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Windows and Linux Operating Systems

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Introduction

This document provides an overview of the HPE Operations Orchestration 10.70 release. It contains important information not included in the manuals or in the online help.

About HPE OO

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

HPE 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 HPE OO concepts, see the *HPE 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 version to 10.70.

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 10.70, 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 Note: The 10.70 workspace format is not supported by 10.x Studio versions prior to 10.10. For best practices for rolling back from 10.70 to a previous version, see the "Rolling Back Studio" section in the *HPE OO Installation, Upgrade, and Configuration Guide*.

What's New in Operations Orchestration 10.70?

Auto-upgrade your 10.60 RASes to HPE OO 10.70

You can automatically upgrade your RASes from version 10.60, using the **ras-upgrade.zip** file, which is available from the HPE OO installation package.

There are four steps that you need to complete in order to upgrade your RASes using Automatic RAS Upgrade.

The first two steps should be performed before the Central upgrade. This minimizes downtime and enables you to fix any issues that may be encountered, before the upgrade.

1. **Upload the ras-upgrade.zip file to Central.** This is a zip file containing the files that are required to upgrade the RASes to the relevant version. You can extract the **ras-upgrade.zip** file from the HPE OO installation zip file. Then, you upload the file to the Central database.
2. **Prepare the RASes for upgrade.** In this step, the RAS automatically runs a set of preparations, to ensure that the upgrade will be successful. This step runs pre-checks to verify that there are no problems in each RAS environment, and prepares those environments for upgrade. The RASes then download the upgrade package from Central.
 - a. If a RAS encounters a problem, the details are displayed on the RAS grid. You need to fix the problem before upgrading that RAS. Examples of problems might be:
 - Insufficient disk space. The RAS upgrade file may require up to 2 GB.
 - Missing OS permissions (administrator permissions).
 - b. Once you have fixed the problems, you should run the preparation process again. This process can be repeated multiple times.

Important: During the first two steps, you can use the RASes as usual. There is no need to schedule downtime.

3. **Upgrade Central.** The next step is to upgrade your environment, by upgrading Central to the new version. This is done manually. For more information, see the *HPE OO Installation, Upgrade, and Configuration Guide*.
4. **Upgrade the RASes.** After Central is upgraded, you need to upgrade your RASes to the same version.

To start the upgrade process, you need to manually select the required RASes and click the

Upgrade Now  button.

When the process ends, the **Upgrade State** column in the RAS grid shows whether the upgrade was successful. Each RAS that was successfully upgraded restarts and reports to Central that it is up in a new version.

Note: A RAS can only be upgraded if the preparation was successful, and its **Upgrade State** shows as **Ready for upgrade**.

If the upgrade fails, you can retry.

Important: The versions of Central and the RASes **must be aligned**. RASes with older versions will not be able to run flows.

In the RAS grid, the **Version** column displays the version of each RAS. Check this column to see if your RASes are aligned with the Central version.

Note: This feature only works if you are upgrading from 10.6x to a later version. It will not work for RASes from earlier versions.

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

Central Enhancements in HPE OO 10.70

Rerun a flow from a specific step

Central provides the ability to rerun a flow from a specific step if the flow failed or was canceled. This functionality can be used to recover a flow that has failed in complex flows, where you do not want to rerun the entire flow for one step. See "Rerunning a flow from a Specific Step" in the *HPE OO Central User Guide* to learn more.

To define a step in a flow to be "rerunnable", you must define the step as a rerun point in Studio. See "Enable Rerunning a Flow in Central from a Specific Step" in the *HPE OO Studio Guide*.

The administrator can enable/disable the Rerun functionality using the **Enable the rerun option for failed/canceled runs** check box in the **System Configuration > System Settings** option in Central.

Note:

- Marking a large number of steps as rerun points increases OO resource consumption and may impact the overall flow execution performance. If you want to define many rerun points, it is recommended that you increase the maximum Java Heap Size. See "Increasing the JVM Heap Size" in the *HPE OO Tuning Guide*.
- This functionality is available in HPE OO version 10.70 and above. If you mark rerun points in a flow, your content pack will fail to deploy in earlier versions of OO.
- If you enable the rerun functionality using Run Settings in Central, you should purge the additional data routinely to control the size of the HPE OO database and enhance the performance of HPE OO.

Network Consumption Enhancements

The number of network requests and the RAS-Central throughput have been reduced by implementing the following changes:

- **Phase execution polling** – The worker job-polling mechanism was optimized to query the database only when jobs exist. This reduces the database load and the network traffic between Central and the database, thus increasing response time.
- **Zippping** – Improved zip capabilities have been added. This significantly decreases the network throughput between the RAS and Central.
- **Merge APIs** – Several configuration APIs (Pause/Resume, Cancelled flows, Worker groups) have been merged to reduce the number of requests sent from a RAS to Central.

CloudSlang Enhancements in HPE OO 10.70

- HPE OO is now compatible with CloudSlang version 1.0. For details on the CloudSlang and how it is used to define workflows in OO, see the CloudSlang documentation [here](#).

Note: HPE OO version 10.70 does not support older CloudSlang content. This means that older content packs will fail to deploy and existing flows will fail to run. Existing content packs should be migrated to CloudSlang 1.0 and then redeployed.

- After upgrading to HPE OO 10.70, all schedules that run CloudSlang flows from versions less than 1.0 are automatically disabled.

If you try to enable them, the following error appears:

`"The configured schedule uses invalid flows"`

- Description, Input, and Output sections are now displayed for CloudSlang flows in the **Content Management > Flow Library**, **Content Management > Content Packs > Changes** tab, and in **Run Management > Flow Launcher**. These fields provide details about the flow.
- The Sensitive property is available for Input and Output. When an input is defined as Sensitive, the content is hidden in memory. By extension, any Python expression that uses this Input is also set as Sensitive.

The Input/Output are seen as sensitive (asterisks) at the **Run > Drill down**. In addition, during flow run, if the input is configured as sensitive, the typed characters will be seen as asterisks

The Output of a flow with a Sensitive Input is not automatically set to Sensitive. It is set to Sensitive only if defined as so.

If an Output is the result of a combination of Outputs where at least one of the Outputs is defined as Sensitive, then the resulting Output is set as Sensitive.

- When System properties are marked as sensitive, they appear as sensitive (asterisks) during the runs and in the **Content Management > Configuration Items > System Properties**.
- HPE OO now supports deployment of multilingual (Unicode) Slang content.
- Content Distribution. All required resources are resolved and downloaded from Central to the RAS at the start of the operation execution using maven.

For python-based content, the administrator must add manually, in the python library in each RAS, all the dependencies needed to run the flow (This should be done only if the author used python libs that are not included in our out-of-the box library). They should be added to the HPE OO class path in ALL HPE OO nodes in the environment (Central or RAS):

- For Central: `<Installation_path>\central\lib\pythonlib`
- For RAS: `<Installation_path>\RAS\lib\pythonlib`

For Java-based content, all required resources are resolved and downloaded from Central to the RAS, at the start of the operation execution using maven, due to the Java action being packaged as a maven artifact by the author.

OOSH Enhancements in HPE OO 10.70

- The OOSH utility has been changed to access HPE OO Central via the latest REST API (v2). This allows OOSH to trigger CloudSlang flows as well as standard OO flows.
- OOSH is now available as a standalone version and no longer requires a full Central installation.
- An option to trigger a flow synchronously has been added to OOSH. This means that OOSH triggers the flow, waits for it to end and shows the result.

Note: The new OOSH will not work with older versions of HPE OO Central that do not support the latest API. Therefore, it is recommended to use matching versions of OOSH and Central.

OOSHA Enhancements in HPE OO 10.70

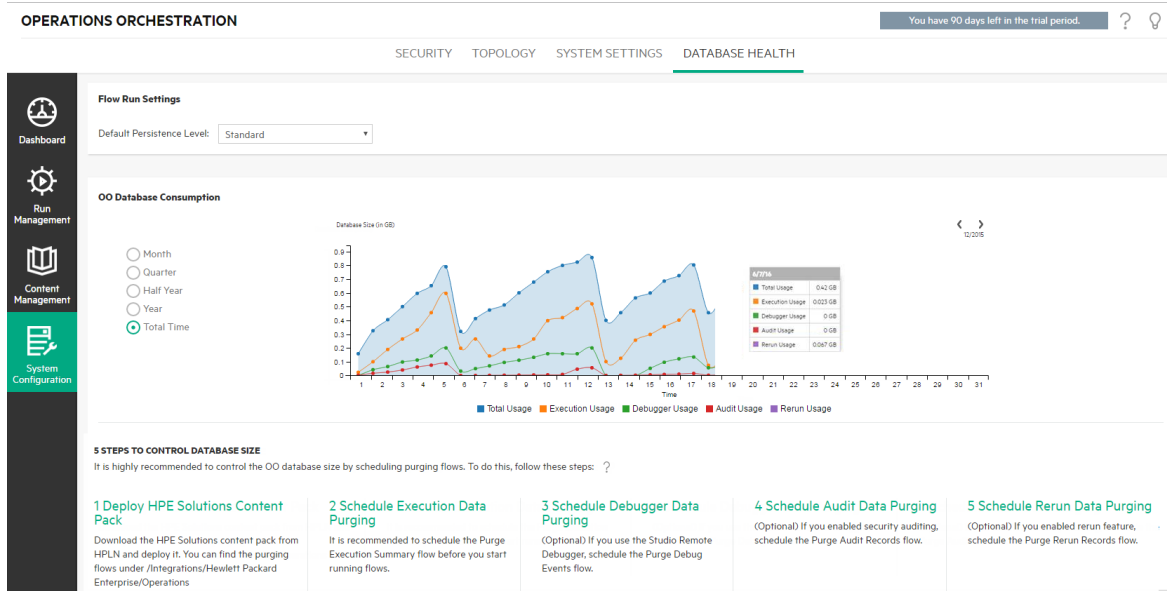
- The OO Shell for Authoring (OOSHA) utility has been enhanced to allow you to create a content pack from a project developed in CloudSlang.
- OOSHA is now available as a standalone version and no longer requires a full Central installation. It can be downloaded from HPLN as well as from the *tools* library.

For more information, see "Creating Content Packs via OOSHA" in the *HPE OO Shell for Authoring (OOSHA) User Guide*.

Database Health Enhancements in HPE OO 10.70

Rerun Usage Information in Database Health Graph

If you have defined rerun points in a flow, you can now see the Rerun Usage information in the Database Health graph in Central.



Purge Rerun Info

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

Data Persistence Enhancements in HPE OO 10.70

New functionality has been added in HPE OO to enable reducing the amount of data persisted in the database, thus decreasing the overall OO database use.

This functionality is especially useful in massive OO deployment, and heavy steps that contain a lot of data.

To implement this, you can define the persistence of a step in a flow to allow less data to be persisted in the OO database. There are two levels of step persistence:

- **Detailed (default):** Persists detailed information when running the flow including step ID, start/end time, and inputs and outputs. This information may be useful when troubleshooting the flow. This option preserves the behavior that was used in versions 10.60 and earlier.

- **Concise:** Persists basic information when running the flow including step ID and start/end time. Use this option when you want to reduce the amount of data persisted in the database and you do not need to troubleshoot the specific step.
- **Note:** The **Concise** option is available in HPE OO version 10.70 and above. If you define a step with Concise persistency, the flow cannot be deployed on earlier Central versions.

For more information, see "Step Inspector > Advanced tab" in the *HPE OO Studio Authoring Guide* and "Run Info > Step Details tab" in the *HPE OO Central User Guide*.

Support Matrix Enhancements

- Microsoft Edge 20 is now supported.

What's New in Previous Releases of HPE OO 10.x

New Features HPE OO 10.60

Rebranding

With the split of HP into HP Enterprise and HP Inc., the Operations Orchestration application and documentation have been rebranded to the new HPE OO look and feel.

Environment Enhancements in HPE OO 10.60

Tomcat Upgraded to 7.0.64

The version of Tomcat used in HPE OO 10.60 has been upgraded to version 7.0.64.

Updated Support Matrix

- RedHat Enterprise Linux 7.x 64 bit is now supported. This replaces support for RedHat Enterprise Linux 5.x 64 bit.
- Oracle Enterprise Linux 6.6 is now supported.
- PostgreSQL 9.4.x and 9.5x are now supported.
- MS SQL 2014 is now supported.
- MySQL 5.7x is now supported.
- Microsoft Windows 10 is now supported for Studio.

For details on the updated database versions, see the HPE OO *Database Guide*.

Authoring Enhancements in HPE OO 10.60

Search and replace of operations and flows usage

It is now possible to perform multiple search and replace of one operation/subflow reference with another. The same applies to dynamic references. For more information, see "Search and Replace References to an Operation or Subflow" in the *HPE OO Studio Authoring Guide*.

OO Shell for Authors (OOSHA) Tool

The Operations Orchestration Shell tool for content authoring (OOSHA) can be used to run authoring commands from the command line, in order to automate processes. This tool is installed together with Studio 10.60.

In this version, OOSHA can be used to package a content pack from a project created in Studio.

For more information, see the *HPE OO Shell for Authoring (OOSHA) User Guide*.

Import Content Packs from HPE Live Network

You can now import content packs quickly and easily from the HPE Live Network pane.

Multiple Studio Instances per User

Multiple Studio instances can be launched in parallel per user. Each instance should use a different Studio workspace.

Dynamic Throttle Supported

OO now supports the use of dynamic variables for throttling values in multi-instance flows. In previous versions of 10.x, the throttling size could only be an integer. In 10.6x, the throttling size can take its value from a \${variable}.

In previous versions of 10.x, multi-instance flows from 9.x that included dynamic variables for throttling values could not be upgraded. In 10.60, these flows can be upgraded.

Central Enhancements in HPE OO 10.60

Reverse RAS Connection

HPE OO 10.60 introduces a new type of RAS – the Reverse RAS – in which the RAS doesn't initiate the connection to Central, but rather waits for Central to connect it.

Reverse RAS is useful in HPE OO deployments where certain RASes cannot access HPE OO Central, usually because of being located behind a Firewall, in a lower security zone.

During the installation of a RAS, you choose between two options:

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

You will need to configure the RAS to accept connection from Central, and configure Central to register the RAS (in the **System Configuration > Topology > Workers** tab).

When the RAS starts up, it will be idle, waiting for Central to initiate connection.

The two RAS types behave identically, only the transport is different.

For more information, see:

- "Installing HPE OO RAS Using the Installation Wizard" in the *HPE OO Installation, Upgrade, and Configuration Guide*
- "Setting Up Topology – Workers and RASes > Register a New RAS" in the *HPE OO Central User Guide*

Large Environment

In HPE OO 10.60, it is possible to include a large number of RASes in your topology.

In order to support such a large scale, it is important to configure Central and the load balancer appropriately. For instructions, see "Configuring Central and the Load Balancer for Large Number of RASes" in the *HPE OO Tuning Guide*.

Upgrade Enhancements in HPE OO 10.60

Automatic RAS Upgrade

For upgrades from 10.6x to later versions of HPE OO, HPE OO supports the automatic upgrade of RASes from Central, without manual intervention and without needing to access the RAS machines physically.

Automatic RAS upgrade is useful for customers with a large number of RASes in their environment, or with RASes in external locations, like end-customers sites, making manual upgrading difficult.

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

Important! Automatic RAS upgrade only works when you are upgrading from 10.6x to a later version of HPE OO. Do not attempt to use it to upgrade from 10.5x.

For more information, see:

- "Setting Up Automatic RAS Upgrade" in the *HPE OO Central User Guide*
- "Upgrading to HPE OO 10.6x from an Earlier Version of HPE OO 10.x" in the *HPE OO Installation, Upgrade, and Configuration Guide*

New Features in HPE OO 10.51

Updated Support Matrix

Microsoft Internet Explorer 9.x is no longer supported.

Central Enhancements in HPE OO 10.51

Timeout Mechanism

It is now possible to configure a timeout setting, so that if a flow run exceeds a specified duration, it will be canceled and will show the status **Canceled-Timeout**. This helps protect the runtime environment from flows that are stuck in a **Running** state.

You can:

- Set a default timeout duration for all flows in the system, under **System Configuration > System Settings > General**.
- Set a custom timeout duration for specific flows under **Content Management > Flow Library**.

A custom timeout setting overrides the default timeout setting and is applied even if timeout is not enabled for the system.

If a timeout setting was defined for an operation inside a flow, the timeout for the operation overrides the timeout assigned to the flow.


For more information, see "Customizing HPE OO" and "Managing the Flow Library" in the *Central User Guide*.

Additional Filtering

There is now built-in filtering in the tables under the following tabs in Central:

- **Run Management > Scheduler**
- **System Configuration > Security > Roles**
- **System Configuration > Security > Internal Users**
- **System Configuration > Topology > Workers**

In the filter boxes at the top of the columns, enter text to filter the display.

<input type="checkbox"/>	State	Schedule Name 	Flow Name
		<input type="text"/>	<input type="text"/>

For the Scheduler, this replaces the **Filter by Flow Name** box. The schedules no longer span across multiple pages, so you can filter all the schedules at once.

For more information, see "Scheduling Flow Runs" in the *Central User Guide*.

Purge Runs by Flow ID

It is now possible to purge flow runs according to the specified flow ID.

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

Authoring Enhancements in HPE OO 10.51

Duplicate UUIDs

If there are items (flows, operations, configuration items) with duplicate UUIDs in a single project or in two different projects, they are now displayed in the project tree in red.

Items with duplicate UUIDs:

- Are read-only and you cannot move or rename them, and the folders containing them cannot be renamed or moved
- Cannot be debugged, as they result in a validation error
- Cannot be dragged to the canvas
- Are not included, when a content pack is created
- Are displayed in the **Problems** pane

To resolve duplicate UUIDs, delete the item with the duplicate UUID and leave the original item.

For more information, see "Handling Duplicate UUIDs in Projects" and "Validating Flows in the Problems Pane" in the *Studio Authoring Guide*.

Working with Multiple Workplaces

There may be cases in which you need to work with more than one workspace—for example, when working with source control.

You can work in SVN in one workspace, and then switch to another workspace to work in Git, without detaching from the SVN workspace and without losing any work you did in SVN, even if you have not yet committed the changes.

Using multiple workspaces in Studio allows you to easily save custom workspace-specific settings such as the proxy settings, debugger connections, the projects you are working on, and the content packs you use.

Additionally, you can work simultaneously on several completely distinct projects and switch between projects as necessary. In this way, you can organize your work more efficiently especially when projects are shared with other authors.

Note: Every workspace contains its own **logs** folder with its own log file.

To use a different workspace, select the new **Switch Workspace** item, under the **File** menu, and browse to the location that you want to use. The workspace is changed and there is no need to restart Studio.

For more information, see "Managing Workspaces" in the *Studio Authoring Guide*.

Alphabetical Sorting of Projects and Content Packs

The lists of projects and content packs are now automatically sorted alphabetically.

Database Enhancements in HPE OO 10.51

The Oracle maintenance stored procedures package now contains a stored procedure for reclaiming LOB space: **hp_oo_db_maint.ForceLobShrink**.

For more information, see "Oracle Database Maintenance" in the *HPE OO Database Guide*.

Security Enhancements in HPE OO 10.51

Configurable X-Frame-Options Response Header

It is now possible to configure how the **X-Frame-Options** response header is added to outgoing responses from HPE OO.

This lets you configure whether or not HPE OO a browser will be allowed to render a page in a <frame> or <iframe>. You can use this to avoid clickjacking attacks, by ensuring that your content is not embedded into other sites.

Note: The default value for this configuration item is **SAMEORIGIN**, which means that only web pages containing iframes that come from the same URI as HPE OO will be allowed.

```
set-sys-config --key xframe.options.mode --value SAMEORIGIN
```

If you are using HPE OO embedded in a browser, you may need to disable this.

For more information, see the *HPE OO Shell (OOSH) Guide*.

Group Mapping is Case-Sensitive

Group mapping is now case-sensitive. If you have two groups with similar names (for example, QG_Basic and qg_basic), which you assign to two different roles, a user logged in with one of these roles will not have access to the permissions of the other.

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

Enable HPE OO to Read from the Subject Alternative Name Field in a Certificate

You can now enable HPE OO to read from the Subject Alternative Name field in a certificate, using the new configuration item `x509.principal.lookup.order`.

This configuration item controls the certificate fields from where the user name extraction is attempted, and their order.

For more information, see "Configuring Client Certificate Authentication in Central > Enabling HPE OO to Read from the Subject Alternative Name Field in a Certificate" in the *HPE OO Security and Hardening Guide*.

Verify that the LDAP Certificate is in the Central Truststore

By setting the property **trustAll.isEnabled** to **false** via OOSH, you can configure Central to verify that the LDAP certificate is in the Central TrustStore. When this configuration item is set to **true**, Central will trust any valid certificate from a secured LDAP server.

For example:

```
oosh> set-sys-config --key ldaps.trustAllCertificates.isEnabled --value false --  
url <central_url> --user <central_user> --password <central_password>
```

In previous versions, when an administrator configured a secure connection to LDAP (under **Central > System Configuration > Security > LDAP**), this connection would accept any valid certificate from a secured LDAP server, even if it was not in the TrustStore.

For more information, see the *HPE OO Shell (OOSH) Guide*.

New Features in HPE OO 10.50

Installation/Upgrade Enhancements in HPE OO 10.50

Trial License

When you install or upgrade to HPE OO 10.50, it is installed with the HPE OO **Enterprise Edition Trial** license. This is a temporary license that runs for 90 days. After the trial license is expired, you will need to purchase the HPE OO Enterprise Edition license.

If you have purchased an HPE OO license, you can install it under the new **License** tab, under **System Configuration > System Settings**. For more information, see "Setting Up Licensing" in the *HPE OO Central User Guide*.

Password Strength

During installation, the HPE OO Installer checks the strength of the passwords that are entered in the **Database Connection** step. If a password is weak, a warning is displayed in the Installer.

You will be able to proceed with the installation, but it is strongly recommended to replace the password with a strong password, in accordance with your company's security policy.

HTTPS-only Option in Installer

During the installation, the **Disable HTTP port (HTTPS only)** check box is selected by default. This means that, by default, all communications to and from Central will be over TLS (Transport Layer Security), and thus encrypted.

Clearing this check box will send sensitive data over an unsecured channel, and therefore is not recommended.

Content Upgrade Utility Updated

The Content Upgrade report generated by the Content Upgrade Utility contains the following changes:

- Under **Require Action > Referencing a missing item**, the last table column now includes the type of item that is missing.
- There is a new **Flows with multi-instance steps** section under **Warnings**. Multi-instance steps in HPE OO 10.x are very different from those in 9.x, so it is highly recommended to check these after upgrading, even when they were upgraded successfully. For more information on upgrading 9.x flows containing multi-instance steps, see the documentation under the CUU folder (Converting Flows using Multi Instance Steps from 9.0x to 10.x Format).

Microsoft Visual C++ 2010 Redistributable Installed

During an installation of, or upgrade to HPE OO 10.50, Microsoft Visual C++ 2010 Redistributable is installed. This makes it possible for HPE OO Studio to work with SVN 1.8.

SVN 1.8 Installed

During an installation of HPE OO 10.50, SVN 1.8 is installed.

During an upgrade to HPE OO 10.50, earlier versions of SVN are upgraded to version 1.8.

(Optional) In order to benefit from the enhancements offered with the SVN 1.8 server, it is recommended to manually upgrade your SVN server as well.

Note: If you roll back from HPE OO 10.50 to an earlier version, you will need to manually delete the **.svn** folder in the **workspace** folder before rolling back, because HPE OO 10.50 works with SVN 1.8 and earlier versions work with SVN 1.7. For more information, see the "Rolling Back

Studio" section in the *HPE OO Installation, Upgrade, and Configuration Guide*.

Installation Help in the Installation Wizard

There are links in the Installation and Configuration Wizard that open the *HPE OO Installation, Upgrade, and Configuration Help*. For more information, see [Documentation Enhancements in HPE OO 10.50](#).

Environment Enhancements in HPE OO 10.50

RASes Restarted After Recovery

The RAS is automatically restarted during recovery.

In previous versions, when a RAS worker failed, there was a cleanup process. The restart of the RAS replaces this cleanup process.

Updated Support Matrix

Ubuntu 14.04.x LTS has been added to the support matrix. This replaces Ubuntu 12.04.x LTS.

Nashorn JavaScript Support

Support for Nashorn JavaScript scriptlets has been added. This includes running and validating Nashorn scriptlets in Studio and running them in Central.

Oracle JDK Replaced with OpenJDK 8

HPE OO 10.50 is delivered with OpenJDK (Zulu) 8 instead of Oracle JDK.

OpenJDK Zulu distribution does not comply with FIPS 140-2. Therefore, to configure HPE OO for FIPS compliance, you will need to change to Oracle JDK manually by following the instructions in "Configuring HPE OO for FIPS 140-2 Level 1 Compliance > Prerequisites" in the *HPE OO Security and Hardening Guide*.

Authoring Enhancements in HPE OO 10.50

GIT Source Control Management System

In Studio, you can now use Git as a Source Control Management (SCM) system as an alternative to Subversion.

The main Git operations in Studio are:

Repository Handling

- Commit changes
- Push changes to the remote Git repository
- Stash local changes
- Unstash stash commits
- Reset to tag
- Update local files with changes from the remote Git repository
- Resolve conflicts that occur during Update, Rebase or Stash operations in the Conflicts dialog box.

Branch Handling

- Create new branch
- Checkout existing branch
- Merge branch
- Rebase branch

To assist you to perform Git operations, new functionality was added to Studio:

- New Git operations in the SCM menus
- Git Repository Log, that allows authors to see a graphic representation of Git actions and easily see updates from the Git remote repository.
- Support for Git in the SCM Changes pane

New Multiple Studio Instances Functionality

Two different users can now open two separate instances of Studio in parallel on the same machine.

New Properties in Studio.properties File

The following new properties have been added to the **Studio.properties** file:

git.history.page.size=100	Refers to the default number of items in the Git history page.
git.history.changes.length=500	Refers to the default number of changes to show in each category.

New Dialog: Configuration > Options

A new dialog, **Configuration > Options**, has been added. This dialog allows you to set different configuration parameters directly in Studio without having to edit the **studio.properties** file manually.

New Option: Tools > Navigate to flow...

A new option, **Navigate to flow...**, is available in Studio. This option allows you to quickly find and open a flow in your workspace.

New Option: Tools > Navigate to item... option

A new option, **Navigate to item...**, is available in Studio. This option allows you to quickly find and open a configuration item in your workspace.

Jump to a flow step from the Run Tree

You can now jump directly to a step in the flow from the Debugger Run Tree in Studio.

Automatic CP Version Incrementing during Content Pack Creation for Unversioned Projects

When creating a content pack from an unversioned project in Studio, the last digit of the version number is now automatically incremented by 1.

Dependency Management

New functionality for managing dependencies has been added to Studio. This includes the following new features:

- **Manage dependencies in new Dependency Editor**

You can now manage dependencies from the Dependencies Editor. The dependency details are also included in a project's properties. From this pane, you can:

- Edit the name and version number of a dependency
- Add a new dependency using name and version
- Remove selected dependencies

- **Update dependencies from Projects and Problems panes**

You can now update dependencies from the Projects pane and from the Problems pane if an error related to dependencies occurs.

- **Validate range of Dependent Items**

The validation process now checks the range of dependent items of a project and also checks that the version of dependent projects match the project version.

- **Validate Project Dependencies Automatically**

New functionality, Dependency Validation, has been added. Dependency validation is triggered automatically:

- When the dependencies of a project are changed and saved
- When a project is updated from SCM either as individual project or as part of an **Update All** operation
- After a project is imported
- When a project is opened

New Content Pack Wizard

A new wizard has been added to allow you to easily create a content pack.

- You can now manage dependencies during the creation of a content pack in the Dependency Management step of the Content Pack Creation wizard.
- The SCM Synchronization page displays only if the project is not synchronized or changes were made to the project dependencies in the Dependency Management window. If not, you will see the Validation and Progress window after clicking Next.
- All the commit operations that were performed for the current branch are automatically pushed to the main Git repository before the content pack is created.

Validate Ranges of Dependent Items of a Project

The validation process now checks the range of dependent items of a project and also checks that the version of dependent projects match the project.

Sensitive Data

- New functionality for hiding output values has been added. If an operation contains sensitive data that you would like to hide from the end-user, you can define this at the step level using a new check box, **Sensitive Data**. You can also mark a result as sensitive data.
- Functionality for hiding input values has been improved. A new check box, **Sensitive Data**, has been added. When you mark an input as sensitive, the input value is now encrypted.
- Results contain output from the operation and additional information that you want to propagate. You can also mark a result as sensitive data.

Studio Process Files Moved to Home Directory

Several Studio process files have been moved to the user's home directory where all the projects and work data of the user are stored. This directory is generally **\${user.home}/.oo**.

The following files have been moved:

Studio.log	The log4j Studio log file.
H2 db	The h2 database files for the local engine.
.lock	The file used to enforce a single instance of running Studio. This file prevents the user from starting multiple instances of Studio in the same working folder.
client.truststore	<p>Stores server certificates. When Studio starts, it copies the client.truststore file from the installation folder to the user's home directory. This copy is used to initialize SSL. If the file is deleted, it is not copied a second time, and a warning message is shown in the log.</p> <p>When you change the truststore password, add the client.truststore.password parameter in the studio.properties file (in obfuscated format).</p> <p>For example:</p> <pre>client.truststore.password={OBFUSCATED} 6L9+NqBjKYp5heuvMEzg0g==</pre>

Database Enhancements in HPE OO 10.50

Purging of Execution Records by Status

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

Purging of Execution Summary

There is a new API for purging the execution summary.

Security Enhancements in HPE OO 10.50

Logged-in User Credentials Support

When the **Enable Capture of Logged-in User Credentials** check box is selected in Central, HPE OO will temporarily capture (in a secure manner) the credentials of the logged-in user when you run flows in the Remote Debugger. A warning message tells you that your credentials may be captured.

Default Roles Can Be Turned Off

In Central, in previous versions, the **EVERYONE** role was set as the default role by default. This could result in the administrator adding permissions to that role, without realizing that this affects all LDAP users, in addition to those are explicitly associated with the role.

In HPE OO 10.50, the default is that there is no default role. This gives the administrator better control of user authorization, because users only get roles that are explicitly assigned either to them or to their LDAP group.

The **Set Default Role** button toggles between selecting a role as the default role and turning this off.

Logged-in User Credentials

It is now possible for an administrator to enable HPE OO to capture the credentials of the logged-in user.

- When this option is **not enabled** (this is the default), the flow will prompt for a password at the relevant step.
 - When this option is **enabled**:
 - If a user starts or resumes a flow that includes logged-in credentials as an input parameter, the credentials of the logged-in user will be captured in the run context and memory (in encrypted form), and used during the flow run. This makes it possible to automate flow runs that require user credentials.
- Note:** The logged-in credentials that are captured are available to Central only in the context of this session. When the user logs out, the credentials are not saved in the database.
- When a user logs in to Central, a warning message appears, telling the user that their credentials might be captured and used in flows. When you are debugging remotely from Studio, the warning appears in the Remote Debugging login page.

The administrator can enable this option by selecting the **Enable the capture of logged-in user credentials** check box in the new **Security > Security Settings** tab in Central .

It is also possible to enable this option by using OOSH to set the value of the **record.loggedin.user.credentials** system property to **true**, as follows:

```
ssc --key capture.loggedin.user.credentials --value true
```

For more information, see:

- *HPE OO Central User Guide*
- *HPE OO Installation, Upgrade, and Configuration Guide*
- *HPE OO Shell User Guide*

Domain Name Not Required for Default LDAP

When HPE OO has multiple LDAP configurations, if the administrator flags one of these as default, users who belong to it will not be required to select a domain upon login.

Sensitive Data is Encrypted in Scriptlets

HPE OO 10.50 secures sensitive data (for example, passwords) during the execution. If you marked a variable as sensitive in Studio, it will be retrieved in an encrypted form when being used in scriptlets. For manipulation on data that is marked as sensitive, it is recommended to use filters instead.

New Security Settings Tab

The **Security > Security Settings** tab in the System Configuration module contains the **Enable the capture of logged-in user credentials** check box.

In addition, the check boxes to enable auditing and authentication, and the security banner configuration have been moved to this tab.

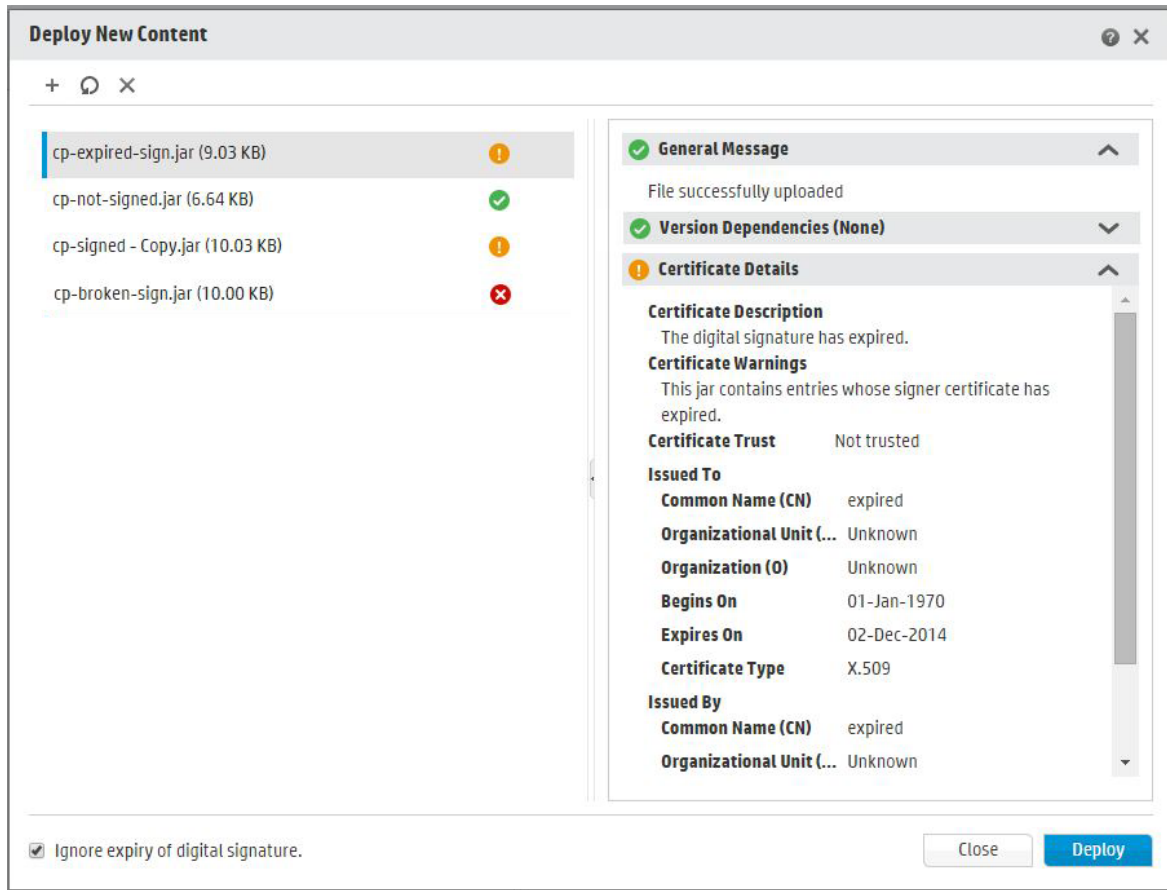
Central Enhancements in HPE OO 10.50

Digital Signatures on Content Packs

In Central, the Deploy New Content dialog box and the **Content Packs** tab now display information about digital signatures on content packs.

If a content pack contains a valid digital signature, this verifies that the content pack was created by a known authority and that it was not altered in transit. This helps protect from malicious content prior to deployment.

During the upload process, before deployment, HPE OO verifies the signature, and the results are displayed in the Deploy New Content dialog box, next to each selected content pack.



- If a content pack is not signed, you can still deploy it.
- If a content pack is signed, but the signature is not from a known and trusted authority, you can still deploy it.
- If the results show that a signed content pack has been altered, that content pack cannot be deployed.
- If the signature has expired, you need to click the **Ignore expiry of digital signature certification** check box in order to deploy the content pack.

HPE OO verifies the following common signature types: .DSA, .RSA, .EC, .SF

All out-of-the-box content packs created by HP are signed with the HP private key.

HPE OO authors can add a digital signature to their customized content packs, using an external signing tool, such as Java JarSigner.

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

Content Pack Validation of Dependencies

During the upload process, before deployment, Central now checks whether the content pack has any dependencies. If you are deploying a content pack that uses elements (for example, operations or properties) that are in a different content pack, the content pack that you are deploying will have a dependencies file that points to this other content pack.

However, what happens if any of these items were deleted from the other content pack, and the new version of this content pack has been deployed in your environment? If this occurs, the content pack that you are now trying to deploy will have missing dependencies, and this could cause the deployment to fail.

If there are missing dependencies, Central displays a warning icon in the Deploy New Content dialog box and displays the expected version of the content pack that contained these dependencies. This gives you an opportunity to add the expected version of this content pack to the deployment, so that the deployment of the content pack that depends on it will be successful.

Deploy New Content

+ ↺ ✕

- project-cp-1.0.0-k.jar (6.57 KB) (No digital signature) ✓
- project-cp-1.0.0-x.jar (7.02 KB) (No digital signature) !**
- project-cp-1.0.0-y.jar (6.96 KB) (No digital signature) ✓
- project-cp-1.0.0-z.jar (6.94 KB) (No digital signature) !

✓ **General Message** ^

File successfully uploaded

! **Version Dependencies** ^

Name	Expected	Found	
HP00-oo-base	1.2-SNAPSHOT	N/A	!
new1	1.3-1.4	N/A	!
top	-2.0	N/A	!
genu	3.0-	N/A	!

✓ **Certificate Details (None)** v

Close Deploy

Validation of Elements During Deployment

During the deployment process, Central now performs a complete path validation for all elements that have a unique path on Central (such as flow, group alias, domain term, system property, system account, and selection list).

If there are any duplications of these elements (either within the deployment unit, or with previously deployed entities), an error message is displayed, listing the duplications.

Empty Content Packs are Displayed in the Content Packs Tab

All deployed content packs are displayed in the **Content Packs** tab, including empty content packs. In previous versions, empty content packs were not displayed.

For example, the HPE OO Third Party content pack is empty, with only a **Lib** folder populated.

Note: During an upgrade from an earlier version of HPE OO 10.x, all empty content packs are deleted. This helps align Central to your needs.

Note also that if the last deployment action prior to the upgrade was the deletion of a content pack, the rollback will not work.

Content Pack Statistics

It is now possible to view statistical information about the usage of deployed content packs. You can:

- See how many flows were run were using content from a selected content pack. You can see how many flows were run each month since first use. You can compare the number of runs from the selected content pack with the total runs (from all content packs) over the same period.
- See how this content pack usage fits into the percentage of all runs during the current month, previous month, quarter, half year, year, or in total.

On the right side of the **Content Packs** tab, next to the **Changes** tab, there is a new **Statistics** tab. This tab displays the usage statistics of the selected content pack.

In the **Content Packs** tab, there is a new **Statistics**  button in the toolbar. This is used to display and compare statistical information about all deployed content packs.

Source Control Information Displayed in Content Pack Details Pane

When you deploy a content pack that was created in Studio, the SCM tag for the content pack is now displayed in the Content Pack Details pane. This enables you to identify the source control version of the content pack after it has been deployed.

OOSH Enhancements

OOSH now supports redirecting output with ">" (and other similar methods). For example:

```
C:\oo\central\bin>oosh.bat lcp --url http://localhost:8080/oo --user admin > result.txt
```

```
Password: *****
```

```
C:\oo1\central\bin>
```

In this example, the command output is stored in **result.txt**.

Sensitive Data

New functionality for hiding output value has been added. If an operation contains sensitive data that the author wanted to hide from the end-user, and they defined the output as sensitive data, this output is retrieved in an encrypted form.

If you bind a sensitive output to an input that is not sensitive, the data will still be encrypted.

Display Workers Execution Status

The **Topology > Workers** tab in Central now displays information about the worker's status, such as if a worker is idle, working, or so busy with executions that it is unable to process all Central tasks. This information can help with troubleshooting, decisions about scaling out, grouping and resource allocation.

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

Dashboard Excludes Remote Debugger Runs

The Central Dashboard no longer includes flows that were run using the Remote Debugger in Studio. This ensures that the statistics and ROI calculations in the Dashboard will not be affected by test runs.

Flows that were run using the Remote Debugger are still displayed in the Run Explorer.

Multi-select in Run Explorer

It is now possible to select multiple runs in the Run Explorer in order to perform actions on them at the same time. For example, you can:

- Cancel all selected runs
- Pause all selected runs
- Reassign all selected runs
- Resume all selected runs


There are two ways to select multiple runs in the Run Explorer:

- Click in the check box next to each run that you want to select
- Hold down the SHIFT / CTRL keys and click anywhere in the row to select a run:
 - Use SHIFT to select multiple runs that are adjacent. Select the first run, and hold the SHIFT key while you select the last run.
 - Use CTRL to select multiple runs that are not adjacent.

For more information, see "Tracking and Managing Flow Runs" in the *HPE OO Central User Guide*.

Hide/Display Columns in Run Explorer and Run Log

It is now possible to choose which columns to display and which to hide in the Run Explorer and the Run Log.

To hide or display columns, click the **Select Columns**  button to display the column picker. Select the check box next to a column name to display that column or clear the check box to hide it.


Extra Columns in Run Log

There is now a wider range of columns that can be selected for display in the Run Log. There are now 22 columns available in the column picker.

The Find dialog box now offers a wider range of search criteria for finding steps in the Run Log.

Go From Run Log Step to the Same Step in the Run Tree and Flow Graph

It is now possible to select a step in the Run Log and jump to see that step highlighted in the Run Tree and Flow Graph.

When you are troubleshooting, you can start by finding the problematic step in the Run Log, and then click the **Go to Run Tree View**  button. The selected step is displayed in the Run Tree and Flow Graph.

In previous versions, it was possible to jump from a selected step in the Run Tree to the Run Log. Now, you can toggle in both directions.

Supporting CloudSlang Workflows

It is now possible to take content that was authored in CloudSlang, and to deploy it in Central. You can add entitlement to CloudSlang flows, run, monitor, and troubleshoot them.

Everything that you can run from the CloudSlang 0.8 CLI can be run in HPE OO 10.50.

For more information, see "Integrating CloudSlang Content in Central" in the *HPE OO Central User Guide*.

For more information about CloudSlang, see <http://www.cloudslang.io/#/>.

Customizable Central Title Banner

It is now possible to add extra text to the header title of "Operations Orchestration", which appears in the top banner in Central. You can make Central look different in different environments, so that users will be able to identify which environment they are in. For example, you can change the header text to "Operations Orchestration (Dev Environment)".

You can add this extra text to the title under **System Configuration > Settings**. For more information, see "Setting Up the Appearance of HPE OO" in the *HPE OO Central User Guide*.

ROI Description

It is now possible to add a description of the ROI counter, in order to help users understand the meaning of the ROI values. For example, you can tell them that ROI is calculated in a particular currency or in work days.

You can add the ROI description under **System Configuration > Settings**. For more information, see "Setting Up the Appearance of HPE OO" in the *HPE OO Central User Guide*.

There is also a new REST API that can be used to add the ROI description. For more information, see the *HPE OO API Guide*.

Central Startup Performance

The Central start time has improved by 50-60%.

Documentation Enhancements in HPE OO 10.50

Help Search

It is now possible to filter the search within the help. You can limit the search to specific documents, such as those dealing with installation, hardening, Central, APIs, and so on.

Search	Hardening ▼	🔍
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Help Navigation Pane Open by Default

When you click the Help button or press F1 to display the context-sensitive help, the help page opens with the navigation pane already opened. In previous versions, this pane was closed and had to be opened manually.

Combined Documents

In 10.50, some of the documents have been merged together:

- The *Security Guide* and *Hardening Guide* have been merged into the *Security and Hardening Guide*.
- The *Installation Guide* and *Upgrading to a New Version of HPE OO 10.x* have been merged into the *Installation, Upgrade, and Configuration Guide*.

Note: In the PDFs, *Upgrading to HPE OO 10.x from 9.x* is available as a separate PDF.

However, it is included as part of the Installation, Upgrade, and Configuration help.

- The five wizard guides have been merged into the *HPE OO Studio Wizards Guide*.

Installation Help in the Installation Wizard

There are now links in the Installation and Configuration Wizard that open the *Installation, Upgrade, and Configuration Help*. This help includes both the *Installation, Upgrade, and Configuration Guide* and *Upgrading to HPE OO 10.x from 9.x*. Click the links on the **Welcome**, **Upgrade**, and **Clustering** pages to open the relevant help topic in a Web browser.

Image Maps in Installation, Upgrade, and Configuration Help

The *Installation, Upgrade, and Configuration Guide* includes flowcharts describing the major steps in the processes. In the *Installation, Upgrade, and Configuration Help*, these flowcharts are image maps, where you can click on a node to jump directly to the step.

Help for Cluster Installations

The *Installation, Upgrade, and Configuration Guide* includes detailed help about how to install HPE OO in a cluster.

New Features in HPE OO 10.22.0001

The HPLN Certificate was updated in HPE OO 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 HPE OO APIs. For more information, see page 16 in the *HPE OO 10.22.0001 API Guide* or page 10 in the *HPE OO 10.50 API Guide*.

New Features in HPE OO 10.22

Hotfixes Integrated into HPE OO 10.22

The following hotfixes that were provided separately by HPE for version 10.21.0001 were 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.

Database Enhancements in HPE 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.

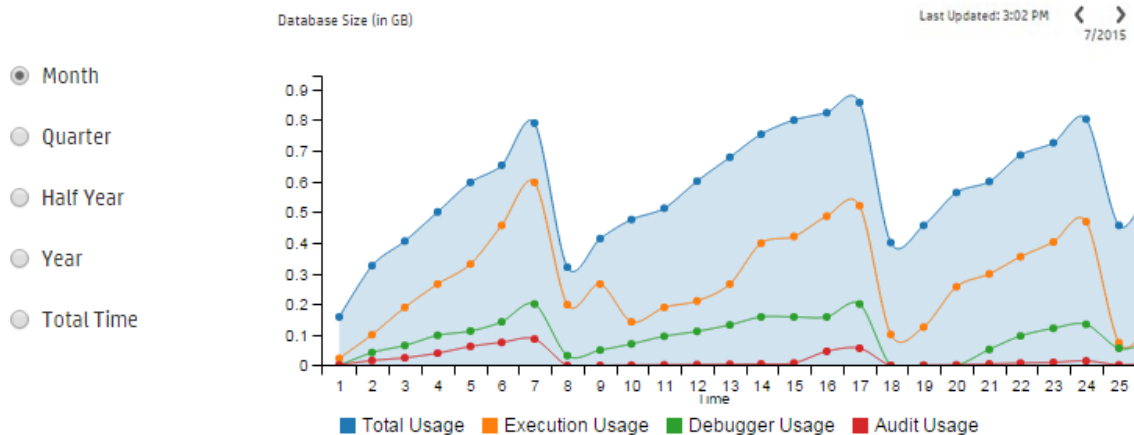
The **Database Health** tab also displays information about how to schedule purging flows, in order to control the size of the database. For more information about the purging flows, see the new *HPE OO Tuning Guide*.

Security Topology **Database Health**

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 HPE OO10.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 HPE 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 HPE OO 10.22

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

Additions to the 10.22 Documentation Set

The following new documents were added to the HPE OO documentation set in version 10.22:

- *Tuning Guide* - explains how to set up the HPE 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 HPE OO instances in a secure manner.

Hotfixes Integrated into HPE OO 10.21

The following hotfixes that were provided separately by HPE for version 10.20 were integrated into version 10.21:

- New version of the upgrade package, to prevent issues with upgrading an existing HPE OO system from version 10.10, when it contains a considerable amount of data.

The new upgrade package also resolves issues with generating an SQL script for the upgrade.

- New versions of the provided SQL scripts for a fresh installation, to prevent issues with creating the HPE OO 10 schema.

New Features in HPE OO 10.20

Content Management Enhancements in HPE OO 10.20

Permissions for System Accounts

It is now possible to grant permissions for system accounts in HPE 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 HPE Operations Orchestration interface. The left pane displays a tree view of configuration items. The 'System_Account_Name' item is selected, and its details are shown in the right pane. The details include the item's ID, Path, Content Pack, and Version. A 'Permissions' section is also visible, showing a table of roles and their permissions.

Name	Deployed Value	Central Value
Configuration		
Group Aliases		
RAS_Operator_Path	N/A	RAS_Operator_P...
test	N/A	
System Accounts		
System_Account_Name	My_username	
SystemAccount2	username	
System Properties		
System_property1		
System_property2	Value2	

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

Permissions	
<input type="checkbox"/> Show all roles	
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 *HPE OO Central User Guide*.

Apply Permissions to Multiple Roles

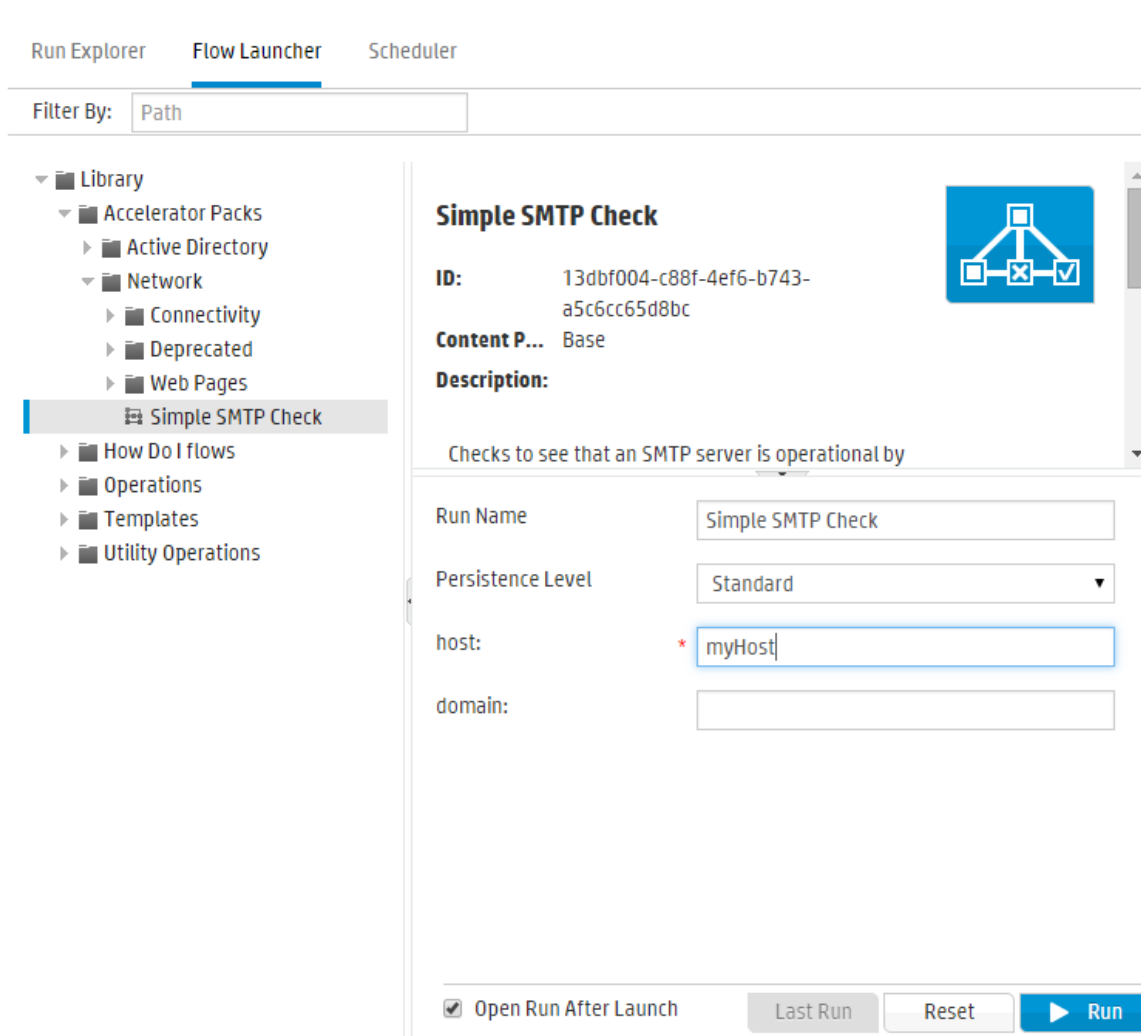
It is now possible to apply permissions to multiple roles in the Edit Permissions dialog box. In previous versions, it was only possible to select one role at a time.

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 HPE 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.



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 *HPE 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 *HPE 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

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

Installation Enhancements in HPE 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 *HPE 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 *HPE 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 *HPE OO Installation Guide*.

Updated Trusted Root Certificates

When you upgrade an HPE 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 HPE OO 10.20

Folders for Configuration Items

In previous versions, you could only create a configuration item in a flat list. In HPE 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 Assign from Variable combo box, in the Input Inspector.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • assigned - default when upgrading from an earlier Studio version • not-assigned - default when installing Studio 10.20
<code>dharma.studio.ui.inputinspector.assignto.selected</code>	<p>This property lets you set the initial option in the Assign to Variable combo box, in the Input Inspector.</p> <p>Possible values:</p> <ul style="list-style-type: none"> • assigned - default when upgrading from an earlier Studio version • not-assigned - default when installing Studio 10.20
<code>default.behavior.define.input</code>	<p>This property lets you set the default behavior that will be used</p>

	<p>when defining inputs in a flow.</p> <p>Possible values:</p> <ul style="list-style-type: none">• prompt_user - default when upgrading from an earlier Studio version• use_default - default when installing Studio 10.20
--	---

Security Enhancements in HPE OO 10.20

Auditing

HPE 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 *HPE 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 *HPE OO Central User Guide*.

Long Encryption Keys

HPE 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 HPE 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 HPE OO 10.20

Java SE 7 Upgraded to 72

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

Role Enhancements in HPE 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 HPE OO 10.20 > [Auditing](#)" and "API Enhancements in HPE 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 HPE 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 **Header** 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 HPE 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 *HPE 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 *HPE OO Database Guide*.


New Features in HPE OO 10.10

Changes to 10.x Documentation

The documentation for HPE 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 HPE 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 HPE OO help is expanded. If the browser window is contracted, the links in the flow diagrams may not work correctly.

 HP Operations Orchestration

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Upgrading to HP OO 10.10 from HP OO 9.x

Upgrading HP OO 10.x to a later version of HP

Installing HP OO

Authoring Flows in HP OO Studio

Using HP OO Central

- Welcome to HP Operations Orchestration C
- Working with the Dashboard
- Setting Up the System Configuration
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 - Setting Up Security – Internal Users
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- Promoting Content Packs
 - Promoting a Content Pack – Overview
 - Deploying and Managing Content Packs
 - Setting Up Worker Group Aliases for a C

Contents

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Promoting a Content Pack – Overview

What is promotion?

The aim of promotion is to deploy a new contact pack to the Central Production server, to make the flows available to users.

Click the steps in the flow diagram to jump to help topics with more information.

OO Central



Deploy to Staging Server

Get the Content Pack from the Author

Deploy the Content Pack to the Staging Server

Inspect the Content Pack

Configure the Content Pack

Configure Worker Group Aliases

Configure System Accounts

Configure System Properties

Set Content Permissions

Test and Troubleshoot the Content Pack

Run a Flow

Monitor the Flow

Identify Problems

Export Events Log and Send to Author

Deploy to Production Server

Deploy the Content Pack to the Production Server

Promotion involves deploying the content pack on the following Central environments:

Context-sensitive Documentation

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



This means that by clicking the **Help** button on any HPE 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 HPE OO installation folder and in the **docs** folder on the ZIP file.

Documentation Updates

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

Content Documentation

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

- Release Notes
- Integration HTML
- Localized documentation

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

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

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

Note: If multiple LDAP configurations are identical apart from the host/port information, these are upgraded to a single LDAP configuration in HPE 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 HPE 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 HPE 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 *HPE OO Central User Guide*.

Content Integrity Model for Content Pack Deployment

HPE 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 9.x (9.03 and later), the recommended best practice is to:

1. Upgrade the repository to HPE 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 HPE 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 *HPE 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 *HPE 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 HPE 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 *HPE OO Central User Guide*.

Authoring Enhancements in HPE 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 *HPE OO Studio Authoring 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 88](#).

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

Manage Description Conflicts for Multi-author Scenarios

HPE 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 HPE 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.l4j.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 HPE OO 10.10

Installation Wizard for HPE OO 10.10

HPE OO 10.10 is installed via a single installation wizard.

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

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

Note: The installation wizard is used for new installations and upgrades from 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 HPE OO 10.x*.

Language Support in Installer

In the installer, you can select a supported language for HPE OO, 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:

	user.language	user.region
Japanese	ja	JP
German	de	DE

	user.language	user.region
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 HPE OO 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

HPE 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 HPE OO 10.10

Java Runtime Environment Upgraded to 7u55

The version of Java Runtime Environment used in HPE 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 *HPE 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 *HPE OO Central User Guide*.

Multiple RAS Support

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

Step Log Mechanism

HPE OO 10.10 introduces 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 HPE 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 HPE 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 HPE 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: HPE OO 10.02 can read the encryption from earlier versions, but earlier versions cannot read the new obfuscation for HPE OO 10.02. Therefore, if you import a content pack that contains system accounts created in HPE 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 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 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 HPE 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

HPE 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 HPE OO 10.01.0001

Performance Improvement

HPE 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 HPE OO has been rewritten, so that it is more concise and easier to navigate.

New Features in HPE OO 10.01

Run Explorer Filtering

In HPE 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

HPE 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 HPE OO 10.00

HPE OO 10.00 brings the following new features, improvements, and changes to the HPE OO 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 *HPE OO10.00 Concepts Guide* for more details.

Firewall Friendliness

All distributed components now initiate the communication channel. See “Architecture” in the *HPE 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 HPE 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 *HPE 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 *HPE 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 *HPE 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.

HPE 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, HPE 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 HPE OO 10.00.

In HPE 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 *HPE 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 *HPE 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 *HPE OO Central User Guide* for more details.

Aliases: Separation Between Run time and Authoring

In HPE 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 HPE OO, a worker in HPE OO 10.00 processes all types of steps, and not only remote actions. Also, the communication direction of a worker in HPE 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 *HPE 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 *HPE OO 10.00 Concepts Guide*.

Simpler RAS Management

HPE 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 HPE 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

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

Highly Parallelized Runs

HPE OO 10.00 has an asynchronous execution mechanism, which enables large bursts of executions. HPE 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 HPE 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

HPE 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 HPE OO 10.00 is different from previous versions:

- In HPE 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 HPE 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 HPE 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 *HPE 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 HPE 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 HPE 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

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

In previous versions, Studio required a connection to a live 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 HPE 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.

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 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 *HPE OO Studio Authoring Guide*.

For more information about the differences between source control management between HPE OO10.x and 9.x, see "Differences in Flow Behavior After Upgrading" in *Upgrading to HPE OO10.10 from 9.x*.

Multiple Authors and Multiple Geographies

In HPE 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 HPE 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 HPE 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 HPE 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 *HPE 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 shows the 'Inputs Summary' tab in HPE OO Studio. The input is named 'filesToAdd' and has an 'Input Type' of 'Single Value'. The 'Input Data Flow' section shows 'Assign from Variable' set to 'filesToAdd', 'Otherwise' set to 'Use Constant', and 'Assign to Variable' set to 'filesToAdd'. The 'Input Properties' section has 'Obfuscated' unchecked and 'Required' checked. The 'Validation Format' is '<not validated>' and 'Record Under' is '<run history>'. The 'Otherwise: Use Constant' Configuration section is empty.

Credential Type

In HPE 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 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 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 *HPE OOSTudio Authoring Guide*.

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

In 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 *HPE OO Studio Authoring Guide*, and the *HPE OO Content Upgrade Guide* for more details.

Changes in behavior with multi-instance steps:

- In 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 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 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 *HPE OO Application Program Interface (API) Guide*.

Numeric Values Keep Their Original Form in Scriptlet Context

In 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 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 HPE 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 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

HPE 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>)`, HPE 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 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, HPE 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 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

HPE OO 10.00 uses the Rhino 1.7R3 script engine, while earlier HPE 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 HPE 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 HPE 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

HPE 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 HPE 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 HPE OO application context.

Changes in Behavior in Studio

Because of the differences in behavior between HPE OO10.00 and earlier versions, some flows may not work properly after content upgrade. For more information, and for suggested solutions, see the *HPE 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 HPE 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 HPE 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 *HPE OO10.00 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 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 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 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 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 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 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, HPE OO does lexicographic comparison.

Changes in Behavior – Scriptlets

- 10.00 uses the Rhino 1.7R3 script engine, while earlier HPE 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 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 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 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 79](#).

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 HPE OO returns all the attributes in the given path.

In 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

HPE 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
```

HPE OO 10.0 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 10.00, the flow will wait for all non-blocking steps to terminate. The flow execution will remain in progress until then.
- In 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 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

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 HPE 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 HPE OO were limited with the API capabilities.

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

Embeddable

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 HPE 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 HPE OO 10.x and 9.x, see "Differences in Behavior After Upgrading" in *Upgrading to HPE OO10.10 from 9.x*.

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Troubleshooting

Installation Troubleshooting

Issue	What Should I Do?
<p>In a new OO 10.70 installation, the LDAP authentication fails with:</p> <p>"PKIX path building failed: sun.security.provider.certpath.SunCertPathBuilderException: unable to find valid certification path to requested target"</p>	<p>Import the LDAP Certificate in the Central TrustStore.</p> <p>By setting the property trustAll.isEnabled to false via OOSH, you can configure Central to verify that the LDAP certificate is in the Central TrustStore.</p> <p>When this configuration item is set to true, Central will trust any valid certificate from a secured LDAP server.</p> <p>To enable the certificate verification, run the following command in OOSH:</p> <pre>oosh> set-sys-config --key ldaps.trustAllCertificates.isEnabled --value true -- url <central_url> --user <central_ user> --password <central_password></pre> <p>To disable the certificate verification (not recommended), run the following command in OOSH:</p> <pre>oosh> set-sys-config --key ldaps.trustAllCertificates.isEnabled --value false -- url <central_url> --user <central_ user> --password <central_password></pre>
<p>In a cluster installation where nodes have different IPs, you get an error message when selecting a license.</p>	<p>This may occur because you have selected the license for the wrong IP.</p> <ol style="list-style-type: none">1. Choose one of the nodes and issue a license for the IP address of this node with

Issue	What Should I Do?
	<p>the HPE License Management system.</p> <ol style="list-style-type: none"> Open the Central UI of the specific node (and not via the Load Balancer IP) and install the license. <p>For more information, see "Setting Up Licensing" in the <i>HPE OO Central User Guide</i>.</p>
<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"> Repair the .net framework installation on that machine using the .net framework 4.5.1 full installer. Restart HPE OO Studio/Central/RAS.
<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 Studio.l4j.ini file (under <installation dir>/studio) 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 HPE OO 10.x with a MySQL database, the following error may appear in the logs:</p> <p>"Packet for query is too large (2515019 > 1048576). You can change this value on the server by setting the max_allowed_packet variable."</p>	<p>Before installing HPE OO 10.x with a MySQL database, make sure that the max_allowed_packet 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"> To set it for within the session, run this command: <pre>mysql --max_allowed_packet=250M</pre> To add it as a permanent option of the MySQL server, add the following line in <MYSQL_HOME_DIR>\my.ini or my.cnf and then restart the MySQL server:

Issue	What Should I Do?
	<code>max_allowed_packet=250M</code> Note: The minimum is 250 M, but some environments may require more, depending on the size of the repository.
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?
Rolling back a 10.5x installation to 10.10 fails with an internal Oracle error (ORA-600).	Upgrade to Oracle 10.2.0.4.6 by applying patch 20299013. In some situations, patch 6880880 is required as well. If this is the case, you will be informed while applying patch 20299013.
After content upgrade, there may be flows or steps in which inputs reference system accounts that do not exist.	Open the flow in Studio 10.x and change the input so that it references an existing system account. 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.
After an upgrade from an earlier version of 10.x, if you start Studio on the same workspace that was used with the previous	In this scenario, if you want to keep the settings from the earlier version in 10.5x , do the following:

Issue	What Should I Do?
<p>version, all the workspace settings are retained from the previous version.</p> <p>If you roll back from 10.70 to the previous version, if you start Studio on the same workspace, any changes made to the workspace in 10.70 are not visible in Studio, but they are saved inside the user workspace. You will see the workspace settings you had in the older version.</p> <p>At this point, you can modify your workspace settings using the earlier 10.x version. These changes in the workspace are saved.</p> <p>If you upgrade to 10.70 again, and start Studio on the same workspace, the settings will be those from 10.5x and you will not see the workspace settings that were changed after rolling back to the previous version.</p>	<ol style="list-style-type: none"> 1. Inside the user home directory, locate the settings.xml file inside the .oo folder (C:/Users/<username>/.oo). 2. Remove the following line: <pre><opstudioSettingsUpgradeVersion> 10.70 </opstudioSettingsUpgradeVersion></pre>
<p>If you migrated a 9.x repository and you imported both the resulting project and the content pack, after upgrading to 10.70, you will not find the project loaded in the workspace. In the logs, you will see the following error “Unable to open Project <name>. 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 10.70, 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>
<p>If you upgraded 9.x content with versions of HPE 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>	<ul style="list-style-type: none"> • Upgrade your repository again, using the Content Upgrade Utility for 10.02 or later (recommended). • Fix your repository manually:

Issue	What Should I Do?
<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 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 and later fixes this.</p>	<ol style="list-style-type: none"> Open your project in Studio, and go to the configuration folders. Locate the duplicated items (they have an error indication) and delete them. <div data-bbox="885 499 1344 898" style="border-left: 2px solid #4a4a8a; padding-left: 10px; margin: 10px 0;"> <p>Note: The Category 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 Show in Explorer, delete it from the file system, and then refresh the project in Studio.</p> </div> Deploy your exported content pack with the latest version of the HPE OO Base Content Pack. <div data-bbox="849 1077 1352 1203" style="border-left: 2px solid #4a4a8a; padding-left: 10px; margin: 10px 0;"> <p>Note: 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>
<p>After an upgrade from 9.x to 10.00, using the HPE OO Shell Utility to upgrade historical data will get the result "Resolved" instead of "RESOLVED", as required in HPE OO 10.x. This causes duplicates in the results distribution on the Dashboard.</p>	<p>Upgrade to HPE OO10.x before using the HPE OO Shell Utility to upgrade historical data.</p>
<p>If you installed HPE 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 HPE OO 10.x environment for scheduling and running flows.</p>
<p>In some situations, operations with missing responses end up in the valid project instead</p>	<p>After upgrading, you will need to manually check the operations to see if they have missing responses.</p>

Issue	What Should I Do?
of the invalid project.	These are not identified as invalid during the upgrade process.
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.	After upgrading, check your prompts and see if there are any that are missing information and need to be rephrased.

Studio Troubleshooting

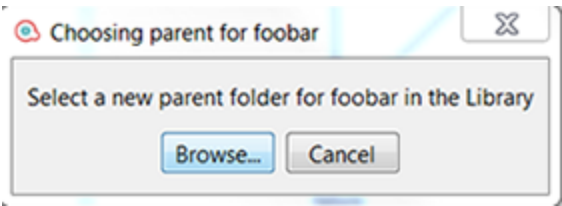
Issue	What Should I Do?
Occasionally, a Java heap space error may occur on some flows in Studio.	<p>Design the flow in a way that it does not use list iteration on large lists (e.g., 300000 elements).</p> <p>The issue arises due to the fact that the list iterator allocates memory for each element separately. For example, for 300000 elements it allocates memory 300000 times.</p> <p>Every time the list iterator step executes, it reallocates new memory for the list input (in the example with 300000 elements), even if it has already loaded all elements in previous execution of List Iterator step. This design allows you to check if the list's input value has been dynamically changed during the run and to add new elements for iteration.</p>
In some cases, when there are items with duplicate UUIDs, when you connect to SVN/Git, you see one item as	Refresh the project.

Issue	What Should I Do?
duplicated and the other as stuck on validating.	
<p>If you install or upgrade to HPE OO 10.5x and you do not have Microsoft Visual C++ 2010 Redistributable Package (x86) installed, you will get an SVN error.</p>	<p>Download and install Microsoft Visual C++ 2010 Redistributable Package (x86). You need to install the version for the x86 platform, regardless of your Windows version.</p> <p>This package can be downloaded from: http://www.microsoft.com/en-us/download/confirmation.aspx?id=5555.</p>
<p>The Git merge operation does not work correctly in the following situation:</p> <ol style="list-style-type: none"> 1. The author creates a flow that contains a parallel lane in one of its steps. 2. The author tries to merge the flow through Git. This results in a merge conflict on the parallel lane step producing “- ours” and “- theirs” files. 3. The author tries to resolve the conflict manually. 4. The original flow is shown as being invalid and cannot be repaired. 	<p>One of the following:</p> <ul style="list-style-type: none"> • When merging, the author should select “keep ours” or “keep theirs”. • The author should create a new flow and perform the preferred merge on this new flow.
<p>After an upgrade to 10.5x and later, it is no longer possible to perform manipulations like concatenation or parsing on sensitive data in scriptlets, because this data is encrypted.</p> <p>The issue is with manipulations on sensitive data that is retrieved by using <code>ScriptletContext.get(x)</code>.</p> <p>In previous versions, obfuscated data was provided to scriptlets as cleartext, so it was possible to manipulate it.</p>	<p>Choose one of the following options:</p> <ul style="list-style-type: none"> • If the data does not need to be encrypted, remove the Sensitive Data flag from that item or from the original item that caused it to be defined as sensitive, via transitivity. • If the data needs to be encrypted, refrain from manipulating it in scriptlets and find an alternative method, for example, using actions.
When trying to connect to an empty Git repository, the clone	Make sure that the repository you

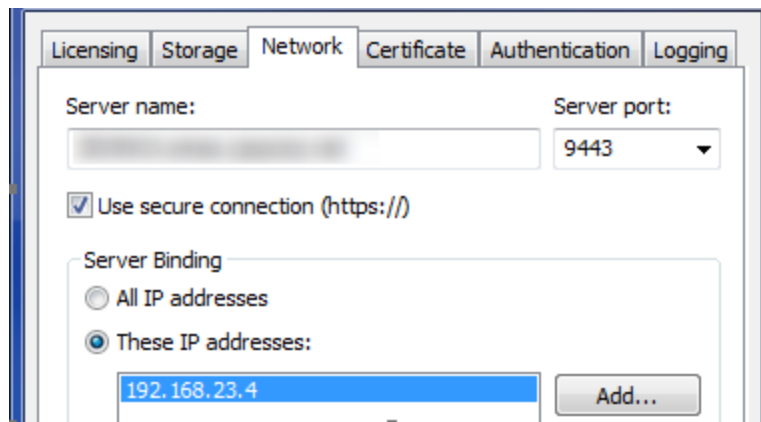
Issue	What Should I Do?
<p>action is executed successfully but the rest of the actions do not work correctly. There is no notification of what is wrong, the project colors are correct, and the commands are available, but the push shows no files.</p>	<p>want to clone is not empty. The clone will work if the repository has just a dummy file.</p>
<p>HPE OO 10 does not resolve variables from step context.</p> <p>In 9.x, to resolve a string like \${var}, HPE 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 Update Item and Perform Lock Action 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 SCM> Update All from the menu.</p> <p>To refresh a project, select the project and click the Refresh button in the toolbar or right-click on the project and choose the Refresh option.</p>
<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 Processes tab.</p>	<p>In order to ensure that the password appears obfuscated in the Task Manager, run the encrypt-password tool.</p> <p>For more information, see "Obfuscating the Studio KeyStore and TrustStore Passwords" in the <i>HPE OO Security and Hardening Guide</i>.</p>
<p>When connected to SCM and "Enforce locking" is enabled,</p>	<p>The solution is to perform an SCM</p>

Issue	What Should I Do?
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.	Update action on the folder before committing it.
During a multiple project import, a "GC overhead limit exceeded" error message appears.	<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 Studio.14j.ini file, change the <code>-Xmx</code> value to a larger value. For example, 1500 MB.</p> <pre data-bbox="966 877 1372 934">-Xmx1500m</pre>
If you have a 10.x workspace with folders inside the Configuration sections, you will not be able to launch a previous Studio version.	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.
If a Studio/SlikSVN folder was renamed, moved or deleted, Studio might return SCM-related errors in the SCM Messages pane even if you did not configure an SCM repository URL.	If the SlikSvn folder was renamed, moved, or deleted, you have to comment out every property from the <code><oo_folder>/studio/conf/scmCommands.properties</code> file.
Under some screen resolutions, the tutorials are not clear.	For the best experience when viewing the tutorials, we recommend using the following screen resolution: 1920 x 1080.
Editing XML operations fails for large files.	<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</p>

Issue	What Should I Do?
	<p>allocation.</p> <p>In the Studio.I4j.ini file, change the -Xmx value to a larger value. For example, 1500 MB.</p> <pre data-bbox="966 499 1372 556">-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 SCM Messages pane:</p> <pre data-bbox="240 814 787 1144">Cannot run program "C:\<path_to_oo_ installation>\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++ 2010 Redistributable Package (x86).</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 Run workspace in Central.</p> <p>Note: The run is present in the database in the OO_EXECUTION_SUMMARY table.</p>	<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 Studio.I4j.ini file, located under <installation_path>\studio, and setting the value of the parameter - Xmx to a higher value.</p>
<p>When connected to a network share-based SVN repository</p>	<p>Use a dedicated web-based SVN</p>

Issue	What Should I Do?
(for example, file:///myshared/repo), SCM operations (such as Update, Commit, and so on) take a long time to finish.	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 HPE OO 10.x from an Earlier Version of HPE OO10.x</i> , for the recommended way on how to roll back Studio to a version previous to 10.x.
Creating a content pack from a 10.x format project with a 10.02 (or earlier) version of SDK will create an inconsistent content pack.	Use only the 10.x version of SDK to create content pack out of 10.x format projects.
<p>The following error message appears: "Select a new parent folder for <item> in the library".</p> <p>For example:</p> 	Delete the .idx and .tmp folders from the location of the project in the workspace, and the .metadata folder from the Content subfolder of the same project, and restart Studio.
In Studio SCM, after committing a single locked item (for example, committing a single flow by right-clicking it in the Projects pane and selecting SCM > Commit), in some cases, the editor shows the item as still being locked. The	This state can be resolved by updating the project or by unlocking the item, which eventually results in a warning: "svn: warning: W160040:

Issue	What Should I Do?
lock is, in fact, not there, because committing always automatically releases the locks.	<p>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>
You cannot detach from SCM because you have locked items in your workspace and unlocking them fails (for example, the SCM server is unreachable).	Delete the folder .svn under <user home>\.ool\Workspace and restart Studio. Now your workspace will be detached.
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.	Change the network configuration of VisualSVN Server to bind to an IPv4 address.



<p>If you use the Set Selection List operation from the HP Solutions content pack to add a custom value of a selection list, the custom value remains in Central even if the selection list itself is deleted (in the oo_content_config_item and oo_config_item_values tables).</p> <p>When redeploying, the new entity is reattached to the custom value.</p>	<p>You can use one of the following workarounds to ensure that the custom value is deleted correctly:</p> <ul style="list-style-type: none"> After undeploying the old entity, but before deploying the new one, delete the configuration item using a REST call (with DELETE).
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Issue	What Should I Do?
	or: Remove the custom value using a REST call (using PUT with null in the request body).
When switching between VPNs with Studio running, a Studio Debugger message appears: java.lang.IllegalArgumentException: Domain id cannot be null	Close and reopen Studio.

Localization Troubleshooting

Issue	What Should I Do?
Characters appear in gibberish in the user interface for localized installations, when using MS SQL Server.	<p>If your HPE 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, HPE OO creates the tables using the database-specific collation. It is important to note that using other collations can cause characters to appear in gibberish in the user interface for localized installations. In addition, other collations are not officially supported in 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>

Issue	What Should I Do?
	<p>Note: HPE OO does <i>not</i> support Unicode characters, when using MS SQL.</p>
The Test command in the Studio Filter Editor and the "Quick Command" in an operation cannot handle Japanese characters.	<p>Modify the Studio.l4j.ini file (under <installation dir>/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?
<p>Deploying a CloudSlang content pack fails with message:</p> <p>An exception occurred during deployment. Check the server log for more details</p>	<p>Check that you are not trying to deploy a content pack that uses CloudSlang version 1.0 on Central with a version lower than 10.70.</p> <p>In addition, note that content packs using a CloudSlang version lower than 1.0 will fail to deploy on Central with version 10.70.</p> <p>Also, check that your content pack does not contain namespaces longer than 255 characters, as these are not supported in Central 10.70.</p>
<p>Central/RAS fails with the following error in the wrapper log:</p> <pre>java.lang.OutOfMemoryError: Metaspace</pre>	<p>Increase the size of the Metaspace.</p> <p>This can be found in the in the central-wrapper.conf (or ras-wrapper.conf) file, in the following parameter:</p> <pre>-XX:MaxMetaspaceSize=<new defined size></pre> <p>Note: Metaspace consumes native memory on the server. If it exhausts all available physical memory and starts using swap space, the performance of HPE OO will degrade significantly.</p>

Issue	What Should I Do?
<p>Special characters cannot be displayed correctly in the *.csv file when exporting the Run Log to a CSV file</p>	<p>The problem is in the Excel CSV encoding, which can be changed, as explained in: http://superuser.com/questions/280603/how-to-set-character-encoding-when-opening-excel</p> <p>Also, make sure you are working with the correct configuration in HPE OO and in the database.</p>
<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 var/cache 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 RAS_Operator_Path is assigned to any worker.</p> <p>Some phases of a run always run on the default group, which is RAS_Operator_Path. Make sure that at least one worker is assigned to this group.</p>
<p>Central/RAS crashes with an OutOfMemory (OOM) exception.</p>	<p>Do one of the following:</p> <ul style="list-style-type: none"> • Increase the heap size for Central/RAS • Remove the limit on the stepLogBuffer size • Check if the content you ran can be changed so that its context will be smaller
<p>Execution speed is low. It looks as if, over time, the run duration is getting longer.</p>	<ol style="list-style-type: none"> 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 HPE OO 10</i> document on the HPE OO Community page. (https://hpln.HPE.COM/node/19651/attachment) 2. Increase the number of worker threads if your hardware can take it. See the "System Tuning"

Issue	What Should I Do?
	<p>section in the <i>HPE OO Installation, Upgrade, and Configuration Guide</i> for more details.</p> <ol style="list-style-type: none"> 3. Increase the number of database connections. See the <i>HPE OO Installation, Upgrade, and Configuration Guide</i> for more details. 4. Scale out. See the <i>HPE OOBenchmark Performance Guide</i> document for more details. <p>(https://hpln.HPE.COM/node/19651/attachment)</p>
<p>Firefox on Windows uses the desktop configuration for font size. In some cases, the desktop is configured to use 125% font size as default, when using low resolution this may result in some layout problems in Central.</p>	<p>This happens when the font size in Firefox is set to 125% zoom. Reduce the zoom to 100%.</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 central-wrapper.conf 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 /var/logs folder (for example, for backup), the Central wrapper.log file is not re-created under the new /var/logs folder.</p>	<p>Create the logs folder inside the var folder.</p>
<p>If you get locked out of Central when there is SAML authentication, with no access via the identity provider, log into HPE OO directly.</p>	<p>Make sure to keep the admin user, for this.</p> <p>To log in directly, go to:</p> <p>http(s)/<host>:<port>/oo/login/direct</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>Disable the RC4 cipher on the JRE level (starting with Java 7):</p> <ol style="list-style-type: none"> 1. Open the \$JRE_HOME/lib/security/java.security file.

Issue	What Should I Do?
<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>2. Edit the <code>jdk.tls.disabledAlgorithms</code> property to disable the RC4 cipher.</p> <p>For more information, see http://stackoverflow.com/questions/18589761/restict-cipher-suites-on-jre-level.</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 Paused_No_Workers_in_Group state. Resume will not work.</p> <p>For example, you have a step that needs to run on group alias Alias_A, and there is no mapping of workers to this alias. HPE OO tries to run the step on group alias Alias_A, but since there are no workers in Alias_A, the execution is paused. When the administrator maps group alias Alias_A to the worker group Group_D and tries to resume the run, it does not work.</p>	<p>From the Topology > Workers 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 ECDRBG128 is not safe, according to NIST.</p>	<p>Set the security property <code>com.rsa.crypto.default</code> to HMACDRBG by adding the following line in the <code><oo_jre>\lib\security\java.security</code> file:</p> <pre>com.rsa.crypto.default.random = HMACDRBG</pre> <p>For more information, see the HPE OO <i>Hardening Guide</i>.</p>
<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</p>	<p>Make sure to deploy the base content pack and any other HPE content packs that are used in</p>

Issue	What Should I Do?
missing some operations.	Studio before deploying your own content packs.
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.	Change the time zone on the RAS to be the same as the time zone on Central.
The HPE OO help links do not work through Load Balancer.	<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> <p>Note: For Apache httpd, it is sufficient to make sure that the balancer members' URLs are just http://central_host:central_port/.</p>
Under low screen resolution, some of the buttons in the UI cannot be seen.	Increase the screen resolution to 1280 x 1024 or 1920 x 1080.
CUU identifies RAS_Operator_Path as a custom Remote Action Service resulting in a duplicate Group Alias on name in a valid project.	<ol style="list-style-type: none">1. Change the name of upgraded RAS_Operator_Path from the valid project to a new name. The affected operations will work on these new Group Alias only.2. Map the new Group Alias to the RAS_Operator_Path group.

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>	Remove the compression.

Wizards Troubleshooting

Issue	What Should I Do?
<p>The getCategories 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 trimNullComplexTypes, which is a hidden input with default value true. You have to set it to false.</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 Studio/tools folder to add any missing dependencies.</p> <p>For more information, see the <i>Studio Wizards User Guide</i>.</p>

Limitations

Upgrading, Rollback, and Installation

Limitations

If HPE OO is installed on a path containing a localized character, configuring the TLS keystore may fail.

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

After an upgrade to HPE OO 10.5x, if an operation was linked to a custom IAction and you do not provide the IAction, this operation is not found by the search functionality.

HPE OO 10.5x uses a different version of Quartz for scheduling than earlier versions. Therefore, if you roll back from 10.5x to an earlier version, you will need to delete all schedules that were created or updated in 10.5x.

If the last deployment action prior to an upgrade was the deletion of a content pack, the rollback will not work.

If you are rolling back from 10.20 and later 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).

HPE 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.

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.

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.

When upgrading from a remote 9.x Central that has localhost as the database in the **Central.properties** file using a silent installation, installation and upgrade do not complete successfully. This problem does not exist for wizard installations.

When you run upgrade on a schedule with a simple trigger, the upgraded schedule may have a different time zone.

During historical-data upgrade to HPE OO 10.x, flow inputs and outputs are not upgraded from previous versions for historical data. Only the flow result is migrated.

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.

After an upgrade to 10.x, and rollback to 10.00, the system accounts disappear.

In certain cases, you may receive an **Invalid File** message during the installation of the licenses, even if the license file is valid. In these cases, try again few times until the license is successfully deployed.

Studio Limitations

GIT Limitations

- Renaming a flow deletes all the committed history.
- In GIT, reverting a flow to a previous commit fails for the following scenario:
 - a. Create a project with an empty folder and a folder containing a flow.
 - b. Commit it.
 - c. Move the flow to the empty folder.
 - d. Commit again.
 - e. Go to source folder's history and revert to the commit before the move. The destination folder still contains the flow.
- When you add new flow after deleting a flow from the same folder, Git will mark the added flow as renamed. This occurs if the flow names are more than 50% similar.
This is a known limitation in Git. For more information, see <http://stackoverflow.com/questions/433111/how-to-make-git-mark-a-deleted-and-a-new-file-as-a-file-move>.
- After deleting an operation from a folder, it is shown in the **SCM Changes** pane with a deleted

flow icon and not an operation icon.

- After checking out a branch, you need to manually refresh the imported project. This action has to be done if before the checkout, there was at least one rename action.
- Conflicts with a situation "project deleted by us and flow modified by them" are not handled correctly in Studio.
- After creating a new branch in Git, and committing changes from that branch, when you try to push changes to the remote Git repository, the Push Commits window appears without the list of files to be pushed.

- In some cases, authors may have items with duplicate UUIDs in their projects. In these situations, when the author tries to perform a rebase, the operation may not succeed. In this case, the author will see items in the **SCM Changes** pane with a blank status. In order to end the rebase cycle, the author should skip the commit or abort the rebase.

- Unstash does not work properly if there are changes between the stash and the unstash.

If there are differences between the files of a stash commit and the same files in the workspace when unstashing that commit, then when unstashing, Studio will prefer the stash commit version during a merge operation.

- If you modify a configuration item and then move it to another folder, the item is not recognized in Git as moved, but as deleted and added. This is a limitation of Git.

Subversion Limitations

- When working with SVN source control, it may happen that an item appears as locked in Studio while this is not actually true, in the repository.

This is an SVN error. After being renamed, an item has the status 'replaced'. At commit time, all locks should be released. However, for the replaced item, the lock is released but the status displayed is not accurate.

- By default, SVN has a list of file patterns (shown below) that are ignored when non-versioned 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.

- 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. With SVN 1.8, the scenario fails when you try to rename the parent folder, with the following

error:

Renaming [C:\Users\turcm\.oo\Workspace\test\Content\Configuration\System Accounts\folder, C:\Users\turcm\.oo\Workspace\test\Content\Configuration\System Accounts\folder.properties] to
[C:\Users\turcm\.oo\Workspace\test\Content\Configuration\System Accounts\asd, C:\Users\turcm\.oo\Workspace\test\Content\Configuration\System Accounts\asd.properties]
svn: E155040: Cannot move mixed-revision subtree
'C:\Users\turcm\.oo\Workspace\test\Content\Configuration\System Accounts\folder' [3:4]; try updating it first.

- 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.
- 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.
- 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.

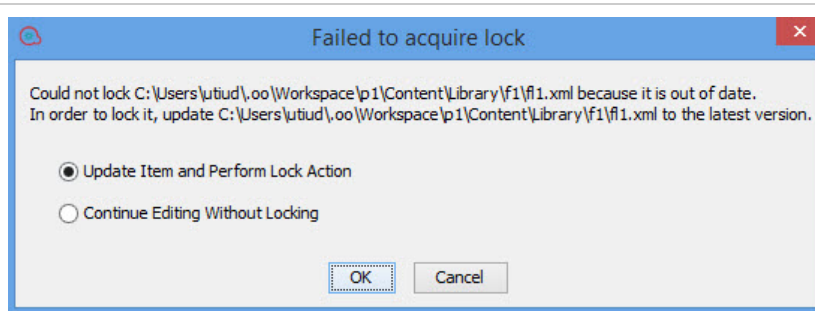
General SCM issues

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.

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.

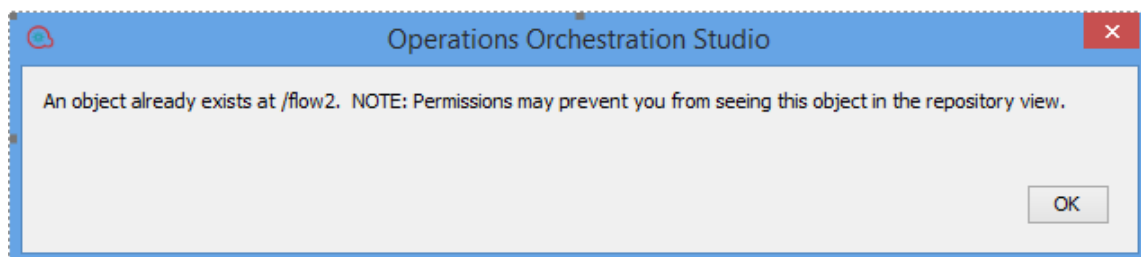
If the item was previously moved or renamed by a different author in another Studio, you should also update the workspace. To update the workspace, from the **SCM** menu, select **Update All**.

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**.



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/Git client tool.

Remote Debugger

- When running a flow with multiple steps and increased context in the Remote Debugger, the "GC overhead limit exceeded" message appears in Studio, even though the run completes successfully.
- In the Remote Debugger, if a flow contains a prompt title that is longer than 128 characters, everything past the 128 character limit is ignored.

Localization Limitations

In a Chinese Studio environment, internal users, configuration items, and run names may be sorted incorrectly.

In a Chinese Studio environment, the inputs are sorted using Chinese dictionary sorting. In some cases, this might lead to inaccuracies in sorting.

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 HPE 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.

Many Japanese words are not correctly searchable in the Studio Search pane "description" list.

The **Read file sample** operation in the Base content pack cannot handle the localized characters. For localized files that are sent as inputs (containing special characters for languages such as French, Japanese, Chinese, German, and Spanish), be aware that Studio uses an UTF-8 file encoding. Other file encodings might not be recognized. It is recommended to use UTF-8 encoding for the mentioned files.

Some button items are not translated in the Create Content Pack wizard, due to a third party limitation.

Some items are truncated in the Create Content Pack wizard, due to a third party limitation.

The validation message is not translated when an input cannot be evaluated with System Evaluators.

Some GIT related messages are not localized in the SCM Messages pane, due to a third party limitation.

API Limitations

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.

When using the 9.x backward compatibility APIs in SOAP, if an authentication failure occurs and auditing is enabled in the system, there will be more than one record audited for the failure. The types of the records may be **AuthenticationFailure** and **AuthorizationFailure**, and the data of the record might not describe the expected operation that was performed. These records may also appear when correct credentials are passed and the operation succeeds.

Central Limitations

CloudSlang content version < 1.0 is not supported in Central 10.70.

CloudSlang namespaces longer than 255 characters are not supported in Central 10.70. The namespace is the combined input name, flow name, and path of an input.

For localized characters, this limit is lower. For example, in Japanese, the 255 characters need to be divided by 4, so the number of characters is only 64.

The OO 9x backwards compatible SOAP/REST APIs are not supported in cases where Client authentication is strictly required (clientAuth="true" in the Tomcat server.xml).

When you try to deploy/update/remove a content pack in OO Central with an Oracle database, the following error occurs at the end of the process:

Illegal character ((CTRL-CHAR, code 0)): only regular white space (\r, \n, \t) is allowed between tokens

Content in 10.70 that uses **non-default** step persistency and/or rerun flags cannot be deployed in older 10.x Central servers.

As Central now uses CSRF protection, jMinix is no longer supported in Central.

If two administrators make changes to entitlements and roles at the same time, this could result in a deadlock.

For example, if one administrator gives a role additional permissions, and at the same time, another administrator deletes a different role, and both commit their changes, this can cause a deadlock.

Custom values remain after a selection list is deleted.

If there are network problems when you are deploying a content pack, you may see an invalid file error, even though the content pack is valid.

When there are network problems, HPE OO does not distinguish between a corrupted file caused by network problems and an invalid file that needs to be fixed.

When cloning or editing schedules, it is possible to save a schedule with an invalid end-by date. For example, if the end-by date is set to the current date.

Canceled steps/flows may appear to be still running in API calls.

If authentication has been enabled in Central, you cannot log in with a user that has a colon as part of the user name. This is also the case when logging into Central for remote debugging.

In the Run Explorer, the **User** filter may return unrelated results, when searching for internal users. This occurs because the user is stored in the database as "domain\user", and the filter also searches for the domain.

For example, if a user stored in the database is "MYDOMAIN\MyUser" and you use a filter of "DOM", the filter will show this user, even though the user name displayed in the Run Explorer is only "MyUser".

When entering extra text to be displayed in the Central header title after "Operations Orchestration", the maximum number of characters that can be entered is 30 for Latin letters and 19 for double-byte letters.

Changing the machine time may cause Central executions to get stuck in the **Running** state. This is due to a limitation in the HPE OO timer mechanism.

On MySQL, that the paths of HPE OO entities (flows, operations, and configuration items) must be limited to 243 characters, when deployed to Central.

Using paths longer than 243 characters may cause failures during content pack deployment/deletion.

Note that the length limit is on the full entity path, starting with “Library” or “Configuration” and ending with the file extension (for example, “.xml”).

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 HPE 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 HPE 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.

For FIPS140-2 compliant RASes you cannot use the automatic RAS upgrade procedure, so the RASes must be upgraded manually. This is because for FIPS140-2 compliance, the OpenJDK needs to be replaced by the Oracle JDK. In addition, the JDK needs to be configured for FIPS compliance which causes the upgrade package’s signature to be voided.

As the upgrade package must have a valid signature in order for the automatic RAS upgrade procedure to be successful, this procedure cannot be used.

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 *HPE 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.

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.

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 HPE 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 9.x that contains LDAP configured with referrals, there is no warning about referrals no longer being supported in 10.x.

When you enable LDAP, you cannot define an internal user and a domain user with the same user name.

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.

In a multiple time zone environment, schedules are not triggered at correct times and sometimes do not appear in the Run Explorer.

When the LDAP configuration is not accessible, schedules fail to be triggered with internal users.

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.

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.

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.

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 HPE OO 10.x WSDL may not run in Studio and Central. To check the support status, see the *HPE OO API Guide*.

If you are using Windows 2012 with Internet Explorer 10, you must install the Desktop Experience in order to view the videos in Central.

If you are applying a filter on runs in the Run Explorer, click the refresh button in order to view the newly added runs.

In some cases, trying to authenticate or search for a user in the LDAP might return multiple results.

- This could happen if, for example, the LDAP configuration is configured using Global Catalog, and the same user identifier exists in a different domain.
- 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.

In these cases, HPE OO arbitrarily chooses the first result (the first user) returned from the LDAP. The following message appears in the log :

“More than one user was found in the LDAP search. The first one returned in the search results is used. Check your LDAP configurations.”

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 HPE OO 10.x only)
	Set System Account (limitation: supported for HPE OO 10.x only)
	Set System Property (limitation: supported for HPE 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.

CloudSlang Support Limitations

Every change to CloudSlang content to HPE OO requires it to be re-packaged.

After rolling back to earlier versions, it is not possible to delete or roll back CloudSlang content packs that were deployed in 10.5x, and CloudSlang flows are shown as folders in the Flow Library. After upgrading back to 10.5x, the CloudSlang content is still not presented correctly.

It is not possible to direct on which worker the CloudSlang content runs.

When CloudSlang python content uses third party libraries, they need to be manually placed in every Central and RAS.

The entitlement behavior of CloudSlang content is different from regular content. This must be aligned for hybrid content.

HPE OO doesn't evaluate the default values of expressions in CloudSlang. These are displayed as expressions. For example, `${input2}`

There is no graphical representation of CloudSlang runs.

Backward Compatibility With HPE OO 9.x APIs

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

Some of the SOAP APIs from HPE OO 9.x have equivalent REST APIs in HPE OO 10.x. We recommend using the REST APIs in HPE OO10.x.

- The base path for using HPE OO 10.x REST API is: `http(s)://<OO Central Server Name / IP>:<PORT>/oo/rest/`.
- The URL for using HPE OO 9.x SOAP API while working with HPE OO 10.x Central is the same as in HPE OO 9.x. That is, `https:// <OO Central Server Name / IP>:<PORT>/PAS/services/WSCentralService`.
- The URL for using HPE OO 9.x REST API while working with HPE OO 10.x Central is the same as in HPE OO 9.x. That is, `https:// <OO Central Server Name / IP>:<PORT>/PAS/services/rest`.
- We have restored compatibility with HPE 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 HPE OO 9.x.

In HPE 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 HPE OO 10.x API that we recommend to use. For details on the HPE 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/lwssso-config
	updateLWSSOConfig	Not Supported	PUT/authns/lwssso-

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
			config
Clusters	getClusterNodes	Not Supported	N/A
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 Note: In HPE OO 10.x, user groups are called roles.	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}

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
<p>Repositories</p> <p>Note: In HPE OO 10.x, the concept of repository was replaced with new concepts. See the <i>HPE 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
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

Functionality	9.x Request	10.x Support for 9.x Request	10.x Equivalent REST Request
	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 HPE OO 9.x have been deprecated. It is recommended to use the new REST APIs instead. For more information, see the *HPE OOAPI 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 *HPE OOAPI 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 *HPE OOAPI Guide*.
- The IAction interface for Java has been replaced by @Action. For more information, see the *HPE OO Action Developers Guide*.
- The **RSFlowInvoke** and **JRSFlowInvoke** utilities have been deprecated. We recommend using the HPE OO Shell Utility instead. For more information, see the *HPE OO Shell Guide*.
- Sleep scriptlets have been deprecated. In HPE OO 10.x, scriptlets must be written in Rhino.

Fixed Defects in 10.70

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

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

CR Number	Title	Description
QCCR8C30495	OOSH cannot connect when the password contains the special character "!"	This restriction has been eliminated.
QCCR8C30974	OOSH deploy command fails with SLF4J: Failed to load class error	This error no longer occurs.
QCCR8C26821	HPE OO Studio 10.x does not allow variable value propagation when defining variables in the Transition Name of a Gated Transition	Variable values are now propagated correctly.
QCCR8C29033	Operations no longer snap to grid lines	The operations now snap correctly to gridlines.
QCCR8C29174	"Table select" filter throws OutOfBoundException	Filter has been updated.
QCCR8C30336	"Too many tokens in the License key" error in general.log when license was applied	This error no longer appears.
QCCR8C30496	In Central, pop-up prompts appear garbled	This was found only in the Japanese version installations and has been corrected.
QCCR8C30497	When importing a content pack via cmd line, prompting for a password does not work	The OOSH tool has been updated.

CR Number	Title	Description
QCCR8C30558	HPE OO Studio 10.x does not allow variable value propagation when defining variables in the Transition Name of a Gated Transition	You can now define a variable in a Transition name.
QCCR8C30798	Cannot create secure LDAP connection when trustStore password is encrypted/obfuscated	This behavior has been corrected.
QCCR8C31018	On a fresh installation, the logs indicate the total data cannot be retrieved from the database	Log level settings have been updated; this error no longer appears.
QCCR8C31275	REST API POST /authns/ldap-config/{id}/test returns error 400	The API has been updated.
QCCR8C31420	When scheduling follows, timezones that do not use DST are not present in the selection list	Timezone list in Schedule now includes a timezone which does not use DST.
QCCR8C31770	After replacing an OO certificate, encrypted truststore password cannot be used anymore. Only cleartext/obfuscated truststore password works	This behavior has been corrected.

Fixed Defects in 10.60

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

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

CR Number	Title	Description
QCCR8C29263	Warning messages appear in log files when authenticating with an internal user against 9.X SOAP/REST API	The order of authentication has been changed. An internal user is authenticated against the internal database followed by an LDAP server (if configured).
QCCR8C29312	Table filter behaves differently depending on column delimiter	The table filter now behaves consistently for all column delimiters.
QCCR8C29738	HTML tags are not parsed in prompt messages titles	All HTML tags are now parsed displayed correctly in all prompt messages titles.
QCCR8C29308	Duration information in CSV Report is not accurate	The CSV report calculation has been corrected.
QCCR8C28843	Add Option to Accept Only Valid and Trusted LDAP Certificates for the Secure LDAP Connection	When the configuration property ldaps.trustAllCertificates.isEnabled is false , the client.truststore of Central will be verified for trusted certificates of the LDAP Server. Use OOSH to toggle the property value.
QCCR8C28568	Slow SQL performance when displaying Step Details in Central Run Management	SQL queries have been improved for better performance.

Fixed Defects in 10.51

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

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

CR Number	Title	Description
QCCR8C23380	Scheduler filters apply only on the current page instead of all pages	In the Schedule tab, the schedules no longer span across multiple pages, so you can filter all the schedules at once.
QCCR8C27915	Add X-Frame-Options HTTP headers in HPE OO outgoing responses	<p>Now, by default, the X-FRAME-OPTIONS response header is added to all outgoing responses with the value SAMEORIGIN.</p> <p>You can change this by setting the value of the xframe.options.mode configuration item to one of the other options via OOSH or REST API. The available options are SAMEORIGIN, ALLOW-FROM, DENY or NONE).</p> <p>For more information, see the <i>HPE OO Shell (OOSH) User Guide</i>.</p>
QCCR8C27155	CSV run reports exported contain an extra CR character that messes rendering in Excel	For input/output/result values that contained "new-lines", the CSV reports were scrambled because the new-line contained an extra CR character. Steps were rendered incorrectly in Excel cells.
QCCR8C28630	HTML tags are not supported in Central UI	HTML Tags are now permitted in the User Message of an input.
QCCR8C27650	Files and folders are not displayed correctly in Central when folders' names are similar	This behavior no longer reproduces in HPE OO 10.51.
QCCR8C27156	The legacy 'run' REST API	This behavior no longer reproduces in HPE OO

CR Number	Title	Description
	from 9.x returns HTTP 400 Bad Request if a flow name with multibyte characters is specified	10.51.
QCCR8C26446	Duration information in CSV Report is not accurate	This behavior no longer reproduces in HPE OO 10.51.
QCCR8C28789	The table filter for output and results behaves differently if the other character than whitespace is chosen from column delimiter	The table now behaves for the rest of the delimiters as it behaves when using the whitespace character.

Fixed Defects in 10.50

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

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

CR Number	Title	Description
QCCR8C19151	Snap-to grid feature in Studio does not work as expected	This behavior has been corrected.
QCCR8C23322	Callouts cause flows to be rendered improperly Flow Visualization and Flow Graph	Flow graph rendering has been updated.
QCCR8C28302	Schedule Details in Central UI shows incorrect Start date that is one day ahead of an actual scheduled date	The time zone calculation has been corrected
QCCR8C28237	Scheduler setup Timezone is cached and locale TZ is not detected anymore until cache is cleared	The timezone setup on a schedule from Central remains cached until the browser cache is cleared.

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 HPE Software Support Online, or contact your HPE 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 Selection List 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 Run Detail page in the HPE OO Run Workspace, for both the Run Details pull-down and the Flow Details 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 Warning box of the Cancel job had YES as the default, when it should have been NO . Now the default is the NO 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>HPE OO Studio Authoring Guide</i> .
QCCR8C23379	Browsing Run Explorer workspace triggers constant 80% CPU usage on	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
	database server	
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 Collapse All 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	The title and the message information are now displayed on the popup window on the Manual operation.

CR Number	Title	Description
	version	
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 HPE 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 Cut/Copy > Paste action takes more than two seconds, a popup dialog appears with a message about the current state.</p> <p>The Cut/Copy > Paste action consumes almost all system CPU because it tries to execute the action in the shortest time possible.</p> <p>Note: 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>
QCCR8C25688	Studio debugger stop button is wrongly disabled while the flow is paused	When a flow is paused, the Stop 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	The upgrader now supports non-English locales.

CR Number	Title	Description
	Central service during the upgrade on non-English Windows	
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>HPE OO Security and Hardening Guide</i>.</p> <p>Instructions about how to create an encrypted password have been added to the <i>HPE 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 HPE Software Support Online, or contact your HPE Support representative directly.

CR Number	Title	Description
QCCR8C21114	Missing .NET Framework check in the HPE OO Studio installation	The installer now checks for .NET Framework.
QCCR8C21866	Silent uninstaller for HPE OO Studio 10.x on windows and Linux	It is now possible to uninstall HPE OO silently.
QCCR8C22082	Format Replace filter behavior changed after upgrading to 10.01	<p>In the Step Results tab, unpredictable results could occur with the Format Replace filter when used with a variable reference such as \${var}.</p> <p>Results are now resolved according to their order.</p>
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 Topology tab) has been added.
QCCR8C22741	When encountering a Display operation, the Studio debugger Step In functionality will not work as expected	When the Step In button is selected in the debugger, it steps in to the next step.

CR Number	Title	Description
QCCR8C22883	After upgrading to 10.02 from 10.01.0001, flows are no longer running	After upgrading to 10.02 from 10.01.0001, flows run as expected.
QCCR8C23921	Inconsistent System Evaluator behavior between HPE OOver versions.	The System Evaluator tried to validate null values.
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 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 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 HPE OO operations are no longer editable.
QCCR8C22551	key.store and client.truststore are not generated when using HPE OO embedded	The key.store and client.truststore were not generated when using HPE OO embedded.
QCCR8C24202	HPE OO 10.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.

CR Number	Title	Description
QCCR8C23999	Setting the saServerIdentifier input as List of Variables in 10.02, will not allow editing additional inputs for the flow in SA 10.01	Setting the saServerIdentifier input as List of Variables in 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 Select flow to execute on server 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 [HPE Software Support Online](#), or contact your HPE 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 HPE OO <i>Security and Hardening Guide</i> .
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

CR Number	Title	Description
		List of Values Input type. The operation would not accept multiple values separated by a comma or semicolon.
QCCR8C22460	Security issue	
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 HPE 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 [HPE Software Support Online](#), or contact your HPE 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 10.x when compared to 9.x	A flow with many steps would take noticeably longer to run in version 10.x, 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 Operations Orchestration

- If you are installing a clean installation of HPE OO or upgrading from version 9.x, you should use the installation wizard.
- If you are upgrading to HPE Operations Orchestration 10.70 from a previous version of HPE OO 10.x or installing 10.70 after using the HPE OO Community Edition, you need to run the **apply-upgrade** script.

Note for those upgrading from 9.x

If you are upgrading from 9.x, you will also need to upgrade your repository. The Content Upgrade Utility (CUU) is a tool that extracts specified content from an existing 9.x repository, and upgrades the extracted content into a content pack that can be deployed in 10.x. For more information, see *Upgrading to HPE OO 10.x from version 9.x*.

Installation Documentation

In the Installation Wizard, there is a link to the *Installation, Upgrade, and Configuration Help*. This help opens directly in a web browser.

The *HPE OO Installation, Upgrade, and Configuration Help* covers all installation options: clean installation, upgrade from 9.x, upgrade from an earlier version of 10.x, silent installation, and installation of a cluster.

Alternatively, you may prefer to read the PDF documents before starting the Installation Wizard. If you prefer to use the PDFs, see the relevant document:

Users	See
New users who have never installed HPE OO	<i>HPE OO Installation, Upgrade, and Configuration Guide</i>
Users who are upgrading from an earlier version of 10.x to 10.70	
Users who have installed the HPE OO Community Edition	
Users installing a cluster	
Users who are upgrading from 9.x to 10.70	<i>Upgrading to HPE OO 10.x from version 9.x</i>

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

Installing the Studio Git Client

After installing or upgrading to 10.70, in order to use the Studio Git integration feature, you must install the Git client version 2.9.2.

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

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

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

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

For example:

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

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

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

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

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

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

Upgrade and Rollback Notes

Upgrade Notes

- Before upgrading to HPE OO 10.70, you must download and install Microsoft Visual C++ 2010 Redistributable Package (x86). You need to install the version for the x86 platform, regardless of your Windows version.

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

- 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 HPE 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 HPE OO 10.x:

- a. Purge your old data.

This can be achieved using the HPE 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.

- After an upgrade from an earlier version of 10.x, if you start Studio on the same workspace that was used with the previous version, all the workspace settings are retained from the previous version.

If you roll back from 10.70 to the previous version, if you start Studio on the same workspace, any changes made to the workspace in 10.70 are not visible in Studio, but they are saved inside the user workspace. You will see the workspace settings you had in the older version.

At this point, you can modify your workspace settings using the earlier 10.x version. These changes in the workspace are saved.

If you upgrade to 10.70 again, and start Studio on the same workspace, the settings will be those from 10.70 and you will not see the workspace settings that were changed after rolling back to the previous version.

In this scenario, if you want to keep the settings from the earlier version in 10.70, do the following:

- a. Inside the user home directory, locate the **settings.xml** file inside the **.oo** folder (**C:/Users/<username>/.oo**).
- b. Remove the following line:

```
<opstudioSettingsUpgradeVersion>10.70</opstudioSettingsUpgradeVersion>
```

Rollback Notes

- If you want to roll back HPE OO 10.x to an earlier version of HPE 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 HPE 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

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

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

- If you uninstalled a previous version of HPE OO and are installing 10.x in the same installation folder, make sure to back up the all the files that were under the installation folder and delete that folder before installing the new version.
- 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 HPE 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 *HPE OO Installation, Upgrade, and Configuration 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.
- If you are using Microsoft SQL Server with HPE OO, it is required that language-specific database collations are used. Selecting a specific collation also means that an HPE OO system that uses SQL Server is limited to the set of languages supported by that specific collation. For example, if the **SQL_Latin1_General_CP1_CS_AS** collation is used, English, German, and Spanish characters may be used, but Japanese characters may not. If **Japanese_Unicode_CS_AS** is used, French accent characters will not be presented properly. For the complete specification of each collation, see the Microsoft SQL Server documentation.
- 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.

