FLOSSOLA Open Source Software Community

Windows Install Guide

for Release 1503a

Revision History

Date	Version	Description	Author
Mar 20, 2012	0.1	Initial Draft	Andrew McDowell
May 17, 2012	0.2	Update	Andrew McDowell
Jul 16, 2013	0.3	Update for Lesotho	Andrew McDowell
Oct 4, 2015	1503a	Updates for Windows Server 2012 and the latest component install media	Andrew McDowell
Nov 19, 2015	1503a	Removed reference to Community Server in section 1 and noted the instructions can be used to install Registry on Windows 7, 8, 8.1 and 10.	Andrew McDowell
Jan 27, 2016	1503a	Added section 2.7 to set AS_JAVA when multiple JDKs are available.	Andrew McDowell
Aug 2, 2016	1503a	Added JDBC driver note in section 2.2	Andrew McDowell

Table of Contents

1. Installation Guide

This Installation Guide assumes the Registry components are being installed on a 64bit Windows Server (e.g. Windows Server 2008 R2 or 2012 R2). It also assumes the server has partitioned disks with a C drive of at least 60Gb and a D (or E) drive of at least 60Gb for application data.

This Installation Guide can also be used to install Registry on 32bit and 64bit Windows operating systems including Windows 7, 8, 8.1 and 10. If partitioned disks are not available, use suitable locations on C drive for all installation steps. If the operating system architecture is 32bit, use 32bit installers in place of the 64bit installers noted in the installation steps.

Note - If you expect to host large volumes of data (e.g. more than 10,000 scanned documents or more than 200,000 parcels) the size of the application data drive may need to be increased to accommodate multiple database backups.

1.1 Download Installers

The Registry deployment package containing the Registry Services EAR, Registry Web Start WAR, library files and database build files can be downloaded from http://flossola.org/index.php/resources/downloads/category/2-registry.

You will also require a number of installation packages for the components supporting Registry. A bundle file containing most of the installers required is available at the location above. Select the bundle file that matches your operating system architecture. For 64bit download **Installers Win x64**. For 32bit download **Installers Win x86**. Both bundle files are approx. 500Mb.

If you choose not to use the installers bundle file and want to download the latest installers from the hosting websites directly, the following links can be used.

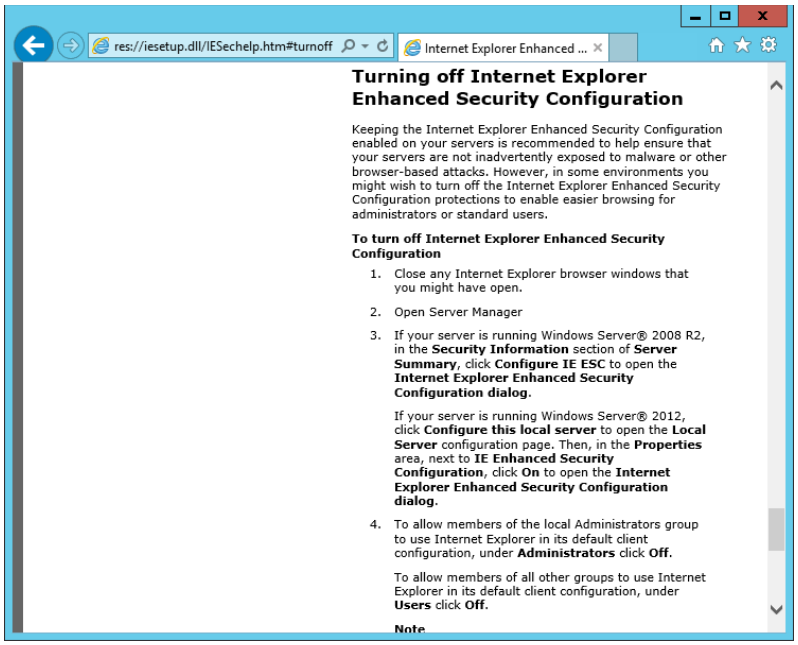
- Latest update of Java 8 JDK (64bit) (http://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html).
- Latest update of Java 8 JRE (32bit) (http://java.com/en/download/manual.jsp). Use the Windows Offline package.
- Glassfish Server Open Source Edition 4.1 (https://glassfish.java.net/download.html). Use the Full Platform version.
- The most recent update for PostgreSQL 9.4. Download 64bit version (Win x86-64) (http://www.enterprisedb.com/products-services-training/pgdownload)
- The latest update of Postgis 2.1 for PostgreSQL 9.4. Download the pg94x64 version executable (http://download.osgeo.org/postgis/windows/pg94/)
- GeoServer (http://geoserver.org/download/). Version 2.7.2 (WAR file) is used for this guide.
- Notepad++ (https://notepad-plus-plus.org/download/v6.8.3.html) Text editor to help with updates to configuration files.
- If you are installing on a recently built Windows Operating System, you will also need to install the Visual C++ Redistributables. These are required for the Postgres uuid-ossp extension. The Visual C++ Redistributables you require is the vc_redist.x86.exe from https://www.microsoft.com/en-us/download/details.aspx?id=48145.

1.2 Install Java

1) Run the Java 8 JDK 64bit installer by right clicking the installer and choosing Run as Administrator. You can optionally exclude the installation of the JDK Source Code. Use the default install location.

2) Run the Java 8 JRE 32bit installer by right clicking the installer and choosing Run as Administrator.

Note - *The 32bit JRE attempts to install the Java browser plugin and this can be blocked by Internet Explorer Enhanced Security Configuration (ESC), hanging the installer. To disable IE ESC, open IE and enter the following URL res://iesetup.dll/IESechelp.htm#turnoff. This will provide instructions on how to disable ESC for your version of Windows. Once disabled, continue with the JRE installation, then re-enable ESC after the JRE is installed.*



1.3 Install Glassfish 4.1

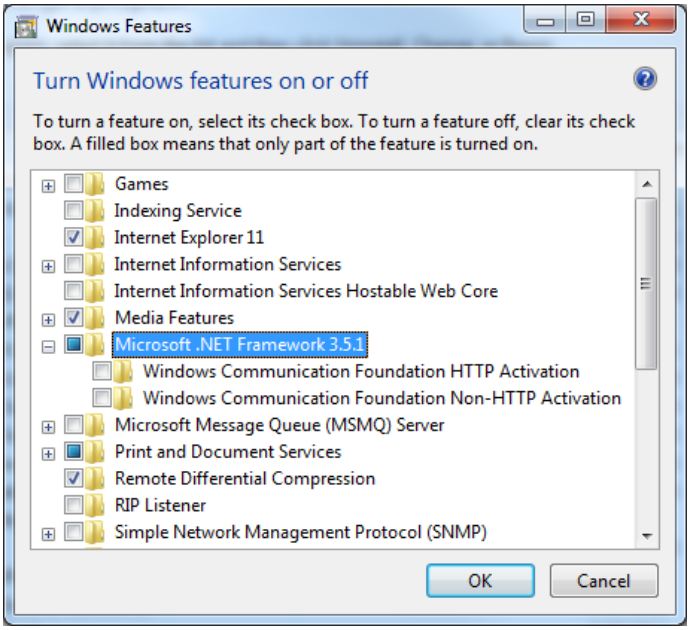
These steps guide you through the Glassfish Installer setting up a shell domain for SOLA as well as configuring a Windows Service to control the SOLA domain.

1) If you have configured a second disk partition on your server, extract the glassfish4.1.zip file to the root of that disk (e.g. D:\glassfish-4.1), otherwise extract it to the root of the C:\ drive (e.g. C:\glassfish-4.1). Remove any duplicate directory that may have been created by the extract so the bin folder is at <diskroot>:\glassfish-4.1\bin.

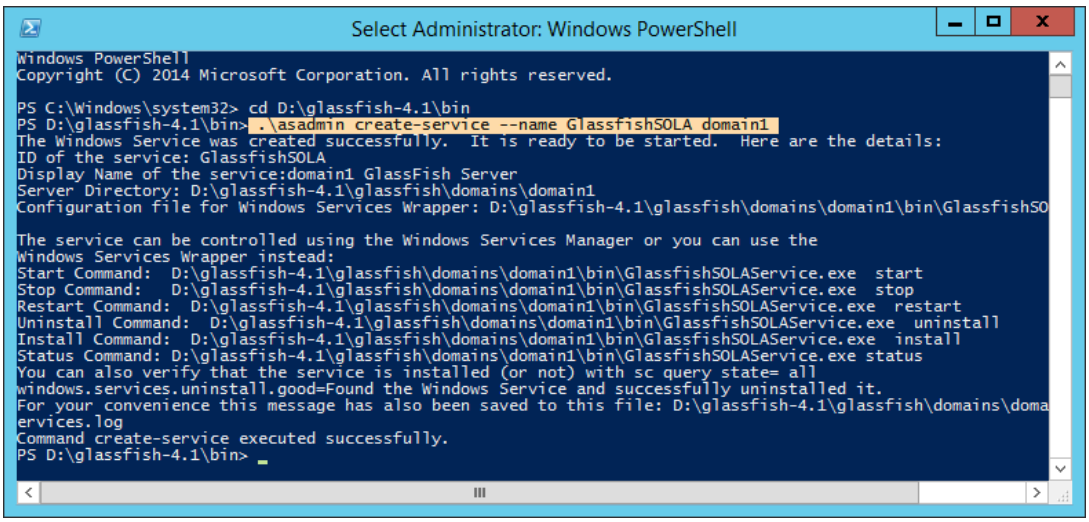
Glassfish includes a default domain called domain1. This will be configured later to host the Registry Services and Web Start application. Now you will install a service to run the domain.

2) The .NET Framework 3.5 is required to create the Glassfish Windows Service. Ensure the .NET Framework 3.5 Features are installed/enabled on your computer. This can be done using the Add Roles and Features Wizard on Server 2008 and Server 2012. See https://technet.microsoft.com/en-us/library/dn482071.aspx for details.

The .NET Framework 3.5 should be enabled on Windows 7, 8, 8.1 and 10 by default. You can check from Control Panel > Programs and Features and clicking the Turn Windows features on or off link. The Windows Features dialog should show the .NET Framework with a blue square in the checkbox as shown below. To access Programs and Features in Windows 10, right click the new Windows icon in the bottom left of the screen and select Programs and Features from the popup menu.



3) Open Windows PowerShell or a Command Prompt as an Administrator and change to the glassfish bin folder e.g. cd D:\glassfish-4.1\bin
4) Type the command **.\asadmin create-service --name GlassfishSOLA domain1** This will create a Windows Service called GlassfishSOLA



5) If you are using Powershell type the following two commands to change the service display name and start it.

    a. **Set-Service -Name GlassfishSOLA -DisplayName "Glassfish SOLA"**
    b. **Start-Service -Name GlassfishSOLA**

6) If you are using a Command Prompt type

    a. **sc config GlassfishSOLA DisplayName= "Glassfish SOLA"**
    b. **sc start GlassfishSOLA**

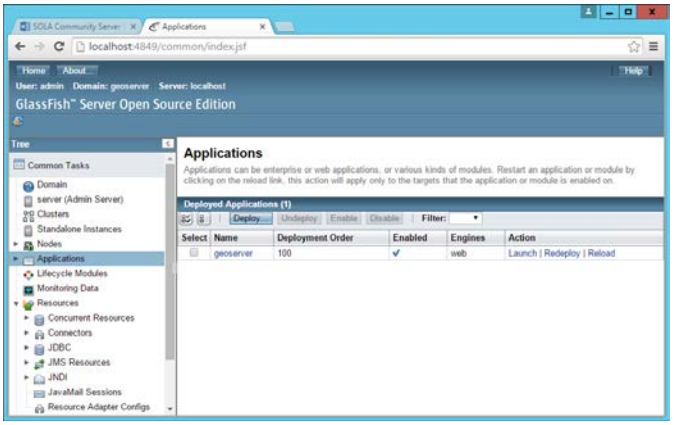
If you are familiar with the Windows Services Control Panel, you will be able to use that to start and stop the new GlassfishSOLA service.

1.4 Install a Geoserver Domain (Optional)

Note – *Geoserver is an optional component for Registry which can be used to host orthophoto imagery for display in the Registry Desktop Map Viewer. If you choose not install a local Geoserver Domain, Registry can be configured to access the orthophoto imagery of Waiheke Island (New Zealand) hosted by the SOLA Demo Geoserver instance at http://flossola.org:8080/geoserver.*

In a production scenario you should create a second Glassfish domain to host Geoserver. This is not a strict requirement as the Geoserver WAR can be installed beside the Registry Services in the same domain. The advantage of using a second domain for Geoserver is that it allows Geoserver to be started, stopped and managed independently of the Registry domain. If you choose not to create a second domain for Geoserver, skip to step 5 and use port 4848 instead of port 4849 to connect to the Glassfish Admin Console.

1) Open a Command Prompt (or PowerShell window) as an Administrator and change to the glassfish bin folder e.g. cd D:\glassfish-4.1\bin
1) Run the command **.\asadmin create-domain --adminport 4849 --instanceport 8085 geoserver.** If prompted, use the default admin user name.
2) Type the command **.\asadmin create-service --name GlassfishGeoserver geoserver.** This will create a Windows Service called GlassfishGeoserver
3) Reset the DisplayName for the new service to "Glassfish Geoserver" and start the service (see steps, 1.3.5 and 1.3.6 above)
4) Extract the geoserver.war file from the geoserver zip file.
5) Open your web browser and enter the following URL – http://localhost:4849. It will open the GlassFish Admin Console for the geoserver domain.
6) Navigate to the Applications node and click the Deploy button
7) Click Choose File and navigate to the geoserver.war file, select and click Open.
8) Click OK to deploy the WAR. Geoserver will process the file and after 1 to 2 minutes you will be returned to the Applications page indicating that the geoserver application is deployed. Note do not navigate away from the Glassfish processing page otherwise the deployment will be aborted.



If you try to login to the Geoserver website (at http://localhost:8085/geoserver) at this stage you will encounter a WicketRuntimeException. The cause of this exception will be fixed by step 2.1.4.

1.4.1 How to Publish an Orthophoto Layer (Optional)

A tutorial for publishing the default Waiheke orthophoto imagery is available from the SOLA Knowledge Base at http://flossola.org/index.php/resources/knowledge-base/36-deployment/67-configuring-an-orthophoto.

1.5 Install Visual C++ Redistributable & Notepad++

1) Install the Visual C++ Redistributable package on the server by right clicking the vc_redist.x86.exe installer and choosing Run as Administrator.
2) Optionally install Notepad++ using the npp.6.8.3.Installer.exe if you don't have a suitable plain text editor already installed.

1.6 Install PostgreSQL

To run the install for PostgreSQL you will need administrator privileges on your computer.

1) Run the PostgreSQL 9.4 installer by right clicking the installer and choosing Run as Administrator.
2) Leave the default location for the installation directory (C:\Program Files…), but you can change the data directory to use a folder on the D (or E) partition (e.g. D:\PostgreSQL\SOLA)
3) At the Password form, enter a suitable password for the postgres superuser. You will need to use this password frequently, so ensure it is a password you will remember.
4) Use the default port of 5432 and the default locale
5) Proceed with the installation – it may take several minutes. Once complete, close the installer – do not run StackBuilder at this time.
6) Verify PostgreSQL has been installed correctly by starting pgAdmin (Start menu > All Programs > PostgreSQL9.4 > pgAdmin III) and attempting to connect to the new database

    a. If a PostgreSQL 9.4 (localhost:5432) server is not listed under the Servers node, in the Object Browser view, click the plug tool in the top left of the tool bar and enter the details for your PostgreSQL server.
    b. Right click this database and choose Connect
    c. When prompted, enter your postgres password.

If you encounter issues while installing PostgreSQL, or you get an unexpected error while trying to connect to the PostgreSQL database, you may need to uninstall and reinstall Postgres. If you do need to reinstall, follow these steps

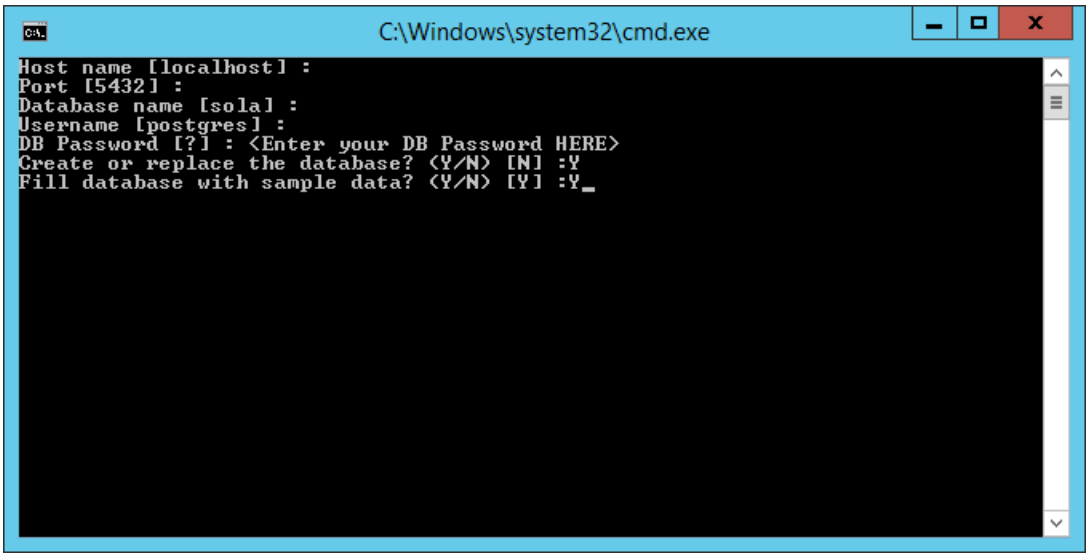
1) Uninstall PostgreSQL using the Control Panel
2) Locate the PostgreSQL installation directory (e.g. in Program Files) and delete it completely
3) When you re-run the installation, choose the install location to be C:\ rather than C:\Pogram Files.

1.7 Install PostGIS 2.1

1) Run the PostGIS 2.1 installer by right clicking the installer and choosing Run as Administrator.
2) When installing the PostGIS component, **clear/uncheck** the Create spatial database option on the Choose Components form. If you do not uncheck this option, you can simply delete the additional spatial database at a later time.
3) If prompted to update pgAdmin during the file copy process, you can optionally do so.

1.8 Create the SOLA Database

1) Locate the database folder in the Registry deployment package and double click the **create_database.bat** build script in the database folder.
2) A Command Prompt will display and ask a sequence of questions about the database connection. Use the default values shown in square brackets, except for the DB Password and Create or Replace the database question (answer Y)
3) You should fill the database with sample data initially to help test all components are correctly configured. You can rerun the create_database script at any stage to rebuild a clean database without the sample data.



The script should take about a minute to run. If it only takes a few seconds, it will indicate an issue with script. Open the build.log file (it will be in the same directory as the create_database script) to see the error/warning messages.

1.8.1 Known error/warning messages

- *The system cannot find the path specified* means the psql.exe could not be located. **Edit** create_database.bat in your preferred text editor (e.g. Notepad++), go to line 14 and update the folder path for the psql variable to match the location of the bin folder in your Postgresql installation. Once done, save and rerun create_database.bat.

2. Configure Glassfish

2.1 Copy PostgreSQL JDBC Driver, SSH Key Files and New Jars

1) Stop the GlassfishSOLA and the GlassfishGeoserver services. You can use the Services Control Panel, Powershell (*Stop-Service -Name GlassfishSOLA*) or a Command Prompt (*sc stop GlassfishSOLA*). Both Powershell and the Command Prompt must be run as Administrator.
2) Locate the Registry deployment package and copy the postgresql-9.1-901.jdbc4.jar file from the lib folder into **...\glassfish-4.1\glassfish\domains\domain1\lib**
3) Copy the keystore.jks and cacerts.jks files from the config folder in the Registry deployment package into **...\glassfish-4.1\glassfish\domains\domain1\config**
    a. The files in the original folder are the original keystore.jks and cacerts.jks for Glassfish 4.1 in case you need to reinstate them.
4) Copy the 4 jackson JAR files and the guava-17.0 JAR file from the module folder into **...\glassfish-4.1\glassfish\module**
5) Delete the file called guava.jar from the **...\glassfish-4.1\glassfish\module** folder. The guava-17.0 is a newer version of that file and the newer version is required for Geoserver.
6) Restart the GlassfishSOLA and the GlassfishGeoserver services using the Services Control Panel, Powershell (*Start-Service -Name GlassfishSOLA*) or a Command Prompt (*sc start GlassfishSOLA*)

Tip – If you are using Powershell, the *Get-Service -Name Glass** command will show the current status of the two Glassfish services.

The key files you replaced were the default key files for Glassfish. They do not include the necessary configuration to support the message encryption used by Registry. The key files you copied in have been generated as the default key files for SOLA development purposes and these files match the default key files in the SOLA Web Services Client Java library. When deploying to a production environment, new key files should be generated for the production Glassfish instance. The task to generate new key files is beyond the scope of this document, but instructions on how to do this are provided in the SOLA Knowledge Base. See http://flossola.org/index.php/resources/knowledge-base/36-deployment/65-hardening-glassfish.

2.2 Configure JDBC Connection

1) Browse to the Glassfish Admin console at **localhost:4848**.
2) In the Glassfish Admin Console, locate the Resources > JDBC > JDBC Connection Pools node
3) Click the New button
4) In the New JDBC Connection Pool (Step 1 of 2)
    a. Pool Name = sola
    b. Resource Type =javax.sql.ConnectionPoolDataSource
    c. Database Driver Vendor = Postgresql
5) Click Next and verify the Datasource Classname is org.postgresql.ds.PGConnectionPoolDataSource
6) Scroll down to the Additional Properties and set the following values
    a. User = postgres
    b. DatabaseName = sola
    c. Password = <your postgres password>
7) Click Finish, then click the new Connection Pool you just created and on the Edit JDBC Connection Pool, click **Ping**. You should get a Ping Succeeded message.
8) It is now necessary to add a new JNDI resource for the connection pool. The JNDI name is the value used by the Java Naming Directory Interface (JNDI) resolution to

reference/locate the sola connection pool resource. Go to the JDBC > JDBC Resources node and click New...

9) Set the JNDI Name to jdbc/sola. It is important to use this name as this is the value referenced by the MyBatis connection configuration files.
10) Select sola as the Pool Name and click OK to create the new JDBC Resource.

Note – These instructions use the PostgreSQL JDBC Driver version 9.1. If a more recent JDBC driver is used (i.e. version 9.3 or 9.4) then be aware the DatabaseName property is ignored. You need to set the database name as part of the URL parameter instead. E.g.

a. URL = jdbc:postgresql://localhost/sola
b. User = postgres
c. Password = <your postgres password>

2.3 Configure Security Realm

SOLA delegates authentication of user credentials to a Glassfish JDBC Security Realm. It is possible to configure a variety of Security Realms in Glassfish, and any of these could be used for SOLA. The JDBC Security Realm is used because it references the user credentials directly from the sola database which greatly simplifies the administration of user details using SOLA Admin.

1) From the Configurations > server-config > Security > Realms node, select New...
2) Set the following values. All other values should remain blank.
   a. Name = SolaRealm
   b. Class Name = com.sun.enterprise.security.auth.realm.jdbc.JDBCRealm
   c. JAAS Context = jdbcRealm
   d. JNDI = jdbc/sola
   e. User Table = system.appuser
   f. User Name Column = username
   g. Password Column = passwd
   h. Group Table = system.user_roles
   i. Group Name Column = rolename
   j. Digest Algorithm = SHA-256
3) Click OK to save the new security realm.
4) Click the Configurations > server-config > Security node
5) Check the **Default Principal To Role Mapping** checkbox to enable this setting. SOLA does not include any specific role mapping configuration and relies on the default mapping provided by Glassfish (i.e. roles from the security realm have a one to one mapping to roles in the application based on role name).
6) Save this change

2.4 Configure JVM Settings

This section customizes a minimal set of JVM settings for the sola application domain. For production deployment, it may be necessary to further customize other JVM settings to improve the overall performance of Glassfish and to harden the Glassfish instance minimizing potential security risks.

Warning - If you copy and paste the settings below (e.g. –server) be aware the hyphen (-) may have been converted automatically by Word to a dash (–). You will need to revert it to a hyphen!

1) Open the Glassfish Admin Console at http://localhost:4848
2) Click the Configurations > server-config > JVM Settings node
3) Click the JVM Options tab
4) Change -client to -server. This will ensure the Server JVM is used to run the application domain rather than the client JVM.

5) Change the -Xmx512m option to -Xmx1280m. This will allow the JVM to use up to 1.25GB of RAM.
6) Click the Add JVM Option button and enter -Xms640m in the blank Value field
7) Save your changes. You should get a message indicating the save was successful. Changes to the JVM settings will also require a restart of Glassfish, however you should complete all of the configurations below before restarting.

2.5 Configure Logger Settings

For development purposes it is useful to capture the SQL queries that are sent from Glassfish to the database in the Glassfish Log. The Glassfish Log is displayed in the Output View by Netbeans making it very convenient to follow the SQL the application sends to the database as the application is running. Note that these settings are not required in production unless it is necessary to capture the database queries for debugging purposes.

1) Click the Configurations > server-config > Logger Settings node
2) Click the Log Levels tab
3) Click the Add Logger button
4) Enter the new logger name java.sql and set the Log Level to FINE.
5) Click the Add Logger button and add a logger called java.sql.Connection with the Log Level set to FINE. Note that the java.sql and java.sql.Connection loggers must both be set to FINE to log SQL statements.
6) Click the Add Logger button and add a logger called org.sola.services with the Log Level set to INFO. This is the logger used by the LogUtility in SOLA. Exception messages and other useful details are recorded in the Glassfish Log through this logger.
7) Click the Add Logger button and add a logger called java.sql.ResultSet with the Log Level set to OFF. This logger will capture all results returned from the database however logging every result has a significant performance impact. This logger should only be turned to the FINE level for debugging specific issues and then turned OFF again.

You can also view the Glassfish Log directly from the Glassfish Admin Console. Click the View Log Files on the server (Admin Server) node. You can also rotate the log if necessary.

2.6 Hardening Glassfish

If you are preparing Registry for production deployment, you should secure (a.k.a. harden) the Glassfish installation. An overview of the recommended steps for hardening Glassfish can be found at http://flossola.org/index.php/resources/knowledge-base/36-deployment/65-hardening-glassfish.

2.7 Configuring AS_JAVA

If your computer has multiple Java JDK's installed, Glassfish may select an older JDK to run that is not compatible with the SOLA security features. This may cause an issue when trying to login to SOLA (see step 3.2-5). You can explicitly set the location of the JDK to use in the **...\glassfish-4.1\glassfish\config\asenv.bat** file. Add the line **set AS_JAVA=<*fully qualified path to your JDK*>** and restart Glassfish.

2.8 Restart Glassfish

1) Restart the GlassfishSOLA and service using the Services Control Panel, Powershell (Restart-Service -Name GlassfishSOLA) or a Command Prompt (sc stop GlassfishSOLA, then sc start GlassfishSOLA)
2) Open the Admin Console again (http://localhost:4848) to ensure the configurations are valid. If you are unable to access the Admin Console, it will indicate a configuration error and you many need to reinstate the domain.xml.bak file in the .../glassfish-4.1/glassfish/domains/domain1/config folder.

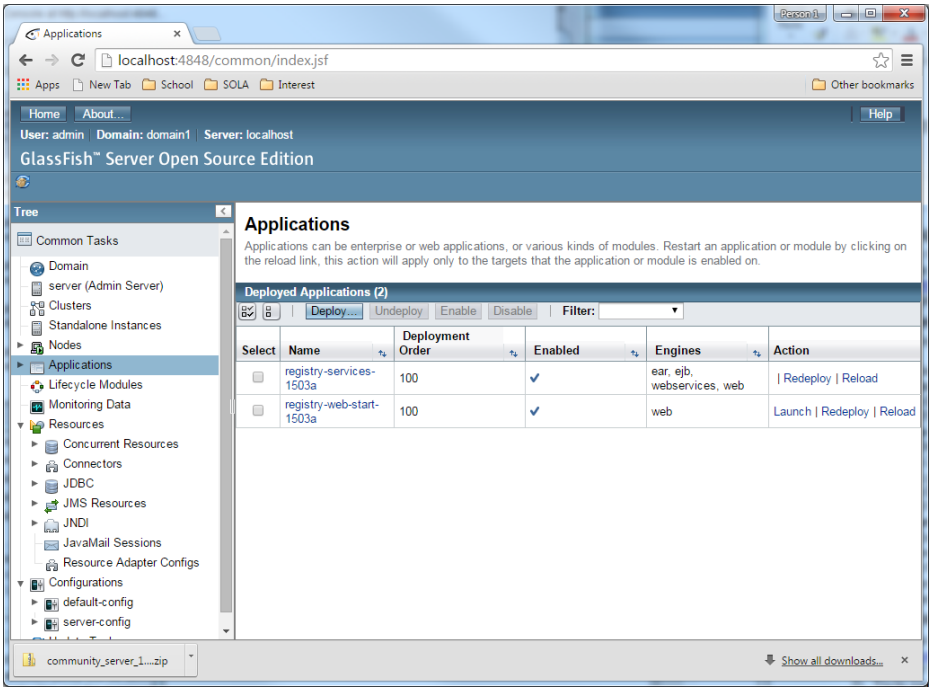
3. Deploy Applications

Source code for Registry is available in the https://github.com/SOLA-FAO Github repositories. The steps below assume you have downloaded the Registry deployment package from http://flossola.org/index.php/resources/downloads/category/2-registry that includes a complied Registry Services EAR file and the Registry Web Start WAR file.

3.1 Deploy Applications

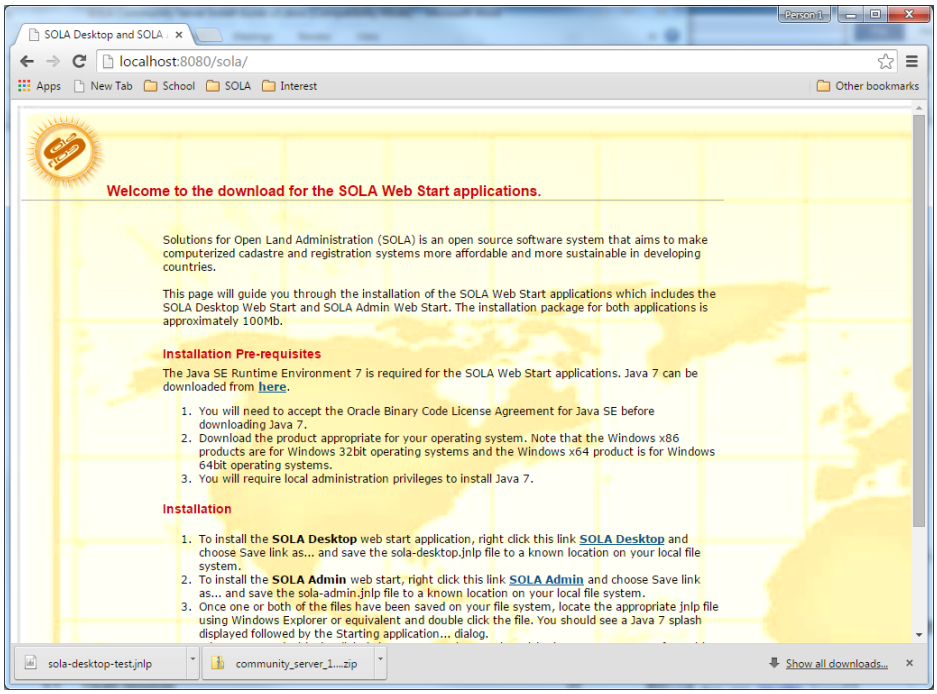
To deploy the Registry Services and Registry Desktop applications;

1) Open Glassfish administration console for domain1 at **http://localhost:4848** and go to **Applications** node.
2) Click the **Deploy** button. On the Deploy Applications or Modules page, click the Choose File button, browse to the Registry deployment package and select **registry-services-1503a.ear** file and click **Open**.
3) On the Deploy Applications or Modules page click the **OK** button. Deployment will take 1 to 2 minutes. **Warning** - Do not navigate away from the Deploy Applications or Modules page during this time otherwise the deployment will be aborted.
4) Click the **Deploy** button again. On the Deploy Applications or Modules page, click the Choose File button, browse to the Registry deployment package and select **registry-web-start-1503a.war** file and click **Open**.
5) On the Deploy Applications or Modules page, change the **Context Root** field from registry-web-start-1503a to **sola**.
6) Click the **OK** button. Deployment will take 1 to 2 minutes. **Warning** - Do not navigate away from the Deploy Applications or Modules page during this time otherwise the deployment will be aborted. Both applications should deploy successfully and show as per the screenshot below.



3.2 Install Registry Desktop Web Start

1) Open the SOLA Web Start Landing page at http://localhost:8080/sola.



2) Click the **SOLA Desktop** link to download the JNLP file for Registry Desktop. Shortly after clicking the link you should see a Java splash displayed followed by the Starting application... dialog.
    a. If you don't see a Java splash displayed, right click the SOLA Desktop link and choose the **Save link as** option to save the JNLP file to your local hard drive. Then use Windows Explorer or equivalent to locate the JNLP file and double click it.
3) The application will download and then verify the installation package. The download and verification may take several minutes. Please wait until this action has completed. If an error occurs during the verification, try to download the web start application one more time as some files can fail to download on the first attempt.
4) If you are prompted with the Do you want to run this application? dialog, tick Do not show this again... and choose Run.
5) Registry Desktop will start automatically. To login use the following credentials

    a. User: **test**
    b. Password: **test**

6) Note that both the user and password are case sensitive.
7) If you encounter errors while logging in, refer to http://www.flossola.org/index.php/resources/knowledge-base/37-troubleshooting/73-no-security-header

3.3 Install Registry Admin Web Start

1) Open the SOAL Web Start Landing page at http://localhost:8080/sola.
2) Click the **SOLA Admin** link to download and install the Registry Admin. Shortly after clicking the link you should see a Java splash displayed followed by the Starting application... dialog.
    a. If you don't see a Java splash displayed, right click the SOLA Admin link and choose the **Save link as** option to save the JNLP file to your local hard drive.

Then use Windows Explorer or equivalent to locate the JNLP file and double click it.

3) The application will download and then verify the installation package. The download and verification may take several minutes. Please wait until this action has completed. If an error occurs during the verification, try to download the web start application one more time as some files can fail to download on the first attempt.
4) If you are prompted with the Do you want to run this application? dialog, tick Do not show this again... and choose Run.
5) Registry Admin Desktop will start automatically. To login use the following credentials

    a. User: **test**
    b. Password: **test**

6) Note that both the user and password are case sensitive.

You can use the Registry Admin to add new users or change configuration settings. After making a configuration change using Registry Admin, you must to restart the Registry Desktop to pick up the configuration changes.

Note – In future releases of Registry, Registry Admin will be replaced by SOLA Web Admin. A demonstration version of SOLA Web Admin is available at https://demo.opentenure.org/admin/.