Oracle® Fusion Middleware
Patching with OPatch

14*c* (14.1.2.0.0)

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Preface

This document describes how to use OPatch to patch an Oracle Fusion Middleware environment.

- Audience
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Audience

This document is intended for administrators who are responsible for patching Oracle Fusion Middleware.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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Patching Your Environment Using OPatch

The OPatch utility provides several commands that you can use to apply and roll back patches to Oracle software in your Oracle Fusion Middleware environment.
For more information about using OPatch commands in an Oracle Fusion Middleware environment, see the following topics:

- **About OPatch**
  OPatch is a Java-based utility that runs on all supported operating systems and requires installation of the Oracle Universal Installer. It is used to apply patches to Oracle software.

- **Preparing to Use OPatch**
  To ensure successful patching, complete these prerequisites to prepare your environment to run OPatch, such as obtaining the latest version of OPatch, obtaining required patches from My Oracle Support, and backing up the Oracle home.

- **Using OPatch to Patch Oracle Fusion Middleware**
  Use OPatch to perform the necessary steps for applying a patch to an Oracle home.

About OPatch

OPatch is a Java-based utility that runs on all supported operating systems and requires installation of the Oracle Universal Installer. It is used to apply patches to Oracle software.

The following topics provide more information about OPatch for Oracle Fusion Middleware:

- **Type of Patches Used with OPatch**
  Oracle provides several types of patches that you can use to patch your Oracle software with OPatch.

- **Information for Oracle WebLogic Server Smart Update Users**
  Smart Update is a standalone Java application through which you upgrade the software installations quickly and easily with maintenance patches and maintenance packs. For Oracle Fusion Middleware 12*c*, Smart Update is no longer supported.

Type of Patches Used with OPatch

Oracle provides several types of patches that you can use to patch your Oracle software with OPatch.

> **✎ Note:**
>
> Oracle has recently implemented a new patch nomenclature for Oracle products. The new patch names, as well as the previous Oracle Fusion Middleware 11*g* names, are provided for reference.

Table 1-1   Patches that can be used with OPatch

New Name	Previously Used Name(s)	Description
Interim patch	PSE MLR Exception release One-Off x-fix Hotfix Security One-Off	A patch that contains one or more fixes made available to customers who cannot wait until the next patch set or new product release to get a fix.
Bundle patch	Maintenance pack Service pack MLRs Cumulative patch Update release Bundle patch	An iterative, cumulative patch that is issued between patch sets. Bundle patches usually include only fixes, but some products may include minor enhancements. Examples are the Database Windows bundles and SOA bundle patches.
Security Patch Update (SPU)	Critical Patch Updates (CPUs)	An iterative, cumulative patch that consists of security fixes. Formerly known as CPU. **Note**: The program name which delivers SPUs will still be referred to as Critical Patch Update, as defined below: Critical Patch Update: Oracle's program for quarterly release of security fixes. Patches released as part of this program may be Patch Set Updates, Security Patch Updates, and Bundle Patches. Regardless of the patch type, the patches are cumulative.
Patch Set Updates (PSU)		Patch Set Updates are used to **patch Oracle WebLogic Server only.** Patch Set Updates are released on a quarterly basis, following the same schedule as the CPUs. These CPUs are released on a Tuesday closest to the 15th of the month, during the months of January, April, July, and October. Patch Set Update content is intended to address the top fifty critical bugs that affects the broad customer base.

Information for Oracle WebLogic Server Smart Update Users

Smart Update is a standalone Java application through which you upgrade the software installations quickly and easily with maintenance patches and maintenance packs. For Oracle Fusion Middleware 12*c*, Smart Update is no longer supported.

In the previous releases of Oracle WebLogic Server, you could patch your Oracle WebLogic Server software by using a utility called Smart Update. In Oracle Fusion Middleware 12*c*, Oracle WebLogic Server users can use OPatch to apply patches for both Oracle WebLogic Server and for Oracle Fusion Middleware.

OPatch offers few similar features as Smart Update, but it has a different set of commands and command options. Use this guide to get familiar with OPatch.

Preparing to Use OPatch

To ensure successful patching, complete these prerequisites to prepare your environment to run OPatch, such as obtaining the latest version of OPatch, obtaining required patches from My Oracle Support, and backing up the Oracle home.

For more information on preparing your environment, see the following topics:

- Locating and Obtaining the Latest Version of OPatch
  Before you run OPatch, find the OPatch utility in the Oracle home, and verify that you have the latest version.

- Obtaining Patches Required for Your Installation
  You can search for and download the patches required for your installation from My Oracle Support.

- OPatch Environment Variables for Fusion Middleware
  Before you run OPatch, ensure that you set the ORACLE_HOME environment variable.

- Backup and Recovery Considerations for Patching
  It is highly recommended that you back up the Oracle home before any patch operation. You can back up the Oracle home using your preferred method.

Locating and Obtaining the Latest Version of OPatch

Before you run OPatch, find the OPatch utility in the Oracle home, and verify that you have the latest version.

- Locating and Running OPatch in the Oracle Fusion Middleware Oracle Home
  You can find and run the OPatch utility in the $ORACLE\_HOME$/OPatch directory after you install any Oracle Fusion Middleware product.

- Identifying the Version of OPatch Included with Oracle Fusion Middleware 14c
  Oracle Fusion Middleware 14c (14.1.2.0.0) includes OPatch version 13.9.4.2.17. This version includes new features and capabilities that are designed to improve the experience of patching an Oracle Fusion Middleware 14*c* Oracle Home.

Locating and Running OPatch in the Oracle Fusion Middleware Oracle Home

You can find and run the OPatch utility in the $ORACLE\_HOME$/OPatch directory after you install any Oracle Fusion Middleware product.

To run OPatch, run the `opatch` command in this directory.

For example, to view the list of commands available for OPatch on a Unix system, enter the following:

```
./opatch -help
```

On Windows systems, run the following command:

```
opatch.bat -help
```

Identifying the Version of OPatch Included with Oracle Fusion Middleware 14*c*

Oracle Fusion Middleware 14c (14.1.2.0.0) includes OPatch version 13.9.4.2.17. This version includes new features and capabilities that are designed to improve the experience of patching an Oracle Fusion Middleware 14*c* Oracle Home.

> **Note:**
>
> To get post-release information about OPatch, including newer versions supported with 12.2.1.4, see the MyOracle Support document 1587524.1.

In general, there is a version of OPatch available for each version of the Oracle Universal Installer software.

> **Note:**
>
> The Oracle Fusion Middleware customers must use the OPatch version in Oracle Home, and must move to a different version only when stated by the support team.

To identify the version of OPatch:

1. Change directory to the following directory:

    ```
    cd ORACLE_HOME/OPatch/
    ```

2. Run the following command:

    ```
    ./opatch version
    ```

    For example:

    ```
    ./opatch version
    OPatch Version: 13.9.4.2.17

    OPatch succeeded.
    ```

Obtaining Patches Required for Your Installation

You can search for and download the patches required for your installation from My Oracle Support.

My Oracle Support:

https://support.oracle.com/signin

After you sign in to My Oracle Support, click the **Patches & Updates** tab, which provides various tools that allow you to quickly locate the patches important to your Oracle software installation.

> **Note:**
>
> Review the README file that is included with each patch. The README file includes important information about the requirements and procedures for applying the patch.

OPatch Environment Variables for Fusion Middleware

Before you run OPatch, ensure that you set the ORACLE_HOME environment variable.

OPatch uses the ORACLE_HOME environment variable to identify the Oracle home that you are planning to patch.

Backup and Recovery Considerations for Patching

It is highly recommended that you back up the Oracle home before any patch operation. You can back up the Oracle home using your preferred method.

You can use any method such as `zip`, `cp -r`, `tar`, and `cpio` to compress the Oracle home.

If the Oracle home does not appear when you execute the `opatch lsinventory -detail` command, the Oracle home might be missing from the Central Inventory, or the Central Inventory itself could be missing or corrupted.

If the Oracle home is listed when you execute the `opatch lsinventory -detail` command, but the products and components within the Oracle home are not listed, the inventory within the Oracle home (local inventory) might be missing or corrupted.

If the Oracle home is backed up and the local inventory is corrupted or lost for some reason, you must restore the entire Oracle home. If a backup does not exist, you may have to reinstall the software.

Using OPatch to Patch Oracle Fusion Middleware

Use OPatch to perform the necessary steps for applying a patch to an Oracle home.

The following topics describe how to use OPatch to patch Oracle Fusion Middleware:

- Summary of the Steps For Using OPatch in a Fusion Middleware Environment
  Applying a patch with OPatch involves a series of steps that must be performed to ensure successful patching.

- Common OPatch Commands When Patching an Oracle Fusion Middleware Oracle Home
  OPatch provides several commands that you can use to apply, roll back, and verify a patch for an Oracle home. You can use OPatch to apply and roll back a single patch or multiple patches.

- Examples of Applying and Rolling Back Patches Using OPatch
  After you obtain the patches required for your installation, use the appropriate OPatch commands to verify any patch prerequisites, apply a patch to an Oracle home, and if necessary, roll back the application of a patch.

- Troubleshooting a Patch by Viewing the OPatch Log File
  To understand how a patch is applied and to troubleshoot any problems with the application of a patch, review the log file for the OPatch session.

- Using the OPatch lsinventory Command to Verify the Patches Applied to an Oracle Home
  To verify what patches have been applied to an Oracle home, or to find out additional information about the Oracle home, use the `opatch lsinventory` command.

- Verifying the Installation after Applying a Patch
  After you apply one or more patches successfully, use the WebLogic Remote Console, Fusion Middleware Control, and your organization's application testing to verify that your system is running successfully.

Summary of the Steps For Using OPatch in a Fusion Middleware Environment

Applying a patch with OPatch involves a series of steps that must be performed to ensure successful patching.

The following table summarizes the typical steps required to patch your existing Fusion Middleware environment using OPatch.

Table 1-2   Using OPatch with Oracle Fusion Middleware

Task	Description	Documentation
Acquire patches required for your installation.	Log in, search for, and download the patches required for your specific installation.	Obtaining Patches Required for Your Installation
Review the `README.txt` file for the patch.	Each patch archive includes a README file that contains important information and instructions that must be followed prior to applying your patch. It is important to review the README file because it provides any unique steps or other information specific to the patch.	The `README.txt` file that is packaged within the patch archive
Check for patch prerequisites.	The OPatch `apply -report` command identifies that the prerequisites for the patch have been met.	Verifying the Prerequisites for a Patch
Apply the patch.	After you determine the Oracle home to which you need to apply the patch, and you have read the README file, then you can apply the patch with the `opatch apply` command.	Examples of Applying and Rolling Back Patches Using OPatch
Verify that the patch was applied to the Oracle home successfully.	The OPatch lsinventory command shows what patches have been applied to the Oracle home. Use this command to verify the application of the patch.	Using the OPatch lsinventory Command to Verify the Patches Applied to an Oracle Home
Verify that your software runs properly after you apply the patch.	After the patching is complete and your servers are restarted, check your product software to verify that the issue has been resolved.	Verifying the Installation after Applying a Patch
Troubleshoot the application of a patch.	If there are problems applying a patch, your first troubleshooting task is to review the log file for the OPatch session.	Troubleshooting a Patch by Viewing the OPatch Log File
Roll back the application of a patch.	If for some reason the result is not satisfactory, you can use the `opatch rollback` command to remove the patch from the Oracle home. If additional assistance is required, go to My Oracle Support (formerly OracleMeta*Link*).	Rolling Back a Patch You Have Applied

Common OPatch Commands When Patching an Oracle Fusion Middleware Oracle Home

OPatch provides several commands that you can use to apply, roll back, and verify a patch for an Oracle home. You can use OPatch to apply and roll back a single patch or multiple patches.

Table 1-3   Common OPatch Commands Used When Patching an Oracle Fusion Middleware Environment

Command	Description	Example
opatch apply	This command applies an interim patch to an Oracle home from the current directory. The ORACLE_HOME environment variable must be set to the Oracle home to be patched.	Verifying the Prerequisites for a Patch Applying a Single Patch Using the Apply Command
opatch napply	This command applies multiple patches.	Applying Multiple Patches Using the OPatch napply Command
opatch lsinventory	This command lists the inventory for a particular Oracle home, or displays all installations that can be found. This command does not have any required options.	Using the OPatch lsinventory Command to Verify the Patches Applied to an Oracle Home
opatch rollback	This command removes an existing one-off patch from the appropriate Oracle home directory indicated by the reference ID.	Rolling Back a Patch You Have Applied
opatch nrollback	This command rolls back multiple interim patches at the same time.	Rolling Back Multiple Patches You Have Applied

Examples of Applying and Rolling Back Patches Using OPatch

After you obtain the patches required for your installation, use the appropriate OPatch commands to verify any patch prerequisites, apply a patch to an Oracle home, and if necessary, roll back the application of a patch.

The following topics provide some examples of using OPatch to patch an Oracle Fusion Middleware installation:

- Verifying the Prerequisites for a Patch
  You can use the checkApplicable command as a prerequisite check before applying a patch. This command will check whether a given patch is applicable to one or more Oracle homes.

- Applying a Single Patch Using the Apply Command
  To apply a single patch to an Oracle Fusion Middleware Oracle home, use the opatch apply command.

- Applying Multiple Patches Using the OPatch napply Command
  To apply multiple patches to an Oracle Fusion Middleware Oracle home, use the opatch napply command.

- Rolling Back a Patch You Have Applied
  To roll back a patch that was applied to an Oracle Fusion Middleware Oracle home, use the opatch rollback command.

- **Rolling Back Multiple Patches You Have Applied**
  To roll back multiple patches that were previously applied to an Oracle Fusion Middleware Oracle home, use the `opatch nrollback` command.

Verifying the Prerequisites for a Patch

You can use the `checkApplicable` command as a prerequisite check before applying a patch. This command will check whether a given patch is applicable to one or more Oracle homes.

For a Fusion Middleware installation, OPatch will look for Product directories present under the Oracle home and registered with a single defined central inventory.

If the environment variable *MW_HOME* (or) 'mw_home' option is not defined and the *ORACLE_HOME* environment variable or 'oh' option is also not defined, OPatch will run the `checkApplicable` command on the applicable Oracle home.

If the *ORACLE_HOME* environment variable is defined or the 'oh' option is given, OPatch will run the command on the referenced Oracle home with precedence given to the 'oh' option.

The following are examples of patches not applicable:

- Patches requiring components that are not installed in the Oracle home (or) installed but not of the same version.

- Files mentioned by patch metadata that could not be patched.

The syntax for the `checkApplicable` command is shown below:

```
opatch checkApplicable [-ph patch_location]
        [-allhomes ]
        [-invPtrLoc <Path to oraInst.loc file> ]
        [-mw_home <Path of the Oracle home> ]
        [-oh <Path of the reference Oracle home> ]
```

Table 1-4   Options for the OPatch `checkApplicable` Command:

Options	Description
-allhomes	This option will overide all other options involved in the logic of getting the homes for the test of 'checkApplicable'.
	This option ensures that the check is applied only to all the registered homes in central inventory.
-invPtrLoc	This option is used to locate the `oraInst.loc` file during an installation, see Installing Software with the Oracle Universal Installer.
	If this option is used during installation, then you must also use this option for other Installer actions, including an OPatch Upgrade (Patch 28186730). When applying interim patches with OPatch, for example: *opatch apply*, the Central Inventory location is found using the `ORACLE_HOME/oraInst.loc` configuration, and you do not have to supply the `-invPtrLoc` parameter.

Table 1-4   (Cont.) Options for the OPatch `checkApplicable` Command:

Options	Description
`-mw_home`	Indicates the path of the Oracle home. This value takes precedence over *MW_HOME* environment variable.
`-oh`	Indicates the oracle home to work on. This value takes precedence over the environment variable *ORACLE_HOME*. This option also ensures that the command runs only on this Oracle home.
`-ph`	Indicates the location of the patch for which you want to run the `checkApplicable` command. If not specified, the patch in the current directory is used.

Using the `-report` option

To verify that a patch can be applied to a specific Oracle home, you can also use the `-report` option with the `opatch apply` command. This option will execute all the prerequisite checks including `checkApplicable`.

For example:

```
opatch apply path_to_patch_directory -report
```

This command displays the actions that are taken by the patch, but does not actually apply the patch. As a result, it allows you to verify that the prerequisites for the patch have been met.

Applying a Single Patch Using the Apply Command

To apply a single patch to an Oracle Fusion Middleware Oracle home, use the `opatch apply` command.

Example 1-1 shows how to use the `opatch apply` command to apply a patch to an Oracle Fusion Middleware Oracle home.

This example assumes that:

*   The patch you have downloaded has been saved to a directory that is named for the patch number in My Oracle Support. In this case, the patch number is 15941858.

*   Change the directory to the patch directory and then run the OPatch apply command. Alternatively, you can run the OPatch command from the *ORACLE_HOME*/OPatch directory and include the location of the patch as an argument to the command. For example:

    ```
    opatch apply /opt/patches/15941858/
    ```

*   The OPatch directory is already included in the PATH variable on the host computer.

Example 1-1   Using the OPatch apply Command to Apply a Patch to an Oracle Fusion Middleware Oracle Home

```
> cd /opt/patches/100006
> opatch apply
Oracle Interim Patch Installer version 13.9.4.2.17
Copyright (c) 2024, Oracle Corporation.  All rights reserved.

Oracle Home       : /opt/Oracle/products/fmw14c
```

```
Central Inventory : /opt/Oracle/oraInventory
   from          : /var/opt/Oracle/oraInst.loc
OPatch version    : 13.9.4.2.17
OUI version       : 13.9.4.0.0
Log file location : /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47AM.log

OPatch detects the Middleware Home as "/opt/Oracle/products/fmw14c"

Verifying environment and performing prerequisite checks...
OPatch continues with these patches:   100006

Do you want to proceed? [y|n]
y
User Responded with: Y
All checks passed.

Please shutdown Oracle instances running out of this ORACLE_HOME on the local system.
(Oracle Home = '/opt/Oracle/products/fmw14c')

Is the local system ready for patching? [y|n]
y
User Responded with: Y
Backing up files...
Applying interim patch '100006' to OH '/opt/Oracle/products/fmw14c'

Patching component oracle.wls.core.app.server 14.1.2.0.0...

Patching component oracle.wls.core.app.server 14.1.2.0.0...
Patch 100006 successfully applied
Log file location: /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47AM.log

OPatch succeeded.
```

Applying Multiple Patches Using the OPatch napply Command

To apply multiple patches to an Oracle Fusion Middleware Oracle home, use the `opatch napply` command.

Example 1-2 shows how to use the `opatch napply` command to apply multiple patches to an Oracle Fusion Middleware Oracle home.

This example assumes that the patches you have downloaded have been saved to a staging directory, such as:

```
/opt/patches
```

It also assumes that you have changed directory to the staging directory and the staging directory contains a directory for each patch. For example:

```
/opt/patches/100006
/opt/patches/100007
```

Example 1-2   Using the OPatch `napply` Command to Apply Multiple Patches to an Oracle Fusion Middleware Oracle Home

```
> /opt/Oracle/products/fmw14c/OPatch/opatch napply -id 100006,100007
Oracle Interim Patch Installer version 13.9.4.2.17
Copyright (c) 2024, Oracle Corporation.  All rights reserved.
```

```
Oracle Home       : /opt/Oracle/products/fmw14c
Central Inventory : /opt/Oracle/oraInventory
   from           : /var/opt/Oracle/oraInst.loc
OPatch version    : 13.9.4.2.17
OUI version       : 13.9.4.0.0
Log file location : /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47PM.log


OPatch detects the Middleware Home as "/opt/Oracle/products/fmw14c"


Verifying environment and performing prerequisite checks...
OPatch continues with these patches:   100006  100007


Do you want to proceed? [y|n]
y
User Responded with: Y
All checks passed.


Please shutdown Oracle instances running out of this ORACLE_HOME on the local system.
(Oracle Home = '/opt/Oracle/products/fmw14c')


Is the local system ready for patching? [y|n]
y
User Responded with: Y
Backing up files...
Applying interim patch '100006' to OH '/opt/Oracle/products/fmw14c'


Patching component oracle.wls.core.app.server,14.1.2.0.0...


Patching component oracle.wls.core.app.server,14.1.2.0.0...
Applying interim patch '100007' to OH '/opt/Oracle/products/fmw14c'


Patching component oracle.wls.core.app.server,14.1.2.0.0...


Patching component oracle.wls.core.app.server,14.1.2.0.0...
Patches 100006,100007 successfully applied.
Log file location: /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47AM.log


OPatch succeeded.
```

Rolling Back a Patch You Have Applied

To roll back a patch that was applied to an Oracle Fusion Middleware Oracle home, use the `opatch rollback` command.

Example 1-3 shows how to use the `opatch rollback` command to roll back a patch that was applied to an Oracle Fusion Middleware Oracle home.

This example assumes that the OPatch directory is already included in the PATH variable on the host computer.

Example 1-3   Using the OPatch `rollback` Command to Roll Back a Patch

```
> opatch rollback -id 100006
Oracle Interim Patch Installer version 13.9.4.2.17
Copyright (c) 2024, Oracle Corporation.  All rights reserved.


Oracle Home       : /opt/Oracle/products/fmw14c
Central Inventory : /opt/Oracle/oraInventory
   from           : /var/opt/Oracle/oraInst.loc
```

```
OPatch version    : 13.9.4.2.17
OUI version       : 13.9.4.0.0
Log file location : /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47.log


OPatch detects the Middleware Home as "/opt/Oracle/products/fmw14c"

Patches will be rolled back in the following order:
   100006
The following patch(es) will be rolled back: 100006

Please shutdown Oracle instances running out of this ORACLE_HOME on the local system.
(Oracle Home = '/opt/Oracle/products/fmw14c')

Is the local system ready for patching? [y|n]
y
User Responded with: Y

Rolling back patch 100006...

RollbackSession rolling back interim patch '100006' from OH '/opt/Oracle/products/fmw14c'

Patching component oracle.wls.core.app.server, 14.1.2.0.0...

Patching component oracle.wls.core.app.server, 14.1.2.0.0...
RollbackSession removing interim patch '100006' from inventory
Log file location: /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47AM.log

OPatch succeeded.
```

Rolling Back Multiple Patches You Have Applied

To roll back multiple patches that were previously applied to an Oracle Fusion Middleware Oracle home, use the opatch nrollback command.

Example 1-4 shows how to use the opatch nrollback command to roll back multiple patches that were previously applied to an Oracle Fusion Middleware Oracle home.

This example assumes that the patches you applied were patch numbers 100006 and 100007.

Example 1-4   Using the OPatch nrollback Command to Roll Back Multiple Patches

```
> /opt/Oracle/products/fmw14c/OPatch/opatch nrollback -id 100006,100007
Oracle Interim Patch Installer version 13.9.4.2.17
Copyright (c) 2024, Oracle Corporation.  All rights reserved.

Oracle Home       : /opt/Oracle/products/fmw14c
Central Inventory : /opt/Oracle/oraInventory
   from           : /var/opt/Oracle/oraInst.loc
OPatch version    : 13.9.4.2.17
OUI version       : 13.9.4.0.0
Log file location : /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47PM.log


OPatch detects the Middleware Home as "/opt/Oracle/products/fmw14c"

Patches will be rolled back in the following order:
   100006   100007
The following patch(es) will be rolled back: 100006   100007

Please shutdown Oracle instances running out of this ORACLE_HOME on the local system.
```

```
(Oracle Home = '/opt/Oracle/products/fmw14c')

Is the local system ready for patching? [y|n]
y
User Responded with: Y

Rolling back patch 100006...

RollbackSession rolling back interim patch '100006' from OH '/opt/Oracle/products/fmw14c'

Patching component oracle.wls.core.app.server, 14.1.2.0.0..

Patching component oracle.wls.core.app.server, 14.1.2.0.0..
RollbackSession removing interim patch '100006' from inventory

Rolling back patch 100007...

RollbackSession rolling back interim patch '100007' from OH '/opt/Oracle/products/fmw14c'

Patching component oracle.wls.core.app.server, 14.1.2.0.0...

Patching component oracle.wls.core.app.server, 14.1.2.0.0...
RollbackSession removing interim patch '100007' from inventory
Log file location: /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47PM.log

OPatch succeeded.
```

Troubleshooting a Patch by Viewing the OPatch Log File

To understand how a patch is applied and to troubleshoot any problems with the application of a patch, review the log file for the OPatch session.

The log file location is usually saved to the following directory or a subdirectory within this location:

```
ORACLE_HOME/cfgtoollogs/opatch/
```

Subdirectories within this location are identified by the patch number or by the command you ran (such as `lsinv`).

The file name for each log file identifies the date and time it was executed. For example:

```
opatch2024-06-10_14-24-54PM_1.log
```

You can also locate the log file by viewing the output of the opatch command. The log file name and location is included in the output of the command. For example:

```
Log file location: /opt/Oracle/products/fmw12c/cfgtoollogs/opatch/
opatch2024-06-10_14-24-54PM_1.log
```

Using the OPatch lsinventory Command to Verify the Patches Applied to an Oracle Home

To verify what patches have been applied to an Oracle home, or to find out additional information about the Oracle home, use the `opatch lsinventory` command.

The following example shows sample output of the `lsinventory` command, which indicates that a specific interim patch has been applied.

Example 1-5   Running the opatch lsinventory Command to Obtain the Oracle Home Information

```
> opatch lsinventory
Oracle Interim Patch Installer version 13.9.1.0.0
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Oracle Home       : /opt/Oracle/products/fmw14c
Central Inventory : /opt/Oracle/oraInventory
   from           : /var/opt/Oracle/oraInst.loc
OPatch version    : 13.9.4.2.17
OUI version       : 13.9.4.0.0
Log file location : /opt/Oracle/products/fmw14c/cfgtoollogs/opatch/
opatch2024-10-13_23-11-47PM.log

OPatch detects the Middleware Home as "/opt/Oracle/products/fmw14c"

Lsinventory Output file location :
/opt/Oracle/products/fmw14c/cfgtoollogs/opatch/lsinv/
lsinventory2024-10-13_23-11-47PM.txt


-----------------------------------------------------------------------------
--
Local Machine Information::
Hostname:
ARU platform id: 226
ARU platform description:: Linux x86-64

Interim patches (1) :

Patch  100006     : applied on Mon Jun 10 12:39:07 PDT 2019
Unique Patch ID:  150220
Patch description:  "TEST PATCH FOR WLS 12.2.1.4.0 - JAVA CLASSES PATCH"
   Created on 17 May 2024, 11:54:20 hrs PST8PDT
   Bugs fixed:
     783169, 15941850


----------------------------------------------------------------------------
--

OPatch succeeded.
```

Verifying the Installation after Applying a Patch

After you apply one or more patches successfully, use the WebLogic Remote Console, Fusion Middleware Control, and your organization's application testing to verify that your system is running successfully.

To verify your installations in an Oracle Fusion Middleware 14*c* environment:

1. Start the servers in all domains associated with the Oracle home you patched.

2. Open the WebLogic Remote Console for each domain to verify the Administration Server and to view the status of the components in the domain.

- Also, in any Oracle Fusion Middleware domain (where the Oracle Fusion Middleware Infrastructure is installed), open the Oracle Enterprise Manager Fusion Middleware Control console to view the status of the components in the domain.

From either console, you can verify that the servers and applications are up and running correctly. See the following topics in the *Administering Oracle Fusion Middleware* document:

- Starting and Stopping Oracle Fusion Middleware

- Overview of Oracle Fusion Middleware Administration Tools

If the software does not work as expected, follow the rollback instructions in Rolling Back a Patch You Have Applied.

2

Obtaining, Creating, and Updating Oracle Fusion Middleware Images with Patches

Use Oracle recommended procedures to obtain, create, and update WebLogic Server and Oracle Fusion Middleware (FMW) images with patches, and to update existing containers running in production.

Oracle WebLogic Server and other FMW products can run in containers such as Docker or CRI-O, and in Kubernetes. For the list of products that support running in containers and Kubernetes, see the supported configuration information at https://www.oracle.com/middleware/technologies/ias/oracleas-supported-virtualization.html.

To run WebLogic Server and FMW products in containers and Kubernetes, you must create container images that, not only include these products, but can also be used to start the containers in which these products run. Oracle strongly recommends running FMW products with the latest security fixes applied, by using the patches released through the Oracle Critical Patch Update (CPU) Program. In addition, you may require one-off or interim patches to resolve specific issues. Therefore, you should periodically update WebLogic Server and FMW images to include the required patches and use the patched images to update the existing containers running in production.

FMW images typically include:

- An operating system
- A Java Developer Kit (JDK)
- The applicable FMW product or products
- Patches, if available
- Your WebLogic domains and applications, if available

You can use these images in the containers that run the FMW products and applications.

To create and update these images, one option is to use Dockerfiles. FMW products may provide Dockerfile examples for your reference. See also, WebLogic Server Dockerfile examples.

However, best practices in image creation, helps you limit the size of images and update them efficiently. Using past experience in creating and updating FMW images, Oracle has developed the open source, WebLogic Image Tool (WIT). See WebLogic Image Tool.

- Introduction to the Open Source WebLogic Image Tool
- Using the Oracle Container Registry
- Identifying the Images Created Using the WebLogic Image Tool
- Applying Patches to WebLogic Domains Running in Kubernetes
- Using the Domain Custom Resource

Introduction to the Open Source WebLogic Image Tool

The WebLogic Image Tool uses best practices to create smaller FMW images which are optimized for starting and running containers in production. Use the following WIT commands to create and update images:

Create Image

Use the `create` command to:

- Create new images for these Supported Fusion Middleware Products.
- Create new FMW images that include FMW patches applied by OPatch, so that the images contain the required patches.
- Create new FMW images that, not only include the required patches, but also contain files and settings, such as domain configurations, properties, scripts, libraries, and applications.

For more information, see the Create Image WIT documentation.

Update Image

Use the `update` command to update existing images that were created using WIT, to not only include the patches applied by Opatch, but also include files and settings, such as domain configurations, properties, scripts, libraries, and applications. For more information, see the Update Image WIT documentation.

Rebase Image

Use the `rebase` command to create a new container image that reuses an existing WebLogic domain from an existing image. For more information, see the Rebase Image WIT documentation.

In all use cases, Oracle recommends using WIT to create and update FMW images. Although you can use Dockerfiles and customized scripts, using WIT optimizes the image size and improves the supportability of the images that you create and update.

Using the Oracle Container Registry

If you prefer to use or start with the images created by Oracle, you may use the pre-built FMW images available in the Oracle Container Registry (OCR). OCR provides FMW images that contain no patches (GA images) and images that include the latest CPU updates. For example, the WebLogic Server and FMW Infrastructure images contain the WebLogic Server and FMW Infrastructure binaries with Patch Set Updates (PSUs), Critical Patch Updates (CPUs), and Security Patch Updates (SPUs). See the `middleware/weblogic_cpu` or `middleware/fmw-infrastructure_cpu` repositories for listings of these images. For more information, see Oracle Container Registry.

All of the WebLogic Server based FMW product images, hosted on OCR, are created using WIT. As such, you also can use WIT to update these images.

For example, you can download a WebLogic Server 14.1.2.0.0 image:

- With the latest WebLogic Server PSU and use this image in production environments.
- With the latest WebLogic Server PSU and use this image with updates, such as domain configurations, properties, scripts, libraries, and applications in production environments.

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- With the latest WebLogic Server PSU and update this image with domain configurations, properties, scripts, libraries, and applications, and with specific one-off patches, as required by your applications or environment.

- With no patches and update this image with domain configurations, properties, scripts, libraries, and applications, and with specific WebLogic Server PSU and one-off patches, as required by your applications or environment.

> **Note:**
>
> When you update existing FMW images using WIT, the process extends the image (the base image) and creates new layers resulting in a bloated final image that is larger than the original image, as well as larger than a new image if you were to create or recreate it using WIT. For small updates, such as a one-off patch, the increase in image size may be negligible. However, for larger updates, the increase in size will be significant, therefore, you should instead, recreate the image with the applicable patches or artifacts.

When applying bundle patches or interim patches to WebLogic Server or FMW images, consider the following recommendations:

- Use the WIT `update` command to patch WebLogic Server or FMW upper stack product images with a single interim patch. These patches are typically small and do not significantly increase the final image size.

- Use the WIT `create` command to create new WebLogic Server or FMW upper stack product images with a bundle patch and multiple interim patches. These patches can be large and may significantly increase the final image size. The `create` command helps you optimize the image size.

- Use the WIT `rebase` command to patch WebLogic Server or FMW Infrastructure images, which contain WebLogic binaries, while reusing the existing WebLogic domain from the existing image (Domain in Image domain home source type).

Identifying the Images Created Using the WebLogic Image Tool

Some Oracle products that are layered on top of WebLogic Server (for example, some of the Global Business Unit products) do not use WIT to create their images. These products may use their own Dockerfiles and scripts to build product images that extend the WebLogic Server image.

To identify whether the WebLogic Server or FMW image was created using WIT, run the following command:

```
$ docker inspect -f '{{index .Config.Labels}}' image-name:1
```

Images created using WIT will include the following label:

```
com.oracle.weblogic.imagetool.buildid:[hash]
```

Additionally, with WIT created images, the WIT `inspect` command will provide information, such as:

- Version of WebLogic Server

- Version of JDK

- Version of the operating system

- Name of the user who owns the image

- Patches applied to the WebLogic Server installation

For more information, see Inspect Image.

If the image was not created using WIT, you can create your own Dockerfile and scripts to update the image or request support from the product team that created the image.

Applying Patches to WebLogic Domains Running in Kubernetes

Oracle recommends using the WebLogic Kubernetes Operator (the Operator) when running WebLogic Server containers in Kubernetes. By using the Operator, you can update WebLogic Server containers running in clusters and domains in a sequential or rolling fashion, so that the applications running in these domains and clusters remain available to external clients. For more information, see *WebLogic Kubernetes Operator*.

The Operator supports the following WebLogic domain home source types:

- **Model in Image:** The primary image contains the JDK and the WebLogic binaries. A separate, auxiliary image contains WebLogic Deployment Tool (WDT) model files, WDT variable files, and application archive file. For more information, see *WebLogic Kubernetes Operator*.

- **Domain in Persistent Volume (PV):** The primary image contains the JDK and WebLogic binaries. The domain home and application binaries are in a shared PV.

One difference between these domain home source types is how you use them to create and update WebLogic images so that the Operator can apply the update in a rolling fashion to ensure application availability. See *WebLogic Kubernetes Operator*.

Using the Domain Custom Resource

In Kubernetes, the Domain Custom Resource contains the image name that the Operator uses to start the containers and pods where WebLogic Server instances will be running. For all three domain home source types, you edit the Domain Custom Resource to supply the name of the new, patched image so that the Operator can manage the WebLogic domain update. See *WebLogic Kubernetes Operator*.

For each domain home source type, Oracle recommends the following patch update approaches:

Model in Image

- To apply patches to a WebLogic primary image, use a patched image from OCR, or the `create` or `update` WIT command (according to the previously stated recommendations in "Using the Oracle Container Registry").

- Edit the Domain Custom Resource with the name of the patched primary image, then the Operator will initiate a rolling restart of the WebLogic domain to update the Oracle Home of the running servers.

> **Note:**
>
> Model in Image domains can use auxiliary images to isolate WebLogic updates from application updates. This isolation simplifies the update process when applying patches. When many domains running in Kubernetes, run the same WebLogic Server version, you can update a single primary image to patch all the domains, and the Operator will apply the update in a rolling fashion. You need not make any changes to the auxiliary image. For more information, see *WebLogic Kubernetes Operator*.

Domain in PV

- To apply patches a WebLogic primary image, use a patched image from OCR, or the `create` or `update` WIT command (according to the previously stated recommendations in "Using the Oracle Container Registry").

- Edit the Domain Custom Resource with the name of the patched WebLogic Server image, then the Operator will initiate a rolling restart of the WebLogic domain to update the Oracle Home of the running servers.

3
Patching Your Environment Using OPatchAuto (Deprecated)

Zero Downtime (ZDT) patching provides a process and mechanism for rolling out a patch across a domain, without requiring the entire cluster to be shut down. This ensures that the application remains available and functional during the patching process.

For information about how to apply Zero Downtime (ZDT) Patching, see Zero Downtime (ZDT) Patching (Doc ID 1942159.1).