



Hewlett Packard
Enterprise

Operations Orchestration

Software Version: 10.70

Windows and Linux Operating Systems

Installation, Upgrade, and Configuration Guide

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Introduction

Welcome to HPE OO 10.70.

This document describes how to install and configure HPE OO using the Installation and Configuration wizard. It also includes instructions for silent installations.

This document is relevant for customers who are:

- Installing a new installation of HPE OO (on a machine where it was not previously installed)
- Installing HPE OO after having installed the HPE OO Community Edition
- Upgrading from an earlier version of HPE OO 10.x
- Upgrading from version 9.x - this document contains basic information about upgrading from version 9.x, but for more detailed information, see *Upgrading to HPE OO 10.x from 9.x*.

This document is also available in HTML form from the Installation and Configuration wizard. Click the links on the **Welcome**, **Upgrade**, and **Clustering** pages to open the relevant help topic in a Web browser. You can keep the help open for reference during the installation.

Notes:

- If you install the Community Edition, you will be limited in the number of flows that you can run per month.
- Installing or upgrading to HPE OO installs the Trial version. As a result, you will need to install the Enterprise Edition license within 90 days of the upgrade. For more information, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

Before starting the installation:

- See the *"System Requirements" on page 7* to verify that your system meets the minimum system requirements.
- Make sure that the person running the installation has Administrator privileges, in order to avoid UAC (user access control) errors. If you are not sure about your UAC settings, you can also right-click on the installer and choose to run it as an Administrator.

Important! If you are connecting to a database with an existing schema, which Central already ran on, make sure that you use the same encryption key (**central/var/security/encryption_**

repository) as the previous Central. Otherwise, Central will not start, and will show an exception message in the **wrapper.log** file ("bad padding"). This is because there is no way to decrypt the already-encrypted data with the new encryption key. If this problem occurs, see "Backing Up HPE OO" in the *HPE OO Administration Guide*.

To prevent this problem from occurring, when you install Central, select the **Do not start Central server after installation** check box in the **Connectivity** step of the installation wizard, or use the corresponding property if you're installing silently. Then, perform the task described in "Backing Up HPE OO > Recovery" in the *HPE OO Administration Guide*.

Note: For more information about basic HPE OO concepts, see the *HPE OO Concepts Guide*.

System Requirements

This section describes the system requirements for HPE OO 10.70.

Software Requirements

Software Requirements for Central and RAS

The Central application requires a dedicated database schema.

Supported Operating Systems

OS	Version
Microsoft Windows Server	2008 64 bit, 2008 R2 64 bit 2012 64 bit, 2012 R2 64 bit
Oracle Enterprise Linux	6.6
RedHat Enterprise Linux*	6.x 64 bit, 7.x 64 bit**
Ubuntu	14.04.x LTS

Note:

* **bzip2** is required when installing on RedHat systems. If it does not already exist on your Linux system, you can download it from <http://www.bzip.org/downloads.html>.

** RedHat Enterprise Linux 5.x 64 bit is no longer supported.

Supported Databases

Database	Version
Oracle	12cR1 RAC, 12c R1 (regular, non-CDB), 11g R2, 11g R2 RAC
MySQL	5.5.x, 5.6.x [*] , 5.7x
PostgreSQL	9.1.x, 9.2.x, 9.3.x, 9.4x, 9.5x
Microsoft SQL Server	2008 R2**, 2012**, 2014

* For MySQL 5.6.20 and 5.6.21, the requirements for the **innodb_log_file_size** have increased significantly. For MySQL 5.6.1 - 19, the recommendation is 256 M, but for MySQL 5.6.20 - 21, the

recommendation is 2 GB.

****** All service packs are supported.

Supported Browsers

Browser	Version
Microsoft Internet Explorer [*]	10.x, 11.x
Microsoft Edge	20
Mozilla FireFox ^{**}	32.x and later 31.x ESR (Extended Support Release) and later
Google Chrome ^{**}	40.x and later

*** Note:** Microsoft Internet Explorer 9.x is no longer supported.

**** Disclaimer:** Future versions of Firefox and Chrome are considered supported, subject to the browser's backward-compatibility.

Recommended screen resolution for the browser: 1280 x 1024 or 1920 x 1080

Other Requirements

Requirement	Version
.NET Framework	Microsoft .NET Framework 4.5 or later, full installation. This is also required for RAS installations.
Ports	Two ports must be available to configure for the Central Server (one for HTTP and one for HTTPS). The default values for these ports are 8080 and 8443, but you can specify different ports during installation. Note: It is also possible to change the ports after HPE OO is installed. See "Changing or Closing the HTTP/HTTPS Ports" in the <i>HPE OO Security and Hardening Guide</i> .

Software Requirements for Studio

Supported Operating Systems

OS	Version
Microsoft Windows	10, 8 64 bit, 8.1 64 bit, 7 64 bit*
Microsoft Windows Server	2012 64 bit, R2 2012 64 bit, 2008 64 bit, R2 2008 64 bit

* **Note:** We no longer support Studio on Windows 7 32 bit.

Other Requirements

Requirement	Version				
.NET Framework	Microsoft .NET Framework 4.5 or later, full installation. This is also required for debugging flows with .NET operations. If you don't have .NET 4.5, any flows or operations with .NET will be marked as invalid in Studio.				
Service packs	Microsoft Visual C++ 2010 Redistributable Package (x86). This is required in order to use the Studio SVN integration feature. You need to download and install the version for the x86 platform, regardless of your Windows version (for example, if it is Windows x64). http://www.microsoft.com/en-us/download/confirmation.aspx?id=5555				
Git client	In order to use the Studio Git integration feature, it is recommended to use version 2.9.2 of the Git client. For example: <table><tr><td>for x64</td><td>https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-64-bit.exe</td></tr><tr><td>for x32</td><td>https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-32-bit.exe</td></tr></table>	for x64	https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-64-bit.exe	for x32	https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-32-bit.exe
for x64	https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-64-bit.exe				
for x32	https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-32-bit.exe				

Note: The minimum screen resolution for Studio is 1280 x 1024.

Software Requirements for the Database Server

Operating system support for database servers is according to the recommendations of the database vendor.

Hardware Requirements

The hardware requirements described here are the minimal supported configuration.

Many customers may require more powerful hardware, depending on their load and usage of the system. In some cases, scaling out (adding nodes) is preferable to scaling up (stronger hardware).

Hardware Requirements for HPE OO Central and Database Servers

These requirements are for on-premise installations where the key components (central servers, RAS) are installed at the customer's site.

Component	Requirement per server (minimum)
CPU	<p>3 Gigahertz (GHz) for single-processor systems or 2 GHz for multi-processor systems</p> <p>Database server:</p> <ul style="list-style-type: none">• According to the database vendor's recommendations and requirements, but no less than 2 CPU cores <p>Central server:</p> <ul style="list-style-type: none">• Minimum: 1CPU core• Recommended: 4CPU cores
Memory (RAM)	<p>Database server:</p> <ul style="list-style-type: none">• As specified by the vendor, but no less than 4 GB <p>Central server:</p> <ul style="list-style-type: none">• Minimum: 2 GB• Recommended: 4 GB
Hard-drive space	<p>Database server:</p> <ul style="list-style-type: none">• Centralized database:<ul style="list-style-type: none">◦ 50 GB for HPE OO data - out of which a few GB are for the HPE OO installation and content pack deployment, and the rest is used for

	<p>HPE OO's operational data.</p> <p>For extensive usage, it is recommended to allocate 100 GB or more, depending on your data retention policy.</p> <ul style="list-style-type: none">• Dedicated database server:<ul style="list-style-type: none">◦ 80 GB hard drive <p>For extensive usage, it is recommended to allocate a 140 GB hard-drive or bigger, depending on your data retention policy.</p>
	<p>Central server:</p> <ul style="list-style-type: none">• 2 GB

For off-premise installations, where the key components are installed on a cloud-based virtualized machine, the hardware requirements are:

- Central/RAS: For Cloud systems, an extra small machine
- Database: According to the database vendor's recommendations and requirements, but no less than a small machine.

For more information about database size requirements see the *HPE OO Database Guide*.

Hardware Requirements for the Central Client

Web client machines for Central must meet the minimum hardware requirements for their web browser.

Hardware Requirements for RAS Installations

Component	Requirement (minimum)
CPU	<p>2 GHz for single- or multi-processor systems</p> <p>Minimum: 1 CPU core</p> <p>Recommended: 4 CPU cores</p>
Memory (RAM)	1 GB

Hard-drive space	2 GB (this includes room for the flows and operations that are included in the installation)
------------------	---

Hardware Requirements for HPE OO Studio Installed on its Own Machine

Machines on which you install Studio must meet the minimum hardware requirements for their web browser or the following, whichever is higher.

Component	Requirement (minimum)
CPU	2 GHz for single- or multi-processor systems 1 CPU core
Memory (RAM)	2 GB (this is the amount of memory that the Studio process requires)
Hard-drive space	4 GB (this includes room for the flows and operations in the installation)

Virtual Systems

Installation of the HPE OO components on guest systems hosted by the following hypervisors is supported, as long as the guest systems meet the requirements described in this *System Requirements* document:

- VMware ESX Server, version 3.x or later
- Microsoft Hyper-V (for all supported Windows versions)

Cloud Deployments

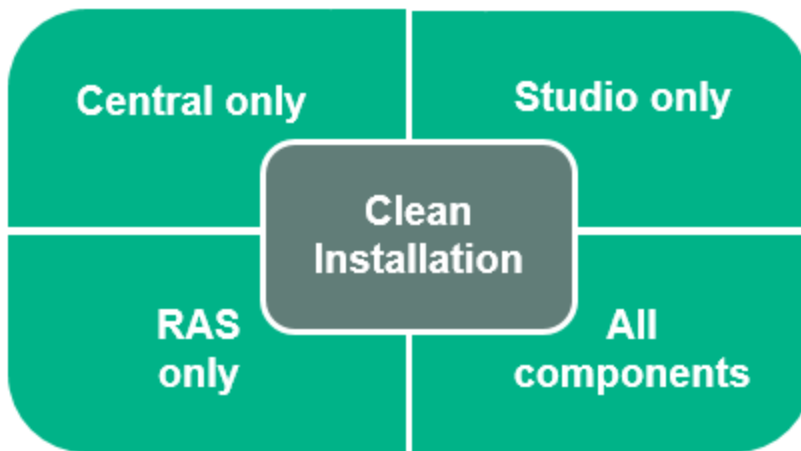
HPE OO can be installed on cloud computer units.

Installing a Clean Installation of HPE OO

This section shows you how to perform a clean installation of HPE OO—in a location where it has not been installed previously.

This section includes descriptions of how to install HPE OO Central, Studio, RAS, or all three components at once.

First, see the [Prerequisites and Installation Notes](#). Then, go to the relevant installation section:



The topics describe how to install HPE OO using the Installation Wizard. It is also possible to perform a silent installation. For information, see ["Installing HPE OO Silently" on page 71](#).

Note: The Installation wizard cannot be launched from the command line. You can only use the Installation wizard on Linux if you are in the graphical user interface or VNC. If you are working from the command line, you will need to do a silent installation.

Even if you are installing silently, it is recommended to see the flowcharts in the topics about installing with the wizard, because the decisions to be made at each point are the same.

When you install Operations Orchestration 10.6x and later, this installs the Trial version. You will need to install the Enterprise Edition license within 90 days. For more information, see ["Setting Up Licensing"](#) in the *HPE OO Central User Guide*.

Prerequisites and Installation Notes

- Before installing HPE OO, you must download and install Microsoft Visual C++ 2010 Redistributable Package (x86). You need to install the version for the x86 platform, regardless of your Windows version.

This package can be downloaded from: <http://www.microsoft.com/en-us/download/confirmation.aspx?id=5555>.

- It is recommended to install HPE OO on a secured environment. For more information, see the *HPE OOSecurity and Hardening Guide* (available in PDF form in the **docs** folder).
- If you are installing Central with MySQL, you will need to provide the MySQL JDBC driver. Use MySQL Connector release 5.1.35.

This driver can be downloaded from:

<http://mvnrepository.com/artifact/mysql/mysql-connector-java>

- Before installing HPE OO, make sure to back up your system. Consult with your system administrator.
- If you uninstalled a previous version of HPE OO and are installing 10.x in the same installation folder, make sure to back up the all the files that were under the installation folder and delete that folder before installing the new version.
- The Central server requires two ports, so make sure that two ports are available.

Note: The default ports are 8080 and 8443, but you can use any two available ports.

SQL Scripts to Create the Database Objects

If, for security reasons, the HPE OO database user lacks the ability to create objects such as tables, indexes, sequences, and so on, you can use SQL scripts from the ZIP file to manually create the database objects using an elevated privileges database connection.

Before using these scripts, you need to have the database or schema already created. The scripts to create the database or schema can be found in the "Manually Creating an HPE OO Database" sections of the *HPE OO Database Guide* document.

The SQL scripts are located at **\docs\sql** on the ZIP file. They include:

- mssql.sql
- mysql.sql
- oracle.sql
- postgres.sql

Database-specific Adaptations

This section describes several key database-specific adaptations and requirements. For detailed instructions, see the *HPE OO Database Guide*.

- **MySQL:** If you are deploying HPE OO using a MySQL database, you need to configure the MySQL server configuration file **my.ini** (Windows) or **my.cnf** (Linux) with the following options:

```
transaction-isolation = READ-COMMITTED  
default-storage-engine = INNODB  
character-set-server = utf8  
max_allowed_packet = 250M  
innodb_log_file_size = 256M  
max_connections = 1000
```

- **Postgres:** If you are deploying HPE OO using a Postgres database, you need to configure the Postgres server configuration file **postgresql.conf** with the following options:

```
default_transaction_isolation = 'read committed'  
autovacuum = on  
track_counts = on  
max_connections = 1000
```

- **Oracle:**

If you are deploying HPE OO using an Oracle database, you need to configure the Oracle server PROCESSES and OPEN_CURSORS to guarantee up to 1000 concurrent connections for HPE OO and up to 900 open cursors per session.

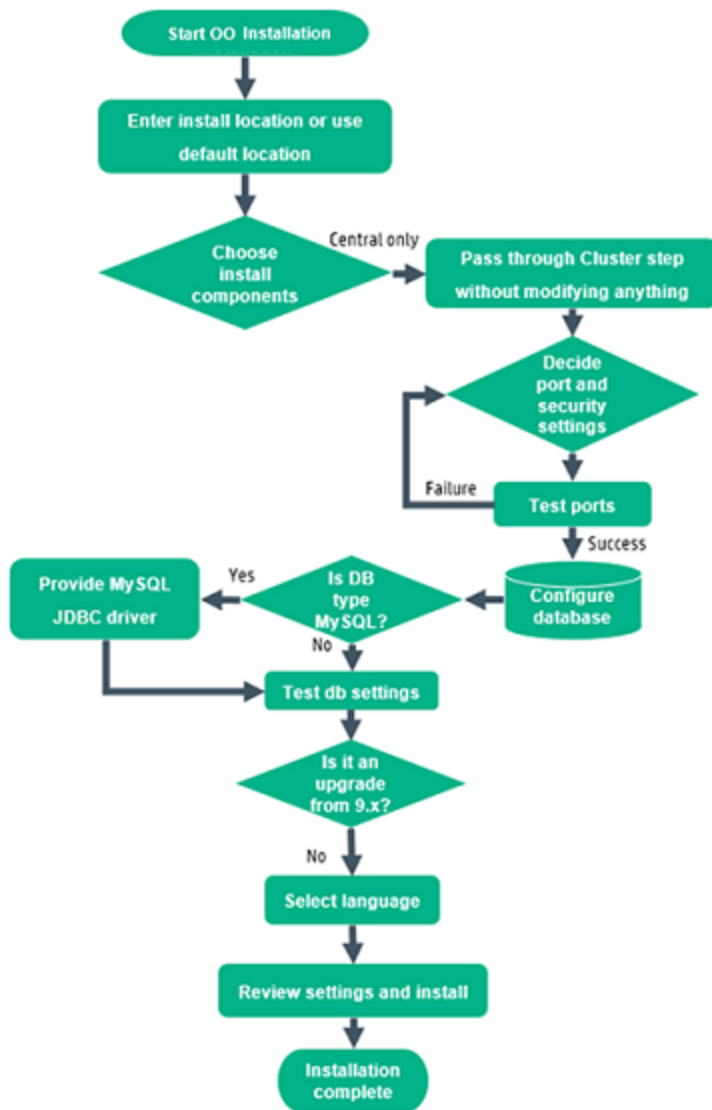
- **SQL Server**

If you are deploying HPE OO using an SQL Server database, you need to set the following options for the database:

ALLOW_SNAPSHOT_ISOLATION	ON
READ_COMMITTED_SNAPSHOT	ON
AUTO_CREATE_STATISTICS	ON
AUTO_SHRINK	OFF

Installing HPE OO Central with Installation Wizard

This section describes how to perform a clean installation of a single Central on Windows or Linux. In some cases, the screenshots display the Windows information. Click each node on the map to jump to the relevant topic.



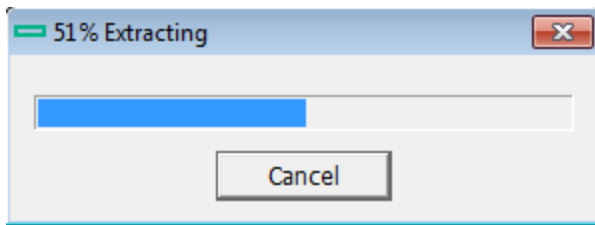
Start the Operations Orchestration Installation

1. Download the ZIP file from the HPE SSO Portal and extract it into a local drive on your computer.
2. To start the installer:
 - On Windows: Double-click the **installer-win64.exe** installation file.
 - On Linux: Run this command from a Linux desktop/an X-Window terminal:

```
bash installer-linux64.bin
```

To start the installer, double-click the **installer-linux64.bin** file.

3. After you start the installer, the installation package is extracted, and the **HPE OO Installation and Configuration Wizard** automatically opens. Click **Next**.



4. In the **License** page, select **I Agree**, and then click **Next**.

[Back to the flowchart](#)

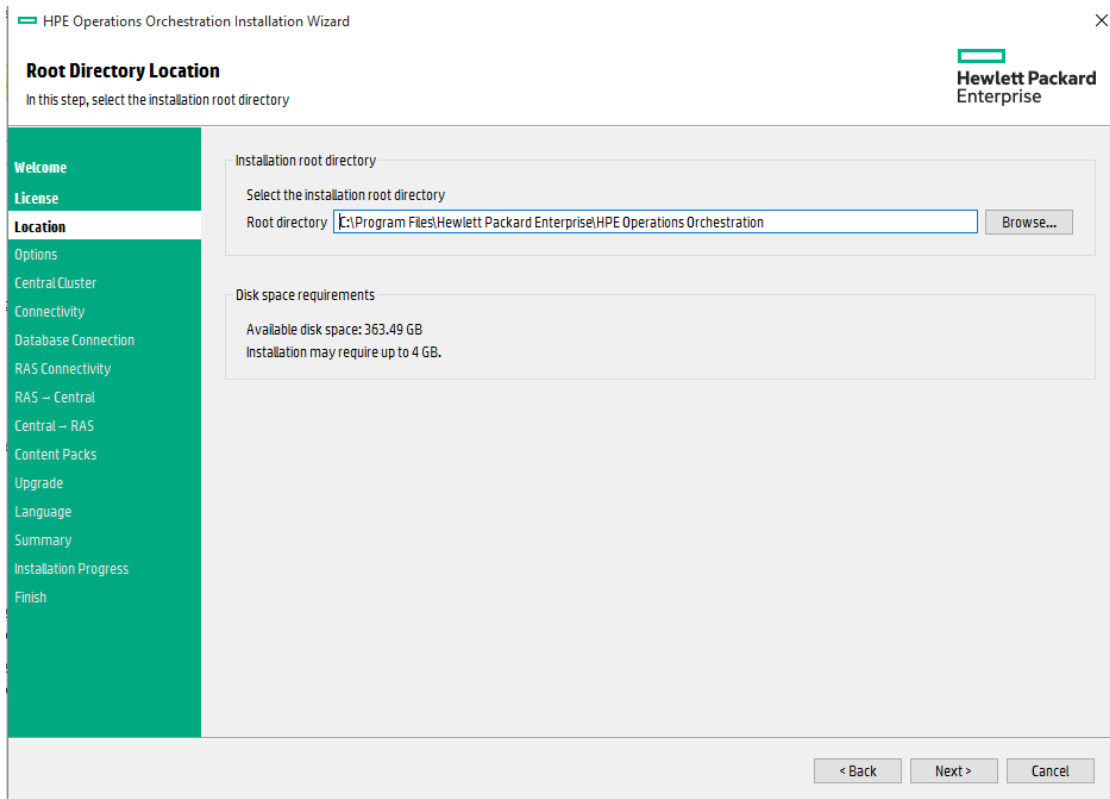
Enter the Installation Location or Use the Default Location

1. In the **Location** page, select the location for the installation root directory.

If the directory does not exist, the directory is created automatically. You are prompted to confirm the creation of the new location.

Note: Valid characters for the installation path are English letters, digits, spaces, hyphens (-) and underscores (_).

The default path is C:\Program Files\Hewlett-Packard Enterprise\HPE Operations Orchestration for Windows and is /opt/hpe/oo for Linux.



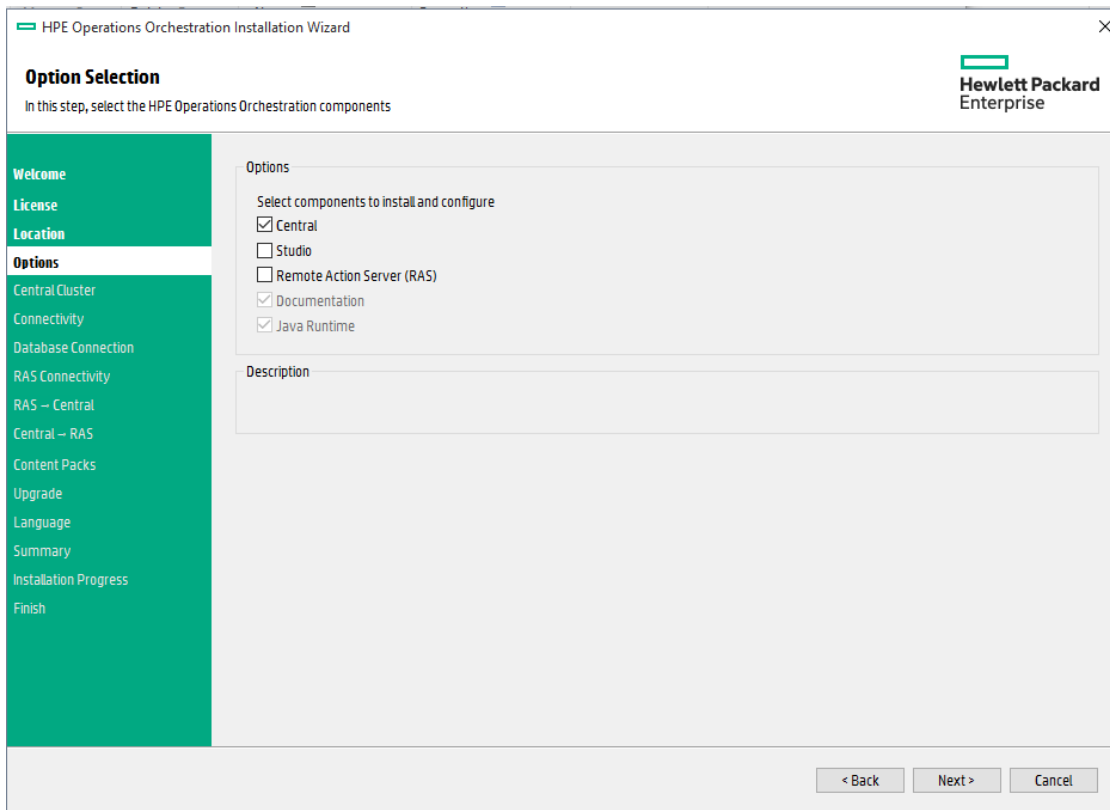
2. Click **Next**.

[Back to the flowchart](#)

Choose the Installation Components

1. In the **Options** page, select **Central**.

Note: You can install Central without setting up a RAS server. If you install a RAS Server, it is recommended that you install this on a separate server to Central. See ["Installing HPE OO RAS Using the Installation Wizard" on page 38](#). See the *Architecture Guide* for more information.



2. Click **Next**.

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Pass Through the Cluster Step Without Modifying Anything

In the **Central Cluster** page, click **Next**.

For information about how to install a node in a cluster, see "[Installing an HPE OO Central Cluster](#)" on [page 60](#).

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Decide Port and Security Settings

In the **Connectivity** page, configure the Central Server ports and TLS:

1. Configure available ports for the Central Server. Default values (8080 and 8443) appear for each port, but you can change these. Choose one of the following options:

The screenshot shows the 'Central Server Connectivity' step of the HPE Operations Orchestration Installation Wizard. The left sidebar contains a navigation menu with options: Welcome, License, Location, Options, Central Cluster, Connectivity (selected), Database Connection, RAS Connectivity, RAS - Central, Central - RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main content area is titled 'Connectivity' and contains the following fields and options:

- Connectivity**
 - Configure the Central Server port numbers and TLS properties
 - ☒ **Disable HTTP port** (HPE recommends to disable the HTTP port and to use a TLS CA certificate for security reasons)
 - ☐ **Allow HTTP access** (not recommended, but can be undone after the installation)
 - HTTP: 8080
 - HTTPS: 8443
 - ☒ **Supply a secure TLS certificate** (when not provided, a self-signed certificate is used, which is not secured)
 - Central TLS certificate: [Text Field] [Browse...]
 - The TLS certificate should be in PKCS12 format.
 - Central TLS certificate password: [Text Field]
 - Confirm password: [Text Field]
 - CA root certificate location (.crt or .cer file): [Text Field] [Browse...]
 - The CA root certificate of the Central TLS certificate.
The CA root certificate will be imported into the Central/RAS TrustStore.
 - ☐ **Do not start Central server after installation**
(Must be checked when you want to configure HPE OO to be compliant with FIPS 140-2.)
This option is ignored when choosing to upgrade from 9.x.
 - [Test ports availability]

At the bottom of the wizard, there is a status bar with a warning icon and the text 'Provide a TLS certificate', and navigation buttons: '< Back', 'Next >', and 'Cancel'.

- (Recommended) Select **Disable HTTP Port** and configure a port in the **HTTPS** field.

This option is recommended for security reasons, so that the communication channel is encrypted.
- (Not recommended) Select **Allow HTTP access** and configure two ports in the **HTTP** and **HTTPS** fields.

Note: Configuring at least one port is mandatory. If a port is not defined, or if the ports are occupied by other applications, you will not be able to complete the installation.

2. (Recommended) Select **Provide a secure TLS certificate**, and then click **Browse** to select the certificate.

This step is recommended, for security reasons. If you do not select a Central TLS certificate, HPE OO uses a self-signed certificate.

Note: Do not use a network path for the location of the Central TLS certificate.

3. If you selected a Central TLS certificate, enter its password, and enter it again for confirmation.
4. Click **Browse** to specify the location of the CA root certificate, which will be imported into the

TrustStore for Central/RAS.

Note: Do not use a network path for the location of the CA root certificate.

For more information about installing HPE OO on a secured environment, see the *HPE OO Security and Hardening Guide*.

5. Select **Do not start Central server after installation** if either of the following is true:

- If you are configuring HPE OO to be compliant with FIPS 140-2.

For more information, see "Configuring HPE OO for FIPS 140-2 Level 1 Compliance" in the *HPE OO Security and Hardening Guide*.

- If you are installing a new Central in cluster mode and the installer version is older than the current Central.

Note: If you are installing Central and RAS together, or upgrading from 9.x, this option is not available. This is because the RAS server needs to connect to the Central server. If Central is not started, the installation of the RAS will fail.

[Back to the flowchart](#)

Test the Ports

Click **Test ports availability**. If the ports are available, a **Success** check mark appears.

- If you encounter an error, adjust the ports accordingly and try again.
- If the **Success** check mark appears, click **Next**.

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Configure the Database

In the **Database Connection** page, you configure and create the database schema.

Note: If you have user input in two languages apart from English (for example, German and Chinese) then MS SQL should not be used. You should use an alternative database such as Oracle, MySQL, or Postgres with the recommended Unicode configuration for .

The screenshot shows the 'Database Connection Configuration' window of the HPE Operations Orchestration Installation Wizard. The window has a title bar with the text 'HPE Operations Orchestration Installation Wizard' and a close button. Below the title bar, the main heading is 'Database Connection Configuration' with a subtext 'In this step, configure and create the database schema'. The Hewlett Packard Enterprise logo is in the top right corner. On the left, there is a green sidebar with a list of steps: Welcome, License, Location, Options, Central Cluster, Connectivity, Database Connection (highlighted), RAS Connectivity, RAS - Central, Central - RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main area is titled 'Database Connection Properties' and contains the following fields: 'Database Type' (a dropdown menu showing 'Oracle Database'), 'Connect to existing database/schema' (selected radio button) and 'Create the database/schema' (unselected radio button), 'Hostname or IP address' (text field), 'Port' (text field with '1521'), 'SID' (selected radio button) and 'Service Name' (unselected radio button), 'Username' (text field), and 'Password' (text field). There is a 'Test Connection' button below the fields. At the bottom, there is a warning icon and text 'The database connection must be tested', and three buttons: '< Back', 'Next >', and 'Cancel'.

1. From the **Database Type** list, select the database vendor, and then enter the connection properties.

Note: When the **Connect to existing database/schema** option is selected, do not use administrative user accounts in the **Username** and **Password** fields, because this will install HPE OO under the administrative account.

When the **Create the database/schema** option is used, provide a user with the relevant privileges in the **Admin username** and **Admin password** fields.

You can select from the following database types:

- **Oracle:** Do not use **SYS**, **SYSTEM**, or other administrative accounts credentials in the **Username** and **Password** fields.

Note: If you are using Oracle 11g R2 or 11g R2 RAC, it is recommended to apply patch 20299013 before installing HPE OO.

- **Microsoft SQL Server:** Do not use **sa** or other administrative account credentials in the **Username** and **Password** fields.

- **Oracle MySQL:** Do not use the **root** credential in the **Username** and **Password** fields.

If you are installing HPE OO with Oracle RAC (Real Application Cluster), you must choose **Other database** and provide the URL. For more information, see "Appendix B: Additional Guidelines for Oracle > Oracle Real Application Cluster (RAC)" in the *HPE OO Database Guide*.

- **PostgreSQL:** Do not use the **postgres** credential in the **Username** and **Password** fields.

Note: PostgreSQL database names are case-sensitive.

- **Internal database:** This uses an H2 local database. This should not be used for production.
- **Other database:** (use to enable advanced features in supported databases). If you select **Other database**, you can only use a database type that is supported for use with HPE OO. See "Appendix C: Installation Wizard 'Other Database' Option" in the *HPE OODatabase Guide* for more information.

Note: The **Other database** option also supports any valid JDBC URL.

2. After selecting the database type, select one of the following:

- **Connect to existing database/schema:** Connect to an existing schema, user, or database. The installer verifies that the schema/database and user exist.
- **Create the database/schema:** Enables you to create a new database or schema. Information in the **Database**, **Username** and **Password** fields will be used in order to create the new schema, user, or database for HPE OO.

Confirm the password by typing it again in the **Confirm Password** field.

Important! Make sure to use a strong password, in accordance with your organization's security policy. If the password is not strong enough, an error message will appear.

Provide existing database user credentials in the **Admin username** and **Admin password** fields. This elevated-privileges user must be able to connect to the database and create the new schema, user, or database for HPE OO.

DBA (Admin) credentials will only be used for creating the HPE OO database and user/role. It is completely safe to provide these credentials, as they not saved and not used after the HPE OO installation.

3. Enter the hostname or IP address and other connection details.

Make sure to use the FQDN (Fully Qualified Domain Name).

If you want to use IPv6, put the IPv6 address in brackets, for example, [3fff::20]. Otherwise, errors will occur.

4. (For Oracle) Select either **SID** or **Service Name**, and enter the SID or service name of the database.

It is recommended to use Oracle database's service name rather than using the SID.

Note: If you are upgrading from a 9.x version that is installed on Oracle, you must enter the SID of this database in the **SID** field, and not the database name.

For more information about setting up the database schema, see the *HPE OO Database Guide*.

[Back to the flowchart](#)

Is the Database MySQL?

Yes: Go to [Provide the JDBC Driver for MySQL](#)

No: Go to [Test Database Settings](#)

Provide the JDBC Driver for MySQL

Complete this step if the database is MySQL:

In the **Database Connection** page, click **Browse** and select the location of the JDBC driver.

[Back to the flowchart](#)

Test the Database Settings

Click **Test Connection**. If you are unable to connect to the database, you will not be able to proceed to the next steps in the wizard.

If your password is not strong enough, a warning is displayed. You will still be able to proceed with the installation, but it is strongly recommended to replace it with a stronger password.

The installer checks for non-empty schemas/databases, and shows a warning message if the schema or database is not empty. If the installation fails during schema validation, the installation process is stopped.

Note: This test only verifies the connection between HPE OO and the selected database, and does not verify the conditions required by the database, like the user's read/write permissions on the provided schema.

Note: For all the database vendors, if you select to create a new database, the created database

uses **case-sensitive** collation as follows:

- MySQL: **utf8_bin collation** is used for the new database.
- Postgres: Case-sensitive by design. No need for specific settings. **UTF-8** encoding is supported
- Oracle: Case-sensitive by default. No need for specific settings. **UTF-8** encoding is supported.
- MS SQL: Use only the following database collations per your required language:
 - English: **SQL_Latin1_General_CP1_CS_AS**
 - Japanese: **Japanese_Unicode_CS_AS**
 - Simplified Chinese: **Chinese_Simplified_Stroke_Order_100_CS_AS**
 - German: **SQL_Latin1_General_CP1_CS_AS**
 - French: **French_100_CS_AS**
 - Spanish: **SQL_Latin1_General_CP1_CS_AS**

However, if you already have a database installed, HPE OO creates the tables using the database specific collation. It is important to note that using other collations can cause characters to appear in gibberish in the user interface for localized installations. In addition, other collations are not officially supported in Microsoft SQL Server for localized installations.

If the installer is used in order to create a new SQL Server database, selecting your language in the language selection page sets the correct collation for the new database.

Using one of the above collations enables using the **varchar** datatype for textual columns instead of the **nvarchar** data type. Using the **varchar** data type is more efficient and reduces overall database size.

Selecting a specific language also means that an HPE OO system that uses SQL Server is limited to the set of languages supported by that specific collation. For example, if the **SQL_Latin1_General_CP1_CS_AS** collation is used, English, German, and Spanish characters may be used, but Japanese characters may not. If **Japanese_Unicode_CS_AS** is used, French accent characters will not be presented properly. For the complete specification of each collation, see the Microsoft SQL Server documentation.

[Back to the flowchart](#)

Is it an Upgrade from 9.x?

In the **Upgrade** page, click **Next** without modifying anything.

This procedure describes how to perform a clean installation of HPE OO10.x. For information about upgrading from 9.x, see the document *Upgrading to HPE OO 10.x from 9.x*.

[Back to the flowchart](#)

Select the Language

In the **Language** page, select a supported language for HPE OO, in addition to English, and then click **Next**.

This language support will be used for:

- The MS SQL collation language, if relevant
- The **central-wrapper.conf** language for content. This language support may be required if, for example, you need to ping a server that is configured in Japanese.

Note: You can change the language support choice after installation, by editing the **central-wrapper.conf** file, located in the installation directory under **central/conf**.

The screenshot shows the 'Language Selection' window of the HPE Operations Orchestration Installation Wizard. The window has a title bar 'HPE Operations Orchestration Installation Wizard' and a close button. Below the title bar, the text 'Language Selection' is displayed, followed by the instruction: 'In this step, select a supported language for HPE Operations Orchestration, in addition to English.' The Hewlett Packard Enterprise logo is in the top right corner. On the left, a vertical sidebar lists the installation steps: Welcome, License, Location, Options, Central Cluster, Connectivity, Database Connection, RAS Connectivity, RAS → Central, Central → RAS, Content Packs, Upgrade, Language (highlighted), Summary, Installation Progress, and Finish. The main area is titled 'Language' and contains a list of radio buttons: English only (selected), French, German, Japanese, Simplified Chinese, and Spanish. At the bottom right, there are three buttons: '< Back', 'Next >' (highlighted with a dashed border), and 'Cancel'.

[Back to the flowchart](#)

Review Settings and Install

1. The **Summary** page displays the installation and configuration settings that you selected and entered in the wizard. Check that the settings are correct. If you want to correct one of the items, click **Back**.
2. Click **Install**. The installation begins, and the wizard displays a check mark next to each successfully installed item on the **Progress** page. When the installation is complete, click **Next**.

Note: If there is a problem with one of the installation or configured items, the installation attempts to continue with the rest of the items regardless of that error. Check the **installer.log** file (the default located is **C:\HPE\oo** for Windows or in **/HPE/oo** for Linux), to check for errors.

3. (Optional) In the **Finish** page, select **Open Welcome Page** to display the HPE OO Welcome page in your default web browser, in the language that was selected on the **Language** page.
4. Click **Finish** to close the Installation and Configuration wizard.

Installation is Complete

Central is installed and menu shortcuts are created on your system.

The installation is of the Trial version of HPE OO. As a result, you will need to install the Enterprise Edition license within 90 days. You will need to generate the license with the IP of the Central server.

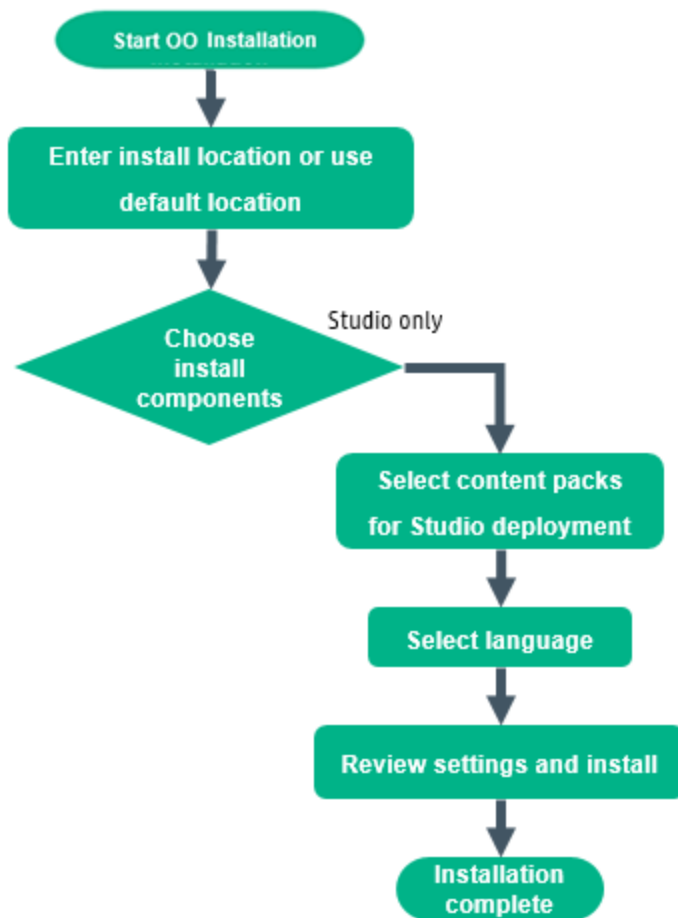
For more information about licensing, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

Installing Operations Orchestration Studio Using the Installation Wizard

This section describes how to perform a clean installation of HPE OO Studio.

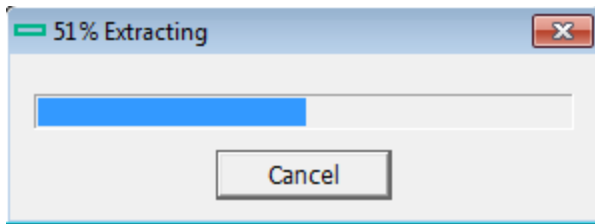
Note: Studio only works on Windows, so it cannot be installed on Linux.

Click each node on the map to jump to the relevant topic.



Start the HPE OO Installation

1. Download the ZIP file from the HPE SSO Portal and extract it into a local drive on your computer.
2. To start the installer, double-click the **installer-win64.exe** installation file.
3. After you start the installer, the installation package is extracted, and the HPE OO **Installation and Configuration Wizard** automatically opens. Click **Next**.



4. In the **License** page, select **I Agree**, and then click **Next**.

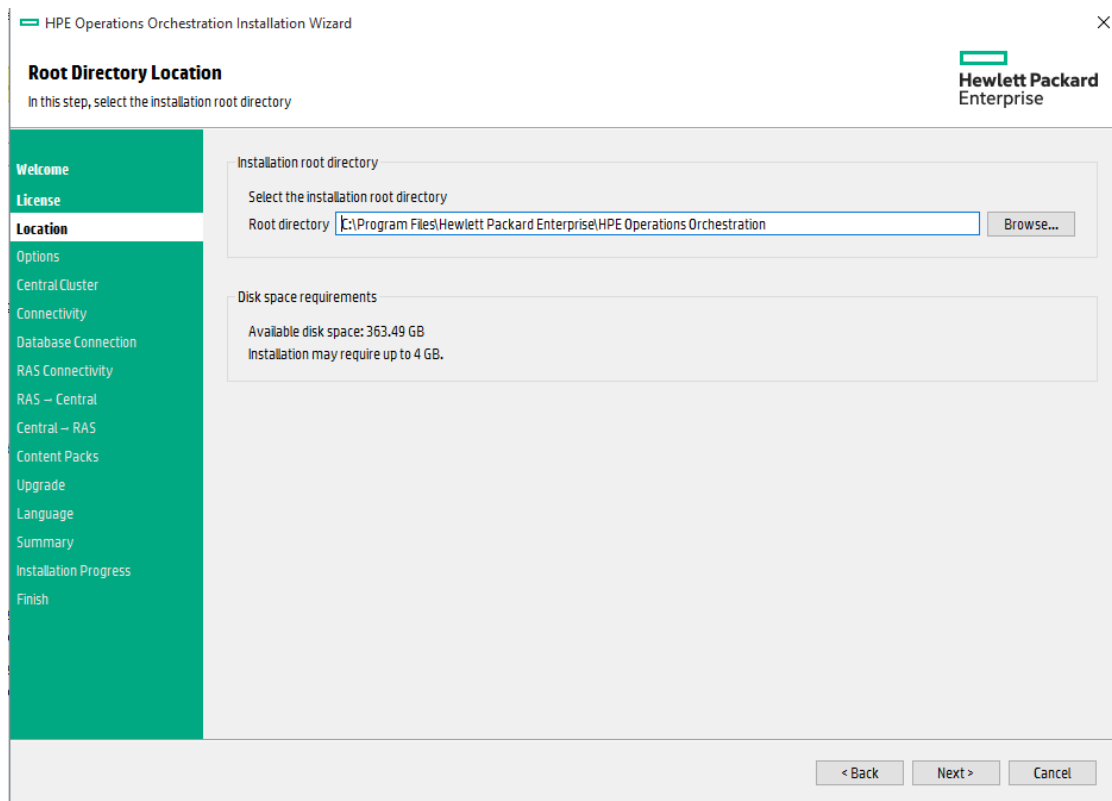
[Back to the flowchart](#)

Enter the Installation Location or Use the Default Location

1. In the **Location** step, select the location for the installation root directory, and then click **Next**.

The default path is C:\Program Files\Hewlett-Packard Enterprise\HPE Operations Orchestration. Valid characters for the installation path include English letters, digits, spaces, hyphens (-) and underscores (_).

If the directory does not exist, the directory will be created automatically. You are prompted to confirm the creation of the new location.

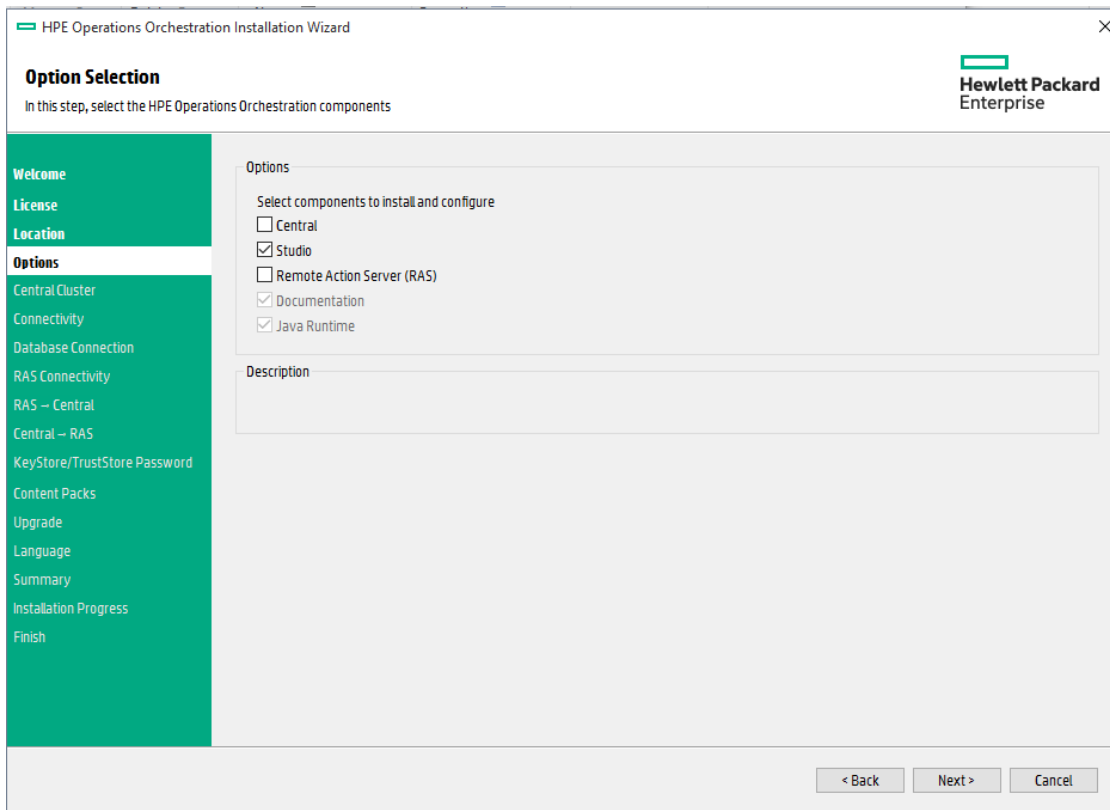


2. Click **Next**.

[Back to the flowchart](#)

Choose All the Installation Components

1. In the **Options** page, select the **Studio** check box.



2. Click **Next**.

[Back to the flowchart](#)

Select Content Packs for Studio Deployment

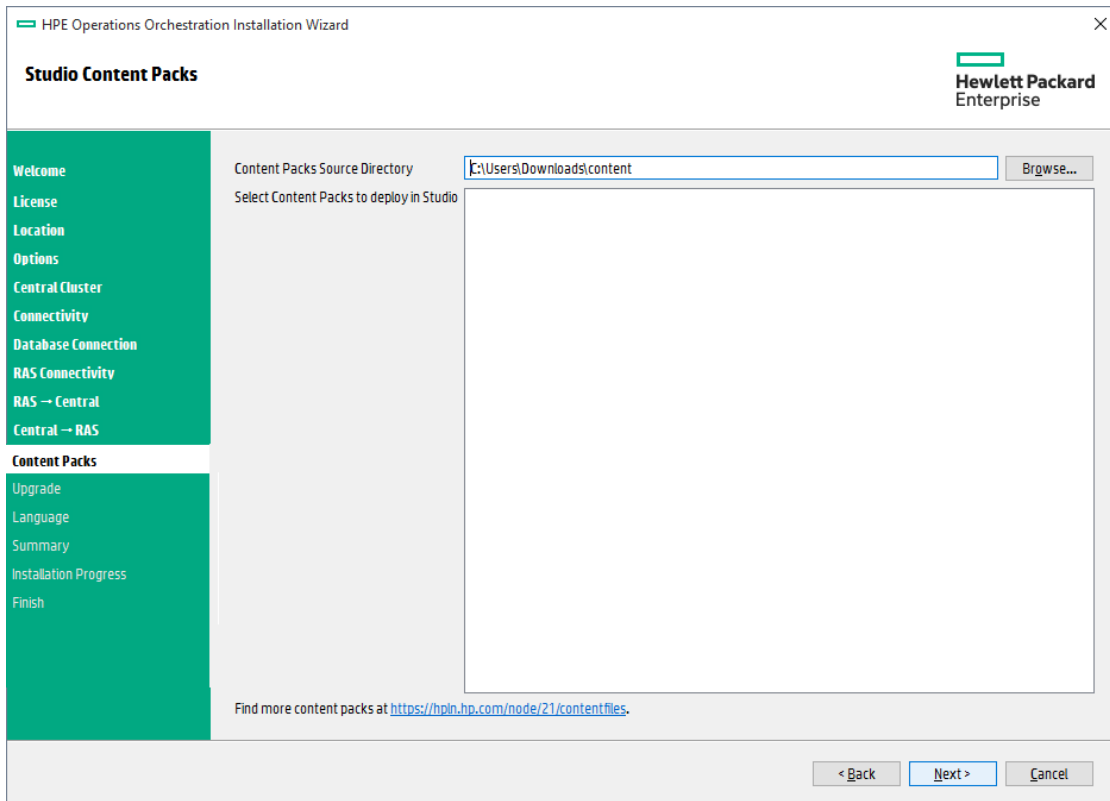
In the **Content Packs** page, you can import one or more content packs.

1. Browse to the location where the content packs are located, and then click **OK**.

The available content packs located in the selected folder appear in the list.

Note: The installation folder includes the released content packs.

2. Select the content pack (or packs) that you want to import, and then click **Next**.



Note: The content packs in the image above are just an example. Select the appropriate content packs.

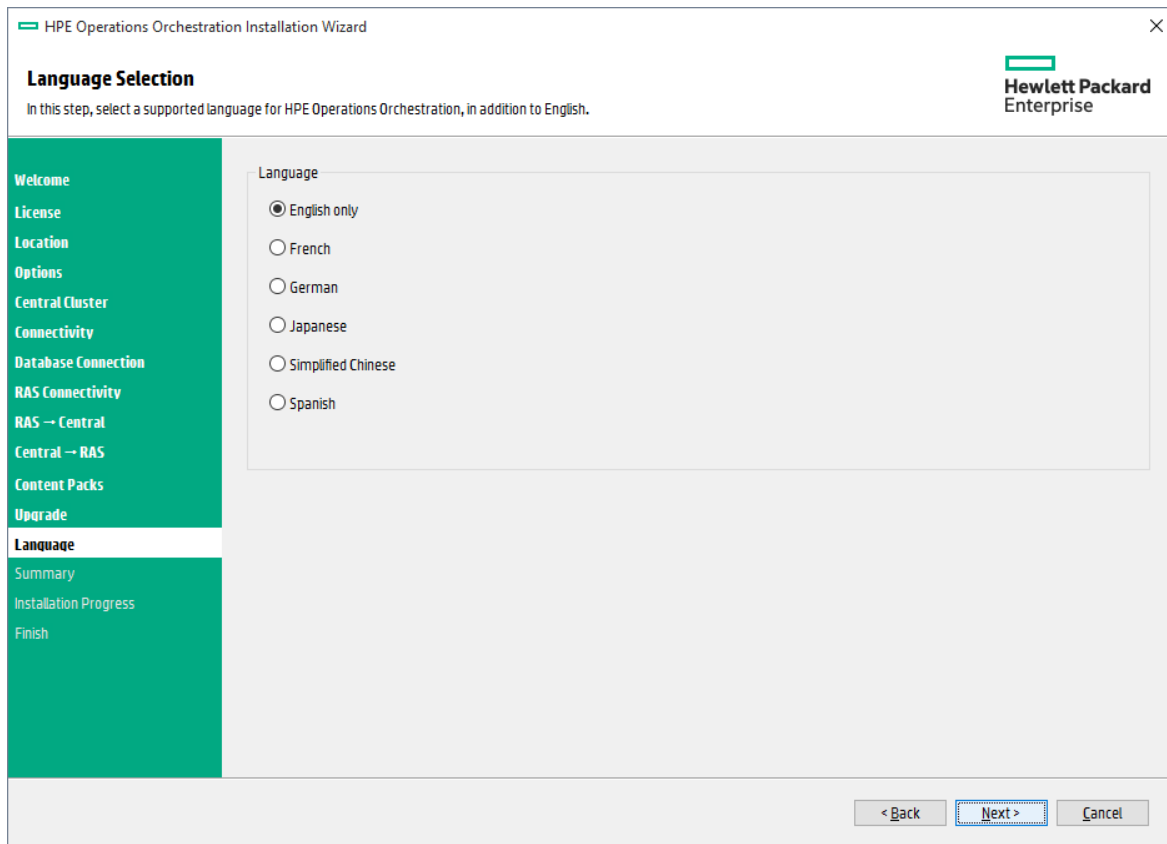
You can download additional and updated content packs on HPLN, using the link in the lower part of the wizard.

[Back to the flowchart](#)

Select the Language

In the **Language** step, select a supported language for HPE OO, in addition to English, and then click **Next**. This language support will be used for the Studio UI.

You can change the language support choice after installation, by editing the **Studio.properties** file, located in the installation directory under and **studio/conf**.



[Back to the flowchart](#)

Review Settings and Install

1. The **Summary** page displays the installation and configuration settings that you selected and entered in the wizard. Check that the settings are correct. If you want to correct one of the items, click **Back**.
2. Click **Install**. The installation begins, and the wizard displays a check mark next to each successfully installed item on the **Progress** page. When the installation is complete, click **Next**.

Note: If there is a problem with one of the installation or configured items, the installation attempts to continue with the rest of the items regardless of that error. Check the **installer.log** file (the default location is **C:\HPE\oo**) to check for errors.

3. (Optional) In the **Finish** page, select **Launch Studio** to start Studio.
4. Click **Finish** to close the Installation and Configuration wizard.

[Back to the flowchart](#)

Installation is Complete

Studio is now installed and menu shortcuts are created on your system.

You can also start **Studio** from the Windows **Start** menu:

From the Windows **Start** menu, select **All Programs > HPE Operations Orchestration > Studio**.

Note: The minimum screen resolution for Studio is 1280x1024.

If you want to store your flows in a source control repository such as SVN or Git, see the *HPE OO Studio Authoring Guide* for instructions about how to set up the repository.

After installing Studio, in order to use the Studio Git integration feature, you must install the Git client version 2.9.2.

1. Download the Git client from the following URL: <https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-64-bit.exe>.
2. Save the Git client to **<oo_installation_folder>/studio/Git**, so that the **bin** folder is directly under **<oo_installation_folder>/studio/Git**. In the Git installation wizard, use the default options.

Alternatively, if you already have a Git client installation on your local disk, point Studio to use that Git installation by performing the following steps:

1. Close Studio.
2. Go to the user home folder **C:\Users\<user>\.oo** (the Studio workspace location) and locate the **Studio.properties** file.
3. Modify the **Studio.properties** file by adding the following property at the end of the file:

```
studio.git.installation.location=<git_installation_folder>
```

For example:

```
studio.git.installation.location=C:/Program Files/Git
```

The **bin** folder should be directly under **C:/Program Files/Git**. Note that **/** should be used as a path separator.

4. Save the **Studio.properties** file and start Studio.

Note: If you opted for this second alternative, you need to consider the following:

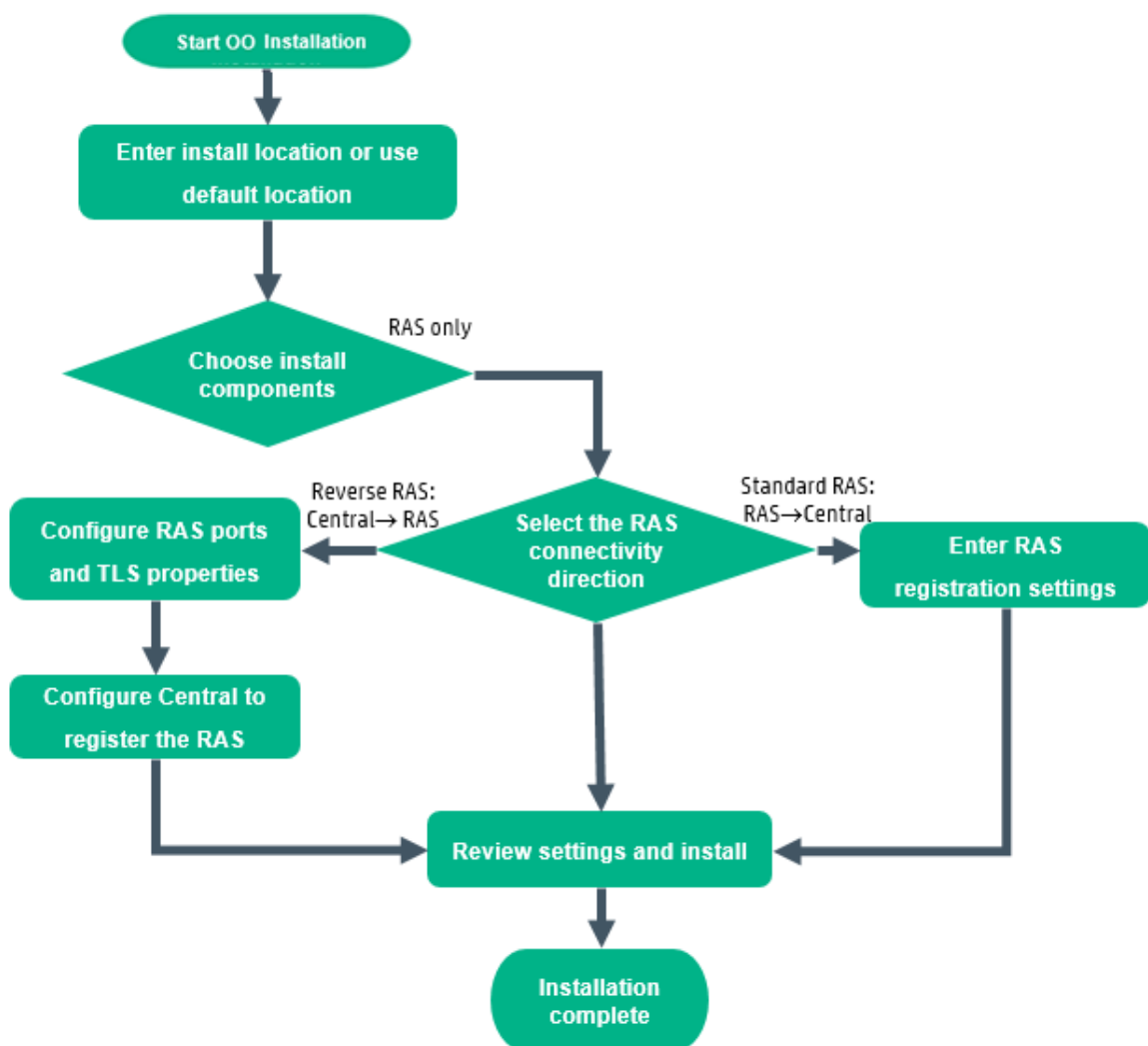
If you are using multiple workspaces and you want the Git location property to be added in each new workspace, you should edit the template properties file located in **Studio\conf\studio.properties.template**. Otherwise, each time you switch to a new workspace, you will have to set the Git location in the new workspace in the **.oo\Studio.properties** file.

If you have another version of the Git client installed, note that you must use version 2.9.2 of Git with Studio. This is the version that was validated with Studio. While other versions might still work correctly, they are not officially supported.

Installing HPE OO RAS Using the Installation Wizard

This section describes how to perform a clean installation of an HPE OO RAS.

Click each node on the map to jump to the relevant topic.



Start the HPE OO Installation

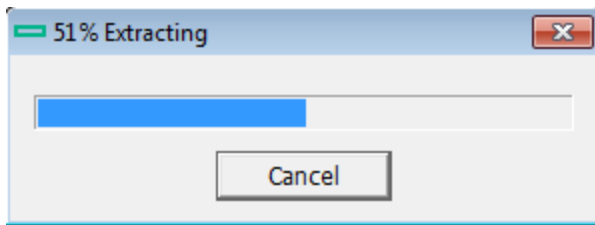
1. Download the ZIP file from the HPE SSO Portal and extract it into a local drive on your computer.
2. To start the installer:

- On Windows: Double-click the **installer-win64.exe** installation file.
- On Linux: Run this command from an X Window terminal:

```
bash installer-linux64.bin
```

To start the installer, double-click the **installer-linux64.bin** file.

3. After you start the installer, the installation package is extracted, and the **HPE OO Installation and Configuration Wizard** automatically opens. Click **Next**.



4. In the **License** page, select **I Agree**, and then click **Next**.

[Back to the flowchart](#)

Enter the Installation Location or Use the Default Location

1. In the **Location** page, select the location for the installation root directory.

If the directory does not exist, the directory is created automatically. You are prompted to confirm the creation of the new location.

Note: Valid characters for the installation path are English letters, digits, spaces, hyphens (-) and underscores (_).

The default path is C:\Program Files\Hewlett-Packard Enterprise\HPE Operations Orchestration for Windows and is /opt/hpe/oo for Linux.

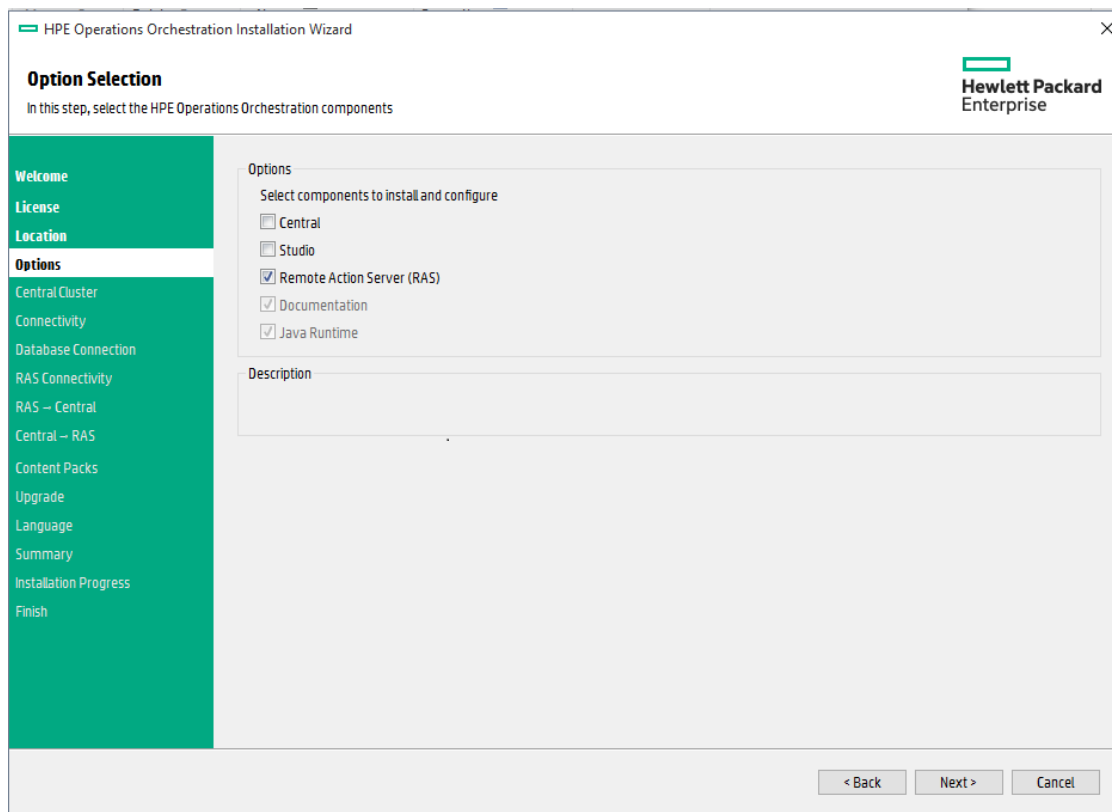
The screenshot shows the 'Root Directory Location' step of the HPE Operations Orchestration Installation Wizard. The window title is 'HPE Operations Orchestration Installation Wizard'. On the left is a green sidebar with a list of steps: Welcome, License, Location (highlighted), Options, Central Cluster, Connectivity, Database Connection, RAS Connectivity, RAS - Central, Central - RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main area has a header 'Root Directory Location' with the instruction 'In this step, select the installation root directory'. Below this, there are two sections: 'Installation root directory' which includes a text box for 'Root directory' containing the path 'E:\Program Files\Hewlett Packard Enterprise\HPE Operations Orchestration' and a 'Browse...' button; and 'Disk space requirements' which shows 'Available disk space: 363.49 GB' and 'Installation may require up to 4 GB.'. At the bottom right are three buttons: '< Back', 'Next >', and 'Cancel'.

2. Click **Next**.

[Back to the flowchart](#)

Choose the Installation Components

1. In the **Options** page, select the **Remote Access Server (RAS)** check box.



2. Click **Next**.

[Back to the flowchart](#)

Select the RAS connectivity direction

The screenshot shows the 'RAS Connectivity' step of the 'HPE Operations Orchestration Installation Wizard'. The window title is 'HPE Operations Orchestration Installation Wizard' with a close button (X) in the top right. The 'RAS Connectivity' title is in bold, and below it, it says 'In this step, select the RAS connectivity direction'. The Hewlett Packard Enterprise logo is in the top right corner. On the left is a green sidebar with a list of steps: Welcome, License, Location, Options, Central Cluster, Connectivity, Database Connection, RAS Connectivity (highlighted), RAS -> Central, Central -> RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main area has two sections: 'RAS Type' with two radio buttons, 'Standard RAS - the RAS initiates communication to Central (Recommended)' (selected) and 'Reverse RAS - Central initiates communication to the RAS'; and 'Description' with two text boxes. The 'Standard RAS' box says 'When the RAS initiates communication to Central, you must register the RAS with a Central server.' The 'Reverse RAS' box says 'When Central initiates communication to the RAS, you must configure the RAS to accept communication from Central. You must also configure Central to register the RAS by providing all required information about the RAS: host/IP, port, and so on. Do this in Central, under the System Configuration > Topology > Workers tab. Choose this option if Central is installed in a different, more secured network, and your security rules do not allow connecting from the less secured network to the more secured one.' At the bottom right are three buttons: '< Back', 'Next >', and 'Cancel'.

Choose between one of the following options:

- **Standard RAS - RAS initiates communication to Central** - this is the simplest option and is recommended if your security rules permit it.
- **Reverse RAS - Central initiates communication to RAS** - choose this option if Central is installed in a different, more secured network, and your security rules do not allow connecting from the less secured network to the more secured one.

You will need to configure the RAS to accept connection from Central. When the RAS starts up, it will be idle, waiting for Central to initiate connection.

[Back to the flowchart](#)

RAS -> Central: Enter the RAS registration settings

This step follows if you selected **Standard RAS - RAS initiates communication to Central**.

Note: If you are installing RAS and Central at the same time, this page does not appear, because the RAS is automatically registered to the Central that is being installed at the same time.

1. In the **RAS -> Central** page, enter, in the **Central URL** box, enter the properties and location of the Central.

Make sure to use the FQDN (Fully Qualified Domain Name) for the Central URL.

If you want to use IPv6, put the IPv6 address in brackets, for example, [3fff::20]. Otherwise, errors will occur.

Note: If Central is set up with HTTPS, make sure to enter the hostname *exactly* as specified in Central's TLS certificate.

2. (Optional) Select the **Central user capable of registering a RAS** check box and enter the user name and password of this user.

If relevant, add the LDAP domain using the following conventions:

- domain\username
- username@domain

For more information about LDAP, see "Setting Up Security – LDAP Authentication" in the *HPE OO Central User Guide*.

3. (Optional) Select the **HTTP proxy definition for connecting to the Central** and enter the HTTP proxy definition.
4. Click **Test Connection**.

Note: If you test the connection to a Central with a custom CA certificate without providing the certificate to the RAS, a java.lang.RuntimeException error message will appear.

- If the connection test is successful, continue.
- If the connection test is not successful, review the settings that you entered in steps 1 - 3 above.

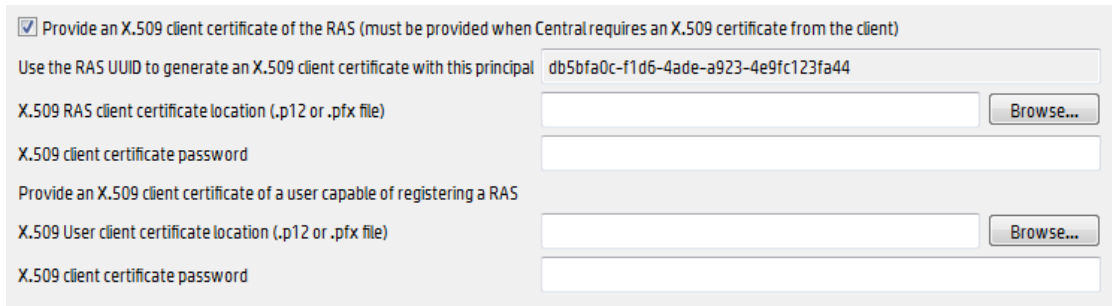
5. When you installed Central, if you provided a CA certificate for Central, you must provide the root CA certificate for the RAS. This certificate will be imported to the RAS TrustStore:

- a. Select the **Supply the CA root certificate of Central** check box.
- b. Click **Browse** to select the relevant CA root certificate.

If the default certificates were used in Central, you should leave this check box cleared, to automatically use the self-signed certificate.

For more information about using TLS certificates, see the *HPE OO Security and Hardening Guide*.

6. If Central requires an X.509 certificate from the client, follow these steps (you may need to scroll down to see all the fields):



The screenshot shows a configuration window for X.509 client certificates. It has a checked checkbox at the top: "Provide an X.509 client certificate of the RAS (must be provided when Central requires an X.509 certificate from the client)". Below this, there is a text field for "Use the RAS UUID to generate an X.509 client certificate with this principal" containing the value "db5bfa0c-f1d6-4ade-a923-4e9fc123fa44". There are two main sections for certificates. The first section is for the "X.509 RAS client certificate" and includes a text field for the location (with a "Browse..." button) and a password field. The second section is for a "user capable of registering a RAS" and also includes a text field for the location (with a "Browse..." button) and a password field.

- a. Click the **Provide an X.509 client certificate of the RAS** check box.
A UUID for the RAS is automatically generated.
 - b. Create the client certificate using this RAS UUID. The client certificate must be in PKCS format and must be with a **.pfx** or **.p12** extension.
 - c. Click **Browse** to select the X.509 client certificate that you created.
 - d. Enter the password of the X.509 client certificate that you created.
 - e. Click **Browse** to select the client certificate of a user capable of registering a RAS.
 - f. Enter the password for the user capable of registering a RAS.
7. Click **Next**.

[Back to the flowchart](#)

Central -> RAS: Configure RAS ports and TLS properties

This step follows if you selected **Reverse RAS - Central initiates communication to RAS**.

1. In the **Central -> RAS** page, enter a shared secret, and enter it again to confirm.

When Central is configured to register this RAS, this secret will need to be entered, in order for Central to connect to the RAS.

The shared secret must conform to the following rules:

- Minimal length of 8 characters
- Contain at least one upper case character
- Contain at least one lower case character
- Contain at least one number

2. In the **RAS listening address** box, enter the FQDN or IP of the RAS server.

By default, this is populated with the IP/FQDN (based on the selected protocol).

3. Enter the port on which the RAS server will listen for the Central connection.
4. Click **Test port availability**. If the ports are available, a **Success** check mark appears.

If you encounter an error, adjust the ports accordingly and try again.

5. (Recommended) Select **Supply a secure TLS certificate**.

This step is recommended, for security reasons. If you do not select a secure TLS certificate, HPE OO will generate and use a self-signed certificate, which will be exported to the **<RAS>/var/security** folder.

6. If you selected **Supply a secure TLS certificate**, click **Browse** to specify the location of the RAS TLS certificate.
7. Enter the certificate's password and enter it again for confirmation.
8. Click **Next**.

For more information about installing HPE OO on a secured environment, see the *HPE OO Security and Hardening Guide*.

[Back to the flowchart](#)

Configure Central to register the Reverse RAS

If you selected **Reverse RAS - Central initiates communication to RAS**, you must also configure Central to register the RAS, by providing all required information about the RAS: host/IP, port, and so on.

You need to do this in Central, under the **System Configuration > Topology > Workers** tab. Once the RAS is registered, Central opens the connection to the RAS.

Note: If the protocol is HTTPS, make sure that the root certificate from the reverse RAS has been added to the Central's client.truststore before attempting to register the worker in the Central UI. It is not required to restart Central after importing the certificate.

Note: If you selected Reverse RAS, the installation process creates a file named **ras-connectivity.properties** under **<installation-directory>\ras\conf**.

. This file includes the following information:

- protocol type: WS/WSS
- listen address: FQDN/IP

- listen port: <integer>
- reverse RAS flag: true/false (The RAS uses this flag to define the mode to use upon startup: regular RAS or reverse RAS)
- hashed shared secret

For more information, see "Setting Up Topology – Workers and RASes" in the HPE OO *Central User Guide*.

[Back to the flowchart](#)

Review Settings and Install

A summary of the installation is displayed.

Review the settings and click **Install**.

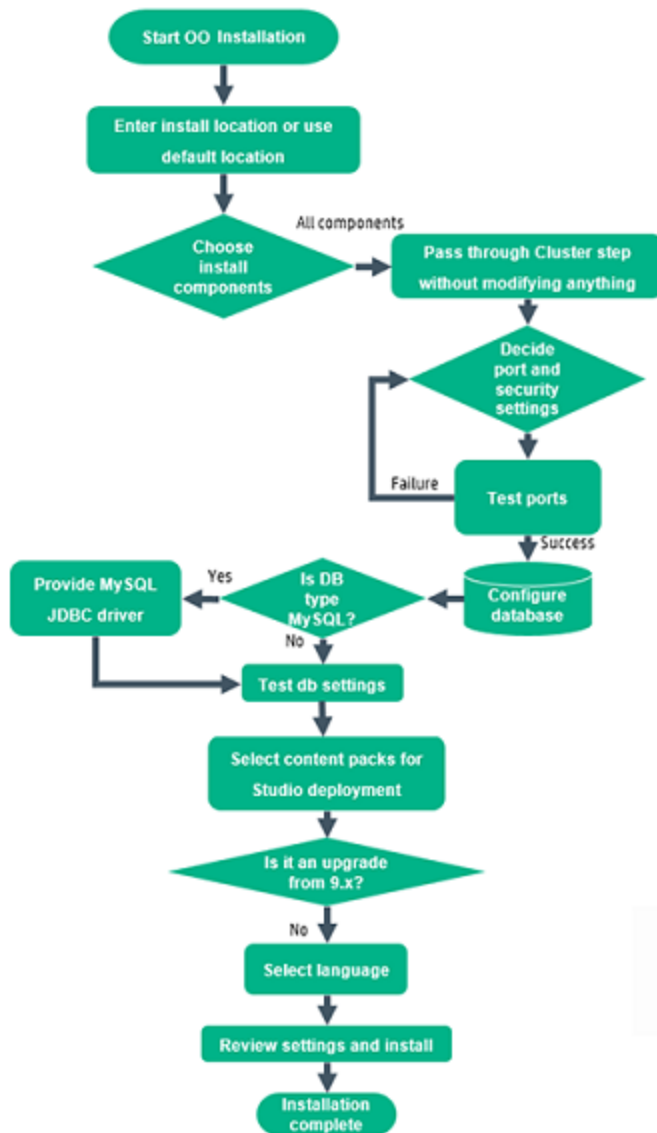
[Back to the flowchart](#)

Installation is Complete

Click **Finish** to complete the installation.

Installing All HPE OO Components Using the Installation Wizard

This section describes how to perform a clean installation of HPE OO, including all components: Central, RAS, and Studio. Click each node on the map to jump to the relevant topic.



Note: Studio (the flow authoring tool) only works on Windows. So if you are installing HPE OO on Linux, note that you will have to run the installer separately on Windows, in order to install Studio.

Start the HPE OO Installation

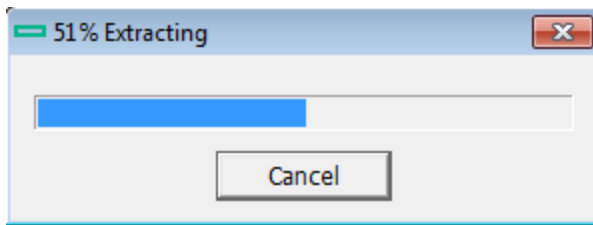
1. Download the ZIP file from the HPE SSO Portal and extract it into a local drive on your computer.
2. To start the installer:

- On Windows: Double-click the **installer-win64.exe** installation file.
- On Linux: Run this command from an X Window terminal:

```
bash installer-linux64.bin
```

To start the installer, double-click the **installer-linux64.bin** file.

3. After you start the installer, the installation package is extracted, and the **HPE OO Installation and Configuration Wizard** automatically opens. Click **Next**.



4. In the **License** page, select **I Agree**, and then click **Next**.

[Back to the flowchart](#)

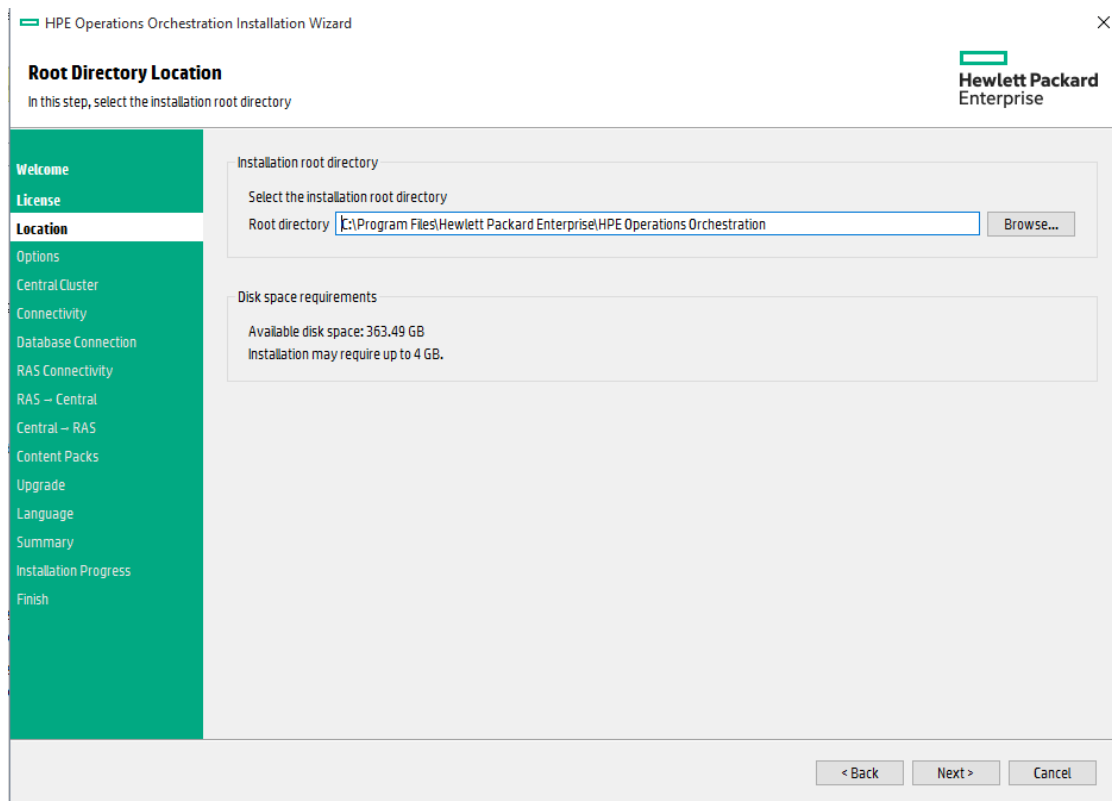
Enter the Installation Location or Use the Default Location

1. In the **Location** page, select the location for the installation root directory.

If the directory does not exist, the directory is created automatically. You are prompted to confirm the creation of the new location.

Note: Valid characters for the installation path are English letters, digits, spaces, hyphens (-) and underscores (_).

The default path is C:\Program Files\Hewlett-Packard Enterprise\HPE Operations Orchestration for Windows and is /opt/hpe/oo for Linux.

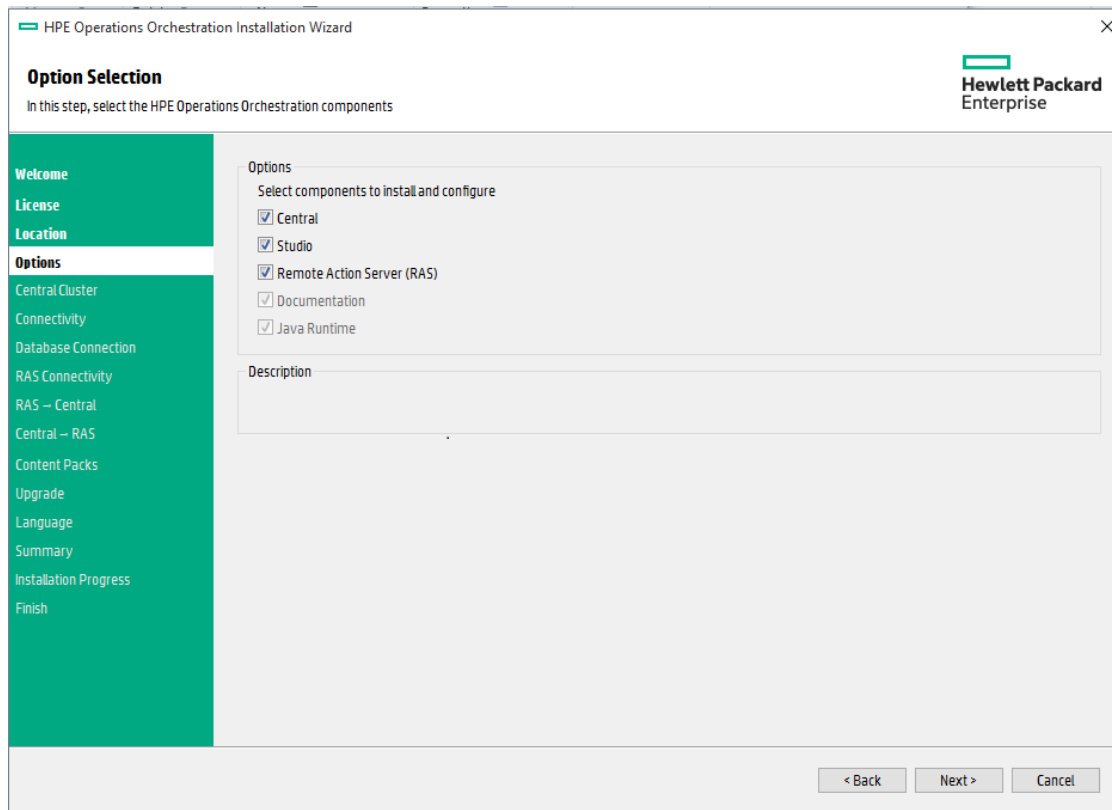


2. Click **Next**.

[Back to the flowchart](#)

Choose All the Installation Components

1. In the **Options** page, select all the check boxes.



2. Click **Next**.

[Back to the flowchart](#)

Pass Through the Cluster Step Without Modifying Anything

In the **Central Cluster** page, click **Next**.

For information about how to install a node in a cluster, see "[Installing an HPE OO Central Cluster](#)" on [page 60](#).

[Back to the flowchart](#)

Decide the Port and Security Settings

In the **Connectivity** page, configure the Central Server ports and TLS:

1. Configure available ports for the Central Server. Default values (8080 and 8443) appear for each port, but you can change these. Choose one of the following options:

HPE Operations Orchestration Installation Wizard

Central Server Connectivity
In this step, configure the Central Server ports and TLS

Connectivity

Configure the Central Server port numbers and TLS properties

☒ **Disable HTTP port** (HPE recommends to disable the HTTP port and to use a TLS CA certificate for security reasons)

☐ **Allow HTTP access** (not recommended, but can be undone after the installation)

HTTP: 8080

HTTPS: 8443

☒ **Supply a secure TLS certificate** (when not provided, a self-signed certificate is used, which is not secured)

Central TLS certificate: [Browse...]

The TLS certificate should be in PKCS12 format.

Central TLS certificate password: []

Confirm password: []

CA root certificate location (.crt or .cer file): [Browse...]

The CA root certificate of the Central TLS certificate.
The CA root certificate will be imported into the Central/RAS TrustStore.

☐ **Do not start Central server after installation**
(Must be checked when you want to configure HPE OO to be compliant with FIPS 140-2.)
This option is ignored when choosing to upgrade from 9.x.

[Test ports availability]

Provide a TLS certificate

< Back Next > Cancel

- (Recommended) Select **Disable HTTP Port** and configure a port in the **HTTPS** field.

This option is recommended for security reasons, so that the communication channel is encrypted.

- (Not recommended) Select **Allow HTTP access** and configure two ports in the **HTTP** and **HTTPS** fields.

Note: Configuring at least one port is mandatory. If a port is not defined, or if the ports are occupied by other applications, you will not be able to complete the installation.

2. (Recommended) Select **Provide a secure TLS certificate**, and then click **Browse** to select the certificate.

This step is recommended, for security reasons. If you do not select a Central TLS certificate, HPE OO uses a self-signed certificate.

Note: Do not use a network path for the location of the Central TLS certificate.

3. If you selected a Central TLS certificate, enter its password, and enter it again for confirmation.
4. Click **Browse** to specify the location of the CA root certificate, which will be imported into the

TrustStore for Central/RAS.

Note: Do not use a network path for the location of the CA root certificate.

For more information about installing HPE OO on a secured environment, see the *HPE OO Security and Hardening Guide*.

Note: Because you are installing Central and RAS together, the **Do not start Central server after installation** option is not available. This is because the RAS server needs to connect to the Central server. If Central is not started, the installation of the RAS will fail.

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Test Ports

Click **Test ports availability**. If the ports are available, a **Success** check mark appears.

- If you encounter an error, adjust the ports accordingly and try again.
- If the **Success** check mark appears, click **Next**.

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Configure the Database

In the **Database Connection** page, you configure and create the database schema.

Note: If you have user input in two languages apart from English (for example, German and Chinese) then MS SQL should not be used. You should use an alternative database such as Oracle, MySQL, or Postgres with the recommended Unicode configuration for HPE OO.

1. From the **Database Type** list, select the database vendor, and then enter the connection properties.

Note: When the **Connect to existing database/schema** option is selected, do not use administrative user accounts in the **Username** and **Password** fields, because this will install HPE OO under the administrative account.

When the **Create the database/schema** option is used, provide a user with the relevant privileges in the **Admin username** and **Admin password** fields.

You can select from the following database types:

- **Oracle:** Do not use **SYS**, **SYSTEM**, or other administrative accounts credentials in the **Username** and **Password** fields.

Note: If you are using Oracle 11g R2 or 11g R2 RAC, it is recommended to apply patch 20299013 before installing HPE OO.

- **Microsoft SQL Server:** Do not use **sa** or other administrative account credentials in the **Username** and **Password** fields.

- **Oracle MySQL:** Do not use the **root** credential in the **Username** and **Password** fields.

If you are installing HPE OO with Oracle RAC (Real Application Cluster), you must choose **Other database** and provide the URL. For more information, see "Appendix B: Additional Guidelines for Oracle > Oracle Real Application Cluster (RAC)" in the *HPE OO Database Guide*.

- **PostgreSQL:** Do not use the **postgres** credential in the **Username** and **Password** fields.

Note: PostgreSQL database names are case-sensitive.

- **Internal database:** This uses an H2 local database. This should not be used for production.
- **Other database:** (use to enable advanced features in supported databases). If you select **Other database**, you can only use a database type that is supported for use with HPE OO. See "Appendix C: Installation Wizard 'Other Database' Option" in the *HPE OODatabase Guide* for more information.

Note: The **Other database** option also supports any valid JDBC URL.

2. After selecting the database type, select one of the following:

- **Connect to existing database/schema:** Connect to an existing schema, user, or database. The installer verifies that the schema/database and user exist.
- **Create the database/schema:** Enables you to create a new database or schema. Information in the **Database**, **Username** and **Password** fields will be used in order to create the new schema, user, or database for HPE OO.

Confirm the password by typing it again in the **Confirm Password** field.

Important! Make sure to use a strong password, in accordance with your organization's security policy. If the password is not strong enough, an error message will appear.

Provide existing database user credentials in the **Admin username** and **Admin password** fields. This elevated-privileges user must be able to connect to the database and create the new schema, user, or database for HPE OO.

DBA (Admin) credentials will only be used for creating the HPE OO database and user/role. It is completely safe to provide these credentials, as they not saved and not used after the HPE OO installation.

3. Enter the hostname or IP address and other connection details.

Make sure to use the FQDN (Fully Qualified Domain Name).

If you want to use IPv6, put the IPv6 address in brackets, for example, [3fff::20]. Otherwise, errors will occur.

4. (For Oracle) Select either **SID** or **Service Name**, and enter the SID or service name of the database.

It is recommended to use Oracle database's service name rather than using the SID.

Note: If you are upgrading from a 9.x version that is installed on Oracle, you must enter the SID of this database in the **SID** field, and not the database name.

For more information about setting up the database schema, see the *HPE OO Database Guide*.

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Is the Database MySQL?

Yes: Go to [Provide the JDBC Driver for MySQL](#)

No: Go to [Test Database Settings](#)

Provide the JDBC Driver for MySQL

Complete this step if the database is MySQL:

In the **Database Connection** page, click **Browse** and select the location of the JDBC driver.

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Test the Database Settings

Click **Test Connection**. If you are unable to connect to the database, you will not be able to proceed to the next steps in the wizard.

If your password is not strong enough, a warning is displayed. You will still be able to proceed with the installation, but it is strongly recommended to replace it with a stronger password.

The installer checks for non-empty schemas/databases, and shows a warning message if the schema or database is not empty. If the installation fails during schema validation, the installation process is stopped.

Note: This test only verifies the connection between HPE OO and the selected database, and does not verify the conditions required by the database, like the user's read/write permissions on the provided schema.

Note: For all the database vendors, if you select to create a new database, the created database

uses **case-sensitive** collation as follows:

- MySQL: **utf8_bin collation** is used for the new database.
- Postgres: Case-sensitive by design. No need for specific settings. **UTF-8** encoding is supported
- Oracle: Case-sensitive by default. No need for specific settings. **UTF-8** encoding is supported.
- MS SQL: Use only the following database collations per your required language:
 - English: **SQL_Latin1_General_CP1_CS_AS**
 - Japanese: **Japanese_Unicode_CS_AS**
 - Simplified Chinese: **Chinese_Simplified_Stroke_Order_100_CS_AS**
 - German: **SQL_Latin1_General_CP1_CS_AS**
 - French: **French_100_CS_AS**
 - Spanish: **SQL_Latin1_General_CP1_CS_AS**

However, if you already have a database installed, HPE OO creates the tables using the database specific collation. It is important to note that using other collations can cause characters to appear in gibberish in the user interface for localized installations. In addition, other collations are not officially supported in Microsoft SQL Server for localized installations.

If the installer is used in order to create a new SQL Server database, selecting your language in the language selection page sets the correct collation for the new database.

Using one of the above collations enables using the **varchar** datatype for textual columns instead of the **nvarchar** data type. Using the **varchar** data type is more efficient and reduces overall database size.

Selecting a specific language also means that an HPE OO system that uses SQL Server is limited to the set of languages supported by that specific collation. For example, if the **SQL_Latin1_General_CP1_CS_AS** collation is used, English, German, and Spanish characters may be used, but Japanese characters may not. If **Japanese_Unicode_CS_AS** is used, French accent characters will not be presented properly. For the complete specification of each collation, see the Microsoft SQL Server documentation.

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Select Content Packs for Studio Deployment

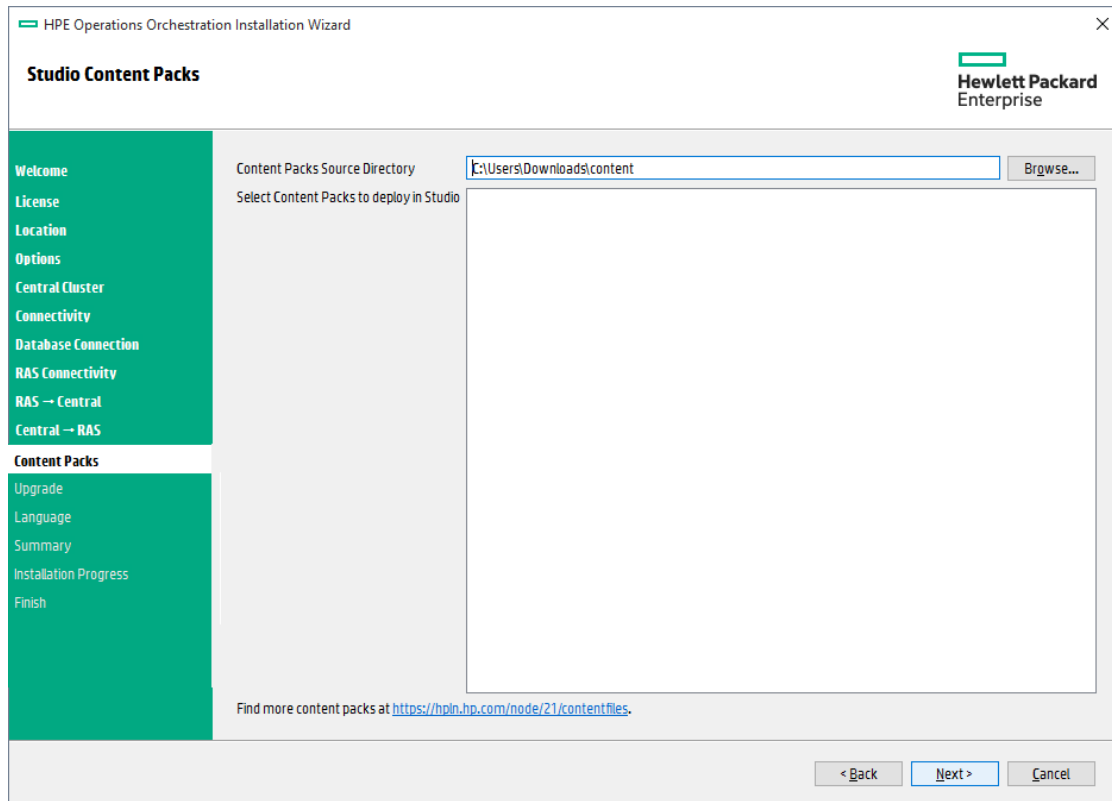
In the **Content Packs** page, you can import one or more existing content packs.

1. Browse to the location where the content packs are located, and then click **OK**.

The available content packs located in the selected folder appear in the list.

Note: The installation folder includes the released content packs.

2. Select the content pack (or packs) that you want to import, and then click **Next**.



Note: You can download additional and updated content packs on HPLN, using the link in the lower part of the wizard.

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Is it an Upgrade from 9.x?

In the **Upgrade** page, click **Next** without modifying anything.

This procedure describes how to perform a clean installation of HPE OO10.x. For information about upgrading from 9.x, see the document *Upgrading to HPE OO10.x from OO 9.x*.

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Select the Language

In the **Language** page, select a supported language for HPE OO, in addition to English, and then click **Next**.

This language support will be used for:

- The MS SQL collation language, if relevant
- The **central-wrapper.conf** language for content. This language support may be required if, for example, you need to ping a server that is configured in Japanese.

Note: You can change the language support choice after installation, by editing the **central-wrapper.conf** file, located in the installation directory under **central/conf**.

The screenshot shows the 'Language Selection' step of the HPE Operations Orchestration Installation Wizard. The window title is 'HPE Operations Orchestration Installation Wizard'. The main heading is 'Language Selection' with a sub-instruction: 'In this step, select a supported language for HPE Operations Orchestration, in addition to English.' The Hewlett Packard Enterprise logo is in the top right. A left sidebar contains a list of steps: Welcome, License, Location, Options, Central Cluster, Connectivity, Database Connection, RAS Connectivity, RAS → Central, Central → RAS, Content Packs, Upgrade, Language (highlighted), Summary, Installation Progress, and Finish. The main area is titled 'Language' and contains a list of radio buttons: English only (selected), French, German, Japanese, Simplified Chinese, and Spanish. At the bottom right are three buttons: '< Back', 'Next >' (highlighted with a blue border), and 'Cancel'.

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Review Settings and Install

1. The **Summary** page displays the installation and configuration settings that you selected and

entered in the wizard. Check that the settings are correct. If you want to correct one of the items, click **Back**.

2. Click **Install**. The installation begins, and the wizard displays a check mark next to each successfully installed item on the **Progress** page. When the installation is complete, click **Next**.

Note: If there is a problem with one of the installation or configured items, the installation attempts to continue with the rest of the items regardless of that error. Check the **installer.log** file (the default located is **C:\HPE\oo** for Windows or in **/HPE/oo** for Linux), to check for errors.

3. (Optional) In the **Finish** page, select **Open Welcome Page** to display the HPE OO Welcome page in your default web browser, in the language that was selected on the **Language** page.
4. Click **Finish** to close the Installation and Configuration wizard.

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Installation is Complete

Central, Studio, and RAS are installed and menu shortcuts are created on your system.

The installation is of the Trial version of HPE OO. You will need to install the Enterprise Edition license within 90 days. For more information, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

After installing Studio, in order to use the Studio Git integration feature, you must install the Git client version 2.9.2. For more information, see "[Installing Operations Orchestration Studio Using the Installation Wizard](#)" on page 30.

Installing an HPE OO Central Cluster

Clustering provides high availability and scalability to enhance throughput. In previous versions of HPE OO, a clustering solution called Terracotta was provided as part of the application. In HPE OO 10.x, this is no longer the case - there is no need for external clustering software, nor is there a requirement for a shared file system.

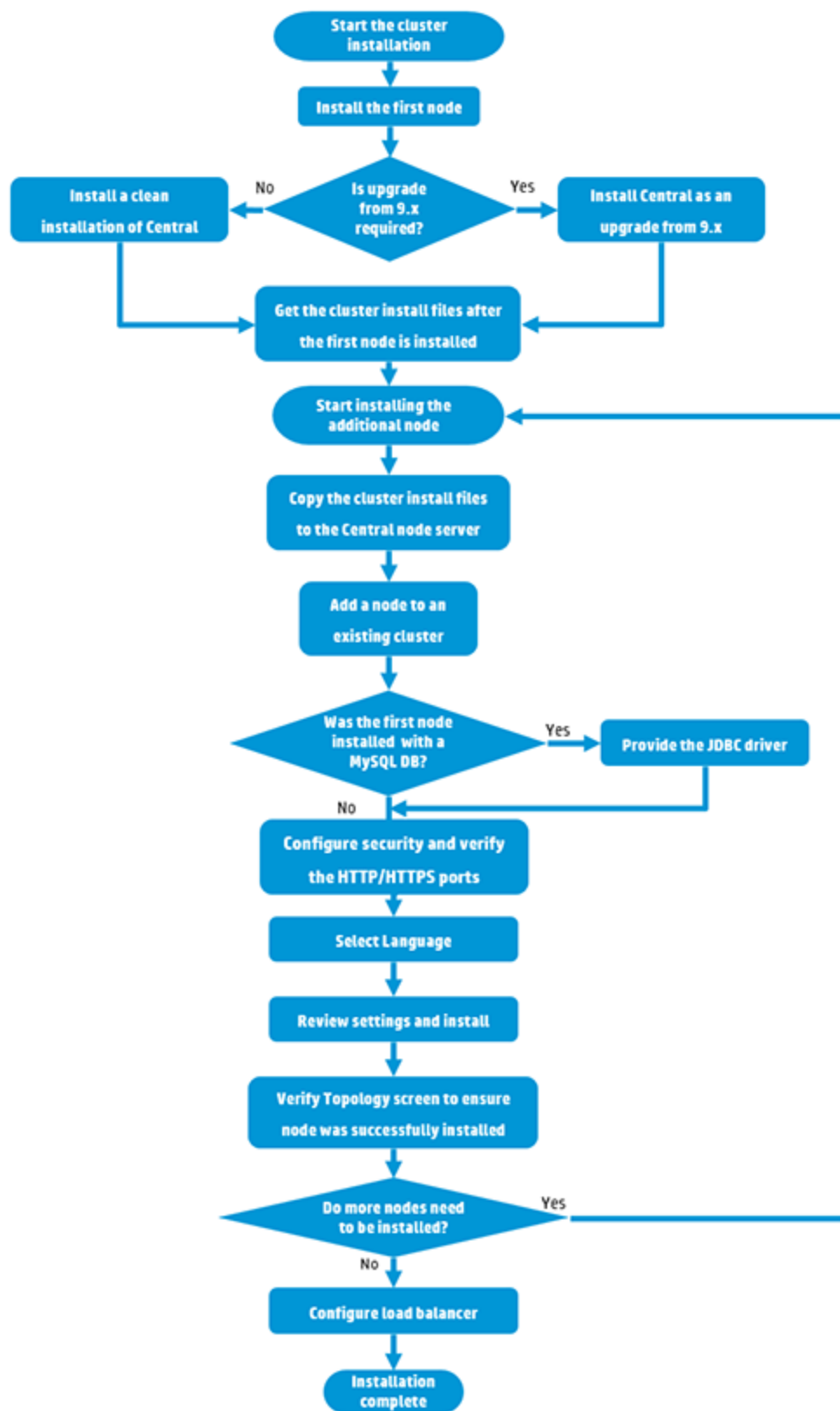
To create a cluster, you run the Installation wizard to create the first Central. Then, you run it again on the other machine to create the next node and, during this second installation, make it point to the same database schema.

In a clustered environment, you need to synchronize the clock times on all computers, to the second. It is recommended to use NTP sync to regularly maintain an accurate system time between all nodes (Central and RASes).

For more information about different architecture models including clustering, see the *HPE OO Architecture Guide*.

Note: In a cluster environment, if a Central node is connected to a specific RAS and is shut down, the connection to the RAS is automatically moved to another working node. The RAS might be disconnected for up to three minutes. The identification may take two minutes and the RAS reconnection up to one minute.

Note: This section covers how to install a cluster using a clean installation of HPE OO 10.x or while upgrading from version 9.x. For information about installing a cluster while upgrading from an earlier version of HPE OO 10.x, see "Upgrading to HPE OO 10.6x from an Earlier Version of HPE OO 10.x" in the *Upgrading to HPE OO 10.x from HP OO 9.x Guide*.



Start the 10.x Cluster Installation

Download the ZIP file from the HPE SSO Portal and extract it into a local drive on your computer.

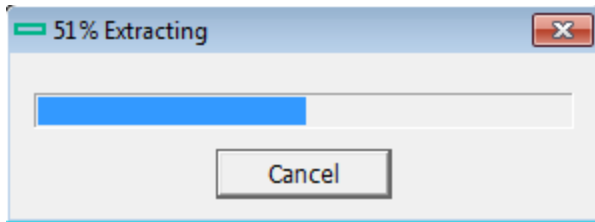
1. To start the installer:

- On Windows: Double-click the **installer-win64.exe** installation file.
- On Linux: Run this command from an X Window terminal:

```
bash installer-linux64.bin
```

To start the installer, double-click the **installer-linux64.bin** file.

2. After you start the installer, the installation package is extracted, and the **HPE OO Installation and Configuration Wizard** automatically opens. Click **Next**.



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Start the Installation of the First Central Node

Install the first Central node as a stand-alone Central.

Complete the following pages in the Installation wizard. For more details, see ["Installing HPE OO Central with Installation Wizard" on page 18](#).

1. In the **License** page, select **I Agree**, and then click **Next**.
2. In the **Location** page, select the location for the installation root directory.
3. In the **Options** page, select **Central** and click **Next**.
4. In the **Central Cluster** page, click **Next**, without selecting any options.

You will select the clustering options when you install the other nodes.

5. In the **Connectivity** page, configure available ports for the Central Server. Default values (8080 and 8443) appear for each port, but you can change these. Choose one of the following options:

The screenshot shows the 'Central Server Connectivity' step of the HPE Operations Orchestration Installation Wizard. The left sidebar contains a navigation menu with options: Welcome, License, Location, Options, Central Cluster, Connectivity (selected), Database Connection, RAS Connectivity, RAS - Central, Central - RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main content area is titled 'Connectivity' and contains the following fields and options:

- Configure the Central Server port numbers and TLS properties**
 - ☒ **Disable HTTP port** (HPE recommends to disable the HTTP port and to use a TLS CA certificate for security reasons)
 - ☐ **Allow HTTP access** (not recommended, but can be undone after the installation)
- HTTP** port: 8080
- HTTPS** port: 8443
- ☒ **Supply a secure TLS certificate** (when not provided, a self-signed certificate is used, which is not secured)
- Central TLS certificate**: [Text field] **Browse...**
- The TLS certificate should be in PKCS12 format.**
- Central TLS certificate password**: [Text field]
- Confirm password**: [Text field]
- CA root certificate location (.crt or .cer file)**: [Text field] **Browse...**
- The CA root certificate of the Central TLS certificate.**
The CA root certificate will be imported into the Central/RAS TrustStore.
- ☐ **Do not start Central server after installation**
(Must be checked when you want to configure HPE OO to be compliant with FIPS 140-2.)
This option is ignored when choosing to upgrade from 9.x.
- Test ports availability** button

At the bottom, there is a status bar with a warning icon and the text 'Provide a TLS certificate', and navigation buttons: '< Back', 'Next >', and 'Cancel'.

- (Recommended) Select **Disable HTTP Port** and configure a port in the **HTTPS** field.

This option is recommended for security reasons, so that the communication channel is encrypted.
 - (Not recommended) Select **Allow HTTP access** and configure two ports in the **HTTP** and **HTTPS** fields.
6. (Recommended) Select **Provide a secure TLS certificate**, and then click **Browse** to select the certificate.

This step is recommended, for security reasons. If you do not select a Central TLS certificate, HPE OO uses the default self-signed certificate.
 7. Enter the Central TLS certificate password, and enter it again for confirmation.
 8. Click **Browse** to specify the location of the CA root certificate, which will be imported into the TrustStore for Central/RAS.

Note: Do not use a network path for the location of the certificates.

For more information about installing HPE OO on a secured environment, see the *HPE OO Security and Hardening Guide*.

9. Select **Do not start Central server after installation** if either of the following is true:

- You are configuring HPE OO to be compliant with FIPS 140-2

For more information, see "Configuring HPE OO for FIPS 140-2 Level 1 Compliance" in the *HPE OO Security and Hardening Guide*.

- You are installing a new Central in cluster mode and the installer version is older than the current Central.

Note: If you are installing Central and RAS together, or upgrading from 9.x, this option is not available.

10. Click **Test ports availability**. If the ports are available, a **Success** check mark appears. If you encounter an error, adjust the ports accordingly.

11. Click **Next**.

12. In the **Database Connection** page, configure and create the database schema.

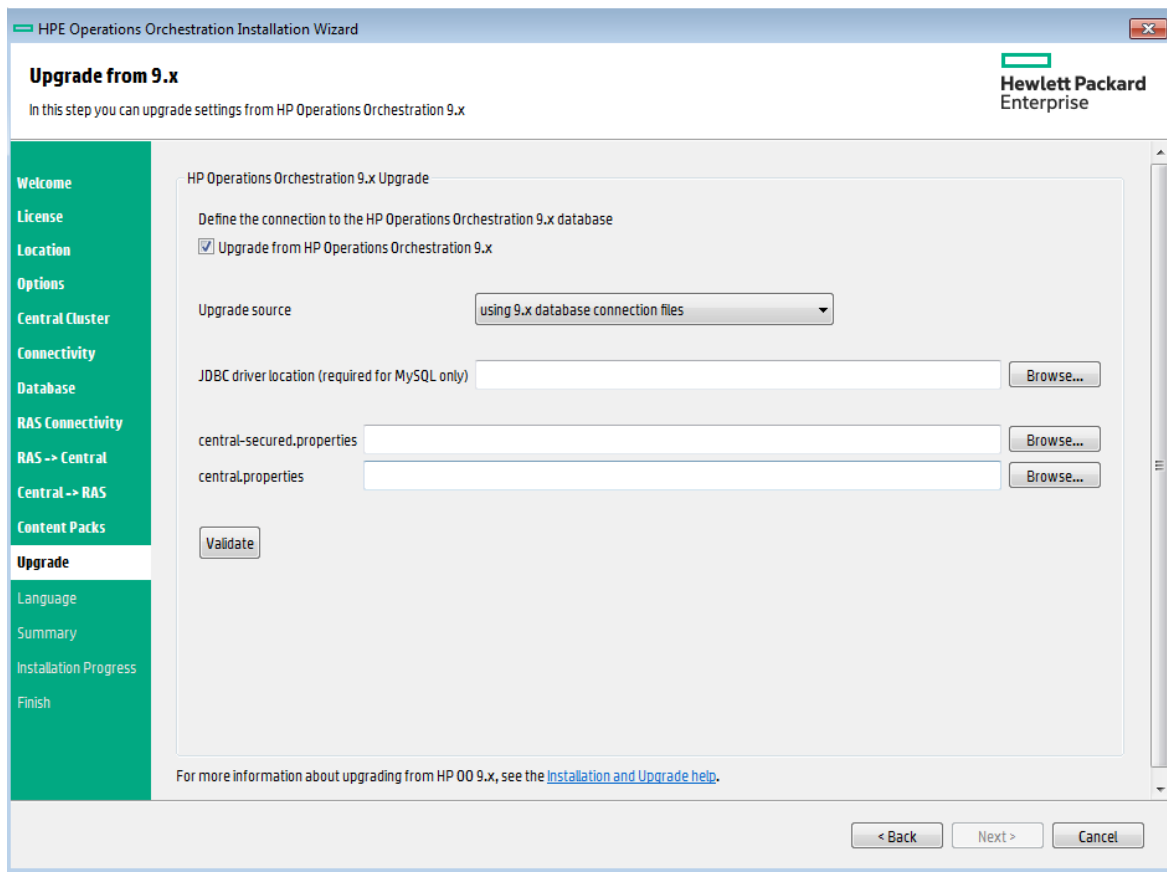
If the first node is an upgrade from 9.x, go to [Yes, it is an Upgrade from version 9.x](#).

If the first node is a clean installation of 10.x, go to [No, it is a Clean Installation of HPE OO 10.x](#).

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Yes, it is an Upgrade from version 9.x

On the **Upgrade** page, select the **Upgrade from Operations Orchestration 9.x** check box in order to clone the database data.



Note: You only need to do this for the first Central; it is not required for other nodes.

Upgrading from 9.x to 10.x (including upgrading the 9.x content) is covered in detail in a separate document: *Upgrading to HPE OO 10.x from version 9.x*. If your cluster includes an upgrade from 9.x, see *Upgrading to HPE OO 10.x from version 9.x* and complete the upgrade.

When the first node has been upgraded from 9.x, continue to the next step, [Get the Cluster Install Files from Central](#).

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No, it is a Clean Installation of HPE OO 10.x

In the **Upgrade** page, click **Next** without modifying anything.

Complete the installation of the first node. For more details, see "[Installing HPE OO Central with Installation Wizard](#)" on page 18.

When the first node has been installed, continue to the next step, [Get the Cluster Install Files from Central](#).

Get the Cluster Install Files from Central

After the first Central has been installed, collect the following files.

File	Description	Location
database.properties	Defines the properties of the database.	<installation dir>/central/conf/database.properties
encryption properties	Defines how the database is encrypted.	<installation dir>/central/var/security/encryption properties
encryption_repository	Used to store the database encryption details.	<installation dir>/central/var/security/encryption_repository
JDBC driver	This is needed only if you are using a MySQL database.	The location will vary

Start the Installation of the Cluster Node

1. Start the Installer and install the next Central node in the cluster.
2. Complete the first four pages in the Installation wizard: **Welcome**, **License**, **Location**, and **Options**.

Note: If you modify the keystore password on the first node, you must apply the same configuration changes on the additional nodes. See "Changing the KeyStore, TrustStore, and Server Certificate Passwords in the Central Configuration" in the Security and Hardening Guide for details on updating the keystore password

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Copy the Cluster Install Nodes to the Central Node Server

Copy the cluster install files to the server on which you are installing this Central node.

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Add a Node to an Existing Cluster

1. In the **Central Cluster** page, select **Add a node to the existing Central cluster**.

The screenshot shows the 'HPE Operations Orchestration Installation Wizard' window. The title bar says 'HPE Operations Orchestration Installation Wizard'. The main title is 'Central Cluster Configuration and Installation'. Below the title, it says 'In this step you can add a node to a Central cluster'. The HP logo and 'Hewlett Packard Enterprise' are in the top right. On the left is a green sidebar with a list of steps: Welcome, License, Location, Options, Central Cluster (selected), Connectivity, Database Connection, RAS Connectivity, RAS -> Central, Central -> RAS, Content Packs, Upgrade, Language, Summary, Installation Progress, and Finish. The main area is titled 'Central Cluster' and contains the following text: 'Add a node to an existing cluster. HPE Operations Orchestration 10 Central cluster is active by default even if you have just a single node. This step is intended to configure an additional node to an existing cluster by importing the configuration from an existing node.' Below this is a checkbox labeled 'Add a node to an existing Central cluster' which is checked. There are four input fields with 'Browse...' buttons: 'Location of <existing-node-install-dir>/central/conf/database.properties', 'Location of <existing-node-install-dir>/central/var/security/encryption.properties', 'Location of <existing-node-install-dir>/central/var/security/encryption_repository', and 'JDBC driver location'. A note below the fields says 'Required if you are using a MySQL database, or are upgrading an HPE OO 9 installation that uses MySQL.' At the bottom, there is a warning icon and text 'database.properties is required', and three buttons: '< Back', 'Next >', and 'Cancel'.

2. Click **Browse** and select the cluster files from the location where you copied them:

- **database.properties**
- **encryption properties**
- **encryption_repository**

Note: Once you have installed two nodes, and are installing a third, you can copy the cluster files from either server, because they contain the same data.

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Was the First Node Installed with a MySQL Database?

Yes: Go to the [Provide JDBC Driver](#) step.

No: Go to the [Configure Security and Verify the HTTP/HTTPS Ports](#) step.

Provide the JDBC Driver

If you are using a MySQL database, enter the location of the JDBC driver in the **Central Cluster** page.

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Configure Security and Verify the HTTP/HTTPS Ports

1. In the **Connectivity** page, configure available ports for the Central Server. Choose one of the following options:

- (Recommended) Select **Disable HTTP Port** and configure a port in the **HTTPS** field.

This option is recommended for security reasons, so that the communication channel is encrypted.

- (Not recommended) Select **Allow HTTP access** and configure two ports in the **HTTP** and **HTTPS** fields.

2. Select **Provide a secure TLS certificate**, and then click **Browse** to select the certificate.
3. Enter the Central TLS certificate password, and enter it again for confirmation.
4. Click **Browse** to specify the location of the CA root certificate, which will be imported into the TrustStore for Central/RAS.

Note: Do not use a network path for the location of the certificates.

For more information about installing HPE OO on a secured environment, see the *HPE OO Security and Hardening Guide*.

5. Select **Do not start Central server after installation** if either of the following is true:
 - You are configuring HPE OO to be compliant with FIPS 140-2
For more information, see "Configuring HPE OO for FIPS 140-2 Level 1 Compliance" in the *HPE OO Security and Hardening Guide*.
 - You are installing a new Central in cluster mode and the installer version is older than the current Central.
6. Click **Test ports availability**. If the ports are available, a **Success** check mark appears. If you encounter an error, adjust the ports accordingly.
7. Click **Next**.

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Select the Language

In the **Language** page, you can select a supported language for Operations Orchestration, in addition to English.

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Review Settings and Install

1. The **Summary** page displays the installation and configuration settings that you selected and entered in the wizard. Check that the settings are correct. If you want to correct one of the items, click **Back**.
2. Click **Install**. The installation begins, and the wizard displays a check mark next to each successfully installed item on the **Progress** page. When the installation is complete, click **Next**.

Note: If there is a problem with one of the installation or configured items, the installation attempts to continue with the rest of the items regardless of that error. Check the **installer.log** file, located in **C:\HPE\oo** (or selected installation folder), to check for errors.

3. (Optional) In the **Finish** page, select **Open Welcome Page** to display the HPE OO Welcome page in your default web browser, in the language that was selected on the **Language** page.
4. Click **Finish** to close the Installation and Configuration wizard.

Central is installed and menu shortcuts are created on your system.

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Verify Central Topology Screen to Ensure the Node was Successfully Installed

To verify that the node was successfully installed, you can check the **Topology/Workers** tab in Central.

1. In Central, click the **System Configuration** button.
2. Select the **Topology /Workers** tab and check that the node was successfully installed.
 - If a new component for Central was installed successfully (RAS or cluster node) it will appear on the screen. If there is no addition on the **Topology/Workers** screen after the component was installed, this means that there was a problem and you should inspect the logs.
 - The **Topology/Workers** screen displays the status of the worker, so you can see if the new component is viable.

For example, the status will be red (unusable) if there are problems with certificates, failures in the operation of the worker unrelated to the initial installation, or loss of network connectivity with the component.
 - All workers display their host name and type. So the **Topology/Workers** screen can be used to verify any load balancer configuration issues.

For example, if there are three Centrals in the topology and only two in the load balancer, there is a clear configuration issue within the environment.

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Install Another Node

Repeat the process as often as required.

To install the next node, go back to [Add a Node to an Existing Cluster](#).

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Configure the Load Balancer

If you are using a load balancer, reverse proxy, or DNS load balancer, configure it according to your policies. This step will vary depending on which load balancer or reverse proxy you are using. Contact your vendor for more information.

If you are using a load balancer, reverse proxy, or DNS load balancer, tell HPE OO where the relevant external URL is located.

1. In Central, click the **System Configuration** button.
2. Select **Topology > Configuration**.
3. In the **URL** box, enter the URL of the load balancer, reverse proxy, or DNS load balancer.
4. Click **Save**.

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Installation Complete

The installation of the cluster is now complete.

After the installation of the cluster, nothing needs to be disabled. The start point and destination point of the cluster are the same. The difference between a 10.x cluster and a 9.x cluster is that you have more internal workers and you can see all Central nodes in your load balancer.

The installation is of the Trial version of HPE OO. You will need to install the Enterprise Edition license within 90 days.

1. Choose one of the nodes and issue a license for the IP address of this node with the HPE License Management system.
2. Open the Central UI of the specific node (and not via the Load Balancer IP) and install the license.

For more information about licensing, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

Installing HPE OO Silently

A silent installation is one that is started from the command line and completes without any input from the person who started it. There is no need to provide input through a wizard or dialog boxes. The silent installation receives its input from a text input file.

You can install and configure HPE OO silently from a command line.

To install HPE OO silently:

1. Open the **sample-silent.properties** text file (located in the **docs** folder, under the HPE OO installation folder and in the **docs** folder on the ZIP file), with the required installation and configuration settings.

For more details about these settings, see the descriptions in the **sample-silent.properties** text file.

2. Save a copy of the text file as **silent.properties**.
3. Remove the comment sign (#) from the properties that you need, and add the value for each of these properties.
4. From a command line, type the following:

```
installer-win64.exe -gm2 -s c:\\temp\\my-silent.properties
```

To disable the extracting installation files progress bar, add to the command line `-gm2` before `-s`.

Use the `-n` option if you don't want to start Central after the installation has completed.

Note: `gm2` is not supported with Linux.

Note: The `-s` property accepts either a full or relative path depending on the operating system:

- Windows: Relative to the location of the `.exe` file.

For example: `dirA`, is the current directory, and `dirB`, is located under `dirA` and contains the installer and the **silent.properties** file. Open a Command window in `dirA` and enter the following:

```
dirB\\installer.exe -s silent.properties
```

Important: Make sure you add two backslashes `\\` and not one backslash `\`. The installation folder to which you download the installation file must not contain any spaces in the name.

- Linux: Relative to the location of the directory where the installer is launched.

Important Notes About Silent Installation

- Be careful not to put trailing spaces in your property values (especially when pasting). Otherwise, values that contain spaces at the end will not be read correctly and installation might fail.
- **Oracle:** Do not use `SYS`, `SYSTEM`, or other administrative account credentials in the `db.username/db.password` properties.
- **PostgreSQL:** Do not use `postgres` credentials in the `db.username/db.password` properties.

Note: PostgreSQL database names are case-sensitive.

- `db.type=H2`: This uses an H2 local database. This should not be used for production.
- `db.type=other`: Use to enable advanced features in supported databases. If you select **other**, you can only use a database type that is supported for use with HPE OO. See the *HPE OO System Requirements* for more information.
- Special characters, except the underscore (`_`), cannot be used for the database name or SID. In addition, you can enter up to 30 characters for the database name or SID.
- When you are upgrading from a remote 9.x Central that has localhost as the database in the **Central.properties** file using a silent installation, installation and upgrade do not complete successfully. This problem does not exist for wizard installations.
- All property values that contain a backslash (`\`) in the **silent.properties** file need to be escaped (with a double-backslash instead of a single one).

Places where this might be needed:

- On Japanese environments, in all the paths given. In Japanese environments, the path separator is the Yen sign and it needs to be escaped. For example, `C:¥¥folder`
- For RAS installations with a LDAP user given in form of 'domain\user'.
- For a database user, if the database is set up with Windows system account authentication
- For any other user that contains a backslash in the name

Note: There are some instances where the default values are different in a silent installation. For example, when installing with the wizard, by default the certificate type is set to CA (user provided), while in a silent installation, this defaults to self signed. When installing with the wizard, by default the HTTP port is disabled, while in a silent installation, it defaults to enabled.

Upgrading Operations Orchestration

You can upgrade to Operations Orchestration from version 9.x or from an earlier version of 10.x.

The process of upgrading is different for each of these types of upgrade:

- [Upgrading from an earlier version of Operations Orchestration 10.x](#)
- [Upgrading from Operations Orchestration 9.x](#)

Upgrading to HPE OO 10.7x from an Earlier Version of HPE OO 10.x

You can upgrade to 10.7x from any version of 10.x, including the Community Edition. It is not necessary to upgrade to the interim versions.

When you upgrade to HPE OO 10.7x, this installs the Trial version. You will need to install the Enterprise Edition license within 90 days. For more information, see "Setting Up Licensing" in the *HPE OOCentral User Guide*.

Note: Upgrading to 10.7x enables you to run flows with CloudSlang 1.0 content.

Upgrading to HPE OO 10.7x is done using a command line script. The relevant scripts are contained in a zip file. The scripts are:

- **apply-upgrade(.bat)** – for upgrading to the new 10.x version
- **rollback(.bat)** – for rolling back to the previously installed 10.x version
- **generate-sql(.bat)** – if your company does not allow HPE OO to change the database schema, this is used in addition to **apply-upgrade(.bat)** or **rollback(.bat)**

Note: There are two versions of each script file: with a **.bat** suffix for Windows and with no suffix for Linux.

Note: Before starting the installation, see the *HPE OO System Requirements* to verify that your system meets the minimum system requirements.

The upgrade process replaces most files, but preserves logs, security data, and user settings defined in the following locations:

- **Central:**
 - Anything under **<installation>/central/conf**
 - **<installation>/central/tomcat/conf/server.xml**
 - **<installation>/central/tomcat/conf/web.xml**
- **RAS:**
 - Anything under **<installation>/ras/conf**

- **Studio:**

Any file with a **.properties** extension under **<installation>/studio/conf**

Note: During the upgrade to version 10.7x, earlier versions of SVN are upgraded to version 1.8. In order to benefit from the enhancements offered with the SVN 1.8 server, it is recommended to manually upgrade your SVN server as well.

Note: If the last deployment action prior to an upgrade was the deletion of a content pack, then it won't be possible to roll back this deletion.

IMPORTANT NOTE for users of Microsoft SQL Server: The upgrade from version 10.02 (or older) will convert some Unicode text to the language of the database collation. As a result, text that does not match the collation (and is non-English) may be corrupted in the upgrade process (foreign characters will be converted to question marks). Make sure your collation is correct .

Upgrading RASes

When upgrading to HPE OO 10.7x, you must apply the upgrader to each RAS separately.

When upgrading to a later version of HPE OO 10.7x, you can apply the upgrader to each RAS separately, or you can use the automatic RAS upgrade functionality to upgrade all of your RASes at once. Automatic upgrade is recommended for customers with a large number of RASes in their environment, or with RASes in different time zones.

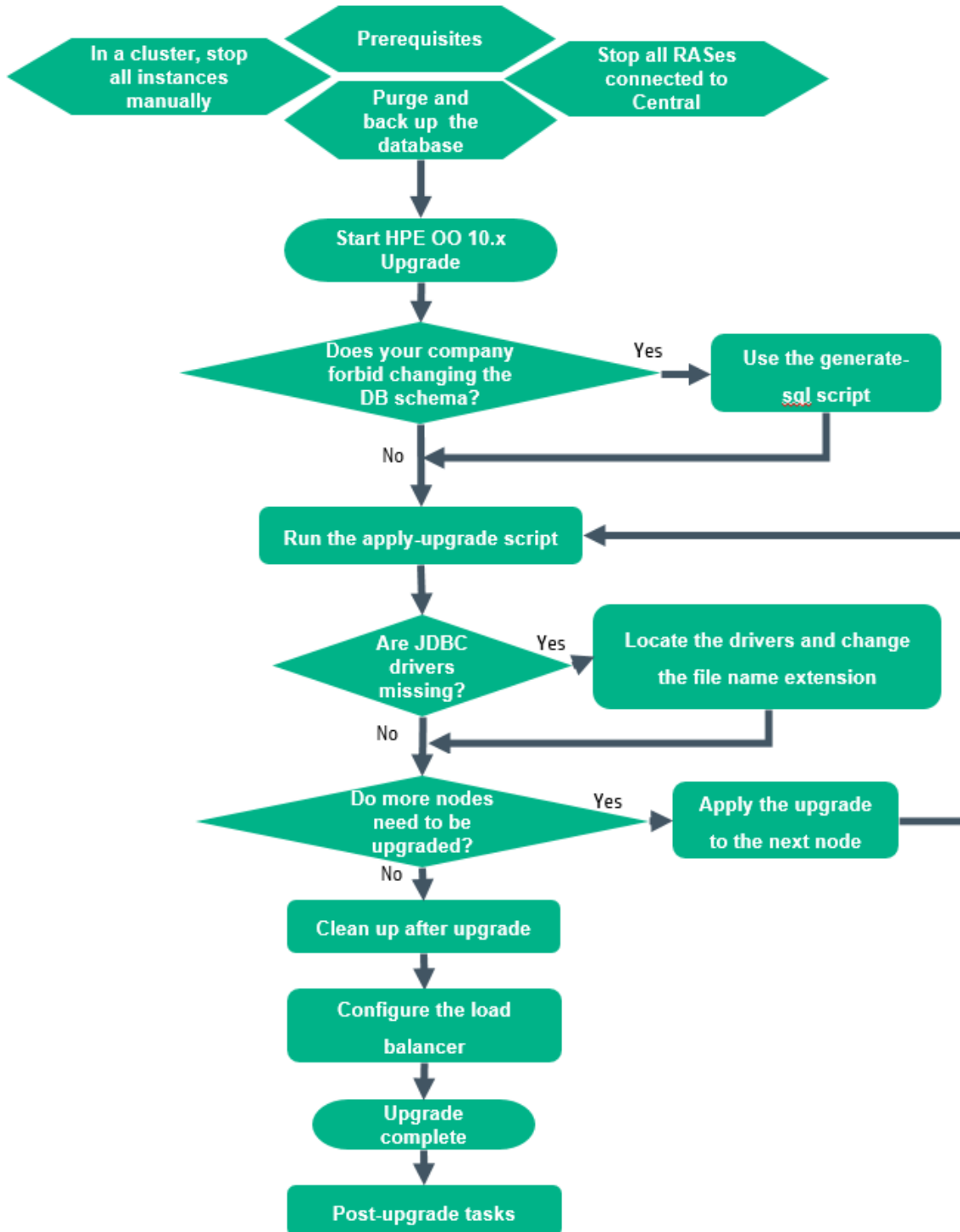
Note: Automatic RAS upgrade is only supported when both Central and the RASes are already at version 10.60 or later. For earlier versions, you will still need to upgrade the RASes manually. For example, you can't use it to upgrade RASes from 10.5x to 10.60.

If you decide to use the automatic RAS upgrade, you need to perform the initial steps (uploading the upgrader file to Central and preparing the RASes) **before upgrading Central**. This is in order to minimize downtime and to allow the administrator to fix any issues that may be encountered during the download of the upgrader package to the RASes. This preparatory step appears in the [Prerequisites](#) below.

For more information, see "Setting Up Automatic RAS Upgrade" in the *HPE OO Central User Guide*.

Once you have upgraded Central, you can complete the final step of upgrading the RASes via the Central UI.

Note: If Central is rolled back to the previous version, you will have to manually roll back the RASes. See ["Rolling Back an Upgrade to an Earlier Version of HPE OO 10.x"](#) on page 86.



Prerequisites

- Back up your Studio workspace from the home folder (<user_home>/oo) before applying the upgrade.

Important! Note that the workspace format in HPE OO 10.10 and later is different from earlier versions. If you decide to roll back to a previous version, the converted workspace will not be compatible with the previous workspace versions.

- Before upgrading to HPE OO 10.7x, you must download and install Microsoft Visual C++ 2010 Redistributable Package (x86). You need to install the version for the x86 platform, regardless of your Windows version.

This package can be downloaded from: <http://www.microsoft.com/en-us/download/confirmation.aspx?id=5555>.

- Make sure that the old version of Central has started successfully at least once. Otherwise, you may not be able to roll back the upgrade, if you decide to do so.
- Cancel or finish all paused or running flows and disable existing schedules before applying the upgrade. If there are flows running or paused when you perform the upgrade, it will not be possible to resume them, their status will be "Canceled" and the duration will be "0 seconds".
- When upgrading to a later version of HPE OO 10.7x, it is recommended to set up the automatic upgrade of RASes in Central (under the **Topology > RAS Upgrade** tab). This will enable you to upgrade all of your RASes at the same time. The initial steps, of uploading the upgrader file to Central and preparing the RASes for upgrade should be done before you upgrade Central. This is in order to minimize downtime and to allow the administrator to fix any issues that may be encountered during the download of the upgrader package to the RASes.

For more information, see "Setting Up Automatic RAS Upgrade" in the *HPE OO Central User Guide*.

Note: This feature only works if you are upgrading from 10.7x to a later version of 10.7x.

- The upgrade process backs up the installation files. If you have a number of hprof files and a lot of log files, this can slow down the process. It is recommended to clean out these files before starting the upgrade.

Make sure that there is sufficient disk space for this backup; otherwise, the upgrade will fail. You may wish to archive the backup, to save space. See [Clean Up After Upgrade](#).

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Purge and Back Up the Database

Due to database structure optimizations, upgrading from a previous HPE OO version to 10.7x may involve moving considerable amounts of data inside the database.

To allow the upgrade operation to complete quickly and successfully, perform the following steps before upgrading to HPE OO 10.7x:

1. Purge your old data.

Purge flows are provided as content in the HPE Solutions content pack, and are the preferred method for purging the HPE OO database.

Keep only the data you really need to be available on the new version.

2. Back up your database.

Keep a copy of your database (preferably after the old data was purged) in order to protect your data.

3. Depending on the amount and type of your data, the upgrade may generate a considerable amount of database transaction logs ("redo logs"). Make sure you have sufficient space allocated.

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Stop all RASes

Make sure to stop all RASes that are connected to Central before you upgrade it.

This step is important to make the process "clean", and prevent damage that could occur due to the yet-to-be-upgraded nodes, which could have execution leftovers from the previous version.

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Stop Cluster Instances Manually

In a cluster setup, stop all Central and RAS instances manually.

This step is crucial. It will make the process "clean", and prevent damage that could occur due to the yet-to-be-upgraded nodes running against the upgraded database.

Note: For Central and RAS, the upgrade process shuts down the server automatically. However, on a cluster, the upgrade stops the node being upgraded, but does not shut down the entire cluster.

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Start the Upgrade

1. Unzip the HPE_OO_Product_SW_and_Doc_10.70_MLU_T9030-15016.zip into the root folder of

the installation.

2. Expand the **C:\Program Files\Hewlett-Packard\HPE Operations Orchestration\upgrade.zip** file into the root folder of the installation.

Note: The root folder is the installation folder that you chose in the installer, when you installed the earlier version of HPE OO 10.x, for example, **C:\Program Files\Hewlett-Packard\HPE Operations Orchestration**.

This creates an **upgrade** folder containing a **<new-version>** folder (for example, **10.70**).

Important! Make sure you extract the zip file directly into the main installation folder, and not into a sub-folder. The **apply-upgrade(.bat)** script will only work if the **upgrade** folder is directly under the main installation folder.

3. For Linux, use the following command inside the **<new-version>** folder, to change file permissions:

```
chmod 755 bin/* java/*/bin/*
```

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Does Your Company Forbid Changing the Database Schema?

If your company does not allow the HPE OO application to change the database schema, you will need to use the **generate-sql(.bat)** script, which is also included in the upgrade zip file.

The **generate-sql(.bat)** script is used to generate the **upgrade.sql** file in the unzipped upgrade folder. This file contains the SQL for applying all of the upgrade's database changes.

- If your company does not allow changing the database schema, go to [Use the Generate-sql\(.bat\) Script](#)
- If your company allows changing the database schema, go to [Run the apply-upgrade Script](#)

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Use the Generate-sql(.bat) Script

1. In the **<installation>\upgrade\<new-version>\bin** sub-folder, open a command line and run the **generate-sql(.bat)** script.

The command line options for **generate-sql(.bat)** are:

-h, --help	Display help on the available parameters.
-r, --rollback	Generate the SQL for rollback. Use only after the database has been upgraded.

The **upgrade.sql** file is created in the **<installation>/upgrade/<new-version>** folder.

2. Stop Central/RAS.
3. Apply the database changes by running **upgrade.sql** against the database with the required credentials.
4. Go to [Run the apply-upgrade Script](#).

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Run the apply-upgrade Script

1. In the **<installation>\upgrade\<new-version>\bin** sub-folder, open a command line and run the **apply-upgrade(.bat)** script.

(Optional) If required, use the following command line options:

-f, --force	Force-start the upgrade. This command upgrades the installation, without prompting.
-h, --help	Display help on the available parameters.
-n, --norestart	Do not restart Central/RAS after the upgrade.

2. Type **y** to apply the upgrade.

The progress of the upgrade is displayed. For example:

```
- Central is upgrading Run Log data, please wait...
  4 executions done (44%)
  6 executions done (66%)
  9 executions done (100%)
  Summary: total executions: 9, succeeded: 9, failed: 0
```

An **upgrade.log** file is created under **<installation>/upgrade/<new-version>**.

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Are User-Supplied JDBC Drivers Missing?

In earlier versions, MySQL JDBC 5.1.21 was in use, so make sure to download MySQL JDBC 5.1.35 for 10.7x.

If you originally installed HPE OO 10.00, it was possible to provide the installer with JDBC drivers (JAR files used to connect to the database) on two occasions:

- When configuring the database connection for HPE OO, and using a database of the type MySQL (or selecting **Other database**, which enables advanced database configuration).
- When setting up an upgrade from version 9.x, which itself runs with MySQL.

The installer stores user-supplied drivers in two directories:

- **<installation>/central/lib**
- **<installation>/central/tomcat/lib**

When you run the **apply-upgrade** script, it attempts to locate these files in order to exclude them from deletion. Specifically, it looks for files whose names match either ***mysql*.jar** or ***.userjdbc.jar**, and lists the search results.

If you supplied any drivers during installation, you must make sure that they are listed. Note that each driver must show up twice—once for each of the two directories mentioned above.

- If a driver is missing, go to [Locate the Drivers and Change the File Name Extension](#)
- If there are no missing drivers, go to [Do More Nodes Need to be Installed?](#)

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Locate the Drivers and Change the File Name Extension

If any driver is missing, complete the following steps:

1. Cancel the upgrade.
2. Stop Central.
3. Locate the driver file in **<installation>/central/lib**, and change its file name extension from **.jar** to **.userjdbc.jar**.
4. Repeat the previous step for **<installation>/central/tomcat/lib**.
5. Run **apply-upgrade** again, and make sure you see the driver file listed under both directories.

If you accidentally let **apply-upgrade** delete your driver, you can manually place the driver in the two directories, this time with a **.userjdbc.jar** extension, and then re-run **apply-upgrade**.

Note: If you are upgrading a cluster, the instructions above apply to all Central nodes.

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Do More Nodes Need to be Upgraded?

- If yes - go to [Apply the Upgrade to the Next Node](#)
- If no - go to [Clean Up After Upgrade](#)

Apply the Upgrade to the Next Node

Apply the upgrade to all the Central/RAS instances. Repeat the process as often as required.

To upgrade the next node, go back to [Run the apply-upgrade Script](#).

Caution: Once you have upgraded one Central node to the new 10.x version, you must upgrade all additional nodes to the same version. Restarting a non-upgraded node may cause permanent issues in the cluster (to the database schema changes).

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Clean Up After Upgrade

Once the upgrade is complete:

- You can delete the java and packages directories under **<installation>/upgrade/<new-version>**, but note that this will make the included scripts non-functional. You can always restore the scripts by re-extracting the upgrade zip.
- You can move the backup directory (created at **<installation>/upgrade/<new-version>/backup**) elsewhere for archival. However, if you later wish to roll back the upgrade, you must move the backup directory back to the original location.
- If you have upgraded from 10.02 to 10.7x, and if you have configured a remote connection for debugging, it will be migrated with the name **Migrated – remoteConnectionHostname**, where **remoteConnectionHostname** is the 10.02 configured **hostname** field. You can rename the migrated connection in the Edit Connections dialog box in Studio.

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Configure the Load Balancer

If you are using a load balancer, reverse proxy, or DNS load balancer, configure it according to your policies. This step will vary depending on which load balancer or reverse proxy you are using. Contact your vendor for more information.

If you are using a load balancer, reverse proxy, or DNS load balancer, tell HPE OO where the relevant external URL is located.

1. In Central, click the **System Configuration** button.
2. Select **Topology > Configuration**.
3. In the **URL** box, enter the URL of the load balancer, reverse proxy, or DNS load balancer.
4. Click **Save**.

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Finished

The upgrade is complete.

Note:

The upgrade installs the Trial version of HPE OO. You will need to install the Enterprise Edition license within 90 days of the upgrade. For more information, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

Post Upgrade Tasks

If you set up the automatic upgrade of RASes before upgrading Central, you can now go back into Central to complete the process. For instructions, see "Setting Up Topology – Automatic RAS Upgrade" in the *HPE OO Central User Guide*.

Install the Git client. After upgrading to 10.7x, in order to use the Studio Git integration feature, you must install the Git client. The recommended version of the Git client is 2.9.2.

1. Download the Git client from the following URL: <https://github.com/git-for-windows/git/releases/download/v2.9.2.windows.1/Git-2.9.2-64-bit.exe>.
2. Save the Git client to **<oo_installation_folder>/studio/Git**, so that the **bin** folder is directly under **<oo_installation_folder>/studio/Git**. In the Git installation wizard, use the default options.

Alternatively, if you already have a Git client installation on your local disk, point Studio to use that Git installation by performing the following steps:

1. Close Studio.
2. Go to the user home folder **C:\Users\<user>\.oo** (the Studio workspace location) and locate the **Studio.properties** file.
3. Modify the **Studio.properties** file by adding the following property at the end of the file:

```
studio.git.installation.location=<git_installation_folder>
```

For example:

```
studio.git.installation.location=C:/Program Files/Git
```

The **bin** folder should be directly under **C:/Program Files/Git**. Note that / should be used as a path separator.

4. Save the **Studio.properties** file and start Studio.

Note: If you opted for this second alternative, you need to consider the following:

If you are using multiple workspaces and you want the Git location property to be added in each new workspace, you should edit the template properties file located in **Studio\conf\studio.properties.template**. Otherwise, each time you switch to a new workspace, you will have to set the Git location in the new workspace in the **.oo\Studio.properties** file.

If you have another version of the Git client installed, note that you must use version 2.9.2 of Git with Studio. This is the version that was validated with Studio. While other versions might still work correctly, they are not officially supported.

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After the Upgrade

After upgrading to OO 10.70, you might need to perform additional steps:

If you created flows and content with Cloud Slang versions prior to version 1.0.

1. When you try to deploy such content after upgrading to OO 10.70, you get an error message during content deployment. After upgrading to CloudSlang 1.0, correct the content, and then redeploy.
2. When you try to run such flows after upgrading to OO 10.70, you get an error message. After upgrading to CloudSlang 1.0, correct the flows, and then run them.

Rolling Back an Upgrade to an Earlier Version of HPE OO 10.x

You can roll back an upgrade to the previous version of 10.x using the rollback script. This restores the installation to the state it was before the upgrade, but without losing database data.

The rollback restores the installation to the previous version, including patches. For example, if you have upgraded from version 10.20 to 10.6x, the rollback will restore version 10.20. If you upgraded from 10.00 to 10.6x, the rollback will restore 10.00.

The rollback process can only remove the latest patch that you installed. This means that if you installed 10.00 and then upgraded to 10.20, and then to 10.6x, you will only be able to roll back to 10.20.

Caution: It is not possible to roll back twice. You can only roll back the last upgrade that you successfully applied. Attempting to run the rollback twice will make the system unusable.

Important! When rolling back to an earlier version of 10.x, you must cancel or finish all paused or running flows and disable existing schedules before applying the rollback. If there are flows running or paused when you perform the rollback, it will not be possible to resume them, their status will be “Canceled” and the duration will be “0 seconds”.

A component (Central, RAS, Studio) will only be rolled back if:

- The component is backed up under **<installation>/upgrade/<new-version>/backup/<component>**.
- The installed version is identical to the upgrade script's **<new-version>**.

If Central is being rolled back, the script rolls back the database schema changes and preserves data that was added after the upgrade. However, in some cases, data may still be lost due to the schema changes.

Notes:

- Any changes that were made in the file system since the upgrade will be lost, including changes to configuration files and log files.
- If you are rolling back from 10.6x to an earlier 10.x version, some types of configuration items located under sub-folders will be deleted. This occurs when you have multiple configuration items with the same type and name (in different folders).

- The rollback might be faulty if the old (pre-upgrade) version of Central was never started prior to the upgrade.
- HPE OO 10.5x and later uses a different version of Quartz for scheduling. Therefore, if you roll back from 10.6x to an earlier version, you will need to delete all schedules that were created or updated in 10.6x.
- HPE OO 10.5x and later uses Microsoft Visual C++ 2010 Redistributable Package (x86), while earlier versions do not. If you roll back to 10.2x, you will need to install Microsoft Visual C++ 2008.
- If you roll back after having upgraded multiple RASes using the automatic RAS upgrade, you will need to roll back the RASes manually.

To roll back to an earlier version of 10.x:

1. Open a command line.
2. Run the **rollback(.bat)** script, which is included in the upgrade zip file.

(Optional) If required, use the following command line options:

-f, --force	Force-start the rollback. This command rolls back the installation, without prompting.
-h, --help	Display help on the available parameters.
-n, --norestart	Do not restart Central/RAS after the rollback.
-o, --filesonly	<p>Do not roll back the database schema. Note that this option refers to the structure of database tables, not to the stored data.</p> <p>You only need to use this option if you have manually restored a backup of the database, which you created before the upgrade. For more information, see "Restoring a Database Backup Created Before the Upgrade" on page 90.</p> <div>Warning! Do not use this option unless you have already taken care of downgrading the schema. Otherwise, the rollback will fail!</div>

The rollback script uses the same **upgrade.log** file as the upgrade script.

Note: After you roll back, it is advised to move or delete the backup directory (created at **<installation>/upgrade/<new-version>/backup**). Otherwise, if you re-upgrade later, no fresh backup will be created, so any file changes that you made since the rollback will not be backed up.

Rolling Back When Your Company Does Not Allow Changing the Database Schema

If your company does not allow the HPE OO application to change the database schema, the rollback procedure is different. You will need to use the **generate-sql(.bat)** script with the **-r** option, which generates a **rollback.sql** file in the unzipped upgrade folder.

1. Open a command line and run the **generate-sql(.bat)** script with the **-r** option.

The command line options for **generate-sql(.bat)** are:

<code>-h, --help</code>	Display help on the available parameters.
<code>-r, --rollback</code>	Generate the SQL for rollback. Use only after the database has been upgraded.

For example:

```
generate-sql -r
```

The **rollback.sql** file is created in the unzipped **<installation>/upgrade/<new-version>** folder.

2. Stop Central/RAS.
3. Apply the database changes by running **rollback.sql** against the database with the required credentials.
4. Roll back Operations Orchestration 10.x using **rollback(.bat)**.

Central/RAS restarts automatically after the rollback.

Rolling Back Studio

Important notes!

- The workspace format in 10.10 and later is different from prior versions. If you decide to roll back to a previous version, the converted workspace will not be compatible with the previous version.

- If you have a 10.6x workspace with folders inside the **Configuration** sections, you will not be able to launch Studio versions prior to 10.20. You will need to open the workspace in HPE OO 10.6x and flatten the configuration items (move all items to the root section and delete the folders) before you can open the workspace in a previous Studio version.
- If you are rolling back to a previous version, you will need to manually delete the **.svn** folder in the **workspace** folder before rolling back, because HPE OO 10.5x and later works with SVN 1.8 and previous versions work with SVN 1.7.

If you roll back to a previous revision you have two options to preserve your workspace:

- If you performed a workspace backup, you can replace your current workspace (<user_home>.oo) with the backed up version.

If you use this approach you will lose all changes made after the workspace backup.

If you want to keep the changes you made after the workspace backup, we recommend using the second approach.

- Create content packs from the projects, before rolling back:
 - a. Create content packs from all your 10.6x format projects.
 - b. Delete all the 10.6x format projects from your <user_home>.oo/Workspace, and also delete them from SCM.
 - c. Roll back HPE OO to the previous version.
 - d. Unzip the content pack jar in the <user_home>/.oo/Workspace folder, keeping the name without the -cp-version suffix.

For example, **test1-cp-1.0.0.jar** will be unzipped to the <user_home>/.oo/Workspace/test1 folder.
 - e. Delete the **Lib** and **META-INF** folders.
 - f. Open Studio and import the projects again.

Rolling Back a Cluster

In a cluster setup, it is recommended to stop all Central/RAS instances manually before rolling back.

Important! If you have added new cluster nodes since the most recent upgrade (of the existing nodes), rolling back the new nodes may cause problems. You should re-install such nodes instead

of rolling them back. Only roll back the older nodes. If unsure, consider rolling back the oldest Central only, and then re-installing the rest.

Restoring a Database Backup Created Before the Upgrade

If the database schema rollback fails, and you have created a backup of the database prior to the upgrade, you can restore the backup as follows.

1. Stop Central/RAS.
2. Manually restore the database backup.
3. Open a command line and run the **rollback(.bat)** script with the **-o** option.

For example:

```
rollback -o
```

Central/RAS restarts automatically after the rollback.

This restores the files only and does not roll back the database schema.

Uninstalling Operations Orchestration

Before uninstalling Operations Orchestration, make sure to back up your version of Operations Orchestration.

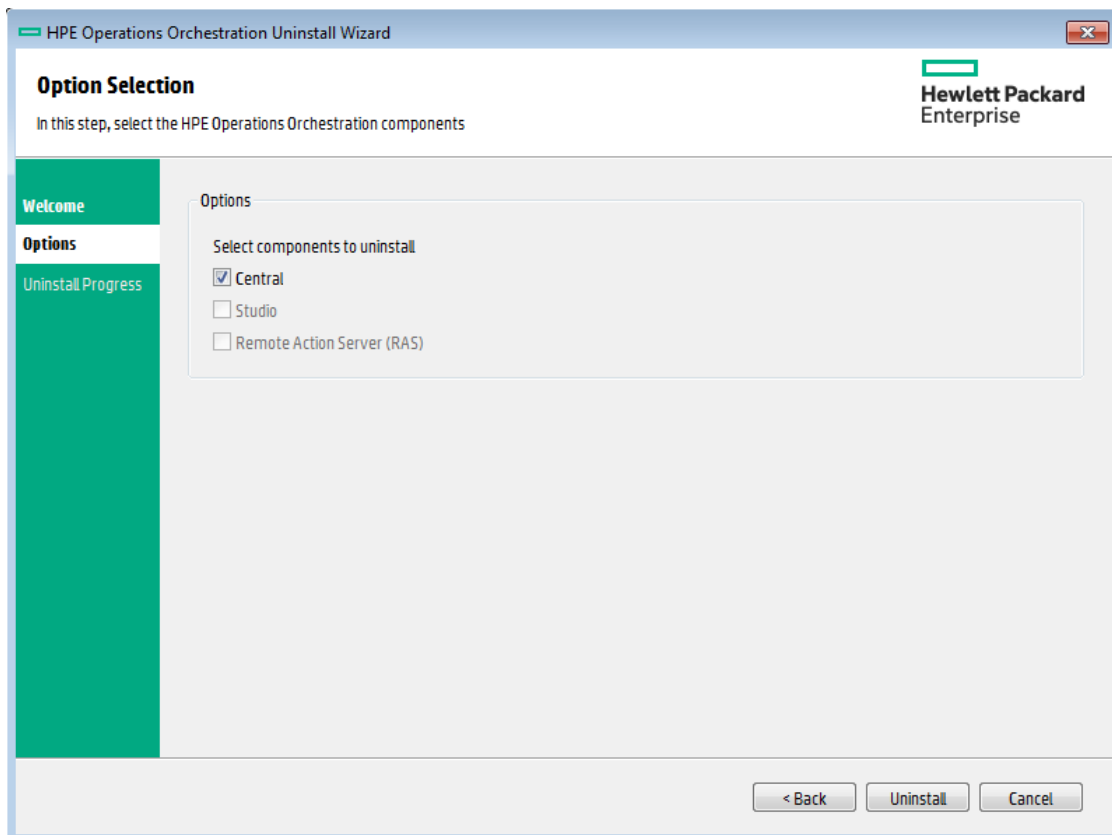
There are two ways to uninstall Operations Orchestration:

- [Using the Uninstall Wizard](#)
- [Silently](#)

Uninstalling HPE OO using the Uninstall Wizard

Uninstalling HPE OO on Windows

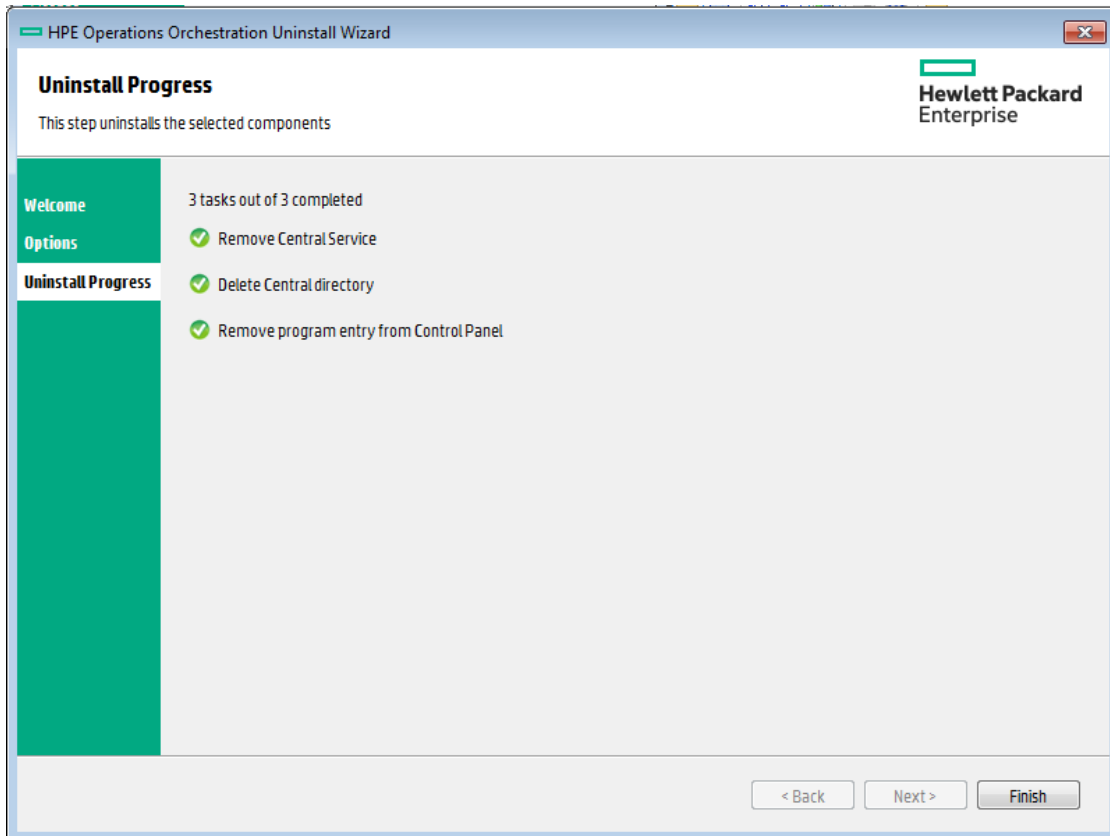
1. In the HPE OO installation directory, for example, **C:\Program Files\Hewlett Packard Enterprise\HPE Operations Orchestration**, double-click **uninstall.exe**, and then click **Next**.
2. Select the HPE OO components that you want to uninstall, and then click **Next**. When prompted whether to continue, click **Yes**.



3. The Uninstall Progress screen displays the progress of the uninstall process, and displays the items that were deleted and removed. For example:

- Central Service
- Central directory
- Studio directory
- Uninstaller control panel programs

Note: The database and database user are not removed or dropped.



4. Click **Finish**.

The selected components of HPE OO are removed from your computer.

Note: Uninstalling a RAS/remote worker does not remove the entry from the database. You need to also remove the RAS from Central UI, by selecting the worker in the **Topology > Workers** tab and using the **Delete** button. For more information, see "Setting Up Topology – Workers" in the *HPE OOCentral User Guide*.

Uninstalling HPE OO on Linux

To uninstall HPE OO in Linux, enter the following:

```
export DISPLAY=<ip address>  
./uninstall
```

After the uninstall completes successfully, you can delete the installation directory.

Uninstalling HPE OO Silently

A silent uninstallation is one that is started from the command line and completes without any input from the person who started it. You can uninstall silently from either Windows or Linux.

To uninstall HPE OOsilently, type the following from a command line:

```
uninstall -s <components>
```

In the <components> placeholder, enter a comma-separated list of components to remove.

Possible components are: all, central, ras, and studio.

For example: `uninstall -s central,ras`

Note: When you uninstall a RAS silently, if Central authentication is enabled, the RAS is not removed from the Central topology. In Central, go to **System Configuration > Topology > Workers**, and remove the RAS from the topology manually.

Appendix

Changing the Database Settings

After installation, if you need to generate an encrypted password for the database, you can do this in the **<install_dir>/central/conf/database.properties** file.

For more information, see [Changing the Database Password](#).

Using JRE From OpenJDK 7

If you want to use the JRE from the OpenJDK 7 project, instead of the standard JRE that was provided in your Operations Orchestration installation, you can do so using the following procedure.

Note: The OpenJDK you use must be for Java SE 7.

The upgrade to Operations Orchestration 10.x replaces the installed JRE. Therefore, the procedure must be done after upgrading to 10.x.

1. Stop Central/RAS and close Studio.
2. Back up and delete the **java** directory under the main Operations Orchestration installation directory.
3. Locate the **jre** directory in your OpenJDK package. Copy it to the Operations Orchestration installation directory and rename it to **java**.
4. Restart Central/RAS.

