HCUK Oracle 12c Database Patching Automation

Deploy and Apply User Guides

# Introduction

This document is intended to be a DBA user guide or manual on how to use the Linux BASH scripts created to assist with the deployment and application of Oracle Patch Set Updates (PSUs) to Oracle 12c (12.1 or 12.2) databases running on Linux x86-64 hosts.

There are 2 different BASH scripts required as the first (the “deploy” script) is used to automate the remote execution of the second (the “apply” script). It is intended that these scripts and all required patches are hosted on a central host, so that by the use of SSH keys it is possible to apply the patches using OPatch on another host remotely.

The deploy and apply scripts have many similar command line options, with any given to the deploy script used with the execution of the apply script. These options will be explained in detail later on in this user guide.

The deploy script is essentially a wrapper script that is used to call or execute the apply script against one or more remote hosts. This executable BASH script is called: **deploy\_PSU\_12c\_RDBMS.sh**

The apply script does the actual stopping, patching and restarting of Oracle services on each of the remote hosts and can be used on its own if required and copied to the target host. This executable BASH script is called: **apply\_PSU\_12c\_RDBMS.sh**

Also, by utilising NFS it is possible to avoid the need to copy files to the remote host. If the required NFS share is unavailable and there is enough disk space available then an attempt to SCP the required files is made, with all files removed after patching is completed.

All scripts, directories and Oracle patches can be found under the NFS share served by mvlp-rep1 and mounted to each OEM Management Servers (mvlt-omgt1, hvlt-omgt1, mvlp-omgt1, hvlp-omgt1) under the base directory:  
**/share/dbadir/PSU\_deploy**

Under the **PSU\_deploy** base directory is the following directories:  
**bin** – contains the executable deploy and apply BASH scripts   
**log** – stores log files generated  
**psu** – is the base directory for each set of Oracle patches to be applied  
**ssh** – contains useful scripts for adding SSH keys on remote hosts if required (SCP it to the host then execute it there)

The deploy script should be executed as the **oraoem** user on any of the **OEM Management Servers** as the SSH key for each of these users is already in the .ssh/authorized\_keys file on most non-production hosts and the mvlp-rep1:/share NFS share mounted correctly.

The execution of the deploy script creates a main log file within the log directory, as well as a log file for each remote host and service that is being patched, with a copy of this left on the remote host within the OS user’s home directory.

# Preparation

## SSH Keys

It is a requirement to have the necessary SSH keys in place so that the deploy script can copy the apply script to each host to be patched and execute this remotely. For most non-production hosts this is already in place for the oraoem user on all OEM Management Servers. If it is required to add the SSH keys to a remote host user’s .ssh/authorized\_keys file then the script **add\_OMS\_SSH\_keys.sh** should be copied to the host and executed there.

## OPatch Version Checks

Prior to patching it may be required to update OPatch on each remote host and one of the first things that the apply script checks is that it is at least version 12.2.0.1.14 or higher (for both Oracle Database 12.1 and 12.2).

## NFS Utilisation by Remote Hosts

If NFS is to be used then on each remote host to be patched the share mvlp-rep1:/share must be mounted as /share and accessible to the remote OS user (usually called oracle). Also, all Oracle patch zip files that contain the patches to be applied must be unzipped in advance and be located within a correctly named directory, which has the following naming convention:   
${**BASE\_DIR**}/**psu**/RDBMS\_${**ORA\_VER**}\_${**PSU\_VER**}  
Where:  
**BASE\_DIR** is the base directory within the NFS share that all required files are stored under, such as “/share/dbadir/PSU\_deploy”  
**ORA\_VER** is the Oracle 12c database version, which currently can either be 12.1.0.2 or 12.2.0.1  
**PSU\_VER** is the Oracle PSU version, which currently can either be 180717 or 181016  
And **psu** is the name of the directory within the BASE\_DIR that contains the directories for each PSU.

For example, the full path to the directory containing the unzipped July 2018 PSU and any other patches to apply for a 12.1 database would be:  
/share/dbadir/PSU\_deploy/psu/RDBMS\_12.1.0.2\_180717

If NFS is not to be used or is unavailable to the remote hosts then the deploy script checks if there is at least 2 times (double) the amount of space required to store both all the zipped and unzipped files within the OS users home directory. For large PSUs this is likely to fail, but for small one off patches it may be fine and succeed.

## The Host List File

In order to make use of the deploy script it is required to first create a “host list file” of the remote hostnames and corresponding Oracle database SID to apply the PSU to. Each entry within this plain text file must be on a single line and be colon delimited. Additionally and if it is required, the remote OS username that owns the Oracle Home to be patched can be listed as the 3rd field. This user must also be able to stop/start the database using the password file and if it is not specified then “oracle” is tried as the default.

For example, lines within the host list file for both of the OEM test database instances on hosts mvlt-oemd1 and hvlt-oemd1 would be:  
mvlt-oemd1:OEMT2  
hvlt-oemd1:OEMT1

In this example OEMT2 on mvlt-oemd1 would be patched first followed by OEMT1 on hvlt-oemd1.

Another example for a set of RTL RAC database instances may be:  
hplr-rac01:CM21:oracm2  
hplr-rac01:VSEP1:oravse  
hplr-rac01:PCO1:orapco

It may be possible to paralyze both the deploy and apply and perform patching activities against multiple hosts at one time by creating additional host list files and executing the deploy script in multiple sessions.

Also, it is best that all databases listed in each host list file are similar to each other in terms of being a standalone or RAC database; Data Guard primary or standby and whether or not OPatch/datapatch is required to be run.

## Shared Oracle Homes

If the Oracle Home is used or shared by more than 1 database instance then it is necessary for the DBA to manually shutdown all other instances in advance. Once a shared Oracle Home has been patched then it is also required for the DBA to manually run “OPatch/datapatch” for each of these other databases (usually while started in upgrade mode), if it this step is specified by any of the patches applied.

## Oracle Listeners

Prior to applying patches all Oracle Listeners running from the Oracle Home will be stopped and only those there were seen to be running beforehand will be restarted.

# Using the Deploy Script

The deploy script is essentially a wrapper that is used to call or execute the apply script against one or more remote hosts, as determined by what is listed within the host list file, which is one of its mandatory command line parameters. Prior to executing the apply script it does a number of other checks and if it encounters a fatal problem it should exit with a non-zero return code.

The file name of the executable BASH script is: **deploy\_PSU\_12c\_RDBMS.sh**

## Deploy Script Usage

If executed without any parameters or one that is incorrect or is either “-help” or “-h” then the following usage statement is displayed:

deploy\_PSU\_12c\_RDBMS.sh [-hostList=HOST\_LIST\_FILE] [-component=COMP\_TYPE] [-version=ORA\_VER] [-PSU=PSU\_VER] {-doDatapatch} {-noGrid} {-pdb} {-noPrompt} {-debug} {-dryRun} {-testRun} {-help}

Where:

-hostList|-hl - Required. Full path to a file listing all hosts to apply patches to and Oracle SIDs (format per line is 'hostname:SID:SSH\_USER'

-component|-c - Required. Specify the Oracle component to stop and apply patches to (only RDBMS is valid)

-version|-v - Required. Specify the Oracle 12c database version (12.1.0.2 or 12.2.0.1)

-PSU|-psu - Required. Specify the Oracle PSU date to apply to the Oracle Home (format must be YYMMDD and currently 180717 and 181016 are valid)

-doDatapatch|-dp - Optional. Setting this option this will run OPatch/datapatch after attaching the new Oracle Home (the default is not to run datapatch)

-noGrid|-ng - Optional. Setting this option this will NOT use any Grid Infrastructure commands (ignored if RAC is detected and the default is to test if GI is present)

-PDB|-pdb - Optional. Setting this option adds the step to open all pluggable databases (not set by default)

-noPrompt|-np - Optional. Set this option to run with no prompts to the user (not set by default)

-dryRun|-dr - Optional. Set this option to not apply any patches but may attempt to restart services (not set by defaul)

-testRun|-tr - Optional. Set this option to only display the apply scripts usage message on each remote host (not set by default)

-debug|-d - Optional. Display additional debug output to screen (not set by default)

-help|-h - Optional. Display this usage message and exit

## Deploy Script Examples

Listed below are some example usages of the deploy script.

deploy\_PSU\_12c\_RDBMS.sh -hostList=/tmp/DB\_12.1\_hosts.lst -c=RDBMS -v=12.1.0.2 -psu=180717 -d -np -dr -tr

deploy\_PSU\_12c\_RDBMS.sh -hostList=/tmp/DB\_12.2\_hosts.lst -c=RDBMS -v=12.2.0.1 -psu=181016 -d -dr -np -tr

## Deploy Script Parameters

The deploy script command line parameters are each explained in more detail below. They may be specified in any order.

### hostList

* A mandatory parameter whose value refers to a locally accessible file
* Lists all hosts to attempt to connect to and apply patches to in sequential order
* Each entry is on a single line and delimited by a colon character
* The first mandatory field specifies the hostname
* The second mandatory field specifies the Oracle database SID
* The third optional field specifies the OS username that owns the Oracle Home to be patched
* This parameter can be replaced with “-hl”

### component

* A mandatory parameter whose value may only be RDBMS
* This parameter and its value is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-c”

### version

* A mandatory parameter whose value may be either 12.1.0.2 or 12.2.0.1
* This parameter and its value is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-v”

### PSU

* A mandatory parameter whose value may be either 180717 or 181016
* This parameter and its value is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-psu”

### doDatapatch

* An optional parameter with no value required
* If set then after applying all database patches the database is started in upgrade mode and “OPatch/datapatch” is run to apply patches to the database itself
* By default this is not set
* This parameter is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-dp”

### noGrid

* An optional parameter with no value required
* If set then no Grid Infrastructure commands are attempted (SRVCTL)
* By default this is not set but if the database is detected to use RAC then it is ignored
* This parameter and its value is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-ng”

### PDB

* An optional parameter with no value required
* If set then an additional step to open all pluggable databases is performed at the end of patching
* This parameter and its value is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-pdb”

### noPrompt

* An optional parameter with no value required
* If this is set then the user is not ever prompted and the script attempts to complete in full
* This parameter is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-np”

### dryRun

* An optional parameter with no value required
* If this is set then no patches are applied but all running services on the remote host are restarted
* This parameter is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-dr”

### testRun

* An optional parameter with no value required
* If this is set then no patches are applied and no services on the remote host are restarted
* This parameter is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-tr”

### debug

* An optional parameter with no value required
* If this is set then additional information is displayed on screen and in log files
* This parameter is passed on to the execution of the apply script on the host being patched
* This parameter can be replaced with “-d”

### help

* An optional parameter with no value required
* If this is set then just the usage message is displayed and all other parameters are ignored
* This parameter can be replaced with “-h”

# Using the Apply Script

The apply script does the actual stopping, patching and restarting of Oracle services on each of the remote hosts after the deploy script first copies it to the host. It can be executed directly on a remote host running an Oracle 12c database instance if this is required.

The file name of the executable BASH script is: **apply\_PSU\_12c\_RDBMS.sh**

## Apply Script Usage

If executed without any parameters or one that is incorrect or is either “-help” or “-h” then the following usage statement is displayed:

apply\_PSU\_12c\_RDBMS.sh [-component=COMP\_TYPE] [-version=ORA\_VER] [-PSU=PSU\_VER] [-SID=ORACLE\_SID] {-stageDir=BASE\_DIR} {-doDatapatch} {-noGrid} {-pdb} {-noPrompt} {-debug} {-dryRun} {-help}

Where:

-component|-c - Required. Specify the Oracle to component stop and apply patches to (currently only RDBMS is valid)

-version|-v - Required. Specify the Oracle 12c database version (12.1.0.2 or 12.2.0.1)

-PSU|-psu - Required. Specify the Oracle PSU date to apply to the Oracle Home (format must be YYMMDD and currently only 180717 and 181016 are valid)

-SID|-sid - Required. Specify the Oracle SID to lookup from the ORATAB file

-stageDir|-s - Optional. Staging directory of where to find the patches to apply (default is /share/dbadir/PSU\_deploy/psu/RDBMS\_12.1.0.2\_180717)

-doDatapatch|-dp - Optional. Setting this option this will run OPatch/datapatch after attaching the new Oracle Home (default is not to run datapatch)

-noGrid|-ng - Optional. Setting this option this will NOT use any Grid Infrastructure commands (ignored if RAC is detected and the default is to test if GI is present)

-PDB|-pdb - Optional. Setting this option adds the step to open all pluggable databases (not set by default)

-noPrompt|-np - Optional. Setting this option will run with no prompts to the user (not set by default)

-dryRun|-dr - Optional. Setting this option will not apply any patches but may attempt to stop and restart services (not set by default)

-debug|-d - Optional. Display additional debug output to screen (not set by default)

-help|-h - Optional. Show this usage

## Apply Script Examples

Listed below are some example usages of the apply script.

apply\_PSU\_12c\_RDBMS.sh -component=RDBMS -version=12.2.0.1 -PSU=180717 -SID=ORCL -noPrompt -dryRun

apply\_PSU\_12c\_RDBMS.sh -c=RDBMS -v=12.1.0.2 -psu=180717 -sid=ORCL -d -np -s=/u01/oracle/software

apply\_PSU\_12c\_RDBMS.sh -c=RDBMS -v=12.1.0.2 -psu=180717 -sid=OEMT1 -d -dr -np -s=/u02/RDBMS\_12.1.0.2\_180717

apply\_PSU\_12c\_RDBMS.sh -c=RDBMS -v=12.2.0.1 -psu=181016 -sid=test122 -d -dr -np -s=/tmp/RDBMS\_12.2.0.1\_181016

## Apply Script Parameters

The apply script command line parameters are each explained in more detail below. They may be specified in any order.

### component

* A mandatory parameter whose value may only be RDBMS
* This parameter can be replaced with “-c”

### version

* A mandatory parameter whose value may be either 12.1.0.2 or 12.2.0.1
* This parameter can be replaced with “-v”

### PSU

* A mandatory parameter whose value may be either 180717 or 181016
* This parameter can be replaced with “-psu”

### doDatapatch

* An optional parameter with no value required
* If set then after applying all database patches the database is started in upgrade mode and “OPatch/datapatch” is run to apply patches to the database itself
* By default this is not set
* This parameter can be replaced with “-dp”

### noGrid

* An optional parameter with no value required
* If set then no Grid Infrastructure commands are attempted (SRVCTL)
* By default this is not set but if the database is detected to use RAC then it is ignored
* This parameter can be replaced with “-ng”

### PDB

* An optional parameter with no value required
* If set then an additional step to open all pluggable databases is performed at the end of patching
* This parameter can be replaced with “-pdb”

### noPrompt

* An optional parameter with no value required
* If this is set then the user is not ever prompted and the script attempts to complete in full
* This parameter can be replaced with “-np”

### dryRun

* An optional parameter with no value required
* If this is set then no patches are applied but all running services on the remote host are restarted
* This parameter can be replaced with “-dr”

### debug

* An optional parameter with no value required
* If this is set then additional information is displayed on screen and in log files
* This parameter can be replaced with “-d”

### help

* An optional parameter with no value required
* If this is set then just the usage message is displayed and all other parameters are ignored
* This parameter can be replaced with “-h”