Building Guacamole-client with remote debugging

Here we illustrate the steps necessary for building a custom guacamole-client docker container with maven with remote debugging enabled. This will allow us to use eclipse to remotely set breakpoints in the code and diagnois issues in the code.

Step 1: Download Apache Guacamole-Client

```
$ mkdir -p ~/FA19-GUAC/eclipse-build
$ cd ~/FA19-GUAC/eclipse-build
$ git clone https://github.com/apache/guacamole-client
```

Step 2: Modify Guacamole-Client for remote debugging

Here we'll modify the Apache Guacamole-client tomcat servlet to support remote debugging.

2a. Add remote debugging to tomcat servlet

```
$ cd ~/FA19-GUAC/eclipse-build
$ vi guacamole-client/guacamole-docker/bin/start.sh
```

```
583 start_guacamole() {
584
585     # Install webapp
586     rm -Rf /usr/local/tomcat/webapps/${WEBAPP_CONTEXT:-guacamole}
587     ln -sf /opt/guacamole/guacamole.war
/usr/local/tomcat/webapps/${WEBAPP_CONTEXT:-guacamole}.war
588
589     # Start tomcat
590     cd /usr/local/tomcat
591     exec catalina.sh run
592
593 }
```

Change the exec line to:

```
    exec env JPDA_ADDRESS=0.0.0.0:8000 catalina.sh jpda run
```

This will allow set an env variable to allow any ip address to connect on port 8000 and enable jpda remote debugging.

```
start_guacamole() {

    # Install webapp
    rm -Rf /usr/local/tomcat/webapps/${WEBAPP_CONTEXT:-guacamole}
    ln -sf /opt/guacamole/guacamole.war
/usr/local/tomcat/webapps/${WEBAPP_CONTEXT:-guacamole}.war

    # Start tomcat
    cd /usr/local/tomcat
    #exec catalina.sh run
    exec env JPDA_ADDRESS=0.0.0.0:8000 catalina.sh jpda run

}
```

2b. Modify the Dockerfile

Here will expose port 8000 on the remote machine to the docker containers port 8000.

```
$ cd ~/FA19-GUAC/eclipse-build/guacamole-client
$ vi Dockerfile
```

Under line 60:

```
59 # Start Guacamole under Tomcat, listening on 0.0.0.0:8080
60 EXPOSE 8080
```

Add:

```
EXPOSE 8000
```

Step 3: Build Guacamole-client docker container

```
$ cd ~/FA19-GUAC/eclipse-build/guacamole-client
$ sudo docker build -t mbarkdoll-fa19/guacamole-client .
```

Step 4: Build Guacamole-client with maven

Make sure you machine has maven and a version of java jdk available.

```
$ apt-get install maven
$ apt-get install openjdk-8-jdk
```

See: https://openjdk.java.net/install/

```
$ cd ~/FA19-GUAC/eclipse-build/guacamole-client
$ mvn package
```

Step 5: Launch the guacamole-client container

Note this requires that you've previously started a guacd and mysql instance.

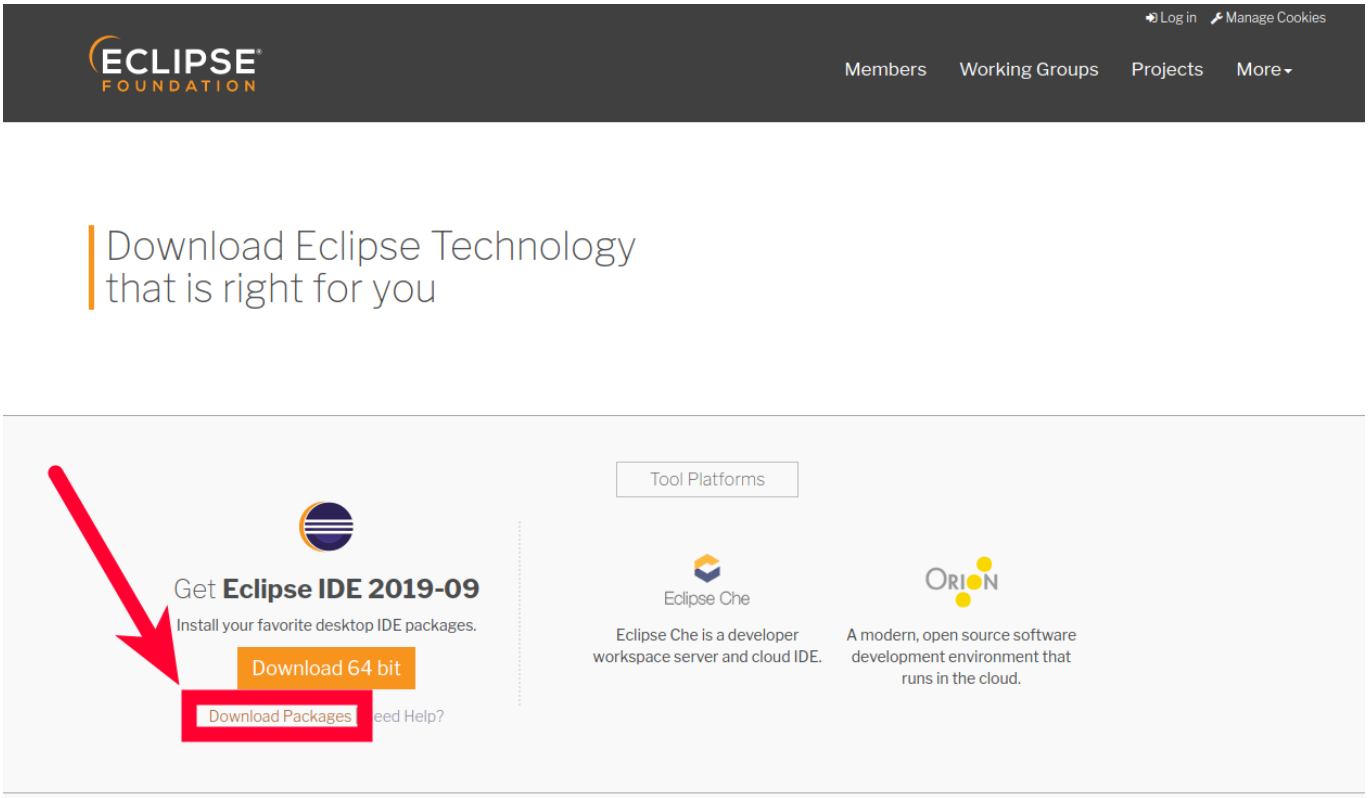
```
$ sudo docker run --name some-guacamole --link some-guacd:guacd --link
some-mysql:mysql -e MYSQL_DATABASE=guacamole_db -e MYSQL_USER=root -e
MYSQL_PASSWORD=secret -e MYSQL_HOSTNAME=some_mysql -e MYSQL_PORT=3306 -v
/home/cisadmin/guacamole/test:/home/admin/guacamole/test -p 8080:8080 -p
8000:8000 mbarkdoll-fa19/guacamole-client
```

Opening src apache/guacamole-client inside eclipse

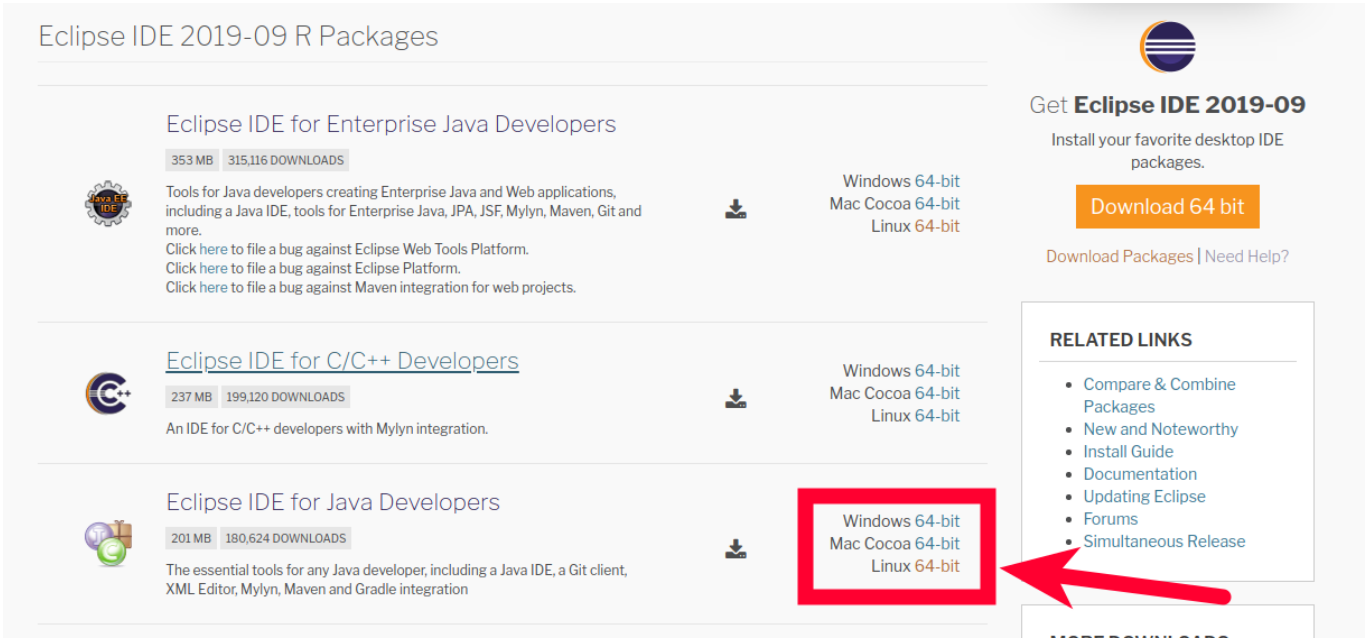
Step 1: Download Eclipse

https://www.eclipse.org/downloads/

Select Download Packages



Recommending "Eclipse IDE for Java Developers" since it supports Java and Maven.



Step 2: Extract Eclipse

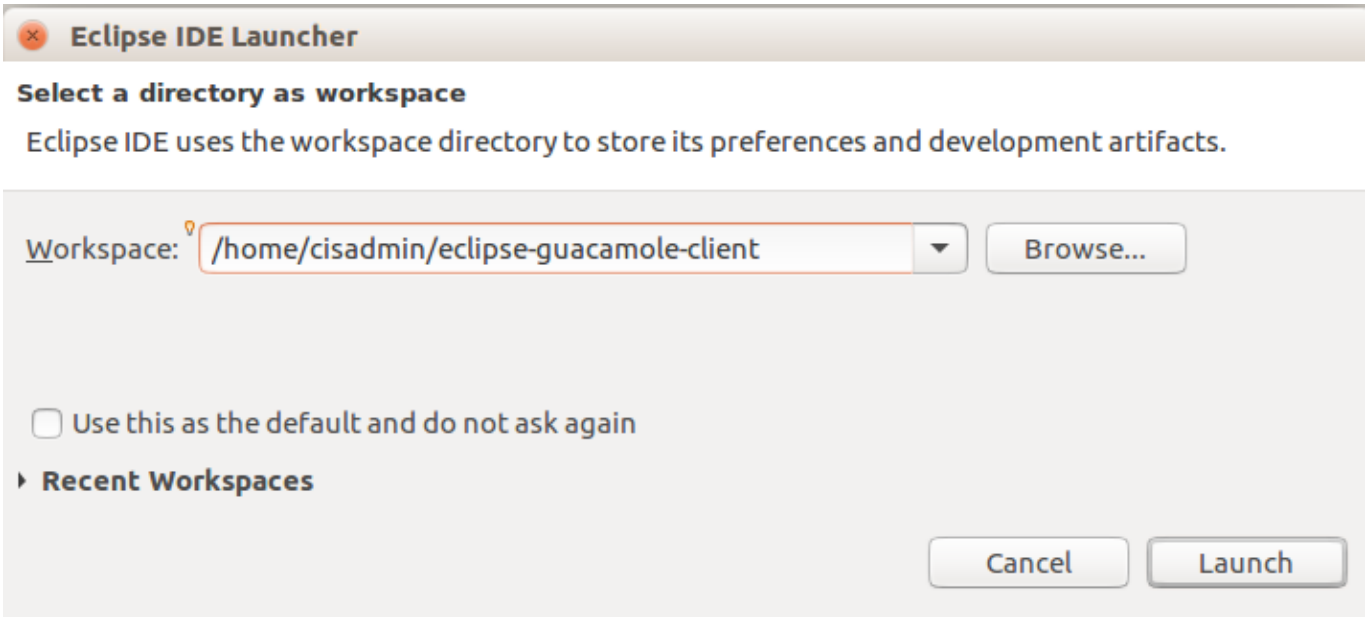
```
$ cd ~/Downloads
$ tar -xzvf eclipse-java-2019-09-R-linux-gtk-x86_64.tar.gz
```

Step 3: Launch Eclipse

```
$ cd ~/Downloads/eclipse
$ ./eclipse
```

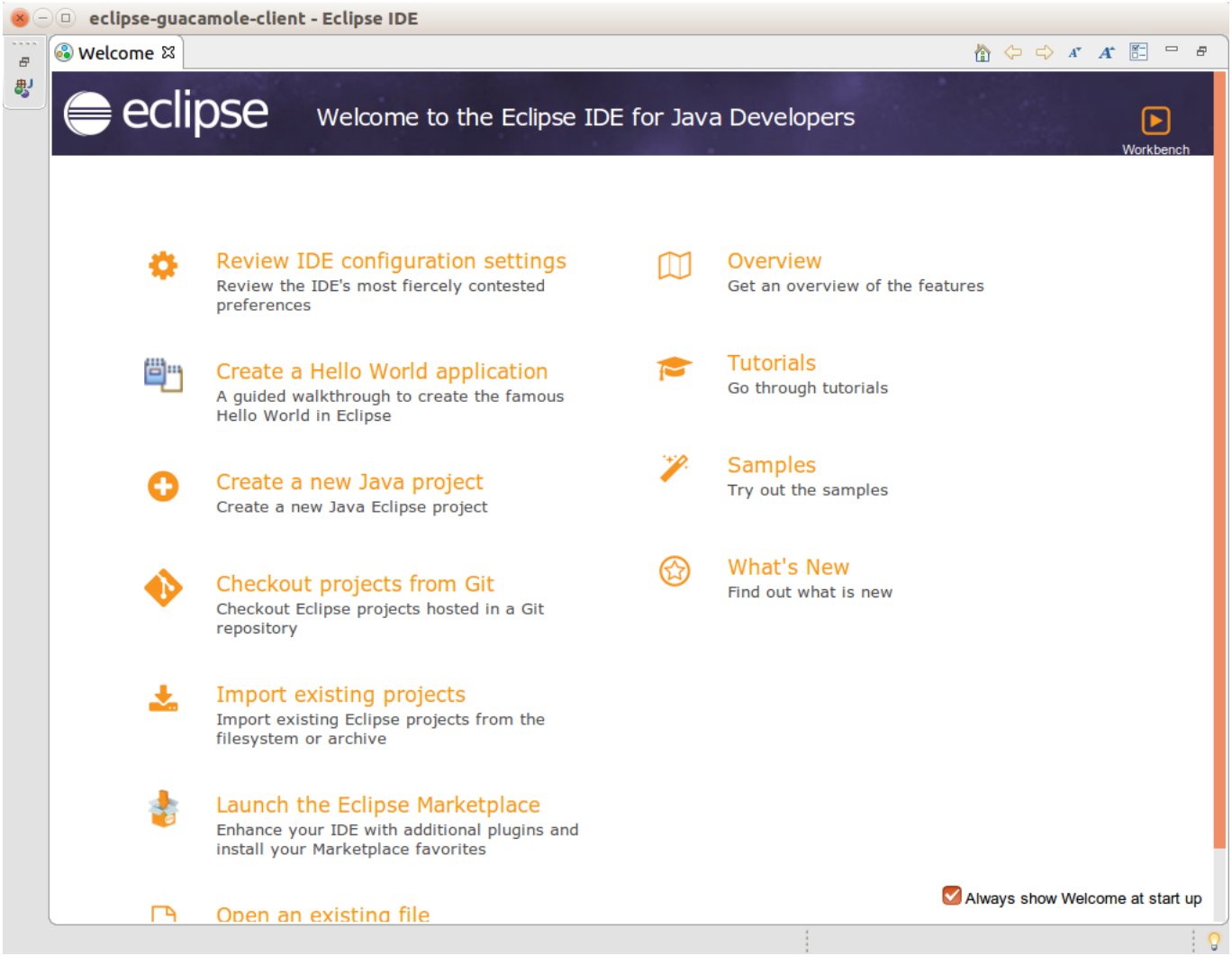
Step 4: Create a Workspace

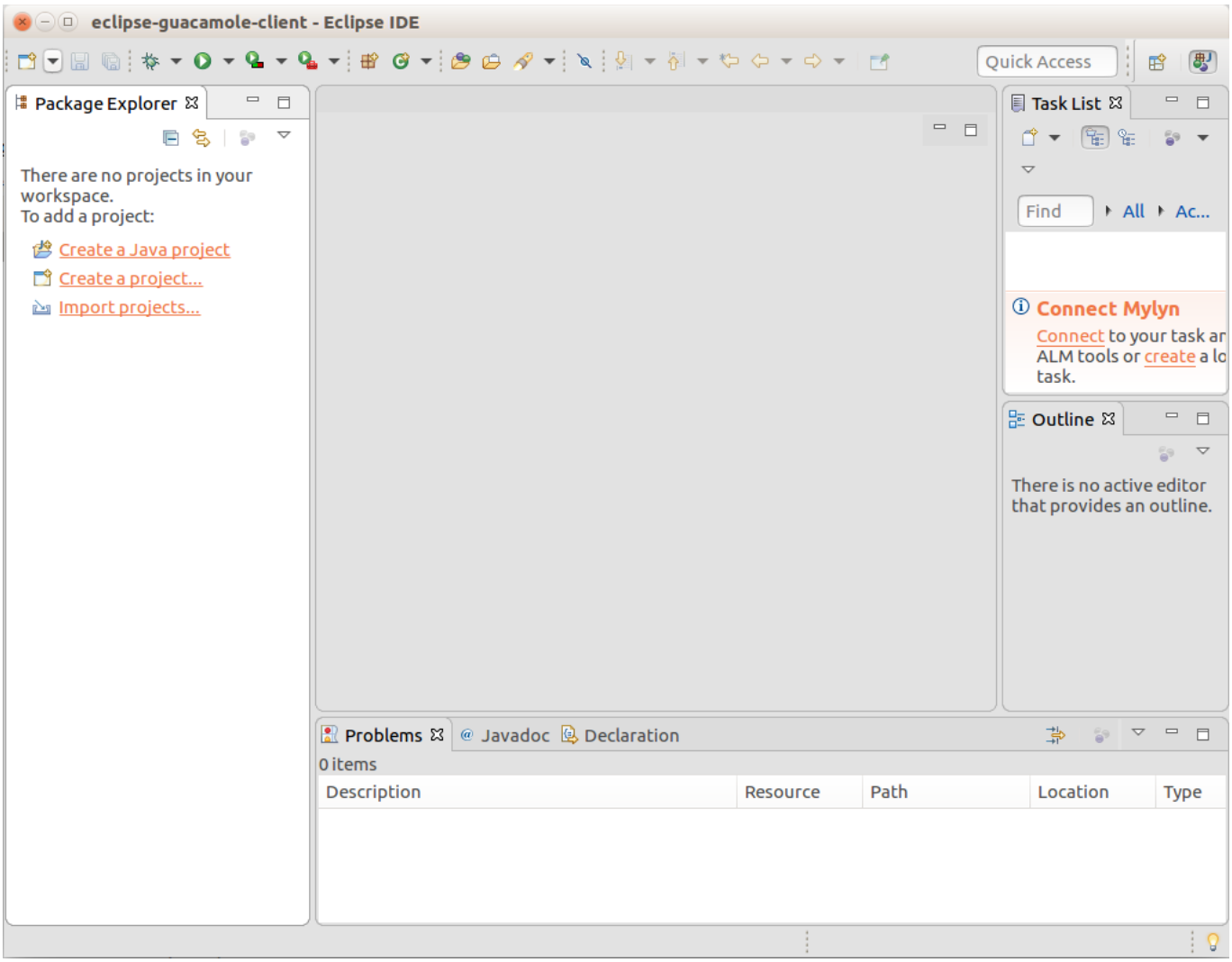
We'll use: /home/cisadmin/eclipse-guacamole-client



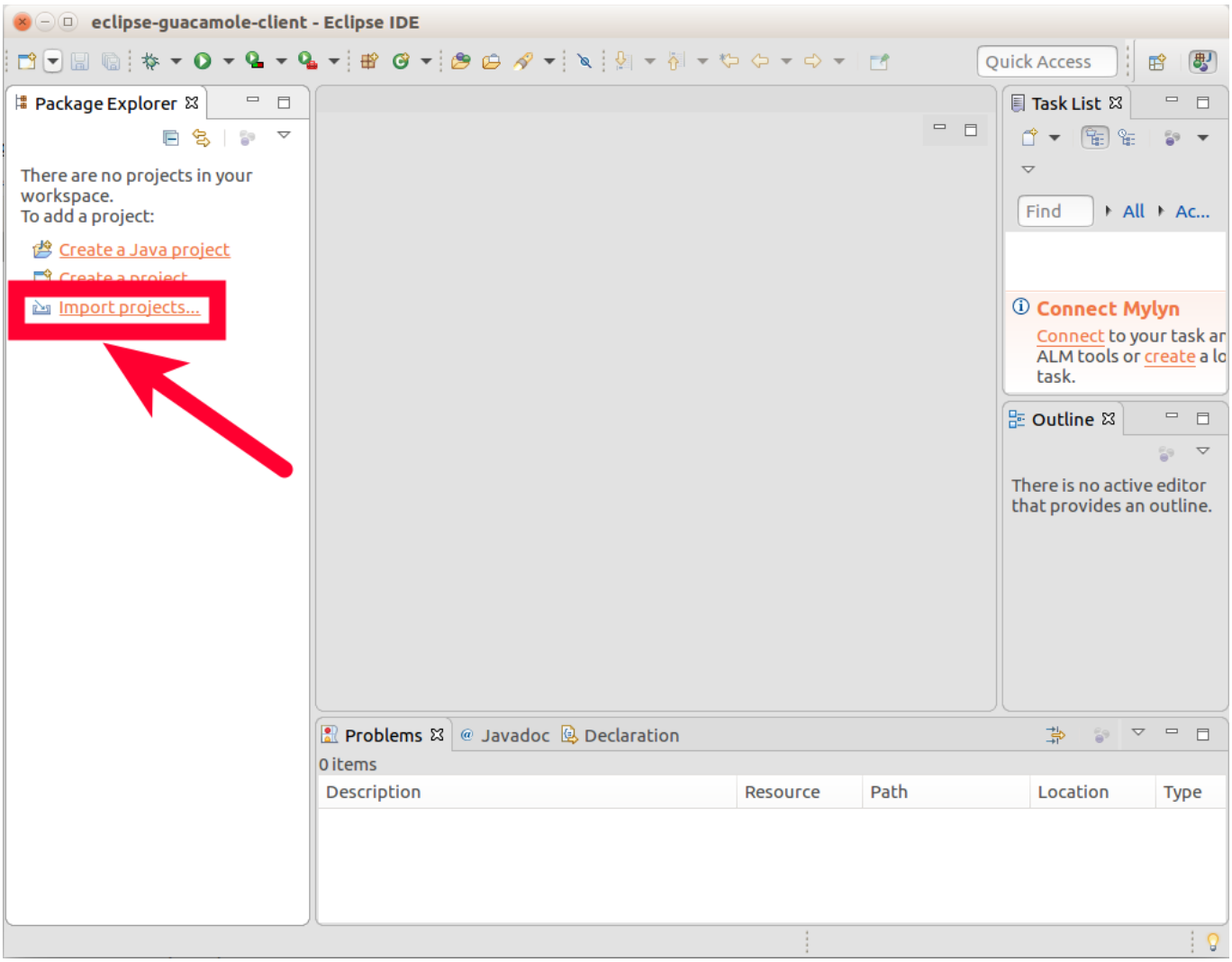
Click Launch

Step 5: Import a maven project

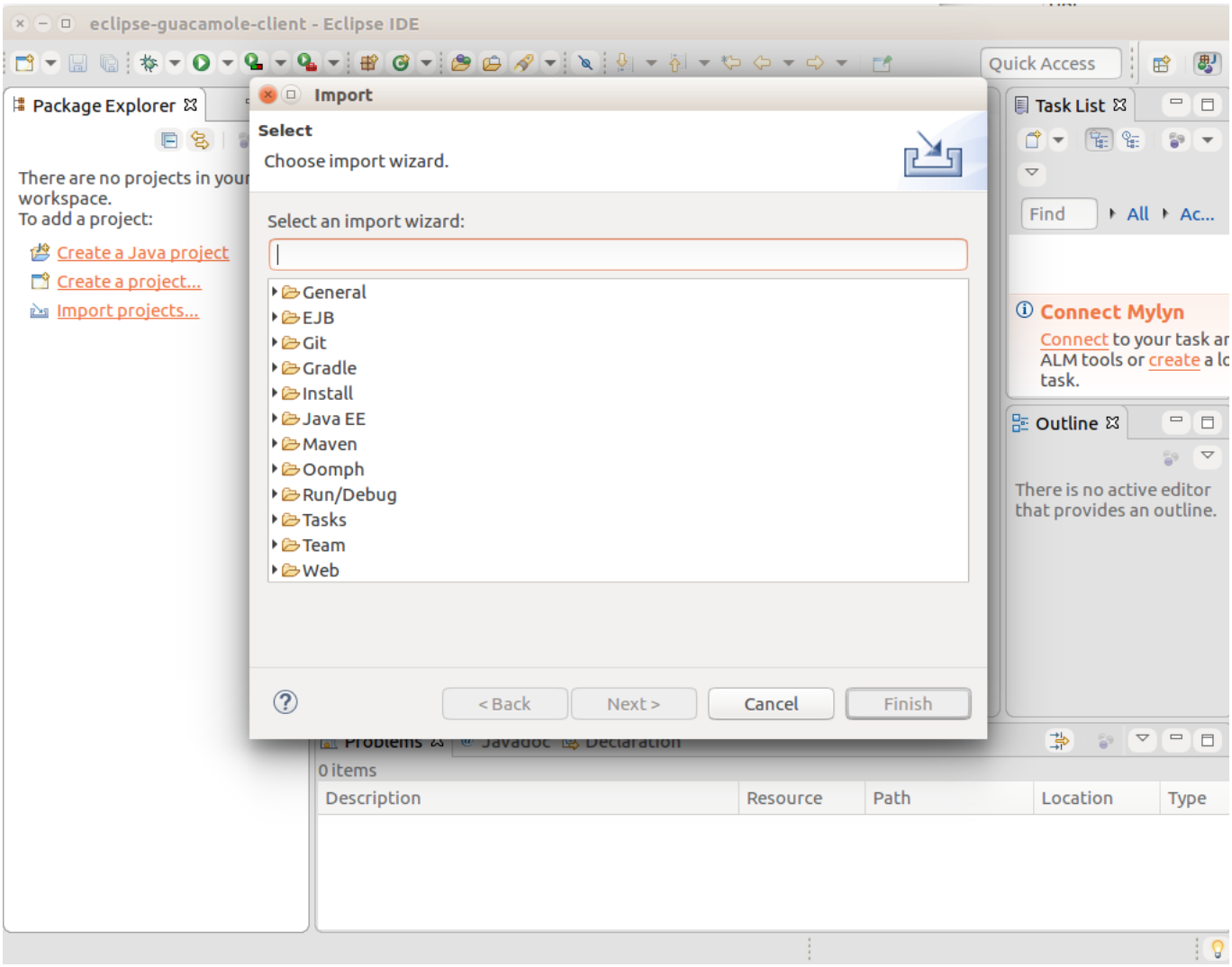

eclipse-guacamole-client - Eclipse IDE
Welcome
eclipse
Welcome to the Eclipse IDE for Java Developers
Workbench
Review IDE configuration settings
Review the IDE's most fiercely contested preferences
Create a Hello World application
A guided walkthrough to create the famous Hello World in Eclipse
Create a new Java project
Create a new Java Eclipse project
Checkout projects from Git
Checkout Eclipse projects hosted in a Git repository
Import existing projects
Import existing Eclipse projects from the filesystem or archive
Launch the Eclipse Marketplace
Enhance your IDE with additional plugins and install your Marketplace favorites
Open an existing file
Overview
Get an overview of the features
Tutorials
Go through tutorials
Samples
Try out the samples
What's New
Find out what is new
Always show Welcome at start up



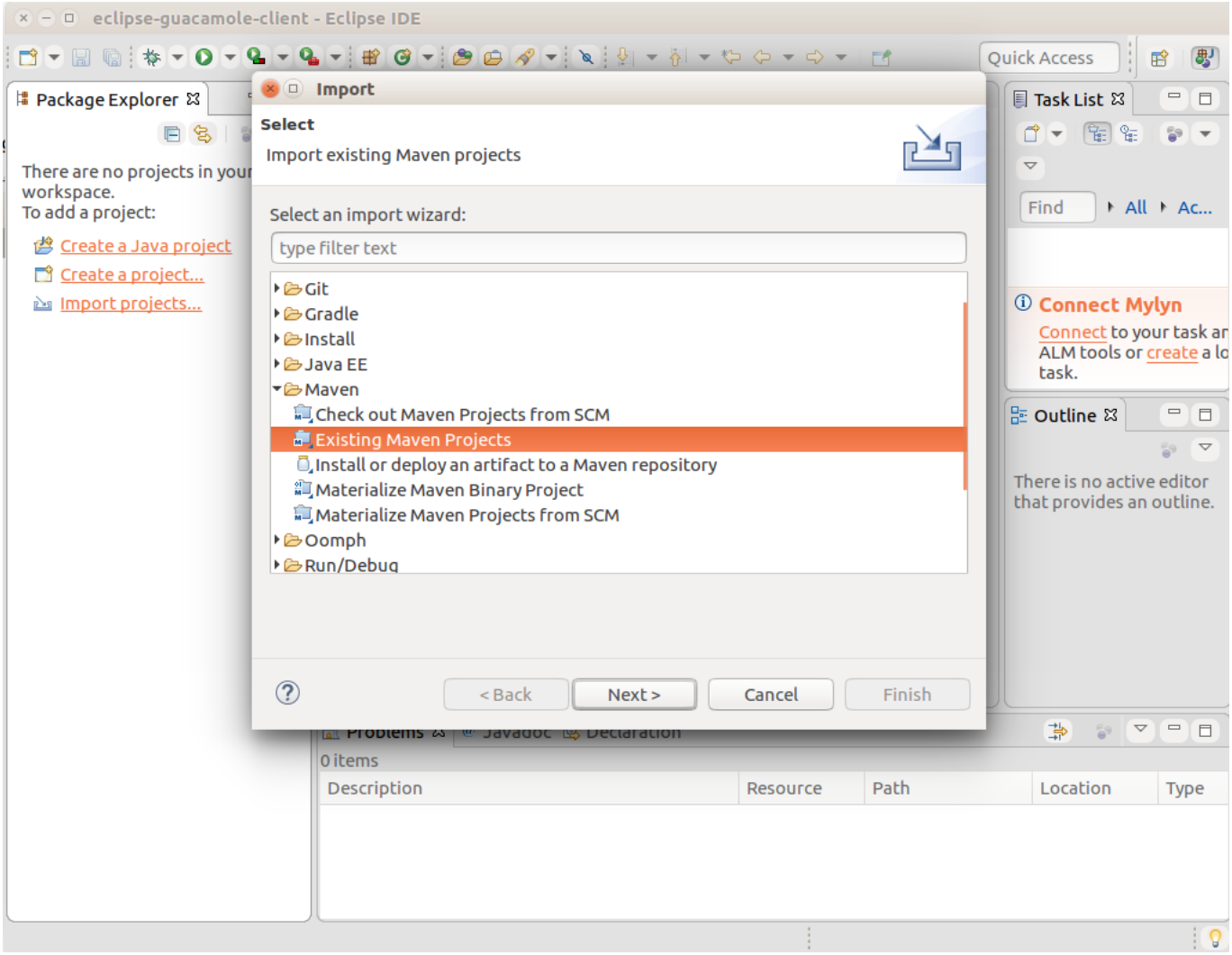
Select File -> Import or Select Import projects...


eclipse-guacamole-client - Eclipse IDE
Quick Access
Package Explorer
There are no projects in your workspace.
To add a project:
Create a Java project
Import projects...
Task List
Find
All
Ac...
Connect Mylyn
Connect to your task ar
ALM tools or create a lo
task.
Outline
There is no active editor that provides an outline.
Problems
Javadoc
Declaration
0 items
Description
Resource
Path
Location
Type

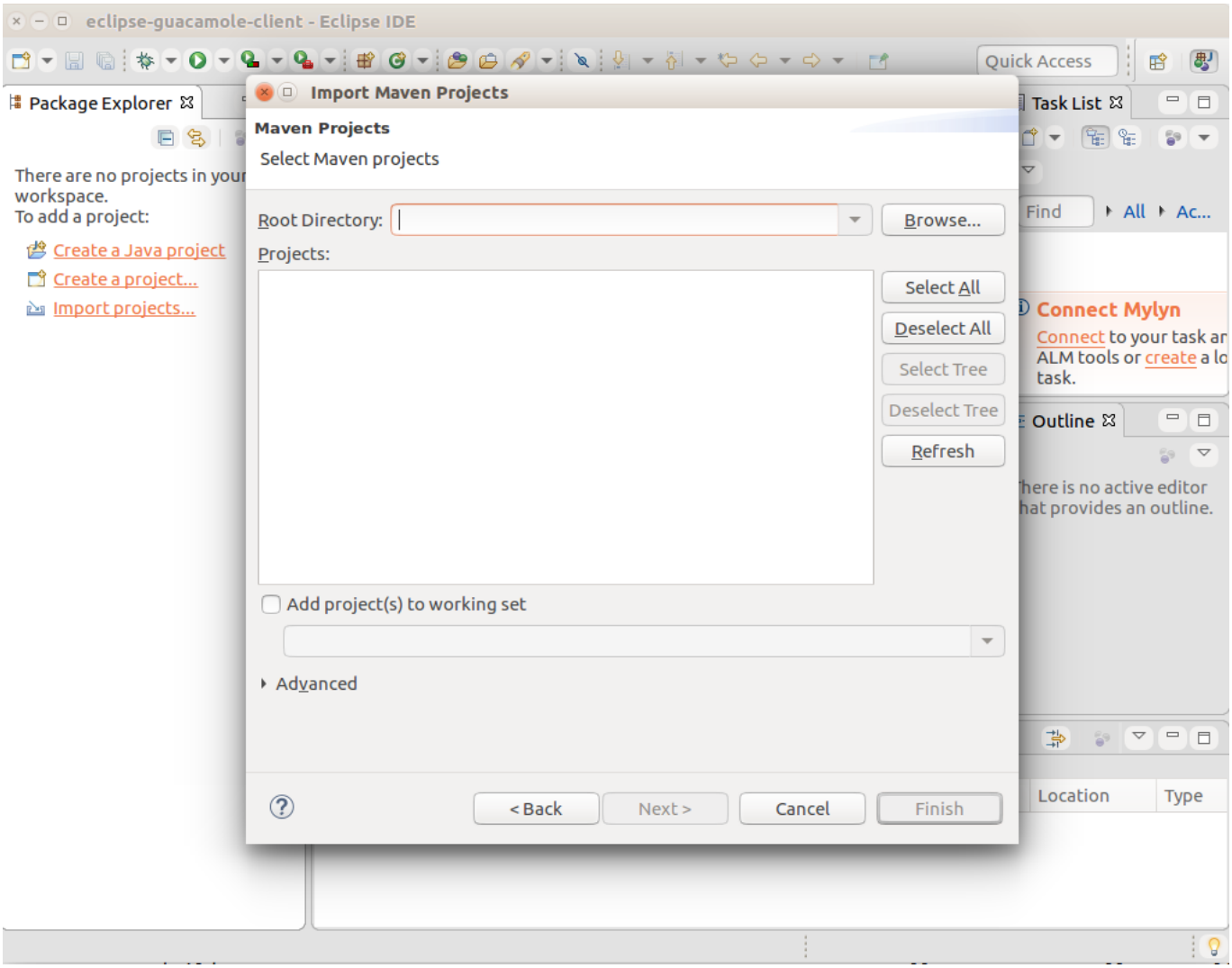
Double click Maven



Select Existing Maven Projects Click Next

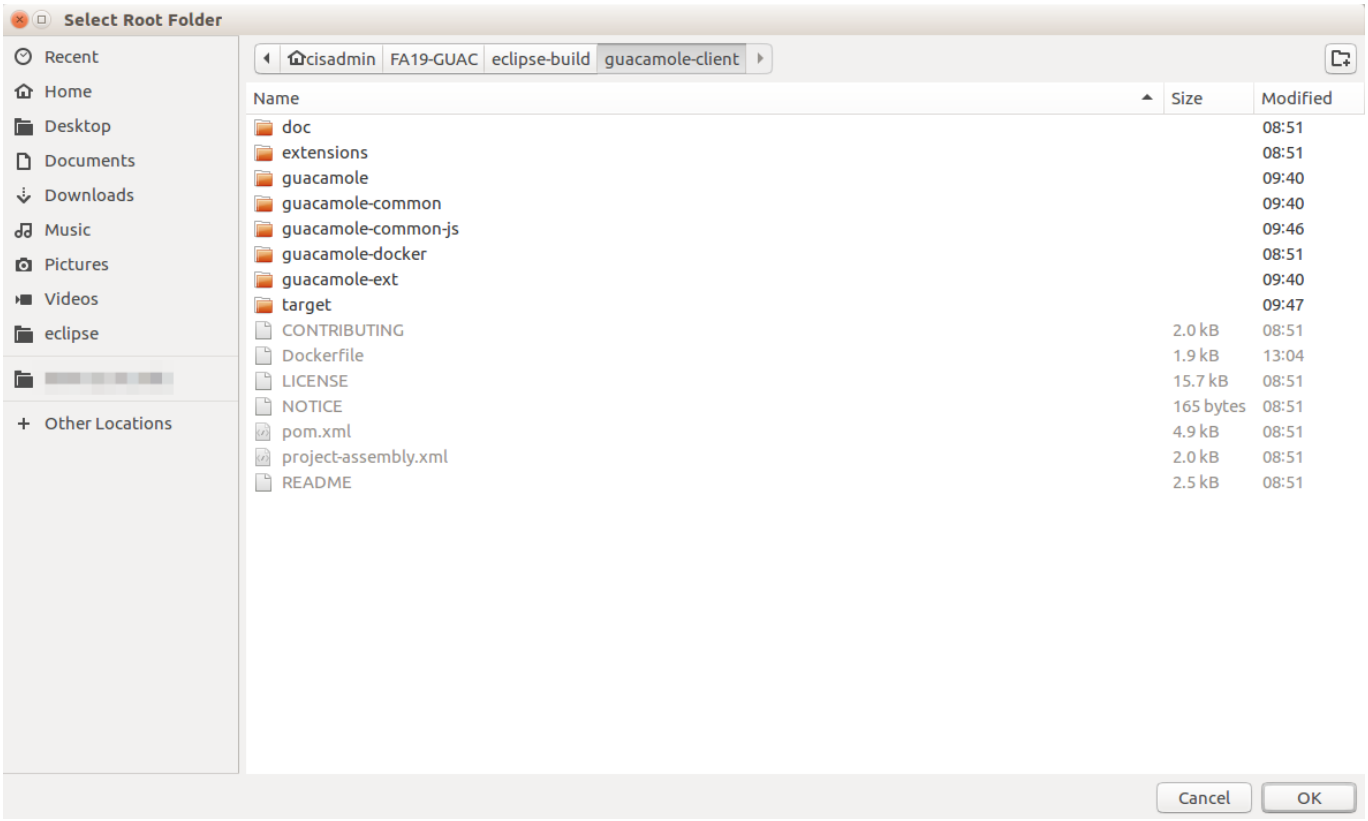

eclipse-guacamole-client - Eclipse IDE
Quick Access
Package Explorer
There are no projects in your workspace.
To add a project:
Create a Java project
Create a project...
Import projects...
Import
Select
Import existing Maven projects
Select an import wizard:
type filter text
Git
Gradle
Install
Java EE
Maven
Check out Maven Projects from SCM
Existing Maven Projects
Install or deploy an artifact to a Maven repository
Materialize Maven Binary Project
Materialize Maven Projects from SCM
Oomph
Run/Debug
< Back
Next >
Cancel
Finish
Task List
Find
All
Ac...
Connect Mylyn
Connect to your task ar
ALM tools or create a lo
task.
Outline
There is no active editor that provides an outline.
Problems
Javadoc
Declaration
0 items
Description
Resource
Path
Location
Type

Click Browse

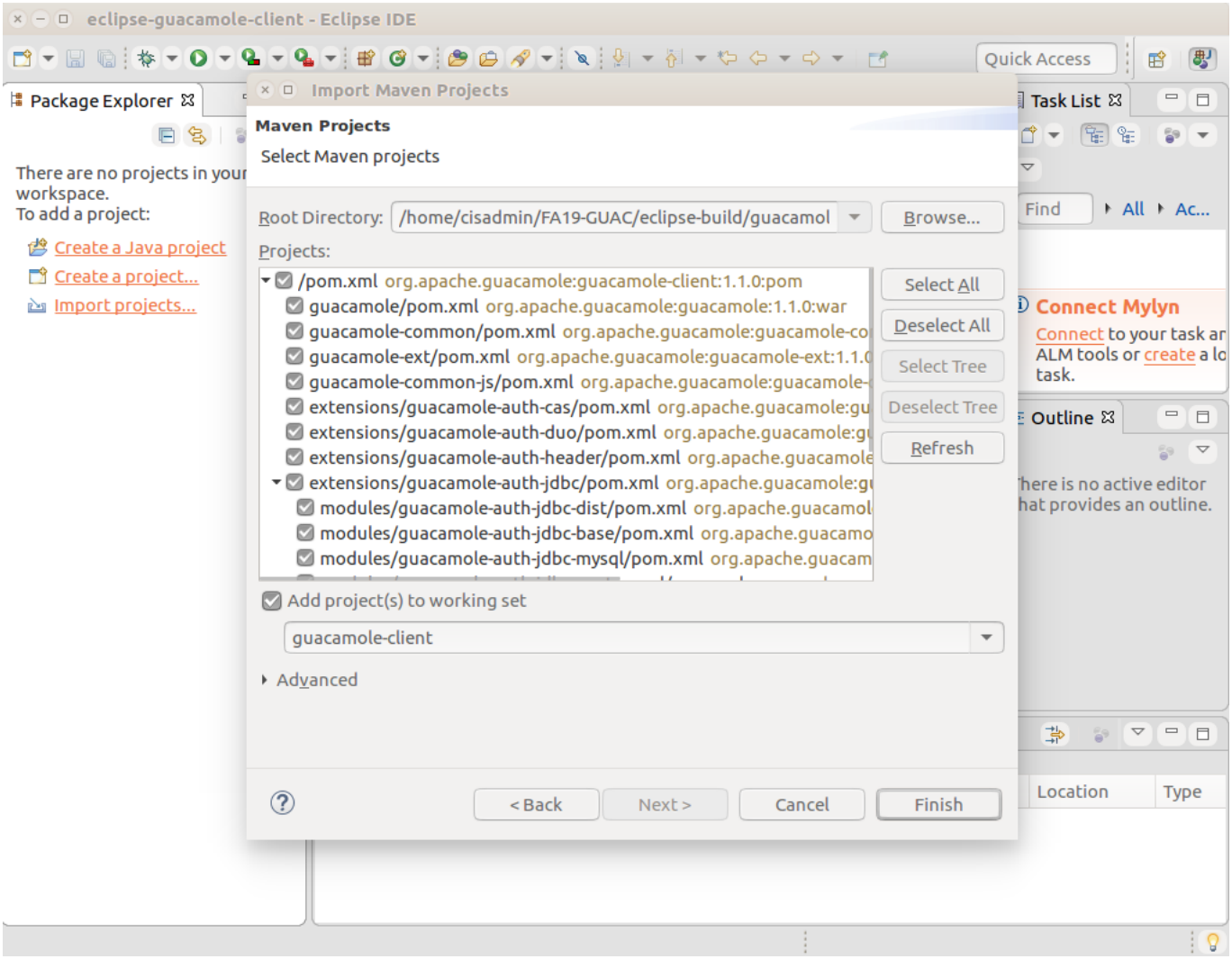


Navigate to: ~/FA19-GUAC/eclipse-build/guacamole-client

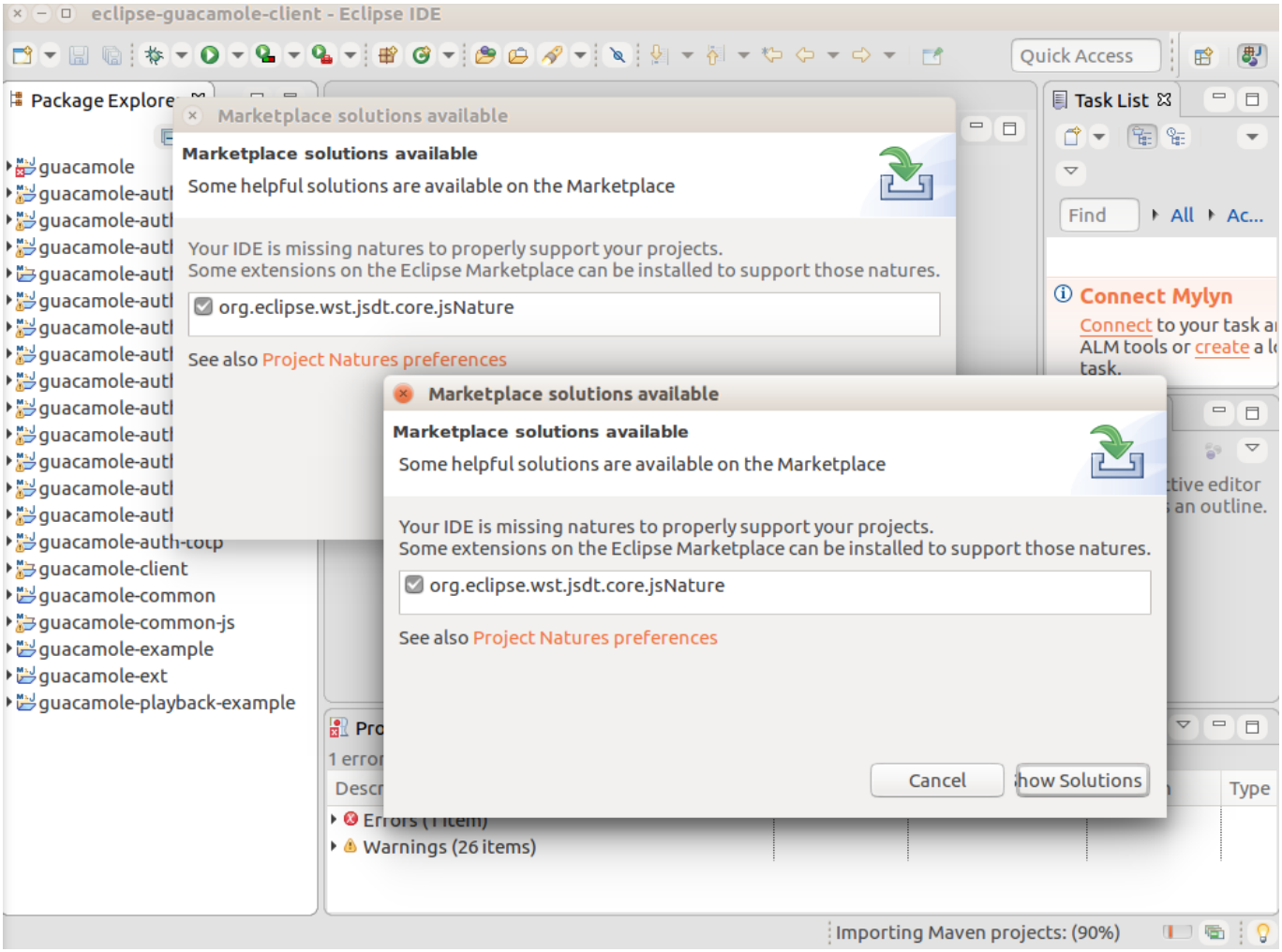
Click Ok



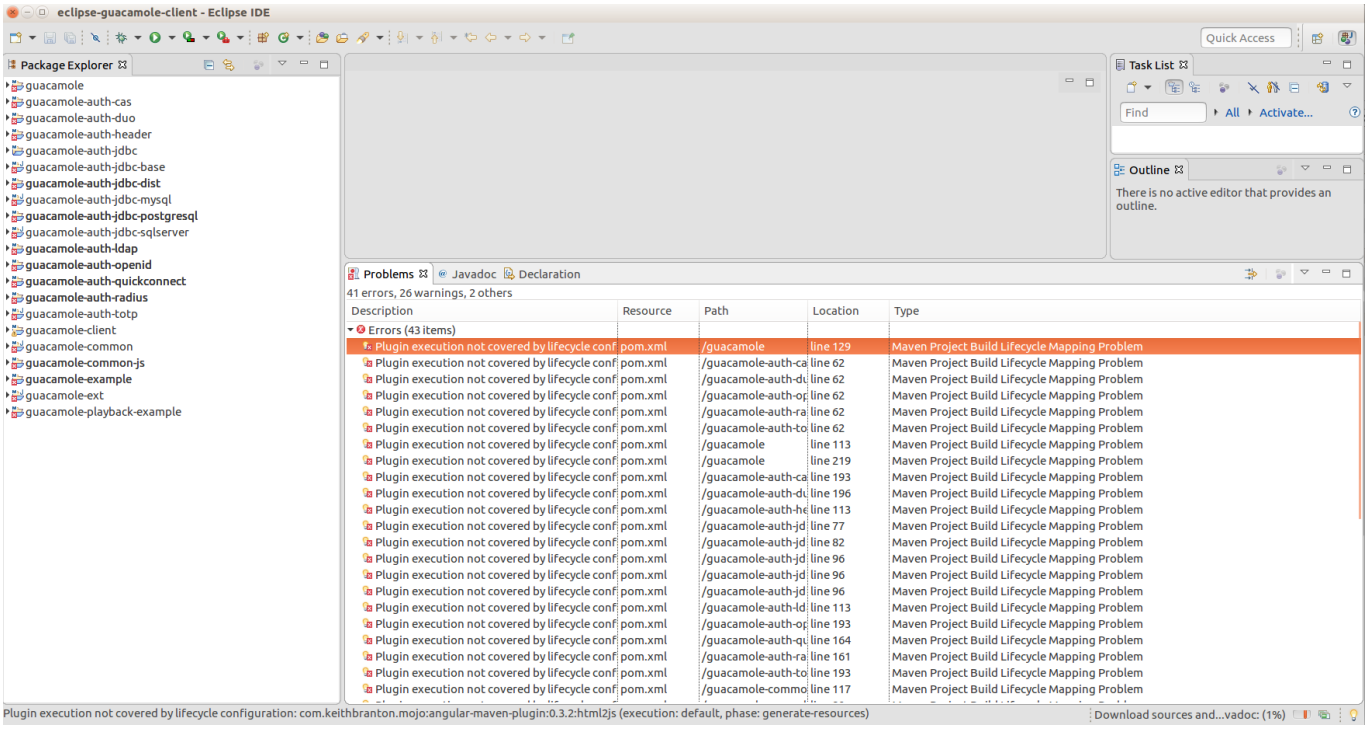
Click Finish



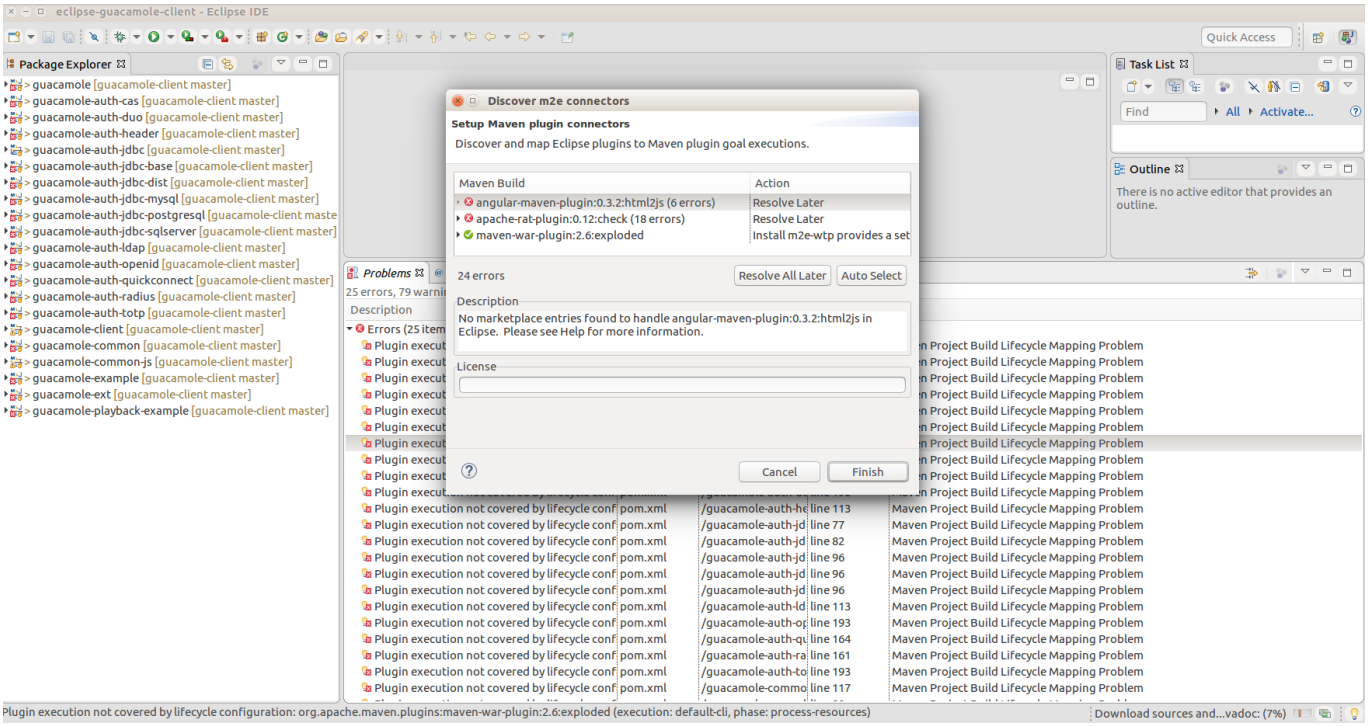
This box kept coming up, I just cancelled out of this particular Markplace solution.



You'll likely notice that you have several errors!

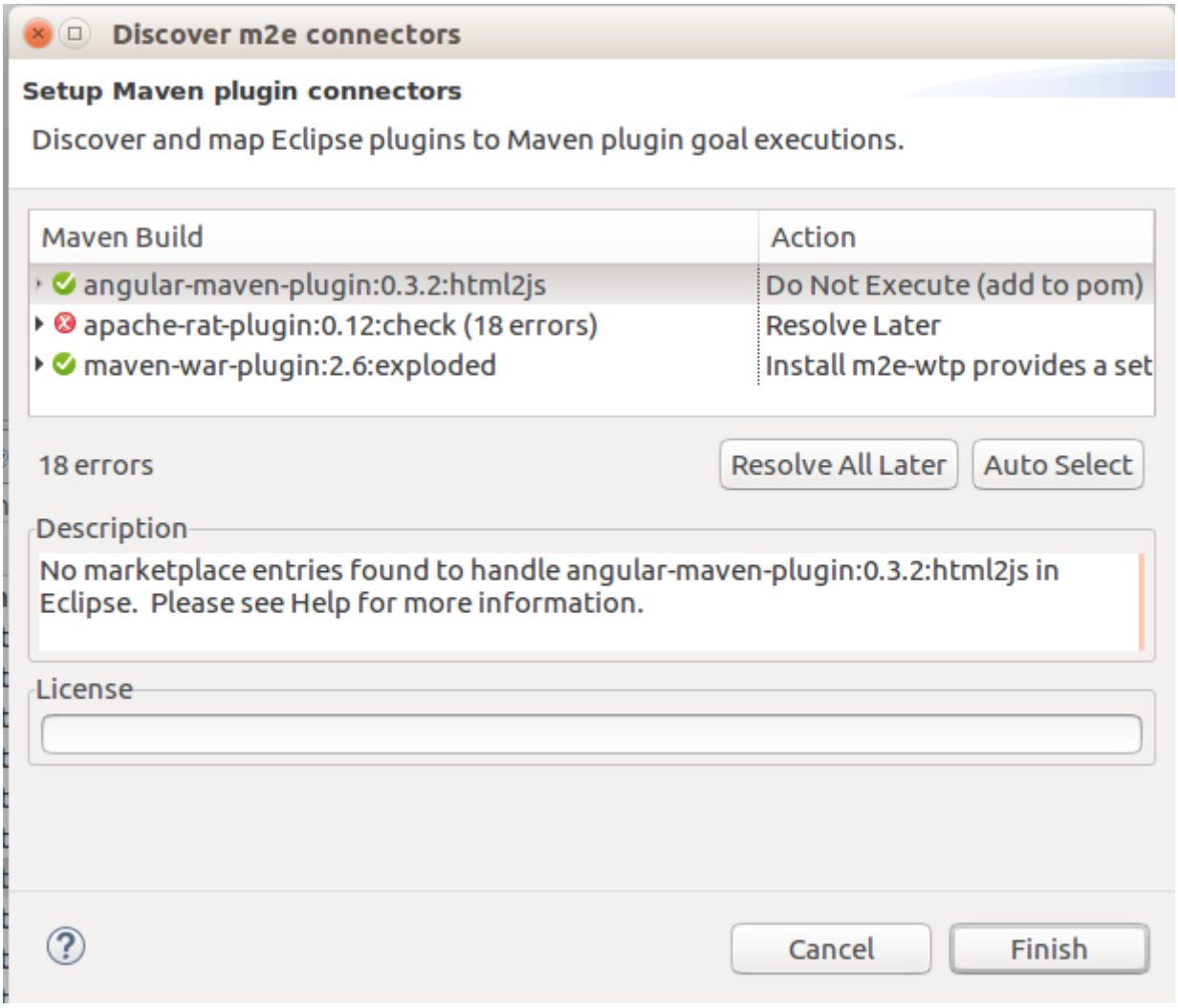


Discover m2e connectors dialog box will display

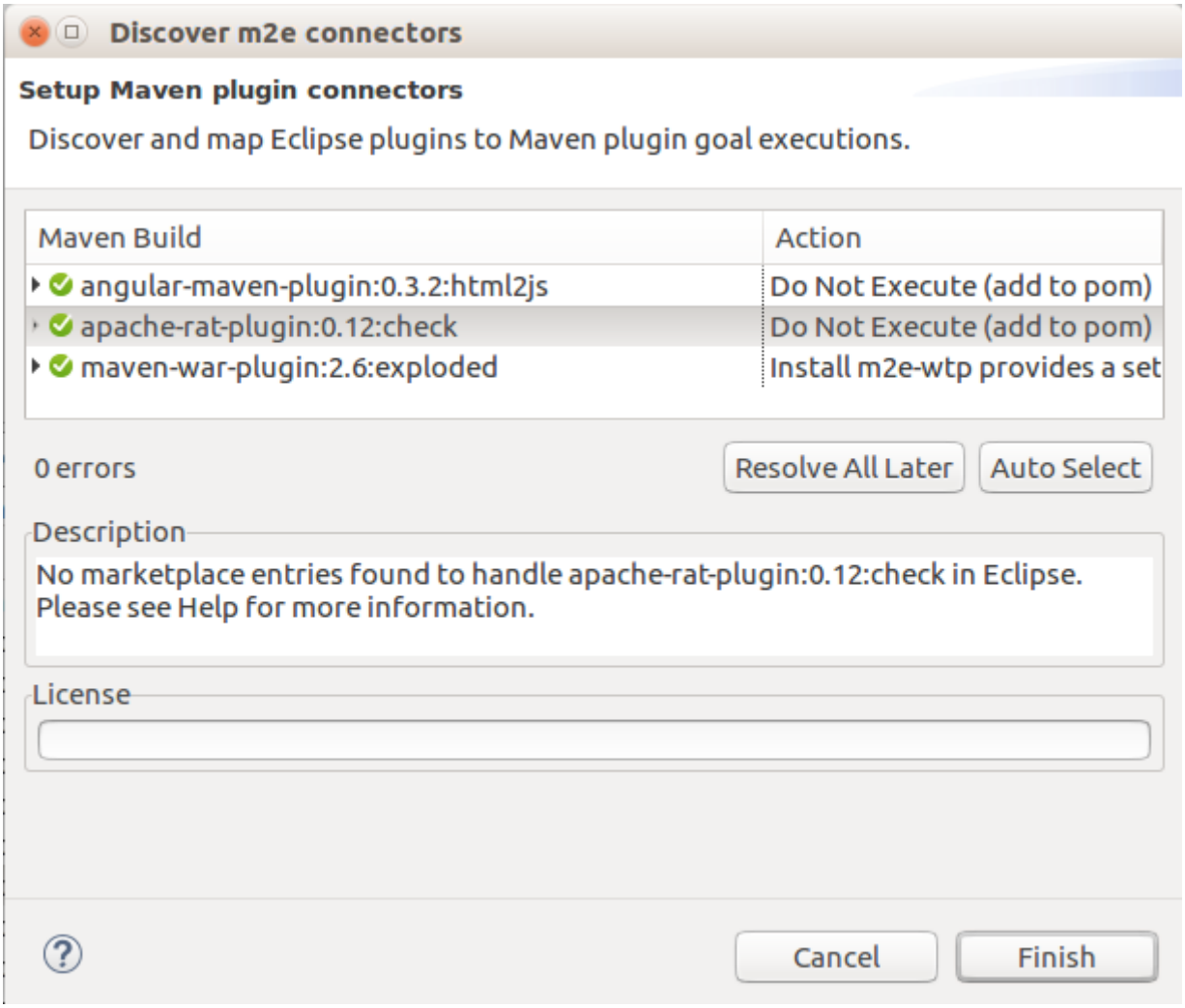


Here we'll modify the action for Maven Build angular-maven-plugin and apache-rat-plugin

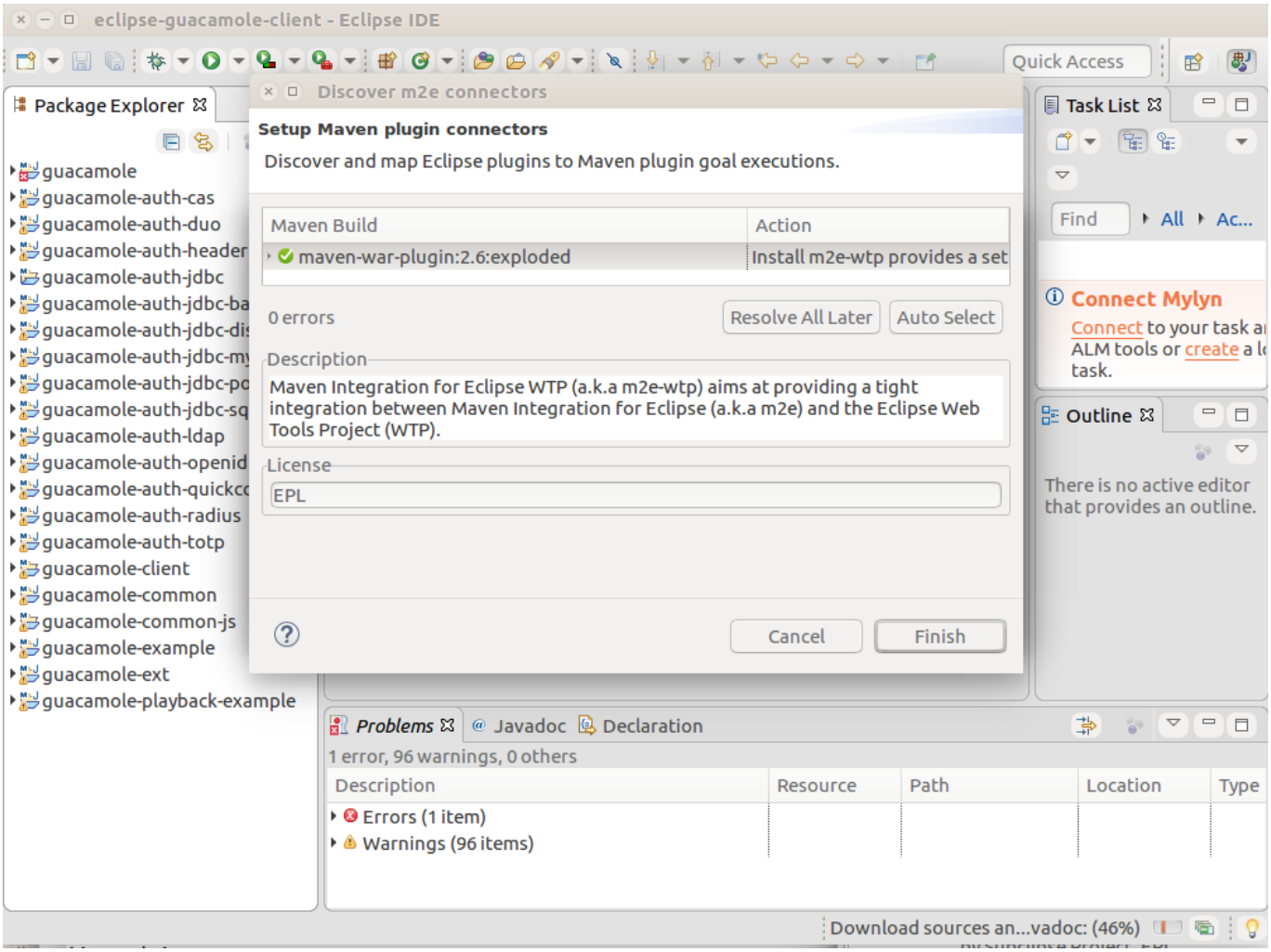
Click Resolve Later under action and change it to Do Not Execute (add to pom)



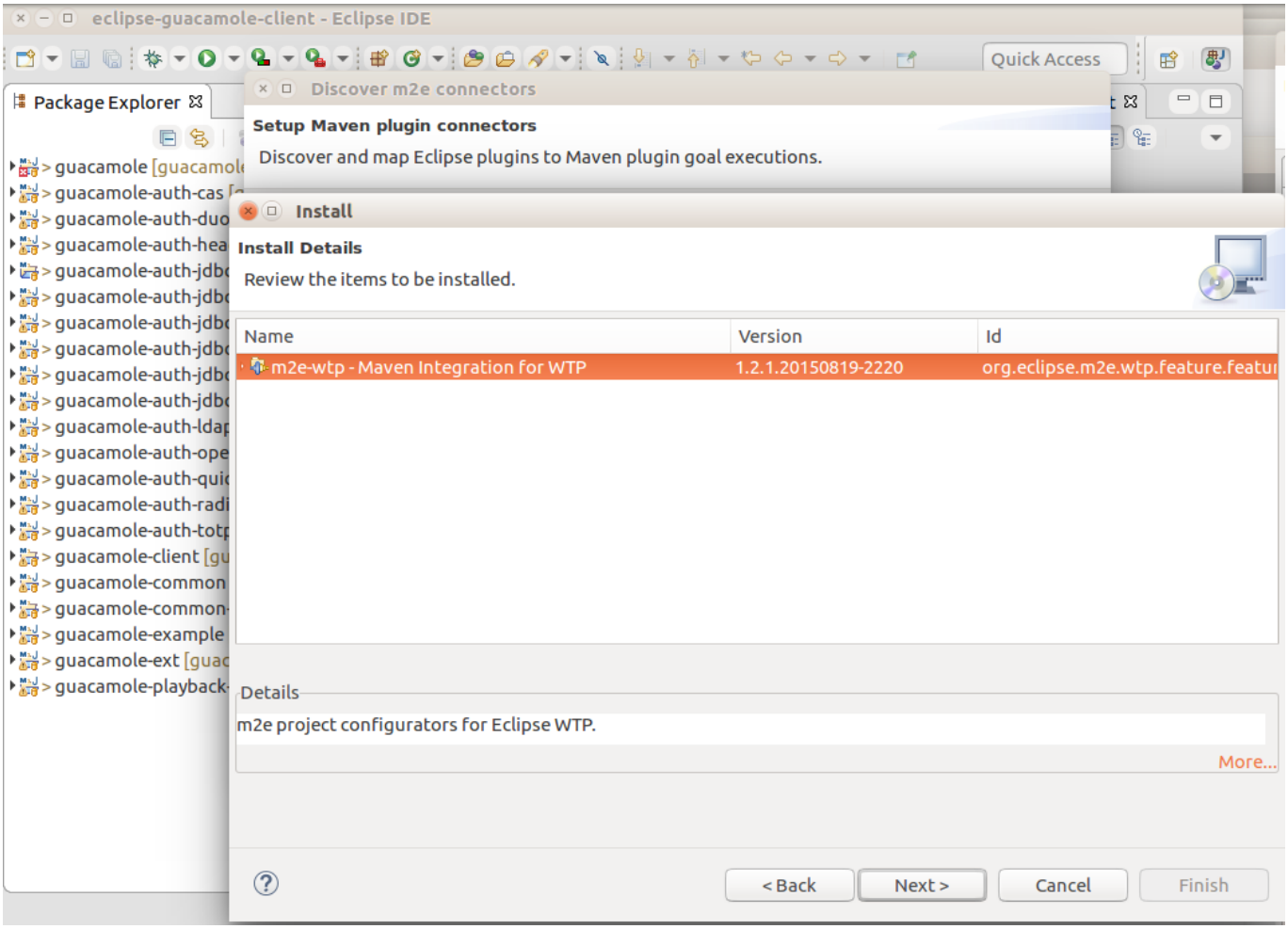
Click Finish



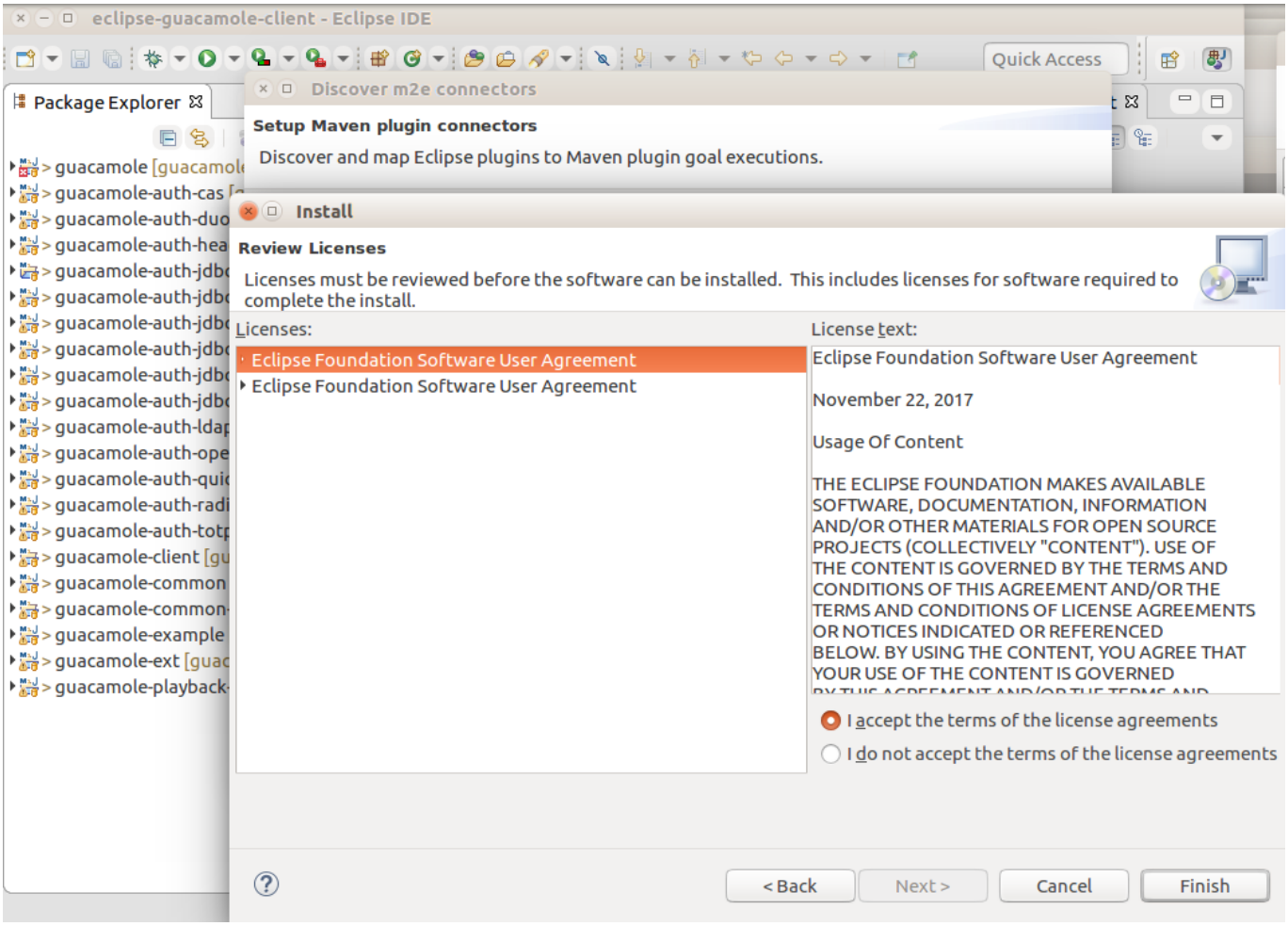
Click Finish



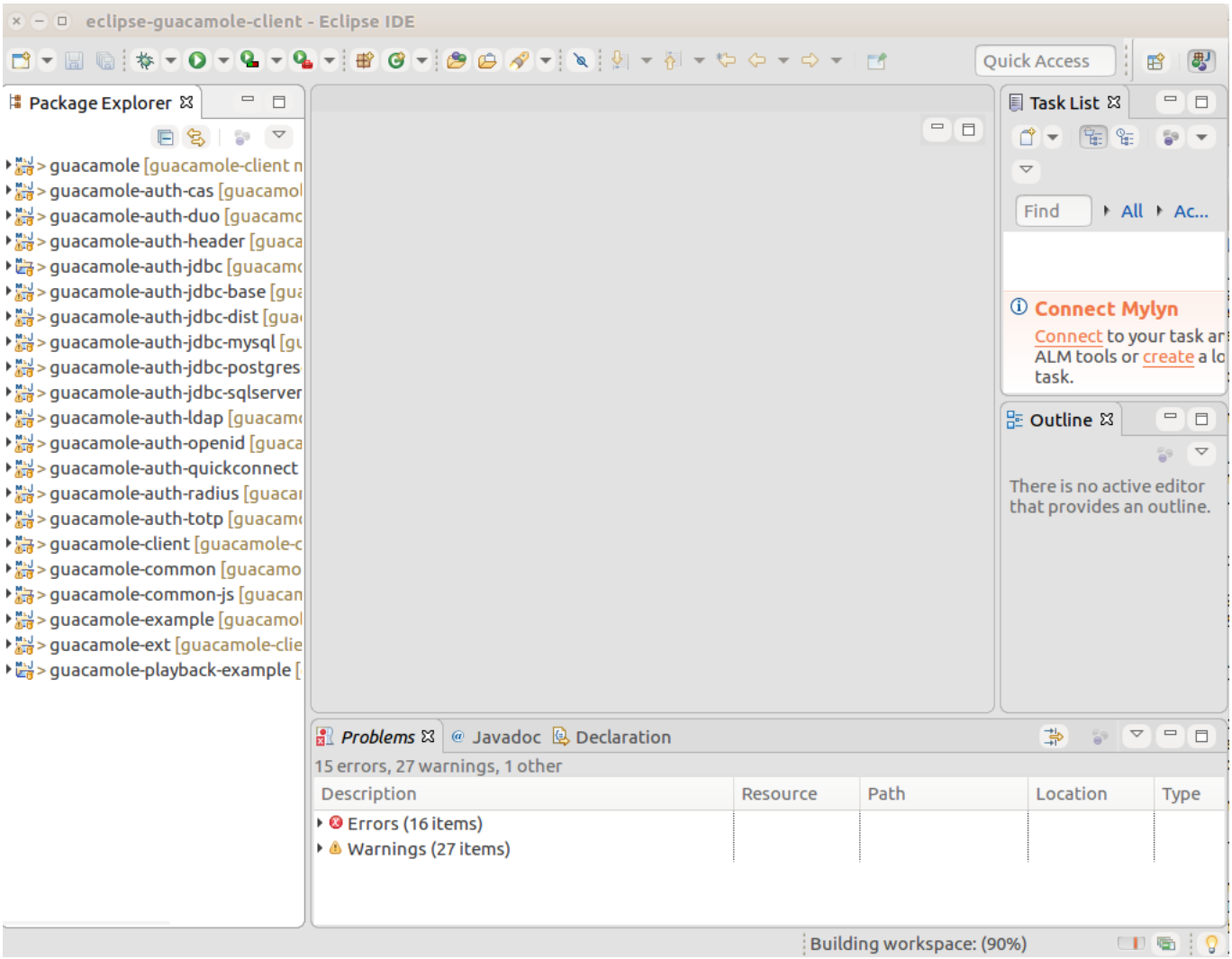
Click Next


eclipse-guacamole-client - Eclipse IDE
Quick Access
Package Explorer
Discover m2e connectors
Setup Maven plugin connectors
Discover and map Eclipse plugins to Maven plugin goal executions.
Install
Install Details
Review the items to be installed.
Name
Version
Id
m2e-wtp - Maven Integration for WTP
1.2.1.20150819-2220
Details
m2e project configurators for Eclipse WTP.
More...
< Back
Next >
Cancel
Finish

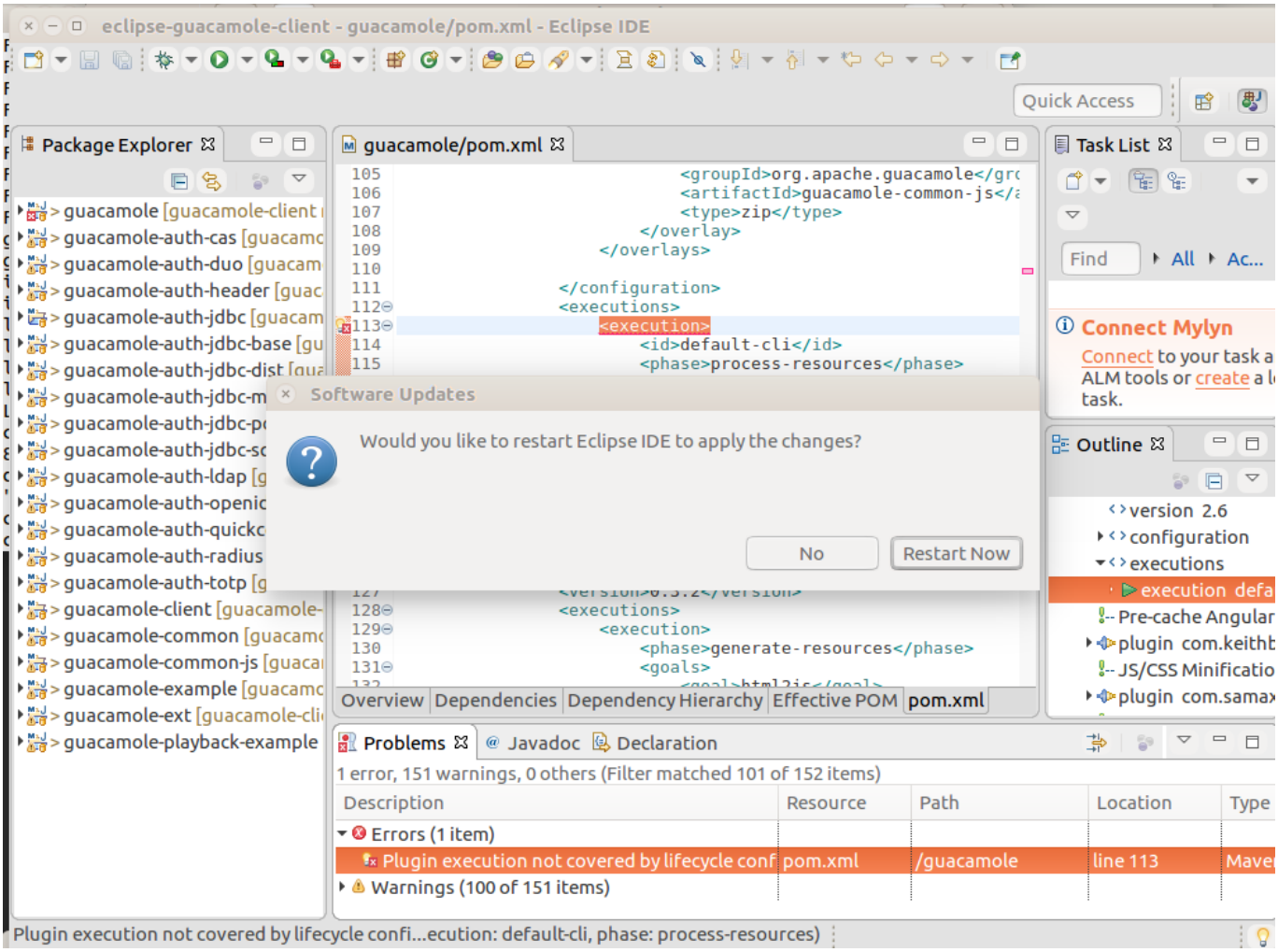
Click I accept the terms of the license agreements Click Finish



This step will take some time...



Click Restart Now



I had one remaining error that required me to edit ~/FA19-GUAC/eclipse-build/guacamole-client/guacamole/src/main/webapp/WEB-INF/web.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
    Licensed to the Apache Software Foundation (ASF) under one
    or more contributor license agreements.  See the NOTICE file
    distributed with this work for additional information
    regarding copyright ownership.  The ASF licenses this file
    to you under the Apache License, Version 2.0 (the
    "License"); you may not use this file except in compliance
    with the License.  You may obtain a copy of the License at

      http://www.apache.org/licenses/LICENSE-2.0

    Unless required by applicable law or agreed to in writing,
    software distributed under the License is distributed on an
    "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY
    KIND, either express or implied.  See the License for the
    specific language governing permissions and limitations
    under the License.
-->
<!--  <web-app version="2.5"
         xmlns="http://java.sun.com/xml/ns/javaee"
```

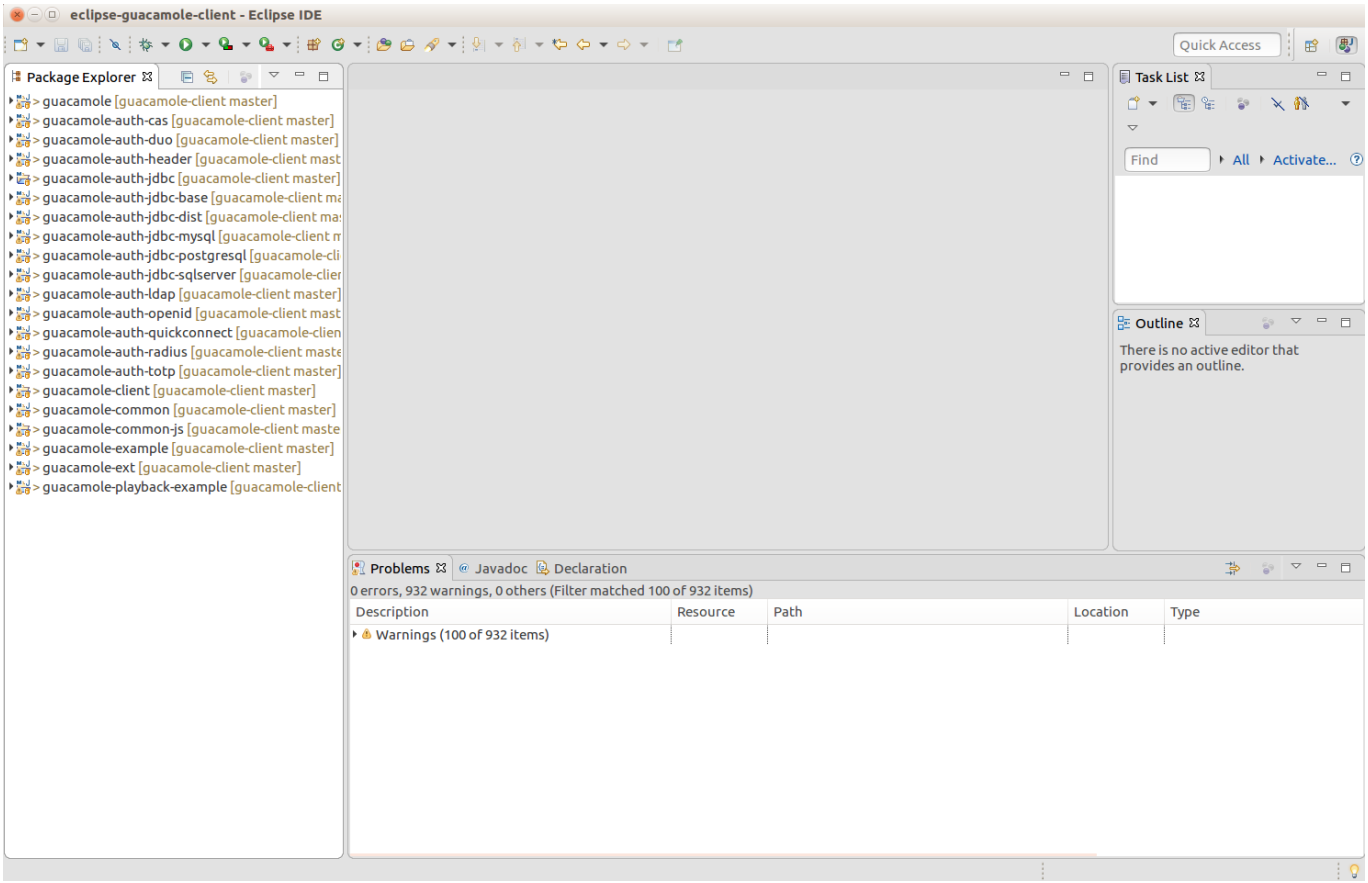
```
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xsi:schemaLocation="http://java.sun.com/xml/ns/javaee
                              http://java.sun.com/xml/ns/javaee/web-
app_2_5.xsd">
-->

<web-app version="2.5"
    xmlns="http://java.sun.com/xml/ns/j2ee"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://java.sun.com/xml/ns/j2ee
http://java.sun.com/xml/ns/j2ee/web-app_2_5.xsd">
```

I'm not certain that this best practice... I need to read into it more.

Once the import completes you should no longer see errors.

If you still see warnings try to Refresh the file view (key F5) or restart eclipse.



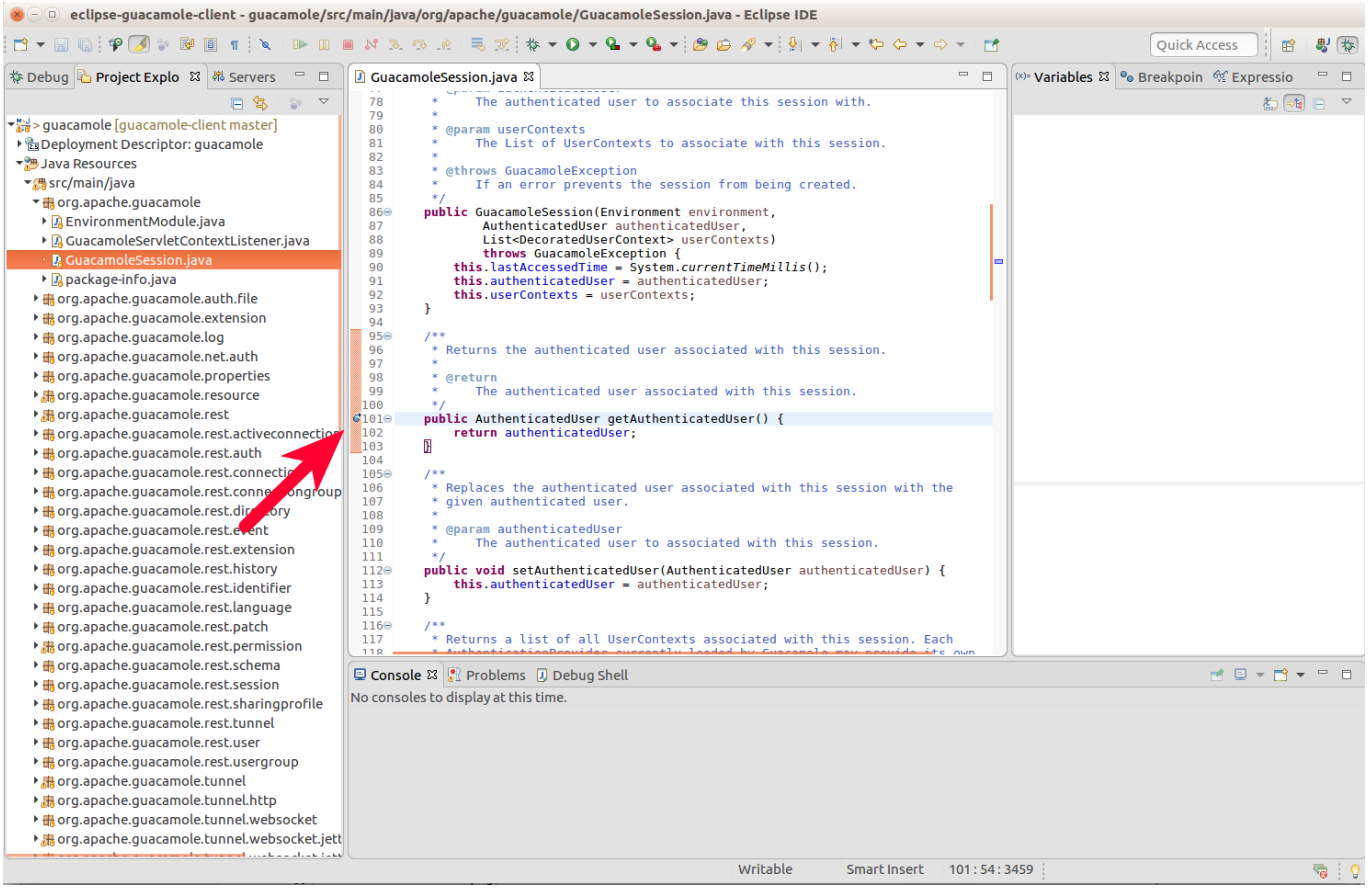
We'll now move on to remotely debugging the code.

Remote Debugging

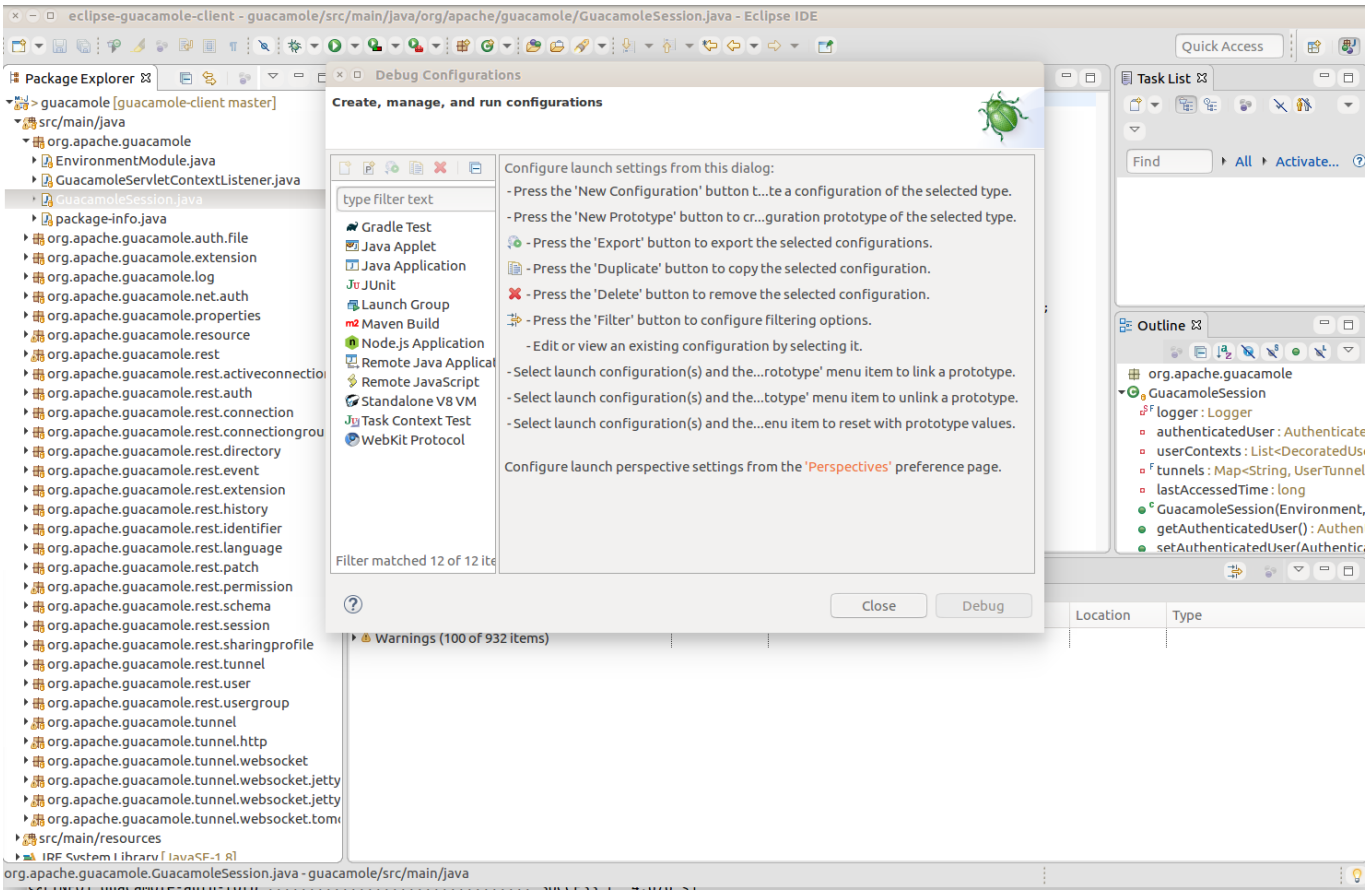
Inside Eclipse

Open file: ~/FA19-GUAC/eclipse-build/guacamole-client/guacamole/src/main/java/org/apache/guacamole/GuacamoleSession.java

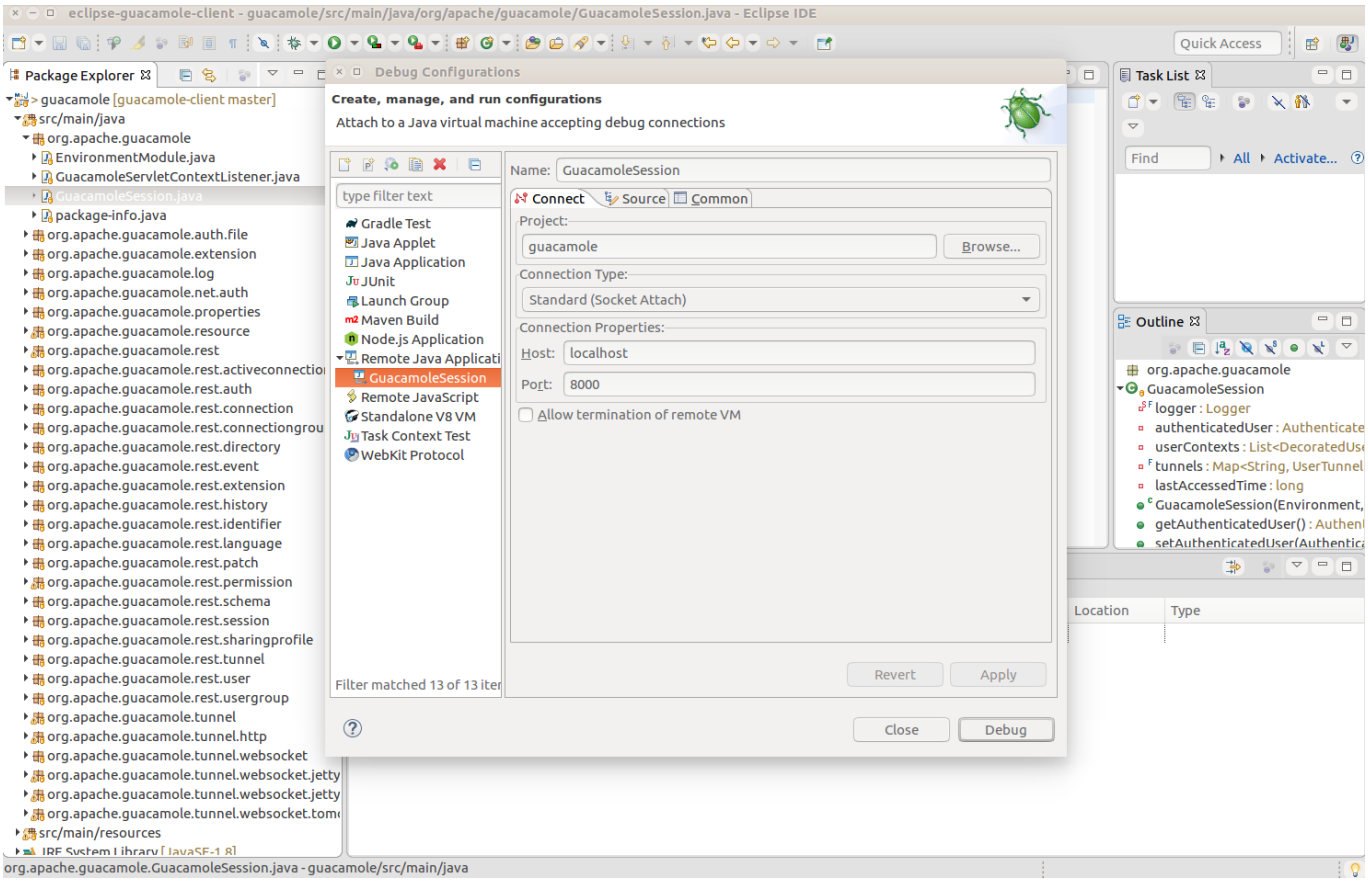
Set a breakpoint in your code (Shift+Ctrl+B)



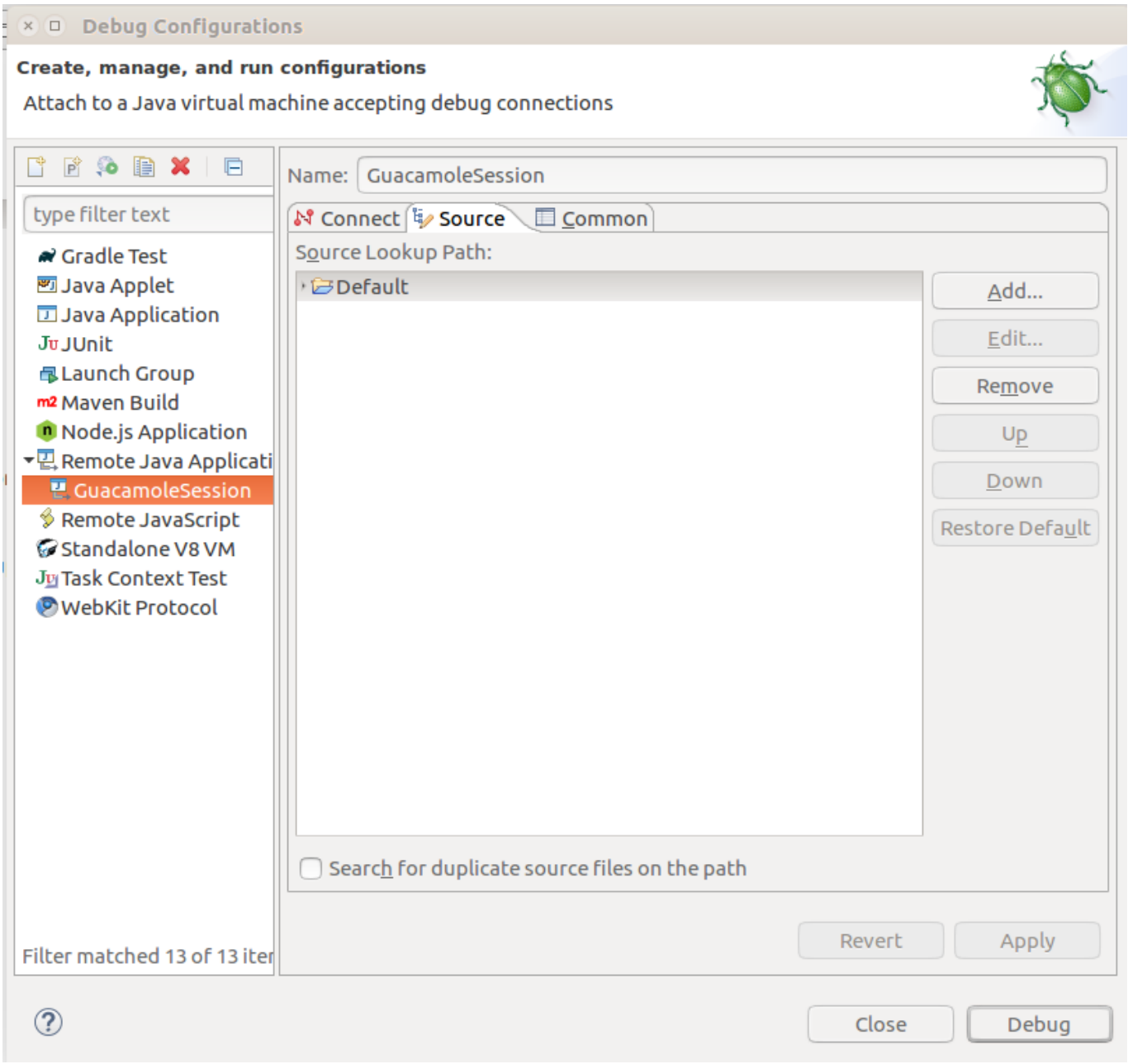
Click Run -> Debug Configurations...



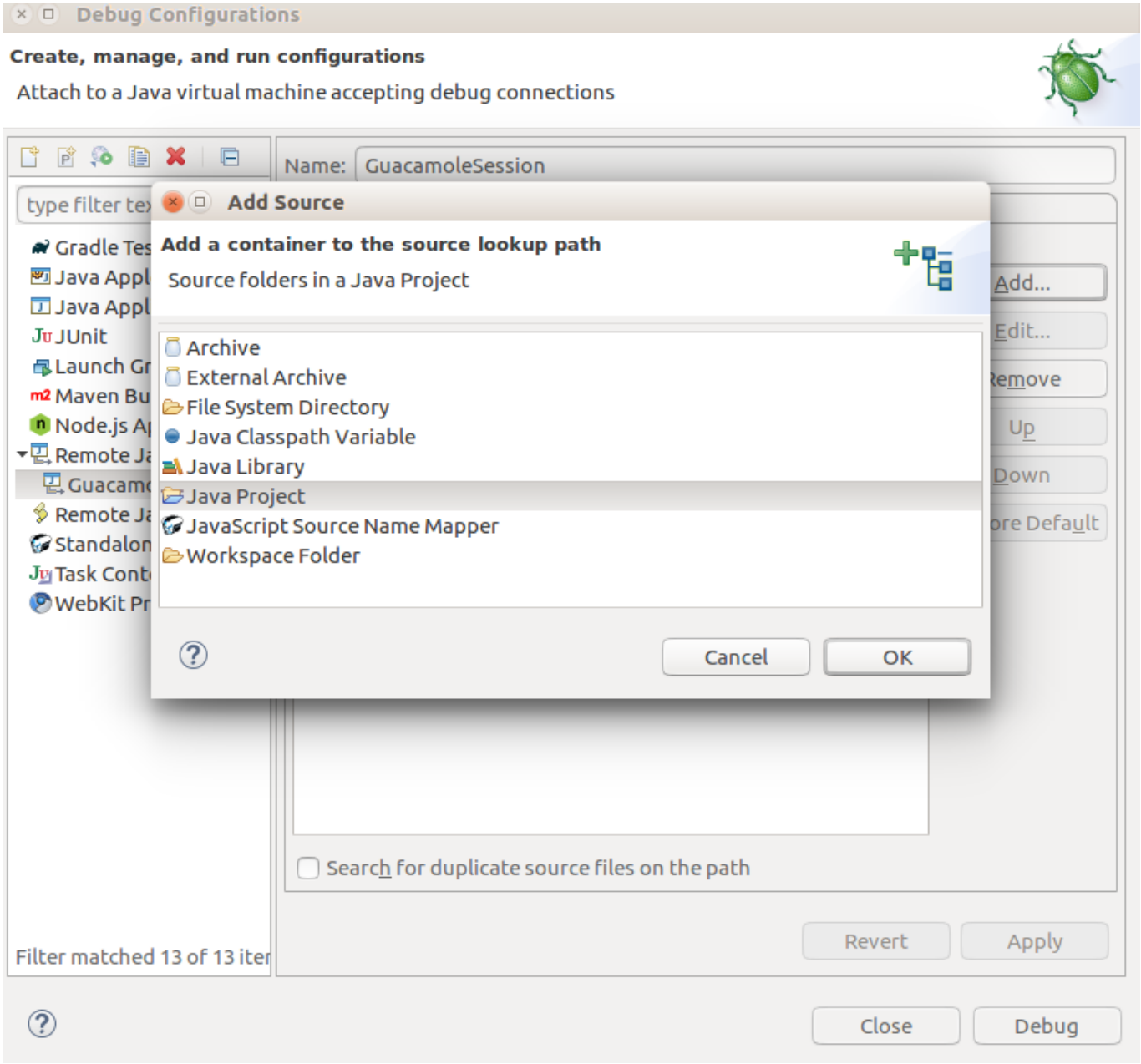
Double Click Remote Java Application



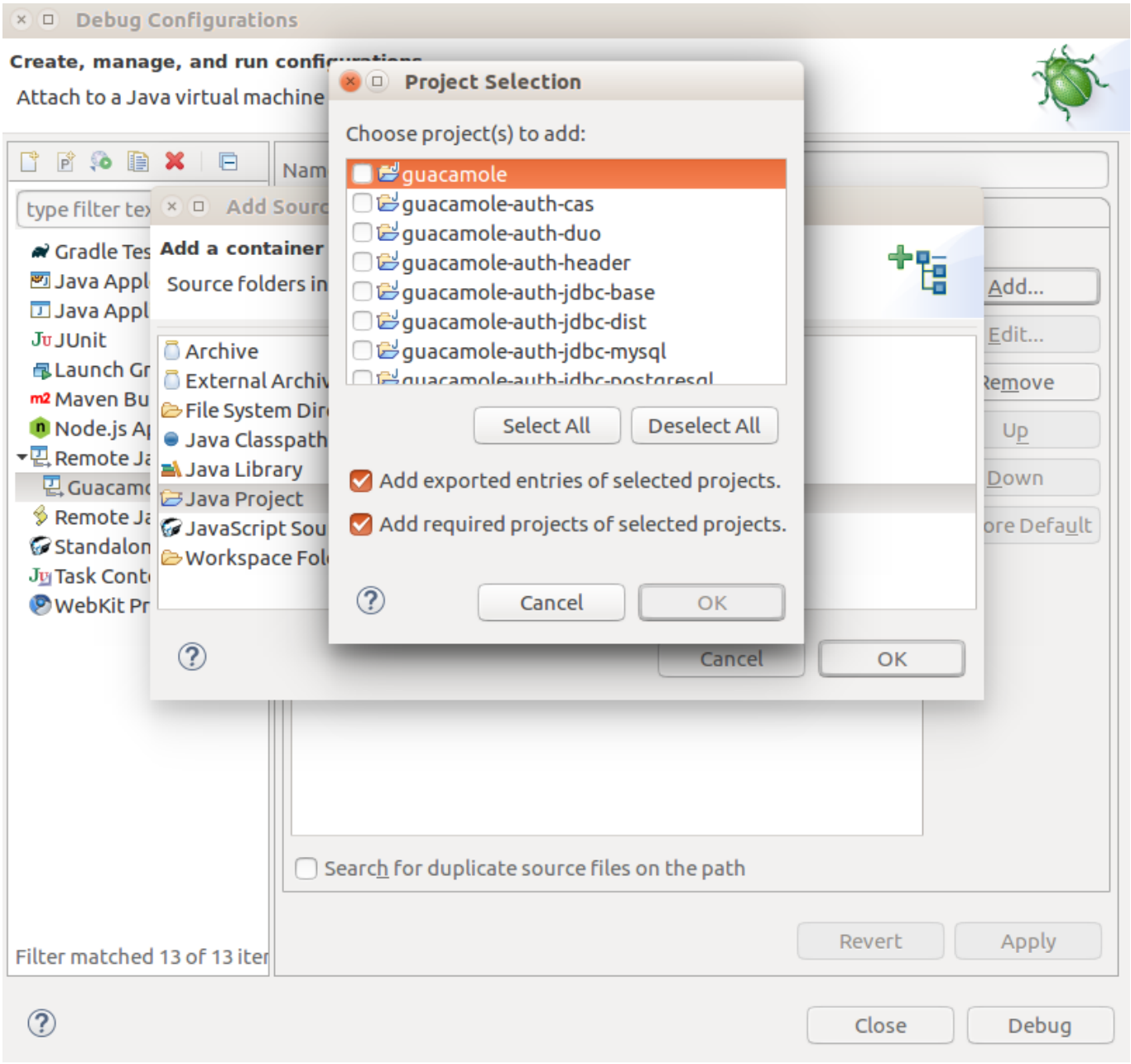
Click Soure Tab Click Add


Debug Configurations
Create, manage, and run configurations
Attach to a Java virtual machine accepting debug connections
type filter text
Gradle Test
Java Applet
Java Application
JUnit
Launch Group
Maven Build
Node.js Application
Remote Java Applicati
GuacamoleSession
Remote JavaScript
Standalone V8 VM
Task Context Test
WebKit Protocol
Filter matched 13 of 13 iter
Name: GuacamoleSession
Connect
Source
Common
Source Lookup Path:
Default
Add...
Edit...
Remove
Up
Down
Restore Default
Search for duplicate source files on the path
Revert
Apply
Close
Debug

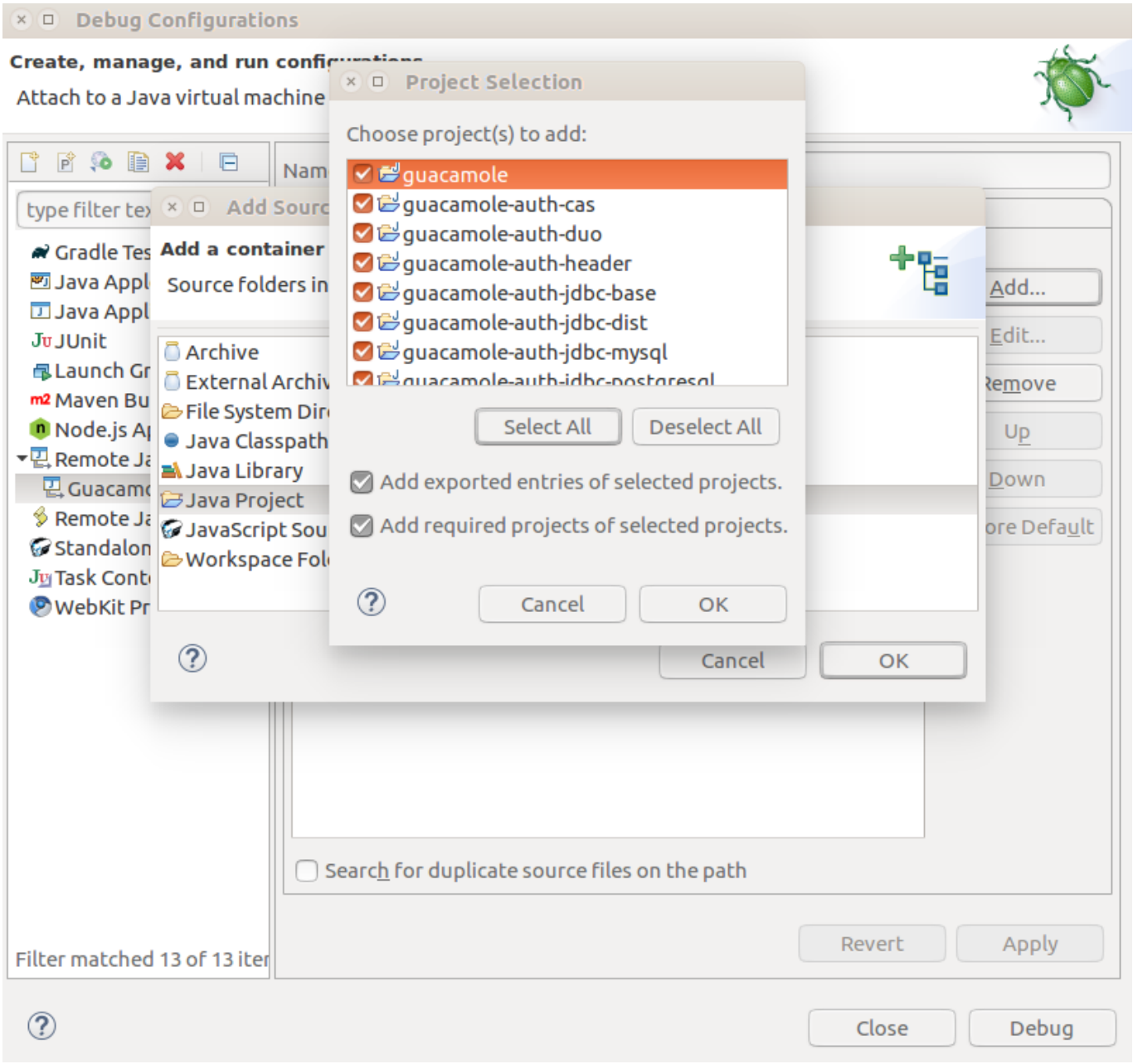
Select Java Project Click Ok



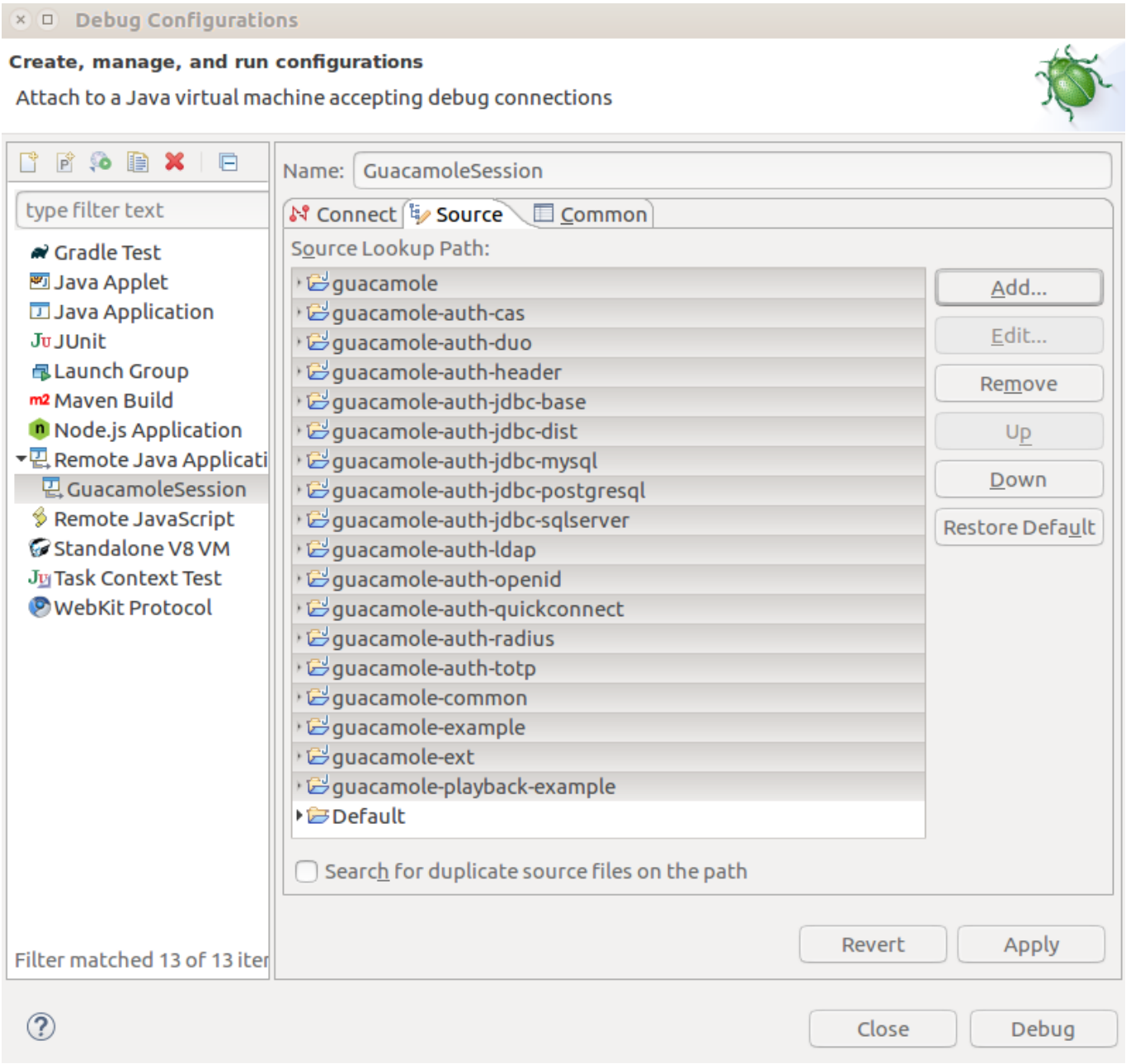
Click Select All



Click OK


Debug Configurations
Create, manage, and run configurations
Attach to a Java virtual machine
Project Selection
Choose project(s) to add:
guacamole
guacamole-auth-cas
guacamole-auth-duo
guacamole-auth-header
guacamole-auth-jdbc-base
guacamole-auth-jdbc-dist
guacamole-auth-jdbc-mysql
Select All
Deselect All
Add exported entries of selected projects.
Add required projects of selected projects.
Cancel
OK
Add a container
Source folders in
Archive
External Archiv
File System Dir
Java Classpath
Java Library
Java Project
JavaScript Sou
Workspace Fol
Cancel
OK
Add...
Edit...
Remove
Up
Down
Search for duplicate source files on the path
Revert
Apply
Close
Debug

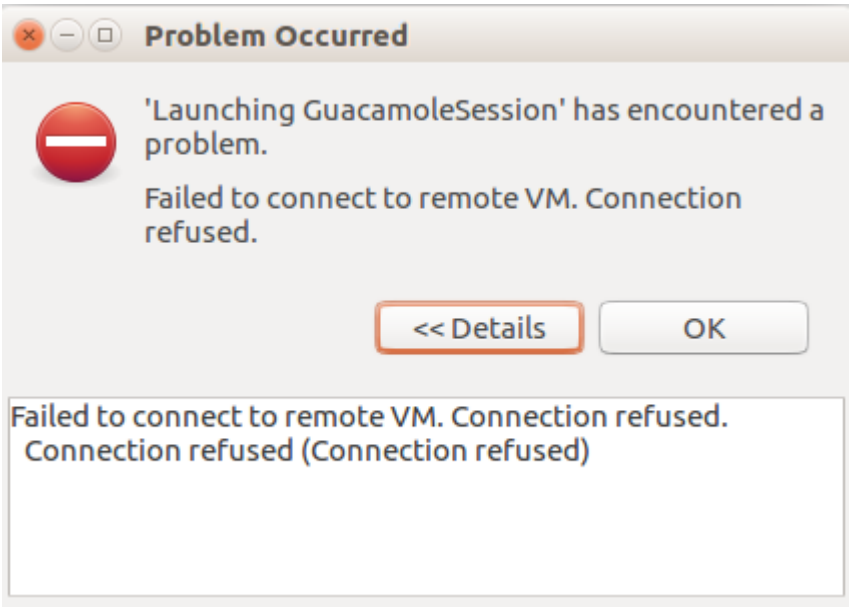
Click Apply



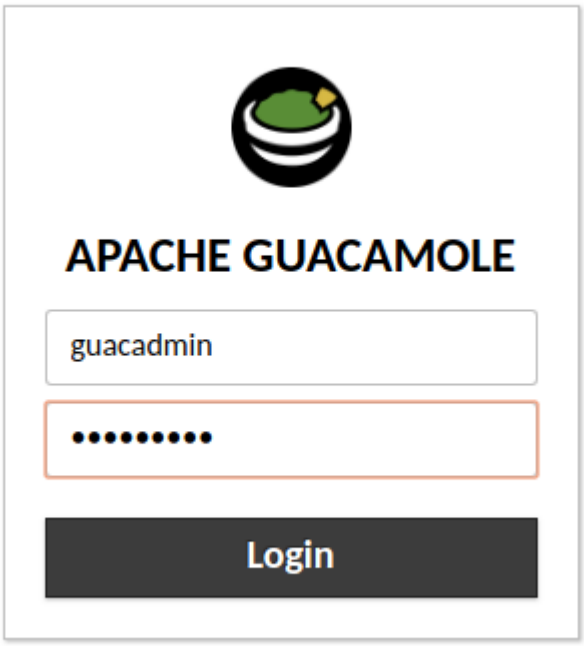
Click Debug

Open a web browser and open http://localhost:8080/guacamole/

You might need to restart your guacamole-client container if you experience. In this case you'll also have to reconnect your debugger in eclipse after restarting the docker container.

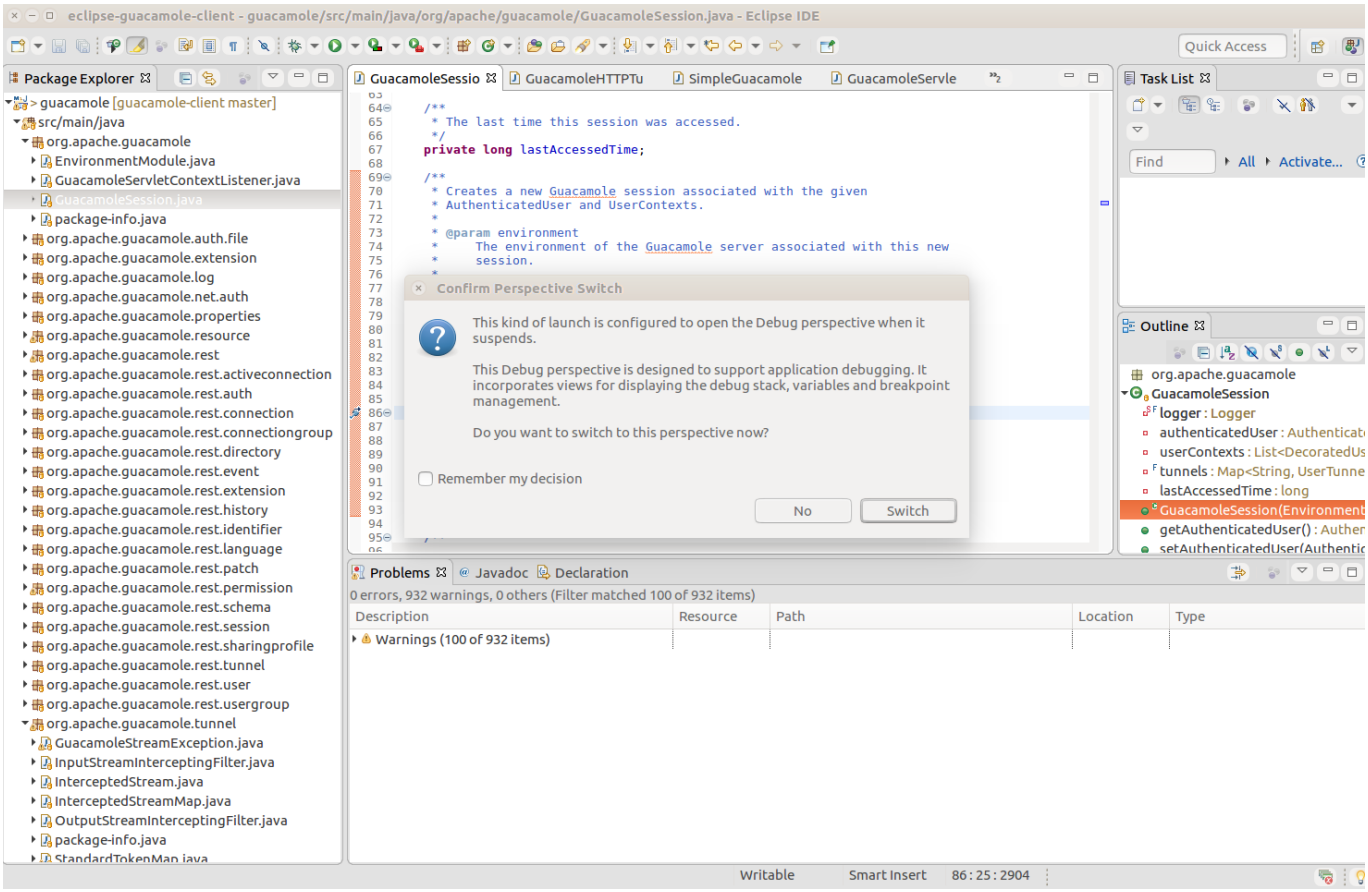


Login to guacamole-client's AngularJS application.

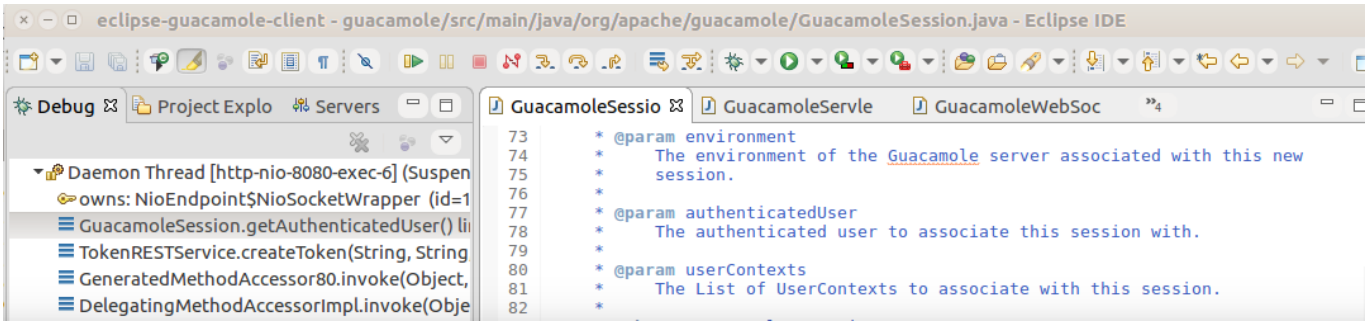


You'll be prompted to switch to a debugging perspective inside eclipse.

Click Switch



Click resume (F8) to allow the program to finish the login process.



Enjoy your debugging experience!!!