

Oracle® Database

Deploying and Managing Oracle Software Using Fleet Patching and Provisioning



Release 19c

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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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Oracle Database Deploying and Managing Oracle Software Using Fleet Patching and Provisioning, Release 19c

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Preface

This guide provides specific use cases for Fleet Patching and Provisioning to simplify lifecycle management tasks in your standard operating environment.

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Audience

This guide is intended for anyone responsible for provisioning, patching, and upgrading their Oracle Database software using Fleet Patching and Provisioning. Additional installation guides for Oracle Database, Oracle Real Application Clusters, and Oracle Clusterware are available at:

<http://docs.oracle.com>

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>.

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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.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.

Convention	Meaning
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Related Documentation

The related documentation for this guide includes the following manuals:

Related Topics

- *Oracle Clusterware Administration and Deployment Guide*
- *Oracle Database Installation Guide*
- *Oracle Grid Infrastructure Installation and Upgrade Guide*
- *Oracle Real Application Clusters Administration and Deployment Guide*
- *Oracle Real Application Clusters Installation Guide for Linux and UNIX*
- *Oracle Database Upgrade Guide*
- *Oracle Database Release Notes*

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Fleet Patching and Provisioning Use Cases

Review these topics for step-by-step procedures to provision, patch, and upgrade your software using Fleet Patching and Provisioning.

Fleet Patching and Provisioning is a software lifecycle management solution and helps standardize patching, provisioning, and upgrade of your standard operating environment.

- [Getting Started with Fleet Patching and Provisioning](#)
Understand how you can get started and use Fleet Patching and Provisioning in your standard deployment.
- [Adding Gold Images for Fleet Patching and Provisioning](#)
Create gold images of software home and store them on the Fleet Patching and Provisioning Server, to use later to provision Oracle homes.
- [Creating an Oracle Grid Infrastructure 12c Release 2 Deployment](#)
Provision Oracle Grid Infrastructure software on two nodes that do not currently have a Grid home, and then configure Oracle Grid Infrastructure to form a multi-node Oracle Grid Infrastructure installation.
- [Provisioning an Oracle Database Home and Creating a Database](#)
This procedure provisions Oracle Database 12c release 2 (12.2) software and creates Oracle Database instances.
- [Upgrading to Oracle Grid Infrastructure 12c Release 2](#)
This procedure uses Fleet Patching and Provisioning to upgrade your Oracle Grid Infrastructure cluster from 11g release 2 (11.2.0.4) to 12c release 2 (12.2).
- [Patching Oracle Grid Infrastructure Without Changing the Grid Home Path](#)
This procedure explains how to patch Oracle Grid Infrastructure without changing the Grid home path.
- [Patching Oracle Grid Infrastructure and Oracle Databases Simultaneously](#)
This procedure patches Oracle Grid Infrastructure and Oracle Databases on the cluster to the latest patch level without cluster downtime.
- [Patching Oracle Database 12c Release 1 Without Downtime](#)
This procedure explains how to patch Oracle Database 12c release 1 (12.1.0.2) with the latest patching without bringing down the database.
- [Upgrading to Oracle Database 12c Release 2](#)
This procedure describes how to upgrade an Oracle database from Oracle Database 11g release 2 (11.2) to 12c release 2 with a single command, using Fleet Patching and Provisioning, both for managed and unmanaged Oracle homes.
- [Adding a Node to a Cluster and Scaling an Oracle RAC Database to the Node](#)
You can add a node to your two-node cluster by using Fleet Patching and Provisioning to add the node, and then extend an Oracle RAC database to the new node.

- [Creating a User Action to Deploy a Web Server](#)
You can install and configure any type of software using Fleet Patching and Provisioning user actions. Review this procedure to automate deployment of Apache Web Server using Fleet Patching and Provisioning.

Getting Started with Fleet Patching and Provisioning

Understand how you can get started and use Fleet Patching and Provisioning in your standard deployment.

How Do I Get Started with Fleet Patching and Provisioning?

You must create and configure a Fleet Patching and Provisioning Server where you can create and store gold images of Oracle Database, Oracle Grid Infrastructure, and other software homes. For detailed steps on creating an Fleet Patching and Provisioning Server see My Oracle Support Note 2097026.1.

<https://support.oracle.com/rs?type=doc&id=2097026.1>

To set up the Fleet Patching and Provisioning Server, ensure that your hardware meets the requirements described in My Oracle Support Note 2126710.1 available at:

<https://support.oracle.com/rs?type=doc&id=2126710.1>

How can I Use Fleet Patching and Provisioning in my Standard Operating Environment?

Review these topics for step-by-step procedures to provision, patch, and upgrade your software using Fleet Patching and Provisioning.

Task	Description
Create an Oracle Grid Infrastructure 12c Release 2 Deployment	Provision and configure Oracle Grid Infrastructure software on two nodes that do not currently have a Grid home, and then configure Oracle Grid Infrastructure to form a multi-node Oracle Grid Infrastructure installation.
Provision Oracle Database Home Software and Create a Database	Provision Oracle Database 12c release 2 (12.2) software and create Oracle Database instances.
Upgrade to Oracle Grid Infrastructure 12c Release 2	Upgrade your Oracle Grid Infrastructure cluster from 11g release 2 (11.2.0.4) to 12c release 2 (12.2) with two Fleet Patching and Provisioning commands.
Patch Oracle Grid Infrastructure without changing your Grid Home Path	Use Fleet Patching and Provisioning to enable Oracle Layered File System (OLFS) for a single Oracle home for change management.
Patch Oracle Grid Infrastructure and Oracle Databases Simultaneously	Patch Oracle Grid Infrastructure and Oracle Databases on the cluster to the latest patch level without cluster downtime.
Patch Oracle Database 12c Release 1 Without Downtime	Patch Oracle Database 12c release 1 (12.1) with the latest patching without bringing down the database.

Task	Description
Upgrade to Oracle Database 12c Release 2	Upgrade an Oracle Database from 11.2 to 12c release 2 with a single command, using Fleet Patching and Provisioning, both for managed and unmanaged Oracle homes.
Add a Node to a Cluster and Scale an Oracle RAC Database to the Node	To your two-node cluster, add a new node, and extend an Oracle RAC Database to the new node, using Fleet Patching and Provisioning.
Create a Fleet Patching and Provisioning Image	Create gold images of software home and store them on the Fleet Patching and Provisioning Server, to use later for creating working copies.
Create a User Action to Deploy an Apache Web Server	You can install and configure any type of software using Fleet Patching and Provisioning user actions. Review this procedure to automate deployment of Apache Web Server using Fleet Patching and Provisioning.

Adding Gold Images for Fleet Patching and Provisioning

Create gold images of software home and store them on the Fleet Patching and Provisioning Server, to use later to provision Oracle homes.

Before You Begin

The Oracle home to be used for creating the gold image can be on the Fleet Patching and Provisioning Server, or Fleet Patching and Provisioning Client, or any target machine that the Fleet Patching and Provisioning Server can communicate with.

Procedure

Create gold images of Oracle homes in any of the following ways and store them on the Fleet Patching and Provisioning server:

1. Import an image from an installed Oracle home on the Fleet Patching and Provisioning Server:

```
rhctl import image -image db12201 -path /share/software/122/dbhome -
imagetype ORACLEDBSOFTWARE
```

The gold image of `imagetype` Oracle Database 12c release 2 software is created and stored on the Fleet Patching and Provisioning Server.

You can also create gold images of Oracle Grid Infrastructure or any other software by specifying `-imagetype` as `ORACLEGISOFTWARE`, `ORACLEGGSOFTWARE`, or `SOFTWARE` respectively.

2. Import an image from an installed Oracle home on a Fleet Patching and Provisioning Client by running the following command from the Fleet Patching and Provisioning Client:

```
rhctl import image -image db12201 -path /u01/app/dbusr/product/12.2.0/
```

The command creates and adds the image `db12201` based on the local Oracle home installed in the specified path.



Note:

You cannot directly use images as software homes. Use images to create working copies of software homes.

Creating an Oracle Grid Infrastructure 12c Release 2 Deployment

Provision Oracle Grid Infrastructure software on two nodes that do not currently have a Grid home, and then configure Oracle Grid Infrastructure to form a multi-node Oracle Grid Infrastructure installation.

Before You Begin

Provide configuration details for storage, network, users and groups, and node information for installing Oracle Grid Infrastructure in a response file. You can store the response file in any location on the Fleet Patching and Provisioning Server.

You can provision an Oracle Standalone Cluster, Oracle Application Clusters, Oracle Domain Services Cluster, or Oracle Member Clusters. Ensure that the response file has the required cluster configuration details.

Ensure that you have storage, network, and operating system requirements configured as stated in the *Oracle Grid Infrastructure Installation Guide*.

Procedure

- From the Fleet Patching and Provisioning Server, run the command:

```
$ rhpctl add workingcopy -workingcopy GI122 -image GI_HOME_12201 -  
responsefile /u01/app/rhpinfo/GI_12201_install.rsp  
{authentication_option}
```

`GI122` is the working copy based on the image `GI_HOME_12201`

`/u01/app/rhpinfo/GI_12201_install.rsp` is the response file location.

Cluster Verification Utility checks for preinstallation configuration as per requirements. Fleet Patching and Provisioning configures Oracle Grid Infrastructure.

Oracle Grid Infrastructure 12c release 2 is provisioned as per the settings in the same response file.

During provisioning, if an error occurs, the procedure stops and allows you to fix the error. After fixing the error, you can resume the provisioning operation from where it last stopped.

Watch a video  [Video](#)

Provisioning an Oracle Database Home and Creating a Database

This procedure provisions Oracle Database 12c release 2 (12.2) software and creates Oracle Database instances.

Procedure

1. From the Fleet Patching and Provisioning Server, provision the Oracle Database home software:

```
$ rhpctl add workingcopy -image db12201 -path /u01/app/dbusr/product/  
12.2.0/db12201  
-client client_001 -oraclebase /u01/app/dbusr/ -workingcopy db122
```

The command provisions the working copy db122 to the specified path on the cluster client_001, from the image db12201 .

2. Create the database instance:

```
$ rhpctl add database -workingcopy db122 -dbname db -dbtype RAC
```

The command creates an Oracle RAC database instance db . You can use the add database command repeatedly to create more instances on the working copy.

Watch a video  [Video](#)

Upgrading to Oracle Grid Infrastructure 12c Release 2

This procedure uses Fleet Patching and Provisioning to upgrade your Oracle Grid Infrastructure cluster from 11g release 2 (11.2.0.4) to 12c release 2 (12.2).

Before You Begin

To upgrade to Oracle Grid Infrastructure 12c release 2 (12.2.0.1), your source must be Oracle Grid Infrastructure 11g release 2 (11.2.0.3 or 11.2.0.4), or Oracle Grid Infrastructure 12c release 2 (12.1.0.2).

Ensure that groups configured in the source home match those in the destination home.

Ensure that you have an image GI_HOME_12201 of the Oracle Grid Infrastructure 12c release 2 (12.2.0.1) software to provision your working copy.

GI_11204 is the active Grid Infrastructure home on the cluster being upgraded. It is a working copy because in this example, Fleet Patching and Provisioning provisioned the cluster. Fleet Patching and Provisioning can also upgrade clusters whose Grid Infrastructure homes are unmanaged that is, homes that Fleet Patching and Provisioning did not provision.

Procedure

1. Provision a working copy of the Oracle Grid Infrastructure 12c release 2 (12.2.0.1) software:

```
$ rhpctl add workingcopy -workingcopy GI122 -image GI_HOME_12201  
{authentication_option}
```

GI122 is the working copy based on the image GI_HOME_12201.

2. Upgrade your target cluster to the GI122 working copy:

```
rhpctl upgrade gihome -sourcewc GI1204 -destwc GI122
```

Rapid Home Provisioning identifies the cluster to upgrade based on the name of the source working copy, and upgrades to the working copy GI122.

Patching Oracle Grid Infrastructure Without Changing the Grid Home Path

This procedure explains how to patch Oracle Grid Infrastructure without changing the Grid home path.

Before You Begin

- Ensure that the gold image containing the Grid home is imported and exists on the Fleet Patching and Provisioning Server.
- Ensure that the directory you provide in the `path` option is not an existing directory.
- The source Grid home must be a managed home (provisioned by Fleet Patching and Provisioning). It does not need to be an Oracle Layered File System (OLFS)-compliant home.
- The Grid home must be Oracle Grid Infrastructure 12c (12.2.0.1) or later.

Procedure for Patching

- To move a non-OLFS-compliant Grid home to an OLFS Grid home, from the Fleet Patching and Provisioning Server, run two commands similar to the following:

```
$ rhpctl add workingcopy -workingcopy GI_HOME_12201_PSU1 -aupath  
/u01/app/orabase/product/12.2.0.1/aupath -image image_name  
-client client_name -softwareonly
```

```
$ rhpctl move gihome -srcwc GI_HOME_12201 -destwc GI_HOME_12201_PSU1 -  
agpath  
/u01/app/orabase/product/12.2.0.1/agpath -path  
/u01/app/orabase/product/12.2.0.1/grid
```

- To move an OLFS-compliant Grid home to a patched version, run two commands similar to the following:

```
$ rhpctl add workingcopy -workingcopy gihome12201_psu1_lpm -aupath
/u01/app/orabase/product/12.2.0.1/aupath -image image_name -client
client_name -softwareonly
```

```
$ rhpctl move gihome -sourcewc gihome12201_lpm -destwc
gihome12201_psu1_lpm
```

Patching Oracle Grid Infrastructure and Oracle Databases Simultaneously

This procedure patches Oracle Grid Infrastructure and Oracle Databases on the cluster to the latest patch level without cluster downtime.

Before You Begin

In this procedure, Oracle Grid Infrastructure 12c release 2 (12.2.0.1) is running on the target cluster. Working copy `GI_HOME_12201_WCPY` is the active Grid home on this cluster. Working copy `DB_HOME_12201_WCPY` runs an Oracle RAC 12c release 2 (12.2.0.1) Database with running database instance `db1`. Working copy `DB_HOME_12102_WCPY` runs an Oracle RAC 12c release 1 (12.1.0.2) Database with running database instance `db2`.

Ensure that you have images `GI_HOME_12201_PSU1`, `DB_HOME_12201_PSU1`, `DB_HOME_12102_PSU5` with the required patches for Oracle Grid Infrastructure and Oracle RAC Database on the Fleet Patching and Provisioning Server.

The groups configured in the source home must match with those in the destination home.

Procedure

1. Prepare target Oracle homes as follows:
 - a. Provision software-only Grid home on the cluster to be patched:

```
$ rhpctl add workingcopy -workingcopy GI_HOME_12201_PATCHED_WCPY
-image GI_HOME_12201_PSU1 -client CLUSTER_005 -softwareonly
```

- b. Provision each release Database home, without database instances, to be patched:

```
$ rhpctl add workingcopy -workingcopy DB_HOME_12201_PATCHED_WCPY
-image DB_HOME_12201_PSU1
$ rhpctl add workingcopy -workingcopy DB_HOME_12102_PATCHED_WCPY
-image DB_HOME_12102_PSU5
```

2. Patch Oracle Grid Infrastructure and all Oracle RAC Databases on node1 as follows:

```
$ rhpctl move gihome -sourcewc GI_HOME_12201_WCPY -destwc  
GI_HOME_12201_PATCHED_WCPY -auto  
-dbhomes  
DB_HOME_12102_WCPY=DB_HOME_12102_PATCHED_WCPY,DB_HOME_12201_WCPY=DB_HOME  
_12201_PATCHED_WCPY -targetnode node1 {authentication_option}
```

When you run the command, you move your active Oracle Grid Infrastructure from working copy GI_HOME_12201_WCPY to GI_HOME_12201_PATCHED_WCPY, Oracle RAC Database db1 from DB_HOME_12201_WCPY to DB_HOME_12201_PATCHED_WCPY, and Oracle RAC Database db2 from DB_HOME_12102_WCPY to DB_HOME_12102_PATCHED_WCPY.

Patching Oracle Database 12c Release 1 Without Downtime

This procedure explains how to patch Oracle Database 12c release 1 (12.1.0.2) with the latest patching without bringing down the database.

Before You Begin

You have an Oracle Database db12102 that you want to patch to the latest patch level.

Ensure that the working copy db12102_psu based on the image DB12102_PSU contains the latest patches and is available.

Procedure

From the Fleet Patching and Provisioning Server, run one of the following commands as per your source and destination database:

1. To patch an Oracle Database home managed by Fleet Patching and Provisioning, and there exist working copies of the source and destination databases, run:

```
rhpctl move database -sourcewc db12102 -patchedwc db12102_psu
```

db12102 is the source working copy of the database being patched

db12102_psu is the working copy of the Oracle Database software with patches applied, based on the image DB12102_PSU.

2. To patch an unmanaged Oracle Database home (source working copy does not exist because the Oracle home is not managed by Fleet Patching and Provisioning), run:

```
rhpctl move database -sourcehome /u01/app/orabase/product/12.1.0.2/  
dbhome_1  
-patchedwc db12102_psu -targetnode node1
```

targetnode specifies the node on which the database to be upgraded is running, because the source Oracle Database is on a 12.1.0.2 cluster.

/u01/app/orabase/product/12.1.0.2/dbhome_1 is the path of the database being patched

db12102_psu is the working copy of the Oracle Database software with patches applied, based on the image DB12102_PSU.

Use the saved gold image for standardized patching of all your databases of release 12c release 1 to the same patch level.

3. If for some reason, you want to rollback the patches applied to a managed Oracle Database home, run:

```
rhpctl move database -sourcewc db12102_psu  
-patchedwc db12102 -ignorewcpatches
```

db12102 is the working copy of the unpatched database to which you want to roll back.

db12102_psu is the working copy of the Oracle Database software with patches applied, based on the image DB12102_PSU.

For all Oracle Databases, you can also specify these additional options with the `move database` command:

- `-keepplacement`: For admin-managed Oracle RAC Databases (not Oracle RAC One Node Database), Fleet Patching and Provisioning retains the services on the same nodes after the move.
- `-disconnect`: Disconnects all sessions before stopping or relocating services.
- `-drain_timeout`: Specify the time, in seconds, allowed for resource draining to be completed for planned maintenance operations. During the draining period, all current client requests are processed, but new requests are not accepted. This option is available only with Oracle Database 12c release 2 (12.2) or later.
- `-stopoption`: Stops the database.
- `-nodatapatch`: Ensures `datapatch` is not run for databases you are moving.

Watch a video  [Video](#)

Upgrading to Oracle Database 12c Release 2

This procedure describes how to upgrade an Oracle database from Oracle Database 11g release 2 (11.2) to 12c release 2 with a single command, using Fleet Patching and Provisioning, both for managed and unmanaged Oracle homes.

Before you Begin

- To upgrade to Oracle Database 12c release 2 (12.2.0.1), your source database must be either Oracle Database 11g release 2 (11.2.0.3 or 11.2.0.4), or Oracle Database 12c release 1 (12.1.0.2).
- Oracle Grid Infrastructure on which the pre-upgrade database is running must be of the same release or later than the database release to which you are upgrading.
- The source Oracle home to be upgraded can be a managed working copy, that is an Oracle home provisioned using Fleet Patching and Provisioning, or an unmanaged home, that is, an Oracle home not provisioned using Fleet Patching and Provisioning. If you are upgrading an unmanaged Oracle home, provide the complete path of the database for upgrade.

Procedure to Upgrade Oracle Database using Fleet Patching and Provisioning

1. From the Fleet Patching and Provisioning Server, run one of the following commands as per your source and destination database:
 - a. To upgrade an Oracle home managed by Fleet Patching and Provisioning, and there exist working copies of the source and destination databases, run:

```
$ rhpctl upgrade database -dbname test_database -sourcewc db112 -  
destwc db122  
  {authentication_option}
```

test_database is the name of the database being upgraded.

db112 is the source working copy of the pre-upgrade database.

db122 is the working copy of the upgraded Oracle Database software.

- b. To upgrade an unmanaged Oracle home (source working copy does not exist because the Oracle home is not managed by Fleet Patching and Provisioning), run:

```
$ rhpctl move database -sourcehome /u01/app/orabase/product/11.2.0/  
dbhome_1  
  -destwc db122 -targetnode node1 {authentication_option}
```

/u01/app/orabase/product/11.2.0/dbhome_1 is the path of the database being upgraded.

db122 is the working copy of the upgraded Oracle Database software.

targetnode specifies the node on which the database to be upgraded is running, because the source Oracle Database is on a 11.2.0.4 cluster.

The upgraded database is now managed by Fleet Patching and Provisioning. You can ensure that your database is patched to the latest level, using Fleet Patching and Provisioning.

 **Note:**

During upgrade, if an error occurs, the procedure stops and allows you to fix the error. After fixing the error, you can resume the upgrade operation from where it last stopped.

Watch a video  [Video](#)

Adding a Node to a Cluster and Scaling an Oracle RAC Database to the Node

You can add a node to your two-node cluster by using Fleet Patching and Provisioning to add the node, and then extend an Oracle RAC database to the new node.

Before You Begin

In this procedure, Oracle Grid Infrastructure 12c release 2 (12.2.0.1) is running on the cluster. Working copy `GI_HOME_12202_WCPY` is the active Grid home on this cluster.

The Oracle RAC database home runs on the working copy `DB_HOME_12202_WCPY`.

Ensure that you have storage, network, and operating system requirements configured for the new node as stated in *Oracle Grid Infrastructure Installation Guide*.

Procedure

1. From the Fleet Patching and Provisioning Server, run the following command to add a node to the existing Oracle Grid Infrastructure working copy:

```
rhctl addnode gihome -workingcopy GI_HOME_12202_WCPY -newnodes n3:n3-  
vip {authentication_option}
```

The command extends the cluster by adding `node3`.

2. Add instances to the administrator-managed Oracle RAC database on the new node:

```
rhctl addnode database -workingcopy DB_HOME_12202_WCPY -dbname db321 -  
node n3 {authentication_option}
```

The command extends the database home on the `node3` and creates database `db321` on this node.

Watch a video  [Video](#)

Creating a User Action to Deploy a Web Server

You can install and configure any type of software using Fleet Patching and Provisioning user actions. Review this procedure to automate deployment of Apache Web Server using Fleet Patching and Provisioning.

Fleet Patching and Provisioning supports creation of work flows to deploy and manage all types of software.

1. Create the script to install Apache Web server:
 - a. On the Fleet Patching and Provisioning Server, download and extract the Apache Web server installation kit.
 - b. Create the script to install, configure, and start the Apache Web server.

2. Register the script as a user action with Fleet Patching and Provisioning. Run the following command from the Fleet Patching and Provisioning Server:

```
rhctl useraction -useraction apachestart
-actionscript /user1/useractions/apacheinstall.sh
-post -optype ADD_WORKINGCOPY -onerror ABORT
```

The command adds the `apachestart` user action for the action script stored in the specified directory. As per the specified properties, the user action runs after the `ADD_WORKINGCOPY` operation and aborts if there is any error.

3. Create an image type and associate the user action with the image type:

```
rhctl add imagetype -imagetype apachetype -basetype SOFTWARE
-useraction "apachestart"
```

The command creates a new image type called `apachetype`, a derivative of the basic image type `SOFTWARE` with an associated user action `apacherstart`.

4. Create a gold image of the image type:

```
rhctl import image -image apacheinstall -path /user1/apache2219_kit/
-imagetype apachetype
```

The command creates a gold image `apacheinstall` with the script for Apache Web server installation, in the specified path based on the `imagetype` created earlier.

To view the properties of this image, run the `rhctl query image -image apacheinstall` command.

5. Deploy a working copy of the gold image on the target:

```
rhctl add workingcopy -workingcopy apachecopy -image apacheinstall
-path /user1/apacheinstallloc -sudouser user1
-sudopath /usr/local/bin/sudo -node node1 -user user1
-useractiondata "/user1/apachehome:1080:2.2.19"
```

Fleet Patching and Provisioning provisions the software to the target and runs the script `apachestart` specified in the user action. You provide the Apache Web server configuration details such as port number with the `useractiondata` option. If the target is a Fleet Patching and Provisioning Client, then you need not specify `sudo` credentials.

You can create other user actions and automate installation and configuration of software homes using Fleet Patching and Provisioning.

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