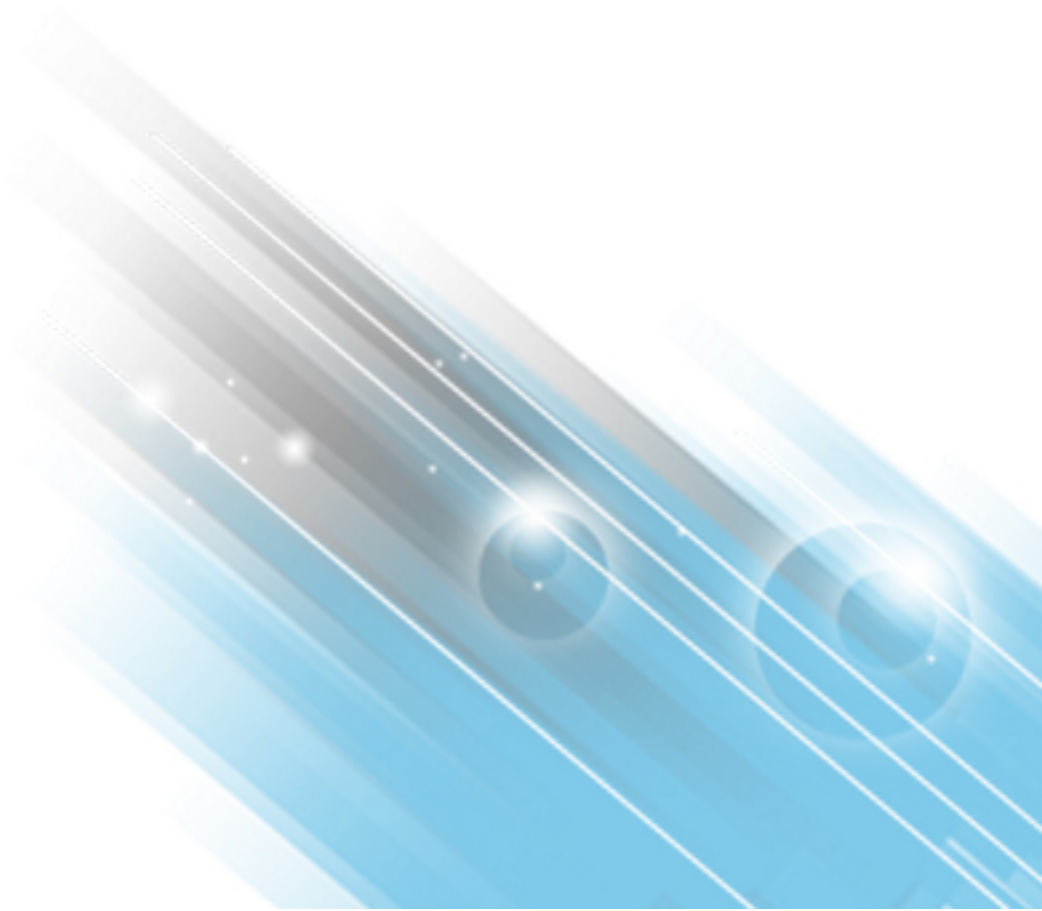
HP Database and Middleware Automation

Software Version: 10.30
Linux, Solaris, AIX, and HP-UX

Oracle Database Patching



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

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

Document Changes

Chapter	Version	Changes
Title Page Legal Notices	10.01	Updated version number, software release date, document release date, and copyright date range.
Oracle Database Patching Quick Start	10.01	Updated from 10.00 to 10.01.

Document Changes, continued

Chapter	Version	Changes
Title Page Legal Notices	10.10	Updated version number, software release date, document release date, and copyright date range.
About HP DMA Solution Packs	10.10	Added overview topic: About HP DMA Solution Packs.
Title Page Legal Notices	10.20	Updated version number, software release date, document release date, and copyright date range.
Oracle Database Patching Quick Start Workflow Details	10.20	Removed the Quick Start chapter. In the "How to Run this Workflow" sections, pointed to the *HP DMA Quick Start Tutorial*.
The Oracle Database Patching Solution Workflow Details	10.20	Updated workflows delivered in this release. Added list of deprecated workflows. Replaced Apply Critical Patch Update to Oracle Home and Apply Critical Patch Update to Oracle Database with Oracle - Patch Home and Databases. Replaced Rollback Critical Patch Update from Oracle Home and Rollback Critical Patch Update from Oracle Database with Oracle - Rollback Patch from Home and Databases.
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.
Oracle - Rollback Patch from Home and Databases	10.22	HP DMA now uses the `trustAllCertificates` parameter in the `dma.xml` file rather than the Trust SSL Certificates workflow parameter.
Title Page Legal Notices Entire guide	10.30	Updated version number, software release date, document release date, and copyright date range. Updated to new documentation template.

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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

About HP DMA Solution Packs 7

Audience 8

Document Map 9

Important Terms 10

Chapter 1: The Oracle Database Patching Solution 11

- What this Solution Includes 12
- Deprecated Oracle Patching Workflows 13
- Supported Products and Platforms 14

Chapter 2: Workflow Details 15

- How to Use the Workflows Together 17
- Oracle - Patch Home and Databases 19
  - Prerequisites for this Workflow 20
  - How this Workflow Works 21
  - How to Run this Workflow 26
  - Sample Scenario 29
  - Parameters for Oracle - Patch Home and Databases 34
- Oracle - Rollback Patch from Home and Databases 36
  - Prerequisites for this Workflow 37
  - How this Workflow Works 38
  - How to Run this Workflow 42
  - Sample Scenario 45
  - Parameters for Oracle - Rollback Patch from Home and Databases 46
- Apply Oracle Patchset 49
  - Prerequisites for this Workflow 50
  - How this Workflow Works 51
  - How to Run this Workflow 56
  - Sample Scenario 59
  - Parameters for Apply Oracle Patchset 61
- Clone Oracle Home 65
  - Prerequisites for this Workflow 66
  - How this Workflow Works 67
  - How to Run this Workflow 70
  - Sample Scenario 72
  - Parameters for Clone Oracle Home 73
- Migrate Oracle Home 75
  - Prerequisites for this Workflow 76
  - How this Workflow Works 77

How to Run this Workflow 81
Sample Scenario 83
Parameters for Migrate Oracle Home 85

Chapter 3: Reference Information 87
Oracle Product Documentation 87
HP DMA Documentation 87

Chapter 4: Tips and Best Practices 88
How a Solution Pack is Organized 89
How to Expose Additional Workflow Parameters 93
How to Use a Policy to Specify Parameter Values 94
Create a Policy 94
Extract a Policy 95
Reference the Policy in the Deployment 96
How to Import a File into the Software Repository 97

Chapter 5: Troubleshooting 98
Target Type 98
User Permissions and Related Requirements 98
Discovery in HP DMA 99

Glossary 100

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 solution is designed for:

- IT architects and engineers who are responsible for planning, implementing, and maintaining Oracle® Database environments
- Engineers who are implementing—or planning to implement—HP Database and Middleware Automation (HP DMA)

To use this solution, you should be familiar with Oracle Database and its requirements (see links to the Oracle Product Documentation on page 87).

Document Map

The following table shows you how to navigate this guide:

Topic	Description
The Oracle Database Patching Solution	General information about this solution, including what it contains.
Workflow Details	Information about each of the workflows included in this solution, including: prerequisites, how it works, how to run it, sample scenarios, and a list of input parameters.
Reference Information	Links to pertinent Oracle Database documentation and more information about HP DMA.
Tips and Best Practices	Simple procedures that you can use to accomplish a variety of common HP DMA tasks.
Troubleshooting	Tips for solving common problems.

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 100.

Chapter 1: The Oracle Database Patching Solution

The HP Database and Middleware Automation (HP DMA) Database Patching solution provides tools to patch your Oracle Database components in an efficient, automated way.

When performed manually, patching can be error-prone, time consuming, and difficult to scale. Automating patching tasks enables you to achieve greater efficiency and faster change delivery with higher quality and better predictability.

Benefits of using these HP DMA tools rather than patching your databases manually:

- You can patch your databases across multiple targets in either a development or production environment.
- You can use a variety of Oracle-supplied patches.
- You can easily roll back your system to a previous patch level.
- You can reduce database down time.
- You can reduce patching errors thanks to safeguards that HP DMA provides.

By consistently using the tools provided in this solution, you can apply your database patches more accurately and consistently—and save time in the process.

Note: The HP DMA Oracle Database patching workflows do not support Oracle One Off Patches but only the Oracle Quarterly patches.

What this Solution Includes

This solution includes the following workflows:

Workflow Template	Description
Oracle - Patch Home and Databases	This workflow applies an Oracle Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home and to the Oracle Database Instances associated with the Oracle Home. It also updates the OPatch version if the OPatch Archive file is specified.
Oracle - Rollback Patch from Home and Databases	This workflow rolls back a Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) from an Oracle Home and from the Oracle Database Instances associated with the Oracle Home.
Apply Oracle Patchset	This workflow applies an Oracle Software Patch Set to an existing Oracle Home and Oracle Database.
Clone Oracle Home	This workflow makes a clone (copy) of an Oracle Home on the same server.
Migrate Oracle Home	This workflow moves an Oracle Instance from one Oracle Home to another Oracle Home.

Deprecated Oracle Patching Workflows

The following Oracle workflows have been deprecated from the solution pack and removed from the product:

Workflow Template	Description
Apply Critical Patch Update to Home	This workflow applies an Oracle Critical Patch Update (CPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home. It also updates the OPatch version if the OPatch Archive file is specified. This workflow has been replaced by the Oracle - Patch Home and Databases workflow that patches both the Oracle Home and databases.
Apply Critical Patch Update to Database	This workflow applies the database portion of an Oracle Critical Patch Update (CPU), Patch Bundle, or Patch Set Update (PSU). This workflow has been replaced by the Oracle - Patch Home and Databases workflow that patches both the Oracle Home and databases.
Rollback Critical Patch Update from Database	This workflow rolls back the database portion of a Critical Patch Update (CPU), Patch Bundle, or Patch Set Update (PSU). This workflow has been replaced by the Oracle - Rollback Patch from Home and Databases workflow that rolls back patches from both the Oracle Home and databases.
Rollback Critical Patch Update from Home	This workflow rolls back a Critical Patch Update (CPU), Patch Bundle, or Patch Set Update (PSU) from an Oracle Home. This workflow has been replaced by the Oracle - Rollback Patch from Home and Databases workflow that rolls back patches from both the Oracle Home and databases.

Tip: Documentation for deprecated workflows is available in the *HP DMA Oracle Database Patching User Guide* for HP DMA version 10.10. This document is available on the HP Software Support web site: https://softwaresupport.hp.com/

Supported Products and Platforms

Operating Systems

The Oracle Database patching workflows are supported on the following operating system platforms.

- Red Hat Enterprise Linux
- Solaris
- AIX
- HP-UX

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/

HP DMA Hardware Requirements

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

HP DMA 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 10.30 solution packs are supported on HP DMA 10.30 (and later).

Oracle Requirements

For database product hardware and software requirements, see the pertinent Oracle Product Documentation.

Chapter 2: Workflow Details

This solution pack contains the following workflows:

Workflow Template	Description
Oracle - Patch Home and Databases	This workflow applies an Oracle Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home and to the Oracle Database Instances associated with the Oracle Home. It also updates the OPatch version if the OPatch Archive file is specified.
Oracle - Rollback Patch from Home and Databases	This workflow rolls back a Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) from an Oracle Home and from the Oracle Database Instances associated with the Oracle Home.
Apply Oracle Patchset	This workflow applies an Oracle Software Patch Set to an existing Oracle Home and Oracle Database.
Clone Oracle Home	This workflow makes a clone (copy) of an Oracle Home on the same server.
Migrate Oracle Home	This workflow moves an Oracle Instance from one Oracle Home to another Oracle Home.

Each workflow included in this solution pack has a set of input parameters whose values will be unique to your environment. If you provide correct values for the parameters that each scenario requires, the workflow will be able to accomplish its objective.

There are two steps required to customize this solution:

1. Ensure that all required parameters are visible. You do this by using the workflow editor.

   For simple patching scenarios, you can use the default values for most parameters. To use this solution's more advanced features, you will need to expose additional parameters.
2. Specify the values for those parameters. You do this when you create a deployment.

Tip: Detailed instructions are provided in the "How to Run this Workflow" topic for each workflow.

The information presented here assumes the following:

- HP DMA is installed and operational.
- At least one suitable target server is available (see Supported Products and Platforms on page 14).
- You are logged in to the HP DMA web interface.
- You have permission to create, edit, and deploy copies of the workflows included in this solution pack.

Tip: All parameters used by the workflows in this solution are provided in the "Parameters" topic associated with each workflow.

How to Use the Workflows Together

The workflows contained in the Database Patching Solution Pack and the Database Provisioning Solution Pack are designed to work together to accomplish your patching tasks. The following tasks provide two procedures to apply a Patch Set and two procedures to apply a Critical Patch Update or Security Patch Update (CPU/SPU), Patch Set Update (PSU), or Patch Bundle.

Choose the task that best matches your objectives.

To apply a Patch Set using the simplest, fastest procedure:

How to Apply the Patch	What to Do if There Is a Problem
Create a brand new Oracle Home with the desired Patch Set: 1. Run the Oracle – Provision Database Software workflow (found in the Database Provisioning Solution Pack). 2. Run the Oracle – Upgrade Database workflow (found in the Database Provisioning Solution Pack).	Go back to the old Oracle Home: 1. Delete the new Oracle Home. 2. Go back to using the old Oracle Home.

To apply a Patch Set if you have an extensive, customized set up:

How to Apply the Patch	What to Do if There Is a Problem
Create a copy of the current Oracle Home and apply the Patch Set to it: 1. Run the Clone Oracle Home workflow to clone the Oracle Home. 2. Run the Apply Oracle Patchset workflow to apply the Patch Set to the cloned Oracle Home. 3. Run the Oracle – Upgrade Database workflow (found in the Database Provisioning Solution Pack).	Go back to the old Oracle Home: 1. Delete the new Oracle Home. 2. Go back to using the old Oracle Home.

To apply a CPU/SPU, PSU, or Bundle with the most safeguards:

How to Apply the Patch	What to Do if There Is a Problem
Create a copy of the current Oracle Home as a backup and then apply the CPU/SPU, PSU, or Patch Bundle to the original Oracle Home: 1. Run the Clone Oracle Home workflow to clone the Oracle Home. 2. Run the Oracle - Patch Home and Databases workflow to apply the patch to the original Oracle Home and databases.	Go back to the old Oracle Home: 1. Delete the new Oracle Home. 2. Use the backup, cloned Oracle Home.

To apply a CPU/SPU, PSU, or Bundle directly to the current Oracle Home and Database:

How to Apply the Patch	What to Do if There Is a Problem
Apply the CPU/SPU, PSU, or Patch Bundle to the current Oracle Home: Run the Oracle - Patch Home and Databases workflow to apply the patch to the current Oracle Home and databases.	Rollback the patch that you just applied: Run the Oracle - Rollback Patch from Home and Databases workflow to rollback the patch from the Oracle Home and databases.

Oracle - Patch Home and Databases

This workflow applies an Oracle Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home and to the Oracle Database Instances associated with the Oracle Home. It also updates the OPatch version if the OPatch Archive file is specified.

Oracle Database patches are published on a quarterly basis.

If you have problems after applying the patch, you can remove it by running Oracle - Rollback Patch from Home and Databases on page 36.

For additional information about how the Oracle - Patch Home and Database workflow can be used with other provisioning and patching workflows see How to Use the Workflows Together on page 17.

This workflow only applies to single Oracle Instance installations. It is not designed for Oracle Real Application Clusters (RAC). To patch Oracle RAC, you can run the Apply Critical Patch Update to RAC Home workflow found in the HP DMA Advanced Database Patching Solution Pack.

If the Oracle patch has already been applied, this workflow will verify the patch and end with SUCCESS status.

Caution: This workflow stops all processes running from the ORACLE_HOME in order to patch. This includes the Oracle Listener, which may be servicing Oracle Instances outside this ORACLE_HOME.

Note: This workflow does not support Oracle One Off Patches but only the Oracle Quarterly patches.

To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Note: The documentation for this workflow contains steps that are referred to by their base names. The names in the HP DMA user interface may have a version appended, for example, v2.

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Oracle - Patch Home and Databases workflow:

- 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 10.30 solution packs are supported on HP DMA 10.30 (and later).
- You have installed the HP DMA Database Patching Solution Pack.
- You need to have Oracle Database provisioned and operational. You can do this by running the following workflows in the HP DMA Database Provisioning Solution Pack:

  Oracle – Provision Database Software

  Oracle – Provision Database
- You have read access to all specified inventory pointers (Linux/UNIX).
- You have an Oracle support contract and have downloaded the appropriate patches either to the software repository or to the target machine.
- If you do not specify the OPatch option, you must have the current OPatch already available on your system.

There may be additional storage requirements for specific platforms due to known Oracle issues. Use your Oracle support contract to access https://support.oracle.com.

Caution: This workflow stops all processes running from the ORACLE_HOME in order to patch. This includes the Oracle Listener, which may be servicing Oracle Instances outside this ORACLE_HOME.

For more information about prerequisites for Oracle Database, refer to the Oracle Product Documentation on page 87.

How this Workflow Works

The following information describes how the Oracle - Patch Home and Databases workflow works:

Overview

This workflow does the following things in the order shown:

- The initial steps of the workflow prepare it to patch the Oracle Home. The workflow processes and validates user input parameters, constructs commands used in subsequent steps, downloads any required files, and fetches the Oracle Home Instances and Listener names.
- If an OPatch archive file has been provided, the workflow uses the correct OPatch version to patch the Oracle OPatch utility before applying the patch.
- The workflow applies the patch to the Oracle Database Home. The workflow stops all Oracle Instances, all Oracle Listeners in the list, and the Oracle Agent. The workflow removes any currently unused modules in kernel and library memory. Then the workflow runs the OPatch utility to deploy an Oracle supplied Patch and runs the cpu_root.sh script (provided by Oracle) to complete the installation.
- The workflow applies the patch to the Oracle Instances, skipping instances in the Ignore SIDs list.
- The final steps of the workflow allow the workflow to end cleanly. The workflow restarts all the Oracle Instances, all Oracle Listeners, and the Oracle Agent. Then it cleans up the downloaded files.

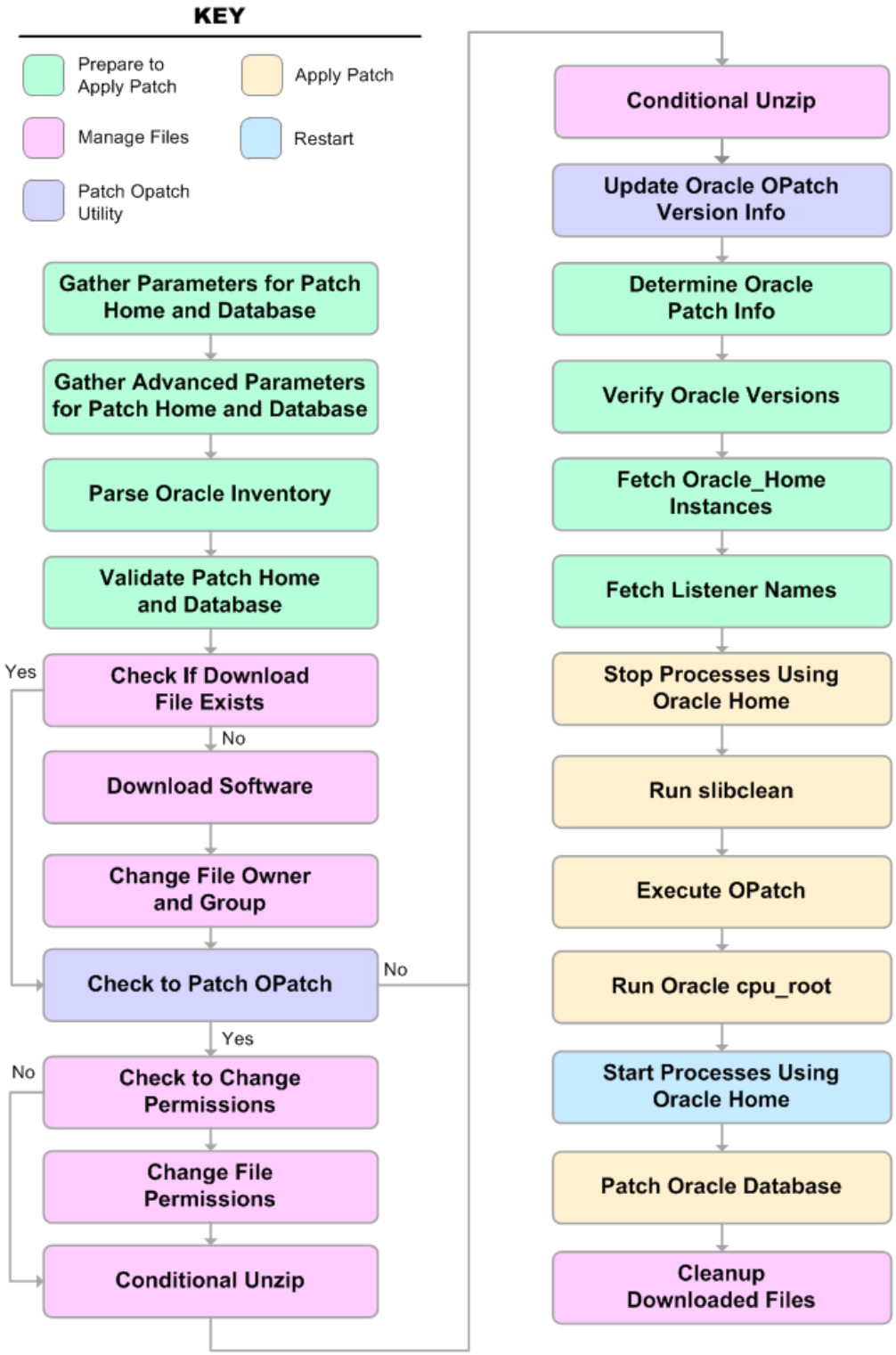
Validation Checks Performed

Much of the validation centers on the input parameters:

- The input parameters have the proper syntax (no special characters or spaces).
- Files exist or have valid specifications if they do not exist.
- If supplied, the OPatch file matches the required version.
- The supplied Critical Patch Update applies to the current Oracle Database version.
- If you are patching Oracle Home manually, the following parameters are all specified: New OPatch Version, Patch Name, and Patch Number.

Steps Executed

The Oracle - Patch Home and Database workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in Oracle - Patch Home and Database

Workflow Step	Description
Gather Parameters for Patch Home and Database	This step gathers the required parameters for the Oracle - Patch Home and Database workflow.
Gather Advanced Parameters for Patch Home and Database	This step gathers the optional advanced parameters for the Oracle - Patch Home and Database workflow.
Parse Oracle Inventory	This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps. • If one or more Inventory Files are specified and they exist, the step parses these files and extracts their contents. • If no Inventory Files are specified, the step assigns the appropriate default and attempts to parse that file. • If one or more Inventory Files are specified and they do not exist, the step creates inventory information based on the specified Oracle Account and Oracle Home.
Validate Apply Critical Patch Update to Home	This step validates the values specified for the input parameters used by the Oracle - Patch Home and Databases workflow. It also sets the values of various output parameters that will be consumed by subsequent steps.
Check if Download File Exists	This step determines whether one or more specified files already exist on the target server.
Download Software	This step downloads a list of files to a specified location on the target server.
Change File Owner and Group	This step changes the ownership and group of each file specified. A warning is issued for files that are not found and they are downloaded from the software repository.
Check to Patch OPatch	This step determines whether an OPatch archive file has been provided. If this file has been provided, the workflow will use the file to patch the Oracle OPatch utility before applying the patch.

Steps Used in Oracle - Patch Home and Database, continued

Workflow Step	Description
Check to Change Permissions	This step determines whether a Change Mode parameter is provided—only if the operating system is AIX.
Change File Permissions	If a Change Mode parameter is provided, this step changes the permissions for the OPatch mode.
Conditional Unzip	This step unzips the specified Archive File into the specified destination directory—for the OPatch download.
Conditional Unzip	This step unzips the specified Archive File into the specified destination directory—for the Critical Patch Update download.
Update Oracle OPatch Version Info	This step determines which version of OPatch will be used to apply the patch update. If OPatch will be updated before the CPU is applied, and the OPatch archive file is available, the updated version is retrieved from the archive file. If OPatch will not be updated before the patch is applied, the current version is used.
Determine Oracle Patch Info	This step determines all the patch information that the workflow requires to apply the pertinent patch.
Verify Oracle Versions	This step ensures that the current Oracle Database and OPatch versions match the versions required to apply the patch.
Fetch Oracle_Home Instances	This step fetches the list of Oracle Instances that share the specified ORACLE_HOME.
Fetch Listener Names	This step fetches the names of the Oracle Listeners running from the specified Oracle Home.
Stop Processes Using Oracle Home	This step stops all Oracle Instances included in the Oracle SIDs list—excluding any specified in the Ignore SIDs list. The step attempts to stop the Oracle Agent.
Run slibclean	This step runs the `slibclean` command on AIX targets. The `slibclean` utility removes any currently unused modules in kernel and library memory.
Execute OPatch	This step runs the Oracle OPatch utility to deploy an Oracle supplied patch.
Run Oracle cpu-root	This step runs the Oracle provided `cpu_root.sh` script as part of an Oracle CPU patch.

Steps Used in Oracle - Patch Home and Database, continued

Workflow Step	Description
Start Processes Using Oracle Home	This step starts all Oracle Instances and Oracle Listeners in the Oracle SIDs list. It also attempts to start the Oracle Agent.
Patch Oracle Databases	This step patches every Oracle Instance in the supplied SID List (skipping all instances in the Ignore SIDs list) by doing the following: 1. Running the optional Preparatory SQL Script 2. Running the Patch SQL file—or the `dbpatch` utility
Cleanup Downloaded Files	This step removes all downloaded files and archives.

For parameter descriptions and defaults, see Parameters for Oracle - Patch Home and Databases.

How to Run this Workflow

The following instructions show you how to customize and run the Oracle - Patch Home and Databases workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Oracle - Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in Parameters for Oracle - Patch Home and Databases on page 34.

Note: Before following this procedure, review the Prerequisites for this Workflow on page 20, and ensure that all requirements are satisfied.

To run this workflow, you need to set your parameters differently depending on the location and status of your Oracle Patch Bundle. Use the following table to choose the method that matches your situation.

For information about uploading files to the HP DMA software repository, see How to Import a File into the Software Repository on page 97.

To specify the parameters for the Oracle Patch Bundle, choose one of the following methods:

Method 1: The Oracle ZIP file is in the software repository:

Note: The ZIP file name must have the following form: `pPatchNum_DBVersion_OSVersion.zip`. Example: `p6880880_102000_Linux-x86-64.zip`

1. In the Patch Archive parameter, specify the name (or names) of the patch archive ZIP file (or files) that was downloaded from Oracle.
2. In the Patch Download Location parameter, specify the directory where the ZIP file (or files) specified in the Patch Archive parameter should be downloaded.
3. In the Patch Archive Location parameter, specify the directory where the ZIP file (or files) specified in the Patch Archive parameter should be extracted (unzipped).

All downloaded files are removed upon successful completion of the workflow.

Method 2: The Oracle ZIP file is stored on each target machine:

Note: The ZIP file name must have the following form: `pPatchNum_DBVersion_OSVersion.zip`. Example: `p6880880_102000_Linux-x86-64.zip`

1. In the Patch Archive parameter, specify the fully qualified name (or names) of the ZIP file (or files) that was downloaded from Oracle.
2. If either OCM Response File or Patch Information File need to be downloaded, specify the Patch Download Location.

All downloaded files are removed upon successful completion of the workflow.

To use the Oracle - Patch Home and Database workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

   Input Parameters for Gather Parameters for Patch Home and Database

Parameter Name	Default Value	Required	Description
Oracle Home	no default	required	Fully-qualified path name of the Oracle Home where the patch will be applied.
Patch Archive	no default	required	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

   Input Parameters for Gather Advanced Parameters for Patch Home and Database

Parameter Name	Default Value	Required	Description
OPatch Archive	no default	optional	Name of the OPatch archive file required for this patch. If this file does not exist on the target, it will be downloaded from the software repository. If this parameter value is not specified, the current OPatch version will be used.
Patch Information File	no default	optional	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.

   Note: See Parameters for Oracle - Patch Home and Databases on page 34 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see How to Expose Additional Workflow Parameters on page 93). You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see "Create a Deployment" in *HP DMA Quick Start Tutorial* for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed.You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: If you want to further verify that the patch was successfully applied on the Oracle Home:

1. Run the following command:

   ```
   $ORACLE_HOME/OPatch/opatch lsinventory -oh $ORACLE_HOME
   ```

2. Check that the patch you applied is on the list of installed patches.

Optional: If you want to further verify that the patch was successfully applied to the Oracle Database Instances associated with the Oracle Home:

1. Log in as an SQLPlus privileged user.
2. Set the environment variable, for example:

   ```
   . oraenv
   ```

3. Give the name of the Oracle Database, for example:

   ```
   orca
   ```

4. Search results for comments and actions, for example:

   ```
   select comments,action from sys.registry$history;
   ```

5. Check that the desired patch was applied. For example, look for:

   CPUOct2013 or PSUOct2013

Sample Scenario

This topic shows you typical parameter values for different use cases for the Oracle - Patch Home and Databases workflow. The workflow always applies an Oracle Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home and the Oracle Database Instances associated with the Oracle Home.

Scenario 1: To patch the Oracle Home and databases and also update the OPatch version

Use this scenario when Oracle provides a new OPatch version.

For this use case, specify a value for the OPatch Archive parameter. This is the OPatch archive file required for this patch update. If this file is not present, it will be downloaded from the software repository.

Input Parameters for Gather Parameters for Patch Home and Database

Parameter Name	Example Value	Description
Oracle Home	`/u01/app/oracle/product/11.2.0/db1`	Fully-qualified path name of the Oracle Home where the patch will be applied.
Patch Archive	`p16902043_112030_Linux-x86-64.zip`	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Input Parameters for Gather Advanced Parameters for Patch Home and Database

Parameter Name	Example Value	Description
OPatch Archive	`p6880880_112000_Linux-x86-64.zip`	Name of the OPatch archive file required for this patch. If this file does not exist on the target, it will be downloaded from the software repository. If this parameter value is not specified, the current OPatch version will be used.
Patch Information File	`201310_PatchInfo.xml`	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.

Scenario 2: To patch the Oracle Home and databases without updating the OPatch version

When Oracle has not updated the OPatch version, you do not specify a value for the OPatch Archive parameter. This forces the current OPatch version to be used.

Input Parameters for Gather Parameters for Patch Home and Database

Parameter Name	Example Value	Description
Oracle Home	`/u01/app/oracle/product/11.2.0/db1`	Fully-qualified path name of the Oracle Home where the patch will be applied.
Patch Archive	`p16902043_112030_Linux-x86-64.zip`	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Input Parameters for Gather Advanced Parameters for Patch Home and Database

Parameter Name	Example Value	Description
OPatch Archive		Name of the OPatch archive file required for this patch. If this file does not exist on the target, it will be downloaded from the software repository. If this parameter value is not specified, the current OPatch version will be used.
Patch Information File	`201310_PatchInfo.xml`	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.

Scenario 3: To manually specify the patch update

For this use case, you provide the proper parameter values to manually configure the patch.

The example values are sufficient to run the October 2013 Critical Patch Update for Oracle 11.2.0.3.

Caution: This use case is quite complex and only experienced Oracle database administrators should implement it.

This example also shows example values for other optional advanced parameters.

Input Parameters for Gather Parameters for Patch Home and Database

Parameter Name	Example Value	Description
Oracle Home	`/u01/app/oracle/product/11.2.0/db1`	Fully-qualified path name of the Oracle Home where the patch will be applied.
Patch Archive	`p16902043_112030_Linux-x86-64.zip`	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Input Parameters for Gather Advanced Parameters for Patch Home and Database

Parameter Name	Example Value	Description
Ignorable Oracle Errors	see description	A comma-separated list of Oracle errors to be ignored when applying the patch to the database. This is in addition to the list of Oracle errors specified in the patch readme. Values are of the form ORA-nnnnn. Example value: ORA-00942,ORA-00955,ORA-01430,ORA-01432,ORA-01434,ORA-01435,ORA-01917,ORA-01920,ORA-01921,ORA-01927,ORA-01952,ORA-02303,ORA-02443,ORA-04043,ORA-06512,ORA-14452,ORA-29809,ORA-29830,ORA-29832,ORA-29844,ORA-29931
Ignore SIDs	TST,DEV	Comma-separated list of Oracle Instances (SIDs) that should not be patched.
Inventory Files	`/etc/oraInst.loc`	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

Input Parameters for Gather Advanced Parameters for Patch Home and Database, continued

Parameter Name	Example Value	Description
New OPatch Version	11.2.0.3.0	The new OPatch version of the patch being applied. If you specify a value for this parameter, you MUST also specify values for Patch Number and Patch Name.
OCM Response File	`ocm.rsp`	Path name of the Oracle Configuration Manager (OCM) response file. If not found on the target, this file is downloaded from the software repository. If left blank, a default response file will be created.
OPatch Archive	`p6880880_ 112000_ Linux-x86-64.zip`	Name of the OPatch archive file required for this patch. If this file does not exist on the target, it will be downloaded from the software repository. If this parameter value is not specified, the current OPatch version will be used.
Patch Information File	`201310_ PatchInfo.xml`	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.
Patch Name	CPUOct2013	Name of the patch that is being applied. If you specify a value for this parameter, you MUST also expose and specify New OPatch Version and Patch Number.
Patch Number	17082364	Patch number of the patch being applied. If you specify a value for this parameter, you MUST also expose and specify New OPatch Version and Patch Name.
Preparatory SQL Script	`example.sql`	File name containing SQL statements that must be run before the database catalog update. This file is passed directly to SQLPlus and must be formatted as such. If it is not found on the target server, this file is downloaded from the software repository.

You need to expose these additional parameters in the Gather Advanced Parameters for Patch Home and Database step (see How to Expose Additional Workflow Parameters on page 93) to manually configure the patch:

- New OPatch Version
- Patch Name
- Patch Number

You may need to expose these additional parameters in the Gather Advanced Parameters for Patch Home and Database step:

- Ignorable Oracle Errors
- Ignore SIDs
- Inventory Files
- OCM Response File
- Preparatory SQL Script

Parameters for Oracle - Patch Home and Databases

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see How to Expose Additional Workflow Parameters on page 93). For some parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Input Parameters Defined in this Step: Gather Parameters for Patch Home and Database

Parameter Name	Default Value	Required	Description
Oracle Home	no default	required	Fully-qualified path name of the Oracle Home where the patch will be applied.
Patch Archive	no default	required	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Additional Input Parameters Defined in this Step: Gather Advanced Parameters for Patch Home and Database

Parameter Name	Default Value	Required	Description
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch to the database. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORA-nnnnn. For example: ORA-04020,ORA-03113
Ignore SIDs	no default	optional	Comma-separated list of Oracle Instances (SIDs) that should not be patched.
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
New OPatch Version	no default	optional	The new OPatch version of the patch being applied. If you specify a value for this parameter, you MUST also specify values for Patch Number and Patch Name.
OCM Response File	no default	optional	Path name of the Oracle Configuration Manager (OCM) response file. If not found on the target, this file is downloaded from the software repository. If left blank, a default response file will be created.

Additional Input Parameters Defined in this Step: Gather Advanced Parameters for Patch Home and Database, continued

Parameter Name	Default Value	Required	Description
OPatch Archive	no default	optional	Name of the OPatch archive file required for this patch. If this file does not exist on the target, it will be downloaded from the software repository. If this parameter value is not specified, the current OPatch version will be used.
Patch Archive Location	`/tmp`	optional	Directory location where the zip archives will be extracted.
Patch Download Location	`/tmp`	optional	Directory on the target server to which all downloaded files are copied from the software repository—used only if the required files are not found on the target but are found in the software repository.
Patch Information File	no default	optional	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.
Patch Name	no default	optional	Name of the patch that is being applied. If you specify a value for this parameter, you MUST also expose and specify New OPatch Version and Patch Number.
Patch Number	no default	optional	Patch number of the patch being applied. If you specify a value for this parameter, you MUST also expose and specify New OPatch Version and Patch Name.
Preparatory SQL Script	no default	optional	File name containing SQL statements that must be run before the database catalog update. This file is passed directly to SQLPlus and must be formatted as such. If it is not found on the target server, this file is downloaded from the software repository.

Oracle - Rollback Patch from Home and Databases

This workflow rolls back a Critical Patch Update or Security Patch Update (CPU/SPU), Patch Bundle, or Patch Set Update (PSU) from an Oracle Home and from the Oracle Database Instances associated with the Oracle Home.

Use this workflow if you encounter problems after applying a patch update. Only the last patch that was applied is rolled back.

For additional information about how the Oracle - Rollback Patch from Home and Databases workflow can be used with other patching workflows see How to Use the Workflows Together on page 17.

This workflow only applies to single Oracle Instance installations. It is not designed for Oracle Real Application Clusters (RAC).

If the Oracle patch has already been removed, this workflow will verify the patch removal and end with SUCCESS status.

Caution: This workflow stops all processes running from the ORACLE_HOME in order to patch. This includes the Oracle Listener, which may be servicing Oracle Instances outside this ORACLE_HOME.

Note: This workflow does not support Oracle One Off Patches but only the Oracle Quarterly patches.

To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Note: The documentation for this workflow contains steps that are referred to by their base names. The names in the HP DMA user interface may have a version appended, for example, v2.

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Oracle - Rollback Patch from Home and Databases workflow:

- 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 10.30 solution packs are supported on HP DMA 10.30 (and later).
- You have installed the HP DMA Database Patching Solution Pack.
- You have read access to all specified inventory pointers (Linux/UNIX).

Caution: This workflow stops all processes running from the ORACLE_HOME in order to rollback the patch. This includes the Oracle Listener, which may be servicing Oracle Instances outside this ORACLE_HOME.

For more information about prerequisites for Oracle Database, refer to the Oracle Product Documentation on page 87.

How this Workflow Works

The following information describes how the Oracle - Rollback Patch from Home and Databases workflow works:

Overview

This workflow does the following things in the order shown:

- The initial steps of the workflow prepare it to roll back the last patch applied to the Oracle Home. The workflow processes user input parameters, constructs commands used in subsequent steps, and downloads any required files.
- The workflow rolls back the Critical Patch Update from the Oracle Database Home. The workflow stops all Oracle Instances, all Oracle Listeners in the list, and the Oracle Agent. The workflow removes any currently unused modules in kernel and library memory. Then the workflow runs the OPatch utility to roll back an Oracle supplied Patch and runs the Oracle provided `cpu_root.sh` script to complete the rollback.
- The final steps of the workflow allow the workflow to end cleanly. The workflow restarts all the Oracle Instances, all Oracle Listeners, and the Oracle Agent. Then it runs Discovery to update the metadata and cleans up the downloaded files.

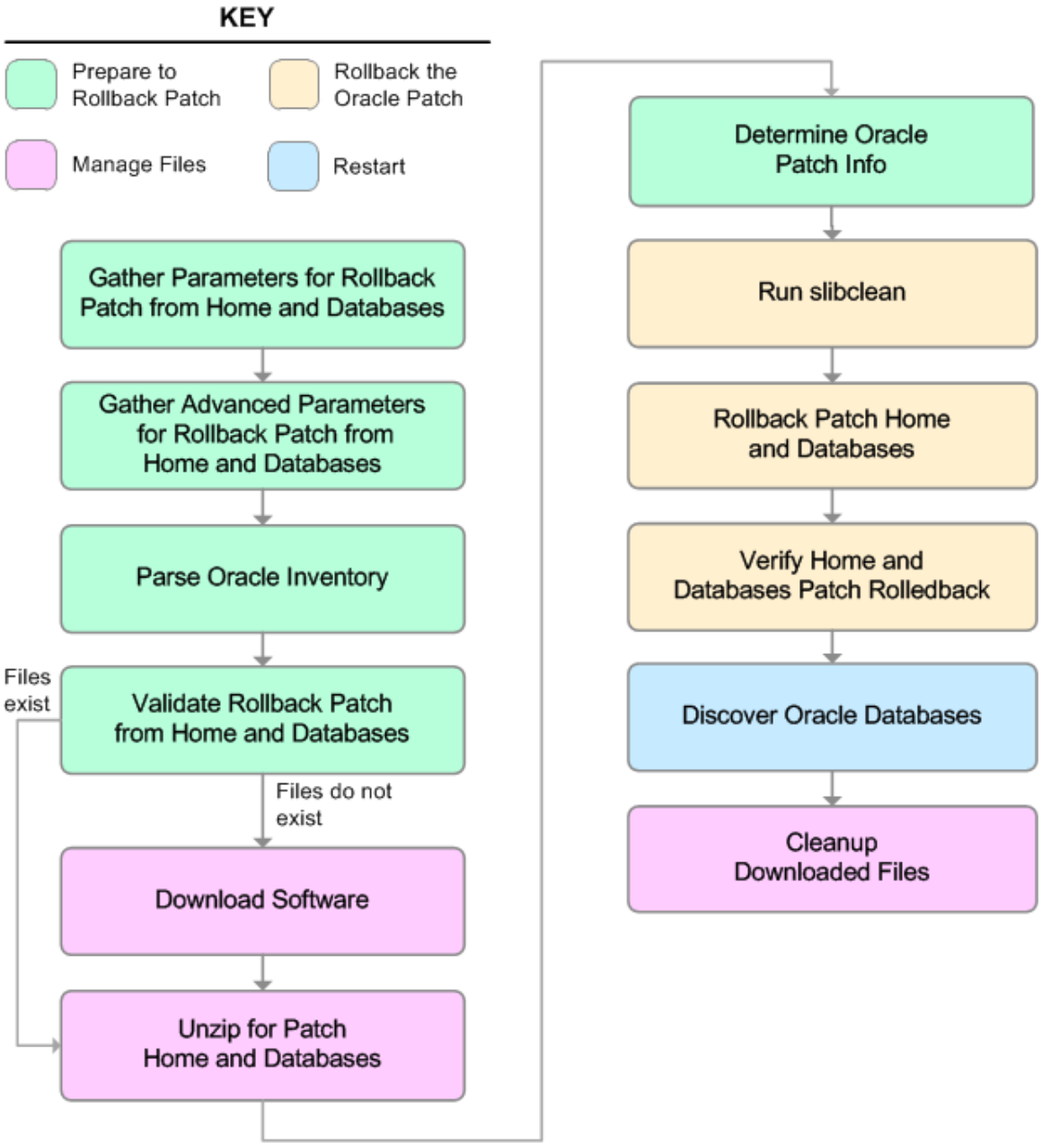
Validation Checks Performed

Much of the validation centers on the input parameters:

- The input parameters have the proper syntax (no special characters or spaces).
- Files exist or have valid specifications.
- The supplied patch update applies to the current Oracle Database version.

Steps Executed

The Oracle - Rollback Patch from Home and Databases workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in Oracle - Rollback Patch from Home and Databases

Workflow Step	Description
Gather Parameters for Rollback Patch from Home and Databases	This step gathers the required parameters for the Oracle - Rollback Patch from Home and Databases workflow.
Gather Advanced Parameters for Rollback Patch from Home and Databases	This step gathers the optional advanced parameters for the Oracle - Rollback Patch from Home and Databases workflow.
Parse Oracle Inventory	This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps. • If one or more Inventory Files are specified and they exist, the step parses these files and extracts their contents. • If no Inventory Files are specified, the step assigns the appropriate default and attempts to parse that file. • If one or more Inventory Files are specified and they do not exist, the step creates inventory information based on the specified Oracle Account and Oracle Home.
Validate Rollback Patch from Home and Databases	This step validates the specified values of the input parameters for the Oracle - Rollback Patch from Home and Databases workflow.
Download Software	This step downloads a list of files to a specified location on the target server.
Unzip for Patch Home and Databases	This step unzips the OPatch Archive and the Patch Archive.
Determine Oracle Patch Info	This step determines all the patch information that the workflow requires to apply the pertinent patch.
Run slibclean	This step runs the `slibclean` command on AIX targets. The `slibclean` utility removes any currently unused modules in kernel and library memory.
Rollback Patch Home and Databases	This step rolls back the patch from the Oracle Home and all databases within the Home.
Verify Home and Databases Patch Rolledback	This step confirms that the patch rollback was properly applied to the Oracle Home and the databases.

Steps Used in Oracle - Rollback Patch from Home and Databases, continued

Workflow Step	Description
Discover Oracle Databases	This step audits the server's physical environment looking for Oracle instances and databases. **Note:** Discovery is ONLY additive. It will not remove instances or databases currently in your environment. It is the end-user's responsibility to delete content that is no longer in use. In cluster situations where one node is active while other nodes are inactive, Discovery will only find instances and databases on the active node. Nothing will be added to inactive nodes.
Cleanup Downloaded Files	This step removes all downloaded files and archives.

For parameter descriptions and defaults, see Parameters for Oracle - Rollback Patch from Home and Databases on page 46.

How to Run this Workflow

The following instructions show you how to customize and run the Oracle - Rollback Patch from Home and Databases workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Oracle - Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in Parameters for Oracle - Rollback Patch from Home and Databases on page 46.

Note: Before following this procedure, review the Prerequisites for this Workflow on page 37, and ensure that all requirements are satisfied.

To use the Oracle - Rollback Patch from Home and Databases workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

   Input Parameters for Gather Parameters for Rollback Patch from Home and Databases

Parameter Name	Default Value	Required	Description
Oracle Home	no default	required	Fully-qualified path name of the Oracle Home where the patch will be rolled back.
Oracle OS User	oracle	required	The OS user that owns the specified Oracle Home.
Patch Archive	no default	required	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

   Input Parameters for Gather Advanced Parameters for Rollback Patch from Home and Databases

Parameter Name	Default Value	Required	Description
Patch Information File	no default	optional	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.

Input Parameters for Gather Advanced Parameters for Rollback Patch from Home and Databases, continued

Parameter Name	Default Value	Required	Description
Trust SSL Certificates	no default	deprecated	HP DMA no longer uses this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the HP DMA web service. HP DMA uses the following parameter in the `dma.xml` file: `<Parameter name="com.hp.dma.conn.trustAllCertificates" values="VALUE" />` Here, VALUE is true or false.
Web Service Password	no default	optional	Password for the HP DMA Discovery web service API.
Web Service URL	DMA.Url	optional	URL for the Discovery web service API.
Web Service User	no default	optional	User who is capable of modifying the managed environment by using the HP DMA Discovery web service API.

Note: See Parameters for Oracle - Rollback Patch from Home and Databases on page 46 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see How to Expose Additional Workflow Parameters on page 93). You will specify values for those parameters when you create the deployment. You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see "Create a Deployment" in *HP DMA Quick Start Tutorial* for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed.You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.

   Note: The targets need to be the same targets (servers) you used when you ran the Oracle - Patch Home and Database workflow.

8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: If you want to further verify that the patch was successfully removed from the Oracle Home:

1. Go to `$ORACLE_HOME/OPatch/opatch lsinventory -oh $ORACLE_HOME`
2. Check that the patch you rolled back is NOT on the list of patches.

Optional: If you want to further verify that the patch was successfully removed from the Oracle Database Instances associated with the Oracle Home:

1. Log in as an SQLPlus privileged user.
2. Set the environment variable, for example:

   ```
   . oraenv
   ```
3. Give the name of the Oracle Database, for example:

   ```
   orca
   ```
4. Search results for comments and actions, for example:

   ```
   select comments,action from sys.registry$history;
   ```
5. Verify that the patch number that you rolled back is NOT listed in the output, for example:

   CPUOct2013 or PSUOct2013

Sample Scenario

It is very straightforward to run the Oracle - Rollback Patch from Home and Databases workflow. This topic shows you typical parameter values to use.

Input Parameters for Gather Parameters for Rollback Patch from Home and Databases

Parameter Name	Example Value	Description
Oracle Home	`/u01/app/oracle/product/11.2.0/db1`	Fully-qualified path name of the Oracle Home where the patch will be rolled back.
Oracle OS User	oracle	The OS user that owns the specified Oracle Home.
Patch Archive	`p16902043_112030_Linux-x86-64.zip`	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Input Parameters for Gather Advanced Parameters for Rollback Patch from Home and Databases

Parameter Name	Example Value	Description
Patch Information File	`201310_PatchInfo.xml`	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.

Parameters for Oracle - Rollback Patch from Home and Databases

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see How to Expose Additional Workflow Parameters on page 93). For some parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Input Parameters Defined in this Step: Gather Parameters for Rollback Patch from Home and Databases

Parameter Name	Default Value	Required	Description
Oracle Home	no default	required	Fully-qualified path name of the Oracle Home where the patch will be rolled back.
Oracle OS User	oracle	required	The OS user that owns the specified Oracle Home.
Patch Archive	no default	required	Name of the patch archive file. If the file does not exist on the target it will be downloaded from the software repository.

Additional Parameters Defined in this Step: Gather Advanced Parameters for Rollback Patch from Home and Databases

Parameter Name	Default Value	Required	Description
Cleanup	True	optional	Flag that determines whether any downloaded and extracted files will be cleaned up. Valid values are True and False.
Download Location	`/tmp`	optional	The directory on the target server where files are copied from the software repository—used only if the required files are not found on the target but are found in the software repository.
Extract Location	`/tmp`	optional	Location where the archive files will be extracted.
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch to the database. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORA-nnnnn. For example: ORA-04020,ORA-03113

Additional Parameters Defined in this Step: Gather Advanced Parameters for Rollback Patch from Home and Databases, continued

Parameter Name	Default Value	Required	Description
OCM Response File	no default	optional	Path name of the Oracle Configuration Manager (OCM) response file. If not found on the target, this file is downloaded from the software repository. If left blank, a default response file will be created.
Oracle SIDs	ALL	optional	Oracle Instances (SIDs) that will be rolled back. Valid values are ALL, INCLUDE: followed by a comma-separated list of SIDs to be rolled back with the Oracle Home, and EXCLUE: followed by a comma-separated list of Oracle SIDS to exclude from the rollback process.
Patch Information File	no default	optional	Name of the Patch Information File that contains supplementary patch data in XML format—supplied by support. If not found on the target, this file is downloaded from the software repository.
Preparatory SQL Script	no default	optional	File name containing SQL statements that must be run before the database catalog update. This file is passed directly to SQLPlus and must be formatted as such. If it is not found on the target server, this file is downloaded from the software repository.
Run Database View Recompile	N	optional	Flag to indicate if the Database View Recompile step will be run.
Trust SSL Certificates	no default	deprecated	HP DMA no longer uses this workflow parameter to determine whether the workflow will trust any Secure Sockets Layer (SSL) certificate used to connect to the HP DMA web service. HP DMA uses the following parameter in the `dma.xml` file: `<Parameter name="com.hp.dma.conn. trustAllCertificates" values="VALUE" />` Here, VALUE is true or false.
Web Service Password	no default	optional	Password for the HP DMA Discovery web service API.
Web Service URL	DMA.Url	optional	URL for the Discovery web service API.

Additional Parameters Defined in this Step: Gather Advanced Parameters for Rollback Patch from Home and Databases, continued

Parameter Name	Default Value	Required	Description
Web Service User	no default	optional	User who is capable of modifying the managed environment by using the HP DMA Discovery web service API.

Apply Oracle Patchset

This workflow applies an Oracle Software Patch Set to an existing Oracle Home and Oracle Database.

Before you can run the Apply Oracle Patchset workflow you must provide the Oracle Software Patch Set in one of the following forms:

- A software archive (ZIP or `cpio.gz` file) that exists on the software repository or the target machine
- Unarchived files on a CD, DVD, NFS mount, or similar device

For additional information about how the Apply Oracle Patchset workflow can be used with other provisioning and patching workflows see How to Use the Workflows Together on page 17.

Note the following:

- The Database Upgrade Assistant (DBUA) utility is not available in Oracle Database version 9.2.0 (and earlier).
- The workflow does not upgrade the following items:
  - Oracle Label Security
  - Oracle Data Vault
  - Oracle ASM
- The workflow does not run the `changePerm.sh` command.
- The workflow does not configure Oracle Configuration Manager (OCM) for a cloned home.
- The workflow does not update Database time zone definitions.

Caution: This workflow stops all processes running from the ORACLE_HOME in order to patch. This includes the Oracle Listener, which may be servicing Oracle Instances outside this ORACLE_HOME.

To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Apply Oracle Patchset workflow:

- 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 10.30 solution packs are supported on HP DMA 10.30 (and later).
- You have installed the HP DMA Database Patching Solution Pack.
- You need to have Oracle Database provisioned and operational. You can do this by running workflows found in the HP DMA Database Provisioning Solution Pack:

  Oracle – Provision Database Software

  Oracle – Provision Database
- You have an Oracle support contract and have downloaded the appropriate patches to software repository or to the target machine.
- You have read access to all specified inventory pointers (Linux/UNIX).

For more information about prerequisites for Oracle Database, refer to the Oracle Product Documentation on page 87.

How this Workflow Works

The following information describes how the Apply Oracle Patchset workflow works:

Overview

This workflow does the following things in the order shown:

- The initial steps of the workflow prepare it to apply the Oracle Patch Set to the Oracle Home and Oracle Database. The workflow processes user input parameters, constructs commands used in subsequent steps, downloads any required files, uncompresses the archive files, and fetches the Oracle binaries and Instances.
- The workflow applies the Patch Set to the Oracle Home. The workflow updates the Oracle installer response file. Then it stops all processes using the Oracle Home. It runs platform-dependent steps. Then the workflow executes the Oracle Software Installer and completes the installation.
- The workflow configures the Oracle Database.
- The final steps of the workflow allow the workflow to end cleanly. The workflow stops and restarts all the Oracle processes. Then it cleans up the downloaded files.

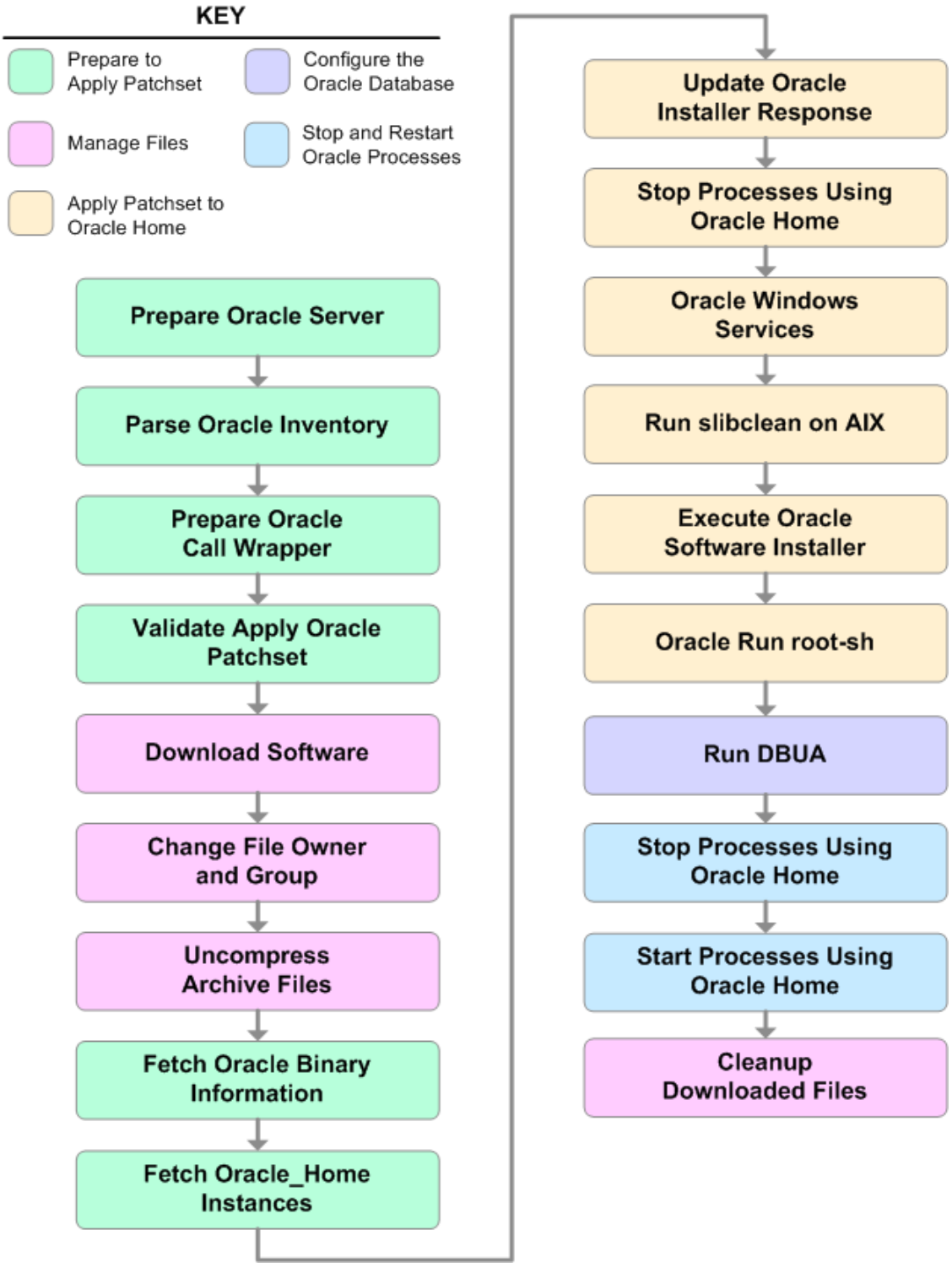
Validation Checks Performed

Much of the validation centers on the input parameters:

- The input parameters have the proper syntax (no special characters or spaces).
- Files exist or have valid specifications.

Steps Executed

The Apply Oracle Patchset workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in Apply Oracle Patchset

Workflow Step	Description
Prepare Oracle Server	This step prepares the target server for access by the OS administrative user.
Parse Oracle Inventory	This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps. • If one or more Inventory Files are specified and they exist, the step parses these files and extracts their contents. • If no Inventory Files are specified, the step assigns the appropriate default and attempts to parse that file. • If one or more Inventory Files are specified and they do not exist, the step creates inventory information based on the specified Oracle Account and Oracle Home.
Prepare Oracle Call Wrapper	This step constructs the commands needed to execute subsequent steps in the workflow as either the OS administrative user or the user who owns the pertinent ORACLE_HOME. The step also creates utility parameters that will be used by subsequent steps.
Validate Apply Oracle Patchset	This step validates the values specified for the input parameters used by the Apply Oracle Patchset workflow. It also sets the values of various output parameters that will be consumed by subsequent steps.
Download Software	This step downloads a list of files to a specified location on the target server.
Change File Owner and Group	This step changes the ownership and group of each file specified. A warning is issued for files that are not found.
Uncompress Archive Files	For each supplied file, this step extracts the contents of the archive file (or files).

Fetch Oracle Binary Information	This step fetches the fully qualified pathnames of the following files from the staging location in an Oracle software archive (either a Patch Set or the install software):
	`runInstaller`
	`products.xml`
	`rootpre.sh`
	`*.rsp`.

Steps Used in Apply Oracle Patchset, continued

Workflow Step	Description
Fetch Oracle_ Home Instances	This step fetches the list of Oracle Instances that share the specified ORACLE_ HOME.
Update Oracle Installer Response	This step updates the provided installer response file or, if one is not provided, creates an installer response file based on a default response file provided by Oracle. This step is designed to be run by the owner of the ORACLE_HOME.
Stop Processes Using Oracle Home	This step stops all Oracle Instances included in the Oracle SIDs list—excluding any specified in the Ignore SIDs list. The step attempts to stop the Oracle Agent.
Oracle Windows Services	This step preserves the list of Windows Services. This is necessary because the same step can be used more than once in a workflow.
Run slibclean on AIX	This step runs the `slibclean` command, if approprate, on AIX targets.
Execute Oracle Software Installer	This step installs the Oracle software as defined by the response file. It is designed to be run as the Oracle software owner (typically oracle).
Oracle Run root-sh	This step runs the Oracle provided `root.sh` script in silent mode. It must be run as root.
Run DBUA	This step runs the Oracle Database Upgrade Assistant (DBUA) with the specified response file. It must be run as the Oracle software owner (typically oracle).
Stop Processes Using Oracle Home	This step stops all Oracle Instances included in the Oracle SIDs list—excluding any specified in the Ignore SIDs list. The step attempts to stop the Oracle Agent.
Start Processes Using Oracle Home	This step starts all Oracle Instances and Oracle Listeners in the Oracle SIDs list. It also attempts to start the Oracle Agent.

Steps Used in Apply Oracle Patchset, continued

Workflow Step	Description
Cleanup Downloaded Files	This step removes all downloaded files and archives.

For parameter descriptions and defaults, see Parameters for Apply Oracle Patchset on page 61.

How to Run this Workflow

The following instructions show you how to customize and run the Apply Oracle Patchset workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Oracle - Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in Parameters for Apply Oracle Patchset on page 61

Note: Before following this procedure, review the Prerequisites for this Workflow on page 50, and ensure that all requirements are satisfied.

To run this workflow, you need to set your parameters differently depending on the location and status of your Oracle Patch Set. Use the following table to choose the method that matches your situation.

For information about uploading files to the HP DMA software repository, see How to Import a File into the Software Repository on page 97.

To specify the Oracle Software Patch Set, choose one of the following methods:

Method 1: The Oracle ZIP file is in the software repository:

Note: The ZIP file must be downloaded from Oracle. Example: `p6890831_111070_Linux-x86.zip`.

1. In the Patchset Archive parameter, specify the name (or names) of the ZIP file (or files) that was downloaded from Oracle.
2. In the Download Location parameter, specify the directory where the ZIP file (or files) specified in the Patchset Archive parameter should be downloaded.
3. In the Software Archive Location parameter, specify the directory where the ZIP file (or files) specified in the Patchset Archive parameter should be extracted (unzipped).

All downloaded files are removed upon successful completion of the workflow.

Method 2: The Oracle ZIP file is stored on each target machine:

Note: The ZIP file must be downloaded from Oracle. Example: `p6890831_111070_Linux-x86.zip`.

1. In the Patchset Archive parameter, specify the fully qualified name (or names) of the ZIP file (or files) that was downloaded from Oracle.
2. You must specify a value for the Download Location parameter if the Install Response needs to be downloaded; otherwise, do not specify a value for Download Location.

All downloaded files are removed upon successful completion of the workflow.

To use the Apply Oracle Patchset workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
Oracle Home	no default	optional	Fully-qualified path name of the Oracle Home where the patch will be applied.

Input Parameters for Validate Apply Oracle Patchset

Parameter Name	Default Value	Required	Description
Download Location	`/var/tmp`	optional	The directory on the target server where files are copied from the software repository—used only if the required files are not found on the target but are found in the software repository.
Oracle Base	`/u01/app/oracle`	required	The location of the base directory for an Optimal Flexible Architecture (OFA) installation. This is typically called the ORACLE_BASE.
Patchset Archive	see description	required	Comma-separated list of relative or fully-qualified path names of the Oracle Patch Set archive files. If a fully-qualified path name points to a file, that file is expected to be on the target. If a relative path name points to a file, that file will be downloaded from the software directory on the HP DMA server. If a fully-qualified path name is a directory, the software is expected to be unzipped and ready to be applied. The default for UNIX targets is: `/tmp/p5337014_10203_SOLARIS64.zip`
Skip root-sh	N	optional	Skip running the `rootpre.sh` and `root.sh` scripts. Valid values are Y (yes) and N (no). Set to Y if an existing newer ORACLE_HOME is installed.

Input Parameters for Validate Apply Oracle Patchset, continued

Parameter Name	Default Value	Required	Description
Software Archive	`/var/tmp`	optional	Directory location where the patch archives will be extracted.

Input Parameters for Update Oracle Installer Response

Parameter Name	Default Value	Required	Description
Install Edition	EE	optional	The product edition of the Oracle Database installation. Can be one of the following: SE (standard edition) or EE (enterprise edition).

Note: See Parameters for Apply Oracle Patchset on page 61 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see How to Expose Additional Workflow Parameters on page 93). You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see "Create a Deployment" in *HP DMA Quick Start Tutorial* for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed.You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: If you want to further verify the results:

1. Log in to Oracle on the server where you deployed the Patch Set.
2. Check that the version that is running is the same as the deployed Patch Set, for example:

   Oracle Database 11g 11.2.0.4.0

Sample Scenario

It is very straightforward to run the Apply Oracle Patchset workflow. This topic shows you typical parameter values to use.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	`/etc/oraInst.loc`	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
Oracle Home	`/u01/app/oracle/product/11.2.0/db1`	Fully-qualified path name of the Oracle Home where the patch will be applied.

Input Parameters for Validate Apply Oracle Patchset

Parameter Name	Example Value	Description
Download Location	`/var/tmp`	The directory on the target server where files are copied from the software repository—used only if the required files are not found on the target but are found in the software repository.
Oracle Base	`/u01/app/oracle`	The location of the base directory for an Optimal Flexible Architecture (OFA) installation. This is typically called the ORACLE_BASE.
Patchset Archive	`p5337014_10203_SOLARIS64.zip`	Comma-separated list of relative or fully-qualified path names of the Oracle Patch Set archive files. If a fully-qualified path name points to a file, that file is expected to be on the target. If a relative path name points to a file, that file will be downloaded from the software directory on the HP DMA server. If a fully-qualified path name is a directory, the software is expected to be unzipped and ready to be applied. The default for UNIX targets is: `/tmp/p5337014_10203_SOLARIS64.zip`
Skip root-sh	N	Skip running the `rootpre.sh` and `root.sh` scripts. Valid values are Y (yes) and N (no). Set to Y if an existing newer ORACLE_HOME is installed.
Software Archive	`/tmp/software`	Directory location where the patch archives will be extracted.

Input Parameters for Update Oracle Installer Response

Parameter Name	Example Value	Description
Install Edition	EE	The product edition of the Oracle Database installation. Can be one of the following: SE (standard edition) or EE (enterprise edition).

Parameters for Apply Oracle Patchset

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see How to Expose Additional Workflow Parameters on page 93). For some parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Parameters Defined in this Step: Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	Fully-qualified path name of the Oracle Home where the patch will be applied.
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: `sudo su - root /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Validate Apply Oracle Patchset

Parameter Name	Default Value	Required	Description
Download Location	`/var/tmp`	optional	The directory on the target server where files are copied from the software repository—used only if the required files are not found on the target but are found in the software repository.
Ignore SIDs	no default	optional	Comma-separated list of Oracle Instances (SIDs) that should not be patched.
Install Response	no default	optional	Location of the Oracle Universal Installer response file.

Additional Parameters Defined in this Step: Validate Apply Oracle Patchset, continued

Parameter Name	Default Value	Required	Description
Instance Wrapper	no default	required	Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example: `su - oracle /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Inventory Pointers	no default	optional	Comma separated list of fully qualified inventory pathname directories. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Oracle Base	`/u01/app/oracle`	required	The location of the base directory for an Optimal Flexible Architecture (OFA) installation. This is typically called the ORACLE_BASE.
Oracle Home Info	no default	optional	Dictionary list of all information discovered in the specified inventory file(s). **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Patchset Archive	see description	required	Comma-separated list of relative or fully-qualified path names of the Oracle Patch Set archive files. If a fully-qualified path name points to a file, that file is expected to be on the target. If a relative path name points to a file, that file will be downloaded from the software directory on the HP DMA server. If a fully-qualified path name is a directory, the software is expected to be unzipped and ready to be applied. The default for UNIX targets is: `/tmp/p5337014_10203_SOLARIS64.zip`
Skip root-sh	N	optional	Skip running the `rootpre.sh` and `root.sh` scripts. Valid values are Y (yes) and N (no). Set to Y if an existing newer ORACLE_HOME is installed.
Software Archive	`/var/tmp`	optional	Directory location where the patch archives will be extracted.

Additional Parameters Defined in this Step: Update Oracle Installer Response

Parameter Name	Default Value	Required	Description
CRS Nodes	no default	optional	List of all nodes where Oracle Clusterware is deployed. **Caution:** This parameter should only be specified for RAC and Cluster Ready systems.
DBA Group	no default	optional	The DBA group to use for superuser access to the subsequent Oracle Database.
Install Edition	EE	optional	The product edition of the Oracle Database installation. Can be one of the following: SE (standard edition) or EE (enterprise edition).
Operator Group	no default	optional	The operator group to use for operator access to the subsequent Oracle Database.
Oracle Group	no default	optional	The Oracle software installation group. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Oracle Home Name	no default	optional	The name of the ORACLE_HOME as recorded in the inventory. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Oracle Products File	see description	optional	The fully qualified path name of the `products.xml` file. Default is: `/tmp/Disk1/stage/products.xml` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Oracle Response Files	see description	optional	A comma-separated list of default response files. Default is: `/tmp/Disk1/response/standard.rsp` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Update Oracle Installer Response, continued

Parameter Name	Default Value	Required	Description
Oracle runInstaller	see description	optional	The fully qualified path name of the Oracle installer executable. Default is: `/tmp/Disk1/runInstaller` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
RAC One Node Install	false	optional	The `oracle.install.db.isRACOneInstall` option. If set to true, the installer will install Oracle RAC One Node software. **Caution:** This parameter should only be specified for RAC and Cluster Ready systems.
Temporary File Location	no default	optional	The location where all temporary output files will be placed. This directory will be removed at the completion of the workflow. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Clone Oracle Home

This workflow makes a clone (copy) of an Oracle Home on the same server.

This workflow uses the tar facility to copy the Oracle Home. The new copy of the Oracle Home is then registered in the inventory using the Oracle Installer (`runInstaller`).

For additional information about how the Clone Oracle Home workflow can be used with other provisioning and patching workflows see How to Use the Workflows Together on page 17.

To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Clone Oracle Home workflow:

- 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 10.30 solution packs are supported on HP DMA 10.30 (and later).
- You have installed the HP DMA Database Patching Solution Pack.
- You need to have Oracle Database provisioned and operational. You can do this by running workflows found in the HP DMA Database Provisioning Solution Pack:

  Oracle – Provision Database Software

  Oracle – Provision Database
- You have an Oracle support contract and have downloaded the appropriate patches to the software repository or to the target machine.
- You have read access to all specified inventory pointers (Linux/UNIX).

For more information about prerequisites for Oracle Database, refer to the Oracle Product Documentation on page 87.

How this Workflow Works

The following information describes how the Clone Oracle Home workflow works:

Overview

This workflow does the following things in the order shown:

- The initial steps of the workflow prepare it to clone the Oracle Home. The workflow processes user input parameters, and constructs commands used in subsequent steps.
- The workflow creates a clone (copy) of one ore more specified Oracle Homes.

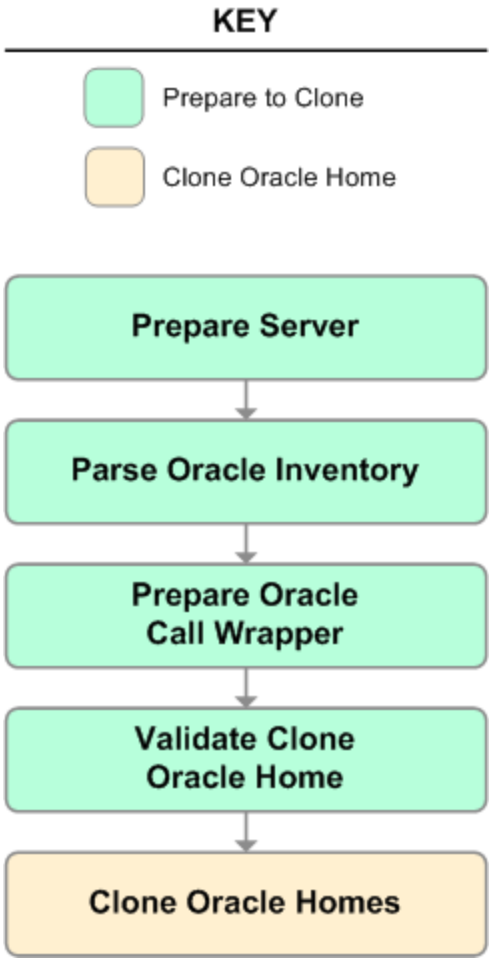
Validation Checks Performed

Much of the validation centers on the input parameters:

- The input parameters have the proper syntax (no special characters or spaces).
- Files exist or have valid specifications.

Steps Executed

The Clone Oracle Home workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in Clone Oracle Home

Workflow Step	Description
Prepare Server	This step prepares the Server Wrapper and Instance Wrapper, which enable subsequent steps to be executed by the OS administrator user or the owner of the database or middleware software.
Parse Oracle Inventory	This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps. • If one or more Inventory Files are specified and they exist, the step parses these files and extracts their contents. • If no Inventory Files are specified, the step assigns the appropriate default and attempts to parse that file. • If one or more Inventory Files are specified and they do not exist, the step creates inventory information based on the specified Oracle Account and Oracle Home.
Prepare Oracle Call Wrapper	This step constructs the commands needed to execute subsequent steps in the workflow as either the OS administrative user or the user who owns the pertinent ORACLE_HOME. The step also creates utility parameters that will be used by subsequent steps.
Validate Clone Oracle Home	This step validates the values specified for the input parameters used by the Clone Oracle Home workflow. It also sets the values of various output parameters that will be consumed by subsequent steps.
Clone Oracle Homes	This step creates a copy of one or more specified Oracle homes.

For parameter descriptions and defaults, see Parameters for Clone Oracle Home on page 73.

How to Run this Workflow

The following instructions show you how to customize and run the Clone Oracle Home workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Oracle - Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in Parameters for Clone Oracle Home on page 73.

Note: Before following this procedure, review the Prerequisites for this Workflow on page 66 and ensure that all requirements are satisfied.

To use the Clone Oracle Home workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

   Input Parameters for Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

   Input Parameters for Validate Clone Oracle Home

Parameter Name	Default Value	Required	Description
New Oracle Homes	see description	optional	Comma-separated list of the Oracle homes (fully qualified paths) that will be cloned (copied) from the Oracle Homes list. There must be one New Oracle Home for each Clone Oracle Home. Default is: `/u01/app/oracle/product/11.2.0.0/DB4`
Oracle Homes	see description	optional	Comma-separated list of Oracle Homes (fully qualified path names) that will be cloned. One or more is required. Default is: `/u01/app/oracle/product/11.2.0.0/DB2`

Note: See Parameters for Clone Oracle Home on page 73 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see How to Expose Additional Workflow Parameters on page 93). You will specify values for those parameters when you create the deployment.
4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see "Create a Deployment" in *HP DMA Quick Start Tutorial* for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed.You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: If you want to further verify the results:

1. Go to the location where the Oracle Home was cloned.
2. Check that your important folders and files were created.

Sample Scenario

It is very straightforward to run the Clone Oracle Home workflow. This topic shows you typical parameter values to use.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	`/etc/oraInst.loc`	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

Input Parameters for Validate Clone Oracle Home

Parameter Name	Example Value	Description
New Oracle Homes	`/opt/app/oracle/product/11.2.0/DB4`	Comma-separated list of the Oracle homes (fully qualified paths) that will be cloned (copied) from the Oracle Homes list. There must be one New Oracle Home for each Clone Oracle Home. Default is: `/u01/app/oracle/product/11.2.0.0/DB4`
Oracle Homes	`/opt/app/oracle/product/11.2.0/DB2`	Comma-separated list of Oracle Homes (fully qualified path names) that will be cloned. One or more is required. Default is: `/u01/app/oracle/product/11.2.0.0/DB2`

Parameters for Clone Oracle Home

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see How to Expose Additional Workflow Parameters on page 93). For some parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Parameters Defined in this Step: Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	Fully-qualified path name of the Oracle Home where the patch will be applied.
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: `sudo su - root /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Validate Clone Oracle Home

Parameter Name	Default Value	Required	Description
Instance Wrapper	no default	required	Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example: `su - oracle /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Validate Clone Oracle Home , continued

Parameter Name	Default Value	Required	Description
New Oracle Home Names	Ora102A	optional	Comma-separated list of Oracle Home Names for the cloned Oracle homes. There must be one New Oracle Home Name for each New Oracle Home.
New Oracle Homes	see description	optional	Comma-separated list of the Oracle homes (fully qualified paths) that will be cloned (copied) from the Oracle Homes list. There must be one New Oracle Home for each Clone Oracle Home. Default is: `/u01/app/oracle/product/11.2.0.0/DB4`
Oracle Homes	see description	optional	Comma-separated list of Oracle Homes (fully qualified path names) that will be cloned. One or more is required. Default is: `/u01/app/oracle/product/11.2.0.0/DB2`
Oracle Inventory Info	no default	optional	Dictionary list of all information discovered in the supplied inventory file(s).

Migrate Oracle Home

This workflow moves an Oracle Instance from one Oracle Home to another Oracle Home.

For additional information about how the Migrate Oracle Home workflow can be used with other patching workflows see How to Use the Workflows Together on page 17.

To use this workflow in your environment, see the following information:

Topic	Information Included
Prerequisites for this Workflow	List of prerequisites that must be satisfied before you can run this workflow
How this Workflow Works	Information about what the workflow does, including validation checks performed, steps executed, and a high-level process flow
How to Run this Workflow	Instructions for running this workflow in your environment
Sample Scenario	Examples of typical parameter values for this workflow
Parameters	List of input parameters for this workflow

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the Migrate Oracle Home workflow:

- 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 10.30 solution packs are supported on HP DMA 10.30 (and later).
- You have installed the HP DMA Database Patching Solution Pack.
- You need to have Oracle Database provisioned and operational. You can do this by running workflows found in the HP DMA Database Provisioning Solution Pack:

  Oracle – Provision Database Software

  Oracle – Provision Database
- You have an Oracle support contract and have downloaded the appropriate patches to software repository or to the target machine.
- You have read access to all specified inventory pointers (Linux/UNIX).

For more information about prerequisites for Oracle Database, refer to the Oracle Product Documentation on page 87.

How this Workflow Works

The following information describes how the Migrate Oracle Home workflow works:

Overview

This workflow does the following things in the order shown:

- The initial steps of the workflow prepare it to move an Oracle Instance from one Oracle Home to another Oracle Home. The workflow prepares the server, determines the Oracle Home, parses the Oracle inventory, constructs commands used in subsequent steps, and processes user input parameters,
- The workflow migrates the Oracle Instance. The workflow shuts down the Oracle Instances, Oracle Listeners, and the Oracle Agent. It copies the Oracle configuration files and the Oracle network files. It resets the Oracle Home in the network files.
- The final steps of the workflow allow the workflow to end cleanly. The workflow restarts all the Oracle Instances, all Oracle Listeners, and the Oracle Agent. Then it shuts down these processes and restarts them to force a clean run environment. Then it associates the Oracle Instance with the Oracle Home in the `oratab` file.

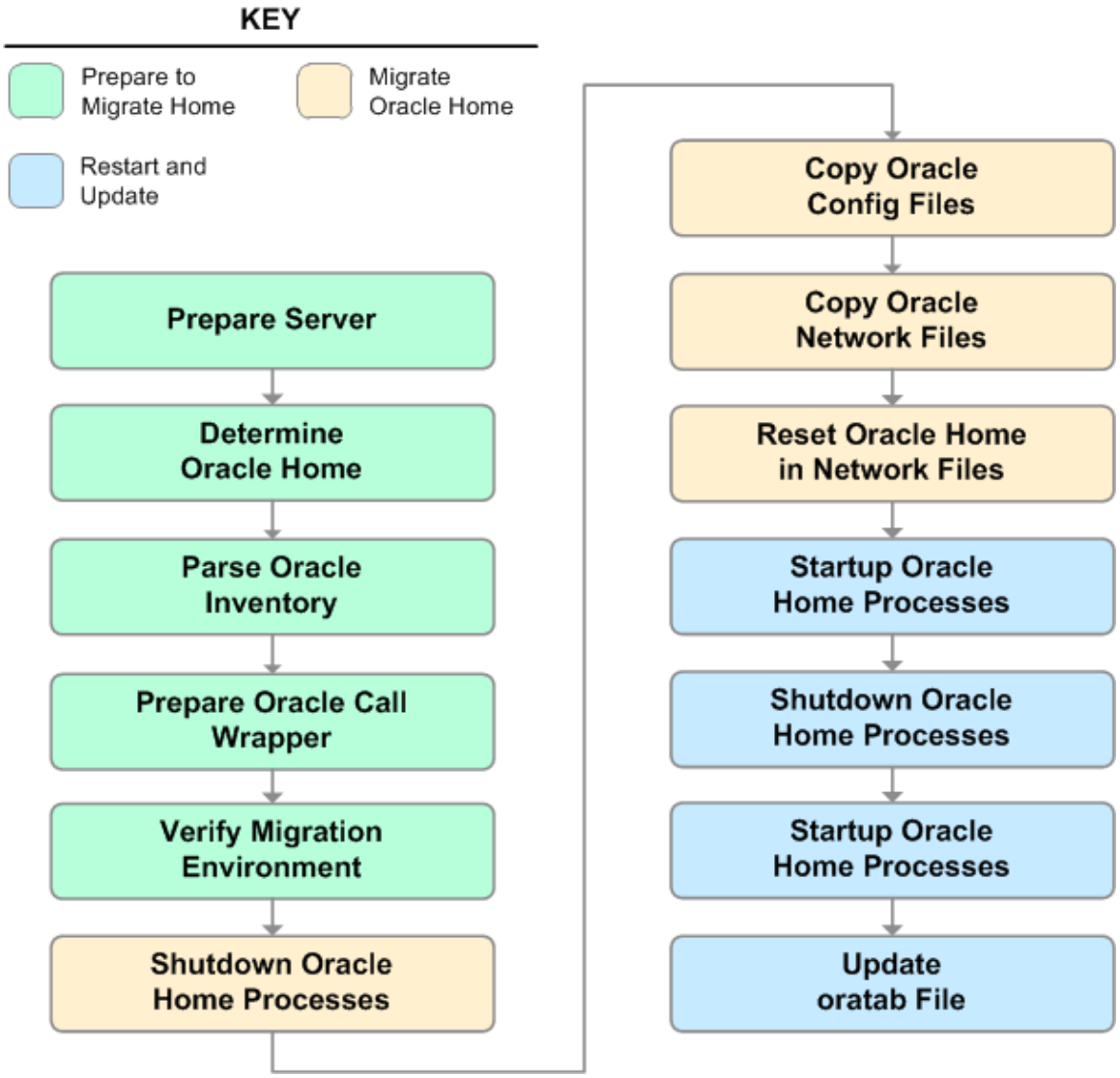
Validation Checks Performed

Much of the validation centers on the input parameters:

- The directories specified in the Current Oracle Home, New Oracle Home, Oracle SIDS, and Listeners parameters exist on the target.
- There are entries in the `oratab` file for the specified Oracle SIDs.
- There are entries in the `listener.ora` file for the specified Oracle Listeners.

Steps Executed

The Migrate Oracle Home workflow includes the following steps. Each step must complete successfully before the next step can start. If a step fails, the workflow reports a failure and all subsequent steps are skipped.



Steps Used in Migrate Oracle Home

Workflow Step	Description
Prepare Server	This step prepares the Server Wrapper and Instance Wrapper, which enable subsequent steps to be executed by the OS administrator user or the owner of the database or middleware software.
Determine Oracle Home	This step determines the value of ORACLE_HOME from the `/etc/oratab` or `/var/opt/oracle/oratab` file on UNIX targets.
Parse Oracle Inventory	This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps. • If one or more Inventory Files are specified and they exist, the step parses these files and extracts their contents. • If no Inventory Files are specified, the step assigns the appropriate default and attempts to parse that file. • If one or more Inventory Files are specified and they do not exist, the step creates inventory information based on the specified Oracle Account and Oracle Home.
Prepare Oracle Call Wrapper	This step constructs the commands needed to execute subsequent steps in the workflow as either the OS administrative user or the user who owns the pertinent ORACLE_HOME. The step also creates utility parameters that will be used by subsequent steps.
Verify Migration Environment	This step verifies the input parameters used throughout the Migrate Oracle Home workflow: • The directories specified in the Current Oracle Home, New Oracle Home, Oracle SIDS, and Listeners parameters exist on the target. • There are entries in the `oratab` file for the specified Oracle SIDs. • There are entries in the `listener.ora` file for the specified Oracle Listeners.
Shutdown Oracle Home Processes	This step stops the Oracle Instances specified in the Oracle SIDs list—excluding those Oracle Instances in the Ignore SIDs list. It also stops all Oracle Listeners in the Listeners list and attempts to stop the Oracle Agent.
Copy Oracle Config Files	This step copies the Oracle configuration files from the current (source) Oracle home to the new (destination) Oracle home.
Copy Oracle Network Files	This step copies the following files from the `${Current Oracle Home}/network/admin` directory to the `${New Oracle Home}/network/admin` directory: • `tnsnames.ora` • `listener.ora` • `sqlnet.ora`

Steps Used in Migrate Oracle Home, continued

Workflow Step	Description
Reset Oracle Home in Network Files	This step resets the ORACLE_HOME value in the `${New Oracle Home}/network/admin` files to reflect the `${New Oracle Home}` value.
Startup Oracle Home Processes	This step starts the Oracle Instances specified in the Oracle SIDs list—excluding those Oracle Instances in the Ignore SIDs list. It also starts all Oracle Listeners in the Listeners list and attempts to start the Oracle Agent.
Shutdown Oracle Home Processes	This step stops the Oracle Instances specified in the Oracle SIDs list—excluding those Oracle Instances in the Ignore SIDs list. It also stops all Oracle Listeners in the Listeners list and attempts to stop the Oracle Agent.
Startup Oracle Home Processes	This step starts the Oracle Instances specified in the Oracle SIDs list—excluding those Oracle Instances in the Ignore SIDs list. It also starts all Oracle Listeners in the Listeners list and attempts to start the Oracle Agent.
Update oratab File	This step updates the `${oratab directory}/oratab` file that associates the ORACLE_SID and ORACLE_HOME values. It replaces entries with the `${Current Oracle Home}` value with the `${New Oracle Home}` value.

For parameter descriptions and defaults, see Parameters for Migrate Oracle Home on page 85.

How to Run this Workflow

The following instructions show you how to customize and run the Migrate Oracle Home workflow in your environment.

Tip: For detailed instructions to run HP DMA workflows—using the Oracle - Compliance Audit workflow as an example—see *HP DMA Quick Start Tutorial*.

The workflow provides default values for some parameters. These default values are usually sufficient for a "typical" installation. You can override the defaults by specifying parameter values in the deployment. You can also expose additional parameters in the workflow, if necessary, to accomplish more advanced scenarios. Any parameters not explicitly specified in the deployment will have the default values listed in Parameters for Migrate Oracle Home on page 85.

Note: Before following this procedure, review the Prerequisites for this Workflow on page 76, and ensure that all requirements are satisfied.

To use the Migrate Oracle Home workflow:

1. Create a deployable copy of the workflow (see "Create a Deployable Workflow" in *HP DMA Quick Start Tutorial*).
2. Determine the values that you will specify for the following parameters:

   Input Parameters for Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

   Input Parameters for Verify Migration Environment

Parameter Name	Default Value	Required	Description
Listeners	no default	optional	Comma-separated list of the Oracle Listener names to be included in start-up and shut-down sequences.
New Oracle Home	no default	required	File system location of the new ORACLE_HOME (migration destination).

   Note: See Parameters for Migrate Oracle Home on page 85 for detailed descriptions of all input parameters for this workflow, including default values.

3. In the workflow editor, expose any additional parameters that you need (see How to Expose Additional Workflow Parameters on page 93). You will specify values for those parameters when

you create the deployment.

4. Save the changes to the workflow (click **Save** in the lower right corner).
5. Create a new deployment (see "Create a Deployment" in *HP DMA Quick Start Tutorial* for instructions).
6. On the Parameters tab, specify values for the required parameters listed in step 2 and any additional parameters that you have exposed.You do not need to specify values for those parameters whose default values are appropriate for your environment.
7. On the Targets tab, specify one or more targets for this deployment.
8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see "Run Your Workflow" in *HP DMA Quick Start Tutorial* for instructions).

To verify the results:

The workflow will complete and report SUCCESS on the Console if it has run successfully. If an error occurs during workflow execution, the error is logged, and the workflow terminates in the FAILURE state.

Optional: If you want to further verify the results:

Make sure that you can log in to the server where your Oracle Database was migrated.

Sample Scenario

The following use cases demonstrate different ways that the Migrate Oracle Home workflow can be run:

Scenario 1: To migrate Oracle Home without shutting down and starting up the Listeners

For this use case, you leave the Listeners parameter blank.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	`/etc/oraInst.loc`	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

Input Parameters for Verify Migration Environment

Parameter Name	Example Value	Description
Listeners		Comma-separated list of the Oracle Listener names to be included in start-up and shut-down sequences.
New Oracle Home	`/u01/app/oracle/product/11.2.0/db4`	File system location of the new ORACLE_HOME (migration destination).

Scenario 2: To migrate Oracle Home with shutting down and starting up the Listeners

For this use case, you set the Listeners parameter to a comma-separated list of Oracle Listener names.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	`/etc/oraInst.loc`	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`

Input Parameters for Verify Migration Environment

Parameter Name	Example Value	Description
Listeners	LISTENER1, LISTENER2	Comma-separated list of the Oracle Listener names to be included in start-up and shut-down sequences.
New Oracle Home	`/u01/app/oracle/product/11.2.0/db4`	File system location of the new ORACLE_HOME (migration destination).

Parameters for Migrate Oracle Home

The following tables describe the required and optional input parameters for this workflow. Some of these parameters may not be initially visible in a deployment (see How to Expose Additional Workflow Parameters on page 93). For some parameters, if you do not specify a value for a parameter, a default value is assigned.

Note: Only those parameters that are configurable in a standard deployment are listed here. Input parameters that must be mapped to output parameters of previous steps are not listed.

Parameters Defined in this Step: Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma-separated list of fully-qualified Oracle inventory files. If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: `/var/opt/oracle/oraInst.loc` Linux: `/etc/oraInst.loc`
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	Fully-qualified path name of the Oracle Home where the patch will be applied. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: `sudo su - root /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Verify Migration Environment

Parameter Name	Default Value	Required	Description
Call Wrapper	no default	required	Command used to execute a step as the Oracle Instance owner. For example: `sudo -u oracle /opt/hp/dma/client/jython.sh` **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Current Oracle Home	no default	required	File system location of the existing ORACLE_HOME (migration source). **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Listeners	no default	optional	Comma-separated list of the Oracle Listener names to be included in start-up and shut-down sequences.
New Oracle Home	no default	required	File system location of the new ORACLE_HOME (migration destination).
Oracle SIDs	no default	optional	Comma-separated list of the Oracle Instances (ORACLE_SIDs) in this ORACLE_HOME where the step's action should be performed. **Caution:** This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Parameters Defined in this Step: Shutdown Oracle Home Processes

Parameter Name	Default Value	Required	Description
Ignore SIDs	TST,DEV	optional	Comma-separated list of Oracle Instances (SIDs) that should not be patched.

Chapter 3: Reference Information

This chapter contains the following information:

Topic	Description
Oracle Product Documentation	Links to Oracle Database product documentation.
HP DMA Documentation	Links to additional HP DMA documentation

Oracle Product Documentation

For the current list of hardware and software requirements, as well as supported platforms for Oracle Database, see:

http://docs.oracle.com/

For Oracle support using your support contract, see:

https://support.oracle.com.

To obtain patches from the Oracle Support Services Web site, OracleMetaLink, see:

https://metalink.oracle.com

HP DMA Documentation

For information about using the HP DMA web interface, see the *HP DMA User Guide*, the *HP DMA Administrator Guide*, and the *HP DMA Quick Start Tutorial*.

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

https://softwaresupport.hp.com/

Chapter 4: 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 93
- How to Use a Policy to Specify Parameter Values on page 94
- How to Import a File into the Software Repository on page 97

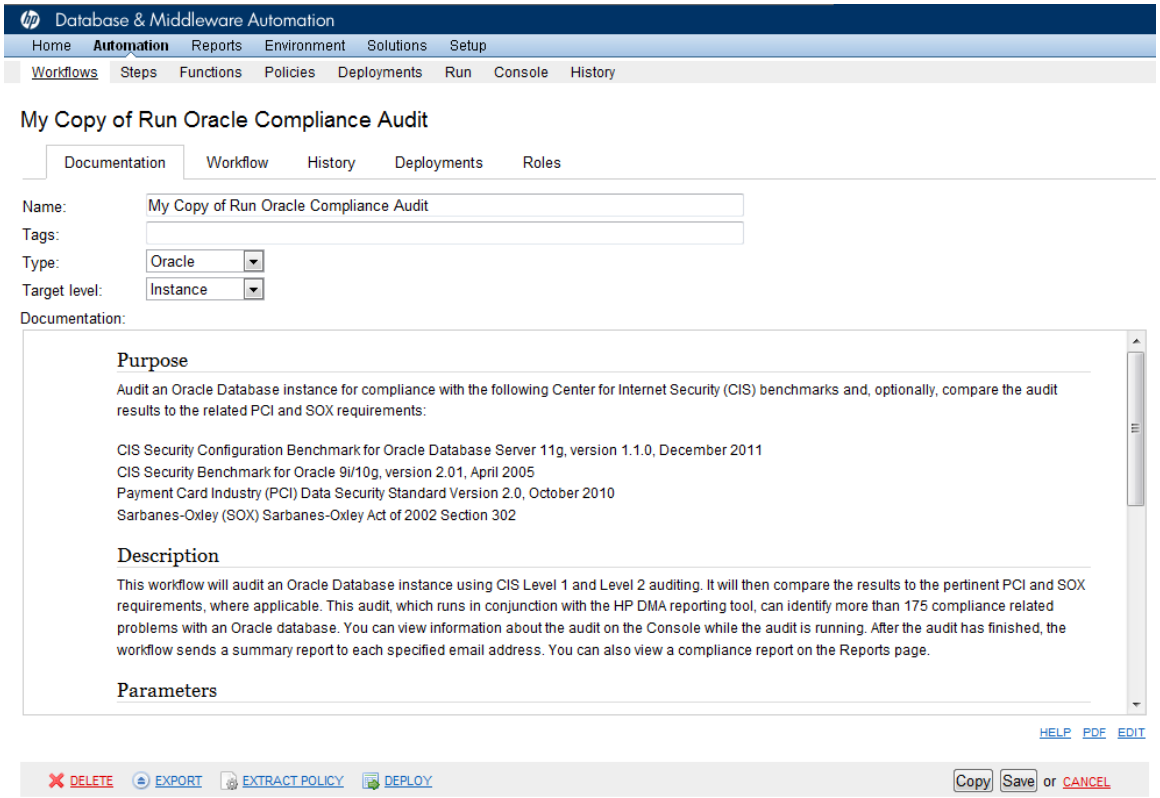
How a Solution Pack is Organized

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

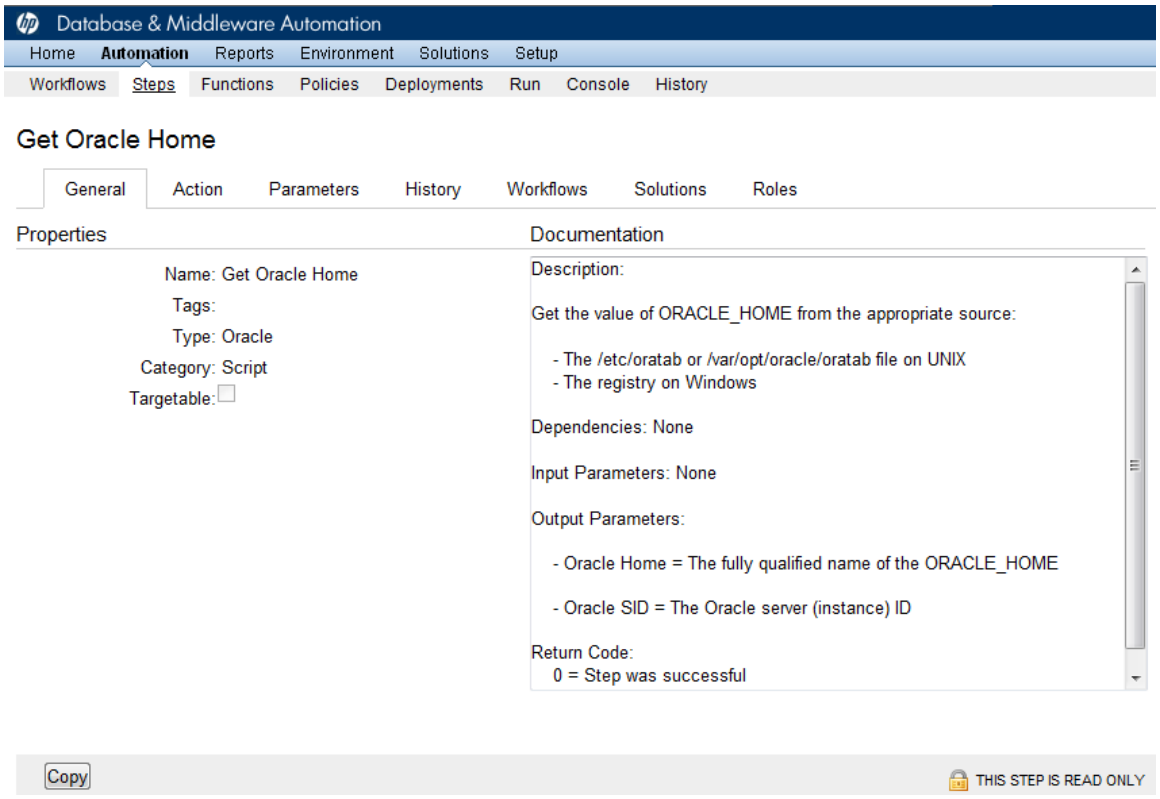
In HP DMA, a **workflow** executes a process —such as installing a software product or checking a database instance for compliance with a specific security benchmark.

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

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

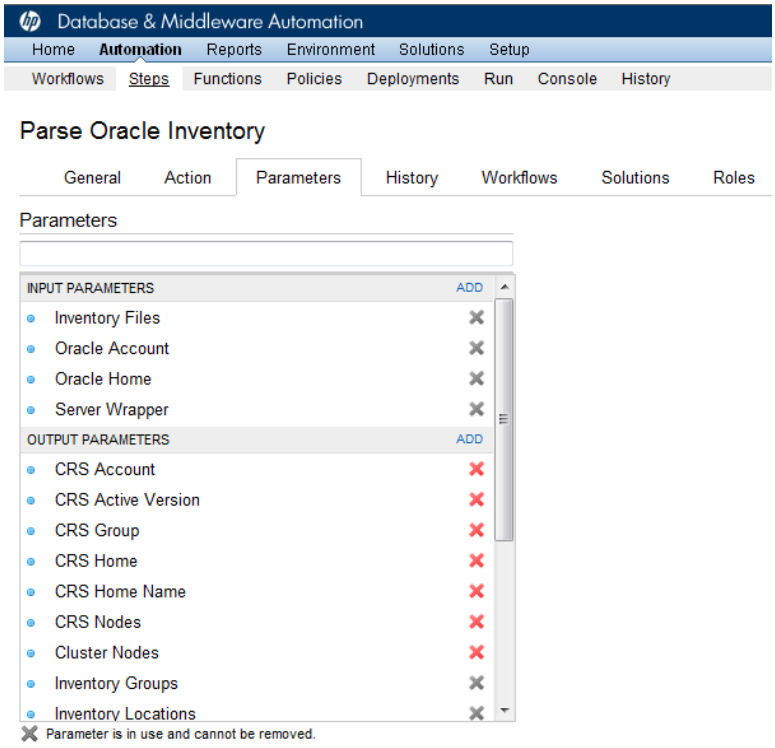


A workflow consists of a sequence of **steps**. Each step performs a very specific task. Each step includes a documentation panel that briefly describes its function.

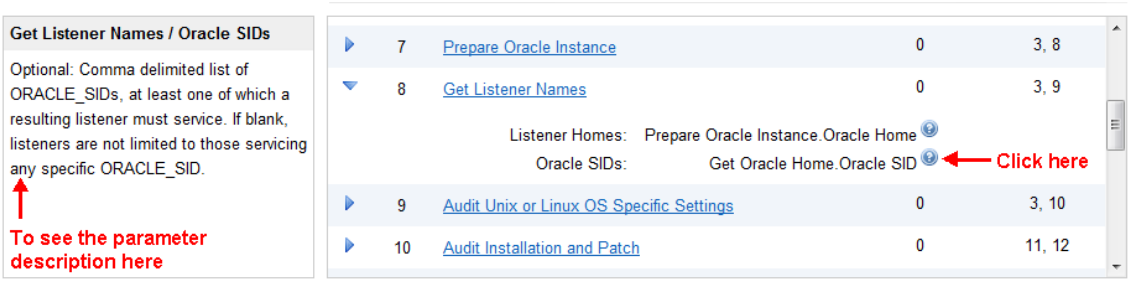


Steps can have input and output **parameters**. Output parameters from one step often serve as input parameters to another step. Steps can be shared among workflows.

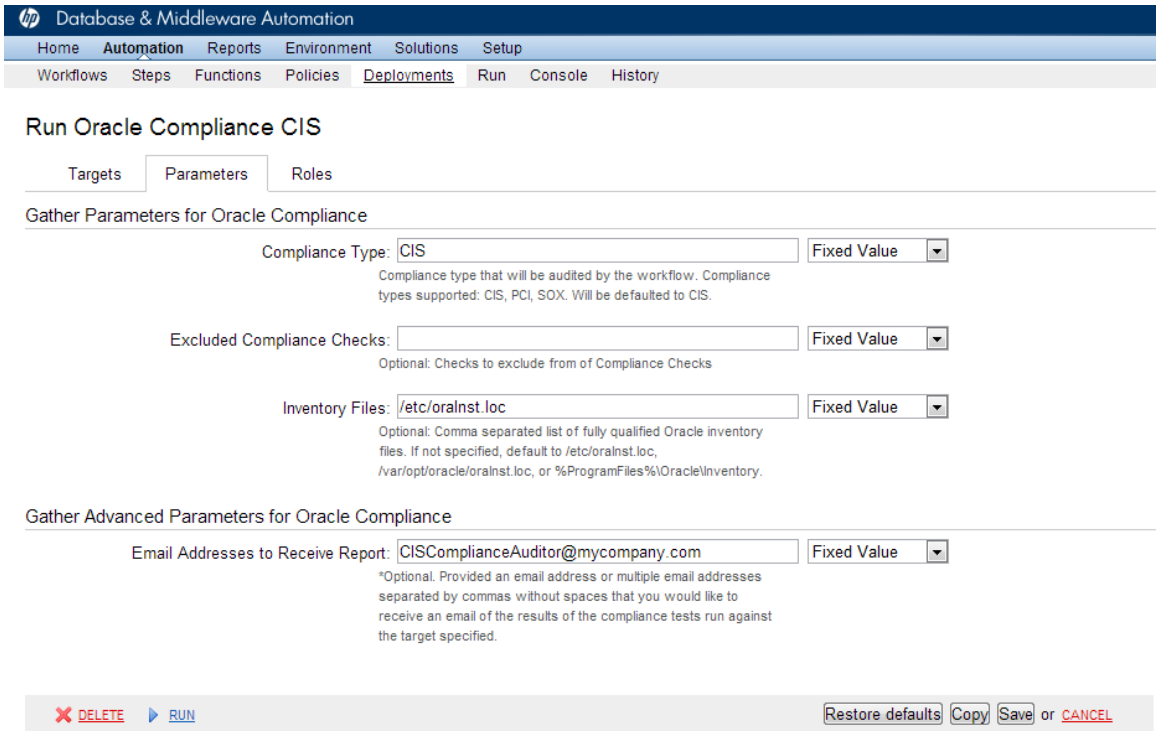
Parameter descriptions are displayed on the Parameters tab for each step in the workflow.



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



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



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.

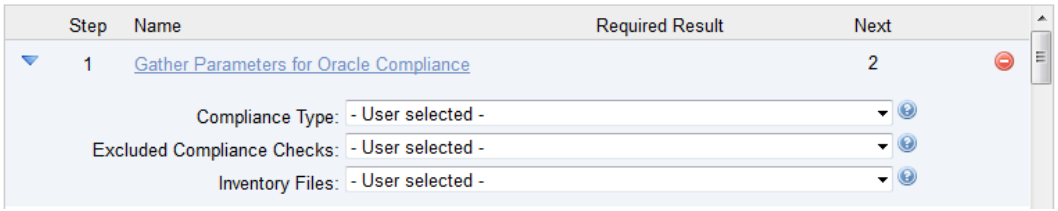
How to Expose Additional Workflow Parameters

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:



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**.

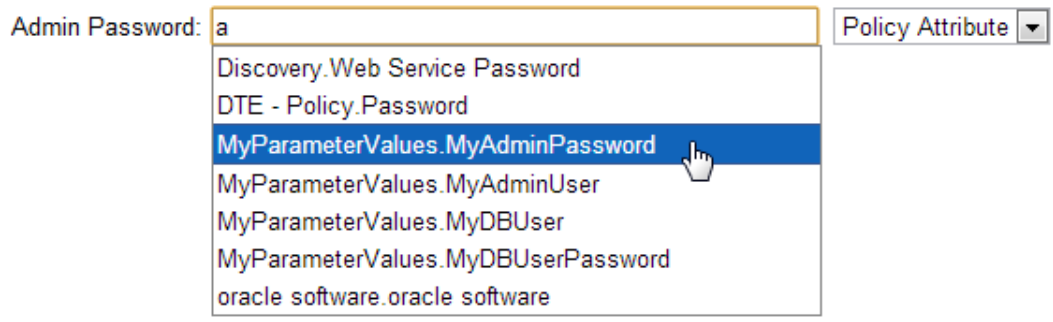
Reference the Policy in the Deployment

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

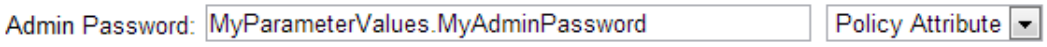
To reference policy attributes in a deployment:

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:



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



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.

Chapter 5: Troubleshooting

These topics can help you address problems that might occur when you install and run the workflows in this solution pack:

- Target Type below
- User Permissions and Related Requirements below
- Discovery in HP DMA on the next page

Target Type

In your deployment, make sure that you have specified the correct type of target. The workflow type and the target type must match. A workflow designed to run against an instance target, for example, cannot run against a server target.

User Permissions and Related Requirements

Roles define access permissions for organizations, workflows, steps, policies, and deployments. Users are assigned to roles, and they gain access to these automation items according to the permissions and capabilities defined for their roles.

Roles are assigned by the HP Server Automation administrator. They are then registered in HP DMA by your HP DMA administrator.

Your HP DMA administrator will ensure that the users in your environment are assigned roles that grant them the permissions and capabilities they need to accomplish their tasks. For example:

- To create a workflow, your role must have Workflow Creator capability.
- To view a workflow, your role must have Read permission for that workflow.
- To edit a workflow, your role must have Write permission for that workflow.
- To view a deployment, your role must have Read permission for that deployment.
- To modify a deployment, your role must have Write permission for that deployment.
- To run a deployment, your role must have Execute permission for that deployment and Deploy permission for the organization where it will run.

Capabilities determine what features and functions are available and active in the HP DMA UI for each user role.

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

Discovery in HP DMA

HP DMA uses a process called “discovery” to find information about the servers, networks, and database instances on target machines in your managed environment.

You must explicitly initiate the process of discovery—it is not automatic. See the *HP DMA User Guide* for instructions. This document is available on the HP Software Support web site: https://softwaresupport.hp.com/

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.

B

bridged execution
A bridged execution workflow includes some steps that run on certain targets and other steps that run on different targets. An example of a bridged execution workflow is Extract and Refresh Oracle Database via RMAN (in the Database Refresh solution pack). This workflow extracts the contents of a database on one target (the Source) and creates a new database with the same contents on another target (the Destination). This workflow is useful when you want to clone a database - for example, to move it from a traditional IT infrastructure location into a private cloud. Bridged execution workflows are supported on HP DMA version 9.11 (and later).

C

capability
Capabilities are collections of related privileges. There are three capabilities defined in HP DMA. Login Access capability enables a user to log in to the web interface. This capability does not guarantee that this user can view any organizations or automation items—permissions are required to access those items. Workflow Creator capability enables a user to create new workflows and make copies of other workflows. Administrator capability enables a user to perform any action and view all organizations. If you have Administrator capability, you do not need Workflow Creator capability. The Administrator can assign any of these capabilities to one or more roles registered roles.

connector
HP DMA includes a Connector component that enables it to communicate with HP Server Automation. You must configure the Connector before you can run an workflow against a target.

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 it's 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

raw devices
In Sybase ASE version 15, you can create and mount database devices on raw bound devices. This enables Sybase ASE to use direct memory access from your address space to the physical sectors on the disk. This can improve performance by reducing memory copy operations from the user

address space to the operating system kernel buffers.

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 HP Server Automation. 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.