

HP ALM

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Installation and Upgrade Guide

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Welcome to this Guide

Welcome to HP Application Lifecycle Management (ALM). ALM empowers IT to manage the core application lifecycle, from requirements through deployment, granting application teams the crucial visibility and collaboration needed for predictable, repeatable, and adaptable delivery of modern applications.

This guide contains the following information:

- Step-by-step instructions for installing and configuring ALM 11.52.
- Step-by-step instructions for upgrading projects from earlier versions of ALM/Quality Center to work in ALM 11.52.
- Generic instructions for installing patches and service packs on ALM 11.52.

How This Guide is Organized

The *HP Application Lifecycle Management Installation and Upgrade Guide* contains the following parts:

| Part | Description |
|---|--|
| "Installation Overview" on page 18 | Presents a numbered-task overview of the whole installation and upgrade process, enabling you to follow the workflow in a simple step-by-step manner. Also provides an overview of the available ALM technology, and contains examples of various ALM system setups. |
| "Patch Installation" on page 28 | Presents generic instructions for installing patches and service packs on ALM 11.52. Detailed instructions are provided in each patch or service pack's <i>Readme</i> . |
| "Installation Prerequisites" on page 38 | Contains prerequisite information for the various supported operating systems (Windows, Linux, and Oracle Solaris), database servers (Oracle and Microsoft SQL), and ALM client machines. |
| "Upgrade Considerations and Prerequisites" on page 70 | Describes important pre-installation considerations and prerequisites for upgrading existing ALM/Quality Center projects to ALM 11.52. |
| "Installation and Configuration" on page 96 | Describes in detail the steps required to install and configure ALM on Microsoft Windows, Linux, and Oracle Solaris platforms. |
| "Project Upgrade" on page 140 | Describes the post-installation steps necessary to upgrade existing ALM/Quality Center projects to ALM 11.52. |

| Part | Description |
|---|---|
| "Installation Management and Customization" on page 160 | Describes the various post-installation tasks and available customization and management options. Also describes how to uninstall ALM. |
| "Appendix" on page 184 | The Troubleshooting appendix contains information on troubleshooting the ALM installation process. The Upgrade Preparation Troubleshooting appendix describes the errors detected while verifying and repairing your projects, and provides information on how to fix these errors before upgrade. |

ALM Help

The ALM Help is an online help system that describes how to use ALM. You can access the ALM Help in the following ways:

- Click **Documentation Library** in the ALM Help menu to open the ALM Help home page. The home page provides quick links to the main help topics.
- Click **Help on this page** in the Help menu to open the ALM Help to the topic that describes the current page.

ALM Help Guides

The ALM Help consists of the following guides and references, available online, in PDF format, or both. PDFs can be read and printed using Adobe Reader, which can be downloaded from the Adobe Web site (<http://www.adobe.com>).

| Reference | Description |
|---------------------------|--|
| Using the ALM Help | Explains how to use the Help and how it is organized. |
| What's New? | Describes the newest features in the latest version of ALM. To access, select Help > What's New . |
| Movies | Short movies that demonstrate the main product features. To access, select Help > Movies . |
| Readme | Provides last-minute news and information about ALM. |

| HP Application Lifecycle Management (ALM) Guides | | Description |
|--|--|--------------------|
| HP ALM User Guide | Explains how to use ALM to organize and execute all phases of the application lifecycle management process. It describes how to specify releases, define requirements, plan tests, run tests, and track defects. | |
| HP ALM Administrator Guide | Explains how to create and maintain projects using Site Administration, and how to customize projects using Project Customization. | |
| HP ALM Lab Management Guide | Explains how to use Lab Management to manage lab resources used for functional and performance testing on remote hosts. | |
| HP ALM Tutorial | A self-paced guide teaching you how to use ALM to manage the application lifecycle management process. | |
| HP ALM Installation and Upgrade Guide | Describes the installation and configuration processes for setting up ALM Server, and the project upgrade process. | |
| HP ALM Business Views Microsoft Excel Add-in User Guide | Explains how to install and use the Business Views Microsoft Excel Add-in to create and configure business view Excel reports. | |
| Business Process Testing User Guide | Explains how to use Business Process Testing to create business process tests. | |

| HP ALM Performance Center Guides | | Description |
|---|--|--------------------|
| HP ALM Performance Center Quick Start | A self-paced guide giving the Performance Center user a high level overview of creating and running performance tests. | |
| HP ALM Performance Center Guide | Explains to the Performance Center user how to create, schedule, run, and monitor performance tests. Explains to the Performance Center administrator how to configure and manage Performance Center projects. | |
| HP ALM Performance Center Installation Guide | Describes the installation processes for setting up Performance Center Servers, Performance Center Hosts and other Performance Center components. | |

| HP ALM Best Practices Guides | Description |
|--|--|
| HP ALM Agile Testing Best Practices Guide | Provides best practices for implementing agile testing principles. |
| HP ALM Business Process Models Best Practices Guide | Provides best practices for working with the Business Models module. |
| HP ALM Database Best Practices Guide | Provides best practices for deploying ALM on database servers. |
| HP ALM Entities Sharing Best Practices Guide | Provides best practices for sharing entities. |
| HP ALM Project Planning and Tracking Best Practices Guide | Provides best practices for managing and tracking releases. |
| HP ALM Project Topology Best Practices Guide | Provides best practices for structuring projects. |
| HP ALM Upgrade Best Practices Guide | Provides methodologies for preparing and planning your ALM upgrade. |
| HP ALM Versioning and Baselining Best Practices Guide | Provides best practices for implementing version control and for creating baselines. |
| HP ALM Workflow Best Practices Guide | Provides best practices for implementing workflows. |

| HP ALM Performance Center Best Practices Guides | | Description |
|--|--|-------------|
| HP Performance Centers of Excellence Best Practices | Provides best practices for successfully building and operating Performance Centers of Excellence. | |
| HP Performance Monitoring Best Practices | Provides best practices for monitoring the performance of applications under test. | |

| HP ALM API References | | Description |
|--|---|-------------|
| HP ALM Project Database Reference | Provides a complete online reference for the project database tables and fields. | |
| HP ALM Open Test Architecture API Reference | Provides a complete online reference for the ALM COM-based API. You can use the ALM open test architecture to integrate your own configuration management, defect tracking, and home-grown testing tools with an ALM project. | |

| HP ALM API References | Description |
|---|--|
| HP ALM Site Administration API Reference | Provides a complete online reference for the Site Administration COM-based API. You can use the Site Administration API to enable your application to organize, manage, and maintain ALM users, projects, domains, connections, and site configuration parameters. |
| HP ALM REST API Reference (Technology Preview) | Provides an online reference for the ALM REST-based API. You can use the REST API to access and work with ALM data. |
| HP ALM COM Custom Test Type Developer Guide | Provides a complete online guide for creating your own testing tool and integrating it into the ALM environment using native COM development tools. |
| HP ALM .NET Custom Test Type Developer Guide | Provides a complete online guide for creating your own testing tool and integrating it into the ALM environment using a combination of DCOM and .NET classes. |

Topic Types

The content in the above mentioned ALM guides is organized by topics. Three main topic types are in use: **Concepts**, **Tasks**, and **Reference**.

| Topic Type | Description | Usage |
|-----------------|---|--|
| Concepts | Background, descriptive, or conceptual information. | Learn general information about what a feature does. |

| Topic Type | Description | Usage |
|--|---|---|
| Tasks | <p>Instructional Tasks. Step-by-step guidance to help you work with the application and accomplish your goals.</p> <p>Task steps can be with or without numbering:</p> <ul style="list-style-type: none"> • Numbered steps. Tasks that are performed by following each step in consecutive order. • Non-numbered steps. A list of self-contained operations that you can perform in any order. | <ul style="list-style-type: none"> • Learn about the overall workflow of a task. • Follow the steps listed in a numbered task to complete a task. • Perform independent operations by completing steps in a non-numbered task. |
| | <p>Use-case Scenario Tasks. Examples of how to perform a task for a specific situation.</p> | Learn how a task could be performed in a realistic scenario. |
| Reference | <p>General Reference. Detailed lists and explanations of reference-oriented material.</p> | Look up a specific piece of reference information relevant to a particular context. |
| | <p>User Interface Reference. Specialized reference topics that describe a particular user interface in detail. Selecting Help on this page from the Help menu in the product generally opens the user interface topics.</p> | Look up specific information about what to enter or how to use one or more specific user interface elements, such as a window, dialog box, or wizard. |
| Troubleshooting and Limitations | <p>Troubleshooting and Limitations. Specialized reference topics that describe commonly encountered problems and their solutions, and list limitations of a feature or product area.</p> | Increase your awareness of important issues before working with a feature, or if you encounter usability problems in the software. |

Additional Online Resources

The following additional online resources are available from the Help menu:

| Resource | Description |
|---|--|
| Troubleshooting & Knowledge Base | Opens the Troubleshooting page on the HP Software Support Web site where you can search the Self-solve knowledge base. Choose Help > Troubleshooting & Knowledge Base . The URL for this Web site is http://h20230.www2.hp.com/troubleshooting.jsp . |

| Resource | Description |
|-----------------------------|--|
| HP Software Support | <p>Opens the HP Software Support Web site. This site enables you to browse the Self-solve knowledge base. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose Help > HP Software Support. The URL for this Web site is www.hp.com/go/hpssoftwaresupport.</p> <ul style="list-style-type: none"> • Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract. • To find more information about access levels, go to: http://h20230.www2.hp.com/new_access_levels.jsp • To register for an HP Passport user ID, go to: http://h20229.www2.hp.com/passport-registration.html |
| HP Software Web site | <p>Opens the HP Software Web site. This site provides you with the most up-to-date information on HP Software products. This includes new software releases, seminars and trade shows, customer support, and more. Choose Help > HP Software Web site. The URL for this Web site is www.hp.com/go/software.</p> |
| Add-ins | <p>Opens the Add-ins page, which offers integration and synchronization solutions with HP and third-party tools.</p> |
| Tools | <p>Opens the ALM Tools add-ins page, which offers integration and synchronization solutions with HP and third-party tools that are installed with ALM on the ALM Server.</p> |

ALM Extension Guides

Extensions provide added functionality to HP ALM. If you have a license for an ALM extension, you can utilize the added functionality by enabling the extension on a per project basis. For details on enabling extensions, refer to the *HP Application Lifecycle Management Administrator Guide*.

To view the list of extensions available with ALM11.52, or to download documentation for ALM extensions, visit the HP ALM Add-ins page, available from the HP Application Lifecycle Management Add-ins page (**Help > Add-ins**).

Part 1: Installation Overview

Chapter 1: About ALM

This chapter provides information about the available ALM editions, and ALM technology and architecture.

This chapter includes

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ALM Editions

HP Application Lifecycle Management (ALM) is also available in several editions which provide subsets of ALM functionality—HP ALM Essentials Edition, HP Quality Center Enterprise Edition, and HP ALM Performance Center Edition.

| Edition | Description |
|---|---|
| HP ALM Edition | A unified platform for managing and automating processes, activities, and assets for building, testing, delivering, and maintaining applications. It includes modules for requirement, test, defect, and development management, and overall release and project planning. HP ALM helps organizations drive consistent processes, shared best-practices, and asset sharing across projects. |
| HP ALM Essentials Edition | Provides a subset of HP ALM product functionality, and is designed to help smaller teams get up and running quickly. It provides core functionality for requirements management, test management, and defect management. |
| HP Quality Center Enterprise Edition | Resides on the same unified platform as HP ALM. It delivers core functionality for quality management. It supports building a quality center of excellence through tight integrations with HP Unified Functional Testing, HP Business Process Testing, and HP Sprinter. |
| HP ALM Performance Center Edition | Functionality for the complete management, scheduling, running, and monitoring of performance test scripts. It resides on the same platform as HP ALM and integrates directly with HP ALM and HP LoadRunner. |

For detailed information about the functionality available for each edition, refer to the *HP Application Lifecycle Management User Guide*.

About ALM Technology and Architecture

ALM is an enterprise-wide application that is based on Java 2 Enterprise Edition (J2EE) technology. J2EE technology provides a component-based approach to the design, development, assembly, and deployment of enterprise applications.

This section includes:

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| Example of Clustered ALM Configuration | 23 |
| Example of Integration with Application Lifecycle Intelligence | 24 |

Understanding the ALM Components

An ALM system contains the following components:

- **HP ALM client components.** When you open Application Lifecycle Management or Site Administration on your client machine, client components are downloaded to the machine. ALM client components interact with each other using .NET and COM technologies. The client communicates with the server over HTTP/S.

- **ALM server/Application server.** Client requests are dispatched by servlets to the deployed server. ALM comes with a built-in application server called the ALM Application Server.

The deployed application contains Application Lifecycle Management, Site Administration, and associated files which are packaged into a Web Application Archive (WAR) file. Client requests from ALM are dispatched to the deployed application.

The Java Database Connectivity (JDBC) interface is used to communicate between the application server and database server(s).

The server can run on a Windows or on an Linux/Oracle Solaris platform.

- **Database server(s).** The database server stores two types of schemas:
 - **Site Administration schema.** Stores information related to the ALM system, such as domains, users, and site parameters. A row exists in this schema for each project you create.

Irrespective of how you configure your system, there is always only one Site Administration schema.

- **Project schemas.** Stores project information, such as entity data and user data. A separate schema exists for every project you create.

By default, the project schemas are created on the same database server as the Site Administration schema. These default project schemas are useful for smaller setups. However, if you are working with a large number of projects or with a small number of huge projects, it may be advisable to define additional database servers solely for storing project schemas. You define additional servers in the Site Administration DB Servers tab. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

The schemas can reside on an Oracle or on a Microsoft SQL server. For detailed guidelines on deploying on the database server, refer to the *HP ALM Database Best Practices Guide*.

Note: To improve system performance, it is advisable that the ALM server and the Database server be installed on separate machines and be connected over LAN.

- **Project repository.** Stores all files to be used by all the projects in the system. For example,

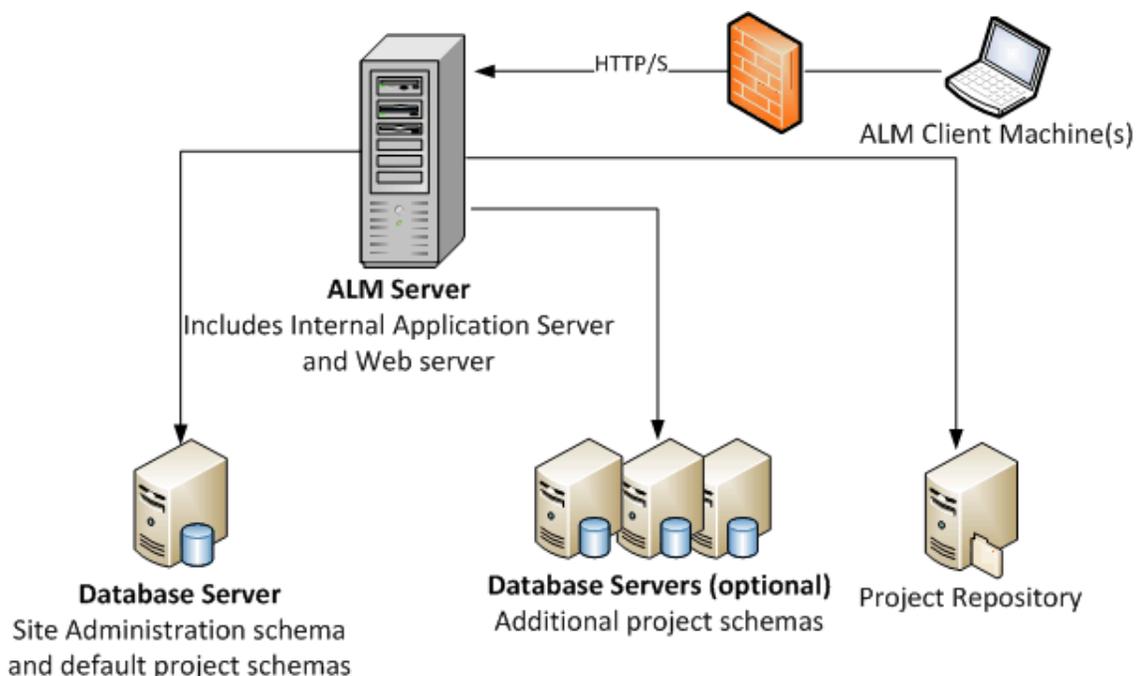
.xml files, templates, and attachments. By default the repository is located on the same machine as the application server, which is useful for smaller setups. For larger organizations however, or when working in a clustered environment, it is advisable to install the repository on a dedicated machine.

When working in a clustered environment, the repository must be accessible by all nodes.

- **Load balancer.** When working with a load balancer, client requests are transmitted to the load balancer and distributed according to server availability within the cluster.
- **Tanuki wrapper.** A Java service wrapper that allows ALM to be installed and controlled like a native Windows Service. It also includes advanced fault detection software to monitor ALM.

Example of Basic ALM Configuration

The following diagram illustrates a basic ALM system configuration:



Example of Clustered ALM Configuration

Within the J2EE framework, ALM supports clustering. A cluster is a group of application servers that run as if they were a single entity. Each application server in a cluster is referred to as a node.

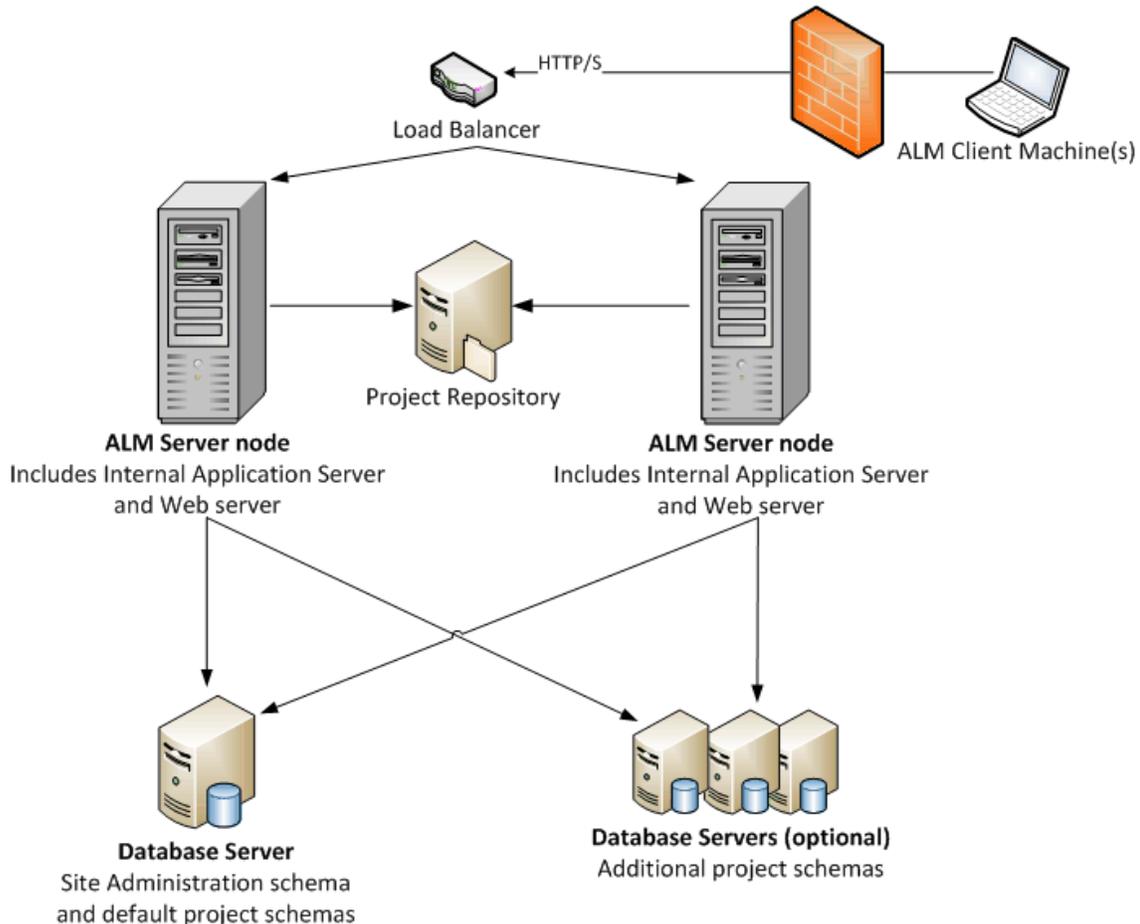
Clusters provide mission-critical services to ensure maximum scalability. The load balancing technique within the cluster is used to distribute client requests across multiple application servers, making it easy to scale to an infinite number of users.

Take the following into consideration when setting up a clustered environment:

- All nodes must have access to the database server on which the Site Administration database schema resides.

- All nodes must have access to all database servers.
- All nodes must have access to the repository. By default the repository is located on the first node in the cluster, and therefore all other nodes must have access to the first node. If you install the repository on a dedicated machine, each node must have access to that machine.

The following diagram illustrates a clustered ALM system configuration:



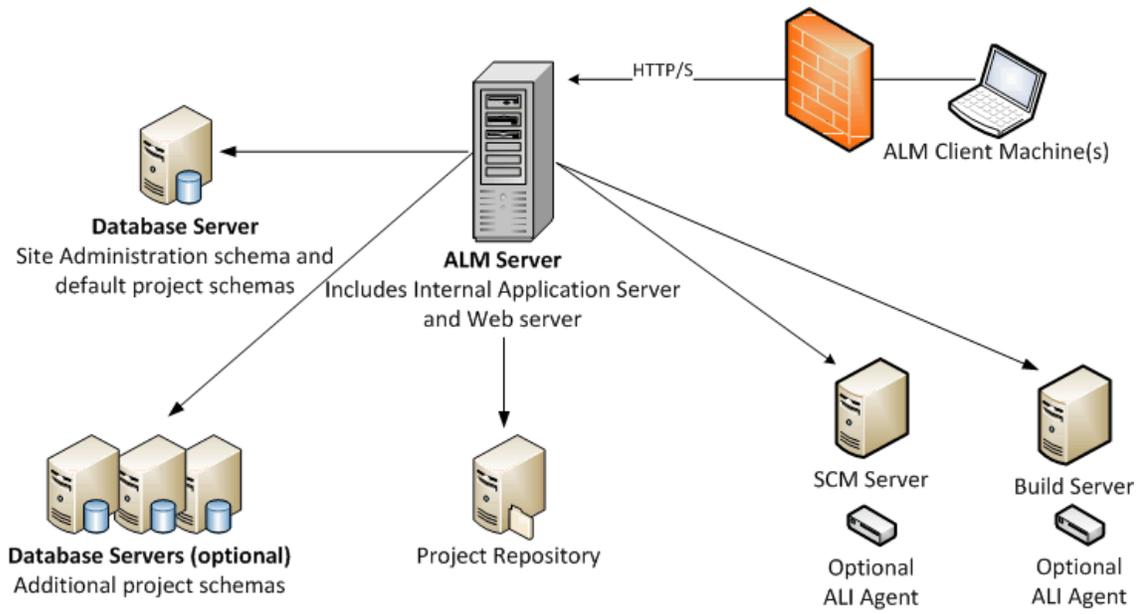
Example of Integration with Application Lifecycle Intelligence

It is possible to integrate ALM with HP Application Lifecycle Intelligence (ALI). ALI is a set of capabilities, reports, and metrics providing complete traceability, enabling stakeholders to make informed decisions. For more information, refer to the *HP Application Lifecycle Intelligence User Guide*.

You integrate ALM with HP Application Lifecycle Intelligence (ALI) using the HP Application Lifecycle Intelligence add-in, available from the HP Application Lifecycle Management Add-ins page (Help > Add-ins).

ALI adds a Source Control Management (SCM) server and a Build server to the system. The SCM and Build servers can reside anywhere so long as ALM has access to them. The SCM and Build servers can work with or without an ALI agent.

The following diagram illustrates an ALM system integrated with ALI:



Chapter 2: How to Install and Upgrade

This chapter presents an overview of the installation and upgrade processes described in this guide.

Note: For patch/service pack installations, refer to ["Installing ALM Patches and Service Packs"](#) on page 30.

Installing and upgrading ALM consists of the following steps:

1. Check that you meet all relevant installation prerequisites.

Before beginning the actual installation procedure, check that your ALM server machine's operating system, your database server, and your client machines, all meet the prerequisite criteria for working with ALM 11.52. For details, see ["Installation Prerequisites"](#) on page 38.

2. (Upgrading) Check that you meet all relevant upgrade prerequisites.

If you are upgrading from an earlier version of ALM/Quality Center, it is important to carefully consider how to configure your new ALM system. This guide provides a suggested system configuration for upgrading projects from your existing system. Follow the suggested configuration as much as possible.

Before beginning the installation, verify and repair all projects in the existing system, and then back up the projects, the database, and the repository. In addition, depending on your new system's configuration, there may be additional prerequisite steps relating to project upgrade.

If you plan to upgrade a copy of the Site Administration database schema, consider beforehand if you have the Confidential Data Passphrase that was used in the existing installation (only relevant for ALM11.00), and how to manage changes to the existing schema (if any).

For more information, see ["Upgrade Considerations and Prerequisites"](#) on page 70.

3. Install ALM 11.52.

Install ALM 11.52 on your ALM server machine. For details, see ["Installation and Configuration"](#) on page 96.

4. (Upgrading) Upgrade projects from your existing ALM system.

The steps you perform to upgrade your existing projects to ALM 11.52 may vary depending on your system configuration. If you are upgrading from Quality Center 10.00, note the project repository migration options. For details, see ["Project Upgrade"](#) on page 140.

Part 2: Patch Installation

Chapter 3: Installing ALM Patches and Service Packs

This chapter provides general instructions for installing and uninstalling ALM patches and service packs on ALM 11.50 and above.

Note:

- **ALM 11.52 cannot be installed over ALM 11.50 with Patch 01 installed.** Before installing ALM 11.52, you must first uninstall Patch 01 from ALM 11.50. For more information on how to uninstall a patch, see "Uninstalling the Patch/Service Pack" on page 36.
- **Patches/service packs with changes to project database schemas**
Patches/service packs that include changes to project database schemas upgrade ALM to a new minor-minor version (for example ALM 11.51 to ALM 11.52.) When installing such a patch/service pack, projects whose major and minor version are identical to the version installed on the server, yet whose minor-minor version is less than that installed on the server, are automatically upgraded to the new minor-minor version. ALM automatically upgrades projects to the new minor-minor version. For more information about the HP version numbering scheme and automatic upgrade of projects to a new minor-minor version, refer to the *HP Application Lifecycle Management Administrator Guide*. To determine if the patch/service pack that you are installing changes project database schemas, refer to the *Release Notes* or to the patch/service pack *Readme*.

Caution: Uninstalling patches/service packs with changes to project database schemas is not supported. Before installing a patch/service pack with changes to project database schemas, back up all projects.

ALM 11.52 includes database schema changes only to the LAB_PROJECT. Before installing ALM11.52, back up the LAB_PROJECT. Other projects are not affected by these changes, and do not need to be backed up.

For specific instructions for the patch/service pack that you are installing, refer to the patch/service pack *Readme*.

If you are installing ALM 11.52 as a patch, refer to the *Release Notes* whenever the term patch/service pack *Readme* is used in this chapter.

This section includes:

| | |
|--|----|
| Pre-Installation Checks and Considerations | 31 |
| Clustering Configuration | 34 |
| Installing the Patch/Service Pack | 34 |
| Uninstalling the Patch/Service Pack | 36 |

Pre-Installation Checks and Considerations

Verify that the patch/service pack that you are installing is compatible with your version of ALM.

- You can verify the installed version of HP ALM by going to the **versions.xml** file that is located under the **<ALM Deployment folder>\conf\ directory**. The default ALM Deployment folder is:
 - Windows: **C:\ProgramData\HP\ALM**
 - Linux/Oracle Solaris: **/var/opt/HP/HP_ALM_Server**
- Refer to the patch/service pack *Readme* for prerequisite and compatibility information.

This section includes:

| | |
|----------------------------|----|
| System Requirements | 31 |
| Required Permissions | 31 |

System Requirements

Verify that your ALM server machine meets the ALM system configurations. For the recommended and supported system configurations for your ALM server machine, refer to the patch/service pack *Readme*.

Note: The supported environment information in the patch/service pack *Readme* is accurate for that patch/service pack release, but there may be subsequent updates. For the most up-to-date supported environments, refer to the HP Software Web site using the following URL: http://support.openview.hp.com/sc/support_matrices.jsp. (Requires HP Passport sign-in credentials.)

Required Permissions

Verify that you have the required permissions to install ALM on a server machine.

This section includes:

| | |
|---|----|
| Windows Operating System | 32 |
| Linux/Oracle Solaris Operating System | 32 |

Windows Operating System

To install an ALM patch/service pack on the Windows operating system:

- You must be logged on as a local or domain user with administrator permissions. Your user name cannot include a pound sign (#) or accented characters (such as, ä, ç, ñ).
- You must have the following file system and registry key permissions:
 - Full read permissions to all the files and directories under the directory in which ALM is installed. The default location for installation files is **C:\Program Files\HP\HP Application Lifecycle Management**. The patch/service pack automatically identifies the correct installation directory path on your server machine. Do not change this path.
 - Full read, write, and execute permissions to the directory on which ALM is deployed. The patch/service pack automatically identifies the deployment directory that was specified during the initial installation of ALM. The default path is **C:\ProgramData\HP\ALM**.
 - Full read and write permissions to the repository directory which contains the **sa** and **qc** directories. The repository path is specified by the user during the first installation of ALM. The patch/service pack automatically identifies the correct repository path on your server machine. By default, it is located under the ALM deployment directory, that is **C:\ProgramData\HP\ALM\repository**. For more information on the repository, refer to the *HP Application Lifecycle Management Administrator Guide*.
 - Full read permissions to the system root (%systemroot%) directory.
 - Full read and write permissions to the installation and configuration log files directory. Installation and configuration log files are written to **C:\ProgramData\HP\ALM\log**.
 - Full read and write permissions to all the keys under **HKEY_LOCAL_MACHINE\SOFTWARE\Mercury Interactive**.

Note: The **ProgramData** folder is hidden by default. Files and folders must be visible to view permissions. Show the hidden files by performing the relevant steps for your operating system.

Linux/Oracle Solaris Operating System

To install an ALM patch/service pack on Linux/Oracle Solaris operating systems:

- By default, the ALM installer for Linux/Oracle Solaris platforms mandates that the current user be the root user. This is because the ALM installer is based on operating system native packages (.**lpp**, .**sparc**, .**rpm**), which all require root users.
- If the repository is located on a remote machine, the ALM/Quality Center application server user account must have network access to the remote repository.
- You must have the following file system permissions:
 - Full read and write permissions for all the files and directories under the directory on which ALM is installed. The patch/service pack automatically identifies the installation path. The installation files are used for configuring the server. By default, the ALM installation files are written to: **/var/opt/HP/HP_ALM_Server**.

- Full read and write permissions to the directory on which ALM is deployed. The patch/service pack automatically identifies the deployment directory specified by the user during the initial installation of ALM. By default, ALM is deployed on: **/var/opt/HP/ALM**.
- Full read and write permissions to the repository directory which contains the **sa** and **qc** directories. The patch/service pack automatically identifies the repository path specified by the user during the initial installation. The default location is: **/var/opt/HP/ALM/repository**. For more information on the repository, refer to the *HP Application Lifecycle Management Administrator Guide*.
- Full read and write permissions to the installation and configuration log files directory. Installation and configuration log files are written to: **/var/opt/HP/ALM/log**.
- If the file repository is located on a remote machine:
 - On the file server machine, share the file repository directory so that the user running the installation is the owner of the files.
 - **Clustering**. On the ALM machine, or on each cluster node, create a mount directory that points to the file repository directory.

Installing ALM for Non-Root Users

There are cases in which the ALM Admin user (**ALM_Admin**) installing ALM is not granted root privileges.

If you are unable to work with ALM using the root user because of security concerns, speak to your system administrator about preparing a non-root user with sudo permissions to install and run ALM.

Using a non-root user with sudo permissions to install and run ALM:

Note: The sudo package is included by default on some systems. These instructions assume that sudo is installed on the target machine. If sudo is not included by default, it can be downloaded and installed from <http://www.gratisoft.us/sudo/download.html>.

Role-Based Access Control (RBAC) can be used for Solaris in a way equivalent to **sudo**. More information regarding RBAC can be found at http://fengnet.com/book/Solaris_admin/ch11lev1sec4.html.

1. Create an **ALM_Admin** user.
2. Edit the **sudoers** file to grant sudo permissions to the **ALM_Admin** user within the ALM installation directory. This allows the **ALM_Admin** user to run the installation file with root privileges.

Example

If the administrator decides that the ALM installation directory is **/user/Install/ALM**, the following line should be added to the sudoers file: **qcadmin**

```
ALL=NOPASSWD:/user/Install/ALM
```

3. Check if the **/var/opt/HP** folder exists. If it does not exist, create it.

4. Give the **ALM_Admin** user Read/Write/Execute permissions to the **/var/opt/HP** folder.
5. Move the ALM installation file to the installation directory, **/user/Install/ALM**.
6. Use the **ALM_Admin** user to run the installation script and start ALM.

Clustering Configuration

When deploying ALM over a cluster, you must install the patch/service pack on each of the cluster nodes.

Install the same version of the patch/service pack on all nodes, and insert the same repository and database details that you used on the first node.

You must use the same confidential data passphrase on all nodes.

It is important that you enter the repository path using the exact same characters on all nodes. For example, you cannot have the path on the first server node defined as **C:\alm\repository** and on additional nodes defined as **\\server1\c\$\alm\repository**. Rather the **\\server1\c\$\alm\repository** path must appear on every node.

Installing the Patch/Service Pack

Before installing the patch/service pack:

1. To prevent loss of files that were added or changed:
 - All files, except for files with a **.class** extension, that were added or changed under **<ALM Deployment folder>\webapps\qcbn** should be copied to **<ALM Deployment folder>\application\qcbn.war**, including the folder tree hierarchy.

Note: Do not copy over **.class** files from the **qcbn** as these files use a different codebase from the patch/service pack.

- Any file added or changed under **<ALM File repository folder>\sa** should be copied to **<ALM File repository folder>\customerData**, including the folder tree hierarchy.

After installing the patch and updating the deployment with the changes, the deployment process copies your files back to **qcbn** and the **sa** file repository.

2. Make sure that all users are logged out of ALM. You can check active connections from Site Administration, in the **Site Connections** tab.
3. Check the *Readme* or *Release Notes* for the patch/service pack to see if it contains changes to project database schemas. If so:
 - a. **Back up all ALM projects.**

Note: ALM 11.52 includes database schema changes only to the **LAB_PROJECT**. Before installing ALM 11.52, back up the **LAB_PROJECT**. Other projects are not affected by these changes, and do not need to be backed up.

- b. Set project update priorities (optional). For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.
4. Stop the ALM server.
 - **Windows Operating System.** In the system tray, right-click the ALM icon  and choose **Stop Application Lifecycle Management**. Close the tray icon utility by right-clicking the ALM icon and selecting **Exit**.

Note: There may be multiple system tray icon processes running on the ALM server machine. After stopping the server, ensure that all system tray icon processes are terminated before installation. System tray processes can also be terminated in Windows Task Manager.

- **Linux/Solaris.** Navigate to the `/var/opt/HP/ALM/wrapper` directory, and run the following command: **HPALM stop**.

To install the patch/service pack:

On your ALM server machine, run the appropriate installation file for your server's operating system and follow the installation and deployment instructions.

| Platform | To Install |
|----------------|---|
| Windows | <p>It is recommended that you use the executable (EXE) file for installing the patch/service pack:</p> <ul style="list-style-type: none"> • Run the latest patch/service pack EXE file. Alternatively you can install the patch/service pack from the command line. • The MSP file is mandatory for proper execution of the ALM EXE installer. The file should be kept in place. <p>Non-interactive Installation</p> <p>To install the patch/service pack in non-interactive mode, run the MSP file instead of the EXE file:</p> <ul style="list-style-type: none"> • Open the command window as administrator and type the following command (where <filename> represents the name of the EXE file for the patch/service pack, with the <code>.exe</code> extension removed): <pre>msiexec /p <filename>.msp REINSTALL=ALL REINSTALLMODE=emus</pre> <p>Example:</p> <p>For patch/service pack Example_Patch.exe, run the following command:</p> <pre>msiexec /p Example_Patch.msp REINSTALL=ALL REINSTALLMODE=emus</pre> |

| Platform | To Install |
|---------------|---|
| Linux/Solaris | <p>In the command prompt, type: <code>./patch_installer.sh</code></p> <p>Note: If you are not the root user but have sudo privileges, run the file using the prefix sudo: <code>sudo ./patch_installer.sh</code></p> |

Patch/service pack installation automatically identifies the installation, deployment, and repository paths from the properties file that was created during the first installation of ALM:

<ALM deployment path>HP/ALM/conf/qcConfigFile.properties

If the installation fails, you receive an error message with the cause of the failure and the path to the log file.

Note: If the patch/service pack changes the database schema, the HP ALM Server Deployment Wizard prompts you to confirm that you have backed up all projects before proceeding with the deployment. You are not able to select **Next** until you confirm that you have backed up your projects.

After the patch/service pack is installed, the next time users log in to ALM, new files are downloaded and installed on the client machines. If file downloads are prohibited through your browser, you can install these files through the HP ALM Client MSI Generator add-in, available on the HP ALM Add-ins page. For more information on installing the add-in, see "Installing HP ALM Add-ins" on page 164, or contact HP Customer Support (<http://support.openview.hp.com/>) for assistance.

Uninstalling the Patch/Service Pack

This section describes how to uninstall the patch/service pack from your ALM server machine.

Caution: Uninstalling patches/service packs with changes to project database schemas is not supported.

Note:

- Before uninstalling the patch/service pack, make sure that all users log out of ALM. You can check active connections from Site Administration, in the **Site Connections** tab.
- **Clustering.** If ALM is deployed over a cluster, make sure you stop all nodes of the cluster before uninstalling the patch/service pack, and that you uninstall the patch/service pack from each of the cluster nodes.

| | |
|---|----|
| Windows Operating System | 37 |
| Linux/Oracle Solaris Operating System | 37 |

Windows Operating System

Note: You should have the ALM installation source files for your environment available, either on the installation DVD or on the server machine.

Uninstall the patch/service pack from the Control Panel. To display the installed patches/service pack, select the **View Installed Updates** checkbox.

Linux/Oracle Solaris Operating System

Note: To uninstall a patch/service pack on a Linux/Oracle Solaris operating system, you must first remove higher patch/service pack levels. For example, you must remove Patch02 before removing Patch01.

Run **patch_uninstall.sh**, located in **var/opt/HP/iHP/HP_ALM_Server/<version number>/patches/PATCH_<xxxx>** (where 'xxxx' represents the patch level).

Example:

To uninstall patch 3, run the following command:

```
./var/opt/HP/iHP/HP_ALM_Server/11.50/patches/PATCH_0003/patch_uninstall.sh
```

Part 3: Installation Prerequisites

Chapter 4: Pre-Installation Checklist

Review and verify the following checklist before installing ALM. This checklist outlines the information that you must supply during the installation process. For detailed prerequisite information, see the chapters in this part that are relevant to your installation.

| Check | Information Required |
|-------------------------------|---|
| Installation Machine | <ul style="list-style-type: none"> Operating system version CPU type Free disk space Free memory <p>For the list of supported system environments, refer to: http://www.hp.com/go/TDQC_SysReq.</p> |
| Setup Paths | <ul style="list-style-type: none"> Installation path Deployment path <p>Note:</p> <ul style="list-style-type: none"> You can accept the default paths offered by the Installation and Configuration wizards, or enter alternative paths. The installation path must not include folders with accented characters (for example, ä, ç, ñ). You must have full permissions on the installation and deployment directories. |
| License Key | License file |
| Cluster Description | <ul style="list-style-type: none"> Is clustering used? Cluster hosts |
| Encryption Passphrases | <ul style="list-style-type: none"> Communication security passphrase Confidential data passphrase <p>Note: In a cluster, use the same passphrase on all nodes.</p> |
| Application Server | The port number |
| Mail Server | <ul style="list-style-type: none"> Server type Server host Server port |

| Check | Information Required |
|---|--|
| Demo Project | Do you require the Web-based demo application for work with the <i>HP Application Lifecycle Management Tutorial</i> ? |
| Database Server | <ul style="list-style-type: none"> • Database type • Database version • Database server name • Database administrator user name • Database administrator user password • Database port • Database SID (Oracle only) • Default tablespace (Oracle only) • Temp tablespace (Oracle only) |
| Site Administration | <ul style="list-style-type: none"> • Site administrator user name • Site administrator password |
| Existing ALM/Quality Center Installation | <p>If there is an existing Site Administration schema, provide the following information for the existing version:</p> <ul style="list-style-type: none"> • ALM/Quality Center version • ALM/Quality Center host • Confidential data passphrase • Database server name • Database administrator user name • Database administrator password • Site Administration database schema name • Site Administration database schema password • Repository folder location • Site administrator user name • Site administrator password |
| Repository | Repository folder location |

Chapter 5: Prerequisites: Windows Operating Systems

This chapter provides an overview of the prerequisites for installing ALM on Windows-based operating systems.

This chapter includes:

| | |
|--------------------------------------|----|
| System Configurations: Windows | 43 |
| Required Permissions: Windows | 43 |
| Clustering: Windows | 44 |
| ALM Repository Path: Windows | 44 |

System Configurations: Windows

Verify that your server machine meets the ALM system configurations. For the recommended and supported system configurations for your ALM server machine, refer to the *Readme*.

Note: The supported environment information in the *Readme* is accurate for the ALM 11.52 release, but there may be subsequent updates. For the most up-to-date supported environments, refer to the HP Software Web site using the following URL:
http://www.hp.com/go/TDQC_SysReq

ALM can be deployed on a VMware ESX/ESXi server according to the VMware guest operating system compatibility matrix.

Required Permissions: Windows

Verify that you have the required permissions to install ALM on a server machine.

Note: Some permissions require access to the **ProgramData** folder. This folder is hidden by default. To show hidden files and folders, perform the relevant steps for your operating system.

- If you are upgrading from a previous version of ALM/Quality Center with a remote repository, the ALM/Quality Center application server user account must have network access to the remote repository. For more information, contact your network administrator.
- You must be logged on as a local or domain user with administrator permissions. Your user name cannot include a pound sign (#) or accented characters (such as, ä, ç, ñ).
- You must disable User Account Control (UAC) during the ALM installation and configuration.
- You must have the following file system and registry key permissions:
 - Full read permissions to all the files and directories under the directory in which ALM is installed. The installation directory path is specified by the user during installation. By default, ALM writes the installation files to: **C:\Program Files\HP\HP Application Lifecycle Management**.
 - Full read, write, and execute permissions to the directory on which ALM is deployed. The deployment directory is specified by the user during installation. By default, ALM is deployed in **C:\ProgramData\HP\ALM**.
 - Full read and write permissions to the repository directory, which contains the **sa** and **qc** directories. The repository path is specified by the user during installation. By default, it is located under the ALM deployment directory. For more information on the repository, refer to the *HP Application Lifecycle Management Administrator Guide*.
 - Full read permissions to the system root (%systemroot%) directory. If you do not have these permissions, you can still install ALM, but you cannot install any patches.
 - Full read and write permissions to the installation and configuration log files directory. Installation and configuration log files are written to **C:\ProgramData\HP\ALM\log**.

- Full read and write permissions to all the keys under **HKEY_LOCAL_MACHINE\SOFTWARE\Mercury Interactive**.

Clustering: Windows

Check with your system administrator whether you are installing ALM on a single node or as a cluster.

If you are installing ALM on cluster nodes, verify which machine to use as the first node to start the installation and the number of machines you should use. This depends on the number of users and availability considerations.

When installing on additional nodes:

- **ALM version.** You must install the same version of ALM on all nodes.
- **Site Administration schema.** All nodes must point to the Site Administration schema.
- **Database details.** Configure all nodes with the same database information.
- **Confidential Data Passphrase.** You must use the same Confidential Data Passphrase on all nodes.
- **Repository path.** All nodes must point to the repository path that is located on the first node. It is important that you enter the repository path using the exact same characters on all nodes. For example, you cannot have the path on the first server node defined as **c:\alm\repository** and on additional nodes defined as **\\server1\c\$\alm\repository**—the **\\server1\c\$\alm\repository** path must appear on every node.

ALM Repository Path: Windows

The location of the repository directory is specified by the user during installation. The default location is: **C:\ProgramData\HP\ALM\repository**. You must have full control permissions to the ALM repository path as described in "Required Permissions: Windows" on previous page.

Chapter 6: Prerequisites: Linux/Oracle Solaris Operating Systems

This chapter provides an overview of the prerequisites for installing ALM on a Linux or an Oracle Solaris operating system.

This chapter includes:

| | |
|---|----|
| System Configurations: Linux/Oracle Solaris | 47 |
| Installing ALM for Non-Root Users | 47 |
| Required Permissions: Linux/Oracle Solaris | 48 |
| Minimum Disk Space Requirements | 49 |
| Clustering: Linux/Oracle Solaris | 49 |
| ALM Repository Path: Linux/Oracle Solaris | 50 |

System Configurations: Linux/Oracle Solaris

Verify that your server machine meets the ALM system configurations. For the recommended and supported system configurations for your ALM server machine, refer to the *Readme*.

Note: The supported environment information in the *Readme* is accurate for the ALM 11.52 release, but there may be subsequent updates. For the most up-to-date supported environments, refer to the HP Software Web site using the following URL:
http://www.hp.com/go/TDQC_SysReq

Consider the following for implementing ALM configurations:

- Verify that you have a supported kernel by running `uname -a`.
- ALM can be deployed on a VMware ESX/ESXi server according to the VMware guest operating system compatibility matrix.

Note: Only Linux operating systems can be deployed on a VMware server. Solaris operating systems are not supported.

Installing ALM for Non-Root Users

By default, the ALM installer for the Linux/Solaris operating systems requires a root user. This is because the installer is based on operating system native packages (.rpm), which can only be run by users with root permissions.

If you are unable to work with ALM using the root user because of security concerns, speak to your system administrator about preparing one of the following solutions:

- Using a non-root user with sudo permissions to install and run ALM.
- Using a non-root user without sudo permissions to configure and run ALM.

To use a non-root user with sudo permissions to install and run ALM:

Note:

- The **sudo** package is included by default on some systems. These instructions assume that sudo is installed on the target machine. If sudo is not included by default, it can be downloaded and installed from <http://www.gratisoft.us/sudo/download.html>.
- Role-Based Access Control (RBAC) can be used for Solaris in a way equivalent to sudo. More information regarding RBAC can be found at http://fengnet.com/book/Solaris_admin/ch11lev1sec4.html.

1. Create an **ALM_Admin** user.
2. Edit the **sudoers** file to grant sudo permissions to the **ALM_Admin** user within the ALM installation directory. This allows the **ALM_Admin** user to run the installation file with root

privileges.

Example

If the administrator decides that the ALM installation directory is `/user/Install/ALM`, the following line should be added to the sudoers file: `qcadmin ALL=NOPASSWD:/user/Install/ALM`

3. Check if the `/var/opt/HP` folder exists. If it does not exist, create it.
4. Give the `ALM_Admin` user Read/Write/Execute permissions to the `/var/opt/HP` folder.
5. Move the ALM installation file to the installation directory, `/user/Install/ALM`.
6. Use the `ALM_Admin` user to run the installation script and start ALM.

To use a non-root user without sudo permissions to configure and run ALM:

1. Create an `ALM_Admin` user.
2. Check if the `/var/opt/HP` folder exists. If it does not exist, create it.
3. Give the `ALM_Admin` user Read/Write/Execute permissions to the `/var/opt/HP` folder.
4. When configuring the ALM installation, you run the installation script but stop when the Configuration Wizard opens. Use the `ALM_Admin` user to run the Configuration Wizard and start ALM. The installation instructions instruct you when to stop.

Required Permissions: Linux/Oracle Solaris

Note: Some permissions require access to the `ProgramData` folder. This folder is hidden by default. To show hidden files and folders, perform the relevant steps for your operating system.

The following permissions are required:

- Verify that you have the required permissions to install ALM on a server machine.
- If you are upgrading from a previous version of ALM/Quality Center with a remote repository, the ALM/Quality Center application server user account must have network access to the remote repository. For more information, contact your network administrator.
- To install ALM, you must have the following file system permissions:
 - Full read and write permissions for all the files and directories under the directory on which ALM is installed. The installation files are used for configuring the server. By default, the ALM installation files are written to: `/var/opt/HP/HP_ALM_Server`.
 - Full read and write permissions to the directory on which ALM is deployed. The deployment directory is specified by the user during installation. By default, ALM is deployed on: `/var/opt/HP/ALM`.
 - Full read and write permissions to the repository directory, which contains the `sa` and `qc` directories. The repository path is specified by the user during installation. By default, it is located under the ALM deployment directory. For more information on the repository, refer to the *HP Application Lifecycle Management Administrator Guide*.

- Full read and write permissions to the installation and configuration log files directory. Installation and configuration log files are written to: **/var/opt/HP/ALM/log**.
- Full read and write permissions to the file delivery logs. The log files are written to: **/var/log**.
- If the file repository is located on a remote machine:
 - On the file server machine, share the file repository directory so that the user running the installation is the owner of the files.
 - On the ALM machine, or on each cluster node, create a mount directory that points to the file repository directory.

Minimum Disk Space Requirements

The following partitions have minimum disk space requirements:

- **/opt**. Requires at least enough free space to accommodate the size of ALM after it has been installed. The approximate size of an installation is 300MB, though the exact amount of space may vary from installation to installation.
- **/var**. Requires at least enough free space equal to the space on the installation DVD, approximately 150MB. A copy of the installation is stored in this partition.
- **/tmp**. Requires a large amount of free space. The exact amount cannot be specified as this partition is also consumed by the operating system. It is advisable that the amount of free space is equal in size to ALM after it has been installed, which is approximately 300MB.

Clustering: Linux/Oracle Solaris

Check with your system administrator whether you are installing ALM on a single node or as a cluster.

If you are installing ALM on cluster nodes, verify which machine to use as the first node to start the installation and the number of machines you should use. This depends on the number of users and availability considerations.

When installing on additional nodes:

- **ALM version**. You must install the same version of on all nodes.
- **Site Administration schema**. All nodes must point to the Site Administration schema.
- **Database details**. All nodes must be configured with the same database information.
- **Confidential Data Passphrase**. You must use the same Confidential Data Passphrase on all nodes.
- **Repository path**. You must mount the file system repository before you start the installation process. The mount should not use any cache mechanisms. For details, contact your network administrator.

All nodes must mount the shared file server with the same mount drive name. For example, if the file server is **some.server.org**, and it is mounted on **/mnt/some_server** on the first node, it should be mounted with **/mnt/some_server** on all nodes.

ALM Repository Path: Linux/Oracle Solaris

The location of the repository directory is specified by the user during installation. The default location is: **`/var/opt/HP/ALM/repository`**. You must have full control permissions to the ALM repository path as described in "Required Permissions: Linux/Oracle Solaris" on page 48.

Chapter 7: Prerequisites: Oracle Database Servers

This chapter provides an overview of the prerequisites for connecting ALM to an Oracle database server.

In addition to the information presented in this chapter, you can find more information on configuring the database server, including information on supported character sets, in the *HP ALM Database Best Practices Guide*.

This chapter includes:

| | |
|--|----|
| Connecting ALM to an Oracle Database Server | 53 |
| Site Administration Database Schema Considerations: Oracle | 57 |
| Oracle RAC Support | 58 |

Connecting ALM to an Oracle Database Server

Verify the following:

| | |
|--|---|
| Database type and version | Verify that ALM supports your database type and version. For the list of supported databases, refer to: http://www.hp.com/go/TDQC_SysReq . |
| Database server name | Verify the name of the database server. |
| Database user permissions | Verify that you have the database permissions required to install ALM on the Oracle database server. For a list of required permissions, see " User Permissions for Connecting ALM to an Oracle Database Server " on next page. |
| Site Administration database schema | <p>To install ALM on an existing Site Administration database schema (second node or upgrade), you must have:</p> <ul style="list-style-type: none"> • The existing database schema name and the database administrator permissions required to connect ALM to the database server. • Full read/write permissions on the existing repository. • ALM must have access to the previous Site Administration schema repository path. • Full read/write permissions for the ALM user to the previous schema repository path. • The Confidential Data Passphrase that was used to create the existing schema. <p>For schema name and password considerations, see "Site Administration Database Schema Considerations: Oracle" on page 57.</p> |

| | |
|---|---|
| <p>Database tablespace name and size</p> | <ul style="list-style-type: none"> • Verify the name of the database server, and check the connection to the database server. Ping the database server machine name to test DNS resolution. • Verify you have the tablespace names (default and temporary) and the minimum tablespace sizes for storing the Site Administration database schema. • Verify that the tablespace is not locked. |
| <p>Database Column Length Semantics</p> | <p>Ensure that column length is defined according to characters, and not according to bytes.</p> |

This section also includes:

User Permissions for Connecting ALM to an Oracle Database Server54

User Permissions for Connecting ALM to an Oracle Database Server

To connect ALM to an Oracle database server, the installing database user must have sufficient permissions to perform certain administrative tasks in Oracle. These tasks include creating the ALM project user schema, copying data between projects, and checking that there is sufficient storage in a specific tablespace.

If you are unable to use the Oracle system user due to security reasons, it is recommended that your database administrator create an ALM database administrative user, for example **qc_admin_db**, with the specific privileges required to install ALM.

Your database administrator can create an ALM database administrative user using the example script, **qc_admin_db__oracle.sql**, which is located in the **\Utilities\Databases_scripts** directory on the installation DVD. This script creates the ALM database administrative user with the recommended grants required on the database. Your database administrator should run the script and create this user on the staging database server.

This section includes:

Database Administrative User Privileges55

Project User Privileges56

Database Administrative User Privileges

Following are the privileges required by the ALM database administrative user. Additional explanations about these privileges can be found in the notes at the end of the table.

| Privilege | Description |
|---|--|
| CREATE SESSION WITH ADMIN OPTION (1) | ALM uses this privilege to connect to the database as the ALM database administrative user. |
| CREATE USER | Required to create a new project user schema when creating a new ALM project. |
| DROP USER | When deleting an ALM project, ALM attempts to remove the Site Administration database schema from the database server. If there is an insufficient privileges error, ALM ignores the error and requests that the user notify the database administrator to delete (drop) the database user schema. |
| CREATE TABLE WITH ADMIN OPTION (1) | Required for granting this permission to a newly created ALM project user schema. |
| CREATE VIEW WITH ADMIN OPTION (1) | Required to create views for ALM projects. |
| CREATE TRIGGER WITH ADMIN OPTION (1) | Required to create triggers for ALM projects. ALM uses database triggers to collect change history for specific tables. |
| CREATE SEQUENCE WITH ADMIN OPTION (1) | Required to create sequences for ALM projects. |
| CREATE PROCEDURE WITH ADMIN OPTION (1) | Required to create stored packages for ALM projects. ALM uses packages to collect change history for specific tables. |
| CTXAPP ROLE WITH ADMIN OPTION (1) | Enables ALM to use the Oracle text searching feature. This role exists only if the Oracle text search component was installed and enabled on the database server. |
| SELECT ON DBA_FREE_SPACE (2) | Required to check free space on the database server prior to creating a new Site Administration database schema or a new project. |

| Privilege | Description |
|---|--|
| SELECT ON SYS.DBA_TABLESPACES (2) | Required to collect a list of tablespaces that exist on the database server prior to creating a new Site Administration database schema or a new project. |
| SELECT ON SYS.DBA_USERS (2) | Required to verify the existence of specific database project users. For example, you might want to verify the existence of an Oracle CTXSYS user before creating a new ALM project. |
| SELECT ON SYS.DBA_REGISTRY (2) | Required to verify that the text search component is installed on the database server. |
| SELECT ON SYS.DBA_ROLES (2) | Required to verify that the text search role (CTXAPP) is installed on the database server. |
| SELECT ANY TABLE WITH ADMIN OPTION (1) and INSERT ANY TABLE | Required for various administrative operations when upgrading the Site Administration database schema during installation using the copy and upgrade method, and for enhancing performance when copying a project that has the same source and target database server. |

Note:

- (1) An ALM database administrative user must have privileges with Admin Option.
- (2) The SELECT ON SYS privileges can be given directly by the table owner, or through a database application role. To avoid giving these privileges each time, you can grant this role to the ALM database administrative user. The recommended name for this role is **QC_SELECT_ON_SYS_OBJECTS**. You can create this role using the **qc_sys_db_oracle.sql** example script, which is located in the **\Utilities\Databases_scripts** directory on the installation DVD. You should run this script before you run the **qc_admin_db_oracle.sql** script.

Project User Privileges

When creating a new project, ALM creates a project user schema. This user schema hosts all the tables that are used by the project for storing and retrieving data. Following are the required privileges for an ALM project user schema:

| Project User Schema Privilege | Description |
|---|--|
| QUOTA UNLIMITED ON <default tablespace> | Required for creating database objects that are owned by the ALM project user schema. This privilege allows users to create tables in the default tablespace. It replaces the UNLIMITED TABLESPACE system privilege that gave users system privileges to create tables in any tablespace, including the SYSTEM tablespace. |
| CREATE SESSION | ALM uses this privilege to connect to the database user schema in order to perform required operations. For example creating database objects such as tables, and using them to insert, retrieve, and delete data. |
| <ul style="list-style-type: none"> • CREATE TABLE • CREATE VIEW • CREATE TRIGGER • CREATE SEQUENCE • CREATE PROCEDURE • CTXAPP Role | For a description of these privileges, see " Database Administrative User Privileges " on page 55. |

Tip: The installation DVD contains an example script that describes the recommended permissions required for the ALM database project user schema. This script contains information and does not need to be run. It is located at `\Utilities\Databases_scripts\qc_project_db_oracle.sql`.

Site Administration Database Schema Considerations: Oracle

Be aware of the following schema name and password considerations:

- The default Site Administration database schema name is **qcsiteadmin_db**. If you want to rename the schema, you can change the name in the ALM Server Configuration wizard when configuring the ALM installation.
- You can create your own ALM user password for accessing the Site Administration database schema.
- If there is an existing Site Administration database schema, you can create a copy of the existing schema and upgrade the copy. This enables you to work with ALM 11.52 and previous

versions of ALM/Quality Center simultaneously.

Note: This scenario does not apply to working with Performance Center projects. After you upgrade LAB_PROJECT, you must then upgrade Performance Center projects before they can be used.

Oracle RAC Support

Oracle RAC is a way to enhance Oracle database availability and scalability, allowing it to interact with more than one database instance.

ALM RAC support includes:

- Load balancing between Oracle instances.
- Failover between all specified Oracle RAC nodes at initial connection.

ALM RAC support does not include:

- TAF (Transparent Application Failover) support. A user failing to complete a request upon an Oracle instance crash is required to perform the activity again with a working Oracle instance.

To enable Oracle RAC support:

1. Verify that a file containing information of Oracle database addresses is saved on your ALM machine. The file is named **tnsnames.ora**. The file should contain information similar to the following examples:
 - a. This first example shows an RAC TNS Alias using all cluster nodes in the ADDRESS subsection and a sample of utilizing the Load balance and Failover features:

```
OrgRAC =
  (DESCRIPTION =
    (ADDRESS_LIST=
      (FAILOVER = on)
      (LOAD_BALANCE = on)
      (ADDRESS= (PROTOCOL = TCP) (HOST = server1) (PORT = 1521))
      (ADDRESS= (PROTOCOL = TCP) (HOST = server2) (PORT = 1521))
      (ADDRESS= (PROTOCOL = TCP) (HOST = server3) (PORT = 1521))
    )
    (CONNECT_DATA=
      (SERVICE_NAME = myrac.yourcompany.com)
    )
  )
```

- b. This second example shows an RAC TNS Alias using Single Client Access Name (SCAN). This enables Oracle 11gR2 clients to connect to the database with the ability to resolve multiple IP addresses, reflect multiple listeners in the cluster and handle public client connections. For more information on working with RAC SCAN, refer to the Oracle documentation.

```
OrgRAC_Scan =
(DESCRIPTION =
  (ADDRESS_LIST=
    (FAILOVER = on)
    (LOAD_BALANCE = on)
    (ADDRESS= (PROTOCOL = TCP) (HOST = myrac-cluster-scan) (PORT = 1521))
  (CONNECT_DATA=
    (SERVICE_NAME = myrac.yourcompany.com)
  )
)
```

2. Verify that you have the address of the TNS server to which ALM should refer, for example, OrgRAC.

Chapter 8: Prerequisites: Microsoft SQL Database Servers

This chapter provides an overview of the prerequisites for connecting ALM to a Microsoft SQL database server.

In addition to the information presented in this chapter, you can find more information on configuring the database server, including information on supported character sets, in the *HP ALM Database Best Practices Guide*.

This chapter includes:

| | |
|--|----|
| Connecting ALM to a Microsoft SQL Database Server | 61 |
| User Permissions for Connecting ALM to a Microsoft SQL Database Server | 62 |
| Site Administration Database Schema Considerations: SQL | 63 |

Connecting ALM to a Microsoft SQL Database Server

Verify the following:

| | |
|--|--|
| Database type and version | Verify that ALM supports your database type and version. For the list of supported databases, refer to: http://www.hp.com/go/TDQC_SysReq . |
| Database server name | Verify the name of the database server. |
| Database user permissions | Verify that you have the database permissions required to connect ALM to the Microsoft SQL database server (not applicable for Windows Authentication). For a list of required permissions, see " User Permissions for Connecting ALM to a Microsoft SQL Database Server " on next page. |
| Site Administration database schema | <p>To install ALM on an existing Site Administration database schema (second node or upgrade), you must have:</p> <ul style="list-style-type: none"> • The existing database schema name and the database administrator permissions required to connect ALM to the database server. • Full read/write permissions on the existing repository. • ALM must have access to the previous Site Administration schema repository path. • Full read/write permissions for the ALM user to the previous schema repository path. • The Confidential Data Passphrase that was used to create the existing schema. <p>For schema name and password considerations, see "Site Administration Database Schema Considerations: SQL" on page 63.</p> |
| Text Search | Verify that the text search component is installed on the server, even if you do not intend to use it. |

User Permissions for Connecting ALM to a Microsoft SQL Database Server

To connect ALM to a Microsoft SQL database server, the installing database user must have sufficient permissions to perform certain administrative tasks in SQL.

If you have the SQL **sa** user, you can use this user to install ALM. If you are unable to use the SQL **sa** user due to security reasons, it is recommended that your database administrator create an ALM database administrative user, for example **td_db_admin**, with the specific privileges required to install ALM.

The **td_db_admin** user must have the Database Creators role. You must also grant the **td_db_admin** user the Security Administrators role, which allows the **td_db_admin** user to create and add the **td** user with only those privileges required for running ALM.

To create an ALM database administrative user on a Microsoft SQL Server:

1. Open the **SQL Server Management Studio**.
2. In the **Object Explorer** pane, under the ALM database server, expand the **Security** folder.
3. Right-click the **Logins** folder, and select **New Login**.
4. Type **td_db_admin** as the user name, and select the authentication type (enter password if necessary).
5. Click the **Server Roles** tab, and select the **dbcreator** and **securityadmin** options.
6. Click **OK**.

To test the ALM database administrative user (SQL Server Authentication):

1. Verify the **select sysdatabases table** permission in the master database:

```
SELECT name FROM sysdatabases where name=<db_name>
```

2. Verify the **create database** permission:

```
CREATE DATABASE <dbName> -- the database name must not already exist
```

3. Verify the **drop database** permission:

```
DROP DATABASE <database_name> -- the database name must exist
```

4. Verify the **select syslogins** permission:

```
SELECT COUNT(*) FROM master..syslogins WHERE name=<dbOwnerName>
```

Note: The **dbOwnerName** must be set to **td**.

To test the ALM database administrative user permissions (Windows Authentication):

1. Verify the **change database context** permission:

```
USE <dbName>
```

2. Verify the **create database** permission:

```
CREATE DATABASE <dbName> -- the database name must not already exist
```

3. Verify the select on **syslogins** permission:

```
SELECT COUNT(*) FROM master..syslogins WHERE name='<dbOwnerName>'
```

4. Verify the select on **sysusers** permission:

```
SELECT COUNT(*) FROM master..sysusers WHERE name='<dbOwnerName>'
```

Site Administration Database Schema Considerations: SQL

Be aware of the following schema name and password considerations:

- The default Site Administration database schema name is **qcsiteadmin_db**. If you want to rename the schema, you can change the name in the ALM Server Configuration wizard when configuring the ALM installation.
- You can create your own ALM user password for accessing the Site Administration database schema.
- If there is an existing Site Administration database schema, you can create a copy of the existing schema and upgrade the copy. This enables you to work with ALM 11.52 and previous versions of ALM/Quality Center simultaneously.

Note: This scenario does not apply to working with Performance Center projects. After you upgrade LAB_PROJECT, you must then upgrade Performance Center projects before they can be used.

Chapter 9: Prerequisites: Miscellaneous

This chapter provides an overview of miscellaneous prerequisites for installing ALM.

This chapter includes:

| | |
|--------------------------------|----|
| License File | 65 |
| Security Passphrases | 65 |
| Mail Server Information | 65 |
| Conflicting Applications | 65 |

License File

Verify that you have the ALM license file.

To activate your license, visit the HP Software Licensing Portal (<http://www.hp.com/software/licensing>) and enter your Entitlement Order Number.

The license file has a **.dat** file extension by default. Make a note of where you save the file, as during the ALM configuration process you need to specify a path to it.

If you do not have a license, visit the HP Software Licensing Portal and click the **Contact Licensing Support** link.

Security Passphrases

Verify that you have passphrases for confidential data and communication security encryption.

For secondary cluster nodes, verify that you have the confidential data encryption passphrase that you used to install the primary cluster.

When upgrading from an ALM 11.00 version of the Site Administration database schema, you must use the same confidential data passphrase as was used for the previous installation.

Performance Center: You must use the same communication security passphrase for the ALM and Performance Center server configurations.

Mail Server Information

A mail server enables ALM users to send emails to other users in a project. You select which server to use as part of the installation configuration process.

Before installing ALM, decide which mail server to use. Ask your system administrator for assistance. If you are using an SMTP Server, check that you have the SMTP Server name and port. The installer checks that the specified mail server name and port are valid and that the mail server is running.

Conflicting Applications

To work with ALM, you may need to disable conflicting applications that are running on the ALM machine. For a list of these applications, see HP Software Self-solve knowledge base article [KM176429](http://h20230.www2.hp.com/selfsolve/document/KM176429) (<http://h20230.www2.hp.com/selfsolve/document/KM176429>). (Requires HP Passport sign-in credentials.)

Chapter 10: Prerequisites: Client-side

This chapter provides an overview of the prerequisites for working with ALM on a client machine. The steps described in this chapter are performed on the client machines, and not on the machine on which ALM server is installed.

This chapter includes:

| | |
|--|----|
| System Configurations | 67 |
| Permissions Required to Download ALM Client Components | 67 |
| Internet Explorer Configuration | 68 |
| Enabling User Account Control (UAC) | 69 |

System Configurations

Verify that client machines meet the ALM system configurations. For the supported and recommended system configurations for ALM clients, refer to the *Readme*.

Important: The supported environment information in the *Readme* is accurate for the ALM 11.52 release, but there may be subsequent updates. For the most up-to-date supported environments, refer to the HP Software Web site: http://www.hp.com/go/TDQC_SysReq

This section includes:

| | |
|---------------------------------|----|
| Required Software | 67 |
| Additional Considerations | 67 |

Required Software

The following must be installed on client machines:

- Microsoft .NET Framework 4

Additional Considerations

The following considerations must also be taken into account:

- If you are integrating ALM with other HP testing tools, you must modify the DCOM permissions on your client machine. For more information, see HP Software Self-solve knowledge base article [KM187086](http://h20230.www2.hp.com/selfsolve/document/KM187086) (<http://h20230.www2.hp.com/selfsolve/document/KM187086>). (Requires HP Passport sign-in credentials.)

ALM Edition: Modifying DCOM permissions is not required for running Functional test sets (server-side test execution).

- You can work with the ALM client using a remote desktop.
- For customers using remote or mass distribution mechanisms, ALM client components can be deployed locally on workstations by running a self-extracting **msi** file. You build the **msi** file by running the HP ALM Client MSI Generator, available from the HP Application Lifecycle Management Add-ins page (Help > Add-ins).

Permissions Required to Download ALM Client Components

To enable ALM to work with HP testing tools as well as various other integrations and third-party tools, you need to log in to the client machine with administrator privileges. These privileges are required to install the HP ALM Client Registration add-in, which you use to register ALM client components and Site Administration client components on your client machine.

File System Permissions

You must have the following file system permissions:

- Full read and write permissions on the HP\ALM-Client deployment folder.

This is located at:

- **Windows 7/2008/2008R2:** %ALLUSERSPROFILE%
- **Windows XP:** %ALLUSERSPROFILE%\Application Data
- Full read and write permissions to the Temp (%TEMP% or %TMP%) directory. The installer program writes installation and log files to this directory. This is generally located at:
 - **Windows XP:** C:\Documents and Settings\\Local Settings\Temp
 - **Windows 7/2008/2008R2:** C:\Users\\AppData\Local\Temp

Internet Explorer Configuration

Before you download Application Lifecycle Management on a client machine, you must perform the following configurations to the Internet Explorer browser on the client machine.

- Configure the Custom Level security settings. The Custom Level security setting should be configured for the specific zone of the ALM server.
- Set Internet Explorer as the default Web browser. This ensures that external links to ALM entities can open in ALM.

To configure security settings on the client machine:

1. In Internet Explorer, select **Tools > Internet Options**. The Internet Options dialog box opens.
2. Click the **Security** tab. The Web content zone of the ALM server (Internet or Local intranet) is automatically selected. Click **Custom Level**.
3. In the Security Settings dialog box, configure the following settings:

Under .NET Framework-reliant components:

- Set **Run components not signed with Authenticode** to **Enable**.
- Set **Run components signed with Authenticode** to **Enable**.

Under ActiveX controls and plug-ins:

- Set **Run ActiveX controls and plug-ins** to **Enable**.
- Set **Download signed ActiveX controls** to **Enable** or **Prompt**.

Note: You do not need to enable **Download signed ActiveX controls** if you install the ALM client using the HP ALM Client MSI Generator Add-in. This allows you to install all ALM modules on a client machine without downloading them through a browser.

4. On Windows 7:
 - It is suggested that you add the ALM server site to the Trusted Sites security zone. This is not mandatory.

- Disable the **Protected Mode** for the Trusted Sites security zone.

5. Click OK.

To set Internet Explorer as the default web browser:

1. In Internet Explorer, select **Tools > Internet Options**. The Internet Options dialog box opens.
2. Click the **Programs** tab.
3. Under **Default web browser**, make sure that Internet Explorer is set as the default browser. If not, click the **Make default** button.

Enabling User Account Control (UAC)

If you enable UAC on a Microsoft Windows 7, 2008, or 2008R2 operating system, be aware of the following considerations:

- To register ALM client components, you must run Internet Explorer as the administrator.
- To register ALM client components on a shared location of a client machine, you must run Internet Explorer as the administrator.
- Administrator permissions are required to run the **ClientMSIGenerator.exe** file. In addition, you must run the **.exe** file as the administrator.

Part 4: Upgrade Considerations and Prerequisites

Chapter 11: Project Upgrade Considerations

This chapter presents project upgrade considerations to be taken into account before installing ALM 11.52

This section includes:

| | |
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| Suggested ALM System Configuration | 73 |
| Additional Project Upgrade Documentation | 75 |

Upgrade Versions

The following table describes how to upgrade projects from previous Quality Center and ALM versions. Note that not all projects can be upgraded directly to ALM 11.52.

| From version: | To ALM 11.52: |
|--|--|
| Quality Center 10.00 and ALM 11.00 | Upgrade projects directly to ALM 11.52. |
| Performance Center 11.00 | Upgrade projects directly to ALM 11.52. Note: You must first upgrade LAB_PROJECT , and then any Performance Center template projects, before upgrading Performance Center projects. |
| Performance Center versions 9.52 and earlier | Projects must be migrated to align them with the required configurations of ALM, using the HP ALM Performance Center 11.52 Migration Installation wizard. For details, see the <i>HP ALM Performance Center Installation Guide</i> . |
| Quality Center 9.2 | Projects must first be upgraded to Quality Center 10.00 or ALM 11.00. |
| Quality Center 9.0 | Projects must first be upgraded to Quality Center 10.00. |

Note: If you are upgrading to ALM 11.52 from Quality Center 10.00, 9.2, or 9.0, you must convert the rich text mechanism from Microsoft Word to HTML. For more information, see HP Software Self-solve knowledge base article [KM1116588](http://h20230.www2.hp.com/selfsolve/document/KM1116588) (<http://h20230.www2.hp.com/selfsolve/document/KM1116588>). (Requires HP Passport sign-in credentials.)

Suggested ALM System Configuration

The ALM system includes the following main components: The ALM server, the database server, and the project repository. For more information regarding the function of each component within the ALM system, see "About ALM Technology and Architecture" on page 21.

When planning your installation and upgrade strategy, decide whether to install the new ALM system on new system components, or to reuse components from the existing system.

It is strongly recommended that you not use any of the existing components as part of the new system.

- **ALM server.** Do not install the new version of the ALM server on the same machine where the existing ALM server is installed. Instead, install the new version on a separate machine.
- **Database server.** Install an updated version of the database server on a separate machine, or create a new instance of the existing server on the machine on which it is currently installed.
- **Project Repository.** Create a copy of the existing repository to be used by the new system.

Advantages

Following this best practice produces two functioning ALM systems:

- The original system that can open and work with existing projects.
- The new system to which existing projects will be upgraded.

Each system is totally separate, and any problem encountered in one does not impact the other.

This best practice has the distinct advantage of enabling you to incrementally upgrade your projects. Since there are two functioning ALM systems, there is no need to deactivate all projects at once. You can deactivate projects individually in the old system and then reactivate them in the new system, upgrading them one-by-one. Without two functioning ALM systems, all projects would remain inactive until their upgrades are complete, a significant amount of project downtime.

Note: Before beginning the upgrade process you must back up the database server and the project repository. Continuing to work in the old ALM system after backing up causes the backup to be out of date.

The following are two examples of critical problems that may arise when you do not follow the suggested upgrade approach:

- **Unnecessary project downtime.** If a project becomes corrupted before you complete its upgrade, there will be no option but to retrieve a backup copy of it. Depending on organizational policy this process may take a few days, meaning that the project is not available at all for this amount of time.

If the original ALM system is functioning however, you can go back to a working version of the project immediately and not be dependent on waiting for the backup to arrive, thus avoiding unnecessary project downtime.

- **Damaged project repository.** If you install the new version of the ALM server on the same machine, you must first uninstall the existing ALM server. It is possible that you may subsequently discover a problem with the project repository that requires the original ALM server to repair it.

Your only course of action is to:

- a. Uninstall the new version.
- b. Reinstall the old version.
- c. Fix the project repository.

- d. Uninstall the old version.
- e. Reinstall the new version.

Additional Project Upgrade Documentation

In addition to this guide, the following best practices guides contain considerations and recommendations involved in the upgrade process. The guides are available on the HP Software Product Manuals site (<http://h20230.www2.hp.com/selfsolve/manuals>).

- **HP ALM Upgrade Best Practices:** This guide provides information on upgrade methodology and can assist you in planning your upgrade. The Upgrade Best Practices guide is also available on the installation DVD.

The Upgrade Best Practices guide discusses the following:

- Determining the need for ALM upgrade
 - Defining upgrade scope and strategy
 - Upgrading infrastructure
 - Upgrading ALM
 - Choosing the upgrade method
 - Upgrading projects
 - Configuring and customizing projects
 - Upgrading in a testing environment
 - Planning for production upgrade
- **HP ALM Database Best Practices Guide.** This guide provides best practices for implementing HP ALM. Following these best practices can help you when upgrading your database or moving to a different database as a part of your overall upgrade plan.

Chapter 12: Project Upgrade Prerequisites

This chapter describes project upgrade steps that must be performed before installing ALM 11.52

This section includes:

| | |
|---|----|
| Back Up Projects in Existing ALM Installation | 77 |
| Verifying Domains and Projects | 77 |
| Repairing Domains and Projects | 82 |
| Restoring Backed Up Projects | 85 |
| Verify Projects Again | 87 |
| Copy Site Administration Database Schema to the New Database Server | 87 |

Back Up Projects in Existing ALM Installation

Back up all your projects in the existing ALM installation. Projects should be backed up before running the verify and repair tools.

When you run the repair or upgrade process, ALM performs changes on your projects to align them with the specifications for the current version of ALM. You must back up your projects before you start to repair or upgrade them.

We strongly recommend that you deactivate projects before backing them up. If you must back up while your project is still active, you must back up the database before the file system. We also recommend backing up the file system as soon as possible after backing up the database. To back up and restore data from active projects, see HP Software Self-solve knowledge base article [KM1373517](http://h20230.www2.hp.com/selfsolve/document/KM1373517) (<http://h20230.www2.hp.com/selfsolve/document/KM1373517>). (Requires HP Passport sign-in credentials.)

To make sure the Garbage Collector does not delete obsolete files while the file system is pending backup, there is a one week grace period before deletion. For details, refer to the *HP Application Lifecycle Management Administrator Guide*.

Note:

- The repair process makes changes to the project database schema only. Before running the repair process, you should back up the project database schema on the database server, and you should back up the project data in the file system.
- Before you run the upgrade process, perform a full backup of your projects that includes the project database schema and the project repository.

To back up the project database schema on the database server:

- **Microsoft SQL database.** To back up the project database schema on the database server, see HP Software Self-solve knowledge base article [KM169526](http://h20230.www2.hp.com/selfsolve/document/KM169526) (<http://h20230.www2.hp.com/selfsolve/document/KM169526>). (Requires HP Passport sign-in credentials.)
- **Oracle database.** To back up the project database schema on the database server, see HP Software Self-solve knowledge base article [KM205839](http://h20230.www2.hp.com/selfsolve/document/KM205839) (<http://h20230.www2.hp.com/selfsolve/document/KM205839>). (Requires HP Passport sign-in credentials.)

Verifying Domains and Projects

Verify all projects in the existing ALM installation.

The verify and subsequent repair process checks that the project schema structure is correct for the existing version of ALM. It is important to verify this before proceeding with the new installation, since the projects on the old server should be aligned prior to upgrade.

You can run the verify tool per individual project, or on the domain level to verify all projects in the domain.

This section includes:

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| Define an Exception File | 78 |
| Verify a Project | 80 |
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Verification Process Overview

The verification process:

- Checks the correctness of a project's database user schema and data.
- Detects problems in your environment, settings, schema structure, and data integrity that could cause the upgrade to fail.
- Generates a verification report which alerts you to problems that can be repaired by ALM and problems that you should manually repair.

By default, the verification report is saved on the ALM server machine. To change this default location, refer to the *HP Application Lifecycle Management Administrator Guide*.

After the project has been verified, you can still use it with a previous version of Quality Center or ALM.

Define an Exception File

If you have made changes to a project database user schema such as the addition of tables or columns, the verification, repair, or upgrade processes may fail. You can define an exception file for objects that are added manually to the database user schema, and are not defined in the schema configuration file. This instructs ALM to ignore these changes.

You can use the exception file to ignore warnings for extra tables, views, columns, and sequences. For any other problem that requires manual repair, consult with your database administrator.

You must use the same exception file when running the verification, repair, or upgrade processes.

You can set an exception file for a single project or for all projects in Site Administration.

Caution: Using the exception file to ignore warnings for objects that are added manually to the schema may compromise the stability of your project upgrade and the validity of the database user schema.

To define an exception file:

1. Copy the **SchemaExceptions.xml** file from the ALM installation directory. By default, the file is located in **<ALM installation path>\data\sas\DomInfo\MaintenanceData**.

2. Create the exception file, for example, **my_exceptions.xml**, and define the exceptions as follows:

Examples

- For an extra table:

```
<TableMissing>
    <object pattern="MY_Table" type="extra"/>
</TableMissing>
```

- For an extra view:

```
<ViewMissing>
    <object pattern="MY_VIEW" type="extra"/>
</ViewMissing>
```

- For an extra column:

```
<ColumnMissing>
    <object pattern="MY_COLUMN" type="extra"/>
</ColumnMissing>
```

- For an extra sequence:

```
<SequenceMissing>
    <object pattern="MY_SEQUENCE" type="extra"/>
</SequenceMissing>
```

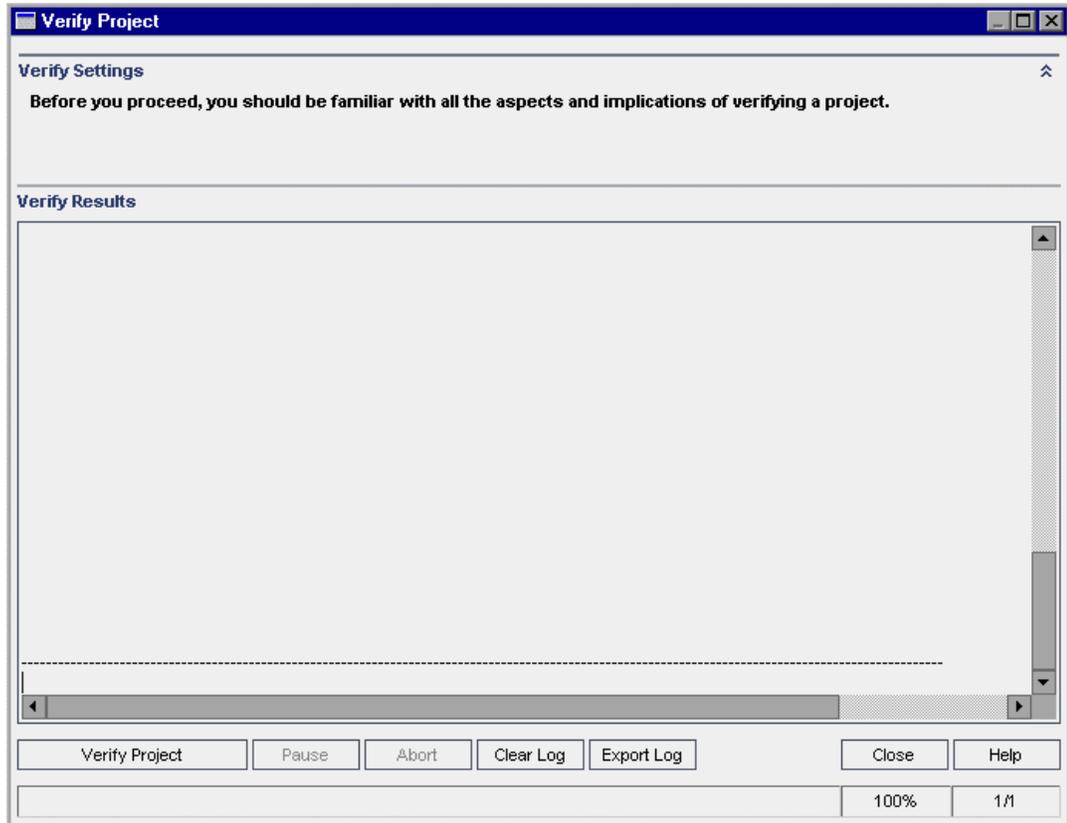
3. To set an exception file for a single project:
 - a. In Site Administration, click the **Site Projects** tab.
 - b. In the Projects list, select a project. In the right pane, select the **Project Details** tab. The project's details are displayed.
 - c. Under **Project Database**, click **Exception File**. The Edit Exception File dialog box opens.
 - d. Type the file location. The file is located under
<ALM deployment path>\sa\DomsInfo\MaintenanceData.
4. To set an exception file for all projects:
 - a. In Site Administration, click the **Site Configuration** tab.
 - b. Add the **UPGRADE_EXCEPTION_FILE** parameter to the list of parameters and define the exception file location. The file is located under
<ALM deployment path>\sa\DomsInfo\MaintenanceData.

For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

Verify a Project

This section describes how to verify a single project.

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a project.
3. Click the **Maintain Project**  button and choose **Verify Project**. The Verify Project dialog box opens.



4. Click the **Verify Project** button to start the verification process. In the Verify Results pane, log messages are displayed.

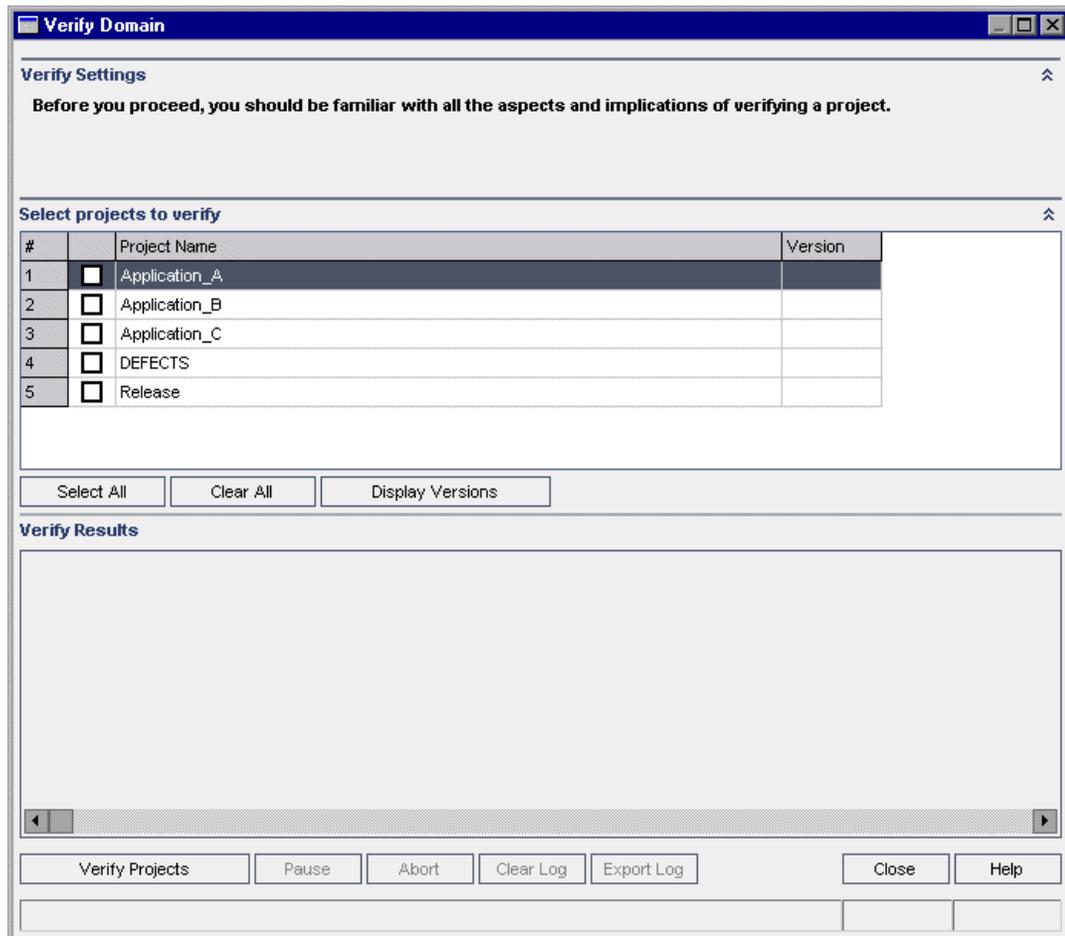
If a database error occurs while running the process, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.
5. To pause the verification process, click the **Pause** button. To continue, click the **Resume** button.
6. To abort the verification process, click the **Abort** button. Click **Yes** to confirm.
7. To save the messages displayed in the Verify Results pane to a text file, click the **Export Log** button. In the Export Log to File dialog box, choose a location and type a name for the file. Click **Save**.
8. To clear the messages displayed in the Verify Results pane, click the **Clear Log** button.

9. When the verification process completes, the Verify Results pane displays the location of the verification report. By default, the file is located in the following directory: **<ALM Repository Path>\sa\DomsInfo\MaintenanceData\out\<Domain Name>\<Project Name>**.
10. Analyze the verification report. The report indicates both problems that can be repaired by ALM automatically, and the problems that you need to repair manually.
11. Click **Close** to close the Verify Project dialog box.

Verify a Domain

This section describes how to verify all projects in a domain.

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a domain.
3. Click the **Maintain Domain** button  and choose **Verify Domain**. The Verify Domain dialog box opens.



4. To view the current version numbers of your projects, select the project names, or click **Select All** to view version numbers for all projects. Click the **Display Versions** button.

The project version number is displayed in the **Version** column.

5. To verify your projects, select the project names, or click **Select All** to verify all projects. Click the **Verify Projects** button.

If a database error occurs while running the process, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.
6. To pause the verification process, click the **Pause** button. To continue, click the **Resume** button.
7. To abort the verification process, click the **Abort** button. Click **Yes** to confirm.
8. To save the messages displayed in the Verify Results pane to a text file, click the **Export Log** button. In the Export Log to File dialog box, choose the location and type the name for the file. Click **Save**.
9. To clear the messages displayed in the Verify Results pane, click the **Clear Log** button.
10. When the verification process completes, the Verify Results pane displays the location of each verification report. By default, the files are located in the following directory: **<ALM Repository Path>\repository\sa\DomsInfo\MaintenanceData\out\<Domain Name>\<Project Name>**.
11. Analyze the verification report. The report indicates problems that can be repaired by ALM and the problems that you need to repair manually.
12. Click **Close** to close the Verify Domain dialog box.

Repairing Domains and Projects

The repair process fixes most data and schema issues found by the verification process. If the verification process finds problems that can cause data loss, the repair process does not fix these automatically. You need to repair these problems manually. To find out whether a particular issue is handled automatically or manually, refer to the verification report.

By default, the repair process runs in non-silent mode. When running the process in non-silent mode, ALM may pause and prompt you for input when an error occurs. Instead, you can choose to run the process in silent mode. When an error occurs, ALM aborts the process without prompting you for input.

After the project has been repaired, you can still use it with a previous Quality Center or ALM version.

For detailed information on the problems fixed by the repair process, and help with repairing problems that cannot be fixed by ALM, see "[Upgrade Preparation Troubleshooting](#)" on page 192.

This section includes:

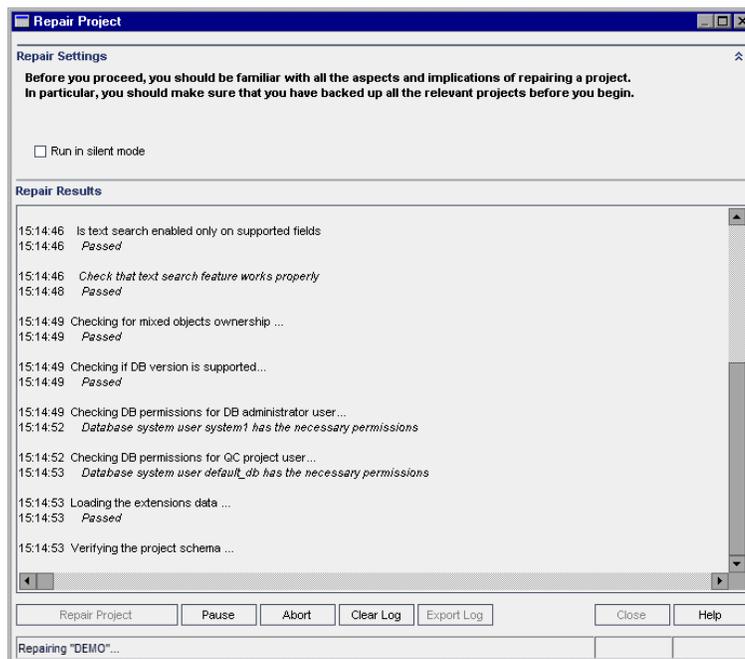
| | |
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Repairing a Project

This section describes how to repair a single project.

To repair a project:

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a project.
3. Click the **Maintain Project**  button and choose **Repair Project**. The Repair Project dialog box opens.



4. To run the repair process without any user interaction, select **Run in Silent Mode**.
5. To start the repair process, click the **Repair Project** button. If the project is active, you are prompted to deactivate it. For more information about deactivating projects, refer to the *HP Application Lifecycle Management Administrator Guide*.

If a database error occurs while running the process in non-silent mode, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.

If the repair process fails, see ["Restoring Backed Up Projects" on page 85](#).

6. To pause the repair process, click the **Pause** button. To continue, click the **Resume** button.
7. To abort the repair process, click the **Abort** button. Click **Yes** to confirm.
8. To save the messages displayed in the Repair Results pane to a text file, click the **Export Log** button. In the Export Log to File dialog box, choose a location and type a name for the file. Click **Save**.

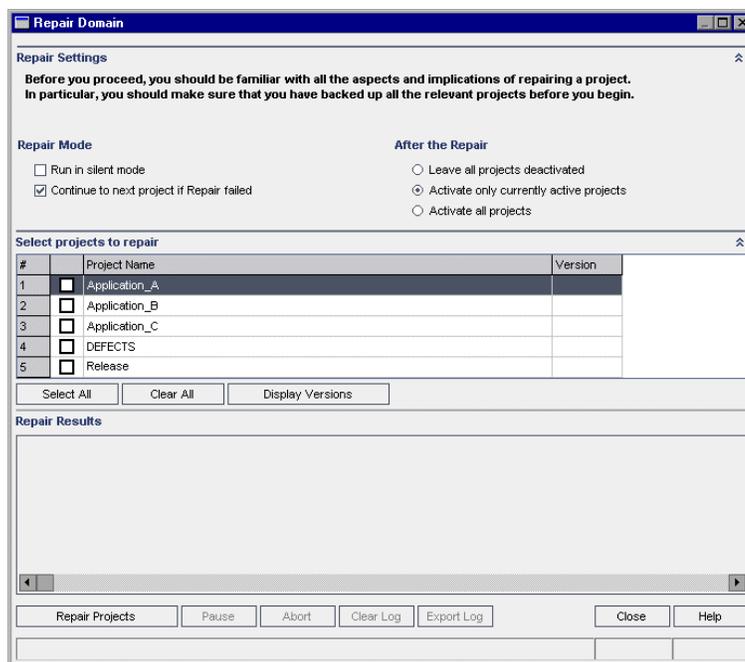
9. To clear the messages displayed in the Repair Results pane, click the **Clear Log** button.
10. Click **Close** to close the Repair Project dialog box.

Repairing a Domain

This section describes how to repair all projects in a domain.

To repair a domain:

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a domain.
3. Click the **Maintain Domain**  button and choose **Repair Domain**. The Repair Domain dialog box opens.



4. In the **Repair Settings** area, under **Repair Mode**, you can select the following options:
 - **Run in Silent Mode.** Runs the process without any user interaction.
 - **Continue to next project if repair failed.** Proceeds to the next project if the repair process fails. This is the default option.
5. In the **Repair Settings** area, under **After the Repair**, you can select one of the following options:
 - **Leave all projects deactivated.** Leaves all projects deactivated after the repair process completes.
 - **Activate only currently active projects.** Reactivates previously-activated projects after the repair process completes. This is the default option.
 - **Activate all projects.** Activates all projects after the repair process completes.

6. To view the current version numbers of your projects, select the project names, or click **Select All** to view version numbers for all projects. Click the **Display Versions** button.

The project version number is displayed in the **Version** column.
7. To repair your projects, select the project names, or click **Select All** to verify all projects. Click the **Repair Projects** button.

If a database error occurs while running the process in non-silent mode, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.

If the repair process fails, see "[Restoring Backed Up Projects](#)" below.
8. To pause the repair process, click the **Pause** button. To continue, click the **Resume** button.
9. To abort the repair process, click the **Abort** button. Click **Yes** to confirm.
10. To save the messages displayed in the Repair Results pane in a text file, click the **Export Log** button. In the Export Log to File dialog box, choose a location and type a name for the file. Click **Save**.
11. To clear the messages displayed in the Repair Results pane, click the **Clear Log** button.
12. Click **Close** to close the Repair Domain dialog box.

Restoring Backed Up Projects

If the repair or upgrade process fails, you must restore the backed up projects before trying the process again. You can restore projects that were backed up on an Oracle or Microsoft SQL database server, and in the file system. A project you restore can be used only in the ALM/Quality Center version from which it was backed up.

If you are restoring projects as part of your overall upgrade process, for example, if you are moving to a new server or database, you must update the **dbid.xml** file accordingly. For details, see "[Restore ALM Projects in New Site Administration Database Schema](#)" on page 144.

If you were previously working with Performance Center 11.00, see "[Restoring LAB_PROJECT](#)" on page 87.

This section includes:

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|---|----|
| Restoring Projects from a Microsoft SQL Database Server | 86 |
| Restoring Projects from an Oracle Database Server | 86 |
| Restoring a Repository from the File System | 87 |
| Restoring LAB_PROJECT | 87 |

Restoring Projects from a Microsoft SQL Database Server

This section describes how to restore a project backed up on a Microsoft SQL database server.

For more information, see HP Software Self-solve knowledge base article [KM169526](http://h20230.www2.hp.com/selfsolve/document/KM169526) (<http://h20230.www2.hp.com/selfsolve/document/KM169526>). (Requires HP Passport sign-in credentials.)

To restore a project from a Microsoft SQL database server:

1. From the SQL Server Enterprise Manager, navigate to the database and select **Tools > Restore Database**.
2. Navigate to the backup file, and follow the restore procedure to complete the data restore process.
3. In Site Administration, restore the project.
4. If the backup was performed while the project was active, realign the project repository. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

Restoring Projects from an Oracle Database Server

This section describes how to restore a project backed up on an Oracle database server.

For more information, see HP Software Self-solve knowledge base article [KM205839](http://h20230.www2.hp.com/selfsolve/document/KM205839) (<http://h20230.www2.hp.com/selfsolve/document/KM205839>). (Requires HP Passport sign-in credentials.)

To restore a project from an Oracle database server:

1. Copy the backup file to the Oracle server machine.
2. Using the SQL*Plus utility, log in to the Oracle server using the **system** account.
3. Create a user for the ALM project. Make sure you create it with the same name as the project name (or the Oracle user name) when the project was exported.

Use these SQL statements:

```
CREATE USER [<project name>] IDENTIFIED BY tdttdt DEFAULT  
TABLESPACE TD_data TEMPORARY TABLESPACE TD_TEMP;  
  
GRANT CONNECT,RESOURCE TO [<project name>];
```

4. On the ALM installation DVD, locate the **\Utilities\Databases\Scripts** directory. Open the **qc_project_db_oracle.sql** file and follow the instructions.
5. Using the command line, type `imp` to run the import utility.
6. Follow the prompt, and log in to the Oracle server using the **system** account.
After all tables have been successfully imported, a confirmation message displays.
7. In Site Administration, restore the project.

8. If the backup was performed while the project was active, realign the project repository. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

Restoring a Repository from the File System

This section describes how to restore a repository backed up in the file system.

To restore a repository from the file system:

1. Copy the backed up repository to the ALM repository.
2. In Site Administration, restore the project.
3. If the backup was performed while the project was active, you must restore the database and the file system from a backup that was created **after** the database backup was created, realign the project, and then activate the project. This procedure must always be performed during disaster recovery. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*. If this process is done to recover certain files or directories, you can skip the realignment.

Restoring LAB_PROJECT

Before restoring other Performance Center projects, you must first restore **LAB_PROJECT**, and then any Performance Center **template** projects.

You restore **LAB_PROJECT** from the Lab Management tab in Site Administration. For details, refer to the *HP ALM Lab Management Guide*.

You restore Performance Center 11.00 projects in Site Administration.

Note: Performance Center 11.00 **template** projects must be restored to the **DEFAULT** domain.

Verify Projects Again

Before proceeding, run the verification tool again to make sure that all problems have been fixed.

Copy Site Administration Database Schema to the New Database Server

To upgrade a copy of the Site Administration database schema on a new database server machine, you must copy the schema from the database server that was used in the previous ALM system to the database server that will be used in the new ALM system.

You perform this step before installing ALM 11.52 because the schema upgrade option is defined as part of the installation configuration.

Perform the required steps for backing up, removing, and restoring databases for your database type. For assistance contact your database administrator.

Note: The database user must have the same permissions as the user installing ALM.

Note: When copying and upgrading the Site Administration database schema, ensure that the existing project refers to the production project database and shared repository, if applicable. When using a staging or side by side upgrade prior to starting the server update, update the following columns in the PROJECTS table in the Site Administration database schema to their new values:

- PHYSICAL_DIRECTORY
- DBSERVER_NAME
- DB_CONNSTR_FORMAT
- DB_USER_PASS

Chapter 13: Upgrading the Site Administration Database Schema

When installing ALM 11.52, you can choose to create a new Site Administration schema on the database server, or you can upgrade a copy of the existing schema. This chapter discusses considerations, guidelines, and prerequisites for upgrading a copy of the existing schema.

This section includes:

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|--|----|
| Schema Upgrade Guidelines | 91 |
| Recovering a Lost Confidential Data Passphrase | 91 |
| Managing Schema Changes | 92 |

Schema Upgrade Guidelines

Upgrading a copy of the existing schema is a useful option if you are installing ALM 11.52 on a new ALM server machine. By creating a copy of the existing schema and then upgrading the copy, you enable yourself to work with new and upgraded projects, as well as with projects from previous versions that have not yet been upgraded.

Example

If your ALM 11.00 schema contains a project called **my_project**, by creating a copy of the Site Administration ALM 11.00 schema and then upgrading it to ALM 11.52, the **my_project** project is available in Site Administration in both ALM 11.00 and ALM 11.52.

Note: Oracle database servers: The new database schema is created in the same tablespace as the existing Site Administration database.

When you upgrade a copy of the existing Site Administration database schema, the copy that is created is independent of the existing schema. Any changes subsequently made to the original schema through updates in your previous version of Quality Center or ALM are not reflected in the upgraded copy of the Site Administration database schema that ALM 11.52 uses.

Therefore, consider the following guidelines:

| | |
|-------------------------------------|---|
| ALM users | After you install ALM 11.52, if you add or delete users or update user details in your previous version of ALM/Quality Center, you must make the same changes in ALM11.52. |
| ALM configuration parameters | After you install ALM 11.52, if you modify configuration parameters in your previous version of ALM/Quality Center, you must make the same changes in ALM 11.52. |
| Server node configuration | If you are working with server nodes, in the Servers tab in Site Administration for ALM 11.52, you must reconfigure the settings for the ALM log file and the maximum number of database connections. |
| ALM repository path | The repository path in your previous version must be defined as a network path, so that it can be accessed by both the previous ALM/Quality Center installations and by ALM 11.52. Make sure that the project is active on one ALM server but not on both. |

Recovering a Lost Confidential Data Passphrase

In ALM 11.00, a Confidential Data Passphrase was introduced. The passphrase encrypts passwords that are used for accessing external systems (databases and LDAP).

If you are upgrading an ALM 11.00 version of the schema, when configuring the installation you must enter the same passphrase as was used in the ALM 11.00 installation. If you do not know the passphrase, perform the following steps.

Note: This procedure can be performed whether you are installing ALM 11.52 on the same machine as the existing installation, or on a new or separate machine, for example, if you are adding a node to a cluster. If you are not sure on which server machine to install ALM 11.52, see "[Suggested ALM System Configuration](#)" on page 73.

1. On the machine where ALM is currently installed, navigate to the following directory:

- **Windows.** C:\ProgramData\HP\ALM\conf

Note: The **ProgramData** folder is hidden by default. To show hidden files and folders, perform the relevant steps for your operating system.

- **Linux/Solaris.** /var/opt/HP/ALM/conf

2. Create a copy of the **qcConfigFile.properties** file

If you are installing ALM 11.52 on a new server machine, place the copy on the machine where you plan to run the new installation. Place the file in the same location on the new machine.

Note: If the **C:\ProgramData\HP\ALM\conf** (Windows) or **/var/opt/HP/ALM/conf** (Linux/Solaris) directories do not exist on the new server machine, manually create them. In such a case, make sure that the new directories have the required permissions to be accessed by the configuration tool.

3. Open the file and delete all information except for the line that starts with **initstring**.

4. Save the copy. If you are installing ALM on a new machine, skip to step 6.

5. If you are upgrading ALM on the same machine as the previous installation:

- a. Uninstall the current version of ALM. For information about uninstalling ALM, see "[Uninstalling ALM](#)" on page 180. Uninstalling ALM does not remove the existing **qcConfigFile.properties** file.
- b. Overwrite the existing **qcConfigFile.properties** file with the version you edited in step 3.

6. When you run the Configuration Wizard after the installation, the wizard detects a previous ALM installation and prompts you to accept the current settings. Accept the current settings. When the wizard reaches the Security page the previous Confidential Data Passphrase appears.

Managing Schema Changes

Changes to the existing Site Administration database schema may cause the upgrade process to fail. Examples of such changes are the deletion of tables or columns, or changes to field types.

If you know for sure that the schema has been changed manually, perform the steps below to ensure a successful schema upgrade.

If you are unsure if the schema has been changed, proceed with the installation as normal. If the schema has been changed, the configuration process fails if the changes cannot be handled automatically. It is important that not all schema upgrade failures are the result of the schema changes. Check the error logs very carefully to identify the exact cause of the failure. If it is apparent that the failure was due to changes to the schema, proceed with the steps below. You will have to run the configuration process again.

To prevent the upgrade process from failing, perform one of the following actions:

Note: It is advisable to perform these actions in this order.

1. Manually repair inconsistencies between the old schema and the new schema. For more information about manually repairing the old schema, see ["Changing the Database User Schema" on page 215](#).
2. If the change is known and you are sure the upgraded ALMserver can work with it, you can create an exception file that instructs ALM to ignore these changes during the upgrade process. After creating the exception file, save it in an accessible location on your system. After installing ALM the Site Administration Database Schema page in the configuration wizard prompts you to add the file to the configuration process. As a result, the changes to the existing schema do not cause the upgrade process to fail.

To create an exception file:

- a. Copy the **SchemaExceptions.xml** file from the ALM installation directory. By default, the file is located in: **<ALM installation path>\data\sa\Admin\MaintenanceData**
- b. Place the copy of the file in an accessible location on your system.
- c. Edit the file and define exceptions. For example:

- **For an extra table:**

```
<TableMissing>
<object pattern="MY_Table" type="extra"/>
</TableMissing>
```

- **For an extra view:**

```
<ViewMissing>
<object pattern="MY_VIEW" type="extra"/>
</ViewMissing>
```

- **For an extra column:**

```
<ColumnMissing>
<object pattern="MY_COLUMN" type="extra"/>
</ColumnMissing>
```

- **For an extra index:**

```
<IndexMissing>
<object pattern="MY_INDEX" type="extra">
```

```
</IndexMissing>
```

- **For an extra constraint:**

```
<ConstraintMissing>
```

```
<object pattern="MY_CONSTRAINT" type="extra">
```

```
</ConstraintMissing>
```

- **For multiple occurrences of extra elements:**

For example, multiple extra columns:

```
<ColumnMissing>
```

```
<object pattern="MY_COLUMN_1" type="extra"/>
```

```
<object pattern="MY_COLUMN_2" type="extra"/>
```

```
</ColumnMissing>
```

- d. Save the **SchemaExceptions.xml** file.

3. If you cannot manually repair the inconsistencies, or create an exception file, create a new schema and then migrate the projects to the new schema.

If ALM is already installed on the server machine, you can rerun the ALM Server Configuration Wizard as follows:

- a. On the machine on which ALM is currently installed, navigate to and run the configuration wizard as follows:
 - **Windows.** Select **Start > Programs > HP ALM Server > Server Configuration Wizard**.
 - **Oracle/Solaris.** Navigate to the **/opt/HP/HP_ALM_Server** directory and run the **run_after_install.sh** file.
- b. In the Site Administration Database Schema page, select **Create a New Schema**.
- c. After the configuration process completes, migrate projects to the new schema using the **Restore Project** option in Site Administration. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

Part 5: Installation and Configuration

Chapter 14: Installing ALM on Microsoft Windows Systems

This chapter describes how to install ALM on Windows operating systems. It also describes how to install ALM silently.

Note: For information on installing ALM on Linux/Oracle Solaris systems, see "Installing ALM on Linux/Oracle Solaris Systems" on page 116.

This section includes:

| | |
|--|-----|
| Installing ALM: Windows | 99 |
| Installing ALM in Silent Mode: Windows | 113 |
| Configure the IIS Mail Service | 113 |

Installing ALM: Windows

Before installing ALM, consider the following:

- Verify that you meet the various installation prerequisites. For prerequisite information, see the relevant chapters in "[Installation Prerequisites](#)" on page 38.
- If you encounter problems during the ALM installation process, see "[Troubleshooting the ALM Installation](#)" on page 186 for troubleshooting suggestions.

To install ALM:

Note: The installation procedure consists of two parts, installation and configuration, which are both documented in this section.

1. Log in to the ALM server machine with the appropriate permissions. For a list of required permissions, see "[Required Permissions: Windows](#)" on page 43.
2. If Quality Center or ALM is installed on the machine, uninstall it. For information on uninstalling, see "[Uninstalling ALM from Windows Systems](#)" on page 181
3. Make sure the following services are started on the machine:
 - a. Secondary Logon
 - b. Windows Management Instrumentation
4. Insert the ALM 11.52 Software installation DVD into the DVD drive, run **setup.exe**, and click **ALM Platform (Windows OS)**.
5. The HP ALM Installation wizard starts, displaying the Welcome page. Click **Next**.
6. The License Agreement page opens.

Read the license agreement. To accept the terms of the license agreement, select **I Agree**. Click **Next**.
7. The Customer Information page opens. Type your **Name** and **Organization**. Click **Next**.

Note: The installer uses this information for subsequent installations.

8. The Select Installation Folder page opens. Specify the location to which you want to deliver ALM installation files. Click the browse button to choose a location, or accept the default location.

Make sure to enter a case-sensitive unique name for the installation folder.

For more information on the required installation directory permissions, see "[Required Permissions: Windows](#)" on page 43.

Click **Next**.

9. The Confirm Installation page opens.

To review or change any settings, click **Back**.

To accept the settings and start the installation process, click **Next**. The ALM files are installed on the server machine.

Note: If anti-virus software is installed on the server machine, it checks every file as it is being copied. Therefore deployment may take longer than expected.

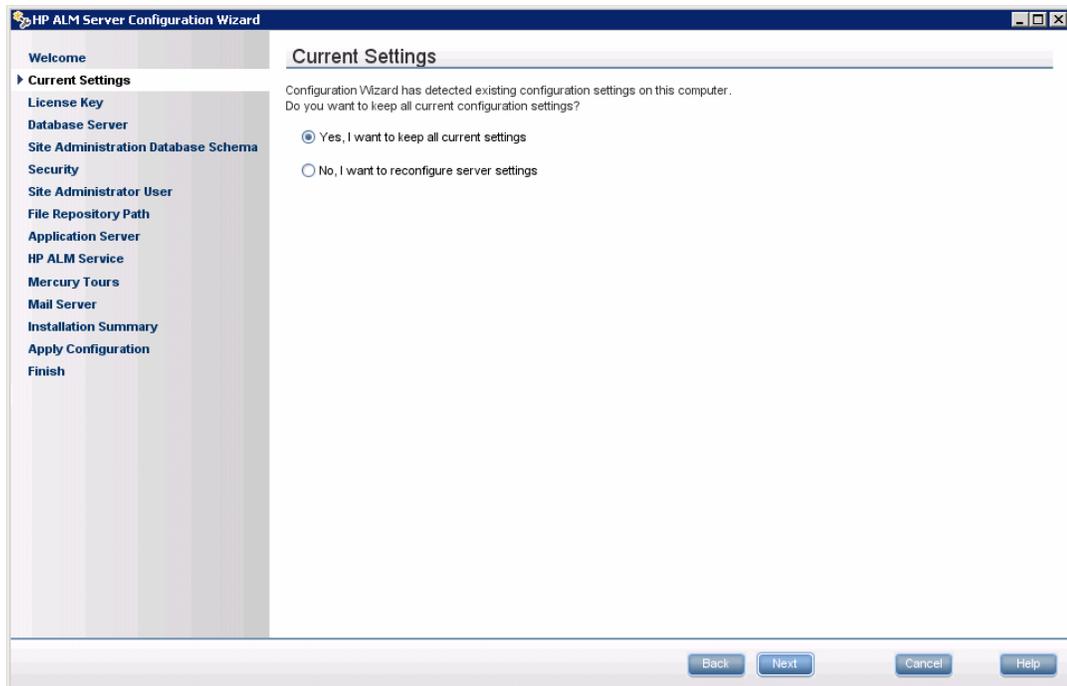
When the installation process completes, the Installation Complete page opens. Click **Finish**.

10. The ALM Configuration wizard opens, displaying the Welcome page. Click **Next**.

Note:

- The Configuration Wizard saves configuration settings in the **qcConfigFile.properties** file. The file is created in the **c:\ProgramData\HP\ALM\conf** directory. The file should not be moved from this location.
- The Configuration Wizard creates the **repid.txt** file in the **<ALM Repository path>\qc folder**. The file should not be moved from this location.
- If you are installing ALM on a secondary node of a cluster, some of the dialog boxes described in this configuration procedure are needed only for the primary node and are not displayed if you are installing a secondary node.

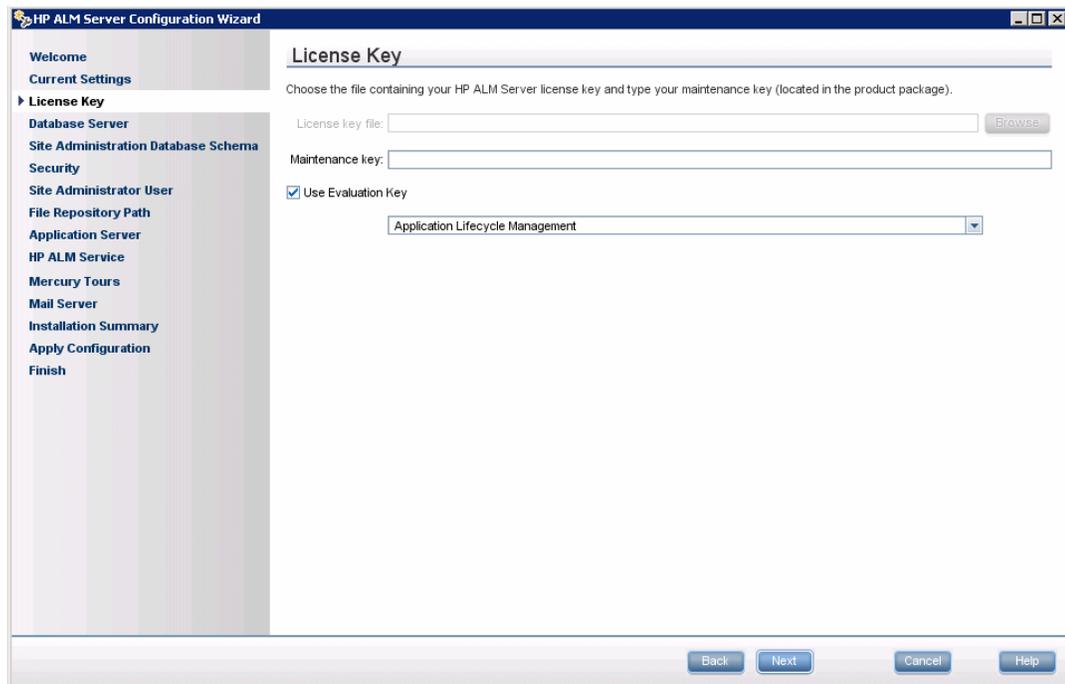
11. If the Configuration wizard detects settings from a previous ALM installation, the Current Settings page opens.



Select **Yes** to use the current settings as default settings for the current installation. You can make changes to any of the default settings during the wizard. Select **No** to clear all settings in the Configuration wizard.

Click **Next**

12. The License Key page opens.

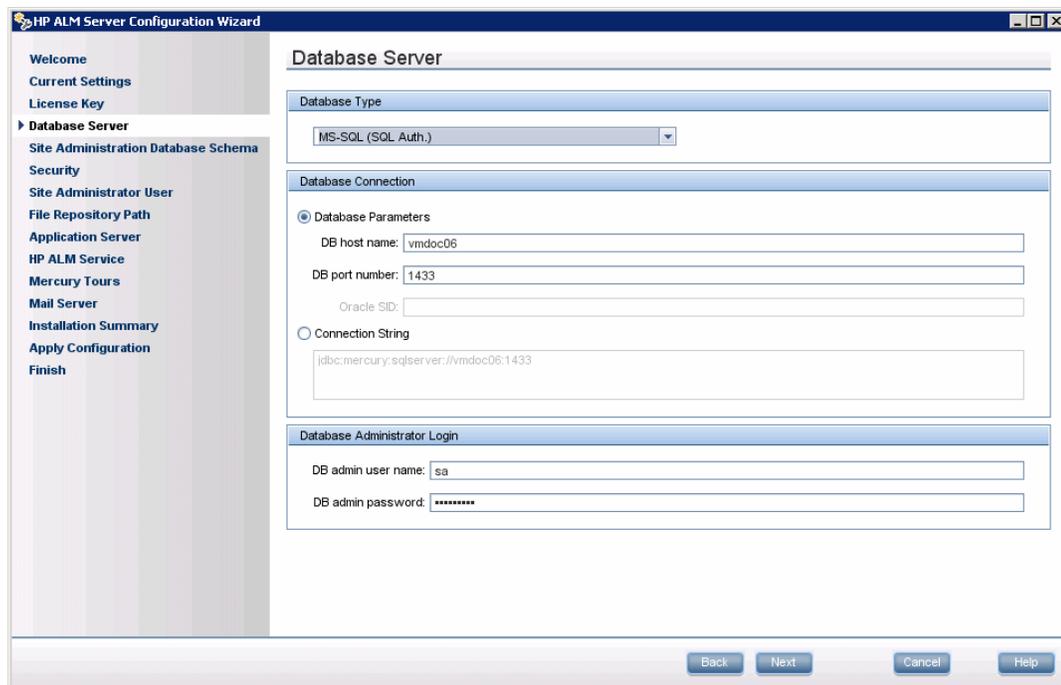


Select one of the following options:

- Browse to or enter the ALM license file path.
- If you do not have a license file, select **Use Evaluation Key** for a 30-day trial version of ALM. From the drop-down list, select the edition to install for the trial period.

Click **Next**.

13. The Database Server page opens.



- a. Under **Database Type**, select the database type to be used in your ALM system.

If you select a Microsoft SQL Server, choose the authentication type:

- Microsoft SQL Server (SQL Server Auth.). Authenticates the user to the database using a database user name and password.
- Microsoft SQL Server (Windows Auth.). Windows authentication relies on the user being authenticated by the operating system.

Note: When upgrading projects to ALM 11.52, you must use the same type of SQL authentication that you used when that project was originally created.

For more information on database requirements, see "[Prerequisites: Oracle Database Servers](#)" on page 52 or "[Prerequisites: Microsoft SQL Database Servers](#)" on page 60.

- b. Under **Database Connection**, specify database connection information.

Select one of the following options:

- **Database Parameters.** Select this option to enter database server information using the following fields:
 - **DB host name.** Type the database server name. For example, **dbsrv01**.
 - **DB port number.** Type the database server port number, or accept the default port number.
 - **Oracle SID.** If you selected Oracle as the database type, type the Oracle system identifier. This is an Oracle parameter that identifies the specific Oracle instance on the host machine on which the Oracle server is installed.

- **Connection String.** Select this option to type a formulated database server connection string.

To use an Oracle RAC database, select **Connection String**, and enter a connection string, specifying the location of the **tnsnames.ora** file, and the TNS server to which ALM should refer. Use the following example:

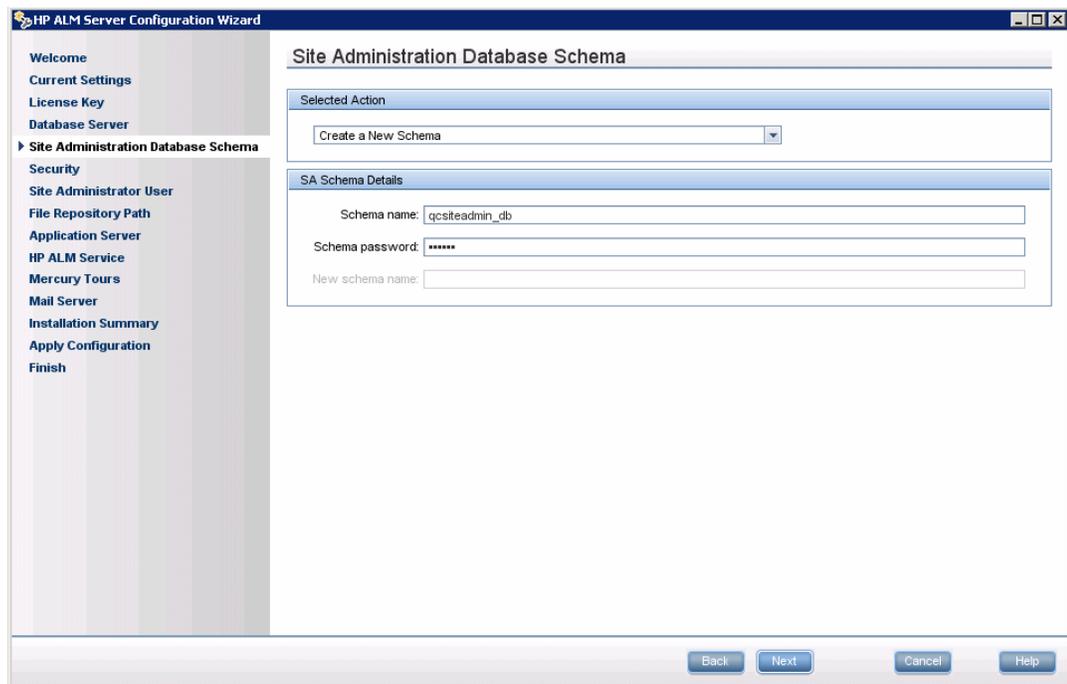
```
jdbc:mercury:oracle:TNSNamesFile=<tnsnames.ora
location>;TNSServerName=OrgRAC
```

For more information on prerequisites for Oracle RAC support, see "[Oracle RAC Support](#)" on page 58.

- c. Under **Database Administrator Login**, specify the following database connection information (Not applicable for Microsoft SQL Server Windows Authentication):
 - **DB admin user name.** Type the name of the user with the administrative permissions required to install ALM on the database server.
 - **DB admin password.** Type the database administrator password.

Click **Next**.

14. The Site Administration Database Schema page opens.



- a. Under **Selected Action**, choose one of the following:
 - **Create a New Schema.** Creates a new schema.
 - **Upgrade a copy of the existing schema.** Creates a copy of the existing Site Administration database schema, and upgrades the copy. For more information, see "[Schema Upgrade Guidelines](#)" on page 91.

If you select this option, the Schema Exceptions File option appears. If you have defined an exception file for the upgrade process, click **Browse** and navigate to the location where it was saved before the installation. For more information about exception files, see ["Managing Schema Changes" on page 92](#).

- **Connect to existing schema / second node.** This option can be used in two scenarios:
 - If you are reinstalling ALM and would like to reconnect to the same Site Administration database schema.
 - If you have an existing node and you want to install ALM on another node to create a cluster. For more information on cluster configuration, see ["Clustering: Windows" on page 44](#).

Note: This option enables you to connect to an ALM 11.52 Site Administration database schema only. To connect to an earlier version, you must first upgrade the schema. For more information, see ["Upgrading the Site Administration Database Schema" on page 90](#).

- b. When connecting ALM to an Oracle database server:

If you are installing ALM on a secondary node or if the Site Administration database already exists, the new Site Administration database schema is created in the same tablespace as the existing schema. Proceed to "The Site Administrator User page opens." on page 106

Type the following information:

- **Default Tablespace.** Select a default storage location from the list.
 - **Temporary Tablespace.** Select a temporary storage location from the list.
- c. Under **SA Schema Details**, type the following information:
 - **Schema name.** Type a Site Administration database schema name, or accept the default schema name.

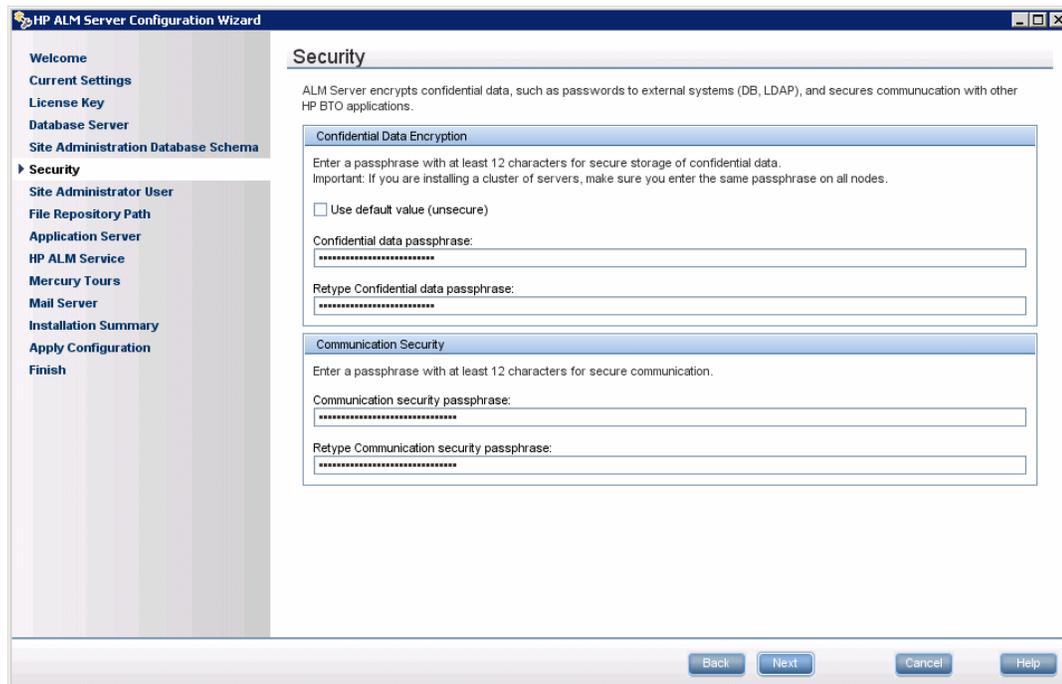
Note: When upgrading an existing Site Administration database schema to work in ALM 11.52, you must use the same name that you used before the upgrade.

- **Schema password.** Enter the following information, depending on your database type:
 - **Oracle:** The default **tdtdtd** password is created, which you can accept or change.
 - **Microsoft SQL Server (SQL Auth.):** ALM uses the **td** user to create the Site Administration database schema. For more details on the **td** user, see ["User Permissions for Connecting ALM to a Microsoft SQL Database Server" on page 62](#).

Type a password for the **td** user that complies with your organization's password policy, or keep the default **tdtdtd** password.
 - **Microsoft SQL Server (Windows Auth.):** Not applicable.
 - **New Schema name.** If you selected **Upgrade a copy of the existing schema**, type a name for the upgraded copy of the database schema.

Click **Next**.

15. The Security page opens.



- a. Confidential Data Encryption

Passwords for accessing external systems (databases and LDAP) are stored by ALM after encryption. Enter a **Confidential Data Passphrase** that ALM uses to encrypt the information.

Make a note of the passphrase for future support calls. You need the passphrase if you choose to redeploy ALM and choose to upgrade a copy of the existing Site Administration Database Schema. The passphrase is also required for the next ALM installation.

Select **Use default value** to use the default Confidential Data Encryption passphrase. By selecting this option, the encrypted information is more vulnerable to unauthorized access.

Confidential Data Passphrase Considerations

- When upgrading from an ALM 11.00 version of the Site Administration database schema, you must enter the same passphrase as was used for the previous installation. If you do not have a note of the passphrase, there is a workaround to recover it. However, you will have to abort the configuration process and then begin again once the workaround is complete. For details, see "[Recovering a Lost Confidential Data Passphrase](#)" on page 91.
- If you are planning to migrate Performance Center and/or Lab Management enabled projects onto the server on which you are performing the installation, you must use the same Confidential Data Passphrase that was defined on the server on which the projects were created.
- If you are installing ALM on a cluster, you must use the same passphrase for all nodes.
- After completing the server configuration wizard, you cannot change the confidential

data encryption passphrase.

- The passphrase is case-sensitive. Also check that there are no empty spaces before or after the passphrase.

b. Communication Security

Communication between ALM and other HP BTO applications is enabled after authentication by a Single Sign-On (SSO) token. Enter a Communication security passphrase that ALM uses to encrypt the SSO token.

Note:

- The communication security passphrase is stored as the value of the **COMMUNICATION_SECURITY_PASSPHRASE** site configuration parameter. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.
- **Performance Center:** You must use the same communication security passphrase for the Performance Center server configuration.

Click **Next**.

16. The Site Administrator User page opens.

The screenshot shows the 'HP ALM Server Configuration Wizard' window. The left sidebar contains a list of steps: Welcome, Current Settings, License Key, Database Server, Site Administration Database Schema, Security, Site Administrator User (selected), File Repository Path, Application Server, HP ALM Service, Mercury Tours, Mail Server, Installation Summary, Apply Configuration, and Finish. The main area is titled 'Site Administrator User' and contains the following text: 'Type user name and password to be used when logging in to Site Administration. This is not the same as the Site Administration database schema name and password.' Below this text are three input fields: 'User name:' with the value 'sa', 'Password:', and 'Retype password:'. At the bottom right, there are four buttons: 'Back', 'Next', 'Cancel', and 'Help'.

You use the site administrator name and password that you define here to log in to Site Administration for the first time. After installation, you can change the site administrator or add other site administrators. Enter a site administrator user name (maximum length 60 characters) and password, and retype the password to confirm.

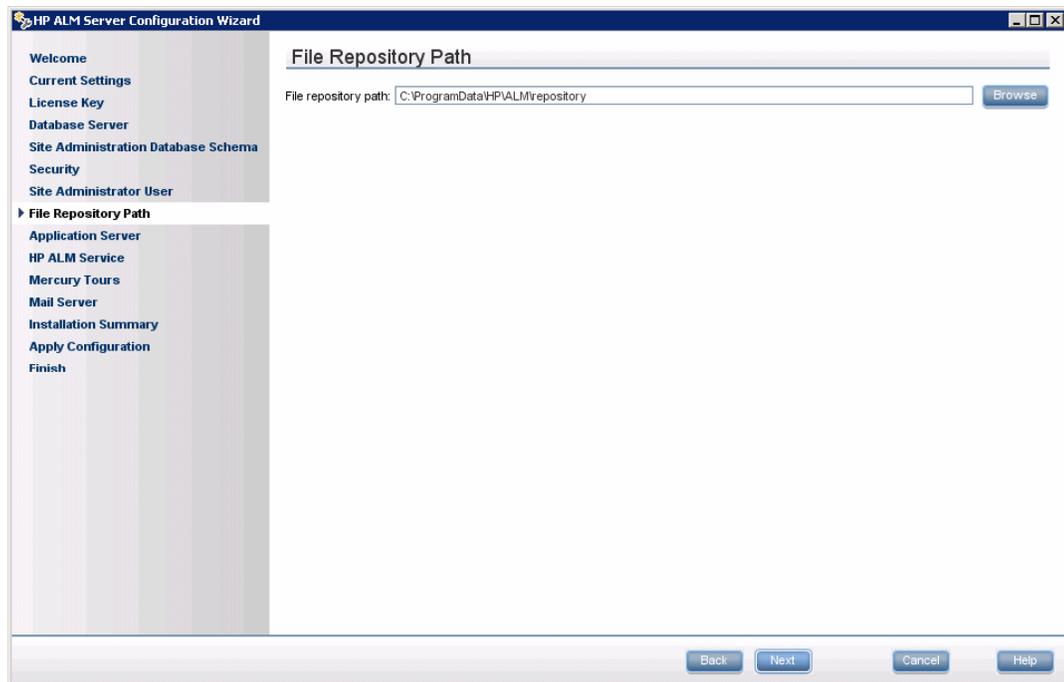
If you are upgrading a copy of the existing Site Administration database schema, by default the same user and credentials are applied to the upgraded schema. To create an additional user, select **Create additional Site Administrator user** (this field appears only when you are upgrading a copy of the existing schema).

Note:

- The user name cannot include the following characters: \ / : * ? " < > |
- It is important that you remember the site administrator user name and password so you can log in to Site Administration.

Click **Next**.

17. The File Repository Path page opens.



In the **File repository path** box, click the browse button to choose a repository path, or accept the default path. Make sure to enter a unique, case-sensitive name for the repository folder.

Note:

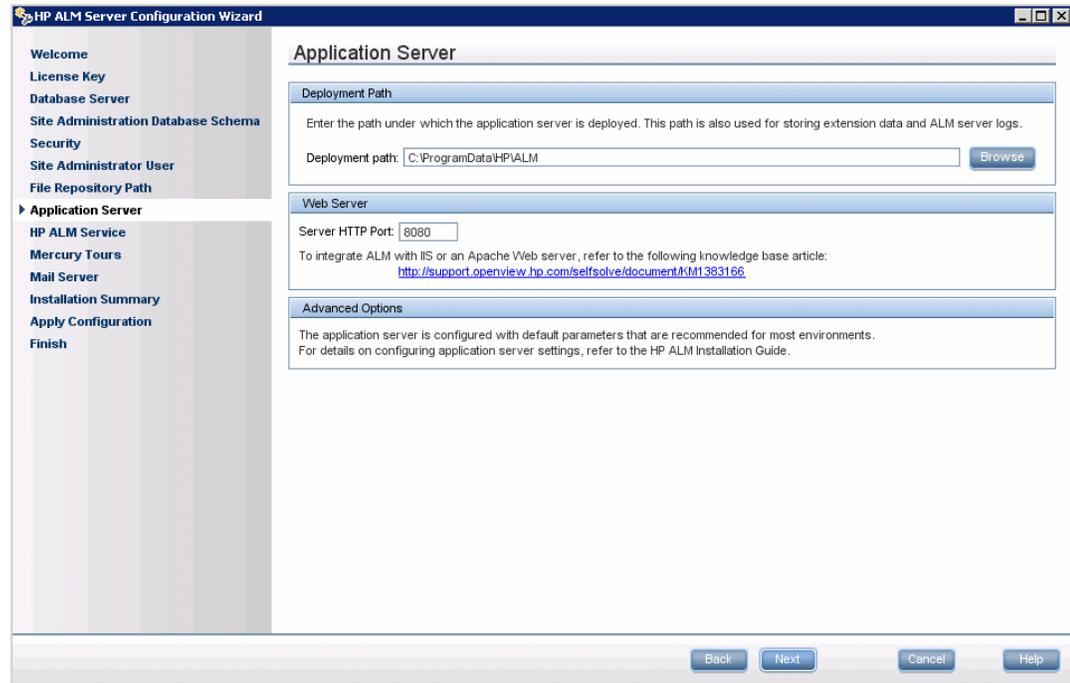
- Make sure you select a path where you have full read and write permissions.
- To work with cluster nodes, make sure that all nodes have access to the file repository path and that the path is UNC. All nodes in the cluster must have the same repository path.

Using the `BASE_REPOSITORY_PATH` site configuration parameter, you can create a location for a repository path where new projects will be located. Performing this action, therefore, means there will be two repository paths: the previous path containing older projects,

and a second path containing projects created subsequently. For details, refer to the *HP Application Lifecycle Management Administrator Guide*.

Click **Next**.

18. The Application Server page opens.



- a. In the **Deployment path** box:

Specify the location in which you want to deploy ALM application files. Click the browse button to choose a location, or accept the default location. It is recommended that you keep the default.

- b. In the **Web Server** box:

Change or keep the default HTTP port number. The default port is 8080.

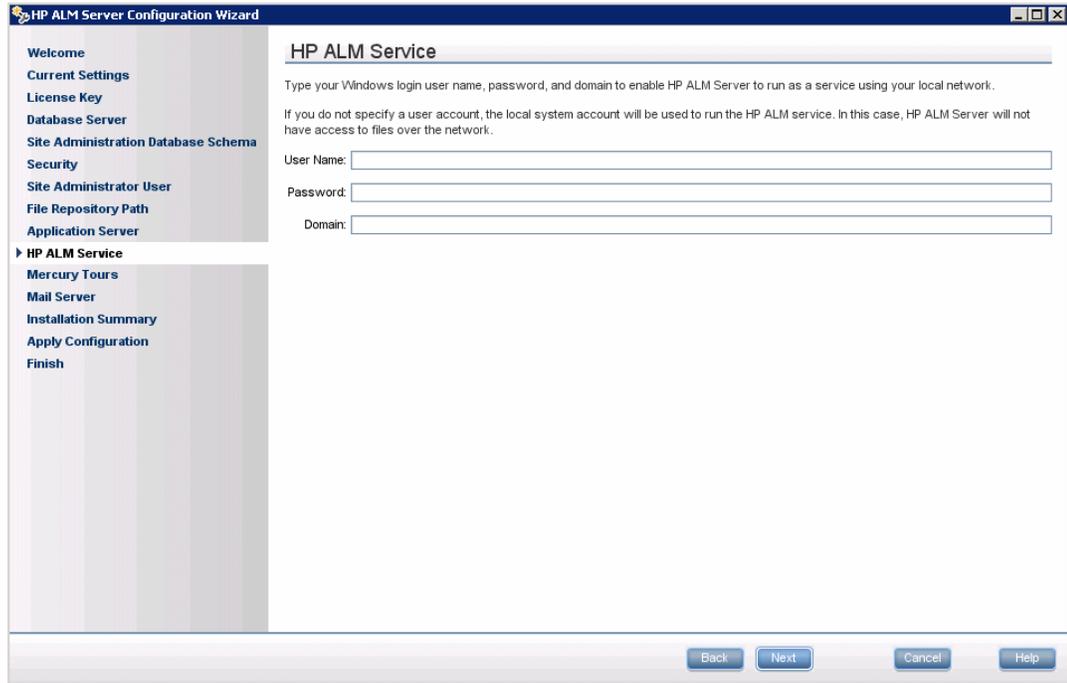
Note:

- To integrate ALM with an IIS Web server, see HP Software Self-solve knowledge base article [KM1383166](http://h20230.www2.hp.com/selfsolve/document/KM1383166) (<http://h20230.www2.hp.com/selfsolve/document/KM1383166>). (Requires HP Passport sign-in credentials.)
- If an error message is displayed that the default port is unavailable, the port may be in use by another application running on the server machine. Either locate the application and stop it, or enter a different port number. To enter a different port number, you must first change the port number on the application server. For details, see "[Changing the Application Server Port Number](#)" on page 167. Then proceed with the configuration as normal.

- You can update the heap memory value after you have installed ALM. For details, see "Changing the Heap Memory Size" on page 167."

Click **Next**.

19. The HP ALM Service page opens.

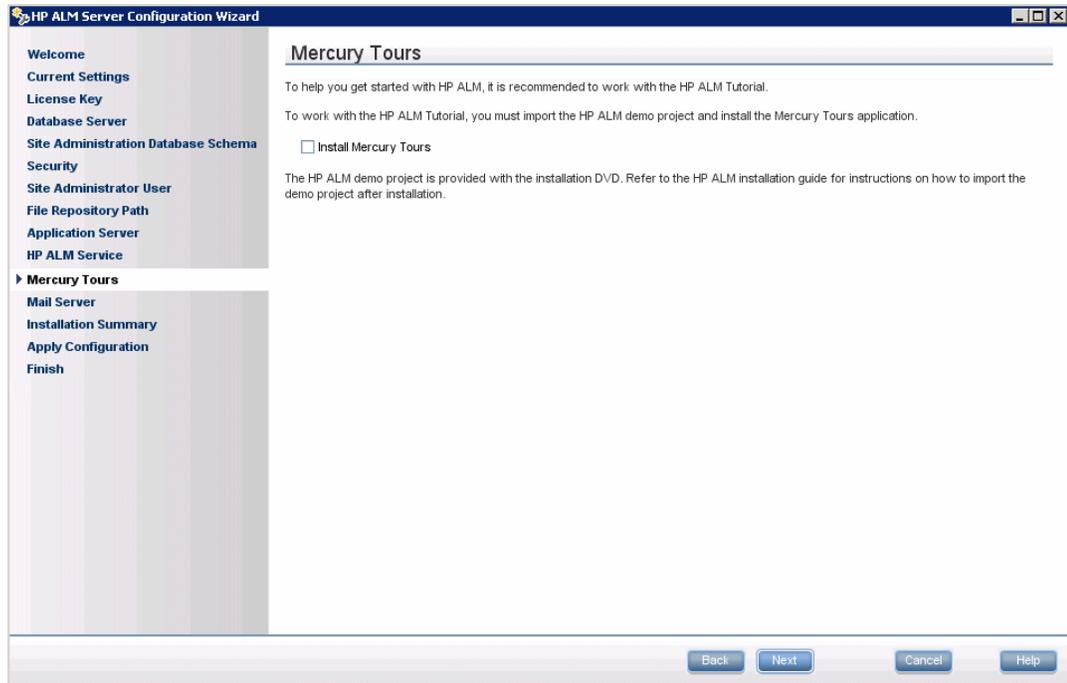


The screenshot shows the 'HP ALM Server Configuration Wizard' window. The title bar reads 'HP ALM Server Configuration Wizard'. On the left is a vertical navigation pane with the following steps: Welcome, Current Settings, License Key, Database Server, Site Administration Database Schema, Security, Site Administrator User, File Repository Path, Application Server, HP ALM Service (selected), Mercury Tours, Mail Server, Installation Summary, Apply Configuration, and Finish. The main content area is titled 'HP ALM Service' and contains the following text: 'Type your Windows login user name, password, and domain to enable HP ALM Server to run as a service using your local network. If you do not specify a user account, the local system account will be used to run the HP ALM service. In this case, HP ALM Server will not have access to files over the network.' Below this text are three input fields labeled 'User Name:', 'Password:', and 'Domain:'. At the bottom right of the window are four buttons: 'Back', 'Next', 'Cancel', and 'Help'.

Type the **User Name**, **Password**, and **Domain** to be used to run the application server as a service. This enables the service to access your local network.

If the repository is on a remote machine, or if you are using a Microsoft SQL server with Windows authentication, enter the details of a domain user who has administrative permissions for the SQL server and who is a local administrator.

20. The Mercury Tours page opens.

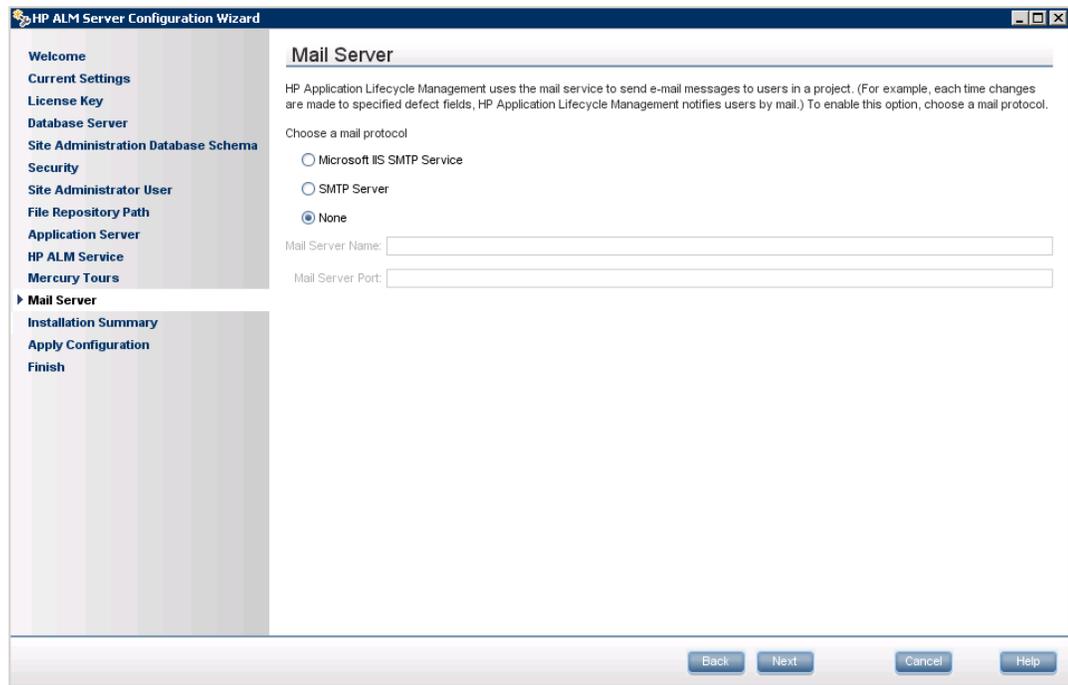


To help you get started with ALM, install the sample Web-based travel reservation application, Mercury Tours. This is a prerequisite for working with the *HP Application Lifecycle Management Tutorial*.

Note: It is recommended that you import the ALM Demo Project available with the ALM 11.52 installation DVD. Importing this project enables you to run all lessons in the *HP Application Lifecycle Management Tutorial*. In Site Administration, import the **ALM_Demo.qcp** file. For more information on importing projects, refer to the *HP Application Lifecycle Management Administrator Guide*.

Click **Next**.

21. The Mail Server page opens.



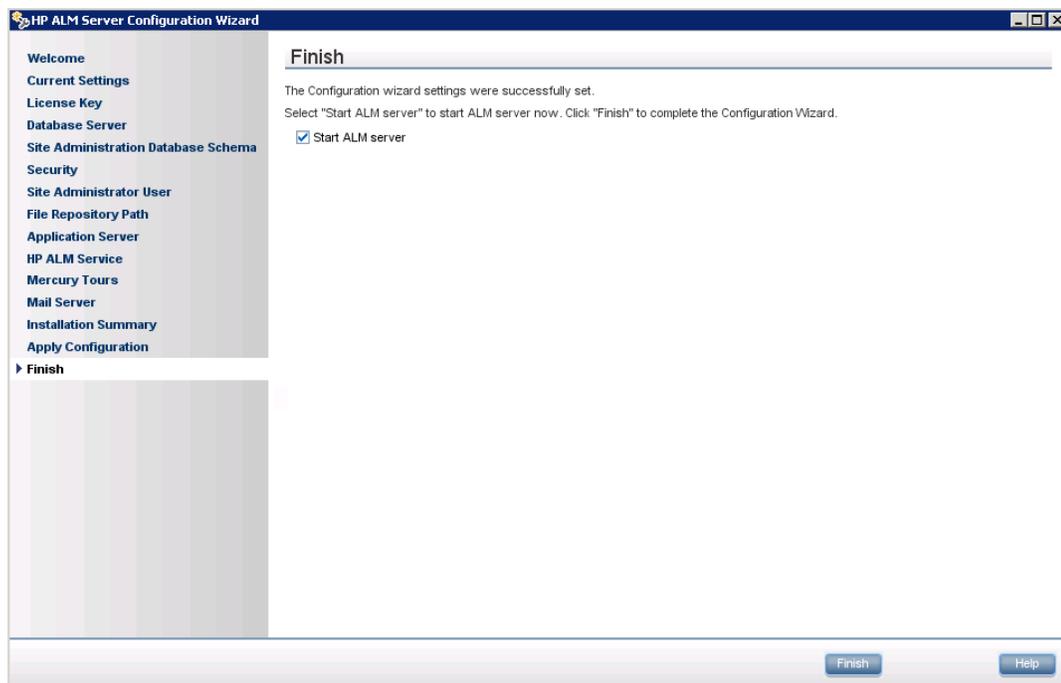
To enable ALM to send emails to users in an ALM project, select a mail protocol. For **SMTP Server**, type the server name.

If you selected **Microsoft IIS SMTP Service**, you must configure the Microsoft IIS SMTP service. For more information, see "[Configure the IIS Mail Service](#)" on page 113.

Click **Next**.

Note: The Mail Server can be configured after installation in Site Administration. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

22. The Installation Summary page opens. To change any settings, click **Back**.
To accept the settings and start the configuration process, click **Next**.
23. The Finish page opens.



Click **Finish**.

If the installation process fails, check the installation logs for details. For more information see ["Checking the Installation and Configuration Log Files"](#) on page 188.

If you selected to upgrade a copy of the existing Site Administration database schema, it is possible that an upgrade related issue caused the configuration to fail. Check the following files located in the **<file repository path>/sa/Admin/maintenancedata/out** directory for more information:

- **upgrade.txt**
- **verifyreport.html**

If the failure was due to changes made to the existing Site Administration database schema and the upgraded ALM server will work properly with these Site Administration database schema changes, you need to create an exception file that excludes these changes from the upgrade process. You then run the configuration wizard again. For more information, see ["Managing Schema Changes"](#) on page 92.

24. If you are prompted to restart the machine, you can choose to restart at a later time, but you must restart before you use ALM. You must also restart before you install any ALM related files, such as integration add-ins.
25. If you are using an Oracle RAC database, verify that the **ORACLE_RAC_SUPPORT** site configuration parameter is set to **Y**. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.
26. The installation of ALM is now complete. Proceed to ["Starting ALM"](#) on page 134.

Installing ALM in Silent Mode: Windows

A silent installation runs the entire setup process in the background without requiring you to navigate through setup screens and input selections. Instead, all configuration parameters are assigned values that you define in a configuration file (**qcConfigFile.properties**). When running an installation in silent mode, no messages are displayed. Instead, you can view installation information in the log file, including information on whether the installation was successful. The installation log file can be found under the **%tmp%** directory.

To troubleshoot problems you may encounter while running the installation, see "[Troubleshooting the ALM Installation](#)" on page 186.

To install ALM in Silent Mode:

Note: To run silent installations for different configurations, you can create multiple configuration files.

1. Uninstall the existing version of ALM/Quality Center from the machine.
2. Create the **qcConfigFile.properties** file.

The file defines the configuration values that are used during the installation.

It is recommended that you use an existing file from a prior installation of ALM.

If there is no existing file, you can create one manually. However, this can be a complicated process that is open to errors. We suggest that you create one by running a normal installation. During the installation process, the file is automatically created. The configuration values you define during the installation process are recorded in the file. Even if you subsequently uninstall ALM, you can keep and edit the file as needed for future installations.

The file is automatically saved in the following path: **c:\ProgramData\HP\ALM\conf**

3. From the command line, run the **run_silent.bat** file on the installation DVD. The file is located in the appropriate **.zip** folder for your operating system (32-bit or 64-bit).

In the command line, add the **-c <configuration file full path>** parameter to specify the path of the configuration file, for example, **c:\Users\qcadmin\Desktop\qcConfigFile.properties**.

Optionally, add the **-i** parameter to specify an alternative installation path.

Configure the IIS Mail Service

If you selected **Microsoft IIS SMTP Service** in the ALM Server Configuration Wizard's Mail Server page, you must configure the Microsoft IIS SMTP service as follows:

1. Open the Internet Information Services (IIS) Manager window.
2. In the Tree pane, right-click **Default SMTP Virtual Server** and select **Properties**. The Default SMTP Virtual Server Properties dialog box opens.
3. In the Access tab, click the **Connection** button. The Connection dialog box opens. Select **All except the list below** and click **OK**.

4. Click the **Relay** button. The Relay Restrictions dialog box opens. Select **All except the list below** and click **OK**.
5. Click **OK** to close the Default SMTP Virtual Server Properties dialog box.

Chapter 15: Installing ALM on Linux/Oracle Solaris Systems

This chapter describes how to install ALM on Linux/Oracle Solaris operating systems. It also describes how to install ALM silently.

Note: For information on installing ALM on Windows systems, see "[Installing ALM on Microsoft Windows Systems](#)" on page 98.

This section includes:

| | |
|---|-----|
| Installing ALM: Linux/Oracle Solaris | 117 |
| Installing ALM in Silent Mode: Linux/Oracle Solaris | 130 |
| Working in Console Mode | 131 |

Installing ALM: Linux/Oracle Solaris

Before installing ALM, consider the following:

- Verify that you meet the various installation prerequisites. For prerequisite information, see the relevant chapters in ["Installation Prerequisites" on page 38](#).
- The steps below are to be performed by the root user. They can also be performed by a non-root user, provided that the system administrator made the preparations according to the instructions in ["Installing ALM for Non-Root Users" on page 47](#).
- If you are working in a clustered environment, you must mount the file system repository before you start the ALM installation process. The mount should not use any cache mechanisms. For details, contact your network administrator.
- By default, the installation and configuration processes run in console mode. Navigating from one wizard step to the next requires familiarity with the various console mode command types. For explanations of the various command types and the methods for entering configuration settings, see ["Working in Console Mode" on page 131](#).
- If you encounter problems during the ALM installation process, see ["Troubleshooting the ALM Installation" on page 186](#) for troubleshooting suggestions.

To install ALM:

Note: The installation procedure consists of two parts, installation and configuration, which are both documented in this section.

1. Log in to the ALM host machine with the appropriate permissions. For a list of required permissions, see ["Required Permissions: Linux/Oracle Solaris" on page 48](#).
2. If Quality Center or ALM is installed on the machine, uninstall it. For information on uninstalling, see ["Uninstalling ALM from Linux/Oracle Solaris Systems" on page 181](#).
3. The installation process can be run in console mode only. After the installation is complete, the ALM Server Configuration Wizard enables you to configure the installation. By default, the wizard runs in console mode.
4. Create an installation directory on the server. For example: **/usr/Install/ALM**.
5. Insert the ALM11.52 Software installation DVD into the DVD drive. Under the mount folder, navigate to the appropriate installation subfolder for your system. For example:
 - **Linux.** /mnt/dvd/ALM-Linux
 - **Solaris.** /mnt/dvd/ALM-Solaris
6. Copy the entire contents of the subfolder to the installation directory you created on the server.
7. Run the following **chmod** command to allow permissions for the installation files: **chmod -R 777 <installation directory>**.
8. From the installation directory on the server, navigate to the folder with the **installer.sh** file.

- If you are going to start ALM using the root user, continue installing with the root user. Run **installer.sh**.
 - If you are going to start ALM using the non-root user, **ALM_Admin**, do one of the following:
 - If the system administrator granted **sudo** privileges to **ALM_Admin**, switch to **ALM_Admin** now and run the **installer.sh** file using **sudo installer.sh**.
 - If the system administrator did not grant **sudo** privileges to **ALM_Admin**, continue installing with the root user. Run **installer.sh**.
9. The HP Application Lifecycle Management Setup Wizard page opens, displaying the Welcome page.

```
-----  
Welcome to the HP Application Lifecycle Management Setup Wizard  
-----  
This wizard will guide you through the steps required to install HP Application  
Lifecycle Management on the computer.  
  
WARNING: This computer program is protected by copyright law and international t  
reaties. Unauthorized duplication or distribution of this program, or any portio  
n of it, may result in several civil  
or criminal penalties, and will be prosecuted to the maximum extent possible und  
er the law.  
  
> To continue, select "Next"  
> To abort the setup wizard, select "Cancel"  
  
Select [ Next[n], Cancel[c] ] :
```

Select **Next** to continue.

10. The License Agreement page is displayed.

```
-----  
LICENSE AGREEMENT  
-----  
Please take a moment to read the License Agreement, located in:  
/usr/tmp/Linux2.4/sequencer/resources/EULA/EULA .  
  
>To review the full License Agreement, select "View Agreement"  
>To accept the agreement terms, select "Agree"  
>To go back to the previous step, select "Back"  
>To abort the setup wizard, select "Cancel"  
  
Select: [ View Agreement[v], Agree[a], Back[b], Cancel[c] ] :
```

Read the agreement. To accept the terms of the agreement, select **Agree**.

11. The Select Installation Directory page is displayed, displaying the default location for the installation files.

```
-----  
SELECT INSTALLATION DIRECTORY  
-----  
  
The installer will install HP Application Lifecycle Management in the following  
directory:  
/opt/HP/HP_ALM_Server.  
  
> To install in this directory, select "Next"  
> To install in a different directory, select "Select different directory"  
> To go back to the previous step, select "Back"  
> To abort the setup wizard, select "Cancel"  
  
Select [ Next[n], Select different directory[s], Back[b], Cancel[c] ]:
```

To keep the default path, select **Next**, or select **Select a different directory** to define another directory.

Note: If you change the default, a soft link (symbolic link) with the default directory path is created which points to the directory you define.

12. The Confirmation page is displayed.

```
-----  
CONFIRMATION  
-----  
  
HP Application Lifecycle Management will be installed in the following directory  
:  
/opt/HP/HP_ALM_Server.  
  
> To start the HP Application Lifecycle Management installation, select "Install"  
> To go back to the previous step, select "Back"  
> To abort the setup wizard, select "Cancel"  
  
Select [ Install[i], Back[b], Cancel[c] ]:
```

If you do not wish to change any of the settings, select **Install** to proceed with the installation. Alternatively, select **Back** to change a previous setting, or **Cancel** to abort the installation.

If you select **Install**, ALM files are installed on the server machine.

13. When the installation process completes, the Finish page is displayed.

```
-----  
FINISH  
-----  
  
HP Application Lifecycle Management has been successfully installed in the /opt/  
HP/HP_ALM_Platform directory  
  
LOG FILE: Install log directory:  
/var/log/28.03.12_14-12-33_HP_ALM_Server_11.50.000_iHP_log.txt  
  
> To complete the setup wizard, select "Finish"  
> To view the output log, select "View Log"  
  
Select [ Finish[f], View Log[v] ]:
```

To complete the Setup Wizard, select **Finish**.

14. The HP ALM Server Configuration wizard starts, displaying the Welcome page.

Note:

- The Configuration Wizard saves configuration settings in the **qcConfigFile.properties** file. The file is created in the **/var/opt/HP/ALM/conf** directory. The file should not be moved from this location.
- The Configuration Wizard creates the **repid.txt** file in the **<ALM Repository path>\qc** folder. The file should not be moved from this location.
- If you are installing ALM on a secondary node of a cluster, some of the dialog boxes described in this configuration procedure are needed only for the primary node and are not displayed if you are installing a secondary node.

```
-----  
Welcome  
  
Welcome to the HP ALM Platform Configuration Wizard.  
  
The HP ALM Platform Configuration Wizard will guide you through the steps of  
installing HP Application Lifecycle Management Platform 12.00 on your computer.  
  
Press 1 for Next, 2 for Cancel, or 3 for Redisplay [1]
```

- If you ran the installation script using the root user and you are going to start ALM using the root user, select **Next** to proceed to the next page.
 - If you ran the installation script using the root user but you are going to start ALM using **ALM_Admin**, select **Cancel**. Then, switch to **ALM_Admin** and run the **run_after_install.sh** file from the installation folder.
 - If you ran the installation script using **ALM_Admin** with **sudo**, select **Cancel**. Then, using **ALM_Admin** without **sudo**, run the **run_after_install.sh** file from the installation folder.
15. If the wizard detects settings from a previous ALM installation, the Current Settings page is displayed.

```
-----  
Current Settings  
  
Configuration Wizard has detected existing configuration settings on this  
computer.  
Do you want to keep all current configuration settings?  
  
[X] 1 - Yes, I want to keep all current settings  
[ ] 2 - No, I want to reconfigure server settings  
  
To select an item enter its number, or 0 when you are finished: [0]
```

By default, current settings are used. The current settings appear as defaults in subsequent wizard screens. You can then make changes to any of the previous settings.

Choose to keep or clear the current settings, then proceed to the next page.

16. The License Key page is displayed.

- a. Enter the License file path.

```
-----  
License Key  
  
Choose the file containing your HP ALM Platform license key and type your  
maintenance key (located in the product package).  
  
License key file:
```

If you have a License key file, enter the ALM License file path. If you do not have a key file, you can leave this field empty and proceed with an evaluation key.

- b. Use an Evaluation Key.

```
[ ] 1 - Use Evaluation Key  
  
To select an item enter its number, or 0 when you are finished: [0]  
  
Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1]
```

If you do not have a License key, you can use an evaluation key for a 30-day trial version of ALM. A list of available ALM editions is displayed.

From the editions list, choose the edition you want to use.

17. The Database Server page is displayed.

- a. Select the database type.

```
-----  
Database Server  
  
Database Type  
  
[X] 1 - MS-SQL (SQL Auth.)  
[ ] 2 - Oracle  
  
To select an item enter its number, or 0 when you are finished: [0]
```

For more information on database requirements, see "[Prerequisites: Oracle Database Servers](#)" on page 52 or "[Prerequisites: Microsoft SQL Database Servers](#)" on page 60.

- b. Select a database connection method.

```
-----  
Database Connection  
  
[X] 1 - Database Parameters  
[ ] 2 - Connection String  
  
To select an item enter its number, or 0 when you are finished: [0]
```

Select one of the following:

- **Database Parameters.** Enables you to enter database server information.
- **Connection String.** Enables you to type a formulated database server connection string. If you select this option, proceed to step d.

Choose **Connection String** to use an Oracle RAC database, and enter a string, specifying the location of the `tnsnames.ora` file, and the TNS server that ALM should refer to. Use the following example:

```
jdbc:mercury:oracle:TNSNamesFile=<tnsnames.ora location>;
TNSServerName=OrgRAC
```

For more information on prerequisites for Oracle RAC support, see "[Oracle RAC Support](#)" on page 58.

c. Enter Database Parameters.

```
DB host name: [m35.com] 0
DB port number: [1433] 0
```

If you selected the **Database Parameters** connection method above, enter the following information:

- **DB host name.** Type the database server name.
- **DB port number.** Type the database server port number, or accept the default port number. To accept the default, enter 1, then press Enter.
- **Oracle SID.** Type the Oracle system identifier. This is an Oracle parameter that identifies the specific Oracle instance on the host machine on which the Oracle server is installed.

d. Enter Database Administrator Login information.

```
Database Administrator Login
DB admin user name: [sa] sa
DB admin password: [*****]
Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1] 1
```

Specify the following:

- **DB admin user name.** The name of the user with the administrative permissions required to connect ALM to the database server.
- **DB admin password.** The database administrator password.

18. The Site Administration Database Schema page is displayed.

- a. Select a Site Administration database schema option.

```
-----
Site Administration Database Schema

Selected Action

[X] 1 - Create a New Schema
[ ] 2 - Upgrade a copy of the existing schema
[ ] 3 - Connect to existing schema/ second node

To select an item enter its number, or 0 when you are finished: [0]
```

Select one of the following:

- **Create a New Schema.** Creates a new Site Administration database schema. This is the default option.
- **Upgrade a copy of the existing schema.** Creates a copy of the existing Site Administration database schema, and upgrades the copy. For more information, see ["Upgrading the Site Administration Database Schema" on page 90](#).

If you select this option, you are prompted to add an exception file to the upgrade process. If you have defined an exception file, enter the location of where it was saved prior to the installation process. For more information about exception files, see ["Managing Schema Changes" on page 92](#).

- **Connect to existing schema / second node.** This option can be used in two scenarios:
 - If you are reinstalling ALM and would like to reconnect to the same Site Administration database schema.
 - If you have an existing node and you want to install ALM on another node to create a cluster. For more information on cluster configuration, see ["Clustering: Linux/Oracle Solaris" on page 49](#).

Note: This option enables you to connect to an ALM 11.52 Site Administration database schema only. To connect to an earlier version of Site Administration, you must first upgrade the schema. For more information, see ["Upgrading the Site Administration Database Schema" on page 90](#).

- b. Enter Oracle Tablespace information.

```
Oracle Tablespaces

Select the default and temporary tablespaces that will be used to store the ALM
Server Site Administration database schema.

Temporary Tablespace:

[X] 1 - TEMP

To select an item enter its number, or 0 when you are finished: [0]
```

If you are using an Oracle database, enter the following information. If you are using a Microsoft SQL database, proceed to step c.

Note: If you are installing ALM on a secondary node or if the Site Administration database already exists, the new Site Administration database schema is created in the same tablespace as the existing schema. Proceed to step 21.

- **Temporary Tablespace.** The Temporary Tablespace is the location on the database where temporary tables are created in order to facilitate internal database functionality, such as large sorting tasks. It is recommended that you accept the default location.
- **Default Tablespace.** The Default Tablespace is the location on the database where database objects will be created.

```
Default Tablespace:
[X] 1 - QC_DATA 5107MB
[ ] 2 - QCQA 367MB
[ ] 3 - TDQC 86MB
[ ] 4 - OTAL 99MB
[ ] 5 - QUALCTR_DATA_2 936MB
[ ] 6 - TDDATA 430MB
[ ] 7 - TD50_DATA 1689MB
[ ] 8 - BSTATS DATA 6149MB
[ ] 9 - QC_PROJECTS 12726MB
[ ] 10 - TD 1678MB
[ ] 11 - USERS 137MB
[ ] 12 - NETAPP 22918MB
[ ] 13 - USER_DATA 468MB
[ ] 14 - QUALITY_CTR_DATA 1008MB
[ ] 15 - QC_92 4568MB
[ ] 16 - QCPD 6336MB
[ ] 17 - QCTB01 99MB
[ ] 18 - TESTDIR_DATA_01 17381MB
[ ] 19 - QC_DATA_03 4501MB

To select an item enter its number, or 0 when you are finished: [0]
```

Select a location from the list.

- c. Enter Site Administration database schema details.

```
SA Schema Details

Schema name: [ilana_linux_vmqrnd67] new_ALM_sa_schema

Schema password: [*****]

Press 1 for default value, or 2 for no value: [1]

Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1]
```

Enter the following information:

- **Schema name.** Enter a name for the Site Administration database schema, or accept the default.

If you selected **Upgrade a copy of the existing schema** above, the **New Schema Name** option appears. Type a name for the upgraded copy of the Site Administration database schema.

Note: When upgrading an existing Site Administration database schema to work in ALM 11.52, you must use the same name that you used before the upgrade.

- **Schema password.** Enter the following information, depending on your database type:
 - **Oracle.** The default **tdtdtd** password is created, which you can accept or change.
 - **Microsoft SQL Server (SQL Auth.).** ALM uses the **td** user to create the Site Administration database schema. For more details on the **td** user, see ["User Permissions for Connecting ALM to a Microsoft SQL Database Server"](#) on page 62.

Type a password for the **td** user that complies with your organization's password policy, or keep the default **tdtdtd** password.

19. The Security page is displayed.

```
-----
Security

ALM Platform encrypts confidential data, such as passwords to external systems
(DB, LDAP), and secures communication with other HP BTO applications.

Confidential Data Encryption

Enter a passphrase with at least 12 characters for secure storage of
confidential data.
Important: If you are installing a cluster of servers, make sure you enter the
same passphrase on all nodes.

[ ] 1 - Use default value (unsecure)

To select an item enter its number, or 0 when you are finished: [0] 0
```

Passwords for accessing external systems (databases and LDAP) are stored by ALM after encryption. Enter a Confidential Data Passphrase that ALM uses to encrypt the information or choose to use the default value. If you use the default value however, the encrypted information is more vulnerable to unauthorized access.

Make a note of the passphrase for future support calls. You will also need the passphrase if you choose to redeploy ALM or choose to upgrade a copy of the existing Site Administration Database Schema, or whenever you upgrade the ALM version.

Confidential Data Passphrase Considerations

- When upgrading from an ALM 11.52 version of the Site Administration database schema, you must enter the same passphrase as was used for the previous installation. If you do not know the passphrase, there is a workaround to recover it. However, you have to abort the configuration process and then begin again once the workaround is complete. For details, see ["Recovering a Lost Confidential Data Passphrase"](#) on page 91.

- If you are planning to migrate Performance Center and/or Lab Management enabled projects onto the server on which you are performing the installation, you must use the same Confidential Data Passphrase that was defined on the server on which the projects were created.
- If you are installing ALM on a cluster, you must use the same passphrase for all nodes.
- After completing the server configuration wizard, you cannot change the confidential data encryption passphrase.
- The passphrase is case-sensitive. Check that there are no empty spaces before or after the passphrase.

20. Enter a Communication Security Passphrase.

```
Communication Security

Enter a passphrase with at least 12 characters for secure communication.

Communication security passphrase:

Retype Communication security passphrase:

Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [ ]
```

Communication between ALM and other HP BTO applications is enabled after authentication by a Single Sign-On (SSO) token. Enter a Communication security passphrase that ALM uses to encrypt the SSO token.

Note:

- The communication security passphrase is stored as the value of the **COMMUNICATION_SECURITY_PASSPHRASE** site configuration parameter. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.
- **Performance Center:** You must use the same communication security passphrase for the Performance Center server configuration.

21. The Site Administrator User page is displayed.

```
-----
Site Administrator User

Type user name and password to be used when logging in to Site Administration.
This is not the same as the Site Administration database schema name and
password.

User name: [sa] sa

Password:

Retype password:

Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1] 1
```

You use the site administrator name and password that you define here to log in to Site Administration. After installation, you can change the site administrator or add other site administrators. Enter a site administrator user name (maximum length 60 characters) and password, and retype the password to confirm.

If you are upgrading a copy of the existing Site Administration database schema, by default the same user and credentials are applied to the upgraded Site Administration database schema. The **Create additional Site Administrator user** option is displayed, enabling you ignore this default and create an additional user.

Note:

- The user name cannot include the following characters: \ / : * ? " < > |
- It is important that you remember the site administrator user name and password as otherwise you cannot log in to Site Administration.

22. The File Repository Path page is displayed.

```
-----  
File Repository Path  
  
File repository path: [/var/opt/HP/ALM/repository]  
  
Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1] 1
```

Accept the default path or enter a new path. If you choose to ignore the default, make sure to enter a unique case-sensitive path.

Note:

- Make sure you select a path where you have full read and write permissions.
- To work with cluster nodes, make sure that all nodes have access to the file repository path and that the path is UNC. All nodes in the cluster must have the same repository path.

Using the `BASE_REPOSITORY_PATH` site configuration parameter, you can create a location for a repository path where new projects will be located. Performing this action, results in the creation of two repository paths - the previous path containing older projects, and a second path containing projects created subsequently. For details, refer to the *HP Application Lifecycle Management Administrator Guide*.

23. The Application Server page opens.

- a. Enter Deployment Path information.

```
-----  
Application Server  
  
Deployment Path  
  
Enter the path under which the application server is deployed. This path is  
also used for storing extension data and ALM server logs.  
  
Deployment path: [/var/opt/HP/ALM]
```

Enter a **Deployment Path**, where you specify the location in which you want to deploy ALM application files. It is recommended that you keep the default.

- b. Enter Web server information.

```
Web Server

Server HTTP Port: [8080]
Press 1 for default value, or 2 for no value: [1]

To integrate ALM with IIS or an Apache Web server, refer to the following
knowledge base article:

http://support.openview.hp.com/selfsolve/document/KM1383166

Advanced Options

The application server is configured with default parameters that are
recommended for most environments.
For details on configuring application server settings, refer to the HP ALM
Installation Guide.

Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1]
```

Change or keep the default HTTP port number. The default port is 8080.

Note:

- If an error message is displayed that the default port is unavailable, it may be the port is in use by another application running on the server machine. Either locate the application and stop it, or enter a different port number. To enter a different port number, you must first change the port number on the application server. For details, see ["Changing the Application Server Port Number" on page 167](#). Then proceed with the configuration as normal.
- You can update the heap memory value after you have installed ALM. For details, see ["Changing the Heap Memory Size" on page 167](#).

The Mercury Tours page is displayed.

```
-----
Mercury Tours

To help you get started with HP ALM, it is recommended to work with the HP ALM
Tutorial.

To work with the HP ALM Tutorial, you must import the HP ALM demo project and
install the Mercury Tours application.

[ ] 1 - Install Mercury Tours

To select an item enter its number, or 0 when you are finished: [0]
```

To help you get started with ALM, install the sample Web-based travel reservation application, Mercury Tours. This is a prerequisite for working with the *HP Application Lifecycle Management Tutorial*.

Note: It is recommended that you import the ALM Demo Project available with the ALM 11.52 installation DVD. Importing this project enables you to run all lessons in the *HP Application Lifecycle Management Tutorial*. In Site Administration, import the **ALM_Demo.qcp** file. For more information on importing projects, refer to the *HP Application Lifecycle Management Administrator Guide*.

24. The Mail Server page is displayed.

```
-----  
Mail Server  
  
HP Application Lifecycle Management Platform uses the mail service to send  
e-mail messages to users in a project. (For example, each time changes are made  
to specified defect fields, HP Application Lifecycle Management Platform  
notifies users by mail.) To enable this option, choose a mail protocol.  
  
Choose a mail protocol  
  
[ ] 1 - SMTP Server  
[X] 2 - None  
  
To select an item enter its number, or 0 when you are finished: [0]
```

To enable ALM to send emails to users in an ALM project, choose **SMTP Server**. Then when prompted, enter the server name.

Note: The Mail Server can be configured after installation in Site Administration. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

25. The Installation Summary page is displayed. To change any settings, select **Back**.
To apply the settings and start the configuration process, select **Next**.
26. The Finish page is displayed.

```
-----  
Finish  
  
The Configuration wizard settings were successfully set.  
  
Select "Start ALM server" to start ALM server now. Click "Finish" to complete  
the Configuration Wizard.  
  
[X] 1 - Start ALM server  
  
To select an item enter its number, or 0 when you are finished: [0]
```

Enter **1**, then press **Enter** to start ALM.

If the installation process fails, check the installation logs for details. For more information see ["Checking the Installation and Configuration Log Files"](#) on page 188.

If you selected to upgrade a copy of the existing Site Administration database schema, it is possible that an upgrade related issue caused the configuration to fail. Check the following files located in the **<file repository path>/sa/Admin/maintenancedata/out** directory for more information:

- **upgrade.txt**
- **verifyreport.html**

If the failure was due to changes made to the existing Site Administration database schema and the upgraded ALM server will work properly with these Site Administration database schema changes, you need to create an exception file that excludes these changes from the upgrade process. Then run the configuration wizard again, using the current settings. For more information, see ["Managing Schema Changes"](#) on page 92.

27. If you are prompted to restart your machine you can choose to restart at a later time but you must restart before you use ALM. You must also restart before you install any ALM related files, such as integration add-ins.
28. If you are using an Oracle RAC database, verify that the **ORACLE_RAC_SUPPORT** site configuration parameter is set to **Y**. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.
29. The installation of ALM is now complete. Proceed to ["Starting ALM"](#) on page 134

Note:

If you intend to run ALM using the non-root user, **ALM_Admin**, but mistakenly ran the configuration wizard as root, you must have the permissions changed. Ask your system administrator to change ownership of the files in the following directories to **ALM_Admin**:

- `/var/opt/HP/ALM`
- `$TEMP` (only the files related to ALM: `QCServer.log*`, `QcSpring.log*`)
- `<ALM repository path>`

Installing ALM in Silent Mode: Linux/Oracle Solaris

A silent installation runs the entire setup process in the background without requiring you to navigate through setup screens and input selections. Instead, all configuration parameters are assigned values that you define in a configuration file (**qcConfigFile.properties**). When running an installation in silent mode, no messages are displayed. Instead, you can view installation information in the log file, including information on whether the installation was successful. The installation log file can be found under the **%tmp%** directory.

To troubleshoot problems you may encounter while running the installation, see ["Troubleshooting the ALM Installation"](#) on page 186.

To install ALM in Silent Mode:

Note: To run silent installations for different configurations, you can create multiple configuration files.

1. Uninstall any previous installations of Quality Center or ALM from the server machine.
2. Create the **qcConfigFile.properties** file.

The file defines the configuration values that are used during the installation.

It is recommended that you use an existing file from a prior installation of ALM.

If there is no existing file, you can create one manually. However, this can be a complicated process that is error-prone. We suggest that you create one by running a normal installation. During the installation process, the file is automatically created. The configuration values you define during the installation process are recorded in the file. Even if you subsequently uninstall ALM, you can keep and edit the file as needed for future installations.

The file is automatically saved in the following path: **/var/opt/HP/ALM/conf**
3. Create an installation directory on the server, for example: **/usr/Install/ALM**
4. Insert the ALM 11.52 Software installation DVD into the DVD drive and under the mount folder, navigate to the appropriate installation subfolder for your system. For example:
 - **Linux:** /mnt/dvd/ALM-Linux
 - **Solaris:** /mnt/dvd/ALM-Solaris
5. Copy the entire contents of the subfolder to the installation directory you created on the server.
6. Run the following chmod command to allow permissions for the installation files: **chmod -R 777 <installation directory>**
7. From the installation directory on the server, navigate to, and run the **silent.sh** file.

In the command line, add the **-c <configuration file full path>** parameter to specify the path of the configuration file.

Working in Console Mode

By default, the ALM Server Configuration Wizard runs in console mode. Navigating from one wizard step to the next requires familiarity with the various console mode command types. This section explains the various command types and the methods for entering configuration settings.

List Options

Some wizard screens present a set of options in the form of a list, where you can select only one option. For example:

```
-----  
Database Server  
  
Database Type  
  
[X] 1 - MS-SQL (SQL Auth.)  
[ ] 2 - Oracle  
  
To select an item enter its number, or 0 when you are finished: [0]
```

To make your selection, type the numeric value of the option you wish to select, then press **Enter**.

The page appears again, this time with the checkmark placed by the option you selected. In this example, if you enter **2**, then press **Enter**, the following appears:

```
-----  
Database Server  
  
Database Type  
  
[ ] 1 - MS-SQL (SQL Auth.)  
[X] 2 - Oracle  
  
To select an item enter its number, or 0 when you are finished: [0]
```

To confirm your selection, type **0** then press **Enter**.

Text Options

Some wizard screens require you to enter text. For example:

```
DB port number:
```

If the wizard detects a pre-existing value for the required field, or if there is a default value, that value appears in brackets. For example:

```
DB port number: [1521]
```

To ignore the existing value, type a new value then press **Enter**. The new value overrides the existing value.

To keep the current value, or leave the field empty, press **Enter**. The following option appears:

```
Press 1 for default value, or 2 for no value: [1]
```

To proceed to the next step with the existing value, type **1** then press **Enter**.

To proceed to the next step and leave the field empty, type **2** then press **Enter**.

Moving to the Next Step

After entering information, either from a list or by entering text, you are prompted with the following options to proceed:

```
Press 1 for Next, 2 for Previous, 3 for Cancel, or 4 for Redisplay [1]
```

Type a number and press **Enter**.

- **Next.** ALM validates the settings you have entered. If the validation is successful, the next step is displayed. If the validation fails, an error message is displayed.
- **Previous.** Displays the beginning of the previous configuration step. Values that you have already entered for the previous step appear as existing values.
- **Cancel.** Cancels the configuration.
- **Redisplay.** Displays the beginning of the current configuration step. Values that you have already entered for the step appear as existing values.

Chapter 16: Starting ALM

This chapter introduces ALM options and resources. It also explains how to start ALM.

| | |
|--|-----|
| Browsing the ALM Program Folder | 135 |
| Starting and Stopping ALM Services | 135 |
| Starting ALM on a Client Machine | 135 |
| Registering ALM on a Workstation | 138 |

Browsing the ALM Program Folder

In Windows, after the ALM setup process is complete, the following items are added to your ALM program folder (**Start > Programs > HP ALM Server**):

| Option (A-Z) | Description |
|---|---|
| ALM Tray Icon | Places the system tray icon in the system tray if it does not appear there. |
| Application Lifecycle Management | Opens ALM. For more information, refer to the <i>HP Application Lifecycle Management User Guide</i> . |
| Mercury Tours | Opens a sample flight reservation Web application. This Web application is used as a basis for the <i>HP Application Lifecycle Management Tutorial</i> . For more information, refer to the <i>HP Application Lifecycle Management Tutorial</i> . Note: This application is only available if you selected it in the ALM Server Configuration Wizard. |
| Server Configuration Wizard | Runs the HP ALM Server Configuration Wizard, enabling you to reconfigure ALM. Caution: Use this option only if you have not yet started working in ALM. |
| Server Deployment Wizard | Redeploys ALM. Run after making changes to the Site Administration repository or application folders. |
| Site Administration | Opens the Site Administration application. For more information, refer to the <i>HP Application Lifecycle Management Administrator Guide</i> . |

Starting and Stopping ALM Services

In the system tray, right-click the ALM icon  and select **Start Application Lifecycle Management**, or **Stop Application Lifecycle Management**.

Starting ALM on a Client Machine

You launch ALM on your workstation from your Web browser.

You can work with multiple versions of ALM side-by-side on a workstation. This includes multiple ALM 11.00/11.52 clients connecting to different ALM servers, and a single Quality Center 10.00 or 9.2 client.

Before logging in to ALM, you must first create a project in Site Administration. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

Note:

- To enable ALM to work with HP testing tools as well as third-party and custom tools, you must run the HP ALM Client Registration add-in, which registers ALM components on the client machine. For more information, see "[Registering ALM on a Workstation](#)" on page 138.
- If your users connect to ALM over a virtual environment, such as Citrix or VMware, you can deploy ALM components on a shared location that all users can access. To enable a shared deployment, run the **Shared Deployment for Virtual Environments** add-in from the HP Application Lifecycle Management Add-ins page. For more information on installing add-ins, see "[Installing HP ALM Add-ins](#)" on page 164.

To start ALM:

1. Open your Web browser and type your ALM URL: **http://<ALM server name>[:port number]/qcbn**

The Application Lifecycle Management Options window opens.



The ALM Options Window contains the following options:

| Option | Description |
|---|--|
| Application Lifecycle Management | Opens the ALM application. For more information, refer to the <i>HP Application Lifecycle Management User Guide</i> . |
| Lab Management | Opens the Lab Management application. For more information, refer to the <i>HP ALM Lab Management Guide</i> . |
| Site Administration | Opens the Site Administration application. For more information, refer to the <i>HP Application Lifecycle Management Administrator Guide</i> . |

| Option | Description |
|---------------|--|
| Tools | Opens the HP Application Lifecycle Management Add-ins page. |
| Readme | Opens the ALM Readme which provides the latest news and information about ALM. |

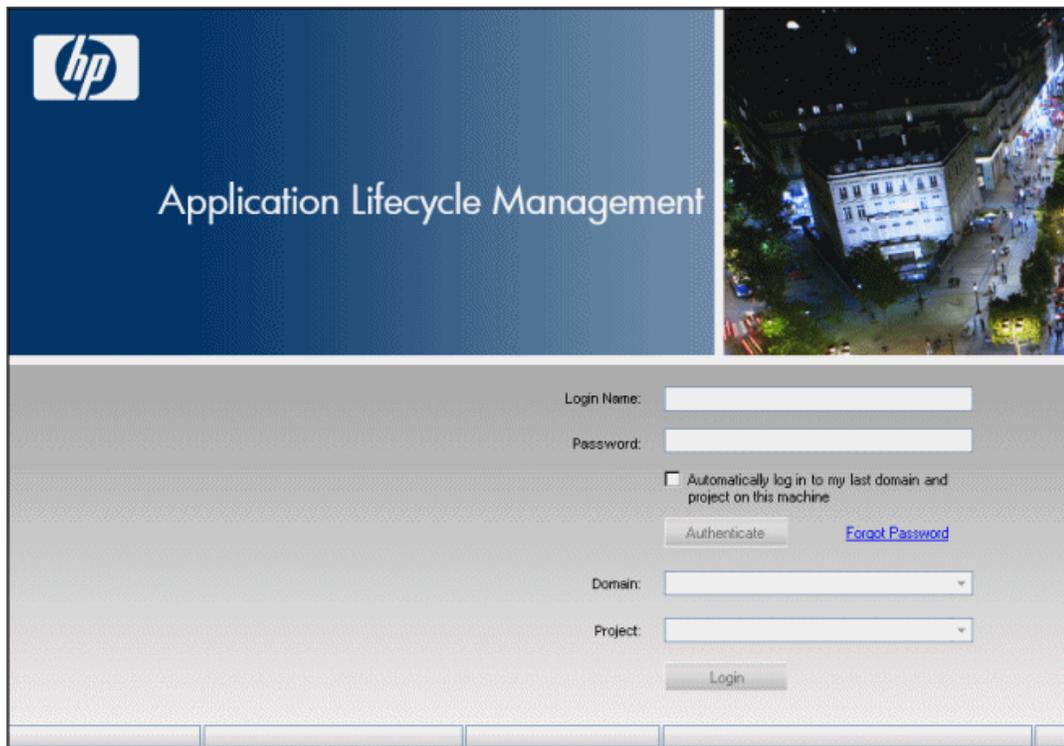
2. Click the **Application Lifecycle Management** link. Each time ALM is run, it carries out a version check. If it detects a newer version, it downloads the necessary files to your machine.

Follow the on-screen instructions.

Note:

- **Windows 7/2008/2008R2:** If you do not have administrator privileges on your machine and a Security Warning displays, click **Don't Install**. You will be redirected to the Install screen.
- If you run ALM over a virtual environment such as Citrix, only the system administrator can install a new version.
- If files are downloaded but the Login window does not display, you must install a Microsoft Hotfix on your machine. For more information, see HP Software Self-solve knowledge base article [KM905289](http://h20230.www2.hp.com/selfsolve/document/KM905289) (<http://h20230.www2.hp.com/selfsolve/document/KM905289>). (Requires HP Passport sign-in credentials.)

3. After the ALM version has been checked and files have been updated as necessary, the Application Lifecycle Management Login window opens.



4. In the **Login Name** box, type your user name.
5. In the **Password** box, type the password. If you cannot remember your password, click the **Forgot Password** link. For more information, refer to the *HP Application Lifecycle Management User Guide*.
6. Select the **Automatically log in to my last domain and project on this machine** check box if you want ALM to automatically log in to the last project in which you were working.
7. Click **Authenticate**. ALM verifies your user name and password and determines which domains and projects you can access. If you specified automatic login, ALM opens.

If authentication fails, check that your user name and password are correct and try again.
8. In the **Domain** list, select a domain. By default, the last domain in which you were working is selected.
9. In the **Project** list, select a project. By default, the last project in which you were working is selected.
10. Click **Login**. ALM opens and displays the module in which you last worked during your previous session.

Registering ALM on a Workstation

To enable you to work with other HP testing tools as well as third-party and custom tools, ALM must be registered on the client machine.

Note: If you are running previous versions of ALM/Quality Center on your machine, before registering ALM11.52, make sure that all instances of ALM/Quality Center and any integration tools are closed.

To register ALM on a workstation:

1. Log on to the machine as a local user or a domain user with administrator privileges. Ensure that you have the registry and file system permissions listed below.

Windows 7/2008/2008R2: Open the Web browser as an administrator (right-click the Internet Explorer icon and select **Run as Administrator**).

2. Run **HP ALM Client Registration** from the HP Application Lifecycle Management Add-ins page.
3. Close and reopen the Web browser.

Permissions Required to Register ALM on a Workstation

You must have full read and write permissions on the following registry keys:

- **HKEY_CLASSES_ROOT**
- **HKEY_CURRENT_USER\Software**
- **HKEY_LOCAL_MACHINE\SOFTWARE**

You must have the following file system permissions:

- Full read and write permissions on the HP\ALM-Client deployment folder. This is located at:
 - **Windows 7/2008/2008R2:** %ALLUSERSPROFILE%
 - **Windows XP:** %ALLUSERSPROFILE%\Application Data
- Full read and write permissions to the **Temp** (%TEMP% or %TMP%) directory. The installer program writes installation and log files to this directory. This is generally located at:
 - **Windows XP:** C:\Documents and Settings\\Local Settings\Temp
 - **Windows 7:** C:\Users\\AppData\Local\Temp

Tools that Require Registering ALM Client Components

The following tools require that ALM client components be registered on the client machine:

| | |
|-----------------------|---|
| <p>HP ALM Add-ins</p> | <ul style="list-style-type: none"> • Unified Functional Testing Add-in HP Unified Functional Testing (UFT) comprises the product formerly known as HP QuickTest Professional and the product known as HP Service Test. <ul style="list-style-type: none"> ▪ Functionality provided by QuickTest is now known as GUI testing in UFT. ▪ Functionality provided by Service Test is also known as API testing in UFT. <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note: Requires that Data Execution Prevention (DEP) be disabled in Windows 7.</p> </div> • HP Screen Recorder Add-in • Service Test Add-in • HP ALM Synchronizer • Defects and Requirements Exchange with HP Service Manager and HP ALM |
| <p>Other</p> | <p>Unified Functional Testing tests</p> <p>HP Unified Functional Testing (UFT) comprises the product formerly known as HP QuickTest Professional and the product known as HP Service Test.</p> <ul style="list-style-type: none"> • Functionality provided by QuickTest is now known as GUI testing in UFT. • Functionality provided by Service Test is also known as API testing in UFT. <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>Note:</p> <ul style="list-style-type: none"> • Required to run tests, and to submit defects from the Run Results Viewer. • Requires that Data Execution Prevention (DEP) be disabled in Windows 7. </div> |

Part 6: Project Upgrade

Chapter 17: Upgrading Projects

Upgrading Projects describes the post-installation steps necessary for upgrading projects from previous versions of ALM/Quality center to ALM 11.52.

This chapter includes:

| | |
|--|-----|
| Deactivate and Remove Projects from Existing ALM/Quality Center Installation | 143 |
| Copy Project Database Schemas to the New Database Server Machine | 143 |
| Restore ALM Projects in New Site Administration Database Schema | 144 |
| Upgrade Projects | 146 |

Deactivate and Remove Projects from Existing ALM/Quality Center Installation

Note: Back up the database and repository after deactivating projects.

In the previous ALM/Quality Center installation, deactivate and remove projects from Site Administration. You do not have to deactivate and remove all projects at once. You can perform this action on a per-project upgrade basis.

To deactivate a project:

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a project.
3. Click the **Deactivate Project** or **Deactivate Template** button . A message box indicates that all connected users will be disconnected.
4. Click **OK** to confirm. The project is deactivated and the project icon is changed in the Projects list.

To remove a project from the Projects list:

Note: If the project is currently in use, it cannot be removed. For information about how to manually remove a project, see HP Software Self-solve knowledge base article [KM1457081](http://h20230.www2.hp.com/selfsolve/document/KM1457081) (<http://h20230.www2.hp.com/selfsolve/document/KM1457081>). (Requires HP Passport sign-in credentials.)

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a project.
3. Click the **Remove Project** or **Remove Template** button .
4. Click **OK** to confirm. If the project is still active, you are prompted to deactivate it.
5. Click **OK**.

Copy Project Database Schemas to the New Database Server Machine

Note: Perform this step only if your new ALM system uses a new database server or new instance of the previous database server.

To restore removed projects in the new database server machine, copy the project schemas from the database server that was used in the previous ALM system to the database server that will be used in the new ALM system.

This enables you to restore the projects in Site Administration in the new ALM installation.

Perform the required steps for backing up, removing, and restoring databases for your database type. For assistance contact your database administrator.

Note: The database user must have the same permissions as the user installing HP ALM.

Restore ALM Projects in New Site Administration Database Schema

To view projects in Site Administration, on the machine on which the new version of ALM has been installed, restore projects you removed above as follows:

Project restore considerations

- Before restoring the project, make sure that the database where the project resides exists in the **DB Servers** tab in Site Administration on your ALM server. The ALM server needs to access the contents of the restored project from the project's database.
- When restoring a project, you should select the **dbid.xml** file located in the project repository. This ensures that the project retains its original ID. If a project does not have its original ID, the following cross project features may not function properly: cross project customization, importing and synchronizing libraries, and cross project graphs.
- If you were previously working with **Performance Center 11.00**, you must first restore and upgrade LAB_PROJECT, and then any Performance Center template projects, before restoring and upgrading other Performance Center projects.

To restore access to an ALM project:

1. Navigate to the project's **dbid.xml** file. The file is located in the project repository's **qc** sub-directory.

By default the project repository is located in the following location:

- **Windows.** C:\ProgramData\HP\ALM\repository
- **Oracle/Solaris.** /var/opt/HP/ALM/repository

For more information on the project structure, refer to the Understanding the Project Structure section in the *HP Application Lifecycle Management Administrator Guide*.

2. Open the file and update the following values:

Note:

- To identify the values of **DB_CONNSTR_FORMAT** and **DB_USER_PASS**, it is recommended to create a new, empty project in ALM 11.52 Site Administration, open the project's **dbid.xml** file, and copy these values. You can later delete the empty project.
- Make sure not to copy/paste or change the value for **PR_SMART_REPOSITORY_ENABLED**.

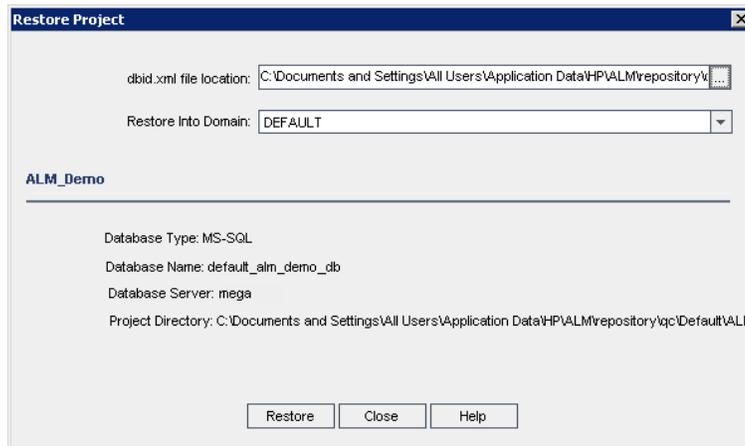
- If you are restoring **LAB_PROJECT** or Performance Center projects as part of the upgrade process, make sure not to edit the **PROJECT_UID** value. You must restore these projects with their original **PROJECT_UID** value to maintain the links between **LAB_PROJECT** and its associated Performance Center projects. This is important for shared data, such as timeslots, runs, and so on.
 - **DB_NAME**. Update to the database schema name as it appears in the database server.
 - **DB_CONNSTR_FORMAT**. Update to the value of the the empty project created in ALM11.52. See above note for details.
 - **DBSERVER_NAME**. This is the name of the database server as defined in the **DB Servers** tab in Site Administration.
 - **DB_USER_PASS**. Update if the encrypted passphrase differs between ALM 11.00 and ALM 11.52. If you are upgrading from Quality Center 10.00, this value is not relevant.
 - **PHYSICAL_DIRECTORY**. Update to the new location of the project repository. It must contain a backslash (\) at the end of the path.
3. Save the file.
 4. In Site Administration, click the **Site Projects** tab.
 5. Click the **Restore Project** or **Restore Template** button . The Restore Project dialog box opens.
 6. To locate the file that includes the project that you want to restore, click the browse button to the right of the **dbid.xml file location** box. The Open File dialog box opens.
 7. Locate the project's **dbid.xml** file. The file is located in the project repository's **qc** sub-directory.

By default the project repository is located at **C:\ProgramData\HP\ALM\repository**.

By default the project repository is located at **/var/opt/HP/ALM/repository**.

For more information on the project structure, refer to the section in the *HP Application Lifecycle Management Administrator Guide* about understanding the project structure.

8. Select the **dbid.xml** file and click **Open**. The Restore Project dialog box opens and displays the database type, name, server, and the directory path of the project.



9. In the **Restore Into Domain** box, select the domain in which you want the restored project to be located.
10. Click **Restore**.
11. If your database server does not have the text search feature enabled, a message box opens. You can enable the text search feature before or after this process completes.
 - Click **Yes** to continue this process. After the process completes, you can enable the text search feature.
 - Click **No** to stop this process. Enable the text search feature and then restart the process.For more information on enabling the text search feature, refer to the *HP Application Lifecycle Management Administrator Guide*.
12. When the restore process completes, click **OK**.
13. Click **Close** to close the Restore Project dialog box and view the restored project in the Projects list.

Upgrade Projects

Once a project appears in the ALM 11.52 Site Administration project list, you can proceed with the actual project upgrade. You can upgrade projects individually or on the domain level, which upgrades all projects contained in the domain.

This section includes:

| | |
|--|-----|
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| Upgrading a Project | 147 |
| Upgrading a Domain | 149 |

About Upgrading Domains and Projects

By default, the upgrade process runs in non-silent mode. When running the process in non-silent mode, ALM may pause and prompt you for input when an error occurs. Instead, you can choose to run the process in silent mode. When running the process in silent mode, ALM aborts the process without prompting you for input.

After the project has been upgraded, you can no longer use the project with a previous version of ALM/Quality Center.

Note:

- During the upgrade process, the project directory must be accessible. For example, if your project directory is located on a file server, ensure that the server is running.
- If a project has extensions enabled, the availability of these extensions on the new server must be verified before upgrading. If any extension is not available on the new server, the upgrade fails.
- **Version Control:** Version control enabled projects from Quality Center 10.00 or ALM 11.00 cannot be upgraded to ALM 11.52 while there are checked out entities. All entities must be checked in to the corresponding version of Quality Center or ALM.
- **Performance Center:** If you were working with Performance Center 11.00, before upgrading other Performance Center projects, you must first upgrade LAB_PROJECT, and then any Performance Center **template** projects. For details on LAB_PROJECT, refer to the *HP ALM Lab Management Guide*.

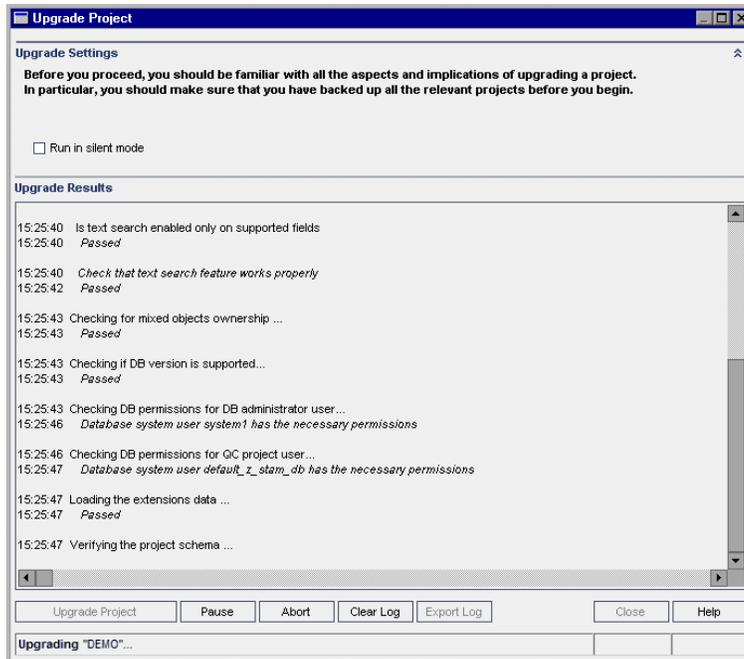
Upgrading a Project

This section describes how to upgrade a single project.

To upgrade a project:

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a project.

3. Click the **Maintain Project**  button and select **Upgrade Project**. The Upgrade Project dialog box opens.



4. To run the upgrade process without any user interaction, select **Run in silent mode**.
5. To start the upgrade process, click the **Upgrade Project** button. If the project is active, you are prompted to deactivate it. For more information, refer to the *HP Application Lifecycle Management Administrator Guide*.

If a database error occurs while running the process in non-silent mode, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.

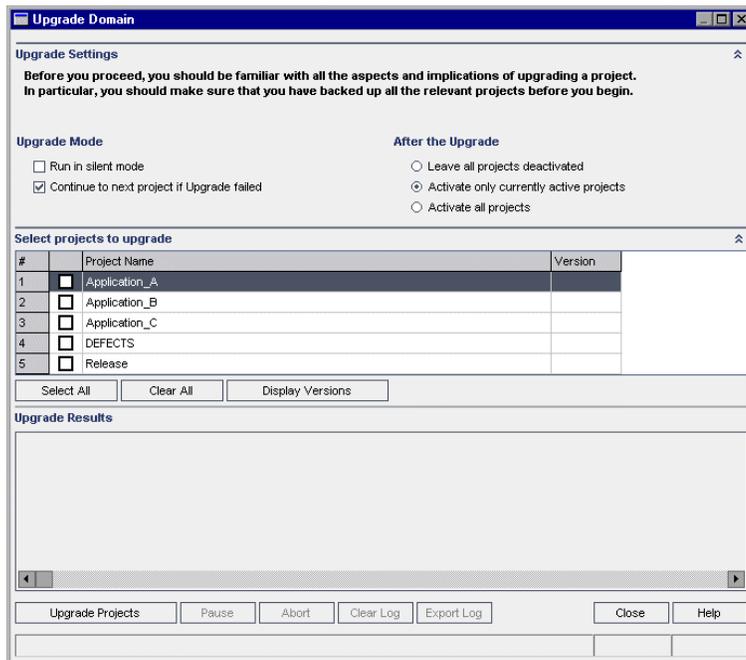
If the upgrade fails, ALM displays an error message with reasons for the failure and refers you to the log file. You must restore the backed up project before you try to upgrade again. For more information, see "[Restoring Backed Up Projects](#)" on page 85.
6. To pause the upgrade process, click the **Pause** button. To continue, click the **Resume** button.
7. To abort the upgrade process, click the **Abort** button. Click **Yes** to confirm.
8. To save the messages displayed in the Upgrade Results pane to a text file, click the **Export Log** button. In the Export Log to File dialog box, choose a location and type a name for the file. Click **Save**.
9. To clear the messages displayed in the Upgrade Results pane, click the **Clear Log** button.
10. Click **Close** to close the Upgrade Project dialog box.

Upgrading a Domain

This section describes how to upgrade all projects in a domain.

To upgrade a domain:

1. In Site Administration, click the **Site Projects** tab.
2. In the Projects list, select a domain.
3. Click the **Maintain Domain**  button and select **Upgrade Domain**. The Upgrade Domain dialog box opens.



4. In the **Upgrade Settings** area, under **Upgrade Mode**, you can select the following options:
 - **Run in Silent Mode.** Runs the process without any user interaction.
 - **Continue to next project if upgrade failed.** Proceeds to the next project if the upgrade process fails. This is the default option.
5. In the **Upgrade Settings** area, under **After the Upgrade**, you can select one of the following options:
 - **Leave all projects deactivated.** Leaves all projects deactivated after the upgrade process completes.
 - **Activate only currently active projects.** Reactivates previously-activated projects after the upgrade process completes. This is the default option.
 - **Activate all projects.** Activates all projects after the upgrade process completes.

6. To view the current version numbers of your projects, select the project names, or click **Select All** to view version numbers for all projects. Click the **Display Versions** button.

The project version number is displayed in the **Version** column.

7. To upgrade your projects, select the project names, or click **Select All** to verify all projects. Click the **Upgrade Projects** button.

If a database error occurs while running the process in non-silent mode, a message box opens. Click the **Abort** or **Retry** buttons, based on whether you can correct the problem described in the message box.

If the upgrade fails, ALM displays an error message with reasons for the failure and refers you to the log file. You must restore the backed up projects before you try to upgrade again. For more information, see "[Restoring Backed Up Projects](#)" on page 85.

8. To pause the upgrade process, click the **Pause** button. To continue, click the **Resume** button.
9. To abort the upgrade process, click the **Abort** button. Click **Yes** to confirm.
10. To save the messages displayed in the Upgrade Results pane in a text file, click the **Export Log** button. In the Export Log to File dialog box, choose a location and type a name for the file. Click **Save**.
11. To clear the messages displayed in the Upgrade Results pane, click the **Clear Log** button.
12. Click **Close** to close the Upgrade Domain dialog box.

Chapter 18: Migrating the Project Repository

This chapter describes the process of migrating a Quality Center 10.00 project repository to the optimized repository architecture used in ALM 11.52. ALM versions 11.00 and later use a new project repository architecture, that is optimized to allow maximum storage space. Therefore, if you are upgrading an ALM 11.00 system to ALM 11.52 this chapter is not relevant.

For details on ALM Optimized Project Repository, refer to the *HP Application Lifecycle Management Administrator Guide*.

This chapter includes:

| | |
|--|-----|
| About the Repository Migration | 153 |
| Repository Migration Status Window | 153 |
| Configure Migration Priority | 156 |

About the Repository Migration

When upgrading projects from Quality Center 10.00 to ALM 11.52, the project repository is automatically upgraded to the optimized repository format. This is carried out in two stages:

1. The first stage is performed during the upgrade of the project. In this stage, all files in the repository are scanned, and their names are stored in the project database.
2. After the upgrade is completed, the project is reactivated. The repository files are gradually migrated to the new system. In this stage, the files are moved from their old location to their new location in the optimized repository. Depending on various factors, such as the size of the repository and the network speed, the file migration may take up to several days.

This second phase of the repository migration is carried in the background. Users can work in the project even while it is in progress. New files that you add to a project after upgrade are saved in the new project repository structure.

Note:

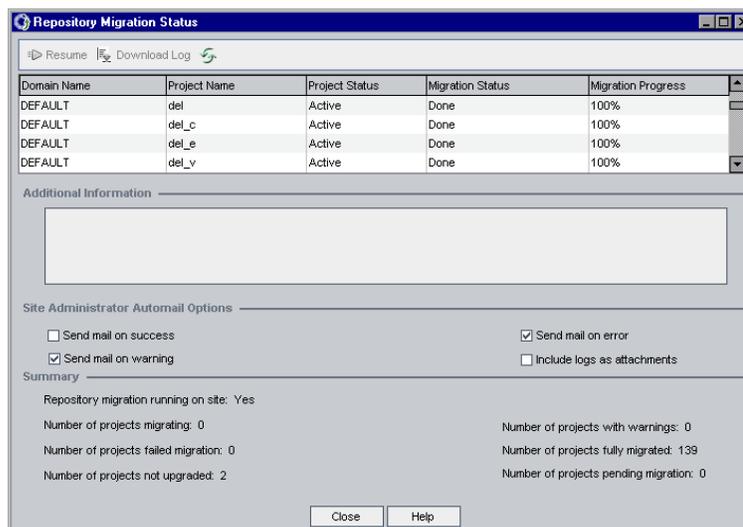
- Until the migration process for a project is complete, you cannot export or copy the project.
- To back up a project before its migration is complete, you must suspend the migration process. For more details, see "[Configure Migration Priority](#)" on page 156.

You monitor and troubleshoot the migration progress in the Repository Migration Status window.

In Site Administration, you can track the status of file migration for each project, and configure the resources allocated to performing the migration.

Repository Migration Status Window

This window lists all the site projects and displays the status of their migration to the optimized project repository.



| | |
|------------------|--|
| To access | In Site Administration, select Tools > Repository Migration Status . |
| See also | <ul style="list-style-type: none"> • "Migrating the Project Repository" on page 152 • "Configure Migration Priority" on page 156 |

User interface elements are described below:

| UI Element | Description |
|--|--|
|  | <p>Instructs ALM to resume the migration of the selected project.</p> <p>If an error or warning was detected during the migration of the selected project, fix the problem as described in the Additional Information field, and click Resume.</p> <p>Note: If the migration process stopped due to missing files, after clicking Resume, you can no longer restore missing files.</p> |
|  | <p>Downloads a log of the migration events associated with the selected project.</p> |
|  | <p>Refresh. Refreshes the display with the most up-to-date information.</p> <p>Note: The grid updates automatically after the migration of every 1000 files.</p> |
| Domain Name | The domain to which the selected project belongs. |
| Project Name | The name of the selected project. |
| Project Status | <p>Indicates the selected project's status in Site Administration. For example, <i>Active</i> or <i>Deactivated</i>.</p> <p>Note: Deactivating a project does not affect its repository migration.</p> |

| UI Element | Description |
|---|---|
| <p>Migration Status</p> | <p>The migration status of a project can be one of the following:</p> <ul style="list-style-type: none"> • None. Project is not upgraded to ALM 11.52, and will not be migrated. • Pending. File migration is pending. • Migrating. File migration is in progress. • Done. File migration is complete. • Error. An error occurred during file migration, and migration could not be completed. See the cause of the error in the Additional Information panel. Fix the error, and click Resume. • Warning. A warning occurred during file migration. <p>For details of the warning, and the actions you must take to resolve the problem, download the log files listed in the Additional Information panel. Resolve the problems as necessary, and click Resume to complete the migration.</p> <p>The main reason for a warning is files in the old repository structure that must be handled manually. Handling these files is the last step before completing the migration.</p> |
| <p>Migration Progress</p> | <p>The number of project files migrated to the new repository, as a percentage of the total number of project files.</p> |
| <p>Additional Information</p> | <p>If a problem was detected, displays the cause of the problem, and links to log files. The log files describe the actions you must take to resolve the problem.</p> |
| <p>Site Administrator Automail Options</p> | <p>ALM sends automail to Site Administrators upon events connected to repository migration. Select the following options:</p> <ul style="list-style-type: none"> • Send mail on success. Sends mail when the migration of a project repository completes successfully. • Send mail on warning. Sends mail when a warning is detected during the migration of a project repository. • Send mail on error. Sends mail when an error is detected during the migration of a project repository. • Include logs as attachments. Attaches detailed log files to automail messages. |
| <p>Summary</p> | <p>Summary information of the migration status of all site projects.</p> |

Configure Migration Priority

While the migration process does not interfere with your work on projects, the process may affect system performance as a whole. Use the following site configuration parameters to control the amount of system resources used by the migration process.

- **REPOSITORY_MIGRATION_JOB_PRIORITY.** Determines the speed at which files are copied from the old to the new project repository. For more details, refer to the *HP Application Lifecycle Management Administrator Guide*.
- **SUSPEND_REPOSITORY_MIGRATION.** Stops the repository migration on the entire site. Use this parameter temporarily, and only in special circumstances. For example, if you suspect that the migration process disrupts your system. For more details, refer to the *HP Application Lifecycle Management Administrator Guide*.

Additional parameters are available for configuring the resources allocated to the migration process. For more information, see HP Software Self-solve knowledge base article [KM862600](http://h20230.www2.hp.com/selfsolve/document/KM862600) (<http://h20230.www2.hp.com/selfsolve/document/KM862600>). (Requires HP Passport sign-in credentials.)

Consider the following when configuring the migration priority:

- Allocating more resources to the migration process may slow down other processes.
- Allocating less resources extends the time in which the process is completed.
- Projects that are pending migration or in the process of migration cannot be exported or copied.

Chapter 19: Performance Center/LAB_ PROJECT Post-Upgrade Steps

If you have upgraded a Performance Center 11.00 project, perform the following steps in the staging and production environments:

For more information regarding these steps, refer to the *HP ALM Lab Management Guide*.

1. Log into **Lab Management**.
2. Configure the external URL:
 - a. On the Lab Management sidebar, under **Servers**, select **PC Servers**.
 - b. On the toolbar, click the **ALM Connection** button. The ALM Connection dialog box opens.
 - c. Enter external URL information.
3. Add a Performance Center Server:
 - a. On the **PC Servers** toolbar, click the **New PC Server** button. The New PC Server dialog box opens.
 - b. Define new server information.
 - c. Click **OK**.
4. Update license details:
 - a. On the Lab Management sidebar, under **Performance Center**, select **PC Licenses**.
 - b. Define new license information.
5. Add, remove, or reconfigure hosts:
 - a. On the Lab Management sidebar, under **Lab Resources**, select **Hosts**.
 - b. Add, remove, or reconfigure hosts as needed.

Part 7: Installation Management and Customization

Chapter 20: Integrating the ALM Application Server with an Apache Web Server

To use ALM with an Apache Web server, you configure the Apache Web server to redirect requests to the ALM Application Server. You configure the Apache Web server to work in proxy HTTP mode.

Note: It is recommended that you use Apache HTTP Server version 2.2 or below.

To configure Apache to work in proxy http mode:

1. Make sure the Apache Web server is stopped.
2. Navigate to the **<Apache Home directory>\conf** directory.
3. Open the **httpd.conf** file.
4. Uncomment or add the following load module commands:

```
LoadModule proxy_module modules/mod_proxy.so
LoadModule proxy_http_module modules/mod_proxy_http.so
```

Note: Make sure that both modules exist in your Apache installation.

5. Add the following section to the file:

```
# Turn off support for true Proxy behavior as we are acting as
# a transparent proxy
ProxyRequests Off

# Turn off VIA header as we know where the requests are proxied
ProxyVia Off

# Turn on Host header preservation so that the servlet container
# can write links with the correct host and rewriting can be
# avoided.
ProxyPreserveHost On

# Set the permissions for the proxy
<Proxy *>
AddDefaultCharset off
Order deny,allow
Allow from all
```

```
</Proxy>

# Turn on Proxy status reporting at /status
# This should be better protected than: Allow from all
ProxyStatus On

<Location /status>
SetHandler server-status

Order Deny, Allow

Allow from all

</Location>

# Configuring mod_proxy_http
# To connect to servlet container with HTTP protocol, the
ProxyPass directive can be # used to send requests received on a
particular URL to a Jetty instance.

ProxyPass /qcbn http://localhost:8080/qcbn
ProxyPass /mtours http://localhost:8080/mtours
```

Note: If you are connecting to ALM on a remote machine, replace localhost with the IP address or name of the server on which ALM is installed.

6. Save the changes to the file.
7. Restart the Apache Web server.

You can now connect to your ALM site using the following URL: **http://<ALM server name> [<:apache port number>]/qcbn**.

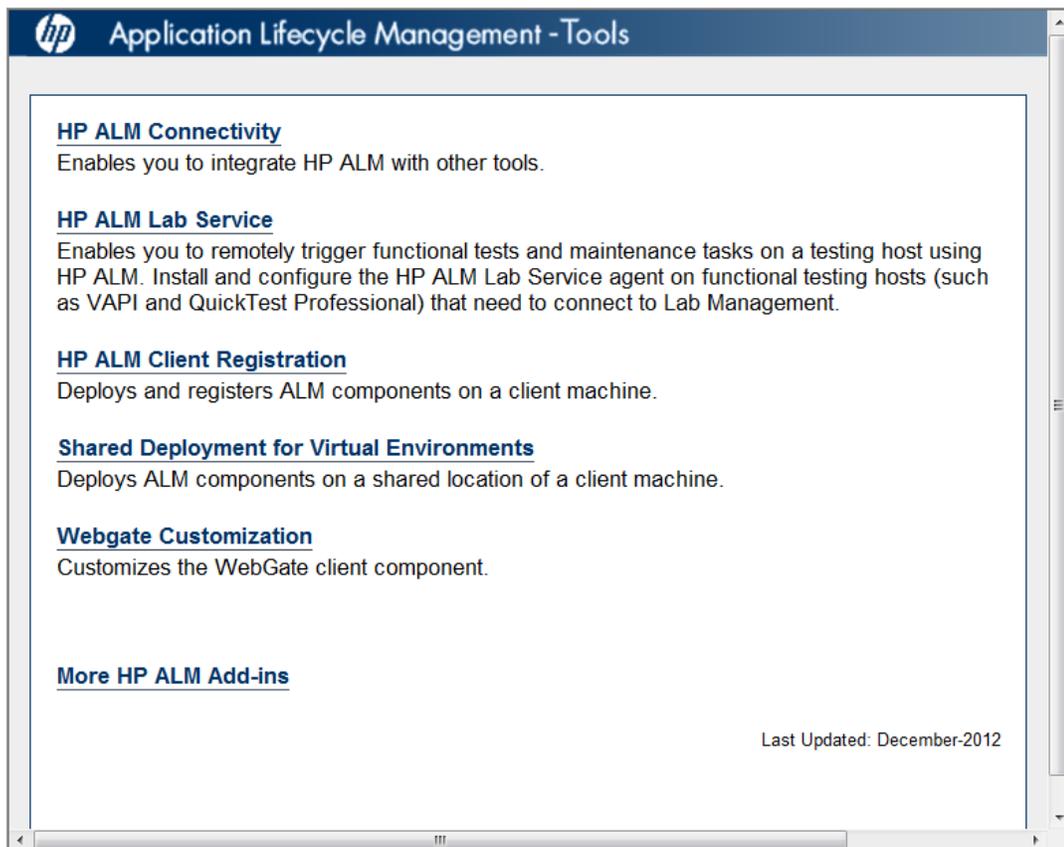
Chapter 21: Installing HP ALM Add-ins

HP Application Lifecycle Management (ALM) offers integration and synchronization solutions with HP and third-party tools. To integrate ALM with other tools, you may need to install an add-in from the HP Application Lifecycle Management ALM Tools page or the HP Application Lifecycle Management Add-ins page.

Note: If you are integrating ALM with another tool, you can verify that you are using a supported version of the tool. Click **Help > What's New**, and choose the appropriate integrations matrix.

To install an ALM add-in:

1. Choose **Help > ALM Tools** in the ALM main window. The HP Application Lifecycle Management Tools add-ins page opens.



The following ALM tool add-ins are available:

- **HP ALM Connectivity.** Enables you to integrate ALM with other tools.
- **HP ALM Lab Service.** Enables you to trigger functional tests and maintenance tasks on a testing host using HP ALM. Install and configure the HP ALM Lab Service agent on functional testing tools (such as VAPI and QuickTest Professional) that need to connect to

Lab Management.

- **HP ALM Client Registration.** Registers ALM components on the client machine, enabling you to work with HP testing tools as well as third-party and custom tools.
 - **Shared Deployment for Virtual Environments.** Deploys ALM components on a shared location that can be accessed by all users. This is useful if users connect to ALM over a virtual environment, such as Citrix or VMware.
 - **Webgate Customization.** Enables you to customize WebGate client components.
 - **More HP ALM Add-ins.** Enables you to install additional add-ins. The add-ins include integration and synchronization solutions with HP and third-party tools.
2. Click an add-in link. A page with additional information about the add-in opens. If you click the **More HP ALM Add-ins** link, another page opens, enabling you to select additional add-ins.
 3. Click the add-in link for instructions on using the add-in.

Tip: You can also click an extension's link to view the extension's documentation.

4. Follow the instructions on your screen to download and install the add-in.

Chapter 22: Managing the ALM Application Server

From ALM 11.50 and later, application server functionality is included with core ALM capability as opposed to the use of an integrated third-party application server, as was the case in previous versions of ALM. The internal application server is referred to as the ALM Application Server.

This chapter contains information relating to managing the ALM Application Server, as well as information regarding general Java management tools.

This chapter includes

| | |
|---|-----|
| Changing the Heap Memory Size | 167 |
| Changing the Application Server Port Number | 167 |
| Configuring Secure Access on Windows Systems | 168 |
| Configuring Secure Access on Linux/Oracle Solaris Systems | 170 |
| Application Server Management Tools | 172 |

Changing the Heap Memory Size

After you install ALM, you may need to change the heap memory values. For example, you may want to increase the heap size if there is an increase in the number of active projects in ALM, or an increase in the number of concurrent user sessions.

Note:

- The maximum heap value cannot exceed your maximum memory (RAM) size.
- On a machine running on a 32-bit operating system, the heap memory size should not exceed 1024 MB.

To change the heap memory size:

1. Verify that all users have logged out of ALM projects and stop the ALM Service as follows:
 - **Windows.** In the system tray, right click the ALM icon and choose **Stop Application Lifecycle Management**.
 - **Linux/Solaris.** Navigate to the `/var/opt/HP/ALM/wrapper` directory, and run the following command: **HPALM stop**.
2. In the **ALM deployment** path, open the `wrapper.conf` file.
3. Change the `wrapper.java.maxmemory` value as necessary.
4. Restart the ALM Service as follows:
 - **Windows.** In the system tray, right click the ALM icon and choose **Start Application Lifecycle Management**.
 - **Linux/Solaris.** Navigate to the `/var/opt/HP/ALM/wrapper` directory, and run the following command: **HPALM start**.

Changing the Application Server Port Number

After you install ALM, you may need to change the application server port number.

It is possible that the default application server port may be in use by another application that is running on the same machine. In this case, you can either locate the application that is using the port and stop it, or you can change the application server port on the machine.

To change the application server port number:

1. Verify that all users have logged out of ALM projects and stop the ALM Service as follows:
 - **Windows.** In the system tray, right click the ALM icon and choose **Stop Application Lifecycle Management**.
 - **Linux/Solaris.** Navigate to the `/var/opt/HP/ALM/wrapper` directory, and run the following command: **HPALM stop**.
2. Navigate to the `<ALM deployment path>/HP/ALM/server/conf/jetty.xml` file.

3. Change the **jetty.port** value.
4. Restart the ALM Service as follows:
 - **Windows.** In the system tray, right click the ALM icon and choose **Start Application Lifecycle Management**.
 - **Linux/Solaris.** Navigate to the **/var/opt/HP/ALM/wrapper** directory, and run the following command: **HPALM start**.

Configuring Secure Access on Windows Systems

The following procedure describes how to configure a Secure Socket Layer (SSL) connection when ALM is installed on a Windows system.

To configure SSL:

1. Verify that all users have logged out of ALM projects and stop the ALM Service as follows: In the system tray, right click the ALM icon and choose **Stop Application Lifecycle Management**.
2. Navigate to the **<ALM deployment path>\server\conf** directory and make a backup of the **jetty.xml** file.

Caution: Make sure that you back up the **jetty.xml** file located in this directory.

3. Open the **jetty.xml** file and add the following section under the **Configure** element:

```
<Call name="addConnector">
  <Arg>
    <New class="org.eclipse.jetty.server.ssl.SslSocketConnector">
      <Set name="host"><Property name="jetty.host" /></Set>
      <Set name="Port">8443</Set>
      <Set name="maxIdleTime">30000</Set>
      <Set name="keystore">C:\CAs\server.keystore</Set>
      <Set name="password">changeit</Set>
      <Set name="keyPassword">changeit</Set>
      <Set name="truststore">C:\CAs\server.keystore</Set>
      <Set name="trustPassword">changeit</Set>
    </New>
  </Arg>
</Call>
```

4. Replace the **C:\CAs\server.keystore** path with the location of your keystore file.
5. If you want to change the port number, replace **8443** with the new port number.
6. If you have changed the default keystore password, replace **changeit** with the new password.
7. (Optional) To encrypt the password, perform the following steps:
 - a. Open Command Prompt and run the following command:

```
<JAVA_HOME>\java \ -cp "<DEPLOYMENT_HOME>\server\lib\*" "
```

```
org.eclipse.jetty.http.security.Password <password>
```

For example, if you run the following command:

```
java -cp "C:\ProgramData\HP\ALM\server\lib*"
org.eclipse.jetty.http.security.Password changeit
```

The output will appear as follows:

```
changeit
OBF:1vn21ugu1saj1v9i1v941sar1ugw1vo0
MD5:b91cd1a54781790beaa2baf741fa6789
```

- b. Replace the plain text password in the **jetty.xml** file with the output above, including the **OBF** and **MD5** prefix.
8. (Optional) To disable non-HTTP access to the ALM Application Server, in the **jetty.xml** file, locate the following section and comment it out by placing **<!--** at the beginning of the section, and **-->** at the end.

Note: It is possible that this section in your **jetty.xml** file is slightly different.

```
<!--
<Call name="addConnector">
  <Arg>
    <New class="org.eclipse.jetty.server.nio.SelectChannelConnector">
      <Set name="host"><Property name="jetty.host" /></Set>
      <Set name="port"><Property name="jetty.port" default="8080"/></Set>
      <Set name="maxIdleTime">300000</Set>
      <Set name="Acceptors">2</Set>
      <Set name="statsOn">>false</Set>
      <Set name="confidentialPort">8443</Set>
      <Set name="lowResourcesConnections">20000</Set>
      <Set name="lowResourcesMaxIdleTime">5000</Set>
    </New>
  </Arg>
</Call>
-->
```

9. Save the **jetty.xml** file.
10. Restart the ALM Service as follows: In the system tray, right click the ALM icon and choose **Start Application Lifecycle Management**.
11. Connect to ALM using port 8443, or the number of the new port if you changed it in step 5 above.

Configuring Secure Access on Linux/Oracle Solaris Systems

The following procedure describes how to configure a Secure Socket Layer (SSL) connection when ALM is installed on a Linux/Solaris system.

To configure SSL:

1. Verify that all users have logged out of ALM projects, and stop the ALM Service. To stop the service, navigate to the `/var/opt/HP/ALM/wrapper` directory, and run the following command:
HPALM stop.
2. Navigate to the `/var/opt/HP/ALM/server/conf/` directory and make a backup of the `jetty.xml` file.

Caution: Make sure that you back up the `jetty.xml` file located in this directory.

3. Open the `jetty.xml` file and add the following section under the **Configure** element:

```
<Call name="addConnector">
  <Arg>
    <New>
      <Set name="host"><Property name="jetty.host" /></Set>
      <Set name="Port">8443</Set>
      <Set name="maxIdleTime">30000</Set>
      <Set name="keystore">/home/admin/Downloads/server.keystore</Set>
      <Set name="password">changeit</Set>
      <Set name="keyPassword">changeit</Set>
      <Set name="truststore">/home/admin/Downloads/server.keystore</Set>
      <Set name="trustPassword">changeit</Set>
    </New>
  </Arg>
</Call>
```

4. Replace the `/home/admin/Downloads` path with the location of your keystore file.
5. If you want to change the port number, replace **8443** with the new port number.
6. If you have changed the default keystore password, replace **changeit** with the new password.
7. (Optional) To encrypt the password, perform the following steps:
 - a. Open Command Prompt and run the following command:

```
./java -cp
"./var/opt/HP/ALM/server/lib/*:/var/opt/HP/ALM/server/lib/ext/" org.eclipse.jetty.http.security.Password <password>
```

For example, if you run the following command:

```
./java -cp
"./var/opt/HP/ALM/server/lib/*:/var/opt/HP/ALM/server/lib/ext/" org.eclipse.jetty.http.security.Password changeit
```

The output will appear as follows:

```
changeit
OBF:1vn21ugu1saj1v9i1v941sar1ugw1vo0
MD5:b91cd1a54781790beaa2baf741fa6789
```

- b. Replace the plain text password in the **jetty.xml** file with the output above, including the **OBF** and **MD5** prefix.
8. (Optional) To disable non-HTTP access to the ALM Application Server, in the **jetty.xml** file, locate the following section and comment it out by placing **<!--** at the beginning of the section, and **-->** at the end.

Note: It is possible that this section in your **jetty.xml** file is slightly different.

```
<!--
<Call name="addConnector">
  <Arg>
    <New class="org.eclipse.jetty.server.nio.SelectChannelConnector">
      <Set name="host"><Property name="jetty.host" /></Set>
      <Set name="port"><Property name="jetty.port" default="8080"/></Set>
      <Set name="maxIdleTime">300000</Set>
      <Set name="Acceptors">2</Set>
      <Set name="statsOn">>false</Set>
      <Set name="confidentialPort">8443</Set>
      <Set name="lowResourcesConnections">20000</Set>
      <Set name="lowResourcesMaxIdleTime">5000</Set>
    </New>
  </Arg>
</Call>
-->
```

9. Save the **jetty.xml** file.
10. Restart the ALM Service as follows: Navigate to the **/var/opt/HP/ALM/wrapper** directory, and run the following command: **HPALM start**.
11. Connect to ALM using port 8443, or the number of the new port if you changed it in step 5 above.

Application Server Management Tools

Since the ALM Application Server is Java-based, we recommend the following Java tools to enable you to effectively manage ALM:

| Tool | Address |
|------------------|---|
| jconsole | http://java.sun.com/developer/technicalArticles/J2SE/jconsole.html |
| jstack | http://download.oracle.com/javase/1.5.0/docs/tooldocs/share/jstack.html |
| jmap | http://download.oracle.com/javase/1.5.0/docs/tooldocs/share/jmap.html |
| jvisualvm | http://download.oracle.com/javase/6/docs/technotes/tools/share/jvisualvm.html |

Note:

- **Jvisualvm** is an all-in-one tool that was added in Java 1.6. However **jvisualvm** is very memory and CPU intensive, so you may find that another tool is more useful.

Chapter 23: Customizing System Files

You can customize various aspects of ALM by creating or configuring system files.

This chapter includes

| | |
|--|-----|
| Customizing Site Administration | 175 |
| Customizing Menus | 176 |
| Understanding the ALM System Tray Icon | 178 |

Customizing Site Administration

Customization of the Site Administration repository and the **qcbn** application, such as editing **.xsl** mail stylesheets or creating custom test types, must be performed in the ALM deployment directory. After customizing any of the files in the deployment directory, you must redeploy ALM.

Caution: You must not modify, add, or delete files in the ALM installation directory.

This section includes:

| | |
|--|-----|
| Customizing the Site Administration Repository | 175 |
| Customizing the qcbn Application | 175 |

Customizing the Site Administration Repository

Perform the following procedure to customize the Site Administration repository.

1. On the machine on which ALM is installed, open a file browser, and navigate to **<ALM installation path>\data\sa**.
2. Open another file browser, and navigate to **<ALM repository path>\customerData**.
3. In the installation directory, navigate to the file that you want to customize.
4. In the repository directory, under **customerData**, create the same folder structure that contains the file in the installation directory.
5. Copy the file from the installation directory and paste the file in the appropriate folder in the repository directory.
6. Edit the file in the repository directory.
7. Run the Server Deployment Wizard from the following location:
 - On Windows systems: Choose one of the following:
 - **Start > HP ALM Server > Server Deployment Wizard**
 - **<installation path>\bin\run_server_deploy_tool.bat**
 - On Linux/Solaris systems:
<installation path>/bin/run_server_deploy_tool.sh

Customizing the qcbn Application

Perform the following procedure to customize the qcbn application.

1. On the machine on which ALM is installed, open a file browser, and navigate to **<ALM installation path>\application\20qcbn.war**.

2. Open another file browser, and navigate to **<ALM deployment path>\application\20qcbn.war**.
3. In the installation directory, navigate to the file that you want to customize.
4. In the deployment directory, under **20qcbn.war** create the same folder structure that contains the file in the installation directory.
5. Copy the file from the installation directory and paste the file in the appropriate folder in the deployment directory.
6. Edit the file in the deployment directory.
7. Run the Server Deployment Wizard from the following location:
 - On Windows systems: Choose one of the following:
 - **Start > HP ALM Server > Server Deployment Wizard**
 - **<installation path>\bin\run_server_deploy_tool.bat**
 - On Linux/Solaris systems:
<installation path>/bin/run_server_deploy_tool.sh
8. Repeat the procedure on each cluster node.

Customizing Menus

You can customize the ALM Tools and Help menus by modifying the **ALM-Client.exe.config** file on the machine on which ALM is installed.

Note: You can only perform **.cab** related actions on a Windows machine. To customize menus, copy the relevant files to a Windows machine and edit the files as necessary. Then copy the files back to the machine on which ALM is installed and proceed as instructed.

To customize ALM:

1. On the machine on which ALM is installed, extract the **ALM-Client.exe.config** file from **Client.cab**. This file is located in: **<ALM deployment path>\deployment\20qcbn.war\Install**.
2. Open the **ALM-Client.exe.config** file (this is in **.xml** format).
3. You can change or delete the Document Generator item in the Tools menu. This is defined in the **Tools** section of the file. In this section you can also add new items to the Tools menu.

The following is the syntax of an entry in the **Tools** line:

```
<TDFrame
    Tools="<Tool_Name>,{<Tool_ID>}"
    Workflow="<Workflow_ID>"
    Parameters="<parameters>"
/>
```

4. To change, delete, or rearrange the list of items in the Help menu, change the default names, IDs, and URLs listed in the **OnlineHelpItem** line. The following is the syntax of an entry in the **OnlineHelpItem** line:

```
<OnlineHelpItem  
ID="<Help_ID>"  
Name="<Help_Name>"  
Url="<Help_URL>"
```

To create a separator line between two items in the Help menu, use the following syntax:

```
<OnlineHelpItem  
ID="<Help_ID>"  
Name="<Help_Name>"  
Url="<Help_URL>"  
IsFirstInGroup="true" />
```

Note: The first two menu items in the Help menu, **Help on this page** and **ALM Help**, and the last Help menu item, **About HP Application Lifecycle Management Software**, cannot be moved or changed. They do not have corresponding entries in the **QualityCenter.exe.config** file. The above step only affects the menu items between them.

5. Unzip the **Client.cab** file to a temporary folder named **Client** which must be under the temp folder. For example, C:\temp\Client.
6. Replace the **ALM-Client.exe.config** file with the modified file.
7. Store the temporary folder on a logical drive, for example X, by running the following command:

```
subst [X]: <temp folder>
```

For example: **subst X: C:\temp**

8. Create a new **Client.cab** file with the following command:

```
cabarc -r -p -P Client\ -s 6144 N <temp folder>\Client.cab  
X:\Client\*.*
```

Note: To use this command you must first download cabsdk.exe (the Cabinet Software Development Kit) from the Microsoft Download Center.

9. Add a class 3 digital signature to the new **Client.cab** file.

Note: The digital signature must be a signature of a trusted provider.

10. Under **<ALM deployment path>\application\20qcbin.war**, create a new Installation folder, if it does not already exist.
11. Save the new cab file under the Installation folder.
12. Run the Server Deployment Wizard from the following location:
 - On Windows systems: Choose one of the following:
 - **Start > HP ALM Server > Server Deployment Wizard**
 - **<installation path>\bin\run_server_deploy_tool.bat**
 - On Linux/Solaris systems:
 - **<installation path>/bin/run_server_deploy_tool.sh**
13. Repeat the procedure on each cluster node.

Understanding the ALM System Tray Icon

Note: This section applies to Windows systems only.

The ALM system tray icon indicates the current status of ALM. It also indicates the current action that ALM is performing.

You can customize the behavior of the icon by modifying the **trayConfigFile.properties** file.

To customize the system tray icon:

1. Navigate to the following directory: **C:\ProgramData\HP\ALM\server\conf**
2. Open the **trayConfigFile.properties** file.
3. Change the following properties as necessary:
 - **pollingintervalMillis**. Defines, in milliseconds, how often the ALM system tray icon checks the status (started or stopped) of ALM. The default value is 5,000.
 - **logDebugMode**. Defines whether debugging information is included in the system tray log. The default value is false.
 - **timeoutintervalMillis**. Defines, in milliseconds, the maximum amount of time ALM takes to change the status of ALM when you right-click the icon and choose Start/Stop ALM Server. If ALM is not able to perform the action in the allotted time the status changes to Error. The default value is 180,000.

Note: If the icon does not appear in the system tray, choose **Start > Programs > HP Application Lifecycle Management > ALM Tray icon**.

Chapter 24: Uninstalling ALM

You can uninstall ALM from the server machine. When uninstalling ALM, projects are not deleted. You can also uninstall ALM client components from a workstation that has been used to access ALM.

This section includes:

| | |
|---|-----|
| Uninstalling ALM from Windows Systems | 181 |
| Uninstalling ALM from Linux/Oracle Solaris Systems | 181 |
| Uninstalling ALM Client Components from a Workstation | 181 |

Uninstalling ALM from Windows Systems

This section describes how to uninstall ALM from your Windows server machine.

1. Choose **Start > Control Panel**.
2. Depending on your operating system:
 - **2008**: In **Home** view, under **Programs**, click **Uninstall a program**. In **Classic** view, double-click **Programs and Features**.
 - **2008 R2**: In **Category** view, under **Programs**, click **Uninstall a program**. In **Large/Small icons** view, click **Programs and Features**.
3. In the programs list, right-click **HP Application Lifecycle Management** and select **Uninstall**.
4. Follow the instructions on your screen.
5. (Optional) To remove all traces of ALM from the machine, delete all remaining files in the installation directory as well as the deployment path. Also delete the **HP\ALM** folders in the **c:\ProgramData** directory and their files.

Note: When you remove the repository directory, all projects' repositories are also removed. The database remains unless it is specifically deleted.

Uninstalling ALM from Linux/Oracle Solaris Systems

This section describes how to uninstall ALM from your Linux/Solaris server machine.

Note: You must log on to the server machine as the same user that installed ALM.

1. Navigate to the **/var/opt/HP/iHP/HP_ALM_Server/<version number>** directory.
2. Run the **install.sh** file.
3. (Optional) To remove all traces of ALM from the machine, delete all remaining files in the installation directory as well as the deployment path. Also delete the **HP/ALM** folders in the **/var/opt** directory and their files.

Note: When you remove the repository directory, all projects' repositories are also removed. The database remains unless it is specifically deleted.

Uninstalling ALM Client Components from a Workstation

When you run ALM on your client computer, client components are downloaded to your workstation. You can use the client uninstall utility to remove all ALM client components, including

files and registry keys. To download the utility, see HP Software Self-solve knowledge base article [KM176290](http://h20230.www2.hp.com/selfsolve/document/KM176290) (<http://h20230.www2.hp.com/selfsolve/document/KM176290>). (Requires HP Passport sign-in credentials.)

If the workstation is used to access ALM after the uninstall utility has been run, all necessary components are downloaded again from the ALM server.

Part 8: Appendix

Chapter A: Troubleshooting the ALM Installation

This chapter contains troubleshooting suggestions for issues relating to the ALM installation.

This section includes:

| | |
|--|-----|
| Disabling Validation Checks for the Configuration Wizard | 187 |
| Checking the Installation and Configuration Log Files | 188 |
| ALM Installation Already Exists | 189 |
| Database Validator Fails | 189 |
| Monitoring ALM Server Fails | 190 |

Disabling Validation Checks for the Configuration Wizard

The ALM Server Configuration Wizard automatically performs validation checks to verify that particular system configurations requirements are met. If the ALM configuration does not complete due to a failed validation, you can disable selected validation checks and rerun the wizard.

Note:

- You should disable validation checks only if you are sure that the validation result is wrong.
- To resolve failures that occur during the ALM Server Installation Wizard, see "[Checking the Installation and Configuration Log Files](#)" on next page, or "[ALM Installation Already Exists](#)" on page 189.
- For troubleshooting tips on database validations, see "[Database Validator Fails](#)" on page 189.

To disable configuration validators and rerun the ALM Server Configuration Wizard:

1. In the ALM installation directory, locate the **run_after_finish.bat** file (Windows) or the **run_after_install.sh** (Linux/Solaris) file. The purpose of these files is to start the ALM Server Configuration Wizard.
2. In the installation directory, create a copy of the file. Make sure to save the copy using a different name, for example: **run_after_finish_skip_validation.bat**
3. Edit the new file by adding skip validation flags as required. The file itself contains instructions how to add the flags. For a list of configuration validators, see "[Configuration Validators](#)" below.
4. Save and then execute the new file.

Configuration Validators

| Validator | Checks | To Disable |
|-------------------------------------|---|---------------------------------|
| Operating system and license | Checks that the operating system is supported. | -wOsValidator |
| Existing installation | Checks if an older version of ALM or Quality Center is installed. | -wPreviousInstallationValidator |
| License file | Checks license file key. | -wLicenseTypeValidator |
| Security passphrases | Checks encryption passphrases. | -wEncryptionStepValidator |
| Mail server | Checks that the mail server name is valid. | wMailServerValidator |

| Validator | Checks | To Disable |
|------------------------------|--|--------------------------|
| Database connectivity | Checks database connectivity. | wDbSettingsStepValidator |
| Database settings | Checks Site Administration database settings. | -wSaSchemaValidator |
| Site administrator | Checks site administrator user settings. | -wSiteAdminUserValidator |
| Repository folder | Checks that the repository folder is accessible, and has sufficient space. | -wRepositoryValidator |

Checking the Installation and Configuration Log Files

If you encounter problems installing ALM, check for errors in the following log files:

Windows File Delivery Logs

| Log | Path |
|---------------------|--|
| Custom actions logs | <ul style="list-style-type: none"> • %temp%\ihp_custom_batches.log • %temp%\iHP.Runtime.CustomActions.HP_Application_Lifecycle_Management_Server.log |

Linux/Solaris File Delivery Logs

| Log | Path |
|-----------------------------------|---|
| Native package installation log | /var/log/<date>_HP_ALM_Server_install_log.txt |
| Installation sequencer wizard log | /var/log/<date>_HP_ALM_Server_11.50.000_iHP_log |
| Prerequisites log | /var/log/<date>_HP_ALM_Server_11.50.000_prerequisites_iHP_log.txt |

Application Logs

| Log | Path |
|---|--|
| Configuration logs | <ul style="list-style-type: none"> • Windows. C:\ProgramData\HP\ALM\log • Linux/Solaris. /var/opt/HP/ALM/log |
| Site Administration database schema creation logs | <ALM deployment folder>\log\sa |

ALM Installation Already Exists

If an error message displays during the installation indicating that an ALM installation already exists, uninstall the existing ALM installation and remove all traces of it from the server machine. For details, see ["Uninstalling ALM" on page 180](#).

If you are upgrading from Quality Center 10.00, perform the following steps to remove all traces of the application:

1. Navigate to the system root (**%systemroot%**) directory.
2. Navigate to the **/home** directory.
3. Back up the **vpd.properties** file.
4. Open the **vpd.properties** file for editing and delete any lines that mention ALM Server.

Database Validator Fails

During the ALM Server configuration, the database validator fails to perform the following checks:

- Check that the input parameters are correct.
- Check that the Site Administration database schema name was provided.
- Check whether the same authentication type was used as the one used in the previous installation.

Perform the following steps:

1. Check whether the parameters are correct:
 - Read the error message that displays during installation and try to understand and resolve the problem from the root cause.
 - For further clarifications, check with your database administrator.
 - If no error was found and you are sure that the parameters are correct, disable the DB parameters validator. For details, see ["Disabling Validation Checks for the Configuration Wizard" on page 187](#).
2. Check that the Site Administration Database Schema name was provided:
 - a. Open a database query tool.
 - b. Make sure the **PROJECTS** table exists in the Site Administration Database Schema. This table does not exist in the project schema.
3. To check the authentication type of a previous installation:
 - a. Navigate to **C:\Program Files\HP\ALM_Server** on Windows, and **/opt/HP/HP_ALM_Server** on Linux/Oracle Solaris and open the application folder.
 - b. Extract the contents of **qcbn.war** into a temp file, and open the **siteadmin.xml** file in a text editor.
 - c. Search for the **native** property. If its value is set to **Y**, Windows authentication was used.

Make sure that the new installation uses the same authentication type (Microsoft SQL Server authentication or Windows authentication) as the previous installation.

Monitoring ALM Server Fails

When running one of the Java-based tools to monitor ALM you receive the following message:

"Not enough storage is available to process this command."

This problem is caused because the JVM running ALM Server is running with a service account.

Choose one of the following solutions, depending on which tool you are running:

- **jmap and jstack.** See the suggestion in the following link:

<http://stackoverflow.com/questions/906620/jstack-and-not-enough-storage-is-available-to-process-this-command>

You will be required to download the pstools tool from the following address:

<http://technet.microsoft.com/en-us/sysinternals/bb897553>

- **jconsole and jvisualvm.** Download the following tool from the following address:

<http://www.iopus.com/guides/srvany.htm>

Also refer to the following Microsoft article: <http://support.microsoft.com/kb/137890>

Chapter B: Upgrade Preparation Troubleshooting

This appendix describes schema and database inconsistencies that the verification process detects. It indicates which problems the repair process can fix automatically, and which you should repair manually. Suggested solutions for repairing each issue are provided.

This appendix includes:

| | |
|---|-----|
| Overview | 193 |
| Quick Warning Reference | 193 |
| General Validation | 197 |
| Schema Validation | 200 |
| Data Validation | 210 |
| Changing the Database User Schema | 215 |

Overview

The verification process, described in "Verifying Domains and Projects" on page 77, detects inconsistencies and indicates which problems the repair process can fix automatically, and which you should repair manually. Suggested solutions for repairing each issue are provided in this appendix.

If an error is displayed during the verification or upgrade process, you can see error descriptions at <http://support.openview.hp.com/selfsolve/document/KM1302383>.

If a warning is displayed during the verification process, you can use the "Quick Warning Reference" below to locate the corresponding solution for that warning.

Some solutions necessitate the changing of the database user schema:

- **Database User Schema.** Database in SQL Server and a user schema in Oracle. This term is used for both cases because ALM can be deployed over SQL Server and Oracle. Both cases are logical sets of database objects (for example, tables, indexes, and so on) owned by the same logical owner.
- **Expected Database User Schema.** ALM Database User Schema configurations, as defined in the configuration file for a new ALM Database User Schema. As a preparation for the current version, each project database user schema should be aligned with the latest configurations, as defined in this schema.

If you need to modify the database user schema, see the additional instructions under "Changing the Database User Schema" on page 215.

Quick Warning Reference

This section lists schema and data issues found in warnings generated by the verification process.

| | |
|----------------------|-----|
| General Issues | 193 |
| Schema Issues | 194 |
| Data Issues | 196 |

General Issues

The following table lists general issues found in verification process warnings. Some issues are fixed automatically by the repair process. Other issues require that you repair them manually.

| Type | Problem | Resolution | Details |
|----------|---------------------------------------|---------------|--|
| Database | Database server version not supported | manual repair | "Supported Database Version" on page 197 |

| Type | Problem | Resolution | Details |
|-----------------|--|---------------|--|
| Database | Schema name contains invalid characters | manual repair | "Valid Database User Schema Name" on page 197 |
| Database | Table owner does not match the ALM server connection method | manual repair | "Mixed Table Ownership" on page 198 |
| Database | Repository over database feature no longer supported | manual repair | "Repository over Database Feature" on page 198 |
| Version control | Certain version control projects cannot be upgraded directly | manual repair | "Version Control Validation" on page 198 |
| Database | Permissions | manual repair | "Database Permissions" on page 199 |
| Database | Configure text search | manual repair | "Text Search Configuration" on page 199 |

Schema Issues

The following table lists schema issues found in verification process warnings. Some schema issues are fixed automatically by the repair process. Other schema issues require that you repair them manually.

| Type | Problem | Element | Resolution | Details |
|--------|----------------|---------|----------------|------------------------------|
| Table | Extra table | | manual repair | "Extra Table" on page 201 |
| Table | Missing table | | repair process | "Missing Table" on page 202 |
| Views | Extra view | | manual repair | "Extra Views" on page 212 |
| Views | Missing view | | repair process | "Views" on page 212 |
| Column | Extra column | | manual repair | "Extra Column" on page 202 |
| Column | Missing column | | repair process | "Missing Column" on page 204 |

| Type | Problem | Element | Resolution | Details |
|------------|---|---------|----------------|---|
| Column | Size mismatch - column size bigger than expected | | manual repair | "Column Size Mismatch" on page 203 |
| Column | Size mismatch - column size smaller than expected | | repair process | "Column Size Mismatch" on page 203 |
| Column | Type mismatch | | manual repair | "Column Type Mismatch" on page 203 |
| Column | Precision | | repair process | "Column Precision Mismatch" on page 203 |
| Column | Nullable - column can accept NULL values | | repair process | "Column Nullability Mismatch" on page 204 |
| Index | Uniqueness | | repair process | "Index Uniqueness Mismatch" on page 205 |
| Index | Clustered | | repair process | "Index Clustered" on page 206 |
| Index | Extra | | manual repair | "Internal Quality Center Changes" on page 208 |
| Index | Missing | | repair process | "Missing Index" on page 206 |
| Constraint | Missing | | repair process | "Missing Constraint" on page 206 |
| Constraint | Extra | | manual repair | "Missing Constraint" on page 206 |
| Index | Changed | | repair process | "Index Changed" on page 206 |
| Triggers | Extra | | manual repair | "Extra Trigger" on page 207 |
| Sequence | Missing | | repair process | "Missing Sequence" on page 208 |
| Sequence | Extra | | manual repair | "Extra Sequence" on page 207 |
| Sequence | Incorrect | | repair process | "Incorrect Sequences" on page 208 |

Data Issues

The following table lists data issues found in the verification process warnings. Some data issues are fixed automatically by the repair process. Other data issues require that you repair them manually.

| Type | Problem | Element | Res-olution | Details |
|----------------|--|--|----------------|--|
| Duplicate data | Duplicate values | | repair process | "Duplicate Values" on page 211 |
| Duplicate data | Duplicate IDs | | repair process | "Duplicate IDs" on page 211 |
| Trees | Wrong number of children | Tables REQ/ALL_LISTS/CYCL_FOLD | repair process | "Tree Inconsistencies" on page 212 |
| Trees | Corrupted path | Tables REQ/ALL_LISTS/CYCL_FOLD | repair process | "Tree Inconsistencies" on page 212 |
| Trees | Orphan records | Tables REQ/ALL_LISTS/CYCL_FOLD | repair process | "Tree Inconsistencies" on page 212 |
| Sequences | Sequence mismatch | Table SEQUENCES | repair process | "Sequences" on page 207 |
| Orphans | Missing parent entities | | repair process | "Orphaned Entities" on page 213 |
| Missing data | Missing entities | | repair process | "Missing Entities" on page 213 |
| Lists | Missing lists and values | Tables SYSTEM_FIELD / LISTS | repair process | "Missing Lists and/or List Values" on page 214 |
| Encryption | Mismatched pass-phrases for encrypted values | Tables LAB_HOSTS / LAB_AUT_HOSTS / LAB_DIAGNOSTICS_SERVERS | manual repair | "Encrypted Values" on page 214 |

General Validation

This sections describes the general validation checks the verification process performs.

| | |
|--|-----|
| Supported Database Version | 197 |
| Valid Database User Schema Name | 197 |
| Mixed Table Ownership | 198 |
| Repository over Database Feature | 198 |
| Version Control Validation | 198 |
| Database Permissions | 199 |
| Text Search Configuration | 199 |

Supported Database Version

The verification process checks that the project schema is stored in a supported database server. If the verification process detects that the database server version is not supported, it displays a warning. For details about the database servers versions supported by ALM, refer to http://www.hp.com/go/TDQC_SysReq.

Valid Database User Schema Name

The upgrade mechanism does not support databases that include special characters in the database name. If the verification process finds special characters, you must remove them. For SQL databases, periods are also not supported in the database user schema name.

To remove special characters from database names:

1. Deactivate the project.
2. Ask your database administrator to rename the database user schema to a name that does not include special characters, or periods for SQL databases.
3. Remove the project from Site Administration.
4. Update the **Dbid.xml** file to point to the new database user schema name.
5. Restore the project by using the updated **Dbid.xml** file.
6. Run the verification process again to make sure the problem is resolved.

Mixed Table Ownership

ALM can connect to Microsoft SQL server by using SQL authentication or Windows authentication.

For each of these methods, a different user owns the project's tables:

- **SQL Authentication.** Table owner is the user `td`.
- **Windows Authentication.** Table owner is the user `dbo` (a user mapped to the operating system user that runs the ALM server).

If you create a project with one type of authentication (for example, SQL), and then restore it with the other type of authentication (for example, Windows), these tables cannot be accessed. In this case, new tables are created with owners that are different from those of the old tables. You will not be able to work with the project. It is likely that the upgrade will fail.

To prevent this problem, the duplicate ownership validator checks that the owner of all of the tables in the project database user schema matches the connection method that ALM is using to connect to the server.

To fix table ownership manually, do one of the following:

- **SQL Authentication:** Run the following query to make `td` the table owner:

```
EXEC sp_changeobjectowner '<table name>', 'td'
```

- **Windows Authentication:** Run the following query to make `dbo` the table owner:

```
EXEC sp_changeobjectowner 'td.<table name>', 'dbo'
```

Repository over Database Feature

The **Repository over Database** feature is not supported in ALM versions 10.00 and later.

If you use this feature in Quality Center 9.2, you should migrate the repository from the database to the file system (available from Quality Center 9.2 Patch 12) before upgrading the project to Quality Center 10.00, and then upgrade the project to ALM 11.00.

For more information about the tool for migrating the project repository from the database to the file system, see the *ReadMe* files for Quality Center 9.2 Patch 12. The verification process checks whether the project is using the **Repository over Database** feature. If the project is using the feature, the validator displays a warning.

Version Control Validation

- **Legacy version control projects.** Integration with external version control tools is not supported in ALM 11.52. Quality Center version 10.00 and ALM version 11.52 include a built-in version control functionality to support your projects. To work with projects from Quality Center 9.2 that use version control, you must first upgrade to Quality Center 10.00, migrate legacy version control data, and then upgrade to ALM 11.52.
- **Quality Center 10.00 version control enabled projects.** Version control enabled projects from Quality Center 10.00 cannot be upgraded to ALM 11.52 while there are checked out

entities. The verification process checks that there are no checked out entities. If there are checked out entities, they must be checked in to Quality Center 10.00.

Database Permissions

To enable an upgrade to the current ALM version, the project schema requires a set of minimum required permissions. The verification process makes sure that both the project user and the administrator user have all the privileges needed to perform the upgrade.

Text Search Configuration

Quality Center versions 9.0 and later support the database text search feature. However, not all databases are configured to support this feature. If your database does support text search, ALM installs the required components when creating a new project database. ALM also activates the text search for the new database. The verification process checks whether your project has the text search feature enabled, and that it is configured correctly.

The verification process validates the following:

- ["Validity of the Text Search Configuration" below](#)
- ["Only Valid Fields Configured Under "Text Search"" on next page](#)
- ["Text Search Validation for Oracle Database Server" on next page](#)
- ["Text Search Validation for Microsoft SQL Database Server " on next page](#)

Validity of the Text Search Configuration

The verification process checks that text search components are installed and are valid on the database server. If a database server is text search-enabled in the DB Servers tab in Site Administration, text search must also be enabled on the Oracle or SQL database server. If the verification process detects that text search is not enabled or configured incorrectly on the Oracle or SQL database server, the upgrade process does not run until you manually repair the problem.

We recommend that you ask your database administrator to reconfigure text search on the Oracle or SQL database server. Alternatively, as a workaround, you can disable text search for the database server from Site Administration.

To disable the text search for the database server:

1. Run the following query on your Site Administration schema:

```
update <SA Schema>.dbservers set db_text_search_enabled = null  
where dbserver_name = '<DB logical name>'
```

2. Restart the ALM server.
3. Run the repair process for your projects.
4. When the repair process completes, run the following query:

```
update <SA Schema>.dbservers set db_text_search_enabled = 'Y' where  
dbserver_name = '<DB logical name>'
```

5. Restart the ALM server.

Only Valid Fields Configured Under "Text Search"

The verification process checks that only valid fields are defined as searchable. You can enable the text search only for specific entities, and only on fields of the type string or memo. The following entities are supported: BUG, COMPONENT, COMPONENT_STEP, DESSTEPS, REQ, TEST, BPTTEST_TO_COMPONENT, and CYCLE. Any other configuration could cause functionality problems during upgrade or customization. This problem is fixed automatically by the repair process.

Text Search Validation for Oracle Database Server

For an Oracle Database server, the verification process checks the following:

- **Validity of Text Search Indexes.** The verification process checks that database text search indexes are valid. Invalid text search indexes can cause functionality problems and even upgrade failure in ALM. If the verification process detects an invalid index, try to recreate the index by dropping it from the schema and creating it again. In Site Administration, click the **Site Projects** tab. Select the relevant project and click the **Enable/Rebuild Text Search** button. If this procedure returns an error, consult your database administrator or contact HP Support.
- **Validity of Project Database User Permissions.** The verification process checks that the project database user has the required permissions to work with text search. When text search is installed on the database, the role CTXAPP is created automatically. ALM requires that this role be granted to all projects database users that support text search. (ALM grants the CTXAPP role automatically when creating the project or enabling the text search for a project.) If this role is not granted to the project database user (configured to support text search), the verification process returns a warning. In these cases, ask your database administrator to grant the required role to the project database user.

Text Search Validation for Microsoft SQL Database Server

The verification process checks that the project database user schema enables the text search feature. To work with text search on SQL project, you need to enable the text search on the database.

To enable text search on the database:

1. Select the database from the SQL server Enterprise Manager.
2. Right-click the database name.
3. Select **Properties/Files**.
4. Select **Use Full-Text Indexing**.

Schema Validation

The verification process helps to ensure that the project database user schema is correct and configured as expected.

The verification process performs two types of schema verifications:

- **Schema Correctness.** Checks that the project database schema includes all of the required schema objects, as defined in the expected database user schema for the project. This verification ensures that all of the required entities exist and are defined as expected. It also ensures that there are no extra entities defined on top of the schema.

- **Alignment to the current version.** Notifies you about differences in the project database user schema caused by internal changes made in Quality Center 10.00. In this way, the verification process aligns the schema with the latest internal changes to the schema made in preparation for the upgrade.

The verification process displays warnings in the verification report if it finds the following:

- Extra entities defined. For example, Table, Column, Trigger, View, and Sequence.
- Differences from the expected definitions. For example, Column Size and Index Attributes.
- Missing objects.

Schema differences found by the verification process can cause upgrade failures or usage problems. As long as the verification process still finds these differences, an upgrade to the current ALM version will not start.

Note: Many of the schema changes can be fixed automatically by the repair process.

The following sections contain possible warnings, grouped by the different database objects, that the verification process can display in the verification report:

| | |
|---------------------------------------|-----|
| Tables | 201 |
| Columns | 202 |
| Indexes and Constraints | 204 |
| Triggers | 207 |
| Sequences | 207 |
| Internal Quality Center Changes | 208 |

Tables

Database tables can contain the following warnings:

- "Extra Table" below
- "Missing Table" on next page

Extra Table

The ALM schema should contain only the tables that are defined in the schema configuration file. Adding extra tables on top of the schema is not supported and might cause future problems with ALM.

Problem: If the verification process finds extra tables that were added manually to the schema, it generates an **Extra Table** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Do one of the following:

- **Change the Schema.** If you use the table, copy it to a different schema. If you do not use the table, delete it. Before taking either action, back up the schema and consult your database administrator. For details, see ["Changing the Database User Schema" on page 215](#).
- **Use the Exception File.** Not recommended: Instruct the upgrade to ignore this problem. For more information about the Exception file, see ["Define an Exception File" on page 78](#).

Note: If the project database is case sensitive, the table name must be the same in both the database and the exception file.

Missing Table

The verification process checks that all of the tables defined for the project schema actually exist (according to the tables of each Quality Center/ALM version).

Problem: If a table is missing, the verification process generates a **Missing Table** warning.

Solution: Do one of the following:

- See ["Changing the Database User Schema" on page 215](#).
- Run the repair process to create the missing table. Although you can use the repair process to add these objects, we recommend that you contact HP Support to make sure that the missing objects are not just symptoms of a bigger problem.

Columns

Database columns can contain the following warnings:

- ["Extra Column" below](#)
- ["Column Size Mismatch" on next page](#)
- ["Column Precision Mismatch" on next page](#)
- ["Column Type Mismatch" on next page](#)
- ["Column Nullability Mismatch" on page 204](#)
- ["Identity Column" on page 204](#)
- ["Missing Column" on page 204](#)

Extra Column

The verification process checks that each table includes the required columns, as defined for the expected database user schema and version. The schema should not include extra columns. Extra columns in a table might cause upgrade failure or functionality problems.

Problem: If the verification process detects an extra column (that does not exist in the database user schema definitions) in one of tables, it generates an **Extra Column** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Do one of the following:

- **Change the Schema.** If you have an internal implementation that requires extra table columns, move the extra columns to a different table in a different schema. If you do not use a particular column, delete it. Before taking either action, back up your schema and consult your database administrator. For a more detailed explanation, see ["Changing the Database User Schema" on page 215](#).
- **Use the Exception File.** Not recommended: Instruct the upgrade to ignore this problem. For more information about the Exception file, see ["Define an Exception File" on page 78](#).

Column Size Mismatch

The verification process checks that all the table columns are defined as expected. This validation ensures that the column size matches the expected size as defined for each table column. This verification excludes user-defined fields, whose size can be customized through project customization.

Some column mismatch warnings are caused by internal changes made in Quality Center 10.00 that are fixed by the repair process automatically. For details, see ["Internal Quality Center Changes" on page 208](#).

Problem A: Size is bigger than expected. If the column size is bigger than expected, decrease the column size to the required size manually. Because this operation can cause data loss, it is not performed automatically by repair process.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution A: Consult your database administrator to resolve this issue. For risks involved in changing the database user schema, see ["Changing the Database User Schema" on page 215](#).

Problem B: Size is smaller than expected. If the column size is smaller than expected, the repair process fixes the problem automatically by increasing the column size to the expected size.

Solution B: Run the repair process to increase the current size to the required size.

Column Precision Mismatch

In an Oracle Database, "precision" is the term used to define the size of fields with the INTEGER type.

Problem: The verification process generates a warning if the precision defined for a certain column is smaller than expected.

Solution: Run the repair process to increase the current precision to the required precision.

Column Type Mismatch

Changing a column type causes the upgrade to fail, and can cause major functionality problems.

Problem: The verification process generates a **Column Type** warning if the column type has changed.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Consult your database administrator to resolve this issue. For risks involved in changing the database user schema, see ["Changing the Database User Schema" on page 215](#).

Column Nullability Mismatch

One of the attributes that is defined for a column is whether it can accept null values. A null is the absence of a value in a column of a row. Nulls indicate missing, unknown, or inapplicable data. If you have defined a NOT NULL or PRIMARY KEY integrity constraint for a particular column, you cannot insert rows into the column without adding a value.

Problem: The verification process compares the required definitions for each column in the expected database user schema to the project database user schema. If it encounters differences in the column NULL attribute definition, it generates a **Column Nullable** warning.

Solution: Run the repair process. The repair process runs a query to modify the column attributes to the expected attributes.

If the column includes NULL values, the repair process cannot update the column attribute to NOT NULL (if this is the required attribute) for the column. Ask your database administrator how to remove the NULL values from the column. After removing the NULL values, run the repair process again. For details, see ["Changing the Database User Schema" on page 215](#).

Identity Column

The IDENTITY property is one of the attributes defined for columns in Microsoft SQL server.

Problem: As part of the verification for the columns attributes, the verification process might find a column IDENTITY property that is not configured as expected.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Change the IDENTITY property of the column to the expected configuration (according to the output from the verification process report) manually. Consult your database administrator to resolve this issue. For details, see ["Changing the Database User Schema" on page 215](#).

Missing Column

If a column is missing from a table, run the repair process or contact HP Support.

Problem: If the verification process finds that a column is missing from one of the tables, it generates a **Missing Column** warning.

Solution: Do one of the following:

- Run the repair process to fix the problem.
- See ["Changing the Database User Schema" on page 215](#).

Indexes and Constraints

A database index is a data structure that improves the speed of operations in a table. You can create indexes using one or more columns, providing the basis for both rapid random lookups and efficient ordering of access to records. Database Constraints are constraints on the database that require relations to satisfy certain properties.

Database indexes and constraints can cause the following validation warnings:

- ["Extra Index" below](#)
- ["Extra Constraint" below](#)
- ["Index Uniqueness Mismatch" below](#)
- ["Index Clustered" on next page](#)
- ["Missing Constraint" on next page](#)
- ["Missing Index" on next page](#)
- ["Index Changed" on next page](#)
- ["Index Order Changed " on next page](#)

Extra Index

The ALM schema should include only those indexes defined in the required schema configurations.

Problem: If the verification process finds an index that is not defined in the required schema configuration, it generates an **Extra Index** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Remove the extra indexes manually. Consult with your database administrator to resolve this issue. For details, see ["Changing the Database User Schema" on page 215](#).

Some **Extra Index** warnings are caused by internal changes made in Quality Center 10.00. These extra indexes are no longer used by ALM, and are removed by the repair process. For details, see ["Internal Quality Center Changes" on page 208](#).

Extra Constraint

The ALM schema should include only those constraints defined in the required schema configurations.

Problem: If the verification process finds a constraint that is not defined in the required schema configuration, it generates an **Extra Constraint** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Remove the extra constraint manually. Consult with your database administrator to resolve this issue. For details, see ["Changing the Database User Schema" on page 215](#).

Index Uniqueness Mismatch

A unique index guarantees that the index key contains no duplicate values. As a result, every row in the table is unique. Specifying unique indexes on ALM data tables ensures data integrity of the defined columns. In addition, it provides helpful information that is used as a query optimizer.

Problem: If the index uniqueness attribute does not have the expected value, the verification process generates an **Index Uniqueness Mismatch** warning.

You cannot create a unique index, unique constraint, or PRIMARY KEY constraint if duplicate key values exist in the data. The verification process performs these data validations. If a table has

duplicate values or IDs, based on the index definitions on that table, the verification process also displays the duplication in the verification report. In this case, the repair process automatically fixes the duplication problem before creating the unique index.

Solution: Run the repair process to fix the problem.

Index Clustered

In Microsoft SQL, index type can be classified as clustered or non-clustered. The verification process compares the required definitions for each index in the expected database user schema to the project database user schema.

Problem: If the verification process finds differences in the index clustered attribute definition, it generates an **Index Clustered** warning.

Solution: Run the repair process to fix the problem.

Missing Constraint

Constraints are rules that the database enforces to improve data integrity.

Problem: If the verification process finds a constraint that should be defined as missing, it generates a **Missing Constraint** warning.

Solution: Run the repair process to fix the problem.

Missing Index

The verification process checks that all the required indexes (as defined in the expected database user schema) exist in the projects database user schema.

Problem: If the verification process does not find all the required indexes in the projects database user schema, it generates a **Missing Index** warning.

Solution: Run the repair process to fix the problem.

Index Changed

The verification process checks that the indexes are defined according to the expected database user schema.

Problem: If the verification process finds an index that is not defined according to the expected database user schema, it generates an **Index Changed** warning.

This warning can indicate the following problems:

- Function in a function-based index is different than expected.
- Index is not defined on the expected columns.

Solution: Run the repair process to fix the problem. The repair process removes the index, and then recreates it, based on the required definitions for this index.

Index Order Changed

The verification process checks that the order of the columns in the index definition has not changed.

Problem: If the order of the columns in the index definition has changed, the verification process generates an **Index Order Changed** warning.

Solution: Run the repair process to fix the problem. The repair process removes the index, and then recreates it, based on the required definitions for this index.

Triggers

A database trigger is procedural code that is automatically executed in response to certain events on a particular table in a database.

Database triggers can contain the following warning:

- ["Extra Trigger" below](#)

Extra Trigger

Extra triggers can cause upgrade failures and functionality problems.

Problem: If the verification process finds an extra trigger, it generates an **Extra Trigger** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Before upgrading, back up your database schema and remove the extra triggers manually.

Because extra triggers can cause upgrade failures, the upgrade process cannot ignore this warning by using the Exception file. For details, see ["Changing the Database User Schema" on page 215](#).

Sequences

A sequence is an Oracle object that acts as a generator that provides a sequential series of numbers.

Database sequences can contain the following warnings:

- ["Extra Sequence" below](#)
- ["Missing Sequence" on next page](#)
- ["Incorrect Sequences" on next page](#)

Extra Sequence

ALM schemas should contain only the sequences that are defined in the schema configuration file.

Problem: If the verification process finds an extra trigger, it generates an **Extra Sequence** warning.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Do one of the following:

- **Change the Schema.** Move the sequence to a new database user schema. Before doing so, consult with your database administrator. For details, see ["Changing the Database User Schema" on page 215](#).

- **Use the Exception File.** Not recommended: Instruct the upgrade to ignore this problem. For more information about the Exception file, see ["Define an Exception File" on page 78](#).

Missing Sequence

Problem: If the verification process finds that one of the sequences that should be defined on the ALM schema is missing, it generates a **Missing Sequence** warning.

Solution: Do the following:

- Run the repair process to fix the problem.
- See ["Changing the Database User Schema" on page 215](#).

Incorrect Sequences

Problem: Sometimes the Oracle object sequence numbers become incorrect, for example, if an export of the database is done on a live activated project, in which users are still modifying tables. If the verification process finds that Oracle sequences objects are not fully synchronized with ALM schema table IDs, the verification process generates an **Incorrect Oracle sequences found** warning.

Solution: Run the repair process to fix the problem.

Internal Quality Center Changes

For upgrade from Quality Center 9.2: As a result of internal changes in Quality Center 10.00, a set of updates needs to be applied to the schema as part of the preparation for the upgrade to ALM.

To apply the updates to the schema, perform the following processes:

- ["Verification Process" below](#)
- ["Repair Process" on page 210](#)

Verification Process

If the verification process finds any internal differences, it generates warnings in the verification report. The repair process fixes them automatically.

The verification process checks for the following internal changes:

| Type | Problem | Element | Comment |
|--------|---------------|---------------------------|---|
| Column | Size mismatch | COMMON_SETTINGS.CSET_NAME | Expected column size is 240. Actual size is 70. |
| Column | Size mismatch | REQ.RQ_REQ_PRIORITY | Expected column size is 255. Actual size is 70. |
| Column | Size mismatch | REQ.RQ_REQ_TYPE | Expected column size is 255. Actual size is 70. |
| Column | Size mismatch | REQ.RQ_REQ_AUTHOR | Expected column size is 255. Actual size is 70. |

| Type | Problem | Element | Comment |
|--------|---------------|-------------------------------|---|
| Column | Size mismatch | REQ.RQ_REQ_PRODUCT | Expected column size is 255. Actual size is 70. |
| Column | Size mismatch | REQ.RQ_REQ_REVIEWED | Expected column size is 255. Actual size is 70. |
| Column | Size mismatch | REQ.RQ_REQ_STATUS | Expected column size is 255. Actual size is 70. |
| Index | Missing | ALL_LISTS.AL_ABS_PATH_COV_IDX | |
| Index | Missing | BUG.BG_COMPOUND_IDX | |
| Index | Missing | CYCLE.CY_FOLDER_IDX | |
| Index | Missing | REQ.RQ_REQ_STATUS_IDX | |
| Index | Missing | RUN.RN_CYCLE_IDX | |
| Index | Missing | STEP.ST_RUN_IDX | |
| Index | Missing | TEST.TS_SUBJECT_IDX | |
| Index | Extra | BUG.BG_DETECTED_BY_LWR_IDX | |
| Index | Extra | BUG.BG_STATUS_LWR_IDX | |
| Index | Extra | BUG.BG_PRIORITY_LWR_IDX | |
| Index | Extra | BUG.BG_RESPONSIBLE_LWR_IDX | |
| Index | Index changed | REQ_COVER.RC_ENTITY_ID_IDX | |
| Index | Index changed | RUN.RN_TEST_ID_IDX | |
| Index | Index changed | RUN.RN_TESTCYCLE_IDX | |

| Type | Problem | Element | Comment |
|--|-------------|----------------------------------|---------|
| Function-based indexes - relevant only for SQL server. | Extra index | COMMON_SETTINGS.CS_COVER_LWR_IDX | |
| Function-based indexes - relevant only for SQL server. | Extra index | HOSTS.HOSTS_LWR_IDX | |
| Function-based indexes - relevant only for SQL server. | Extra index | HOSTS_IN_GROUP.HG_COVER_LWR_IDX | |
| Function-based indexes - relevant only for SQL server. | Extra index | HOST_GROUP.GH_LWR_IDX | |
| Function-based indexes - relevant only for SQL server. | Extra index | USERS.US_USERS_LWR_IDX | |

Repair Process

The repair process fixes these internal differences in the following way:

- **Column Size.** Increases the size of columns to the required size.
- **Index Definition.** Removes extra indexes. It also recreates missing indexes and indexes that were defined differently.
- **Extra Function-based Indexes.** Microsoft SQL Server only. Removes obsolete function-based indexes.

Before beginning the upgrade, run the repair process on each project.

Data Validation

One of the main functions of the verification process is to ensure that the project database contains valid data.

The verification process helps you find and fix the following problems:

| | |
|--|-----|
| Duplicate Values | 211 |
| Duplicate IDs | 211 |
| Tree Inconsistencies | 212 |
| Views | 212 |
| Orphaned Entities | 213 |
| Missing Entities | 213 |
| Missing Lists and/or List Values | 214 |
| Encrypted Values | 214 |

Duplicate Values

Some fields (or a combination of fields) must be unique in given tables. This constraint is enforced by the creation of a unique index on these fields. For example, the combination of fields TS_SUBJECT and TS_NAME, which represent the ID of the test's parent folder and test name, must be unique. It is not possible to create two tests with the same name under the same folder. In rare cases, a corrupted database contains duplicate values in these fields.

Problem: The verification process checks that all unique indexes exist (and therefore enforce unique values). If the verification process finds duplicate values, it does not permit the upgrade to run on the project.

The verification report specifies the fields in which there are duplications and number of duplicate values found, as shown below.

| Duplicate Values | | | |
|---|-------|---------|-------------------|
| Looks for records in selected tables that have duplicate field values. Values must be unique. | | | |
| The Repair tool automatically handles duplicate values. | | | |
| # | Table | Columns | # Duplicate items |

Solution: Automatic Repair. Run the repair process to automatically handle the duplicate values. The repair process renames the duplicate values to resolve the problem.

Duplicate IDs

Most tables have a unique primary key, usually a unique single column. If there are duplicate values in this field, the primary key is not created.

For example, in a table called test, the column TS_TEST_ID represents the test ID, which is unique. In rare cases, a corrupted database contains duplicate IDs.

Problem: The verification process checks that all IDs in a table are unique. If it finds duplicate IDs, it does not permit the upgrade to run on the project.

The verification report specifies the fields in which there are duplicate items and values, as shown below.

| Duplicate IDs | | | |
|---|-------|------------|-------------------|
| Looks for records in selected tables that have duplicate ID field values. | | | |
| The Repair tool automatically deletes the duplicate records. | | | |
| # | Table | Column | # Duplicate Items |
| 1 | TEST | TS_TEST_ID | 2 |

Solution: Automatic Repair. The repair process automatically deletes one of the records with a duplicate ID.

Caution:

This option assumes that the entire record is duplicated, and that the duplicated record is not accessible from the ALM user interface. Because there can be exceptions, we recommend that you use this option only after verifying manually that this record deletion will not cause data loss.

Tree Inconsistencies

The verification process checks four different entity trees (hierarchical representation of entities):

- Test Plan tree
- Business Components tree
- Requirement tree
- Test Lab tree

The verification process checks that the data in the tree tables is correct.

Caution: Do not manually fix any problems related to tree data. The repair process fixes them automatically.

Problem: The verification process checks for the following types of problems:

- **Corrupted Path.** This is an internal ALM field that contains a string that represents the order of each node in the tree.
- **Wrong Number of Children.** This is an internal ALM field that contains the number of children for each node in the tree.
- **Orphan Records in Trees.** By definition, orphan records do not have parent records. As a result, you cannot access them through the ALM user interface.

Solution: Automatic Repair. Run the repair process to automatically fix any problems related to tree data.

Caution: Before beginning the automatic repair, review each orphan record carefully. If the verification process finds an orphan record, it deletes it (and all its descendants) from the tree automatically.

Views

Database views can contain the following warning:

- "Extra Views" below

Extra Views

ALM schemas should contain only the views that are defined in the schema configuration file.

Problem: If the verification process detects extra views that were added manually to the schema, it displays an **Extra Views** warning. Adding extra views on top of the schema is not supported and could cause problems.

Note: This problem requires manual repair. The repair process cannot fix it.

Solution: Do one of the following:

- **Change the Schema.** If you use the view, copy it to a different schema. If you do not use the view, delete it. Before taking either action, back up your schema and consult your database administrator. For details, see ["Changing the Database User Schema" on page 215](#).
- **Use the Exception File.** Not recommended: Instruct the upgrade to ignore this problem. For more information about the Exception file, see ["Define an Exception File" on page 78](#).

Orphaned Entities

The verification process checks for entity data that is missing corresponding parent data. For example, the following entities might be missing corresponding test configurations or test criteria:

- Test configuration coverage
- Criteria coverage
- Run criteria
- Runs
- Test instances

Caution: Do not manually fix any problems related to orphaned entities. The repair process fixes them automatically.

Problem: In version-controlled projects, deleting a test configuration or test criteria did not delete corresponding entities after checking in. This caused incorrect coverage calculation.

Solution: Automatic Repair. Run the repair process to automatically fix any problems related to orphaned entities created by this problem.

Missing Entities

The verification process checks for data that is missing. For example, the following entities might be missing:

- Test configurations
- Test criteria

Caution: Do not manually fix any problems related to missing entities. The repair process fixes them automatically.

Problem: The upgrade process can detect that certain entities are missing based on information that exists in related tables.

Solution: Automatic Repair. Run the repair process to automatically fix any problems related to missing entities created by this problem.

Missing Lists and/or List Values

The verification process checks that all of the fields of List type are associated with a list.

Problem: If a list and/or its values are missing, the verification process generates a warning about missing lists or missing list values.

Solution:

Run the repair process to create the missing list and/or its values.

Missing lists are re-created with the name: **AUTO_GENERATED_LIST_NAME_<unique_number>**

After running the repair process, do the following in **Customization > Project Lists**:

- Rename any lists whose names are prefixed by **AUTO_GENERATED_LIST_NAME_**.
- If necessary, add any list values that are missing.

Tip: Although you can use the repair process to add these objects, we recommend that you contact HP Support to make sure that the missing objects are not just symptoms of a bigger problem.

Encrypted Values

Some fields are saved in the database in an encrypted state. Encryption is done using confidential data passphrases.

Note: This is an issue with Performance Center and Lab Management projects.

Problem: The verification process checks that all encrypted data can be decrypted with the current confidential data passphrases. If the verification process finds encrypted values that cannot be decrypted, the project is not upgraded.

The verification report specifies the fields that cannot be decrypted.

Solution: If verifying the LAB_PROJECT fails due to a problem with the Confidential Data Passphrase, do one of the following:

- Make sure that the same Confidential Data Passphrase is defined on the original server on which the LAB_PROJECT was located, as well as on the server to which it is being restored.
- Perform the following steps:
 - a. In Site Administration: Before attempting to verify the LAB_PROJECT again, navigate to the **Lab Management** tab, and clear all encrypted field values from the project by running the following queries:

- For a Microsoft SQL Database

```
update td.LAB_DIAGNOSTICS_SERVERS set DIAG_SVR_PASSWORD = ""
update td.LAB_AUT_HOSTS set AUTHOST_PASSWORD = ""
ALTER TABLE td.LAB_HOSTS DISABLE TRIGGER ALL
update td.LAB_HOSTS set HOST_PASSWORD = ""
ALTER TABLE td.LAB_HOSTS ENABLE TRIGGER ALL
```

- For an Oracle Database

```
update <schema name>.LAB_DIAGNOSTICS_SERVERS set DIAG_SVR_
PASSWORD = ''
update <schema name>.LAB_AUT_HOSTS set AUTHOST_PASSWORD = ''
update <schema name>.LAB_HOSTS set HOST_PASSWORD = ''
```

- b. Proceed with the verify, repair, and upgrade of your LAB_PROJECT.
- c. Login to Lab Management and update the passwords of the AUT Hosts, Diagnostics Server and Standalone Unix Load Generators. For information on working in Lab Management, refer to the *HP ALM Lab Management Guide*.

Changing the Database User Schema

This section describes the problems that require manual repair (cannot be fixed automatically by the repair process), and recommends solutions for these problems. If you encounter any of the problems mentioned below, consult with your database administrator or contact HP Support for further guidelines to resolve these problems before upgrading.

The stability of the new database upgrade component depends on the validity of the database user schema validity. We recommend that you not use the Exception file to change the database user schema.

This section includes:

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Missing Database Objects

Missing database objects can be symptoms of a bigger problem.

Problem: Missing database objects (for example, tables and indexes) can yield unexpected and unwanted behavior.

Solution: Although you can use the repair process to add these objects, we recommend that you contact HP Support to make sure that the missing objects are not just symptoms of a bigger problem.

Missing List Warning

User-defined fields of List type must be associated with lists.

Problem: If a list is missing for a user-defined field, the verification process generates a **Missing List** warning.

Solution: Contact HP Support for instructions on changing the data type of the user-defined field from List to String in the SYSTEM_FIELD table.

Caution: Contact HP Support before attempting to fix the problem manually.

Sequences Warning

An internal mechanism manages IDs and other system numerators. The table SEQUENCES holds the name of the table or other entity whose numeration is being tracked as well as its highest current value.

Problem: If one of the records is missing in this table, or if one of the values is incorrect, the verification process generates a **Sequences** warning.

Solution: The repair process fixes the problem automatically.

Caution: We strongly recommend that you not attempt to fix the problem manually.

Changed Database Objects

Any of the following cases is defined as a Changed Database Object:

- Data type of a column was changed
- Length of a column was changed
- Nullability of a column was changed
- Column is defined as identity although it should not be defined as such, or vice versa

Problem: A changed column data type can result in incorrect behavior on the server side.

Solution: To avoid this behavior, make sure that you have resolved all data type and length concerns before beginning the upgrade.

For every changed database object that is found, do the following:

1. Create a new column with the required attributes as originally defined by the ALM server.
2. Move the data from the old column to the new one.

If you cannot move the data (for example, move strings to numeric columns, or move large data to smaller fields), contact HP Support.

3. Remove the old column.
4. Rename the new column to the original column name.

Extra Database Objects

ALM has various customization options. One option is to add user-defined fields (UDFs). You can add a UDF by using either the project customization user interface or through OTA (Open Test Architecture).

Problem: Any other addition to the database user schema (for example, defining extra objects on top of ALM schema) can result in a failure, such as the following:

- **Name Conflict.** If the later version happens to include a name that you added for a proprietary database object (for example, a table, view, or column), the two names will be in conflict.
- **Copy and Synchronize Failure.** If the database user schema contains extra or missing database objects, some ALM mechanisms for copying and synchronizing might fail.
- **Extra Triggers.** If the database contains extra triggers, some update operations might fail.

Solution:

For each extra database object that is found, perform the corresponding solution:

- **Move extra columns to newly created tables.**

To make sure a new table has a one-to-one relationship with the original table, define the primary key of the new column in the new table with the value of the primary key of the original column in the original table.

- **Move extra tables to a different database user schema.**

These extra tables include those tables created above. You might need to amend the proprietary application data access of these tables. You can still access these tables from within the ALM database connection by specifying the full name.

Examples:

- Oracle

```
<schema name>.<table name>
```

- SQL Server

```
<database name>.td.<table name>
```

To be able to see these tables, you must grant the necessary permissions for the database user schema.

- **Move extra views to a different database user schema.**

Like extra tables, these views can be moved to a different database user schema. In addition, you must grant reading permissions to the newly created database user schema on the database user schema objects.

- **Remove referential integrity between customer database objects and ALM database objects.**

This removal includes no data loss.

- **Remove extra triggers before the upgrade, and, only if truly necessary, restore them after the upgrade.**

No data loss is involved. The upgrade process includes data upgraders that perform some data manipulations (for example, removing duplicate values, fixing tree structures, and so on).

Your triggers will not be invoked on these update events.

As a result, you need to do the following:

- a. Ask HP Support for information about the data upgrader activity.
- b. Review the information about the data upgrader activity.
- c. Decide on which proprietary updates you need to perform.

- **Remove extra indexes.**

You can log all indexes before the upgrade, and (only if necessary) restore them after the upgrade. No data loss is involved.

- **Oracle Database only: Move extra sequences to a newly created database user schema.**

To access the extra sequences from the database user schema, you must grant ALM the required permissions. When moving these sequences, set them to start with the number they reached at the time of the move.

