vCenter Orchestrator Installation and Configuration Guide

vCenter Orchestrator 4.0.1

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Contents

Updated Information

This *vCenter Orchestrator Installation and Configuration Guide* is updated with each release of the product or when necessary.

This table provides the update history of the *vCenter Orchestrator Installation and Configuration Guide*.

Revision	Description
EN-000227-03	■ Added a user role in "Orchestrator User Roles and Related Tasks," on page 10. ■ Updated Step 1 in "Log In to the Orchestrator Configuration Interface," on page 34.
EN-000227-02	■ Added reference to VMware Technical Publications glossary in "About This Book," on page 7. ■ Updated "Install vCenter Server and Orchestrator," on page 21. ■ Added information about supported directory service types in "Directory Services Setup," on page 17. ■ Corrected the note in Step 7 in "Generate the LDAP Connection URL," on page 40. ■ Corrected the instructions in Step 3 and Step 4 in "Define the LDAP Lookup Paths," on page 43. ■ Added a prerequisite in "Configure the Database Connection," on page 45. ■ Added a prerequisite in "Start the Orchestrator Server," on page 55. ■ Added a new topic, Chapter 10, "Where to Go From Here," on page 63.
EN-000227-01	■ Added a procedure about restoring the default administrative password in "Revert to the Default Password for Orchestrator Configuration," on page 35. ■ Added instructions about changing the communication ports on the Orchestrator client side in "Change the Default Configuration Ports on the Orchestrator Client Side," on page 38. ■ Added information about using SSL with LDAP in "Import the LDAP Server SSL Certificate," on page 41. ■ Added instructions about deleting a plug-in in "Remove a Plug-In," on page 53. ■ Added instructions about changing the SSL certificate for Web views in "Change the Web View SSL Certificate," on page 60.

Revision	Description
EN-000227-00	Updates for the release of Orchestrator 4.0.1: ■ Added information about the supported versions of directory service types in "Supported Directory Services," on page 14. ■ Added information about internationalization support in "Level of Internationalization (i18n) Support," on page 14. ■ Added instructions about installing Orchestrator with the vCenter Server installer in "Install vCenter Server and Orchestrator," on page 21. ■ Added details about the location of the `vCenterOrchestrator.exe` file in "Install Orchestrator Standalone," on page 23. ■ Added information about upgrading Orchestrator in Chapter 6, "Upgrade Orchestrator Standalone," on page 27 and Chapter 5, "Upgrade Orchestrator with vCenter Server," on page 25. ■ Added new topics about configuring the Orchestrator components in Chapter 3, "Orchestrator Components Setup Guidelines," on page 17. ■ Added information about the supported configuration maximums for Orchestrator in "Orchestrator Configuration Maximums," on page 19. ■ Removed information about enabling support for Oracle on Windows, because Orchestrator now includes the Oracle database driver. ■ Added port numbers to the list in "Orchestrator Network Ports," on page 36. ■ Added information and an example about using Global Catalog with Active Directory in "Generate the LDAP Connection URL," on page 40. ■ Added information about customizing the LDAP search queries in "Define the LDAP Search Options," on page 44. ■ Added a list of the most common LDAP authentication errors in "Common Active Directory LDAP Errors," on page 44. ■ Added instructions about using Windows authentication in "Configure the Database Connection," on page 45. ■ Added a prerequisite for using an Oracle database in an internationalized environment in "Configure the Database Connection," on page 45. ■ Added instructions about identifying the SQL Server authentication type in "Identify the SQL Server Authentication Type," on page 47. ■ Added instructions about importing a server certificate in "Import a Server Certificate," on page 47. ■ Added instructions about enabling the Orchestrator service watchdog in "Activate the Service Watchdog Utility," on page 55. ■ Added troubleshooting information in "Unwanted Server Restarts," on page 56. ■ Added instructions about changing the SSL certificate used for Web views in "Change the Web View SSL Certificate," on page 60. ■ Added information about uninstalling Orchestrator in Chapter 8, "Uninstall Orchestrator," on page 31.
EN-000192-01	■ Removed OpenLDAP from the list of supported directory services in "Supported Directory Services," on page 14. ■ Added information about unsupported database types and full partition warning in "Orchestrator Database Setup," on page 18. ■ Added a note about an unsupported directory service type in Step 3 in "Generate the LDAP Connection URL," on page 40. ■ Added information about the methods Orchestrator uses to store passwords in "Password Encryption and Hashing Mechanism," on page 45. ■ Added instructions about how to remove a self-signed server certificate in "Change a Self-Signed Server Certificate," on page 49.
EN-000192-00	Initial release of Orchestrator 4.0.

About This Book

The *VMware vCenter Orchestrator Installation and Configuration Guide* provides information and instructions about installing, upgrading and configuring VMware® vCenter Orchestrator.

Intended Audience

This book is intended for advanced vCenter administrators and experienced system administrators who are familiar with virtual machine technology and datacenter operations.

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Introduction to VMware vCenter Orchestrator 1

VMware vCenter Orchestrator is a development and process-automation platform that provides a library of extensible workflows to allow you to create and run automated, configurable processes to manage the VMware vCenter infrastructure as well as other VMware and third-party technologies.

Orchestrator exposes every operation in the vCenter Server API, allowing you to integrate all of these operations into your automated processes. Orchestrator also allows you to integrate with other management and administration solutions through its open plug-in architecture.

This chapter includes the following topics:

Key Features of the Orchestrator Platform

Orchestrator is composed of three distinct layers: an orchestration platform that provides the common features required for an orchestration tool, a plug-in architecture to integrate control of subsystems, and a library of workflows. Orchestrator is an open platform that can be extended with new plug-ins and libraries, and can be integrated into larger architectures through a SOAP API.

The following list presents the key Orchestrator features.

Persistence Production grade external databases are used to store relevant information, such as processes, workflow states, and configuration information.

Central management Orchestrator provides a central way to manage your processes. The application server-based platform, with full version history, allows you to have scripts and process-related primitives in one place. This way, you can avoid scripts without versioning and proper change control spread on your servers.

Check-pointing Every step of a workflow is saved in the database, which allows you to restart the server without losing state and context. This feature is especially useful for long-running processes.

Versioning All Orchestrator Platform objects have an associated version history. This feature allows basic change management when distributing processes to different project stages or locations.

Scripting engine

The Mozilla Rhino JavaScript engine provides a way to create new building blocks for Orchestrator Platform. The scripting engine is enhanced with basic version control, variable type checking, name space management and exception handling. It can be used in the following building blocks:

- Actions
- Workflows
- Policies

Workflow engine

The workflow engine allows you to capture business processes. It uses the following objects to create a step-by-step process automation in workflows:

- Workflows and actions that Orchestrator provides.
- Custom building blocks created by the customer
- Objects that plug-ins add to Orchestrator

Users, other workflows, a schedule, or a policy can start workflows.

Policy engine

The policy engine allows monitoring and event generation to react to changing conditions in the Orchestrator server or plugged-in technology. Policies can aggregate events from the platform or any of the plug-ins, which allows you to handle changing conditions on any of the integrated technologies.

Web 2.0 front end

The Web 2.0 front end allows you to integrate Orchestrator functions into Web-based interfaces, using Web views. For example, you can create Web views that add buttons to start workflows from a page in your company's Intranet. It provides a library of user customizable components to access vCO orchestrated objects and uses Ajax technology to dynamically update content without reloading complete pages.

Security

Orchestrator provides the following advanced security functions:

- Public Key Infrastructure (PKI) to sign and encrypt content imported and exported between servers
- Digital Rights Management (DRM) to control how exported content might be viewed, edited and redistributed
- Secure Sockets Layer (SSL) encrypted communications between the desktop client and the server and HTTPS access to the Web front end.
- Advanced access rights management to provide control over access to processes and the objects manipulated by these processes.

Orchestrator User Roles and Related Tasks

vCenter Orchestrator provides different tools and interfaces based on the specific responsibilities of the two global user roles: Administrators and End Users.

Administrators

This role has full access to all of the Orchestrator platform capabilities. Basic administrative tasks include the following items:

- Installing and configuring Orchestrator
- Managing access rights for Orchestrator and applications
- Importing and exporting packages
- Enabling and disabling Web views

- Running workflows and scheduling tasks
- Managing version control of imported elements
- Creating new workflows and plug-ins

Developers

This role has full access to all of the Orchestrator platform capabilities. Developers are granted access to the Orchestrator client interface and have the following responsibilities:

- Creating applications to extend the Orchestrator platform functionality
- Automating processes by customizing existing workflows and creating new workflows and plug-ins
- Customizing Web front ends for these processes, using Web 2.0

End Users

Users in this role are granted access to only the Web front end. They can run and schedule workflows and policies that you make available in a browser by using Web views.

Orchestrator Architecture

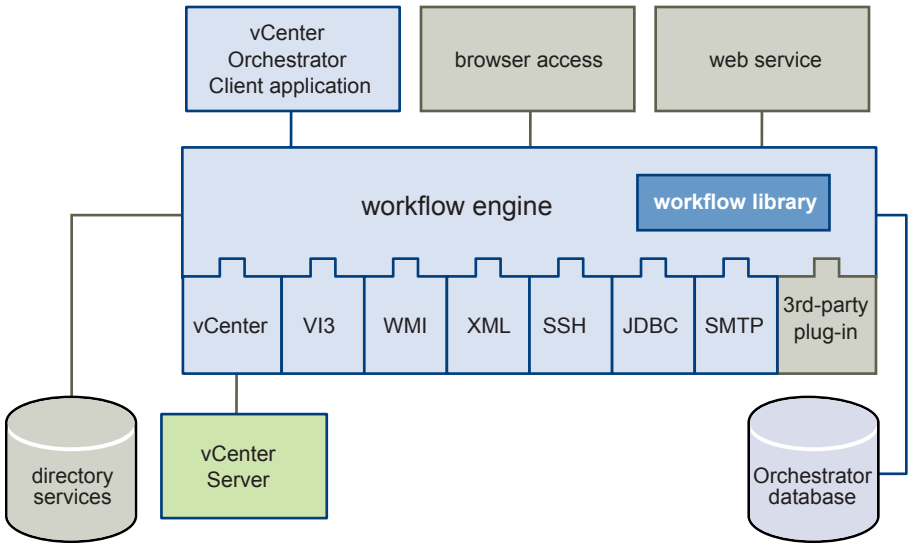
Orchestrator contains a workflow library and workflow engine to allow you to create and run workflows that automate orchestration processes. You run workflows on the objects of different technologies that Orchestrator accesses through a series of plug-ins.

Orchestrator provides a standard set of plug-ins, including a plug-in to VMware vCenter Server, to allow you to orchestrate tasks in the different environments that the plug-ins expose.

Orchestrator also presents an open architecture to allow you to plug in external third-party applications to the orchestration platform. You can run workflows on the objects of the plugged-in technologies that you define yourself. Orchestrator connects to a directory services server to manage user accounts, and to a database to store information from the workflows that it runs. You can access Orchestrator and the workflows and objects it exposes through the Orchestrator client interface, through a Web browser, or through Web services.

Figure 1-1 shows the architecture of Orchestrator.

Figure 1-1. VMware vCenter Orchestrator Architecture



NOTE The VMware Infrastructure 3 and Microsoft plug-ins are not installed by default.

Orchestrator System Requirements 2

Your system must meet the technical requirements that are necessary to install and configure VMware vCenter Orchestrator.

This chapter includes the following topics:

Hardware Requirements for Orchestrator

Make sure your system meets the minimum hardware requirements before you install Orchestrator.

- 2.0GHz or faster Intel or AMD x86 processor. At least two CPUs are recommended. Processor requirements might differ if your database runs on the same hardware.
- 4GB RAM. You might need more RAM if your database runs on the same hardware.
- 2GB disk space. You might need more storage if your database runs on the same hardware.
- A free static IP address.

Operating Systems Supported by Orchestrator

Orchestrator offers support for several operating systems.

- Windows Server 2008 Datacenter, 64-bit
- Windows Server 2008 Enterprise R2, 64-bit
- Windows Server 2008 Enterprise SP1, 64-bit
- Windows Server 2008 Standard, 64-bit
- Windows Server 2008 Datacenter, 32-bit
- Windows Server 2008 Enterprise, 32bit
- Windows Server 2008 Standard, 32bit
- Windows Server 2003 R2 SP2, 32-bit

- Windows Server 2003 R2 SP2, 64-bit
- Windows Server 2003 R2, 32-bit

Supported Directory Services

Orchestrator requires a working LDAP server on your infrastructure.

Orchestrator supports these directory service types.

- Windows Server 2003 Active Directory
- Windows Server 2008 Active Directory
- Novell eDirectory Server 8.8.3
- Sun Java Directory Server Enterprise Edition (DSEE) Version 6.3

Browsers Supported by Orchestrator

The Orchestrator user interface requires a Web browser.

You must have one of the following browsers to connect to Orchestrator.

- Microsoft Internet Explorer 6.0 and 7.0
- Mozilla Firefox 3.0.x

Orchestrator Database Requirements

Orchestrator requires you to have a database that is separate from the standard vCenter database.

NOTE Because of CPU and memory use, you should consider hosting the Orchestrator database and the Orchestrator server on different machines from the same datacenter. Make sure at least 1GB of free disk space is available on each machine.

The following database types are supported by Orchestrator:

- Microsoft SQL Server 2008 Enterprise Edition x64 (10.0.1600)
- Microsoft SQL Server 2005 Enterprise Edition x32 (9.0.3042)
- Oracle 10g Enterprise Edition, Release 2 x32 (10.2.0.1.0)

Level of Internationalization (i18n) Support

Orchestrator is compliant with i18n level 1. Although Orchestrator is not localized, it can run on a non-English operating system and handle non-English text.

Non-ASCII Character Support in Orchestrator

Table 2-1 displays the level of internationalization compliance and limitations in Orchestrator GUI data entries.

Table 2-1. Non-ASCII Character Support

	Support for Non-ASCII Characters			
Item	**Description Field**	**Name Field**	**Input and Output Parameters**	**Attributes**
Action	Yes	No	No	No
Category	Yes	Yes	-	-

Table 2-1. Non-ASCII Character Support (Continued)

	Support for Non-ASCII Characters			
Item	**Description Field**	**Name Field**	**Input and Output Parameters**	**Attributes**
Configuration element	Yes	Yes	-	No
Package	Yes	Yes	-	-
Policy	Yes	Yes	-	-
Policy template	Yes	Yes	-	-
Resource element	Yes	Yes	-	-
Web view	Yes	Yes	-	No
Workflow	Yes	Yes	No	No
Workflow presentation display group and input step	Yes	Yes	-	-

Caution You cannot use non-ASCII characters in the filename when you export Orchestrator objects. This is due to a third party limitation.

Non-ASCII Character Support for Oracle Databases

To store characters in the correct format in an Oracle database, set the `NLS_CHARACTER_SET` parameter to `AL32UTF8` before configuring the database connection and building the table structure for Orchestrator. This setting is crucial for an internationalized environment.

Orchestrator Components Setup Guidelines

3

To enhance the availability and scalability of your Orchestrator setup, install Orchestrator on a server different from the server on which vCenter Server runs. Separating Orchestrator from vCenter Server makes it possible to adjust the operating system to meet the specific recommendations for each service.

This chapter includes the following topics:

vCenter Server Setup

Increasing the number of vCenter Server instances causes Orchestrator to manage more sessions. Each active session implies activity on the corresponding vCenter and too many active sessions can cause Orchestrator to experience timeouts when more than 10 vCenter connections occur.

NOTE Run only one vCenter Server on a virtual machine. You can run multiple vCenter instances on different virtual machines in your Orchestrator setup if your network has sufficient bandwidth and latency. If you are using LAN to improve the communication between Orchestrator and vCenter, a 100Mb line is mandatory.

Directory Services Setup

Orchestrator requires a connection to an LDAP server on your infrastructure.

The supported directory service types are: Active Directory, eDirectory, and Sun Java System Directory Server. OpenLDAP is not supported and can only be used for testing and evaluation purposes.

Connect your system to the LDAP server that is physically closest to your Orchestrator server and avoid connections to remote LDAP servers. Long response times for LDAP queries can lead to slower performance of the whole system.

To improve the performance of the LDAP queries, keep the user and group lookup base as narrow as possible. Try to limit the users to targeted groups that are going to need access, rather than to whole organizations with many users who are not going to need access. Depending on the combination of database and directory service you choose, the resources you need can vary. For recommendations, see third-party documentation.

Orchestrator Database Setup

Orchestrator requires a database to store workflows and actions.

Orchestrator server supports Oracle and Microsoft SQL Server databases and provides experimental support for MySQL and PostgreSQL. You can use MySQL and PostgreSQL for testing and evaluation purposes.

NOTE The driver for MySQL is not installed with Orchestrator. For details about enabling support for this database type, see "Enable Support for MySQL Databases on Windows," on page 18.

The way in which your database is set up can affect Orchestrator performance. Install the database on a virtual machine other than the one on which Orchestrator is installed. This method avoids the JVM and DB server having to share CPU, RAM, and IOs.

Storing your database plug-ins in a database separate from the one that Orchestrator uses allows more modularity when upgrading the system. A dedicated database instance allows you to perform upgrades and maintenance without impacting other products.

The location of the database is important because almost every activity on the Orchestrator server triggers operations on the database. To avoid latency in the database connection, connect to the database server that is closest to your Orchestrator server and that is on the network with the highest bandwidth.

The size of the Orchestrator database varies depending on the setup and how workflow tokens are handled. Allow for approximately 50K per vCenter Server object and 4KB per workflow run.

CAUTION Make sure that at least 1GB of free disk space is available

- on the virtual machine where the database is installed
- on the virtual machine where the Orchestrator server is installed

Insufficient disk storage space might result in unwanted behavior of the Orchestrator server and client.

Enable Support for MySQL Databases on Windows

To use a MySQL database, you must download the driver and copy it to the appropriate locations. The Orchestrator installer does not install drivers for MySQL databases.

Procedure

1 Download the latest MySQL driver from http://dev.mysql.com/downloads/connector/j/.

2 Extract the downloaded archive.

3 In the extracted folder, locate the `mysql-connector-java-x.x.x.jar` file, where *x.x.x* is the current subminor version.

4 To make the driver available to VMware vCenter Orchestrator server and VMware vCenter Orchestrator configuration interface, copy `mysql-connector-java-x.x.x.jar` to the following locations:

   - VMware vCenter Orchestrator configuration interface:

     install_directory\VMware\Orchestrator\configuration\jetty\lib\ext\

   - VMware vCenter Orchestrator server:

     install_directory\VMware\Orchestrator\app-server\server\vmo\lib\

5 Restart the Orchestrator servers.

   a Right-click **My Computer** on your desktop and select **Manage**.

   b In the Computer Management dialog box, expand **Services and Applications** and select **Services**.

   c In the right pane, right-click and select **VMware vCenter Orchestrator Configuration > Restart**.

   d In the right pane, right-click and select **VMware vCenter Orchestrator Server > Restart**.

You installed the MySQL database driver.

MySQL Database Parameters

When you use a MySQL database, the database server must be configured with the parameter `max_allowed_packet` set to 16M.

Procedure

1 Open the `C:\Program Files\MySQL\MySQL Server X.X\my.ini` file for editing.

2 In section [mysql], add the line: **`max_allowed_packet = 16M`**.

Orchestrator Configuration Maximums

When you configure Orchestrator, make sure you stay at or below the supported maximums.

Table 3-1 contains information about the tested and recommended configuration maximums for Orchestrator.

Table 3-1. Orchestrator Configuration Maximums

Item	Maximum
Connected vCenter Server systems	10
Connected ESX/ESXi servers	100
Connected virtual machines	3000
Concurrent running workflows	150

Installing Orchestrator 4

Orchestrator consists of a server component and a client component. You can install the Orchestrator components on the machine where vCenter Server is installed or on a separate machine. To improve performance, install the Orchestrator server component on a separate machine.

To install Orchestrator, you must be either a local Administrator or a domain user that is a member of the Administrators group. To run and use Orchestrator, you must use a local system account for the machine on which Orchestrator is installed.

This chapter includes the following topics:

Install vCenter Server and Orchestrator

When you install VMware vCenter Server, Orchestrator is silently installed on your system as an additional component.

NOTE To install the vCenter Server on a drive other than `C:`, verify that the `C:\WINDOWS\Installer` folder is large enough to install the Microsoft Windows Installer `.msi` file. If the folder is not large enough, your vCenter Server installation might fail.

For a list of required ports, see the *ESX and vCenter Server Installation Guide*.

Prerequisites

See vCenter Server installation prerequisites in the *ESX and vCenter Server Installation Guide*.

Procedure

1 Download the vCenter Server installation package from the VMware Web site.

Option	Description
Use ISO image	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.iso`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.
Use ZIP archive	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.zip`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.

2 Extract the files from the archive and in the `C:\`*`install_directory`*`\` directory, double-click the `autorun.exe` file.

3 When the vCenter Server Installer appears, click **vCenter Server**.

4 Select a language for the installer and click **OK**.

5 When the Welcome page appears, click **Next**.

6 Select **I agree to the terms in the license agreement** and click **Next**.

7 Type your user name, organization, and vCenter Server license key, and click **Next**.

8 Select the type of database to use.

Option	Action
To use the bundled database	Click **Install SQL Server 2005 Express instance (for small-scale deployments)**. This database is suitable for deployments of up to 5 hosts and 50 virtual machines.
To use an existing database	Click **Use an existing supported database** and select your database from the list. Type the user name and password for the DSN and click **Next**. If your database is a local SQL Server database using Windows NT authentication, leave the user name and password fields blank. If you specify a remote SQL Server database that uses Windows NT authentication, the database user and the logged-in user on the vCenter Server machine must be the same.

A dialog box might appear, warning you that the DSN points to an older version of a repository that must be upgraded. If you click **Yes**, the installer upgrades the database schema, making the database irreversibly incompatible with previous VirtualCenter versions.

9 Enter the administrator name and password that you use when you log in to the system on which you are installing vCenter Server and click **Next**.

10 Select **Use SYSTEM Account** and click **Next**.

11 Select the account type.

If you want to use Windows authentication for SQL Server, specify an account that is an administrator on the local machine. As a best practice, type the account name as *DomainName**Username*. Type the account password, retype the password, and click **Next**.

12 Either accept the default destination folders or click **Change** to select another location, and click **Next**.

The installation path cannot have commas (,) or periods (.).

13 Select **Create a standalone VMware vCenter Server instance** or **Join Group** and click **Next**.

Join a Linked Mode group to enable the vSphere Client to view, search, and manage data across multiple vCenter Server systems.

This option does not appear if you are upgrading the VirtualCenter database schema. If it does not appear, you can join a Linked Mode group after the installation is complete.

14 (Optional) If you join a group, enter the fully qualified domain name and LDAP port number of any remote vCenter Server system and click **Next**.

In some cases, you can enter the IP address instead of the fully qualified domain name. To help ensure connectivity, the best practice is to use the fully qualified domain name. For IPv6, unless both the local and the remote machine are in IPv6 mode, you must enter the fully qualified domain name of the remote machine instead of the IPv6 address. If the local machine has an IPv4 address and the remote machine has an IPv6 address, the local machine must support IPv4 and IPv6 mixed mode. The domain name server must be able to resolve both IPv4 and IPv6 addresses if your environment has both addressing types in a single Linked Mode group.

15 Enter the port numbers to use or accept the default port numbers and click **Next**.

16 Select the vCenter Server configuration that best describes your setup and click **Next**.

17 Click **Install**.

Installation might take several minutes. Multiple progress bars appear during the installation of the selected components.

18 When the installation finishes, click **Finish**.

You completed the installation of vCenter Server. The Orchestrator client and server components are installed on your system.

What to do next

Start the VMware vCenter Orchestrator Configuration service and log in to the Orchestrator configuration interface. Configure Orchestrator using an IPv4 operating system. Orchestrator does not support IPv6 operating systems.

For the detailed procedures, see

1 "Start the Orchestrator Configuration Service," on page 34

2 "Log In to the Orchestrator Configuration Interface," on page 34

3 Chapter 9, "Configuring Orchestrator," on page 33

Install Orchestrator Standalone

If you install VMware vCenter Server, Orchestrator is already installed on your system. To make Orchestrator available to use, you must only configure it or import a backed up configuration. For production environments and to enhance the scalability of your Orchestrator setup, install Orchestrator on a dedicated Microsoft Windows server.

Prerequisites

Verify that your hardware meets the Orchestrator system requirements. See "Hardware Requirements for Orchestrator," on page 13.

Procedure

1 Download the vCenter Server installation package from the VMware Web site.

Option	Description
Use ISO image	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.iso`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.
Use ZIP archive	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.zip`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.

2 Extract the files from the archive and browse to the *`VIMSetup_image`*`\vpx\vCO\` folder.

3 Double-click the `vCenterOrchestrator.exe` file and click **Next**.

4 Select **I accept the terms of the License Agreement** and click **Next**.

5 Select the Orchestrator installation directory.

CAUTION You cannot install Orchestrator in a directory whose name contains non-ASCII characters. If you are operating in a locale that features non-ASCII characters, you must install Orchestrator in the default location. This is because of a third-party limitation.

Option	Action
Accept the default location	Click **Next** to accept the default installation directory `C:\Program Files\VMware\Orchestrator`.
Select a different location	Browse for a different installation directory and click **Next**.

6 Select the type of installation and click **Next**.

Option	Description
Client	Installs the Orchestrator client application, which allows you to create and edit workflows.
Server	Installs the Orchestrator platform.
Client-Server	Installs the Orchestrator client and server.

7 Specify the location for the Orchestrator shortcuts and click **Next**.

CAUTION The name of the shortcuts directory must not contain non-ASCII characters. This is because of a third-party limitation.

8 Click **Install** to complete the installation process.

9 Click **Done** to close the installer.

What to do next

Log in to the Orchestrator configuration interface, change the default password, and start configuring Orchestrator. For the detailed procedures, see

- "Log In to the Orchestrator Configuration Interface," on page 34
- "Change the Default Password," on page 35

Upgrade Orchestrator with vCenter Server

5

If you installed Orchestrator with the vCenter installer, you can upgrade to the latest version of Orchestrator by upgrading your vCenter Server. The vCenter Server installer detects the previous version and the installation path.

Prerequisites

- Back up your vCenter environment.
- Make sure the vCenter Server upgrade prerequisites and database upgrade prerequisites are met.

See the *vSphere Upgrade Guide* for details.

Procedure

1 Stop the VMware vCenter Orchestrator Server and the VMware VirtualCenter Server services.

   a Right-click **My Computer** on your desktop and select **Manage**.

   b In the Computer Management dialog box, expand **Services and Applications** and select **Services**.

   c In the right pane, right-click and select **VMware vCenter Orchestrator Server > Stop**.

   d In the right pane, right-click and select **VMware VirtualCenter Server > Stop**.

2 Download the vCenter Server installation package from the VMware Web site.

Option	Description
Use ISO image	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.iso`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.
Use ZIP archive	The filename is `VMware-VIMSetup-`*xx*`-4.`*a*`.`*b*`-`*yyyy*`.zip`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.

3 Extract the files from the archive and in the `C:\`*`install_directory`*`\` directory, double-click the `autorun.exe` file.

4 When the vCenter Server Installer appears, click **vCenter Server**.

5 Select a language for the installer and click **OK**.

6 When the Welcome page appears, click **Next**.

   The Welcome page informs you that an earlier version of vCenter is detected and will be upgraded.

7 Select **I agree to the terms in the license agreement** and click **Next**.

8 Type your vCenter Server license key and click**Next**.

9 Enter the database password that corresponds to the username and DSN that the installer displays and click **Next**.

You can omit the database username and password if the DSN is using Windows NT authentication.

If you specify a remote SQL Server database that uses Windows NT authentication, the database user and the logged-in user on the vCenter Server machine must be the same.

10 Select **Yes, I want to upgrade my vCenter Server database** to upgrade the vCenter Server database schema.

If the database schema is current, this dialog does not appear.

11 Click **I have taken a backup of the existing vCenter Server database and SSL certificates** and click **Next**.

12 Specify the account for the vCenter Service to run in.

- Click **Next** to use the SYSTEM account. You cannot use the SYSTEM account if you are using Windows authentication for SQL Server.
- Deselect **Use SYSTEM Account**, accept the default Administrator account name and password, and click **Next**.
- Deselect **Use SYSTEM Account** and enter a different Administrator account name and password.

13 Enter the port numbers to use or accept the default port numbers and click **Next**.

14 Click **Install**.

15 When the installation finishes, click **Finish**.

You upgraded vCenter Server and the Orchestrator client and server components. The existing Orchestrator configuration is preserved.

What to do next

Start the vCO configuration service and log in to the Orchestrator configuration interface. On the Database tab, update the database. Reimport the vCenter SSL certificate and start the Orchestrator Server.

For the detailed procedures, see

- "Start the Orchestrator Configuration Service," on page 34
- "Log In to the Orchestrator Configuration Interface," on page 34
- "Import the vCenter SSL Certificate," on page 39
- "Start the Orchestrator Server," on page 55

Upgrade Orchestrator Standalone 6

To upgrade an installation of Orchestrator on a Microsoft Windows server different from the server on which vCenter Server runs, run the latest version of the Orchestrator standalone installer.

Prerequisites

- Create a backup of the Orchestrator database.
- Export the Orchestrator configuration to a local file.
- Export your custom workflows and packages.
- Stop the VMware vCenter Orchestrator Server.

Procedure

1 Download the vCenter Server installation package from the VMware Web site.

Option	Description
Use ISO image	The filename is `VMware-VIMSetup-`*`xx`*`-4.`*`a.b`*`-`*`yyyy`*`.iso`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.
Use ZIP archive	The filename is `VMware-VIMSetup-`*`xx`*`-4.`*`a.b`*`-`*`yyyy`*`.zip`, where *a* and *b* are major and minor version, *xx* is the two-character language code, and *yyyy* is the build number.

2 Extract the files from the archive and browse to the *`VIMSetup_image`*`\vpx\vCO\` folder.

3 Double-click the `vCenterOrchestrator.exe` file and click **Next**.

4 Select **I accept the terms of the License Agreement** and click **Next**.

5 When the installer detects an earlier version of Orchestrator, decide to continue or quit the update procedure.

Option	Description
Continue with update	Click this button if you exported the Orchestrator configuration and backed up your custom workflows and packages.
Quit	Click this button to cancel the upgrade procedure and create backups.

6 When the installer detects the installation directory, click **Next**.

You cannot change the installation directory when upgrading Orchestrator. To change this parameter, you must perform a clean installation.

7 Select the type of installation that matches your existing installation type and click **Next**.

Option	Description
Client	Installs the Orchestrator client application, which allows you to create and edit workflows.
Server	Installs the Orchestrator platform.
Client-Server	Installs the Orchestrator client and server.

For example, if you have installed the Orchestrator client, select **Client** and upgrade your Orchestrator server separately.

The versions of the Orchestrator client and server versions must be the same.

8 Specify the location for the Orchestrator shortcuts and click **Next**.

CAUTION The name of the shortcuts directory must not contain non-ASCII characters. This is because of a third-party limitation.

9 Click **Install** to complete the installation process.

10 Click **Done** to close the installer.

You upgraded to the latest version of Orchestrator. The existing Orchestrator configuration is preserved.

What to do next

Log in to the Orchestrator configuration interface and on the Database tab, update the database. Reimport the vCenter SSL certificate and start the Orchestrator Server.

For the detailed procedures, see

- "Import the vCenter SSL Certificate," on page 39
- "Start the Orchestrator Server," on page 55

Upgrading Orchestrator Applications After Upgrading vCenter Server 7

You must refactor any legacy Orchestrator applications that you wrote for use with VMware Infrastructure 3.5 so that they run with vCenter Server 4.0 and above. Orchestrator provides workflows to help you refactor the applications to the new version.

For detailed information about refactoring applications, see the *VMware vCenter Orchestrator Developer's Guide*.

Uninstall Orchestrator

8

You can remove the Orchestrator client and server components from your system by using the Windows Add or Remove Programs Utility from the Control Panel.

Prerequisites

Save the Orchestrator system settings to a local file. For details, see "Export the Orchestrator Configuration," on page 56.

Procedure

1 From the Windows Start menu, select **Settings > Control Panel > Add or Remove Programs**.

2 Select vCenter Orchestrator and click **Remove**.

3 Click **Uninstall** in the Uninstall vCenter Orchestrator dialog.

A message confirming that all items were successfully removed appears.

4 Click **Done** to close the uninstaller.

Orchestrator is uninstalled from your system.

Configuring Orchestrator

9

VMware vCenter Orchestrator Web Configuration is installed silently with VMware vCenter Server. This is the tool you use to configure the components that are related to the Orchestrator engine, such as network, database, server certificate, and so on. The correct configuration of these components ensures the proper functioning of Lifecycle Manager or any other applications running on the Orchestrator platform.

This chapter includes the following topics:

Start the Orchestrator Configuration Service

The VMware vCenter Orchestrator Configuration service startup type is set to Manual by default. You must start it manually before you try to access the Orchestrator configuration interface and after you reboot.

If you installed Orchestrator standalone, the Orchestrator Configuration service is already started.

Procedure

1 Right-click **My Computer** on your desktop and select **Manage**.

2 In the Computer Management dialog box, expand **Services and Applications** and select **Services**.

3 Locate VMware vCenter Orchestrator Configuration on the list and check its status.

4 If the status is not set, right-click **VMware vCenter Orchestrator Configuration** and select **Start**.

The Orchestrator Configuration service is now running and Orchestrator configuration interface is available for use.

What to do next

You can log in to the Orchestrator configuration interface and start the process of configuring Orchestrator.

Log In to the Orchestrator Configuration Interface

To start the configuration process, you must access the Orchestrator configuration interface.

Prerequisites

The VMware vCenter Orchestrator Configuration service must be running.

CAUTION To avoid potential exploitation of the administrative credentials, change the nonsecure password when you first access the configuration interface. Retaining the default password might cause serious security issues in a production environment and is a common cause of data breach.

Procedure

1 Select **Start > Programs > VMware > vCenter Orchestrator Web Configuration**.

You cannot view the Orchestrator configuration shortcut if you are logged in to the Orchestrator server machine as a different user than the user who installed Orchestrator. To access the configuration interface, go to *install_directory*\Orchestrator\configuration and double-click the VMOConfiguration shortcut.

You can also access the Orchestrator configuration interface by entering the following URL address in a Web browser:

http://*orchestrator_server_DNS_name_or_IP_address*:8282

8282 is the default HTTP access port reserved for the Web UI of Orchestrator configuration. To enable HTTPS connection through port 8283, you must configure Jetty to use SSL. See Jetty Documentation, Configuring SSL.

2 Log in with the default credentials.

- User name: **vmware**.

  You cannot change the **vmware** default user name.

- Password: **vmware**

  You can change the password after you log in for the first time.

When you log in to the Orchestrator configuration interface for the first time, you see the installation path, the Orchestrator version, and the server status in the **Information** tab. The status indicators of all tabs on the left display red triangles, indicating that the components are not configured.

What to do next

Select a tab and follow the links in the inspector on the right, entering the necessary information until a green circle appears on the selected tab. The green circle indicates that your configuration changes are correct and that all dependencies are met.

Change the Default Password

You must change the default password to avoid potential security issues.

Prerequisites

The VMware vCenter Orchestrator Configuration service must be running.

Caution To avoid potential exploitation of the administrative credentials, change the nonsecure password when you first access the configuration interface. Retaining the default password might cause serious security issues in a production environment and is a common cause of data breach.

Procedure

1. Log in to the Orchestrator configuration interface as **vmware**.
2. On the **General** tab, click **Change Password**.
3. In the **Current password** text box, enter **vmware**.
4. In the **New password** text box, enter the new password.
5. Reenter the new password to confirm it.
6. Click **Apply changes**.

Revert to the Default Password for Orchestrator Configuration

If the default password for the Orchestrator configuration interface is changed, you cannot retrieve it because Orchestrator uses encryption to encode passwords. You can revert to the default password vmware if the current password is not known.

Procedure

1. Navigate to the following folder on the Orchestrator server system.

Option	Action
If you installed Orchestrator with the vCenter Server installer	Go to *install_directory*\VMware\Infrastructure\Orchestrator\configuration\jetty\etc.
If you installed the standalone version of Orchestrator	Go to *install_directory*\VMware\Orchestrator\configuration\jetty\etc.

2. Open the `password.properties` file in a text editor.
3. Delete the content of the file.
4. Add the following line to the `password.properties` file.

```
vmware=92963abd36c896b93a36b8e296ff3387
```

5 Save the `password.properties` file.

6 Restart the Orchestrator Configuration service.

You can log in to the Orchestrator configuration interface with the default credentials.

- User name: **`vmware`**
- Password: **`vmware`**

Configure the Network Connection

When you install Orchestrator, the IP address for your server is set as not set. To change this, you must configure the network settings used by Orchestrator.

Prerequisites

System administrators must make sure that the network provides a fixed IP, which is obtained by using a properly configured DHCP server (using reservations) or by setting a static IP. The Orchestrator server requires that this IP address remain constant while it is running.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 Click **Network**.

3 From the **IP address** drop-down menu, select the network interface to which to bind the Orchestrator server.

Orchestrator discovers the IP address of the machine on which the server is installed.

When an interface is selected, the corresponding DNS name appears. If no network name is found, the IP address appears in the **DNS name** text box. Use this IP address to log in to the Orchestrator client interface.

4 Set up the communication ports.

For more information about default ports, see "Orchestrator Network Ports," on page 36.

5 Click **Apply changes**.

What to do next

Click **SSL Certificate** to load the vCenter SSL certificate in Orchestrator.

Orchestrator Network Ports

Orchestrator uses specific ports that allow communication with the other systems. Some of the communication ports you must set are a subset of the standard ports that JBoss uses. The ports are set with a default value, but you can change these values at any time. When you make the changes, make sure that all ports are free on your host and, if necessary, open these ports on required firewalls.

Default Configuration Ports

Table 9-1 lists the default ports that Orchestrator needs to provide the Orchestrator service. You must configure your firewall to allow incoming TCP connections.

NOTE Other ports might be required if you are using custom plug-ins.

Table 9-1. VMware vCenter Orchestrator Default Configuration Ports

Port	Number	Protocol	Source	Target	Description
Lookup port	8230	TCP	vCO Client	vCO Server	The main port to communicate with the Orchestrator server (JNDI port). All other ports communicate with the Orchestrator smart client through this port. It is part of the Jboss Application server infrastructure.
Command port	8240	TCP	vCO Client	vCO Server	The application communication port (RMI container port) used to load remotely. It is part of the Jboss Application server infrastructure.
Messaging port	8250	TCP	vCO Client	vCO Server	The Java messaging port used to dispatch events. It is part of the Jboss Application server infrastructure.
Data port	8244	TCP	vCO Client	vCO Server	The port used to access all Orchestrator data models, such as workflows and policies. It is part of the Jboss Application server infrastructure.
HTTP server port	8280	TCP	end-user Web browser	vCO Server	The port used by the Orchestrator Server to connect to the Web frontend through HTTP.
HTTPS server port	8281	TCP	end-user Web browser	vCO Server	The SSL secured HTTP protocol used to connect to the Web frontend and to communicate with the vCenter API.
Web configuration HTTP access port	8282	TCP	end-user Web browser	vCO Configuration	The access port for the Web UI of Orchestrator configuration.
Web configuration HTTPS access port	8283	TCP	end-user Web browser	vCO Configuration	The SSL access port for the Web UI of Orchestrator configuration. **NOTE** To enable the HTTPS connection, configure Jetty to use SSL. See *Jetty Documentation, Configuring SSL*.

External Communication Ports

Table 9-2 lists the ports to which Orchestrator connects to communicate with external services. You must allow your firewall to allow outgoing connections.

Table 9-2. VMware vCenter Orchestrator External Communication Ports

Port	Number	Protocol	Source	Target	Description
LDAP	389	TCP	vCO Server	LDAP Server	The look up port of your LDAP Authentication server.
LDAP using SSL	636	TCP	vCO Server	LDAP Server	The look up port of your secure LDAP Authentication server.
LDAP using Global Catalog	3268	TCP	vCO Server	Global Catalog Server	The port to which Microsoft Global Catalog server queries are directed.
PostgreSQL	5432	TCP	vCO Server	PostgreSQL Server	The port used to communicate with the PostgreSQL Server that is configured as the Orchestrator database.
SQL Server	1433	TCP	vCO Server	Microsoft SQL Server	The port used to communicate with the Microsoft SQL Server that is configured as the Orchestrator database.
Oracle	1521	TCP	vCO Server	Oracle DB Server	The port used to communicate with the Oracle Database Server that is configured as the Orchestrator database.
MySQL	3306	TCP	vCO Server	MySQL Server	The port used to communicate with the MySQL Server that is configured as the Orchestrator database.

Table 9-2. VMware vCenter Orchestrator External Communication Ports (Continued)

Port	Number	Protocol	Source	Target	Description
SMTP Server port	25	TCP	vCO Server	SMTP Server	The port used for email notifications.
vCenter API port	443	TCP	vCO Server	vCenter Server	The vCenter API communication port used by Orchestrator to obtain virtual infrastructure and virtual machine information from orchestrated vCenter Server(s).

Internal JBoss Ports

Table 9-3 lists the internal JBoss Server ports. These ports do not need to be added to the firewall exceptions.

Table 9-3. Internal JBoss Server Ports

Port Number	Description
3455	RMI server registry invoker
3873	EJB3/AOP remoting connector
4445	JBoss pooled invoker
4446	Remoting server service connector
8083	Dynamic class/resource loader

Change the Default Configuration Ports on the Orchestrator Client Side

When you change the default network ports in the Orchestrator configuration interface, your changes are applied only on the Orchestrator server side. To connect to the server with the client, you must change the configuration of all Orchestrator client instances or connect to the server by using your Orchestrator server DNS name or IP address followed by the new Lookup port number.

The main port to communicate with the Orchestrator server is the Lookup port. The Orchestrator client discovers all other ports through this port. If you change the default lookup port value in the Orchestrator configuration interface after you install the Orchestrator client instances, you can add a `vmo.properties` configuration file for each Orchestrator client instance and define the new Lookup port by adding the `ch.dunes.net.jboss-server.port` system property.

Prerequisites

Log in to the server where the vCenter Orchestrator Client application is installed.

Procedure

1 Navigate to the `apps` folder on the Orchestrator client system.

Option	Action
If you installed Orchestrator with the vCenter Server installer	Go to *`install_directory`*`\VMware\Infrastructure\Orchestrator\apps`.
If you installed the standalone version of Orchestrator	Go to *`install_directory`*`\VMware\Orchestrator\apps`.

2 Create a file that contains the lookup port value.

`ch.dunes.net.jboss-server.port=`*`new_lookup_port_number`*

3 Save the file as `vmo.properties`.

4 Repeat the procedure for every Orchestrator client instance.

You can log in to the Orchestrator client without adding the lookup port number to the Orchestrator server DNS name or IP address.

Import the vCenter SSL Certificate

The Orchestrator configuration interface uses a secure connection to communicate with vCenter. You can import the required SSL certificate from a URL or file.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 Click **Network**.

3 In the right pane, click the **SSL Certificate** tab.

4 Load the vCenter SSL certificate in Orchestrator from a URL address or file.

Option	Description
Import from URL	Enter URL of the vCenter server: **`https://`*`your_vcenter_server_IP_address`***
Import from file	Obtain the server certificate file. Usual locations are: ■ `C:\Documents and Settings\AllUsers\ApplicationData\VMware\VMware VirtualCenter\SSL\rui.crt` ■ `/etc/vmware/ssl/rui.crt`

5 Click **Import**.

A message confirming that the import is successful appears.

6 Repeat the steps for each vCenter server.

7 Click **Startup Options**.

8 Click **Restart the vCO configuration server** to restart the Orchestrator Configuration service after adding a new SSL certificate.

The imported certificate appears in the Imported SSL certificates list. On the **Network** tab, the red triangle changes to a green circle to indicate that the component is now configured correctly.

What to do next

Each time you want to specify the use of an SSL connection, you must return to the **SSL Certificate** tab on the **Network** tab and import the corresponding vCenter SSL certificate.

Configuring LDAP Settings

Orchestrator requires a connection to a working LDAP server on your infrastructure.

1 Generate the LDAP Connection URL on page 40

The LDAP service provider uses a URL address to configure the connection to the directory server. To generate the LDAP connection URL, you must specify the LDAP host, port, and root.

2 Import the LDAP Server SSL Certificate on page 41

If your LDAP server uses SSL, you can import the SSL certificate file to the Orchestrator configuration interface and activate secure connection between Orchestrator and LDAP.

3 Specify the Browsing Credentials on page 42

Orchestrator must read your LDAP structure to inherit its properties. You can specify the credentials that Orchestrator uses to connect to an LDAP server.

4 Define the LDAP Lookup Paths on page 43

You can define the users and groups lookup information.

5 Define the LDAP Search Options on page 44

You can customize the LDAP search queries and make searching in LDAP more effective.

6 Common Active Directory LDAP Errors on page 44

When you encounter the `LDAP:error code 49` error message and experience problems connecting to your LDAP authentication server, you can check which LDAP function is causing the problem.

Generate the LDAP Connection URL

The LDAP service provider uses a URL address to configure the connection to the directory server. To generate the LDAP connection URL, you must specify the LDAP host, port, and root.

The supported directory service types are: Active Directory, eDirectory, and Sun Java System Directory Server. OpenLDAP is not supported and can only be used for testing and evaluation purposes.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **LDAP**.

3 From the **LDAP client** drop-down menu, select the directory server type that you are using as the LDAP server.

NOTE If you change the LDAP server or type after you set permissions on Orchestrator objects (such as access rights on workflows or actions), you must reset these permissions.

If you change the LDAP settings after configuring custom applications that capture and store user information, the LDAP authentication records created in the database become invalid when used against the new LDAP database.

---

4 (Optional) If you use Sun Java System Directory Server you must set `objectClass` to `groupOfUniqueNames` when you add users, create groups, or assign group memberships. The User ID (`uid`) attribute is mandatory for every user that can log in to Orchestrator.

Use Java System Directory Service Control Center from Sun Microsystems to set `objectClass` to `groupOfUniqueNames`. When creating a new group, select **Entry Type > Static Group > groupOfUniqueNames** in Java System Directory Service Control Center.

5 In the **Primary LDAP host** text box, type the IP address or the DNS name of the host on which your primary LDAP service runs.

This is the first host on which the Orchestrator configuration interface verifies user credentials.

6 (Optional) In the **Secondary LDAP host** text box, type the IP address or the DNS name of the host on which your secondary LDAP service runs.

If the primary LDAP host becomes unavailable, Orchestrator verifies user credentials on the secondary host.

7 In the **Port** text box, type the value for the look up port of your LDAP server.

NOTE Orchestrator supports Active Directory hierarchical domains structure. If your Domain Controller is configured to use Global Catalog, you must use port 3268. You cannot use the default port 389 to connect to the Global Catalog server.

8 In the **Root** text box, type the root element of your LDAP service.

If your domain name is company.org, your root LDAP is **`dc=company,dc=org`**.

This is the node used to browse your service directory after typing the appropriate credentials. For large service directories, specifying a node in the tree narrows the search and improves performance. For example, rather than searching in the entire directory, you can specify **`ou=employees,dc=company,dc=org`**. This displays all the users in the Employees group.

9 (Optional) Select the **Use SSL** check box to activate encrypted certification for the connection between Orchestrator and LDAP.

If your LDAP uses SSL, you must first import the SSL certificate and restart the Orchestrator Configuration service. See "Import the LDAP Server SSL Certificate," on page 41.

10 (Optional) Select the **Use Global Catalog** check box to allow LDAP referrals when the LDAP client is Active Directory.

The LDAP server look up port number changes to 3268. Orchestrator follows the LDAP referrals to find users and groups in a subdomain that is part of the Active Directory tree to which Orchestrator is connected. You can add permissions on any groups that can be accessed from your Global Catalog.

Example: Example Values and Resulting LDAP Connection URL Addresses

- LDAP host: **`DomainController`**
- Port: **`389`**
- Root: **`ou=employees,dc=company,dc=org`**

Connection URL: `ldap://DomainController:389/ou=employees,dc=company,dc=org`

- LDAP host using Global Catalog: **`10.23.90.130`**
- Port: **`3268`**
- Root: **`dc=company,dc=org`**

Connection URL: `ldap://10.23.90.130:3268/dc=company,dc=org`

What to do next

Assign credentials to Orchestrator to ensure its access to the LDAP server. See "Specify the Browsing Credentials," on page 42.

Import the LDAP Server SSL Certificate

If your LDAP server uses SSL, you can import the SSL certificate file to the Orchestrator configuration interface and activate secure connection between Orchestrator and LDAP.

SSL capabilities are not installed as part of Microsoft Active Directory, eDirectory, and Sun Java Directory Server, and require more configuration. For instructions about configuring your LDAP server for SSL access, see third-party documentation.

Prerequisites

- Verify that SSL access is enabled on the LDAP server.
- Obtain a self-signed server certificate or a certificate that is signed by a Certificate Authority.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Network**.

3 In the right pane, click the **SSL Certificate** tab.

4 Browse to select a certificate file to import.

5 Click **Import**.

A message confirming that the import is successful appears.

6 Click **Startup Options**.

7 Click **Restart the vCO configuration server** to restart the Orchestrator Configuration service after adding a new SSL certificate.

The imported certificate appears in the Imported SSL certificates list. You activated secure connection between Orchestrator and your LDAP server.

What to do next

You must enable SSL on the **LDAP** tab in the Orchestrator configuration interface.

Specify the Browsing Credentials

Orchestrator must read your LDAP structure to inherit its properties. You can specify the credentials that Orchestrator uses to connect to an LDAP server.

Prerequisites

You must have a working LDAP service on your infrastructure and have generated the LDAP connection URL.

Procedure

1 In the **LDAP** tab of the Orchestrator configuration interface, enter a valid user name (LDAP string) in the **User name** text box for a user on your LDAP who has browsing permissions.

The possible formats in which you can specify the user name in Active Directory are as follows:

- Bare user name format, for example **user**.
- Distinguished name format: **cn=user,ou=employees,dc=company,dc=org**.

  Use this format with OpenLDAP, Sun, and eDirectory. No spaces between the comma and the next identifier.
- Principle name format: **user@company.org**.
- NetBEUI format: **COMPANY\user**.

2 In the **Password** text box, enter the valid password for the user name you entered in Step 1.

Orchestrator uses these credentials to connect to the LDAP server.

What to do next

Define the LDAP containers for Orchestrator to look up users and groups.

Define the LDAP Lookup Paths

You can define the users and groups lookup information.

Two global roles are identified in Orchestrator: Developers and Administrators. The users in the Developers role have editing privileges on all elements. The users in the Administrators role have unrestricted privileges. Administrators can manage permissions, or discharge administration duties on a selected set of elements to any other group or user. These two groups must be contained in the Group lookup base.

Prerequisites

You must have a working LDAP service on your infrastructure.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **LDAP**.

3 Define the **User lookup base**.

This is the LDAP container (the top level domain name or organizational unit) where Orchestrator searches for potential users.

a Click **Search** and type the top-level domain name or organizational unit.

Searching for **company** returns `dc=company,dc=org` and other common names containing the search term. If you type **dc=company,dc=org** as a search term, no results are found.

b Click the LDAP connection string for the discovered branch to insert it in the **User lookup base** text box.

If no matches are found, check your LDAP connection string in the main LDAP page.

NOTE You can connect to the Global Catalog Server through port 3268. It issues LDAP referrals which Orchestrator follows to find the account or group in a subdomain.

---

4 Define the **Group lookup base**.

This is the LDAP container where Orchestrator looks up groups.

a Click **Search** and type the top-level domain name or organizational unit.

b Click the LDAP string for the discovered branch to insert it in the **Group lookup base** text box.

5 Define the **vCO Admin group**.

This must be an LDAP group (like Domain Users) to which you grant administrative privileges for Orchestrator.

a Click **Search** and type the top-level group name.

b Click the LDAP string for the discovered branch to insert it in the **vCO Admin group** text box.

IMPORTANT In eDirectory installations, only the eDirectory administrator can see users or user groups that have administration rights. If you are using an eDirectory LDAP server, and you log into Orchestrator as a member of the vCO Admin group but you are not the eDirectory administrator, you can create users or user groups with administration rights, but you cannot see those users using their own rights and permissions. This issue does not apply to other LDAP servers.

---

6 Click the **Test Login** tab and type credentials for a user to test whether they can access the Orchestrator smart client.

After a successful login, the system checks if the user is in the Orchestrator Administrator group.

What to do next

Define the LDAP search options and apply your changes.

Define the LDAP Search Options

You can customize the LDAP search queries and make searching in LDAP more effective.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **LDAP**.

3 In the **Request timeout** text box, enter a value in milliseconds.

This value determines the period during which the Orchestrator server sends a query to the service directory, the directory searches, and sends a reply. If the timeout period elapses, modify this value to check whether the timeout occurs in the Orchestrator server.

4 (Optional) For all links to be followed before the search operation is performed, select the **Dereference links** check box.

Sun Java System Directory Server does not support reference links. If you are using it, you must select the **Dereference links** check box.

5 (Optional) To filter the attributes that the search returns, select the **Filter attributes** check box.

Selecting this check box makes searching in LDAP faster. However, you might need to use some extra LDAP attributes for automation later.

6 (Optional) Select the **Ignore referrals** check box to disable referral handling.

When you select the check box, the system does not display any referrals.

7 In the **Host reachable timeout** text box, enter a value in milliseconds.

This value determines the timeout period for the test checking the status of the destination host.

8 Click **Apply changes**.

On the **LDAP** tab, the red triangle changes to a green circle to indicate that the component is now configured correctly.

What to do next

Proceed with the database configuration.

Common Active Directory LDAP Errors

When you encounter the `LDAP:error code 49` error message and experience problems connecting to your LDAP authentication server, you can check which LDAP function is causing the problem.

Table 9-4. Common Active Directory Authentication Errors

Error	Description
525	The user is not found.
52e	The user credentials are not valid.
530	The user is not allowed to log in at this time.
531	The user is not allowed to log in to this workstation.
532	The password has expired.
533	This user account has been disabled.

Table 9-4. Common Active Directory Authentication Errors (Continued)

Error	Description
701	This user account has expired.
773	The user must reset their password.
775	The user account has been locked.

Password Encryption and Hashing Mechanism

Orchestrator utilizes PBE with MD5 and DES encryption mechanism to encode the stored passwords used to connect to the database, LDAP, and Orchestrator servers.

Table 9-5. Encryption and Hashing Algorithms in Orchestrator

Algorithm	Description
Password Based Encryption (part of Java 2 SDK 1.4)	Generates an encryption key from a password. PBE stores and checks the hash value of the password. For more information, see the *Java Cryptography Extension Reference Guide* on java.sun.com.
Message Digest 5 algorithm	Generates a 128-bit cryptographic message digest value, usually expressed as a 32 digit hexadecimal number.
Data Encryption Standard	Applies a 56-bit key to each 64-bit block of data.

Configure the Database Connection

To establish a connection to the Orchestrator database, you must configure the database connection parameters.

Prerequisites

Set up a new database to use with the Orchestrator server. See "Orchestrator Database Setup," on page 18.

If you are using an SQL Server database, verify that the SQL Server Browser service is running.

To store characters in the correct format in an Oracle database, set the `NLS_CHARACTER_SET` parameter to `AL32UTF8` before configuring the database connection and building the table structure for Orchestrator. This setting is crucial for an internationalized environment.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 Click **Database**.

3 From the **Select the database type** drop-down menu, select the type of database for Orchestrator server to use.

> **NOTE** Orchestrator supports Oracle and SQL Server databases and provides experimental support for MySQL and PostgreSQL. You can use MySQL and PostgreSQL for testing and evaluation purposes.

4 Specify the database connection parameters.

For a list of connection parameters, see "Database Connection Parameters," on page 46.

If the specified parameters are correct, a message states that the connection to the database is successful.

> **NOTE** Although Orchestrator has established a connection to the database, the database configuration is not yet complete. You must install or update the database.

5 To build or update the table structure for Orchestrator, install or update the database.

Option	Description
Install the database	Configures a new database.
Update the database	Uses the database from your previous Orchestrator installation.

After the database is populated, you can reset the database access rights to **db_dataread** and **db_datawrite**.

6 Click **Apply changes**.

NOTE If you change the Orchestrator database after configuring and installing the default plug-ins, click the **Troubleshooting** tab and force plug-in reinstallation by clicking the **Reset current version** link. This operation deletes the *install_directory*\app-server\server\vmo\plugins_VSOPluginInstallationVersion.xml file, which holds the version of the plug-ins already installed, and forces plug-in reinstallation.

The database configuration is successfully updated. On the **Database** tab, the red triangle changes to a green circle to indicate that the component is now configured correctly.

Database Connection Parameters

To establish a connection to the database, you must specify the database connection parameters. Depending on the type of database you are connecting to, the required information may vary.

Table 9-6 lists the connection parameters that you must specify.

Table 9-6. Database Connection Parameters

Connection Parameter	Description
User name	The user name that Orchestrator uses to connect and operate the selected database. The name you select must be a valid user on the target database with db_owner rights.
Password	The valid password for the user name you entered.
Database host IP address or DNS name	The database server IP address or DNS name.
Port	The database server port that allows communication to your database.
Database name	The full unique name of your database. The database name is specified by the SERVICE_NAMES parameter in the initialization parameter file. **NOTE** PostgreSQL JDBC driver does not support non-ASCII characters in the database name.
Instance name	The name of the database instance that can be identified by the INSTANCE_NAME parameter in the database initialization parameter file.
Domain (SQL Server only)	To use Windows authentication, enter the Windows domain, for example **company.org**. To use SQL authentication, leave this text box blank.
Use Windows authentication mode (SQL Server only)	Select to send NTLMv2 responses when using Windows authentication.

Identify the SQL Server Authentication Type

You can identify whether SQL Server is using Windows NT or SQL Server authentication.

Procedure

1 Open the SQL Server Management Studio.

2 Click the **Properties** tab.

3 Check the connection type.

Server Certificate

The server certificate is a form of digital identification that is used with HTTPS to authenticate Web applications. Issued for a particular server and containing information about the server's public key, the certificate allows you to sign all elements created in Orchestrator and guarantee authenticity. When the client receives an element from your server (typically this is a package), they verify your identity and decide whether to trust your signature.

1 Import a Server Certificate on page 47

You can import a server certificate and use it with Orchestrator.

2 Create a Self-Signed Server Certificate on page 48

Installing Orchestrator requires that you create a self-signed certificate. You can create a self-signed certificate to guarantee encrypted communication and a signature for your packages. However, the recipient cannot be sure that the self-signed package you are sending is in fact a package issued by your server and not a third party claiming to be you.

3 Obtain a Server Certificate Signed by a Certificate Authority on page 48

To provide recipients with an acceptable level of trust that the package was created by your server, certificates are typically signed by a Certificate Authority (CA). Certificate Authorities guarantee that you are who you claim to be, and as a token of their verification, they sign your certificate with their own.

4 Export a Server Certificate on page 49

The server certificate private key is stored in the vmo_keystore table of the Orchestrator database. In case you lose or delete this key, or if you bind the Orchestrator server to a different database, the content of the exported packages signed with this certificate will become unavailable. To ensure that packages are decrypted on import, you must save this key to a local file.

5 Change a Self-Signed Server Certificate on page 49

If you want to sign your packages with a server certificate different from the one you used for the initial Orchestrator configuration, you need to export all your packages and reinstall the Orchestrator server.

Import a Server Certificate

You can import a server certificate and use it with Orchestrator.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 Click **Server Certificate**.

3 Click **Import certificate database**.

4 Browse to select the certificate file to import.

5 Enter the password used to decrypt the content of the imported keystore database.

The details about the imported server certificate appear in the Server Certificate window.

Create a Self-Signed Server Certificate

Installing Orchestrator requires that you create a self-signed certificate. You can create a self-signed certificate to guarantee encrypted communication and a signature for your packages. However, the recipient cannot be sure that the self-signed package you are sending is in fact a package issued by your server and not a third party claiming to be you.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Server Certificate**.

3 Click **Create certificate database and self-signed server certificate**.

4 Enter the relevant information.

5 From the drop-down menu, select a country.

6 Click **Create**.

Orchestrator generates a server certificate that is unique to your environment. The details about the certificate public key appear in the Server Certificate window. The certificate private key is stored in the `vmo_keystore` table of the Orchestrator database.

What to do next

For disaster recovery purposes, you can save the certificate private key to a local file.

Obtain a Server Certificate Signed by a Certificate Authority

To provide recipients with an acceptable level of trust that the package was created by your server, certificates are typically signed by a Certificate Authority (CA). Certificate Authorities guarantee that you are who you claim to be, and as a token of their verification, they sign your certificate with their own.

Prerequisites

Create a self-signed server certificate or import an existing server certificate.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Server Certificate**.

3 Generate a Certificate Signing Request (CSR).

   a Click **Export certificate signing request**.

   b Save the `VSOcertificate.csr` file in your file system when prompted.

4 Send the CSR file to a Certificate Authority, such as Verisign or Thawte.

   Procedures might vary from one CA to another, but they all require a valid proof of your identity.

   CA returns a Certificate Signing Request that you must import. This is an exact copy of your actual certificate and the CA signature.

5 Click **Import certificate signing request signed by GA** and select the file sent by your CA.

Orchestrator uses the server certificate to

- Sign all packages before they are exported by attaching your certificate's public key to each one.
- Display a user prompt on importing a package that contains elements signed by untrusted certificates.

What to do next

You can import this certificate on other servers.

Export a Server Certificate

The server certificate private key is stored in the vmo_keystore table of the Orchestrator database. In case you lose or delete this key, or if you bind the Orchestrator server to a different database, the content of the exported packages signed with this certificate will become unavailable. To ensure that packages are decrypted on import, you must save this key to a local file.

Prerequisites

You must have created or imported a server certificate.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Server Certificate**.

3 Click **Export certificate database**.

4 Enter a password to encrypt the content of the exported keystore database.

You must enter this password again when importing the file.

5 Click **Export**.

6 Save the `vmo-server.vmokeystore` file when prompted.

Change a Self-Signed Server Certificate

If you want to sign your packages with a server certificate different from the one you used for the initial Orchestrator configuration, you need to export all your packages and reinstall the Orchestrator server.

Procedure

1 Export all your packages.

a Click the **Packages** view in the Orchestrator client.

b Right-click the package to export and select **Export package**.

c Browse to select a location in which to save the package and click **Open**.

d Leave the **View content**, **Re-Packageable**, and **Edit element** options selected.

CAUTION Do not sign the package with your current certificate. You must not encrypt the package. When you delete the certificate database, the private key will be lost and the content of the exported package will become unavailable.

e (Optional) Deselect the **Export version history** check box if you do not want to export the version history.

f Click **Save**.

2 (Optional) Export the Orchestrator configuration.

3 Uninstall the Orchestrator server.

4 Delete the Orchestrator database, or create a backup if you want to keep old data.

   The database you bind Orchestrator to must not contain records in the vmo_keystore table.

5 Reinstall the Orchestrator server.

6 (Optional) Import your Orchestrator configuration.

7 Create a new self-signed certificate or import one.

8 Reimport your packages.

   a Click the **Packages** view in the Orchestrator client.

   b From the drop-down menu, select **Import package**.

   c Browse to select the package to import and click **Open**.

   d Click **Import** or **Import and trust provider**.

   e Click **Import checked elements**.

The server certificate change is effective at the next package export.

Configure the Default Plug-Ins

To deploy the set of default plug-ins when the Orchestrator server starts, the system must authenticate against the LDAP server. You can specify the administrative credentials that Orchestrator uses with plug-ins, and enable as well as disable plug-ins on the **Plug-ins** tab.

If you change the Orchestrator database after configuring and installing the default plug-ins, you must click the **Reset current version** link in the **Troubleshooting** tab. This operation deletes the *install_directory*\app-server\server\vmo\plugins_VSOPluginInstallationVersion.xml file, which holds the version of the plug-ins already installed, and forces plug-in reinstallation.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Plug-ins**.

3 Type the credentials for a user who is a member of the Orchestrator Administration group that you specified on the **LDAP** tab.

   When the Orchestrator server starts, the system uses these credentials to set up the plug-ins. The system checks the enabled plug-ins and performs any necessary internal installations such as package import, policy run, script launch, and so on.

4 (Optional) Install a new plug-in.

   a Click the magnifying glass icon.

   b Select the file to install.

   c Click **Open**.

   d Click **Upload and install**.

   The allowed file extensions are `.vmoapp` and `.dar`. A `.vmoapp` file can contain a collection of several `.dar` files and can be installed as an application, while a `.dar` file contains all the resources associated with one plug-in.

   The installed plug-in file is stored in the *install_directory*\app-server\server\vmo\plugins folder.

NOTE If you add a `.dar` file directly to the file system, you must click **Reload plug-ins** to update the plug-ins available to the Orchestrator configuration interface.

5 (Optional) To disable a plug-in, deselect the check box next to it.

This action does not remove the plug-in file.

6 Click **Apply changes**.

On the **Plug-ins** tab, the red triangle changes to a green circle to indicate that the component is now configured correctly. The first time the server boots, it installs the selected plug-ins.

What to do next

You can now configure the settings for Mail, SSH, and vCenter 4.0 plug-ins.

Define the Default SMTP Connection

The Mail plug-in is installed with Orchestrator Server and is used for email notifications. The only option available for this plug-in is to use default values for new mail messages. You can set the default email account.

Avoid load balancers when configuring mail in Orchestrator. You will get SMTP_HOST_UNREACHABLE.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Mail**.

3 Select the **Define default values** check box and fill in the required text boxes.

Text box	Description
SMTP host	Enter the IP address or domain name of your SMTP server.
SMTP port	Enter a port number to match your SMTP configuration. The default SMTP port is 25.
User name	Enter a valid email account. This is the email account Orchestrator uses to send emails.
Password	Enter the password associated with the user name.
From name and address	Enter the sender information to appear in all emails sent by Orchestrator.

4 Click **Apply changes**.

Configure the SSH Plug-In

You can set up the SSH plug-in to ensure encrypted connections.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **SSH**.

3 Click **New connection**.

4 In the **Host name** text box, enter the host to access with SSH through Orchestrator.

NOTE The username and password are not required because Orchestrator uses the credentials of the currently logged-in user to run SSH commands. You must reproduce the accounts you want to work on SSH on target hosts from the LDAP server.

5 Click **Apply changes**.

The host is added to the list of SSH connections.

6 (Optional) Configure an entry path on the server.

a Click **New root folder**.

b Enter the new path and click **Apply changes**.

The SSH host is available in the **Inventory** view of the Orchestrator smart client.

Configure the vCenter 4.0 Plug-In

Orchestrator uses the vCenter Web Service API to control vCenter. You can set all the parameters to enable Orchestrator to connect to your vCenter Sever instances.

Prerequisites

Import the SSL certificates for each vCenter Server instance you define. For more information, see "Import the vCenter SSL Certificate," on page 39.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **vCenter 4.0**.

3 Click **New vCenter host**.

4 From the **Available** drop-down menu, select **Enabled**.

5 In the **Host** text box, type the IP address or the DNS name of the vCenter Server host.

6 In the **Port** text box, leave the default value, **443**.

7 (Optional) Select the **Secure channel** check box to establish a secure connection to your vCenter Server host.

8 In the **Path** text box, use the default value, **/sdk**.

This is the location of the SDK that you use to connect to your vCenter Server instance.

9 In the **User name** and **Password** text boxes, type the credentials for Orchestrator to use to establish the connection to the vCenter Server host.

The user that you select must be a valid user with administrative privileges on your vCenter Server, preferably at the top of the vCenter Server tree structure. Orchestrator uses these credentials to monitor the vCenter Web service (typically to operate Orchestrator system workflows). All other requests inherit the credentials of the user who triggers an action.

10 Specify the method you use to manage user access on the vCenter Server host.

Option	Action
Share a unique session	Select this option to allow Orchestrator to create only one connection to vCenter Server. Enter the credentials of a user who is a vCenter Server administrator.
Session per user	Select this option if your vCenter Server is in an Active Directory domain. Make sure that the user has the necessary permissions to perform the required operations. CAUTION Each user who logs in Orchestrator creates a new session to vCenter Server. This can rapidly strain CPU, memory and bandwidth.

11 Click **Apply changes**.

The URL to the newly configured vCenter Server host is added to the list of defined hosts.

12 Repeat Step 3 through Step 11 for each vCenter Server instance.

What to do next

If you did not restart the Orchestrator Configuration service after importing the vCenter SSL Certificate, select **Startup Options > Restart the vCO configuration server**.

Remove a Plug-In

You can disable an Orchestrator plug-in from the **Plug-ins** tab, but this action does not remove the plug-in file from the Orchestrator server file system. To remove the plug-in file, you must log in to the machine on which the Orchestrator server is installed and remove the plug-in file manually.

Prerequisites

Log in to the machine on which the Orchestrator server is installed.

Procedure

1 Navigate to the Orchestrator installation folder on the Orchestrator server system.

Option	Action
If you installed Orchestrator with the vCenter Server installer	Go to *install_directory*\VMware\Infrastructure\Orchestrator\app-server\server\vmo\plugins.
If you installed the standalone version of Orchestrator	Go to *install_directory*\VMware\Orchestrator\app-server\server\vmo\plugins.

2 Delete the `.dar` archive that contains the plug-in to remove.

3 Restart the Orchestrator Configuration service.

The plug-in is removed from the Orchestrator configuration interface.

4 Log in to the Orchestrator client.

5 In the Orchestrator client, click the **Packages** view.

6 Right-click the package to delete and select **Delete element with content**.

NOTE Orchestrator elements that are locked in the read-only state, for example workflows in the standard library, are not deleted.

You removed all custom workflows and actions, policies, Web views, configurations, settings, and resources that the plug-in contains.

Access Rights to Orchestrator Server

The type of vCenter Server license you apply in the Orchestrator configuration interface determines whether you get read-only or full access to the Orchestrator server capabilities.

Table 9-7. Orchestrator Server Modes

vCenter License Edition	vCenter Orchestrator Mode	Description
Standard	Server	You are granted full read and write privileges to all Orchestrator elements. You can run and edit workflows.
Foundation	Player	You are granted read privileges on all Orchestrator elements. You can run workflows but you cannot edit them.
Essentials	Player	You are granted read privileges on all Orchestrator elements. You can run workflows but you cannot edit them.
Evaluation	Server	You are granted full read and write privileges to all Orchestrator elements. You can run and edit workflows.

NOTE All predefined workflows are locked as read-only by design. To edit a standard workflow, you must duplicate the workflow and make changes to the duplicated workflow.

Import the vCenter Server License

To finish the configuration of the Orchestrator server, you must import the vCenter Server license. The set of plug-ins delivered with Orchestrator do not require a license. If you add a plug-in that requires a license, you must import it.

To access the vCenter Server license, you can log in the VMware Web site with the credentials that were used to order the license.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Licenses**.

3 In the **Serial number** text box, type your vCenter Server license key.

The serial number is a string of five hyphen-separated groups of five alphanumeric characters each.

4 Click **Apply changes** and verify that the license is installed.

To view details, click the name of the imported license.

5 Start the Orchestrator server.

The Orchestrator server is now configured correctly.

Start the Orchestrator Server

You can install the Orchestrator server as a service on the **Startup Options** tab. When you do this, you can start, stop, and restart the service from the Configuration interface. This process is reversible as you can always use the **Uninstall vCO server from service** option.

Prerequisites

- If you installed Orchestrator silently with vCenter Server, verify that your system has at least 4GB of RAM and that the database is running on a dedicated server. The Orchestrator server might not start if your system does not meet this requirement.
- If you installed Orchestrator standalone, verify that your system has at least 2GB of RAM. The Orchestrator server might not start if your system does not meet this requirement.
- All of the status indicators must display a green circle. You cannot start the Orchestrator server if any of the components is not configured properly.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 Click **Startup Options**.

3 Click **Install vCO server as service**.

The Orchestrator server is installed as a Windows service.

4 Click **Start service**.

The Orchestrator server status appears as `Service is starting`. The first boot can take around 5-10 minutes because it is building the database tables.

A message states that the service is started successfully. The Orchestrator server status appears at the bottom of each configuration tab and is one of the following:

- Running
- Not available
- Stopped

To see the Orchestrator server status, update the page by clicking the **Refresh** link.

What to do next

You can save and export the Orchestrator configuration file so that it can be imported later if needed. See "Export the Orchestrator Configuration," on page 56.

Activate the Service Watchdog Utility

Orchestrator provides a watchdog utility that checks for the activity of the Orchestrator server service. The utility pings the Orchestrator server service periodically, and restarts it if a certain timeout period is exceeded.

By default, the timeout period is set to zero (0), which means that the watchdog utility is deactivated.

You can activate the service watchdog utility by setting the timeout period for the service's response to the ping from the utility. You can set the timeout period for the response from the Orchestrator server service in the `wrapper.conf` configuration file. The `wrapper.conf` file defines the wrapping of the Orchestrator server in the host system.

Prerequisites

The Orchestrator server must be running as a Windows service.

Procedure

1 Navigate to the `wrapper.conf` wrapper configuration file.

The wrapper configuration file is in the following location:

`install_directory``/app-server/bin/wrapper.conf`

2 Open the `wrapper.conf` file in an editor.

3 Locate the `–wrapper.ping.timeout` parameter in the `wrapper.conf` file, or add it to the file if it does not exist.

4 Set the number of seconds to allow between a ping from the watchdog utility and the response from the service.

The default timeout is 0 seconds, which means that the utility is deactivated.

For example, you can increase the timeout period to 30 seconds by setting the parameter as `–wrapper.ping.timeout=30`.

5 Save and close the `wrapper.conf` file.

6 In the Orchestrator configuration interface, select **Startup Options > Restart Service** to restart the Orchestrator server.

You activated the Orchestrator watchdog utility by setting the timeout parameter.

Unwanted Server Restarts

You might experience unwanted server restarts if you have activated the service watchdog utility.

Problem

In certain circumstances, if the response time exceeds the watchdog timeout period, the watchdog utility can falsely detect a JVM error, which causes a server restart.

Cause

The problem occurs when the Orchestrator server is running with a heavy load, for example if you have connected Orchestrator to many vCenter Server instances that are running many virtual machines, or if the server is performing swapping.

Solution

If you experience this behavior, extend the watchdog timeout period by increasing the timeout parameter in the `wrapper.conf` configuration file. If the problem still persists, deactivate the watchdog utility by setting the timeout parameter back to zero (0).

Export the Orchestrator Configuration

Orchestrator Configuration provides a mechanism to export your system settings to a local file. This mechanism allows you to take a snapshot of your system configuration at any moment and import this configuration into a new Orchestrator instance.

VMware recommends that you export and save your configuration settings on a regular basis, especially when making modifications, performing maintenance, or upgrading the system.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 On the **General** tab, click **Export Configuration**.

3 (Optional) Enter a password to protect the configuration file.

Use the same password when you import the configuration.

4 Click **Export**.

5 Click **Save** when prompted.

You can use the `vmo_config_dateReference.vmoconfig` file to clone or to restore the system.

What to do next

For a list of exported configuration settings, see "Orchestrator Configuration Files," on page 57.

Orchestrator Configuration Files

When you export the system configuration, a `vmo_config_dateReference.vmoconfig` file is created locally. It contains all the Orchestrator configuration files.

NOTE Some of the configuration files that are created during the export are empty. For example, the server file is empty because the startup options for the Orchestrator server are individual for each machine where the Orchestrator server is installed. These empty files must be reconfigured, even when a working configuration was previously imported.

Table 9-8 contains a list of the settings that are not saved during configuration export.

Table 9-8. Settings Not Saved During Configuration Export

File	Description
certificate	Certificates are not exported. Most certificates are stored in the Orchestrator database. However, the vCenter Server certificate is not stored in the database. You must store it in a separate location, or import it again when you import an Orchestrator configuration.
licenses	Licenses are not exported. They are stored in the Orchestrator database.
server	The server configuration is reset to Unknown. You must install the Orchestrator server as a Windows service again.

Table 9-9 contains a list of the settings that are saved during configuration export.

Table 9-9. Settings Saved During Configuration Export

File	Description
general	The maximum number of completed events and workflows recorded, and the Web view development and configuration.
network	The IP binding address and the TCP ports used by the different elements of the Orchestrator server.
database	The database configuration.
ldap	The LDAP server configuration.
log	The log settings information.
plug-ins	The list of disabled plug-ins and the account name.
mail plug-in	The SMTP host, SMTP port, user name, password, sender's name, sender's address.
vCenter 4.0 plug-in	The vCenter 4.0 plug-in configuration.

Import the Orchestrator Configuration

You can restore the previously exported system configuration if a system failure occurs or when you reinstall Orchestrator.

Procedure

1 Install a new Orchestrator instance on a new server.

2 Log in to the Orchestrator configuration interface as **vmware**.

3 On the **General** tab, click **Import Configuration**.

4 (Optional) Enter the protective password you used when exporting the configuration.

5 Browse to select the `.vmoconfig` file you exported from your previous installation.

6 Click **Import**.

A message states that the configuration is successfully imported. The new system replicates the old configuration completely.

Configure the Maximum Number of Events and Runs

You can define the maximum number of events stored in the database and the maximum number of workflow runs.

Each event corresponds to a change in the state of a workflow or policy and is stored in the database. When the maximum number of events set for a workflow or policy is reached, the database deletes the oldest event to store the new event.

Each time you run a workflow, a workflow token is created in the database. This token contains all parameters related to the running of the workflow. For example, if you run the Test workflow three times, three workflow tokens are created. The three tokens appear in the Orchestrator client above the Test workflow.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 On the **General** tab, click **Advanced Configuration**.

3 Fill in the **Max number of events** text box.

To track every change in your infrastructure, enter **0** (zero=infinite). This means that the server never rolls over, but it might become unavailable. Database administrators must periodically clean the server and archive events.

4 Fill in the **Max number of runs** text box.

After you reach the maximum number of runs, the rollover process starts. If you do not want the rollover process to start, enter **0** in this text box. If you enter **0**, your database continues to extend.

5 (Optional) To set the default login credentials, fill in the **User name for automatic Web login** and **Password for automatic Web login** text boxes.

This feature allows you to generate URLs that enable you to run, answer, schedule, or monitor a workflow without having to enter your credentials. Use your default operator credentials for these text boxes.

6 Fill in the **Web view directory** text box.

This is the root folder from which development Web views are loaded. Files for each Web view must be in a separate subfolder, and the name of this subfolder must be the same as the URL folder defined in the client.

7 (Optional) To put the server in Web view development mode, select the **Enable Web view development** check box.

In this mode, all elements in the Web view are loaded from the specified Web view directory and not from the Web view content itself.

8 Click **Apply changes**.

Install an Application

An application is a set of plug-ins and packages. Because a Orchestrator installation contains only a few pre-defined plug-ins, you must install applications frequently to extend basic functions.

Prerequisites

Obtain the `.vmoapp` file containing the application.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 On the **General** tab, click **Install Application**.

3 Browse to select the `.vmoapp` file to install.

4 Click **Install**.

What to do next

Every time you install an application, a validation is made on the server configuration. In most cases, you must perform additional configuration steps.

Start a Published Web View

You can use Web views to build the user front-end. Web views might vary from a simple page displaying basic information to complex Web 2.0 applications. Orchestrator provides a demonstration Web view called WebOperator, which you can use to review how Web views work. You can access Web views through the Orchestrator configuration interface.

Prerequisites

Make sure that the Orchestrator server is started.

Procedure

1 Log in to the Orchestrator configuration interface as **`vmware`**.

2 On the **General** tab, click **Web views**.

The links to your published Web views appear. You can follow them to open a Web view in a new browser window.

Change the Web View SSL Certificate

Orchestrator provides an SSL certificate that controls user access to Web views. You can configure Orchestrator to use a different SSL certificate to control access to Web views. For example, if your company security policy requires you to use their SSL certificates.

Procedure

1 Create an SSL certificate by running the keytool Java utility at the command prompt.

```
keytool –genkey –alias mySslCertificate –keyalg RSA
```

The keytool utility generates a file called `.keystore` by using the information and password that you provide when you run the command.

2 Open the following Orchestrator application server configuration file in an editor.

Option	Action
If you installed the standalone version of Orchestrator	Go to *install_directory*\VMware\Orchestrator\app-server\server\vmo\deploy\jboss-deploy-tomcat\jbossweb-tomcat55.sar\server.xml.
If the vCenter Server installed Orchestrator	Go to *install_directory*\VMware\Infrastructure\Orchestrator\app-server\server\vmo\deploy\jboss-deploy-tomcat\jbossweb-tomcat55.sar\server.xml.

3 Find the following entry at line 44 in the `server.xml` file.

```
<!-- Define a SSL HTTP/1.1 Connector on port ${ch.dunes.https-server.port} -->
<Connector address="${jboss.bind.address}" protocol="HTTP/1.1" SSLEnabled="true"
clientAuth="false" emptySessionPath="true"
keystoreFile="${java.home}/lib/security/jssecacerts"
keystorePass="dunesdunes"
maxHttpHeaderSize="8192" maxThreads="100"
port="${ch.dunes.https-server.port}" scheme="https" secure="true"
sslProtocol="TLS" strategy="ms" />
```

4 Change the `keystoreFile` and `keystorePass` attributes to refer to the `.keystore` file and the password you created when you ran the keytool utility.

```
keystoreFile="/PathToKeystore/.keystore"
keystorePass="NewKeystorePassword"
```

5 Save the `server.xml` file and restart the Orchestrator server.

You changed the SSL certificate that the Orchestrator server uses to control access to Web views.

Define the Server Log Level

In the Orchestrator configuration interface, you can set the level of server log that you require. The default server log level is `INFO`. Changing the log level affects any new messages that the server writes to the server log and the number of active connections to the database.

CAUTION Only set the log level to `DEBUG` or `ALL` to debug a problem. Do not use this setting in a production environment because it can seriously impair performance.

Procedure

1 Log in to the Orchestrator configuration interface as **vmware**.

2 Click **Log**.

3 Select an option from the **Log level** drop-down menu.

Option	Description
FATAL	Only fatal errors are written to the log file.
ERROR	Errors and fatal errors are written to the log file.
WARN	Warnings, errors, and fatal errors are written to the log file.
INFO	Information, warnings, errors, and fatal errors are written to the log file.
DEBUG	Debug information, information messages, warnings, errors, and fatal errors are written to the log file.
ALL	Events are not filtered. All events are written to the log file.
OFF	No entries are written to the log file and no log updates are made.

NOTE The log contains messages of the selected level and all higher levels. If you select the `INFO` level, all `INFO` messages and higher-level messages (`INFO`, `WARN`, `ERROR`, and `FATAL`) are written to the log file.

4 Click **Apply changes**.

5 (Optional) Click the **Generate log report** link to export the log files.

This operation creates a ZIP archive of all log files.

The new log level is applied to any new messages that the server generates, without restarting the server. The logs are stored in *`install_directory`*`\app-server\server\vmo\log\`.

10 Where to Go From Here

When you have installed and configured vCenter Orchestrator, you can use Orchestrator to automate frequently repeated processes related to the management of the virtual environment.

- Log in to the Orchestrator client, run, and schedule workflows on the vCenter Server inventory objects.
- Publish the weboperator Web view and provide browser access to Orchestrator functions to users and user groups.
- Set up the user permissions on Orchestrator objects.
- Modify the standard Orchestrator workflows and write your own actions and workflows to automate operations in vCenter Server.
- Develop plug-ins, Web services, and Web views to extend the Orchestrator platform.

For information about features and instructions about using and maintaining Orchestrator, see the *vCenter Orchestrator Administration Guide*.

For guidance with advanced development tasks and extending the Orchestrator platform, see the *vCenter Orchestrator Developer's Guide*.

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