

# HP Operations Orchestration

Software Version: 10.22.0001

Windows and Linux Operating Systems

## Release Notes

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# Introduction

This document provides an overview of the HP Operations Orchestration 10.22.0001 release. It contains important information not included in the manuals or in the online help.

## About HP OO

HP Operations Orchestration (**HP OO**) is the industry-leading solution for IT process automation and runbook automation.

HP OO is a system for creating and using actions in structured sequences (called flows) which maintain, troubleshoot, repair, and provision your Information Technology (IT) resources by:

- Checking the health of, diagnosing, and repairing, networks, servers, services, software applications, and individual workstations.
- Deploying applications, patching, and maintaining them by checking client, server, and virtual machines for required software and updates, and, if needed, performing the necessary installations, updates, and distributions.
- Performing repetitive tasks, such as checking status on internal or external web site pages.

For more information about basic HP OO concepts, see the *HP OO Concepts Guide*.

## Important notes

Upgrades are cumulative, and include the features included in previous versions of 10.x. Therefore, the upgrade path is from your current 10.x version to 10.22.0001. For information about installing and upgrading to 10.22.0001, see "[Installing HP OO](#)" on page 101.

Note also, that the rollback process (which rolls back an installation to the previous version) can only remove the latest patch that you installed. This means that if you installed 10.00 and then upgraded to 10.10, and then to 10.22.0001, you will only be able to roll back to 10.10.

**Caution:** Running the rollback twice will not remove the two latest versions. Attempting to do so will make the system unusable.

**Important!** The 10.22.0001 workspace format is not supported by 10.x Studio versions prior to 10.10. For best practices for rolling back from 10.22.0001 to a previous version, see the "Rolling Back Studio" section in *Upgrading to a New Version of HP OO 10.x*.

# What's New in HP Operations Orchestration 10.22.0001?

The HPLN Certificate was updated in HP Operations Orchestration 10.22.0001.

A security problem was fixed in version 10.22.0001. For more information, contact HP Support.

There are changes in the way you interact with the HP OO APIs. For more information, see page 16 in the *HP OO API Guide*.

## Database Enhancements in HP OO 10.22

### Monitor Database Size

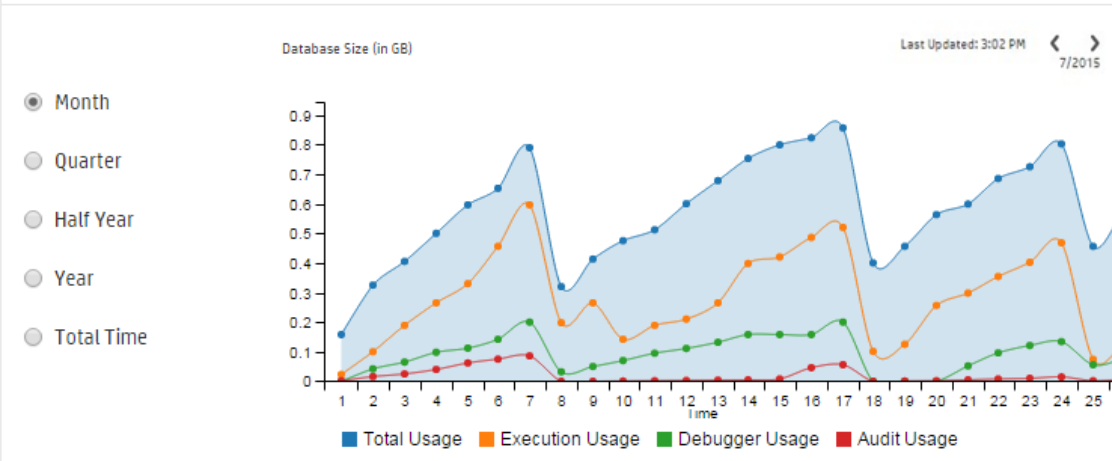
There is now a new **Database Health** tab in the System Configuration workspace. Using the graph, you can monitor the size of your database, comparing the current size to its size over the past month, quarter, half year, year, or total time. You can also see how the data is divided between execution, debugger and auditing usage.

The **Database Health** tab also displays information about how to schedule purging flows, in order to control the size of the database. For more information about the purging flows, see the new *HP OO Tuning Guide*.

### Run Log Persistence Level

Default persistence level: Extended ▼

### OO Database Consumption



#### 4 STEPS TO CONTROL DATABASE SIZE

It is highly recommended to control the OO database size by scheduling purging flows. To do this, follow these steps: ?

**Note:** The graph is updated approximately every 24 hours from the time Central was first up. For example, if you run a purging flow to reduce the database size, the updated size will be displayed on the following day.

### Set Default Persistence Level for the Run Log

In HP OO 10.x, a very detailed run history is persisted, including much more information than in version 9.x. This makes it easy to troubleshoot, as all the information is available in the Run Log. However, you may want to reduce the information that is persisted:

- If your database size has increased to the limit
- If some of the persisted data is not relevant for you

In HP OO 10.22, you can choose how much data to save. By selecting the persistence level, you control the level of detail that is saved to the Run Log. Two persistence levels are available:

- **Standard** - large input/output values are truncated at approximately 4,000 bytes when logged
- **Extended** - large input/output values are not truncated when logged



**Note:** The **Extended** level is similar to the behavior of previous 10.x versions.

The top-level inputs and outputs of the launched flow are always logged with their full values (even at **Standard** level).

In the new **Database Health** tab, you can set a default persistence level for the entire system, to be applied to all flows that are run. You can override this default for individual flows in the flow library, or when triggering or scheduling a flow run.

**Note:** All runs started from the Remote Debugger have the **Extended** persistence level.

### Purging of Execution Summary

There is a new API for purging execution records by their status.

## API Enhancements in HP OO 10.22

In HP OO 10.22, the permission required for the REST “/steps-log” DELETE has been changed to **dataCleanupManage** instead of **systemSettingsManage**.

## Hotfixes Integrated into HP OO 10.22

The following hotfixes that were provided separately by HP for version 10.21.0001 have now been integrated into version 10.22:

- Functionality has been added, allowing multi-character delimiters.
- In the Remote Debugger, when breakpoints are set, the server.log and execution.log files are no longer filled with errors.
- A step's session context is no longer passed into subflows, causing particular flow loops to break.
- Flow executions no longer remain in the RUNNING state indefinitely.
- It is now possible to launch flows from BSM containing user prompts.

## What's New with HP OO Documentation?

### Additions to the 10.22 Documentation Set

Two new documents were added to the HP OO documentation set:

- *Tuning Guide* - explains how to set up the HP OO database so that it is the right size for your needs, and so that performance is maximized.
- *Security Guide* - explains how to deploy and manage HP OO instances in a secure manner.

## Changes to 10.x Documentation

The documentation for HP OO 10.x has been rewritten, so that it is more concise and easier to navigate.

Persona icons have been added to help identify task owners, and flow diagrams provide an overview of processes. In the HP OO help, these flow diagrams link directly to the relevant help topic.


**Note:** In order for the links in the flow diagrams to work properly, make sure that the browser window containing the HP OO help is expanded. If the browser window is contracted, the links in the flow diagrams may not work correctly.

The screenshot shows the HP Operations Orchestration help interface. On the left is a navigation pane with a tree view of topics. The main content area is titled "Promoting a Content Pack – Overview" and includes a "What is promotion?" section with a description and a flow diagram. The flow diagram shows four steps: "Deploy to Staging Server", "Configure the Content Pack", "Test and Troubleshoot the Content Pack", and "Deploy to Production Server". Each step has associated tasks listed below it.

Deploy to Staging Server	Configure the Content Pack	Test and Troubleshoot the Content Pack	Deploy to Production Server
Get the Content Pack from the Author	Configure Worker Group Aliases	Run a Flow	Deploy the Content Pack to the Production Server
Deploy the Content Pack to the Staging Server	Configure System Accounts	Monitor the Flow	
Inspect the Content Pack	Configure System Properties	Identify Problems	
	Set Content Permissions	Export Events Log and Send to Author	



## Context-sensitive Documentation

The help in HP OO 10.x is context-sensitive.

This means that by clicking the **Help**  button on any HP OO window or dialog box, you display the relevant help topic. Click the **Open topic with navigation** link in the top left corner to display the navigation pane with links to all the help topics.

[Open topic with navigation](#)

## Running a Flow

  There are different places from which you can run a flow in Central:

- From the Run Explorer
- From the Flow Library

## PDF Documents

PDF versions of the documents are available in the **docs** folder, under the HP OO installation folder and in the **docs** folder on the ZIP file.

## Documentation Updates

Check the HP OO Resources page on HPLN at <https://hpln.hp.com/node/21/otherfiles> for updates to the documentation.

## Content Documentation

Download the following HP OO Content documents from the HPLN **Operations Orchestration Content 10.x Content** page:

- Release Notes
- Integration HTML
- Localized documentation

## What's New in Previous Releases of HP OO 10.x?

### Hotfixes Integrated into HP OO 10.21.0001

The following hotfixes that were provided separately by HP for version 10.21 have now been integrated into version 10.21.0001:

- Preventing issues when upgrading from an earlier version of 10.x, when HTTP is disabled.
- The default role was not mapped to LDAP users that did not belong to any LDAP group.
- LWSSO was not working correctly when two different Centrals were used in the same browser.

### Hotfixes Integrated into HP OO 10.21

The following hotfixes that were provided separately by HP for version 10.20 have now been integrated into version 10.21:

- New version of the upgrade package, to prevent issues with upgrading an existing HP OO system from version 10.10, when it contains a considerable amount of data.
- The new upgrade package also resolves issues with generating the SQL script for the upgrade.
- New versions of the provided SQL scripts for a fresh installation, to prevent issues with creating the HP OO 10 schema.

## Content Management Enhancements in HP OO 10.20

### Permissions for System Accounts

It is now possible to grant permissions for system accounts in HP OO. This enables the administrator to control which users can view which system accounts and run flows that use them. This feature is useful for customers with multiple organizations, who may wish to hide some of the system accounts from some users.

Only users with **View and Run** permission on a system account will be able to view it in the Configuration Items tree (described below) and to run (or resume) flows that use it.

Only users with **View and Run** permission on a system account will be able to remote debug a flow that uses it, from Studio.

**Notes:** After an upgrade from an earlier version of 10.x, any role that has either the **View Configuration Items** or the **Manage Configuration Items** permission will be automatically entitled to view and use all system accounts. You can modify these default permissions in Central once the upgrade is complete.

After an upgrade from 9.x, the ADMINISTRATOR and PROMOTER roles will be automatically entitled to view and use all system accounts. You can remove these default permissions in Central once the upgrade is complete.

## Configuration Items Tree

The **Configuration Items** tab in the Central Content Management workspace has been redesigned. Instead of under three tabs (**Group Aliases**, **System Accounts**, and **System Properties**), the configuration items are displayed together in a tree, similar to the tree in the Flow Library. The tree displays the deployed value for each configuration item. If an item was given an override value in Central, this value is also displayed.

The screenshot shows the 'Configuration Items' tab in the Central Content Management workspace. The interface includes a filter box at the top with 'Path' entered. Below the filter is a tree view of configuration items. The tree is expanded to show 'System Accounts', with 'System\_Account\_Name' selected. The details pane on the right displays the following information for 'System\_Account\_Name':

System_Account_Name
<b>ID:</b>
4f32bcb8-969c-470f-9803-f823b72a9436
<b>Path:</b>
Configuration/System Accounts/System_Account_...
<b>Content Pack:</b>
My_Project
<b>Version:</b>
1.0.0

Below the details pane is a 'Permissions' section with a checkbox for 'Show all roles'. A table shows the permissions for the selected item:

Role Name	View and Run
ADMINISTRATOR	<input checked="" type="checkbox"/>
PROMOTER	<input checked="" type="checkbox"/>

- Enter text in the **Filter By** box to filter the display of configuration items.
- Select an item in the tree to display its information in the details pane to the right.
- If you select a system account in the Configuration Items tree, the **Permissions** pane is also displayed. If you have **Manage Content Permissions** permission, you can assign **View and Run** permission for this system account.
- Select a configuration item and use the toolbar buttons to edit, revert, or delete that item, if you have **Manage Configuration Items** permission.

If you override the value of a configuration item in Central, the **Deployed** value and the **Central** value are connected. If you move or rename a configuration item in Studio and deploy it again, the Central value is also moved or renamed.

**Note:** While you can edit existing configuration items in Central 10.20, including those that were created in earlier versions of Central, it is not possible to create new ones. New

configuration items can only be created in Studio.

Configuration items must be unique. If you deploy a configuration item in a folder containing a configuration item with the same name, it will either overwrite that item (if they have the same UUID) or fail deployment (if it has a different UUID).

However, note that it is now possible to have two configuration items with the same name if they are located in different folders. This helps reduce the risk of conflicts between configuration items.

For more information, see "Setting Up Configuration Items for a Content Pack" in the *HP OO Central User Guide*.

#### **Apply Permissions to Multiple Roles**

It is now possible to apply permissions to multiple roles in the Edit Permissions dialog box. In previous versions, it was only possible to select one role at a time.

#### **Replace Items in a Deployed Content Pack**

It is now possible to delete, move, or rename an item in a deployed content pack, and to replace it with another item (by creating, moving, or renaming that other item) in the same deployment.

## **Flow Triggering Enhancements in HP OO 10.20**

There is a new **Flow Launcher** tab in the Run Management workspace, making it quicker and more convenient to run flows in Central. You can browse for a flow, view the flow information, name the run, enter inputs, and run the flow, all in the same window, without needing to open an additional dialog box.

Run Explorer   **Flow Launcher**   Scheduler

Filter By:

- Library
  - Accelerator Packs
    - Active Directory
  - Network
    - Connectivity
    - Deprecated
    - Web Pages
  - Simple SMTP Check**
  - How Do I flows
  - Operations
  - Templates
  - Utility Operations

### Simple SMTP Check

**ID:** 13dbf004-c88f-4ef6-b743-a5c6cc65d8bc

**Content P...** Base

**Description:**

Checks to see that an SMTP server is operational by

Run Name

Persistence Level

host: \*

domain:

Open Run After Launch

The **Flow Launcher** tab includes:

- The Flows tree, on the left, where you can browse to locate a flow. You can enter text in the **Filter By** box to filter the display of flows, and you can expand and collapse the tree nodes.
- The **Flow Details** pane, on the upper right, where you can view information about the selected flow, such as UUID, content pack, and description.
- The **Inputs** pane, on the lower right, where you can give the flow run a name and enter any required inputs.

If you have run this flow previously, you can click the **Last Run** button to view the progress of your last run.

For more information about running a flow from the **Flow Launcher** tab, see "Running a Flow" in the *HP OO Central User Guide*.

It is still possible to run a flow from the Flow Library in the Content Management workspace. But it is no longer possible to run a flow from the Run Explorer.

### Embedding Central Views in External Web Pages

It is now possible to embed parts of the Central UI into an iFrame in an external web page. You can embed:

- Flow Run view - for running and interacting with flows
- Drill Down view - for advanced tracking of running flows

For more information, see "Embedding Central Views in External Web Pages" in the *HP OO Central User Guide*.

**Note:** Use the **Run Link** field in the **Flow Information** pane in the **Flow Library** tab for embedding the **Flow Run** view.

### Execution Performance Enhancements

HP OO 10.20 has significant improvements in single flow performance of plain flows and sub-flows.

## Installation Enhancements in HP OO 10.20

### Unregister a RAS in the Uninstall Wizard

It is now possible to unregister a RAS in the Uninstall wizard.

For more information, see "Uninstalling HP Operations Orchestration" in the *HP OO Installation Guide*.

### Define a Database Connection to Oracle Using the Database Service Name

When defining a database connection to an Oracle database, you can now use either the service name or the SID.

For more information, see the *HP OO Installation Guide*.

### Disable the HTTP Port

It is now possible to disable the HTTP Port during installation. You might want to do this for security reasons, so that the only communication channel is on SSL and encrypted.

For more information, see the *HP OO Installation Guide*.

### Updated Trusted Root Certificates

When you upgrade an HP OO installation from an earlier 10.x version, the SSL truststore is updated to include the up-to-date trusted root certificates, as published by Oracle. This includes deletion of expired certificates, and import of new ones.

**Note:** If the upgrade detects that your truststore is manually managed (meaning you have removed any of the public root certificates), no certificates will be imported.

## Authoring Enhancements in HP OO 10.20

### Folders for Configuration Items



In previous versions, you could only create a configuration item in a flat list. In HP OO 10.20, it is possible to create and manage folders for configuration items.

### **New Size Limit for Prompts**

The size limit for prompts that you can add to a flow in Studio is now 255 characters. In previous versions, it was possible to create prompts with up to 1024 characters, which caused problems in Central.

### **Different Behavior for Obfuscated Values**

In the Studio Debugger, when you use the "Load Run Inputs" feature, if there are obfuscated inputs from a previous run, these are not reloaded.

### **Multiple Selection When Importing Projects**

It is now possible to import multiple projects into Studio at once.

### **Copy, Cut, and Paste in Studio**

It is now possible to cut, copy, and paste inputs, flow outputs, and step results in Studio.

### **References Resolved by Path**

References to system properties and group aliases now need to be referenced by path. For example, a system property called **myProperty**, in the **/Configuration/System Properties/myFolder** folder, which was previously referenced as **#{myProperty}** now needs to include the path, so it will be **#{myFolder/myProperty}**.

**Note:** System properties located in the root folder (**System Properties**) are referenced as before.

### **Updates to the Input Inspector**

The Input Inspector has been redesigned for ease of use:

- There is now a new **Inputs** toolbar for moving, adding, removing, copying, and pasting inputs in the Input Inspector.
- There is more information now presented in the Input Inspector's initial view. You can now see the **Assign From**, **Otherwise** and **Assign To** fields directly in the Input Inspector.
- You can now select the **Assign From** and **Assign To** values from a drop-down list.
- You can perform all basic input operations and inspect the basic definition of all the inputs at a glance using the table view.

### **Updated Default Values for Studio Properties**

The default values of the following Studio properties have been updated:

<code>dharma.studio.ui.inputinspector.assignfrom.selected</code>	<p>This property lets you set the initial option in the <b>Assign from Variable</b> combo box, in the Input Inspector.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>• <b>assigned</b> - default when upgrading from an earlier Studio version</li> <li>• <b>not-assigned</b> - default when installing Studio 10.20</li> </ul>
<code>dharma.studio.ui.inputinspector.assignto.selected</code>	<p>This property lets you set the initial option in the <b>Assign to Variable</b> combo box, in the Input Inspector.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>• <b>assigned</b> - default when upgrading from an earlier Studio version</li> <li>• <b>not-assigned</b> - default when installing Studio 10.20</li> </ul>
<code>default.behavior.define.input</code>	<p>This property lets you set the default behavior that will be used when defining inputs in a flow.</p> <p>Possible values:</p> <ul style="list-style-type: none"> <li>• <b>prompt_user</b> - default when upgrading from an earlier Studio version</li> <li>• <b>use_default</b> - default when installing Studio 10.20</li> </ul>

## Security Enhancements in HP OO 10.20

### Auditing

HP OO now gives you the option to audit events, so that you can track security breaches. Auditing lets you track actions that took place on Central, such as logins, triggering flows, creating schedules, editing configurations, and so on.

Currently, you can retrieve the audit trail only via APIs. For more information, see the *HP OO API Guide*.

**Note:** You need to have **View Audit** permission to retrieve the audit trail.

For more information about how to enable auditing in Central, see "Enabling Auditing" in the *HP OO Central User Guide*.

### Long Encryption Keys

HP OO now supports encryption keys that are 2048 bits long (and longer). This aligns our cryptography keys with the FIPS 186-4 standard.

### XSS Protection

The HP OO client is protected from XSS (cross-site scripting), via a third party security solution (jsoup). The XSS protection is always on and is not configurable.

If you are adding your own client on top of Central's APIs (Portal, and so on), you need to protect it from XSS.

The jsoup XSS protection replaces the AntiSamy XSS protection from previous versions.

### Protection from the "POODLE" attack

A new `sslEnabledProtocols` property has been added to the `server.xml` file (located at `<installation_folder>/central/tomcat/conf/server.xml`):

```
sslEnabledProtocols="TLSv1,TLSv1.1,TLSv1.2" .
```

This property ensures that only TLS v1, TLS v1.1 and TLS v1.2 are allowed and that SSL 3.0 is not. This prevents vulnerability to the "POODLE" attack (Padding Oracle On Downgraded Legacy Encryption).

## Environment Enhancements in HP OO 10.20

### Java SE 7 Upgraded to 72

The version of Java SE 7 used in HP OO 10.20 has been upgraded to version 7u72.

## Role Enhancements in HP OO 10.20

### New Role Permissions

There are two new role permissions: **View Audit** and **Manage Data Cleanup**.

For more information, see "Security Enhancements in HP OO 10.20 > [Auditing](#)" and "API Enhancements in HP OO 10.20 > [Data Cleanup \(Purging\)](#)"

**Note:** After an upgrade from earlier versions of 10.x, these permissions will not be enabled for any of the roles. You will need to enable them manually.

## Wizard Enhancements in HP OO 10.20

### Updates to the Web Services Wizard

It is now possible to generate system accounts and properties for common inputs using the Web Services Wizard.

In the content pack, the results can be found in the **Configuration>System Accounts** and **Configuration>System Properties** folders. These system accounts and properties are used by all generated flows to initialize inputs such as **host**, **port**, **username**, **password**, **proxy**, **proxyPort**, and **proxyUsername**.

The flows work the same as previously, but it is much easier to change an input that is common to multiple flows. For example, when the password is changed and the Web Services Wizard is used to generate 100 flows.

### Updates to the PowerShell Wizard

PowerShell 4.0 is now supported.

### Updates to the REST Wizard

In the **Configuration** page of the REST Wizard, there is now a **Headers** text box, which lets you add multiple headers in the generated flows, in the following format:

`headerName1=headerValue1\nheaderName2=headerValue2`. The headers must be separated by the new-line character.

In the **API Definitions - Swagger** page, there is a new **Resolve relative references according to the RFC3986** check box. If this check box is selected, this ensures that the relative paths discovered in the Swagger file found at the provided URL will be automatically resolved, and the HTTP requests will be made at the correct resource listening paths.

## Database Enhancements in HP OO 10.20

### Data Cleanup (Purging)

The data cleanup APIs enable the database administrator to purge flow data such as inputs, outputs, step log, and debugger events. This is useful for customers who run large numbers of flows, which could cause the database to reach the maximum table size. By using the data cleanup APIs, you can purge the tables manually as required, or by scheduling recurrent flows that incorporate these APIs. This helps you to keep the database size under control and maintain optimal system performance.

**Note:** Data cleanup only affects the data of completed runs.

For more information, see the *HP OO API Guide*.

Database purging flows are also available in the **HP Solutions** content pack under **Integrations/Hewlett-Packard/Operations Orchestration/10.x/Database**. For more information, see the *HP OO Database Guide*.

## LDAP Enhancements in HP OO 10.10

### Multiple LDAPs

If your organization works with multiple LDAP servers, it is now possible to configure Central to work with all of them. This includes LDAPs with different schemes and from different vendors. For example, you might have an Active Directory (Microsoft LDAP) implementation for one part of the organization and a Sun One (Oracle LDAP) implementation for another part.

If you set up multiple LDAP configurations on different domains, when users log in to HP OO, they will need to select the domain from a drop-down list with the active domains. There will be no drop-down list of domains if only one LDAP is configured and is set as the default.

**Note:** In HP OO 9.x, multiple LDAP configurations were given an order of priority, so that if an authentication failed, HP OO tried the next LDAP configuration on the list. HP OO 10.x has a failover functionality, in which you can set up multiple LDAP servers in a single configuration. So, if an authentication fails, HP OO tries the next LDAP server, within that configuration.

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

After an upgrade from HP OO 9.x (9.03 and later), if there are multiple LDAP configurations, these are all upgraded to HP OO 10.10.

**Note:** If multiple LDAP configurations are identical apart from the host/port information, these are upgraded to a single LDAP configuration in HP OO 10.10, with multiple rows in the host/port section, for failover.

### Easier LDAP Configuration

In order to make it easier to enter the LDAP configuration information, the **Security > LDAP** tab comes with default values already loaded. For the **User DN** and **Group DN** fields, it is possible to fetch a base DN from the LDAP, and then refine it for your needs.

### LDAP Configurations with Attributes Whose Values will be Used as Groups

It is now possible to set up an LDAP authentication configuration with a list of attribute names that will be used as groups, as an alternative to group filters.

This enables organizations to base the functional groups of users on LDAP attributes, rather than LDAP groups.

## Content Management Enhancements in HP OO 10.10

### New Content Packs Tab

You can now manage and view your deployed content packs in Central, under a new **Content Packs** tab. In the **Content Packs** tab, you can:

- Deploy and roll back content packs.

The **Deploy New Content**  and **Roll Back Deployment**  buttons have been moved from the **Flow Library** tab to the new **Content Packs** tab.

- Delete deployed content packs
- View a list of all active deployed content packs—non-empty content packs that haven't been rolled back, deleted, or overridden by other content packs.
- View the name, version, deployment date, publisher, and description of each content pack, as well as the user who deployed it.
- Filter the display of content packs by name.
- View the changes that were made to a selected content pack.
- Display the items within a content pack. The contents are arranged in a tree, under **Library** and **Configuration** folders, reflecting the way that the content pack appeared in Studio. The tree nodes can be expanded and collapsed, like in Studio.

**Note:** In previous versions, the paths of operations were not saved after deployment. So if you have upgraded a previous version with deployed content, you will not see the paths of the operations in the content pack. The operations will be displayed in an **Operations** folder under the **Library** folder. For content deployed in HP OO 10.10 and later, the operations are displayed the folder in which they are located in the deployed content pack. Note that if you redeploy the upgraded content, the operations will be displayed with their paths in the content pack.

For more information, see "Deploying and Managing Content Packs" in the *HP OO Central User Guide*.

### **Content Integrity Model for Content Pack Deployment**

HP OO 10.10 employs a new model for content pack deployment, which preserves content integrity. This affects the workflow for when you make changes to a content pack.

Each entity (flow, operation, and configuration item) in deployed content packs must have a unique UUID. If you try to deploy a content pack with a duplicated entity (with the same UUID as an entity in another deployed content pack), the deployment will fail.

If you move an entity from one content pack to another, this may result in a duplication, which will cause deployment to fail. For example, you have two content packs, A and B. You deploy content pack A to Central, and then you move entity X from A to B. When you try to deploy content pack B, the deployment will fail because entity X appears in both A and B.

In such a situation, the correct workflow is to deploy **both A and B** together after moving the entity, and not to deploy B on its own. The new version of A, without entity X, overwrites the previous version on Central, so there is no duplication.

When it's time to promote the content from one Central environment to another, you will only need to deploy the latest versions of the content packs that were deployed in the original Central environment. In previous versions, it was necessary to re-create all of the deployment history in the exact order that it was performed in the original environment.

After an upgrade, there may be content deployed in previous versions that does not meet the requirements for uniqueness. If this occurs, there is an indication in the **Content Packs** tab, showing that the content pack may not be valid (some of its contents might have moved to a different content pack without a new version of the first content pack being re-deployed).

If you are upgrading a large repository from HP OO 9.x (9.03 and later), the recommended best practice is to:

1. Upgrade the repository to HP OO 10.10.
2. Import it in Studio.
3. Split it into multiple content packs in Studio.
4. Deploy those content packs together in Central.
5. If you modify, remove, or move entities in these content packs, deploy all affected content packs again.

### Filters in the Flow Library

It is now easier to find a flow in the flow library, using a filter.

To filter the flows, enter part or all of the flow path in the **Filter By** text box.

### New Tabs in Studio Dependencies Pane

In Studio, two new tabs have been added to the **Dependencies** pane:

- **Content Packs** - Displays multiple trees, for multiple content packs. From this view, it is possible to close, delete, or import a content pack.
- **Library** - Displays a single tree, with all of the content merged together under a general **Library** folder and a general **Configurations** folder. From this view, it is possible to import a content pack.

Studio keeps track of the last view that was selected, so that when Studio is closed and started again, it loads the view was last selected.

## Run Explorer Enhancements in HP OO 10.10

### Enhancements to the Run Explorer Filters

To help you locate the run that you need, the Run Explorer filters have been enhanced. You can filter the display of runs by visible columns, according to status, start time, user name, run name, or run ID.

You can filter by multiple fields. This may be useful for troubleshooting, for example:

- You can check which runs failed the previous night (by filtering according to time range and status).
- You can filter to see runs that were triggered by a certain user.
- You can filter to see runs that are pending an action from you (by filtering according to user and status).

Changes that you make to the filters are saved in the local cache of the browser. For more information, see "Adjusting the Display of Flow Runs" in the *HP OO Central User Guide*.

### **Adjust the Appearance of the Columns in the Run Explorer**

You can now adjust the appearance of the columns:

- Customize column width, by dragging the edge of a column
- Change the order of the columns, by dragging a column name to the right or left

Changes that you make to these settings are saved in the local cache of the browser. For more information, see "Adjusting the Display of Flow Runs" in the *HP OO Central User Guide*.

### **Faster Refresh in Run Explorer**

The Run Explorer's refresh mechanism has been optimized to prevent overlapping of refresh calls and to achieve a better user experience. The Run Explorer in Central displays up to 200 runs in a single page.

**Note:** If you have selected a row at the top of the Run Explorer, and another user runs a flow, this new run appears in the Run Explorer under the row that you have selected.

## **Enhancements to the Display of Run Information in HP OO 10.10**

When you run a flow in Central and drill down to see information about the flow run, you can view:

- The flow's steps and transition messages, which are automatically refreshed as the run progresses. This enables you to track ongoing runs.
- Information about a selected step in the flow (start time, end time, step result, duration, inputs, results, worker group, and so on).

**Note:** You can drag the slider on the left edge of the **Flow Info** pane to adjust its width.

- A graphical view of the flow, with the selected step highlighted.



**Note:** You can adjust the way that the flow graph is displayed, by dragging it across the screen to view hidden item, or by adjusting the size of the image.

- The Run Log – a table with information about the entire run (steps, start time, duration, inputs, results, and so on), with the option to search for a specific step. You can export the run log into a SCV file, to help identify the causes of a problem, and you can use a Find functionality to locate a specific step in the Run Log.

**Note:** If the run includes subflows, the steps in the subflows are indented.

- Information about the flow (UUID, flow name, path, description, flow inputs, flow outputs, and so on).

You can choose which information you want to display.

For more information, see "Testing and Troubleshooting a Flow Run" in the *HP OO Central User Guide*.

## Authoring Enhancements in HP OO 10.10

### Remote Debugger Enhancements

The Remote Debugger in Studio offers enhanced remote debugging capabilities for connecting to several Central instances (or servers) and debugging a flow using the Central context.

During the troubleshooting and debugging process, there is no need to deploy the selected flow to Central. When you use the Remote Debugger, Studio connects in a volatile manner to Central. Since the debugging process is done from Studio, you can make changes to your flow without affecting the selected Central environment.

**Note:** Any dependent content packs that are needed for the flow have to be aligned to the same version on both Studio and Central.

There is a new Edit Connections dialog box in Studio, which enables you to configure multiple remote connections. This replaces the configuration of remote connections from within the **Studio.properties** file, which is no longer supported.

In Central, you can assign remote debugging permission to a role, in order to enable a user to use the Remote Debugger.

You can override the values of a run during debugging. For example, you can modify a system property in Central, and this will override the value of that property within Studio. You can modify a value within the Debugger Context Inspector, and this will override both the value in Central and the value in Studio.

The Context Inspector in the Remote Debugger has been enhanced. You can now:

- Filter the display according to selected values
- Sort the display according to columns
- Search for items in the Context Inspector
- See in the **Source** column whether a value originated in the runtime, Central, or Studio
- Easily identify when a value is new or modified, via the color and the appearance of "New" or "Modified" next to a value.

**Note:** After an upgrade from 10.02 to 10.10, the Remote Debugger configurations need to be reconfigured in Studio, because the information is no longer taken from the **studio.properties** file.

### Rerunning Flows

In the Remote Debugger, it is possible to repeat runs that ran previously. For example, if you run a flow that requires you to enter multiple flow inputs, you can repeat that run later, without having to re-enter all the inputs. This functionality can be used when testing flows remotely.

### Enforce Locking Policy

This options prevents the flow author from making any changes to an item (flow or configuration item) unless the item is locked. This ensures that only one author can edit an item. See the Studio Guide for more information.

### Searching Content on HP Live Network from Studio

In Studio, you can now search for relevant information and content on the HP Live network based on your HPLN profile access permissions.

**Note:** If the **HPLN** tab is not visible, select **Reset Layout** from the **Window** menu. This can happen after an upgrade. For more information, see "[Troubleshooting](#)" on page 54.

Note that this menu item is only enabled if there is an existing project in Studio.

### Manage Description Conflicts for Multi-author Scenarios

HP OO 10.10 saves the description for each flow, operation, configuration item, and folder of a project individually. The flows, operations, and configuration items descriptions are saved in the corresponding XML file, and the folder descriptions are saved in a **<folder name>.properties** file located on the same level as the folder in the file structure.

Opened projects are upgraded to 10.10 format the first time Studio is launched. Studio upgrades projects to 10.10 format when they are opened or imported.

In versions prior to 10.10, descriptions for projects and their content were saved in a single **cp.properties** file. After you upgrade a project to 10.10 format, its **cp.properties** file is deleted. This change affects only projects. Content packs maintain the same structure, having all the descriptions in the **cp.properties** file.

**Important!** As a best practice, when connected to SCM, only one author should upgrade the

projects and should commit immediately after the upgrade.

**Note:** The upgrade process is time consuming, but it happens only once for a project. For more information on upgrading, see the "Upgrading Studio" section in *Upgrading to a New Version of HP OO 10.x*.

### Search for Configuration Items

The Search capabilities in Studio have been extended to include configuration items.

### New Video Tutorial about Using the Remote Debugger

In the Studio tutorials page, accessible from within the **Welcome** pane, there is a new video that guides you through the debugging functionality on a remote Central.

### Set the Properties for Studio Projects

In Studio, you can now set the description and publisher of a content pack, in the Project Properties window:

- Define the publisher in the **Publisher** box. When you create a content pack, the value will be loaded by default into the Create Content Pack dialog box, where you can also edit it.
- Create a multi-line description of the project in the **Description** box. When you create a content pack, the value will be loaded by default into the Create Content Pack dialog box. You cannot edit the description in the Create Content Pack dialog box, but hovering over it will display the whole description.

### Progress Bar for Importing a Project

In Studio, when you import a project, there is now a progress bar indicating the status of the import process.

### Studio Files

The files required to start and configure Studio have been reorganized as follows:

- Studio is now launched through the **Studio.exe** file, located under **<installation\_path>\studio**. You can pin the new executable file to the task bar.
- Properties that are not required at run time can be added to or edited in the **Studio.properties** file.
- Properties that are required at run time can be added to or edited in the **Studio.I4j.ini** file, located under **<installation\_path>\studio**.

### Updates to Studio Menus

New items were added to the **Studio** menu bar, enabling you to configure the Proxy settings for the Remote Debugger, edit the remote Central connections, set the credentials for HP Live Network search, and configure the Studio overrides for debugging purposes.

### Studio Debugger Watches

In Studio, in the Debugger window, you can now follow the inputs you are interested in, by adding them to watches. The functionality is available in the **Debug Options** pane, in the **Watches** tab.

## Installation Enhancements in HP OO 10.10

### Installation Wizard for HP OO 10.10

HP OO 10.10 is installed via a single installation wizard.

In previous versions of 10.x, it was necessary to install HP OO 10.00 and then upgrade to the newer 10.x version via a patch.

For more information, see the *HP OO Installation Guide*.

**Note:** The installation wizard is used for new installations and upgrades from HP OO 9.x. You can also upgrade from an earlier version of 10.x, by using the **apply-upgrade** script and not via the wizard. For more information, see *Upgrading to a New Version of HP OO 10.x*.

### Language Support in Installer

In the installer, you can select a supported language for HP Operations Orchestration, in addition to English.

This language support will be used for:

- The Studio UI
- 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 **Studio.properties** and **central-wrapper.conf** files.

1. Locate the files in the installation directory under **central/conf** and **studio/conf**.
2. In the **Studio.properties** and **central-wrapper.conf** files, set the **user.language** and **user.region** properties to the desired language:

	<b>user.language</b>	<b>user.region</b>
Japanese	ja	JP
German	de	DE
Simplified Chinese	zh	CN
Spanish	es	ES
French	fr	FR
English	en	US

For example, for Japanese, set the following:

```
user.language=ja
```

```
user.region=JP
```

3. Restart the HPOO Central service for the settings to take effect.

### Installer Checks for Available Disk Space

During installation, the installer checks for available space. If there is insufficient disk space for the installation, the **Next** button is not available.

### Menu Shortcuts

Menu shortcuts are now created as part of the installation process.

### Localization

HP OO 10.10 is localized into five languages: Japanese, Simplified Chinese, German, French, and Spanish. You can select a supported language, in addition to English, during the installation. See ["Language Support in Installer" on the previous page](#).

Central language support is according to the browser language. If the language is not supported by the browser, Central is displayed in English.

**Note:** Searching in the Run Log is only supported if the storage space taken up by the searched field is no more than 4,000 bytes. Note that Japanese and Chinese take up about 3 bytes per character, while other (non-English) languages take up about 1.5 bytes per character. Also note that in the case of transition descriptions, the 4,000 bytes are shared among all of the locales in which the description is available.

Even if you cannot search in the Run Log, you are still able to see the runs.

## Environment Enhancements in HP OO 10.10

### Java Runtime Environment Upgraded to 7u55

The version of Java Runtime Environment used in HP OO 10.10 has been upgraded to version 7u55. This includes the latest security fixes from Oracle.

### Updated Support Matrix

The following have been added to the support matrix:

- PostgreSQL 9.3
- Oracle 11g RAC
- Microsoft Windows 8 64 bit (Studio)
- Microsoft Windows 8.1 64 bit (Studio)

- Microsoft Windows Server R2 2012 64 bit (Studio)
- Internet Explorer 11.x

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

See the *HP OO System Requirements*.

### **SAML Authentication**

HP administrators can now configure Central to work with SAML 2.0 authentication. SAML (Security Assertion Markup Language) is an XML-based open standard data format for exchanging authentication and authorization data between an identity provider and a service provider.

For more information, see "Setting Up Security – SAML Authentication" in the *HP OO Central User Guide*.

### **Multiple RAS Support**

HP OO 10.10 can support up to 20 RASes without performance degradation.

### **Step Log Mechanism**

HPOO 10.10 introduce a new step logging mechanism. The new mechanism gives you advanced monitoring and tracking capabilities, such as getting the run execution tree, retrieving inputs and outputs from a step, getting the step duration, getting the details of the worker that executed the operation, and so on. This mechanism replaces the event log mechanism (and the RSS feed), which is deprecated in the current version and will be removed in a future release.

## **New Features in HP OO 10.02**

### **Status Column in Topology > Workers Tab**

The **Topology > Workers** tab now displays the status of every worker. This makes it clear to the administrator whether the worker is running or stopped.

### **Progress Indication for Deployment**

After you deploy a content pack in Central, a progress bar is displayed, indicating the progress of your deployment.

### **Multiple Selection of Files for Deployment**

In the Deploy Content dialog box, it is now possible to select multiple files for deployment, using the **+** button.

In previous versions, it was only possible to select one file.

### **Lock Indication When Another User is Deploying Content**

In HP OO 10.02, it is not possible for two users to deploy a content pack to the same Central at the same time. If you try to deploy content to Central while another user is already deploying content, you will see an error message, indicating that another deployment is currently in progress.

In previous versions, problems could arise when two users simultaneously deployed a content pack to the same Central.

### **Deployment Performance Improvement**

Deployment time in Central is now reduced significantly.

### Add Inputs in Scheduler

It is now possible to add extra inputs to a scheduled flow, while setting up the schedule. In previous versions, it was only possible to enter flow inputs, while setting up the schedule.

### Central Displays Original Values of Deployed System Accounts

System accounts that existed in deployed content packs have their original value displayed in the **Deployed User Name** column in the **Configuration Items > System Accounts** tab.

If a system account from a deployed content pack is edited, this overrides the default value, and the new value is displayed in the **Override User Name** column.

### View Status and Delete Workers in Central

The **Topology > Workers** tab in Central now displays the status of each worker: whether it is **Running** or **Stopped**. The worker path indicates whether the worker is in Central or in RAS. This information will help HP OO administrators with troubleshooting.

It is also possible to delete a selected worker. For example, one that is no longer in use.

### Constants in SDK

The classes **ResponseNames**, **ReturnCodes**, **InputNames**, and **OutputNames**, under the **com.hp.oo.sdk.content.constant** package, include commonly used constants, which you can use in **@Actions**. For example, input names such as **HOST**, **USERNAME**, **PASSWORD**, **PORT**, and so on, or response names such as **SUCCESS**, **FAILURE**, **NO\_MORE**, and so on.

### Adjustable Logging Levels

It is now possible to adjust the granularity of the information that is provided in the log, separately for regular logging, deployment, and execution.

The granularity options are:

- INFO - Default logging information
- DEBUG - More logging information
- ERROR/WARNING - Less logging information

To adjust the granularity in the logging, you can replace **INFO** with **DEBUG** or **ERROR/WARNING** in the following place in the **log4j.properties** file (under **<oo-installation>/central/conf/log4j.properties**).

For example:

```
log.level=INFO
execution.log.level=DEBUG
deployment.log.level=DEBUG
```

### System Account Passwords can be Included in Upgraded Content and Content Packs

In previous versions, when content was upgraded using the Content Upgrade Utility, the passwords of system accounts were not included in the upgrade. The Content Upgrade Utility now includes an option to upgrade system accounts with their user names and passwords by adding one of these arguments to the command: **-ip** or **--include-passwords**.

This way, when the upgraded content is deployed on Central, the user names and passwords will also be deployed. Note that the passwords will be obfuscated inside the project/content pack.

**Note:** HP OO 10.02 can read the encryption from earlier versions, but earlier versions cannot read the new obfuscation for HP OO 10.02. Therefore, if you import a content pack that contains system accounts created in HP OO 10.02 or later into earlier versions (10.00, 10.01, or 10.00.001), these system accounts will not include the user name and password.

### Enhancements to Upgrade Report

After content upgrade, the upgrade report now includes sorting and grouping:

- Items are grouped into separate tables according to the type of problem
- Tables are sorted according to path
- All groups are collapsible, via the **Show/Hide items** link

### Renamed CUU Argument

In the Content Upgrade Utility, the argument `--rases-dirs` or `-rd` has been replaced with `--rases-file` or `-rf`. This is more consistent with the other arguments and a better description of the functionality. The functionality remains the same.

### Notification of Content Pack Creation

After an author successfully creates a content pack in Studio, a dialog box appears, displaying the location where the content pack was created.

### SVN Cleanup Functionality

In some cases, you will need to clean up the working copy in the Studio workspace. For example, if a Studio process crashes or if there is an IO error, and the working copy remains locked. A **Cleanup** option is now available from the **SVN** menu.

In previous versions, it was necessary to use an external tool for this cleanup process.

### Drag and Drop Enhancements in Studio

In Studio, it is now possible to select multiple items in the **Project** pane or **Dependencies** pane, in order to drag and drop them into a project. This functionality works with both the right and left mouse buttons.

- When you drag and drop from the **Dependencies** pane to a project, this copies the item into the project.
- When you drag and drop from one folder to another in the **Project** pane, this moves the item.

**Note:** It is not possible to drag and drop flows and operations at the same time as configuration items. It is not possible to drag and drop a flow or operation into the **Configuration** folder, and vice versa.

- It is also possible to drag and drop flows and operations from the Bookmarks pane to the Projects pane, to copy them to a project.



### Studio Editors Can Stay Open

It is now possible to create a new content pack or a new operation without closing all the editors in Studio. In previous versions, it was necessary to close all tabs before creating a new content pack or operation.

When you create a new operation, the Create Operations dialog box opens, even if there are open editors with unsaved changes.

When you save a content pack, the Saving dialog box gives you the option to save all changes in the currently open editors or to decide whether to save each one individually.



### Open Multiple Selected Items in Studio

It is possible to open multiple selected items from the **References** pane, **Problems** pane, **Search** Pane, **Project** pane, or **Dependencies** pane. Select multiple items in the pane, using the SHIFT or CONTROL keys, right-click, and select **Open**.


### Adding an Input at Cursor Position

It is now possible to add inputs at the current cursor position, and not just at the end of the input list. This is possible for flow inputs, step inputs, operation inputs, and operation responses.


### Step Into and Step Out Actions in the Debugger

The Studio Debugger includes two new buttons: **Step Into**  and **Step Out** .


These actions allow a flow developer to step in and out of the running of a subflow, while debugging a flow. Both actions are available when a debugged flow is paused, waiting for the user's action.

- To step into a step's subflow, click the **Step Into**  button. The debugger will start running the subflow and will pause on the first step of the subflow.

Clicking **Step Into** at the beginning of the parent flow tells the debugger to pause on the first step of the parent flow.

- To step out of the subflow, click the **Step Out**  button. The debugger will run the rest of the steps in the current subflow invocation and will pause on the first step following the subflow (in the parent flow). If the current step is in the parent flow, the action will behave like a resume action.

### Go to Step Functionality in Studio Flow Editor

A new **Go to Step**  button in the **Authoring pane** toolbar enables you to jump to a specific object in the flow. Type the name of the object to jump to the object, or the first letters of the object to select it from a list.

### Configuration Items Must Have Unique Names

It is now required that configuration items (system accounts, domain terms, selection lists, and system properties) have unique names. If two items of the same type are given identical names in Studio, these items will not pass validation, and will appear in the **Problems** pane. Any flow that uses one of these duplicates will be marked as invalid, and it will not be possible to debug the flow until the duplication is fixed.

**Note:** This validation only applies to configuration items that were assigned via selection from a drop-down list. It does not apply to configuration items that were assigned dynamically, using the `${..}` notation.

In previous versions, duplicated configuration items were not identified during validation. This could lead to problems with binding, and configuration items would overwrite each other.

### Updated About Page in Studio

The **About** page in Studio has been redesigned and now includes a link to the Third Parties document.

### Links to HPLN Community and Online Content


The **Welcome** page in Studio contains two new buttons:

- **Community Home Page** – links to HPLN Community page
- **Online Content** – links to the Base Content Pack download page on HPLN

These options are also available from the **Help** menu in Studio.

### Displaying the Grid by Default

By default, the grid is not displayed in the authoring pane. If the grid is set to display, via the

**Show/Hide Grid** button , this state is not persistent after Studio is closed. To change the default behavior, so that the grid is displayed by default, it is possible to open the **Studio.properties** file and set the property `dharmastudio.ui.activegrid=true`.

### Changes in Behavior for Empty and Encrypted Values

In HP OO 9.x, when you use `assign-from`, if the variable is empty, the flow will behave as if the variable does not exist. However, if the variable is empty and encrypted, the input on which the `assign-from` is used will be overridden with an encrypted empty value.

The empty encrypted variable remains empty even if it is used in a sub-flow with: `assign-from: variable, otherwise: any non-empty value, assign-to: variable`.

In HP OO 10.x, the inputs are obfuscated, rather than encrypted. The flow will not initialize the empty obfuscated variable. If it uses the values described above, in the end, the variable will have the value that was initialized in the sub-flow.

### Importing Plugins Replaces Previously Deployed Plugins

It is now possible to import a single plugin (maven artifact), either by the JAR file or by the POM file. If you import a plugin that was already deployed, the new plugin replaces the existing one.

### Java Runtime Environment Upgraded to 1.7.0\_45

The version of Java Runtime Environment used in HP OO 10.02 has been upgraded to version 1.7.0\_45. This includes the latest security fixes from Oracle.

### Tomcat Upgraded to 7.0.47

HP OO 10.02 uses an upgraded version of Tomcat, version 7.0.47.

### Changes in File Locations

Some of the upgrade files have been organized into new locations, to make it easier to locate them. For example, executable scripts are now located in the **bin** folder, and the **upgrade.log** file is now

located under `<installation>/upgrade/<new-version>`.

### **Use Maven Archetype to Create a Working Studio Project**

Using the Maven archetype, you can create an @Action project and a content pack project that can be opened in Studio to create operations and flows. For more information see the *Action Developers Guide*.

## **New Features in HP OO 10.01.0001**

### **Performance Improvement**

HP OO 10.01.0001 offers a substantial improvement when running a single flow, regardless whether it is executed from the Studio Debugger or from Central.

### **Track the Progress of Parallel Flows During Execution**

It is now possible to see the progress of a parallel lane even before it is completed.

### **Improved Documentation**

The documentation for HP OO has been rewritten, so that it is more concise and easier to navigate. For more information, see [HP OO Documentation](#).

## **New Features in HP OO 10.01**

### **Run Explorer Filtering**

In HP OO 10.01, it is possible to filter the flows that are displayed in the Run Explorer. You can create filters based on the flow path.

### **Dashboard**

The Dashboard workspace reflects the system's ROI, and analyzed flow aggregation. It provides statistical information about the 10 most popular flows and financial information about the return on investment.

### **System Properties in Central**

System properties can be managed in the Content Workspace under **Configuration Items > System Properties**.

### **Localization**

HP OO 10.01 is localized into five languages: Japanese, Simplified Chinese, German, French, Spanish. You can modify the language in which Studio is presented, even if this is different from the locale set on your computer.

Central language support is according to the browser language. If the language is not supported, Central is displayed in English.

When creating a content pack, the **cp.properties** resource bundle with your locale is created by default. The **cp.properties** files with different locales can be created in order to support multiple languages.

### **Flow Visualization**

Flow visualization gives Central users a graphical view of the steps in a flow as they appear in Studio. This visualization is available when you view a flow's details in the Flow Library. The currently running step is highlighted.

**Folder Description**

In Studio, authors can add a description to a folder in a project. For example, an author can group together all the flows and operations that were created with the same technology, and provide information about this in the folder description.

**New Features in HP OO 10.00**

HP Operations Orchestration 10.00 brings the following new features, improvements, and changes to the HP Operations Orchestration platform and content.

**New Architecture**

The architecture of the product has been upgraded and modernized. The basis of the new architecture is the “task and worker” design pattern. See "Architecture" in the *HP OO 10.00 Concepts Guide* for more details.

**Firewall Friendliness**

All distributed components now initiate the communication channel. See "Architecture" in the *HP OO 10.00 Concepts Guide* for more details.

**Central Look and Feel**

The Central Web-based application has a new, more modern design, consistent with the HP Experience style.

The Central UI is organized to reflect the most common OO use cases. Functionalities for the same roles are grouped into the same UI areas:

- **Run Workspace** – used for running flows, monitoring runs, scheduling runs, and troubleshooting runs.
- **Content Workspace** – used for promotion tasks, such as deploying new content, setting permissions on flows, setting up configuration items. It rolls back only to the last content pack deployment.
- **System Workspace** – where the system administrator can configure topology, and set up users, roles, LDAP authentication, and LWSSO.

For more information, see the *HP OO 10.00 Central User Guide*.

**Content Packs**

Content (flows, operations, configuration items, localization data, and action binaries) is now packaged into “content packs” and deployed to the Central server at run time with zero downtime, for immediate availability.

See "Content Packs" in the *HP OO 10.00 Concepts Guide* for more details.

**Updated Support Matrix**

PostgreSQL is now also supported, as well as newer versions of MySQL, Oracle, and MS SQLServer. In addition, more operating systems are now supported. See the *HP OO System Requirements*.

## New Features For End Users

### Simplified Execution Gateway

In previous versions, end users were sometimes exposed to Central. However, since Central is oriented to administrators, they were exposed to much more information than they really needed and in some cases, this could harm the system.

HP OO 10.00 has a refined permission model, which enables setting the end user permissions accurately. The administrator can set up permissions to allow end users to use Central and only be exposed to the information they need, limiting their ability to harm the system.

In addition, HP OO Central 10.00 provides interactive execution capabilities and UI embedding capabilities, which allow the end user to interact with the system in a much more usable fashion.

## New Features for Administrators

### Roles and Permissions

The way that permissions are managed has changed in HP OO 10.00.

In HP OO 10.00, user groups for Central can be configured in Central only, and not from within Studio, as in previous versions.

We have separated between permissions for Studio, permissions for Central, and permissions for content.

- **Studio** – Permissions to perform actions in Studio have been removed from the application. Versioning of library items and configuration items is achieved via integration with a standard source control management system.
- **Central** – Permissions to perform actions and to view UI elements in Central are configured via roles.
  - A **Permission** is a predefined ability to perform a task. Central comes ready with a set of permissions that can be assigned to roles.
  - A **Role** is a collection of permissions. The administrator configures the roles (by assigning permissions to them) and then assigns the roles to users.

The administrator can configure both **View** and **Manage** permissions for the different roles. For example, setting up permissions for a **Promoter** role to both view and manage schedules, and for an **End User** role who can run flows but does not even see the Scheduler module.

The increased number of permissions enables the administrator to define exactly which parts of the Central web UI each role sees; thus, creating a dedicated UI experience for each group of users. For more information, see "Setting Up Security – Roles" in the *HP OO 10.00 Central User Guide*.

- **Content** – Permissions to access data (flows and folders) are also configured according to the roles, but this is done for individual flows or content folders, and not system-wide. This is done as part of the promotion of a content pack. The administrator can assign permission to a role to

have **View** permission or **Run** permission for a flow or folder. For example, you might want to give users with the role **Promoter** permission to view and run the contents of a selected folder, and give users with the role **End User** permission to view the content only.

For more information, see "Managing the Flow Library" in the *HP OO 10.00 Central User Guide*.

As a result of these changes, there are some features from previous versions that are no longer relevant:

- Setting permissions on system accounts is no longer supported.
- Setting permissions on operations is no longer supported.
- Execution permissions are configured in Central, and no longer in Studio.
- Separate permission for HEADLESS execution is not supported.
- Authoring permissions (read\write\linked to) are no longer managed and configured in Studio.
- The user group terminology has changed: users groups have been changed to roles.

#### **Promotion to the Central Server**

Content packs are promoted to the Central server. The aim of promotion is to deploy a new content pack to the Central Production server, to make the flows available to users.

In addition to deployment, the promotion process also includes:

- Setting up the configuration items in the content: aliases, system accounts, and so on
- Setting permissions for the flows in the content pack
- Testing and troubleshooting the flows in the content pack

See "Promoting Content Packs" in the *HP OO Central User Guide* for more details.

#### **Aliases: Separation Between Run time and Authoring**

In HP OO 10.00, we understand that the author working in Studio does not always know which environment the content will be deployed upon. Therefore, we have created the concept of an "alias", which is created in Studio, and then mapped to the relevant value after the content has been deployed to Central. If the content is deployed to different Central nodes, the mapping can be done differently on each node, without the need to modify the original alias in Studio.

An author can create an operation in Studio, and give this operation a "group alias". After the flow is deployed in Central, the administrator maps the group alias to a worker group in Central. For more information, see [Configuration of Worker Groups and Group Aliases](#).

#### **Workers**

A worker is responsible for executing flows. The worker pulls tasks (executions) from Central and performs steps within these executions. This includes both invoking the actions and navigating between the steps of the flow.

Unlike a RAS in previous versions of HP OO, a worker in HP OO 10.00 processes all types of steps, and not only remote actions. Also, the communication direction of a worker in HP OO 10.00 is reversed from that of a RAS in previous versions. In previous versions, the Central server connected to the RAS server. In this version, the worker initiates the connection to the Central server. For more information, see "Components" in the *HP OO 10.00 Concepts Guide*.

### **Configuration of Worker Groups and Group Aliases**

A worker group is a logical collection of workers. Having a group, rather than a single worker, enables workers to withstand a high action execution load, and increases availability of workers in a data center.

Group aliases let you separate between assigning an operation to a worker during authoring time and in the run time environment. At authoring time, the flow author defines an operation to run on a group alias rather than a group. When the content pack is imported to Central, the administrator maps the alias to a group in the run time environment. There is no need to edit the flows and modify the worker assignment manually. For more information, see "Worker Groups and Group Aliases" in the *HP OO 10.00 Concepts Guide*.

### **Simpler RAS Management**

HP OO 10.00 uses a group mechanism that separates between the logical notion of the target RAS (which is what the author is aware of) and between the physical notion of the target RAS (which is what the administrator is aware of). For every environment, the administrator can map between the logical and physical notions. Therefore, promotion of content between environments does not require adjustment, and the addition of a RAS does not require going back to the author.

In previous versions, the content had to be aware of the target RASes. This meant that when content was promoted between environments (for example Dev, Staging, and Production), it required adjustments. Therefore, the content was not identical between environments and tests results were not definite. An administrator who wanted to promote the content to the Production environment needed to have authoring knowledge or had to go back to the author to make this change. When a RAS needed to be scaled out to allow high availability or improved performance, it had to be added with a load balancer, and the content had to be adjusted again.

### **Live Scale Out**

In HP OO 10.00, you can add a component without restarting the other components. You simply add it to the system in a live manner. Since the Central cluster is no longer based on Terracotta, you just add a new instance and point it to the database. You can scale out RASes via a new grouping mechanism, which means that there is no need for a load balancer for the RASes.

The run time repository was combined into the database, which means there is no need to manage a shared file system for clustering and improving the cluster's stability.

In previous versions, adding a component to the system required a restart of the system components. Terracotta needed to be updated and restarted as well as the Central nodes. If RASes were scaled out, it was required to use a load balancer and adjust the flow.

### **High Performance**

HP OO 10.00 has an improved execution mechanism, which enables you to reach higher performance. HP OO 10.00 is faster than previous versions.

### **Highly Parallelized Runs**

HP OO 10.00 has an asynchronous execution mechanism, which enables large bursts of executions. HP OO 10.00 supports launching 100 flows/second and there is no limit to the number

of parallel executions.

In previous versions, the execution mechanism was based on synchronous execution, so the number of parallel executions was limited by the number of the system threads (with a default of 300).

#### **Automatic Content Distribution**

In HP OO 10.00, content binaries are automatically distributed to the various RASes. When there is a change in their version, the system automatically distributes them to the relevant RAS upon their first use.

In previous versions, content binaries needed to be distributed manually to the various RASes. You needed to make sure that before executing the content, the binaries of the correct version are in the relevant RASes.

#### **Isolated Content Dependencies**

HP OO 10.00 enables you to use a different third party version for every content pack. You can use your own third party versions and this is not affected by HP changing the out-of-the-box version. The only limitation is regarding dependencies that are shared between the plugin and the platform.

Previous versions used a single version of a third party library for all repository operations. This meant that you could not use your own version of the third party library, due to collisions with the out-of-the-box version. In addition, every new HP content pack that was deployed posed a risk, because it could change the out-of-the-box version and break the dependencies of your operations.

#### **Authentication via LDAP Integration**

If you have an LDAP service for authentication, you can add the LDAP configuration to Central, in the Central UI. This enables the Central security feature and users will need to be authenticated to use the system. This change is dynamic—there is no need to restart Central for the change to be applied.

When the next user logs in to Central, they will need to enter their user name and password, as required by the LDAP authentication.

The way that LDAP is configured in HP OO 10.00 is different from previous versions:

- In HP OO 10.00, you need to specify the port for the LDAP host.

In previous versions, it was possible not to specify the port for the LDAP host, and Central would use the default port.

- In HP OO 10.00, you can configure multiple LDAP hosts by entering multiple values in the **Host** and **Ports** fields, with semicolons as delimiters. This saves time, because you don't need to enter the same information into multiple windows.

In previous versions, the way to configure multiple LDAP hosts was by opening multiple LDAP windows with different IP addresses.

- In HP OO 10.00, if the LDAP connection is lost, there is no need to restart Central. If there are multiple LDAP hosts configured, Central will connect again. If the first LDAP host is down, after three seconds, Central will try to connect to the second one that was configured.



In previous versions, Central was bound to the LDAP connection, so if the LDAP connection was lost, it was necessary to restart Central.

### Internal Users

As an alternative to LDAP authentication, it is possible to configure internal users in Central. Internal users can log in using their user name and password, and do not require external authentication. When an internal user and user with LDAP authentication with the same role are logged in, there is no difference between them.

**Note:** Using internal users is considered low security. For example, there is no password policy in place. If you require high security, you should use LDAP authentication.

### Dynamic Login

If no authentication is configured, users will be able to enter Central without authentication. If authentication is configured, users will need to log in with authenticated user names and passwords—there is no need to restart Central for the change to be applied.

### Modernized Extension Development

Java extension development is now Java annotation-driven and provides classpath isolation. See the *HP OO Action Developers Guide* for more details.

### Changes in on-Fail Error Handling

If the **on-Fail** option is *not* selected in a step, when a run time exception occurs in an action or scriptlet, or relating to input or output assignment, the flow will fail to complete

If the **on-Fail** option *is* selected in a step, when a run time exception occurs in an action or scriptlet, or relating to input or output assignment, the flow finishes, and does not terminate in the middle of the flow.

In previous versions, when a run time exception occurred in an operation, the flow finished at the point where the run time exception occurred.

In HP OO 10.00, the **on-Fail** option for a response relates to all exceptions, for example, exceptions relating to input or output assignment, or exceptions that occur in the step scriptlet. In previous versions, it only related to exceptions in an operation.

### Scheduling Personas

In HP OO 10.00, the user that creates the schedule is the one that is designated as the schedule owner. When the scheduled flow is run, this user is also the owner of this flow execution (who performs the scheduled run). This means that the same user is both the schedule owner and the executor.

In previous versions, there were two different scheduling personas:

- The **Schedule creator** was the user that created the schedule.
- The **Schedule executor** was configured from within the Administration settings (under **Administration > System Configuration > Scheduler > Scheduler Settings**) and this was the user that performed the scheduled run.

## New Features for Authors

### Standalone Studio

HP OO Studio functions as a standalone integrated development environment (IDE).

In previous versions, Studio required a connection to a live HP OO Central. The Studio login and many repository operations used this connection, which made it difficult to work in remote teams. In some cases, a cross-site connection was not allowed and in other cases, such operations were very slow.

In HP OO 10.00, Studio is a standalone tool that doesn't require a connection to Central. All of its repository operations are available offline. This results in improved performance and enables distributed work. If a source control interaction is required, you decide when the interaction occurs. Remote teams can use various standalone Studios, and it is possible to author flows outside of the office network.

### Standard Source Control Integration

In previous versions, Studio included its own proprietary version control capabilities, which were limited by definition. It was not possible to connect to and use your organization's source control software.

HP OO Studio 10.00 is integrated with a standard source control software. The out-of-the-box solution is based on a commonly used source control application (SVN). This means that the capabilities of source control software are available for Studio, so you can connect to and use your organization's source control software. This also means that the automation code can reside together with other source codes (automation as code).

In HP OO Studio 10.00, the proprietary version control capabilities (check-in and check-out operations) have been removed. These have been replaced by the source control integration. When an author makes local changes, the local history is displayed as it was in previous versions.

For more information, see "Working With Source Control" in the *HP OO Studio Authoring Guide*.

For more information about the differences between source control management between HP OO 10.x and 9.x, see "Differences in Flow Behavior After Upgrading" in *Upgrading to HP OO 10.10 from HP OO 9.x*.

### Multiple Authors and Multiple Geographies

In HP OO 10.00, Studio is offline and leverages standard source control software to enable sharing work between multiple and distributed authors.

In previous versions, the capabilities of Studio were limited in regard to multi-authoring and multi-geographies. For example, Studio required a constant connection to Central, and collaboration capabilities were limited by the proprietary version control.

### Fine-grained HP Content

The HP OO 10.00, content is broken down into a set of content packs, each for a different area of functionality. You have better control over which content packs to download and which to deploy. You can use only what you really need.

In previous versions, the HP content was provided as one big repository. This meant that you did not have control over what was downloaded and deployed. Content versions included much more

content than you needed, and imposed risks on the deployment. Content versions could unintentionally affect your entire content.

### Fine-grained Customer Content

In HP OO 10.00, the customer content can be separated into projects and managed separately for each author or author group. This gives you complete flexibility in defining the flows that are grouped together and defining the workspace of each author. In this manner, different authors get a focused development environment just with their relevant flows and don't affect other authors' flows.

In previous versions, the customer content was kept in one big repository. This meant that different groups needed to work simultaneously on the same large repository. This meant having to find ways to avoid collisions and manage permissions. Individual authors didn't get a focused development environment with just their own flows.

### Projects Pane and Dependencies Pane

There are two new panes in Studio 10.00:

- **Projects** pane, which shows the projects you're working in, and displays the editable flows, operations, and other objects.
- **Dependencies** pane, which shows the available content packs, and displays the read-only flows, operations, and other objects.

These two new panes replace the **Repository** pane and the **My Changes/Checkouts** pane from previous versions.

See the *HP OO Studio Authoring Guide* for more details.

### Renamed check box in the Input Editor

In the Input Editor, the **Encrypted** check box has been renamed to **Obfuscated**. There is no change in the functionality, but the label is a more accurate description.

The screenshot displays the configuration for an input named 'filesToAdd'. The 'Input Properties' section shows the 'Obfuscated' checkbox is unchecked and the 'Required' checkbox is checked. The 'Validation Format' is set to '<not validated>' and the 'Record Under' is set to '<run history>'. The 'Input Data Flow' section shows 'Assign from Variable' is 'filesToAdd', 'Otherwise' is 'Use Constant', and 'Assign to Variable' is 'filesToAdd'. The right-hand pane shows the 'Constant Value' field for the 'Otherwise: Use Constant' configuration.

### Credential Type

In HP OO 10.00, inputs of the type **Credentials**, which use a system account, must be defined as referring to either a user name or a password. There is a new field called **Credential Type**, with the options **Username** and **Password**.

### New Way of Creating Operations: Soft Copy

In HP OO 10.00, there is a new method for creating new operations.

In previous versions, you could create operations from built-in operations in Studio. This is no longer possible, and there is no **New Operation** menu item. There are no longer operation types—WebOp, SSH, Telnet, and so on.

In HP OO 10.00, you can create operations by copying and modifying existing operations, or by creating an action plugin in Java and importing that action plugin.

When you create an operation by importing a Java action plugin, the copied operation continues to reference the original operation. So if the original operation is updated to link to a new version of the action plugin file, the copied operations are all updated automatically. This is known as a "soft copy".

**Note:** If you want to have two operations that are based on two separate versions of the action plugin file, you need to create two operations. This cannot be done by copying an existing operation.

For more information about creating an operation, see "Creating Operations" in the *HP OO Studio Authoring Guide*.


### No Separation Between Headless Runs and Those Started Within the Central UI

In HP OO 10.00, "headless" runs (which are started outside of Central) and flows that are run from within the Central UI are treated in the same way.

In previous versions, there was a separation between these types of run.

### Multi-instance Steps

Multi-instance steps now reside within a multi-instance branch. You simply select the **Multi-**

**instance**  icon on the **Step** palette and drag it onto the authoring canvas. You then add one or more subflows or operations to the multi-instance branch, and set multiple targets for the step via an input list of values.

Each of the inner steps inside the multi-instance step will run multiple times, once for each target that is set.

The new approach is more consistent with the parallel execution visualization and capabilities. See the *HP OO Studio Authoring Guide*, and the *HP OO Content Upgrade Guide* for more details.

Changes in behavior with multi-instance steps:

- In HP OO 10.00, the multi-instance step inputs behave the same as a regular step. If you remove an input (that was declared in the operation) from the multi-instance step, then it won't be calculated.

In previous versions, you could not remove operation inputs from the inputs of a multi-instance step (unlike a regular step).

- The whole structure of the multi-instance step has changed. There is now a multi-instance branch. So there are also changes in the multi-instance step properties.
- The multi-instance branch step scriptlet and results run N times (as a number of multi-instance instances).
- The results and scriptlet for all the inner steps (inside the multi-instance branch ) will run once for each multi-instance branch run, meaning N times at total.
- Using a multi-instance step inside a parallel lane does not work. This cannot be created in HP OO 10.00 Studio, and will not pass migration. It is supported as a subflow step in parallel lane.
- A multi-instance step that has a transition to a parallel step (or another multi-instance step) that is not a "group done" transition, will also not pass migration, and will not work in HP OO 10.00.
- Multi-instance steps no longer support termination of the flow within the multi-instance step.

### Two XML Files

The flow XML has been split into two XML files, in order to improve the readability of the files:

- Advanced Flow Language (AFL), which defines the structure of the flow.
- Graphical Hierarchical Language (GHL), which describes the position of the graphical flow components in the Studio layout.

Both languages provide an XML schema (XSD). For an example of the XSD, see the *HP OO Application Program Interface (API) Guide*.

### Numeric Values Keep Their Original Form in Scriptlet Context

In HP OO 10.00, the string retains its original form. In previous versions, when a numeric value was put in a scriptlet context and retrieved back, it was changed to a string representation of float, which could lead to unpredictable behavior.

For example, in the following script:

```
var n = 1;
scriptletContext.put("numericValue", n);
```

- In HP OO 10.00, the context holds the original string "1"
- In previous versions, the context held the string "1.0"

**Note:** Putting a float variable on the context is the same in HP OO 10.00 and in previous versions. In both cases, the float will keep its original form (for example, "1.1").

**Scriptlet Context is Read Only**

In HP OO 10.00, scriptlet filters have read-only access to the `scriptletContext`. Using `scriptletContext.put/putGlobal` has no effect outside of the script run. This change helps to enforce good practices, so that filters are only used for filtering values.

In previous versions, it was possible to change/add data to the `scriptletContext` in scriptlet filters.

**ScriptletContext.get() Looks in Local Context First**

HP OO 10.00 looks for the value in the local context first and will only look in the global context if the value is not available. This enables the flow to override variable values at run time and is more intuitive.

In previous versions, when a script called `scriptletContext.get(<paramName>)`, HP OO would first look for the `<paramName>` value in the global context, and would only look in the local context (in the flow or step) only if no value was found.

**Automatic Initialization of Variables**

In HP OO 10.00, non-existing variable references are initialized with an empty string "", instead of "\${var}".

In previous versions, if `${var}` syntax was used in a value field, and `var` was not initialized in the flow, HP OO used the literal string "\${var}" as the value for variable substitution. This literal substitution in the parameter could result in confusion or errors in the flow.

**Note:** In HP OO 10.00, the \$ symbol is used as an escape character. So that if you previously had a literal string "\${var}", you can add another \$ symbol to maintain the original string. If you use "\$\${var}", this will be "\${var}" in execution.

**Updated Script Engine**

HP OO 10.00 uses the Rhino 1.7R3 script engine, while earlier HP OO versions used Rhino 1.7R1.

This may affect scriptlets, because Rhino 1.7R3 requires the symbol “;”.

For example, the following scriptlet would work in previous versions, but will not work in HP OO 10.00:

```
if ( (scriptletContext.get("glob1") == "1,2,3") || (scriptletContext.get
("glob1") == "1") || (scriptletContext.get("glob1") == "2") ||
(scriptletContext.get("glob1") == "3") )
scriptletResponse = "success"
else scriptletResponse = "failure"
```

In HP OO 10.00, you would need to change the scriptlet to be as follows:

```
if ( (scriptletContext.get("glob1") == "1,2,3") || (scriptletContext.get
("glob1") == "1") || (scriptletContext.get("glob1") == "2") ||
(scriptletContext.get("glob1") == "3") ){
```

```

scriptletResponse = "success";
}
else scriptletResponse = "failure";

```

In addition, error messages thrown by scriptlets may differ slightly from those in previous versions, because of the newer Rhino script engine.

Note that Sleep scripts are deprecated.

### Annotation-based Content

HP OO 10.00 adds '@Action' annotations that can be added directly onto your custom code. This means that your code can now be leveraged to be HP OO content and still be tested in the context of the customer development framework.

Previous versions provided an 'IAction' mechanism to create custom content. You had to implement that interface and test it within the HP OO application context.

### Changes in Behavior in Studio

Because of the differences in behavior between HP OO 10.00, some flows may not work properly after content upgrade. For more information, and for suggested solutions, see the *HP OO 10.00 Content Upgrade Guide*.

- The Debugger displays only selection lists that are relevant for the flow, rather than all of them.
- The **on-Fail** rule in a response now takes into account exceptions that occur in the step scriptlet, and exceptions relating to input or output assignment.
- There is no longer a **Step Results (Deprecated)** section under the **Advanced** tab in the Step Inspector. After content upgrade, results in this section are moved to under the **Results** tab. See the *Content Upgrade Guide* for more details.
- In previous versions, it was possible to take the name of a selection list or system property and use it in an input title, in the format `${<name>}`. For example, `${Boolean}`. This is no longer possible for selection lists. After content upgrade, each selection list is copied as a system property, in order to maintain backwards compatibility. See the *Content Upgrade Guide* for more details.
- In previous versions, some types of operations included built-in field values, but these are not supported in HP OO 10.00. For example, in the loop operation in previous versions, there were two inputs, **count** and **reset**, and two fields, **from** and **increment by**, to specify the starting count and increment. After content upgrade to HP OO 10.00, the fields are converted into regular inputs. See the *Content Upgrade Guide* for more details.
- In 10.00, there is a new **Categories** folder in the **Configuration** folder. In previous versions, there was a domain term called **Categories**, which contained different classifications of a flow. After content upgrade, the items that previously appeared as rows in the **Categories** domain term now appear as separate items in the **Categories** folder. See the *Content Upgrade Guide* for more details.

- Non-existing variable references are initialized with an empty string "", instead of "\${var}". See the *HP OO 10.00 Concepts Guide* for more details.
- In selection lists and domain terms, values cannot exceed 255 characters.

### Changes in Behavior – Flow and Step Inputs

- The assignment chain has been changed. For example, in the following scenario of flow inputs:

Name	Type	Required	Encrypted	Assign from	Otherwise	Assign to	Value in execution
Input 1	Single Value	false	false	Input 1	Prompt user	Input 2	myhost
Input 2	Single Value	false	false	Input 2	Prompt user	targetHost	localhost

In previous versions, in the flow context, the result would be the variable "targetHost" with the value "localhost".

In HP OO 10.00, the result is the value "myhost".

- Inputs available when triggering a flow has changed. When you ask for the inputs of a flow (using the Rest API), it will show you only the inputs that have the same input name as the input "Assign From" parameter (as declared in Studio).
- Step inputs - assigning outputs with a filter.

In HP OO 10.00, all the output values are processed with their filters, so even if an output is not mapped to a flow result, the flow will fail if the filter throws a run time exception.

In previous versions, if a step output was not mapped to the flow result, its filter would not be processed. For example, if you have an output field filter that can cause a run time exception for some step result values, it won't fail the flow as long as that step output field is not mapped to a flow result.

- The transition of encrypted fields has been changed according to the following logic:
  - If an encrypted field is passed along to a non-encrypted field, it will be shown decrypted.
  - If an encrypted field is passed to the flow result, it will be shown decrypted.
  - If a steps' encrypted field is assigned to another steps' encrypted field, it will remain encrypted.
  - In general, when a field is in a step/operation/property that is marked as encrypted, it will not be shown. Otherwise it will be shown.



- In HP OO 10.00, the author needs to choose which attribute to extract from the logged in user. In addition, the password is never used for security issues, and will always be prompted .

In previous versions, the logged in user was an object consisting of the user name and password, and assignment took place according to the name of the input. For example, if the input name was "user name", the user name would be extracted from the object.

- In HP OO 10.00, the credentials input type does not exist and instead, the user will have to use the regular prompt input (and check it as encrypted).

In previous versions, the credentials input prompt was an object consisting of the user name and password and a message was prompted during run time to insert both.

- It is no longer possible to set the flow input as "not assigned" otherwise "fail". After content upgrade, these inputs will be modified to single value, otherwise "prompt".

### Changes in Behavior – Exception Handling

- If an exception is thrown anywhere during flow execution, from an action\scriptlet\internal execution step, then the following logic applies:

If the author checked the **On Fail** flag on one of the operation responses, the flow will continue to run regularly (on all the execution steps) and chooses the transition mapped to this response. This will also be the case if the exception was thrown in the operation scriptlet or the step scriptlet.

If the author didn't check the **On Fail** flag on any response of the operation, the flow will stop its execution at the execution step that threw the exception in any case except for the following:

- If the author checked the **Toggle single response** option on the step, the flow will continue to run to the next step.
- If the exception was in a parallel \ multi-instance step, the branch with the error will stop execution. The other branches will finish (reach the end of the branch), and then the flow will stop execution.
- If the exception was in a sub-flow, the child and parent flows will stop the execution.
- If the **Default** check box is selected on one of the responses, the behavior is now different. In previous versions, the flow would continue to run to the transition mapped to the default response. In OO 10.0, we stop the execution of the flow in the execution step that the exception was thrown from, and end the flow.

In all the cases above for which the flow stops running, it will reach termination in an organized manner with a `FLOW_RESPONSE_TYPE=EXCEPTION`.

## Changes in Behavior – Rules

- The following behavior of rules was redesigned in HP OO 10.0 to behave as follows:

Input 1	Rule Type	Input	Result in Previous Versions	10.0 Result
5abc	=	5iop	true	false
Two	>	Two	true	false

In general, if one of the inputs is not numeric, HP OO does lexicographic comparison.

## Changes in Behavior – Scriptlets

- HP OO 10.00 uses the Rhino 1.7R3 script engine, while earlier HP OO versions used Rhino 1.7R1. This may affect scriptlets, because Rhino 1.7R3 requires the symbol “;”.

For example, the following scriptlet worked in previous versions, but will not work in OO 10.0, because of the missing “;”:

```
if (scriptletContext.get("glob1") == "1,2,3")
scriptletResponse = "success"
else scriptletResponse = "failure"
```

You can fix the scriptlet like this:

```
if (scriptletContext.get("glob1") == "1,2,3")Unknown macro: {scriptletResponse
= "success";}
else scriptletResponse = "failure";
```

- Error messages thrown by scriptlets may differ slightly from those in previous versions, because of the newer Rhino script engine.
- Scriptlet filters have read-only access to the `scriptletContext`. Using `scriptletContext.put/putGlobal` has no effect outside of the script run.
- `ScriptletContext.get()` looks in local context before looking in global context.
- In HP OO 10.0, when a script calls `scriptletContext.get(<paramName>)`, the system first looks for the value in the local context and only if the value is not available, it tries to fetch it from the global context. This is done in order to allow the flow to override variable values at run time. Also, it is more intuitive.

In previous versions, when a script called `scriptletContext.get(<paramName>)`, the system would first look for the `paramName` in the global context, and only if no value was found, it would look for the `paramName` in the local context (flow/step).

- In HP OO 10.0, when a numeric value is put in the scriptlet context and retrieved back, the string keeps its original form. In previous versions, it was changed to a string representation of float. See ["Numeric Values Keep Their Original Form in Scriptlet Context " on page 45.](#)

**Changes in Behavior – Filters**

In the **XML Get Attribute** filter, you can set the attribute name whose value you want to extract. You can also leave it empty, and then OO returns all the attributes in the given path.

In HP OO 10.0, the attributes are returned in the same order that they appear in the XML. In previous versions, they were returned in the opposite order.

For example:

Working on the following XML, if a user didn't set the attribute name, but only the path: "tickets/ticket/details/comment/".

```
<?xml version="1.0" encoding="utf-8"?>
  <tickets>
    <ticket id="1448" severity="3">
      <details>
        <description>A simple Test xml</description>
        <comment user="john" att2="att2val">Initially raising ticket</comment>
        <comment user="frank">Problem diagnosed, not a real issue</comment>
        <comment user="albert">ok, I'm going to close it.</comment>
        <state>Closed</state>
      </details>
    </ticket>
  </tickets>
```

previous versions single match result:

att2val

HP OO 10.0 single match result:

john

previous versions table result:

Path,att2,user

```
/tickets/ticket/details/comment[1],att2val,john/tickets/ticket/details/comment
[2],,frank/tickets/ticket/details/comment[3],,albert
```

HP OO10.0 table result:

Path,user,att2

```
/tickets/ticket/details/comment[1],john,att2val/tickets/ticket/details/comment
[2],,frank/tickets/ticket/details/comment[3],,albert
```

### **Changes in Behavior – Non-blocking Steps**

- In HP OO 10.00, the flow will wait for all non-blocking steps to terminate. The flow execution will remain in progress until then.
- In HP OO 10.00, a non-blocking step will run in parallel with the rest of the flow. This includes input binding, scriptlets, operation, and filters. The entire step is parallel as opposed to the behavior in previous versions where just the operation was parallel.
- In HP OO 10.00, a subflow with a non-blocking step will not terminate until all its non-blocking steps end.

## **New Features for Integrators**

### **Complete REST API**

HP OO 10.00 provides a complete REST API to the entire set of Central functionalities. Every functionality that is exposed in Central is practically implemented over a public REST API, enabling you to utilize the same set of APIs to integrate your systems with HP OO.

Previous versions provided a sets of APIs (SOAP, REST, and so on) that covered mostly the execution functionalities. Integrators who needed to integrate their systems with HP OO were limited with the API capabilities.

Some of the RESTful APIs and SOAP APIs from previous versions are not supported in HP OO 10.00.

### **Embeddable**

HP OO 10.00 is provided not just as a standalone application but also as a WAR file. You can embed it in your application servers and do not need a separate service and management for HP OO.

Previous versions is installed as a standalone application. If you wanted to OEM the application, you needed to 'bundle' it. This meant that it included its own service and required its own management.

For more information about the differences between HP OO 10.x and 9.x, see "Differences in Behavior After Upgrading" in *Upgrading to HP OO 10.10 from HP OO 9.x*.

## Known Issues and Limitations

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# Troubleshooting

## Installation Troubleshooting

Issue	What Should I Do?
<p>In Windows 2012, it can happen that even though the correct version and type of .net framework is installed, the .net operations fail with the error: "Can't initialize jni4net Bridge".</p> <p>In Studio, flows and operations are not highlighted in red, so you cannot see there is a problem.</p>	<ol style="list-style-type: none"><li>1. Repair the .net framework installation on that machine using the .net framework 4.5.1 full installer.</li><li>2. Restart HP OO Studio/Central/RAS.</li></ol>
<p>When Studio is installed on Windows 2012, there is no progress bar when importing content or creating a content pack. There is a Java limitation for the Windows 2012 operating system and the default look and feel is not supported.</p>	<p>Modify the <b>Studio.l4j.ini</b> file (under <b>&lt;installation dir&gt;/studio</b>) to specify a different look and feel. Add at the end of the file:</p> <pre>- Dswing.defaultlaf=com.sun.java.swing.plaf.windows. WindowsClassicLookAndFeel</pre>
<p>After an installation of HP OO 10 with a MySQL database, the following error may appear in the logs:</p> <p>"Packet for query is too large (2515019 &gt; 1048576). You can change this value on the server by setting the max_allowed_packet variable."</p>	<p>Before installing HP OO 10.x with a MySQL database, make sure that the <b>max_allowed_packet</b> variable has a minimum value of 250 M. In order to do this, you can set the value for a session or as a permanent option of the MySQL server:</p> <ul style="list-style-type: none"><li>• To set it for within the session, run this command: <pre>mysql --max_allowed_packet=250M</pre></li><li>• To add it as a permanent option of the MySql server, add the following line in <b>&lt;MYSQL_HOME_DIR&gt;/my.ini</b> or <b>my.cnf</b> and then restart the MySQL server: <pre>max_allowed_packet=250M</pre></li></ul> <div data-bbox="721 1629 1370 1772"><p><b>Note:</b> The minimum is 250 M, but some environments may require more, depending on the size of the repository.</p></div>

Issue	What Should I Do?
Silent installation does not work if trailing spaces appear in silent properties for paths.	Make sure that no trailing spaces appear in silent properties for paths.
In some cases, Central is not started as part of the installation, or the Central URL cannot be accessed from a remote location. This may be caused by the Windows firewall.	Check the Windows firewall logs and policies. If required, contact your server system administrator to discuss possible solutions.
If you install Studio on a path with special characters (for example, French, Japanese, or Chinese characters), this results in an error.	Install Studio from a folder without special characters.

## Upgrading Troubleshooting

Issue	What Should I Do?
If you upgraded to version 10.21 or later and then rolled back to version 10.10, if you try to upgrade to 10.20 (rather than back to 10.21 or later) the upgrade fails.	<p>If you need to reinstall 10.20 after uninstalling 10.21, you will need to apply hotfix <b>HF_26466</b> on top of your 10.20 installation before re-installing 10.21. Contact HP Support for information on obtaining this hotfix.</p> <p>This issue can also be resolved by altering the HP OO database schema before the upgrade to version 10.20. Contact HP Support for details.</p>
After content upgrade, there may be flows or steps in which inputs reference system accounts that do not exist.	<p>Open the flow in Studio 10.x and change the input so that it references an existing system account.</p> <p>In cases such as this, it does not help to go to the original repository in version 9.x to look for the missing reference. It must be fixed in the 10.x project.</p>

Issue	What Should I Do?
<p>If you migrated a 9.x repository and you imported both the resulting project and the content pack, after upgrading to 10.02 or later, you will not find the project loaded in the workspace. In the logs, you will see the following error “Unable to open Project &lt;name&gt;. A content pack with the same name already exists in your workspace.”</p> <p>The project was not loaded in the workspace but it still exists on the disk, in the location where you created it. In 10.02 and later, it is not possible to have a content pack and a project with the same name open in the workspace.</p>	<p>Close the resulting content pack and import the project from the disk.</p>



Issue	What Should I Do?
<p>If you upgraded 9.x content with versions of HP OO prior to 10.02, you may get errors in Central 10.x deployment and you may have problems deploying out-of-the-box content packs such as the Base Content Pack.</p> <p>The problems are caused by duplication of configuration items (system properties, system accounts, domain terms, selection lists, and so on). These items were part of the HP out-of-the-box content, and should be treated as read-only. This principle was violated by former versions of the Content Upgrade Utility and version 10.02 fixes this.</p>	<ul style="list-style-type: none"> <li>• Upgrade your repository again, using the Content Upgrade Utility for 10.02 or later (recommended).</li> <li>• Fix your repository manually:             <ol style="list-style-type: none"> <li>a. Open your project in Studio, and go to the configuration folders.</li> <li>b. Locate the duplicated items (they have an error indication) and delete them.                 <div data-bbox="911 680 1370 1058" style="background-color: #f0f0f0; padding: 10px; margin: 10px 0;"> <p><b>Note:</b> The <b>Category</b> domain term cannot be deleted from within Studio. If this item is duplicated, you will need to delete it from your file browser, outside of Studio.</p> <p>For example, right-click on the item, select <b>Show in Explorer</b>, delete it from the file system, and then refresh the project in Studio.</p> </div> </li> <li>c. Deploy your exported content pack with the latest version of the HP Base Content Pack.                 <div data-bbox="867 1220 1370 1402" style="background-color: #f0f0f0; padding: 10px; margin: 10px 0;"> <p><b>Note:</b> If you edited selection lists from the out-of-the-box content, you need to create them again, rename, and replace all usages.</p> </div> </li> </ol> </li> </ul>
<p>After an upgrade from HP OO 9.x to 10.x, using the HP OO Shell Utility to upgrade historical data will get the result "Resolved" instead of "RESOLVED", as required in HP OO 10.x. This causes duplicates in the results distribution on the Dashboard.</p>	<p>Upgrade to HP OO 10.x <b>before</b> using the HP OO Shell Utility to upgrade historical data.</p>
<p>If you installed HP OO 10.x using upgrade from a 9.x server and you want to import schedules using Operations Orchestration Shell, note that, only the schedules of the flows that do not have existing schedules in 10.x will be migrated.</p>	<p>Make sure to complete the importing of the 9.x schedules before working with the HP OO 10.x environment for scheduling and running flows.</p>

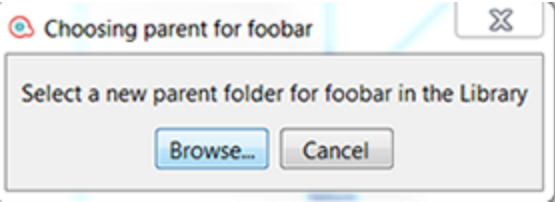
Issue	What Should I Do?
<p>In some situations, operations with missing responses end up in the valid project instead of the invalid project.</p>	<p>After upgrading, you will need to manually check the operations to see if they have missing responses. These are not identified as invalid during the upgrade process.</p>
<p>The size limit for prompts in a flow is now 255 characters, while in previous versions, the size limit was 1024 characters. After an upgrade, prompts with more than 255 characters will be cut down to the correct size.</p>	<p>After upgrading, check your prompts and see if there are any that are missing information and need to be rephrased.</p>

## Studio Troubleshooting

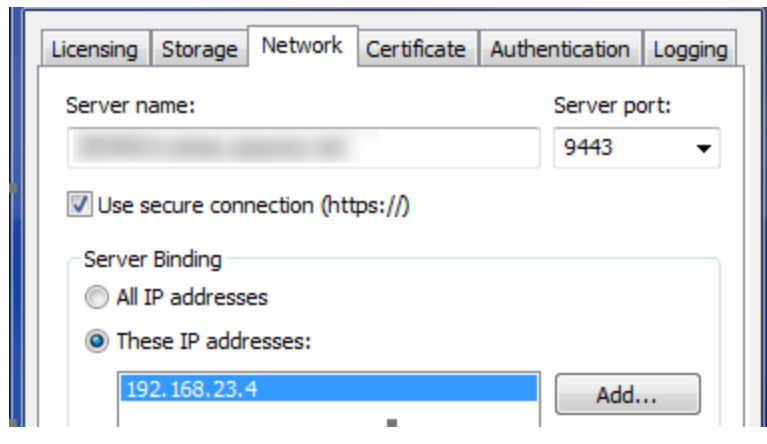
Issue	What Should I Do?
<p>OO 10 does not resolve variables from step context.</p> <p>In 9.x, to resolve a string like <code>\${var}</code>, HP OO would try to find a match in the step context (existing inputs), flow context, global context and system properties.</p> <p>In 10.x, the search is only performed in flow context, global context, and system properties.</p>	<p>Search for a match in the step context as well.</p>
<p>In a multi-author scenario, if you choose the option <b>Update Item and Perform Lock Action</b> in the dialog when locking an item, your project may get into an inconsistent state.</p>	<p>In order to resolve it you will have to manually refresh the project.</p> <p>If the item was previously moved or renamed by a different author in another Studio instance, you should also update all your workspace by selecting <b>SCM&gt; Update All</b> from the menu.</p> <p>To refresh a project, select the project and click the <b>Refresh</b> button in the toolbar or right-click on the project and choose the <b>Refresh</b> option.</p>

Issue	What Should I Do?
<p>By default, when you connect to the Remote Debugger after an upgrade, the certificate file passwords appear in regular text in the Windows Task Manager, in the <b>Processes</b> tab.</p>	<p>In order to ensure that the password appears obfuscated in the Task Manager, run the <b>encrypt-password</b> tool.</p> <p>For more information, see "Obfuscating the Studio KeyStore and TrustStore Passwords" in the <i>HP OO Hardening Guide</i>.</p>
<p>When connected to SCM and "Enforce locking" is enabled, after you move a folder several times and then back to its original location, a lock error may appear when you try to commit the folder, saying that is it not possible to verify the lock for the items inside it.</p>	<p>The solution is to perform an SCM Update action on the folder before committing it.</p>
<p>During a multiple project import, a "GC overhead limit exceeded" error message appears.</p>	<p>The problem is caused by the fact that the heap is too small to accommodate such big project.</p> <p>You need to increase the memory allocation.</p> <p>In the <b>Studio.14j.ini</b> file, change the <code>-Xmx</code> value to a larger value. For example, 1500 MB.</p> <pre data-bbox="982 1129 1370 1203" style="background-color: #f0f0f0; padding: 5px;">-Xmx1500m</pre>
<p>If you have a 10.x workspace with folders inside the <b>Configuration</b> sections, you will not be able to launch a previous Studio version.</p>	<p>Open the workspace with the 10.x version, flatten the configuration items (move all items to the root section and delete the folders) and then re-open the workspace in a previous Studio version.</p>
<p>If a Studio/SlikSVn folder was renamed, moved or deleted, Studio might return SCM-related errors in the <b>SCM Messages</b> pane even if you did not configure an SCM repository URL.</p>	<p>If the SlikSvn folder was renamed, moved, or deleted, you have to comment out every property from the <code>&lt;oo_folder&gt;/studio/conf/scmCommands.properties</code> file.</p>
<p>Under some screen resolutions, the tutorials are not clear.</p>	<p>For the best experience when viewing the tutorials, we recommend using the following screen resolution: 1920 x 1080.</p>

Issue	What Should I Do?
<p>Editing XML operations fails for large files.</p>	<p>The problem is caused by the fact that the heap is too small to accommodate such big project.</p> <p>You need to increase the memory allocation.</p> <p>In the <b>Studio.I4j.ini</b> file, change the <b>-Xmx</b> value to a larger value. For example, 1500 MB.</p> <pre data-bbox="982 619 1372 699" style="background-color: #f0f0f0; padding: 5px;">-Xmx1500m</pre>
<p>On Windows 7, Windows 2008 Server, and Windows 2008 Server R2, there may be problems running SVN with Studio, if you are missing the correct version of the MS Visual C++ DLLs. The following error message appears in the <b>SCM Messages</b> pane:</p> <pre data-bbox="284 913 950 1249" style="font-family: monospace;">Cannot run program "C:\&lt;path_to_oo_ installation&gt;\studio\SlikSvn\bin\svn": CreateProcess error=14001, The application has failed to start because its side-by-side configuration is incorrect. Please see the application event log or use the command line sxstrace.exe tool for more detail</pre>	<p>Download and install the Microsoft Visual C++ 2008 SP1 redistributable package according to your operating system. For example, <a href="http://www.microsoft.com/en-us/download/details.aspx?id=5582">http://www.microsoft.com/en-us/download/details.aspx?id=5582</a>.</p>
<p>When Studio is connected via Remote Debugger to a Central with authentication, flows that run in the Debugger without any prompt input are not visible in the <b>Run</b> workspace in Central.</p> <div data-bbox="284 1430 950 1545" style="background-color: #f0f0f0; padding: 5px;"> <p><b>Note:</b> The run is present in the database in the OO_EXECUTION_SUMMARY table.</p> </div>	<p>Grant the user viewing the Run Management workspace remote debugging rights in Central.</p>
<p>After importing many content packs (typically, after deleting a large number of content packs and importing newer versions), Studio can become slow, and actions might fail with an "out of memory" error.</p>	<p>Restart Studio.</p> <p>If necessary, increase the maximum heap size by editing the <b>Studio.I4j.ini</b> file, located under <b>&lt;installation_path&gt;\studio</b>, and setting the value of the parameter <b>-Xmx</b> to a higher value.</p>

Issue	What Should I Do?
When connected to a network share-based SVN repository (for example, <b>file:///myshared/repo</b> ), SCM operations (such as Update, Commit, and so on) take a long time to finish.	Use a dedicated web-based SVN server instead of a network share-based repository. This is related to the fact that SVN is not optimized to efficiently use the Windows network share protocol.
Reverting individual flows, operations, configuration items, or folders to a revision before upgrading to 10.x will cause the description of corresponding items to be lost.	When you revert an entire project to a revision prior to upgrading to 10.x, the project is upgraded again, and therefore, the descriptions are not lost. The recommended approach to revert to a revision before 10.x is to revert the entire project to that revision.
If, after rolling back to a Studio version previous to 10.x, the first time you open Studio, it freezes and an "UnknownFieldException: No such field com.hp.oo.content.entities.*.descriptionCdata" error is present in the logs.	See the "Rolling Back Studio" section in <i>Upgrading to HP OO 10.x from an Earlier Version of HP OO 10.x</i> , for the recommended way on how to roll back Studio to a version previous to 10.2x.
Creating a content pack from a 10.2x format project with a 10.02 (or earlier) version of SDK will create an inconsistent content pack.	Use only the 10.2x version of SDK to create content pack out of 10.2x format projects.
The following error message appears: "Select a new parent folder for <item> in the library".  For example:  	Delete the <b>.idx</b> and <b>.tmp</b> folders from the location of the project in the workspace, and the <b>.metadata</b> folder from the <b>Content</b> subfolder of the same project, and restart Studio.

Issue	What Should I Do?
<p>In Studio SCM, after committing a single locked item (for example, committing a single flow by right-clicking it in the <b>Projects</b> pane and selecting <b>SCM &gt; Commit</b>), in some cases, the editor shows the item as still being locked. The lock is, in fact, not there, because committing always automatically releases the locks.</p>	<p>This state can be resolved by updating the project or by unlocking the item, which eventually results in a warning: "svn: warning: W160040: No lock on path..." After this, it is possible to obtain a lock again.</p> <p>To avoid this limitation, it is recommended that you always commit an entire folder or the entire project. If you indeed need to a commit single item, check the lock after committing and update the item if necessary.</p>
<p>You cannot detach from SCM because you have locked items in your workspace and unlocking them fails (for example, the SCM server is unreachable).</p>	<p>Delete the folder <b>.svn</b> under <b>&lt;user home&gt;\.oo\Workspace</b> and restart Studio. Now your workspace will be detached.</p>
<p>When using VisualSVN Server as an SVN server, in Studio the SCM operations (for example, Checkout, Update, Commit, and so on) take a long time to finish.</p>	<p>Change the network configuration of VisualSVN Server to bind to an IPv4 address.</p>



## Localization Troubleshooting

Issue	What Should I Do?
<p>Characters appear in gibberish in the user interface for localized installations, when using MS SQL Server.</p>	<p>If your HP OO system is localized and you are using MS SQL Server, you will need to set the database collation to the relevant collation name, in according to your required language:</p> <p>English: SQL_Latin1_General_CP1_CS_AS</p> <p>Japanese: Japanese_Unicode_CS_AS</p> <p>Simplified Chinese: Chinese_Simplified_Stroke_Order_100_CS_AS</p> <p>German: SQL_Latin1_General_CP1_CS_AS</p> <p>French: French_100_CS_AS</p> <p>Spanish: SQL_Latin1_General_CP1_CS_AS</p> <p>If you already have a database installed, HP 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 MS SQL for localized installations.</p> <p>Note also that for MS SQL, it is recommended that the same language is used all over the database.</p> <p><b>Note:</b> HP OO does <i>not</i> support Unicode characters, when using MS SQL.</p>
<p>The <b>Test</b> command in the Studio Filter Editor and the "Quick Command" in an operation cannot handle Japanese characters.</p>	<p>Modify the <b>Studio.I4j.ini</b> file (under &lt;installation dir&gt;/studio) and add the following parameter:</p> <pre>-Ddharma.windows.cmd.unicode=true</pre> <p>to ensure that localized characters are recognized by Windows.</p>

## Central Troubleshooting

Issue	What Should I Do?
Special characters cannot be displayed correctly in the *.csv file when exporting the Run Log to a CSV file	<p>The problem is in the Excel CSV encoding, which can be changed, as explained in: <a href="http://superuser.com/questions/280603/how-to-set-character-encoding-when-opening-excel">http://superuser.com/questions/280603/how-to-set-character-encoding-when-opening-excel</a></p> <p>Also, make sure you are working with the correct configuration in HP OO and in the database.</p>
Changing the machine time causes executions to get stuck in a <b>Running</b> state.	<ol style="list-style-type: none"><li>1. Stop all Central cluster nodes and synchronize their time to the current time.</li><li>2. Unlock the <b>oo_lock</b> table:<ol style="list-style-type: none"><li>a. Drop the <b>oo_lock</b> table.</li><li>b. Create the <b>oo_lock</b> table.</li><li>c. Insert back all values that should be there, such as TRIGGER_ACCESS, STATE_ACCESS, and so on.</li></ol></li><li>3. Update <b>oo_triggers</b>. Set <b>next_fire_time</b> and <b>prev_fire_time</b> to the current time.</li><li>4. Update <b>oo_fired_triggers</b>. Set <b>fired_time</b> to the current time.</li><li>5. Start Central.</li></ol> <p>This will fix the situation and all stuck jobs will continue to run.</p>
After setting the security banner to an empty string and restarting Central, a Null Pointer exception is thrown.	<ol style="list-style-type: none"><li>1. Manually connect to the database.</li><li>2. Run this SQL query:  <pre>INSERT INTO OO_CONFIG_ITEMS(KEY_,VALUE VALUES ('security.banner','Sample text for security banner')</pre></li></ol>



Issue	What Should I Do?
<p>When you delete a content pack that contains a plugin, the plugin is not deleted from the Central cache. If you redeploy an artifact with the same version of the plugin, it does not overwrite the old one.</p>	<p>The administrator should manually clean up the cache, so that only the required libraries will be downloaded.</p> <p>When the Central and RASes are down, delete the <b>var/cache</b> folder.</p>
<p>When triggering a flow from Central, the following error appears:</p> <p>'There was a problem launching the flow. See the logs for details.'</p>	<p>Check if the default group <b>RAS_Operator_Path</b> is assigned to any worker.</p>
<p>Central/RAS crashes with an OutOfMemory(OOM) exception.</p>	<p>Do one of the following:</p> <ul style="list-style-type: none"> <li>• Increase the heap size for Central/RAS</li> <li>• Remove the limit on the <b>stepLogBuffer</b> size</li> <li>• Check if the content you ran can be changed so that its context will be smaller</li> </ul>
<p>Execution speed is low. It looks as if, over time, the run duration is getting longer.</p>	<ol style="list-style-type: none"> <li>1. Make sure the root cause of the bottleneck is not database-related. Monitor the database resource usage (CPU, memory, IO, storage, network). For more information about monitoring, see the <i>Monitoring OO 10</i> document on the HP OO Community page.  (<a href="https://hpln.hp.com/node/19651/attachment">https://hpln.hp.com/node/19651/attachment</a>)</li> <li>2. Increase the number of worker threads. See the <i>HP OO Tuning Guide</i> for more details.</li> <li>3. Increase the number of database connections. See the <i>HP OO Tuning Guide</i> for more details.</li> <li>4. Scale out. See the <i>HP OO Tuning Guide</i> and <i>HP OO Benchmark Performance Guide</i> document for more details.  (<a href="https://hpln.hp.com/node/19651/attachment">https://hpln.hp.com/node/19651/attachment</a>)</li> </ol>
<p>On FireFox, when there is low resolution (for example, 1024x768), it is not possible to configure schedules in the Scheduler.</p>	<p>This happens when the font size in Firefox is set to 125% zoom. Reduce the zoom to 100%.</p>

Issue	What Should I Do?
<p>On FireFox, when there is low resolution (for example, 1024x768), the <b>Cancel</b> button in the Edit Role dialog box cannot be seen.</p>	<p>Increase the screen resolution to 1280x1024 or 1920x1080.</p>
<p>Deploying content packs takes a long time and an "out of memory" message is displayed.</p>	<p>Increase the memory for Central by changing the configuration of the <b>central-wrapper.conf</b> file. For example:</p> <pre># Initial Java Heap Size (in MB) wrapper.java.initmemory=1024  # Maximum Java Heap Size (in MB) wrapper.java.maxmemory=2048</pre>
<p>If you delete the <b>/var/logs</b> folder (for example, for backup), the Central <b>wrapper.log</b> file is not re-created under the new <b>/var/logs</b> folder.</p>	<p>The <b>central-wrapper</b> log file is created in the <b>/bin</b> folder.</p>
<p>If you get locked out of Central when there is SAML authentication, with no access via the identity provider, log into HP OO directly.</p>	<p>Make sure to keep the admin user, for this.</p> <p>To log in directly, go to:</p> <p><b>http(s)/&lt;host&gt;:&lt;port&gt;/oo/login/direct</b></p>
<p>The remote host supports the use of the RC4 cipher. This cipher is flawed in its generation of a pseudo-random stream of bytes so that a wide variety of small biases are introduced into the stream, decreasing its randomness.</p> <p>If plain text is repeatedly encrypted (for example, HTTP cookies), and an attacker is able to obtain many (i.e., tens of millions of) cipher texts, the attacker may be able to derive the plain text.</p>	<p>Disable the RC4 cipher on the JRE level (starting with Java 7):</p> <ol style="list-style-type: none"> <li>1. Open the <b>\$JRE_HOME/lib/security/java.security</b> file.</li> <li>2. Edit the <b>jdk.tls.disabledAlgorithms</b> property to disable the RC4 cipher.</li> </ol> <p>For more information, see <a href="http://stackoverflow.com/questions/18589761/restict-cipher-suites-on-jre-level">http://stackoverflow.com/questions/18589761/restict-cipher-suites-on-jre-level</a>.</p>

Issue	What Should I Do?
<p>The default group can be removed from all workers, causing the execution to pause on "no worker in group".</p>	<p>Some phases of a run always run on the default group, which is <b>RAS_Operator_Path</b>. Make sure that at least one worker is assigned to this group.</p> <p><b>Note:</b> It is recommended to assign most (or even all) workers to <b>RAS_Operator_Path</b>, in order to optimize the execution time. You should only exclude a RAS from this group if you want to minimize its usage, and if you have only few operations that use it.</p> <p>if you start a run in Central and there aren't any available workers in <b>RAS_Operator_Path</b>, the run will not start and an error message is displayed in Central, redirecting you to check the Central logs.</p>
<p>For a flow that has already started running on Central, if it requires a group alias that does not have a worker group mapped, the mapping during the run will not work , unless the worker group name is identical to the group alias. The flow will remain in a <b>Paused_No_Workers_in_Group</b> state. Resume will not work.</p> <p>For example, you have a step that needs to run on group alias <b>Alias_A</b>, and there is no mapping of workers to this alias. HP OO tries to run the step on group alias <b>Alias_A</b>, but since there are no workers in <b>Alias_A</b>, the execution is paused. When the administrator maps group alias <b>Alias_A</b> to the worker group <b>Group_D</b> and tries to resume the run, it does not work .</p>	<p>From the <b>Topology &gt; Workers</b> tab, assign a worker to a worker group with exactly the same name as the group alias required by the flow. Then, resume the flow.</p>
<p>The default DRBG algorithm <b>ECDRBG128</b> is not safe, according to NIST.</p>	<p>Set the security property <b>com.rsa.crypto.default</b> to <b>HMACDRBG</b> by adding the following line in the <b>&lt;oo_jre&gt;\lib\security\java.security</b> file:</p> <pre>com.rsa.crypto.default.random = HMACDRBG</pre> <p>For more information, see the <i>HP OO Hardening Guide</i>.</p>

Issue	What Should I Do?
<p>In some cases, the content deployment does not end or does not appear to end. This may be caused by the anti-virus blocking the browser read actions.</p>	<p>Check the CPU consumption of the anti-virus process at the time of deployment, or check the anti-virus log file. If required, contact your server system administrator to discuss possible solutions.</p>
<p>When deploying new content in Central, there may be error messages, saying that Central is missing some operations.</p>	<p>Make sure to deploy the base content pack and any other HP content packs that are used in Studio before deploying your own content packs.</p>
<p>When Central, the RAS, and the Central client (browser) are in different time zones, this can cause problems when a flow is run via the Scheduler. For example, the start time in the flow will be different from the start time in the step.</p>	<p>Change the time zone on the RAS to be the same as the time zone on Central.</p>
<p>When the Centrals from a clustered environment are in different time zones, it can happen that the final flow run duration is calculated as a negative number and in the Run Explorer, the run duration is displayed as 0 seconds.</p>	<p>Make sure that all the Centrals are in the same time zone and that they are time-synced.</p>
<p>The HP OO help links do not work through Load Balancer.</p>	<p>Make sure that the Load Balancer is configured correctly. You need to add to the Load Balancer all suffixes that are different from /oo.</p> <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p><b>Note:</b> For Apache httpd, it is sufficient to make sure that the balancer members' URLs are just <b>http://central_host:central_port/</b>.</p> </div>
<p>Under low screen resolution, some of the buttons in the UI cannot be seen.</p>	<p>Increase the screen resolution to 1280 x 1024 or 1920 x 1080.</p>

## Load Balancer Troubleshooting

Issue	What Should I Do?
<p>Compression should not be set on the load balancer configuration.</p> <p>This can affect the connection between Central and workers and can lead to problems in new worker registration or existing worker functionality.</p>	<p>Remove the compression.</p>

## Wizards Troubleshooting

Issue	What Should I Do?
<p>The <b>getCategories</b> SOAP request fails when being used as a flow in Studio using the Web Services wizard.</p> <p>The reason the flow fails with NPE is that the request that is sent is empty. The default behavior is to trim all empty elements: if that is all the request contains, no elements will be included in the envelope.</p>	<p>Use input <b>trimNullComplexTypes</b>, which is a hidden input with default value true. You have to set it to <b>false</b>.</p>

## Content Packs Troubleshooting

Issue	What Should I Do?
<p>Some content from Middleware or SAP content packs appears in red in Studio.</p>	<p>Use the Content Third Party Wizard located under the <b>Studio/tools</b> folder to add any missing dependencies.</p> <p>For more information, see the <i>Third Party Content Pack Wizard User Guide</i>.</p>

## Limitations

### Upgrading and Installation Limitations

<p>If you are rolling back from 10.2x 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).</p>
<p>HP OO 10.x does not support 32 bit platforms. If you have an earlier version of Studio installed on a 32 bit platform, you will not be able to upgrade this installation to 10.x. You will need to uninstall Studio and install it again on a 64 bit platform.</p>
<p>When upgrading from an earlier version of 10.x or rolling back to an earlier version, you must cancel or finish all paused or running flows and disable existing schedules before applying the upgrade/rollback. If there are flows running or paused when you perform the upgrade/rollback, it will not be possible to resume them and the upgraded executions will be canceled.</p>
<p>If you are upgrading an existing HP OO system containing a considerable amount of data from 10.10 to 10.2x, the upgrade may take a very long time to complete.</p>
<p>If you have upgraded to a certain 10.x version and have Central installed in a cluster, you must upgrade each node of the environment by turn to bring them to the same version. Any nodes that are not upgraded will fail to start.</p>
<p>When upgrading from a remote 9.x Central that has localhost as the database in the <b>Central.properties</b> file using a silent installation, installation and upgrade do not complete successfully. This problem does not exist for wizard installations.</p>
<p>When you run upgrade on a schedule with a simple trigger, the upgraded schedule may have a different time zone.</p>
<p>During historical-data upgrade to HP OO 10.x, flow inputs and outputs are not upgraded from previous versions for historical data. Only the flow result is migrated.</p>
<p>When upgrading a schedule with a start date in the past, the start date will be overridden with "now". This may also affect the number of occurrences.</p>
<p>When you upgrade to 10.x, the Java version included with HP OO will be upgraded to version 1.7u55, because of the Oracle Critical Patch Update for April 2014.</p>
<p>After an upgrade to 10.x, and rollback to 10.00, the system accounts disappear.</p>

## Studio Limitations

If you rename an item inside a folder and commit it, and after that you rename the folder containing the renamed item and try to commit the folder, an SCM error message will appear.

This is a limitation of Apache Subversion, which is a third party SCM tool. For more information about the progress of this limitation, please contact Apache.

In some situations, the move functionality doesn't work properly on SCM. For example, when one user moves a folder from one project to another and commits the changes, if a different user moves that folder back to the first project in any path, an error message is displayed.

By default, SVN has a list of file patterns (shown below) that are ignored when nonversioned files are added to SCM:

```
*.o *.lo *.la *.al .libs *.so *.so.[0-9]* *.a *.pyc *.pyo
```

This means that a non-versioned project or folder that matches one of these patterns is shown as black (as if it is versioned) in the **SCM Changes** panel. However, you can still add the project or folder to SCM and work with them as usual.

In the **SCM Messages** pane, the messages coming from the Source Control Management client tool may contain an encoded URL. This is the repository URL in a standard encoded form. The message is coming from an external SVN client tool used by Studio (SlikSVN).

**Note:** For information about URL-encoding or percent-encoding, see <http://en.wikipedia.org/wiki/Percent-encoding>.

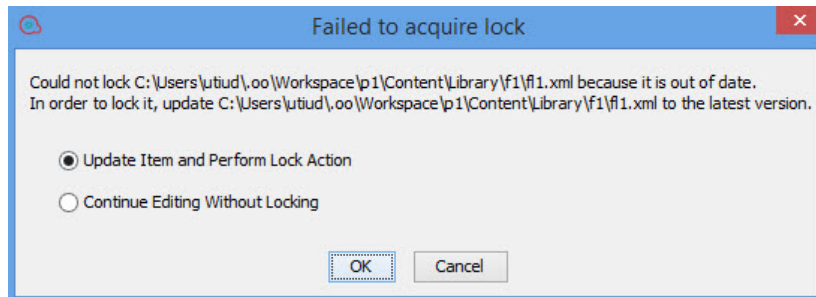
Note that a non-encoded version of the URL (the same URL that was entered when the **Checkout** button was clicked) is also logged in the **SCM Messages** pane.

Similarly, in a localized installation, some of the text in the **SCM Messages** pane may appear in English. This is because the message comes directly from the SVN client tool.

In Studio, the € sign is not supported in names of elements, such as flows, configuration items, operations.

Studio SCM does not support conflicts and merging. You need to lock an item before starting to edit it. If a flow is already locked, you must wait for the lock to be released, before editing the flow.

If you try to lock an out-of-date item in an environment with multiple authors, the following dialog box appears:



If you select **Update Item and Perform Lock Action**, inconsistencies may occur in your project. To resolve this issue, you need to manually refresh your project.

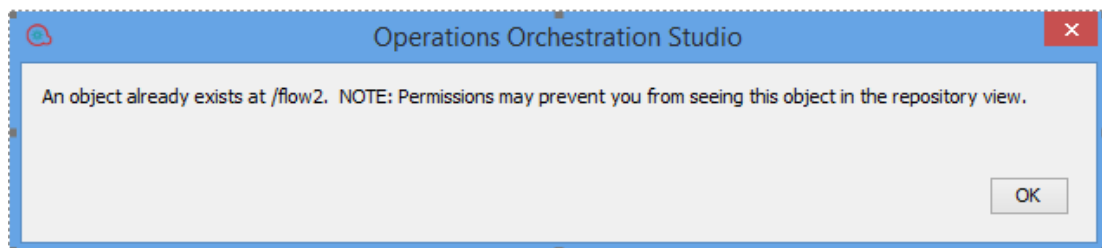
If the item was previously moved or renamed by a different author in another Studio, you should also update the workspace. To update the workspace, from the **SCM** menu, select **Update All**.

**Note:** It is recommended that you always update your workspace before editing existing items.

**Note:** To refresh a project, select the project and click the **Refresh** button in the toolbar or right-click on the project and select **Refresh**.



In a multi-authoring environment, when you move items between two projects, the following message may appear:



In these cases, it is recommended to manually refresh the destination project.

**Note:** To refresh a project, select the project and click the **Refresh** button in the toolbar or right-click on the project and select **Refresh**.





## Localization Limitations

The date format for the Scheduler and Run Management is wrong in the Chinese and Japanese environments.

The following items may not be translated:

Folders, flows, operations, steps, transitions, callouts, LDAP configuration error messages, and Remote Debugger error messages.

This is due to third party elements that cannot be localized.

If you are planning to localize HP OO to Japanese or Chinese, it is recommended not to use an MS SQL database, but to use an alternative such as Oracle, MySQL, or Postgres.

Foreign languages are not supported in OOSH.

## API Limitations

When launching HP OO flows from the BSM GUI or when trying to configure HP OO flows in BSM, you may receive error 401 messages periodically. Sometimes, everything works after the second or third attempt to launch the flow.  
A hotfix is available through HP Support.

The APIs **Delete flow schedule** and **Enable flow schedule** return 200 for non-existent schedules, instead of returning 404 Not Found (like GET /schedules/123).

The GET/group-aliases REST API returns group aliases that are mapped into groups.

## Central Limitations

Deploying a content pack that contains paths longer than 255 characters fails with unclear error messages in UI and logs.

After deploying content updates in Central, the **Content Pack Changes** view does not display the content changes accurately.

When you click a content pack and for some reason (for example, server side error) the REST request fails, there is no notification that the request failed, and even though the selection is on a different content pack, you see the changes from the previously selected content pack.

In the Run Explorer, the **User** column filter considers the domain, (in the following format: domain/user name).

The Central Scheduler does not work when SAML authentication is used.

There is a limit to how many groups an LDAP user can have. Users who are members of more than 1,015 groups may fail logon authentication.

For more information, see <http://support.microsoft.com/kb/328889>

If you are going to embed the Drill Down window into an external HTML page, it is recommended to have an SSO solution in place (for example, SAML 2.0). If an SSO solution has not been configured, an HP OO login screen will appear in the iframe, when it first loads inside the page. On some browsers (for example, IE11), the default privacy settings will need to be updated to allow third party cookies before users will be able to log into HP OO via the iframe .

While you can edit existing configuration items in Central 10.x, it is not possible to create new ones. New configuration items can only be created in Studio.

There are limitations to the way that Central enforces path uniqueness:

- Unlike Studio, Central enforces path uniqueness for certain item types only – namely, flows and the specific configuration item types that are supported by the REST API **/v1/config-items**. For more information, see the *HP OO API Guide*.
- Unlike in Studio, paths are case-sensitive in Central. This means that Central may not detect a conflict between “my item” and “My Item”, for example.

On a clustered environment, if two Centrals are in different time zones, this might cause errors in the run durations (in the Run Explorer, for instance). In this case, the duration is computed incorrectly and does not reflect the real execution time of the run.

In the case of failure, the Central and RAS recovery mechanism will re-run a step that was not completed when the failure occurred. This may cause duplication of the some of the steps' logging, which is reflected as duplicated fields in the UI.

In the Chrome browser, after deployment, it is not possible to delete the folder containing the content pack. This is a limitation in the browser.

Short database disconnections might cause running flows to fail to complete (to end with the status **Failed To Complete**). If this occurs, run the flow again.

BSM integration and LWSSO do not work when HP OO and BSM are not on the same domain. When a user runs a flow from the run book, the HP OO login page appears, even though it should not appear when LWSSO is used.

In a clustered environment, the clocks on the different machines must be synchronized using some form of time-sync service (daemon) that runs regularly. The clocks must be within a second of each other. For instructions on how to do this, see <http://www.nist.gov/pml/div688/grp40/its.cfm>.

SSO Kerberos authentication is not currently supported.

Descriptions (for example, of flows or inputs) that are longer than 4,000 bytes are truncated, so that only part of the description is visible.

When you use the Operations Orchestration Shell (OOSH) to run HP OO commands from the command line, if the trigger command fails, a general message is displayed, instead of a specific one.

Restarting a Linux Central machine does not automatically start Central. Setting a service to start automatically on Linux depends on the Linux flavors.

LDAP group membership is only supported when the group membership field value is a DN.

LDAP referrals are not supported. If a user tries to log in or tests the LDAP configuration with a user that is in a referral LDAP, a message appears, saying that the user was not found.

**Note:** When you upgrade from a version of HP OO 9.x that contains LDAP configured with referrals, there is no warning about referrals no longer being supported in 10.x.

With Open LDAP, in some cases, user groups are not fetched. This occurs because in Open LDAP, the membership attribute contains the UID and not the DN.

**memberUID** contains the user's UID while **member** contains the user's DN. This is one of the main differences between RFC2307 and RFC2307bis.

More applications are moving toward support for RFC2307bis, because it offers faster LDAP browsing when retrieving additional attributes.

In LDAP, there are two common ways of grouping users:

- **posixGroup:** Uses the **memberUid** attribute, which contains only the value of the UID of a user's full DN. For example:

```
cn=SomeGroup,ou=Groups,dc=example,dc=com  
memberUID: someuser
```

- **groupofNames:** Uses the **member** attribute, which contains the full DN of the user. For example:

```
cn=SomeGroup,ou=Groups,dc=example,dc=com  
memberUID: uid=someuser,ou=People,dc=example,dc=com
```

The **posixGroup** version is generally used in UNIX environments.

The **groupofNames** version is the more Windows/AD like method. EMC VNX Unisphere expects this method.

For more information, see <http://ludopoitou.wordpress.com/2011/04/20/linux-and-unix-ldap-clients-and-rfc2307-support/>.

The operating system time and time zone of the Central and RAS machines must not be changed after installation.

<p>In a multiple time zone environment, schedules are not triggered at correct times and sometimes do not appear in the Run Explorer.</p>
<p>When the LDAP configuration is not accessible, schedules fail to be triggered with internal users.</p>
<p>When upgrading a schedule with a start date in the past, the start date will be overridden with "now". This may also affect the number of occurrences.</p>
<p>When debugging a flow from Studio remotely on Central, if the run gets to paused state and then the pause is handled from the Central UI, the flow continues to run; however, in Studio it remains at the prompt. Handling the prompt in Studio shows the rest of the flow execution in Studio.</p>
<p>The Remote Debugger does not support features that require user information on the context. This includes logged in user credentials, user data, roles, and gated transitions.</p>
<p>Due to limitations in the SOAP API support in 10.x versus 9.x, some of the operations generated with Web Service Wizard from the HP OO 10.x WSDL may not run in Studio and Central. To check the support status, see the <i>API Guide</i>.</p>
<p>If you are using Windows 2012 with Internet Explorer 10, you must install the Desktop Experience in order to view the videos in Central.</p>
<p>If you are applying a filter on runs in the Run Explorer, click the refresh button in order to view the newly added runs.</p>
<p>In some cases, trying to authenticate or search for a user in the LDAP might return multiple results.</p> <ul style="list-style-type: none"><li>• This could happen if, for example, the LDAP configuration is configured using Global Catalog, and the same user identifier exists in a different domain.</li><li>• It could also happen if the customer configured the Users Filter string incorrectly, for example, did not use a unique identifier for the user name.</li></ul> <p>In these cases, HP OO arbitrarily chooses the first result (the first user) returned from the LDAP. The following message appears in the log :</p> <p>"More than one user was found in the LDAP search. The first one returned in the search results is used. Check your LDAP configurations."</p>

There are a number of operations related to the getScheduledFlowsHP OO plugins in previous versions. These operations require engine support. Due to the limitations on the platform side, there are out-of-the-box operations and flows that are not supported at this time.

Cluster	Get Cluster Servers
	Get Server Status
Cross Run Data Persistence	Get Stored Flow Variable
	Store Flow Variable
Repository	Check In
	Create Snapshot
	Delete Path
	Delete Snapshot
	Get Last Modified By
	Get References to Path
	Repository Sync
	Set Selection List (limitation: supported for HP OO 10.x only)
	Set System Account (limitation: supported for HP OO 10.x only)
	Set System Property (limitation: supported for HP OO 10.x only)
Other	Generate Documentation
	Generate Documentation with Hidden Folders
	Generate Run URL
	Launch Flow
	Resume Flow Run

## Wizards Limitations

The Invoke2 method array is misordered when other variables are at the same level.

When the invoke2 xmlTemplate has an array and other variables in the same xmlBlock, the soap request is built in the incorrect order:

```
start xml block
  array
  variable
end xml block
```

This produces a soap capture:

```
start xml block
  array 0 values
  variable
  array 1 values
  array 2 values
end xml block
```

In some cases, the PowerShell operation doesn't work in Studio after upgrading from 9.x.

In the Web Services Wizard, the **inputMap** is incomplete when importing custom WSDL with complex attributes. The **inputMap** only contains entries for **systemType**, **eventType** and **errorsType**, and is missing the entries for **applicationSource** and **applicationDestination**.

## Backward Compatibility With HP OO 9.x APIs

- Some SOAP and REST APIs from HP OO 9.x are supported by HP OO 10.x, and some are not.

Some of the SOAP APIs from HP OO 9.x have equivalent REST APIs in HP OO 10.x. We recommend using the REST APIs in HP OO 10.x

- The base path for using HP OO 10.x REST API is: `http(s)://<OO Central Server Name / IP>:<PORT>/oo/rest/`.
- The URL for using HP OO 9.x SOAP API while working with OO 10.x Central is the same as in HP OO 9.x. That is, `https:// <OO Central Server Name / IP>:<PORT>/PAS/services/WSCentralService`.
- The URL for using HP OO 9.x REST API while working with OO 10.x Central is the same as in HP OO 9.x. That is, `https:// <OO Central Server Name / IP>:<PORT>/PAS/services/rest`.
- We have restored compatibility with HP OO 9.x in terms of behavior when launching interactive flows using APIs. Flows launched from a backward-compatible SOAP/REST API will fail if they contain required inputs or steps with required inputs, which are set to prompt the user if no value was provided. This is the same behavior as in HP OO 9.x.

In HP OO 10.00, there was an incompatibility and these flows would become paused instead of failing. Since version 10.02, the behavior was restored to be as it was in version 9.x.

## SOAP

Below you can find information on what is supported, what is not, and the HP OO 10.x API that we recommend to use. For details on the HP OO 10.x REST requests, see the section below.

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
Configurations	getLWSSOConfig	Not Supported	GET/authns/lwss-config
	updateLWSSOConfig	Not Supported	PUT/authns/lwss-config
Clusters	getClusterNodes	Not Supported	N/A

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
Flows	getFlowDetails	Supported	GET/flows/{Benchmark}
	getFlowGraph	Partially Supported.  The request will succeed, but a static image is returned saying that this feature is not supported.	N/A
	getFlowInputDescriptions	Not Supported	GET/flows/{Benchmark}/inputs
Groups and User Management	createGroup	Not Supported	POST/roles
	updateGroup	Not Supported	PUT/roles/{roleName}
	deleteGroup	Not Supported	DELETE/roles/{roleName}
	getUserGroups	Not Supported	GET/roles
	createUser	Not Supported	POST/users
	updateUser	Not Supported	PUT/users/{username}
	deleteUser	Not Supported	DELETE/users/{userIds}

**Note:** In HP OO 10.x, user groups are called roles.



Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
<p>Repositories</p> <p><b>Note:</b> In HP OO 10.x, the concept of repository was replaced with new concepts. See the <i>HP OO Concepts Guide</i>.</p>	getPermissions	Not Supported	<p>In order to control content permissions, use:</p> <p>GET/roles/{rolesNames}/entitlements/** or</p> <p>PUT/roles/{roleName}/entitlements/**.</p>
	setPermissions	Not Supported	
	getAttributes	Not Supported	
	renameRepoEntity	Not Supported	
	deleteRepoEntity	Not Supported	
	moveFlow	Not Supported	
	updateDescription	Not Supported	
	createFolder	Not Supported	
	moveFolder	Not Supported	
	list	Supported	<p>GET/flows/tree</p> <p>GET/flows/tree/sub</p> <p>GET/flows/tree/level</p>
	search	Supported	N/A

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
Runs	getFlowsRunHistory	Not Supported	N/A
	getFlowRunHistory	Supported	GET/executions
	pauserun	Supported	PUT/executions/{executionId}/status
	resumerun	Supported	PUT/executions/{executionId}/status
	cancelrun	Supported	PUT/executions/{executionId}/status
	runFlow	Supported	POST/executions
	runFlowEx	Supported	POST/executions
	getRunStatus	Supported	GET/executions/{id} GET/executions/{executionIds}/summary
	getRunStatusEx	Supported	GET/executions/{id} GET/executions/{executionIds}/summary
getStatusForRuns	Not Supported	N/A	

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
Scheduler	isScheduledFlowPaused	Not Supported	GET/schedules/ GET/schedules/{id}
	isSchedulerPaused	Not Supported	GET/schedules/ GET/schedules/{id}
	isSchedulerEnabled	Not Supported	GET/schedules/ GET/schedules/{id}
	getSchedulesForFlowCategory	Not Supported	N/A
	pauseScheduledFlow	Not Supported	/PUT/schedules/{ids} /enabled
	pauseSchedule	Not Supported	PUT/schedules/{ids} /enabled
	resumeSchedule	Not Supported	PUT/schedules/{ids} /enabled
	scheduleFlow	Not Supported	POST/schedules
	getSchedule	Not Supported	GET/schedules/{id}
	deleteSchedule	Not Supported	DELETE/schedules/ {ids}
	getScheduledFlows	Not Supported	GET/schedules
	getSchedulesOfFlow	Not Supported	GET/schedules
	resumeScheduledFlow	Not Supported	PUT/schedules/{ids} /enabled
	deleteScheduledFlow	Not Supported	GET/schedules DELETE/schedules/ {ids}
Selection Lists	getSelectionList	Not Supported	N/A
	createSelectionList	Not Supported	N/A
Repositories	/list/{path}	Supported	N/A
Runs	/run/{flow path/Benchmark}	Supported	POST/executions

## REST

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
Repositories	/list/{path}	Supported	GET/flows/tree GET/flows/tree/sub GET/flows/tree/level
Runs	/run/{flow path/Benchmark}	Supported	POST/executions

## Deprecation Notes

- Support for Studio on Microsoft Windows 7 32 bit is deprecated since version 10.02.
- The SOAP APIs from HP OO 9.x have been deprecated. It is recommended to use the new REST APIs instead. For more information, see the *HP OO API Guide*.

**Note:** HP is committed to support deprecated APIs until the next major release.

- The REST API that starts with /PAS has been replaced by a new REST API. For more information, see the *HP OO API Guide*.
- The URL flow invocation (launch API) that starts with /PAS has been replaced by a new API that starts with /oo. For more information, see the *HP OO API Guide*.
- The IAction interface for Java has been replaced by @Action. For more information, see the *HP OO Action Developers Guide*.
- The **RSFlowInvoke** and **JRSFlowInvoke** utilities have been deprecated. We recommend using the HP OO Shell Utility instead. For more information, see the *HP OO Shell Guide*.
- Sleep scriptlets have been deprecated. In HP OO 10.x, scriptlets must be written in Rhino.

## Fixed Defects in 10.22.0001

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C28374	Searching on HPLN from Studio throws PKIX path building failed error	The HPLN Certificate was updated in HP Operations Orchestration.

## Fixed Defects in 10.22

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit [HP Software Support Online](#), or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C26434	Launching flows from BSM containing user prompts is not possible.	This functionality has been restored.
QCCR8C27293	When running Purge Execution Summary flow, Central can crash if there are flows with more than 500.000 steps.	The SQL query that fetches the database records to be deleted has been optimized.
QCCR8C27299	Add functionality to allow multi-character delimiters.	Multi-character delimiters are now supported.
QCCR8C27565	Under certain conditions, flow executions remain in the RUNNING state indefinitely.	The worker recovery mechanism has been updated.
QCCR8C27675	Errors in the server.log and execution.log files when debugging a flow in Studio against the Central server. These errors shouldn't be there if the flow runs successfully.	The debugger mechanism has been updated.
QCCR8C27849	Step's session context is passed into subflows causing particular flow loops to break.	The behavior has been fixed.

CR Number	Title	Description
QCCR8C27904	When using UTC time zones, editing a Scheduled Task adds 12 hours to Start time.	The handling of negative timezone offsets was corrected in the JavaScript code of the Scheduler dialog.
QCCR8C27917	After upgrade, the product version in Add/Remove programs remains unchanged.	The installer was updated.
QCCR8C28051	Database records may contain duplicated records for multi-instances and parallel steps.	Duplicated events are no longer persisted in the database.
QCCR8C27675	OO Logs Null Pointer Exceptions Whenever BreakPoints are Used	When running a flow in Studio and debugging against a Central server, when breakpoints were set, the server.log and execution.log files would be filled with errors.

## Fixed Defects in 10.21.0001

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C26785	The operation "Store System Account in Flow Variables" returns the following error even if the system account it exists in the system. "exception: The provided system account does not exist."	The operation's behavior has been corrected.
QCCR8C26996	LWSSO is not working correctly when two different Centrals are used in the same browser	The behavior has been corrected.
QCCR8C27051	Upgrading an OO 10.x installation to 10.21 having the HTTP connector disabled fails	Upgrading now works correctly.
QCCR8C27107	Default role is not mapped to LDAP users that are not belonging to any LDAP group	The default role is now assigned if the user's LDAP group list is empty.



## Fixed Defects in 10.21

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR1197103	BSM 9.24 cannot connect to OO 10.02 using LWSSO	The LWSSO filters have been modified.
QCCR8C24594	Central ignores Prompt user display sizes when running a flow	The specified size is now taken into consideration.
QCCR8C26268	When launching OO flows from the BSM UI or when trying to configure OO flows in BSM, OO can periodically return 401 error code	The behavior has been corrected.
QCCR8C26322	Preceding or trailing whitespace in the debugger 'load run inputs' window results in the run id being considered to be invalid.	The input values are now trimmed.
QCCR8C26439	OO 10 Filtered results do not resolve variables from step context	Variables provided in step input values are no longer by passed by the filter specified on <b>Results</b> .
QCCR8C26458	In runFlow WS method, listValues should be ignored if contains a single element with empty content	listValues is now ignored if it has empty content.

CR Number	Title	Description
QCCR8C26460	The HP OO 10 backwards compatible SOAP API does not allow omitting the <b>flowInputs</b> parameter in the <b>runFlow</b> method	When using the <b>runFlow</b> and <b>runFlowEx</b> methods, the flowInputs parameter can now be omitted as in HP OO 9.x.
QCCR8C26667	Content Upgrade Utility (CUU) does not upgrade properly multi instances containing List Appender and flow variables	In upgraded OO 10 flows, the multi-instance steps containing List Appenders will have a scriptlet merging branch contexts to flow context.  For more information on upgrading 9.x flows containing multi-instance steps, see the documentation under the <b>CUU</b> folder (Converting Flows using Multi Instance Steps from OO 9.0X to OO 10.21 Format.pdf).
QCCR8C26668	Because OO 10 does not allow a direct transition from within an MI lane to a return step, upgraded flows from 9.x in this situation will be marked as invalid	A marker step and an error handler step have been added to each multi-instance step from the upgraded flows.  For more information on upgrading 9.x flows containing multi-instance steps, see the documentation under the <b>CUU</b> folder (Converting Flows using Multi Instance Steps from OO 9.0X to OO 10.21 Format.pdf).
QCCR8C26675	The Display tab from step inspector will prompt the user for inputs twice, at the same step	This behavior is no longer is encountered.
QCCR8C26835	After setting the security banner to an empty string and restarting Central, a Null Pointer exception is thrown.  The exception is raised only when Oracle was chosen as the database vendor.	The default banner has been reset to an empty value as opposed to Null.

CR Number	Title	Description
QCCR8C26945	<p data-bbox="557 285 824 453">Integration between OO and BSM fails when authenticating in BSM using an external user.</p> <p data-bbox="557 474 824 579">The following errors can be observed in the OO logs:</p> <p data-bbox="557 600 824 705">ERROR - *No LDAP configurations were found for domain null*</p>	<p data-bbox="841 285 1383 390">There is now enhanced error logging with a more appropriate error message, explaining the cause of the failure.</p>

## Fixed Defects in 10.20

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C22492	Inputs of type "selection list" are ignored when using trigger.html URL	When a flow had a <b>Selection List</b> type input , it was not populated when using URL in the following format: <OO url>/trigger.html#<uuid>?runName=<runName>&input_<inputName>=<selection list value>
QCCR8C22614	Can't copy text from Run Details and Flow Details pull-downs on run detail page using the mouse context menu	On the <b>Run Detail</b> page in the HP OO Run Workspace, for both the <b>Run Details</b> pull-down and the <b>Flow Details</b> pull-down, text could be selected by sweeping with the mouse but as soon as the right mouse button was clicked, the pull-down closed, the selected text disappeared, and the right-mouse button menu appeared. Because the selected text was gone, it was impossible to copy it to the Windows clipboard for pasting elsewhere.
QCCR8C22707	Confirmation pop-up for Cancel must not have YES button selected by default	The <b>Warning</b> box of the <b>Cancel</b> job had <b>YES</b> as the default, when it should have been <b>NO</b> . Now the default is the <b>NO</b> button.
QCCR8C22943	Line breaks in Studio are not consistent with Central interface	Line breaks in an operation in Studio were not seen in the operation in Central.
QCCR8C22945	Document all settings from Studio.properties	A new chapter, "Studio Properties", has been added to the <i>HP OO Studio Authoring Guide</i> .
QCCR8C23379	Browsing Run Explorer workspace triggers constant 80% CPU usage on database server	The Central UI caused high CPU usage on the database server. A caching mechanism has been added, to avoid querying the database too often.

CR Number	Title	Description
QCCR8C23517	Installer summary output doesn't let you scroll till the during the summary view	It is now possible to resize the installer wizard.
QCCR8C23588	Drilldown 'collapse all' won't work when the tree is refreshing, but the button is still enabled	If the <b>Collapse All</b> button was clicked while the tree was refreshing, the tree would collapse and 'freeze', like when a node is selected in the tree.
QCCR8C23796	MSSQL create Schema (database) – Setting an already existing user or the Admin user as the database user to be created fails the installation.	When installing Central with MSSQL database with an already existing user as the database user, the installation would fail.
QCCR8C23798	Wrong error message for installation create database in MSSQL when the Admin user is not inserted	When installing Central without entering an administrator user name and password, the error message did not explain clearly what was missing.
QCCR8C23984	Flow inputs do not always populate when launching from URL	When a flow is launched from a URL, some of the inputs were not filled out.
QCCR8C24610	Remove unnecessary note from Studio guide	The following note has been removed because it is no longer applicable: "Do not select the Prompt User option for a step in the middle of a flow. User prompts in the middle of a flow are not supported as an input source in this version."
QCCR8C24675	OOTB Manual operation works differently in the 10.02 version	The title and the message information are now displayed on the popup window on the Manual operation.

CR Number	Title	Description
QCCR8C25189	Studio freezes if the user opens flow while expanding a folder is in progress	The locking mechanism that initializes the projects or content packs was updated to avoid deadlocks.
QCCR8C25427	Low speed of OO 10.10	Performance when running flows has been improved.
QCCR8C24645	When the installer wizard is opened, the Mac title bar is displaying SWT, instead of the name of the application.	The title bar now displays the expected text.
QCCR8C25632	Studio performance - Working with Large project – cut + paste activities, consumes all system CPU and the Studio seems stuck, GDI objects usage off the charts, Studio UI not responsive.	<p>When a <b>Cut/Copy &gt; Paste</b> action takes more than two seconds, a popup dialog appears with a message about the current state.</p> <p>The <b>Cut/Copy &gt; Paste</b> action consumes almost all system CPU because it tries to execute the action in the shortest time possible.</p> <div style="background-color: #e0e0e0; padding: 5px; border: 1px solid #ccc;"> <p><b>Note:</b> The application is single-threaded, so if the machine user has at least two core CPUs, then CPU consumption will not be at 100%.</p> </div>
QCCR8C25688	Studio debugger stop button is wrongly disabled while the flow is paused	When a flow is paused, the <b>Stop</b> button is now enabled.
QCCR8C22582	Error message about evaluation format is not visible in Central UI	The container holding the error message has been resized.
QCCR8C24718	Installer unable to detect status of Central service during the upgrade on non-English Windows	The upgrader now supports non-English locales.

CR Number	Title	Description
QCCR8C25165	Central will not start after changing the keystore/truststore passwords	<p>The missing information has been added to the "Changing the KeyStore/TrustStore Password" section in the <i>HP OO Hardening Guide</i>.</p> <p>Instructions about how to create an encrypted password have been added to the <i>HP OO Administration Guide</i>.</p>
QCCR8C25931	Strip whitespace result filter doesn't remove 'ZERO WIDTH NO-BREAK SPACE' U+FEFF	<p>The "Strip Whitespace" result filter now removes the hidden character 'ZERO WIDTH NO-BREAK SPACE' U+FEFF if an UTF file with BOM is read.</p>

## Fixed Defects in 10.10

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C21114	Missing .NET Framework check in the OO studio installation	The installer now checks for .NET Framework.
QCCR8C21866	Silent uninstaller for OO Studio 10.x on windows and Linux	It is now possible to uninstall HP OO silently.
QCCR8C22082	Format Replace filter behavior changed after upgrading o 10.01	In the <b>Step Results</b> tab, unpredictable results could occur with the <b>Format Replace</b> filter when used with a variable reference such as <code>\${var}</code> .  Results are now resolved according to their order.
QCCR8C22799	Logged in user name does not include the domain name.	The logged in user did not authenticate correctly when AD/LDAP was used.
QCCR8C23301	Creating CP with sdk zip 10.02 version and failed to be deployed in Studio 10.10	Content packs created with the Maven archetype all had the same UUID defined and so no two such content packs could be created simultaneously in Studio.
QCCR8C21080	Uninstall of RAS does not remove the definition from the database	The ability to remove the RAS from Central UI (under the <b>Topology</b> tab) has been added.
QCCR8C22741	When encountering a Display operation, the Studio debugger Step In functionality will not work as expected	When the <b>Step In</b> button is selected in the debugger, it steps in to the next step.
QCCR8C22883	After upgrading to OO 10.02 from OO 10.01.0001, flows are no longer running	After upgrading to OO 10.02 from OO 10.01.0001, flows run as expected.
QCCR8C23921	Inconsistent System Evaluator behavior between OO versions.	The System Evaluator tried to validate null values.



CR Number	Title	Description
QCCR8C24051	Unable to upgrade content with the content upgrade utility and java.lang.NullPointerException	The following error appeared when trying to upgrade a 9.x repository for version 10.02: [15:56:25] FATAL [main] - Error java.lang.NullPointerException
QCCR8C22644	Run history disappears after importing empty content packs.	All history from the Run Explorer is now kept after an empty version of content pack is installed.
QCCR8C22839	Transition messages set in OO studio do not show up in Central	The transition messages (messages between operations) were not showing up when a flow was run in Central.
QCCR8C23258	Jenkins plugin incorrectly retrieves flows under the Basepath folder	The flow names are now correctly displayed under "Select flow to execute on server".
QCCR8C23999	Setting the saServerIdentifier input as List of Variables in OO 10.02, will not allow editing additional inputs for the flow in SA 10.01	When trying to run a flow from SA Client, a warning is thrown and the inputs of the OO operations are no longer editable.
QCCR8C22551	key.store and client.truststore are not generated when using oo embedded	The key.store and client.truststore were not generated when using HP OO embedded.
QCCR8C24202	OO10.x does not handle correctly the 'listValues' sent from SA 10.x	saServerIdentifiers were not transmitted correctly.
QCCR8C24051	Unable to upgrade content with the content upgrade utility and java.lang.NullPointerException	An error would occur when using the Content Upgrade Utility to upgrade a 9.x repository for version 10.02.
QCCR8C23999	Setting the saServerIdentifier input as List of Variables in OO 10.02, will not allow editing additional inputs for the flow in SA 10.01	Setting the <b>saServerIdentifier</b> input as <b>List of Variables</b> in HP OO 10.02 did not allow editing of additional inputs for the flow in SA 10.01.
QCCR8C22310	Security issue	
QCCR8C23258	Jenkins plugin incorrectly retrieves flows under the Basepath folder	The Jenkins plugin incorrectly populated the flows within the <b>Select flow to execute on server</b> combo box.

## Fixed Defects in 10.02

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR8C22262	Security issue	
QCCR1D166237	When passing an encrypted parameter to an unencrypted parameter the encrypted data will be revealed	When the Use Constant clause is used to define the value assignment of an input, any references to encrypted variables are replaced with "*****" instead of resolving the unencrypted values.
QCCR1D171734	Java heap space error occurs when trying to view a flow with a duration more than 2 hours in Central/Run Workspace	A customer was consistently getting an error when trying to view the Run log of a flow that has a duration more than two hours of execution time in Central/ Run Workspace.
QCCR1D174250	Security issue	
QCCR1D173872	LDAP - Large number of groups returned causes test/login to fail	When a user ID had too many group memberships an error was thrown.
QCCR8C22219	The execution_userid is not populated when run from Studio	When running Studio to debug through Central, the execution_userid was not getting set to the user that was logged in, and was setting it to dummy_user.
QCCR8C22318	Hardening guide doesn't include the SSL configuration of LB	Information about configuring a load balancer has been added to the HP OO Configuration and Hardening Guide.
QCCR8C22261	Evaluators fail on List of Values input type with delimiter	The Do Nothing operation at /Library/Operations/Utility Operations/Flow Variable Manipulation did not work with the List of Values Input type. The operation would not accept multiple values separated by a comma or semicolon.
QCCR8C22460	Security issue	

CR Number	Title	Description
QCCR8C22550	Studio hangs with some specific scriptlet syntax such as "scriptletContext.get("");"	In the "scriptlet" of any step in Studio, the use of syntax such as "scriptletContext.get("");" caused Studio to hang.
QCCR8C22462	Hotfix for "QCIM8C21536 Webservice wizard not generating all inputs for object" for OO 10	Input maps were missing from the WSDL file when importing via web services wizard.

## Fixed Defects in 10.01.0001

The reference number for each fixed defect is the Quality Center Change Request (QCCR) number.

For more information about fixed defects, visit HP Software Support Online, or contact your HP Support representative directly.

CR Number	Title	Description
QCCR1D171325	Central duplicates the folders and their content when the name of one folder contains the same name as any other folder.	When content packs were deployed to Central, this would result in two copies of folders, if a folder containing the same name already existed in Central.
QCCR1D160344	Reverting after renaming, moving or deleting the new file and does not restore the old one.	Reverting a single item (flow or configuration property) in the repository did not produce the expected results.
QCCR1D167885	Execution of long flows takes much more time in OO 10 when compared to 9.x	A flow with many steps would take noticeably longer to run in version 10, as compared with version 9.x.
QCCR8C21055	Performance - Studio: Studio engine should be tuned in various aspects to suit the Studio	The standalone engine used by Studio for local debugging was not tuned for best performance when used by Studio. Debugging performance could be improved by finding the optimal values for varying parameters (for example, the periodicity of worker's outBuffer).

## Installing HP OO

### Upgrading to HP OO 10.22.0001 from an earlier version of 10.x

To upgrade to HP OO 10.22.0001, you can run the **apply-upgrade** script on any existing version of HP OO 10.x.

For more information, see *Upgrading to a New Version of HP OO 10.x*.

### Installing HP OO 10.22.0001

HP OO 10.22.0001 does not include an installation wizard. If you have never installed HP OO before, the installation path is:

1. Install HP OO 10.20. See the *HP OO 10.20 Installation Guide*.
2. Upgrade from 10.20 to 10.22.0001. See *Upgrading to a New Version of HP OO 10.x*.

### Upgrading from HP OO 9.x

If you are upgrading from 9.x, the upgrade path is:

1. Upgrade from 9.x to 10.20. See *Upgrading to HP OO 10.x from HP OO 9.x*.
2. Upgrade from 10.20 to 10.22.0001. See *Upgrading to a New Version of HP OO 10.x*.

It is possible to upgrade from any version of 9.x, from 9.03 and later, with all content packs that are supported by HP OO 9.03 and later.

## Upgrade and Rollback Notes

### Upgrade Notes

- If you are upgrading from an earlier version of 10.x, make sure to cancel or finish all paused or running flows and disable existing schedules before applying the upgrade.
- Due to database structure optimizations, upgrading from a previous HP OO version to 10.x 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 HP OO 10.x:

- a. Purge your old data.

This can be achieved using the HP OO 10.x stored procedures available on HPLN.

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

- b. Back up your database.

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

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

## Rollback Notes

- If you want to roll back HP OO 10.x to an earlier version of HP OO 10.x and you have large amounts of data in the database, perform the following actions before rollback begins:

- a. Purge your old data.

This can be achieved using the HP OO 10.x stored procedures available on HPLN.

- b. Back up your database.

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

- c. Depending on the amount and type of your data, the rollback may generate a considerable number of database transaction logs (“redo logs”). Make sure you have sufficient space allocated.

## Installation Notes

- If you uninstalled a previous version of HP 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.
- If you want to add a new 10.22.0001 node to an existing FIPS-2 compliant cluster, the FIPS-2 configuration needs to be done both after installing the new node and after upgrading to 10.22.0001; otherwise, the upgrade to 10.22.0001 process will fail.
- If the user used to connect to the database does not have permission to create tables, you will need to choose one of two options:
  - a. Use the installer’s schema creation option, in which two database users are specified: a privileged user (only used to create the schema) and the user for the HP OO application.
  - b. Run an SQL script to manually create the tables and schema. There are SQL scripts located on [HPLN](#) (HP Live Network) and [SSO](#) (Software Support Online), which you can use:

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

**Note:** Users with this requirement will also need to use the **generate-sql** script when upgrading to the latest 10.x version (for more information, see the *HP OO Installation Guide*).

- The installation path does not support special characters. Valid characters for the installation path include English letters, digits, spaces, hyphens (-) and underscores (\_).
- On Windows, a full installation of Microsoft .NET Framework 4.5 is required for RAS installations and for debugging .NET operations in Studio.
- It is possible to replace the standard JRE that was provided in your HP OO installation with the JRE from the OpenJDK 7 project. For more information, see "Using JRE From OpenJDK 7" in the *HP OO Installation Guide*.
- If you are using Microsoft SQL Server with HP OO, it is required that language-specific database collations are used. Selecting a specific collation also means that an HP 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.
- Some data on the database schema is encrypted and the keys for decryption are stored locally on the file system. If the file system becomes corrupted or deleted, the schema will be useless, because there will be no way to decrypt the data.

Make sure to back up the **central/var/security** folder and the **central/conf/database.properties** file after installing, so that it will be possible to recover from this scenario.

To recover:

- a. Install a new Central with an existing schema. The installation will fail on the **Start Central** step.
- b. Stop the Central service and verify that Central is not running.
- c. Override the **central/var/security** folder with the backed up folder.
- d. Override the **central/conf/database.properties** file with the backed up file.

