



Database and Middleware Automation

Ultimate Edition

Software Version: 10.50

Linux, Solaris, AIX, and HP-UX

User Guide

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Using

This section contains the following topics:

Topics	Description
What is DMA	Provides information on DMA
"Automation" on the next page	Provides information about DMA automation.
"Environment" on page 49	Provides information on DMA environment.
"Solutions" on page 68	Provides information on DMA solution packs.
"Promote Solution" on page 70	Provides information on promoting workflows.

What is Database and Middleware Automation?

HPE Database Middleware and Automation (HPE DMA) automates frequently performed data center tasks and processes that tend to be complex, manually intensive, and error-prone. It enables operations teams to automate the repair and maintenance of business critical applications, regardless of platform, version, or vendor.

HPE DMA provides the following benefits:

- Automates routine IT life cycle tasks and procedures
- Reduces operational expenditures associated with data center management

HPE DMA groups components into solution packs to address a specific data center task or process—for example: database patching, middleware provisioning, or database compliance. Solution packs are customizable to your unique data center environment. For more information, see ["Solutions" on page 68](#) section.

Accessing HPE DMA

To access HPE DMA, open a web browser and specify the following URL:

```
https://<HPDMAserver>:8443/dma/login
```

Here, *<HPDMAserver>* represents the host name or IP address of your HPE DMA server.

After you have accessed the HPE DMA user interface, enter your user name and password to log in.

After you log in, you can view information about your roles and capabilities by clicking your user name in the upper right corner of the HPE DMA window.

Automation

This section includes the following topics:

- ["About HPE DMA Automation"](#)
- ["Workflows" on the next page](#)
- ["Steps" on page 19](#)
- ["Working with Parameters" on page 27](#)
- ["Functions" on page 35](#)
- ["Policies" on page 37](#)
- [Deployments](#)
- ["Run" on page 43](#)
- ["Console" on page 44](#)
- ["History" on page 45](#)

About HPE DMA Automation

HPE DMA Automation provides the following benefits:

- Drives standardization in asset management across a data center.
- Empowers data center administrators to define and share best practices.
- Simplifies and automates common administrative tasks.
- Reduces human error when performing data center administration tasks. When common tasks are automated, the risk of human error is reduced, and consistency is driven across an enterprise.

HPE DMA workflows separate tasks into reusable steps that provide a simple, holistic view of how data center administration tasks are performed. Workflows have the unique ability to run in any environment without any modifications to the underlying automation code.

Workflows

A **workflow** is a set of steps used to accomplish a specific operational task or procedure—such as patching a database instance, installing middleware, or auditing all the instances in an organization for compliance with a security standard.

A workflow is deployed to specific targets. There are three types of targets:

- Servers
- Instances
- Databases

HPE DMA targets must be, or in the case of instance and database targets, reside on HP Server Automation (SA) managed servers. In addition, these servers must have the DMA Client Files policy. See ["DMA Client Files Policy" on page 67](#).

Workflow **steps** contains the actual code used to perform a unit of work detailed in a workflow. A step is typically an executable script, although it can take other forms. Steps are linked together to form the business logic for a task or procedure. You can use a workflow to perform a new business process by building on existing best practices and processes.

Workflow **documentation** should contain information required to understand not only how a procedure is executed, but also how that procedure has been qualified and tested. workflow documentation encapsulates best practices into a shareable document that can be exported for IT auditors, change control boards, or training manuals for new data center administrators.

The Workflow Execution Architecture

HPE DMA controls the flow or progression of a workflow through its component steps. This limits the amount of memory that the HPE DMA client running on the managed server requires.

This procedure explains how HPE DMA runs a workflow:

1. HPE DMA finds the first workflow step to execute.
2. HPE DMA replaces all metadata, parameters, and header variables for this workflow step.
3. The HPE DMA client executes that script and returns the output and errors as it executes.
4. When the script has completed, the HPE DMA client sends the return code back to the HPE DMA server.

5. Based on the value of the return code, HPE DMA decides which workflow step to execute next.
6. HPE DMA repeats step 2 through step 5 until the workflow is completed.

Searching for a Workflow

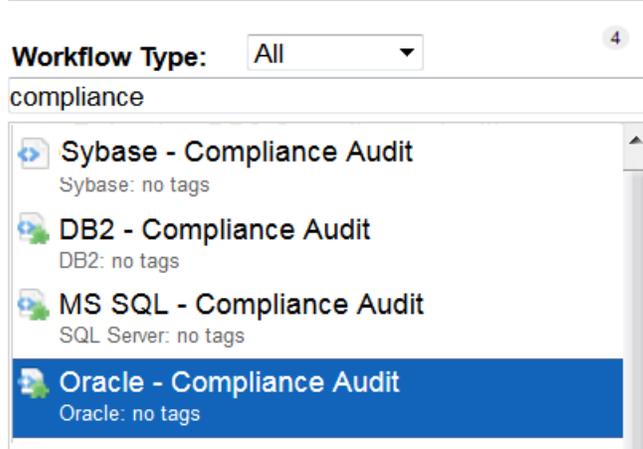
You can use a real-time filter to search for any workflow by name, type, or tags.

In the Workflow Type filter, you can select:

- Other
- OS
- DB2
- MySQL
- Oracle
- PostgreSQL
- SQL Server
- Sybase
- All (default)

Type what you are searching for in the Workflow box, and see the filter results display as you type. The search string is not case-sensitive, as shown in the following figure.

Workflows



Note: The real-time filter feature is available throughout the HPE DMA user interface (UI).

Viewing an Existing Workflow

From the Automation > Workflows page, you can view a list of existing workflows and preview the steps included in any workflow listed.

Steps List

In the Workflows pane, point to the workflow name. As you point to the workflow, you can view the associated steps in the Steps pane:

Example of Steps in a Workflow

The screenshot displays the Automation > Workflows page. The top navigation bar includes Home, Automation (selected), Reports, Environment, Solutions, and Setup. Below this is a secondary navigation bar with Workflows (selected), Steps, Functions, Policies, Deployments, Run, Console, and History.

The main content area is titled "Workflows" and features a "Workflow Type:" dropdown menu set to "All". A search box contains the text "compliance". A list of workflows is shown, with "Run DB2 Compliance Audit" (DB2: no tags) highlighted in green. Other workflows include DB2 - Compliance Audit, MS SQL - Compliance Audit, Oracle - Compliance Audit, Run MS SQL Compliance Audit, Run Oracle Compliance Audit, Run Sybase Compliance Audit, and Sybase - Compliance Audit.

To the right of the workflow list is a "STEPS" pane showing 18 numbered steps for the selected workflow:

- Gather Parameters for DB2 Compliance
- Gather Advanced Parameters for DB2 Compliance
- Failure
- Prepare DB2 Call Wrapper
- Validate DB2 Compliance Parameters
- Check IF DB2 Admin Server Exists
- Discover DB2 Target Configuration
- Audit DB2 Installation and Patches
- Audit DB2 Directory and File Permissions
- Audit DB2 Configuration Parameters
- Audit DB2 Label Based Access Controls
- Audit DB2 Database Maintenance
- Audit DB2 Database Objects Security
- Audit DB2 Entitlements
- Audit DB2 General Policy and Procedures
- Audit DB2 Utilities and Tools
- Validate Post Compliance Checks
- Delete File

At the bottom of the interface, there are buttons for "Choose File" (with "No file chosen" text), "Import workflow", and "New workflow".

Workflow Documentation

In the Workflows pane, click the workflow that you want to view. The Documentation tab opens, as shown in the figure below.

Provided that the workflow is deployable (not locked), you can modify the workflow documentation to suit your environment. To open the documentation editor, click the **Edit** link in the lower right corner.

For formatting information, click the **Help** link in the lower right corner.

Home **Automation** Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

Run Oracle Compliance Audit

Documentation Workflow History Deployments Roles

Name: Run Oracle Compliance Audit
 Tags:
 Type: Oracle
 Target level: Instance

Documentation:

Purpose

Audit an Oracle Database instance for compliance with the following Center for Internet Security (CIS) benchmarks and, optionally, compare the audit results to the related PCI and SOX requirements:

CIS Security Configuration Benchmark for Oracle Database Server 11g, version 1.1.0, December 2011
 CIS Security Benchmark for Oracle 9i/10g, version 2.01, April 2005
 Payment Card Industry (PCI) Data Security Standard Version 2.0, October 2010
 Sarbanes-Oxley (SOX) Sarbanes-Oxley Act of 2002 Section 302

Description

This workflow will audit an Oracle Database instance using CIS Level 1 and Level 2 auditing. It will then compare the results to the pertinent PCI and SOX requirements, where applicable. This audit, which runs in conjunction with the HP DMA reporting tool, can identify more than 175 compliance related problems with an Oracle database. You can view information about the audit on the Console while the audit is running. After the audit has finished, the workflow sends a summary report to each specified email address. You can also view a compliance report on the Reports page.

Parameters

[HELP](#)

Copy HIDE EXPORT EXTRACT POLICY HP DMA DATABASE COMPLIANCE SOLUTION PACK

Workflow Details

From the Documentation tab, click the Workflow tab to view the following information:

A graphical representation of the workflow logic

- A list of all available steps, grouped by tag
- A table listing the steps included in the workflow and the parameters associated with each step .

Run MS SQL Compliance Audit

Documentation Workflow History Deployments Roles

Workflow steps:

1. Gather Parameters for MS SQL Compliance
2. Gather Advanced Parameters for MS SQL Compliance
3. Failure
4. Validate Compliance Parameters
5. Prepare SQL Server Compliance Check
6. Audit SQL Server OS and Network Config
7. Audit SQL Server Installation and Databases

Gather Advanced Parameters for MS SQL Compliance

Description: Accepts advanced parameters and handles defaulting.
 Purpose: Set the default values for call wrapper and all the MS SQL advanced configurable parameters for Compliance audit that are used in subsequent workflow steps. Return Codes: If all parameters are valid, the step returns a 0, else the step returns...

Step	Name	Required Result	Next
▶ 1	Gather Parameters for MS SQL Compliance		2, 3
▶ 2	Gather Advanced Parameters for MS SQL Compliance	0	3, 4
▶ 3	Failure		
▶ 4	Validate Compliance Parameters	0	3, 5
▶ 5	Prepare SQL Server Compliance Check	0	3, 6

Creating a New Workflow

To create a new workflow:

1. On the Automation > Workflows page, click **New Workflow**.
The Documentation tab opens.
2. Specify the following information:
 - Name: A unique name for the workflow.
 - Tags: Use this field as a keyword field. Use existing tags or create new ones so that you and

others can easily find or filter for this workflow in the future.

- **Type:** Type of database or middleware software to which this workflow pertains.
 - **Target Level:** This determines which types of targets you can select when you create a deployment. Select Server, Instance, or Database.
 - **Documentation:** Use this field to document the function of this workflow. You will likely develop the workflow documentation in an iterative fashion as you refine the workflow.
3. Add at least one step to your workflow using one or both of the following methods:
 - See ["Creating a New Step" below](#)
 - See ["Adding an Existing Step" below](#)

To delete a step from a workflow, click the "Remove"  button.

4. When you are finished adding and connecting steps, click **Save**.

"Workflow Saved Successfully" displays in a green bar at the top of the Workflows page.

Creating a New Step

You can use the New Step wizard to create a new step "on the fly" while you are editing a workflow. This is an alternative to creating a step from the Automation > Steps page.

To create a new step by using the New Step wizard:

1. Click the **New Step** link just below the Steps panel. The New Step wizard opens.
2. Specify the information that the wizard prompts you to provide. This will vary depending on the type of step that you are creating (script, email, or variable timer)
3. Click **Next** to advance through the wizard pages.

If you add parameters to your new step, you can specify Plain Text or Password for the parameter type. The value of a Password type parameter is always masked in the HPE DMA user interface.

4. Click **Finish** when you have provided all required information.

The New Step wizard creates the step and adds it to the workflow after any existing steps.

Adding an Existing Step

To add an existing step to a workflow, you must first locate the step and then place it in the appropriate spot in the workflow. The following procedure assumes that the workflow has been created, and that

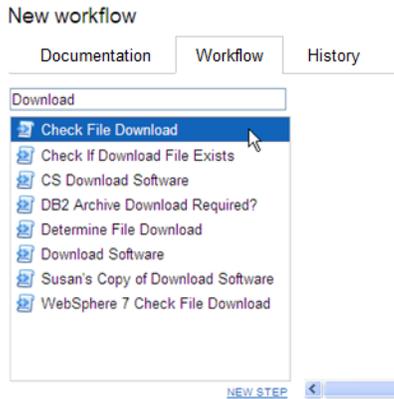
you are viewing the workflow tab.

To add an existing step to a workflow:

1. In the steps panel, click one of the tags to show the list of steps that have that tag:



Alternatively, you can type text into the filter box above the Steps panel, and any steps whose names contain that text are listed:



2. Double-click a step to add it to the workflow.
3. In the steps table below the diagram, modify the Required Result and Next values for this step and any pertinent existing steps so that the workflow logic is correct.

Click in the Required Result or Next column to edit the value.

Note: Be sure to always include the built-in SUCCESS and FAILURE steps in your workflows (see ["Built-in Steps" on page 25](#)). Make sure that the final step that the workflow executes is either SUCCESS or FAILURE, depending on the outcome of the previous steps.

Note: A Download Software step is built into your HPE DMA software. This step enables you to download one or more files from the software repository to a specified location on the target server. To locate this step, on the workflow tab, type "download" in the filter box. See ["Download Software" on page 26](#) for additional information.

Copying a Workflow

Copy is available from all the tabs in the Automation > Workflow area. Creating a copy of a workflow saves time by enabling you to reuse information in a workflow by renaming it without having to re-type the workflow's information.

To make a copy of a workflow:

1. Click **Copy**.

The Documentation tab opens, and the workflow name changes to "Copy of <workflow name>."

2. Make any changes to the copy.
3. Click **Save**.

Exporting a Workflow

You can export a workflow, and it is saved on the local file system as an SOP file.

When you export a workflow, you export the steps used in that workflow, but you do not export the functions.

To export a Workflow:

1. Go to Automation > Workflows.
2. Click the workflow that you want to export.
3. Click **Export**.
4. A page displays and allows you to select a location to which you want to save the workflow.
5. Click **OK**.
6. Click **Save**.

Importing a Workflow

You can import a workflow that was previously exported as an SOP file.

To import a workflow:

1. On the Automation > Workflows page, click **Browse** to find the workflow you want to import.

Note: In some browsers, this button is labeled Choose File instead of Browse.

2. After you select a file to import, Click **Import workflow**.

Assigning Roles to a Workflow

Roles determine who can read or modify a workflow. You can modify the roles settings for any workflow that you have permission to Write. You can only assign permissions for roles that you have—unless you have a role with Administrator capability.

To assign roles to a workflow:

1. Go to Automation > Workflows.
2. In the Workflows pane, point to the workflow name.
3. Click the workflow you want to view.

The Documentation tab displays.

4. Click the **Roles** tab.

The Roles tab displays.

5. Select or clear the **Read** or **Write** check boxes, depending on the permission you want to grant.
6. Click **Save**.

Viewing the History of a Workflow

Every time that a workflow is saved, a new entry is added to the table on the History tab. The entry shows you when the workflow was saved and by whom it was saved.

Sending the History of a Workflow

You can get the workflow execution history of a workflow by an Email by adding Send Email step to any existing or a new workflow. This step allows to compose an email with a subject and body of the message. The Email can be sent to multiple recipients by providing a list of comma separated Email addresses.

You must install HPE DMA Utility Solution Pack to be able to send an Email of workflow history and logs upon execution of the workflow.

How to send Email of Workflow History and Logs

1. Go to Automation > Steps.
2. Select the Send Email step.
3. Modify the following parameter values as required in the Parameters tab.
 - Body
 - FilePathAndName

- Mailing List
 - Subject
4. Open the workflow for which you have to get history or create a new workflow.
 5. Perform the steps listed in the task [Add an Existing Step](#) to locate and add Send Email step to the workflow.
 6. In the steps table below the workflow diagram, modify the Required Result and Next values for the Send Email step and any pertinent existing steps so that the workflow logic is correct.
 7. Perform the run task to execute the workflow.

On execution of the workflow, an email is sent with the selected information to the specified recipients.

Deleting a Workflow

You can delete a workflow unless its status is “Read Only.” You must either have a role with Administrator capability, or you must have a role that has both Workflow Creator capability and permission to Write the workflow.

Caution: If you delete a workflow that has associated deployments, the associated deployments will be deleted automatically with the workflow.

To delete a workflow:

1. Go to Automation > Workflows.
2. Open the workflow you want to delete.
3. Click and confirm delete.

Steps

Steps are reusable automation components. They are assembled into workflows that automate a task or system healing action. steps can accept input parameters for customization and provide output for subsequent steps to use.

Searching for Steps

Steps are reusable automation components. They are assembled into workflows that automate a task or system healing action. steps can accept input parameters for customization and provide output for subsequent steps to use.

Viewing a Step

Note: Steps provided by HPE are Read Only. You must copy a step before you can modify it. See ["Copying a Step" on page 25](#).

To view information about a specific step:

1. Go to Automation > Steps.

You can also access individual steps from the Steps tab on the Solutions page or the list of steps associated with a workflow.

2. In the Steps pane, point to the step name that you want to view.

As you point to a step, the workflows that use that particular step is shown in the Workflows pane.

3. Click the step you want to view.

There are seven tabs that you can use to view information about this step:

- ["General Tab" on the next page](#)
- ["Action Tab" on the next page](#)
- ["Parameters Tab" on page 22](#)
- ["History Tab" on page 23](#)
- ["Workflows Tab" on page 23](#)
- ["Solutions Tab" on page 23](#)
- ["Roles Tab" on page 24](#)

Note: To modify the properties of a step, you must have Write permission for that step (see ["Roles Tab" on page 24](#) and [Roles, Capabilities, and Permissions](#)).

General Tab

The General tab displays information about a step. In the Properties area, you can view and edit the following information:

- Name: Step's name (must be unique).
- Tags: Use this field as a keyword field to type descriptive words about a step's function, language, compliance, etc., so that you can easily find or filter for this step.
- Type: Determines where or at what level a step is executed.
- Category: Specifies the type of step. There are three step categories:
 - Script: Executes the code on the Action tab.
 - Email: Sends an email to the specified email address.
 - Variable Timer: Waits the number of minutes that you specify before the workflow proceeds to the next step. This is useful, for example, if you want to allow time for the system to reboot.

The Category setting determines which options are available on the Action tab.

You can only specify the Category field when you are creating a new step. You cannot edit the Category field after a step has been saved.

In the Documentation area, you can view or edit documentation that is related to the step.

Action Tab

The Action tab enables you to view and specify the action that a step takes when that step is used in a workflow. The options available on the Action tab reflect the Category type specified on the General tab.

Actions for Script Type Steps

For a Script type step, you must specify two items:

- Call wrapper – the location of the interpreter that executes the script.

Specify `jython` here to run the script using HPE DMA's built-in python interpreter.

You can specify a different call wrapper if you prefer. For example:

```
/bin/ksh
```

```
/usr/bin/perl
```

```
powershell -ExecutionPolicy unrestricted -File, cscript /E VBS
```

Caution: If you install Windows PowerShell on a managed server, and you want to use it as an HPE DMA call wrapper, you must restart the SA agent on that server. To do this, restart the Opsware Agent service.

- Code – the script to run using the Call wrapper.

You can type or paste the script into the Code box, or you can use the Import Script tool.

The Import Script tool replaces any information in the Code field with the contents of a file that you specify. To import a script, follow these steps:

- a. Click the **Import Script** link.
- b. Click **Browse** to locate the script you want to import.
- c. Click **Open** to import the script (or click **X** to cancel).

Actions for Email Type Steps

For an Email type step, you must specify three things:

- To – email address to which the email message will be sent.
- Subject – subject of the email message.
- Message – content (body) of the email message. The message can be in either of the two formats - plain text or HTML. If the message is in HTML format, it must have an opening tag (<html>) and a closing tag (</html>).

Note: If the message in HTML format contains bold, italics, or underlined text, the text should be preformatted using the <pre> tag to keep the formatting intact.

Actions for Variable Timer Type Steps

For a Variable Timer type step, you must specify one option: the Delay. This is the number of minutes that you want the workflow to wait before executing the next step.

Parameters Tab

Parameters enable you to pass information into or out of a step. You set the input to a value, and the output parameter is set within the code (see ["Working with Parameters" on page 27](#)). Script steps can

have both input and output parameters. All other step types can only have input parameters.

- Input Parameters

The Parameters tab defines the variables that a workflow sets when running a step so that the step can run against different objects and still be reusable. For example, in a database backup, the directory where the backup should be placed would be a good candidate for an input parameter so that both development and production database backups could use the step without modification.

- Output Parameters

Script type steps enable you to define output parameters as well as input parameters. Steps use output parameters to provide information to be used by downstream steps. For example, if a step determines the location of the Oracle Home directory on a target server, it can add that location to its set of output parameters for subsequent steps to use.

Note: If you want to remove a parameter from a step, you can click the Remove link for that parameter. If that parameter is associated with a workflow, however, you cannot remove it, and the Remove link is not available.

History Tab

Every time that a step is saved, a new entry is added to the table on the History tab. The entry shows you when the step was saved and by whom it was saved. If you click an entry in the table, the action information for that version of the step is displayed in the Details area.

Workflows Tab

The Workflows tab shows you a list of the workflows that use this step. If you have permission to Read a specific workflow, you can view or edit information pertaining to that workflow by clicking its name.

Solutions Tab

The Solution tab shows you a list of the Solution Packs that include this step. To view information about a particular Solution Pack, click the name of that Solution Pack. For more information, see ["Solutions" on page 68](#).

Roles Tab

The Roles tab shows you which user groups have Write permission for the step.

Permissions settings for baseline steps (steps that are shipped with HPE DMA) cannot be changed, even by an HPE DMA Administrator. To change permissions for any other step, select or clear the check boxes to grant or revoke Write access.

If there is a “—” in the Write column, none of the roles have Write access to the step. For more information on changing permissions as an HPE DMA Administrator, see [Permission Settings](#).

Creating a New Step

You do not need any special permissions to create new steps. To use your new step in a workflow, however, you must have Write permission for that workflow (see [Roles, Capabilities, and Permissions](#)).

To create a new step:

1. Go to Automation > Steps.
2. Click **New Step**.
3. Specify the following information on the General tab:
 - Name: Unique name of the step.
 - Tags: Use this field as a keyword field, to type descriptive words about a step's function, language, compliance, etc. so that you can easily find or filter for this step.
 - Type: Helps you decide where or at what level to run a step.
 - Category: Specifies the type of step.
4. Specify the information required on the Action tab:
 - For a Script type step, specify the Call wrapper and Code (see ["Actions for Script Type Steps" on page 21](#)).
 - For an Email type step, specify the email address, subject, and content (see ["Actions for Email Type Steps" on page 22](#)).
 - For a Variable Timer type step, specify the Delay (see ["Actions for Variable Timer Type Steps" on page 22](#)).
5. *Optional:* In the Documentation area, add documentation that describes the step that you are

creating—for example: describe its purpose, dependencies, parameters, and return codes.

6. *Optional:* Specify any parameters that this step uses (see ["Parameters Tab" on page 22](#)).
7. *Optional:* Specify who is allowed to modify this step (see ["Roles Tab" on the previous page](#)).
8. Click **Save**.

Copying a Step

Since steps provided by HPE are read-only, you must first copy a step before you can modify it. You do not need any special permissions in order to copy a step. To use your copied step in a workflow, however, you must have Write permission for that workflow (see [Roles, Capabilities, and Permissions](#)).

To copy an existing step:

1. Go to Automation > Steps.
2. Click a step that you want to modify.
3. Click **Copy**.
4. Specify a unique name for the copy.
5. Modify the step to suit your objective.
6. Click **Save** in the lower right corner.

Built-in Steps

There are three utility steps that are provided with your HPE DMA software:

- ["Success" on the next page](#)
- ["Failure" on the next page](#)
- ["Download Software" on the next page](#)

You can use these steps to build workflows.

Note: It is good practice to always include a SUCCESS step and a FAILURE step in your workflows. The final step that a workflow executes should be either SUCCESS or FAILURE, depending on the return code of the previous step.

Success

This step is intended to be used as the terminal step in a workflow when the workflow has successfully executed the previous steps. A workflow may contain multiple Success steps depending on its branching logic. After the Success step executes, the Console and History pages indicate that the workflow execution status is SUCCESS.

Failure

This step is intended to be used as the terminal step in a workflow when a step in the workflow has failed. Typically, there will only be one Failure step in the Workflow—but you can have multiple Failure steps, depending on the workflow's branching logic. After the Failure step executes, the Console and History pages indicate that the workflow execution status is FAILURE.

Download Software

This step enables you to conveniently transfer a group of files from the software repository to a target server. This is useful, for example, when you are using an HPE DMA workflow to install software on one or more target servers.

This step has the following parameters:

Table: Download Software Parameters

Parameter	Type	Required	Description
FileNames	input	yes	Comma-delimited list of files to download.
TargetDir	input	yes	Directory on the target server where the files will be downloaded.
Download Files	output	n/a	Comma-delimited list of files.

You must specify both input parameters. You can use the output parameter in downstream workflow steps.

This step has the following dependencies:

- You must first add any files that will be transferred to the software repository. See [Importing a File into the Software Repository](#) for instructions.
- File names must be unique. When referencing files in this step's FileNames input parameter,

specify a comma-separated list of the uploaded file names.

Note that it is important to specify the actual file names, and not the SA package names.

This Step has the following return codes:

Table: Download Software Return Codes

Return Code	Meaning
0	All files were successfully downloaded.
1	A fatal error occurred while files were being downloaded.
9	One or more files were successfully downloaded.output.

Working with Parameters

You create parameters at the step level, and then you assign values at either the workflow level or the deployment level. The following topics provide examples that illustrate how parameters are created and then used at various levels.

- ["Creating Parameters" on the next page](#)
- ["Assigning Values to Parameters" on page 29](#)
- ["Using Parameters" on page 32](#)

The following figure shows an example of a step whose purpose is to validate all the input parameters required for the workflow. This step provides output parameters that are consumed by the subsequent steps in the workflow.

Note: Password type parameters are masked throughout the HPE DMA user interface.

Figure: Automation > Steps > Parameters Tab

The screenshot displays the 'Parameters' tab for the 'Parse Oracle Inventory' step. The interface is divided into two main sections: a list of parameters on the left and a detailed view of the selected parameter on the right.

Parameters List:

Category	Parameter Name	Status
INPUT PARAMETERS	Inventory Files	✖
	Oracle Account	✖
	Oracle Home	✖
	Server Wrapper	✖
OUTPUT PARAMETERS	CRS Account	✖
	CRS Active Version	✖
	CRS Group	✖
	CRS Home	✖
	CRS Home Name	✖
	CRS Nodes	✖
	Cluster Nodes	✖
	Inventory Groups	✖
	Inventory Locations	✖

✖ Parameter is in use and cannot be removed.

Parameter Details (Oracle Account):

- Type: Plain Text
- Name: Oracle Account
- Default Value: (empty)
- Description: Optional: Oracle user that will own the Oracle Home. This is required only if inventory does not exist.

A 'Copy' button is visible at the bottom of the interface.

Creating Parameters

You can add, modify, and remove parameters for any step for which you have Write permission (see [Roles, Capabilities, and Permissions](#)).

To create a new parameter:

1. Go to Automation > Steps.
2. Select the step that you want to modify (or create a new step).
3. Go to the Parameters tab.
4. Use the Add link to add a new input or output parameter. Specify the following information:

- Type: Plain Text or Password.
- Name: A unique name (within this step) for the parameter.
- Value: The default value of this parameter.

The default value is encrypted before it is stored in the HPE DMA database.

The value of Password type parameters are always masked in the HPE DMA user interface.

- Description: Information that indicates the purpose of this parameter and how its value should be specified. For example:

Required: Unique node name that cannot contain any of the following special characters / \ * , ; = + ? | < > & % ' " [] > # \$ ^ { }. If you plan to federate into an existing cell later, make sure that the node name is unique within that cell.

5. Click **Save**.

Assigning Values to Parameters

Parameters are defined in steps, but their values are assigned at the workflow level, the deployment level, or with a run action.

Parameters whose values are assigned at the workflow level typically either have constant values or values that are determined at execution time using custom fields. For example, a parameter's value may change based on the organization. In this case, the parameter remains consistent, but the value assigned to that parameter changes.

To assign parameter values at the workflow level, go to the Automation > Workflows > Workflow tab.

Once you go to the Workflow tab, view the workflow table located below the workflow diagram. If the step contains an input parameter, there is an arrow next to each step that, when clicked, displays the "values" that can be associated with that step's parameters.

Figure: Workflow Tab with Step Parameters Displayed

Home **Automation** Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

DB2 - Apply Fixpack On DB2 Home

Documentation Workflow History Deployments Roles

Step	Name	Required Result	Next
1	Gather Parameters for DB2 Apply Fixpack		2, 3
	DB2 Fixpack Software Binaries:	Not selected	
	DB2 Installation Location:	Not selected	
	Trust SSL Certificates:	Not selected	
	Web Service Endpoint:	Not selected	

Gather Parameters for DB2 Apply Fixpack

Description: Accepts parameters for the workflow DB2 Apply Fixpack from user. All the parameters are mandatory in this step. Purpose: Set the default value for call wrapper and all the DB2

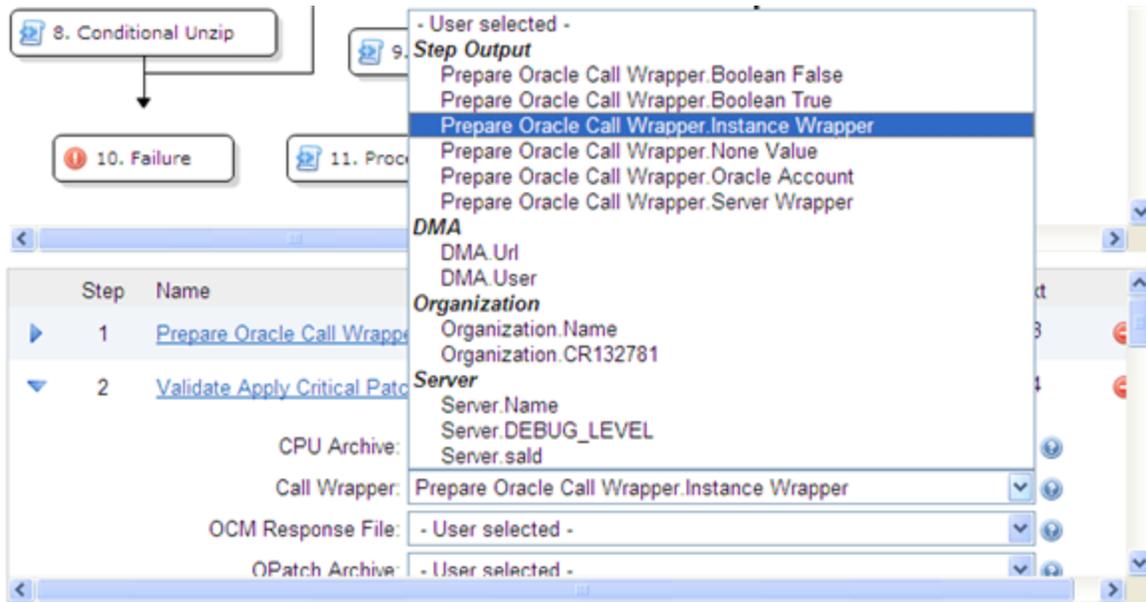
Note: When you are working with parameters at the deployment level or with a run action the parameters are not as static as parameters that you would set at the workflow level. If you know that you have a value that changes often, do not assign it at the workflow level—assign it, instead, at the deployment level. For more information, see ["Using Parameters" on page 32](#).

The drop-down list associated with each input parameter contains built-in metadata and any user-defined Custom Fields.

If a prior step in the workflow contains an output parameter, that output parameter will be included in the drop-down list for that parameter.

In the following figure, for example, the output parameters of the Gather Parameters for MS SQL Compliance step are available to provide values for the input parameters of the Validate Compliance Parameters step. The HPE DMA, organization, and server metadata items are also available.

Figure: Automation > Workflow Tab: Parameter “Values” Drop-Down List



If you assign an output parameter from a previous step to an input parameter at the workflow level, that input parameter does not appear in the deployment parameters list. All parameters that are not either assigned to a Custom Field or mapped at the workflow level will be modifiable at the deployment level. Any parameter that is not set in the workflow or at the deployment level will use the default value assigned for that step.

Assigning Values to Parameters at the Workflow Level

To assign values to parameters at the workflow level:

1. Go to Automation > Workflows.
2. Perform one of the following tasks:
 - Click **New Workflow** to create a workflow.
 - Select an existing editable workflow.
3. Go to the Workflow tab.

The steps in the workflow display in the workflow table, below the workflow diagram. The arrows to the left of each step expand that step to display any parameters associated with the step. If a step has no input parameters, the arrow does not appear.

- A numeric value in the Required Result column is the return code that must be received from at least one parent node in order for that step to run.
 - You can use the Next field to reorder your workflow's steps
4. Click the arrow next to each step. The input or output parameter "values" display in a drop-down list. Assign a value from the "Values" list (as shown in Figure: Automation > Workflow Tab: Parameter "Values" Drop-Down List) to the desired parameter.

5. Click **Save**.

The Workflow page opens, and the following message displays: "Workflow saved successfully. Would you like to deploy the workflow now?"

To proceed, see [Deployments](#).

Using Parameters

There are three points at which you can assign parameter values: in the workflow, in the deployment, and at run time.

Parameter values should be assigned at the deployment level when the value is specific to the targets that are part of the deployment. For example, you may wish to use the same workflow with production and development servers, but you need to use a different parameter value for each environment. This can be accomplished by creating one deployment of that workflow for production servers, and a second deployment for development servers. This allows you to set the same parameter differently for the each set of targets.

Note: If you assign a value to a parameter at the workflow level, that parameter does not display at the deployment level, so it cannot be overridden.

In a deployment, you can specify parameter values using static text, built-in custom fields, user-defined custom fields, and policy attributes. You will not see any output parameters from other steps on the Deployment page, however; mapping output to input parameters is only possible in the Workflow editor.

If you create a Deployment and then add parameters to your Step, any newly-created parameters appear in the Deployment parameter list and contain the default value assigned in the Step editor.

To assign parameter values at the deployment level:

1. Perform one of the following actions:
 - Click the ... **Would you like to deploy the workflow now** link at the top of the page (this is available immediately after you save a workflow).
 - Create new deployment (see [Creating a New Deployment](#)).
2. On the Targets tab, specify the following:
 - Name: Type a unique deployment name
 - Workflow: If you clicked the link in step 1, the workflow name is pre-populated. If you are creating a new deployment, select a workflow from the list.

Click **View Workflow** if you need to see the workflow for which you are creating a deployment.

- Schedule (optional): Select a deployment schedule from the drop-down list (see ["Scheduling a Deployment" on page 41](#)).

Note: On the Deployments > Parameters tab, if you select Runtime and try to save a deployment with a schedule, you cannot save until you clear the check box or unschedule the deployment.

3. Add the targets from the available pool.
4. Go to the Parameters tab.
5. For each parameter whose value you want to specify, follow these steps:

- a. Select the source of the parameter value from the drop-down list on the far right:

Inventory Files: Custom Field ▾

Optional: Comma-separated list of fully-qualified Oracle inventory files.
If this parameter is not specified, the workflow looks for the oraInst.loc file in /etc and /var/opt/oracle.

- Fixed Value
- Custom Field
- Policy Attribute
- Runtime Value

- b. If you selected Fixed Value, Custom Field, or Policy Attribute, specify the parameter value in the text box.

– If you selected Custom Field or Policy Attribute, select a custom field or policy attribute from the drop-down list.

– If you selected Fixed Value, simply type the value in the text box.

– If you selected Runtime, the text box is disabled. You will specify the parameter value at run time.

To replace all parameter values with their default values assigned at the step level, click **Restore Defaults**.

6. Click **Save**.

The Deployment page opens, and the message “Deployment saved successfully. Would you like to run the workflow now?” displays. For more information, see ["Run" on page 43](#).

Using Metadata and Policies from a Workflow Step

You can use metadata from any workflow step type by using the `${Object.Attribute}` syntax.

For example, the `${Instance.Password}` metadata variable would be replaced at run-time with the actual password for the instance on which this workflow step was executed.

For example, if the password for a given instance were password, the script

```
var password = "${Instance.Password}"
```

would be replaced with

```
var password = "password"
```

at run time.

You can also replace user-defined metadata using these conventions.

Functions

Functions are reusable pieces of code that can be included in automation steps. Any common routine or operation that multiple steps perform is a good candidate for a function. Functions can be tagged with keywords indicating the language in which they are written and the operating system with which they work.

HPE DMA now supports Python-style imports for functions. If your function has the “python” or “jython” tag, and a step attempts to import it using standard Python syntax (for example: `import oostools`), HPE DMA will now facilitate that import.

Previously, functions were “injected” into the step code just prior to step execution. This mechanism is still available so that existing automation content can be used. Python-style imports are now the preferred method for importing functions, however.

Note that HPE DMA functions can import other functions.

Searching for a Function

You can use a real-time filter to locate a function by name or by tags. Type what you are searching for in the Functions field, and the filter results will display as you type.

Viewing/Opening a Function

From the Automation > Functions page, you can view all existing functions as well as preview a function’s code.

To view or modify a particular function, select its name in the Functions list. Detailed information about that function is then displayed. The Code tab shows you the code that implements that function. The Steps and Functions tabs show you which steps and other functions, respectively, use that function.

Note: Some functions are read-only.

Creating a Function

To create a function:

1. Go to Automation > Functions.
2. Click **New function**. The General tab opens.
3. Specify a unique Name for the function.
4. *Optional:* Specify any Tags or Documentation in the appropriate areas.

When adding a new DMA python function module, you must add a tag "python" or "jython" if the module needs to import other modules. Adding the tag "python" or "jython" will ensure that the dependent function modules are downloaded and that the DMA GUI displays the dependent function modules correctly.

5. Click the **Code** tab.
6. Type or paste new code in the Code area.
7. Click **Save**.

Note: Functions must contain script code. You cannot save a function without script code.

Copying a Function

To copy a function:

1. Go to Automation > Functions.
2. Select a function.
3. Click **Copy**.
4. Type a new name for function.
5. Click **Save**.

Modifying a Function

Before you modify a function, make sure that no workflows that use this function are running. If a workflow uses a function in multiple steps, and that function is modified after the workflow starts running, the function will be different in later steps that it was in earlier steps. This is because the function is imported just prior to step execution.

To modify a function:

1. Go to Automation > Functions.
2. Select the function that you want to modify.
3. Edit the desired information.
4. Click **Save**.

Note: You cannot modify read-only functions.

Deleting a Function

Because functions are imported at run time, it is possible to delete a function that is used by steps or other functions—this would break those steps or functions. HPE DMA does not check to determine whether a function is being used before deleting it.

To delete a function:

1. Go to Automation > Functions
2. Select the function to delete.
3. Click and confirm delete.

Note: You cannot delete read-only functions.

Policies

Policies are reusable sets of attributes that can be used as parameter values in deployments. Deployments can reference policy attributes to change the automation behavior. Policies provide values for input parameters. They can contain fixed values or reference Custom Fields.

Policies enable HPE DMA to manage groups of hundreds or thousands of servers at a time without the need to configure each individual server. For example, you could create a Web Server Policy that defines what every web server in your data center looks like. This policy might contain the following attributes:

- Software List
- Root Password

- Apache User ID
- Apache User Password

The Software List attribute would be a list of software that must be installed on every web server. This might include openssl, apache, perl, etc.

Policy Attribute Types

Policies have three different types of attributes:

- Text: This is a simple text value that users can view while deploying and running automation.
- Password: This is a simple text value. However, the value is masked (obfuscated) when displayed so that users cannot see the value.
- List: This is a free-form text field that can contain comma-delimited lists of values or other large text data not suitable for a Text type attribute.

Policy Roles

When you create a policy, you can specify which users and user groups are allowed to Read or Write that policy. Read permission enables the user who is deploying a workflow to access the policy attributes when specifying parameter values. Write permission enables the user to modify the policy.

Policy Solution Packs

Certain HPE DMA solution packs include Policies. You can modify the attributes values for these Policies, but you cannot add or remove attributes. You can, however, make a copy of a solution pack Policy and then customize that copy.

Creating a New Policy

You can create and use Policies to provide values for various Deployment scenarios.

To create a new policy:

1. Go to Automation > Policies.
2. Click **New Policy**.
3. Type a unique Name for your policy.
4. In the Attributes area, perform the following actions for each attribute you want to add:
 - a. Specify a unique name (within the policy).
 - b. From the drop-down list, select this attribute's type: Text, List, or Password. See "[Policy Attribute Types](#)" on the previous page for details.
 - c. Click **Add**.
 - d. Specify the value of the attribute
 - e. *Optional*: On the Roles tab, select the Read box for any users or user groups that you want to be able to use this policy to provide parameter values in a deployment. Select the Write box for any users or groups that you want to be able to modify this policy (add or remove attributes).
5. Click **Save**.

Extracting a Policy

You can automatically create a reusable policy that provides values for all input parameters associated with a workflow. This is a convenient way to create a policy.

To extract a policy:

1. Go to Automation > Workflows.
2. Select the workflow that you want to work with.
3. Click the **Extract Policy** link at the bottom of the page.
4. Specify values for each attribute listed.
5. *Optional*: Add any new attributes that you want to use.
6. *Optional*: Remove any attributes that you do not want to use.
7. *Optional*: On the Roles tab, select the Read box for any users or user groups that you want to be able to use this policy to provide parameter values in a deployment. Select the Write box for any users or groups that you want to be able to modify this policy (add or remove attributes).
8. Click **Save**.

Determining Where a Policy Is In Use

To determine where a policy is in use:

1. Go to Automation > Policies.
2. Select a policy.
3. Click the **Deployments** tab to see where the policy is in use.

Deleting a Policy

To delete a policy:

1. Go to Automation > Policies.
2. Select a policy.
3. Click the **Deployments** tab to see where the policy is in use. You cannot delete a policy if it is being used. If the policy is being used, follow these steps for each deployment listed:
 - a. Select the deployment.
 - b. Click the **Parameters** tab.
 - c. Change any parameter values that reference this policy so that this policy is no longer referenced by the deployment.

The Delete button on the Policy page will be activated after you disassociate the policy from all deployments.

4. Click **Delete** in the lower left corner of the Policy page.

Assigning Policies to Roles

To change permissions for a policy, select (or clear) the check boxes to grant (or revoke) Read and Write access. For more information on changing permissions as an administrator, see [Permission Settings](#)

To assign a policy to a role:

1. Go to Automation > Policies.
2. In the Policies pane, click the policy that you want to view. The Attributes tab displays.

3. Click the **Roles** tab.
4. Select or clear the Read or Write check boxes as appropriate.
5. Click **Save**.

Scheduling a Deployment

HPE DMA enables you to schedule a deployment. This is useful, for example, if you want the Discovery workflow to run periodically in your environment (see "[Discovery](#)" on page 57).

You can use one of the following pre-defined schedules, or you can specify a custom schedule.

Schedule	When the Workflow Runs
None	When you click Run .
Every hour	Every hour at the top of the hour (for example: 06:00, 07:00, 08:00, and so on).
Twice a day	Every day at 11:15 and 23:15 UTC.
Once a day	Every day at 2:45 UTC.

Custom schedules are specified using standard cron expressions. For example, the following custom schedule would run the Workflow at 11:45 PM Coordinated Universal Time (UTC— also known as Greenwich Mean Time, or GMT) every Saturday:

Custom Schedule

Minutes (0-59):

Hours (0-23):

Days of month (1-31):

Months (1-12):

Weekdays (sun-sat or 0-6):

The following instructions show you how to schedule an existing deployment. You can also schedule a deployment as you create it.

To schedule a deployment:

1. Go to Automation > Deployments.
2. In the Workflows column, select the workflow associated with the deployment that you want to schedule.
3. In the Deployments column, select the deployment that you want to schedule.
4. From the Schedule drop-down menu, do one of the following things:
 - Select one of the pre-defined schedules described above.
 - Select Custom, and specify the schedule using a cron expression.
5. Click **Save**.

Deployment Considerations

Deployments with Runtime parameter values cannot be scheduled. If a Smart Group is associated with a scheduled deployment, that Smart Group will be evaluated each time that this deployment runs (see ["Smart Groups" on page 57](#)). If the schedule is removed from an existing deployment, any workflows that are running as part of a previously scheduled deployment will finish, but no new ones will start until a new schedule is set.

User Considerations

A scheduled deployment is run by the user who most recently saved that deployment. This user name is displayed on the Automation > Console and Automation > History pages.

Permissions Considerations

You must have permission to Read, Write, and Execute a deployment in order to schedule it.

In a scheduled deployment, the workflow is run by the user who most recently modified the deployment. If that user's Run permission is revoked after the deployment is scheduled, the deployment will not run—although it will continue to be scheduled, and a log message will be generated at each scheduled run time.

Timing and Concurrency Considerations

All schedules use the HPE DMA server local time zone.

When a workflow runs as part of a scheduled deployment, a separate “job” is created for each target server, instance, and database—and a separate line appears on the Console and History pages. These separate jobs run concurrently. This is the same behavior that occurs if the deployment is run manually.

If the workflow takes longer to run on a given target (server, instance, or database) than the interval between deployments, scheduled deployments for that target will be skipped. If the scheduled deployment runs the workflow on multiple targets, HPE DMA will skip only those targets where the workflow is still running.

If a scheduled deployment for a target is skipped, a job is created for that target but the workflow does not actually run. The job will show that the deployment for that target was skipped because another workflow was still running.

There is no limit on the number of scheduled deployments. Too many deployments executing simultaneously, however, can cause performance problems.

In a multiple HPE DMA server implementation, only one HPE DMA server will run the scheduled deployment—which HPE DMA server actually runs the deployment is non-deterministic.

Run

To “run” a workflow, you specify a deployment and one or more targets. If the deployment contains Runtime specified parameters, they can be entered; otherwise the previously configured parameter values will be displayed.

There are several ways that you can run a workflow:

- From within a workflow or a deployment: After you create, edit, and then save a workflow or a deployment, click the “Would you like to run the workflow now?” link.
- From the Automation > Run page.

To run a workflow from the Run page:

1. Go to Automation > Run.
2. Select a workflow, a deployment, and the target (or targets) where you want to run the workflow.

3. Provide values for any Runtime parameters.

All other parameter values will be displayed for you to review before executing the workflow. It is not possible to change non-Runtime parameter values at this time.

Any workflow with Runtime parameters cannot be scheduled (see "[Scheduling a Deployment](#)" on [page 41](#)). Workflows with Runtime parameters must be executed manually using Automation > Run.

4. Click **Run Workflow**.
5. Go to the Console or History page to view information about the workflow's progress.

Console

The Console provides a real-time view of what automation is currently running on servers in your environment. In the output area, you can see "initiated," "running," and "finished" as each step completes. Output and error messages from the running steps can be used to debug problems in the automation code.

While the workflow is running, its status indicator on the Console says RUNNING. After the workflow finishes, its status indicator changes to one of the final states listed here:

Status	Description
RUNNING	The workflow is currently executing.
SUCCESS	The workflow completed execution, and it completed with conditions that the workflow author considered to be successful. The "Success" step was the last step executed.
FAILURE	The workflow completed execution, but the conditions in which it completed constitute a failure according to the workflow author. The "Failure" step was the last step executed.
FINISHED	The workflow ran to completion, but neither success nor failure was indicated. In this case, the last step executed was neither "Success" nor "Failure."
CANCELLED	The workflow was interrupted when someone clicked the "Cancel Workflow" button. The workflow was either in the middle of or had just completed the last step listed in the Output area.
SKIPPED	This status pertains only to scheduled deployments. It

Status	Description
	indicates that the workflow was scheduled to run, but the execution was skipped. This would happen, for example, or if a previous execution of this workflow were still running on this target.
ABORTED	A connectivity problem arose between either the HPE DMA server or the SA server and one or more of the target servers.

After one minute, completed workflows are removed from the Console view—unless it has been selected to view details. All completed workflows can be found in the History view.

To view the progress of a workflow in the Console:

1. Go to Automation > Console.
2. Search for the desired workflow using the Filter box.
3. Select the workflow that you want to see. The steps appear in the left pane as they are executed.
4. Select a step in the Output area to view the progress of and output from that step in the right pane.

History

The History page provides an audit trail of who ran automation on which servers in your environment. It also provides a useful debugging tool for troubleshooting steps and workflows. Output and error messages are captured from all steps in workflows that are running or have finished running. History information for a step is added after that step is complete.

Figure: Workflow History

Workflows Steps Functions Policies Deployments Run Console History

History

History (loaded: 10 May 14:32)

	Status	Workflow	Deployment	Started	Run by	Server	Instance	Database
	All							
1	RUNNING	MS SQL - Install Standalone S	MSSQL-InstallStar	10 May 14:31	autotest	tgt2012.mycompany.com		
2	FAILURE	MS SQL - Install Standalone S	MSSQL-InstallStar	10 May 14:35	autotest	tgt2012.mycompany.com		
3	FAILURE	_Configure Sybase ASE 15 S	ConfSybASE15	10 May 13:10	autotest	tgt2019.mycompany.com	NY_DS	
4	SUCCESS	Provision Oracle RAC 11.2 CF	ProvOrclRAC11.2	10 May 12:10	autotest	tgt1042.mycompany.com		
5	SKIPPED	Run Oracle Compliance Audit	RunOrclCompAud	10 May 12:10	autotest	tgt4711.mycompany.com	orcl01	
6	SUCCESS	Provision an Oracle Database	ProvOrclDB	10 May 12:20	autotest	tgt2552.mycompany.com	orcl07	
7	SUCCESS	Provision Oracle Software	ProvOrclSoftware	10 May 12:15	autotest	tgt2552.mycompany.com		
8	SUCCESS	Provision Oracle RAC 11.2 CF	ProvOrclRAC11.2	10 May 12:10	autotest	tgt2552.mycompany.com		
9	SUCCESS	Provision an Oracle Database	ProvOrclDB	10 May 12:15	autotest	tgt3125.mycompany.com	orcl29	
10	SUCCESS	Provision Oracle Software	ProvOrclSoftware	10 May 12:10	autotest	tgt3125.mycompany.com		

Page 1 of 11 View 1 - 10 of 110

Step Output Step Errors Step Header Connector Output Connector Errors

MS SQL - Parameters - Install Standalone
 10 May 14:35 - 10 May 14:36 Exit: 2 Server: tgt2012.mycompany.com

Check If Download File Exists
 10 May 14:36 - 10 May 14:37 Exit: 2 Server: tgt2012.mycompany.com
 [INFO]: Local file (C:\temp\SQL_Install\SQL08R2-Enterprise1.zip) does not exist
 [INFO]: Will download (SQL08R2-Enterprise1.zip) from repository
 [INFO]: File(s) not found on locally on target server, it will be downloaded from software repository

Download Software
 10 May 14:37 - 10 May 14:39 Exit: 0 Server: tgt2012.mycompany.com
 Starting Download Software
 Searching for SQL08R2-Enterprise1.zip ... DONE (unit_id = 30830001).
 Downloading SQL08R2-Enterprise1.zip ... DONE.

Unzip Archive
 10 May 14:39 - 10 May 14:42 Exit: 0 Server: tgt2012.mycompany.com
 Extracting C:\temp\SQL_Install\SQL08R2-Enterprise1.zip to C:\temp\SQL_Install

Delete File
 10 May 14:42 - 10 May 14:42 Exit: 0 Server: tgt2012.mycompany.com
 Starting Delete File
 Delete file C:\temp\SQL_Install\SQL08R2-Enterprise1.zip

To view information about the execution history of a specific workflow, select that workflow in the table. The information appears in the tabs below the table.

History Page Tabs

The tabs in the lower portion of the History page contain detailed information about the workflow execution selected in the table.

Tab Name	Information Displayed
Step Output	This tab lists each step that has been executed, its exit code, and any informational messages that it has generated. If this tab says “No Steps have started running,” this means that the workflow has started but no steps have been executed.
Step Errors	This tab shows you any errors that occurred during the workflow execution.
Step Header	This tab is only applicable for Script steps, where it displays data using the <code>steplog.print_header</code> function.
Connector Output	This tab displays information about the interaction between HPE DMA and HP Server Automation. It also displays output (stdout) from the HPE DMA client on the target server.
Connector Errors	This tab shows you any errors that occur in the interaction between HPE DMA and HP Server Automation. It also displays errors (stderr) from the HPE DMA client on the target server.

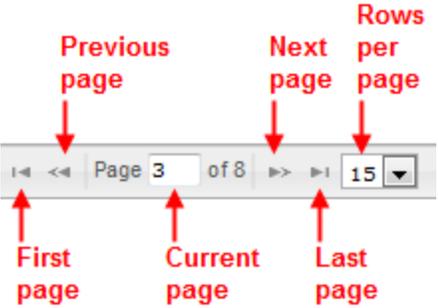
Customizing the History Table

You can modify the presentation of the History table as well as the information displayed in it. Any changes that you make to the History table persist when you leave the History page and are re-applied when you return.

How to Modify the History Table

Objective	How To
Resize a column.	Drag the column border to the left or right.
Reorder the columns.	Drag the column heading to the left or right.

How to Modify the History Table, continued

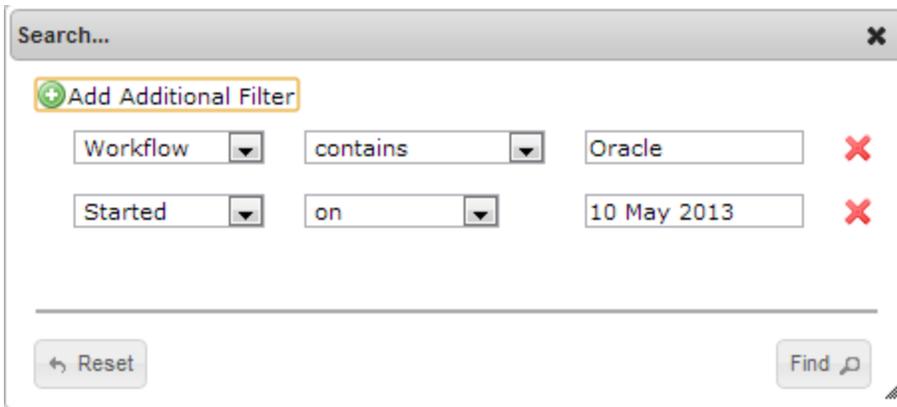
Objective	How To
Collapse the entire table.	Click  in the upper right corner of the table.
Sort the table rows.	<p>Click the heading of the column by which you want to sort. To toggle the sort, click the column heading again.</p> <p>The arrows show you which column the table is currently sorted by and the direction of the sort.</p>
Reload the table contents.	Click  in the lower left corner of the table.
Export the contents of the table to a CSV file.	Click  above the upper right corner of the table.
Change the number of rows displayed.	<p>Use the paging controls under the table to set the number of rows displayed per page and view specific pages:</p> 
Filter the table.	<p>To filter by Status, select a status from the drop-down menu.</p> <p>To filter by the date on which the workflow execution Started, click the box containing the date, and select a date from the calendar.</p> <p>To filter by any other column, type a string in the text box above that column.</p>
Clear all filter criteria and any column size or order adjustments.	Click the  in the lower left corner of the table.
Configure filter criteria.	Click the  in the lower left corner of the table.

How to Modify the History Table, continued

Objective	How To
	This opens the Search dialog.

The Search dialog enables you to precisely configure the filter criteria for the History table.

Figure: Filter Criteria Settings



Use the Search dialog to configure your search criteria.

How to Modify the Filter Criteria

Objective	How To
Add a new filter criterion.	Click the  in the upper left corner.
Remove an existing filter criterion.	Click the  to the right of that criterion.
Apply any changes that you have made to the filter criteria, and close the dialog.	Click Find .
Close the dialog without making changes to the filter criteria.	Click Reset , and then click Find .
Remove all filter criteria.	Click Reset , and then click the  in the upper right corner of the dialog.

Environment

This section contains the following topics:

- ["Dashboard" on the next page](#)
- ["Smart Groups" on page 57](#)

- ["Discovery" on page 57](#)
- ["Custom Fields" on page 64](#)
- ["Roles" on page 67](#)
- ["DMA Client Files Policy" on page 67](#)

Dashboard

The Environment > Dashboard presents a list of the objects that HPE DMA can currently use in automation. Environments contain the following hierarchy of objects:

- ["Organizations" below](#)
- ["Servers" on the next page](#)
- ["Instances" on page 53](#)
- ["Databases" on page 55](#)

The operations available for each object are explained in this section.

Organizations

An Organization is a logical grouping of servers. You can use organizations to separate dev/ stage/prod resources or to separate logical business units.

Because user security for running workflows is defined at the organization level, organizations should be broken into units with user security in mind. You can specify which organizations a user can run workflows against. See [Roles, Capabilities, and Permissions](#) for more information.

Navigating through the Organization Browser

The Environment page contains two parts: the organization browser is on the top, and the object editor is on the bottom.

To open the object editor, select an object in the organization browser. There you will be able to view specific properties for that object. If you have the necessary permissions, you will also be able to modify values and add additional objects to the object hierarchy.

Creating an Organization

The Default organization is built in to the software. All other organizations must be explicitly created.

Note: You must have Administrator capability in order to create an organization, delete an organization, or modify permissions for an organization.

To create an organization:

1. Go to Environment > Dashboard.
2. Click **New Organization**. The Properties tab displays.
3. Specify a unique Name for the organization.
4. Add the servers, instances, and databases that you want the organization to include.

Deleting an Organization

Before you can delete an organization, you must delete any server objects that it contains. An organization must be empty before it can be deleted.

To delete an organization:

1. Go to Environment > Dashboard.
2. In the organization browser, select the organization that you want to delete.
3. Click **Delete**, and confirm.

Servers

The next object in the Environment hierarchy is the server.

Servers cannot be used as HPE DMA targets until you add them to an organization.

All SA managed servers that have the DMA Client Files software policy are available to add (see "[DMA Client Files Policy](#)" on page 67). The easiest way to ensure that servers have this policy is to use the Application Deployment feature in SA to attach and remediate it (see "Using HPE DMA with Application Deployment" in the *SA User Guide: Application Deployment Manager*).

Note: The Viewing Server Information topic contains explicit instructions for navigating to the server in the organization browser. The subsequent topics assume that the server is visible.

Viewing Server Information

To view server information:

1. Go to Environment > Dashboard.
2. In the organization browser, select the organization to which the server belongs.
The list of servers that belong to that organization appears in the organization browser.
3. Select the server that you want to view.

This opens the server editor. The editor contains several tabs that separate the server properties into logical groupings.

Adding a Server to an Organization

To add a server to an organization:

1. In the organization browser, select the organization to which the server will belong.
2. Click **Add servers**.

The “Add servers to organizations” dialog opens. It contains a list of the SA managed servers that have the DMA Client Files policy (see ["DMA Client Files Policy" on page 67](#)) and are not already included in an organization.

You can use the Search filter to reduce the number of servers listed. The first 500 SA managed servers whose names contain the string specified in the Search box are listed. To filter the list of servers, specify text in this box, and then click **Search**.

Note that the SA host name for each available server is displayed in this dialog.

3. Select the server (or servers) that you want to add.
4. Click **Add**. The “Add servers to organizations” dialog closes.
5. Click **Save**.

Deleting a Server

Deleting a server deletes all instance and database objects associated with that server. It also deletes any deployments that reference this server.

To delete a server object:

1. In the organization browser, select the organization to which the server belongs.
2. Select the server name. The server editor opens.
3. Click **Delete**, and confirm.

Instances

The next object in the Environment hierarchy is the instance. A server is allowed to host multiple instances, but this is rarely done. An instance can be associated with multiple servers, as is the case with Oracle Real Application Clusters (RAC).

Note: The Viewing Instance Information topic contains explicit instructions for navigating to the instance in the organization browser. The subsequent topics assume that the instance is visible.

Viewing Instance Information

To view instance information:

1. Go to Environment > Dashboard.
2. In the organization browser, select the organization to which the server belongs.
The list of servers that belong to that organization appears in the organization browser.
3. Select the server that hosts this instance.
The list of instances hosted by this server appears in the organization browser.
4. Select the instance that you want to view.
This opens the instance editor. The editor contains several tabs that separate the instance properties into logical groupings.

Creating a New Instance

You can add new instances from the server editor. Instances are not available as targets until you create them manually or discover them automatically (see ["Discovery" on page 57](#)).

To create a new instance object:

1. In the organization browser, select the pertinent server name. The server editor opens.
2. Click **New instance**.
3. Edit the instance properties.
 - General
 - Name: This is a required property.
 - Type: Type of database instance (for example: Oracle, DB2, or SQL Server).
 - ASM: Only for Oracle instances. Select ASM (Automatic Storage Manager) if the Instance maintains its own file system.
 - Connection
 - User
 - Password
 - Host
 - Port
 - Domain (for Windows authentication)
 - Servers
 - Databases
4. Click **Save**.

Associating a Server with an Instance

If more than one server is associated with an instance—such as in an Oracle RAC configuration—you can add that server by using the instance editor.

The server must already be present in the organization. The ADD SERVER link simply associates the server with this instance. You cannot add a new server to the organization by using this button.

To associate an additional server with an instance:

1. In the organization browser, select the instance name. The instance editor opens.
2. In the Servers box, click the **ADD SERVER** link. The Add Servers dialog opens.
3. Select the server (or servers) that you want to add.

4. Click **Add**. The Add Servers dialog closes.
5. Click **Save**.

Deleting an Instance

Deleting an instance also deletes any database objects associated with that instance. It also deletes any deployments that reference this instance.

To delete an instance object:

1. In the organization browser, select the instance name. The instance editor opens.
2. Click **Delete** and confirm.

Databases

The final object in the environment hierarchy is the database. A database is typically associated with a single instance. Depending on its type, however, an instance may be associated with multiple databases.

Note: The "[Viewing Database Information](#)" topic contains explicit instructions for navigating to the database in the organization browser. The subsequent topics assume that the database is visible.

Viewing Database Information

To view database information:

1. Go to Environment > Dashboard.
2. In the organization browser, select the organization to which the pertinent server belongs.
The list of servers that belong to that organization appears in the organization browser.
3. Select the server that hosts this instance.
The list of instances hosted by this server appears in the organization browser.
4. Select the instance with which this database is associated.
The list of databases associated with this instance appears in the organization browser.
5. Select the database that you want to view.

This opens the database editor. The editor contains several tabs that separate the database properties into logical groupings.

Creating a New Database

Databases are not available as targets until you create them manually or discover them automatically (see ["Discovery" on the next page](#)).

To create a new database object:

1. In the organization browser, select the instance with which you want to work.
2. To create a new database object for this instance, click **New database**.
3. In the database editor, specify the Name of the new database.
4. Click **Save**.

Associating an Existing Database Object with an Instance

To associate an existing database object with an instance:

1. In the organization browser, select the instance that you want to work with.
The instance editor opens.
2. Click the **ADD DATABASE** link. The "Add Database" dialog opens.
3. Select the database (or databases) that you want to add.
4. Click **Add**. The "Add Databases" dialog closes.
5. Click **Save**.

Deleting a Database

Deleting a database object also deletes any deployments that reference that database.

To delete a database object:

1. In the organization browser, select the database that you want to delete.
2. Click **Delete**, and confirm.

Smart Groups

Smart Groups are dynamic groups of servers, instances, or databases defined by some criteria. As information about the object changes, its membership in the groups is re-evaluated. For example, if a server has a Custom Field called `sshd_running` set to true, it may belong to an SSH Group of servers. When `sshd_running` for this server turns false, it is no longer in the SSH Group.

Grouping servers by dynamic criteria is useful for automation. A deployment can contain a list of static servers that the workflow can run on as well as a list of Smart Groups. Deploying a workflow to the SSH Group allows the flow to run only on servers with ssh enabled. You do not need to update the deployment each time sshd is started and stopped. The Smart Group takes care of that for you.

Each Smart Group is assigned to a role for Role-Based Access Control. A user can only create Smart Groups for roles assigned to that user. The role acts as the master server list on which the Smart Group will filter. The role must give the user both Read and Deploy permission on an organization for that organization's servers to be used in the Smart Group.

The Deployments tab on the Smart Group page tells you which deployments are currently using a particular Smart Group.

Discovery

HPE DMA provides special Discovery workflows that you can use to automatically discover instances, databases, and middleware residing on your managed servers. You can run the Discovery workflows manually, or you can set up scheduled deployments to run them periodically.

Authentication Settings

There are four authentication settings that you must specify before you can successfully run the Discovery workflows:

Name	Required	Default	Description
Trust SSL Certificates	No	No default	Deprecated: no longer uses this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the web server. now uses the <code>com.hp.dma.conn</code> .

Name	Required	Default	Description
			trustAllCertificates parameter in the dma.xml file.
Web Service User	Yes	User selected	The user who will run the Discovery workflow. This user must be capable of modifying the managed environment through the Discovery web service API.
Web Service Password	Yes	User selected	The password for the user who will run the Discovery workflow.
Web Service URL	Yes	User selected	URL for the Discovery web service API. For example: https://DMA01.mycompany.com:8443/dma

You can specify these settings two different ways:

- Define an HPE DMA policy that specifies these settings, and then reference that policy in your deployment. This is the recommended approach.
- Specify explicit parameter values in your deployment. This method is not recommended for production environments.

Instructions for specifying the authentication settings are provided in the four Discovery Process steps.

Discovery Workflow Updates

The Discovery workflows are provided with your HPE DMA software in the form of the HPE DMA Discovery Solution Pack. Your HPE DMA support agreement enables you to download updates to this solution pack free of charge. Be sure to check with HPE periodically to ensure that you have the latest version.

Note: The following instructions apply only to an update. Do not attempt to import the same version of the Discovery solution pack that you already have. This will cause an error.

To update the Discovery solution pack:

1. Download the zip file containing the HPE DMA Discovery Solution Pack.
If the solution pack is packaged in a zipped folder, first unzip the folder and extract its contents.
2. Open the HPE DMA UI (see ["Accessing HPE DMA" on page 7](#)).

3. On the Solutions > Installed tab, click the **Browse** button in the lower right corner. The Choose File dialog opens.
4. Browse to and select the ZIP file that you downloaded, and click **Open**.
5. Click **Import solution pack**.

For more information about importing solution packs, see ["Solutions" on page 68](#).

Discovery Process

There are four steps required to run the Discovery workflow:

- ["Creating a Deployable Workflow" below](#)
- ["Creating a Discovery Deployment" on page 61](#)
- ["Running the Workflow" on page 62](#)
- ["Viewing the Results" on page 63](#)

Basic instructions for each step are provided here. For more detailed information, see ["Workflows" on page 9](#).

Creating a Deployable Workflow

The workflow template provided by HP in your solution pack cannot be deployed. To use it, you must first create your own copy.

To create a deployable copy of the workflow template:

1. Go to the Automation > Workflows area.
2. From the list of workflows, select one of the Discovery workflow templates.
3. Click the **Copy** button in the lower left corner.
4. On the Documentation tab, specify the following:
 - Name – Name that will appear in the list of available workflows.
 - Tags – Keywords that you can use later to search for this workflow (optional).
 - Target level – Must be Server.
5. On the Roles tab, grant Read permission to the groups whom you want to be able to view this

workflow. Also grant Write permission to the groups who will be able to modify your copy of the workflow.

Only those groups who have Login Access permission will be displayed on the Roles tab. By default, full permissions are granted to all groups to which you—the creator of this copy of the workflow—belong.

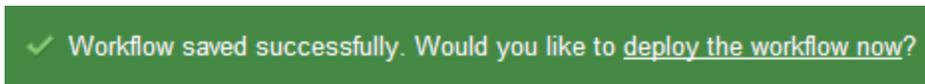
6. Make sure that **User selected** is specified for each parameter (this is the default):

Step	Name	Required Result	Next
▼ 1	Discover Databases		2, 3
	Trust SSL Certificates:	- User selected -	▼ ⓘ
	Web Service Password:	- User selected -	▼ ⓘ
	Web Service URL:	- User selected -	▼ ⓘ
	Web Service User:	- User selected -	▼ ⓘ

You will specify the authentication settings when you create the deployment.

7. Click the **Save** button (located in the lower right corner).

Your new workflow now appears in the list of available workflows, and the following message is displayed:



8. Click the **deploy the workflow now** link in the green message area.

For more information about creating and working with workflows, see "[Workflows](#)" on page 9.

Using a Policy to Specify the Authentication Settings

Instead of explicitly specifying the Discovery authentication settings in the deployment, you can use a policy to supply this information. This approach can be advantageous, because the policy can then be used in any deployment.

To create a policy to provide authentication settings:

1. Go to the Automation > Policies page.
2. From the list of policies, select the Discovery policy.
3. In the Web Service Password box, type your password. The characters are obfuscated.

4. In the Web Service URL box, type the following:

```
https://<DMAServer>:8443/dma
```

where <DMAServer> is the fully qualified host name or IP address of your HPE DMA server.

5. In the Web Service User box, type your user name.
6. Go to the Roles tab.
7. Grant Read and Write permission to any additional roles who will be using this policy.
By default, any groups that you belong to will have Read and Write permission.
8. Click the **Save** button (lower right corner).

Note: When you create your Discovery deployment, be sure to use this policy to specify values for each of the authentication parameters. See "[Creating a Discovery Deployment](#)".

Creating a Discovery Deployment

Before you can run your new workflow, you must create a deployment. A deployment associates a workflow with one or more specific HPE DMA targets (in this case, servers).

To create a Discovery deployment:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your copy of the workflow template—follow these steps:
 - a. Go to the Automation > Deployments area.
 - b. In the lower right corner, click **New Deployment**.
2. Specify the following:
 - o Name – Name that will appear in the list of available deployments.
 - o Workflow – The workflow that you just created.
 - o Schedule – Frequency with which the workflow will run. If you select None, the workflow will run only once when you explicitly tell it to run. See "[Scheduling a Deployment](#)" on page 41 for more information.
3. From the list of AVAILABLE Smart Groups on the left side of the Targets area, add the Smart Groups where the workflow will run. Any Smart Groups that you add appear in the SELECTED list on the right side.

For information about composing Smart Groups, see "[Smart Groups](#)" on page 57.

You can also add organizations or servers instead of Smart Groups. If you add individual servers, however, you will then have to update this deployment whenever new servers are added to the environment. If you use a properly configured Smart Group, new servers will be automatically added to your scheduled deployments when they are added to HPE DMA.

4. Go to the Parameters tab.
5. Specify the authentication parameters.

If you defined an authentication policy (see ["Using a Policy to Specify the Authentication Settings" on page 60](#)), specify the values from that policy:

Web Service Password:
Required: Password for the discovery web service API.

Web Service URL:
Required: URL for the discovery web service API.

Web Service User:
Required: User capable of modifying the managed environment through the discovery web service API.

Type the first few characters of the name of the policy (in this case, Discovery) in each text box, and a list of choices appears. You can also type a dot "." to get a list of all available policy attributes. Select the appropriate item for each parameter.

If you did not define an authentication policy, you can type in explicit values here.

6. Click **Save**.

Your new deployment now appears in the list of available workflows, and the following message is displayed:

✓ Workflow saved successfully. Would you like to [deploy the workflow now?](#)

7. Click the **deploy the workflow now** link in the green message area.

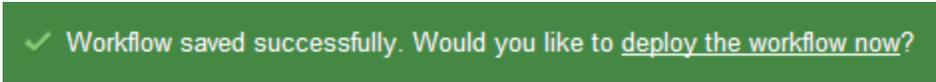
Running the Workflow

Now you are ready to run your Discovery workflow against the targets that you selected.

To run a Discovery workflow:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your deployment—follow these steps:
 - a. Go to the Automation > Run area.
 - b. In the list of WORKFLOWS on the left side, select the workflow that you created.
 - c. In the list of DEPLOYMENTS in the center, select the deployment that you just created.
2. In the list of targets on the left side, select the check box for each target where you want to run the Workflow.
3. Click the **Run Workflow** button in the lower right corner.

The following message is displayed.



✓ Workflow saved successfully. Would you like to [deploy the workflow now?](#)

To view the progress of your deployment, click the console link in the green message area.

Viewing the Results

While your workflow is running, you can watch its progress on the Console page.

To view the progress of the workflow as the deployment proceeds, click the workflow name in the upper box on the Console page.

To view the outcome of a specific step, select that step in the left box in the Output area. Informational messages are displayed in the right box, and the values of any output parameters are listed.

While the workflow is running, its status indicator on the Console says RUNNING. After the workflow finishes, its status indicator changes to one of the final states listed in "[Console](#)" on page 44.

To view step-by-step results, select the row in the table that corresponds to your deployment. The tabs below the table show you information about each step in the workflow. This includes the start and end time for each step, the exit code, and the following information:

- Output tab – any informational messages that were produced
- Errors tab – any errors that were reported
- Header tab – values assigned to any output parameters

After the workflow runs, you can view a summary on the History page (see "[History](#)" on page 45). This page lists all the workflows that have run on this server during the time period specified in the Filter box.

Confirm the Discovery

You can view the results of the Discovery workflow on the Environment page.

To view the instances and databases detected on a specific server:

1. In the organization browser, select the organization to which the server belongs.
2. Select the server. Any instances detected are listed in the next column.
3. Select an instance. Any databases detected are listed in the right-most column.

Custom Fields

Custom Fields are primarily used to customize workflows or show information about the environment. Custom Fields can be used in workflow steps to automatically apply values that are specific to an organization, server, instance, or database. For example, you can have a Custom Field that identifies a database as “Production” or “Test” and then use this field in workflows to choose between different behavior for the different types of databases.

Note: When you define a Custom Field for any item in the environment (organization, server, instance, or database), all other items of that type will also have that Custom Field. For example, if you create a Custom Field called Oracle Home for an instance target, all instance targets will have a Custom Field called Oracle Home—whether or not they actually represent Oracle instances. Except for the original item, the Custom Field will be blank (it will not have a value). Blank Custom Fields have no effect.

Viewing Custom Fields

From the Environment > Custom Fields page, you can view all existing Custom Fields that are defined in your HPE DMA environment. You can view the Custom Fields that are associated with a particular organization, server, instance, or database when you view that object in the Environment browser. Custom Field values are assigned at the individual object level (see ["Assigning Values to Custom Fields" on page 66](#)).

The Usage tab shows you which workflows, steps, deployments, and Smart Groups use a particular Custom Field.

The **Show empty values** check box enables you to show or hide Custom Fields that have no values.

Searching for Custom Fields

You can perform a real-time filter on any Custom Field. Type what you are searching for in the **Custom Fields** box, and see the filter results display as you type.

Creating Custom Fields

To create a custom field:

1. Go to Environment > Custom Fields.
2. Click **New field**.
3. Specify the following information on the Attributes tab:
 - Name: A unique name for this Custom Field.
 - Object: Organization, Server, Instance, or Database.
 - Type: Text, Multi-line text, List, or Password.
 - Options: Only available if the Custom Field is of type List.
 - Use the “Add option”  button to add options.
 - Use the “Delete option”  button to delete options.
4. To define the Custom Field you just created, see ["Assigning Values to Custom Fields" on the next page](#).
5. Click **Save**.

Editing Custom Fields

To edit custom fields:

1. Go to Environment > Custom Fields.
2. Click the Custom Field you want to edit.
3. Modify the following information on the Attributes tab:
 - Name
 - Object: Cannot be changed for existing Custom Fields as changing this state could result in

broken automation.

- Type: Cannot be changed for existing Custom Fields as changing this state could result in broken automation.
- Options: Only available if the Custom Field is of type List.
 - Use the “Add option” button  to add options.
 - Use the “Delete option” button  to delete options.

Options can be reordered with drag-and-drop.

4. Click **Save**.

Assigning Values to Custom Fields

To assign values to custom fields:

1. Go to Environment > Dashboard.
2. Select the object (organization, server, instance, or database) whose Custom Fields you want to work with.
3. Click the **Custom Fields** tab.
4. Select the **Show empty values** box to view all the Custom Fields, including those that do not yet have values.
5. Specify the values in the Custom Field boxes.

Note that Password type Custom Field values are always masked in the HPE DMA user interface.

6. Click **Save**.

Removing Custom Fields

You cannot delete a Custom Field that is in use. You must first remove any references to a Custom Field before you can delete it.

To delete a Custom Field:

1. Go to Environment > Custom Fields.
2. Select the Custom Field that you want to delete.
3. Click **Delete**, and confirm.

Roles

Roles based access can be assigned to organizations by the HPE DMA administrator.

- If you have Read permission for an organization, you can see the servers, instances, and databases in that organization.
- If you have Execute permission for an organization, you can run workflows in that organization.
- If you have Write permission for an Organization, you can modify the properties of the organization and the servers, instances, and databases that it contains.

From the Roles tab, you can view the permissions for a specific organization. If you have Administrator capability, you can assign access permissions to specific users or user groups for any Organization except Default. See [Permission Settings](#) for more information.

To view the role-based permissions granted for an Organization:

1. Go to Environment > Dashboard.
2. Select the Organization whose role-based access permissions you want to see.
3. Click the **Roles** tab.

DMA Client Files Policy

Note: The policy discussed in this section is an HP Server Automation (SA) software policy, not an HPE DMA automation policy.

Before you can run an HPE DMA workflow on an SA managed server, that server must have a special SA software policy called **DMA Client Files**. This policy installs the files and software needed for HPE DMA workflow execution.

See the *HPE DMA Installation Guide* to learn how to add this policy to the SA Library.

Supported Platforms

The DMA Client Files policy runs on the platforms listed the *HPE DMA Release Notes*.

Policy Updates

If the DMA Client Files policy is updated, be sure that your SA administrator remediates your target servers against that policy. This will ensure that all servers have the latest policy updates.

For more information, see “Remediating Servers with Software Policies” in the *SA User Guide: Software Management*.

Servers and Organizations

Only those SA-managed servers that have the DMA Client Files policy (attached and remediated) are available to add to HPE DMA organizations.

If you detach the DMA Client Files policy and then attempt to run a workflow from HPE DMA, the workflow will fail. HPE DMA does not re-attach the policy.

Solutions

A solution pack is a set of HPE DMA workflows, steps, functions, and policies that address a specific process or problem. Solution packs are imported into HPE DMA and can be deployed in five to ten minutes. Each solution pack contains the following items:

- Workflow templates for commonly-recurring IT administration tasks
- Workflow steps to provide an automation library
- Functions that implement step actions
- Policies that define desired automation behavior
- Documentation that defines best practices followed in the workflow templates

For information about available solution packs, contact your HPE Software sales representative.

Installed Page

You can view all installed solution packs from the Solutions > Installed page.

History Page

You can view a recursive history of solution pack activity on the Solutions > History page, as shown below.

Solution Pack Install/Upgrade History		Filter <input type="text"/>			
Solution Pack	Operation	Version	User	Date	
HP DMA Promote Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Discovery Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Application Server Release Management Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Application Server Provisioning Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Application Server Patching Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Application Server Configuration Management Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Database Release Management Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Database Refresh Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Database Provisioning Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Database Patching Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Database Compliance Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Advanced Database Provisioning Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	
HP DMA Advanced Database Patching Solution Pack	Upgrade	10.30.000.000	dma_initial_admin	07 Apr, 2015	

Searching for a Solution

You can perform a real-time filter on any solution pack name or version. Type what you are searching for in the filter box, and see the filter results display as you type.

Viewing a Solution

The HPE DMA Solutions page enables you to view the contents of a solution pack. From the Installed tab, you can view all the solution packs that your company already owns, as well as detailed information about each item contained and used within each solution pack.

To view a solution:

1. In the Solutions pane, point to the solution pack name. As you point to the solution pack, the following information is displayed in the Details pane:

- Name
 - Version
 - Targets
 - Installed
 - Description
2. Select the solution that you want to view.

Click through the following tabs to view the selected Solution's components, associations, and implementation details:

- General tab: Provides solution pack description, active version, and associated usage notes.
- Policies tab: Displays the policies associated with the solution. See ["Policies" on page 37](#).
- Workflows tab: Displays the workflows associated with the solution. See ["Workflows" on page 9](#)
- Steps tab: Displays the steps associated with the solution. See ["Steps" on page 19](#).
- Reports tab: Displays the reports associated with the solution (if any reports are available).

Installing a Solution

Only HPE DMA users with Administrator capability can install, roll back, or delete a solution pack. See the *HPE DMA Administrator Guide* for details.

Promote Solution

The Promote solution enables you to promote (copy) a customized workflow and all related items from one HPE DMA server (the source) to another HPE DMA server (the destination) in a reliable and replicable manner. This is useful, for example, when you want to move a workflow from a development environment to a test environment or from a test environment to a production environment.

This section contains the following information:

["Why Promote"](#)

["What is Promoted"](#)

["Basic Principles of the Promote Solution"](#)

["What the Promote Solution Contains"](#)

["What the Promote Solution Does"](#)

["HPE DMA Environment Descriptions"](#)

["Promote Scenarios"](#)

["Best Practices for Using the Promote Solution"](#)

["Purpose of the Target Server"](#)

["Supported Products and Platforms"](#)

["Promote Solution FAQs"](#)

Why Promote

Prior to the Promote solution, the only way to move workflows between two environments was to manually export and import each workflow. This mechanism only moved the workflow and its constituent steps. Permissions, policies, deployments, functions, Smart Groups, and Custom Fields had to be recreated manually in the new environment. This process was difficult, time-consuming, and error prone. In addition, there was no way to know whether the workflow in the destination environment matched the workflow that was tested in the source environment.

The Promote solution automates the process of moving a workflow and all related items from a development environment to a test environment or a test environment to a production environment. It minimizes the number of manual steps required and ensures that any workflow that you copy to the production environment will precisely match the workflow that was tested in the test environment.

This solution enables you to do the following things:

- Develop a workflow in a safe and self-contained "sandbox" environment, and then move that workflow to your test environment in a simple, automated, and repeatable manner.
- Test a workflow in a safe and self-contained test environment, and then move that workflow to your production environment in a simple, automated, and repeatable manner.
- Move everything related to a workflow, including steps, functions, deployments, policies, permissions, Smart Groups, and Custom Fields.
- Use a revision control tool (such as SVN or CVS) to version your workflows and keep them under change control.

- Preview the results of a potential promotion before committing changes in the destination environment.
- Compare your versioned workflow to the workflow in your production environment.

What is Promoted

The Promote workflows promote the following automation items from the source HPE DMA server to the destination HPE DMA server:

Item	What is Promoted								
Locked Objects	<p>The Promote workflows handle workflows (and other automation items) that are locked as follows:</p> <p>Note: The solution pack that contains the workflow (and other automation items) must be installed on the source server and the destination server.</p> <table border="0"> <thead> <tr> <th data-bbox="431 709 557 737">Condition</th> <th data-bbox="889 709 976 737">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 764 862 863">A locked workflow or automation item on the source server does not exist (or is unlocked) on the destination server.</td> <td data-bbox="889 764 1338 831">The Promote workflows will give an appropriate error message and then fail.</td> </tr> <tr> <td data-bbox="431 890 862 1020">A locked workflow or automation item on the source server matches the same locked item on the destination server.</td> <td data-bbox="889 890 1328 957">The Promote workflows do not need to promote it.</td> </tr> <tr> <td data-bbox="431 1047 862 1178">A locked workflow or automation item on the source server does <u>not</u> match the same locked item on the destination server.</td> <td data-bbox="889 1047 1338 1115">The Promote workflows will give an appropriate error message and then fail.</td> </tr> </tbody> </table>	Condition	Result	A locked workflow or automation item on the source server does not exist (or is unlocked) on the destination server.	The Promote workflows will give an appropriate error message and then fail.	A locked workflow or automation item on the source server matches the same locked item on the destination server.	The Promote workflows do not need to promote it.	A locked workflow or automation item on the source server does <u>not</u> match the same locked item on the destination server.	The Promote workflows will give an appropriate error message and then fail.
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A locked workflow or automation item on the source server does <u>not</u> match the same locked item on the destination server.	The Promote workflows will give an appropriate error message and then fail.								
Workflow	<p>The Promote workflows promote a single workflow that you specify by name from the source server to the destination server.</p> <p>Note: The solution pack that contains the workflow must exist on the source server and the destination server.</p> <table border="0"> <thead> <tr> <th data-bbox="431 1423 557 1451">Condition</th> <th data-bbox="889 1423 976 1451">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 1478 797 1545">A workflow with the same name exists on the destination server.</td> <td data-bbox="889 1478 1292 1545">The Promote workflows will always overwrite it.</td> </tr> <tr> <td data-bbox="431 1572 829 1640">The workflow does not exist on the destination server.</td> <td data-bbox="889 1572 1292 1640">The Promote workflows will always create it.</td> </tr> </tbody> </table>	Condition	Result	A workflow with the same name exists on the destination server.	The Promote workflows will always overwrite it.	The workflow does not exist on the destination server.	The Promote workflows will always create it.		
Condition	Result								
A workflow with the same name exists on the destination server.	The Promote workflows will always overwrite it.								
The workflow does not exist on the destination server.	The Promote workflows will always create it.								
Steps	<p>All steps included in the specified workflow are promoted.</p> <table border="0"> <thead> <tr> <th data-bbox="431 1738 557 1766">Condition</th> <th data-bbox="889 1738 976 1766">Result</th> </tr> </thead> </table>	Condition	Result						
Condition	Result								

Item	What is Promoted													
	<p>A step with the same name exists on the destination server.</p> <p>The step does not exist on the destination server.</p>	<p>If the step type (for example: script, email, or timer) on the source server matches the type on the destination server, the Promote workflows will always overwrite the step.</p> <p>If the step type does not match, the Promote workflows will give an appropriate error message and then fail.</p> <p>The Promote workflows will always create it.</p>												
Functions	<p>All functions imported by the steps included in the specified workflow are promoted.</p> <table border="0" data-bbox="407 779 1393 1020"> <thead> <tr> <th data-bbox="407 779 878 831">Condition</th> <th data-bbox="878 779 1393 831">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="407 831 878 915">A function with the same name exists on the destination server.</td> <td data-bbox="878 831 1393 915">The Promote workflows will always overwrite it.</td> </tr> <tr> <td data-bbox="407 915 878 1020">The function does not exist on the destination server.</td> <td data-bbox="878 915 1393 1020">The Promote workflows will always create it.</td> </tr> </tbody> </table>		Condition	Result	A function with the same name exists on the destination server.	The Promote workflows will always overwrite it.	The function does not exist on the destination server.	The Promote workflows will always create it.						
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The function does not exist on the destination server.	The Promote workflows will always create it.													
Deployments	<p>The deployments associated with the specified workflow are promoted. You can use the Filter Deployments parameter to specify ALL, NONE, or INCLUDE/EXCLUDE to filter which deployments should be promoted.</p> <table border="0" data-bbox="407 1157 1393 1837"> <thead> <tr> <th data-bbox="407 1157 878 1209">Condition</th> <th data-bbox="878 1157 1393 1209">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="407 1209 878 1293">A deployment with the same name exists on the destination server.</td> <td data-bbox="878 1209 1393 1293">The Promote workflows will always overwrite it.</td> </tr> <tr> <td data-bbox="407 1293 878 1377">The deployment does not exist on the destination server.</td> <td data-bbox="878 1293 1393 1377">The Promote workflows will always create it.</td> </tr> <tr> <td data-bbox="407 1377 878 1503">A deployment parameter of Password Type already exists on the destination server.</td> <td data-bbox="878 1377 1393 1503">The Promote workflows will preserve the password value.</td> </tr> <tr> <td data-bbox="407 1503 878 1713">A deployment parameter of Password Type does not exist on the destination server.</td> <td data-bbox="878 1503 1393 1713">For security reasons, the Promote workflows will promote the parameter name but leave the password value blank. The password value must be manually configured on the destination server.</td> </tr> <tr> <td data-bbox="407 1713 878 1837">A deployment parameter of a non-password type already exists on the destination server.</td> <td data-bbox="878 1713 1393 1837">The Promote workflows will overwrite the parameter value.</td> </tr> </tbody> </table>		Condition	Result	A deployment with the same name exists on the destination server.	The Promote workflows will always overwrite it.	The deployment does not exist on the destination server.	The Promote workflows will always create it.	A deployment parameter of Password Type already exists on the destination server.	The Promote workflows will preserve the password value.	A deployment parameter of Password Type does not exist on the destination server.	For security reasons, the Promote workflows will promote the parameter name but leave the password value blank. The password value must be manually configured on the destination server.	A deployment parameter of a non-password type already exists on the destination server.	The Promote workflows will overwrite the parameter value.
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Item	What is Promoted																		
	<p>A deployment parameter of a non-password type does not exist on the destination server.</p> <p>The Promote workflows will promote the parameter name and value.</p> <p>A deployment for the specified workflow exists on the destination server but is not specified to be promoted.</p> <p>The deployment will be preserved on the destination server.</p>																		
Policies	<p>The policies referenced by any deployments of the promoted workflow are promoted. You can use the Filter Policies parameter to specify ALL, NONE, or INCLUDE/EXCLUDE to filter which policies should be promoted.</p> <table border="1" data-bbox="407 724 1393 1801"> <thead> <tr> <th data-bbox="407 724 862 772">Condition</th> <th data-bbox="862 724 1393 772">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="407 772 862 856">A policy with the same name exists on the destination server.</td> <td data-bbox="862 772 1393 856">The Promote workflows will always overwrite it.</td> </tr> <tr> <td data-bbox="407 856 862 940">The policy does not exist on the destination server.</td> <td data-bbox="862 856 1393 940">The Promote workflows will always create it.</td> </tr> <tr> <td data-bbox="407 940 862 1066">A policy attribute of Password Type already exists on the destination server.</td> <td data-bbox="862 940 1393 1066">The Promote workflows will preserve the password value.</td> </tr> <tr> <td data-bbox="407 1066 862 1276">A policy attribute of Password Type does not exist on the destination server.</td> <td data-bbox="862 1066 1393 1276">For security reasons, the Promote workflows will promote the attribute name but leave the password value blank. The password value must be manually configured on the destination server.</td> </tr> <tr> <td data-bbox="407 1276 862 1402">A policy attribute of a non-password type already exists on the destination server.</td> <td data-bbox="862 1276 1393 1402">The Promote workflows will overwrite the attribute value.</td> </tr> <tr> <td data-bbox="407 1402 862 1528">A policy attribute of a non-password type does not exist on the destination server.</td> <td data-bbox="862 1402 1393 1528">The Promote workflows will promote the attribute name and value.</td> </tr> <tr> <td data-bbox="407 1528 862 1654">A policy attribute has been removed from a policy on the source server.</td> <td data-bbox="862 1528 1393 1654">If the policy attribute already exists on the destination server, it will be preserved. The policy attributes will be merged.</td> </tr> <tr> <td data-bbox="407 1654 862 1801">A policy referenced by a deployment of the promoted workflow is excluded by the Filter Policies parameter.</td> <td data-bbox="862 1654 1393 1801">If the policy exists on the destination server, the Promote workflows will link the existing policy to the promoted deployment.</td> </tr> </tbody> </table>	Condition	Result	A policy with the same name exists on the destination server.	The Promote workflows will always overwrite it.	The policy does not exist on the destination server.	The Promote workflows will always create it.	A policy attribute of Password Type already exists on the destination server.	The Promote workflows will preserve the password value.	A policy attribute of Password Type does not exist on the destination server.	For security reasons, the Promote workflows will promote the attribute name but leave the password value blank. The password value must be manually configured on the destination server.	A policy attribute of a non-password type already exists on the destination server.	The Promote workflows will overwrite the attribute value.	A policy attribute of a non-password type does not exist on the destination server.	The Promote workflows will promote the attribute name and value.	A policy attribute has been removed from a policy on the source server.	If the policy attribute already exists on the destination server, it will be preserved. The policy attributes will be merged.	A policy referenced by a deployment of the promoted workflow is excluded by the Filter Policies parameter.	If the policy exists on the destination server, the Promote workflows will link the existing policy to the promoted deployment.
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A policy referenced by a deployment of the promoted workflow is excluded by the Filter Policies parameter.	If the policy exists on the destination server, the Promote workflows will link the existing policy to the promoted deployment.																		
Smart Groups	The Smart Groups referenced by any promoted deployment are promoted. You can use the Filter Smart Groups parameter to specify ALL, NONE, or																		

Item	What is Promoted										
	<p>INCLUDE/EXCLUDE to filter which Smart Groups should be promoted.</p> <table border="0"> <thead> <tr> <th data-bbox="431 359 553 384">Condition</th> <th data-bbox="889 359 976 384">Result</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 415 841 478">A Smart Group with the same name exists on the destination server.</td> <td data-bbox="889 415 1292 478">The Promote workflows will always overwrite it.</td> </tr> <tr> <td data-bbox="431 506 829 569">The Smart Group does not exist on the destination server.</td> <td data-bbox="889 506 1292 569">The Promote workflows will always create it.</td> </tr> <tr> <td data-bbox="431 596 857 695">A Smart Group exists on the destination server but is not specified to be promoted.</td> <td data-bbox="889 596 1360 659">The Smart Group will be preserved on the destination server.</td> </tr> <tr> <td data-bbox="431 722 865 848">A Smart Group referenced by any deployment of the promoted workflow is excluded by the Filter Smart Groups parameter.</td> <td data-bbox="889 722 1360 1037"> <p>If the Smart Group exists on the destination server, the Promote workflows will link the existing Smart Group to the promoted deployment.</p> <p>If the Smart Group does not exist on the destination server, the Promote workflows will promote the workflow and other automation items without the Smart Group</p> </td> </tr> </tbody> </table>	Condition	Result	A Smart Group with the same name exists on the destination server.	The Promote workflows will always overwrite it.	The Smart Group does not exist on the destination server.	The Promote workflows will always create it.	A Smart Group exists on the destination server but is not specified to be promoted.	The Smart Group will be preserved on the destination server.	A Smart Group referenced by any deployment of the promoted workflow is excluded by the Filter Smart Groups parameter.	<p>If the Smart Group exists on the destination server, the Promote workflows will link the existing Smart Group to the promoted deployment.</p> <p>If the Smart Group does not exist on the destination server, the Promote workflows will promote the workflow and other automation items without the Smart Group</p>
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Roles	<p>The roles specified in Roles on Destination Server are assigned to the promoted automation items (workflows, steps, deployments, and policies) that do not exist on the destination server prior to the promote operation. The roles for promoted items are given full permissions:</p> <table border="0"> <thead> <tr> <th data-bbox="431 1247 613 1272">Promoted item</th> <th data-bbox="792 1247 951 1272">Permissions</th> </tr> </thead> <tbody> <tr> <td data-bbox="431 1304 542 1329">Workflow</td> <td data-bbox="792 1304 971 1329">READ, WRITE</td> </tr> <tr> <td data-bbox="431 1335 488 1360">Step</td> <td data-bbox="792 1335 971 1360">READ, WRITE</td> </tr> <tr> <td data-bbox="431 1367 574 1392">Deployment</td> <td data-bbox="792 1367 1114 1392">READ, WRITE, EXECUTE</td> </tr> <tr> <td data-bbox="431 1398 505 1423">Policy</td> <td data-bbox="792 1398 971 1423">READ, WRITE</td> </tr> </tbody> </table> <p>The <u>first</u> role specified in Roles on Destination Server is set in the Roles attribute for promoted Smart Groups that do not exist on the destination server prior to the promote operation.</p> <p>Roles and permissions for existing items are preserved.</p> <p>Note: Roles should be configured on the destination server <u>before</u> running the Promote workflows. If the specified roles do not exist on the destination server, the Promote workflows will fail.</p> <p>The administrator should review the permissions <u>after</u> running the Promote workflows and, for security reasons, remove permissions that are not required by specific roles.</p>	Promoted item	Permissions	Workflow	READ, WRITE	Step	READ, WRITE	Deployment	READ, WRITE, EXECUTE	Policy	READ, WRITE
Promoted item	Permissions										
Workflow	READ, WRITE										
Step	READ, WRITE										
Deployment	READ, WRITE, EXECUTE										
Policy	READ, WRITE										

Item	What is Promoted
Custom Fields	<p>All Custom Fields that are referenced by the specified workflow (or any promoted steps, deployments, or Smart Groups) are promoted.</p> <p>The following items are copied for each Custom Field:</p> <ul style="list-style-type: none">• Name• Object (organization, server, instance, or database)• Type (text, multi-line text, or list)• Options (for list type Custom Fields only) <p>Note: Because Custom Field values vary depending on the environment, their values are not promoted and must be manually configured on the destination server.</p>

What is Not Promoted

The Promote workflows do not promote the following:

- Environments: organizations, servers, instances, and databases
- Deployment targets other than Smart Groups
- Password values
- Custom Field values

Basic Principles of the Promote Solution

The Promote solution is based on a set of basic principles. Understanding the basic principles ensures that you can use the full potential of the Promote solution and use it efficiently.

The following are basic principles regarding the Promote solution:

"Promote copies a single workflow"

"Promote will not modify locked objects"

"Promote overwrites previously existing, unlocked content"

"Gold standard" workflows"

"Preview mode"

"Rollback in case of failure"

"No delegation of rights"

"No content development on test or production servers"

Solution Packs

"No promotion of sensitive data"

Promote copies a single workflow

The Promote workflows promote a single workflow at a time.

Promote will not modify locked objects

The Promote workflows will never promote locked objects (see "Locked Objects" in "[What is Promoted](#)").

Promote overwrites previously existing, unlocked content

Each run of [Promote Workflow – Export](#) and [Promote Workflow – Import](#) overwrites the content on the HPE DMA destination server as long as it is unlocked. Overwriting provides a deterministic and easy to understand use model for the Promote workflows: What you promoted last will be on the destination server. Previously promoted or installed content will be overwritten by the Promote workflows.

"Gold standard" workflows

Within this document a "gold standard" workflow is a stable version of the workflow that is ready to be used in the next phase of the development-to-production lifecycle.

Preview mode

The Promote solution allows you to run the Promote solution in a preview mode. In preview mode no actual changes are committed on the destination HPE DMA server. Preview mode allows you to compare your source content and current content on the destination server. It allows you to preview the changes on the destination server.

You can use preview mode at any time to compare your "gold standard" workflow to the workflow in a destination environment to make sure that nothing has changed.

Rollback in case of failure

If the Promote workflows fail—or are unable to verify the results—they will restore the destination server to its previous state. The workflow will rollback or undo all changes that were committed.

No delegation of rights

You need to log in to DMA using an account with sufficient rights to use the Promote workflows. For security and logging reasons you cannot provide credentials to run the Promote workflows in a deployment.

No content development on test or production servers

The Promote workflows were designed so that you should not do any content development on the test or production servers. All content development and customization is done on the development server (s). Stable content can then be promoted to the test and eventually the production servers.

Solution Packs

DMA content solution packs should be manually imported on all DMA servers used to promote. The solution packs are used to verify that the workflow version that was exported from the source server matches the workflow version that will be imported to the destination server.

The Promote workflows will fail if the solution pack version on the source server does not match the version on the destination server.

No promotion of sensitive data

For security reasons the Promote workflows do not promote certain items such as password values and roles.

What the Promote Solution Contains

The Promote solution allows you to promote customized content from development servers to test servers, and then to production servers. It provides three workflows:

Workflow Name	Purpose
Promote Workflow – Export	Exports a workflow and related items from the HPE DMA database on the source server and stores them in a collection of XML files in a working directory/ZIP file.
Promote Workflow – Import	Creates a workflow and related items on the specified destination server using the contents of the XML files that reside in the specified working directory/ZIP file.
Promote Workflow - Export and Import	Exports a workflow and related items from the HPE DMA database on the source server and stores them in a collection of XML files in a working directory/ZIP file. Then creates that workflow and all its components on a different HPE DMA server. The functionality is the same as running the Promote Workflow – Export workflow followed by running the Promote Workflow – Import workflow.

What the Promote Solution Does

You can use the Promote solution to promote (copy) a workflow from one HPE DMA server (the source) to another HPE DMA server (the destination).



This is useful, for example, when you want to copy a workflow that has been validated in your test environment onto an HPE DMA server in your production environment.

You can perform the promote operation by using a single workflow as shown above (the one-phase approach), or you can run two separate workflows that carry out the export and import phases, respectively:



The two-phase approach is appropriate when different people (or groups) are responsible for the source and destination environments or when you want control the versions of the master copies of each workflow (and all related items).

In either case, if the specified workflow already exists on the destination server, HPE DMA makes a backup copy of that workflow and all related automation items. This backup copy is used to restore the workflow on the destination server to its original state if the promote operation fails or is unable to verify the promoted workflow on the destination. You can also use the backup copy to perform a manual rollback in the future.

Promote Workflow - Export and Import and Promote Workflow – Import both support a preview mode that you can use to determine exactly which items will be created or updated on the destination server. The preview also shows you items that you must manually configure on the destination server after the promotion is completed. For example, for security reasons password values will not be promoted and you need to set them appropriately on the destination server. If you set the Preview Only parameter to YES, HPE DMA will conclude the workflow after the preview without copying any information to the destination server.

Tip: The Promote workflows create a collection of XML files that contain the source and destination workflows and related automation items. You can store these files in the event that you later want to return to a specific version of the workflow.

HPE DMA Environment Descriptions

HPE DMA servers

Generally you should have three types of HPE DMA servers:



- **Development**

The development server is used to develop workflows, steps, and deployments. This is your “sandbox”. You should load HPE DMA solution packs here and do all your customizations. You can also use this server for initial testing of the content in development.

- **Test**

The test server should resemble the production server as closely as possible. You use it primarily to conduct integration testing and user acceptance testing. You should load HPE DMA solution packs on this server to verify that the versions match. Use the Promote solution to import the content you want to test. If a test reveals issues, fix the content on a development server and use the Promote solution to load the changed content to the test server.

- **Production**

This is the server your database and middleware administrators use to run workflows. You should load HPE DMA solution packs on this server to verify that the versions match. Use the Promote Solution to import the content you want to use in production. Do not load any content that you have not thoroughly tested.

HPE DMA Archive

The Promote solution allows you to import content to a file system and export content from a file system. You can use a file system as an archive or use a revision control system to manage different versions of your customized content.

- **File system archive**

The Promote solution exports content to and imports content from the file system of the selected target server. It creates distinct directories for each export of content. This enables you to keep and

identify different versions of your customized content. For actual archiving you should copy the exported content to an appropriately named location and save it.

- Revision Control System

The Promote solution exports content to and imports content from the file system of the selected target server. HPE DMA is not integrated with any revision control system. You can easily use a revision control system of your choice (such as SVN or CVS) to manage versions of your customized content. Use the revision control system user interface to check in or check out customized content as needed.

Promote Scenarios

You should structure your environments based on the hardware (or virtual machines) that you have available, the amount of testing that you are comfortable with, and the risk that you are willing to accept of breaking an existing workflow in production.

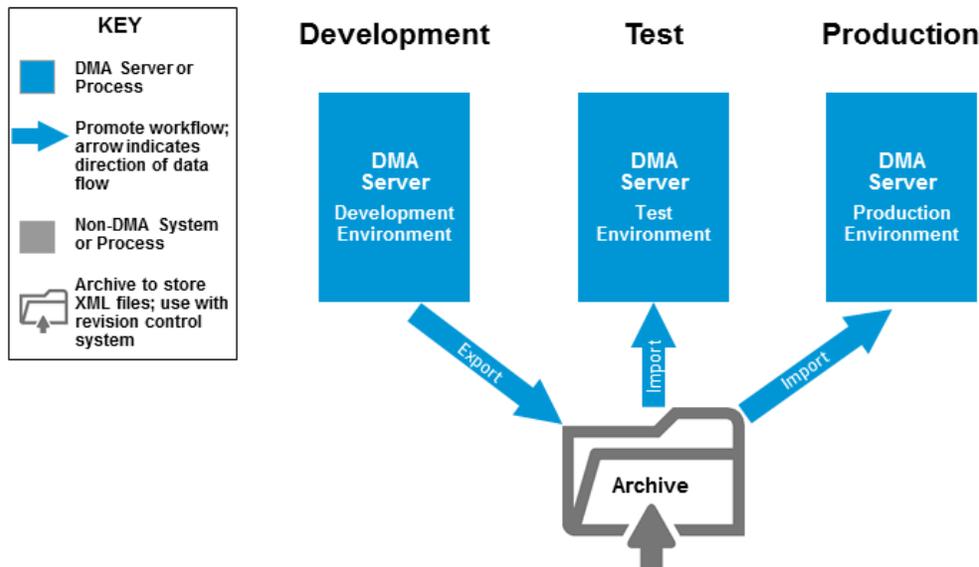
Scenario 1: Minimal test configuration

Use this scenario in the following situations:

- You are limited by hardware.
- You do not have a firewall or proxy between development, test, and production HPE DMA servers.

You should only use Promote Workflow – Export and Promote Workflow – Import in this scenario and not Promote Workflow - Export and Import.

You should have a controlled process for importing content to the test and production servers.



Development Developers use the development server to conduct their own tests. They may export and potentially archive customized content at will. When customized content is ready for acceptance test, developers export it to an archive (file system or revision control system).

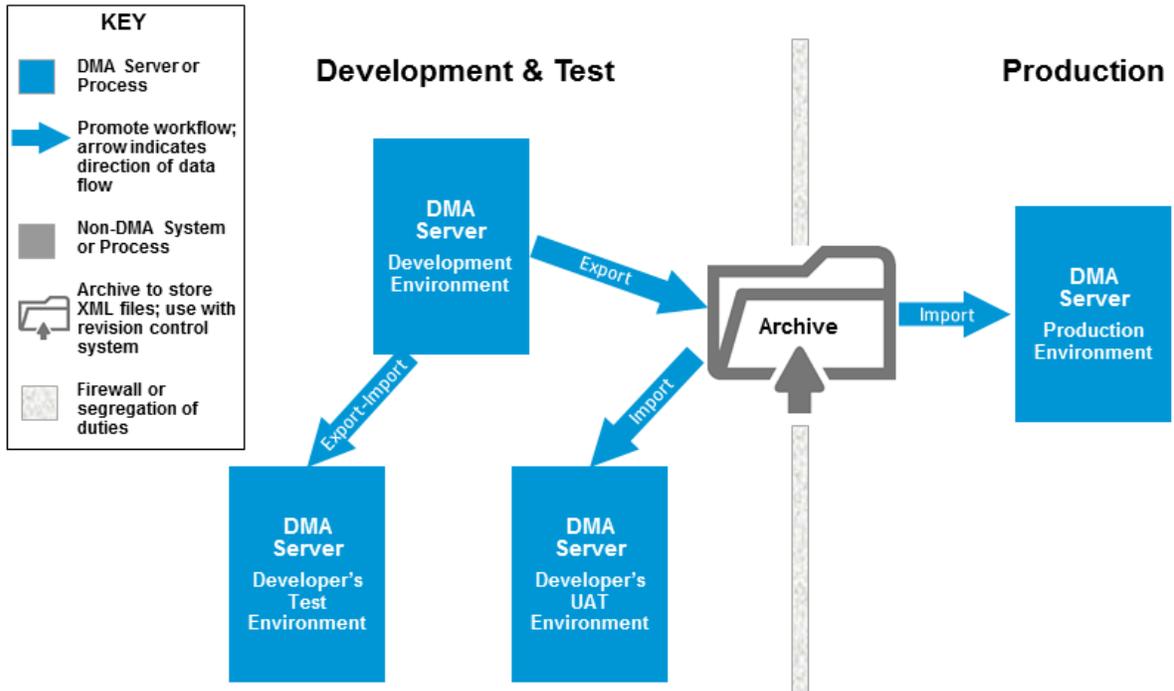
Test The test system is used for acceptance and integration testing. Test runs are controlled events. For each test run, all content currently running on the production server is imported from the archive to the test server. Then the new content is imported and the required tests are conducted. Following this sequence ensures that the new content will work on the production server.

Production After all test have passed, the new content can be imported to the production server.

Scenario 2: Better test configuration

Use this scenario in the following situations:

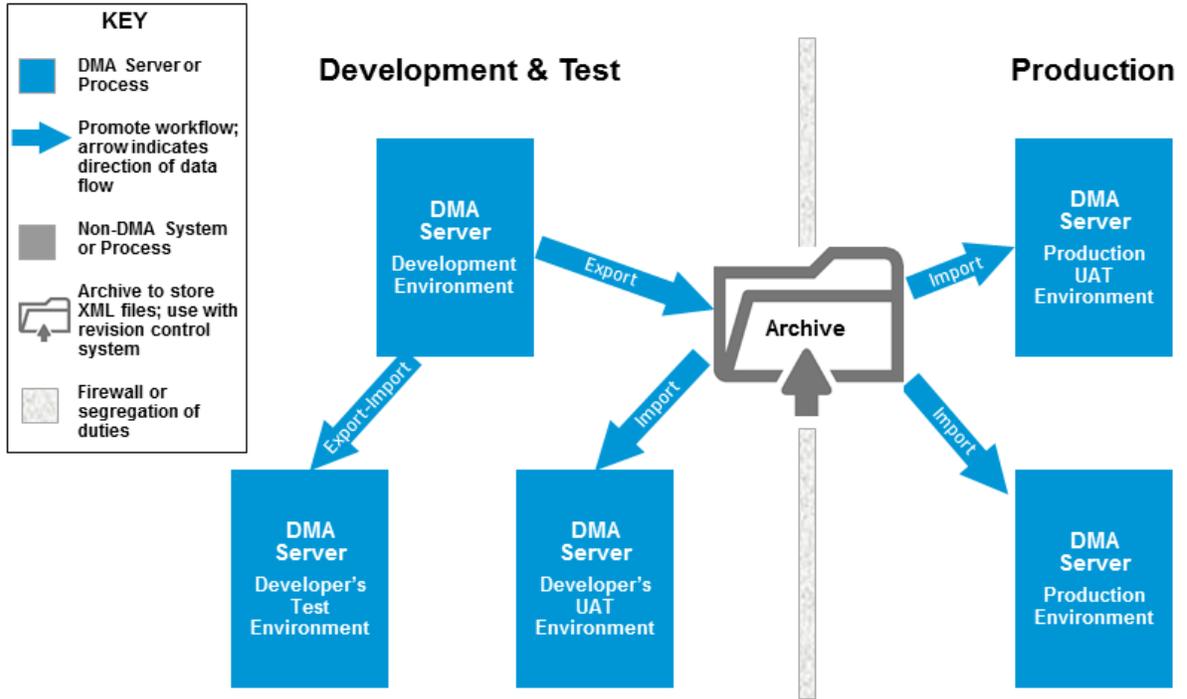
- You have a server (or virtual machine) available as a developer's User Acceptance Test (UAT) box. This server should only contain workflows that match the production server.
- You have HPE DMA workflows customized for your enterprise.
- *Optional:* You have a firewall or use a proxy or you have segregated duties between development and production.



Note: This scenario is fully described in ["Best Practices for Using the Promote Solution"](#).

Scenario 3: Best test configuration

This scenario matches the previous scenario ("Scenario 2: Better test configuration") except you also have a server (or virtual machine) available as a production UAT box. This is appropriate when you segregate roles and the production users desire to perform their own testing. This server should only contain workflows that match the production server.



Best Practices for Using the Promote Solution

This section provides instructions to use one of the "Promote Scenarios" and for specific use cases.

- "Best Practice Details"
- "Other Best Practices"

Best Practice Details

Tip: These best practice details use "Scenario 2: Better test configuration" of HPE DMA servers as an example. You can modify the instructions for the other scenarios in "Promote Scenarios".

Throughout this section you will find tables with information for how to run the Promote workflows. The following explains what the table items refer to:

Where to run <Promote_ workflow>	Since several HPE DMA servers are involved in the Promote process, this is the specific server on which you run the Promote workflow—based on "Scenario 2: Better test configuration" definitions.
Deployment target	This is the target server that you use when you set up the deployment to execute the <Promote_workflow>. See "Purpose of the Target Server" for more information.
Destination	Only used in Promote Workflow - Export and Import: This is the destination server to specify in Destination DMA URL. You also specify Destination DMA Password and Destination DMA Username for this destination.
Export Location	This is the working directory/ZIP file where the workflow (and related automation items) XML files will be created.
or	
Import Location	This is the working directory/ZIP file where the workflow (and related automation items) XML files will be retrieved.
Preview Only	Only used in Promote Workflow - Export and Import and Promote Workflow – Import: This is the value to specify for the Preview Only parameter.

Refer to the [Workflow Details](#) section in the *HPE DMA Promote Solution User Guide* for complete information to run the Promote workflows, including values to specify for all parameters.

Prepare the HPE DMA servers

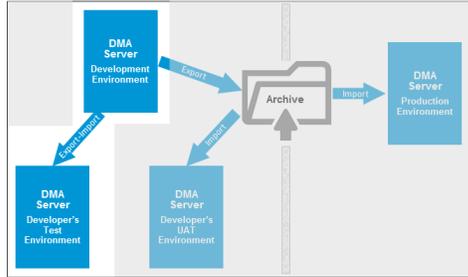
1. Install the same HPE DMA platform version on all HPE DMA servers (see "How to Install HPE DMA" or "How to Upgrade HPE DMA" in the *HPE DMA Installation Guide* for more information).
2. Ensure that the HPE DMA servers are SA Managed Servers and are available targets for HPE DMA (see "Install the DMA Client Files Policy" and "Add Available Targets" in the *HPE DMA Installation Guide* for more information).
3. On all HPE DMA servers, import the Promote Solution Pack.
4. If you already have production workflows, you can use those workflows as the "gold standard" and copy them to the developer's test server and the developer's UAT server. Do the following for all production workflows:
 - a. "Make existing production workflows the "gold standard""
 - b. Copy the working directory/ZIP file with the "gold standard" workflow from the Archive to the working directory/ZIP file on the developer's test server (**Destination**).
 - c. Use Promote Workflow – Import to create the workflow on the developer's test server (**Destination**) using the copy of the "gold standard" workflow (and all related items) .

Where to run Promote Workflow – Import	Developer's test server
Deployment target	Developer's test server
Import Location	Directory/ZIP file on the target server where the XML files are stored
Preview Only	NO

- d. Copy the working directory/ZIP file with the "gold standard" workflow from the Archive to the working directory/ZIP file on the developer's UAT server (**Destination**).
- e. Use Promote Workflow – Import to create the workflow on the developer's UAT server (**Destination**) using the copy of the "gold standard" workflow (and all related items) .

Where to run Promote Workflow – Import	Developer's UAT server
Deployment target	Developer's UAT server
Import Location	Directory/ZIP file on the target server where the XML files are

Develop and test the workflow



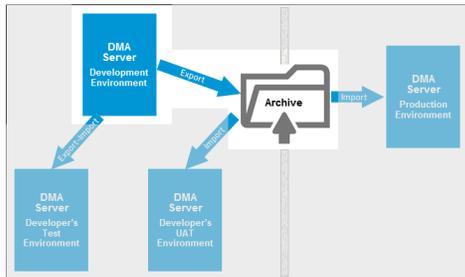
- | | |
|--------------|--------|
| | stored |
| Preview Only | NO |
1. Develop your workflow in a development environment.
 2. When the workflow is ready to be tested, use Promote Workflow - Export and Import to export the workflow and all related items from the HPE DMA database on the development server (**Source**) and to automatically import them into the developer's test server (**Destination**).

Where to run Promote Workflow - Export and Import	Development server
Deployment target	Development server
Destination	Developer's test server
Export Location	Directory/ZIP file on the target server where the XML files are stored
Preview Only	NO

Note: To use Promote Workflow - Export and Import the same user (with the appropriate roles) who runs the workflow on the development server must be available on the developer's test server.

3. Fully test all workflows in the

Create a "gold standard" workflow



developer's test environment.

Note: If testing fails, return to the development server to make any changes.

1. After your testing is successful in the developer's test environment, consider the tested workflow the "gold standard."
2. Use Promote Workflow – Export to export the workflow and all related items from the HPE DMA database on the developer's server (**Source**) and to store the XML files on the same server.

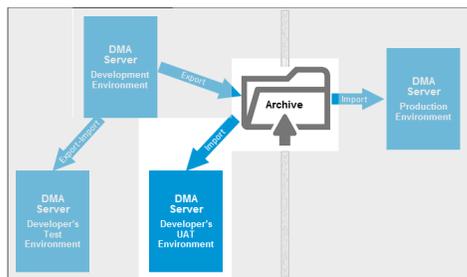
Where to run Promote Workflow – Export	Development server
Deployment target	Development server
Export Location	Directory/ZIP file on the target server where the XML files are stored

3. Copy the working directory/ZIP file from the target to your Archive.

Tip: The Archive is your file storage system. It can be a shared files location or even a thumb drive.

4. Link the Archive to a revision control system (for example: SVN or CVS) and commit the master copies of the XML files to it (see "HPE DMA Archive" for more information about the Archive).

Perform User Acceptance Test



Note: HPE DMA is not integrated with any revision control system. To version your workflows, you must manually check the XML files generated by the Promote workflows into your revision control system.

1. Copy the working directory/ZIP file with the "gold standard" workflow from the Archive to the working directory/ZIP file on the developer's UAT server (**Destination**).
2. Use Promote Workflow – Import to create the workflow on the developer's UAT server (**Destination**) using the copy of the "gold standard" workflow (and all related items) .

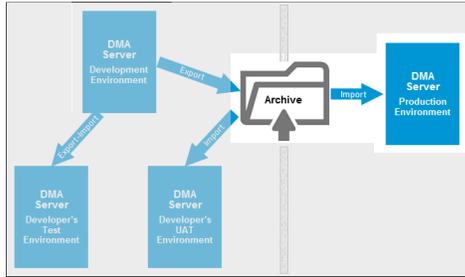
Where to run Promote Workflow – Import	Developer's UAT server
Deployment target	Developer's UAT server
Import Location	Directory/ZIP file on the target server where the XML files are stored
Preview Only	NO

3. Fully test all workflows in the developer's UAT environment.

Note: If testing fails, return to the development server to make any changes.

Copy to production

1. Copy the working directory/ZIP file with the "gold standard"



workflow from the Archive to the working directory/ZIP file on the production server (**Destination**).

2. If you already have the workflow on the production server, use Promote Workflow – Import in Preview Only mode to compare the copy of the "gold standard" workflow to your production version.

Where to run Promote Workflow – Import	Production server
Deployment target	Production server
Preview Only	YES
Import Location	Directory/ZIP file on the target server where the XML files are stored

3. If the results of the comparison are satisfactory, use Promote Workflow – Import to create the workflow on the production destination server using the copy of the "gold standard" workflow (and all related items).

Where to run Promote Workflow – Import	Production server
Deployment target	Production server
Import Location	Directory/ZIP file on the target server where the XML

	files are stored
Preview Only	NO

4. Use the workflow in the production environment to run your enterprise.

Other Best Practices

The following are other best practices regarding the Promote solution:

- "Use role-based access controls"
- "Fix broken workflows"
- "Promote the Discovery Solution Pack"
- "Promote a single workflow"
- "Promote all development workflows"
- "Verify that production workflows are unchanged"
- "Make existing production workflows the "gold standard""
- "Promote workflows in conjunction with an HPE DMA platform upgrade"

Use role-based access controls

Use the HPE DMA role-based access controls to protect the production workflows (and related items) from being modified.

Limit the number of users whose roles have Administrator capability on the production server. Any other users who can access the production server should only have roles with Login Access capability.

To allow for emergency situations, follow these steps:

1. Create a single "Emergency" role.
2. Grant Workflow Creator capability—WRITE permission to the production workflows (and related items)—to this role.
3. Do NOT give any users the Emergency role unless an actual emergency occurs.

In the event of an emergency—when a workflow breaks in the production and must be fixed in production—follow these steps:

1. Assign the Emergency role to the user who will fix the workflow.
2. This user should repair the workflow.
3. After the workflow is repaired, revoke the role.

Fix broken workflows

Caution: Repair the broken workflow and test that workflow in a development environment. Do not repair the workflow in the production environment.

If a production workflow is broken, follow these steps to fix it:

1. Use the Promote workflows to copy the broken workflow (and all related items) to the development environment.
2. Fix the workflow.
3. Use "[Best Practice Details](#)" to return the workflow to the production environment.

Promote the Discovery Solution Pack

The workflows in the Discovery Solution Pack should be the first workflows that are promoted across environments.

Promote a single workflow

To promote a single workflow, follow the instructions in "[Best Practice Details](#)". For a new workflow (number N), you should have clean copies of all previous N-1 workflows on the developer's UAT server to be tested.

Promote all development workflows

To promote N workflows from your development environment, follow the instructions in "[Best Practice Details](#)". Perform the "[Develop and test the workflow](#)" steps for all N workflows, then perform the "[Create a "gold standard" workflow](#)" steps for all N workflows, and so on.

Verify that production workflows are unchanged

To verify that production workflows have not been corrupted over time, you should periodically (for example, every three months) run Promote Workflow – Import in Preview Only mode to compare your "gold standard" workflows in the archive to your production versions.

Make existing production workflows the "gold standard"

For existing HPE Database and Middleware Automation customers: You can use existing production workflows to make "gold standard" workflows:

1. Run Promote Workflow – Export to export the workflow and all related items from the HPE DMA database on the production server (**Source**) and store the XML files on the same server.

Where to run Promote Workflow – Export	Production server
Deployment target	Production server
Export Location	Directory/ZIP file on the target server where the XML files are stored

2. Copy the working directory/ZIP file from the target to your Archive.
3. Link the Archive to a revision control system (for example: SVN or CVS) and commit the "gold standard" workflows to it.

Promote workflows in conjunction with an HPE DMA platform upgrade

If you upgrade your HPE DMA platform on your development server, you need to upgrade the HPE DMA platform on all of your HPE DMA servers before you can promote workflows across environments.

Purpose of the Target Server

The target server specified when you deploy and run any of the Promote workflows serves a different purpose than it does for other HPE DMA workflows.

In the Promote context, the target server is simply the server where the source and backup XML files containing the workflow being promoted (and all related items) are stored or retrieved. The Promote log files are also stored on the target server. No operations other than storing and retrieving these files are performed on the target server.

Note: Only specify one target server when you run any of the Promote workflows.

The target server can be the source server, the destination server, or a third server.

All servers must be managed by the same SA Core. To do this, your HPE DMA server must also be a managed server in your environment and must be included in an HPE DMA organization. See the *HPE DMA Installation Guide* or the *HPE DMA Administrator Guide* for information about adding managed servers.

Recommended Best Practice

Specify the HPE DMA server where you are running the Promote workflow as the target server.

Sample Scenarios

Scenario 1: The Export target is the source server and the Import target is the destination server

If you are using the two-phase Promote process, you will need to copy the XML files from the target server specified for the Export phase to the target server that will be specified for the Import phase. For example:

1. Run Promote Workflow – Export on the source server using the source server as the target.
2. Copy the XML files from the working directory/ZIP file on the source server to the working directory/ZIP file on the destination server.
3. Run Promote Workflow – Apply using the destination server as the target.

Tip: It may be convenient to store the XML files on an NFS share that is accessible to both target

servers. This eliminates the copy step above.

Scenario 2: The Promote target is a separate server used for revision control

If you are using the one-phase Promote process, you can use a separate target server with your revision control tool. For example:

1. Run Promote Workflow using a separate server as the target.
2. Use a revision control tool (such as SVN or CVS) to version the XML files generated by the Promote workflows. You must manually check the files in the desired working directory/ZIP file on your target into your revision control system. This allows you to keep the files under change control and revert to a specified version.

Supported Products and Platforms

This solution requires the HPE DMA version 10.50 (or later) platform and the HPE DMA version 10.50 (or later) solution packs.

Note: The source and destination HPE DMA servers must be running the same version of HPE DMA (for example: version 10.50). You can force the Promote workflows to allow different platform versions by setting Ignore Platform Version.

Although you can use the Promote workflows to promote HPE DMA content between different versions of HPE DMA, HP only supports Promote when the source content version matches the destination content version. If you promote to a different version, you may need to make manual changes.

Operating Systems

For specific target operating system versions supported by each workflow, see the HP Database and Middleware Automation Support Matrix available on the HP Software Support website:

<https://softwaresupport.hp.com/>.

Hardware Requirements

For HPE DMA server hardware requirements, see the *HPE DMA Installation Guide* and the *HPE DMA Release Notes*.

Before Using the Promote Solution

Make sure that the following requirements are satisfied before using the Promote solution:

- The source server and destination server must have the same HPE DMA platform version installed.
- You have installed the latest version of the Promote solution pack.
- All servers (source, destination, target) are under the management of HP Server Automation, visible to **??**, and in the same group.

The Promote workflows are like any other HPE DMA workflow. You need the following permissions to use them:

- Read permission on any deployable copies of the workflows that you create from the read-only workflows delivered in the Database Compliance solution pack
- Read, Write, and Execute permission on any deployment that will be used to execute the workflows in your environment
- Read and Execute permission on the organization that contains the specified target server

Destination Server Preparation

- Any roles required to modify or execute the workflow (or workflows) that will be promoted must exist on the destination HPE DMA server. The roles must have permission for the workflow (or workflows).
- HPE DMA solution packs are removed from the destination server.

After Using the Promote Solution

Do the following after using the Database Compliance solution:

- Run the Promote Workflow – Apply workflow one more time in Preview Only mode to compare your source copy to your destination version.
- Customize the HPE DMA values that were not copied: servers, environments, or Custom Field values.

The Promote Workflow and Promote Workflow – Apply workflows both support a preview mode that you can use to show you items (such as passwords) that you must manually configure on the destination server after the promotion is completed.

Promote Solution FAQs

The following are frequently asked questions regarding the Promote solution:

- [What is promoted?](#)
- ["What is meant by "working directory/ZIP file"?"](#)
- [Are promoted workflows versioned?](#)
- [What is the purpose of the target server in the promote process?](#)
- [What happens if the promote process fails?](#)
- [Can I manually roll back a promoted workflow?](#)
- [Do I install solution packs on my destination server?](#)
- ["What capabilities or permissions do I need to be able to run the Promote workflows?"](#)
- [Do the Promote workflows create the roles that I need on the destination server?](#)
- ["How are permissions promoted?"](#)
- ["Are existing policies, Smart Groups, or deployments deleted from the destination server when I promote a workflow?"](#)
- ["How do I know if other workflows are affected when I promote a single workflow?"](#)
- ["How do the Promote workflows handle workflows or other automation items that are locked?"](#)

What is promoted?

When you promote a workflow, you also promote any automation items referenced by that workflow or its deployments. Referenced steps, functions, and Custom Fields are always promoted. You can specify which deployments, policies, and Smart Groups are promoted, or you can promote all of them or none of them. The default behavior is to promote all referenced items. (See ["What is Promoted"](#) for more information.)

What is meant by "working directory/ZIP file"?

Throughout this guide, the phrase "working directory/ZIP file" refers to the specific directory or ZIP file on the target server that contains the XML files and log files. The Promote workflows use the following:

- Promote Workflow – Export and Promote Workflow - Export and Import store these files on the target server in Export Location (either a directory or ZIP file).
- Promote Workflow – Import retrieves these files from the target server in the specified Import Location (either a directory or ZIP file).

Are promoted workflows versioned?

To create a versioned history of your promoted workflows, you can store the XML files produced by these workflows in a revision control system, such as SVN or CVS.

Tip: When you run the workflows, be sure to specify the Export Location parameter to ensure that the XML files are stored in the correct location on the specified target server.

What is the purpose of the target server in the promote process?

The target server has one purpose: to store and retrieve the source and backup XML files created during the promote operation. The files are stored in the working directory/ZIP file on the target server. Log files are also stored in the same working directory/ZIP file.

See the "[Purpose of the Target Server](#)" on page 100 for more information.

What happens if the promote process fails?

If the Rollback on Error parameter is set to YES (the default), the following happens:

- Items are promoted one at a time. If one item fails, the workflow stops promoting any remaining items and then restores the failed item and any previously promoted items.
- If the workflow is unable to verify that the promoted workflow on the destination server is identical to the workflow on the source server, the destination server is restored to its original state.
- If no restore versions are available to restore promoted items, the promoted items remain on the destination server. They are not deleted. They will be overwritten in a future promote process.

If Rollback on Error is set to NO, the workflow stops promoting any remaining items but no attempt is made to roll back any changes made before the failure occurred.

Can I manually roll back a promoted workflow?

If you want to roll back a workflow that was promoted to the destination server, you can run the Promote Workflow – Import workflow using the backup files from the Promote operation to restore the original destination workflow and all related items.

Tip: Use one of the following methods to select a specific version:

- Specify Export Location in a meaningful way and in a unique location. That way, you can roll the destination server workflow back to a specific version.
- Use a revision control system such as SVN or CVS to manage different versions. Use the revision control system to revert to the desired version.

Do I install solution packs on my destination server?

Yes, you must install solution packs on your destination server. When you promote a workflow, the solution pack that contains the workflow on the source server is compared to the solution pack on the destination server. If the versions do not match, the Promote workflows will fail.

What capabilities or permissions do I need to be able to run the Promote workflows?

You need the following capabilities to run the Promote workflows:

- The HPE DMA user who runs Promote Workflow – Import must have Administrator capability.
- The HPE DMA user specified in the Destination DMA Username parameter in Promote Workflow - Export and Import must have Administrator capability.

The Promote workflows are like any other HPE DMA workflow. You need the following permissions to use them:

- Read permission on any deployable copies of the workflows that you create from the read-only workflows delivered in the Promote Solution Pack
- Read, Write, and Execute permission on any deployment that will be used to execute the workflows in your environment
- Read and Execute permission on the organization that contains the specified target server

Caution: Take every precaution to ensure that unauthorized users cannot run the Promote workflows in your environment.

Do the Promote workflows create the roles that I need on the destination server?

No. You must create and configure the required roles on the destination server. Although you can do this at any time, it is good practice to create the roles prior to running the Promote workflows. If the roles do not exist on the destination server, the Promote workflows will fail.

How are permissions promoted?

Permissions are associated with roles. You must specify the parameter Roles on Destination Server. If the promoted item did not previously exist on the destination server, it will be given the specified roles with full permissions—READ, WRITE, and EXECUTE, based on the item type. If the promoted item already exists on the destination server, the roles and permissions will not be changed—you cannot use the Promote workflows to add or delete roles or permissions on items that already exist on the destination server.

Note: The administrator should review the permissions after running the Promote workflows and, for security reasons, remove permissions that are not required by specific roles.

Are existing policies, Smart Groups, or deployments deleted from the destination server when I promote a workflow?

No. Any policies, Smart Groups, or deployments that exist on the destination server remain there—even if you only specify a subset of them on a subsequent promote. Items are overwritten if they have changed.

For example, say that a workflow that you are promoting references three deployments: A, B, and C. You promote the workflow and with the Filter Deployments parameter set to ALL. All three of the deployments (A, B, and C) are promoted.

Later, you promote a revised version of the workflow, and you specify that only deployment A should be promoted. In this scenario, deployments B and C remain on the destination server. Deployment A is overwritten if it is different than the original version.

The Promote workflows do not delete automation items on the destination server using filters. You must manually delete them on the destination.

How do I know if other workflows are affected when I promote a single workflow?

It is possible that promoting a single workflow brings over related items that have changed (for example, functions or steps) and are used by other workflows. You should carefully review the Preview report to be aware of any other workflows that should be promoted.

How do the Promote workflows handle workflows or other automation items that are locked?

If a workflow or automation item is locked on the source server but does not exist on the destination server, the workflow will fail. If the workflow or automation item exists and is locked on the destination server, the Promote workflows will compare the two versions. If the versions match, no promotion is necessary. If the versions do not match, the promote fails. If the workflow or automation item is unlocked on the destination server, it will be overwritten.

Send documentation feedback

If you have comments about this document, you can [contact the documentation team](#) by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on User Guide (Database and Middleware Automation 10.50)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to hpe_dma_docs@hpe.com.

We appreciate your feedback!