

HP Database and Middleware Automation

For Linux, Solaris, AIX, and HP-UX

Software Version: 10.10

Oracle Database Patching

User Guide

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Software Release Date: June 2013



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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.
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.

Support

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

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- Download software patches
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- Review information about available services
- Enter into discussions with other software customers
- Research and register for software training

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To find more information about access levels, go to:

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

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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, & 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 127).

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.
Oracle Database Patching Quick Start	A step-by-step tutorial that shows you how to run HP DMA workflows, using the Apply Critical Patch Update to Home workflow as an example.
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 consist 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.

- 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 141.

Tip: For more information about the basic structure of a solution pack, including HP DMA screen images, see [How this Solution Pack is Organized](#) on page 130.

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, & 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.

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
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.
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).
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).
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.
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.

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 Product Manuals web site:

<http://h20230.www2.hp.com/selfsolve/manuals>

For database product hardware and software requirements, see the pertinent [Oracle Product Documentation](#).

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

This solution requires HP DMA version 10.10 (or later).

Chapter 2

Oracle Database Patching Quick Start

This tutorial shows you how to run one of the workflows, [Apply Critical Patch Update to Home](#), in the Database Patching Solution Pack. You can use this tutorial as an example for running the other patching workflows.

The tutorial will guide you through the following steps:

1. [Import the Solution Pack](#) on the next page
2. [Create a Deployable Workflow](#) on page 20
3. [Create a Deployment](#) on page 21
4. [Run Your Workflow](#) on page 22
5. [View the Results](#) on page 23

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

See [Parameters for Apply Critical Patch Update to Home](#) on page 45 for descriptions of available input parameters, including default values.

The information presented in this tutorial assumes the following:

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

Note: This tutorial is included in every HP DMA solution pack user guide. To skip directly to information about the Database Patching workflows, see the [Workflow Details](#).

Import the Solution Pack

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

The HP DMA 10.10 solution packs are included on the HP DMA 10.10 installation media. They are located in the following folders:

- The `DMA_10.10_Server_and_Client` folder contains the Discovery solution pack.
The Discovery solution pack is not automatically installed with HP DMA. You must import it if you want to use the discovery workflows.
- The `DMA_10.10_Database_Solution_Packs` folder contains all of the database solution packs (provisioning, advanced provisioning, patching, advanced patching, compliance, refresh, and release management).
- The `DMA_10.10_Middleware_Solution_Packs` folder contains all of the application server solution packs (provisioning, patching, configuration management, and release management).

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

To get the most recent version of a solution pack:

1. Go to the following web site: [HP Software Support Online](#)
2. Go to the Self-Solve tab, and sign in using your HP Passport credentials (see [Support](#) on page 4 for more information).
3. On the Advanced Search page, specify the following search criteria:

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

4. Click **Search**.
5. If there is a more recent version of the Database Patching solution pack that you want to import, do the following:
 - a. Click the link for the solution pack that you want to import (for example: DB Patch 10.x).
 - b. Click the **DOWNLOAD PATCH** link, and download the ZIP file that contains the patch.
 - c. From the patch ZIP file, extract the ZIP file that contains the solution pack (for example: DBPatching.zip).

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

To import the solution pack:

1. On the system where you downloaded the solution pack, open a web browser, and go to the following address:
`https://<HP_DMAserver>:8443/dma/login`
2. Log in to the HP DMA server using an account with Administrator capability.
3. On the Solutions > Installed tab, click the **Browse** button in the lower right corner. The Choose File dialog opens.

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

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

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

The screenshot shows the HP Database & Middleware Automation web interface. At the top, there is a navigation bar with tabs for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, there are sub-tabs for Installed and History. The main content area is titled "Installed Solutions" and features a green notification banner stating "Successfully imported HP DMA Database Patching Solution Pack".

The interface is divided into two main sections: "SOLUTION PACKS" on the left and "DETAILS" on the right. The "SOLUTION PACKS" section contains a list of various solution packs, with "HP DMA Database Patching Solution Pack" (Version 10.01) highlighted in blue. The "DETAILS" section provides the following information for the selected pack:

- Name: HP DMA Database Patching Solution Pack
- Version: 10.01
- Targets: 7
- Installed: 06 Mar, 2013
- Description: Database Patching for Oracle, SQL Server, DB2, and Sybase Build 31995

At the bottom right of the interface, there are two buttons: "Browse..." and "Import solution pack".

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

The screenshot displays the HP Database & Middleware Automation interface. At the top, there is a navigation bar with tabs for Home, Automation, Reports, Environment, Solutions, and Setup. Below this, there are sub-tabs for Installed and History. The main content area is titled "HP DMA Database Patching Solution Pack" with a version of 10.01. It features several tabs: General, Policies, Workflows, Steps, and Reports. The Workflows tab is active, showing a list of workflow steps on the right and a list of available workflows on the left. A "DELETE" button is visible at the bottom of the interface.

Workflow Name	Step Number
Apply Critical Patch Update to Database	1
Apply Critical Patch Update to Home	2
Apply Oracle Patchset	3
Apply Sybase Stand Alone EBF Patch	4
Clone Oracle Home	5
Migrate Oracle Home	6
MS SQL - Install Patch	7
MS SQL: Rollback Patch	8
Rollback Critical Patch Update from Database	9
Rollback Critical Patch Update from Home	10
Rollback Sybase EBF Patch for Standalone	11
Prepare Server	12
Determine Oracle Home	
Failure	
Prepare Oracle Instance	
Validate Apply Critical Patch Update to Database	
Check If Download File Exists	
Download Software	
Determine Oracle Patch Info	
Failure	
Run SQL Script	
Run SQL Script	
Verify Patch Applied	

Create a Deployable Workflow

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

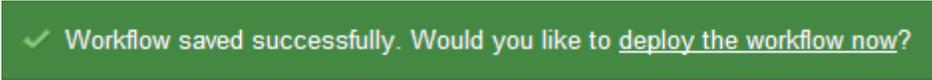


Read-only workflows are not deployable. You can create a deployable workflow by making a copy of a workflow template.¹

To create a deployable copy of the workflow template:

1. In the HP DMA web interface, go to Solutions > Installed.
2. In the left pane, click the Database Patching Solution Pack.
3. Go to the Workflows tab.
4. From the list of workflows, select the Apply Critical Patch Update to Home template.
5. Click the **Copy** button in the lower left corner.
6. On the Documentation tab, specify the following:
 - Name – Name that will appear in the list of available workflows
 - Tags – Keywords that you can use later to search for this workflow (optional)
 - Type – Oracle (this will be selected as a result of the copy)
 - Target level – Server (this will be selected as a result of the copy)
7. On the Roles tab, grant Read access to at least one user or group and Write access to at least one user or group.
8. Click **Save**.

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



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

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

¹For more information about creating and working with workflows, see “Workflows” in the *HP DMA User Guide*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Create a Deployment

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

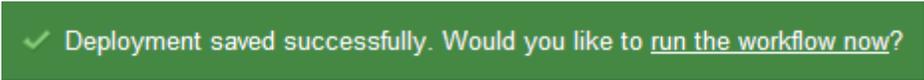
To create a deployment:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your copy of the workflow template—follow these steps:
 - a. Go to the Automation > Deployments page.
 - b. In the lower right corner, click **New deployment**.
2. Specify the following:
 - Name – Name that will appear in the list of available deployments.
 - Workflow – From the drop-down list, select the deployable workflow (the copy) that you just created.
 - Schedule – Frequency or date when the workflow will run. Select None so that the workflow will run once when you explicitly tell it to run.
3. From the list of AVAILABLE targets on the left side of the Targets area, click the **ADD** link for the server where the workflow will run.
4. On the Parameters tab, specify values for the input parameters listed there.

Note: These are a subset of the required parameters for this workflow. Parameters that are not visible in the deployment will have default values. See [Parameters for Apply Critical Patch Update to Home](#) on page 45 for descriptions of all available input parameters for this workflow, including default values.

5. Click **Save**.

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



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

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

Run Your Workflow

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

To run the workflow:

1. If you do not see the green message bar—for example, if you navigated to another page after you created your deployment—follow these steps: show
 - a. Go to the Automation > Run area.
 - b. In the list of WORKFLOWS on the left side, select the workflow that you created.
 - c. In the list of DEPLOYMENTS on the right side, select the deployment that you just created.
2. Select the target selector check box for the server where you want to run the workflow.
3. Click the **Run workflow** button.
4. The following message is displayed:



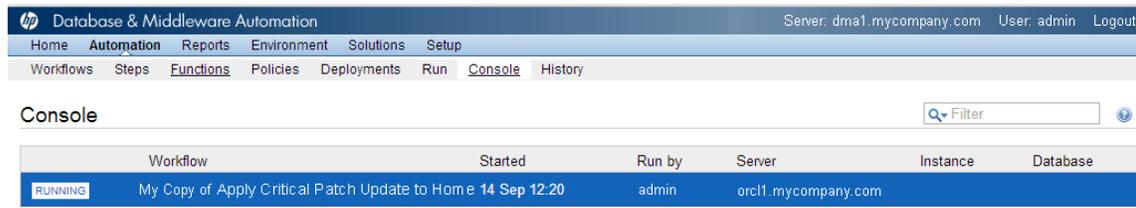
✓ Workflow started successfully. For status, see the [console](#) or [history](#).

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

View the Results

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

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

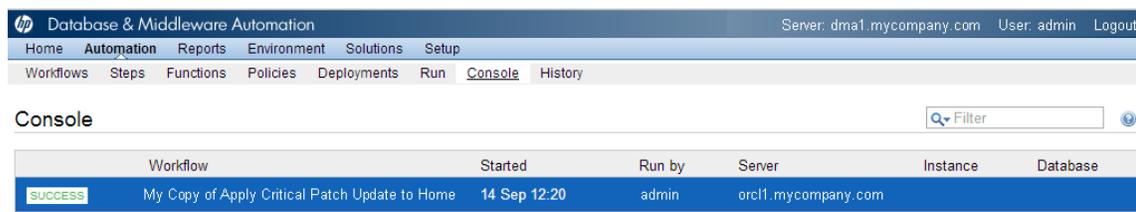


The screenshot shows the HP Database & Middleware Automation interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this is a secondary navigation bar with 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The 'Console' page is active, displaying a table of workflows. The table has columns for 'Workflow', 'Started', 'Run by', 'Server', 'Instance', and 'Database'. A single row is visible with the status 'RUNNING' in a blue box. The workflow name is 'My Copy of Apply Critical Patch Update to Home', started on '14 Sep 12:20', run by 'admin', on server 'orcl1.mycompany.com'.

Workflow	Started	Run by	Server	Instance	Database
My Copy of Apply Critical Patch Update to Home	14 Sep 12:20	admin	orcl1.mycompany.com		

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

While the workflow is running, its status indicator on the Console says RUNNING. After the workflow finishes, its status indicator changes to SUCCESS, FAILURE, or FINISHED depending on the outcome of the workflow.



The screenshot shows the HP Database & Middleware Automation interface, similar to the previous one. The 'Console' page is active, displaying a table of workflows. The table has columns for 'Workflow', 'Started', 'Run by', 'Server', 'Instance', and 'Database'. A single row is visible with the status 'SUCCESS' in a green box. The workflow name is 'My Copy of Apply Critical Patch Update to Home', started on '14 Sep 12:20', run by 'admin', on server 'orcl1.mycompany.com'.

Workflow	Started	Run by	Server	Instance	Database
My Copy of Apply Critical Patch Update to Home	14 Sep 12:20	admin	orcl1.mycompany.com		

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

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

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

Chapter 3

Workflow Details

This solution pack contains the following workflows:

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.
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).
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).
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.
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 15).
- 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 (CPU), 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
<p>Create a brand new Oracle Home with the desired Patch Set:</p> <ol style="list-style-type: none">1. Run the Provision Oracle Software workflow (found in the Database Provisioning Solution Pack).2. Run the Upgrade Oracle Database workflow (found in the Database Provisioning Solution Pack).	<p>Go back to the old Oracle Home:</p> <ol style="list-style-type: none">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
<p>Create a copy of the current Oracle Home and apply the Patch Set to it:</p> <ol style="list-style-type: none">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 Upgrade Oracle Database workflow (found in the Database Provisioning Solution Pack).	<p>Go back to the old Oracle Home:</p> <ol style="list-style-type: none">1. Delete the new Oracle Home.2. Go back to using the old Oracle Home.

To apply a CPU, PSU, or Bundle using the procedure with the most safeguards and the least database downtime:

How to Apply the Patch	What to Do if There Is a Problem
<p>Create a copy of the current Oracle Home and apply the CPU, PSU, or Patch Bundle to it:</p> <ol style="list-style-type: none"> 1. Run the Clone Oracle Home workflow to clone the Oracle Home. 2. Run the Apply Critical Patch Update to Home workflow to apply the patch to the newly-cloned Oracle Home. 3. Run the Migrate Oracle Home workflow to individually migrate Oracle Database Instances from their original, unpatched Oracle Home to the newly-cloned and patched Oracle Home. This allows selective patching of Oracle Database Instances. 4. Run the Apply Critical Patch Update to Database workflow to apply the database portion of the patch. 	<p>Go back to the old Oracle Home:</p> <ol style="list-style-type: none"> 1. Delete the new Oracle Home. 2. Go back to using the old Oracle Home.

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

How to Apply the Patch	What to Do if There Is a Problem
<p>Apply the CPU, PSU, or Patch Bundle to the current Oracle Home:</p> <ol style="list-style-type: none"> 1. Run the Apply Critical Patch Update to Home workflow to apply the patch to the newly-cloned Oracle Home. 2. Run the Apply Critical Patch Update to Database workflow to apply the database portion of the patch. 	<p>Rollback the patch that you just applied:</p> <ol style="list-style-type: none"> 1. Run the Rollback Critical Patch Update from Database workflow. 2. Run the Rollback Critical Patch Update from Home workflow.

Note: If there is a problem after running the [Apply Critical Patch Update to Home](#) workflow, go directly to "What to Do if There Is a Problem" step 2: Run the [Rollback Critical Patch Update from Home](#) workflow.

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.

Oracle Database patches are published on a quarterly basis.

After you run the Apply Critical Patch Update to Home workflow, you should also run the workflow [Apply Critical Patch Update to Database](#) on page 48 to apply the patch to the Oracle Database Instances associated with the Oracle Home.

If you have problems after applying the patch to the Oracle Home, you can remove it by running the workflow [Rollback Critical Patch Update from Home](#) on page 74. If you have problems after applying the patch to both the Oracle Home and the Oracle Database Instances, you can remove it by running the workflows [Rollback Critical Patch Update from Database](#) on page 62 then [Rollback Critical Patch Update from Home](#) on page 74.

For additional information about how the Apply Critical Patch Update to Home workflow can be used with other patching workflows see [How to Use the Workflows Together](#) on page 26.

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.

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

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the [Apply Critical Patch Update to Home](#) workflow:

- This solution requires HP DMA version 10.10 (or 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:

Provision Oracle Software

Provision an Oracle 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 127.

How this Workflow Works

The following information describes how the [Apply Critical Patch Update to Home](#) 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 Critical Patch Update.
- The workflow applies the Critical Patch Update 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 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.

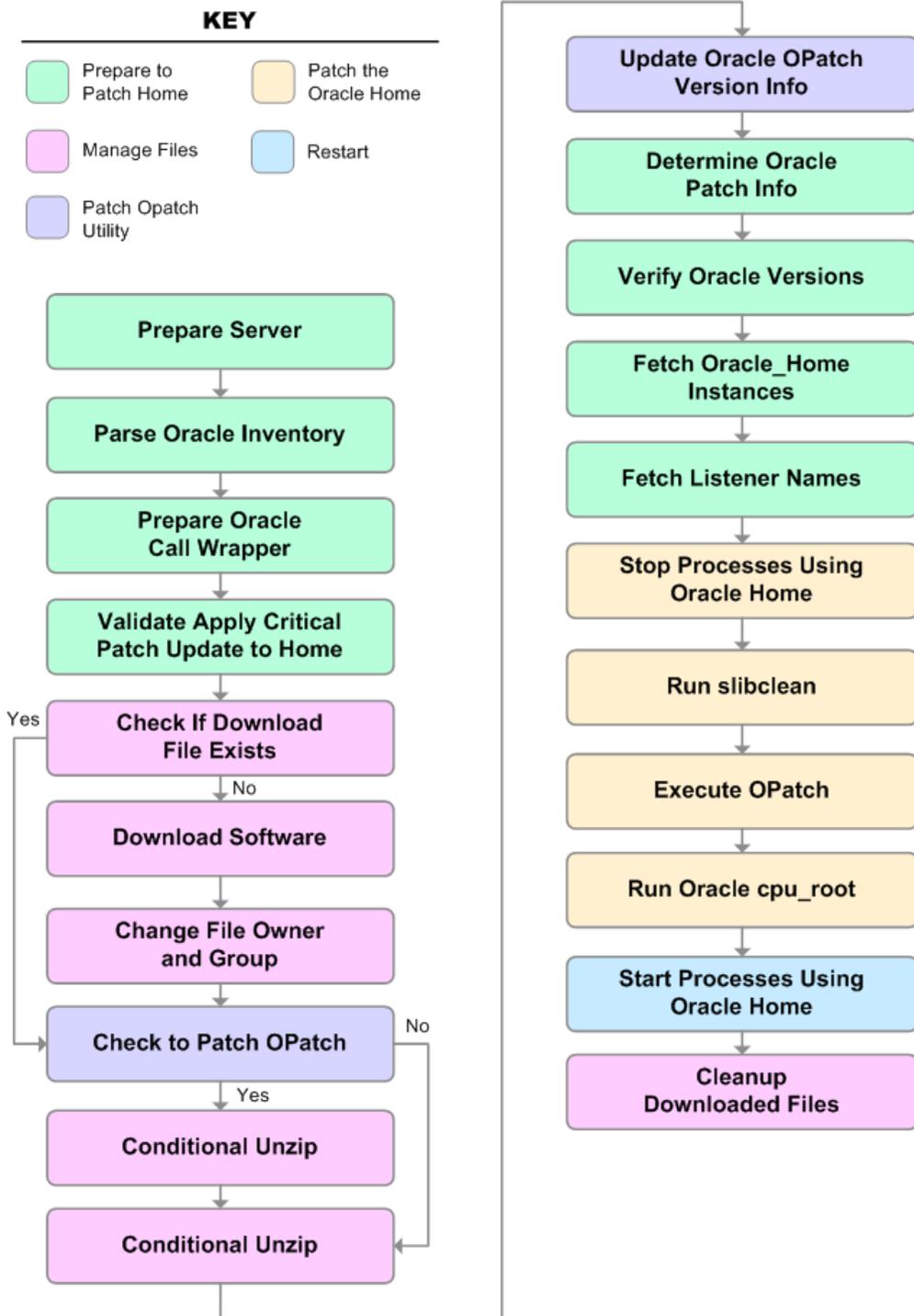
Validation Checks Performed

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: Patch Name, Database Version, OPatch Version, and Patch Number.

Steps Executed

The Apply Critical Patch Update to 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 Apply Critical Patch Update to 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	<p>This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps.</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>The step also creates utility parameters that will be used by subsequent steps.</p>
Validate Apply Critical Patch Update to Home	This step validates the values specified for the input parameters used by the Apply Critical Patch Update to Home 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 Critical Patch Update (CPU).
Conditional Unzip	This step unzips the specified Archive File into the specified destination directory—for the OPatch download.

Steps Used in Apply Critical Patch Update to Home (continued)

Workflow Step	Description
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 Critical Patch Update (CPU). 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 CPU 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 <code>slibclean</code> command on AIX targets. The <code>slibclean</code> 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 <code>cpu_root.sh</code> script as part of an Oracle CPU patch.
Start Processes Using Oracle Home	This step starts all Oracle Instances in the Oracle SIDs list. It also attempts to start the Oracle Agent.

Steps Used in Apply Critical Patch Update to Home (continued)

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

For parameter descriptions and defaults, see [Parameters for Apply Critical Patch Update to Home](#) on page 45.

How to Run this Workflow

The following instructions show you how to customize and run the [Apply Critical Patch Update to Home](#) workflow in your environment.

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 Critical Patch Update to Home](#) on page 45.

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 29, 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 138.

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 CPU Archives parameter, specify the name (or names) of the 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 CPU Archives parameter should be downloaded.
3. In the Patch Archive Location parameter, specify the directory where the ZIP file (or files) specified in the CPU Archives 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 CPU Archives parameter, specify the fully qualified name (or names) of the ZIP file (or files) that was downloaded from Oracle.
2. Do not specify a value for the Patch Archive Location parameter. You must specify the Patch Download Location if either OCM Response File or Patch Information File need to be downloaded; otherwise, do not specify a value for Patch Download Location.

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

Method 3: The unzipped Oracle patch is stored on each target machine:

1. In the CPU Archives parameter, specify the fully qualified directory name where the unzipped files are located. The directory name must be the patch number.
2. Do not specify a value for the Patch Archive Location parameter.
3. You must specify the Patch Download Location if either OCM Response File or Patch Information File need to be downloaded; otherwise, do not specify a value for Patch Download Location.

To use the Apply Critical Patch Update to Home workflow:

1. Create a deployable copy of the workflow (see [Create a Deployable Workflow](#) on page 20).
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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Critical Patch Update to Home

Parameter Name	Default Value	Required	Description
CPU Archive	no default	required	Relative or fully-qualified path name of the Critical Patch Update archive file. For example: <code>p7150622_10203_SOLARIS64.zip</code> 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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORA-nnnnn. For example: <code>ORA-04020,ORA-03113</code>
OCM Response File	no default	optional	Path name of the Oracle Configuration Manager (OCM) response file (required for OPatch version 10.2.0.4.6 or newer). If not found on the target, this file is downloaded from the software repository. If left blank, a default response file will be created.

Input Parameters for Validate Apply Critical Patch Update to Home (continued)

Parameter Name	Default Value	Required	Description
OPatch Archive	no default	optional	The fully qualified path name of the OPatch archive file required for this Critical Patch Update. If this file is not present, 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	<code>/var/tmp</code>	optional	Directory location where the zip archives will be extracted.
Patch Download Location	<code>/var/tmp</code>	optional	Directory on the target server where the patch 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	Full path 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 Apply Critical Patch Update to Home](#) on page 45 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 134). 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](#) on page 21 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](#) on page 22 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. 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.

Sample Scenario

This topic shows you typical parameter values for different use cases for the [Apply Critical Patch Update to Home](#) workflow. The workflow always applies an Oracle Critical Patch Update (CPU), Patch Bundle, or Patch Set Update (PSU) to an Oracle Home.

Scenario 1: To 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 fully qualified path name of the OPatch archive file required for this Critical Patch Update. If this file is not present, it will be downloaded from the software repository.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	/etc/oraInst.loc	Comma separated list of Oracle inventory file names (with absolute paths). 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	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Critical Patch Update to Home

Parameter Name	Example Value	Description
CPU Archive	p13632717_112030_Linux-x86-64.zip	Relative or fully-qualified path name of the Critical Patch Update archive file. For example: p7150622_10203_SOLARIS64.zip 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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).
OPatch Archive	p6880880_112000_Linux-x86-64.zip	The fully qualified path name of the OPatch archive file required for this Critical Patch Update. If this file is not present, it will be downloaded.
Patch Archive Location	/var/tmp	Directory location where the zip archives will be extracted.

Input Parameters for Validate Apply Critical Patch Update to Home (continued)

Parameter Name	Example Value	Description
Patch Download Location	<code>/var/tmp</code>	Directory on the target server where the patch 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.

Scenario 2: To patch the Oracle Home 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 Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	/etc/oraInst.loc	Comma separated list of Oracle inventory file names (with absolute paths). 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	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Critical Patch Update to Home

Parameter Name	Example Value	Description
CPU Archive	p13632717_112030_Linux-x86-64.zip	Relative or fully-qualified path name of the Critical Patch Update archive file. For example: p7150622_10203_SOLARIS64.zip 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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).
OPatch Archive		When this parameter value is not specified, the current OPatch version will be used.
Patch Archive Location	/var/tmp	Directory location where the zip archives will be extracted.
Patch Download Location	/var/tmp	Directory on the target server where the patch 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.

Scenario 3: To manually specify the Critical 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 April 2012 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.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	/etc/oraInst.loc	Comma separated list of Oracle inventory file names (with absolute paths). 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	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Critical Patch Update to Home

Parameter Name	Example Value	Description
CPU Archive	p13632717_112030_Linux-x86-64.zip	Relative or fully-qualified path name of the Critical Patch Update archive file. For example: p7150622_10203_SOLARIS64.zip 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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).
Database Version	11.2.0.3	The Oracle Database version to which the patch applies. If you specify a value for this parameter, you MUST also specify the Patch Number, Patch Name, and OPatch Version.

Input Parameters for Validate Apply Critical Patch Update to Home (continued)

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
New OPatch Version	11.2.0.3.0	The OPatch version of the patch being applied. If you specify a value for this parameter, you MUST also specify values for Patch Number, Database Version, and Patch Name.
OPatch Archive	p6880880_112000_Linux-x86-64.zip	The fully qualified path name of the OPatch archive file required for this Critical Patch Update. If this file is not present, it will be downloaded.
Patch Archive Location	/var/tmp	Directory location where the zip archives will be extracted.
Patch Download Location	/var/tmp	Directory on the target server where the patch 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 Name	CPUApr2012	Name of the patch that is being deployed—applied or rolled back. If you specify a value for this parameter, you MUST also specify the Patch Number, Database Version, and OPatch Version—these parameters need to be exposed.
Patch Number	13632717	Patch number of the patch being applied. If you specify a value for this parameter, you MUST also specify the Patch Name, Database Version, and OPatch Version.

Note: You need to expose these additional parameters in the Validate Apply Critical Patch Update to Home step (see [How to Expose Additional Workflow Parameters](#) on page 134):

- Patch Name
- Database Version
- OPatch Version
- Patch Number
- New OPatch Version

Parameters for Apply Critical Patch Update to 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 134). For most 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: Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.

Additional Input Parameters Defined in this Step: Validate Apply Critical Patch Update to Home

Parameter Name	Default Value	Required	Description
Archive Location	no default	optional	Deprecated: This parameter is no longer used.

Additional Input Parameters Defined in this Step: Validate Apply Critical Patch Update to Home (continued)

Parameter Name	Default Value	Required	Description
CPU Archive	no default	required	Relative or fully-qualified path name of the Critical Patch Update archive file. For example: p7150622_10203_SOLARIS64.zip 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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).
Call Wrapper	no default	required	Command used to execute a step as the Oracle Instance owner. For example: <pre>sudo -u oracle /opt/hp/dma/client/jython.sh</pre> Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Database Version	no default	optional	The Oracle Database version to which the patch applies. If you specify a value for this parameter, you MUST also specify the Patch Number, Patch Name, and OPatch Version.
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch. 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) to ignore during patch post-processing.
New OPatch Version	no default	optional	The OPatch version of the patch being applied. If you specify a value for this parameter, you MUST also specify values for Patch Number, Database Version, and Patch Name.
OCM Response File	no default	optional	Path name of the Oracle Configuration Manager (OCM) response file (required for OPatch version 10.2.0.4.6 or newer). 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: Validate Apply Critical Patch Update to Home (continued)

Parameter Name	Default Value	Required	Description
OPatch Archive	no default	optional	The fully qualified path name of the OPatch archive file required for this Critical Patch Update. If this file is not present, 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	<code>/var/tmp</code>	optional	Directory location where the zip archives will be extracted.
Patch Download Location	<code>/var/tmp</code>	optional	Directory on the target server where the patch 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	Full path 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 deployed—applied or rolled back. If you specify a value for this parameter, you MUST also specify the Patch Number, Database Version, and OPatch Version—these parameters need to be exposed.
Patch Number	no default	optional	Patch number of the patch being applied. If you specify a value for this parameter, you MUST also specify the Patch Name, Database Version, and OPatch Version.

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).

Oracle Database patches are published on a quarterly basis.

Before you can run the Apply Critical Patch Update to Database workflow you need to apply the CPU, Bundle, or PSU to the Oracle Home. To do this, use the workflow [Apply Critical Patch Update to Home](#) on page 28.

Note: The target for this workflow is an Oracle Instance. An Oracle Home may have multiple Oracle Instances. After patching the Oracle Home, all associated Oracle Instances need to be patched.

If you have problems after applying the patch to both the Oracle Home and the Oracle Database Instances, you can remove it by running the workflows [Rollback Critical Patch Update from Database](#) on page 62 then [Rollback Critical Patch Update from Home](#) on page 74.

For additional information about how the Apply Critical Patch Update to Database workflow can be used with other patching workflows see [How to Use the Workflows Together](#) on page 26.

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.

The patch to be applied is determined by the last directory entry in `${ORACLE_HOME}/.patch_storage` (sorted by name, not date).

If the January 2008 view recompile is not found in the `sys.registry$history` table, this patch is also applied (for Oracle versions prior to 11.2).

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

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the [Apply Critical Patch Update to Database](#) workflow:

- This solution requires HP DMA version 10.10 (or 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:

Provision Oracle Software

Provision an Oracle Database

- You have already run the workflow [Apply Critical Patch Update to Home](#) on page 28
- You have read access to all specified inventory pointers (Linux/UNIX).

Caution: Because this workflow runs the Oracle Database in upgrade mode while the patch is being applied, no one can use the database while the patch is being applied.

For more information about prerequisites for Oracle Database, refer to the [Oracle Product Documentation](#) on page 127.

How this Workflow Works

The following information describes how the [Apply Critical Patch Update to Database](#) workflow works:

Overview

This workflow does the following things in the order shown:

- First, the workflow prepares to apply the patch. It prepares the server, determines the Oracle Home, prepares the Oracle Instance, and validates the input parameters. If the patch files do not already exist they are downloaded. It determines all the pertinent patch information.
- The patch applied by running the specified SQL Script. Then the workflow verifies that the patch is applied
- The database view is recompiled. Then the workflow verifies that this was successful.
- The Patch Level metadata is updated.
- Finally, the workflow cleans up files that are no longer needed.

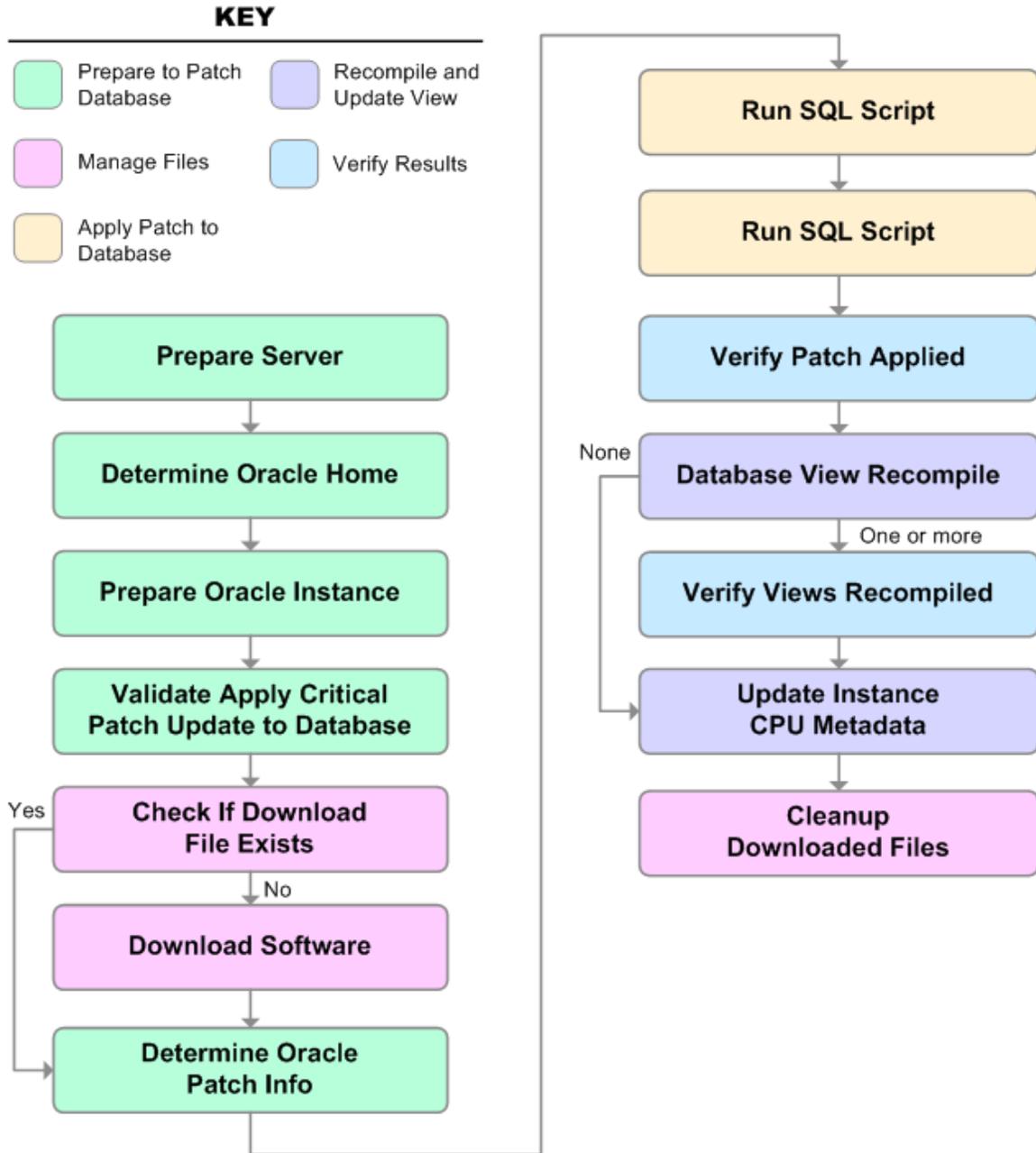
Validation Checks Performed

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 critical patch update applies to the current Oracle Database version.

Steps Executed

The Apply Critical Patch Update to 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 Apply Critical Patch Update to Database

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 <code>/etc/oratab</code> or <code>/var/opt/oracle/oratab</code> file on UNIX targets.
Prepare Oracle Instance	This step prepares access to the pertinent Oracle Instance.
Validate Apply Critical Patch Update to Database	This step validates the values specified for the input parameters used by the Apply Critical Patch Update to Database 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.
Determine Oracle Patch Info	This step determines all the patch information that the workflow requires to apply the pertinent patch.
Run SQL Script	This step runs the specified SQL Script against each SID in the specified Oracle SIDs list. It skips all Oracle Instances in the Ignore SIDs list (these are typically standby databases). The first Run SQL Script step runs the optional user-defined Preparatory SQL Script file.
Run SQL Script	This step runs the specified SQL Script against each SID in the specified Oracle SIDs list. It skips all Oracle Instances in the Ignore SIDs list (these are typically standby databases). The second Run SQL Script step runs the Patch Information File.
Verify Patch Applied	This step confirms that the patch was properly applied to the database.
Database View Recompile	This step recompiles the database views as required by the Critical Patch Update (CPU) or Patch Set Update (PSU) patching process.
Verify Views Recompiled	This step confirms that any views that were required to be recompiled were successfully recompiled.

Steps Used in Apply Critical Patch Update to Database (continued)

Workflow Step	Description
Update Instance CPU Metadata	This step updates the Patch Level metadata field associated with the pertinent instance.
Cleanup Downloaded Files	This step removes files and archives that were downloaded to the target system during previous workflow steps.

For parameter descriptions and defaults, see [Parameters for Apply Critical Patch Update to Database](#) on page 59.

How to Run this Workflow

The following instructions show you how to customize and run the [Apply Critical Patch Update to Database](#) workflow in your environment.

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 Critical Patch Update to Database](#) on page 59.

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 49, and ensure that all requirements are satisfied.

To use the Apply Critical Patch Update to Database workflow:

1. Create a deployable copy of the workflow (see [Create a Deployable Workflow](#) on page 20).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Prepare Oracle Instance

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

Input Parameters for Validate Apply Critical Patch Update to Database

Parameter Name	Default Value	Required	Description
Download Location	<code>/var/tmp</code>	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.
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORA-nnnnn. For example: <code>ORA-04020,ORA-03113</code>

Input Parameters for Validate Apply Critical Patch Update to Database (continued)

Parameter Name	Default Value	Required	Description
Patch Information File	no default	optional	Full path 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.

Note: See [Parameters for Apply Critical Patch Update to Home](#) on page 45 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 134). 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](#) on page 21 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 target for this workflow is an instance.

8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see [Run Your Workflow](#) on page 22 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 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:

```
CPUJul2012 or PSUJul2012
```

Sample Scenario

It is very straightforward to run the [Apply Critical Patch Update to Database](#) workflow. This topic shows you typical parameter values to use.

Typical scenario: To apply a CPU patch to your Oracle Database

This case shows how to set the input parameters to patch Oracle Database. Inventory Files contains one (or more) Oracle inventory file names. Download Location is the directory on the target server from where files are copied. Ignorable Oracle Errors is a list of Oracle errors to be ignored (in addition to the errors specified in the patch readme). Patch Information File is a file that contains all patch information in XML format. Preparatory SQL Script is a file that contains your customized SQL statements will be run before the database catalog update. If this file is not found on the target server, the file is downloaded from the software repository. When you set Startup Instance to Y, the workflow will start the Oracle Instance if it is offline.

Input Parameters for Prepare Oracle Instance

Parameter Name	Example Value	Description
Inventory Files	/etc/oraInst.loc	Comma separated list of Oracle inventory file names (with absolute paths). 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 Apply Critical Patch Update to Database

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.
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
Patch Information File	/etc/oraInst.loc	Full path 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 Validate Apply Critical Patch Update to Database (continued)

Parameter Name	Example Value	Description
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.

Parameters for Apply Critical Patch Update to Database

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 134). For most 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: Prepare Oracle Instance

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	no default	optional	Fully qualified path name of the Oracle Home where the patch will be applied. Only necessary to specify if there is more than one Oracle Home in the inventory file (or files).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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 Critical Patch Update to Database

Parameter Name	Default Value	Required	Description
Download Location	<code>/var/tmp</code>	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.

Additional Parameters Defined in this Step: Validate Apply Critical Patch Update to Database (continued)

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. 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
Instance Wrapper	no default	required	Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example: <code>su - oracle /opt/hp/dma/client/jython.sh</code> Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Patch Archive Location	<code>/var/tmp</code>	optional	Directory location where the zip archives will be extracted.
Patch Directory	no default	optional	Deprecated. No longer used.
Patch Download Location	<code>/var/tmp</code>	optional	Directory on the target server where the patch 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	Full path 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.
Startup Instance	no default	optional	Specify Y if you would like to attempt to start the database instance if it is offline.

Additional Parameters Defined in this Step: Run SQL Script

Parameter Name	Default Value	Required	Description
Ignore SIDs	no default	optional	Comma-separated list of Oracle Instances (SIDs) to ignore during patch post-processing.

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).

Use this workflow if you encounter problems after applying the Critical Patch Update to both the Oracle Home and the Oracle Database Instances. Only the last patch that was applied is rolled back.

After you run this workflow, run the workflow [Rollback Critical Patch Update from Home](#) on page 74 to rollback the CPU, Bundle, or PSU from the Oracle Home.

For additional information about how the Rollback Critical Patch Update from Database workflow can be used with other patching workflows see [How to Use the Workflows Together](#) on page 26.

Note: The target for this workflow is an Oracle Instance. An Oracle Home may have multiple Oracle Instances. After rolling back all associated Oracle Instances, you will need to roll back the Oracle Home.

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

The rollback script used is located in `${ORACLE_HOME}/rdbms/admin` per the patch README instructions.

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

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the [Rollback Critical Patch Update from Database](#) on the previous page workflow:

- This solution requires HP DMA version 10.10 (or later).
- You have installed the HP DMA Database Patching Solution Pack.
- You have read access to all specified inventory pointers (Linux/UNIX).
- You have already run the workflow [Rollback Critical Patch Update from Home](#) on page 74.

Caution: This workflow runs the Oracle Database in upgrade mode while the patch is being applied so the database cannot be used by others.

For more information about prerequisites for Oracle Database, refer to the [Oracle Product Documentation](#) on page 127.

How this Workflow Works

The following information describes how the [Rollback Critical Patch Update from Database](#) workflow works:

Overview

This workflow does the following things in the order shown:

- First, the workflow prepares to roll back the patch. It prepares the server, determines the Oracle Home, prepares the Oracle Instance, and validates the input parameters. If the patch files do not already exist they are downloaded. It determines all the pertinent patch information.
- The workflow applies the rollback by running the specified SQL Script. Then the workflow verifies that the patch was properly rolled back from the database.
- The workflow confirms that the database view was recompiled correctly. If not, it recompiles the database view.
- The workflow updates the Patch Level metadata.
- Finally, the workflow cleans up files that are no longer needed.

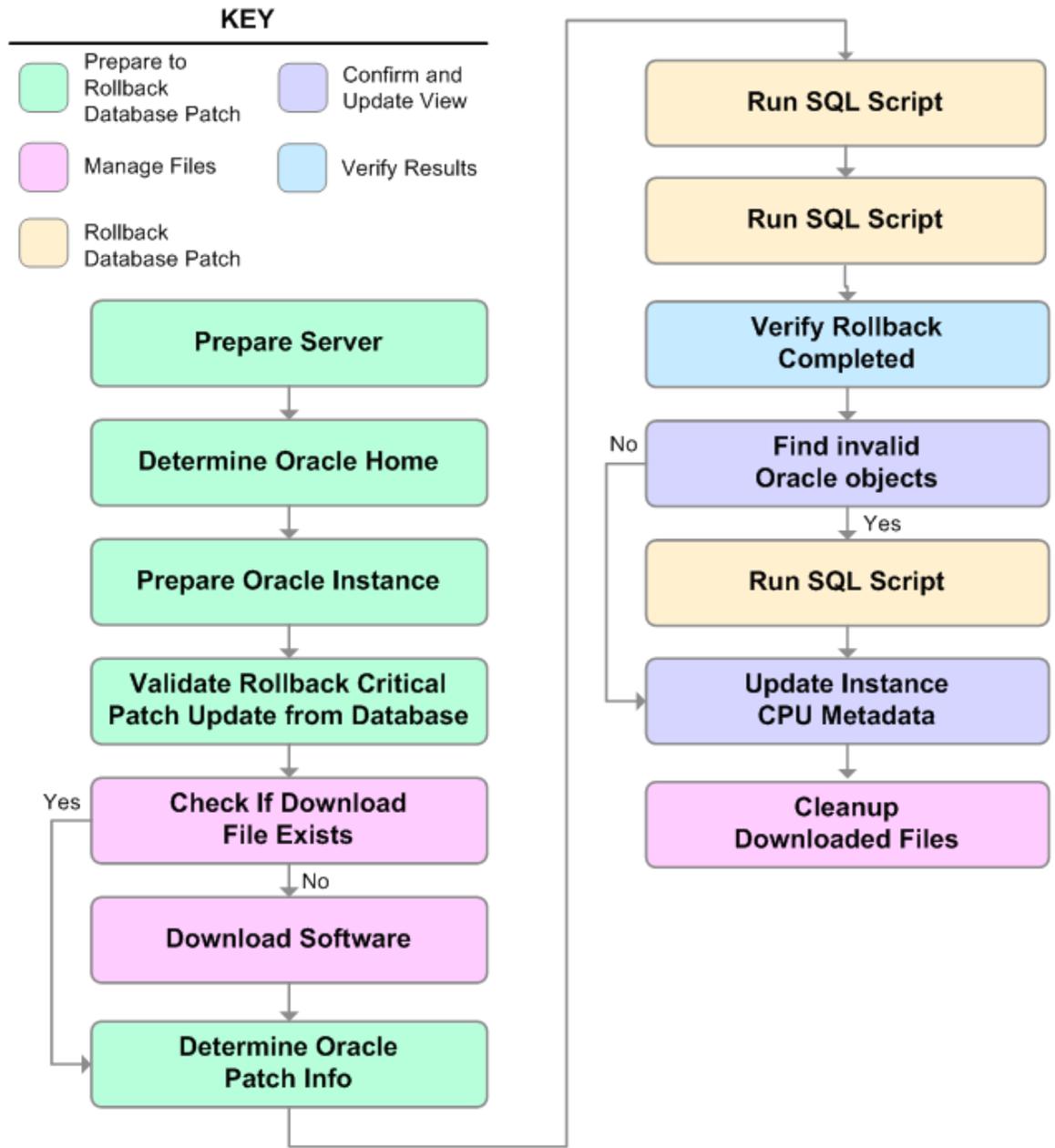
Validation Checks Performed

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 Rollback Critical Patch Update from 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 Rollback Critical Patch Update from Database

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 <code>/etc/oratab</code> or <code>/var/opt/oracle/oratab</code> file on UNIX targets.
Prepare Oracle Instance	This step prepares access to the pertinent Oracle Instance.
Validate Rollback Critical Patch Update from Database	This step validates the specified values of the input parameters for the Rollback Critical Patch Update from Database workflow.
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.
Determine Oracle Patch Info	This step determines all the patch information that the workflow requires to apply the pertinent patch.
Run SQL Script	This step runs the specified SQL Script against each SID in the specified Oracle SIDs list. It skips all Oracle Instances in the Ignore SIDs list (these are typically standby databases). The first Run SQL Script step runs the optional user-defined Preparatory SQL Script file.
Run SQL Script	This step runs the specified SQL Script against each SID in the specified Oracle SIDs list. It skips all Oracle Instances in the Ignore SIDs list (these are typically standby databases). The second Run SQL Script step runs the Patch Information File.
Verify Rollback Completed	This step confirms that the patch was properly rolled back from the database.
Find Invalid Oracle Objects	This step confirms that the database view was recompiled correctly.
Run SQL Script	This step runs the specified SQL Script against each SID in the specified Oracle SIDs list. It skips all Oracle Instances in the Ignore SIDs list (these are typically standby databases). The third Run SQL Script step runs the Oracle provided <code>utlrp.sql</code> file to recompile all invalid objects in the database.

Steps Used in Rollback Critical Patch Update from Database (continued)

Workflow Step	Description
Update Instance CPU Metadata	This step updates the Patch Level metadata field associated with the pertinent instance.
Cleanup Downloaded Files	This step removes files and archives that were downloaded to the target system during previous workflow steps.

For parameter descriptions and defaults, see [Parameters for Rollback Critical Patch Update from Database](#) on page 72.

How to Run this Workflow

The following instructions show you how to customize and run the [Rollback Critical Patch Update from Database](#) workflow in your environment.

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 Rollback Critical Patch Update from Database](#) on page 72

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 63, and ensure that all requirements are satisfied.

To use the Rollback Critical Patch Update from Database workflow:

1. Create a deployable copy of the workflow (see [Create a Deployable Workflow](#) on page 20).
2. Determine the values that you will specify for the following parameters:

Input Parameters for Prepare Oracle Instance

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

Input Parameters for Validate Rollback Critical Patch Update from Database

Parameter Name	Default Value	Required	Description
Download Location	<code>/var/tmp</code>	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.
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when rolling back the patch. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORA-nnnnn. For example: <code>ORA-04020,ORA-03113</code>

Input Parameters for Validate Rollback Critical Patch Update from Database (continued)

Parameter Name	Default Value	Required	Description
Patch Information File	no default	optional	Full path 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.
Startup Instance	no default	optional	Specify Y if you would like to attempt to start the database instance if it is offline.

Input Parameters for Run SQL Script

Parameter Name	Default Value	Required	Description
Startup Instance	no default	optional	Specify Y if you would like to attempt to start the database instance if it is offline.

Note: See [Parameters for Rollback Critical Patch Update from Database](#) on page 72 for detailed descriptions of all input parameters for this workflow, including default values.

- In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 134). You will specify values for those parameters when you create the deployment.
- Save the changes to the workflow (click **Save** in the lower right corner).
- Create a new deployment (see [Create a Deployment](#) on page 21 for instructions).
- 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.
- On the Targets tab, specify one or more targets for this deployment.

Note: The targets need to be the same targets (instances) you used when you ran the Apply Critical Patch Update to Database workflow.

- Save the deployment (click **Save** in the lower right corner).
- Run the workflow using this deployment (see [Run Your Workflow](#) on page 22 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 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 rolled back. For example, look for:

```
CPUJul2012 or PSUJul2012
```

Sample Scenario

It is very straightforward to run the [Rollback Critical Patch Update from Database](#) workflow. This topic shows you typical parameter values to use.

Input Parameters for Prepare Oracle Instance

Parameter Name	Example Value	Description
Inventory Files	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

Input Parameters for Validate Rollback Critical Patch Update from Database

Parameter Name	Example Value	Description
Download Location	<code>/var/tmp</code>	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.
Ignorable Oracle Errors	see description	Comma-separated list of Oracle errors to be ignored when rolling back the patch. This is in addition to the list of Oracle errors specified in the patch README. Values are of the form ORAnnnn. For example: ORA-04020,ORA-03113
Patch Information File	<code>/etc/oraInst.loc</code>	Full path 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	<code>example.sql</code>	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.
Startup Instance	Y	Specify Y if you would like to attempt to start the database instance if it is offline.

Input Parameters for Run SQL Script

Parameter Name	Example Value	Description
Startup Instance	Y	Specify Y if you would like to attempt to start the database instance if it is offline.

Parameters for Rollback Critical Patch Update from Database

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 134). For most 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: Prepare Oracle Instance

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	no default	optional	Fully qualified path name of the Oracle Home where the patch will be applied. Only necessary to specify if there is more than one Oracle Home in the inventory file (or files).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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 Rollback Critical Patch Update from Database

Parameter Name	Default Value	Required	Description
Download Location	<code>/var/tmp</code>	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.

Additional Parameters Defined in this Step: Validate Rollback Critical Patch Update from Database (continued)

Parameter Name	Default Value	Required	Description
Ignorable Oracle Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when rolling back the patch. 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
Instance Wrapper	no default	required	Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example: <pre>su - oracle /opt/hp/dma/client/jython.sh</pre> Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.
Patch Information File	no default	optional	Full path 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.
Startup Instance	no default	optional	Specify Y if you would like to attempt to start the database instance if it is offline.

Additional Parameters Defined in this Step: Run SQL Script

Parameter Name	Default Value	Required	Description
Ignore SIDs	no default	optional	Comma-separated list of Oracle Instances (SIDs) to ignore during patch post-processing.
Startup Instance	no default	optional	Specify Y if you would like to attempt to start the database instance if it is offline.

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.

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

If you have also applied the database portion of the patch, make sure that you run the workflow [Rollback Critical Patch Update from Database](#) on page 62 to roll back the patch from the Oracle Database Instances before you run this workflow.

For additional information about how the Rollback Critical Patch Update from Home workflow can be used with other patching workflows see [How to Use the Workflows Together](#) on page 26.

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

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

Prerequisites for this Workflow

Be sure that the following prerequisites are satisfied before you run the [Rollback Critical Patch Update from Home](#) workflow:

- This solution requires HP DMA version 10.10 (or 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 127.

How this Workflow Works

The following information describes how the [Rollback Critical Patch Update from Home](#) 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 cleans up the downloaded files.

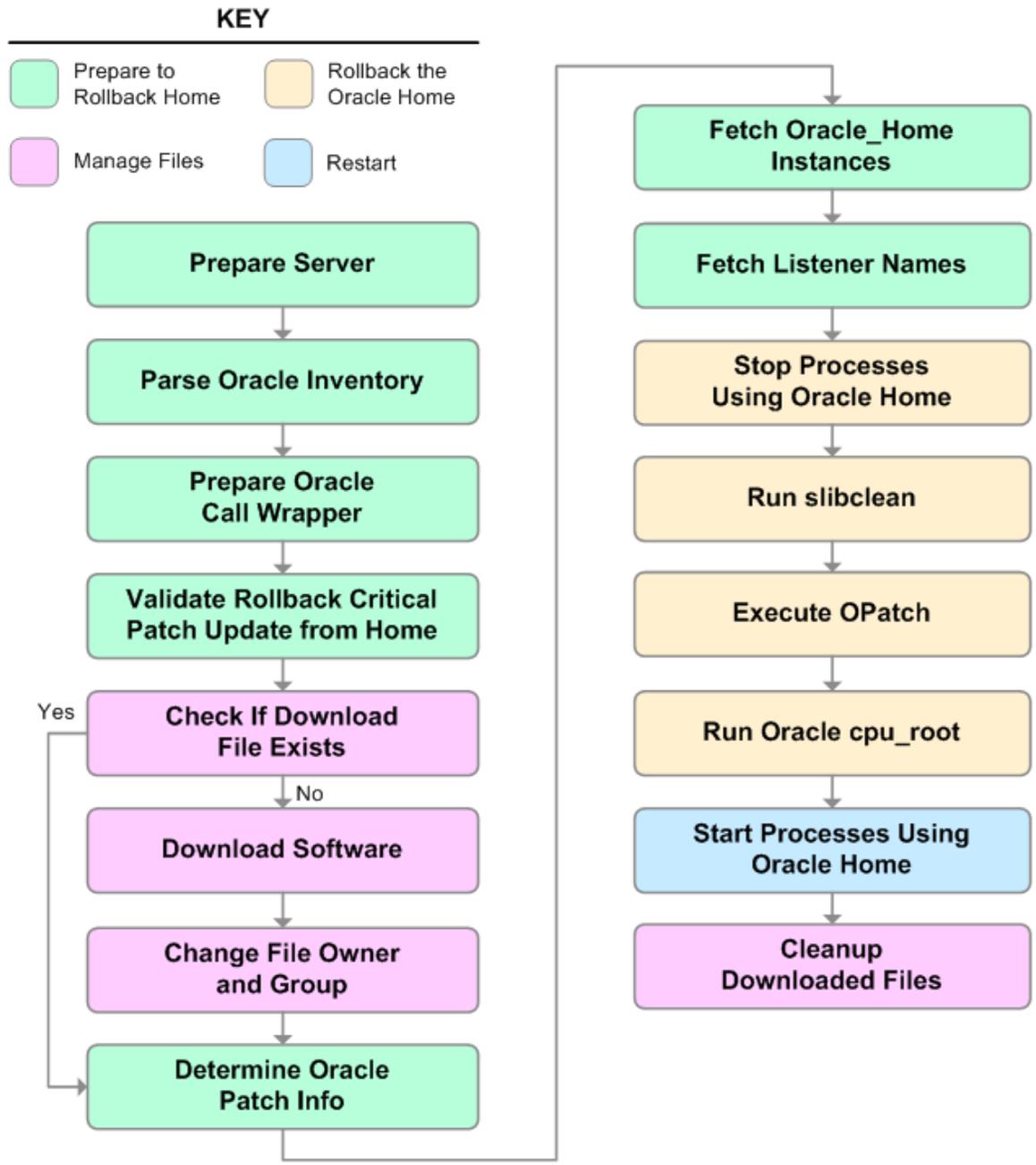
Validation Checks Performed

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 Critical Patch Update applies to the current Oracle Database version.

Steps Executed

The Rollback Critical Patch Update from 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 Rollback Critical Patch Update from 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. <ul style="list-style-type: none"> • 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 Rollback Critical Patch Update from Home	This step validates the specified values of the input parameters for the Rollback Critical Patch Update from Home workflow.
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.
Determine Oracle Home	This step determines all the patch information that the workflow requires to apply the pertinent 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.

Steps Used in Rollback Critical Patch Update from Home (continued)

Workflow Step	Description
Run slibclean	This step runs the <code>slibclean</code> command on AIX targets. The <code>slibclean</code> 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 <code>cpu_root.sh</code> script as part of an Oracle CPU patch.
Start Processes Using Oracle Home	This step starts all Oracle Instances in the Oracle SIDs list. It also attempts to start the Oracle Agent.
Cleanup Downloaded Files	This step removes all downloaded files and archives.

For parameter descriptions and defaults, see [Parameters for Rollback Critical Patch Update from Home](#) on page 83.

How to Run this Workflow

The following instructions show you how to customize and run the [Rollback Critical Patch Update from Home](#) workflow in your environment.

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 Rollback Critical Patch Update from Home](#) on page 83.

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 75, and ensure that all requirements are satisfied.

To use the Rollback Critical Patch Update from Home workflow:

1. Create a deployable copy of the workflow (see [Create a Deployable Workflow](#) on page 20).
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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Execute OPatch

Parameter Name	Default Value	Required	Description
Patch Name	no default	optional	Name of the patch that is being deployed—applied or rolled back. If you specify a value for this parameter, you MUST also specify the Patch Number, Database Version, and OPatch Version—these parameters need to be exposed.

Note: See [Parameters for Rollback Critical Patch Update from Home](#) on page 83 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 134). 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](#) on page 21 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 Apply Critical Patch Update to Home workflow.

8. Save the deployment (click **Save** in the lower right corner).
9. Run the workflow using this deployment (see [Run Your Workflow](#) on page 22 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 `$ORACLE_HOME/OPatch/opatch lsinventory -oh $ORACLE_HOME`
2. Check that the patch you rolled back is on the list of rollback patches.

Sample Scenario

It is very straightforward to run the [Rollback Critical Patch Update from Home](#) workflow. This topic shows you typical parameter values to use.

Input Parameters for Parse Oracle Inventory

Parameter Name	Example Value	Description
Inventory Files	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	<code>/u01/app/oracle/product/11.2.0/db1</code>	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Execute OPatch

Parameter Name	Example Value	Description
Patch Name	<code>CPUPr2012</code>	Name of the patch that was applied.

Parameters for Rollback Critical Patch Update from 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 134). For most 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: Parse Oracle Inventory

Parameter Name	Default Value	Required	Description
Inventory Files	see description	optional	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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 Rollback Critical Patch Update from Home

Parameter Name	Default Value	Required	Description
Instance Wrapper	no default	required	<p>Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example:</p> <pre>su - oracle /opt/hp/dma/client/jython.sh</pre> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
OCM Response File	no default	optional	Path name of the Oracle Configuration Manager (OCM) response file (required for OPatch version 10.2.0.4.6 or newer). If not found on the target, this file is downloaded from the software repository. If left blank, a default response file will be created.
Patch Download Location	/var/tmp	optional	Directory on the target server where the patch 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	Full path 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 was applied.
Patch Number	no default	optional	Patch number of the patch that was applied.

Additional Parameters Defined in this Step: Execute OPatch

Parameter Name	Default Value	Required	Description
Archive Location	no default	optional	Deprecated: This parameter is no longer used.

Additional Parameters Defined in this Step: Execute OPatch (continued)

Parameter Name	Default Value	Required	Description
CPU Archive	no default	required	<p>Relative or fully-qualified path name of the Critical Patch Update archive file. For example: p7150622_10203_SOLARIS64.zip</p> <p>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 repository. If a fully-qualified path name is a directory, the patch is expected to be unzipped and ready to be applied (this directory must be the patch number).</p>
Call Wrapper	no default	required	<p>Command used to execute a step as the Oracle Instance owner. For example:</p> <pre>sudo -u oracle /opt/hp/dma/client/jython.sh</pre> <div style="background-color: #f0f0f0; padding: 5px; border: 1px solid #ccc;"> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p> </div>
Is Rollback	False	optional	Deprecated: This parameter is no longer used.
OPatch Version	no default	optional	The updated version of OPatch as an integer (for example: 10.2.0.4.3 = 1002000403).
Patch Name	no default	optional	<p>Name of the patch that is being deployed—applied or rolled back.</p> <p>If you specify a value for this parameter, you MUST also specify the Patch Number, Database Version, and OPatch Version—these parameters need to be exposed.</p>
RDBMS Patch Number	no default	optional	The non-CRS Oracle patch number.
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.

Additional Parameters Defined in this Step: Stop Processes Using Oracle Home

Parameter Name	Default Value	Required	Description
Allowed Errors	no default	optional	Comma-separated list of Oracle errors to be ignored when applying the patch. 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	TST,DEV	optional	Comma-separated list of Oracle Instances (SIDs) to ignore during patch post-processing.

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 26.

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:

- This solution requires HP DMA version 10.10 (or 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:

Provision Oracle Software

Provision an Oracle 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 127.

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.

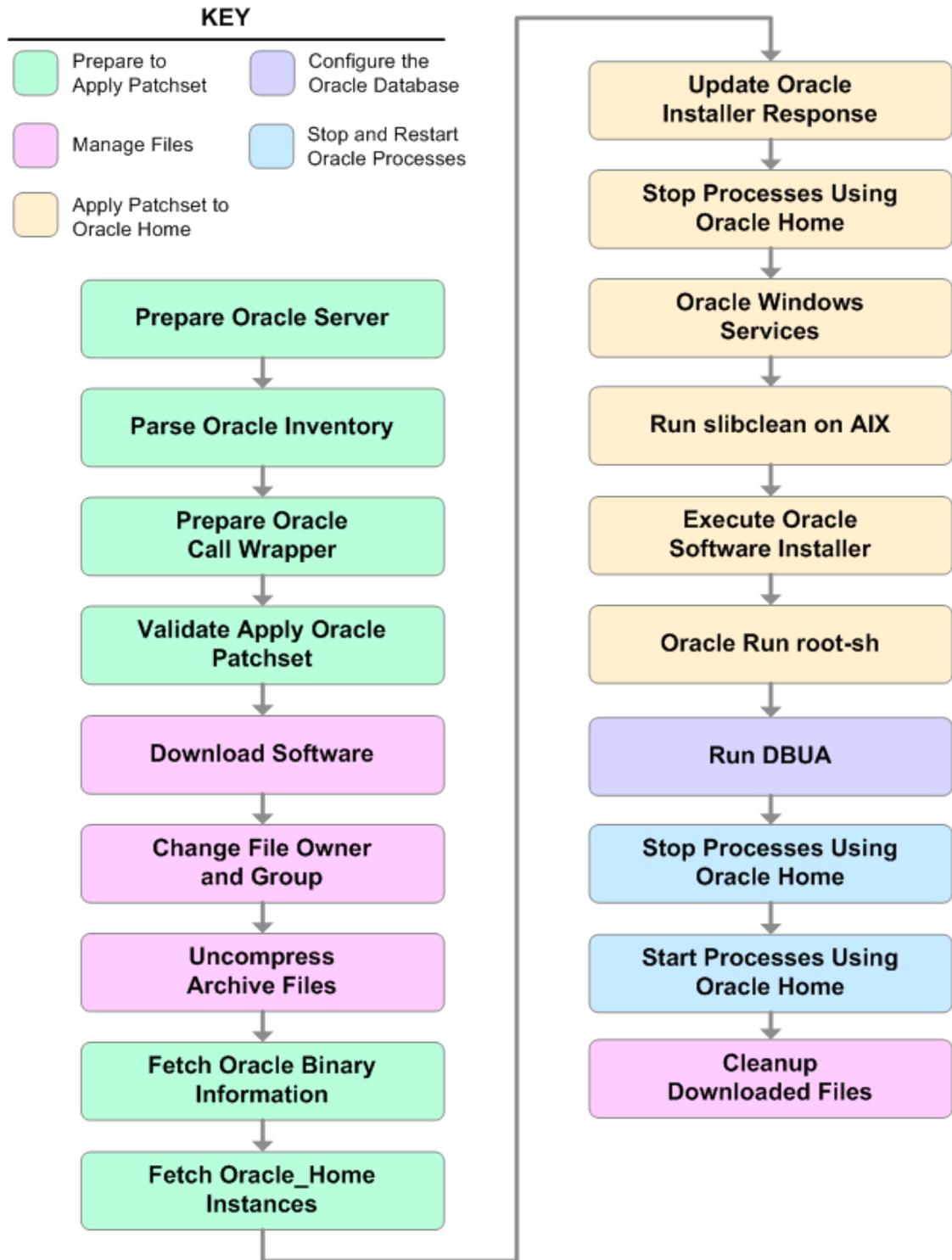
Validation Checks Performed

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	<p>This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps.</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>The step also creates utility parameters that will be used by subsequent steps.</p>
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	<p>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):</p> <pre>runInstaller products.xml rootpre.sh *.rsp.</pre>

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 <code>slibclean</code> command, if appropriate, 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 <code>root.sh</code> 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 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 101.

How to Run this Workflow

The following instructions show you how to customize and run the [Apply Oracle Patchset](#) workflow in your environment.

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 101

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 88, 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 138.

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.

Method 3: The unzipped Oracle patch is stored on each target machine:

1. In the Patchset Archive parameter, specify the fully qualified directory name where the unzipped files are located.
2. Do not specify a value for the Software Archive or Download Location parameters.
3. You must specify the Download Location if the Install Response needs to be downloaded; otherwise, do not specify a value for Download Location.

To use the Apply Oracle Patchset workflow:

1. Create a deployable copy of the workflow (see [Create a Deployable Workflow](#) on page 20).
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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Oracle Patchset

Parameter Name	Default Value	Required	Description
Download Location	<code>/var/tmp</code>	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	<code>/u01/app/oracle</code>	required	The location of the base directory for an Optimal Flexible Architecture (OFA) installation. This is typically called the ORACLE_BASE.

Input Parameters for Validate Apply Oracle Patchset (continued)

Parameter Name	Default Value	Required	Description
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 <code>rootpre.sh</code> and <code>root.sh</code> 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.

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 101 for detailed descriptions of all input parameters for this workflow, including default values.

- In the workflow editor, expose any additional parameters that you need (see [How to Expose Additional Workflow Parameters](#) on page 134). You will specify values for those parameters when you create the deployment.
- Save the changes to the workflow (click **Save** in the lower right corner).
- Create a new deployment (see [Create a Deployment](#) on page 21 for instructions).
- 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](#) on page 22 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 11.2.0.2.0

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	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Home	<code>/u01/app/oracle/product/11.2.0/db1</code>	The ORACLE_HOME to use if more than one home is included in the inventory file(s).

Input Parameters for Validate Apply Oracle Patchset

Parameter Name	Example Value	Description
Download Location	<code>/var/tmp</code>	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	<code>/u01/app/oracle</code>	The location of the base directory for an Optimal Flexible Architecture (OFA) installation. This is typically called the ORACLE_BASE.
Patchset Archive	<code>p5337014_10203_SOLARIS64.zip</code>	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: <code>/tmp/p5337014_10203_SOLARIS64.zip</code>
Skip root-sh	N	Skip running the <code>rootpre.sh</code> and <code>root.sh</code> scripts. Valid values are Y (yes) and N (no). Set to Y if an existing newer ORACLE_HOME is installed.
Software Archive	<code>/tmp/software</code>	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 134). For most 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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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	<code>/var/tmp</code>	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) to ignore during patch post-processing.

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

Parameter Name	Default Value	Required	Description
Install Response	no default	optional	Location of the Oracle Universal Installer response file.
Instance Wrapper	no default	required	<p>Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example:</p> <pre>su - oracle /opt/hp/dma/client/jython.sh</pre> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
Inventory Pointers	no default	optional	<p>Comma separated list of fully qualified inventory pathname directories.</p> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
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	<p>Dictionary list of all information discovered in the specified inventory file(s).</p> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>

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

Parameter Name	Default Value	Required	Description
Patchset Archive	see description	required	<p>Comma-separated list of relative or fully-qualified path names of the Oracle Patch Set archive files.</p> <p>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.</p> <p>The default for UNIX targets is: /tmp/p5337014_10203_SOLARIS64.zip</p>
Skip root-sh	N	optional	Skip running the <code>rootpre.sh</code> and <code>root.sh</code> 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	<p>List of all nodes where Oracle Clusterware is deployed.</p> <p>Caution: This parameter should only be specified for RAC and Cluster Ready systems.</p>
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.

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

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

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 26.

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:

- This solution requires HP DMA version 10.10 (or 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:

Provision Oracle Software

Provision an Oracle 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 127.

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 or more specified Oracle Homes.

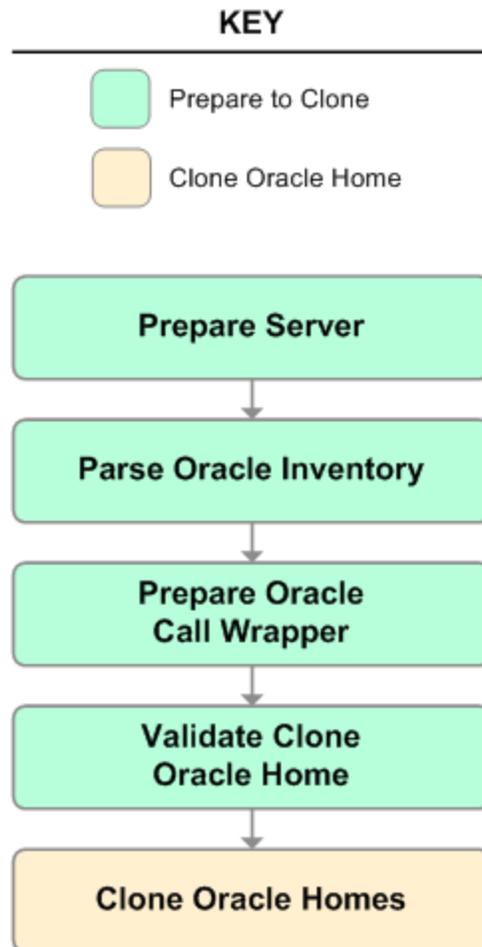
Validation Checks Performed

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	<p>This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps.</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>The step also creates utility parameters that will be used by subsequent steps.</p>
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 113.

How to Run this Workflow

The following instructions show you how to customize and run the [Clone Oracle Home](#) workflow in your environment.

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 113.

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 107 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](#) on page 20).
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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

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: <code>/u01/app/oracle/product/11.2.0.0/DB4</code>
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: <code>/u01/app/oracle/product/11.2.0.0/DB2</code>

Note: See [Parameters for Clone Oracle Home](#) on page 113 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 134). 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](#) on page 21 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](#) on page 22 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	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

Input Parameters for Validate Clone Oracle Home

Parameter Name	Example Value	Description
New Oracle Homes	<code>/opt/app/oracle/product/11.2.0/DB4</code>	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: <code>/u01/app/oracle/product/11.2.0.0/DB4</code>
Oracle Homes	<code>/opt/app/oracle/product/11.2.0/DB2</code>	Comma-separated list of Oracle Homes (fully qualified path names) that will be cloned. One or more is required. Default is: <code>/u01/app/oracle/product/11.2.0.0/DB2</code>

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 134). For most 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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s).
Server Wrapper	see description	required	Command that will execute a step as the OS administrative user. The default for UNIX targets is: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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	<p>Command that will be used to execute subsequent steps as the user who owns the ORACLE_HOME. For example:</p> <pre>su - oracle /opt/hp/dma/client/jython.sh</pre> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
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: <code>/u01/app/oracle/product/11.2.0.0/DB4</code>
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: <code>/u01/app/oracle/product/11.2.0.0/DB2</code>
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 26.

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:

- This solution requires HP DMA version 10.10 (or 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:

Provision Oracle Software

Provision an Oracle 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 127.

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.

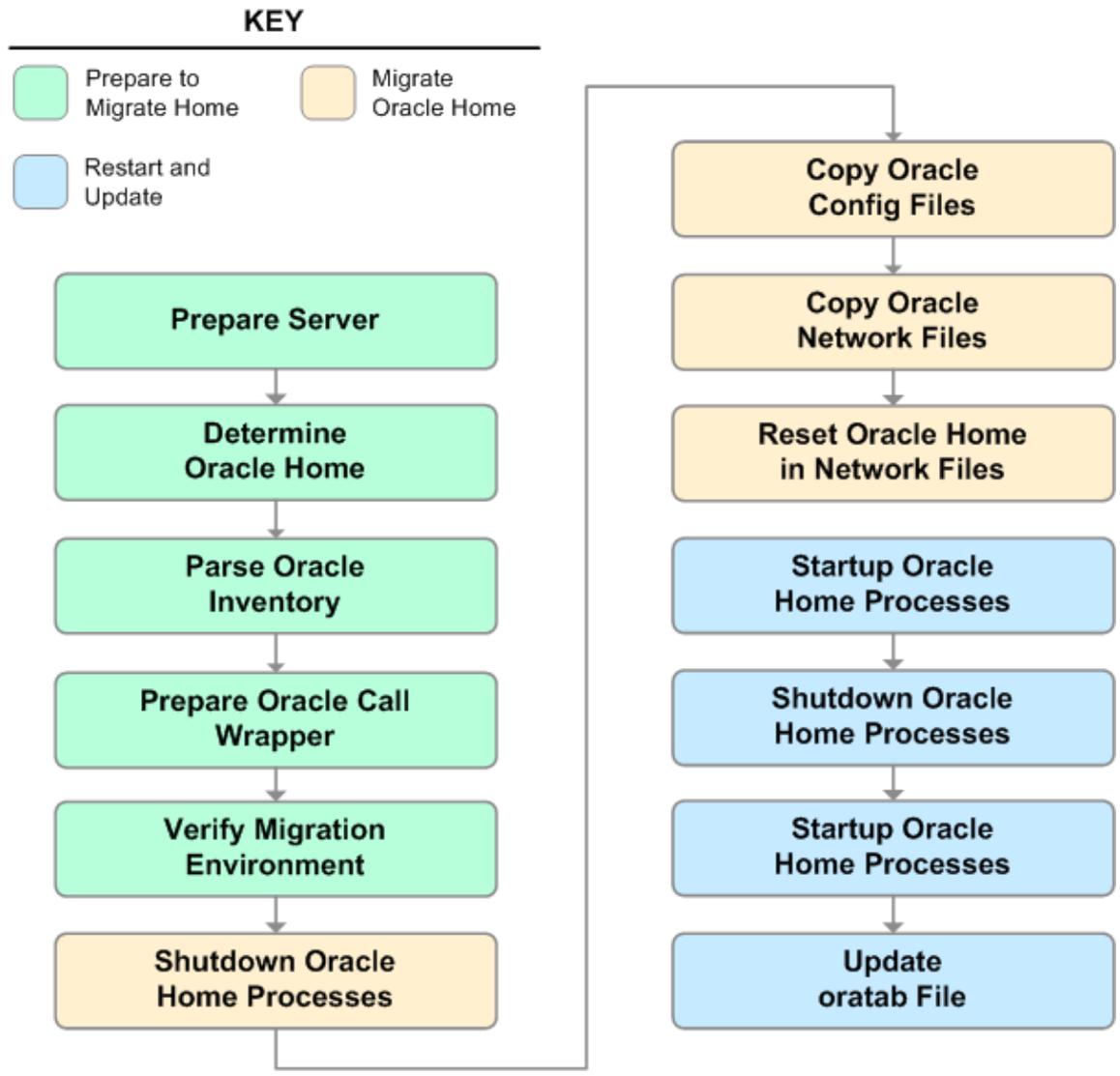
Validation Checks Performed

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 <code>/etc/oratab</code> or <code>/var/opt/oracle/oratab</code> file on UNIX targets.
Parse Oracle Inventory	<p>This step parses the specified Oracle inventory files (if they exist) and passes the inventory information to subsequent steps.</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>The step also creates utility parameters that will be used by subsequent steps.</p>
Verify Migration Environment	<p>This step verifies the input parameters used throughout the Migrate Oracle Home workflow:</p> <ul style="list-style-type: none"> • 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 <code>oratab</code> file for the specified Oracle SIDs. • There are entries in the <code>listener.ora</code> 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.

Steps Used in Migrate Oracle Home (continued)

Workflow Step	Description
Copy Oracle Network Files	<p>This step copies the following files from the <code>\${Current Oracle Home}/network/admin</code> directory to the <code>\${New Oracle Home}/network/admin</code> directory:</p> <ul style="list-style-type: none"> • <code>tnsnames.ora</code> • <code>listener.ora</code> • <code>sqlnet.ora</code>
Reset Oracle Home in Network Files	<p>This step resets the <code>ORACLE_HOME</code> value in the <code>\${New Oracle Home}/network/admin</code> files to reflect the <code>\${New Oracle Home}</code> value.</p>
Startup Oracle Home Processes	<p>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.</p>
Shutdown Oracle Home Processes	<p>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.</p>
Startup Oracle Home Processes	<p>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.</p>
Update oratab File	<p>This step updates the <code>\${oratab directory}/oratab</code> file that associates the <code>ORACLE_SID</code> and <code>ORACLE_HOME</code> values. It replaces entries with the <code>\${Current Oracle Home}</code> value with the <code>\${New Oracle Home}</code> value.</p>

For parameter descriptions and defaults, see [Parameters for Migrate Oracle Home](#) on page 125.

How to Run this Workflow

The following instructions show you how to customize and run the [Migrate Oracle Home](#) workflow in your environment.

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 125.

Note: Before following this procedure, review the [Prerequisites for this Workflow](#) on page 116, 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](#) on page 20).
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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

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 125 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 134). 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](#) on page 21 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](#) on page 22 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	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

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	<code>/u01/app/oracle/product/11.2.0/db4</code>	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	<code>/etc/oraInst.loc</code>	Comma separated list of Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>

Input Parameters for Verify Migration Environment

Parameter Name	Example Value	Description
Listeners	<code>LISTENER1, LISTENER2</code>	Comma-separated list of the Oracle Listener names to be included in start-up and shut-down sequences.
New Oracle Home	<code>/u01/app/oracle/product/11.2.0/db4</code>	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 134). For most 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 Oracle inventory file names (with absolute paths). If not specified, set to the appropriate default value for the target server operating system. Defaults are: Solaris or HP-UX: <code>/var/opt/oracle/oraInst.loc</code> Linux: <code>/etc/oraInst.loc</code>
Oracle Account	no default	optional	Oracle user who owns the ORACLE_HOME. Required if inventory does not exist.
Oracle Home	no default	optional	The ORACLE_HOME to use if more than one home is included in the inventory file(s). 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: <code>sudo su - root</code> <code>/opt/hp/dma/client/jython.sh</code> 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	<p>Command used to execute a step as the Oracle Instance owner. For example:</p> <pre>sudo -u oracle /opt/hp/dma/client/jython.sh</pre> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
Current Oracle Home	no default	required	<p>File system location of the existing ORACLE_HOME (migration source).</p> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>
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	<p>Comma-separated list of the Oracle Instances (ORACLE_SIDs) in this ORACLE_HOME where the step's action should be performed.</p> <p>Caution: This parameter is derived by the workflow. Under most circumstances, you should not change its mapping or its value.</p>

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) to ignore during patch post-processing.

Chapter 4

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* and the *HP DMA Administrator Guide*.

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

<http://h20230.www2.hp.com/selfsolve/manuals>

Chapter 5

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 this Solution Pack is Organized](#) on the next page

[How to Expose Additional Workflow Parameters](#) on page 134

[How to Use a Policy to Specify Parameter Values](#) on page 135

[How to Import a File into the Software Repository](#) on page 138

How this Solution Pack is Organized

In HP DMA, a **workflow** executes a process —such as patching a database.

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

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

The screenshot displays the HP Database & Middleware Automation web interface. The top navigation bar includes 'Home', 'Automation', 'Reports', 'Environment', 'Solutions', and 'Setup'. Below this, a secondary navigation bar lists 'Workflows', 'Steps', 'Functions', 'Policies', 'Deployments', 'Run', 'Console', and 'History'. The main content area is titled '_Apply Critical Patch Update to Home' and features four tabs: 'Documentation' (selected), 'Workflow', 'Deployments', and 'Roles'. Under the 'Documentation' tab, there are input fields for 'Name' (containing '_Apply Critical Patch Update to Home'), 'Tags', 'Type' (set to 'Oracle'), and 'Target level' (set to 'Server'). A large 'Documentation' section follows, containing three sub-sections: 'Purpose' (describing the application of Oracle Critical Patch Update, Patch Bundle, or Patch Set Update to an Oracle Home), 'Platforms' (listing support for Red Hat Enterprise Linux and Solaris), and 'How to Use this Workflow' (providing instructions on applying the patch, including notes on RAC and DTC service). At the bottom of the interface, there is a toolbar with buttons for 'DELETE', 'EXPORT', 'EXTRACT POLICY', and 'RUN', along with 'Copy', 'Save', and 'CANCEL' options.

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

The screenshot shows the Oracle Database & Middleware Automation interface. The main title is "Validate Apply Critical Patch Update to Home". Below the title are tabs for "General", "Action", "Parameters", "History", "Workflows", "Solutions", and "Roles". The "General" tab is selected, showing properties such as Name, Tags, Type, Category, and Targetable. The "Documentation" tab is also visible, showing the purpose and input parameters for the step.

Properties

- Name: Validate Apply Critical Patch Update to Home
- Tags: CPU, Oracle
- Type: Oracle
- Category: Script
- Targetable:

Documentation

Purpose:
Validate all workflow parameters.

Input Parameters:

- *Archive Location
Directory location the CPU archive will be extracted to.
- *CPU Archive
Fully qualified pathname of the Critical Patch Update Archive file.
Example: p7150622_10203_SOLARIS64.zip
- *Call Wrapper
Because this step calls opatch to determine version information, it must be run as an oracle user.
Example: sudo -u oracle /opt/datapalette/jython/jython
- *Listeners
A comma separated list of listeners running from ORACLE_HOME. If left blank, no listener is shutdown for the patch. Typically, the listener name is "LISTENER".
- *OCM Response File
Full pathname of the Oracle Configuration Manager (OCM) response file. Required for OPatch version 10.2.0.4.6 or newer.

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.

The screenshot shows the Oracle Database & Middleware Automation interface. The main title is "Validate Apply Critical Patch Update to Home / CPU Archive". Below the title are tabs for "General", "Action", "Parameters", "History", "Workflows", "Solutions", and "Roles". The "Parameters" tab is selected, showing a list of parameters with their values and descriptions. A red arrow points to the "CPU Archive" parameter description, and another red arrow points to the "CPU Archive" parameter value.

Validate Apply Critical Patch Update to Home / CPU Archive

*Required: Relative or fully-qualified path name of the Critical Patch Update archive file. 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

Parameters

Parameter	Value
Archive Location	Prepare Server.No Value
CPU Archive	- User selected -
Call Wrapper	Prepare Oracle Call Wrapper.Instance Wrapper
Database Version	Prepare Server.No Value
Ignorable Oracle Errors	- User selected -
Ignore SIDs	Prepare Server.No Value

To see the parameter descriptions here

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

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

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

Validate Apply Critical Patch Update to Home

General Action **Parameters** History Workflows Solutions Roles

Input parameters

Name	Value	Description
Archive Location		*Deprecated, Unused.
CPU Archive		*Required: Relative or fully-qualified path name of the
Call Wrapper		*Required: Jython call wrapper required to run as the
Database Version		*Optional: Provide the Database Version of the patch
Ignorable Oracle Errors		*Optional: A comma-separated list of Oracle errors t
Ignore SIDs		*Deprecated, Unused.
New OPatch Version		*Optional: Provide the OPatch Version of the patch i
OCM Response File		*Optional: Path name of the Oracle Configuration Me
OPatch Archive		*Optional: The fully qualified path name of the OPatc
Oracle Home		*Required: Fully qualified pathname of the Oracle Hc
Patch Archive Location	/var/tmp	*Optional: Directory location where the zip archives v
Patch Download Location	/var/tmp	*Optional: The directory to which all downloaded files
Patch Information File		*Optional: Supplementary patch data supplied by su
Patch Name		*Optional: Provide the patch name being applied. If p
Patch Number		*Optional: Provide the Patch Number of the patch be

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

hp Database & Middleware Automation

Home Automation Reports Environment Solutions Setup

Workflows Steps Functions Policies Deployments Run Console History

Example Deployment

Targets Parameters Roles

Parse Oracle Inventory

Inventory Files: Text

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

Oracle Home: Text

*Optional: The ORACLE_HOME to use if more than one home in the inventory file(s)

Validate Apply Critical Patch Update to Home

CPU Archive: Text

*Required: Relative or fully-qualified path name of the Critical Patch Update archive file. 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 patch is expected to be unzipped and ready to be applied (this directory must be the patch number).

Ignorable Oracle Errors: Text

*Optional: 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: ORA-04020,ORA-03113

OCM Response File: Text

*Optional: Path name of the Oracle Configuration Manager (OCM) response file. If not found on the target, this file is downloaded from the software directory on the HP DMA server. If left blank, a default response file will be created.

OPatch Archive: Text

*Optional: The fully qualified path name of the OPatch Archive file required for this Critical Patch Update. If this file is not present, it will be downloaded. If this parameter value is not specified, the current OPatch version will be used.

will be downloaded. If this parameter value is not specified, the current OPatch version will be used.

All parameters used by the workflows in this solution pack are also described in the "Parameter" topic associated with each workflow.

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 (see [Create a Deployable Workflow](#) on page 20).

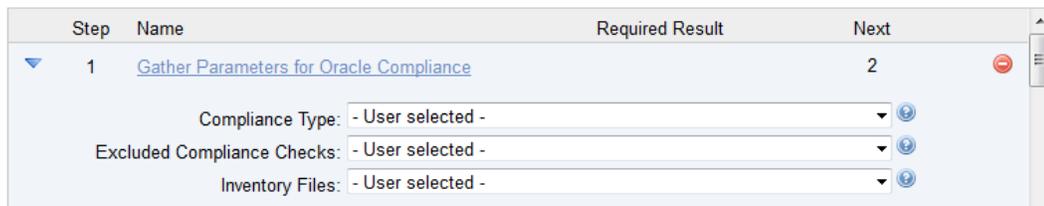
How to Expose Additional Workflow Parameters

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

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

To expose a hidden workflow parameter:

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



Step	Name	Required Result	Next
1	Gather Parameters for Oracle Compliance		2

Compliance Type: - User selected -

Excluded Compliance Checks: - User selected -

Inventory Files: - User selected -

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

How to Use a Policy to Specify Parameter Values

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

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

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

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

For more information, see the *HP DMA User Guide*. This document is available on the HP Software Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

Create a Policy

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

To create a policy that provides parameter values:

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

For your convenience, this name should be similar to the parameter name used in the pertinent workflow (or workflows).
 - c. Click **Add**.
 - d. In the new text box to the right of the attribute's name, enter a value for this attribute.

To remove an attribute, click the **Remove** button.
5. On the Roles tab, grant Read and Write permission to any additional users and groups who will

be using this policy. By default, any groups to which you belong have Read and Write permission.

6. Click the **Save** button (lower right corner).

Extract a Policy

An alternative to creating your own policy one attribute at a time is to extract the policy. This automatically creates a reusable policy that provides values for all input parameters associated with a workflow. This is a convenient way to create a policy.

To extract a policy:

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

Reference the Policy in the Deployment

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

To reference policy attributes in a deployment:

1. Create or access the deployment.
See “Deployments” in the *HP DMA User Guide* for details.
2. On the Parameters tab, perform the following steps for each parameter whose value you want to provide by referencing a policy attribute:
 - a. In the drop-down menu for that parameter, select **Policy Attribute**.
 - b. In the text box for that parameter, type any character. A drop-down list of policy attributes appears. For example:

Admin Password: Policy Attribute

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

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

Admin Password: Policy Attribute

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

How to Import a File into the Software Repository

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

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

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

To import a file into the HP SA Software Library:

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

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

If the HP SA Client is not installed locally, follow the instructions under “Download and Install the HP SA Client Launcher” in the *HP Server Automation Single-Host Installation Guide*.
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 6

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 your server management tool 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 Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

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 Product Manuals web site: <http://h20230.www2.hp.com/selfsolve/manuals>

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 your server management tool. 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 its value is linked to an

output parameter from a previous step in the workflow or to a metadata field. Mapped parameters are not visible on the Deployment page. You can "unmap" a parameter by specifying - User Selected - in the workflow editor. This parameter will then become visible on the Deployment page.

O

organization

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

P

parameters

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

policy

Policies are reusable sets of attributes that can be used as parameter values in deployments. Deployments can reference policy attributes to change the automation behavior. Policies provide values for input parameters. They can contain fixed values or reference Custom Fields. Policies enable HP DMA to manage groups of hundreds or thousands of servers at a time without the need to configure each individual server.

R

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 your server management tool. Before you can associate a role with an automation item or organization, however, you must register that role in HP DMA.

S

smart group

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

software repository

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

solution pack

A solution pack contains one or more related workflow templates. These templates are read-only and cannot be

deployed. To run one of the workflows included in a solution pack, you must first create a deployable copy of that template and then customize that copy for your environment. Solution packs are organized by function - for example: database patching or application server provisioning.

steps

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

T

target instance

In the context of MS SQL database refresh, the term "target instance" refers to the SQL Server instance where the database that will be restored resides.

W

workflow

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

workflow editor

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

workflow templates

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