ArchNav Installation Instructions

Cloud Computing

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1. Introduction

This document steps through setting up the ArchNav application. There are several software pieces that need to be installed and this document steps through installing all required software. It is important to use the versions of each software piece that is specified in this document (see the section "Software Requirements" for a table of all software pieces and their respective versions).

2. Software Requirements

ArchNav is dependent on several technologies. Below is a table that includes a complete list of technology requirements. The versions below were confirmed to work with the latest version of the ArchNav code and must be the versions that are downloaded and installed.

Software Download	Version	Link
Java SE Development Kit	8u212	https://www.oracle.com/technetwork/java/javase/downloads/index.html
MySQL Workbench	8.0.16	https://dev.mysql.com/downloads/windows/installer/8.0.html
MySQL Connector (Java)	8.0.16 for MySQL 8.0.16	https://dev.mysql.com/downloads/connector/j/
jDeveloper	12.2.1.3.0	https://www.oracle.com/technetwork/developer-tools/jdev/downloads/index.html
WebLogic (integrated with jDeveloper)	12x	
Glassfish Extensions (for jDeveloper)	for JDeveloper 12.2.1.3.0	https://github.com/adfemg/glassfish-extension
Oracle ADF Essentials (for Glassfish)	for JDeveloper 12.2.1.3.0, and Glassfish 5.0.0	https://www.oracle.com/database/technologies/developer-tools/adf/adf-essentials.html
Glassfish	5.0.0	https://javaee.github.io/glassfish/download
Oracle ADF	for JDeveloper 12.2.1.3.0 and for Glassfish 5.0.0	https://www.oracle.com/technetwork/developer-tools/adf/downloads/index.html
Maven	3.6.1	https://maven.apache.org/download.cgi
Cygwin	3.0.7	https://www.cygwin.com/
wget and git packages (for Cygwin)		
Fortress	2.0.3	https://directory.apache.org/fortress/downloads.html
ApacheDS	2.0.0-AM25	https://directory.apache.org/apacheds/downloads.html
Directory Studio	2.0.0-M14	https://directory.apache.org/studio/
Tomcat	9.0.21	https://tomcat.apache.org/download-90.cgi

a. Install Java SDK

Visit the link https://www.oracle.com/technetwork/java/javase/downloads/index.html to download Java SDK (be sure to check the table above for the required version).
From the above link, scroll down to “Java SE 8u211 / Java SE 8u212” and click “Download” for “JDK”. Select the correct download for your operating system. Click on the .exe, for example, jdk-8u212-windows-x86.exe, file and follow the wizard using the default settings.

b. Install MySQL Workbench and the MySQL Database

Download MySQL Workbench and MySQL Server

Visit the link https://dev.mysql.com/downloads/windows/installer/8.0.html to download the MySQL Workbench and the MySQL Database. The MySQL Database gets installed with the MySQL Workbench.
There are two download options to choose from. Different from the standard MySQL Installer, the smaller "web-community" version does not bundle any MySQL applications, but it will download the MySQL products you choose to install. If you have an online connection while running the MySQL Installer, choose the mysql-installer-web-community file (filename: mysql-installer-web-community-8.0.16.0.msi). If you do not have an online connection while running the MySQL Installer, choose the mysql-installer-community file (filename: mysql-installer-community-8.0.16.0.msi). For this installation the “web” installer was used.

Run the installation wizard

Launch the MySQL installation wizard and follow the steps below.

- For the “Optional MySQL Installer Upgrade Available: You will continue receiving product catalog updates if you do not apply the upgrade. Do you want to apply this upgrade now?” option, select “Yes” if you wish to receive automated options.

- For “Choosing a Setup Type”, select the “Full” version to install. This includes the following “Setup Type Description”:

  “Installs the MySQL Server and the tools required for MySQL application development. This is useful if you intend to develop applications for an existing server.”

- For “Check Requirements”, the wizard will check for required software to be previously installed prior to installing MySQL Community Server. Click “Yes” to proceed as the wizard will try to remedy any installation check failures by downloading the appropriate required installs. The installer will check for the following:

1) MySQL for Excel 1.3.8 (a message you might see is: “Visual Studio 2010 Tools for Office Runtime is not installed”).

   To proceed, there are two options: (1) click on “Execute” or (2) click “Next”. If there are any failed requirements, then click “Execute” to allow the wizard to download and install the dependency. To address the failed requirement, “Microsoft Visual Studio Tools for Office Runtime 2010” was installed.

2) MySQL for Visual Studio 1.2.8 (a message you might see is: “Visual Studio version 2012, 2013, 2015 or 2017 must be installed”). To address this failed requirement:

   Go to https://visualstudio.microsoft.com/vs/older-downloads/ to download older versions of Microsoft Visual Studio. Download the 2017 edition (the latest version is 2019, but the version of MySQL that is being installed requires version 2017).

   To install Visual Studio 2017, follow the below steps:

   - Expand “2017” and click on the “Download” button. You will be taken to a page that allows you to enter a “subscription” login or join a community. Join the free community and then select the 2017 download. If you don’t see it, in the same browser, refresh page.
   - From the “Downloads” list, select “Visual Studio Community 2017 (version 15.9)” (no key is required).
   - Click on the installer, which is an executable (.exe) file.
   - The installer wizard will eventually get to a page of “Workloads” as additional installations. Do not select any of these, and at the bottom, click “Install”. You will be prompt with “Do you want to continue without workloads?” and click “Continue”.

   Additional documentation on installing the required MySQL for Visual Studio can be found at:

   https://dev.mysql.com/doc/visual-studio/en/visual-studio-install.html

3) Connector/Python (3.7) 8.0.16 (a message you might see is: “Python 3.7 (64-bit) is not installed”).

   To proceed, there are two options: (1) click on “Execute” or (2) click “Next”. If there are any failed requirements, then click “Execute” to allow the wizard to download and install the dependency. To address the failed requirement, “Python 3.7 (64-bit)” was installed.

- After all failed requirements are resolved, to proceed with installing MySQL Community Server, click “Execute”.

- The “Installation” page will show a list of components that will be installed and a green checkmark that appears per component indicates successful installation of each component.
- Stepping through the installation wizard, you will be prompted for several product configurations. Configure the installation as follows:

    1) High Availability:

        - Select: “Standalone MySQL Server / Classic MySQL Replication”

    2) Type and Networking

        - Config Type: chose “Development Computer”
        - Connectivity: chose “TCP/IP”, Port “3306”
        - Accept all default settings on this page
        - Check “Show Advanced and Logging Options”
        - Click “Next”

    3) Authentication Method

        - Select the default: “Use Strong Password Encryption for Authentication (RECOMMENDED)”
        - Click “Next”

    4) Account and Roles

        - Set a password for the “root” user

    5) Windows Service

        - Accept the default settings and click “Next”

    6) Logging Options

        - Accept the default settings and click “Next”

    7) Advanced Options

        - Accept the default settings and click “Next”

    8) Apply Configuration

        - Click “Execute”
        - Click “Finish”

    9) Click “Next”

10) MySQL Router Configuration

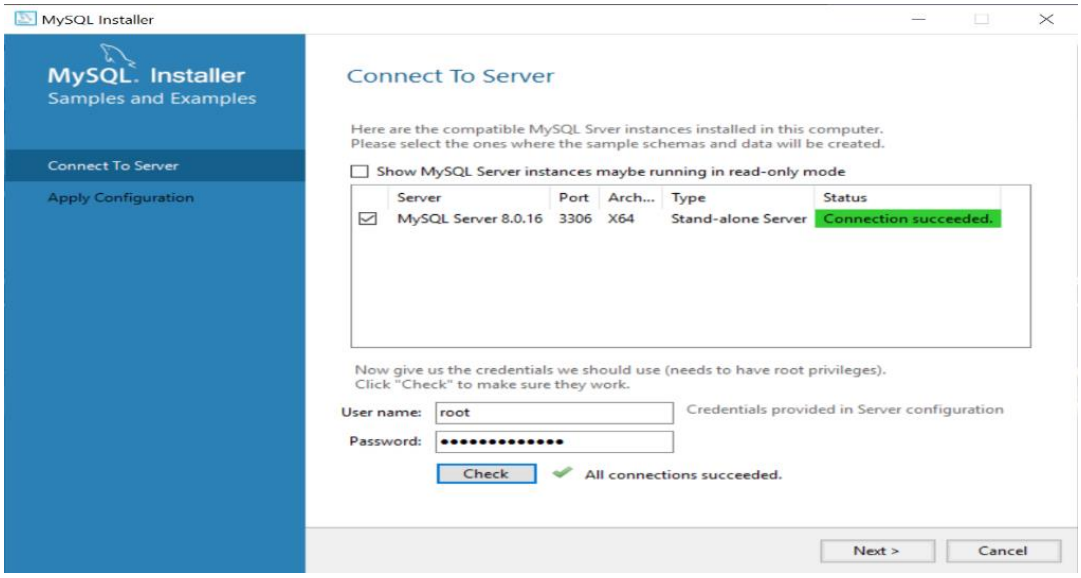
- Ignore for now → click “Finish”

11) Click “Next”

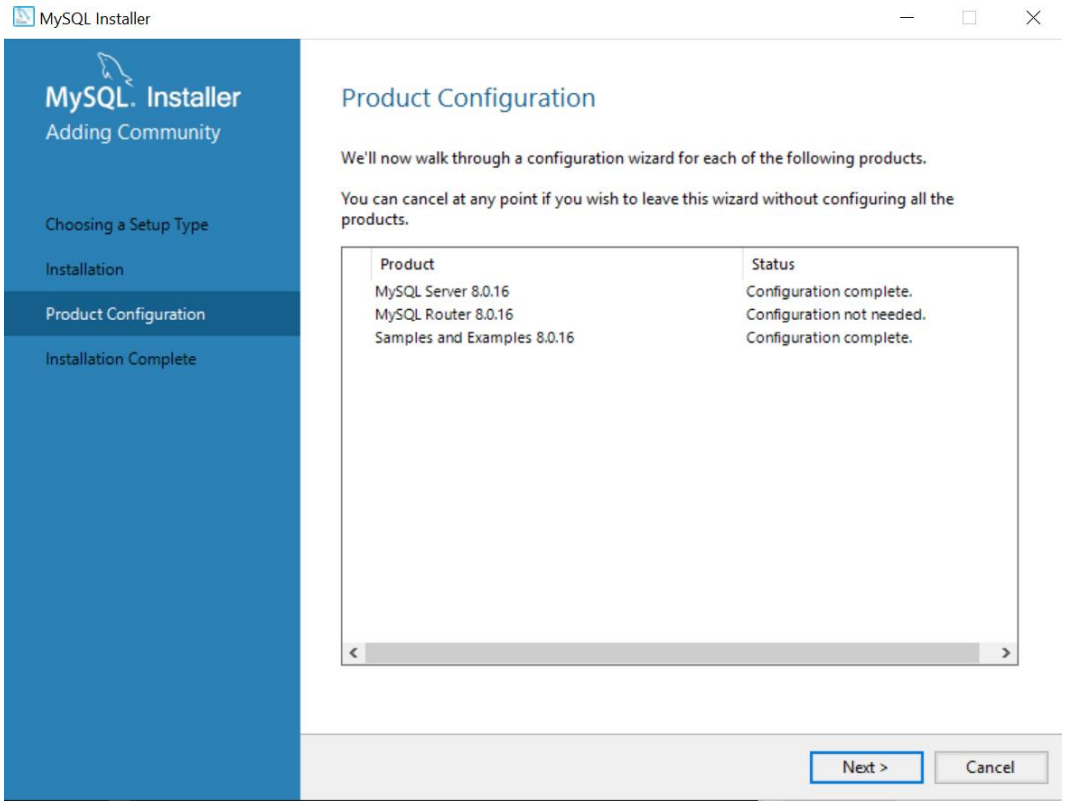
Connect to the MySQL Server using the MySQL Workbench and apply final setup configurations

To connect to the MySQL Server and apply the final setup configurations, follow the below steps:

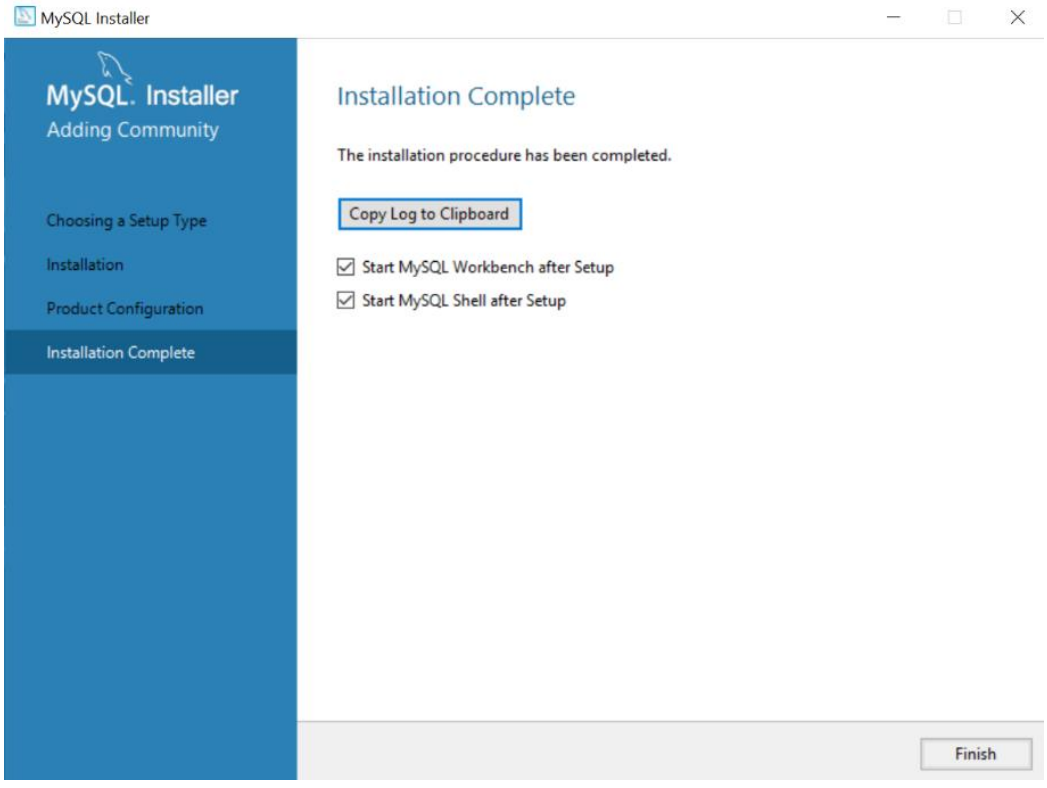
- Enter the password for the root user and click “Check” to test the connection to the database server and should get the following “Connection Succeeded” success message:



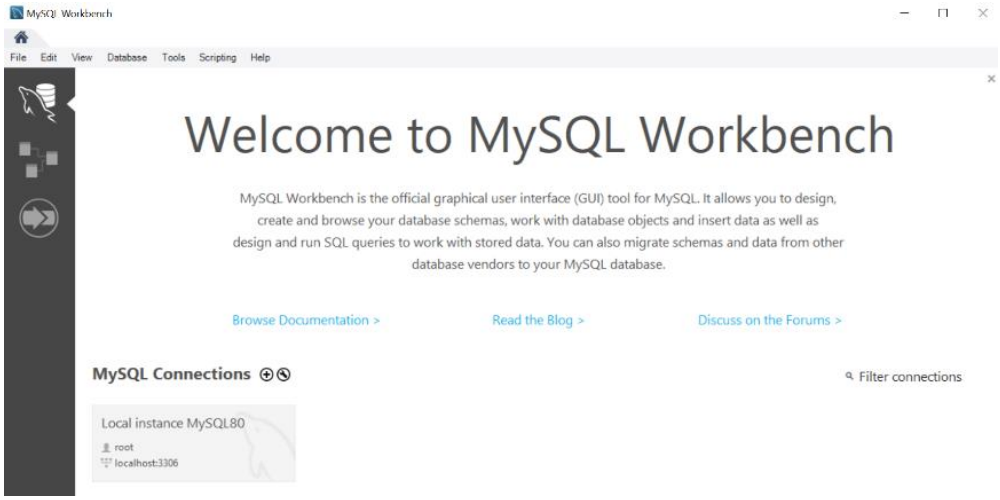
- Click “Next”
- Click “Execute”
- Click “Finish”
- The above steps should complete all of the “Product Configurations”. A “Product Configuration” page will display providing a status on whether the configurations were successful (see below).



- Click “Next”
- An “Installation Complete” should report that the installation is complete (see below).



- Click “Finish”
- The Workbench and MySQL terminal seesion should both be launched



c. Install MySQL Connector (Java)

The MySQL Connector (Java) should have installed automatically during the installation of MySQL Workbench and MySQL Server. In the case that the MySQL Connector (Java) was not installed, the following steps can be taken to install it.

Below is the MySQL Connector (Java) version information for the required version that is compatible with the version of MySQL Workbench, MySQL Server, and Java SDK that were installed.

Connector/J version	JDBC version	MySQL Server version	JRE Supported	JDK Required for Compilation	Status
8.0	4.2	5.6, 5.7, 8.0	1.8.x	1.8.x	General availability. Recommended version.

To install the MySQL Connector/J:

- Go to https://dev.mysql.com/downloads/connector/j/ to download MySQL Connector/J (be sure to download the correct version).
- Unzip the .ZIP file. Place the connector into the directory where the application CLASSPATH points to.

d. Install jDeveloper

Additional information about installing jDeveloper can be found at the following links: https://docs.oracle.com/middleware/12213/jdev/install/GUID-311BD061-083E-403A-8FE7-4D78EEAFCB45.htm#OJDIG174

https://docs.oracle.com/middleware/12213/jdev/install/GUID-311BD061-083E-403A-8FE7-4D78EEAFCB45.htm#OJDIG118

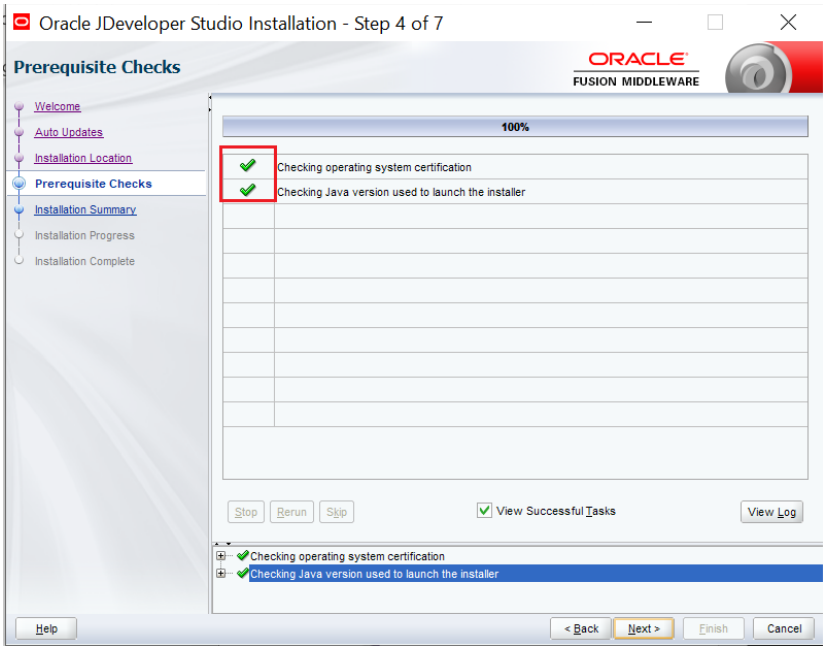
Installation of jDeveloper and related files

The "Oracle JDeveloper Studio Edition 12.2.1.3.0" edition is the complete version of JDeveloper with all the features and is the recommended version. This includes feathers for Oracle ADF applications. There are two files that are required to be downloaded and installed for the installation to be complete. Follow the steps below to install jDeveloper.

- The two files that needed downloaded are (1) File 1: jdev_suite_122130_win64.exe, (2) File 2: jdev_suite_122130_win64-2.zip.
- Installing File 1: jdev_suite_122130_win64.exe:
  - Launch the jdev_suite_122130_win64.exe (this step takes time for the installer to prepare and get started):
    - Click "Next" on the "Welcome" page.
    - Auto Updates: keep default: "Skip Auto Updates" and click "Next"
    - Keep default Oracle Home directory: "C:\Oracle\Middleware\Oracle_Home" (see warning below) (cannot be any spaces in the name of this directory), and click "Next".

      WARNING: be sure the path where JDeveloper is installed does NOT include the subdirectory of "Oracle_Home" since we are doing an upgrade from the original ArchNav and there are library dependencies on this directory structure – install directly into: C:\Oracle\Middleware

    - Click "Next" on the "Prerequisite Checks" screen assuming the prerequisite checks are all successful indicated by a green check.

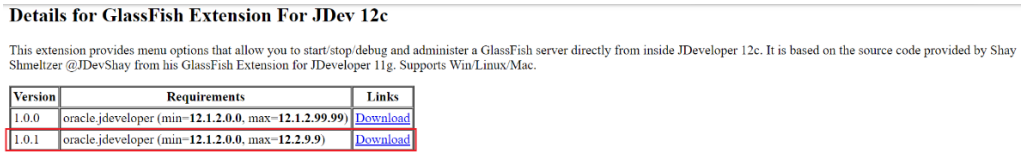


        - In the “Installation Summary” page, review the summary of components that will be installed, and then click “Install”.
        - After the installation completes, click on “Finish”.
- Installing File 2: jdev_suite_122130_win64-2.zip.
    - Although the documentation provides the below message, this step can be skipped for now.

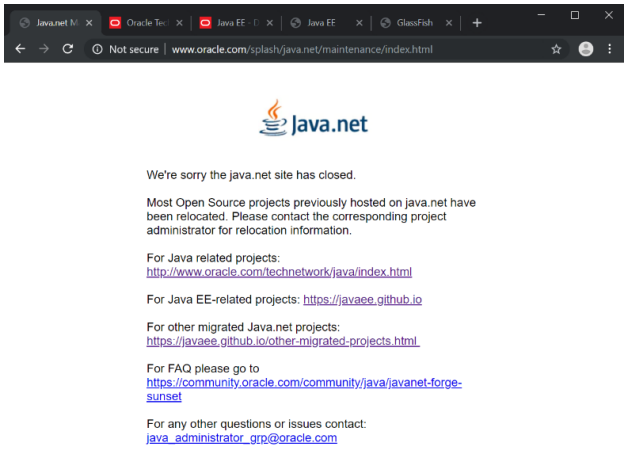
Add the jDeveloper GlassFish extensions

The GlassFish application server is used by ArchNav and so there are some GlassFish extensions that must be installed into jDeveloper. To do this, follow the below steps.

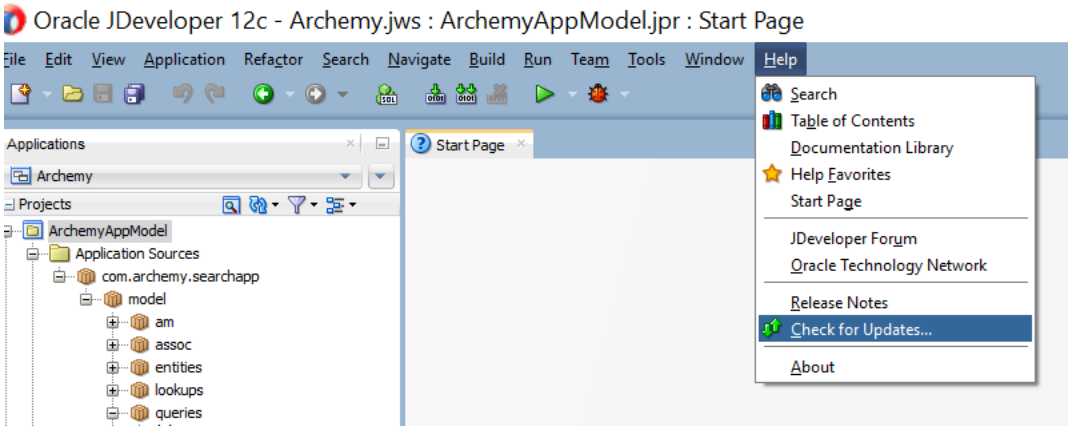
- Oracle JDeveloper Third Party Extensions - GlassFish Extension for JDev 12c can be downloaded from: https://www.oracle.com/ocom/groups/public/@otn/documents/webcontent/130355.xml
- The GlassFish extension for JDeveloper 12c can be downloaded from: https://www.oracle.com/ocom/groups/public/@otn/documents/webcontent/130355.xml#com.javanme.gfext
- Download the JDeveloper GlassFish extension version 1.0.1:



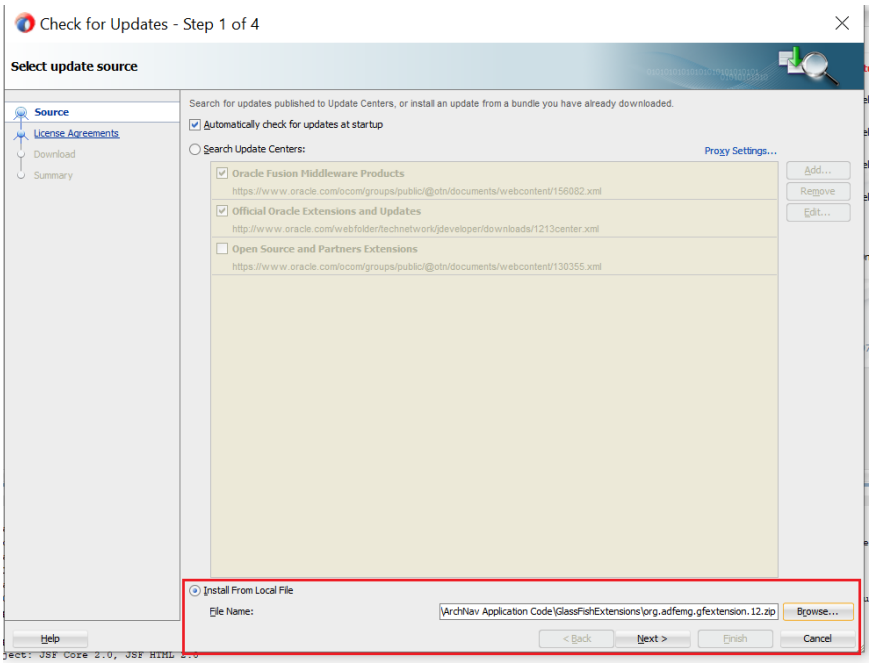
- After clicking on the “Download” hyperlink, redirected to the below page but none of these links lead to the glassfish extension download for JDevelper 12c.



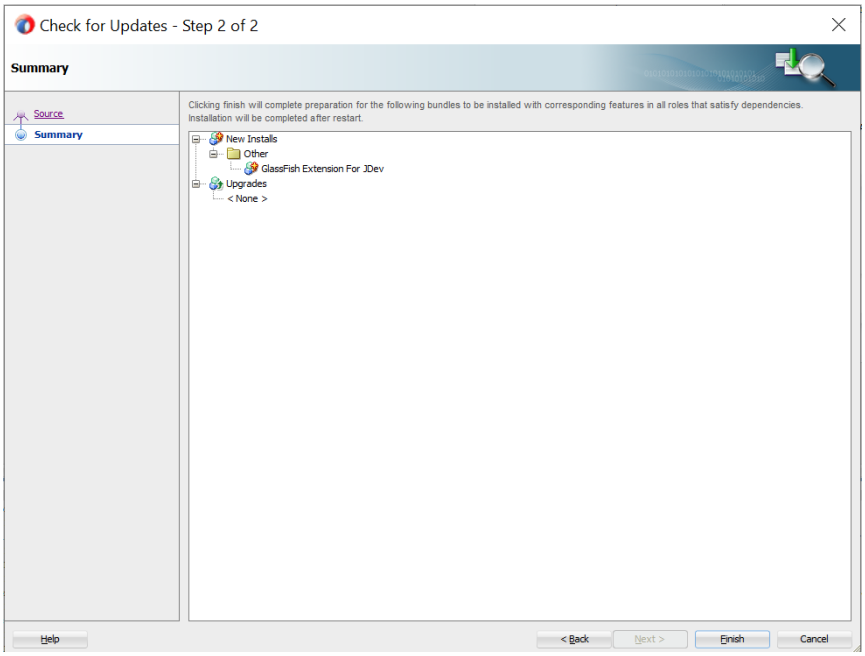
- After much search, found the glassfish extension for JDeveloper 12c at this link: https://github.com/adfemg/glassfish-extension
- The file downloaded from the link in step 2 directly above is "org.adfemg.gfextension.12.zip".
- In JDeveloper, go to Help → Check for Updates.



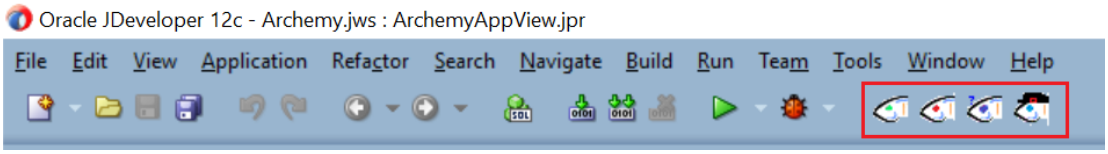
- Select "Install From Local File" and browse for the file that was downloaded in step 2 above. Click "Next".

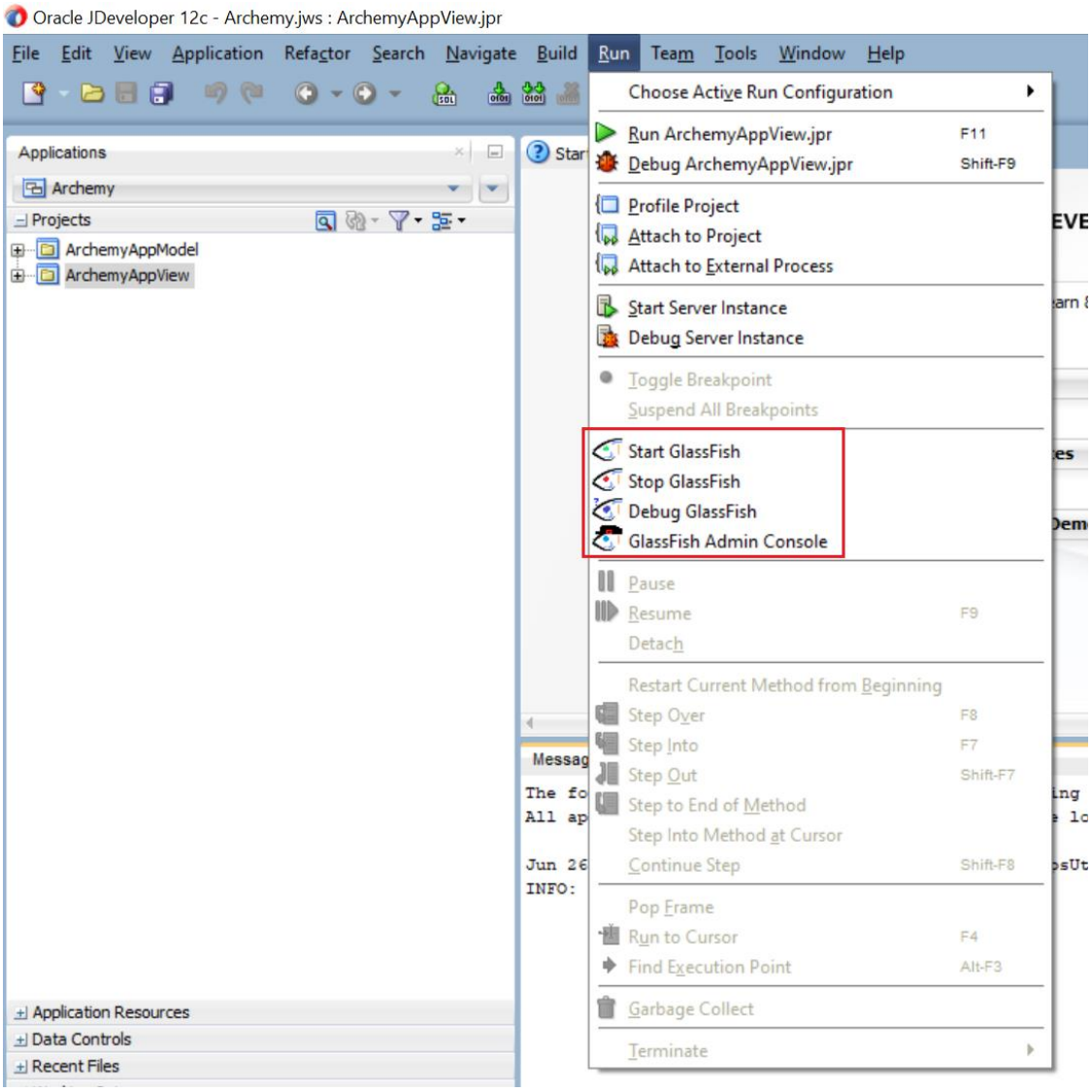


- JDeveloper will show a summary of what will be installed before the installation. Click “Finish” and restart the JDeveloper to complete the installation.



- After JDeveloper restarts, a new section of buttons is added to the toolbar as well as inside the “Run” menu that contain the Glassfish Extension buttons:





- Before using the GlassFish extension, configure the paths to the GlassFish server installation (do this step after installing the GlassFish server and so see the section on installing GlassFish below).

e. Install GlassFish and Glassfish Extensions with jDeveloper

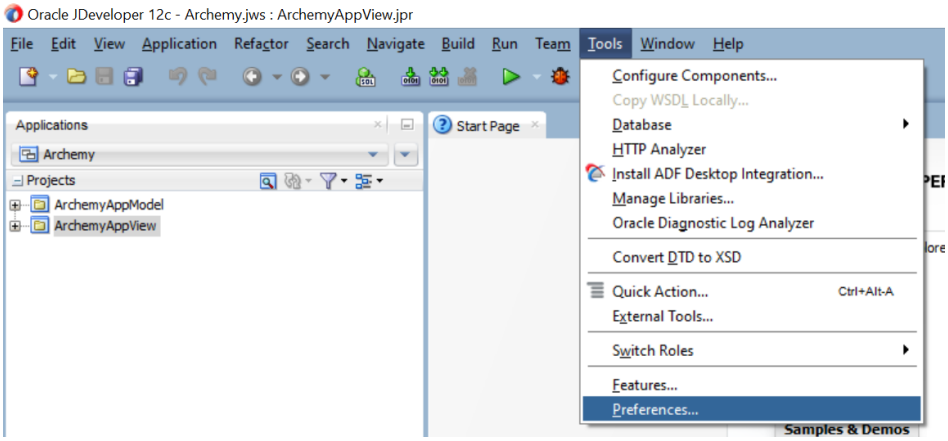
Install GlassFish

As was mentioned above, GlassFish is an application server required to run ArchNav. To install GlassFish, follow the steps below.

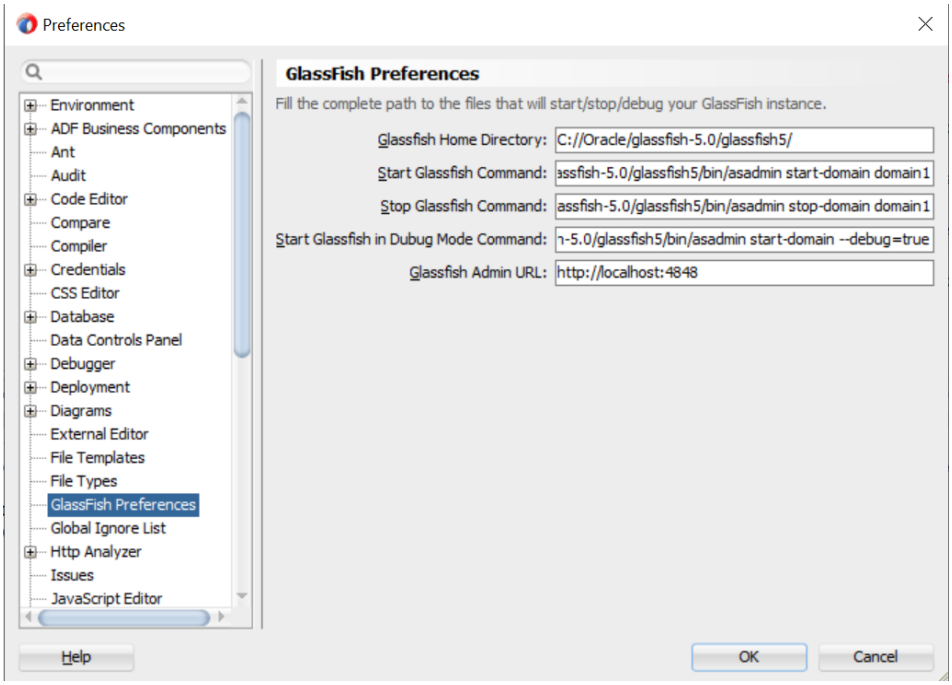
- Download Glassfish – choose "GlassFish 5.0 – Full Platform" from https://javaee.github.io/glassfish/download
- The file that gets downloaded will be a ZIP file – glasshish=5.0.zip.
- Change to the directory where the file was downloaded and unzip the file.
- GlassFish Server 5.0 is extracted into a new glassfish5 directory under the current directory. This glassfish5 directory is the as-install-parent directory that will be used in the start and stop commands.

Install GlassFish Extensions in jDeveloper

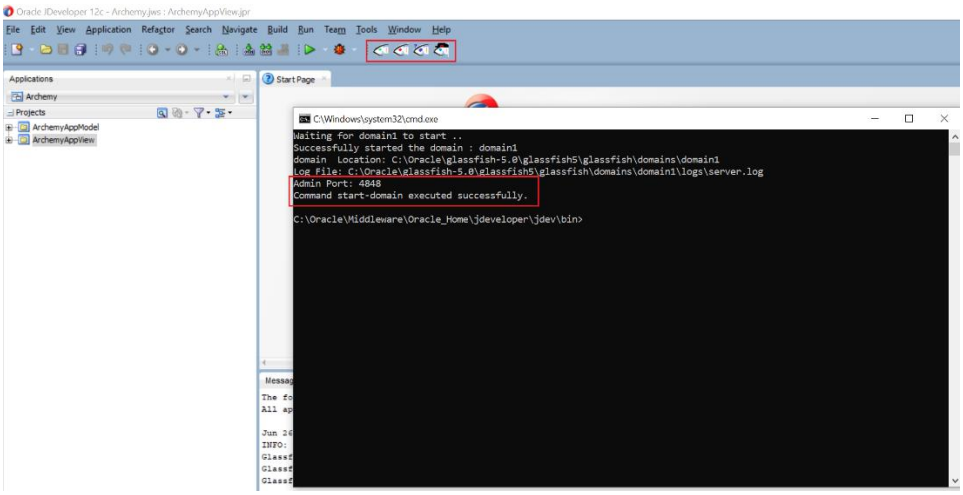
- After installing the GlassFish Server, in JDeveloper, configure the paths to the GlassFish server installation so can start and stop the GlassFish server from JDeveloper:
  - In JDeveloper, go to Tools → Preferences → Glassfish Preferences:



  - Add the path to the GlassFish preferences. These will be used by the GlassFish buttons in the JDeveloper toolbar and Run menu:



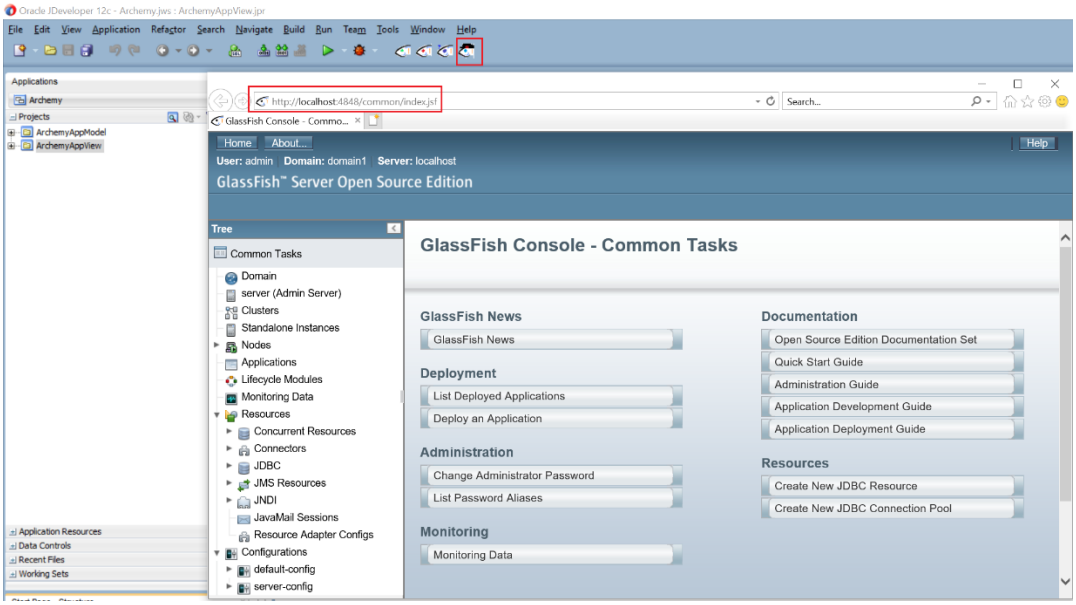
- Click “OK”.
- Test that GlassFish can be started and stopped from JDeveloper by clicking on the “Start GlassFish” button (the left-most fish head button in the screenshot below):



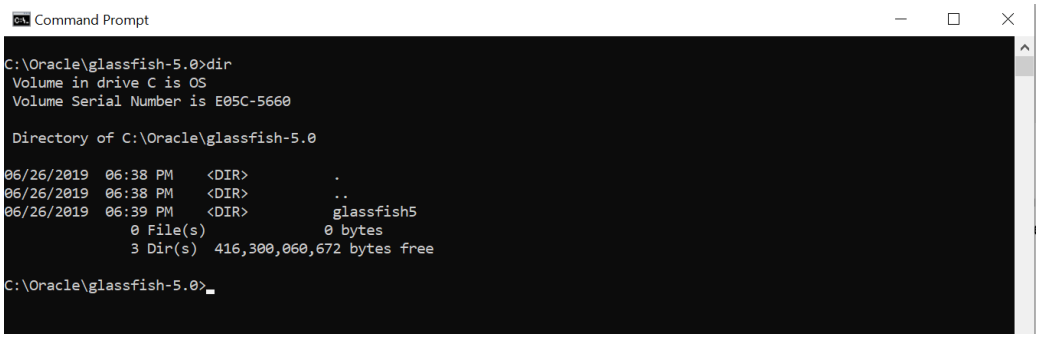
- Starting and stopping the GlassFish server will appear in the message logs in JDeveloper:

```
Messages - Log
The following messages were generated while migrating Applications, Default Project Settings (applications.xml):
All application and project data will remain in the locations in which they were created by the previous install.

Jun 26, 2019 6:00:20 PM oracle.security.jps.util.JpsUtil disableAudit
INFO: JpsUtil: isAuditDisabled set to true
Glassfish is Starting
Glassfish Stopped
Glassfish is Starting
Glassfish Administrator is Starting
Glassfish Stopped
```

- The “Stop GlassFish” button is second from the left. The third button from the left is the “Debug GlassFish” button. Finally, the fourth button is the button to launch the “GlassFish Admin Console”. The GlassFish Admin Console will be launched in a browser window (see screenshot below):

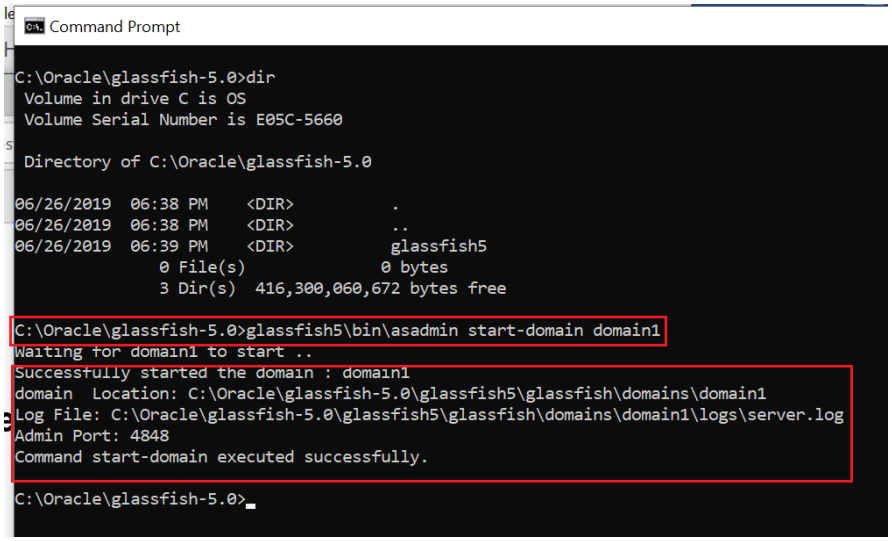


- GlassFish can also be started and stopped manually:
  - Open a command window (Windows Dos will work).
  - Navigate to one directory up from the as-install-parent directory:



  - Start the GlassFish Server by typing the command:

glassfish5\bin\asadmin start-domain domain1



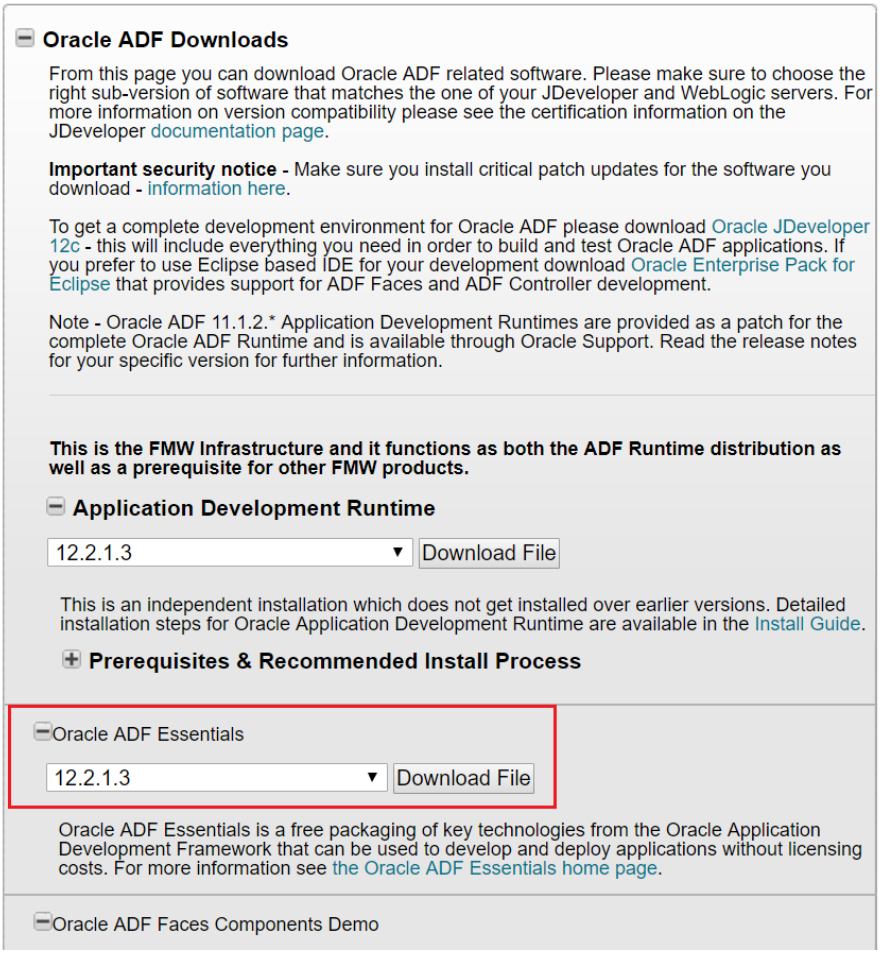
- After GlassFish is started, you can launch the GlassFish Admin Console by going to a browser and typing the URL: http://localhost:4848
- Stop the GlassFish Server by typing the following command:

glassfish5\bin\asadmin stop-domain domain1

f. Install Oracle ADF Essentials (for jDeveloper and Glassfish)

The ArchNav application uses ADF Essentials and so ADF Essentials that are compatible with GlassFish must be installed. To do this, follow the below steps.

- Download ADF from: https://www.oracle.com/technetwork/developer-tools/adf/downloads/index.html
- Select “Oracle ADF Essentials” to download and choose version 12.2.1.3:



- Navigate to where the file (adf-essentials.zip) was downloaded and unzip the file.
- To install the ADF libraries, copy the files from the unzipped directory to the following glassfish directory (where the GlassFish Server was installed).

  <glassfish>\domains\domain1\lib\

  NOTE: all sub-directories must be removed before deploying.

  The GlassFish directory should be:

  <glassfish> directory = “C:\Oracle\glassfish-5.0\glassfish5\glassfish”

g. Install Maven

To install Maven, follow the steps below.

- To download Maven, go to the link: https://maven.apache.org/download.cgi

  Other useful links are:

https://www.mkyong.com/maven/how-to-install-maven-in-windows/
https://stackoverflow.com/questions/7593229/maven-wrong-local-pom-and-versioning-issue
https://maven.apache.org/guides/getting-started/maven-in-five-minutes.html
https://maven.apache.org/install.html

- Unzip the apache-maven-3.6.1-bin.zip into the desired directory (C dir)
- Add the maven bin directory (C:\apache-maven-3.6.1\bin) to the PATH environment variable

h. Install Cygwin

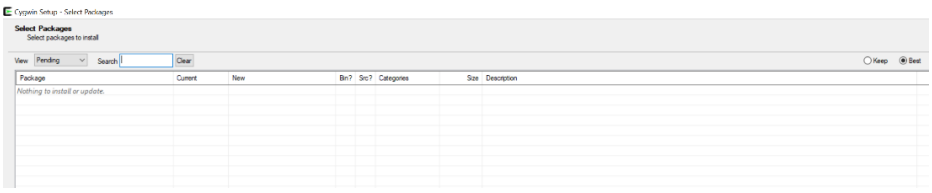
To install Cygwin, follow the steps below.

- Visit https://www.cygwin.com/ and download the latest Cygwin installer (filename: setup-x86_64.exe)
- Use Basic installation:
  - Follow the installer wizard

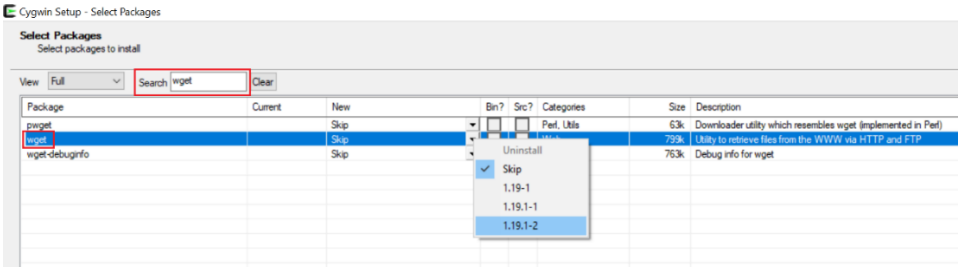
i. Install wget and git packages for Cygwin

To install wget and git packages, follow the steps below.

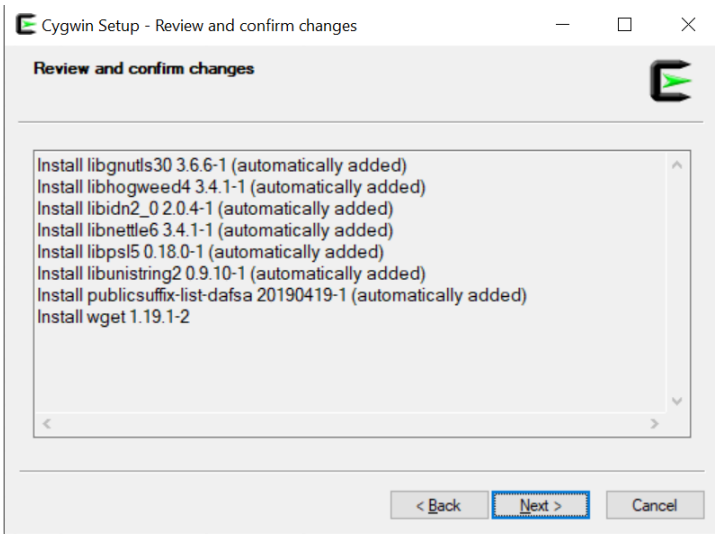
- Visit https://www.cygwin.com/ and download the latest Cygwin installer (filename: setup-x86_64.exe)
- Basic installation
  - Follow the installer wizard
- Add wget and git packages0
  - Re-run the installer to install “wget”
  - Step through the wizard until get to the page:



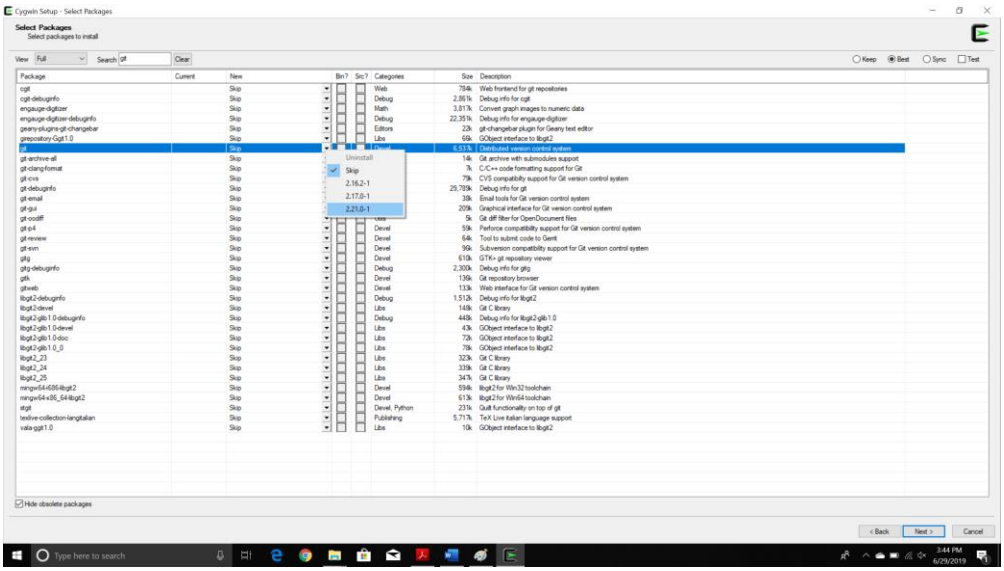
  - Search for “wget” and click on “Skip” to select the appropriate version and then click “Next”

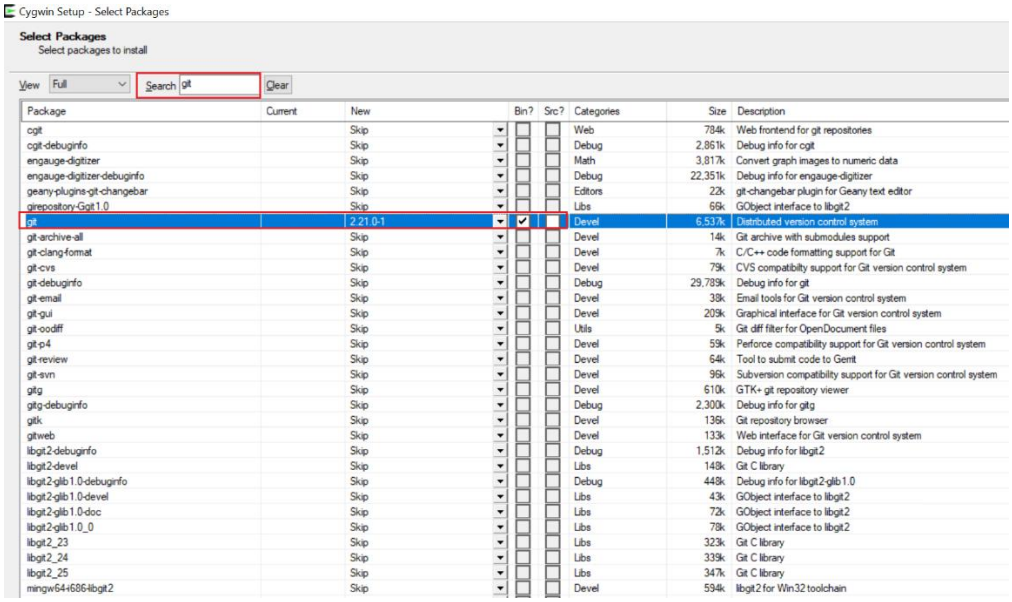


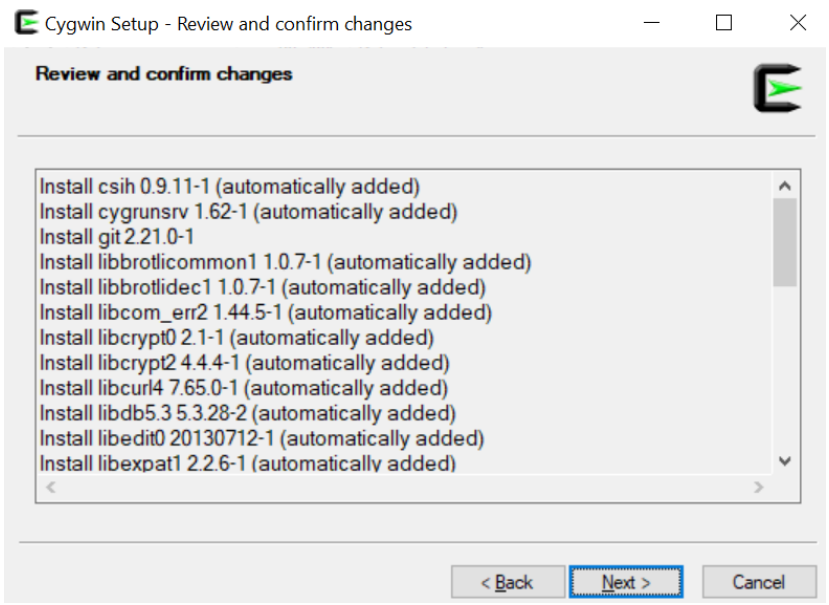
- Review the summary of the packages to be installed and click “Next”:



- After “wget” installs, click “Finish”
- Re-run the installer to install “git”
- Search for “git” and repeat the steps as when installed “wget”







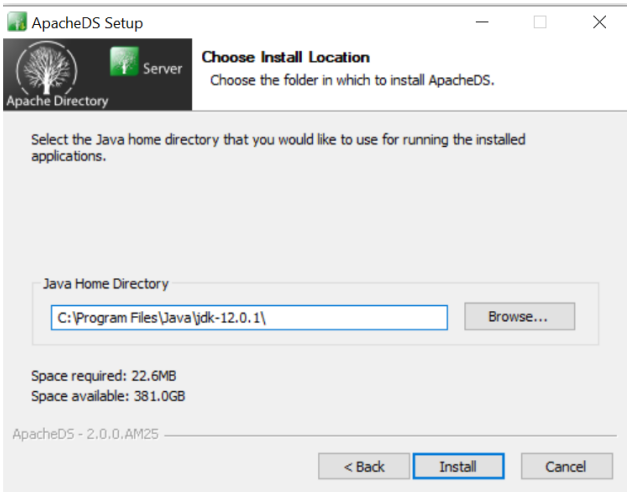
j. Install ApacheDS

To install Fortress, follow the below steps.

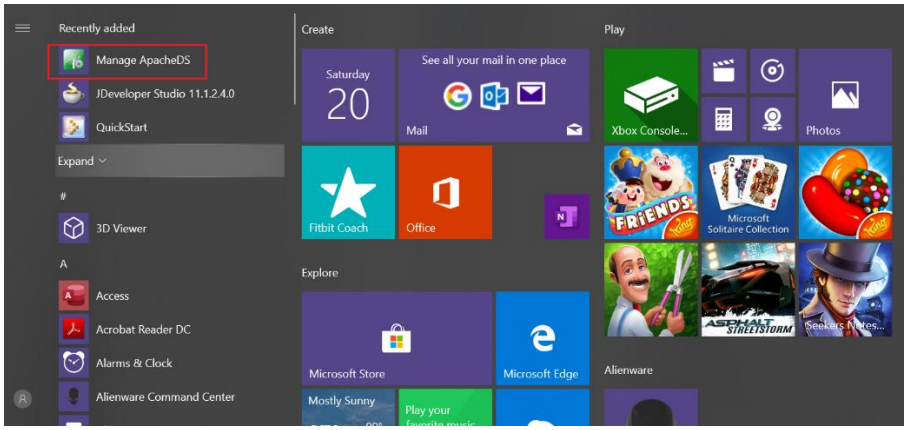
Some helpful links that provide addition installation information are:
https://directory.apache.org/fortress/installation.html
https://github.com/apache/directory-fortress-core/blob/master/README-QUICKSTART-APACHEDS.md

- Download ApacheDS:

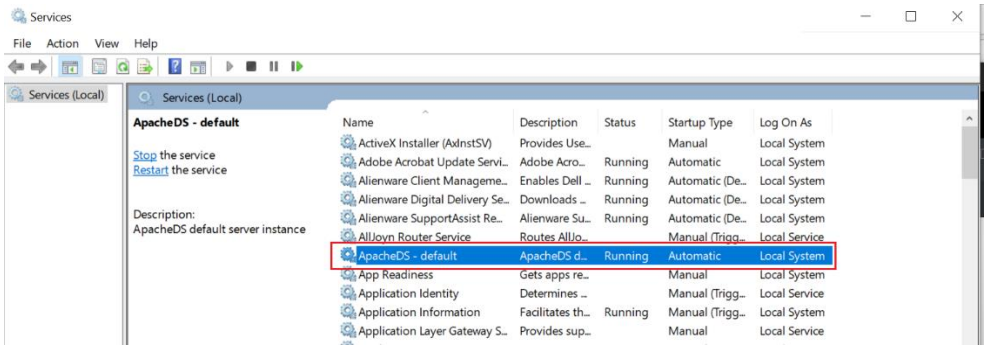
- Under “Section 2” of the install guide (https://github.com/apache/directory-fortress-core/blob/master/README-QUICKSTART-APACHEDS.md) the link to ApacheDS points to a Linux version. To download ApacheDS for Windows, go to the below link. Be sure the version is the same, which is “apacheds-2.0.0.AM25”: https://directory.apache.org/apacheds/download/download-windows.html
- First, download the apacheds for windows.
- Launch the apacheds-2.0.0.AM25.exe file
- Set the ApacheDS installation directory in C:\Program Files\ApacheDS\. By default, it wants to install into C:\Program Files (x86)\ApacheDS\ but this causes issues with Windows trying to startup the ApacheDS server throwing the error: “windows could not start the service on local computer error 1067”.
- Step through the install wizard, and specify the Java Home directory:



- To confirm that ApacheDS was installed properly and can run it:
  - Go to Windows Start menu and click on “Manage ApacheDS”:



  - The “Services” window should see “ApacheDS” with a status of “running”:



NOTE: the ApacheDS gets corrupted a lot. The service shuts down and cannot restart it – get an error. To fix, need to re-install this. First, use the Uninstall.exe executable, located in C:\Program Files (x86)\ApacheDS\, to uninstall ApacheDS. After the uninstall process completes, the "instances" directory remains. This has to be deleted as well. If not, the re-install will still produce the same error that is produced from the corrupted files. Because have to delete "instances" and do a clean re-install, must re-configure all the fortress stuff.

Some additional links that can be helpful with installing ApacheDS are:

https://directory.apache.org/apacheds/advanced-ug/5.2-start-stop.html
https://directory.apache.org/apacheds/advanced-ug/5.2-start-stop.html#on-windows
https://directory.apache.org/apacheds/advanced-ug/5.2-start-stop.html#522-windows-installer-exe)
(ApacheDS basic user guide: https://directory.apache.org/apacheds/basic-user-guide.html)
(ApacheDS advanced user guide: https://directory.apache.org/apacheds/advanced-user-guide.html)

k. Install Directory Studio

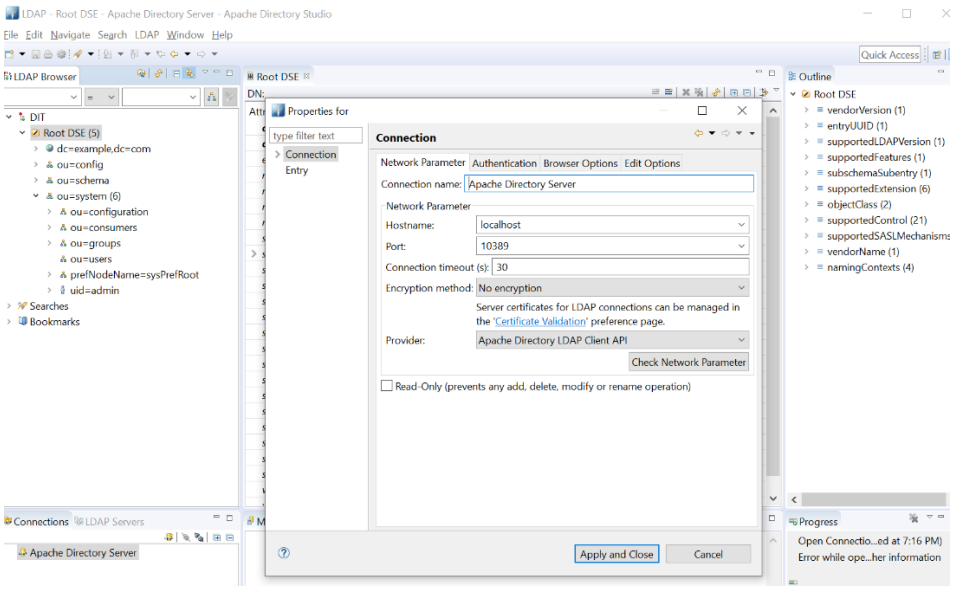
Directory Studio is a tool that makes it easier to connect to and browse LDAP connections in ApacheDS.

Some helpful links for installing and configuring Directory Studio

https://directory.apache.org/studio/
For windows: https://directory.apache.org/studio/download/download-windows.html
User guide to create a new connection: https://directory.apache.org/studio/users-guide/2.0.0.v20180908-M14/ldap_browser/gettingstarted_create_connection.html)
(full user guide TOC: https://directory.apache.org/studio/users-guide/2.0.0.v20180908-M14/ldap_browser/ and https://directory.apache.org/studio/users-guide.html)

- Configuring the port number in the Apache DS:
  - Fortress Core will be configured to connect to ApacheDS as its LDAP server. The connection details to Apache (including host, port) will need to be configured in Fortress to connect to ApacheDS. The default port to ApacheDS is in the screenshot below, which

can be accessed by right-clicking on the LDAP connection in Apache Directory Studio and then clicking on “Connection” in the left frame (resource: https://directory.apache.org/apacheds/basic-ug/1.4.1-changing-server-port.html):

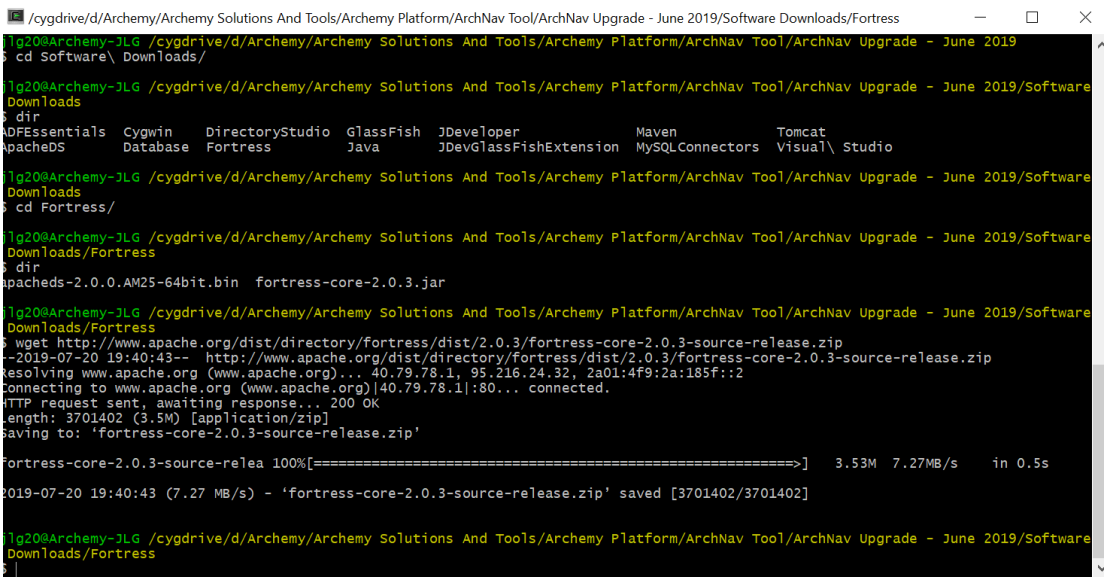


I. Install Fortress

To install Fortress, follow the below steps.

Useful links: A step-by-step tutorial to build Apache Fortress Core (https://directory.apache.org/fortress/gen-docs/latest/apidocs/org/apache/directory/fortress/core/doc-files/apache-fortress-core.html)
(user guide: https://directory.apache.org/fortress/user-guide.html)
(Overview: https://directory.apache.org/fortress/
and https://directory.apache.org/fortress/overview.html)

- Launch the installer executable and follow the wizard.
- Download and install Apache Fortress Core:
  - Use wget http://www.apache.org/dist/directory/fortress/dist/2.0.3/fortress-core-2.0.3-source-release.zip



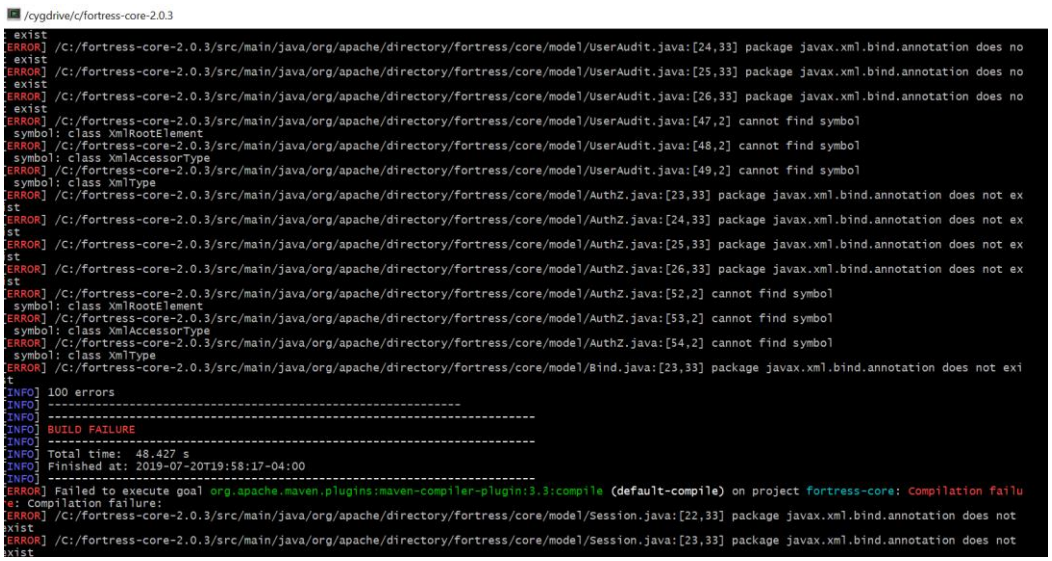
- unzip fortress-core-2.0.3-source-release.zip.
- cd fortress-core-2.0.3 (placed into C directory).

- Prepare the package:
  - cp build.properties.example build.properties:
    - The following properties were already configured (NOTE: the default port for ApacheDS LDAP server is 10389 and so this is already configured although the installation guide specifies “389” for the port. Look at the above installation of ApacheDS and configuring the port through Apache Directory Studio above)

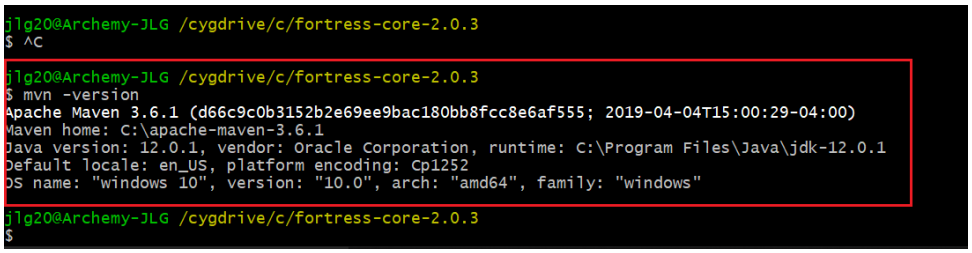
      # This is default, tells fortress what type of ldap server in use:
      ldap.server.type=apacheds

      # These parameters point fortress to LDAP host:
      ldap.host=localhost
      ldap.port=10389

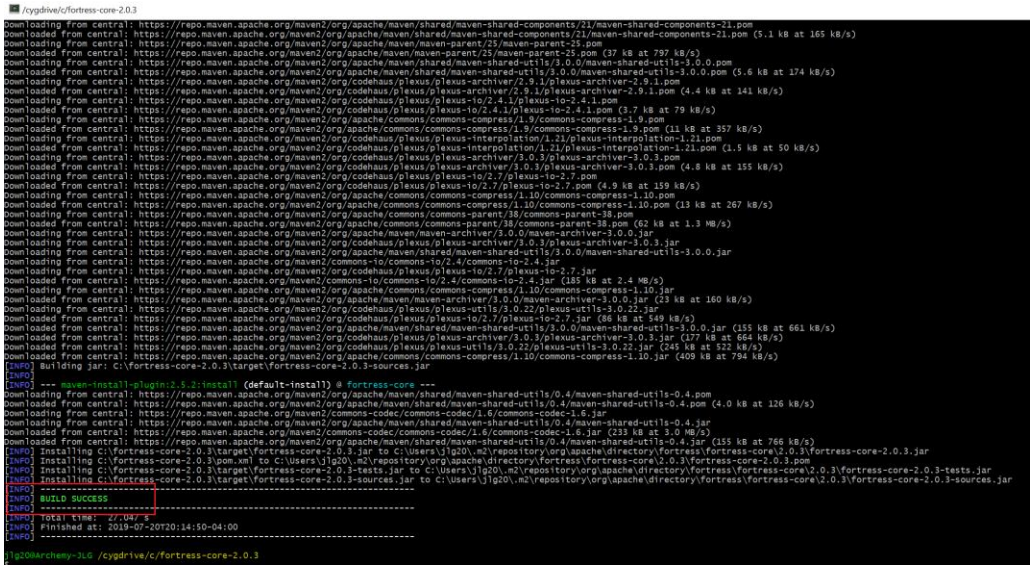
- Build Fortress Core
  - Open Cygwin, go to the root directory of fortress (C:\fortress-core-2.0.3\) and type “mvn install”
    - NOTE: not all JDK versions include the correct packages to build Fortress Core. JDK 12 does not include certain required packages and so the build will fail:



- Running “mvn -version” not only tells the version of Maven being used, but also what JDK version it is using:



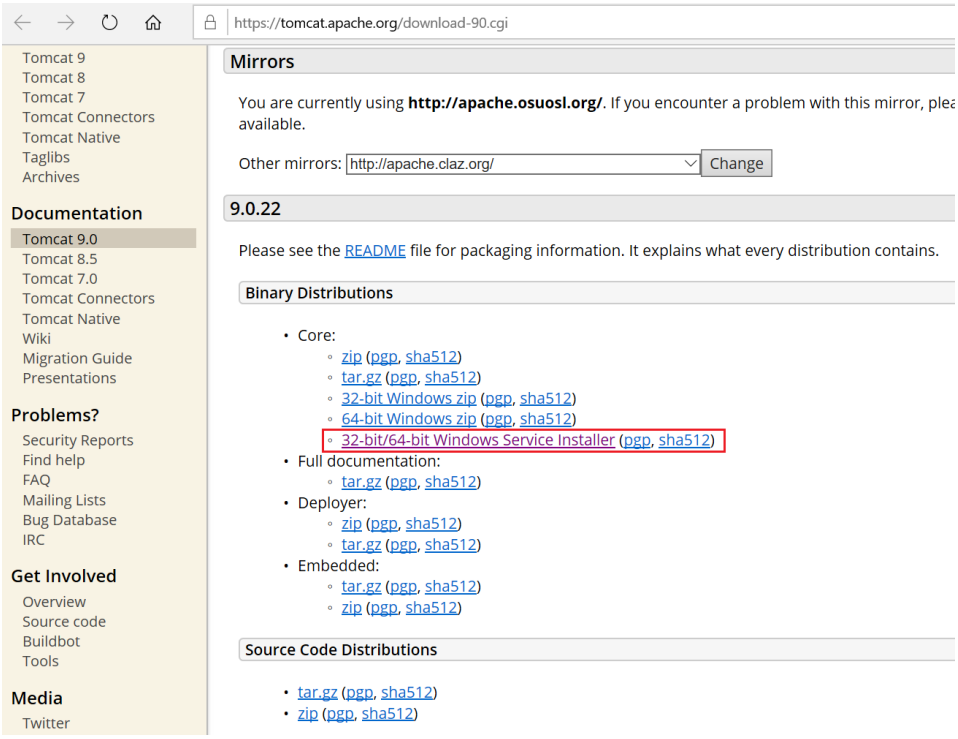
- Make sure the JAVA_HOME environment variable (see SYSTEM) is set to the proper JDK – must be set to JDK 8 since javax.xml.bind is a required package that is no longer available in JDK 12 (also deprecated in JDK versions later than JDK 8 – resource: https://stackoverflow.com/questions/52502189/java-11-package-javax-xml-bind-does-not-exist
  also see: http://openjdk.java.net/jeps/320#Java-EE-modules)
- After pointing Maven to JDK 8 (set JAVA_HOME Env variable), re-run “mvn install” and this time the build should be successful:



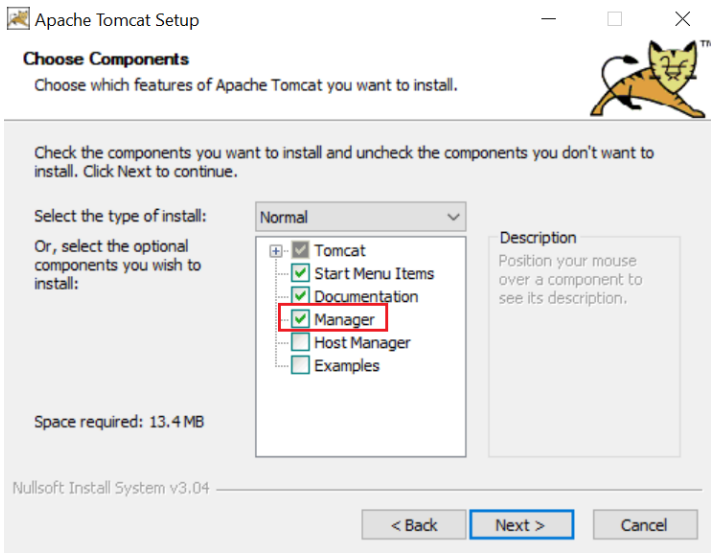
m. Install Tomcat

Tomcat is an application server where Fortress is deployed and so it must be installed. To do this, follow the below steps.

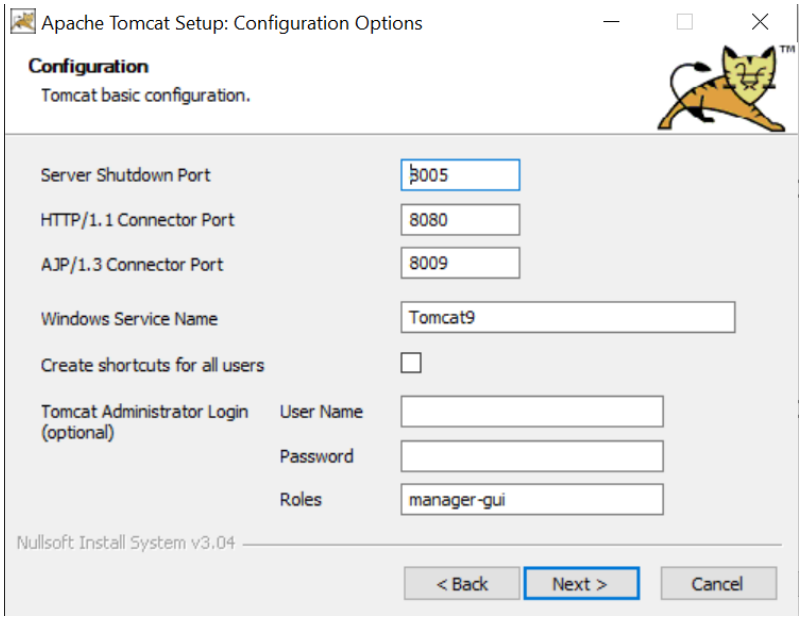
- Install Apache Tomcat (install guide: http://tomcat.apache.org/tomcat-9.0-doc/setup.html) and (download link: https://tomcat.apache.org/download-90.cgi):
  - Download the executable installer:



- Run the executable installer and step through the wizard:
  - Make sure the “Manager” app is included in the installation:



  - Accept the default ports (NOTE: leave the “Tomcat Administrator Login” credentials blank – this will be added later):

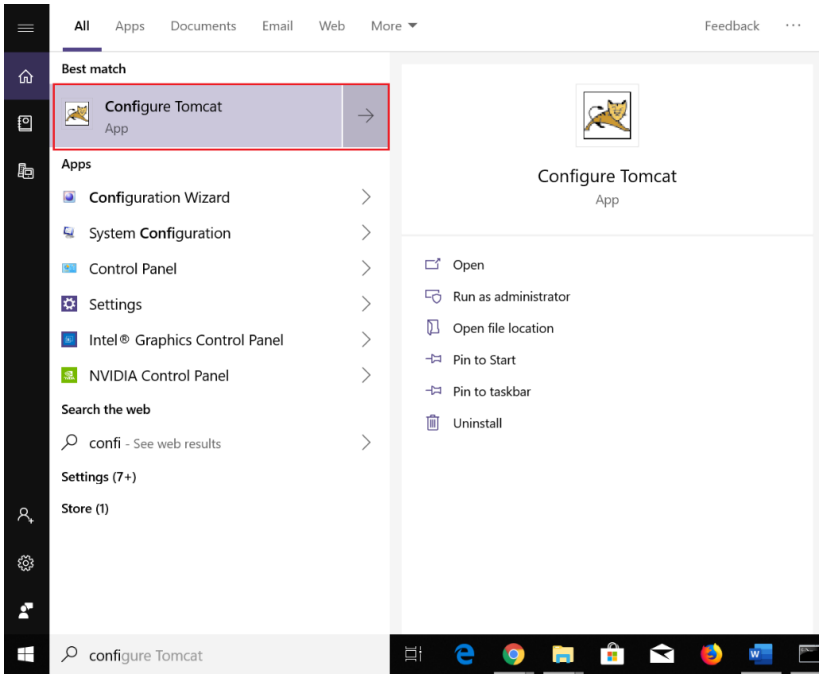


  - Installs into directory:

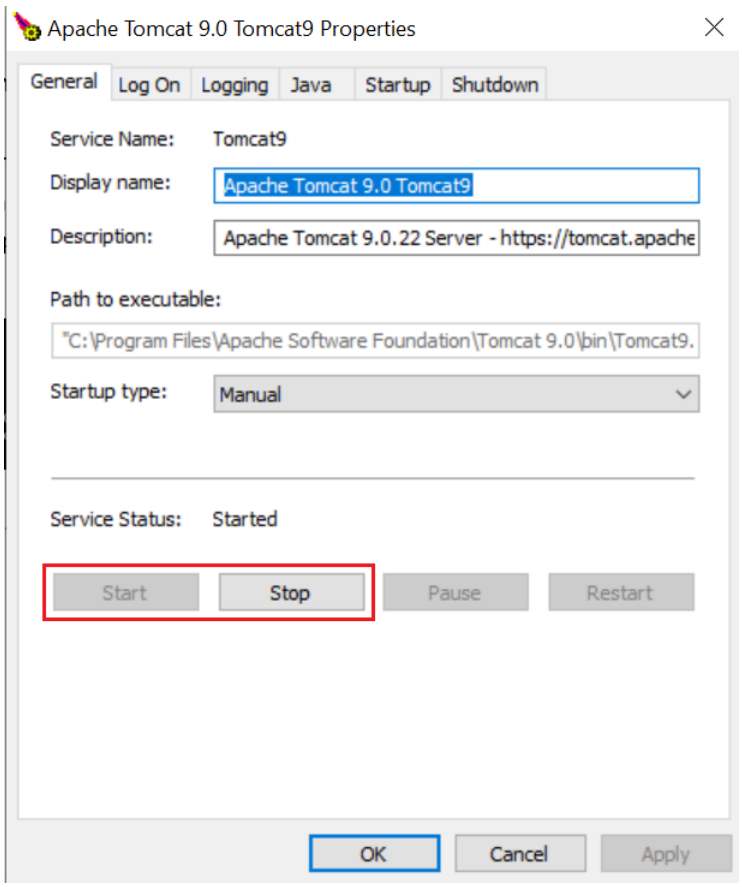
    C:\Program Files\Apache Software Foundation\Tomcat 9.0

- Unzip apache-tomcat-9.0.21-windows-x64.zip in the C directory.
- To test run Tomcat.

- (preferred method): Under Windows Stat Menu, select “Configure Tomcat”:



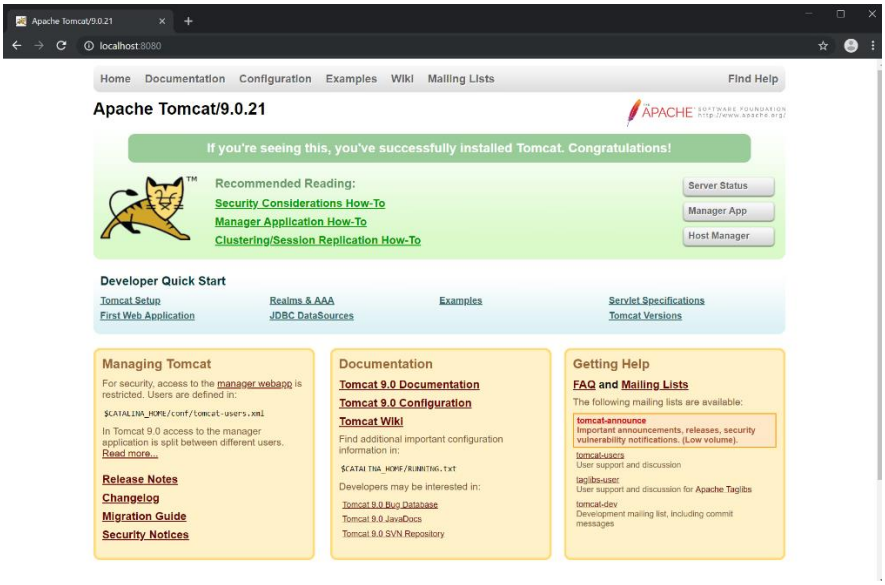
- Use the below to “Start” or “Stop” Tomcat:



- An alternative method to start/stop Tomcat is: using Cygwin, navigate to the apache-tomcat root directory.
- Type the command: "./bin/catalina.sh start" (to stop Tomcat use command: "./bin/catalina.sh stop").
- Tomcat will startup:

```
jlg20@Archemy-JLG /cygdrive/c/apache-tomcat-9.0.21
$ ./bin/catalina.sh start
Using CATALINA_BASE:   C:\apache-tomcat-9.0.21
Using CATALINA_HOME:   C:\apache-tomcat-9.0.21
Using CATALINA_TMPDIR: C:\apache-tomcat-9.0.21\temp
Using JRE_HOME:        C:\Program Files\Java\jdk1.8.0_212
Using CLASSPATH:       C:\apache-tomcat-9.0.21\bin\bootstrap.jar;C:\apache-tomcat-9.0.21\bin\tomcat-juli.jar
Tomcat started.
```

- Confirm by launching the Tomcat Admin Console at http://localhost:8080



- Download and integrate Fortress Realm to Tomcat:
  - Using Cygwin, download Fortress Realm (JAR file) with the command: "wget http://repo.maven.apache.org/maven2/org/apache/directory/fortress/fortress-realm-proxy/2.0.3/fortress-realm-proxy-2.0.3.jar".
  - Copy the fortress-realm-proxy-2.0.3.jar file to the Tomcat lib directory (C:\apache-tomcat-9.0.21\lib\).
- To get access to the Manager app, add required users to the tomcat-users.xml file (located in C:\Program Files\Apache Software Foundation\Tomcat 9.0\conf\):

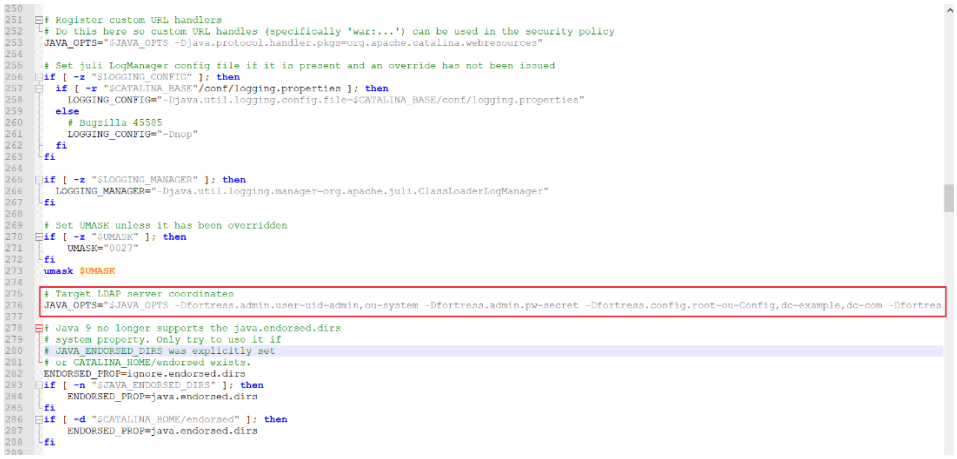
```
<role rolename="manager-script"/>
<role rolename="manager-gui"/>
<user username="tcmanager" password="m@nager123" roles="manager-script"/>
<user username="tcmanagergui" password="m@nager123" roles="manager-gui"/>
```

- Configure LDAP in Tomcat:

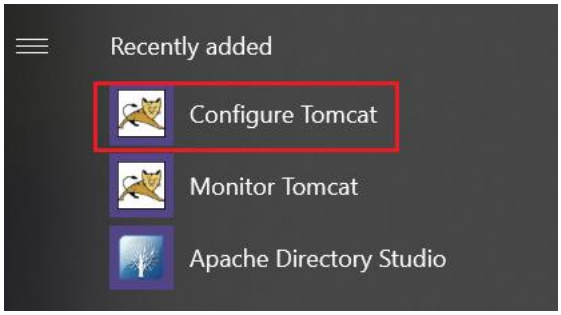
- Edit the Catalina.bat script (located in directory C:\Program Files\Apache Software Foundation\Tomcat 9.0\bin\) adding the following text in exactly the place indicated in the below screenshot:

  Command to add:

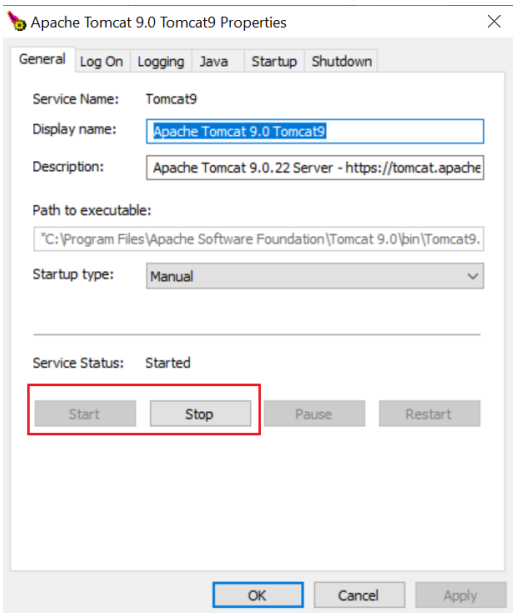
  rem Target LDAP server coordinates
  set "JAVA_OPTS=%JAVA_OPTS% -
  Dfortress.admin.user=uid=admin,ou=system -
  Dfortress.admin.pw=secret -
  Dfortress.config.root=ou=Config,dc=example,dc=com -
  Dfortress.port=10389"



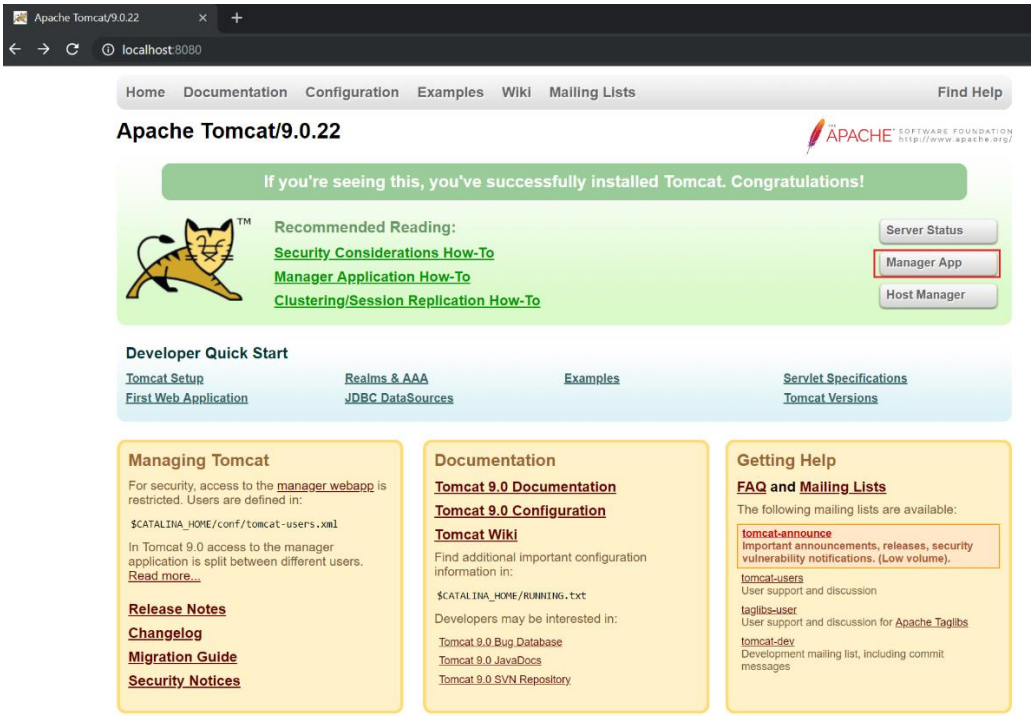
- Startup Apache Tomcat and access the Tomcat Web Application Manager console:
  - Go to the Windows StartUp menu and select “Configure Tomcat”:



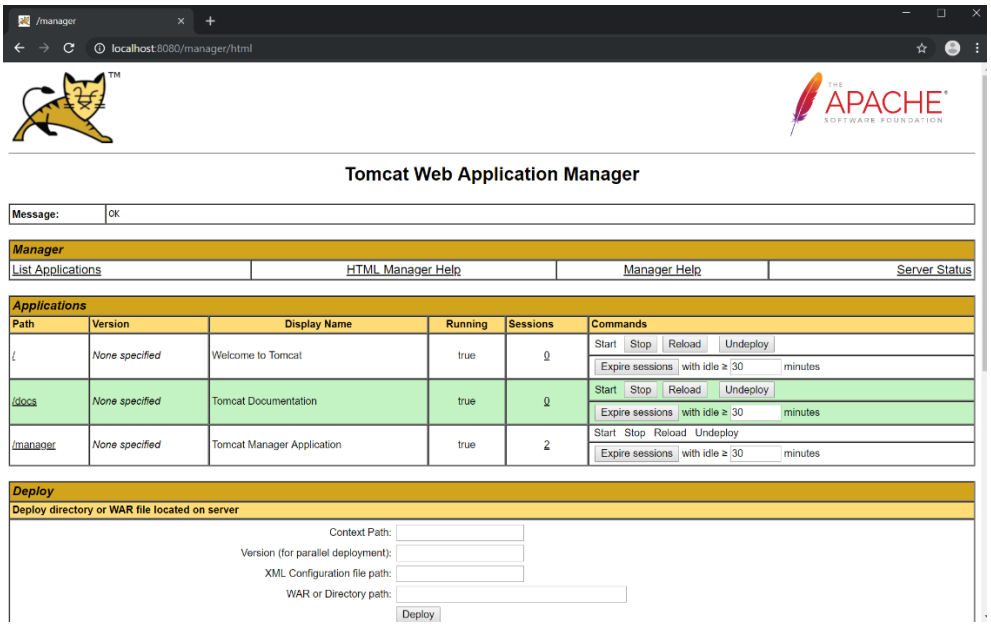
  - Toggle starting and stopping Tomcat with “Start” and “Stop,” respectively:



- Test access to the Manager application by launching the Apache Tomcat console (http://localhost:8080) and clicking on the “Manager App” button:



- Login using the tcmanagergui username and password that was configured in the tomcat-users.xml file:



3. Software Setups

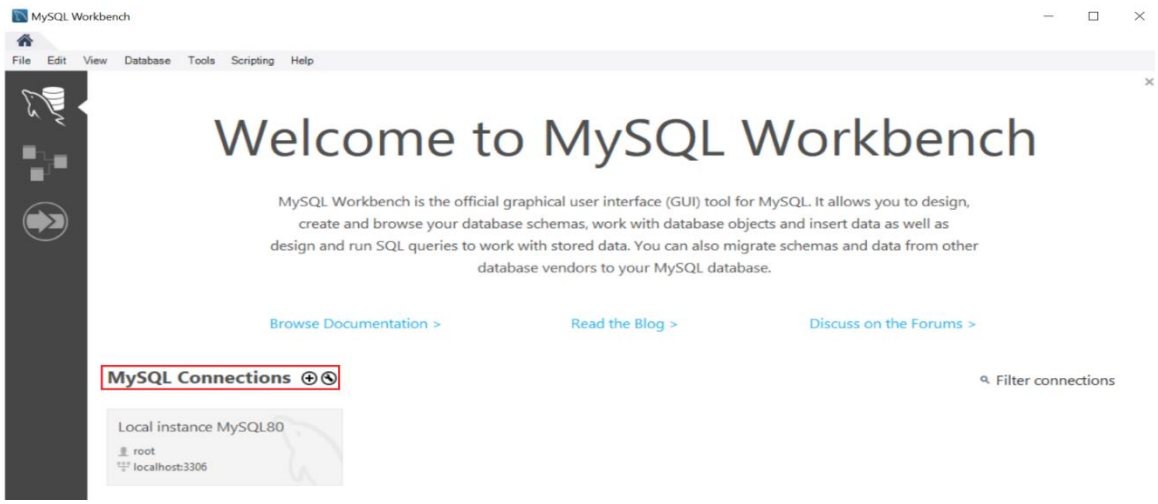
Several of the software applications that were downloaded require setup in order to run ArchNav. See below for details on how to setup each software application.

a. Setup the ArchNav Database

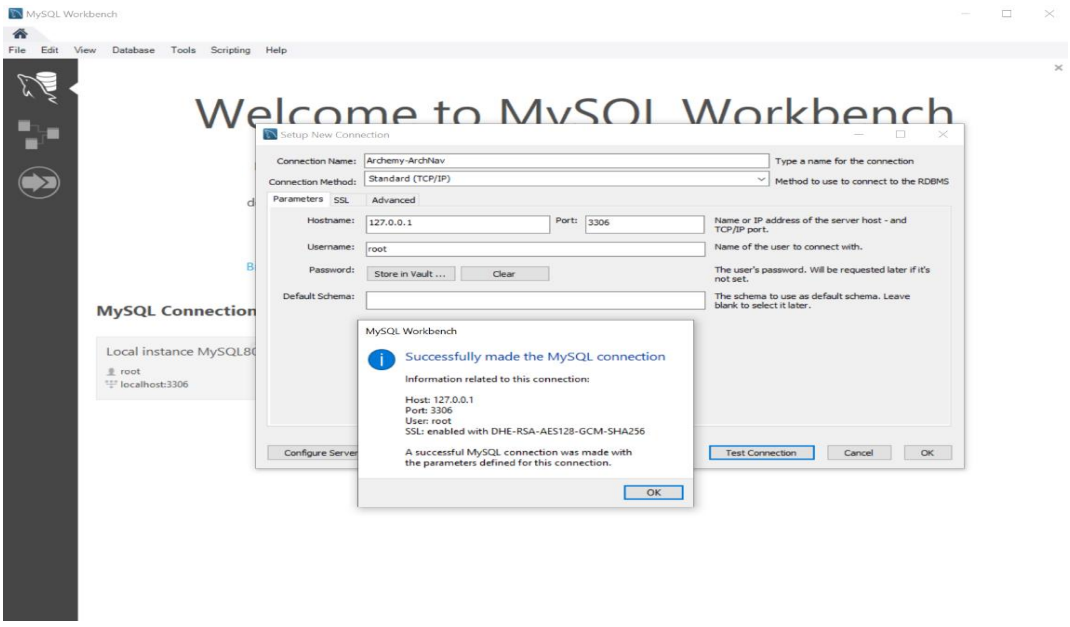
The MySQL Workbench can be used to setup the ArchNav database. Follow the below steps to complete this setup.

Create a new MySQL Connection for the ArchNav database

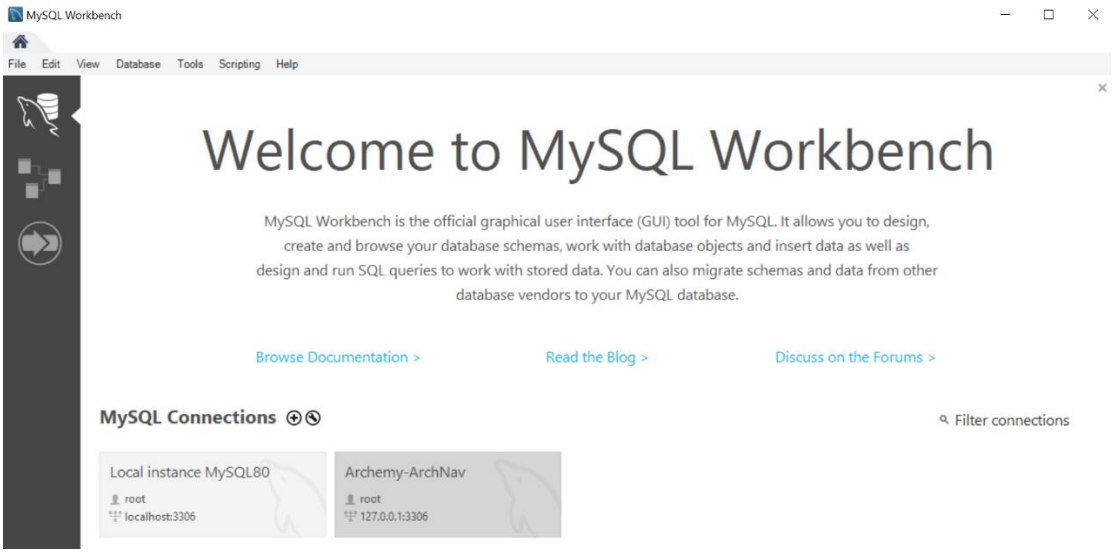
- Create a new MySQL connection for the ArchNav database. In the MySQL Workbench, click on “MySQL Connections”:



- Click on the ⊕ to create a new MySQL connection
- Enter the following information (see configuration and text connection results below):
  - Connection Name: for this new connection, using "***Archemy-ArchNav***"
  - Connection Method: "***TCP/IP***"
  - Hostname: "***127.0.0.1***"
  - Port: "***3306***"
  - Username: "***root***"
- Test the connection by clicking on the "***Test Connection***" button:



- After the new MySQL connection is created, there should be a separate button for that connection on the "**Welcome to MySQL Workbench**" homepage:



Import the ArchNav Schema into the new MySQL database

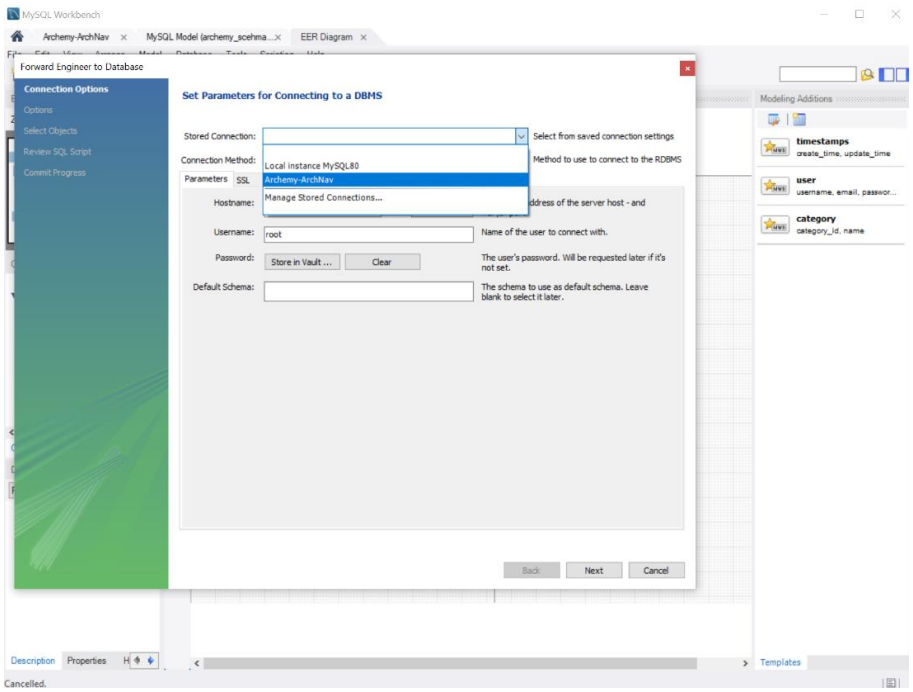
The first step is to import the database schema used for the ArchNav database. To do this, follow the below steps.

- Click on the new MySQL Connection Archemy-ArchNav.
- Import the archemy schema (this assumes you have an open connection with the new MySQL connection created in the steps above (in this case, the Archemy-ArchNav MySQL Connection).
  - In the application code directory, look for the directory "DB Model" and confirm that the archemy_schema.mwb file exists.
  - Go to the MySQL Workbench, in the open Archem-ArchNav connection and perform the following steps:
    - From the top navbar in the MySQL Workbench, go to *File* → *Open Model.*
    - Navigate to the "DB Model" directory and select the "archemy_schema.mwb" file and click "*Open*". The schema will load in the Workbench.

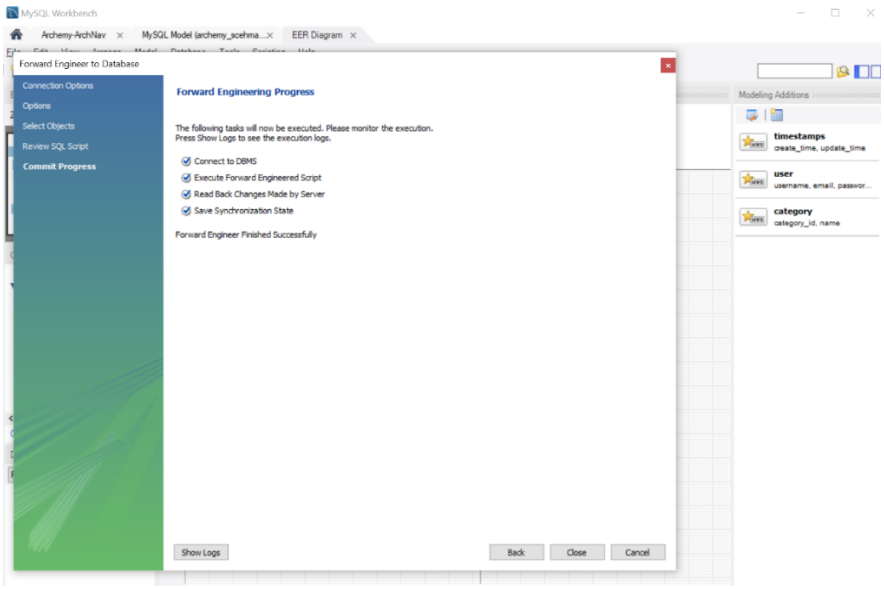
Export the Archemy-schema

Once the database schema was imported into MySQL Workbench, it must be exported to MySQL Server so it can be used. To do this, follow the below steps.

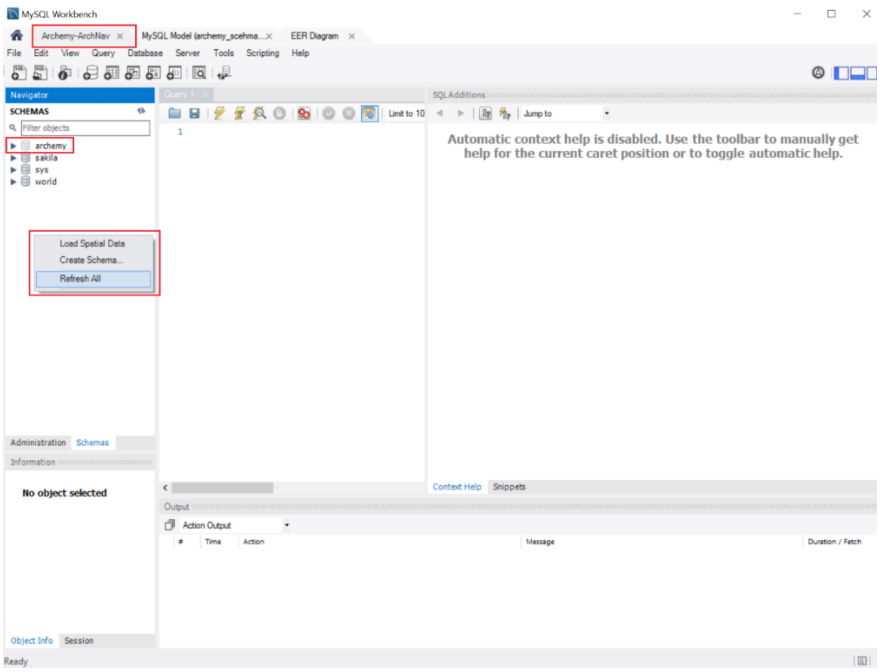
- From the top navbar in the MySQL Workbench, go to Database → Forward Engineer.
- Select the Archemy-ArchNav Stored Connection.

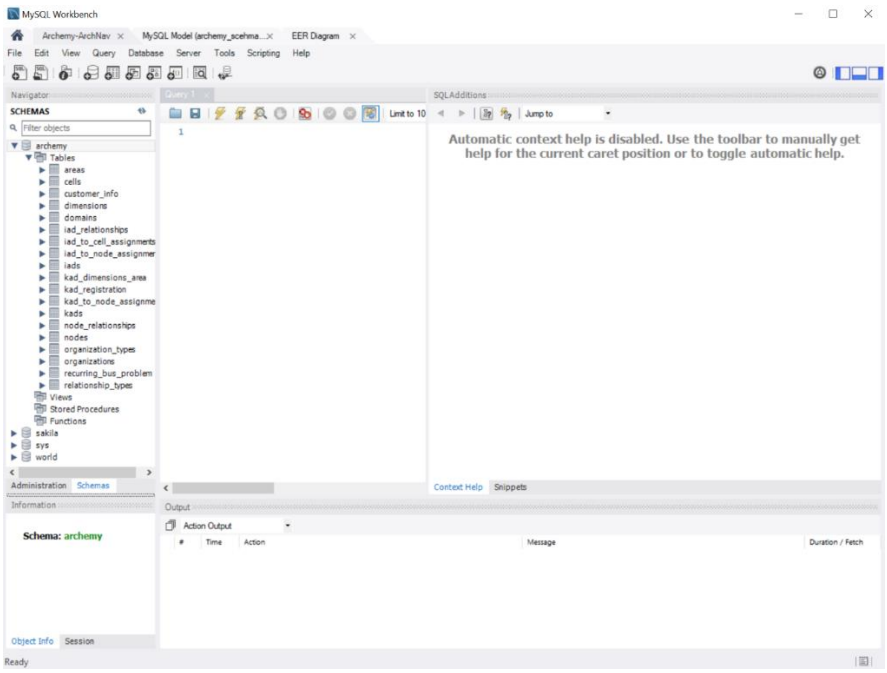


- Select the default configurations for the rest of the fields.
- Click on “Next”.
- In the next page “Set Options for Database to be Created”, keep the default settings and click “Next”.
- You will be prompted to enter the password for “root” and so enter this password.
- In the next page “Set Objects to Forward Engineer” select the default settings and click “Next”.
- In the next page “Review the SQL Script to be Executed” scroll through the script, and if “OK” then click “Next”.
- You will again be prompted to enter the root password, and so provide it.
- The forward engineering process will execute and the following success confirmation → the archemy-schema was successfully exported to the Archemy-ArchNav MySQL Server.



- Click “Close”.
- Confirm the archemy-schema was properly exported into the Archemy-ArchNav:
  - Select the “Archemy-ArchNav” tab.
  - Right-click in the “Schemas” frame, and select “Refresh All” and the “archemy” schema should appear in the list (see the two screenshots below):





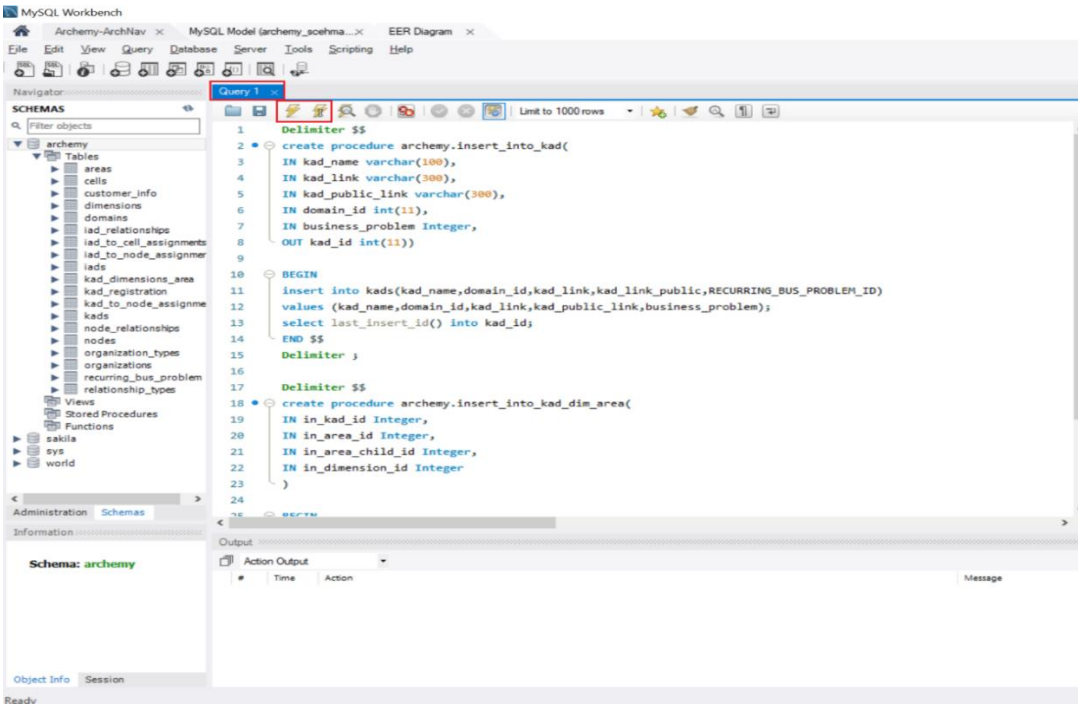
Import the ArchNav stored procedures

The ArchNav database makes use of stored procedures. Follow the below steps to import the stored procedures.

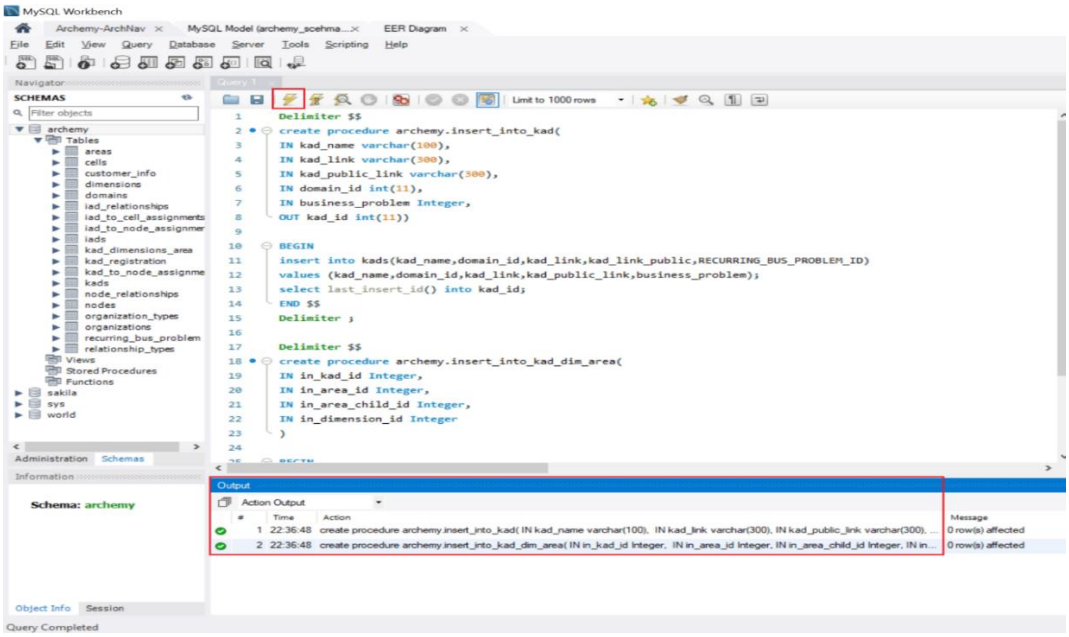
- Navigate to the following directory:

  "~\App\ArchemyAppModel\src\com\archemy\searchapp\model\sql\" and confirm that the procedures.sql file exists

- Open the procedures.sql file in an editor (e.g., Notepad++).
- Copy the contents of procedures.sql into the MySQL Workbench Query editor:



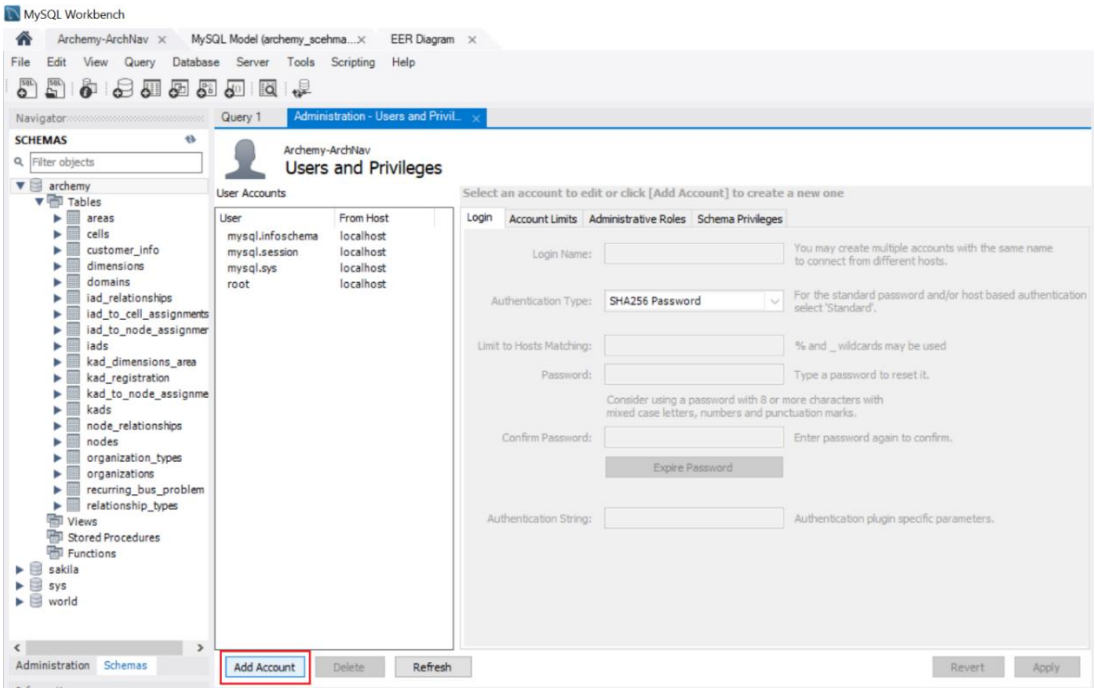
- Execute the procedures SQL code by clicking on the far-left lightning bolt button (see screenshot above). The below screenshot will show the action output following the execution of the procedures SQL. The action output states that the procedures were created.



Create the Archemy database user

The ArchNav application uses the “archemy” database user to connect to the ArchNav database. This database user must exist for the ArchNav to be able to connect to the database.

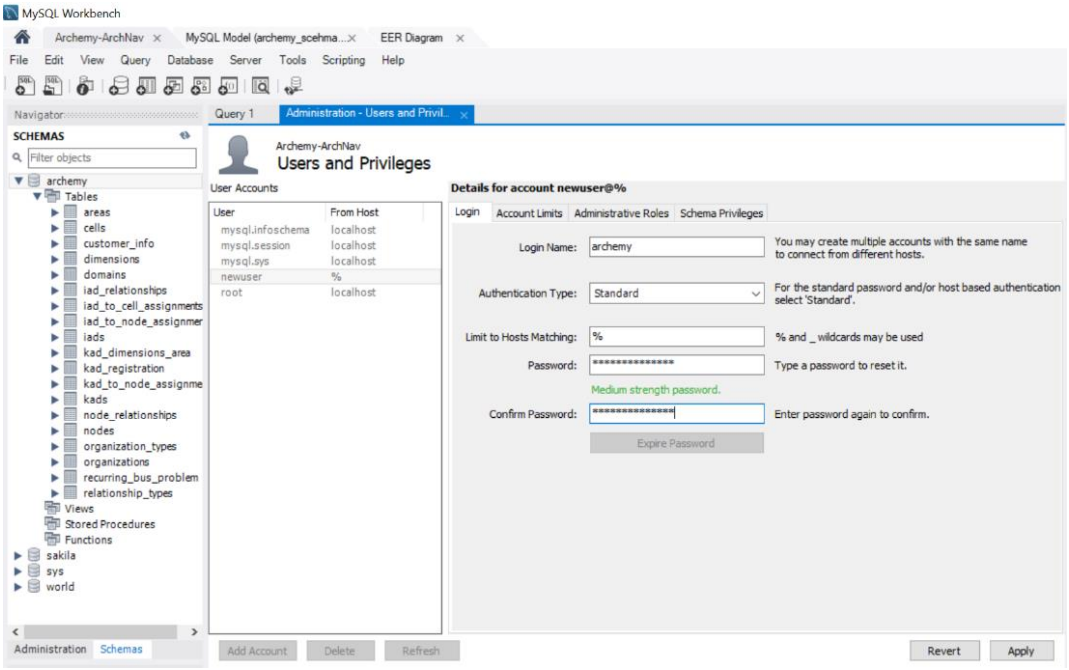
- From the top navbar in the MySQL Workbench, go to Server → Users and Privileges.
- In the “Users and Privileges” frame, click on the “Add Account” button (see screenshot below):



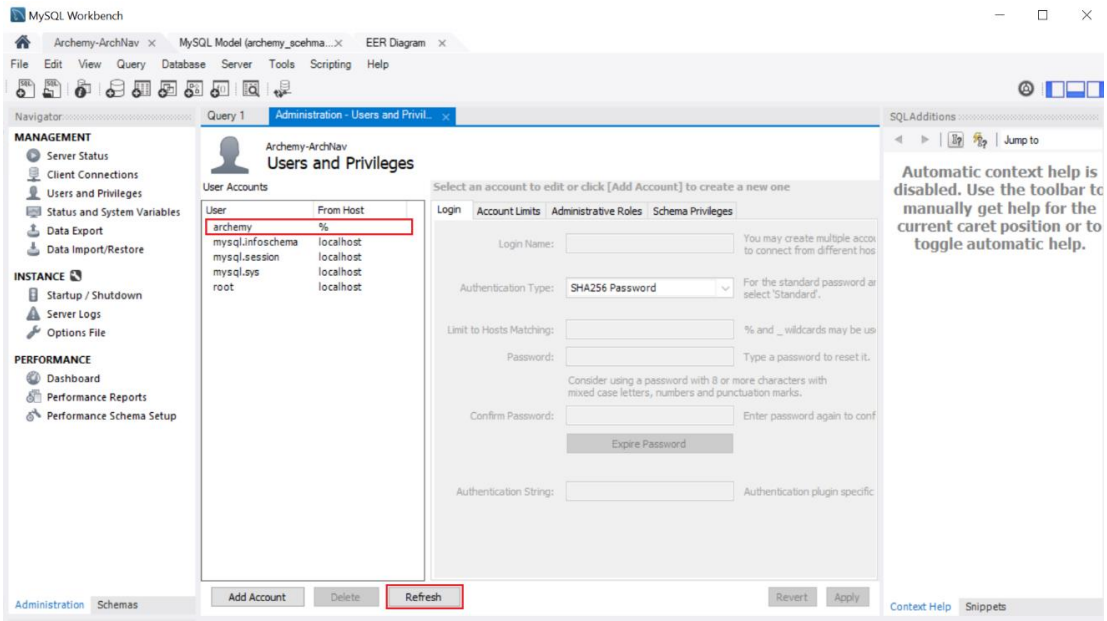
- Enter the following information:
  - Username: “archemy”.
  - Password: create a password and keep track of it.
  - Leave the default settings for the rest of the fields.

    NOTE: the percent sign “%” character for the “Limit to Hosts Matchup” matches zero or more characters and so “localhost” will be a match.

  - Click “Apply”



- To confirm the user was successfully created, click the “Refresh” button and the user “archemy” should appear in the left frame of the “Users and Privileges” page:



Import the ArchNav data

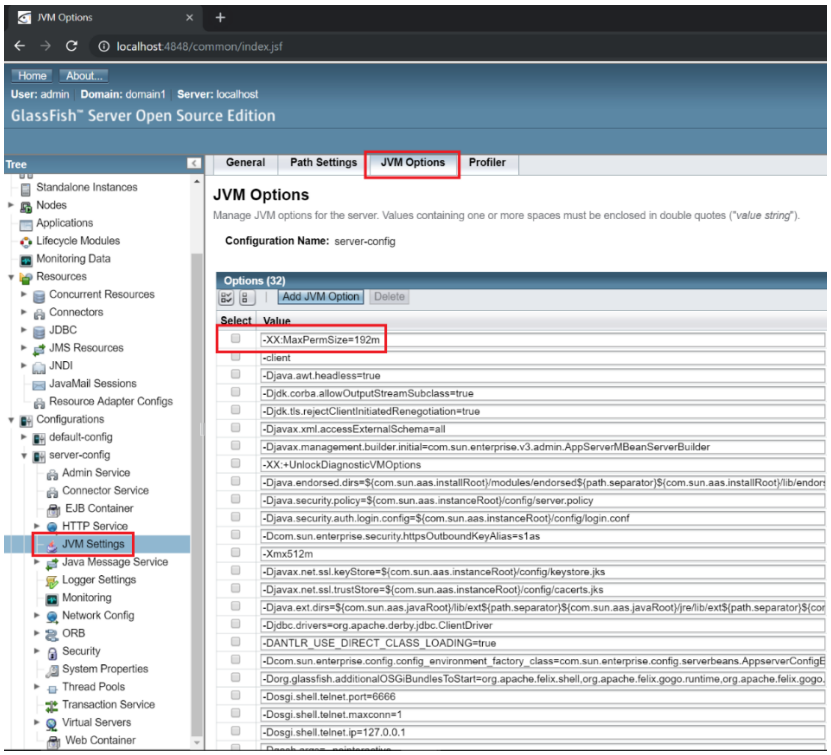
To import the ArchNav database data navigate to the Data sub-directory. Load the DatabaseImport.sql file into the MySQL Workbench and run the script.

b. Configure GlassFish for ADF Applications

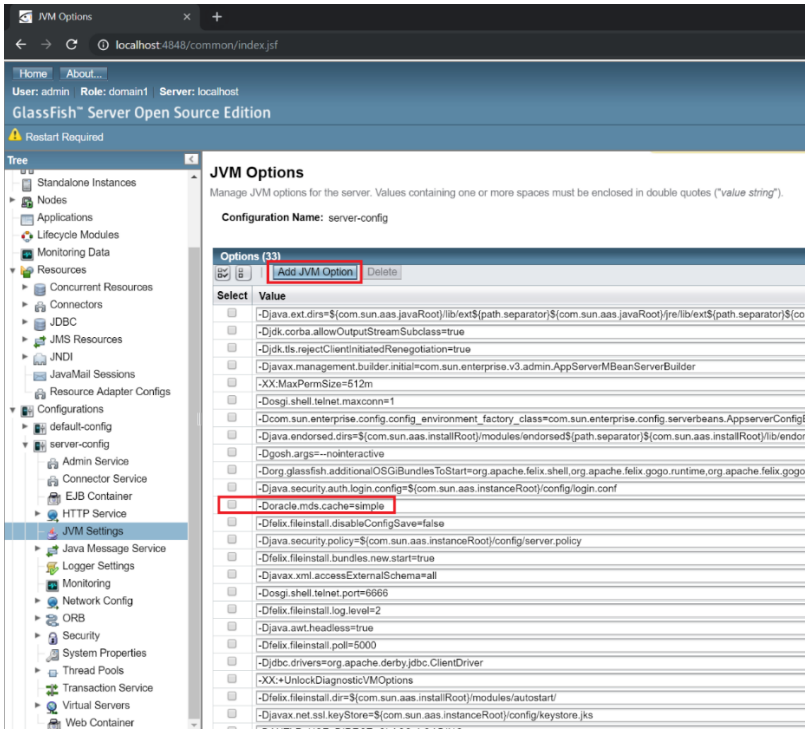
Configure GlassFIsh

To configure GlassFish for ADF applications, follow the below steps.

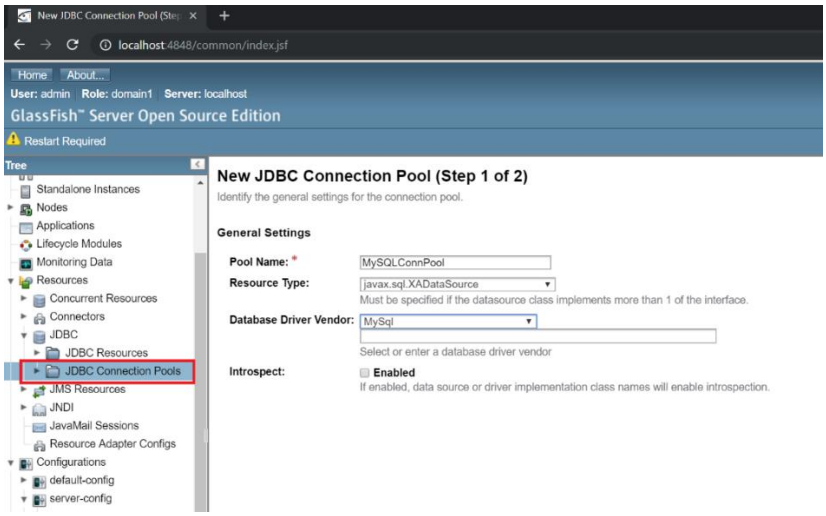
- In the GlassFish admin console, increase the JVM MaxPermSize to 512m:
  - Click on server-config → JVM Settings.
  - Click on the "JVM Options" tab.
  - Update the -XX-MaxPermSize value by increasing it to 512m (see below):



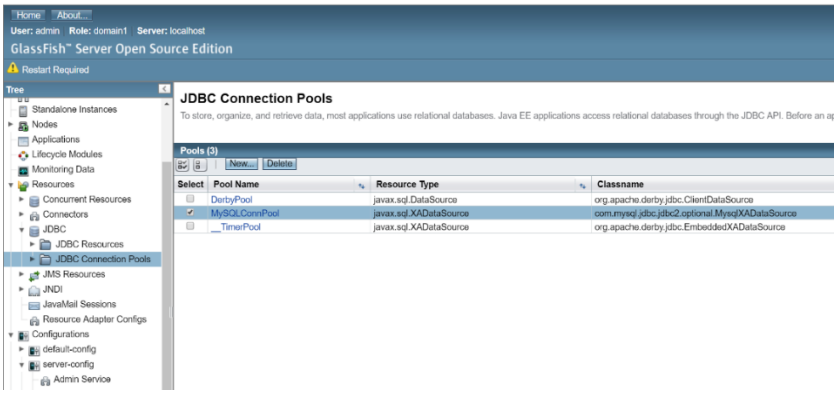
- Add -Doracle.mds.cache=simple as a DVM Option:



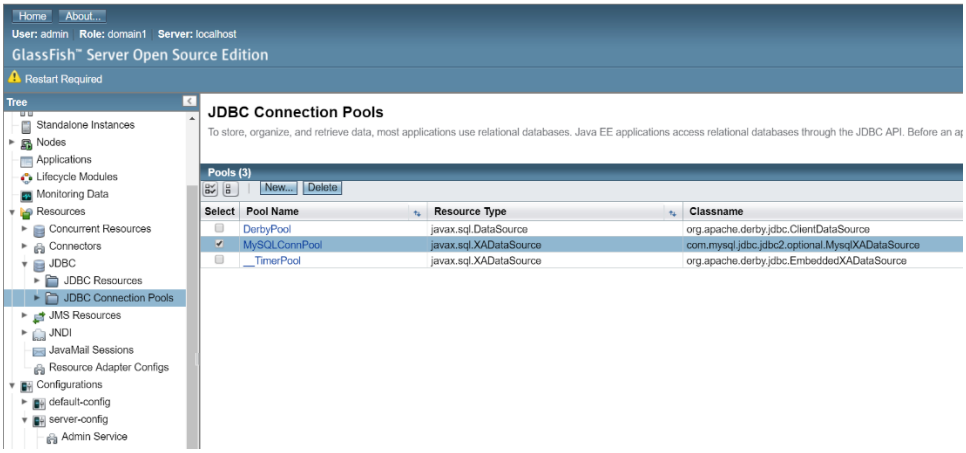
- Add a new connection pool for MySQL:
  - Navigate to Resources → JDBC → JDBC Connection Pools.
  - Click on “New” to create a new connection pool and provide the following information:
    - Pool Name = “MySQLConnPool”.
    - Resource Type = “javax.sql.XADataSource.
    - Database Driver Vendor = “MySql”:



  - Click “Next”.
  - On the second page, keep all default settings and click “Finish”.
  - The connection pool will be created:

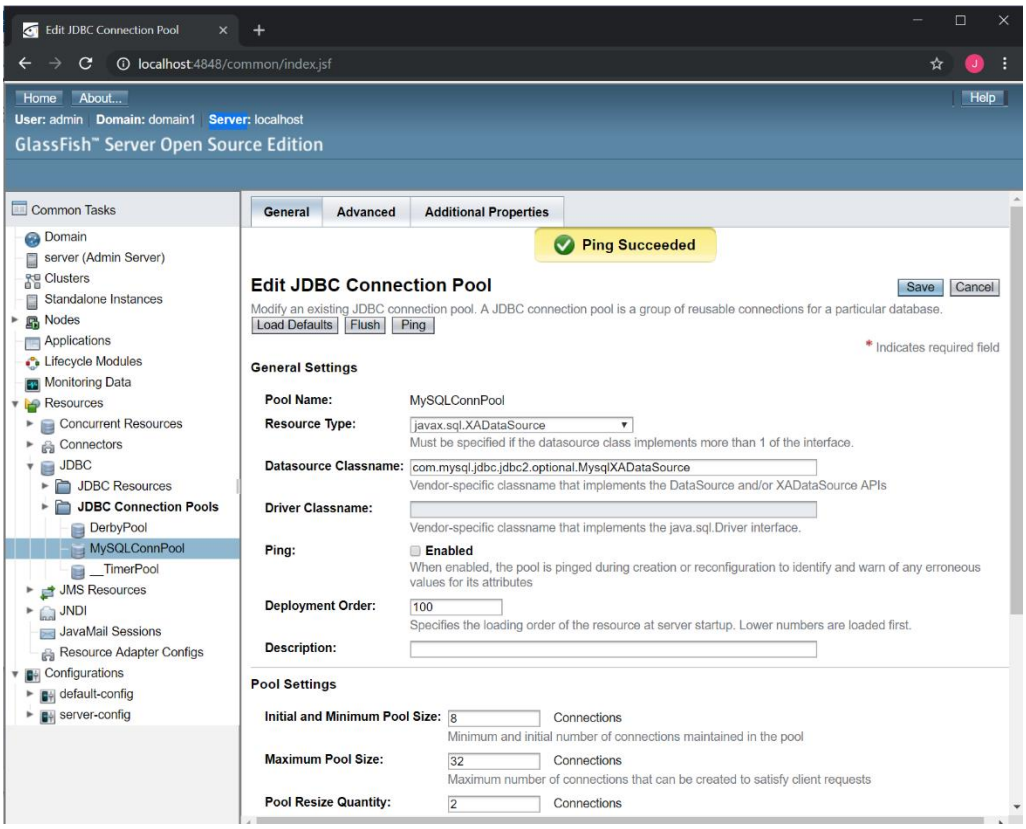


- Click “Next”.
- On the second page, keep all default settings and click “Finish”.
- The connection pool will be created:

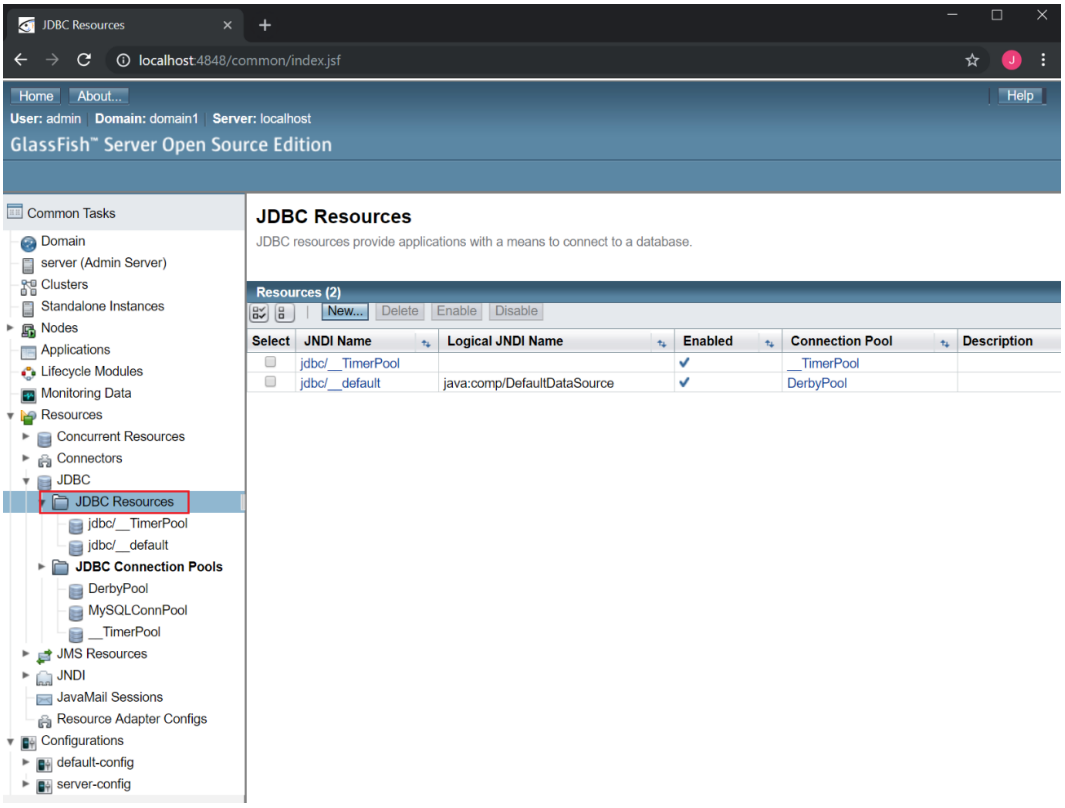


- Under the “Advanced Properties” tab, fill the following for properties (create a table for this):
  - Port = “3306” (should already be filled in)
  - ServerName = “localhost”
  - DatabaseName = “archemy”
  - User = “archemy”
  - Password = <some_password>
- Click “Save”.
- After saving the property values, click on the new MySQL connection pool and test the connection to the database by clicking on the “Ping” button. (NOTE: in order to get a successful ping, make sure the above properties are correctly configured. Also, make sure the correct JDBC driver for MySQL is placed into the correct domain directory for Glassfish: mysql-connector-java-5.1.47-bin.jar should be placed into the directory:

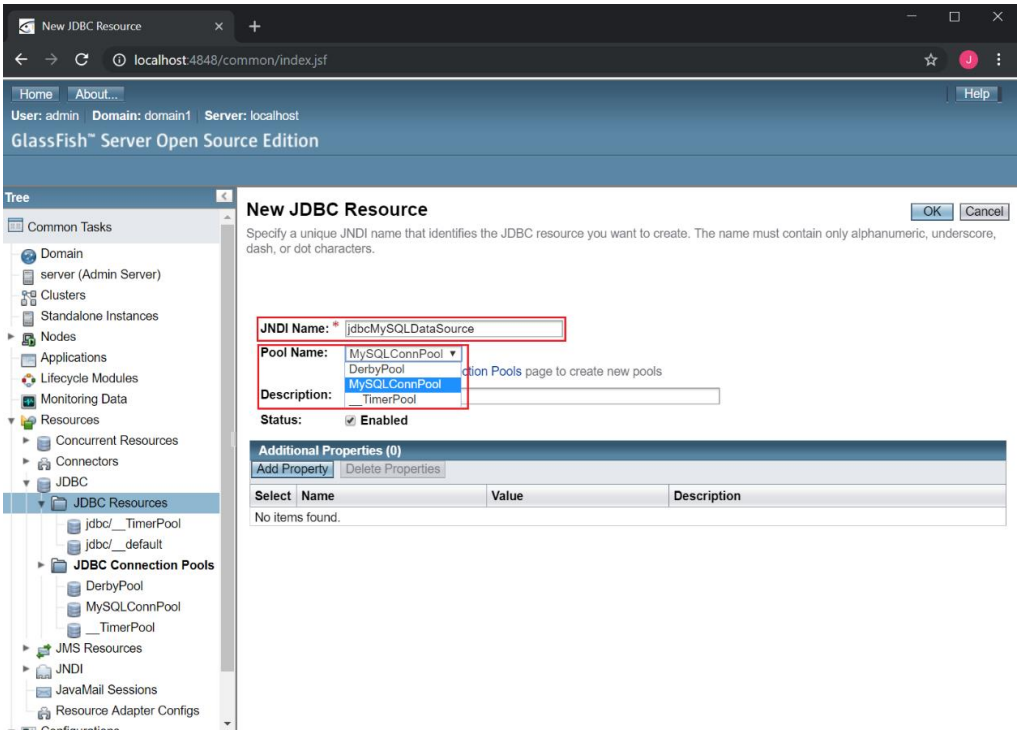
  C:\Oracle\glassfish-5.0\glassfish5\glassfish\domains\domain1\lib\).



- Create a new JDBC Resource to use with the MySQL connection pool.



- Click on “New”.
- Fill in JNDI Name, select Pool Name:

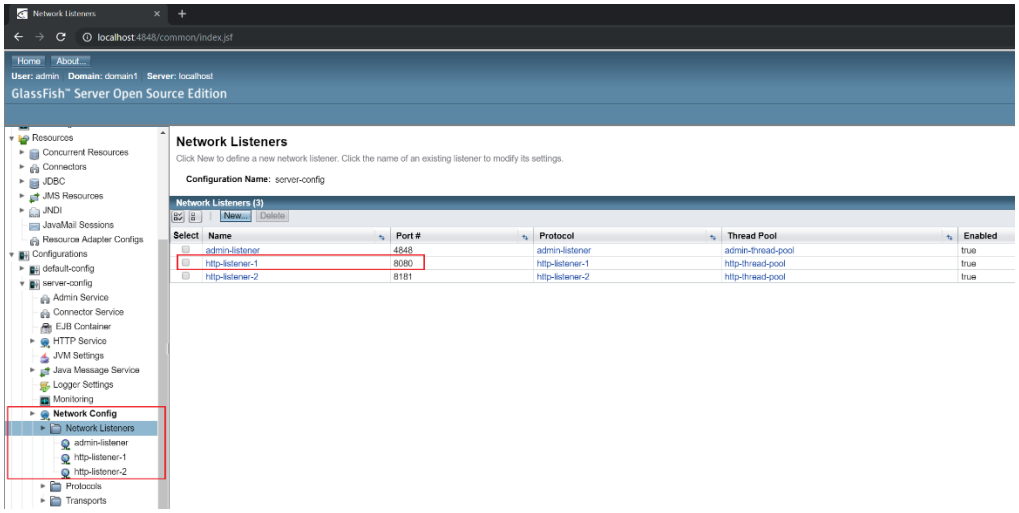


- Click “OK”.

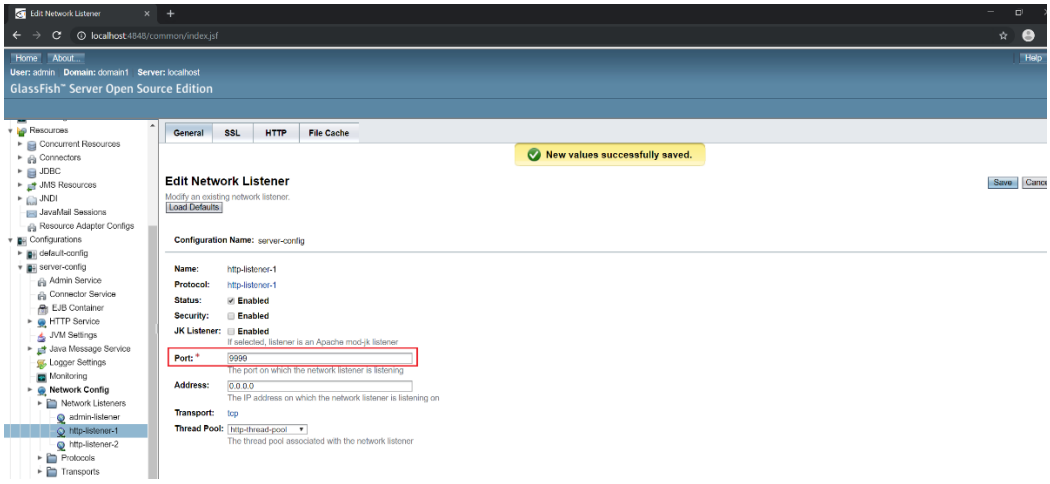
Set GlassFish on a different port

The GlassFIsh and Tomcat application servers are both configured to use the HTTP port of 8080 by default. It is better to leave the Tomcat application server configured to use port 8080, and so the GlassFish HTTP port must be configured to use a different port. To do this, follow the steps below.

- Launch the admin console (assuming the Glassfish server is started).
- Navigate to Network Config → Network Listeners → http-listener-1:



- Change the port from 8080 to 9999:

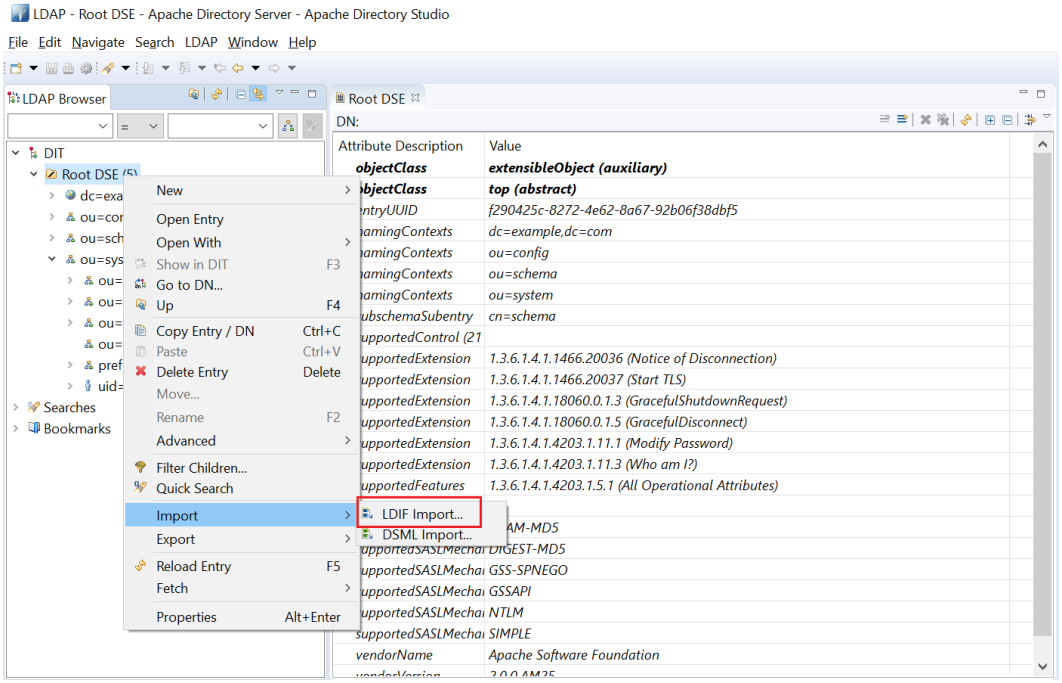


- Stop and restart the GlassFish application server.

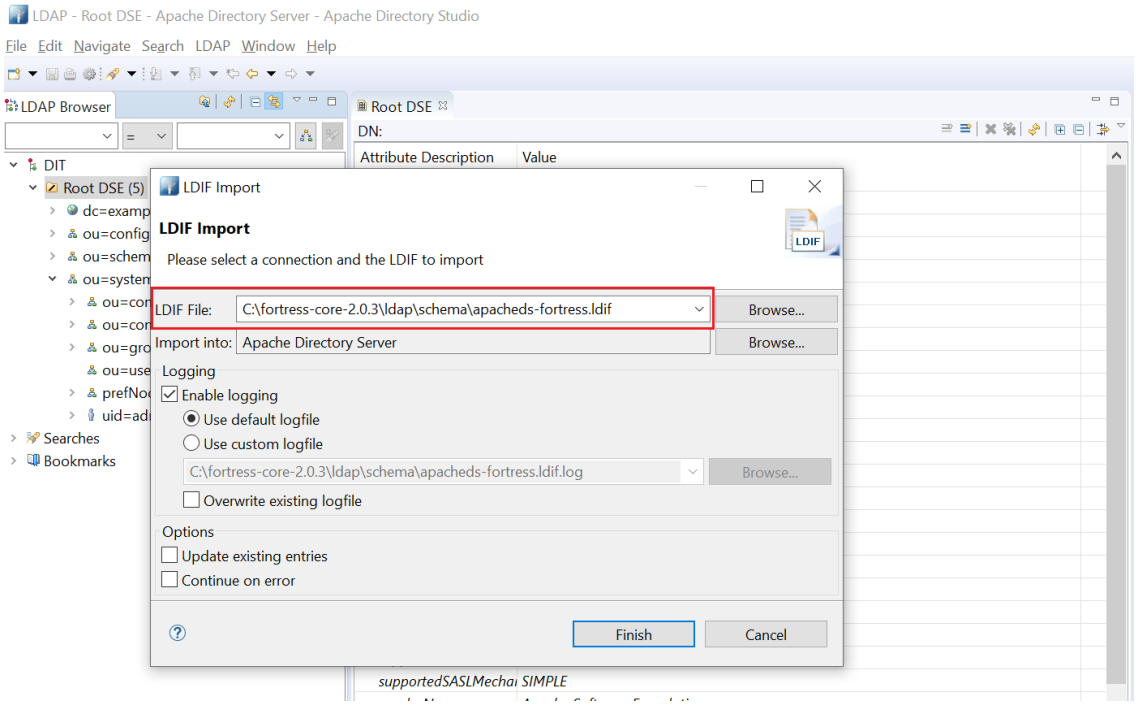
c. Import ApacheDS Schema

To import the ApacheDS schema, follow the below steps.

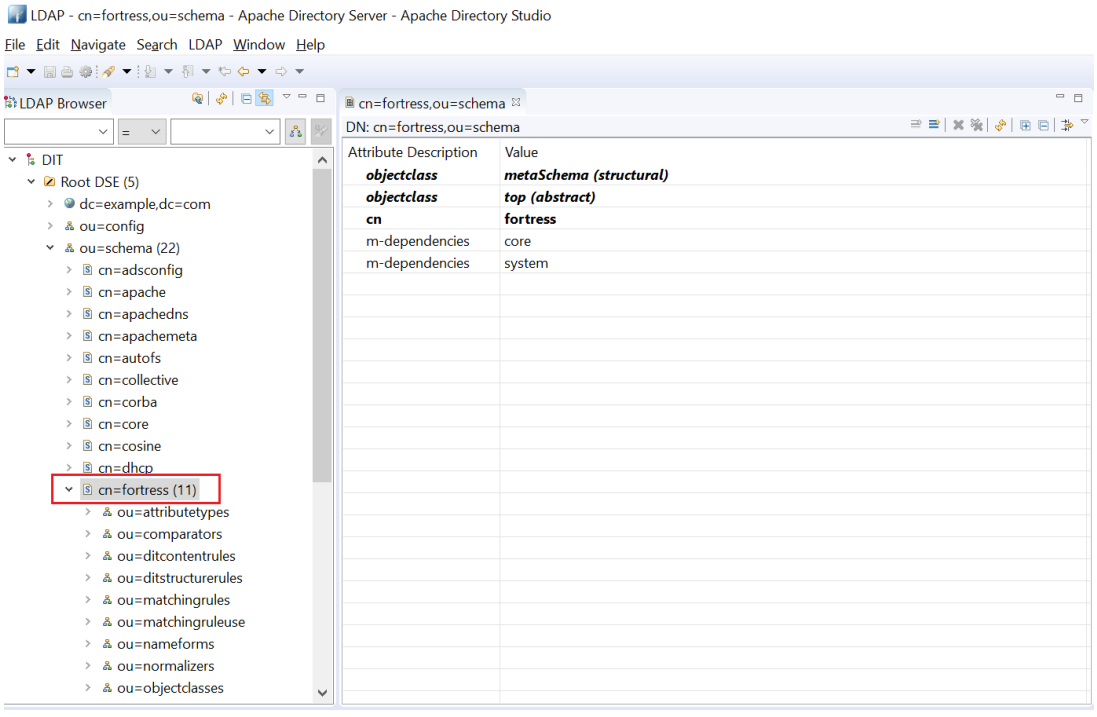
- In Apache Directory Studio, right-click on “Root DSE (5)” in left frame.
- Select Import → LDIF Import.



- Navigate to the LDIF file:



- The ApacheDS schema will appear after successfully imported:



- Also, the following log will confirm the Fortress Schema import was successful:

```
#!DATE 2019-07-21T00:36:33.918
dn: cn=fortress, ou=schema
changetype: add
m-dependencies: system
m-dependencies: core
objectclass: metaSchema
```

```
objectclass: top
cn: fortress

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:33.932
dn: ou=attributetypes, cn=fortress, ou=schema
changetype: add
ou: attributetypes
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:33.949
dn: m-oid=1.3.6.1.4.1.18060.17.1.1, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Name
m-name: ftPermName
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.1

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:33.968
dn: m-oid=1.3.6.1.4.1.18060.17.1.2, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Operation Name
m-name: ftOpNm
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.2

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:33.983
dn: m-oid=1.3.6.1.4.1.18060.17.1.3, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Object Name
m-name: ftObjNm
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.3

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:33.999
dn: m-oid=1.3.6.1.4.1.18060.17.1.4, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Object ID
m-name: ftObjId
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.4

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.008
dn: m-oid=1.3.6.1.4.1.18060.17.1.5, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Role Name
m-name: ftRoleName
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.5

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.029
dn: m-oid=1.3.6.1.4.1.18060.17.1.6, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.27
m-description: Fortress TimeOut
m-name: ftTimeOut
m-ordering: integerOrderingMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: integerMatch
m-oid: 1.3.6.1.4.1.18060.17.1.6

#!RESULT OK
#!CONNECTION ldap://localhost:10389
```

```
#!DATE 2019-07-21T00:36:34.043
dn: m-oid=1.3.6.1.4.1.18060.17.1.7, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Group Names
m-name: ftGroups
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.7

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.059
dn: m-oid=1.3.6.1.4.1.18060.17.1.8, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Role Names
m-name: ftRoles
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.8

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.069
dn: m-oid=1.3.6.1.4.1.18060.17.1.9, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress User IDs
m-name: ftUsers
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.9

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.079
dn: m-oid=1.3.6.1.4.1.18060.17.1.10, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Properties
m-name: ftProps
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.10

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.099
dn: m-oid=1.3.6.1.4.1.18060.17.1.11, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Type Name
m-name: ftType
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.11

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.109
dn: m-oid=1.3.6.1.4.1.18060.17.1.12, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Entity Unique ID
m-name: ftId
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.12

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.123
dn: m-oid=1.3.6.1.4.1.18060.17.1.13, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress User Temporal Constraint
m-name: ftCstr
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.13

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.138
dn: m-oid=1.3.6.1.4.1.18060.17.1.14, ou=attributetypes, cn=fortress, ou=schema
```

```
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress User Role Assignments
m-name: ftRA
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.14

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.149
dn: m-oid=1.3.6.1.4.1.18060.17.1.15, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress User Role Constraints
m-name: ftRC
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.15

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.169
dn: m-oid=1.3.6.1.4.1.18060.17.1.16, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Separation of Duties Set Name
m-name: ftSetName
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.16

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.179
dn: m-oid=1.3.6.1.4.1.18060.17.1.17, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.27
m-description: Fortress Separation of Duties Set Cardinality
m-name: ftSetCardinality
m-ordering: integerOrderingMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: integerMatch
m-oid: 1.3.6.1.4.1.18060.17.1.17

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.194
dn: m-oid=1.3.6.1.4.1.18060.17.1.18, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Child to Parent Relationships
m-name: ftRels
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.18

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.199
dn: m-oid=1.3.6.1.4.1.18060.17.1.19, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress User Organizational Unit Pool
m-name: ftOSU
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.19

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.218
dn: m-oid=1.3.6.1.4.1.18060.17.1.20, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Organizational Unit Pool
m-name: ftOSP
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.20

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.232
dn: m-oid=1.3.6.1.4.1.18060.17.1.21, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Admin Role Constraints
```

```
m-name: ftARC
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.21

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.243
dn: m-oid=1.3.6.1.4.1.18060.17.1.22, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Admin Role Assignments
m-name: ftARA
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.22

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.259
dn: m-oid=1.3.6.1.4.1.18060.17.1.23, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Role Hierarchy Range
m-name: ftRange
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.23

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.269
dn: m-oid=1.3.6.1.4.1.18060.17.1.24, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Audit Modifier Internal UserID
m-name: ftModifier
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.24

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.279
dn: m-oid=1.3.6.1.4.1.18060.17.1.25, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Audit Modifier Operation Code
m-name: ftModCode
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.25

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.294
dn: m-oid=1.3.6.1.4.1.18060.17.1.26, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Audit Modifier Unique ID
m-name: ftModId
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.26

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.303
dn: m-oid=1.3.6.1.4.1.18060.17.1.27, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.7
m-description: Fortress System User
m-name: ftSystem
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: booleanMatch
m-oid: 1.3.6.1.4.1.18060.17.1.27

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.318
dn: m-oid=1.3.6.1.4.1.18060.17.1.28, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Parent Nodes
m-name: ftParents
```

```
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.28

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.332
dn: m-oid=1.3.6.1.4.1.18060.17.1.29, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: LDAP Group protocol attribute
m-name: configProtocol
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.29

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.338
dn: m-oid=1.3.6.1.4.1.18060.17.1.30, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: LDAP Group config properties
m-name: configParameter
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.30

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.358
dn: m-oid=1.3.6.1.4.1.18060.17.1.31, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Constraints
m-name: ftPA
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.31

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.368
dn: m-oid=1.3.6.1.4.1.18060.17.1.32, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Set
m-name: ftPASet
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.32

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.384
dn: m-oid=1.3.6.1.4.1.18060.17.1.33, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Set Default Operator
m-name: ftPADefaultOperator
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.33

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.399
dn: m-oid=1.3.6.1.4.1.18060.17.1.34, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Set Type
m-name: ftPASetType
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.34

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.415
dn: m-oid=1.3.6.1.4.1.18060.17.1.35, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Data Type
m-name: ftPADataType
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
```

```
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.35

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.415
dn: m-oid=1.3.6.1.4.1.18060.17.1.36, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Set Default Value
m-name: ftPADefaultValue
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.36

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.433
dn: m-oid=1.3.6.1.4.1.18060.17.1.37, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Default Strategy
m-name: ftPADefaultStrategy
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-singleValue: TRUE
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.37

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.448
dn: m-oid=1.3.6.1.4.1.18060.17.1.38, ou=attributetypes, cn=fortress, ou=schema
changetype: add
m-syntax: 1.3.6.1.4.1.1466.115.121.1.15
m-description: Fortress Permission Attribute Valid Values
m-name: ftPAValidVals
m-substr: caseIgnoreSubstringsMatch
objectclass: metaAttributeType
objectclass: metaTop
objectclass: top
m-equality: caseIgnoreMatch
m-oid: 1.3.6.1.4.1.18060.17.1.38

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.448
dn: ou=comparators, cn=fortress, ou=schema
changetype: add
ou: comparators
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.464
dn: ou=ditcontentrules, cn=fortress, ou=schema
changetype: add
ou: ditcontentrules
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.464
dn: ou=ditstructurerules, cn=fortress, ou=schema
changetype: add
ou: ditstructurerules
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.464
dn: ou=matchingrules, cn=fortress, ou=schema
changetype: add
ou: matchingrules
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.480
dn: ou=matchingruleuse, cn=fortress, ou=schema
changetype: add
ou: matchingruleuse
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.480
dn: ou=nameforms, cn=fortress, ou=schema
changetype: add
ou: nameforms
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.480
dn: ou=normalizers, cn=fortress, ou=schema
```

```
changetype: add
ou: normalizers
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.495
dn: ou=objectclasses, cn=fortress, ou=schema
changetype: add
ou: objectClasses
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.511
dn: m-oid=1.3.6.1.4.1.18060.17.2.1, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: description
m-may: ftCstr
m-may: ftParents
m-description: Fortress Role Structural Object Class
m-name: ftRls
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.1
m-must: ftId
m-must: ftRoleName

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.511
dn: m-oid=1.3.6.1.4.1.18060.17.2.2, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftType
m-description: Fortress Permission Object Class
m-name: ftObject
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalunit
m-oid: 1.3.6.1.4.1.18060.17.2.2
m-must: ftId
m-must: ftObjNm

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.526
dn: m-oid=1.3.6.1.4.1.18060.17.2.3, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftObjId
m-may: ftRoles
m-may: ftUsers
m-may: ftType
m-may: ftPASet
m-description: Fortress Permission Operation Structural Object Class
m-name: ftOperation
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.3
m-must: ftId
m-must: ftPermName
m-must: ftObjNm
m-must: ftOpNm

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.542
dn: m-oid=1.3.6.1.4.1.18060.17.2.4, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftRoles
m-may: description
m-description: Fortress Role Static Separation of Duty Set Structural Object C
 lass
m-name: ftSSDSet
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.4
m-must: ftId
m-must: ftSetName
m-must: ftSetCardinality

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.542
dn: m-oid=1.3.6.1.4.1.18060.17.2.5, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftRoles
m-may: description
m-description: Fortress Role Dynamic Separation of Duty Set Structural Object
 Class
m-name: ftDSDSet
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.5
m-must: ftId
m-must: ftSetName
m-must: ftSetCardinality

#!RESULT OK
#!CONNECTION ldap://localhost:10389
```

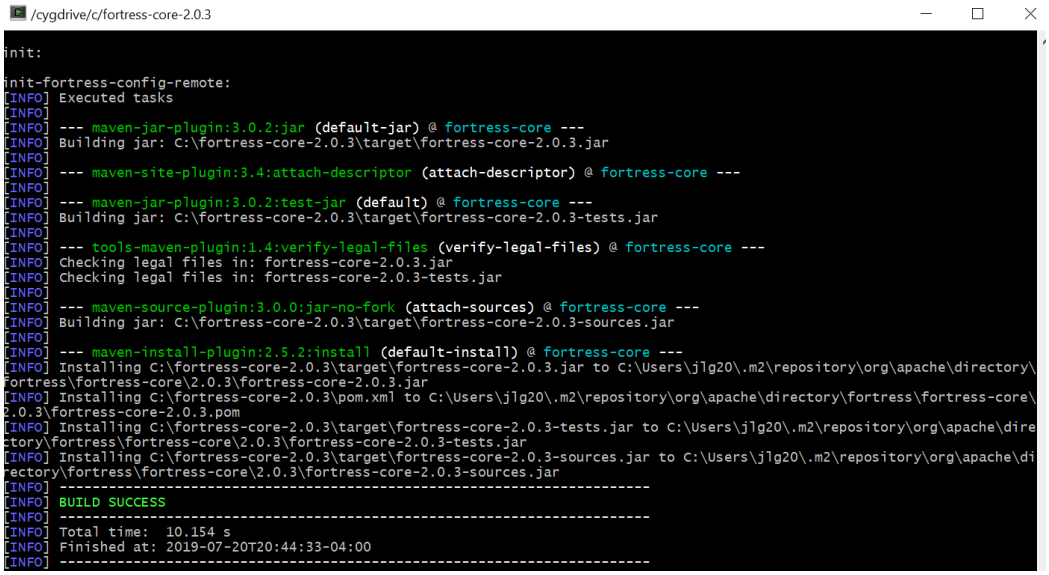
```
#!DATE 2019-07-21T00:36:34.558
dn: m-oid=1.3.6.1.4.1.18060.17.2.6, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftParents
m-description: Fortress OrgUnit Structural Object Class
m-name: ftOrgUnit
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalunit
m-oid: 1.3.6.1.4.1.18060.17.2.6
m-must: ftId

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.573
dn: m-oid=1.3.6.1.4.1.18060.17.2.7, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftRels
m-may: description
m-description: Fortress Hierarchy Structural Object Class
m-name: ftHier
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.7
m-must: cn

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.589
dn: m-oid=1.3.6.1.4.1.18060.17.2.8, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: configParameter
m-may: ftProps
m-description: LDAP Configuration Group
m-name: configGroup
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: groupOfNames
m-oid: 1.3.6.1.4.1.18060.17.2.8
m-must: configProtocol
m-must: ftType

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.605
dn: m-oid=1.3.6.1.4.1.18060.17.2.9, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftPA
m-may: ftPASetType
m-may: description
m-description: Fortress Attribute Set Structural Object Class
m-name: ftAttributeSet
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalunit
m-oid: 1.3.6.1.4.1.18060.17.2.9
m-must: ftId
m-must: ftPASet
m-must: cn

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.605
dn: m-oid=1.3.6.1.4.1.18060.17.2.10, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftPADataType
m-may: ftPADefaultValue
m-may: ftPADefaultStrategy
m-may: ftPADefaultOperator
m-may: ftPAValidVals
m-may: description
m-description: Fortress Attribute Structural Object Class
m-name: ftAttribute
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-supObjectClass: organizationalrole
m-oid: 1.3.6.1.4.1.18060.17.2.10
m-must: ftId
m-must: ftPASet
m-must: ftPA
m-must: cn

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.620
dn: m-oid=1.3.6.1.4.1.18060.17.3.1, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftRC
m-may: ftRA
m-may: ftARC
m-may: ftARA
m-may: ftCstr
m-may: ftSystem
m-description: Fortress User Attribute AUX Object Class
m-name: ftUserAttrs
m-typeObjectClass: AUXILIARY
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-oid: 1.3.6.1.4.1.18060.17.3.1
m-must: ftId

#!RESULT OK
#!CONNECTION ldap://localhost:10389
```

```
#!DATE 2019-07-21T00:36:34.636
dn: m-oid=1.3.6.1.4.1.18060.17.3.2, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftProps
m-description: Fortress Properties AUX Object Class
m-name: ftProperties
m-typeObjectClass: AUXILIARY
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-oid: 1.3.6.1.4.1.18060.17.3.2

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.651
dn: m-oid=1.3.6.1.4.1.18060.17.3.3, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftOSU
m-may: ftOSP
m-may: ftRange
m-description: Fortress Pools AUX Object Class
m-name: ftPools
m-typeObjectClass: AUXILIARY
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-oid: 1.3.6.1.4.1.18060.17.3.3

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.651
dn: m-oid=1.3.6.1.4.1.18060.17.3.4, ou=objectclasses, cn=fortress, ou=schema
changetype: add
m-may: ftModifier
m-may: ftModCode
m-may: ftModId
m-description: Fortress Modifiers AUX Object Class
m-name: ftMods
m-typeObjectClass: AUXILIARY
objectclass: metaObjectClass
objectclass: metaTop
objectclass: top
m-oid: 1.3.6.1.4.1.18060.17.3.4

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.667
dn: ou=syntaxcheckers, cn=fortress, ou=schema
changetype: add
ou: syntaxcheckers
objectclass: organizationalUnit
objectclass: top

#!RESULT OK
#!CONNECTION ldap://localhost:10389
#!DATE 2019-07-21T00:36:34.667
dn: ou=syntaxes, cn=fortress, ou=schema
changetype: add
ou: syntaxes
objectclass: organizationalUnit
objectclass: top
```

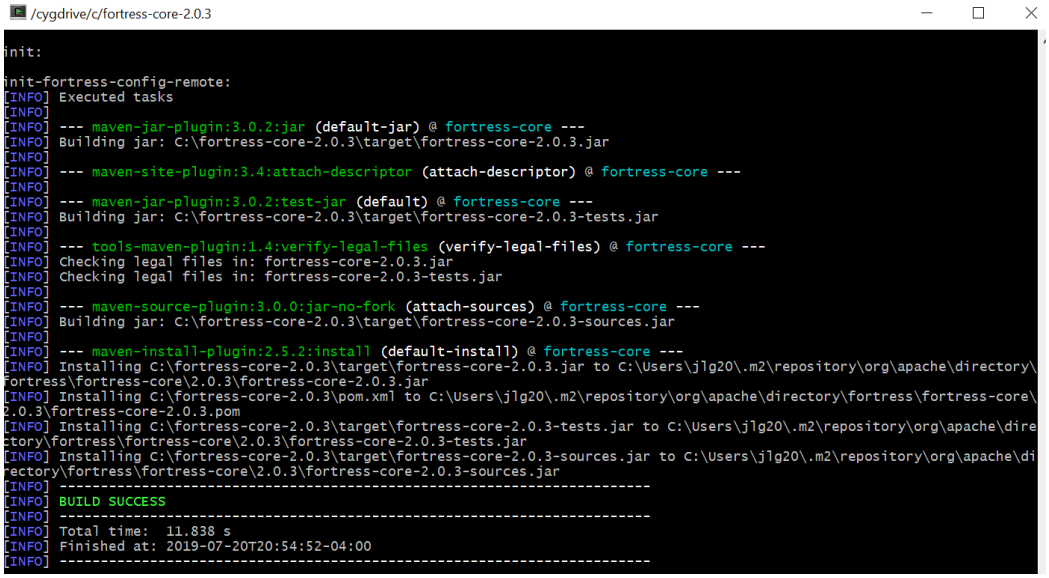
d. Integrate Apache Fortress Core and ApacheDS

To integrate Fortress and ApacheDS, follow the below steps.

- Use Cygwin and run the command in the Fortress root directory: “mvn install -Dload.file=./ldap/setup/refreshLDAPData.xml”:
  - Should get a build success:

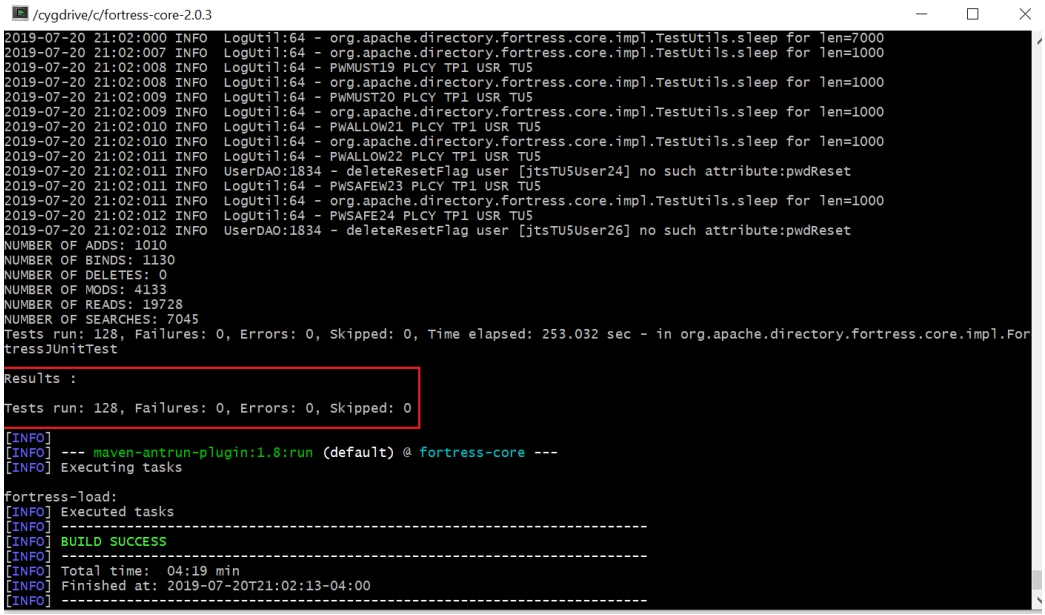


- Use Cygwin and run the following command from the Fortress root directory: “mvn install -Dload.file=./ldap/setup/DelegatedAdminManagerLoad.xml”:
  - Should get a build success:

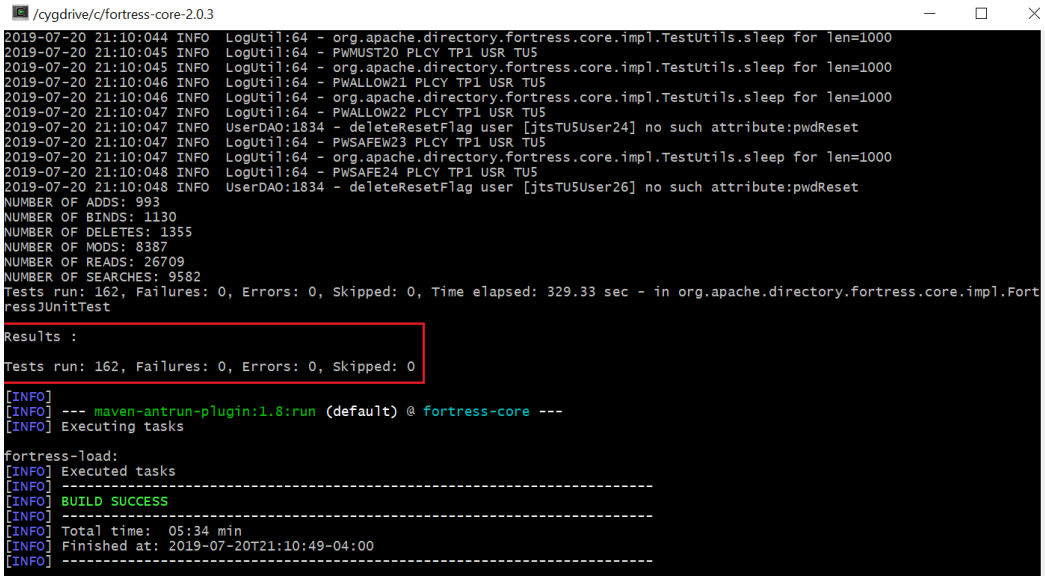


NOTE: skipped step “Make a backup copy of pom.xml and then edit it. Find and change the jgrapht-core version to 0.9.2 (for jdk 7.x compatibility)” from original installation guide since the jgrapht-core version in the upgraded Fortress Core is a later version.

- Test the Apache Fortress Core / Apache DS integration:
  - In Cygwin, run the following command from the Fortress root directory: “mvn -Dtest=FortressJUnitTest test”.
  - Should get a build success:



- Rerun the same test command to verify that the teardown APIs are working properly: “mvn -Dtest=FortressJUnitTest test”.
- Should get a build success with a larger number of tests run (compare the results from the previous run):



e. Setup Fortress REST Application

Before setting up the Fortress REST application, both Fortress Web and Fortress Rest need to be downloaded. The mvn command for each should be run within the main directory of the corresponding package installation. For example, the Rest package directory contains a sub-subdirectory and the .pom file is in:

"./src/main/resources/FortressRestServerPolicy.xml tomcat:deploy"

To run download Fortress Web and Fortress Rest, follow the below steps.

- Run the following wget commands to download fortress-realm, fortress-rest, fortress-web:

  Command: wget http://apache.cs.utah.edu//directory/fortress/dist/2.0.3/fortress-realm-2.0.3-source-release.zip

  Command: wget http://apache.cs.utah.edu//directory/fortress/dist/2.0.3/fortress-rest-2.0.3-source-release.zip

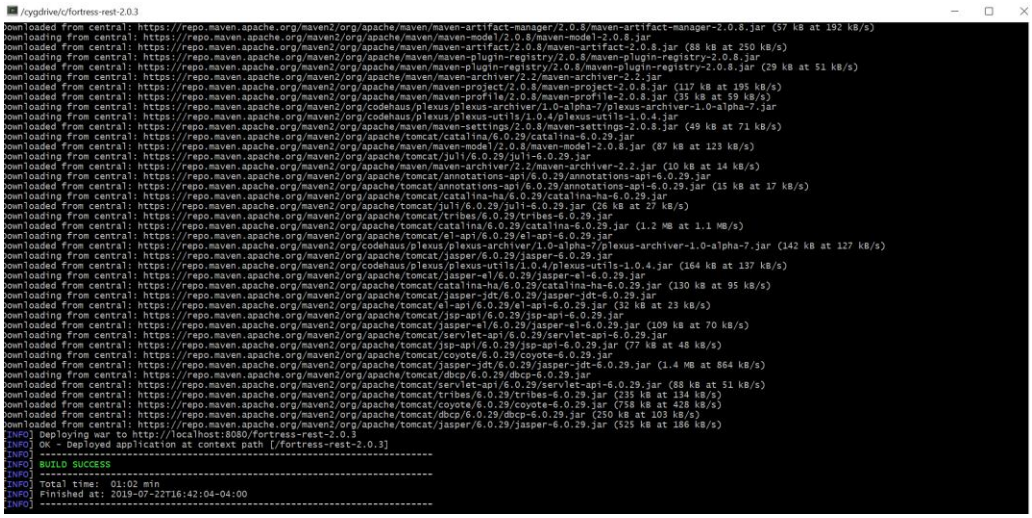
  Command: wget http://apache.cs.utah.edu//directory/fortress/dist/2.0.3/fortress-web-2.0.3-source-release.zip

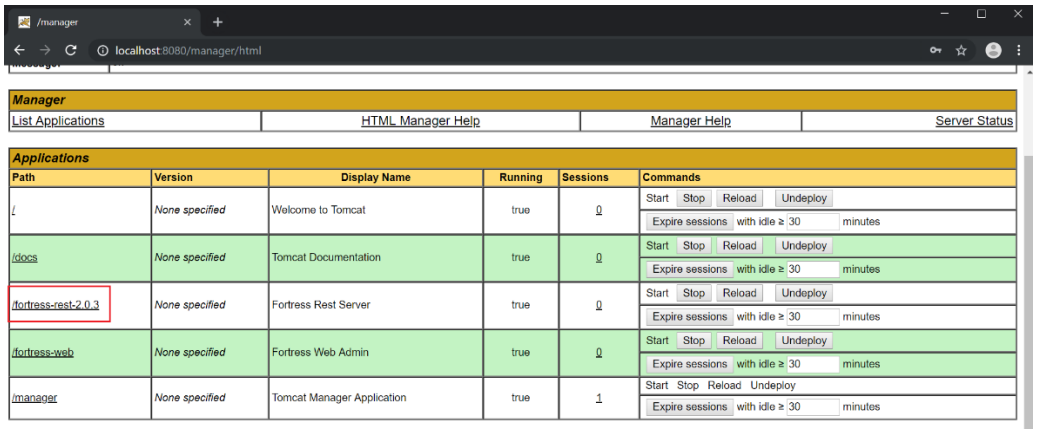
- Unzip both Fortress REST and Fortress Web at the same level as Fortress Core (C: directory).
- Perform Fortress REST test policy load and deploy to Tomcat:
  - Copy the fortress.properties file from C:\fortress-core-2.0.3\config\ to C:\fortress-rest-2.0.3\src\main\resources\
  - Navigate to the root directory for Fortress REST: C:\fortress-rest-2.0.3\

    - Run command:

"mvn install -Dload.file=./src/main/resources/FortressRestServerPolicy.xml tomcat:deploy"

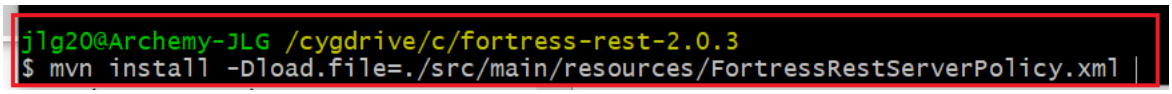
    - Should get a build success and fortress-rest should be deployed in tomcat:



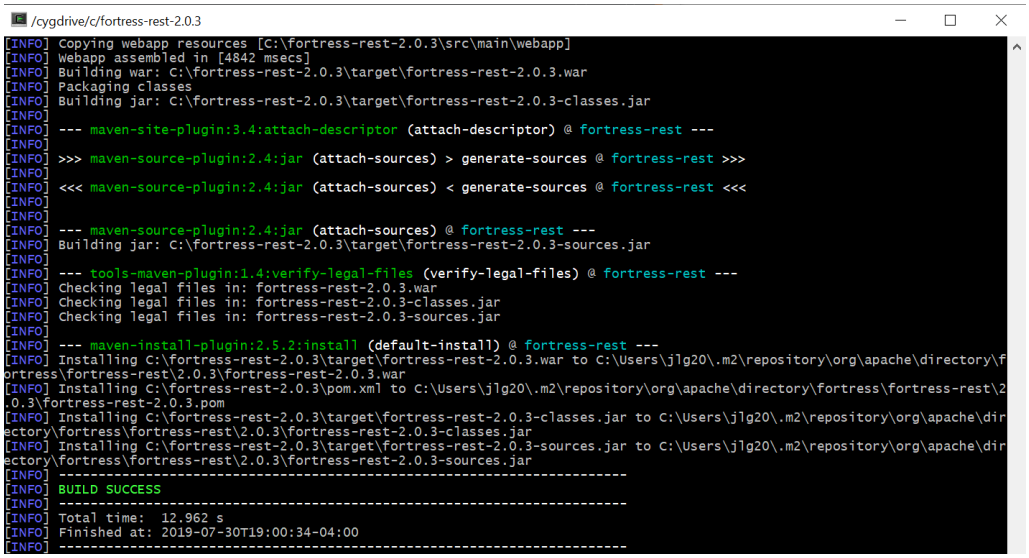


- After fortress-rest was already deployed to tomcat, and do another build and redeploy – can break the command into two different steps:
  - To rebuild fortress-rest (from root directory), use command:

"mvn install -Dload.file=./src/main/resources/FortressRestServerPolicy.xml"



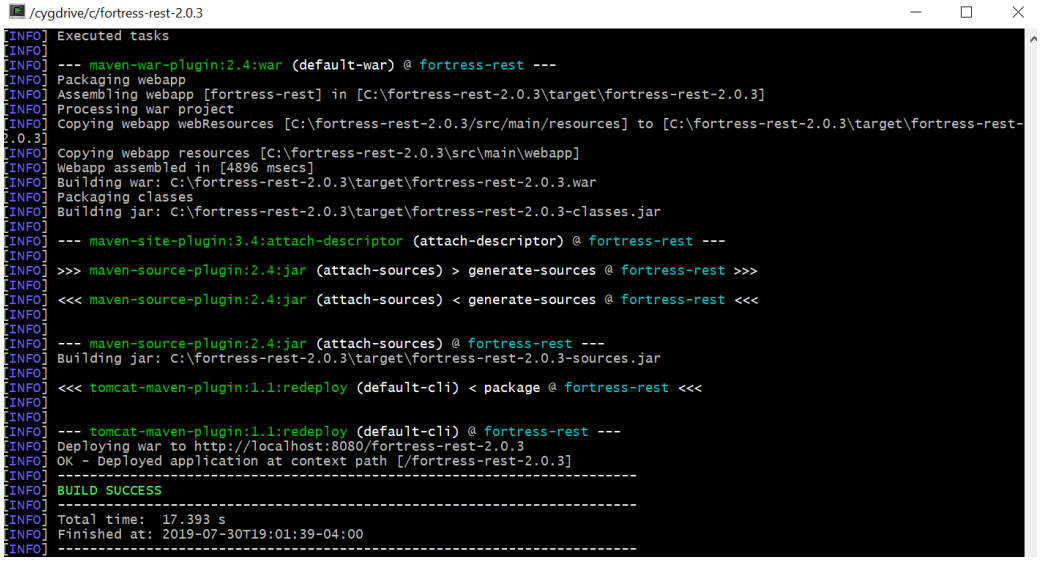
  - You should get a "Build Success":



  - To redeploy (don't use the tomcat:deploy command) – to redeploy, must use the following command: "mvn tomcat:redeploy":

(resource: https://directory.apache.org/fortress/gen-docs/latest/apidocs/org/apache/directory/fortress/core/doc-files/apache-fortress-rest.html)

- You should get a “Build Success”:



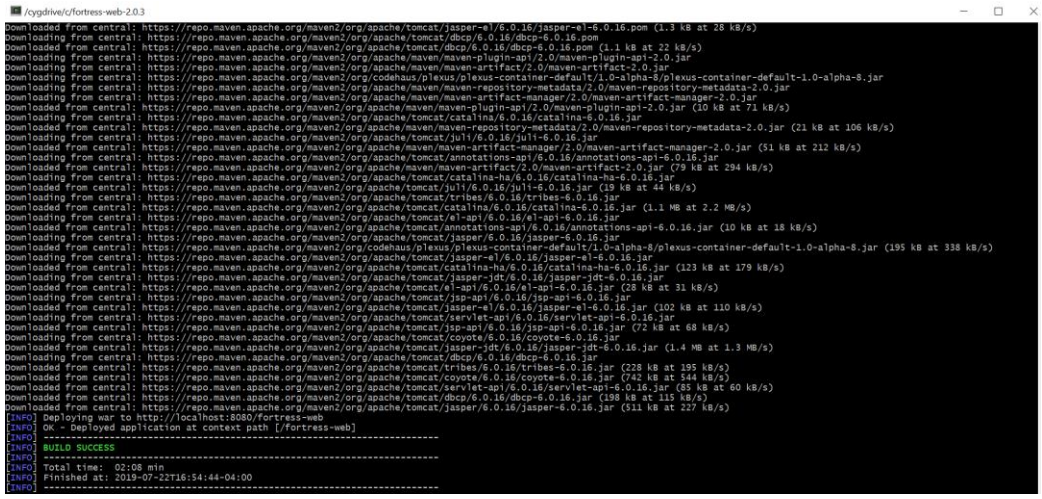
f. Setup Fortress Web

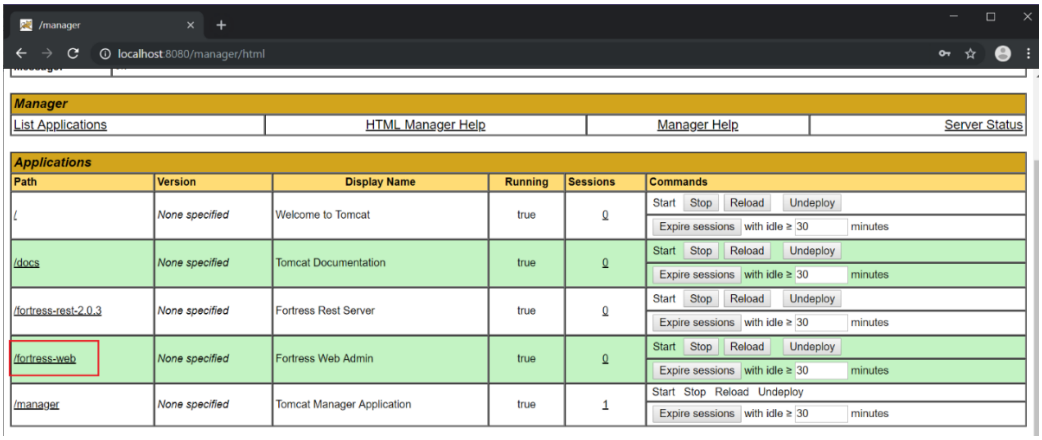
To setup Fortress Web, follow the below steps.

- Copy the fortress.properties file from C:\fortress-core-2.0.3\config\ to C:\fortress-web-2.0.3\src\main\resources\
- Navigate to the root directory for Fortress web (C:\fortress-web-2.0.3\) and run the command

“mvn install -Dload.file=./src/main/resources/FortressWebDemoUsers.xml tomcat:deploy”

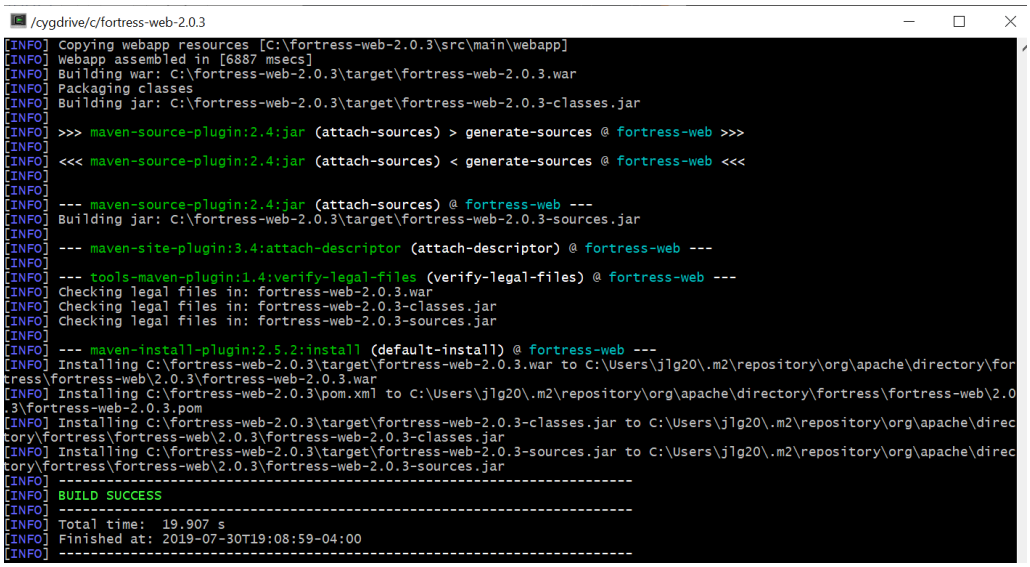
- You should get a build success, and fortress-web should be deployed in tomcat:





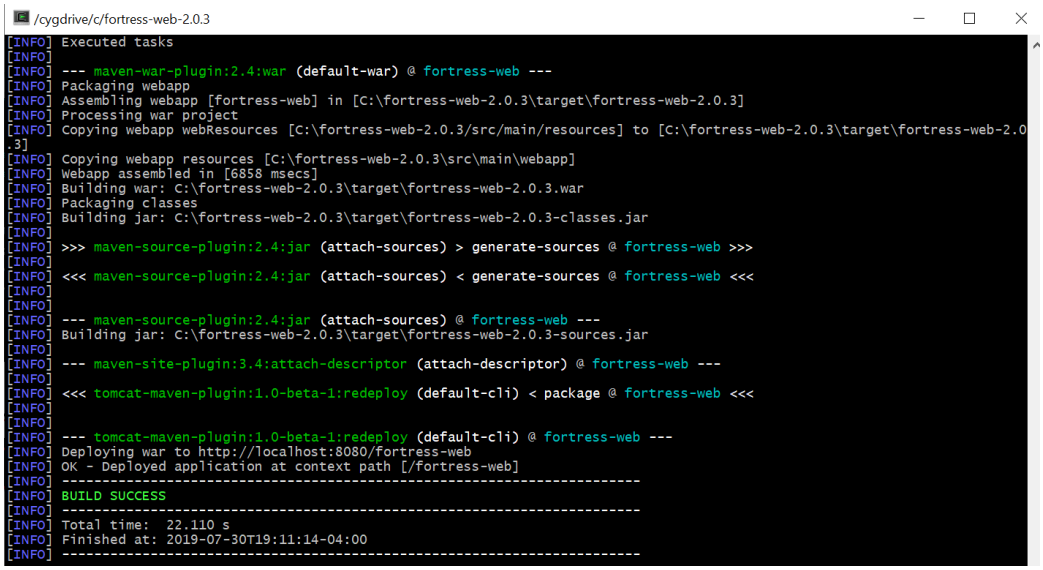
- After fortress-web was already deployed to tomcat, and do another build and redeploy – can break the command into two different steps:
  - To rebuild fortress-rest (from root directory), use command: “mvn install -Dload.file=./src/main/resources/FortressWebDemoUsers.xml”:

  - You should get a “Build Success”:



- To redeploy (don't use the tomcat:deploy command) – to redeploy, must use the following command: "mvn tomcat:redeploy":

- Should get a "Build Success":

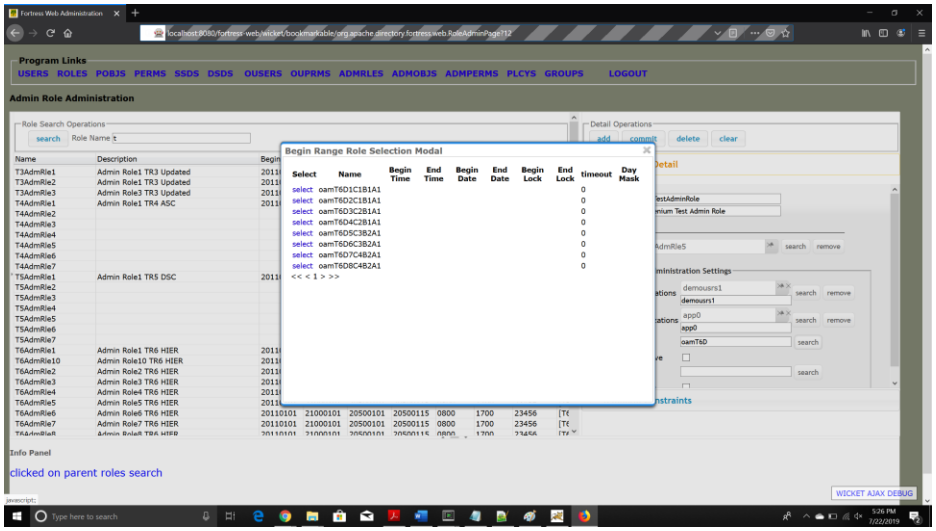


g. Run Selenium Web Driver Integration Test

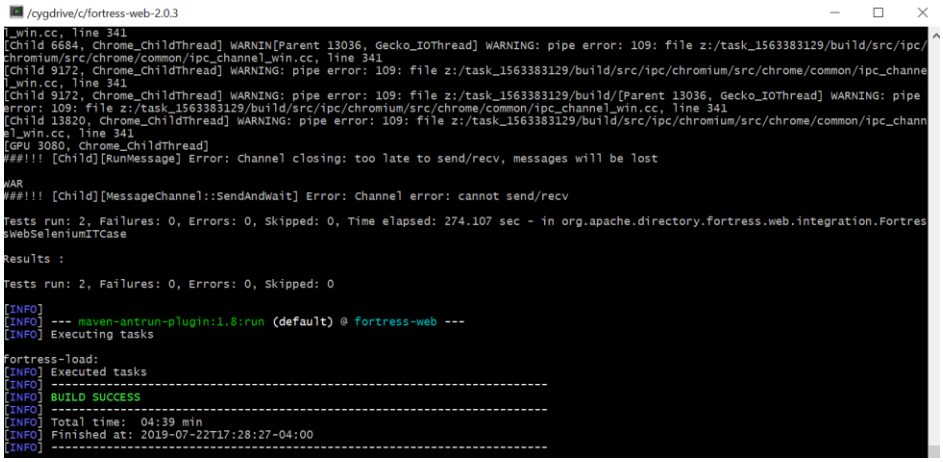
To run this test, you can also run the FortressJUnit test in Fortress Core. See https://directory.apache.org/fortress/gen-docs/latest/apidocs/org/apache/directory/fortress/core/doc-files/apache-fortress-core.html

To run this test, follow the below steps.

- Run from root directory of Fortress-web
  - Run the test command: “mvn test -Dtest=FortressWebSeleniumITCase”:
    - It will launch the Firefox browser conducting the test:



- When the test completes, should also get a build success:



4. Deploy ArchNav

a. Build and Deploy ArchNav Security Application

To build and deploy the ArchNav Security application, follow the below steps.

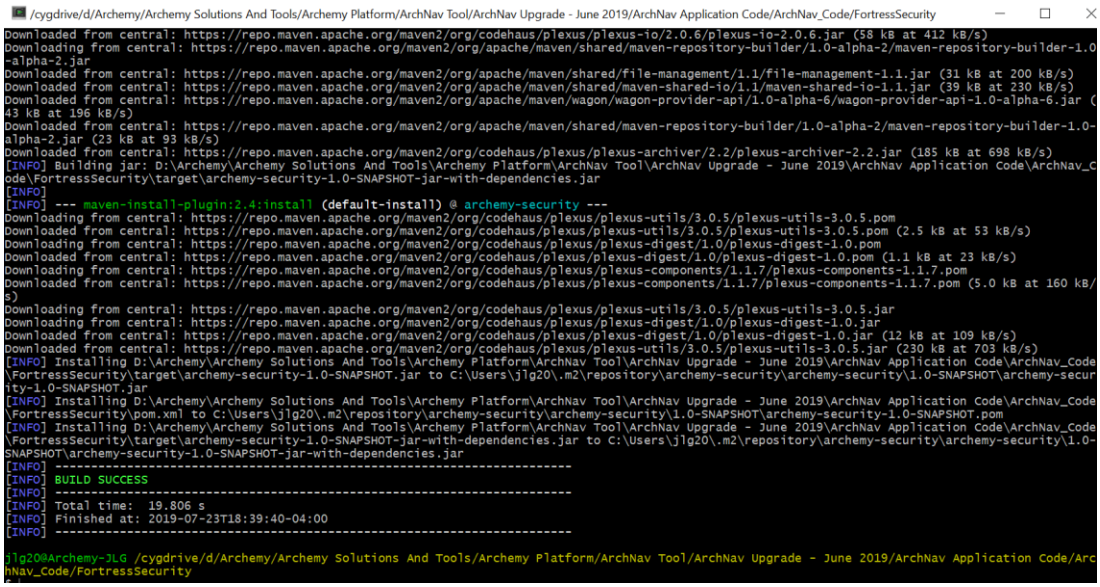
- Copy the fortress.properties file from Fortress-core to the ArchNav FortressSecurity directory:

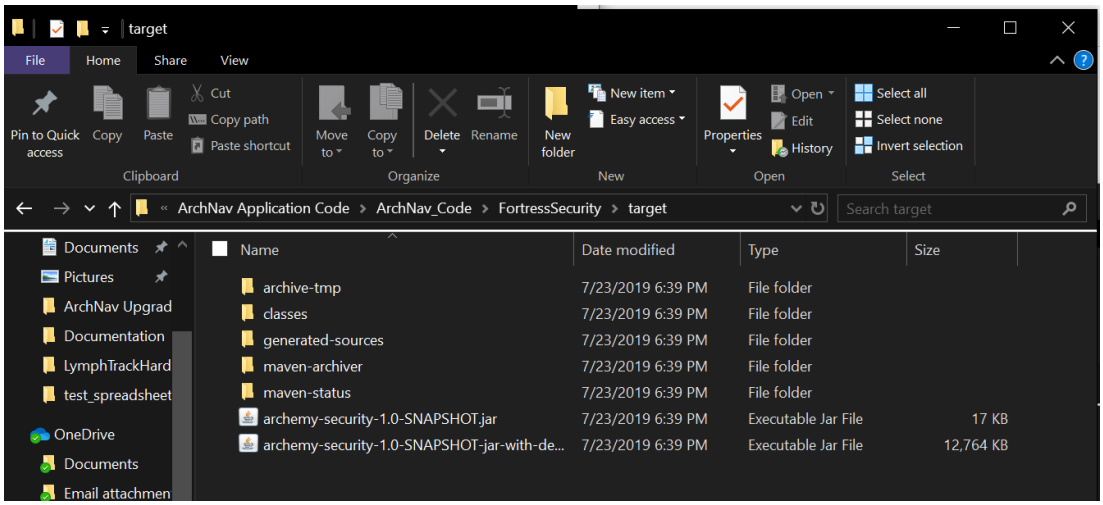
Copy from C:\fortress-core-2.0.3\config\

to

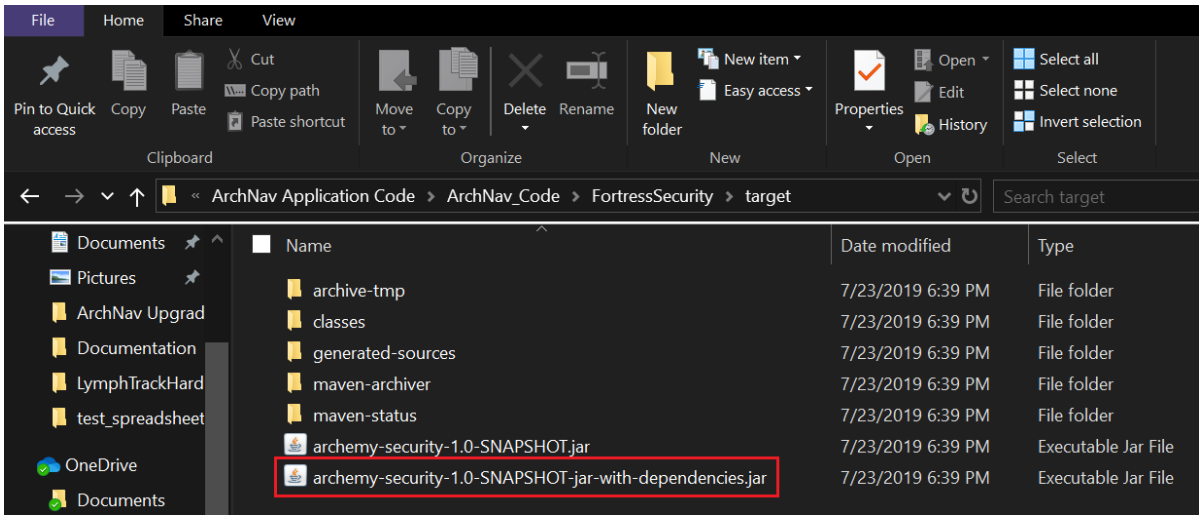
D:\Archemy\Archemy Solutions And Tools\Archemy Platform\ArchNav Tool\ArchNav Upgrade - June 2019\ArchNav Application Code\ArchNav_Code\FortressSecurity\src\main\resources\

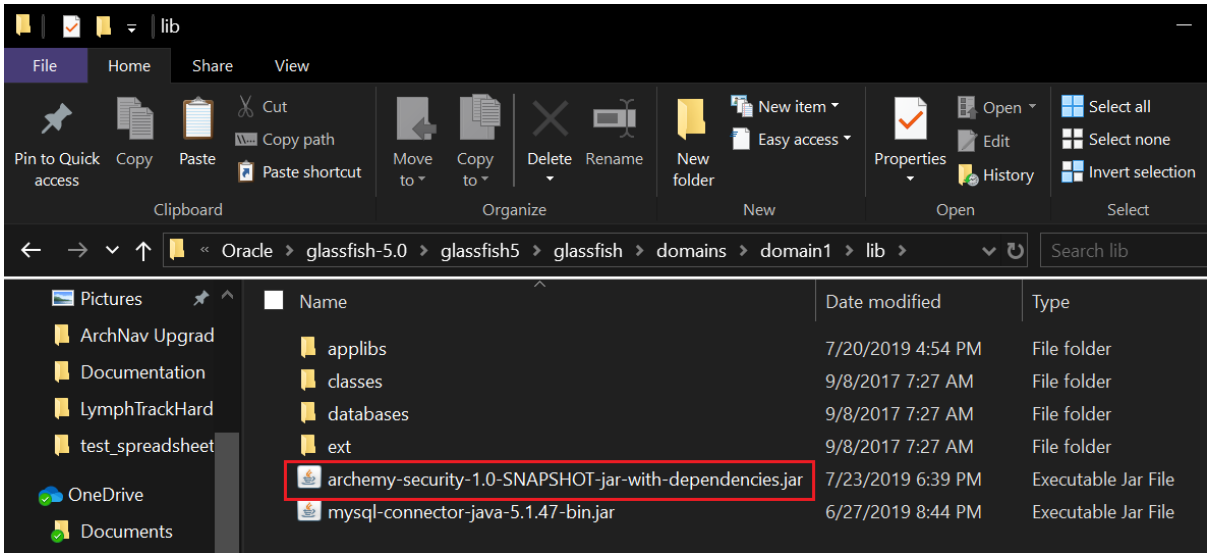
- In the FortressSecurity directory (root directory):
  - Run the command: “mvn clean install”.
  - Should get a build success and the JAR files generated as per the screenshots below:





- Integrated the built achemy-security JAR file with Glassfish by copying the archemy-security-1.0-SNAPSHOT-jar-with-dependencies.jar file into the Glassfish domain1/lib directory:

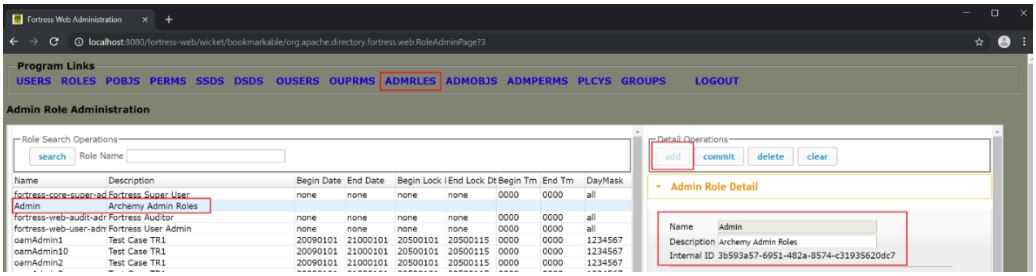




b. Configure Fortress to Include ArchNav Authentication and RBAC Details

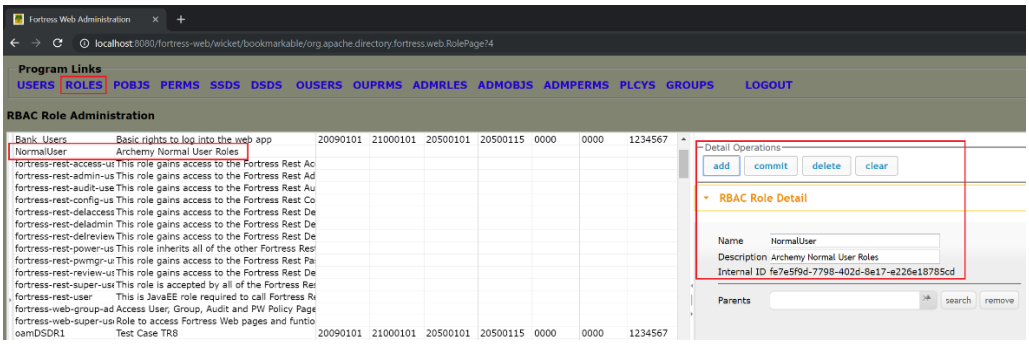
To setup ArchNav aunthentication and RBAC details, follow the steps below.

- Create Admin and Normal user roles:
  - Under “ADMRLES”
    - Add “Admin” role with description “Archemy Admin Roles”:



- Click “commit” after adding each entry.

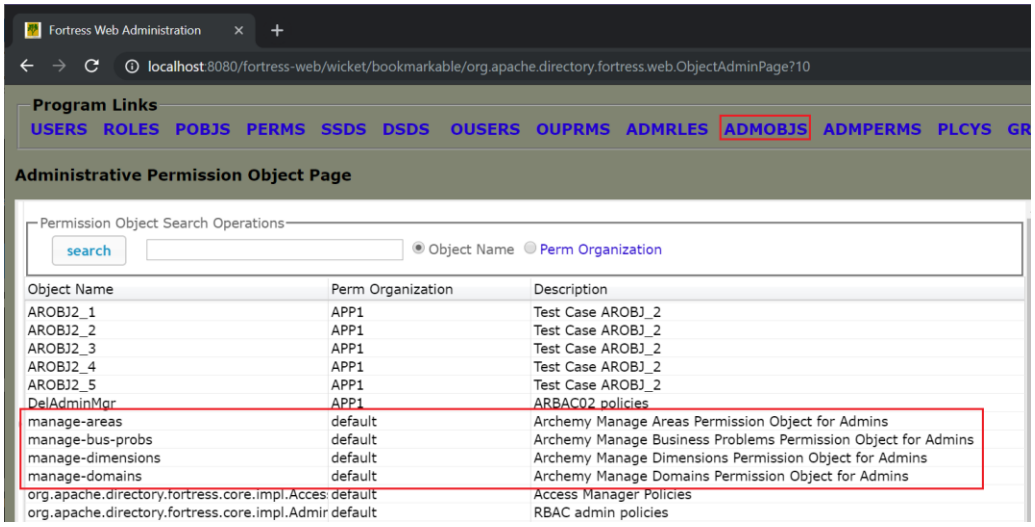
- Under “ROLES”:
  - Add role name “NormalUser” with description “Archemy Normal User Roles”:



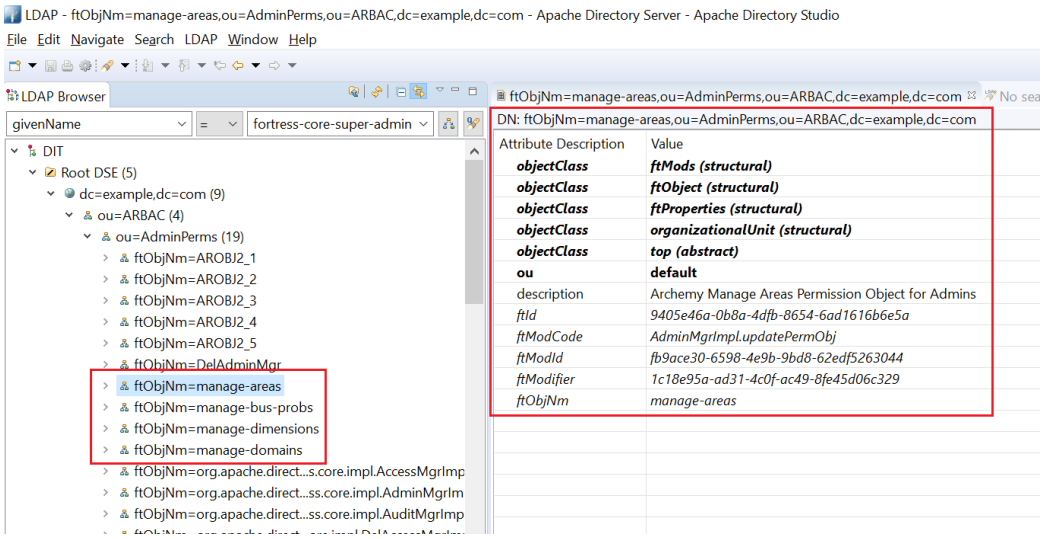
  - Click “commit” after adding each entry.

- Create administrative permission objects
  - Click “ADMOBJS”
    - Add the following entries:

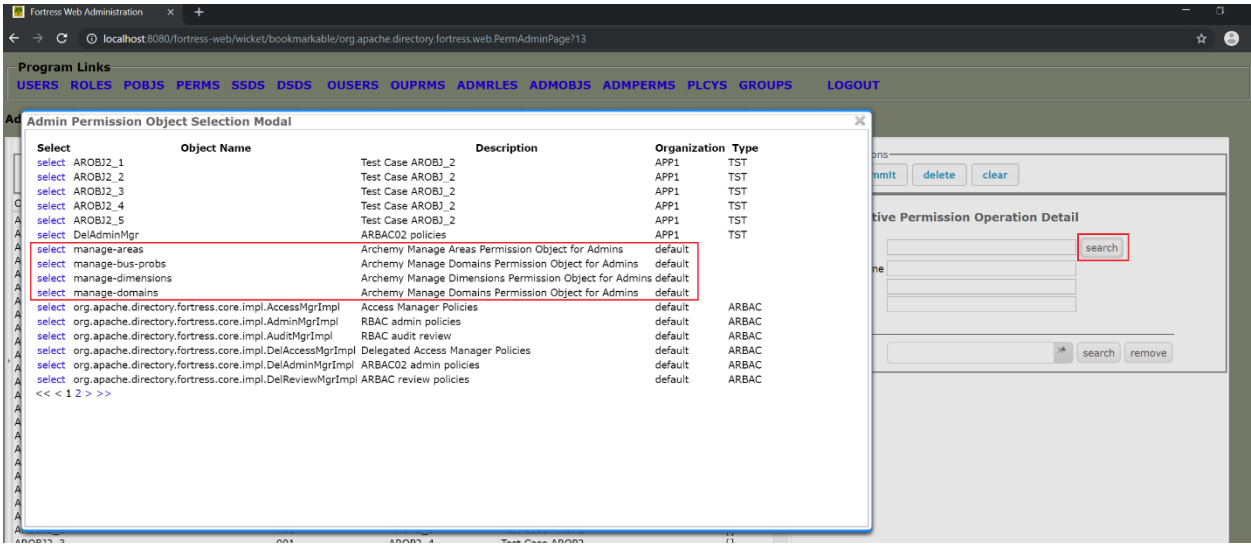
Object Name	Perm Organization	Description
manage-areas	default	Archemy Manage Areas Permission Object for Admins
manage-dimensions	default	Archemy Manage Dimensions Permission Object for Admins
manage-domains	default	Archemy Manage Domains Permission Object for Admins
manage-bus-probs	default	Archemy Manage Business Problems Permission Object for Admins



- Click “commit” after adding each entry.
- All entries should appear in the Fortress web app (see above) as well as in Apache Directory Studio (see below):



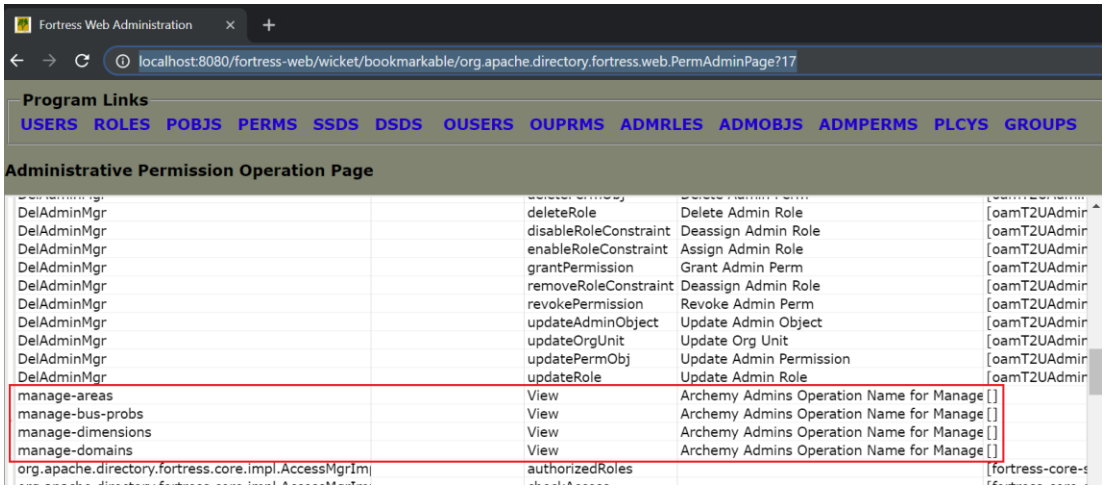
- Create administrative permissions
  - Click “ADMPERMS”
  - Locate the entries for the administrative objects created in the previous steps by clicking on the “Search” button in the right-hand frame labeled “Administrative Permission Operation Detail” and use the popup to select the administrative object that was created in the previous step:



- Create the following entries:

Object Name	Operation Name	Description
manage-areas	View	Archemy Admins Operation Name for Manage Areas
manage-dimensions	View	Archemy Admins Operation Name for Manage Dimensions
manage-domains	View	Archemy Admins Operation Name for Manage Domains
manage-bus-probs	View	Archemy Admins Operation Name for Manage Business Problems

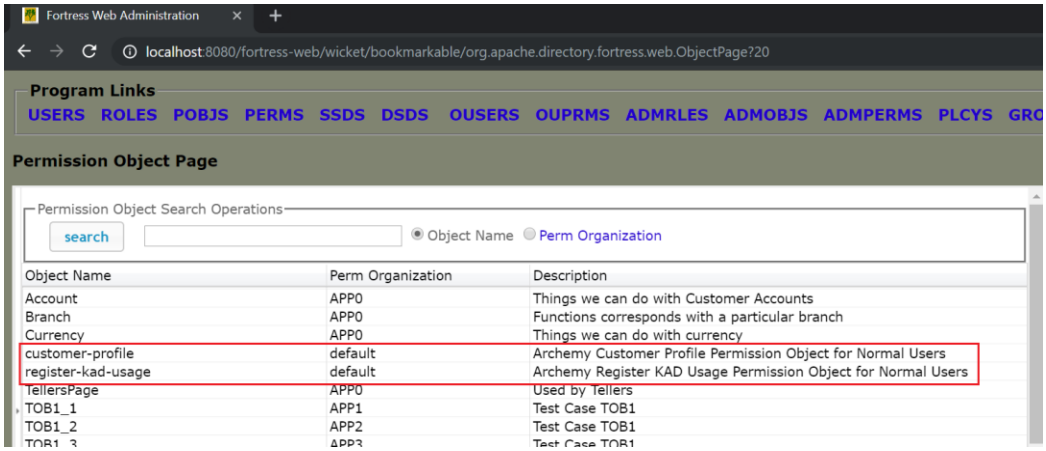
- For each of the above entries, set "**Admin**" for the "Roles" field.
- Click "commit" after adding each entry.
- The added entries should appear in Fortress and Apache Directory Studio:



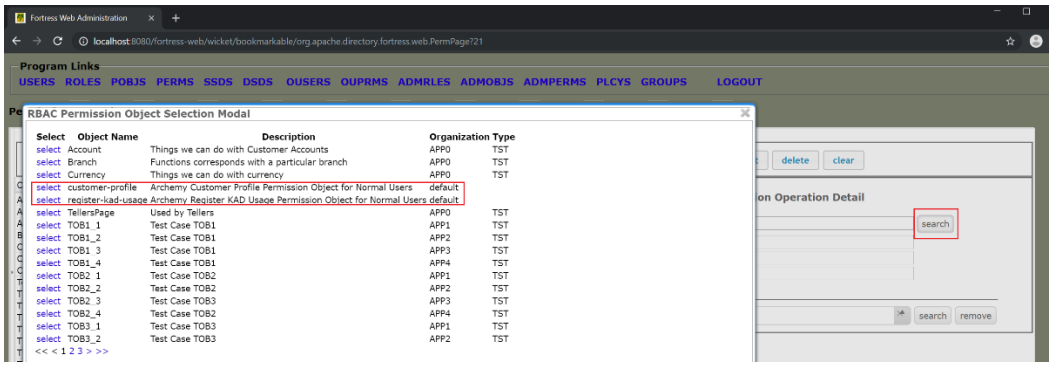
- Create Normal User Permission Objects
  - Click "POBJS"
  - Add the following entries:

Object Name	Perm Organization	Description
customer-profile	default	Archemy Customer Profile Permission Object for Normal Users
register-kad-usage	default	Archemy Register KAD Usage Permission Object for Normal Users

- Click “Commit” after each entry is added.
- Entries should appear in the Fortress web app:



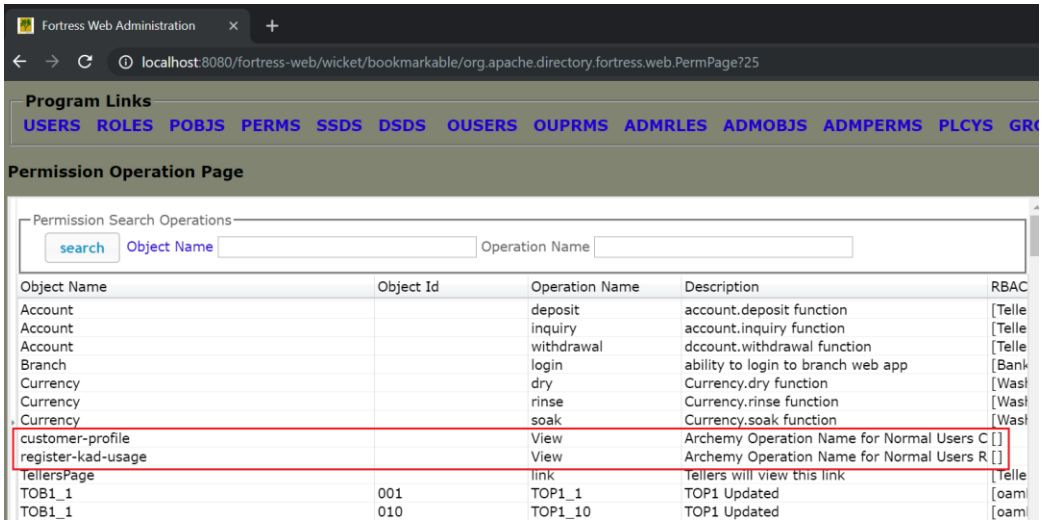
- Create Normal User Permissions
  - Click “PERMS”
  - Search for each Normal User Object and add the following Normal User Permissions by clicking “Search” in the “RBAC Permission Operation Detail” frame and selecting from the popup:



  - Enter the below data:

Object Name	Operation Name	Description
customer-profile	View	Archemy Operation Name for Normal Users Customer Profile Permission Object
register-kad-usage	View	Archemy Operation Name for Normal Users Register KAD Usage Permission Object

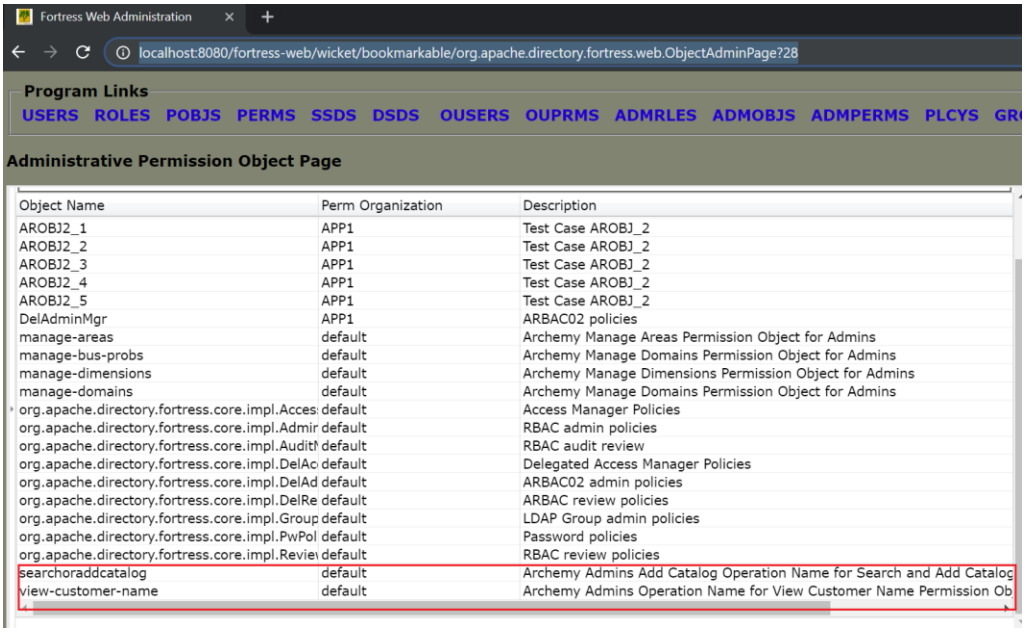
- Add “NormalUser” for the Roles field.
- Click “commit” for each added entry.
- The entries should appear:



- Create Admin Permission Objects for Catalog Add, Delete, and View Cust Name Operations
  - Click on “ADMOBJS”
  - Add the following entries:

Object Name	Perm Organization	Description
searchoraddcatalog	default	Archemy Admins Add Catalog Operation Name for Search and Add Catalog Permission Object
view-customer-name	default	Archemy Admins Operation Name for View Customer Name Permission Object
customer-info	default	Archemy Customer Information Permission Object for Admins

  - Click “commit” after each added entry.
  - Entries should appear in Fortress:



- Create a user organizational unit administration object.
  - Click on “OUSERS”
  - Enter the following fields:

Name	Description
“Archemy-Users”	Archemy Users OU

  - Click “Add” and then click “Commit”

- Create an Admin user.
  - Click on “USERS”
  - Fill in the following fields:

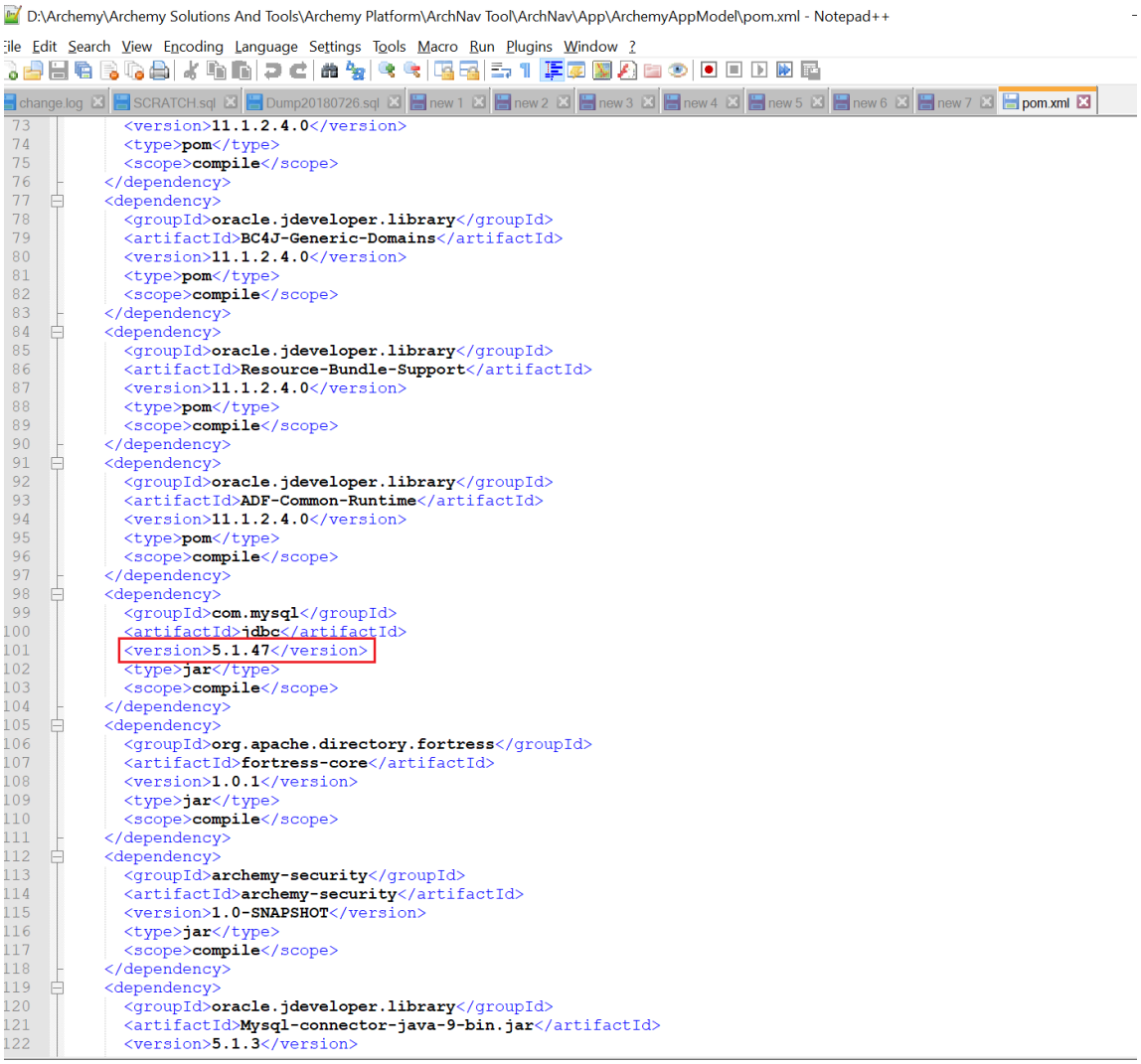
UserId	Password	User Organization	Admin Role Assignments
<create username> (use an email address as the username)	<create password>	Archemy-Users	Admin

- Must click “Add” and then “Commit” first to create the user before assigning “Admin” as the “Admin Role Assignments”. When add “Admin” as an “Admin Role Assignments” must click on “Assign” button and then click on the “Commit” again. To confirm the Admin role assignment was successful, click on “USERS” to refresh the list of users, and scroll to the right. “Admin” should be listed as an “Admin Role Assignments”.

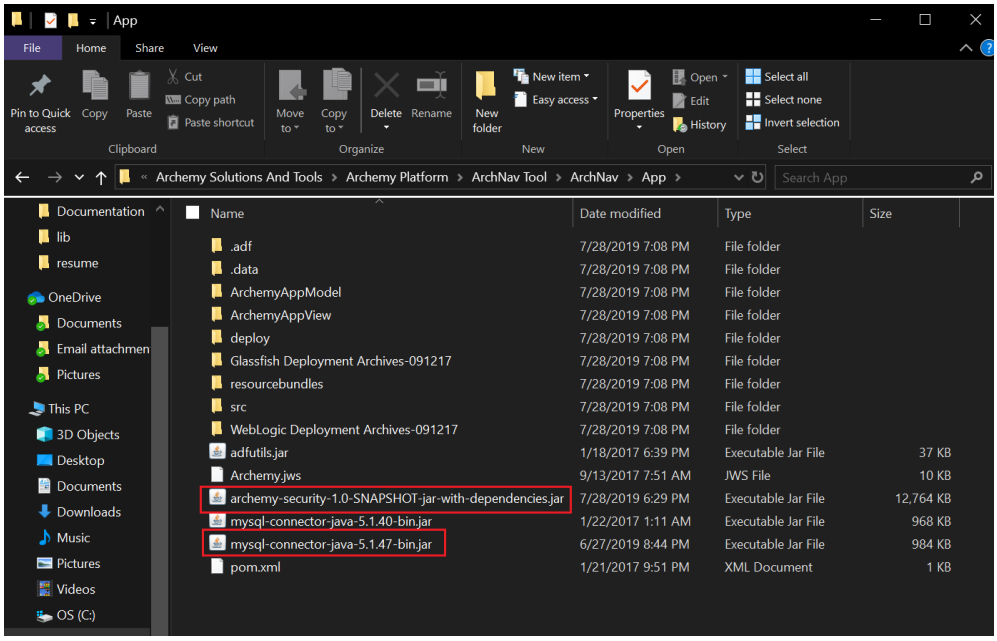
c. Build the ArchNav Application

To build the ArchNav application, follow the steps below.

- Configure ArchemyAppModel to point to the correct version of the MySQL driver (do this before loading the ArchNav project into JDeveloper).
  - Open the pom.xml file in an editor.
  - Change the version for the MySQL Driver:



- Copy relevant JAR files:
  - Copy the highlighted below JAR files into the “App” directory. The MySQL connector JAR file was downloaded and installed into Glassfish. The archemy-security JAR file was generated during a maven build when generated the Archemy Security piece.

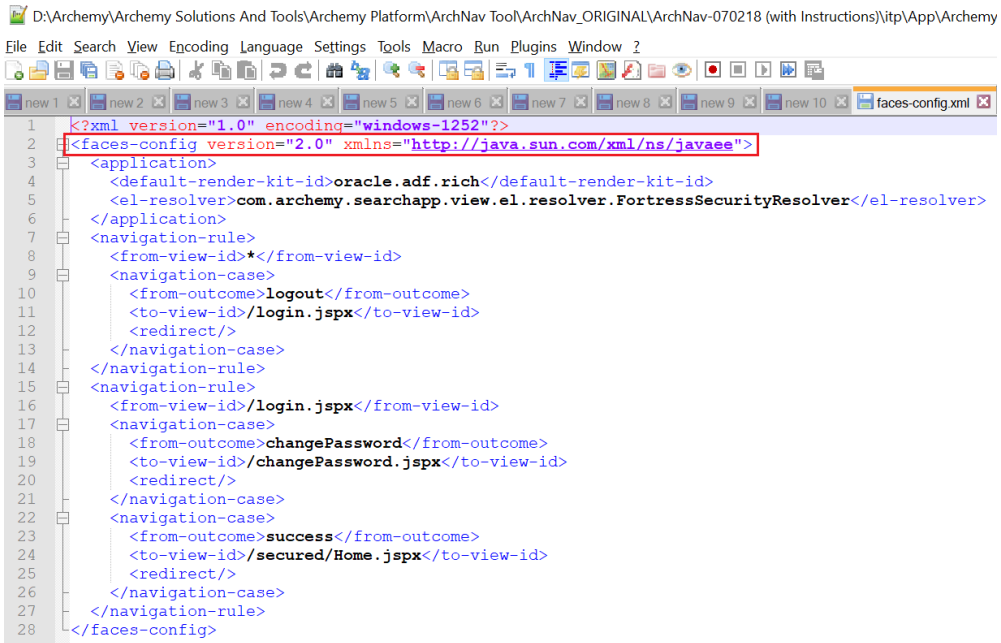


- Change the header in faces-config.xml
  - Open the faces-config.xml file located in:

    ../ArchemyAppView/public_html/WEB-INF/

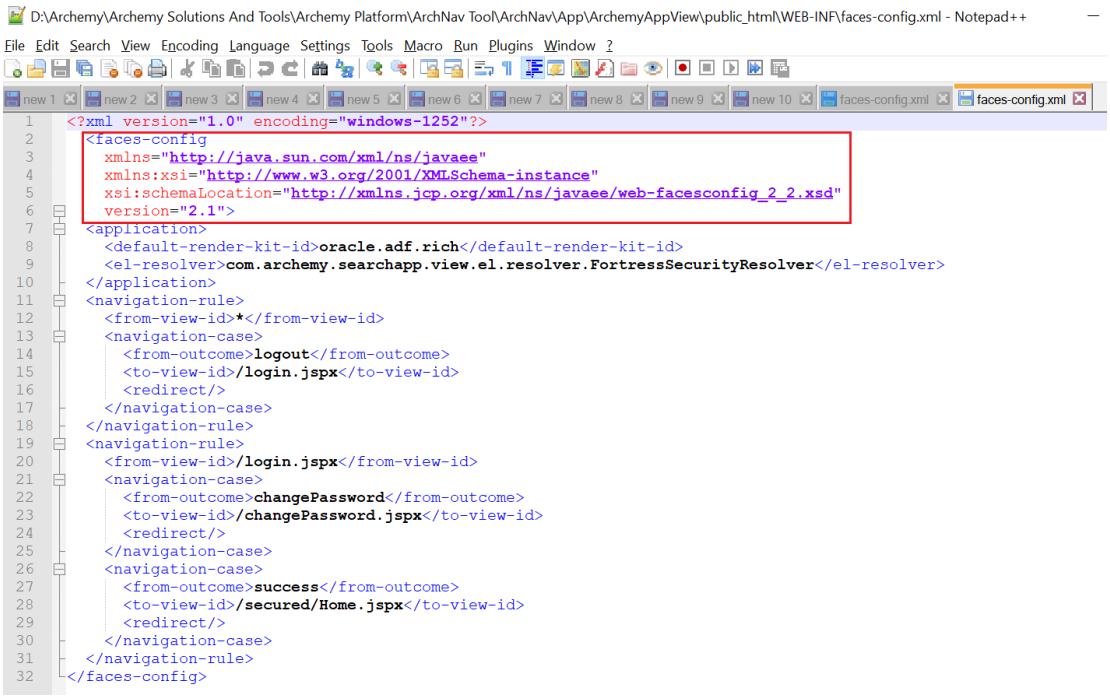
  - Change the <faces-config> tab, replace:

    <faces-config version="2.0" xmlns="http://java.sun.com/xml/ns/javaee">



- And put the following in place:

```
<faces-config
  xmlns="http://java.sun.com/xml/ns/javaee"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee/web-
facesconfig_2_2.xsd"
  version="2.1">
```

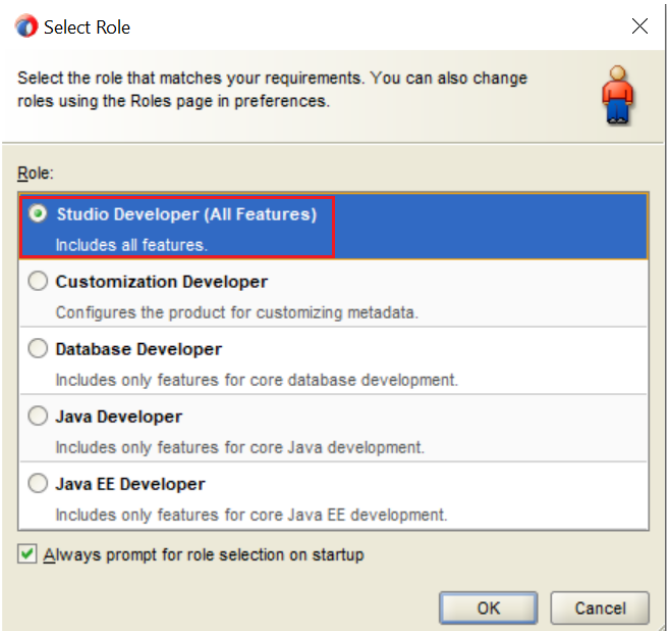


- Once import the code into JDeveloper, navigate to ArchemyAppView → Web Content → WEB-INF and open the faces-config.xml in the JDeveloper IDE editor. Click on the "Source" tab at the bottom of the open file. There should be no errors. If there are errors, these must be corrected before doing a build and then deploy.

d. Import Archemy Workspece into jDeveloper

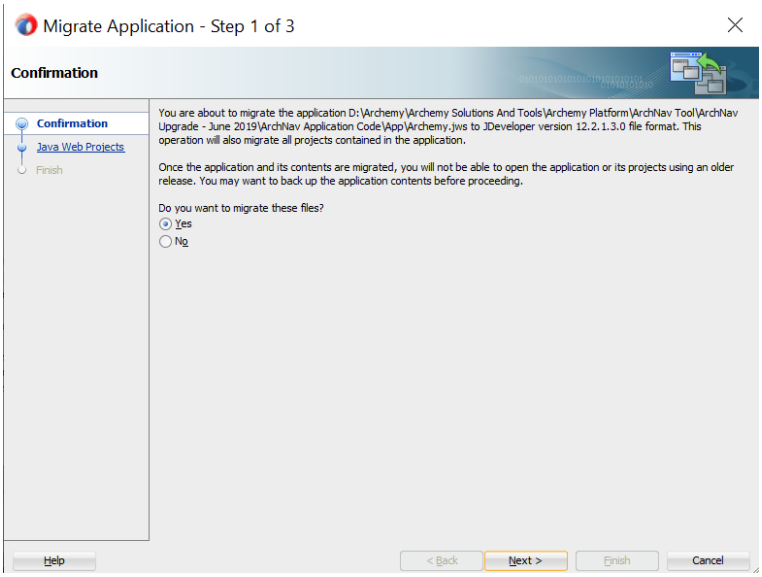
To import the Archemy workspace into jDeveloper, follow the below steps.

- To import the Archemy workspace:
  - Launch JDeveloper in "Studio Developer" mode

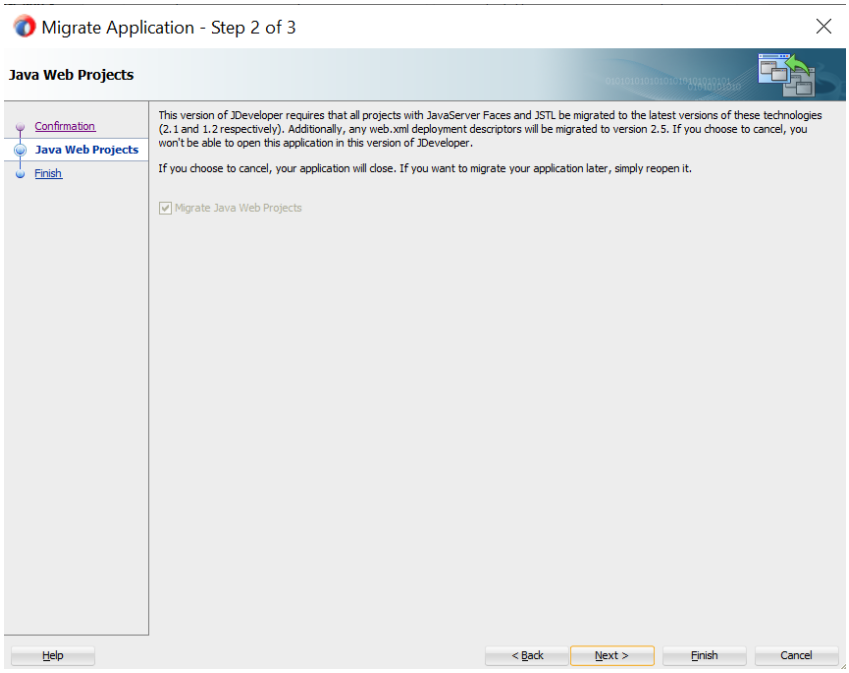


- In JDeveloper, go to File → Open.
- Navigate to and select Archemy.jws under the App directory.
- Select "Yes" and click "Next" to migrate the Archemy workspace to be compatible with JDeveloper 12c.

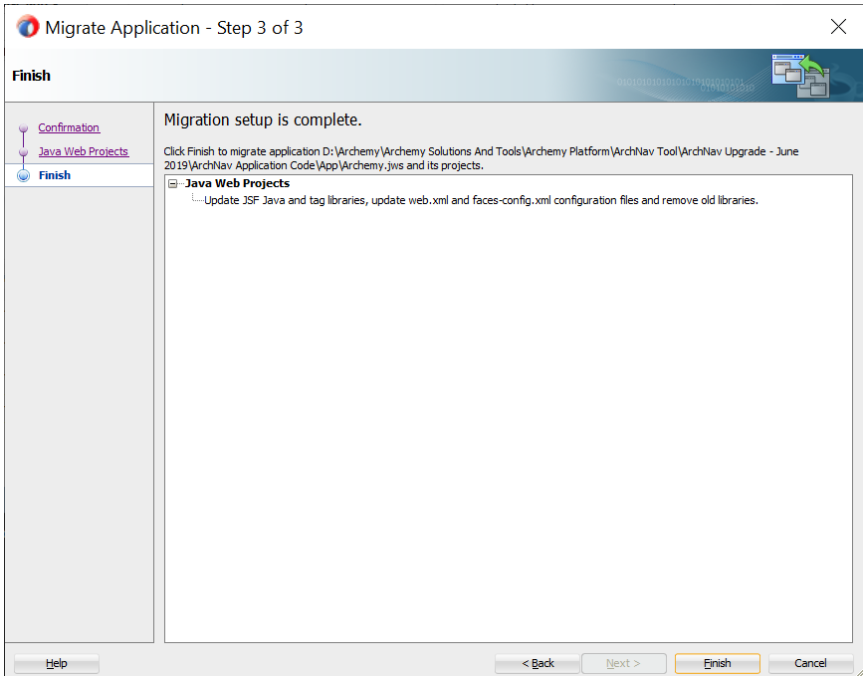
  NOTE: the migration step was already performed to upgrade the ArchNav application project file for a later version of jDeveloper and thus is not required at this point.



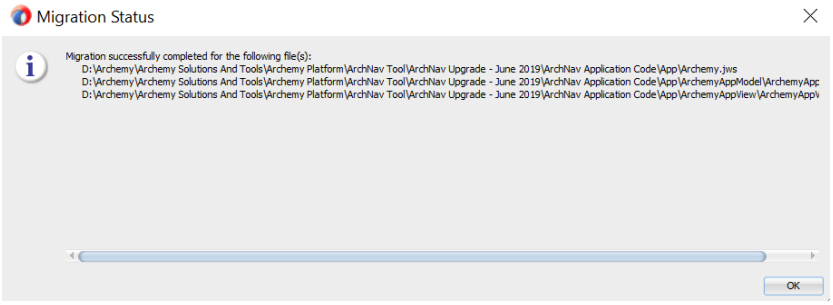
- Click "Next" to migrate JavaServer Faces and JSTL:



- When the migration is completed, the below page will confirm the migration setup was complete:



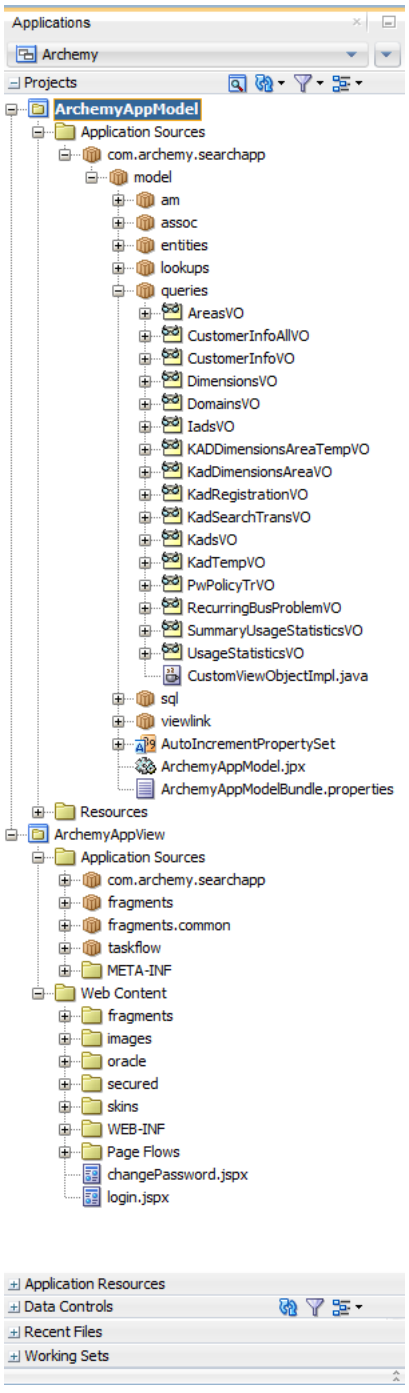
- Click “Finish” to start the actual migration process.
- When the migration is complete, the following dialog will appear indicating that the migration was successful and completed:



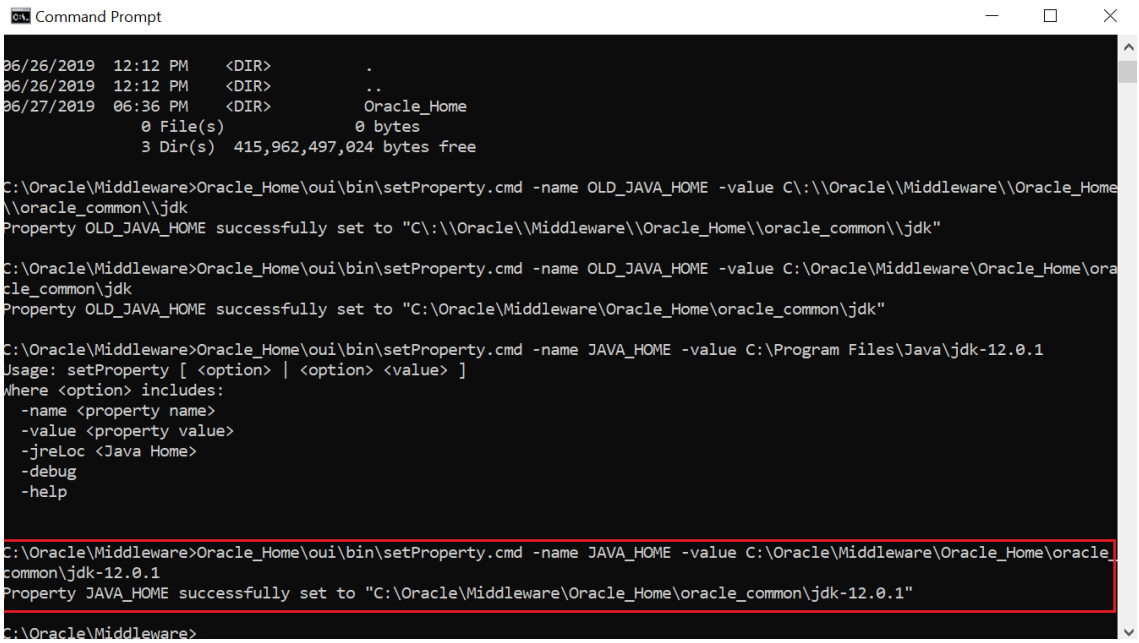
- Click “Ok”. The message log in JDeveloper should list the files that were migrated:

```
Messages - Log
INFO: Check for index data updates
Jun 26, 2019 3:23:18 PM oracle.jdeveloper.maven.util.MavenUtil$4 transferStarted
INFO: Downloading nexus-maven-repository-index.properties
Jun 26, 2019 3:23:18 PM oracle.jdeveloper.maven.util.MavenUtil$4 transferCompleted
INFO: Done - nexus-maven-repository-index.properties
[3:35:26 PM] Migration started.
Jun 26, 2019 3:35:26 PM oracle.adf.share.dt.migration.wsm.PolicyAttachmentMigratorHelper migrate
INFO: Not an ADF application. No adf-config.xml at file:/D:/Archemy/Archemy Solutions And Tools/Archemy Platform/ArchNav Tool/ArchNav Upgrade - June 2019/ArchNav Application Code/App/.adf/META-INF/adf-config.xml
Jun 26, 2019 3:35:31 PM oracle.adf.share.config.ADFConfigFactory findOrCreateADFConfig
INFO: Resource META-INF/adf-config.xml not found on the classpath.
Jun 26, 2019 3:35:31 PM oracle.adf.share.config.ADFConfigFactory findOrCreateADFConfig
INFO: A default implementation of ADFConfig is being created for application. This can lead to unexpected results in some cases. Please add a basic META-INF/adf-config.xml to your classpath to avoid functional errors.
Jun 26, 2019 3:35:33 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Migrating Faces Config
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Removing Tag Libraries from Project: JSF Core 2.0, JSF HTML 2.0
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Removing Libraries from Project
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Adding Tag Libraries to Project: JSF Core 2.2, JSF HTML 2.2
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Removing Tag Libraries from Project: JSF Core 2.0, JSF HTML 2.0
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Removing Libraries from Project
Jun 26, 2019 3:35:35 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Adding Tag Libraries to Project: JSF Core 2.2, JSF HTML 2.2
Jun 26, 2019 3:35:36 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Cleaning '.jsps' directory
Jun 26, 2019 3:35:36 PM oracle.jdevimpl.webapp.faces.migration.MigratorMessageLog updateProgress
INFO: Cleaning '.tags' directory
Migration successfully completed for the following file(s):
      D:\Archemy\Archemy Solutions And Tools\Archemy Platform\ArchNav Tool\ArchNav Upgrade - June 2019\ArchNav Application Code\App\Archemy.jws
      D:\Archemy\Archemy Solutions And Tools\Archemy Platform\ArchNav Tool\ArchNav Upgrade - June 2019\ArchNav Application Code\App\ArchemyAppModel\ArchemyAppModel.jpr
      D:\Archemy\Archemy Solutions And Tools\Archemy Platform\ArchNav Tool\ArchNav Upgrade - June 2019\ArchNav Application Code\App\ArchemyAppView\ArchemyAppView.jpr
[3:35:38 PM] Migration finished.
```

- After the Archemy.jws workspace loads, the following directory structure for the project should appear in JDeveloper:



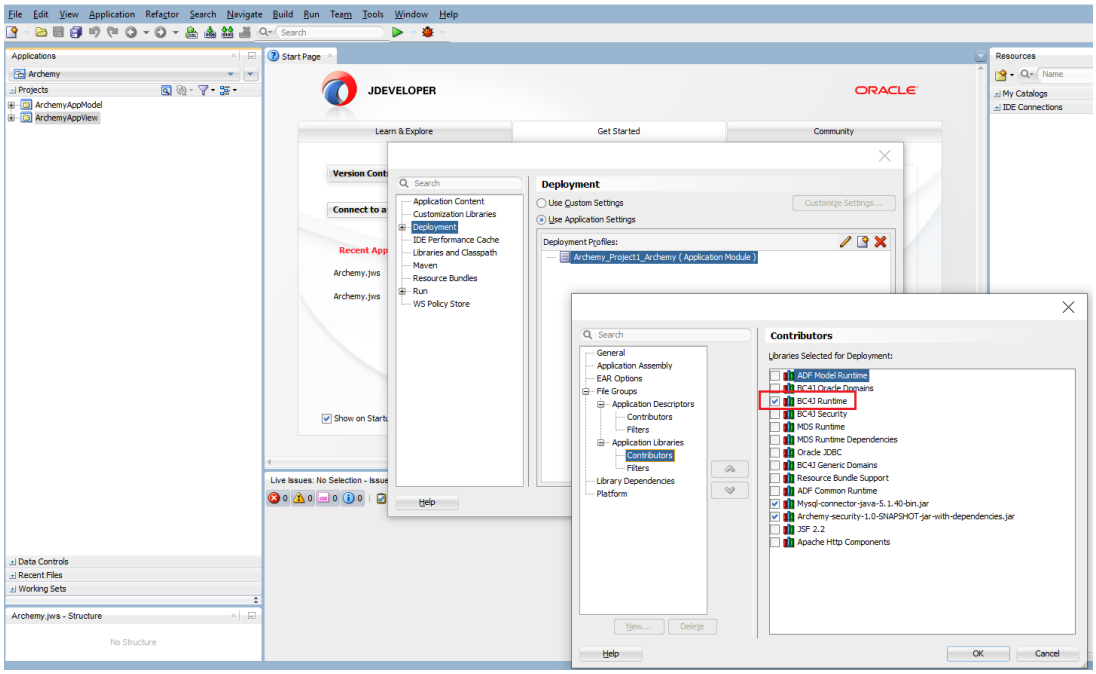
- Update JDK in JDeveloper using setProperty.cmd (Windows) script (see https://docs.oracle.com/middleware/12213/jdev/install/GUID-4230A928-7BE8-4D23-B8F9-1CB2D4EDEC33.htm#OJDIG-GUID-A02C7708-B331-4A8C-B1C7-B35E289C7A5B):



e. Configure Archemy Project to Include Important Libraries

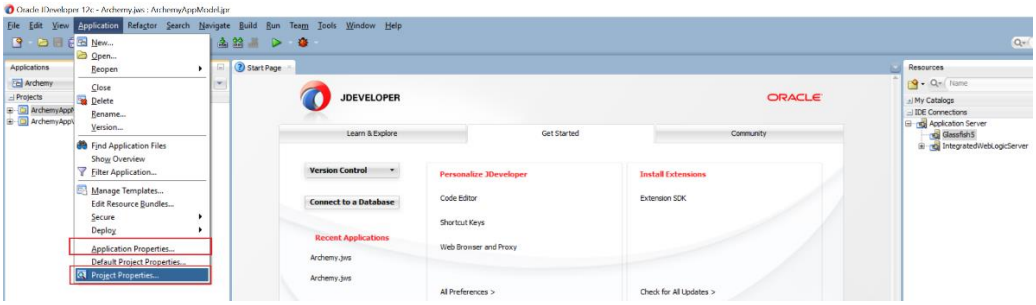
To import library dependencies, follow the below steps.

- Highlight ArchemyAppView and navigate to Applications → Application Properties.
  - Click on Deployment in the left frame and double click on the existing deployment profile for the Archemy application.
  - Select “Contributions” under “Application Libraries” and check “BC4J Runtime” under “Contributors”:

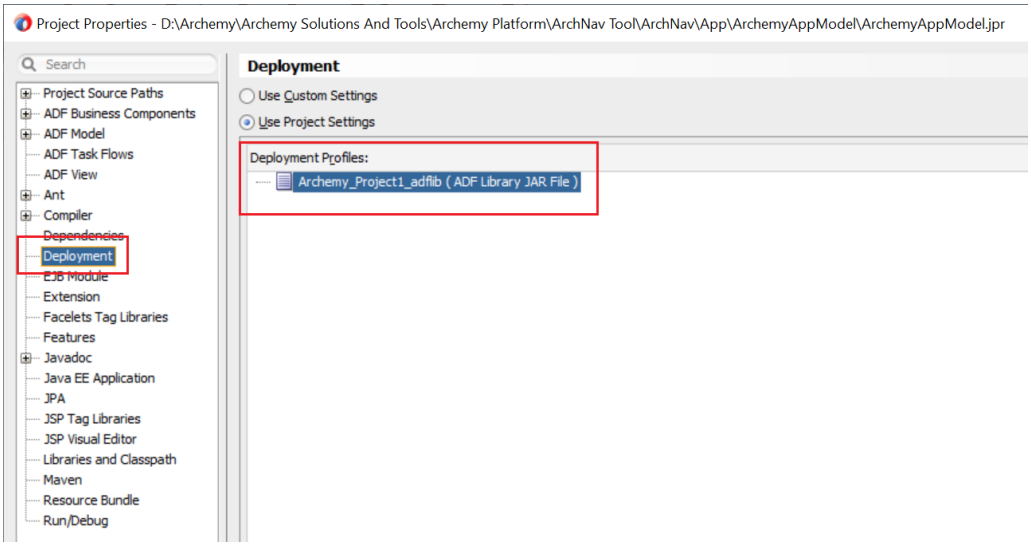


- Click “OK” on all pop-up windows and save the project.

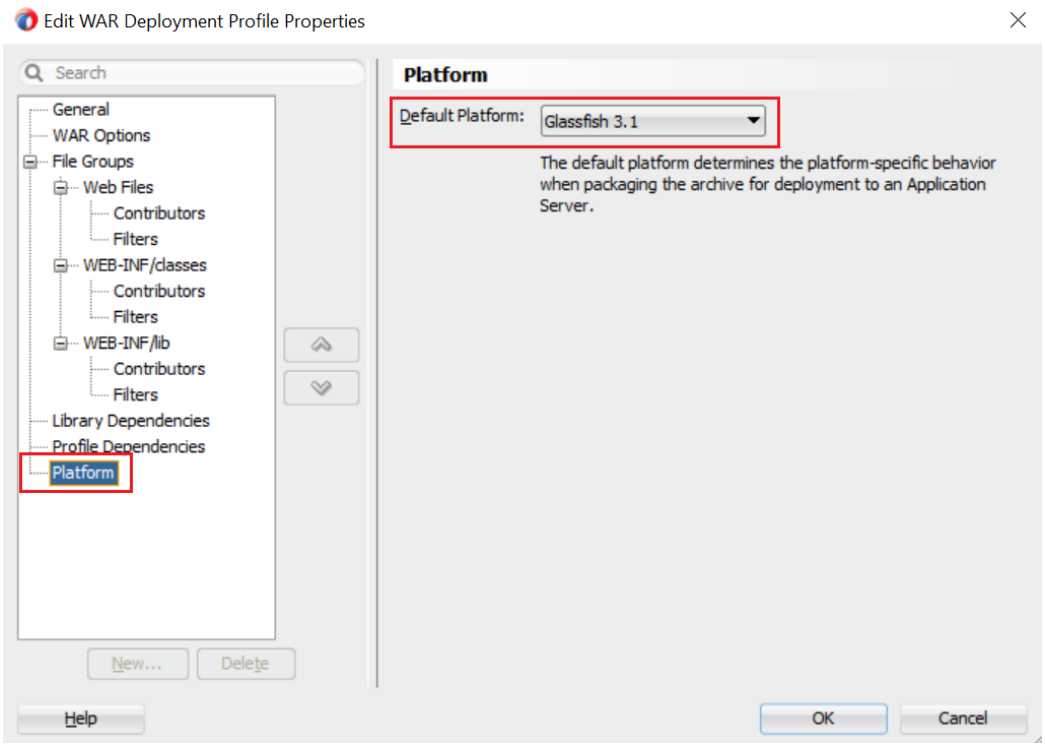
- Configure Archemy project in JDeveloper to build a deployment profile using Glassfish.
  - Highlight ArchemyAppView:
    - Navigate to Application → Project Properties (will have to repeat the following steps for “Application Properties” as well) (NOTE: it is important that the steps that follow are done for both “Project Properties” and “Application Properties” so that all are set to deployment in Glassfish before doing a build.



    - Click on “Deployment” in the left frame, and then double-click on the “Archemy_Project1_adflib” deployment profile:

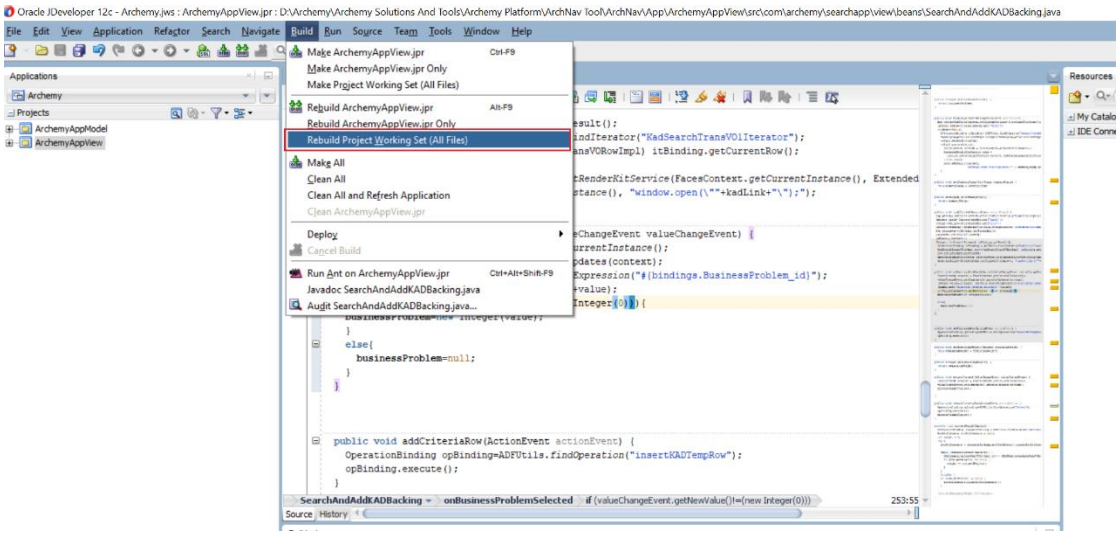


    - Select “Platform” in the left frame, and then select “Glassfish” as the “Default Platform” in the right frame. Click OK.



- Save the Project.

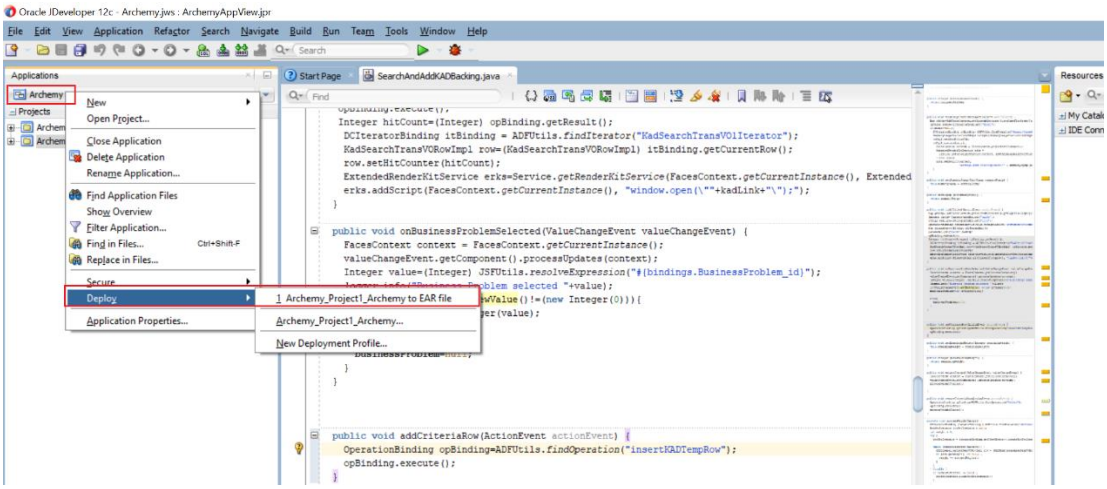
- Build / Compile the ArchNave code:
  - Navigate to Build → Rebuild Project_Working_Set (All Files):



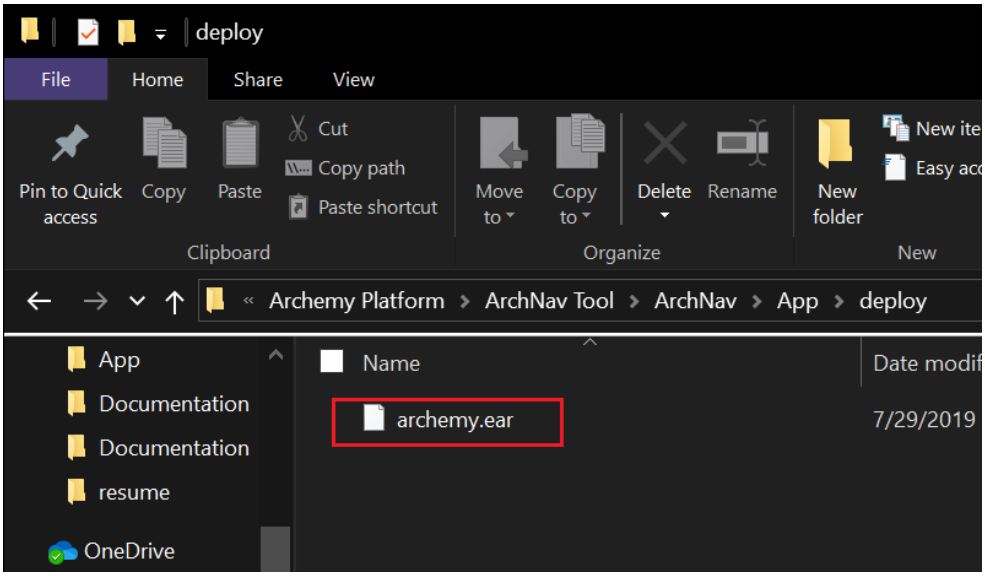
- The code should compile and build with no errors and no warnings.

- Generate EAR file:
  - Right-click on “Archemy” listed under “Applications” in the far top-left corner.

Select “Deploy” → “Archemy_Project1_Archemy…” (NOTE: the first time through this, will only have this option, and after the EAR is generated, will have an additional option “Archemy_Project1_Archemy to EAR file”).

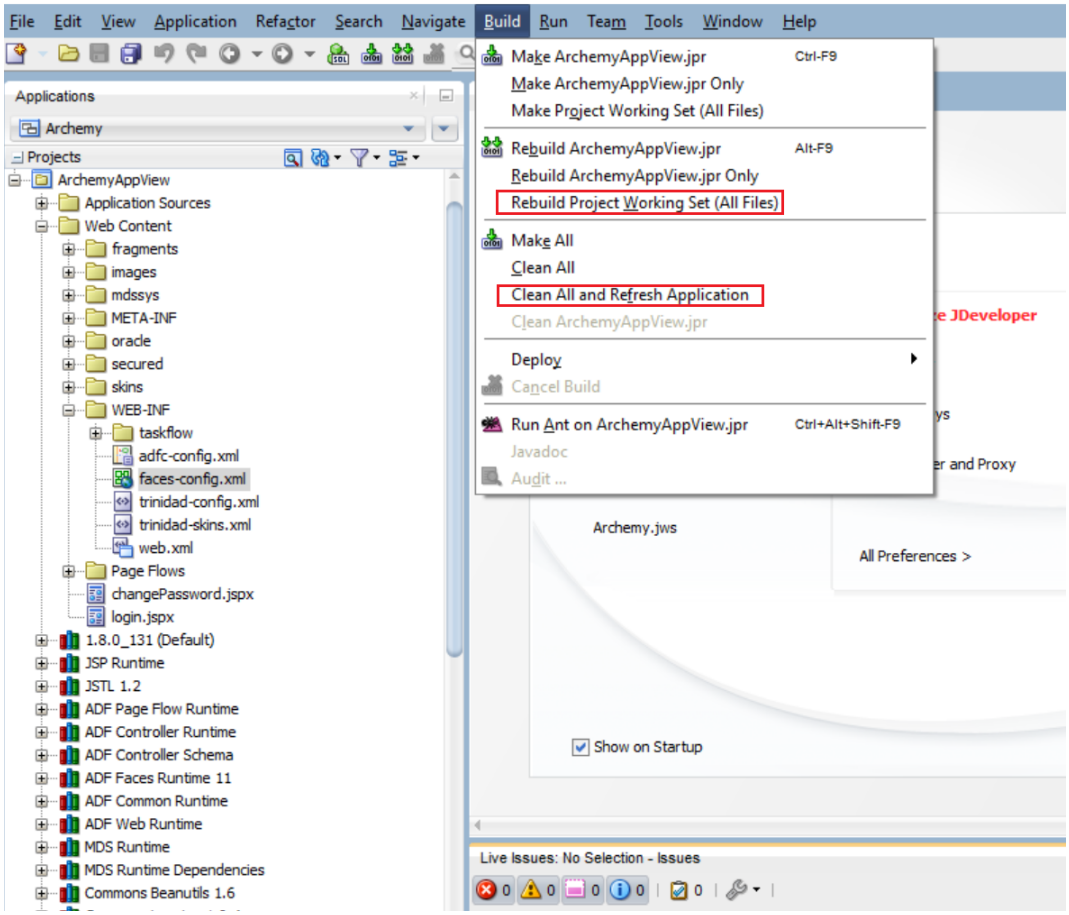


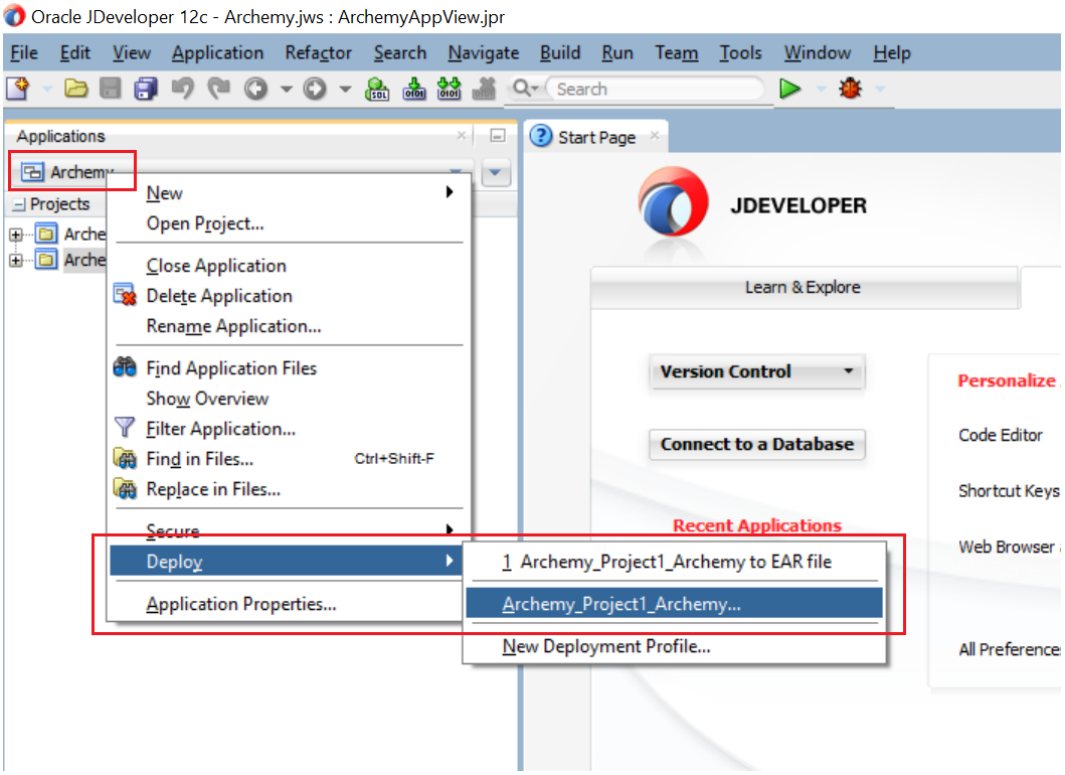
- An EAR file (archemy.ear) should be generated into a “deploy” directory:



- When do a “Clean All and Refresh Application” before doing a “Rebuild Project Working Set (All Files)” then when deploy there will only be one choice available: “Archemy_Project1_Archemy…” otherwise there will be two choices with “Archemy_Project1_Archemy to EAR file” as a second choice (see screenshots below):

Oracle JDeveloper 12c - Archemy.jws : ArchemyAppView.jpr

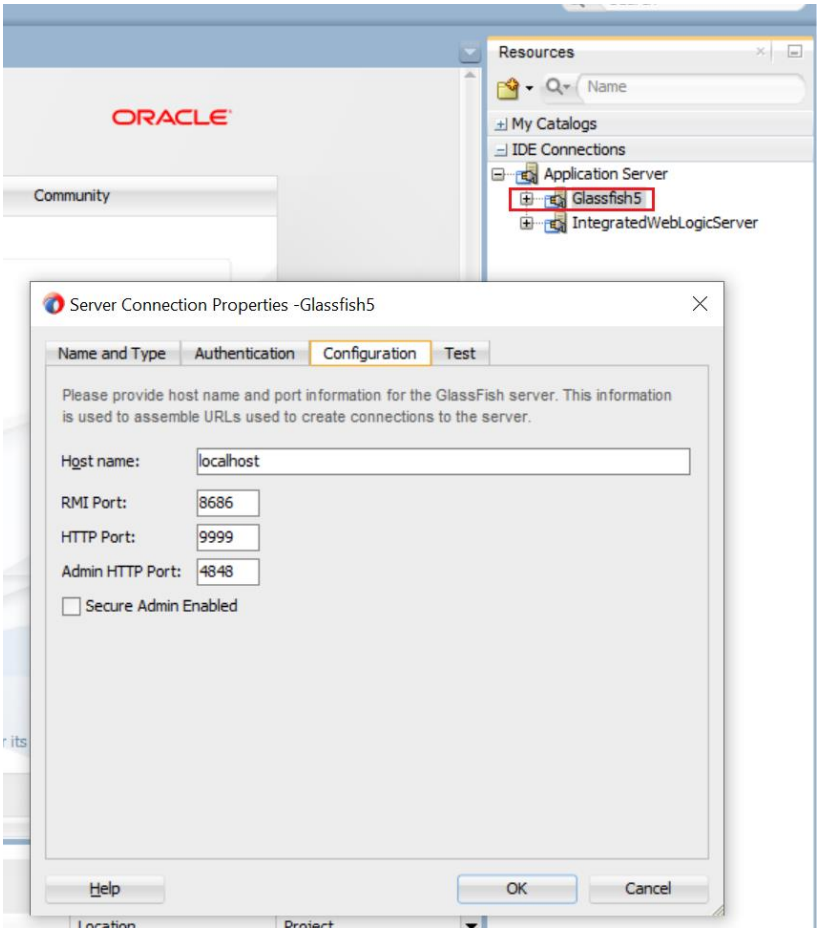




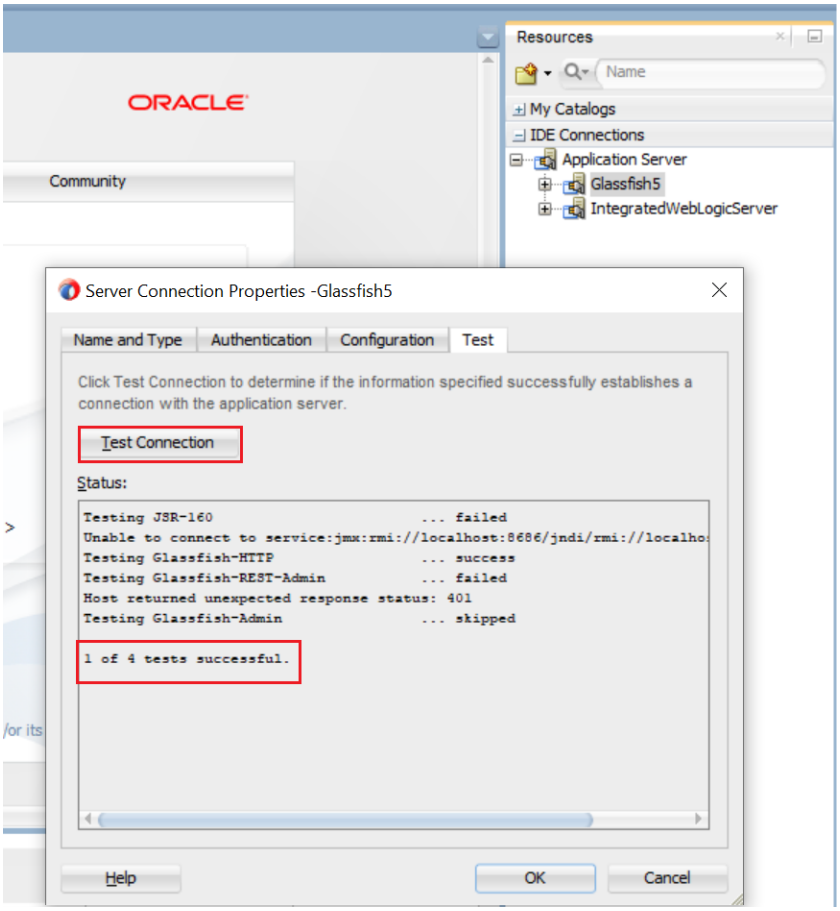
f. Deploy ArchNav into GlassFish

Before deploying the ArchNav project into GlassFish, test the database connection. To do this follow the below steps.

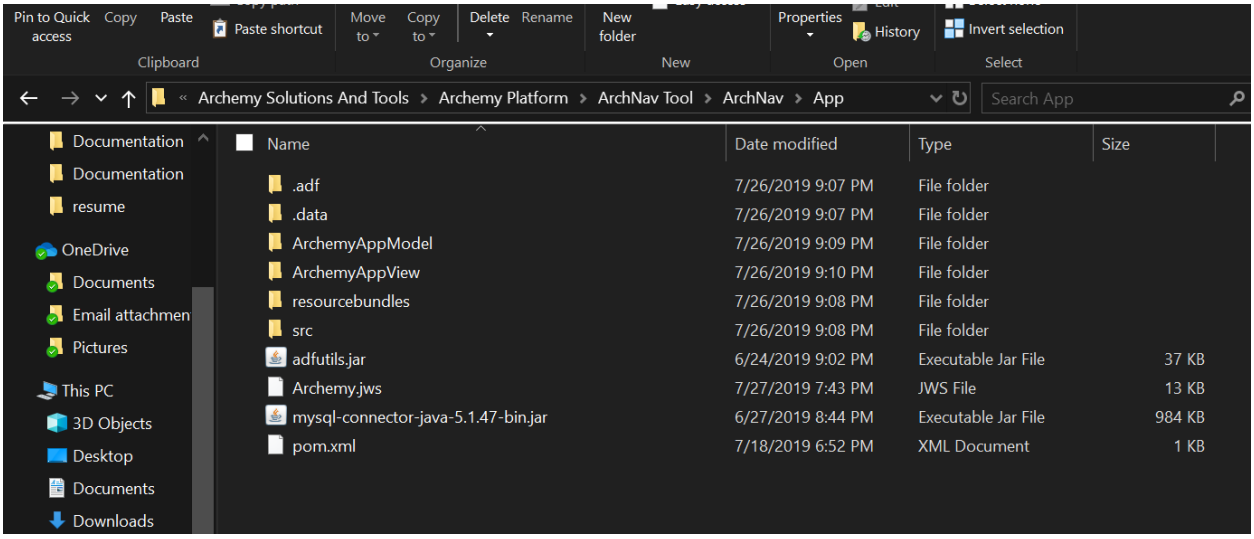
- Perform test connection to Glassfish server from JDeveloper.
  - In JDeveloper, in the far-right frame, expand “IDE Connections” and then expand “Application Server”. “Glassfish 5” should be listed as an Application server. Right-click on “Glassfish 5” and click on the “Configuration” tab to confirm the Glassfish configurations are correct.



- Click on the “Test” tab and click the “Test Connection” button to confirm connection to the Glassfish application server is successful. Click OK.



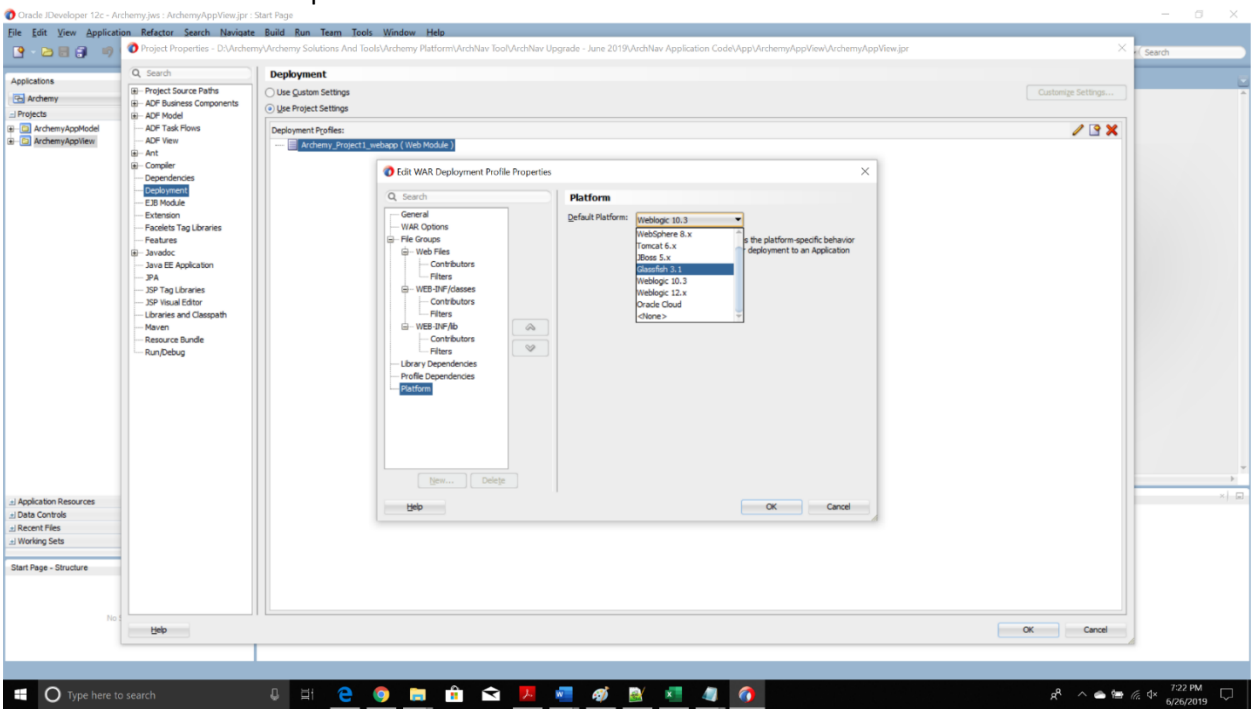
The project directory structure for ArchNav should be similar to the screenshot below:



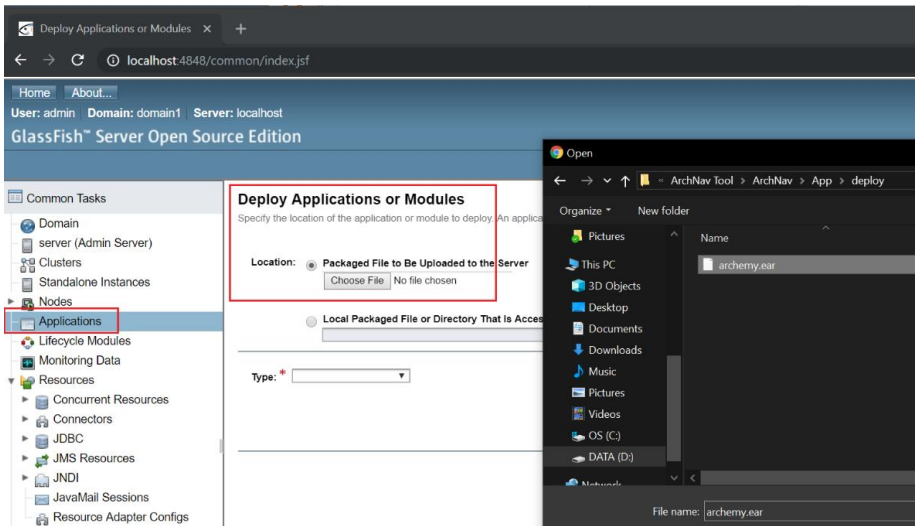
As was mentioned above, GlassFish is the application server used to make ArchNav accessible. ArchNav must be deployed into GlassFish to become available. To do this, follow the below steps.

- In the GlassFish admin console, go to *Application -> Project Properties*.
- Select "*Deployment*" in left frame.
- You will see the Archemy_Project1_webapp module listed in the right frame, double-click this.
- Select "*Platform*" in the left frame of the popup.
- From the “Default Platform” menu, you should see GlassFish listed.

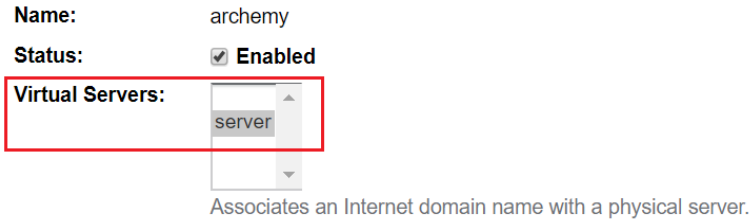
  NOTE: although the ArchNav application uses GlassFish 5.0, the jDeveloper configurations for deploying applications in GlassFish will say GlassFish 3.0. This is OK – select this option.



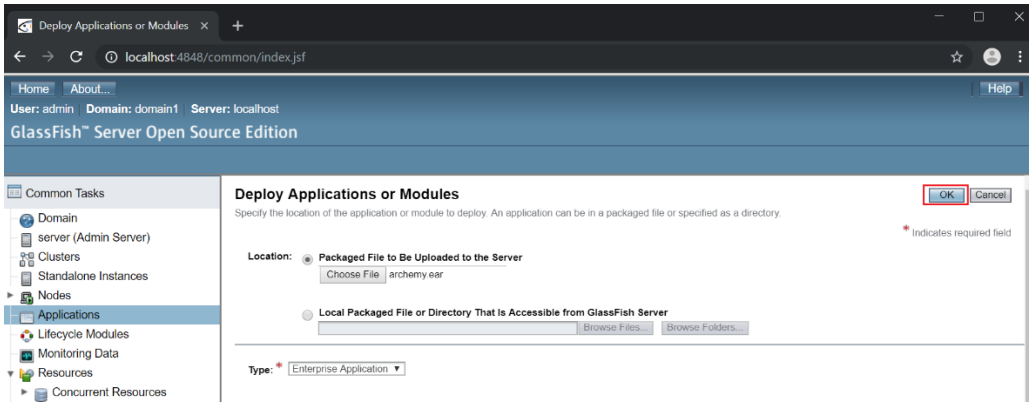
  - First option (preferable option) to deploy:
    - Open the Admin Console for Glassfish (http://localhost:4848).
    - Click on “Applications” from the left from.
    - Under “Deploy Applications or Modules” click on “Choose File” to navigate to the generated EAR file to upload and deploy:



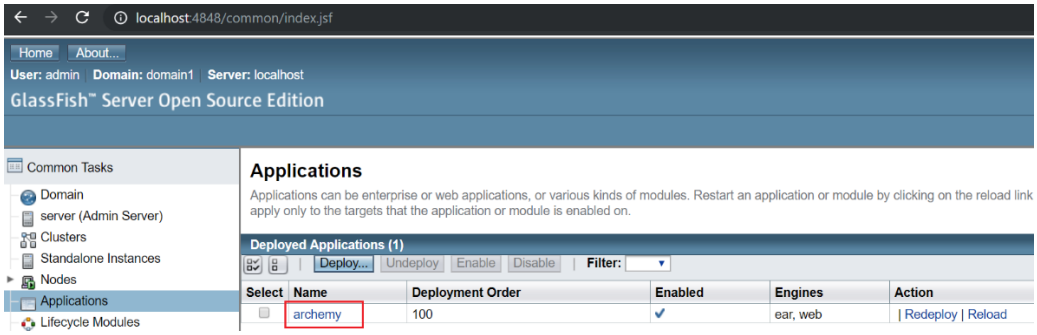
- Be sure to select “server” under “Virtual Servers” after choosing the EAR file to deploy:



- Click “OK”:



- After the application is successfully deployed, it will be listed under “Applications”:



g. Test ArchNav

To test the ArchNav application, follow the below steps.

- To launch the ArchNav application:
  - In a browser, go to URL: http://localhost:9999/archemy/faces/login.jspx
  - Login using the admin username and password that was setup in section "Configure Fortress to Include ArchNav Authentication and RBAC Details".