

Exadata Cloud Service Patching using API

Level 300

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Objectives

After completing this lesson, you should be able to:

- Understand Patching Facilities in Exadata Cloud Service
- Patching the Compute Node Operating System
- Patching performed By Oracle
- ExaCS Quarterly Release Update
- Explain tools for Prerequisite Check, applying and Rollback of Patches
- Understanding Log Files for analysis
- Best Practices for Patching ExaCS
- Using Exacheck for pre and post patching/upgrades

Patching Performed by Oracle

Patches and updates to all other system components are managed and performed by Oracle. This includes the physical compute nodes (Dom0), network switches, power distribution units (PDUs), integrated lights-out management (ILOM) interfaces, and the Exadata Storage Servers.

- In all but rare exceptional circumstances, you will receive advance communication about these updates through the Cloud Notification Portal to help you plan for them. If there are corresponding recommended updates for your compute node virtual machine environment, then Oracle will provide notification about these. There is no option to opt out of any updates.
- Scheduled updates are mostly performed in a manner that preserves service availability throughout the update process. However, there may be some noticeable impact on performance and throughput as individual system components are unavailable for a period of time during the update process.
- For example, the compute nodes may need to be rebooted when a service is updated. In such cases, wherever possible, the compute nodes would be rebooted in a rolling manner.

For further information about the standard update policies and practices that apply to Exadata Cloud Service see [Oracle Database Cloud Exadata Service Supported Software Versions and Planning for Updates](#).

- Workload Management: <https://docs.oracle.com/en/database/oracle/oracle-database/12.2/racad/workload-management-with-dynamic-database-services.html>
- Client Failover Best Practices for Highly Available Oracle Databases - Oracle Database 12c: <http://www.oracle.com/technetwork/database/availability/client-failover-2280805.pdf>

Quarterly patch(DBMS/GI) release for Exadata Cloud Customers

How to update the Exadata System Software to 19c on the Exadata Cloud Service in Oracle Cloud Infrastructure (Doc ID 2521053.1)

Oracle Database Cloud Exadata Service Supported Software Versions and Planning for Updates (Doc ID 2124174.1)

Exadata Cloud Service Software Versions (Doc ID 2333222.1)

For ExaCS, the quarterly patches contains bundle patches and set of oneoffs

Oracle deliver the bundle in two ways for Exadata Cloud customer

- Existing provisioned system (delivered via Patches)
- New provisioning system (Image available)

Key Points to remember:

- Cloud tooling updates are cumulative
- Update to the latest cloud tooling before any patches/upgrades.
- All Exadata db nodes must have the same cloud tooling version.

Patching the Compute Node Operating System

You will need to patch the operating system of your Exadata Cloud Service after any Oracle scheduled maintenance is complete to get all the latest security fixes. To patch the operating system of the Exadata Cloud Service please refer to: <https://docs.cloud.oracle.com/iaas/Content/Database/Tasks/exatooling.htm> .

This Exadata DB system upgrade allows you to upgrade the operating system to Oracle Linux 7 (OL7). Refer to My Oracle Support Note

How to update the Exadata System Software to 19c on the Exadata Cloud Service in Oracle Cloud Infrastructure (Doc ID 2521053.1)

for detailed instructions and information, including dependencies around the Grid Infrastructure Patch level and database support for OL7.

It is also recommended to patch the Grid Infrastructure and Databases to the latest version following: <https://docs.cloud.oracle.com/iaas/Content/Database/Tasks/exapatching.htm>

How to update Exadata System Software on database servers in the Exadata Cloud Service (Doc ID 2417624.1)

How to update the Exadata System Software (DomU) to 19c on the Exadata Cloud Service in OCI (Doc ID 2521053.1)

Note: All provisioned environment has 19c GRID compatibility.

Patching Facilities in Exadata Cloud Service

- Oracle Database Exadata Cloud Service provides uniform API for patching database, tools and compute nodes operating systems for ExaCS. These facilities are provided by the **dbaascli** utility .
- Customers are responsible for managing patches and updates to the Oracle Database and Oracle Grid Infrastructure software on the compute nodes in addition to OS patches, dbaascli simplifies the patching operation.
- Oracle recommends to use only dbaascli for any operation (Instead of exadbcpatch)

Following patching operations are supported on Exadata Cloud Service

- Self patch of cloud tooling.
- Listing Available Patches for Db & GI homes
- Checking Prerequisites Before Applying a Patch
- Applying a Patch
- Listing Applied Patches
- Rolling Back a Patch or Failed Patch

- **Note** — Patches for the **Daylight Savings Time (DST)** as well any **Non Routine Patching** could require manual steps, which can be worked with Oracle support services.

dbaascli –Input & Output

Inputs for database patching:

- Patchid or LATEST for prereq, apply or rollback operations.
- Database name as input which could be one or more database. For patching all the databases provide parameter alldbs .
- Instance name in the format of hostname:oracle_home

Input for tools patching:

You can either specify patchid which indicates the rpmversion to upgrade or LATEST

Dbaascli operation o/p

For database patching : List of all the available database patches available for upgrade.

Patch prereq, apply or rollback completed successfully or not. If not completed successfully then It return error message.

For tools patching: List of all the tools patches available for upgrade. apply completion status.

dbaascli Usages for Patching-Tools Patching, List, Pre Check & Apply

Tools patching: Updating Cloud tooling

```
dbaascli patch tools list
```

```
dbaascli patch tools apply --patchid LATEST
```

```
dbaascli patch tools apply --patchid <id>
```

```
dbaascli patch tools auto enable
```

Database Patch list -

```
dbaascli patch db list --oh hostname:/u02/app/oracle/product/12.1.0/dbhome_2
```

Database Patch prereq

```
dbaascli patch db prereq --patchid <patchid> --instance1 hostname:<oracle_home>
```

```
dbaascli patch db prereq --patchid <patchid> --dbnames <dbname>
```

```
dbaascli patch db prereq --patchid <patchid> --dbnames <dbname> -alldbs
```

```
dbaascli patch db prereq --patchid <patchid> --dbnames=<dbname1,dbname2> -alldbs
```

Database Patch apply -

```
dbaascli patch db apply --patchid <patchid> --instance1 hostname:<oracle_home> --dbnames <dbname1> --run_datasql 1
```

```
dbaascli patch db apply --patchid <patchid> --instance1 hostname:<oracle_home> --dbnames <dbname1,dbname2> --run_datasql 1
```

```
dbaascli patch db apply --patchid <patchid> --dbnames <dbname>
```

```
dbaascli patch db apply --patchid <patchid> --dbnames <dbname> -alldbs
```

```
dbaascli patch db apply --patchid <patchid> --dbnames <dbname1,dbname2>
```

dbaascli Usages for Patching-Rollback

Database patch Rollback -

```
dbaascli patch db switchback --patchid <patchid> --instance1 hostname:<oracle_home> --dbnames <dbname1> --run_datasql 1
dbaascli patch db switchback --patchid <patchid> --instance1 hostname:<oracle_home> --dbnames <dbname1,dbname2> --run_datasql 1
dbaascli patch db switchback --patchid <patchid> --dbnames <dbname>
dbaascli patch db switchback --patchid <patchid> --dbnames <dbname> -alldbs
dbaascli patch db switchback --patchid <patchid> --dbnames <dbname1,dbname2>
```

Note - Rollback is named as switchback.

Command Help

- *dbaascli patch db --help*
- *dbaascli patch tools –help*

Note: sudo can be used for both GI and RDBMS patching.

Updating Cloud Tooling on Exadata Cloud Service

Cloud tooling include the fixes for existing issues and new features so it is highly recommended to upgrade the cloud tooling once new version or release is available. This is important before trying Patching using dbaascli. Note: When updating the cloud tooling on database deployments hosting a Data Guard configuration, you must perform the update on both nodes; that is, on the one hosting the primary database and on the one hosting the standby database.

Check your current version of cloud tooling

```
[root@xdprod-n53zg1 ~]# rpm -qa|grep -i dbaastools  
dbaastools_exa-1.0-1+18.2.3.1.0_190415.1015.x86_64
```

Check for cloud tooling updates

```
[root@xdprod-n53zg1 ~]# dbaascli patch tools list
```

Upgrade to Latest Cloud Tooling

```
[root@xdprod-n53zg1 ~]# dbaascli patch tools apply --patchid LATEST
```

Repeat the same steps on another instance if it is data guard setup for dbaascli cloud tooling upgrade

Note: How to upgrade DBAAS Cloud Tooling using dbaascli (Doc ID 2350471.1)

Configuring Automatic Cloud Tooling Updates

```
#dbaascli patch tools auto enable
```

Disabling Automatic Cloud Tooling Updates

```
# dbaascli patch tools auto disable
```

Steps to Apply RDBMS Patches- LIST

To list the available patch identifiers for an Oracle Home directory:

```
[opc@xdprod-n53zg1 ~]$ sudo dbaascli patch db list --oh xdprod-n53zg1:/u02/app/oracle/product/12.1.0/dbhome_2
DBAAS CLI version 18.2.3.1.0
Executing command patch db list --oh xdprod-n53zg1:/u02/app/oracle/product/12.1.0/dbhome_2
INFO : EXACS patching
```

Available Patches

```
patchid :27968010 (DB 12.1.0.2.180717 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY 12.1.0.2.180717 (Jul
2018))patchid :28349951 (DB 12.1.0.2.181016 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY 12.1.0.2.181016 (Oct
2018))patchid :28833531 (DB 12.1.0.2.190115 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY 12.1.0.2.190115 (Jan
2019))patchid :29176139 (DB 12.1.0.2.190416 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY 12.1.0.2.190416 (Apr
2019))
```

Install database patch using

```
dbaascli patch db apply --patchid 27968010 (DB 12.1.0.2.180717 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY
12.1.0.2.180717 (Jul 2018))patchid :28349951 (DB 12.1.0.2.181016 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY
12.1.0.2.181016 (Oct 2018))patchid :28833531 (DB 12.1.0.2.190115 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY
12.1.0.2.190115 (Jan 2019))patchid :29176139 (DB 12.1.0.2.190416 DATABASE PATCH FOR ENGINEERED SYSTEMS AND DB IN-MEMORY
12.1.0.2.190416 (Apr 2019)) --dbnames <>
```

Steps to Apply RDBMS Patches- prereq

To check prerequisites before applying a patch: **Precheck** : Check patch readiness

On specific instances:

```
[opc@xdprod-n53zg1 ~]$ sudo dbaascli patch db prereq --patchid 27968010 --instance1 xdprod-n53zg1:/u02/app/oracle/product/12.1.0/dbhome_2
DBAAS CLI version 18.2.3.1.0
Executing command patch db prereq --patchid 27968010 --instance1 xdprod-n53zg1:/u02/app/oracle/product/12.1.0/dbhome_2
INFO: DBCS patching
333333 /var/opt/oracle/exapatch/exadbcpatchmulti -precheck_async 27968010 -cli -instance1=xdprod-n53zg1:/u02/app/oracle/product/12.1.0/dbhome_2
This might take some time, please take a look at file /var/opt/oracle/log/exadbcpatch/exadbcpatch.log for progress
Prereq check completed successfully, ready to apply patch
Alternatively
[opc@xdprod-n53zg2 ~]$ sudo dbaascli patch db prereq --patchid 27968010 --dbnames bmsprod
```

Steps to Apply RDBMS Patches- Apply

To apply a patch:

- On specific instances:

```
[opc@xdprod-n53zg1 ~]$ sudo dbaascli patch db apply --patchid 27968010 --dbnames bmsprod
DBAAS CLI version 18.2.3.1.0
Executing command patch db apply --patchid 27968010 --dbnames bmsprod
INFO : EXACS patching
This might take some time, please take a look at file /var/opt/oracle/log/exadbcpatch/exadbcpatch.log for
progress
```

Log should show following on completion:

```
2019-05-02 21:34:48.613752 - ##### INFO: Exadbcpatch completed successfully #####
```

```
SELECT TO_CHAR(action_time, 'DD-MON-YYYY HH24:MI:SS') AS action_time,action, namespace,version,id,comments,bundle_series
FROM sys.registry$history ORDER by action_time;
ACTION_TIME ACTION NAMESPACE VERSION ID COMMENTS BUNDLE_SER
```

```
02-MAY-2019 22:08:44 jvmpsuv.sql SERVER 12.1.0.2.1 0 RAN jvmpsuv.sql
80717OJVMP
SU
```

```
BOOTSTRAP DATAPATCH 12.1.0.2 RDBMS_12.1.0.2.0DBBP_LINUX.X64
_170106
```

Steps to Apply RDBMS Patches- Rollback

```
[opc@xdprod-n53zg2 ~]$ sudo dbaascli patch db switchback --patchid 27968010 --dbnames bmsprod  
DBAAS CLI version 18.2.3.1.0
```

```
Executing command patch db switchback --patchid 27968010 --dbnames bmsprod
```

```
INFO : EXACS patching
```

```
This might take some time, please take a look at file /var/opt/oracle/log/exadbcpatch/exadbcpatch.log for  
progress
```

Listing Applied Patches

You can produce a list of applied patches to determine which patches have been applied.

You can use the opatch utility to determine the patches that have been applied to an Oracle Database or Grid Infrastructure installation.

To produce a list of applied patches for an Oracle Database installation, proceed as follows:

- Connect to a compute node as the oracle user.
- Set the ORACLE_HOME variable to the location of the Oracle Database installation you wish to examine. For example:
 - \$ export ORACLE_HOME=/u01/app/oracle/product/12.1.0.2/dbhome_1
 - Execute the opatch command with the lspatches option:
 - \$ \$ORACLE_HOME/OPatch/opatch lspatches

To produce a list of applied patches for Oracle Grid Infrastructure, proceed as follows:

- Connect to a compute node as the opc user.
- Become the grid user:
- \$ sudo -s # su - grid
- Execute the opatch command with the lspatches option:
- \$ \$ORACLE_HOME/OPatch/opatch lspatches

Log file analysis for patching issues

Patch log location :-

- /var/opt/oracle/log /
- /var/opt/oracle/log/exadbcpatchmulti
- /var/opt/oracle/log/exadbcpatchsm
- /var/opt/oracle/log/exadbcpatch

Each node will have exadbcpatch log. exadbcpatchmulti log will be only on one node(from where we started patching).

Note: exadbcpatch.cfg should have correct URL. E.g: it is region specific.

```
oss_container_url=https://swiftobjectstorage.us-ashburn-1.oraclecloud.com/v1/exadata/patches/dbaas_patch
```

ExaCS- Data Guard First Patching

In case of data guard environment with ExaCS you can take advantage of Data Guard Patching before primary instances.

Example Scenario: Primary Instance I1 and standby Instance I2.

Assume each Instance have two nodes. I11, I12, I21, I22.

Tool will apply the patch on I21 then on I22 then I12 and then on I11. and run datapatch on I11.

Task of exadbcpatchmulti in Data Guard Scenario

- Find which one is active/Inactive node.
- Find which one is primary/Standby.
- Find Number of nodes/node names.
- Find Last node where to run the datasql.
- Find standby nodes name/primary nodes name

ExaCS- Patching Best Practices

- 1) Exachk : Pull out Exacheck report from both nodes

```
exachk -localonly -dball > <node>_exachk.output.txt
```

- 2) Cluvfy : Capture all outputs to individual files

```
As grid : <GI_HOME>/bin/cluvfy stage -post crsinst -n all -verbose
```

```
As grid: <GI_HOME>/bin/cluvfy stage -post acfscfg -n node1,node2 -verbose
```

```
As grid: <GI_HOME>/bin/cluvfy comp software -n <node1,node2> -allfiles -verbose
```

```
As Oracle: <GI_HOME>/bin/cluvfy comp peer -n <node1,node2> -verbose
```

```
As Oracle: <GI_HOME>/bin/cluvfy comp admprv -n <node1,node2> -o user_equiv -verbose
```

```
As Oracle: <GI_HOME>/bin/cluvfy comp admprv -n <node1,node2> -o crs_inst -verbose
```

- 3) space checks on all file systems

```
df -k
```

- 4) Verify services on all databases using services

```
srvctl status service -d <DB>
```

5) collect /etc/oratab on all nodes and Verify consistency in the oratab files on all nodes

```
cat /etc/oratab
```

Important : Make sure for a given ORACLE_HOME, there should be only one entry per home which point to the database name in the /etc/oratab.

- Databases are assigned to the correct dbhomes
- There are no Instance specific entries
- The oratab files on all nodes are consistent

Note: dbaascli does not use oratab file for facilitating patching.

6) run dbaas_diag_tool on both nodes as "root"

Diagnostic Data Collection For Oracle Database Cloud Service Instances 2219712.1

```
# ./dbaas_diag_tool.pl --gettfalogs true
```

7) list /var/opt/oracle/dbaas_acfs directory on both nodes

```
ls -l /var/opt/oracle/dbaas_acfs/
```

8) Dbaastools rpm should be updated to the latest on both nodes:

```
#dbaascli patch tools auto enable
```

9) Verify central inventory and node inventory are consistent across all nodes: inventory.xml on both nodes is consistent

There are no homes deleted/created outside the inventory

All existing homes/dbs in the inventory should be created from tooling

Make sure all existing ORACLE_HOME are not moved or relocated using attachhome/detachhome options

10) Verify all files needed for patching/relinking are intact on both nodes

e.g.:

```
$ORACLE_HOME/rdbms/admin/shrept.lst --MOS 1587532.1
```

11) Verify the Central inventory and node inventories are consistent across all nodes- ie, opatch lspatches shows the same patch list on all nodes

Exacheck for ExaCS- Health check of ExaCS system

EXACHK is a utility in Oracle EXADATA System that monitors health of the system. EXACHK used to identify the findings needed attention for *Database Server, Storage Server and Infiniband Switch*

- Grid Infrastructure, Database and ASM and operating system software checks
- MAA Scorecard which conducts an automatic MAA Review
- Exadata Software Planner, Software prechecks, Exadata and Database Critical Issue alerts
- All checks have explanations, recommendations, and manual verification commands so that customers can self-correct all FAIL and WARNING conditions reported.
- Development recommends that the latest exachk be executed with the following frequency:
 - Monthly
 - Week before any planned maintenance activity
 - Day before any planned maintenance activity
 - Immediately after completion of planned maintenance activity or an outage or incident

The latest version of **EXACHK** is version **18.4.0 20181129** ([Patch 18622611](#))
Oracle Exadata Database Machine exachk or HealthCheck (Doc ID 1070954.1)

Demo

Summary

After completing this session

You should have understanding of following concepts:

- Understanding of Patching Facilities in Exadata Cloud Service
- Understanding of ExaCS Quarterly Release Update
- Understanding how to keep cloud tooling current
- Understanding of Prereq, Apply, Rollback scenarios
- Understanding Log Files for analysis
- Understanding of Best Practices for Patching ExaCS
- Understanding of Exacheck for pre and post patching/upgrades

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