12 OpenClinica Installation and Upgrade Guides

OpenClinica Community Edition can be installed on a computer/server running either a Linux or Windows operating system. This chapter includes procedures to install the OpenClinica Community Edition as a new application, as well as upgrade from a version of OpenClinica that was previously installed.

Post any questions to the OpenClinica Forums.

Approved for publication by Ben Baumann. Signed on 2014-03-25 11:14AM

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12.1 System Requirements

OpenClinica has a flexible architecture that can run on numerous infrastructure combinations. General system recommendations are as follows:

Single server environment hardware recommendation (OpenClinica and PostgreSQL Databases reside on the same server):

Minimum:
Linux (RedHat 6/7.x or CentOS 6/7.x)
CPU: Quad core 2GHz+ CPU
RAM: 4GB
Disk space: 100GB

Recommended:
Linux (RedHat 6/7x or CentOS 6/7.x)
CPU: Quad core 2GHz+ CPU
RAM: 16GB
Disk space: 500GB

Multiple-server environment hardware recommendation (OpenClinica and PostgreSQL Databases reside on separate servers)

Minimum:
Linux (RedHat 6/7.x or CentOS 6/7.x)
CPU: Quad core 2GHz+ CPU
RAM: 2GB (OpenClinica), 2GB (PostgreSQL/Database)
Disk space: 100GB

Recommended:

Linux (RedHat 6/7.x or CentOS 6/7.x)
CPU: Quad core 2GHz+ CPU
RAM: 8GB (OpenClinica), 4GB (PostgreSQL/Database)
Disk space: 500GB

Recent production versions of OpenClinica have been verified to run on the following components:

Version	Server OS	Database	Application Server	Language	Memory	Disk	Client Browser
3.10 - 3.14	RHEL/CentOS 6/7.x or above 64-bit (recommended) Windows 2012, R2 or above 64-bit Windows 2008, 64-bit	Postgres 9.5.x (recommended) Postgres 8.4	Apache Tomcat 7.0.x	JDK 7	2GB	20GB	IE 11+ Firefox 30.0+
3.6 - 3.9	RHEL/CentOS 6.5 or above 64-bit (recommended) Ubuntu 12.04 LTS 64-bit Windows 2012, R2 or above 64-bit Windows 2008, 64-bit	Postgres 8.4	Apache Tomcat 7.0.x	JDK 7	2 GB	20GB	IE 11+ Firefox 30.0+
3.4, 3.5	RHEL/CentOS 6.5 or above 64-bit (recommended) Ubuntu 12.04 LTS 64-bit Windows 2012, R2 or above 64-bit Windows 2008, 64-bit Windows 2003 R2 or above 32-bit (not recommended)	Postgres 8.4	Apache Tomcat 7.0.x	JDK 7	2 GB	2 GB	IE 11+ Firefox 30.0

3.3	RHEL/CentOS 6.5 or above 64-bit (recommended) Windows 2003 R2 or above 32-bit Ubuntu 12.04 LTS 64-bit	Postgres 8.4	Apache Tomcat 7.0.x	JDK 7	2 GB	2 GB	IE 11+ Firefox 25.01
3.2	Windows 2003 R2 CentOS 6.5 (~Red Hat Enterprise Linux 6.4) Ubuntu 12.04 LTS	Postgres 8.4	Apache Jakarta Tomcat 6.0.32 or 7.0.42 (recommended)	JDK 6 or JDK 7 (recommended)	256 MB minimum 2 GB recommended	500 MB minimum 2 GB recommended	IE 11 Firefox 25
3.1	Windows 2003 Red Hat Enterprise Linux 4.0 CentOS Ubuntu	Postgres 8.4 (recommended) Oracle 10g	Apache Jakarta Tomcat 6.0.32	JDK 6	256 MB minimum 2 GB recommended	500 MB minimum 2 GB recommended	IE 7 or 8 Firefox 3.0+

Approved for publication by Warren Vandeventer. Signed on 2019-03-27 10:11AM

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12.2 Install OpenClinica

- Please go to our github wiki for instructions: https://github.com/OpenClinica/OpenClinica/wiki

Approved for publication by Kkrumlian Kkrumlian. Signed on 2015-11-20 9:04AM

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12.3 Install OpenClinica 3.4

- To install on **linux** please follow the instructions here: https://github.com/OpenClinica/OpenClinica/wiki/Install-OpenClinica-3.4-on-Linux
- To install on **windows** please follow the instructions here: https://github.com/OpenClinica/OpenClinica/wiki/Install-OpenClinica-3.4-on-Windows

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12.4 Install OpenClinica 3.3 on Linux

The recommended and tested platform is RHEL/CentOS 6.5

These instructions are for installing version 3.3 of OpenClinica, and also apply to installing the maintenance releases of 3.3 for example 3.3.1. When you see *v.x* or *v.x.y* in the instructions, use your version number, e.g. 3.3.1.

Overview of Installation on Linux Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

1. Ensure your operating system meets the specified requirements
2. Download the installation files
3. Install Java
4. Install Tomcat
5. Install PostgreSQL database
6. Set up the PostgreSQL database
7. Deploy OpenClinica within Tomcat
8. Set Tomcat to start
9. Configure the OpenClinica application
10. Restart the system and verify access to OpenClinica
11. Configure Tomcat to use HTTPS
12. Verify the installation by ensuring you can log in to OpenClinica.

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study Director) and then build a Study.

Operating System Requirements

The following packages should be installed for your Operating System:

- vim
- unzip
- tar

You require "root" user access. Run all commands in the installation instructions using root-level permission.

Download Installation Files

OpenClinica and OpenClinica Web Services run and depend on several external software technologies: the Java Development Kit, the Apache Tomcat Servlet Container, and the PostgreSQL relational database

The OpenClinica website has a copy of the neccessary installers for Java, Tomcat, and PostgreSQL for you to download. If you choose to use versions of Java, Tomcat, and PostgreSQL other than those provided on the website, please note that they have not been tested with the OpenClinica application.

There are 32-bit and 64-bit editions of the software, when applicable. To determine if your system is running a 32-bit or 64-bit operating system, in your Linux terminal, run

uname -a

The display reports the version:

- If i386 or i686 displays, it is a 32-bit operating system.
- If x86_64 displays, it is a 64-bit operating system. (Recommended)

To download the installation files:

1. Run the following commands to create the OpenClinica directory on your system and to make it the current directory:

   mkdir -p /usr/local/oc/install
   cd /usr/local/oc/install
2. Run the following commands to download the Java, Tomcat, and PostgreSQL files for your architecture. In the commands, substitute *v.x* with the version of OpenClinica you are installing (e.g. 3.1):

   - For 32-bit operating systems, to get the files from OpenClinica run:

     Apache Tomcat: https://openclinica.app.box.com/oc-downloads/1/2186656927

     JDK and Postgres:
     https://openclinica.app.box.com/oc-downloads/1/2186650849
   - For 64-bit operating systems, to get the files from OpenClinca, run:

     Apache Tomcat: https://openclinica.app.box.com/oc-downloads/1/2186656927
     JDK and Postgres:
     https://openclinica.app.box.com/oc-downloads/1/2186651363
   - Instead of downloading the files from the above links, you can download them directly from their native websites but those versions may not be explicited tested to work with OpenClinica:

     - PostgreSQL:http://www.postgresql.org/
     - Java:http://www.oracle.com/technetwork/java/index.html
     - Tomcat:http://tomcat.apache.org/
3. Download the OpenClinica software from the OpenClinica website, using this location:https://community.openclinica.com/project/openclinica. To download the software, you need an OpenClinica community user account, which is free to create; you will be required to log in to the account to download the OpenClinica software.

After downloading the OpenClinica software, move it to the directory where you downloaded the other software components to:

/usr/local/oc/install

Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Install Java by running:

   tar -zxvf jdk-7*

3. Install Java in the operating system by running:

   mv jdk1* /usr/local/
   ln -s /usr/local/jdk1* /usr/local/java

Java is now installed in the correct location.

Install Tomcat

The OpenClinica software uses the Apache Tomcat Java application server.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Install Tomcat by running the following:

   tar -zxvf apache-tomcat-*
   mv apache-tomcat-* /usr/local/
   ln -s /usr/local/apache-tomcat-7.0.52 /usr/local/tomcat
   /usr/sbin/adduser tomcat

3. Move the web apps provided with Tomcat that are not needed by OpenClinica to another location by running:

   mkdir /usr/local/tomcat/oldwebapps

mv /usr/local/tomcat/webapps/* /usr/local/tomcat/oldwebapps

Tomcat is now installed.

Install PostgreSQL Database

The OpenClinica software uses PostgreSQL as an underlying relational database management system. Complete these instructions to install the PostgreSQL database.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Start the PostgreSQL setup by running:

   chmod a+x postgresql-8.4.*
   ./postgresql-8.4.* --mode text

   The PostgreSQL Setup Wizard starts.

3. For most of the options in the Setup Wizard, accept the defaults. Complete the Setup Wizard as follows:

Prompt	**Action**
Installation Directory [/opt/PostgreSQL/8.4]	Press Enter to accept.
Data Directory [/opt/PostgreSQL/8.4/data]	Press Enter to accept.
Password	Enter a password for the PostgreSQL database superuser, then press Enter. Record the password because you will need it again in this installation.
Retype Password	Type the password again, then pressEnter.
Port [5432]	Press Enter to accept.
Please choose an option [1]	Press Enter to accept.
Install pl/pgsql in template1 database? [Y/n]	Type n, then press Enter.
Do you want to continue? [Y/n]	Press Enter to accept.
Setup has finished installing PostgreSQL on your computer. Stack Builder may be used to download and install additional tools, drivers and applications to complement your PostgreSQL installation. [Y/n]	Type n, then press Enter.

PostgreSQL is now installed on your system and will start when you start up your system.

Set Up the PostgreSQL Database

Complete these instructions to set up the PostgreSQL database.

1. Run the following commands to create the PostgreSQL database and database user OpenClinica uses to connect to the database:

   /opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE"

   /opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica"

2. The database user password is set to clinica by default, which is not a secure password. Change the password as follows:

   1. Run:

      /opt/PostgreSQL/8.4/bin/psql -U postgres

   2. A psql prompt displays with this message:

      ALTER USER clinica WITH PASSWORD 'XXXX';

   3. Replace XXXX with a secure password. Record the password for use in a later installation step.

   4. Exit the psql prompt by running:

      q

Deploying OpenClinica within Tomcat

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.2:

   unzip OpenClinica-*v.x**
   cd OpenClinica-v.x*/distribution
   unzip OpenClinica.war -d OpenClinica
   cp -rf OpenClinica* /usr/local/tomcat/webapps

OpenClinica is now deployed for use with the database.

Deploying OpenClinica Web Services within Tomcat

Web Services are optional. Do not install them if you are not planning to use them.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.2:

   unzip OpenClinica-ws-*v.x**
   cd OpenClinica-ws-v.x*/distribution
   unzip OpenClinica-ws.war -d OpenClinica-ws
   cp -rf OpenClinica* /usr/local/tomcat/webapps

OpenClinica web services are now deployed for use with the database.

Set Tomcat to Start

You can set Tomcat to automatically start when you start your system, or you can start and stop Tomcat manually by issuing commands.

To set Tomcat to start automatically on system startup, run the following:

cp /usr/local/oc/install/OpenClinica-*v.x**/install-docs/linux/tomcat /etc/init.d/

cd /etc/init.d

chmod a+x /etc/init.d/tomcat

/sbin/chkconfig --add tomcat (Note: This command is only for Red Hat Linux. For other operating systems, see the operating system instructions for adding an init script.)

To stop and start Tomcat manually by issuing commands, run the following:

/usr/local/tomcat/bin/shutdown.sh (stops Tomcat)

/usr/local/tomcat/bin/startup.sh (starts Tomcat)

Configure OpenClinica for Optimum Performance

Under stress tests, OpenClinica 3.1.3 has performed well with the following JVM (Java Virtual Machine) settings:

Edit the init.d/tomcat and replace the JAVA_OPTS with following:

export JAVA_OPTS="$JAVA_OPTS -Xmx1280m -XX:+UseParallelGC -XX:ParallelGCThreads=n -XX:MaxPermSize=180m -XX:+CMSClassUnloadingEnabled"

For the setting -XX:ParallelGCThreads=n, n should be replaced with the # of cores of your CPU as long as the total number of cores are lesser than 8.

The number of cores can be determined by using 'top' command.

Please note that the minimum RAM requirement is 1280 MB of memory for these settings, so the server is expected to have much higher RAM available. The amount of available memory can be determined by using the command free -m to give the memory (in MB). The MaxPermSize value depends on the number of war files that you are deploying. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.

For the settings to take effect, restart the Tomcat server.

Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected in Set Up the PostgreSQL Database. Change the values for any other properties, then save the file.
3. Update the filePath parameter to the right value.
4. Run the following commands:

   chown -R tomcat /usr/local/tomcat/*
   chown -R tomcat /usr/local/apache-*
5. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization

Configure the OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system.

Note: Most of the properties are not needed or used for Web Services, see Description of

datainfo.properties File for Web Services for more information on what settings are actually used.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica-ws/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other properties.
3. Run the following commands:

   chown -R tomcat /usr/local/tomcat/*
   chown -R tomcat /usr/local/apache-*

Verify Access to OpenClinica

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Restart the system by running:

reboot

Strictly speaking, rebooting is not necessary but ensures that all the relevant services are setup correctly to start on boot. After the system starts up, access OpenClinica at the following URL:

http://localhost:8080/OpenClinica

The Log In page should display.

To verify your set-up, try to access OpenClinica from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

Verify Access to OpenClinica Web Services

Access OpenClinica Web Services at the following URL:

http://localhost:8080/OpenClinica-ws

The **Welcome** page should display.

To verify your set-up, try to access OpenClinica Web Services from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

Configure Tomcat to Use HTTPS

OpenClinica strongly recommends securing the Tomcat application server using a Secure Socket Layer protocol (SSL). SSL is a data transport encryption technology used to make

secure https:// connections. SSL requires a third-party security certificate to be effective. Information about configuring SSL certificates for Tomcat is at this website: http://tomcat.apache.org/tomcat-6.0-doc/ssl-howto.html.

Verify the Installation

Log in to OpenClinica with the username root and the password 12345678. OpenClinica requires you to change the password for the user "root" to a secure password. See Update User Profile if you need more information.

The user "root" is assigned to the Study "Default". Create a user account login for yourself, with the User Type set to "technical administrator" and the User Role set to Data Manager. For instructions to create the user account, see Create a New User.

Approved for publication by Thasbiha Khaja. Signed on 2014-08-12 1:17PM

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12.5 Install OpenClinica 3.3 on Windows

These installation instructions have been verified on the following Windows operating systems versions:

- Windows Server 2003 Standard Edition SP2
- Windows Server 2003 Standard Edition SP1

Please note that all these instructions require Administrator-level permissions.

These instructions are for installing version 3.3 of OpenClinica. Screenshots shown in these instructions might look different than the screens on your system because your operating system might not be exactly the same. For the same reason, your screenshots might not correspond exactly with those in the written instructions. Where the screenshot differs from the written instruction, always follow the written instruction.

All characters in the installation commands are case sensitive. Also note that any additional white space between or after characters in commands could cause installation errors.

9.3.1 Overview of Installation on Windows Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

- 9.3.2 Ensure your system complies with software dependencies and operating system requirements.
- 9.3.3 Install Java
- 9.3.4 Install PostgreSQL
- 9.3.5 Install Tomcat

- 9.3.6 Starting and Stopping Tomcat
- 9.3.7 Set Up the PostgreSQL Database
- 9.3.8 Configure Tomcat to Work with OpenClinica and OpenClinica Web Services
- 9.3.9 Configure the OpenClinica Installation
- 9.3.10 Verify the Installation
- 9.3.11 Install OpenClinica Web Services Package
- 9.3.12 Configure OpenClinica Web Services
- 9.3.13 Verify the Installation of OpenClinica Web Services

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study Director), and then build a Study.

9.3.2 Software Dependencies and Operating System Requirements

Windows Configuration
Your Windows operating system must be configured to show file extensions by default. To configure this behavior:
1. Open a **Windows Explorer** window.
2. Select **Tools > Folder Options**.
3. Click the **View** tab.
4. In **Advanced** settings, clear the **Hide extensions for known file types** checkbox.
5. Click **Apply**.

Software Dependencies
OpenClinica runs on any Servlet/JSP container that implements the Servlet 2.4 and JavaServer Pages 2.0 specifications from the Java Community Process. OpenClinica was developed to run on and has been tested with Apache Tomcat 7.0.52.

OpenClinica runs on the PostgreSQL relational database. Using a
JDBC (Java Database Connectivity) driver, the database connects to the OpenClinica web application and provides the data to the user.

New installations require the following software dependencies, all of which are open source. These installation instructions walk through the process of downloading, installing, and configuring them for use with OpenClinica.

- Java 7 Standard Edition Development Kit 7.0 update 52 (Note: Java frequently changes its naming conventions.)
- Tomcat 7.0.52
- PostgreSQL 8.4.7.2

Other Versions of Dependent Software
The software dependencies OpenClinica uses are frequently updated with minor versions and revisions. Sometimes only a matter of weeks separates the release of two adjacent versions. In some cases, the particular revision number used may no longer be available. In general, you should be able to use more recent minor versions and revisions of the software dependencies. For example, if the installation instructions refer to PostgreSQL 8.4.7.2, then PostgreSQL 8.4.8 should work successfully too (but not PostgreSQL 9).
Record the version or revision number of all the software you use. If you have concerns about a particular combination, post your question to the OpenClinica Forums.

9.3.3 Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application. Follow these instructions to install Java:

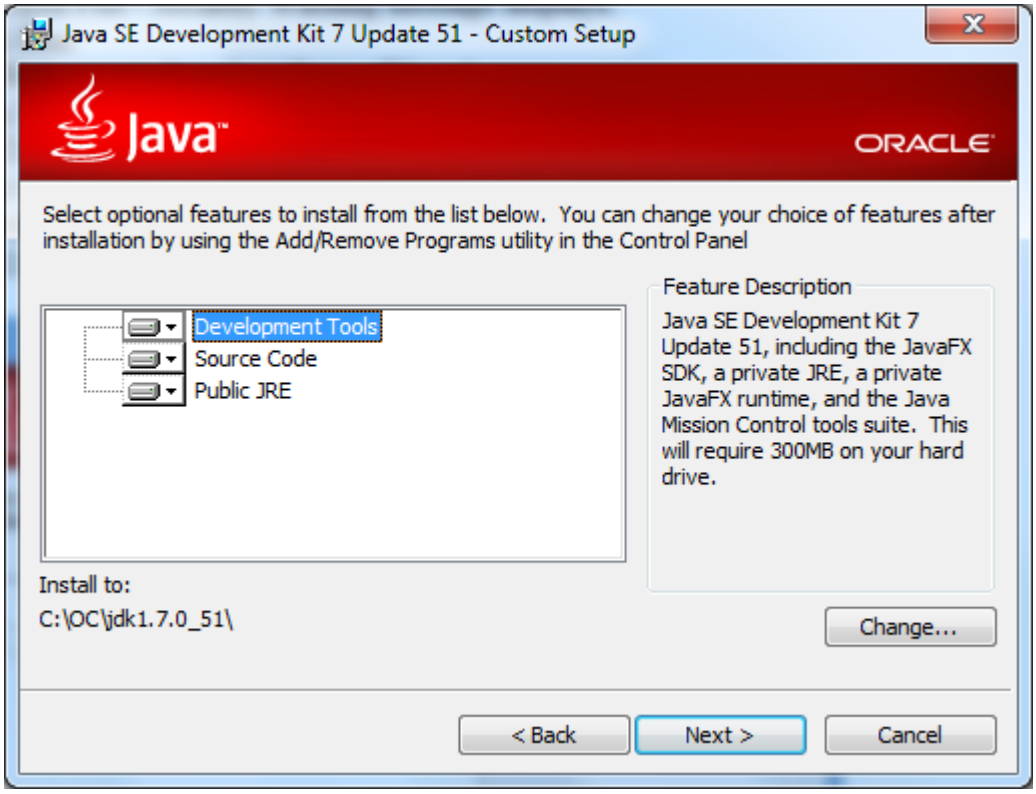
1. OpenClinica 3.3 is designed to run on a Java 7 SDK platform. To avoid conflicts with other versions of Java, clear out any other Java installations on the system. Select **Start > Control Panel > Add Remove Programs**, then remove any Java JREs and SDKs.
2. Create the directory c:ocinstall.
3. From one of the following websites, download the Java 7 SE Development Kit 7.0 update 52 (jdk-7u51-windows-i586.exe) into c:ocinstall:

- From the Java website: http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html

4. Run c:ocinstalljdk-7u51-windows-i586.exe.

5. The **Open File - Security Warning** message displays.

6. Click **Run**.
The **Welcome to Java Installation** Wizard opens.
7. Click **Next**.
The **Custom Setup** screen displays.
8. Click **Change**....
9. Change the path to c:oc jdk1.7.0_51, then click **OK**.
The **Custom Setup screen** should now look like this:



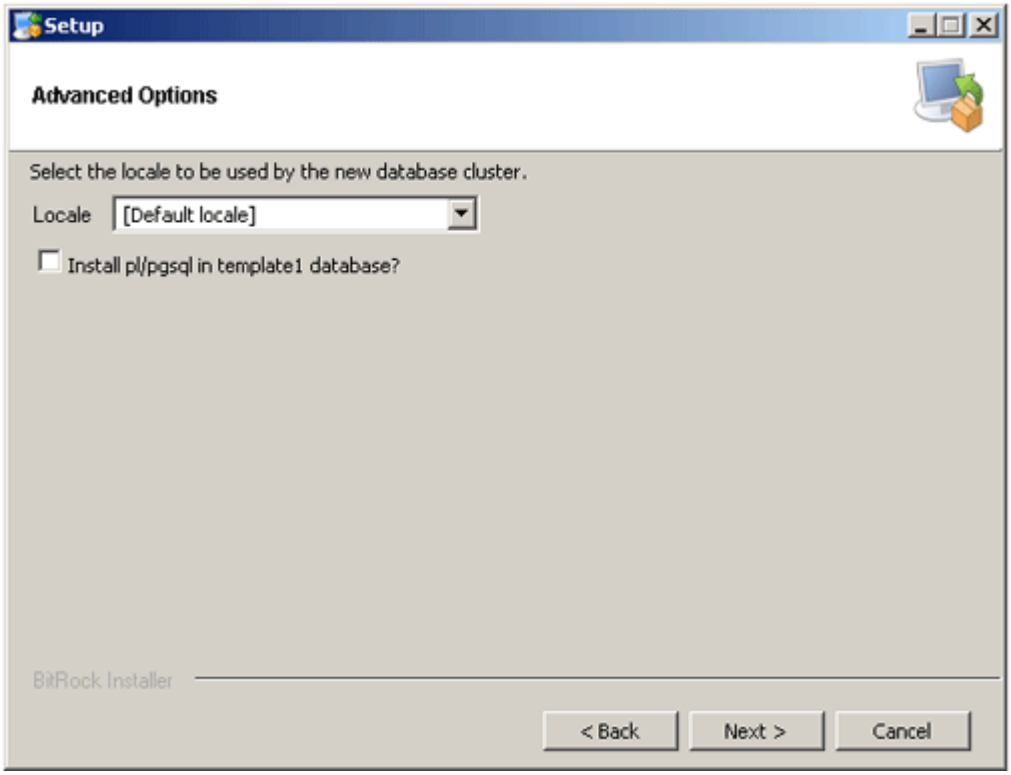
10. Click **Next**.
The Setup Wizard installs the JDK. When setup completes, a screen to install JRE7 displays.
11. Click **Cancel**, and then in the confirmation dialog box click **Yes**.

The **Install Success** screen displays.
12. Click **Close**.
13. A web browser window opens, presenting you with the option to register the JDK. Register, or close the window.

9.3.4 Install PostgreSQL Database

The OpenClinica software uses the PostgreSQL relational database management system. Complete these instructions to install PostgreSQL.

1. From this location http://www.enterprisedb.com/postgresql-8421-installers-win32?ls=Crossover&type=Crossover , download the executable to c:ocinstall.
2. Run the executable
   The **Open File Security Warning** message displays
3. Click **Run**.
   The **PostgreSQL Installation Wizard** opens.
4. Click **Next**.
   The **Installation directory** screen displays.
5. Click **Next** to accept the default values.
   The **Data directory** screen displays.
6. Click **Next** to accept the default values.
   The **Password** screen displays.
7. Enter a password for the Postgres superuser. Record the password for use later in the installation process. Re-enter the password, and click **Next**.
   The **Port** screen displays.
8. Click **Next** to accept the default value (5432).
   The **Advanced Options** screen displays.



9. Complete the screen as follows:
   1. For **Locale**, select **Default locale**.
   2. Clear the **Install pl/pgsql in template1** database? checkbox.
   3. Click **Next**.

The **Ready to install** screen displays

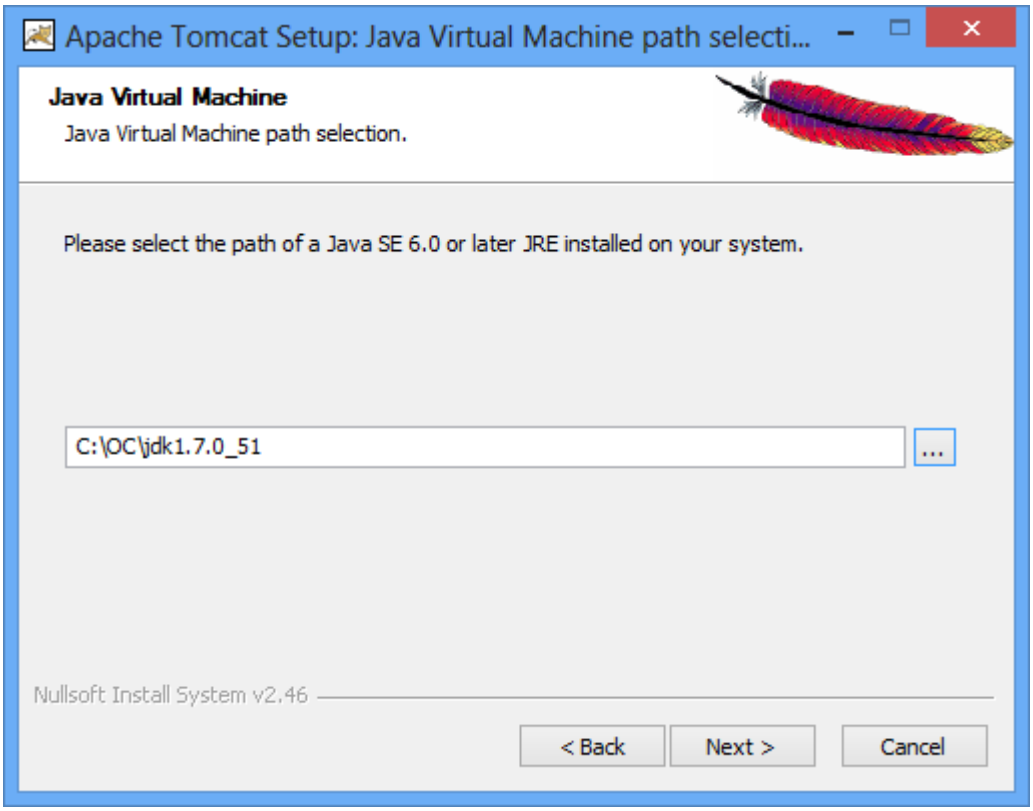
10. Click **Next** to start the installation.
    When the installation finishes, the Completing the **PostgreSQL Setup Wizard** screen displays.
11. Clear the **Launch Stackbuilder at exit** checkbox, then click **Finish**.

9.3.5 Install Tomcat

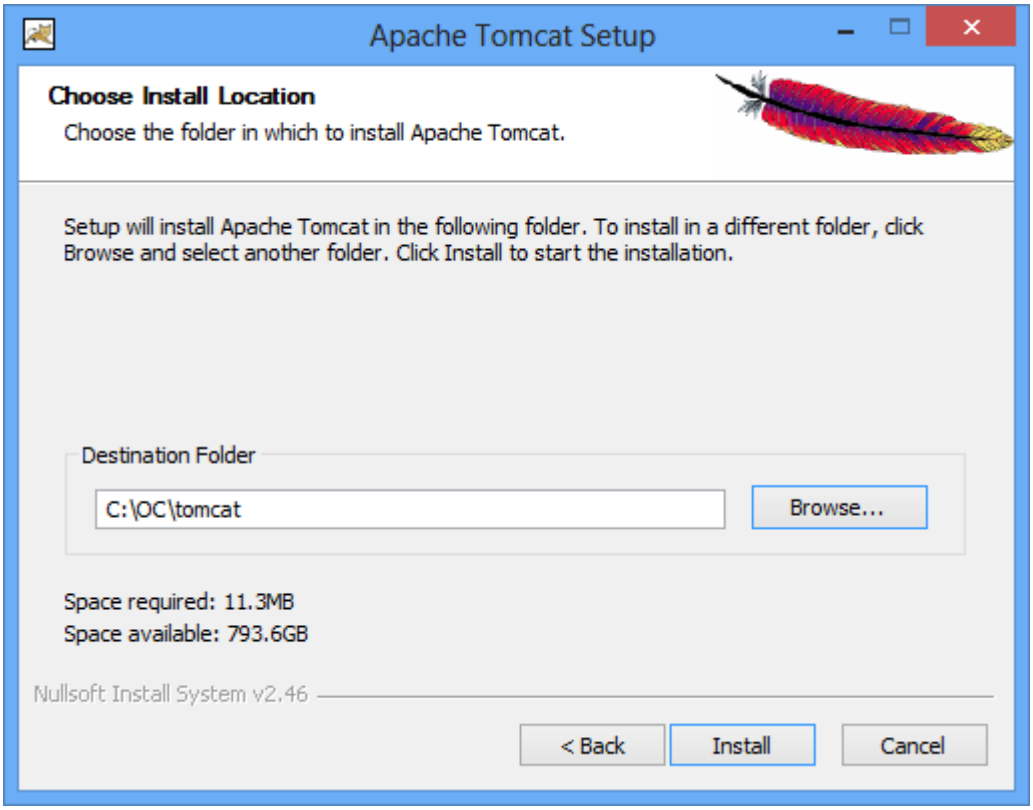
1. From either of the following websites, download the Windows Service Installer Version, apache-tomcat-7.0.52.exe, and save it to c:ocinstall:

   From the Apache website: http://tomcat.apache.org/download-70.cgi

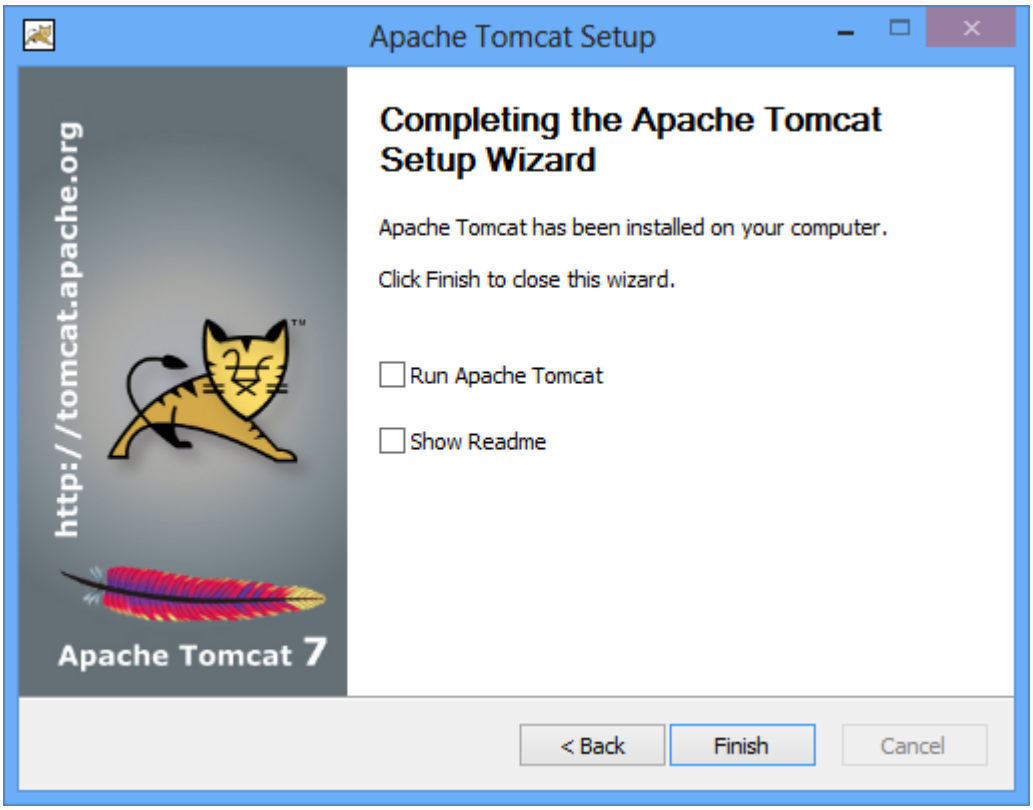
2. Run
   c:ocinstall apache-tomcat-7.0.52.exe
   The **Apache Tomcat Setup Installation Wizard** opens.
3. When the **Open File - Security Warning message** displays, click **Run**.
4. On the **Welcome** screen of the Apache Tomcat Setup Installation Wizard, click **Next**.
   The **License Agreement** screen displays.
5. Click **I Agree** to accept the agreement.
   The **Choose Components screen** displays.
6. Click **Next** to accept the default values.
   The **Configuration** screen displays.
7. Click **Next** to accept the default values.
   The **Java Virtual Machine** screen displays.
8. Click ..., then select the path you installed the JDK into:
   c:oc jdk1.7.0_51
   The screen now should look like this:



9. Click **Next**.
   The **Choose Install Location** screen displays
10. Edit the **Destination Folder** to be c:octomcat. The screen should look like this:



11. Click **Install** to start the installation.
    When the installation is finished, the **Completing the Apache Tomcat Setup Wizard** screen displays.
12. Complete the screen as follows:
    0. Clear the **Run Apache Tomcat** checkbox.
    1. Clear the S**how Readme** checkbox.
    The screen should now look like this:



13. Click **Finish.**
14. Create the directory c:octomcatoldwebapps.
15. Move the web apps provided with Tomcat that OpenClinica does not need by moving the

contents of c:octomcatwebapps to c:octomcatoldwebapps.

9.3.6 Starting and Stopping Tomcat

Start Tomcat using any one of these methods:

1. From the **Apache Tomcat 7** Properties window:
    1. Select **Start > Apache Tomcat 7.0 > Configure Tomcat to open the window**.
    2. Click the **General** tab.
    3. On the **General** page, click the **Start** button to start Tomcat.
2. Using the Windows run command:
    1. Select **Start > Run**.
    2. In the **Run** box, type cmd, then click **OK**.
    3. At the new command prompt, start Tomcat by typing

    net start tomcat7
    then press **Enter**.

    When you need to stop Tomcat, type
    net stop tomcat7
    then press **Enter**.

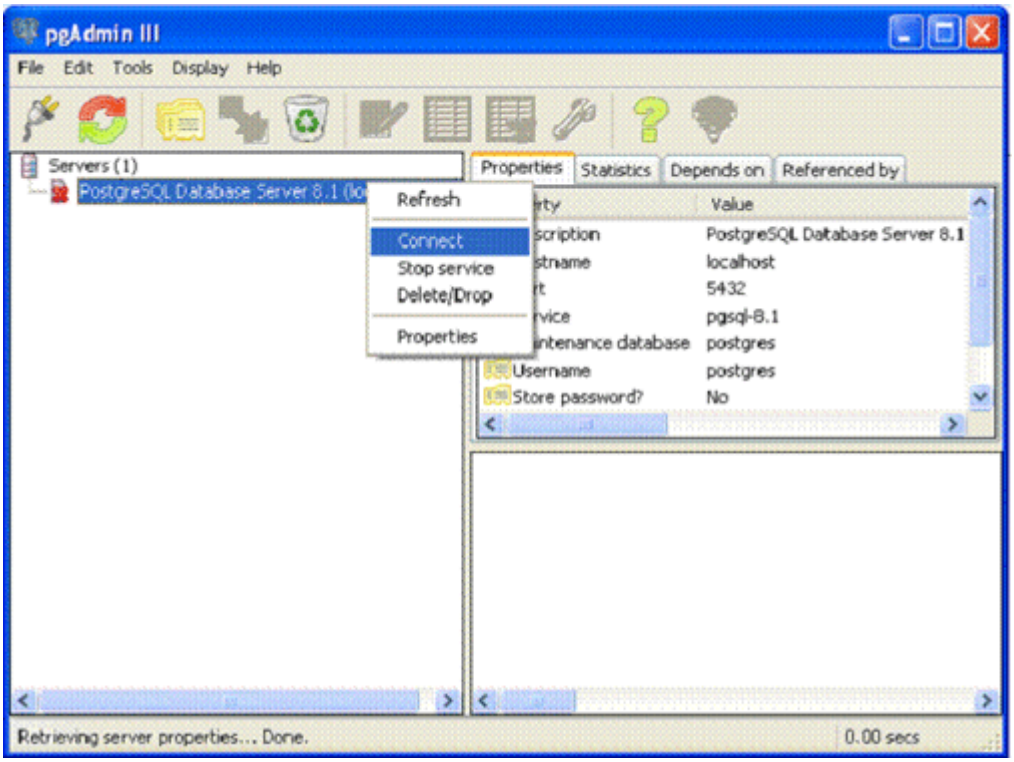
9.3.6 Install OpenClinica Package

1. Download the OpenClinica software, OpenClinica-v.x.y.zip, from the OpenClinica website location, https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to this account to download the OpenClinica software.
   After downloading the OpenClinica software, move it to the directory with the other software dependencies you downloaded:
   c:ocinstall.
2. Right-click OpenClinica-v.x.y.zip and select **Extract All**.
   The **Extraction Wizard** opens.
3. Click **Next**.
4. In the next screen, change the directory to c:ocinstall, and click **Next**.
5. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
6. Copy c:ocinstallOpenClinica-v.x.ydistributionOpenClinica.war to c:octomcatwebapps.

9.3.7 Set Up the PostgreSQL Database

Complete these instructions to setup PostgreSQL database.

1. Select **Start > Programs > PostgreSQL 8.4 > pgAdminIII**.
2. The **pgAdminIII** window opens. Right-click the PostgreSQL 8.4 (localhost:5432) icon, and select Connect, as shown here:



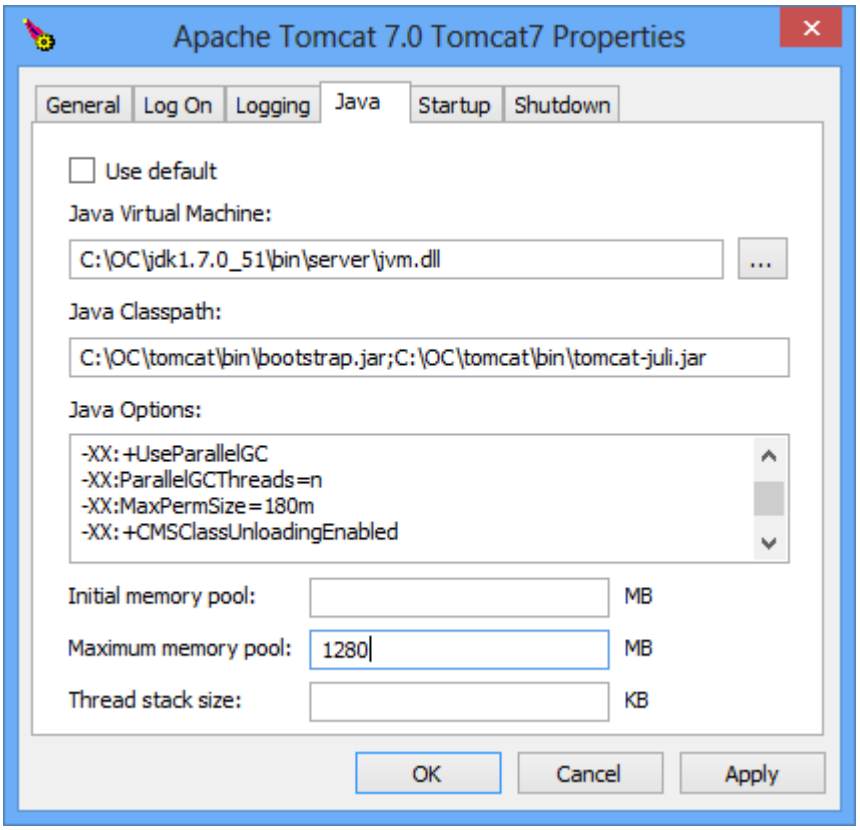
3. Log in to the database server using the password you set up during the PostgreSQL installation.
4. Create the database openclinica and the database user clinica, which OpenClinica uses to connect to the database:
   0. Expand the databases, and select **postgreSQL**.
   1. Select **Tools > Query tool**.
   The **Query** window opens.
   2. In the **SQL Editor** box, delete all the text.
   3. In the **SQL Editor** box, type the following:
   CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE;
   4. Select **Query > Execute**, which runs the SQL query.
   When the query completes, a message displays in the **History** window.
   5. In the **SQL Editor** box, delete all the text.
   6. In the **SQL Editor** box, type the following:
   CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica;
   7. Select **Query > Execute**.
   When the query completes, a message displays in the **History** window.
   8. Close the **Query** window, and click **No** when prompted to save changes.
5. The database password is set to clinica by default, which is not a secure password. Change the password as follows:
   1. In the pgAdminIII window, expand and select **Login Roles.**
   2. Select **View > Refresh**.
   3. The clinica database user is listed.
   4. Right-click the clinica user account and select **Properties**.
   5. In the **Login Role** for clinica box that displays, enter the new password and re-enter it, then click **OK**. Record the password for future use.

9.3.8 Configure Tomcat to Work with OpenClinica and (if installed) OpenClinica Web Services

1. Select **Start>All Programs > Apache Tomcat 7.0 > Configure Tomcat**.

The **Apache Tomcat 7** Properties window opens.

2. Please click the Java Options tab described in the 'Configure Tomcat' section and add the following
   -XX:+UseParallelGC
   -XX:ParallelGCThreads=n
   -XX:MaxPermSize=180m
   -XX:+CMSClassUnloadingEnabled
   On Java Console set Maximum Pool Size to 1280.
   Please note that the minimum RAM requirement is 1280 MB of memory for these settings, so the CPU is expected to have much higher RAM available.
   Where n is the number of cores of your CPU. There should be no spaces before or after each entry. Each entry should be on a new line. The MaxPermSize value depends on the number of .war files that you are deploying. For instance, if you deploy web and web services, XX:MaxPermSize should be set to 360m.
   -XX:ParallelGCThreads = # of cores of your CPU, as long as the number of processors on your CPU are lesser than 8.The Window should look like this for a 4 core processor:
   This setting is based upon the number of war files deployed. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.
3. The window should now look like this:



4. Click **Apply**, which completes the configuration of Tomcat.
5. Start Tomcat:
   1. Click the **General** tab.
   2. On the **General** page, click **Start**.
6. In about five minutes, Tomcat will be fully started. Verify it is fully started by opening the file c:octomcatlogstomcat7-stderr.current date.out, and looking for this line:
   INFO: Server Startup in XXXXX ms
7. After verifying Tomcat has fully started, in the **General** page of the **Apache Tomcat 7** Properties window, click **Stop**.

8. Wait two minutes for Tomcat to stop, then delete OpenClinca.war from c:octomcatwebapps.

9.3.9 Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system, however.

1. Using WordPad, open the configuration file: c:octomcatwebappsOpenClinicaWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected when you set-up PostgreSQL. Change the values for any other properties. The datainfo.properties file for Windows is the same as for Linux.
3. When you finish making changes, save the file.
4. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3-1-technical-documents/openclinica-and-internationalization/.

9.3.10 Verify the Installation

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Verify the installation was successful by following these steps:

1. Restart Tomcat
2. Open a web browser and access OpenClinica at the following URL:

   http://localhost:8080/OpenClinica

   (The port number may be different if you changed the configuration of your Tomcat instance that is running OpenClinica.) The OpenClinica Login page should display.
3. Log in to OpenClinica using the default user name, root, and password 12345678. You will be forced to change the password for the user "root" to a secure password. See Update User Profile if you need more information.
4. The user "root" is assigned to a default Study named "Default." Create a user account for yourself, with the User Type set to "technical administrator" and the User Role set to Data Manager: for instructions to create the user account, see Create a New User.
5. Log out and stop Tomcat if you now plan to install Web Services Package

9.3.11 Install OpenClinica Web Services Package

Web Services are optional. You do not need to install them if you are not planning on using web services.

1. Download the OpenClinica-ws software, OpenClinica-ws-v.x.y.zip, from the OpenClinica website location: https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to the account to download the OpenClinica software. After downloading the OpenClinica-ws software, move it to the directory with the other software dependencies you downloaded: c:ocinstall.

2. Right-click OpenClinica-ws-v.x.y.zip and select **Extract All**.
3. The **Extraction Wizard** opens.
4. Click **Next**.
5. In the next screen, change the directory to c:ocinstall, and click **Next**.
6. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
7. Copy c:ocinstallOpenClinica-ws-v.x.ydistributionOpenClinica-ws.war to c:octomcatwebapps.
8. Restart Tomcat then stop Tomcat following the intructions from above.

9.3.12 Configure OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system, however.
Note: Most of the properties are not needed or used for Web Services.

1. Using WordPad, open the configuration file: c:octomcatwebappsOpenClinica-wsWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other properties.

   The datainfo.properties file for Windows is the same as for Linuxsee more information at description of datainfo.properties file for web services.
3. If you are installing Web Services for OpenClinica 3.1.2 and earlier please edit ***adminEmail*** property (section 5 - adminEmail) if you would like e-mail to be send through 'Contact' link from Web Services welcome page.
4. Other properties that can be configured for web services are:
   0. Section 11 - Logging configuration
5. When you finish making changes, save the file.

9.3.13 Verify the Installation of OpenClinica Web Services

1. Restart Tomcat
2. Point your web browser to the OpenClinica Web Services welcome page: http://<<server url>>:8080/OpenClinica-ws. The OpenClinica Web Services **Welcome** page should be display.
3. Verify the version number is v.x.x-Community, where v.x.x is the version number you upgraded OpenClinica Web Services to. The version number is displayed in the lower right corner of the page.

Web Services should have the same version as OpenClinica application.

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12.6 Upgrade to OpenClinica 3.3 on Linux

The following process describes how to upgrade Java and Tomcat to work with OpenClinica 3.3 on Linux. Be sure to back up your database before starting the upgrade process.

Before you begin, the following packages should be installed with your Linux operating system:
vim
unzip
tar
(eg:~# yum install vim)

You will require "root" user access to your operating system. Run all commands in this guide with a user account possessing root-level permissions.

9.3.1 Upgrade Java 6 to Java 7

9.3.1.1 Preconditions for Upgrading Java

1. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.

2. Verify the current version of Java is Java 6 by running this command:

   /usr/local/java/jre/bin/java version

9.3.1.2 Upgrade Java 6 to Java 7

a. For 32-bit operating systems, to get the files from OpenClinica, run:

wget https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/jdk-7u51-linux-i586.gz

b. For 64-bit operating systems, to get the files from OpenClinca, run:

wget https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/jdk-7u51-linux-x64.gz

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application.

1. Install Java by running:

   tar -xvf jdk-7u51-linux-x64.tar.gz

   chown R root:root jdk1.7.0_51

   chmod a+x jdk-7*

2. To install the Java in operating system by running

mv jdk1.7* /usr/local/

ln -s /usr/local/jdk1.7* /usr/local/java

Java is now installed in the correct location.

9.3.1.3 Verify Java 7 is installed

1. Verify the current version of the Java is Java 7 by running these commands in root:
2. /usr/local/java/jre/bin/java version
3. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.

9.3.2 Upgrade Tomcat 6 to Tomcat 7

9.3.2.1 Preconditions for Upgrading Tomcat

1. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.
2. Stop Tomcat 6 by running the following command:

   service tomcat stop
3. Uninstall Tomcat 6 from your system (including all the configuration files).

   rm i /usr/local/tomcat

   rm irf /usr/local/apache-tomcat-6.0.32

9.3.2.2 Install Tomcat 7

1. The OpenClinica software uses the Apache Tomcat Java application server.
   Download Tomcat 7 from one of the following sites and copy it into the local folder /usr/local/oc/install/
   Download it from the Tomcat website: http://tomcat.apache.org/download-70.cgi
   - or -
   Download it from the OpenClinica website:
   https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/apache-tomcat-7.0.52.tar.gz
   Run the following command in /usr/local/oc/install/ to install Tomcat 7.
   wget
   https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/apache-tomcat-7.0.52.tar.gz
2. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:
   cd /usr/local/oc/install
3. Install Tomcat by running the following:

   tar -xvf apache-tomcat-7*

mv apache-tomcat-7.0.52 /usr/local/

ln -s /usr/local/apache-tomcat-7.0.52 /usr/local/tomcat

(Note: The system will prompt you to enter your UNIX password. Use tomcat as the password, and press enter for all the default value for the full name, room number, phone, home phone and other. Is the info correct? Type Y and enter.)

4. Move the web apps provided with Tomcat that are not needed by OpenClinica to another location by running:

   mkdir /usr/local/tomcat/oldwebapps

   mv /usr/local/tomcat/webapps/* /usr/local/tomcat/oldwebapps

   Tomcat is now installed and you can set Tomcat to automatically start when you start your system, or you can start Tomcat manually by issuing commands.

   To set Tomcat to start automatically on system startup, run the following: (Note: Before running the command install the OpenClinica 3.3 on your install folder)

   cp /usr/local/oc/install/OpenClinica-3.3*/install-docs/linux/tomcat /etc/init.d/

   chmod a+x /etc/init.d/tomcat

   /sbin/chkconfig --add tomcat

   (Note: This command is only for Red Hat Linux. For other operating systems, see the operating system instructions for adding an init script.)

5. Update the File Path parameter to the correct value

   chown -R tomcat /usr/local/tomcat/*

   chown -R tomcat /usr/local/apache-*

9.3.2.3 Deploy the OpenClinica Software Package

Download the OpenClinica software package, OpenClinica 3.3.tar.gz, from the OpenClinica website: https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to the account in order to download the OpenClinica software.

First, make sure Tomcat is stopped:

1. Stop Tomcat 7 by running:
   service tomcat stop
2. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:
   cd /usr/local/oc/install
3. Run each of the following commands:

unzip OpenClinica 3.3*

cd OpenClinica 3.3*/distribution

unzip OpenClinica.war -d OpenClinica

cp -rf OpenClinica* /usr/local/tomcat/webapps

rm -f /usr/local/tomcat/webapps/OpenClinica

OpenClinica is now deployed for use with the database.

9.3.2.4 Verify Tomcat 7 is Started and the Application is Running

1. Start Tomcat:
   service tomcat start
   (Note: Replace start with stop to stop the Tomcat service)
2. Verify Tomcat 7 is running with the following commands. You should see a similar message as shown in the bracket().
   service tomcat status (Tomcat is running)
3. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.

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12.7 Upgrade to OpenClinica 3.3 on Windows

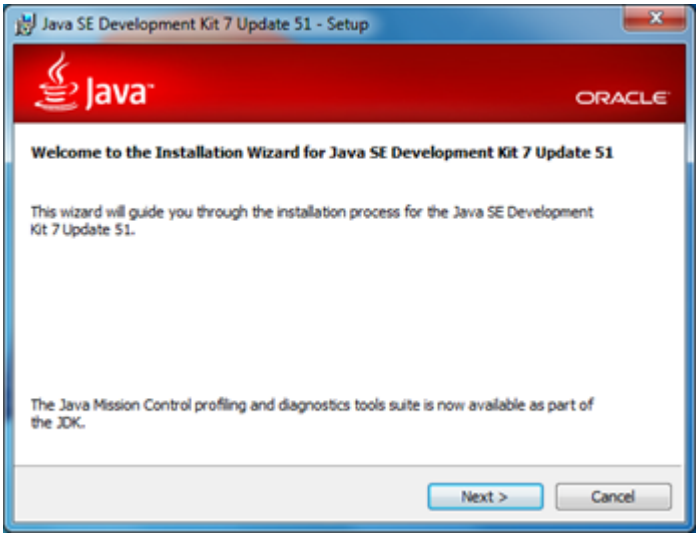
9.4.1 Upgrade Java 6 to Java 7

9.4.1.1 Preconditions for Upgrading Java

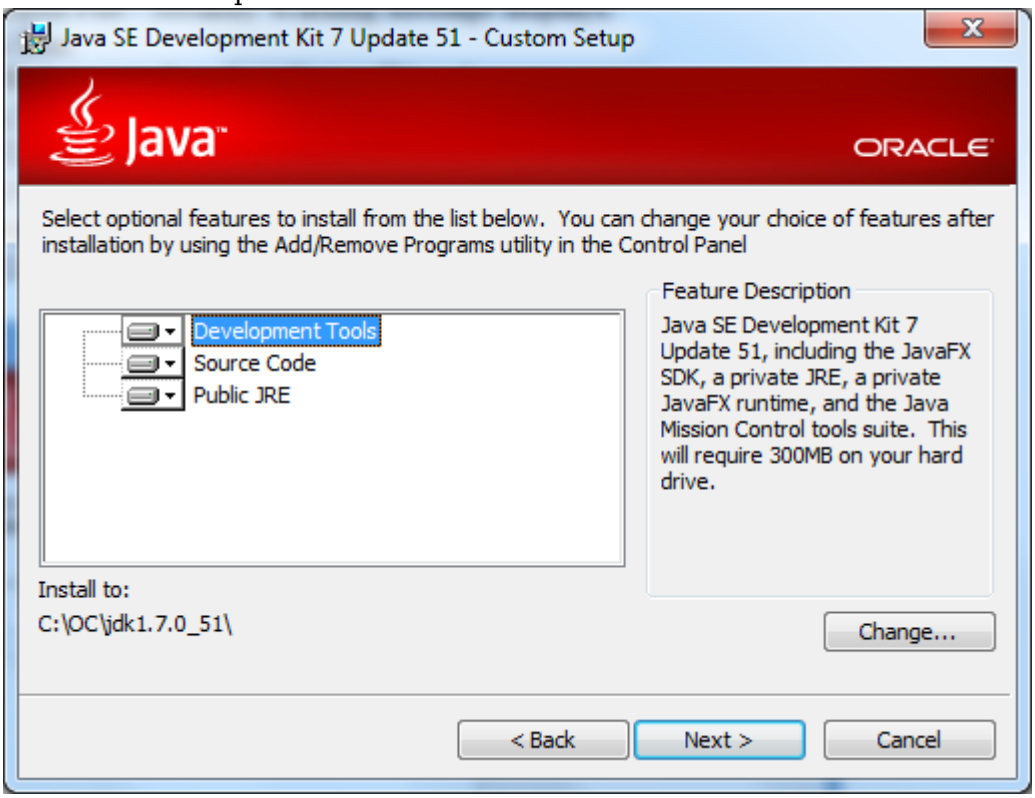
1. Verify Java 6 (jdk1.6.0_24) is already installed and running.
   Go to **Start>All Programs>Java Folder**. Click **About Java**.
   Verify the current version of Java is 6 (jdk1.6.0_24).
2. Verify the following directory exists c:ocinstall. If it does not, then create the directory.
3. Open a web browser and access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The OpenClinica login page should display.

9.4.1.2 Upgrade Java 6 to Java 7

1. From one of the following websites, download the Java 7 SE Development Kit 7.0 update (jdk-7u51-windows-i586.exe) and save it to c:ocinstall:
    - From the Java website: http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html
    - From the OpenClinica website: http://svn.akazaresearch.com/oc/software/OpenClinica-3.2/windows/
2. Run c:ocinstalljdk-7u51-windows-i586.exe.
3. The installation window starts and looks like:



4. Click Next
5. The Custom Setup screen displays.
   a. Click **Change**....
   b. Change the path to c:oc jdk1.7.0_51, then click OK.
   The Custom Setup screen should now look like this:



6. Click **Next**
7. **Java Setup-Destination Folder** will show up. Keep the default location and click **Next**
8. The Setup Wizard installs the JDK.

9. The **Install Success** screen displays.
10. Click **Close**.

9.4.1.3 Verify Java 7 is installed

1. Verify Java 7 (jdk1.7.0_51) has been installed and running. Also, please notice that all applications, not specified with Java 6, will use Java 7 after the upgrading.
   Go to **Start>All Programs>Java Folder**. Click **About Java**.
   Verify the current version of Java is 7 (jdk1.7.0_51). The updated **About Java** screen should look as below:

Verify Java 7 is installed by opening a web browser and accessing OpenClinica at the following URL: http://localhost:8080/OpenClinica
The OpenClinica login page should display

9.4.2 Upgrade Tomcat6 to Tomcat7

9.4.2.1 Preconditions for Upgrading Tomcat

1. First, open a web browser and verify you can access OpenClinica at the following URL: http://localhost:8080/OpenClinica
   The OpenClinica login page should display.
2. To upgrade the Tomcat 6 to Tomcat 7, you need to first remove Tomcat 6:

Stop Tomcat 6 using any one of these methods:

1. From the Apache Tomcat 6 Properties window:
   - Select **Start > Apache Tomcat 6.0 > Configure Tomcat** to open the window.
   - Click the **General** tab.
   - On the **General** page, click the **Stop** button to stop Tomcat
2. Using the Windows run command:
   - Select **Start > Run**.
   - In the **Run box**, type cmd, then click **OK**.

At the new command prompt, stop Tomcat by typing

net stop tomcat6

Then press **Enter**.

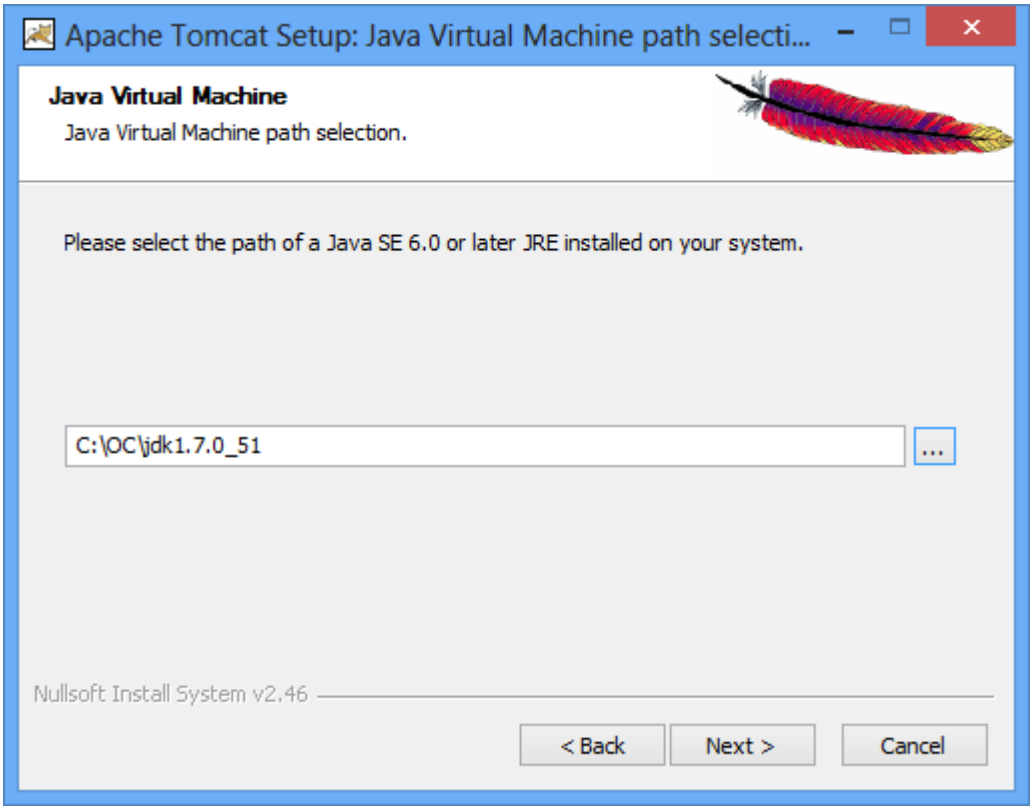
a. Uninstall Tomcat 6
Select **Start > Control Panel > Add Remove Programs**, then remove Tomcat 6 by pressing **uninstall** program.

b. Reboot the system

After removing the Tomcat6 from the program, reboot the system.

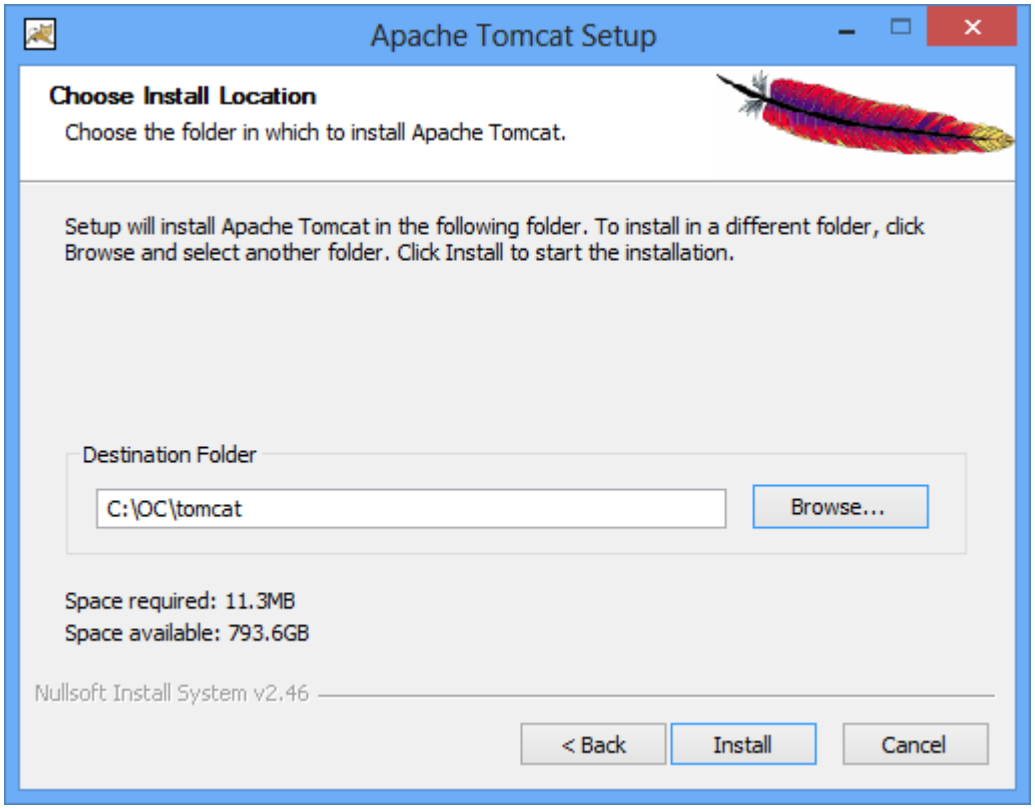
9.4.2.2 Install Tomcat 7

1. From either of the following two websites, download the Windows Service Installer Version, apache-tomcat-7.0.52.exe, and save it to c:ocinstall:
   - Download from the Apache website: http://tomcat.apache.org/download-70.cgi
   - Download from the OpenClinica website: http://svn.akazaresearch.com/oc/software/OpenClinica-3.3/windows/
2. Run the Installation file:
   c:ocinstallapache-tomcat-7.0.52.exe
   The **Apache Tomcat Setup Installation Wizard** opens.
   When the **Open File - Security Warning** message displays, click **Run**.
   On the **Welcome** screen of the **Apache Tomcat Setup Installation Wizard**, click **Next**.
   The **License Agreement** screen displays. Click **I Agree** to accept the agreement.
   The **Choose Components** screen displays. Click **Next** to accept the default values.
   The **Configuration** screen displays. Click **Next** to accept the default values.
   The **Java Virtual Machine** screen displays. Click ..., then select the path where you installed the JDK:
   c:oc jdk1.7.0_51
   The screen now should look like this:



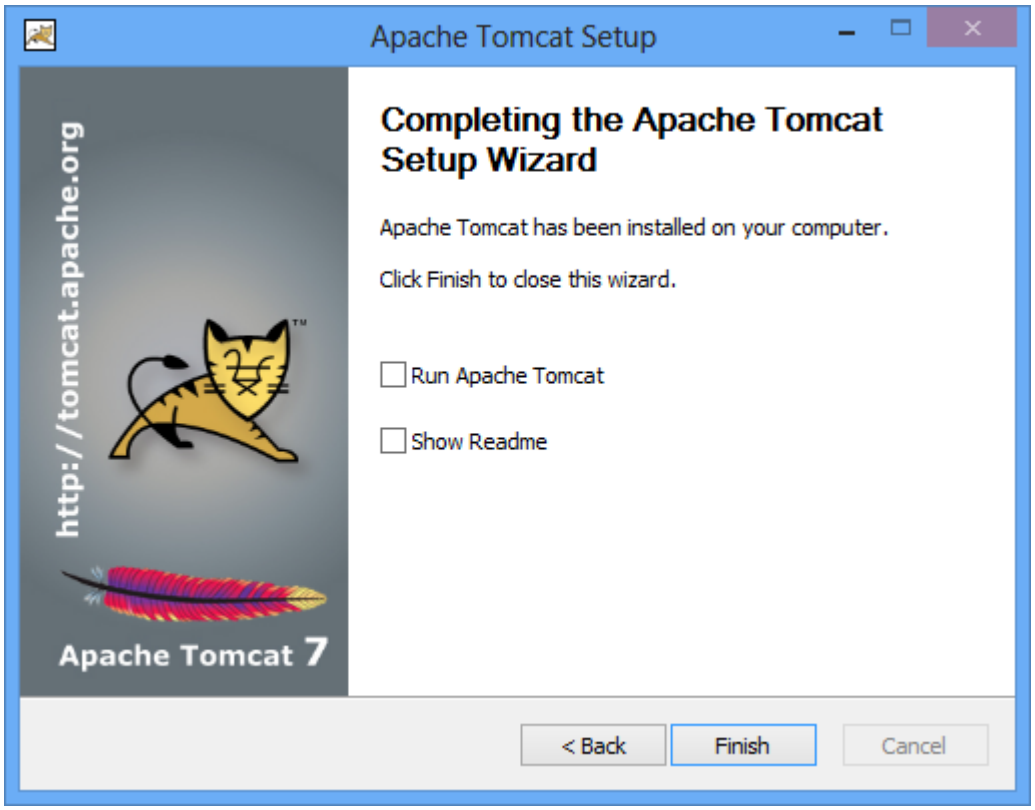
Click **Next**.

The **Choose Install Location** screen displays. Edit the **Destination Folder** to be c:octomcat. The screen should look like this:



Click **Install** to start the installation.
When the installation is finished, the **Completing the Apache Tomcat Setup Wizard** screen displays.Complete the screen as follows:

-Clear the **Run Apache Tomcat** checkbox.
-Clear the **Show Readme** checkbox.
The screen should now look like this:



Click **Finish.**

9.4.2.3 Deploy the OpenClinica Package

1. Download the OpenClinica software package, OpenClinica 3.3.zip, from the OpenClinica website: https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to the account in order to download the OpenClinica software.

   After downloading the OpenClinica software, move it to the directory with the other software dependencies you downloaded:
   c:ocinstall.

1. Right-click OpenClinica 3.3.zip and select **Extract All**.
   The **Extraction Wizard** opens.
2. Click **Next**
3. In the next screen, change the directory to c:ocinstall, and click **Next.**
4. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
5. Stop Tomcat. At the new command prompt, stop Tomcat by typing:
   net stop tomcat7
6. Copy c:ocinstallOpenClinica 3.3distributionOpenClinica.war to c:octomcatwebapps.

9.4.2.4 Verify Tomcat 7 is installed and Application is Running

a. Start Tomcat

Verify that Tomcat is running. If Tomcat is not started than start Tomcat using any one of these methods:

1. From the **Apache Tomcat 7**Properties window:
   - Select **Start > Apache Tomcat 7.0 > Configure Tomcat** to open the window.
   - Click the **General tab**.
   - On the **General** page, click the **Start** button to start Tomcat.
2. Using the Windows run command:
   Select **Start > Run**.
   In the **Run** box, type cmd, then click **OK**.
   At the new command prompt, start Tomcat by typing
   net start tomcat7
   then press **Enter**.

b. Verify the OpenClinica Application

Open a web browser and access the OpenClinica at the following URL:
http://localhost:8080/OpenClinica
The OpenClinica login page should display.

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12.8 Install OpenClinica 3.2 on Linux

These instructions have been verified for CentOS 6.5.

These instructions are for installing version 3.2 of OpenClinica, and also apply to installing the maintenance releases of 3.2 for example 3.2.1. When you see *v.x* or *v.x.y* in the instructions, use your version number, e.g. 3.2.1.

Overview of Installation on Linux Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

1. Ensure your operating system meets the specified requirements
2. Download the installation files
3. Install Java
4. Install Tomcat
5. Install PostgreSQL database
6. Set up the PostgreSQL database
7. Deploy OpenClinica within Tomcat
8. Set Tomcat to start
9. Configure the OpenClinica application
10. Restart the system and verify access to OpenClinica
11. Configure Tomcat to use HTTPS
12. Verify the installation by ensuring you can log in to OpenClinica.

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study Director) and then build a Study.

Operating System Requirements

The following packages should be installed for your Operating System:

- vim
- unzip
- tar

You require "root" user access. Run all commands in the installation instructions using root-level permission.

Download Installation Files

OpenClinica and OpenClinica Web Services run and depend on several external software technologies: the Java Development Kit, the Apache Tomcat Servlet Container, and the PostgreSQL relational database (unless you are using the Oracle database).

The OpenClinica website has a copy of the neccessary installers for Java, Tomcat, and PostgreSQL for you to download. If you choose to use versions of Java, Tomcat, and PostgreSQL other than those provided on the website, please note that they have not been tested with the OpenClinica application.

There are 32-bit and 64-bit editions of the software, when applicable. To determine if your system is running a 32-bit or 64-bit operating system, in your Linux terminal, run

uname -a

The display reports the version:

- If i386 or i686 displays, it is a 32-bit operating system.
- If x86_64 displays, it is a 64-bit operating system.

To download the installation files:

1. Run the following commands to create the OpenClinica directory on your system and to make it the current directory:

   mkdir -p /usr/local/oc/install
   cd /usr/local/oc/install
2. Run the following commands to download the Java, Tomcat, and PostgreSQL files for your architecture. In the commands, substitute *v.x* with the version of OpenClinica you are installing (e.g. 3.1):

   - For 32-bit operating systems, to get the files from OpenClinica run:

     Apache Tomcat: https://openclinica.app.box.com/oc-downloads/1/2186656927

     JDK and Postgres:
     https://openclinica.app.box.com/oc-downloads/1/2186650849

   - For 64-bit operating systems, to get the files from OpenClinca, run:

     Apache Tomcat: https://openclinica.app.box.com/oc-downloads/1/2186656927
     JDK and Postgres:
     https://openclinica.app.box.com/oc-downloads/1/2186651363

   - Instead of downloading the files from the above links, you can download them directly from their native websites:

     - PostgreSQL:http://www.postgresql.org/
     - Java:http://www.oracle.com/technetwork/java/index.html
     - Tomcat:http://tomcat.apache.org/
3. Download the OpenClinica software from the OpenClinica website, using this location:https://community.openclinica.com/project/openclinica. To download the software, you need an OpenClinica community user account, which is free to create; you will be required to log in to the account to download the OpenClinica software.

   After downloading the OpenClinica software, move it to the directory where you downloaded the other software components to:

   /usr/local/oc/install

Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Install Java by running:

   tar -zxvf jdk-7*

3. Install Java in the operating system by running:

   mv jdk1* /usr/local/
   ln -s /usr/local/jdk1* /usr/local/java

Java is now installed in the correct location.

Install Tomcat

The OpenClinica software uses the Apache Tomcat Java application server.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Install Tomcat by running the following:

   tar -zxvf apache-tomcat-*
   mv apache-tomcat-* /usr/local/
   ln -s /usr/local/apache-tomcat-7.0.52 /usr/local/tomcat
   /usr/sbin/adduser tomcat

3. Move the web apps provided with Tomcat that are not needed by OpenClinica to another location by running:

   mkdir /usr/local/tomcat/oldwebapps
   mv /usr/local/tomcat/webapps/* /usr/local/tomcat/oldwebapps

Tomcat is now installed.

Install PostgreSQL Database

The OpenClinica software uses PostgreSQL as an underlying relational database management system. Complete these instructions to install the PostgreSQL database.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the

current directory by running:

cd /usr/local/oc/install

2. Start the PostgreSQL setup by running:

   chmod a+x postgresql-8.4.*
   ./postgresql-8.4.* --mode text

   The PostgreSQL Setup Wizard starts.

3. For most of the options in the Setup Wizard, accept the defaults. Complete the Setup Wizard as follows:

Prompt	**Action**
Installation Directory [/opt/PostgreSQL/8.4]	Press Enter to accept.
Data Directory [/opt/PostgreSQL/8.4/data]	Press Enter to accept.
Password	Enter a password for the PostgreSQL database superuser, then press Enter. Record the password because you will need it again in this installation.
Retype Password	Type the password again, then pressEnter.
Port [5432]	Press Enter to accept.
Please choose an option [1]	Press Enter to accept.
Install pl/pgsql in template1 database? [Y/n]	Type n, then press Enter.
Do you want to continue? [Y/n]	Press Enter to accept.
Setup has finished installing PostgreSQL on your computer. Stack Builder may be used to download and install additional tools, drivers and applications to complement your PostgreSQL installation. [Y/n]	Type n, then press Enter.

PostgreSQL is now installed on your system and will start when you start up your system.

Set Up the PostgreSQL Database

Complete these instructions to set up the PostgreSQL database.

1. Run the following commands to create the PostgreSQL database and database user OpenClinica uses to connect to the database:

   /opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE"

/opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica"

2. The database user password is set to clinica by default, which is not a secure password. Change the password as follows:

    1. Run:

       /opt/PostgreSQL/8.4/bin/psql -U postgres

    2. A psql prompt displays with this message:

       ALTER USER clinica WITH PASSWORD 'XXXX';

    3. Replace XXXX with a secure password. Record the password for use in a later installation step.

    4. Exit the psql prompt by running:

       q

Deploying OpenClinica within Tomcat

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.2:

   unzip OpenClinica-*v.x**
   cd OpenClinica-v.x*/distribution
   unzip OpenClinica.war -d OpenClinica
   cp -rf OpenClinica* /usr/local/tomcat/webapps

OpenClinica is now deployed for use with the database.

Deploying OpenClinica Web Services within Tomcat

Web Services are optional. Do not install them if you are not planning to use them.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.2:

```
unzip OpenClinica-ws-v.x*
cd OpenClinica-ws-v.x*/distribution
unzip OpenClinica-ws.war -d OpenClinica-ws
cp -rf OpenClinica* /usr/local/tomcat/webapps
```

OpenClinica web services are now deployed for use with the database.

Set Tomcat to Start

You can set Tomcat to automatically start when you start your system, or you can start and stop Tomcat manually by issuing commands.

To set Tomcat to start automatically on system startup, run the following:

cp /usr/local/oc/install/OpenClinica-*v.x**/install-docs/linux/tomcat /etc/init.d/

cd /etc/init.d

chmod a+x /etc/init.d/tomcat

/sbin/chkconfig --add tomcat (Note: This command is only for Red Hat Linux. For other operating systems, see the operating system instructions for adding an init script.)

To stop and start Tomcat manually by issuing commands, run the following:

/usr/local/tomcat/bin/shutdown.sh (stops Tomcat)

/usr/local/tomcat/bin/startup.sh (starts Tomcat)

Configure OpenClinica for Optimum Performance

Under stress tests, OpenClinica 3.1.3 has performed well with the following JVM (Java Virtual Machine) settings:

Edit the init.d/tomcat and replace the JAVA_OPTS with following:

export JAVA_OPTS="$JAVA_OPTS -Xmx1280m -XX:+UseParallelGC -XX:ParallelGCThreads=n -XX:MaxPermSize=180m -XX:+CMSClassUnloadingEnabled"

For the setting -XX:ParallelGCThreads=n, n should be replaced with the # of cores of your CPU as long as the total number of cores are lesser than 8.

The number of cores can be determined by using 'top' command.

Please note that the minimum RAM requirement is 1280 MB of memory for these settings, so the server is expected to have much higher RAM available. The amount of available memory can be determined by using the command free -m to give the memory (in MB). The MaxPermSize value

depends on the number of war files that you are deploying. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.

For the settings to take effect, restart the Tomcat server.

Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected in Set Up the PostgreSQL Database. Change the values for any other properties, then save the file.
3. Update the filePath parameter to the right value.
4. Run the following commands:

   chown -R tomcat /usr/local/tomcat/*
   chown -R tomcat /usr/local/apache-*
5. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization

Configure the OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system.

Note: Most of the properties are not needed or used for Web Services, see Description of datainfo.properties File for Web Services for more information on what settings are actually used.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica-ws/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other properties.
3. Run the following commands:

   chown -R tomcat /usr/local/tomcat/*

chown -R tomcat /usr/local/apache-*

Description of datainfo.properties File

The datainfo.properties file will look similar to the following. Each group of properties is numbered and a description of the property group is presented as a series of comment lines (lines that begin with # are comments) before the section where you specify the values for the properties in the group.

```
##########################################################################
################

# 1 - Database Configuration

#

# Database configuration is done with the following 6 properties

# The dbType options are either postgres or oracle.

# Enter the user name and password to access the database in

# dbUser and dbPass.

# The db field is for the name of the database and provide the port

# in dbPort.

# dbHost can be a URL, IP address or localhost

#

# REQUIRED

##########################################################################
################

dbType=postgres

dbUser=clinica

dbPass=clinica

db=${WEBAPP.lower}

dbPort=5432

dbHost=localhost



##########################################################################
```

```
#################

# 2 - filePath

#

# File Path is the string which declares the

# repository for all uploaded and generated

# files in the system, including CRFs and

# data sets.  The directory should NOT be

# accessible by the web server.

#

# REQUIRED.

############################################################
#################

filePath=${catalina.home}/${WEBAPP.lower}.data/



############################################################
#################

# 3 - Attached File Location

# Location for files if item data type is "file". If it has been kept empty,

# "filePath" will be used as the attached file location.

# This will be a sub folder within the filePath location only.

# You may configure a full path that points to a directory outside of the filePath.

# If you configure a full path, it must have a trailing slash.

# Example = /usr/local/attached_file/ or C:\attached_file\

#

# NOT REQUIRED

############################################################
#################

# attached_file_location=
```

```
##############################################################################
################

# 4 - user_account_notification

#

# User Account Notification is the method by

# which new users are sent their passwords.

# Users can be sent passwords via email,

# or the password can be displayed on the screen

# to the administrator, who is instructed to

# write it down and physically give it to the user

# in question.  The default is email.

#

# REQUIRED.

##############################################################################
################

userAccountNotification=email



##############################################################################
################

# 5 - adminEmail

#

# The Admin Email is the field to set the administrator's

# email for a given server. It is also used for

# replies to the email messages sent by the system.

#

# REQUIRED

##############################################################################
################

adminEmail=admin@example.com
```

```
################################################################################
################

# 6- Spring Based Email System

#

# Configure the Email SMTP host below. If the host

# requires a username and password make sure

# mail.smtp(s).auth is set to true.

# Configure mail protocol via mail.protocol, Valid options

# would be smtp or smtps.

# Configure smtp over ttls by setting mail.smtp(s).starttls.enable

# to true.

# Configure connection timeout. Preconfigred to 5 secs

################################################################################
################

mailHost=mail.smtp.com

mailPort=25

mailProtocol=smtp

mailUsername=

mailPassword=

mailSmtpAuth=false

mailSmtpStarttls.enable=false

mailSmtpsAuth=false

mailSmtpsStarttls.enable=false

mailSmtpConnectionTimeout=100

mailErrorMsg=developers@openclinica.org


################################################################################
################

# 8 - sysURL
```

```
#
# The web address for the system.  It can either be an external
# address (demo.openclinica.org) or an internal IP
# address (192.168.2.000).
# NOTE: If you reconfigure the address or port in some later
# step, such as by configuring SSL, you will need to come back
# and update this file. You will also need to restart tomcat
# for changes to this take effect.
#
# REQUIRED
##########################################################################
sysURL=http://localhost:8080/${WEBAPP}/MainMenu


##########################################################################
# 9 - max_inactive_interval
#
# This is maximum time interval between client requests. That is,
# if users leave any page open without sending a request to the
# server, after this time interval, when users attempt sending
# request they will be directed to login page.
#
# REQUIRED
##########################################################################
maxInactiveInterval=3600


##########################################################################
```

```
# 11 - Logging configuration


# SysLog support has been fully implemented in OpenClinica, but by default has been turned off.
# Every piece of code that could send information to the syslog server has not been reviewed
# and cleaned to ensure it is entirely readable and useful.  This will be an ongoing effort
# and resolved in a future release.  Please use the SysLog support at your own risk.
#
# Specify the log location - local/syslog/both
#
log.dir=${catalina.home}/logs/openclinica
logLocation=local
#
# Specify logging level - trace/debug/info/warn/error
logLevel=info
syslog.host=localhost
syslog.port=514


##########################################################################
################

# 12- News/About
# On the OpenClinica login screen, there will be a box to the right of the login section
# which can contain an RSS feed.  You can configure what RSS feed is used in the rss.rl field.
# If you do not want the RSS feed, please comment out rss.url and rss.more and uncomment
# about.text1 and about.text2.  These two fields can be used for any free form text that you
# you want to appear on the OpenClinica login page.
# the default feed is http://clinicalresearch.wordpress.com/feed/
# default value for rss.more http://clinicalresearch.wordpress.com/
##########################################################################
################
```

rssUrl=http://clinicalresearch.wordpress.com/feed/

rssMore=http://clinicalresearch.wordpress.com/

about.text1= Hello World 1

about.text2= Hello World 2

##
###############

13 - CRF File Upload Configuration

crf.file.extensionSettings can have 3 values valid,invalid or left empty which defaults to valid.

if crf.file.extensionSetting= valid , then extensions specified can be uploaded.

if crf.file.extensionSetting= invalid , then extensions specified can NOT be uploaded.

if crf.file.extensions is left empty and crf.file.extensionSettings=valid then all extensions are valid

if crf.file.extensions is left empty and crf.file.extensionSettings=invalid then all extensions are NOT valid

separate extensions with a comma and do not include the leading dot.

##
###############

crfFileExtensions=

crfFileExtensionSettings=

##
###############

14 - supportURL

#

The Support URL is included in the support button that appears

in the top right corner of all pages in OPenClinica. By including

the URL here we will be able to configure it depending on the adopter

#

REQUIRED

##

```
################

# supportURL=https://www.openclinica.com/OpenClinica/3.1/support/


#############################################################
################

# 15- Quartz Scheduler Configuration

#

# Configure the mis-fire threshold for the scheduler,

# and the number of extract jobs can run at a single time.

#

# REQUIRED

#############################################################
################

org.quartz.jobStore.misfireThreshold=18000000

org.quartz.threadPool.threadCount=1

org.quartz.threadPool.threadPriority=5


#############################################################
################

# 16 - CCTS configuration

#

# This is used for OpenClinica instances that have been modified and configured

# to work with the Cancer Clinical Trials Suites.  This is a caBIG suite of applications.

# The configuration determines how long OpenClinica will hold a transaction from C3PR

# and will wait for a roll back message before committing it to the database.

#

# NOT REQUIRED

#############################################################
################

ccts.waitBeforeCommit=6000
```

```
################################################################################
################

# 17 - Facility information

#

# The OpenClinica defaults will be used when creating a new study

# unless you uncomment each property and provide a value next to

# each = sign.

#

# NOT REQUIRED

################################################################################
################

# FacName=

# FacCity=

# FacState=

# FacZIP=

# FacCountry=

# FacContactName=

# FacContactDegree=

# FacContactPhone=

# FacContactEmail=


################################################################################
################

# 18 - export data file path

#

# Export Data File Path is the string which (optionally)

# declares a specific file path for file extracts to be

# saved.  This is a sub folder of filePath.

# Note that if it is set, files from Jobs only will be saved
```

to two places: this directory and under the above file path

declared in the 'filePath' property.

#

NOT REQUIRED. Please comment out if you want Jobs to generate

one file/files only, in the directory structure under 'filePath'.

##

exportFilePath=scheduled_data_export

##

extract.number defines how many subjects the system will paginate through when creating the ODM file to

to be transformed by the XSLT engine. This number can be increased to use higher amounts of memory and

potentially decrease the amount of wait time. Lower this number if you have an extremely large amount of

event definitions to reduce the impact on concurrent users in the system at the time of the extract.

This is a global setting that applies to all extracts in your OpenClinica instance.

##

extract.number=99

##

19 - Usage statistics configuration

Usage statistics refers to information automatically sent back to OpenClinica.org

to help us figure out how well OpenClinica is working and help us improve it in

future versions.

This includes technical information such as the version of OpenClinica installed, the number of studies created and user load. These statistics DO NOT include information such as study or CRF names, study data, or user information. We collect this data in aggregate and use it according to our

Privacy Policy [https://community.openclinica.com/privacy-policy] to improve our products and services.

#

As part of system configuration, we give you the option to help us improve OpenClinica by sending these usage statistics. If you elect to send this information but later change your mind, you can disable this feature in the datainfo.properties file by changing

'collectStats' value to 'false'

collectStats=true

usage.stats.host=usage.openclinica.com

usage.stats.port=514

OpenClinica.version=3.2

##

20 - Rule Designer configuration

OpenClinica Enterprise customers are allowed access to a GUI based Rule Designer.

This configuration allows the OpenClinica instance to contact the Rule Designer for

access. If you are not an OpenClinica Enterprise customer, your users will be re-directed

to a landing page and will have to navigate back to their OpenClinica instance.

If you do not want to see a link to the Rule Designer on the Build Study page,

you must delete this configuration option.

#

To become an OpenClinica Enterprise customer, please contact sales@openclinica.com

##

designerURL=http://localhost:8080/designer/

##

21 - LDAP/Active Directory configuration

#

IMPORTANT: To use LDAP, the property of the configuration number '10 - change_passwd_required' must be set to '0'

#

##
################

If ldap is enabled (values:'true' or 'false')

ldap.enabled=false

LDAP host in the form 'ldap://<host>:<port">'

ldap.host=

User distinguished name used to authenticate to LDAP

#ldap.userDn=cn=ldap1,ou=ldap,dc=dc1,dc=dc2

ldap.userDn=cn=chin,ou=chin_ldap,dc=dc1,dc=dc2

Password used to authenticate to LDAP

ldap.password=

Query used to during login to find the LDAP user by username. Should always return a maximum of one result.

ldap.loginQuery=(sAMAccountName={0})

URL to redirect LDAP users to retrieve a forgotten password

ldap.passwordRecoveryURL=http://www.google.com?&q=what+do+i+do+if+i+forgot+my+password%3F

BaseDN to search for users

ldap.userSearch.baseDn=DC=dc1,dc=dc2

Query used to search users in the user search screen (when creating a new user).

The '{0}' placehoder is replaced by the value typed in the 'filter' field.

Simple query, searches only username

#ldap.userSearch.query=(&(memberOf=CN=ldapgroup,OU=ldap,DC=dc1,DC=dc2)(sAMAccountName=*{0}*))

#

Sophisticated query, searches username, first name, last name and email

ldap.userSearch.query=(&(memberOf=CN=ldapgroup,OU=ldap,DC=dc1,dc=dc2)(|(sAMAccountName=*{0}*)))

Field used to retrieve the user's distinguished name

ldap.userData.distinguishedName=distinguishedName

Field used to retrieve the user's username

ldap.userData.username=sAMAccountName

Field used to retrieve the user's first name

ldap.userData.firstName=givenName

Field used to retrieve the user's last name

ldap.userData.lastName=sn

Field used to retrieve the user's email

ldap.userData.email=mail

Field used to retrieve the user's organization

ldap.userData.organization=company

Description of datainfo.properties File for Web Services

Web Services datainfo.properties file is similar the datainfo.properties of OpencClinica. However, web services needs less configuration than OpenClinica. The following file show highlighted properties that are relevant to web services. Only properties from first section must be updated and should be set exaclty as they are set for OpenClinica.

###

 # 1 - Database Configuration

#

 # Dateabase configuration is done with th following 6 properties

 # The dbType options are either postgres or oracle.

 # Enter the user name and password to access the database in

 # dbUser and dbPass.

 # The db field is for the name of the database and provide the port

 # in dbPort.

 # dbHost can be a URL, IP address or localhost

#

 # REQUIRED

###

dbType=postgres

dbUser=clinica

dbPass=clinica

db=openclinica

dbPort=5432

dbHost=localhost

###

 # 2 - filePath

#

 # File Path is the string which declares the

 # repository for all uploaded and generated

 # files in the system, including CRFs and

 # data sets. The directory should NOT be

 # accessible by the web server.

#

 # REQUIRED.

##

filePath=${catalina.home}/${WEBAPP.lower}.data/

##

3 - Attached File Location

Location for files if item data type is "file". If it has been kept empty,

"filePath" will be used as the attached file location.

This will be a sub folder within the filePath location only.

You may configure a full path that points to a directory outside of the filePath.

If you configure a full path, it must have a trailing slash.

Example = /usr/local/attached_file/ or C:\attached_file\

#

NOT REQUIRED

##

attached_file_location=

##

4 - user_account_notification

#

User Account Notification is the method by

which new users are sent their passwords.

Users can be sent passwords via email,

or the password can be displayed on the screen

to the administrator, who is instructed to

write it down and physically give it to the user

in question. The default is email.

#

REQUIRED.

##

userAccountNotification=email

##

 # 5 - adminEmail

#

 # The Admin Email is the field to set the administrator's

 # email for a given server. It is also used for

 # replies to the email messages sent by the system.

#

 # REQUIRED

##

adminEmail=admin@example.com

##

 # 6- Spring Based Email System

#

 # Configure the Email SMTP host below. If the host

 # requires a username and password make sure

 # mail.smtp(s).auth is set to true.

 # Configure mail protocol via mail.protocol, Valid options

 # would be smtp or smtps.

 # Configure smtp over ttls by setting mail.smtp(s).starttls.enable

 # to true.

 # Configure connection timeout. Preconfigred to 5 secs

##

mailHost=mail.smtp.com

mailPort=25

mailProtocol=smtp

mailUsername=

mailPassword=

mailSmtpAuth=false

mailSmtpStarttls.enable=false

mailSmtpsAuth=false

mailSmtpsStarttls.enable=false

mailSmtpConnectionTimeout=100

mailErrorMsg=developers@openclinica.org

##

8 - sysURL

#

The web address for the system. It can either be an external

address (demo.openclinica.org) or an internal IP

address (192.168.2.000).

NOTE: If you reconfigure the address or port in some later

step, such as by configuring SSL, you will need to come back

and update this file. You will also need to restart tomcat

for changes to this take effect.

#

REQUIRED

##

sysURL=http://localhost:8080/${WEBAPP}/MainMenu

##

9 - max_inactive_interval

#

This is maximum time interval between client requests. That is,

if users leave any page open without sending a request to the

server, after this time interval, when users attempt sending

request they will be directed to login page.

#

REQUIRED

##

maxInactiveInterval=3600

##

 # 11 - Logging configuration

 # SysLog support has been fully implemented in OpenClinica, but by default has been turned off.

 # Every piece of code that could send information to the syslog server has not been reviewed

 # and cleaned to ensure it is entirely readable and useful. This will be an ongoing effort

 # and resolved in a future release. Please use the SysLog support at your own risk.

#

 # Specify the log location - local/syslog/both

#

log.dir=${catalina.home}/logs/openclinica-ws

logLocation=local

#

 # Specify logging level - trace/debug/info/warn/error

logLevel=info

syslog.host=localhost

syslog.port=514

##

12- News/About

On the OpenClinica login screen, there will be a box to the right of the login section

which can contain an RSS feed. You can configure what RSS feed is used in the rss.rl field.

If you do not want the RSS feed, please comment out rss.url and rss.more and uncomment

about.text1 and about.text2. These two fields can be used for any free form text that you

you want to appear on the OpenClinica login page.

the default feed is http://clinicalresearch.wordpress.com/feed/

default value for rss.more http://clinicalresearch.wordpress.com/

##

rssUrl=http://clinicalresearch.wordpress.com/feed/

rssMore=http://clinicalresearch.wordpress.com/

about.text1= Hello World 1

about.text2= Hello World 2

##
###############

13 - CRF File Upload Configuration

crf.file.extensionSettings can have 3 values valid,invalid or left empty which defaults to valid.

if crf.file.extensionSetting= valid , then extensions specified can be uploaded.

if crf.file.extensionSetting= invalid , then extensions specified can NOT be uploaded.

if crf.file.extensions is left empty and crf.file.extensionSettings=valid then all extensions are valid

if crf.file.extensions is left empty and crf.file.extensionSettings=invalid then all extensions are NOT valid

separate extensions with a comma and do not include the leading dot.

##
###############

crfFileExtensions=

crfFileExtensionSettings=

##
###############

14 - supportURL

#

The Support URL is included in the support button that appears

in the top right corner of all pages in OPenClinica. By including

the URL here we will be able to configure it depending on the adopter

#

REQUIRED

##

```
################

# supportURL=https://www.openclinica.com/OpenClinica/3.1/support/


#########################################################################
################

# 15- Quartz Scheduler Configuration

#

# Configure the mis-fire threshold for the scheduler,

# and the number of extract jobs can run at a single time.

#

# REQUIRED

#########################################################################
################

org.quartz.jobStore.misfireThreshold=18000000

# threadCount should be set to zero on web services modules

org.quartz.threadPool.threadCount=0

org.quartz.threadPool.threadPriority=5


#########################################################################
################

# 16 - CCTS configuration

#

# This is used for OpenClinica instances that have been modified and configured

# to work with the Cancer Clinical Trials Suites.  This is a caBIG suite of applications.

# The configuration determines how long OpenClinica will hold a transaction from C3PR

# and will wait for a roll back message before committing it to the database.

#

# NOT REQUIRED

#########################################################################
################
```

```
ccts.waitBeforeCommit=6000


##################################################################
################

# 17 - Facility information

#

# The OpenClinica defaults will be used when creating a new study

# unless you uncomment each property and provide a value next to

# each = sign.

#

# NOT REQUIRED

##################################################################
################

# FacName=

# FacCity=

# FacState=

# FacZIP=

# FacCountry=

# FacContactName=

# FacContactDegree=

# FacContactPhone=

# FacContactEmail=


##################################################################
################

# 18 - export data file path

#

# Export Data File Path is the string which (optionally)

# declares a specific file path for file extracts to be
```

saved. This is a sub folder of filePath.

Note that if it is set, files from Jobs only will be saved

to two places: this directory and under the above file path

declared in the 'filePath' property.

#

NOT REQUIRED. Please comment out if you want Jobs to generate

one file/files only, in the directory structure under 'filePath'.

##

exportFilePath=scheduled_data_export

##

19 - Usage statistics configuration

Usage statistics refers to information automatically sent back to OpenClinica.org

to help us figure out how well OpenClinica is working and help us improve it in

future versions.

This includes technical information such as the version of OpenClinica installed, the number of studies created and user load. These statistics DO NOT include information such as study or CRF names, study data, or user information. We collect this data in aggregate and use it according to our Privacy Policy [https://community.openclinica.com/privacy-policy] to improve our products and services.

#

As part of system configuration, we give you the option to help us improve OpenClinica by sending these usage statistics. If you elect to send this information but later change your mind, you can disable this feature in the datainfo.properties file by changing

'collectStats' value to 'false'

collectStats=true

usage.stats.host=usage.openclinica.com

usage.stats.port=514

OpenClinica.version=3.2

##

################

20 - Rule Designer configuration

OpenClinica Enterprise customers are allowed access to a GUI based Rule Designer.

This configuration allows the OpenClinica instance to contact the Rule Designer for

access. If you are not an OpenClinica Enterprise customer, your users will be re-directed

to a landing page and will have to navigate back to their OpenClinica instance.

If you do not want to see a link to the Rule Designer on the Build Study page,

you must delete this configuration option.

#

To become an OpenClinica Enterprise customer, please contact sales@openclinica.com

##
################

designerURL=https://designer.openclinica.com/

**##
################**

 # 21 - LDAP/Active Directory configuration

#

 # IMPORTANT: To use LDAP, the property of the configuration number '10 - change_passwd_required' must be set to '0'

#

**##
################**

 # If ldap is enabled (values:'true' or 'false')

ldap.enabled=false

 # LDAP host in the form 'ldap://<host>:<port">'

ldap.host=

 # User distinguished name used to authenticate to LDAP

#ldap.userDn=cn=ldap1,ou=ldap,dc=dc1,dc=dc2

ldap.userDn=cn=chin,ou=chin_ldap,dc=dc1,dc=dc2

 # Password used to authenticate to LDAP

ldap.password=

 # Query used to during login to find the LDAP user by username. Should always return a maximum of one result.

ldap.loginQuery=(sAMAccountName={0})

 # URL to redirect LDAP users to retrieve a forgotten password

ldap.passwordRecoveryURL=http://www.google.com?&q=what+do+i+do+if+i+forgot+my+password%3F

 # BaseDN to search for users

ldap.userSearch.baseDn=DC=dc1,dc=dc2

 # Query used to search users in the user search screen (when creating a new user).

 # The '{0}' placehoder is replaced by the value typed in the 'filter' field.

 # Simple query, searches only username

#ldap.userSearch.query=(&(memberOf=CN=ldapgroup,OU=ldap,DC=dc1,DC=dc2)(sAMAccountName=*{0}*))

#

 # Sophisticated query, searches username, first name, last name and email

ldap.userSearch.query=(&(memberOf=CN=ldapgroup,OU=ldap,DC=dc1,dc=dc2)(|(sAMAccountName=*{0}*)))

 # Field used to retrieve the user's distinguished name

ldap.userData.distinguishedName=distinguishedName

 # Field used to retrieve the user's username

ldap.userData.username=sAMAccountName

 # Field used to retrieve the user's first name

ldap.userData.firstName=givenName

 # Field used to retrieve the user's last name

ldap.userData.lastName=sn

 # Field used to retrieve the user's email

ldap.userData.email=mail

 # Field used to retrieve the user's organization

ldap.userData.organization=company

Verify Access to OpenClinica

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Restart the system by running:

reboot

After the system starts up, access OpenClinica at the following URL:

http://localhost:8080/OpenClinica

The Log In page should display.

To verify your set-up, try to access OpenClinica from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

Verify Access to OpenClinica Web Services

At this point, Java, Tomcat, PostgreSQL, and OpenClinica and OpenClinica Web Services are installed and set up. Restart the system by running:

reboot

After the system starts up, access OpenClinica Web Services at the following URL:

http://localhost:8080/OpenClinica-ws

The **Welcome** page should display.

To verify your set-up, try to access OpenClinica Web Services from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

Configure Tomcat to Use HTTPS

OpenClinica strongly recommends securing the Tomcat application server using a Secure Socket Layer protocol (SSL). SSL is a data transport encryption technology used to make secure https:// connections. SSL requires a third-party security certificate to be effective. Information about configuring SSL certificates for Tomcat is at this website: http://tomcat.apache.org/tomcat-6.0-doc/ssl-howto.html.

Verify the Installation

Log in to OpenClinica with the username root and the password 12345678. OpenClinica requires you to change the password for the user "root" to a secure password. See Update User Profile if you need more information.

The user "root" is assigned to the Study "Default". Create a user account login for yourself, with the User Type set to "technical administrator" and the User Role set to Data Manager. For instructions to create the user account, see Create a New User.

Functional approval by Rahul Sundaram. Signed on 2014-07-10 12:24PM

Approved for publication by Ben Baumann. Signed on 2014-07-10 12:29PM

Not valid unless obtained from the OpenClinica document management system on the day of use.

12.9 Install OpenClinica 3.2 on Windows

These installation instructions have been verified on the following Windows operating systems versions:

- Windows Server 2003 Standard Edition SP2
- Windows Server 2003 Standard Edition SP1

Please note that all these instructions require Administrator-level permissions.

These instructions are for installing version 3.2 of OpenClinica. Screenshots shown in these instructions might look different than the screens on your system because your operating system might not be exactly the same. For the same reason, your screenshots might not correspond exactly with those in the written instructions. Where the screenshot differs from the written instruction, always follow the written instruction.

All characters in the installation commands are case sensitive. Also note that any additional white space between or after characters in commands could cause installation errors.

9.3.1 Overview of Installation on Windows Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

- 9.3.2 Ensure your system complies with software dependencies and operating system requirements.
- 9.3.3 Install Java
- 9.3.4 Install PostgreSQL
- 9.3.5 Install Tomcat
- 9.3.6 Starting and Stopping Tomcat
- 9.3.7 Set Up the PostgreSQL Database
- 9.3.8 Configure Tomcat to Work with OpenClinica and OpenClinica Web Services
- 9.3.9 Configure the OpenClinica Installation
- 9.3.10 Verify the Installation
- 9.3.11 Install OpenClinica Web Services Package
- 9.3.12 Configure OpenClinica Web Services
- 9.3.13 Verify the Installation of OpenClinica Web Services

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study Director), and then build a Study.

9.3.2 Software Dependencies and Operating System Requirements

Windows Configuration

Your Windows operating system must be configured to show file extensions by default. To configure this behavior:

1. Open a **Windows Explorer** window.
2. Select **Tools > Folder Options**.
3. Click the **View** tab.
4. In **Advanced** settings, clear the **Hide extensions for known file types** checkbox.
5. Click **Apply**.

Software Dependencies
OpenClinica runs on any Servlet/JSP container that implements the Servlet 2.4 and JavaServer Pages 2.0 specifications from the Java Community Process. OpenClinica was developed to run on and has been tested with Apache Tomcat 7.0.52.

OpenClinica runs on the PostgreSQL relational database. Using a
JDBC (Java Database Connectivity) driver, the database connects to the OpenClinica web application and provides the data to the user.

New installations require the following software dependencies, all of which are open source. These installation instructions walk through the process of downloading, installing, and configuring them for use with OpenClinica.

- Java 7 Standard Edition Development Kit 7.0 update 52 (Note: Java frequently changes its naming conventions.)
- Tomcat 7.0.52
- PostgreSQL 8.4.7.2

Other Versions of Dependent Software
The software dependencies OpenClinica uses are frequently updated with minor versions and revisions. Sometimes only a matter of weeks separates the release of two adjacent versions. In some cases, the particular revision number used may no longer be available. In general, you should be able to use more recent minor versions and revisions of the software dependencies. For example, if the installation instructions refer to PostgreSQL 8.4.7.2, then PostgreSQL 8.4.8 should work successfully too (but not PostgreSQL 9).
Record the version or revision number of all the software you use. If you have concerns about a particular combination, post your question to the OpenClinica Forums.

9.3.3 Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application. Follow these instructions to install Java:

1. OpenClinica 3.2 is designed to run on a Java 7 SDK platform. To avoid conflicts with other versions of Java, clear out any other Java installations on the system. Select **Start > Control Panel > Add Remove Programs**, then remove any Java JREs and SDKs.
2. Create the directory c:ocinstall.
3. From one of the following websites, download the Java 7 SE Development Kit 7.0 update 52 (jdk-7u51-windows-i586.exe) into c:ocinstall:

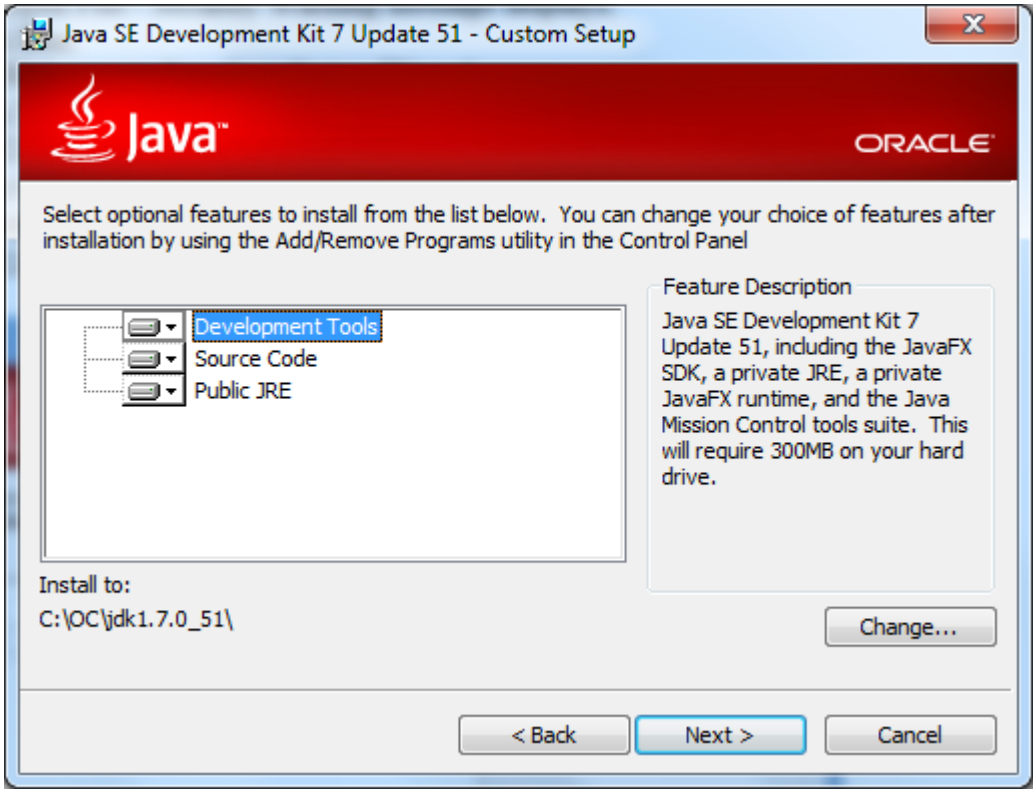
   - From the Java website:
     http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html

4. Run c:ocinstalljdk-7u51-windows-i586.exe.

5. The **Open File - Security Warning** message displays.

6. Click **Run**.
The **Welcome to Java Installation** Wizard opens.
7. Click **Next**.
The **Custom Setup** screen displays.
8. Click **Change**....

9. Change the path to c:oc jdk1.7.0_51, then click **OK**.
The **Custom Setup screen** should now look like this:



10. Click **Next**.
The Setup Wizard installs the JDK. When setup completes, a screen to install JRE7 displays.
11. Click **Cancel**, and then in the confirmation dialog box click **Yes**.
The **Install Success** screen displays.
12. Click **Close**.
13. A web browser window opens, presenting you with the option to register the JDK. Register, or close the window.

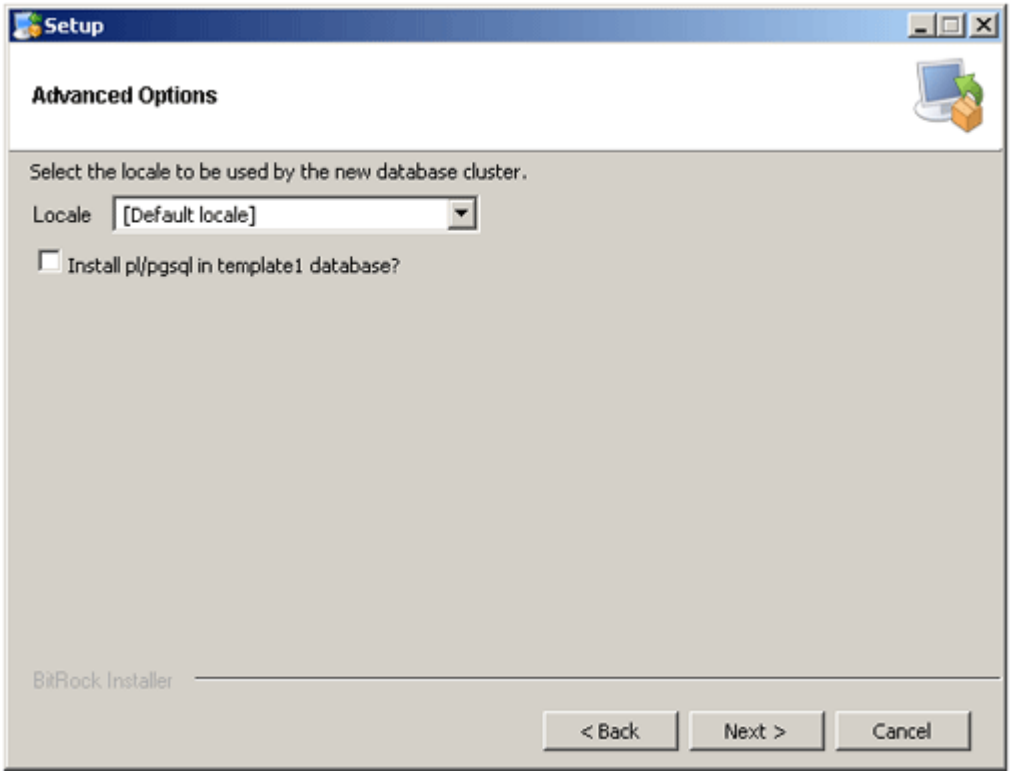
9.3.4 Install PostgreSQL Database

The OpenClinica software uses the PostgreSQL relational database management system. Complete these instructions to install PostgreSQL.

1. From this location http://www.enterprisedb.com/postgresql-8421-installers-win32?ls=Crossover&type=Crossover , download the executable to c:ocinstall.
2. Run the executable.
   The **Open File Security Warning** message displays
3. Click **Run**.
   The **PostgreSQL Installation Wizard** opens.
4. Click **Next**.
   The **Installation directory** screen displays.
5. Click **Next** to accept the default values.
   The **Data directory** screen displays.
6. Click **Next** to accept the default values.
   The **Password** screen displays.
7. Enter a password for the Postgres superuser. Record the password for use later in the

installation process. Re-enter the password, and click **Next**.
The **Port** screen displays.

8. Click **Next** to accept the default value (5432).
The **Advanced Options** screen displays.



9. Complete the screen as follows:
   1. For **Locale**, select **Default locale**.
   2. Clear the **Install pl/pgsql in template1** database? checkbox.
   3. Click **Next**.

   The **Ready to install** screen displays
10. Click **Next** to start the installation.
When the installation finishes, the Completing the **PostgreSQL Setup Wizard** screen displays.
11. Clear the **Launch Stackbuilder at exit** checkbox, then click **Finish**.

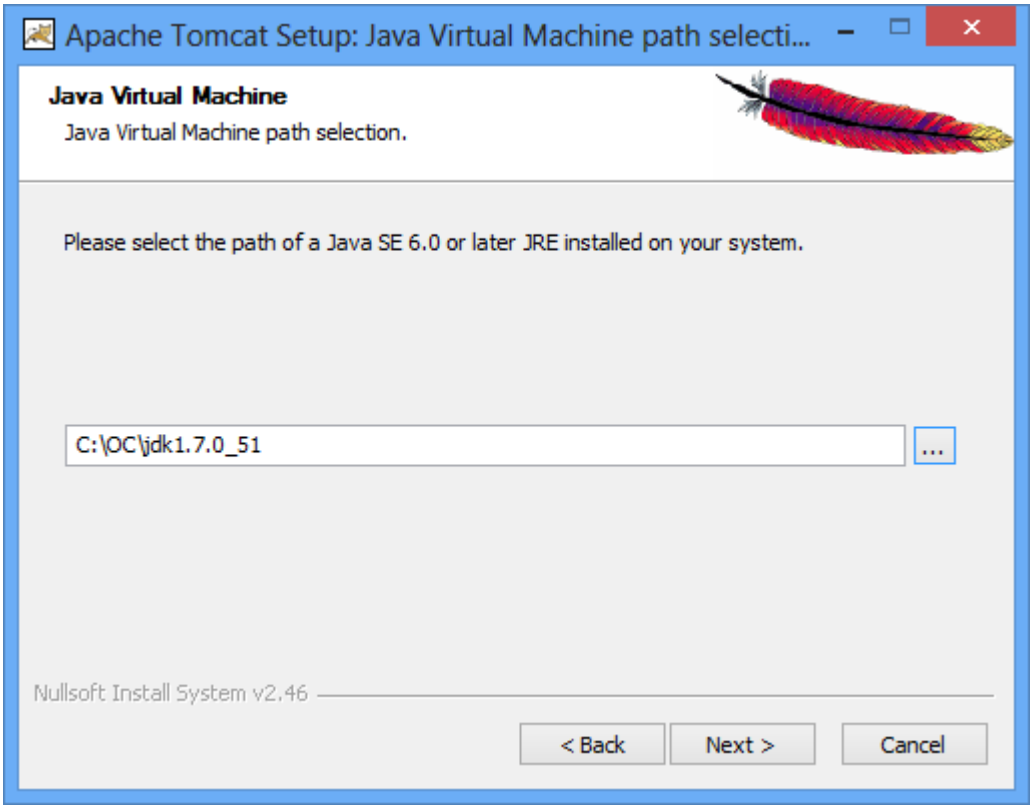
9.3.5 Install Tomcat

1. From either of the following websites, download the Windows Service Installer Version, apache-tomcat-7.0.52.exe, and save it to c:ocinstall:

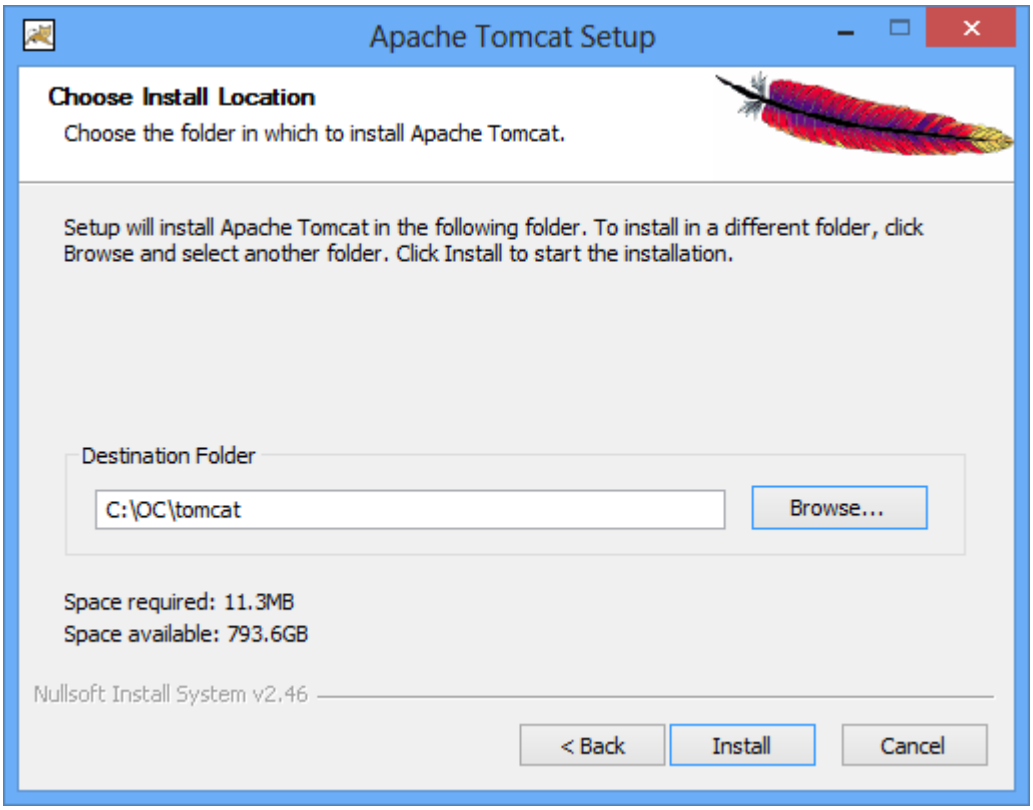
   From the Apache website: http://tomcat.apache.org/download-70.cgi
   Run
   c:ocinstall apache-tomcat-7.0.52.exe
   The **Apache Tomcat Setup Installation Wizard** opens.
2. When the **Open File - Security Warning message** displays, click **Run**.
3. On the **Welcome** screen of the Apache Tomcat Setup Installation Wizard, click **Next**.
The **License Agreement** screen displays.
4. Click **I Agree** to accept the agreement.
The **Choose Components screen** displays.
5. Click **Next** to accept the default values.
The **Configuration** screen displays.
6. Click **Next** to accept the default values.

The **Java Virtual Machine** screen displays.

7. Click ..., then select the path you installed the JDK into:
   c:oc jdk1.7.0_51
   The screen now should look like this:

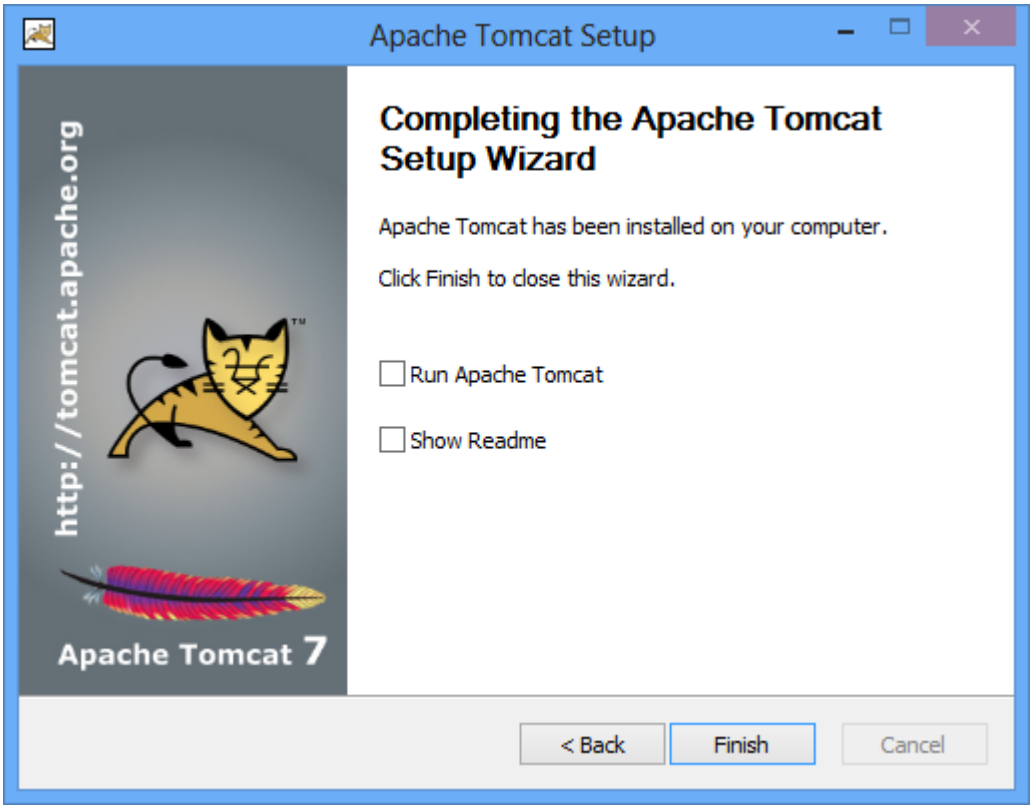


8. Click **Next**.
   The **Choose Install Location** screen displays
9. Edit the **Destination Folder** to be c:octomcat. The screen should look like this:



10. Click **Install** to start the installation.
    When the installation is finished, the **Completing the Apache Tomcat Setup Wizard** screen displays.

11. Complete the screen as follows:
    0. Clear the **Run Apache Tomcat** checkbox.
    1. Clear the S**how Readme** checkbox.
    The screen should now look like this:



12. Click **Finish.**
13. Create the directory c:octomcatoldwebapps.
14. Move the web apps provided with Tomcat that OpenClinica does not need by moving the contents of c:octomcatwebapps to c:octomcatoldwebapps.

9.3.6 Starting and Stopping Tomcat

Start Tomcat using any one of these methods:

1. From the **Apache Tomcat 7** Properties window:
    1. Select **Start > Apache Tomcat 7.0 > Configure Tomcat to open the window**.
    2. Click the **General** tab.
    3. On the **General** page, click the **Start** button to start Tomcat.
2. Using the Windows run command:
    1. Select **Start > Run**.
    2. In the **Run** box, type cmd, then click **OK**.
    3. At the new command prompt, start Tomcat by typing

    net start tomcat7
    then press **Enter**.

    When you need to stop Tomcat, type
    net stop tomcat7
    then press **Enter**.

9.3.6 Install OpenClinica Package

1. Download the OpenClinica software, OpenClinica-v.x.y.zip, from the OpenClinica website

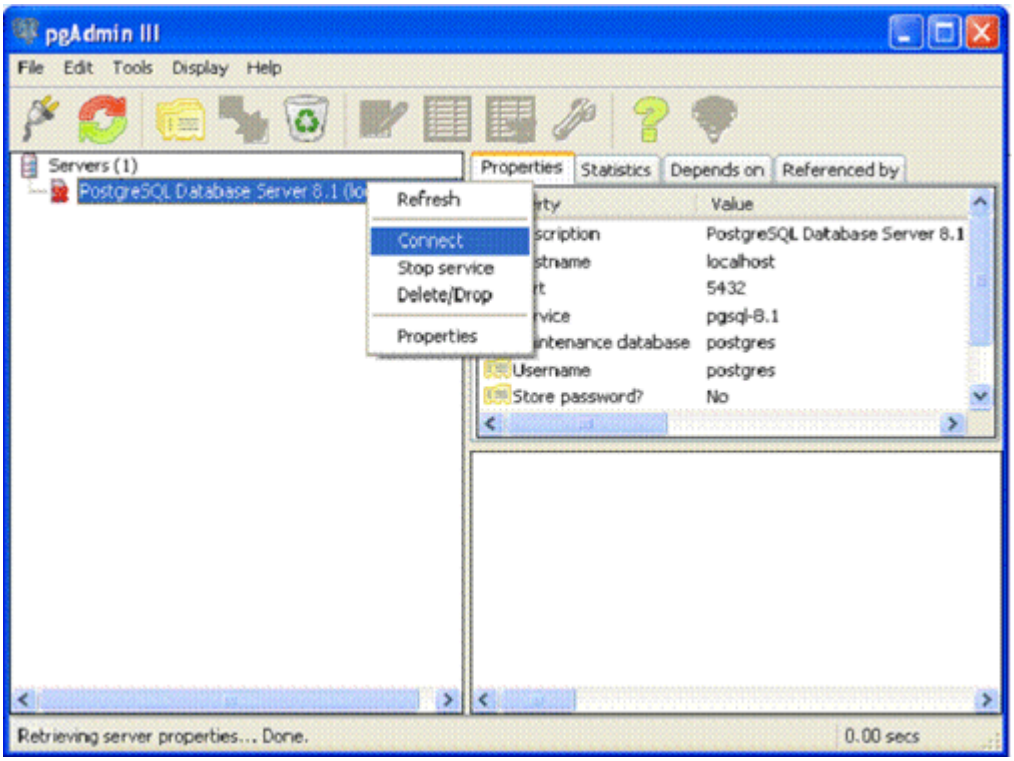
location, https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to this account to download the OpenClinica software.
After downloading the OpenClinica software, move it to the directory with the other software dependencies you downloaded:
c:ocinstall.

2. Right-click OpenClinica-v.x.y.zip and select **Extract All**.
   The **Extraction Wizard** opens.
3. Click **Next**.
4. In the next screen, change the directory to c:ocinstall, and click **Next**.
5. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
6. Copy c:ocinstallOpenClinica-v.x.ydistributionOpenClinica.war to c:octomcatwebapps.

9.3.7 Set Up the PostgreSQL Database

Complete these instructions to setup PostgreSQL database.

1. Select **Start > Programs > PostgreSQL 8.4 > pgAdminIII**.
2. The **pgAdminIII** window opens. Right-click the PostgreSQL 8.4 (localhost:5432) icon, and select Connect, as shown here:



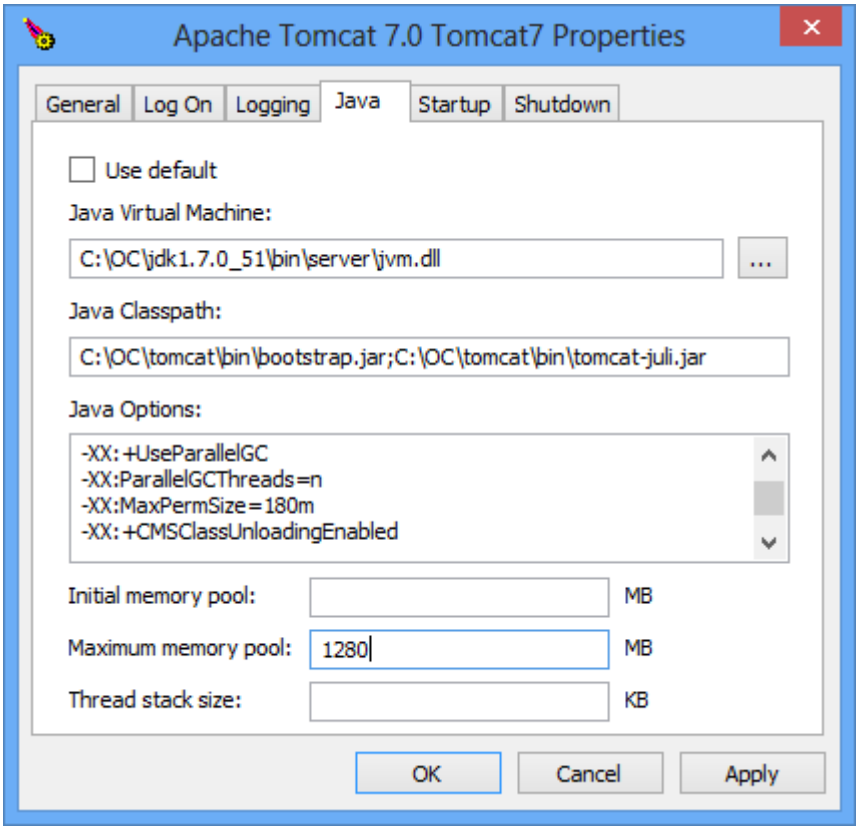
3. Log in to the database server using the password you set up during the PostgreSQL installation.
4. Create the database openclinica and the database user clinica, which OpenClinica uses to connect to the database:
   0. Expand the databases, and select **postgreSQL**.
   1. Select **Tools > Query tool**.
   The **Query** window opens.
   2. In the **SQL Editor** box, delete all the text.
   3. In the **SQL Editor** box, type the following:
   CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE;
   4. Select **Query > Execute**, which runs the SQL query.

When the query completes, a message displays in the **History** window.
5. In the **SQL Editor** box, delete all the text.
6. In the **SQL Editor** box, type the following:
CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica;
7. Select **Query > Execute**.
When the query completes, a message displays in the **History** window.
8. Close the **Query** window, and click **No** when prompted to save changes.

5. The database password is set to clinica by default, which is not a secure password. Change the password as follows:
    1. In the pgAdminIII window, expand and select **Login Roles.**
    2. Select **View > Refresh**.
    3. The clinica database user is listed.
    4. Right-click the clinica user account and select **Properties**.
    5. In the **Login Role** for clinica box that displays, enter the new password and re-enter it, then click **OK**. Record the password for future use.

9.3.8 Configure Tomcat to Work with OpenClinica and (if installed) OpenClinica Web Services

1. Select **Start>All Programs > Apache Tomcat 7.0 > Configure Tomcat**.
The **Apache Tomcat 7** Properties window opens.
2. Please click the Java Options tab described in the 'Configure Tomcat' section and add the following
-XX:+UseParallelGC
-XX:ParallelGCThreads=n
-XX:MaxPermSize=180m
-XX:+CMSClassUnloadingEnabled
On Java Console set Maximum Pool Size to 1280.
Please note that the minimum RAM requirement is 1280 MB of memory for these settings, so the CPU is expected to have much higher RAM available.
Where n is the number of cores of your CPU. There should be no spaces before or after each entry. Each entry should be on a new line. The MaxPermSize value depends on the number of .war files that you are deploying. For instance, if you deploy web and web services, XX:MaxPermSize should be set to 360m.
-XX:ParallelGCThreads = # of cores of your CPU, as long as the number of processors on your CPU are lesser than 8.The Window should look like this for a 4 core processor:
This setting is based upon the number of war files deployed. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.
3. The window should now look like this:



4. Click **Apply**, which completes the configuration of Tomcat.
5. Start Tomcat:
    1. Click the **General** tab.
    2. On the **General** page, click **Start**.
6. In about five minutes, Tomcat will be fully started. Verify it is fully started by opening the file c:octomcatlogstomcat7-stderr.current date.out, and looking for this line:
   INFO: Server Startup in XXXXX ms
7. After verifying Tomcat has fully started, in the **General** page of the **Apache Tomcat 7** Properties window, click **Stop**.
8. Wait two minutes for Tomcat to stop, then delete OpenClinca.war from c:octomcatwebapps.

9.3.9 Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system, however.

1. Using WordPad, open the configuration file:
   c:octomcatwebappsOpenClinicaWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected when you set-up PostgreSQL. Change the values for any other properties. The datainfo.properties file for Windows is the same as for Linux.
3. When you finish making changes, save the file.
4. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3-1-technical-documents/openclinica-and-internationalization/.

9.3.10 Verify the Installation

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Verify the installation was successful by following these steps:

1. Restart Tomcat
2. Open a web browser and access OpenClinica at the following URL:

   http://localhost:8080/OpenClinica

   (The port number may be different if you changed the configuration of your Tomcat instance that is running OpenClinica.) The OpenClinica Login page should display.
3. Log in to OpenClinica using the default user name, root, and password 12345678. You will be forced to change the password for the user "root" to a secure password. See Update User Profile if you need more information.
4. The user "root" is assigned to a default Study named "Default." Create a user account for yourself, with the User Type set to "technical administrator" and the User Role set to Data Manager: for instructions to create the user account, see Create a New User.
5. Log out and stop Tomcat if you now plan to install Web Services Package

9.3.11 Install OpenClinica Web Services Package

Web Services are optional. You do not need to install them if you are not planning on using web services.

1. Download the OpenClinica-ws software, OpenClinica-ws-v.x.y.zip, from the OpenClinica website location: https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to the account to download the OpenClinica software. After downloading the OpenClinica-ws software, move it to the directory with the other software dependencies you downloaded: c:ocinstall.
2. Right-click OpenClinica-ws-v.x.y.zip and select **Extract All**.
3. The **Extraction Wizard** opens.
4. Click **Next**.
5. In the next screen, change the directory to c:ocinstall, and click **Next**.
6. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
7. Copy c:ocinstallOpenClinica-ws-v.x.ydistributionOpenClinica-ws.war to c:octomcatwebapps.
8. Restart Tomcat then stop Tomcat following the intructions from above.

9.3.12 Configure OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system, however.
Note: Most of the properties are not needed or used for Web Services.

1. Using WordPad, open the configuration file: c:octomcatwebappsOpenClinica-wsWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other

properties.

The datainfo.properties file for Windows is the same as for Linuxsee more information at description of datainfo.properties file for web services.

3. If you are installing Web Services for OpenClinica 3.1.2 and earlier please edit ***adminEmail*** property (section 5 - adminEmail) if you would like e-mail to be send through 'Contact' link from Web Services welcome page.
4. Other properties that can be configured for web services are:
   0. Section 11 - Logging configuration
5. When you finish making changes, save the file.

9.3.13 Verify the Installation of OpenClinica Web Services

1. Restart Tomcat
2. Point your web browser to the OpenClinica Web Services welcome page: http://<<server url>>:8080/OpenClinica-ws. The OpenClinica Web Services **Welcome** page should be display.
3. Verify the version number is v.x.x-Community, where v.x.x is the version number you upgraded OpenClinica Web Services to. The version number is displayed in the lower right corner of the page.

Web Services should have the same version as OpenClinica application.

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Approved for publication by Ben Baumann. Signed on 2014-07-21 3:32PM

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12.10 Upgrade to OpenClinica 3.2 on Linux

The following process describes how to upgrade Java and Tomcat to work with OpenClinica 3.2 on Linux. Be sure to back up your database before starting the upgrade process.

Before you begin, the following packages should be installed with your Linux operating system:
vim
unzip
tar
(eg:~# apt-get install vim)

You will require "root" user access to your operating system. Run all commands in this guide with a user account possessing root-level permissions.

9.3.1 Upgrade Java 6 to Java 7

9.3.1.1 Preconditions for Upgrading Java

1. Access OpenClinica at the following URL: http://localhost:8080/OpenClinica

The Login page should display.

2. Verify the current version of Java is Java 6 by running this command:

   /usr/local/java/jre/bin# ./java version

9.3.1.2 Upgrade Java 6 to Java 7

a. For 32-bit operating systems, to get the files from OpenClinica, run:

wget https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/jdk-7u51-linux-i586.gz

b. For 64-bit operating systems, to get the files from OpenClinca, run:

wget https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/jdk-7u51-linux-x64.gz

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application.

1. Install Java by running:

   ar -xvf jdk-7u51-linux-x64.tar.gz (This command is to unzip gz)

   chown R root:root jdk1.7.0_51 (to change owner)

   chmod a+x jdk-7*

2. To install the Java in operating system by running

   mv jdk1.7* /usr/local/

   ln -s /usr/local/jdk1.7* /usr/local/java

   Java is now installed in the correct location.

9.3.1.3 Verify Java 7 is installed

1. Verify the current version of the Java is Java 7 by running these commands in root:

   Goto: cd /usr/local/java/jre/bin

   Run: ./java version
   (for example: root@bagel:/usr/local/java/jre/bin# ./java version)
2. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.

9.3.2 Upgrade Tomcat 6 to Tomcat 7

9.3.2.1 Preconditions for Upgrading Tomcat

1. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.
2. Stop Tomcat 6 by running the following command:

   /etc/init.d/tomcat stop
3. Uninstall Tomcat 6 from your system (including all the configuration files) but Before running this command make sure that , cd /usr/local.

   rm rf tomcat

   rm rf apache-tomcat-6.0.32

9.3.2.2 Install Tomcat 7

1. The OpenClinica software uses the Apache Tomcat Java application server.
   Download Tomcat 7 from one of the following sites and copy it into the local folder /usr/local/oc/install/
   Download it from the Tomcat website: http://tomcat.apache.org/download-70.cgi
   - or -
   Download it from the OpenClinica website:
   https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/apache-tomcat-7.0.52.tar.gz
   Run the following command in /usr/local/oc/install/ to install Tomcat 7.
   wget
   https://dev.openclinica.com/oc/software/OpenClinica-3.2/linux/apache-tomcat-7.0.52.tar.gz
2. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:
   cd /usr/local/oc/install
3. Install Tomcat by running the following:

   tar -zxvf apache-tomcat-7*

   mv apache-tomcat-7.0.52 /usr/local/

   ln -s /usr/local/apache-tomcat-7.0.52 /usr/local/tomcat

   (Note: The system will prompt you to enter your UNIX password. Use tomcat as the password, and press enter for all the default value for the full name, room number, phone, home phone and other. Is the info correct? Type Y and enter.)
4. Move the web apps provided with Tomcat that are not needed by OpenClinica to another location by running:

   mkdir /usr/local/tomcat/oldwebapps

   mv /usr/local/tomcat/webapps/* /usr/local/tomcat/oldwebapps

   Tomcat is now installed and you can set Tomcat to automatically start when you start your system, or you can start Tomcat manually by issuing commands.

To set Tomcat to start automatically on system startup, run the following: (Note: Before running the command install the OpenClinica 3.2 on your install folder)

cp /usr/local/oc/install/OpenClinica-3.2*/install-docs/linux/tomcat /etc/init.d/

cd /etc/init.d

chmod a+x /etc/init.d/tomcat

/sbin/chkconfig --add tomcat

(Note: This command is only for Red Hat Linux. For other operating systems, see the operating system instructions for adding an init script.)

5. Update the File Path parameter to the correct value

   chown -R tomcat /usr/local/tomcat/*

   chown -R tomcat /usr/local/apache-*

9.3.2.3 Deploy the OpenClinica Software Package

First, make sure Tomcat is stopped:

1. Stop Tomcat 7 by running:
   /etc/init.d/tomcat stop
2. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:
   cd /usr/local/oc/install
3. Run each of the following commands:

   unzip OpenClinica 3.2*

   cd OpenClinica 3.2*/distribution

   unzip OpenClinica.war -d OpenClinica

   cp -rf OpenClinica* /usr/local/tomcat/webapps

   rm -f /usr/local/tomcat/webapps/OpenClinica.war

   OpenClinica is now deployed for use with the database.

9.3.2.4 Verify Tomcat 7 is Started and the Application is Running

1. Start Tomcat:
   /etc/init.d/tomcat start
   (Note: Replace start with stop to stop the Tomcat service)
2. Verify Tomcat 7 is running with the following commands. You should see a similar

message as shown in the bracket().
/etc/init.d/tomcat status (Tomcat is running)

3. Access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The Login page should display.

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12.11 Upgrade to OpenClinica 3.2 on Windows

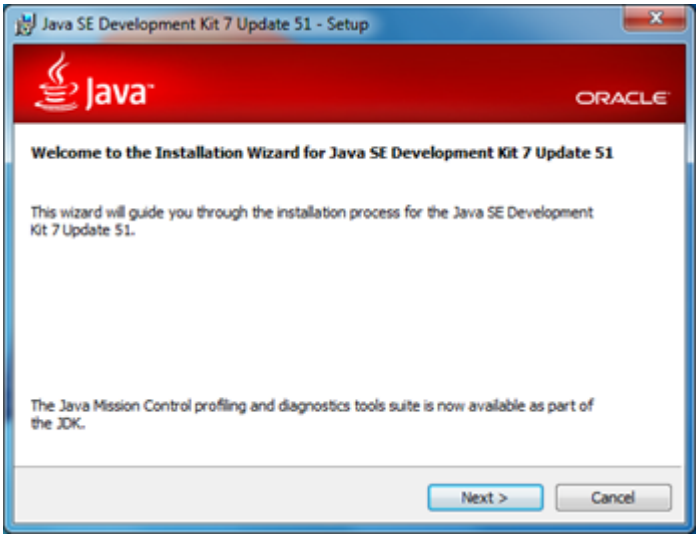
9.4.1 Upgrade Java 6 to Java 7

9.4.1.1 Preconditions for Upgrading Java

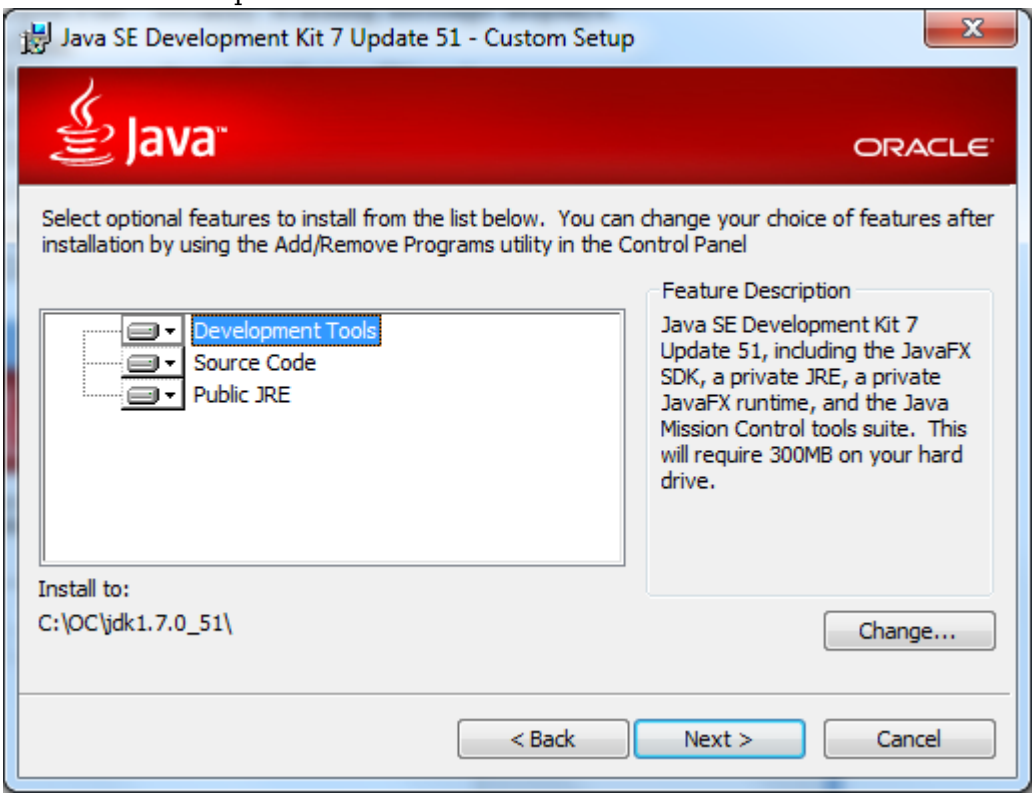
1. Verify Java 6 (jdk1.6.0_24) is already installed and running.
   Go to **Start>All Programs>Java Folder**. Click **About Java**.
   Verify the current version of Java is 6 (jdk1.6.0_24).
2. Verify the following directory exists c:ocinstall. If it does not, then create the directory.
3. Open a web browser and access OpenClinica at the following URL:
   http://localhost:8080/OpenClinica
   The OpenClinica login page should display.

9.4.1.2 Upgrade Java 6 to Java 7

1. From one of the following websites, download the Java 7 SE Development Kit 7.0 update (jdk-7u51-windows-i586.exe) and save it to c:ocinstall:
   - From the Java website:
     http://www.oracle.com/technetwork/java/javase/downloads/jdk7-downloads-1880260.html
   - From the OpenClinica website:
     http://svn.akazaresearch.com/oc/software/OpenClinica-3.2/windows/
2. Run c:ocinstalljdk-7u51-windows-i586.exe.
3. The installation window starts and looks like:



4. Click Next
5. The Custom Setup screen displays.
   a. Click **Change**....
   b. Change the path to c:oc jdk1.7.0_51, then click OK.
   The Custom Setup screen should now look like this:



6. Click **Next**
7. **Java Setup-Destination Folder** will show up. Keep the default location and click **Next**
8. The Setup Wizard installs the JDK.
9. The **Install Success** screen displays.
10. Click **Close**.

9.4.1.3 Verify Java 7 is installed

1. Verify Java 7 (jdk1.7.0_51) has been installed and running. Also, please notice that all applications, not specified with Java 6, will use Java 7 after the upgrading.
   Go to **Start>All Programs>Java Folder**. Click **About Java**.
   Verify the current version of Java is 7 (jdk1.7.0_51). The updated **About Java** screen should

look as below:

Verify Java 7 is installed by opening a web browser and accessing OpenClinica at the following URL: http://localhost:8080/OpenClinica
The OpenClinica login page should display

9.4.2 Upgrade Tomcat6 to Tomcat7

9.4.2.1 Preconditions for Upgrading Tomcat

1. First, open a web browser and verify you can access OpenClinica at the following URL: http://localhost:8080/OpenClinica
   The OpenClinica login page should display.
2. To upgrade the Tomcat 6 to Tomcat 7, you need to first remove Tomcat 6:

Stop Tomcat 6 using any one of these methods:

1. From the Apache Tomcat 6 Properties window:
   - Select **Start > Apache Tomcat 6.0 > Configure Tomcat** to open the window.
   - Click the **General** tab.
   - On the **General** page, click the **Stop** button to stop Tomcat
2. Using the Windows run command:
   - Select **Start > Run**.
   - In the **Run box**, type cmd, then click **OK**.

At the new command prompt, stop Tomcat by typing

net stop tomcat6

Then press **Enter**.

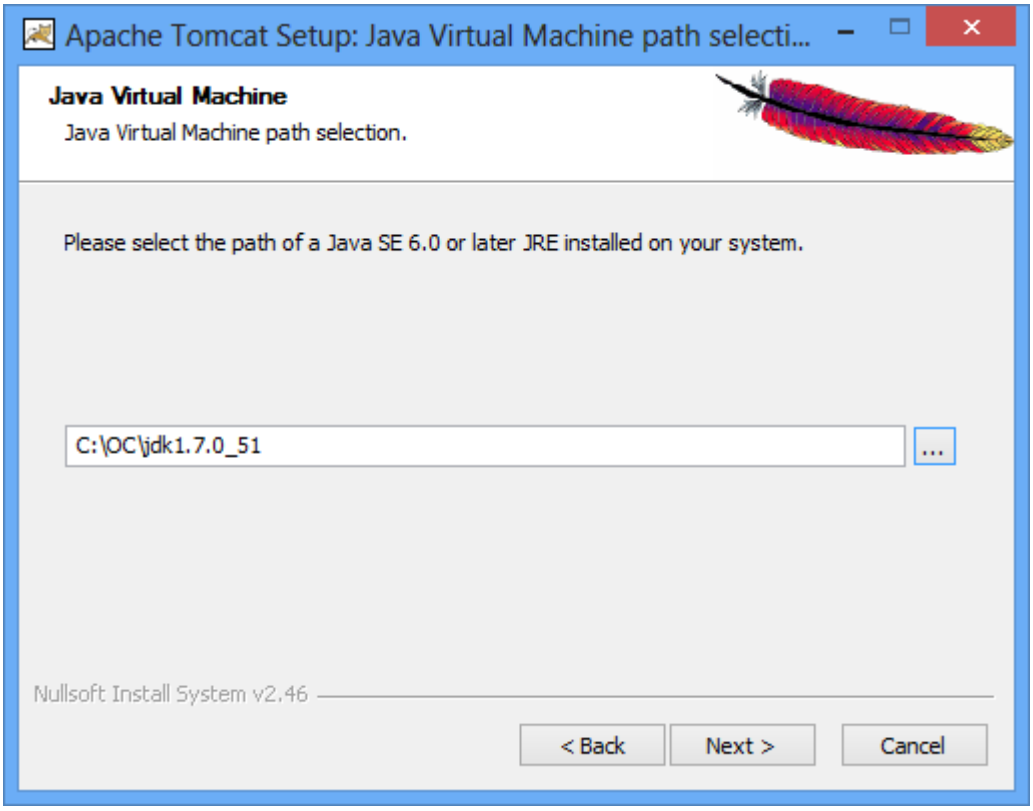
a. Uninstall Tomcat 6
Select **Start > Control Panel > Add Remove Programs**, then remove Tomcat 6 by pressing **uninstall** program.

b. Reboot the system

After removing the Tomcat6 from the program, reboot the system.

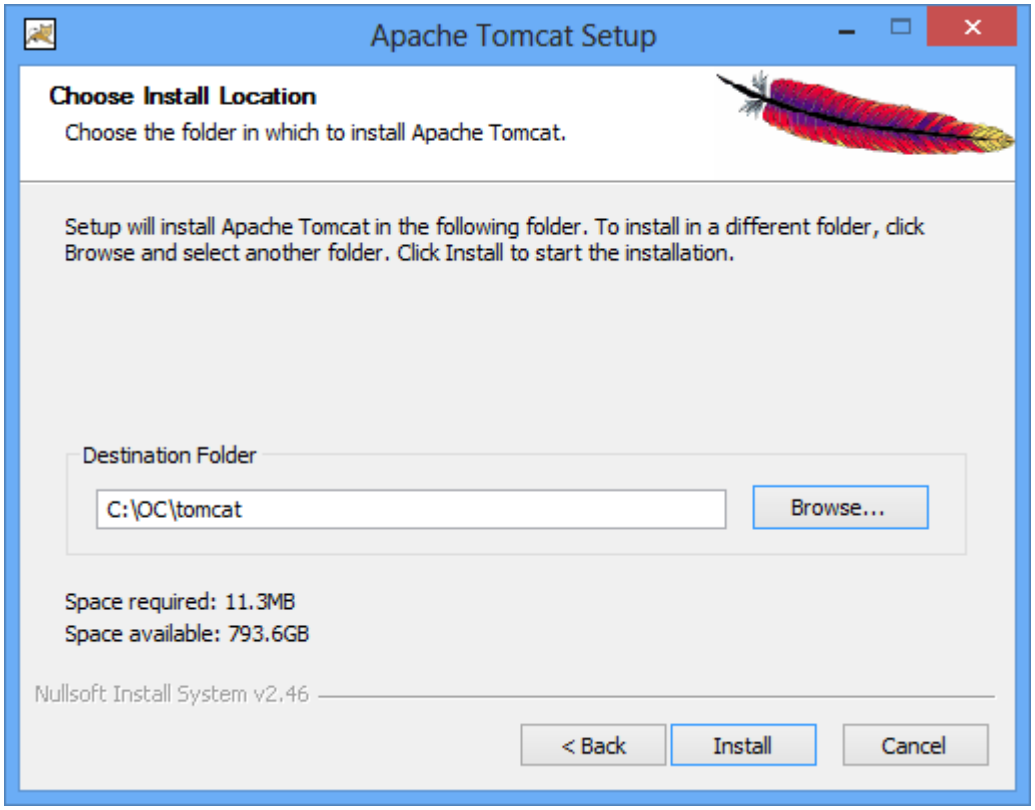
9.4.2.2 Install Tomcat 7

1. From either of the following two websites, download the Windows Service Installer Version, apache-tomcat-7.0.52.exe, and save it to c:ocinstall:
   - Download from the Apache website: http://tomcat.apache.org/download-70.cgi
   - Download from the OpenClinica website: http://svn.akazaresearch.com/oc/software/OpenClinica-3.2/windows/
2. Run the Installation file:
   c:ocinstallapache-tomcat-7.0.52.exe
   The **Apache Tomcat Setup Installation Wizard** opens.
   When the **Open File - Security Warning** message displays, click **Run**.
   On the **Welcome** screen of the **Apache Tomcat Setup Installation Wizard**, click **Next**.
   The **License Agreement** screen displays. Click **I Agree** to accept the agreement.
   The **Choose Components** screen displays. Click **Next** to accept the default values.
   The **Configuration** screen displays. Click **Next** to accept the default values.
   The **Java Virtual Machine** screen displays. Click ..., then select the path where you installed the JDK:
   c:oc jdk1.7.0_51
   The screen now should look like this:



   Click **Next**.

   The **Choose Install Location** screen displays. Edit the **Destination Folder** to be c:octomcat. The screen should look like this:



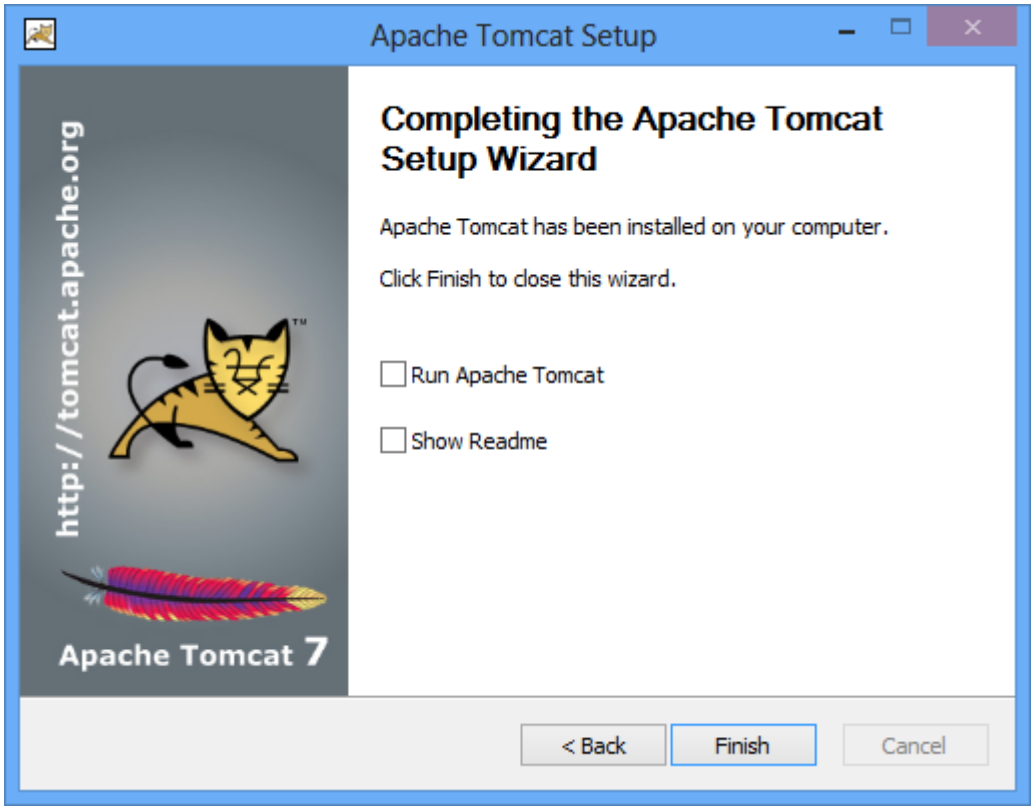
Click **Install** to start the installation.

When the installation is finished, the **Completing the Apache Tomcat Setup Wizard** screen displays.Complete the screen as follows:

-Clear the **Run Apache Tomcat** checkbox.

-Clear the **Show Readme** checkbox.

The screen should now look like this:



Click **Finish.**

9.4.2.3 Deploy the OpenClinica Package

1. Download the OpenClinica software package, OpenClinica 3.2.zip, from the OpenClinica website: https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create. You will be required to log in to the account in order to download the OpenClinica software.

   After downloading the OpenClinica software, move it to the directory with the other software dependencies you downloaded:
   c:ocinstall.

1. Right-click OpenClinica 3.2.zip and select **Extract All**.
   The **Extraction Wizard** opens.
2. Click **Next**
3. In the next screen, change the directory to c:ocinstall, and click **Next.**
4. In the next screen, clear the **Show Extracted Files** checkbox, and click **Finish**.
5. Stop Tomcat. At the new command prompt, stop Tomcat by typing:
   net stop tomcat7
6. Copy c:ocinstallOpenClinica 3.2distributionOpenClinica.war to c:octomcatwebapps.

9.4.2.4 Verify Tomcat 7 is installed and Application is Running

a. Start Tomcat

Verify that Tomcat is running. If Tomcat is not started than start Tomcat using any one of these methods:

1. From the **Apache Tomcat 7**Properties window:
   - Select **Start > Apache Tomcat 7.0 > Configure Tomcat** to open the window.
   - Click the **General tab**.
   - On the **General** page, click the **Start** button to start Tomcat.
2. Using the Windows run command:
   Select **Start > Run**.
   In the **Run** box, type cmd, then click **OK**.
   At the new command prompt, start Tomcat by typing
   net start tomcat7
   then press **Enter**.

b. Verify the OpenClinica Application

Open a web browser and access the OpenClinica at the following URL:
http://localhost:8080/OpenClinica
The OpenClinica login page should display.

Approved for publication by Ben Baumann. Signed on 2014-03-30 10:44AM

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12.12 Install OpenClinica 3.1.x on Linux

These instructions have been verified for Red Hat Enterprise Linux version 5.

These instructions are for installing version 3.1 of OpenClinica, and also apply to installing the maintenance releases of 3.1 for example 3.1.2. When you see *v.x* or *v.x.y* in the instructions, use your version number, e.g. 3.1.2.

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12.12.1 Overview of Installation on Linux Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

1. Ensure your operating system meets the specified requirements
2. Download the installation files
3. Install Java
4. Install Tomcat
5. Install the database you will use, either PostgreSQL or Oracle:
    - Follow these instructions to install PostgreSQL.
    - If you are using Oracle, you will need to obtain the instructions to install it. OpenClinica does not provide instructions to install Oracle.
6. Set up the database you installed:
    - Set up PostgreSQL
    - Set up Oracle
7. Deploy OpenClinica within Tomcat
8. Set Tomcat to start
9. Configure the OpenClinica application
10. Restart the system and verify access to OpenClinica
11. Configure Tomcat to use HTTPS
12. Verify the installation by ensuring you can log in to OpenClinica.

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study

Director) and then build a Study.

12.12.2 Operating System Requirements

The following packages should be installed for your Operating System:

- vim
- unzip
- tar

You require "root" user access. Run all commands in the installation instructions using root-level permission.

12.12.3 Download Installation Files

OpenClinica and OpenClinica Web Services run and depend on several external software technologies: the Java Development Kit, the Apache Tomcat Servlet Container, and the PostgreSQL relational database (unless you are using the Oracle database).

The OpenClinica website has a copy of the neccessary installers for Java, Tomcat, and PostgreSQL for you to download. If you choose to use versions of Java, Tomcat, and PostgreSQL other than those provided on the website, please note that they have not been tested with the OpenClinica application.

There are 32-bit and 64-bit editions of the software, when applicable. To determine if your system is running a 32-bit or 64-bit operating system, in your Linux terminal, run

uname -a

The display reports the version:

- If i386 or i686 displays, it is a 32-bit operating system.
- If x86_64 displays, it is a 64-bit operating system.

To download the installation files:

1. Run the following commands to create the OpenClinica directory on your system and to make it the current directory:

   mkdir -p /usr/local/oc/install
   cd /usr/local/oc/install

2. Run the following commands to download the Java, Tomcat, and PostgreSQL files for your architecture. In the commands, substitute *v.x* with the version of OpenClinica you are installing (e.g. 3.1):

   - For 32-bit operating systems, to get the files from OpenClinica run:

     wget
     http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/apache-tomcat-6.0.32.tar.gz

wget http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/jdk-6u24-linux-i586.bin

If you will be using PostgreSQL (not Oracle) for your database, also run:

wget http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/postgresql-8.4.1-1-linux.bin

- For 64-bit operating systems, to get the files from OpenClinca, run:

  wget http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/apache-tomcat-6.0.32.tar.gz

  wget http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/jdk-6u24-linux-x64.bin

  If you will be using PostgreSQL (not Oracle) for your database, also run:

  wget http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/linux/postgresql-8.4.1-1-linux-x64.bin

- Instead of downloading the files from the above links, you can download them directly from their native websites:

  - PostgreSQL: http://www.postgresql.org/
  - Java: http://www.oracle.com/technetwork/java/index.html
  - Tomcat: http://tomcat.apache.org/

3. Download the OpenClinica software from the OpenClinica website, using this location: https://community.openclinica.com/project/openclinica. To download the software, you need a OpenClinica community user account, which is free to create; you will be required to log in to the account to download the OpenClinica software.

   After downloading the OpenClinica software, move it to the directory where you downloaded the other software components to:

   /usr/local/oc/install

12.12.4 Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Install Java by running:

   ```
   chmod a+x jdk-6*
   ./jdk-6*
   ```

3. When the files finish extracting, the system displays "Press Enter to continue ...," press Enter.
4. A web browser window opens, presenting you with the option to register the Java software. Register, or close the window.

5. Install Java in the operating system by running:

   ```
   mv jdk1* /usr/local/
   ln -s /usr/local/jdk1* /usr/local/java
   ```

Java is now installed in the correct location.

12.12.5 Install Tomcat

The OpenClinica software uses the Apache Tomcat Java application server.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   ```
   cd /usr/local/oc/install
   ```

2. Install Tomcat by running the following:

   ```
   tar -zxvf apache-tomcat-*
   mv apache-tomcat-6.0.32 /usr/local/
   ln -s /usr/local/apache-tomcat-6.0.32 /usr/local/tomcat
   /usr/sbin/adduser tomcat
   ```

3. Move the web apps provided with Tomcat that are not needed by OpenClinica to another location by running:

   ```
   mkdir /usr/local/tomcat/oldwebapps
   mv /usr/local/tomcat/webapps/* /usr/local/tomcat/oldwebapps
   ```

Tomcat is now installed.

12.12.6 Install PostgreSQL Database

The OpenClinica software uses an underlying relational database management system, either PostgreSQL or Oracle. Complete these instructions if you will be using the PostgreSQL database. If you will be using the Oracle database, install Oracle instead of completing these instructions. Note: we do not provide instructions for installing Oracle.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

cd /usr/local/oc/install

2. Start the PostgreSQL setup by running:

   chmod a+x postgresql-8.4.*
   ./postgresql-8.4.* --mode text

   The PostgreSQL Setup Wizard starts.

3. For most of the options in the Setup Wizard, accept the defaults. Complete the Setup Wizard as follows:

Prompt	**Action**
Installation Directory [/opt/PostgreSQL/8.4]	Press Enter to accept.
Data Directory [/opt/PostgreSQL/8.4/data]	Press Enter to accept.
Password	Enter a password for the PostgreSQL database superuser, then press Enter. Record the password because you will need it again in this installation.
Retype Password	Type the password again, then press Enter.
Port [5432]	Press Enter to accept.
Please choose an option [1]	Press Enter to accept.
Install pl/pgsql in template1 database? [Y/n]	Type n, then press Enter.
Do you want to continue? [Y/n]	Press Enter to accept.
Setup has finished installing PostgreSQL on your computer. Stack Builder may be used to download and install additional tools, drivers and applications to complement your PostgreSQL installation. [Y/n]	Type n, then press Enter.

PostgreSQL is now installed on your system and will start when you start up your system.

12.12.7 Set Up the PostgreSQL Database

Complete these instructions if you will be using the PostgreSQL database. If you will be using the Oracle database, instead use the Oracle setup instructions.

1. Run the following commands to create the PostgreSQL database and database user OpenClinica uses to connect to the database:

   /opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE"

   /opt/PostgreSQL/8.4/bin/psql -U postgres -c "CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica"

2. The database user password is set to clinica by default, which is not a secure password. Change the password as follows:

    1. Run:

       /opt/PostgreSQL/8.4/bin/psql -U postgres

    2. A psql prompt displays with this message:

       ALTER USER clinica WITH PASSWORD 'XXXX'

    3. Replace XXXX with a secure password. Record the password for use in a later installation step.

    4. Exit the psql prompt by running:

       q

12.12.8 Deploying OpenClinica within Tomcat

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.1:

   unzip OpenClinica-*v.x**
   cd OpenClinica-v.x*/distribution
   unzip OpenClinica.war -d OpenClinica
   cp -rf OpenClinica* /usr/local/tomcat/webapps
   rm -f /usr/local/tomcat/webapps/OpenClinica.war

OpenClinica is now deployed for use with the database.

12.12.9 Deploying OpenClinica Web Services within Tomcat

Web Services are optional. Do not install them if you are not planning to use them.

1. The current directory on your system should be /usr/local/oc/install. If it is not, make it the current directory by running:

   cd /usr/local/oc/install

2. Run the following commands. In the commands, *v.x* is your version of OpenClinica, e.g. 3.1:

```
unzip OpenClinica-ws-v.x*
cd OpenClinica-ws-v.x*/distribution
unzip OpenClinica-ws.war -d OpenClinica-ws
cp -rf OpenClinica* /usr/local/tomcat/webapps
rm -f /usr/local/tomcat/webapps/OpenClinica-ws.war
```

OpenClinica web services are now deployed for use with the database.

12.12.10 Set Tomcat to Start

You can set Tomcat to automatically start when you start your system, or you can start and stop Tomcat manually by issuing commands.

To set Tomcat to start automatically on system startup, run the following:

cp /usr/local/oc/install/OpenClinica-v.x*/install-docs/linux/tomcat /etc/init.d/

cd /etc/init.d

chmod a+x /etc/init.d/tomcat

/sbin/chkconfig --add tomcat (Note: This command is only for Red Hat Linux. For other operating systems, see the operating system instructions for adding an init script.)

To stop and start Tomcat manually by issuing commands, run the following:

/usr/local/tomcat/bin/shutdown.sh (stops Tomcat)

/usr/local/tomcat/bin/startup.sh (starts Tomcat)

12.12.11 Configure OpenClinica for Optimum Performance

Under stress tests, OpenClinica 3.1.3 has performed well with the following JVM (Java Virtual Machine) settings:

Edit the init.d/tomcat and replace the JAVA_OPTS with following:

export JAVA_OPTS="$JAVA_OPTS -Xmx1280m -XX:+UseParallelGC -XX:ParallelGCThreads=n -XX:MaxPermSize=180m -XX:+CMSClassUnloadingEnabled"

For the setting -XX:ParallelGCThreads=n, n should be replaced with the # of cores of your CPU as long as the total number of cores are lesser than 8.

The number of cores can be determined by using 'top' command.

Please note that the minimum RAM requirement is 1280 MB of memory for these settings, so the server is expected to have much higher RAM available. The amount of available memory can be

determined by using the command free -m to give the memory (in MB). The MaxPermSize value depends on the number of war files that you are deploying. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.

For the settings to take effect, restart the Tomcat server.

12.12.12 Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected in Set Up the PostgreSQL Database. Change the values for any other properties, then save the file.
3. Update the filePath parameter to the right value.
4. Run the following commands:

   chown -R tomcat /usr/local/tomcat/*
   chown -R tomcat /usr/local/apache-*
5. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization

12.12.13 Configure the OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system.

Note: Most of the properties are not needed or used for Web Services, see Description of datainfo.properties File for Web Services for more information on what settings are actually used.

1. Open the configuration file: /usr/local/tomcat/webapps/OpenClinica-ws/WEB-INF/classes/datainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other properties.
3. Run the following commands:

```
chown -R tomcat /usr/local/tomcat/*
chown -R tomcat /usr/local/apache-*
```

12.12.14 Description of datainfo.properties File

The datainfo.properties file will look similar to the following. Each group of properties is numbered and a description of the property group is presented as a series of comment lines (lines that begin with # are comments) before the section where you specify the values for the properties in the group.

```
#############################################################################
# 1 - Database Configuration
#
# Database configuration is done with the following 6 properties
# The dbType options are either postgres or oracle.
# Enter the user name and password to access the database in
# dbUser and dbPass.
# The db field is for the name of the database and provide the port
# in dbPort.
# dbHost can be a URL, IP address or localhost
#
# REQUIRED
#############################################################################
dbType=postgres
dbUser=clinica
dbPass=clinica
db=${WEBAPP.lower}
dbPort=5432
dbHost=localhost

#############################################################################
# 2 - filePath
#
# File Path is the string which declares the
# repository for all uploaded and generated
# files in the system, including CRFs and
# data sets.  The directory should NOT be
# accessible by the web server.
#
# REQUIRED.
#############################################################################
filePath=${catalina.home}/${WEBAPP.lower}.data/
```

```
##############################################################################
################
# 3 - Attached File Location
# Location for files if item data type is "file". If it has been kept empty,
# "filePath" will be used as the attached file location.
# This will be a sub folder within the filePath location only.
# You may configure a full path that points to a directory outside of the filePath.
# If you configure a full path, it must have a trailing slash.
# Example = /usr/local/attached_file/ or C:\attached_file\
#
# NOT REQUIRED
##############################################################################
################
# attached_file_location=

##############################################################################
################
# 4 - user_account_notification
#
# User Account Notification is the method by
# which new users are sent their passwords.
# Users can be sent passwords via email,
# or the password can be displayed on the screen
# to the administrator, who is instructed to
# write it down and physically give it to the user
# in question.  The default is email.
#
# REQUIRED.
##############################################################################
################
userAccountNotification=email

##############################################################################
################
# 5 - adminEmail
#
# The Admin Email is the field to set the administrator's
# email for a given server. It is also used for
# replies to the email messages sent by the system.
#
# REQUIRED
##############################################################################
################
adminEmail=admin@example.com

##############################################################################
################
# 6- Spring Based Email System
#
# Configure the Email SMTP host below. If the host
# requires a username and password make sure
```

```
# mail.smtp(s).auth is set to true.
# Configure mail protocol via mail.protocol, Valid options
# would be smtp or smtps.
# Configure smtp over ttls by setting mail.smtp(s).starttls.enable
# to true.
# Configure connection timeout. Preconfigred to 5 secs
#############################################################
################
mailHost=mail.smtp.com
mailPort=25
mailProtocol=smtp
mailUsername=
mailPassword=
mailSmtpAuth=false
mailSmtpStarttls.enable=false
mailSmtpsAuth=false
mailSmtpsStarttls.enable=false
mailSmtpConnectionTimeout=100
mailErrorMsg=developers@openclinica.org

#############################################################
################
#
#       This property will be removed starting from 3.1.3

#
# 7 - passwd_expiration
#
# Passwd Expiration Time is the number of
# days that can elapse before a user is notified that
# they should change their password.
#
# REQUIRED.
#############################################################
################
passwdExpirationTime=360

#############################################################
################
# 8 - sysURL
#
# The web address for the system.  It can either be an external
# address (demo.openclinica.org) or an internal IP
# address (192.168.2.000).
# NOTE: If you reconfigure the address or port in some later
# step, such as by configuring SSL, you will need to come back
# and update this file. You will also need to restart tomcat
# for changes to this take effect.
#
# REQUIRED
#############################################################
```

```
#################
sysURL=http://192.168.2.000:8080/${WEBAPP}/MainMenu

#############################################################################
#################
# 9 - max_inactive_interval
#
# This is maximum time interval between client requests. That is,
# if users leave any page open without sending a request to the
# server, after this time interval, when users attempt sending
# request they will be directed to login page.
#
# REQUIRED
#############################################################################
#################
maxInactiveInterval=3600

#############################################################################
#################
#
#       This property will be removed starting from 3.1.3

# 10- change_passwd_required
# Change Passwd Required is a flag which will force users to change
# their password when they log on for the first time or when their
# time expires. 1 is for required, 0 is for not required.
#
# REQUIRED.
#############################################################################
#################
change_passwd_required=1

#############################################################################
#################
# 11 - Logging configuration

# SysLog support has been fully implemented in OpenClinica, but by default has been turned off.
# Every piece of code that could send information to the syslog server has not been reviewed
# and cleaned to ensure it is entirely readable and useful.  This will be an ongoing effort
# and resolved in a future release.  Please use the SysLog support at your own risk.
#
# Specify the log location - local/syslog/both
#
log.dir=${catalina.home}/logs/openclinica
logLocation = local
#
# Specify logging level - trace/debug/info/warn/error
logLevel = info
syslog.host = localhost
syslog.port = 514
```

```
#################################################################
################
# 12- News/About
# On the OpenClinica login screen, there will be a box to the right of the login section
# which can contain an RSS feed.  You can configure what RSS feed is used in the rss.rl field.
# If you do not want the RSS feed, please comment out rss.url and rss.more and uncomment
# about.text1 and about.text2.  These two fields can be used for any free form text that you
# you want to appear on the OpenClinica login page.
# the default feed is http://clinicalresearch.wordpress.com/feed/
# default value for rss.more http://clinicalresearch.wordpress.com/
#################################################################
################
# rssUrl=http://clinicalresearch.wordpress.com/feed/
# rssMore=http://clinicalresearch.wordpress.com/
# about.text1= Hello World 1
# about.text2= Hello World 2

#################################################################
################
# 13 - CRF File Upload Configuration
# crf.file.extensionSettings can have 3 values valid,invalid or left empty which defaults to valid.
# if crf.file.extensionSetting= valid , then extensions specified can be uploaded.
# if crf.file.extensionSetting= invalid , then extensions specified can NOT be uploaded.
# if crf.file.extensions is left empty and crf.file.extensionSettings=valid then all extensions are valid
# if crf.file.extensions is left empty and crf.file.extensionSettings=invalid then all extensions are
NOT valid
# separate extensions with a comma and do not include the leading dot.
#################################################################
################
# crfFileExtensions=
# crfFileExtensionSettings=

#################################################################
################
# 14 - supportURL
#
# The Support URL is included in the support button that appears
# in the top right corner of all pages in OPenClinica. By including
# the URL here we will be able to configure it depending on the adopter
#
# REQUIRED
#################################################################
################
# supportURL=https://www.openclinica.com/OpenClinica/3.1/support/

#################################################################
################
# 15- Quartz Scheduler Configuration
#
# Configure the mis-fire threshold for the scheduler,
# and the number of extract jobs can run at a single time.
```

```
#
# REQUIRED
##########################################################################
################
org.quartz.jobStore.misfireThreshold=18000000
org.quartz.threadPool.threadCount=1
org.quartz.threadPool.threadPriority=5

##########################################################################
################
# 16 - CCTS configuration
#
# This is used for OpenClinica instances that have been modified and configured
# to work with the Cancer Clinical Trials Suites.  This is a caBIG suite of applications.
# The configuration determines how long OpenClinica will hold a transaction from C3PR
# and will wait for a roll back message before committing it to the database.
#
# NOT REQUIRED
##########################################################################
################
ccts.waitBeforeCommit=6000

##########################################################################
################
# 17 - Facility information
#
# The OpenClinica defaults will be used when creating a new study
# unless you uncomment each property and provide a value next to
# each = sign.
#
# NOT REQUIRED
##########################################################################
################
# FacName=
# FacCity=
# FacState=
# FacZIP=
# FacCountry=
# FacContactName=
# FacContactDegree=
# FacContactPhone=
# FacContactEmail=

##########################################################################
################
# 18 - export data file path
#
# Export Data File Path is the string which (optionally)
# declares a specific file path for file extracts to be
# saved.  This is a sub folder of filePath.
# Note that if it is set, files from Jobs only will be saved
```

```
# to two places: this directory and under the above file path
# declared in the 'filePath' property.
#
# NOT REQUIRED.  Please comment out if you want Jobs to generate
# one file/files only, in the directory structure under 'filePath'.
##########################################################################
################
# exportFilePath=scheduled_data_export
##########################################################################
################
# 19 - Usage statistics configuration
# Usage statistics refers to information automatically sent back to OpenClinica.org
# to help us figure out how well OpenClinica is working and help us improve it in
# future versions.
# This includes technical information such as the version of OpenClinica installed, the number of studies created and user load. These statistics DO NOT include information such as study or CRF names, study data, or user information. We collect this data in aggregate and use it according to our Privacy Policy [https://community.openclinica.com/privacy-policy] to improve our products and services.
#
# As part of system configuration, we give you the option to help us improve OpenClinica by sending these usage statistics. If you elect to send this information but later change your mind, you can disable this feature in the datainfo.properties file by changing
# 'collectStats' value to 'false'
collectStats=true
usage.stats.host=usage.openclinica.com
usage.stats.port=514
OpenClinica_version=${version}

##########################################################################
################
# 20 - Rule Designer configuration
# OpenClinica Enterprise customers are allowed access to a GUI based Rule Designer.
# This configuration allows the OpenClinica instance to contact the Rule Designer for
# access.  If you are not an OpenClinica Enterprise customer, your users will be re-directed
# to a landing page and will have to navigate back to their OpenClinica instance.
# If you do not want to see a link to the Rule Designer on the Build Study page,
# you must delete this configuration option.
#
# To become an OpenClinica Enterprise customer, please contact sales@openclinica.com
##########################################################################
################

designerURL=https://designer.openclinica.com/
```

12.12.15 Description of datainfo.properties File for Web Services

Web Services datainfo.prioperties file is similar the datainfo.properties of OpencClinica. However,

web services needs less configuration than OpenClinica. The following file show highlighted properties that are relevant to web services. Only properties from first section must be updated and should be set exaclty as they are set for OpenClinica.

```
##########################################################################
#################

# 1 - Database Configuration
#
# Database configuration is done with the following 6 properties
# The dbType options are either postgres or oracle.
# Enter the user name and password to access the database in
# dbUser and dbPass.
# The db field is for the name of the database and provide the port
# in dbPort.
# dbHost can be a URL, IP address or localhost
#
# REQUIRED
##########################################################################
#################
dbType=postgres
dbUser=clinica
dbPass=clinica
db=openclinica
dbPort=5432
dbHost=localhost

##########################################################################
#################
# 2 - filePath
#
# File Path is the string which declares the
# repository for all uploaded and generated
# files in the system, including CRFs and
# data sets.  The directory should NOT be
# accessible by the web server.
#
# REQUIRED.
##########################################################################
#################
filePath=${catalina.home}/${WEBAPP.lower}.data/

##########################################################################
#################
# 3 - Attached File Location
# Location for files if item data type is "file". If it has been kept empty,
# "filePath" will be used as the attached file location.
# This will be a sub folder within the filePath location only.
# You may configure a full path that points to a directory outside of the filePath.
```

If you configure a full path, it must have a trailing slash.
Example = /usr/local/attached_file/ or C:\attached_file\
#
NOT REQUIRED
##
################
attached_file_location=

##
################
4 - user_account_notification
#
User Account Notification is the method by
which new users are sent their passwords.
Users can be sent passwords via email,
or the password can be displayed on the screen
to the administrator, who is instructed to
write it down and physically give it to the user
in question. The default is email.
#
REQUIRED.
##
################
userAccountNotification=email

**##
################**
 # 5 - adminEmail
#
 # The Admin Email is the field to set the administrator's
 # email for a given server. It is also used for
 # replies to the email messages sent by the system.
#
 # REQUIRED
**##
################**
adminEmail=admin@example.com

**##
################**
 # 6- Spring Based Email System
#
 # Configure the Email SMTP host below. If the host
 # requires a username and password make sure
 # mail.smtp(s).auth is set to true.
 # Configure mail protocol via mail.protocol, Valid options
 # would be smtp or smtps.
 # Configure smtp over ttls by setting mail.smtp(s).starttls.enable
 # to true.
 # Configure connection timeout. Preconfigred to 5 secs
##

#################
mailHost=mail.smtp.com
mailPort=25
mailProtocol=smtp
mailUsername=
mailPassword=
mailSmtpAuth=false
mailSmtpStarttls.enable=false
mailSmtpsAuth=false
mailSmtpsStarttls.enable=false
mailSmtpConnectionTimeout=100
mailErrorMsg=developers@openclinica.org

##
################
8 - sysURL
#
The web address for the system. It can either be an external
address (demo.openclinica.org) or an internal IP
address (192.168.2.000).
NOTE: If you reconfigure the address or port in some later
step, such as by configuring SSL, you will need to come back
and update this file. You will also need to restart tomcat
for changes to this take effect.
#
REQUIRED
##
################
sysURL=http://localhost:8080/${WEBAPP}/MainMenu

##
################
9 - max_inactive_interval
#
This is maximum time interval between client requests. That is,
if users leave any page open without sending a request to the
server, after this time interval, when users attempt sending
request they will be directed to login page.
#
REQUIRED
##
################
maxInactiveInterval=3600

##
################
 # 11 - Logging configuration

 # SysLog support has been fully implemented in OpenClinica, but by default has been turned off.
 # Every piece of code that could send information to the syslog server has not been

reviewed
 # and cleaned to ensure it is entirely readable and useful. This will be an ongoing effort
 # and resolved in a future release. Please use the SysLog support at your own risk.
#
 # Specify the log location - local/syslog/both
#
log.dir=${catalina.home}/logs/openclinica-ws
logLocation = local
#
 # Specify logging level - trace/debug/info/warn/error
logLevel = info
syslog.host = localhost
syslog.port = 514

##
################
12- News/About
On the OpenClinica login screen, there will be a box to the right of the login section
which can contain an RSS feed. You can configure what RSS feed is used in the rss.rl field.
If you do not want the RSS feed, please comment out rss.url and rss.more and uncomment
about.text1 and about.text2. These two fields can be used for any free form text that you
you want to appear on the OpenClinica login page.
the default feed is http://clinicalresearch.wordpress.com/feed/
default value for rss.more http://clinicalresearch.wordpress.com/
##
################
rssUrl=http://clinicalresearch.wordpress.com/feed/
rssMore=http://clinicalresearch.wordpress.com/
about.text1= Hello World 1
about.text2= Hello World 2

##
################
13 - CRF File Upload Configuration
crf.file.extensionSettings can have 3 values valid,invalid or left empty which defaults to valid.
if crf.file.extensionSetting= valid , then extensions specified can be uploaded.
if crf.file.extensionSetting= invalid , then extensions specified can NOT be uploaded.
if crf.file.extensions is left empty and crf.file.extensionSettings=valid then all extensions are valid
if crf.file.extensions is left empty and crf.file.extensionSettings=invalid then all extensions are
NOT valid
separate extensions with a comma and do not include the leading dot.
##
################
crfFileExtensions=
crfFileExtensionSettings=

##
################
14 - supportURL
#
The Support URL is included in the support button that appears

```
# in the top right corner of all pages in OPenClinica. By including
# the URL here we will be able to configure it depending on the adopter
#
# REQUIRED
#################################################################
################
# supportURL=https://www.openclinica.com/OpenClinica/3.1/support/

#################################################################
################
# 15- Quartz Scheduler Configuration
#
# Configure the mis-fire threshold for the scheduler,
# and the number of extract jobs can run at a single time.
#
# REQUIRED
#################################################################
################
org.quartz.jobStore.misfireThreshold=18000000
org.quartz.threadPool.threadCount=1
org.quartz.threadPool.threadPriority=5

#################################################################
################
# 16 - CCTS configuration - ***for caBIG Web Services only***
#
# This is used for OpenClinica instances that have been modified and configured
# to work with the Cancer Clinical Trials Suites.  This is a caBIG suite of applications.
# The configuration determines how long OpenClinica will hold a transaction from C3PR
# and will wait for a roll back message before committing it to the database.
#
# NOT REQUIRED
#################################################################
################
ccts.waitBeforeCommit=6000

#################################################################
################
# 17 - Facility information
#
# The OpenClinica defaults will be used when creating a new study
# unless you uncomment each property and provide a value next to
# each = sign.
#
# NOT REQUIRED
#################################################################
################
# FacName=
# FacCity=
# FacState=
# FacZIP=
```

FacCountry=
FacContactName=
FacContactDegree=
FacContactPhone=
FacContactEmail=

##
###############
18 - export data file path
#
Export Data File Path is the string which (optionally)
declares a specific file path for file extracts to be
saved. This is a sub folder of filePath.
Note that if it is set, files from Jobs only will be saved
to two places: this directory and under the above file path
declared in the 'filePath' property.
#
NOT REQUIRED. Please comment out if you want Jobs to generate
one file/files only, in the directory structure under 'filePath'.
##
###############
exportFilePath=scheduled_data_export

##
###############
19 - Usage statistics configuration
Usage statistics refers to information automatically sent back to OpenClinica.org
to help us figure out how well OpenClinica is working and help us improve it in
future versions.
This includes technical information such as the version of OpenClinica installed, the number of studies created and user load. These statistics DO NOT include information such as study or CRF names, study data, or user information. We collect this data in aggregate and use it according to our Privacy Policy [https://community.openclinica.com/privacy-policy] to improve our products and services.
#
# As part of system configuration, we give you the option to help us improve OpenClinica by sending these usage statistics. If you elect to send this information but later change your mind, you can disable this feature in the datainfo.properties file by changing
# 'collectStats' value to 'false'
collectStats=true
usage.stats.host=usage.openclinica.com
usage.stats.port=514
OpenClinica_version=${version}

**##
###############
20 - Rule Designer configuration
OpenClinica Enterprise customers are allowed access to a GUI based Rule Designer.
This configuration allows the OpenClinica instance to contact the Rule Designer for
access. If you are not an OpenClinica Enterprise customer, your users will be re-directed
to a landing page and will have to navigate back to their OpenClinica instance.**

 # If you do not want to see a link to the Rule Designer on the Build Study page,
 # you must delete this configuration option.
#
 # To become an OpenClinica Enterprise customer, please contact sales@openclinica.com
##

designerURL=https://designer.openclinica.com/

12.12.16 Verify Access to OpenClinica

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Restart the system by running:

reboot

After the system starts up, access OpenClinica at the following URL:

http://localhost:8080/OpenClinica

The Log In page should display.

To verify your set-up, try to access OpenClinica from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

12.12.17 Verify Access to OpenClinica Web Services

At this point, Java, Tomcat, PostgreSQL, and OpenClinica and OpenClinica Web Services are installed and set up. Restart the system by running:

reboot

After the system starts up, access OpenClinica Web Services at the following URL:

http://localhost:8080/OpenClinica-ws

The **Welcome** page should display.

To verify your set-up, try to access OpenClinica Web Services from another computer by running the same command from that computer, but replace localhost with the server's IP or hostname.

12.12.18 Configure Tomcat to Use HTTPS

OpenClinica strongly recommends securing the Tomcat application server using a Secure Socket Layer protocol (SSL). SSL is a data transport encryption technology used to make secure https:// connections. SSL requires a third-party security certificate to be effective. Information about configuring SSL certificates for Tomcat is at this website: http://tomcat.apache.org/tomcat-6.0-doc/ssl-howto.html.

12.12.19 Verify the Installation

Log in to OpenClinica with the username root and the password 12345678. OpenClinica requires you to change the password for the user "root" to a secure password. See Update User Profile if you need more information.

The user "root" is assigned to the Study "Default". Create a user account login for yourself, with the User Type set to "technical administrator" and the User Role set to Data Manager. For instructions to create the user account, see Create a New User.

12.13 Install OpenClinica 3.1.x on Windows

These installation instructions have been verified on the following Windows Operating Systems versions:

- Windows Server 2003 Standard Edition SP2
- Windows Server 2003 Standard Edition SP1
- Windows XP Professional Version 2002 SP2

These instructions are for installing version 3.1 of OpenClinica, and also apply to installing the maintenance releases of 3.1 for example 3.1.2. When you see *v.x* or *v.x.y* in the instructions, use your version number, e.g. 3.1.2.

Screenshots shown in these instructions might look different than the screens on your system because your operating system might not be the same. The screenshots might not correspond exactly with the written instructions. Where the screenshot differs from the written instruction, always follow the written instruction.

All characters in the installation commands are case sensitive. Also note that any additional white space between or after characters in commands could cause installation errors.

Approved for publication by Ben Baumann. Signed on 2014-03-28 4:02PM

Not valid unless obtained from the OpenClinica document management system on the day of use.

12.13.1 Overview of Installation on Windows Systems

Use the following process to acquire, install, and configure OpenClinca and its software dependencies. In each step, click the link to view detailed instructions for that step:

1. Ensure your system complies with software dependencies and operating system requirements.
2. Install Java
3. Install the database you will use, PostgreSQL or Oracle:
    - Follow these instructions to install PostgreSQL.

    - If you are using Oracle, you will need to obtain the instructions to install it. OpenClinica does not provide instructions to install Oracle.
4. Install Tomcat.
5. Install the OpenClinica package.
6. Set up the database you installed:
    - Set up PostgreSQL.
7. Configure Tomcat
8. Configure the OpenClinica application.
9. Start Tomcat.
10. Verify the installation.
11. Configure Tomcat to use HTTPS: Follow the same instructions as for Linux systems.

After completing the OpenClinica installation, see the Overview of OpenClinica for instructions to start using the application. A good first step is to define one or more users (especially a Study Director), and then build a Study.

12.13.2 Software Dependencies and Operating System Requirements

Windows Configuration

Your Windows operating system must be configured to show file extensions by default. To configure this behavior:

1. Open a Windows Explorer window.
2. Select Tools > Folder Options.
3. Click the View tab.
4. In Advanced settings, clear the Hide extensions for known file types checkbox.
5. Click Apply

Software Dependencies

OpenClinica runs on any Servlet/JSP container that implements the Servlet 2.4 and JavaServer Pages 2.0 specifications from the Java Community Process. OpenClinica was developed to run on and has been tested with Apache Tomcat 6.0.32.

OpenClinica runs on either the PostgreSQL relational database or an Oracle relational database. Using a
JDBC (Java Database Connectivity) driver, the database connects to the OpenClinica web application and provides the data to the user.

New installations require the following software, which is all open source. These installation instructions step you through the process of downloading, installing, and configuring it for use with OpenClinica:

- Java 6 Standard Edition Development Kit 6.0 update 24 (Note: Java frequently changes its naming conventions.)
- Tomcat 6.0.32
- PostgreSQL 8.4.7.2 or Oracle 10g

Other Versions of Dependent Software

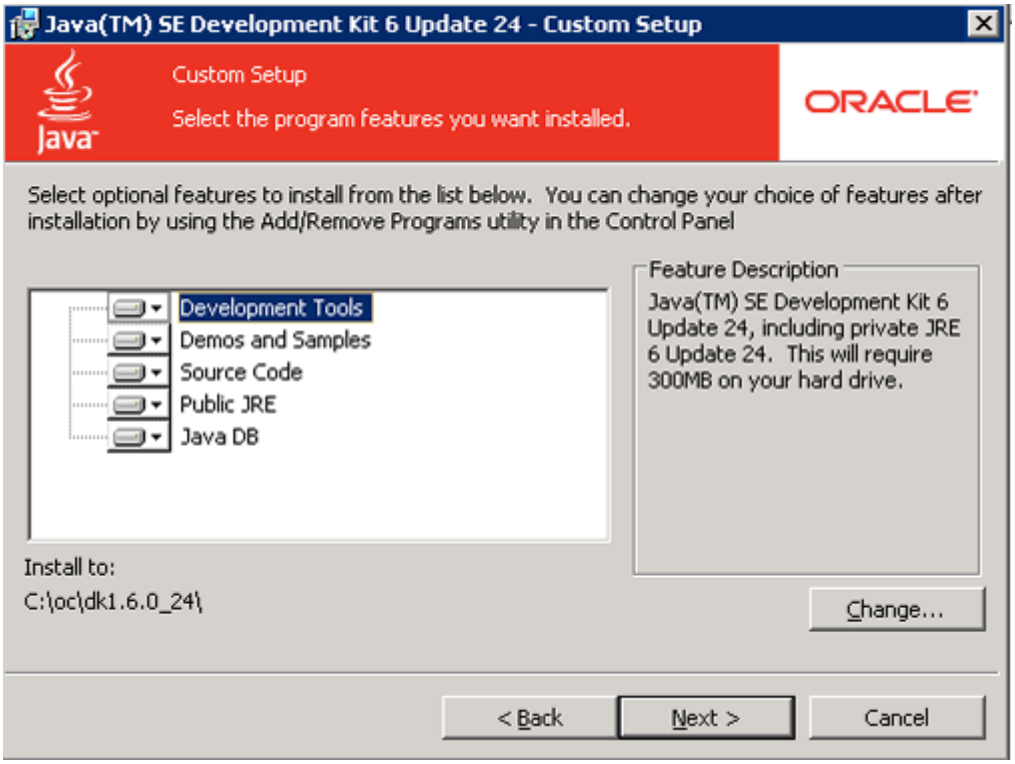
The software dependencies OpenClinica uses are open source, and frequently updated with minor versions and revisions. Sometimes only a matter of weeks separates the release of two adjacent versions. At the time of this OpenClinica release, the latest stable version of Java, Tomcat, and PostgreSQL were used in integrated testing (and are referenced in this document). In some cases, the revision number used is no longer available. In general, you should be able to use more recent minor versions and revisions of the software dependencies. For example, if the installation instructions refer to PostgreSQL 8.4.7.2, then PostgreSQL 8.4.8 should work successfully too (but not PostgreSQL 9).

Record the version or revision number of all the software you use. If you have concerns about a particular combination, post your question to the **users@openclinica.com** mailing list.

12.13.3 Install Java

The OpenClinica software is written in the Java programming language, so you must have Java installed on your system in order to run the OpenClinica application. Follow these instructions to install Java:

1. OpenClinica 3.1 is designed to run on a Java 6 SDK 1.6.x platform. To avoid conflicts with other versions of Java, clear out any other Java installations on the system. Select Start > Control Panel > Add Remove Programs, then remove any Java JREs and SDKs.
2. Create the directory c:ocinstall.
3. From one of the following websites, download the Java 6 SE Development Kit 6.0 update 24 (jdk-6u24-windows-i586.exe) into c:ocinstall:
    - Java: http://www.oracle.com/technetwork/java/javasebusiness/downloads/java-archive-downloads-javase6-419409.html#jdk-6u24-oth-JPR
    - OpenClinica: http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/windows/
4. Run c:ocinstalljdk-6u24-windows-i586.exe.
   The Open File - Security Warning message displays.
5. Click Run.
   The Welcome to Java Installation Wizard opens.
6. Click Next.
   The Custom Setup screen displays.
7. Click Change….
8. Change the path to c:ocjdk1.6.0_24, then click OK.
   The Custom Setup screen should now look like this:



9. Click Next.
   The Setup Wizard installs the JDK. When setup completes, a screen to install JRE6 displays.
10. Click Cancel, and then in the confirmation dialog box click Yes.
    The Install Success screen displays.
11. Click Finish.
12. A web browser window opens, presenting you with the option to register the JDK. Register, or close the window.

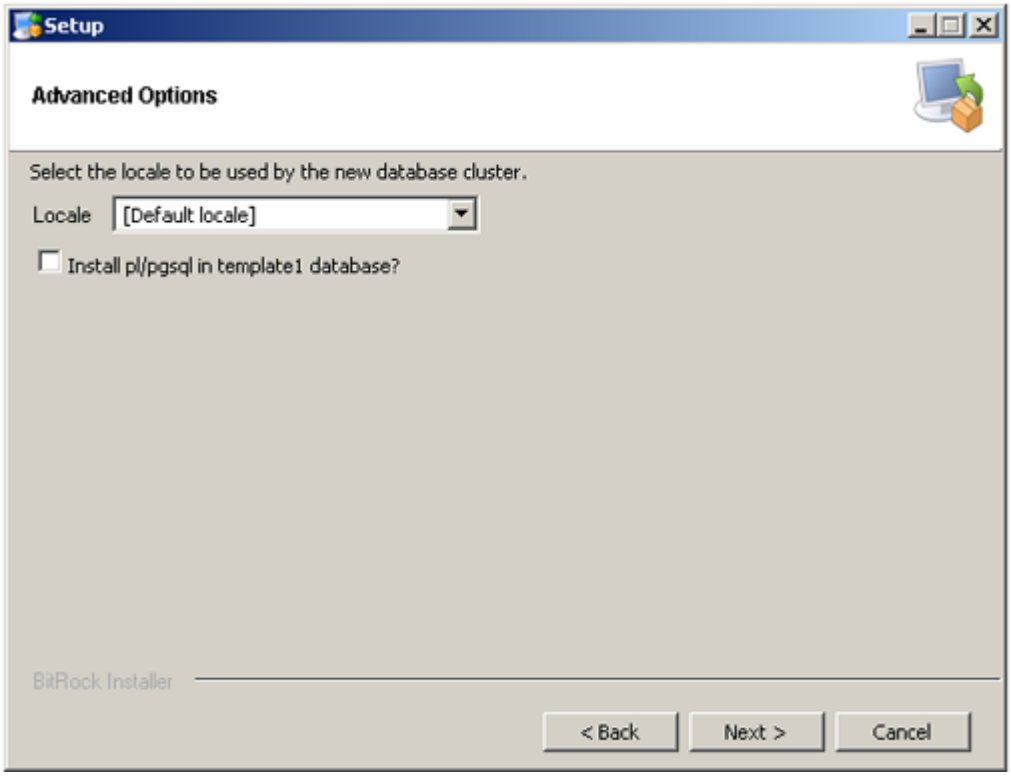
12.13.4 Install PostgreSQL Database

The OpenClinica software uses an underlying relational database management system, either PostgreSQL or Oracle. Complete these instructions if you will be using the PostgreSQL database. If you will be using the Oracle database, install Oracle instead of completing these instructions. Note: we do not provide instructions for installing Oracle.

1. From this location http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/windows/, download postgresql-8.4.7-2-windows.exe to c:ocinstall.
2. Run:
   c:ocinstallpostgresql-8.4.7-2-windows.exe
   The Open File Security Warning message displays.
3. Click Run.
   The PostgreSQL Installation Wizard opens.
4. Click Next.
   The Installation directory screen displays.
5. Click Next to accept the default values.
   The Data directory screen displays.
6. Click Next to accept the default values.
   The Password screen displays.
7. Enter a password for the Postgres superuser. Record the password for use later in the installation process. Re-enter the password, and click Next.

The Port screen displays.

8. Click Next to accept the default value (5432).
   The Advanced Options screen displays.



9. Complete the screen as follows:
   1. For Locale, select "Default locale".
   2. Clear the Install pl/pgsql in template1 database? checkbox.
   3. Click Next.

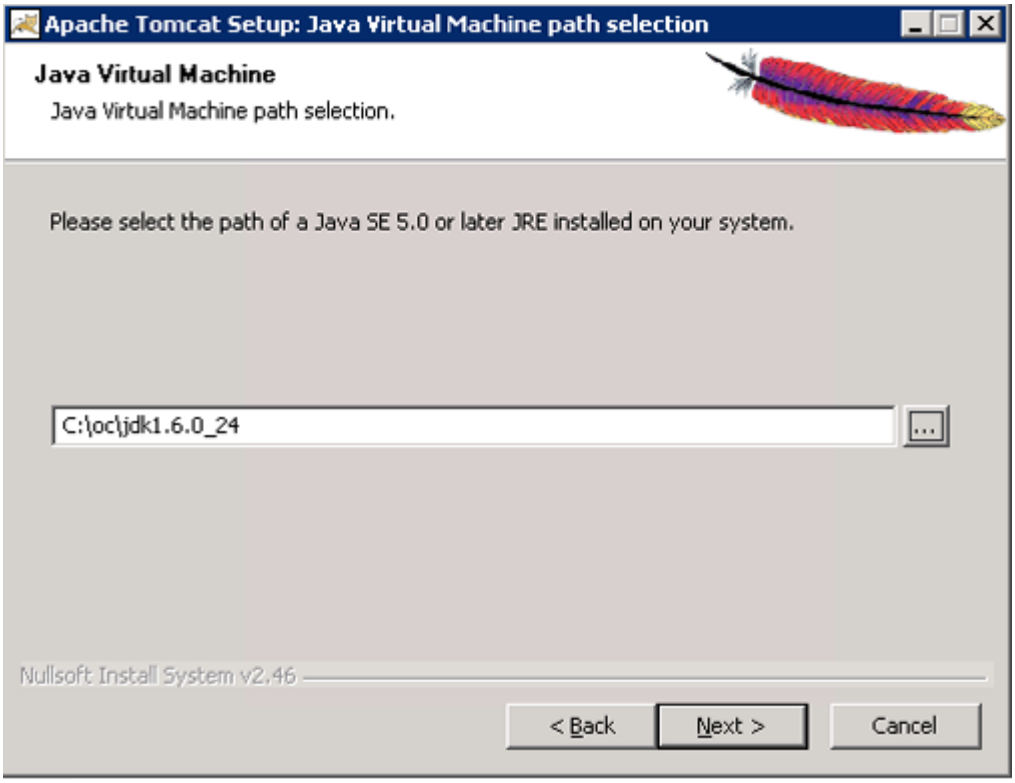
   The Ready to install screen displays
10. Click Next to start the installation.
    When the installation finishes, the Completing the PostgreSQL Setup Wizard screen displays.
11. Clear the Launch Stackbuilder at exit checkbox, then click Finish.

12.13.5 Install Tomcat

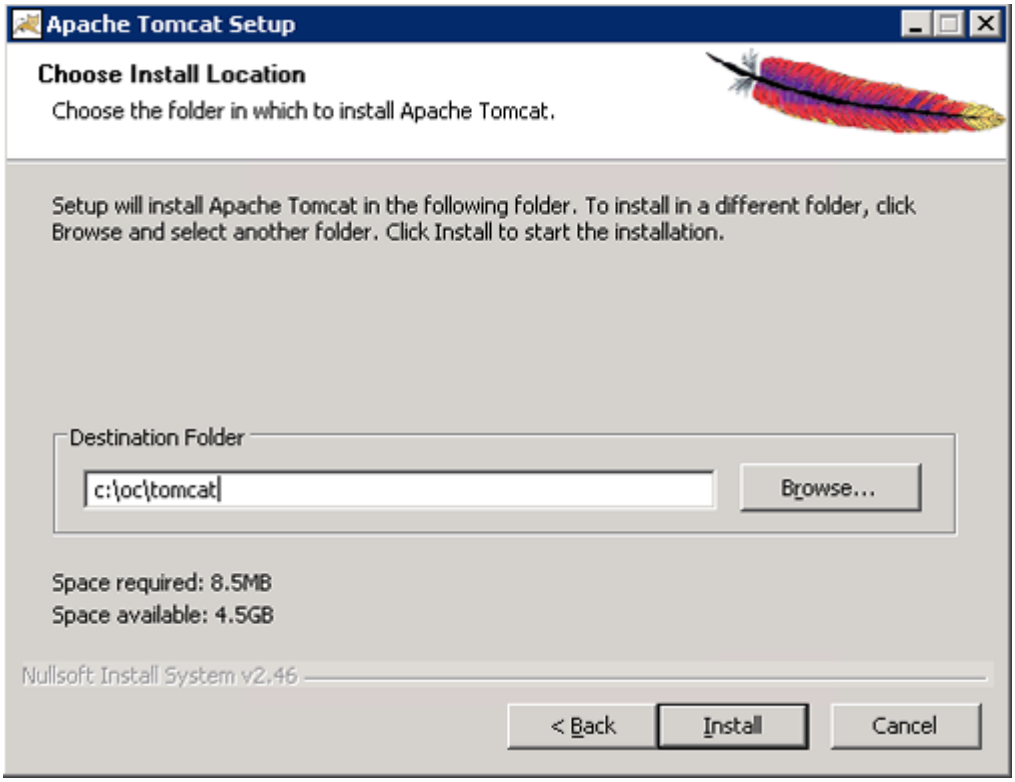
1. From either of the following websites, download the Windows Service Installer Version, apache-tomcat-6.0.32.exe, and save it to c:ocinstall:
   - Apache: http://tomcat.apache.org/download-60.cgi
   - OpenClnica: http://svn.akazaresearch.com/oc/software/OpenClinica-3.1/windows/
2. Run
   c:ocinstallapache-tomcat-6.0.32.exe
   The Apache Tomcat Setup Installation Wizard opens.
3. When the Open File - Security Warning message displays, click Run.
4. On the Welcome screen of the Apache Tomcat Setup Installation Wizard, click Next.
   The License Agreement screen displays.
5. Click I Agree to accept the agreement.
   The Choose Components screen displays.
6. Click Next to accept the default values.
   The Configuration screen displays.
7. Click Next to accept the default values.

The Java Virtual Machine screen displays.

8. Click ..., then select the path you installed the JDK into:
   c:ocjdk1.6.0_24
   The screen now should look like this:

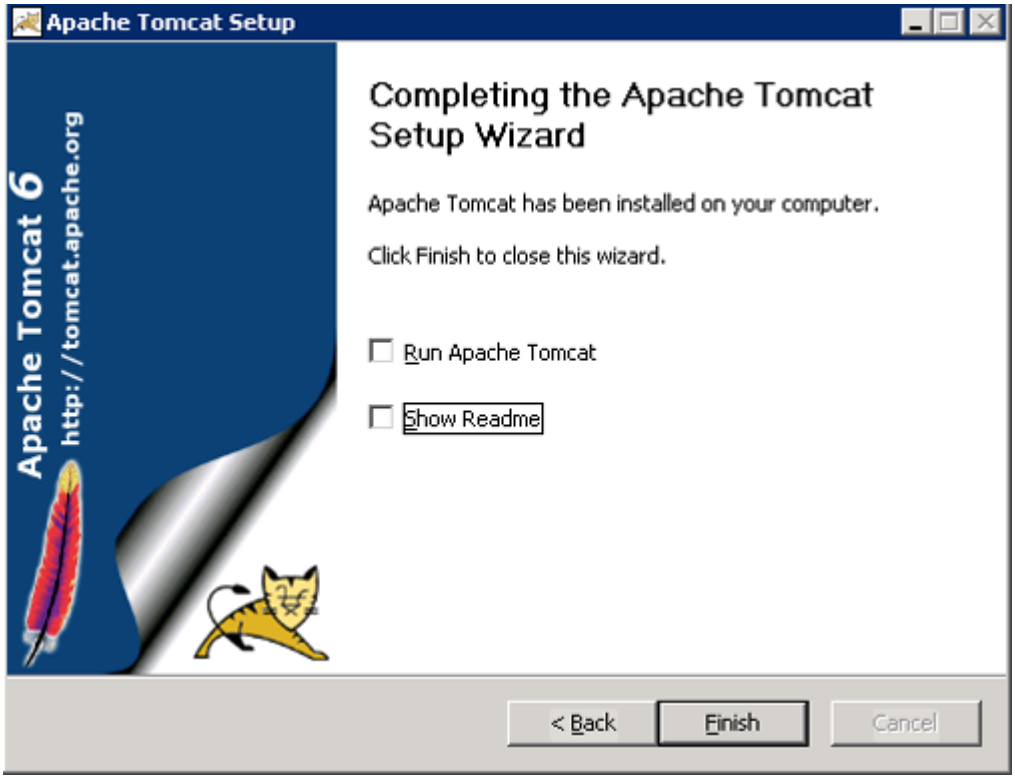


9. Click Next.
   The Choose Install Location screen displays.
10. Edit the Destination Folder to be c:octomcat. The screen should look like this:



11. Click Install to start the installation.
    When the installation is finished, the Completing the Apache Tomact Setup Wizard screen displays.
12. Complete the screen as follows:
    1. Clear the Run Apache Tomcat checkbox.
    2. Clear the Show Readme checkbox.

    The screen should now look like this:



13. Click Finish.
14. Create the directory c:octomcatoldwebapps.
15. Move the web apps provided with Tomcat that OpenClinica does not need by moving the contents of c:octomcatwebapps to c:octomcatoldwebapps.

12.13.6 Install OpenClinica Package

1. Download the OpenClinica software, OpenClinica-*v.x.y*.zip, from the OpenClinica website location, https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create; you will be required to log in to the account to download the OpenClinica software.

   After downloading the OpenClinica software, move it to the directory with the other software dependencies you downloaded:
   c:ocinstall.

2. Right-click OpenClinica-*v.x.y*.zip and select Extract All.
   The Extraction Wizard opens.
3. Click Next.
4. In the next screen, change the directory to c:ocinstall, and click Next.
5. In the next screen, clear the Show Extracted Files checkbox, and click Finish.
6. Copy c:ocinstallOpenClinica-*v.x.y*distributionOpenClinica.war to c:octomcatwebapps.

12.13.7 Install OpenClinica Web Services Package

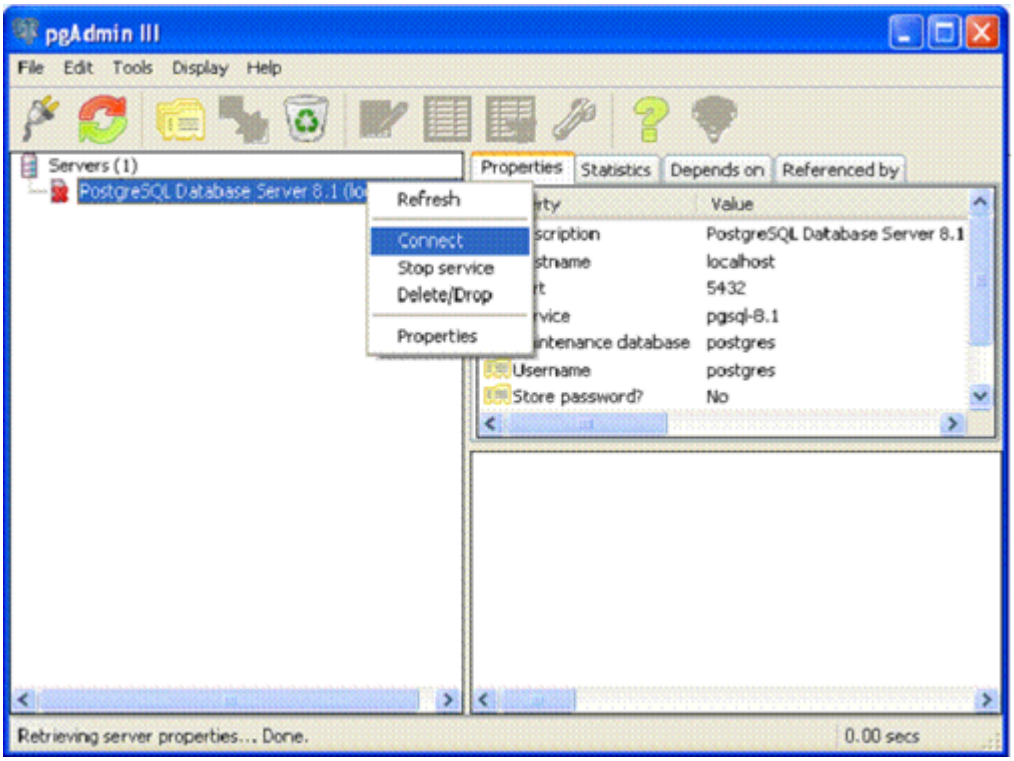
Web Services are optional. Please do not install them if you are not planning on using web services.

1. Download the OpenClinica-ws software, OpenClinica-ws-*v.x.y*.zip, from the OpenClinica website location, https://community.openclinica.com/project/openclinica. To download the software, you need a community account, which is free to create; you will be required to log in to the account to download the OpenClinica software. After downloading the OpenClinica-ws software, move it to the directory with the other software dependencies you downloaded: c:ocinstall.
2. Right-click OpenClinica-ws-*v.x.y*.zip and select Extract All.
3. The Extraction Wizard opens.
4. Click Next.
5. In the next screen, change the directory to c:ocinstall, and click Next.
6. In the next screen, clear the Show Extracted Files checkbox, and click Finish.
7. Copy c:ocinstallOpenClinica-ws-*v.x.y*distributionOpenClinica-ws.war to c:octomcatwebapps.

12.13.8 Set Up the PostgreSQL Database

Complete these instructions if you will be using the PostgreSQL database. If you will be using the Oracle database, instead use the Oracle setup instructions.

1. Select Start > Programs > PostgreSQL 8.4 > pgAdminIII.
2. The pgAdminIII window opens. Right-click the PostgreSQL 8.4 (localhost:5432) icon, and select Connect, as shown here:



3. Log in to the database server using the password you set up during the PostgreSQL

installation.

4. Create the database openclinica and the database user clinica, which OpenClinica uses to connect to the database:
    1. Expand the databases, and select postgreSQL.
    2. Select Tools > Query tool.
       The Query window opens.
    3. In the SQL Editor box, delete all the text.
    4. In the SQL Editor box, type the following:
       CREATE ROLE clinica LOGIN ENCRYPTED PASSWORD 'clinica' SUPERUSER NOINHERIT NOCREATEDB NOCREATEROLE;
    5. Select Query > Execute, which runs the SQL query.
       When the query completes, a message displays in the History window.
    6. In the SQL Editor box, delete all the text.
    7. In the SQL Editor box, type the following:
       CREATE DATABASE openclinica WITH ENCODING='UTF8' OWNER=clinica;
    8. Select Query > Execute.
       When the query completes, a message displays in the History window.
    9. Close the Query window, and click No when prompted to save changes.
5. The database password is set to clinica by default, which is not a secure password. Change the password as follows:
    1. In the pgAdminIII window, expand and select Login Roles.
    2. Select View > Refresh.
       The clinica database user is listed.
    3. Right-click the clinica user account and select Properties.
    4. In the Login Role for clinica box that displays, enter the new password and re-enter it, then click OK. Record the password for future use.

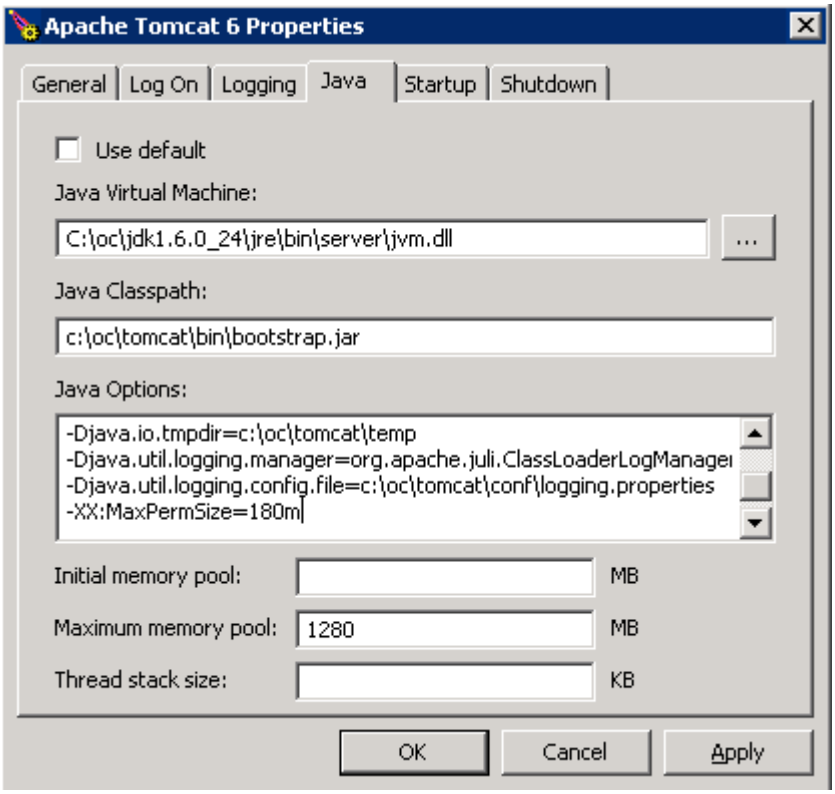
12.13.9 Configure Tomcat

1. Select Start > Apache Tomcat 6.0 > Configure Tomcat.
   The Apache Tomcat 6 Properties window opens.
2. Click the Java tab, then complete the Java page as follows:
    1. For Maximum memory pool, enter 1280.
    2. In the Java Options text box, add this line at the end:

-XX:MaxPermSize=180m

Please note that this setting is based upon the number of war files deployed. The web war needs a 180m of PermGen and the ws war needs a 90m of PermGen memory settings.

1. The window should now look like this:



2. Click Apply, which completes the configuration of Tomcat.
3. Start Tomcat:
    1. Click the General tab.
    2. On the General page, click Start.
4. In about five minutes, Tomcat will be fully started. Verify it is fully started by opening the file c:octomcatlogscatalina.out, and looking for this line:
   INFO: Server Startup in XXXXX ms
5. After verifying Tomcat has fully started, in the General page of the Apache Tomcat 6 Properties window, click Stop.
6. Wait two minutes for Tomcat to stop, then delete OpenClinca.war from c:octomcatwebapps.

12.13.10 Configure OpenClinica for better Performance

Under stress test, OpenClinica has performed well with the following JVM settings:

Please click the Java Options tab described in the 'Configure Tomcat' section and add the following

-XX:+UseParallelGC
-XX:ParallelGCThreads=n
-XX:MaxPermSize=180m
-XX:+CMSClassUnloadingEnabled

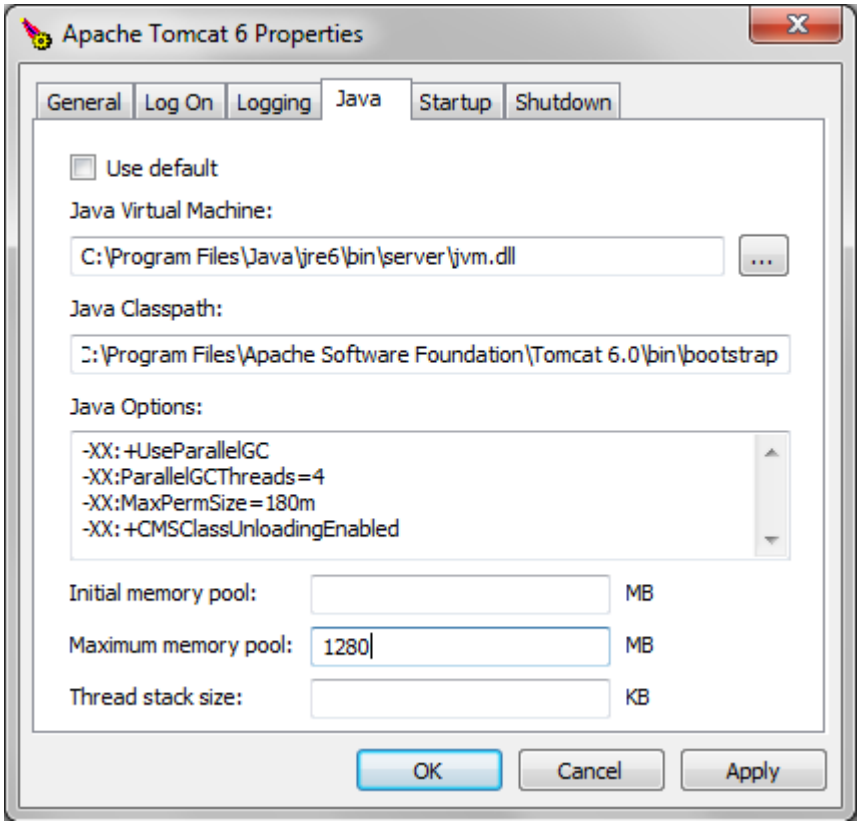
On Java Console use 'Maximum Pool Size' to 1280.

Please note that the bare minimum ram requirement is 1280 MB of memory for these settings, so the CPU is expected to have much higher RAM available.

Where n is the number of cores of your CPU. There should be no spaces before or after each entry,

Also each entry should be in a new line. The MaxPermSize value depends on the number of war files that you are deploying. For instance, if you deploy web and web servics, XX:MaxPermSize should be set to 360m.

-XX:ParallelGCThreads = # of cores of your CPU, as long as the number of processors on your CPU are lesser than 8. The Window should look like this for a 4 core processor:



After the above settings have been applied, start Tomcat

12.13.11 Configure the OpenClinica Application

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica to start. There are other properties in the configuration file you will probably want to modify for your system, however.

1. Using WordPad, open the configuration file: c:octomcatwebappsOpenClinicaWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change the value for dbPass to the password you selected in Set Up the PostgreSQL Database. Change the values for any other properties.

   The datainfo.properties file for Windows is the same as for Linuxsee more information at Description of datainfo.properties File.
3. When you finish making changes, save the file.
4. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more

information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization

12.13.12 Configure the OpenClinica Web Services

If you followed all the previous instructions exactly, there is only one property in the configuration file, datainfo.properties, that you may need to change in order for OpenClinica Web Services to start. There are other properties in the configuration file you will probably want to modify for your system, however.

Note: Most of the properties are not needed or used for Web Services, see Description of datainfo.properties File for Web Services for more information on what settings are actually used.

1. Using WordPad, open the configuration file: c:octomcatwebappsOpenClinica-wsWEB-INFclassesdatainfo.properties
2. Edit values for the properties in the datainfo.properties file. You must change all values from Database Configuration section of datainfo.properties file to reflect your settings in datainfo.properties file for OpenClinica application. Change the values for any other properties.

   The datainfo.properties file for Windows is the same as for Linuxsee more information at Description of datainfo.properties File for WebServices.
3. If you are installing Web Services for OpenClinica 3.1.2 and early please edit ***adminEmail*** property (section 5 - adminEmail) if you would like e-mail to be send through 'Contact' link from Web Services welcome page.
4. Other properties that can be configured for web services are:
   1. Section 11 - Logging configuration
5. When you finish making changes, save the file.

12.13.13 Start Tomcat

Start Tomcat using any one of these methods:

- From the Apache Tomcat 6 Properties window:
  1. Select Start > Apache Tomcat 6.0 > Configure Tomcat to open the window.
  2. Click the General tab.
  3. On the General page, click the Start button to start Tomcat.

- Using the Windows run command:
  1. Select Start > Run.
  2. In the Run box, type cmd, then click OK.
  3. At the new command prompt, start Tomcat by typing
     net start tomcat6
     then press Enter.

     When you need to stop Tomcat, type
     net stop tomcat6

then press Enter.

- Via the Windows Services Microsoft Management Console (MMC), if you are familiar with it.

12.13.14 Verify the Installation

At this point, Java, Tomcat, PostgreSQL, and OpenClinica are installed and set up. Verify the installation was successful by following these steps:

1. Open a web browser and access OpenClinica at the following URL:

   http://localhost:8080/OpenClinica

   The OpenClinica Log In page should display.

2. Log in to OpenClinica using the default user name, root, and password 12345678. You will be forced to change the password for the user "root" to a secure password. See Update User Profile if you need more information.

3. The user "root" is assigned to a default Study named "Default." Create a user account for youself, with the User Type set to "technical administrator" and the User Role set to Data Manager: for instructions to create the user account, see Create a New User.

12.13.15 Verify the Installation of OpenClinica Web Services

1. Point your web browser to the OpenClinica Web Services welcome page: http://<<*server url*>>:8080/OpenClinica-ws. The OpenClinica Web Services **Welcome** page should be display.
2. Verify the version number is *v.x.x*-Community, where *v.x.x* is the version number you upgraded OpenClinica Web Services to. The version number is displayed in the lower right corner of the page.

Web Services should have the same version as OpenClinica application.

12.14 Upgrade to OpenClinica 3.1.x on Linux

These instructions are for upgrading from OpenClinica 3.0.*x* to version 3.1 or to a 3.1.*x* maintenance release on Linux systems running the essential software dependencies: Java 6, Tomact 6, and PostgreSQL 8.4. When you see *v.x* or *v.x.x* or similar in the instructions, use the version number you are upgrading to, e.g. 3.1 or 3.1.2.

The instructions apply only if you followed the upgrade instructions to get to 3.0.*x*; if you did not, you might need to do other things in order to upgrade your system.

If you are running an earlier version of OpenClinica and/or its related software dependencies, make sure you upgrade these to the required versions before upgrading beyond OpenClinica 3.0.*x*. Please

note that these instructions do not cover upgrading related software dependencies for 3.1.*x*. To upgrade these components, you'll need to follow the instructions provided by those technologies. Make sure you back up everything so your existing files are not lost.

If you are upgrading from OpenClinica 2.5.*x*, you need to first upgrade to 3.0.*x*, and you will need to upgrade the software dependencies so they meets the requirements for OpenClinica 3.0.*x*. Perform a full backup of your 2.5.*x* instance, perform a fresh install of 3.0.*x*, and then restore your 2.5.*x* data. For information about backing up your 2.5.*x* instance, see the 3.0.*x* upgrade documentation that is included with the downloaded files for 3.0.*x*.

Approved for publication by Ben Baumann. Signed on 2014-03-25 11:07AM

Not valid unless obtained from the OpenClinica document management system on the day of use.

12.14.1 Overview of the Upgrade Process on Linux Systems

Follow this process to upgrade OpenClinica. In each step, click the link to view detailed instructions for the step:

1. Back up OpenClinica.
2. Upgrade OpenClinica.
3. Configure OpenClinica:
    1. Make any changes needed to the datainfo.properties file as described here: Configure the OpenClinica Application.
    2. Ensure that OpenClinica is configured for optimum performance as described here: Configure OpenClinica for Optimum Performance.
    3. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization
    4. Reboot the system by typing reboot.
4. Make manual updates to the database.
5. Start Tomcat by running the following command:
   /etc/init.d/tomcat start

12.14.2 Overview of the Upgrade Process for Web Services on Linux Systems

Follow this process to upgrade OpenClinica. In each step, click the link to view detailed instructions for the step:

1. Upgrade OpenClinica Web Services.
2. Configure OpenClinica:
    1. Make any changes needed to the datainfo.properties file as described here: Configure the OpenClinica Application.
    2. Ensure that OpenClinica is configured for optimum performance as described here: Configure OpenClinica for Optimum Performance.
    3. Reboot the system by typing reboot.
3. Start Tomcat by running the following command:
4. /etc/init.d/tomcat start

12.14.3 Back Up OpenClinica

Before upgrading, follow this process to back up the database and files needed by OpenClinica:

1. Stop Tomcat by running the following command:
   /etc/init.d/tomcat stop
2. Confirm Tomcat has stopped before continuing.
3. Create the backup directory by running the following command:
   mkdir -p /usr/local/oc/backup/manual/`date +%b-%d-%Y`
4. Make the backup directory become the current directory by running the following command:
   cd /usr/local/oc/backup/manual/`date +%b-%d-%Y`
5. Run:
   /opt/PostgreSQL/8.4/bin/pg_dump -F c -U postgres openclinica > openclinica.backup
6. When prompted for a password, enter the PostgreSQL database superuser password you specified when setting up the database as part of installing OpenClinica.
7. Copy the files OpenClinica needs by running the following command:
   cp -rf /usr/local/tomcat/openclinica* .
   cp -rf /usr/local/tomcat/webapps/OpenClinica* .

12.14.4 Upgrade OpenClinica

1. Download the OpenClinica software from the OpenClinica website, using this location: https://community.openclinica.com/project/openclinica. To download the software, use your free community account; you will be required to log in to the account to download the OpenClinica software. If you do not have an account, you may get one here.

   After downloading the OpenClinica software, move it to:

   /usr/local/oc/install
2. Run the following commands:
   cd /usr/local/oc/install
   unzip OpenClinica-*v.x.y**
   cd OpenClinica-*v.x.y**/distribution
   unzip OpenClinica.war -d OpenClinica
   rm -rf /usr/local/tomcat/work/Catalina/localhost/OpenClinica*
   rm -rf /usr/local/tomcat/webapps/OpenClinica*
   cp -rf OpenClinica* /usr/local/tomcat/webapps
   rm -f /usr/local/tomcat/webapps/OpenClinica.war

12.14.5 Upgrade OpenClinica Web Services

Run upgrade for OpenClinica Web Services only if you are currently using Web Services

1. Download the OpenClinica Web Services package from the OpenClinica website, using this location: https://community.openclinica.com/project/openclinica. To download the software, use your free community account; you will be required to log in to the account to download the OpenClinica software. If you do not have an account, you may get one here.

   After downloading the OpenClinica Web Services, move it to:

   /usr/local/oc/install
2. Run the following commands:
   cd /usr/local/oc/install
   unzip OpenClinica-ws-*v.x.y**
   cd OpenClinica-ws-*v.x.y**/distribution
   unzip OpenClinica-ws.war -d OpenClinica-ws
   rm -rf /usr/local/tomcat/work/Catalina/localhost/OpenClinica-ws*
   rm -rf /usr/local/tomcat/webapps/OpenClinica-ws*
   cp -rf OpenClinica-ws* /usr/local/tomcat/webapps
   rm -f /usr/local/tomcat/webapps/OpenClinica-ws.war

12.14.6 Manual Database Updates

Now, you'll need to make database updates for your database: either PostgreSQL or Oracle. The instructions apply to upgrading OpenClinica on Linux and Windows systems:

PostgreSQL

1. Open the file README_Instructions_for_Duplicate_Row_Fix.txt, located at /usr/local/oc/OpenClinica-*v.x.y*/config/databases/*v.x*/PostgreSQL
2. Follow the instructions in the README file.

Oracle

1. At the location /usr/local/oc/OpenClinica-*v.x.y*/config/databases/*v.x.y*/Oracle/upgrade, open the file README_Instructions_for_Duplicate_Row_Fix.txt, and follow the instructions in the README file.
2. As the sysdba user, run the Grant_View.sql script located in /usr/local/oc/OpenClinica-*v.x.y*/config/databases/*v.x.y*/Oracle/upgrade.
3. The script prompts you for a user name: provide the user name for the database user OpenClinica is set up to use, as specified in the datainfo.properties file that you configured during installation. Run this script before starting Tomcat. There is no risk in running this script on a database that has already been upgraded to 3.1.*y*.

12.14.7 Verify the Upgrade

1. Test the database connection and basic authentication:
    1. Point your web browser to

http://<<*server url*>>:8080
    2. Verify that Tomcat is running. If the URL loads Tomact is running.
    3. Point your web browser to the OpenClinica login page:
    http://<<*server url*>>:8080/OpenClinica
    The OpenClinica Log In page should display.
    4. Log in to OpenClinica.
2. Verify the version number is *v.x.x*-Community, where *v.x.x* is the version number you upgraded OpenClinica to. The version number is displayed in the lower right corner of the page.

12.14.8 Verify the Upgrade for OpenClinica Web Services

1. Point your web browser to the OpenClinica Web Services welcome page: http://<<*server url*>>:8080/OpenClinica-ws. The OpenClinica Web Services **Welcome** page should be display.
2. Verify the version number is *v.x.x*-Community, where *v.x.x* is the version number you upgraded OpenClinica Web Services to. The version number is displayed in the lower right corner of the page.

Web Services should have the same version as OpenClinica application.

12.15 Upgrade to OpenClinica 3.1.x on Windows

These instructions are for upgrading from OpenClinica 3.0.*x* to version 3.1 , 3.1.*x* maintenance release or to a 3.2 on Windows systems running the essential software dependencies: Java 6, Tomact 6, and PostgreSQL 8.4. When you see *v.x* or *v.x.x* or similar in the instructions, use the version number you are upgrading to, e.g. 3.1 or 3.1.2.

The instructions apply only if you followed the upgrade instructions to get to 3.0.*x*; if you did not, you might need to do other things in order to upgrade your system.

If you are running an earlier version of OpenClinica and/or its related software dependencies, make sure you upgrade these to the required versions before upgrading beyond OpenClinica 3.0.*x*. Please note that these instructions do not cover upgrading related software dependencies for 3.1.*x*. To upgrade these components, you'll need to follow the instructions provided by those technologies. Make sure you back up everything so your existing files are not lost.

If you are upgrading from OpenClnica 2.5.*x*, you need to first upgrade to 3.0.*x*, and you will need to upgrade the software dependencies so they meets the requirements for OpenClinica 3.0.*x*. Perform a full backup of your 2.5.*x* instance, perform a fresh install of 3.0.*x*, and then restore your 2.5.*x* data. For information about backing up your 2.5.*x* instance, see the 3.0.*x* upgrade documentation that is included with the downloaded files for 3.0.*x*.

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12.15.1 Overview of the Upgrade Process on Windows Systems

1. Ensure your system complies with software dependencies and system requirements.
2. Back up OpenClinica.
3. Upgrade OpenClinica.
4. Configure OpenClinica:
    1. Ensure that OpenClinica is configured for optimum performance as described here: Configure OpenClinica for Optimum Performance.
    2. You may also need to configure OpenClinica for internationalization should you wish to utilize OpenClinica in different languages. Also, if you need to use some UTF-8 characters in your application, you may need to modify your default connecter configuration. For more information regarding configuring OpenClinica for internationalization and using UTF-8 characters, please refer to https://docs.openclinica.com/3.1/technical-documents/openclinica-and-internationalization
5. Verify the upgrade.
6. Make manual updates to the database. The instructions are the same as for upgrading OpenClinica on Linux systems, except the README file on Windows systems is located at: c:ocinstallOpenClinica-*v.x.y*configdatabasesPostgreSQL

12.15.2 Software Dependencies and System Requirements

To upgrade to OpenClinica 3.1.*x*, you need the following:

- Operating system must be either of these:
    - Windows XP
    - Windows Server 2003
- Browsers supported in this release:
    - Internet Explorer *11*
    - Mozilla Firefox 30
- Software versions must be:
    - Java JDK 1.7.065
    - PostgreSQL 8.4.1
    - Tomcat 7.0.33.0 application server
      Note: In most cases, minor maintenance releases of the above products will also work (but not major releases)

12.15.3 Back Up OpenClinica

Before upgrading, follow this process to back up the database and files needed by OpenClinica:

1. Stop Tomcat. (See instructions, which are included in Start Tomcat.)
2. Back up the database (instructions here).
3. Back up the file CATALINA_HOMEwebappsOpenClinicaWEB-INFclassesdatainfo.properties

4. Back up the folder CATALINA_HOMEwebappsOpenClinica
5. Back up the CRFs and datasets, which are located in CATALINA_HOMEwebappsopenclinica.data

12.15.4 Manual Database Updates

Now, you'll need to make database updates for your database: either PostgreSQL or Oracle. The instructions apply to upgrading OpenClinica on Linux and Windows systems:

PostgreSQL

1. Open the file README_Instructions_for_Duplicate_Row_Fix.txt, located at c:ocinstallOpenClinica-*v.x.x*configdatabasesPostgreSQL
2. Follow the instructions in the README file.

Oracle

1. At the location c:ocinstallOpenClinica-*v.x.x*configdatabasesOracleupgrade, open the file README_Instructions_for_Duplicate_Row_Fix.txt, and follow the instructions in the README file.
2. As the sysdba user, run the Grant_View.sql script located in c:ocinstallOpenClinica-*v.x.x*configdatabasesOracleupgrade
3. The script prompts you for a user name: provide the user name for the database user OpenClinica is set up to use, as specified in the datainfo.properties file that you configured during installation. Run this script before starting Tomcat. There is no risk in running this script on a database that has already been upgraded to 3.1.*x*.

12.15.5 Verify the Upgrade

1. Test the database connection and basic authentication:
    1. Verify that Tomcat is running. If the URL loads Tomcat is running.
    2. Point your web browser to the OpenClinica login page: http://<<*server url*>>:8080/OpenClinica
    The OpenClinica Log In page should display.
    3. Log in to OpenClinica.
2. Verify the version number is *v.x.x*-Community, where *v.x.x* is the version number you upgraded OpenClinica to. The version number is displayed in the lower right corner of the page.

12.15.6 Upgrade OpenClinica

1. Undeploy OpenClinica:
    1. Delete the directory CATALINA_HOMEwebappsOpenClinica
    2. Delete the file CATALINA_HOMEwebappsOpenClinica.war if exists
    3. Delete the directory workCatalinalocalhostOpenClinica
2. Create the following directory, if it does not already exist:

c:ocinstall
3. Download the OpenClinica software, OpenClinica-*v.x.x*.zip, from the OpenClinica website: https://community.openclinica.com/project/openclinica. To download the software, use your free community account; you will be required to log in to the account to download the OpenClinica software. If you do not have an account, you may get one here.

   After downloading the OpenClinica software, extract the files to:
   c:ocinstall.
4. Copy the file
   c:ocinstallOpenClinica-*v.x.x*distributionOpenClinica.war
   to
   c:octomcatwebapps
5. Start Tomcat. (See instructions at Start Tomcat.)
6. In about five minutes, Tomcat will be fully started. Verify it is fully started by opening the file
   c:octomcatlogscatalina.out
   and looking for this line:
   INFO: Server Startup in XXXXX ms
7. Stop Tomcat. (See instructions, which are included at Start Tomcat.)
8. Wait about two minutes for Tomcat to stop, then delete the file
   c:octomcatwebappsOpenClinca.war
9. Using WordPad, make any changes to the configuration file
   1. Open the file
      CATALINA_HOMEwebappsOpenClinicaWEB-INFclassesdatainfo.properties
   2. Make changes to any values for the properties: see more information at Description of datainfo.properties File.
   3. When you finish making changes, save the file.
10. Move the backed up CRF and dataset files from the openclinica.data directory to the new openclinica.data directory.
11. Start Tomcat. (See instructions at Start Tomcat.)

12.15.7 Back Up OpenClinica Web Services

Before upgrading, follow this process to back up the database and files needed by OpenClinica:

1. Stop Tomcat. (See instructions, which are included in Start Tomcat.)
2. Back up the database (instructions here).
3. Back up the file
   CATALINA_HOMEwebappsOpenClinica-wsWEB-INFclassesdatainfo.properties
4. Back up the folder
   CATALINA_HOMEwebappsOpenClinica-ws

12.15.8 Verify the Upgrade for OpenClinica Web Services

1. Point your web browser to the OpenClinica Web Services welcome page: http://<<*server url*>>:8080/OpenClinica-ws. The OpenClinica Web Services **Welcome** page should be display.
2. Verify the version number is *v.x.x*-Community, where *v.x.x* is the version number you upgraded OpenClinica Web Services to. The version number is displayed in the lower right corner of the page.

Web Services should have the same version as OpenClinica application.

12.15.9 Upgrade OpenClinica Web Services

Run upgrade for OpenClinica Web Services only if you are currently using Web Services

1. Undeploy OpenClinica Web Services:
    1. Delete the directory
       CATALINA_HOMEwebappsOpenClinica-ws
    2. Delete the file
       CATALINA_HOMEwebappsOpenClinica-ws.war if exists
    3. Delete the directory
       workCatalinalocalhostOpenClinica-ws
2. Create the following directory, if it does not already exist:
   c:ocinstall
3. Download the OpenClinica software, OpenClinica-ws-*v.x.x*.zip, from the OpenClinica website: https://community.openclinica.com/project/openclinica. To download the software, use your free community account; you will be required to log in to the account to download the OpenClinica software. If you do not have an account, you may get one here.

   After downloading the OpenClinica software, extract the files to:
   c:ocinstall.
4. Copy the file
   c:ocinstallOpenClinica-ws-*v.x.x*distributionOpenClinica-ws.war
   to
   c:octomcatwebapps
5. Start Tomcat. (See instructions at Start Tomcat.)
6. In about five minutes, Tomcat will be fully started. Verify it is fully started by opening the file
   c:octomcatlogscatalina.out
   and looking for this line:
   INFO: Server Startup in XXXXX ms
7. Stop Tomcat. (See instructions, which are included at Start Tomcat.)
8. Wait about two minutes for Tomcat to stop, then delete the file
   c:octomcatwebappsOpenClinca-ws.war
9. Using WordPad, make any changes to the configuration file
    1. Open the file
       CATALINA_HOMEwebappsOpenClinica-wsWEB-INFclassesdatainfo.properties
    2. Make changes to any values for the properties: see more information at Description of datainfo.properties File.
    3. When you finish making changes, save the file.
10. Start Tomcat. (See instructions at Start Tomcat.)

12.16 OpenClinica VM Image

The OpenClinica VM(Virtual Machine) with JUNO demo study image is an easy method to get OpenClinica up and running quickly without going through the entire installation procedure. This documentation applies to all current versions of OpenClinica.

- Download OpenClinica Appliance (Virtual Machine) with JUNO demo study

This virtual machine is a self-contained image based off CentOS 6.8 (Linux) base server installation with Postgres 9.5, Tomcat 7 from EPEL repository, Oracle JDK SE7U67 and OpenClinica. The default password for **root** user is **clinica**.

Approved for publication by Warren Vandeventer. Signed on 2017-01-18 1:31PM

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12.16.1 Installing and Using VirtualBox

The OpenClinica VM Image is under the Open Virtualization Archive (OVA) format known to work well with free and open source VirtualBox. We recommend using VirtualBox 5.0 or newer.

You can download Virtualbox from https://www.virtualbox.org/

Documentation and community support is readily available from the same website as well.

The following shows how to load the OpenClinica VM image in VirtualBox

1. Open VirtualBox.
2. Open "Import Appliance..." from the File menu.
3. Now browse to the location where you downloaded the ova file and select it and click "Open".
4. Once imported, you can press "Start" to start the OpenClinica virtual machine
5. Login using user name **root** and password **clinica**. Find the ip address of the virtual machine using **ifconfig** command inside the virtual machine. If the network is not up (ping google.com to find out). You might have to adjust your network settings (default is bridged) within VirtualBox and run **service network restart** to restart your virtual machine network service. Confirm you have network running correctly before proceeding to the next step.
6. Security (it is highly recommended that you follow these steps immediately after first start):
   - You should change and record the default password for system account "root" (login as root and apply command "passwd")
   - You should upgrade the base system immediately to install all security updates published meanwhile. The base system is CentOS 6.8, so you need to run as root the command "yum -y update"
7. Go to http://ip-address:8080/OpenClinica/ where ip-address should be replaced by the actual ip address you found out using ifconfig in the previous step.
8. You should be able to see the OpenClinica login page. The JUNO study demo accounts are as follows:

datamanager / password

crc_A / password

investigator_A / password

12.17 Configuring an Oracle Database for OpenClinica (Deprecated)

If you use OpenClinica with the Oracle database, follow these instructions to set up the database. The instructions differ depending on the version of OpenClniica you are using.

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12.17.1 Set Up Oracle for OpenClinica Versions Pre-3.1.2

Follow these instructions to configure an Oracle 10g database to run with OpenClinica versions 3.1 and 3.1.1.

1. Open a shell/command prompt window and change the current directory to the location of the OpenClinica database files.
2. Ensure there is at least 512MB of disk space available at that location.
3. Start sqlplus:
    1. Run
       sqlplus sys as sysdba
    2. When prompted for the password, enter the sys password.
4. At the SQL prompt, run the script to set up the database tablespace and database user "clinica":
    1. Run
       @oracle_setup_db.sql
    2. When the following prompts are display (shown below in bold), provide these values (shown below in code font):
        - Specify Tablespace name for Clinica Data:
          openclinica
        - Specify Tablespace type for Clinica Data (S/M/L):
          L
          (This specifies a tablespace size of Large, 512MB.)
        - DataFile Name (with exact path):
          /usr/lib/oracle/xe/oradata/XE/OPENCLINICA01.DBF
          (This is the default oradata directory for Linux; specify the full path to the oradata directory on your system.)
        - Specify the wanted username for the OpenClinica oracle account:
          clinica
    3. Check spool_oracle_setup_db.txt for any errors.
5. Change the default password "clinica" to a secure password:
    1. As the sysdba user, connect to your instance via sqlplus by running
       sqlplus sys as sysdba

    2. Run the following command, where *PASSWORD* is the new, secure password you are sepcifying for the clinica database user:
       alter user clinica identified by *PASSWORD*;
6. Start Tomcat, which will build the OpenClinica database within the tablespace.
7. After the tablespace is built, create indexes to help performance by running the following:
    1. Connect to sqlplus as the clinica user by running:
       sqlplus clinica/clinica
    2. Run this script:
       @performance.sql

12.17.2 Set Up Oracle for OpenClinica 3.1.2 or Above

Follow these instructions to configure an Oracle 10g database to run with OpenClinica versions 3.1.2 or above.

1. Open a shell/command prompt window and change the current directory to the location of the OpenClinica database files.
2. Ensure there is at least 512MB of disk space available at that location.
3. Start sqlplus:
    1. Run
       sqlplus sys as sysdba
    2. When prompted for the password, enter the sys password.
4. At the SQL prompt, run the script to create the tablespace:
    1. Run
       @create_ts.sql
    2. When the following prompts display (shown below in bold), provide these values (shown below in code font):
        - Specify Tablespace name for Clinica Data:
          openclinica
        - Specify Tablespace type for Clinica Data (S/M/L):
          L
          (This specifies a tablespace size of Large, 512MB.)
        - DataFile Name (with exact path):
          /usr/lib/oracle/xe/oradata/XE/OPENCLINICA01.DBF
          (This is the default oradata directory for Linux; specify the full path to the oradata directory on your system.)
5. At the SQL prompt, run the script to create the database user "clinica":
    1. Run
       @oracle_setup_db.sql
    2. When the following prompts display (shown below in bold), provide these values (shown below in code font):
        - Specify the Tablespace name you provided when you executed the create_ts.sql script:
          openclinica
        - Specify the wanted username for the OpenClinica oracle account:
          clinica
    3. Check spool_oracle_setup_db.txt for any errors.
6. Change the default password "clinica" to a secure password:

    1. As the sysdba user, connect to your instance via sqlplus by running
       sqlplus sys as sysdba
    2. Run the following command, where *PASSWORD* is the new, secure password you are sepcifying for the clinica database user:
       alter user clinica identified by *PASSWORD*;
7. Start Tomcat, which will build the OpenClinica database within the tablespace.
8. After the tablespace is built, create indexes to help performance by running the following:
    1. Connect to sqlplus as the clinica user by running
       sqlplus clinica/clinica
    2. Run this script:
       @performance.sql

12.18 Operating System Installation

OpenClinica Enterprise is available either via a cloud hosted solution or a self hosted and managed system. The base supported platform for self hosted customers is Red Hat Enterprise Linux (RHEL) 6.5 or above. RHEL is a commercially supported operating system and recommended for enterprise customers. CentOS is a free rebuild for RHEL without commercial support and is available at http://centos.org. For either, we highly recommend using the 64-bit version for best performance if your hardware is capable of supporting that architecture.

RHEL 6.x installation guide is available at https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Installation_Guide/. Using Kickstart is recommended if you prefer to automate the installation steps. However,unless you are running a large number of deployments, the interactive installer is easier to perform.

If you choose to use RHEL, we recommend selecting the "minimal" option in the package selection. Refer to https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Installation_Guide/s1-pkgselection-x86.html for more details. As noted in the installation guide, choosing this option maximizes security and performance since it reduces the number of services running and the number of updates required for maintaining the system. If you are using CentOS, the exact same options are available there as well. The net installation method allows you to download a small image and pull in packages on demand. Since an OpenClinica installation only requires a small number of packages within the operating system, this can be far more efficient than downloading the complete image. For CentOS, refer to http://www.if-not-true-then-false.com/2011/centos-6-netinstall-network-installation/ for a detailed guide on doing a net installation.

As an alternative in CentOS, you can download the minimal installation image at http://wiki.centos.org/Manuals/ReleaseNotes/CentOSMinimalCD6.0. If you choose to download the minimal image, please note that the following core packages must be installed on the system for the OpenClinica installation and maintenance.

* tar
* unzip
* vim-enhanced
* cronie

Approved for publication by Ben Baumann. Signed on 2014-06-13 5:26PM

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