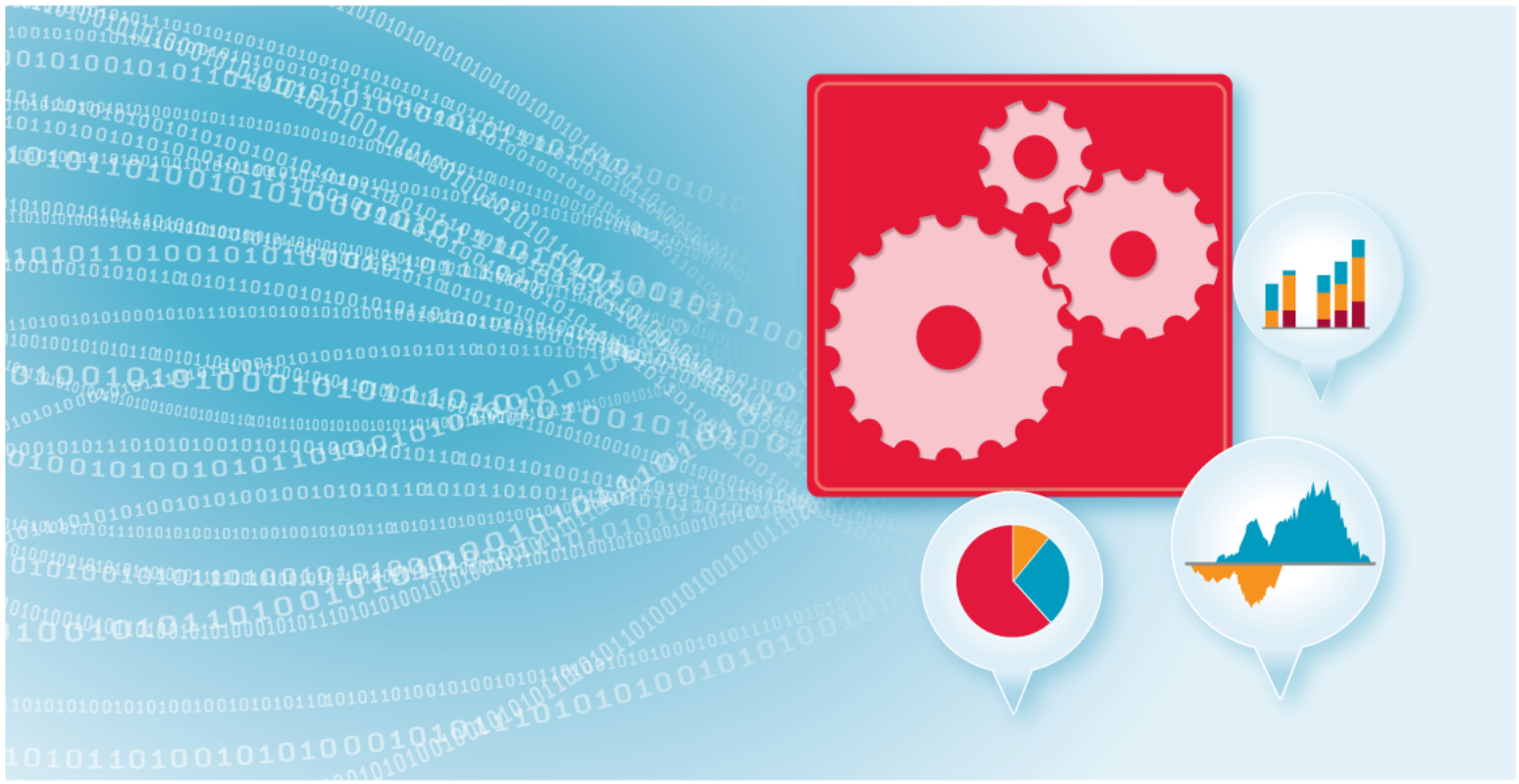

LAVASTORM analytics

Enterprise Installation Guide

Lavastorm Analytics Engine

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Legend

✓	Indicates a prerequisite.
•	Indicates an unordered list.
◊	Indicates a procedure with only one step.
1. 2.	Indicates a procedure with multiple steps.
»	Indicates the result of a procedure.
	Indicates a note. A note highlights important information.
	Indicates a tip. A tip gives you hints, for example, alternative methods for completing a task.
	Indicates a caution.
Bold text	Indicates user interface text.
`Code font`	Indicates code or system commands.
Menu > Menu item	Indicates navigation to a menu or sub menu item.
Link	Indicates a cross-reference to a section within the current document, or a link to an external document.
EXAMPLE	Indicates an example.
Image caption	Indicates an image caption.

Table of contents

1. Introduction

Welcome to the Lavastorm Analytics Engine Enterprise Installation Guide.

This installation guide describes the procedure for installing and uninstalling the LAE Server and LAE Web Application on UNIX.

After installation, the LAE license that you have (or will receive) determines which features are available to you.

If you encounter any issues during the install process, please contact Lavastorm Analytics Support at support@lavastorm.com or visit the Lavastorm Analytics forums at http://community.lavastorm.com.

Note: The images in this guide are for illustrative purposes only.

2. Installing the LAE Server on UNIX

2.1 Pre-installation steps

Before running the installer for LAE, there are several steps that you should complete. Each is described further in the following sections.

Third-party software

The LAE Server requires the following types of software to be installed on the UNIX system:

- Database connectivity (optional)
- Special case software that is specific to an operating system

Database connectivity

LAE does not require database connectivity. However, many LAE graphs use nodes that obtain data from database sources.

Oracle

If LAE will be accessing Oracle databases, the Oracle client or database must be installed on the UNIX system. LAE supports Oracle versions 10.2 and higher.

Depending on the Oracle installation, the Lavastorm user created later on may need to be part of the Oracle installation group. Typically, this would be `oinstall`.

Red Hat Enterprise Linux and Oracle Enterprise Linux

If you are installing on Red Had Enterprise Linux or Oracle Enterprise Linux, you must disable Security Enhanced (SE) Linux before installing.

Creating a Lavastorm user

Create a user to install LAE (you can use any username).

◊ To create a user account, as root, execute one of the following commands:

- Linux: `/usr/sbin/adduser -m -d <users-directory> <user name>`
- Solaris: `/usr/sbin/useradd -m -d <users-directory> <user name>`

Setting up the user environment

1. Log in to the installation machine as the installation user.
2. Determine which command shell you are using. You can do this by typing: `echo $SHELL`.

Note: The LAE installation only supports the *sh family of shells, that is, *sh* and *bash*.

3. Set up to use either the GUI installation interface or the command-line installation.

Note: This guide leads you through the GUI installation. The command-line installation follows the same steps.

   a. For the GUI installation interface, ensure that the `DISPLAY` environment variable is set to the X-server hostname:
      i. Type `echo $DISPLAY`.
      ii. If the command returns nothing or complains that `DISPLAY` is not set, then set the `DISPLAY` variable using one of the following commands:

      - ***sh:*** `DISPLAY=<xserver-hostname>:0.0 ; export DISPLAY`
      - ***bash:*** `export DISPLAY=<xserver-hostname>:0.0`

   b. If you want to use the command-line installation interface, ensure that the `DISPLAY` environment variable is *not* set:
      i. Type `echo $DISPLAY`
      ii. If the command returns a value, then unset the `DISPLAY` variable using the following command:

      - ***sh, bash:*** `unset DISPLAY`

4. If you are using Oracle, set the `ORACLE_HOME` environment variable to the directory where the Oracle client is installed. To do this, execute one of the following commands:

- ***sh:*** `ORACLE_HOME=<path-to-oracle> ; export ORACLE_HOME`
- ***bash:*** `export ORACLE_HOME=<path-to-oracle>`

Installation planning for the installer

There are several things to determine before running the installer.

Installation temporary directory

Identify a directory that the LAE installer can use for temporary storage. The installer requires temporary space to extract its components prior to installation. The temporary space is required only during installation and can be deleted later. The required temporary space is around 500 MB.

The following instructions refer to this directory as *<install-temp>*.

Third-party software directory

Identify a directory where third-party software is typically installed on your UNIX system (normally, you would install LAE into a subdirectory of this directory). This is typically a site-specific and/or UNIX-specific location. Typical locations are: */opt or /usr/local*.

The following instructions refer to this directory as *<third-party-directory>*.

Lavastorm directory

Identify a directory that will contain all the Lavastorm software. The recommended value is:

<third-party-directory>/lavastorm.

The following instructions refer to this directory as *<lavastorm-directory>*.

Lavastorm database directory

Identify a directory where the LAE installer should record what components and versions have been installed. The recommended value is: *<lavastorm-directory>/db*.

The following instructions refer to this directory as *<install-database>*.

Installation directory

Identify a directory where the LAE installer should install LAE. Lavastorm recommends that:

- This directory should be below the Lavastorm Directory, and
- The name of this directory should contain the software name (LAE) and the version.

So, the recommendation is that the Installation Directory should be:

<lavastorm-directory>/lae/<software-version>

EXAMPLE:

- */opt/lavastorm/lae/6.1.X*
- */opt/lavastorm/lae/5.1.0*

The following instructions refer to this directory as *<installation-directory>*.

Installation planning for LAE

LAE log directory

Identify a directory where the LAE Server and controller will create log files.

The following instruction s refer to this directory as *<lae-log-directory>*.

LAE universal shared directory

Identify a directory where LAE will store LAE data files. The directory should have sufficient space to store the LAE data files; the amount of space required will depend on the size and volume of data that the LAE will be processing.

The LAE can acquire and process data from virtually any data source, utilizing the Universal Shared Directory in place of a data warehouse or other resource-heavy or schema-dependent storage environments. Processing is conducted completely independent of the source data environment(s), thus avoiding impact on core systems and resources.

LAE data handling is designed to be transient by nature. It doesn't require a highly available, redundant system to store its internal data. The recovery strategy in case of system failure (power outage or network problem) requires a simple re-run of the Analytics from the original data sources.

This Universal Shared Directory environment provides all inter-process storage, passing temporary files of data sets between each processing node within or across servers when not streaming. The directory can be provided through either NAS, or RAID 0 (striped for performance, not for redundancy).

The use of NAS for transient storage seems more common for distributed computation, but it has its own bottleneck. Each LAE Server requires extensive data exchange with the Universal Shared Directory. This may cause not only slowdown of the LAE Server calculations, but overall network congestion. The critical factor in NAS-based design is maintaining adequate I/O channel capacity.

Generally it is recommended that RAID 0 be used for the Universal Shared Directory. In this case the local storage is maintained at each server, which is then shared across the Server Farm, optimizing performance. This minimizes the network congestion and allows high overall performance of the system. This benefit is especially true when multiple servers are used for redundancy, and generally not farmed together. The servers will therefore always be writing local storage (as our usual setup), but will generally be reading local as well; completely avoiding any network penalty.

If the server is being setup as part of an LAE farm using the file I/O method (see below), then this directory should point to the shared directory exported to the other servers in the farm.

The following instructions refer to this directory as *<lae-shared-directory>*.

LAE temporary directory

Identify a directory where LAE will write local temporary files. This should be a directory that is on fast storage, since it is accessed heavily during processing.

Generally, this is the same as the Universal Shared Directory, unless the Universal Shared Directory uses NAS—with the shared directory on NAS, you would typically have the Temporary Directory be a different directory that is local to the machine where LAE is running.

The following instructions refer to this directory as *<lae-temp-directory>*.

LAE data I/O method

If the server is being set up as part of an LAE farm, then select which method LAE should use to exchange data between servers. LAE supports two methods: **sftp** and **file**. The **sftp** method transfers data between servers using the Secure File Transfer Protocol. The **file** method simply writes to the local file system and depends on the other servers having been cross mounted using NFS (or other network file system).

If the server is NOT being set up as part of an LAE farm, the I/O method should be **file**.

The following instructions refer to this as *<lae-io-method>*.

LAE Server port

Identify the TCP/IP port which the LAE Server will run on. This port should be opened through the firewall on the machine.

The instructions below refer to this as *<lae-server-port>*.

LAE host name

On machines with multiple network devices, if you want to bind the LAE network traffic to one network device, identify the hostname of the device to bind to. In general, during the installation, most customers will leave this parameter unspecified.

The following instructions refer to this as *<lae-server-hostname>*.

Summary

During the installation, you will need to provide the following information (the third column is available for you to record values for each item):

Item	Example	Value
<install-temp>	/opt/lavastorm/installTemp	
<third-party-directory>	/opt	
<lavastorm-directory>	/opt/lavastorm	
<install-database>	/opt/lavastorm/db	
<installation-directory>	/opt/lavastorm/lae/6.1.X	
<lae-log-directory>	/opt/lavastorm/lae/log	
<lae-shared-directory>	/hosts/<hostname>/lae/tmp	
<lae-temp-directory>	/hosts/<hostname>/lae/tmp	
<lae-io-method>	File	
<lae-server-port>	7721	
<lae-server-hostname>		

2.2 Installation

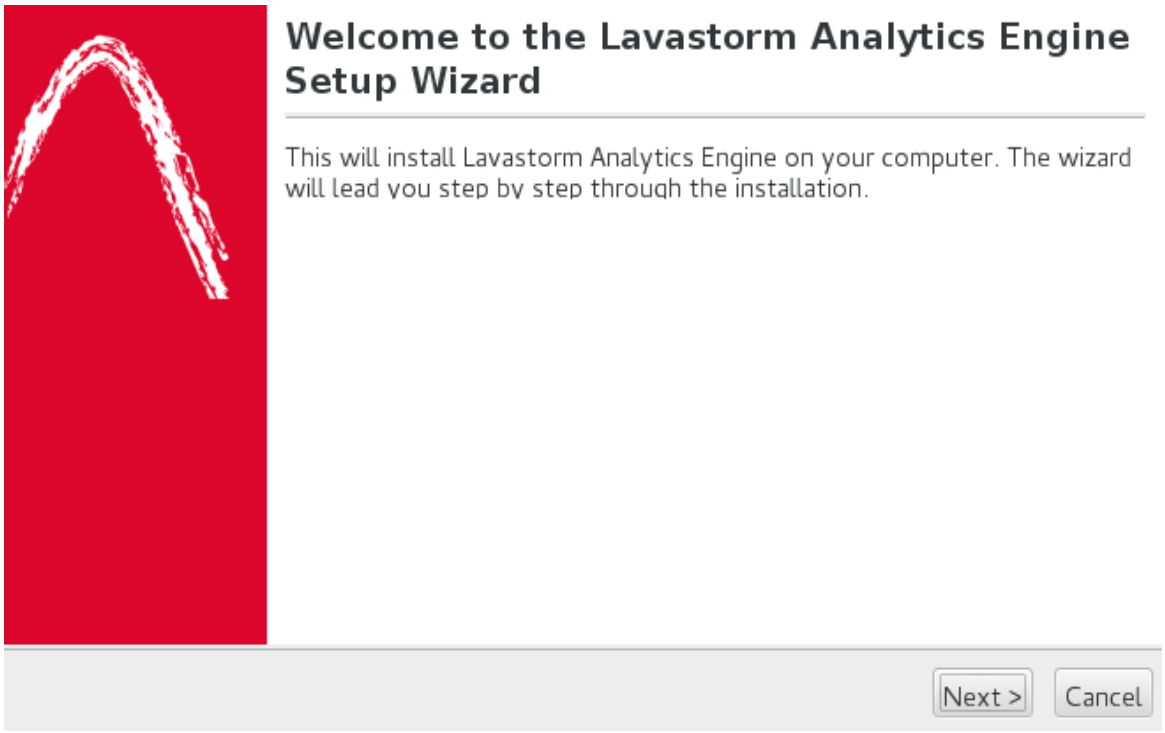
Note: When installing a new version of the LAE software, **do not upgrade an existing installation**. This will cause your previous installation to be uninstalled and could potentially cause the loss of data. **Always perform a fresh installation** and then copy over your data.

1. Run the installer. To do this, execute the command:

   `sh Lavastorm_Analytics_Engine_6_1_<X>-<arch>.sh`

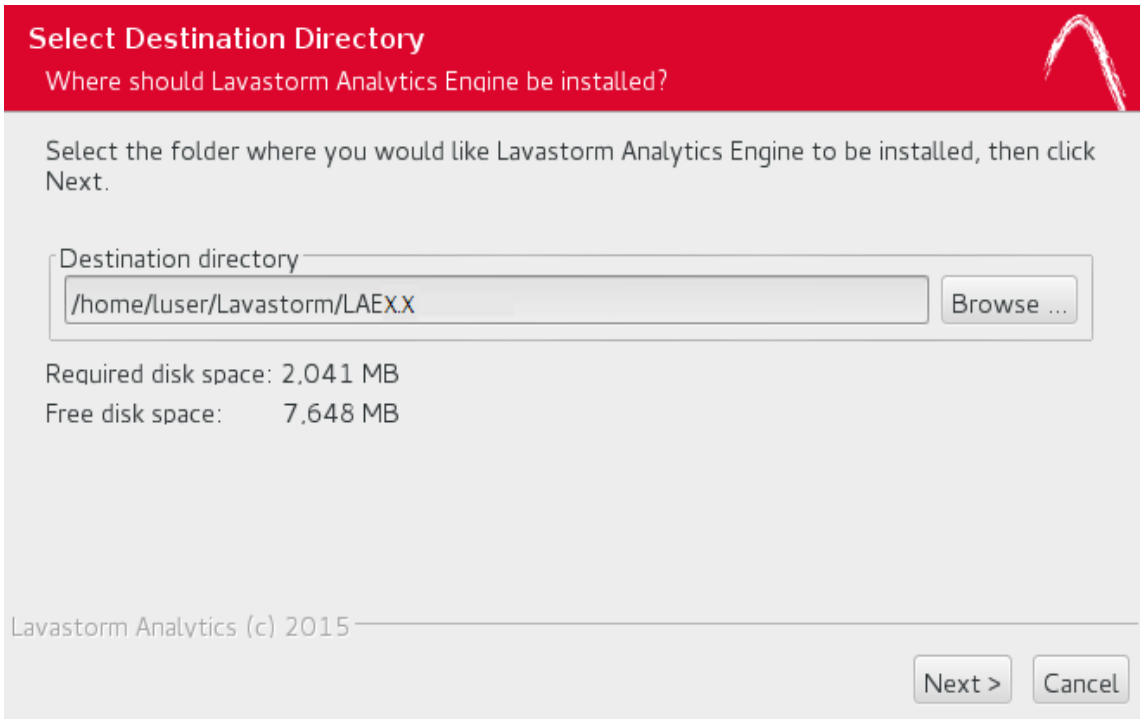
   Where *<arch>* is your operating system architecture (for example, Linux x86-32) and *<X>* is the LAE minor version number.

2. When the Setup Wizard appears, click **Next**:



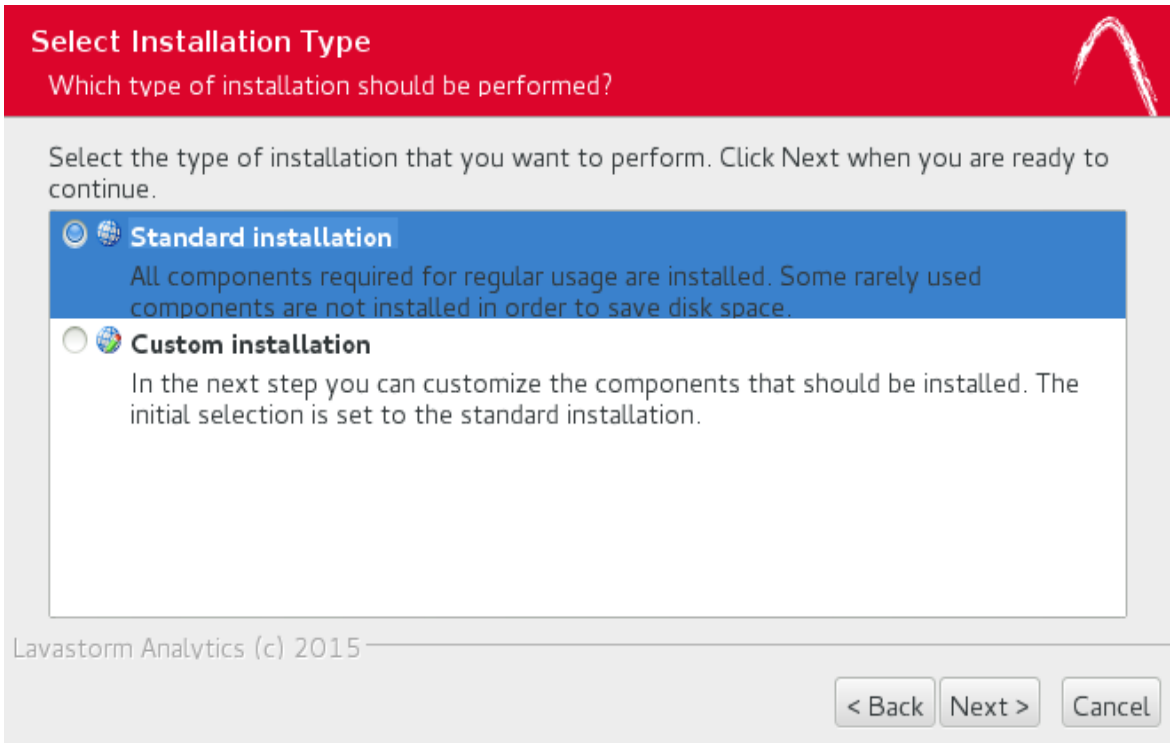
3. On the next screen, you will be prompted to review the license agreement. Select **I accept the agreement** and click **Next**.

» A **Select Destination Directory** window opens:



4. Accept the default setting, or modify it to specify a different location for the LAE installation.

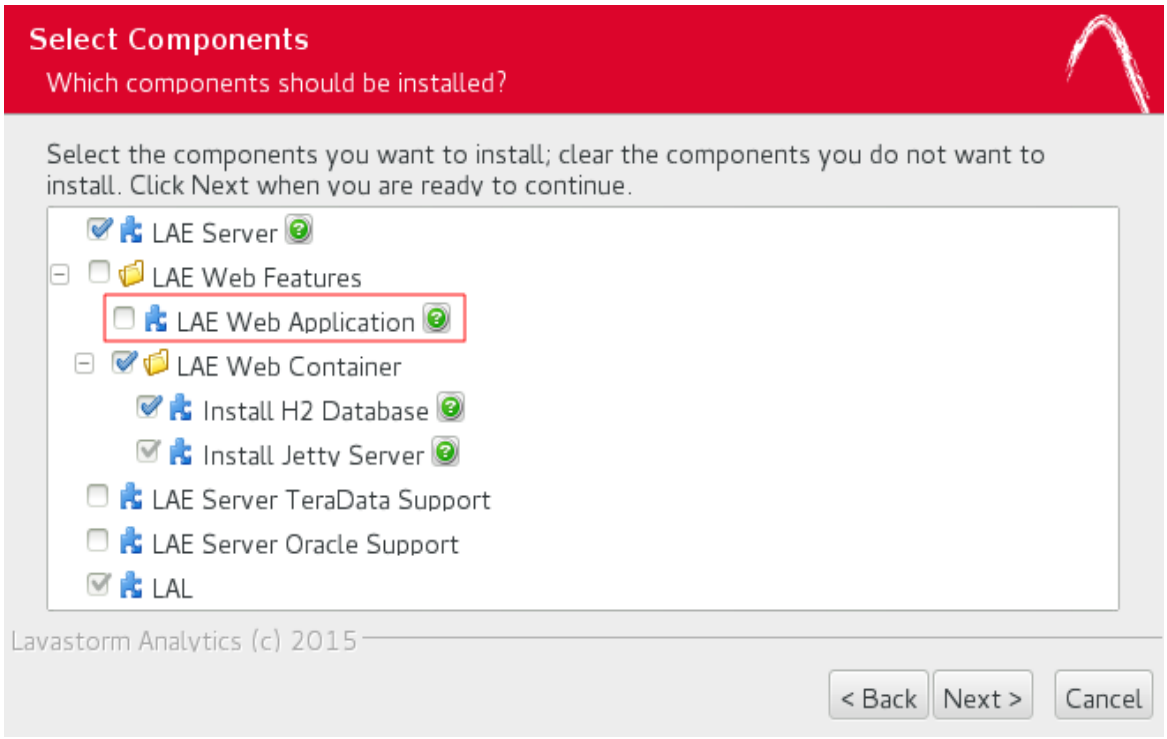
» A **Select Installation Type** window opens:



The **Standard installation** installs the LAE Server, and it installs the LAE Web Application onto a Jetty server using an H2 database. The **Custom installation** offers the additional options of TeraData Support and Oracle Support. In addition, selecting **Custom installation** gives you the option to install only the LAE Server and not the LAE Web Application as part of the current server installation.

5. Accept the default setting for **Standard installation**, or select **Custom installation** to modify the components to be installed.

» If you selected **Custom installation**, a **Select Components** window opens:

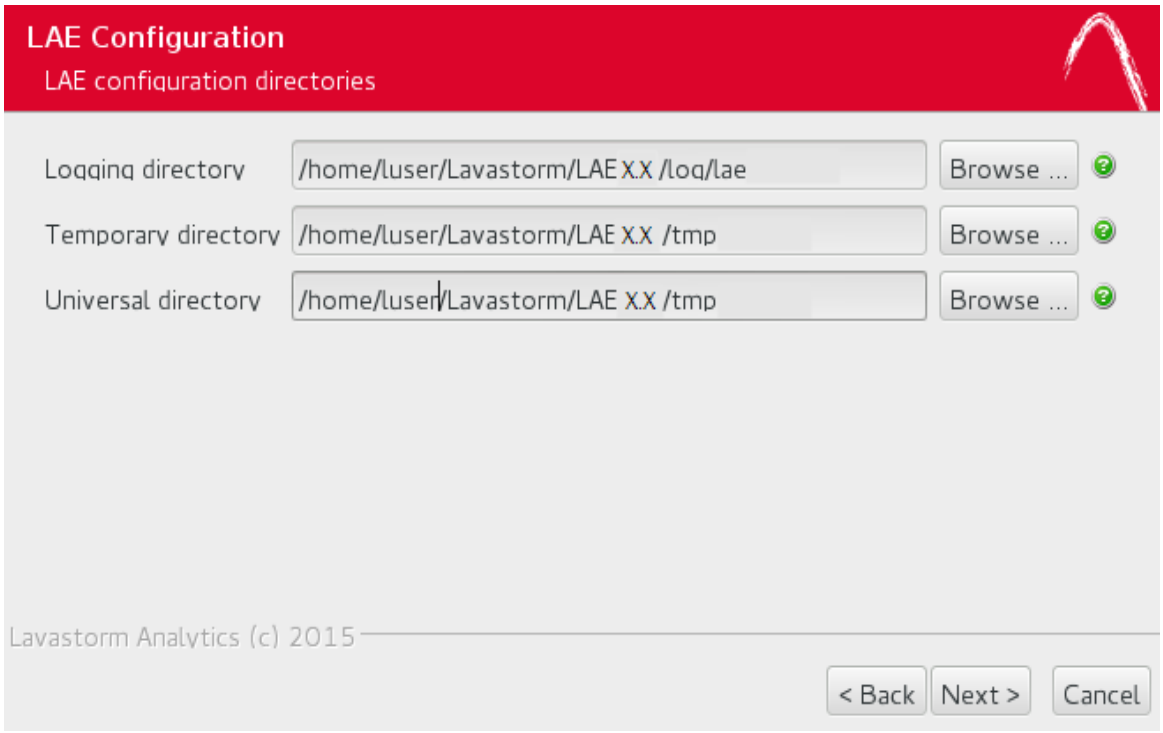


Note: You must install both the LAE Web Application and the LAE Server on your main server. However, if your installation is part of a server farm, you do not need to install the LAE Web Application on every server.

6. If you do not wish to install the LAE Web Application, clear the LAE Web Application check box and click **Next**.

Note: If you are installing LAE via the command line, and do not want to install the LAE Web Application, then you must enter the , (comma) symbol when prompted for a choice on what you want to install; leaving it blank and simply pressing Enter will install the default packages, which include the LAE Web Application.

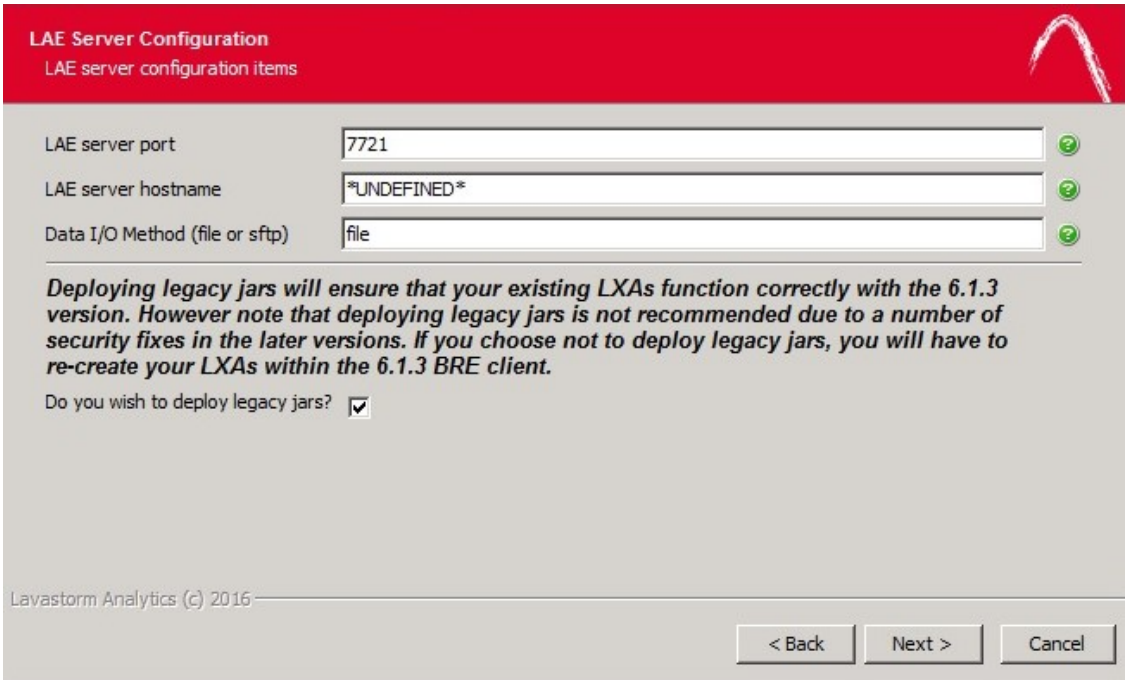
» An **LAE Configuration** window opens:



7. Accept the paths for the logging, temporary and universal directories, or modify them to specify alternate locations.

> **Note:** The temporary directory could get very large because this is where LAE keeps all the data on every pin in a graph when the graph executes. Ensure that the temporary directory that you choose has enough room for this.

» An **LAE Server Configuration** window opens:

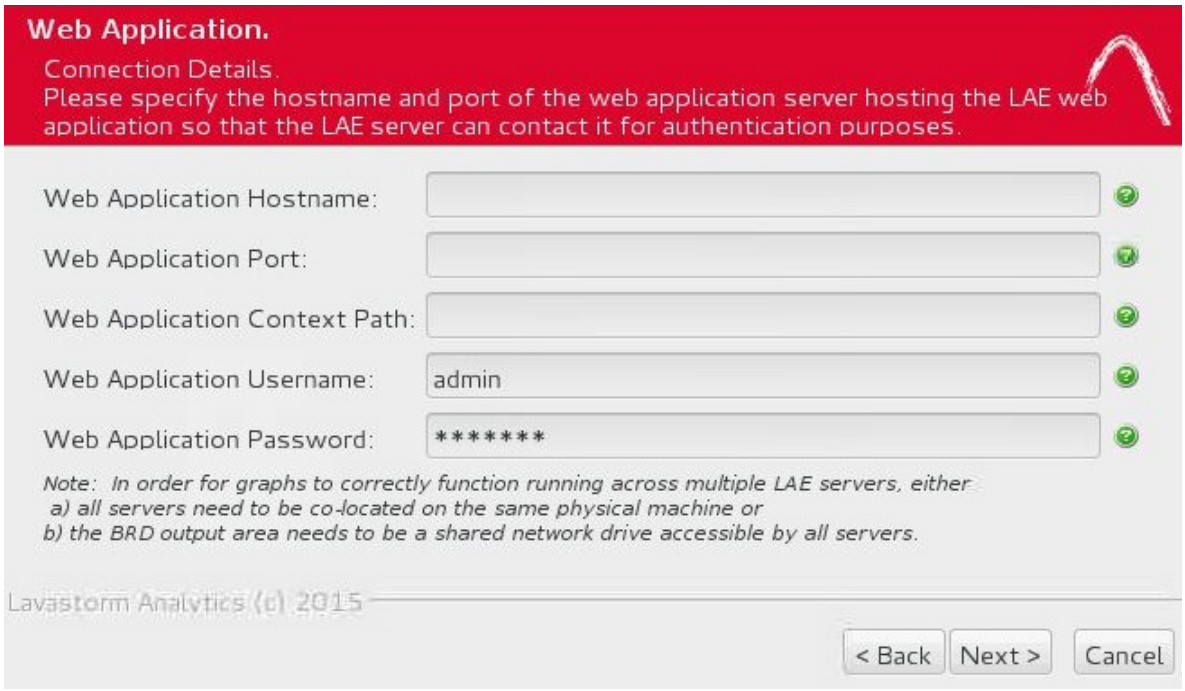


8. Accept the default settings, or modify them to specify a different server port, hostname or data I/O method. If you are upgrading from a previous version of the product, you will also need to choose whether to deploy legacy jars.

> **Note:** Setting the LAE Server hostname to anything other than *UNDEFINED* will cause the LAE Server to bind to the interface associated with that specific hostname, and the LAE Server will be unable to be reached via any other interface, for example, localhost. Most users will want to leave this value as *UNDEFINED*.

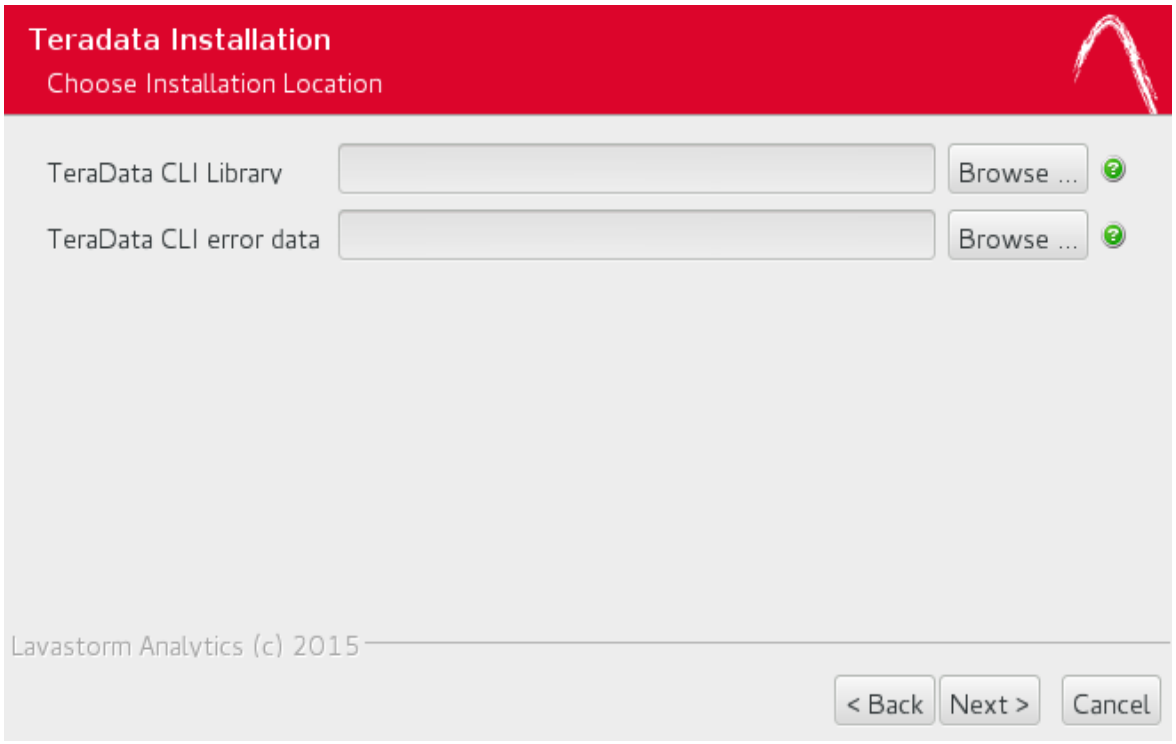
> **Note:** By default, the option to deploy legacy jars is selected, meaning that if you are upgrading from a previous version of the product, your existing LXAs will continue to function correctly. However, due to a number of security vulnerabilities within the legacy jars, we recommend that you deselect the option to deploy them and instead re-create your LXA files in BRE v6.1.3 onwards.

» If you opted not to install the LAE Web Application as part of the current server installation, a Web Application window opens:



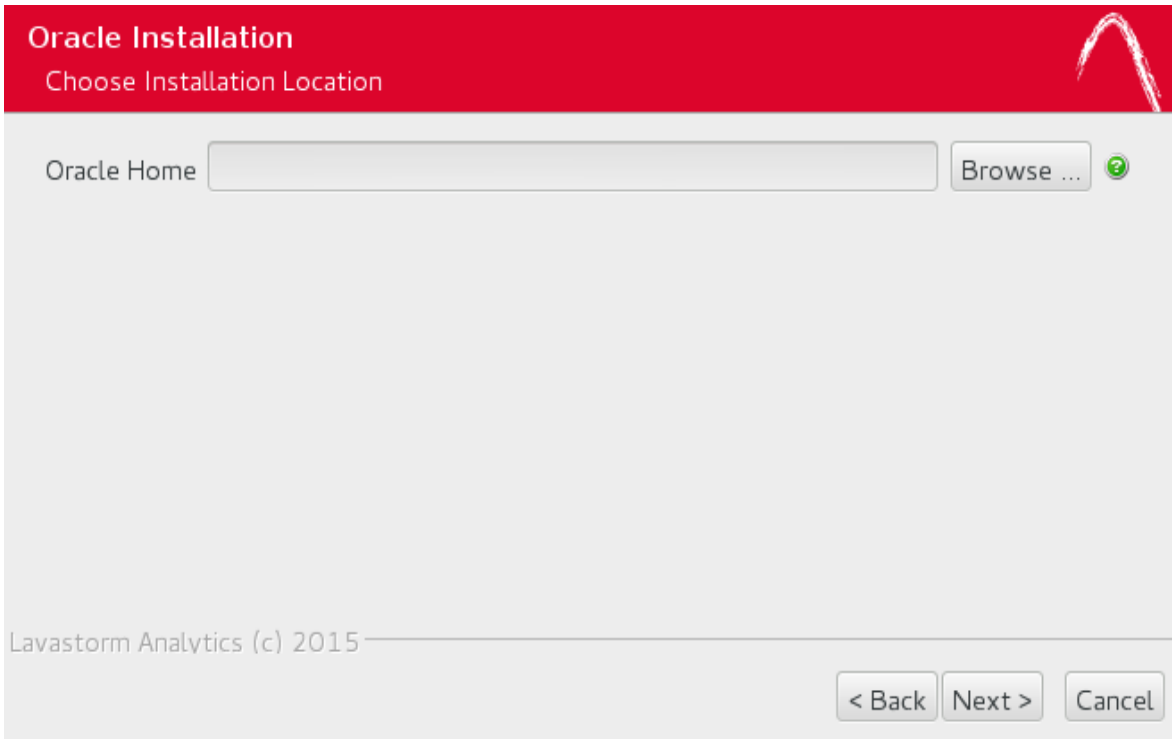
9. Add the **Web Application Hostname** and **Web Application Port** details to point to the main server where the LAE Web Application is installed.

» If you opted to install TeraData support, you will next be prompted for your TeraData installation locations:



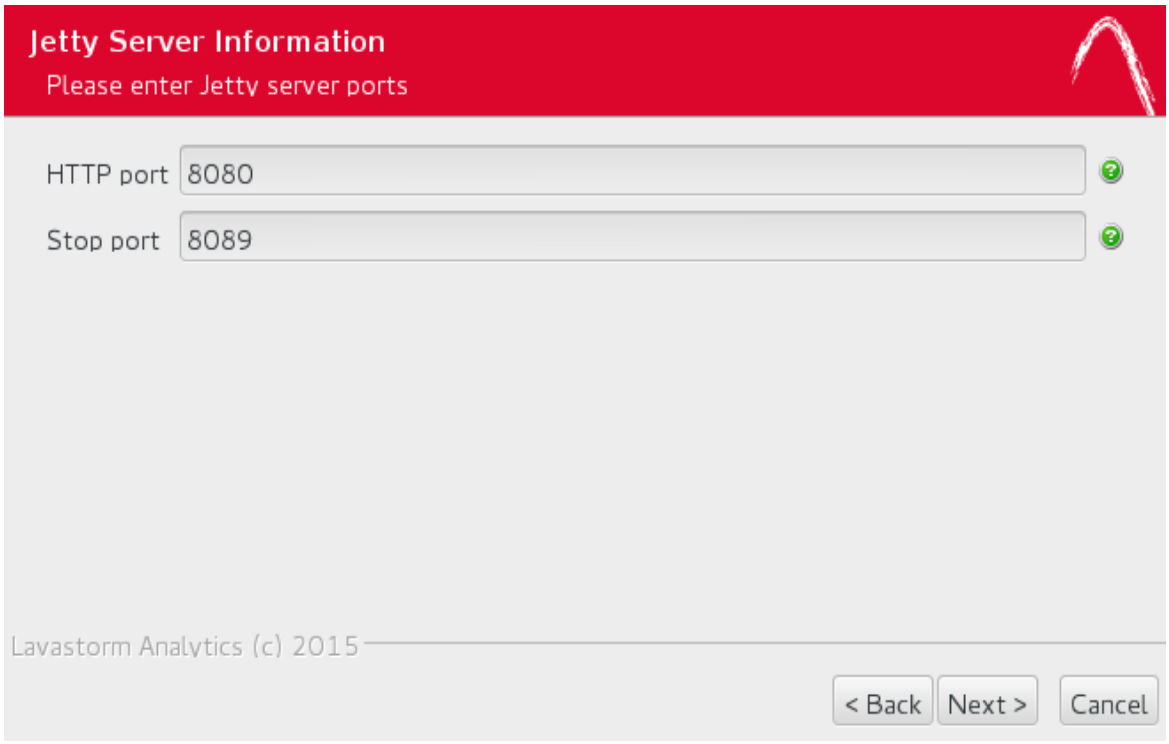
10. Enter the paths for your **TeraData CLI Library** and **TeraData CLI error data** and click **Next**.

» If you opted to install Oracle support, you will be prompted for your Oracle installation location:



11. Enter the path for your Oracle Home directory and click **Next**.

» After the optional components, if you opted to install the LAE Web Application, a **Jetty Server Information** window opens:



12. Accept the default settings, or modify them to specify a different **HTTP port** or **Stop port**.

» If you opted to install the LAE Web Application, a **H2 Database Information** window opens:

13. Accept the default setting, or modify it to specify a different **Database port**.

» An **LAE Security Store Information** window opens:

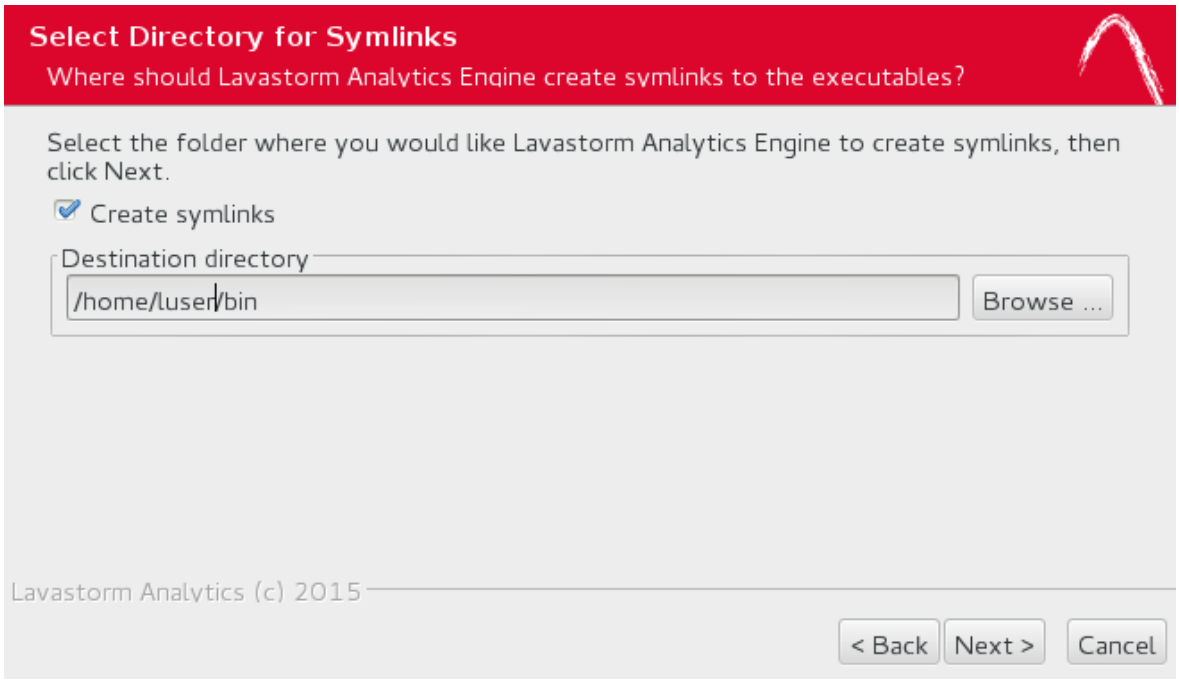
14. Enter a **Security Store Password**.

    Select **Store Password** if you wish to save your security store password as an encrypted value in both the web-conf/site.prop and the conf/site.prop configuration files. For increased security, do not select **Store Password**. In this case, you will be asked to enter the security store password when the LAE Web Application is started, before you reach the login screen.

    The security store safely stores encrypted values, such as the LDAP/AD import binding user password so that after performing an LDAP/AD import, the binding user can perform an LDAP/AD synchronization task without having to re-enter their password.

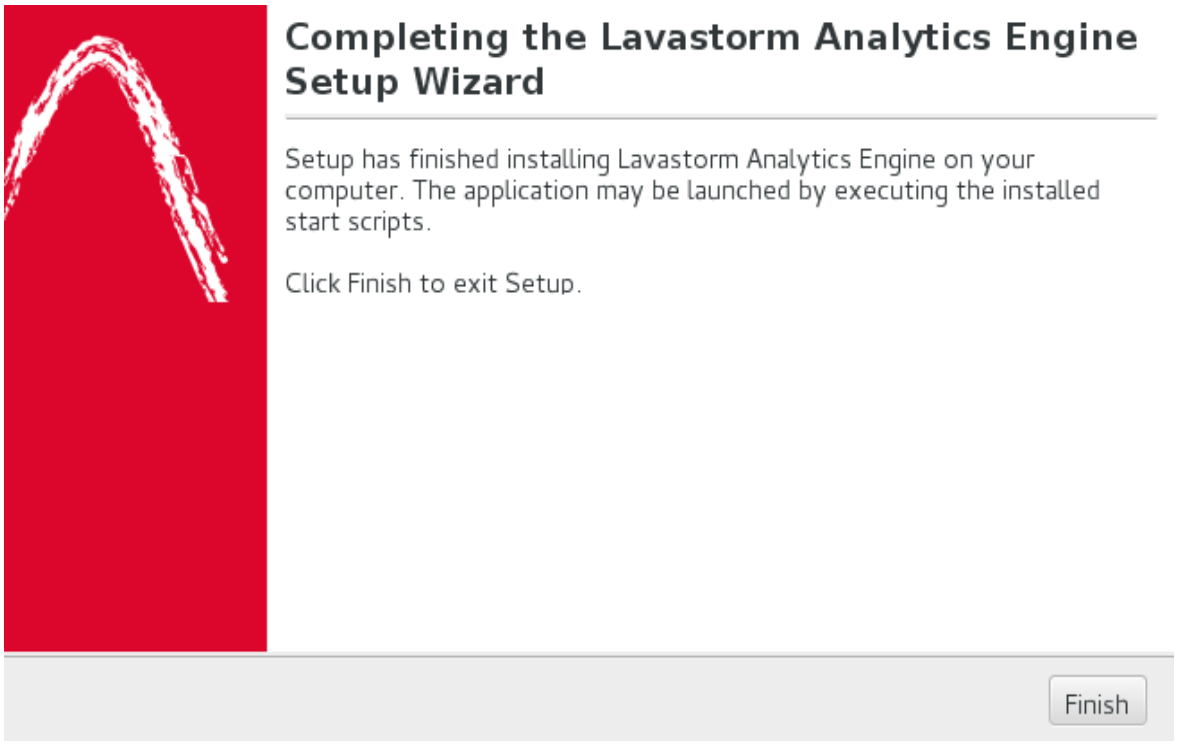
    After installation, you can use the laeConfig command line tool to update the details as required, see the LAE Administration Guide for more information.

» A **Select Directory for Symlinks** window opens:



15. If you would like to create symlinks, select the **Create symlinks** check box and enter the **Destination directory**. Click **Next**.

» The installer will then run. When it finishes, you will be presented with one final window:



16. Click **Finish** to exit Setup.

Note: After installation, unset the DISPLAY environment variable before running the LAE Server.

2.3 Java heap space

By default, the heap size is set to 25% of your RAM or 1G, whichever is smaller.

If you need to adjust the heap size, you can use the examples given in the following step as a guide:

- If you are using .profile.lavastorm to run the application, export INSTALL4J_ADD_VM_PARAMS=<JVM arguments>, where *JVM arguments* is replaced by the parameters that you wish to edit.

EXAMPLE: For example, to edit the maximum heap size and the maximum permanent generation size:

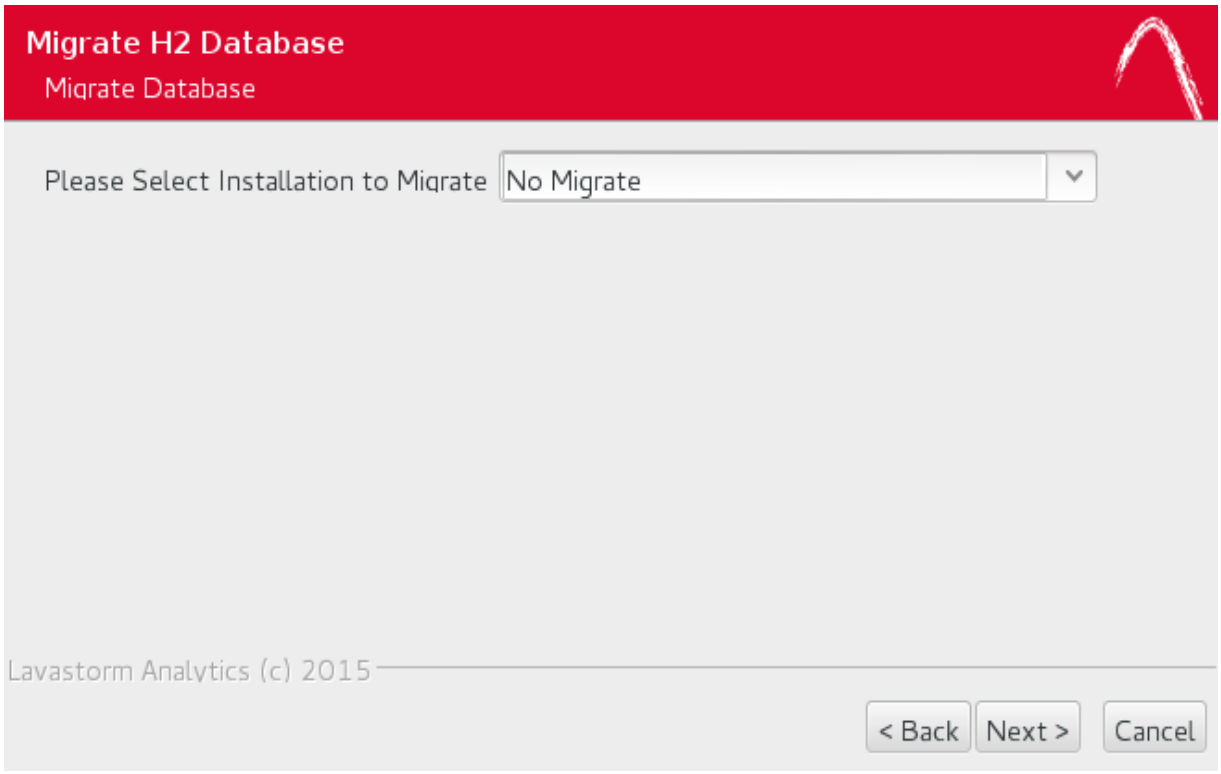
Export INSTALL4J_ADD_VM_PARAMS="-Xmx*1024*M -XX:MaxPermSize=*512*M", where *1024*M and *512*M are replaced with values that are appropriate for your system settings.

3. Updating Web App database from 6.x to 6.1.X

Users upgrading from a 6.0 or a 6.1 installation will need to follow some additional steps in order to migrate their existing data to 6.1.X.

3.1 Built-in H2 database

When you run the installer, it will detect any existing H2 databases and ask you if you want to migrate, and it will list all available installations of LAE on the server that you are installing onto, for example:



When you select one of these installations, the installer will copy the H2 database associated with that installation into the new install. Ensure that you do not have any jobs currently running.

3.2 Non-H2 database

If using a separate non-H2 database, you will need to update that database manually. It is recommended that you back up the existing non-H2 database before proceeding.

1. Locate the SQL scripts in the following directory on the server:
   <root installation directory>/sql/migration/<non-H2 database>
   Under this directory, there are two sub-directories DDL and DML.
2. Connect to the non-H2 database using a SQL tool such as SQL*Plus or SQL Developer.
3. Execute the SQL script under the DDL sub-directory.
4. Execute the SQL script under the DML sub-directory.
   » The non-H2 database has been fully updated and is ready for use.

4. Starting the LAE Server and LAE Web Application

LAE Web Application

To start the LAE Web Application, you must first start both the H2 database and the Jetty server.

1. Start the H2 database with the following command:
   `<installation-dir>/bin/startDatabase &`

2. Start the Jetty server with the following command:
   `<installation-dir>/bin/startLavastormJettyServer &`

Caution: The H2 database must be started before the Jetty server, and both the Jetty server and the H2 database must be started prior to starting the LAE Server.

Note: The default port used by the LAE Web Application is 8080 and the default port used by the database is 8089. Ensure that your administrator has configured the server so that the LAE Web Application port and database port are not blocked.

Logging on to the LAE Web Application

1. You must open BRE and apply your LAE license to the LAE Web Application server before you attempt to log in to the LAE Web Application.

2. The default URL for the LAE Web Application is:
   http://<host-name>:8080/

LAE Server

In order to start the server, you must be in a properly configured LAE environment. This means that you must have executed one of the LAE environment resource scripts:

- For *sh* or *bash*: source .profile.lavastorm

To invoke the LAE Server, type the following command:

sh, bash:

```
<installation-directory>/bin/laeServer >
     <lae-log-directory>/laeServer.log 2>&1 &
```

Note: The default port used by the LAE Server is 7721. Make sure your administrator has configured the server so that the LAE Server port is not blocked.

5. LAE Web Application

5.1 WebLogic 12c installation

This section describes the general procedure for installing the LAE Web application on a WebLogic 12c server running under Linux. This document does not cover the installation of WebLogic, the creation of WebLogic domains, or the administration of WebLogic servers. Please refer to the WebLogic documentation for those topics.

The LAE Web Application will be installed on a WebLogic domain server. The domain directory of this server will be referred to as *DOMAIN_HOME* here. If you have installed WebLogic using its default, the *DOMAIN_HOME* is found under the installation root folder at: `/user_projects/domains/mydomain`.

The directory under which you have installed LAE will be referred to as *LAE_HOME*.

Post-LAE installation

1. Do not start the default LAE Jetty server. The web application included with the installation will be configured and run under WebLogic after it has been installed following the steps covered in this document.

   Note: The LAE Web Application must be deployed and running on WebLogic before the LAE Server can be started.

2. If you plan on using the H2 database included with the installation, start the H2 database, see LAE Web Application on page 30

3. When the LAE installation is complete, start the Lavastorm Analytics Server (see LAE Server on page 30) and apply the license.

Configure WebLogic to run LAE

1. Create a directory named “classpath” under *DOMAIN_HOME*/config.

2. Copy the site.prop file found under *LAE_HOME*/web-conf to the newly created directory, *DOMAIN_HOME*/config/classpath

3. Edit the `site.prop` file as follows:
   a. Configure the following LAE Server properties:

   i. Set the `ls.lae.container.serverHost` property to the hostname where the LAE Server is installed.

   ii. Set the `ls.lae.container.serverPort` property to the LAE Server listening port.

   b. Set the location of the keystore:
   Set `ls.lae.auth.trust.keyStore` to *DOMAIN_HOME*/config/classpath

   > **Note:** If the LAE Server and LAE Web Application are installed on the same server, trusted host authentication is automatically configured by the installer. Leave the default value for this property.

4. Add the new classpath directory to the PRE_CLASSPATH variable in the domain environment:
   a. Edit *DOMAIN_HOME*/bin/setDomainEnv.sh

   b. Add the line “export PRE_CLASSPATH=DOMAIN_HOME/config/classpath” just below the line containing “export WL_HOME”.

   > **Note:** Remember to replace *DOMAIN_HOME* with the complete path where your domain server is installed. *DOMAIN_HOME* is only used for documentation purposes.

5. Copy files `log4j-1.2.17.jar`, `wllog4j.jar`, `bcprov-jdk15on-1.50.jar` to *DOMAIN_HOME*/lib.
   a. `log4j-1.2.17.jar` can be downloaded from https://logging.apache.org/log4j/1.2/download.html

   b. `wllog4j.jar` can be found in the wlserver/server/lib directory of the WebLogic base installation, that is, MW_HOME/wlserver/server/lib.

   c. `bcprov-jdk15on-1.50.jar` can be found in *LAE_HOME*/lib/java.

Deploy LAE on WebLogic

1. Start the WebLogic Server:
   $ DOMAIN_HOME/startWebLogic.sh

2. Start the Node Manager:
   $ DOMAIN_HOME/bin/startNodeManager.sh

3. Create a managed server where LAE will be deployed.
   a. Log in to the WebLogic web console, http://localhost:7001/console

   b. Create a new managed server for LAE. Please refer to the WebLogic documentation to perform this step.

4. Create a new Data Source:
   a. In the admin console, expand the Services link in the Domain Structure panel and click **Data Sources**.

   b. In the Summary of JDBC Data Sources, click the **New** button to expand the drop down menu and select **Generic Data Source**.

   c. For the JNDI name, enter `jdbc/LavaStormDataSource`.

   d. Select your database type.

   e. Click **Next** and select your database driver.

   f. Enter the JDBC parameter appropriate for your database.

   g. In the **Create a New JDBC Data Source** panel, select the server created in step 3.

   h. Click **Finish**.

5. Start the managed server created in step 3.

6. Deploy the Lavastorm Analytics Engine Application on the Lavastorm server:
   a. In the **Domain Structure** panel, click **Deployments**.

   b. In the **Summary of Deployments** panel, click the **Install** button.

   c. If LAE was installed on a different physical machine than the one where the WebLogic server is running, copy *LAE_HOME*/jetty/webapps/root.war from the LAE installation to a directory on the server running WebLogic that is accessible to the WebLogic server.

   d. Navigate to the location of the `root.war` application and select it by clicking the radio button.

   e. Select **Install this deployment as an application** and click **Next**.

   f. Check the box next to the Lavastorm server and click **Next**.

   g. Click **Next**.

h. Select **No, I will review the configuration later** on the next screen.

i. Click **Finish**.

7. The admin console will return to the Summary of Deployments panel with status messages. If everything was installed correctly, the LAE deployment should indicate a State of Active.

8. The LAE application can now be accessed at http://<lavastorm_server>:<lavastorm_port>/lae.

5.2 Deploying LAE Web Application to Tomcat 7

Note: When starting Tomcat, ensure that the LAE server and the Jetty server are not running.

✓ You have installed LAE, accepting all defaults (including the H2 Database and Jetty Server). This allows the installer to configure the trusted hosts, see Trusted host configuration on page 37.

The location of the LAE Web Application installation is referred to below as <LAE Web Application-installation-directory>. The location of the Tomcat installation is referred to below as <TOMCAT_HOME>.

1. Copy <LAE Web Application-installation-directory>/web-conf/site.prop to <TOMCAT_HOME>/lib/site.prop

2. Copy the database driver jar file to <TOMCAT_HOME>/lib

3. Remove the ROOT directory from <TOMCAT_HOME>/webapps

4. Copy <INSTALL_DIR>/jetty/webapps/root.war to<TOMCAT_HOME>/webapps/ROOT.war

   Note: The LAE war file is case sensitive (ROOT.war).

5. Add the JNDI datasource to <TOMCAT_HOME>/conf/context.xml

6. Start Tomcat.

7. Open a browser and navigate to the application.
   » The application opens and displays the following message: "Cannot connect to the LAE Server".

8. Start the LAE Server.

9. Navigate to the application.
   » The application is now running.

5.3 Configuring thread pooling

The LAE Web Application Server will need to regularly communicate with the LAE Server in order to deploy and check the status of graphs. If you intend to use a customized thread pool configuration and to use the LAE Web Application Server features, you will need to configure a pool for the LAE Web Application Server to use.

If thread pooling is in place, the LAE Web Application Server will be configured to communicate with the LAE Server and take from a pool named “automation”. When configuring your thread pools you will need to construct an unlimited “automation” pool.

The example pool.config file shipped with LAE contains an example of such a pool.

5.4 Setting up Oracle database with LAE Web Application Server

If you wish to use an Oracle database with your LAE Web Application Server rather than H2, a few additional configuration steps are required.

1. Add the following parameter to the site.prop file: `ls.lae.persistence.databaseType=oracle`. By default, this parameter does not exist, so the system assumes an H2 database.
2. Navigate to directory: *< LAE Web Application-installation-directory>/jetty/resources*.
3. Open the *lavastorm_datasource.xml* file.
4. Change *driverClass* to: *oracle.jdbc.driver.OracleDriver*.
5. Change *jdbcUrl* to: *jdbc:oracle:thin:@<lae-server-hostname>:<oracle-port>:<oracle-database>.*
6. Change *User* and *Password* to the login credentials for your Oracle database.
7. Navigate to directory: *< LAE Web Application-installation -directory>/jetty/lib/ext*.
8. Copy your Oracle *.jar* file into the *ext* directory. It will typically be named *ojdb6.jar*.
9. Create tables in the database by running the following two SQL scripts:
   - *tables_oracle_quartz.sql*
   - *tables_oracle_lavastorm.sql*

5.5 Enabling a custom Web Application context path

The login path that is used by the LAE Server to authenticate against the Web Application is configurable to support different context paths.

If you wish to deploy the Web Application under a context other than root:

1. Add the following property to the LAE Server conf/site.prop file located at *<LAE Web Application Install Directory>*`/conf/site.prop`:
   `ls.brain.webapp.context=<context path>`

   EXAMPLE: If the login path used by the LAE Server to authenticate against the Web Application is `http://172.16.36.65:8081/lavastorm/`, then the site.prop file should be configured as follows:
   `ls.brain.webapp.context=/lavastorm`

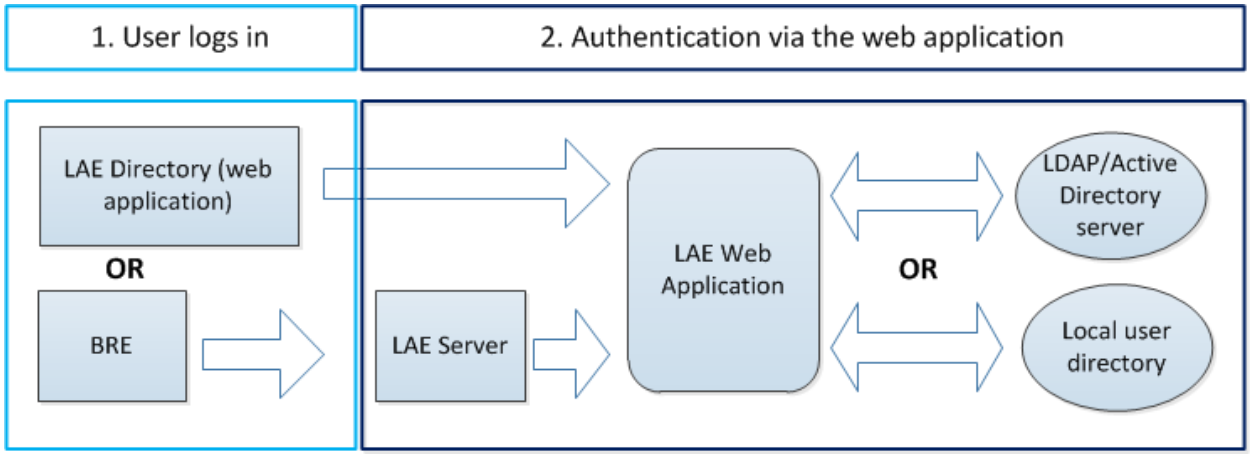
2. Rename the Web Application Server `root.war` file to match your context path.

   EXAMPLE: If the login path used by the LAE Server to authenticate against the Web Application is `http://172.16.36.65:8081/lavastorm/`, as in the example in step 1, then the `root.war` file should be renamed to `lavastorm.war`.

5.6 Overview of the LAE authentication process

LAE users can be either imported from an external LDAP or Active Directory (AD) system, or created manually in the web application by a user with the role of administrator. For information on how to integrate LAE with your LDAP/AD source system, see the LAE Administration Guide.

User authentication is orchestrated by the web application, regardless of whether a user logs in to LAE from BRE, or if a user logs in via the LAE Directory page of the Web Application. For LDAP/AD imported users, authentication occurs via the LDAP/AD server. For manually created users, authentication occurs locally in the Web Application. When a user logs in via BRE, their credentials are transmitted from BRE to the LAE server, which then communicates with the LAE Web Application to perform user authentication through either the configured LDAP/AD server or through the local user directory.



Subsequent communications between the LAE Web Application server and the LAE server(s) is authenticated using host-based authentication, see Trusted host configuration below.

5.7 Trusted host configuration

Host-based authentication works by configuring servers to trust each other. This trust is established by each server generating a public/private key pair for itself, and then sharing the public key with servers that are to be trusted. During host-based authentication, the public key is used to encrypt data in the authentication request. The server that is being authenticated against will ensure that the data was encrypted using its public key and then ensure that the host that is requesting authentication is registered as a trusted host.

Default installation

During installation of the enterprise server software, you choose to either install the LAE Web Application and the LAE Server simultaneously (default) or to install only the LAE Server. If you choose to install only the LAE Server, you enter information about the location of the existing LAE Web Application server, (see Installation). The installer will automatically configure the system such that the LAE Server trusts the LAE Web Application and the LAE Web Application trusts the LAE Server.

In general, the installer should take care of the configuration for you. However, in the event that manual host-based authentication is necessary, please see Server farms and Overview of laeConfig utility

Overview of laeConfig utility

A utility in *$LAEINSTALL/bin*, named *laeConfig*, contains functionality for configuring trusted host authentication. In order to use *laeConfig* you must be in a properly configured LAE environment. This means that you must have executed one of the LAE environment resource scripts:

- For *sh* or *bash*: source .profile.lavastorm

The laeConfig includes a built-in help system that follows the format below:

- *laeConfig help*: general help for the utility
- *laeConfig help auth*: help for commands specific to authentication
- *laeConfig help auth trust*: help for commands specific to trusted host authentication configuration
- *laeConfig help auth trust create*: help exists for each of the specific commands as well

Note that one important argument seen in the laeConfig help is the target. The target specifies what the command is being issued to (in this case either the LAE Server or the LAE Web Application server).

EXAMPLE:

laeConfig --target laeserver://192.168.1.1:8080

If you omit the target argument, it is assumed that the command is being issued to the LAE Server configured in your environment via the previously mentioned environment configuration scripts.

For trusted host authentication configuration, *laeConfig* will be used to issue commands to the LAE Server and/or the LAE Web Application server to establish a trust between the two. The commands executed have options for supplying credentials, which are required for both the LAE Server and the LAE Web Application server.

For the LAE Web Application server, use the credentials configured on the LAE Server. The options for supplying credentials include via the command line, through environment variables, or via prompting the user at the time the command is executed. The subsequent sections demonstrate the latter (prompting the user). For details on the other options, please review the *laeConfig* help sections.

Note: All of the subsequent trusted host configuration sections will assume you are logged on to the LAE Server environment, have executed the previously mentioned configuration scripts (.profile.lavastorm), and have changed directories to the $LAEINSTALL/bin directory.

Note: All of the commands mentioned in the following sections will respond with “OK” when successful.

Server farms

When installing LAE servers as part of a server farm, trusts must also be established between the controller LAE server, that is, the server that is installed with the LAE Web Application, and the other farm servers. This must be done manually using the laeConfig command line utility.

The installer will generate key pairs for all servers; the only additional manual step is to configure the farm LAE servers to trust the controller LAE server. The following example laeConfig command demonstrates how to configure a farm server to trust the controller server. It is assumed that the command is being run from the farm server's environment. This command requires that the LAE controller server is running. When you run the command, it will prompt you for both the target and remote username and password to configure the trust; assuming that you have followed the installation instructions, then at this point the username and password for both are the same, as all user authentication is unified against the single LAE Web Application.

EXAMPLE:

```
laeConfig auth trust create laeserver://<controller server
host/ip>:<controller server port>
```

6. User-hosted auto-update server

Users who do not wish to receive auto-updates to their client machines from the Lavastorm Analytics download server can host the updates internally on their own web server.

Note: When updating, both the LAE Server and desktop BRE client must be updated so that their versions are in sync in order to avoid connection errors.

The only prerequisite is that the user has an existing web server available from the client machines on which to locate the Lavastorm Analytics files. The Jetty server that hosts the LAE Web Application can be used for this purpose.

Note: Windows users must have administrator rights to install updates.

1. Within the section of the web container that is available on the web, create the following directory structure:
   …/lae/<version>/
   An example URL would be:
   http://localhost:8080/downloads/lae/6.1.X/
2. Retrieve the `updates.xml` file and the `.exe` installer from the `downloads.lavastorm.com` update server.
3. Place the `updates.xml` file and the `.exe` installer in the …/lae/6.1.X/ directory.
4. When installing LAE, enter the following with the appropriate path for your web server as the Update URL: http://localhost:8080/downloads/lae/6.1.X/updates.xml

When placing the initial files or a subsequent installer `.exe` in the …/lae/6.1.X/ directory, edit the `updates.xml` file and make sure that the `fileName` and `newVersion` fields in each entry match the file name and version of the .exe. If you rename the .exe and don't update the .xml file, the software will not update.

7. User credentials

Note: After installation, you are assigned the following default user credentials:
User name: admin
Password: welcome

Caution: As a first step after installation, we recommend that you change your password the first time that you sign in to the LAE Directory. A second step, before working with the LAE Directory, is to upload all necessary node libraries.

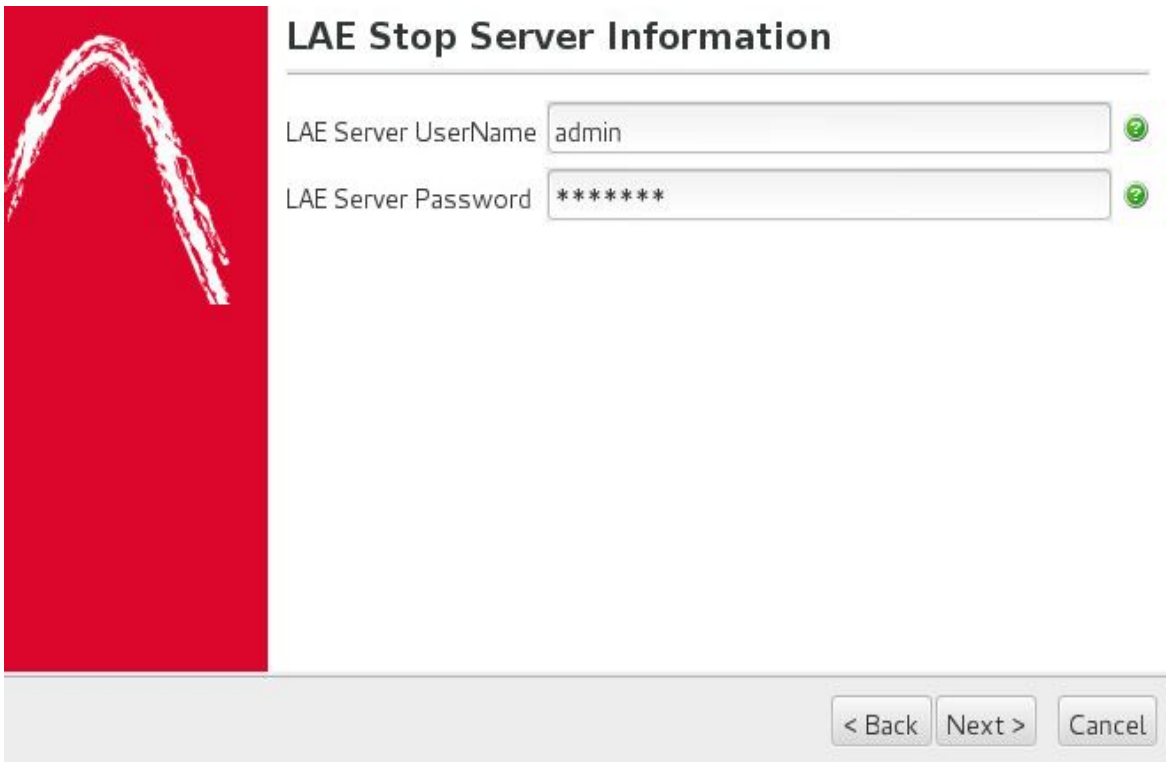
For more information on changing your password and uploading node libraries, please see the LAE Administration Guide.

8. Uninstalling the LAE Server

Caution: Ensure that the administrator user's password is reset to "welcome" in order to successfully run the uninstall process. You can change your password through the LAE Directory, please see the LAE Administration Guide for more information.

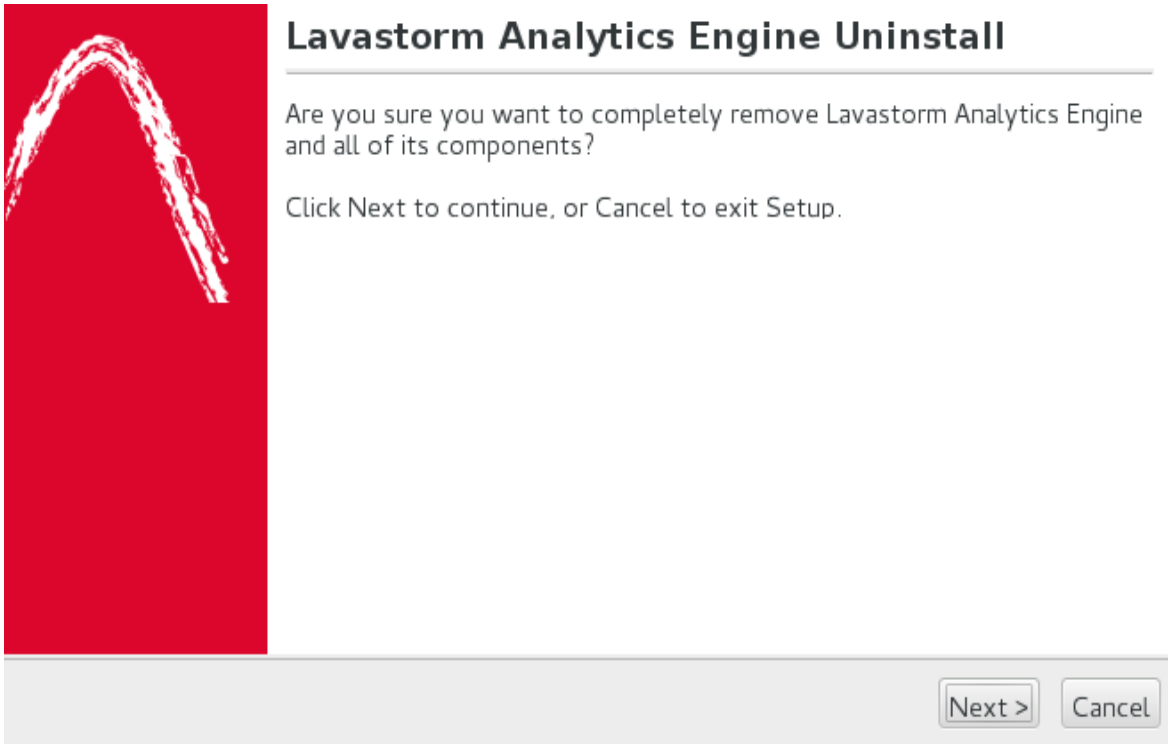
1. Run the uninstaller. To do this, execute the command:
   `<installation-dir>/uninstall`

   » If the LAE Server is running, an **LAE Stop Server Information** window will appear:



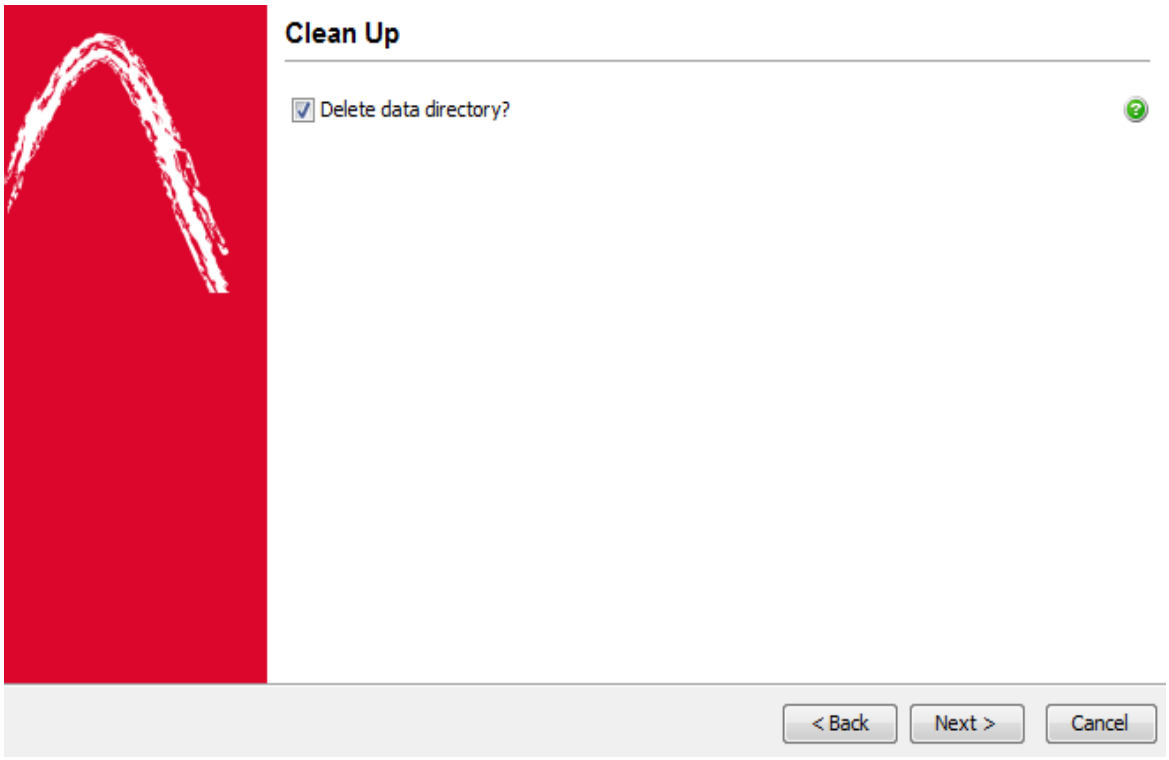
2. Enter the username and password for your LAE Server credentials and click **Next**.

» A **Lavastorm Analytics Engine Uninstall** window opens:



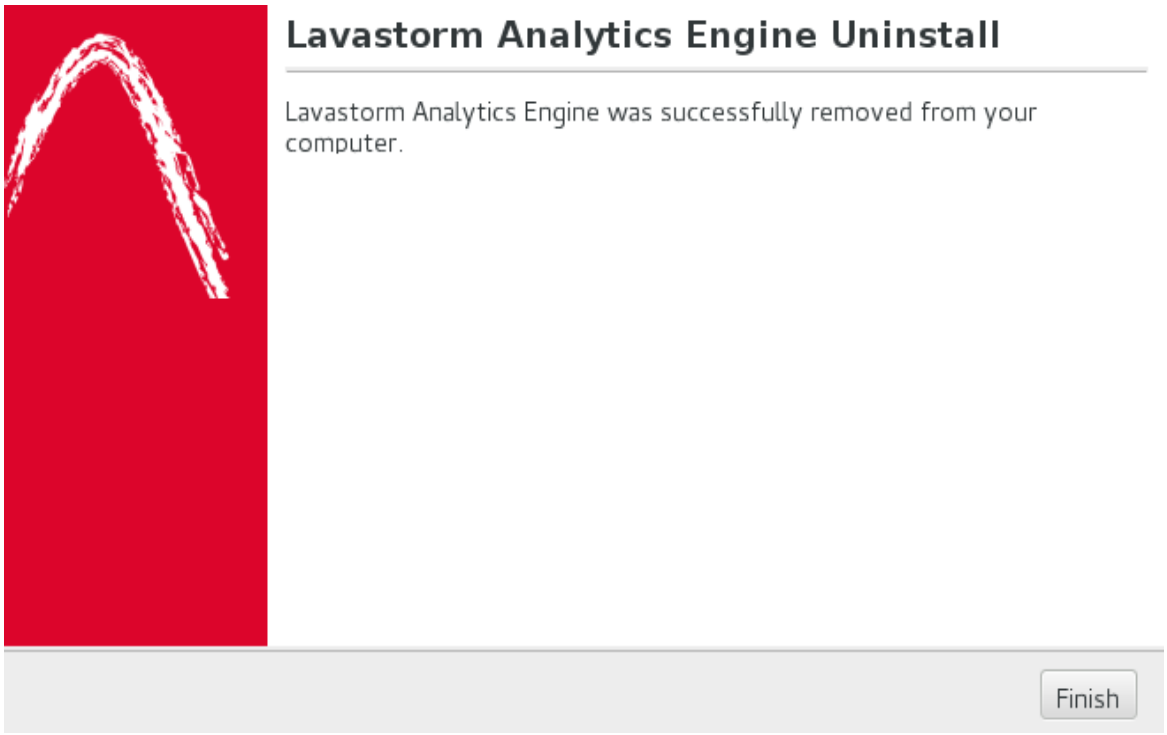
3. Click **Next**.

» A **Clean Up** window opens:



4. Check the box if you would like to delete the data directory as part of the uninstall and click **Next**.

» The uninstaller will then run. When it finishes, you will be presented with one final window:



5. Click **Finish** to complete the uninstallation.

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