

Saving time and labor on Oracle
Patching with Enterprise Manager
Provisioning Pack – a case study with
Oracle Internal IT

An Oracle White Paper

January 2008

Introduction

The purpose of this white paper is to detail the process and benefits of using Enterprise Manager Provisioning pack procedure to automate application of the Critical Patch Updates (henceforth referred to as CPU) on Real Application Clusters (RAC) in Oracle Internal IT (henceforth referred to as ST-IT) environments.

Oracle ST-IT environment consists of complex multi-tier systems. ST-IT maintains high secure environments adhering to the quarterly cycle of CPU. The application of these patches are mandatory to keep the environments secure, stable, and at high performance. With the rules and requirements in place, orchestration of identifying, testing and rolling out patches on to the production servers had become a time consuming, labor-intensive and error-prone process.

With the use of Deployment Procedures of Oracle Enterprise Manager Provisioning Pack, the entire process is automated resulting in reduction of time and manual labor. The entire process which normally took weeks is now possible in hours with a few simple click of buttons, thereby yielding lower operational cost. The procedures automate the application of CPU's on RAC Database in rolling fashion achieving Zero Down time, which provides high availability in a completely unattended way. In this paper we will see in detail the usage and the benefits achieved in using these best practice procedures.

Patching cycle:

CPU patching is one of the most critical patches as it covers the security aspect of the Oracle components that face the Internet or any other semi public environments. Thus, they are released every quarter. ST-IT chose the CPU patch as the initial target for kick-starting patching via EM as it meant that a repeatable process is ready even for next cycle, thus it saves time in every quarter.

The patching cycle of the Critical Patch Updates is a time and labor consuming process. It takes time to identify, test, and roll out the patches. ST-IT has 2 full times DBA's working for four weeks on completing the cycle.

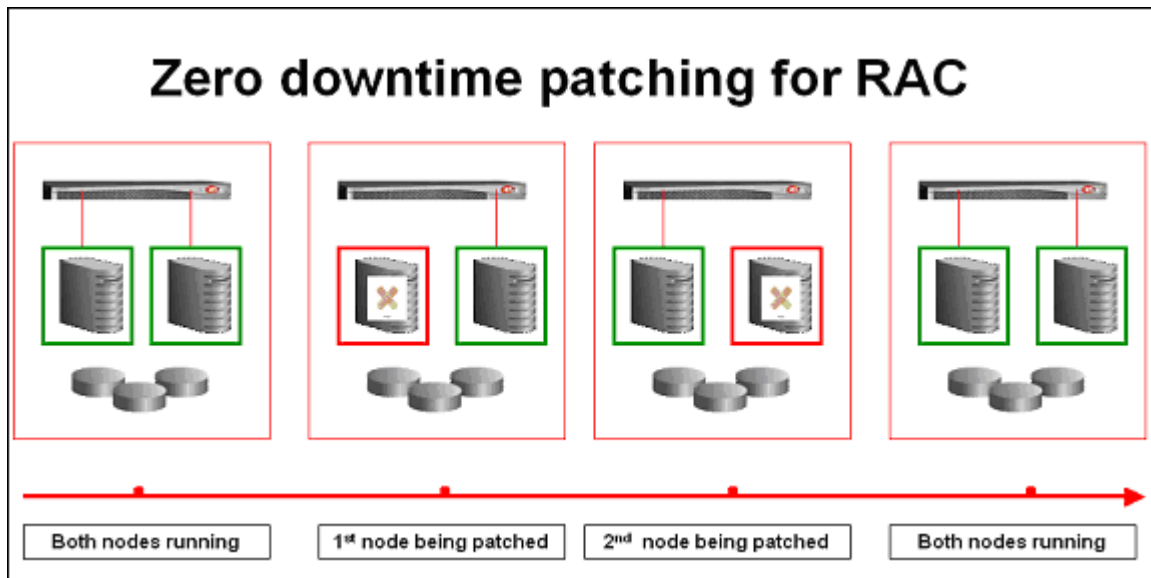
The patching operations can be broken down into various steps:

- Patch Identification: Identifying the correct patch number based on version and platform of the Oracle product installations in the environment.
- Target Discovery: Discovering the right set of targets to be patched for the cycle under test and production categories.
- Verification of Inventories: Verifying the inventories for the right product version.
- Staging of the patches: Transporting patches locally to the target for starting the patching process.
- Pre-Patching Process: Creating Blackouts, executing backups and so on.
- Patching Process: The actual process of patching a database with appropriate steps to stop and start database in normal and upgrade mode. Application of the SQLs (catcpu.sql) and compilation scripts (ultrpl.sql) and bringing back the database in the normal, open mode for operation.
- Post –Patching Process: Removing Blackouts, clearing up staged files and utilities.
- Verification and Reporting: Checking proper application of patch. Reports on the compliance and the actual patches applied.

- The entire cycle is first completed on Stage environment and then rolled out to the Production environment.

Case Study: Patching RAC Database with CPU in Rolling Fashion

The CPU patches provide high alert security fixes ensuring security and stability of Oracle products. The CPU's can be applied in a rolling fashion enabling High availability of the systems even during the patching process. Oracle Enterprise Manager Deployment procedures support automated orchestration of patches in this way and even apply the SQL scripts – catcpu.sql and utlrp.sql on the first node without bringing down the database. This ensures a complete Zero Down time approach. The picture below depicts the orchestration of rolling patches through EM on a two-node RAC system.



ST-IT choose the deployment procedure 'Patch Oracle RAC Database – Rolling' to apply the JULY CPU 2007 (6079591) on our environment. Our environment setup:

- Oracle Enterprise Manager 10.2.0.3
- 3 Node RAC Primary database at 10.2.0.3
- 2 Node RAC Standby at 10.2.0.3
- 4 Midtier's at 10.1.2.0.2 (Used 'Patch Oracle Application Server' deployment procedure)

For this Case Study, the 3 Node RAC Primary was chosen, which was to be patched with Zero downtime.

ST-IT's prior cycles to apply the CPU patches manually on the same infrastructure used to take four weeks with two DBA's and now the same take just half the time.

This was the first time that ST-IT used Enterprise Manager Provisioning for patching process and Enterprise Manager was set up to complete the process. This is a one-time process, which will provide a defined, ready setup and process for the quarterly cycles in future.

It took three weeks to complete the deployment cycle from setup of EM to testing patch application on stage, incorporating custom steps, testing, and rolling out on production. The table below describes the details:

| Cycle | Tasks | Details |
|--------|--|---|
| Week 1 | Prepare the EM for deployment | <p>Followed the Grid automation guide to setup our EM environment (Refer: Achieving Grid Automation with Deployment Procedures). According to the guide below steps were followed:</p> <ol style="list-style-type: none"> 1. Setup Software Library and Metalink connectivity. 2. Patch OMS (5890474 & 5998260) 3. Run Refresh From Metalink and Upgrade OPatch Job <p>Note: The patches above are not required if you have the latest version of EM 10.2.0.4.</p> <p>One time process, the same would be used for future cycles.</p> |
| Week 2 | Patching Stage and Customizing Deployment Procedures | <p>Testing of the patches on stage environment.</p> <p>After the initial run, modifications were made to include backup steps into the procedure to create best practices specific to Oracle ST-IT.</p> |
| Week3 | Patching Production | <p>As the testing of the procedures in stage was already completed, it was the easiest patching rollout to production. This means that the DBA can let EM do the work. The DBA was notified the status when completed.</p> |

Steps Involved in Patching Using Enterprise Manager

The whole set of steps briefed in the Patching cycle is completely automated by using Enterprise Manager Provisioning pack procedures. This section covers the step-by-step approach in patching using the deployment procedure of Enterprise Manager Provisioning pack.

- 1) **Identification of the Patches:** The Enterprise Manager Home page > ‘Critical Patch Advisories for Oracle Homes’ section provides a detailed view of the patches to be applied on to the entire environment. It provides details such as patch numbers, product version, and platform. Click the **Patch Advisories** link to see the details.
- 2) **Select the Deployment Procedure for patching RAC in Rolling mode:**
Click **Deployments >Patch Procedures>** Select the procedure for ‘ Patch Oracle Database – Rolling’ and click **Run**.

Description Procedure for patching an Oracle RAC Database Primary in Rolling m
Type Patch Oracle Software
Last Modified By SYSMAN
Staging Area Path %emd_root%
Sudo Command sudo
PAM Command pbrun
Preferred Command Interpreter for PAM and sudo 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 Feb 18, 2008 4:08:42 AM CST
Enable Notification
Procedure Status Notification Job Tag Apply CPU Patch Primary DB -
Status for which Notification is to be Sent Action Required
 Suspended
 Failed
 Succeeded
 Stopped
 Completed with Errors

Note

[Expand All](#) | [Collapse All](#)

| Name | Type | Description |
|--------------------------------------|---------------|--|
| MPS CPU PATCH PRIMARY RAC DB - Apply | | Procedure for patching an Oracle RAC Database |
| Initialize | Computational | Initializes the runtime data. The step also downl . 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 |
| Upgrade opatch | Job | Upgrades opatch to the latest version |
| Stage Patches | Job | Stages selected patches into Oracle Homes. Pl Example:%emd_root%/EMStagedPatches. |

This starts the interview screens, where you can select the patch, targets, and staging directory, provide the credentials, and then review and submit the procedure.

3) Select the Staging Location and the Patch:

[Software Updates](#) | [Target List](#) | [Library Step Properties](#) | [Credentials](#) | [Sche](#)

Oracle RAC Database - Rolling - Pchandir: Software Updates

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 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 |
|----------------------|----------|------------|------|---------|----------|---------|---------------|---------------|-------------|--------|
| | | | | | | | | | | |

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

You can use the default location, which is \$ORACLE_HOME/EMStagedPatches or provide your own Staging location. Note that the staging location should be accessible by the OMS.

Click **Add**, to Search and Select the patches.

Oracle RAC Database - Rolling - Pchandir: Software Updates >

Search And Select Software Updates Cancel Select

Search Metalink
 Search Software Library

Search

Patch Number: 6079591

Product Family: Oracle Database

Product: Oracle Database

Release: Any

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 |
|--------------------------|----------------------|----------|-----------------------|-------|-----------------|-----------|----------|---------------|---------------|
| <input type="checkbox"/> | p6079591_10.2.0.3_46 | 6079591 | 2007-09-18 21:43:07.0 | Patch | Oracle Database | Linux x86 | 10.2.0.3 | | |

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 M button for README is not clickable in case of patches selected from software library.

Provide the patch number and other relevant details. If you are connected to Metalink, you can select **Search Metalink**, this is required be only once as the patch gets stored into the Software Library for repeated usage. If you do not have Metalink connection, you can upload patches offline into the Software Library and select **Search Software Library** option.

Select the patch and Click **Next**

Check the patch details, details of the patch, select the **Select** check box, and click **Submit**.

Software Updates | Target List | Library Step Properties | Credentials | Schedule | Review

Oracle RAC Database - Rolling - Pchandir: Software Updates Cancel Step 1 of 6 Next

Select the Software Updates to Stage and Apply.

Staging Location: %emmd_root%/EMStage
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 |
|----------------------|----------|-----------------------|-------|-----------------|-----------|----------|---------------|---------------|-------------|--|
| p6079591_10.2.0.3_46 | 6079591 | 2007-09-18 21:43:07.0 | Patch | Oracle Database | Linux x86 | 10.2.0.3 | | | | <input checked="" type="checkbox"/> 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 M button for README is not clickable in case of patches selected from software library.

The procedure by default selects the option to run the SQL script. If you have any custom SQL to run, you can enter the script in the location provided. Click **Next** if you are sure about the patch selected.

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.

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

4) Select Targets:

ORACLE Enterprise Manager 10g
 Grid Control

Home Targets Deployments Alerts Compliance Jobs Reports

General Provisioning

Software Updates **Target List** Library Step Properties Credentials Schedule Review

MPS CPU PATCH PRIMARY RAC DB-Apply: Target List Cancel Back Step 2 of 6 Next

Select the targets. Click on Add to view and select available targets

RAC Database Targets to be patched

Add

| Name | Target Type | Host Name | Status |
|--------------------|-------------|-----------|--------|
| No Target Selected | | | |

Cancel Back Step 2 of 6 Next

Click **Add** and then add the targets that you want to patch.

Software Updates **Target List** Library Step Properties Credentials Schedule Review

Oracle RAC Database - Rolling - Pchandir: Target List Cancel Back Step 2 of 6 Next

Select the RAC database targets from the list below. Make sure to select all instances running out of an oracle home.

Target Type: Cluster Database

Target Version: 10.2.0.3%

Target Name:

On Host:

Platform: Linux x86

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

Select All | Select None | Expand All | Collapse All

| Select Name | Target Type | Cluster Name | Host Name | Oracle Home | Status |
|--|------------------|-------------------|-----------|-------------|--------|
| <input type="checkbox"/> Cluster Database Targets | | | | | |
| <input type="checkbox"/> ▶ ABC1234.us.oracle.com(Patched) | Cluster Database | crs_mps02 | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.TG.us.oracle.com(Patched) | Cluster Database | crs_mps02 | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.DR(Unpatched) | Cluster Database | crs_mps03_cluster | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.racle.com(Unpatched) | Cluster Database | crs_mps02 | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.TG.US.ORACLE.COM(Unpatched) | Cluster Database | crs_mps03_cluster | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.TG.us.oracle.com(Unpatched) | Cluster Database | crs_mps03_cluster | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.TG.US.ORACLE.COM(Unpatched) | Cluster Database | crs_mps02 | | | ↑ |
| <input type="checkbox"/> ▶ ABC1234.s.oracle.com(Unpatched) | Cluster Database | crs_mps03_cluster | | | ↑ |

The targets available for patching are displayed and both patched and unpatched environments can be viewed along with the Status.

Select the appropriate target and click **Continue**.

As for this case study ST-IT had chosen the 3-node RAC (the first one on the list) out of the mission critical targets listed above.

5) Provide Credentials:

| Oracle Home | Host | Target | Username | Password | Save OH Credential |
|----------------------------------|---------------------|------------------------------|----------|----------|--------------------------|
| /u03/app/oracle/product/10.2.0.3 | abcd1234.oracle.com | ABC1234.us.oracle.com_MYOST1 | oracle | ***** | <input type="checkbox"/> |
| /u03/app/oracle/product/10.2.0.3 | abcd1234.oracle.com | ABC1234.us.oracle.com_MYOST2 | oracle | ***** | <input type="checkbox"/> |

In this page, you can choose to use Oracle home's preferred credential or choose to override these credentials and fill the username and password for the selected targets. Click **Next** to continue.

6) Schedule the execution:

Instance Name: Oracle RAC Database - Rolling - Pct
Enter an instance name for the Deployment Procedure execution. Default Value syntax: Procedure Name_UserName_TimeStamp

This page allows you to schedule the patching for a later time or start the process immediately. Click **Next** to continue.

7) Review and Submit:

Oracle RAC Database - Rolling - Pchandir: Review

Cancel Back Step 6 of 6 Finish

Software Updates
Staging Location %emd_root%\EMStage

RAC Database Updates

| Software Update Name | Patch ID | Created On | Type | Product | Platform | Release | Interim Patch | Applicable On | Description | README |
|----------------------|----------|-----------------------|-------|-----------------|-----------|----------|---------------|---------------|-------------|----------------------|
| p6079591_10.2.0.3_46 | 6079591 | 2007-09-18 21:43:07.0 | Patch | Oracle Database | Linux x86 | 10.2.0.3 | | | | 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. The view button for README is not clickable in case of patches selected from software library.

Target List
RAC Database Targets to be patched

[Expand All](#) | [Collapse All](#)

| Name | Target Type | Cluster Name | Host Name | Oracle Home | Status |
|-------------------------------|------------------|--------------|-----------|-------------|--------|
| Cluster Database Targets | | | | | |
| ABC123.us.oracle.com(Patched) | Cluster Database | crs_mps02 | | | |

Credentials
Home Credentials
Credentials Type **Overridden Preferred Credentials for each home**

| Oracle Home | Host | Target | Username |
|----------------------------------|---------------------|------------------------------|----------|
| /u03/app/oracle/product/10.2.0.3 | abcd1234.oracle.com | ABC1234.us.oracle.com_MYOST1 | oracle |
| /u03/app/oracle/product/10.2.0.3 | abcd1234.oracle.com | ABC1234.us.oracle.com_MYOST2 | oracle |

Schedule
Scheduled **Immediately**
Repository

This is the final step where you can review the details before completing the process. If you are satisfied with the details, click **Finish** to start the patching.

8) Track the Progress:

On submitting, the 'Procedure Completion Status' page is displayed, which is also accessible from the path: Deployments -> Patch Procedures -> Procedure Completion Status -> Select the procedure for RAC Rolling Patch.

You can track the progress of all the steps here. To drill down to see details, click **Jobs** and a page shown below is displayed.

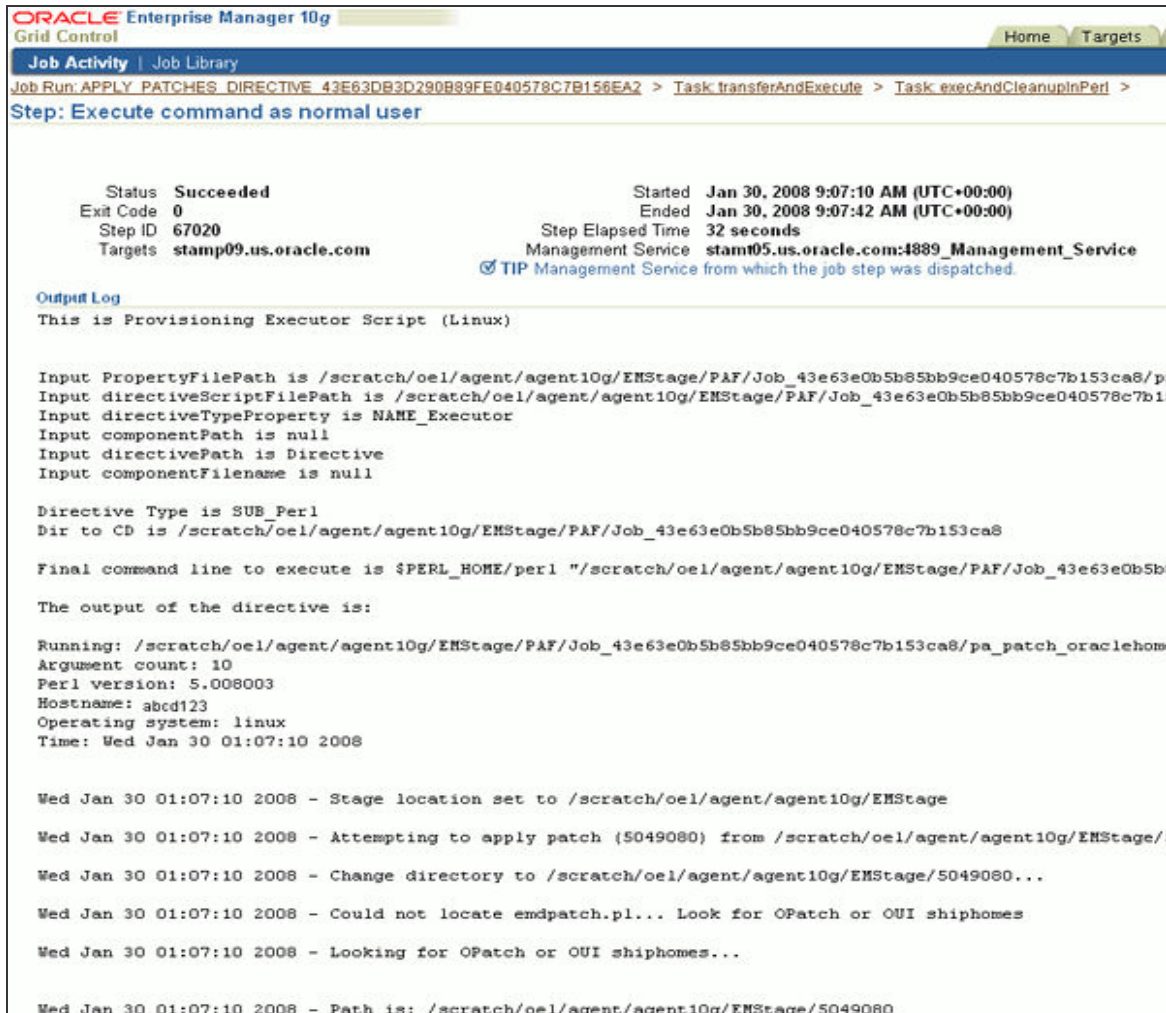
| Procedure | | MPS CPU PATCH PRIMARY RAC DB - Apply | Scheduled | Jan 30, 2008 8:10:10 AM (UTC+00:00) |
|---------------------|---------------|--------------------------------------|----------------|-------------------------------------|
| Procedure Version | 1.11 | | Start Date | Jan 30, 2008 8:10:22 AM (UTC+00:00) |
| Error Handling Mode | Stop On Error | | Last Updated | Jan 30, 2008 8:50:02 AM (UTC+00:00) |
| Status | Succeeded | | Completed Date | Jan 30, 2008 8:50:15 AM (UTC+00:00) |
| Owner | SYSMAN | | Elapsed Time | 2385 Seconds |

| Status Detail | | | |
|---|----------------------------|---------------|--|
| Steps Job Details OMS Log | | | |
| Expand All Collapse All | | | |
| Name | Status | Type | Description |
| ▼ MPS CPU PATCH PRIMARY RAC DB - Apply | Succeeded | | Procedure for patching an Oracle RAC Database Primary in Rolling mode. This procedure is not applicable for shared oracle home installations. |
| Initialize | Succeeded | Computational | Initializes the runtime data. The step also downloads patch from Metalink and software library components, for all patches selected to run from Metalink . Do disable or delete this step. |
| ▼ For all hosts | Succeeded | Rolling | Iterates over a list of hosts. |
| ▼ For all homes | Succeeded (2) | Rolling | Iterates over a list of Oracle Homes. |
| Oracle Home Preprocess | Succeeded (2) | Computational | Initializes the Oracle Home specific runtime data like staging location. Do not delete this step. |
| Upgrade opatch | Succeeded (2) | Job | Upgrades opatch to the latest version |
| Stage Patches | Succeeded (2) | Job | Stages selected patches into Oracle Homes. Please ensure that the patching staging / write permissions in the Staging Location. Stage Location Example:%emd_root%/EMStagedPatches. |
| Start Blackout | | Directive | |
| Stop RAC Instances | Succeeded (2) | Directive | Stops all the selected Oracle RAC Instances. |
| stop Services | | Directive | Directive to shutdown the database services on the windows hosts running in t Home. |
| Custom Prereq Check | | Directive | Directive to check whether all the services of the database on the windows hosts stopped or not. |
| Apply Patches | Succeeded (2) | 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 hosts. |
| Start RAC Instances | Succeeded (2) | Directive | Starts all the selected Oracle RAC Instances. |
| Stop Blackout | | Directive | |
| ▼ On the node for SQL execution | Succeeded | Rolling | Operates on the node for SQL execution |
| ▼ On the Oracle Home for SQL execution | Succeeded (2) | Rolling | Operates on the oracle home selected for SQL execution. |
| Apply SQL Script | Succeeded (1), Skipped (1) | Directive | Applies a SQL script. |
| Apply Post SQL Script | Succeeded (1), Skipped (1) | Directive | Applies a SQL script to recompile invalid objects in the database. |
| ▼ For all hosts | Succeeded | Parallel | Iterates over a list of hosts. |
| Host Configuration Collection | Succeeded (2) | Job | Refreshes the configuration information about a host. |

Click any job to track the details. For example, here **Apply Patches** job is tracked and the details are displayed in the page shown below.

| Job Run APPLY_PATCHES_DIRECTIVE_43E63D8D3Q290B9FE040578C7B156EA2 > | | | | | | |
|--|-------------------------------------|-------------|-------------------------------------|-------------------------------------|------------------------|--|
| Task: Transfer files and/or execute directive | | | | | | |
| Page Refreshed Feb 12, 2008 9:15:08 AM UTC | | | | | | |
| Summary | | | | | | |
| Status | Succeeded | Type | Component | Step | Job | |
| Started | Jan 30, 2008 9:06:49 AM (UTC+00:00) | Owner | SYSMAN | | | |
| Ended | Jan 30, 2008 9:07:42 AM (UTC+00:00) | Description | | | | |
| Elapsed Time | 52 seconds | | | | | |
| Targets | <input type="text"/> | | | | | |
| Status | All | | | | | |
| | <input type="button" value="Go"/> | | | | | |
| Expand All Collapse All | | | | | | |
| Name | Targets | Status | Started | Ended | Elapsed Time (seconds) | |
| ▼ Task: Transfer files and/or execute directive | abcd1234.oracle.com | Succeeded | Jan 30, 2008 9:06:49 AM (UTC+00:00) | Jan 30, 2008 9:07:42 AM (UTC+00:00) | 52 | |
| Step: setupAndTransfer | 0 targets | Succeeded | Jan 30, 2008 9:06:59 AM (UTC+00:00) | Jan 30, 2008 9:07:00 AM (UTC+00:00) | 1 | |
| ▼ Task: execAndCleanupInPar | abcd1234.oracle.com | Succeeded | Jan 30, 2008 9:07:00 AM (UTC+00:00) | Jan 30, 2008 9:07:42 AM (UTC+00:00) | 42 | |
| Step: Execute command as normal user | abcd1234.oracle.com | Succeeded | Jan 30, 2008 9:07:10 AM (UTC+00:00) | Jan 30, 2008 9:07:42 AM (UTC+00:00) | 31 | |

Click on the finite steps to look into the Log details of the steps.



ORACLE Enterprise Manager 10g
Grid Control

Home Targets

Job Activity | Job Library

Job Run: APPLY_PATCHES_DIRECTIVE_43E63DB3D290B89FE040578C7B156EA2 > Task: transferAndExecute > Task: execAndCleanupInPerl >

Step: Execute command as normal user

| | | | |
|-----------|-----------------------|--------------------|--|
| Status | Succeeded | Started | Jan 30, 2008 9:07:10 AM (UTC+00:00) |
| Exit Code | 0 | Ended | Jan 30, 2008 9:07:42 AM (UTC+00:00) |
| Step ID | 67020 | Step Elapsed Time | 32 seconds |
| Targets | stamp09.us.oracle.com | Management Service | stam05.us.oracle.com:4889_Management_Service |

TIP Management Service from which the job step was dispatched.

Output Log

This is Provisioning Executor Script (Linux)

```
Input PropertyFilePath is /scratch/oe1/agent/agent10g/EMStage/PAF/Job_43e63e0b5b85bb9ce040578c7b153ca8/pa_patch_oraclehome
Input directiveScriptFilePath is /scratch/oe1/agent/agent10g/EMStage/PAF/Job_43e63e0b5b85bb9ce040578c7b153ca8/pa_patch_oraclehome
Input directiveTypeProperty is NAME_Executor
Input componentPath is null
Input directivePath is Directive
Input componentFilename is null

Directive Type is SUB_Perl
Dir to CD is /scratch/oe1/agent/agent10g/EMStage/PAF/Job_43e63e0b5b85bb9ce040578c7b153ca8

Final command line to execute is $PERL_HOME/perl "/scratch/oe1/agent/agent10g/EMStage/PAF/Job_43e63e0b5b85bb9ce040578c7b153ca8/pa_patch_oraclehome

The output of the directive is:

Running: /scratch/oe1/agent/agent10g/EMStage/PAF/Job_43e63e0b5b85bb9ce040578c7b153ca8/pa_patch_oraclehome
Argument count: 10
Perl version: 5.008003
Hostname: abcd123
Operating system: linux
Time: Wed Jan 30 01:07:10 2008

Wed Jan 30 01:07:10 2008 - Stage location set to /scratch/oe1/agent/agent10g/EMStage
Wed Jan 30 01:07:10 2008 - Attempting to apply patch {5049080} from /scratch/oe1/agent/agent10g/EMStage/5049080
Wed Jan 30 01:07:10 2008 - Change directory to /scratch/oe1/agent/agent10g/EMStage/5049080...
Wed Jan 30 01:07:10 2008 - Could not locate endpatch.pl... Look for OPatch or OUI shiphomes
Wed Jan 30 01:07:10 2008 - Looking for OPatch or OUI shiphomes...

Wed Jan 30 01:07:10 2008 - Path is: /scratch/oe1/agent/agent10g/EMStage/5049080
```

Deployment procedures on success or failure can trigger a notification that implies that one can run the patching on several systems completely unattended, the on-call DBA will be notified if the process needs attention.

Handling Failures:

If patch application fails due to some reason, the Step in question is highlighted with **Failed** Status. You can drill down to view the logs for failure details. After you rectify the problems, if any, you can retry the step/s by pressing the **Retry** button. You need not start from the beginning, thus saving time.

Conclusion

Oracle Enterprise Manager provisioning procedures automates the entire patching process effectively by lowering the effort and total cost involved.

The following observations were made from the case study:

- The total time taken for the entire patching cycle -Manually: 4 weeks.
- The total time taken for the entire patching cycle -Using EM: 2 weeks.

This meant that the operation time was cut by 50% thus saving two weeks for every CPU patching cycle. This saves a lot of time and cost involved in maintaining a secure, stable and highly available environment. Converting this in cost saving terms by using the below:

Total Savings per CPU Cycle = Market Rate for a RAC DBA * 2 DBA's * 2 weeks

This is a substantial saving of about \$24,000 (**) per cycle, and as CPU patch is released every quarter this means a huge estimated saving of \$96,000 per year.

****Note:** The above calculation is derived by using the prevailing market rates for a RAC DBA and the actual saving depends on actual rates charged by their IT staff or contractors.

The savings increase exponentially with the increase in the number of targets. Multiple targets can be patched up simultaneously with the deployment procedures in a single execution, thus reducing the overall time spent.

Oracle Enterprise Manager Provisioning pack also provides a whole set of best practice provisioning procedures for various operations in data centers. Thus defining standardization in the process, and reducing time, effort and total cost of the operation. This eliminates any chances of human errors in the monotonous process, improving the life of the DBAs managing complex data centers.



**Saving time and labor on Oracle Patching with Enterprise Manager Provisioning Pack – a case study with Oracle Internal IT
Jan 2008**

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