HP Operations Orchestration

For the Windows and Linux

Software Version: 10.02

Central User Guide

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Contents

Welcome to HP Operations Orchestration Central Guide

HP OO Central is a web-based application used for promoting flows, running and scheduling flows, administering the system, and extracting and analyzing data resulting from flow runs.
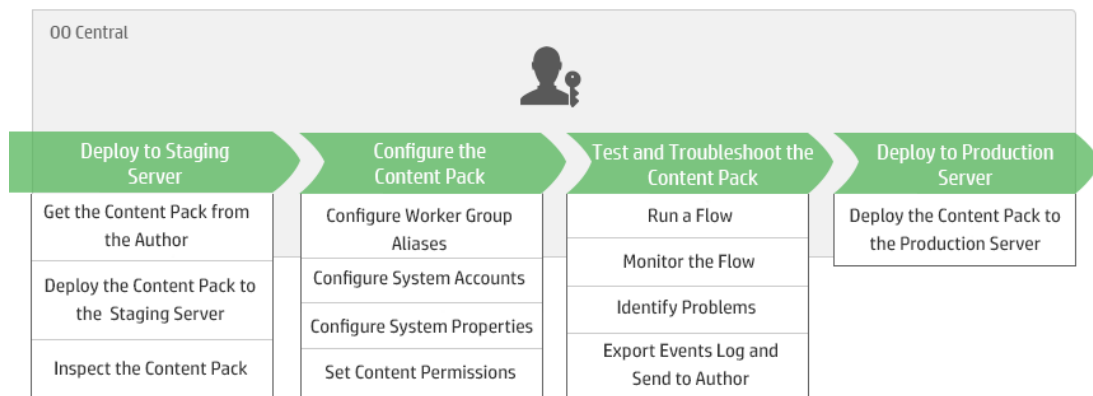
Major Tasks and Personas

The main personas who work with Central are the Operations Administrator (Op Admin) and the End User. However, some of the initial setup tasks are performed by the System Administrator (Sys Admin).

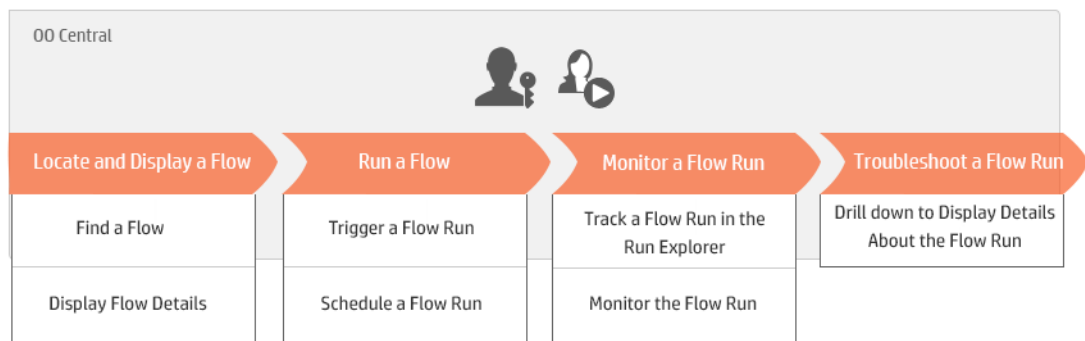**Operational Administrator (Op Admin)**

The Op Admin is responsible for the day to day operation of HP OO. This includes configuration, maintenance, content pack promotion, and setting permissions for HP OO users.

The Op Admin troubleshoots any failures in the production environment and either solves the problem or routes it to the System Administrator, to HP Support, or to the Flow Author (depending on the issue).

The Op Admin uses Central to:

- Promote content packs - see "Promoting a Content Pack – Overview" on page 64

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

- Run and monitor flows - see "Running and Monitoring a Flow – Overview" on page 94

OO Central			
Locate and Display a Flow	**Run a Flow**	**Monitor a Flow Run**	**Troubleshoot a Flow Run**
Find a Flow	Trigger a Flow Run	Track a Flow Run in the Run Explorer	Drill down to Display Details About the Flow Run
Display Flow Details	Schedule a Flow Run	Monitor the Flow Run	

End User

	The End User triggers and monitors flows. The End User can access entitled HP OO flows directly through Central or indirectly through an embedded web UI in another application

The End User uses Central to:

- Run and monitor flows - see "Running and Monitoring a Flow – Overview" on page 94

System Administrator (Sys Admin)

	The System Administrator is responsible for the HP OO hardware and software. The Sys Admin installs and patches HP OO (Central and RASes), and is responsible for the correct functioning of the application from the system perspective, dealing with things such as CPU, memory, and OS environment.

The Sys Admin uses Central to set up the Central configurations:

- Configure the topology – see:

  "Setting Up Topology – Workers" on page 55

  "Setting Up Topology – Configuration" on page 60

- Configure security and authentication – see:

  "Setting Up Security – Roles" on page 22

  "Setting Up Security – Internal Users" on page 42

  "Setting Up Security – LDAP Authentication" on page 32

  " Setting Up Security – LWSSO" on page 50

  "Setting Up a Security Banner" on page 47

Sample Scenario

	System Admin		Op Admin		Flow Author

Setup

	After the installation of Central, the **system administrator**, configures the LDAP authentication (see "Setting Up Security – LDAP Authentication" on page 32).
	The system administrator sets up the Central roles and maps these roles to the LDAP groups (see "Setting Up Security – Roles" on page 22).
	The system administrator assigns workers to the worker groups. He creates a new group, "Windows", for the external worker (see "Setting Up Topology – Workers" on page 55).
	The operations administrator deploys the base content in the Central servers (see "Deploying a Content Pack" on page 67).

Promotion

	The flow author creates a new content pack in Studio and deploys it to the file system.
	The operations administrator receives an email from the flow author, saying that a new content pack is ready for deployment.
	The operations administrator deploys the new content pack to the Central Staging server (see "Deploying a Content Pack" on page 67).
	The operations administrator maps the Central user accounts to the system accounts in the content pack (see "Setting Up System Accounts for a Content Pack" on page 74).
	The operations administrator sets up the system properties in the content pack (see "Setting Up System Properties for a Content Pack" on page 78).
	The operations administrator verifies that the Windows alias was automatically assigned to the worker group and maps the other group aliases to actual worker groups (see "Setting Up Worker Group Aliases for a Content Pack" on page 71).
	The operations administrator takes a look at the flow library and verifies that all the flows are there and that when she selects a flow, she can see the flow meta data (see "Managing the Flow Library" on page 82).
	The operations administrator sets the permissions for the flows in the content pack (see "Managing the Flow Library" on page 82).

Running and monitoring flows

	The operations administrator triggers one of the flows in the content pack (see "Running a Flow" on page 95).
	The operations administrator navigates to the **Runs** view to see the flow status (see "Tracking Flow Runs" on page 120).
	The operations administrator pauses, resumes, or cancels the flows, if required (see "Managing Flow Runs" on page 123).
	The operations administrator drills down to the flow details and tests the flow, to see if there are any problems (see "Testing and Troubleshooting a Flow Run" on page 133).

Updating the content pack

	The operations administrator identifies a problem with the content pack. It is too large, and she wants it to be split into two smaller content packs.
	The operations administrator sends an email to the flow author, asking him to split the content pack into two.
	The flow author splits the content pack into two smaller content packs and sends them to the operations administrator .

Final deployment

	The operations administrator deploys the new content packs to the Staging server and verifies that there are no other problems.
	The operations administrator deploys the content packs to the Production server.

Navigating HP OO Central

HP OO Central is divided into four workspaces, so you can perform end-to-end tasks from the same place. A workspace is a unit that holds all the screens that belong to the same end-to-end task group.

- **Dashboard Workspace** – used to display the system's ROI, and analyzed flow aggregation. For users with an Op Admin role.

- **Run Workspace** – used for running flows, monitoring runs, scheduling runs, and troubleshooting runs. Can be used by users with an End User or Op Admin role.

- **Content Workspace** – used for promotion tasks, such as deploying new content, setting permissions on the flows, setting up configuration items, and rolling back to earlier versions of content packs. For users with an Op Admin role.

- **System Workspace** – used to configure topology, and set up users, roles, LDAP authentication, , LWSSO, and security banners. For users with a System Administrator role.

Dashboard Workspace

Click the **Dashboard** button to display the Dashboard Workspace.

This workspace provides statistical information about the system (popular flows, result distribution, execution time, and so on) and financial information about ROI (return on investment).
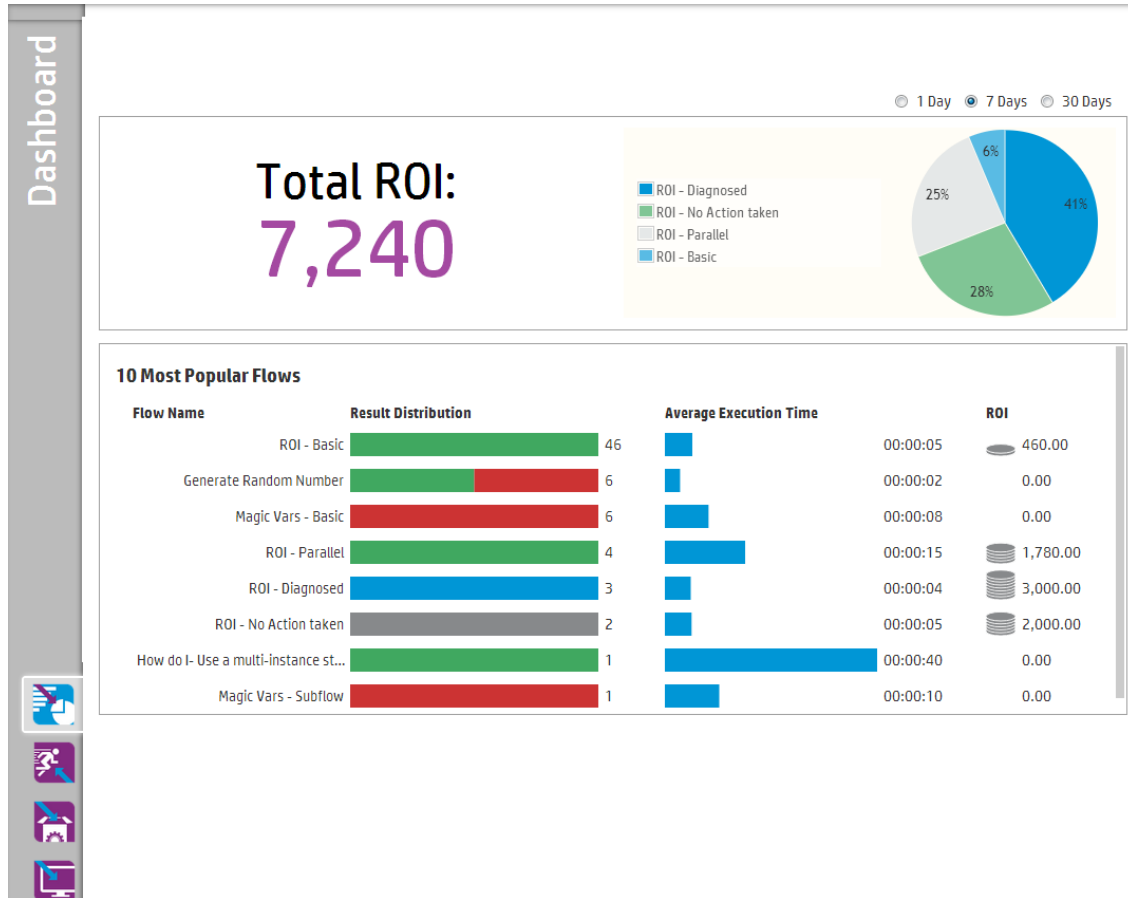
Run Workspace

Click the **Run Workspace** button to display the Run Workspace.

This workspace includes the following modules:

- **Run Explorer** – In the Run Explorer module, the Op Admin or End User can monitor their running flows and the flows that have finished running. You can track flow runs, monitor their progress, and perform actions on flow runs, such as pausing, resuming, and canceling them. If a flow fails and you want to troubleshoot, you can drill down into the run to display detailed information.

- **Scheduler** – In the Scheduler module, the Op Admin can view, create, and modify flow run

schedules.

Content Workspace

Click the **Content Workspace** button to display the Content Workspace.

This workspace includes two modules:

- **Flow Library** – The Flow Library displays the flows that have been deployed. From here, the Op Admin can run or schedule a flow, deploy or roll back new content, view a flow's meta data, set the content permissions, or run a flow for testing.

- **Configuration Items** – In the Configuration Items module, the Op Admin can configure the contents of a content pack, in order to adjust it to the environment: mapping group aliases to actual worker groups and mapping system accounts in the content pack to Central user accounts.

System Workspace

Click the **System Workspace** button to display the System Workspace.

This workspace contains the following tabs:
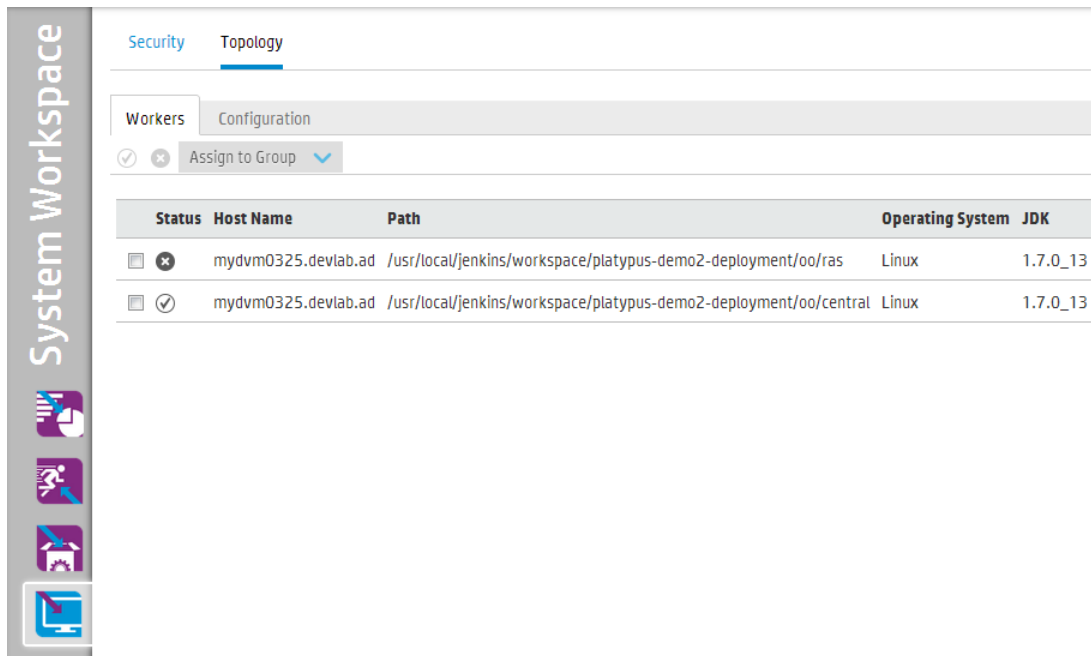
- **Security** – Enables the System Administrator to set up roles for HP OO and to apply these roles to internal users or to users in an authentication system such as LDAP or LWSSO.

- **Topology** – Enables the System Administrator to create worker groups, assign workers to

these groups, and set up configuration details, such as the URL of the load balancer host.

Viewing the Workspaces

It is possible to set up the HP OO roles so that users who have been assigned particular roles will only be able to access the workspaces that are relevant to their role.

For example, you can set up roles so that:

- Users who belong to the **Flow Runner** role will see only the Run Workspace.

- Users who belong to the **Promoter** role will see the Content Workspace and the Run Workspace.

- Users who belong to the **System Administrator** role will see the System Workspace and the Run Workspace.

For more information about roles, see .

Working with the Dashboard

The Dashboard provides statistical information about the system (popular flows, result distribution, execution time, and so on) and financial information about return on investment.

The Dashboard shows information about all flows that the logged-in user is entitled to see.

The Dashboard enables the Op Admin to analyze the flow statistics, and compare the performance of the top ten flows.

The time range of the data in the Dashboard appears in the top right corner. This time range can be set to the last day, the last seven days, or the last thirty days.

> **Note:** It is also possible to perform a wider range of Dashboard tasks using APIs:
>
> - Set the date range with a wider range of possible date ranges.
>
> - Display a larger number of flows
>
> - Sort and filter data
>
> For more information, see "Dashboard" in the *HP OO 10.02 API Guide*.
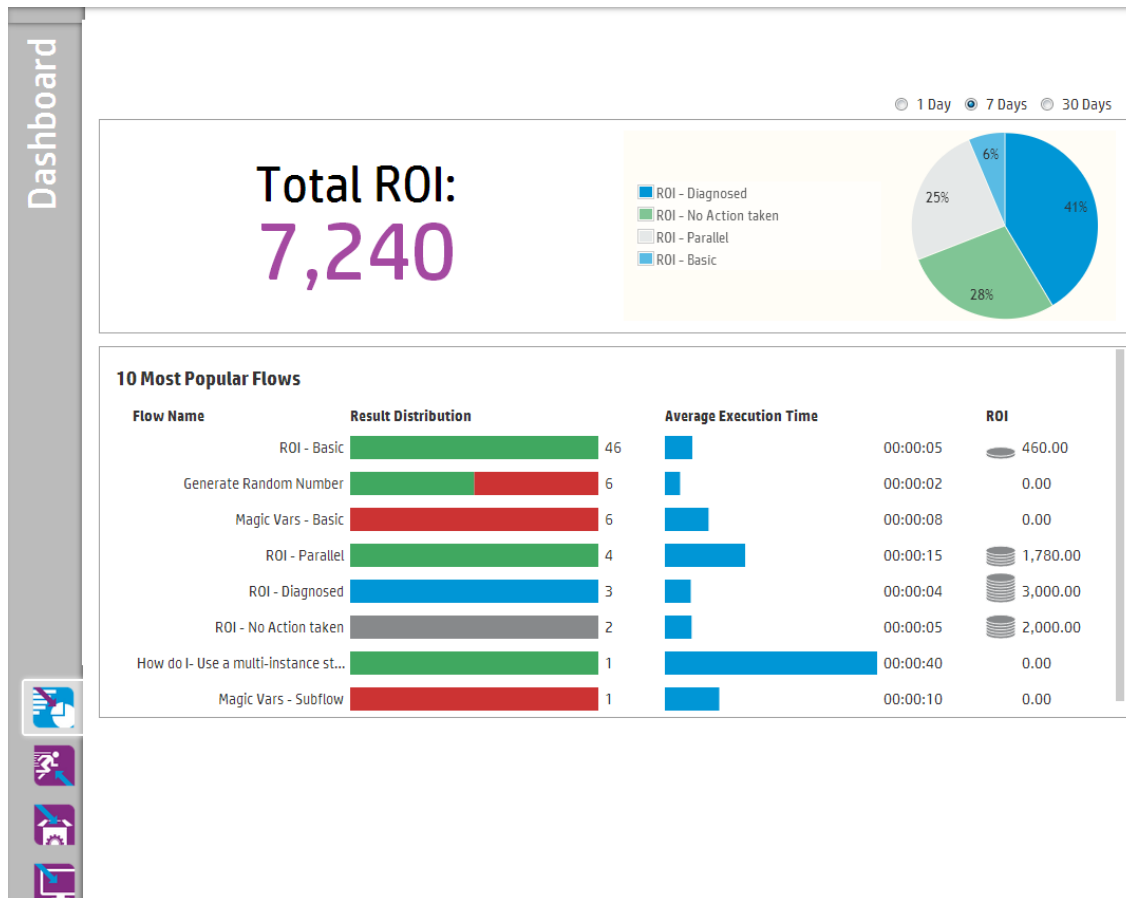
For information about how to interpret the Dashboard, see "Reference Material" on the next page.

> **Note:** The **Dashboard** tab is only visible if you have been assigned a role with the **View Dashboard** permission. For information about setting up roles, see "Setting Up Security – Roles" on page 22.

If you do not have ROI values assigned in your flows, the total ROI value will be 0. To see a movie on how to set an ROI value for your content, click the **Play** button under the movie thumbnail.

> **Note:** The screenshot below is for illustration purposes only. To play the movie, click the **Play** button in Central.
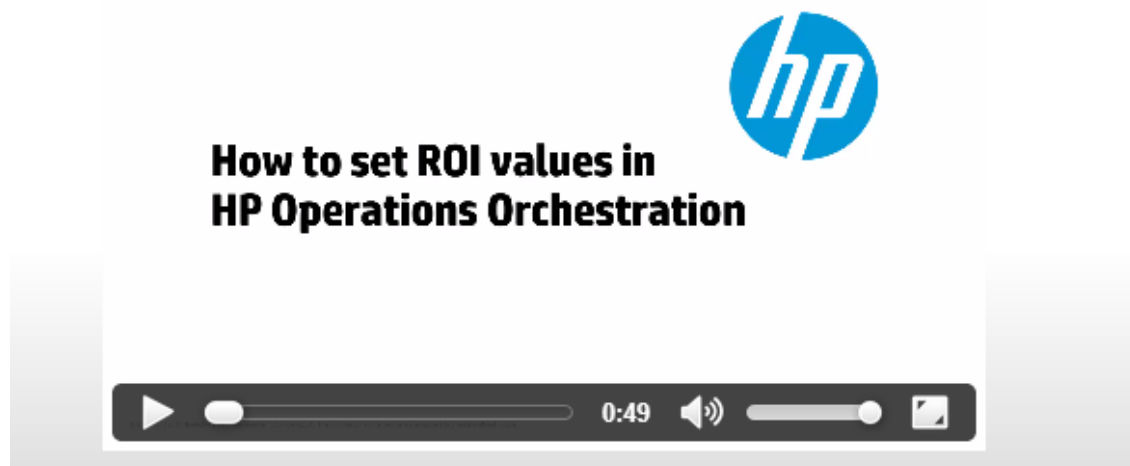
What do you want to do?

Customize the Dashboard time range

In the dashboard, you can display information about all the flow runs that you are entitled to see, over the past day (the last 24 hours starting from now), the past week (the last 7 days starting from today), or the past 30 days (starting from today).

○ 1 Day ● 7 Days ○ 30 Days

If you do not adjust the date range, the default is seven days.

> **Note:** It is also possible to set the date range using APIs, with a wider range of possible date ranges. For more information, see the *HP OO 10.02 API Guide*.

1. Click the **Dashboard Workspace** button to display the Dashboard Workspace.

2. In the top right corner, select the option with the number of days that you want to include in the date range:

   - **1** - to display information about runs from the past day

   - **7** - to display information about runs from the past 7 days

   - **30** - to display information about runs from the past 30 days

Extract the ROI Information by API

You can extract the relevant ROI information by API, as a basis for periodical reports for the business manager.

For more information, see "Get Statistics" in the *HP OO 10.02 API Guide*.

.

Reference Material

System ROI

GUI item	Description
Time range	All the data in the Dashboard is relevant to the specified time range in the top right corner. To adjust the date range, select one of the options : • **1 Day** - to display information about runs from the past day • **7 Days** - to display information about runs from the past 7 days • **30 Days** - to display information about runs from the past 30 days
Total ROI	This value is the sum of the ROI values of all performed transitions in the defined time range, which the logged on user is entitled to see.
Main Contributors pie chart	Displays the flows that were the major contributors to the ROI, with their relative contributions expressed in a pie chart.

10 Most Popular Flows

GUI item	Description
Results Distribution bar graph	For each of the top ten flows, displays the number of finished runs. Finished runs means those with a status of success, error, failed to complete, diagnosed, or no action taken. This does not include flows that are paused, running, canceled, pending cancel, or pending pause.
	The bar graph displays the relative distribution of runs according to status. The different statuses are expressed by the following colors:
	● **Green**: Completed - Resolved
	● **Red**: Completed - Error
	● **Gray**: Completed – No Action Taken
	● **Blue**: Completed - Diagnosed
	● **Yellow**: Failed to Complete
	The colors are the same as the colors of the status icons in the Run Explorer.
	Tip To identify the status indicated by a color, roll the cursor over a colored bar to display a tool-tip.
Average Execution Time bar	Displays the average duration of each flow, based on the finished runs for that flow over the time that was set as the date range.
	The bar displays the duration time of the flow, relative to the other flows in the top ten.
ROI column	Displays the ROI value of each flow.
	The coins represent the relative ROI score of the flow compared to the other flows in the top ten.

Setting up the System Configuration

| | Setting up the system configuration is usually done by the system administrator, after HP OO is installed. |

Setting Up Security – Roles

Access to HP OO Central tasks is managed using Role-Based Access Control (RBAC). RBAC lets the administrator control which actions HP OO users are allowed to perform, based on their role.

- 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. Roles can be assigned to users.

For example, you could create a role called **Flow Manager** with permission to run flows, view schedules, schedule flows, manage runs, and create reports. An **End User** role could have permission to run flows, but not to schedule them. If a role is set up with no schedule permissions, uses with this role do not even see the Scheduler module.

The large number of available permissions enables a refined definition of which parts of the web UI each role sees. The administrator can formulate a dedicated UI experience for each group of users . This enables end users to use Central and only be exposed to the information they need, limiting their ability to harm the system.

> **Note:** The **Role** tab is only visible if you have been assigned a role with the **Manage Security Configuration** or **View Security Configuration** permission. You will only be able to edit the roles if you have a role with the **Manage Security Configuration** permission.

Once the roles are set up, they can be assigned to internal users or mapped to LDAP users:

- The administrator can map a role to one or more LDAP groups, so that LDAP users who are assigned to these groups will be assigned the permissions in the role.

- The administrator can assign a role to an internal user, while setting up the user configuration. For more information, see "Setting Up Security – Internal Users" on page 42.

By default, Central includes the roles ADMINISTRATOR and EVERYBODY, corresponding to these roles in Studio.

> **Note:** Role-Based Access Control is not the same as content permissions. If you want to restrict access to data (flows and folders), you will need to configure the permission of that content. This is done as part of the promotion of a content pack. For information about content permissions, see "Managing the Flow Library" on page 82.

What do you want to do?

Create a role

> **Note:** You must have the **Manage Security Configuration** permission in order to create and edit roles.

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Roles**.

3. Click the **Add** + button.

4. In the **Name** box, enter a unique name for the role. The role name cannot have more than 255 characters.

5. In the **Description** box, enter a description of the role. The description cannot have more than 255 characters.

6. Select the check boxes next to the permissions that you want to assign to this role. The permissions are grouped according to the four Central workspaces. If a role is not assigned any permissions in a workspace, users with this role will not be able to enter that workspace.

   Run Time

   - **View Schedules** – Permission to view schedules

   - **Manage Schedules** – Permission to create and modify schedules

   - **Manage Others' Runs** – Permission to modify runs that were triggered by other users

Content

- **View Content Packs** – Permission to view content packs

- **Manage Content Packs** – Permission to modify content packs, deploy content, and roll back a deployment.

- **View Configuration Items** – Permission to view configuration items (for example, group aliases, system accounts, system properties)

- **Manage Configuration Items** – Permission to modify configuration items (for example, group aliases, system accounts, system properties)

- **Manage Flow Permissions** - Permission to modify content permissions (for flows and folders)

System

- **View General Settings** – Permission to view the Monitoring and System Information reports

  > **Note:** These reports contain information for HP Support:
  >
  > ○ **/oo/reports/sysinfo** shows the system configuration
  >
  > ○ **/oo/monitoring** is a performance monitoring dashboard

- **Manage General Settings** – Permission to configure the log level using REST API

- **View Topology** – Permission to view workers and worker groups

- **Manage Topology** – Permission to enable/disable workers and configure worker groups

- **View Security Configuration** – Permission to view the security configuration.This includes viewing internal users, LDAP authentication, and roles.

- **Manage Security Configuration** – Permission to modify the security configuration.This includes configuring internal users, LDAP authentication, LWSSO, and roles.

Dashboard

- **View Dashboard** - Permission to view the Dashboard

7. To map this role to an LDAP group, click the **LDAP Mapping** tab.

   For more information, see Map a role to an LDAP group.

8. Click **Save** to save the role.

9. To enable the authentication functionality, select the **Enable Authentication** check box to display the Enable Authentication dialog box.

> **Note:** The **Enable Authentication** check box is only available if there are existing internal or LDAP users with permission to disable the authentication in the future.
>
> If the **Enable Authentication** check box is cleared, there is no authentication and all users can access all tasks.

10. In the Enable Authentication dialog box, enter your administrator user name and password, and click **OK**.

Edit a role

You must have **Manage Security Configuration** permission in order to edit a role.

1. Select **Security** > **Roles**.

2. Select the role that you want to edit and click the **Edit** button.

3. Make the required changes in the Role Details dialog box.

4. Click **Save**.

Delete a role

1. Select **Security** > **Roles**.

2. Select the role that you want to delete and click the **Delete** ✕ button.

3. Click **OK** in the confirmation dialog box.

Map a role to an LDAP group

1. Select **Security** > **Roles**.

2. Select the role that you want to map to an LDAP group, and click the **Edit** button.

3. In the Role Details dialog box, click the **LDAP Mapping** tab.

4. Click the **Add** ➕ button to add a new mapping.

5. In the text box, type the name of the LDAP group to which you want to map this role.

6. If required, click the **Add** ➕ button again to map the role to further LDAP groups.

7. Click **Save**.

Delete the mapping of a role to an LDAP group

1. Select **Security** > **Roles**.

2. Select the role from which you want to remove the mapping to an LDAP group, and click the **Edit** ✎ button.

3. In the Role Details dialog box, click the **LDAP Mapping** tab.

4. Click the **Delete** ✕ button next to the mapping that you want to delete.

   Note: There is no confirmation dialog box when you delete a mapping. If you change your mind, click **Cancel** to close the Role Details dialog box without saving.

5. Click **Save**.

Assign a role to be the default role

When a role is defined as the default role, it will be assigned to all users that have not been assigned a role.

1. Select **Security** > **Roles**.

2. Select the role that you want to specify as the default role.

3. Click the **Default** 👤 button in the **Roles** toolbar.

Reference Material

Security > Roles

GUI item	Description
Enable Authentication check box	Select the check box to enable the user authentication functionality in HP OO. If this check box is cleared, there is no authentication and all users can access all tasks.
Add + button	Opens the Role Details dialog box, so that you can add a new role.
Edit ✎ button	Opens the User Configuration dialog box, so that you can edit the selected role.
Delete ✕ button	Deletes the selected role.
Default ▣ button	Makes the selected role the default role.
Role Name	Displays the role name.
Description	Displays a description of the role.
LDAP Mapping	Displays the groups that have been mapped to the role.

Role Details dialog box > Permissions tab

GUI item	Description
Name	Enter a name for the role, of up to 255 characters.
Description	Enter a description of the role, of up to 255 characters..
Run Time	
View Schedules	Permission to view schedules
Manage Schedules	Permission to create and modify schedules
Manage Others' Runs	Permission to modify runs that were triggered by other users
Content	

View Content Packs	Permission to view content packs
Manage Content Packs	Permission to modify content packs, deploy content, and roll back a deployment
View Configuration Items	Permission to view configuration items (for example, group aliases, system accounts, system properties)
Manage Configuration Items	Permission to modify configuration items (for example, group aliases, system accounts, system properties)
Manage Flow Permissions	Permission to modify content permissions (for flows and folders)
System	
View General Settings	Permission to view the Monitoring and System Information reports, which contain information for HP Support: • **/oo/reports/sysinfo**shows the system configuration • **/oo/monitoring** is a performance monitoring dashboard
Manage General Settings	Permission to configure the log level using REST API
View Topology	Permission to view workers and worker groups
Manage Topology	Permission to enable/disable workers and configure worker groups
View Security Configuration	Permission to view the security configuration.This includes viewing internal users, LDAP authentication, and roles.
Manage Security Configuration	Permission to modify the security configuration.This includes configuring internal users, LDAP authentication, LWSSO, and roles.
Dashboard	
View Dashboard	Permission to view the Dashboard

Role Details dialog box > LDAP Mapping tab

GUI item	Description
Add + button	Displays a text box so that you can create a mapping from this role to an LDAP group.
Text box	In the text box, type the name of the LDAP group to which you want to map this role.
Delete ✕ button	Deletes the mapping in the adjacent text box.

Setting Up Security – LDAP Authentication

If you are using an LDAP authentication service, you can add the LDAP configuration to Central. Users will need to enter their LDAP user name and password in order to use the system. This change is dynamic—there is no need to restart Central for the change to be applied.

The LDAP groups that users belong to can be mapped to HP OO roles, so that the administrator can control which actions users are allowed to perform in the system. For more information about roles, see "Setting Up Security – Roles" on page 22

It is recommended to configure more than one host and port for LDAP services, to support failover. Central will try to connect to the first configured LDAP host. If the connection fails, Central will attempt to connect to the second LDAP host.

The LDAP connection is not bound. This means that if one LDAP host goes down, Central just moves to the next one in the list. There is no need to restart Central.

Note: If an LDAP host goes down permanently, it is recommended to remove that host information from the LDAP configuration. Central will try to connect to this host, and when it doesn't work, it will try the next one after three seconds. By removing the first LDAP configuration, you can prevent this delay.

Note: If you do not have an LDAP service, you can set up internal users, who will log in using their HP OO user name and password. For more information about this option, see "Setting Up Security – Internal Users" on page 42.

It is also possible to run Central without the user authentication feature. All Central users will be identified as "anonymous" and the system will not require authentication. All Central users will have full administrative access to do anything in the system—triggering, content management, and system configuration.

Note: The **LDAP** tab is only visible if you have been assigned a role with the **Manage Security Configuration** or **View Security Configuration** permission. You will only be able to edit the LDAP authentication if you have a role with the **Manage Security Configuration** permission.

If a user has been assigned the same user name for both LDAP user and internal user, Central will relate to the LDAP user.

Note: For a comparison between configuring LDAP in HP OO 10.x and in previous versions, see the *HP OO Release Notes*.

What do you want to do?

Add an LDAP authentication configuration

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **LDAP**.

3. In the **Hosts** box, enter the IP address or host name of the LDAP server. If you have multiple LDAP hosts, use ";" as the delimiter. We recommend configuring multiple LDAP hosts to support failover.

   For example, `16.55.222.71;16.55.222.80`

   Note: Central will try to connect to the first LDAP host in the list. If the connection fails, it tries with the second LDAP host, which appears after the delimiter.

4. In the **Ports** box, enter the port number of the LDAP server. This value must be between 0 and 64435. If you have multiple LDAP hosts, use ";" as the delimiter.

   For example, `389;636`

   > **Tip:** The convention is to use 636 for secured ports and 389 for unsecured ports. However, this may vary.

5. Select the **Secured Channel** check box to support secured transport layer connection.

6. In the **Users DNs** box, enter the distinguished names to use for the users. If you have multiple user DNs, use ";" as the delimiter.

   For example, `ou=people,dc=devlab,dc=ad;ou=people,dc=devlab,dc=com`

7. In the **Users Filter** box, enter the search filter parameters in order to filter the display of users. This filter will be applied on each user DN that was entered in the **Users DNs** box.

   The default provided is `(|(uid={0})(sAMAccountName={0}))`

   It is recommended to modify the default values, even if they work, because this filter is very general. It is highly recommended that the filter contain the `objectclass` attribute.

   Examples of common default configurations:

Implementation	Filter
Sun ONE Novell OpenDS Open LDAP	`(&(objectclass=person)(uid={0}))`
Active Directory	`(&(objectclass=user)(sAMAccountName={0}))`

   > **Note:** In this filter, `{0}` is expected on the corresponding user ID.

8. Select the **Users SUB Search Scope** check box if you want the users filter to run recursively.

   > **Note:** If recursive searching is not required, then it is not recommended to select this check box.

9. In the **User ID Attribute** box, enter the attribute with the unique user ID.

For example, `uid`

> **Note:** In most LDAP implementations, `uid` is the default. In Active Directory, the default is `sAMAccountName`.

10. (Optional) In the **User Common Name Attribute** box, enter the user name that will be displayed on the screen. If you do not enter anything in this field, the user ID will be displayed by default.

> **Note:** In most LDAP implementations, `cn` is the default.

11. In the **Groups DNs** box, enter the distinguished names to use for the groups. If you have multiple DNs, use ";" as the delimiter.

    For example, `ou=groups,dc=devlab,dc=ad;ou=groups,dc=devlab,dc=com`

12. In the **Groups By User DN Filter** box, enter the search filter parameters in order to filter the display of groups. This filters the groups of which the given user is a member. The filter is applied on each Group DN.

    The default provided is `(|(member={0})(uniquemember={0}))`

    It is recommended to modify the default values even if they work, because this filter is very general. It is highly recommended that the filter contain the `objectclass` attribute.

    Examples of common default configurations:

Implementation	Filter
Sun ONE OpenDS	`(&(objectclass=groupofuniquenames)(uniquemember={0}))`
Active Directory	`(&(objectclass=group)(member={0}))`
Open LDAP	`(&(objectclass=groupofnames)(member={0}))`
Novell	The objectclass is usually: `group` or `groupofnames` or `groupofuniquenames` . The member attribute is usually `member` or `uniquemember`.

13. Select the **Groups SUB Search Scope** check box if you want the groups filter to run recursively.

> **Note:** If recursive searching is not required, then it is not recommended to select this check box.

14. In the **Group Name Attribute box**, enter the attribute that contains the name of the group to be displayed in the UI.

> **Note:** In most LDAP implementations, `cn` is the default.

15. (Optional) If the LDAP allows privileged users with search capabilities, enter the user DN in the **Privileged User DN** box.

    For example, `uid=john,ou=people,dc=devlab,dc=ad`

> **Note:** Make sure to use the exact DN for the user with such privileges.

16. (Optional) If the LDAP allows privileged users with search capabilities, enter the password in the **Privileged User Password** box.

> **Note:** Make sure to use the exact password for the user with such privileges.

17. To test the configuration, enter a user ID in the **Test Connection** section, and click the **Test Configurations** button. If the connection is successful, the **Test Connection** section displays the groups that the user belongs to and the user's details.

    In the example below, the first line in the **Test Connection** section displays that the user belongs to the groups **oo 2** and **oo2**. The second line displays the user ID, the user common name, the user's email address, and the user attributes.

Test Connection

User ID: eroth   **Test Configurations**

1. oo 2. oo2

User ID: eroth Emails: roth.eyal@hp.com Attributes: [{"name":"objectClass","value":"person"},{"name":"givenName","value":"Eyal"},{"name":"uid","value":"eroth"},

18. Click **Save**.

> **Note:** Make sure to save your changes before enabling authentication. If you don't save, the authentication will not include your changes!

19. To enable the authentication functionality, select the **Enable Authentication** check box to display the Enable Authentication dialog box.

> **Note:** The **Enable Authentication** check box is only available if there are existing internal or LDAP users with permission to disable the authentication in the future.
>
> If the **Enable Authentication** check box is cleared, there is no authentication and all users can access all tasks.

20. In the Enable Authentication dialog box, enter your administrator user name and password, and click **OK**.

Edit an LDAP authentication configuration

1. Select **Security** > **LDAP**.

2. Enter the required changes.

3. To test the configuration, enter a user ID and click the **Test Configurations** button. If the connection is successful, the **Test Connection** section displays the groups that the user belongs to and the user's details.

4. Before saving, select the check box next to the configuration name, in the top left corner, to enable the configuration.

5. Click **Save**.

Delete an LDAP authentication configuration

1. Select **Security** > **LDAP**.

2. Click the **Delete** button in the lower right corner of the screen.

Reference Material

Security > LDAP

GUI item	Description
Enable Authentication check box	Select the check box to enable the user authentication functionality in HP OO. If this check box is cleared, there is no authentication and all users can access all tasks.
Hosts	Enter the IP address or host name of the LDAP server. If you have multiple LDAP hosts, use ";" as the delimiter. For example, `16.55.222.71;16.55.222.80`
Ports	Enter the port number of the LDAP server. This value must be between 0 and 64435. If you have multiple LDAP hosts, use ";" as the delimiter. For example, `389;636`

Secured Channel	Select the **Secured Channel** check box to support secured transport layer connection.
Users DNs	Enter the distinguished names to use for the users. If you have multiple LDAP hosts, use ";" as the delimiter. For example, `ou=people,dc=devlab,dc=ad;ou=people,dc=devlab,dc=com`
Users Filter	Enter the search filter parameters in order to filter the display of users. This filter will be applied on each user DN that was entered in the **User DNs** box. The default provided is `(|(uid={0})(sAMAccountName={0}))` It is recommended to modify the default values, even if they work, because this filter is very general. It is highly recommended that the filter contain the `objectclass` attribute. Examples of common default configurations: <table><tr><td>**Implementation**</td><td>**Filter**</td></tr><tr><td>Sun ONE Novell OpenDS Open LDAP</td><td>`(&(objectclass=person)(uid={0}))`</td></tr><tr><td>Active Directory</td><td>`(&(objectclass=user)(sAMAccountName={0}))`</td></tr></table> **Note:** In this filter, `{0}` is expected on the corresponding user ID.
Users SUB Search Scope check box	Select this check box if you want the users filter to run recursively. **Note:** If recursive searching is not required, then it is not recommended to select this check box.
User ID Attribute	Enter the attribute with the unique user ID. For example, `uid` **Note:** In most LDAP implementations, `uid` is the default. In Active Directory, the default is `sAMAccountName`.

User Common Name Attribute	(Optional) Enter the user name that will be displayed on the screen. If you do not enter anything in this field, the user ID will be displayed by default.
	Note: In most LDAP implementations, `cn` is the default.
Privileged User DN	(Optional) If the LDAP allows privileged users with search capabilities, enter the user DN in the **Privileged User DN** box.
	For example, `uid=john,ou=people,dc=devlab,dc=ad`
	Note: Make sure to use the exact DN for the user with such privileges.
Privileged User Password	(Optional) If the LDAP allows privileged users with search capabilities, enter the password in the **Privileged User Password** box.
	Note: Make sure to use the exact password for the user with such privileges.
Groups DNs	Enter the distinguished names to use for the groups. If you have multiple LDAP hosts, use ";" as the delimiter.
	For example, `ou=groups,dc=devlab,dc=ad;ou=groups,dc=devlab,dc=com`

Groups By User DN Filter	Enter the search filter parameters in order to filter the display of groups. This filters the groups of which the given user is a member. The filter is applied on each Group DN.
	The default provided is `(|(member={0})(uniquemember={0}))`
	It is recommended to modify the default values even if they work, because this filter is very general. It is highly recommended that the filter contain the `objectclass` attribute.
	Examples of common default configurations:

Implementation	Filter
Sun ONE OpenDS	`(& (objectclass=groupofuniquenames) (uniquemember={0}))`
Active Directory	`(&(objectclass=group)(member= {0}))`
Open LDAP	`(&(objectclass=groupofnames) (member={0}))`
Novell	The objectclass is usually: `group` or `groupofnames` or `groupofuniquenames` . The member attribute is usually `member` or `uniquemember`.

Groups SUB Search Scope check box	Select this check box if you want the groups filter to run recursively. **Note:** If recursive searching is not required, then it is not recommended to select this check box.
Group Name Attribute	Enter the attribute that contains the name of the group to be displayed in the UI. **Note:** In most LDAP implementations, `cn` is the default.
Test Connection - User ID	To test the configuration, enter a user ID and click the **Test Configurations** button. If the connection is successful, the **Test Connection** section displays the groups that the user belongs to and the user's details.

Setting Up Security – Internal Users

As an alternative to using an external authentication system, such as LDAP, it is possible to set up internal users in Central. Internal users will log in using their HP OO user name and password, and they will not require any external authentication.

By assigning roles to users, the administrator controls which actions users are allowed to perform in the system. For more information about roles, see "Setting Up Security – Roles" on page 22.

> **Note:** The **Internal Users** tab is only visible if you have been assigned a role with the **Manage Security Configuration** or **View Security Configuration** permission. You will only be able to edit the users if you have been assigned a role with the **Manage Security Configuration** permission.

☐ Enable Authentication

| Roles | LDAP | Internal Users | SSO | Security Banner |

	Username	Roles
☐	User1	EVERYONE
☐	User2	ADMIN

If a user has been assigned the same user name for both LDAP user and internal user, Central will relate to the LDAP user.

What do you want to do?

Add a user

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Internal Users**.

3. Click the **Add** + button.

4. Enter the details for the internal user:

Internal User Details

User Name	*	User Name
Password		••••
Confirm Password		••••

Roles

☑ ADMIN   ☑ SYSTEM_ADMIN
☐ EVERYONE   ☐ END_USER
☐ PROMOTER

Cancel   **Save**

a. In the **User Name** box, enter a unique user name.The user name cannot have more than 255 characters.

b. Enter the password in both the **Password** and the **Confirm Password** boxes.The password cannot have more than 255 characters.

c. Select the check box next to each role that you want to assign to this user. You can assign multiple roles to a user.

> **Note:** If you assign multiple roles to a user, the user will be able to access all the permissions in those assigned roles. A role with fewer permissions will not restrict this user's access to the permissions in their other roles.

5. Click **Save** to save the new user.

6. To enable the authentication functionality, select the **Enable Authentication** check box to display the Enable Authentication dialog box.

> **Note:** The **Enable Authentication** check box is only available if there are existing internal or LDAP users with permission to disable the authentication in the future.
>
> If the **Enable Authentication** check box is cleared, there is no authentication and all users can access all tasks.

7. In the Enable Authentication dialog box, enter your administrator user name and password, and click **OK**.

Edit a user account

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Internal Users**.

3. Select the check box next to the user that you want to edit and click the **Edit** button.

    > **Note:** The **Edit** button is only enabled if a single user is selected.

4. Make the required changes in the User Configuration dialog box.

5. Click **Save**.

Delete a user

1. Select **Security** > **Internal Users**.

2. Select one or more users that you want to delete and click the **Delete** button.

    > **Note:** The **Delete** button is only enabled if at least one user is selected.

3. Click **OK** in the confirmation dialog box.

> **Note:** A user cannot delete their own account.

Reference Material

Security > Internal Users

☐ Enable Authentication

| Roles | LDAP | **Internal Users** | SSO | Security Banner |

+ ✎ ✕

	Username	Roles
☐	User1	EVERYONE
☐	User2	ADMIN

GUI item	Description
Enable Authentication check box	Select the check box to enable the user authentication functionality in HP OO. If this check box is cleared, there is no authentication and all users can access all tasks.
Add + button	Opens the Internal Users Configuration dialog box, so that you can add a new user.
Edit ✎ button	Opens the Internal Users Configuration dialog box, so that you can edit the selected user.
Delete ✕ button	Deletes the selected user.
User Name	Displays the user name.
Roles	Displays the roles that have been assigned to the user.

Internal User Details dialog box

Internal User Details

User Name *	User Name
Password	••••
Confirm Password	••••

Roles

☑ ADMIN   ☑ SYSTEM_ADMIN
☐ EVERYONE   ☐ END_USER
☐ PROMOTER

Cancel   Save

GUI item	Description
User Name	Enter a unique user name of up to 255 characters.
Password	Enter a password of up to 255 characters.
Confirm Password	Enter the password a second time for verification.
Roles	Select the check box next to each role that you want to assign to this user. You can assign multiple roles to a user.
Save	Click to save the user.

Setting Up a Security Banner

You can configure a security banner to appear before the log on screen. This banner may be useful if you want to warn users about security rules and issues.

For example, you may want to create a banner that says "You are now logging on to our PRODUCTION environment! Do not continue unless you are familiar with the Governance rules for this system and have taken the necessary training."

When a security banner is enabled, it appears as a pop-up dialog box before the log on screen, and the user needs to click an **OK** button to continue.
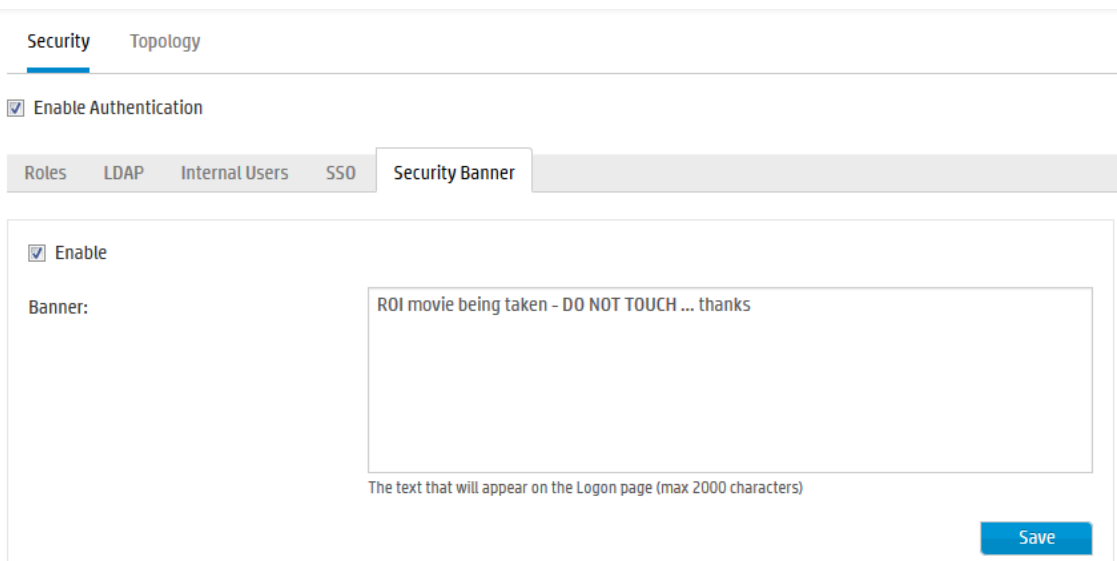
> **Note:** The **Security Banner** tab is only visible if you have been assigned a role with the **Manage Security Configuration** or **View Security Configuration** permission. You will only be able to edit the banner if you have been assigned a role with the **Manage Security Configuration** permission.

Security   Topology

☑ Enable Authentication

Roles   LDAP   Internal Users   SSO   **Security Banner**

☑ Enable

Banner: ROI movie being taken - DO NOT TOUCH ... thanks

The text that will appear on the Logon page (max 2000 characters)

Save

What do you want to do?

Add a security banner

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Security Banner**.

3. Select the **Enable** check box.

4. In the **Banner** text box, enter the text that you want to appear on the banner. The maximum length of this text is 2000 characters.

5. Click **Save** to save the banner.

Edit a security banner

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Security Banner**.

3. Make the required changes in the **Banner** text box.

4. Click **Save**.

Remove a security banner

If you clear the **Enable** check box, but do not delete the text from the **Banner** text box, you can save this text for later use.

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **Security Banner**.

3. Clear the **Enable** check box.

4. Click **Save**.

Reference Material

Security > Security Banner

GUI item	Description
Enable Authentication check box	Select the check box to enable the user authentication functionality in HP OO. If this check box is cleared, there is no authentication and all users can access all tasks.
Enable check box	Select the check box to enable the security banner, so that it is displayed upon login.
Banner text box	Enter the text for the security banner. The maximum length of this text is 2000 characters.
Save	Click to save the security banner.

▣ Setting Up Security – LWSSO

▣ You can set up single sign-on (SSO) for HP Operations Orchestration through Lightweight SSO (LWSSO). LWSSO is an HP solution that enables single sign-on using one authentication across various HP applications.

LWSSO shares a cookie between HP products that are accessed from a web browser. As a result, if a user logs onto another HP product web client that has LWSSO enabled, such as the SM web client or the BSM web client, this user will be able to enter the HP OO Central application directly, bypassing the HP OO Central logon screen.

Prerequisites for this configuration:

- The LWSSO feature must be enabled on all the HP products between which you want to use single sign-on.

- The user's logon credentials in the other HP product must match those of an HP OO user account.

  For example, if BSM is integrated with HP OO, the user that is logged into BSM must also exist in HP OO (either an LDAP user or an internal user).

After you save an LWSSO configuration, the changes take effect immediately, and there is no need to restart the server.

All nodes in the cluster configuration will refresh their configuration from the database periodically at a 10 minute interval. In the case of a single server, the node will update its configuration from the database at the same 10 minute interval.

When connecting another application that employs LWSSO to HP OO 10.x, you must specify the connection URL of HP OO using the following format:

`<protocol>://<FQDN>:<portNumber>`

For example, `http://lab.lab:8080`

> **Note:** The LWSSO enabling procedure may be different for other HP products. See the corresponding documentation for each HP product.
>
> For example, for some applications, the connection URL needs to be in the format `<protocol>://<FQDN>:<portNumber>/oo`.

> **Note:** The **SSO** tab is only visible if you have been assigned a role with the **Manage Security Configuration** or **View Security Configuration** permission. You will only be able to edit the LWSSO authentication if you have a role with the **Manage Security Configuration** permission.

What do you want to do?

Set up the LWSSO authentication configuration

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Security** > **SSO**.

3. In the **initString** box, enter the password you want to use to connect HP products. This value must be the same as those used in the LWSSO configuration of the other HP products. This password must contain at least 12 characters.

   The initstring is used to encrypt the LWSSO cookie and has no link to the user's password. However, when two applications are integrated using LWSSO, the initstring in both applications must match. Otherwise, the cookie encrypted by one application cannot be decrypted by the other application.

4. In the **Domain** box, enter the domain of the HP OO server.

5. If there are multiple domains used by applications that employ LWSSO, enter them in the **Protected Domains** box, using commas as separators.

The HP OO server domain must appear in the **Protected Domains** list. When there are several domains in the **Protected Domains** box, all applications that are integrated through LWSSO must define the same list of protected domains.

6. Select the **Enable** check box to enable the LWSSO configuration. If you do this, after you save the settings, the icon next to the **LW SSO Settings** title will change to **Enabled** ⊘ .

> **Note:** The **Enable** check box is there to let you disable an LWSSO configuration while keeping the general authentication feature enabled. For example, you might have authentication enabled for internal users and LDAP users, but you may or may not want the LWSSO configuration to be enabled.
>
> Note that the new state of LWSSO settings is not enabled immediately when you select the **Enable** check box, but when you save the new configuration.

7. Click **Save**.

8. To enable the authentication functionality, select the **Enable Authentication** check box to display the Enable Authentication dialog box.

> **Note:** The **Enable Authentication** check box is only available if there are existing internal or LDAP users with permission to disable the authentication in the future.
>
> If the **Enable Authentication** check box is cleared, there is no authentication and all users can access all tasks.

9. In the Enable Authentication dialog box, enter your administrator user name and password, and click **OK**.

Edit an existing LWSSO authentication configuration

1. Select **Security** > **SSO**.

2. Enter the required changes.

3. Click **Save**.

Update or retrieve the LWSSO configuration via REST API

Updating or retrieving the LWSSO configuration via REST API may be useful if LWSSO is configured incorrectly and you get locked out of the Central system.

To update the LWSSO configuration:

HTTP Rest call at **/oo/rest/authns/lwsso-config** with the **PUT HTTP** method.

With a **.json** of the type:

```
{ enabled : false,
```

```
initString : "CENTRAL_PASS_PHRASE",

domain : "domain1"

protectedDomains : ["domain1", "domain2"]

}
```

To retrieve the LWSSO configuration:

HTTP Rest call at **/oo/rest/authns/lwsso-config** with the **GET HTTP** method.

Reference Material

Security > SSO

GUI item	Description
Enable Authentication check box	Select the check box to enable the user authentication functionality in HP OO. If this check box is cleared, there is no authentication and all users can access all tasks.
✓ ✕	The icons next to the **LWSSO Settings** title indicate whether the settings are enabled or disabled.
Enable	Select the check box to enable LWSSO.

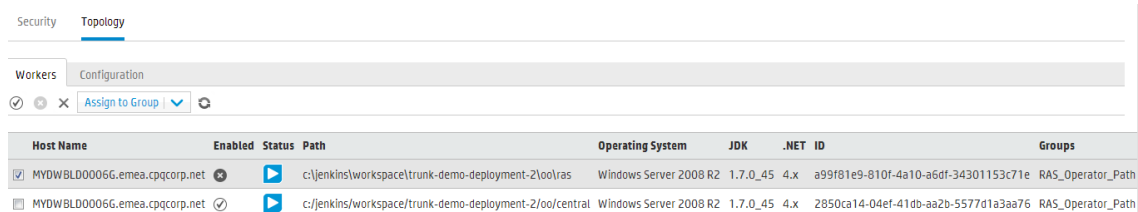| initString	The initstring is used to encrypt the LW SSO cookie and has no link to the user's password. However, when two applications are integrated using LWSSO, the initstring in both applications must match. Otherwise, the cookie encrypted by one application cannot be decrypted by the other application.
Domain	Enter the domain of the HP OO server.
Protected Domains	If there are multiple domains used by applications that employ LWSSO, enter them in the **Protected Domains** box, using commas as separators. The HP OO server domain must appear in the **Protected Domains** list. When there are several domains in the **Protected Domains** box, all applications that are integrated through LWSSO must define the same list of protected domains.
Save	Click to save the LWSSO authentication configuration.

Setting Up Topology – Workers

Network topology is the arrangement of the various elements (links, nodes, and so on) in a network. Workers and load balancers are part of the topology and can be configured under the **Topology** tab.

> **Note:** The **Topology** tab is only visible if you have been assigned a role with the **Manage Topology** or **View Topology** permission. You will only be able to edit the topology if you have a role with the **Manage Topology** permission.

Host Name	Enabled	Status	Path	Operating System	JDK	.NET	ID	Groups
MYDWBLD0006G.emea.cpqcorp.net	☑	▶	c:\jenkins\workspace\trunk-demo-deployment-2\oo\ras	Windows Server 2008 R2	1.7.0_45	4.x	a99f81e9-810f-4a10-a6df-34301153c71e	RAS_Operator_Path
MYDWBLD0006G.emea.cpqcorp.net	☐	▶	c:/jenkins/workspace/trunk-demo-deployment-2/oo/central	Windows Server 2008 R2	1.7.0_45	4.x	2850ca14-04ef-41db-aa2b-5577d1a3aa76	RAS_Operator_Path

Workers are responsible for executing flows. A worker connects to Central to obtain tasks (flow execution messages) to process.

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.

> **Note:** A worker may belong to more than one group simultaneously.

The **Topology** > **Workers** tab 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.

> **Note:** The status can take a minute or two to update.

Use the **Topology** > **Workers** tab to assign workers to worker groups, remove workers from groups, enable, disable, or delete workers.

> **Note:** Some execution stages always run on the default group, which is **RAS_Operator_Path**. Therefore, make sure that at least one worker is assigned to this group.

It is recommended to assign most (or even all) workers to **RAS_Operator_Path**, in order to optimize the execution time. You should only exclude a RAS from this group if you want to minimize its usage, and if you have only few operations that use it.

For more information about workers and worker groups, see "Worker Groups and Group Aliases" in the *HP OO Concepts Guide*.

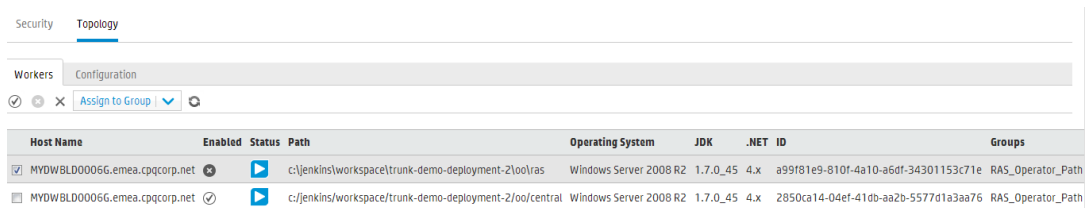## *What do you want to do?*
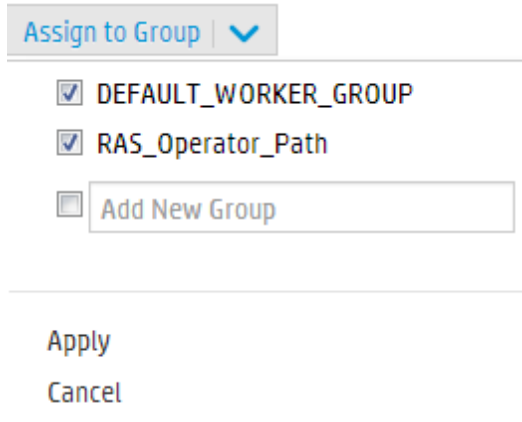
Assign a worker to an existing worker group

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Topology** > **Workers**.

3. Select the check box next to the worker name.

4. Click the **Assign to Group** button.

5. Select the check boxes next to the worker groups that you want to assign this worker to.

6. Click **Apply**.

Create a new worker group and assign a worker to it

1. Select **Topology** > **Workers**.

2. Select the check box next to the worker name.

3. Click the **Assign to Group** button .

4. Click the check box next to the empty box and enter the name of the new worker group that you want to create.

Assign to Group ▼

☑ DEFAULT_WORKER_GROUP
☑ RAS_Operator_Path
☐ Add New Group

Apply
Cancel

5. Click **Apply**.

Remove a worker from the a worker group

1. Select **Topology** > **Workers**.

2. Select the check box next to the worker name.

3. Click the **Assign to Group** Assign to Group ▼ button.

4. Clear the check boxes next to the worker groups that you want to remove this worker from.

5. Click **Apply**.

Disable a worker

1. Select **Content Management** > **Topology** > **Workers**.

2. Select the check box next to the worker name.

3. In the Workers toolbar, click **Disable** ⊗ .

> **Note:** The **Disable** button is only available if at least one enabled worker is selected.

Enable a worker

1. Select **Topology** > **Workers**.

2. Select the check box next to the worker name.

3. In the Workers toolbar, click **Enable** ⊘ .

> **Note:** The **Enable** button is only available if at least one disabled worker is selected.
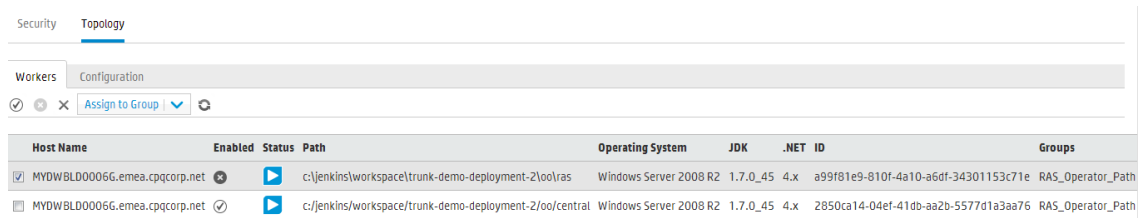
Delete a worker

1. Select **Topology** > **Workers**.

2. Select the check box next to the worker name.

3. In the Workers toolbar, click **Delete** ✕ .

> **Note:** The **Delete** button is only available if at least one worker is selected and if the selected worker is not currently running.

Reference Material

Topology > Workers

Security	Topology							
Workers	Configuration							
Host Name	**Enabled**	**Status**	**Path**	**Operating System**	**JDK**	**.NET**	**ID**	**Groups**
☑ MYDWBLD0006G.emea.cpqcorp.net ⊗		▶	c:\jenkins\workspace\trunk-demo-deployment-2\oo\ras	Windows Server 2008 R2	1.7.0_45	4.x	a99f81e9-810f-4a10-a6df-34301153c71e	RAS_Operator_Path
☐ MYDWBLD0006G.emea.cpqcorp.net ⊘		▶	c:/jenkins/workspace/trunk-demo-deployment-2/oo/central	Windows Server 2008 R2	1.7.0_45	4.x	2850ca14-04ef-41db-aa2b-5577d1a3aa76	RAS_Operator_Path

GUI item	Description
Enable button ⊘	Click to enable the selected worker. The **Enable** button is only available if at least one disabled worker is selected.
Disable button ⊗	Click to disable the selected worker. The **Disable** button is only available if at least one enabled worker is selected.
Delete button ✕	Click to delete the selected worker. The **Delete** button is only available if at least one worker is selected and if the selected worker is not currently running.
Refresh button ↻	Click to refresh the display of workers.
Assign to Group ⌄	Click to display the **Assign to Group** pop-up.
Host Name	The name of the host where this worker is located.

Enabled	Whether the worker is enabled or disabled.
Status	Whether the worker has the status of **Running** or **Stopped**. **Note:** The status can take a minute or two to update.
Path	The path to the host where this worker is located. The path indicates if the worker is in Central or in a RAS.
Operating System	The operating system of the machine where this worker is located.
JDK	The JDK version that is installed on the worker machine.
.NET	The .NET version that is installed on the worker machine.
ID	The UUID (unique identifier) of the worker.
Groups	The worker groups to which the selected worker is assigned.

Topology > Workers > Assign to Group pop-up

GUI item	Description
Assign to Group	Click the **Assign to Group** button to display the Assign to Group pop-up.
Add New Group	Select the check box and enter the name of a new group, to which the selected worker will be assigned.
<Worker groups>	Select the check boxes next to group names to assign the selected worker to these groups. The display in the dialog box will vary, depending on the groups that have been set up.
Apply	Click to apply the changes to the worker.
Cancel	Click to close the Assign to Group pop-up without saving the changes.

Setting Up Topology – Configuration

If you are using a load balancer, reverse proxy, or DNS load balancer, you need to tell HP OO where the relevant external URL is located. For example, **https://my.server.com:443/oo**. This URL is required by the event log.

If the URL of the load balancer host is not configured, the event log will refer to the IP/host from the HTTP request.

> **Note:** It is also possible to configure the load balancer host URL via REST API for configuration items.

What do you want to do?

Configure a external URL for a load balancer, reverse proxy, or DNS load balancer

1. Click the **System Workspace** button to display the System Workspace.

2. Select **Topology** > **Configuration**.

3. In the **URL** box, enter the URL of the load balancer, reverse proxy, or DNS load balancer.

4. Click **Save**.

Reference Material

Topology > Configuration

GUI item	Description
URL	Enter the URL of the load balancer, reverse proxy, or DNS load balancer.
Save	Click to save the configuration.

Setting the Browser Language

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

Set up your browser as follows for foreign language support.

Browser	Procedure
Internet Explorer	To change your language preferences go to **Tools** > **Internet Options** > **General** (tab) > **Languages** > **Language** preference, and select the required language. Make sure the primary language is the first in the list.
Firefox	To change your language preferences go to **Tools** > **Options** , and select **Content** (tab) > **Languages** > **Choose** (button). Select the required language.
Google Chrome	To change your language preferences, select the **Customize and control Google Chrome** icon, and then select **Settings** > **Show advanced settings**. In the **Languages** section, click **Language and input settings**. Click **Add**, and select the required language. You can add languages to this from a predefined set, and Chrome will send all the languages you choose with the Accept-Language header in the order in which you arrange them.
Safari	In Windows, you can't change the language sent by Safari. The language sent with the Accept-Language header is derived from your system settings.

Note: Make sure that the added language is the first in the list.

Enabling Authentication

The **Enable Authentication** check box is available under the **Security** tab. You can use this to enable or disable the authentication functionality in Central. If authentication is not enabled, all users will be able to access all tasks.

Only users with administrator credentials can enable authentication in Central. This is to prevent a user from becoming locked out of the system.
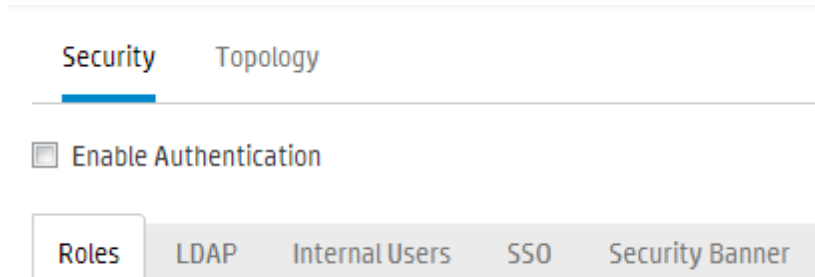
The **Enable Authentication** check box is only available if there are existing internal or LDAP users with permission to disable the authentication in the future.

What do you want to do?

Enable authentication
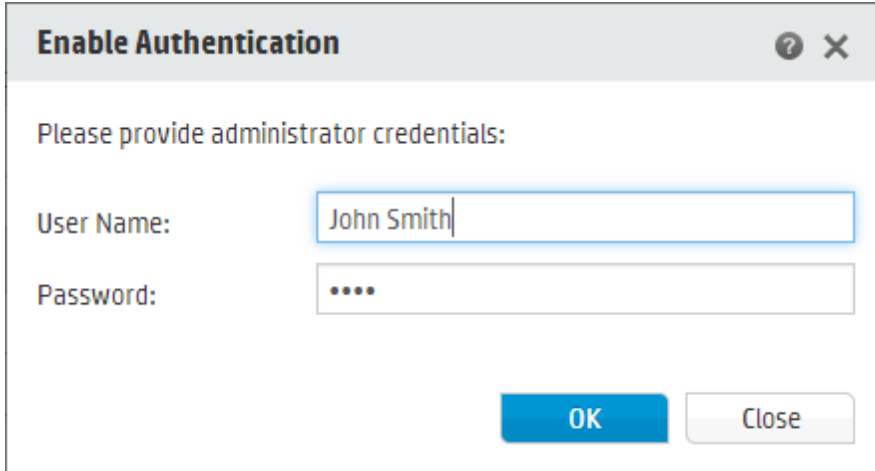
1. Select the **Enable Authentication** check box to display the Enable Authentication dialog box.

2. In the Enable Authentication dialog box, enter your administrator user name and password, and click **OK**.

Disable authentication

1. If the authentication functionality has been enabled, clear the **Enable Authentication** check box.

2. In the confirmation dialog box, click **OK**.

Reference Material

Security > Enable Authentication

GUI item	Description
User Name	Enter your administrator user name.
Password	Enter your administrator password.
OK	Click to save the credentials and enable the authentication.

Promoting Content Packs

	The Op Admin is usually the one responsible for promoting content packs.

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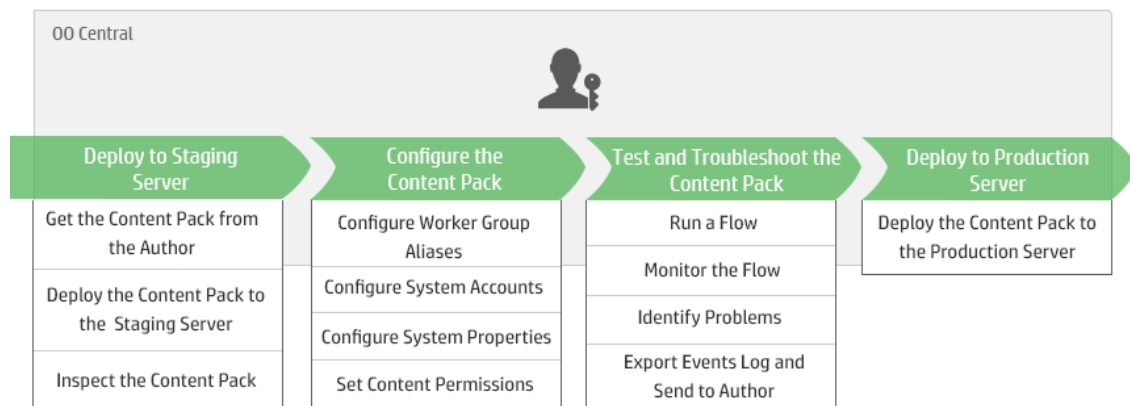
Promotion involves deploying the content pack on the following Central environments:

- Development

- QA (optional)

- Staging

- Production

Is promotion the same as deployment?

Deployment is part of promotion. However, the promotion process also includes other tasks, such as:

- Configuring the content pack: configuring worker group aliases, mapping system accounts, and so on

- Testing and troubleshooting the flows in the content pack

What is a content pack?

A content pack is a file containing operations, flows, actions (Java-based or .Net based), and configuration items. When flow authors complete a project, they package it into a content pack for promotion on the Central server.

For more information about content packs, see *Basic HP OO Concepts*.

When do you promote a content pack?

You promote a content pack when:

- There is a need for new content in the Production environment.

- You have fixed a bug in a flow and need to upload the new version of the flow to the Production environment.

- You need to add new functionality to an existing flow in the Production environment.

- You are upgrading to a new version of an out-of-the-box content pack from HPLN.

Who does the promotion?

The promotion process in each of the environments is slightly different and may be done by a different persona. However, in most cases, it is the Op Admin who is responsible for promotion.

The person doing the promotion must be assigned a role with **View Content Packs** and **Manage Content Packs** permissions.

Promotion steps

> **Note:** This is just a high level look at the Central workflow, and there are many options that are not described here. For more detailed information about any of the steps, use the links to learn

about the options in-depth.

Step 1: Get the Content Pack From the Flow Author

1. The Flow Author creates a content pack in HP OO Studio. See "Compiling a Content Pack" in the *HP OO Studio Authoring Guide*.

2. The Flow Author saves the content pack to the file system.

3. The Flow Author shares the content pack with the Op Admin/Promoter.

Step 2: Deploy to the Staging Server

1. The Op Admin receives the content pack from the flow author.

2. The Op Admin deploys the content pack on the Staging server. See "Deploying a Content Pack" on the next page.

Step 3: Configure the Content in the Content Pack

In this step, the Op Admin adjusts the content pack to the environment by configuring the content in it.

1. If the content pack includes system accounts, the Op Admin assigns values to the system accounts in the content pack. See "Setting Up System Accounts for a Content Pack" on page 74.

2. The Op Admin maps the aliases of the worker groups to actual worker groups. See "Setting Up Worker Group Aliases for a Content Pack" on page 71.

> **Note:** The Op Admin can also map the system properties via API. For more information, see the *HP OO API Guide*.

3. The Op Admin sets the content permissions on the flows. See "Managing the Flow Library" on page 82.

Step 4: Test and Troubleshoot the Content Pack

1. The Op Admin runs each flow from **Content Workspace** > **Flow Library** and checks whether it runs properly. See "Tracking Flow Runs" on page 120.

2. If a flow run fails, the Op Admin can drill down into a flow to identify the problems. See "Testing and Troubleshooting a Flow Run" on page 133.

3. 👤 If the flow contains problems that need to be fixed by the flow author, the Op Admin can export the flow events log, send the log to the author to review, and ask the author to fix the flow.

Step 5: Deploy to the Production Server

1. 👤 If required, the Op Admin adjusts the configuration of the content pack, for the Production server. For example, it may be necessary to map the worker group aliases and system accounts differently for this server.

2. 👤 Finally, the Op Admin deploys the content pack to the Production server.

Deploying a Content Pack

👤 Deployment is performed at least twice in the promotion process.

A content pack is often deployed to the following Central environments:

- Development

- QA (optional)

- Staging

- Production

> **Note:** It is advised to deploy the base content pack and any other HP content packs that are used in Studio before deploying your own content packs.

Content Pack Versions

You can deploy a content pack to a server multiple times, as the content is updated by flow authors, and new versions of the content pack are created.

After a content pack has been deployed, it is possible to roll back to the last deployment version. This might be useful if you find that there are problems with the flows in a new deployment. For more information, see Roll back to a previous deployment.

> **Note:** When you roll back to the last deployment, you return the content to the state that it was in before your most recent deployment. If the most recent deployment involved multiple content packs, the rollback returns all of these content packs to the state they were in, previously.
>
> Note also that you can only roll back one version. You cannot roll back to earlier versions than the last one.

Content Pack Validation

During the deployment process, Central validates the deployed content packs to make sure that the structural integrity of the deployed content is intact. This includes checking that there are no missing references, that there are no duplicate UUIDs, that the flows in the content packs are correctly formed, that there are no duplicate flow paths and no duplicate system property names.

Deploying Multiple Content Packs

A single user can deploy multiple content packs at once, by using the the **Add +** button in the Deploy New Content dialog box,

However, it is not possible for two users to deploy content packs 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.

Split Deployment

After a content pack has been deployed, it is possible to split the original content pack into two or more parts in Studio and deploy each of these separately. Note that if one of these smaller content packs has the same name as the one that was originally deployed, it will overwrite the original one on the Central server. If it has a different name, it will be deployed alongside it.

What do you want to do?

Deploy a content pack

1. Click the **Content Workspace** button to display the Content Workspace.

2. Under the **Flow Library** tab, click the **Deploy New Content** button.

3. In the Deploy New Content dialog box, click the **Add +** button.

4. Browse to the content pack on the file system, select it, and then click **Open**.

5. Repeat steps 3 - 4 to add more content packs, if desired.

6. Click **Deploy**.

Deploy New Content   ⊘ ✕

\+

✕   oo10-base-cp.jar (114.45 MB)

                                                        Close   **Deploy**

The deployment may take a few minutes. A progress bar displays the progress of the deployment. The progress bar shows as each step is completed.

Deploy New Content   ⊘ ✕

\+

✕   oo10-base-cp.jar (114.45 MB)

| 13% |

Step 2 out of 15

                                                        Close   Deploy
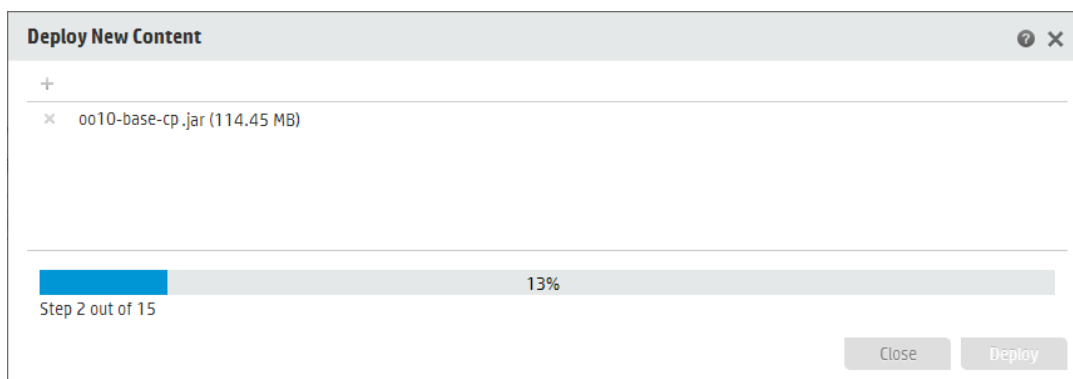
> **Note:** It is not possible for two users to deploy a content pack to the same Central at the same time. If you try to deploy content to Central while another user is already deploying content, you will see an error message, indicating that another deployment is currently in progress.
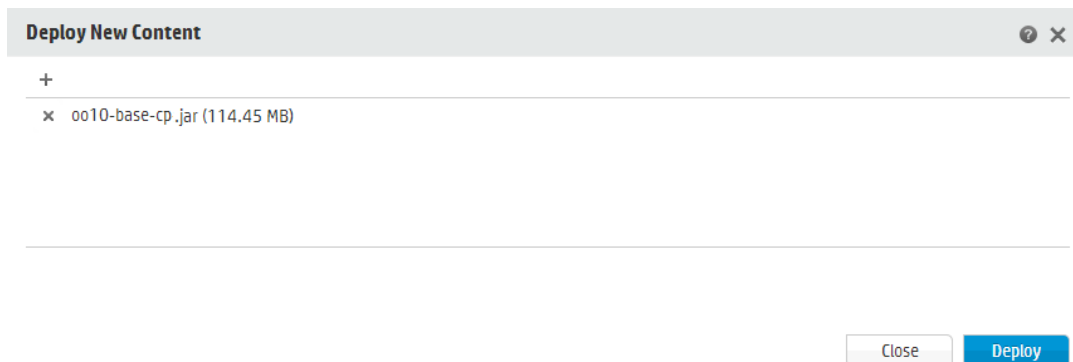
After deployment, an icon indicating the success or failure of the deployment is displayed in the dialog box.

7. Click **Close** to close the dialog box.

Roll back to the last deployment

After a content pack has been deployed, it is possible to roll back to the last deployment. This might be useful if you find that there are problems with the flows in a new deployment.

1. Click the **Content Workspace** > **Flow Library** tab.

2. Click the **Roll Back Deployment** button.

3. Click **OK** in the confirmation dialog box.

Reference Material

Deploy New Content dialog box

Deploy New Content	⊘ ✕
✛	
✕ oo10-base-cp.jar (114.45 MB)	

<div align="right">Close Deploy</div>
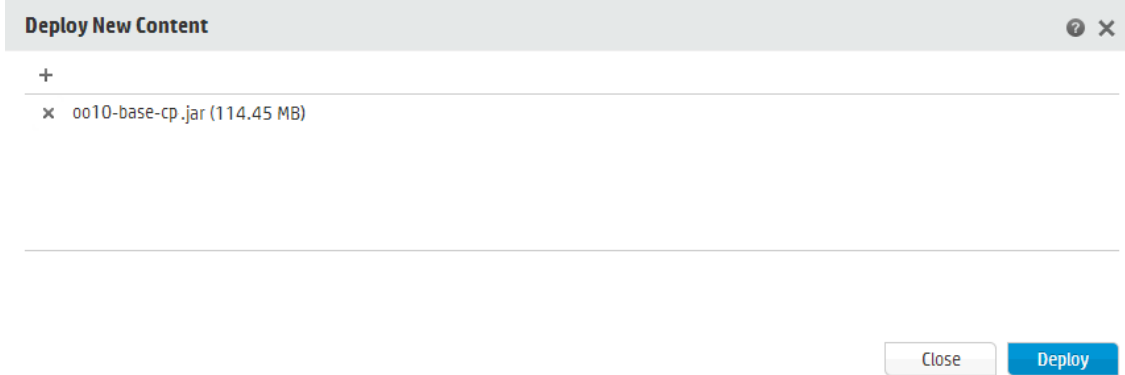
GUI item	Description
Add ✛	Click to add a new content pack for deployment. You can add multiple content packs and deploy them in a single action.
Remove ✕	Click ✕ next to a content pack to remove it from the Deploy New Content dialog box.
Deploy	Click to deploy the content packs that are listed in the Deploy New Content dialog box.
Close	Click to close the Deploy New Content dialog box.

Setting Up Worker Group Aliases for a Content Pack

After a content pack has been deployed to a Central server, the Op Admin may need to configure the contents of this content pack, in order to adjust it to the environment.

If the content pack includes operations that have been assigned to group aliases, rather than actual worker groups, you will need to map these group aliases to actual worker groups. For more information about group aliases, see "Worker Groups and Group Aliases" in the *HP OO Concepts Guide*.

> **Note:** If a group name and alias name are the same, these are mapped automatically by default.

To access the configuration items, click the **Content Workspace** > **Configuration Items** tab.

> **Note:** The **Configuration Items** tab is only visible if you have been assigned a role with the **Manage Configuration Items** or **View Configuration Items** permission. You will only be able to edit the group aliases if you have a role with the **Manage Configuration Items** permission.

What do you want to do?

Assign a group alias in the content pack to a worker group

If the content pack includes operations that have been assigned to group aliases, map these group aliases to worker groups.

1. Click the **Content Workspace** button to display the Content Workspace.

2. Select **Configuration Items** > **Group Aliases**.

3. Click the **Add** + button. The Group Alias Details dialog box opens.

4. In the **Alias Name** box, enter the name of the alias that was used in the operations.

5. From the **Worker Group Name** list, select the worker group to which you want to map this group alias.

6. Click **Save**.

> **Note:** If you want to map the group alias to a group that does not exist yet, go to **Content Management** > **System Configuration** > **Workers** and create a new group, and then return to this task to do the mapping. For more information about creating worker groups, see "Setting Up Topology – Workers" on page 55.

Change the worker group that is mapped to a group alias

1. Select **Content Workspace** > **Configuration Items** > **Group Aliases**.

2. Select the group alias that you want to edit and click the **Edit** ✎ button.

3. From the **Worker Group Name** list, select another worker group to which to map the group alias.

4. Click **Save**.

Delete a group alias mapping

1. Select **Content Workspace** > **Configuration Items** > **Group Aliases**.

2. Select the group alias mapping that you want to delete and click the **Delete** ✕ button.

3. Click **Yes** in the confirmation dialog box.

Reference Material

Group Aliases pane
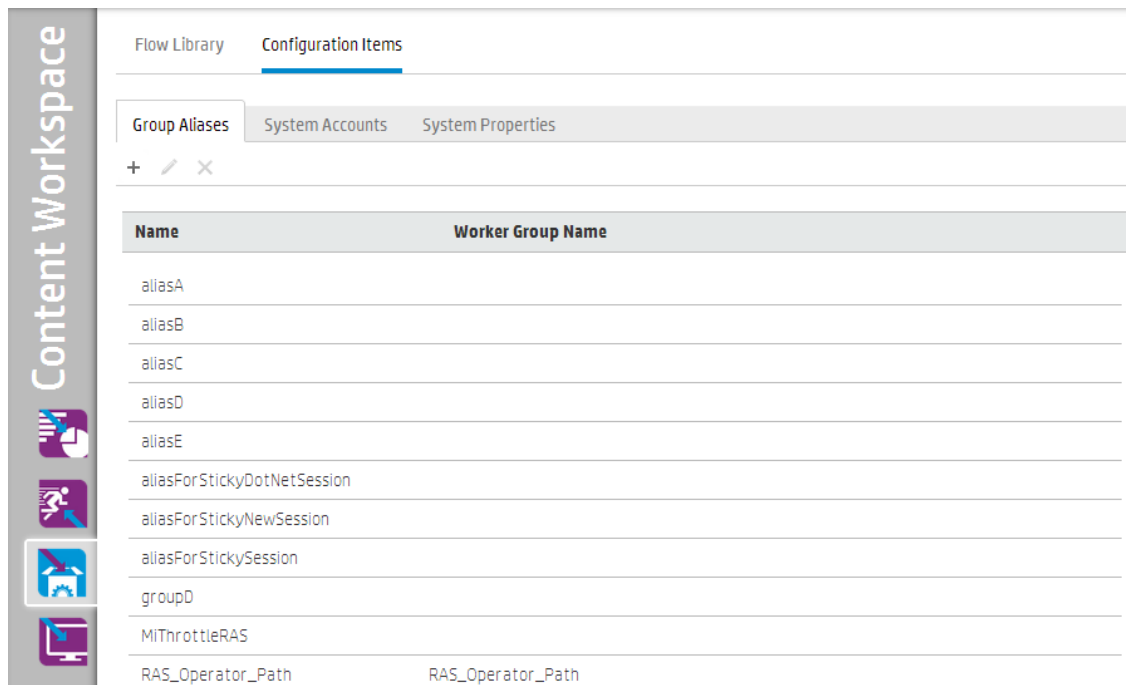
GUI item	Description
Name	Displays the name of a worker group alias from the content pack.
Worker Group Name	Displays the worker group that you want to map that alias to.
Add + button	Opens the Group Alias Details dialog box, so that you can assign a group alias in the content pack to a worker group.
Edit ✎ button	Opens the Group Alias Details dialog box, so that you can change the worker group that is mapped to a group alias.
Delete ✕ button	Deletes the selected group alias mapping.

Group Alias Details dialog box

GUI item	Description
Alias Name	Enter the name of a worker group alias from the content pack.
Worker Group Name	Select the worker group that you want to map that alias to.

Setting Up System Accounts for a Content Pack

After a content pack has been deployed to a Central server, the Op Admin may need to configure the contents of this content pack, in order to adjust it to the environment. This includes setting up the system accounts.

In many cases, content packs come with system accounts configured. For example, if you are deploying a content pack for an Oracle database, it will include Oracle user accounts. You will need to create Central user names and map them to the system accounts in the content pack.

- System accounts that existed in deployed content packs have their original value displayed in the **Deployed User Name** column.

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

- If you create a new system account, it will only have a value in the **Override User Name** column.

Note: The following special characters cannot be used in a system account name: `<>\\"/;%!@#$%^&*()`.

To access the configuration items, click the **Content Workspace** > **Configuration Items** tab.

Note: The **Configuration Items** tab is only visible if you have been assigned a role with the **Manage Configuration Items** or **View Configuration Items** permission. You will only be able to edit the system accounts if you have a role with the **Manage Configuration Items** permission.

What do you want to do?

Add a system account to a content pack

1. Click the **Content Workspace** button to display the Content Workspace.

2. Select **Configuration Items** > **System Accounts**.

3. Click the **Add** + button. The Add System Account dialog box opens.

4. In the **System Account Name** box, enter the system account name, as it appears in the content pack.

5. In the **User Name** box, enter a name for a Central user account. This user name will be mapped to the system account from the content pack.

> **Note:** The user name does not have to be identical to the original system account name.

6. In the **Password** box, enter a password for the Central user.

7. Enter the password a second time in the **Confirm Password** box.

8. Click **Save**.

Edit a system account in a content pack

1. Select **Content Workspace** > **Configuration Items** > **System Accounts**.

2. Select the system account that you want to edit and click the **Edit** ✎ button.

3. In the Edit System Account dialog box, make any required changes to the system account name, user name, or password.

> **Note:** The following special characters cannot be used in a system account name:
> `<>\\"/;%!@#$%^&*()`.

4. Click **Save**.

Delete a system account mapping from a content pack

1. Select **Content Workspace** > **Configuration Items** > **System Accounts**.

2. Select the system account mapping that you want to delete and click the **Delete** ✕ button.

3. Click **Yes** in the confirmation dialog box.

> **Note:** System accounts that were deployed prior to HP OO 10.02 can be deleted, but those deployed in or after HP OO 10.02 cannot be deleted.

Reference Material

System Accounts pane

GUI item	Description
Name	Displays the name of the system account as it appears in the content pack.
Deployed User Name	For a system account that was in the content pack at the time of deployment, displays the original value. If you edit the system account, this field keeps a record of the original value.
Override User Name	Displays the Central user name, which is mapped to the system account. ● For a system account that was added to the content pack after deployment, displays the value. ● For a system account that was in the content pack at the time of deployment and was edited, displays the new value, which overrides the original value.
Add + button	Opens the Add System Account dialog box, so that you can add a new system account.
Edit ⁄ button	Opens the Edit System Account dialog box, so that you can edit the selected system account.
Revert ↻ button	Reverts the selected system account to its original value. This button is only available for system accounts that were in the content pack at the time of deployment.
Delete ✕ button	Deletes the selected system account. **Note:** System accounts that were deployed prior to HP OO 10.02 can be deleted, but those deployed in or after HP OO 10.02 cannot be deleted.

Add System Account dialog box

GUI item	Description
System Account Name	Enter the name of the system account as it appears in the content pack.
User Name	Enter the Central user name, to be mapped to the system account.
Password	Enter the password for the Central user name.
Confirm Password	Enter the password a second time in the **Repeat Password** box.

Setting Up System Properties for a Content Pack

After a content pack has been deployed to a Central server, the Op Admin may need to configure the contents of this content pack, in order to adjust it to the environment. This includes setting up the system properties.

- System properties that existed in deployed content packs have their original value displayed in the **Deployed Value** column.

- If you edit a system property from a deployed content pack, this overrides the default value, and the new value is displayed in the **Override Value** column.

- If you create a new system property, it will only have a value in the **Override Value** column.

To access the configuration items, click the **Content Workspace** > **Configuration Items** tab.

> **Note:** The **Configuration Items** tab is only visible if you have been assigned a role with the **Manage Configuration Items** or **View Configuration Items** permission. You will only be able to edit the system properties if you have a role with the **Manage Configuration Items** permission.

What do you want to do?

Add a system property

1. Click the **Content Workspace** button to display the Content Workspace.

2. Select **Configuration Items** > **System Properties**.

3. Click the **Add** + button. The System Property Details dialog box opens.

System Property Details	❓ ✕
Name *	
Override Value	
	Cancel Save

4. In the **Name** box, enter the system property name of up to 255 characters.

   > **Note:** The following characters cannot be used in a system property name: /\

5. Click **Save**.

Edit a system property value

1. Select **Content Workspace** > **Configuration Items** > **System Properties**.

2. Select the system property that you want to edit and click the **Edit** ✏ button.

System Property Details ❓ ✕

Name	*	system_property_for_display
Deployed Value		value_for_display
Override Value		

Cancel   Save

3. In the System Property Configuration dialog box, make any required changes to the system property value.

> **Note:** The system property name cannot be modified, if it originated from a deployed content pack.

4. Click **Save**.

Delete a system property

You can only delete a system property if it was created after deployment of the content pack. You cannot delete system properties that were in the content pack at the time of deployment.

1. Select **Content Workspace** > **Configuration Items** > **System Properties**.

2. Select the system property that you want to delete and click the **Delete** ✕ button.

3. Click **Yes** in the confirmation dialog box.

Revert a system property from a content pack

If you have changed the value of a system property that was in the content pack at the time of deployment, you can revert to its original value.

1. Select **Content Workspace** > **Configuration Items** > **System Properties**.

2. Select the system property that you want to revert to the original value and click the **Revert** ↻

button.

3. Click **Yes** in the confirmation dialog box.

Reference Material

System Properties tab

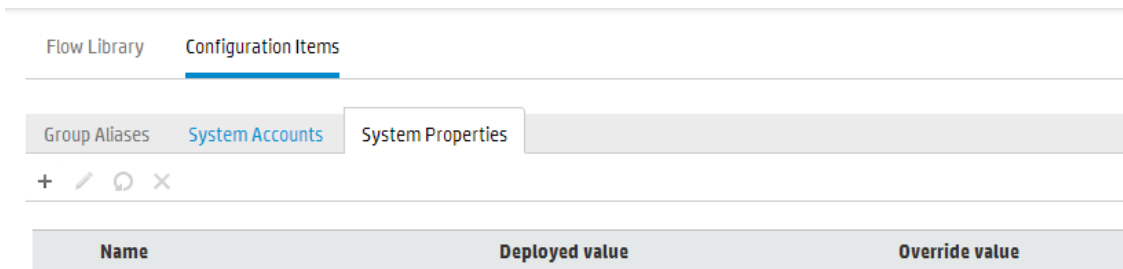| GUI item	Description
Name	Displays the name of the system property.
Deployed Value	For a system property that was in the content pack at the time of deployment, displays the original value. If you edit the system property, this field keeps a record of the original value.
Override Value	• For a system property that was added to the content pack after deployment, displays the value. • For a system property that was in the content pack at the time of deployment and was edited, displays the new value, which overrides the original value.
Add + button	Opens the System Property Details dialog box, so that you can add a new system property.
Edit ✎ button	Opens the System Property Details dialog box, so that you can edit the selected system property.
Delete ✕ button	Deletes the selected system property. This button is only available for system properties that were added to the content pack after deployment.
Revert ↻ button	Reverts the selected system property to its original value. This button is only available for system properties that were in the content pack at the time of deployment.

System Property Configuration dialog box

System Property Details	? ✕
Name *	system_property_for_display
Deployed Value	value_for_display
Override Value	
	Cancel Save

GUI item	Description
Name	Enter the name of the system property.
Override Value	Enter the value of the system property.
Save	Saves the system property.

Managing the Flow Library

After a content pack has been deployed, you can see the flows inside it in the Flow Library. From here, you can browse flows, to find the one that you need. You can view the flow meta data, view reports about the last time that a flow was run, and set the content permissions.

To access the Flow Library, click the **Content Workspace** > **Flow Library** tab.

When you select a flow in the flow library, information about that flow is displayed in the information pane to the right.

This information includes the:

- Description about the flow, if one exists

- Path to the location where the flow is stored

- Version of the flow

- Flow UUID

- Flow ROI

Setting Permission for Content

Content permissions let you restrict access to data (flows and folders) to according to the roles that have been assigned to users. This should be done as part of the promotion of a content pack.

You can entitle a role to have either view permission or run permission, or both, 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.

> **Note:** To modify the content permissions, you must be assigned a role with **Manage Security** permission.

If you set the content permissions of a folder and apply the change to all children, these permissions will apply to all the flows within that folder. It is also possible to set the permissions of the entire library.

> **Note:** Content permission is not the same as restricting the actions that HP OO users are allowed to perform in the system. This is done via Role-Based Access Control (RBAC). For more information about RBAC, see "Setting Up Security – Roles" on page 22

What do you want to do?

Display flow information

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Open the folders to look for the flow that you need.

4. Select a flow.

5. View the flow information, displayed in the information pane to the right.

6. If required, use the scroll bar to scroll down and view the contents of the **Description** section.

7. If desired, click the **Flow Map** button to display a flow map representing the flow.

For more information, see "Viewing a Flow Map" on page 89.

Display information about the last time a flow was run

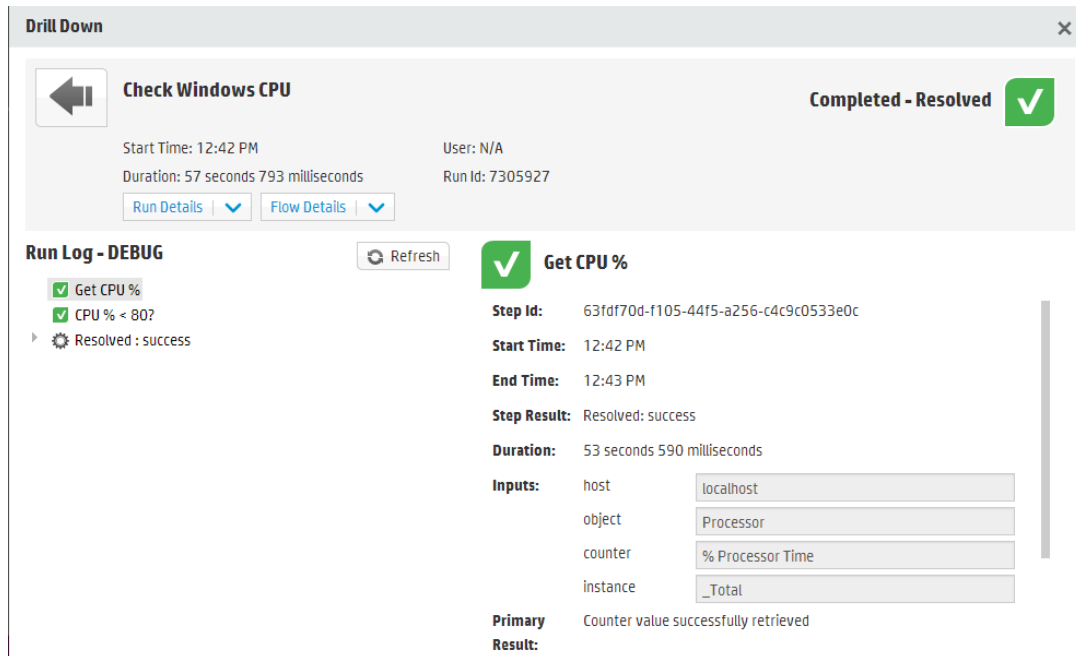You can view the details what happened the last time a flow was run.

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Select a flow in the flow library.

4. Click the **Last Run Report** button. The Drill Down window opens, showing what happened the last time this flow was run.

The **Last Run Report** button is only available for flows that have been run at least once.

The information in the Drill Down dialog box is the same as the information in the Run Explorer drill down view. For more details about these fields, see .

Set content permission for a flow or folder

1. Select a flow or folder in the flow library.

2. In the **Permissions** section, click the **Edit** button

3. In the Edit Permissions dialog box, select the **View** and **Run** check boxes to assign permissions for the selected role.

Edit Permissions   ✕

Path: Library/Accelerator Packs

Role Name	View	Run
ADMIN	☑	☑

☑ Apply To Children   Cancel   Save

- Select **View** to enable users with the selected role to view this flow or the contents of this folder in Central.

- Select **Run** to enable users with the selected role to run this flow or the contents of this folder in Central.

4. If you have selected a folder, you can select the **Apply to Children** check box to apply these permissions to all the flows in the folder.

5. Click **Save**.

Reference Material

Flow Library pane

GUI item	Description
Deploy button	Click the **Deploy** button to open the Deploy New Content dialog box.
Roll Back button	Click the **Roll Back** button to roll back to the last deployment.
Run button	Click the **Run** button to run the selected flow.
Schedule button	Click the **Schedule** button to open the Schedule Flow dialog box.

Last Run Report button	Displays the details about what happened the last time that the selected flow was run. The **Last Run Report** button is only available for flows that have been run at least once.
Flow Map Button	Click the **Flow Map** button to display a flow map representing the flow. For more information, see "Viewing a Flow Map" on page 89.
ID	Displays the UUID of the selected flow.
Path	Displays the path to the location of the selected flow.
Content Pack	Displays the content pack that the selected flow came from.
Version	Displays the version number of the selected flow.
Run Link	If required, copy this link and embed it in an external website. To test how this will look, click the link from here to open the triggering dialog box. For more information, see "Running a Flow" on page 95.
Description	Displays a description of the selected flow. If required, use the scrollbar to scroll down and view the contents of the **Description** section.
Permissions	Displays the permissions that have been set for this flow or folder, for each role that has been defined in the system: • Displays **View** if users with the adjacent role have permission to view this flow (or the contents of this folder) in Central. • Displays **Run** if users with the adjacent role have permission to run this flow (or the contents of this folder) in Central. The display of roles in this section corresponds to the roles that have been defined in the system.
Edit	Click to open the Edit Permissions dialog box for the selected flow or folder.

Edit Permissions dialog box

GUI item	Description
Run	Select **View** to enable users with the selected role to view this flow (or the contents of this folder) in Central.
View	Select **Run** to enable users with the selected role to run this flow (or the contents of this folder) in Central.
Apply to children	If you have selected a folder, select the **Apply to Children** check box to apply the updated permissions to all the flows in the folder.
Save	Click to save the changes to the permissions.

Viewing a Flow Map

From the Flow Library, you can click the **Flow Map** button to display a flow map representing the flow. This is the same map that existed in Studio, when the flow was created.

Why View a Flow Map?

- In the promotion phase, the op admin can view the flow map in order to better understand what the flow does and which steps and outputs to expect.

- In the execution phase, the end user can use the flow map to get a clear picture of what the flow does and to verify that this is the flow they need.

- In the troubleshooting phase, the end user and op admin can use the flow map to understand exactly which series of steps caused a flow to fail.
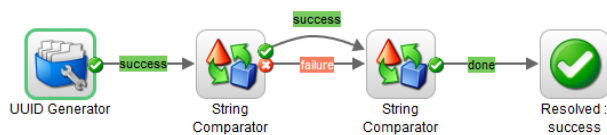
What do you want to do?

Display a flow map

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Select the flow that you need.

4. Click the **Flow Map** button to display a flow map representing the flow.

Adjust the zoom of a flow map

When you display a flow map, the zoom level is automatically adjusted so that the entire flow fits into the window. However, you can increase or decrease this zoom level.

1. Display the flow map for the selected flow.

2. Adjust the zoom levels:

   - Click the **Zoom In** button to increase the zoom.

   - Click the **Zoom Out** button to decrease the zoom.

Pan across a flow map

1. Display the flow map for the selected flow.

2. Roll your mouse over the flow map so that the cursor changes to a hand icon.

3. Press down on the cursor and drag across the map to move the display to a specific location on the map.

Reference Material

Flow map elements

GUI item	Description
Operation Operation1	An operation has a gray background.

Responses	Operations have predefined response icons, for "error","resolved", "diagnosed" and "no action".
Non-blocking	A non-blocking step does not block the rest of the flow. While it is running, the flow run continues to carry out the steps that come after it. A non-blocking step appears with an orange lightning bolt.
Subflow	A subflow is a flow within a flow. A subflow appears with a blue background.
Response steps	Response steps are end points for a flow.
Transitions	Transitions between steps have labels, color-coded using the same colors as the response steps.
Gated transition	A gated transition restricts access to the next step to users who have been assigned a particular role. Gated transitions appear with a red arrow.
Handoff transition	A handoff transition is one where a message appears, suggesting that the current user hand off the flow run to another user. Handoff transitions appear with a hollow arrow head.
Multi-instance step	A multi-instance step can run multiple times, with multiple targets. In HP OO 10.x, a multi-instance step resides within a multi-instance branch.

Parallel Split Step	A parallel split step is a set of step sequences that are carried out simultaneously.
	Each series of steps is represented visually in the flow diagram as a lane.
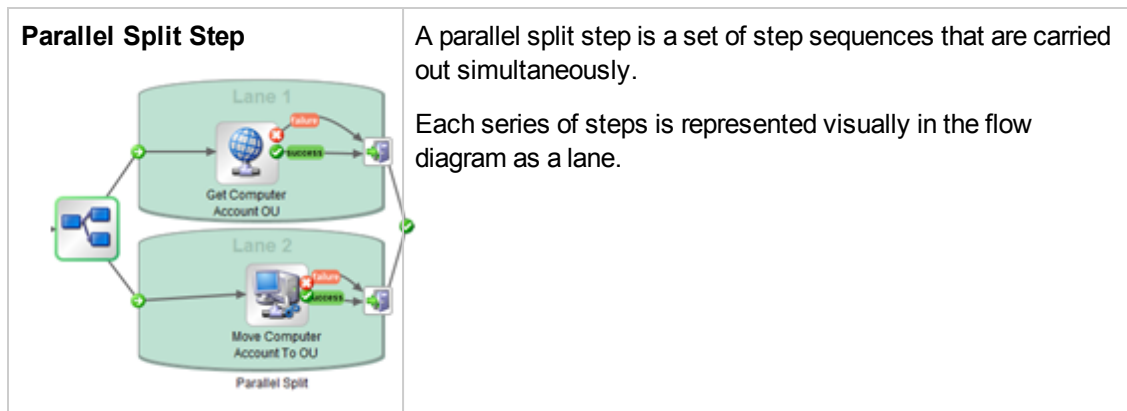
Flow map toolbar

GUI item	Description
Zoom In 🔍	Click the **Zoom In** button to increase the zoom by 10%.
Zoom Out 🔍	Click the **Zoom Out** button to decrease the zoom by 10%.

Testing and Troubleshooting a Content Pack

In this step, the Op Admin tests and troubleshoots the flows in the Staging server.

What do you want to do?

Test a content pack on the Staging server

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Select the flow that you want to test, and click the **Run** button.

4. Check whether the flow runs as expected.

5. Click the **Runs** tab, to monitor the progress of the flow run. For more information, see "Tracking Flow Runs" on page 120.

6. Click the **Drill down** button at the end of each row to display more information about the selected run. For more information, see "Testing and Troubleshooting a Flow Run" on page 133.

7. To further test the flow, run it again, with the same or different parameters.

Running and Monitoring Flows

	The Op Admin and the End User are responsible for running and monitoring flows.

Running and Monitoring a Flow – Overview

Once the content packs have been deployed, the Op Admin or End User can run flows and monitor the flow runs.
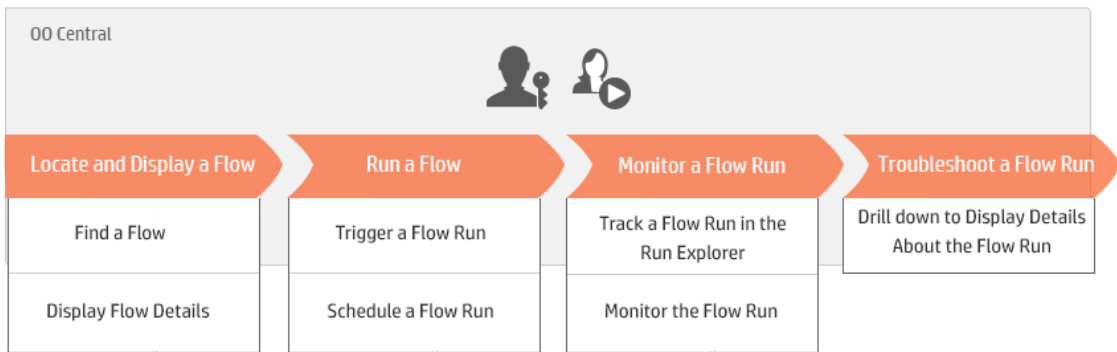
Note that this is just a high level look at the workflow, and there are many options that are not described here. For more detailed information about any of the steps, use the links to learn about the options in-depth.

Step 1: Find the flow that you want to run

The Op Admin/End User browses to the flow by using the flow library. Go to the **Content Workspace > Flow Library** module or to the **Run Workspace > Run Explorer** module. See "Managing the Flow Library" on page 82.

Step 2: Run the flow

The Op Admin/End User runs the flow. See "Running a Flow" on the next page.

Alternatively, the Op Admin/End User schedules the flow to run later. See "Scheduling Flow Runs" on page 103.

Step 3: Monitor the flow run

The Op Admin/End User tracks the flow run in the Run Explorer. See "Tracking Flow Runs" on page 120.

If required, the Op Admin/End Use performs actions on flow runs, such as pausing, resuming, and canceling flow runs.. See "Managing Flow Runs" on page 123.

Step 4: Troubleshoot the flow run

If required, the Op Admin investigates any problems with the run. See "Testing and Troubleshooting a Flow Run" on page 133.

Running a Flow

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

- From the Run Explorer

- From the Flow Library

For information about how to pause, resume, or cancel a flow run, see "Managing Flow Runs" on page 123.

What do you want to do?

Run a flow from the Run Explorer

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. Click the **Run** button in the top right corner.

Run Flow ⊘ ✕

Flow: * Choose a flow   ...

Cancel   Run
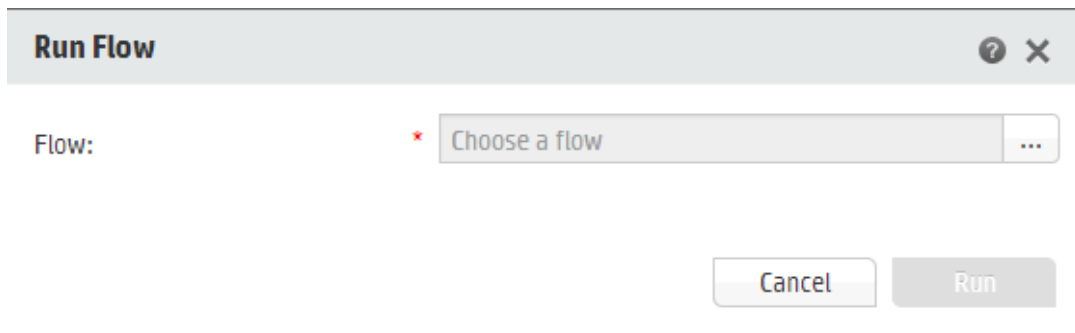
4. Click the Browse [...] button next to **Choose a flow** to open the Select a Flow dialog box.

Select a Flow ✕

- ▼ 📁 Library
  - ▼ 📁 Accelerator Packs
    - ▶ 📁 Active Directory
    - ▼ 📁 Network
      - ▶ 📁 Connectivity
      - ▶ 📁 Deprecated
      - ▶ 📁 Web Pages
      - 🗋 Simple SMTP Check
    - ▶ 📁 Operating Systems
  - ▶ 📁 Flow1
  - ▶ 📁 flows for triggering
  - ▶ 📁 How Do I flows
  - ▶ 📁 Operations
  - ▶ 📁 Templates
  - ▶ 📁 Tutorials
  - ▶ 📁 Utility Operations

Simple SMTP Check

ID: 13dbf004-c88f-4ef6-b743-a5c6cc65d8bc
Path: Library/Accelerator Packs/Network/Simple SMTP Check.xml
Content HPOO-oo-base
Pack:
Version: 1.2-SNAPSHOT
Run http://16.59.63.164:8293/oo/trigger.html#
Link: c88f-4ef6-b743-a5c6cc65d8bc
Description:

```
Checks to see that an SMTP server is opera
tional by ensuring it gets a valid respons
e to an ehlo command.

Inputs:
host - The smtp server to check.
domain - The domain to put after the ehlo
```

Cancel   OK

5. Select the flow that you want to run and click **OK**.

6. In the **Run Name** box, enter a name for the run.

    By default, the run name is the flow name, but you can change this. You may want to give it a name that identifies this particular run. For example, you may want to run the same flow multiple times, each with different input. Naming the runs makes it easier to identify them based on the inputs.

7. Enter the necessary inputs for the run in the Run Flow dialog box.

8. Click **Run**.

Run a flow from the Flow Library

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Browse for a flow in the flow library.

4. Select the flow that you want to run, and click the **Run** button.

5. In the Run Flow dialog box, enter a name for this flow run.

    By default, the run name is the flow name, but you can change this. You may want to give it a name that identifies this particular run. For example, you may want to run the same flow multiple times, each with different input. Naming the runs makes it easier to identify them based on the inputs.

6. Enter the necessary inputs for the run in the Run Flow dialog box.

Run Flow   ? ✕

Flow: * | Library/Accelerator Packs/Network/Simple SMTF ... |

Run Name: | Simple SMTP Check |

host: * | localHost |

domain: | |

                                                   Cancel   Run

7. Click **Run**.

Run an interactive flow

1. Run the interactive flow, either from the Flow Library or the Run Explorer.

2. When the run reaches an interactive point (such as **Inputs Required**, **Handoff**, **Display Message**, and so on), its status is changed to **Paused - Action Required**.

3. Select the run in the Run Explorer and click the **Drill down** ❯ button at the end of the row to display the Run Information window.

4. Click the **Expand** ⊘ button to expand the prompt message.

Inputs Required - Local Ping

targetHost: * localHost

Enter a value for targetHost

packetCount:

Enter a value for packetCount

packetSize:

Enter a value for packetSize

timeout:

Enter a value for timeout

Resume

Note: You can click the **Contract** ⟫ button on the left side of the Inputs Required dialog box to hide it again.

5. Read the message and follow its instructions to resume the run—enter the required inputs, handoff, and so on, and click **Resume**.

For information about the different statuses, see "Tracking Flow Runs" on page 120.

Run a flow with a gated transition

A gated transition restricts access to the next step to users who have been assigned a particular role.

Note: Gated transition flows can only be resumed by users who have **Manage Others' Runs** permissions.

1. Run the flow from the Flow Library or the Run Explorer.

2. When the flow run reaches the gated transition, if you have not been assigned a role with the required permission, the flow run is paused. The run status appears as **Paused – Action Required**,

3. Click the **Drill down** button at the end of the row to display more information about the run.

4. Click the **Expand** button to expand the prompt message.

5. In the prompt message, click the **Hand off to another user (email this run)** link to create an email message to send to the user who needs to complete the flow run.

6. An email message opens with a message for the person to whom you are handing off the flow run and a link to the flow run. Enter the email address of this person and send the message.

Run a flow with a handoff transition

A handoff transition is one where a message appears, suggesting that the current user hand off the flow run to another user. Unlike with a gated transition, the first user has the option to resume the flow run without handing it off to another user.

1. Run the flow from the Flow Library or the Run Explorer.

2. When the flow run reaches the handoff transition, the flow run is paused. The run status appears as **Paused – Action Required**.

3. Click the **Drill down** button at the end of the row to display more information about the run.

4. Click the **Expand** button to expand the prompt message.

5. You have two options:

   - To hand off the flow run to another user, click **Hand off to another user (email this run)**. An email message opens with a message for the person to whom you are handing off the flow run and a link to the flow run. Enter the email address of this person and send the message.

   - Click **Resume** to continue the flow without handing it off.

Run a flow with a Paused - No Workers interaction

A flow has the **Paused – No workers** status when there is a worker group that has not yet been mapped to any workers. Before you can resume the run, you will need to map the worker group to actual workers. For more information see "Setting Up Worker Group Aliases for a Content Pack" on page 71.

1. Run the flow from the Flow Library or the Run Explorer.

2. When the flow run reaches the point where it relates to a worker group with no workers, the flow run is paused. The run status appears as **Paused – No Workers**.

3. Click the **Drill down** button at the end of the row to display more information about the run.

4. Click the **Expand**

 button to expand the prompt message.

5. Map the worker group to the relevant workers. For details, see "Setting Up Worker Group Aliases for a Content Pack" on page 71.

6. Return to the pause message and click **Resume**.

Run a flow externally

You can embed a link to a flow in a website, so that it is possible to run the flow from that website. When users click the link in the website, a triggering dialog box will open, enabling them to run the flow. If inputs are required, these are included in the dialog box.

> **Note:** You can edit the run link, in order to pass inputs or to change the name of the flow run.

1. Click the **Content Workspace** button to display the Content Workspace.

2. Click the **Flow Library** tab.

3. Click a flow to display its details in the information pane to the right.

4. Copy the text from the **Run Link** section and embed this link in a website.

Run Link: http://16.59.63.164:8293/oo/trigger.html#deb358b4-8bee-4e27-92d4-af01e6e62c7e

5. If required, use the `input_` and `runName` prefixes to edit the run link. You can get it to pass inputs or to change the name of the flow run.

   The format is `input_<inputName>=<inputValue>` and `runName=<runNameValue>`. These values should come after the `?` and concatenate with `&`.

   For example:

   ```
   https://<your fqdn to Central>:<port #>/oo/trigger.html#7a1fc3c7-1c5b-4868-a1c7-2932d878897e?input_host=someHost&input_username=someUsername
   ```

   ```
   https://<your fqdn to Central>:<port #>/oo/trigger.html#7a1fc3c7-1c5b-4868-a1c7-2932d878897e?runName=someName
   ```

> **Note:** To test how the run link will look, you can click the link in the **Run Link** section to open the triggering dialog box.

Reference Material

Run Flow dialog box

Run Flow		? ✕
Flow:	*	Library/Accelerator Packs/Network/Simple SMTP ...
Run Name:		Simple SMTP Check
host:	*	localHost
domain:		
		Cancel Run

GUI item	Description
Flow	Displays the path to the flow.
Run Name	In the **Run Name** box, enter a name for the run. The name does not have to be the same name as the original flow. You may want to give it a name that identifies this particular run. For example, you may want to run the same flow multiple times, each with different input. Naming the runs makes it easier to identify them based on the inputs.
<Input fields>	Enter inputs if these are required. The number of input fields and the labels on them will vary, depending on the inputs that are required in the selected flow.
Run	Click to run the flow.

Scheduling Flow Runs

👥 🔓 Schedules allow you to control when to run your flows. You can specify a schedule to run for a specific flow. You can also set up recurring schedules for a task that needs to be repeated.

For example, you need to regularly check whether a number of servers are online. In this case, you can you can define a flow to check the IP address and then create a schedule to run that flow.

Schedules are displayed in the **Scheduler** tab. The display of schedules depends on the permissions that you have been assigned in your role:

- If you have been assigned a role with the **View Schedules** permission, you will be able to view the HP OO schedules and their details.

- If you have been assigned a role with the **Manage Schedules** permission, you will be able to view and edit schedules.

	State	Schedule Name	Flow Name	Next Run ⬍	Previous Run	User
☐	✓	Restart Windows Server	Restart Windows Server	Sunday, July 14 2013 10:49 AM		N/A
☑	✓	Is Account Locked	Is Account Locked	Monday, July 8 2013 10:50 AM		N/A
☐	✓	Web site Health Check	Web site Health Check	Monday, July 1 2013 10:50 AM		N/A

Schedule Owner

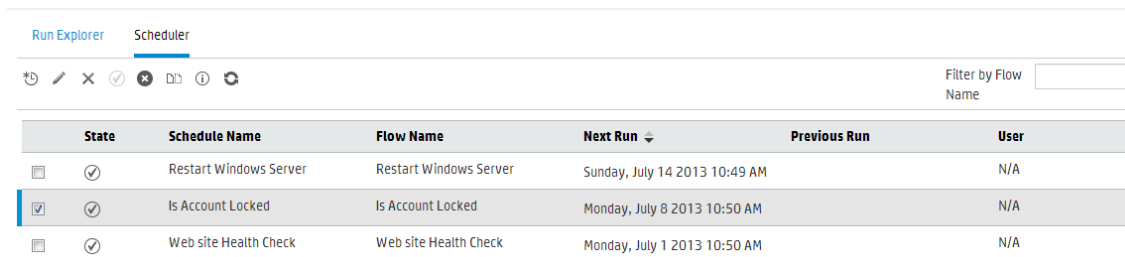Each schedule has an owner. This is the user who created the schedule. The name of the owner appears in the **User** column in the Scheduler and in the Run Explorer.

- In the **Scheduler** tab, the **User** column indicates the schedule owner.

- In the **Run Explorer** tab, the **User** column indicates the owner of this flow execution (the user who performs the scheduled run).

If another user updates the schedule (for example, the recurrence, name, or time zone), the schedule owner changes to this user. This user is displayed as the schedule owner in the Scheduler and as the flow executor in the Run Explorer.

Note: The new owner appears only for runs that started after the change. For runs that started before the change, the original owner is displayed in the **User** column.

If the schedule is created or updated by a user who is logged in as an anonymous user, the **User** column will display N/A.

Note: If the schedule is updated by a user without run permissions on the scheduled flow, this flow will not run.

Note: If an LDAP configuration exists and the configured LDAP server is not responding, this will affect all types of schedules. This includes both schedules that are run with a LDAP user and schedules that are run with an internal user.

What do you want to do?

View existing schedules

To view the **Scheduler** tab, you must be logged in with a user account that is assigned a role with **View schedules** permissions.

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab. A table displays all the current schedules, including the following information:

   - **State**: Displays whether the schedule is enabled or disabled .

   - **Schedule Name**: Displays the name that was given to this schedule. This value can be edited in the Edit Schedule dialog box.

   - **Flow Name**: Displays the name of the flow that the schedule relates to. This value is taken from the flow and cannot be modified in the schedule.

   - **Next Run**: Displays the time and date when the next run is scheduled to occur. The time and date displayed is in the your time zone.

   - **Previous Run**: Displays the time and date when the previous run occurred, if this exists.

   - **User**: Displays the name of the user who created or modified this schedule.

Display the details of a schedule

You can drill down to see the details of a schedule in the Schedule Details dialog box. This

functionality is useful for users with **View Schedules** permission, but without permission to edit schedules.

The details include information that is not displayed in the table in the **Scheduler** tab, such as recurrence pattern, range of recurrence, and the timezone in which the schedule runs.

To display the details of a schedule:

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Select the check box next to the schedule that you want to view and click the **Details** ⓘ button in the **Scheduler** toolbar. The details of the selected schedule are displayed in the Schedule Details dialog box.

> **Note:** The **Details** button is only available if a single schedule is selected.

4. When you have finished viewing the details of the schedule, click **OK**.

Edit schedules

To edit a schedule, you must be logged in with a user account that is assigned a role with **Manage schedules** permission.

To edit a schedule:

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Select the check box next to the schedule that you want to edit and click the **Edit** 🖉 button in the **Scheduler** toolbar.

4. In the Edit Schedule dialog box, make the required changes to the schedule, and then click **Save**.

Clone schedules

You can create an identical copy of a schedule that appears in the **Scheduler** tab. You can make any required changes to this schedule in the Clone Schedule dialog box.

To clone a schedule:

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Select the check box next to the schedule that you want to clone, and click the **Clone** button in the **Scheduler** toolbar.

   > **Note:** The **Clone** button is only enabled if a single schedule is selected.

   The Clone Schedule dialog box opens. All the fields in the dialog box are populated with the values from the selected schedule.

4. If required, edit the schedule details in the Clone Schedule dialog box. You may wish to give the clone a different name.

5. Click **Save**.

Delete schedules

You can delete individual or multiple schedules.

To delete schedules:

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Select the check boxes next to the schedules that you want to delete and click the **Delete** button in the **Scheduler** toolbar.

4. In the confirmation dialog box, click **Yes**.

The selected schedules are deleted from the **Scheduler** tab.

Enable a schedule

By default, when a new schedule is created, it is enabled. If a schedule has been disabled, you need to enable it before it will run. You can enable individual or multiple schedules.

To enable a schedule for a flow run:

1. Click the **Run Workspace** button to display the Run Workspace.

2. In the **Scheduler** tab, select the check box next to each disabled schedule that you want to enable.

3. In the **Scheduler** toolbar, click **Enable** ⊘ .

> **Note:** The **Enable** button is only available if at least one disabled schedule is selected.

4. In the confirmation dialog box, click **Yes**.

The icon in the **State** column changes to **Enabled** for this schedule.

Disable a schedule

You can disable individual or multiple schedules. These schedules remain in the **Scheduler** tab, but they will not run until they are enabled.

To disable a schedule for a flow run:

1. Click the **Run Workspace** button to display the Run Workspace.

2. In the **Scheduler** tab, select the check box next to each enabled schedule that you want to disable.

3. In the **Scheduler** toolbar, click **Disable** ⊗ .

> **Note:** The **Disable** button is only available if at least one enabled schedule is selected.

4. In the confirmation dialog box, click **Yes**.

The icon in the **State** column changes to **Disabled** for this schedule.

Filter the display of schedules

You can filter the schedules that are displayed in the **Scheduler** tab. This can help you locate schedules quickly, when there are many schedules displayed in the **Scheduler** tab. For example, if you are looking for schedules of flows relating to connectivity, you could enter "Connect" as the filter term.

> **Note:** The filter is not case-sensitive.

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. In the **Filter by Flow Name** box, enter the name of the flow that is used in the schedule that you want to find. If you do not know the exact name, enter part of the name.

Only schedules for a flow that contains this text in its name are displayed in the **Scheduler** tab.

Refresh the display of schedules

If someone creates, edits, deletes, enables, or disables a schedule in another client, this does not show in the **Scheduler** tab until you have refreshed the page.

To refresh the display of schedules:

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. In the **Scheduler** toolbar, click **Refresh** .

> **Note:** It is also possible to refresh the page using a browser refresh command (for example, using key combinations such as F5 or Ctrl+R), but this loads the entire page. Clicking the **Refresh** button is faster, because it only refreshes the display of schedule data .

Sort the display of schedules

If there are multiple schedules displayed in the **Scheduler** tab, you can sort them according to any of the column headings.

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Click the column header that you want to use to sort the schedules.

   By default, the schedules are sorted in ascending order, in the **Next Run** column. The ascending icon is displayed next to the column header that was used to sort.

4. If you want to reverse the order, so that the schedules are sorted in descending order, click the column header again.

   The schedules are sorted in descending order, and the descending icon is displayed next to the column header.

Navigate through schedules

If there are schedules displayed on multiple pages in the **Scheduler** tab, you can navigate between the pages using the pagination bar.

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Scheduler** tab.

3. Use the pagination bar |K| |<| 2 |>| |>| to navigate between the pages. Enter the number of a specific page in the center box, or click the buttons to jump to the following pages:

   - First

   - Previous

   - Next

   - Last

Create a schedule

To create a schedule, you must be logged in with a user account that is assigned a role with **View schedules** and **Manage schedules** permissions.

1. You can create a new schedule either from the Scheduler or from the Flow Library:

   - To create a schedule from the Flow Library:

     i. Click the **Content Workspace** button to display the Content Workspace.

     ii. Click the **Flow Library** tab.

     iii. Select a flow from the Flow Library.

     iv. Click the **Schedule** button. The Create Schedule dialog box opens.

   - To create a schedule from the Scheduler:

     i. Click the **Run Workspace** button to display the Run Workspace.

     ii. Click the **Scheduler** tab.

     iii. In the **Scheduler** toolbar, click the **Schedule** button.

     iv. Select the flow for which you want to create the schedule, and click **OK**. The Create Schedule dialog box opens.

2. In the **Schedule Name** box, enter a meaningful name for this schedule.

Flow

Flow Path:	*	Library/Accelerator Packs/Operating Systems/Win ...
Schedule Name:	*	Restart Windows Server
User:		N/A

3. In the **Recurrence pattern** section, select from one of the following recurrence frequencies for the schedule: daily, weekly, monthly.

   ■ **Daily**: To run the flow on a daily basis, select **Daily** and one of the following:

Recurrence pattern

● Daily	● Every	1	hour(s) ▼
○ Weekly	○ Every day		
○ Monthly	○ Every weekday		
○ Yearly			

   ○ **Every**: To run the flow every day at regular intervals, select **Every**, and then enter the value and select **minutes** or **hours**.

   > **Note:** If you select **Every**, the interval field cannot be left empty, and the value must be at least **1**.

   ○ **Every day**: Select to run the flow once every day of the week.

   > **Note:** The flow run will start at the time set in the **Start time** field in the **Range of recurrence** section.

   ○ **Every weekday**: Select to run the flow once a day, on weekdays only.

   > **Note:** If the working week is not Monday-to-Friday, use the **Weekly** option instead, and select the working days.

■ **Weekly**: To run the flow on a weekly basis, select **Weekly** and then select the days of the week on which you want the flow to run.

Recurrence pattern

○ Daily	☐ Sun	☑ Mon	☑ Tue	☐ Wed
● Weekly				
○ Monthly	☐ Thu	☐ Fri	☐ Sat	
○ Yearly				

Note: If you select **Weekly**, you must select at least one day.

■ **Monthly**: To run the flow every month, select **Monthly** and one of the following:

Recurrence pattern

○ Daily	○ Day	1 ▾	of every	1 ▾	month(s)
○ Weekly	● The	first ▾	Monda ▾	of every	3 ▾	month(s)
● Monthly			day		
			Sunday		
○ Yearly			**Monday**		
			Tuesday		
			Wednesday		

○ To run the flow on a particular date in each month, select **Day** and select the date. For example, select **15** to run the flow on the 15th of every month.

○ To run the flow once a month on a particular day of the week, select the day of the week and whether it is the first, second, third, fourth, or last time that this day occurs in the month. For example, to run the schedule on the third Friday of each month, select **third**, then select **Friday**, and then select **1** month(s).

○ To run the flow at intervals of several months, select a number of months. For example,to run a schedule once a quarter, on the first Monday of the quarter, select **first**, then select **Monday**, and then select **3** months.

For example, in a schedule starting on April 1, 2013, and ending on December 20, 2013, with a recurrence pattern of the third day of every 2 months, the flow will run on June 3, August 3, October 3, and December 3.

○ To run the flow on the last day of the month, select **last** and then select **day** instead of a specific day of the week.

- **Yearly**: To run the flow once a year, select **Yearly** and one of the following:

Recurrence pattern

○ Daily   ○ Every   January ▾   1
○ Weekly
○ Monthly ◉ The   second ▾   Monday ▾   of   August ▾
◉ Yearly

- To run the flow on a particular date each year, select **Every** and then select the month and the date. For example, every July 4.

- To run the flow once a year on a particular month and on a particular day of the week, select the month, then select the day of the week and whether it is the first, second, third, fourth, or last time that this day occurs in the month. For example, the second Monday of each November.

4. In the **Range of recurrence** section, in the **Start date** box, enter the date on which you want the flow schedule to start.

Note: If a schedule with an earlier date undergoes content upgrade, the start date is changed to the current date.

Range of recurrence

Start date: 04/21/2013   ◉ No end date
Start time: 00 ▾ : 00 ▾   ○ End after   10   occurrences
Timezone: (UTC-07:00) America/P ▾   ○ End by   04/21/2013

Note: The date format appears in accordance with the locale of the client browser.

5. In the **Start time** boxes, enter the time at which you want the flow schedule to start, in hours and minutes.

6. From the **Timezone** list, select the time zone where you are located.

Note: Time zones around the world are expressed as positive or negative offsets from Coordinated Universal Time (UTC). When you create a schedule, a time zone is selected

by default from the alphabetically-ordered list that is currently available. HP OO selects the first time zone from the list that has the offset equal to the client offset (computed with daylight savings, if relevant).

Note that this timezone might not be geographically correct. For example, if you are located in a location where the time zone is UTC-09.00, the default time zone will be **America/Anchorage**. If desired, you can select the geographically correct location from the **Timezone** list.

(UTC-09:00) America/Anchorage
(UTC-09:00) America/Juneau
(UTC-09:00) America/Nome
(UTC-09:00) America/Sitka
(UTC-09:00) America/Yakutat
(UTC-09:00) Pacific/Gambier

7. Select when you want the schedule to end:

   ▪ Select **No end date** if you do not want to set an end date for the schedule.

   ▪ To limit the schedule to a specific number of runs, select **End after** and enter the number of runs after which the schedule will stop. This option is only available for daily schedules that have been set to run at intervals of a number of hours or minutes.

   ▪ To end the schedule on a specific date, select **End by** and enter the date after which schedule will stop.

8. If the flow requires inputs, enter them in the **Inputs** section on the right side. If a red star appears next to an input box, this means that the input is required, and the **Save** button will not be enabled unless an input value is provided.

Inputs

host: * [   ]

domain: [   ]

9. If you want to enter additional inputs that are not flow inputs, click **Add Input** at the bottom of the **Inputs** section, and enter the name and value of the input.

10. Click **Save**.

> **Note:** If the **Save** button is not enabled, this means that a required input has not been provided, or there is a mistake in one of the fields in the dialog box. For example, the **Save** button is not enabled if a non-existent date is entered, such as February 31, or if no days of the week are selected for a weekly recurrence pattern.

Reference Material

Scheduler tab

GUI item	Description
Schedule ⏱ **button**	Opens the Create Schedule dialog box, so that you can add a new schedule.
Edit ✏ **button**	Opens the Edit Schedule dialog box, so that you can edit the selected schedule. The **Edit** button is only available if at least one schedule is selected.
Delete ✕ **button**	Deletes the selected schedules. The **Delete** button is only available if at least one schedule is selected.
Enable ⊘ **button**	Enables the selected schedules. The **Enable** button is only available if at least one disabled schedule is selected.
Disable ⊗ **button**	Disables the selected schedules. The **Disable** button is only available if at least one enabled schedule is selected.

Clone ⬚ **button**	Creates an identical copy of the selected schedule. The **Clone** button is only enabled if a single schedule is selected.
Details ⓘ **button**	Displays the details of the selected schedule. The **Details** button is only enabled if a single schedule is selected.
Refresh button ↻	Refreshes the display of schedules.
Filter by Flow Name	Filters the schedules that are displayed in the **Scheduler** tab, showing only those with the name that is entered in the **Flow Name** box.
State	Displays whether the schedule is enabled ✓ or disabled ✕.
Schedule Name	Displays the name that was given to the schedule.
Flow Name	Displays the name of the flow that is run in the schedule.
Next Run	Displays the time when the next run is scheduled.
Previous Run	Displays the time when the previous run in the schedule occurred.
User	Displays the name of the user who created or modified the schedule. If the schedule is created or updated by a user who is logged in as an anonymous user, the **User** column will display N/A.
Ascending icon ▲	If schedules are sorted in ascending order, and the ascending icon ▲ is displayed next to the column header that was used to sort.
Descending icon ▼	If schedules are sorted in descending order, and the descending icon ▼ is displayed next to the column header that was used to sort.
Pagination bar	⟨⟨ ⟨ 2 ⟩ ⟩⟩ If the schedules do not all fit on a single page, use the pagination bar to navigate between the pages. Enter the number of a specific page in the center box, or click the buttons to jump to the following pages: • First • Previous • Next • Last

Create Schedule dialog box

GUI item	Description
Flow Path	Displays the path to where the flow is located.
Schedule Name	Enter a meaningful name for this schedule.
Recurrence pattern section	In the **Recurrence pattern** section, you define the frequency at which the schedule recurs. The **Recurrence pattern** section changes, depending on whether you select **Daily**, **Weekly**, **Monthly**, or **Yearly**.

Recurrence pattern

- ● Daily ● Every [1] [hour(s) ▼]
- ○ Weekly ○ Every day
- ○ Monthly ○ Every weekday
- ○ Yearly

Daily - Every <n> minutes/hours	To run the flow every day at regular intervals, select **Daily**, select **Every**, enter the value, and select **minutes** or **hours**. **Note:** If you select **Every**, the interval field cannot be left empty, and the value must be at least **1**.
Daily – Every day	To run the flow once a day, every day of the week, select **Daily**, and then select **Every day**. **Note:** The flow run will start at the time set in the **Start time** field in the **Range of recurrence** section.
Daily – Every weekday	To run the flow every weekday, select **Daily**, and then select **Every day**. **Note:** If the working week is not Monday-to-Friday, use the **Weekly** option instead, and select the working days.

Recurrence pattern

- ○ Daily ☐ Sun ☑ Mon ☑ Tue ☐ Wed
- ● Weekly ☐ Thu ☐ Fri ☐ Sat
- ○ Monthly
- ○ Yearly

Weekly	To run the flow on a weekly basis, select Weekly and then select the days of the week on which you want the flow to run. **Note:** If you select **Weekly**, you must select at least one day.

Monthly – Day <n> of every month	To run the flow on a particular day of each month , select **Monthly**, select **Day** and then select the date. For example, select **15** to run the flow on the 15th of every month.
Monthly – The <nth> <day of week> of every <n> month(s)	To run the flow once a month on a particular day of the week, select the day of the week and whether it is the first, second, third, fourth, or last time that this day occurs in the month. For example, to run the schedule on the third Friday of each month, select **third**, then select **Friday**, and then select **1** month(s).

To run the flow at intervals of several months, select a number of months. For example,to run a schedule once a quarter, on the first Monday of the quarter, select **first**, then select **Monday**, and then select **3** month(s).

To run the flow on the last day of the month, select **last**, and then select **day** instead of a specific day of the week. |

Yearly – Every <month> <n>	To run the flow on a particular date each year, select **Yearly**, select **Every**, and then select the month and the date. For example, every July 4.
Yearly – The <nth> <day of week> of <month>	To run the flow once a year on a particular month and on a particular day of the week, select **Yearly**, select the month, select the day of the week and whether it is the first, second, third, fourth, or last time that this day occurs in the month. For example, the second Friday of each November.

Range of recurrence section	In the **Range of recurrence** section, you define when the schedule starts and ends.

Range of recurrence

Start date:	04/21/2013	⦿ No end date		
Start time:	00 ▾ : 00 ▾	○ End after	10	occurrences
Timezone:	(UTC-07:00) America/P ▾	○ End by	04/21/2013	

Start date	Enter the date on which you want the schedule to start.
	Note: If a schedule with an earlier start date undergoes content upgrade, the start date is changed to the current date.
Start time	Enter the time of day at which you want the schedule to start.
No end date	Select if you want the schedule to run continuously.
End after <n> occurrences	To limit the schedule to a specific number of runs, select **End after** and enter the number of runs after which the schedule will stop. This option is only available for daily schedules that have been set to run at intervals of a number of hours or minutes.
End by <date>	To end the schedule on a specific date, select **End by** and enter the date after which schedule will stop.

Timezone	From the **Timezone** list, select the time zone where you are located.
	Note: Time zones around the world are expressed as positive or negative offsets from Coordinated Universal Time (UTC). When you create a schedule, a time zone is selected by default from the alphabetically-ordered list that is currently available. HP OO selects the first time zone from the list that has the offset equal to the client offset (computed with daylight savings, if relevant).
	Note that this timezone might not be geographically correct. For example, if you are located in a location where the time zone is UTC-09.00, the default time zone will be **America/Anchorage**. If desired, you can select the geographically correct location from the **Timezone** list.
	(UTC-09:00) America/Anchorage (UTC-09:00) America/Juneau (UTC-09:00) America/Nome (UTC-09:00) America/Sitka (UTC-09:00) America/Yakutat (UTC-09:00) Pacific/Gambier
	Inputs host: * domain:
Inputs	If the flow requires inputs, enter them in the **Inputs** section. This section will look different, depending on whether inputs are required.
Save	Click to save the schedule.

Tracking Flow Runs

While a flow is running, you can track the run and monitor its progress in the **Run Explorer** tab. The table displays information for basic monitoring of your runs and those of other users:

- Run Name

- Run ID

- Status:

Completed – Resolved

Completed – Error

Completed – No Action Taken

Completed – Diagnosed

Failed to Complete: because of a run time exception

Canceled

Running

Paused – User Paused

Paused – Action Required: the run will not continue until the action is completed. For example, enter missing information, or change to a user with permission to run the next step.

Paused – No workers: there is a worker group that has not yet been mapped to any workers. Before you can resume the run, map the worker group to actual workers. See "Setting Up Worker Group Aliases for a Content Pack" on page 71.

Pending Pause: the user has asked to pause the run, but the run has not been paused yet.

Pending Cancel: the user has asked to cancel the run, but the run has not been canceled yet.

- User: the last user to run or resume the flow

- Start time

- Duration

The Run Explorer is auto-refreshed whenever the run status, duration and user are updated. However, if a run is started after you opened the Run Explorer, this run does not show in the **Run Explorer** tab until you refresh the page. A bubble message appears next to the **Refresh** button, telling you that new runs are available.

This topic describes how to track and view details about a run. For information about performing actions on a flow run, such as pausing, resuming, canceling, and so on, see "Managing Flow Runs" on the next page.

For information about filtering the display of runs, see "Filtering the Display of Flow Runs" on page 129.

What do you want to do?

View basic details about a flow run

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. View the basic details about each run, in the **Runs** table.

Display advanced details about a flow run

1. Click the **Run Explorer** tab.

2. Select the flow run that you want to look at in detail.

3. Click the **Drill down** ❯ button at the end of each row to display more information about the selected run. For more information, see "Testing and Troubleshooting a Flow Run" on page 133.

> **Note:** The **Drill down** ❯ button is only displayed when you select a row in the table.

Reference Material

For reference information about the **Run Explorer** tab, see "Managing Flow Runs" below
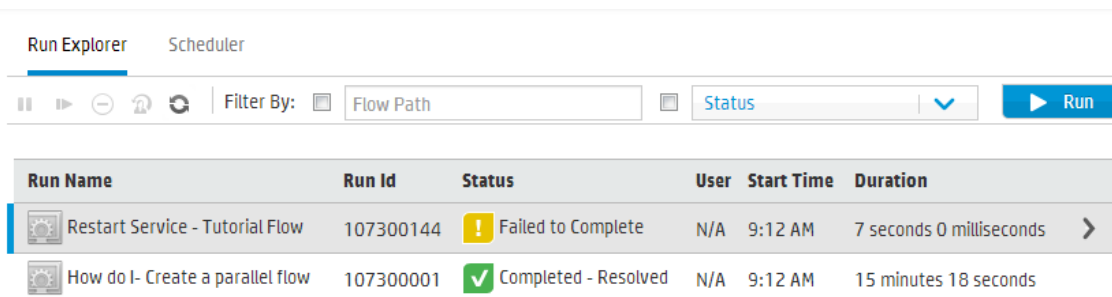
Managing Flow Runs

👥 🔓 You can use the Run Explorer to manage flow runs when there are multiple flows running. You can perform actions on these flow runs, such as pausing, resuming, reassigning, and canceling them.

Flow runs are displayed in the **Run Explorer** tab. The display of runs depends on the content permissions that your user has been assigned. You can only see runs of flows you have permission to view.

The actions that you can perform on flow runs depends on permissions that you have been assigned in your role:

- If you have been assigned a role with the **Manage Others' Runs** permission, you will be able to perform actions on the runs triggered by all users.

- If you have been assigned a role without this permission, you will be able to perform actions on the runs that you have triggered.

Run Name	Run Id	Status	User	Start Time	Duration	
🖥 Restart Service - Tutorial Flow	107300144	⚠ Failed to Complete	N/A	9:12 AM	7 seconds 0 milliseconds	❯
🖥 How do I- Create a parallel flow	107300001	✅ Completed - Resolved	N/A	9:12 AM	15 minutes 18 seconds	

You can filter the runs that are displayed in the Run Explorer. For more information about filtering, see "Filtering the Display of Flow Runs" on page 129.

What do you want to do?

Pause a flow run

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. Select a flow that is currently running.

4. Click the **Pause** ❙❙ button in the Run Explorer toolbar.

The run status is changed to **Pending pause** and then to **Paused**.

Resume a flow run that was paused

You can resume a run that has **Paused – User Paused** status. If you have been assigned a role with the **Manage Others' Runs** permission, you can resume runs that were paused by others. Otherwise, you can resume runs that you paused.

1. Click the **Run Workspace** > **Run Explorer** tab.

2. Select a flow that was paused.

3. If the **Resume** ▶ button is available in the Run Explorer toolbar, click it to resume the run.

4. If the **Resume** ▶ button is not available in the Run Explorer toolbar, this means that you need to interact with the system in order to complete the run.

    Click the **Drill down** ❯ button at the end of the row to display more information about the run.

5. Click the **Expand** 《 button to expand the prompt message. Enter the required information.

6. Click **Resume**.

Cancel a flow run

1. Click the **Run Workspace** > **Run Explorer** tab.

2. Select a flow that is currently running.

3. Click the **Cancel** ⊖ button in the Run Explorer toolbar.

4. In the confirmation dialog box, click **Yes** to confirm that you want to cancel the flow run.

Reassign ownership of a flow run

Each run has an owner. By default, this is the person who started the run, but you can change the

owner during execution by assigning the run to a different user.

The owner of a run is the user who appears in the **User** column.

Reassignment is usually triggered as a result of a gated transition, where the run is paused because it doesn't have permission to proceed, or as a result of a handoff, where the author marked a transition as needing to be handed off to another user. However, you can also reassign a flow at any point in the flow run. If the flow is running, it will become paused so that it can be reassigned.

1. Click the **Run Workspace** > **Run Explorer** tab.

2. Select a flow that is currently running or paused.

3. Click the **Reassign** button.

4. In the Reassign a Run dialog box, enter the user name of a different user.

5. Click **Reassign**.

> **Note:** If you reassign a run to a non-existent user, the reassignment will fail.

Hand off a flow run

Some flows contain gated transitions, requiring the current user to hand off the run to another user. The run pauses, and a dialog box enables the current user to send an email to another user, asking them to continue the run.

1. Click the **Run Workspace** > **Run Explorer** tab.

2. Select a run that is currently paused at the gated transition.

3. Click the **Drill down** button at the end of the row to display more information about the selected run.

4. Click the **Expand** button to expand the prompt message.

5. In the prompt message, click the **Hand off to another user (email this run)** link to create an email message to send to the user who needs to complete the flow run.
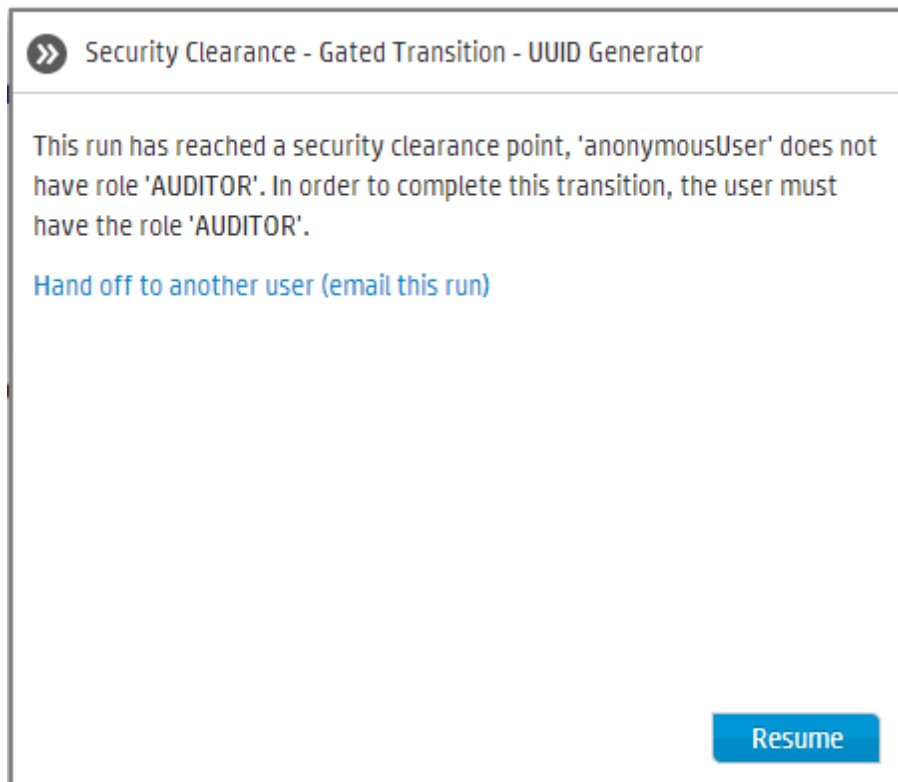
6. An email message opens, with a message for the person to whom you are handing off the flow run and a link to the flow run. Enter the email address of this person and send the message.

Refresh the runs in the Run Explorer

The Run Explorer is auto-refreshed whenever the run status, duration and user are updated. However, if a run is started after you opened the Run Explorer, this run does not show in the **Run Explorer** tab until you refresh the page.

When new runs are started, a bubble message appears next to the **Refresh** button, telling you that new runs are available.

- Click the **Refresh** button in the Run Explorer toolbar.

  The new runs are added to the grid.

  Note that after you refresh, your selected row is cleared.

Note: It is also possible to refresh the page by pressing F1 on your keyboard, but this loads the entire page. Clicking the **Refresh** button only refreshes the data display, so this is much faster.

Reference Material

Run Explorer

GUI item	Description
Pause ‖ button	Click to pause the selected run. The run will stop until it is resumed.
Resume ▶ button	Click to resume the selected run. This button is only available for a run that is paused.
Cancel ⊖ button	Click to cancel the selected run.
Refresh ↻ button	Click to refresh the runs that are displayed in the Run Explorer.
Reassign button	Click to reassign a flow to a different user.
Run ▶ Run button	Click to run a flow.
Run Name	Displays the name of the flow that is being run.

Status	Displays the current status of the flow run. Options include:
	Completed – Resolved
	Completed – Error
	Completed – No Action Taken
	Completed – Diagnosed
	Failed to Complete: because of a run time exception
	Canceled
	Running
	Paused – User Paused
	Paused – Action Required: the run will not continue until the action is completed. For example, enter missing information, or change to a user with permission to run the next step.
	Paused – No workers: there is a worker group that has not yet been mapped to any workers. Before you can resume the run, map the worker group to actual workers. See "Setting Up Worker Group Aliases for a Content Pack" on page 71.
	Pending Pause: the user has asked to pause the run, but the run has not been paused yet.

	Pending Cancel: the user has asked to cancel the run, but the run has not been canceled yet.
User	Displays the current owner of this run. This may be the user who triggered the run, the user who last modified the run, or the user to whom the run was reassigned. If this last user is logged in as an anonymous user, the **User** column will display N/A.
Start Time	Displays the time at which the run started.
Duration	Displays the duration that the run has been running. To refresh this value, press F5.
Drill Down > button	Click to drill down and display more information about the flow run.

Filtering the Display of Flow Runs

It is possible to filter the flow runs that are displayed in the Run Explorer. You can view only the runs of the flows that contain a specific word in their name or runs with a specific status.

To apply a filter, click one or more of the filter check boxes in the Run Explorer toolbar and enter all the criteria that you want to filter by. Once you have entered the criteria, the filter is applied—there is no need to click a button to apply it.

You can apply multiple filters at the same time. For example, you can filter the Run Explorer to display only failed runs with the word "Ping" in their name.

> **Note:** If you are using a filter, click the refresh button in order to view the newly added runs to the Run Explorer.

It is also possible to filter runs via API. For more information, see the *HP OO API Guide*.
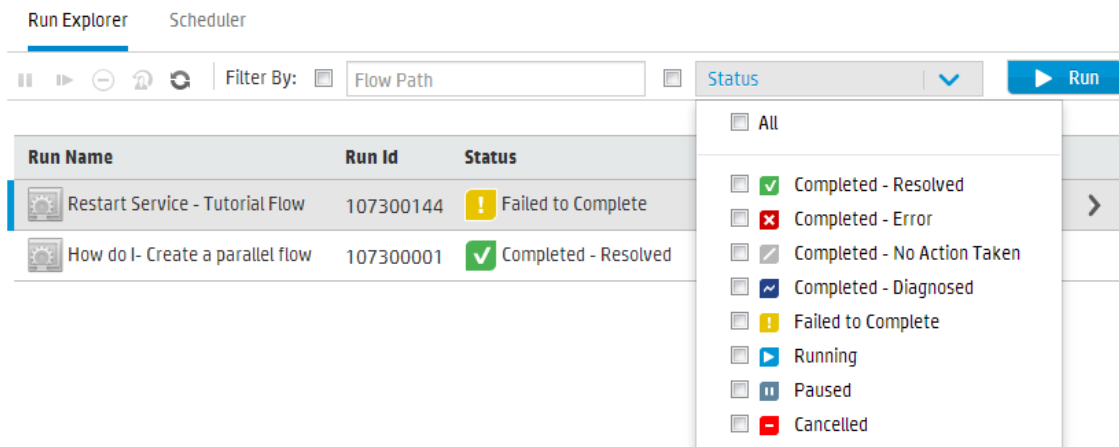
What do you want to do?

Create a filter according to flow name

Filters are not case-sensitive, so you can type in upper or lower case.

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. In the Run Explorer toolbar, select the **Flow Path** check box.
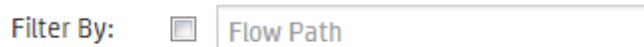
Selecting the check box at this stage is optional. When you start typing inside the **Flow Path** text box, the check box is automatically selected.

4. In the **Flow Path** text box, enter part or all of the flow name.

The Run Explorer only displays runs of the flows that contain this text in their name.

Create a filter according to flow status

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. In the Run Explorer toolbar, select the **Status** check box.
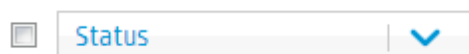
Selecting the check box at this stage is optional. When you select a status, the **Status** check box is automatically selected.

4. From the **Flow Status** list, select the status that you want to filter by. You can select more than one status.

The Run Explorer only displays runs with one of the selected statuses.

> **Note:** After you have selected a status for the filter, the name of this status appears as the title of the **Flow Status** list. ☑ Status: Completed - Re... | ⌄
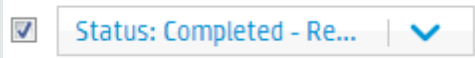
Remove a filter

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. In the Run Explorer toolbar, clear all the filter check boxes.

The filters are no longer applied.

> **Note:** If you clear the filter check boxes and keep the selections below them, this is a way to save the filters for later use.

Reference Material

Run Explorer toolbar - Filter options
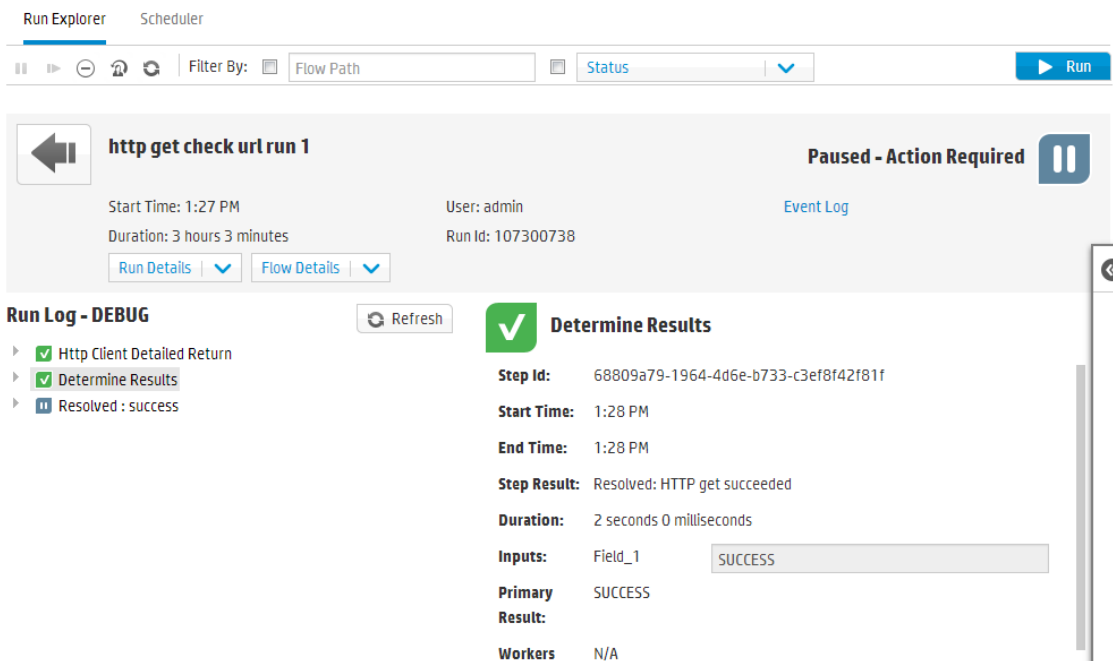
GUI item	Description
Filter by: Flow Path	Select the **Flow Path** check box to filter according to flow name. Then, enter part or all of the flow name.
Filter by: Status	Select the **Status** check box to filter according to run status. Then, from the **Status** list, select the status or statuses that you want to filter by.

Testing and Troubleshooting a Flow Run

After you have triggered a flow run, you can drill down into the run and investigate its progress in detail. This is particularly helpful if a flow run fails.

The **Run Log - DEBUG** tree displays information about the progress of the run. You can click a specific step to get more details, such as inputs, duration, results, description, ROI, and so on.

If a flow failed, you will see at which step the failure occurred.

> **Note:** There are also cases where a run has no drill down details:
>
> - If a run comes from a content upgrade from version 9.x.
>
> - If the run details were cleared in the system.

What do you want to do?

Display advanced details about a flow run

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. Select the flow run that you want to look at in detail.

4. Click the **Drill down** ❯ button at the end of each row to display the Drill Down information about the selected run.

5. To see details about the run steps, you can navigate through its run tree. Click each step to display information about its start time, duration, inputs, results, description, and ROI.

Run Log - DEBUG   ↻ Refresh

✅ Ping
✅ Traceroute
⏸ Display Trace Route Results

✅ **Ping**

Step Result:	Resolved: success
Duration:	2 minutes 38 seconds
Inputs:	targetHost localhost
	packetCount

> **Note:** The fields displayed in this section will vary between different steps, depending on whether they include inputs, results, and so on.

6. Click the **Run Details** button to display more information about the run, such as its inputs and outputs.

Run Details ⌄

Flow Inputs:

host	localhost
user	
password	******
runLength	
waitTime	
threshold	12

7. Click the **Flow Details** button to display more information about the flow.

Flow Details ⌄

Flow UUID:

fb53080b-7be2-49ad-ad94-024a69ad786f

Flow Name:

InputPromptFlow

Path:

Content/Library/Demo Folder/InputPromptFlow.xml

Description:
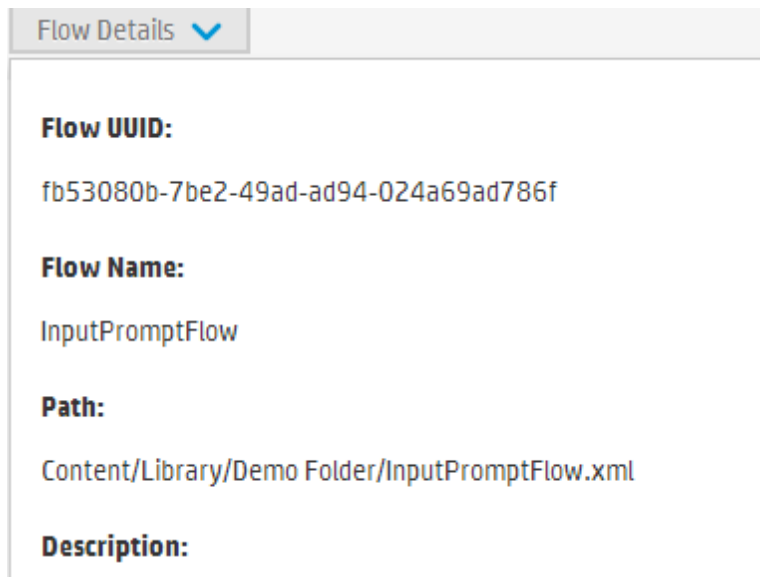
8. Click the **Back** ◀ button to return to the main **Run Explorer** window.

Display an event log for a flow run

You can view a log listing all the events that occurred in a flow run. This can help identify the causes of a problem. It may be useful to send the event log to the flow author, when a flow needs fixing.

The events log has an RSS format (xml).

1. Click the **Run Workspace** button to display the Run Workspace.

2. Click the **Run Explorer** tab.

3. Select the flow run for which you want to display the events log.

4. Click **Event Log** to display an XML page with the details of the events that occurred during the flow run.

5. If required, you can send the event log file to the flow author, when requesting a change to a flow.

Reference Material

Run Explorer drill down view

The fields included in the step details section may vary between different types of step.

GUI item	Description
Back button	Click the **Back** button to return to the main **Run Explorer** window.
Run Details	Click to display more details about the flow run.
Flow Details	Click to display more details about the flow.
Start Time	Displays the time when the flow run started.
Duration	Displays the duration of the flow run.
Triggered By	Displays the name of the user who triggered the flow run.
Run Log - DEBUG	Displays the steps that were executed in the flow run.
Step Id	Displays the UUID of the selected step.
Start Time	Displays the time when the selected step started.
Duration	Displays the duration of the selected step.
Inputs	Displays the inputs of the selected step, if these exist.
Operation Group	Displays the operation group of the selected step, if one exists.
Results	Displays the results of the selected step, if any exist.
Primary Result	Displays the primary result of the selected step, if one exists.

Description	Displays the description of the selected step, if one exists.
ROI	Displays the ROI value of the selected step, if one exists.
Extra Data	Displays extra data about of the selected step, if any exist.

Run Details

Displays the flow inputs and output results, if any exist. The fields that are displayed will vary, and there may be no run details at all.

Run Details ∨

Flow Inputs:

host	localhost
user	
password	******
runLength	
waitTime	
threshold	12

Flow Details

Flow Details ∨

Flow UUID:

fb53080b-7be2-49ad-ad94-024a69ad786f

Flow Name:

InputPromptFlow

Path:

Content/Library/Demo Folder/InputPromptFlow.xml

Description:

GUI item	Description
Flow UUID	Displays the UUID (unique identifier) of the flow.
Flow Name	Displays the name of the flow.
Path	Displays the path to where the flow is located.
Description	Displays the description of the flow, if one exists.

Typical Errors

insert duplicate key in object 'dbo.OO_CONTENT_CONFIG_ITEM'. The duplicate key value is ('<configuration item>, <CONFIGURATION_ITEM_ TYPE>).

For example, `"insert duplicate key in object 'dbo.OO_CONTENT_CONFIG_ITEM'. The duplicate key value is (Remote Command Execution - Protocols, SELECTION_LIST)"`

This error message appears when a content pack contains duplicated configuration items with identical UUDs. This error can occur after a content upgrade from 9.x to 10.x (earlier than 10.02).

Solution:

For each pair of duplicated items, delete one item.

Failed to read the file <cp jar name>. The file might be corrupt.

This error message appears when HP OO is unable to read a content pack.

Solution:

If the file was copied from another machine, try copying it again.

Otherwise, go to Studio and select **Create content pack**, and redeploy the content pack.

Failed to read the file <cp jar name>. The file is empty.

This error message appears when the content pack file is empty.

Solution:

If the file was copied from another machine, try copying it again.

Otherwise, go to Studio and select **Create content pack**, and redeploy the content pack.

Wrong file format. <cp jar name> should contain the Lib and Content root folders.

This error message appears when a content pack is missing the required **Lib** and **Content** folders.

Solution:

If the file was copied from another machine, try copying it again.

Otherwise, go to Studio and select **Create content pack**, and redeploy the content pack.

Note: Do not edit the contents of the content pack manually.

Wrong file format. <cp jar name> is missing the 'contentpack.properties' file.

This error message appears when a content pack is missing a required file.

Solution:

If the file was copied from another machine, try copying it again.

Otherwise, go to Studio and select **Create content pack**, and redeploy the content pack.

> **Note:** Do not edit the contents of the content pack manually.

Missing '<flow or operation/type of configuration item>' with UUID '<uuid>', which is required by the '<flow/operation>': '<flow path/operation uuid>'.

This error message appears when there is a missing flow, operation, or configuration item.

Solution:

1. Go to Studio and search for the flow, operation, or configuration item with the given UUID in either the HP content packs or other projects in your repository.

2. Redeploy the deployment unit with the content pack that contains the flow, operation, or configuration item that you found.

Missing '<flow or operation/type of configuration item>' with UUID '<uuid>', which is required by the '<flow/operation>': '<flow path/operation uuid>' and <number of additional dependents> more . See the server log for the full list of dependents.

This error message appears when there is a missing entity (flow, operation, or configuration item) that other flows or operations depend upon.

Solution:

1. Check the server log to see all of the flows and operations that depend on this missing entity.

2. Go to Studio and search for a flow, operation, or configuration item with the given UUID in either the HP content packs or other projects in your repository.

3. Redeploy the deployment unit with the content pack that contains the flow, operation, or configuration item that you found..

An exception occurred during deployment. Check the server log for more details.

This error message may appear in a number of different situations, leading to an exception during deployment.

Solution:

Check the server log to see the details of the exception.

The content pack that you are deploying has been deployed previously. In the previous deployment, this content pack contained an entity ('<flow or operation/ type of configuration item>' with UUID <uuid>), which is used by other deployed content packs (<1 or 2 content pack name(s) >). The current content pack that is being deployed is missing that entity.

This error message appears when you are deploying a content pack that has been deployed previously, and this content pack originally contained an entity that is used by other deployed content packs. However, the version that you are deploying is missing that entity.

Solution:

Option 1: Go to Studio and search for the flow, operation, or configuration item with the given UUID in a previous version of the content pack that you are deploying, and add it to the current version of the content pack.

Option 2: Go to Studio and in the dependent content pack(s), remove the dependency on the given flow, operation, or configuration item, and redeploy that/those content packs as well.

The content pack that you are deploying has been deployed previously. In the previous deployment, this content pack contained an entity ('<flow or operation/ type of configuration item>' with UUID <uuid>), which is used by other deployed content packs (<1 or 2 content pack name(s) >) and <number of additional dependent content packs> more. The current content pack that is being deployed is missing that entity. See the server log for the full list of dependent content packs.

This error message appears when you are deploying a content pack that has been deployed previously, and this content pack originally contained an entity that is used by other deployed content packs. However, the version that you are deploying is missing that entity.

Solution:

Check the server log to see all of the content packs that depend on this missing entity.

Option 1: Go to Studio and search for the flow, operation, or configuration item with the given UUID in a previous version of the content pack that you are deploying, and add it to the current version of the content pack.

Option 2: Go to Studio and in the dependent content pack(s), remove the dependency on the given flow, operation, or configuration item, and redeploy that/those content packs as well.

A flow with UUID <uuid> has <number of scheduled tasks> scheduled tasks that will be deleted.

This warning message appears when a flow is being deleted by deploying a new version of an already deployed content pack that contained flows with scheduled tasks.

Solution:

There is nothing to fix.

Schema validation error in '<flow name>'. <the xml parser exception>.

This error message appears when the schema is not correctly validated.

Solution:

Go to Studio and select **Create content pack** and redeploy the content pack.

> **Note:** Do not edit the contents of the content pack manually.

A flow with a duplicated path is being deployed. This path already exists either in a flow in another content pack in the deployment unit, or in a flow that was deployed previously. To see the error details, run the deployment again with the server log level set to DEBUG.

This error message appears when you are deploying a content pack with a flow that has the same path as another flow in another content pack in the deployment unit.

Solution:

1. To see the details about the flow path, flow UUID, and content pack name, run the deployment again with the server log level set to DEBUG. You will receive one of the following errors:

   - A flow with a duplicated path: '<flow path>' is being deployed. A flow with this path has previously been deployed.

   - A flow with a duplicated path: '<flow path>' is being deployed. A flow with this path exists in the content pack '<name of content pack>'.

2. In Studio, modify one of the content packs so that there is no longer a duplication, and redeploy the content pack. For more information about the required changes, see the sections about these error messages, below.

A flow with a duplicated path: '<flow path>' is being deployed. A flow with this path has previously been deployed.

This error message appears when you are deploying a content pack with a flow that has the same path as a flow that was previously deployed.

Solution:

In Studio, change the path of the flow (change the name of one of the folders or the flow name) and redeploy the content pack.

A flow with a duplicated path: '<flow path>' is being deployed. A flow with this path exists in the content pack '<name of content pack>'.

This error message appears when you are deploying a content pack with a flow that has the same path as another flow in another content pack in the deployment unit.

Solution:

In Studio, change the path of the flow (change the name of one of the folders or the flow name) and redeploy the content pack.

A system property with a duplicated name: <system property name> is being deployed. This name already exists in a system property in the content pack '<name of content pack>'.

This error message appears when you are deploying a content pack with a system property that already exists in another content pack in the deployment unit.

Solution:

In Studio, change the name of the system property and redeploy the content pack.

A '<flow or operation/type of configuration item>' with a duplicated UUID: <uuid> is being deployed. This UUID already exists in a '<flow or pperation/type of configuration item>'in the content pack '<name of content pack>'.

This error message appears when you are trying to deploy a content pack with a flow, operation, or configuration item that has the same UUID as an item in another content pack that is deployed in the deployment unit.

Solution:

1. In Studio, search for the flow, operation, or configuration item with the given UUID.

2. Copy the flow, operation, or configuration item into the same project.

3. Delete the original copy of the flow, operation, or configuration item, in that same project.

4. Select **Create content pack**, and redeploy the content pack.

> **Note:** Do not edit the contents of the content pack manually.

The property <content.pack.name/content.pack.version> is missing in the properties file contentpack.properties.

This error message appears when the content pack name or version are missing from the content pack's properties file.

Solution:

Go to Studio and select **Create content pack**, and redeploy the content pack.

You do not have permission to perform this action.

This error message appears when you are logged in as a user that does not have permission to perform the action.

Solution:

Log in as a user with the appropriate permission. Alternatively, ask the administrator to give your user permission to perform the action.

Service unavailable. The server may be down, too busy, or experiencing network problems. Check the server log for the deployment status.

This error message appears when the server is either too busy to handle the request or is down for maintenance, or when some network error has prevented the response from arriving to the client.

Solution:

Check the server log to see if the deployment didn't start or end successfully, or failed.

<server response status (for example, Internal Server Error)>. Check the server log for more details.

This error message appears when there is an unexpected error status from the server (for example, "Out of memory").

Solution:

Check the server logs to see if there was an exception.

An error has occurred. Check the server log for more details.

This error message appears when there is an unexpected error status from the server, but no error status text was received.

Solution:

Check the server logs to see if there was an exception.

liquibase: Waiting for changelog lock.

After a few attempts to log into the system, the server does not start and this error message appears.

Solution:

In the **DATABASECHANGELOGLOCK** table, set the value of the **LOCKED** column to **0**.

During deployment the file name became corrupted. Please try to redeploy.

In some cases, the file name arrives in a corrupt state, and causes an exception.

Solution:

Deploy again.

Running HP OO Commands from the Command Line

The Operations Orchestration Shell (OOSH) lets you run HP OO commands from the command line, instead of from the Central web interface. This enables you to create scripts to run commands, to automate your HP OO processes.

You can perform actions such as:

- Run flows

- Deploy content packs

- Manage files - import, upload, delete, and so on

- Display flow information

- Manage system configuration

See the reference section for a complete list of commands that can be used with the OOSH utility and the options that can be used with each command.

> **Note:** Users who invoke upgrade-related commands from the OOSH utility must have the corresponding permissions.

> **Note:** The OOSH utility works with java 1.7.

Running Commands

You can run commands within the OOSH utility or from a normal prompt/shell.

To run commands from a normal prompt/shell, type `c:\hpoo\central\bin> oosh.bat <command>`.

For example:

```
c:\hpoo\central\bin> oosh.bat trigger --uuid ABC --user ABC --password ABC --url ABC
```

> **Note:** If you used to work with **RSFlowInvoke** and **JRSFlowInvoke** with HP OO 9.x, note that this is the alternative for HP OO 10.x.

What do you want to do?

Connect to a Central server

If you are running OOSH in shell mode, you can use the `connect` command to connect to the Central server.

All other commands support basic connection properties: `url`, `user`, `password`. This enables you to invoke them directly from the command line without using the `connect` command first.

> **Note:** It is possible to specify the user name (with the user property) without specifying the password (with the `password`) property. You will be prompted for the password upon making the connection.

The `connect` command has more options. It also enables connection via an HTTP proxy.

For a complete list of all the options you can use with the `connect` command, see the reference section or type `help connect` in the command line.

1. Double-click the `oosh.bat` batch file, to start the OOSH utility.

2. In the command line, type (for example):

   ```
   connect --url <Central server URL>
   ```

3. Press the **Enter** key.

If the connection is successful, the command line displays:

```
Connected
```

Display information about a flow

1. In the command line of the OOSH utility, type.

```
finfo --uuid <the UUID of the flow>
```

> **Note:** The UUID of the flow is displayed in the Flow Library information panel.

2. Press the **Enter** key.

   The flow information is displayed in the command line.

Run a flow

With the `trigger` command, you can use the options `--user`, `--password`, `--url`, and so on. For a complete list of all the options you can use with the `trigger` command, see the reference section or type `help trigger` in the command line.

1. In the command line of the OOSH utility, type (for example):

```
trigger --uuid <the UUID of the flow>
```

2. Press the **Enter** key.

Deploy a content pack

This command will only work if there is an active connection to a Central server. For a complete list of all the options you can use with the `deploy` command, see the reference section or type `help deploy` in the command line.

1. In the command line of the OOSH utility, type (for example):

```
deploy --url <URL of OO Central> --files <comma-separated list of files to d
eploy>
```

2. Press the **Enter** key.

Display help about the OOSH utility

- To display a list and description of all available commands in the OOSH utility, type:

```
help
```

- To display help about a particular command, type:

```
help <command>
```

For example:

```
help trigger
```

Create a script to run OO commands from the OOSH utility

1. To create a script, write a simple text file with the OOSH commands that you want to run. Write each command on a separate line, in the sequence that you want the commands to run.

2. To run the script, use the `script` command in OOSH. For example:

```
script --file<script file name>
```

Add OOSH as the parser of an executable file

In Linux only, it is also possible to add OOSH as the parser of an executable file.

1. For example, create script-a:

```
#!/<install-dir>/oosh
<command-sequence>
```

2. Chmod the file:

```
chmod 755 script-a
```

3. Run it from the command line:

```
./script-a
```

Reference Material

Available commands for OOSH utility

Command	Argument	Description	Default Value/Behavior	Required
connect		Connects to an OO Central server		
	--url	URL of OO Central		Yes
	--user	OO Central user name		No
	--password	OO Central password		No
	--proxyhost	http proxy host to connect through		No
	--proxyport	http proxy port to connect through	8080	No
	--proxyuser	http proxy user to connect with		No
	--proxypassword	http proxy password to connect with		No
deploy		Deploys a content pack (requires an active connection)		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--files	Comma-separated list of content packs to deploy		Yes
disconnect		Disconnects from the OO Central server		

Command	Argument	Description	Default Value/Behavior	Required
trigger		Runs a flow		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--uuid	UUID of the flow to run. For example, `cd38b579-4220-4fa5-bafd-78d67f73eb6f`		Yes
	--inputs	Comma-separated key=value map of the flow inputs. For example, `key1=value1,key2=value2`		No

Command	Argument	Description	Default Value/Behavior	Required
track		Shows information about a specific execution (tracking)		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--id	Execution id		Yes
	--property	Displays a specific property (default: all). Available properties: `executionId, executionName, status, resultStatusType, resultStatusName`	all	No

Command	Argument	Description	Default Value/Behavior	Required
finfo flow-info		Displays information about a specific flow run		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--property	Displays a specific property (default: all). Available properties: `id, name, path, description, cpName, version`	all	No
lcp list-content-packs		Lists all currently deployed content packs in the connected server		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No

Command	Argument	Description	Default Value/Behavior	Required
lsc list-sys-config		Lists the system configuration		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--key	Lets you request the value of a specific key only		No
ssc set-sys-config		Sets the system configuration		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--key	System configuration key		Yes
	--value	System configuration value	empty string	No
show connection		Shows the connection properties		

Command	Argument	Description	Default Value/Behavior	Required
historical-data-start-date		Sets the start date for the import of historical data		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--date	The date from which to start the import, in format dd/MM/yyyy		Yes
historical-data-status		Gets the status of historical data import		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No

Command	Argument	Description	Default Value/Behavior	Required
import-historical-data		Imports the historical data of deployed content with the data defined in the 9.x server		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
import-permissions		Imports the permissions of deployed content with the permissions file		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No

Command	Argument	Description	Default Value/Behavior	Required
import-schedules		Imports the schedules of deployed content with the schedules defined in the 9.x server		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
permissions-status		Gets a list of all the permissions that were imported so far		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--output	Full path where the output should be written		No

Command	Argument	Description	Default Value/Behavior	Required
upload-permissions-file		Uploads the permissions file created during content upgrade		
	--url	URL of OO Central		Yes, unless already connected to Central with the `connect` command
	--user	OO Central user name		No
	--password	OO Central password		No
	--file	The full path to the permissions file, which is in the **Output** folder of the Content Upgrade Utility		No

Note: : After an upgrade from HP OO 9.x to 10.x, using the HP OO Shell Utility to migrate historical data will get the result "Resolved" instead of "RESOLVED", as required in HP OO 10.x. This causes duplicates in the results distribution on the Dashboard. If this occurs, upgrade to HP OO 10.02.