

Debugging KeyCloak

Source Code

1. Create a new "workspace" directory and open a terminal in that directory

NOTE

For the duration of these instructions, we will refer to this workspace directory as `/home/dphillips/workspace`

2. git clone <https://github.com/keycloak/keycloak.git>
3. Change to the keycloak source directory
 - `cd keycloak`
4. Check out the appropriate version
 - `git checkout -b 9.0.3 9.0.3`
 - This creates a new local branch `9.0.3` using the git tag `9.0.3`
5. Download the corresponding version of KeyCloak/Red Hat SSO and extract it

CodeReady Studio

1. Download Red Hat CodeReady Studio
 - <https://developers.redhat.com/products/codeready-studio/download>

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CodeReady Studio

A development environment with superior support for your entire development lifecycle.

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Product: CodeReady Studio 12.17.0

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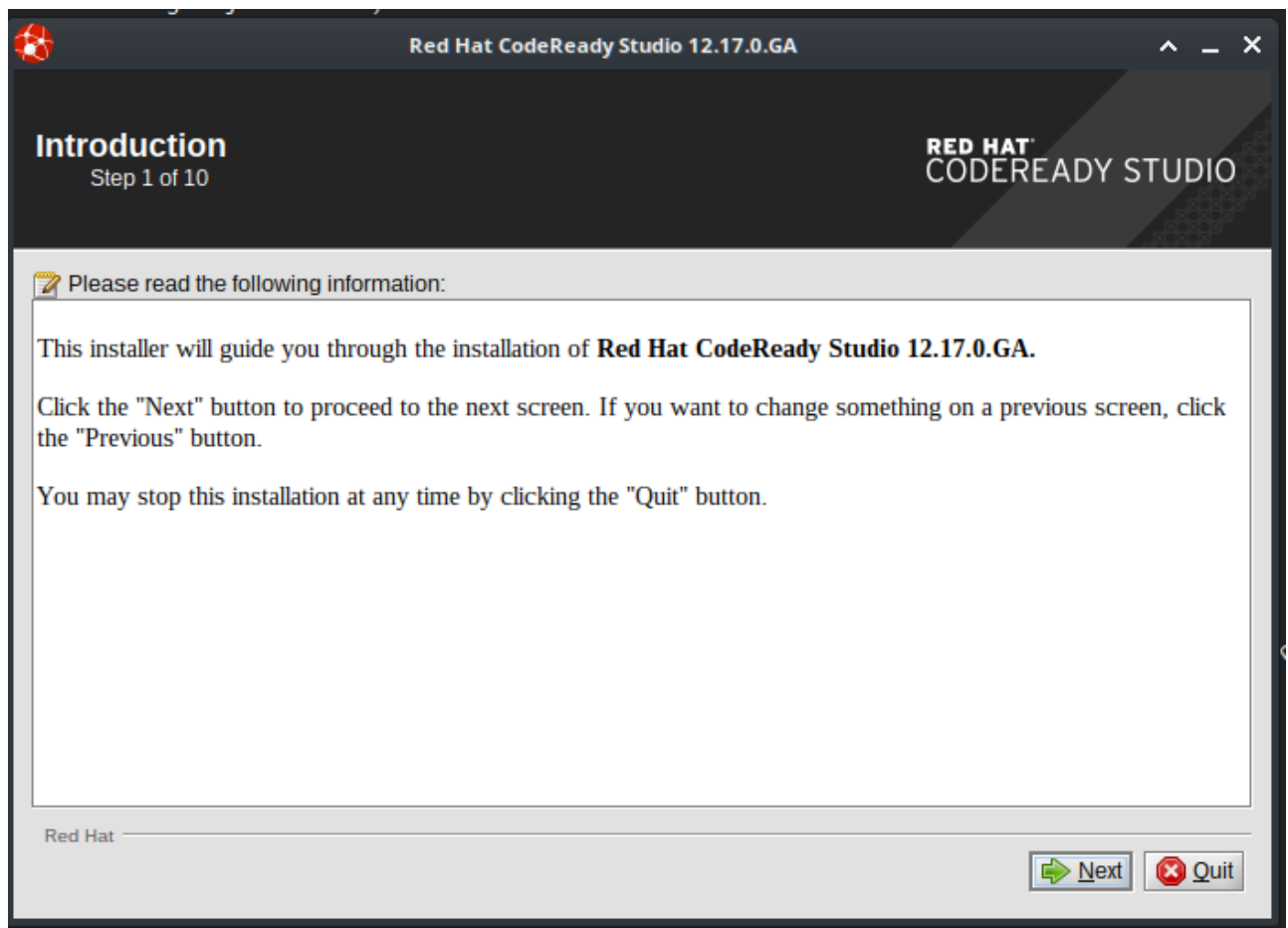
Version	Release Date	Description	Download
12.17.0	2020-10-11	Installer	Installer (895 MB)
		JBoss Central Zip	JBoss Central Zip (101 MB)
		Update Site Zip	Update Site Zip (927 MB)

How we use cookies

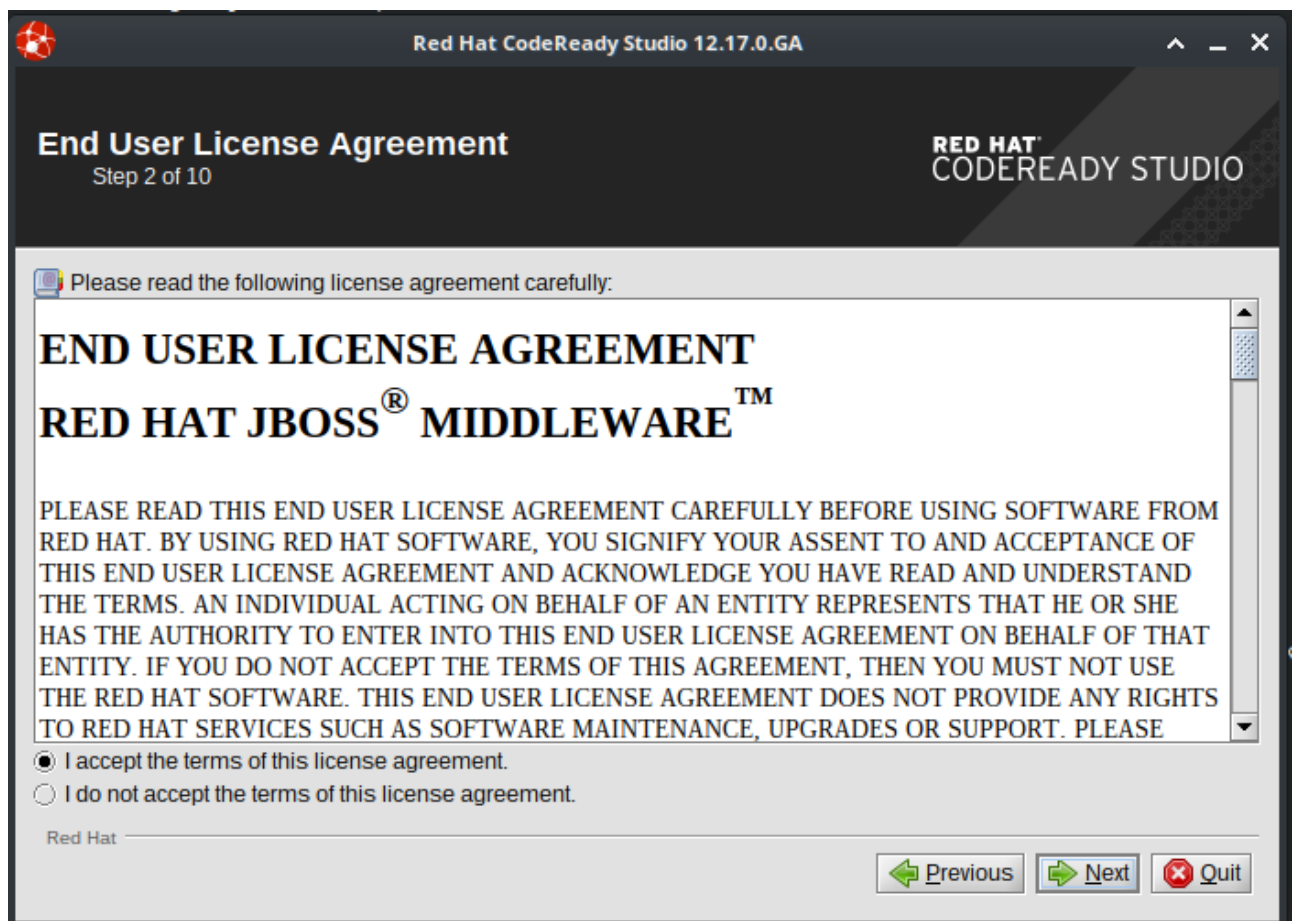
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Figure 1. CodeReady Studio Product Page

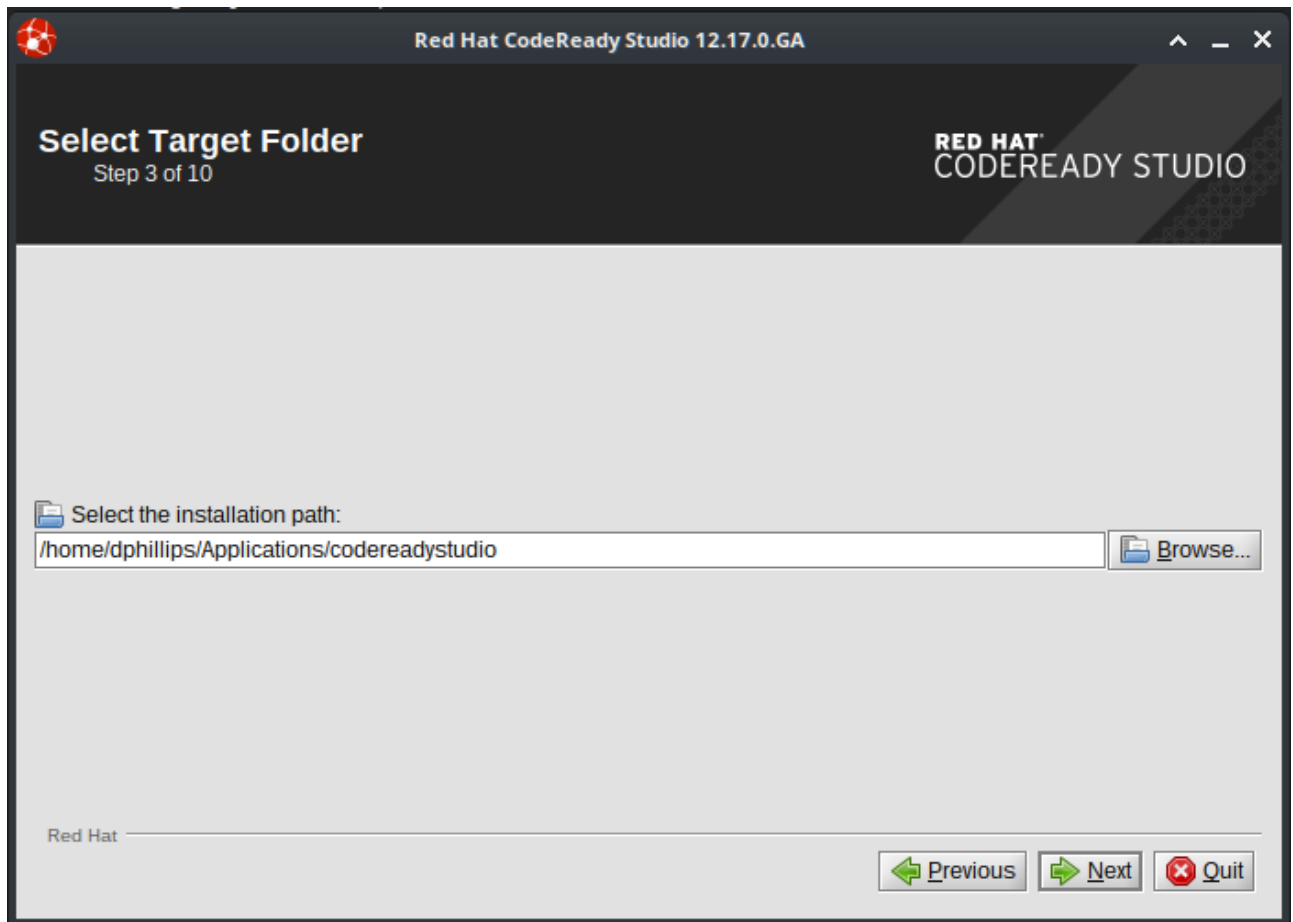
2. Log in or create a Red Hat Developers account to complete the download
3. Download the installer JAR file
4. Execute the Installer JAR
 - `java -jar /path/to/codeready.jar`
5. Read the installer instructions and click "Next"



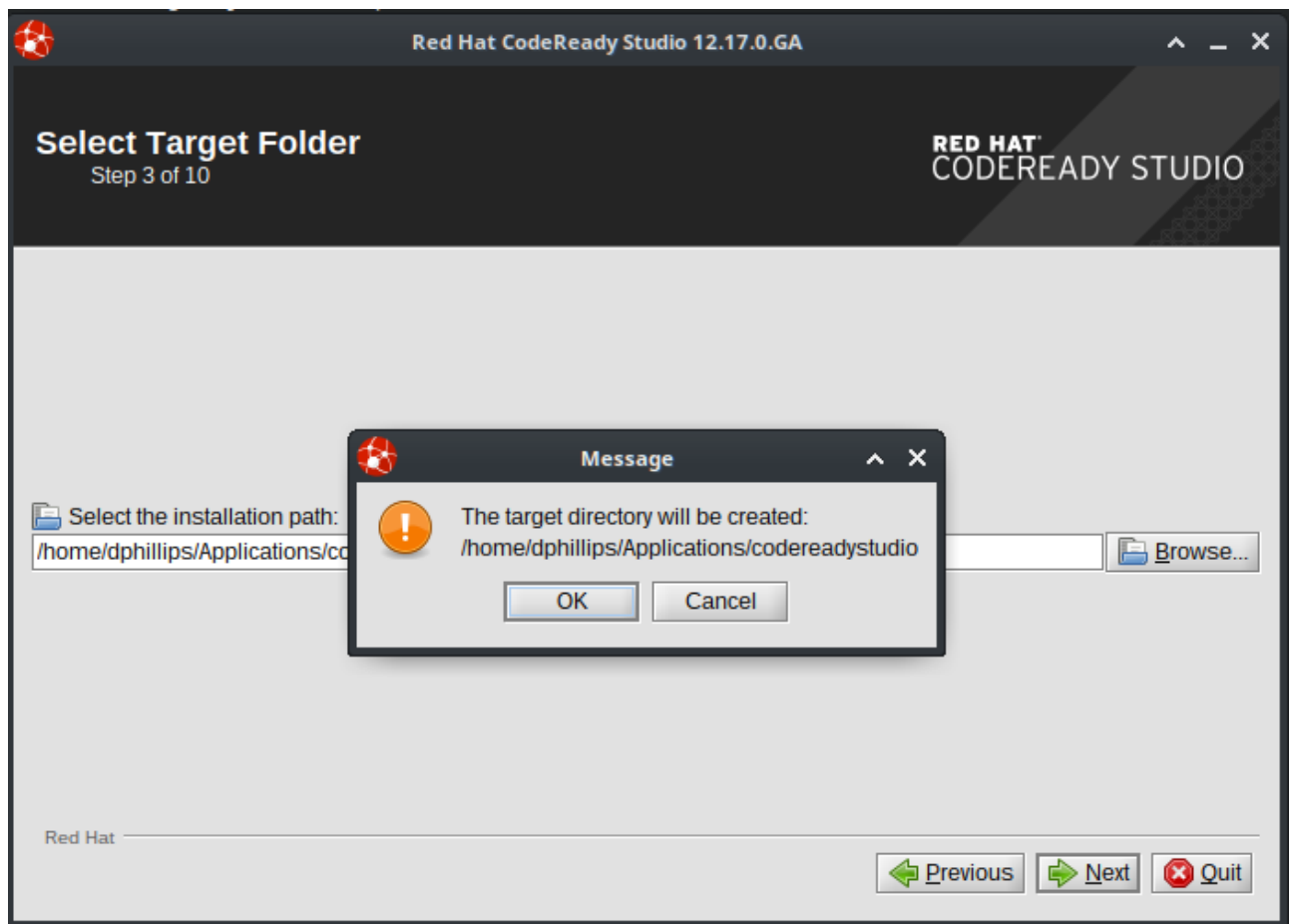
6. Review the license agreement, select "I accept", and click "Next"



7. Update the installation path (OPTIONAL) and click "Next"

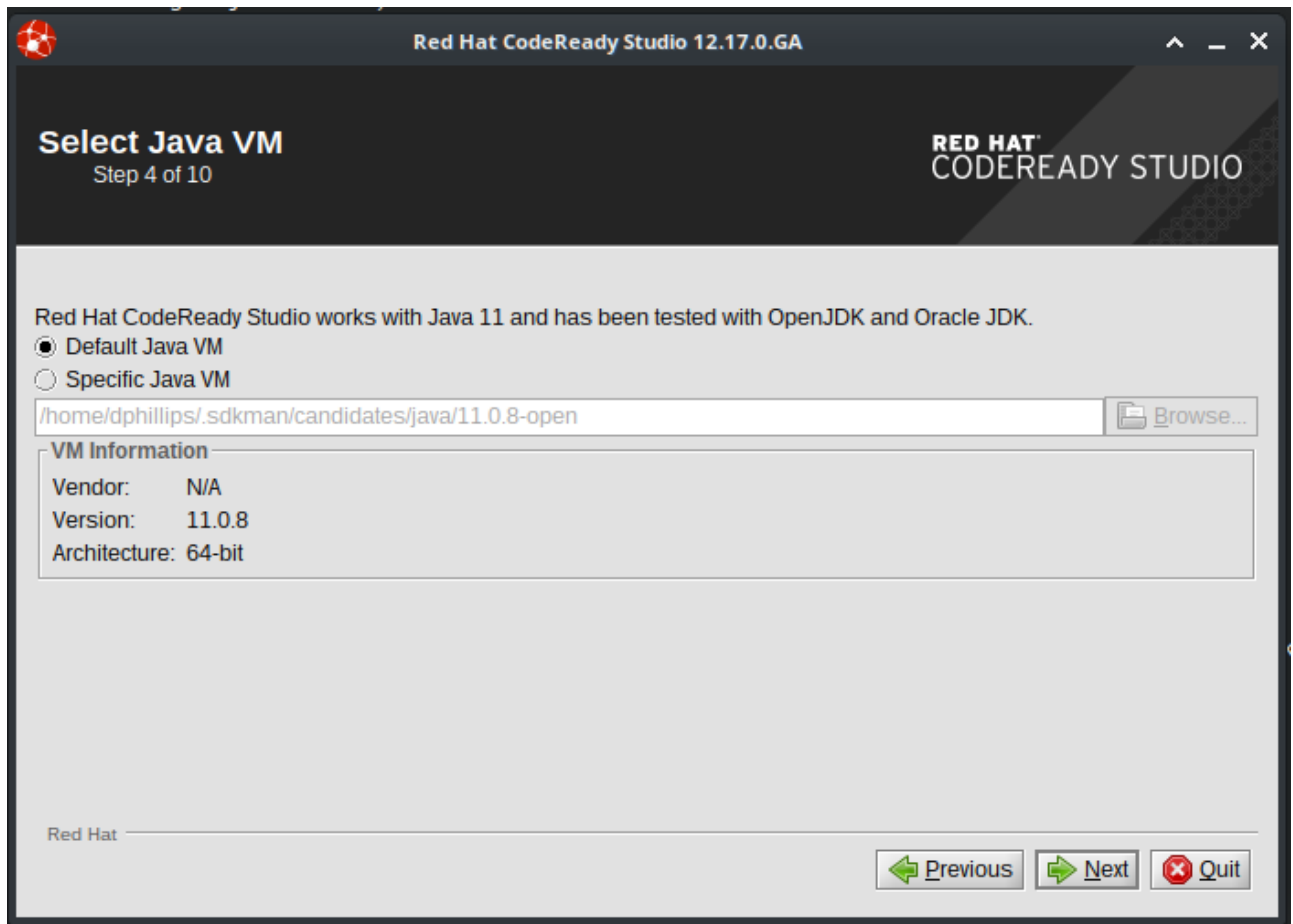


8. Click "OK" to acknowledge the warning that a new directory will be created

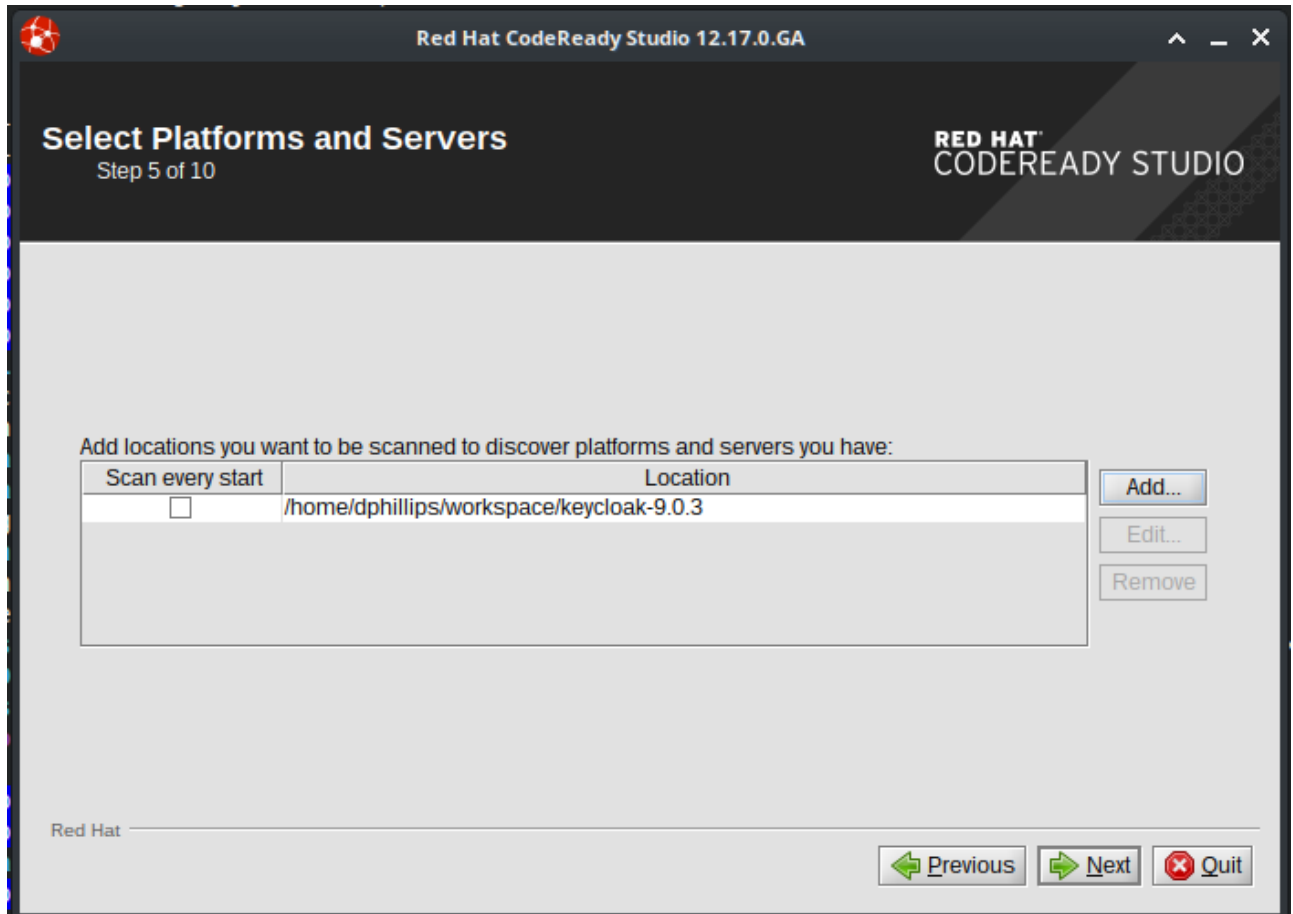


9. Either accept the default JVM or choose a specific JVM

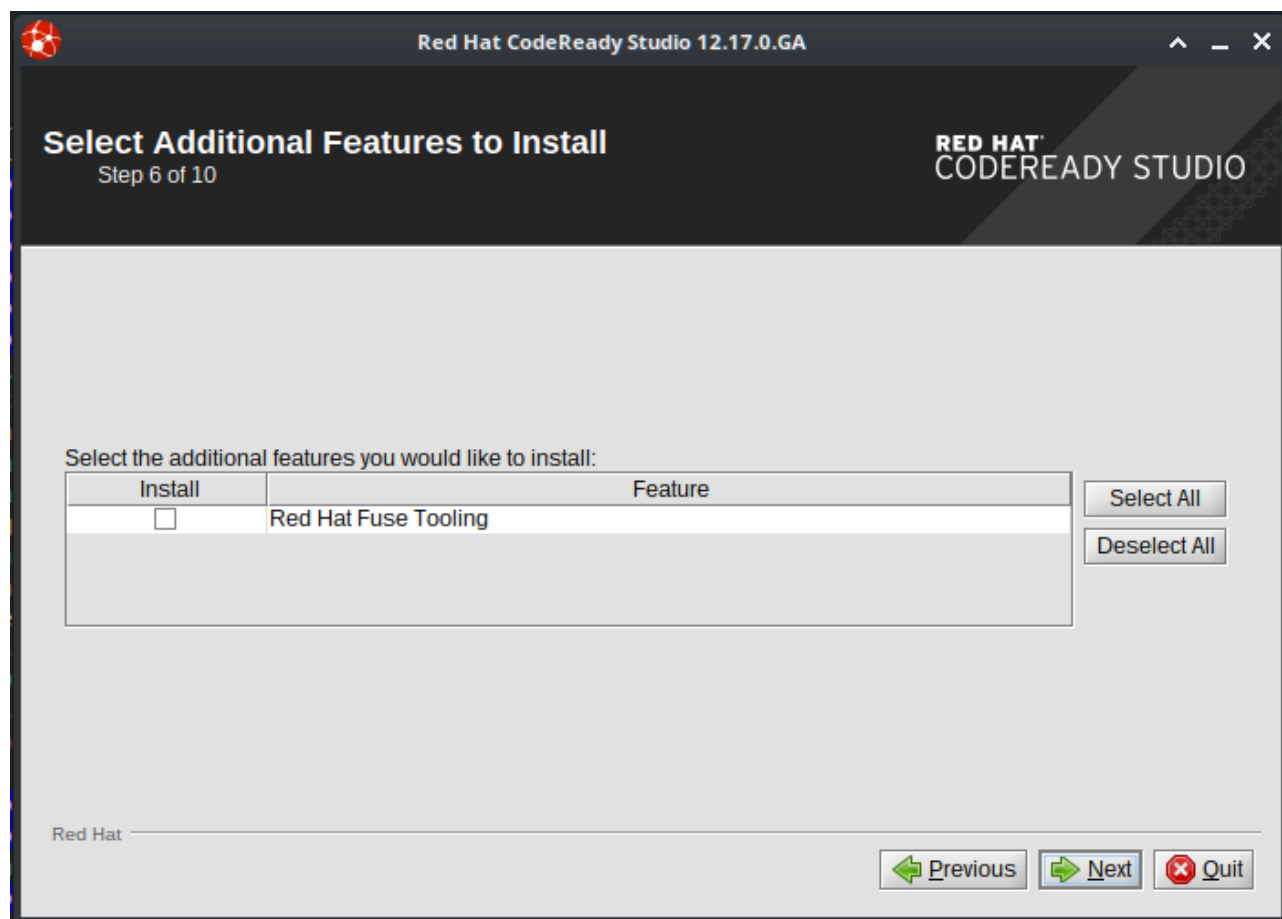
NOTE | The JVM **MUST** be Java 11 or later



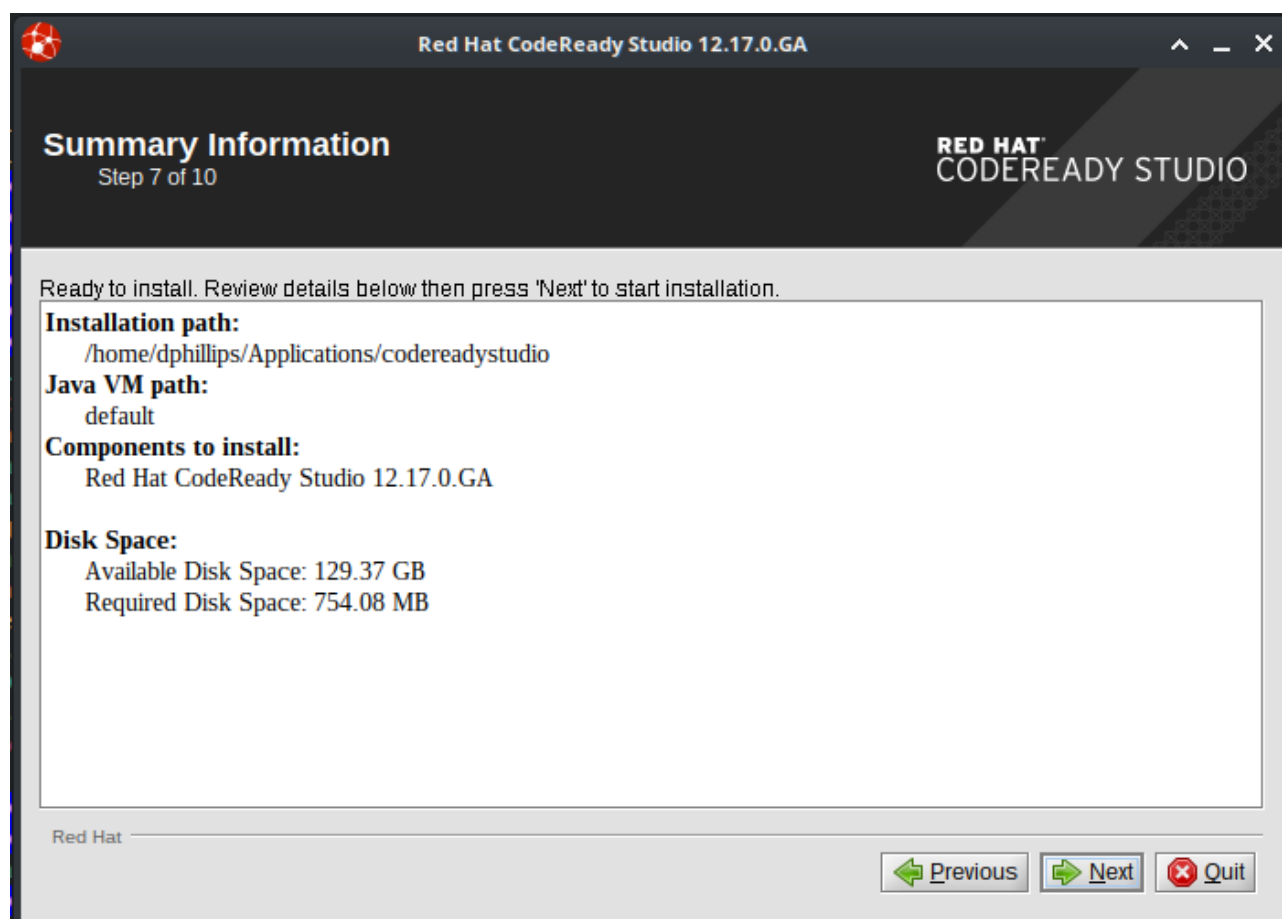
10. Add the KeyCloak server instance to the list



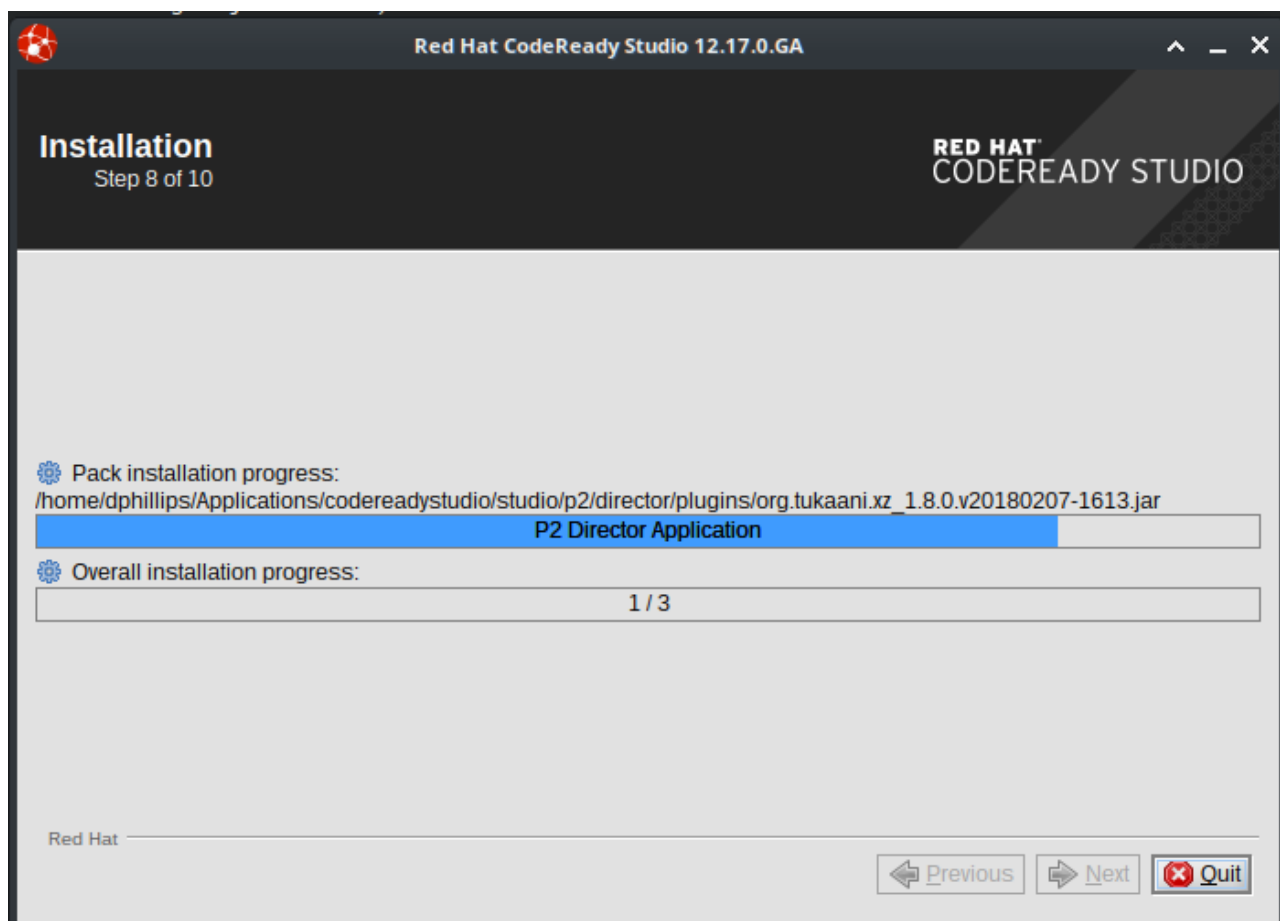
11. You can optionally include Red Hat Fuse Tooling



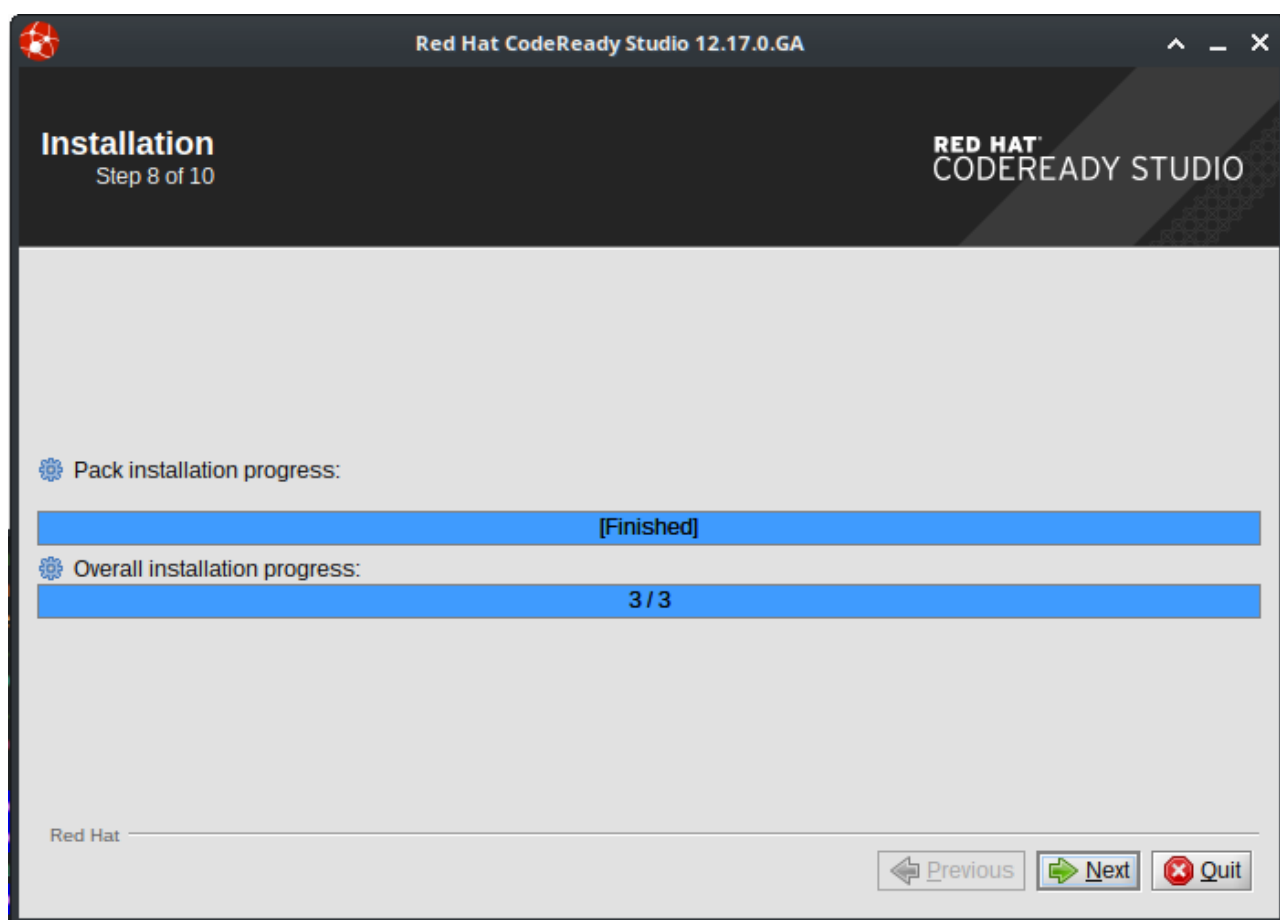
12. Review the installation details and click "Next" to begin the installation



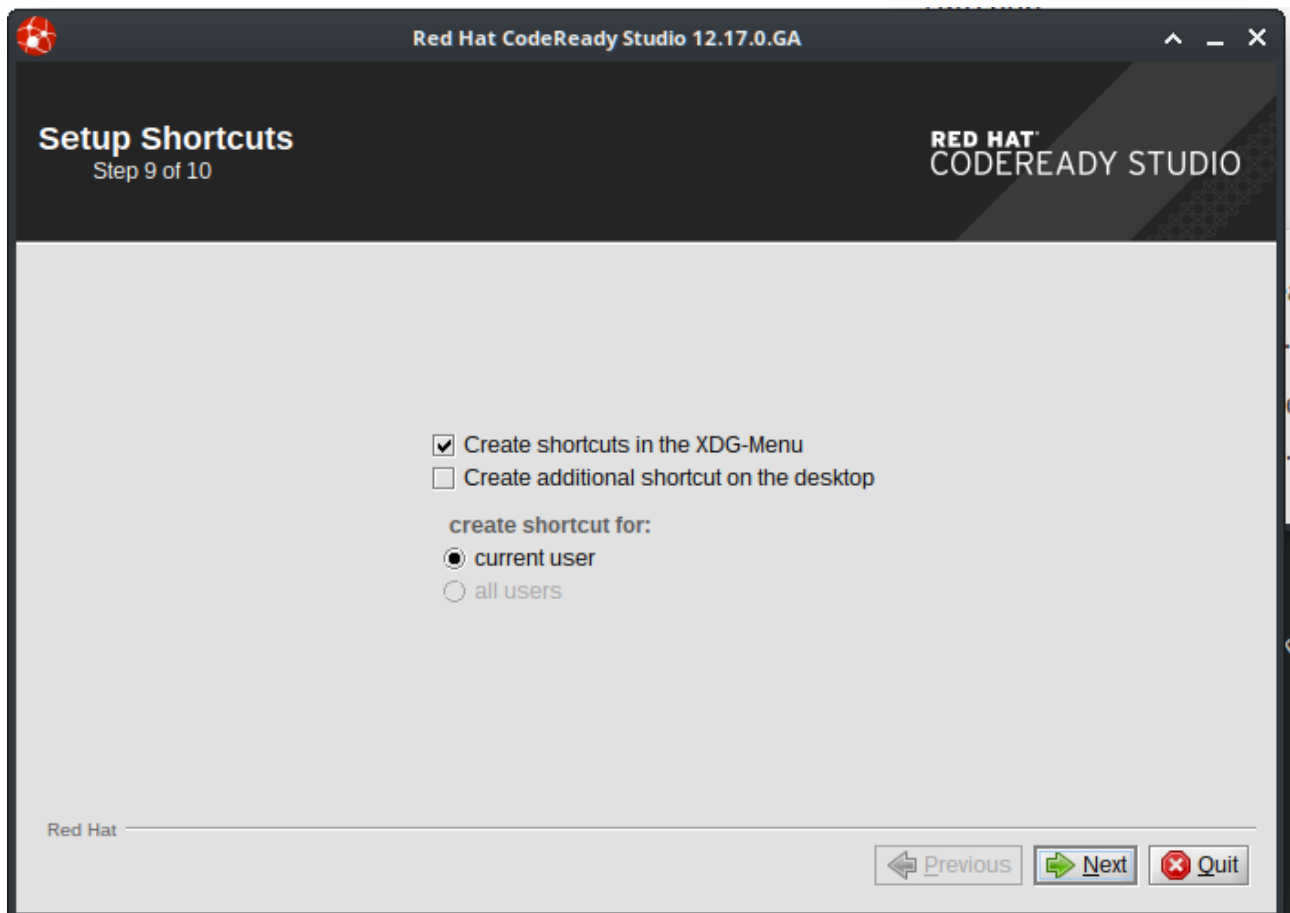
13. The installation will take a few minutes



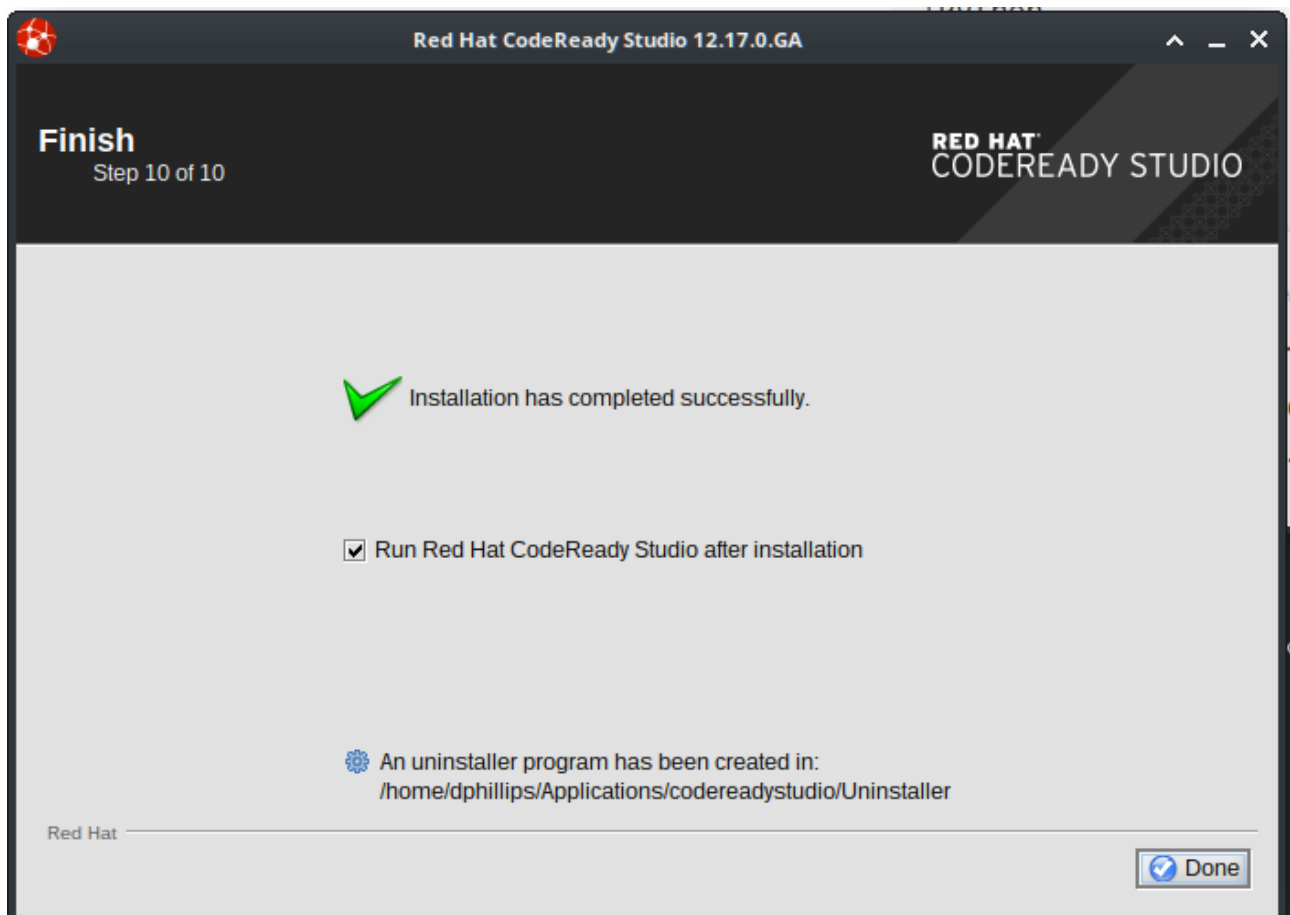
14. Once the install is complete, click "Next"



15. You may choose to have the installer create menu entries and then click "Next"

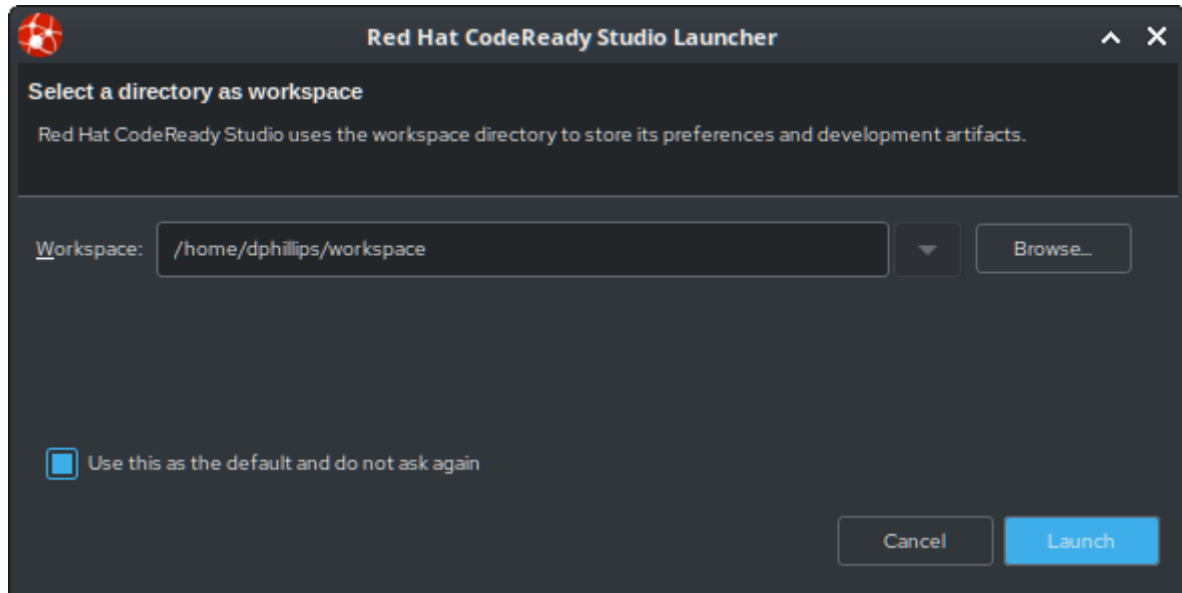


16. Select "Run Red Hat CodeReady Studio after installation" and click "Next"

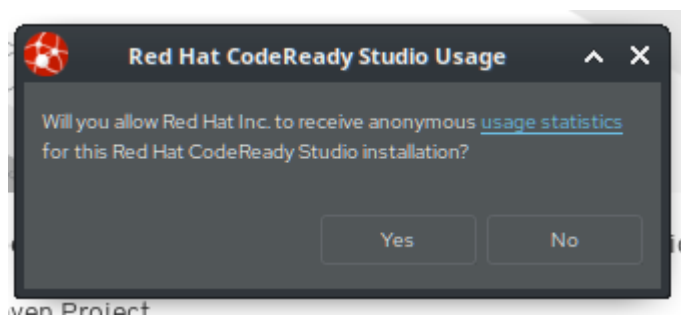


Import KeyCloak Maven Multi-Module Project

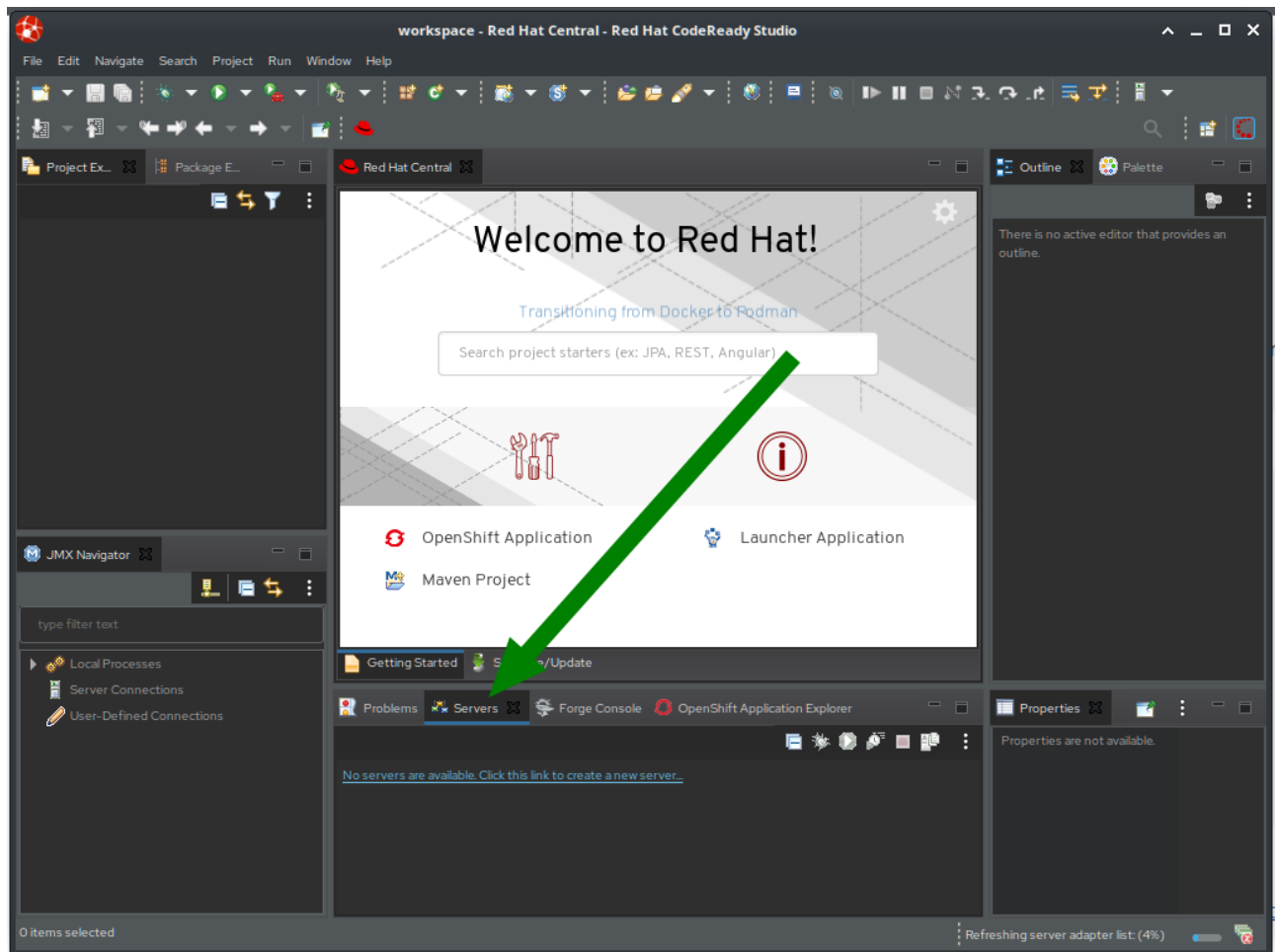
1. As CodeReady Studio starts, select your workspace as determined at the beginning of these instructions



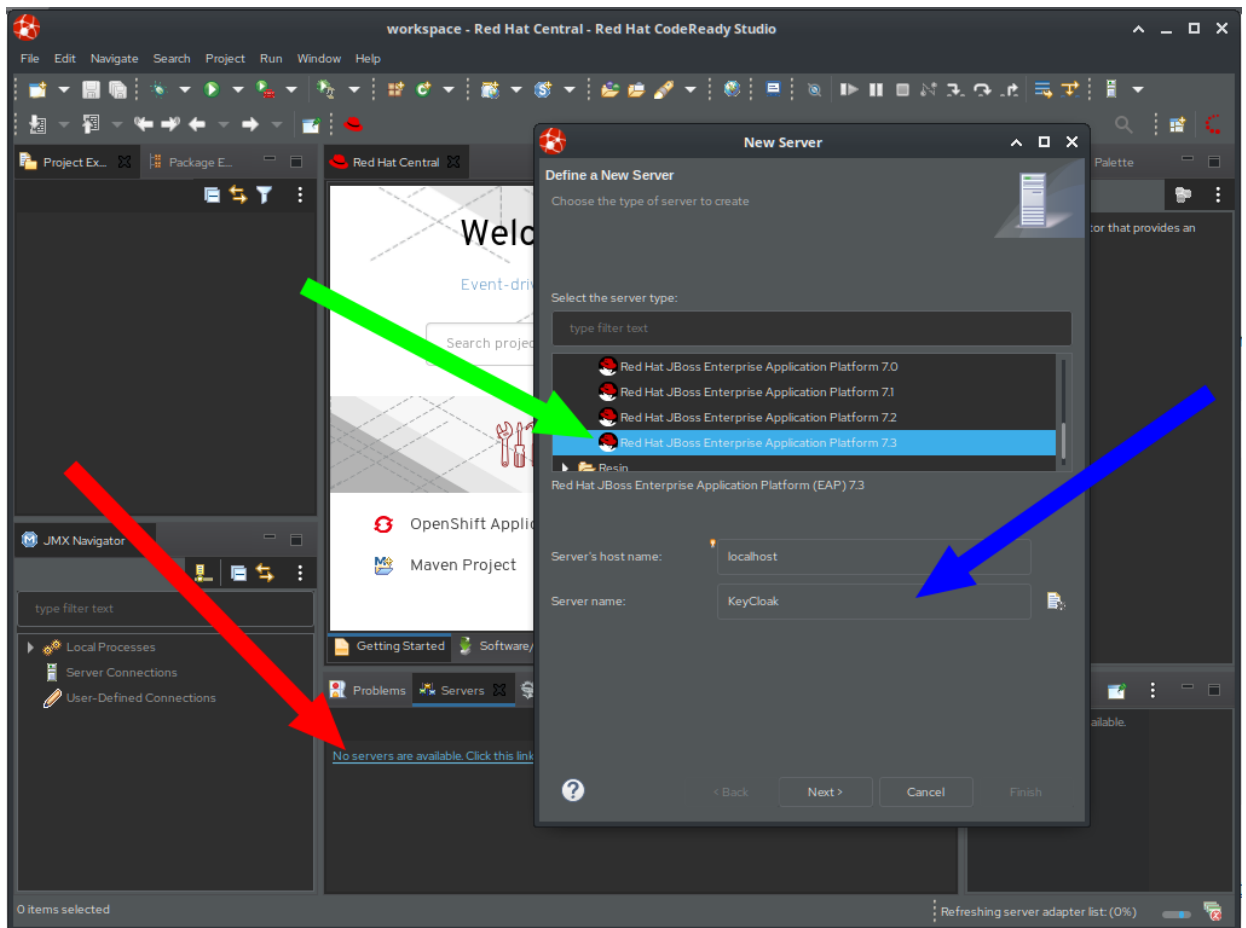
2. Choose "Yes" or "No" to the prompt about usage statistics collection



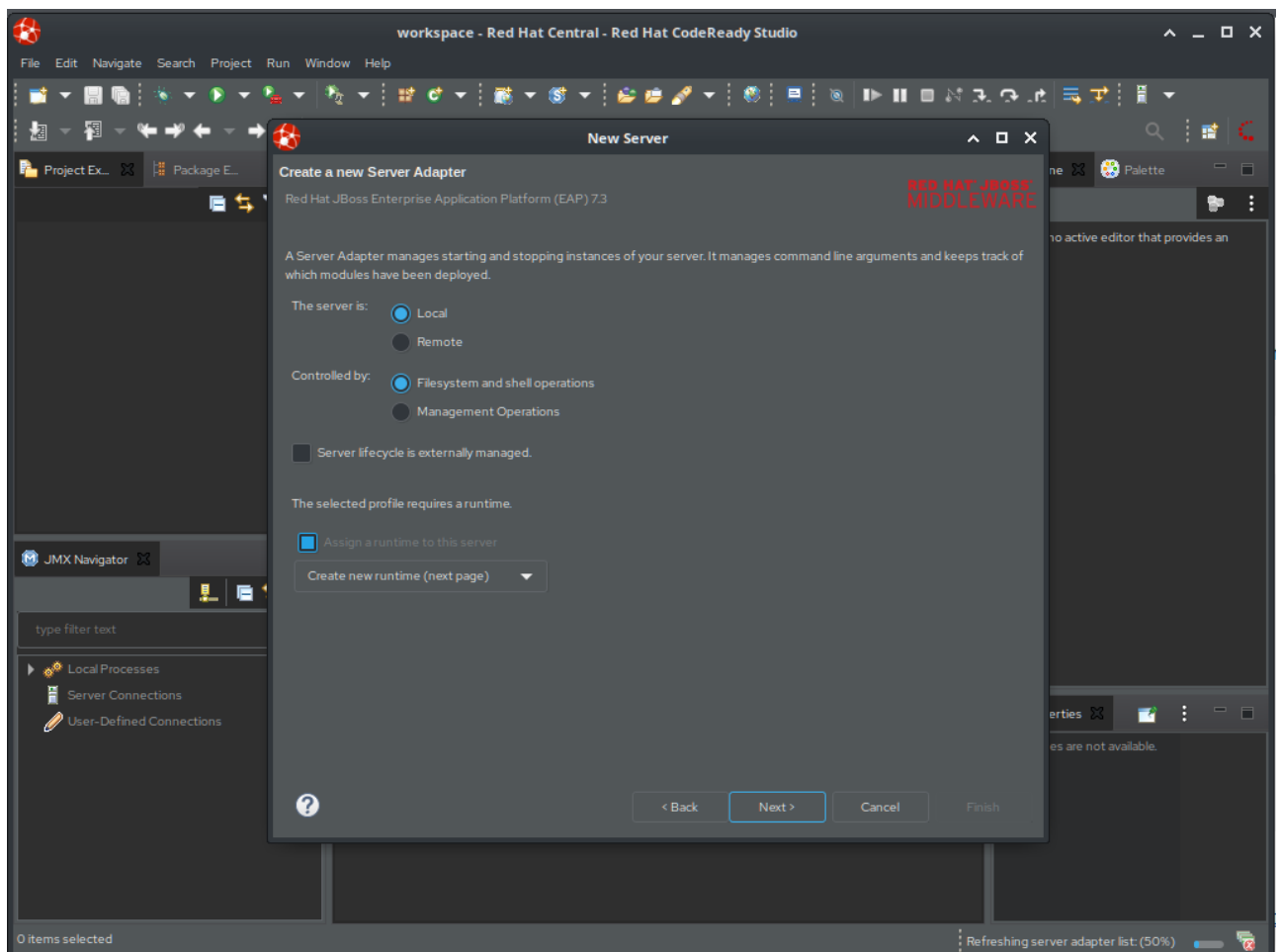
3. Select the "Servers" panel



4. Click the link in the "Servers" panel to add a new Server
 - Choose "Red Hat JBoss Enterprise Application Server 7.0.3"
 - Set the server name to "keycloak"

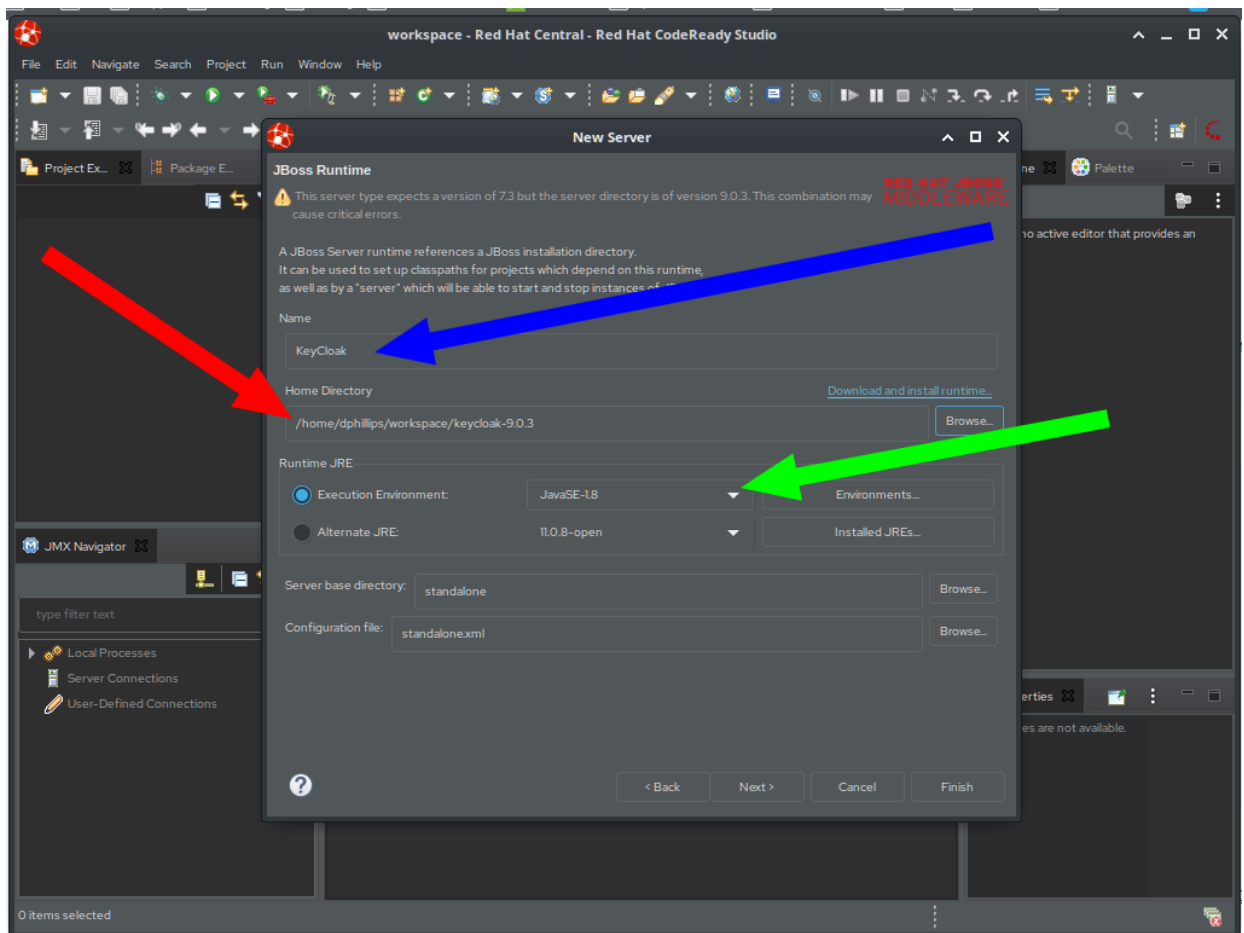


5. Accept the defaults for the server adapter and click "Next"

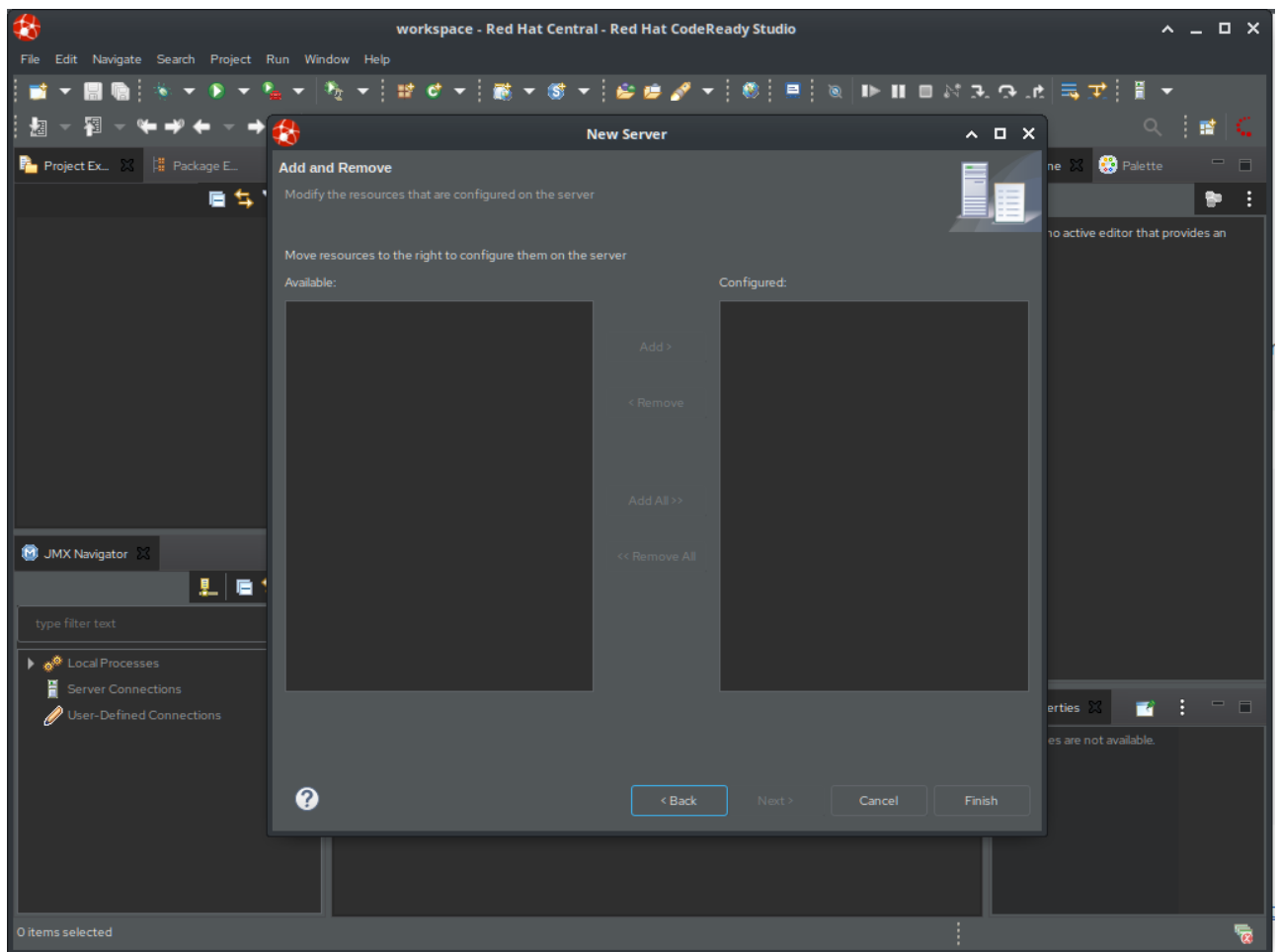


6. In the "New Server" dialog:

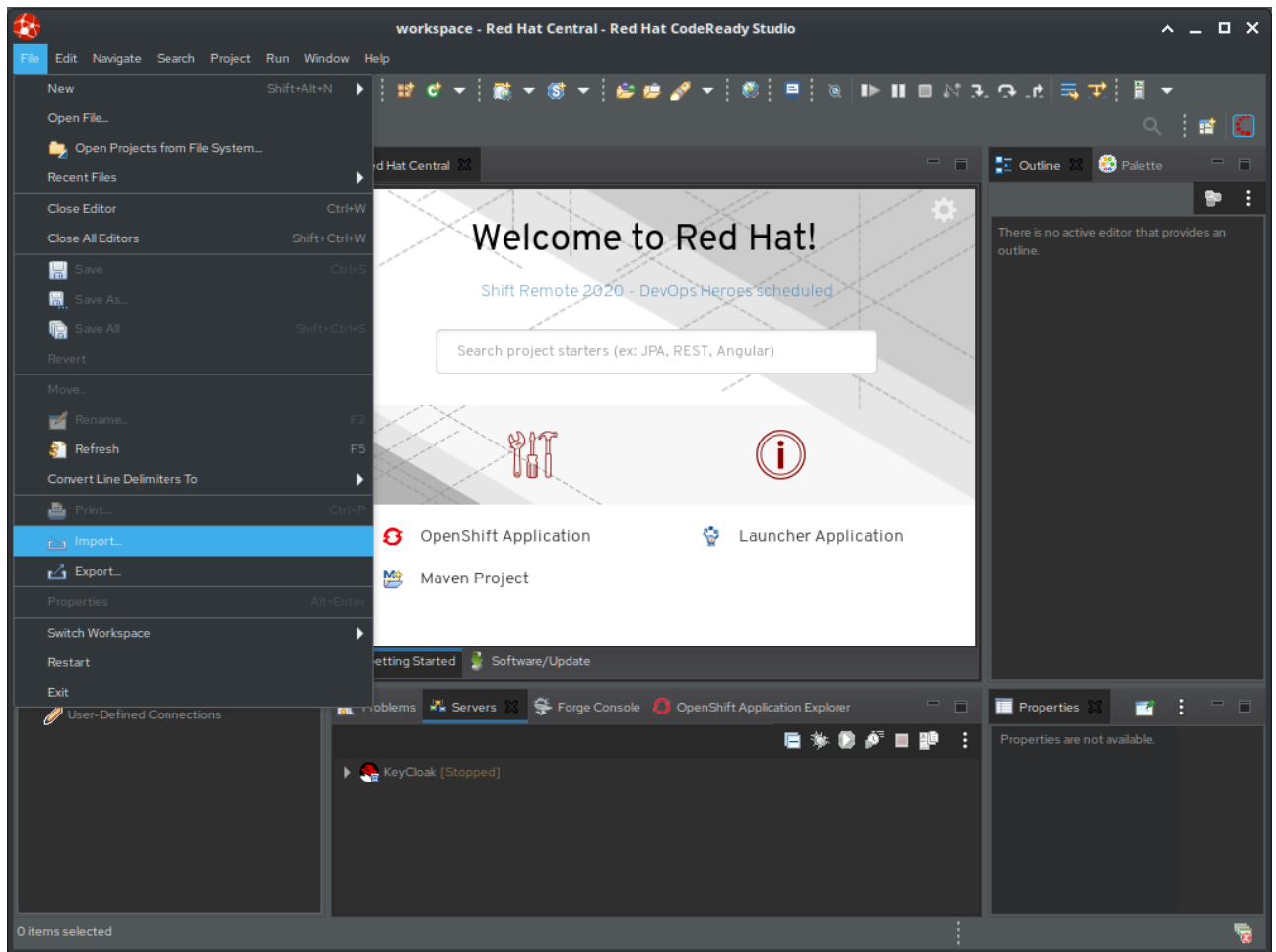
- Set the "Name" to "KeyCloak"
- Browse to your KeyCloak server download (the binary package)
- Select the "Runtime JRE"



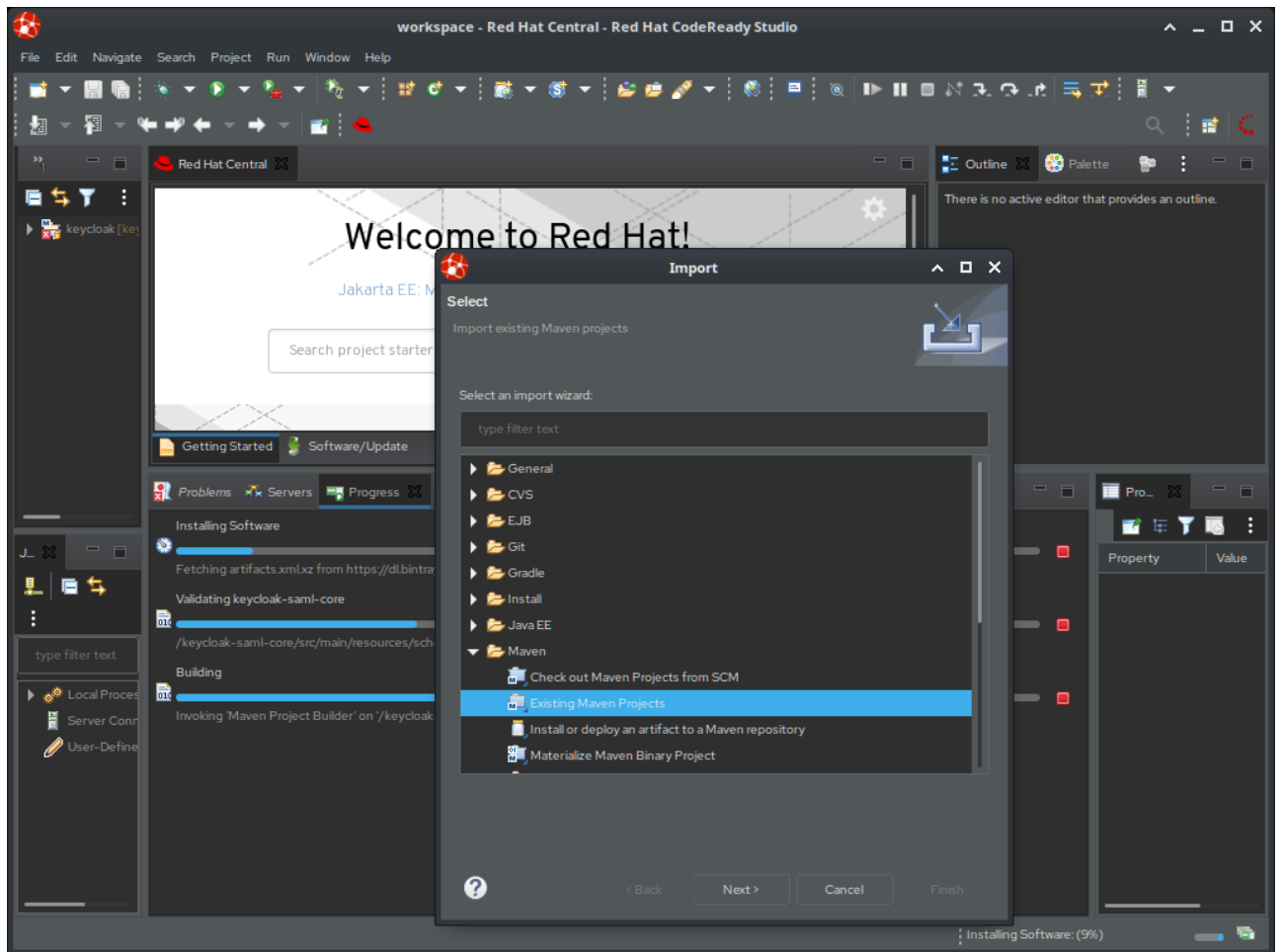
7. On the "Add and Remove" dialog, click "Finish"



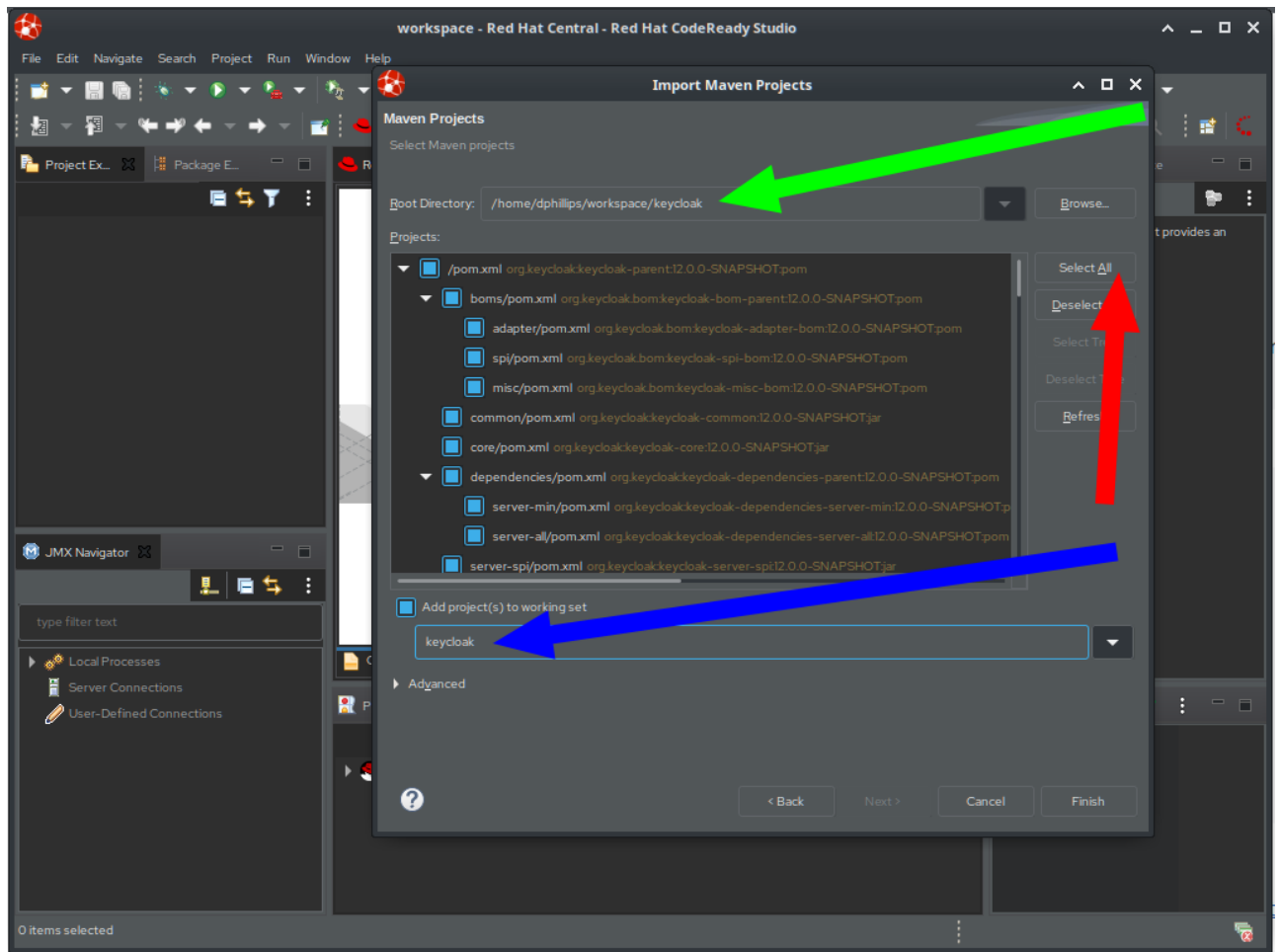
8. In the "File" menu, select "Import"



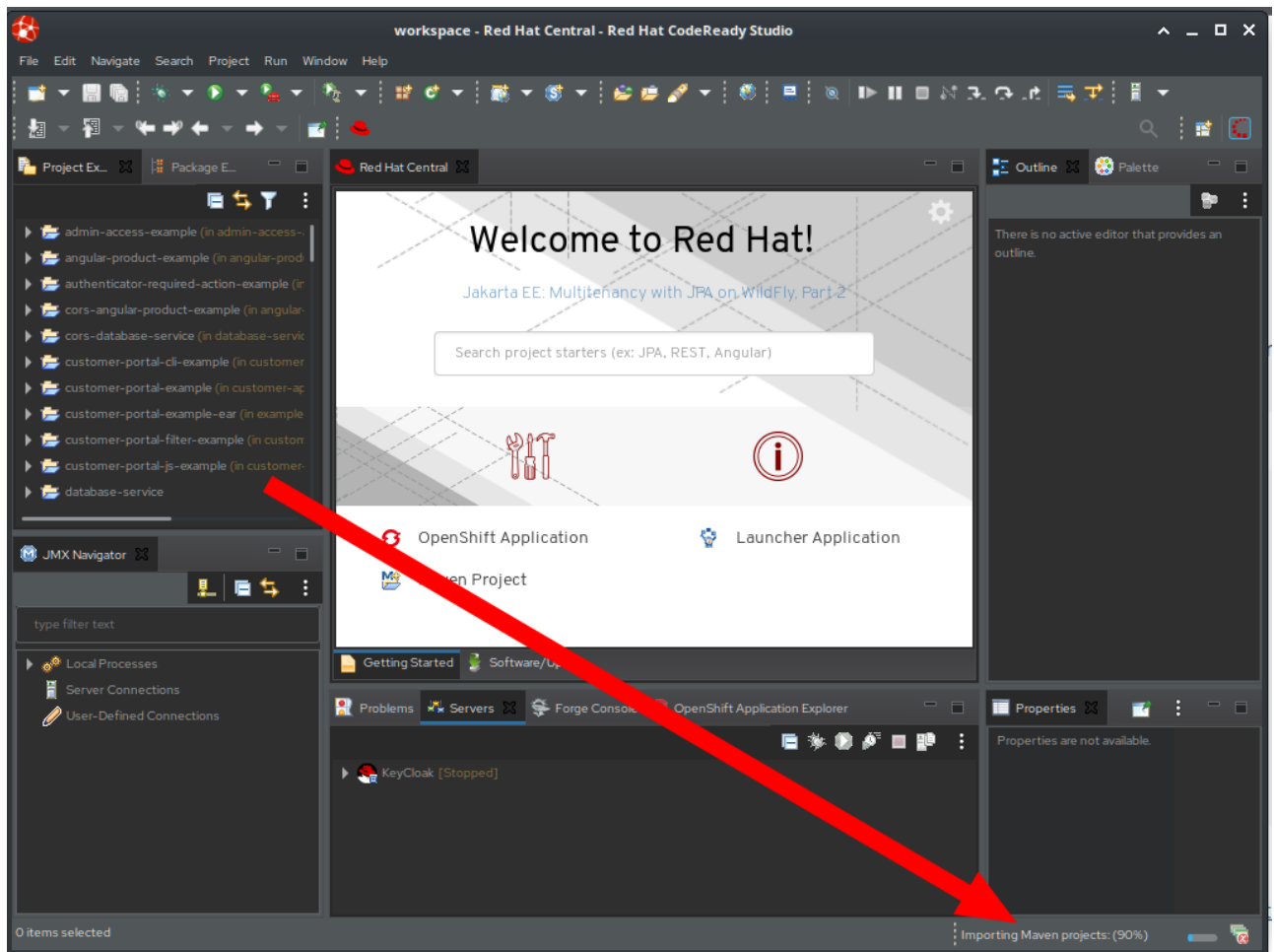
9. Under the "Maven" folder, select "Existing Maven Projects"



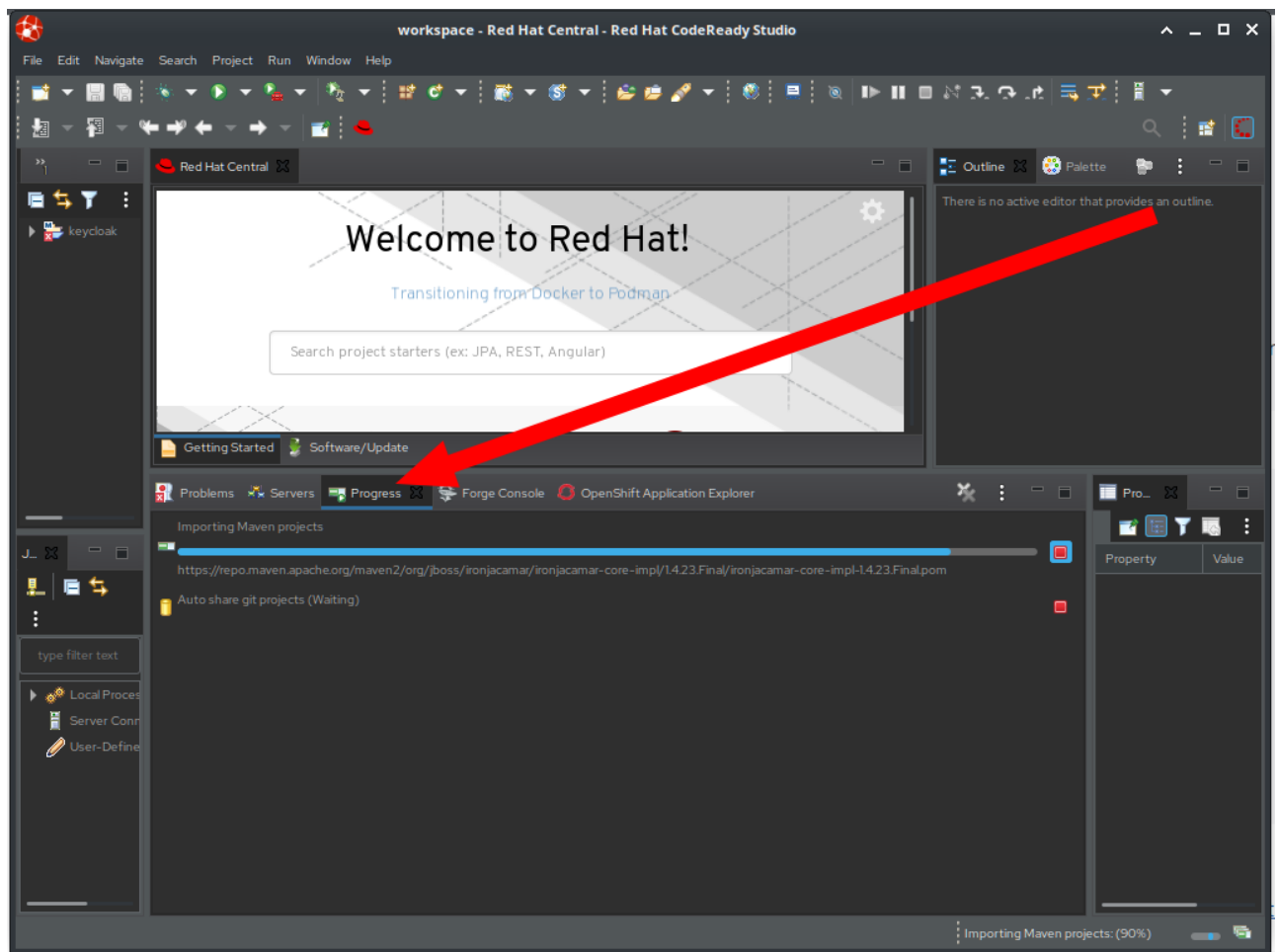
10. Browse to and select your KeyCloak source directory (e.g. `/home/dphillips/workspace/keycloak`), then click "Finish"



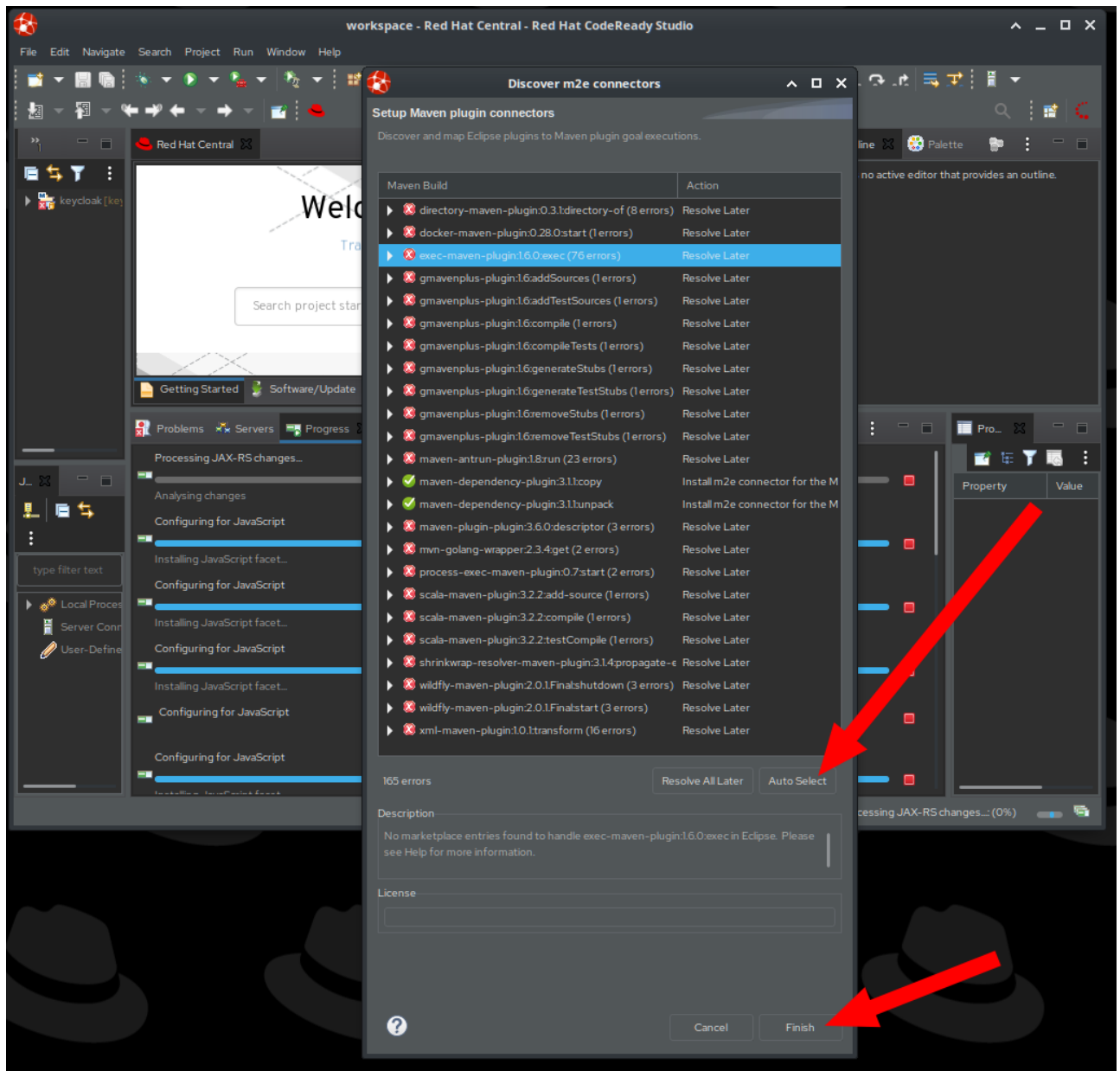
11. Make note that there are background processes running, and double-click on that progress bar.



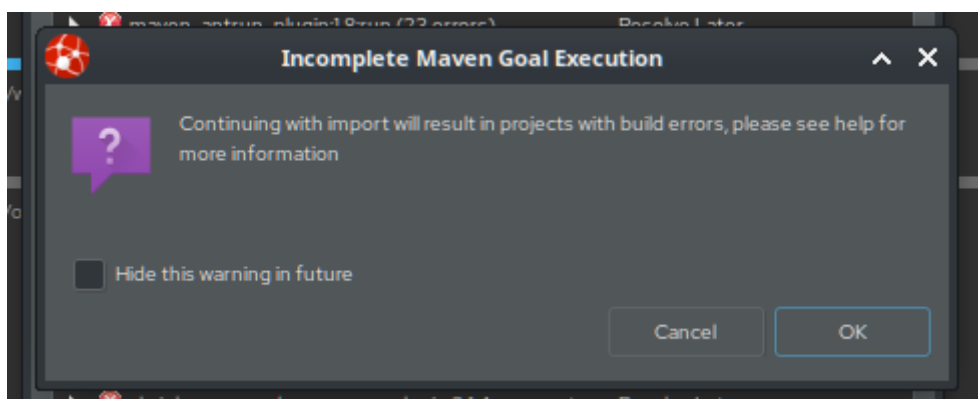
12. You will see a series of processes running which can take a **VERY LONG TIME** and which must complete before we can proceed.



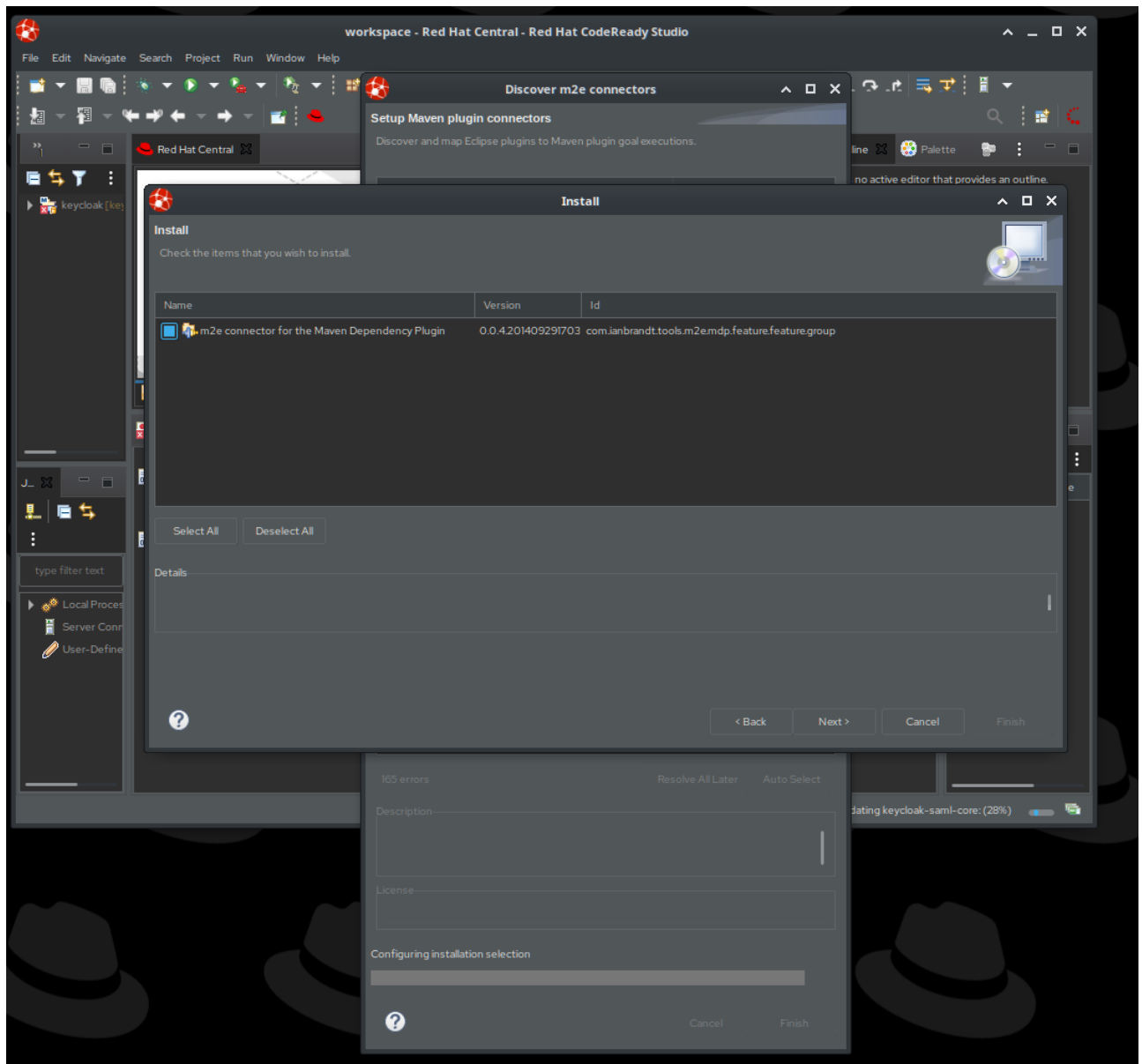
13. You will see a dialog about unknown maven plugin connectors. Click "Auto Select" and then click "Finish"



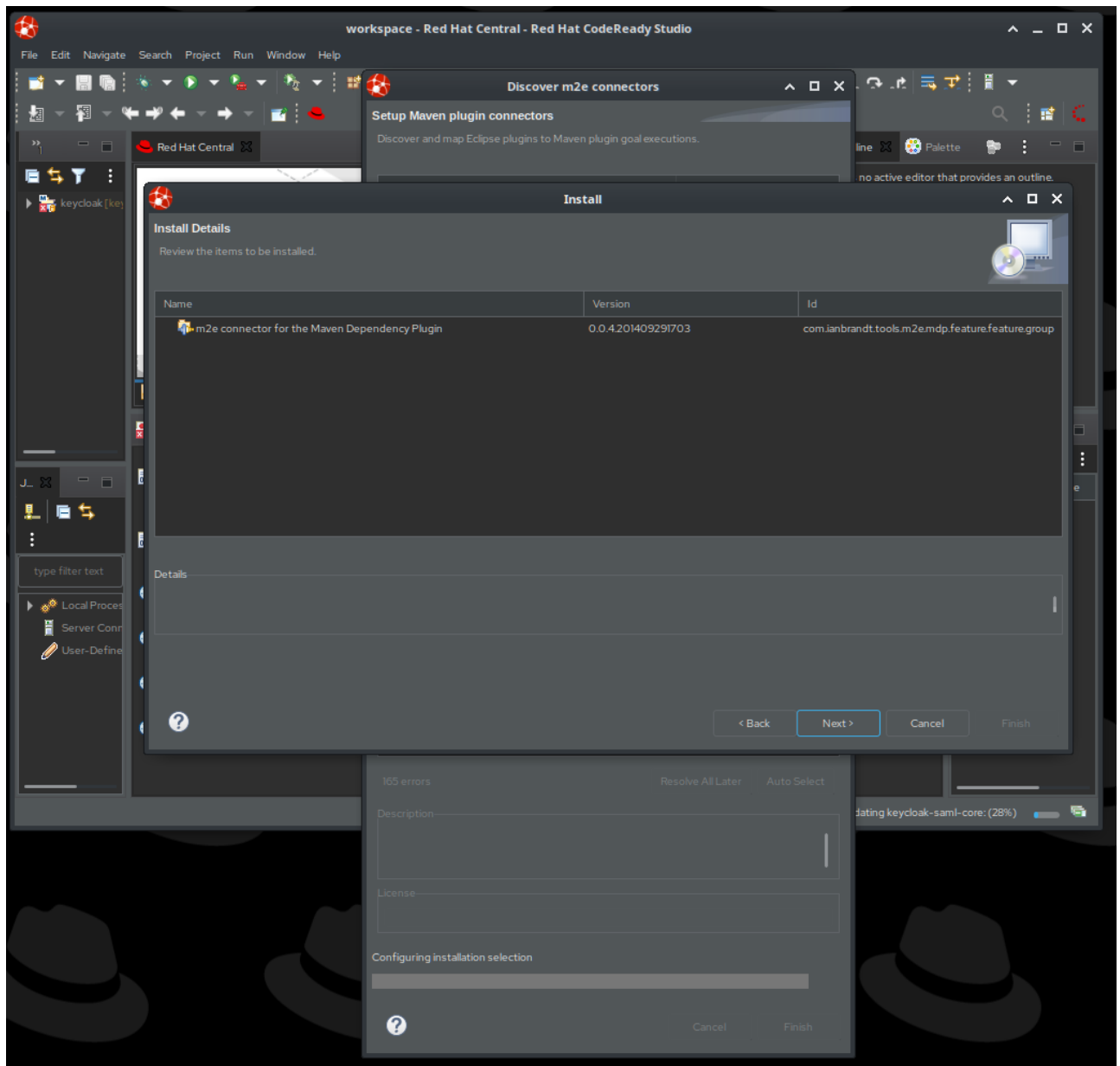
14. You may get a warning about incomplete maven goals but you can click "OK" to proceed.



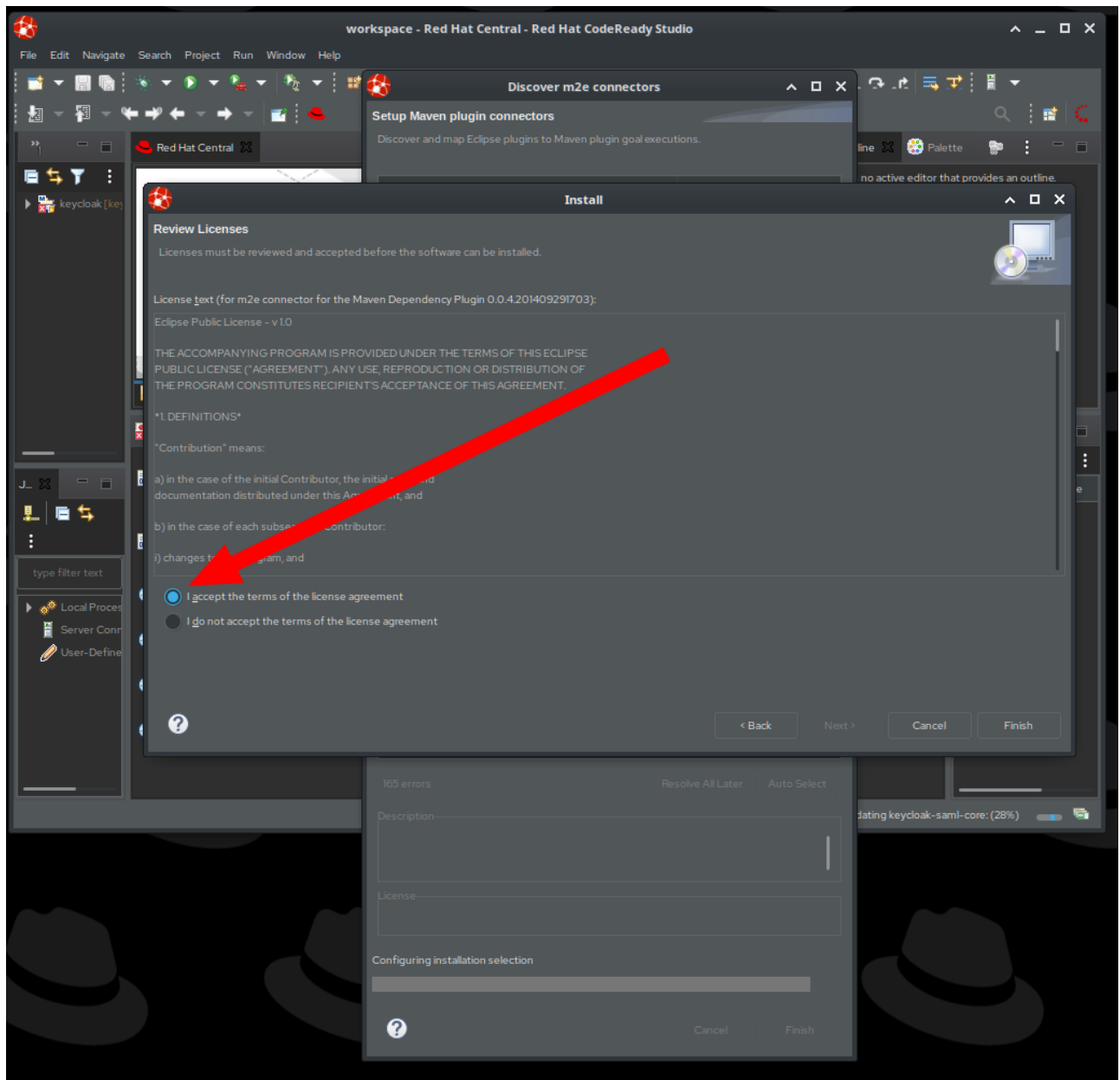
15. You might be prompted to install additional M2E Connectors for Eclipse, click "Next"



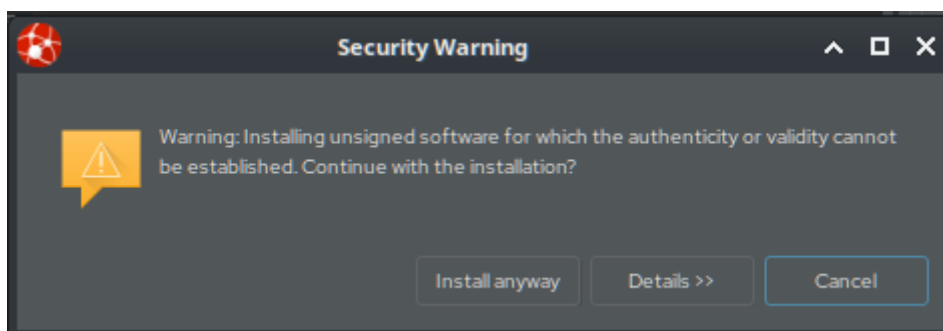
16. You will then be shown the installation details for that M2E plugin. Click "Next"



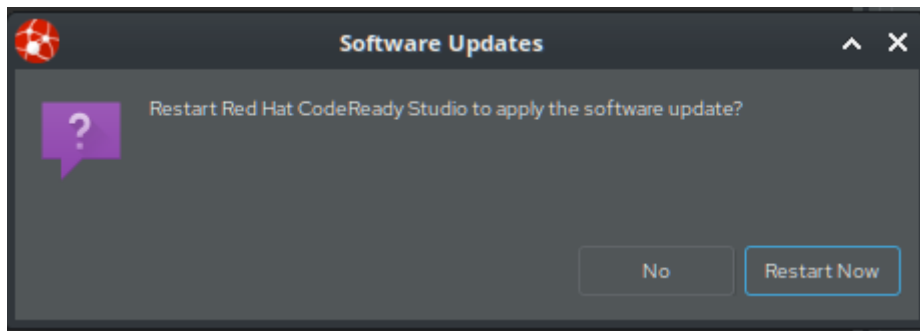
17. Accept the license agreement for the M2E connectors



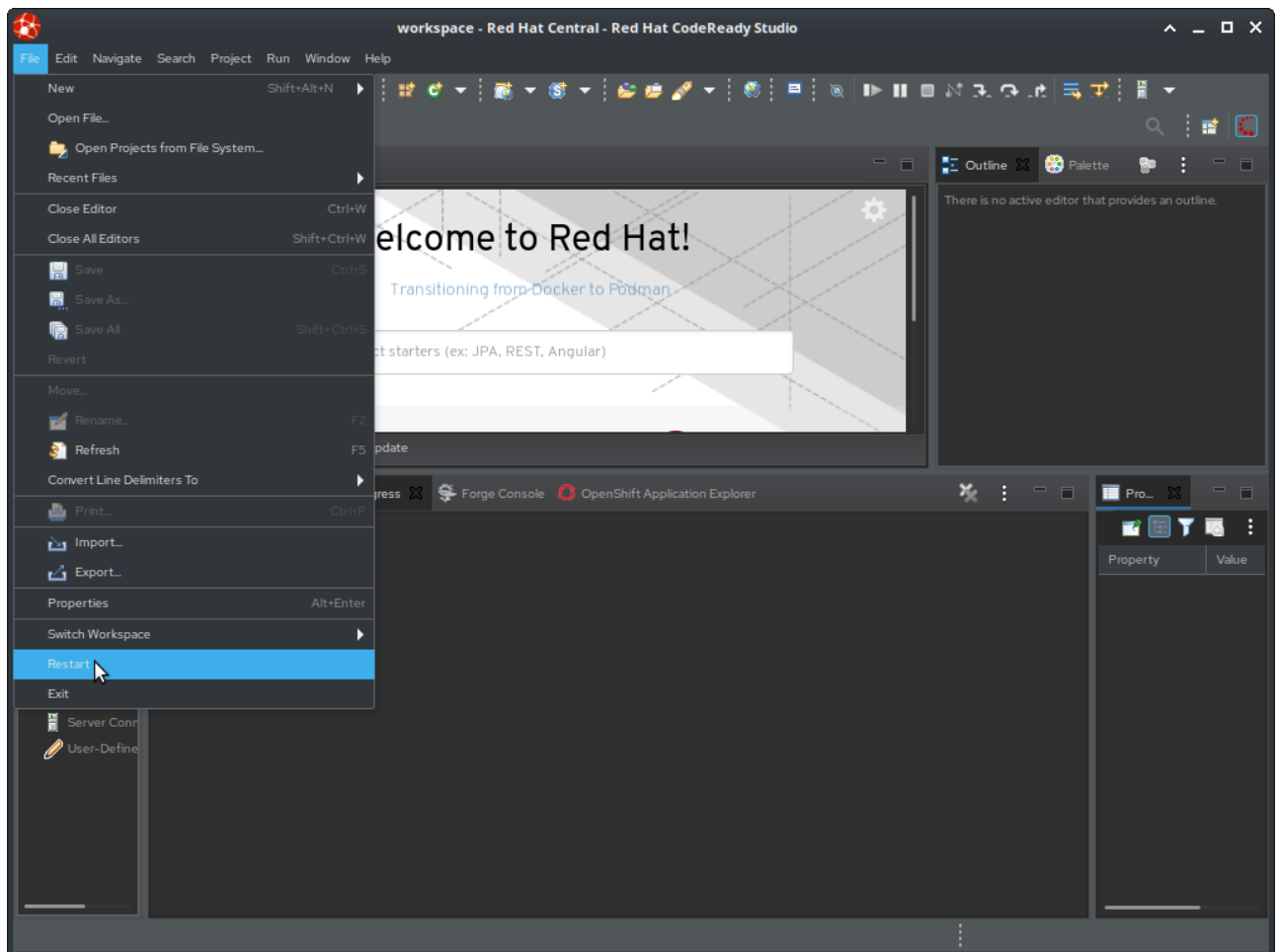
18. You may get a warning about unsigned software for the M2E Connectors, you can ignore it by clicking "Install Anyway"



19. You will be prompted to restart the IDE to apply the new plugins. Click "No" and wait for the remaining background tasks to complete.

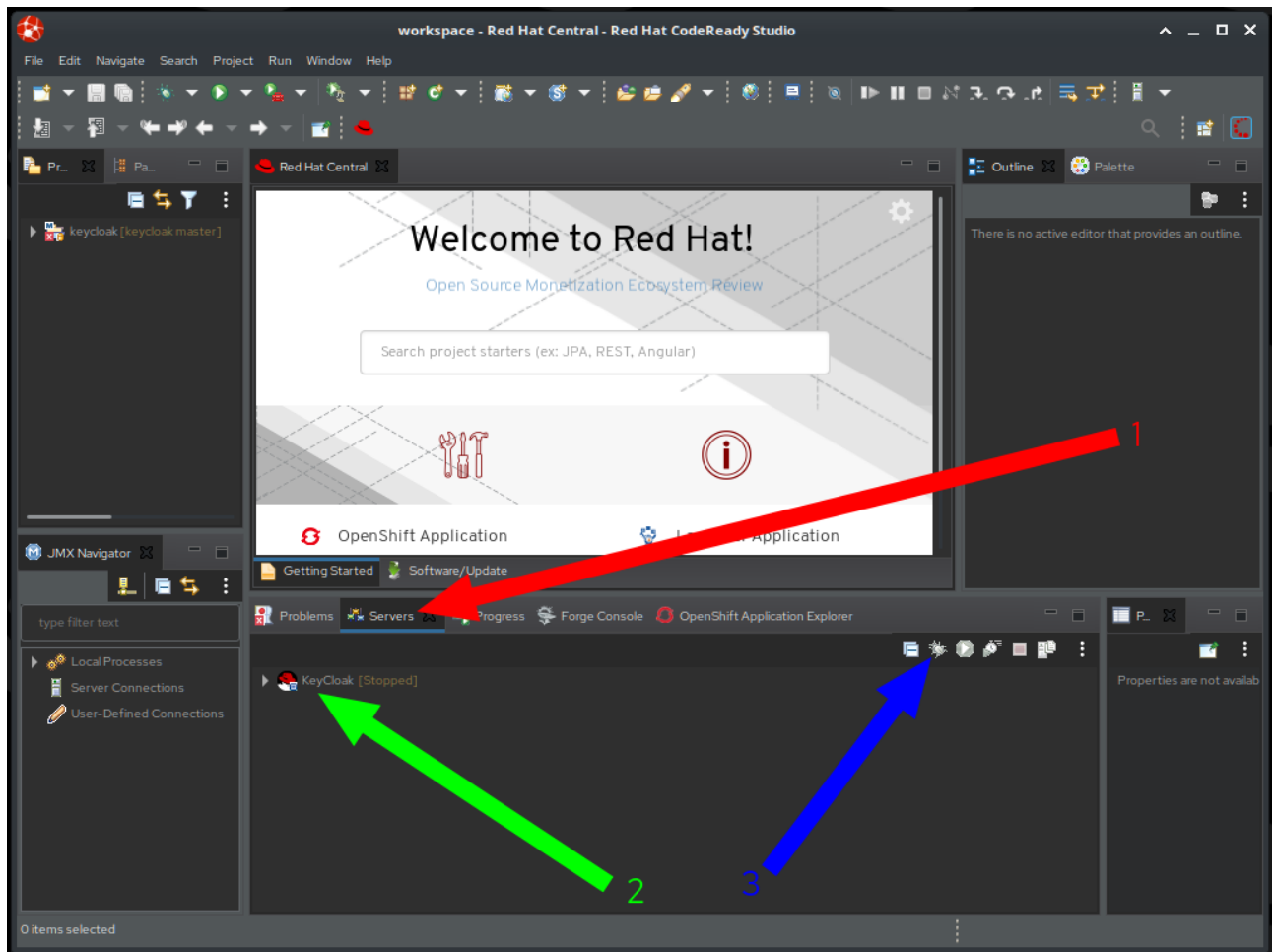


20. Once all of the background tasks have completed, select "File" → "Restart"

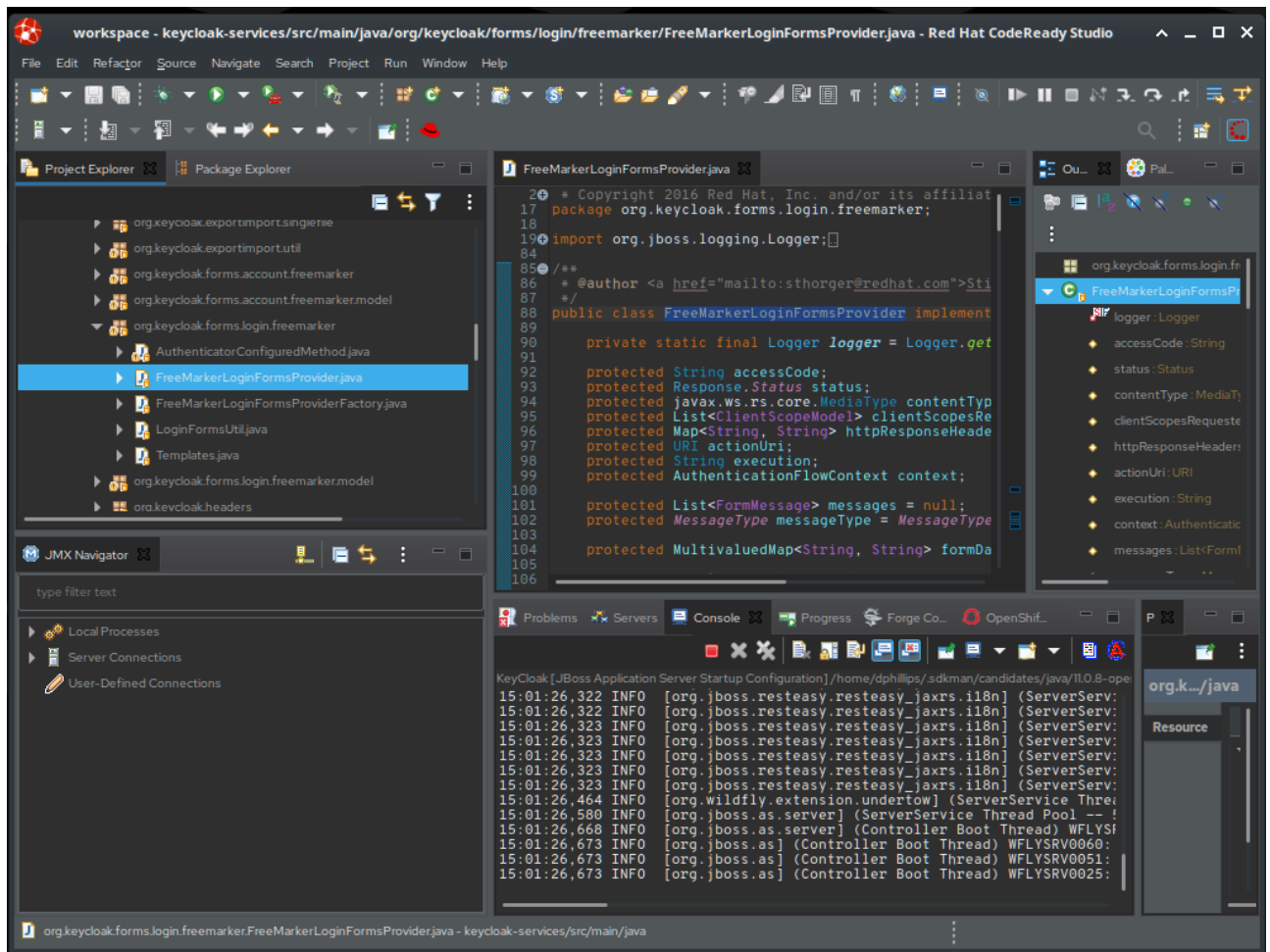


Running The Debugger & Setting Breakpoints

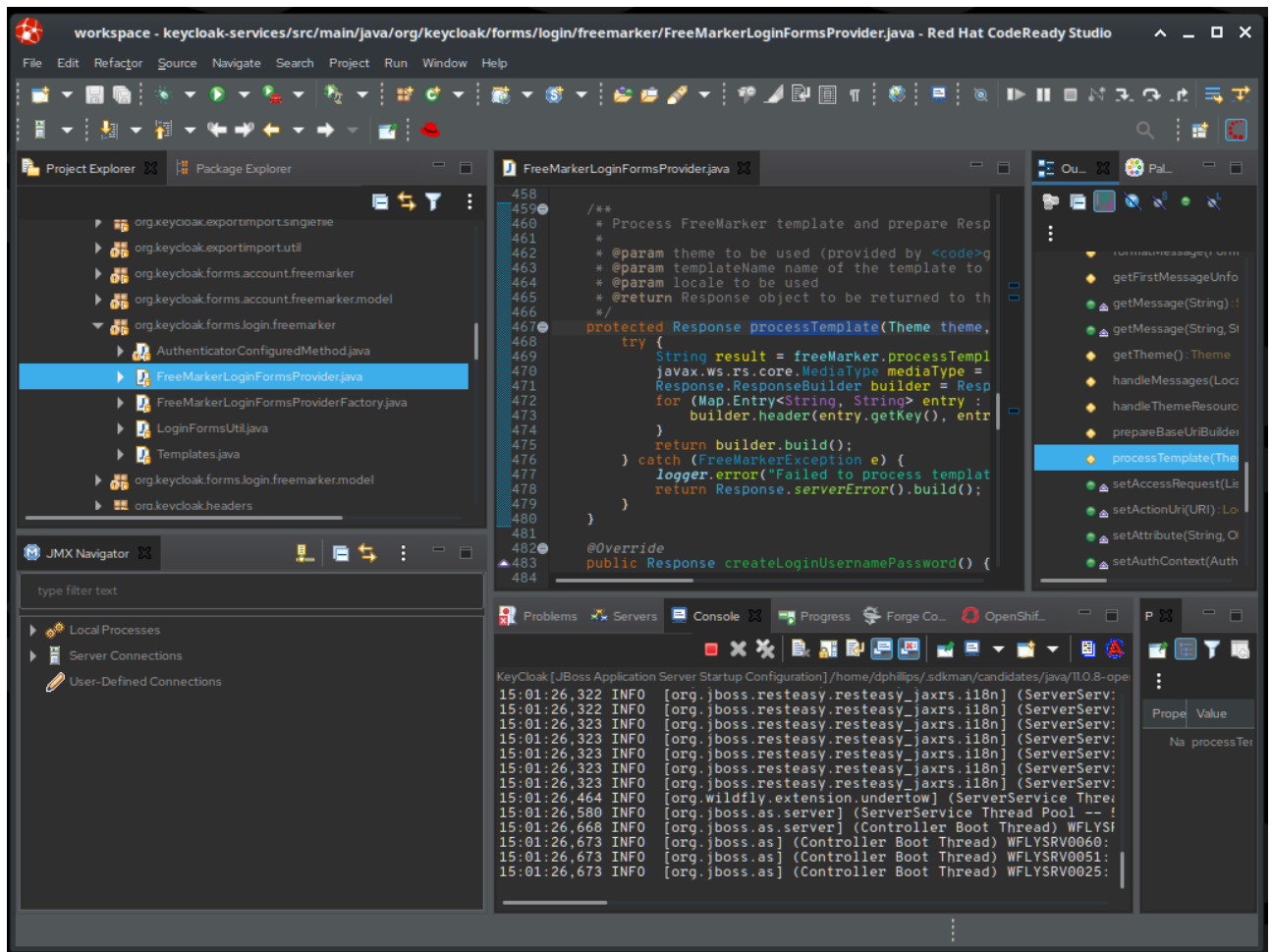
1. Navigate to the "Servers" pane, select "KeyCloak", and then click the "Debug" button



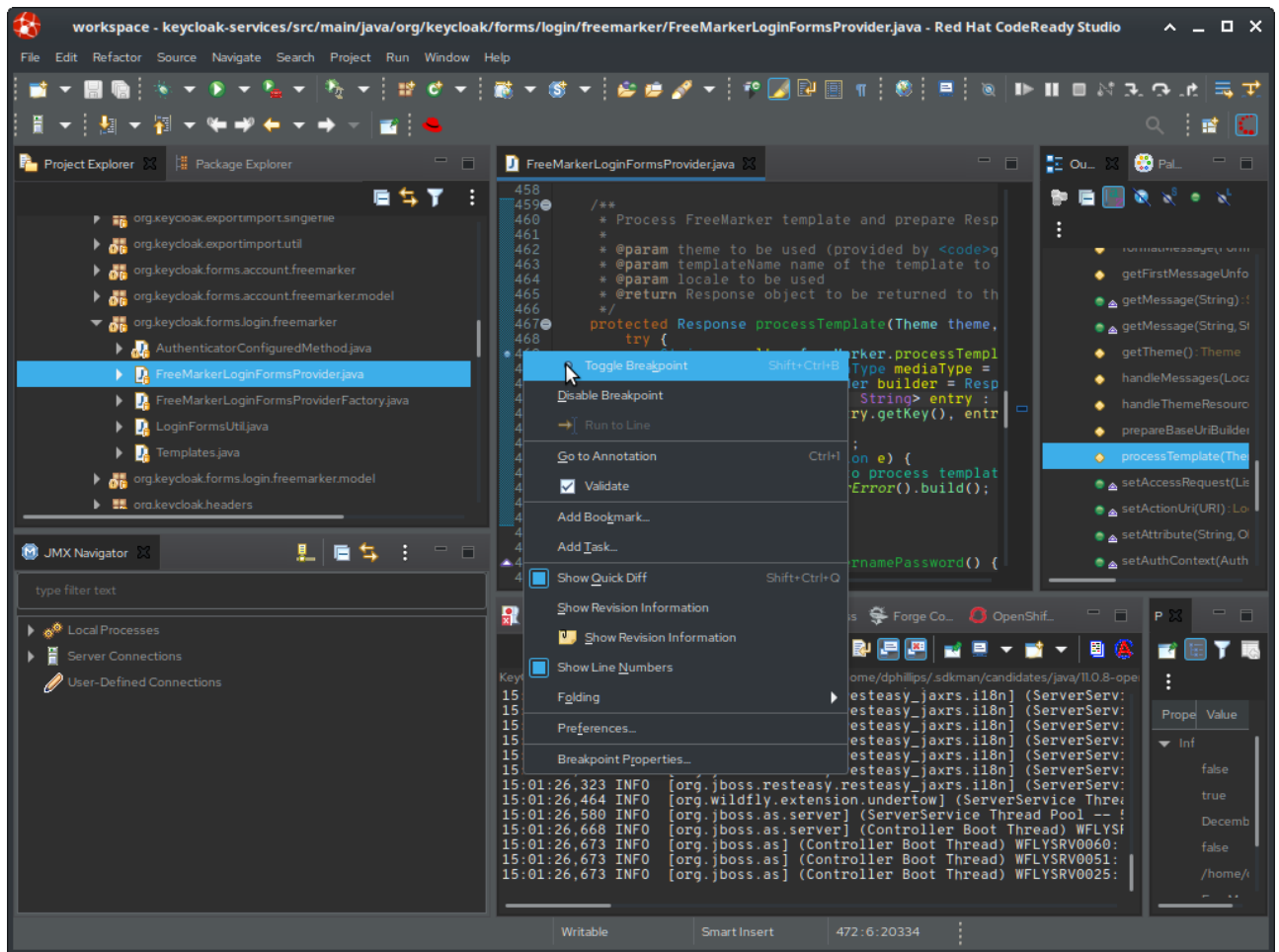
2. Once the KeyCloak server is completely started, navigate in the project explorer to the `keycloak-services` module, to the `org.keycloak.forms.login.freemarker` package, and open the `FreeMarkerLoginFormsProvider` class.



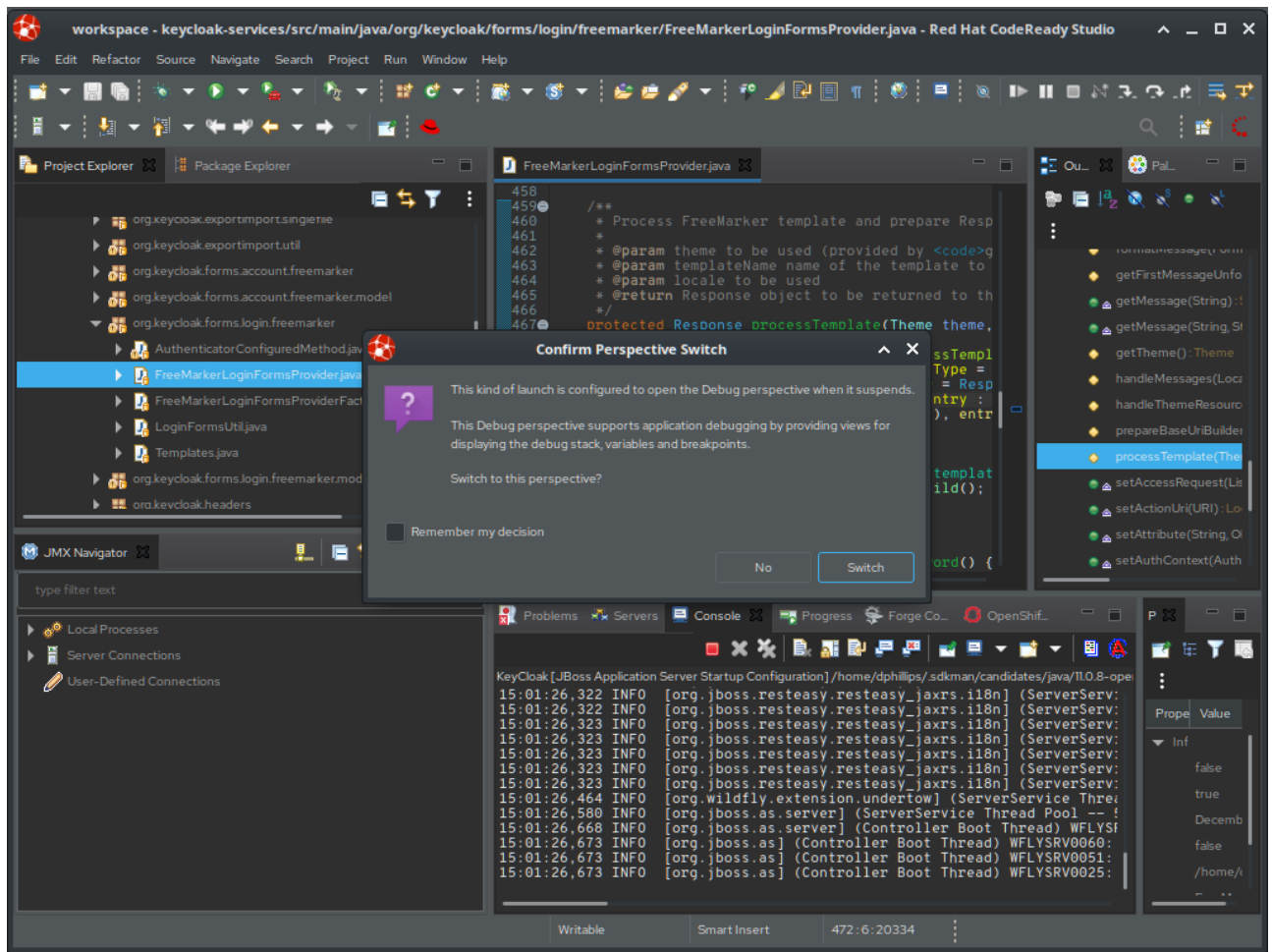
3. Locate the "processTemplate" method



4. Set a breakpoint on the first line inside of the `try/catch` block



5. Open a browser and navigate to the keycloak server at <http://localhost:8080/auth/realms/<realm>/<client>/>, and you should expect to be prompted to switch to the Debugging perspective in your IDE



6. Now you can inspect the `this.attributes` field to see what is being passed to FreeMarker

workspace - Source not found. - Red Hat CodeReady Studio

File Edit Navigate Search Project Run Window Help

FreeMarkerLoginFormsProvider.ja... FreeMarkerLoginFormsProvider.p...

Source not found.

Edit Source Lookup Path...

Name	Value
loadFactor	0.75
modCount	14
size	14
table	HashMap\$Node<KV
[0]	HashMap\$Node<KV
[1]	HashMap\$Node<KV
[2]	null
[3]	null
[4]	null
[5]	HashMap\$Node<KV
[6]	null

<Choose a previously entered expression>

msg=org.keycloak.theme.beans.Messag

Console Problems Debug Shell

KeyCloak [JBoss Application Server Startup Configuration] /home/dphillips/sdkman/candidates/java/11.0.8-open/bin/java (Dec 15, 2020, 3:01:02 PM)

```

15:01:26,322 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,322 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,323 INFO [org.jboss.resteasy.resteasy_jaxrs.i18n] (ServerService Thread Pool -- 67) RESTEASY002
15:01:26,464 INFO [org.wildfly.extensionundertow] (ServerService Thread Pool -- 67) WFLYVIRT0021: Register
  
```

1:7