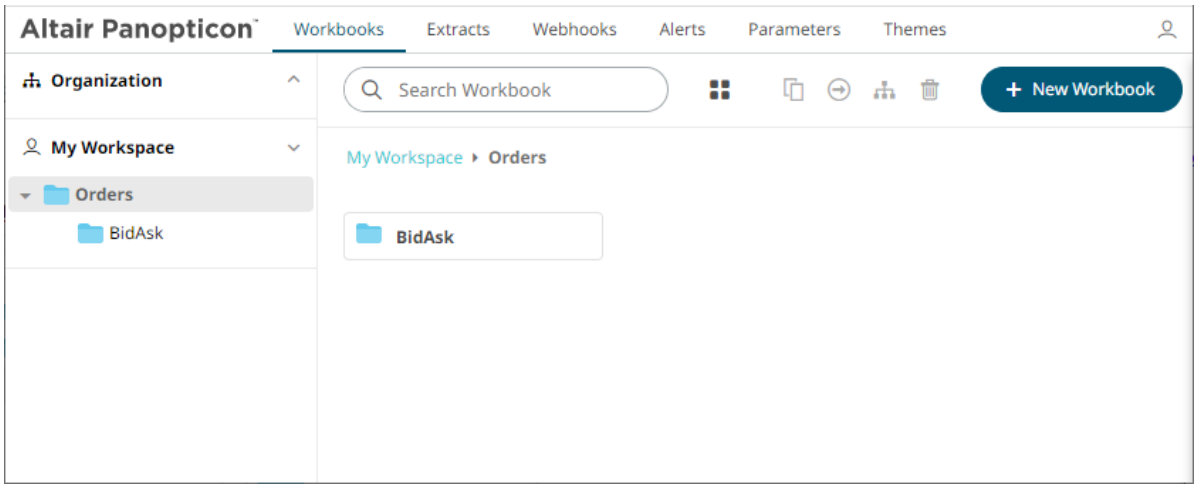


2. Right-click on the folder and select **New Folder**.

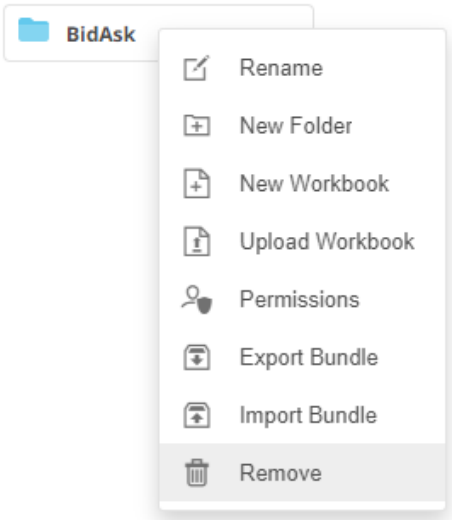


Refer to Creating Folders for the steps in creating the subfolders. Also, Adding Groups and Users with Allowed Authorization and Adding Groups and Users with Denied Access for more information on adding Users and Groups with allowed or denied authorization.

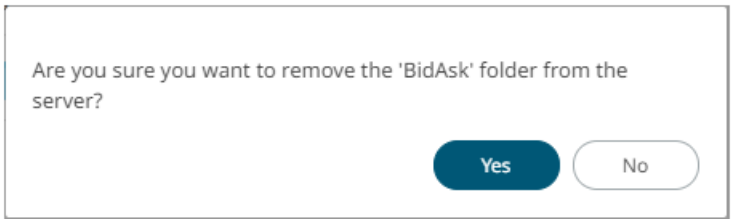
The subfolder is added.



3. You can also opt to delete a subfolder by right-clicking on the folder and selecting **Remove** on the context menu as long as it does not contain published workbooks.



A confirmation message displays.



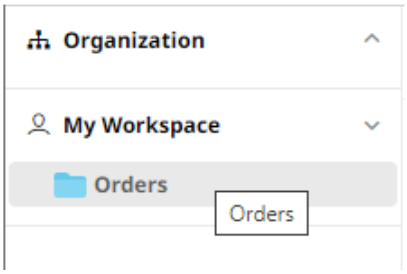
Click 

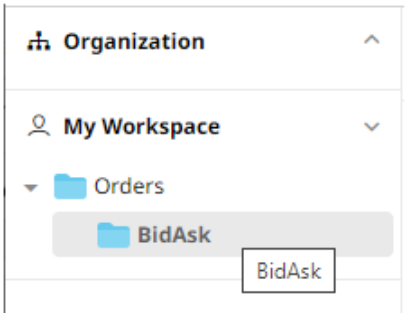
.

Updating Folder or Subfolder Properties

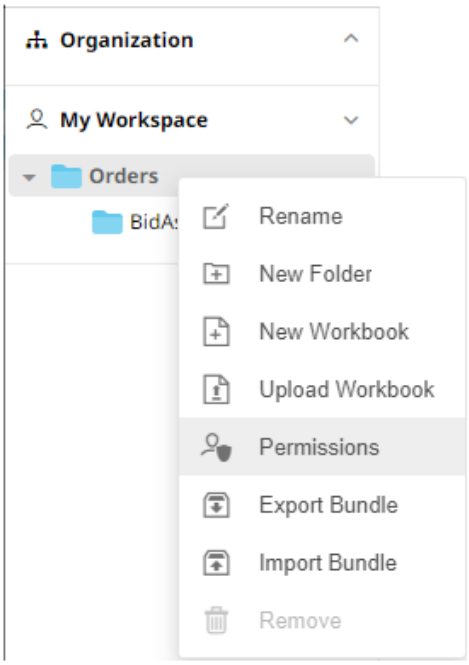
Steps:

1. To update folder properties, click a folder or a subfolder.

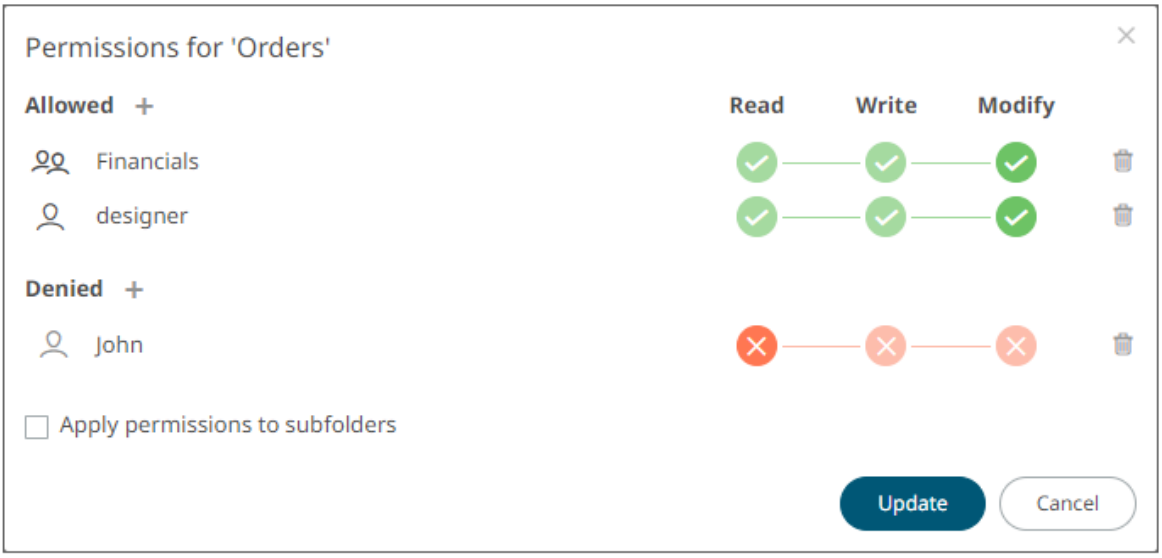




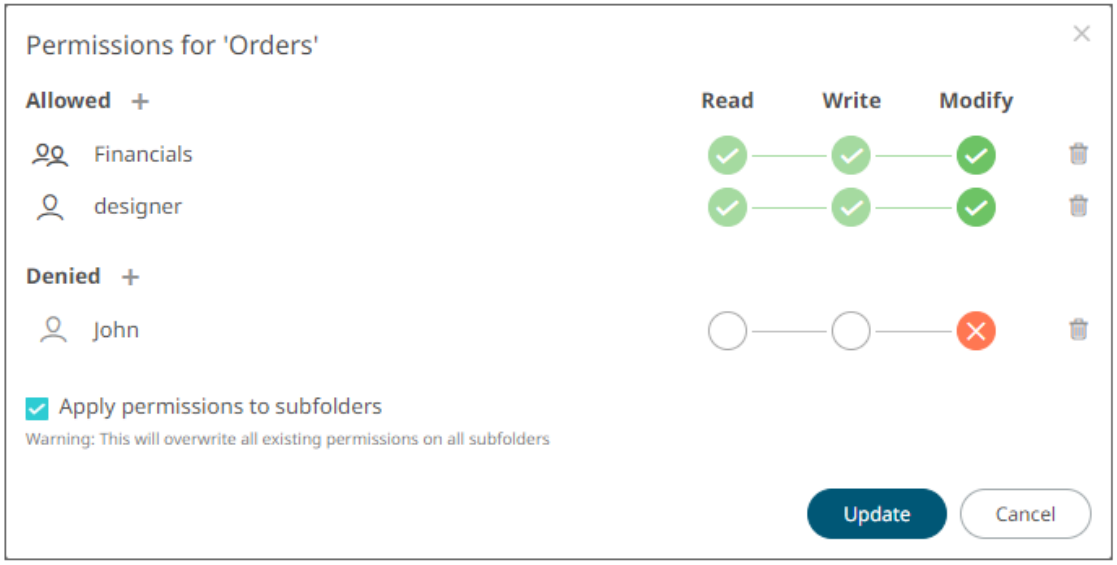
2. Right-click on the folder or subfolder and select **Permissions**.



The corresponding *Permissions* dialog displays.



3. Make the necessary changes such as new folder name, add or delete users and groups.
4. You can either:
   - check the **Apply Permissions to Subfolders** box



     This means the permissions that will be used on all of the subfolders will be fetched from the parent folder.
   - leave the **Apply Permissions to Subfolders box** unchecked and modify the permission properties of the subfolders

NOTE **The Apply Permissions to Subfolders check box is not enabled when defining the permissions for a subfolder.**

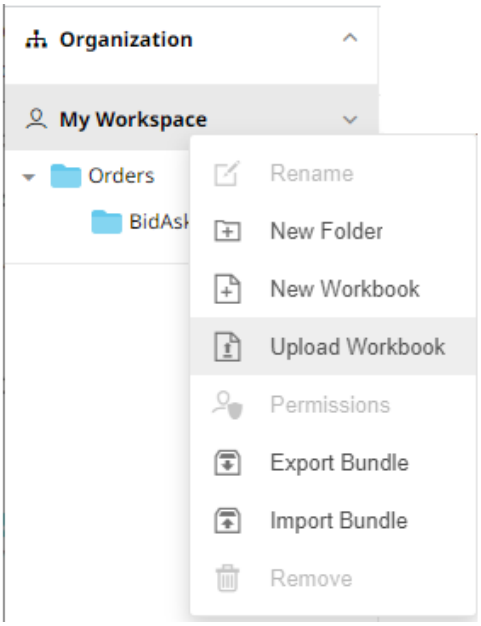
5. Click Update to save the changes.

Uploading Workbooks

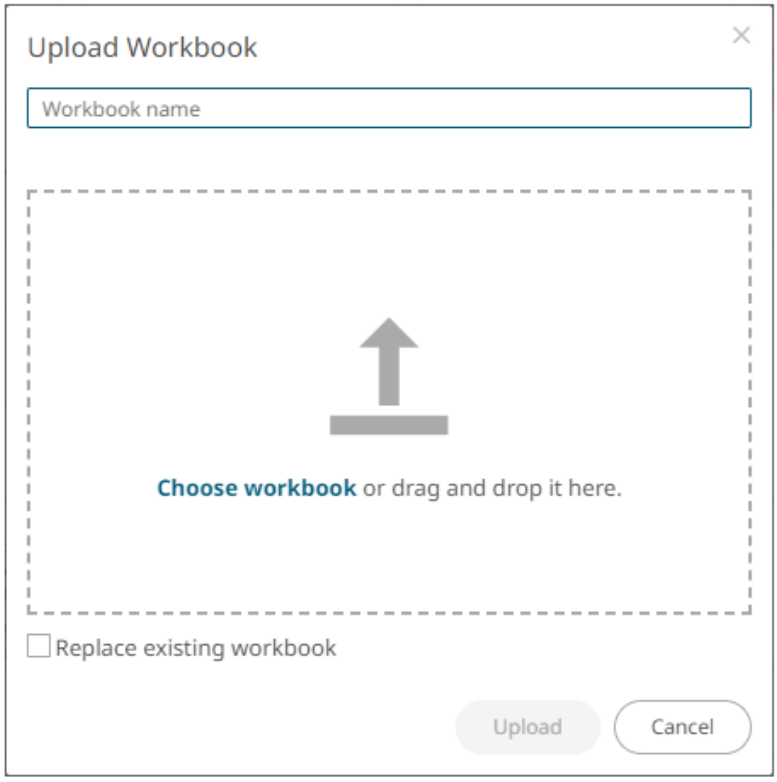
Users with a Designer role can upload and publish workbooks to the currently selected folder in the *Workbooks* page.

Steps:

1. On the *Workbooks* page, click on a folder or subfolder and select **Upload Workbook**.



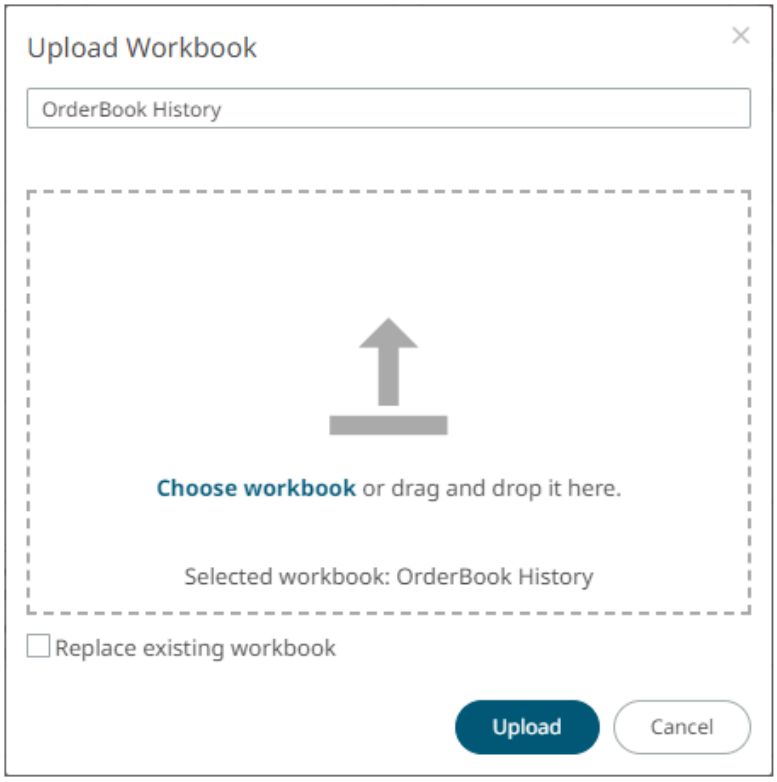
The *Upload Workbook* dialog displays.



2. To upload a workbook, you can either:

- drag it from your desktop and drop on the dialog, or
- click **Choose Workbook** and select one on the *Open* dialog that displays.

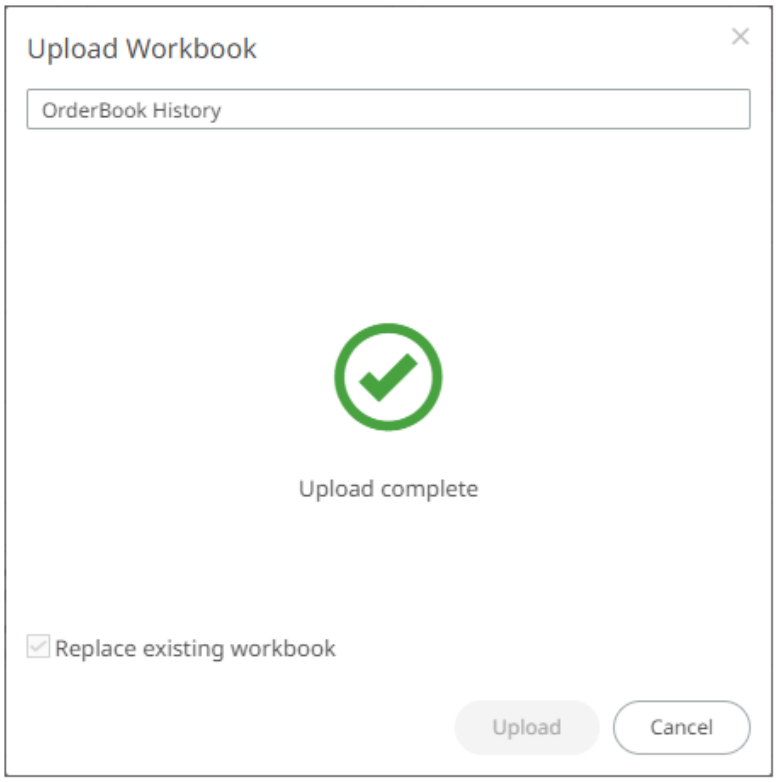
The name of the workbook is displayed on the uploaded workbook area and in the *Name* box.



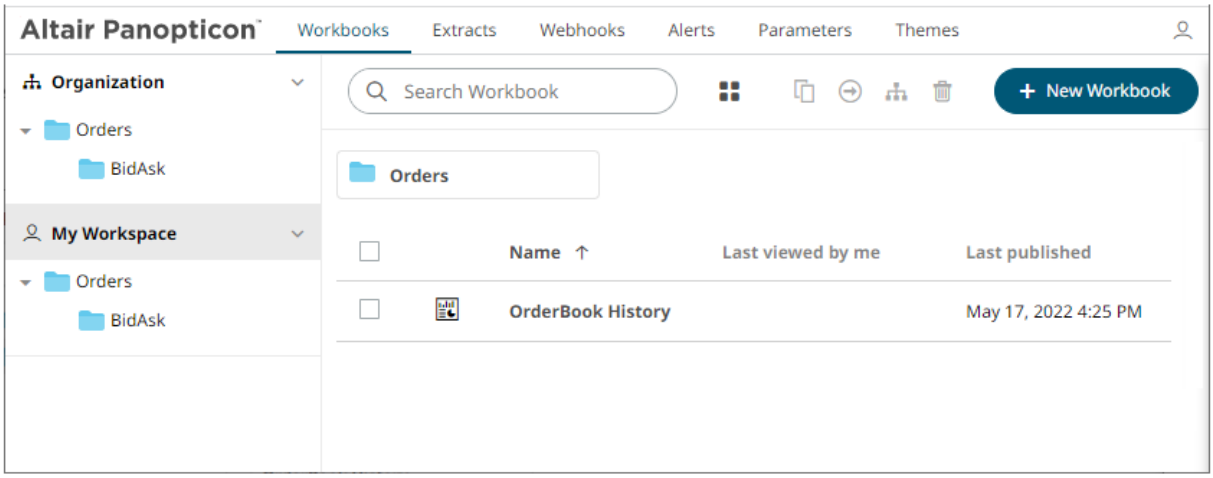
3. You can opt to rename the workbook.
4. To replace an existing workbook, check the **Replace existing workbook** box.
5. Click 

.

   You will be notified once the workbook is uploaded.



The workbook is added and displayed.



NOTE

- **An error message is displayed if the data source schema of the uploaded workbook has not been updated or missing.**
- **The uploaded workbook will not include the data source. However, if Panopticon Real Time can reach the same folder of the data source, or the workbook has been designed in the same machine, then the data can be viewed.**

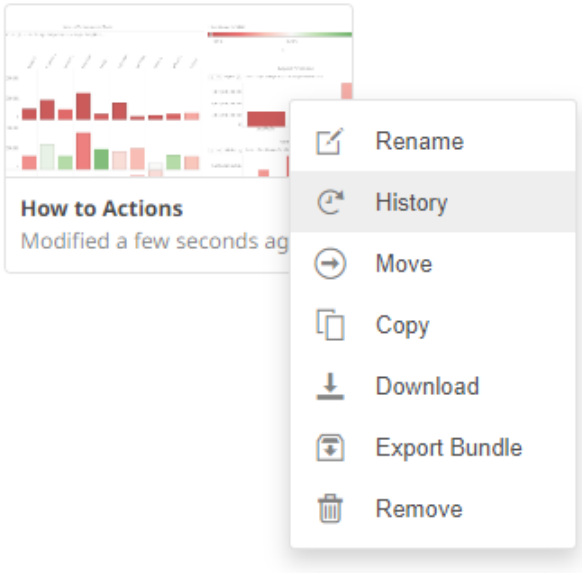
Viewing Workbook History and Republishing

Aside from opening workbooks, a user with Designer role can also perform the following:

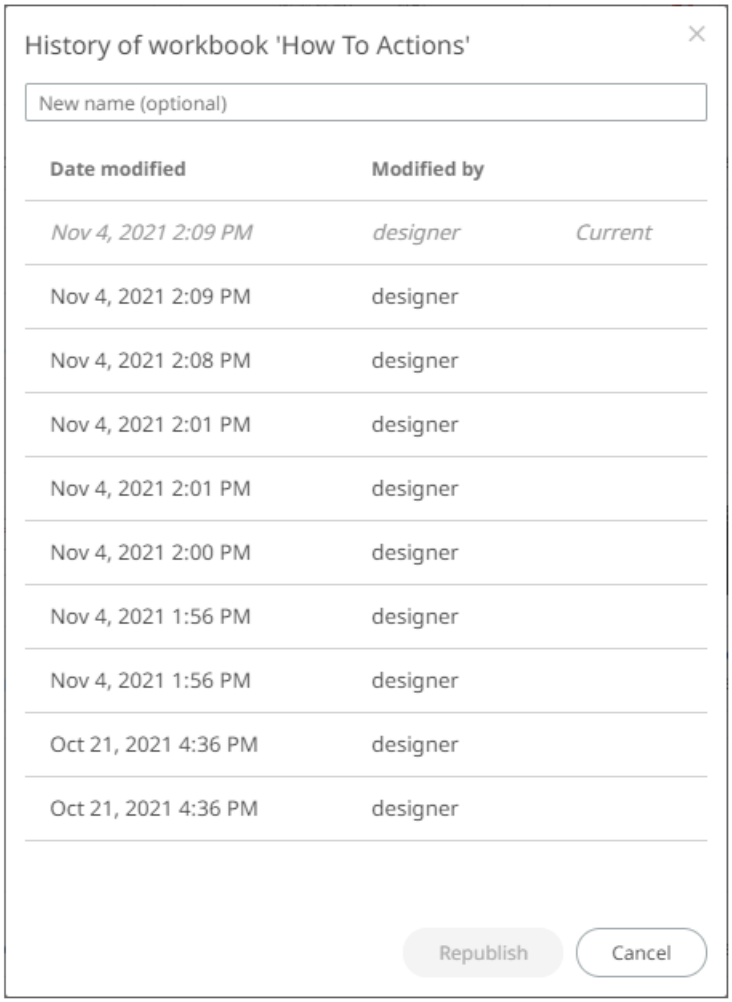
- view the change history of workbooks
- republish an archived workbook to the recent version of Panopticon Real Time
- rename an archived workbook

Steps:

1. On the *Workbooks* page, right-click on a workbook and select **History** on the context menu.



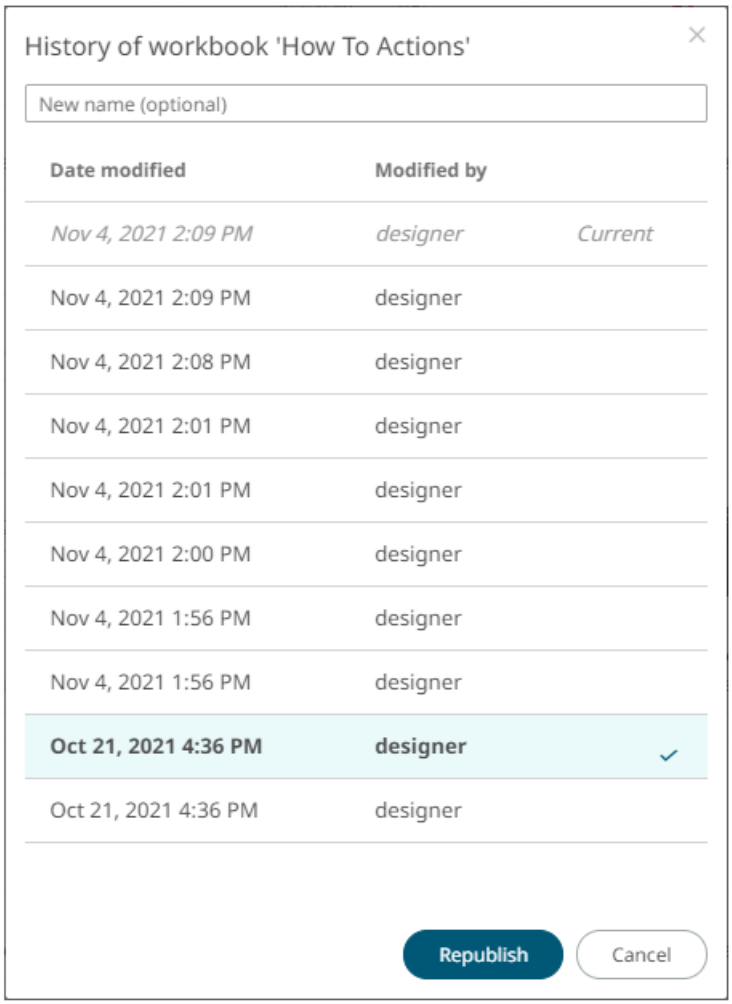
The *History of Workbook* <*Name*> dialog is displayed with the current version of the workbook indicated.



Sort the archival list either through the *Date Modified* or *Modified By* by clicking on the or button.

Also, move to the other pages of the list by clicking on a page or clicking the « or » button.

2. Click on an archived workbook in the list.

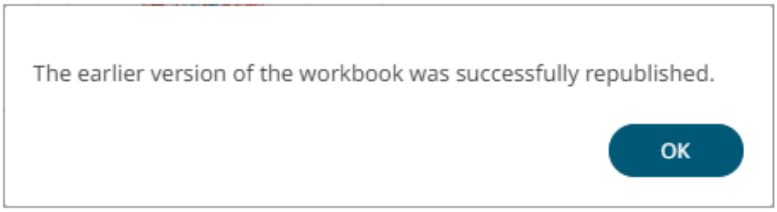


Then click Republish. A notification message displays.



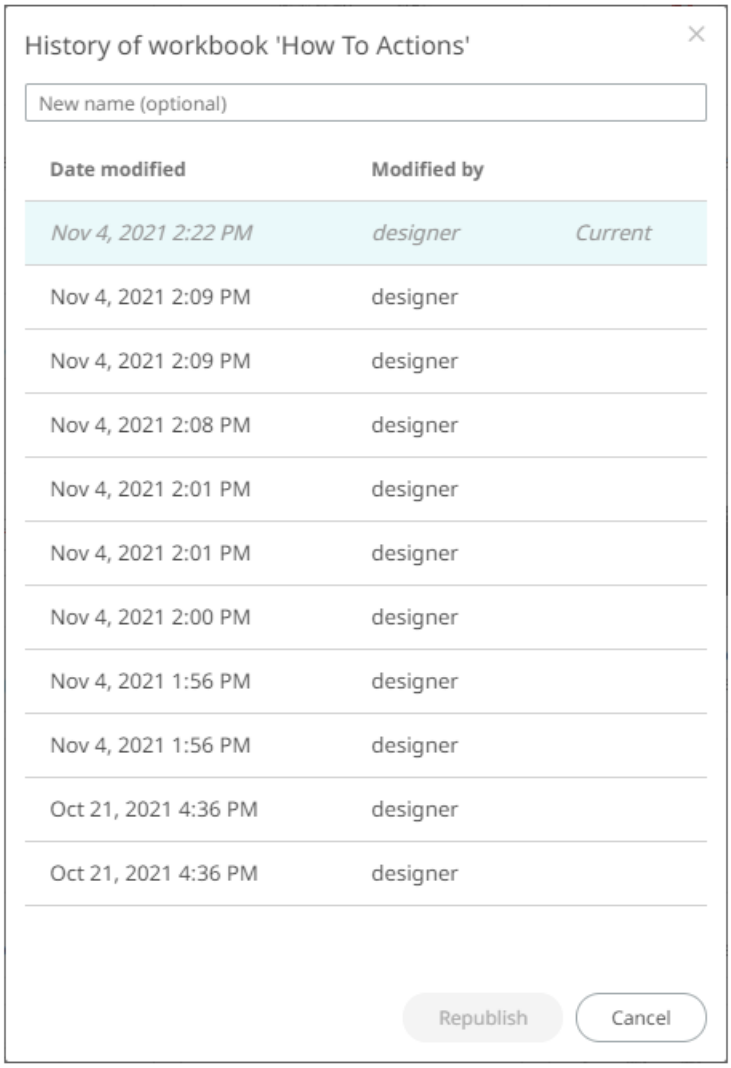
3. Click Yes.

A notification message displays.



4. Click OK .

   The republished workbook version is added in the history list.



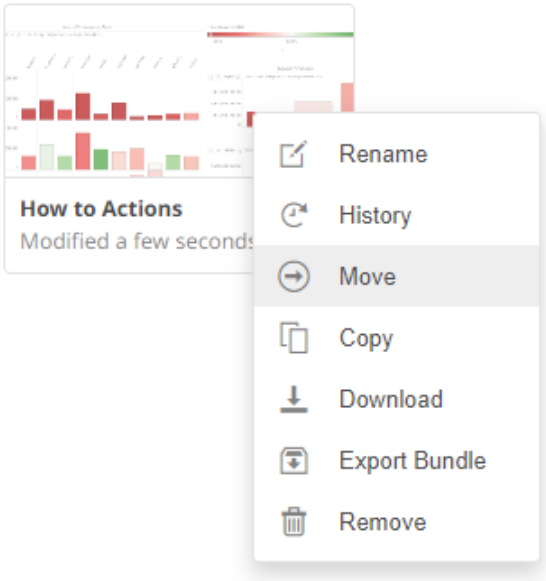
5. You may also opt to rename an archived workbook by entering a new one in the *New Name* box and follow steps 2 to 4 to republish it.

Moving a Workbook

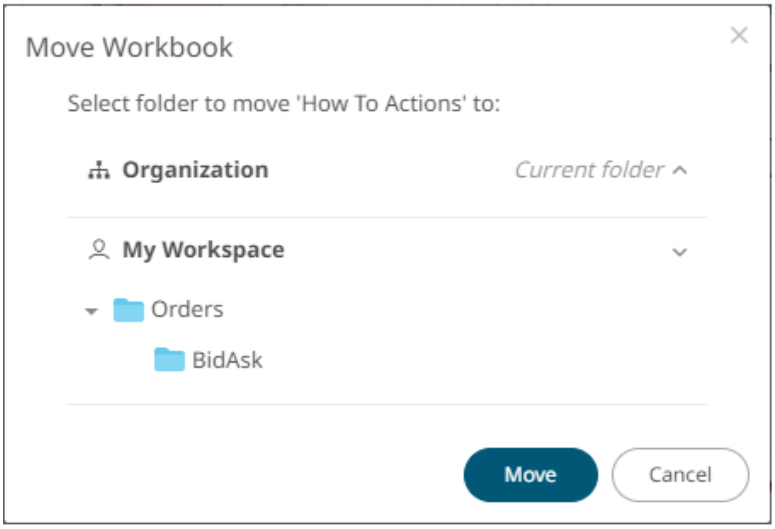
Users with a Designer role are allowed to move a workbook to another folder or subfolder they have permission to.

Steps:

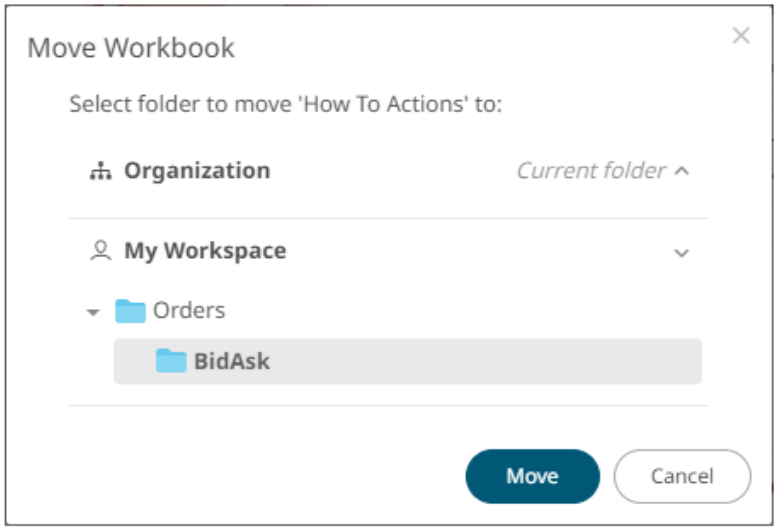
1. Right-click on a workbook and select **Move** on the context menu.



The *Move Workbook* dialog displays with the folder or subfolders that the user is allowed to move the workbook.

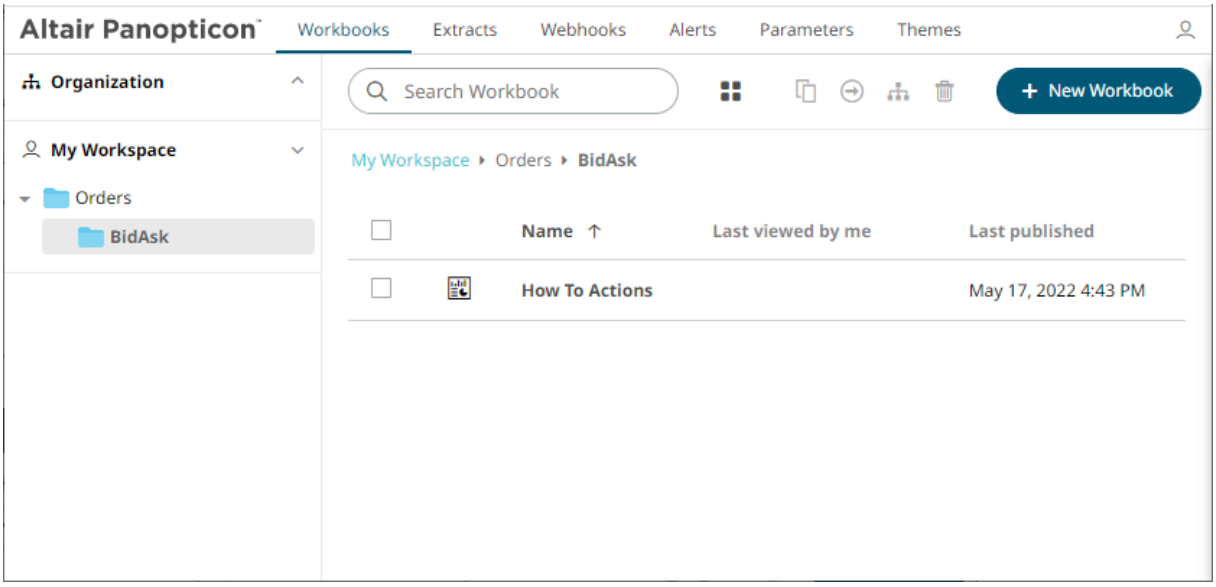


2. Select the folder or subfolder.



3. Click Move .

The workbook is moved and displayed on the selected folder.

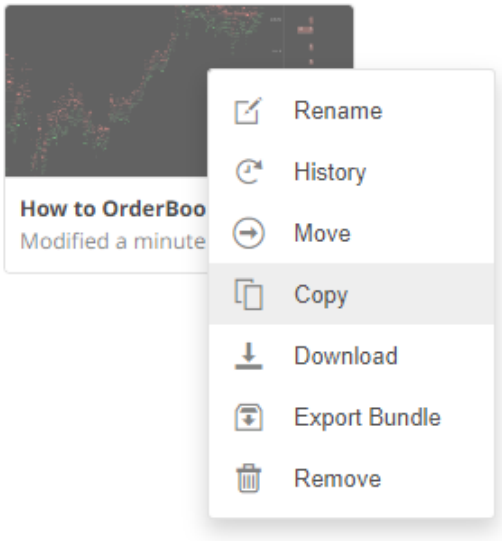


Copying a Workbook

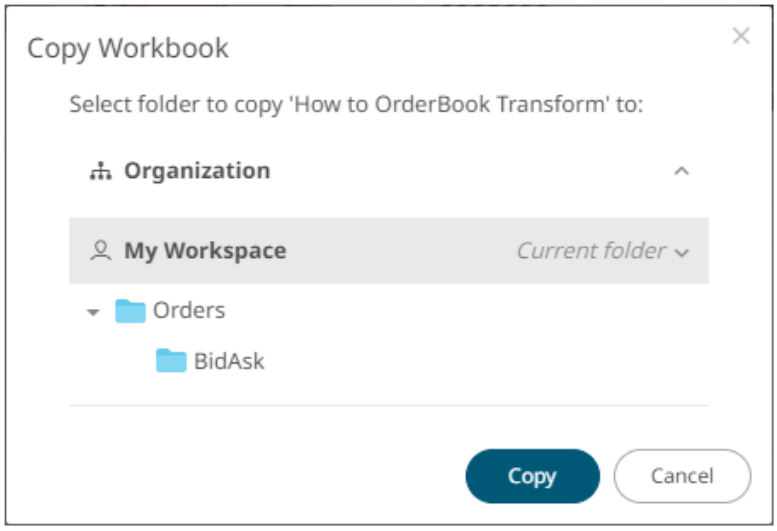
Users with a Designer role are allowed to copy a workbook to another folder or subfolder they have permission to.

Steps:

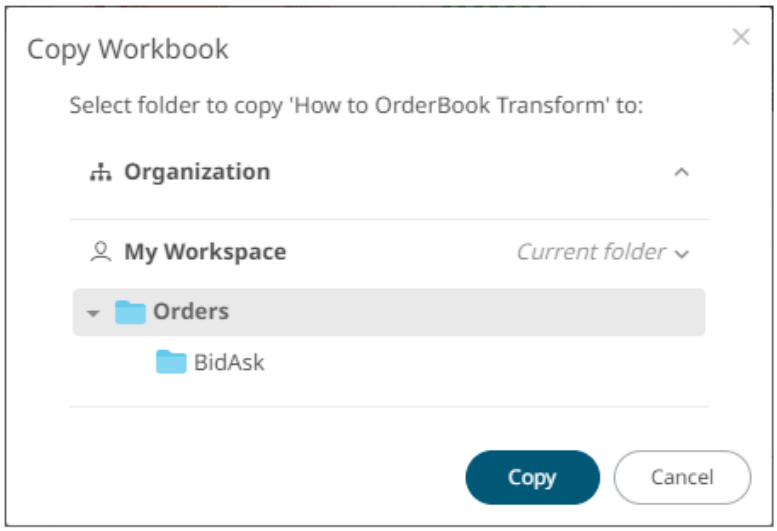
1. Right-click on a workbook and select **Copy** on the context menu.



The *Copy Workbook* dialog displays with the folder or subfolders the user is allowed to copy the workbook to.

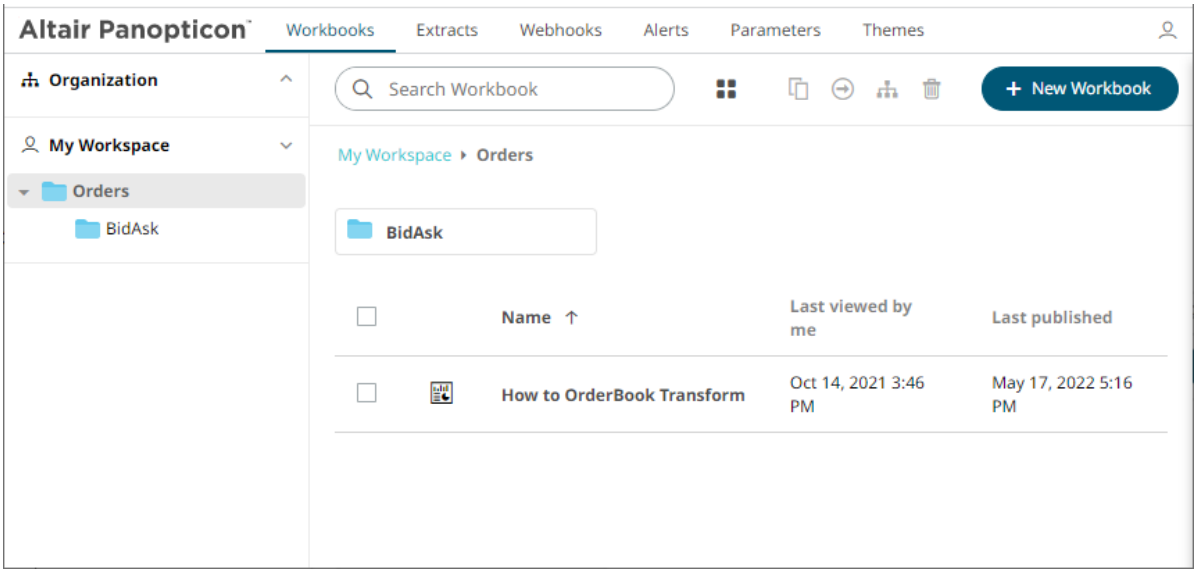


2. Select the folder or subfolder.



3. Click Copy.

The workbook is copied and displayed on the selected folder.



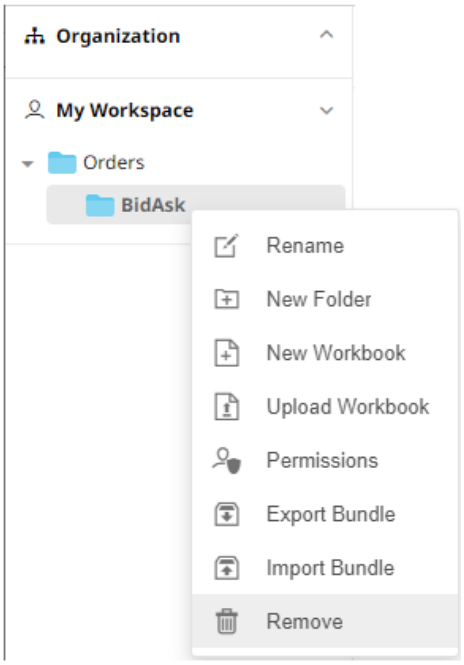
Deleting a Workbook or Folder

Users with a Designer role have the ability to remove workbooks or folders.

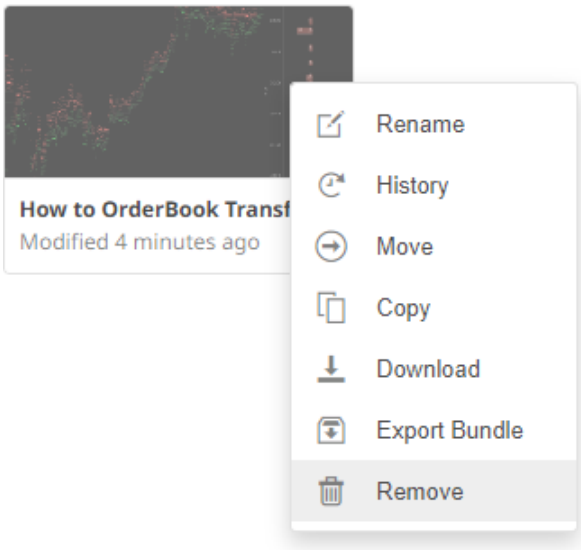
NOTE **Folders and subfolders can be deleted as long as they do not contain published workbooks.**

Steps:

1. Right-click on a workbook or folder and select **Remove** on the context menu.

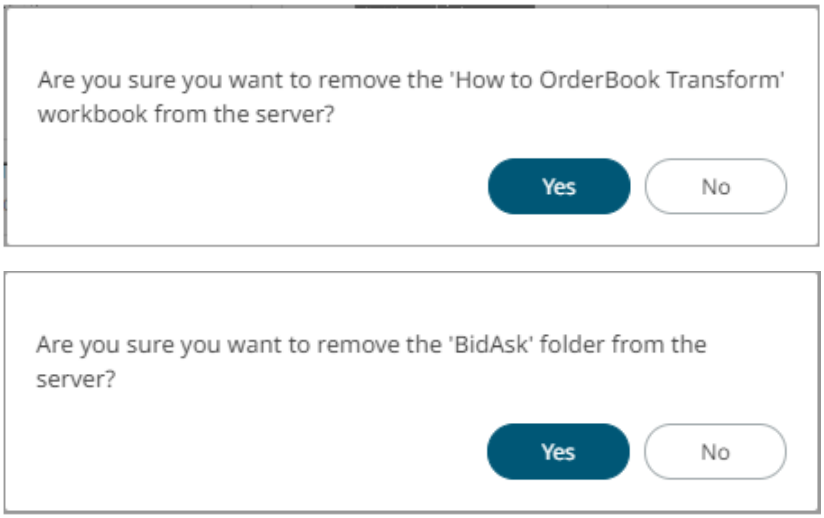


Workbook Folder or Subfolder Context Menu



Workbook Context Menu

A notification message displays.



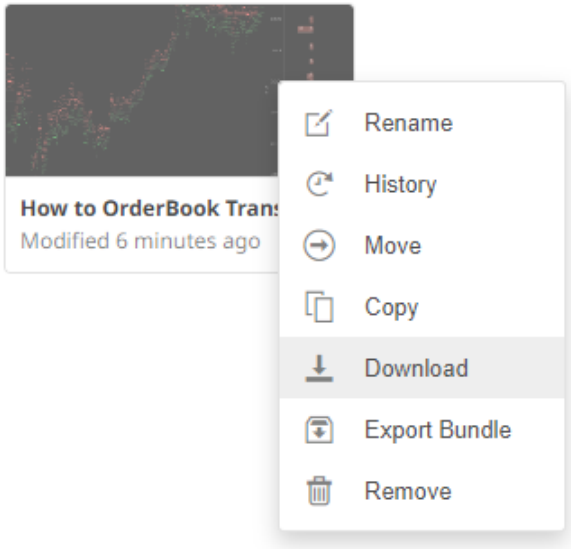
2. Click 

to remove.

Downloading a Workbook

A user with a Designer role with READ + WRITE permission to the folder is allowed to download a copy of a workbook available in it.

Right-click on a workbook and select **Download** on the context menu.



A copy of the workbook is downloaded.

Exporting a Workbook or Folder Bundle

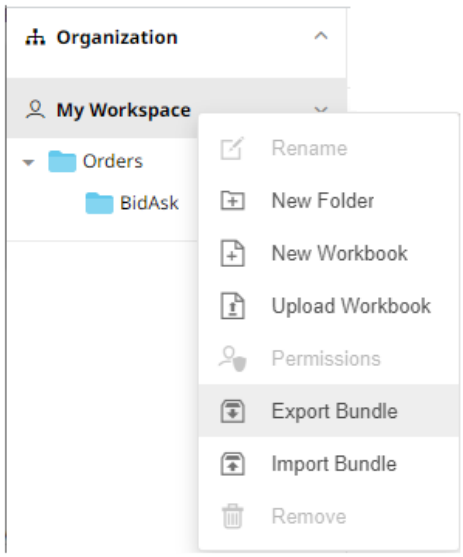
Users with a Designer role have the ability to download workbooks or folders and the associated data files.

NOTE

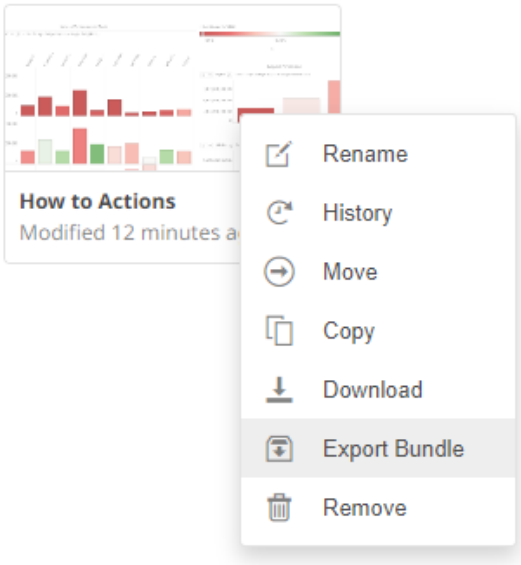
- **Data files associated with workbooks will only be included in the download if they are available inside the repository.**
- **Users will only be able to download workbooks from folders where they have WRITE permission.**

Steps:

1. Right-click on a workbook or folder and select **Export Bundle** on the context menu.



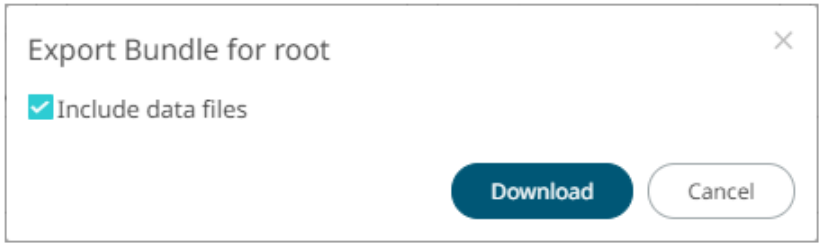
Workbook Folder or Subfolder Context Menu



Workbook Context Menu

A notification message displays.





The **Include Data Files** box is checked by default. This means the associated workbook data files will be included in the download.

2. Click 

. A copy of the workbook or folder bundle is downloaded.

Importing Workbook Bundle

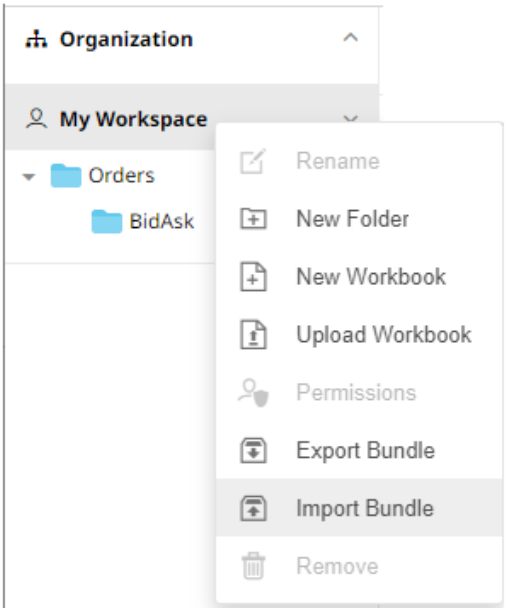
Users with a Designer role have the ability to import workbook bundles (*.**exz**).

NOTE

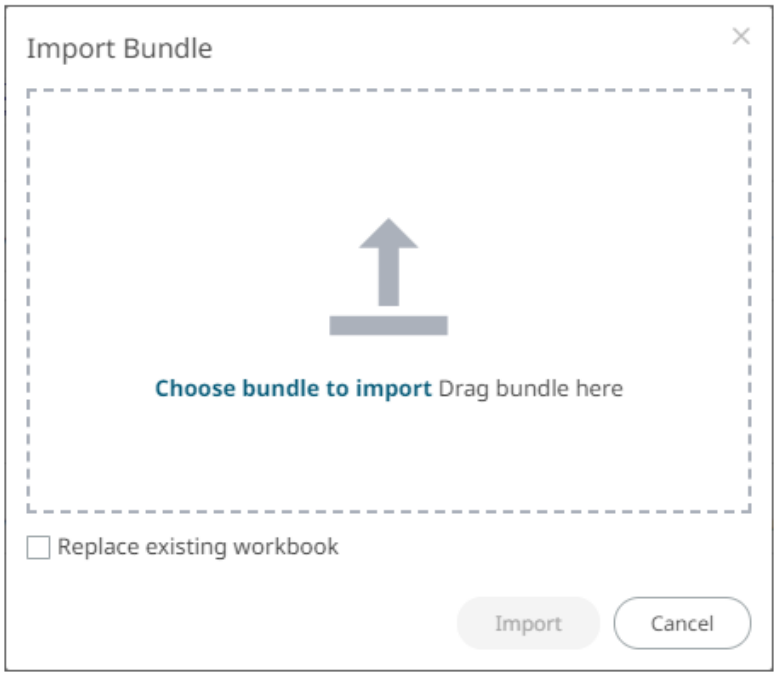
- **Users will only be able to import a bundle to folders where they have WRITE permission.**
- **Existing workbooks with the same name as the uploaded workbooks will be archived, only if the new workbook differs from the current one. Consequently, the uploaded version will be the current one.**
- **The bundle must not exceed the value set in the property `file.upload.size.max.bytes` in the `Panopticon.properties`.**
- **The exported folder structure is maintained when uploading the bundle. If the folders do not exist on the server, they will be created.**
- **After importing, if there are duplicate workbook titles, their folder name will prefix the title.**

Steps:

1. Right-click on a folder and select **Import Bundle** on the context menu.



The *Import Bundle* dialog displays.



2. To import a bundle, you can either:
   - drag it from your desktop and drop on the dialog, or
   - click **Choose Bundle to Import** and select one on the *Open* dialog that displays.

   The name of the selected bundle is displayed on the dialog box.



3. To replace existing workbooks, check the **Replace existing workbook** box.
4. Click Import.

Panopticon Workbook Examples

`The AltairPanopticonVisualizationServerWAR_<version number>.zip` file includes the bundle of the workbook examples and their associated data files (`Examples.exz`) that you can import.

These workbooks cover:

- Visualization Guide
- Example Use Cases and Sample Dashboard
- Capabilities and How to Guides

Visualization Guide

The example workbook **VizGuide** includes demonstration of all snapshot and time series visualizations with usage guidelines.

Example Use Cases and Sample Dashboards

This section of example workbooks includes:

Sample Workbook	Description
Bond Maturity Screening	Bond universe selection and screening.
Displaying Spreads	Spread calculation on selected instruments.
Equity Analysis	Equity portfolio selection and screening.

Equity Universe Screening	Equity universe selection and screening.
GDP Per Capita	Data displayed as a hierarchy (Treemap), Map with scatter points and Choropleth, with each visual emphasizing different aspects of the dataset.
Nano Executions	Nanosecond accuracy executions.
Olympics	Olympic medals by country, across time.
Order Book	Equity order book imbalance across the S&P 500.
Portfolio Performance	Equity portfolio performance across time, including the playback of performance at each time slice across the 15-month time window.
Shopping Basket Analysis	The display of shopping baskets, constituent products, and the correlation of product purchases based on these baskets. The co-occurrence of products in a basket is demonstrated through use of a self-inner join in the underlying data table.
Supermarket Sales Summary	Supermarket sales and revenues against the target.
US Border Crossings	Periodicity in US border crossings by crossing point.
US Treasury Yield Curves	Demonstrates the manual axis tick marks, time series calculations, Scatter Plot reference lines based off a time series, and the time surface across the last two years.

Capabilities and How to Guides

This section of example workbooks includes:

Sample Workbook	Description
BP Oil Spill Timeline	Use of text time series to display market events, such as news headlines and overlay them on time series displays correlating the event to performance and money flow.
Cross Tab	Display of cross tabbing / trellising into rows and columns across different visuals. Cross tabbing produces a series of trellised smaller visuals which each correspond to a portion of the total dataset as defined by the row and column cross reference.
Financial Time Series	Display of typical financial time series displays such as the Line, OHLC and Candle Stick and Needle graphs for price and volume distributions. Additionally, the time axis of these displays is configured to show either a calendar axis, a working week axis where Saturdays and Sundays are removed, and a working hour axis, where only a defined time range (Monday to Friday) are displayed.
How to Actions	Examples of how to use Navigation action, URL action, and Script action. Using Action Control parts to set values to parameters that are involved in data connections. How to pick up current time window parameter values from time series visualizations, and how to pick up current axes span parameter values from visualizations.
How to Auto Parameterize	Use of parameters and auto-parameterization to pass context automatically between visualizations on the same dashboard. Parameters are passed through right-click or double-click mouse events and cause a new data request behind the target visualization. Unlike filtering, the data request can be pre-defined with parameters reflecting variable components of the pre-defined query, function or stored procedure.

How to Color	Use of the different color settings and properties: • sequential or diverging numeric color palettes • categorical text color palettes • #RGB color source for text columns • Alpha value for the level of color transparency/opacity • colored shapes through the Shape Legend and Color Legend • Line shades based on the Alpha value adjustment in the numeric action slider • Configured Custom Single color for visual members in the Time Combination graph which are retrieved in the Timeseries Legend • color background of text columns in the visualization table • Special examples including mixing of colors using the Action Dropdown or #RGB color source in the Bar Graph. In addition, setting the color gradient or quadrants on the background image, and color codes that are added to the data by using join.
How to Conflate	Use of fixed or auto conflation for time series data sets.
How to Drill	Automatic and manual drill configuration, demonstrating the use of double-clicking to drill through the levels of hierarchy orgranularity of a visualization, and the use of restricted “Level of Details” display, where only a certain number of hierarchy levels can be displayed at a single time, and drilling transverses these levels.
How to Filter	Using filter boxes with Numeric, Text, and Time Series columns. Demonstrating both categorical text filters for specified dimensions, with either selection or wild card entry, and numeric filters for measures, which either demonstrate the range (min to max) and distribution or focus on the distribution with a percentile scale. In addition, visualizations can be used as filters by selecting items and either including or excluding them.
How to Maps	Showing features of the map plot visualization as well as an example of how to use the SVG shapes visualization to create a choropleth map.
How to Non Additive	Working with non-additive numbers, where the aggregates must be provided externally, rather than calculated in the product. This example demonstrates single hierarchies, and multiple hierarchies around a defined leaf column. In each case, the data table is configured to specify the leaf column, and the value to check for aggregate presence, while the visuals are set to use external aggregates.
How to OrderBook Transform	The transform settings allow for orders to be reconstructed into an Order Book and standardized by conflating into an appropriate granularity for the output display. This allows playback through its values for compliance customers. To reconstruct the Order Book from the orders, the data must include: • Order ID (Unique per Order) • Order State/Event Type • Update Time • Side (Buy/Sell) • Price • Balance/Remaining Quantity

How to Panel Layout	Shows how to use panels for creating compartments within a dashboard which allow dashboard parts to maximize in a limited way, confined to the space within their panel. Includes dashboards with or without layout panels.
How to PDF	Uses the configured Paper Size and DPI resolution. Setting the resolution of the workbook to match the output resolution from the PDF settings through the Workbook Style, ensures that what is displayed in the web client matches that output in the PDF.
How to Pivot & Unpivot	Pivoting of data for optimum use by dividing them into Dimensions (Text fields), and Measures (Numeric fields). This example shows how key values are displayed when pivoted, or when data is already pivoted, or when an already pivoted data is unpivoted. They are transformed to provide maximum flexibility.
How to Python	Demonstrates the use of Python as a data source and as data transform. Also, the use of Pyro for Python connectivity. With Python, a list of dictionaries is passed. This workbook additionally demonstrates enhancing the build in capabilities through Python with the addition of the Numpy and Scipy modules, specifically demonstrating: • K Means Clustering • Curve Fitting • Chi Square Testing Of course, the full data manipulation capabilities of Python are made available, rather than that just demonstrated in the example dashboards.
How to R	Includes examples and instructions in using Rserve with Panopticon: • R environment to use • Sample data sets from R (i.e., Seatbelts, Volcano) • Univariate Timeseries Forecasting (ARIMA modelling) • Unsupervised Machine Learning in the form of K-means cluster analysis on a synthetic, randomized data set • Continuous Unsupervised Machine Learning • Logistic Regression (machine learning classification) • Multiple Linear Regression (Supervised Machine Learning) • Anscombe's Quartet of 'Identical' Simple Linear Regressions • Geographic binning (Interactive transform)
How to Reference Lines	Use of Reference Lines in time series visualizations, both from source columns, and from time series calculations.
How to Retrieve Text and XML	Retrieving Text and XML, together with appropriate parsing from external URLs. This example by design requires a valid direct Internet link, as it retrieves data from external web sites. Delimited text is retrieved based on a parameterized URL and displayed in a time series graph. RSS is retrieved, parsed through the XML connector, and displayed in a table, and RFD is also retrieved through the XML connector making use of XML name spaces in the XPath definitions to extract data from the source XML.
How to Time Window	Example of how to use Time Axis Minimum Range and Time Axis Increment Step with streaming data.

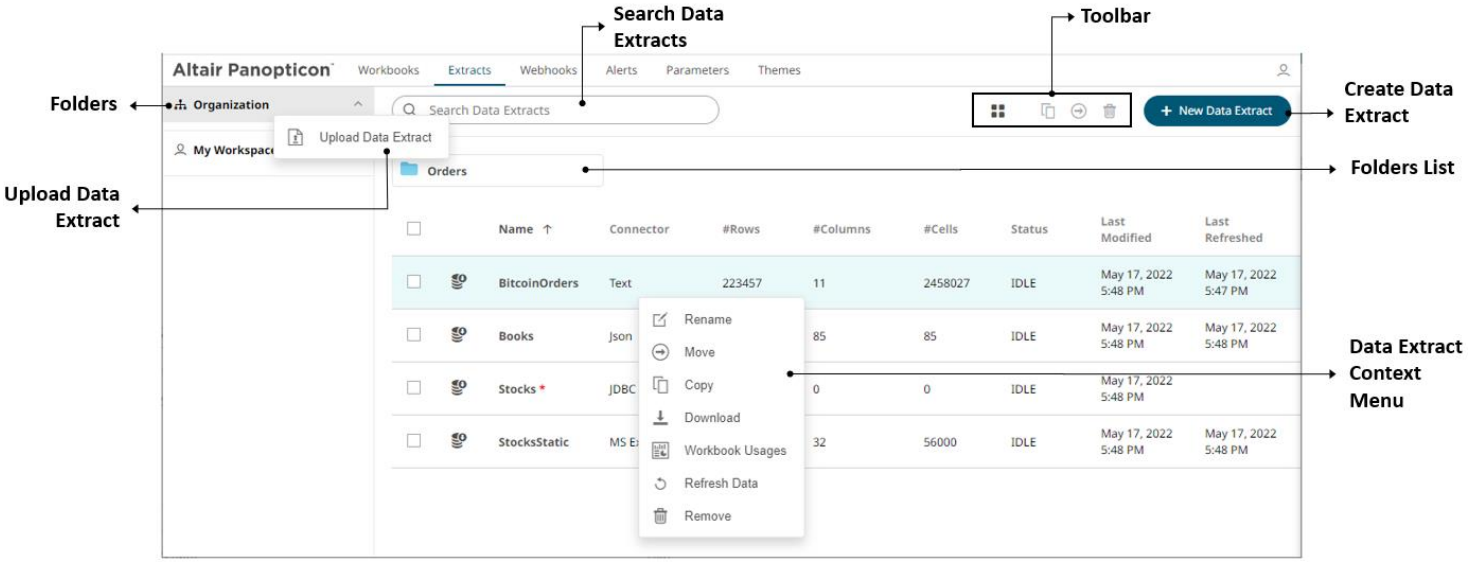
	In addition, time series calculations, based on selected time windows, including time relative calculations such as simple moving averages, time window calculations such as the % Change across the time window, and finally re-baselining of performance values based on a selected time slice (Snapshot).
How to Use JS Dashboard Part	Demonstrates how to include bespoke JS code inside a dashboard such as: • how to add a listener for parameter value changes • how to update the parameter values • data loading This dashboard part also supports loading data from Panopticon Real Time, inside the same data loading framework as the rest of the dashboard.
How to Use Timeseries Data Formats	Time series retrieval, interpolation and display. This example shows how line graphs are drawn between known data points, and how gaps are displayed where there is a time slice, but an unknown value (null). It also demonstrates the use of interpolation to fill the data gap. Finally, the example shows sparse time data similar to that from multiple sensors. As the data is not aligned to a standard set of time slices, the gap displays rules take over the visualization, removing most trends lines. This output is then adjusted to standardize time slices producing appropriate output, where there are values for each series at each given time.
Order Book History	Displays Order Book across time and playback.

[8] DATA EXTRACTS

One of the methods in accessing data is by retrieving only the required results into memory, by querying on demand, pushing aggregation and filtering tasks to underlying big data repositories, or queryable data extracts.

This is commonly known as a ROLAP implementation, where the product is dynamically writing data queries to the underlying data repository and retrieving aggregated and filtered datasets. Given the on-demand nature of this method it is more suitable to exploratory data analysis but requires dynamic query generation.

Starting with version 21.0, users with a Designer role can create and manage data extracts.



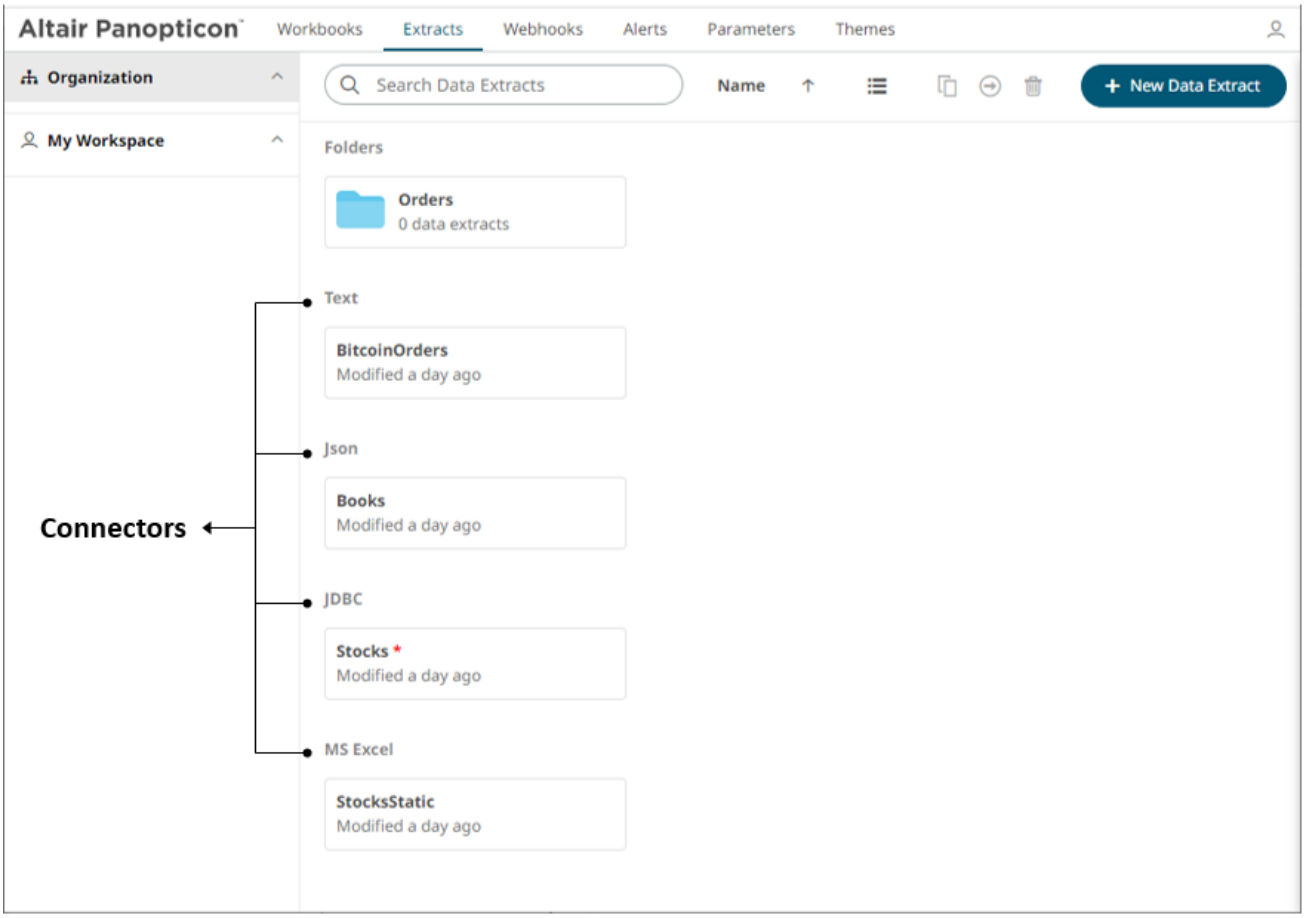
Property	Description
Folders	List of folders where data extracts can be created, uploaded, moved, or copied.
Folder Context Menu	Allows uploading of data extracts to folders
Search Data Extract	Entering text will filter the returned data extracts.
Toolbar	Allows copying, moving, and removing of data extracts. Also, to display the data extracts list either on *List View* or *Grid View*.
Create Data Extract	Allows creating a new data extract.
Folders List	Available folders on *List View*.
Data Extract Context Menu	Allows renaming, moving, copying, deleting, and downloading of data extracts. Also, viewing of workbook usages and refreshing of data extract.

Folders and Data Extracts Display View

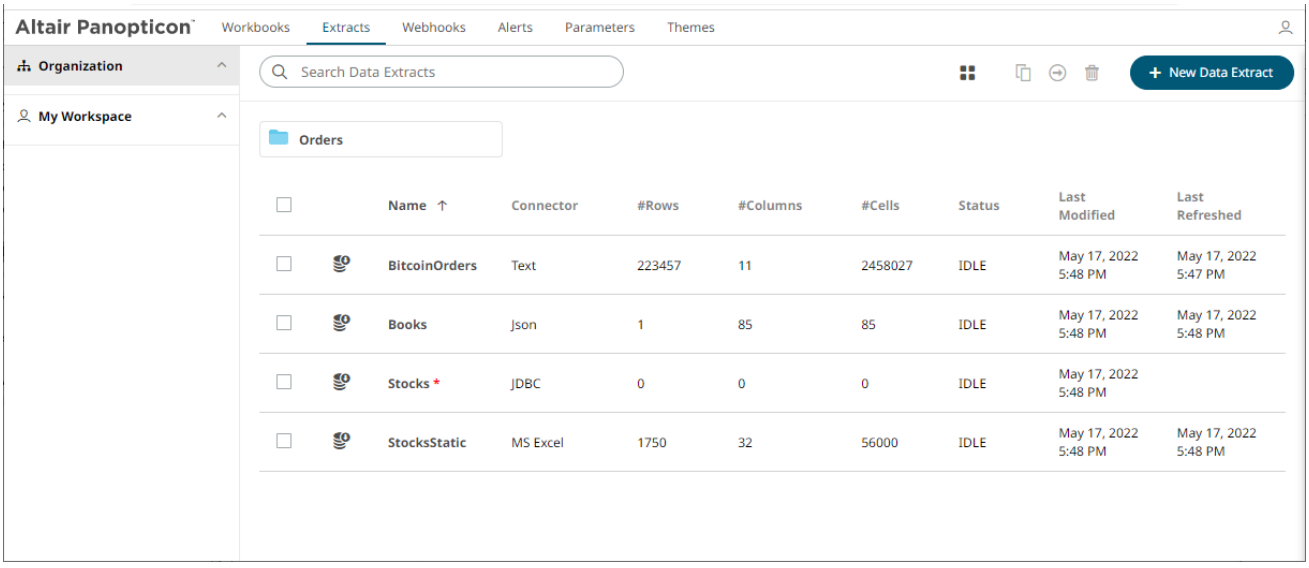
Data extracts can be displayed either on a *List* or *Grid View*.

On the *Toolbar*, click **Grid View**  . The folders and data extracts are displayed as thumbnails.

NOTE Data extracts are placed under their corresponding connector.



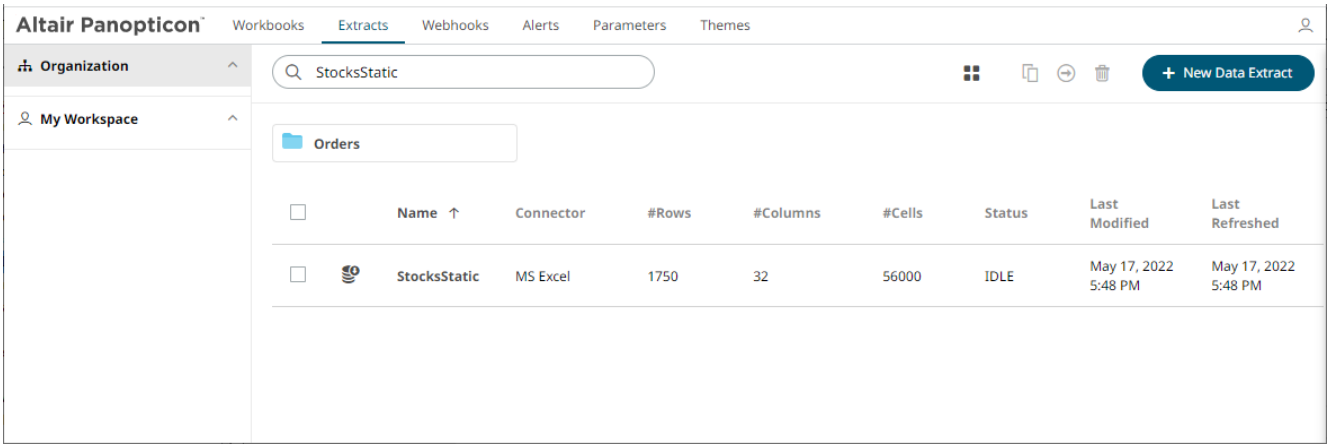
Or click **List View** , the data extracts are displayed in a standard listing.



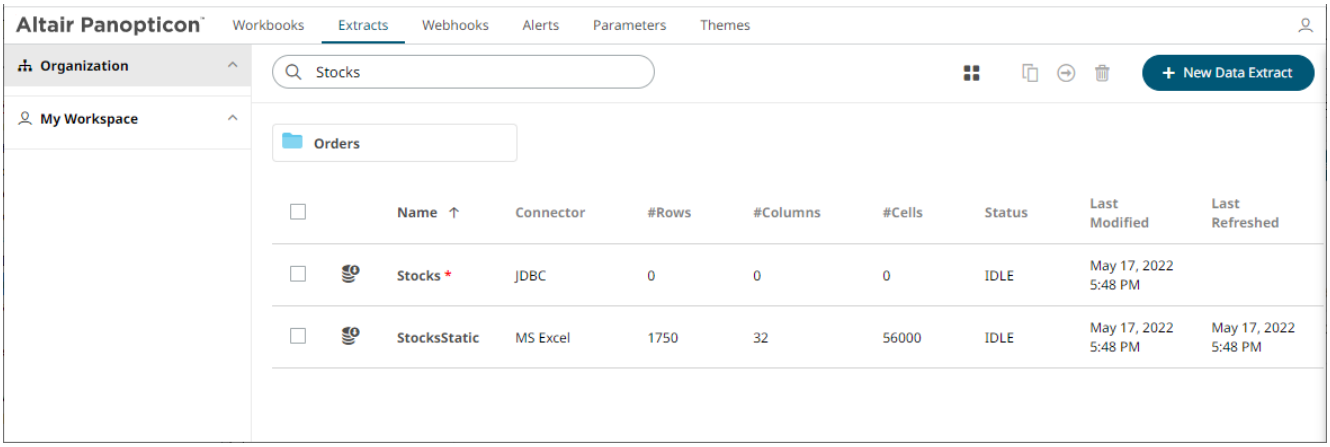
On either display view style, clicking on a data extract title or thumbnail displays the *Extracts* page.

Searching for Data Extracts

On the *Extracts* page, to search for a particular data extract, enter it in the *Search Data Extracts* box.



You can also enter one or more characters into the *Search Data Extracts* box and the suggested list of data extracts that matched the entries will be displayed.



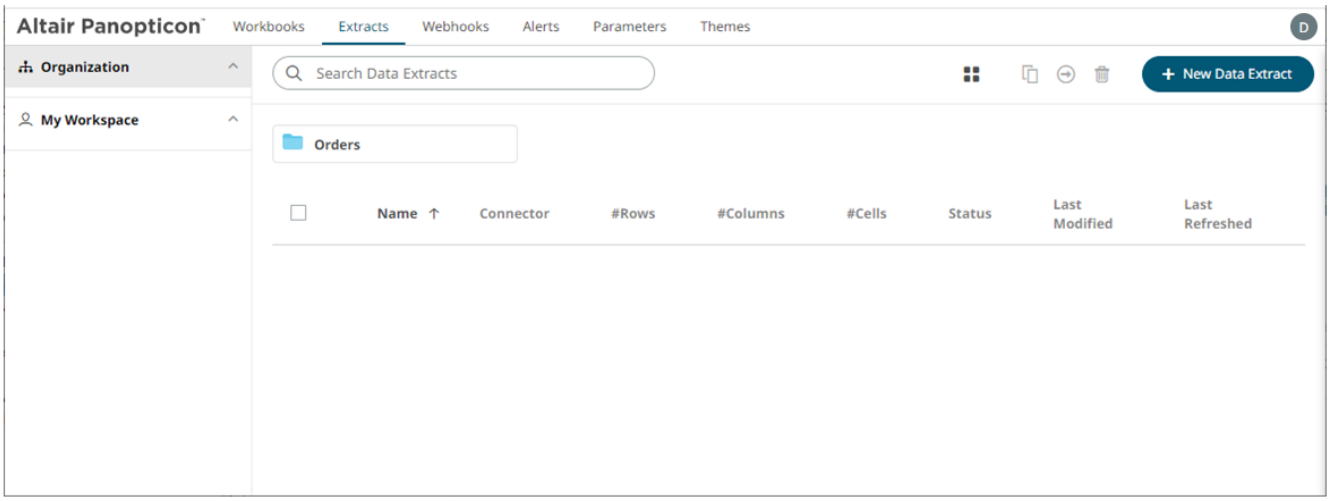
Click on a data extract to open and display.

To clear the filter, delete the text entry in the *Search Data Extracts* box.

CREATING DATA EXTRACTS

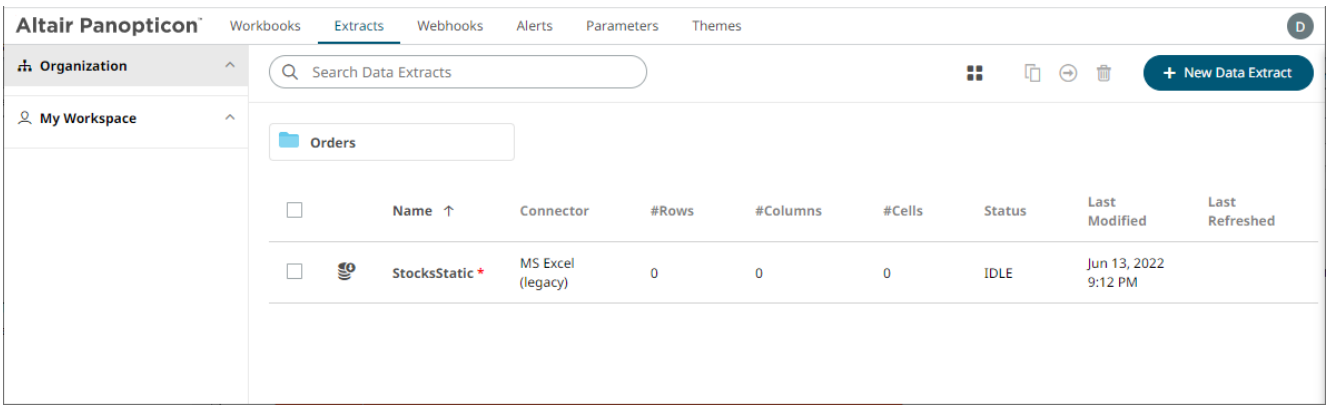
Users with a Designer role have the ability to create data extracts.

On the *Extracts* page, the following properties are displayed.



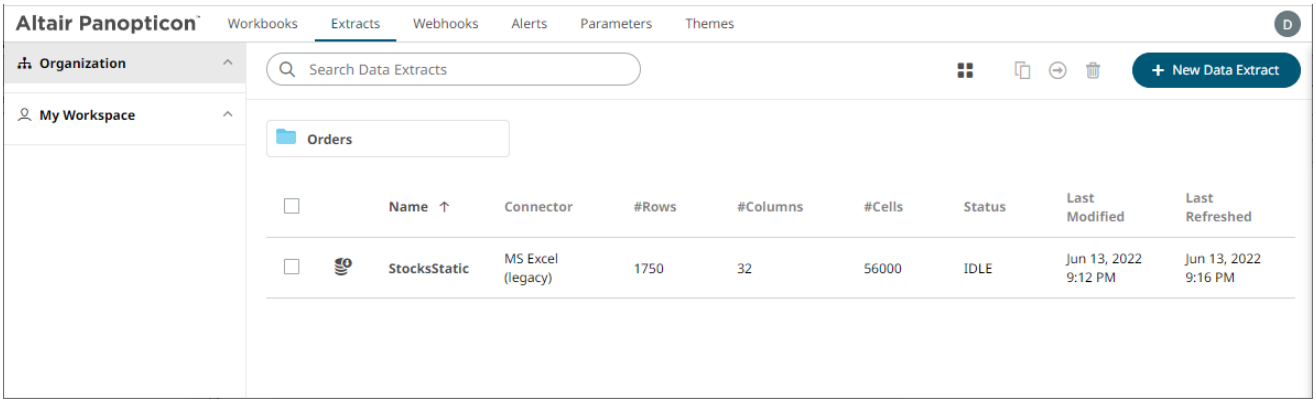
Data Extract Property	Description
Name	Data extract name.
Connector	Data connector used in the extract.
#Rows	Number of rows of the data extract.
#Columns	Number of columns of the data extract.
#Cells	Number of cells of the data extract.
Status	Status of the data extract. Values include **IDLE** or **RUNNING**. When saving a new data extract, it is first run and the status changes to **RUNNING**. When the data extract is complete, the status changes to **IDLE**.
Last Modified	The Date/Time when the data extract is last completed or modified.
Last Refreshed	The Date/Time when the data extract is last refreshed.

A sample data extract using the MS Excel (legacy) connector before refreshing the data:



NOTE	A * symbol appears beside a data extract that is not yet refreshed.

After refreshing the data:



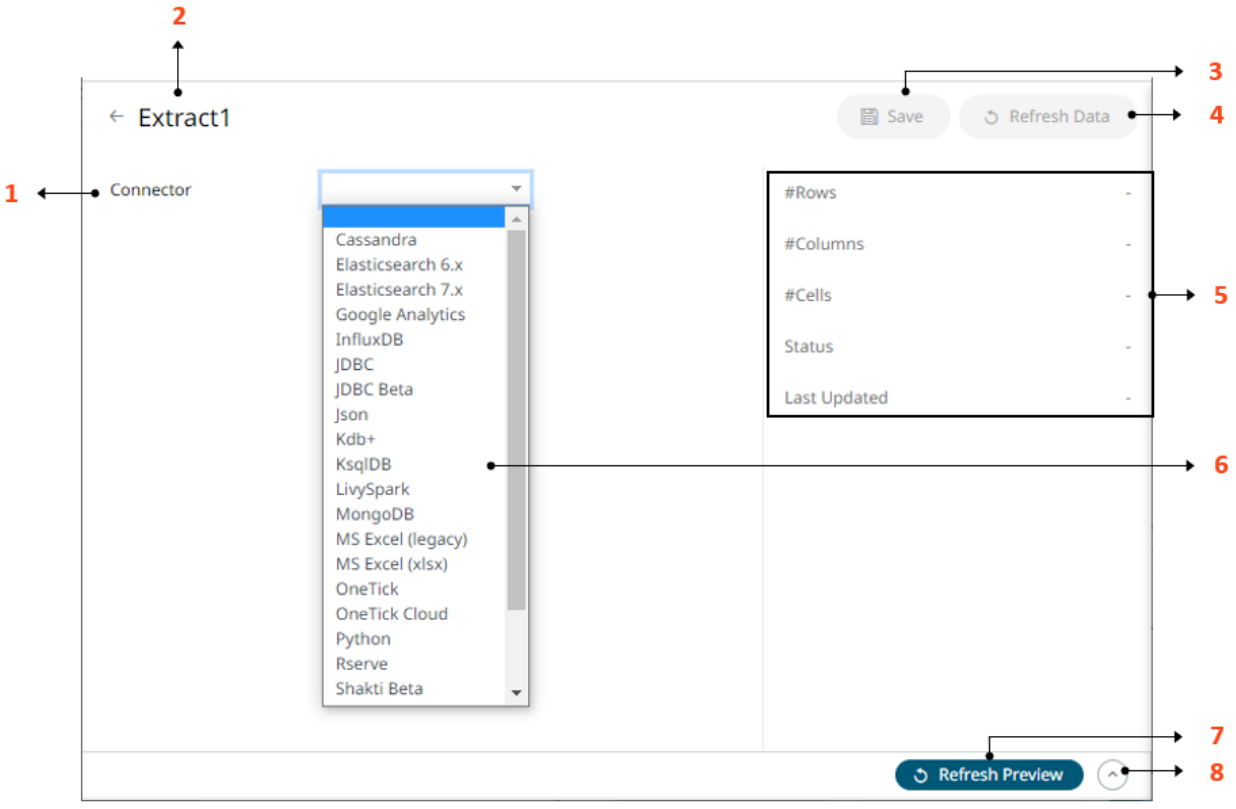
This section discusses the steps and guidelines on how to create data extracts.

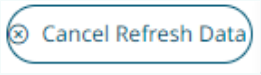
Steps:

1. On the **Extracts** tab, click on a folder then 

.

   The **Extracts** tab displays with the following sections:



Section/Panel	Description
1	**Connector drop-down list** Includes the non-streaming connectors to extract data from.
2	**Extract Name** Name of the data extract. Click the button to go back to the *Data Extracts* listing page.
3	**Save** Save the changes made on the **Extracts** tab.
4	**Refresh Data** Refresh the data after modifying and saving changes on the *Data Extract* page. You can also opt to click **Cancel Refresh Data**  .
5	**Details** Display the details of the data extract including the number of rows, columns, cells, status, and the last time it was updated.
6	**Connectors** Select the connector that will be used for the data extract.
7	**Refresh Data Preview** Refresh the data preview.
8	**Expand Data Preview** Expand the *Data Preview* panel.

2. Enter the *Name* of the data extract. This should be unique and should only contain letters (a to Z), numbers (0 to 9), and underscores.

3. Click or press **Enter** to apply the name.

4. Select any of the following non-streaming connectors:

   - Cassandra
   - Elasticsearch 6.x
   - Elasticsearch 7.x
   - InfluxDB
   - JDBC Database
   - JSON
   - Kx kdb+
   - ksqlDB
   - Livy Spark
   - MongoDB
   - MS Excel (legacy)
   - MS Excel (xlsx)

- OneTick
- OneTick Cloud
- Python
- Rserve
- Shakti
- Splunk
- Text
- XML

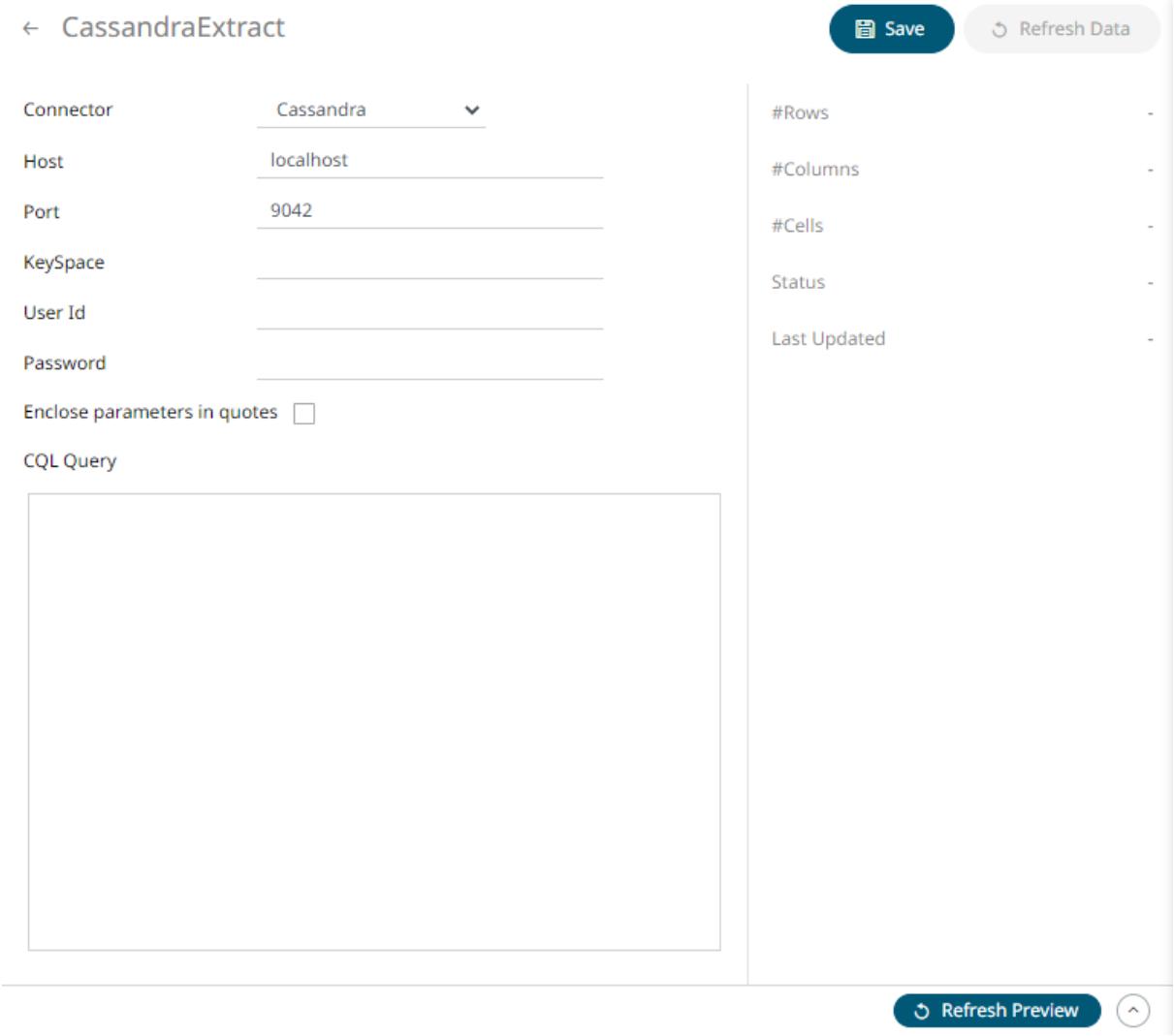
  The tab page changes depending on the selected connector. Refer to the sections below for more information.

Creating Data Extract from Apache Cassandra

The Apache Cassandra connector allows connection to Apache and Datastax Cassandra instances, by executing a pre-defined CQL query, and retrieving the resulting data.

Steps:

1. On the *New Data Extract* page, select **Cassandra** in the *Connector* drop-down list.



2. Follow steps 2 to 4 in Apache Cassandra to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Elasticsearch 6.x

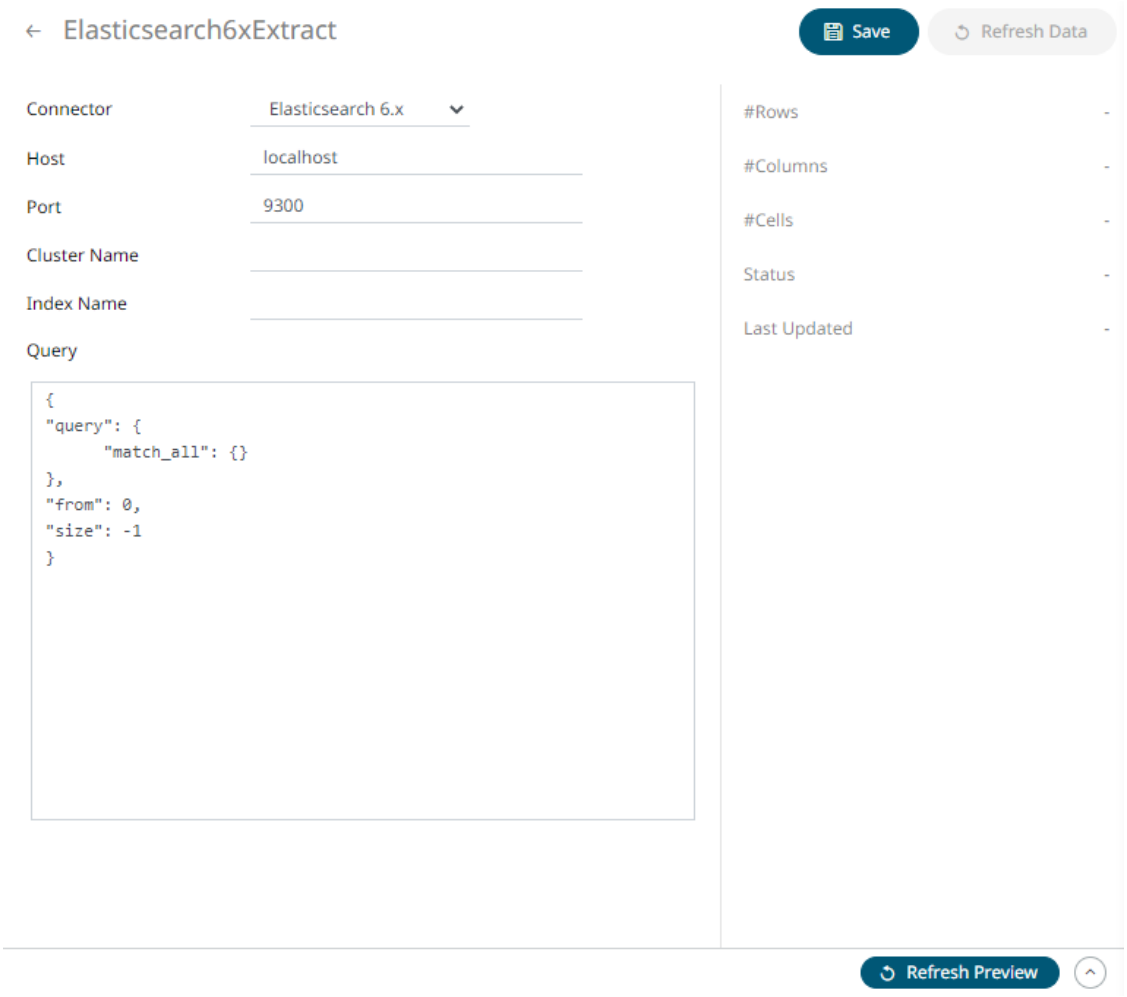
The Elasticsearch 6.x connector allows you to connect and access data from an Elasticsearch cluster using Transport Client.

NOTE

- **The Elasticsearch 6.x connector supports Elasticsearch 6.x versions.**
- **Elasticsearch 6.x and Elasticsearch 7.x connectors will not work in a single Panopticon Real Time instance due to conflicting Elasticsearch API dependencies.**

Steps:

1. On the *New Data Extract* page, select **Elasticsearch 6.x** in the *Connector* drop-down list.



2. Follow steps 3 to 4 in Elasticsearch 6.x to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

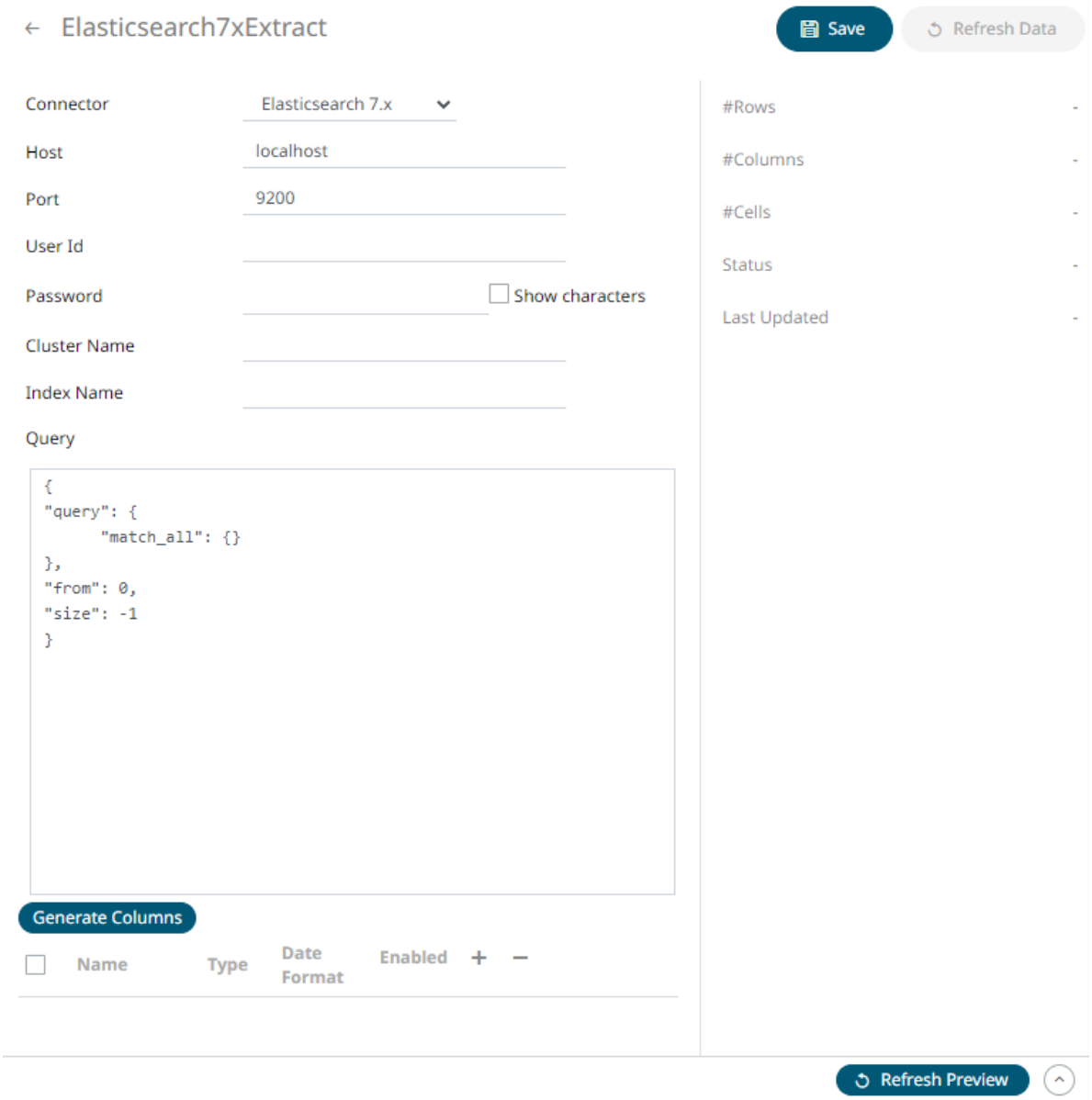
Creating Data Extract from Elasticsearch 7.x

The Elasticsearch 7.x connector allows you to connect and access data from an Elasticsearch cluster using Java High Level REST Client.

NOTE **Similar to Elasticsearch 6.x connector but uses Java High Level REST Client.**

Steps:

1. On the *New Data Extract* page, select **Elasticsearch 7.x** in the *Connector* drop-down list.



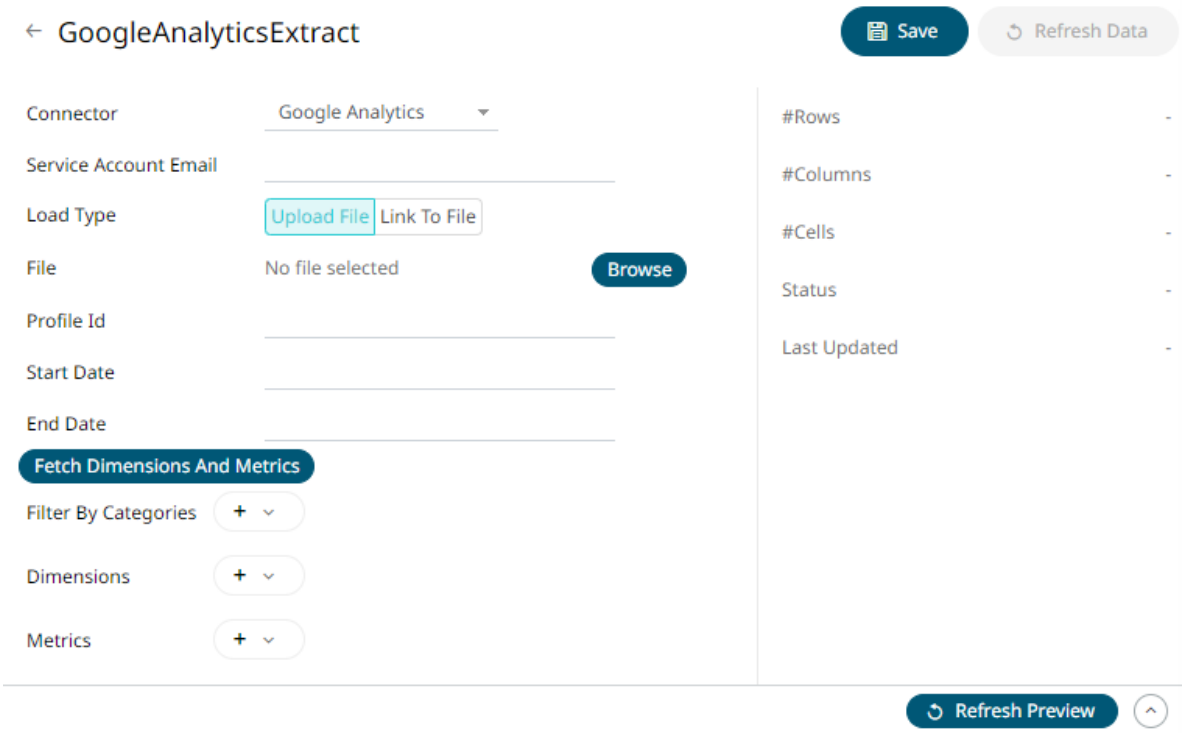
2. Follow steps 3 to 6 in Elasticsearch 7.x to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Google Analytics

The Google Analytics connector allows you to track and report website traffic using the Google Analytics service.

Steps:

1. On the *New Data Extract* page, select **Google Analytics** in the *Connector* drop-down list.



2. Follow steps 3 to 8 in Google Analytics to define the connector settings.
3. Click  to save and display the details of the data extract.

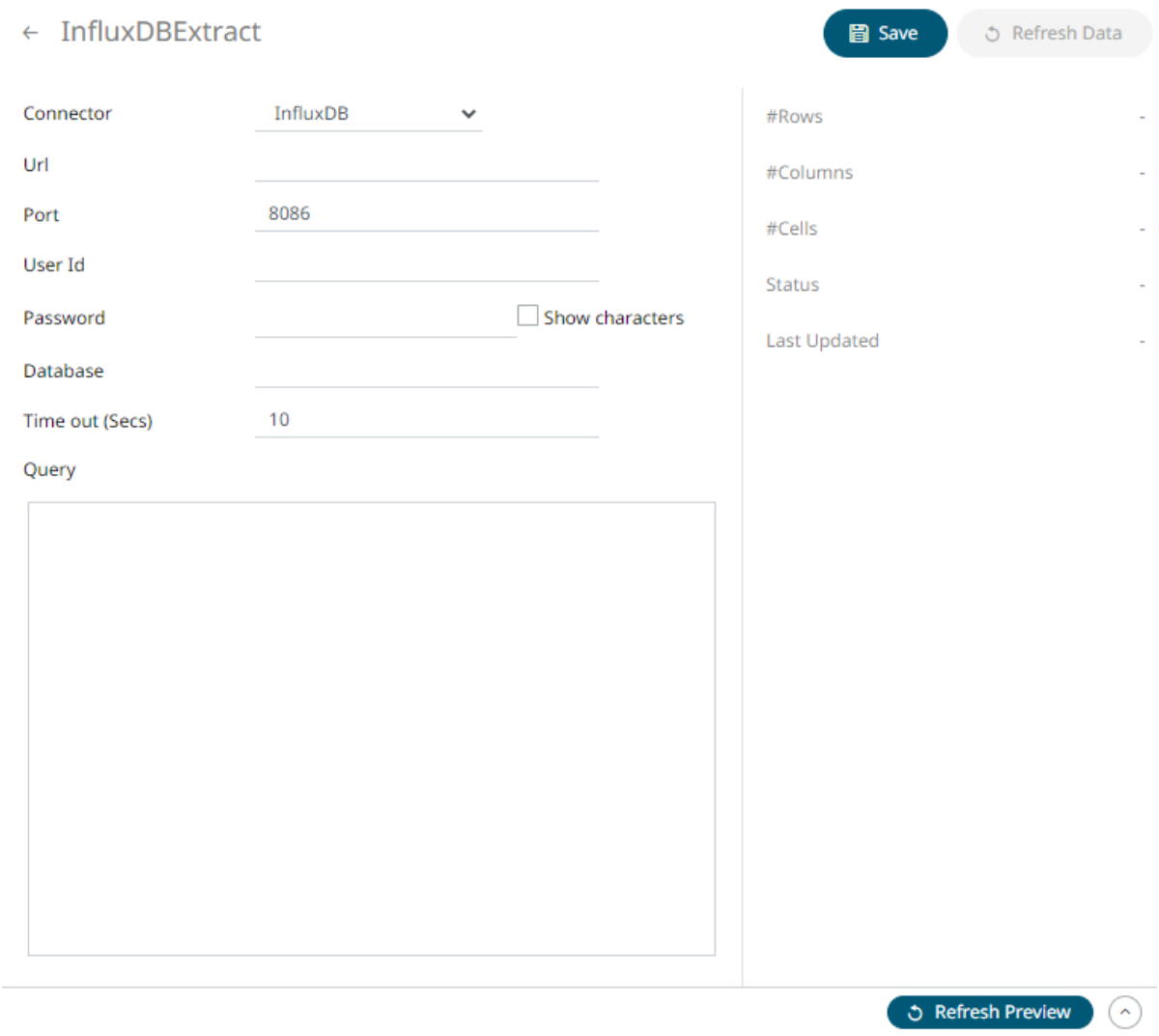
4. Click  then  to display the data preview.

Creating Data Extract from InfluxDB

The InfluxDB connector allows for the retrieval of a JSON data set from the InfluxDB. The database communicates over HTTP(S) where you can define a query on the URL to return the desired data.

Steps:

1. On the *New Data Extract* page, select **InfluxDB** in the *Connector* drop-down list.



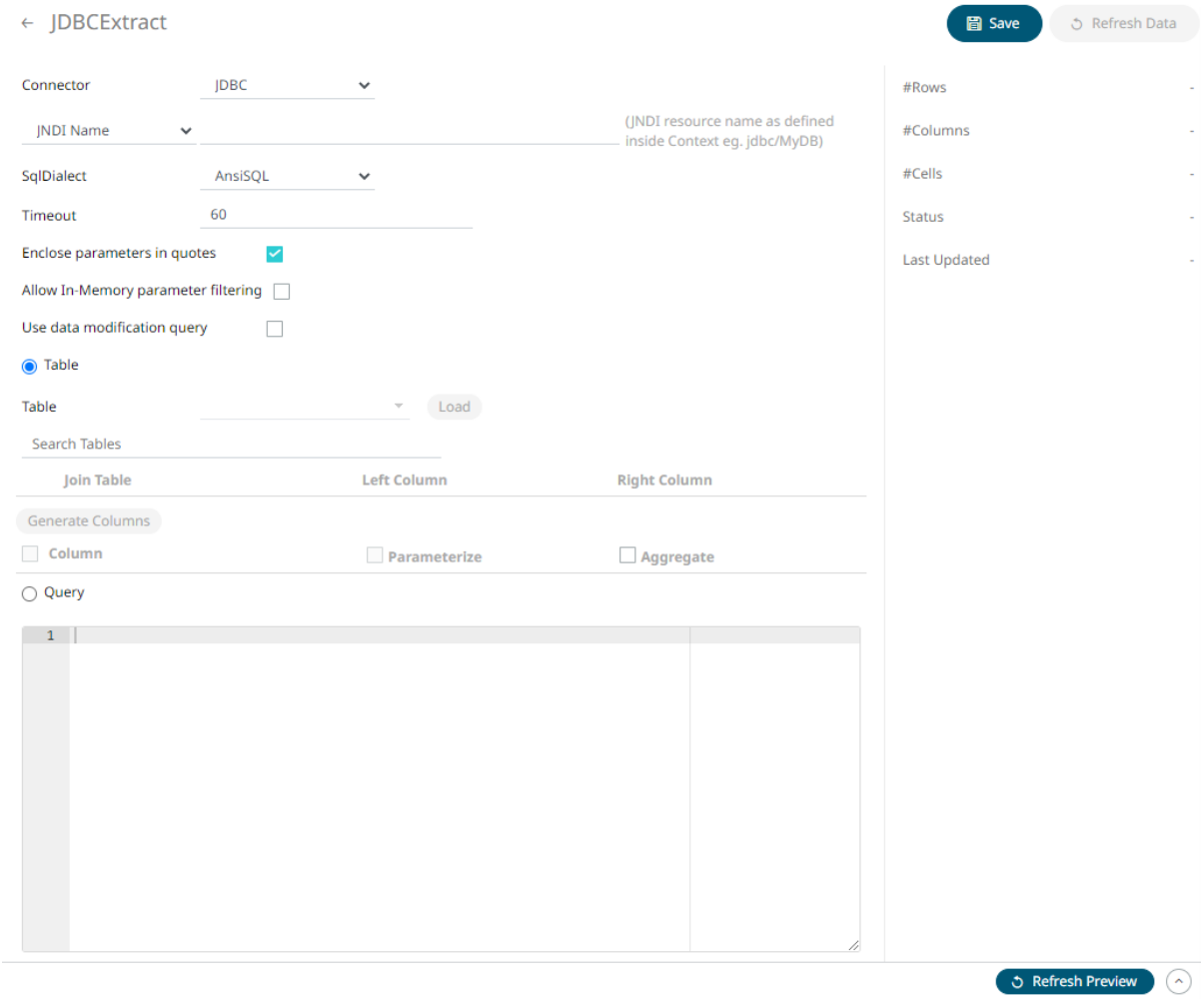
2. Follow steps 3 to 4 in InfluxDB to define the connector settings.
3. Click Save to save and display the details of the data extract.
4. Click then Refresh Preview to display the data preview.

Creating Data Extract from JDBC Database

The JDBC connector allows the retrieval and processing of data from virtually any database, that has a JDBC driver.

Steps:

1. On the *New Data Extract* page, select **JDBC** in the *Connector* drop-down list.



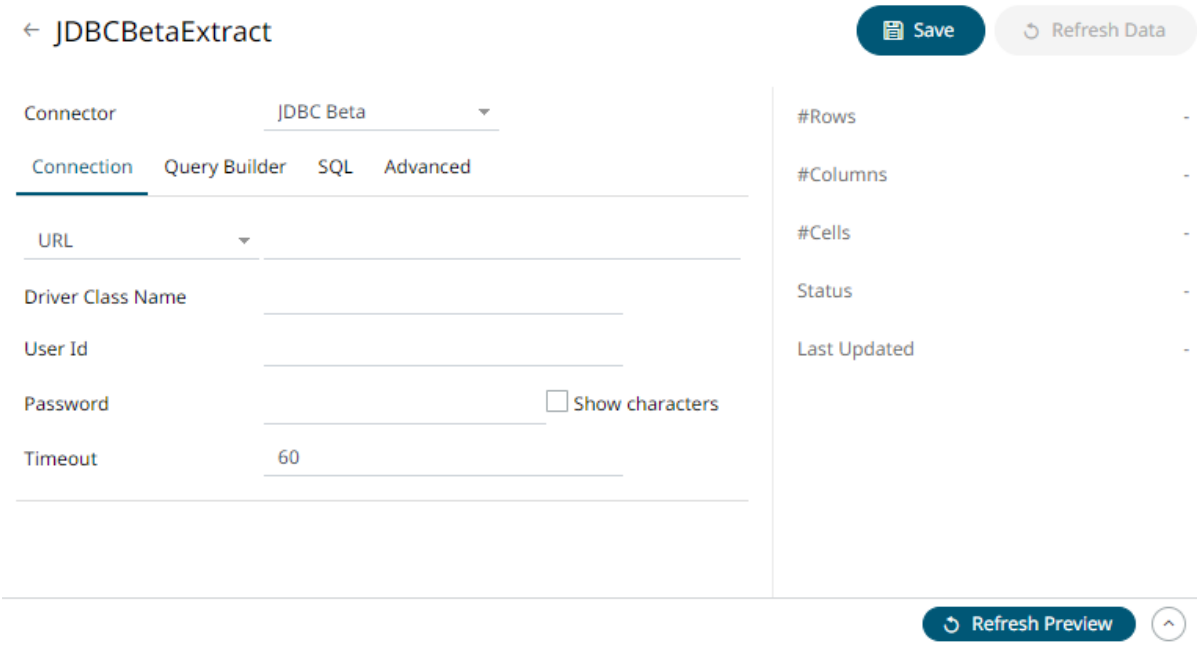
2. Follow steps 3 to 16 in JDBC Database to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from JDBC Beta

JDBC Beta connector is the new version of JDBC connector and is the recommended connector for any new JDBC connectivity for better performance and configuration UI. Just like JDBC connector, it also allows the retrieval and processing of data from virtually any database, that has a JDBC driver.

Steps:

1. On the *New Data Extract* page, select **JDBC Beta** in the *Connector* drop-down list.



2. Follow steps 3 to 7 in JDBC Beta Connector to define the connector settings.
3. Click  to save and display the details of the data extract.

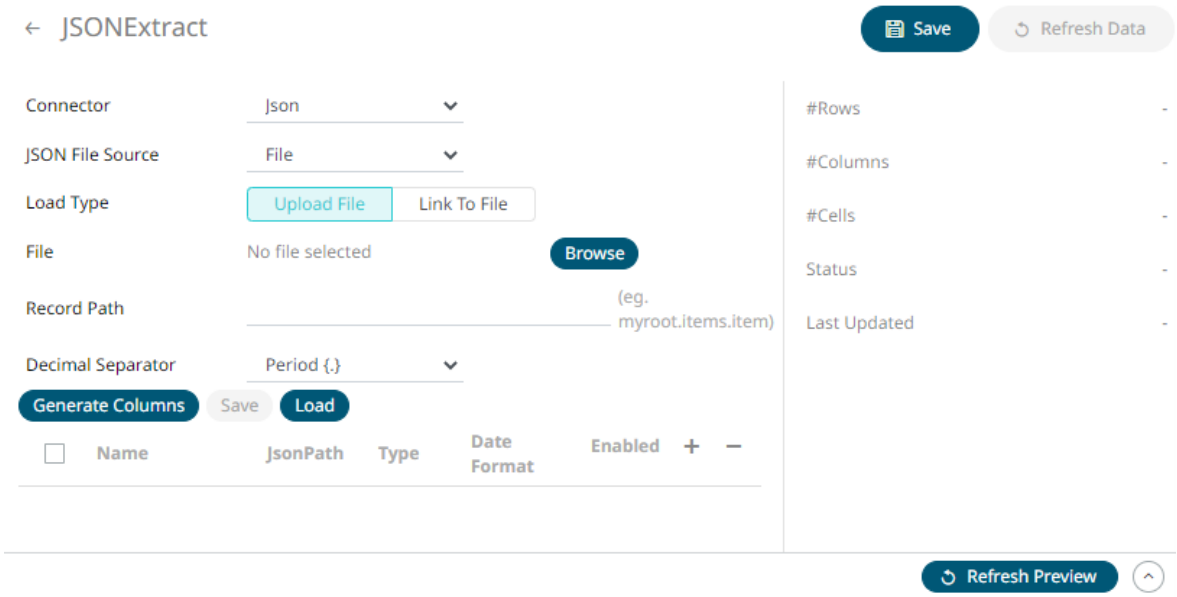
4. Click  then  to display the data preview.

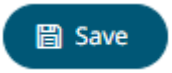
Creating Data Extract from JSON

The JSON connector allows the retrieval and processing of JSON files, either from a disk, a Text, or from a defined URL.

Steps:

1. On the *New Data Extract* page, select **JSON** in the *Connector* drop-down list.



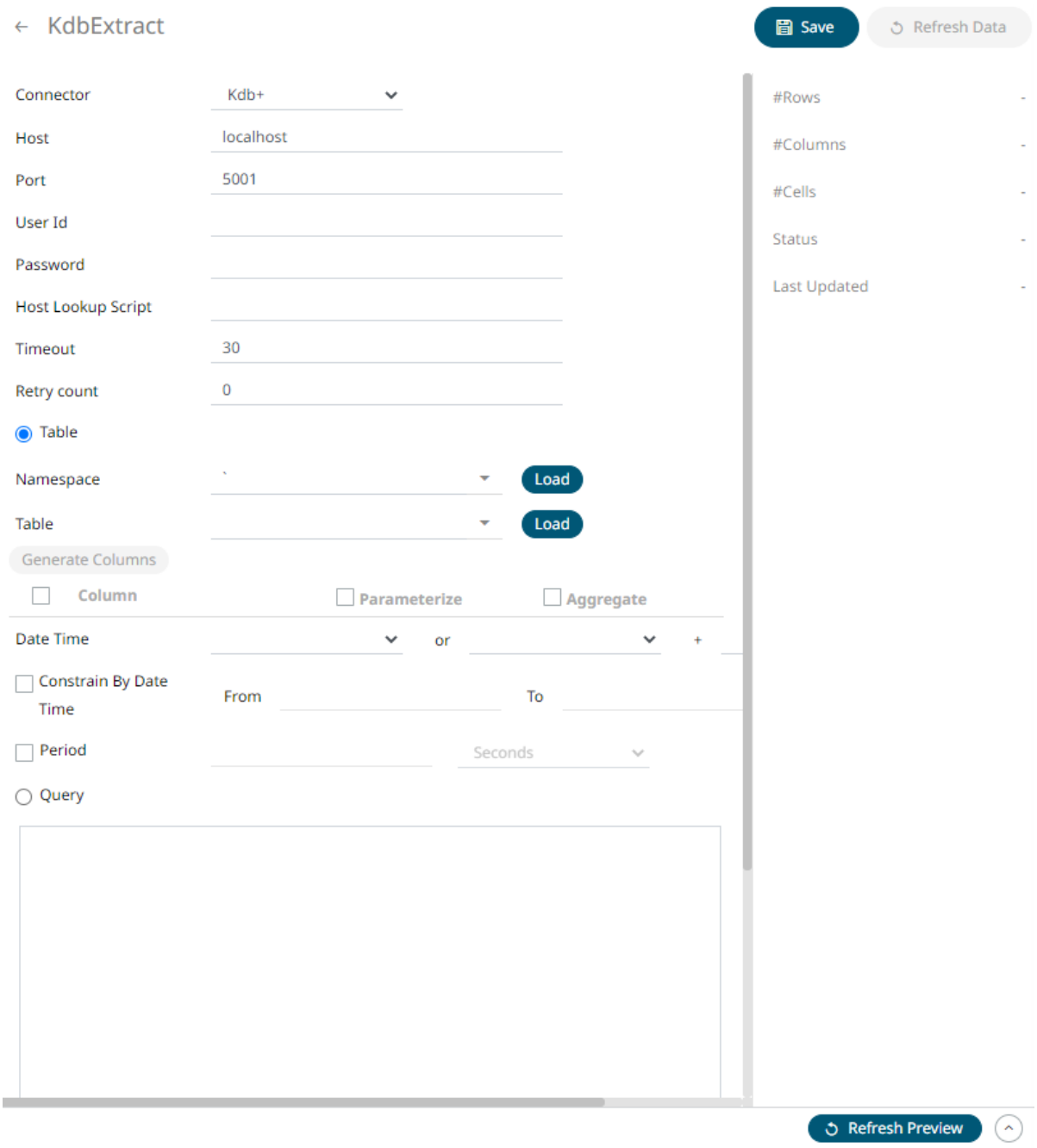
2. Follow steps 3 to 8 in JSON to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

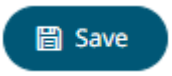
Creating Data Extract from Kx kdb+

The Kx kdb+ connector allows connection to the Kx kdb+ databases on a polled basis.

Steps:

1. On the *New Data Extract* page, select **Kdb+** in the *Connector* drop-down list.



2. Follow steps 3 to 19 in Kx kdb+ to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

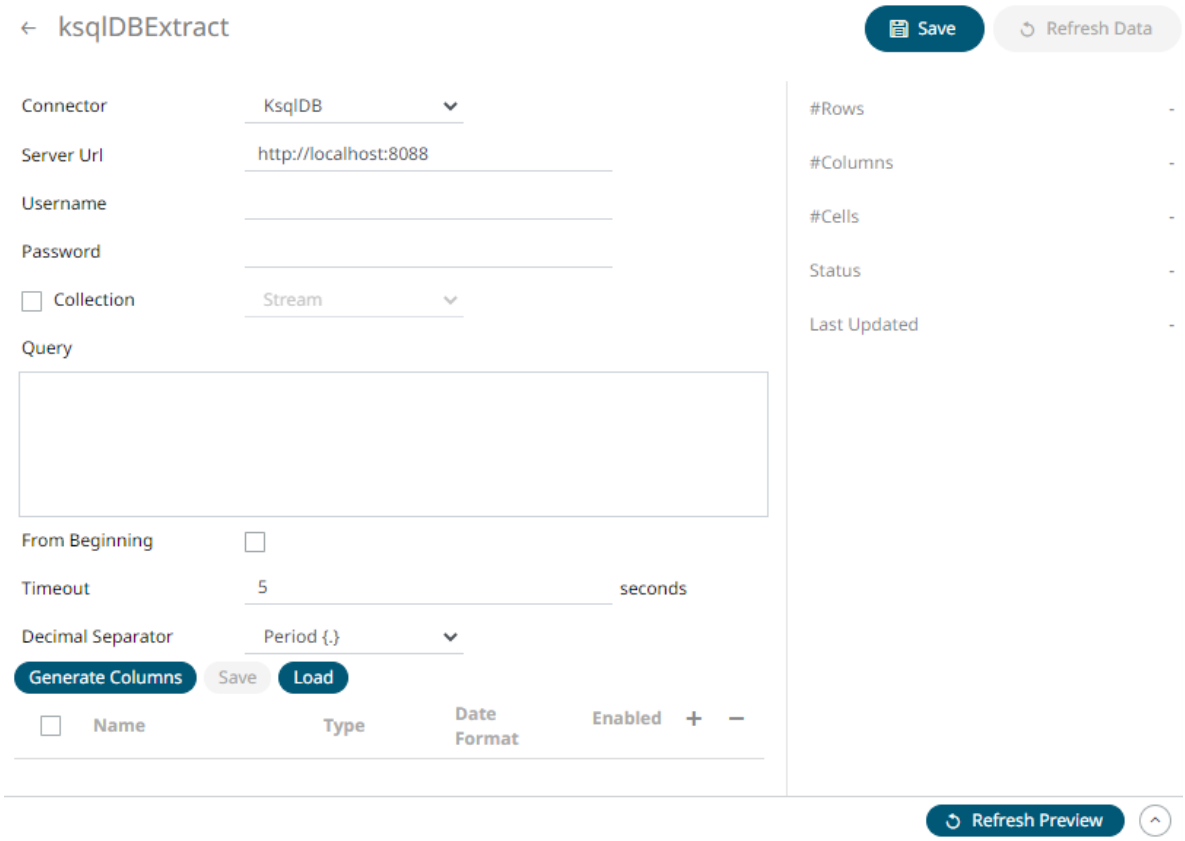
Creating Data Extract from ksqlDB

The ksqlDB connector allows executing ksqlDB pull queries and terminating push queries.

NOTE **Pull queries fetch the current state of a materialized view which is incrementally updated as new events arrive.**

Steps:

1. On the *New Data Extract* page, select **ksqlDB** in the *Connector* drop-down list



2. Follow steps 3 to 12 in ksqlDB to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

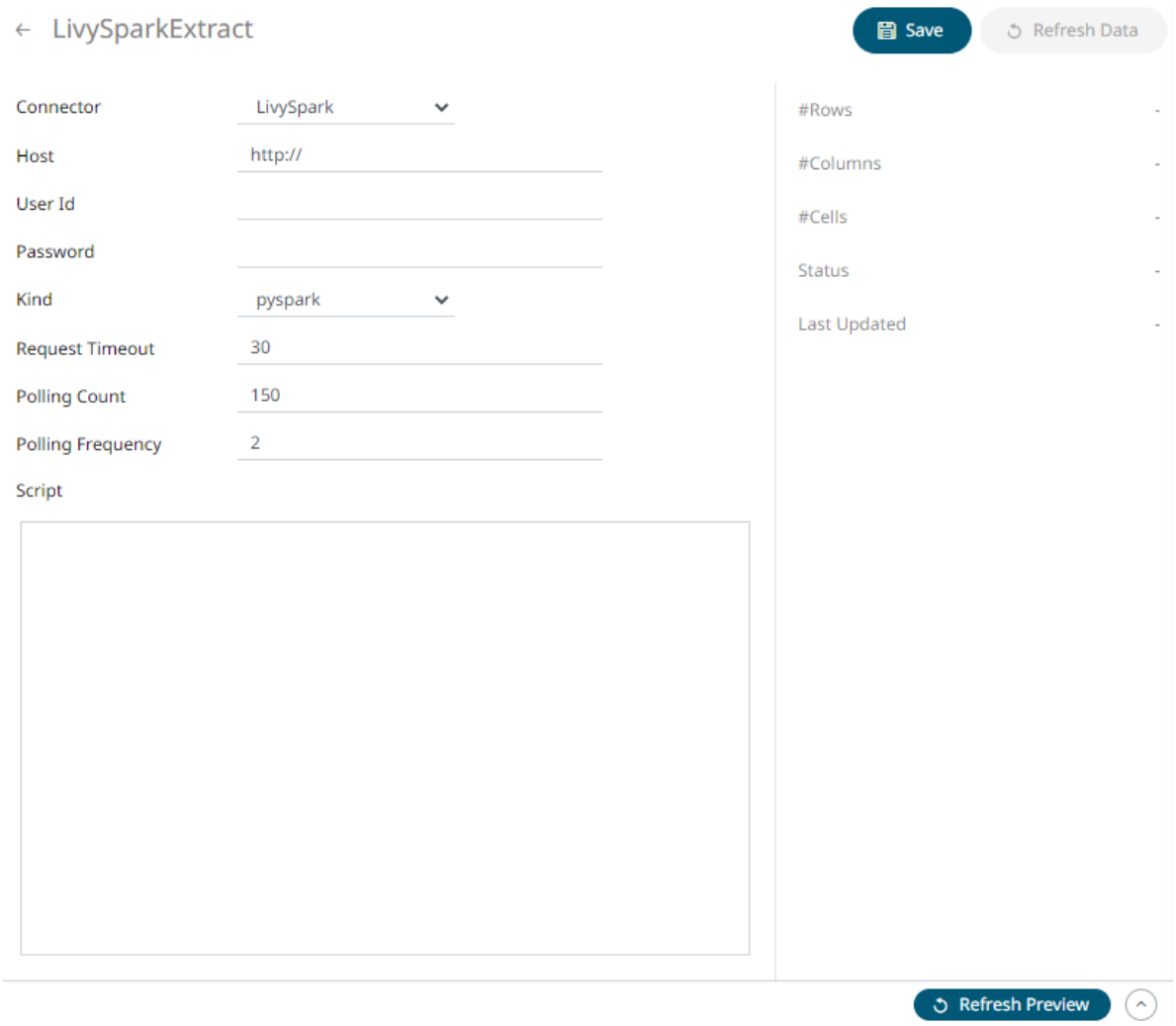
Creating Data Extract from Livy Spark

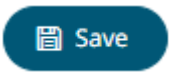
Livy is an open source REST interface for interacting with Apache Stark. It supports executing snippets of code or programs such as Scala, Python, Java, and R in a Spark context that runs locally or in Apache Hadoop YARN.

The Livy Spark connector allows you to run these codes and fetch the data in Panopticon Real Time.

Steps:

1. On the *New Data Extract* page, select **LivySpark** in the *Connector* drop-down list.



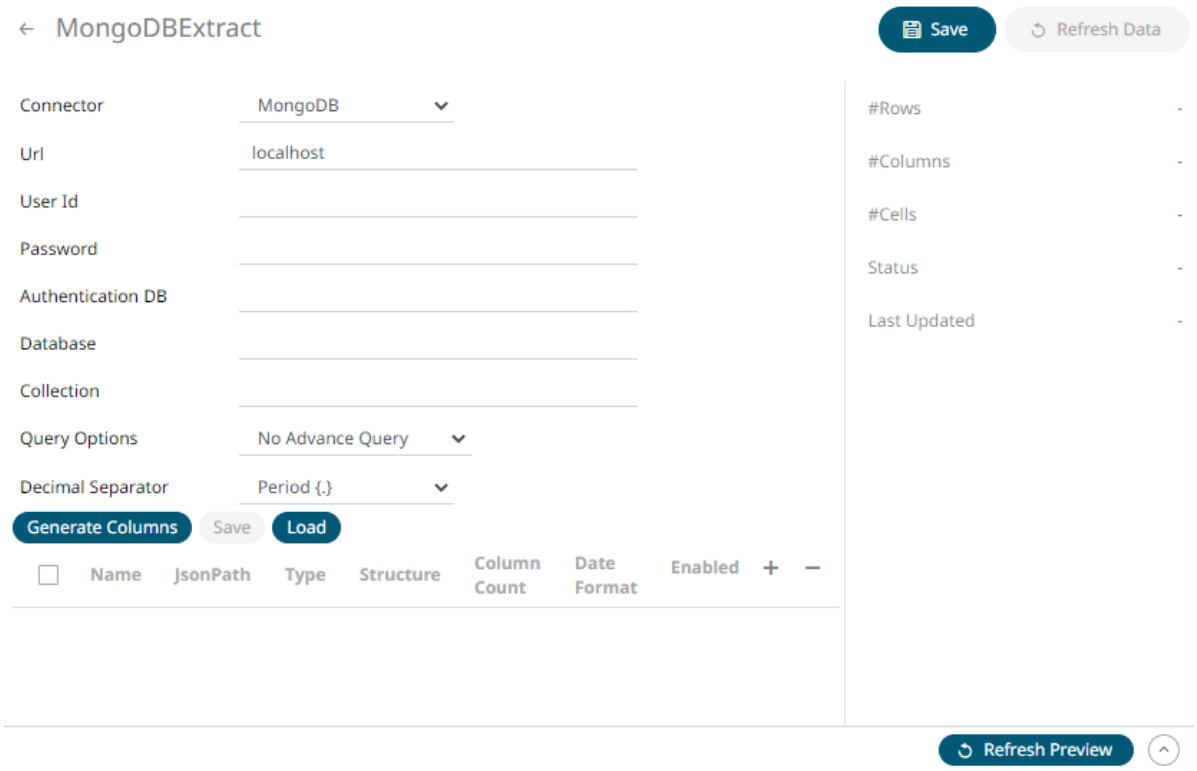
2. Follow step 3 in Livy Spark to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from MongoDB

The MongoDB connector is an interface used to import MongoDB's schema-less BSON documents into a table schema that Panopticon Real Time can interpret and analyze. It uses many BSON structure types and MongoDB query features.

Steps:

1. On the *New Data Extract* page, select **MongoDB** in the *Connector* drop-down list.



2. Follow steps 3 to 9 in MongoDB to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from MS Excel (legacy)

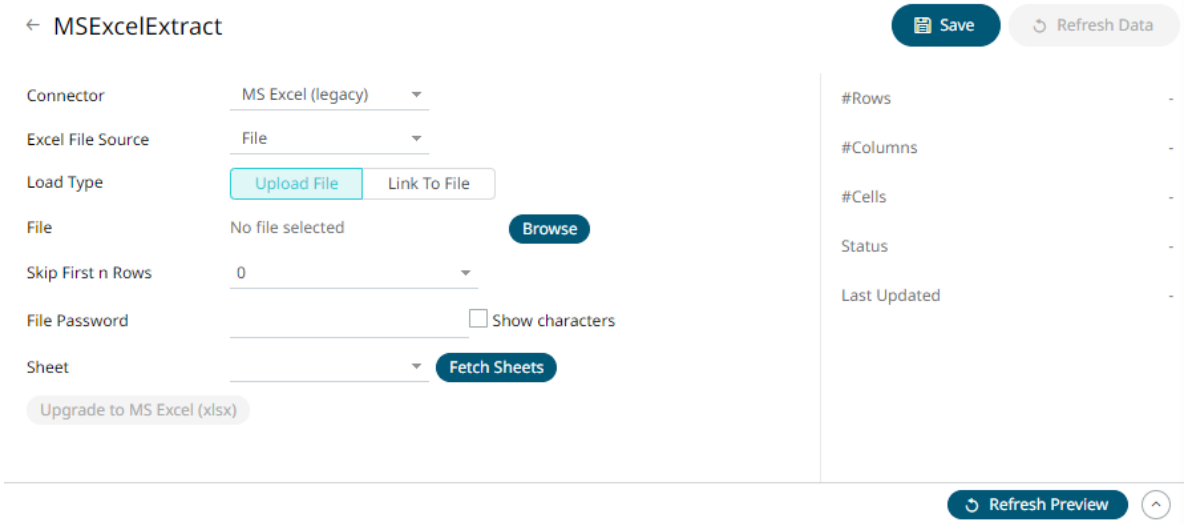
Used for retrieving data from MS Excel workbooks or spreadsheets, where for each selected sheet, the first row contains the field/column names, and subsequent rows contain the data.

NOTE **In production use, it is not advised to use a single Excel file as multiple Panopticon data sources. This is because, when using the same Excel file with the data on several sheets, conflicts may occur in reading the file.**

A workaround could be to set up a Data Extract with scheduled refresh for each of the datasets in the Excel file, and then let the data tables in your workbook load the data from the Data Extracts.

Steps:

1. On the *New Data Extract* page, select **MS Excel (legacy)** in the *Connector* drop-down list.



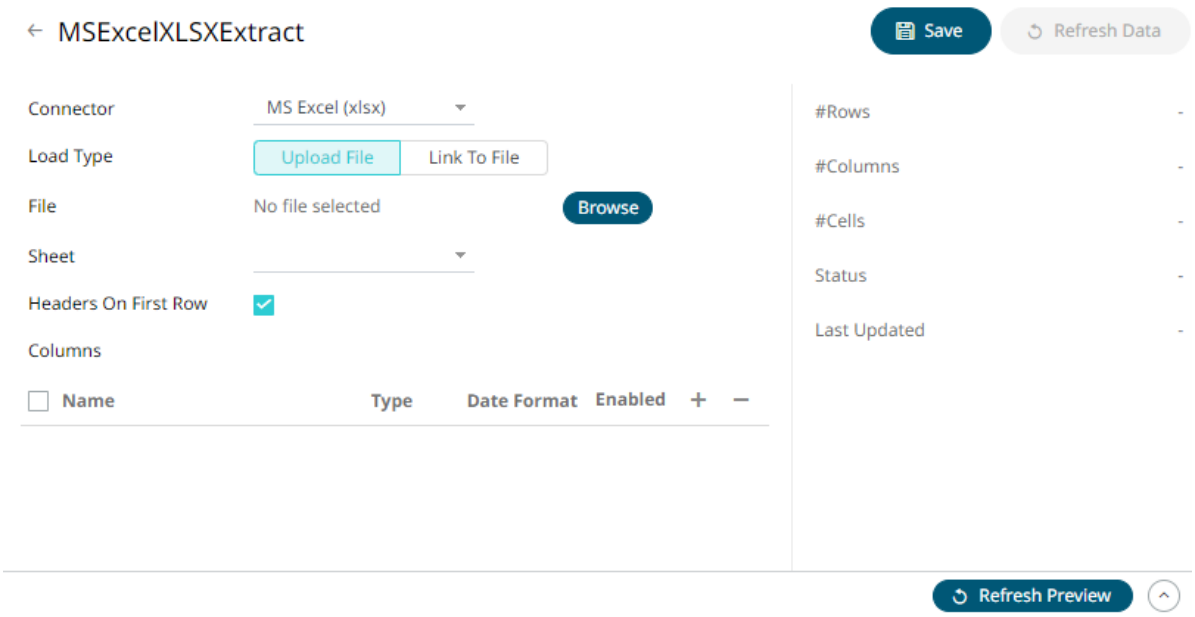
2. Follow steps 3 to 7 in MS Excel (legacy) to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from MS Excel (xlsx)

The MS Excel (xlsx) connector allows for retrieval and processing of MS Excel workbook data stored using the XLSX file format. The MS Excel (xlsx) connector processes data on a row-by-row basis, allowing for better performance and less memory consumption compared to the MS Excel (legacy) connector.

Steps:

1. On the *New Data Extract* page, select **MS Excel (xlsx)** in the *Connector* drop-down list.



2. Follow steps 3 to 6 in MS Excel (xlsx) to define the connector settings.
3. Click Save to save and display the details of the data extract.
4. Click then Refresh Preview to display the data preview.

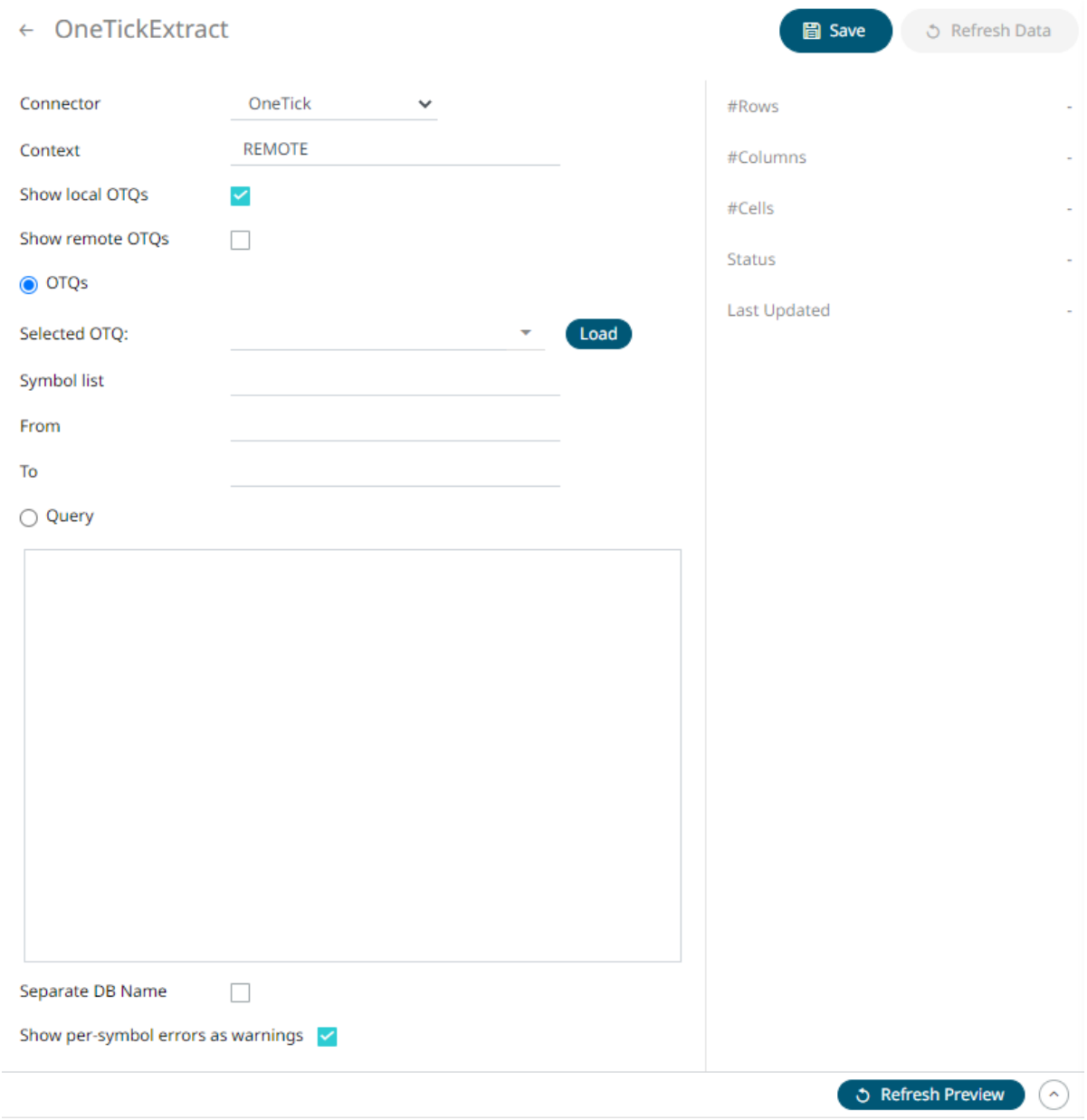
Creating Data Extract from OneTick

The OneTick connector allows connection to OneMarketData OneTick tick history databases on a polled basis. In general, it is used to retrieve conflated time series data sets. The connector supports either:

- Execution of a specified OTQ
- Execution of a specified parameterized OTQ
- Execution of a custom SQL Query

Steps:

1. On the *New Data Extract* page, select **OneTick** in the *Connector* drop-down list.



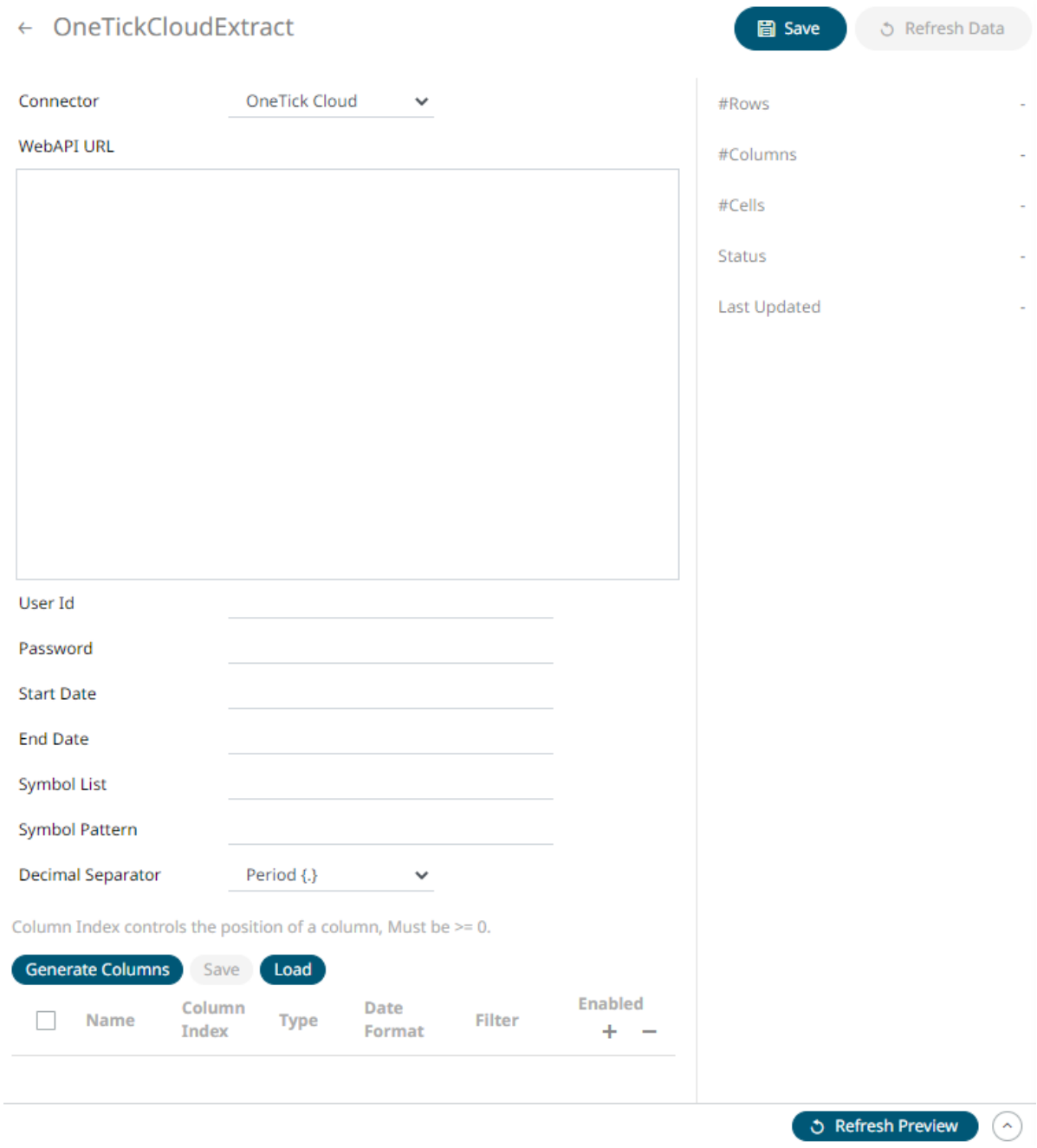
2. Follow steps 3 to 7 in OneTick to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from OneTick Cloud

The OneTick Cloud connector allows access to historic market data with no software dependencies by using the OneTick Cloud and their web API.

Steps:

1. On the *New Data Extract* page, select **OneTick Cloud** in the *Connector* drop-down list.



2. Follow steps 3 to 11 in OneTick Cloud to define the connector settings.
3. Click  to save and display the details of the data extract.

4. Click  then  to display the data preview.

Creating Data Extract from Python

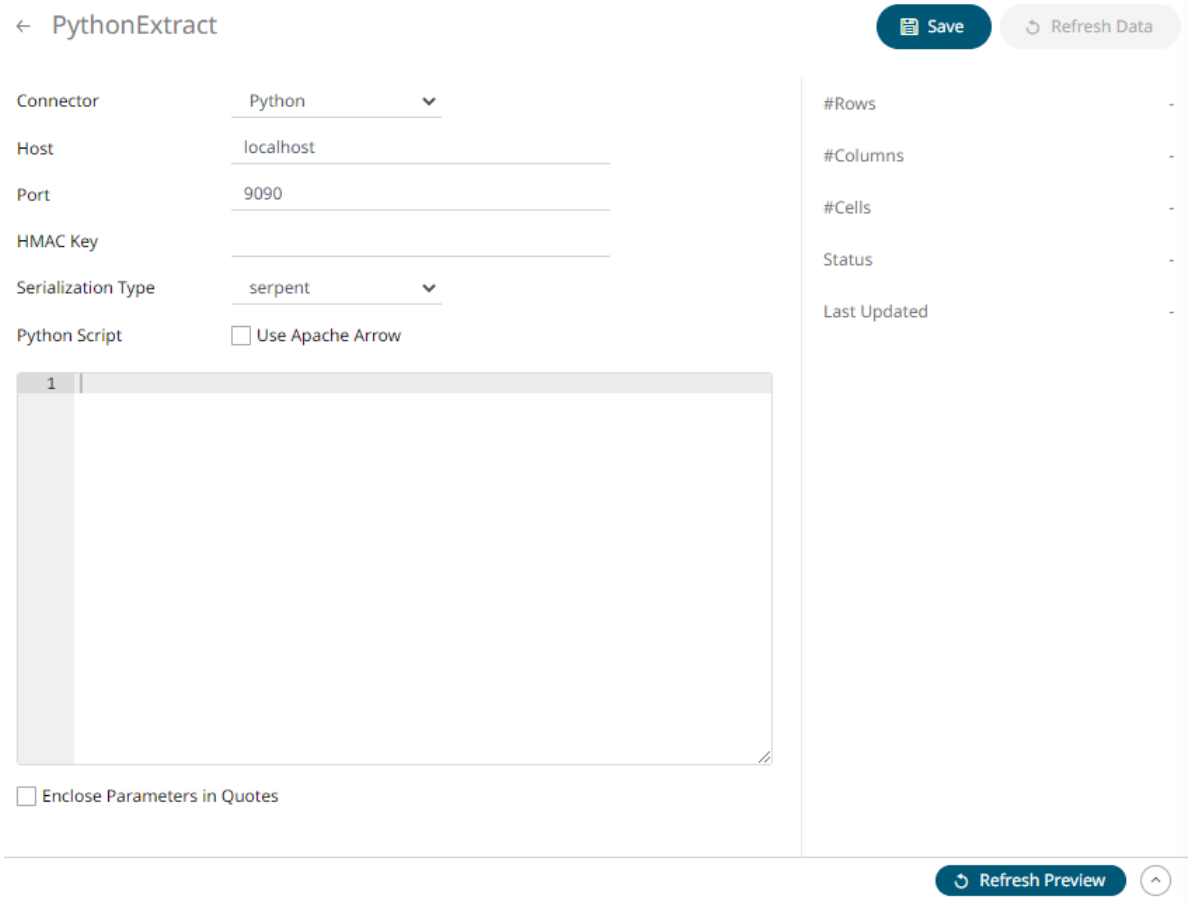
The Python connector allows the retrieval of output data from a Python Pyro (Python Remote Objects) process.

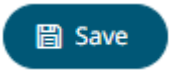
For Python connectivity, Python must be first installed, together with the latest version of Pyro4. In addition, Pyro must be initiated manually or through using the batch file **start_Python_connectivity.bat**.

If the scripts utilize additional modules such as Numpy & Scipy in the shipped example, these also need to be installed into the existing Python installation.

Steps:

1. On the *New Data Extract* page, select **Python** in the *Connector* drop-down list.



2. Follow steps 3 to 7 in Python to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

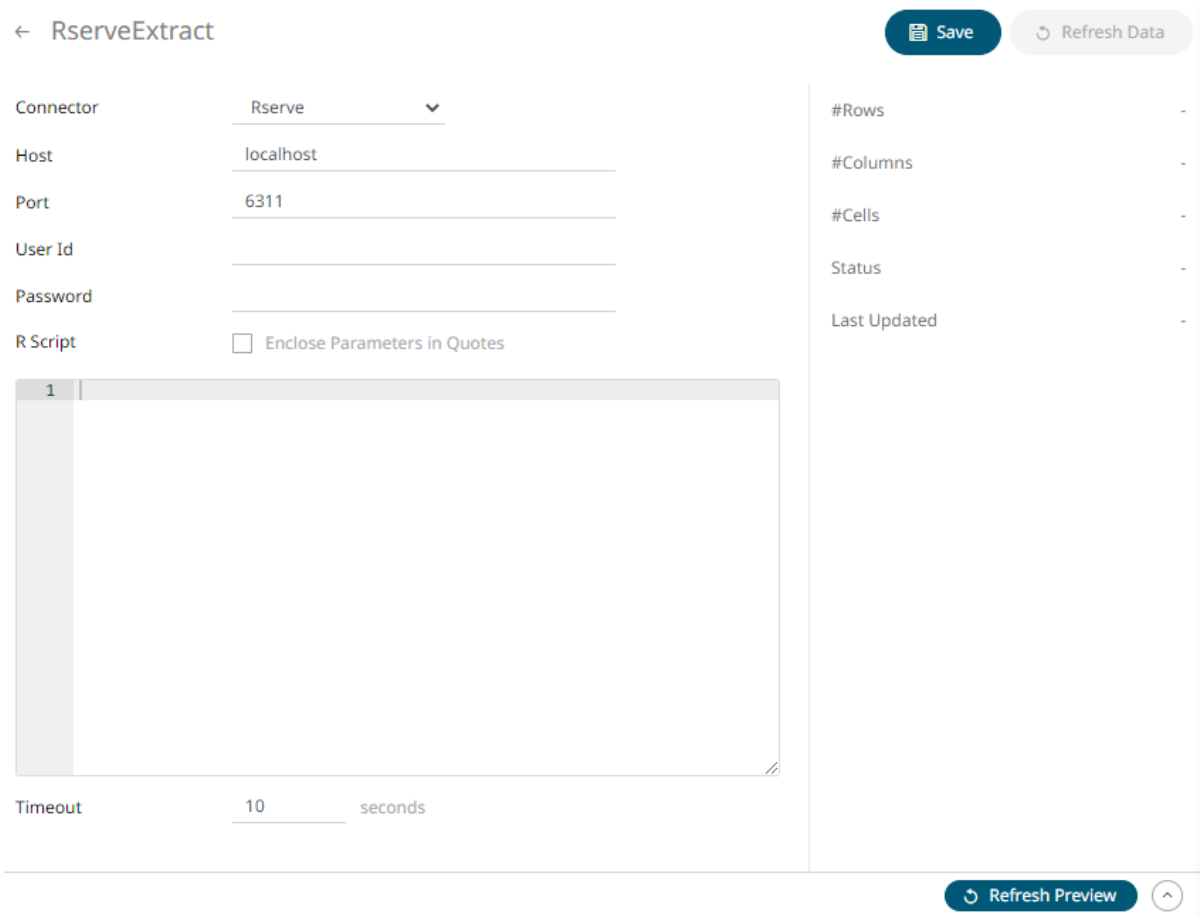
Creating Data Extract from Rserve

The Rserve connector allows the retrieval of an output data frame from a running Rserve process.

For R connectivity, R must be first installed, together with the Rserve library. In addition, R must be open, and the Rserve library must be loaded and initialized.

Steps:

1. On the *New Data Extract* page, select **Rserve** in the *Connector* drop-down list.



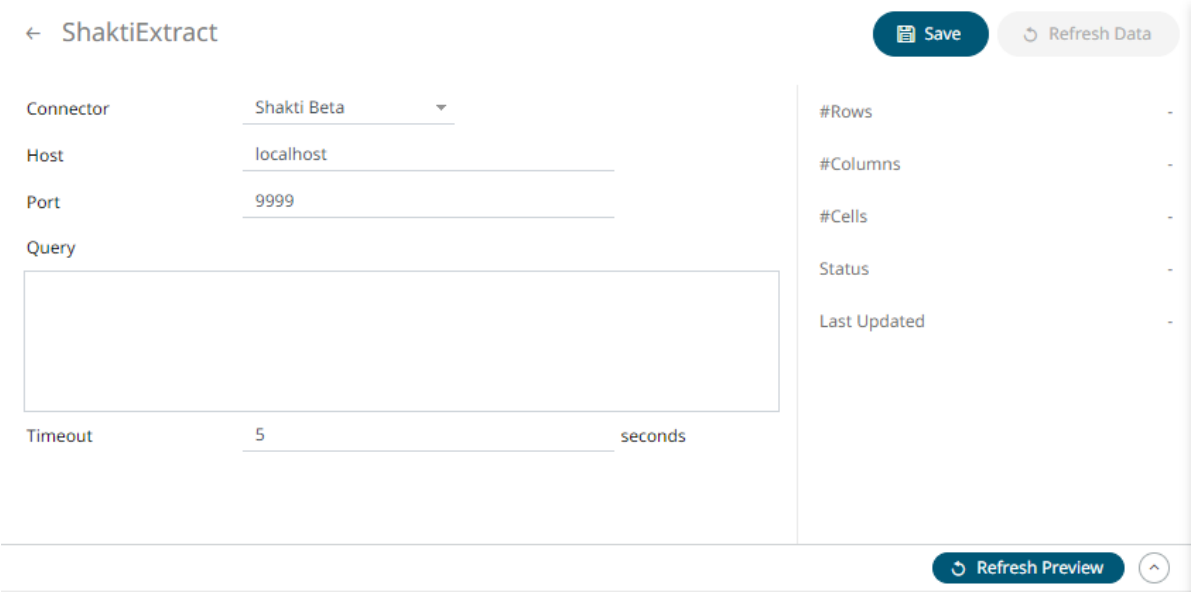
2. Follow steps 3 to 6 in Rserve to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Shakti Beta

The Shakti connector allows connecting to Shakti databases on a polled basis.

Steps:

1. On the *New Data Extract* page, select **Shakti Beta** in the *Connector* drop-down list.



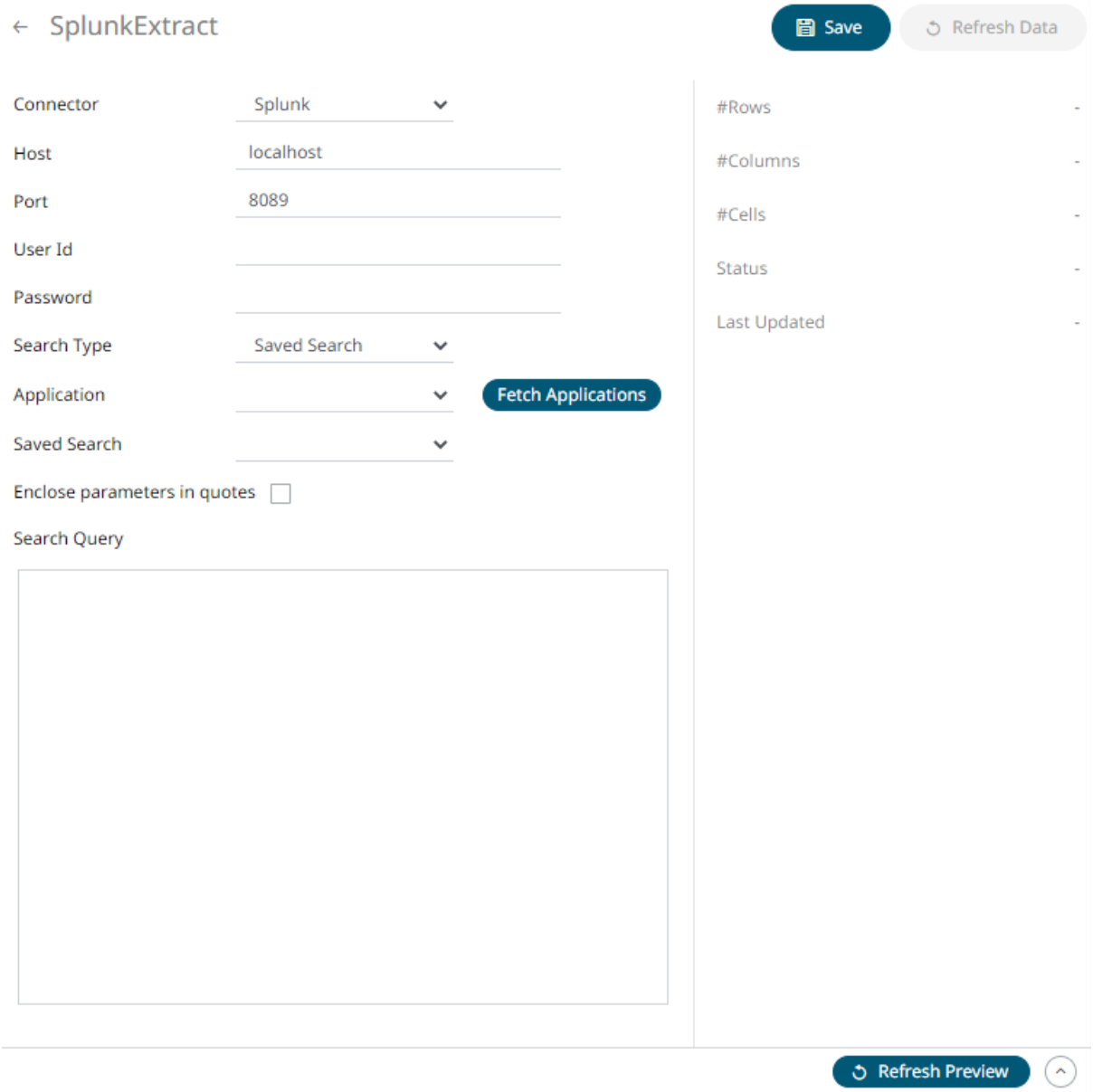
2. Follow steps 3 to 5 in Shakti to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Splunk

The Splunk connector allows the retrieval of data from a Splunk instance.

Steps:

5. On the *New Data Extract* page, select **Splunk** in the *Connector* drop-down list.



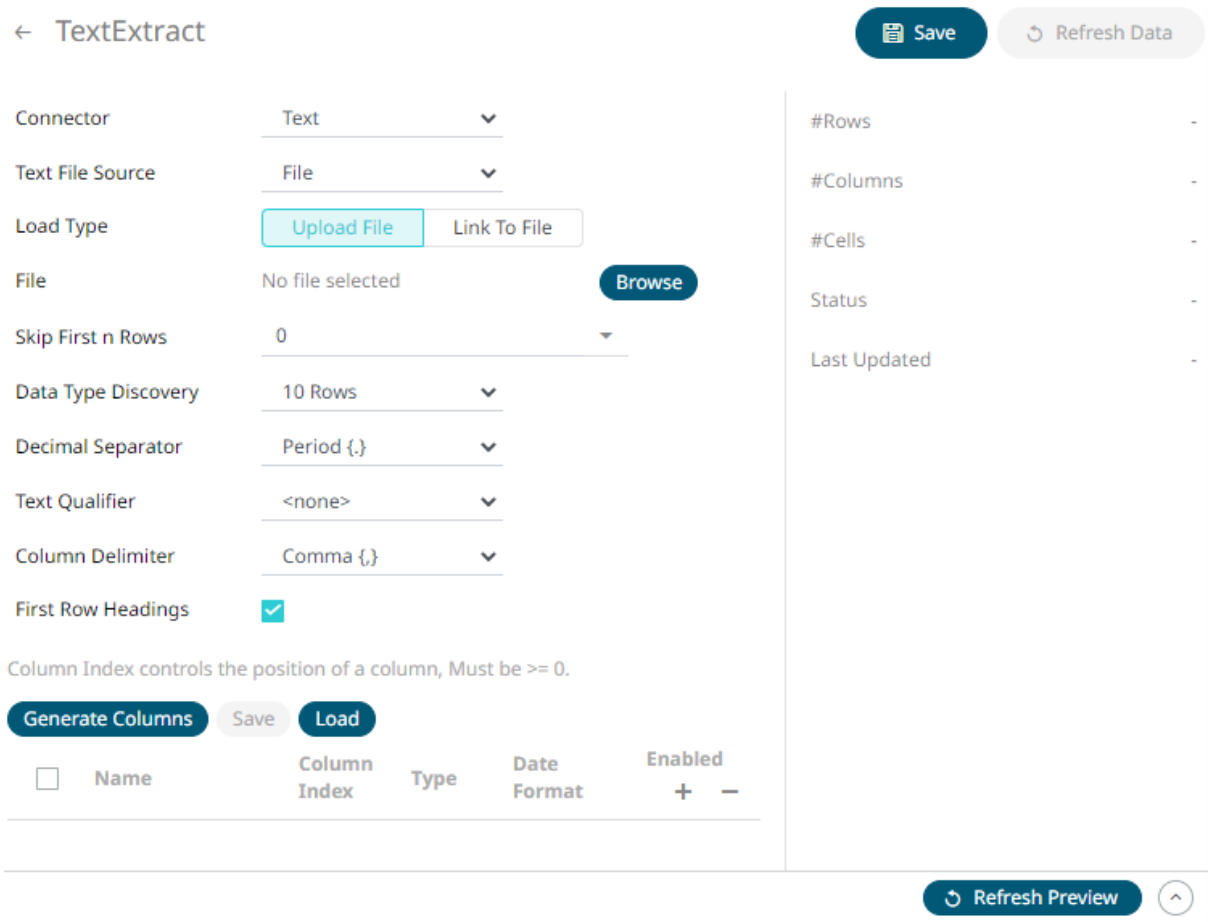
2. Follow steps 3 to 7 in Splunk to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Text

The Text connector allows the retrieval and processing of delimited Text files (such as CSV, TSV, and so on), either from a disk or from a defined URL.

Steps:

1. On the *New Data Extract* page, select **Text** in the *Connector* drop-down list.



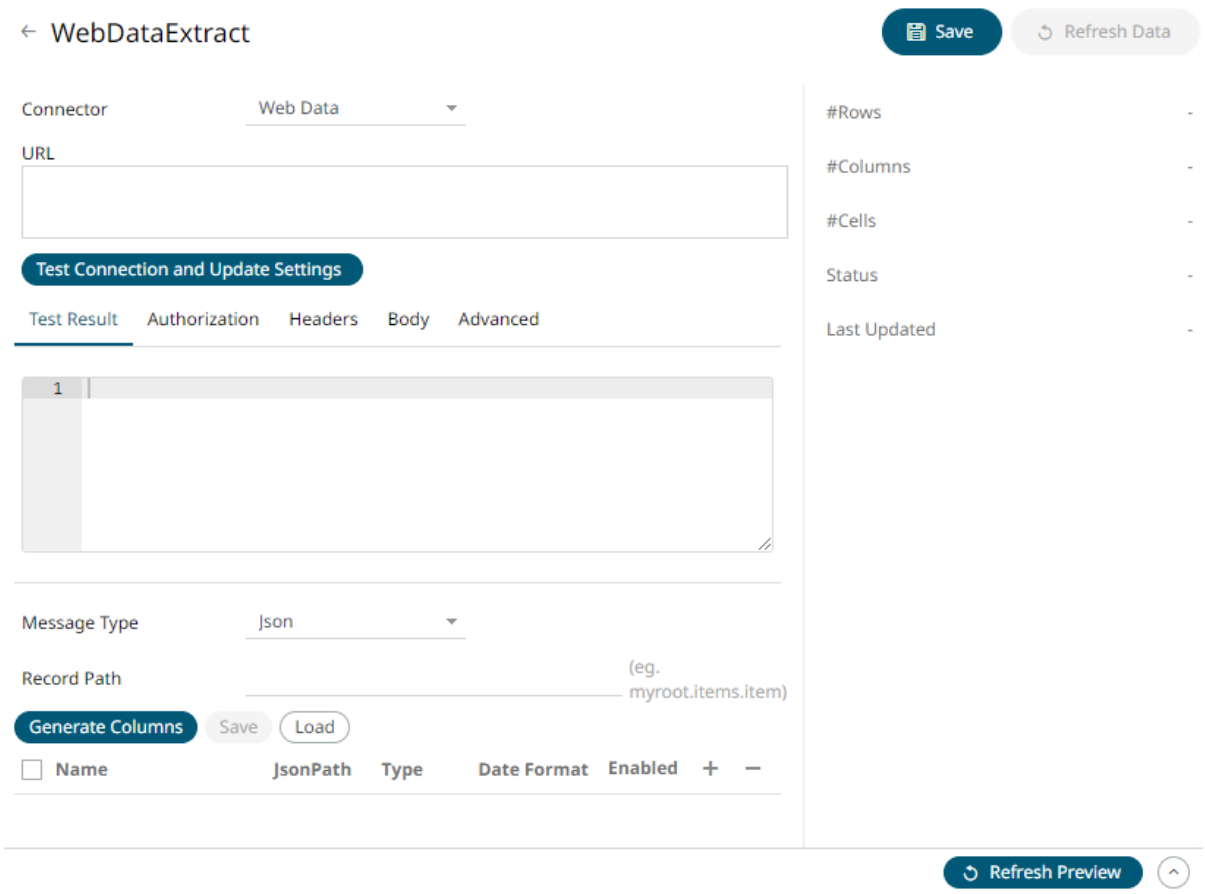
2. Follow steps 3 to 6 in Text to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

Creating Data Extract from Web Data

The Web Data connector allows the retrieval and processing of JSON, delimited Text (such as CSV, TSV), and XML data that is accessible over HTTP/HTTPS.

Steps:

1. On the *New Data Extract* page, select **Web Data** in the *Connector* drop-down list.



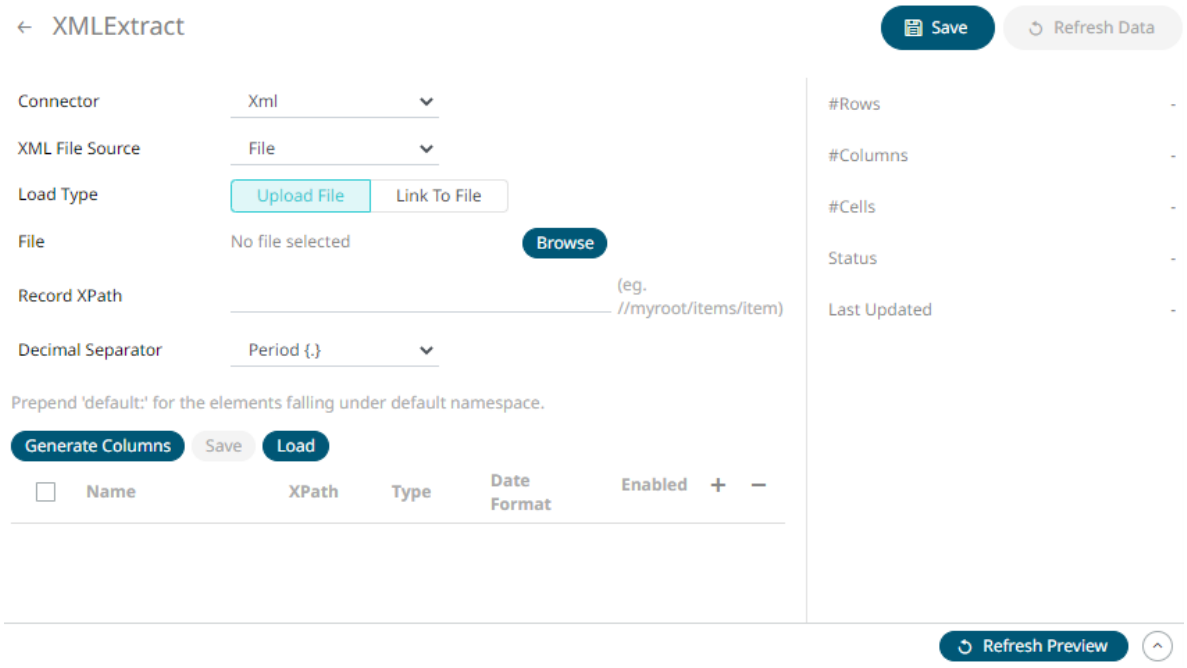
4. Follow steps 3 to 8 in Web Data Connector to define the connector settings.
5. Click  to save and display the details of the data extract.
6. Click  then  to display the data preview.

Creating Data Extract from XML

The XML connector allows the retrieval and processing of XML files, either from a disk, a Text, or from a defined URL.

Steps:

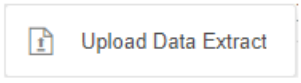
1. On the *New Data Extract* page, select **Xml** in the *Connector* drop-down list.



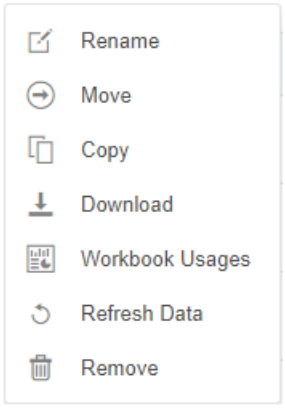
2. Follow steps 3 to 8 in XML to define the connector settings.
3. Click  to save and display the details of the data extract.
4. Click  then  to display the data preview.

DATA EXTRACT AND FOLDER CONTEXT MENU

The *Data Extracts* page provides context menu in each folder and the data extract.



Folder Context Menu



Data Extract Context Menu

The *Data Extract* context menu options include:

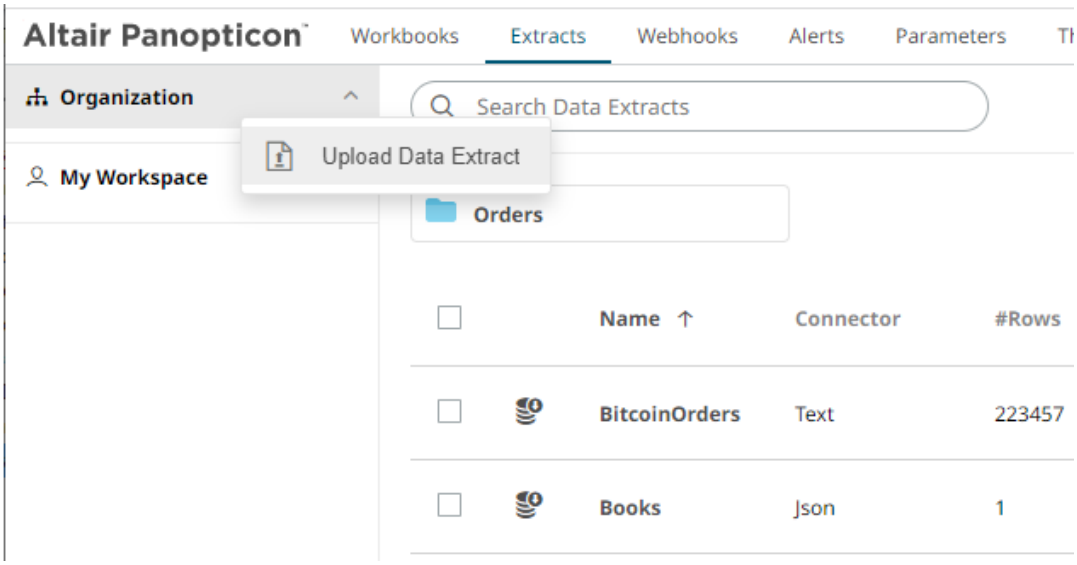
Menu Option	Description
Rename	Rename the data extract.
Move	Move a data extract to another folder where the user has permission.
Copy	Copy a data extract to another folder where the user has permission.
Download	Download a copy of the data extract definition.
Workbook Usages	View the list of workbooks currently using the data extract.
Refresh Data	Refresh the data extract.
Remove	Delete the data extract.

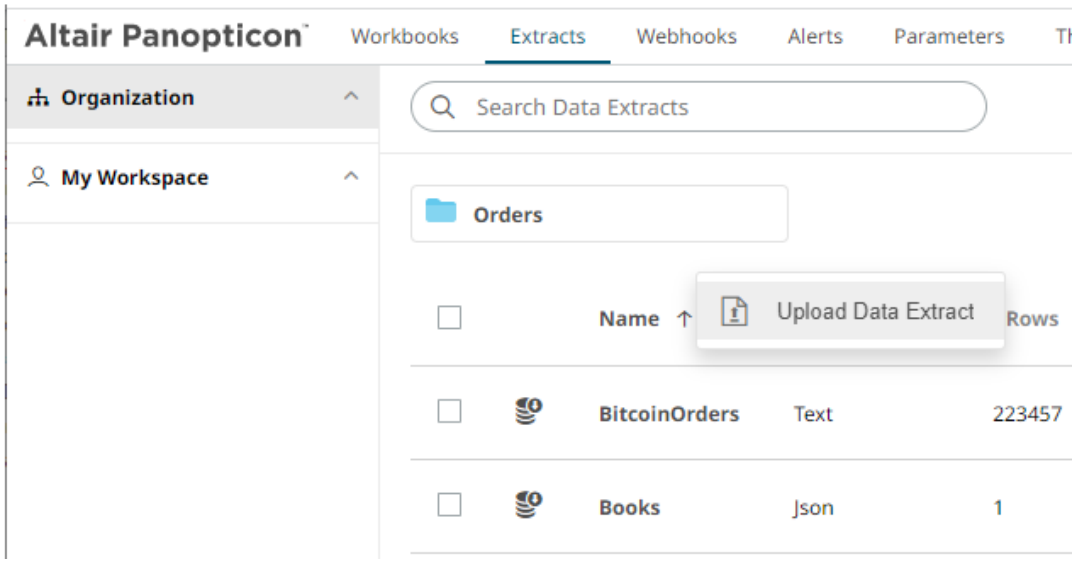
Uploading Data Extracts

Users with a Designer role can upload data extracts to folders where they have permission.

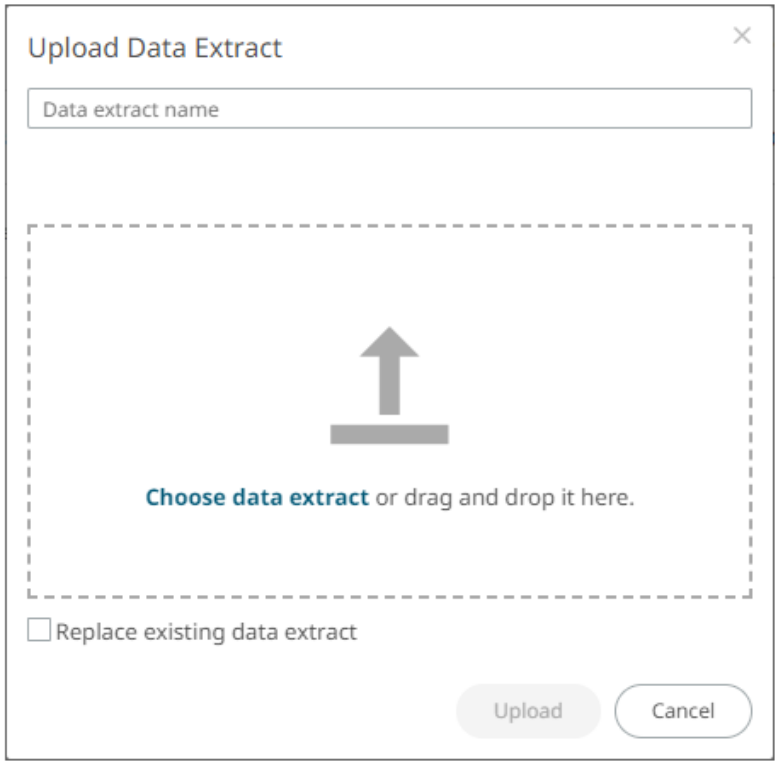
Steps:

1. On the *Data Extracts* page, click on a folder or a personal folder and select **Upload Data Extract**.



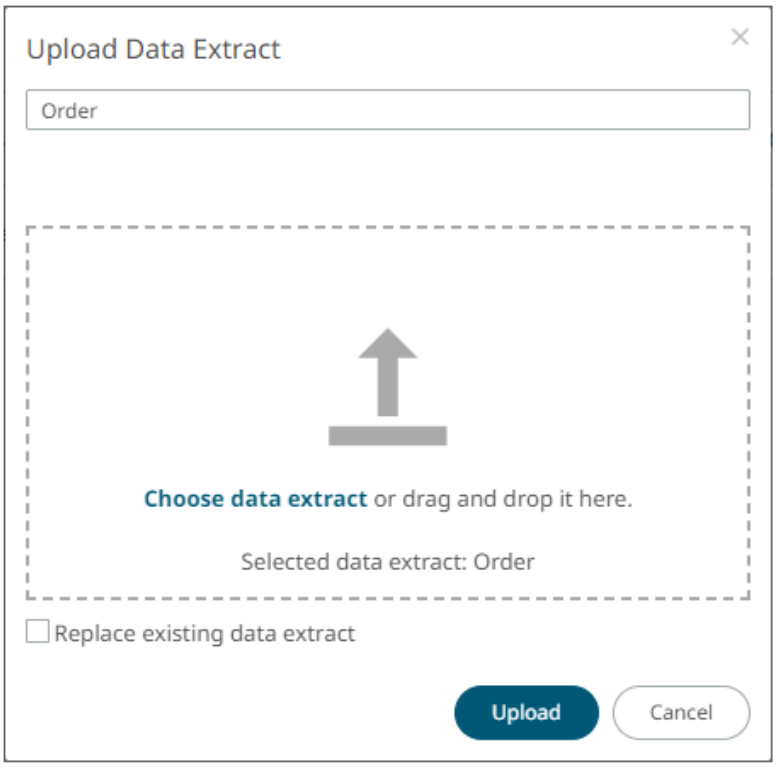


The *Upload Data Extract* dialog displays.



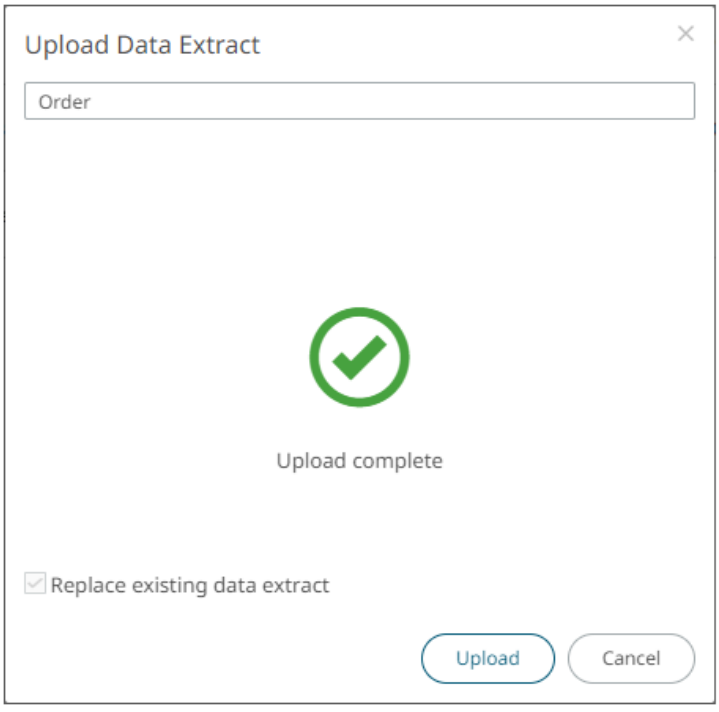
2. To upload a data extract, you can either:
   - drag it from your desktop and drop on the dialog, or
   - click **Choose Data Extract** and select one on the *Open* dialog that displays.

   The name of the data extract is displayed on the uploaded data extract area and in the *Name* box.

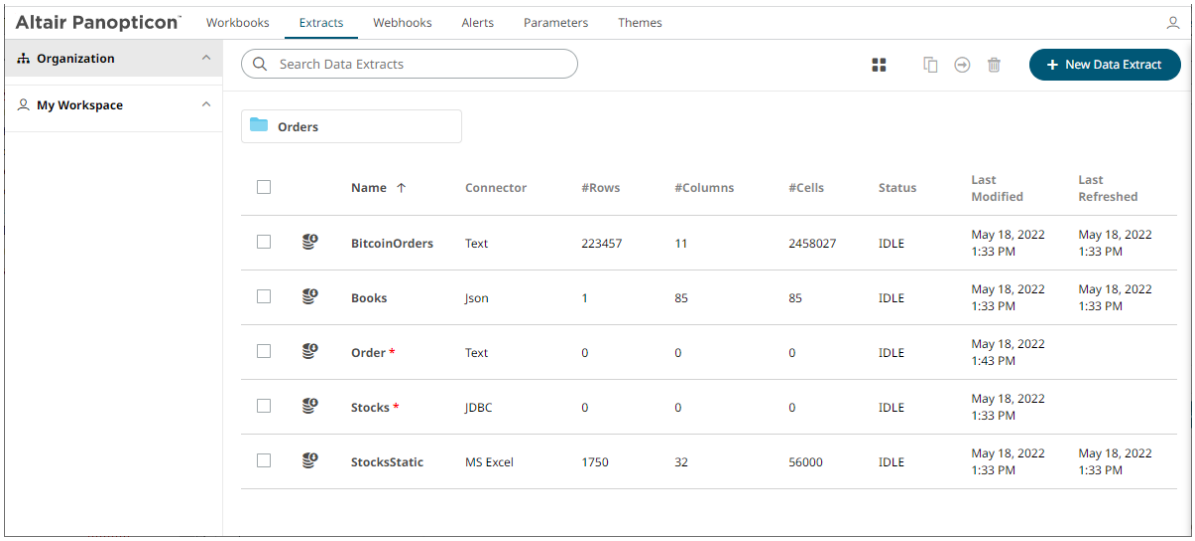


3. You can opt to rename the data extract.
4. To replace an existing data extract, check the *Replace existing data extract* box.
5. Click Upload.

   You will be notified once the data extract is uploaded.



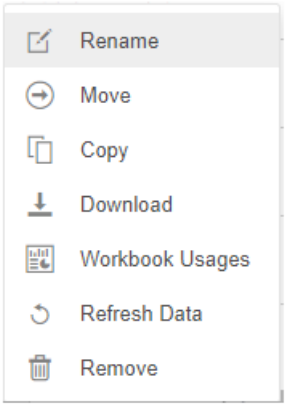
The data extract is uploaded and added in the designated folder.



Renaming a Data Extract

Steps:

1. Right-click on a data extract then select **Rename** on the context menu.



The *Rename Data Extract* dialog displays.



2. Enter a new name then click 

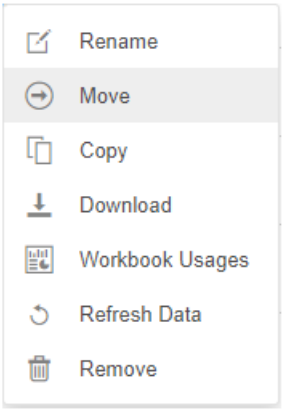
.

Moving a Data Extract

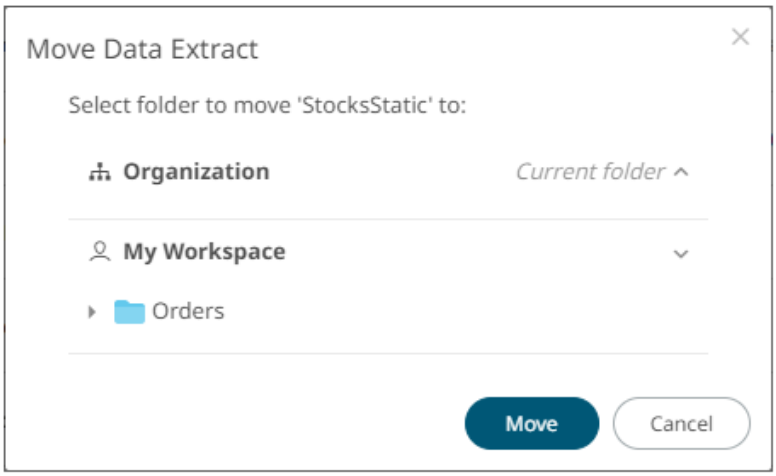
Users with a Designer role are allowed to move a data extract to another folder where they have permission.

Steps:

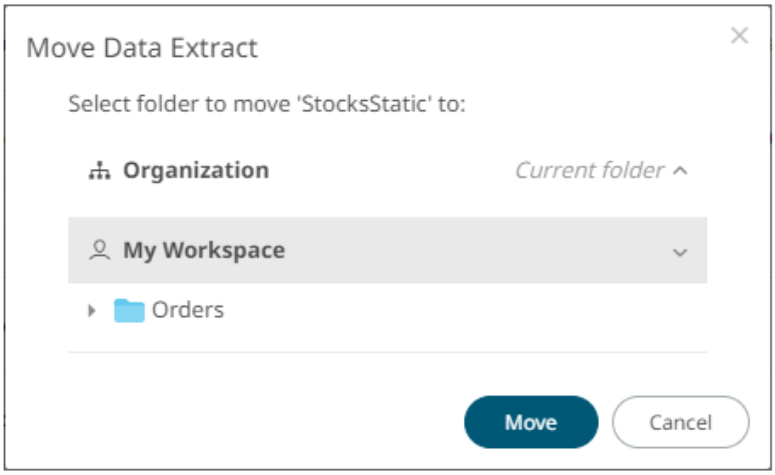
1. Right-click on a data extract and select **Move** on the context menu.



The *Move Data Extract* dialog displays with the folders that the user is allowed to move the data extract.

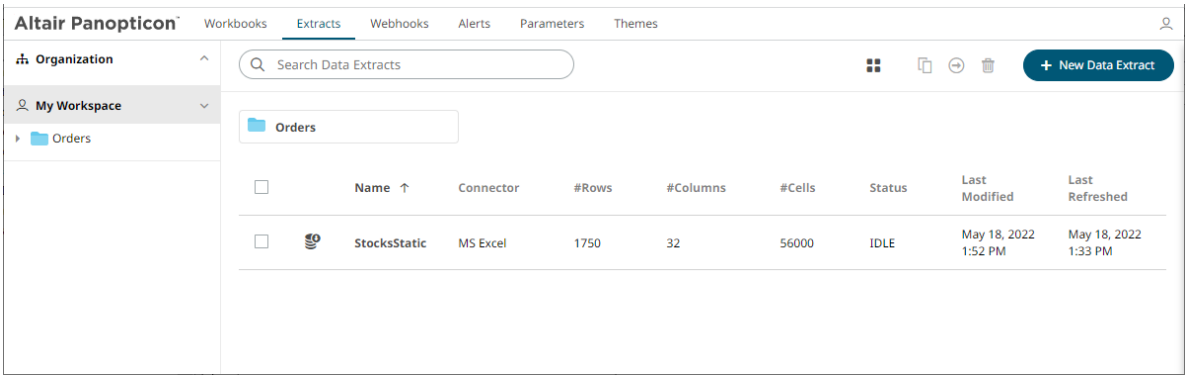


2. Select the folder or subfolder.



3. Click Move.

The data extract is moved and displayed on the selected folder.

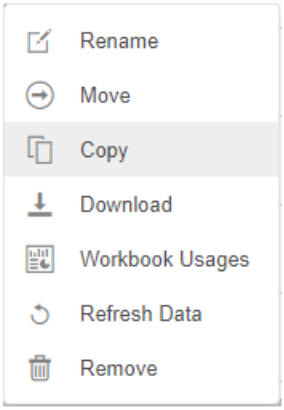


Copying a Data Extract

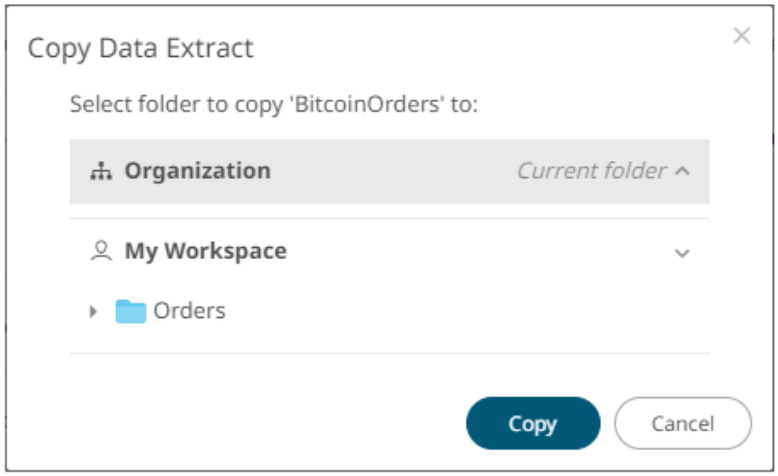
Users with a Designer role are allowed to copy a data extract to another folder where they have permission.

Steps:

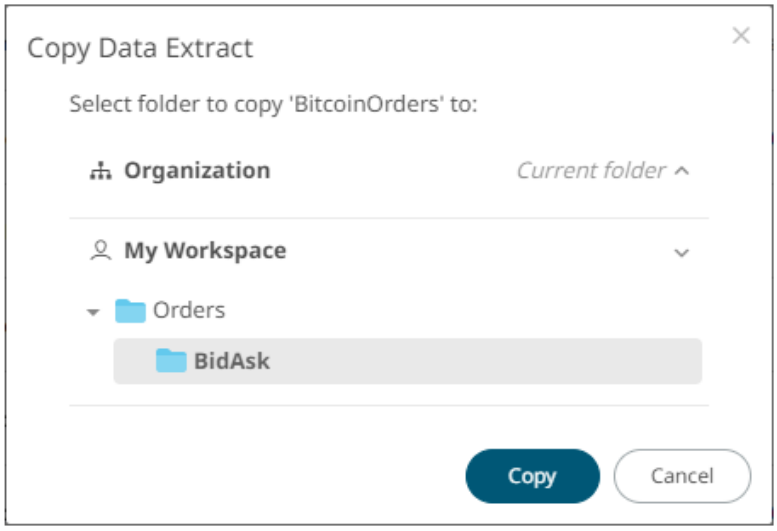
1. Right-click on a data extract and select **Copy** on the context menu.



The *Copy Data Extract* dialog displays with the folder or subfolders the user is allowed to copy the data extract to.



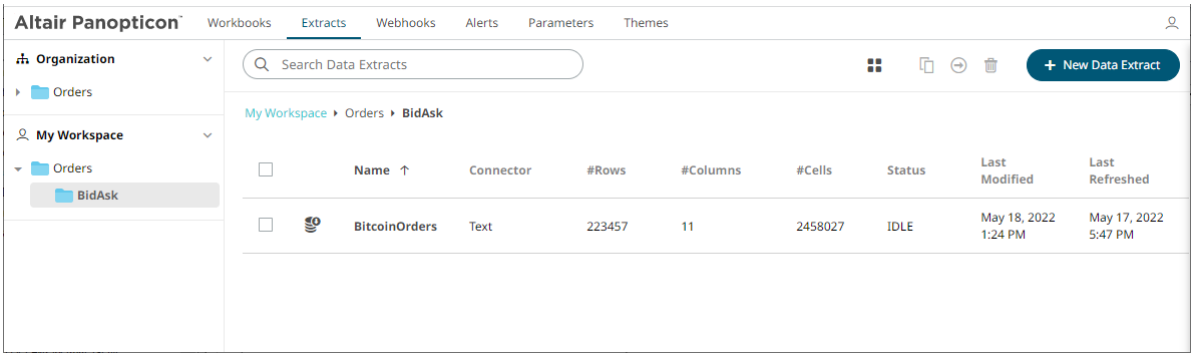
4. Select the folder or subfolder.



5. Click 

.

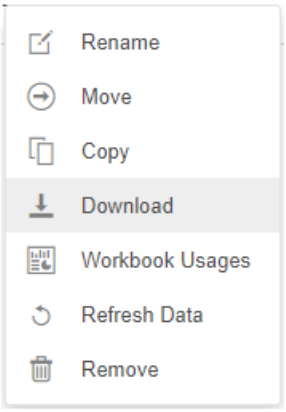
The data extract is copied and displayed on the selected folder.



Downloading a Data Extract

A user with a Designer role with READ + WRITE permission to the folder is allowed to download a copy of a data extract available in it.

Right-click on a data extract and select **Download** on the context menu.



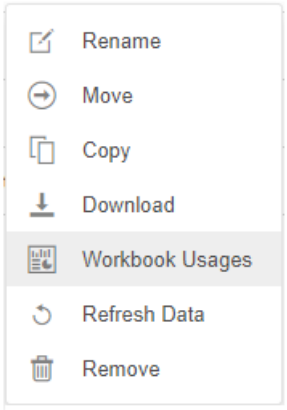
A copy of the data extract is downloaded.

Viewing the Data Extract Usage

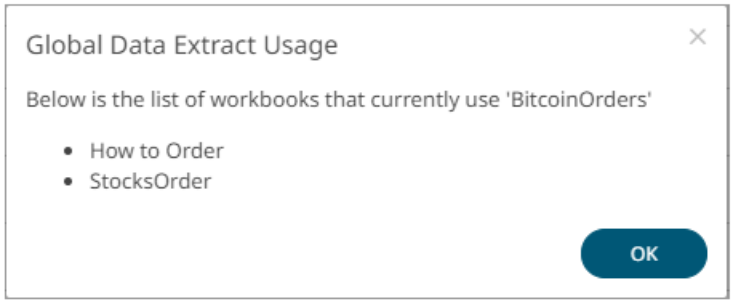
View the list of workbooks that is currently using the data extract.

Steps:

1. Right-click on a data extract and select **Workbook Usage** on the context menu.



The list of workbooks that is currently using the data extract is displayed in the *Data Extract Usage* dialog.



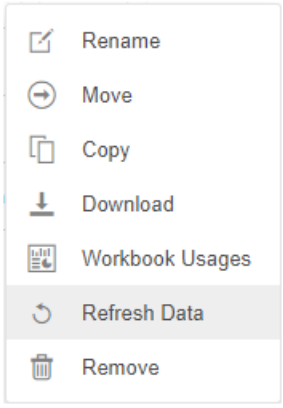
2. Click OK.

Refreshing the Data Extract

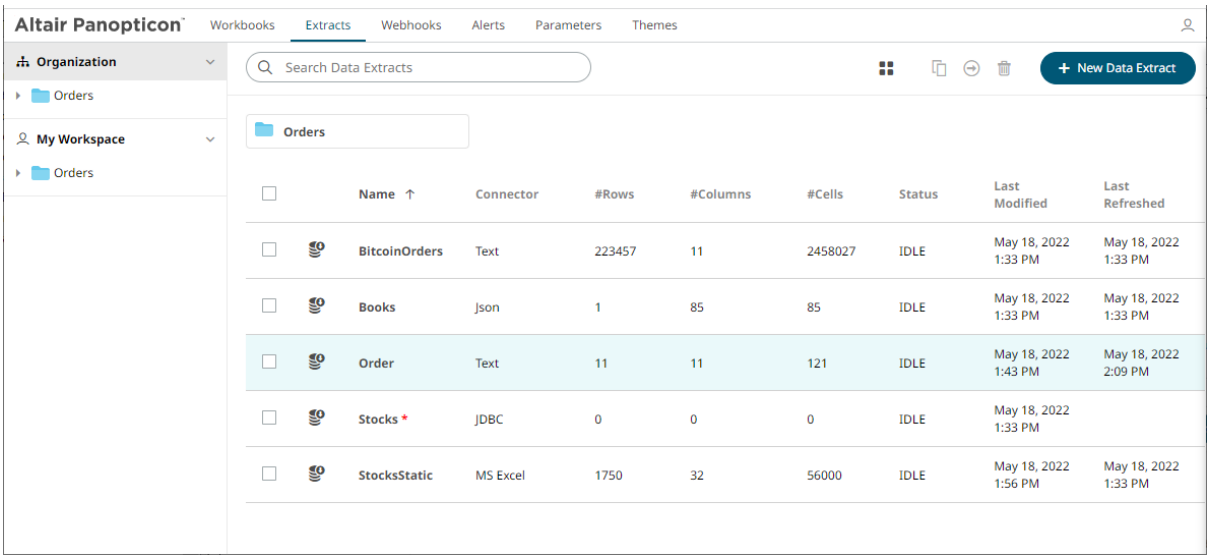
After saving the modifications in the data extract settings, the extract is flushed. Refresh the data extract to run it. Consequently, the extract meta data details are displayed.

Steps:

Right-click on a data extract and select **Refresh Data** on the context menu.



The data extract is first ran and the status changes to **RUNNING**. When the data extract is complete, the status changes to **IDLE**. Also, the number of *Rows*, *Columns*, *Cells*, *Status*, and the last Date/Time it was updated and refreshed are displayed.

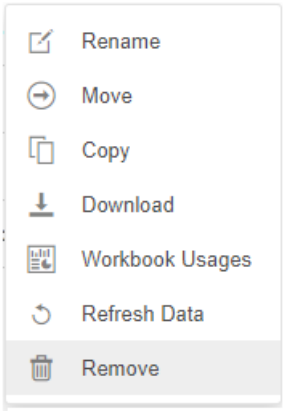


Deleting a Data Extract

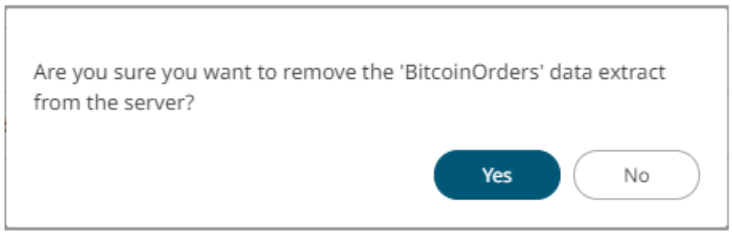
Users with a Designer role have the ability to remove a data extract.

Steps:

1. Right-click on a data extract and select **Remove** on the context menu.



A notification message displays.

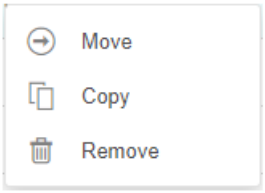


3. Click  to remove.

DATA EXTRACTS TOOLBAR AND CONTEXT MENU

Moving, copying, and removing data extracts can either be done using:

- Context menu



- Toolbar



Grid View

The *Data Extracts* toolbar options include:

Toolbar Option	Description
Sort By / Sort Order	Allows sorting data extracts by *Name, Last Modified,* or *Connector*.
Display View	Display data extracts either by *List View* or *Grid View*.
Copy	Copy data extracts to another folder or subfolder where the user has permission.
Move	Move data extracts to another folder or subfolder where the user has permission.
Remove	Remove data extracts.

The *Context Menu* options include:

Toolbar Option	Description
Copy	Copy data extracts to another folder or subfolder where the user has permission.
Move	Move data extracts to another folder or subfolder where the user has permission.
Remove	Remove data extracts.

Sorting Data Extracts

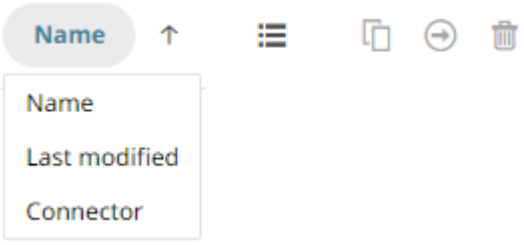
Sorting data extracts can be done by **Name, Last Modified**, or **Connector**.

Steps:

On the *Data Extracts* page, either:

- click the **Sort By** option on the *Toolbar* of the *Grid View.*

  By default, the sorting is by **Name**.

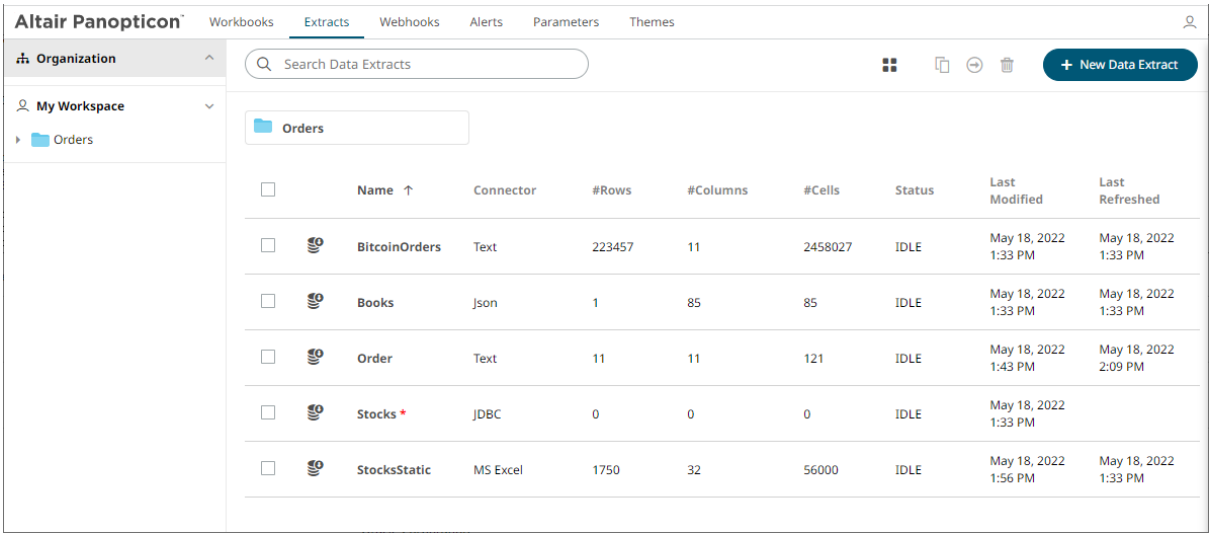


  - Name
  - Last Modified
  - Connector

  Then click the *Sort Order*:

- Ascending
- Descending

- click on the **Name**, **Connector**, **#Rows**, **#Columns**, **#Cells**, **Status**, **Last Modified**, or **Last Refreshed** column header of the *List View*



Then click the *Sort Order*:

- Ascending
- Descending

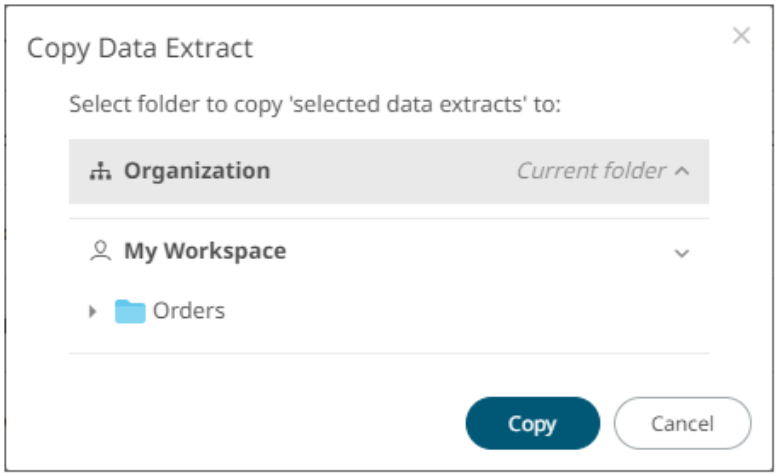
Copying Data Extracts

Users with a Designer role are allowed to copy data extracts to another folder or subfolder where they have permission.

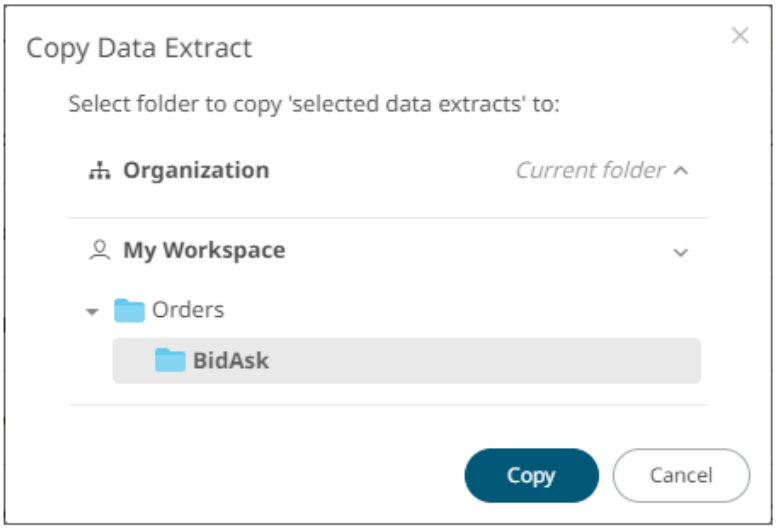
Steps:

1. On the *List* or *Grid* view, select several data extracts then:
   - right-click and select **Copy** on the context menu, or
   - click the **Copy** icon on the toolbar.

   The *Copy Data Extract* dialog displays with the folder or subfolders the user is allowed to copy the data extracts to.



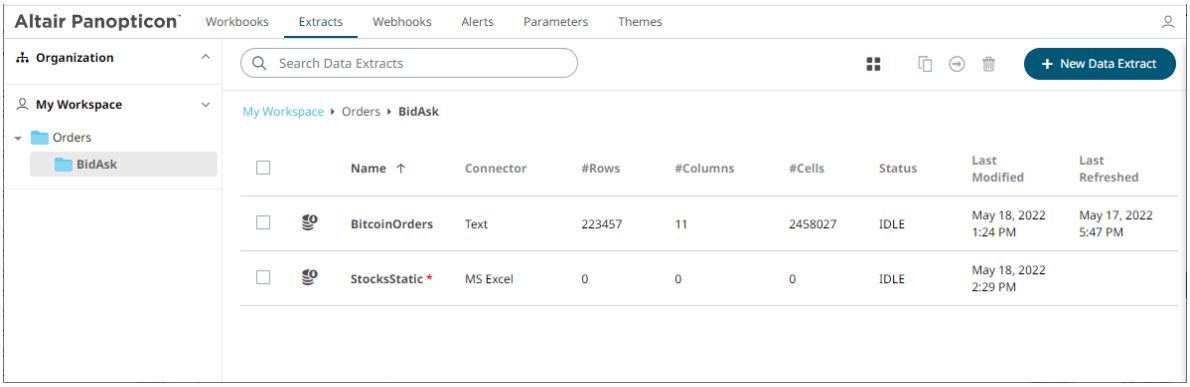
4. Select the folder or subfolder.



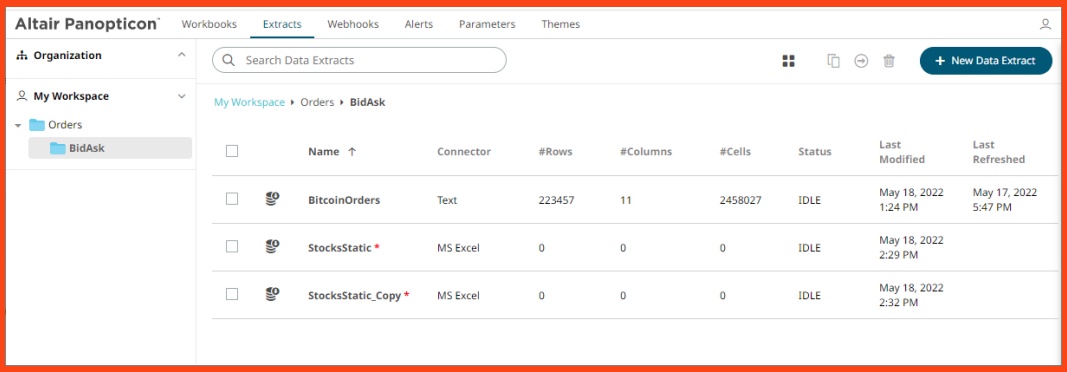
5. Click 

.

The data extracts are copied and displayed on the selected folder.



NOTE **If data extracts with the same name are already in the selected folder, a copy of the data extracts are added.**



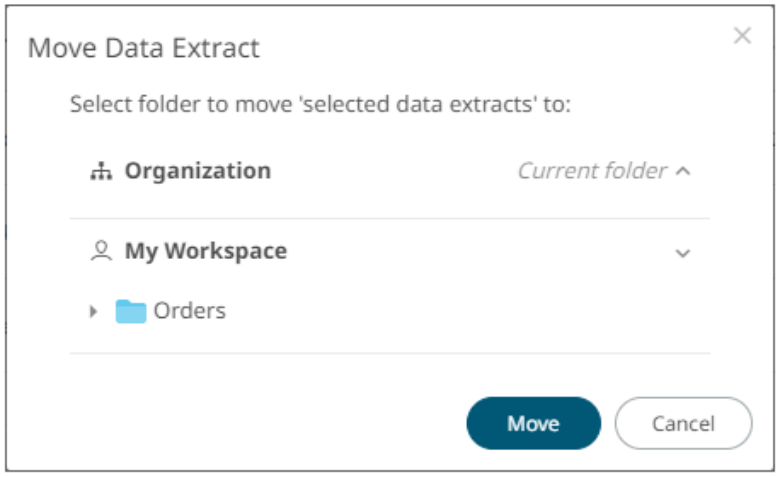
Moving Data Extracts

Users with a Designer role are allowed to move data extracts to another folder or subfolder where they have permission.

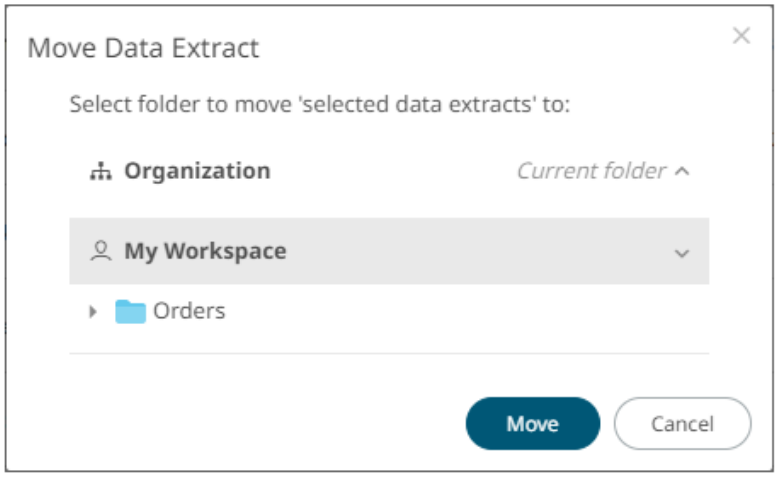
Steps:

1. On the *List* or *Grid* view, select several data extracts then:
   - right-click and select **Move** on the context menu, or
   - click the **Move** icon on the toolbar.

   The *Move Data Extract* dialog displays with the folder or subfolders that the user is allowed to move the data extracts.

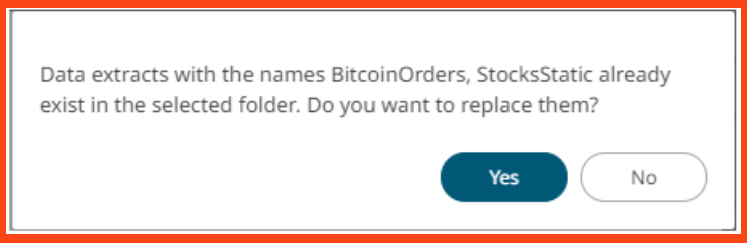


2. Select the folder or subfolder.



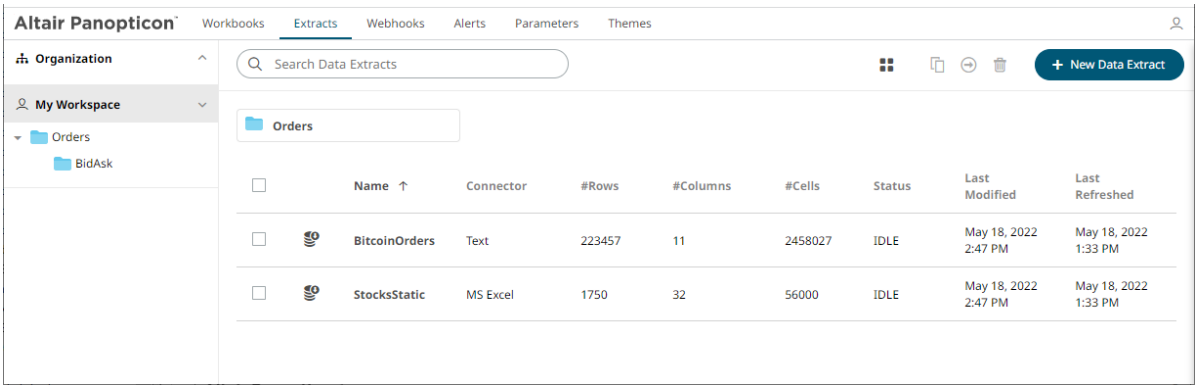
3. Click Move .

NOTE **If data extracts with the same name are already in the selected folder, a notification message displays if they will be replaced.**



Click Yes to replace a copy of the same data extracts.

The data extracts are moved and displayed on the selected folder.



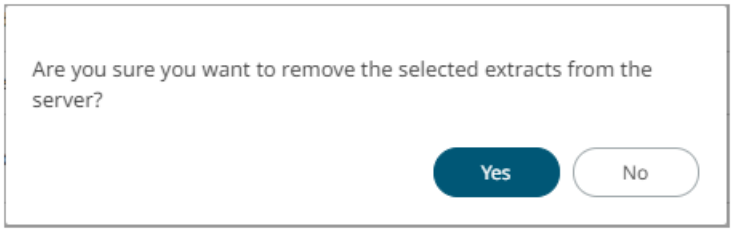
Deleting Data Extracts

Users with a Designer role have the ability to remove data extracts.

Steps:

1. On the *List* or *Grid* view, select several data extracts then:
   - right-click and select **Remove** on the context menu, or
   - click the **Remove**  icon on the toolbar.

   A notification message displays.



2. Click  to remove.

[9] WEBHOOKS

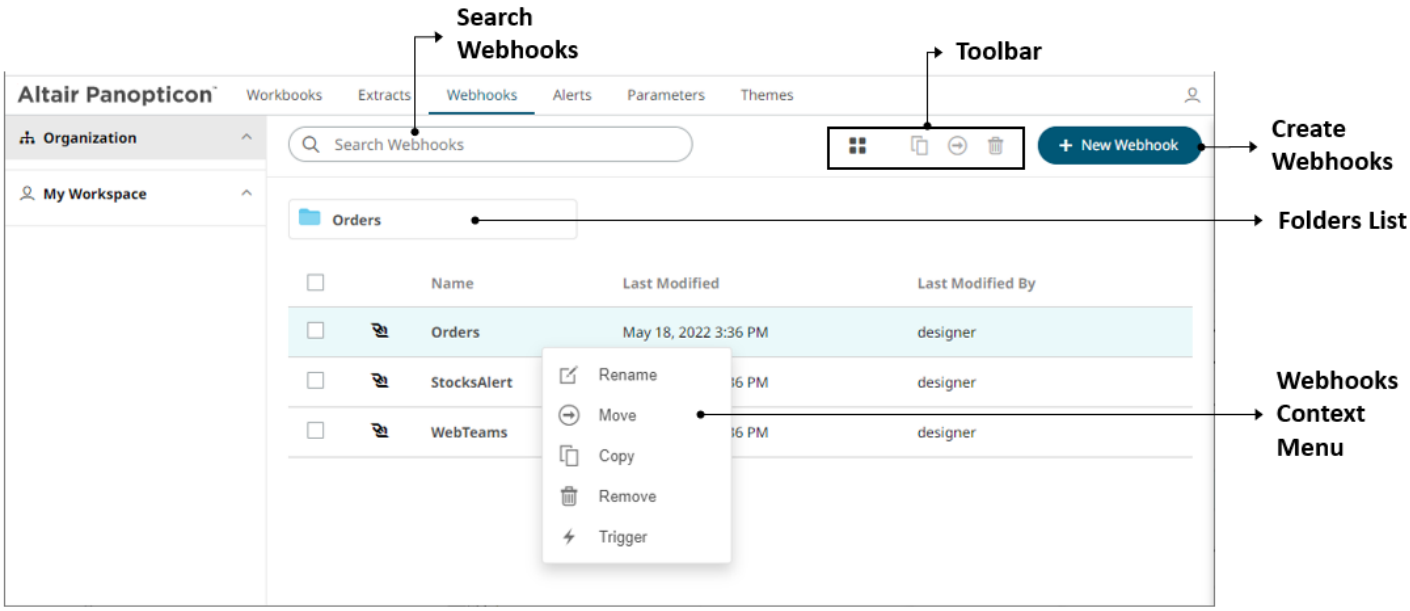
A webhook is a special URL that makes it possible to send a message from other systems into the system that issued the webhook. Webhook URLs should be treated with care and not shared publically, since anyone with knowledge about the webhook URL will be able to use it.

Collaboration platforms such as Microsoft Teams, Slack, and many others, all have support for creating incoming webooks. In Panopticon, outgoing webhooks can be added (based on incoming webhook URLs from other systems) and used as a channel for sending messages about triggered alerts, similar to how such messages can also be sent by email. Webhooks added to Panopticon are stored in the server folder structure and are subject to the same permissions model as workbooks.

An outgoing webhook in Panopticon can be used as the message channel for multiple different alerts in multiple different workbooks, due to the parameterization of the webhook request body. The exact structure and content that you should create in the request body of a webhook will be specified in the documentation of the system that issued the webhook.

NOTE **Do not expect that the example request body shown below, will work as is.**

Starting with version 21.1, users with a Designer role can create and manage webhooks.

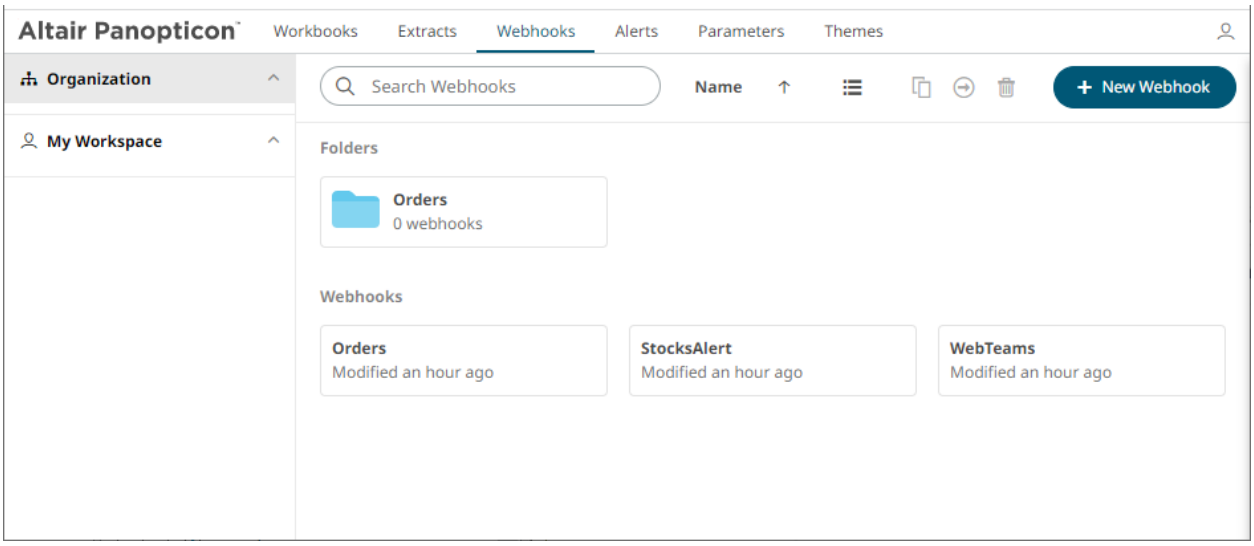


Property	Description
Search Webhooks	Entering text will filter the webhooks.
Toolbar	Allows copying, moving, and removing of webhooks. Also, to display the webhooks list either on *List View* or *Grid View*.
Create Webhooks	Allows creating new webhooks.
Webhooks Context Menu	Allows renaming, moving, copying, deleting, and enabling of the trigger of webhooks.

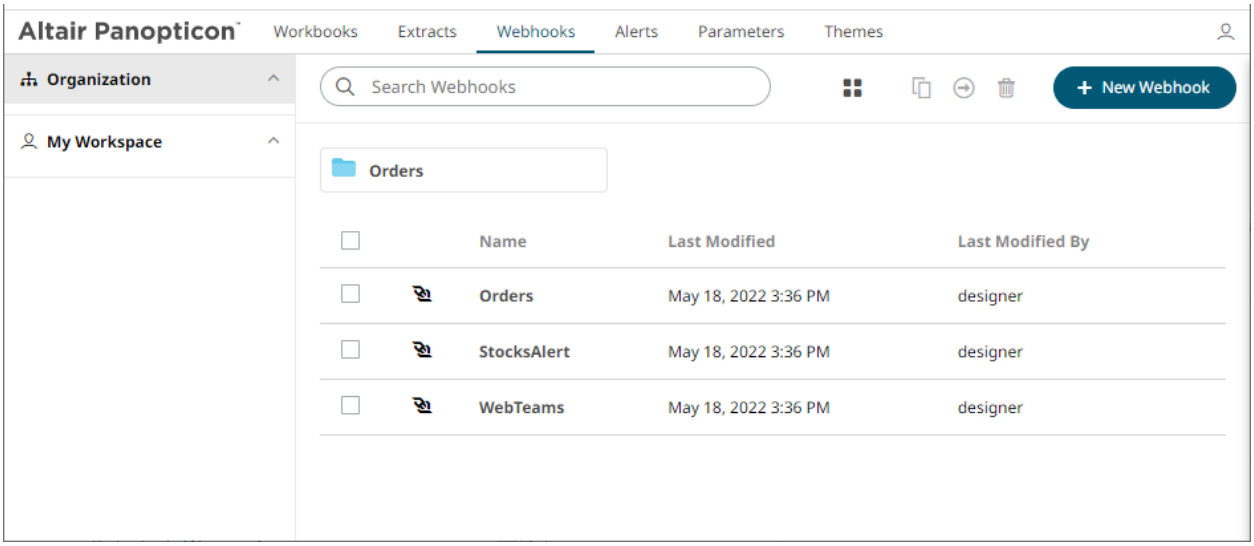
Folders and Webhooks Display View

Webhooks can be displayed either on a *List* or *Grid View*.

On the *Toolbar*, click **Grid View** . The folders and webhooks are displayed as thumbnails.



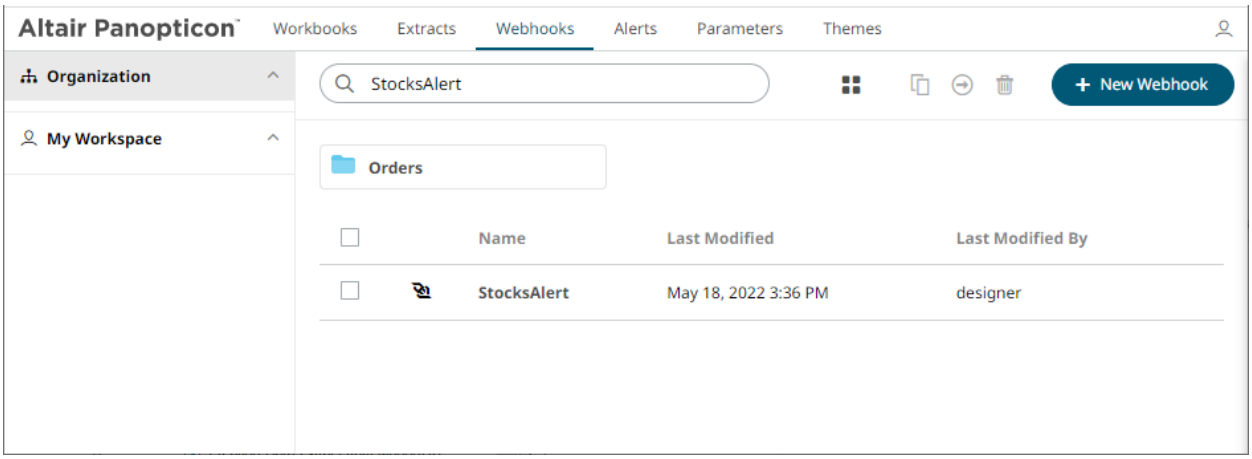
Or click **List View** , the webhooks are displayed in a standard listing.



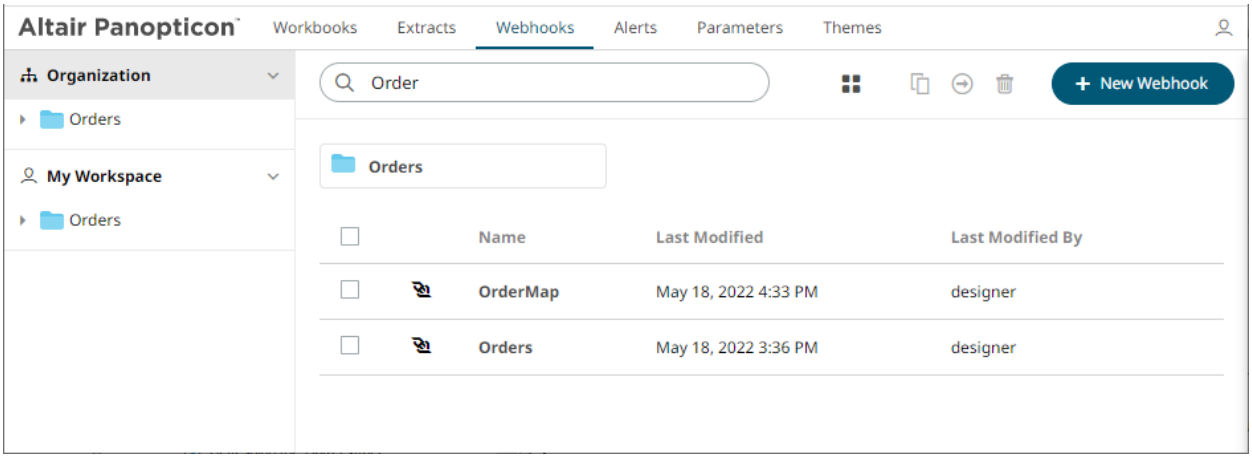
On either display view style, clicking on a webhooks title or thumbnail displays the *Webhooks* page.

Searching for Webhooks

On the *Webhooks* tab, to search for a particular webhook, enter it in the *Search Webhooks* box.



You can also enter one or more characters into the *Search Webhooks* box then click **Enter**. The suggested list of webhooks that matched the entries will be displayed.



Click on a webhook to open the settings page.

To clear the filter, delete the text entry in the *Search Webhooks* box.

CREATING WEBHOOKS

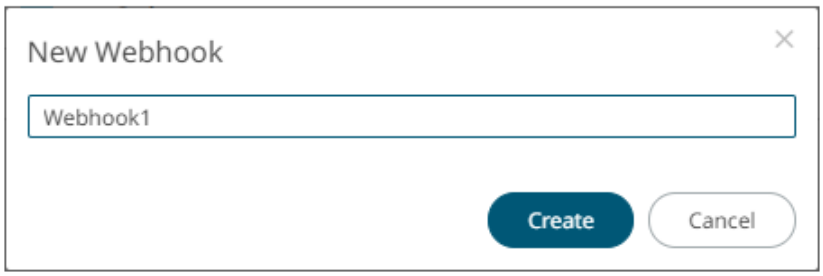
This section discusses the instructions and guidelines to create webhooks.

Steps:

1. On the **Webhooks** tab, click on a folder then 

.

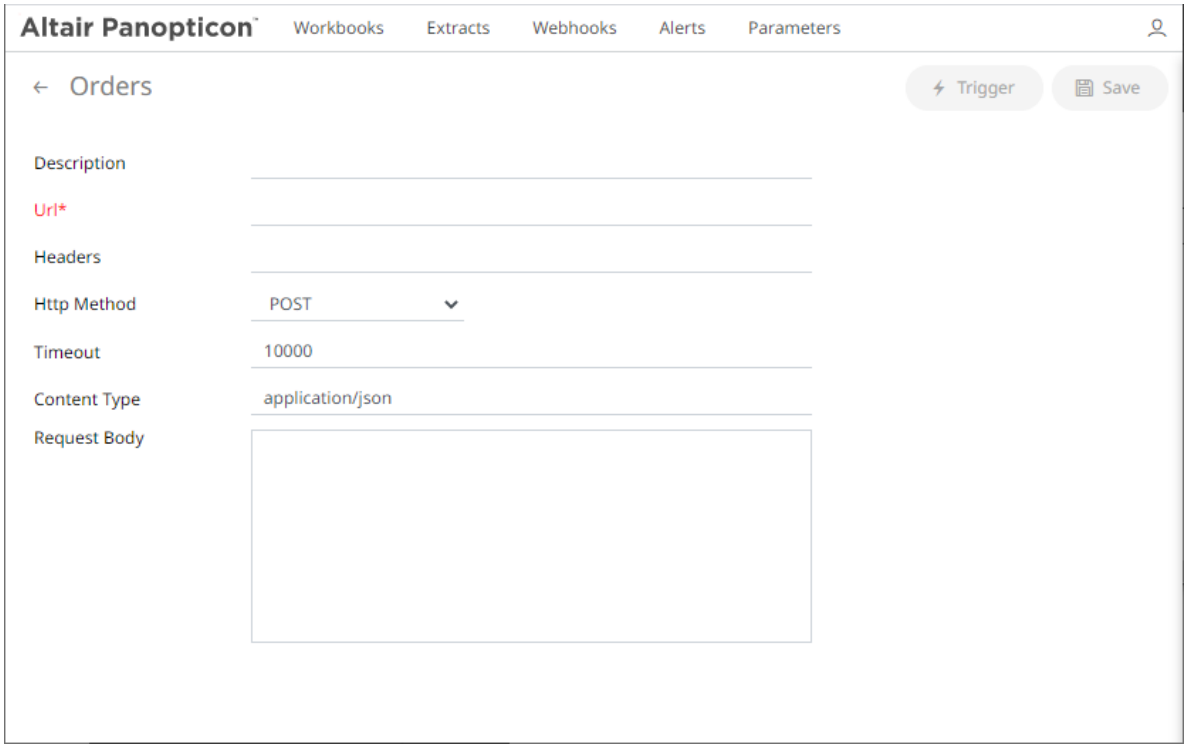
   The *New Webhook* dialog displays.



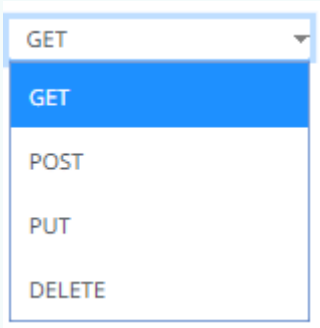
2. Enter the name of the webhook then click 

.

   The new webhook is displayed on the *Webhook* page.



3. Enter or select the following webhook properties:

Property	Description
Description	Description of the webhook.
URL	URL of the webhook. This property is required.
Headers	A comma separated list of name=value pairs representing HTTP headers.
HTTP Method	Select the appropriate HTTP method for the request from the following options:  • GET – retrieve data • POST – add new data • PUT – replace existing data • DELETE – remove existing data
Timeout	Timeout (in ms) for reading a response from the URL.
Content Type	The content type of the request body. Default is **application/json.**

Request Body	The request body to be supplied to the HTTP call.
	For example:
	`{`
	`'Alert title': '{_alert_title}',`
	`'Alert dashboard URL': '{_alert_dashboard_url}',`
	`'Alert description': '{_alert_description}',`
	`'Alert reason': '{_alert_reason}',`
	`'Triggering items': '{_alert_triggering_items}',`
	`'Timestamp': '{_current_time}',`
	`'Folder': '{_workbook_folder}',`
	`'Workbook': '{_workbook_name}',`
	`'Dashboard': '{_dashboard_name}'`
	`}`

NOTE ***URL***, ***Headers***, **and** ***Request Body*** **fields can be parameterized (i.e., special server parameters, alert parameters, and global parameters).**

4. Click 

to save the new webhook.

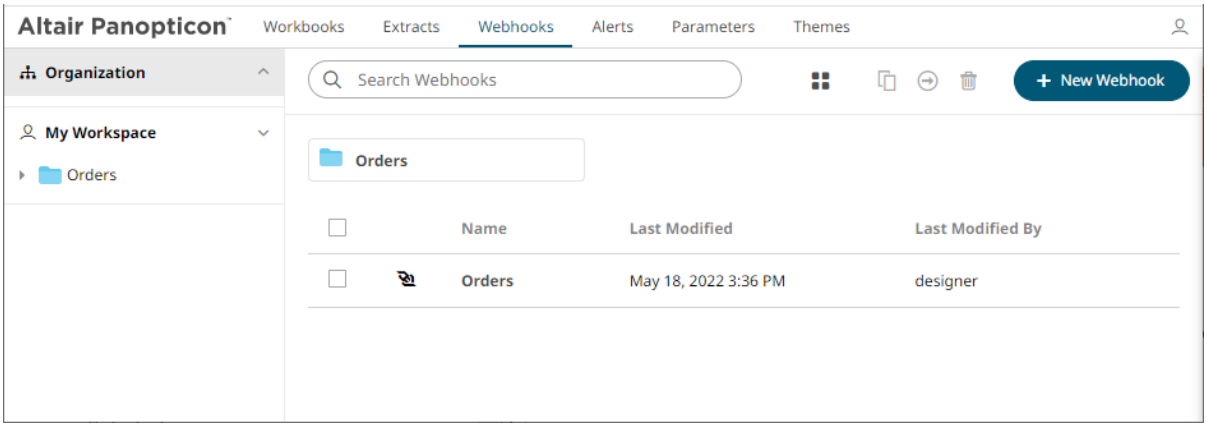
5. You may opt to click 

to trigger the webhook. Any parameter in the request body will be replaced by its value when triggering the webhook request.

   For example:

   ```
   {_current_time} - 2021-07-01T12:34:56Z
   ```

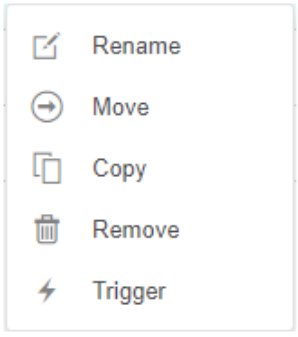
6. Click  to go back to the *Folders and Webhooks* list. The new webhook is added on the list.



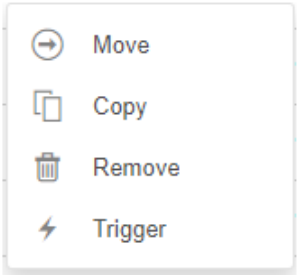
WEBHOOKS TOOLBAR AND CONTEXT MENU

Moving, copying, and removing webhooks can either be done using:

- Context menu



Webhook Context Menu



Webhooks Folder Context Menu

- Toolbar



List View



Grid View

The *Webhooks* toolbar options include:

Toolbar Option	Description
Sort By / Sort Order	Allows sorting webhooks by *Name, Last Modified,* or *Last Modified By*.
Display View	Display webhooks either by *List View* or *Grid View*.
Copy	Copy webhooks to another folder or subfolder where the user has permission.
Move	Move webhooks to another folder or subfolder where the user has permission.
Remove	Remove webhooks.

The *Context Menu* options include:

Toolbar Option	Description
Rename	Rename the webhook.
Move	Move webhooks to another folder or subfolder where the user has permission.
Copy	Copy webhooks to another folder or subfolder where the user has permission.
Remove	Remove webhooks.
Trigger	Trigger the webhook.

Sorting Webhooks

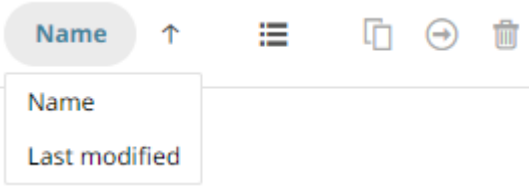
Sorting webhooks can be done by **Name, Last Modified**, or **Last Modified By**.

Steps:

On the *Webhooks* tab, either:

- click the **Sort By** option on the *Toolbar* of the *Grid View.*

  By default, the sorting is by **Name**.



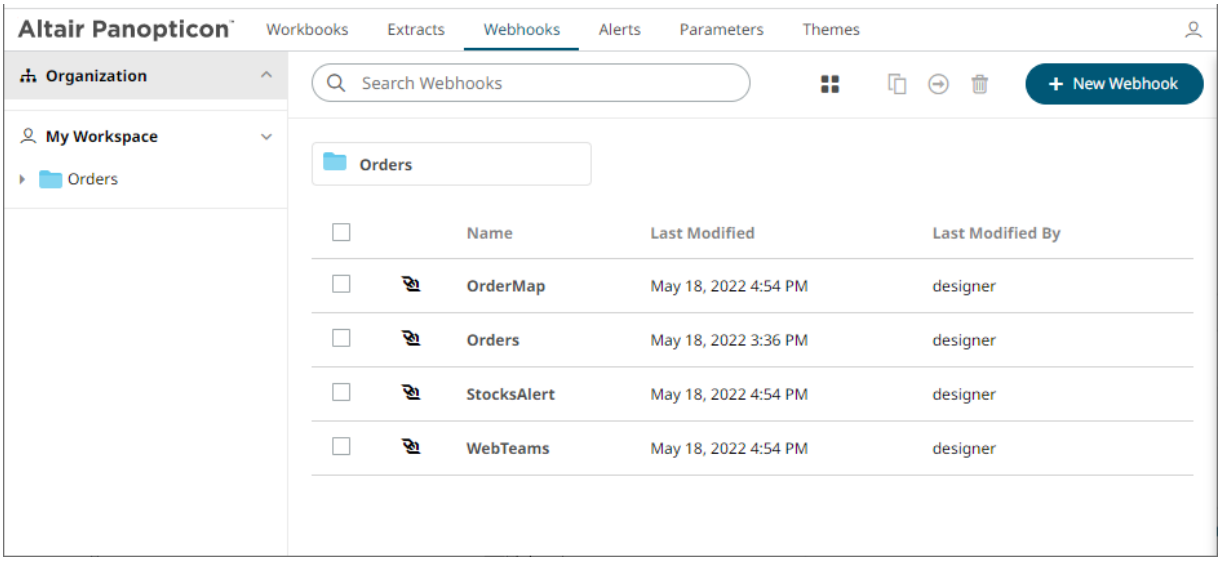
  - Name
  - Last Modified

  Then click the *Sort Order*:

  -  Ascending

- Descending

- click on the **Name**, **Last Modified**, or **Last Modified By** column header of the *List View.*



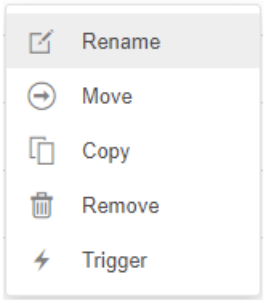
Then click the *Sort Order*:

- Ascending
- Descending

Renaming a Webhook

Steps:

1. Right-click on a webhook then select **Rename** on the context menu.



The *Rename Webhook* dialog displays.



3. Enter a new name then click Rename.

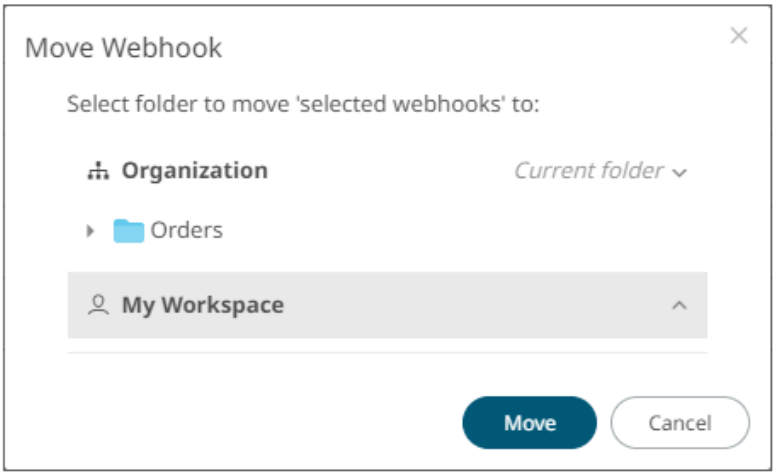
Moving Webhooks

Users with a Designer role are allowed to move webhooks to another folder or subfolder where they have permission.

Steps:

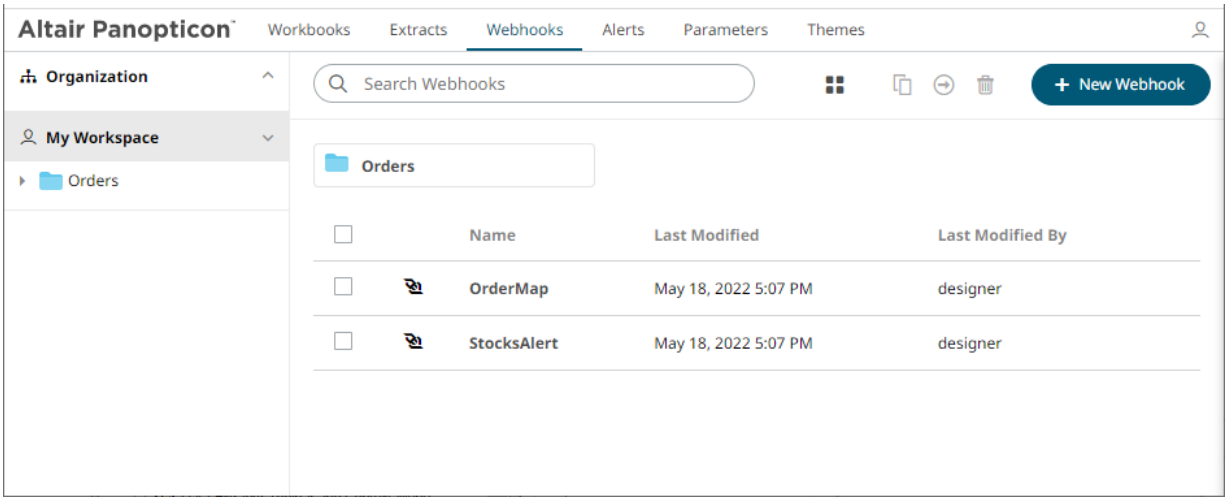
1. On the *List* or *Grid* view, select one or several webhooks then:
   - right-click and select **Move** on the context menu, or
   - click the **Move** icon on the toolbar.

   The *Move Webhook* dialog displays with the folder or subfolders that the user is allowed to move the webhooks. Select the folder or subfolder.



2. Click Move.

   The webhooks are moved and displayed on the selected folder.

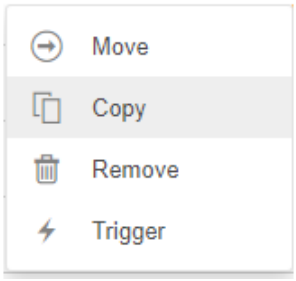


Copying Webhooks

Users with a Designer role are allowed to copy webhooks to another folder or subfolder where they have permission.

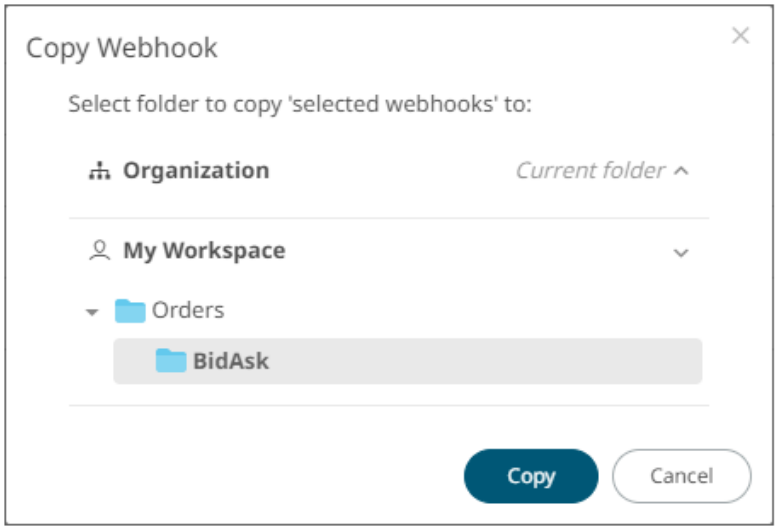
Steps:

1. On the *List* or *Grid* view, select one or several webhooks then:
   - right-click and select **Copy** on the context menu, or



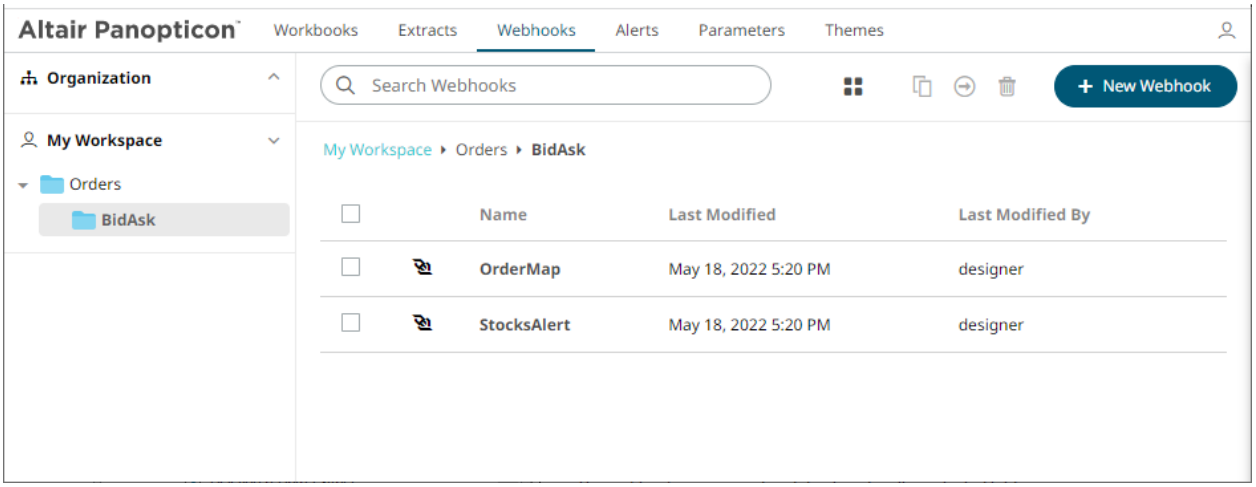
   - click the **Copy**  icon on the toolbar.

   The *Copy Webhook* dialog displays with the folder or subfolders the user is allowed to copy the webhooks to. Select the folder or subfolder.



2. Click Copy .

   The webhooks are copied and displayed on the selected folder.

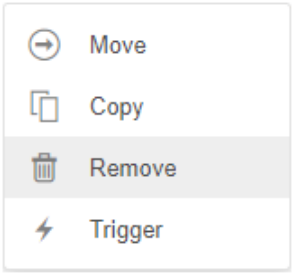


Deleting Webhooks

Users with a Designer role have the ability to remove webhooks.

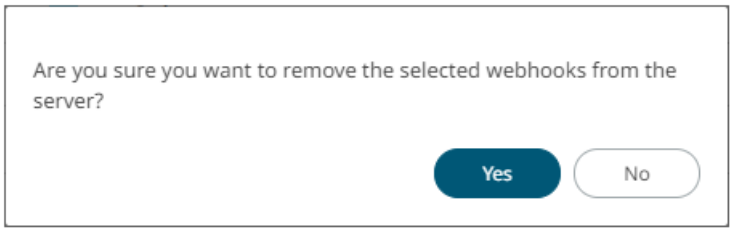
Steps:

1. On the *List* or *Grid* view, select one or several webhooks then:
   - right-click and select **Remove** on the context menu, or



- click the **Remove** icon on the toolbar.

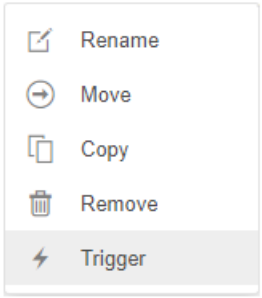
A notification message displays.



2. Click Yes to remove.

Triggering Webhooks

To trigger a webhook, right-click on it and select **Trigger** on the context menu.



Any parameter in the request body will be replaced by its value when triggering the webhook request.

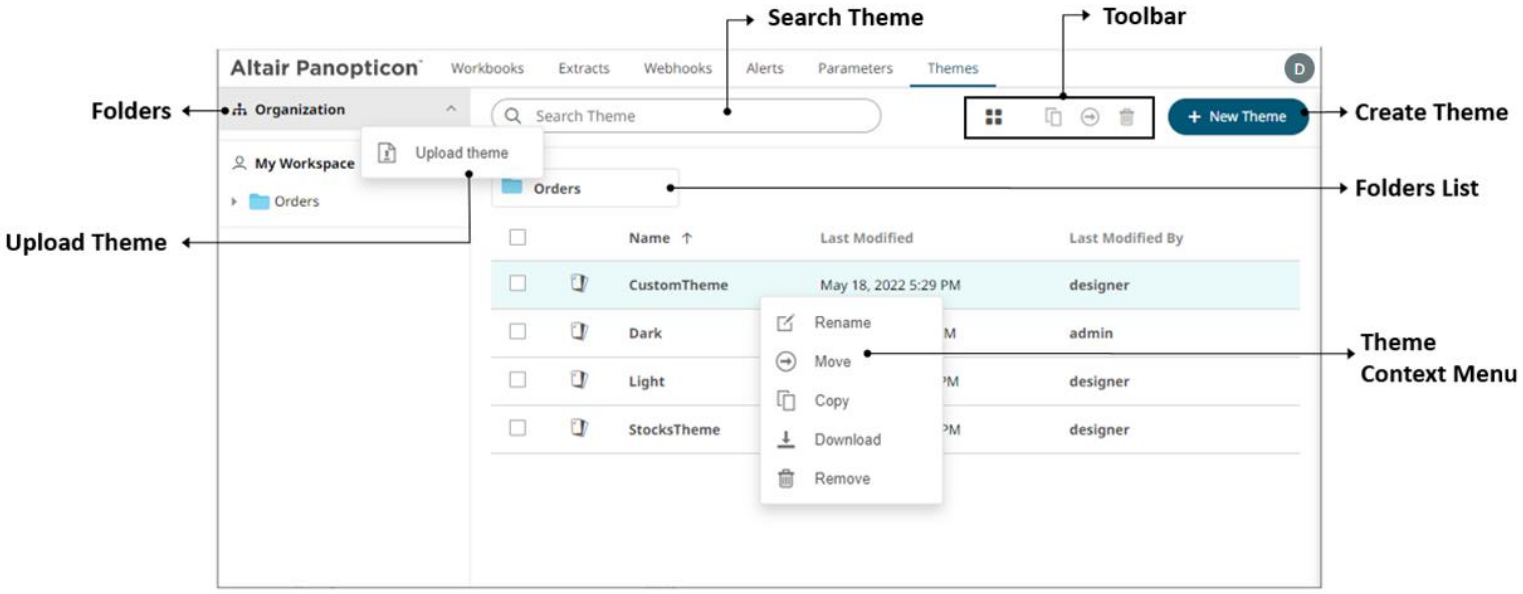
For example:

```
{_current_time} - 2021-07-01T12:34:56Z
```

[10] MANAGING WORKBOOK THEMES

Workbook themes are set of configurable settings that affect all colors and fonts of dashboards and visualizations in a workbook. This configuration also includes setting which among the color palettes will be available for the Color variable or shape palettes for the Shape variable in the visualizations. Furthermore, the general colors to be used in visualizations such as axis, background, border, and focus colors can be defined.

Theme files are independent of workbooks and can be stored externally (e.g., *Themes* folder in the `AppData`).

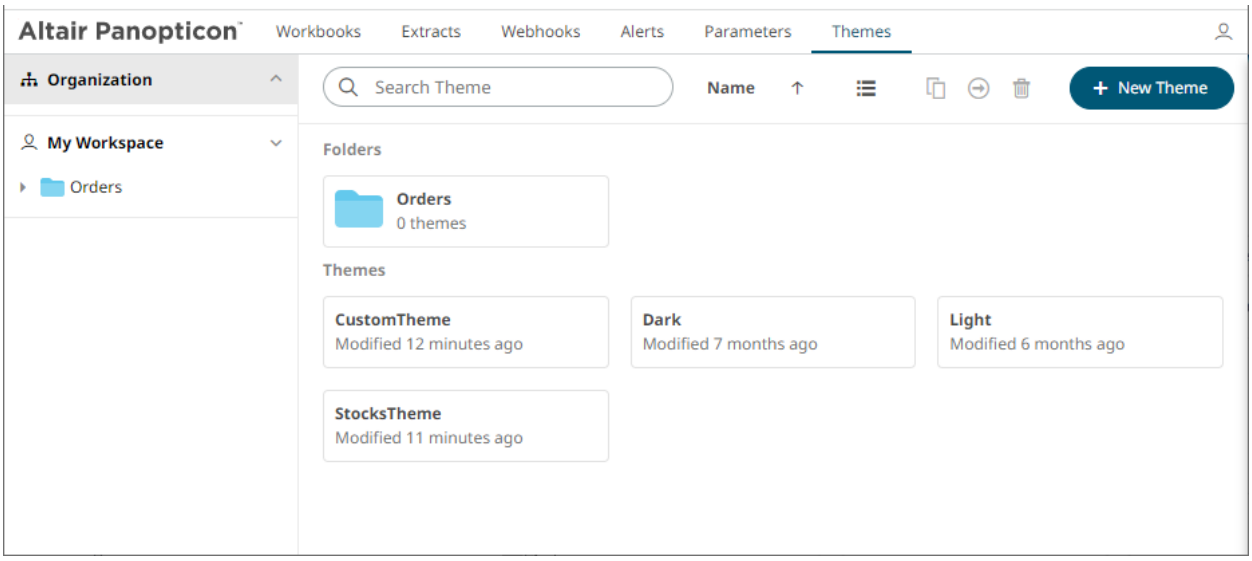


Property	Description
Search Theme	Entering text will filter the themes.
Toolbar	Allows copying, moving, and removing of themes. Also, to display the themes list either on *List View* or *Grid View*.
Create Theme	Allows creating new themes.
Theme Context Menu	Allows uploading, renaming, moving, copying, downloading, and deleting themes.

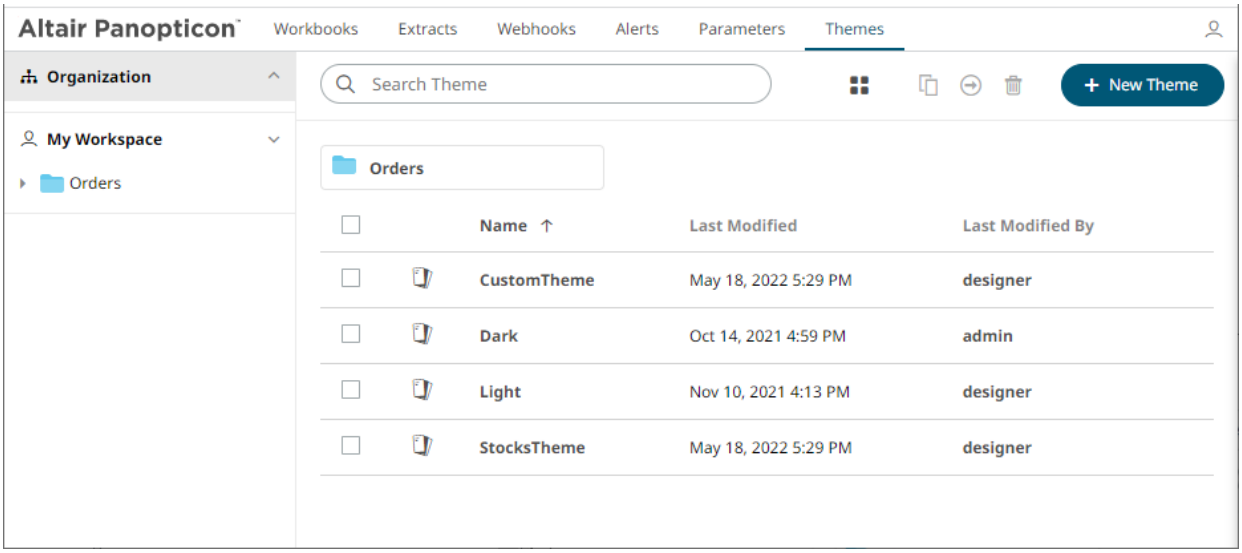
FOLDERS AND THEMES DISPLAY VIEW

Themes can be displayed either on a *List* or *Grid View*.

On the *Toolbar*, click **Grid View** . The folders and themes are displayed as thumbnails.



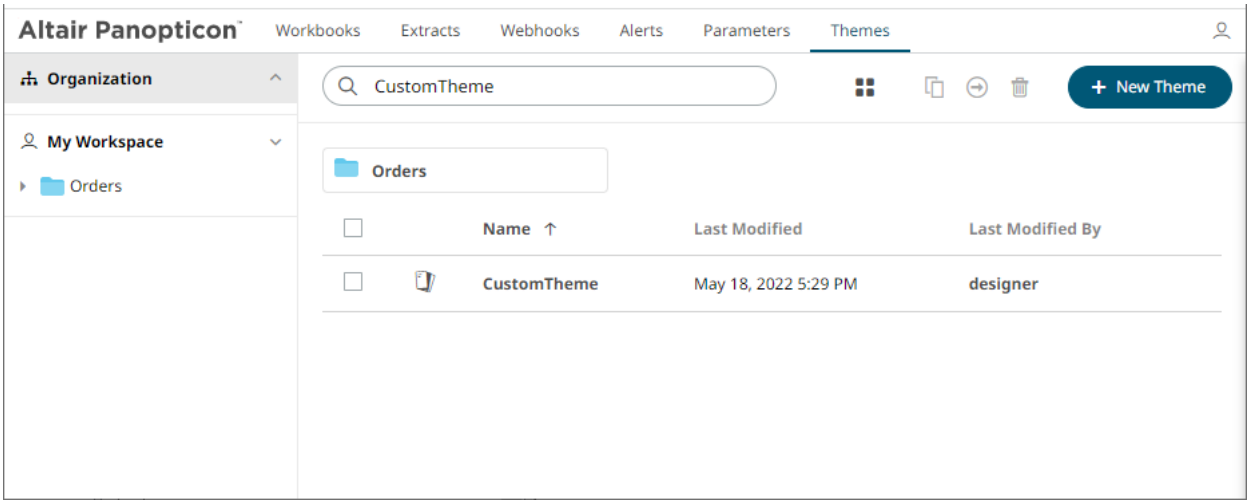
Or click **List View** , the themes are displayed in a standard listing.



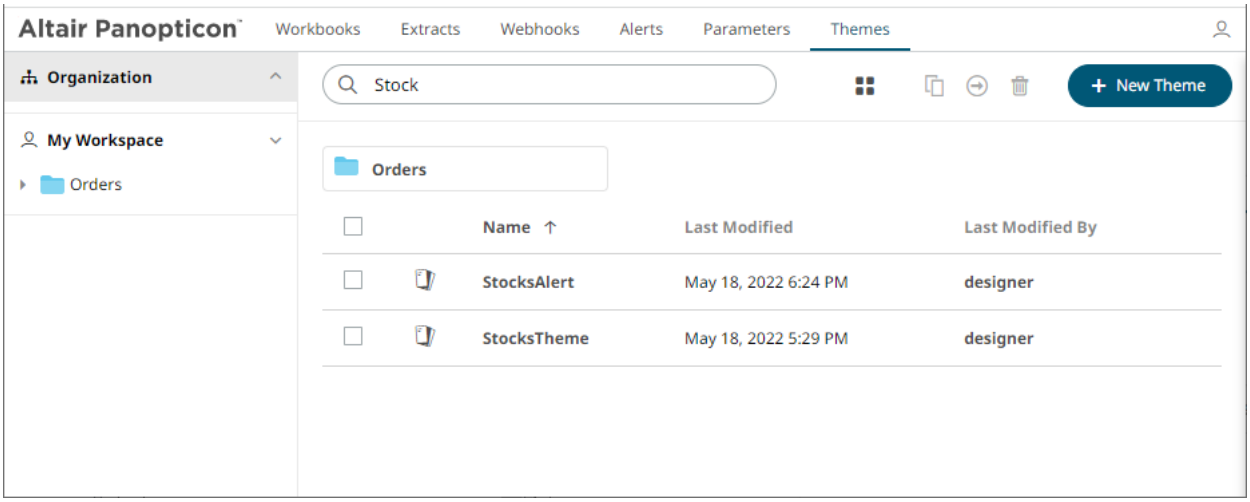
On either display view style, clicking on a themes title or thumbnail displays the *Theme* page.

SEARCHING FOR THEMES

On the *Themes* tab, to search for a particular theme, enter it in the *Search Theme* box.



You can also enter one or more characters into the *Search Theme* box then click **Enter**. The suggested list of themes that matched the entries will be displayed.



Click on a theme to open the settings page.

To clear the filter, delete the text entry in the *Search Theme* box.

CREATING A NEW THEME

Creating a new theme allows setting the colors, fonts, color palettes, general colors, and shape palettes to be used in workbooks and visualizations.

Steps:

1. On the **Themes** tab, click 

.

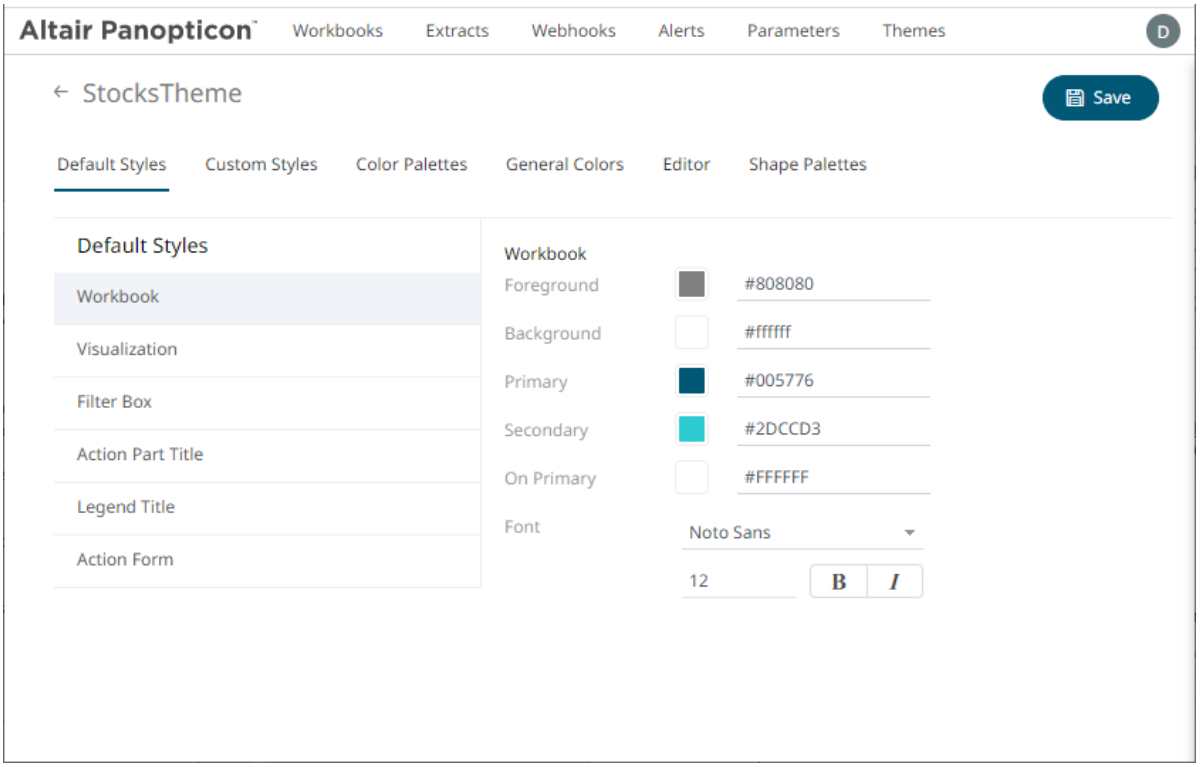
   The *New Theme* dialog displays.



2. Enter the name of the theme then click 

.

   The new theme is displayed on the *Theme* page.



3. When creating a new theme, you may specify the following properties:
   - Default Styles – Define the default style settings of the workbook, visualizations, filter box, action part title, legend title, and action form.
   - Custom Styles – Define the settings of the custom styles.

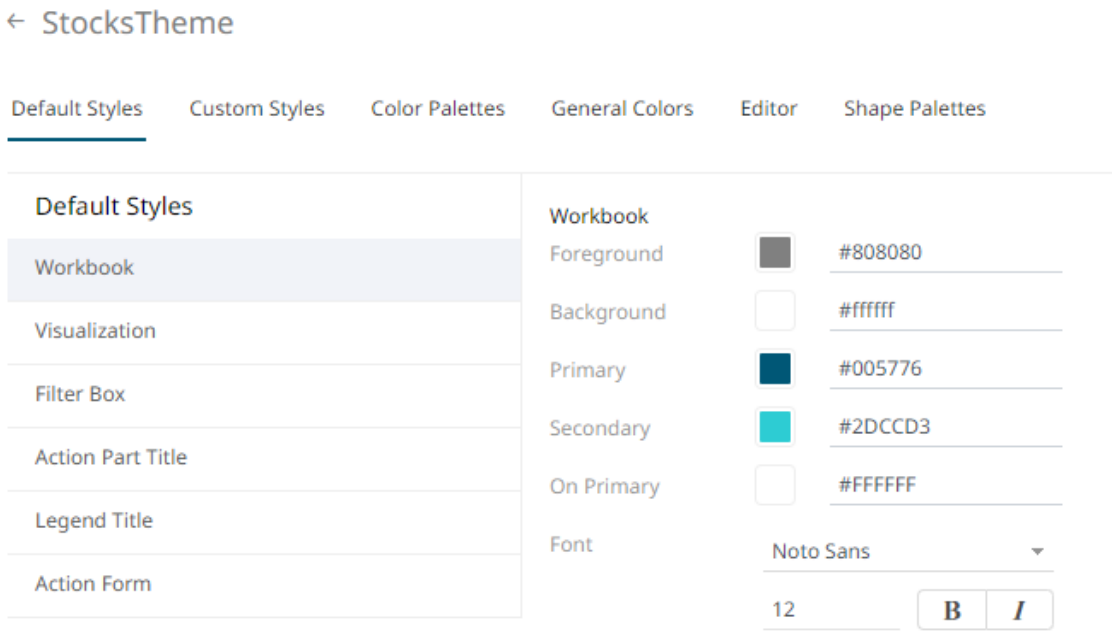
- Color Palettes – Manage, import, or export Text, Sequential, and Diverging color palettes.
- General Colors – Define or create duplicate general color.
- Editor – Define the editor style settings.
- Shape Palettes – Define the settings of shape palettes and add, upload, download, duplicate, or remove them.

Define the Default Style Settings of a Theme

When you define the default settings of a theme, you specify the colors and fonts of the workbook, visualizations, filter box, action part title, legend title, and action form.

Steps:

1. To define the default styles of the workbook, click **Workbook o**n the **Default Styles** tab. The *Workbook Settings* are displayed.

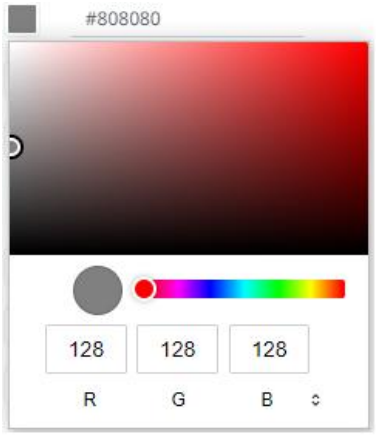


You may opt to modify the colors of the following properties:

Property	Description
Foreground	Foreground color of the workbook.
Background	Background color of the workbook.
Primary	Primary color of the workbook.
Secondary	Secondary color of the workbook.
On Primary	Foreground color within the primary color.

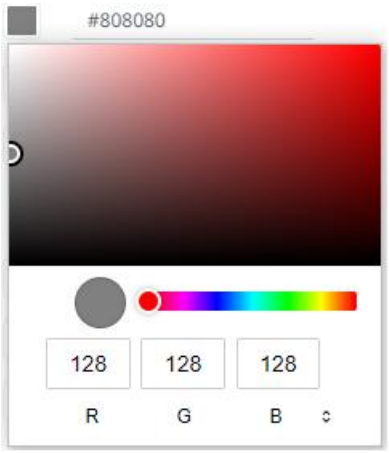
1.1. You can either:

- click the corresponding *Color* box to display the *Color* dialog to:

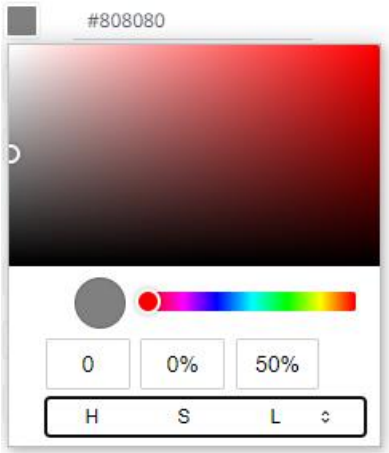


- select the color, or
- click to enter the values

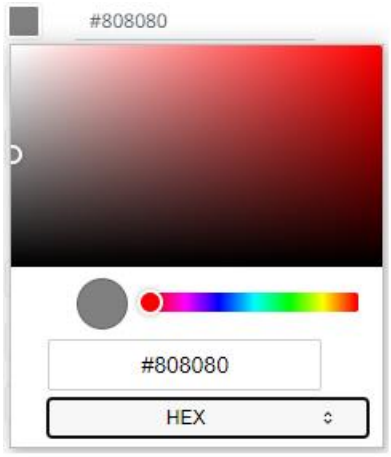
for RGB



for HSL



for the Hex color code



- or enter the Hex color code



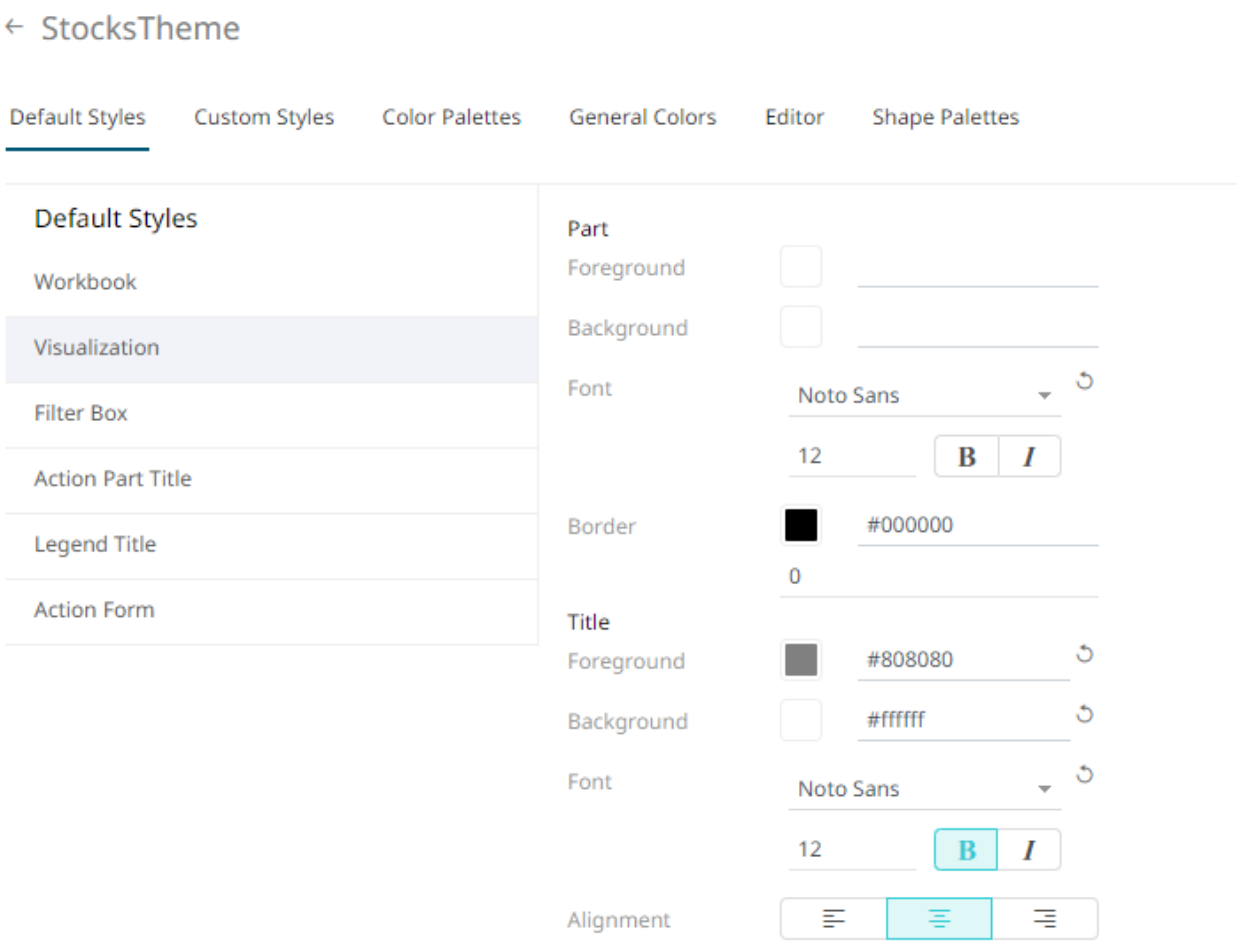
1.2. Select the *Font.*

NOTE	The available custom fonts in Panopticon Real Time can be selected in the *Font* drop-down list.

1.3. Specify the *Font Size*.

1.4. Specify whether **Bold** and **Italic**.

2. To define the default styles of the visualizations, click **Visualization** on the *Default Styles* pane. The *Visualizations Settings* are displayed.



You may opt to modify the colors of the following properties:

Property	Description
Foreground	Foreground color of the visualizations and title.
Background	Background color of the visualizations and title.
Border	Border color of the visualizations.

2.1. Follow step 1.1 to define the visualization, title, and border colors.

2.2. Select the visualization and title *Font.*

2.3. Specify the visualization and title *Font Size*.

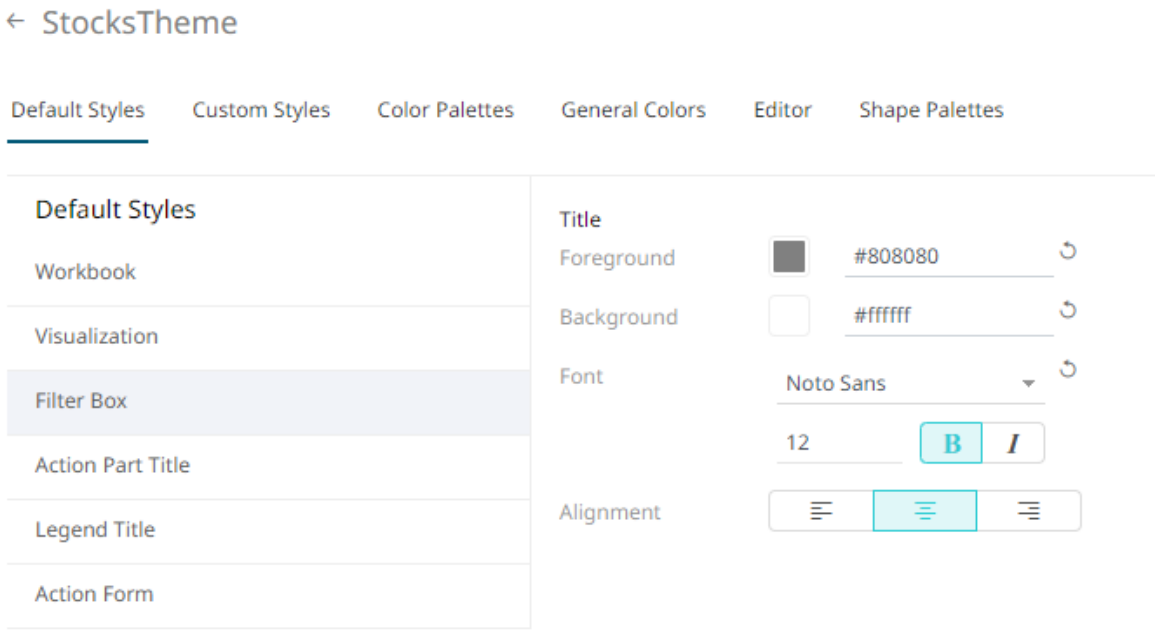
2.4. Specify whether **Bold** and **Italic**.

NOTE	For the part title, **Bold** is selected by default.

2.5. Specify the *Border Size* of the visualizations.

2.6. Select the visualization title *Alignment*: **Left** or **Center**.

3. To define the default styles of the filter box, click **Filter Box** on the *Default Styles* pane. The *Filter Box Settings* are displayed.



You may opt to modify the colors of the following properties:

Property	Description
Foreground	Foreground color of the filter box.
Background	Background color of the filter box.

3.1. Follow step 1.1 to define the filter box colors.

3.2. Select the filter box title *Font.*

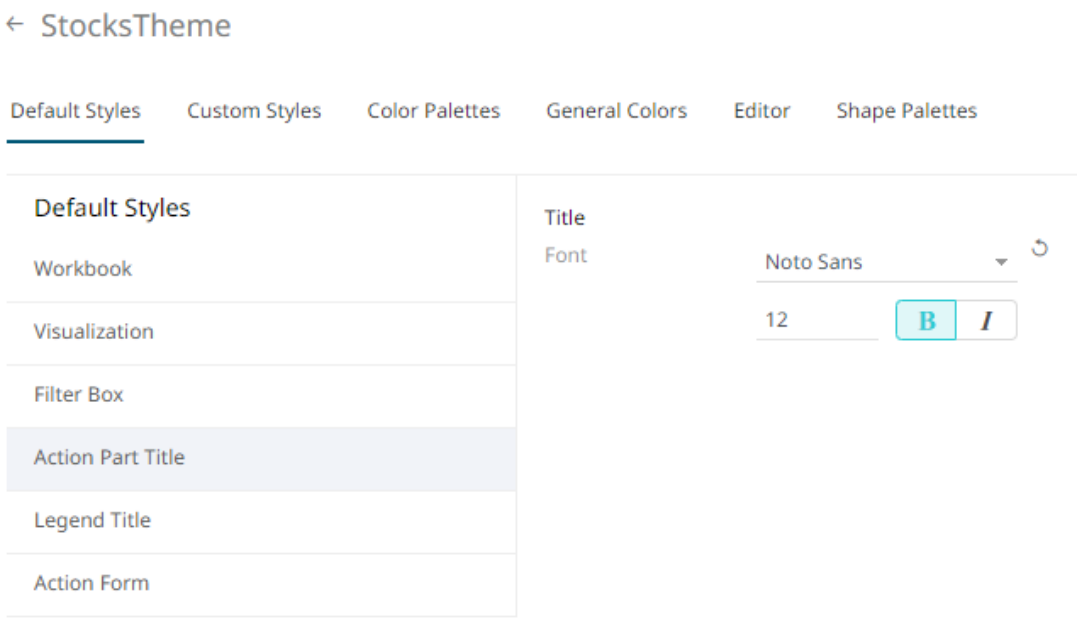
3.3. Specify the filter box title *Font Size*.

3.4. Specify whether **Bold** and **Italic**.

NOTE	For the filter box title, **Bold** is selected by default.

3.5. Select the filter box title *Alignment*: **Left** or **Center**.

4. To define the default styles of the action part title, click **Action Part Title** on the *Default Styles* pane. The *Action Part Title Settings* are displayed.



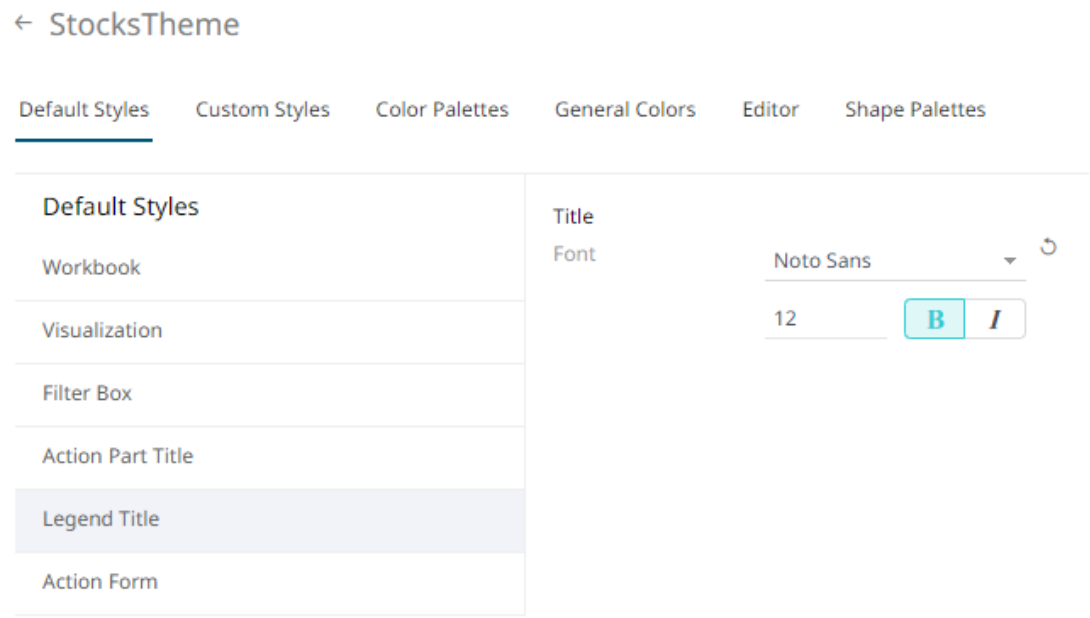
4.1. Select the action part title *Font.*

4.2. Specify the action part title *Font Size*.

4.3. Specify whether **Bold** and **Italic**.

NOTE	For the action part title, **Bold** is selected by default.

5. To define the default styles of the legend title, click **Legend Title** on the *Default Styles* pane. The *Legend Title Settings* are displayed.



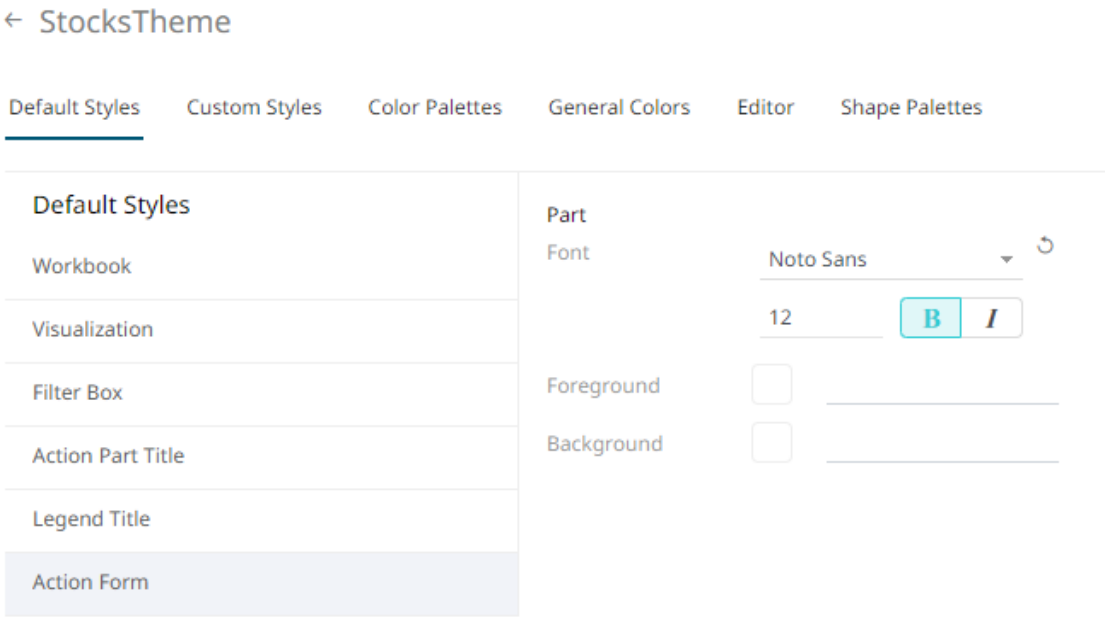
5.1. Select the legend title *Font.*

5.2. Specify the legend title *Font Size*.

5.3. Specify whether **Bold** and **Italic**.

NOTE	For the legend title, **Bold** is selected by default.

6. To define the default styles of the action form, click **Action Form** on the *Default Styles* pane. The *Action Form Settings* are displayed.



You may opt to modify the colors of the following properties:

Property	Description
Foreground	Foreground color of the action form.
Background	Background color of the action form.

6.1. Follow step 1.1 to define the action form colors.

6.2. Select the action form *Font.*

6.3. Specify the action form *Font Size*.

6.4. Specify whether **Bold** and **Italic**.

NOTE	For the action form, **Bold** is selected by default.

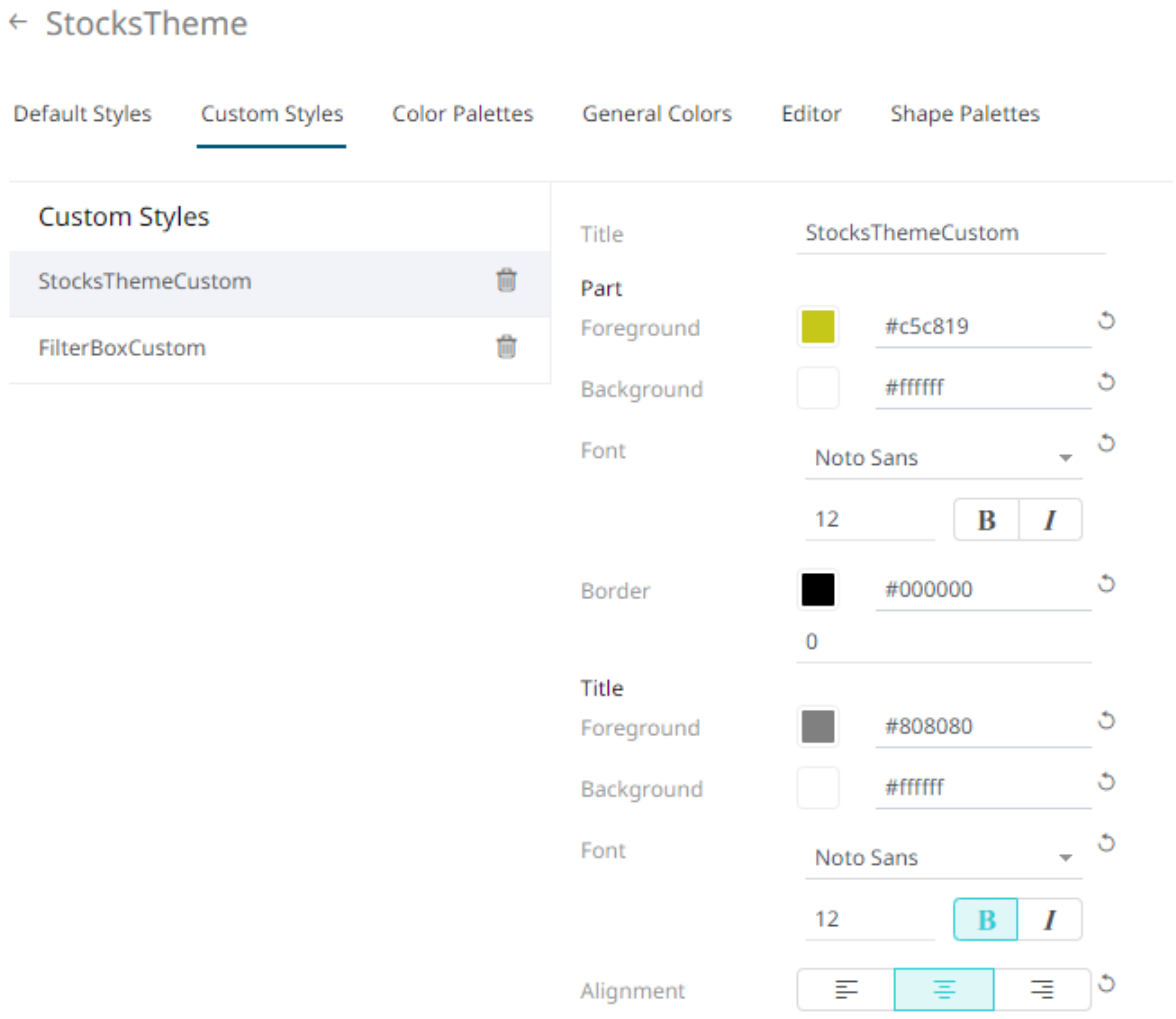
7. Proceed to the **Custom Styles** tab to specify the custom styles of the theme.

Define the Custom Style Settings of a Theme

Published custom style configuration of a part can be modified in the **Custom Styles** tab and can be applied to other parts.

Steps:

1. Click **Custom Styles** tab. The available published custom styles and properties are displayed.



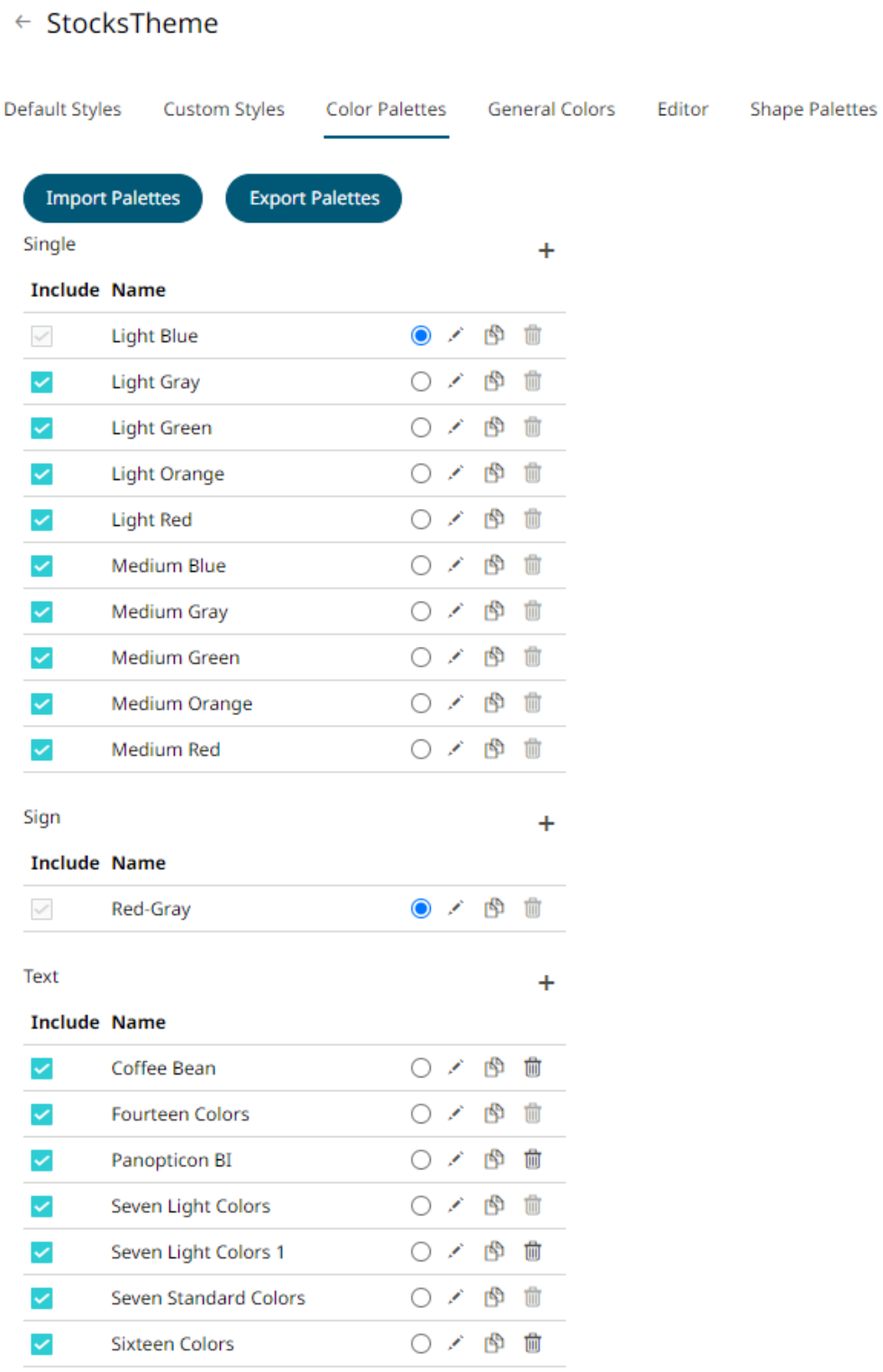
2. See Define Default Styles to specify the settings depending on the custom style part.
3. Proceed to the **Color Palettes** tab to define the color palettes of the theme.

Define the Color Palettes Settings of a Theme

When you define the settings of the color palettes, you can manage, import, or export Single, Sign, Text, Sequential, and Diverging color palettes.

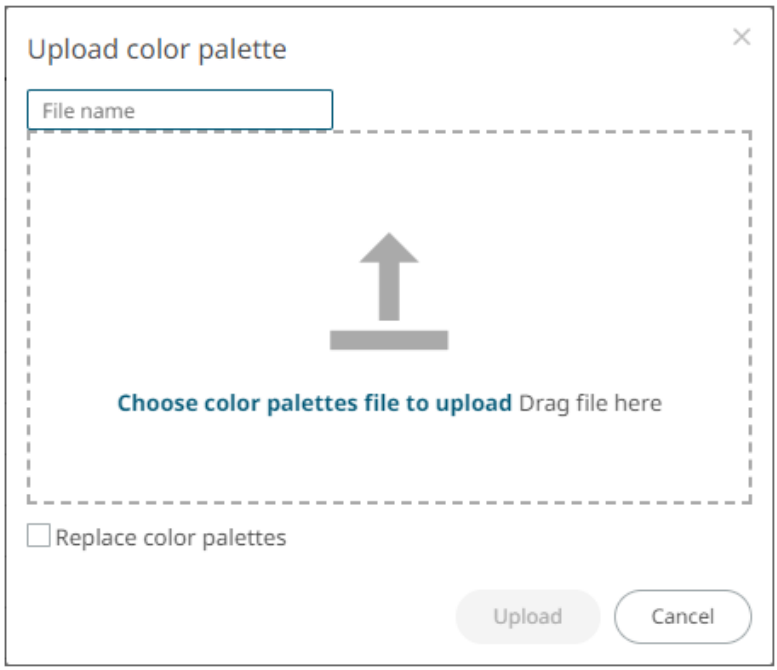
Steps:

1. To select the *Diverging*, *Sequential*, *Text, Sign and Single* color palettes to use within the workbooks, click the **Color Palettes** tab.



NOTE	For more information on how to create, modify, duplicate, or delete Single, Sign, Text, Sequential, or Diverging Palettes, see to the sections below.

2. Check the boxes of the provided color palettes that will be included for each category.
3. Click the radio button of the preferred *Default* color palette for each category.
4. To upload color palettes, click Import Palettes. The *Upload Color Palette* dialog displays.

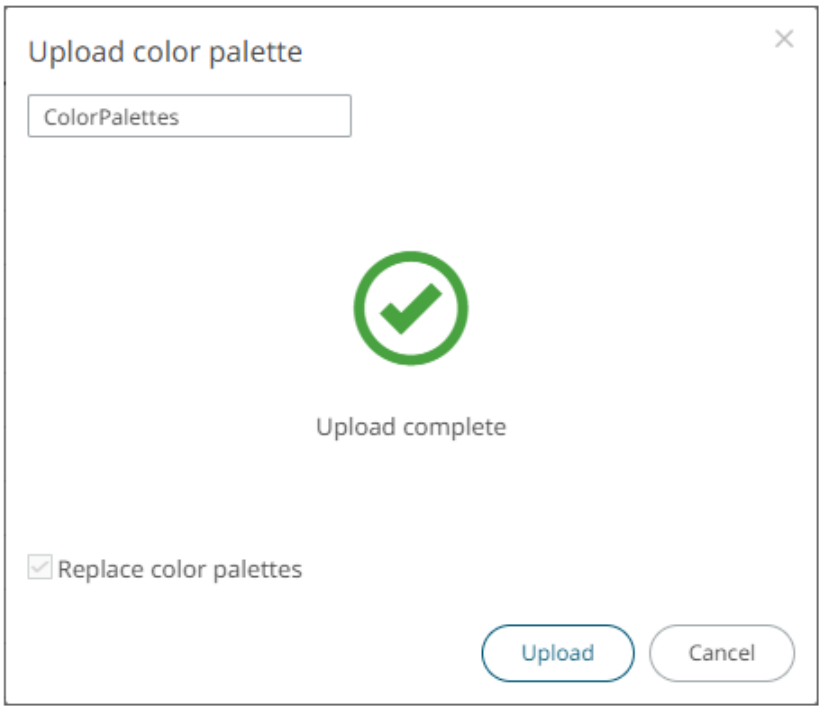


5. To upload a color palette, either:
   - drag the file from your desktop and drop on the dialog, or
   - click **Choose color palettes file to upload** and then browse and select one on the *Open* dialog that displays

   The name of the color palette is displayed on the uploaded color palette area and in the *Name* box.

   You can opt to rename the uploaded color palette.
6. To replace the color palettes, check the *Replace Color Palettes* box.
7. Click Upload.

   A notification displays once the color palettes file is uploaded.



8. To export color palettes, click Export Palettes. The `.excp` file is exported. You can now move this file to the desired location.
9. Proceed to the **General Colors** tab to specify the general colors of the theme.

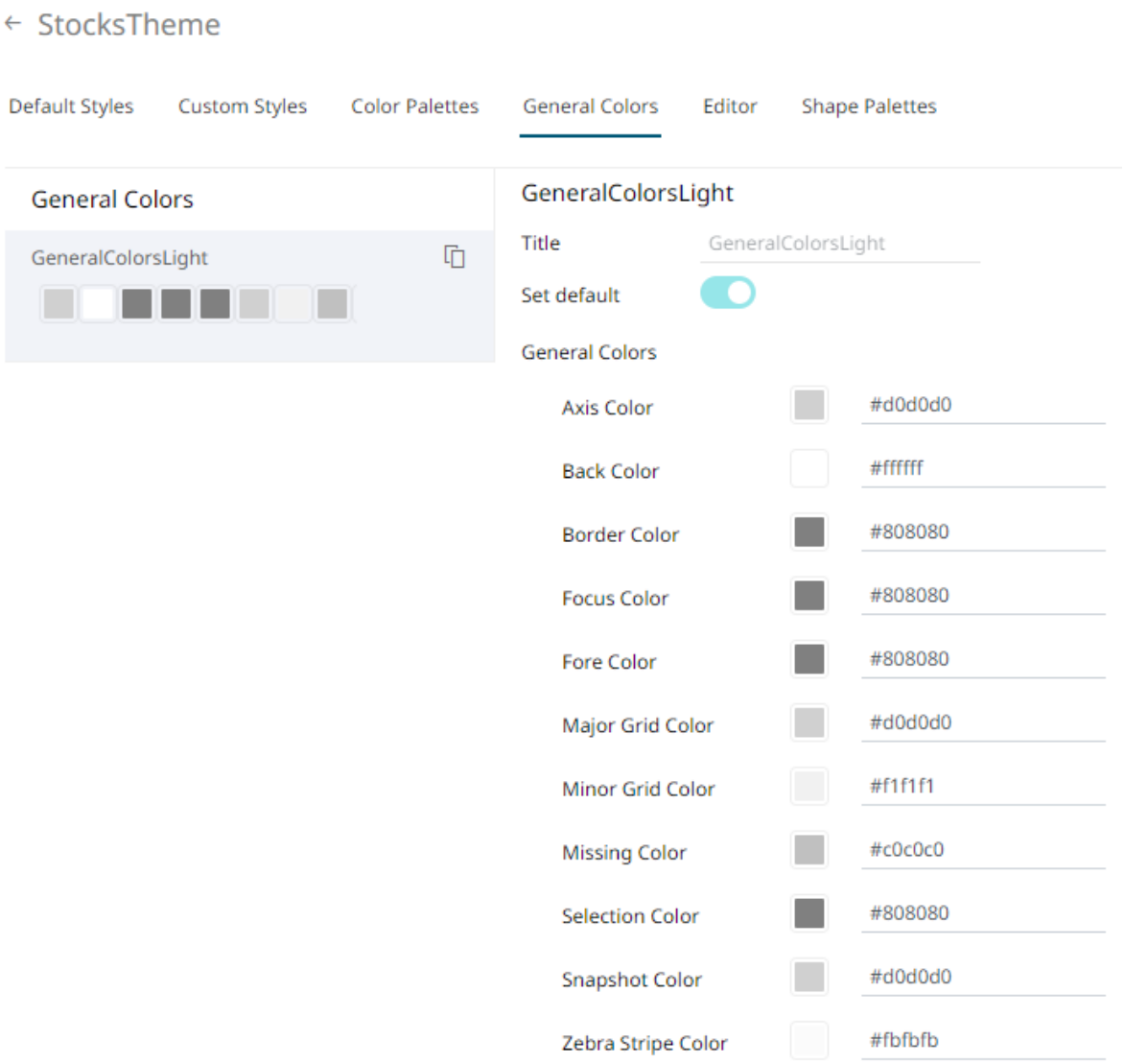
Define the General Color Settings of a Theme

You can specify new general colors or duplicate or remove them.

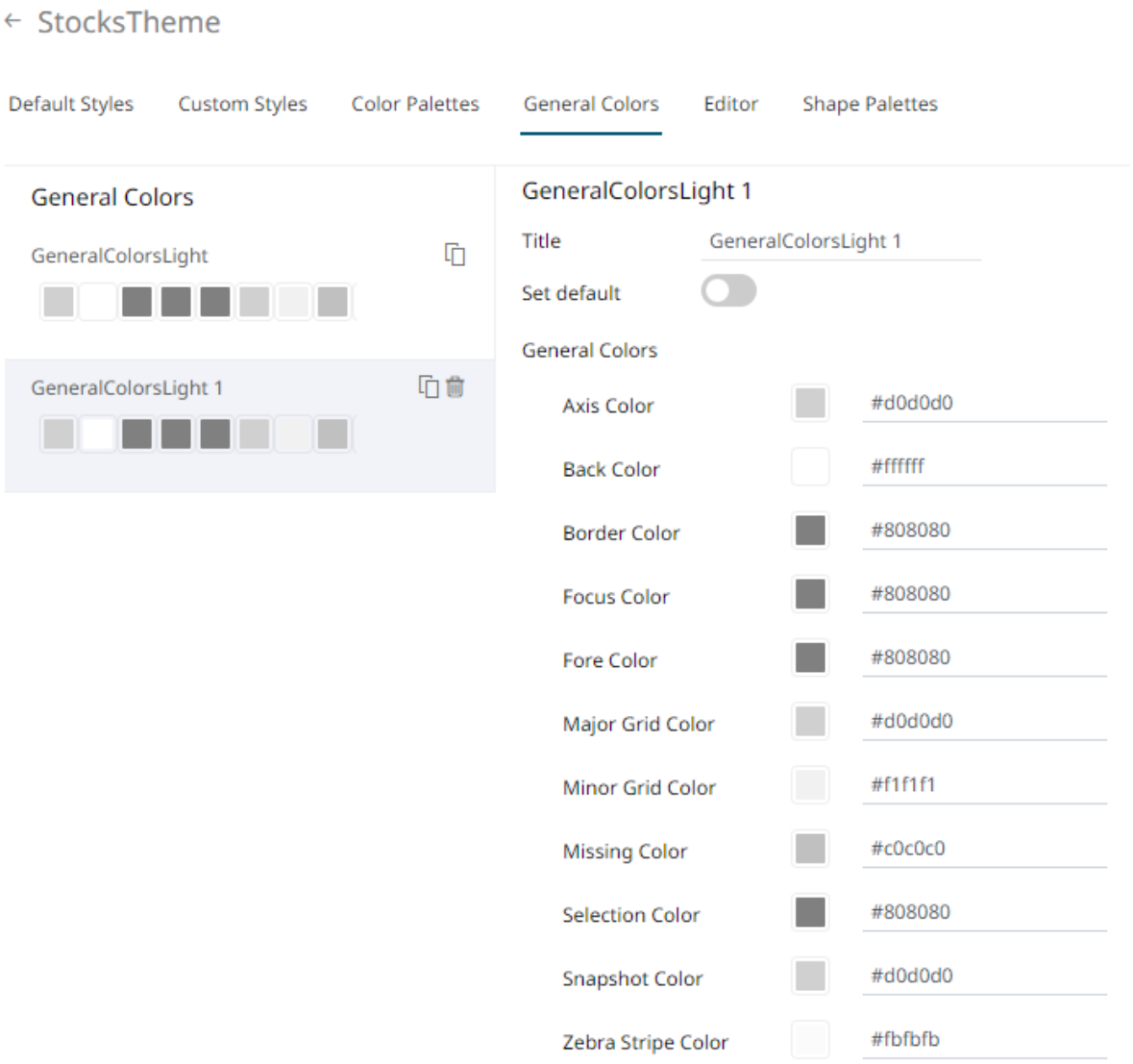
Steps:

1. To set the general colors to be used for visualizations, click the **General Colors** tab.

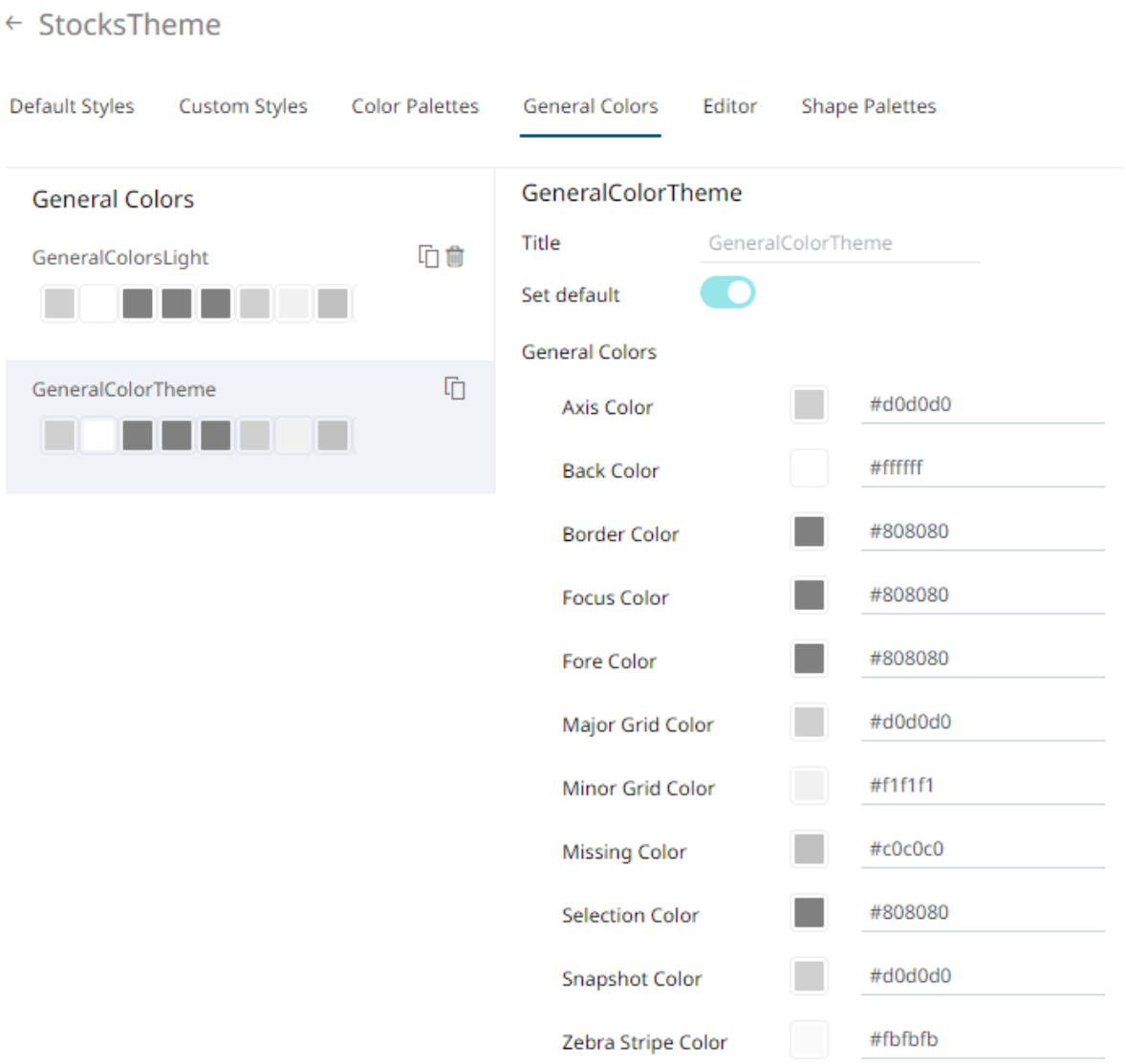
   By the default, the new *General Colors* is named **GeneralColorsLight**.



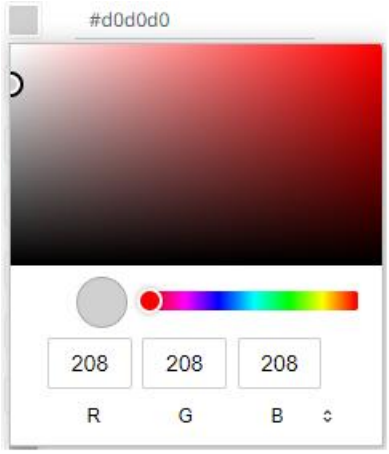
2. Click **Duplicate** to make a duplicate copy of the new general colors.



3. You can enter a new name and click ✓. **Set Default** is turned off and the **Remove** icon is now available.
4. Tap the **Set Default** slider to turn it on and the **Remove** icon is no longer available.



5. Click any of the color boxes to display the *Color* dialog.



Select or specify the new general colors: AxisColor, BackColor, BorderColor, FocusColor, ForeColor, MajorGridColor, MinorGridColor, MissingColor, SelectionColor. SnapshotColor,ZebraStripeColor.

Or enter the corresponding Hex color code.

6. Repeat steps 2 to 5 to add more general colors.

   Once the new theme is saved and selected in the opened workbook, all of the defined *General Colors* will be added as options in the *General Colors* drop-down list of a *Color* variable in a visualization.

7. Select any of the general colors and tap the **Set Default** slider to make it the default.

8. Select any of the general colors that is not set as the default, and click **Delete** to remove.

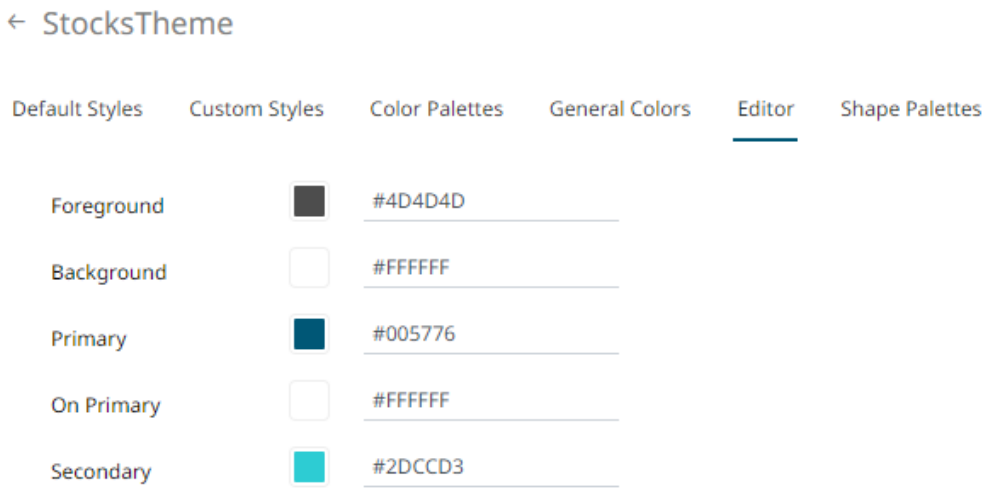
9. Proceed to the **Editor** tab to specify the editor style of the **Dark** theme.

Define the Editor Style Settings of a Theme

You can define the editor style settings of a dark theme.

Steps:

1. To set the *Foreground*, *Background*, *Primary*, *On Primary*, and *Secondary* colors for the editor style of the **Dark** theme, click the **Editor** tab.



2. Click on any of the color boxes to display the *Color* dialog and select or enter the preferred color.

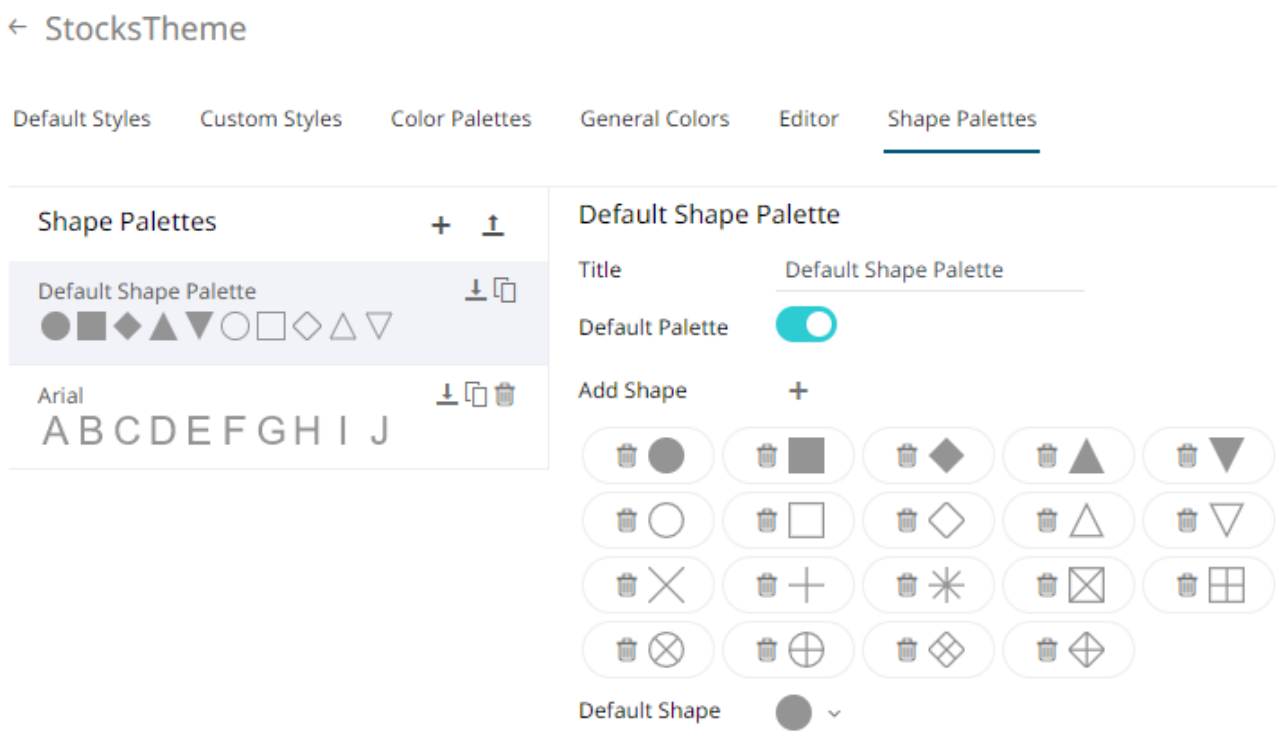
3. Proceed to the **Shape Palettes** tab to specify the shape palettes of the theme.

Define the Shape Palettes of a Theme

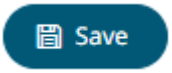
When you define the shape palettes of a theme, you specify the settings of shape palettes and add, upload, download, duplicate, or remove them.

Steps:

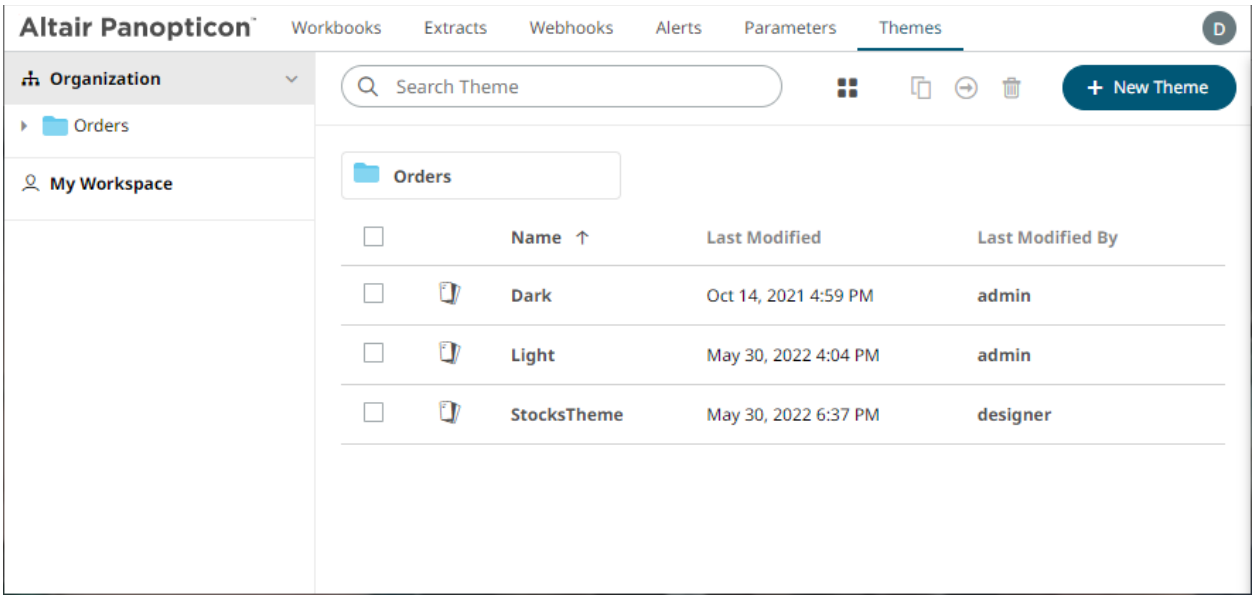
1. To set the shape palettes that can be used with the workbook theme, click the **Shape Palettes** tab.



NOTE	For more information in how to create, upload, download, modify, duplicate, or delete shape palettes, refer to the sections below.

2. Click **Save**  to save the new theme.

3. Clicking the ← displays the **Themes** tab page with the new theme added in the list.

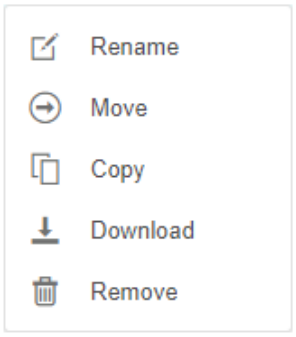


NOTE Unlike the default Dark and Light themes, new themes can be deleted.

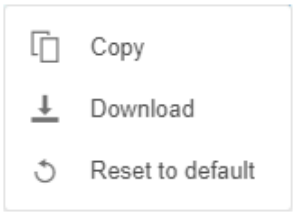
THEMES TOOLBAR AND CONTEXT MENU

Moving, copying, and removing themes can either be done using:

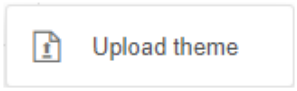
- Context menu



Theme Context Menu



Dark or Light Context Menu



Theme Folder Context Menu

- Toolbar



List View



Grid View

The toolbar options include:

Toolbar Option	Description
Sort By / Sort Order	Allows sorting of themes by *Name, Last Modified,* or *Last Modified By*.
Display View	Display themes either by *List View* or *Grid View*.
Copy	Copy themes to another folder or subfolder where the user has permission.
Move	Move themes to another folder or subfolder where the user has permission.
Remove	Remove themes.

The context menu options include:

Toolbar Option	Description
Upload Theme	Upload theme.
Rename	Rename the theme.
Move	Move themes to another folder or subfolder where the user has permission.
Copy	Copy themes to another folder or subfolder where the user has permission.

Remove	Remove themes.
Reset to Default	Reset to default **Dark** or **Light** theme settings.

Sorting Themes

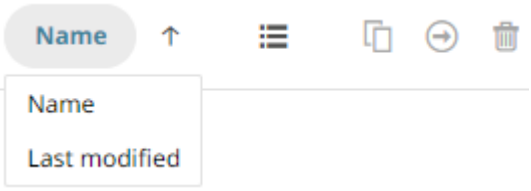
Sorting themes can be done by **Name, Last Modified**, or **Last Modified By**.

Steps:

On the *Themes* tab, either:

- click the **Sort By** option on the *Toolbar* of the *Grid View.*

  By default, the sorting is by **Name**.

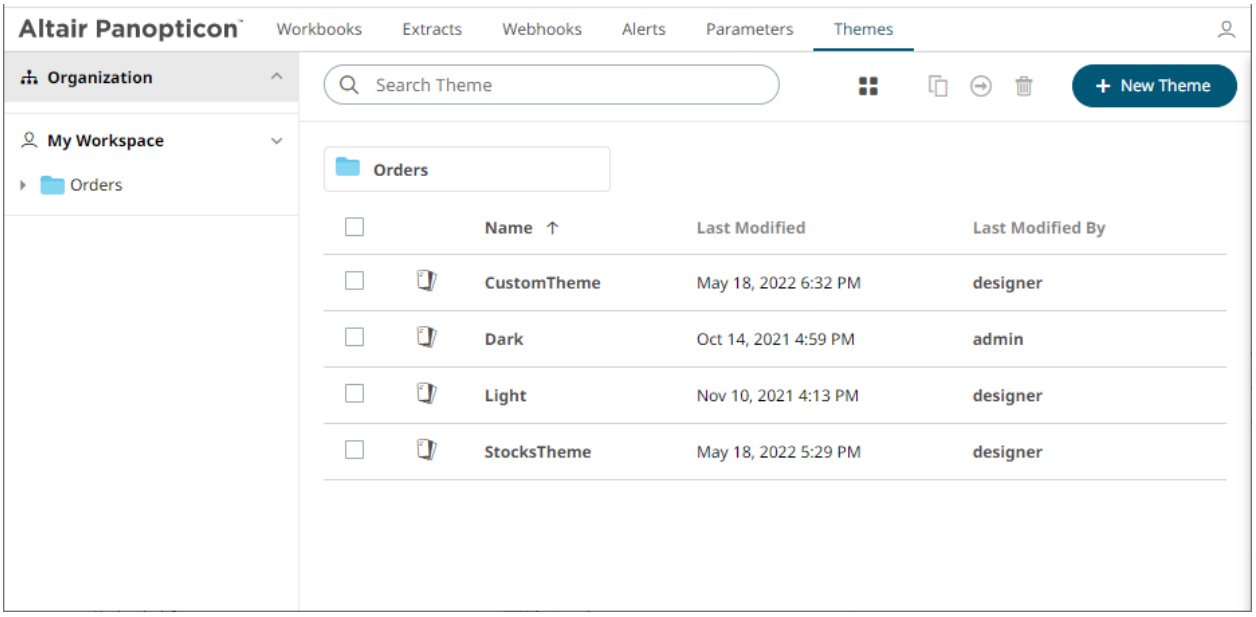


  - Name
  - Last Modified

  Then click the *Sort Order*:

  - Ascending
  - Descending

- click on the **Name**, **Last Modified**, or **Last Modified By** column header of the *List View.*



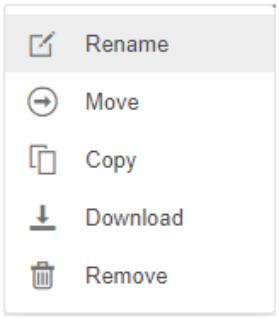
Then click the *Sort Order*:

- Ascending
- Descending

Renaming a Theme

Steps:

1. Right-click on a theme then select **Rename** on the context menu.



The *Rename Theme* dialog displays.



2. Enter a new name then click 

.

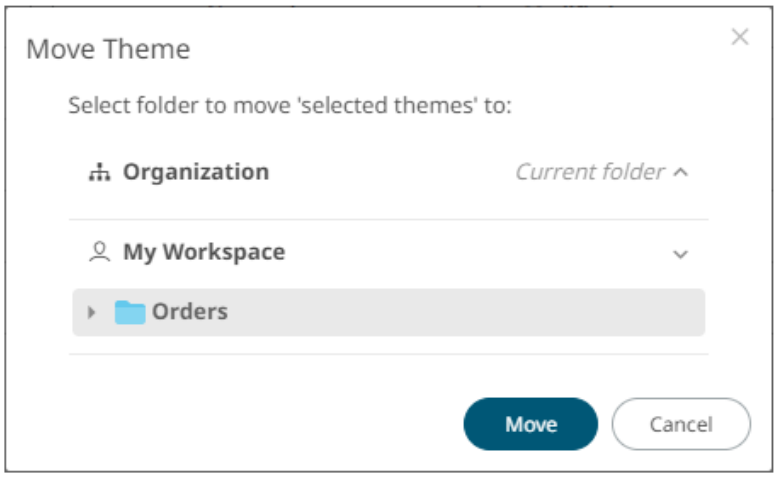
Moving Themes

Users with a Designer role are allowed to move themes to another folder or subfolder where they have permission.

Steps:

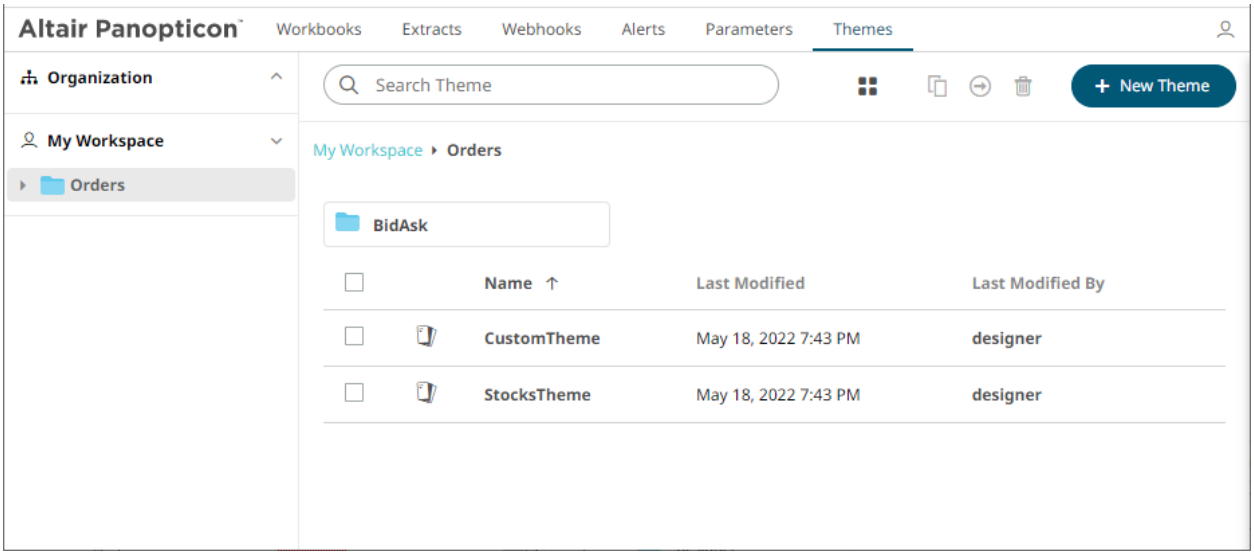
1. On the *List* or *Grid* view, select one or several themes then:
   - right-click and select **Move** on the context menu, or
   - click the **Move**  icon on the toolbar.

   The *Move Theme* dialog displays with the folder or subfolders that the user is allowed to move the themes. Select the folder or subfolder.



2. Click Move .

   The themes are moved and displayed on the selected folder.



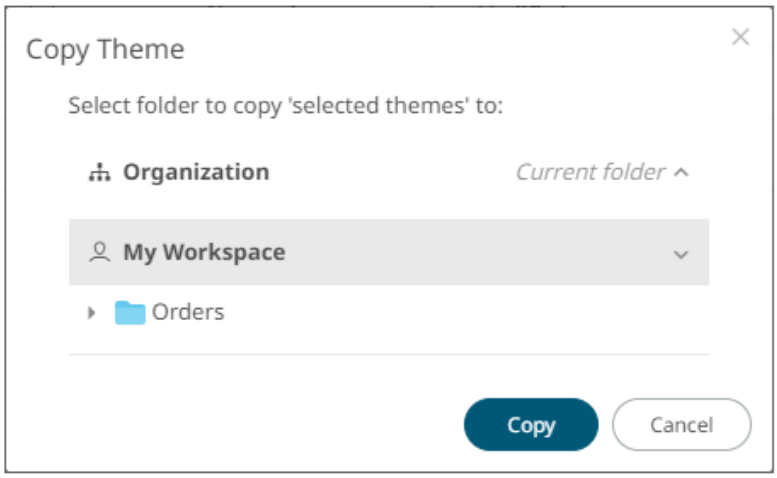
Copying Themes

Users with a Designer role are allowed to copy themes to another folder or subfolder where they have permission.

Steps:

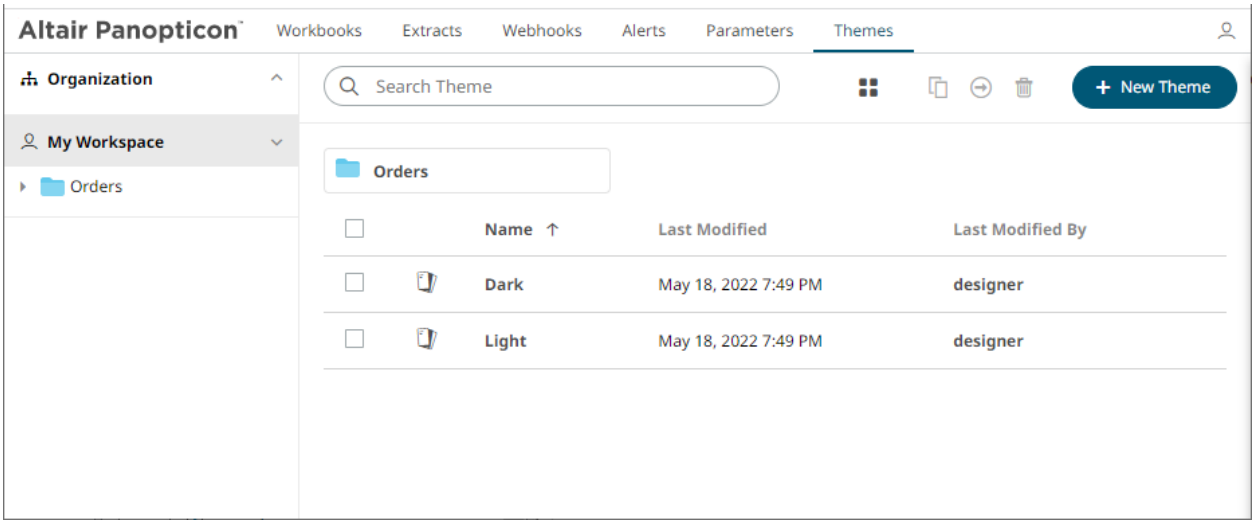
1. On the *List* or *Grid* view, select one or several themes then:
   - right-click and select **Copy** on the context menu, or
   - click the **Copy** icon on the toolbar.

   The *Copy Theme* dialog displays with the folder or subfolders the user is allowed to copy the themes to. Select the folder or subfolder.



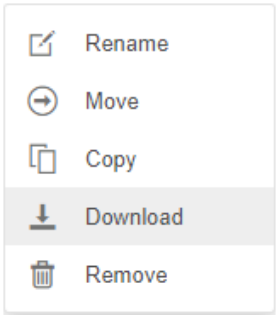
2. Click Copy.

   The themes are copied and displayed on the selected folder.



Downloading Themes

On the *List* or *Grid* view, right-click on a theme and selected **Download** on the context menu to download a copy.



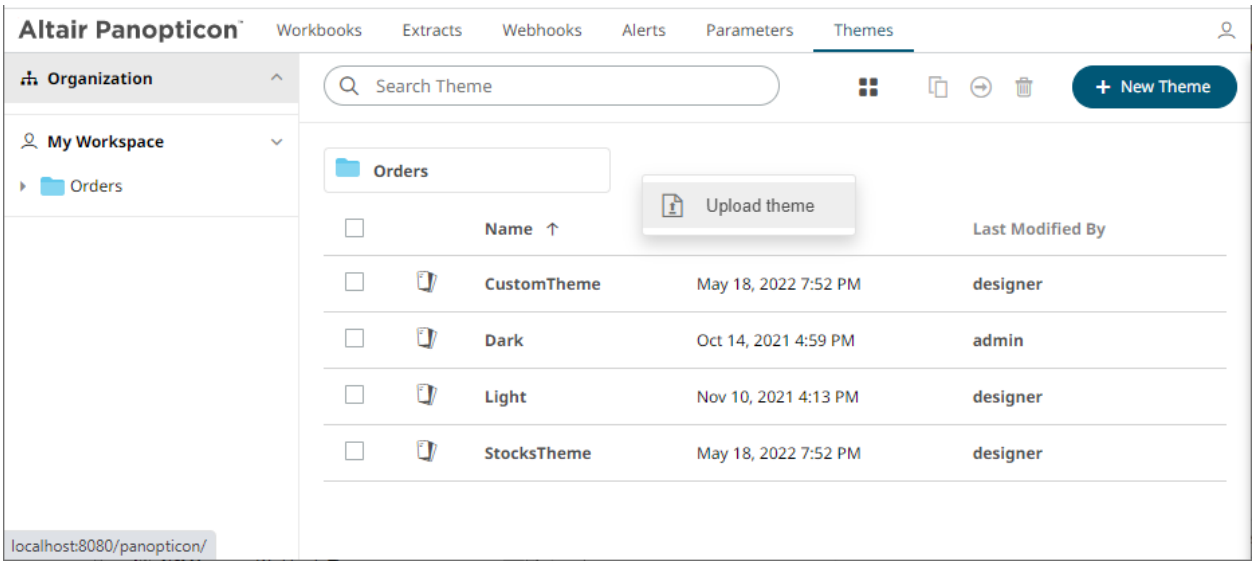
You can copy this file to the desired location.

Uploading Themes

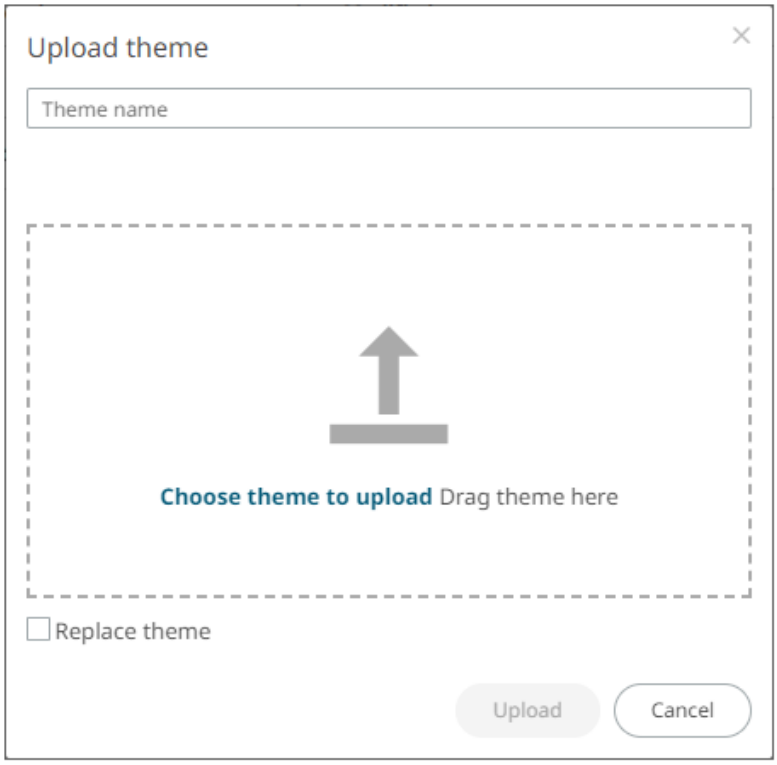
Users can upload their own workbook themes and also replace existing ones.

Steps:

1. Click on a folder of subfolder where the user has permission to upload a theme then select **Upload Theme** on the context menu.



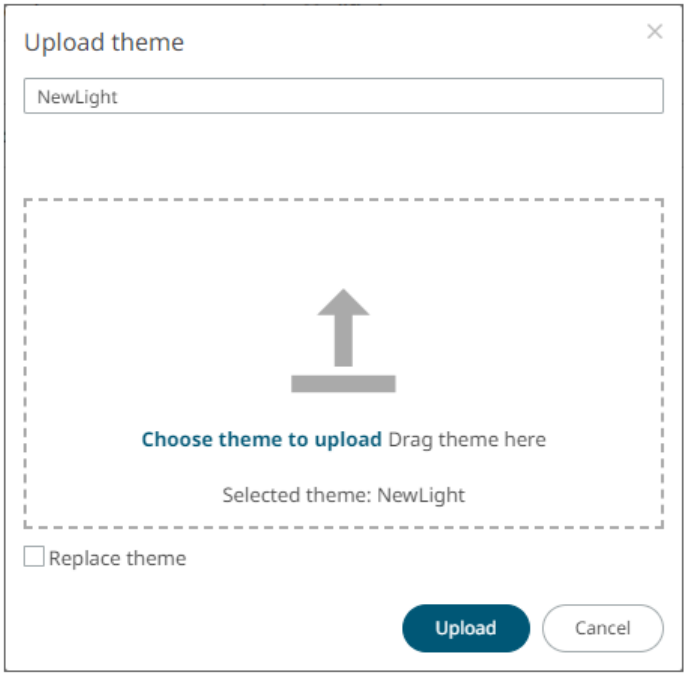
   The *Upload Theme* dialog displays.



2. To upload a workbook theme, either:

- drag the file from your desktop and drop on the dialog, or
- click **Choose theme to upload** and then browse and select one on the *Open* dialog that displays

The name of the workbook theme is displayed on the uploaded workbook palette area and in the *Name* box.

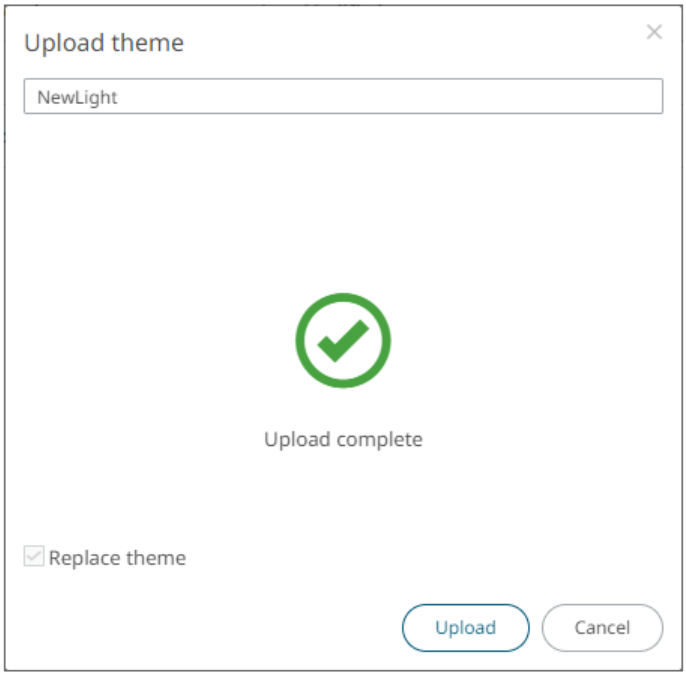


You can opt to rename the uploaded workbook theme.

3. To replace the workbook theme, check the *Replace Theme* box.
4. Click 

.

A notification displays once the file is uploaded.



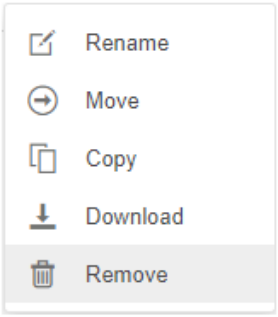
The uploaded theme is added in the *Theme* list.

Deleting Themes

The default themes (**Dark** and **Light**) cannot be removed.

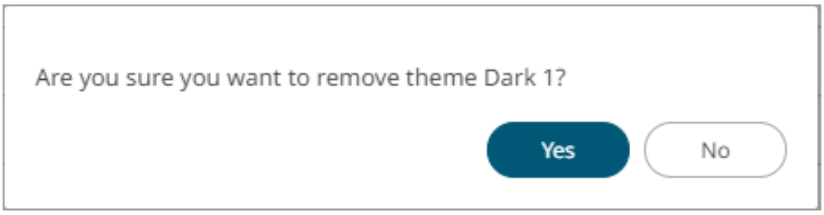
Steps:

1. Right-click on one or two themes then either:
   - select **Remove** on the context menu, or



   - click the **Remove** icon on the toolbar.

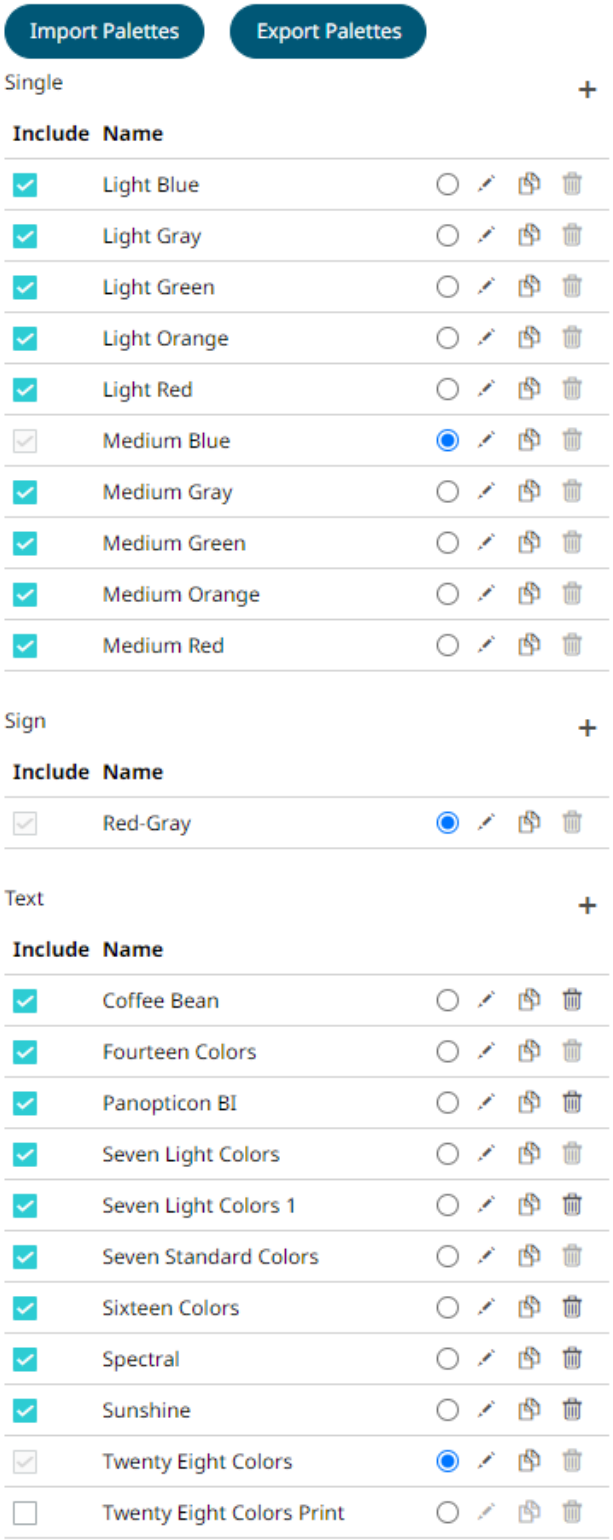
   A notification message displays.



2. Click Yes.

COLOR PALETTES

Single, sign, text, sequential, and diverging color palettes that are used in text or numeric color variables in visualizations can be created, modified, duplicated, or deleted in the **Color Palettes** tab of a *Theme* page.



Sequential

Include	Name
☑	Gray
☑	Purple-Orange
☑	White-Blue
☐	White-Blue-Print
☑	White-Green
☑	White-Orange
☑	White-Red
☐	White-Red-Print
☑	Yellow-Red

Diverging

Include	Name
☐	Brown-Gray-Petrol
☑	Brown-White-Petrol
☐	Orange-Gray-Blue
☐	Orange-Gray-Green
☑	Orange-White-Blue
☑	Orange-White-Green
☑	Purple-White-Turquoise
☐	Red-Black-Blue
☐	Red-Black-Green
☐	Red-Gray-Blue
☐	Red-Gray-Green
☑	Red-White-Blue
☐	Red-White-Blue-Print
☑	Red-White-Green
☐	Red-White-Green-Print
☑	Red-Yellow-Green
☐	Red-Yellow-Green-Print

NOTE **Creating, modifying, duplicating, or deleting color palettes can also be done inside a workbook in the Web Authoring. However, these changes will only be associated with the inline theme of the workbook and will not be reflected in the Color Palettes tab of the Themes page in Panopticon Real Time.**

Creating a New Single Color Palette

These are the single colors that will be shared in a workbook for:

- records in Table and Record visualizations for the background, text, or shape
- visual members in Combination visualizations for the background or text

Light and medium single color palettes are provided in Panopticon Real Time, but you can also add new ones.

Steps:

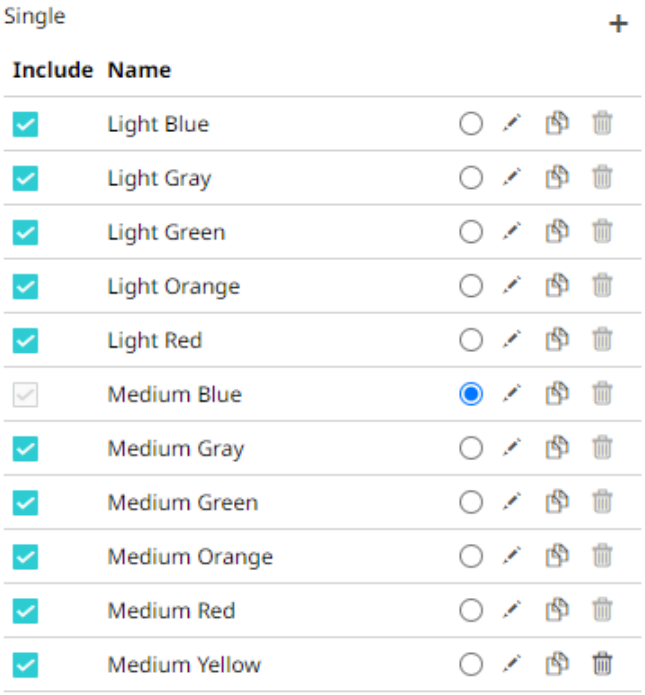
1. On the *Single* section, click the **Add Palette** + icon.

   The *New Single Palette* dialog displays.



2. Enter the *Title* then click ✓ .
3. Click the **Color** box to display the *Color* dialog and set the palette color or enter the Hex color code.
4. Click Ok .

   The new single color palette is added in the list (e.g., **Medium Yellow**). Note that it is already included and can be modified, duplicated, and deleted.



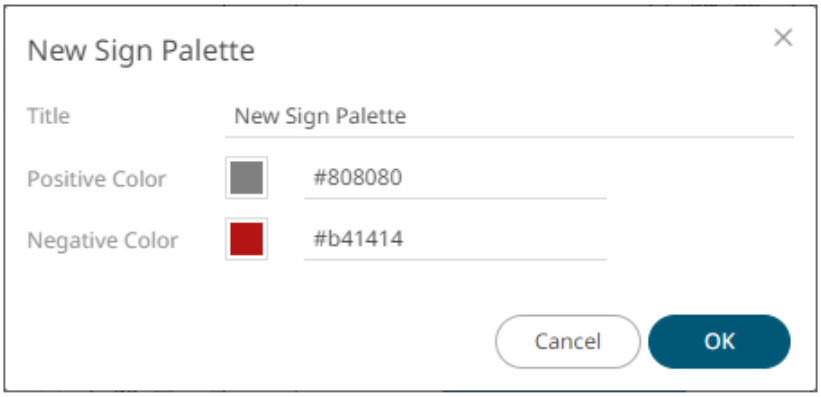
Creating a New Sign Color Palette

The Sign color palette is used to signify the positive or negative values in numeric visual members.

Steps:

1. On the *Sign* section, click the **Add Palette** + icon.

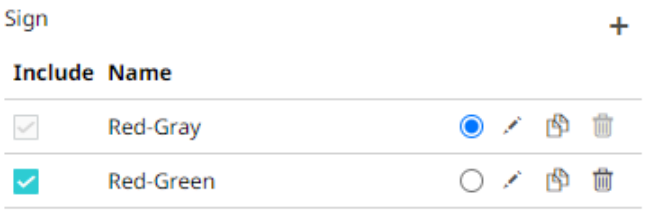
   The *New Sign Palette* dialog displays.



2. Enter the *Title* then click ✓.
3. To set the *Positive Color* (default is **Gray**) and the *Negative Color* (default is **Red**), click the **Color** box to display the *Color* dialog and select the palette color or enter the Hex color code.
4. Click 

.

   The new Sign color palette is added in the list (e.g., **Red-Green**). Note that it is already included and can be modified, duplicated, and deleted.



Creating a New Text Color Palette

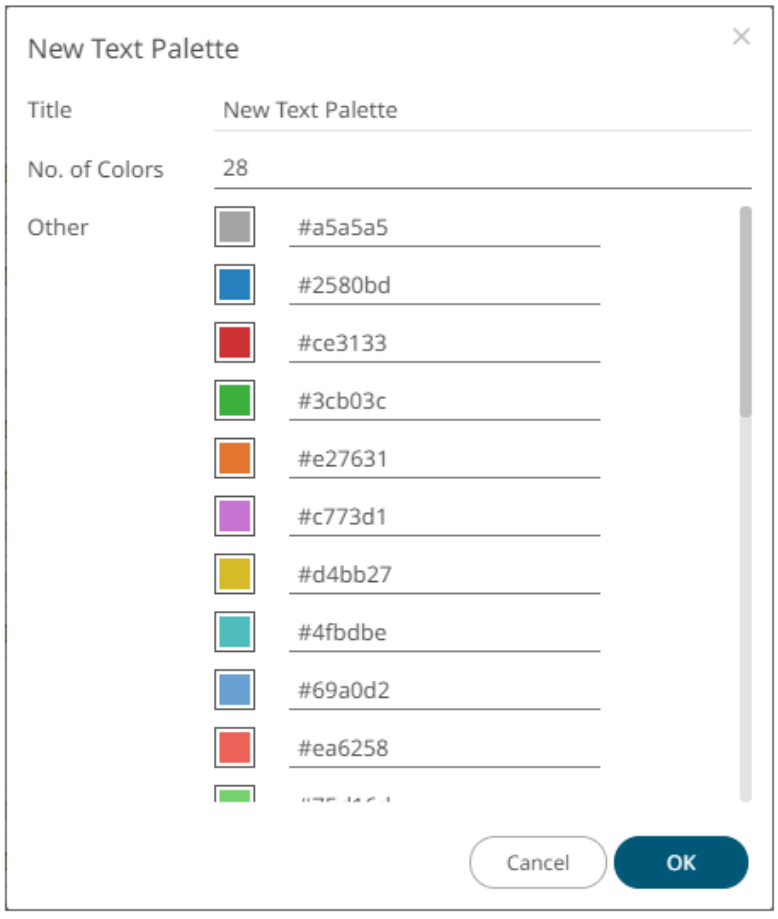
The configuration pane for the *Color* variable changes depending on the column data type.

When a text column is added to the *Color* variable, the configuration pane displays the color associated with each categorical item, as specified with a default color palette (e.g., **Twenty Eight Colors**).

Steps:

1. On the *Text* section, click the **Add Palette** + icon.

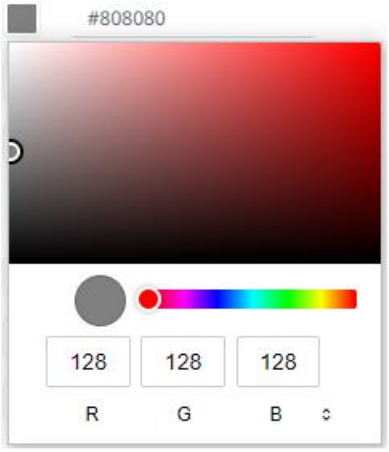
   The *Next Text Palette* dialog displays.



2. Enter the *Title* then click ✓.
3. Select the *Number of Colors* in the drop-down list. Default is **28** colors.

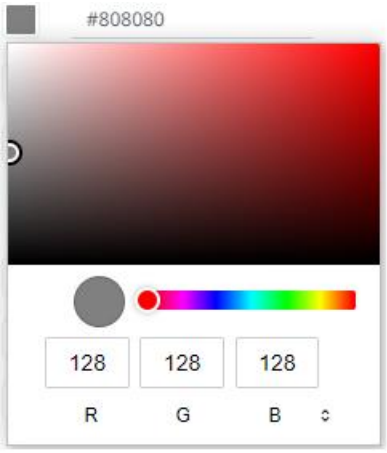
   The *Other* list is updated accordingly.

4. To set the colors:
   - click the corresponding *Color* box to display the *Color* dialog to:

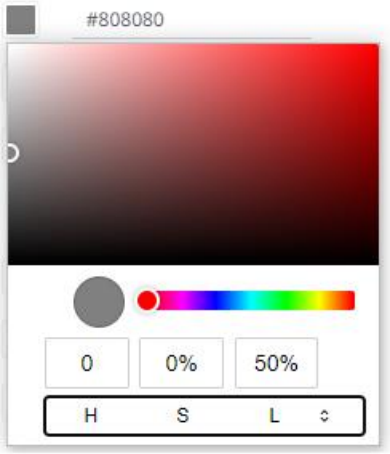


     - select the color, or
     - click to enter the values

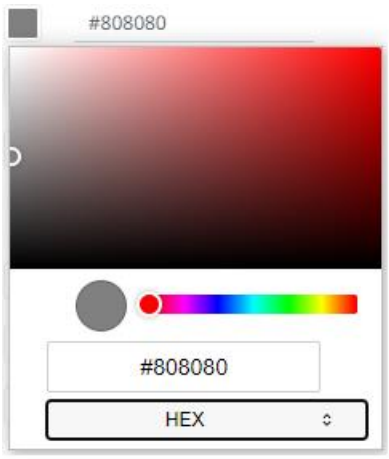
       for RGB



       for HSL



       for the Hex color code



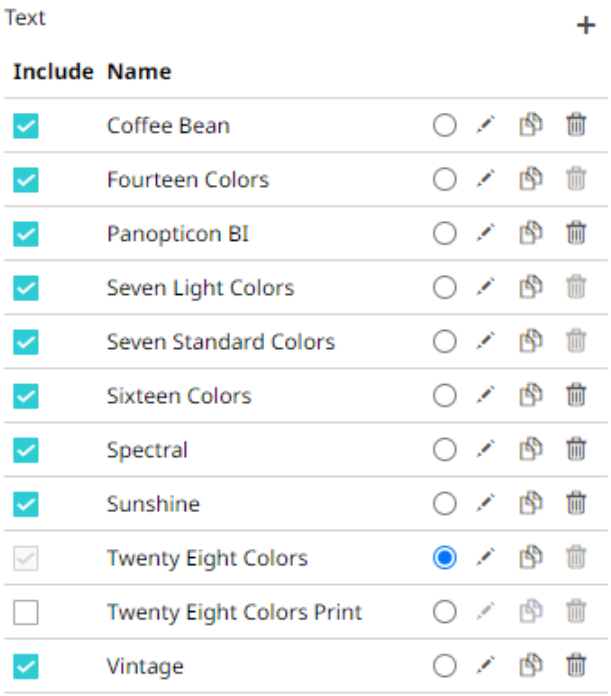
- or enter the *Hex* color code



5. Click 

.

The new text color palette is added in the list (e.g., **Sixteen Colors**). Note that it can be deleted.



Creating a Sequential or Diverging Numeric Color Palette

Panopticon visualizations support two types of Numeric Color Palettes: **Sequential** and **Diverging**.

❑ Sequential Color Palettes

Sequential palettes use a two-color gradient between a minimum and a maximum value. Numeric column containing only positive values default to a Sequential Palette using the **White-Blue** color palette.

In this case the range *Mid* point is disabled, and the *Min* and *Max* points are populated with defaults from the data set.

- Diverging Color Palettes

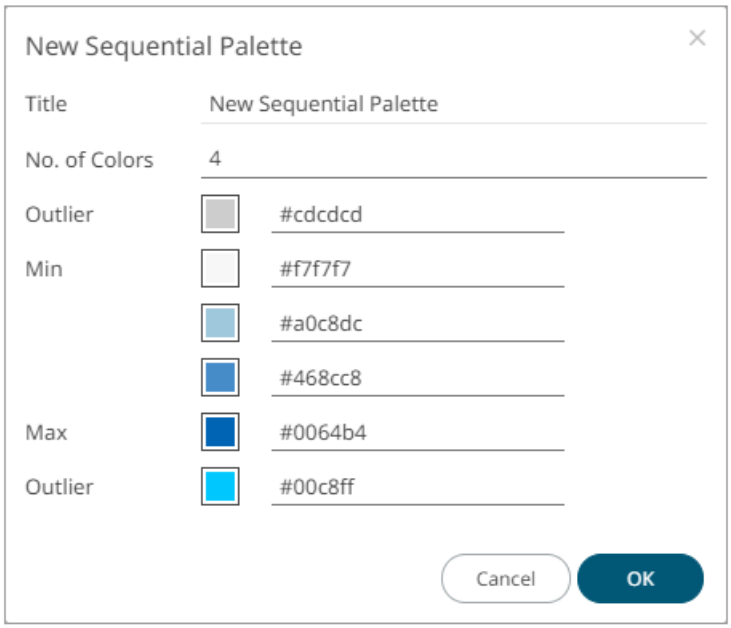
  Diverging Palettes use a three-color gradient between a minimum, middle and a maximum value. Numeric columns containing both positive and negative values default to the Diverging Palette with the **Red White Blue** color palette selected.

  Diverging Palettes use the **Range Midpoint**. The *Min*, *Mid* and *Max* points are populated with defaults from the data set.

To create a new sequential numeric color palette:

1. On the *Sequential* section, click the **Add Palette** + icon.

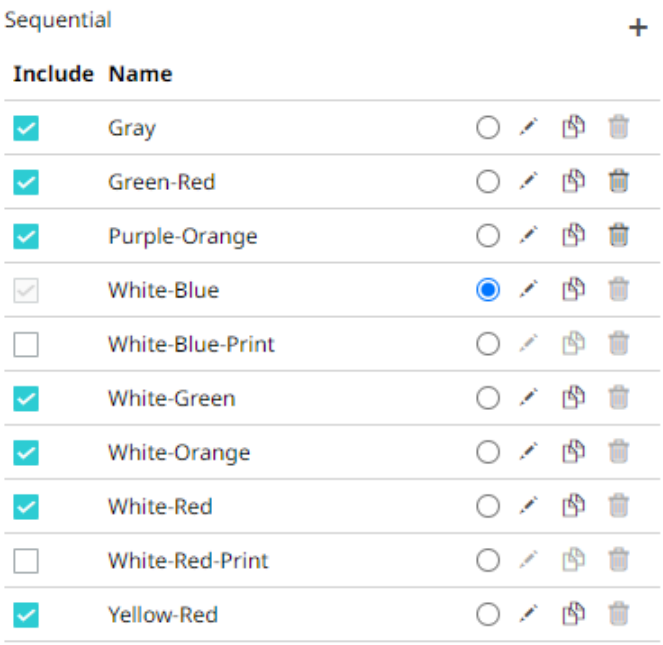
   The *New Sequential Palette* dialog displays.



2. Enter the *Title* and click ✓ .
3. Select the *Number of Colors* in the drop-down list. Default is **4** colors.

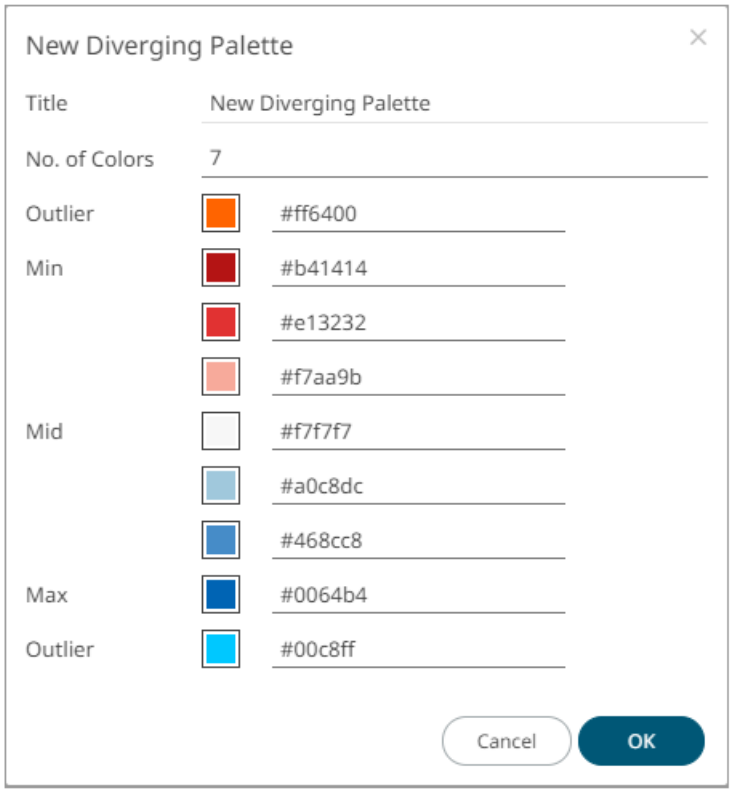
   The number of colors from *Min* to *Max* is updated accordingly.
4. Set the *Outliers*, *Min*, and *Max* colors. Refer to step 4 of Creating a New Text Color Palette for more information.
5. Click Ok .

   The new sequential numeric color palette is added in the list and can be deleted (e.g., **Green-Red**).



To create a new diverging numeric color palette:

1. On the *Diverging* section, click the **Add Palette** + icon.
   The *New Diverging Palette* dialog displays.



2. Enter the *Title* and click ✓ .

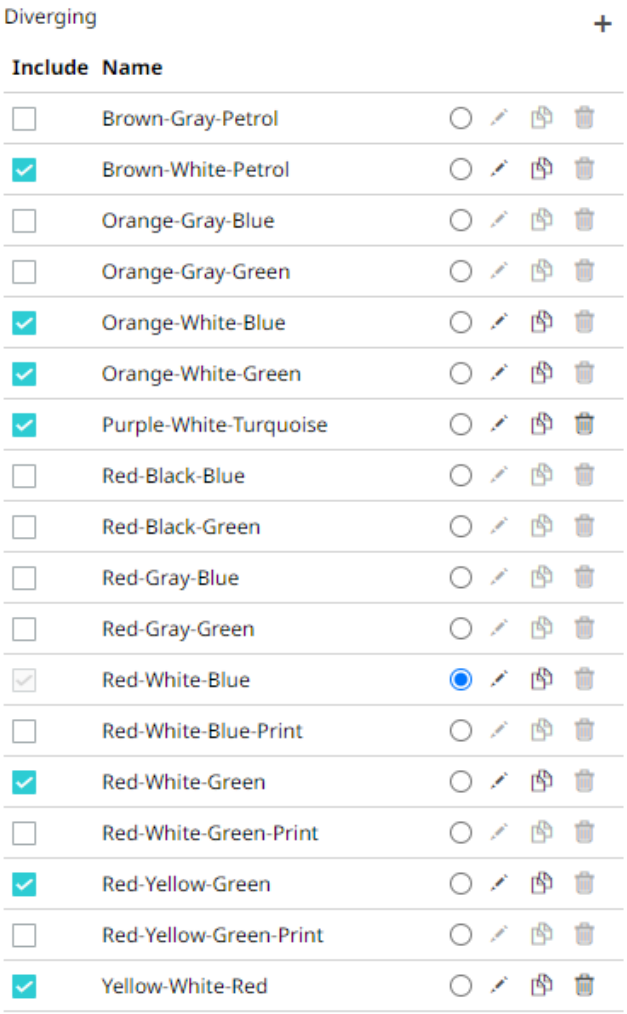
3. Select the *Number of Colors* in the drop-down list. Default is **7** colors.

   The number of colors from *Min, Mid,* to *Max* is updated accordingly.

4. Set the *Outliers*, *Min*, *Mid*, and *Max* colors. Refer to step 4 of Creating a New Text Color Palette for more information.

5. Click Ok.

   The new diverging numeric color palette is added in the list and can be deleted (e.g., **Yellow-White-Red**).



Modifying Color Palettes

Any of the included or checked color palettes can be modified.

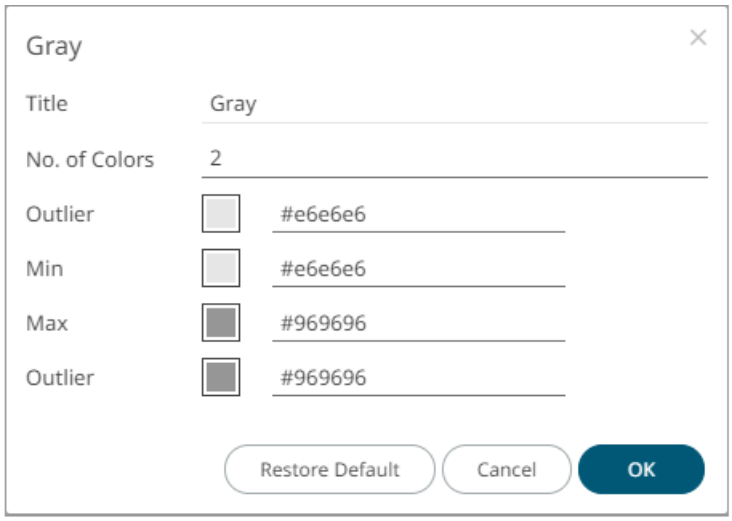
NOTE

- **For the selected default color palette, only the *Number of Colors* and assigned colors can be modified.**
- **Color palettes that are not selected cannot be modified.**

Steps:

1. Click the **Edit** icon of an included or checked color palette.

   The corresponding dialog box displays.



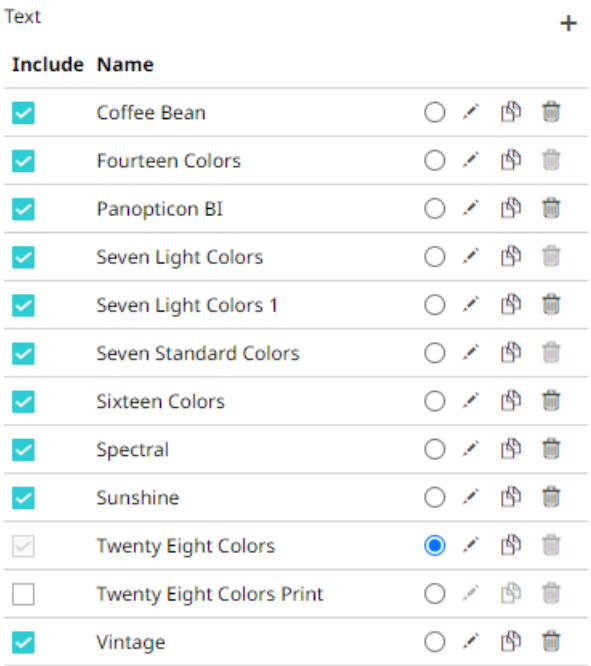
2. Modify the *Title*, *Number of Colors*, and assigned colors.
3. Click 

to commit the changes or 

to revert to the original settings.

Creating a Duplicate of a Color Palette

Click the **Duplicate** icon of a color palette. A copy of the color palette is added in the list (e.g., **Seven Light Colors 1**).



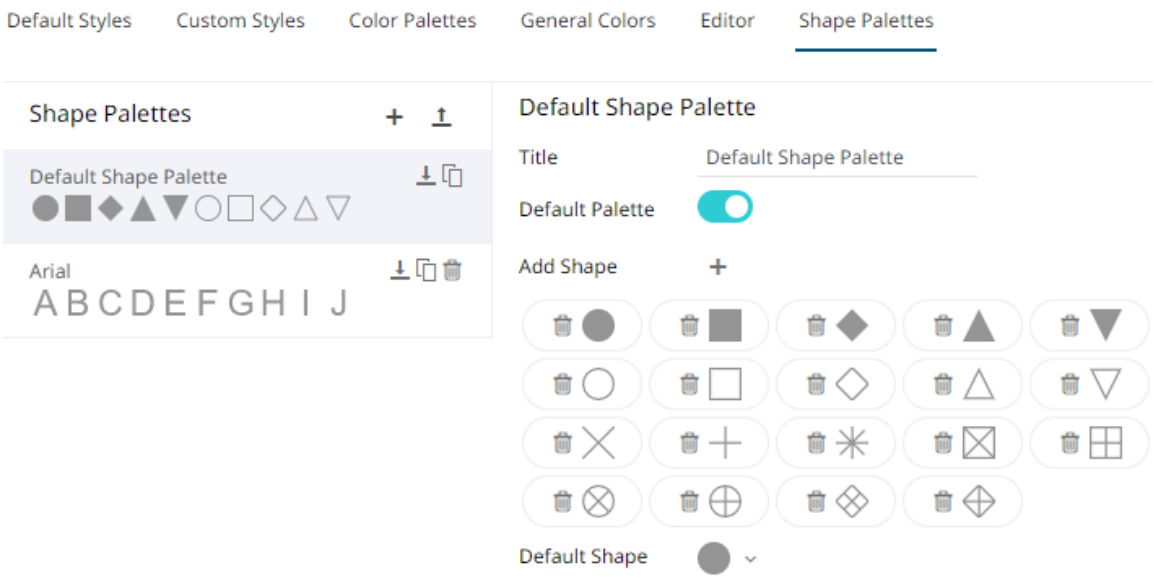
You can opt to modify the settings.

Deleting Color Palettes

New or duplicate color palettes can be deleted. Click the **Delete** icon to remove the color palette in the list.

SHAPE PALETTES

Shape palettes that can be used with the workbook theme can be created, uploaded, downloaded, modified, duplicated, rearranged, or deleted on the *Shape Palettes* page.



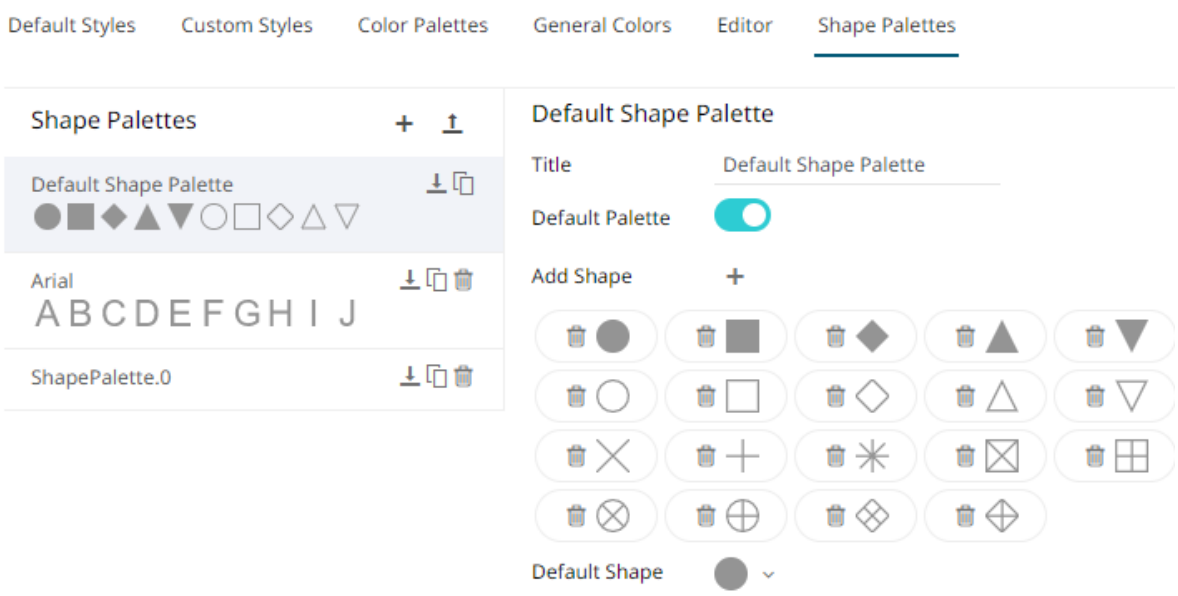
NOTE	**Panopticon is shipped with two shape palettes (Default Shape Palette and Arial) for the Dark and Light themes.**

Creating a New Shape Palette

Steps:

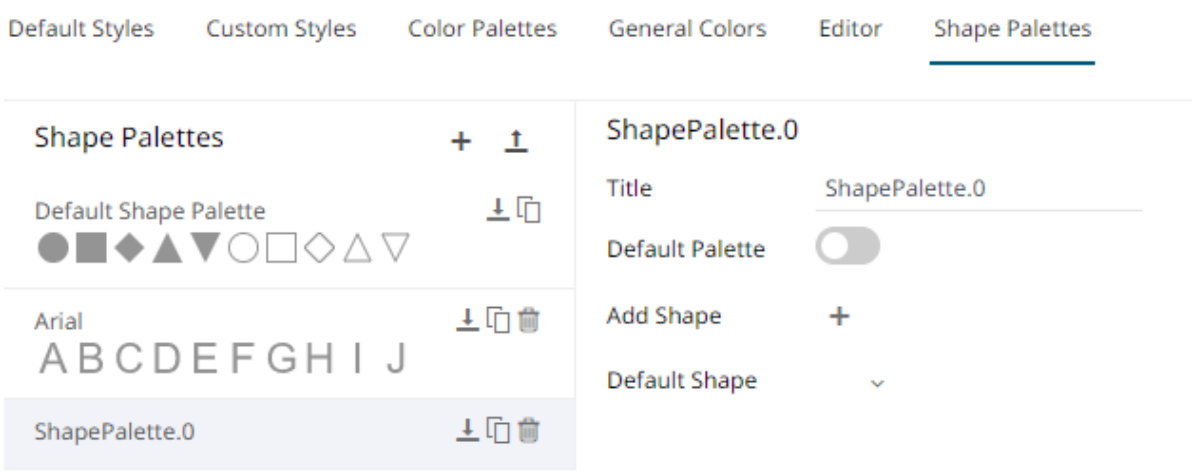
1. Click **Add Palette** .

   A new shape palette displays (i.e., **ShapePalette.0**).



2. Click *ShapePalette.<Number>*.

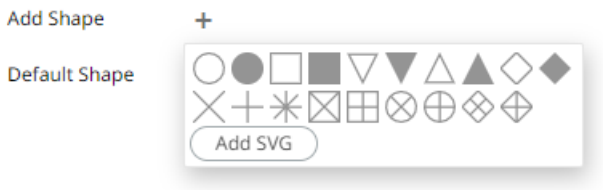
   The page changes to allow the definition of the new shape palette.



3. Enter the shape palette *Title* and click ✓.
4. To make this shape palette the default for the workbook theme, tap the **Default Palette** slider to turn it on.

NOTE **The default shape palette can not be deleted.**

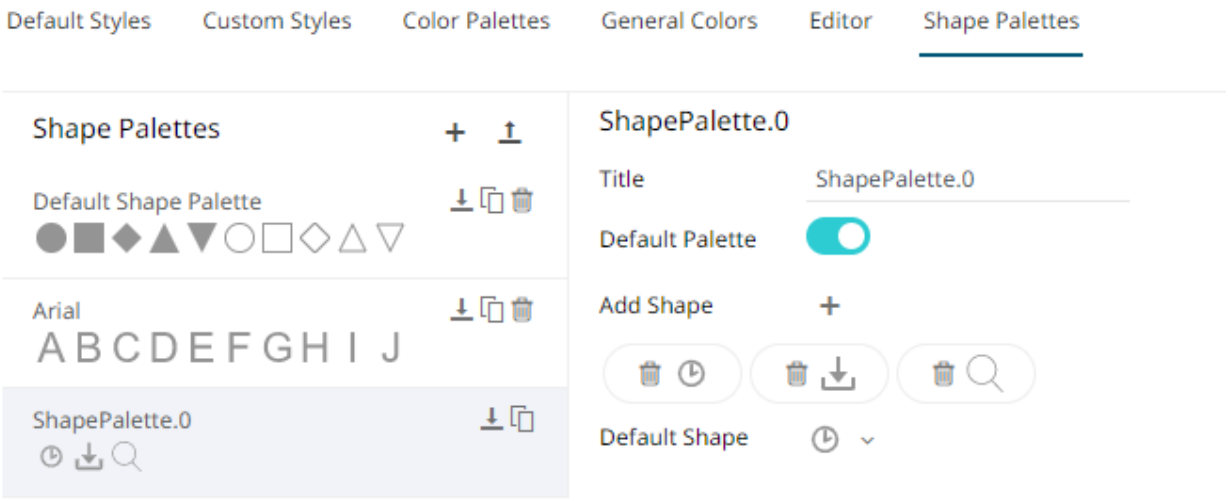
5. To add the shapes, click +.



You can either:

- click on a shape.
- click Add SVG. Select one or more SVG files in the *Open* dialog box that displays.

The added shapes are displayed.



To delete a shape, click it's corresponding **Delete** icon.

6. Select the *Default Shape* in the drop-down list.
7. Click the **Save** Save.
8. When saved, the Saved! notification is displayed.

   The new shape palette is available in the *Shape Palette* drop-down list in the *Shape* variable when the workbook theme, where it is added, is used (i.e., **Light**).

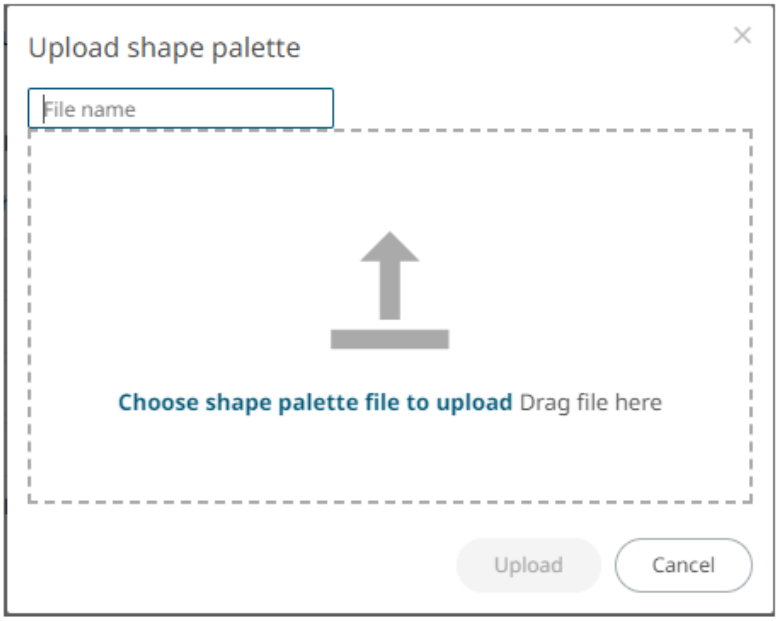
Uploading a Shape Palette

Users can upload their own shape palettes.

Steps:

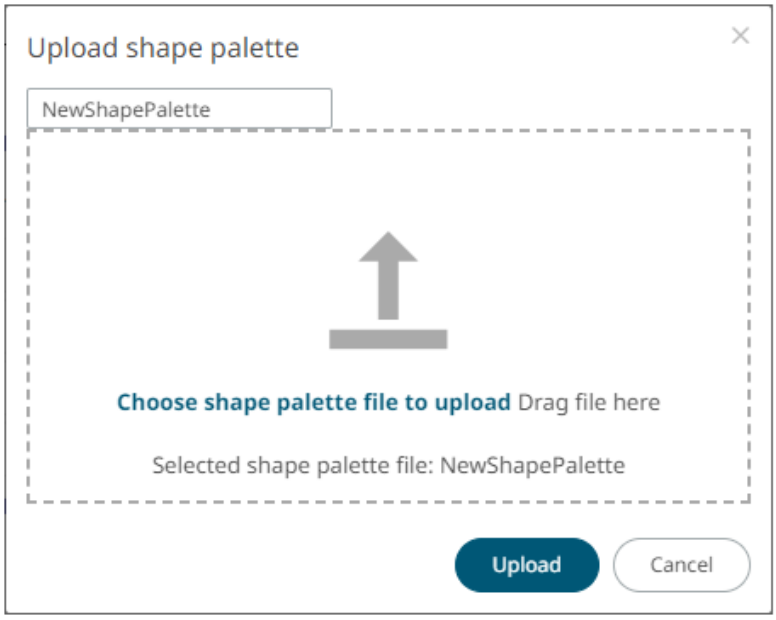
1. On the *Shape Palettes* pane, click .

   The *Upload Shape Palette* dialog displays.



2. To upload a shape palette, either:
   - drag the file from your desktop and drop on the dialog, or
   - click **Choose shape palette file to upload** and then browse and select one on the *Open* dialog that displays.

   The name of the shape palette is displayed on the uploaded shape palette area and in the *Name* box.

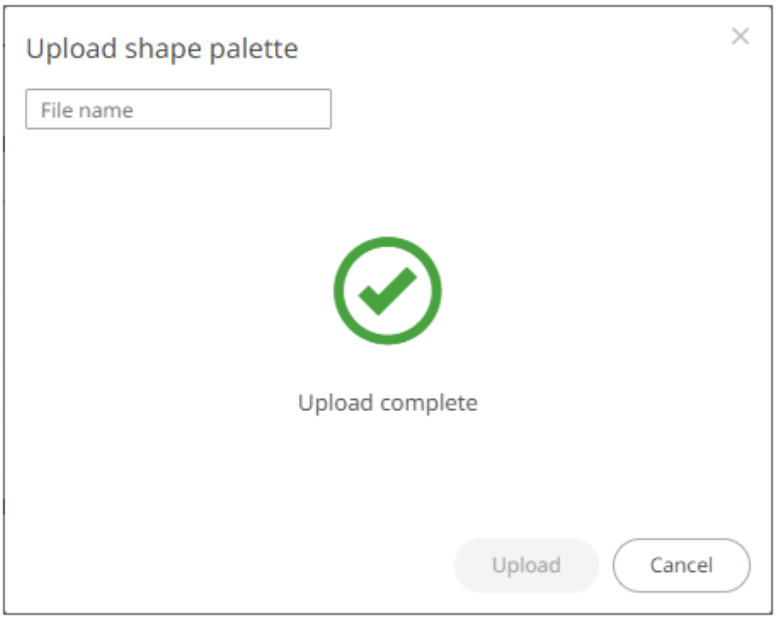


   You can opt to rename the uploaded shape palette.

3. Click 

.

   A notification displays once the file is uploaded.



Click Cancel to close the dialog. The uploaded shape palette is added in the list.

Downloading a Shape Palette

You can download a copy of any of the shape palettes.

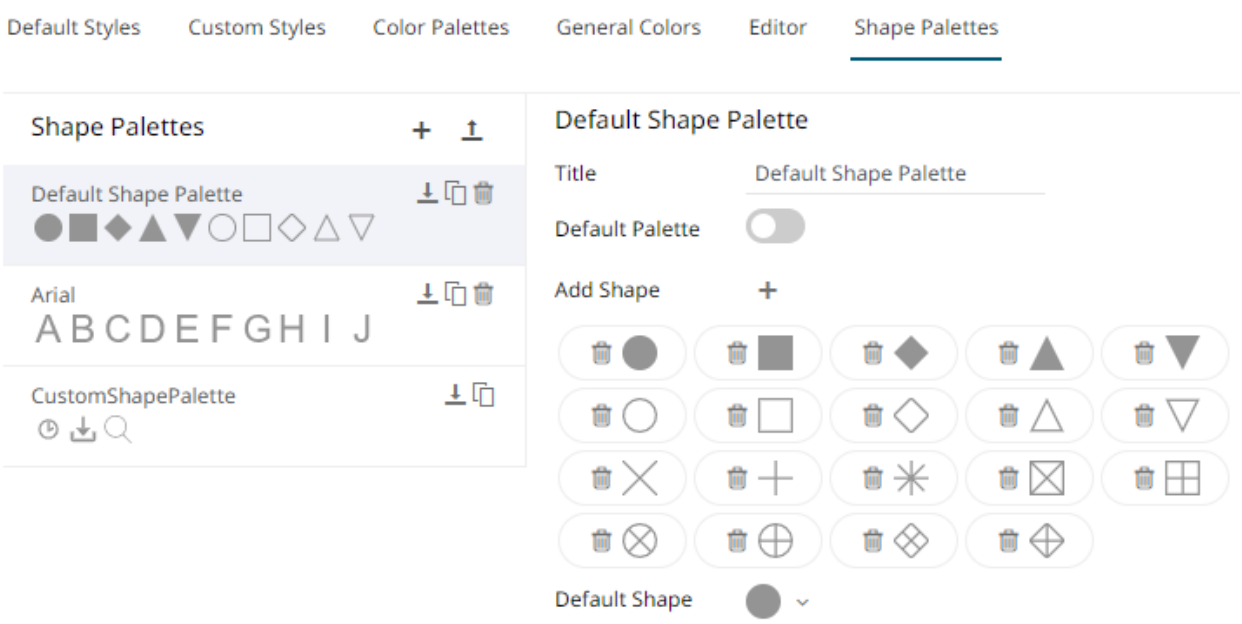
Click the **Download** icon of a shape palette.

Modifying Shape Palettes

Any of the shape palettes can be modified.

Steps:

1. Click on a shape palette to display its settings.

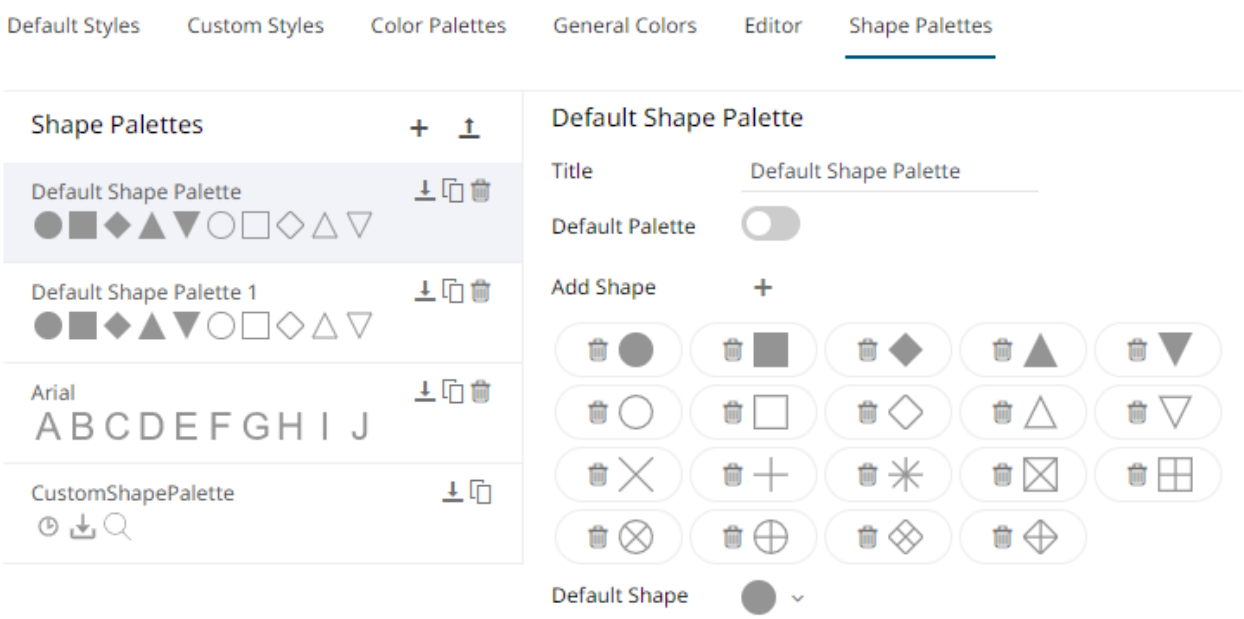


2. You can modify the following properties:
   - Title
   - Default Palette. Tap to enable or disable.
   - Add or delete shapes
   - Default Shape
3. Click the **Save** 

icon to save the changes.

Creating a Duplicate of a Shape Palette

Click the **Duplicate** icon of a shape palette. A copy of the shape palette is added in the list (e.g., **Default Shape Palette 1**).



You can opt to modify the settings.

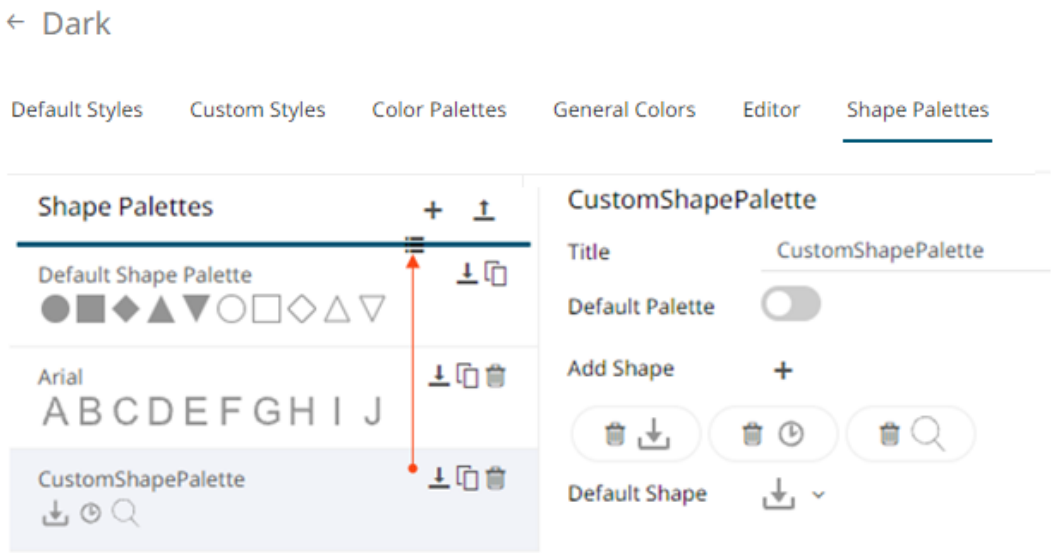
Rearranging Shape Palettes

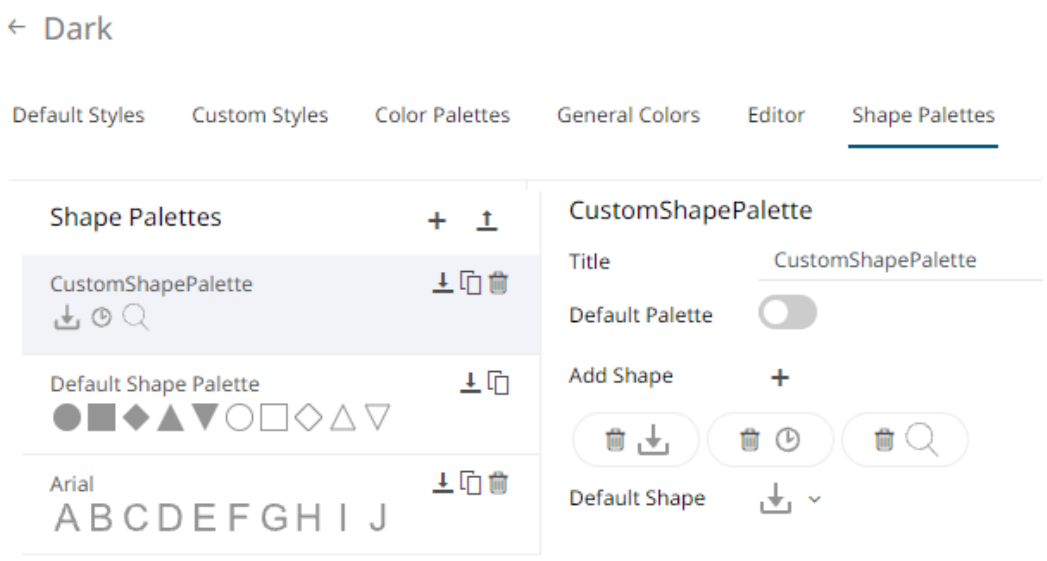
The order of the shape palettes can be rearranged.

Steps:

1. Click on a shape palette you want to move.

   The **Hand Hover** icon displays along with the blue marker before or after a shape palette where you can drop the item.
2. Drag and drop the shape palette to the desired position.





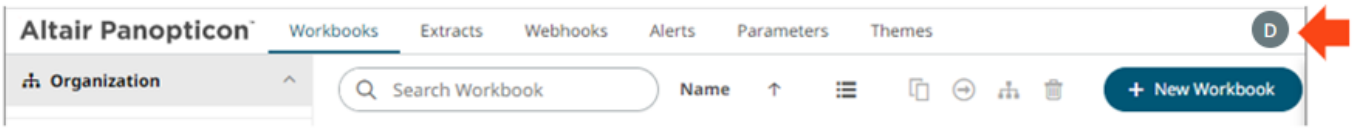
3. Click the **Save**  icon to save the changes.

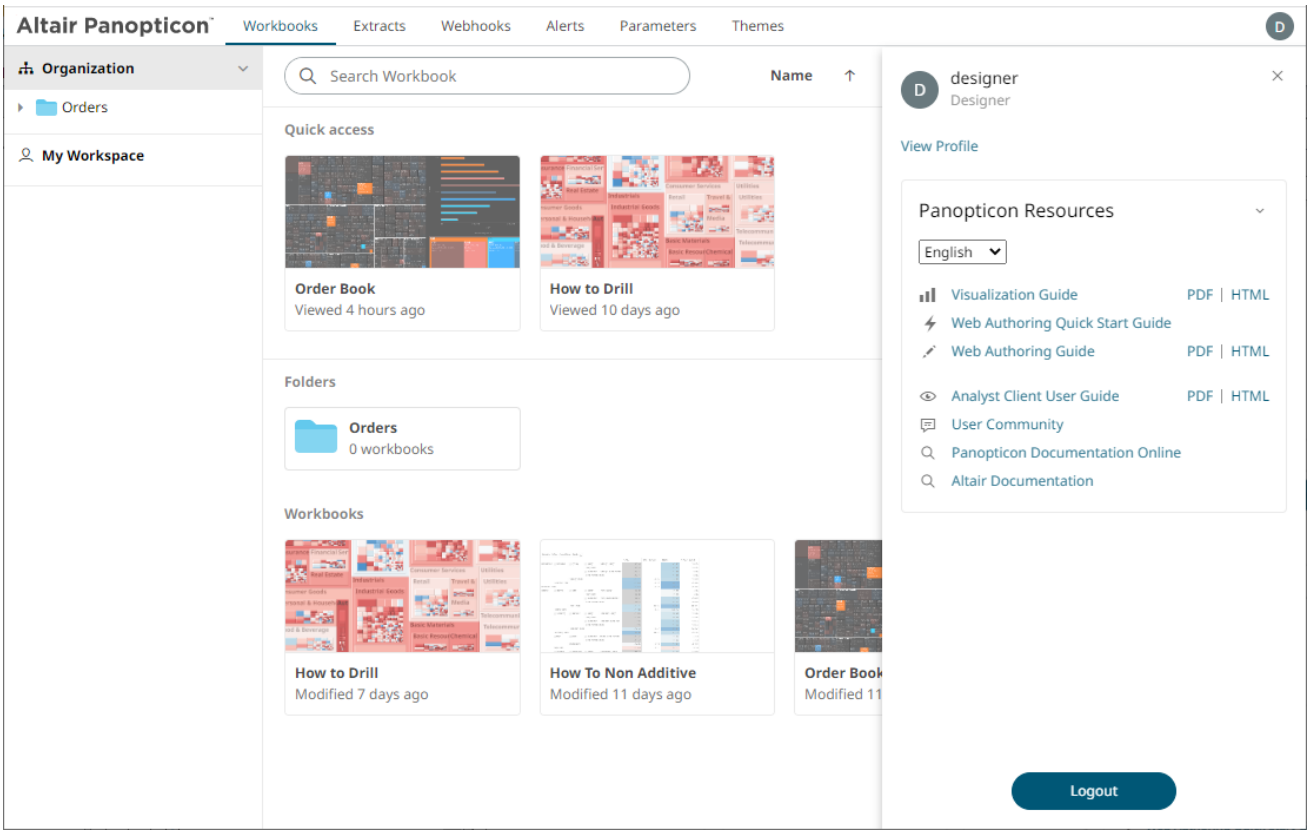
Deleting Shape Palettes

Any shape palette can be deleted except the default. Click the **Delete**  icon to remove the shape palette in the list.

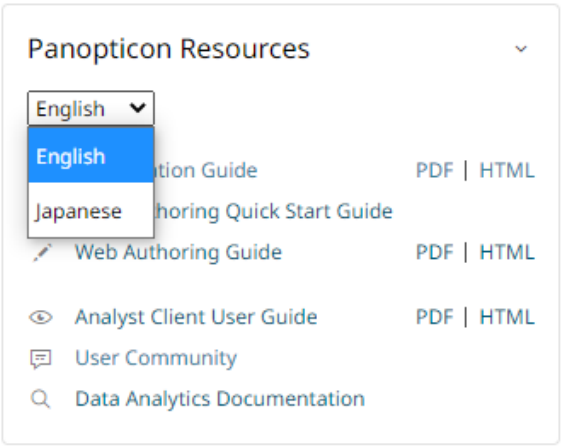
[11] PANOPTICON RESOURCES

Clicking the user icon D on the top right section of the toolbar displays the other Panopticon online resources that users with a Designer role can access.





Select the *Language* on the drop-down list: **English** or **Japanese**.



Resource	Description
Visualization Guide	Guide to the supported Panopticon visualizations.
Web Authoring Quick Start Guide	Panopticon Web Authoring Quick Start Guide. Available upon installation.
Web Authoring Guide	Panopticon Web Authoring Guide which consists of: • creating and managing of data tables. • building and viewing of workbooks. • creating and managing global parameters and alerts. Available upon installation.
Analyst Client User Guide	Panopticon Real Time documentation for users with a Viewer role which consists of: • viewing and analysing of workbooks • creating, monitoring, and deleting of alerts Available upon installation.
User Community	Link to the Panopticon User Community page.
Data Analytics Documentation	Link to the Altair Data Analytics Documentation page.

07.2022

CONTACT US

GET IN TOUCH

We'd love to hear from you. Here's how you can reach us.

SALES CONTACT INFORMATION

US: + 1.800.445.3311
International: + 1.978.441.2200

Sales Email

US: sales@datawatch.com
Europe: sales_euro@datawatch.com
Asia Pacific: sales_apac@datawatch.com

SUPPORT CONTACT INFORMATION

Customer Portal: https://www.altair.com/data-analytics-support/
Email: mailto:dasupport@altair.com
United States: +1 800.988.4739
Canada: +1 978.275.8350
Europe, Middle East, Africa: +44 (0) 8081 892481