Altair Engineering Inc.

Altair Grid Engine Documentation

RStudio AGE Launcher plugin Administrator's Guide

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Contents

1 Introduction

This document provides details for installing the **RStudio AGE Launcher** plugin and setting up the infrastructure as highlighted in Figure 1 when using **AGE** with **RStudio Workbench**.

Figure 1 illustrates the high-level infrastructure architecture for integrating the AGE cluster with RStudio Workbench by using the plugin as glue. When the prerequisites for **RStudio AGE Launcher** plugin are satisfied in the AGE and RStudio Workbench applications, the plugin can be easily installed by executing a few commands and setting the parameters in two configuration files.

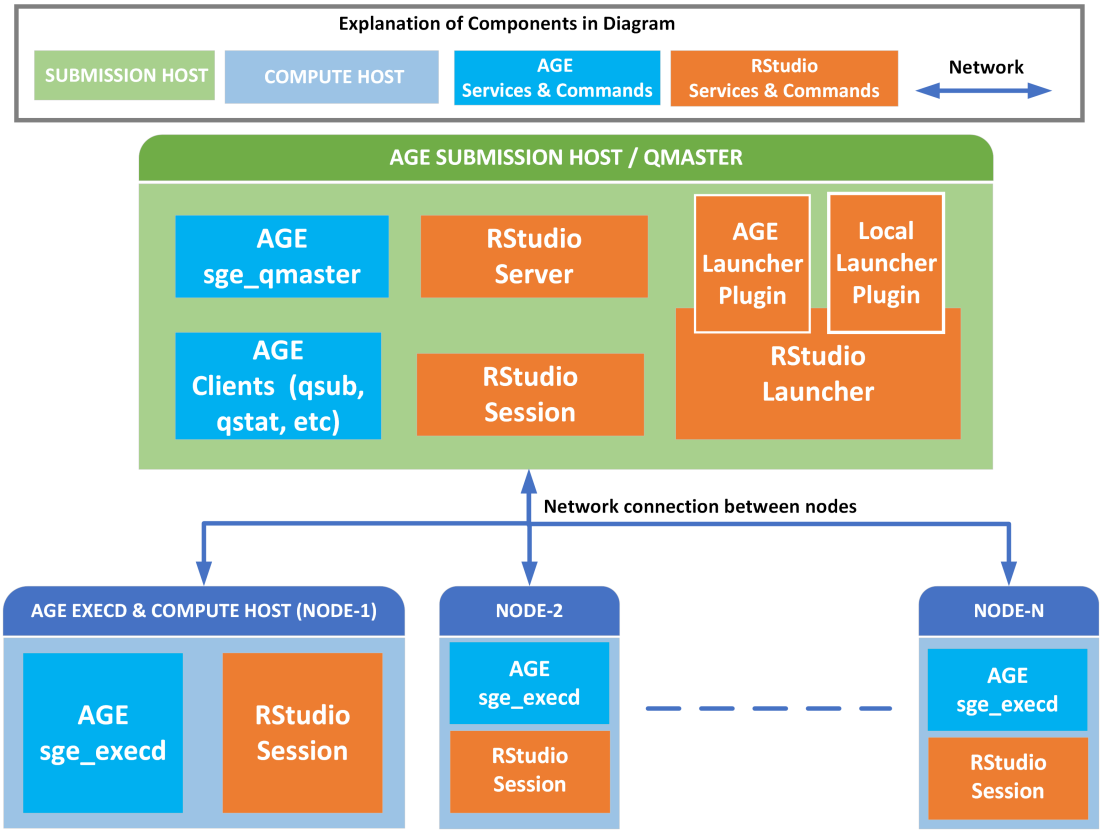

Figure 1: The high-level architecture of infrastructure with **AGE** and **RStudio Workbench** services

2 Prerequisites for the Launcher Plugin

The **RStudio AGE Launcher** plugin works with the **RStudio Workbench** and **AGE (Altair Grid Engine)** applications. This chapter lists the prerequisite to check for each application before proceeding further with the installation and configuration of the plugin. If the AGE and RStudio Workbench applications are correctly configured in the system as per the requirement of the plugin, skip this chapter and start at the chapter titled **Install the plugin**.

2.1 Check the installation of Altair Grid Engine

This sub-chapter only explains the necessary steps to ensure the correct installation of **AGE cluster**. To perform a fresh install of the AGE software on the system, refer to the administrator's documentation in **InstallGE.pdf** and **AdminGuideGE.pdf** along with this guide. The following steps are necessary to ensure correct installation of the AGE cluster so that it satisfies the requirements of the plugin.

1. Get the values of AGE environment variables (`SGE_ROOT` and `SGE_CELL`) by importing `settings.sh` file from AGE. The **launcher.AGE.conf** requires the values of AGE environment variables (**SGE_ROOT** and **SGE_CELL**), so this information is used later in the chapter **Configure the plugin**.

2. Ensure the **parallel environment** is configured with **allocation rule** set as follows:
   "`allocation_rule $pe_slots`"
   by running the command below. The resource **CPUs** is allocated to the **RStudio Session** based on the configuration of **parallel environment**. If this contains any errors, the user cannot submit an **RStudio session** in AGE cluster with a request for **CPUs** and **Memory**.

   ```
   sgeadmin@head-node:~$ qconf -mp <parallel environment name>
   ```

3. Ensure the **queue** is configured with **parallel environment** set as follows:
   "`pe_list <parallel environment name>`"
   by running the following command:

   ```
   sgeadmin@head-node:~$ qconf -mq <queue name>
   ```

4. Add a GPU complex in the exec host, if needed; this is an optional parameter. If it is not configured, the user cannot request a session requiring GPUs. The resource **GPUs** is allocated to the **RStudio Session** based on the configuration of **GPU complex**. If this contains any errors, the user cannot submit the **RStudio session** in AGE cluster with a request for **GPUs**.

   ```
   sgeadmin@head-node:~$ qconf -ace <gpu name>
   sgeadmin@head-node:~$ qconf -aattr exechost complex_values     \
                              '<gpu name>=6(0-5)' <host name>
   ```

5. Add project details in the cluster, if needed; this is an optional parameter. If it is not configured, the user cannot request the session requiring project details. The **launcher.AGE.conf** requires the values of AGE objects (**Parallel environment**, **GPU complex**, and **Project**, so this information is used later in the chapter **Configure the plugin**.

```
sgeadmin@head-node:~$ qconf -aprj <project name>
```

2.2 Check the installation of RStudio Workbench

This sub-chapter only explains the necessary steps to ensure the correct installation of **RStudio Workbench**. To perform a fresh install on the system, refer to the **admin guide of RStudio Workbench** along with this guide. The following steps are necessary to ensure the correct installation of RStudio Workbench so that it satisfies the needs of the plugin.

1. Select the correct version of **RStudio Workbench** based on compatibility with the **RStudio AGE Launcher** plugin. The plugin is compatible with the following versions of RStudio Workbench as detailed in **Table 1**, so install the corresponding version to avoid any incompatibility issues with the plugin.

RStudio AGE Launcher plugin	RStudio Workbench Release
juliet-rose/rstudio-AGE-launcher	1.4.1717-3 Workbench (Juliet Rose).
ghost-orchid/rstudio-AGE-launcher	2021.09.0+351.pro6 Workbench (Ghost Orchid) 2022.02.2+485.pro2 Workbench (Prairie Trillium) The ghost-orchid/rstudio-AGE-launcher plugin is compatible with the both Ghost Orchid and Prairie Trillium releases.

Table 1. Compatibility of the **RStudio AGE Launcher** plugin with the **RStudio Workbench** release.

2. Install the **RStudio Workbench** package in the head node, which is the entrypoint for RStudio Workbench GUI.

2.1. Check the installation of **RStudio Workbench server** component in the head node. This service provides the access to RStudio Workbench web GUI. The web port is allowed for an external access by enabling the inbound and outbound access in the firewall settings.

```
sgeadmin@head-node:~$ which rstudio-server
 /usr/sbin/rstudio-server
sgeadmin@head-node:~$ ls -al /usr/sbin/rstudio-server
 /usr/sbin/rstudio-server -> /usr/lib/rstudio-server/bin/rstudio-server
sgeadmin@head-node:~$ ls -al /usr/lib/rstudio-server/bin/rstudio-server
```

```
 /usr/lib/rstudio-server/bin/rstudio-server
sgeadmin@head-node:~$ rstudio-server version
2022.02.2+485.pro2 Workbench (Prairie Trillium) for RHEL 8
```

2.2. Check the installation of **RStudio Workbench launcher** component in the installed node. The node should have the permission (e.g. AGE submission host) to submit batch jobs and get the details of submitted jobs. The **rstudio-AGE-launcher** plugin provides the interconnection between the RStudio Workbench and AGE cluster. **rstudio-local-launcher** starts the IDE in the **RStudio Workbench server** location, which helps to debug the correct installation of **RStudio Workbench** in a single node setup without connecting the AGE cluster.

```
sgeadmin@head-node:~$ which rstudio-launcher
 /bin/rstudio-launcher
sgeadmin@head-node:~$ ls -al /bin/rstudio-launcher
 /bin/rstudio-launcher -> /usr/lib/rstudio-server/bin/rstudio-launcher.sh
sgeadmin@head-node:~$ ls /usr/lib/rstudio-server/bin/rstudio-launcher
 /usr/lib/rstudio-server/bin/rstudio-launcher
sgeadmin@head-node:~$ ls /usr/lib/rstudio-server/bin/rstudio-local-launcher
 /usr/lib/rstudio-server/bin/rstudio-local-launcher
sgeadmin@head-node:~$ tree $SGE_ROOT/rstudio-age/bin
  |---- bin
      |---- lx-amd64
          |---- ghost-orchid
          |   |---- rstudio-AGE-launcher
          |---- juliet-rose
              |---- rstudio-AGE-launcher
sgeadmin@head-node:~$ rstudio-launcher version
Version 2.1
Plugin API Version 2.0.0
sgeadmin@head-node:~$
```

2.3. Check the installation of **RStudio Workbench session** component in the installed node. This service starts the required IDEs (RStudio, Jupyter, MS VS code editor) in compute node.

```
sgeadmin@head-node:~$ ls -al /usr/lib/rstudio-server/bin/rsession*
 /usr/lib/rstudio-server/bin/rsession
 /usr/lib/rstudio-server/bin/rsession-run
sgeadmin@head-node:~$
```

3. Install the **RStudio Workbench session** and specific **IDEs** in all the compute nodes of AGE cluster. Following command helps to check the installation of those packages in a specific compute node.

```
sgeadmin@head-node:~$ ssh compute-node-1

sgeadmin@compute-node-1:~$ ls -al /usr/lib/rstudio-server/bin/rsession*
```

```
   /usr/lib/rstudio-server/bin/rsession
   /usr/lib/rstudio-server/bin/rsession-run
sgeadmin@compute-node-1:~$ which jupyter
   /usr/local/bin/jupyter
sgeadmin@compute-node-1:~$ which R
   /usr/local/bin/R
sgeadmin@compute-node-1:~$ ls /opt/code-server/bin/code-server
   /opt/code-server/bin/code-server
sgeadmin@compute-node-1:~$
```

RStudio Workbench session is the program to start the IDE on a **compute node** remotely and redirect the connection to the **RStudio Workbench GUI** by port forwarding. This allows to access the IDE running on the **remote compute node**, otherwise the **IDE** does not start correctly in the compute node. The installed version of the **RStudio Workbench Session** in compute node should be compatible with the installed version of **RStudio Workbench Server** in head node.

Instead of installing the **RStudio Workbench Session** component separately on each compute node, the location of a single installation can be shared between multiple nodes by using a shared file system. The binaries for the **RStudio Workbench Session** are available in `/usr/lib/rstudio-server` and the data for **RStudio Workbench Session** are available in `/var/lib/rstudio-server`, so that it can be shared between multiple compute nodes to avoid the seperate installation of it.

Jupyter Notebook, Jupyter Lab, Microsoft Visual Studio Code and **R** are the specific IDEs supported in the **RStudio Workbench Session**. Install the specific IDEs, if it is missing in the compute node. **RStudio Workbench Admin Guide** details the installation and configration of **RStudio Workbench session** and specific **IDEs** in detailed for the reference.

4. The **RStudio AGE Launcher** plugin requires python3 and the plugin works correctly using version of 3.6.8 or greater. Check the installed version of **Python** on the head-node. This host will run the plugin along with other RStudio Workbench services. Python version information can be collected by running the command as shown below:

   ```
   sgeadmin@head-node:~$ python3 --version
   Python 3.6.8
   ```

5. Check the installed version of RStudio Workbench by running the following commands:

   ```
   sgeadmin@head-node:~$ rstudio-server version
   2022.02.2+485.pro2 Workbench (Prairie Trillium) for RHEL 8
   ```

6. Select the **RStudio AGE Launcher** plugin based on the installed version of RStudio Workbench. If it is the release named **Juliet Rose**, then the corresponding plugin is available at **rstudio-age/bin/lx-amd64/juliet-rose/rstudio-AGE-launcher**. If it is the release named **Ghost Orchid** or **Prairie Trillium**, the corresponding plugin is available at **rstudio-age/bin/lx-amd64/ghost-orchid/rstudio-AGE-launcher**.

7. Ensure that the permission for the `~/.local` folder are correct for each user, and that the folders are accessible from all the nodes via the shared file system. This is the shared directory with permissions **drwxrwxr-x**; this restricts write permissions for other users.

```
[sgeadmin@head-node:~]$ chown -R test:test ~test/.local
[sgeadmin@head-node:~]$ ls /home/test/.local/ -al
total 52
drwxrwxr-x  4 test test  4096 Nov 23 14:56 .
drwxr-xr-x 16 test test 36864 Nov 25 11:08 ..
drwx------  3 test test  4096 Nov 23 14:56 lib
drwxrwxr-x  5 test test  4096 Nov 22 10:25 share
```

3 Install the Plugin

Install the **RStudio AGE Launcher** plugin from the archive packages or rpm as follows:

1. If the plugin package is available in the **archive (tar.gz)** format, manually unarchive the package and copy the **rstudio-age** folder to `$SGE_ROOT` as follows:

```
[sgeadmin@head-node:~]$ tar -xzvf ge-rstudio-age-2022.1.0-lx-amd64.tar.gz
[sgeadmin@head-node:~]$ echo $SGE_ROOT
/ge/age
[sgeadmin@head-node:~]$ cp -r rstudio-age $SGE_ROOT/
```

2. If the plugin package is available in the **RPM** format, install the package by using the yum command:

```
[sgeadmin@head-node:~]$ sudo yum install ge-rstudio-age-2022.1.0-0.x86_64.rpm
```

3.1 Check the Installation of the Plugin

The directory structure of the plugin after the successful installation of the plugin in `$SGE_ROOT` is shown below. **Table 2** explains the purpose of each file in each sub-directory in the plugin.

```
[sgeadmin@head-node:~]$ cd $SGE_ROOT/
[sgeadmin@head-node:~]$ tree rstudio-age
/ge/sge/rstudio-age/
|---- bin
|   |---- lx-amd64
|       |---- ghost-orchid
|       |   |---- rstudio-AGE-launcher
|       |---- juliet-rose
|           |---- rstudio-AGE-launcher
|---- conf-template
|   |---- jupyter.conf
|   |---- launcher.AGE.conf
|   |---- launcher.conf
|   |---- logging.conf
|   |---- notifications.conf
|   |---- rserver.conf
|   |---- rsession.conf
|   |---- vscode.conf
|---- doc
|   |---- README
|---- helper-scripts
    |---- age_jobresc.py
    |---- age_qstat.py
```

```
7 directories, 13 files in rstudio-age
---------------------------------------
```

Directory name	Description
bin	The directory contains the binary files for the **RStudio AGE Launcher plugin** for the Linux 64 bit system and the different releases of RStudio Workbench.
conf-template	The directory contains the sample configuration files for RStudio Workbench and the plugin. The user can change the configuration files for RStudio Workbench in `/etc/rstudio/` by copying the sample files in this directory. 1. **launcher.AGE.conf** is the configuration file for the **RStudio AGE Launcher** plugin 2. **launcher.conf** is the configuration file for the **rstudio-launcher** service.
doc	The directory contains the **README** file to refer the user ### and admin guide of the **RStudio AGE Launcher** plugin.
helper-scripts	The directory contains the Python helper scripts for supporting the binaries in the **bin** directory. This is the plain source code. The user is advised not to change this inadvertently.

Table 2. Directory Structure of the **RStudio AGE Launcher** Plugin

The `--version` option provides version information for the installed plugin. This helps to ensure correct execution of the plugin in the execution environment of the user.

```
[sgeadmin@head-node:~]$ cd $SGE_ROOT
[sgeadmin@head-node:~]$ cd rstudio-age/bin/lx-amd64/ghost-orchid
[sgeadmin@head-node:~]$ ./rstudio-AGE-launcher --version
AGE-RStudio-plugin 2022.1.0 (1.0.0)

[sgeadmin@head-node:~]$ cd $SGE_ROOT
[sgeadmin@head-node:~]$ cd rstudio-age/bin/lx-amd64/juliet-rose
[sgeadmin@head-node:~]$ ./rstudio-AGE-launcher --version
AGE-RStudio-plugin 2022.1.0 (1.0.0)
```

4 Configure the Plugin

The activation of **RStudio AGE Launcher** plugin requires changing the existing configuration file for **launcher.conf** and creating a new configuration file for **launcher.AGE.conf**. These configuration files share information about using **AGE Cluster** with the **rstudio-launcher** service and integrating the AGE cluster with **RStudio Workbench**.

4.1 Configure /etc/rstudio/launcher.conf

The user has to provide the details of **RStudio AGE Launcher** plugin in **launcher.conf**. The **rstudio-launcher** service uses this information to run the plugin along with it to provide the interconnection with AGE cluster.

1. The prerequisite is to configure the **launcher.conf** to run **rstudio-launcher** service correctly with the default **RStudio Local Launcher** plugin. The **admin guide of RStudio Workbench** has the complete details about the configuration of **launcher.conf** and the meaning of each configuration parameter in it. If **RStudio AGE Launcher** plugin is installed in **/ge/age/rstudio-age**, then the example **launcher.conf** file is available in **/ge/age/rstudio-age/conf-template/launcher.conf** for reference.

```
[server]
address=192.168.14.162
port=5559
server-user=rstudio-server
admin-group=rstudio-server
enable-debug-logging=1
thread-pool-size=4
request-timeout-seconds=240
job-expiry-hours=1
```

Note
To collect the debugging details for troubleshooting, enable the **enable-debug-logging=1** in **launcher.conf** parameter.

2. Configure the **RStudio AGE Launcher** plugin via launcher.conf under the **[cluster]** section as shown below to enable the **AGE cluster**. The **exe configuration parameter contains the full path to the executable for the **RStudio AGE Launcher** plugin. If the RStudio Workbench release is **Ghost Orchid**, the full path of the plugin executable is **/ge/age/rstudio-age/bin/lx-amd64/ghost-orchid/rstudio-AGE-launcher**.

```
[cluster]
name=AGE
type=AGE
exe=/ge/age/rstudio-age/bin/lx-amd64/ghost-orchid/rstudio-AGE-launcher
```

The user can set the configuration parameter **name** to any value. For an example, they can use **name=AGE-PRIMARY**, which will be displayed in the session submission dialogbox with the **Cluster** drop-down menu option. The user must set the configuration parameter **type** to the value of **AGE**. This is used for parsing the **launcher.AGE.conf** correctly and get the AGE cluster information for job submission.

4.2 Configure /etc/rstudio/launcher.AGE.conf

This is the new configuration file, which is not available in the default installation of RStudio Workbench. The user has to create this configuration file for **RStudio AGE Launcher** plugin and it does not have any impact on the existing features of RStudio Workbench, other than interconnecting with AGE cluster.

1. Copy the example **launcher.AGE.conf** configuration file from **rstudio-age/conf-template/launcher.AGE.conf** to **/etc/rstudio**. If AGE is installed in **/ge/age/**, the example **launcher.AGE.conf** file is available in **/ge/age/rstudio-age/conf-template/launcher.AGE.conf**. **Table 3** explains the details of each configuration parameter in **launcher.AGE.conf**.

```
[sgeadmin@head-node:~]$ cd /ge/age/rstudio-age/conf-template
[sgeadmin@head-node:~]$ cp launcher.AGE.conf /etc/rstudio
```

2. Provide **AGE cluster** information in launcher.AGE.conf as follows:

Note
If AGE is installed in **/ge/age/**, information about the environment variables (`SGE_ROOT` and `SGE_CELL`) are available in the **/ge/age/default/common/settings.sh** script in launcher.AGE.conf.

```
SGE_ROOT=/ge/age
SGE_CELL=default
configOptions=pe:smp,gpu:gpu,memory:m_mem_free,host:h
defaultQsubOptions=-binding%20linear:1
defaultConfigOptionsValue=cpus:2,memory:700
customMenuOptions=cpus:true,memory:true,pe:false
```

Note
RStudio configuration files do not support the **whitespace characters**, so use the **hexadecimal value of the space character (%20)** to replace the whitespaces within it. For an example, **-binding linear:1** is configured as **-binding%20linear:1**.

3. Start the services of RStudio Workbench (rstudio-launcher and rstudio-server) after the completion of configuration. If the user faces a problem with the **RStudio AGE Launcher plugin**, refer to chapters **Prerequisite for the plugin** and **Troubleshooting the plugin** to find out more about the reason for failure.

```
[sgeadmin@head-node:~]$ sudo systemctl restart rstudio-launcher rstudio-server
[sgeadmin@head-node:~]$ sudo systemctl status rstudio-launcher
```

4.3 Information about the configuration parameter in launcher.AGE.conf

This is the configuration file used to provide AGE cluster information to the plugin. The plugin uses this information to connect with the AGE cluster for job submission and monitoring. The plugin submits the job in the AGE cluster by using the configuration information from **launcher.AGE.conf** and the user request details for the **RStudio session** from the web GUI of **RStudio Workbench**. **Table 3** explains the details of each configuration parameter in **launcher.AGE.conf**.

Configuration Parameter	Description
SGE_ROOT	This is an **AGE environment variable** to connect with the cluster and access the client commands (qsub, qstat and qacct). The default value of this parameter is **empty**. The value should be the root directory of the Altair Grid Engine cluster. This parameter is introduced from **v2022.1.0 (1.0.0)** release.
SGE_CELL	This is an **AGE environment variable** to connect with the cluster and get the details of cluster settings. The default value of this parameter is **empty**. The value should be the name of the Altair Grid Engine cell. This parameter is introduced from **v2022.1.0 (1.0.0)** release.
defaultQsubOptions	All the **RStudio session** requests are included with the value of this configuration parameter. The default value of this parameter is **empty**. For example, if all requests should be bound to core, then it can be provided with the value of **-binding%20linear:1**.This parameter is introduced from **v2022.1.0 (1.0.0)** release.

Configuration Parameter	Description
configOptions	Allocate the resources to the **RStudio session** by using this configuration parameter. This parameter is introduced from **v2022.1.0 (1.0.0)** release. The value of **configOptions** is formatted with **comma** as a separator for each attribute and the attribute is formatted with the **key:value** pair. The example value of this paramenter is **pe:smp,gpu:gpu_slots,memory:m_mem_free,host:h** and it is the default value as well. The meaning of each attribute is explained one by one below. 1. **pe:smp** means to submit the job with the **smp** parallel environment by using the qsub option **-pe smp <number of cpus>**. This is related to the number of **CPUs** requested for the RStudio session from web GUI. 2. **memory:m_mem_free** means to submit the job with the specified amount of memory by using the qsub option **-l m_mem_free=<amount of memory>**. This is related to the amount of **Memory** requested for RStudio session via the web GUI. 3. **gpu:gpu_slots** means to submit the job with the **gpu_slots** gpu complex by using the qsub option **-l gpu_slots=<number of gpus>**. This is related to the number of **GPUs** requested for the RStudio session via the web GUI. 4. **host:h** means to submit the job in the specific host by using the qsub option **-l h=<host name>**. This is related to the **Hostname** requested for the **RStudio session** via the web GUI.
defaultConfigOptionsValue	Customize the default value for the textbox of CPUs and Memory in RStudio Session submission window by using this configuration parameter. This parameter is introduced from **v2023.1.0 (1.1.0)** release. The value of **configOptions** is formatted with **comma** as a separator for each attribute and the attribute is formatted with the **key:value** pair. The example value of this paramenter is **cpus:1,memory:500** and it is the default value as well. This is applicable only to **cpus,memory** and it is not applicable to other resources such as **pe, hostname, gpus, queue, project, qsub_options**. The meaning of each attribute is explained one by one below. 1. **cpus:2** means to fill the textbox of cpus with the specified number of cpus. 2. **memory:700** means to fill the textbox of memory with the specified amount of memory.

Configuration Parameter	Description
customMenuOptions	Customize the GUI display of RStudio Session GUI window by using this configuration parameter. This parameter is introduced from **v2023.1.0 (1.1.0)** release. The value of **customMenuOptions** is formatted with **comma** as a separator for each attribute and the attribute is formatted with the **key:value** pair. The example value of this paramenter is **cpus:true,memory:true,pe:true,hostname:true,gpus:true, queue:true,project:true,qsub_options:true** and it is the default value as well. The meaning of cpu attribute is explained and it is similar for other attributes. 1. if **cpus:true** means the **CPUs** textbox is enabled in the submission window, then the user can use that to request the CPU resource in the session. 2. if **cpus:false** means the **CPUs** textbox is disabled in the submission window, then the user can not request the CPU resource in the session. If **cpus, memory** disabled, then the **defaultConfigOptionsValue** would be used for submitting the **cpus, memory** request in the session.

Table 3. Configuration Parameters for **launcher.AGE.conf**

5 Customize the GUI of RStudio Session submission window

The RStudio Session submission window can be customized by specifying the following configuration parameters in launcher.AGE.conf. Figure 2 is the GUI of customized RStudio Session submission window for the below mentioned **launcher.AGE.conf** configuration. **defaultConfigOptionsValue** and **customMenuOptions** are the configuration parameters to customize the GUI of RStudio Session submission window.

```
SGE_ROOT=/ge/age
SGE_CELL=default
configOptions=pe:smp,memory:m_mem_free
defaultQsubOptions=-binding%20linear:1
defaultConfigOptionsValue=cpus:3,memory:1200
customMenuOptions=pe:false,hostname:false,gpus:false,queue:false,
                  project:false,qsub_options:false
```

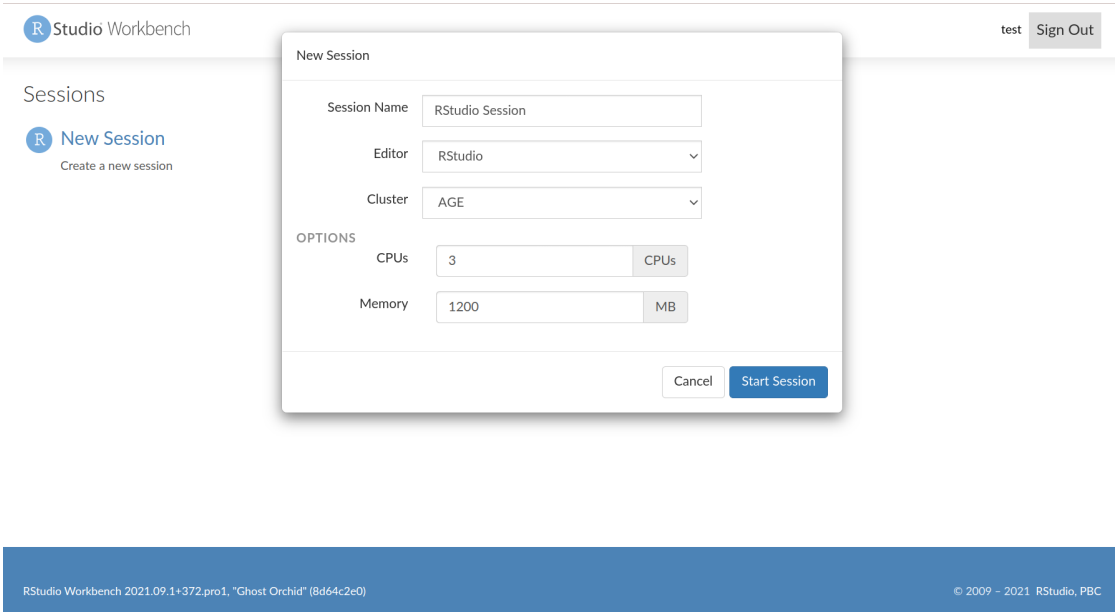

Figure 2: The customized RStudio Session submission window

6 Troubleshooting the Plugin

If there are any issues with the session submission with the AGE cluster or errors during the setup of the plugin, the reason for failure can be identified by troubleshooting the plugin as detailed below.

6.1 Problem starting the plugin with the rstudio-launcher service

If the **RStudio AGE Launcher** plugin does not start properly with the **rstudio-launcher** service, check the following details to identify the reason for failure.

1. If the plugin executes properly with the **–version** option, the Linux environment and the system library dependency are satisfied in the user environment in order to execute the plugin with **rstudio-launcher** service. The `--version` option provides version information for the installed plugin as follows:

```
[sgeadmin@head-node:~]$ cd $SGE_ROOT
[sgeadmin@head-node:~]$ cd rstudio-age/bin/lx-amd64/ghost-orchid
[sgeadmin@head-node:~]$ ./rstudio-AGE-launcher --version
AGE-RStudio-plugin 2022.1.0 (1.0.0)

[sgeadmin@head-node:~]$ cd $SGE_ROOT
[sgeadmin@head-node:~]$ cd rstudio-age/bin/lx-amd64/juliet-rose
[sgeadmin@head-node:~]$ ./rstudio-AGE-launcher --version
AGE-RStudio-plugin 2022.1.0 (1.0.0)
```

2. Get the status of **rstudio-launcher** service. If the **RStudio AGE Launcher** plugin does not run along with the service, there is the possibility of an issue with the configuration file. Make sure the configuration files for **launcher.AGE.conf** and **launcher.conf** are configured correctly as detailed in the chapter **Configure the plugin**

```
Status of rstudio-launcher after starting it:
sgeadmin@head-node:~$ sudo systemctl status rstudio-launcher.service
* rstudio-launcher.service - RStudio Launcher
   Loaded: loaded (/usr/lib/systemd/system/rstudio-launcher.service)
   Active: active (running) since Thu 2022-05-05 11:18:16 CEST; 8s ago
  Process: 23881 ExecStop=/usr/bin/killall -TERM rstudio-launcher
 Main PID: 34256 (rstudio-launche)
    Tasks: 24 (limit: 55803)
   Memory: 89.9M
CGroup: /system.slice/rstudio-launcher.service
        |---34256 /usr/lib/rstudio-server/bin/rstudio-launcher
        |---34266 /ge/age/rstudio-age/bin/lx-amd64/juliet-rose/rstudio-AGE-launcher
        |---34568 /usr/lib/rstudio-server/bin/rstudio-local-launcher

Status of rstudio-launcher service after stopping it:
sgeadmin@head-node:~$ sudo systemctl status rstudio-launcher.service
```

```
* rstudio-launcher.service - RStudio Launcher
   Loaded: loaded (/usr/lib/systemd/system/rstudio-launcher.service)
   Active: inactive (dead) since Thu 2022-05-05 08:07:25 CEST; 1h 50min ago
  Process: 23881 ExecStop=/usr/bin/killall -TERM rstudio-launcher
 Main PID: 1299
    Tasks: 0 (limit: 55803)
   Memory: 11.1M
   CGroup: /system.slice/rstudio-launcher.service
```

6.2 Problem with job submission or RStudio session

If there is a problem with submission of the RStudio session from the web GUI with the option of **AGE** as a **Cluster** value, check the following information to resolve it.

1. Check the job submission script in the **tmp** folder, where the **RStudio AGE Launcher** plugin generates the job submission script files for debugging. The job submission script submits the batch job in AGE cluster by using the `qsub` command.

Note
Do not remove the plugin-generated temporary files during the troubleshooting procedure. The user is advised to copy the file safely and use it for troubleshooting the plugin.

```
sgeadmin@head-node:~$ ls /tmp/*rstudio* -al
-rwxrwxrwx 1 root root  268  5. Mai 12:34 /tmp/rstudio_age_jobstat.sh
-rw-r--r-- 1 root root 3163  5. Mai 13:21 /tmp/mw48c5vqA2_rstudio
-rw-r--r-- 1 root root  396  5. Mai 13:21 /tmp/mw48c5vqA20_rstudio
sgeadmin@head-node:~$
```

   - **/tmp/rstudio_age_jobstat.sh** is the shell script for parsing already-submitted jobs with the prefix **RStudio-**.
   - **/tmp/mw48c5vqA2_rstudio** is the script for submitting RStudio Session as an AGE batch job by using the command **qsub**. The name of this file is random and varies for each new **RStudio session** request, which is removed automatically by the plugin after creating a new session or stopping the plugin.
   - **/tmp/mw48c5vqA20_rstudio** is the wrapper shell script for submitting **RStudio session** in the **AGE cluster**. The name of the script is the same as the name of the previous script, but having an extra random character before the prefix **_rstudio**. The name of this file is random and varies for each new **RStudio session** request. The file is removed automatically by the plugin, when **restarting the plugin** or submitting the **new RStudio session** request.

2. The plugin generates a job submission script for **RStudio Session**, which is a random file name in **/tmp** folder; it uses the postfix of **_rstudio** to find it. The user can change

the job submission script to submit the **sleep** job for testing the configuration of the AGE cluster for troubleshooting. If the **sleep** job is successfully submitted and running in the AGE cluster but not with the **RStudio Session**, check the configuration files for **launcher.conf** and **launcher.AGE.conf** as detailed in chapter **Configure the plugin**. If the job is not successfully running in the AGE cluster, identify the root cause of the problem and resolve it in the AGE cluster. The chapter **Prerequisite for the plugin** details the basic configuration requirement in the AGE cluster and its relationship with the configuration file **launcher.AGE.conf**.

```
sgeadmin@head-node:~$ cp /tmp/mw48c5vqA2_rstudio /tmp/mw48c5vqA2_rstudio_dbg
sgeadmin@head-node:~$ echo "sleep 100" > /tmp/mw48c5vqA2_rstudio_dbg
sgeadmin@head-node:~$ cp /tmp/mw48c5vqA20_rstudio /tmp/mw48c5vqA20_rstudio_dbg
sgeadmin@head-node:~$ awk -i inplace '{gsub("/tmp/mw48c5vqA2",          \
                                  "/tmp/mw48c5vqA2_rstudio_dbg")} 1'  \
                                  /tmp/mw48c5vqA20_rstudio_dbg
sgeadmin@head-node:~$ sudo chmod +x /tmp/mw48c5vqA20_rstudio_dbg
sgeadmin@head-node:~$ /tmp/mw48c5vqA20_rstudio_dbg
Your job 3000000004 ("RStudio-RStudio-Session") has been submitted
sgeadmin@head-node:~$ qstat -u test -f
queuename                      qtype resv/used/tot. np_load
-----------------------------------------------------------
test_q@node-1-centos8          BIP   0/0/28         0.03
-----------------------------------------------------------
test_q@node-2-centos8          BIP   0/1/28         0.00
3000000004 0.55500 RStudio-RS test   r  05/05/2022 13:21:45
-----------------------------------------------------------
sgeadmin@head-node:~$ qdel 3000000004
sgeadmin has registered the job 3000000004 for deletion
```

3. Get details of submitted job by AGE command **qstat** and helper script **/tmp/rstudio_age_jobstat.sh**.

```
sgeadmin@head-node:~$ qstat -u test -f
queuename                      qtype resv/used/tot. np_load
-----------------------------------------------------------
test_q@node-1-centos8          BIP   0/0/28         0.03
-----------------------------------------------------------
test_q@node-2-centos8          BIP   0/1/28         0.00
3000000003 0.55500 RStudio-RS test   r  05/05/2022 13:21:35
-----------------------------------------------------------

sgeadmin@head-node:~$ /tmp/rstudio_age_jobstat.sh
3000000003
1651749694562
test
/tmp/mw48c5vqA2
argend
/home/test
/home/test/RStudio-RStudio-Session.o3000000003
```

```
/home/test/RStudio-RStudio-Session.e3000000003
128
test_q@node-2-centos8
node-2-centos8
7b8bdbe3|d5de8cfc78a31|d5de8cfc78a317b8bdbe3|rstudio-r-session|
rstudio-r-session-id:d5de8cfc78a317b8bdbe3|rstudio-r-session-name:RStudio Session
```

6.3 Enable Logging and Debugging

The user can enable **logging** and **debugging** to collect more information about RStudio Workbench and the AGE plugin. So, it is advised to enable it during the process of troubleshooting and collect more details about the situation for further analysis. It is a best practice to disable the **debugging** in a production setup to improve the performance of the system.

1. Enable logging by creating the configuration file **/etc/rstudio/logging.conf**. This is the configuration file for providing information about logging related to **RStudio Workbench**. The user can find more details about the logging configuration in **admin guide of RStudio Workbench**. If the **RStudio AGE Launcher** plugin is installed in **/ge/age/rstudio-age**, the example **logging.conf** file is available in **/ge/age/rstudio-age/conf-template/logging.conf**. Copy the logging.conf file from template to **/etc/rstudio/logging.conf**.
2. The configuration paramenter for enabling debugging is **enable-debug-logging=1**, which is available in the launcher.conf file under **[server]**.

Note
The **Juliet Rose** release stores the log files related to **RStudio Workbench** in **/var/log/rstudio-server/**. The plugin stores the log files in **/var/lib/rstudio-launcher** and the log file for AGE plugin is available in **/var/lib/rstudio-launcher/AGE/**.

Note
The **Ghost Orchid** release stores the log files related to both **RStudio Workbench** and **Plugin** in **/var/log/rstudio-server/**.

7 Limitation

Note
RStudio configuration files do not support the **whitespace characters**, so use the **hexadecimal value for the space character (%20)** to replace the whitespaces within it.