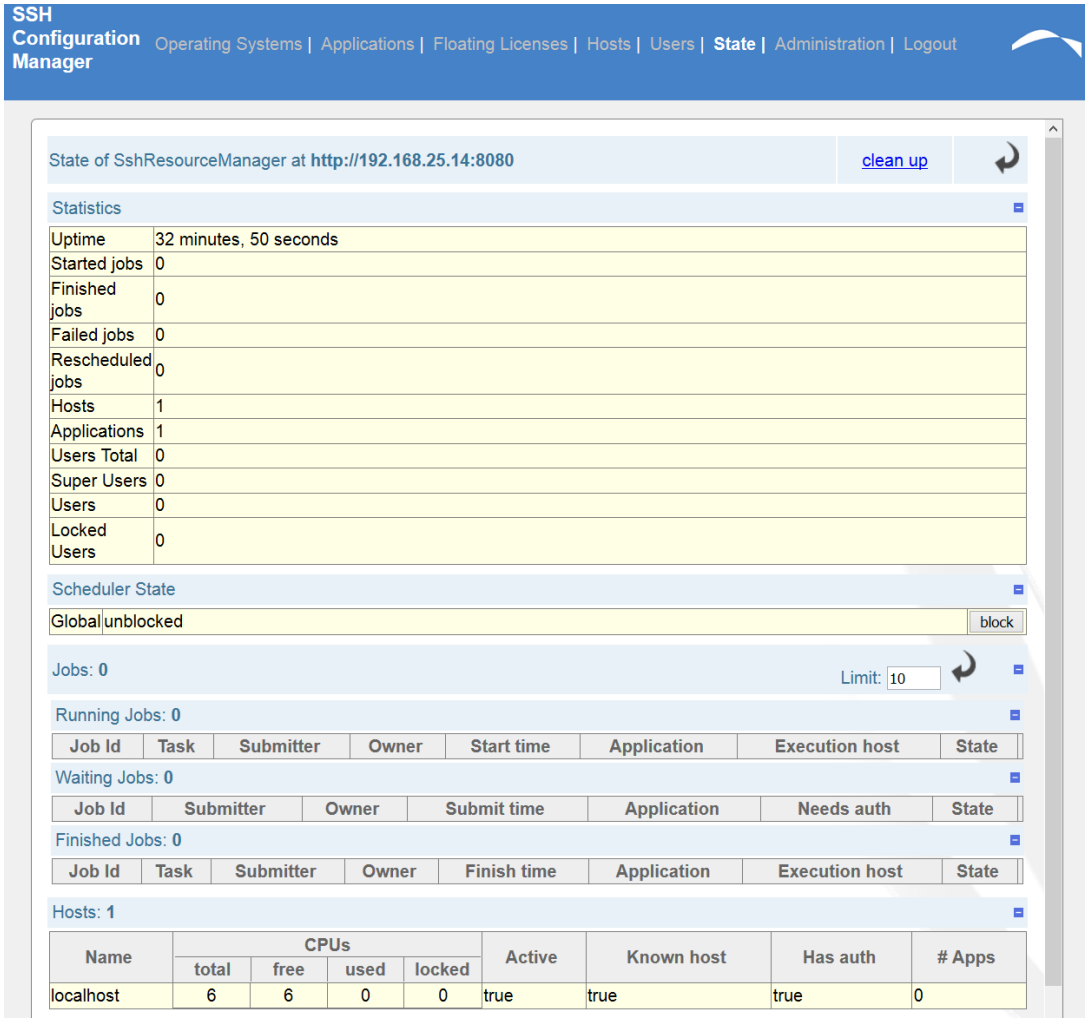
Quick Guide: Setting Up the SSHResourceManager

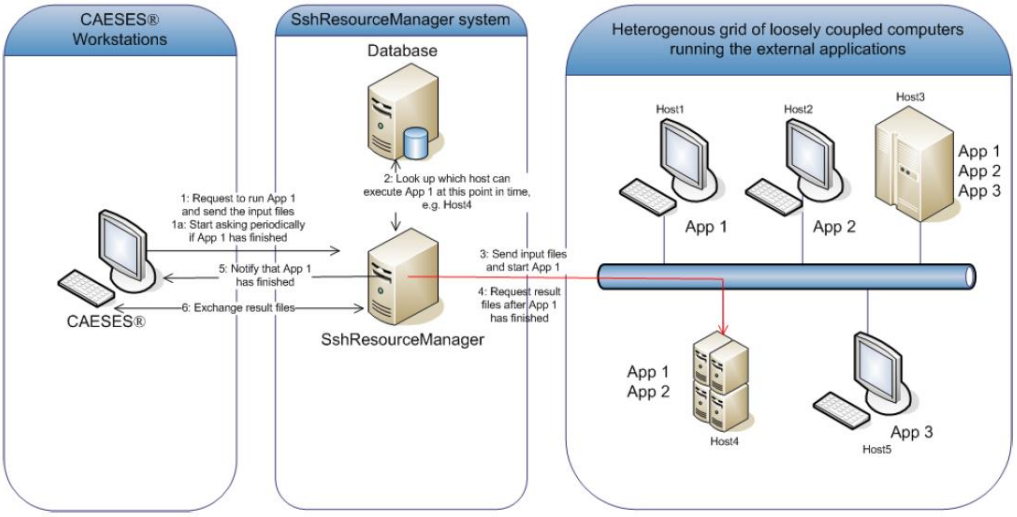
This quick guide shows you how to setup the SSHResourceManager (RSM). Please see also the admin guide for further information which can be found in the installation directory:

<CAESESInstallDir>/tools/sshResourceManager/doc/adminguide.pdf



1 Location of the RSM

The first decision you have to take is where you want to install the RSM. In general this should be a computer which is always running and is accessible by the local workstations, where CAESES is installed. It needs to have a connection to the host where the actual computation should be triggered. In most cases these computers are Linux servers or Linux clusters. However, it could also be a Windows server.



*An additional **important** prerequisite is that the RSM can connect to a **database**.*

2 Creating a Database

First, we need to set up a database, which is used to store all necessary information. In most cases this will be MySQL:

- Install the database server on a computer that is reachable from the computer and that is supposed to run the RSM (can be the same computer). You can download MySQL here: https://dev.mysql.com/downloads/mysql/
- Create a database, a user and assign the user to the database, as shown in the next steps:
- Log into MySQL: -> *mysql –u root -p*
- Create a database: -> *create database rsm;*
- Create a user: -> *create user rsmuser;*
- Assign user to database: -> *grant all on rsm.* to 'rsmuser'@'localhost' identified by 'pw';*

```
MariaDB [(none)]> create database rsm;
Query OK, 1 row affected (0.01 sec)

MariaDB [(none)]> create user rsmuser;
Query OK, 0 rows affected (0.00 sec)

MariaDB [(none)]> grant all on rsm.* to 'rsmuser'@'localhost' identified by 'pw';
Query OK, 0 rows affected (0.00 sec)
```

✓ The OS of our test computer is Debian (Linux). On this system MariaDB is installed by default, which is a fork of MySQL.

RSM and JDBC

In this step, we extract the RSM and add the JDBC Driver:

- Create a folder on your system, where you want to run the RSM as a user
  -> *mkdir ~/rsm*
- Copy the RSM zip archive to this folder and extract it
  -> *cp CAESESInstallDir/tools/sshResourcemanager/sshresourcemanager.zip ~/rsm*
  -> unzip ~/rsm/sshresourcemanager.zip

Adding the JDBC Driver

Now we need a driver which is used for the communication of the RSM with the database. This driver is called JDBC driver.

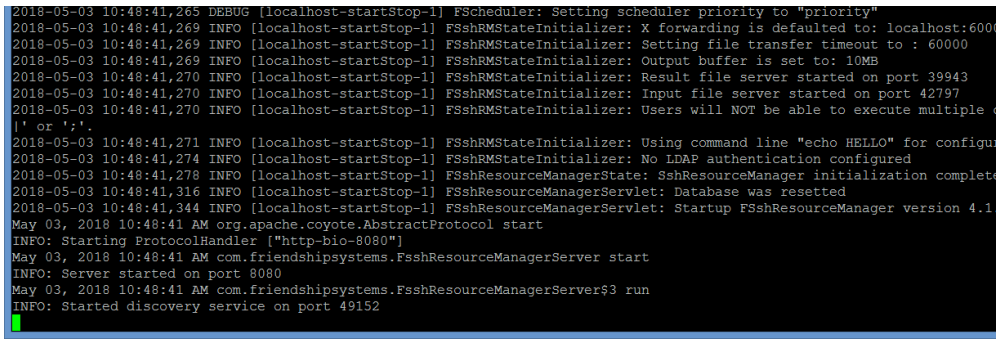
- Download a JDBC driver for the database system:
  https://dev.mysql.com/downloads/connector/j/
- Extract the downloaded package and search for the .jar file, e.g.
  ~/Downloads/usr/share/java/mysql-connector-java-8.0.11.jar
  if you extracted the JDBC Connector inside the downloads folder.
- Copy the .jar file to the "dbdriver" subdirectory of the folder "rsm".

4 Edit the Database Settings

Now we have to set the properties of the RSM to make sure that the RSM, the database and the JDBC driver can communicate with each other.

- Open the RSM configuration file "SshResourceManager.properties" located inside the RSM installation directory.
- Find the chapter "Database Settings".
- Set the JDBC Driver: **databaseJDBCDriver=com.mysql.jdbc.Driver**
  (it may change to "**com.mysql.cj.jdbc.Driver**"
  or if you use mariaDB "**org.mariadb.jdbc.Driver**")
- Set the dialect which works in most cases**:**
  databaseDialect=org.hibernate.dialect.MYSQLDialect
- Set the URL: **databaseConnectionURL=jdbc:mysql://localhost/rsm**
  (in case you use mariaDB it is **jdbc:mariaDB://localhost/rsm**)
- Set the database user: **databaseUser=rsmuser**
- Set the user's password: **databasePassword=pw**
- Start the RSM and test the connection on port 8080: java –jar sshresourcemanager.jar 8080

Here is an output message of a successful start of the RSM:



✓ You can find a list of supported dialects here:

http://docs.jboss.org/hibernate/orm/3.5/api/org/hibernate/dialect/package-summary.html

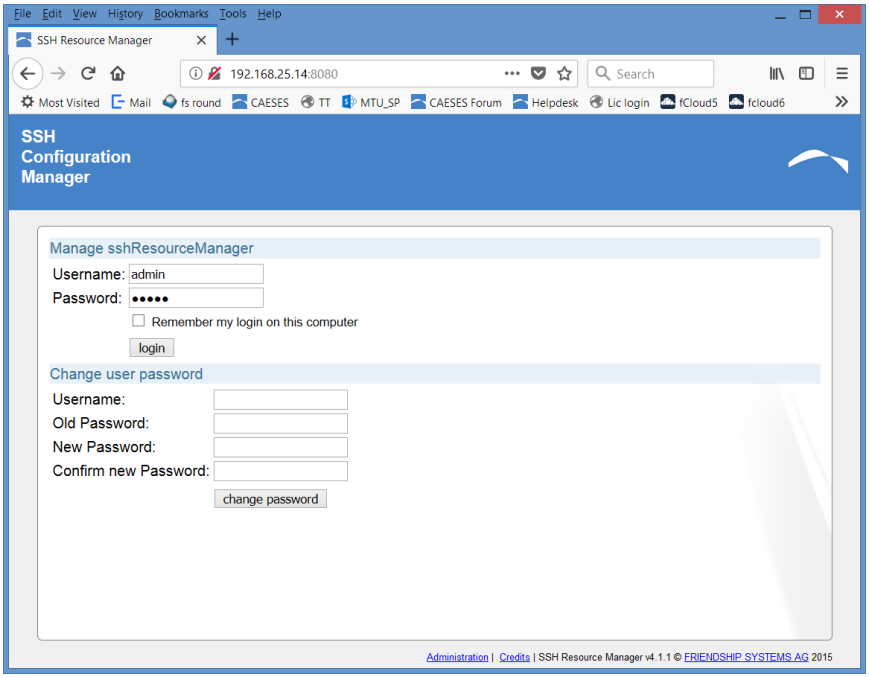
✓ Errors can occur, when the database settings do not correspond to the created database. Also there are incompatibilities of certain database server with certain JDBC driver. When you use MariaDB database then make sure to use the latest version, to avoid conflicts with the JDBC driver.

5 RSM Configuration

If the previous steps have been successful, you should now be able to log in to the RSM browser interface, to set up your host and applications.

✓ Remember that you can log into the RSM from any computer in the network

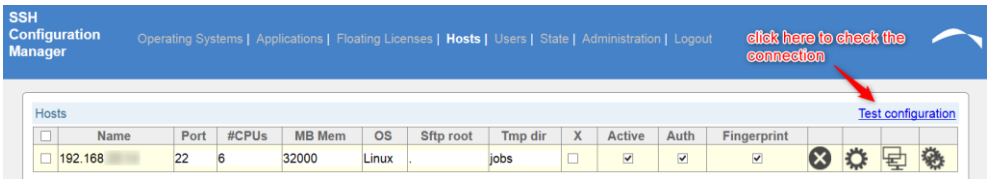
- Open a web browser and navigate to
  http://<IPAddress or name of the computer running SshRM>:8080/
- Now log in to the RSM itself. In the menu "Manage sshResourceManager" enter "admin" (without quotes) as *Username* and an arbitrary password. There is no need to remember this password, as long as no users are configured.

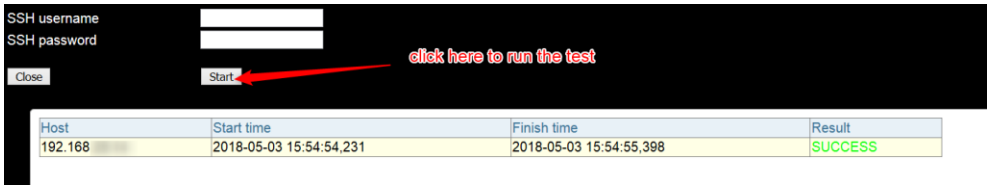


In the following steps, the network settings and the applications are configured.

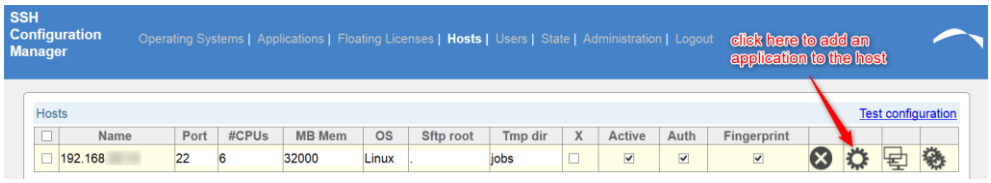
- Go to the "Applications" page. This is what will be seen by the CAESES when it connects to the RSM. Let's enter a new application for testing purposes only
  Name: date
  Press the "+" sign

- Go to the "Hosts" page. These are the computers the RSM will connect to via SSH. If you installed the RSM on the head node, add the following host:
  Name: localhost (otherwise enter the IP address)
  Port: 22 should be ok, except when you have set up the SSH server to listen on a different port.
  CPUs: Normally the RSM uses this information to determine which host has free resources. So, for every instance of an application it starts, it will subtract the number of required CPUs of the application (see Application page) from the number of available ones on a certain host and will only select the host for execution if the number is larger than 0.
  MB Mem: Currently unused, just set anything.
  OS: Linux/Windows
  Sftp Root: "." (no quotes) This is used for temporary files that are created on the host. It should be the initial directory of a user when connecting via SFTP. For Linux "." means that the user's home directory is used.
  Tmp Dir: This is the actual directory where the temporary data is stored relative to the Sftp Root. It will be created if it doesn't exist. e.g. "jobs" (no quotes)
  Active: true
  Press the "**+**" sign
- A new host is created. Press the "Fingerprint" checkbox and confirm the RSA fingerprint (if it matches the expected value). This is a security feature to avoid man-in-the-middle attacks and is similar to the mechanism used by "regular" SSH clients.
- There are two ways to specify the log in data for SSH for this host: 1. inside CAESES (see later) or 2. on this page. If you set them on this page, you will not have to set them inside CAESES. To do so, press the "**Auth**" checkbox. Enter the username and password and check the "Check login" checkbox. If the login with the given credentials succeeds, it will say so, otherwise, you can try again. The second option should be preferred.
- Now check the connection to the new host:

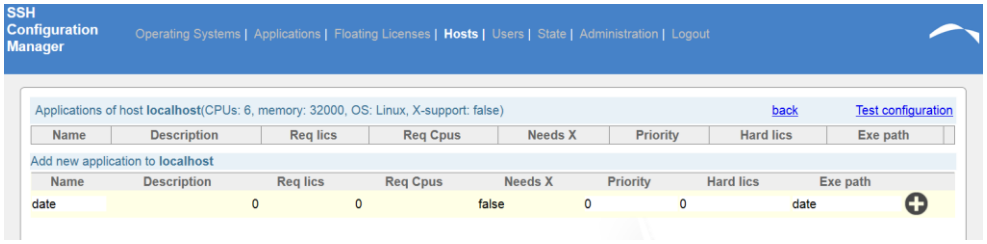




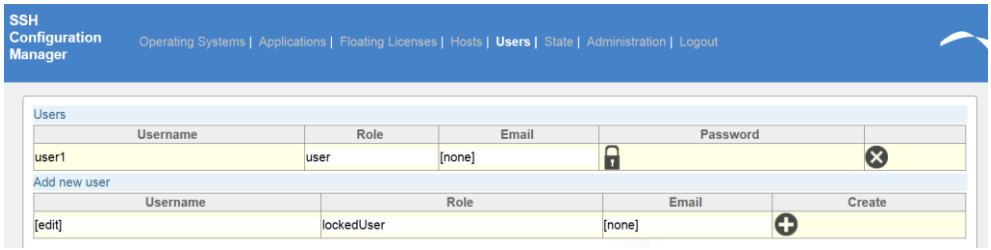
► Press the single gear at the end of the line to add an application to the host.



► Select the application (e.g. “date”) from the drop-down menu. Then set the execution path, which is simply “date” on Linux. Press the "**+**" sign.



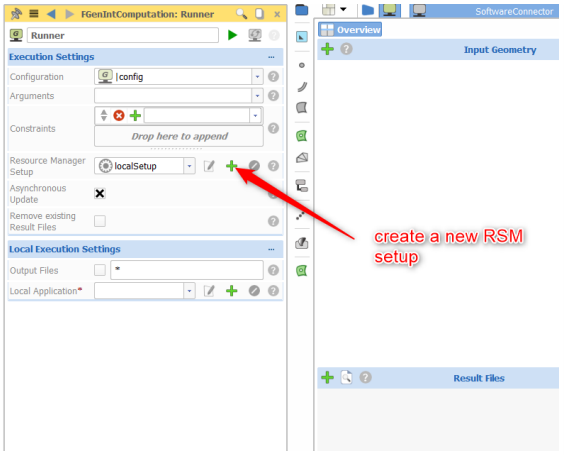
► Create a new user and set the role as “user” and set a password.

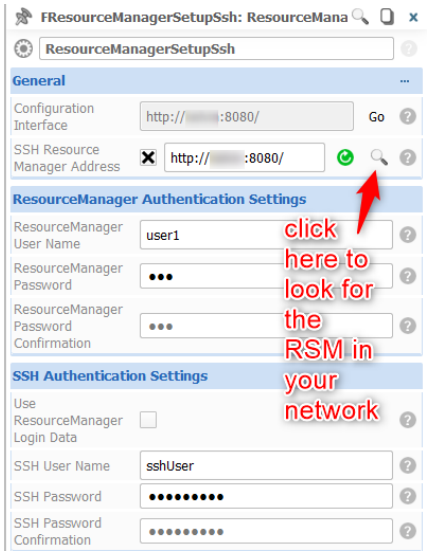


6 Using the RSM

Now that we have the RSM up and running as well as an existing application, we can access the RSM from CAESES on your local machine.

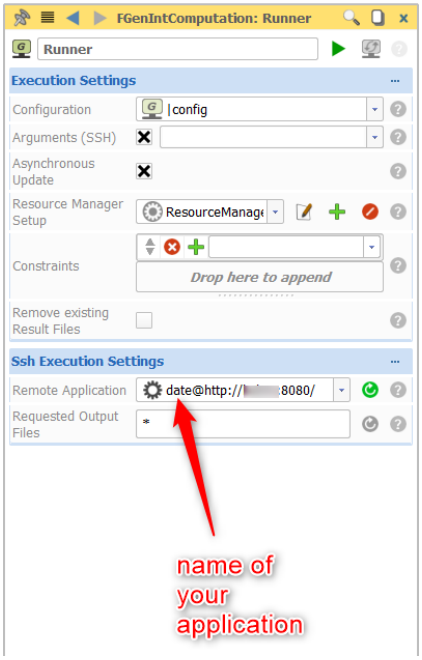
- Start CAESES on your local machine
- Create a new *Software Connector* and select the *Runner*
- In the "Object Editor" see the "Execution Settings" and press the green "**+**" button next to the "Resource Manager Setup" combo box.



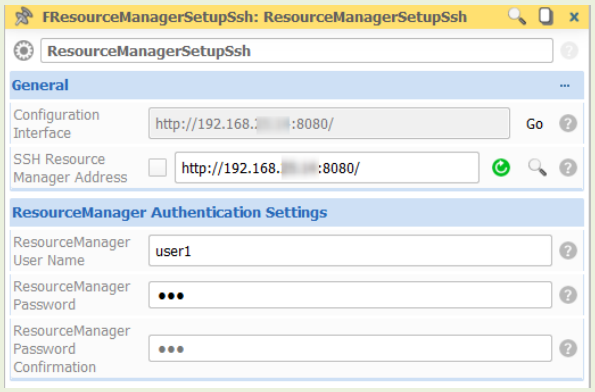


- Press the little magnifying glass next to the "SSH Resource Manager Address" field. It should show your running RSM. Select it and press "Ok". If it doesn't show the RSM, enter the address manually.
- Enter your RSM user data.
- Enter your SSH user account data.
- Click on the green refresh button to load your applications.

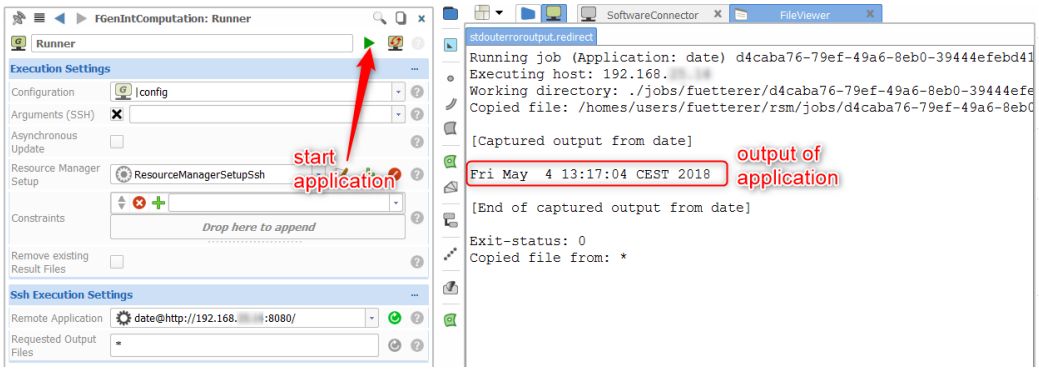
Now you should be able to select your application.



✓ If you are having trouble to connect to the RSM and retrieve the application list, then disable "DNS resolving" and enter the IP address of the RSM.



► Start your application by pressing the run button, just to see if it works:



Now you are ready to set up your application (e.g. CFD tools). Go back to the RSM web interface and add a new application. Add it to the Host as you have done with the date testing application (which, of course, can be removed now). If you now refresh the list of applications inside CAESES, you should see the new application and you should be able to run it.