



Standardize Oracle RAC Provisioning Using HP DMA

HP Database and Middleware Automation version 10.10

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Purpose

This paper describes how to use HP Database and Middleware Automation (HP DMA) to create a repeatable, standardized “gold image” for provisioning Oracle Grid Cluster Ready Services (CRS), Automatic Storage Management (ASM), and Real Application Clusters (RAC) database.

Benefits of HP DMA

HP DMA automates many of the daily administrative tasks required to manage the lifecycle of relational databases and J2EE application servers. These tasks are complex, often manual, typically time-consuming, and frequently error-prone. HP DMA improves the efficiency of these administrative tasks, enabling administrators to deliver change faster with higher quality, better consistency, and improved reliability.

HP DMA equips you to do the following:

- Define and enforce standards for software installation
- Define an installation process once and reuse it repeatedly
- Capture knowledge
- Avoid human error

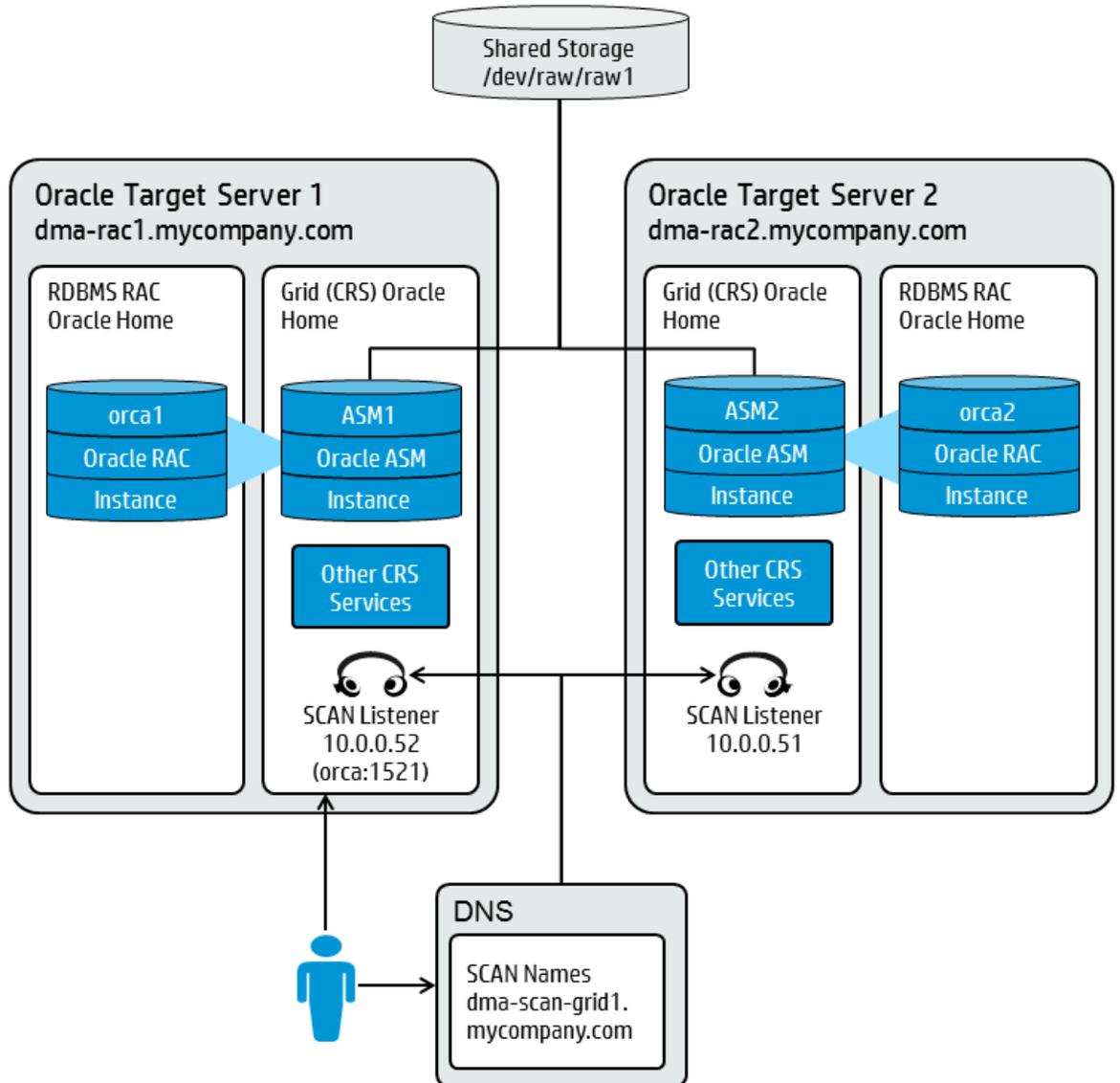
What Oracle Grid infrastructure for cluster does

The Oracle Grid infrastructure for cluster allows an Oracle database to participate as a RAC database and use common ASM storage across nodes. It enables the user to use these features:

- Start automatically with the server
- Manage the configurations of the database
- Run Oracle Restart
- Use ASM
- Manage nodes in an Oracle cluster
- Manage virtual IP addresses and SCAN virtual IP addresses

Goal

When you follow the instructions provided in this paper, you can create the following configuration. This example shows an RAC database that lives on two nodes of a CRS cluster:



Prerequisites

Before you can perform the procedures in this paper, your environment must meet the following minimum requirements:

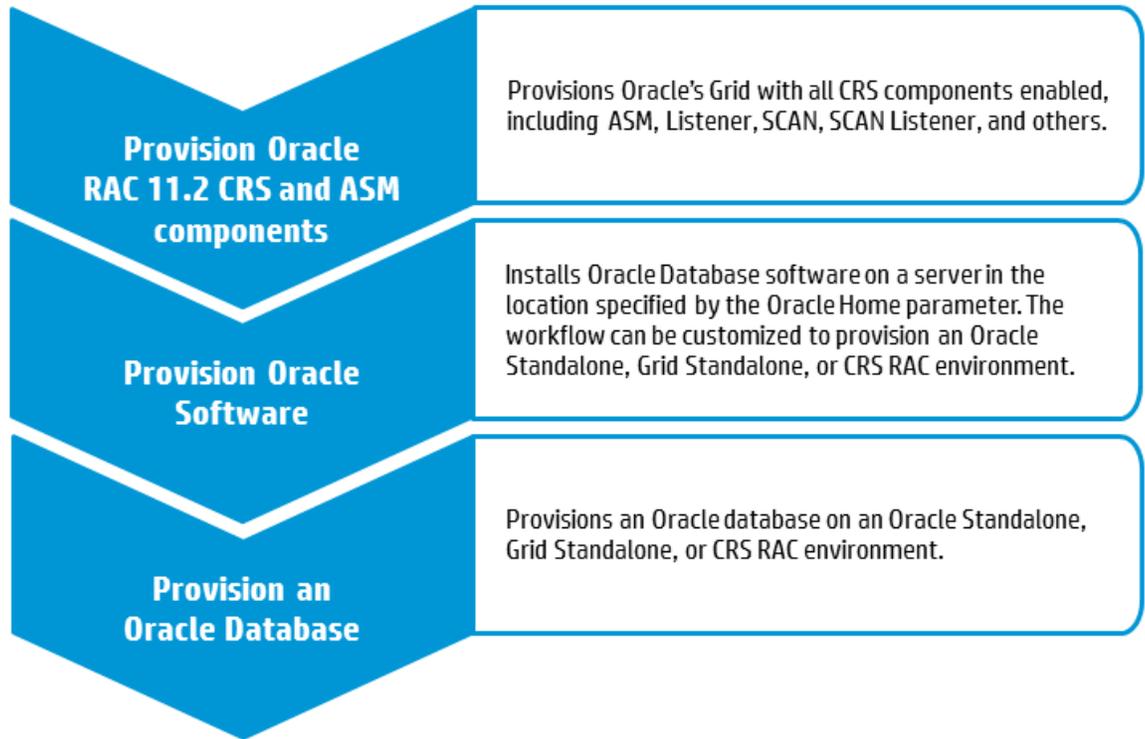
- A server running one of the following operating systems:
 - Linux (any version that is supported by Oracle and HP DMA)
 - AIX
 - Solaris

This server must meet the Oracle requirements for installing 11gR2 (see www.oracle.com/pls/db112/homepage for more information).
- A shared raw disk (or disks) to be used across all of the nodes. The disk needs to be available to be mounted and used by Oracle ASM. The device cannot be formatted, but it may be partitioned.
- Storage:
 - A staging directory with 8 gigabytes available to successfully unzip the Oracle Grid Infrastructure and Oracle Database binaries.
 - For ASM disks, a minimum of 5 gigabytes combined for logical storage (more may be required for your environment).
 - A minimum of 30 gigabytes on the partition to install Oracle Grid Infrastructure and Oracle Database Homes (more may be required for your environment).
- Networking:
 - A separate NIC configured for a VLAN private interconnect on both nodes.
 - Virtual IP addresses, one per node.
 - A SCAN virtual IP address, one per cluster.
- Licenses for Oracle Database and HP DMA.

For a specific example of how to meet these general requirements for Oracle Enterprise Linux version 6, see [Appendix A: How to meet prerequisites](#). You can adapt these instructions for the platform that you use.

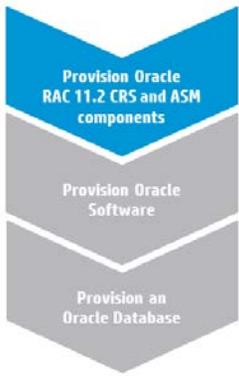
Process overview

You will use the following three HP DMA workflows to standardize the process of provisioning Oracle Grid (CRS), ASM, and database:



The following three sections provide detailed information that you will need to run each workflow.

Note: For additional information, see [Appendix B: How to run an HP DMA workflow](#).



Workflow 1: Provision Oracle RAC 11.2 CRS and ASM components

This section provides detailed information that you will need to run the Provision Oracle RAC 11.2 CRS and ASM components workflow.

Solution pack

This workflow requires the HP DMA Advanced Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

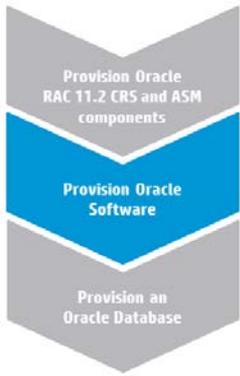
When you deploy the Provision Oracle RAC 11.2 CRS and ASM components workflow, specify input parameter values for the following step:

Note: You must specify a non-default value for any parameter whose name appears in bold text in the following table.

Step: Gather Parameters for Provision Oracle RAC 11-2 CRS and ASM Components

Parameter	Description	Example Value
ASM Diskgroup	Required: Name of the Disk Group that you are creating.	DATA
ASM Disks	Required: Comma-separated list of disks included in your disk group.	/dev/raw/raw1,/dev/raw/raw2
ASM Groups	Required: Operating system groups that manage ASM. Syntax: ASMGroup:ASMDBA:ASMOper	oinstall:dba:oinstall
ASM Password	Required: The password used to manage ASM (default is Manager1).	
CRS Account	Required: The user who will own the CRS software.	oracle
CRS Archive	Optional: The location of the CRS archive (.zip or .cpio.gz) in the software repository.	p10404530_112030_Linux-x86-64_3of7.zip
CRS Base	Required: The location of the Oracle Base directory. This is where the admin directory is located.	/u01/app/grid
CRS Binary Stage	Required: The location where the CRS archive has been (or will be) extracted.	/tmp
CRS Group	Required: The system group to be used by the CRS installation. Must be the primary group of the CRS Account User.	oinstall

Parameter	Description	Example Value
CRS Home	Required: The location where the CRS software will be installed.	/u01/app/11.2.0/grid
CRS Name	Required: The unique Oracle name for this CRS cluster. Must contain only letters, numbers, and dashes (-).	RAC01
CRS Nodes	Required: Comma-separated list of the CRS nodes. Must be in the format node1-public:node1-private:node1-virtual,node2-public:node2-private:node2-virtual	dma-rac1.mycompany.com:dma-rac1-priv:dma-rac1-vip.mycompany.com, dma-rac2.mycompany.com:dma-rac2-priv:dma-rac2-vip.mycompany.com
Oracle Inventory	Required: The location of the system's current Oracle inventory file. If it does not exist, it will be created.	/etc/oraInst.loc
Scan Info	Required: The Oracle single Client Access name and port you will use to reference this cluster without specifying a specific node.	dma-scan-grid1.mycompany.com:1522
Target Directory	Optional (required if downloading files to the target system): The directory on the target machine where the files will be downloaded.	/tmp



Workflow 2: Provision Oracle Software

This section provides detailed information that you will need to run the Provision Oracle Software workflow.

Solution pack

This workflow requires the HP DMA Database Provisioning Solution Pack.

Parameters to expose

None

Input parameters

When you deploy the Provision Oracle Software workflow, specify input parameter values for the following steps:

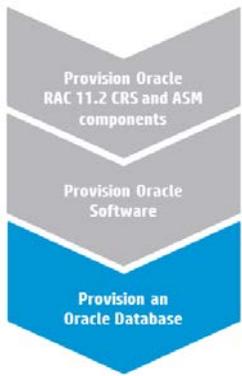
Note: You must specify a non-default value for any parameter whose name appears in bold text in the following table.

Step: Gather Parameters for Provision Oracle Software

Parameter	Description	Example Value
Oracle Account	Optional (required only if inventory does not exist): Oracle user that will own the Oracle Home.	oracle
Oracle Base	Required: The fully-qualified path to the Oracle base directory where the admin directories will be located.	/u01/app/oracle
Oracle Home	Required: Fully-qualified pathname where the Oracle Home will be created. If the specified directory does not exist, it will be created.	/u01/app/oracle/product/11.2.0/dbhome_1
Oracle Software	Required: Comma-separated list of relative or fully-qualified path names of the Oracle Database software archive files. If a fully-qualified path name points to a file, that file is expected to be on the target. If a relative path name points to a file, that file will be downloaded from the software repository. If a fully-qualified path name is a directory, the software is expected to be unzipped and ready to be applied.	/tmp/p10404530_112030_Linux-x86-64_1of7.zip, /tmp/p10404530_112030_Linux-x86-64_2of7.zip

Input Parameters for Gather Advanced Parameters for Provision Oracle Software

Parameter	Description	Example Value
Cluster Nodes	Optional: Comma-separated list of nodes to install software on. Leave blank for non-clustered environments.	dma-rac1.mycompany.com, dma-rac2.mycompany.com <i>Use the public node values of the CRS Nodes parameter in the Provision Oracle RAC 11.2 CRS and ASM components deployment.</i>
Install Edition	Optional: The install edition of the Oracle installation. Valid values are SE or EE (default is EE).	
RAC One Node Install	Optional: Set to true to install Oracle RAC One Node software using the oracle.install.db.isRACOneInstall option (default is false).	



Workflow 3: Provision an Oracle Database

This section provides detailed information that you will need to run the Provision an Oracle Database workflow.

Solution pack

This workflow requires the HP DMA Database Provisioning Solution Pack.

Parameters to expose

In the workflow copy and in the step Gather Advanced Parameters for Provision Oracle Database (step 2), expose the ASM Password and Cluster Nodes parameters (see [Appendix C: How to expose hidden parameters](#)).

Input parameters

When you deploy the Provision an Oracle Database workflow, specify input parameter values for the following steps:

Note: You must specify a non-default value for any parameter whose name appears in bold text in the following table.

Step: Gather Parameters for Provision Oracle Database

Parameter	Description	Example Value
Database Name	Required: The name of the database to provision.	orca
Datafile Location	Required: Database file locations.	+ASMDATA <i>Use a plus sign (+) followed by the same value as the ASM Diskgroup parameter for the Provision Oracle Grid Infrastructure for Standalone Server deployment.</i>
Oracle Account	Optional: Oracle user that will own the Oracle Home. This is required only if inventory does not exist.	Oracle <i>Use the same value as the Oracle Account parameter for the Provision Oracle Software deployment.</i>
Oracle Base	Required: The fully-qualified path to the Oracle base directory where the admin directories are located.	/u01/app/oracle <i>Use the same value as the Oracle Base parameter for the Provision Oracle Software deployment.</i>
Oracle Home	Optional: The ORACLE_HOME to use if more than one Oracle Home exists in the inventory file(s).	/u01/app/oracle/product/11.2.0/dbhome_1 <i>Use the same value as the Oracle Home parameter for the Provision Oracle Software deployment.</i>

Input Parameters for Gather Advanced Parameters for Provision Oracle Database

Parameter	Description	Example Value
ASM Password	Optional (required when provisioning an Oracle database using ASM storage): The password used to manage ASM. Note: This parameter is not exposed in the deployment by default. You must set it to User selected in the workflow before you create the deployment (see Appendix C: How to expose hidden parameters).	<i>Use the same value as the ASM Password parameter for the Provision Oracle Grid Infrastructure for Standalone Server deployment.</i>
Cluster Nodes	Optional: Comma-separated list of nodes to install software on. Leave blank for non-clustered environments. Note: This parameter is not exposed in the deployment by default. You must set it to User selected in the workflow before you create the deployment (see Appendix C: How to expose hidden parameters).	dma-rac1.mycompany.com, dma-rac2.mycompany.com <i>Use the same value as the Cluster Nodes parameter for the Provision Oracle Software deployment.</i>

Step: Add oratab entry

Parameter	Description	Example Value
Start on Boot	Optional: Set to Y if the database instance should be started upon boot. Valid values: Y and N.	N

Step: Discover Oracle Databases

Parameter	Description	Example Value
Trust SSL Certificates	Optional: Set to True if this step will trust any SSL used to connect to the DMA Web Service. Valid values are True and False.	True
Web Service Password	Required: Password for the discovery web service API.	
Web Service User	Required: User capable of modifying the managed environment through the discovery web service API.	dmawebuser

FAQs

What if I don't want to meet all of the prerequisites?

For the Provision Oracle Grid Infrastructure for Standalone Server workflow, do the following:

1. In the workflow copy and in the step Install Oracle Grid Infrastructure for Standalone Server (step 19), expose the Ignore System Prerequisites parameter (see [Appendix C: How to expose hidden parameters](#)).
2. In the deployment, set the value of Ignore System Prerequisites to Y.
3. Execute the deployment.

For the Provision Oracle Software workflow, do the following:

1. In the workflow copy and in the step Gather Advanced Parameters for Provision Oracle Software (step 2), expose the runInstaller Parameters parameter (see [Appendix C: How to expose hidden parameters](#)).
2. In the deployment, set the value of runInstaller Parameters to -ignoreSysPrereqs.
3. Execute the deployment.

No changes are required for the Provision an Oracle Database workflow.

What if I get a failure on the Oracle installer that the ASM disk is not a valid device?

The raw device must exist and be owned by oracle (the user who owns the Oracle Home).

1. Verify that the raw device exists and is owned by oracle:

```
ls -l /dev/raw/raw1
```

2. Look for a line similar to the following:

```
crw-rw----. 1 oracle oinstall 162, 1 Mar 12 14:24 /dev/raw/raw1
```

3. If the device does not exist or is not owned by oracle, run the following commands:

```
raw /dev/raw/raw1 /dev/sdc1
chown oracle:oinstall /dev/raw/raw1
```

What if I get an error message that the /u01/app directory doesn't exist?

The /u01/app directory must exist and be owned by oracle (the user who owns the Oracle Home).

1. Create the directory:

```
mkdir /u01/app
```

2. Change the ownership:

```
chown -R oracle:oinstall /u01/app
```

What if I get a failure in the install log related to the virtual IP address or SCAN virtual IP address?

If you get a failure related to virtual IP addresses, check the following:

1. Ensure that the virtual IP address and SCAN virtual IP address resolve in DNA and are in /etc/hosts
2. Ensure that your public name, virtual IP address, and SCAN virtual IP address are all in the same subnet.

What if I get an error referencing the public, private, or virtual IP addresses?

If HP DMA gives an error referencing the public, private, or virtual IP addresses do the following:

Check that the values specified for the CRS Nodes parameter in the Provision Oracle RAC 11.2 CRS and ASM components deployment are in the required format:

```
node1-public:node1-private:node1-virtual,node2-public:node2-private:node2-  
virtual
```

Appendix A: How to meet prerequisites

To fulfill the ASM requirements listed in [Prerequisites](#) on an Oracle Enterprise Linux version 6 (OEL6) platform, you can use the following specific instructions:

1. Add a disk that already exists:

```
raw /dev/raw/raw1 /dev/sdc1
```

2. Change ownership of the disk:

```
chown oracle:oinstall /dev/raw/raw1
```

3. Edit the `/etc/rc.local` file as root using the following example:

```
#!/bin/sh
#
# This script will be executed *after* all the other init scripts.
#
touch /var/lock/subsys/local
raw /dev/raw/raw1 /dev/sdc1
chown oracle:oinstall /dev/raw/raw1
```

4. Configure YUM to point to the OEL6 repositories.

5. YUM the Oracle RPM to meet the prerequisites:

```
yum install oracle-rdbms-server-11gR2-preinstall
```

Note: Adapt these instructions as appropriate for other platforms.

Appendix B: How to run an HP DMA workflow

The following steps outline the general instructions to run an HP DMA workflow:

1. Import the specified HP DMA solution pack (if it is not already available).
2. Create a deployable copy of the workflow: Specify a name, add roles, optionally expose parameters (see [Appendix C: How to expose hidden parameters](#)), and then Save.
3. Create a deployment: Specify a name, schedule, targets, and input parameters, and then Save.
4. Execute the deployment to run the workflow.
5. View the results to verify that the workflow ran correctly (refer to the online workflow documentation).

Note: For more information about running HP DMA workflows, see the *HP DMA Quick Start Tutorial* available at h20230.www2.hp.com/selfsolve/manuals.

Appendix C: How to expose hidden parameters

If you need to expose any hidden parameters, do the following additional steps when you create a deployable copy of the workflow:

1. Click the workflow tab.
2. Click the blue arrow  next to the pertinent step to expand the list of input parameters.
3. For the parameter that you want to expose, select User selected from the drop-down list. For example:



4. Repeat steps 2 and 3 for all the parameters that you would like to expose.
5. Save the copy of the workflow.

To learn more about HP Database and Middleware Automation visit
hp.com/go/dma

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