

USING ENTERPRISE MANAGER TO ACHIEVE GRID AUTOMATION WITH DEPLOYMENT PROCEDURES

Deployment Procedures are Oracle's latest contribution in automating operations around the grid. This FAQ style technical document introduces the concept of Deployment Procedures to System Administrators and Integrators. The document spells out the advantages, the features and dives deep into few use cases that these Deployment Procedures are designed to solve.

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1. What are Deployment Procedures?

Deployment procedures are out of box best practices that comprise enumeration of a set of steps that are orchestrated by Enterprise Manager. Oracle ships a set of best practices Deployment Procedures to accomplish provisioning and patching related tasks. Deployment Procedures can be extended and customized for customer needs. The Deployment Procedure to patch a single instance database differs from the one to patch a RAC environment or an Application Server. Deployment Procedures can vary from one customer to another or a test installation to a production installation.

Deployment Procedures take into account and resolve the reality that environments are often different with each having complexities across different tiers with multiple dependencies. The situation is further compounded by existing operational practices. In a typical data center, Deployment Procedures can involve a design time activity (typically performed by a Lead Administrator) and a runtime activity (typically performed by the Operator).

Deployment Procedures have been introduced in Grid Control 10.2.0.2 and is licensed under the Enterprise Manager Provisioning Pack.

2. What are the few key advantages of Deployment Procedures?

a. Extensible

The objective of Deployment procedures is to have as many best practice methods out of box as possible. In an ideal case the customer should be able to run the deployment procedures as-is against a set of targets. Oracle shipped best practices Deployment Procedure cannot be modified. The customer can create a copy of the Oracle shipped Deployment Procedure and modify the same to insert or delete steps and error handling modes (see answers to [Question 10](#)).

b. Reusable

Deployment procedures are reusable. The steps of the deployment procedure can be based against directives that are stored in the Software Library. The deployment procedures can also be exported and imported across environments. This implies that the deployment procedures once developed for a test environment need not be recreated for production environment.

c. Hot-pluggable

The out-of-box deployment procedures are metadata driven. So new sets of procedures can be added to the Enterprise Manager environment without any additional outage.

3. What are the Out-of-box deployment procedures?

In version 10.2.0.4 of the Oracle Enterprise Manager, the “Out-of-box” deployment procedures include the following:

Patching procedures for:

Single instance database.

Real Application Clusters (RAC) – Rolling and All Nodes modes patching.

Clusterware – Rolling upgrade patching.

Automated Storage Management patching.

Application Server patching.

Host operating system patching procedures for Linux, Solaris, and Windows.

Provisioning Procedures for:

RAC provisioning.

Single Click Extend Cluster.

Delete / De Scale Cluster.

Application Server and Applications provisioning.

4. Are there any pre-requisites for using the Deployment Procedures?

For pre-requisites refer to Section 10.2 – ‘Deployment Procedure Requirements’ under “Enterprise Manager Advanced Configuration” from the library list at

http://download-west.oracle.com/docs/cd/B16240_01/doc/nav/portal_booklist.htm

Other pre-requisites before proceeding with the deployment procedures:

- i. Configure the software library before starting to use the deployment procedures in 10.2.0.4.
Refer to chapter 18 – Using Software Library in the above document.
- ii. Run the ‘Refresh from Metalink’ job. (See [Question 5](#) for details).
- iii. Run the ‘OPatch Update’ job. (See [Question 6](#) for details)

(The requisites are also mentioned in the Metalink Note: 427577.1, which also provides pointers to any additional info required)

5. What does 'RefreshFromMetalink' do? How to run it?

'RefreshFromMetalink' job downloads the metadata of the latest patch advisories, products and product versions available from Metalink. Additionally, it also does the computation of the vulnerable targets to the latest Critical Patch Updates available. (For example: Running the job post April 17th will generate advisories based on April CPU)

'RefreshFromMetalink' job can runs by default every 24hrs and updates from the Metalink. It is a requisite to run this job before proceeding to any patching or provisioning exercises. 'Refresh from Metalink' job can be run manually both in online and offline modes, its explained with illustration in the following section.

Online / Connected Mode:

The 'RefreshFromMetalink' job to can be kicked off manually by creating a job from the 'Job Activity' page under 'Jobs' tab.

The pre-requisite for the job to run is to pre-set up Metalink credentials. To setup, Click on 'Setup' link at the top and set the Metalink credentials in the 'Patching Setup' page.

The following figure shows, the job to be created, which would download the metadata from Metalink.

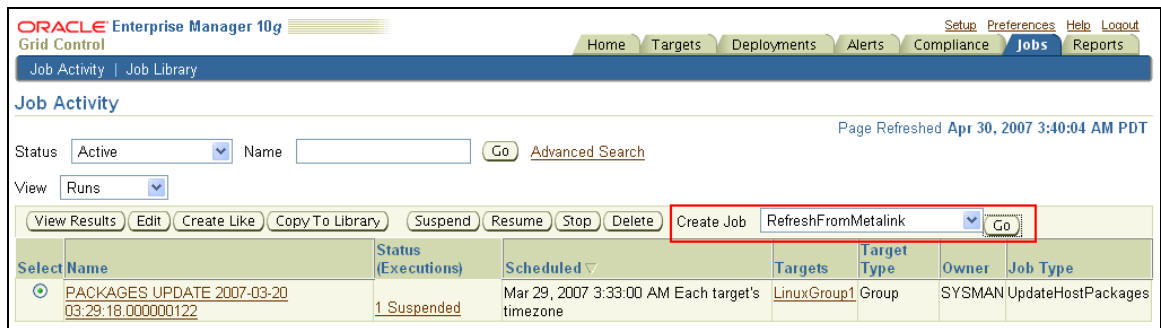


Figure 1: Manually Create 'RefreshFromMetalink' job.

Offline /Disconnected Mode:

The pre-requisite to run the 'RefreshFromMetalink' job in offline mode is to have the xml's required for the execution to be uploaded manually to the OMS. The following steps illustrates on how to execute the job in offline mode.

- 1) The following xml's are required to be downloaded from Metalink. Use a box, which has an Internet connection, download the xml's by providing Metalink credentials.

- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_products
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_platforms
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_languages
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_product_groups
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_product_releases
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_component_releases
- http://updates.oracle.com/ARULink/XMLAPI/query_advisories
- http://updates.oracle.com/ARULink/XMLAPI/download_seed_data?table=aru_releases

2) Upload the xml from the local box to the OMS from the ‘Offline Patching Settings’ page as shown in the figure below. Select the option ‘No Connection’ under the Metalink Connection Method.

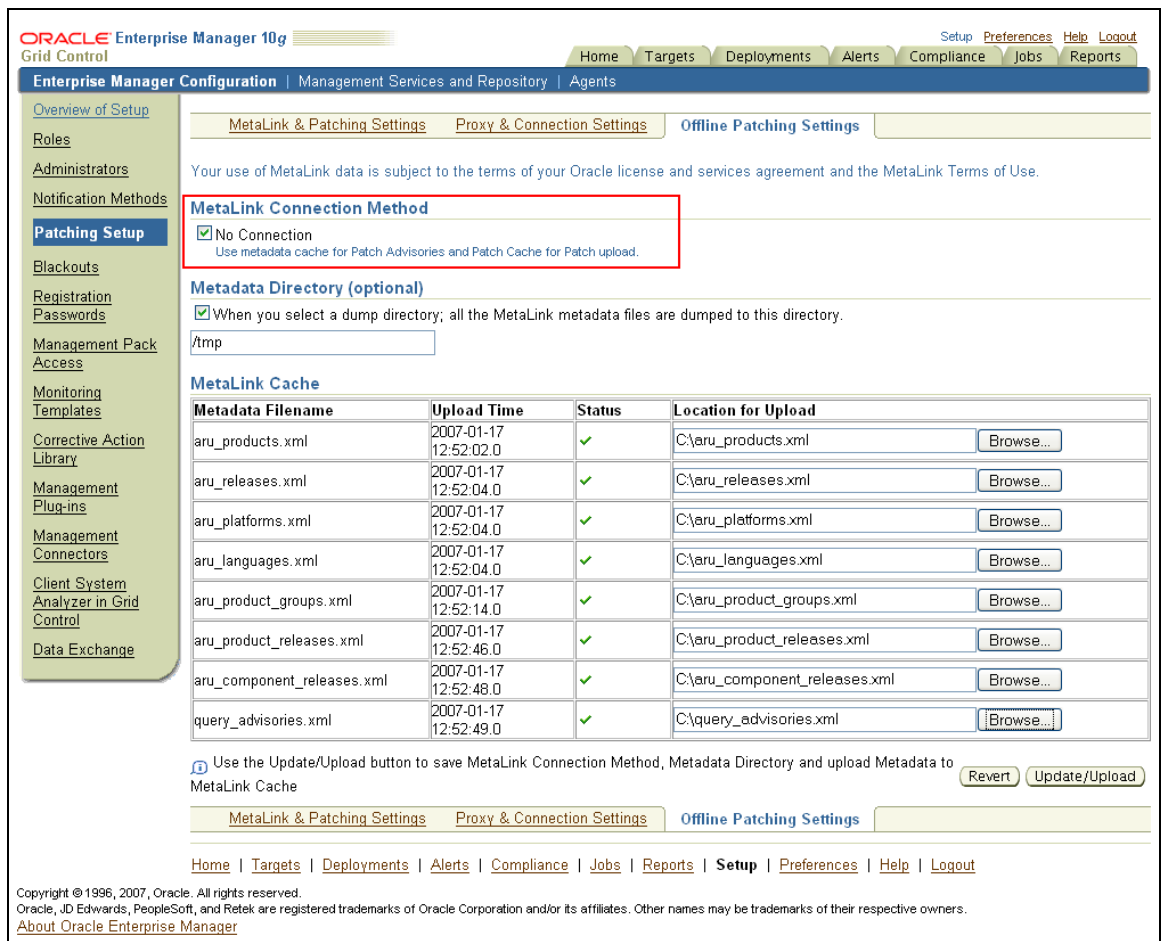


Figure 2: Offline Mode for Metadata Update

3) Create and execute the ‘RefreshfromMetalink’ job from the Jobs tab, as discussed in the online mode section above.

6. What does ‘Upgrading OPatch’ mean? What is its significance? How can one do ‘OPatch Upgrade’?

Upgrading OPatch is to get the latest OPatch installed in the Oracle Home. Without the latest OPatch, certain bug fixes done in later OPatch releases will not be available to be used during the patching process. This can lead to patching failures in some cases. It is recommended to have the latest OPatch patches for successful operation of patching through the deployment procedures.

OPatch updates are released to Metalink through 2 different patches

- 4898608 – For versions 10.2.0.x and onwards.
ARU Download URL: <http://updates.oracle.com/download/4898608.html>
- 2617419 –For versions lesser than 10.2.0.x.
ARU Download URL <http://updates.oracle.com/download/2617419.html>

‘Upgrade OPatch’ is an automated step in the Deployment procedures, the step computes the appropriate version of OPatch picked from the software library against that of the version in the Oracle Home of the target, updates the Oracle Home OPatch, if it is of lower version.

The pre-requisite for the whole upgrade operation is to have the latest OPatch version patch in the Software library of the OMS. This can be achieved in two modes: Online and Offline mode.

The following illustration explains the two modes and the pre-requisites.

Online Mode:

The patches can be downloaded into the software library through the OPatch Upgrade job, which is to be executed once to download the OPatch patches from Metalink to the Software library.

The only pre-requisites for the job to run are to setup Metalink credentials. To setup, Click on ‘Setup’ link at the top and set the Metalink credentials in the ‘Patching Setup’ page.

The ‘OPatch Upgrade’ job to OPatch upgrade can be kicked off manually by creating a job from the ‘Job Activity’ page under ‘Jobs’ tab. The following figure shows, the job to be created, which would download the patches into the software library. This job is an automated job, which runs nightly, and will also be auto kicked off while setting up Software Library too.

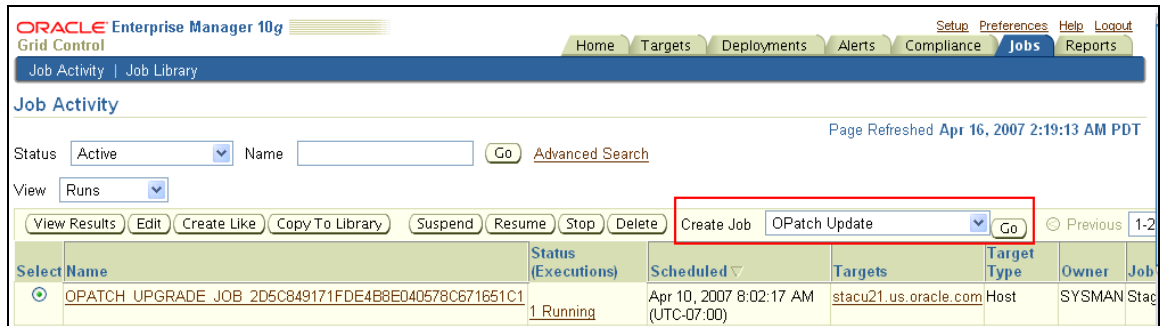


Figure 3: Create 'OPatch Update' job manually to download patches to software library.

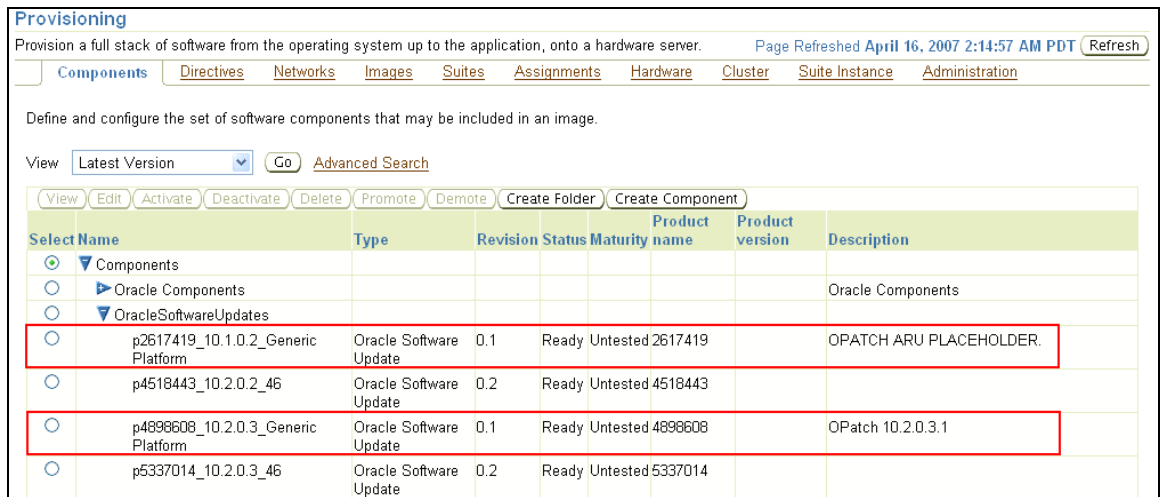


Figure 4: OPatch Place holder patches for version 10.2 onwards and below.

Offline Mode:

To get the patches to Software library in an Offline Mode, need to upload the patches to the software library and patch cache (optionally) manually from the local system.

From the Deployments page, click on link **View/Upload Patch** and click **Upload Patch**. Fill in the details required and upload the patch directly to the software library. The following figure illustrates it; provide the correct values to the parameters for uploading the patch. Make sure you select the Product Family – Oracle System Management Products and Product – Universal Installer.

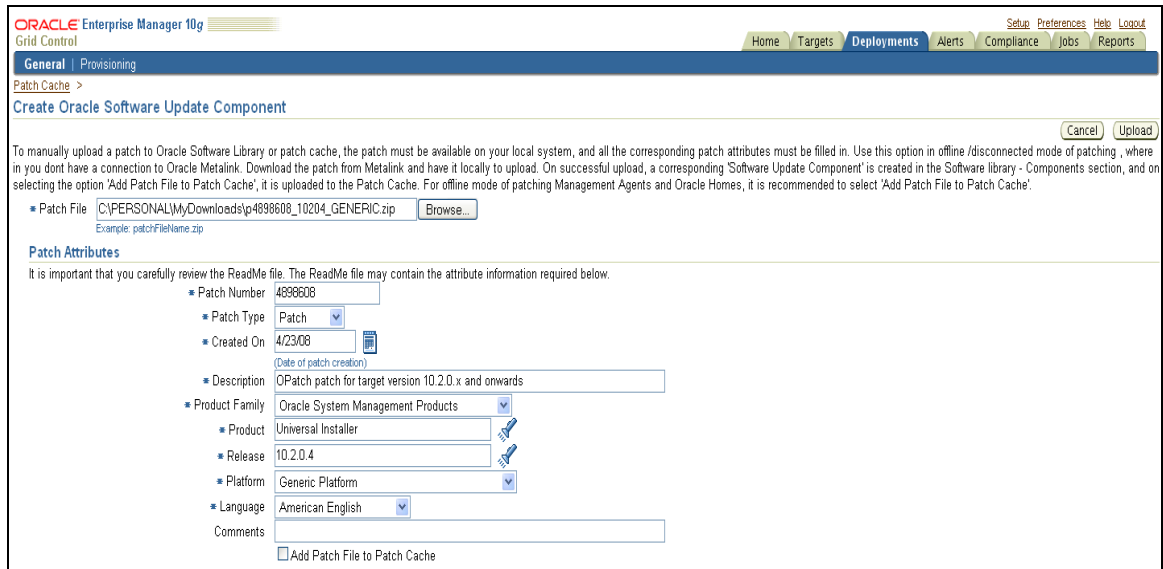


Figure 5: Upload the OPatch patches to the Software Library as a Software Update Component.

For version below 10.2, upload the 10.1.0.2 version of the patch -2617419 to the software library through the patch cache. Refer to the README of the patch for the information on the parameter values.

7. How can one use the out-of-box deployment procedure to apply a security related Critical Patch Update (CPU) to Oracle databases? Can I apply NApply CPU's too using the same procedure?

The out-of-box deployment procedure can be used 'as-it-is' to apply CPU to several single instance databases at the same time. If required the Out-Of-Box procedure can be customized as per the requirement, this involves a design time activity by a lead DBA that can be used over and over again by patch operators (Look for details of customizations under [Question-10](#)).

In 10.2.0.4 Oracle Enterprise Manager the standard procedures are capable of supporting the CPU's of type of Napply too.

In the following example patch 6914212-APR 2008 Critical Patch Update is applied to 10.2.0.3 databases.

This involves the following steps:

- 1) Select the 'Patch Oracle Database' Out-of-Box Procedure from the Deployment Manager page through the link **Patching through Deployment Procedures** under the Deployments Tab.

ORACLE Enterprise Manager 10g
Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

General | Provisioning

Procedures >
View Procedure

Edit Create Like Revert Run Done

Name: Patch Oracle Database
Description: Procedure for patching standalone Oracle Database installations.
Type: Patch Oracle Software
Last Modified By: Oracle
Staging Area Path: %emd_root%
Sudo Command: sudo
PAM Command: pbrun
Environment Variables for sudo or PAM:
my \$PATHSEP = ':'; # Path separator var. use ^
isEmpty(<test>)
Returns true if value <test> is empty.
Please do not modify this subroutine.
sub isEmpty(\$)
{
 my (\$test) = @_; # string to check
 return (\$test =~ /\$/);
}

Last Updated: Dec 29, 2006 4:34:30 PM UTC
Enable Notification:
Procedure Status Notification Job Tag:
Status for which Notification is to be Sent:

Name	Type	Description
▼ Patch Oracle Database		Procedure for patching standalone Oracle Database installations.
Initialize	Computational	Initializes the runtime data. The step also downloads patch from Metalink and creates software library components, for all patches selected to run from Metalink. Do not disable or delete this step.
▼ For all hosts	Parallel	Iterates over a list of hosts.
▼ For all homes	Rolling	Iterates over a list of Oracle Homes.
QHPPreProcess	Computational	Initializes each Oracle Home. Do not disable or delete this step.
Upgrade opatch	Job	Upgrades opatch to the latest version.
Stage Patches	Job	Stages selected patches into Oracle Homes. Stage Location Example: %oracle_home%/EMStagedPatches.
Start Blackout	Computational	Starts Blackout of Oracle Database Instances in an Oracle Home.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.
Custom Prereq Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.
Apply Patches	Directive	Applies staged patches in Oracle Homes.
Validate the Patch	Directive	Directive to validate the applied patches.
Run root script	Directive	Runs root script after applying a patchset only. Requires sudo privileges as root.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Apply Post SQL Script	Directive	Applies a SQL script.
Apply Post SQL Script	Directive	Applies a SQL script to recompile invalid objects in the database.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Stop Blackout	Computational	Stops Blackout of Oracle Database Instances in an Oracle Home.
Host Configuration Collection	Job	Refreshes the configuration information about a host.

Edit Create Like Revert Run Done

Home | Targets | Deployments | Alerts | Compliance | Jobs | Reports | Setup | Preferences | Help | Logout

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About Oracle Enterprise Manager

Figure 6: View the procedure and run it

- 2) Click **Schedule Deployment** and run it. There are 3 inputs that need to be provided at runtime—the patch number(s), the targets and the credentials. Finally the procedure needs to be scheduled for immediate or deferred execution.
- 3) One can choose to search the patch from Metalink or the Software Library. (Usage on ‘Search from Software Library’, check in [Question 8](#)). Here the patch 6914212 is selected by Searching from Metalink.

Note: To search on Metalink, Metalink credentials have to be pre-set. To setup, Click **Setup** link at the top and set the Metalink credentials in the Patching Setup page.

Patch Oracle Database: Software Updates >

Search And Select Software Updates (Cancel) (Select)

Search Metalink
 Search Software Library

Search

Patch Number: 6914212

Product Family: Oracle Database

Product: Oracle Database

Release: Any

Patch Type: All Patches

Platform: Any

Language: Any

Select All | Select None

Select	Software Update Name	Patch ID	Created On	Type	Product	Platform	Release	Interim Patch Applicable On	Description	README
<input type="checkbox"/>	p6914212_10.2.0.3_212_9480	6914212		Patch Oracle Database	ADSL Based Systems (64-bit)		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>
<input type="checkbox"/>	p6914212_10.2.0.3_29_9480	6914212		Patch Oracle Database	Solaris Operating System (SPARC 64-bit)		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>
<input type="checkbox"/>	p6914212_10.2.0.3_226_9480	6914212		Patch Oracle Database	Linux x86-64 (AMD64/EM64T)		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>
<input type="checkbox"/>	p6914212_10.2.0.3_59_9480	6914212		Patch Oracle Database	HP-UX PA-RISC (64-bit)		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>
<input type="checkbox"/>	p6914212_10.2.0.3_197_9480	6914212		Patch Oracle Database	HP-UX Itanium		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>
<input type="checkbox"/>	p6914212_10.2.0.3_46_9480	6914212		Patch Oracle Database	Linux x86		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/>

TIP To look up for the README, selected updates should be valid patch on Oracle Metalink and require connection to Oracle Metalink. To Setup or Update Oracle Metalink credentials click on 'Setup' Link. The view button for README is not clickable in case of patches selected from software library.

Figure 7: Search and Select the patch from Metalink

4) Deployment procedure by default runs the default SQL (catcpu.sql for CPUs) as shown below or you can optionally enter the location of the SQL you want run by choosing the other option “Enter the script to apply SQL”.

Additionally, ‘Upgrade OPatch’ can be made optional during run by unselecting the check box.

Software Updates
 Target List
 Library Step Properties
 Credentials
 Schedule
 Review

Patch Oracle Database: Software Updates (Cancel) Step 1 of 6 (Next)

Select the Software Updates to Stage and Apply.

Staging Location: %emd_root%\EMStage
Directory where the Updates are staged to and applied from.

Standalone Database Updates

Select the Software Updates to apply. Click on "Add" to search and select software updates from Metalink or Software Library or Upload the Updates by clicking "Upload From File". Consult README to determine any update specific steps. Click on "View" to look up for the README.

Software Update Name	Patch ID	Created On	Type	Product	Platform	Release	Interim Patch Applicable On	Description	README
p6914212_10.2.0.3_46_9480	6914212		Patch Oracle Database	Linux x86		10.2.0.3		CPUAPR2008: MERGE LABEL REQUEST ON TOP OF 10.2.0.3 FOR BUGS 6868171 6491723	<input type="button" value="View"/> <input type="button" value="Remove All"/>

TIP To look up for the README, selected updates should be valid patch on Oracle Metalink and require connection to Oracle Metalink. To Setup or Update Oracle Metalink credentials click on 'Setup' Link. The view button for README is not clickable in case of patches selected from software library.

Upgrade OPatch

Upgrade OPatch.
 To download OPatch to the Software Library in online/offline modes, refer to [FAQ#6 of Achieving Grid Automation with Deployment Procedures](#)

Apply SQL Script

Apply Default SQL Script
 Procedure applies SQL that is bundled with patch based on patch meta data. This is applicable for CPU and patchsets. Please consult README for any explicit steps to apply SQL

Enter the script to apply SQL (e.g. %oracle_home%\rdbms\admin\catupgrd.sql)

Figure 8: Choosing one or more patches from the Software Library or Metalink

- The targets are then chosen. Search shows up one or more targets in the grid environment on which the patch is applicable.

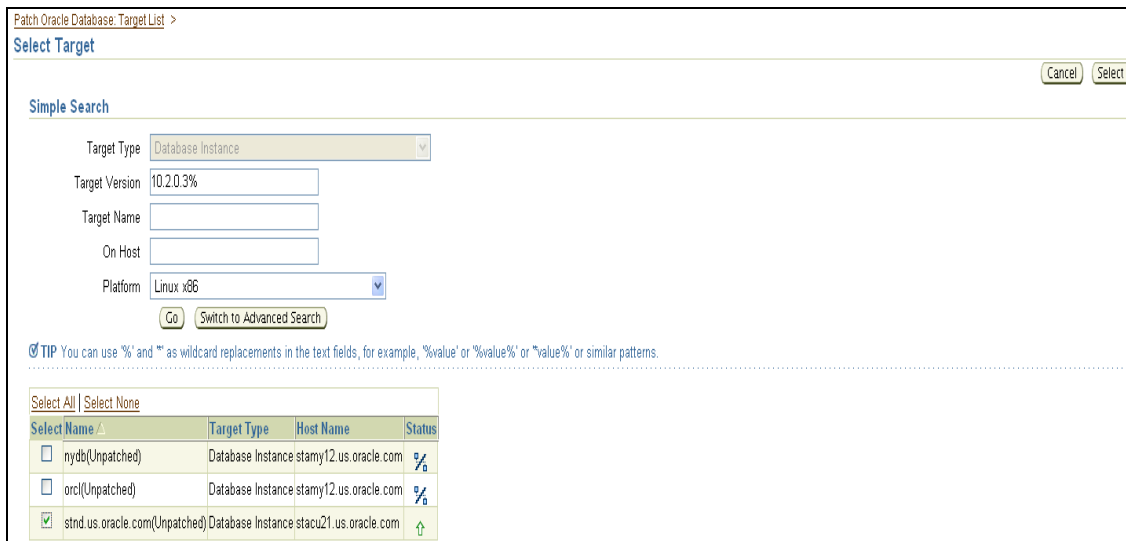


Figure 9: Choosing the list of Targets to patch

- Followed by credentials. One can choose to use the ORACLE_HOME credentials from the repository by selecting the option **Use Oracle Home Preferred Credentials**.

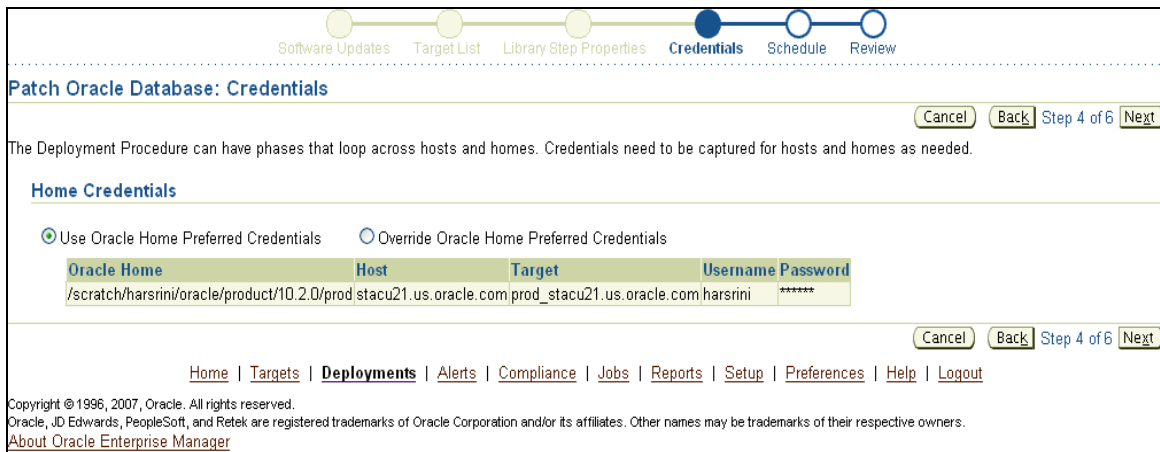


Figure 10: Specifying credentials

- The procedure can be scheduled to run immediate or for later time.

On Submission, using **Procedure Completion Status** link can monitor the procedure run. It can be retried from a failed step, if required.

The flow for applying CPUs is illustrated in the following screenwatch:
http://download.oracle.com/enterprise_manager/10203_CPU_Patching/10203_CPU_Patching.html

8. What is Offline Patching? How can I do offline patching using Deployment Procedures?

“Offline Patching” is a mode of patching to address the case where you do not have a direct Internet connection to Metalink.

To perform Offline Patching through deployment procedures, you would require following the steps:

1. Download the Patch from Metalink from any box that has online connection and have it locally to upload to the Software Library.
2. Click on **View/Upload Patch** link from the Patching section under the Deployments Tab.
3. Select the **Upload Patch** option available in the Patch Cache.
4. Upload the patch zip file available locally and all mandatory attributes regarding the patch.
5. The patch is uploaded directly to the Software Library. Optionally in cases of Offline Agent Patching cases, the patch can be uploaded to Patch Cache by selecting the **Add Patch File to Patch Cache** check box. Refer to the patch README for the values of the parameters mentioned in the page.

The screenshot shows the Oracle Enterprise Manager 10g Grid Control interface. The main heading is "Create Oracle Software Update Component". Below this, there is a "Patch File" field with the value "C:\PERSONAL\MyDownloads\p-4898608_10204_GENERIC.zip" and a "Browse..." button. The "Patch Attributes" section includes the following fields:

- Patch Number: 4898608
- Patch Type: Patch
- Created On: 4/23/08
- Description: OPatch patch for target version 10.2.0.x and onwards
- Product Family: Oracle System Management Products
- Product: Universal Installer
- Release: 10.2.0.4
- Platform: Generic Platform
- Language: American English

At the bottom of the form, there is a checkbox labeled "Add Patch File to Patch Cache".

Figure 11: Upload patch to Software Library with all mandatory attributes.

6. Select the appropriate Deployment Procedure (Out –of –Box or Customized) based on the Targets to patch from the “Deployments Manager” page and run it.
7. While selecting the Software Updates, Choose to select from Software Library.

Patch Oracle Database: Software Updates >

Search And Select Software Updates Cancel Select

Search Metalink
 Search Software Library

Search

Patch Number: 4689959
 Product Family: Oracle Database
 Product: Any
 Release: Any
If search criteria includes Patchset number and Release, please specify the Patchset Release and not the Release applicable on.
 Patch Type: All Patches
 Platform: Any
 Language: Any

Go

Select All | Select None

Select	Software Update Name	Patch ID	Created On	Type	Product	Platform	Release	Interim Patch Applicable On	Description	README
<input type="checkbox"/>	p4689959_10.2.0.2_46	4689959	2007-01-11 07:46:30.0	Patch	Oracle Database	Linux x86		10.2.0.2	Oracle Database Patch Timezone patch	View

TIP To lookup for the README, selected updates should be valid patch on Oracle Metalink and require connection to Oracle Metalink. To Setup or Update Oracle Metalink credentials click on 'Setup' Link. The view button for README is not clickable in case of patches selected from software library.

Cancel Select

Figure 12: Select the option -'Search Software Library' for the Patch.

8. Proceed through the patching flow and patch the target. (Similar to the [Question number: 7](#)).

9. Can Deployment procedures be used to patch RAC in rolling mode?

Yes, deployment procedures support application of patches on Real Application Clusters in rolling mode.

Note: Read the README of the patch to check if it is applicable in rolling mode before proceeding. Critical Patch Updates are applicable in rolling mode.

The example below illustrates the application of an interim patch on the two nodes of a Real Application Cluster in a rolling mode.

- 1) From the Deployment Manager page select the out-of-box procedure Patch Oracle RAC Database –Rolling. The below figure, shows steps in the procedure for deletion of cluster. Click on **Run** to run it.

View Procedure [Edit] [Create Like] [Revert] [Run] [Done]

Name: **Patch Oracle RAC Database - Rolling**
 Description: **Procedure for patching an Oracle RAC Database in Rolling mode. This procedure is not applicable for shared oracle home installations.**
 Type: **Patch Oracle Software**
 Last Modified By: **Oracle**
 Staging Area Path: **%emd_root%**
 Sudo Command: **sudo**
 PAM Command: **pbrun**
 Environment Variables for sudo or PAM:

```
my $PATHSEP = ':'; # Path separator var. use
# isEmpty(<test>)
# Returns true if value <test> is empty.
# Please do not modify this subroutine.
sub isEmpty($)
{
  my ($test) = @_; # string to check

```

Last Updated: **Dec 29, 2006 8:34:28 AM PST**
 Enable Notification:
 Procedure Status Notification Job Tag:
 Status for which Notification is to be Sent:

Name	Type	Description
▼ Patch Oracle RAC Database - Rolling		Procedure for patching an Oracle RAC Database in Rolling mode. This procedure is not applicable for shared oracle home installations.
Initialize	Computational	Initializes the runtime data. The step also downloads patch from Metalink and creates software library components, for all patches selected to run from Metalink. Do not disable or delete this step.
▼ For all hosts	Rolling	Iterates over a list of hosts.
▼ For all homes	Rolling	Iterates over a list of Oracle Homes.
Oracle Home Preprocess	Computational	Initializes the Oracle Home specific runtime data like staging location. Do not disable or delete this step.
Upgrade opatch	Job	Upgrades opatch to the latest version
Stage Patches	Job	Stages selected patches into Oracle Homes. Stage Location Example:%oracle_home%/EMStagedPatches.
Stop RAC Instances	Directive	Stops all the selected Oracle RAC Instances.
stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.
Custom Prereq Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.
Apply Patches	Directive	Applies staged patches in Oracle Homes.
Validate the Patch	Directive	Directive to validate the applied patches.
Run root script	Directive	Runs root script after applying a patchset only. Requires sudo privileges as root.
Start RAC Instances	Directive	Starts all the selected Oracle RAC Instances.
▼ On the the node for SQL execution	Rolling	Operates on the node for SQL execution
▼ On the Oracle Home for SQL execution	Rolling	Operates on the oracle home selected for SQL execution.
Apply SQL Script	Directive	Applies a SQL script.
Apply Post SQL Script	Directive	Applies a SQL script to recompile invalid objects in the database.
▼ For all hosts	Parallel	Iterates over a list of hosts.
Host Configuration Collection	Job	Refreshes the configuration information about a host.

Figure 13: Patch Oracle RAC Database - Rolling Mode.

- 2) The first step is to select the Patches to be patched from either Metalink or Software library. In the example shown in the figure below, the patch number 4518443 is picked up form Metalink.

Patch Oracle RAC Database - Rolling : Software Updates [Cancel] Step 1 of 6 [Next]

Select the Software Updates to Stage and Apply.

Staging Location:
Directory where the Updates are staged to and applied from.

RAC Database Updates
 Select the Software Updates to apply. Click on "Add" to search and select software updates from Metalink or Software Library or Upload the Updates by clicking "Upload From File".
 Consult README to determine any update specific steps. Click on "View" to lookup for the README.

[Add] [Upload From File]

Software Update Name	Patch ID	Created On	Type	Product	Platform	Release	Interim Patch Applicable On	Description	README
p4518443_10.2.0.1_46	4518443	2007-02-15 01:49:33.0	Patch	Oracle Database	Linux x86	10.2.0.1		Listner Hangup	[View] [Remove All]

TIP Select the Updates which are applicable to RAC Database-Rolling only.
 TIP To lookup for the README, selected updates should be valid patch on Oracle Metalink and require connection to Oracle Metalink. To Setup or Update Oracle Metalink credentials click on 'Setup' Link. The view button for README is not clickable in case of patches selected from software library.

Apply SQL Script
 Apply Default SQL Script
 Procedure applies SQL that is bundled with patch based on patch meta data. This is applicable for CPU and patchsets. Please consult README for any explicit steps to apply SQL.
 Enter the script to apply SQL (e.g. %oracle_home%/rdbms/admin/catupgrd.sql)

▼ **Hide Variables for Target Properties**
 %oracle_home% The current home location being patched
 %emd_root% Target agent home location
 %perbin% Location of perl binary used by Agent

TIP The Variables for Target Property can be used to specify directory location for Staging Location and script to Apply SQL.

Figure 14: Select patches from Metalink or Software Library.

- Proceed to the next step and select the Targets to be patched. The list of targets for which the patch is applicable is populated by default. On selecting the targets the next step shows up the instances associated with the target.

Select Target Cancel Continue

Simple Search

Target Type: Cluster Database

Target Version: 10.2.0.1%

Target Name:

On Host:

Platform: Linux x86

Go Switch to Advanced Search

TIP You can use '%' and '*' as wildcard replacements in the text fields, for example, '%value%' or '*value%' or similar patterns.

Select	Name ^	Target Type	Cluster Name	Status
<input type="radio"/>	eorcl(Unpatched)	Cluster Database	crsex	↑
<input type="radio"/>	RAC11(Unpatched)	Cluster Database	crs11	↑

Figure 15: Select Targets from the Grid Control on which the patches are applicable.

Select Instance Cancel Back Select

Select instances associated with the target- RAC11.
It is recommended to select all instances.

Select All | Select None

Select	Name ^	Target Type	Host Name	Status
<input checked="" type="checkbox"/>	RAC11_rac111	RAC Instance	stamy04.us.oracle.com	↑
<input checked="" type="checkbox"/>	RAC11_rac112	RAC Instance	stamy05.us.oracle.com	↑

Figure 16: Select Instances associated with the Targets.

- Proceed through and provide credentials for the targets and schedule the run. The status updates for the run can be checked through from the Procedure Completion Status page.

The figure below shows up the orchestration of the rolling patching on the nodes of the cluster database. In which the Apply patch step has shows up one node patched successfully and the application of the patch on the other node is in progress.

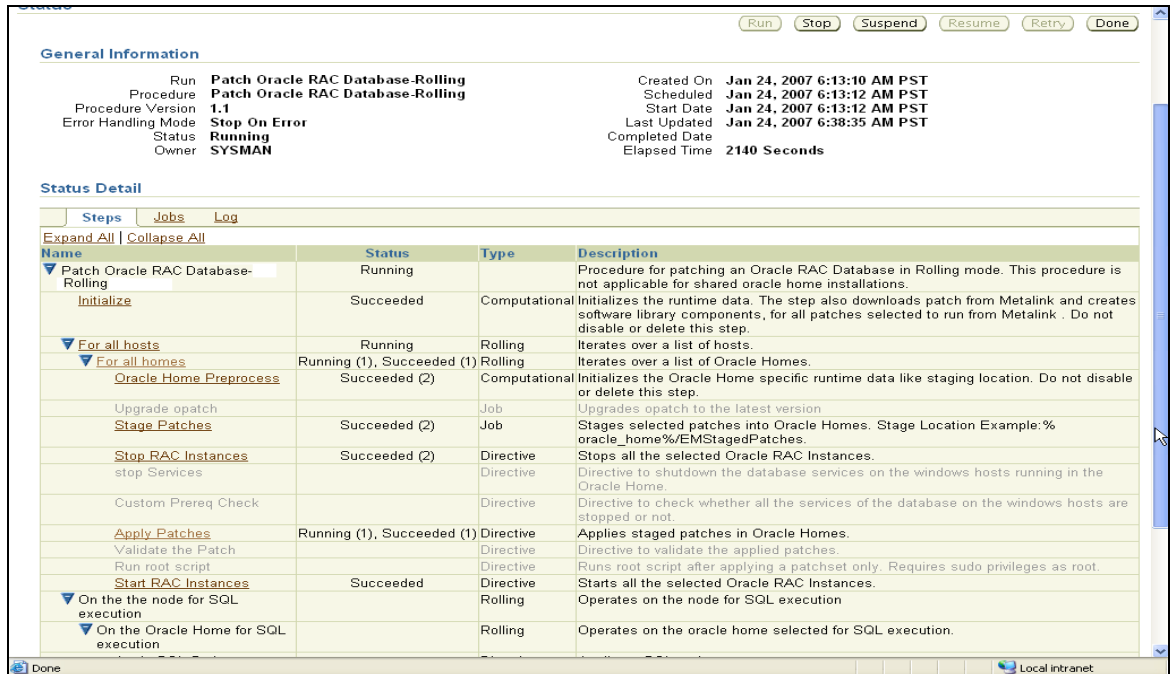


Figure 17: Patch Oracle RAC Database - Rolling mode.

Note: Almost all of the recent CPU's can be applied in a rolling fashion. For applying Patchsets (For example 10.2.0.4 over 10.2.0.3) use the procedure 'Patch Oracle RAC Database – All Nodes'.

10. Are out of box Deployment Procedures customizable? If so, how?

Out-of-box Deployment Procedures are not customizable, but they can be used as starting templates to create similar procedures (using the Create Like functionality) that can then be customized. One can edit the deployment procedure to insert or delete a step or a phase or to enable or disable a step or a phase.

Deployment procedures also allow different error handling methods depending upon the case. For example, in a patching operation where hosts are patched in parallel, it may be wise to simply skip the host on which a failure occurs. However, failure on a device creation could render the remaining provisioning operation ineffective. So, it may be necessary to abort the entire procedure for failure of such a step.

Look for customization examples in the proceeding questions.

11. How can I use deployment procedures to handle patching in Low Bandwidth Data centers?

Deployment Procedure extensibility framework supports uploading the patch to a central location and patch multiple targets from a central location. This prevents the purpose of staging the patch on every target of execution, there by avoiding any network bandwidth related issues.

Follow the steps below to customize the deployment procedure.

- 1) Do 'Create like' of the out-of-box patching deployment procedures for example pick the 'Patch Oracle Database' procedure. Create a deployment procedure, which has only staging step in the deployment procedure by disabling all other steps as show in the figure below.

Expand All Collapse All		
Name	Type	Description
▼ Patch Oracle Database_Stage Procedure		Procedure for patching standalone Oracle Database installations.
Initialize	Computational	Initializes the runtime data. The step also downloads patch from Metalink and creates software library components, for all patches selected to run from Metalink . Do not disable or delete this step.
▼ For all hosts	Parallel	Iterates over a list of hosts.
▼ For all homes	Rolling	Iterates over a list of Oracle Homes.
OHPreProcess	Computational	Initializes each Oracle Home. Do not disable or delete this step.
Upgrade opatch	Job	Upgrades opatch to the latest version
Stage Patches	Job	Stages selected patches into Oracle Homes. Stage Location Example:%oracle_home%/EMStagedPatches.
Start Blackout	Computational	Starts Blackout of Oracle Database Instances in an Oracle Home.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.
Custom Prereq Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.
Apply Patches	Directive	Applies staged patches in Oracle Homes.
Validate the Patch	Directive	Directive to validate the applied patches.
Run root script	Directive	Runs root script after applying a patchset only. Requires sudo privileges as root.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Apply SQL Script	Directive	Applies a SQL script.
Apply Post SQL Script	Directive	Applies a SQL script to recompile invalid objects in the database.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Stop Blackout	Computational	Stops Blackout of Oracle Database Instances in an Oracle Home.
Host Configuration Collection	Job	Refreshes the configuration information about a host.

Figure 18: "Customized Stage Only" deployment procedure.

- 2) Repeat Step-1 and create a deployment procedure, which is an "Apply Patch" procedure, with the 'Stage Patches' step disabled. Figure below illustrates the same.

Expand All Collapse All		
Name	Type	Description
▼ Patch Oracle Database_ApplyPatch Procedure		Procedure for patching standalone Oracle Database installations.
Initialize	Computational	Initializes the runtime data. The step also downloads patch from Metalink and creates software library components, for all patches selected to run from Metalink . Do not disable or delete this step.
▼ For all hosts	Parallel	Iterates over a list of hosts.
▼ For all homes	Rolling	Iterates over a list of Oracle Homes.
OHPreProcess	Computational	Initializes each Oracle Home. Do not disable or delete this step.
Upgrade opatch	Job	Upgrades opatch to the latest version
Stage Patches	Job	Stages selected patches into Oracle Homes. Stage Location Example:%oracle_home%/EMStagedPatches.
Start Blackout	Computational	Starts Blackout of Oracle Database Instances in an Oracle Home.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.
Custom Prereq Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.
Apply Patches	Directive	Applies staged patches in Oracle Homes.
Validate the Patch	Directive	Directive to validate the applied patches.
Run root script	Directive	Runs root script after applying a patchset only. Requires sudo privileges as root.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Apply SQL Script	Directive	Applies a SQL script.
Apply Post SQL Script	Directive	Applies a SQL script to recompile invalid objects in the database.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Stop Blackout	Computational	Stops Blackout of Oracle Database Instances in an Oracle Home.
Host Configuration Collection	Job	Refreshes the configuration information about a host.

Figure 19: Customized "Apply Only" deployment procedure.

3) Run the saved customized stage only procedure of Step-1: "Patch Oracle Database_Stage_Procedure". In the first step of the run specify the central location where the patch is to be staged. The central location can be any NFS location or can be on a Net App filer, which is accessible by all targets to be patched. The below illustrates the place in the interview screen to specify the central staging location.

Patch Oracle Database_ApplyPatch Procedure: Software Updates Cancel Step 1 of 6 Next

Select the Software Updates to Stage and Apply.

Staging Location: Directory where the Updates are staged to and applied from.

Figure 20: Specify a central location as the 'Staging Location'.

4) On successful execution of the step above, the patch will be staged in the central location specified. Proceed on to run the saved customized apply patch procedure of Step-2: "Patch Oracle Database_ApplyPatch Procedure". In the first step of the run specify the same staging location as provided in the above step.

5) Proceed on to select the patch, targets to patch and submit the procedure for execution.

The deployment procedure on execution patches the targets with the patch from the central location and not by the normal mode of pushing the patch to separate local staging location per target and patch from there.

12. What is a CRS Bundle patch? How can I apply patches of that kind to the Cluster Database through Deployment Procedures?

CRS Bundle patches are type of patches, which are applicable on both the CRS and RAC Homes on the nodes. For example patch number- 4091881, is a CRS bundle patch.

To apply the CRS bundle patches you would require to add customizations to the Clusterware patching deployment procedure shipped out-of-box (Patch Oracle Clusterware –Rolling), which would enable to apply the patch on the RAC instances running locally after patching Clusterware. A sample directive to apply patch on Multiple RAC instances is available in the Directives section of Software Library.

Note: Always refer through the patch ReadMe before using the process, if it has any additional steps incorporate that as a customized step into the procedure.

The steps below illustrate how to customize the directive and ‘Patch Clusterware deployment procedure’ to apply patches of this kind.

Pre-requisite for the procedure:

The sample directive ‘Apply Patch on Multiple Homes’ is only a read only script. Need to edit to be used in the deployment procedure.

- 1) Click on Deployments tab and click the **Provisioning** link in the Deployments page. Select the sample directive from the ‘Directives’ page under ‘Directives>Oracle Directives>Patching >CRS>All>Generic’. See figure 49 below for navigation and sample directive ‘Apply Patch on Multiple Homes’.

Provisioning

Provision a full stack of software from the operating system up to the application, onto a hardware server. Page Refreshed March 1, 2007 6:31:48 AM PST [Refresh](#)

[Components](#) [Directives](#) [Networks](#) [Images](#) [Suites](#) [Assignments](#) [Hardware](#) [Cluster](#) [Suite Instance](#) [Administration](#)

Upload scripts or programs that stage and install components and images.

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Select Name	Type	Revision	Status	Maturity	Product name	Product version	Description
<input type="radio"/> Directives							
<input type="radio"/> Oracle Directives							Oracle Directives
<input type="radio"/> Common							Common
<input type="radio"/> Common Provisioning Utilities							Common Provisioning Utilities
<input type="radio"/> Patching							Patching
<input type="radio"/> ASM							ASM
<input type="radio"/> Common							Common
<input type="radio"/> CRS							CRS
<input type="radio"/> All							All
<input type="radio"/> Generic							Generic
<input checked="" type="radio"/> Apply Patch on Multiple Homes		0.1	Ready	Untested		1.0	TestDirective description
<input type="radio"/> Change OH Owner to User		0.1	Ready	Untested		1.0	TestDirective description
<input type="radio"/> Run CRS Patchset Root Script		0.1	Ready	Untested		1.0	TestDirective description
<input type="radio"/> Run CRS PrePostScripts		0.1	Ready	Untested		1.0	TestDirective description
<input type="radio"/> Shutdown CRS Applications		0.1	Ready	Untested		1.0	TestDirective description
<input type="radio"/> OS							OS
<input type="radio"/> RAC Provisioning							RAC Provisioning

Figure 21: Sample directive 'Apply Patch on Multiple Homes'.

- Click on **Edit** to edit the directive, open the Perl file 'pa_patch_multiple_oraclehomes' under the Upload File section. Click Open the Perl file, and copy to a local editor (for example, Notepad). Edit the Perl file and uncomment the sections of the code which are under # Supporting Bundle Patch. See the figure below, which displays the Perl file of the sample directive to be edited.

Edit Directives

[Describe](#) [Configure](#) [Upload File](#) [Revision History](#) [Referring Components](#)

Upload a file that has the content for the new Directives. If there is a job associated with this Directives, then clicking on the Finish button will save the Directives and also trigger off the job, while the Save button will only save the Directives. If no job is associated with this Directives, then both the buttons behave the same way.

Currently associated File pa_patch_multiple_oraclehome

Upload Later
 Upload from Agent Machine
 Upload from Local Machine

[Describe](#) [Configure](#) [Upload File](#) [Revision History](#) [Referring Components](#)

Figure 22: Perl file associated with the Sample directive

Select the option **Upload from Local Machine** and upload the edited Perl file from the local machine. See the figure below, which shows up the option to upload the Perl file to the directive.



Figure 23: Upload edited Perl file to the directive from the Local Machine

Customizing the 'Patch Oracle Clusterware – Rolling' deployment procedure:

- 3) Do a 'Create like' of the out-of-box 'Patch Oracle Clusterware-Rolling' deployment procedure. Select the step **Apply CRS Patch** (See the figure below) and Click **Insert** to insert the custom step to apply patches of RAC Homes.

<input type="checkbox"/>	stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.	Normal	Inherit (Stop On Error)
<input type="checkbox"/>	Custom Prereq Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.	Normal	Inherit (Stop On Error)
<input checked="" type="checkbox"/>	Apply CRS Patch	Directive	Apply CRS Patch / Patchset.	Normal	Inherit (Stop On Error)
<input type="checkbox"/>	Validate the Patch	Directive	Directive to validate the applied patches.	Normal	Inherit (Stop On Error)

Figure 24: Select and Insert step below the 'Apply CRS Patch' step

- 4) Provide the required details in the Create section of the step. You must insert the Apply RAC patch after the Apply CRS Patch step. (See the figure below)

Figure 25: Create a custom step to apply patch on RAC

- 5) Select the Directive, which is uploaded to the Software library. See the figure below, which shows the selection of the "Apply Patch on Multiple

Homes” directive. Pick up the version 0.2 of the directive, which is the version of the edited copy of the standard sample directive.

Select	Component Name	Type	Revision	Status	Maturity	Product Name	Product Version	Description
<input checked="" type="radio"/>	Directives/Oracle Directives/Patching/CRS/All/Generic/Apply Patch on Multiple Homes	Directives	0.2	Ready	Untested		1.0	TestDirective descrip
<input type="radio"/>	Directives/Oracle Directives/Patching/CRS/All/Generic/Apply Patch on Multiple Homes	Directives	0.1	Ready	Untested		1.0	TestDirective descrip

Figure 26: Select the new custom directive from the Software Library.

- 6) Proceed to the next step and Map the properties to the directive. See the figure below, which shows up the various mappings to the directive properties. Associate the RAC ORACL_HOME’s to be patched to the exposed Target Variable – ‘racLocalInstanceHomes’.

Property	Display Name	Description	Value Type	Target Variable
oracle_homes	<Enter Display Name for oracle_homes>	<Enter Description Here>	Choose Variable	Target Variable: racLocalInstanceHomes
patch_ids	<Enter Display Name for patch_ids>	<Enter Description Here>	Choose Variable	Procedure Variable: patchIds
stage_dir	<Enter Display Name for stage_dir>	<Enter Description Here>	Choose Variable	Target Variable: replacedStageDir
command_name	<Enter Display Name for command_name>	<Enter Description Here>	Set Value	apply
patchsetRelease	<Enter Display Name for patchsetRelease>	<Enter Description Here>	Choose Variable	Procedure Variable: patchReleases
level	<Enter Display Name for level>	<Enter Description Here>	Set Value	-level

Figure 27: Map Properties for the 'Apply Patch on Multiple Homes' directive.

- 7) Proceed to review the selections for the new custom step to be incorporated. The figure below illustrates the review screen for the new Directive Step created.

Done

Name **Apply RAC patch**
 Description **Applies patch on the RDBMS component.**
 Type **Directive**
 Error Handling **Inherit (Stop On Error)**

Details

Selected Directive

Directive Name **Directives/Oracle Directives/Patching/CRS/All Generic/Apply Patch on Multiple Homes**

Directive Properties

Property	Display Name	Description	Value
oracle_homes	oracle_homes		\${target.racLocalInstanceHomes} (Variable)
patch_ids	patch_ids		\${data.patchIds} (Variable)
stage_dir	stage_dir		\${target.replacedStageDir} (Variable)
command_name	command_name		apply
patchsetRelease	patchsetRelease		\${data.patchReleases} (Variable)
level	level		-level

Run Mode

Run Privilege **Normal**
 Run Directive
 Perform Cleanup

Figure 28: Review the created 'Directive Step' and add it .

- 8) Click **Finish** to incorporate the directive step into the deployment procedure. The figure below illustrates the step added to the deployment procedure.

<input type="checkbox"/>	Apply CRS Patch	Directive	Apply CRS Patch / Patchset.	Normal	Inherit (Stop On Error)
<input type="checkbox"/>	Apply RAC patch	Directive	Apply the RAC/CRS Bundle patch on RAC Homes running of the targets	Normal	Inherit (Stop On Error)
<input type="checkbox"/>	Validate the Patch	Directive	Directive to validate the applied patches.	Normal	Inherit (Stop On Error)

Figure 29: Added directive step "Apply RAC patch" after "Apply CRS Patch" step.

- 9) Save the deployment procedure and 'Run' it. Select the CRS bundle patch to be used to patch in the Software Updates section. Proceed through the interview screens and provide in the required inputs for execution of the procedure.

Consult the patch 'readme.txt' of the patches to understand what steps need to be associated. In the above example as per the 'readme.txt' of the patch the only step, which required to be incorporated was to patch the RAC Homes present in the node. Incase of any extra steps; add those as directive steps to the deployment procedure in the same way as shown in the example above.

13. How can I add a node to my existing RAC cluster using the RAC deployment procedures?

You can add a node to the existing RAC cluster using RAC deployment procedures. Watch the screen watch explaining the usage of the deployment procedure to do this from the link below.

http://download.oracle.com/enterprise_manager/extend_cluster/extend_cluster.html

14. How can I delete my RAC cluster nodes using RAC deployment procedures?

You can select to delete or de-scale few nodes of the Cluster or the entire cluster using the out-of-box deployment procedures Delete / Scale down Oracle Real Application Clusters in a single click step.

Note: Delete /Scale down procedure supports delete node (of entire stack) only when there is only one RAC instance left. In multi instance case, use the Enterprise Manager delete instance functionality to delete one instance after other.

In the example below 1 node of 2 nodes cluster is deleted using the deployment procedure.

- 1) From the Deployment Manager page select the out-of-box procedure Delete /Scale down Oracle Real Application Clusters. The below figure, illustrates the steps in the procedure for deletion of cluster. Click **Run** to run it.

Name	Type	Description
▼ Delete/Scale down Oracle Real Application Clusters		This procedure deletes nodes from Oracle Real Application Clusters in order to scale down the cluster or completely delete the cluster.
▼ Initialization Phase	Parallel	Initializes the runtime and verifies the state of the Clusterware services.
Initialization	Computational	Initializes the runtime. Do not disable or delete this step.
Verification	Directive	Verifies the state of the Clusterware services. Do not disable or delete this step.
▼ Cluster Introspection	Rolling	Executes the cluster introspection utility.
Selected Cluster Introspection	Directive	Step to obtain the locations of shared storage and database files of the selected cluster database.
Load Runtime Cluster Data	Computational	Step to analyse the result of the cluster introspection step and load the results into the run time data.
▼ Delete Configuration	Parallel	Deletes instances from the selected nodes and updates the cluster configuration.
Delete All Instances	Directive	Removes all instances and listeners from all RAC homes on the nodes to be deleted.
Stop ASM Services	Directive	Stops ASM services in the Clusterware for the nodes being deleted.
Stop Listener Services	Directive	Stops listener services in the Clusterware for the nodes being deleted.
▼ Delete Database Homes	Parallel	Deletes database homes from the node(s) being deleted.
Update Inventory	Directive	Updates the central inventory in the nodes being deleted.
De-install Database	Directive	De-installs the RAC Database from the nodes being deleted.
▼ Update Nodelist for Remaining Nodes	Parallel	Updates the nodelist for the remaining nodes on the cluster.
Update Nodelist	Directive	Updates the nodelist on each home on the node.

Figure 30: Delete/Scale Down Oracle Real Application Clusters deployment procedure.

- 2) The whole operation is on a single click. The page shows list of clusters available in the environment are showed up in the “Select RAC Cluster”. From the figure below, the existing cluster RAC 11 is selected. On Selecting the Cluster, the nodes corresponding to the cluster is populated in the ‘Available Nodes’ list. In this example one between the two nodes of the cluster is selected for deletion.

- 3) Provide the credentials for the cluster. By default, the operation is scheduled for immediate execution, edit if required, to change the schedule for a later date and time.
- 4) Click **Review** to review the selection and submit the procedure for execution. Check the progress of the execution from the Procedure Completion Status page.

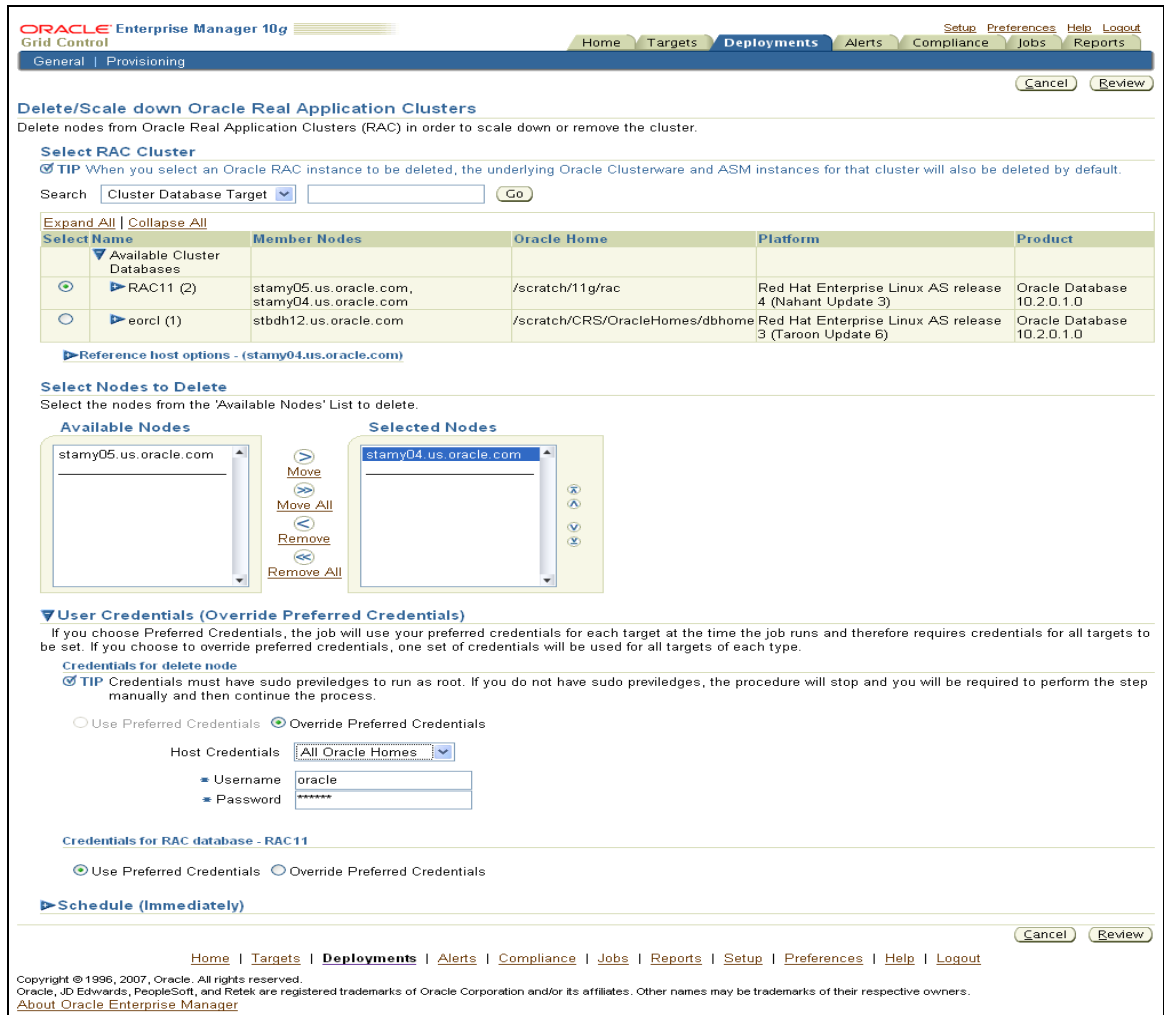


Figure 31: Select the nodes for deletion from the existing clusters.

15. How can I use deployment procedures to deploy a J2EE application on the application server node?

You can use deployment procedures to deploy your custom j2ee application on to a new cluster node by extending the existing AS cluster. The out-of-box deployment procedure for provisioning Application Server has steps, which allow deployment of custom j2ee applications. It

is disabled by default, on enabling and configuring you can deploy the custom application on the new node, which you are provisioning. The following example shows you how to do to customize the deployment procedure and incorporate the application to be deployed on the new extended application server.

- 1) Do a 'Create Like' of the Out-Of-Box "Application Server Provisioning Deployment Procedure 10.1.3" deployment procedure.

Create Like Procedure (Cancel) (Save)

Name:

Description:

Staging Area Path:
Enter the target's complete path to place binaries when running this procedure (e.g., /tmp/oracle).

Sudo Command:
Enter sudo command. If it is not in default path, specify full path (e.g., /usr/local/bin/sudo).

PAM Command:
Enter Pluggable Authentication Module command. If it is not in default path, specify full path (e.g., /usr/bin/pbrun).

Environment Variables for sudo or PAM:
Enter environment variables for sudo or PAM in Perl format. These variables will be inserted across a sudo or PAM session for each step. Example: If you want to set my_var to value 'ABC', then the following line should be added above: \$ENV['my_var'] = "ABC";

Enable Notification:

Procedure Status Notification Job Tag:
The text provided will be prepended to the Notification Job Name (30 characters max.).

Status for which Notification is to be Sent:
Notification will be sent when procedure is in one or selected Status in the list.

Buttons: Enable, Disable, Delete, Insert, Edit Step

Actions: Select All, Select None, Expand All, Collapse All

Select	Name	Type	Description	Run Privilege	Run Privilege Command	Error Handling Mode
<input type="checkbox"/>	▼ Copy of Application Server Deployment 10.1.3		This procedure installs or clones and configures a standard Web and Application tier for a multi-tier application server topology.			Stop On Error
<input type="checkbox"/>	Initialize	Computational	Initializes the runtime. Do not disable or delete this step.			Inherit (Stop On Error)
<input type="checkbox"/>	▼ Verify Application Tier system requirements	Parallel				Inherit (Stop On Error)
<input type="checkbox"/>	Verify Application Tier system requirements	Component	Verifies system requirements for Application Tier	Normal		Inherit (Stop On Error)
<input type="checkbox"/>	Verify and fix Application Tier system requirements	Component	Verifies and fixes system requirements for Application Tier (requires sudo privileges as root)	sudo		Inherit (Stop On Error)

Figure 32: Copy of the Out-Of-Box Application Server Deployment 10.1.3 procedure

- 2) Select the step Deploy Application from the procedure and Enable it.

<input type="checkbox"/>	Register the Application Tier with Oracle Internet Directory (OID) and deploy sample application	Parallel	Registers the Application Tiers with the Oracle Internet Directory (OID) Specified and deploys your application on the Application Tiers			Inherit (Stop On Error)
<input type="checkbox"/>	Register Application Tier with Oracle Internet Directory (OID)	Component	Registers Application Tier with Oracle Internet Directory (OID)	Normal		Inherit (Stop On Error)
<input type="checkbox"/>	Register Application Tier with Oracle Internet Directory (OID)	Manual	Registers Application Tier with Oracle Internet Directory (OID)			
<input checked="" type="checkbox"/>	Deploy Application	Component	Deploys your application on all the Application Tiers	Normal		Inherit (Stop On Error)
<input type="checkbox"/>	Deploy Oracle Web Service Manager(OWSM)	Component	Deploys Oracle Web Service Manager(OWSM) into the Application Tier.	Normal		Inherit (Stop On Error)
<input type="checkbox"/>	Run root scripts	Directive	Run root scripts (requires sudo privileges as root)	sudo		Inherit (Stop On Error)

Figure 33: Enable 'Deploy Application' Step.

3) Select the step and click **Edit**, to incorporate the required application and directive to deploy.

Figure 34: Edit the 'Deploy Application' step

1) Deploy application step is tied up with a sample application ear file. On proceeding to select Component step, you have options to **Retain Selection**, which is of the sample custom application or **Select the New Component**, which would provide options to pick components from the software library. The figure below illustrates you the options seen for the step.

Figure 35: 'Select Component' Step

The custom j2ee application, which is to be deployed “myJ2EEApplication”, is uploaded into the software library as a generic component.

- 2) Select “myJ2EEApplication” component uploaded to the software library.

Edit Component Step: Select Component Cancel Back Step 2 of 5 Next

A component is currently selected based on its location in the Software Library. You can retain this selection, or you can select a new component. Components can be created in the Components page in the Provisioning subtab, under Deployments.

Retain Selection Select New Component

Select Component

Component Name: myj2EEApplication Revision: All Versions
 Subtype: --Any-- File name:
 Maturity: --Any-- Status: --Any--
 Author: Product Name:

Select	Component Name	Type	Revision	Status	Maturity	Product Name	Product Version	Description
<input checked="" type="radio"/>	Components/myj2EEApplication	Component	0.1	Active	Untested	myJ2EEApp1.0		My j2EE Application deployment archive file

Figure 36: ‘Select New Component’ from Software Library

- 3) Proceed to select the directive to associate with the step for deployment of the custom application component. Directive to deploy J2EE applications comes out-of-box, but if you have custom script to carry out the deployment you can choose the same from the stored directives in the software library. For example, to deploy the custom component as shown in the figure below, selecting the option **Retain Selection** uses the directive shipped out-of-box.

Edit Component Step: Select Directive Cancel Back Step 3 of 5 Next

A directive is currently selected based on its location in the Software Library. You can retain this selection, or you can select a new directive. Directives can be created in the Directives page in the Provisioning subtab, under Deployments.

Retain Selection Select New Directive

Current Directive Selected: **Directives/Oracle Directives/myJ2EECompany Provisioning/10.1.3/all_platforms/Deploy Application**

Figure 37: 'Select Directive - Retain Selection to use the out-of-box directive.

- 4) Proceed to next step to Map the properties required by the directive in deploying the component. In the example in figure below, the values for OC4J_ADMIN_USER, APPLICATION NAME, EAR FILE NAME, etc. is set and the ORACLE_HOME value will be picked up from the variable during runtime.

Edit Component Step: Map Properties Cancel

Specify the values for the component and/or directive properties. You can also change the run privilege accordingly.

Run Mode
Run Privilege:

Component Properties
The selected component has no properties to set.

Directive Properties

Property Name	Value	Target Variable
ORACLE_HOME	<Enter Display Name for ORACLE_H...>	Choose Variable
OC4J_ADMIN_USER	<Enter Display Name for OC4J_ADM...>	Set Value
EAR_FILE_NAME	<Enter Display Name for EAR_FILE...>	Set Value
OC4J_APP_INSTANCE_NAME	<Enter Display Name for OC4J_APP...>	Set Value
AGENT_HOME	<Enter Display Name for AGENT_HC...>	Set Value
APPLICATION_NAME	<Enter Display Name for APPLICATI...>	Set Value
APPLICATION_HTTP_PORT	<Enter Display Name for APPLICATI...>	Set Value
VERSION	<Enter Display Name for VERSION>	Choose Variable

Figure 38: Map Properties for the directive

- Proceed to Review step to review the selections and click **Finish** to add the Deploy Application step to the custom deployment procedure.

Edit Component Step: Review Cancel Back Step 5 of 5 Finish

Please review the information below before saving the changes.

Name: **Deploy myJ2EE Application**
 Description: **Deploys your application on all the Application Tiers**
 Type: **Component**
 Error Handling: **Inherit (Stop On Error)**

Details

Selected Component

Component Name	Components/myJ2EEApplication
Description	My J2EE Application deployment archive file
Revision	0.1
Status	Active

Selected Directive

Directive Name: Directives/Oracle Directives/myJ2EECompany Provisioning/10.1.3/all_platforms/Deploy Application

Directive Properties

Property	Display Name	Description	Value
ORACLE_HOME	ORACLE_HOME		\${target.oraHome} (Variable)
OC4J_ADMIN_USER	OC4J_ADMIN_USER		oc4jadmin
EAR_FILE_NAME	EAR_FILE_NAME		myj2eeapp.ear
OC4J_APP_INSTANCE_NAME	OC4J_APP_INSTANCE_NAME		myj2eeapp
AGENT_HOME	AGENT_HOME		%emd_root%
APPLICATION_NAME	APPLICATION_NAME		XYZ Corp Home
APPLICATION_HTTP_PORT	APPLICATION_HTTP_PORT		80
VERSION	VERSION		\${data.apptierProductVersion} (Variable)

Run Mode
Run Privilege: **Normal**

Figure 39: Review and Finish to add the step

- 'Save' the custom deployment procedure and proceed to run it. On running the deployment procedure, it would take through review screens to provide in runtime values required for the run. The following steps illustrate how the 'Application Server Provisioning' deployment procedure will be executed.
- First step in the process is to select the source. The source can be either a reference from an existing cluster or a certified, tested image of the application server in the software library. In the figure below, the source is selected from the existing installations shown up in the drop down list "Select Cluster".

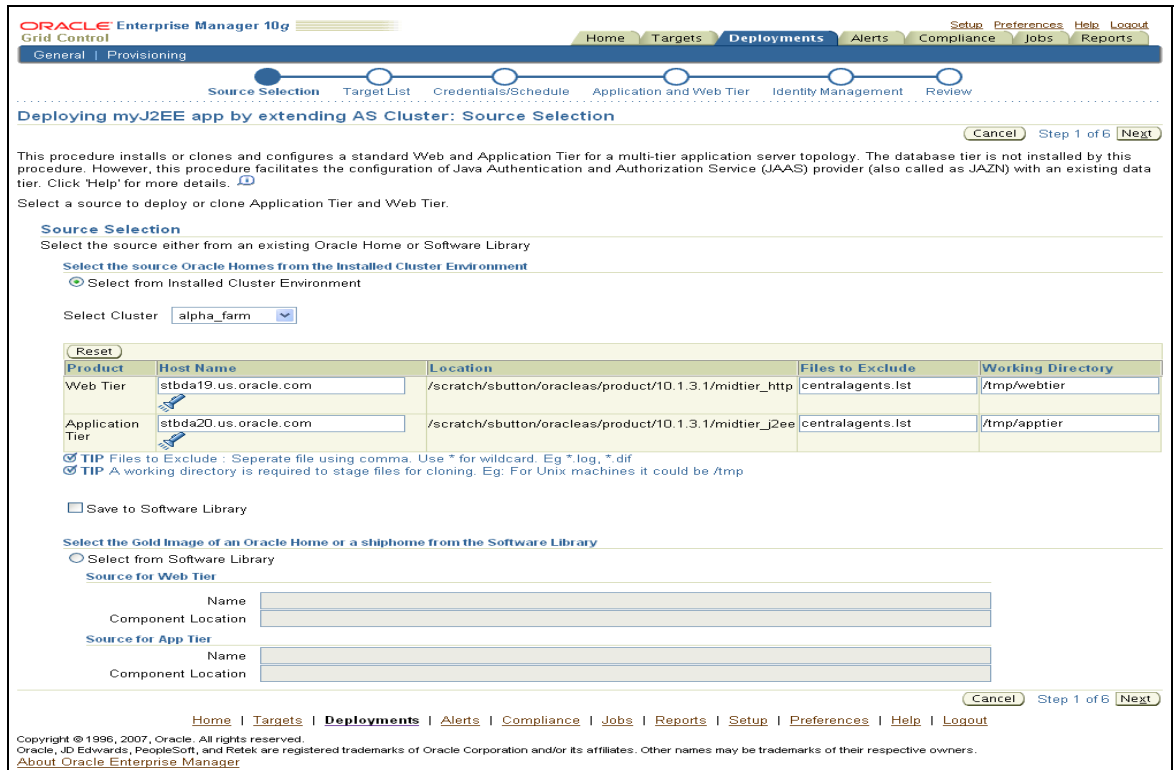


Figure 40: Select Source- Select from existing Cluster Environment.

- 8) Proceed to the next step to select the targets for Web Tier and Application Tiers. In the figure below, the destination targets are searched and selected from the Grid Control for Web Tier Hosts and Application Tier Hosts.

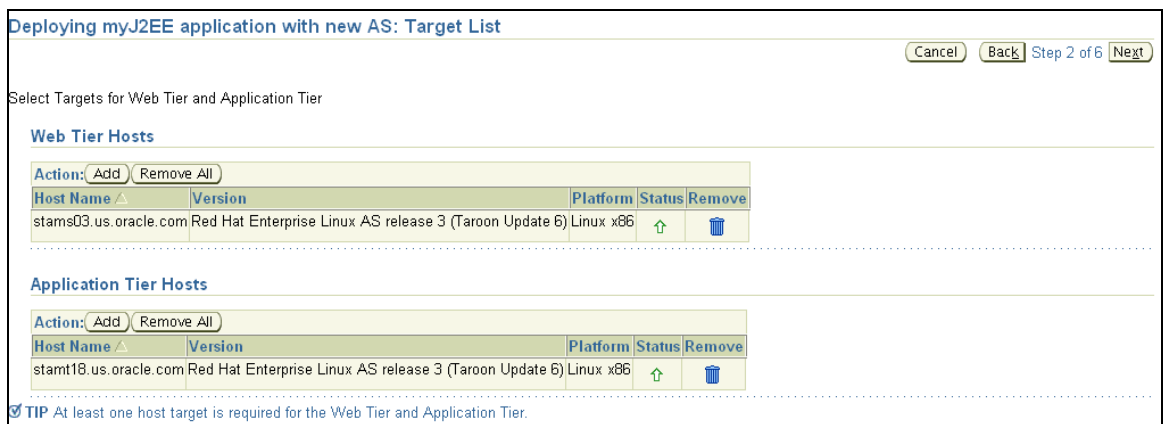


Figure 41: Select Targets for Web Tier and Application Tier

- 9) Provide the credentials for the Target and Source and Schedule the procedure in the next step. In this example, the required credentials are provided and scheduled for immediate deployment.

Deploying myJ2EE app by extending AS Cluster: Credentials/Schedule

Provide credentials and choose a time to schedule this procedure.

Target Host Credentials

Use Preferred Credentials Override Preferred Credentials

Host Credentials: All Hosts

Username: myoracle
Password: *****

Source Oracle Home Credentials

Use Preferred Credentials Override Preferred Credentials

Host Credentials: All Hosts

Username: oracle
Password: *****

TIP Preferred Credentials will be enabled only when the credentials for all the targets are available. You may set the Preferred Credentials by selecting 'Preferences' link in Enterprise Manager.

Schedule

One Time (Immediately) One Time (Later)

Grace Period: Indefinite End After: _____ Hours _____ Minutes

Figure 42: Credentials for Source and Target. Schedule the procedure for execution.

10) Proceed to the next step and provide in other configuration details required for the extension of the existing cluster. In this example, as in the figure below the configuration details like Instance details, Port details, and Load Balancer Details and ID management configuration details are provided.

Deploying myJ2EE app by extending AS Cluster: Application and Web Tier

Specify the configuration parameters for this clone operation.

Cluster Details

Create new Cluster Extend existing cluster

Cluster Name: alpha_farm

Web Tier Install Base Directory: /scratch/sbutton/oracleas/product/10

Application Tier Install Base Directory: /scratch/sbutton/oracleas/product/10

Multicast Address: [Same as Source Oracle Home]

Multicast Port: [Same as Source Oracle Home]

TIP Provide a multicast address and port number that is different from source cluster to create a new cluster.

Cluster Information

- 'Create new Cluster' creates a new cluster using the source Oracle Homes from the 'Source Selection' page
- 'Extend existing cluster' scales up the cluster selected in the 'Source Selection' page with the targets selected in 'Target List' page.

Instance Details

Application Tier Instance Name: midtier_charlieCloned

Web Tier Instance Name: midtier_httpCloned

Source OC4J Admin Password: *****

OC4J Admin Password: *****

Confirm OC4J Admin Password: *****

OC4J Instance Name: home

Instance Information

- All Oracle Application Server 10g instances installed on a host must have unique names. The hostname and domain name of the host are appended to the instance name.
- Each Oracle Application Server 10g instance has its own password, regardless of which user performed the installation. Passwords are not shared across instances, even if the instances were installed by the same user.

Port Details

HTTP Listener: Oracle HTTP Server Port: 7777

Application Server Control: Port: [Same as Source Oracle Home]

Port Information

Specify HTTP Load Balancer Host and Listen Ports to manage HTTP connections made by client applications.

Load Balancer Details

Load Balancer Host Name: slb.oracle.com

Load Balancer User Name: ldbadmin

Load Balancer Password: *****

Virtual Host Name: sdf.oracle.com

Virtual Port: 1156

Identity Management Configuration

Configure Java Authentication and Authorization Service (JAAS) with a LDAP-based provider

None

Same as Source Oracle Home

Note: The Identity Management page will be skipped if you choose 'None'.

Figure 43: Configuration Details required for the extension of the existing cluster.

11) Proceed to review the selection. Submit the procedure and check the progress of the execution from the Procedure Completion Status page.

16. What are examples of customizations that a customer can incorporate in a patching deployment procedure?

Following are three examples how deployment procedures can be customized:

a. Manual step

XYZ Corporation has a process of making sure that users are logged off from their application before the database is shutdown. The DBA checks with key users that they have indeed logged off before proceeding with the Database shutdown. This can be achieved by introducing a manual step before the “Stop Database” step. The procedure would pause on the completion of the manual step. Only when the DBA chooses to continue the procedure would advance. The following screenshot shows how manual step can be inserted into a procedure.

The screenshot shows a web-based configuration interface for creating a new step in a deployment procedure. At the top, a progress bar indicates three steps: 'Create' (the current step, highlighted with a blue circle), 'Enter Instructions', and 'Review'. Below the progress bar, the 'Create' section is active. The form contains the following fields:

- Select:** A dropdown menu set to 'Step'.
- * Name:** A text input field containing 'Logout confirmation'.
- Description:** A text area containing 'Confirm with users that they are logged off'.
- Insert Location:** A dropdown menu set to 'Before "Stop Database"'. A small note below it reads: 'This new step will be inserted before and at the same level as the selected step.'
- Type:** A dropdown menu set to 'Manual'.

In the top right corner of the form, there is a 'Cancel' button, a 'Step 1 of 3' indicator, and a 'Next' button.

Figure 44: Inserting a manual step to confirm users are logged-off

b. Application service shutdown and startup handling

Deployment procedures can be used to perform operations that are outside the scope of out-of-box procedures. Examples include stopping and starting an ERP application or registering a newly provisioned service with the load balancer. Each of these steps can run in the context of any valid operating system user and can make use of Pluggable Authentication Module like “pbrun” (Powerbroker). They can also run in super user mode using “sudo” (see drop down for “Run Privilege” in figure below).

In the following example, the deployment procedure shuts down the Oracle Internet Directory (OID) service before patching the underlying database and starts it up (not shown) after the patching. The OID shutdown step has been placed in a phase for ORACLE_HOMES

containing OID that is again placed under a phase for hosts that have such ORACLE_HOMES.

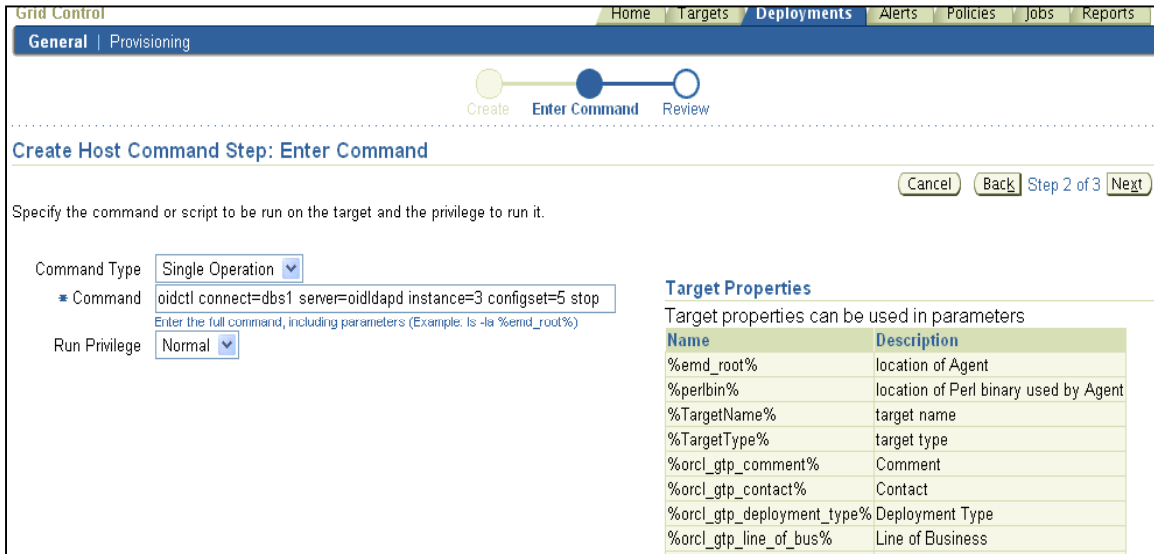


Figure 45: Phase to shutdown application services e.g. OID

Select Name	Type	Description	Error Handling Mode
<input type="checkbox"/> Copy of XYZ Corp's CPU patching procedure		Procedure for applying CPUs to databases	Skip Target
<input type="checkbox"/> Initialize	Computational	Initializes the runtime. Do not disable or delete this step.	Inherit (Skip Target)
<input type="checkbox"/> Application shutdown for hosts	Parallel	Shuts down application services	Inherit (Skip Target)
<input type="checkbox"/> Inside Homes	Rolling	Loops over Homes	Inherit (Skip Target)
<input type="checkbox"/> OID shutdown	Host Command	Shuts down OID services	Inherit (Skip Target)
<input type="checkbox"/> For all hosts	Parallel	Iterates over a list of hosts.	Inherit (Skip Target)
<input type="checkbox"/> For all homes	Rolling	Iterates over a list of Oracle Homes.	Inherit (Skip Target)
<input type="checkbox"/> OHPreProcess	Computational	Initializes each Oracle Home. Do not disable or delete this step.	Inherit (Skip Target)
<input type="checkbox"/> Stage Patches	Job	Stages selected patches into Oracle Homes.	Inherit (Skip Target)
<input type="checkbox"/> Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.	Inherit (Skip Target)
<input type="checkbox"/> Apply Patches	Directive	Applies staged patches in Oracle Homes.	Inherit (Skip Target)
<input type="checkbox"/> Start Database	Directive	Starts Oracle Database instances in an Oracle Home.	Inherit (Skip Target)

Figure 46: Host command-based step to stop OID service

c. Send notifications for the Deployment procedure run

Deployment procedures are tied up with the EM notification systems. This enables you to be notified about the status of the procedure run. Deployment procedures utilize the standard “PAF Status Notification” Rule to send out notifications. The pre-requisite is to set the methods of notifications and their setup (like SMTP server for emails) in Enterprise Manager. Also the standard rule can be customized to extend notifications to specific procedure runs and various methods of notification based on the requirement.

The steps below illustrate with examples to enable notifications and get notified on the list of status for deployment procedures. This involves enabling of Notifications in the required Deployment procedures and by configuring the Notification rule for specific jobs and methods of notification.

Customizing the Deployment Procedures for enabling Notifications:

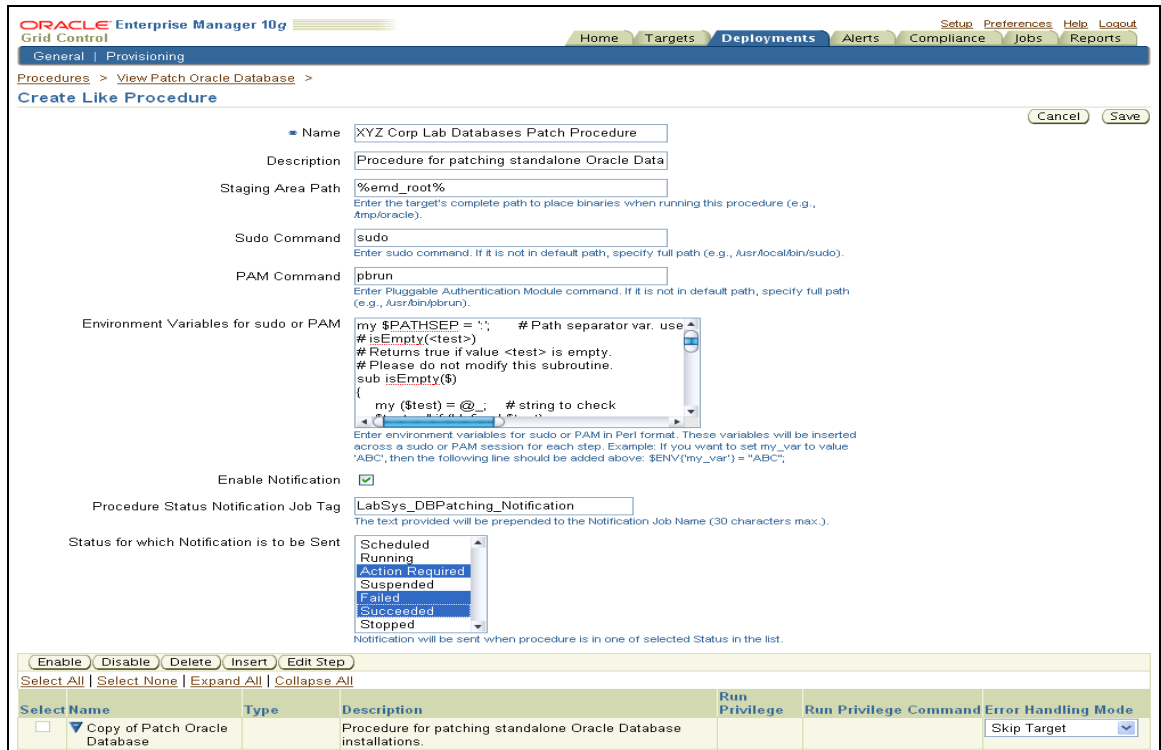


Figure 47: Enable Notification for Deployment Procedures.

- 1) To enable the notification, do a 'create like' the out-of-box deployment procedure. The above figure illustrates the 'XYZ Corp Lab Database Patch Procedure', which is copy of the out-of-box - "Patch Oracle Database" deployment procedure.
- 2) Select the check box **Enable Notification**. Provide a name for the Procedure Status Notifications Job Tag; this is to create notification rules specific to a deployment procedure. Also the job name can be associated to create a rule specific to this procedure and set notification methods as required. The figure above illustrates the Job tag specified as "LabSys_DBPatching_Notification", which is unique to the deployment procedure used to patch lab systems at XYZ Corp.

- 3) Select the different status from the **Status for which Notification is to be Sent** list provided. These are the statuses for which you would want to be notified for this particular Deployment procedure. In the example referred in the figure above, the status ‘Action Required, Failed and Succeeded’ is selected to receive the notifications for.

Configuring of Notification Rules:

The Provisioning Framework uses the out-of-box generic “PAF Status Notification” rule to send notifications for the status of the procedure run. The standard rule can simply be subscribed to send the basic Email notifications. To access the Notification rules, Click the **Preferences** link and Select the **Rules** link under the Notification section of the gun handle options in the Preferences page. The figure below shows how to enable Subscribe options for the ‘PAF Status Notification’ rule to send Emails. Click on **Apply** after subscribing.

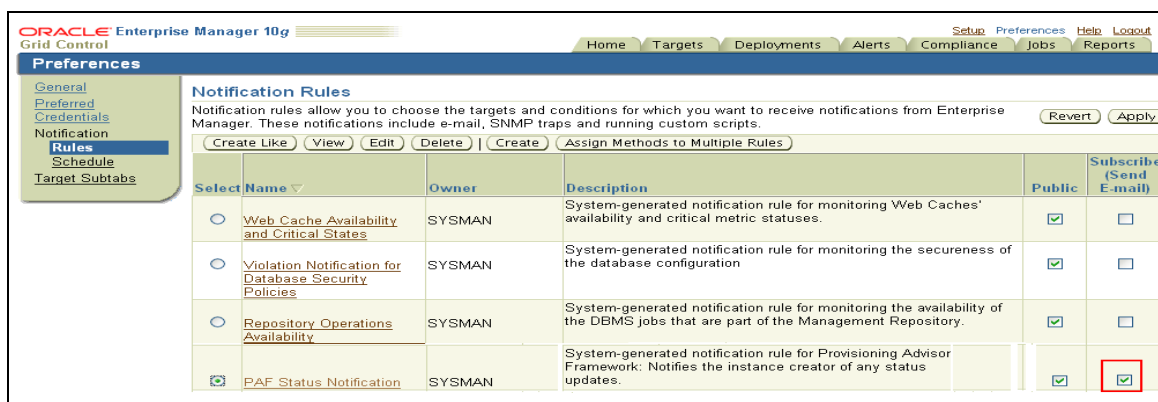


Figure 48:Subscribe to Emails for the Standard 'PAF Status Notification' Rule.

Advanced users can customize the standard “PAF Status Notification” rule to receive notifications in required ways for specific deployment procedures. For example, you might want to be notified by email for a test system procedure, but for a production run would want to be well informed on the status through SMS Alerts and so on. To incorporate specific requirements and enable different methods of notification, it requires editing the standard out-of-box notification rule and editing the job with the specific name and associating specific Method of notification from the pre-defined notification methods. The steps below illustrates this:

- 12) Do a ‘Create Like’ of the Standard ‘PAF Status Notification’ Rule. Provide a Name, for example based on the procedure you are configuring this for like ‘Lab system databases patching procedure notification’ rule. The figure below illustrates this.

Create Notification Rule [Cancel] [OK]

General Availability Metrics Policies Jobs Methods

Name: Lab system Databases Patching Procedure Notification

Description: Customized notification rule for notifications from the Patching procedure for Oracle Databases in XYZ Corp's Lab. Notifies the instance creator of any status updates of the procedure run

Make Public
Allow other administrators to subscribe to this rule.

Target Type: Host

Apply rule to all Host targets
 Apply rule to specified Host targets or groups containing Host targets

General Availability Metrics Policies Jobs Methods

[Cancel] [OK]

Figure 49: "Create Like" of Standard PAF Notification Rule and incorporating changes.

- 13) Select the 'Jobs' sub tab and edit the Job to associate the job name (LabSys_DBPatching_Notification) with this new notification rule. Provide the name as the job nametag used in during the customization of the deployment procedure for which notifications is enabled.

Create Notification Rule [Cancel] [OK]

General Availability Metrics Policies Jobs Methods

Add specific jobs (existing jobs) or jobs by criteria.

[Remove] | Add Jobs by Criteria [Go]

Select All | Select None

Select	Job Name	Job Type	Job Owner	Job Status	Edit
<input checked="" type="checkbox"/>	%PAFNOTIFICATION%	PAF Notification Job	All Owners	Started	[Edit]

Figure 50: Edit the Job of the new PAF Status Notification Rule

Create Notification Rule >

Edit Job by Criteria [Cancel] [Continue]

Specify job criteria and their status for which you would like to receive notifications. You can use "%" as wildcards.

Jobs

Job Name: %LabSys_DBPatching_Notification%

Job Type: PAF Notification Job

Job Owner: All Owners

Job Status

Select the status for which you would like to receive notification.

Scheduled Started Suspended Succeeded Problem

[Cancel] [Continue]

Figure 51: Associate the job name of the Custom Deployment Procedure

14) Select the “Methods” sub tab. set the required Notification Method for the new rule. Can choose the basic **Send Email** Option or pick from various Advanced Notification Method available or incorporated by you. The figure below shows the notification methods, which have been created and available with the Enterprise Manger Grid Control.

The screenshot shows the 'Create Notification Rule' dialog box with the 'Methods' tab selected. Under 'E-mail Notification', the 'Send Me E-mail' checkbox is checked. Below this is a table of 'Advanced Notification Methods' with columns for Name, Type, Description, and Assign Method to Rule.

Name	Type	Description	Assign Method to Rule
Remedy_DefaultCategory_LowPriority.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Remedy_DefaultCategory_LowPriority_AutoClose.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Remedy_DefaultCategory_MediumPriority.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Remedy_DefaultCategory_MediumPriority_AutoClose.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Remedy_DefaultCategory_HighPriority_AutoClose.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Remedy_DefaultCategory_UrgentPriority_AutoClose.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
_oc4j_stapp04NotifyDevice	Java Callback	System generated notification device for data exchange hub oc4j_stapp04	<input type="checkbox"/>
Remedy_DefaultCategory_UrgentPriority.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
_stapp04_oc4jNotifyDevice	Java Callback	System generated notification device for data exchange hub stapp04_oc4j	<input type="checkbox"/>
Remedy_DefaultCategory_HighPriority.xml	Java Callback	This notification method is used by the TTConnector	<input type="checkbox"/>
Default Remedy Helpdesk Ticket	OS Command	Creates a ticket using the default Remedy Helpdesk ticket template	<input type="checkbox"/>

Figure 52: Set Notification Methods -Basic Email Notification and Advanced Notification Methods.

Save the new rule, this completes the process of enabling notifications and configuring rule for a specific Deployment procedure.

On executing the deployment procedure, based on the status selected under “Send Notification For Status” list the users registered with the OMS will receive notifications on various notification methods deployed.

Note: The Notification would be sent to all registered email address under the EM user account. If you want this only to a specific group or individual (for example, to the DBA group or DBA who is patching), you need to create a shared EM user or a separate EM account for the DBA and register the specific email address to Notification setup by logging into EM with the specific EM user credentials.

17. How can the out-of-box Directives be customized? If so how to do it?

Out-of-Box directive can be customized by making a copy of the Perl script associated and create it into a new directive. The use case in the following example outlines the usage.

Example for this case is: Supporting Multiple Inventory case.

Use case: I have multiple inventories in my environment. Say one for each Oracle Home. So, while patching the databases (single or a group), the inventory location file is specified.

To support the use case, the Out-of-Box (OOB) deployment procedures – Apply Patch steps needs to be edited to take up the extra parameter (invPtrLoc), which OOB results to default value.

Create the new customized directive from the OOB Directive

Step 1: Select the OOB Oracle Directive from the Software Library.
 Software Library: Deployments > Provisioning > Directives > Oracle Directives > Patching > Common > All > Generic > ‘Apply Patch’ Directive.

Oracle Directives	Version	Ready	Tested	Production	Prerequisites	Description
Apply Patch	0.4	Ready	Untested			TestDirective description
Apply Patch 10203	0.1	Ready	Untested			Apply Patch for 10203
Apply Patch Without Logging	0.3	Ready	Untested			TestDirective description
Custom Prereq Checks	0.8	Ready	Untested			TestDirective description
Custom Shutdown DB	0.8	Ready	Untested			TestDirective description
Custom Validation Patch	0.8	Ready	Untested			TestDirective description
NApply Apply Patch	0.1	Ready	Untested			TestDirective description
PA_Apply_Post_SQL	0.7	Ready	Untested			TestDirective description
PA_Apply_SQL	0.7	Ready	Untested			TestDirective description
PA_Blackout	0.3	Ready	Untested			TestDirective description
Run_root_postsript_for_patchsets	0.4	Ready	Untested			TestDirective description
Run_the_Prereqs	0.3	Ready	Production	Oracle Database	10.2.0.3	Executes the Patch applicability prerequisite checks
Start SQL Apply	0.3	Ready	Untested			TestDirective description
Stop SQL Apply	0.3	Ready	Untested			TestDirective description

Figure 53: OOB Directive: Apply Patch in the Software Library

Step 2: Select the directive and click Edit and take a copy of the Perl script. (Open and Copy the Perl code to the local editor and save it locally.)

Best practice while doing customization is to create a ‘Custom Directives’ directory to segregate and store the custom directives. Use the **Create Folder** option to create the folder.



Figure 54: Best Practice: Create 'Custom Directives' to aggregate custom scripts

Step 3: Select the directory and click **Create Directive**.

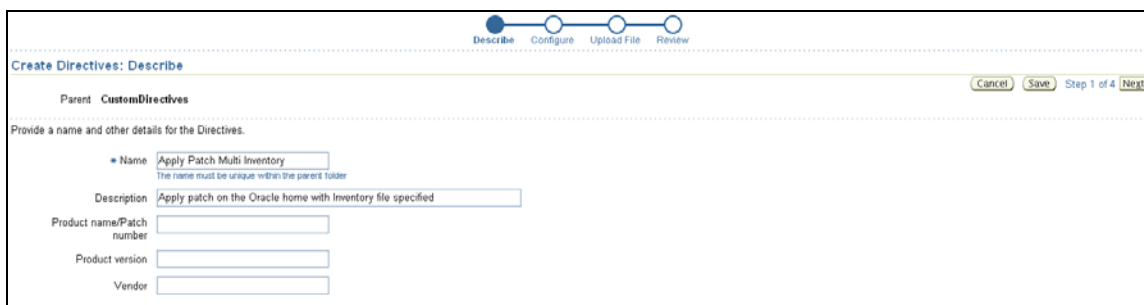


Figure 13: Create Directive 'Apply Patch Multiple Inventory'

Step 4: Click **Add** to add the Arguments required for the ‘Apply Patch Multiple Inventory’ script.

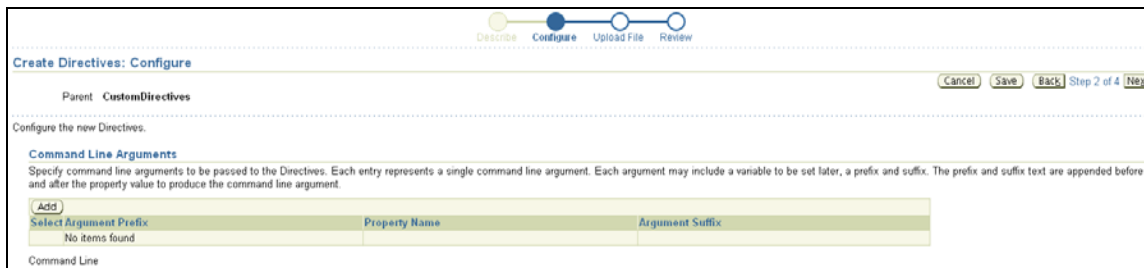


Figure 14: Add Command Line Arguments for the script.

Make sure you enter a space character after the ‘Argument Prefix’ for example “-invPtrLoc”

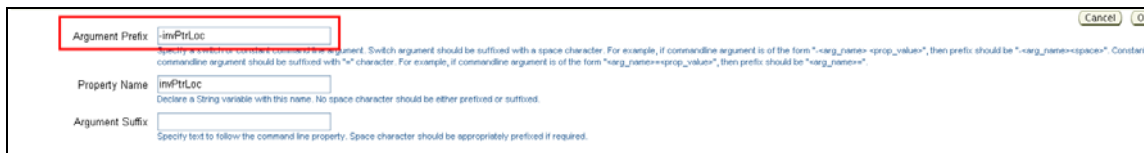


Figure 15: Add the Argument Prefix followed by a space

Repeat 'Add' action to add all the 5 Command line Arguments as seen in the figure below. Set the Shell Type to 'Perl', since using a Perl script.

Note: If you have any other script other than Perl or Bash like 'bat' set Shell Type to 'Defined in Script'.

Progress: Describe, Configure, Upload File, Review

Create Directives: Configure

Parent CustomDirectives [Cancel] [Save] [Back] Step 2 of 4 [Next]

Configure the new Directives.

Command Line Arguments
Specify command line arguments to be passed to the Directives. Each entry represents a single command line argument. Each argument may include a variable to be set later, a prefix and suffix. The prefix and suffix text are appended before and after the property value to produce the command line argument.

[Edit] [Remove] [Add]

Select Argument Prefix	Property Name	Argument Suffix
<input type="radio"/> -oh	oracle_home	
<input type="radio"/> -patchid	patch_ids	
<input type="radio"/> -stageDir	stage_dir	
<input type="radio"/> -patchsetRelease	patchsetRelease	
<input checked="" type="radio"/> -invPtrLoc	invPtrLoc	

Command Line -oh \${oracle_home} -patchid \${patch_ids} -stageDir \${stage_dir} -patchsetRelease \${patchsetRelease} -invPtrLoc \${invPtrLoc}

Configuration Properties

Shell Type: Perl [v] [Run Privileged]

Figure 16: Command Line Argument for the Apply Patch directive

Step 5: Click **Next** and Upload the Perl script from the local system.

Progress: Describe, Configure, Upload File, Review

Create Directives: Upload File

Parent CustomDirectives [Cancel] [Save] [Back] Step 3 of 4 [Next]

Upload a file that has the content for the new Directives.

Currently associated File: None

Upload Later
 Upload from Agent Machine
 Upload from Local Machine

File name: C:\OFFICIAL\DP\Custom [Browse...]

Use this option only for uploading files of small size (~1 MB)

Figure 17: Upload from Local Machine - Upload the script to the Directive

Create Directives: Review

Parent CustomDirectives

Cancel Save Back Step 4 of 4 Finish

Review the configuration for the Directives. If there is a job associated with this Directives, then clicking on the Finish button will save the Directives and also trigger off the job, while the Save button will only save the Directives. If no job is associated with this Directives, then both the buttons behave the same way.

Describe

Name **Apply Patch Multi Inventory**

Description **Apply patch on the Oracle home with Inventory file specified**

Status

Maturity **Untested**

Product name/Patch number

Product version

Vendor

Last Modified

Last Modified By

Configure

Command Line `-oracle_home ${oracle_home} -patch_ids ${patch_ids} -stage_dir ${stage_dir} -command_name ${command_name} -patchsetRelease ${patchsetRelease} -invPrtLoc ${invPrtLoc}`

Shell Type **Perl**

Run Privileged

Upload File

File name **pa_patch_oraclehome_multiple_inv.pl**

Figure 18: Complete Review and Click Finish to add the new Directive

Step 6: Click **Next** and review the selection in the Review page.

Step 7: Click **Finish** and add the new directive to the Software Library.
Modify the 'Apply Patch' of the procedure to map to the new directive:

Step 1: Select the Deployment procedure 'Patch Oracle Database', click **Create Like** and edit the 'Apply Patches' to associate with the new directive created.

Edit

Cancel Step 1 of 4 Next

Edit the general information of the step or phase.

Select Step

Name

Description

Type Library: Directive

Error Handling

Figure 19: Edit the 'Apply Patches' step of the Procedure

Step 2: In Select Directive page, choose **Select New Directive** and pick the new directive created. Make sure you select the **Always Use Latest Revision** check box to associate the step to the latest directive.



Figure 620: Check 'Select New Directive' to pick the newly created directive.

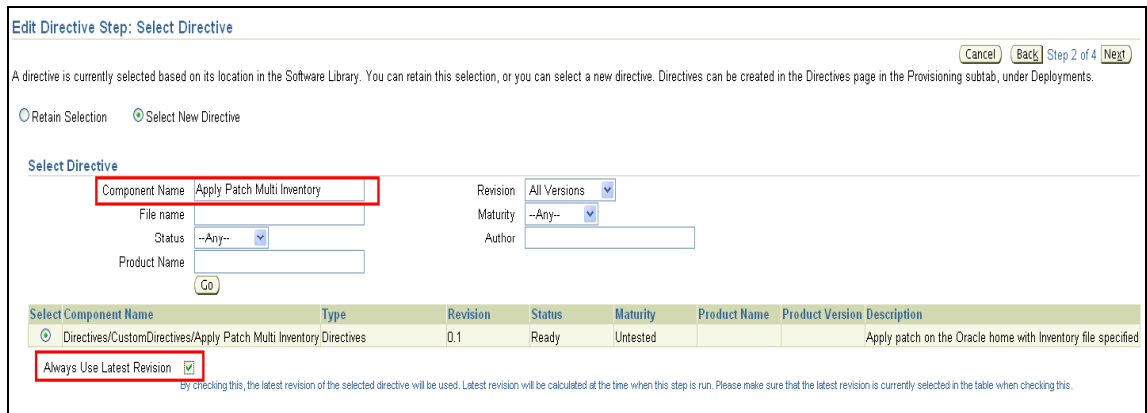


Figure 21: Select the new directive and check 'Always Use Latest Review'.

Step 3: Click **Next** and Map the properties for the arguments as seen in the figure below.

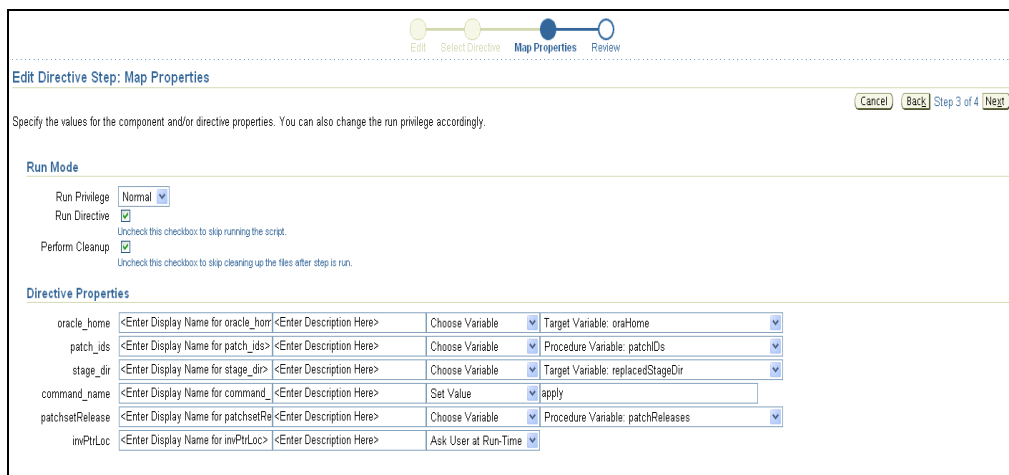


Figure 22: Map the properties for the Directive Arguments.

Note: If your inventory pointer location is a standard location for your environment across targets, you can map that property to **Set Value** and to the location in your environment. If it is not a common one and you would want to specify during the inventory based on the target groups. Make the property selection dynamic by setting it to 'Ask User at Run Time' as seen in the figure above.

Step 4: Click **Next**, review the selection and click **Finish** to complete editing the step.

Step 5: Save the Procedure with a unique name (say Patch Oracle Database with Multiple Inventory). Select and click **Schedule Deployment**.

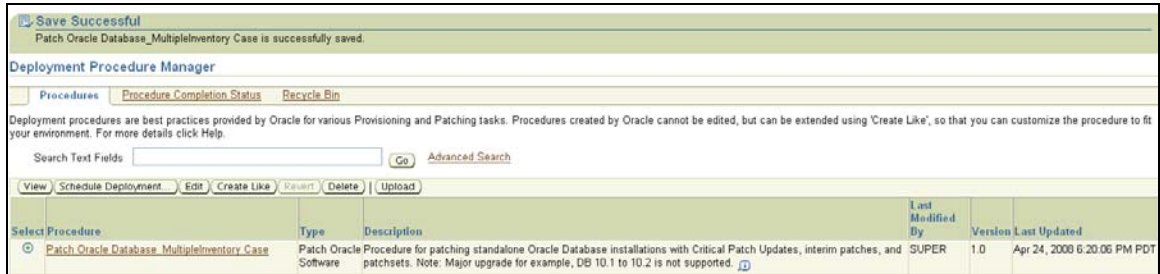


Figure 23: Save the procedure and use for the Patching Databases with non-default inventory.

During the interview:

Specify the Inventory Pointer location in the Library Step Properties page during the interview. Click through and submit the procedure for execution and monitor the status of execution from the Procedure Completion Status page.

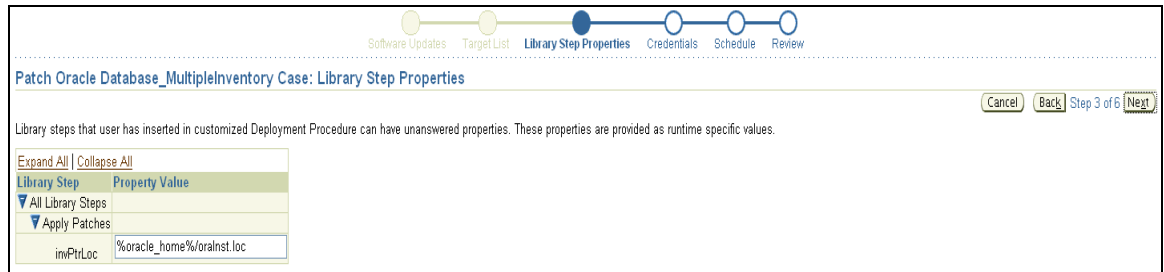


Figure 24: Specify the Inventory Pointer location for the targets chosen.

Note: RAC Procedures support: The same can be applied to the RAC Procedures and the same Apply Patch directive created can be used. So for using in RAC Case, make a create like of the RAC Procedure, and edit the ‘Apply Patches’ step to uptake the new directive.

18. Can Deployment Procedures be executed using a Pluggable Authentication Module (PAM) and sudo?

Yes. Deployment Procedures allow execution in sudo and other PAM contexts. The sudo and the PAM command to be used throughout the procedure can be specified while editing the procedure (see figure 58). The individual directive steps can be chosen to run in normal mode, privileged mode (which requires sudo setup at the target for superuser execution for the command) or as a different user than the preferred credentials. (If its EM 10.2.0.3, apply the one-off patch (5890474) on the OMS Oracle Home).

The **use case** is described below in *italics*:

The various actors (Operating System users on the target box) involved are:

- 1. Oracle: This is the Database Home owner. This is a locked account.*
- 2. emd: This is the Agent Home owner.*
- 3. foo: This is the user who is performing the patching operation.*

These are just examples. The user names in actual environments may vary.

Requirements for the various users are as follows:

- 1. All the three users oracle, emd and foo belong to the same group, which is the OS DBA group.*
- 2. User foo can sudo to user oracle using foo's password.*
- 3. In the 'sudoers' file of the Target, foo should have access to "<AgentHome>/perl/bin/perl"*

The goal is to patch the Database Home using foo's credentials.

Design Time experience (one time):

This process needs to be done just once to customize the Deployment Procedure.

- 1. User selects the Oracle shipped Patch Oracle Database Deployment Procedure and does a Create Like for that Deployment Procedure and gives it some name.*
- 2. User selects run-as sudo for all steps in the edited Deployment Procedure.*
- 3. User selects the sudo command to be run. In this example it may be "sudo -u oracle"*
- 4. User gives the staging location for the directives in "Staging Area Path". The default is %oracle_spool%/EMStagedPatches/Others. Example: It could be %emd_root%/EMStagedPatches/Others. This directory needs to have 770 permissions. This could also be any other directory, which can be written onto by user "oracle".*
- 5. User saves the modified Deployment Procedure (Patch Oracle Database with sudo).*

Run Time experience (every time):

This process needs to be done for every run of the Deployment Procedure

User selects the modified patching Deployment Procedure (Patch Oracle Database with sudo) and runs it.

- 1. User selects the Database Updates to be patched.*
- 2. User provides the location for staging the patch. The default for this is: User gives the PA Staged location as: %oracle_spool%/EMStagedPatches/Others. Example: It could be %emd_root%/EMStagedPatches/Others. This directory needs to have 770 permissions and it should exist before the DP is run. This could also be any other directory, which can be written onto by user "oracle".*
- 3. Now user gives foo's credentials (Patching User credentials)*
- 4. Schedule and submit the job.*

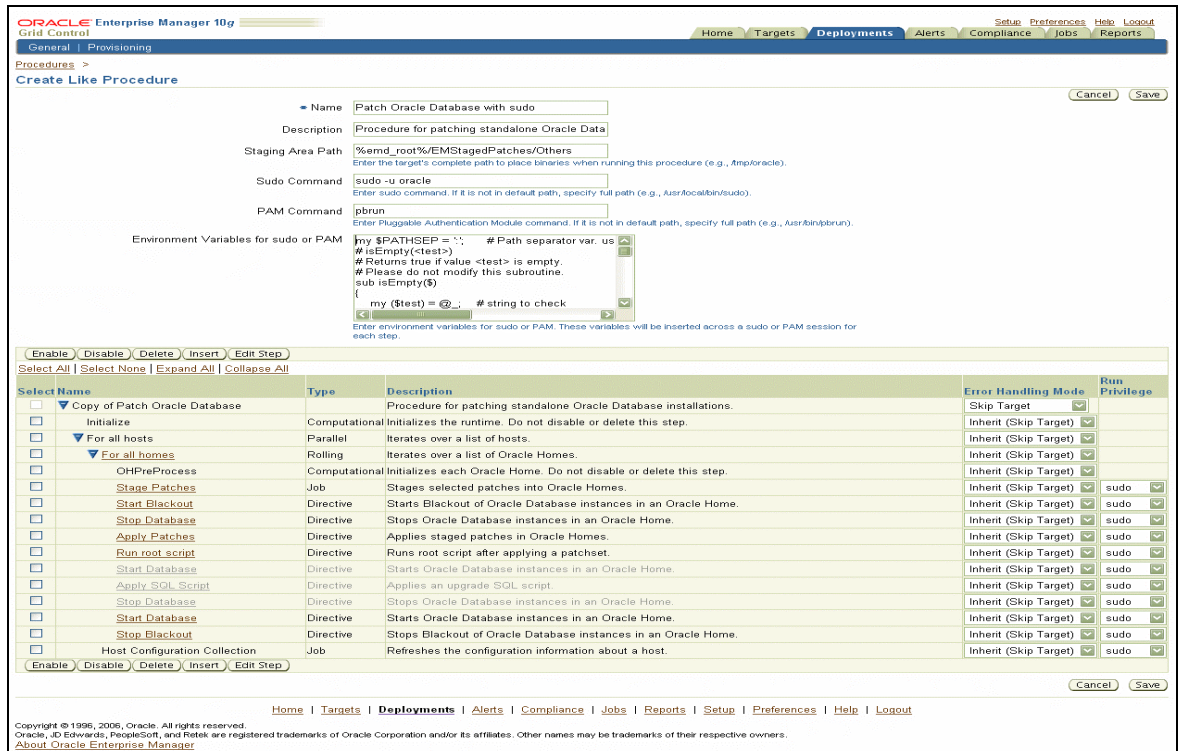


Figure 67: Screenshot for modifying a Deployment Procedure for sudo

19. How can we back-up the deployment procedures? Or transfer them from one Grid Control environment to another?

In version 10.2.0.3 there is an out-of-box PAR Deploy utility to export deployment procedures created by a user and distribute them across various Oracle Enterprise Manager deployments.

Provisioning Archive files can contain deployment procedures and/or components and directives from Software Library. If you have created a custom deployment procedure, which you would want to export to another home, you would require creating a PAR file containing the procedure and exporting it from the OMS. The same file can be imported or deployed on another OMS either from the UI or through the command line.

Refer to Section 10.4.2 – Importing or Exporting Deployment Procedures under “Enterprise Manager Advanced Configuration” from the library list at

http://download-west.oracle.com/docs/cd/B16240_01/doc/nav/portal_booklist.htm

20. What are the out-of-box variables exposed with deployment procedures?

Enterprise Manager exposes several variables that can be used with Deployment Procedures. These variables can be used by our customers to customize their specific tasks like startup, shutdown, etc using their own directives.

Database specific:

oraHome - directory of the ORACLE_HOME
instances - selected database targets from the ORACLE_HOME
all_instances_home- all database targets running from the ORACLE_HOME
dbSIDs - all sids from the ORACLE_HOME
dbListeners - all listeners from the ORACLE_HOME
runRootScript - yes/no indicating if rootscript needs to be run

Automated Storage Management specific:

asmTargetHome – selected ASM target ORACLE_HOME
asmInstanceName – ASM instance running from the ORACLE_HOME
asminstances – ASM instances running from the ORACLE_HOME

Real Application Cluster specific:

racLocalInstnaceNames :
All local RAC Database instances running out of the ORACLE_HOME
racLocalInstanceTgtNames :
All local RAC Database Target names running out of the ORACLE_HOME
RacLocalInstnaceHomes :
All ORACLE_HOMES running the RAC database instances locally.
racLocalInstanceSids : SIDs of the local RAC instances running in the ORACLE_HOME

Clusterware specific:

nodeName : Name of CRS node on which the RAC instance being patched is running.
crsName : Name of the Cluster.

Application Server specific:

oracleSid : Value of SID that may be present in an AS ORACLE_HOME

Global:

isPatchset - yes/no of if patchset is being applied to the ORACLE_HOME
replacedStageDir: The absolute staging location of patches
patchIDs: List of patch ids selected
patchSrcs: Indicating whether the patches came from *Metalink* or software lib
patchData :Uniform resource Names (URNs) of the patches
patchReleases : Corresponding release of the patches.

targetVersion : Version of the target being patched.

Note: stageDir - the staging directory to use provided like %oracle_home% (Use replacedStageDir)

21. Is there a CLI runtime for Deployment Procedures?

Yes, the Deployment Procedures can be run from Command Line Interface. The basic CLI verb 'emcli submit_procedure' is enhanced with the scripts, which can be utilized to run deployment procedures. This supports command line execution of the deployment procedures out-of-box and customized deployment procedure with option to schedule, scale and customize the run time values dynamically.

Make sure the pre-requisite patch – 5890474 is applied to the OMS 10.2.0.3 and pick the latest EMCLI executables and templates from the OMS Home.

For further details refer to Section 10: Using EMCLI to execute deployment procedures under “Enterprise Manager Advanced Configuration” guide from the library list at http://download-west.oracle.com/docs/cd/B16240_01/doc/nav/portal_booklist.htm

22. Which log files are to be looked for in case of any errors while executing the deployment procedures? Can these be associated with the SR's?

The Deployment procedure logs in OMS Home and the Agent Home of the Target.

OMS Side logs:

Generic EM trace file - \$OMS_ORACLE_HOME/sysman/log/emoms.trc

PAF logs - \$OMS_ORACLE_HOME/sysman/log/pafLogs/

For specific DP instance there exists a log inside:

\$OMS_ORACLE_HOME/sysman/log/pafLogs/<name>_<instance_guid>.log

Agent Side Logs:

\$Agent_ORACLE_HOME/sysma/logs/emagent.nohup

\$Agent_ORACLE_HOME/sysma/logs/emagent.trc

Advanced Options:

Optionally, to capture more details you can make the logging finer. Follow the steps below to re-set the log level and capture the logs mentioned above. (Note: Its advised to archive the old logs and have a fresh run after resetting the log level to capture the fresh logs.)

In the OMS Side:

“\$ORACLE_HOME/sysman/config/emomslogging.properties”file

@ log4j.rootCategory=...

Replace the value of the above parameter to ‘DEBUG’.

Bounce the OMS for the changes to take effect:

OMS Home/bin/emctl stop oms

OMS Home/bin/emctl start oms

In the Agent side of the Target:

AGENT_HOME/sysman/config/emd.properties

tracelevel.Dispatcherr=DEBUG (Writes to emagent.nohup)

tracelevel.command=DEBUG (Writes to emagent.trc)

Re-load the agent: \$Agent_ORACLE_HOME/bin/emctl reload agent

The settings above are to be set only when you want to extra details and when the logs don't have sufficient information to debug the issue. Make sure to set the debug level back to the original levels after reproducing the issue.

While reporting issues with deployment procedures, associate the tar/zip of the logs from both the above locations with the SR.

23. Can I solve conflicts while applying NApply patches using Deployment Procedures? If so, how?

The standard patching Deployment Procedures intelligently identify if a given patch is a normal patch or napply and calls the corresponding command to apply the patch. (Either apply/napply).

The procedures by default trigger napply with OPatch option: skip_subset. (Skips the molecules from applying if it is a subset of any patch in the OH)

The OPatch also has other options like:

skip_duplicate: Skip the molecules while applying, which are duplicates of that in the Oracle Home.

skip_conflict: Skip the molecules while applying, which are conflicting with any patches in the Oracle Home.

skip_missing_components: Skip the molecules while applying, which have some dependant components, which are missing, in the patch or in the Oracle Home.

In case of conflicts during applying a patch, the application of the patch will fail and the logs would explain the reason behind the failure. In that case, one could use any or all of the above OPatch options to successfully execute the patch application through the procedures.

(This can be adopted by default but watch out for the logs of the Apply Patch step).

All the above options are already available as a part of the Perl directive code, which is commented out by default. Uncomment the lines to be used as a part of the procedure. The procedure to skip the errors/conflicts during patching and apply the rest of the molecules/patches is described below:

The directive “Apply Patch 10203” has to be edited to enable this. Do the following:

a. Go to “Deployments->Provisioning->Directives”

b. Select

Directives/OracleDirectives/Patching/Common/All/Generic/ApplyPatch and click **Edit**

c. Go to Upload File section.

d. Download the file “pa_patch_oraclehome.pl” from here.

e. Edit it as given below and upload it back by selecting **Upload from Local Machine**.

The changes to be done to the directive are:

Go to line 1370 and removes the comment and put the comment to 1371.

Similarly remove the comment on line 1397 and put it on 1398.

1370,1371 – Before

```
#. " $skip_conflict $skip_missing_comp $skip_subset 2>&1");  
. " $skip_subset 2>&1");
```

1370,1371 – After

```
. " $skip_conflict $skip_missing_comp $skip_subset 2>&1");  
#. " $skip_subset 2>&1");
```

The existing flow for applying CPUs is illustrated in the following screenwatch:

http://download.oracle.com/enterprise_manager/10203_CPU_Patching/10203_CPU_Patching.html

24. Can I provision Single Instance Databases using deployment procedures? If so, how?

One can provision Databases from either a reference Installation or from a gold image in the Software library. This can be done through the procedure “Oracle Database Provisioning” under the page ‘Provisioning Procedures’ from ‘Deployments’

The example below shows the steps to provision Databases using the ‘Oracle Database Provisioning’ procedure.

- 1) Select the procedure “Oracle Database Provisioning” from the Deployment Procedures page under Deployments tab. (See figure below).

ORACLE Enterprise Manager 10g
Grid Control

Home Targets **Deployments** Alerts Compliance Jobs Reports

General | Provisioning

Deployment Procedure Manager

Procedures Procedure Completion Status Recycle Bin

Deployment procedures are best practices provided by Oracle for various Provisioning and Patching tasks. Procedures created by Oracle cannot be edited, but can be extended using 'Create Like', so that you can customize the procedure to fit your environment. For more details click Help.

Search Text Fields [Advanced Search](#)

Select	Procedure	Type	Description	Last Modified By	Version	Last Updated
<input checked="" type="radio"/>	Oracle Database Provisioning	Database Provisioning	This procedure installs or clones a single instance database home and configures a database on the selected hosts. It follows the best practices specified by the Oracle Database Installation Guide. D	Oracle	3.45	Apr 25, 2007 5:15:23 AM PDT
<input type="radio"/>	Delete/Scale down Oracle Real Application Clusters	RAC Provisioning	This procedure deletes nodes from Oracle Real Application Clusters in order to scale down the cluster or completely delete the cluster. D	Oracle	3.45	Sep 5, 2007 9:57:56 AM PDT
<input type="radio"/>	One Click Extend Cluster Database	RAC Provisioning	This procedure will extend an existing cluster database to a set of new nodes. Oracle Clusterware and Oracle Database will be extended and configured by the procedure. D	Oracle	3.45	Sep 5, 2007 9:57:58 AM PDT

Figure 68: 'Oracle Database Provisioning' procedures.

2) Click on **Run** to start the procedure. The source of can be selected either from the Installed Home or Software Library. In this example we will use the database clone component in software library to provision. (See figure 59 and 60 below)

Oracle Database Provisioning: Select Source and Destination

This procedure installs or clones a single instance database home and configures a database on the selected hosts. It follows the best practices specified by the Oracle Database Installation Guide.

Select Source

Installed Home Software Library

Source Host

▶ Source Host details

▶ Source Host credentials

Specify Destination Host Settings

Add one or more targets to provision or clone Oracle database. All fields are required for each destination. The Oracle Home and Oracle Base must be an empty directory or one that does not exist on the host. A working directory for staging temporary files, is required for each destination host.

Host Name	Oracle Base	Oracle Home	Working Directory	Oracle Home User	Oracle Home Password	Agent User Name	Agent Password	Remove
No targets selected. To select new target(s) use 'Add...' option.								

Additional Parameters

Eg: -invPtrLoc /home/orainst.loc (to use a non-default oracle inventory location)

▶ Schedule (Immediately)

Figure 70: Source Selection: Installed Home or Software Library.

Select Source

Installed Home Software Library

Component

Location

Figure 71: Select the Source from Software Library.

3) Select the pre-staged database clone component from the Software library. (See figure below)

Select Component for Oracle Database

Information

If you are unable to find the zipped up shiphome or Gold Image of an Oracle Home, you can upload the Component now by clicking **Upload** link. This opens up a new window which allows to upload your component and displays all the components in the software library. You may return to the current window and press the Refresh button to see the newly uploaded components.

This page allows you to select a zipped up shiphome or Gold Image of an Oracle Home from the Software Library

Search

Component Name Revision

Subtype File name

Status

Select	Component Name /	Location	Vendor	Revision	Status	Product Version
<input type="radio"/>	My-DB-Clone	Components/My-DB-Clone		0.1	Active	Unknown
<input type="radio"/>	MYFAVAIXDB	Components/MYFAVAIXDB		0.1	Ready	Unknown
<input type="radio"/>	MyTelstraDbComp	Components/MyTelstraDbComp		0.1	Ready	Unknown
<input checked="" type="radio"/>	SIDB10203Clone	Components/SIDB10203Clone	Oracle	0.1	Ready	10.2.0.3
<input type="radio"/>	Sprint's gold image fo DB Homes	Components/Sprint's gold image for DB Homes		0.1	Ready	Unknown

TIP The selected components must be of version 10.2.0.1 or above.

Figure 72: Select "SIDB10203Clone" -10.2.0.3 DB Clone Component from Software Library

4) Proceed to select the Destination Target for provisioning the database. The Enterprise Manager shows up the pre-selected target list, which matches the criteria of the Source selected. (See Figure #62 below).

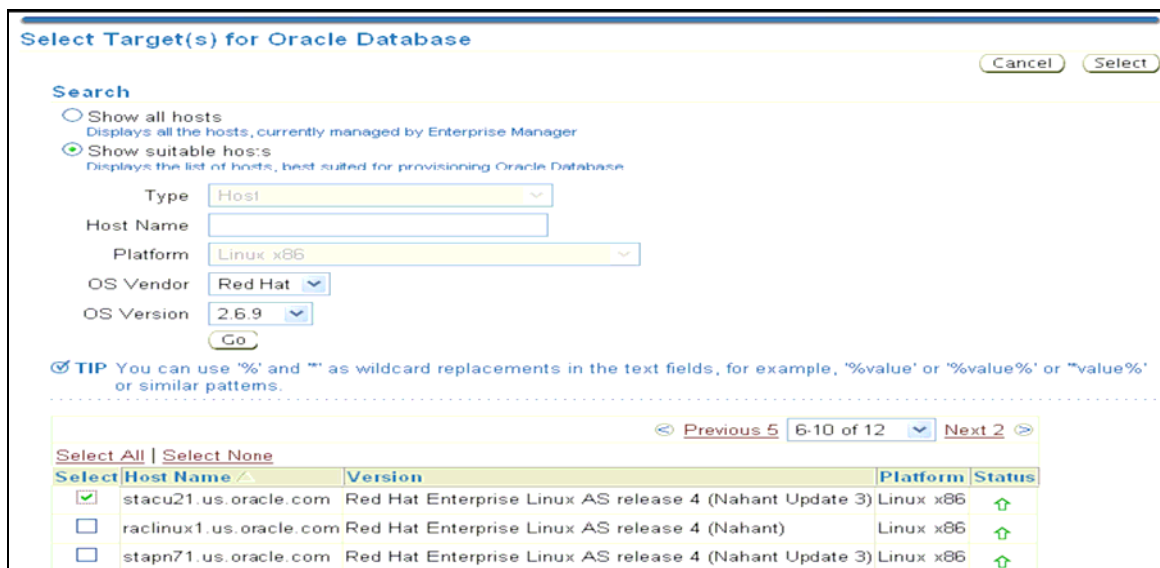


Figure 73: Pre-populated destination target list as per the Source selected.

5) Fill in the details of Oracle Base and Oracle Home on the Destination target. By default the values for Oracle Base and Homes are populated as per Oracle best practices, override for your usage. (See figure #63 below)

6) By default Credentials are set to 'Preferred Credentials'. If not stored, select to override. In this example 'Override-Same for all hosts' option is selected and filled in the details of the Home and Agent credentials.

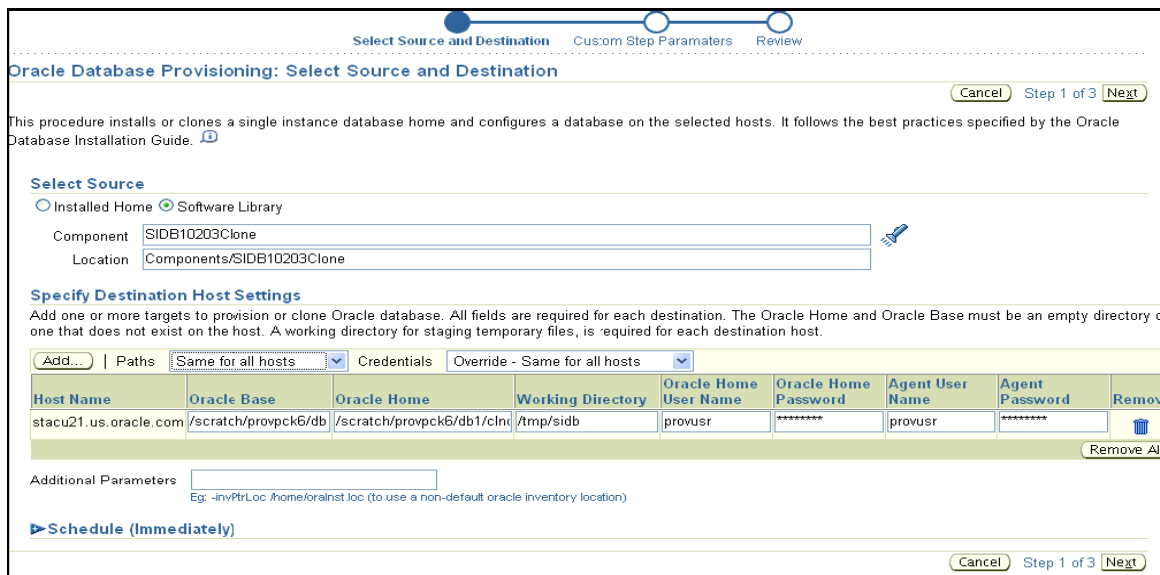


Figure 74: Provide in details on the Destination Target.

7) Click **Next** to proceed on the ‘Custom Step Parameters’ step. Fill in values attributes asked for.(See Figure #64 below).

Custom Step	Property Value
▼ All Custom Steps	
▼ Step: Run Database Configuration Tools	
Oracle System Identifier (SID)	orcl <small>A database is referenced by at least one Oracle instance which is uniquely identified from any other instance on a computer by a SID. The length of SID may not exceed 8 characters. Enter SIDs as a comma separated list eg. orcl1,orcl2,orcl3. Each SID will be configured with the correspondingly ordered ORACLE_HOME in the 'Specify Destination Host Settings'. In order to create databases with the same SID for all homes, enter one SID eg. orcl.</small>
Database Domain Name	 <small>Specify domain name to be used for database creation. You can leave this value blank if domain name is not required. Global Database Name will be constructed using SID and domain name eg. orcl.mycompany.com.</small>
Database Template Name	 <small>Specify template name to be used for database creation. If not specified, default template will be used.</small>
Database Password	***** <small>This password is used for SYS, SYSMAN, SYSTEM, and DBSNMP accounts.</small>
Database File Location	/scratch/provus/oracleHomes <small>The Database File Location specified would be used for database storage. For best database organization and performance, Oracle recommends installing database files and Oracle Software on separate disks.</small>
Response File Location	 <small>Specify the absolute path of the pre-created database configuration response file on the targets hosts to be used for database configuration. If no response file is provided then default configuration options will be used.</small>

Figure 75: Fill in values for the Custom Step Parameters.

Database password is applicable to accounts SYS, SYSMAN, SYSTEM, and DBSNMP.

Mandatory parameters: ‘Oracle System Identifier (SID)’, ‘Database password’, ‘Database File Location’,

Optional parameters:

Database Domain Name, Database Template Name (If you want a template based Provisioning), and Response File Location: If not specified, the default configuration options will be chosen for the provisioning.

Note: For installing multiple SIDB instances provide comma-separated list of SID’s.

8) Click **Next** and proceed to Review the options selected. (See figure below)

Select Source and Destination Custom Step Parameters **Review**

Oracle Database Provisioning: Review Cancel Back Step 3 of 3 Finish

Review your selections in the summary displayed below.

Select Source

Software Library
 Component **SIDB10203Clone**
 Location **Components/SIDB10203Clone**

Specify Destination Host Settings

Host Name	Oracle Base	Oracle Home	Working Directory	Oracle Home User Name	Agent User Name
stacu21.us.oracle.com	/scratch/propvck6/db1	/scratch/propvck6/db1/clndb1	/tmp/sidb	provusr	provusr

Custom Step Parameters

Custom Step	Property Value
▼ All Custom Steps	
▼ Step: Run Database Configuration Tools	
Oracle System Identifier (SID)	orcl
Database Password	*****
Database File Location	/scratch/propvck6/db2/oradata
Response File Location	--Unspecified--

Schedule

Start Date **One Time (Immediately)**
 Grace Period **Indefinite**

Figure 76: Oracle Database Provisioning-Review the Selection

9) Click **Finish** to execute the procedure and monitor the steps from the Procedure Completion Status page.

On completion of the execution, there will be a new Database provisioned on the destination target.

For Oracle Home Software Clone only:

If you want only to do Cloning operation, do a create like of the 'Oracle Database Provisioning' procedure and selectively disable steps of Database creation and save as a custom procedure. (See figures below)

Name	Type	Description
▼ Oracle Database Home Cloning Procedure		This procedure installs or clones a single instance database home and configures a database on the selected hosts. It follows the best practices specified by the Oracle Database Installation Guide.
Initialize Deployment Procedure	Computational	Initializes the current Deployment Procedure execution. Do not disable or delete this step.
▼ Database Archive	Parallel	Database Oracle home from the reference host is archived.
Database Archive	Directive	Prepares an archive of the database Oracle home. The database Oracle home from the reference host is used to prepare the archive.
▼ Prepare Agent Home for collection	Parallel	Prepares Agent Home for inventory collection of new homes.
Floup for inventory collections	Host Command	Adds group write permissions to OUIinventories.add to enable seamless host collections.
▼ Deploy Oracle Database	Parallel	Prepares the database stage area for provisioning database.
Stage Prerequisite Component	Component	Stages Prerequisite component on selected target hosts.
Execute Prerequisite Checks	Directive	Executes the prerequisite checks on the hosts on which the database is being provisioned. This step is performed on Unix platforms. This step may fail if one or more of the prerequisites are not met. Failure to execute this step will not cause the deployment procedure to fail.
Check if Fixes are Required	Computational	Check if the nodes need to be fixed.
Execute System Fixes	Directive	Performs system level fixes based on the prerequisite check failures in the previous step. This step is performed on Unix operating systems. This step is skipped if the "Execute Prerequisite Checks" step is disabled or if execution is successful. This step requires sudo privileges as root.
Verify Prerequisite Checks	Directive	Executes the prerequisite checks on the nodes to provision the cluster. Any failure in this step indicate that one or more prerequisite checks have not been fixed automatically and need manual intervention. It is recommended that you fix the problem and then retry this step in the failed nodes. This step is performed on Unix operating systems. This step is skipped if the "Execute Prerequisite Checks" step is disabled or if execution is successful.
Sysctl Configuration	Component	Modifies sysctl.conf by updating IPV4IPV6 and kernel parameters (requires sudo privileges as root).
Copy Clone Database Archive	Job	Copies the database archive from the reference host to the target hosts that require database Oracle home for clone option.
Stage Clone Database Archive	Directive	Stages the database archive to the database Oracle home location on target hosts for clone option.
Setup Database Stage Area	Component	Gets up the Stage Area for a database install from shiphome.
Verify Prerequisite Checks	Directive	Executes the prerequisite checks on the nodes to provision the cluster. Any failure in this step indicate that one or more prerequisite checks have not been fixed automatically and need manual intervention. It is recommended that you fix the problem and then retry this step in the failed nodes. This step is performed on Unix operating systems. This step is skipped if the "Execute Prerequisite Checks" step is disabled or if execution is successful.
Install/Clone Oracle Database	Directive	Lays down Oracle database software bits.
Attach home to central inventory	Directive	Registers the Oracle home with the central inventory. This is a special step for cases where environments are hardened and compilers and linkers are not available on production machines. Note: This step can only be used for UNIX as long as cloning is performed from the source Oracle home whose path is the same as that of the target. This step does not work for different paths.
Root scripts	Directive	Executes root scripts
Run Database Configuration Tools	Component	Executes database config tools on the target hosts.
Create SPFILE	Directive	Create the SPFILE for the database instance.
Database Verification Run	Directive	Executes the database verification utility on each host.
Clean up Database Stage Area	Directive	Executes a script that cleans up the temporary database stage area that was set up for database install/clone.
▼ Targets Discovery	Parallel	Performs a target discovery and registers new targets with Enterprise Manager.
Register target	Directive	Registers DB target with agent.
Refresh Host Configuration	Job	
Targets Discovery	Directive	Performs a target discovery and registers new targets with Enterprise Manager.

Figure 77: Cloning Procedure: Created from 'Oracle Database Provisioning' procedure.

25. Can I apply patchsets say 10.2.0.4 on 10.2.0.2 DB using Deployment Procedures?

To apply patchset upgrades say 10.2.0.4 on top of 10.2.0.3/10.2.0.2 or 10.2.0.1 you can use the standard 'Patch Oracle Database' procedures with just enabling the 'Run Root Script' step.

Do 'Create like' of the standard procedure and enable the 'Run Root Script' and save the procedure as 'Patch Oracle Database (Patchsets)'.

Name	Type	Description
▼ Patch Oracle Database_Patchset		Procedure for patching standalone Oracle Database installations with Critical Patch Updates, interim patches, and patchsets. Note: Major upgrade for example, DB 10.1 to 10.2 is not supported.
Initialize	Computational	Initializes the runtime data. The step also downloads patch from Metalink and creates software library components, for all patches selected to run from Metalink. Do not disable or delete this step.
▼ For all hosts	Parallel	Iterates over a list of hosts.
▼ For all homes	Rolling	Iterates over a list of Oracle Homes.
QHPPreProcess	Computational	Initializes each Oracle Home. Do not disable or delete this step.
Upgrade opatch	Job	Upgrades opatch to the latest version.
Stage Patches	Job	Stages selected patches into Oracle Homes. Please ensure that the patching user has staging / write permissions in the Staging Location. Stage Location Example: %emd_root%\EMStagedPatches.
Start Blackout	Computational	Starts Blackout of Oracle Database Instances in an Oracle Home.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
stop Services	Directive	Directive to shutdown the database services on the windows hosts running in the Oracle Home.
Custom Preop Check	Directive	Directive to check whether all the services of the database on the windows hosts are stopped or not.
Apply Patches	Directive	Applies staged patches in Oracle Homes.
Validate the Patch	Directive	Directive to validate the applied patches.
Run root script	Directive	Runs root script after applying a patchset only. Requires sudo privileges as root on Unix hosts.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Apply SQL Script	Directive	Applies a SQL script.
Apply Post SQL Script	Directive	Applies a SQL script to recompile invalid objects in the database.
Stop Database	Directive	Stops Oracle Database instances in an Oracle Home.
Start Database	Directive	Starts Oracle Database instances in an Oracle Home.
Stop Blackout	Computational	Stops Blackout of Oracle Database Instances in an Oracle Home.
Host Configuration Collection	Job	Refreshes the configuration information about a host.

Figure 78: Enable 'Run Root Script' step to apply DB patchsets.

Note: On enabling 'Run Root Script' step, set the step to execute in SUDO or PAM (say pbrun, suexec) mode for example: `sudo -u root` or `pbrun root`

Support: The procedure supports minor upgrades of database like 9.2.0.x to 9.2.0.X, 10.1.0.1 to 10.1.0.X, and 10.2.0.1 to 10.2.0.X (X=2,3,or 4) of a version of a database. Deployment Procedures does not support upgrading major version like 10.1.0.x to 10.2.0.x

26. Can I Provision or Patch 11g Databases using Deployment Procedures? Does it require any certification patch to be applied to the OMS?

Yes, 11g DB can be Provisioned and Patched using Deployment Procedures.

To provision 11g DB: Use the standard provisioning procedures like 'Provision Oracle Database' procedure. You do not require any certification patch over the OMS of EM 10.2.0.4

To patch 11g DB: With CPU and One-off patches.

Apply the patch '6058648' on the Oracle Enterprise Manager (OMS_ORACLE_HOME) to get the support and use the standard procedure 'Patch Oracle Database'.

Technical document
ORACLE

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