Department of Veterans Affairs

Mental Health eScreening

System Administration Manual

April 2016

Software Version 1.0

Revision History

Date	Version	Description	Author
October 2016	1.5.3	Added URLs to SSL Section	E. Floto
April 2016	1.5.2	Updated how URL Rewrite is installed to meet TRM requirements, section 2.5 rewrite.	J.Garvin
April 2016	1.5.1	Updated filepaths in section 5.2.1. Updated section referrals in sections 2.2.3, 2.4, 4, 4.1.1, 4.1.2.	A. Listvinsky
March 2016	1.5	Changed section 1.3 into sections 1.3.1 and 1.3.2 and added specification for a single VM. Added Historical changes to SDC Server 1.3.1 Swapped out Section 2 written by the Vendor for complete re-write by Josh Garvin, IT Specialist Restarting Tomcat is now section 5.4.1 Creating a Connector Proxy User is now section 2.3 Updating Important Files is now section 2.4 Reformatted Table of Contents Updated screenshot page fit	E.Floto J. Garvin M. Morgan
December 2015	1.4	Added “64-bit” to JDK 8, 2.1, step 1. Added clarification of VistALink Listener Port in 2.3.1. Added note to 2.3.3 that Java options require a dash, and link to a Tomcat service reference, and image of the Java options box. Added section 2.3.5 Installing Maven. Added information to 2.3.6 for Instance IIS. Added section 2.3.7 Restarting Tomcat. Added mention of encrypted flag to 2.3.9 (in addition to original reference 4.3) Added error information & screenshots to 2.4. Added section 2.5 Updating eScreening. Added log locations to table 20 in 4.2.1. Added section 4.2.2 Dissection of error message. *Appendix updates*: Updated Hyperlinks permanent links. Provided .XML file from SVN. Added steps for VistALink .JAR files.	A. Boen E. Floto L. Deighan C. Hichak K. Rizvi R. Kumar
November 2015	1.3	Corrected SQL reference in table, section 1.4	Information Innovators Inc.

Date	Version	Description	Author
November 2015	1.2	Added SSL information and procedure, and updated Java 7 to Java 8. Also updated deployment procedures: sections 2.1 and 2.4.	Information Innovators Inc.
August 2015	1.1	Minor updates to deployment procedure	Information Innovators Inc.
July 2015	1.0.9	Added VA proxy user account set-up	Information Innovators Inc.
July 2015	1.0.8	Simplified the setup process	Information Innovators Inc.
June 2015	1.0.7	Final document	L. Deighan
March 2015	1.0.6	Minor updates	L. Deighan
January 2015	1.0.5	San Diego server deployment data	L. Deighan
June 2014	1.0.4	Harmonized graphics	M. Roberts
June 2014	1.0.3	Sprint 16 updates	M. Roberts
March 2014	1.0.2	Sprint 11 update	M. Roberts
February 2014	1.0.1	Draft	M. Roberts

Contents

1. System Business and Operational Description

Mental Health eScreening (MHE) is a software application for automating the manual, paper-based process of screening Veterans for mental health issues. It consists of a web-based assessment runtime, a database for storing assessment data, a web-based user-friendly forms editor for designing assessments and notes templates, and a web administrative dashboard for operating the system. eScreening will replace manual screening processes in San Diego OEF/OIF/OND, Aspire Center, Mental Health, and Primary Care locations, as well as within the Department of Veterans Affairs (VA) specified care settings in four other VISN 22 potential pilot sites: Las Vegas, Loma Linda, Long Beach, and Greater Los Angeles.

The application exchanges data directly with VistA, primarily consisting of pulling open clinical reminders, pulling Veteran identification and demographic data, inserting Veteran assessment data in the form of notes, and closing clinical reminders based on completion of assessments, as well as creating new clinical reminders and inserting health factors based on the results of screening.

The system will be hosted on the VA network and will operate as follows:

- Assessment runtime: Designed to be run from a tablet browser, with the target configuration being Safari on iPad
- Administrative dashboard and forms editor: Designed to be run from a desktop browser, with the target configuration being Firefox 26 or later on Windows 7.

eScreening is a joint product of Center for Stress and Mental Health (CESAMH) and VHA Center for Innovation (VACI). The principal stakeholders are:

- Niloofar Afari, PhD: Division Director, Mental Health Integrative and Consultative Care Services, VA San Diego Healthcare System; Director of Clinical Affairs, VA Center of Excellence for Stress and Mental Health; Associate Professor of Psychiatry, UCSD Health System
- Clint Latimer: VA Innovation Coordinator/Project Manager/Contracting Officer Representative (COR), FAC-P/PM
- James Pittman (Co-Sponsor/SME, CESAMH & Department of Social Work)
- Elizabeth Floto (Project Manager, CESAMH)

The implementation work is performed by a contractor team of engineers and clinicians under VACI Innovation project 20388, contract VA118-11-D1002. A full list of stakeholders may be found within the roles and responsibilities section.

1.1. Operational Priority and Service Level

eScreening's overall importance to VA lies within its ability to improve the efficiency of existing or planned mental health screening procedures. The application improves care by scoring Veteran assessments in real-time, alerting VA personnel and auto-scheduling clinical reminders when mental, physical, or behavioral health symptoms are specified, and allowing VA to identify and treat severe conditions within minutes that would normally take days or weeks with paper-

based screening systems. The customers served are the Veterans who consume services provided by San Diego Mental Health, Primary Care, OEF/OIF/OND, and the Aspire Center.

eScreening is considered *important*, but not *critical* for patient care, in most cases. If the system is down or otherwise unavailable, patients' safety will not be immediately compromised and paper-based screening will be available as a contingency. However, the system's unique ability to identify and report Veteran mental or behavioral health issues in real time implies that service should be prioritized above other non-critical systems.

There is currently no Service Level Agreement (SLA) in place for eScreening. The need for an SLA will be determine and addressed by the VA COR/PM and VA San Diego IT.

1.2. Logical System Description

eScreening consists of a new application for designing, performing, and publishing mental health assessments, as well a data repository and an existing VistA instance. This figure displays the basic system components and their composition:

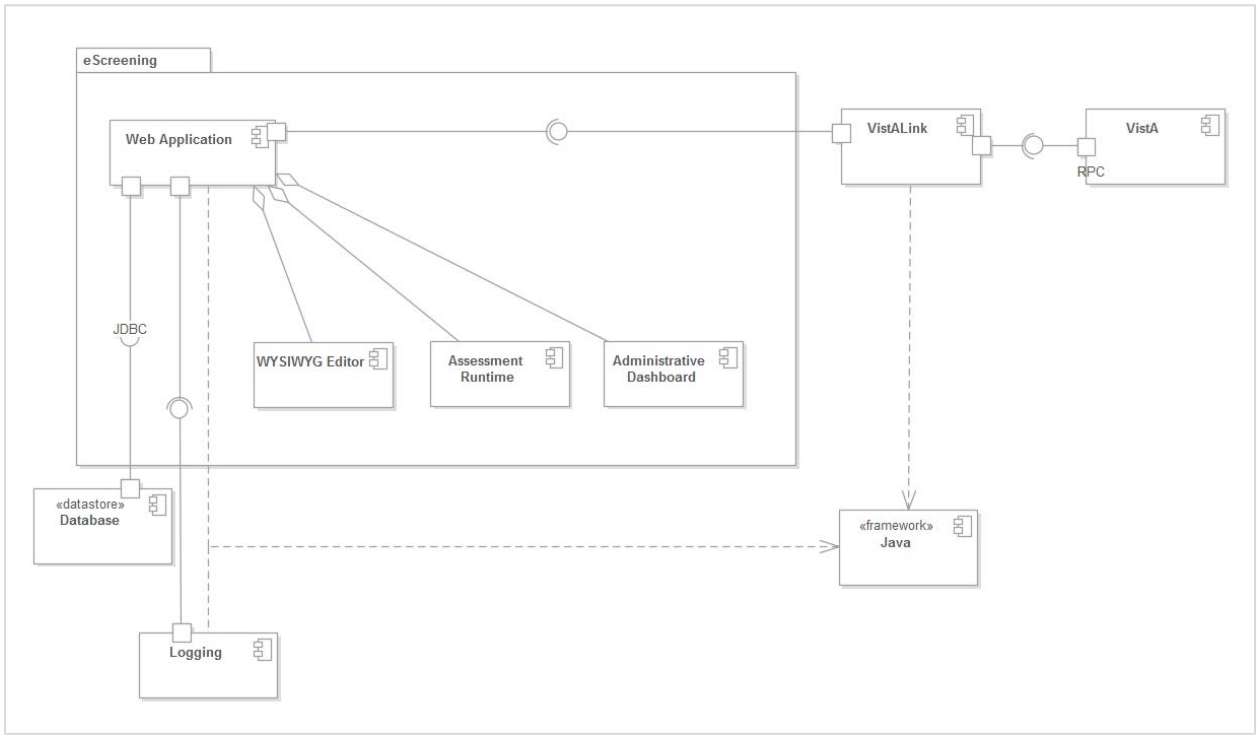


Figure 1: eScreening Logical Components

The application components are:

- Forms Editor: A What You See is What You Get tool for designing assessment forms and note templates. Staff use the designer to create or edit existing assessment and notes templates; the assessment forms are then used by the assessments runtime and the notes templates are used by the dashboard.

- Runtime: The runtime executes assessment forms created by the designer. Veterans "take" assessments by inputting answers into questions within forms based on the templates. The assessment session and the answer to the forms are stored in the repository.
- Dashboard: The dashboard allows staff to create assessment sessions based on assessment forms, view the status of ongoing assessments, and upload the results of assessments to VistA based on note templates created by the designer. The dashboard uses the repository to track and store assessments and templates.
- Database: A repository of assessment forms, users, ongoing and historical assessments, and assessment metadata used by the designer, runtime, and dashboard.

This diagram visualizes the integrations between the application, the repository, and VistA:

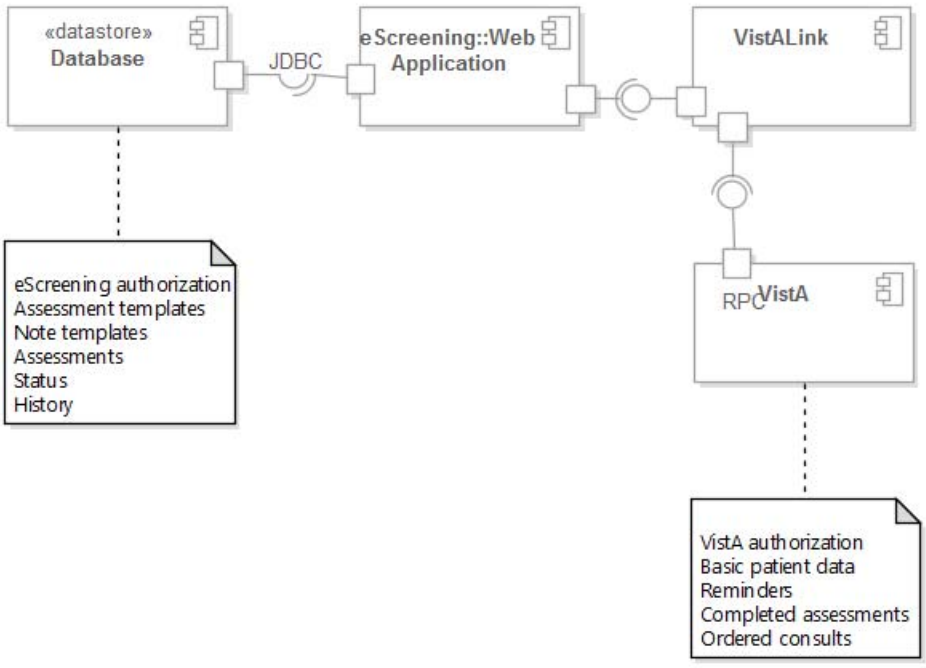


Figure 2: Logical Integration

The assessment process consists of staff creating an assessment session for a Veteran, the Veteran taking the assessment, staff reviewing the assessment, and eventually uploading the results of the assessment to VistA. The workflow is described below.

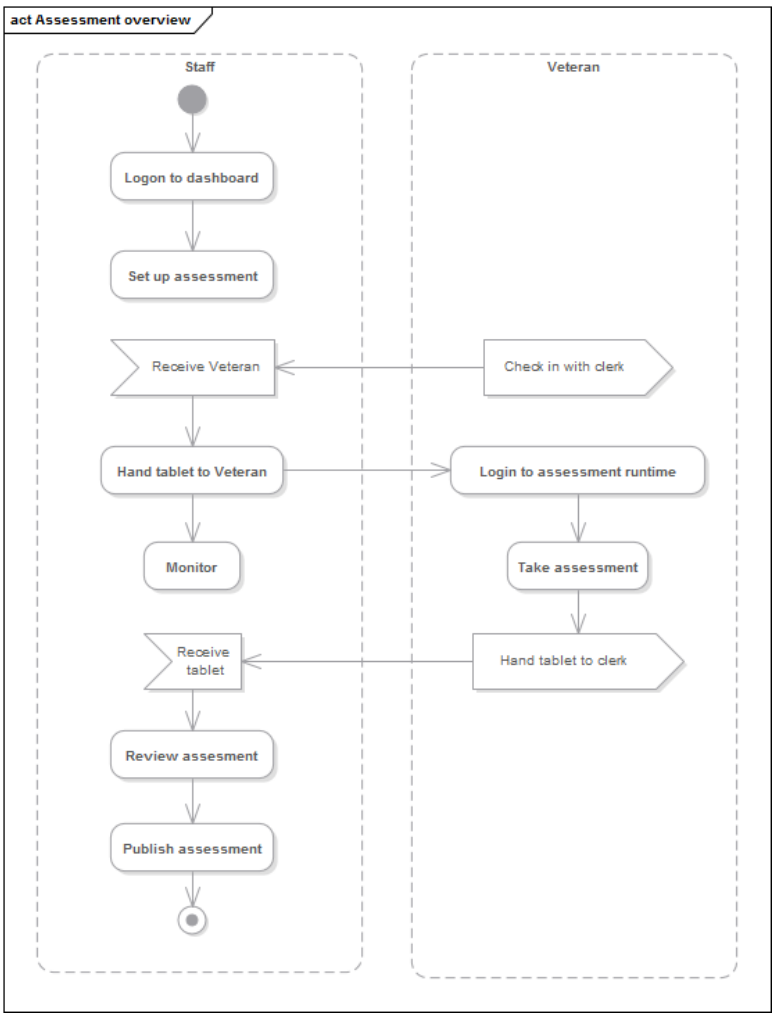


Figure 3: Perform Assessment Flow

Each of the application components utilizes the repository, but all three of the primary functions utilize VistA as well. The designer uses VistA for reference data in designing forms; the runtime uses VistA for authenticating Veterans and pulling basic Veteran data (such as demographics and open clinical reminders) for use in assessments, and the dashboard publishes assessment results to VistA in the form of notes, new reminders, etc. The following figure details the logical data integrations that occur between the application, VistA and the repository:

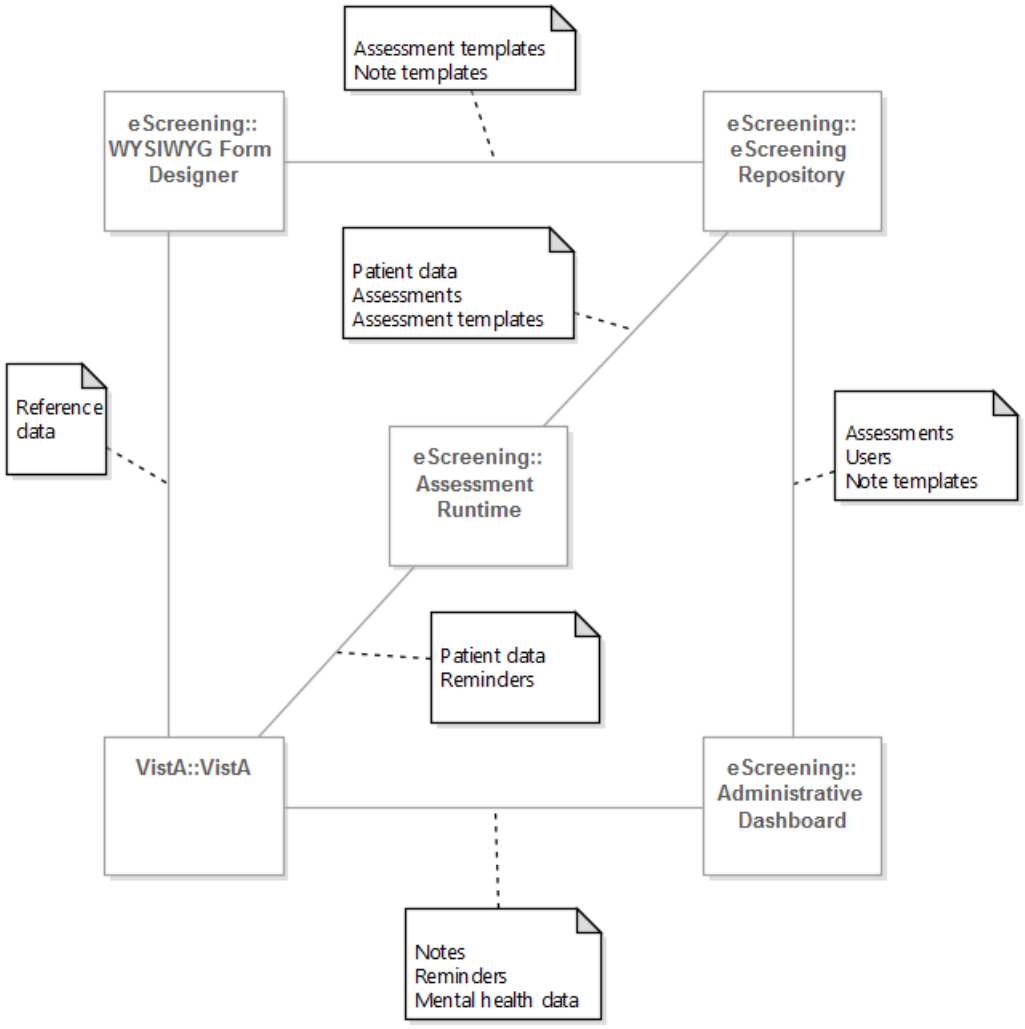


Figure 4: Logic Data Integration

Note: The application also caches some reference data based on lookups of VistA data. For example, the application currently pulls health factors periodically for use in the forms editor. This reference data does not change often and is safe to cache for short periods of time.

1.3. System Description

1.3.1. VISN 22 San Diego Server

The physical eScreening hardware consists of one physical server and 600 tablets. The eScreening application runs on the physical server in the San Diego VA Medical Center. Staff access the dashboard and designer components from VA workstations. Staff and Veterans access the runtime component from HTML5-capable browsers on tablet devices.

This table details the specs for the eScreening hardware:

Item	Make	Model	OS	Memory	Storage	Location
Server	Dell	R420	Windows Server 2012	64 GB	1.2 TB (after RAID 10)	VASD data center
Tablet	Samsung	Slate	Windows 7 Enterprise	4 GB	118 GB	SD VAMC
Tablet	Apple	iPad2	iOS 7.1	512 MB	16 GB	Each program location

Here is the historical events during the Innovation Contract regarding the server.

- 2014 added 16 GB memory and 1.2 TB storage for San Diego
- 2016 added 8 GB memory and 0.3TB storage for Long Beach

Table 1: System Hardware

The application server hardware is a rack-mount server with the following rack and electrical footprint:

Element	Attribute
Form factor	2U
Power	Dual hot plug 550W power supplies, 2 x 15 amp 10 ft. wall plug

Table 2: Server Data Center Specifications

The server additionally contains 12 CPU cores (6 physical, 6 virtual), and can be upgraded to include another CPU for a total of 24 cores. The memory can be upgrade to a total of 384 GB 1600 MT/S over 12 DIMM slots. The internal storage can be upgraded to a maximum of 16 TB (8 TB usable via RAID 10). It would be recommended than new servers at a VISN level have 4 CPU cores per medical center in the VISN.

The tablets connect to the server and the server connects to VistA. The tablets talk HTTP over TLS to the server via a SD VAMC 11g wireless network. The eScreening server communicates with Cache via RPC over port 8000. The diagram below shows all device communications, including type and bandwidth:

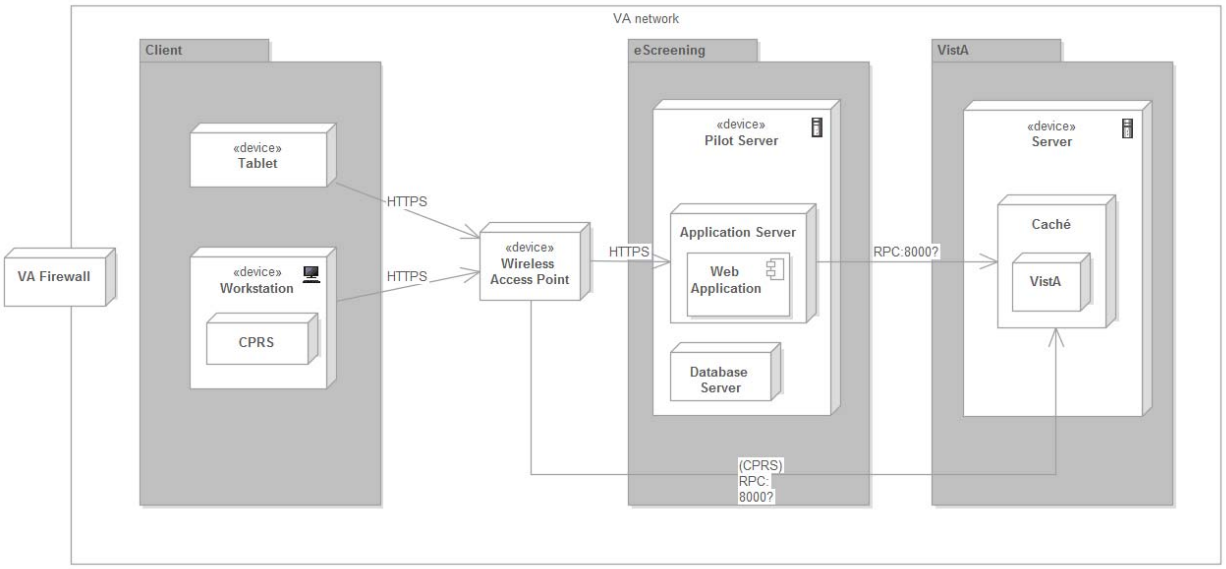


Figure 5: eScreening Hardware Connections

In OEF/OIF/OOO outreach scenarios, tablets connect to the VA network over VPN and MIFI. All communication between eScreening and VistA takes place behind the VA firewall.

1.3.2. Virtual Machine Option

In November of 2015, San Francisco VAMC opted to self-implement the eScreening system. The IT Specialist set up a virtual server configured with quad Xeon E5-2695 2.4GHz processor, 64GB RAM, and two 150GB drives. This virtual machine was configured for use in a single medical center, as opposed to a whole VISN as described in section 1.3.1.

1.4. Software Description

The system consists of the following components:

Web application: An application comprised of JavaScript, HTML5, and CSS3 on the presentation layer and Java on the service and data access layers. The application performs authentication/authorization against the eScreening database. It provides screening services to Veterans, and administration and reporting features to staff. The application integrates with VistA via VistALink.

- Database: A MySQL database that stores Veteran screening data and metadata, as well as VA staff credentials and permissions.
- VistA: The application integrates with VistA for security, basic Veteran information, clinical reminders, health factors, consults, and notes.

A full list of the software used in the system is described below:

Category	Product	License
Application	HTML5, CSS3, JavaScript, JQuery	Open source
Framework	Java 8 64 bit Oracle VM, Spring 3.2.6-RELEASE	Open source
Web server	Apache Tomcat 7 servlet container	Open source
Database	MySQL Ver 14.14 Distrib 5.6.19, for Win 64 (x86_64)	Open source
Integration	VA VistALink 1.6	VA
Operating system	Windows Server 2012 with 1.2 TB disk RAID 10	Commercial (provided)

Table 3: Software Used in eScreening

All application software is open source or provided by the VA. The operating system is San Diego's preferred operating system (Windows), but there are no Windows-specific components to the system.

1.4.1. Background Processes

The application background processes are:

- java.exe: The container technology hosting the web application servlet
- mysqld.exe: The server daemon for the MySQL database

Note: MySQL is configured to run as a Windows service so that it starts automatically with Windows.

1.4.2. Job Schedules

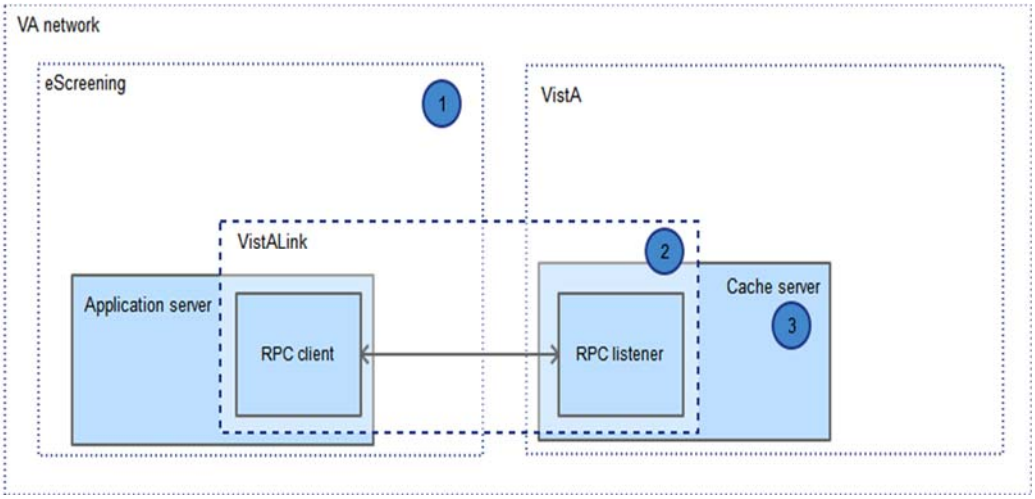
No batch jobs are currently scheduled to run on any interval.

1.4.3. Dependent Systems

The application requires VistA in order to function. The application uses VistA for security, general patient data, clinical reminders, health factors, and clinical notes. The following attributes describe the integration with the dependent system:

- Name: VistA
- Location: San Diego VAMC
- Function: Repository for existing patient data and events, as well data and events generated by eScreening
- Interface method: RPC over VistALink

This diagram describes how eScreening integrates with VistA:



Legend

❶ The eScreening application uses the VistALink Java client library
❷ VistALink provides bi-directional communication between the client and the server
❸ The Cache (M) server runs the VistALink listener

All communication between eScreening and VistA takes place behind VA firewalls via VA VistALink, a Java RPC framework that is part of the OneVA architecture. eScreening uses VistALink for bidirectional communications between the client and VistA (M) server. eScreening utilizes existing CPRS RPCs to perform the same actions as CPRS without requiring any VistA code changes.

2. Step-by-step Installation Instructions

This section will cover the installation of software necessary to run the eScreening database, communicate with VistA, run the eScreening website and associated dependencies that keep the application running.

Preface

The following installation guide will ensure the **complete** installation/configuration of all prerequisite and supporting software for the eScreening server as well as its related components. Part of the server configuration requires communication with, and participation from your facility's Clinical Applications Coordinator (CAC) and VistA Account/Support Specialist for VistA/Traumatic Brain Injury related information. Other parts of the server setup require you to create a SSL certificate, new Apache Tomcat service as well as set paths for programs. The creation of folders on the **D:** drive is also required to place files and folders.

- It is imperative that the directions are followed in the order shown below for proper functionality of the server and eScreening application.
- Anytime <site> appears throughout this document it is representing the 3-letter facility/site abbreviation of the installing facility. For example, Ann Arbor's 3-letter abbreviation is "ann".
- The virtual server requirements are as follows:
    - **Single site**: 24GB of RAM, 4 CPU cores (quad Xeon E5-2695 2.4GHz) and two 150GB hard drives.
    - **Multiple sites (approx. 5)**: 64GB of RAM, 12 CPU cores (quad Xeon E5-2695 2.4GHz) and 1.2TB (after RAID 10) hard drive.

Once the installation and configuration of the eScreening server has been completed, contact your eScreening Technical Administrator. The Technical Administartor will need to follow the directions outlined in the Initial Setup Manual to test connectivity and functionality.If you do not have a copy of the Initial Setup Manual, please try the San Diego eScreening Share Point Page.

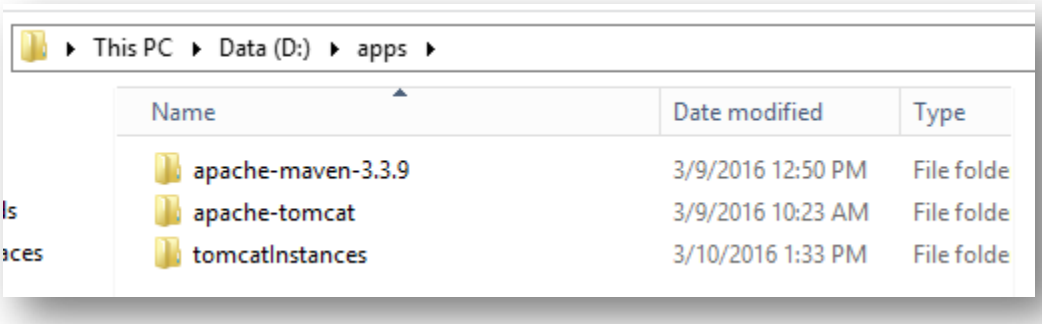
2.1. Creating/Copying Folders On the Server

The following folders must be manually created/copied over on the **D:** drive of the server before installing the prerequisite software:

1. Create a new folder called "**escreening**".
2. Create a new folder called "**apps**".

3. Create a new folder called “**Prerequisite Software**”.
4. Create a new folder in “D:\apps” called “**apache-tomcat**”.

Note: After the entire installation and configuration process is complete on the server, the **D:\apps** folder will contain three folders in it: **apache-maven-3.3.9**, **apache-tomcat** and **tomcatInstances**:



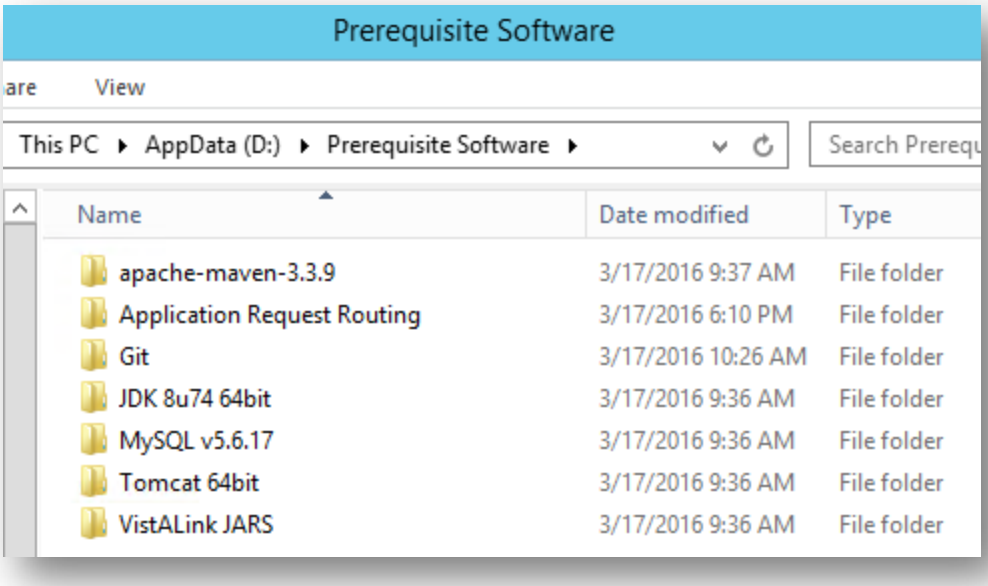
The folder “tomcatInstances” is copied over later on in this document after the program Git is installed. This will store the configuration for the Apache-Tomcat instance. The other two folders are either copied or extracted there.

2.2. Installing the Prerequisite Software

The following steps will guide you through installing all of the prerequisite software required on the server to support all functions of the eScreening application.

All of the prerequisite software that is needed should be kept in the **“D:\Prerequisite Software”** folder in separate subfolders for convenience that include the following titles:

- Apache-Maven
- Application Request Routing
- Git
- JDK 8 update 74
- MySQL
- Tomcat
- URL Rewrite 2.o
- VistA Link JARs



Separate subfolders were created to store the installers for each software title as well as any unzipped files for convenience later on if anything has to be reinstalled.

To acquire all of the prerequisite software needed for the installation, please use the following download links and ensure you are using the same exact version of software as noted in the table below:

Software	**Download Link**
Apache-Maven 3.3.9	http://maven.apache.org/download.cgi#
Application Request Routing 3.0	http://www.iis.net/downloads/microsoft/application-request-routing
Git 2.7.2 64bit*	https://www.git-scm.com/downloads
JDK 8u74 64bit	http://www.oracle.com/technetwork/java/javase/downloads/index.html
MySQL v5.6.17	http://downloads.mysql.com/archives/installer/
Apache-Tomcat 7.0.68	http://tomcat.apache.org/download-70.cgi
URL Rewrite 2.0	http://www.iis.net/downloads/microsoft/url-rewrite
VistALink JARs	San Diego SharePoint Site
* you can use the lastest version of Git Bash	

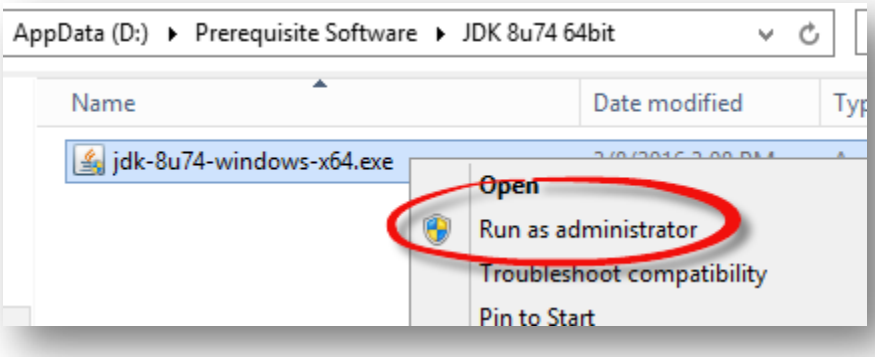
After you've downloaded all of the prerequisite software and saved them to their own folders in the "D:**Prerequisite Software**" folder you can proceed with the rest of the installation.

2.2.1. Installing Notepad++

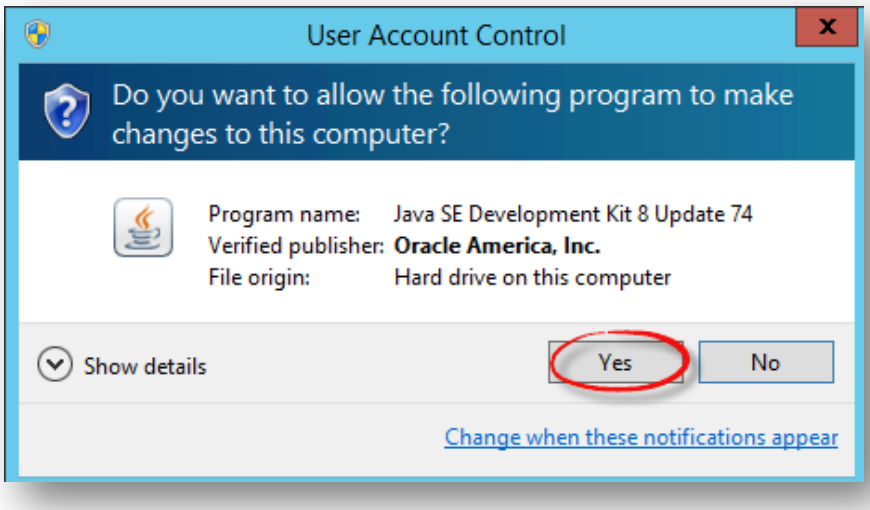
Notepad++ is used for editing some files in step 2.4. The lastest version of Notepad++ will work.

2.2.2. Installing Java Development Kit (JDK) 8 Update 74

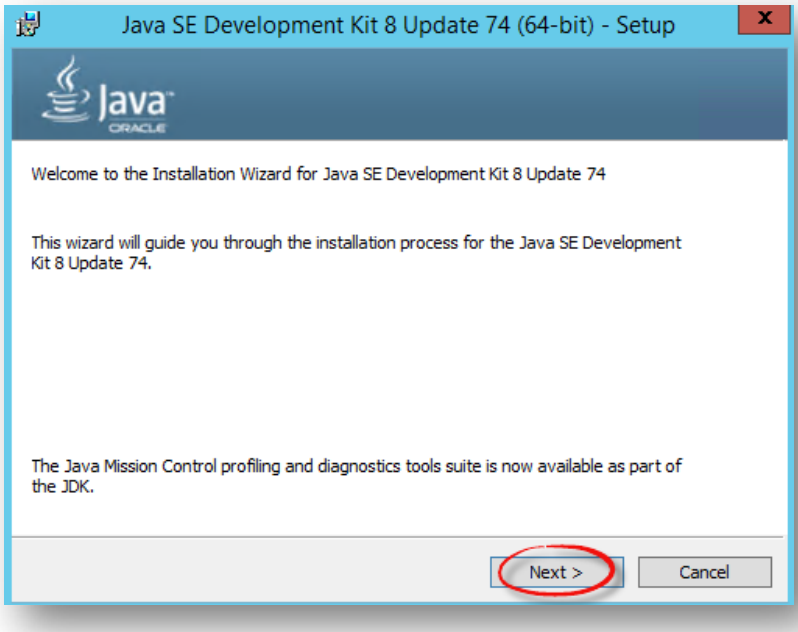
1. On the server, navigate to the folder "D:\Prerequisite Software\JDK 8u74 64bit".
2. Right-click the "jdk-8u74-windows-x64.exe" installer and select "Run as administrator" to launch the application.



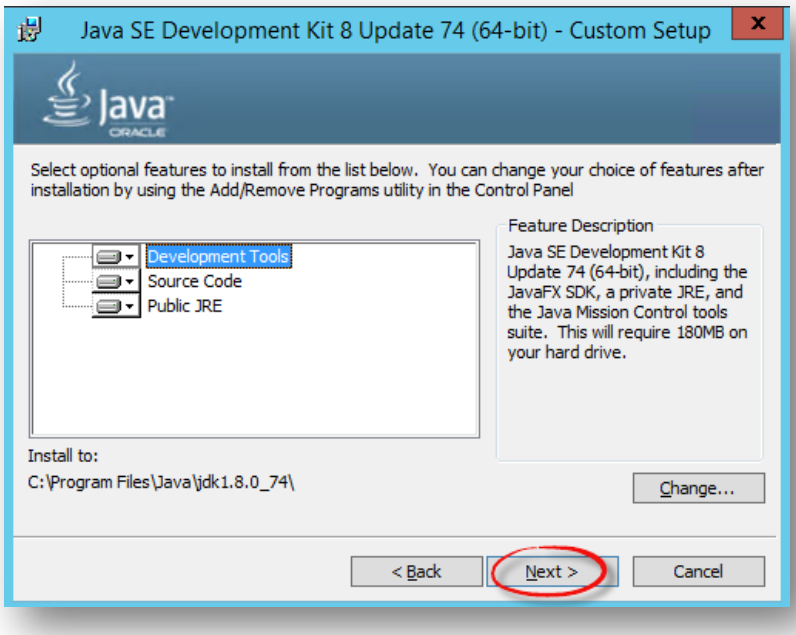
3. When prompted by the User Account Control screen select "Yes" to continue.



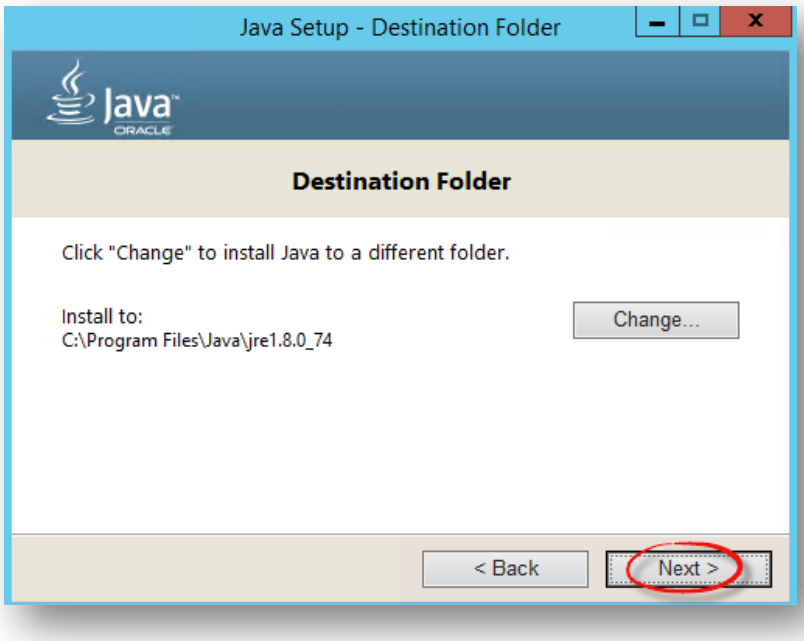
4. Click “Next” to proceed with the installation.



5. Click “Next” again, leaving everything at their default values.

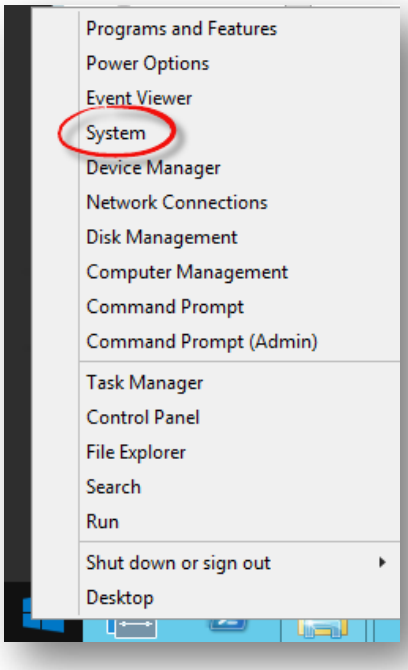


6. Click “Next” again, leaving the destination folder at the default value.

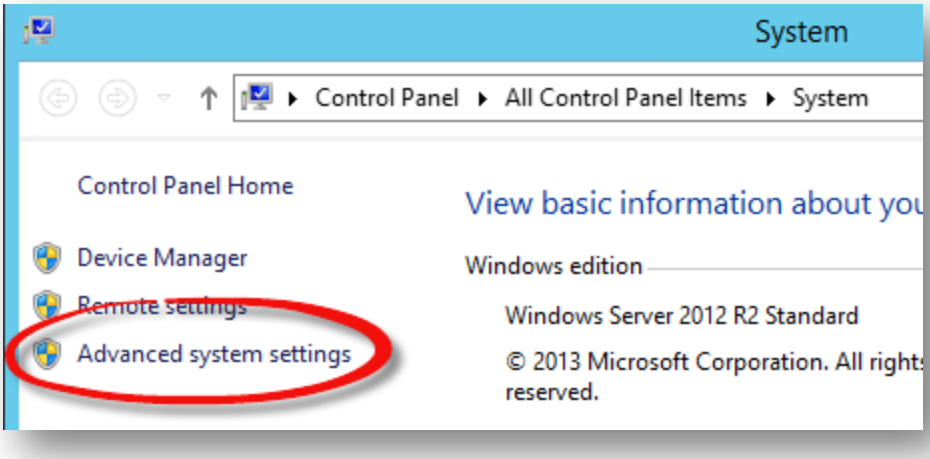


7. Click “Close” to complete the installation process.

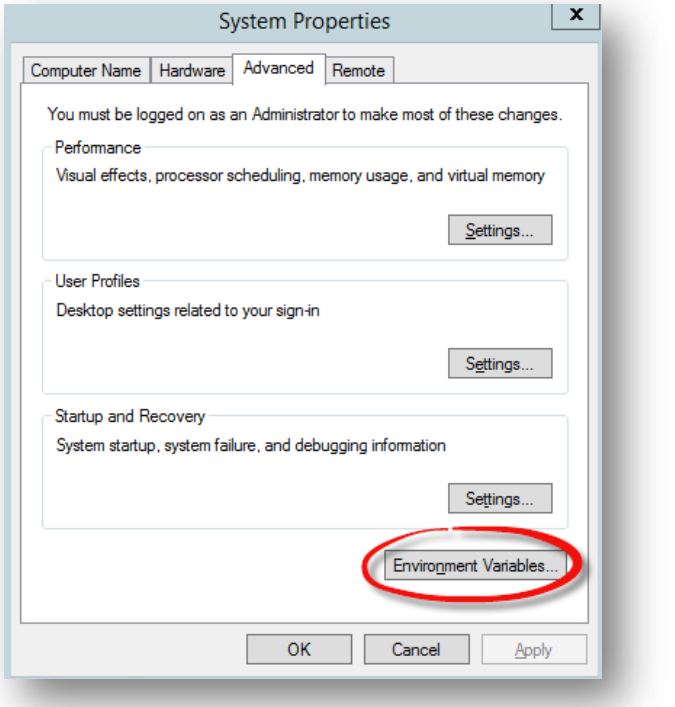
8. After the installation has finished, create a new environment variable called “JAVA_HOME” and set the value to “C:\Program Files\Java\jdk1.8.0_74\” by right-clicking the Windows Start Button and selecting “System”.



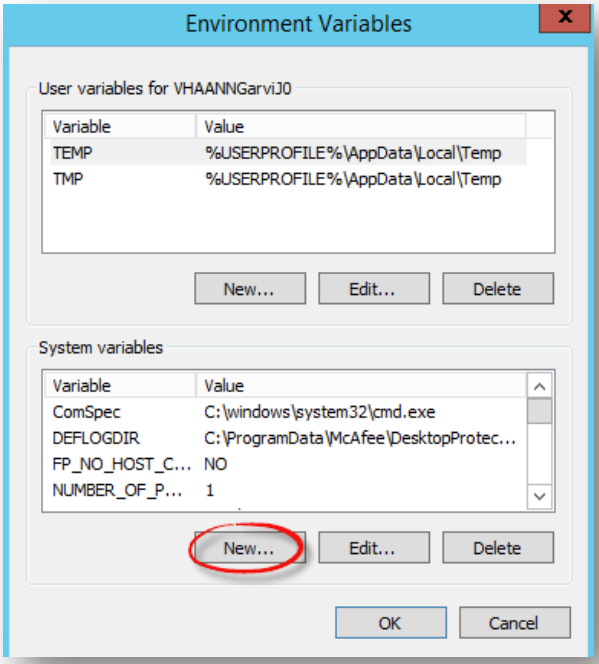
9. Click “Advanced system settings” on the left hand side of the window that popped up when you clicked “System” in the previous step.



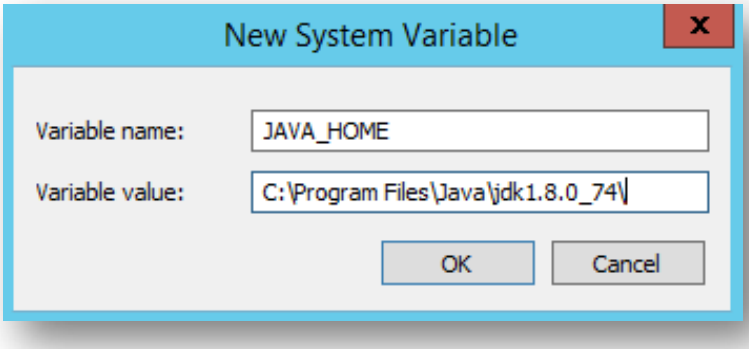
10. Click “Environment Variables…” at the bottom of the System Properties window.



11. When the Environment Variables window opens, click the “New…” button under the “System variables” list.

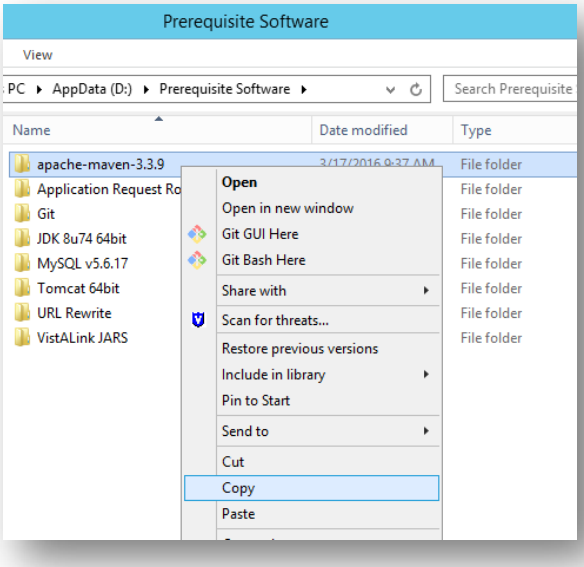


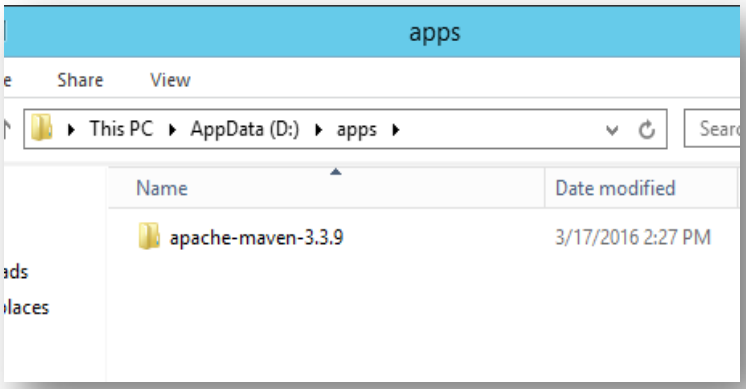
12. In the “Variable name:” text box enter “JAVA_HOME” and in the “Variable value:” text box enter “C:\Program Files\Java\jdk1.8.0_74\” and then select “OK” and select “OK” again to commit the changes.



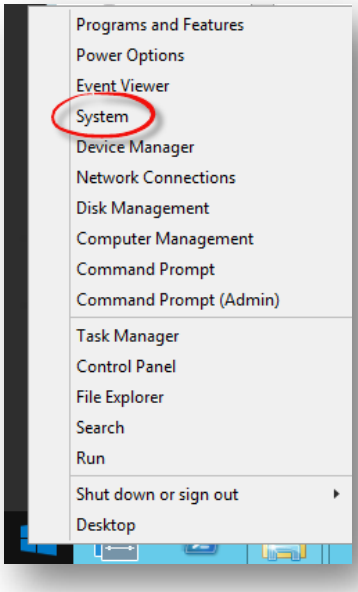
2.2.3. Installing Maven

1. Navigate to the “D:\Prerequisite Software” folder and manually copy the entire “apache-maven-3.3.9” folder to “D:\apps”. The folder “D:\apps” was created in section 2.1 of this documentation.

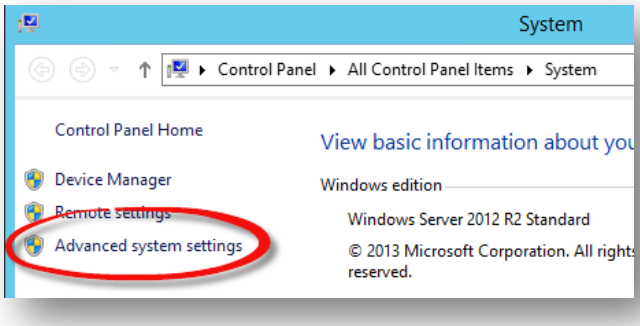




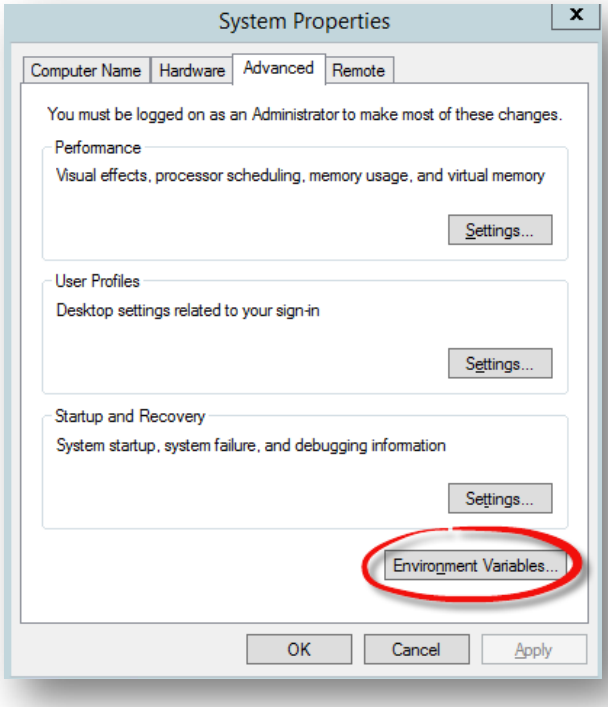
2. Add “D:\apps\apache-maven-3.3.9\bin” in the PATH environment variable by right-clicking the Windows Start Button and selecting “System”.



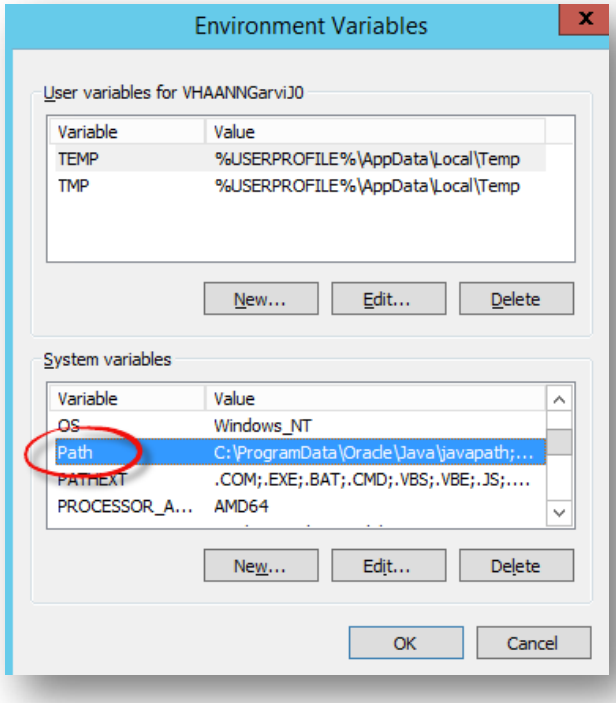
3. Click “Advanced system settings” on the left hand side of the window that popped up when you clicked “System” in the previous step.



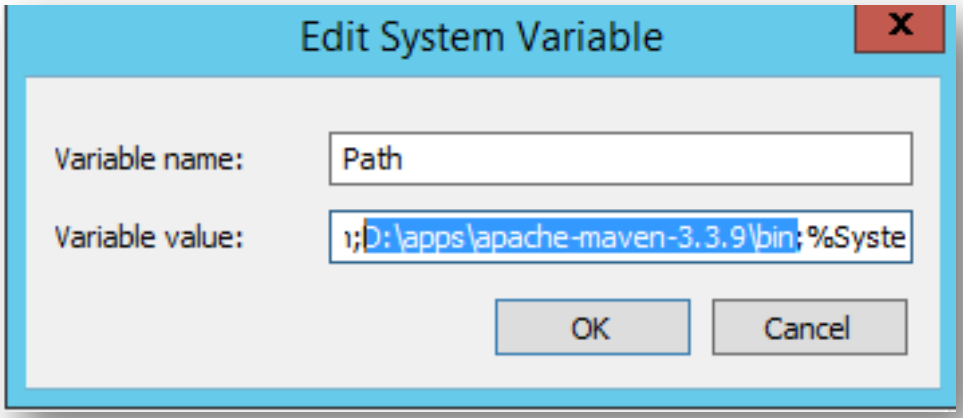
4. Click “Environment Variables…” at the bottom of the System Properties window.



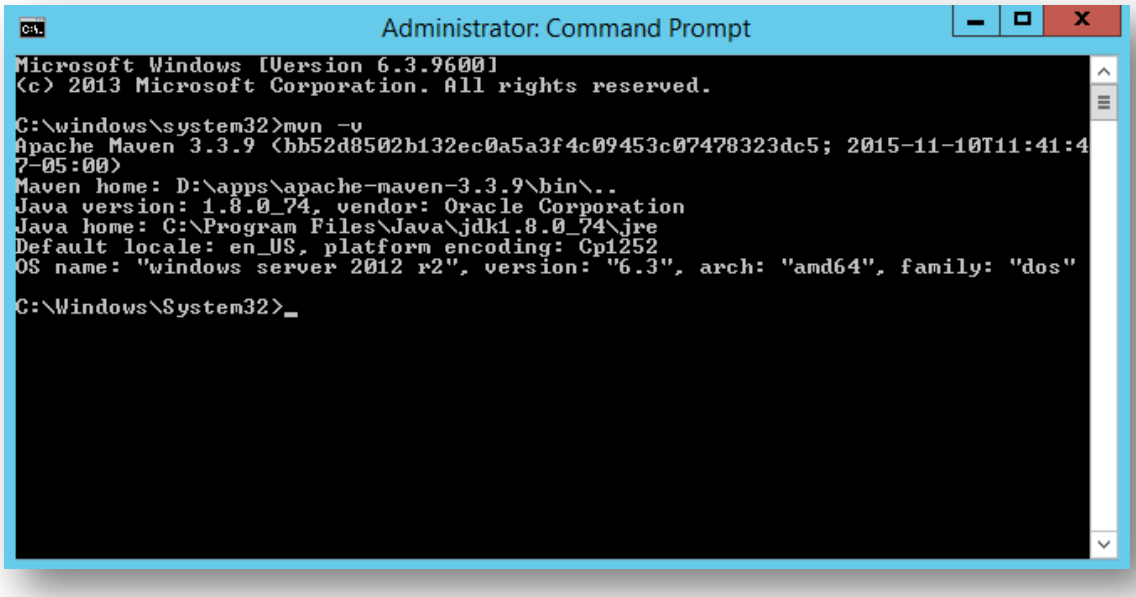
5. When the Environment Variables window opens, scroll down the “System variables” list and double click on “Path”.



6. Add “D:\apps\apache-maven-3.3.9\bin” to the path after you see a semicolon. Ensure you add a semicolon after \bin to separate this file-path from others.



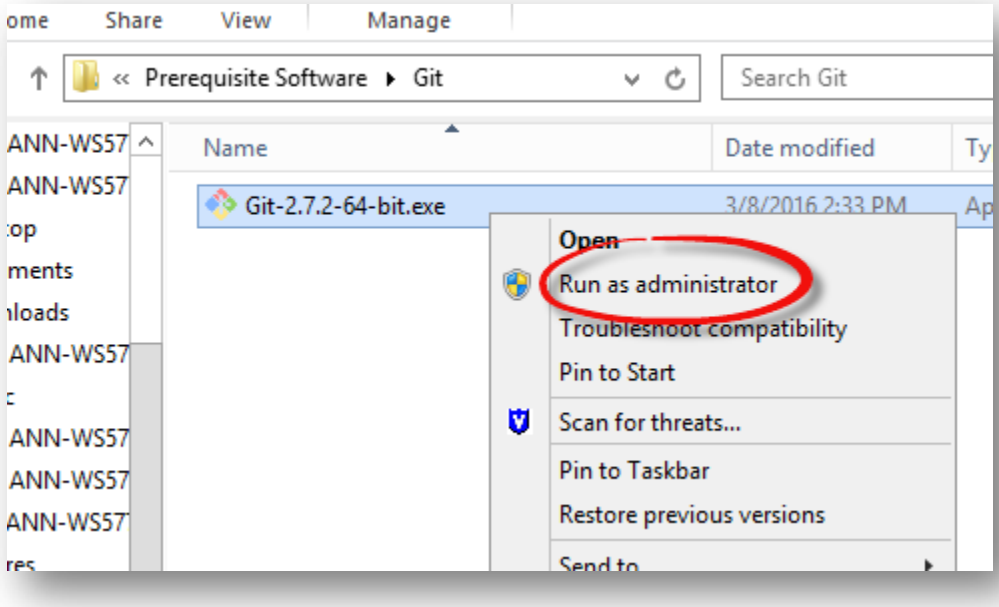
7. Click “OK” to save the new settings and open up command prompt as an administrator and type the command “mvn –v” to verify the Maven install. The results should look identical to the following screenshot:



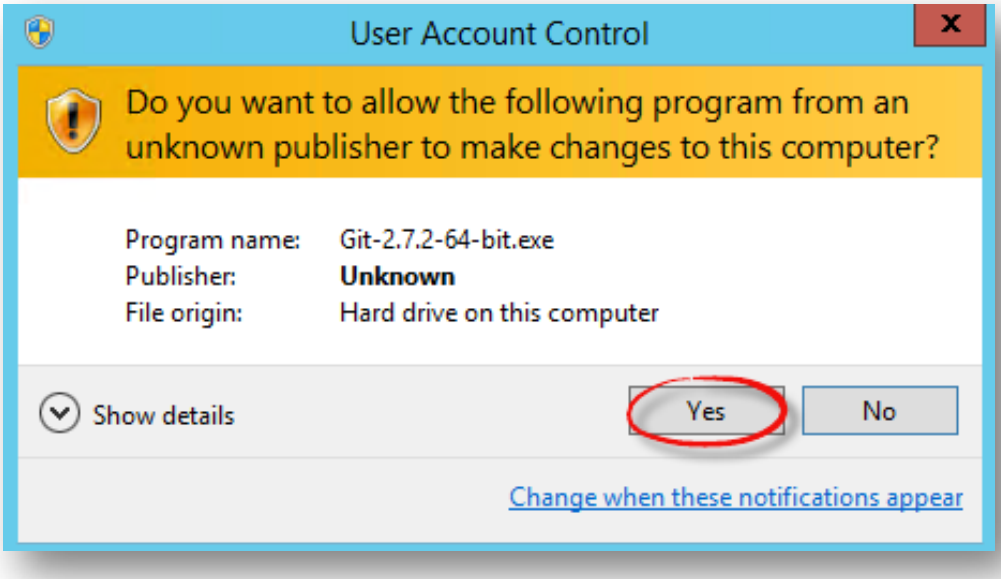
If you are still getting an error after re-checking the parameters above, try restarting the server before running the “mvn -v”.

2.2.4. **Installing Git**

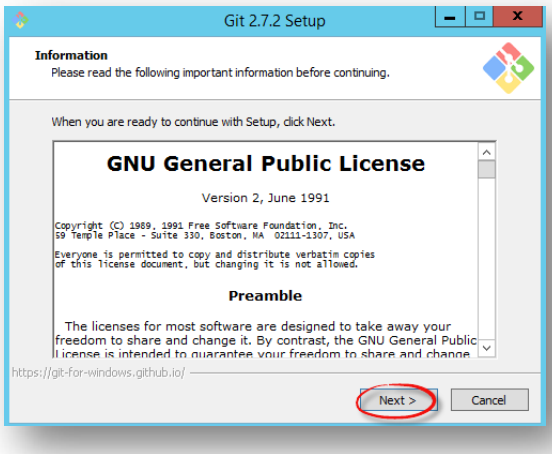
1. Navigate to the “D:\Prerequisite Software\Git” folder and right-click the “Git-2.7.2-64-bit.exe” installer and select “Run as administrator”.

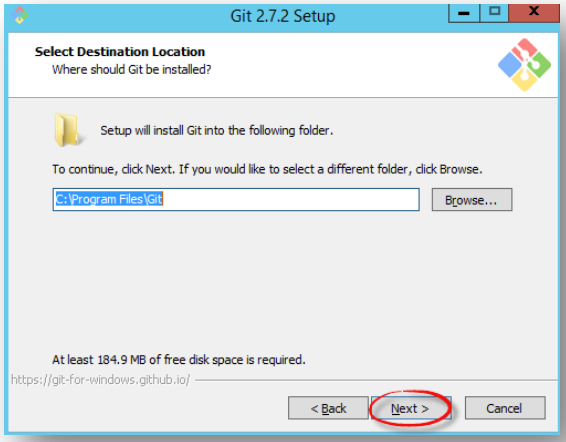


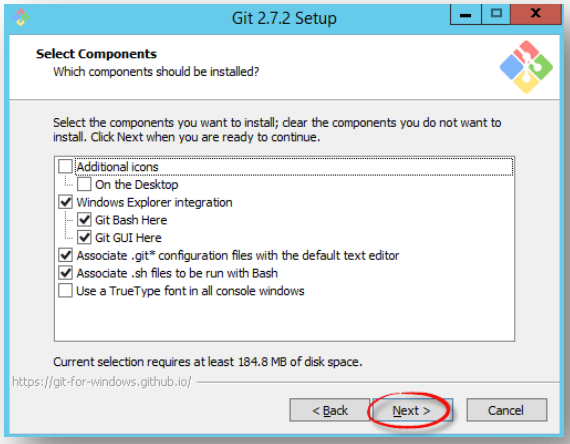
2. Click “Yes” to continue when the User Account Control window appears.

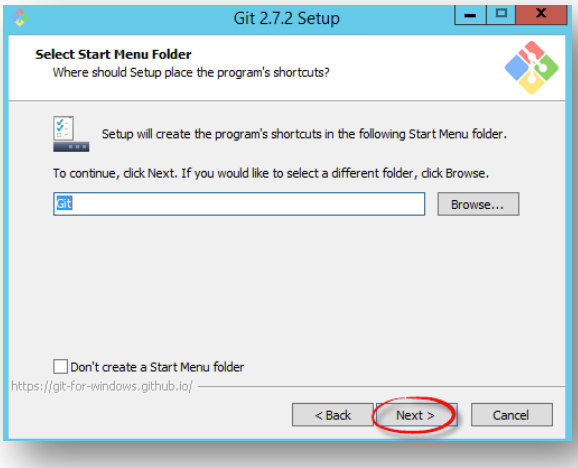


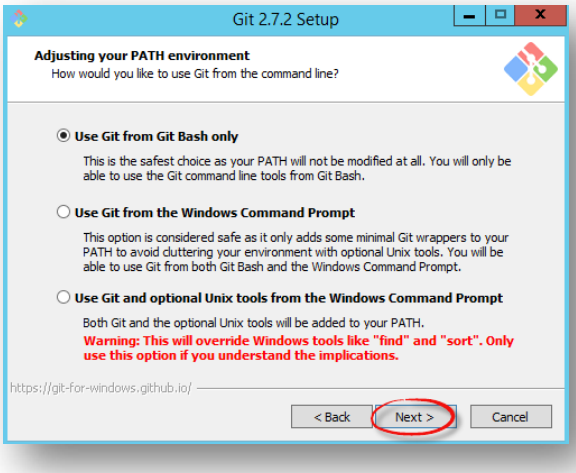
3. Click “Next” through the installer leaving all default settings in place.

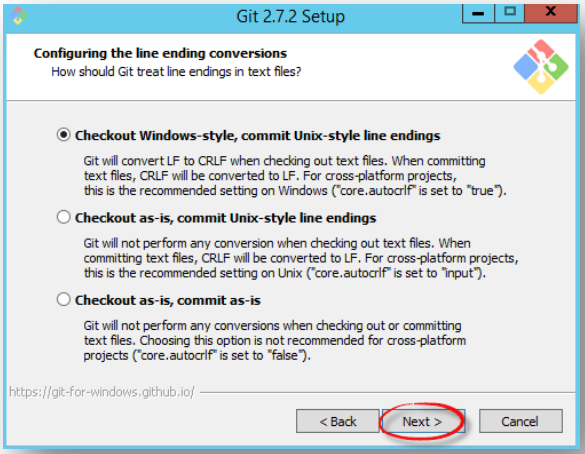


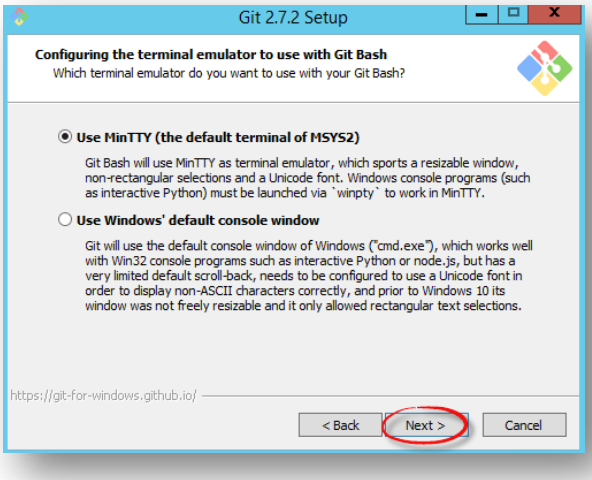


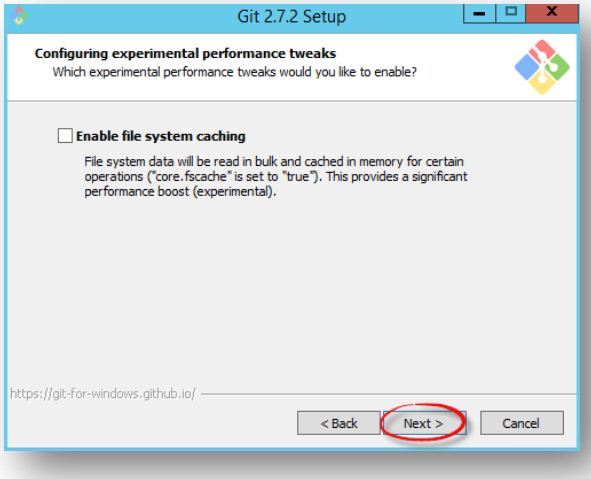



Git 2.7.2 Setup
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
Git
Browse...
Don't create a Start Menu folder
https://git-for-windows.github.io/
< Back
Next >
Cancel

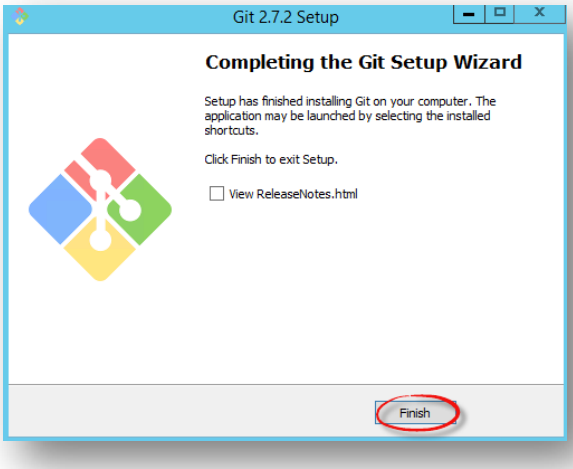

Git 2.7.2 Setup
Adjusting your PATH environment
How would you like to use Git from the command line?
Use Git from Git Bash only
This is the safest choice as your PATH will not be modified at all. You will only be able to use the Git command line tools from Git Bash.
Use Git from the Windows Command Prompt
This option is considered safe as it only adds some minimal Git wrappers to your PATH to avoid cluttering your environment with optional Unix tools. You will be able to use Git from both Git Bash and the Windows Command Prompt.
Use Git and optional Unix tools from the Windows Command Prompt
Both Git and the optional Unix tools will be added to your PATH.
Warning: This will override Windows tools like "find" and "sort". Only use this option if you understand the implications.
https://git-for-windows.github.io/
< Back
Next >
Cancel


Git 2.7.2 Setup
Configuring the line ending conversions
How should Git treat line endings in text files?
Checkout Windows-style, commit Unix-style line endings
Git will convert LF to CRLF when checking out text files. When committing text files, CRLF will be converted to LF. For cross-platform projects, this is the recommended setting on Windows ("core.autocrlf" is set to "true").
Checkout as-is, commit Unix-style line endings
Git will not perform any conversion when checking out text files. When committing text files, CRLF will be converted to LF. For cross-platform projects, this is the recommended setting on Unix ("core.autocrlf" is set to "input").
Checkout as-is, commit as-is
Git will not perform any conversions when checking out or committing text files. Choosing this option is not recommended for cross-platform projects ("core.autocrlf" is set to "false").
https://git-for-windows.github.io/
< Back
Next >
Cancel





4. Uncheck the “View ReleaseNotes.html” box and click “Finish”

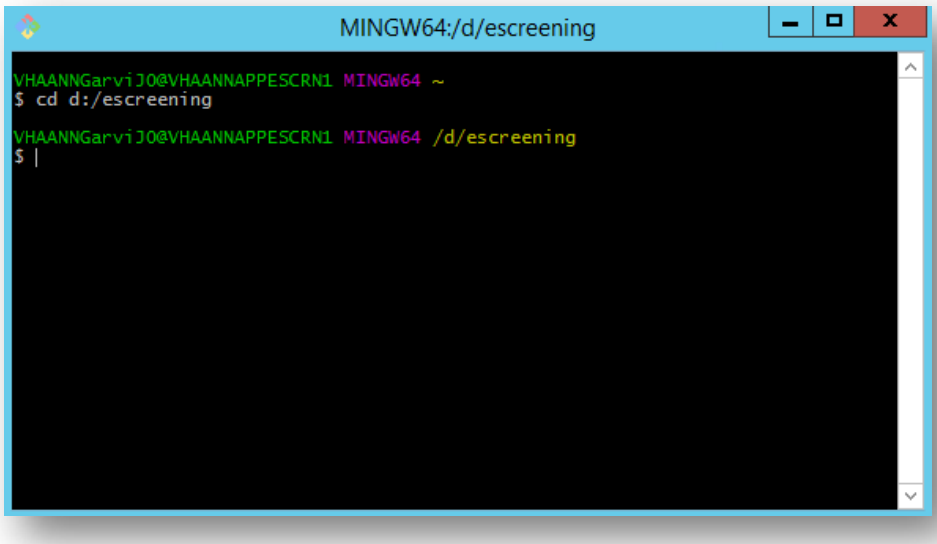


2.2.5. Creating a Deployment Staging Area

The deployment staging area resides in the file location “D:\escreening”. This folder will store all of the eScreening files you will need for the installation and site-specific configuration. To obtain the files follow the steps below:

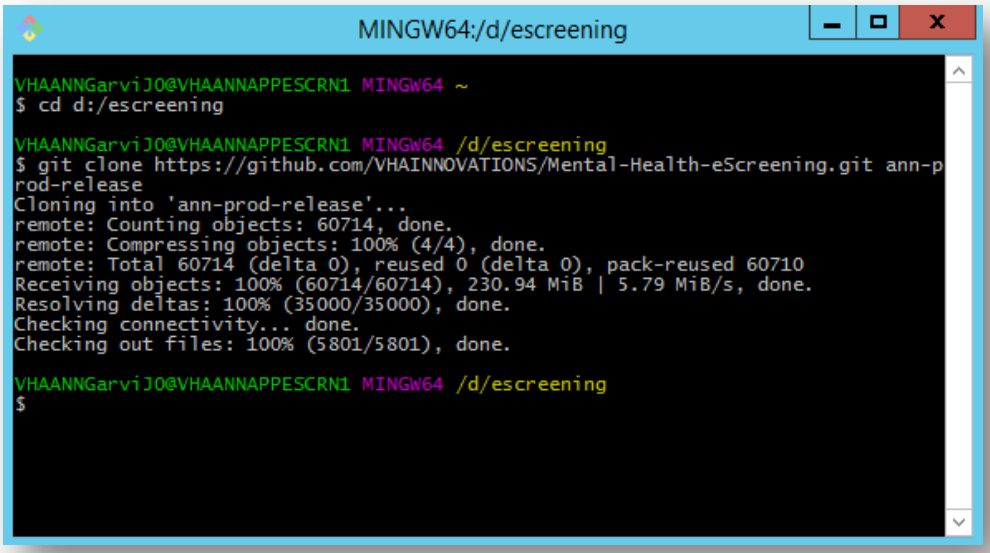
1. Start the Git Bash program by clicking the Start Button and then typing “git bash” and then select the program from the list below the search box. Once Git Bash is open, change directories to “D:\escreening” by running the following command:

cd d:/escreening

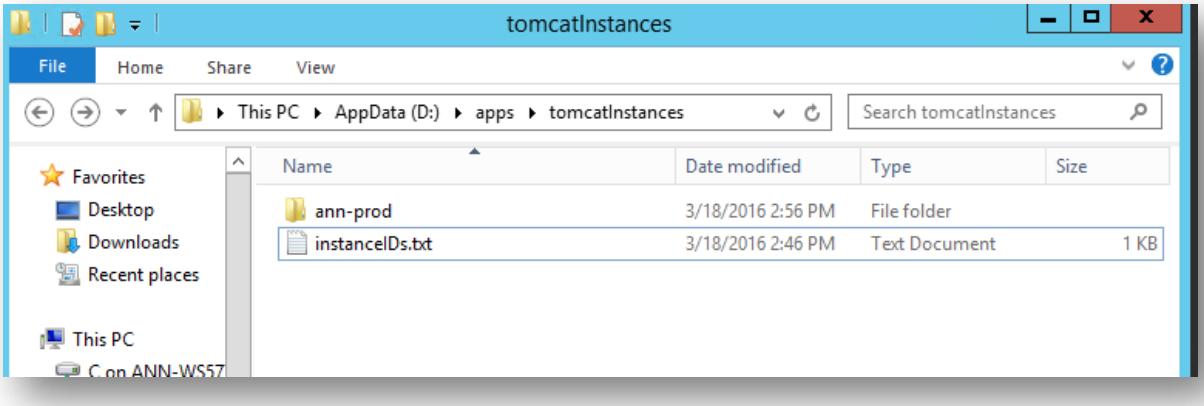


2. Download the files to the folder “D:\escreening” by running the following command (**Note:** Replace <site> below with your facility’s 3-letter site code):

   git clone https://github.com/VHAINNOVATIONS/Mental-Health-eScreening.git <site>-prod-release

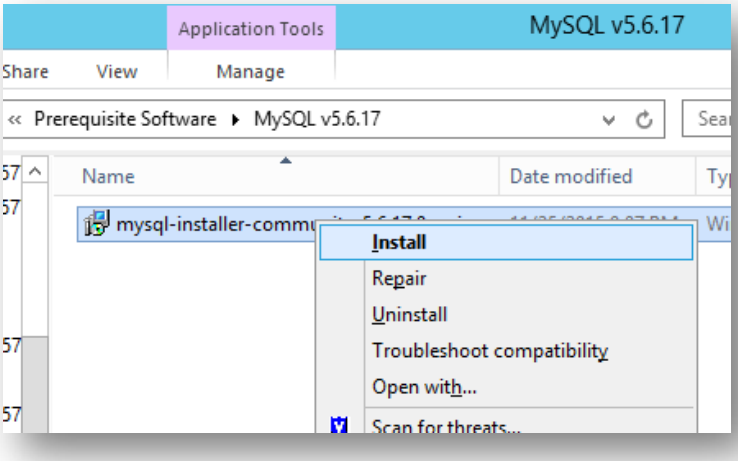


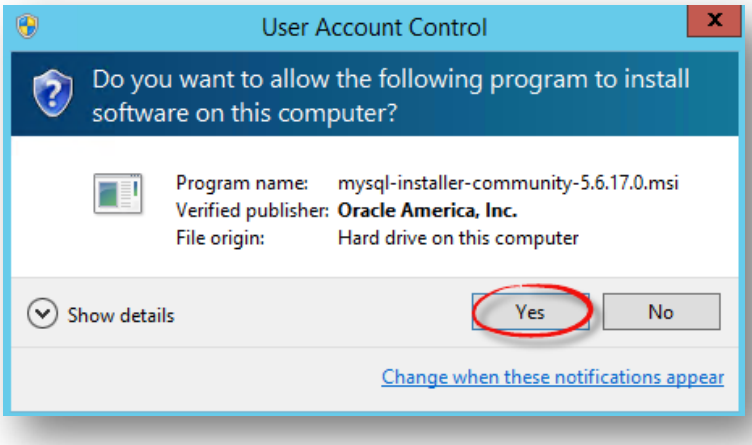
3. Now that the files have copied over to “D:\escreening”, navigate to the newly created folder “D:\escreening\<site>-prod-release\deploy\apps” and copy the “**tomcatInstances**” folder to “**D:\apps**”. Once the folder has been copied to “**D\apps**”, open it up and rename the “**instance-template**” folder to “**<site>-prod**”



2.2.6. **Installing MySQL**

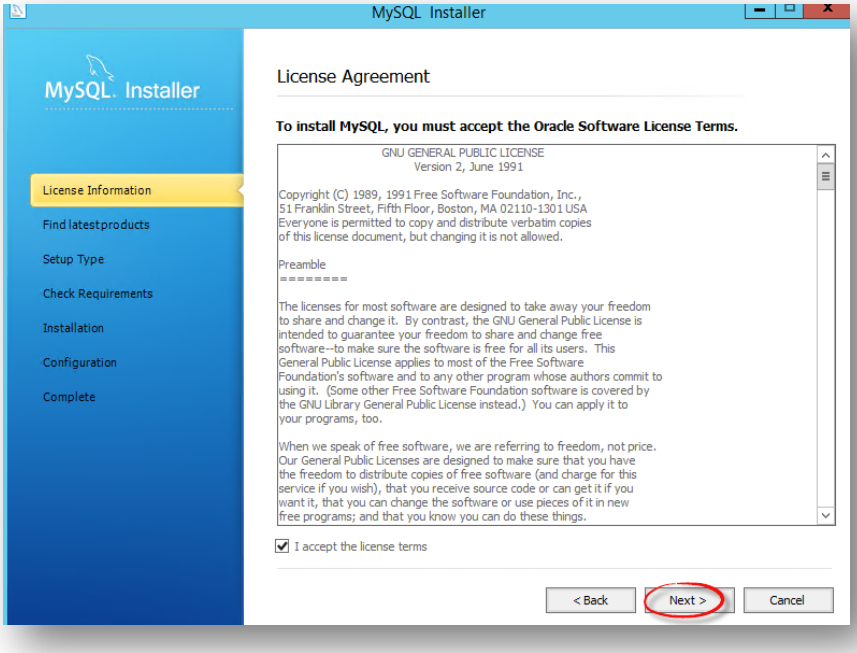
1. Navigate to the “D:\Prerequisite Software\MySQL v5.6.17” folder and right-click the “mysql-installer-community-5.6.17.0.msi” installer and select “Install”. Click “Yes” when prompted by any/all User Account Control windows.



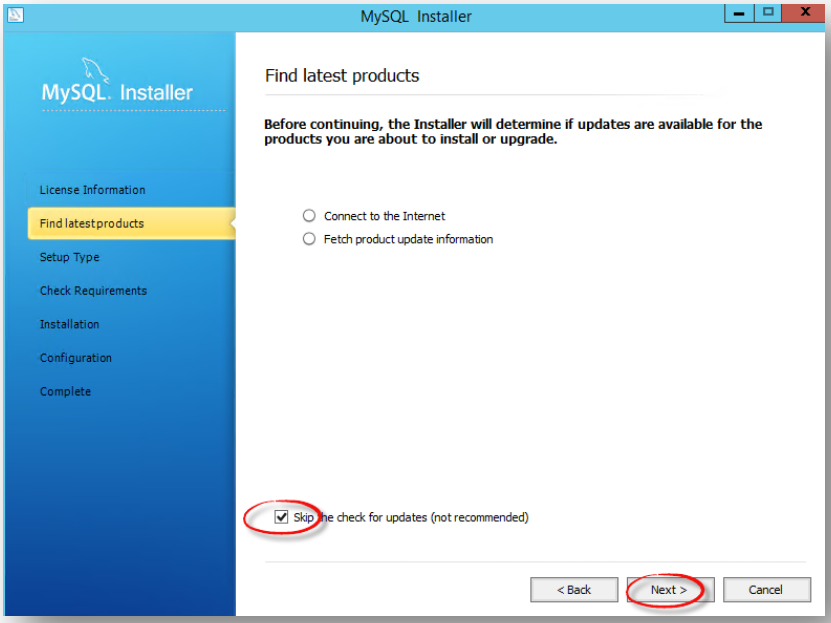


2. Click “Install MySQL Products” on the Welcome Page.

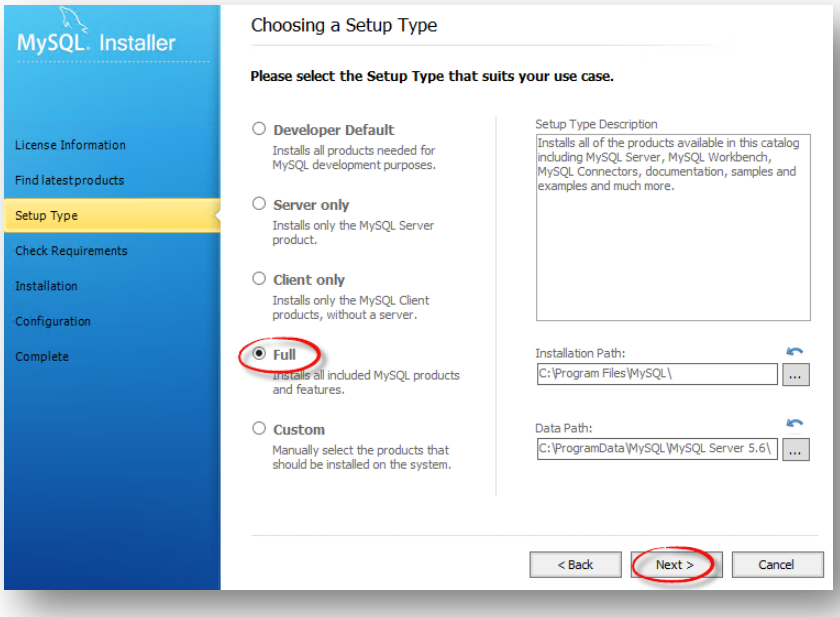
3. Check the “I accept the license terms” box and click “Next”.



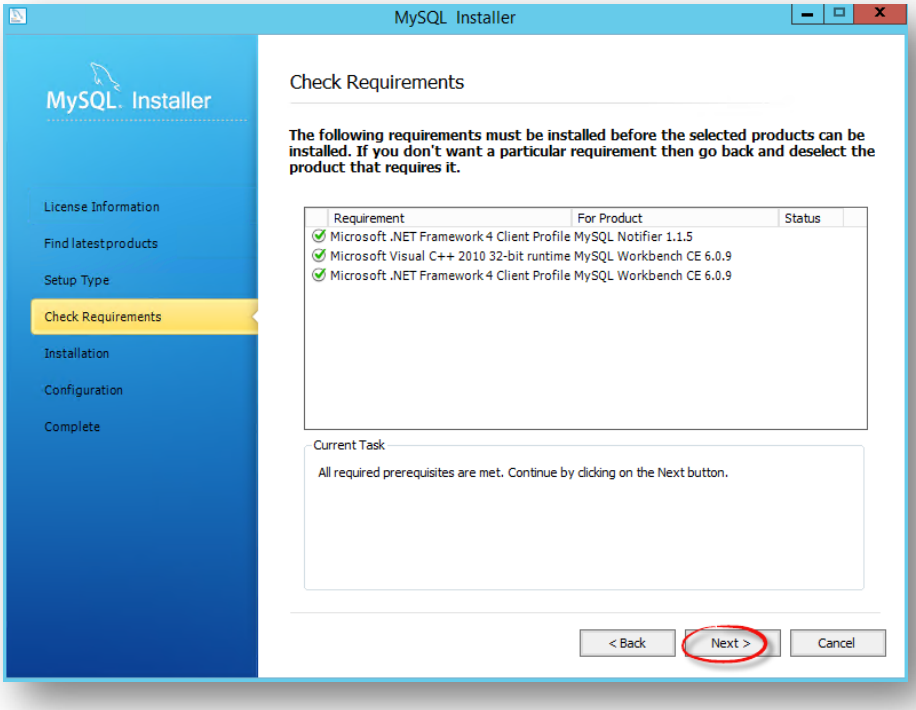
4. Check the “Skip the check for updates (not recommended)” box and click “Next”.

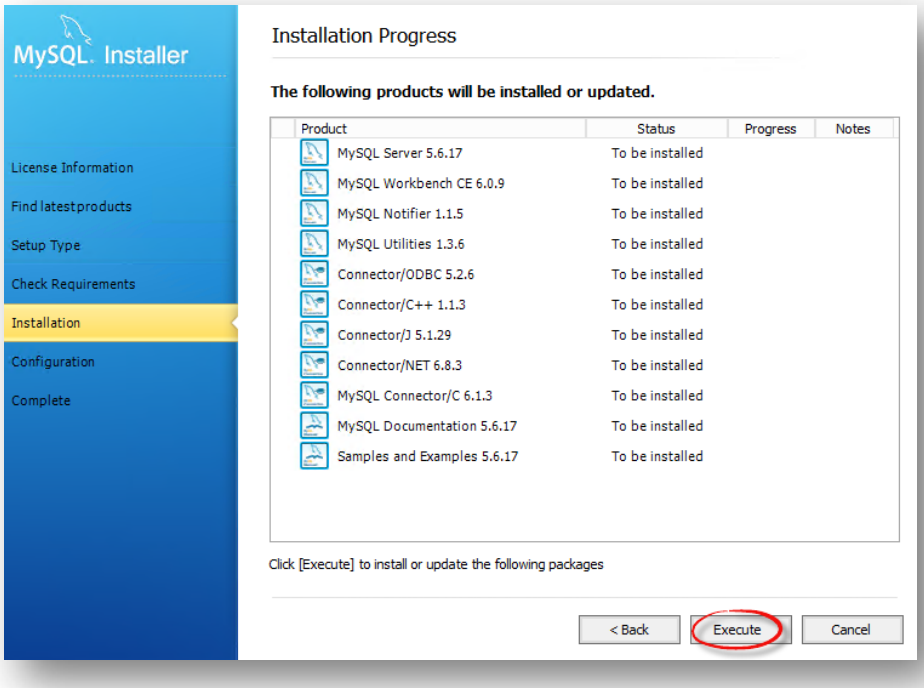


5. Select the “Full” option, leave the default installation and data path to the default setting and click “Next”.

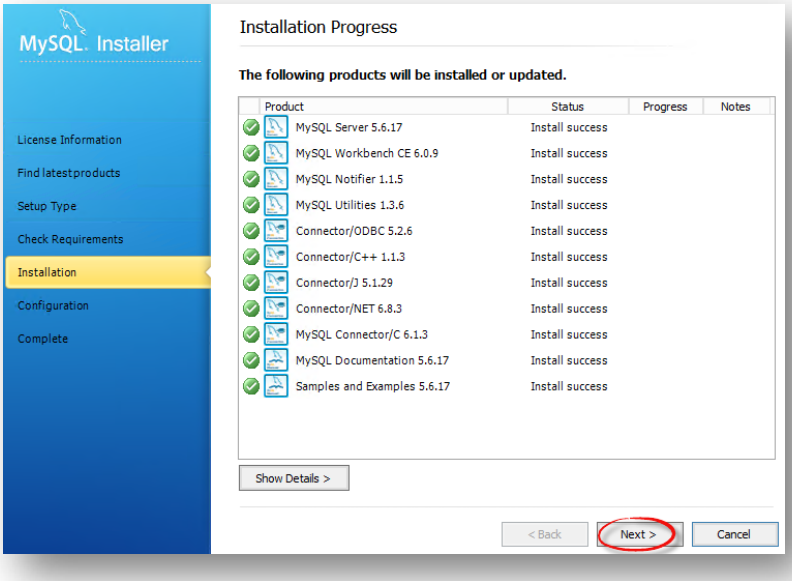


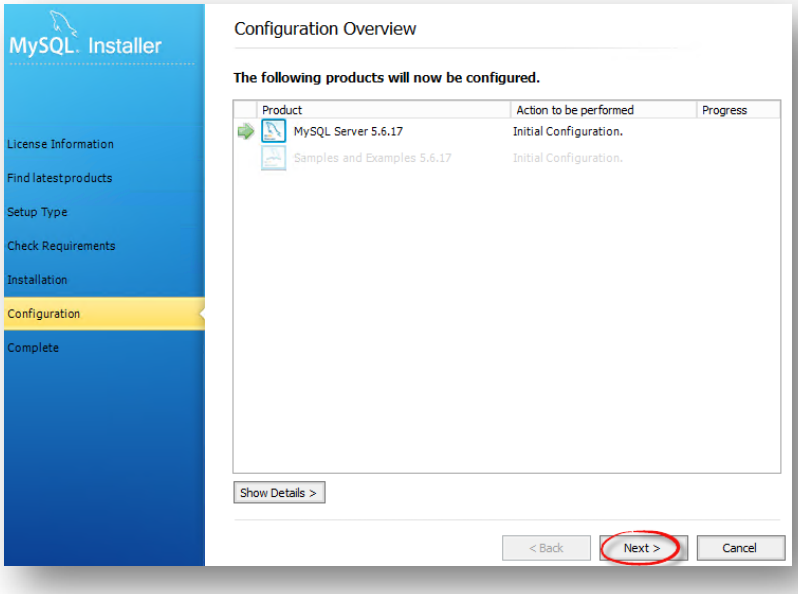
6. Click “Next” then click “Execute”.



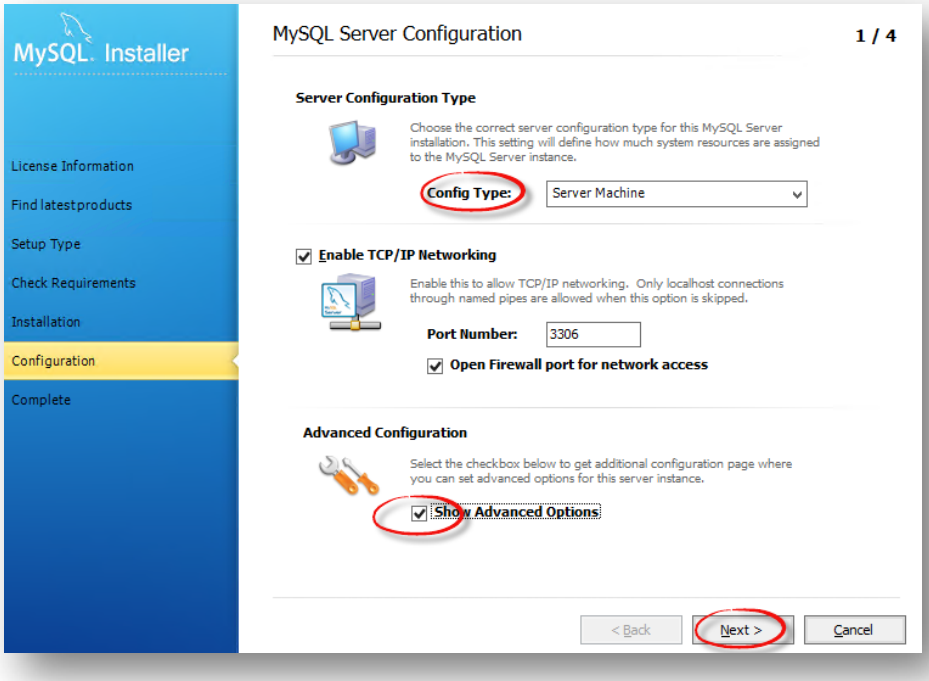


7. When the products are finished installing click “Next” and then click “Next”.

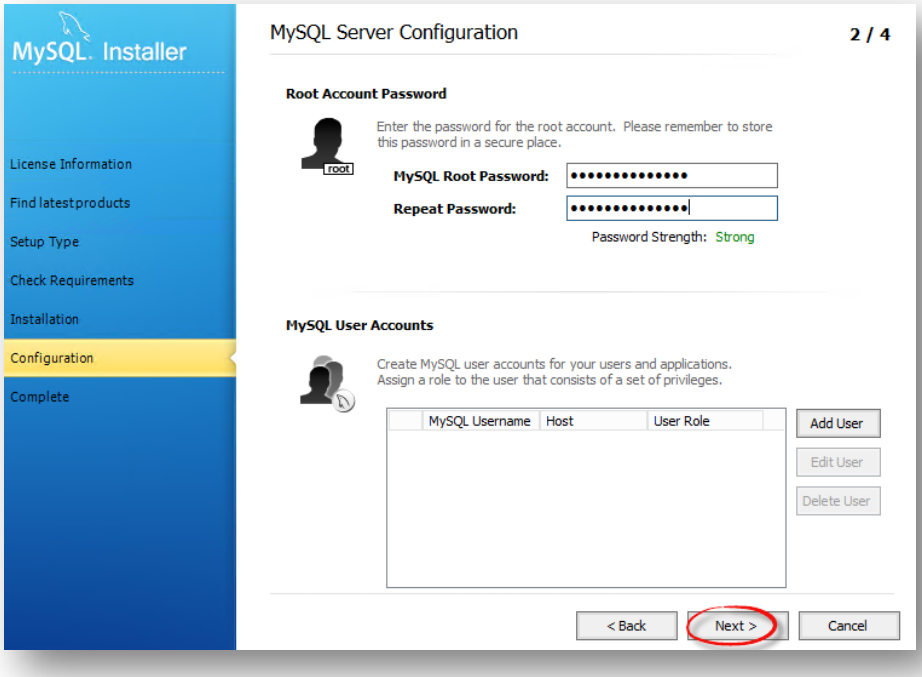




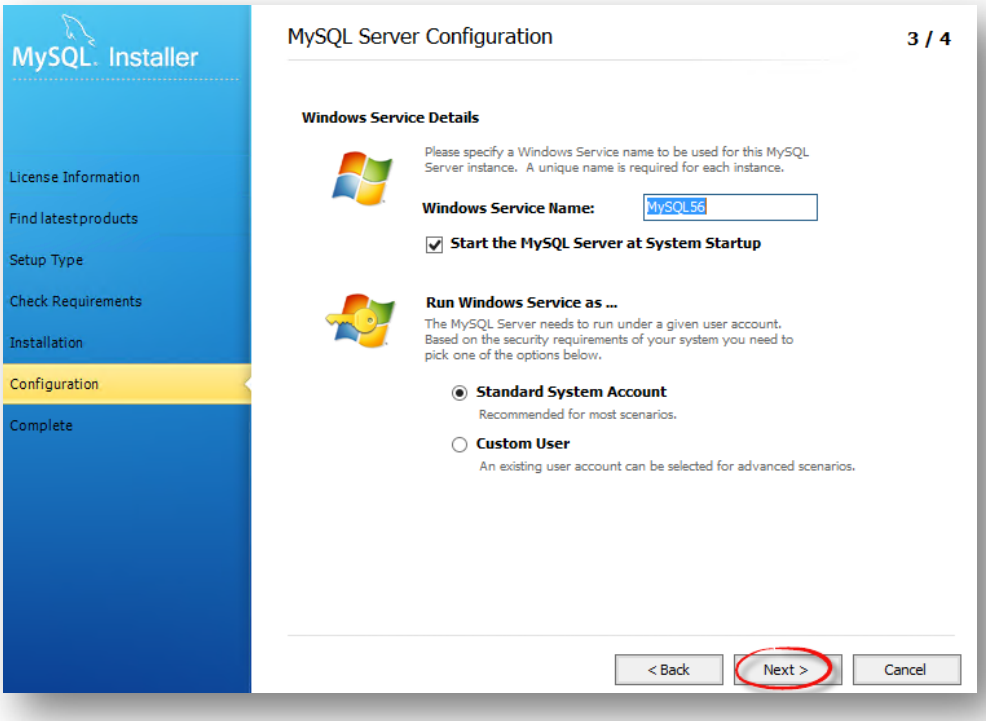
8. Select “Server Machine” from the “Config Type:” drop down menu and check the “Show Advanced Options” box and leave the rest at default and click “Next”.

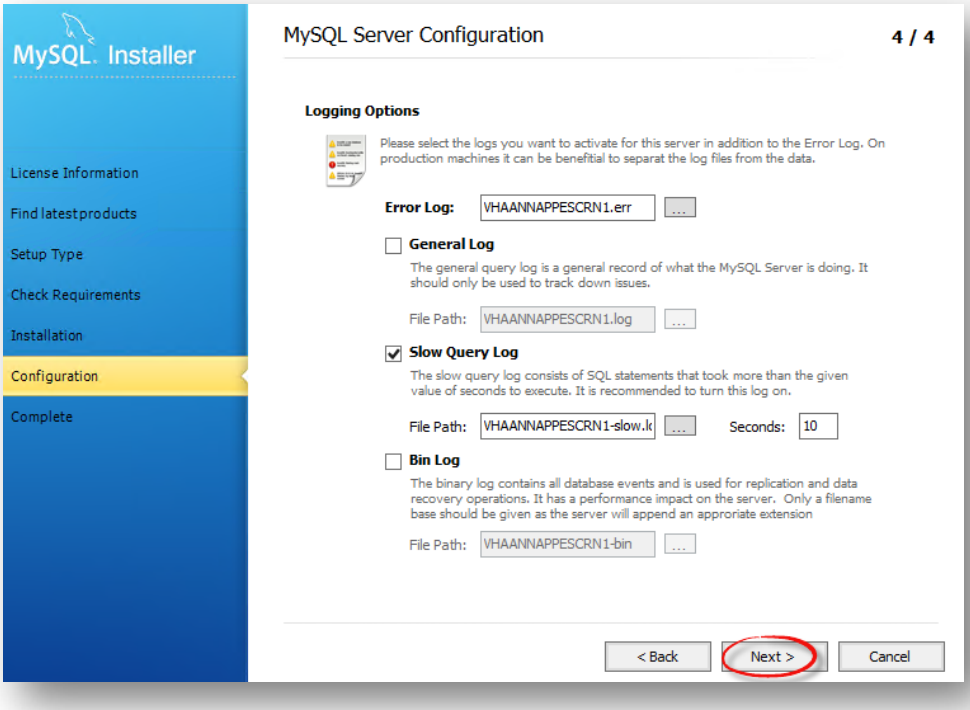


9. Enter a strong MySQL Root Password, don’t create any MySQL User Accounts and click “Next”.

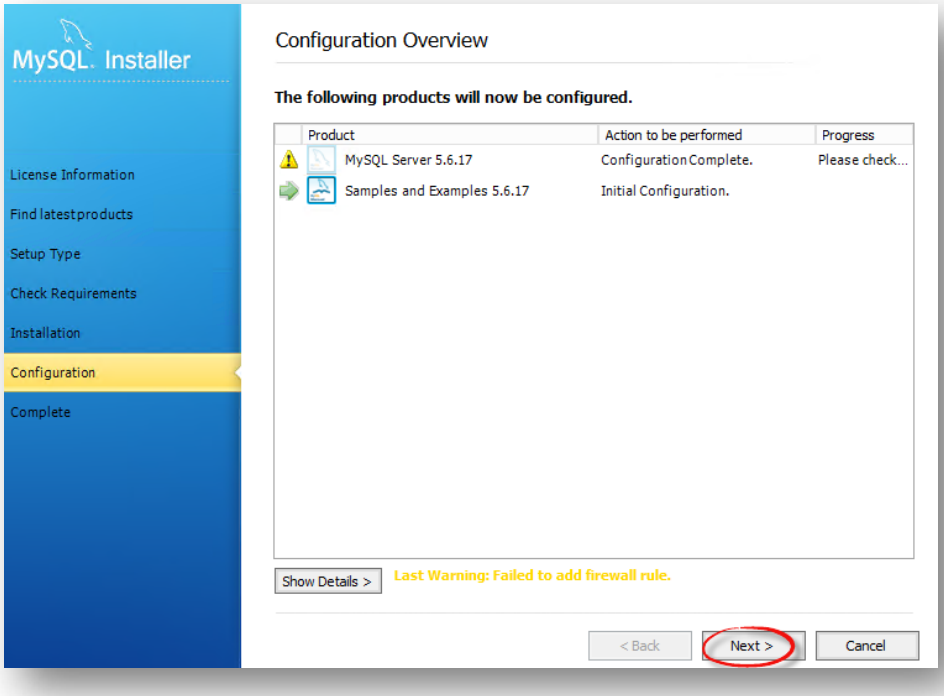


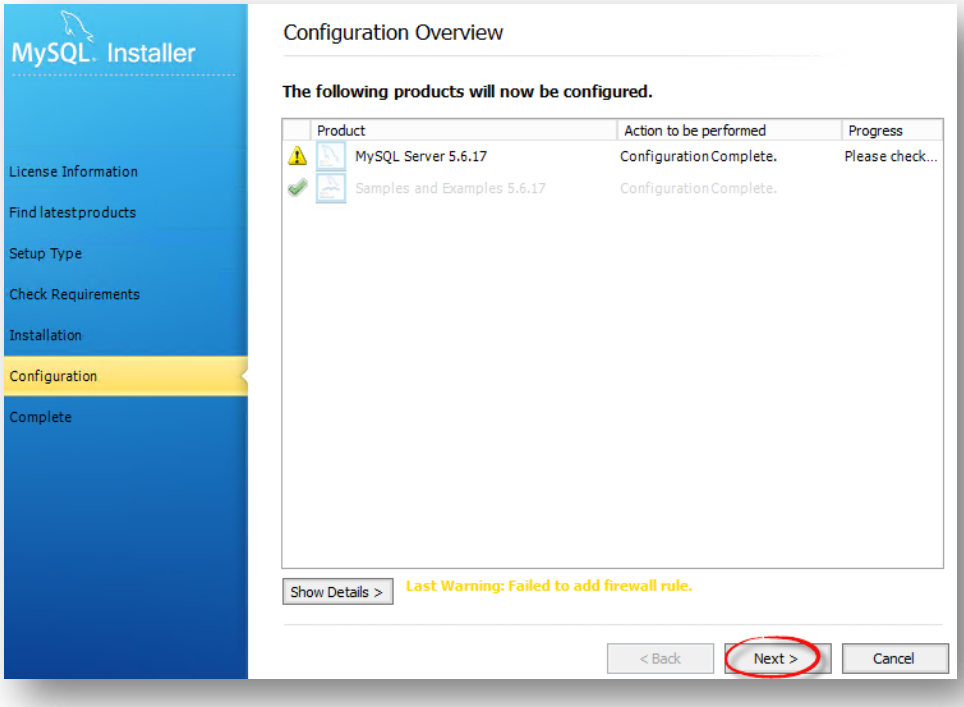
10. Leave the default settings and click “Next” then click “Next” again.



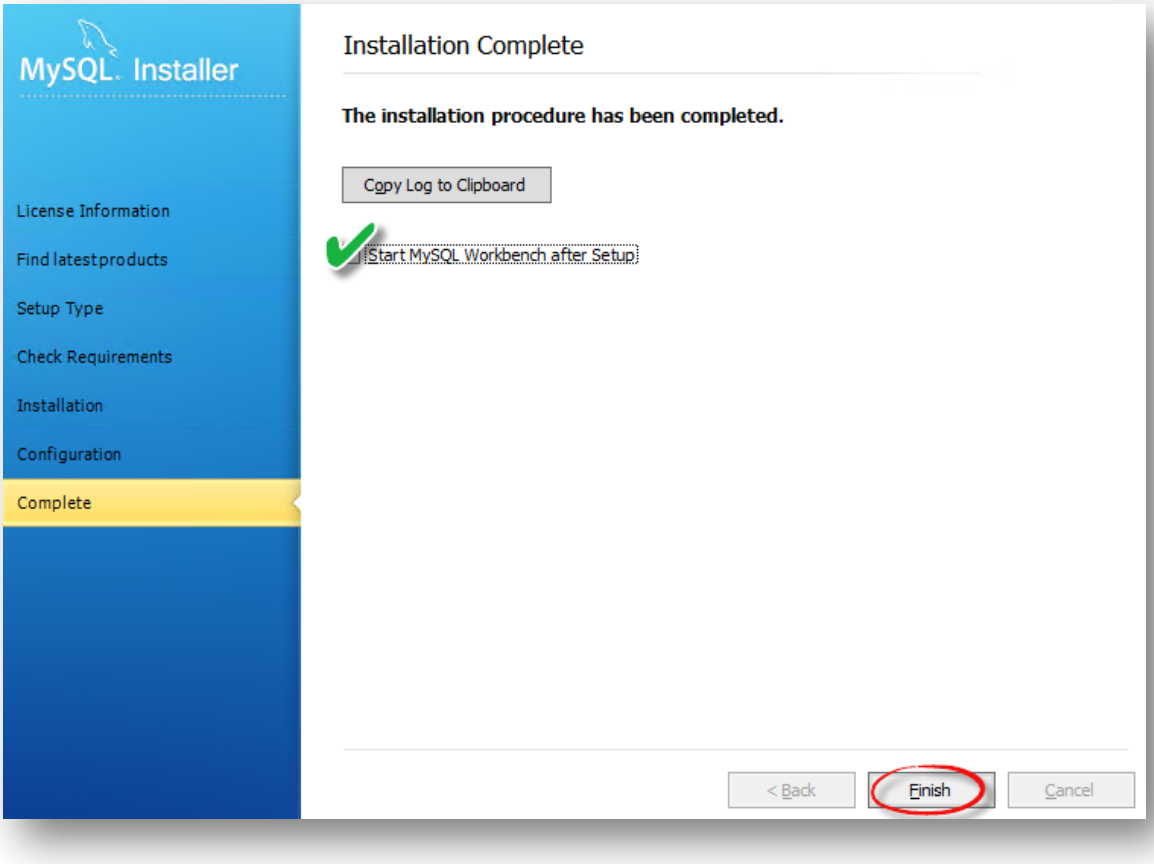


11. Disregard the “Failed to add firewall rule” and click “Next” then “Next” again.

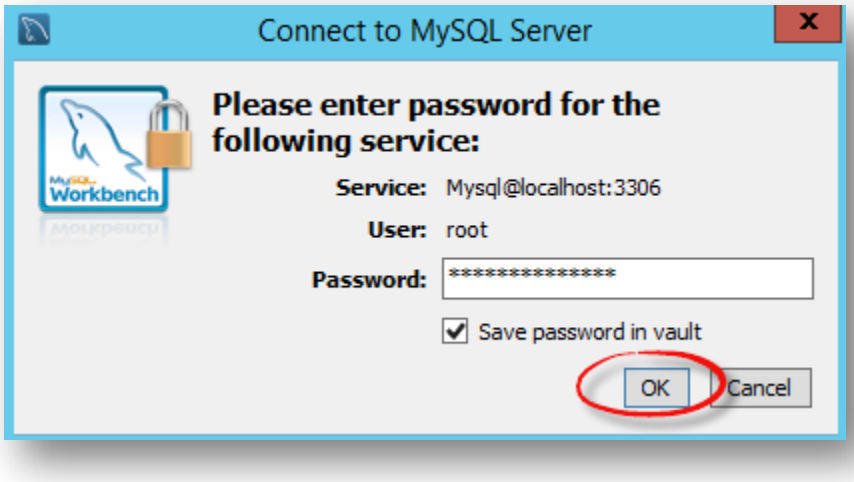




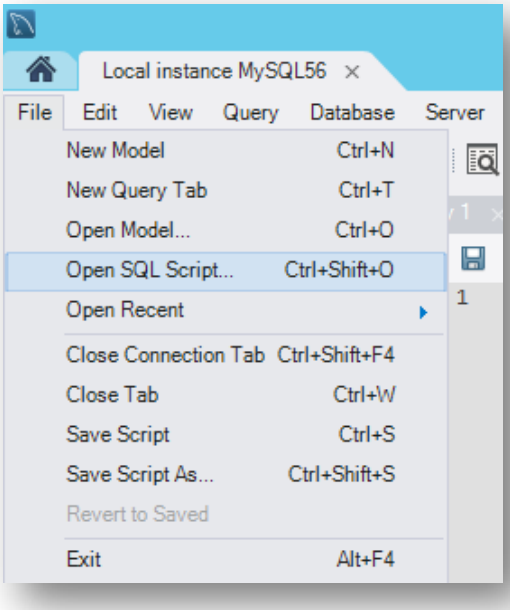
12. Check the “Start MySQL Workbench after Setup” box and click “Finish”.



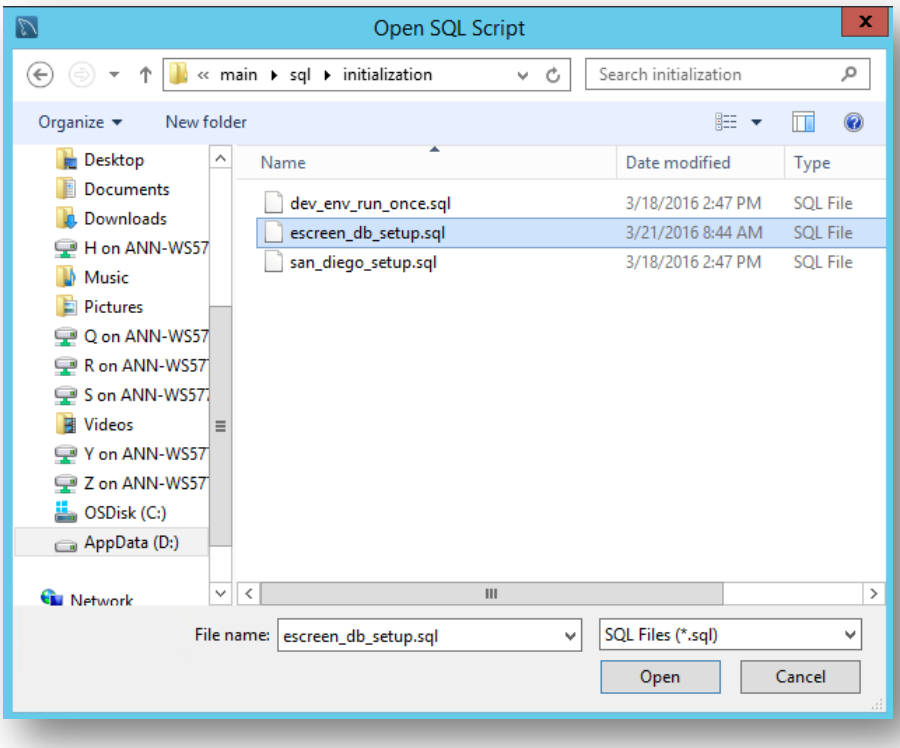
13. Enter the MySQL Root password you just created and click the “Save password in vault” box and then click “OK”.



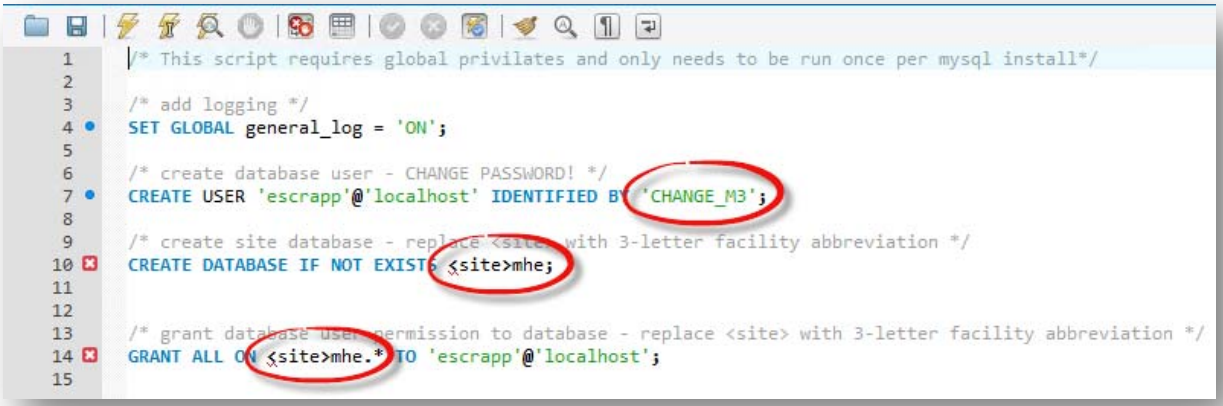
14. Once MySQL Workbench opens click on “File” then click “Open SQL Script…”



15. Navigate to “D:\escreening\<site>-prod-release\escreening\src\main\sql\initialization” and select the “escreen_db_setup.sql” script and click “Open”.

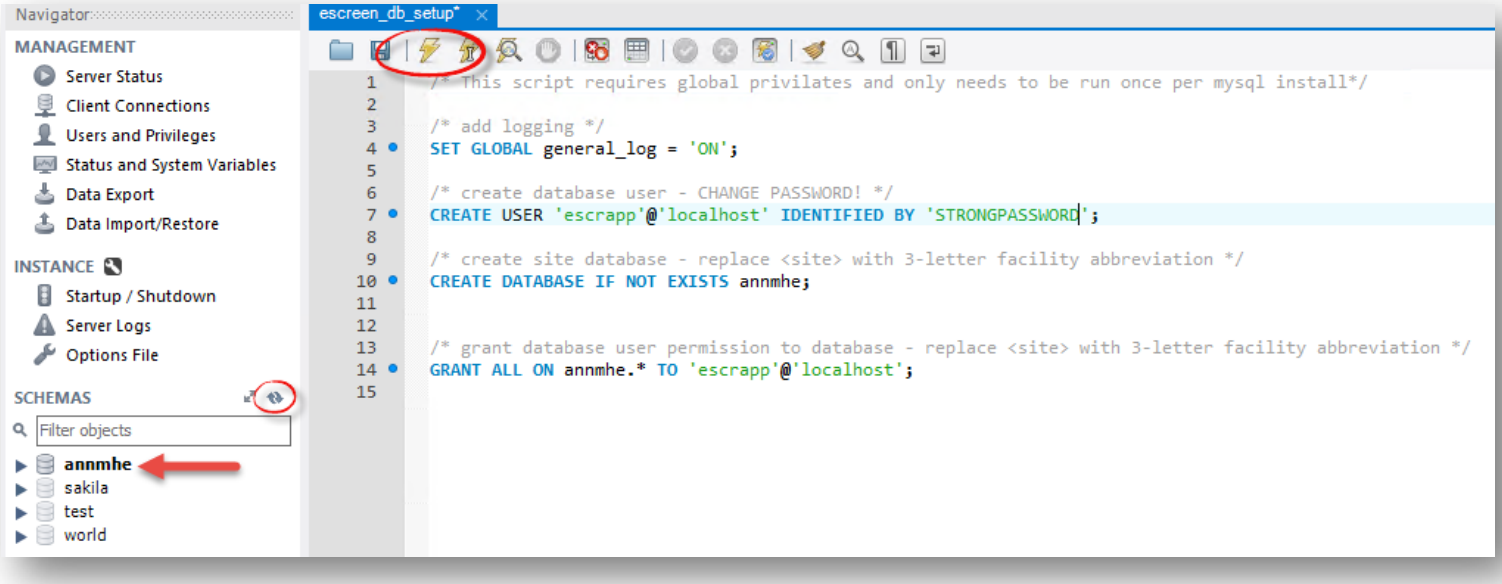


16. When the script opens, change the password on line 7 (CHANGE_M3) to a strong password. **Remember the password** you set for the "escrapp" user as you will need to enter the username/password again later on in this documentation. Change the database name on lines 10 and 14 by replacing <site> with your facility's 3-letter abbreviation. The database name should resemble something like "annmhe".



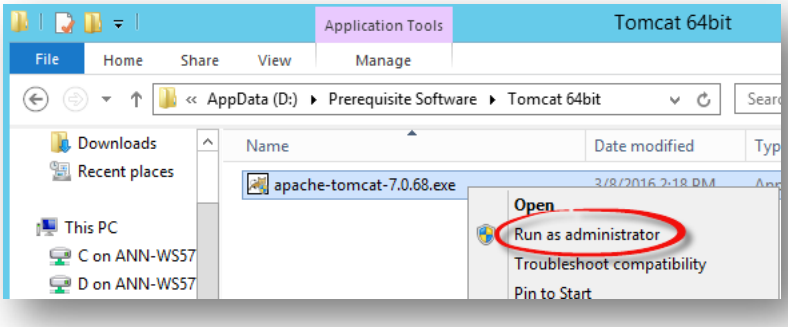
Note: This SQL script only needs to be run once to create your site eScreening database.

17. To execute the script, click the lightning bolt button and then look for the output at the bottom of the screen. You will see the script execute all of the actions successfully. To see the new database you just created, look under "SCHEMAS" and click the refresh button.

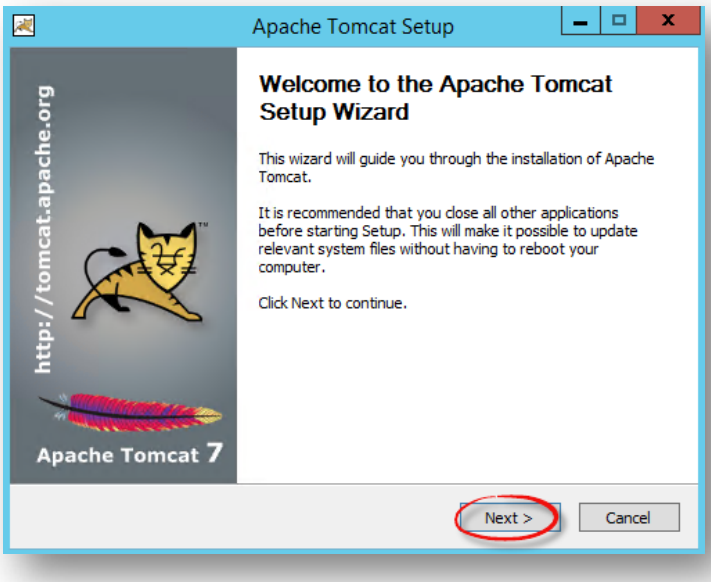


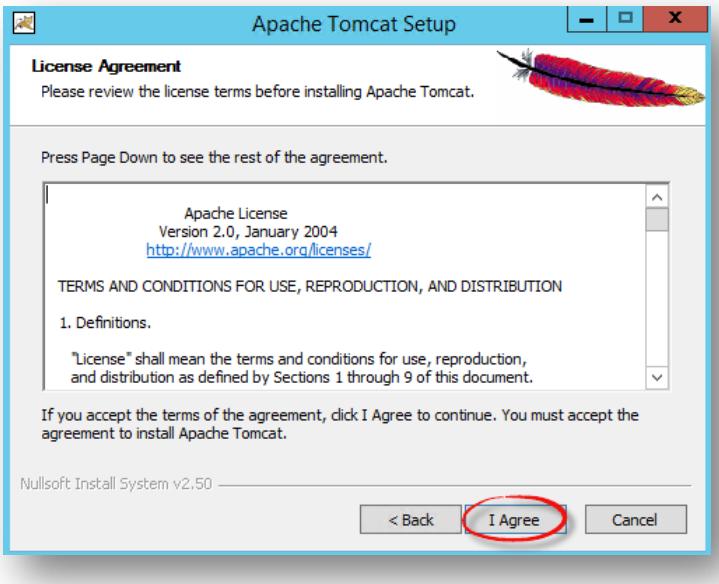
2.2.7. Installing Tomcat

1. Navigate to the “D:\Prerequisite Software\Tomcat 64bit” folder and right-click the “apache-tomcat-7.0.68.exe” installer and select “Run as administrator”. Click “Yes” on any User Account Control prompts that appear to continue with the installation.

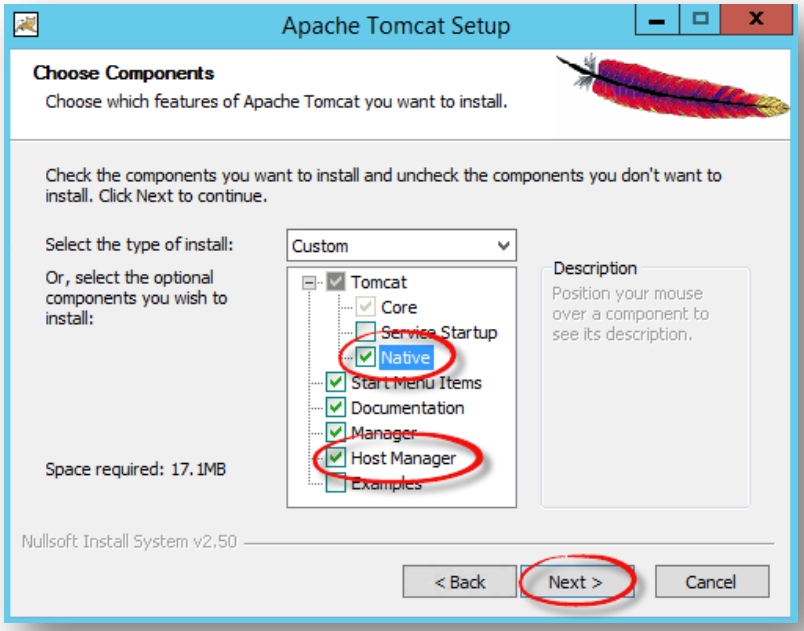


2. Click “Next” then click “I Agree”.

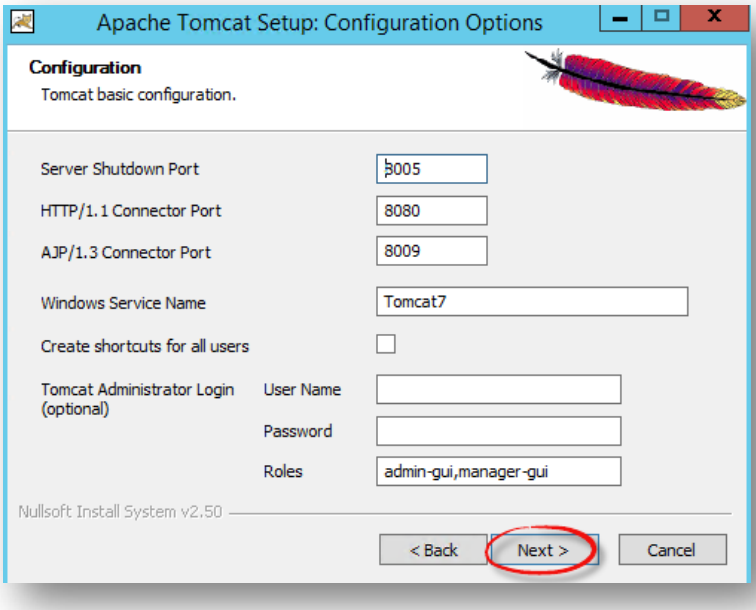




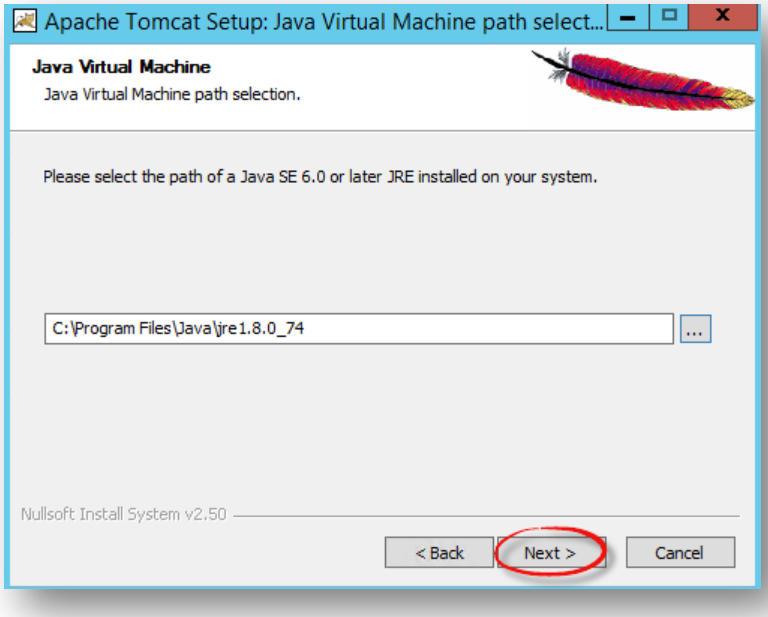
3. Ensure the “Host Manager” and “Native” boxes are checked and click “Next”.



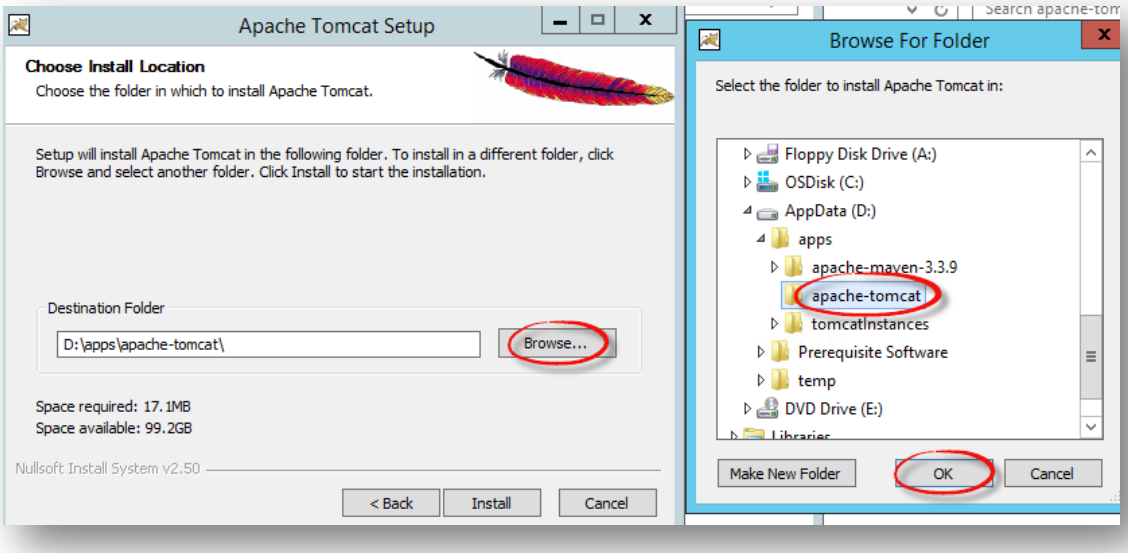
4. Leave the defaults in place and click “Next.”



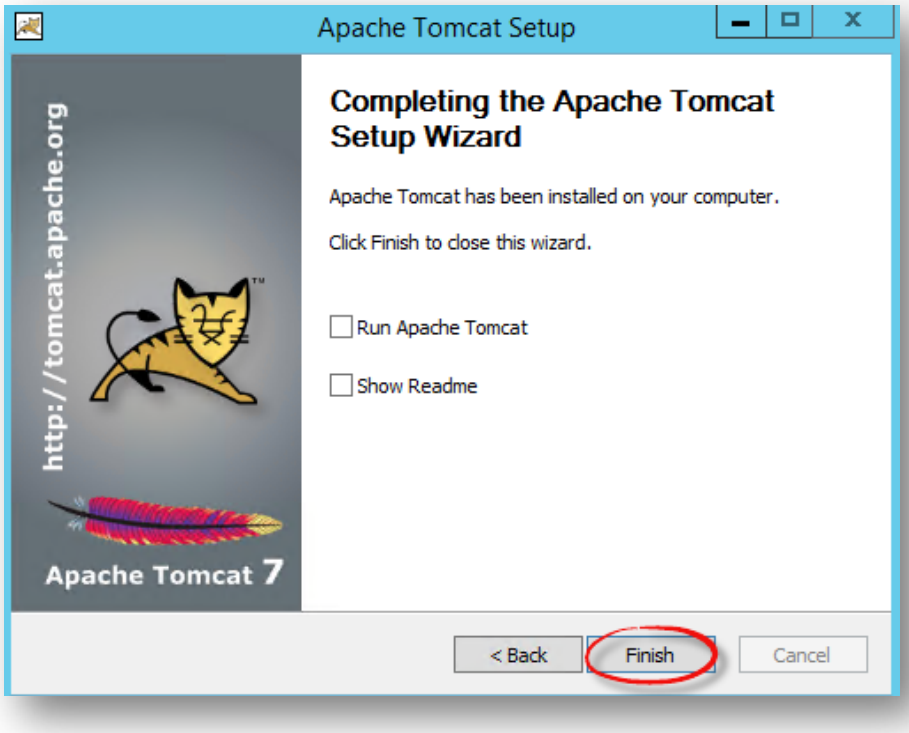
5. Click “Next”.



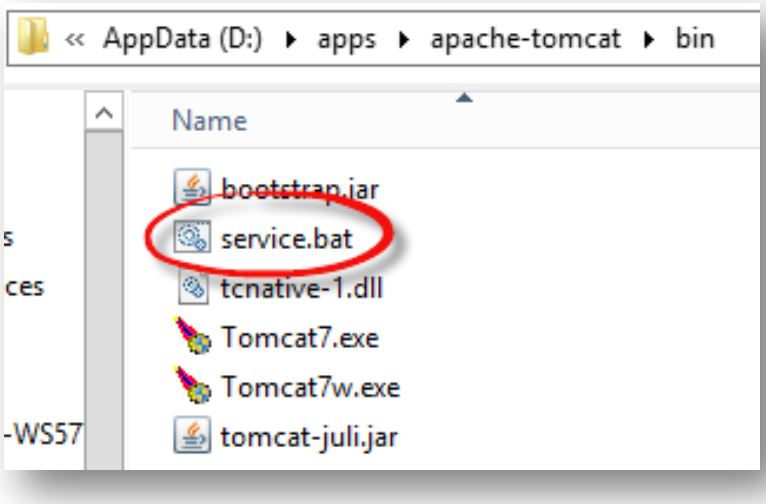
6. Click “Browse” then navigate to and select “D:\apps\apache-tomcat” and click “OK” then click “Install”.



7. Uncheck the “Run Apache Tomcat” and “Show Readme” boxes and click “Finish”.

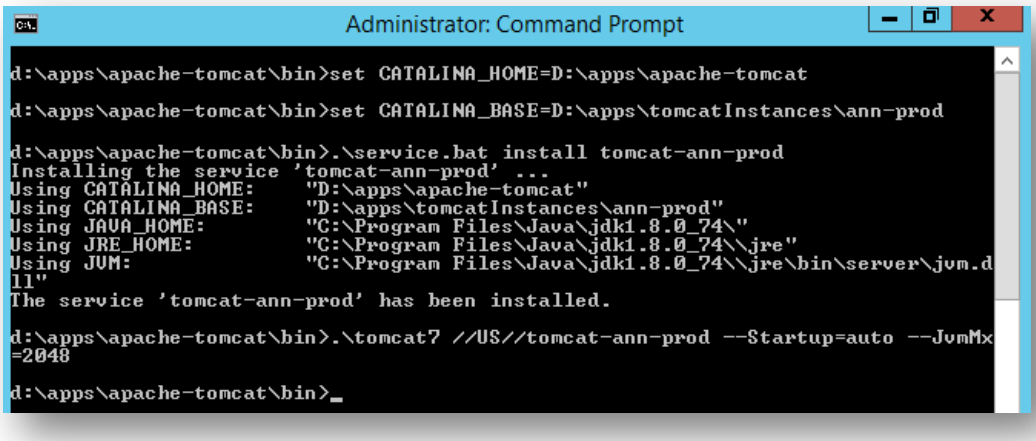


8. Navigate to the "D:\escreening\<site>-prod-release\escreening\src\main\sql\initialization” folder and copy the “**service.bat**" file to the “D:\apps\apache-tomcat**bin**” folder.



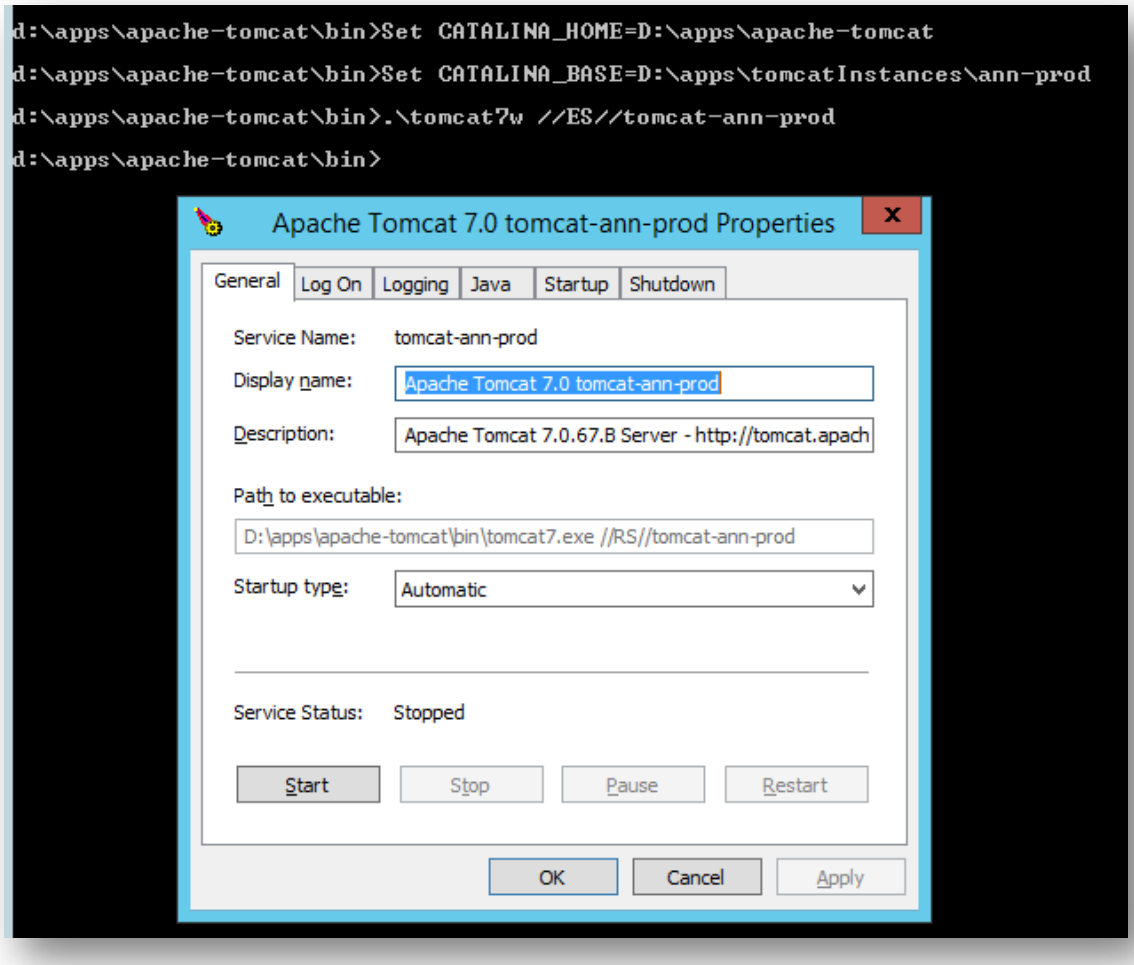
9. Open command prompt as an Administrator and install the new Tomcat Service by typing in the following commands:

d: (changes the working directory to the d:\ drive)
cd “d:\apps\apache-tomcat\bin”
set CATALINA_HOME=D:\apps\apache-tomcat
set CATALINA_BASE=D:\apps\tomcatInstances\<site>-prod
.\service.bat install tomcat-<site>-prod
.\tomcat7 //US//tomcat-<site>-prod --Startup=auto --JvmMx=2048



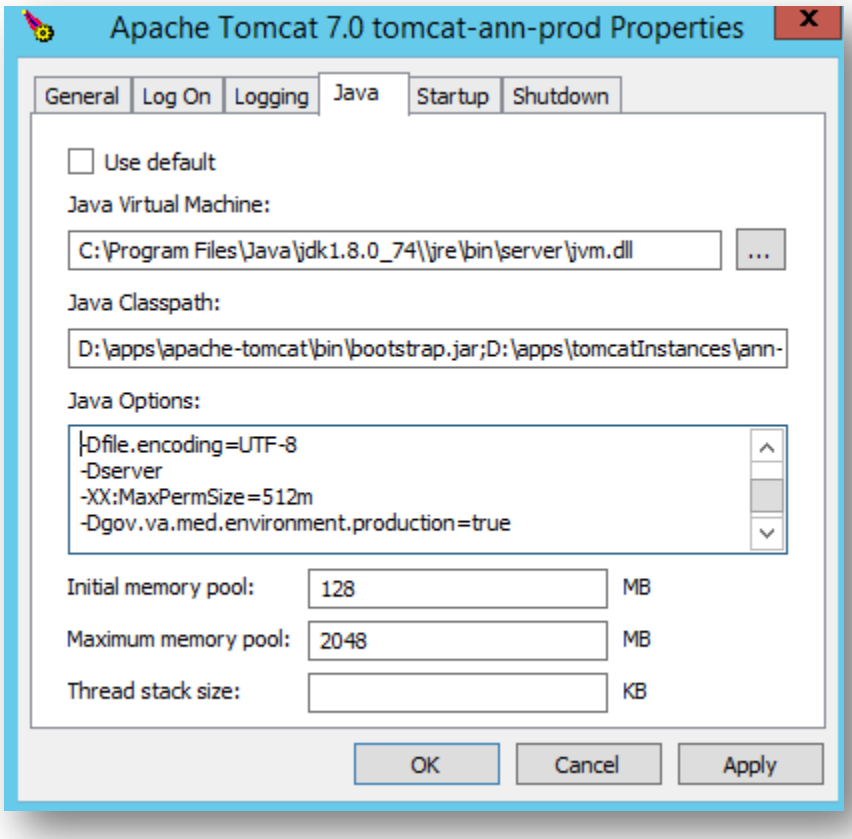
10. To set the Tomcat parameters, type the following commands:

set CATALINA_HOME=D:\apps\apache-tomcat
set CATALINA_BASE=D:\apps\tomcatInstances\<site>-prod
.\tomcat7w //ES//tomcat-<site>-prod (**this command launches the service properties box)**



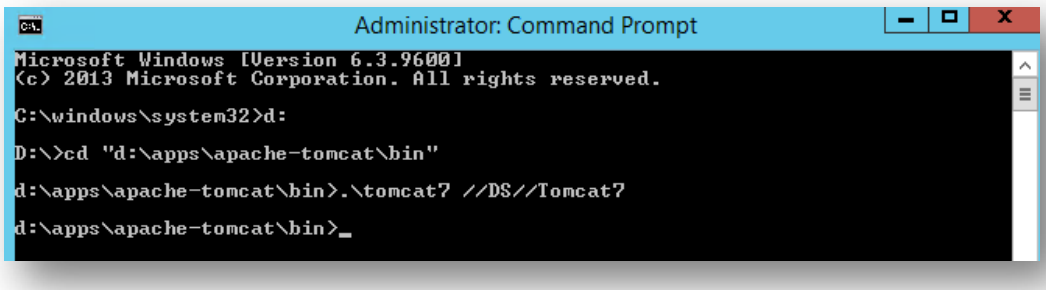
When the service properties box opens click on the Java tab and add the following settings in the Java Options text box. Be sure to include the dash before each setting.

-Dfile.encoding=UTF-8
-Dserver
-XX:MaxPermSize=512m
-Dgov.va.med.environment.production=true

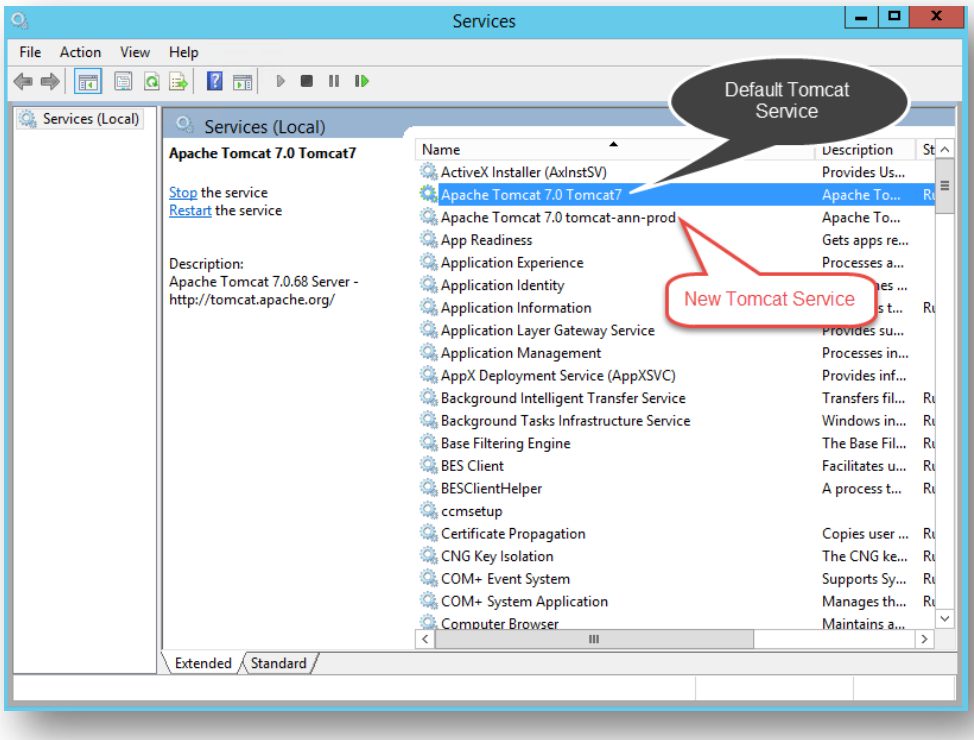


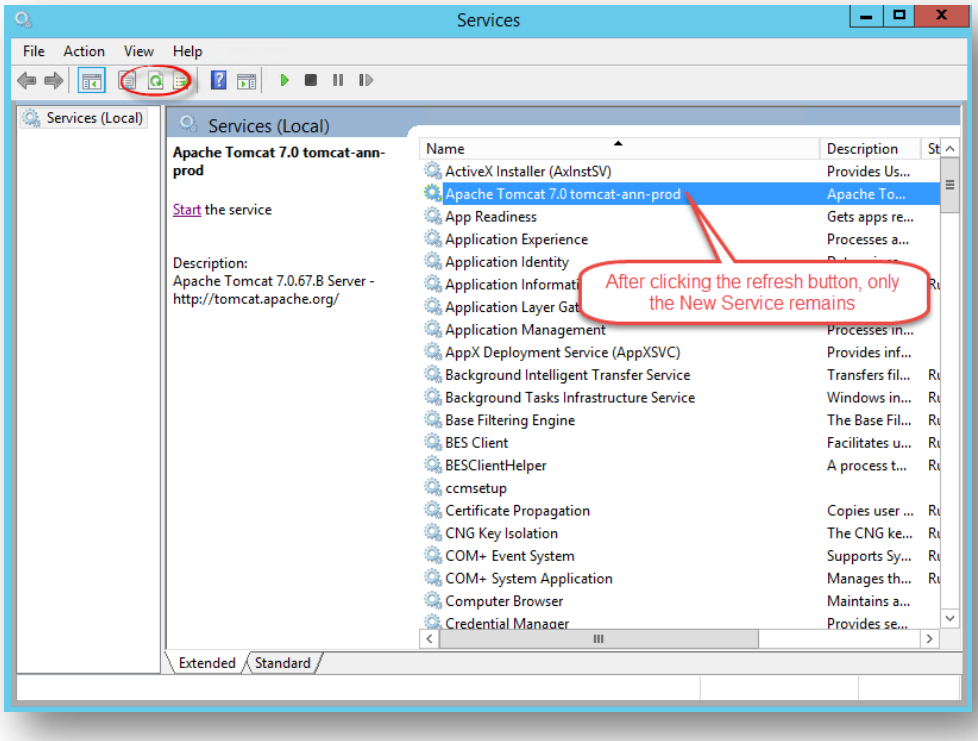
11. Now run the following commands to delete the default Tomcat service:

d: (changes the working directory to the d:\ drive)
cd “d:\apps\apache-tomcat\bin”
.\tomcat7 //DS//Tomcat7



12. Open up Services to see that the new Tomcat service was created and the default Tomcat service was removed. Click the refresh button to ensure you are seeing the latest information.





2.3. Creating a Connector Proxy User:

A Proxy User account should be set up by a VistA Account Specialist or a VistA Support Specialist, using the Foundations Manager Menu in VistA.

The Vista Support Specalist will need to provide:

1) Proxy user access code

2) Proxy user verify code

3) Proxy user DUZ

Here is an excerpt from the *VistALink 1.6 System Management Guide (December 2010).*

1. You must hold the Kernel XUMGR key.
2. Add a new connector proxy user by using the Foundations menu on your M system and choosing the Enter/Edit Connector Proxy User option.
3. The account requires no additional information from what is prompted for by the option.
4. Leave the connector proxy user's Primary Menu empty.
5. Securely communicate the access code and verify code for the connector proxy user to the J2EE system manager setting up access from J2EE to your system. Also communicate the IP and port of your VistALink listener.
6. **naming convention for the account should contain either:

   CONNECTOR
   or **APPLICATION**
   or **PROXY**
   …not USER, as it may be confused as a regular user account.

The account option for the secondary menu should be enabled for “OR CPRS GUI”. Do not assign a primary menu.

- **Do not enter divisions for a connector proxy user.**
- **Do not enter a primary menu.**
- **Do not also use the connector proxy user as a test "end-user**
- **Utilize the user only as a connector proxy user.**

The account option for the secondary menu should be enabled for “OR CPRS GUI”. Do not assign a primary menu.

The following special characters may cause issues in step 24.1.b due to encryption if used in the Access or Verify codes: $ & < “ ‘. We advise the use of one the following charaters: @ ! % = or *.

2.4. Updating Important Files

1. The following files must be updated with site specific information:

    a. "D:\escreening\<site>-prod-release\escreening**pom.xml**"

To modify "**pom.xml**", open the xml file in Notepad or Notepad++ and scroll down to the very end of the file and copy lines 1122 – 1132 then paste them starting on line 1133. You are copying an already created profile and duplicating it then modifying the contents to reflect your -own site.

Make the following changes after you've pasted the lines (refer to the image below):

Change line 1134 to "<site>-prod". Replace <site> with your site's 3 letter abbreviation.

Change line 1136 to "<site>". Replace <site> with your site's 3 letter abbreviation.

Change line 1139 to "jdbc:mysql://localhost:3306/<site>mhe". This is the name of the database you created earlier. Replace <site> with your site's 3 letter abbreviation.

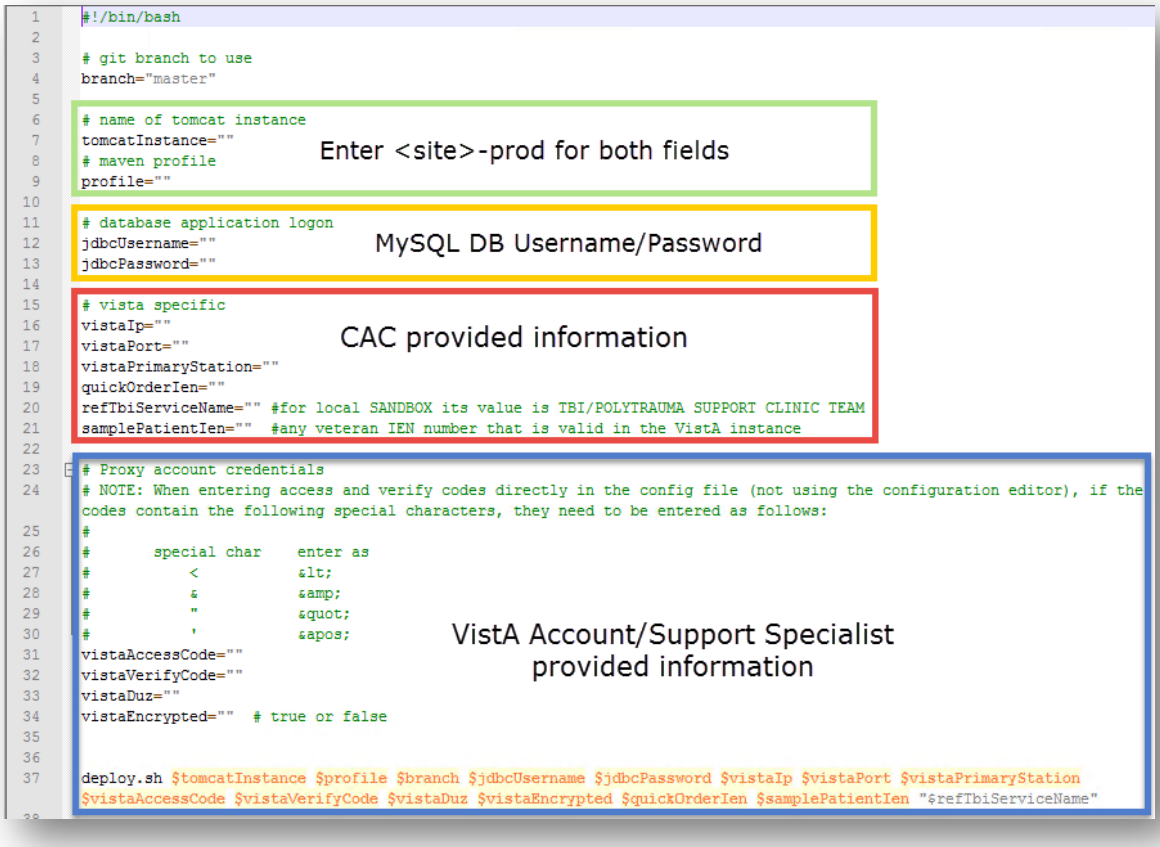
Change line 1140 to "<site>mhe". This is the name of the database you created earlier. Replace <site> with your site's 3 letter abbreviation.

Change line 1141 to "<site>". This is your site's 3 letter abbreviation.

Once you are done making the changes, save the file.

b. "D:\escreening**deploy-ann-prod.sh**". If you have problems finding the file, please refer to section 2.2.5.3.

Below is a screenshot of the shell script you will need to update with site specific information:



To update this file with all of the required information you must gather data from both your Clinical Applications Coordinator (CAC) and VistA Account/Support Specialist. **Note:** The VistA Account/Support Specialist will need to create a proxy user account with specific guidelines noted above in section 2.3.

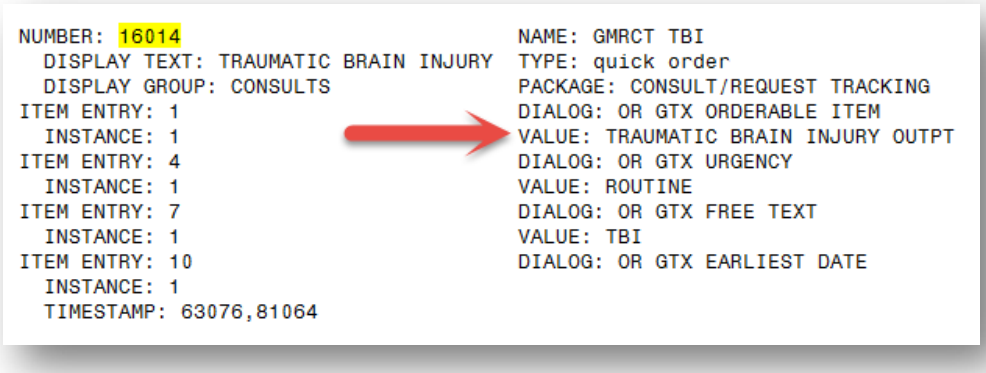
For the "**tomcatInstance**" and "**profile**" fields, enter "<site>-prod" for both fields. Replace <site> with your 3 letter site abbreviation.

For the "**jdbcUsername**" and "**jdbcPassword**" fields, enter the MySQL Database username "escrapp" and the password you created earlier when you ran the SQL script

Contact your **Clinical Applications Coordinator (CAC) or VistA Specalist** for the following information and fill out the fields under “vista specific” with the information provided.

i. VistaIP –this is the VistA Link IP address or Host name (ex. test.vista.san-diego.med.va.gov), line 16. Using the fully qualified domain name is (see example above) is recommended.
ii. VistAPort –this the VistA Link Listern Port number (**Note:** The VistALink Listener Port is not the same as the RPC Broker port used to connect to CPRS and other VistA GUI applications. The VistALink Listener Port can be found on a spreadsheet of Port Numbers, IP Addressing, and Site Specific Ports maintained by the Region OI&T.), line 17.
iii. VistAPrimaryStation- this is the facility station number, line 18
iv. QuickOrderIEN for the TBI Consult Order, line 19
v. TBIServiceName, this is the Name in CPRS for the TBI Consult order, line 20
vi. SamplePatientIEN (Any Veteran IEN number that is valid in VistA), line 21

The following image shows what the Quick Order IEN is (highlighted in yellow) as well as the TBI Service Name. Your CAC will know what you are asking for when you ask for the information. This particular consult that is placed when a Post 911 Combat Veteran has a positive on the TBI SCREENING Clinical Reminder.



To fill out the “Proxy account credentials” (lines 31-33) with the information provided by VistA Account/Support Specialist from section 2.3 (Proxy User Account). These three lines require the Access Code, Verify code, and DUZ.

**Be sure to use the value “false” in the “vistaEncrypted” field on line 34. The information is being encrypted in the destination file “gov.va.med.vistalink.connectorConfig.xml”.

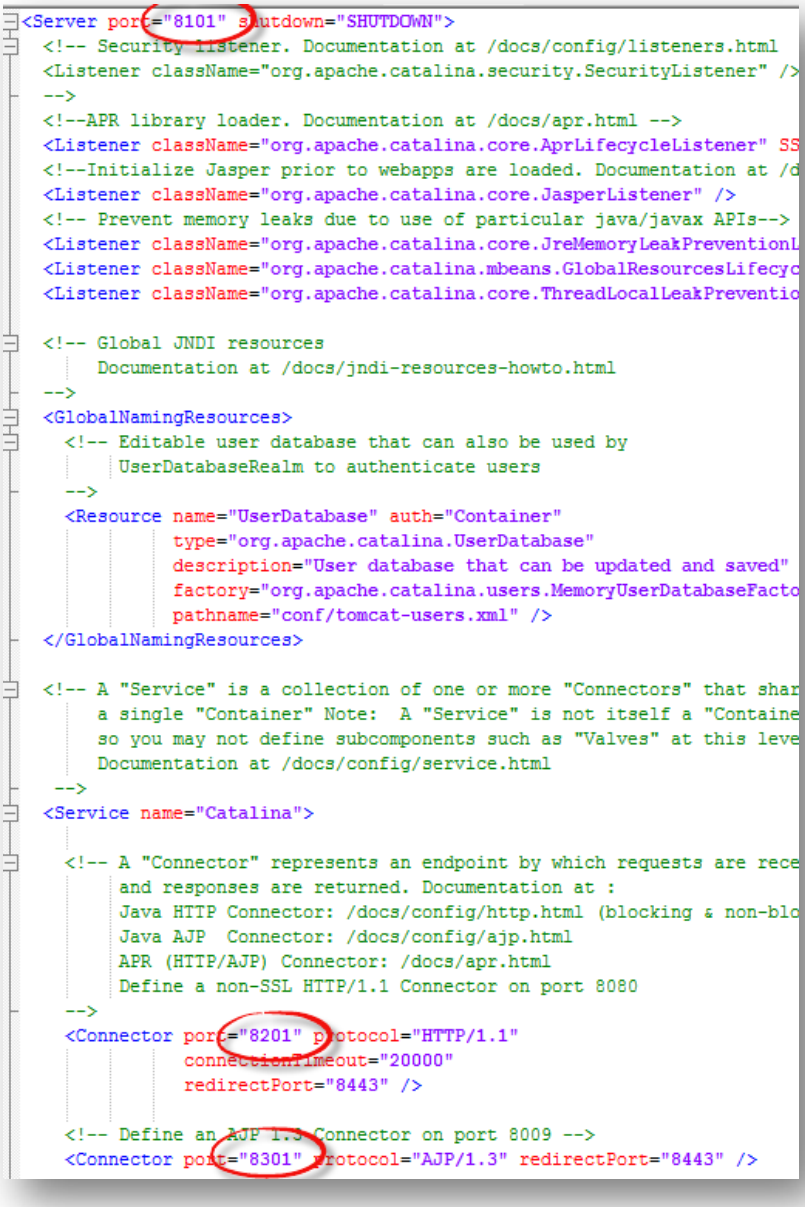
****IMPORTANT**** Line 37 of this script must be manually modified to include a **./** before "deploy.sh" at the beginning of the line. There should be no space between the ./ and deploy.sh. The beginning of line 37 should look identical to this:

The finished result should look like this (all sensitive information is redacted):

```
#!/bin/bash

# git branch to use
branch="master"

# name of tomcat instance
tomcatInstance="ann-prod"
# maven profile
profile="ann-prod"

# database application logon
jdbcUsername="escrapp"
jdbcPassword="[redacted]

# vista specific
vistaIp="[redacted]
vistaPort="[redacted]
vistaPrimaryStation="506"
quickOrderIen="16014"
refTbiServiceName="TRAUMATIC BRAIN INJURY OUTPT" #for local SANDBOX its value is TBI/POLYTRAUMA SUPPORT CLINIC TEAM
samplePatientIen="[redacted]  #any veteran IEN number that is valid in the VistA instance

# Proxy account credentials
# NOTE: When entering access and verify codes directly in the config file (not using the configuration editor), if the
codes contain the following special characters, they need to be entered as follows:
#
#       special char    enter as
#           <           &lt;
#           &           &amp;
#           "           &quot;
#           '           &apos;
vistaAccessCode="[redacted]
vistaVerifyCode="[redacted]
vistaDuz="[redacted]
vistaEncrypted="false"  # true or false


./deploy.sh $tomcatInstance $profile $branch $jdbcUsername $jdbcPassword $vistaIp $vistaPort $vistaPrimaryStation
$vistaAccessCode $vistaVerifyCode $vistaDuz $vistaEncrypted $quickOrderIen $samplePatientIen "$refTbiServiceName"
```

c. "D:\apps\tomcatInstances\<site>-prod\conf**server.xml**"

i. Ensure the Server port = 8101
ii. Ensure the HTTP Connector port = 8201
iii. Ensure the AJP Connector port = 8301



d. "D:\apps\tomcatInstances**instanceIDs.txt**"

i. Replace <instance_name> with "<site>-prod"
ii. Replace <instance_id> with "01"

```
This is the list of instances with the unique ID for each one (this is used to set port numbers):

|Name|      |ID|
<instance_name> <instance_id>
```

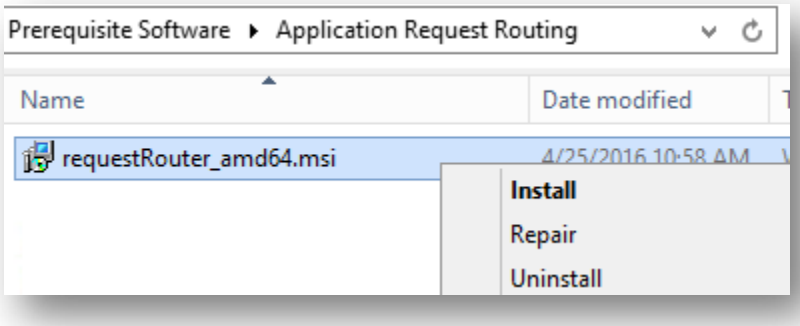
```
This is the list of instances with the unique ID for each one (this is used to set port numbers):

|Name|      |ID|
<ann-prod> <01>
```

Note: If you create multiple instances, create another line underneath the preceding instance and give the “instance_name” a new name (e.g. ann-test) and give the “instance_id” the next number following the previous instance number:

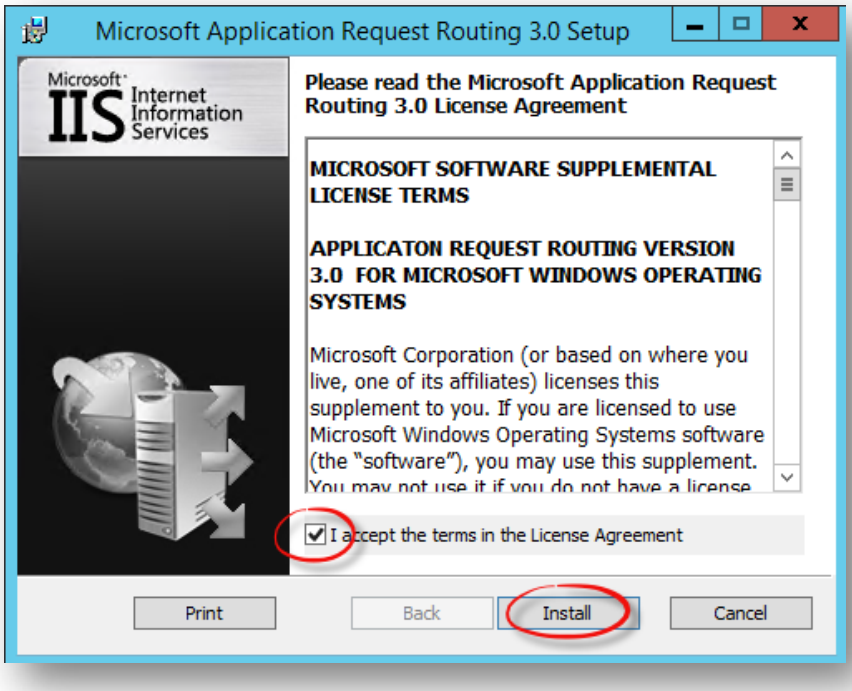
|Name| |ID|
<ann-prod> <01>
<ann-test> <02>

2.5. Installing Application Request Routing and URL Rewrite

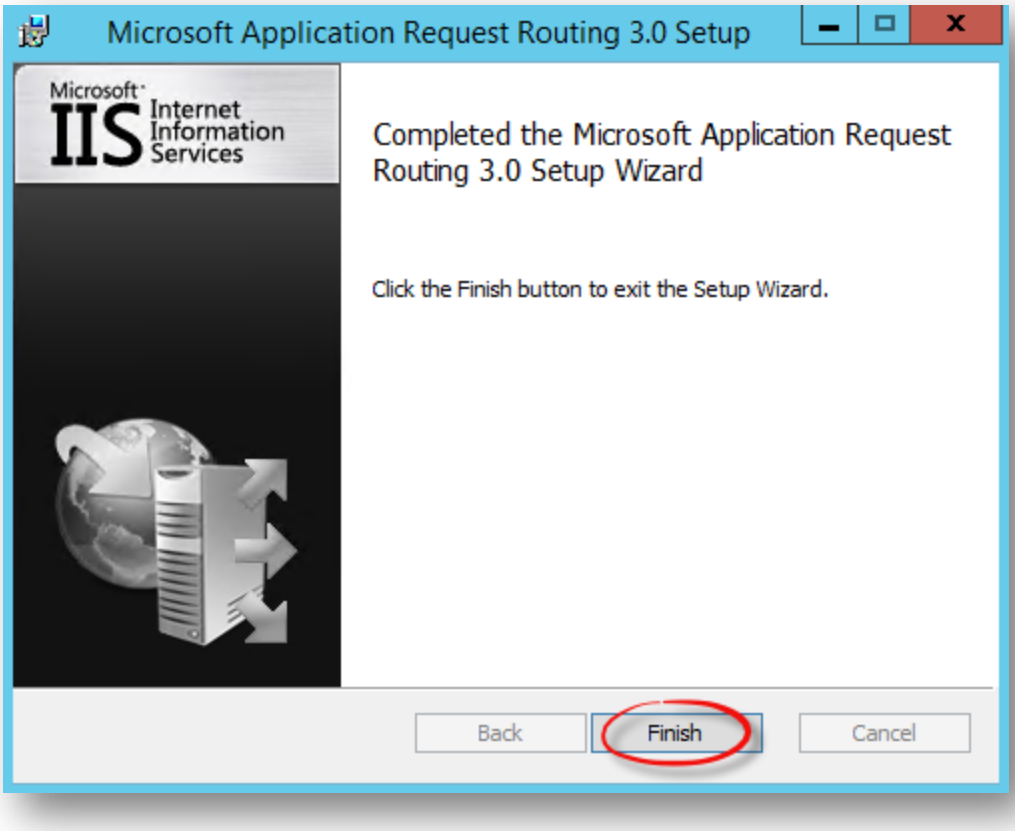
1. Navigate to the “D:\Prerequisite Software\Application Request Routing” folder and right-click the “requestRouter_amd64.msi” installer and select “Install”.



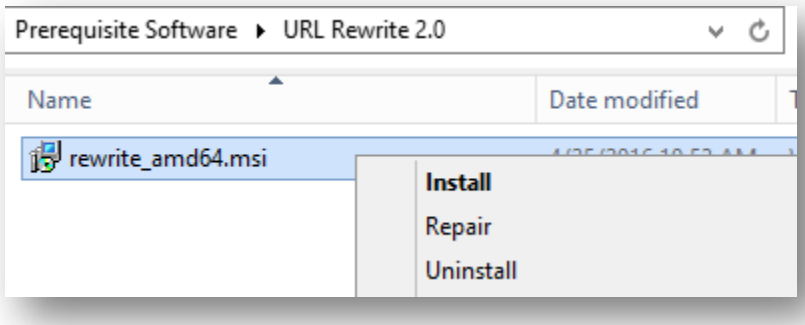
2. Check the “I accept the terms in the License Agreement” box and click “Install”. Click “Yes” to any User Account Control prompts you may receive to continue with the installation.



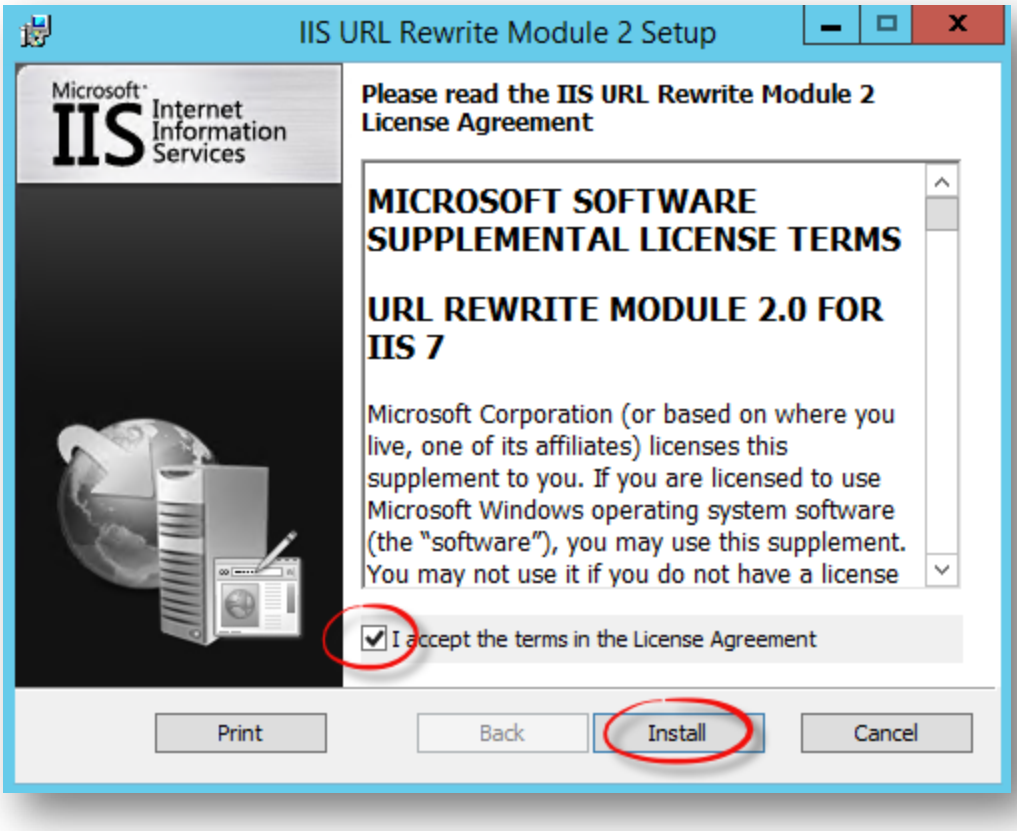
3. Click “Finish” to complete the Application Request Routing 3.0 installation.



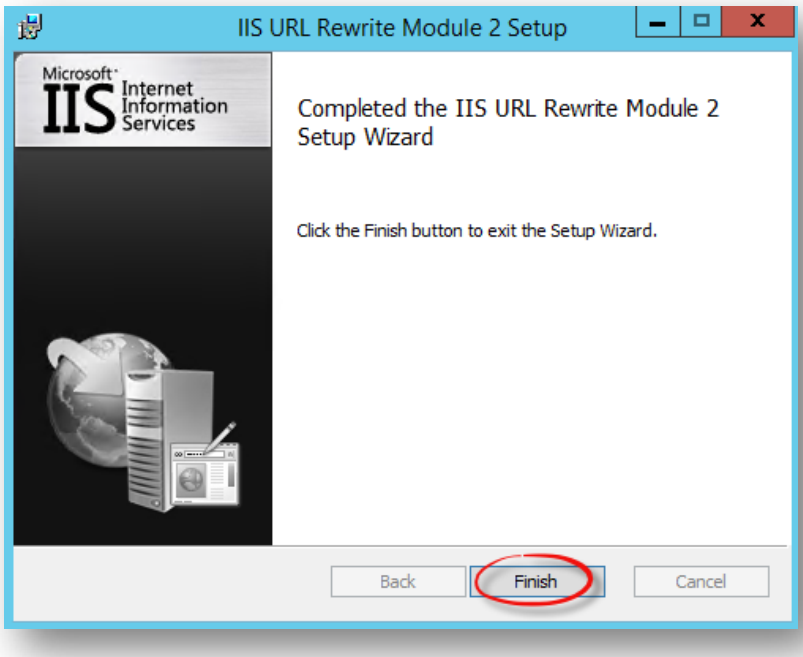
4. Navigate to the “D:\Prerequisite Software\URL Rewrite 2.0” folder and right-click the “rewrite_amd64.msi” installer and click “Install”.



5. Check the “I accept the terms in the License Agreement” box and click “Install”. Click “Yes” to any User Account Control prompts you may receive to continue with the installation.

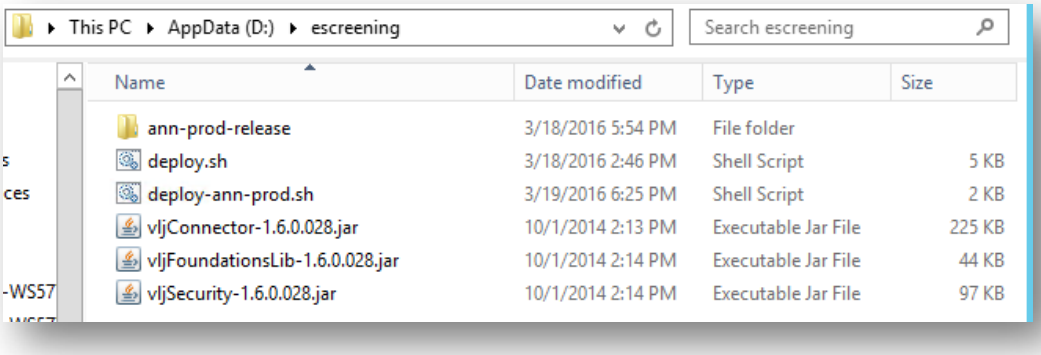


6. Click “Finish” to complete the URL Rewrite 2.0 installation.



2.6. Installing VistALink JARs

1. Open File Explorer and navigate to “D:\prerequisite software\vistalink jars” and copy the three JAR files to the “D:**escreening**” folder.



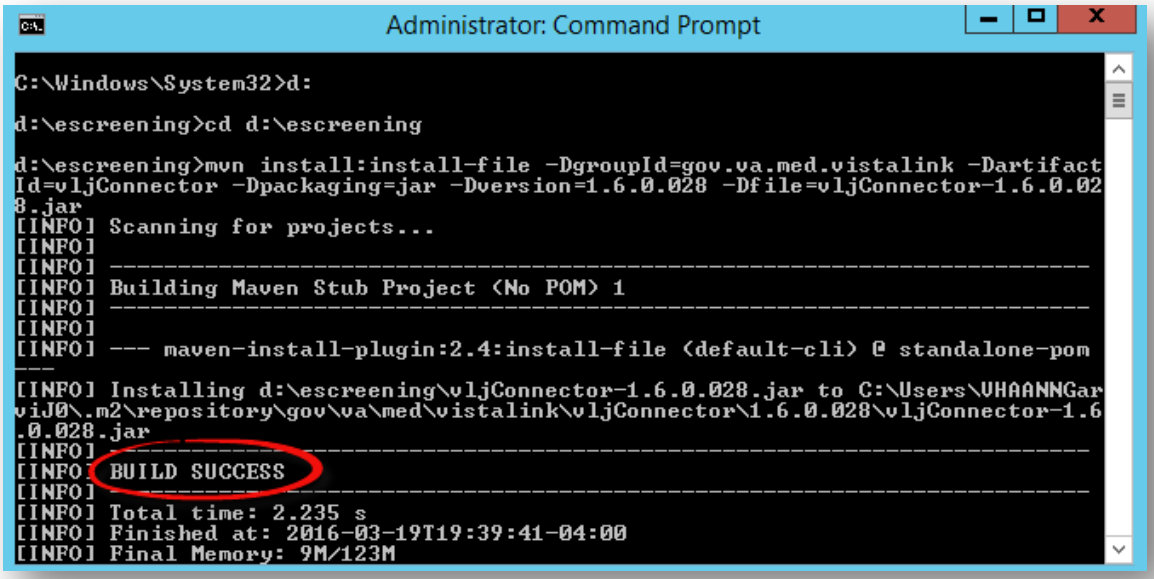
2. Open command prompt as an administrator and change directories to “D:\escreening” and execute the following commands:

mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljConnector -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljConnector-1.6.0.028.jar

mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljFoundationsLib -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljFoundationsLib-1.6.0.028.jar

mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljSecurity -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljSecurity-1.6.0.028.jar

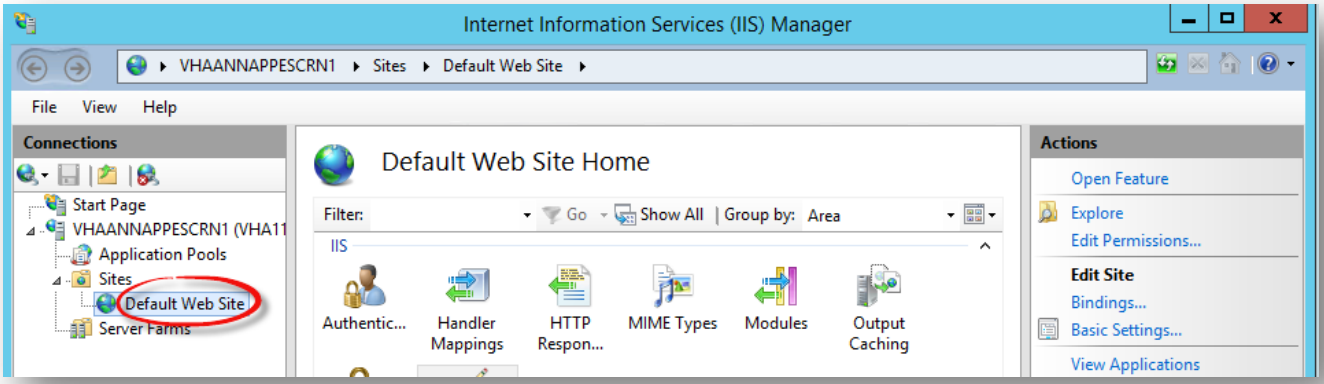
You will receive a “BUILD SUCCESS” message after each JAR is installed.



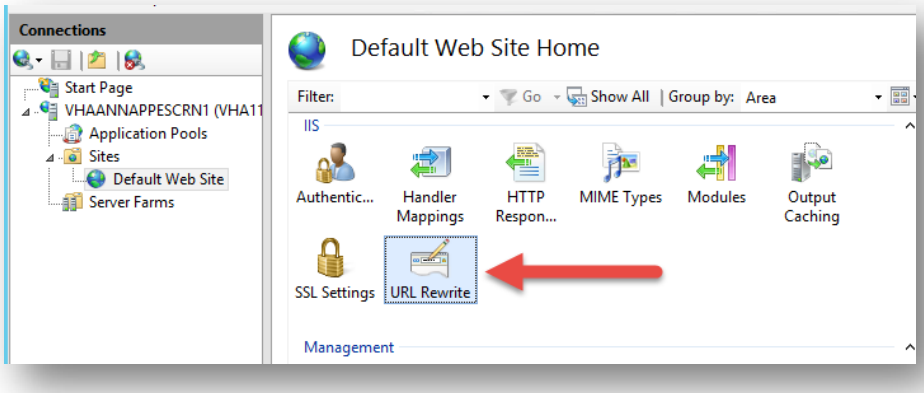
2.7. **Creating the IIS Proxy Rule**

1. Ensure the new Tomcat service is running in Services then open Internet Information Services (IIS) Manager.

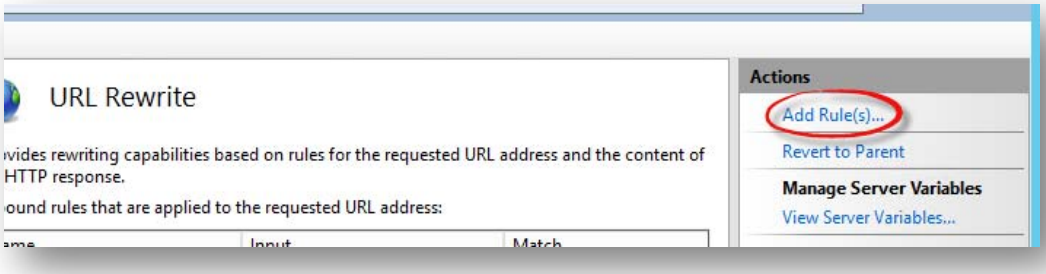
2. Once IIS Manager is open, expand the local server then expand “Sites” then click “Default Web Site”.

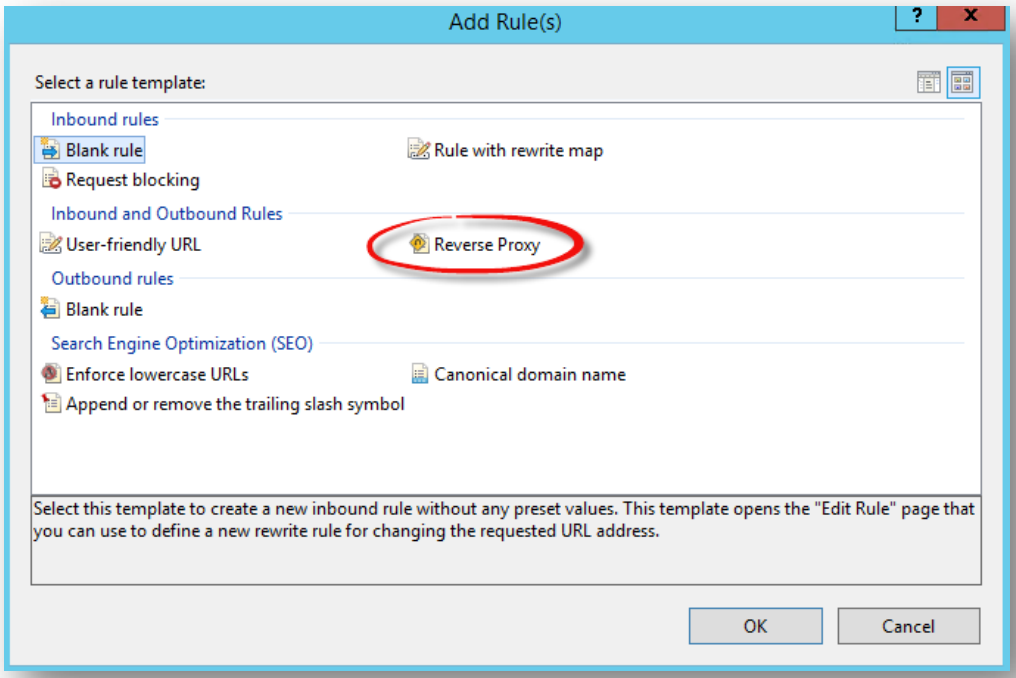


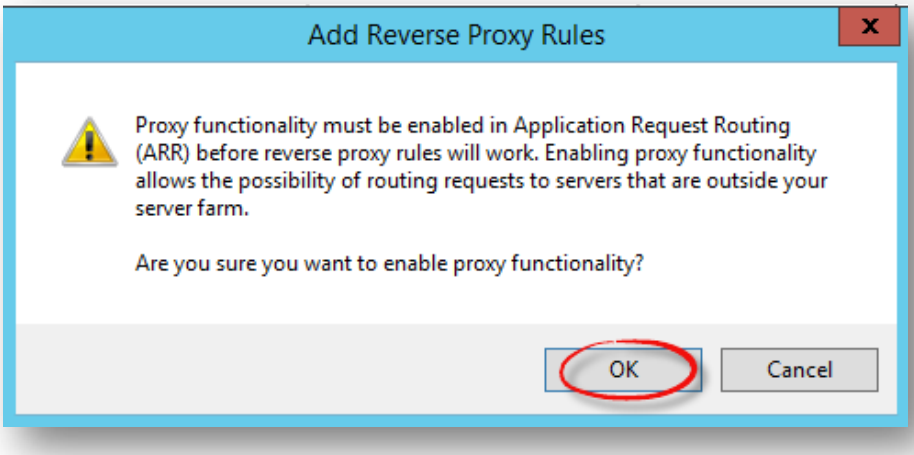
3. Double-click on the URL Rewrite icon to open it.



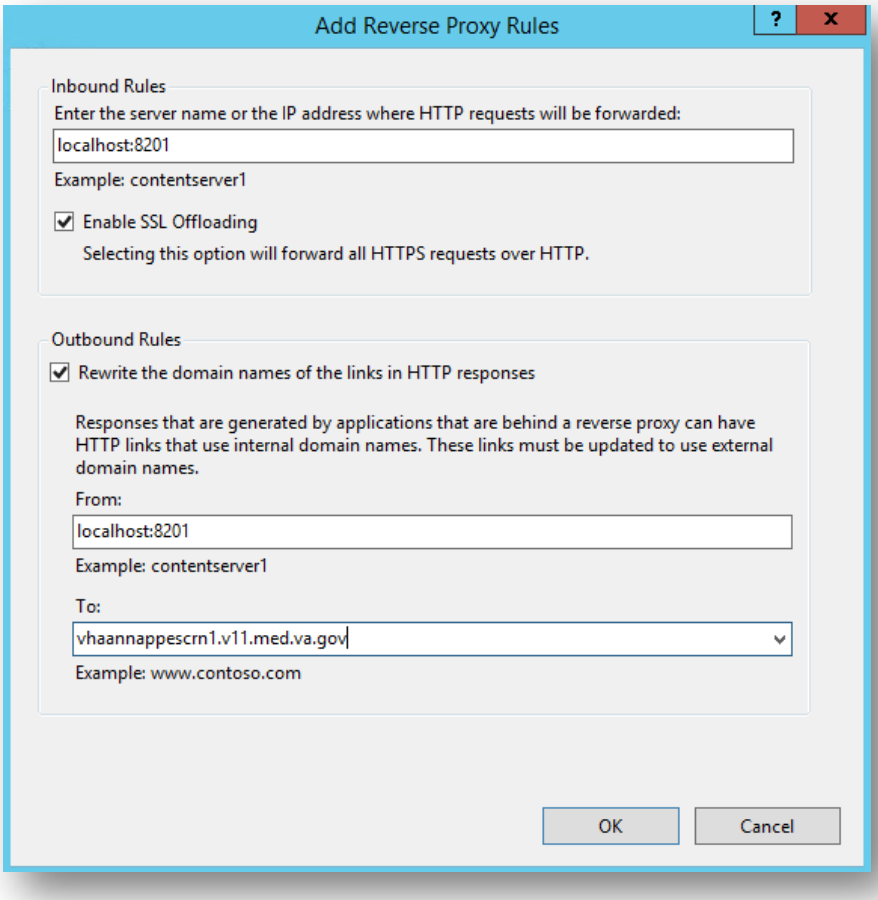
4. Click “Add Rule(s)…” then select “Reverse Proxy” and click “OK” when prompted.





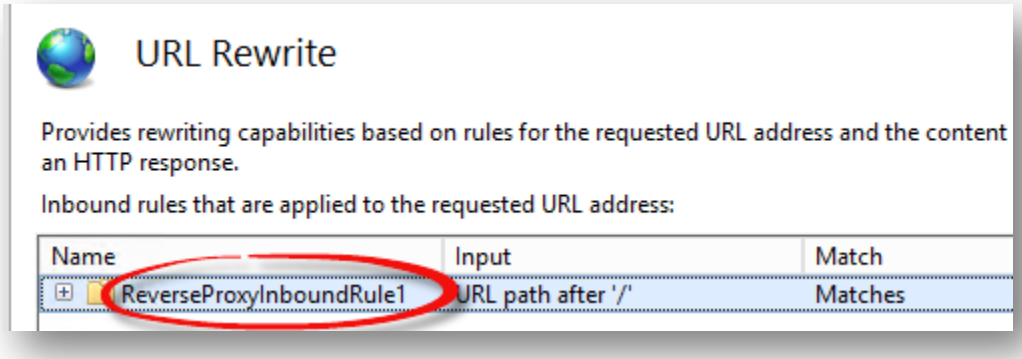


5. For Inbound Rules, enter “localhost:8201” and check the “Enable SSL Offloading” box. For Outbound Rules, enter “localhost:8201” in the “From:” box and enter the fully qualified domain name of the eScreen virtual server as shown here:



6. Click “OK”.

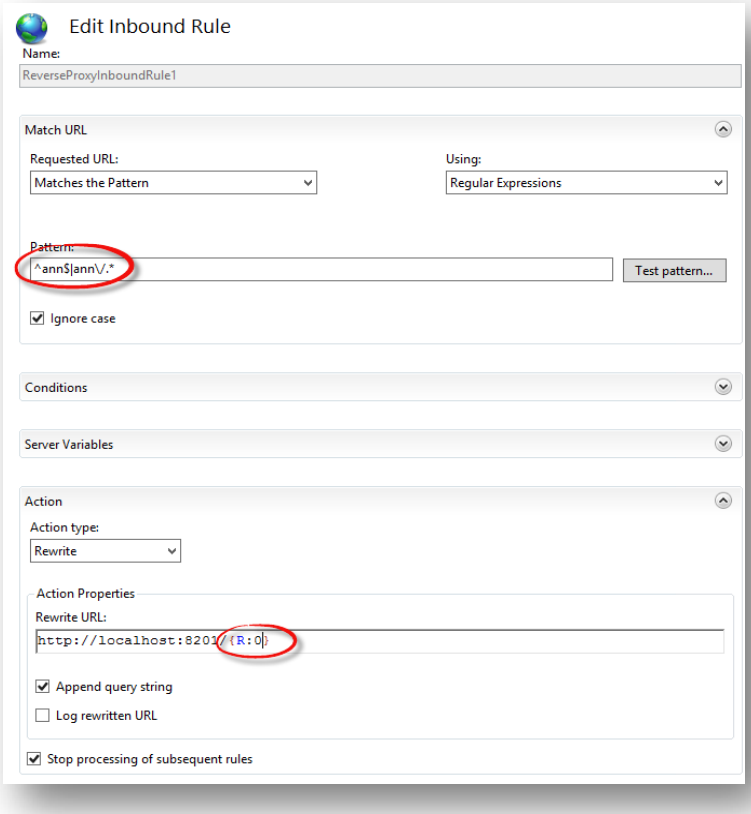
7. Edit the “ReverseProxyInboundRule1” rule by double clicking on it.



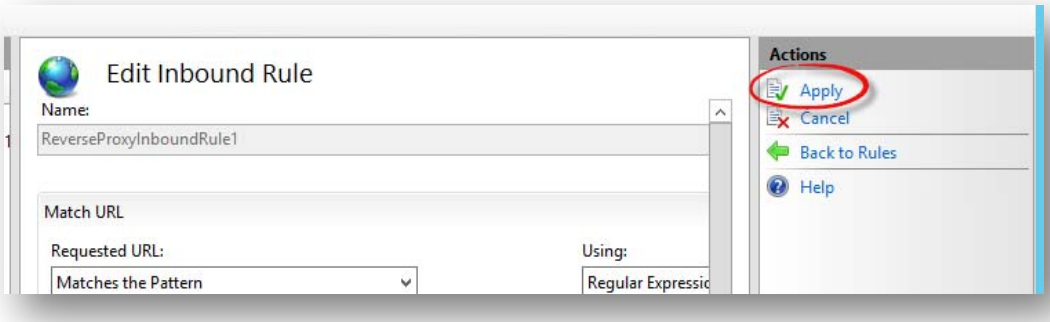
8. Once the rule is open to edit, make the following changes:

   In the "Pattern:" field, enter: ^**<site>$|<site>\.*** where <site> is your site's 3 letter abbreviation. (e.g. ^ann$|ann\/.* → the \/ is backslash\ forward slash/)

   In the "Rewrite URL:" field, enter: http://localhost:8201/{R:0}



9. Click "Apply" to save the changes and close IIS Manager.



10. **Restart** the Tomcat service in Services.

2.8. Deploying eScreening

1. Open Git Bash then execute the following commands:

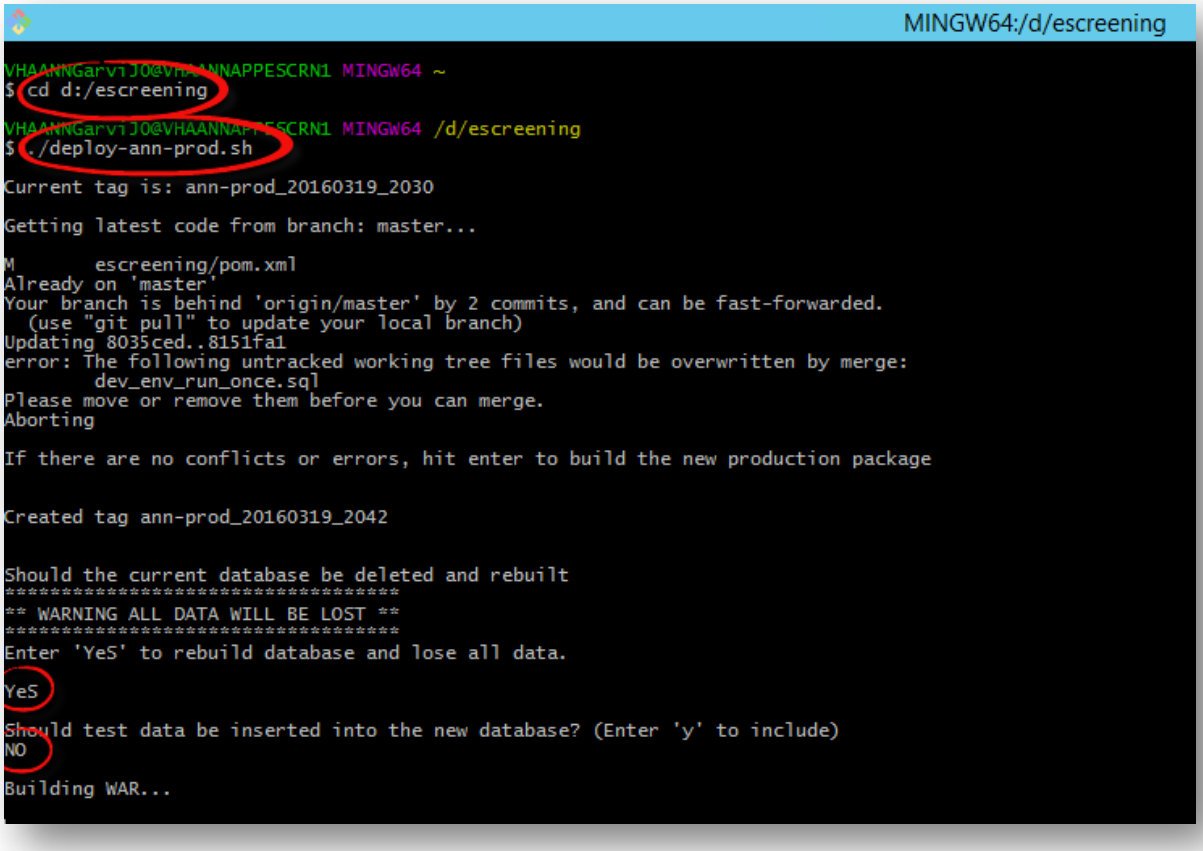
   cd d:/escreening

   ./deploy-<site>-prod.sh

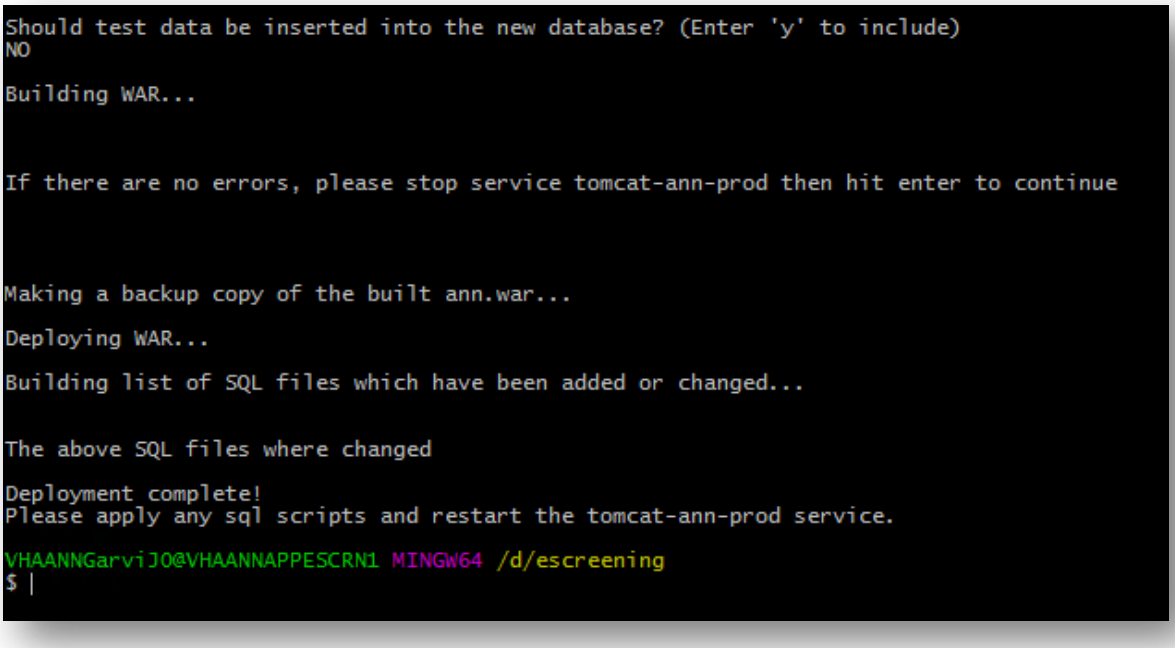
   (hit the enter key when prompted to build the new production package. Ignore any conflicts about branch being behind master.)

   Type “YeS” (case sensitive) if you are creating a brand new instance or type NO if you are just updating any information.

   Type “NO” when asked “should test data be inserted into the new database?”.



2. Once the WAR file has been built, you will be prompted to stop the Tomcat service and then hit the "enter" key to continue. Be sure to **stop** the Tomcat service in Services and then hit the "enter" key to continue. A backup copy of the WAR file will get created automatically and then the WAR file will get deployed.



3. Deployment of the WAR file is now complete! The backup copy of the WAR file has been saved to "**D:\escreening\release_backups**". Deploying the WAR file updates your MySQL database (<site>mhe) with tables and all of the required components you need.

4. **Start** the Tomcat service and then open a web browser and type in:

   http://<Fully_Qualified_Domain_Name_of_the_Virtual_Server>/<site>

   Here is an example:

   http://vhaannappescrn1.v11.med.va.gov/ann → this site leads to the Ann Arbor eScreening Home Page.

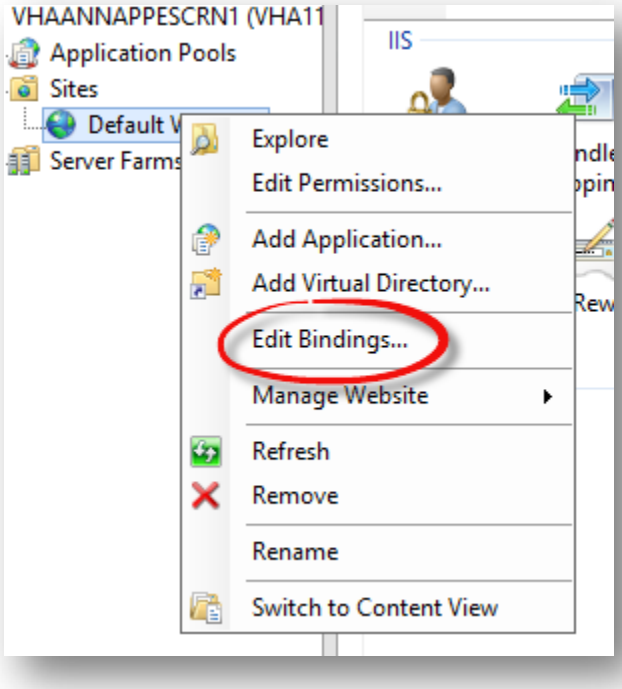
5. In order to make the site https, an SSL certificate is needed. The next section will guide you through that process.

2.9. SSL Certificate

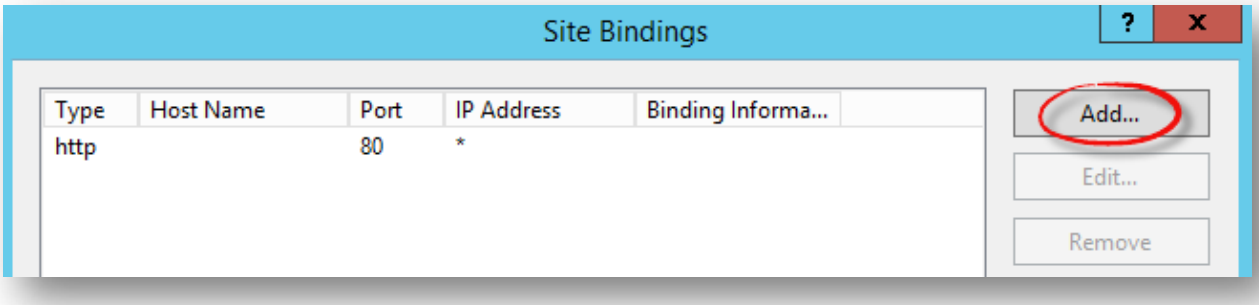
A SSL certificate is required on every server hosting eScreening and is created using IIS Manager. The SSL certificate expires one year from the issue date. Be sure to note the expiration date of the certificate and make sure a new one is installed before it expires.

Below is the process for creating a SSL certificate on the server:

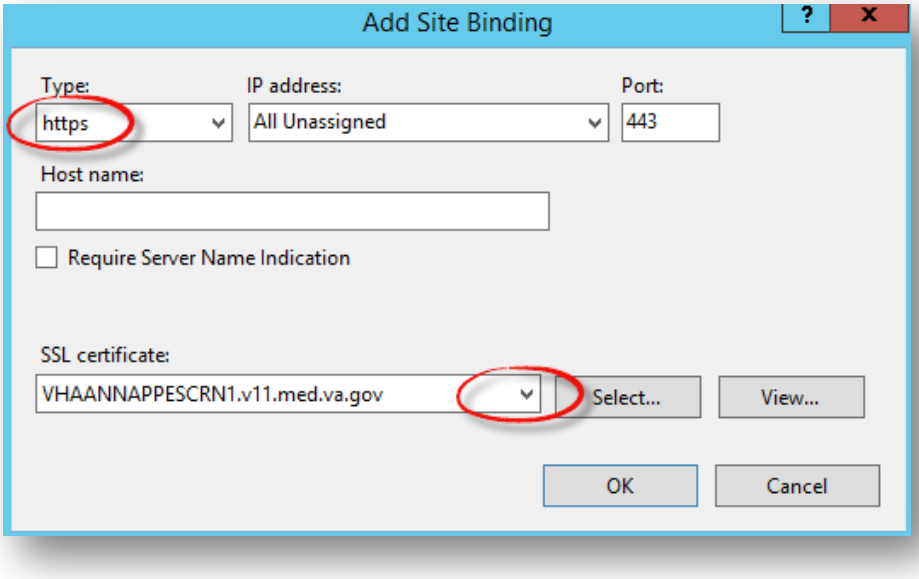
1. Open IIS Manager and navigate to the “Default Web Site” and then right-click “Default Web Site” and click “Edit Bindings”.



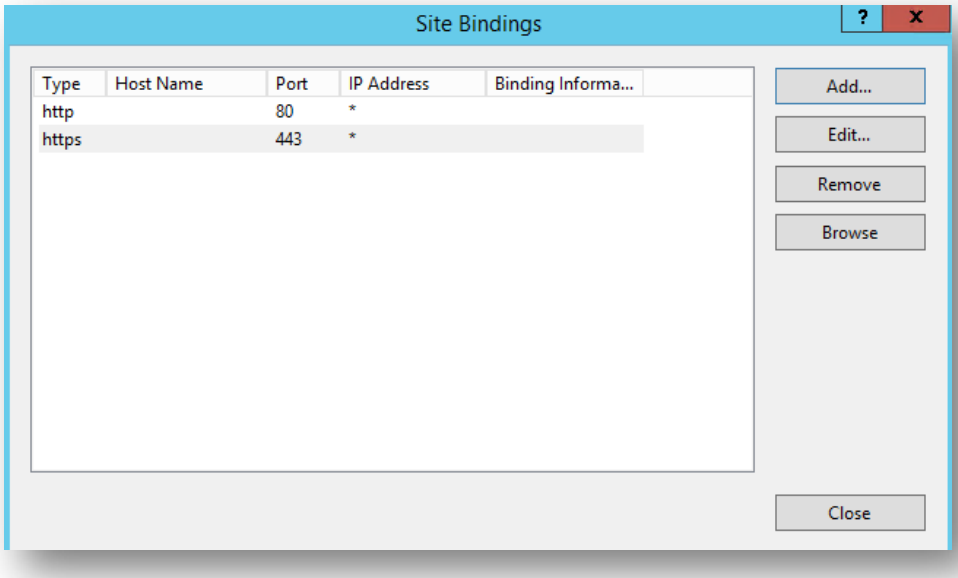
2. Click “Add…”.



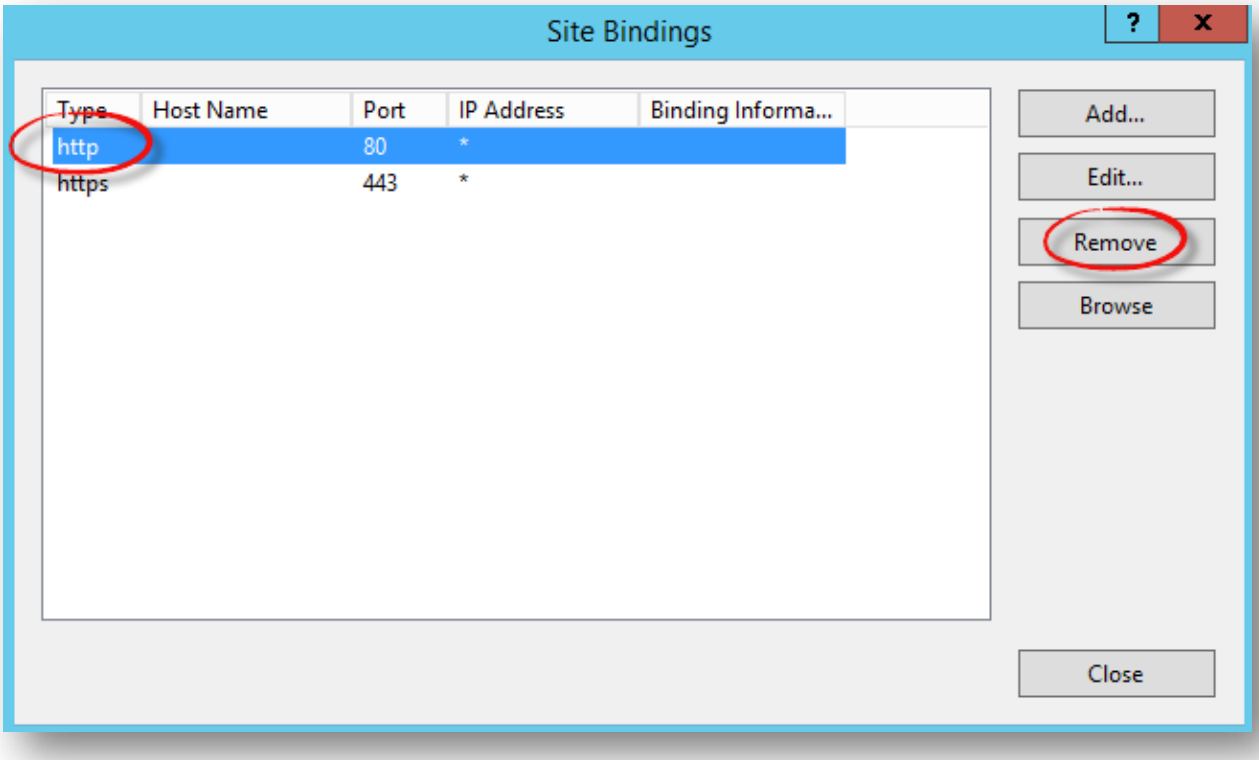
3. Select “https” from the “Type:” dropdown menu and select the FQDN of the virtual server from the “SSL certificate:” dropdown menu and click “OK”.



4. Your Site Bindings will now look like this:



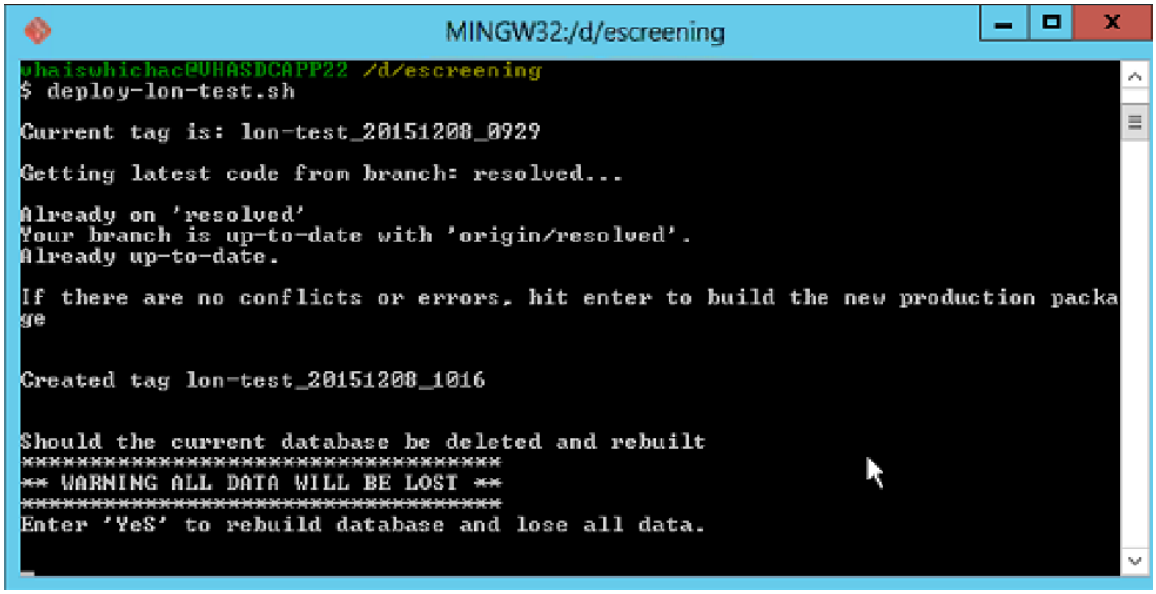
5. Click on the http binding and click “Remove” then click “Yes” when asked “Are you sure you want to remove the selected binding?”



6. Removing http will only allow https to be used for the site. You can now close IIS Manager. The eScreening setup is now complete and you can contact Elizabeth Floto @ Elizabeth.Floto@va.gov to help setup your site and receive training on templates and administration of the website.
7. Additional information about requesting and installing certificates can be found at: http://vaww.pki.va.gov/ssltls/

3. Updating eScreening

To update the parameters provided in section 2.4.1.b in the deploy shell script, follow instructions , however, make sure that you enter "**NO**" to the question "Should the current database be deleted and rebuilt?". If you select YES, it is essentially a "factory reset" and you will lose all data.



4. Routine Operations

There are two routine operations that must be performed on the system: user management and backing up the database. User management is performed within the administrative dashboard and consists of adding, editing, and removing users, and is covered in Section 4.2, Security/Identity Management. Backing up the database is performed at the operating system level and is covered in Section 4.1.3 Back-up & Restore.

Note: The system administrator role is an IT role, not an eScreening program role.

Operation	Role	Section
User management	Healthcare System Technical Administrator (HSTA)	4.2
Database backup	System Administrator	4.1.3

Table 4: Routine Operations

4.1. Administrative Procedures

4.1.1. System Start-up

The system does not require any regular manual start-up procedures. The database and application servers are both implemented as Windows services that automatically start with Windows, and it is unlikely that either service will fail under normal conditions. The services are listed below:

Service	Name	Display Name
MySQL	MySQL56	MySQL56
Tomcat	Tomcat7	Apache Tomcat 7.0 Tomcat7

Table 5: System Services

In the event that either does not start, or shuts down prematurely, they can be manually started via the Windows services snap-in. However, before starting either service, consult the Windows event viewer and individual service logs for information about the error. See Section 4, Exception Handling, for more details about error handling and logs.

4.1.2. System Shut-down

The system can be shut down by shutting down the two system processes from the Services snap-in. The services are listed in Section 4.1.1, System Start-up.

4.1.3. Back-up & Restore

Database backup and restore in eScreening are scripted in order to simplify maintenance. The backups are automated and run on a VA-configured frequency, whereas restores are done manually when necessary, as depicted in the image below:

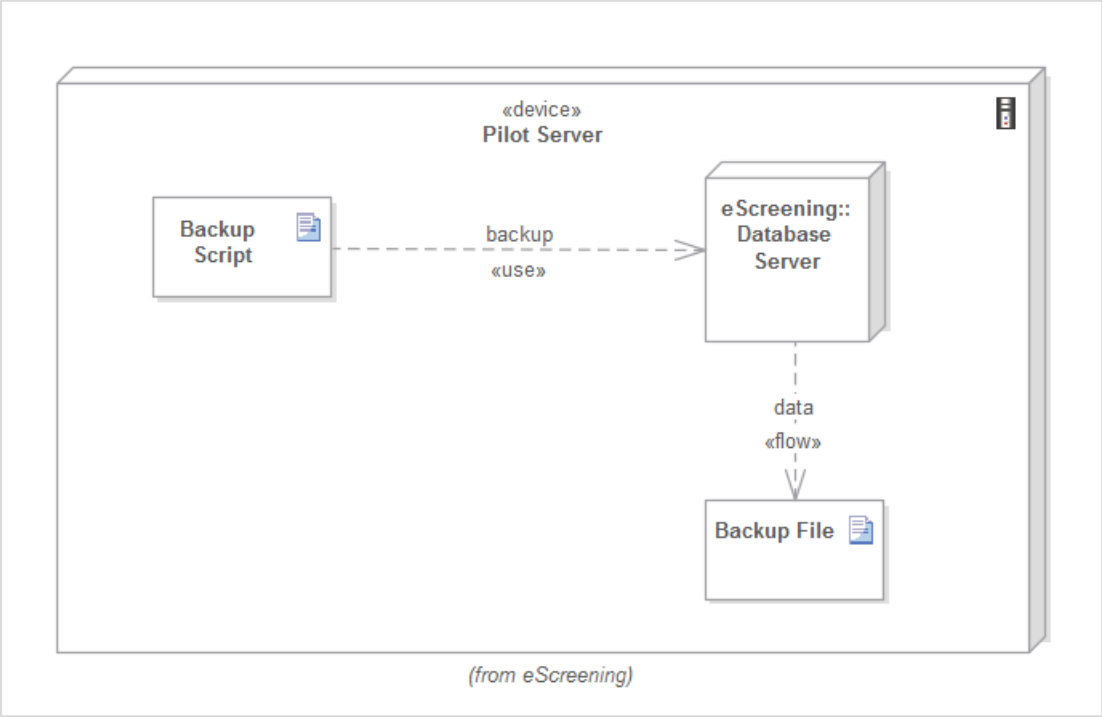


Figure 6: Database Backup Process

The only system component that requires backup is the eScreening database/repository. Backups are done to local storage, but it is expected that VA IT will move backups to external storage for safekeeping.

4.1.4. Back-Up Procedures

Database backup is automated via a Windows system task, a backup script, and a separate VA IT process to copy the backup files to remote storage. The Windows task runs nightly, but can be configured to run on any time interval. The backup process can be run during hours of operation, but it is recommended that it be run outside of operating hours in order to maintain the best user experience.

The following table reflects the backup schedule for the eScreening database:

Component	Backup schedule	Type	Copy to remote disk
eScreening database	Nightly	Full	By VA per VA standards

Table 6: Backup Schedule

The Windows task runs a script called *backup.bat*, which performs the database backup and copies the backup file to the folder specified by the BACKUP_FOLDER variable (default value: d:\data\backup). The BACKUP_FOLDER variable can be overridden on the command line by passing a value for the /BACKUP_FOLDER parameter. The backup script also contains a NUM_ BACKUPS_KEPT variable for the number of backups to keep (default: 7). NUM_BACKUPS_KEPT can be overridden on the command line by passing in a different value for the /NUM_BACKUPS_KEPT parameter.

Each time the backup script runs, it creates a backup of the database in the folder specified by BACKUP_FOLDER with a filename of *escreening.yyyyMMddhhmmssfff.bak*. This pattern can be changed in the script file. After the file is copied, the backup script automatically removes the oldest backup files in excess of the number given in the NUM_BACKUPS_KEPT variable. The backup script output is logged in the d:\logs\backup folder in files named *backup.yyyyMMddhhmmssfff.log*. This log file also contains a hash of the newest key for each record in each table, which can be used later for validating backups, regardless of whether they are full or differential.

A full description of the backup command variables and parameters are as follows:

Variable	Description	Default value	Override parameter
BACKUP_FOLDER	Path to backup folder	D:\data\backup	/BACKUP_FOLDER
NUM_BACKUPS_KEPT	Number of backups kept	7	/NUM_BACKUPS_KEPT

Table 7: Backup Script Variables

By default, backup script performs a full back up each time. This is due to the relatively small amount of data. Should the data eventually grow past a VA-specified amount, VA can follow the instructions in the script file for creating differential backups instead.

The following diagram illustrates the process:

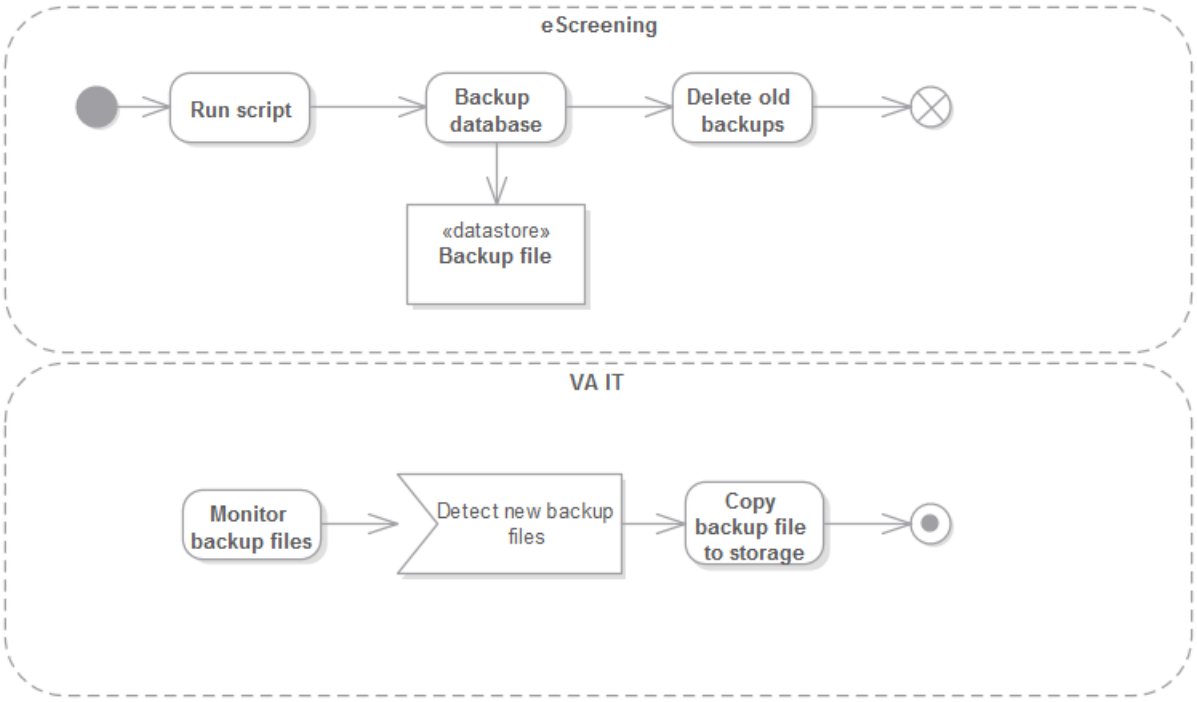


Figure 7: Backup Process

Note: It is recommended that the system administrator move backups off the eScreening server to a remote drive for safe keeping and to reduce disk space usage. A description of processes created by IT in order to safeguard backup files is beyond the scope of this manual.

Restore Procedures

Database backups can be restored by the running the *restore.bat* script. The restore script takes one parameter: the fully-qualified path of the backup file to be restored. For example, the following command restores the database using the file escreeening.2014.04.03.59.01.bak:

restore.bat d:\data\backup\escreeening.2014.04.03.59.01.bak

Warning: Database restoration restores the database to a previous state. Changes made to the database after the most-recent backup and before the restoration runs will be lost.

The restore script is reentrant and will roll back the restoration if it encounters any errors. The output of the script is captured in the d:\logs\restore folder in files named *restore.yyyyMMddhhmmssfff.log*. The log contains a hashed key for the newest record in each table; this metadata can be used later to validate backups.

Back-Up Testing

Backup testing should be performed by VA IT on an external system on a regular basis as dictated by VA standards.

Frequency	Location	Process
VA specified	VA-specified external server	Comparison of backup and restore metadata

Table 8: Backup Testing Schedule

The backup script, as indicated in Section 4.1.3, Backup Procedures, emits the hash of the key of the newest record for each database table in the backup-specific log file. The restore script logs a hash of the newest in each table that it restores. VA can validate the backup file by restoring it to an external database server and then comparing the backup metadata to the restore metadata.

Step	Description
1	Note backup log metadata
2	Restore backup to external server
3	Compare restore metadata to backup metadata.

Table 9: Backup Validation Process

In the unlikely event that the restore and backup metadata do not tie, the IT system administrator should perform a detailed investigation in the current state of the database and the backup files as per VA guidelines.

Storage and Rotation

The VA system administrator should copy/move database backups to remote storage for safekeeping according to IT guidelines. The eScreening server provides RAIDed storage and a rolling backup system for safeguarding backups locally, but relocating backups to SAN or other storage per VA IT guidelines provides additional safety and redundancy. External/redundant storage by IT is beyond the scope of this document.

4.2. Security and Identity Management

The eScreening security architecture consists of components that perform authentication and authorization of VA staff and Veterans operating on the VA network via a client system over WIFI or VPN. These components include:

- Client device (tablet). Provides strong password and locks down access to only eScreening
- Network: Encrypted and secured communication between the tablet and the server over TLS
- Web application: Authenticated and authorized access to features
- VistA: Authenticated and authorized access to pull some basic data and upload data

The tablet has a strong password and can only be unlocked by program staff. The tablet runs in "kiosk" mode, limiting the user to only the eScreening application within the tablet web browser; no other web site can be accessed in the browser, and no application other than the browser can be accessed when in kiosk mode.

The following attributes describe the eScreening architecture as related to security:

- The eScreening system resides in the San Diego VA Medical Center and consists of a web application, web services, and a database
- Clinicians access authorized portions of the web application from VA facilities over VA WIFI using the clinicians' credentials
- Veterans access authorized portions of the web application from VA facilities over VA WIFI from within a locked-down supervised mode session. Veterans input answers to assessment questions, and their answers are securely transmitted to the eScreening server in the VA data center.
- eScreening reads limited patient identification and demographics data from VistA, and writes assessment results to VistA
- eScreening integrates with VistA via VistALink entirely on the VA network
- Staff use CPRS to view/sign assessment notes, maintain patient record

For more information on eScreening security, see the System Security Plan.

4.2.1. Identity Management

Users are added, modified, or deactivated through the administrative dashboard user interface. In the user interface, the Healthcare System Technical Administrator user has the ability to create users, assign their access (add them to program locations), and deactivate them. Adding a user consists of using the *create user* form to fill in the new user's name, phone number, email address, and other attributes. Modifying a user consists of using the *edit user* form to modify values. Deactivating consists of changing the user's status to *inactive*.

Note: Users are not deleted in eScreening; they are simply inactivated and they can be reactivated in the future as needed.

Activity	Location	Interface
Add user	Administrative dashboard	Add User form
Edit user	Administrative dashboard	Edit User form
Deactivate user	Administrative dashboard	User Status field

Table 10: Identity Management Functions

For more information on user management, see the Administrator Training Manual, which details the Healthcare System Technical Administrator's tasks.

4.3. User Notifications

The user community will be notified of any scheduled changes via email distribution lists. It is recommended that separate mailing lists should be established for users, program administrators, and support staff.

4.4. System Monitoring, Reporting, & Tools

System monitoring should be performed using VA's enterprising monitoring suite. Probes should be established for operating system CPU, memory, disk space, and the Tomcat and MySQL processes.

4.4.1. Availability Monitoring

Probe the status controller regularly (for example, every 10 minutes) for the application's availability. This keeps the Java VM warm and allows the monitoring tool to test the status of system components such as the database and VistA connectivity.

Concern	Test
Web application	Application: OK
Database connectivity	Database: OK
VistA connectivity	VistA: OK

Table 11: Application Status Checks

Loading the status screen checks the application status in general, as well as the database and VistA connectivity. In addition to automated monitoring, this screen can be checked manually to determine the status of the system after a deployment or patch, or during troubleshooting.

4.4.2. Performance and Capacity Monitoring

eScreening performance and capacity management consists of two concepts: verifying system performance through page loads and log analysis, and verifying capacity through disk and network analysis.

There are three stated KPIs for eScreening: initial page load <= 15s, subsequent page load <= 3s, and individual assessment upload <= 5s. These KPI are summarized below:

Action	Threshold	Verification
Initial page load	15 seconds	Manual
Subsequent page load	3 seconds	Manual
Assessment upload	5 seconds	Log analysis

Table 12: Performance Thresholds

Page performance verification is currently a manual process performed by the system administrator as per VA guidelines. Ongoing page performance analysis can be performed by scraping the application server logs for page response times. If desired, the system administrator can compute averages and percentiles. The logs can be exported to VA's enterprise log analysis system as needed.

eScreening disk and network capacity can be assessed by the system administrator or NEDIIS per VA guidelines. Free space can be queried via VA's enterprise monitoring tool (e.g. SolarWinds, etc.). Network link capacity can be accessed via ongoing link analysis via the network OSS team or NEDIIS.

Element	Procedure	Actor
Disk space	Disk free probe	System administrator
Network links	NetScout ongoing analysis	NEDIIS
30 concurrent users/site	Log analysis	System administrator

Table 13: Procedures for Monitoring Capacity

For more details on disk or link analysis, see VA guidelines.

4.4.3. Critical Metrics

The critical metric for eScreening is whether 30 concurrent users can simultaneously use the system at a single VA site. The upstream implication of a failure to support that level of concurrency is a possible delay in performing screening for some Veterans. The downstream implication is a possible delay in identifying or seeking treatment for some Veterans. The critical metric is summarized below:

Metric	Threshold	Upstream implications	Downstream implications
Concurrent users/site	30	Delay or errors performing assessments	Delayed identification of health issues

Table 14: Critical Metrics for eScreening

The system's current or historical support for concurrent users/site can be assessed by exporting the log files to VA's enterprise log analysis service. The logs have an industry standard structure that will be recognized without custom parsing by most commercial or open source log parsing tools. Adherence can be determined by comparing page requests times and error counts against concurrent logins.

4.5. Routine Updates, Extracts, and Purges

Updates, extracts, and purges are performed for eScreening per VA guidelines and as requested by program administrators. These activities are summarized below:

Activity	Periodicity	Responsible party
Updates	As needed	DBA
Extracts	As needed (monthly?)	Scripted by DBA, run by specified individuals
Purges	As needed	DBA

Table 15: Routine Data Activities

Updates consist of inserting or updating data in the database can be performed as needed. Updates should be scripted with sufficient error handling and rollback logic to handle expected and unexpected errors during execution while protecting data integrity. Examples of scriptable updates include changes to health factors, program data, or Veteran data. Data changes require expertise in SQL and the eScreening schema (see project schema document). Updates should be performed by qualified DBAs as requested by eScreening program coordinators.

Extracts consist of exporting data for analysis. It is expected that OIA will periodically (perhaps monthly) extract Veteran assessment data or metadata for use in external systems. Extracts can be performed via the eScreening user interface or via SQL scripts against the database. Scripting extracts requires knowledge of the eScreening schema and should be performed by qualified DBAs. After the script is created by the DBA, it can be run by authorized individuals with shell-level access to the system as specified by program administrators.

Purging consists of deleting or tombstoning data in the database via SQL scripts. Purging requires knowledge of the eScreening schema and should be performed by qualified DBAs. Purging requires authorization by program administrators.

Warning: Purging removes data from the system and should only be performed after taking a database backup and via express authorization of program administrators.

4.6. Scheduled Maintenance

Scheduled maintenance will be performed as authorized by program administrators. Currently, there is no schedule for maintenance.

4.7. Capacity Planning

Capacity planning should be performed by VASD IT in cooperation with eScreening program administrators. Currently, there is no schedule or requirements for capacity planning.

5. Exception Handling

Runtime errors in eScreening are typically related to configuration, connectivity, or data issues. Errors related to connecting to the eScreening database, configuration, and bad or unmatched Veteran data can be resolved locally by the system administrator. Other kinds of errors, such as problems connecting to VistA can be resolved through cooperating with external teams. The types of errors are summarized below:

Type	Examples
Locally resolvable	Unmatched records, bad data, DB connectivity
Externally resolvable	Network or VistA issues
Unresolvable	Errors due to bugs

Table 16: Types of Errors

Note: Some errors, such as those due to unidentified bugs, require application source code changes and cannot be changed by the system administrator.

5.1. Routine Errors

Like most systems, eScreening may generate a small set of errors that may be considered routine in the sense that they have minimal impact on the user and do not compromise the operational state of the system. Most of the errors are transient in nature and only require the user to retry an operation. The following subsections describe these errors, their causes, and what, if any, response an operator needs to take.

While the occasional occurrence of these errors may be routine, getting a large number of an individual error over a short period of time is an indication of a more serious problem. In that case the error needs to be treated as an exceptional condition.

5.1.1. Security Errors

Security errors in eScreening consist of authentication or authorization issues related to accounts. For example, if a staff user attempts to logon to eScreening with invalid credentials three contiguous times, the system will display an error message directing the user to see the clerk.

Likewise, if a staff user is already authenticated but attempts an unauthorized action in VistA, the system will display an error message. This can occur if the user attempts an operating that requires querying VistA, such as setting up a Veteran for a screening or uploading Veteran assessment data after a screening. If a user enters an invalid access/verify code combination and eScreening cannot authenticate and authorize the user, eScreening will display a message indicating that the user seek assistance from the clerk.

The following table displays the known security error types, descriptions, and resolutions:

Type	Description	Resolution
Staff authentication failure	When a staff user does not have a valid account or does not use a valid password, the user will be unable to login and an error message will display instructing the user to see the clerk.	Ensure user is active and correct in eScreening.
Staff authorization failure	When a staff user attempts to access an application feature to which he/she does not have access (through URL manipulation), the site directs the user to a help page instructing the user to see the clerk.	Ensure user has correct entitlements for the job he/she is performing and trained on system use.
Veteran data lookup/upload failure	When a staff user does not enter the correct access/verify codes, the system will be unable to authorize the user's lookup/upload action in VistA, and an error will display.	Ensure user is using correct VistA access/verify codes.

Table 17: Security Errors in eScreening

Note: If a Veteran attempts to take an assessment without known credentials (last name and last four SSN digits) the system will treat the issue as being a data condition instead of an error condition. eScreening is designed to handle new Veterans who do not have VistA records. Because the system cannot know whether the Veteran user is new to VistA or simply mistyping his credentials, the system will treat the Veteran as a new VHA patient. eScreening staff will then be responsible for addressing the Veteran's status. If the Veteran already has a VistA record, staff will be able to *map* the eScreening record to the VistA record. On the other hand, if the Veteran is truly new, VA will need to create a new VistA record for the Veteran, and then map his or her eScreening record to the new VistA record.

5.1.2. Time-outs

In eScreening, timeouts can occur between the client and the server, and between the server and VistA. Timeouts can be due to capacity issues with regard to the eScreening server, the VistA server, or the network fabric in between. It is expected that most timeouts will be due to capacity or contention issues caused by the tablet communicating with the server over VA WIFI, not on the server itself or between the server and VistA. When any part of the system times out, the application displays a user-friendly error message indicating that the user should talk to the clerk. The following table summarizes the types of possible timeouts:

Type	Incidence	Response
Timeout connecting to VistA	Unknown	Repeat attempt or file support ticket with VistA or NOSS group.
Timeout uploading data to eScreening	Unknown	Try again, troubleshoot server, or file support ticket with NOSS

Table 18: Possible eScreening Timeouts

Most timeouts will be transient in nature, and resolve after the network or server contention abates. However, timeouts can also be investigated and submitted to the appropriate support groups. Some timeouts between the server and client can be logged, timeouts on the server itself, and timeouts between the server and VistA are logged on the server. This allows the system

administrator to investigate individual timeout issues as well as use system tools or external tools in order to investigate patterns of timeouts.

For example, the system administrator can see the most-recent errors by tailing the log in PowerShell:

```
gc d:\data\logs\logFileName.log –tail 100
```

Likewise, the admin can search all log files for timeout errors:

```
dir d:\data\logs\*.log | select-string “connection refused”
```

Timeouts tend to be sporadic, based on transient network or server conditions. However, the system administrator can analyze the logs in VA’s enterprise log analysis utility for greater insight into trends.

5.1.3. Concurrency

Concurrent updates can lead to unpredictable errors in any system, including eScreening. However, due to the nature of eScreening, concurrency issues are very unlikely to occur. If they did occur, they would be related to very rare events like multiple staff attempting to update a Veteran’s record or upload a Veteran’s assessment. In the case of concurrent updates to Veteran or assessment data in eScreening, the system will note if one user is updating an old version of the data and prompt the user to view the updated record and possibly try again.

The table below summarizes the type of possible concurrency issues that could occur:

Activity	Incidence	Response
Simultaneous updates to modules in the forms editor	Very rare	System will catch and log error, then prompt user to (optionally) try again.
Simultaneous updates of patient data	Very rare	System will catch and log error, then prompt user to (optionally) try again.
Simultaneous uploads of assessment data to eScreening	Very rare	System will catch and log error, then prompt user (optionally) to try again.
Simultaneous uploads of assessment data to VistA	Very rare	System will catch and log error on the later attempt.

Table 19: Possible Concurrency Issues

In the case of multiple concurrent uploads of assessment data to VistA, eScreening will throw an exception internally when it sees the redundant request, which the UI will catch and display an error message to the user that says the record has already been uploaded.

5.2. Significant Errors

Significant errors can be defined as errors or conditions that affect the system’s stability, availability, performance, or otherwise make the system unavailable to its user base. The

following subsections contain information to aid administrators, operators, and other support personnel in the resolution of errors, conditions, or other issues.

5.2.1. Application Error Logs

eScreening logs are, by default, all kept within d:\data\logs*. A subfolder should exist for each component that does logging; collocating the logs this way simplifies finding and querying the logs.

Logging for each component is configurable at the component level. The log configuration files are stored in these folders:

- Application: d:\apps\tomcatInstances\webapps\escreening\WEB-INF\classes\log4j.xml
- Tomcat: d:\apps\tomcatInstances\conf\logging.properties
- MySQL: d:\ProgramData\MySQL\MySQL Server 5.6\my-default.ini
- eScreening application log is located in:
  d:\apps\tomcatInstances

  The log files for the eScreening application are found under:
  \apps\tomcatInstances\<instance-name>\logs\es_web_app_<instance_name>.log

  The instance name, i.e., <instance_name> represents sdc-prod, lon-prod, sfo-prod, etc. Replace the <instance_name> with the appropriate instance names.

  The log files are configured to create a new log file with a file extension after every log file reaches the size of 10 MB. For more details about the setup of the log files, go to:
  https://logging.apache.org/log4j/1.2/apidocs/org/apache/log4j/RollingFileAppender.html

Logging is configured by the system administrator. Sensible defaults are supplied along with the application, allowing adequate log coverage for troubleshooting without affecting performance or taking up excessive disk space. The following table outlines the key logging attributes:

Type	Location	Max size	Growth rate	Rotation suggestion	Retention suggestion
Application logs	d:\data\logs\application	100 MB (suggested)	Varies	Daily	10 days
MySQL logs	d:\data\logs\mysql	As configured	Varies	Daily	10 days

Type	Location	Max size	Growth rate	Rotation suggestion	Retention suggestion
eScreening application logs	\apps\tomcatInstances\<instance-name>\logs\es_web_app_<instance_name>.log For example, if the instance_name of escreening application is sfo-prod. At any given point the loggable information could be found under d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.1 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.2 ord:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.3 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.4 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.5 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.6 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.7 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.8 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.9 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.10 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.11 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_ap p_sfo-prod.log.12 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.13 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.14 or d:\apps\tomcatInstances\sfo-prod\logs\esc_web_app_sfo-prod.log.15	10 MB	Varies with traffic	After every file reaches 10 MB	Do not touch. The system automatically starts over on the first log file after 150 MB.

Table 20: eScreening Logging

Note: These values should be adjusted by the system administrator based on VA guidelines instead of kept at their default levels.

Querying and analyzing the log files is simple because they are text files and use the industry-standard log4j log conventions (TRACE, DEBUG, INFO, WARN, ERROR, etc.) or built-in Java logging (WARN, SEVERE, etc.) conventions. PowerShell or other Windows shell utilities can be used to query the files. Some examples are listed in the following table:

Activity	Example
Find all errors	select-string "ERROR|SEVERE" *.log
Find warnings in last 100 lines of a file	gc tomcat7-stdout.2014-01-10.log -tail 100 | select-string WARN

Table 21: Example Log Queries

For more detailed log file analysis, the system administrator can import the log files with VA's enterprise log analysis tool.

5.2.2. Dissection of error message

Each Log message follows the following format:
[%p] %d{dd/MM/yyyy HH:mm:ss} [%t] [(%C{1}:%L)] %m%n

The above format is described as follows:
[%p] ==> [Priority (DEBUG, INFO, WARN, ERROR)]

%d{dd/MM/yyyy HH:mm:ss} ==> DATE/MONTH/YEAR HOUR:MIN:SS
PS: Please note that the time stamp is DATE followed by MONTH and not MONTH followed by DATE as we are accustomed in United States of America

[%t] ==> [NAME OF THREAD]

[(%C{1}:%L)] ==> [(fully qualified class name of the caller issuing the logging request:line number from where the logging request)]

%m%n = application supplied message associated with the logging event and line separator character

5.2.3. Application Error Codes and Descriptions

eScreening does not currently use error codes; rather, it defines custom exception classes that can be used for structured exception handling. These classes can be reused across a family of issues. The table below describes the existing custom application types and descriptions:

Type	Description

Type	Description
AssessmentEngineDataValidationException	Error validating assessment data
AssessmentHadUnexpectedNumMappedTemplatesException	Internal error
AuthenticationException	Error authenticating user.
BadPasswordException	User entered bad password
BadUseridException	User entered bad user id
CellDoesNotMatchColumnException	Internal error
CouldNotResolveVariableException	Internal error
CouldNotResolveVariableValueException	Internal error
EmptyDataExportException	User attempted to export
EscreeningDataValidationException	Error validating user-entered data
InvalidAssessmentContextException	Error authorizing Veteran
ReferencedFormulaMissingException	Internal error
ReferencedVariableMissingException	Internal error
TemplateProcessorException	Internal error
UnregisteredDataTableColumnException	Internal error

Table 22: Existing Custom Application Types and Descriptions

5.2.4. Infrastructure Errors

eScreening relies on various infrastructure components and must handle temporary failures in those components when they occur.

Database

eScreening can experience errors connecting to the database or performing data operations. Because the database currently resides on the same server as the application, the most likely cause of database connectivity failures is unhandled exceptions around database connections. These types of errors are not very likely because the system uses an ORM to handle connections, but if they do occur, they will most likely be transient. Database connection errors can be found in the logs by querying for “connection” and orphaned connections can be queried and forced close via MySQL commands. For more information on querying and force-closing orphaned connections, see the MySQL online manual:
https://dev.mysql.com/doc/refman/5.6/en/index.html

The application can experience errors performing data operations as well. This includes errors querying, inserting, updating, or deleting data. When these types of database errors occur, the application will catch the exception and log it. If the error is something that the user can fix by trying again, the application will display a message to the user; otherwise, the application will handle the error itself and may direct the user to a user-friendly error page based on the severity of the error.

Web Server and Application Server

Tomcat automatically logs all errors to the *stderr* and *stdout* files, although the system administrator can configure the logging per VA guidelines. Errors are denoted in the logs by severity (e.g., "SEVERE").

By default, Tomcat uses Java logging; however, for the system administrator can easily configure Tomcat to use log4j instead as per VA conventions. For more information on Tomcat logging, see the online manual http://tomcat.apache.org/tomcat-6.0-doc/logging.html

The eScreening web application is currently configured to do its logging through Tomcat. The system administrator can configure application-specific behavior in the log4j.xml file.

Network

eScreening can suffer from errors due to network conditions between the client and the server, or between the server and VistA. If there are network problems during the initial loading of a page, the client may display built in error messages (e.g., HTTP 404). On the other hand, if there are errors transmitting data in the background, the client JavaScript will attempt to retry the operation before failing with a user-friendly error message.

For network issues between the server and VistA, if the application can catch and retry the operation, it will. For network errors beyond the application's grasp, the server will fail and log the operation and redirect the user to a user-friendly error page. The error page typically instructs the user to see the clerk.

Authentication & Authorization

All authentication and authorization errors are caught by the application and logged.

For eScreening authentication errors, the system will prompt the user a total of three times and then redirect the user to an error page instructing the user to see the clerk. eScreening authorization errors should be rare, but if they occur, the user will be directed to the page instructing the user to see the clerk. The clerk can adjust the user's settings as needed.

For VistA authentication issues, the system will prompt the user several times before redirecting the error page. For VistA authorization issues, the application will direct the user to the error page after the first failure. The clerk can then coordinate with external VA resources to resolve the user's VistA access issues.

5.3. Dependent System(s)

eScreening is dependent upon VistA for authorizing Veterans and uploading Veteran assessment data. For persistent failures connecting to VistA or performing VistA operations, the system administrator should verify with VistA support resources the VistA connection information in:

.\WEB-INF\classes\gov.va.med.vistalink.connectorConfig.xml

Changes to the VistA configuration file will be picked up on subsequent requests. When changing the configuration, set the *encrypted* flag to “false.” This will cause the system to encrypt the connection information and then set the flag back to “true.”

```
<connector jndiName="vljtestconnector" ip="54.235.74.13"
        port="8000" primaryStation="500" access-
code="SGll8EpcOHZe9oXgwuPsFg=="
        verify-code="JQ9S3/VDJAQJO39bZVcqP8q3W8JSIxt9" encrypted="true"
        enabled="true" timeout="15" always-use-default-as-min="false" />
```

Other than configuration errors, there is nothing that can be done to resolve VistA access or connectivity issues within eScreening; all other errors must be resolved in cooperation with VistA support.

5.4. Troubleshooting

Troubleshooting eScreening issues consists of checking the logs and tweaking configuration settings. Most application behavior cannot be adjusted without modifying code. The following table summarizes the types of errors and resolution procedures likely to occur in eScreening:

Type	Procedure
Errors	Check logs and report issue.
Database connectivity issues	Check status page, application and database logs and connection string. Troubleshoot using MySQL CLI.
Other database issues	Check logs and report issue.
VistA connectivity issues	Check logs, report issue to appropriate help desk.

Table 23: Troubleshooting eScreening

The first step in most cases is to check the system status page. The process of authenticating and viewing the status page will give you some information about the system stability, because this process exercises the application, database, and VistA. The inability to authenticate or errors reported on the status page allows the system administrator to narrow his/her focus.

The next step is to check the logs. The logging level can be temporarily dialed up in each logging configuration file (see 5.2.1) to support DEBUG-level messaging as needed. The logs will display detailed information about the type of problem that is occurring, and can be tailed and searched. If the application is operational in general, failing actions can be tested in the application and checked in the logs.

If the application cannot connect to the database, the system administrator can check whether the *mysqld* process is running, check the MySQL logs, and test connecting to the database using

various parameters using the MySQL CLI (command line interface). The CLI can also be used to query and modify data or state as needed in order to resolve the issue.

If the problem is with VistA, the connection information can be changed or confirmed with VistA support technicians. Most VistA issues will require cooperation with VistA support.

Finally, if the issue lies within the application itself, such as a bug or the inability to deal with an unforeseen issue in the production environment, the application source code can be modified as needed to resolve the issue.

The following tables provide a detailed listing of error conditions and resolution actions.

Category	Description	Actions
Verify VistA Account in the MyAccount Page	User is presented with "Account is locked. Failed to verify Access/Verify codes"	User's account is locked in VistA. User must close their browser, start a new session, and then retry. If the account is still locked, then the user needs to contact the VistA System Administrator to resolve the locked account issue.
Verify VistA Account in the MyAccount Page	User is presented with: "Another account has already verified this Access/Verify codes"	Another user has already verified their VistA account and is using the DUZ associated with the verify code. Sys admin should use CPRS to look up the user's DUZ, search the MySQL USER.VISTA_DUZ field to determine who is using it, and then determine which user owns that DUZ. If the existing user made a mistake, then the system administrator should NULL out the USER.DUZ field and set USER.CPRS_VERIFIED to "0"
Verify VistA Account in the MyAccount Page	User is presented with: "Invalid Access/Verify codes. Please see your admin. Too many attempts to verify a VistA account will lock your account."	User has entered the wrong Access/Verify code more than 2 times. User should seek assistance with a VistA admin to ensure their Access/Verify code is correct or have it be reset to something else.
Verify VistA Account in the MyAccount Page	User is presented with "Failed to connect to VistA" and the application log file will contain "VistaSocketException" entry.	See "VistA Connection Issues" below
Staff Login	Nobody is able to log in to the system despite providing valid credentials. This can happen when the database is down and the server cannot access the database to verify a user's credential. The application log file entry will have a "CannotGetJdbcConnectionException" exception.	See "Database Connection Issues" below
Select Veteran Page in the Create Battery Tab	After clicking on Search, the application spins for a minute and then redirects to the System Exception page. The application log file entry will have "VistaSocketException" entry.	See "VistA Connection Issues" below
Import Data Page of the System Configuration Tab	After clicking on one of the Import buttons, user is presented with "An unexpected error occurred while trying to import Clinical Reminder list from VistA." The application log file entry will have "VistaSocketException" entry.	See "VistA Connection Issues" below
Veteran Login	If veteran doesn't include Last name a form error is shown: "Last name is required"	Veteran should be directed to give last name
Veteran Login	If veteran doesn't include 4 numbers for SSN	Veteran should be directed to give valid last four of

Category	Description	Actions
	field a form error is shown: “The last 4 SSN is required”	social security number
Veteran Login	Veteran is presented with “Unable to connect” page after trying to log in.	See “Unable to Connect” below
Veteran Login	If Veteran is show form error: “Last name / Last 4 SSN were not found, please try again.” Veteran has entered an incorrect combination of last name and last four of SSN.	Log into eScreening as a VA staff member. Search for the veteran to make sure there is an account. If not, then an assessment should be created with the veteran’s credentials. If the veteran does have an account, verify the credentials the veteran is using. If the credentials are incorrect in eScreening, go to ’create battery’ find the veteran’s battery, click on select to select the battery, and then from the ’veteran detail’ page, click on ’map to vista record’ or ’refresh from vista’. If the credentials are still incorrect they CPRS must be used to update the VistA record for the veteran
Veteran Login	Veteran is presented with a page titled “Please See A Clerk for Assistance” with message “For assistance, please contact the Help Desk”. This happens when the veteran does not have a battery in either the Clean or the Incomplete state. This can happen if no battery was assigned to the veteran or if the veteran has completed the battery.	Log into eScreening as a VA staff member. Navigate to “create battery” and create the correct battery for the veteran’s appointment.
Veteran Login	Could not communicate with the database. Please try again and if the problem persists, notify the clerk.	See “Database Connection Issues” below
Veteran Assessment	During the taking of a battery, veteran is shown a dialog with title “Server Error!” and message “Unable to connect. Please see support staff for assistance.” This occurs when the veteran’s device is unable to connect to the eScreening server.	See “Unable to Connect” below
Veteran Assessment	After answering a question a banner error with the text “Error, Please contact support” shows up. This is shown because the veteran answered a question which may have follow-up questions and the veteran’s device is unable to contact the eScreening server.	See “Unable to Connect” below.
Veteran Assessment	During the taking of a battery, veteran is shown a dialog with title “Server Error!” and message “Unable to process submitted data.” or “Submitted data could not be processed”. This indicates that the client application running in the veteran’s browser is submitting invalid data to the eScreening server.	Baring malicious intent, this is most likely a bug and should be reported to the developer team. A code is sent to the veteran’s device and can be shown if the Details link is clicked in the dialog. This will provide an error code that can be used by the system administrator to find the correct place in the eScreening system log. The eScreening system log should be inspected to look for the veteran’s submission by the system administrator. Then the log segment tracking this submission should be sent to the developer team.

Table 24: Errors and descriptions

The following table shows actions for common errors:

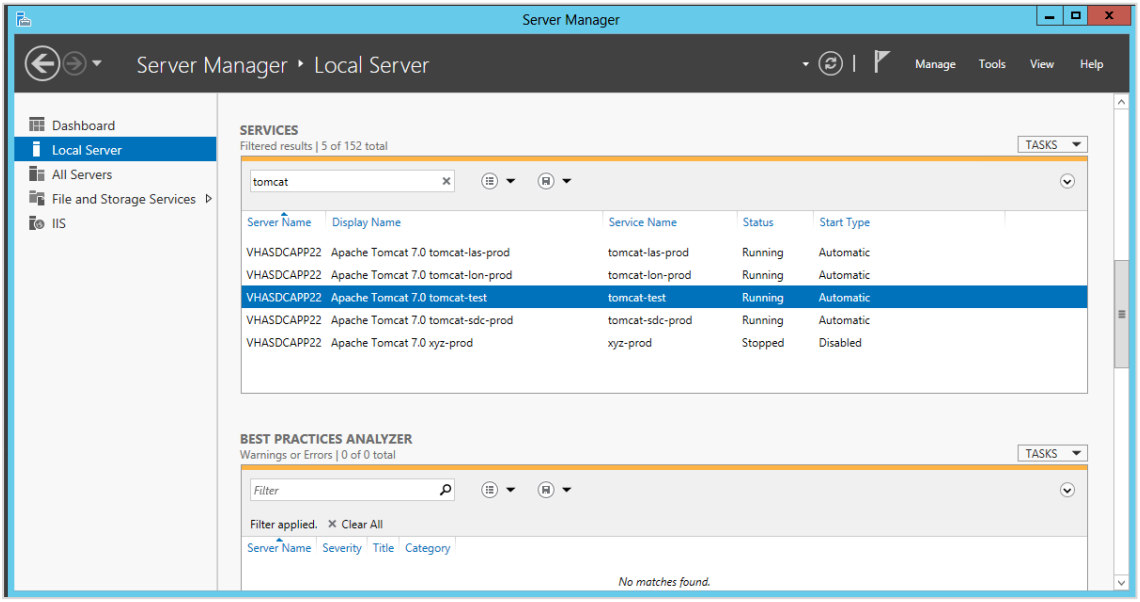
Category	Actions
Unable to Connect	The server cannot be connected to from the device the Veteran is using. The network used by the Veteran should be checked to make sure it has a network connection (e.g. navigate to a page within the VA's network). If the device can navigate to another VA site then the server should be checked to make sure it is still running. If it is then IT should be contacted to ensure that the network hasn't become fragmented.
Database Connection Issues	As a system administrator, log into the web server and ensure the web server can communicate with the database, ensure the database is running by checking the Windows service list, and ensure the database account the web site is using is able to be used to log into MySQL.
VistA Connection Issue	As a system administrator, log into the web server and ensure the web server can reach the VistA server. Contact the VistA administrator to verify the Proxy Connection account is still valid. This can be found in the following file $(rootwebsite)/WEB-INF/classes/gov.va.med.vistalink.connectorConfig.xml, If the access code or the verify code needs to be updated, update the fields, set the connector attribute of encrypted="false", and then restart Tomcat. This will trigger VistA Link to encrypt the fields and save it back into the XML file.

Table 25: Actions for common errors

5.4.1. Restarting Tomcat

If you experience issues and instability during normal opperations, try restarting the Tomcat service.

1. Open **Server Manager**.
2. Select the system you are trying to restart (in the example below, tomcat-test is selected).
3. Right-Click, then select **Stop Service**.
4. After service has stopped, right-click and select **Start Service**.



5.5. System Recovery

The following subsections define the process and procedures necessary to restore the system to a fully operational state after a service interruption. Each of the subsections starts at a specific system state and ends up with a fully operational system.

5.5.1. Restart after Non-Scheduled System Interruption

If the system crashes or is brought down, it can be simply restarted by restarting the database and Java server processes and then viewing the application status page. The two processes, which are covered earlier in this document, are run as Windows services and can be started from the Services snap-in. Once the services start, the system administrator can log on to the application and view the status page in order to verify connectivity. The full steps are:

1. Ensure the MySQL and Tomcat services are running.
2. Load the application home page.
3. View the status page to ensure the application can connect to VistA.

If the Windows services do not start properly, the Event Viewer and the log files for each service can be checked for errors. Failures in the services are unlikely to happen, however, if the operating system itself is healthy.

5.5.2. Restart after Database Restore

The system can be restarted after restoring from a database backup by simply accessing the application. If the application server was taken offline in order to prevent access to the database during the restore, the application server should be restarted as well before utilizing the application.

5.5.3. Back Out Procedures

The upgrade back out procedure consists of notifying the service desk, taking the application offline such that users see a “down for maintenance” page, performing the back out steps (restoring the database, redeploying the old version of the application, etc.), checking the application locally, restoring service, and then notifying the help desk that the maintenance is over.

Notifying the service desk should be done in accordance with the policies established at the time. (Currently, there is no service desk for supporting eScreening.) This may take the form of an email, call or service desk ticket.

Taking the application offline consists of changing configuration so that all requests except those passing in a special maintenance parameter (established by the system administrator) are routed to a simple HTML page that contains the designated “down for maintenance” message instead of hitting the web application.

After all existing requests to the web application have ended the old version of the database or application can be restored as per the back-out plan. This configuration can be verified by using another maintenance parameter to access the application and view the status page.

Once the back-out has completed, the routing expression on the server is restored to point to the desired version of the web application. The full steps are given below:

1. Notify the Service Desk about back-out plan initiation via email or service ticket
2. Disable user access to the system by engaging the maintenance mode routing expression
3. Restore backup taken before the change implementation by following the database restore procedures in this document
4. Conduct system health checks by utilizing the maintenance mode health check parameter and viewing the status page
5. Enable user access by disengaging the maintenance mode routing expression
6. Notify the Service Desk of successful back out

For more information on how to configure the maintenance routing expressions, see the Tomcat manual: http://tomcat.apache.org/tomcat-7.0-doc/index.html .

6. Operations & Maintenance System Support

An understanding of how eScreening is supported by various organizations within the VA is important to operators and administrators of the system. If you are unable to resolve an issue, then it is necessary to understand how to obtain support through OI&T's system support organizations. The following sections describe the support structure and provide procedures on how to obtain support.

6.1. Support Structure

This section describes the systems support structure as seen from the perspective of operations personnel. The first section defines the support hierarchy through which a support request may navigate. The second section defines the responsibilities for each level of support.

6.1.1. Support Hierarchy

There will be two levels of production support for eScreening until the application achieves nationwide deployment. The first level will consist of triage, account management, and basic troubleshooting performed by a Healthcare System Technical Administrator (HSTA). The second level will consist of application code and database change management as described within the eScreening Change Management Guide.

Following nationwide deployment, it is expected that the application will migrate to standardized VA support and change management practices, with tier 1 support performed by the National Service Desk, tier 2 support performed by VA regional IT support staff, and tier 3 performed by application developers as designated by eScreening program management.

6.1.2. Division of Responsibilities

This section defines the scope and responsibilities of each support tier.

6.2. Support Procedures

The eScreening support procedures will consist of triage, troubleshooting, and change management.

1. Defect and change requests triaged by Program Administrator
2. Troubleshooting by Healthcare System Technical Administrator
3. Change management performed by application developers as authorized by Change Control Board

1. Triage: The Program Administrator will collect and triage application defect and change requests from users. These requests will be entered in the eScreening change management backlog in the form of trouble tickets.

2. Troubleshooting: The program administrator will assign trouble tickets to the Healthcare System Technical Administrator, who will analyze, troubleshoot, and document the reported issues. If the HSTA can resolve the issue through at the configuration or database level, or through coordination with the National Service Desk (in the event of a CPRS or VistA issue), the HSTA will document the resolution within the ticket and mark it resolved.

3. Change management: If an HSTA is unable to resolve an issue without modification of the application source code, the HSTA will change the ticket state to needing Change Control Board (CCB) review. The CCB, which will consist of the VA PM, Program Administrators, Healthcare System Technical Administrators, and designated VA IT/support staff, will prioritize and assign all application change requests to designated application developers. The application developers will estimate the amount of time needed to complete the work associated with the ticket, and the PM will allocate the ticket to a specific development sprint. After the application development team completes and tests the work, they will mark the ticket resolved and perform the application release as authorized by the CCB.

For a detailed explanation of change and defect management, see the eScreening Change Management Guide.

Appendix: Setting Up Your Development Environment

1. Install Maven:
   Download Maven 3.1.1
   http://maven.apache.org/download.cgi
   a. Unzip the file and copy it to where ever you like, for example: C:\Users\somebody\apps\apache-maven-3.1.1
   b. Create an environment variable MAVEN_HOME=C:\Users\somebody\apps\apache-maven-3.1.1
   c. Add the bin folder to the PATH if you want.
      %MAVEN_HOME%\bin
2. Install VA VistALink JARS to the local machine.
   a. Download the artifact from VA: https://downloads.va.gov/files/FOIA/Software/Patches_By_Application/XOBV-VISTA%20LINK/XOBV_1_6/
      If this link is not working, download the zip file (VistALinkJars) from the eScreening SharePoint Site in San Diego (http://vaww.sandiego.portal.va.gov/eScreening) which is located here.
   b. Unzip the VistALink zip file.
   c. Open up a command prompt and CD to the folder: (For example: C:\Users\somebody\Desktop\vlj-1.6.0.028\samples-J2SE)
   d. Manually install the three JARS by entering these commands:

```
mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljConnector -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljConnector-1.6.0.028.jar

mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljFoundationsLib -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljFoundationsLib-1.6.0.028.jar

mvn install:install-file -DgroupId=gov.va.med.vistalink -DartifactId=vljSecurity -Dpackaging=jar -Dversion=1.6.0.028 -Dfile=vljSecurity-1.6.0.028.jar
```

3. Install Git client.
4. Install JDK from Oracle:
   Latest JDK8:
   http://www.oracle.com/technetwork/java/javase/downloads/index.html
5. Install Spring Tool Suite (STS)
   http://spring.io/tools/sts/all

STS 3.7.0.RELEASE

If you installed the x64 JDK, then make sure you download the 64 bit version. You can download the zip or the executable.

6. Create a new project with code from GitHub:

a. Go to: **New -> Project…**
b. Select: **Maven** -> **Check out Maven Projects from SCM**.
c. Click **Next**.
d. Set SCM drop-down to Git (If you do not have Git in the list, click the link **m2e Marketplace** in the lower right corner, then find and install **m2e-egit**).
e. Set SCM URL to:

    https://github.com/VHAINNOVATIONS/Mental-Health-eScreening.git

    You can also use this if you have setup SSH keys:

    it@github.com:VHAINNOVATIONS/Mental-Health-eScreening.git
f. Click **Finish**.
g. Wait (this takes a bit). You will see a dialog: Discover and map Eclipse Plugins to Maven plugin goal. If you see problems with the sql-maven-plugin you can ignore them and resolve them later (see step i).
h. Click **Finish**, then click **OK** in the confirmation dialog.
i. In the Eclipse Markers tab, you may see several "Maven Problems" related to the sql-maven-plugin. Select them all, then right-click, then click **Quick Fix**, then ignore them. The problems should not show up anymore.
j. After the process is complete, right-click the project root directory, then click **Maven** -> **Update Project…**

7. Create the MySQL Database:
    a. Install MySQL 5.6.17 community edition http://dev.mysql.com/downloads/mysql/
    b. After installation, open the MySQL Workbench program that installed with MySQL. Connect to the server, then execute the scripts:

        /eScreeningDashboard/src/main/sql/initialization/dev_env_run_once.sql
    c. After running this step, open a command prompt and change directory to where the pom.xml file is.
    d. To create the tables and insert the test data, execute the following Maven command:

        mvn integration-test -DskipTests=true -Drecreate_db=true -P dev

8. Configure the default web browser for Eclipse.
   Using the eclipse menu, select **Windows/Web Browser/Firefox** (or **Chrome**).
9. Install Tomcat (this is optional since STS comes with its own tomcat)
    a. Download **Tomcat 7** from http://tomcat.apache.org/download-70.cgi
    b. Expand the compressed (downloaded) file and put its contents into a directory.
    c. Create a new Tomcat server in Eclipse that points to the directory where you put the contents.
    d. Double-Click the new server, then click **Open launch configuration**, then go to **Arguments**, then add this VM argument to the arguments already present:

        XX:MaxPermSize=256m

10. Run in eclipse:
    e. Right-Click **eScreeningDashboard**

f. Select **Run As/Run On Server**
g. To run the web app on the Eclipse Tomcat server, click **Next**, then **Finish**. The browser launches and opens the web site.

11. Import coding convention file for eclipse (STS)
    a. Start eclipse/sts
    b. Select **Windows/Preferences**
    c. Navigate on the tree node to Java/Code Style/Formatter

12. Click **Import…** select **spring-eclipse-code-conventions.xml** from here:

    https://github.com/spring-projects/spring-batch/blob/master/spring-eclipse-code-conventions.xml

Servers

Tomcat 7.0.42 Tomcat will be used as the server for the Dashboard application. It is installed on the sandbox and integration application server. We recommend that developers have a local instance to check war file deployments against.

Apache-tomcat-7.0.42 (64 bit)
http://tomcat.apache.org/download-70.cgi

Frameworks

Software	Version	URL
Java	8u45	http://www.oracle.com/technetwork/java/javase/downloads/index.html
Spring Tool Suite	3.7.0.RELEASE	http://spring.io/tools/sts
MySQL	5.6.17	http://dev.mysql.com/downloads/mysql/
Apache Tomcat	7.0.53	http://tomcat.apache.org/download-70.cgi
Spring Framework	4.1.6.RELEASE	http://projects.spring.io/spring-framework/
Spring Security	3.2.7.RELEASE	http://projects.spring.io/spring-security/
Hibernate	4.3.0.Final	http://hibernate.org/orm/downloads/
VistALink	1.6.0.028	https://downloads.va.gov/files/FOIA/Software/Patches_By_Application/XOBV-VISTA%20LINK/XOBV_1_6/

jquery	1.10.2	http://jquery.com/download/
jquery ui	1.10.3	http://jqueryui.com/download/#" />version=1.9.2
Bootstrap	v. 3.1.1	http://getbootstrap.com/
AngularJS	v. 1.2.15	https://angularjs.org/
Maven	3.1.1	http://maven.apache.org/download.cgi

Tasking and source control

We used a feature branch workflow with GIT described in the GIT Workflow.pdf .

VA sandbox wiki (requires VA sandbox account)
Put all official project documents here:
http://sandbox.vacloud.us/groups/20388/