

HP Database and Middleware Automation

For Linux operating systems

Software Version: 10.22

Quick Start Tutorial

Document Release Date: December 2014

Software Release Date: December 2014



Legal Notices

Warranty

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

The information contained herein is subject to change without notice.

Restricted Rights Legend

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Copyright Notice

© Copyright 2013-2014 Hewlett-Packard Development Company, L.P.

Trademark Notices

Oracle® is a registered trademark of Oracle and/or its affiliates.

Documentation Updates

The title page of this document contains the following identifying information:

- Software Version number, which indicates the software version.
- Document Release Date, which changes each time the document is updated.
- Software Release Date, which indicates the release date of this version of the software.

To check for recent updates or to verify that you are using the most recent edition of a document, go to: <http://h20230.www2.hp.com/selfsolve/manuals>

This site requires that you register for an HP Passport and sign in. To register for an HP Passport ID, go to: <http://h20229.www2.hp.com/passport-registration.html>

Or click the **New users - please register** link on the HP Passport login page.

You will also receive updated or new editions if you subscribe to the appropriate product support service. Contact your HP sales representative for details.

The following table indicates changes made to this document since the last released major edition.

Document Changes

Title Page Legal Notices	10.20	Updated version number, software release date, document release date, and copyright date range.
Quick Start	10.20	Updated screen shots.
Create a Deployable Workflow Create a Deployment Run Your Workflow	10.20	Included information about exposing parameters and specifying runtime values for parameters.
Title Page Legal Notices Entire guide	10.21	Updated version number, software release date, document release date, and copyright date range. Updated document template.
Title Page Legal Notices	10.22	Updated version number, software release date, document release date, and copyright date range.
Import the Solution Pack	10.22	Added code release to the list of middleware solution packs.

Support

Visit the HP Software Support Online web site at: <http://www.hp.com/go/hpsoftwaresupport>

This web site provides contact information and details about the products, services, and support that HP Software offers.

HP Software online support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued support customer, you can benefit by using the support web site to:

- Search for knowledge documents of interest
- Submit and track support cases and enhancement requests
- Download software patches
- Manage support contracts
- Look up HP support contacts
- Review information about available services
- Enter into discussions with other software customers
- Research and register for software training

Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract. To register for an HP Passport ID, go to:

<http://h20229.www2.hp.com/passport-registration.html>

To find more information about access levels, go to:

http://h20230.www2.hp.com/new_access_levels.jsp

HP Software Solutions Now accesses the HPSW Solution and Integration Portal Web site. This site enables you to explore HP Product Solutions to meet your business needs, includes a full list of Integrations between HP Products, as well as a listing of ITIL Processes. The URL for this Web site is <http://h20230.www2.hp.com/sc/solutions/index.jsp>

Contents

Contents	4
About HP DMA Solution Packs	5
Audience	6
Document Map	7
Important Terms	8
Supported Products and Platforms	9
Chapter 1: Quick Start	10
Import the Solution Pack	11
Create a Deployable Workflow	15
Create a Deployment	17
Run Your Workflow	21
View the Results	24
Chapter 2: Additional Resources	27
Chapter 3: Tips and Best Practices	28
How a Solution Pack is Organized	29
How to Expose Additional Workflow Parameters	33
How to Use a Policy to Specify Parameter Values	34
Create a Policy	34
Extract a Policy	35
Reference the Policy in the Deployment	36
How to Import a File into the Software Repository	37
Glossary	39

About HP DMA Solution Packs

HP Database and Middleware Automation (HP DMA) software automates administrative tasks like provisioning and configuration, compliance, patching, and release management for databases and application servers. When performed manually, these day-to-day operations are error-prone, time consuming, and difficult to scale.

HP DMA automates these daily, mundane, and repetitive administration tasks that take up 60-70% of a database or application server administrator's day. Automating these tasks enables greater efficiency and faster change delivery with higher quality and better predictability.

HP DMA provides role-based access to automation content. This enables you to better utilize resources at every level:

- End-users can deliver routine, yet complex, DBA and middleware tasks.
- Operators can execute expert level tasks across multiple servers including provisioning, patching, configuration, and compliance checking.
- Subject matter experts can define, enforce, and audit full stack automation across network, storage, server, database, and middleware.

An HP DMA workflow performs a specific automated task—such as provisioning database or application servers, patching database or application servers, or checking a database or application server for compliance with a specific standard. You specify environment-specific information that the workflow requires by configuring its parameters.

Related HP DMA workflows are grouped together in solution packs. When you purchase or upgrade HP DMA content, you are granted access to download specific solution packs.

Audience

This guide is designed for anyone who is new to HP DMA and wants to learn how to run an HP DMA workflow.

To use this tutorial HP DMA needs to be installed and operational.

Document Map

The following table shows you how to navigate this guide:

Topic	Description
Quick Start	A step-by-step tutorial that shows you how to run a sample workflow and view the results.
Additional Resources	Links to more information about HP DMA.
Tips and Best Practices	Simple procedures that you can use to accomplish a variety of common HP DMA tasks.

Important Terms

Here are a few basic HP DMA terms that you will need to know:

- In HP DMA, a **workflow** executes a process —such as installing a software product or checking a database instance for compliance with a specific security benchmark.
- A workflow consists of a sequence of **steps**. Each step performs a very specific task. Steps can be shared among workflows.
- Steps can have input and output **parameters**, whose values will be unique to your environment.

If you provide correct values for the input parameters that each scenario requires, the workflow will be able to accomplish its objective. Output parameters from one step often serve as input parameters to another step.

- A **solution pack** contains a collection of related workflows and the steps, functions, and policies that implement each workflow.

More precisely, solution packs contain **workflow templates**. These are read-only versions of the workflows that cannot be deployed. To run a workflow included in a solution pack, you must first create a deployable copy of the workflow template and then customize that copy for your environment.

- A **deployment** associates a workflow with the targets (servers, instances, or databases) where the workflow will run. To run a workflow, you execute a specific deployment. A deployment is associated with one workflow; a workflow can have many deployments, each with its own targets and parameter settings.
- The umbrella term **automation items** is used to refer to those items to which role-based permissions can be assigned. Automation items include workflows, deployments, steps, and policies.

Organizations also have role-based permissions. Servers, instances, and databases inherit their role-based permissions from the organization in which the server resides.

- The **software repository** contains any files that a workflow might need to carry out its purpose (for example, software binaries or patch archives). If the files that a workflow requires are not in the software repository, they must be stored locally on each target server.

When you are using HP DMA with HP Server Automation (HP SA), the software repository is the HP SA Software Library.

- An **organization** is a logical grouping of servers. You can use organizations to separate development, staging, and production resources—or to separate logical business units. Because user security for running workflows is defined at the organization level, organizations should be composed with user security in mind.

Additional terms are defined in the [Glossary](#) on page 39.

Supported Products and Platforms

Hardware Requirements

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

Software Requirements

The latest HP DMA solution packs require the latest HP DMA platform. To use the latest solution packs, update the HP DMA platform. HP DMA 10.22 solution packs are supported on HP DMA 10.22 (and later).

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 web site:

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

Chapter 1: Quick Start

This tutorial shows you how to run a workflow. It uses the Run Oracle Compliance Audit workflow as an example—the workflow runs a compliance audit for Oracle Database on a single target. Other workflows can be run using the same process.

The tutorial will guide you through the following steps:

1. [Import the Solution Pack](#) on the next page
2. [Create a Deployable Workflow](#) on page 15
3. [Create a Deployment](#) on page 17
4. [Run Your Workflow](#) on page 21
5. [View the Results](#) on page 24

Note: In this tutorial, default values will be used for most input parameters. Before executing these steps, make sure that these default values are suitable for your environment.

For descriptions of all available input parameters for a specific HP DMA workflow, see the "Parameters" topic associated with the workflow in the pertinent user guide.

The information presented in this tutorial assumes the following:

- HP DMA is installed and operational.
- At least one valid target is available.

Note: This tutorial uses a very simple scenario to help you get started quickly. For detailed information about other workflows see the Workflow Details chapter in the pertinent user guide.

Import the Solution Pack

The following instructions assume that you have purchased a license for the HP DMA solution pack that you want to import.

The HP DMA 10.22 solution packs are included on the HP DMA 10.22 installation media. They are located in the following folders:

- The `DMA_10.22_Server_and_Client` folder contains the Discovery solution pack.

The Discovery solution pack is not automatically installed with HP DMA. You must import it if you want to use the discovery workflows.

- The `DMA_10.22_Database_Solution_Packs` folder contains all of the database solution packs (provisioning, advanced provisioning, patching, advanced patching, compliance, refresh, and release management).
- The `DMA_10.22_Middleware_Solution_Packs` folder contains all of the application server solution packs (provisioning, patching, configuration management, release management, and code release).

Note: Always check to see if there are more recent versions of the HP DMA solution packs available online. Due to frequent releases, it is likely that the solution packs provided on the installation media have since been updated.

To get the most recent version of a solution pack:

1. Go to the following web site: [HP Software Support Online](#)
2. Go to the Self-Solve tab, and sign in using your HP Passport credentials (see [Support](#) on page 3 for more information).
3. On the Advanced Search page, specify the following search criteria:

Product:	Database and Middleware Automation
Version:	All Versions
Operating System:	All Operating Systems
Document Type:	Patches

4. Click **Search**.
5. If there is a more recent version of the solution pack that you want to import, do the following:
 - a. Click the link for the solution pack that you want to import (for example: discovery 10.22).
 - b. Click the **DOWNLOAD PATCH** link, and download the ZIP file that contains the patch.

- c. From the patch ZIP file, extract the ZIP file that contains the solution pack.

Note: This ZIP file may be included in a larger ZIP file that contains multiple solution packs.

To import the solution pack:

1. On the system where you downloaded the solution pack, open a web browser, and go to the following address:

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

2. Log in to the HP DMA server using an account with Administrator capability.
3. On the Solutions > Installed tab, click the **Browse** button in the lower right corner. The Choose File dialog opens.

Note: This button and the dialog that subsequently opens may have different names depending on the browser that you are using.

4. Locate and select the solution pack ZIP file that you extracted earlier, and click **Open**.
5. Click **Import solution pack**.

To view basic information about the solution pack, hover your mouse over its name in the left pane:

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

Installed History

Installed Solutions

✓ Successfully imported [HP DMA Database Compliance Solution Pack](#)

SOLUTION PACKS	DETAILS
Version 10.20.0 HP DMA Application Server Patching Solution Pack Version 10.20.0	Name: HP DMA Database Compliance Solution Pack
HP DMA Application Server Provisioning Solution Pack Version 10.10.0	Version: 10.22.0
HP DMA Application Server Release Management Solution Pack Version 10.20.0	Targets: 1
HP DMA Database Compliance Solution Pack Version 10.22.0	Installed: 23 Oct, 2013
HP DMA Database Patching Solution Pack Version 10.20.0	Description: Provides CIS Level I and II, PCI, and SOX auditing for Oracle Database, Microsoft SQL Server, and Sybase ASE. PCI and SOX compliance checks are currently mappings to the existing CIS audits. Build 35361
HP DMA Database Provisioning Solution Pack Version 10.20.0	
HP DMA Database Refresh Solution Pack Version 10.10.0	
HP DMA Database Release Management Solution Pack Version 10.20.0	
HP DMA Discovery Solution Pack Version 10.20.0	
QA Common Steps Tests Version 10.20.0	

Choose File No file chosen Import solution pack

To view detailed information about the solution pack, click its name in the left pane. To view a list of the workflows that the solution pack contains, go to the Workflows tab.

The screenshot displays the HP DMA Database Compliance Solution Pack interface. At the top, there is a navigation bar with tabs for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, there are sub-tabs for Installed and History. The main title is "HP DMA Database Compliance Solution Pack" with a version number of 10.22.0. Below the title, there are tabs for General, Policies, Workflows, Steps, and Reports. The Workflows tab is selected, showing a list of workflows in a table. The left pane shows a list of solution packs, with "Run Oracle Compliance Audit" selected.

Workflow Name	Order
• Gather Parameters for Oracle Compliance	1
• Gather Advanced Parameters for Oracle Compliance	2
• Failure	3
• Prepare Server	4
• Validate Compliance Parameters	5
• Get Oracle Home	6
• Prepare Oracle Instance	7

Create a Deployable Workflow

The workflow templates provided by HP in your solution pack are read-only and cannot be deployed. When you are viewing a read-only item in the HP DMA web UI, you will see the lock icon in the lower right corner:



Read-only workflows are not deployable. You can create a deployable workflow by making a copy of a workflow template.¹

To create a deployable copy of the workflow template:

1. In the HP DMA web interface, go to Solutions > Installed.
2. In the left pane, click the desired solution pack, for example: Database Compliance Solution Pack.
3. Go to the Workflows tab.
4. From the list of workflows, select the desired workflow template, for example: Run Oracle Compliance Audit.
5. Click the **Copy** button in the lower left corner.
6. 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)
 - Type – OS (this will be selected as a result of the copy)
 - Target level – Instance (this will be selected as a result of the copy)
7. On the Roles tab, grant Read access to at least one user or group and Write access to at least one user or group.
8. *Optional:* Expose hidden parameters (for more information, see [How to Expose Additional Workflow Parameters](#)).
9. Click **Save**.

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

¹For more information about creating and customizing workflows, see the *HP DMA User Guide*. This document is available on the HP Software Support web site: <https://softwaresupport.hp.com/>

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

10. Click the **deploy the workflow now** link in the green message bar.

Create a Deployment

Before you can run your new workflow, you must create a deployment. A deployment associates a workflow with one or more specific targets (servers, instances, or databases).

To create a 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 page.
 - b. In the lower right corner, click **New deployment**.
2. Specify the following:
 - Name – Name that will appear in the list of available deployments.
 - Workflow – From the drop-down list, select the deployable workflow (the copy) that you just created.
 - Schedule – Frequency or date when the workflow will run. Select None so that the workflow will run once when you explicitly tell it to run.

- From the list of AVAILABLE targets on the left side of the Targets area, click the **ADD** link for the instance where the workflow will run.

The screenshot displays the 'New deployment' interface in the HP Database & Middleware Automation console. The navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. The 'Deployments' tab is active, showing options for 'Workflows', 'Steps', 'Functions', 'Policies', 'Run', 'Console', and 'History'.

The 'New deployment' section has three tabs: 'Targets', 'Parameters', and 'Roles'. The 'Targets' tab is selected, showing the following configuration:

- Name: My Deployment - Oracle Compliance
- Workflow: My Copy of Run Oracle Compliance Audit (with a [VIEW WORKFLOW](#) link)
- Schedule: None

The 'Targets' area is split into two panes:

- AVAILABLE:** A list of targets grouped by server. The first group is 'ORCL1.MYCOMPANY.COM' with an [ADD ALL](#) link. Below it are instances 'inst1', 'inst2', and 'inst3', each with an [ADD](#) link. A red arrow labeled 'Instance' points to 'inst1'. The second group is 'ORCL2.MYCOMPANY.COM' with an [ADD ALL](#) link, containing instances 'DB1' and 'DB2'. The third group is 'ORCL3.MYCOMPANY.COM' with an [ADD ALL](#) link, containing instances 'LN_DS' and 'NY_DS'. The fourth group is 'ORCL4.MYCOMPANY.COM' with an [ADD ALL](#) link.
- SELECTED:** A list of selected targets. It contains 'ORCL1.MYCOMPANY.COM' with a [REMOVE ALL](#) link, and 'inst1' with a [REMOVE](#) link.

At the bottom of the interface, there are 'Save' and 'CANCEL' buttons.

4. On the Parameters tab, specify values for the following input parameters:

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

New deployment

Targets Parameters Roles

Gather Parameters for Oracle Compliance

Compliance Type: Fixed Value ▼
Compliance type that will be audited by the workflow.
Compliance types supported: CIS, PCI, SOX. Will be defaulted to CIS.

Excluded Compliance Checks: Fixed Value ▼
Optional: Checks to exclude from of Compliance Checks

Inventory Files: Fixed Value ▼
Optional: Comma separated list of fully qualified Oracle inventory files. If not specified, default to /etc/orainst.loc, /var/opt/oracle/orainst.loc, or %ProgramFile%\Oracle Inventory.

Gather Advanced Parameters for Oracle Compliance

Email Addresses to Receive Report: Fixed Value ▼
Optional: Provide an email address or multiple email addresses (separated by commas without spaces) that you would like to receive an email message containing the results of the compliance tests run against the specified target.

or

Note: These are a subset of the required parameters for this workflow. Parameters that are not visible in the deployment will have default values. For descriptions of all available input parameters for a specific HP DMA workflow, see the "Parameter" topic for that workflow in the pertinent user guide.

If you want to specify values for hidden parameters, they must be exposed when you create a deployable copy of the workflow (see [Create a Deployable Workflow](#)).

If you do not want to specify a Fixed Value, the following options are also available from the drop-down menu:

- Custom Field
- Policy Attribute

- Runtime Value

Use Runtime Value to specify a parameter value when you run the workflow. This option cannot be used for scheduled deployments.

5. Click **Save**.

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

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

6. Click the **run the workflow now** link in the green message bar.

Run Your Workflow

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

To run the 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 page.
 - b. In the list of WORKFLOWS on the left side, select the workflow that you created.
 - c. In the list of DEPLOYMENTS on the right side, select the deployment that you just created.

2. In the lower left pane, select the target (server, instance, or database) where you want to run the workflow.

The screenshot displays the HP Database & Middleware Automation interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this, a secondary navigation bar lists 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled 'Run Workflow' and features a 'Filter' input field. A list of workflows is shown, with 'My Copy of Run Oracle Compliance Audit' selected. A red arrow points to this workflow, labeled 'Workflow name'. To the right, a pane shows the details of the selected workflow, 'My Deployment - Oracle Compliance', with a red arrow pointing to it labeled 'Deployment name'. Below this, a tree view shows the target selector 'ORCL1.MYCOMPANY.COM' with a sub-entry 'inst1' selected. Red arrows point to 'inst1' with labels 'Instance' and 'Server', and another red arrow points to the selection checkbox with the label 'Target selector'. The bottom pane displays the workflow steps: 'Gather Parameters for Oracle Compliance' (Step 1), 'Gather Advanced Parameters for Oracle Compliance' (Step 2), and 'Prepare Server' (Step 3). The parameters for Step 1 are: Compliance Type: CIS, Excluded Compliance Checks, and Inventory Files: /etc/orainst.loc. The parameters for Step 2 are: Email Addresses to Receive Report: DBAdminTeam@mycompany.com. The parameters for Step 3 are: No parameters. A 'Run workflow' button is located at the bottom right.

3. Click the **Run workflow** button.
4. If you selected Runtime Value for any parameters in the deployment you will be prompted to specify values.
5. The following message is displayed:



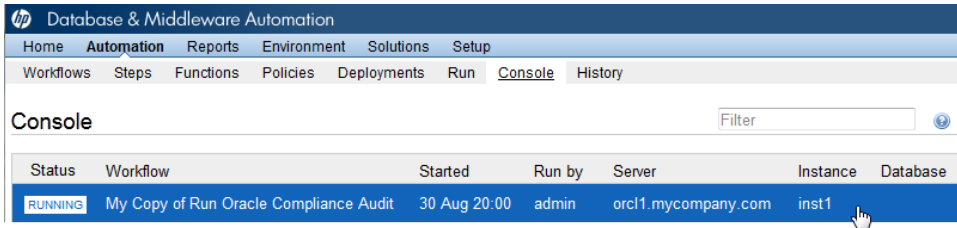
✓ Workflow started successfully. For status, see the [console](#) or [history](#).

6. To view the progress of your deployment, click the **console** link in the green message bar.

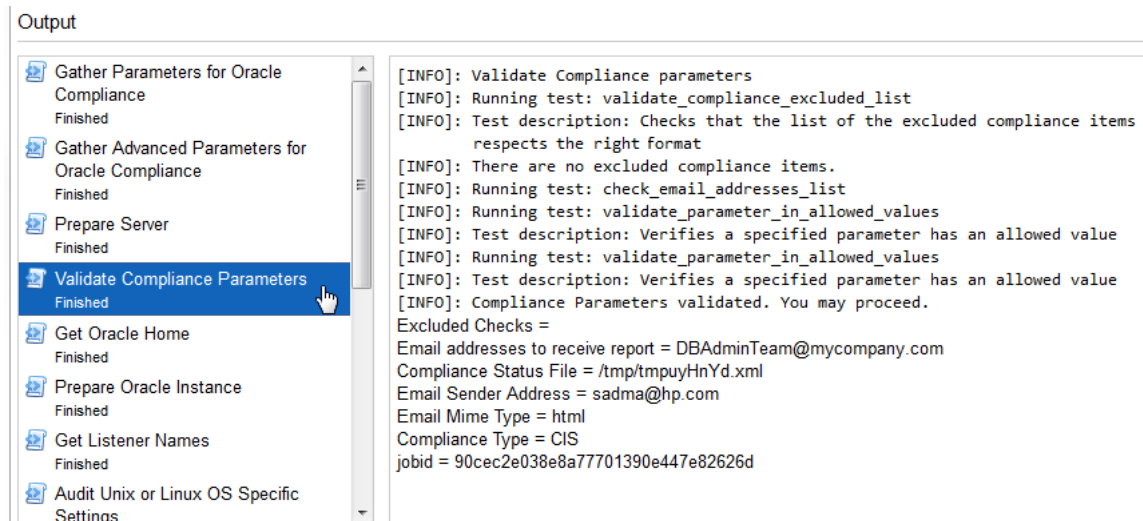
View the Results

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

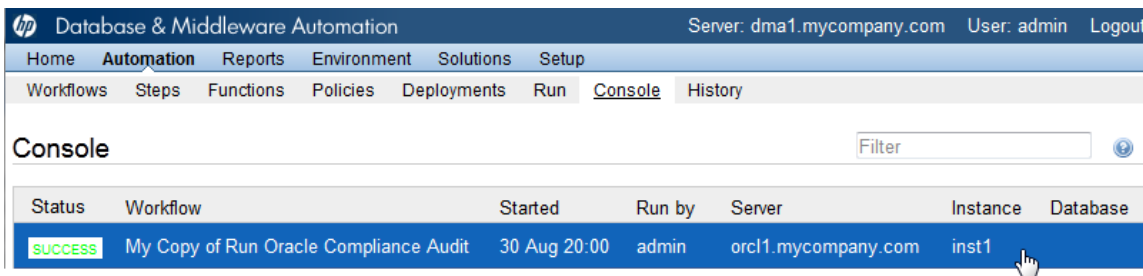
To view the progress of the workflow as the deployment proceeds, click the workflow name in the upper box on the Console page.



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 SUCCESS, FAILURE, or FINISHED depending on the outcome of the workflow.



After the workflow has finished running, you can view a summary of your deployment on the History page. This page lists all the deployments that have run on this HP DMA server during the time period specified in the Filter box.

To view step-by-step results, select the row in the table that corresponds to your deployment.

hp Database & Middleware Automation

Home **Automation** Reports Environment Solutions Setup

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	SUCCESS	My Copy of Run Oracle Comp My Deployment -	10 May 14:13	admin	orcl1.mycompany.com	inst1		
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

```

Gather Parameters for Oracle Compliance
10 May 14:13 - 10 May 14:14 Exit: 0 Server: orcl1.mycompany.com, Instance: inst1
[INFO]: Gather Parameters for Oracle Compliance

Gather Advanced Parameters for Oracle Compliance
10 May 14:14 - 10 May 14:14 Exit: 0 Server: orcl1.mycompany.com, Instance: inst1
[INFO]: Gather Advanced Parameters for Oracle Compliance

Prepare Server
10 May 14:14 - 10 May 14:14 Exit: 0 Server: orcl1.mycompany.com, Instance: inst1

Validate Compliance Parameters
10 May 14:14 - 10 May 14:14 Exit: 0 Server: orcl1.mycompany.com, Instance: inst1
[INFO]: Validate Compliance parameters
[INFO]: Running test: validate_compliance_excluded_list
[INFO]: Test description: Checks that the list of the excluded compliance
items respects the right format
[INFO]: There are no excluded compliance items.
[INFO]: Running test: check_email_addresses_list
[INFO]: Running test: validate_parameter_in_allowed_values
[INFO]: Test description: Verifies a specified parameter has an allowed value
[INFO]: Running test: validate_parameter_in_allowed_values
[INFO]: Test description: Verifies a specified parameter has an allowed value
    
```

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:

- Step Output – any informational messages that were produced
- Step Errors – any errors that were reported
- Step Header – values assigned to any output parameters
- Connector Output – any informational messages related to the connection to your server management tool
- Connector Errors – any errors that were reported by the connector to your server management tool—if any errors were reported a red asterisk (*) appears on the tab

Chapter 2: Additional Resources

For additional information about using HP DMA, see the following documents:

Purpose	Document
To install HP DMA	<i>Database and Middleware Automation Installation Guide</i>
For help troubleshooting the HP DMA installation process	<i>Database and Middleware Automation Troubleshooting Guide</i>
To accomplish HP DMA administration tasks	<i>Database and Middleware Automation Administration Guide</i>
To use the HP DMA web interface	<i>Database and Middleware Automation Platform User Guide</i>
To learn more about what HP DMA is and how it works	<i>Database and Middleware Automation Concepts Guide</i>
For information about specific solution packs and workflows	See the HP DMA solution pack user guides

These documents are part of the HP DMA documentation library, which is available on the HP Software Support web site:

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

For additional information about using HP DMA APIs, see the following WebHelp:

Purpose	Document
To use the HP DMA application programming interfaces (APIs)	<i>HP DMA API Reference WebHelp</i> is available on all HP DMA Servers at: <code>https://<DMA_SERVER>:8443/dma/api</code> Here, <DMA_SERVER> is the fully qualified host name of your HP DMA server.

Chapter 3: Tips and Best Practices

This portion of the document contains a collection of tips and best practices that will enable you to use HP DMA more effectively. It contains the following topics:

- [How a Solution Pack is Organized](#) on the next page
- [How to Expose Additional Workflow Parameters](#) on page 33
- [How to Use a Policy to Specify Parameter Values](#) on page 34
- [How to Import a File into the Software Repository](#) on page 37

How a Solution Pack is Organized

Note: This topic uses the Run Oracle Compliance Audit workflow in the Database Compliance solution pack as an example. The information provided here, however, pertains to any solution pack.

In HP DMA, a **workflow** executes a process —such as installing a software product or checking a database instance for compliance with a specific security benchmark.

A **solution pack** contains one or more related **workflow templates**.

Each workflow template has a Documentation tab that provides detailed information about that workflow.

The screenshot displays the HP Database & Middleware Automation web interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. A secondary navigation bar lists 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled 'My Copy of Run Oracle Compliance Audit' and features several tabs: 'Documentation' (selected), 'Workflow', 'History', 'Deployments', and 'Roles'. Below the tabs, there are input fields for 'Name' (My Copy of Run Oracle Compliance Audit), 'Tags', 'Type' (Oracle), and 'Target level' (Instance). The 'Documentation' section is expanded, showing three sub-sections: 'Purpose', 'Description', and 'Parameters'. The 'Purpose' section states the audit's goal and lists benchmarks like CIS Security Configuration Benchmark for Oracle Database Server 11g, CIS Security Benchmark for Oracle 9i/10g, PCI Data Security Standard, and SOX. The 'Description' section explains the workflow's process. At the bottom, there are action buttons: DELETE, EXPORT, EXTRACT POLICY, and DEPLOY, along with 'Copy', 'Save', and 'CANCEL' options.

A workflow consists of a sequence of **steps**. Each step performs a very specific task. Each step includes a documentation panel that briefly describes its function.

The screenshot displays the HP Database & Middleware Automation web interface. At the top, there is a navigation bar with the HP logo and the title 'Database & Middleware Automation'. Below this, a secondary navigation bar contains links for 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. A third navigation bar lists 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled 'Get Oracle Home' and features several tabs: 'General', 'Action', 'Parameters', 'History', 'Workflows', 'Solutions', and 'Roles'. The 'General' tab is active, showing two columns: 'Properties' and 'Documentation'. The 'Properties' column lists: Name: Get Oracle Home, Tags: (empty), Type: Oracle, Category: Script, and Targetable: . The 'Documentation' column contains a scrollable text area with the following content: 'Description: Get the value of ORACLE_HOME from the appropriate source: - The /etc/oratab or /var/opt/oracle/oratab file on UNIX - The registry on Windows', 'Dependencies: None', 'Input Parameters: None', 'Output Parameters: - Oracle Home = The fully qualified name of the ORACLE_HOME - Oracle SID = The Oracle server (instance) ID', and 'Return Code: 0 = Step was successful'. At the bottom of the interface, there is a 'Copy' button on the left and a lock icon with the text 'THIS STEP IS READ ONLY' on the right.

Steps can have input and output **parameters**. Output parameters from one step often serve as input parameters to another step. Steps can be shared among workflows.

Parameter descriptions are displayed on the Parameters tab for each step in the workflow.

Database & Middleware Automation

Home **Automation** Reports Environment Solutions Setup

Workflows **Steps** Functions Policies Deployments Run Console History

Parse Oracle Inventory

General Action **Parameters** History Workflows Solutions Roles

Parameters

INPUT PARAMETERS ADD

- Inventory Files X
- Oracle Account X
- Oracle Home X
- Server Wrapper X

OUTPUT PARAMETERS ADD

- CRS Account X
- CRS Active Version X
- CRS Group X
- CRS Home X
- CRS Home Name X
- CRS Nodes X
- Cluster Nodes X
- Inventory Groups X
- Inventory Locations X

X Parameter is in use and cannot be removed.

Parameter descriptions are also displayed on the Workflow tab for each workflow.

Get Listener Names / Oracle SIDs

Optional: Comma delimited list of ORACLE_SIDs, at least one of which a resulting listener must service. If blank, listeners are not limited to those servicing any specific ORACLE_SID.

To see the parameter description here

▶	7	Prepare Oracle Instance	0	3, 8
▼	8	Get Listener Names	0	3, 9
Listener Homes: Prepare Oracle Instance.Oracle Home				
Oracle SIDs: Get Oracle Home.Oracle SID ← Click here				
▶	9	Audit Unix or Linux OS Specific Settings	0	3, 10
▶	10	Audit Installation and Patch	0	11, 12

Parameter descriptions are also displayed on the Parameters tab in the **deployment** (organized by step).

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

Run Oracle Compliance CIS

Targets Parameters Roles

Gather Parameters for Oracle Compliance

Compliance Type: Fixed Value ▾
Compliance type that will be audited by the workflow. Compliance types supported: CIS, PCI, SOX. Will be defaulted to CIS.

Excluded Compliance Checks: Fixed Value ▾
Optional: Checks to exclude from of Compliance Checks

Inventory Files: Fixed Value ▾
Optional: Comma separated list of fully qualified Oracle inventory files. If not specified, default to /etc/orainst.loc, /var/opt/oracle/orainst.loc, or %ProgramFiles%\Oracle\Inventory.

Gather Advanced Parameters for Oracle Compliance

Email Addresses to Receive Report: Fixed Value ▾
*Optional. Provided an email address or multiple email addresses separated by commas without spaces that you would like to receive an email of the results of the compliance tests run against the target specified.

[X DELETE](#) [▶ RUN](#) [Restore defaults](#) [Copy](#) [Save](#) or [CANCEL](#)


Note: The workflow templates included in this solution pack are read-only and cannot be deployed. To use a workflow template, you must first create a copy of the template and then customize that copy for your environment.





How to Expose Additional Workflow Parameters

Each workflow in this solution pack has a set of input parameters. Some are required and some are optional. To run a workflow in your environment, you must specify values for a subset of these parameters when you create a deployment.

By default, only a few of the input parameters for each workflow are visible on the Deployment page, and the rest are hidden. In order to specify a value for a parameter that is currently hidden, you must first expose that parameter by changing its mapping in the workflow editor.

To expose a hidden workflow parameter:

1. In the HP DMA web interface, go to Automation > Workflows.
2. From the list of workflows, select a deployable workflow.
3. Go to the Workflow tab.
4. In the list of steps below the workflow diagram, click the  (blue arrow) to the immediate left of the pertinent step name. This expands the list of input parameters for this step.
5. For the parameter that you want to expose, select - User Selected - from the drop-down list.
For example:

Step	Name	Required Result	Next
▼ 1	Gather Parameters for Oracle Compliance		2 
	Compliance Type: - User selected -		
	Excluded Compliance Checks: - User selected -		
	Inventory Files: - User selected -		

6. Repeat steps 4 and 5 for all the parameters that you would like to specify in the deployment.
7. Click **Save** in the lower right corner.

How to Use a Policy to Specify Parameter Values

It is sometimes advantageous to provide parameter values by using a policy rather than explicitly specifying the values in a deployment. This approach has the following advantages:

- The policy can be used in any deployment.
- It is faster and less error-prone than specifying parameter values manually.
- For parameter values that change frequently—for example, passwords that must be changed regularly—you only need to update them in one place.

To establish a policy, you can either [Create a Policy](#) or [Extract a Policy](#) from a workflow.

After you establish the policy, you must [Reference the Policy in the Deployment](#).

For more information, see the *HP DMA User Guide*. This document is available on the HP Software Support web site: <https://softwaresupport.hp.com/>

Create a Policy

The first step in this approach is to create a policy that provides parameter values. There are two ways to do this: (1) create a new policy, and define all attributes manually (as shown here) or (2) extract a policy from a workflow (see [Extract a Policy](#) on the next page).

To create a policy that provides parameter values:

1. In the HP DMA web UI, go to Automation > Policies.
2. Click **New Policy**.
3. In the **Name** box, specify the name of the policy
4. For each parameter value that you want to provide using this policy, perform the following actions on the Attributes tab:
 - a. From the drop-down list, select the type of attribute:
 - A Text attribute contains simple text that users can view while deploying and running workflows.
 - A List attribute contains a comma-separated list of values (or a large amount of text not suitable for a Text attribute).
 - A Password attribute contains simple text, but the characters are masked so that users cannot see the text.

- b. In the text box to the left of the Add button, specify the name of the attribute.

For your convenience, this name should be similar to the parameter name used in the pertinent workflow (or workflows).

- c. Click **Add**.
- d. In the new text box to the right of the attribute's name, enter a value for this attribute.

To remove an attribute, click the **Remove** button.

5. On the Roles tab, grant Read and Write permission to any additional users and groups who will be using this policy. By default, any groups to which you belong have Read and Write permission.
6. Click the **Save** button (lower right corner).

Extract a Policy

An alternative to creating your own policy one attribute at a time is to extract the policy. This automatically creates 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 screen.
4. Specify values for each attribute listed.
5. *Optional:* Remove any attributes that you do not want to use.
6. *Optional:* Add any new attributes that you 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**.

Reference the Policy in the Deployment

After you create a policy, you can reference its attributes in a deployment.

To reference policy attributes in a deployment:

1. Create or access the deployment.

See “Deployments” in the *HP DMA User Guide* for details.

2. On the Parameters tab, perform the following steps for each parameter whose value you want to provide by referencing a policy attribute:

- a. In the drop-down menu for that parameter, select **Policy Attribute**.
- b. In the text box for that parameter, type any character. A drop-down list of policy attributes appears. For example:

Admin Password: Policy Attribute ▼

- Discovery.Web Service Password
- DTE - Policy.Password
- MyParameterValues.MyAdminPassword**
- MyParameterValues.MyAdminUser
- MyParameterValues.MyDBUser
- MyParameterValues.MyDBUserPassword
- oracle software.oracle software

- c. From the drop-down list, select the attribute that you want to reference. For example:

Admin Password: Policy Attribute ▼

3. Click **Save** to save your changes to the deployment.

How to Import a File into the Software Repository

Many HP DMA workflows are capable of downloading files from the software repository on the HP DMA server to the target server (or servers) where the workflow is running. The following procedure shows you how to import a file into the software repository so that it can be downloaded and deployed by a workflow.

HP DMA uses the HP Server Automation (HP SA) Software Library as its software repository.

Tip: Be sure to use unique file names for all files that you import into the software repository.

To import a file into the HP SA Software Library:

1. Launch the HP SA Client from the Windows Start Menu.

By default, the HP SA Client is located in Start → All Programs → HP Business Service Automation → HP Server Automation Client

If the HP SA Client is not installed locally, follow the instructions under “Installing the SA Client Launcher” in the *User Guide: Server Automation*, available on the HP Software Support web site: <https://softwaresupport.hp.com/>

2. In the navigation pane in the HP SA Client, select Library → By Folder.
3. Select (or create) the folder where you want to store the file.
4. From the Actions menu, select **Import Software**.
5. In the Import Software dialog, click the **Browse** button to the right of the File(s) box.
6. In the Open dialog:
 - a. Select the file (or files) to import.
 - b. Specify the character encoding to be used from the Encoding drop-down list. The default encoding is English ASCII.
 - c. Click **Open**. The Import Software dialog reappears.
7. From the Type drop-down list, select **Unknown**.
8. If the folder where you want to store the files does not appear in the Folder box, follow these steps:
 - a. Click the **Browse** button to the right of the Folder box.
 - b. In the Select Folder window, select the import destination location, and click **Select**. The Import Software dialog reappears.

9. From the Platform drop-down list, select all the operating systems listed.
10. Click **Import**.

If one of the files that you are importing already exists in the folder that you specified, you will be prompted regarding how to handle the duplicate file. Press F1 to view online help that explains the options.

11. Click **Close** after the import is completed.

Glossary

A

automation items

The umbrella term automation items is used to refer to those items to which role-based permissions can be assigned. Automation items include workflows, deployments, steps, and policies.

C

cross-platform

Cross-platform database refresh involves converting the data from one type of byte ordering to another. This is necessary, for example, if you want to load a database dump file on a little-endian Linux target that was created on a big-endian Solaris server.

custom field

Custom Fields are used to customize workflows or show information about the environment. Custom Fields can be used in workflow steps to automatically supply information that is specific to an organization, server, instance, or database.

D

deployment

Deployments associate a workflow with a target environment in which a workflow runs. You can customize a deployment by specifying values for any workflow parameters that are designated - User Selected - in the workflow. You must save a deployment before you can run the workflow. You can re-use a saved deployment as many times as you like.

F

function

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. Functions are "injected" into the step code just prior to step execution.

I

input parameters

A workflow has a set of required parameters for which you must specify a value. The required parameters are a subset of all the parameters associated with that workflow. The remaining parameters are considered optional. You can specify a value for an optional parameter by first exposing it using the workflow editor and then specifying the value when you create a deployment.

M

mapping

An input parameter is said to be "mapped" when its value is linked to an output parameter from a previous step in the workflow or to a metadata field. Mapped parameters are not visible on the Deployment page. You can "unmap" a parameter by specifying - User Selected - in the workflow editor. This parameter will then become visible on the Deployment page.

O

organization

An organization is a logical grouping of servers. You can use organizations to separate development, staging, and production resources - or to separate logical business units.

P

parameters

Parameters are pieces of information - such as a file system path or a user name - that a step requires to carry out its action. Values for parameters that are designated User Selected in the workflow can be specified in the deployment. Parameters that are marked Enter at Runtime in the deployment must be specified on the target system when the workflow runs.

policy

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 HP DMA to manage groups of hundreds or thousands of servers at a time without the need to configure each individual server.

R

role

Each HP DMA user has one or more roles. Roles are used to grant users permission to log in to and to access specific automation items and organizations. Roles are defined in your server management tool. Before you can associate a role with an automation item

or organization, however, you must register that role in HP DMA.

S

smart group

Smart Groups are dynamic groups of servers, instances, or databases defined by some criteria. They are used to specify targets for deployments. As information about an environment object changes, its membership in the groups is re-evaluated.

software repository

The software repository is where the workflow will look for any required files that are not found on the target server. If you are using HP DMA with HP Server Automation (SA), this repository is the SA Software Library.

solution pack

A solution pack contains one or more related workflow templates. These templates are read-only and cannot be deployed. To run one of the workflows included in a solution pack, you must first create a deployable copy of that template and then customize that copy for your environment. Solution packs are organized by function - for example: database patching or application server provisioning.

steps

Steps contains the actual code used to perform a unit of work detailed in a workflow.

T

target instance

In the context of MS SQL database refresh, the term "target instance" refers

to the SQL Server instance where the database that will be restored resides.

W

workflow

A workflow automates the process followed for an operational procedure. Workflows contain steps, which are linked together to form business logic for a common task. Workflows connect existing tasks in order to perform a new business process by building on existing best practices and processes.

workflow editor

The workflow editor is the tool that you use to assemble steps into workflows. You can map each input parameter to output parameters of previous steps or built-in metadata (such as the server name, instance name, or database name). You can also specify User Selected to expose a parameter in the deployment; this enables the person who creates the deployment to specify a value for that parameter.

workflow templates

A workflow template is a read-only workflow that cannot be deployed. To run one of the workflows included in a solution pack, you must first create a deployable copy of the workflow template and then customize that copy for your environment.