

**Oracle® Health Sciences Empirica Healthcare  
Analysis**

Installation Guide

Release 1.0.1

**E57001-01**

May 2015

E57001-01

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# Preface

The preface includes the following section:

- [Audience](#)
- [Documentation accessibility](#)
- [Related documents](#)
- [Finding prerequisite software for Oracle Health Sciences applications](#)
- [Conventions](#)

## Audience

This document is intended for database and system administrators who are responsible for installing, upgrading, and configuring the Empirica Healthcare Analysis software.

## Documentation accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc>.

### Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info> or visit <http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs> if you are hearing impaired.

## Related documents

For more information, see the following documents in the Oracle Health Sciences Empirica Healthcare Analysis release 1.0.1 documentation set:

- *Oracle Health Sciences Empirica Healthcare Analysis Release Notes*
- *Oracle Health Sciences Empirica Healthcare Analysis Known Issues*
- *Oracle Health Sciences Empirica Healthcare Analysis User Guide*
- *Oracle Health Sciences Empirica Healthcare Analysis Installation Guide*
- *Oracle Health Sciences Empirica Healthcare Analysis Secure Configuration Guide*
- *Oracle Health Sciences Empirica Healthcare Analysis Third Party Licenses and Notices*

## Finding prerequisite software for Oracle Health Sciences applications

- Download the latest major or minor release from the Oracle Software Delivery Cloud (<https://edelivery.oracle.com/>).

For information on the credentials that are required for authorized downloads, click **FAQs** on the main page of the Oracle Software Delivery Cloud portal.

- Download subsequent patch sets and patches from My Oracle Support (<https://support.oracle.com>).

To find patch sets or patches, select the **Patches & Updates** tab.

If a previous version of prerequisite software is no longer available on the Oracle Software Delivery Cloud, log a software media request Service Request (SR). Previous versions of prerequisite software are archived and can usually be downloaded. After you open an SR, you can check its status:

- US customers: Call 1-800-223-1711.
- Outside the US: Check [www.oracle.com/us/support/contact/index.html](http://www.oracle.com/us/support/contact/index.html) for your local Oracle Support phone number.

For more information on logging a media request SR, go to My Oracle Support for Document 1071023.1: Requesting Physical Shipment or Download URL for Software Media

(<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1071023.1>).

## Conventions

The following text conventions are used in this document:

<b>Convention</b>	<b>Meaning</b>
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.
<sample>	You should replace the angle brackets and italicized placeholder text with appropriate text.

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# Empirica Healthcare Analysis Overview

This chapter includes the following sections:

- [Introduction to the Empirica Healthcare Analysis software](#)
- [Assumptions](#)
- [Physical configuration options](#)
- [Components of the installation package](#)

## Introduction to the Empirica Healthcare Analysis software

The Empirica Healthcare Analysis software is a data analysis environment for exploring multiple sources of the following types of data:

- Population-based temporal, clinical data, such as electronic healthcare records.
- Administrative data, such as insurance claims.

The application informs and supports pharmacovigilance, pharmacoepidemiological, and risk management activities at the following organizations:

- Life sciences organizations, such as pharmaceutical and drug safety regulatory organizations.
- Healthcare organizations, such as payer and provider organizations.

## Assumptions

This guide assumes familiarity with the following activities:

- Setting Linux file permissions.
- Administering WebLogic.
- Configuring Linux services.
- Setting up and configuring the Oracle Database.

## Physical configuration options

The Empirica Healthcare Analysis software is typically installed in a two-tier configuration, using separate database server and application server machines. The provisioning and basic setup of the two systems is outside the scope of this document.

## Components of the installation package

The installation package contains the following components.

<b>File</b>	<b>Description</b>
Healthcare_Install.tar.gz	Components for installing the Empirica Healthcare Analysis software.
Healthcare-1_0_1_0_XXX.zip	Build that you install, where XXX is the build number.
Database.zip	Scripts for setting up the Empirica Healthcare Analysis database account.



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## Planning your installation

This chapter includes the following topics:

- [How to use this document](#)
- [Preparing the environment for the Empirica Healthcare Analysis installation](#)
- [Information to collect before you begin](#)

### How to use this document

This document contains the procedures that guide you through the installation process.

### Information to collect before you begin

Before you begin, collect the following information about the setup of the database and application servers. You will need this information for the installation.

#### Database server

- TNSNAMES entry for the database.
- Service name and SID for the database.
- system and sys password for the database.
- Time zone setting of your database so you can set the WebLogic server to the same time zone.

Oracle recommends using the UTC time zone for both servers.

- The location of the data files for the instance, if you plan to create the tablespaces in the same location. For example:

```
/u01/app/oradata/<sid>
```

#### Application server

- JDK installation location, such as:  

```
/usr/java/jdk1.7.x_xx
```
- The following information about the Oracle client:
  - Oracle base location, such as:  

```
/u01/app/oracle
```
  - Oracle home location, such as:

/u01/app/oracle/product/11.2.0

- The following information about WebLogic:
  - Installation location, such as:  
/u01/app/oracle/Middleware
  - URL for the WebLogic Administration Console, such as:  
<https://<servername>:7002/console>
  - URL for Oracle Enterprise Manager, such as:  
<https://<servername>:7002/em>
  - User name and password of a WebLogic administrator.
- For single sign-on (SSO) installations, the following information:
  - Native login port number to use for initially changing the Empirica Healthcare Analysis admin password.
  - Port number used for normal SSO Empirica Healthcare Analysis connections on the server.
  - SSO logout URL.
  - SSO header, which contains the user name.

## Preparing the environment for the Empirica Healthcare Analysis installation

Before installing, make sure that the application and database servers meet the software requirements described in the *Empirica Healthcare Analysis Release Notes*.

[Appendix B](#) describes how to prepare the application server and install some of the required software:

1. [Setting environment variables](#)
2. [Installing WebLogic](#)
3. [Installing Oracle ADF Runtime](#)
4. [Installing RCU and creating repositories](#)
5. [Setting up the WebLogic domain:](#)
  - a. [Creating and configuring the WebLogic domain.](#)
  - b. [Creating the nodemanager.properties file](#)
  - c. [Starting WebLogic and the Node Manager](#)
  - d. [Creating a data source for credential access.](#)
  - e. [Associating the credential store with the data source.](#)
  - f. [Restarting the EHCServer managed server](#)

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## Preparing the database and application servers

This chapter includes the following topics:

- [Required privileges for the database server](#)
- [Required privileges for the application server](#)
- [Requirements and assumptions for the Linux accounts](#)
- [Preparing the installation staging area](#)
- [Downloading the Toolbox.zip file](#)
- [Configuring the connection to the Oracle database](#)
- [Setting up the application database account](#)
- [Preparing the environment on the application server](#)
- [Starting WebLogic and the Node Manager](#)

### Required privileges for the database server

You must have access to the following types of accounts:

- A user account that allows the user to start and stop the Oracle database.  
This account should not have sudo privileges.  
This document refers to this user account as the non-privileged user account.
- A user account with sudo privileges. This user executes certain steps as root.  
This document refers to this user account as the privileged user account.

### Required privileges for the application server

You must have access to the following types of user accounts:

- A user account that allows the user to start and stop the WebLogic server.  
This account should not have sudo privileges.  
This document refers to this user account as the non-privileged user account.  
Unless otherwise specified in this document, the non-privileged user should perform all activities.
- A user account that has sudo privileges. This user executes certain steps as root.  
This document refers to this user account as the privileged user account.

## Requirements and assumptions for the Linux accounts

This section discusses the requirements and assumptions for the Linux accounts.

### Setting the default file creation umask

Perform this step as the non-privileged user on the application server.

- Edit the `~/.login` file, and add the following command to the file:

```
umask 027
```

The command sets the default file creation umask, so that by default, files you create give read-only access to other users in your group and no permissions to users outside the group.

### Preparing the installation staging area

This section discusses the steps to unpack the Empirica Healthcare Analysis installation files.

### Downloading the Toolbox.zip file

1. Navigate to the following URL:

```
http://www.drugepi.org/toolbox-archive/
```

2. Download the archived Pharmacoepidemiology Toolbox including High-dimensional Propensity Score (hd-PS) package, version 2.4.11.

This guide refers to this package as `Toolbox.zip`.

### Unpacking the installation files into the installation directory

Choose an installation directory that is on the application server and that is accessible to the WebLogic software, such as `/u01/stage`. The installation directory stores Empirica Healthcare Analysis components during the installation process.

1. Log in to the application server as the non-privileged user.
2. Using a tool such as the `tar` command, unpack the `Healthcare_Install.tar.gz` to the `/u01/stage` directory. For example, use the following command:

```
$ cd /u01/stage/
```

```
$ tar xvf /u01/stage/Healthcare_Install.tar.gz
```

The `/u01/stage/Healthcare_Install` directory is created.

---

---

**Note:** In this document, `<INSTALL_DIR>` refers to the folder created in this step, such as `/u01/stage/Healthcare_Install`. This document assumes that you are installing to this directory.

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3. Using a tool such as `unzip`, unpack the `Healthcare-1_0_1_0_XXX.zip` file into the `<INSTALL_DIR>/Healthcare` directory.
4. Unpack the `Database.zip` file:
  - a. Create the following directory:

```
/u01/stage/Database
```

- b. Using a tool such as `unzip`, unpack the contents of the `Database.zip` file into the directory.
5. Using a tool such as `unzip`, unpack the contents of the `Toolbox.zip` file that you downloaded in [Downloading the Toolbox.zip file](#) into the following directory:

```
/u01/stage
```

A directory named `toolbox` is created within the `/u01/stage` directory.

## Configuring the connection to the Oracle database

This section includes the following topic:

- [Adding the database TNSNAMES entry](#)

### Adding the database TNSNAMES entry

Perform these steps using the non-privileged user account.

1. On the application server, open the `tnsnames.ora` file, located in the following directory:

```
<ORACLE_HOME>/network/admin/
```

If the file does not exist, create it.

2. Add an entry that points to the database, using the information found in the `TNSNAMES.ORA` file on the database server. For more information, see [Information to collect before you begin](#).

## Setting up the application database account

Perform these steps as the non-privileged user on the application server.

1. In a command shell, use the following command to navigate to the `/u01/stage/Database` directory:

```
$ cd /u01/stage/Database
```

2. Review the `1_create_healthcare_tablespace_linux.sql` file:

- a. Edit the `1_create_healthcare_tablespace_linux.sql` file. For example:

```
$ vi 1_create_healthcare_tablespace_linux.sql
```

- b. To create the data files in a location other than the default location of your database, specify the alternate location in the `datafile_path` variable. The path must end in a forward slash (`/`). For example:

```
DEFINE datafile_path = '/u01/app/oracle/oradata/<sid>/'
```

- c. Save the file, and exit the vi editor.

3. Create the application tablespace:

- a. Execute the `1_create_healthcare_tablespace_linux.sql` script from the Oracle system account.

For example, type:

```
$ sqlplus system@<TNS_Name> @1_create_healthcare_tablespace_
linux.sql
```

- b. When prompted, type the Oracle system account password.

4. Create the application Oracle user and schema:
  - a. Type the following text:

```
$ sqlplus sys@<TNS_Name> as sysdba @2_create_healthcare_oracle_user.sql
```
  - b. When prompted, type the Oracle sys account password.
  - c. When prompted a second time, create a password for the Empirica Healthcare Analysis database account. Retype the password to verify it.

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**Note:** Remember this password for later in this procedure.

---

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- d. When prompted, create a password for the **empirica\_admin** account.
- e. Retype the password to verify it.

---

---

**Note:** Remember this password.

---

---

5. Populate the application schema:
  - a. Execute the 3\_create\_all SQL script from the Empirica Healthcare Analysis database account (not the sys or system accounts). For example:

```
$ sqlplus healthcare@<TNS_name> @3_create_all.sql
```
  - b. When prompted, type the Healthcare database account password that you created in the previous step.

## Preparing the environment on the application server

This section includes the following topics:

- [Installing unlimited strength encryption Java libraries](#)
- [Installing and configuring Xvfb](#)
- [Modifying the default WebLogic Configuration](#)

### Installing unlimited strength encryption Java libraries

Perform these steps using the privileged user account on the application server.

1. Copy the following files from the installation directory to the JDK installation directory:

- local\_policy.jar
- US\_export\_policy.jar

For example, using the privileged user account, execute the following commands in a command shell, updating the path to match the location of your JDK:

```
$ sudo su - root
# cp -f <INSTALL_DIR>/java/*.jar /usr/java/jdk1.7.x_
xx/jre/lib/security/
# exit
```

2. If you are prompted to overwrite files, type **y** and press **Enter**.

3. Ensure that the two files have the same ownership and permissions as the rest of the files in the destination directory.

## Installing and configuring Xvfb

The following instructions are for installing Xvfb, the X Windows Virtual Frame Buffer. These procedures are required on the application server for the creation of graphs.

### Determining whether Xvfb is installed

Perform these steps using the privileged user account.

1. Execute the following command in a command shell:

```
$ which Xvfb
```

2. If the following response or some other path to Xvfb appears, Xvfb is already installed. Continue to [Configuring Xvfb](#).

```
/usr/bin/Xvfb
```

### Installing Xvfb

**Prerequisites:** Yum must be installed and configured with an appropriate configuration file. Additionally, your system must be able to connect to the Yum repositories. For more information on configuring Yum for an Oracle Linux 6 system, see <http://public-yum.oracle.com/>.

If Xvfb is not installed, perform the following steps using the privileged user account.

1. If Xvfb is not installed, type the following command:

```
$ sudo yum install Xvfb
```

2. If you are prompted for your password after typing this command, type your password, not the password of root.
3. When prompted, type **Y**, and press **Enter**.

### Configuring Xvfb

Perform these steps using the privileged user account.

1. Execute the following commands in a command shell:

```
$ sudo su - root
```

```
# cp <INSTALL_DIR>/service/xvfb /etc/rc.d/init.d
```

```
# /sbin/chkconfig --add xvfb
```

2. Execute the following command. This command verifies that the installation was successful.

```
# /sbin/chkconfig --list xvfb
```

The following response appears:

```
xvfb 0:off 1:off 2:off 3:on 4:off 5:on 6:off
```

3. Manually start Xvfb by executing the following command:

```
# /etc/rc.d/init.d/xvfb start
```

The following response appears:

```
Starting X Virtual Frame Buffer
```

4. Type `exit` to stop running as root.

## Modifying the default WebLogic Configuration

Make the following modifications in the WebLogic domain bin directory, such as `/u01/app/oracle/Middleware/user_projects/domains/empirica/bin`.

1. Using the non-privileged user account, open the file `setDomainEnv.sh` in a text editor, such as `vi`.
2. Type the following text at the bottom of the file. If you are not using UTC for the time zone, adjust the time zone in the text accordingly:

```
# Local Customization
export TZ=UTC
export LANG=en_US.UTF-8
export DISPLAY=localhost:99.0
```

3. In the `setDomainEnv.sh` file, search for instances of `ojdbc6dms.jar`:
  - If no instances exist, continue to step 4.
  - If at least one instance exists, replace all instances with `ojdbc6.jar` from the `$ORACLE_HOME` folder.

For example, edit the following text:

```
if [ "${PRE_CLASSPATH}" != "" ] ; then
    PRE_CLASSPATH="${COMMON_COMPONENTS_HOME}/modules/oracle.jdbc.11.1.1/ojdbc6dms.jar${CLASSPATHSEP}${PRE_CLASSPATH}"
    export PRE_CLASSPATH
else
    PRE_CLASSPATH="${COMMON_COMPONENTS_HOME}/modules/oracle.jdbc.11.1.1/ojdbc6dms.jar"
    export PRE_CLASSPATH
fi
```

to look like the following text:

```
if [ "${PRE_CLASSPATH}" != "" ] ; then
#   PRE_CLASSPATH="${COMMON_COMPONENTS_HOME}/modules/oracle.jdbc.11.1.1/ojdbc6dms.jar${CLASSPATHSEP}${PRE_CLASSPATH}"
#   PRE_CLASSPATH="${ORACLE_HOME}/jdbc/lib/ojdbc6.jar${CLASSPATHSEP}${PRE_CLASSPATH}"
    export PRE_CLASSPATH
else
#   PRE_CLASSPATH="${COMMON_COMPONENTS_HOME}/modules/oracle.jdbc.11.1.1/ojdbc6dms.jar"
#   PRE_CLASSPATH="${ORACLE_HOME}/jdbc/lib/ojdbc6.jar"
    export PRE_CLASSPATH
fi
```

---



---

**Note:** In the previous examples, the text highlighted in green replaces the yellow text.

---



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4. Search for any instance of setting the JVM option `java.awt.headless` to `true`:
  - If no instances exist, continue to the next step.
  - If an instance exists, either remove or disable the instance.

For example, replace the following text:

```
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}"
-Dem.oracle.home=/u01/app/oracle/Middleware/oracle_common
-Djava.awt.headless=true"
```

with the following text:

```
#EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}"
-Dem.oracle.home=/u01/app/oracle/Middleware/oracle_common
```



```
-Djava.awt.headless=true"
EXTRA_JAVA_PROPERTIES="${EXTRA_JAVA_PROPERTIES}
-Dem.oracle.home=/u01/app/oracle/Middleware/oracle_common"
```

5. Save the file, and exit the editor.

## Starting WebLogic and the Node Manager

Perform these steps on the application server using the non-privileged user account.

1. In a command shell, navigate to the WebLogic default domain bin directory, using a command such as the following:

```
$ cd /u01/app/oracle/Middleware/user_projects/domains/empirica/bin
```

2. If WebLogic is running, execute the command:

```
$ ./stopWebLogic.sh
```

3. To start WebLogic, execute the following command:

```
$ nohup ./startWebLogic.sh > /dev/null &
```

---

**Note:** Information messages might appear. You might need to press Enter to see the prompt.

---

4. Identify the process ID for the Node Manager service. For example, use the following command:

```
pgrep -f "java.+NodeManager -v$"
```

5. Stop the Node Manager. For example, use the following command:

```
kill -9 <process_id_for_the_Node_Manager_service>
```

such as:

```
kill -9 15318
```

6. Start the Node Manager:

- a. Navigate to \$WL\_HOME/server/bin directory, such as:

```
/u01/app/oracle/Middleware/wlserver_10.3/server/bin
```

- b. Execute the following command:

```
$ nohup ./startNodeManager.sh > /dev/null &
```

7. Verify that the Node Manager can be reached:

- a. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:

```
https://<servername>:7002/console
```

- b. Log in to the WebLogic Administration Console using the WebLogic administrator credentials provided to you by the system administrator.

- c. In the left pane, expand **Environment**, and select **Machines**.

The Summary of Machines page appears.

- d. In the list of machines, select **EHCMachine**.

The Settings for EHCMachine page appears.

- e. Select the **Monitoring** tab.
  - f. Confirm that the status is Reachable. If status is Inactive, the Node Manager is not running.
8. Exit the command shell.
  9. In the Domain Structure section on the left, expand **Environment**, and select **Servers**.
  10. In the table of servers, select **EHCServer**.

The Settings for EHCServer page appears.

11. Select the **Configuration** tab, and select the **Server Start** sub-tab.
12. In the Change Center section on the left, click **Lock & Edit**.
13. In the Arguments field, type the following text:

```
-Xms256m -Xmx2048m -XX:MaxPermSize=1024m
```

---

---

**Note:** `-XmxNNNNm` and `-XX:MaxPermSize` are memory parameters that control the amount of memory used by the Empirica Healthcare Analysis application. You might need to adjust the parameters upwards to achieve appropriate performance. The numbers to use depend on the size of the data set installed and the number of users expected to access the system simultaneously.

---

---

14. Click **Save**.
15. In the Change Center section on the left, click **Activate Changes**.  
Your changes are activated. This might take a few moments.
16. On the left, select **Servers**.
17. Select the **Control** tab.
18. Start or restart the EHCServer:
  - a. In the table of servers, if the State of the EHCServer is SHUTDOWN, proceed to step d.
  - b. In the table of servers, if the State of the EHCServer is RUNNING, select the check box for the server, expand the **Shutdown** drop-down menu, located above and below the table, and select **Force Shutdown Now**.  
You are prompted to confirm the shutdown.
  - c. Click **Yes**.
  - d. Wait until the State of the server changes to SHUTDOWN. The page does not refresh automatically. To refresh the page, click the refresh button, located above the table, or click the refresh button for your browser.
  - e. In the table of servers, select the check box for the EHCServer, and click **Start**, located above and below the table.  
You are prompted to confirm the start.
  - f. Click **Yes**.

- g.** Wait until the State of the server changes to STARTING and then RUNNING. The page does not refresh automatically. To refresh the page, click the refresh button, located above the table, or click the refresh button for your browser.



---

# Setting up the Empirica Healthcare Analysis software

This chapter includes the following topics:

- [Configuring properties files](#)

## Configuring properties files

This section describes how to configure properties files in the Empirica Healthcare Analysis software.

### Reviewing the `webvdme.properties` file

**Prerequisites:** If you intend to configure the Empirica Healthcare Analysis software to use single sign-on (SSO) with Oracle Access Manager (OAM), refer to [Appendix A, "Single sign-on \(SSO\) - Oracle Access Manager \(OAM\) setup"](#) for configuration details.

Perform these steps on the application server using the non-privileged user account.

The `webvdme.properties` file stores database connection information for the Empirica Healthcare Analysis software.

1. In a command shell, create a directory that will be used for temporary files created by the Empirica Healthcare Analysis application, such as:

```
/u01/app/oracle/product/Healthcare/temp
```

Make sure to create this directory so that the non-privileged user account has write access to it.

2. Navigate to the following directory:

```
<INSTALL_DIR>/Healthcare/WEB-INF/classes
```

3. Make a copy of the `template_webvdme.properties` file in the same directory with the name **`webvdme.properties`**. For example, use the following command:

```
$ cp template_webvdme.properties webvdme.properties
```

4. Using a text editor, open the `webvdme.properties` file.
5. Review the settings for the following values in the file, changing the values as appropriate for your installation.
  - a. `connect=jdbc:oracle:thin:@//host:port/service_name`

where:

- host is the IP address or fully qualified name of the database server.
- port is the port number used by the database listener.
- service\_name is the database service name.

Example: connect=jdbc:oracle:thin:@//198.168.0.1:1521/ORCL

- b. sqlldr\_connect=tnsnames\_alias

Example: sqlldr\_connect=orcl

6. Modify the **temp\_dir** entry so that it points to the temporary directory that you created in step 1.
7. Optionally, configure the Empirica Healthcare Analysis software for single sign-on (SSO):
  - a. In the `webvdme.properties` file, uncomment the following properties:
    - `sso.plugins=com.oracle.hsgbu.empirica.sso.EmpiricaSsoPlugin`
    - `sso.EmpiricaSsoPlugin.username.header=oam-remote-user`

---

**Note:** The value of the `sso.EmpiricaSsoPlugin.username.header` property depends on your OAM configuration.

---

- b. Specify the SSO logout URL by uncommenting the following property and replacing the bold sample URL with the appropriate value. You obtain the SSO logout URL in [Information to collect before you begin](#).
    - `sso.EmpiricaSsoPlugin.logoutRedirectUrl=https://ssoServer:port/oam/sso/logout.jsp`
  - c. Update the session timeout value:
    - a. Navigate to the following directory:
 

```
<INSTALL_DIR>/Healthcare/WEB-INF
```
    - b. Open the `web.xml` file.
    - c. Set the value of the **session-timeout** parameter so that it is greater than the session timeout for the single sign-on setup in the organization.
8. Save the file, and exit the editor.

## Reviewing the listener.properties file

Perform these steps on the application server using the non-privileged user account.

The `listener.properties` file stores information used for analysis runs.

1. Navigate to the following directory:
 

```
<INSTALL_DIR>/Healthcare/WEB-INF/classes
```

The directory contains the `template_listener.properties` file.
2. Make a copy of the `template_listener.properties` file in the same directory with the name `listener.properties`. For example, use the following command:
 

```
$ cp template_listener.properties listener.properties
```
3. Using a text editor, open the `listener.properties` file.

4. Edit the `sqlldr_path` path settings as needed.

---

**Note:** If R version 3.0.1 is installed on your application server, set the property `r_path` to the path of the R executable.

---

5. Save and close the file.

## Creating the `webvdme-fonts.properties` file

Perform these steps on the application server using the non-privileged user account.

The `webvdme-fonts.properties` file stores font information.

1. Navigate to the following directory:

```
<INSTALL_DIR>/Healthcare/WEB-INF/classes
```

The directory contains the `template_webvdme-fonts.properties` file.

2. Make a copy of the `template_webvdme-fonts.properties` file in the same directory with the name `webvdme-fonts.properties`. For example, use the following command:

```
$ cp template_webvdme-fonts.properties webvdme-fonts.properties
```

## Setting up the `log4j.properties` file

Perform these steps on the application server using the non-privileged user account.

1. Navigate to the following directory:

```
<INSTALL_DIR>/Healthcare/WEB-INF/classes
```

2. Open the `log4j.properties` file, and update the following property with the location for storing the application log file. Make sure the non-privileged user account has write access to the folder.

```
log4j.appender.defaultAppender.File
```

3. Save and close the file.

## Installing the `pharmacoepi.jar` file

- Copy the `pharmacoepi.jar` file from the following location:

```
/u01/stage/toolbox/java
```

to

```
$INSTALL_DIR/Healthcare/WEB-INF/lib
```

## Preparing the `LTI.jar` file for the patient timelines applet

If you do not perform these steps, security-related dialog boxes appear for end users when they work with single-patient and multi-patient timelines in applet mode, and the applets might be blocked by a client machine's security settings.

**Prerequisite:** Make sure you have access to the `jar` and `jarsigner` commands, and that you know your company's jar signing process.

1. From the `<INSTALL_DIR>/Healthcare/AppJars/DataMontage` directory, copy the following file into any empty directory that is outside the `<INSTALL_DIR>/Healthcare` directory:

- `lti.jar`

2. Update the manifest in the JAR file:

- a. Create a text file in the same directory as your copied JAR file, and save it. The example later in this procedure uses the name `MANIFEST.MF`.
- b. In the file, insert two lines of text with the fully qualified domain name of the application server and the WebLogic connection port.

You can use an asterisk (\*) as a wildcard for the most specific part of the domain name, or you can use the IP address of the server.

To name more than one server in each entry, use a space as the delimiter. For example, if you support connections by way of both SSL on port 7004 and SSO on port 7777 within the `example.com` domain, you might include entries similar to the following lines in the `MANIFEST.MF` file:

```
Codebase: <server_name>.example.com:7004 <server_
name>.example.com:7777
```

```
Caller-Allowable-Codebase: <server_name>.example.com:7004 <server_
name>.example.com:7777
```

---

**Note:** Information that is specific to a single server and port improves the security of the application deployment.

---

- c. Insert a line break after the last line of text, and save and close the file.
  - d. Open a command shell and navigate to the directory containing the text file you created and the JAR file.
  - e. In the command shell, issue the following command, replacing `MANIFEST.MF` with the name of the text file you created:
3. Sign the modified JAR file so it will work correctly within the Empirica Healthcare Analysis application. Use your company's jar signing process to perform this signing task, which typically includes using java's `jarsigner` utility. For information about this utility, see:

```
http://docs.oracle.com/javase/7/docs/technotes/tools/windows/jarsigner.html
```

4. Copy the signed JAR file to the `<INSTALL_DIR>/Healthcare/AppJars/DataMontage` directory, replacing the original file.



---

---

## Configuring database credentials

This chapter includes the following topics:

- [Storing database credentials](#)
- [Setting up permissions for the credential store](#)

### Storing database credentials

1. In an internet browser, enter the URL for the Oracle Enterprise Manager, such as the following:

```
https://<server_name>:7002/em
```

2. Type the WebLogic administrator credentials, and click **Login**.

The Oracle Enterprise Manager appears.

3. On the left, expand **WebLogic Domain**, and select **empirica**.

4. Expand the WebLogic Domain menu, located below the empirica page title, and select **Security > Credentials**.

The Credentials page appears.

5. Create a map for credentials for the Empirica Healthcare Analysis application:

- a. In the Credentials table, click **Create Map**.

The Create Map dialog box appears.

- b. Type the following map name:

**oracle.hsgbu.empirica**

- c. Click **OK**.

6. Create a key for the credentials for the Empirica Healthcare Analysis database account:

- a. In the Credentials table, click **Create Key**.

- b. Fill in the following fields. Text fields are case-sensitive.

– **Select Map**—Select the map you just created.

– **Key**—Type the following value:

**DatabaseCredentials**

– **Type**—Select Password.

- **User Name, Password, Confirm Password**—Type the login information for the Empirica Healthcare Analysis database schema. The default user name is **healthcare**.
  - **Description**—Type the following value:  
**Empirica Healthcare Analysis schema username and password**
  - c. Click **OK**.
7. To see the keys you created, expand the map in the Credentials table.

## Setting up permissions for the credential store

You must set up file access permissions for the Empirica Healthcare Analysis application to access the credential store. Otherwise, the Empirica Healthcare Analysis application cannot start, and users cannot login.

1. In the Oracle Enterprise Manager, on the left, expand **WebLogic Domain**, and select **empirica**.
2. Expand the WebLogic Domain menu, located below the empirica page title, and select **Security > System Policies**.

The System Policies page appears.

3. In the System Policies table, click **Create**.

The System Policies > Create System Grant page appears.

4. In the Codebase field, type the case-sensitive codebase, such as:

```
file:${oracle.deployed.app.dir}/Healthcare${oracle.deployed.app.ext}
```

---



---

**Note:** Use the codebase value as is unless you plan to use a context root value other than the default value of **Healthcare**. For more information, see [Creating the Empirica Healthcare Analysis deployment in WebLogic](#).

---



---

5. Add a permission:
  - a. Click **Add**.  
The Add Permission page appears.
  - b. Select the **Select here to enter details for a new permission** check box, located at the bottom of the page.
  - c. Type the following values for the fields below the check box:
    - **Permission Class**—oracle.security.jps.service.credstore.CredentialAccessPermission
    - **Resource Name**—context=SYSTEM,mapName=oracle.hsgbu.empirica,keyName=\*
    - **Permission Actions**—read
  - d. Click **OK**.  
The System Policies > Create System Grant page appears.
6. Click **OK**.  
The permission is saved. The System Policies page appears.

7. Search for the permission you just created:
  - a. From the **Name** drop-down list, select **Includes**.
  - b. In the field after the **Name** field, type **Healthcare** or the intended application context root. For more information, see [Creating the Empirica Healthcare Analysis deployment in WebLogic](#).
  - c. Click the **Search** button.

The newly created permission appears in the table.

8. Create a permission based on the permission:

- a. Select the permission in the table, and click **Create Like**.

The System Policies > Create System Grant page appears.

- b. Type a codebase value, such as the following value:

```
file:${domain.home}/servers/${weblogic.Name}/stage/Healthcare/Healthcare${oracle.deployed.app.ext}
```

---

**Note:** Use the codebase value as is unless you plan to use a context root value other than the default value of **Healthcare**. For more information, see [Creating the Empirica Healthcare Analysis deployment in WebLogic](#).

---

- c. Click **OK**.

The permission is added.

9. Search for the permission you just created:

- a. From the **Name** drop-down list, select **Includes**.
  - b. In the field after the **Name** field, type **Healthcare** or the intended application context root. For more information, see [Creating the Empirica Healthcare Analysis deployment in WebLogic](#).
  - c. Click the **Search** button.

The newly created permissions appear in the table.

10. Create a permission based on the permission:

- a. Select a permission in the table, and click **Create Like**.

The System Policies > Create System Grant page appears.

- b. Type a codebase value, such as the following value:

```
file:${wls.home}/../..../patch_wls1036/patch_jars/-
```

---

**Note:** This directory should reflect the directory where you installed the patch for WebLogic.

---

- c. Click **OK**.

The permission is added.



---

---

## Deploying the Empirica Healthcare Analysis application

This chapter includes the following topics:

- [Creating the Empirica Healthcare Analysis deployment in WebLogic](#)

### Creating the Empirica Healthcare Analysis deployment in WebLogic

Perform these steps by connecting to the application server using a web browser.

1. Log in to the WebLogic Administration Console using the WebLogic administrator credentials provided to you by the system administrator. Typically, the address for the WebLogic Administration Console is the following:

<https://<servername>:7002/console>

2. On the left pane named Domain Structure, click **Deployments**.
3. In the Change Center section on the left, click **Lock & Edit**.
4. In the Deployments table on the right, click the **Install** button.
5. In the console, navigate to the following directory:  
`<INSTALL_DIR>`
6. Select the **Healthcare** radio button, and click **Next**.
7. Select **Install this deployment as an application**, and click **Next**.
8. For Deployment Target, select **EHCServer**, and click **Next**.
9. Leave the default selections in the first two sections on the page.
10. In the Source accessibility section, select **Copy this application onto every target for me**, and click **Next**.
11. Click **Finish**.

The deployment is created. This might take a few moments.

12. In the Change Center section on the left, click **Activate Change**.

The deployment changes to the **Prepared** state.

13. Select the check box to the left of the Healthcare deployment, click the **Start** button, and select **Servicing all requests** from the drop-down list.

You are prompted to confirm the start.

14. Click **Yes**.

The Empirica Healthcare Analysis application appears in the Deployments table with a state of **Active**.

---

---

## Post-installation configuration

This chapter includes the following topics:

- [Setting the passwords of the system and admin users \(installation only\)](#)
- [Configuring the Empirica Healthcare Analysis software](#)

### Setting the passwords of the system and admin users (installation only)

The **system** account is used internally by the Empirica Healthcare Analysis software. You cannot use the **system** account to log in to the Empirica Healthcare Analysis software.

The **admin** account is a superuser account and is not an SSO user account. You use the **admin** account to log in initially so you can create other users and configure the Empirica Healthcare Analysis software. You must set the password for the product installation to be complete.

Perform these steps as the non-privileged user.

1. Open a command shell, and navigate to the following directory:

```
<INSTALL_DIR>/bin/PasswordReset
```

2. Verify that the environment variable definitions in the `runPasswordReset.sh` file point to the appropriate locations for your system.

For example, open `runPasswordReset.sh` with a text editor and inspect the following lines. The values that appear are examples.

```
# System locations
JAVA_HOME=/usr/java/jdk1.7.x_xx
WEBLOGIC_MODULES_DIR=/u01/app/oracle/Middleware/oracle_common/modules
JPS_CONFIG_FILE=/u01/app/oracle/Middleware/user_
projects/domains/empirica/config/fmwconfig/jps-config-jse.xml
# Product installation staging locations
INSTALL_ROOT=/u01/stage/Healthcare_Install
PRODUCT_BASE_DIR=$INSTALL_ROOT/Healthcare
```

Multiple directories named **modules** might be located under the Oracle installation home. Make sure that the `WEBLOGIC_MODULES_DIR` entry refers to the directory located below the `oracle_common` directory.

The `JPS_CONFIG_FILE` entry refers to the location of the OPSS configuration file, which by default is located in the `config/fmwconfig` sub-directory of the home directory of the WLS domain.

3. Set the password for the **system** user name:

- a. In the command shell, execute the following command:  

```
$ ./runPasswordReset.sh system override-passwordmustchange
```

Logging information appears, followed by a prompt to enter a new password.
  - b. Type the password for the **system** user name, and press **Enter**.  
By default, the password must contain at least eight characters, including an upper-case character, lower-case character, acceptable symbol, and number.  
A prompt to confirm the password appears.
  - c. Retype the password, and press **Enter**.  
The passwords must match. They are not echoed.  
If the passwords match and the password change is successful, a confirmation message appears.  
If the passwords do not match, an error message appears. Run the command again and use matching passwords.
4. Set the password for the **admin** user name:
    - a. In the command shell, execute the following command:  

```
$ ./runPasswordReset.sh admin
```

Logging information appears, followed by a prompt to enter a new password.
    - b. Type the password for the **admin** user name, and press **Enter**.  
The password must contain at least eight characters, including an upper-case character, lower-case character, acceptable symbol, and number.  
A prompt to confirm the password appears.
    - c. Retype the password, and press **Enter**.  
The passwords must match. They are not echoed.  
If the passwords match and the password change is successful, a confirmation message appears.  
If the passwords do not match, an error message appears. Run the command again and use matching passwords.

---

---

**Note:** Remember this password for later use. You use the password to log in using the admin user name when you set up and configure the application.

---

---

## Configuring the Empirica Healthcare Analysis software

Before users can begin using the Empirica Healthcare Analysis software, you must complete the following tasks. For information about how to perform each task, see the *Empirica Healthcare Analysis User Guide*.

1. To test that the site is set up correctly, open the Microsoft Internet Explorer browser, and enter the following URL:

<https://<server name>:7004/Healthcare>

**Notes:**



- If your site is not configured to require SSL connections, use the following values:
  - **http://**instead of **https://**.
  - **7003** instead of **7004**.
- If you are using SSO, use the native login port provided to you by the administrator who configured OAM for your application. The native login port is listed as an entry in the [Information to collect before you begin](#).

If the login page appears, the site is set up correctly.

2. Log in using the built-in administrative account:

- User name: admin
- Password: The password set during [Setting the passwords of the system and admin users \(installation only\)](#).

3. When prompted, change your password.

You are logged out of the software.

4. Log in using the built-in administrative account and the new password you just created.

The home page appears.

5. Verify site options:

- a. Click **Settings**, and click **Set Site Options**.

The Site Options page appears.

- b. Verify the SMTP server name.

- c. If R version 3.0.1 is installed on your system and you specified the `r_path` property in [Reviewing the listener.properties file](#), select **Show Evaluative Analysis tab** to enable the evaluative analysis feature.

If R version 3.0.1 is not installed on your system, make sure that **Show Evaluative Analysis tab** is not selected so that the evaluative analysis feature is disabled.

- d. Make sure that all other site options are set correctly. If you change any site options, save the changes.

6. Click **Exit**.

You are logged out.

7. If you configured access using single-sign on (SSO), test SSO login:

- a. Log in to the Empirica Healthcare Analysis software as **admin**, and create a user that is enabled for SSO. The same user name must also be configured for OAM.
- b. Open the Microsoft Internet Explorer browser, and type the URL using the SSO port, which is listed as an entry in [Information to collect before you begin](#).

The login prompt appears.

- c. Type the SSO user name and password.

The home page appears.

- d. Click **Exit**.

You are logged out.

The Empirica Healthcare Analysis installation is complete.

---

## Single sign-on (SSO) - Oracle Access Manager (OAM) setup

To configure the Empirica Healthcare Analysis application to use single sign-on (SSO) using Oracle Access Manager (OAM), an OAM administrator runs the OAM register script. This script creates an OAM agent and uses an XML file as input, such as the following XML sample.

Replace the bold values with appropriate values for your installation. In the following example, **EmpiricaHealthcare** is the name of your registered SSO agent or Webgate ID. The name must be unique in the OAM environment.

```
<?xml version="1.0" encoding="UTF-8"?>
<OAMRegRequest>
  <serverAddress>https://<OAM_server>.oracle.com:7004</serverAddress>
  <hostIdentifier>EmpiricaHealthcare</hostIdentifier>
  <agentName>EmpiricaHealthcare</agentName>
  <cachePragmaHeader>private</cachePragmaHeader>
  <cacheControlHeader>private</cacheControlHeader>
  <protectedResourcesList>
    <resource>/Healthcare/</resource>
    <resource>/Healthcare</resource>
  </protectedResourcesList>
  <publicResourcesList>
    <resource>/index.html</resource>
    <resource>/Healthcare/ping.jsp</resource>
    <resource>/Healthcare/utlLogout.jsp</resource>
    <resource>/Healthcare/logout.inc</resource>
    <resource>/Healthcare/css/*/resource>
  </publicResourcesList>
  <excludedResourcesList>
    <resource>/Healthcare/servlet/event</resource>
    <resource>/Healthcare/servlet/event/</resource>
  </excludedResourcesList>
</OAMRegRequest>
```



---

---

## Getting the application server ready for the Empirica Healthcare Analysis application

This section describes how to do the following steps:

- Set environment variables.
- Install WebLogic.
- Install Oracle ADF Runtime.
- Install required database repositories
- Perform additional setup tasks before installing the Empirica Healthcare Analysis software

You must perform these steps before installing the Empirica Healthcare Analysis application.

For information about the required versions of each component and the download location, see the System Requirements chapter in the *Empirica Healthcare Analysis Release Notes*.

---

---

**Note:** For any input, do not include trailing whitespace. Most text is case sensitive. Paths might vary depending on your environment.

---

---

### Setting environment variables

In this procedure, you edit configuration scripts, which set environment variables for the command shells you use.

In this section, you configure environment variables for your application server using your privileged account and using `sudo`. This section requires you to edit files, using commands such as the following. The first command logs you in as root. If you are prompted for your password after typing this command, type your password, not the password of root.

```
$ sudo su - root
# vi <file_name>
# exit
```

This section sets the following variables:

- `ORACLE_HOME`
- `ORACLE_BASE`
- `ORACLE_SID`

- *PATH*

Before you begin, ensure that the variables are not set in the following files in ways that contradict the settings of this section:

- `.login`
- `.profile`
- `.bashrc`
- `.cshrc`

To set environment variables:

1. Log in to the application server as root, for example:

```
$ sudo su - root
```

2. If the password prompt appears, type the password for the privileged account.

Do not use the password for the root account.

3. If you use a Bourne (`sh`) or bash command shell, set the environment variables for the shell as follows:

- a. Using a text editor such as `vi`, open the `/etc/profile` file:

```
# vi /etc/profile
```

- b. Add the following lines to the file.

For the values in the first two lines, use information about your Oracle client installation.

```
ORACLE_BASE=/u01/app/oracle
ORACLE_HOME=/u01/app/oracle/product/11.2.0
ORACLE_SID=<server_sid>
NLS_LANG=AMERICAN_AMERICA.AL32UTF8
export ORACLE_BASE ORACLE_HOME ORACLE_SID NLS_LANG
```

- c. Add the `bin` directory of your Oracle client installation to the `PATH` variable. For example, add the following line as the last line where the `PATH` variable is set:

```
export PATH=$ORACLE_HOME/bin:$PATH
```

4. If you use a C shell (`csh` or `tcsh`), set the environment variables for the shell as follows:

- a. Using a text editor such as `vi`, open the `/etc/csh.login` file:

```
# vi /etc/csh.login
```

- b. Add the following lines to the file.

For the values in the first two lines, use information about your Oracle client installation.

```
setenv ORACLE_BASE /u01/app/oracle
setenv ORACLE_HOME /u01/app/oracle/product/11.2.0
setenv ORACLE_SID <server_sid>
setenv NLS_LANG AMERICAN_AMERICA.AL32UTF8
```

- c. Add the `bin` directory of your Oracle client installation to the `PATH` variable. For example, add the following line as the last line where the `PATH` variable is set:

```
setenv PATH ${ORACLE_HOME}/bin:${PATH}
```

5. Save the file.
6. Exit the command shell, and open a new login shell.

This step is required for the change to take effect.

## Installing WebLogic

Prerequisites:

- The user account you use for these steps must **not** be the root user.
- The following steps describe the graphical mode for installing WebLogic. Therefore, you must set the DISPLAY environment variable before running the installer.

To install WebLogic:

1. Log in to the application server as the non-privileged user.
2. Unzip /u01/stage/V29856-01.zip file to the /u01/stage directory. For example, use the following command:

```
$ cd /u01/stage/
$ mkdir weblogic
$ cd weblogic
$ unzip /u01/stage/V29856-01.zip
```

3. In a command shell, execute the following command:

```
$ java -jar wls1036_generic.jar
```

The Welcome page appears.

4. Click **Next**.

The Choose Middleware Home Directory page appears.

5. Select **Create a new Middleware Home**.

6. In the Middleware Home Directory field, browse to the Middleware directory, such as:

```
/u01/app/oracle/product/Middleware
```

7. Click **Next**.

The Register for Security Updates page appears.

8. To receive security updates, leave **I wish to receive security updates selected**, and type your e-mail address and password for My Oracle Support.

If you do not want to receive security updates, deselect **I wish to receive security updates**, and click **Yes** when prompted to confirm.

9. Click **Next**.

The Choose Products and Components page appears.

10. Select Custom, and click **Next**.

The Choose Products and Components page appears.

11. Deselect the following options:

- WebLogic Server

- Oracle Coherence
12. Select the following options:
    - Core Application Server
    - Administration Console
    - Configuration Wizard and Upgrade Framework
    - WebLogic JDBC Drivers
  13. Click **Next**.

The JDK Selection page appears.
  14. In the Local JDK list at the bottom of the page, deselect any selected options.
  15. Click **Browse**, and select the JDK 1.7 path, such as the following path:  
`/usr/java/jdk1.7.x_xx`
  16. Click **Next**.

The Choose Product Installation Directories page appears.
  17. Click **Next**.

The Installation Complete page appears.
  18. Deselect **Run Quickstart**, and click **Done**.
  19. Copy the following files from `$WL_HOME/modules` to `$JAVA_HOME/jre/lib/endorsed`, where `WL_HOME` is the WebLogic Server installation home directory. If the endorsed directory does not exist, create it.
    - `javax.annotation_1.0.0.0_1-0.jar`
    - `javax.xml.bind_2.1.1.jar`
    - `javax.xml.ws_2.1.1.jar`

## Installing Oracle ADF Runtime

1. Log in to the application server as the non-privileged user.
2. Unzip `/u01/V37382-01.zip` file to the `/u01/stage` directory. For example, use the following command:

```
$ cd /u01/stage/  
$ mkdir adf  
$ cd adf  
$ unzip /u01/stage/V37382-01.zip
```
3. In a command shell, type the following command:

```
$ cd disk1/install/linux64
```
4. Type the following command:

```
$ ./runInstaller
```

Information about the Oracle Universal Installer appears.

You are prompted to enter the JDK location.
5. Type the JDK directory. Replace the following directory with the path to your JDK, and change `XX` to your JDK version number:  
`/usr/java/jdk1.7.x_xx`



The Welcome page appears.

6. Click **Next**.

The Install Software Updates page appears.

7. Select either **Skip Software Updates** or **Search My Oracle Support for Updates**.
8. If you selected **Search My Oracle Support for Updates**, type your My Oracle Support credentials. If an update is required, you are prompted to install it.
9. Click **Next**.

The Prerequisite Checks page appears.

10. Review the checks, and click **Next**.

The Specify Installation Location page appears.

11. Make sure the Oracle Middleware Home field points to the directory created in the WebLogic installation.
12. Click **Next**.

The Application Server page appears.

13. Click **Next**.

The Installation Summary page appears.

14. Click **Install**.

The Installation Progress page appears.

15. After the installation completes, click **Next**.

The Installation Complete page appears.

16. Click **Finish**.

## Installing RCU and creating repositories

1. Log in to the application server as the non-privileged user.
2. Unzip `/u01/V37394-01.zip` file to the `/u01/stage` directory. For example, use the following command:

```
$ cd /u01/stage/
$ mkdir rcu
$ cd rcu
$ unzip /u01/stage/V37394-01.zip
```

3. In a command shell, type the following command:

```
$ ./rcuHome/bin/rcu &
```

The Welcome page appears.

4. Click **Next**.

The Create Repository page appears.

5. Click **Next**.

The Database Connection Details page appears.

6. Type the database information, including a user name with sysdba privileges, and click **Next**.

The Repository Creation Utility dialog box appears.

7. After the progress completes, click **OK**.

The Select Components page appears.

8. Expand **Oracle AS Common Schemas**, and select **Metadata Services** and **Oracle Platform Security Services**.
9. In the Create a new Prefix field, type a prefix, such as **EMPIRICA**.
10. Click **Next**.

The Repository Creation Utility - Checking Prerequisites dialog box appears.

11. Click **OK**.

The Schema Passwords page appears.

12. Specify the schema passwords, and click **Next**.

---

---

**Note:** Remember these passwords.

---

---

The Map Tablespaces page appears.

13. Click **Next**.

The Repository Creation Utility - Confirmation dialog box appears.

14. Click **OK**.

The Repository Creation Utility - Creating Tablespaces dialog box appears.

15. Click **OK**.

The Summary page appears.

16. Click **Create**.

The Completion Summary page appears.

17. Click **Close**.

## Setting up the WebLogic domain

This section includes the following topics:

- [Creating and configuring the WebLogic domain](#)
- [Creating the nodemanager.properties file](#)
- [Starting WebLogic and the Node Manager](#)
- [Creating a data source for credential access](#)
- [Associating the credential store with the data source](#)
- [Restarting the EHCServer managed server](#)

### Creating and configuring the WebLogic domain

The Empirica Healthcare Analysis application requires a WebLogic domain that includes Enterprise Manager and is configured for Web Service security. You can either create a new WebLogic domain or extend an existing WebLogic domain. This procedure describes how to create a new WebLogic domain.

You must use the same user account that you used when you [installed WebLogic](#).

1. In a command shell, type the following command:

```
$ cd /u01/app/oracle/product/Middleware/wlserver_10.3/common/bin
```

2. Type the following command:

```
$ ./config.sh &
```

The Welcome page appears.

3. Select **Create a new WebLogic domain**, and click **Next**.

The Select Domain Source page appears.

4. Select **Generate a domain configured automatically to support the following products**, and select the following products:

- Oracle Enterprise Manager - 11.1.1.0 [oracle\_common]
- Oracle WSM Policy Manager - 11.1.1.0 [oracle\_common]
- Oracle JRF - 11.1.1.0 [oracle\_common]

5. Click **Next**.

The Specify Domain Name and Location page appears.

6. Type a domain name, such as **empirica**, and click **Next**.

The Configure Administrator User Name and Password page appears.

7. Type a user name and password for WebLogic administration.

---

---

**Note:** Remember these credentials. You use them to administer the WebLogic instance.

---

---

8. Click **Next**.

The Configure Server Start Mode and JDK page appears.

9. In the WebLogic Domain Startup Mode section, select **Production Mode**.

10. In the JDK Selection section, select **Available JDKs**, and select the 1.7.x\_xx JDK that is specified in the system requirements in the *Empirica Healthcare Analysis Release Notes*.

11. Click **Next**.

The Configure JDBC Component Schema page appears.

12. In the table at the bottom, select the OWSM MDS schema.

13. Fill in the following fields:

- From the **Driver** drop-down list, select the driver for either a service or instance connection.
- For **DBMS/Service**, type the appropriate value for the driver you selected:
  - If the name of the driver contains the words **for Instance connections**, type the SID.
  - If the name of the driver contains the words **for Service connections**, type the service name.
- For **Schema Owner**, type a value, such as EMPIRICA\_MDS.

- For **Schema Password**, type the password that you created when you created the schema in [Installing RCU and creating repositories](#).
14. Click **Next**.

The Test JDBC Component Schema page appears.
  15. Click **Next**.

The Select Optional Configuration page appears.
  16. Select the following options:
    - Administration Server
    - Managed Servers, Clusters and Machines
    - Deployments and Servers
  17. Click **Next**.

The Configure the Administration Server page appears.
  18. Select **SSL enabled**, and for **SSL listen port**, type **7002**.
  19. Click **Next**.

The Configure Managed Servers page appears.
  20. Click **Add**.

A row in the table becomes editable.
  21. Select **SSL enabled**, and fill in the fields as follows:
    - **Name**—Type **EHCServer**
    - **Listen address**—Type the fully qualified name of the application server.
    - **Listen port**—Type **7003**.
    - **SSL listen port**—Type **7004**.
  22. Click **Next**.

The Configure Clusters page appears.
  23. Click **Next**.

The Configure Machines page appears.
  24. Select the **Unix Machine** tab.
  25. Click **Add**.

A row in the table becomes editable.
  26. Fill in the fields as follows:
    - **Name**—Type **EHCMachine**.
    - **Node manager listen address**—Type the fully qualified name of the application server.
    - **Node manager listen port**—Type **5556**, if the value is not already present.
  27. Click **Next**.

The Assign Servers to Machines page appears.
  28. In the right list of machines, select **EHCMachine**.
  29. In the left list of servers, select **EHCServer**, and click the right arrow button.

The server is added to the machine.

**30. Click Next.**

The Target Deployments to Clusters or Servers page appears.

**31. Assign deployments to the EHCServer:**

- a. In the list of target servers on the left, select **EHCServer**.
- b. Deselect the **FMW Welcome Page** entry, and make sure all other entries are selected.

**32. Assign deployments to the EHCServer:**

- a. In the list of target servers on the left, select **EHCServer**.
- b. Deselect the **FMW Welcome Page** entry.
- c. Select the following options, if they are not already selected, and make sure all other options are not selected:
  - wsil-wls
  - wsm-pm

**33. Click Next.**

The Target Services to Clusters or Servers page appears.

**34. In the list of target servers on the left, select EHCServer.**

**35. In the list of services on the right, select the following services, if they are not already selected:**

- JRF Startup Class
- JPS Startup Class
- JDBC, as well as all of its child options.

**36. Click Next.**

The Configuration Summary page appears.

**37. Click Create.**

The Creating Domain page appears.

**38. When progress reaches 100 percent, click Done.**

The wizard closes.

**39. Store your WebLogic administrator credentials so that you are not prompted for your credentials when you start WebLogic:**

- a. In the command shell, navigate to the AdminServer directory under the empirica domain. For example, navigate to the following location:

```
/u01/app/oracle/Middleware/user_projects/domains/empirica
```

- b. If the following directory structure does not exist within the empirica directory, create it:

```
servers/AdminServer/security
```

---

**Note:** The directory names are case-sensitive. Capitalize the words as they are shown.

---

- c. Using a text editor, edit the `boot.properties` file in the security directory. This step creates the file, if it does not already exist.
- d. Type the following lines in the file, providing the user name and password that you created when you created and configured the WebLogic domain. For more information, see [Creating and configuring the WebLogic domain](#).
  - `username=<weblogic_admin_user>`
  - `password=<weblogic_admin_password>`
- e. Save the file, and close the text editor.

## Creating the `nodemanager.properties` file

Perform these steps as the non-privileged user on the application server.

1. Navigate to the `$WL_HOME/server/bin` directory, such as:
 

```
/u01/app/oracle/Middleware/wlserver_10.3/server/bin
```
2. Start the Node Manager by executing the following command:
 

```
$ ./startNodeManager.sh <listen_address> 5556
```

 where `<listen_address>` is the value you entered in [Creating and configuring the WebLogic domain](#).
3. After the console says **<secure socket listener started on port 5556>**, press **Ctrl+C**. The Node Manager stops.
4. Navigate to the `$WL_HOME/common/nodemanager` directory, such as:
 

```
/u01/app/oracle/Middleware/wlserver_10.3/common/nodemanager
```
5. Review the `nodemanager.properties` file:
  - a. Edit the `nodemanager.properties` file. For example:
 

```
$ vi nodemanager.properties
```
  - b. Set the values of the following properties to **true**:
    - `SecureListener`

---

---

**Note:** For a non-SSL environment, set the `SecureListener` property to **false**.

---

---

    - `StopScriptEnabled`
    - `StartScriptEnabled`
6. Save the file, and exit the `vi` editor.

## Starting WebLogic and the Node Manager

1. Navigate to the WebLogic default domain bin directory, using a command such as the following:
 

```
$ cd /u01/app/oracle/Middleware/user_projects/domains/empirica/bin
```
2. Start WebLogic using the following command:
 

```
$ nohup ./startWebLogic.sh > /dev/null &
```

---

---

**Note:** Information messages might appear. You might need to press Enter to see the prompt.

---

---

3. Navigate to `$WL_HOME/server/bin` directory, such as:  
`/u01/app/oracle/Middleware/wlserver_10.3/server/bin`
4. Execute following command  
`$ nohup ./startNodeManager.sh &`
5. Verify that the Node Manager can be reached:
  - a. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:  
<https://<servername>:7002/console>
  - b. In the left pane, expand **Environment**, and select **Machines**.  
The Summary of Machines page appears.
  - c. In the list of machines, select **EHCMachine**.  
The Settings for EHCMachine page appears.
  - d. Select the **Monitoring** tab.
  - e. Confirm that the status is Reachable. If status is Inactive, the Node Manager is not running.
6. Start Managed Server using the Node Manager:
  - a. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:  
<https://<servername>:7002/console>
  - b. In the left pane, expand **Environment**, and select **Servers**.
  - c. Select the **Control** tab.
  - d. Select **EHCServer**, and click **Start**.
7. Apply the JRF Template to the Managed Server:
  - a. In an internet browser, enter the URL for the Oracle Enterprise Manager, such as the following:  
<https://<servername>:7002/em>
  - b. In the left pane, expand **Weblogic Domain**, expand **empirica**, and select the **EHCServer**.
  - c. Click **Apply JRF Template**, located at the top of the page.
8. Restart the EHCServer managed server:
  - a. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:  
<https://<servername>:7002/console>
  - b. In the left pane, expand **Environment**, and select **Servers**.  
The Summary of Servers page appears.
  - c. Select the **Control** tab.

- d. From the list of servers, select the **EHCServer**.
- e. From the **Shutdown** drop-down list, select **Force Shutdown Now**.
- f. After the state of the EHCServer changes to **Shutdown**, select the check box for **EHCServer** in the table, and click **Start**.

## Creating a data source for credential access

To set up a data source in the WebLogic Administration Console for the credential store:

1. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:  
`https://<servername>:7002/console`
2. In the left pane, expand **Services**, and select **Data Sources**.
3. In the upper-left corner of the page, in the Change Center section, click **Lock & Edit**.
4. In the right pane, click the **New** button, and from the drop-down list that appears, select **Generic Data Sources**.  
The JDBC Data Source Properties page appears.
5. Type values for the following fields:
  - **Name**—For example, type **Empirica Credential Store**.
  - **JNDI Name**—For example, type **jdbc/mds/opss**.
6. Click **Next**.  
The JDBC Data Source Properties page appears.
7. Click **Next**.  
The Transaction Options page appears.
8. Click **Next**.  
The Connection Properties page appears.
9. Fill in the following names:
  - **Database Name**—Type the SID.
  - **Host Name**
  - **Port**
  - **Database User Name**—For example, **EMPIRICA\_OPSS**.
  - **Password, Confirm Password**—Type the password that you entered when you [installed RCU](#).
10. Click **Next**.
11. Click **Next**.  
The Test Database Connection page appears.
12. At the top of the page, click **Test Configuration**.  
A Connection Test Succeeded message appears.
13. Click **Next**.



The Select Targets page appears.

14. From the Servers list, select **AdminServer** and **EHCServer**.
15. Click **Finish**.
16. In the upper-left corner of the page, in the Change Center section, click **Activate Changes**.

A message appears, indicating that the changes have been activated. The Credential Store Data Source entry is created.

## Associating the credential store with the data source

1. In an internet browser, enter the URL for the Oracle Enterprise Manager, such as the following:

<https://<servername>:7002/em>

2. In the left pane, expand **WebLogic Domain**, and select **empirica**.
3. In the right pane, expand the **WebLogic Domain** drop-down menu at the top of the page, and select **Security > Security Provider Configuration**.

The Security Provider Configuration page appears.

4. In the Security Stores area, click **Change Store Type**.

The Configure Security Stores page appears.

5. From the **Store Type** drop-down list, select **Oracle Database**.
6. Next to the **Data Source JNDI Name** field, click **Select**, select the **Empirica Credential Store**, and click **OK**.
7. In the Data Source Properties area, type the:
  - **User name**—Name of the database user name, such as **EMPIRICA\_OPSS**.
  - **Password, Confirm Password**—Password for the schema that you created in [Installing RCU and creating repositories](#).
8. In the **Root DN** field, type **cn=root**.
9. Select **Create new domain**.
10. In the **Domain Name** field, type **empirica**.
11. Click **OK**.

A message appears, indicating that the domain must be restarted.

12. Click **Yes**.

The domain restarts. A confirmation dialog box appears and displays the results.

13. Click **Close**.

The credential store is set up.

14. Stop and restart the WebLogic server.

## Restarting the EHCServer managed server

1. In an internet browser, enter the URL for the WebLogic Administration Console, such as the following:

<https://<servername>:7002/console>

2. In the left pane, expand **Environment**, and select **Servers**.  
The Summary of Servers page appears.
3. Select the **Control** tab.
4. From the list of servers, select the **EHCServer**.
5. From the **Shutdown** drop-down list, select **Force Shutdown Now**.
6. After the state of the EHCServer changes to **Shutdown**, select the check box for **EHCServer** in the table, and click **Start**.

## Configuring SSL

The WebLogic server is configured by default to use a demo SSL certificate. This certificate is intended for demonstration purposes only. Do not use the demo SSL certificate for production environments.

Perform the following steps to configure WebLogic to use SSL for production use of the Empirica Healthcare Analysis application. For more information, see the following document:

[http://docs.oracle.com/cd/E23943\\_01/web.1111/e13707/ssl.htm](http://docs.oracle.com/cd/E23943_01/web.1111/e13707/ssl.htm)

1. Obtain an SSL certificate from a Certification Authority.
2. Using the WebLogic Administration Console, configure both AdminServer and EHCServer to use your SSL certificate. For more information, see the following document:

[http://docs.oracle.com/cd/E23943\\_01/apirefs.1111/e13952/taskhelp/security/ConfigureKeystoresAndSSL.html](http://docs.oracle.com/cd/E23943_01/apirefs.1111/e13952/taskhelp/security/ConfigureKeystoresAndSSL.html)

3. Configure the Node Manager to use your SSL certificate. For more information, see the following document:

[http://docs.oracle.com/cd/E23943\\_01/doc.1111/e15483/node\\_manager.htm#CCHEBIHI](http://docs.oracle.com/cd/E23943_01/doc.1111/e15483/node_manager.htm#CCHEBIHI)

## Troubleshooting

This section includes the following topics:

- [Issue: An error occurs when you try to log in because the application cannot connect to the database.](#)
- [Issue: The password for the OPSS database account changes.](#)

### **Issue: An error occurs when you try to log in because the application cannot connect to the database.**

#### **Resolution:**

Try these steps in order, testing after each step to determine whether the issue is resolved.

1. Restart WebLogic using the following commands:

```
$ ./stopWebLogic.sh
```

```
$ nohup ./startWebLogic.sh > /dev/null &
```

2. In the WebLogic Administration Console, verify that the data source user name is set up as EMPIRICA\_OPSS with the correct password. Test the connection.
3. In the Oracle Enterprise Manager, under System Policies, verify the codebase paths match the installation.
4. To check for specific permission errors, enable debugging, and examine error messages in the log file:

- a. Open the WebLogic start script (`startWebLogic.sh`) in your domain directory, such as the following directory:

```
/u01/app/oracle/Middleware/user_projects/domains/empirica/bin
```

- b. Add the following text below the `# START WEBLOGIC` entry in the file:

```
JAVA_OPTIONS="{JAVA_OPTIONS} -Djava.security.debug=access,failure
-Djps.auth.debug=true -Djps.auth.debug.verbose=true"
```

- c. Restart WebLogic using the following commands:

```
$ ./stopWebLogic.sh
```

```
$ nohup ./startWebLogic.sh > /dev/null &
```

- d. Examine the `startWebLogic.sh` output to see whether it contains the following permission error:

```
java.security.AccessControlException: access denied
```

- e. If the error exists, look below the error at the code source, such as the following text:

```
CodeSource=file:/u01/app/oracle/product/Middleware/user_
projects/domains/empirica/servers/AdminServer/stage/Healthcare/Heal
thcare/...
```

- f. In Enterprise Manager, update the permission codebase paths in System Policies to reflect the missing permission.

- g. Restart WebLogic using the following commands:

```
$ ./stopWebLogic.sh
```

```
$ nohup ./startWebLogic.sh > /dev/null &
```

- h. After the permission issue is resolved, remove the debug options, and start WebLogic using the following commands:

```
$ ./stopWebLogic.sh
```

```
$ nohup ./startWebLogic.sh > /dev/null &
```

### Issue: The password for the OPSS database account changes.

This issue occurs when the password for the EMPIRICA\_OPSS account expires or changes, for example, due to password expiration policies.

#### Resolution:

You must register the new password in the following locations:

- The bootstrap wallet file.
  - a. In a command shell, navigate to the directory for the bootstrap wallet file using a command such as:

```
$ cd
/u01/app/oracle/Middleware/user-projects/domains/empirica/config/fm
wconfig.
```

- b. In a command shell, start WLST using a command such as:

```
$ /u01/app/oracle/Middleware/oracle_common/common/bin/wlst.sh
```

The following prompt appears:

```
wls:offline>
```

- c. Execute the following command:

```
modifyBootStrapCredential(jpsConfigFile='./jps-config.xml',
username='<user>', password='<new password>')
```

where:

- <user> is the name of the OPSS schema database account, such as EMPIRICA\_OPSS.
- <new password> is the new password of the OPSS schema database account.

- d. To exit WLST, execute the **exit()** command.

- The data source associated with the OPSS schema database account.

- a. Open the WebLogic Administration Console.
- b. Expand **Services**, and select **Data Sources**.
- c. Select the **Data Source** entry.

If you followed the recommendations in [Creating a data source for credential access](#), the data source is named **Empirica Credential Store**, and the JDNI name is **jdbc/mds/opss**.

- d. Select the **Configuration** tab, and select the **Connection Pool** tab.
- e. In the Change Center section on the left, click **Lock & Edit**.
- f. Scroll to the Password and Confirm Password fields.
- g. Type the account password in both fields, and click **Save**.
- h. In the Change Center section on the left, click **Activate Changes**.

### Issue: The password for the MDS account changes.

This issue occurs when the password for the EMPIRICA\_MDS account expires or changes, for example, due to password expiration policies.

Perform the following steps to register the new password in the data source associated with the MDS schema database account.

1. Open the WebLogic Administration Console.
2. Expand **Services**, and select **Data Sources**.
3. Select the **Data Source** entry.
4. Select the **mds-owsm** data source.
5. Select the **Configuration** tab, and select the **Connection Pool** tab.
6. In the Change Center section on the left, click **Lock & Edit**.

7. Scroll to the Password and Confirm Password fields.
8. Type the account password in both fields, and click **Save**.
9. In the Change Center section on the left, click **Activate Changes**.

