18^c ORACLE®
Database

Rapid Home Provisioning and Maintenance
Gold Image Database Maintenance

ORACLE®

Contents

Introduction: Key Benefits and Features

The growing scale of today's data centers puts increasing demands on administrators. At the same time, consumers expect fast access to always-on services, so deployment and maintenance must be efficient and non-disruptive. In order to keep pace, complexity and manual touch points must be reduced. Oracle's Rapid Home Provisioning solution standardizes and simplifies software distribution and management. Automation and efficiency minimize the impact of maintenance and scale to large deployments.

Rapid Home Provisioning represents a standard method for provisioning, patching and upgrading the Oracle Database estate in a unified manner across an entire enterprise.

Key benefits include:

- » Enables and enforces standardization
- » Simplifies provisioning, patching and upgrading
- » Minimizes the impact and risk of maintenance
- » Increases automation and reduces touch points
- » Supports large scale deployments

"Extreme consolidation and a growing infrastructure footprint have made it increasingly difficult to keep our systems up to date with the latest Oracle patches. With Rapid Home Provisioning, we are now able to manage patching and upgrades with minimal impact to business, while also providing a reliable platform for our agile development environment." Ravi Kulkarni, Senior IT Manager, Dell Inc.

Rapid Home Provisioning (RHP) provides centralized software deployment and maintenance. Software need be installed only once, then stored on the RHP Server, and from there can be provisioned to any node or cluster in the data center, whenever needed.

Key features include:

- » Manage existing deployments with no changes needed – no agents, daemons or reconfiguration needed
- » Centralized repository of Gold Images – Grid Infrastructure, Database, application, middleware and generic homes
- » Provision and configure new clusters and databases
- » Non-disruptive distribution to minimize maintenance windows
- » Provision, scale, patch or upgrade with a single command
- » Built-in resume and restore capabilities
- » Notification model
- » Custom workflow support
- » Audit log
- » Supports all deployment models – base machines, VMs, OS Containers, Oracle Multitenant

Key new features in Rapid Home Provisioning and Maintenance 18c

The new 18c release extends the capabilities of RHP in several dimensions:

Local "Switch Home" for Applying Updates

The Rapid Home Provisioning automatons for updating Oracle Database and Grid Infrastructure Homes can be executed in a local mode, with no RHP Server or Client in the architecture.

These automatons feature the same user interface, outcome, and many of the command line options as the server and client modes. This provides for a consistent, standardized maintenance approach across environments that are orchestrated with a central RHP Server and those environments that do not employ the RHP Server.

Zero-Downtime Database Upgrade

Zero-Downtime Database Upgrade automates all of the steps required for a Database upgrade. It can minimize or even eliminate application downtime during the upgrade process. It can also minimize resource requirements. It also provides a fallback path to roll back upgrades if necessary.

By automating all of the steps involved in the upgrade process, Zero-Downtime Database Upgrade reduces the effort, risk and application impact of database upgrades.

Dry Run Command Validation

The workflows encapsulated in Rapid Home Provisioning commands are composed of multiple smaller steps, of which some could potentially fail. The new release includes a "dry run" command mode which allows finding and fixing many potential errors prior to command execution.

While RHP allows a failed command to be resumed after an error condition is corrected, it is often preferable to address as many potential issues as possible before the command is executed. This minimizes problems and the distraction of corrective measures that could arise during a maintenance window. The new "dry run" command mode will test the preconditions for a given command, without making any changes, and report on potential problems. These can then be corrected before the command is actually executed.

Authentication Plug-in

For authenticating communication between a Rapid Home Provisioning Server and target servers, Rapid Home Provisioning enables you to provide login credentials or, when communicating with a Rapid Home Provisioning Client, automatically handles authentication for most operations, internally. A new plug-in framework enables support for additional, user-defined authentication procedures.

Host-to-host authentication in customer environments, particularly in compliance-conscious industries such as financials and e-commerce, will typically leverage advanced technologies and products which are not supported natively by Rapid Home Provisioning. This feature enables integrating Rapid Home Provisioning's authentication with the mechanisms in use at a customer's data center.

Gold Image Distribution among RHP Servers

In the Rapid Home Provisioning architecture, one central RHP Server operates on a set of targets within a given data center (or network segment of a data center). Large enterprises typically host multiple data centers, and within each data center there may be separate network segments. Each will need a dedicated RHP Server. For these customers, this feature provides a simple and secure mechanism for sharing Gold Images among the RHP Servers.

While each data center may have some unique requirements in terms of the Gold Images that target machines will use, the goal of standardization points to using the same Gold Images across all data centers whenever possible. To that end, RHP supports peer-to-peer sharing of Gold Images, to easily propagate Gold Images among multiple RHP Servers.

Configuration Drift Reporting and Resolution

Provisioned copies of gold images can potentially drift from their deployed configuration, for example if one-off patches are applied. Rapid Home Provisioning provides two capabilities for reporting and reconciling this drift:

1. Rapid Home Provisioning compares a specific deployed home to its parent gold image and lists any patches that are applied to the home but that are not in the gold image.

2. Rapid Home Provisioning compares a specific gold image to all deployed copies and lists the aggregation of all patches applied to those homes that are not in the gold image. This provides a build specification for a new gold image that could be applied to all of the copies of the original gold image, such that no patches will be lost from any of those deployments when the new version is applied.

Operating system configurations are also at risk of drift. The Rapid Home Provisioning Server can collect and retain operating system configuration and the root file system contents of specified Rapid Home Provisioning Clients and targets. This information can then be used to

- View current configuration -

- Report any drift from the previous collection

These capabilities support the goal of maintaining standardized deployments across the database estate.

Command Scheduler and Bulk Operations

Rapid Home Provisioning commands can now be scheduled in advance. Tasks can be scheduled to run periodically. The command queue be queried and modified. Also, commands can applied to a list of clients.

The ability to schedule and bundle automated tasks is essential for maintenance of a large database estate. RHP now supports scheduling key tasks such as provisioning software homes, switching to a new home, and scaling a cluster. Also, a list of clients can now be added to a command, facilitating large-scale operations.

Engineered Systems support

This release introduces support for Oracle Exadata infrastructure patching. In addition to the existing support for the Oracle Database and Grid Infrastructure Homes, the software for the database nodes, storage cells and InfiniBand switches software can now be patched with RHP.

Integration of Oracle Exadata components support in to Rapid Home Provisioning allows the management and tracking of maintenance for these components through the centralized Rapid Home Provisioning Service's inventory.

How Does Rapid Home Provisioning and Maintenance Work?

Architecture

The architecture within a data center consists of an Oracle Grid Infrastructure (12.2 or later) deployment running the Rapid Home Provisioning centralized Service (also referred to as the RHP Server, but in fact merely a service of the Grid Infrastructure) and any number of target deployments. The RHP Service can manage existing targets in the datacenter, and create new ones. The targets may be

- Deployments that are not running the RHP Client software (available in Grid Infrastructure 12.2 and later). These targets may be running with or without Oracle Grid Infrastructure. Supported versions of Oracle Grid Infrastructure are 11.2 and 12.1. They cannot make requests to the Service, but are managed by the Service.

- Oracle Grid Infrastructure 12.2 and later running the Rapid Home Provisioning Client. RHP Clients can make requests to the Service, and also can be managed by the Service.
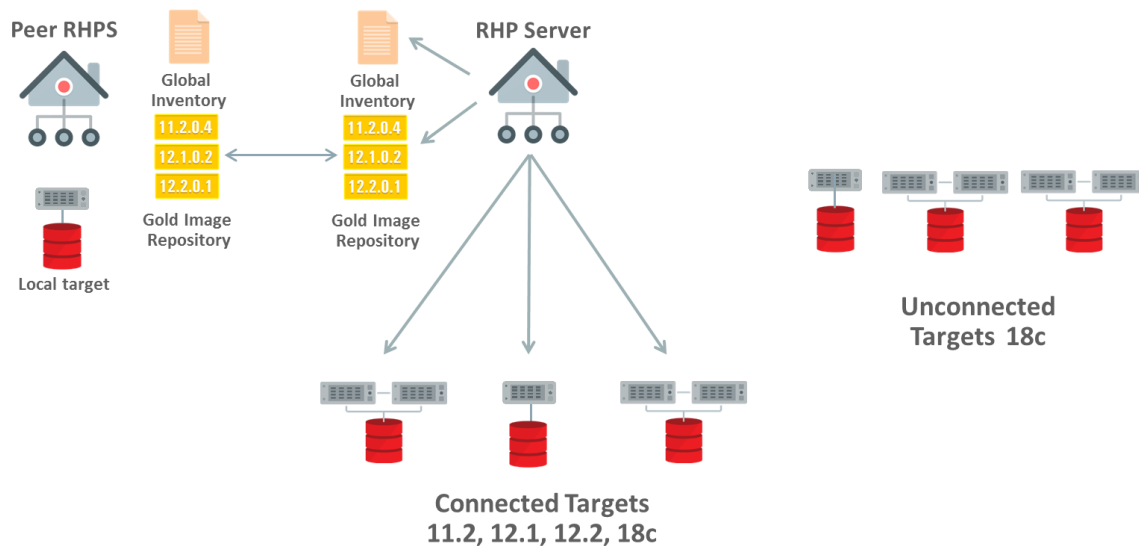
Figure 1 - RHP Architecture

One Central Service for a Large Estate of Targets

The Rapid Home Provisioning Service is available as part of Grid Infrastructure version 12.2 and later. Oracle Clusterware manages the components that form the RHP Service. These components include the RHP Service itself, Grid Naming Service (GNS[1]) which is used to advertise the location of the RHP Service to RHP Clients, an inventory of the managed target estate, and the gold image repository.

The main features of the Rapid Home Provisioning Service are:

•   Efficiently stores gold images for the managed homes (Grid Infrastructure, Database, and generic software), including binaries and metadata related to users, roles, and permissions.

•   Provides a list of available homes to authorized RHP Clients upon request.

•   Reports on existing deployments.

Since the RHP Service is a feature of the Grid Infrastructure, the minimum hardware recommended for a Rapid Home Provisioning Service is the same as for any Grid Infrastructure deployment:

- At least 4 GB of RAM

- Swap Space Requirement

    --> Equal to the size of the RAM if RAM between 4 GB and 16 GB

    --> More than 16 GB if RAM is more than 16 GB

- At least 6.9 GB of disk space

- At least 1 GB of space in the /tmp directory.

- At least 50 GB of space in the ASM diskgroup used by RHP Service (to store Gold Images)

- 1 Ethernet interface card for the Oracle Grid Infrastructure public network

- 1 Ethernet interface card for the Oracle Grid Infrastructure private network

More details can be found in the Oracle Support Document 2126710.1 (RHP: Rapid Home Provisioning Server - Minimum Requirement). For detailed steps on creating an RHP Service (and Client too), please see Oracle Support Document 2097026.1 (How to Setup a Rapid Home Provisioning (RHP) Server and Client).

Also note that a Domain Services Cluster (new in 12.2) would be a good choice for hosting an RHP Service, but a DSC does not have to host an RHP Service.

Oracle recommends hosting the RHP Service on a multi-node cluster for high availability, but it can be hosted on a single-node Grid Infrastructure deployment.

---

[1] Either flavor of GNS (with our without zone delegation) will meet the requirement

Any Number of Clients and Targets

The Rapid Home Provisioning Client is part of Oracle Grid Infrastructure version 12.2 and later. Administrators operate on a Rapid Home Provisioning Client to perform tasks such as requesting deployment of Oracle homes and listing available gold images. When a user requests an Oracle home by specifying a gold image, the RHP Client communicates with the RHP Service to fulfill the request. Clients can be created and fully managed from the RHP Service.

In addition to creating and managing RHP Clients, the RHP Service can manage existing and create new targets that are not running the RHP Client software. These targets cannot initiate communication with the RHP Service and are managed solely from the RHP Service. These targets may be running Grid Infrastructure 11.2 or 12.1. Or, they can be running Single Instance Oracle Database of those same versions, with no Grid Infrastructure installed, or with Oracle Restart installed.

The RHP Service works directly with target 11.2 and 12.1 Grid Infrastructure homes, so these older Grid Infrastructure homes cannot be RHP Clients.

Clients and Targets do not depend on the RHP Service

During normal run time operations, Clients and targets have no dependency on the Service. So if the Service is unavailable, the software homes that have been provisioned on the clients and targets operate normally.

Gold Images and their Provisioned Copies

Each gold image represents an installed home, either Oracle Database home, Grid Infrastructure home, or any other software home. Applications do not run directly on gold images. Instead, copies can be created from gold images, and these are the deployed executables.

Gold images can be imported from an installed home on the RHP Service, an RHP Client, or any node in the data center. Gold images can also be shared among RHP Services.

» State and Access

Rapid Home Provisioning allows you to define the state of an image – published, testable, or restricted. This enables life cycle management. Furthermore, access to a given image can be controlled at both the role and specific user levels.

» Series

Using an image series is a convenient way to group different gold images into a logical sequence. An image can belong to zero, one or more series. A series could represent a sequence of patch levels, with different series tailored to specific use cases.

» Notifications

Users may subscribe to series events. Anyone subscribed will be notified by email when an image is added to or deleted from the series they are subscribed to.

» Provisioned copies versus unmanaged homes

A provisioned copy is an instantiation of a gold image. Provisioned copies are the deployed executables that run on RHP Clients and other targets. Provisioned copies are independent, and any number of copies may be provisioned from a given gold image, facilitating standardization across the data center.

Provisioned copies are also referred to as managed homes, to differentiate them from software homes that were not provisioned by RHP. The latter are referred to as unmanaged homes. 12.2 RHP Clients and other targets can run both managed and unmanaged homes. During a patch or upgrade process, an unmanaged home can be switched to a managed home, easily bringing that home in to the RHP management framework.

» Space Efficiency

The lifecycle of a software home will include deployment of the initial image, and invariably the deployment of subsequent images containing patches. For products such as Oracle Database and Grid Infrastructure, the patched version of a given release will involve changes to only a portion of the original files. Rapid Home Provisioning takes advantage of this fact: when saving a patched gold image, RHP saves only the deltas from the source image.

The resulting savings can be appreciable. For example, an Oracle Database 11.2.0.4 home (and therefore a gold image) is approximately 4.5 GB. When we went through the workflow for creating a new gold image with a recent CPU patch applied (see Appendix B), the resulting delta consumed only 340 MB of storage, a savings of over 4 GB.

This delta-based approach applies to Oracle Database and Grid Infrastructure Homes. For customers running multiple versions of these products, and various patchsets on each version, the overall savings will be significant.

Achieving this space saving requires following the workflow described in Appendix B, which establishes the relationship between an initial gold image and the delta(s) that follow. Note that implementing this approach is optional: you are free to create every gold image independently, and store each one as a full-sized entity. There is no disadvantage to that apart from the storage consumption.

Provisioning Standardized Deployments

Clusters

The Rapid Home Provisioning Service can provision and configure Oracle Grid Infrastructure on one or more nodes that have only the OS installed, and then configure Oracle Grid Infrastructure to form a single node or multi-node Oracle Grid Infrastructure installation. Versions 11.2 onwards are supported.

Databases

Rapid Home Provisioning can provision Oracle Database homes for Oracle Database 11.2 and later. Once the software is provisioned, a single RHP command will create a database with choices including

- Oracle Real Application Clusters (Oracle RAC)

- Oracle Real Application Clusters One Node (Oracle RAC One Node)

- single instance (with or without Grid Infrastructure or Oracle Restart on the target)

- using templates

- creating Oracle Multitenant Container Databases (CDBs)

- creating an Admin- or Policy-managed database

Generic software

The Rapid Home Provisioning ecosystem is not limited to Database and Grid Infrastructure homes. Any software binary – Oracle, third-party or custom – may be used to create a gold image which can then be provisioned to any node or nodes in the data center.

Storage Options for Provisioned Software

When you provision software, the storage option determines where the software is placed:

- LOCAL (default): In a local file system not managed by Rapid Home Provisioning.

- RHP_MANAGED: In a shared file system managed by Rapid Home Provisioning

The options do not apply to all provisioning scenarios. There are two factors: the type of home being provisioned (Database, Grid Infrastructure or arbitrary software) and where the copy is provisioned – on to the Rapid Home Provisioning Server itself, an RHP Client, or a target that is not an RHP Client.

LOCAL: Choosing this value stores copies in a local file system that is not managed by Rapid Home Provisioning. This is available for all provisioning scenarios.

RHP_MANAGED: Choosing this value, which is available for Rapid Home Provisioning Servers and Rapid Home Provisioning Clients, stores provisioned copies in an Oracle ACFS shared file system. Oracle Database homes are the only type of software home supported with this option. This option leverages ACFS snapshot technology to minimize storage use.

Persistent Home Path during Patching

Out-of-place patching is the best practice for applying updates. The patched environment is created in a new directory path and then the home switched to the new path. This approach allows for non-disruptive software distribution since the existing home can be active while the new home is provisioned. Also, rollback is facilitated since the old home is available if any problems are encountered after the switch.

One potential drawback to traditional out-of-place patching is that the home path changes. While RHP internals handle this transparently for Oracle Database and Grid Infrastructure software, some customers and third parties have developed scripts which depend on the path. To address this, Rapid Home Provisioning leverages a new filesystem capability which allows for separation of gold image software from the site-specific configuration changes, so the home path is persistent throughout updates.

This capability is available for Oracle Database and Oracle Grid Infrastructure versions 12.2 and later provisioned in LOCAL storage. Also, if an eligible Database or Grid Home was provisioned without using this capability, then during an "`rhpctl move database`" or "`rhpctl move gihome`" (i.e., a patching operation) it may be converted to this configuration.

Simple Capacity-on-Demand for Clusters and Databases

Rapid Home Provisioning allows you to extend and contract the number of nodes that form a Grid Infrastructure and, independently, Oracle RAC Databases. The Rapid Home Provisioning Service can perform these operations on itself (excluding the GI), 12.2 RHP Clients, and non-client targets. Rapid Home Provisioning Clients can execute local commands to extend and contract Oracle RAC Databases they host, but not their Grid Infrastructure.

When contracting an active RAC Database, there are several options for managing sessions that are connected to the node which will be removed. For example, the sessions can be allowed to drain for a specified time, after which any remaining connections are terminated. Or, the node can be removed immediately, ending any current sessions.

Enterprise-wide Patching: Simple, Automated, Resumable, Recoverable

Timely patching is a critical element of maintaining a secure and performing data center. However, overall maintenance windows are shrinking while availability demands from both management and application owners are increasing. Consolidation makes it more difficult to find a window in which all tenants of a shared environment can accept a maintenance window, and also increases the impact of an issue during maintenance, since a problem on a single cluster could impact multiple LOBs. Administrators may develop a fear of patching, and put off applying critical fixes until after a forcing event such as a security breach.

Key Features for Patching

- Out-of-place, non-disruptive distribution of new homes

- Rolling by default

- Dry-run evaluation

- Resumable in case of errors during operation

- Simple rollback

- Data Guard support

- Control over service draining and relocation to maximize availability

Database

Out-of-place patching is the best practice for patching. The patched environment is created in a new directory path and then each database has its home switched to the new path. This approach will work whether the database home is shared with other databases or not..

Rapid Home Provisioning simplifies this solution for Oracle Database versions 11.2 onward, significantly reducing the impact and risk of maintenance. After the one-time activity of preparing the new (patched) gold image, each deployment in the datacenter can be patched with two commands:

1. `'rhpctl add workingcopy'` (Note: in the rhpctl command, copies of Gold Images are referred to as 'workingcopies')

2. `'rhpctl move database'`

Compare the above two commands with the legacy approach that must be executed on every node to be patched for a Database maintenance cycle:

Per-cluster patching experience without Rapid Home Provisioning

1. **Prepare home for out of place patching**
    a. Run OPatch version check
    b. Run Inventory check
    c. Run conflicts check
    d. Run components check
    e. Run Space check
    f. As software owner, tar the existing software home
    g. As software owner, untar the tarball into a new home
 	
2. **Apply the Patch**
    a. Run Opatch apply to install the patch
    b. Attach the new home to inventory
    c. Update the node list to the inventory
 	
3. **Orchestrate switching the database to the new home**
    a. Stop the database instance on the node
    b. Modify the configuration of database CRS resource to start the instance from newly cloned (patched) Oracle home
    c. Start the database instance
	4. **REPEAT THE LEFTHAND COLUMN FOR EVERY DATABASE IN THIS HOME**
	5. **Apply SQL**
	    a. Run datapatch.pl or SQLs necessary for the patch
	
	6. **Fix Dependent Scripts**
	Fix static settings of ORACLE_HOME paths in wrapper scripts

Because RHP implements out-of-place patching and understands the configuration details of the Database, undoing a patching operation by rolling back to the original home is the same single command that rolled to the patched version. This capability reduces the risk of maintenance.

Also, the process is restartable. If a failure occurs during the patch procedure, the operator simply corrects the problem then re-issues the patch command. It will resume where it left off.

Support for Patching Oracle Data Guard standbys

Patching in a Data Guard environment requires that all standbys and the primary are binary patched before Datapatch (or any post-patch script) is run on the primary. Rapid Home Provisioning is "Data Guard aware," meaning that when patching a standby Database, RHP recognizes that it is a standby and applies the binary change but does not execute Datapatch at the end of the procedure.

Because RHP runs Datapatch at the end of the patching sequence for the primary database, you must ensure that all standbys have been binary patched before you update the primary. Note that this applies to Database version 12.1 onwards. See Oracle Support Document Oracle Patch Assurance - Data Guard Standby-First Patch Apply (Doc ID 1265700.1) for more details.

Grid Infrastructure

Patching Grid Infrastructure homes versions 11.2 onwards is just as simple as for Database homes. When a gold image representing the patched home is ready for distribution, a single command provisions the home to the target. That target (RHP Client or otherwise) is not disrupted by this out-of-place provisioning – the Clusterware will continue operating without any impact.

When the maintenance window arrives, a single command switches to the patched home. By default a rolling update is performed. And as for database patching, the operation can be safely and easily reversed with a fallback to the prior (managed) home.

Combined Grid Infrastructure and Database Patching

When you patch an Oracle Grid Infrastructure deployment, Rapid Home Provisioning enables you to simultaneously patch the Oracle Database homes on the cluster, so you can patch both types of software homes in a single maintenance operation.

As an example, assume that an RHP Service has provisioned the following provisioned copies on an Oracle Grid Infrastructure 12c release 1 (12.1.0.2) target cluster which includes the node `test_749`:

GI121WC1: The active Grid home on the Oracle Grid Infrastructure 12c release 1 (12.1.0.2) cluster

GI121WC2: A software-only Grid home on the Oracle Grid Infrastructure 12c release 1 (12.1.0.2) cluster

DB121WC1: An Oracle RAC 12c release 1 (12.1.0.2.0) database home running database "alpha"

DB121025WC1: An Oracle RAC 12c release 1 (12.1.0.2.5) database home with no database instances (this is the patched home)

DB112WC1: An Oracle RAC 11g release 2 (11.2.0.4.0) database home running database "bravo"

DB112045WC1: An Oracle RAC 11g release 2 (11.2.0.4.5) database home with no database instances (this is the patched home)

to simultaneously move

Oracle Grid Infrastructure from copy GI121WC1 to copy GI121WC2

Oracle RAC Database "alpha" from copy DB121WC1 to copy DB121025WC1

Oracle RAC Database "bravo" from copy DB112WC1 to copy DB112045WC1

Issue the following command:

```
$ rhpctl move gihome -sourcewc GI121WC1 -destwc GI121WC2 -auto
 -dbhomes DB121WC1=DB121025WC1,DB112WC1=DB112045WC1 -targetnode test_749
```

For each node in the client cluster, RHP:

1. Runs any configured pre-operation user actions for moving the Oracle Grid Infrastructure (move gihome).

2. Runs any configured pre-operation user actions for moving the database copies (move database).

3. Copies or merges configuration files such as listener.ora and tnsnames.ora (move database).

4. Switches Oracle Home resource attribute of the Databases (move database).

5. Relocates Database services to available instances; applying drain and disconnect options (move database).

6. Stops remaining services running on the node; applying drain and disconnect options (move database).

7. Stops database instances (move database)

8. Executes GI pre-patch and post-patch (move gihome).

9. Starts database instances (move database)

10. Applies SQL patches if the current node is the last node (move database)

11. Updates central inventory (move gihome)

12. Runs any configured post-operation user actions for moving the database copies (move database).

13. Runs any configured post-operation user actions for moving the Oracle Grid Infrastructure copy (move gihome).

Note that Grid Infrastructure and Database patching can be performed separately as well.

Flexible, Intelligent GI and DB Patching Orchestration

When switching a Grid Infrastructure and/or Database Home in a multi-node configuration, RHP offers several options to control the behavior of events. This enables workflows which maximize service availability and minimize disruption to applications and end users.

Switching to a new home across a cluster is performed in either rolling or non-rolling fashion.

A non-rolling update bounces the software stack on all nodes in parallel, so this provides the shortest maintenance window. However, all services will be offline for the duration of the restart. This is acceptable if all Database services are SI DB (they cannot be rolled) or possibly for non-critical deployments for which downtime is insignificant.

A rolling update operates on nodes sequentially, allowing for services to remain up on one or more nodes throughout the maintenance window. This is the default mode of operation for RHP.

To maximize the availability of services during a rolling update, RHP provides several options to control the timing and outcome of operations. These are:

- `-ignorewcpatches`: by default, RHP will not switch to a home that is missing any patches present in the source home. This parameter overrides this behavior. You would use it, for example, if you decided that after a move operation to a patched home, that you wished to switch back to the previous home. Since the previous home would not have all the patches present in the patched home, you would need to specify this parameter for the operation to succeed.

- `-keepplacement`: when specified, RHP will note which nodes the services of admin-managed RAC Databases are running on at the start of the move operation, and ensure they are on the same nodes at the conclusion of the move. This applies to admin-managed RAC (not RAC One) services, version 11.2 onwards.

- `-disconnect` applies to SI DB, RAC, and RAC One instances (11.2 onwards)

- `-drain_timeout` applies to SI DB, RAC, and RAC One instances (12.2 onwards)

- `-stopoption` applies to SI DB, RAC, and RAC One instances (11.2 onwards)

- `-nodatapatch` applies to SI DB, RAC, and RAC One instances (12.1 onwards)

Also for rolling updates, RHP offers a "batch" mode of operation. In batch mode, cluster nodes are processed in batches. When operating on clusters running 11.2 or 12.1 Grid Infrastructure, each batch must contain exactly one node. For 12.2 GI clusters, a batch may contain one or more nodes.

Batch mode comes in two flavors – user-defined and RHP-defined. In both flavors, each batch of nodes is updated in parallel, and batches are processed sequentially. Also, all of the options discussed above for rolling also apply to both types of batched operations.

In user-defined batch mode, identified with the command line option "`-batches`", you provide the list of node batches in the order they are to be processed. After each batch completes, you may either continue with the next batch, revert the just-completed batch back to its source home, or abort the operation.

In RHP-defined batch mode, identified with the command line option "-smartmove", RHP will evaluate the topology of the cluster and the services running on it. Batches are then computed which will optimize service availability, and processing begins with the first batch.

So to deconstruct the "rhpctl move database / rhpctl move gihome" syntax, here are some guidelines for usage:

- The command always requires the "-patchedwc" parameter, specifying the destination copy for the move operation

- Credentials are always required if the target is not a 12.2 RHP Client or the RHP Service itself. (Recall that 11.2 and 12.1 clusters cannot be clients of 12.2 RHP Service, nor can standalone installations that do not have Grid Infrastructure installed.)

- If the operation has user actions defined, "-useractiondata" may be specifed

- When initiating a non-batched rolling update (the default), a non-rolling update (with "-nonrolling"), or starting a batched move operation ("-batches" or "-smartmove")

  - You must specify either a source copy or source home which will be switched from.

  - You may specify a list of specific databases to move from the source copy/home. If you do not, all databases will be moved.

  - You may specify any of the control options described above ("-ignorewcpatches", "-keepplacement", "-disconnect", "-drain_timeout", "-stopoption", "-nodatapatch", "-targetnode", "-notify")

- If you specify "-batches" the command will process the first batch, and complete. At that point, you will issue another "rhpctl move database" command and specify the same "-patchedwc", along with either "-continue", "-revert" or "-abort":

  - "-continue": If the just-completed batch was successfully processed, this options continues the patching operation on the next batch according to the order that was specified when the command was initially issued.

    - If there was a failure while processing the current batch, this option will retry the operation on that current batch. (You may need to take corrective actions outside of RHP in order for the retry to succeed).

  - "-revert": If you have patched one or more batches in a cluster and are dissatisfied with the result, then you can revert the Grid Infrastructure and/or Databases to the original home using this option. Basically, this will undo the patching steps on the nodes that have been completed.

    - This options applies only when the original source home is a provisioned copy (not an unmanaged home).

    - Node batches are processed in reverse order during revert, i.e., the last batch to be reverted will be the one that was first processed to start the patch sequence

- Revert is rolling and will apply "`-stopoption, -disconnect, and -drain_timeout`". It will not apply "`-keepplacement`" nor execute user actions.

- o "`-abort`": Terminates the patching operation. RHP will not clean up or undo any of the patching steps. The cluster and/or databases may be in an inconsistent state as all nodes are not patched. Further actions on the homes are therefore outside of RHP's scope at this point.

- o As noted above you may also specify credentials and/or "`-useractiondata`".

- o Also, reissuing the original command has the same result as the "`-continue`" option.

- If you specify "`-smartmove`" and also specify "`-eval`", the command will not make any updates to the configuration. Instead, it will print the plan it would execute were you to run the command without "`-eval`".

- If you specify "`-smartmove`" and do not specify "`-separate`", the command will generate the list of batches, and process each one sequentially. Control will return to the command line when all batches are complete.

- If you specify "`-smartmove`" and also specify "`-separate`", the command will generate the list of batches, process the first one, and complete. At this point, you will issue another "`rhpctl move database`" command and specify the same "`-patchedwc`", along with either "`-continue`", "`-revert`" or "`-abort`". This is the same behavior as the "`-batches`" scenario.

- For "`move dbhome`", "`-smartmove`" requires Grid Infrastructure Home version 12.2 onwards, and applies to DB homes versions 11.2 onwards.

For "`rhpctl move gihome`", you always specify the destination copy. You may specify "`-batches`" or "`-smartmove`", and the rules and behavior discussed above apply. "`-batches`" applies to clusters running Grid Infrastructure 11.2 onwards while "`-smartmove`" applies to "`move dbhome`" and "`move gihome`" for clusters running Grid Infrastructure 12.2 onwards.

Note that with "`rhpctl move gihome`", you may also patch DB homes simultaneously by using the "`-auto`" parameter.

Single command to Upgrade GI or DB Homes

Rapid Home Provisioning provides a single command to upgrade an Oracle Database home, and a single command to upgrade a Grid Infrastructure home, replacing the numerous steps that are traditionally required. As with patching, the process is restartable: if an error occurs, the procedure stops and allows the user to repair the problem. After the issue is addressed, the command can be reissued, and it will resume where it stopped earlier.

For Grid Infrastructure, the upgrade is rolling by default; this may be overridden if you choose.

After an upgrade to Grid Infrastructure 12.2, the RHP Client is configured and started automatically.

For both DB and GI, the pre-upgrade home can be running on provisioned copy (a managed home that you provisioned with Rapid Home provisioning) or on an unmanaged home.

Oracle Grid Infrastructure and Database Support Matrix

To summarize support for Grid Infrastructure and Database Homes:

The Rapid Home Provisioning Service 12.2.0.1 supports provisioning, patching, scaling and upgrade for the following Database and Grid Infrastructure versions.

Target Home	Provision and Patch	Scale Up / Scale Down	Upgrade to
Database		**RAC home**	
11.2.0.3	N	N	11.2.0.4, 12.1.0.2, 12.2.0.1
11.2.0.4	Y	Y	12.1.0.2, 12.2.0.1
12.1.0.1	N	N	N/A
12.1.0.2	Y	Y	12.2.0.1
12.2.0.1	Y	Y	Future
Grid Infrastructure		**Cluster**	
11.2.0.3	N	N	N/A
11.2.0.4	Y	Y	12.1.0.2, 12.2.0.1
12.1.0.1	N	N	N/A
12.1.0.2	Y	Y	12.2.0.1
12.2.0.1	Y	Y	Future

RHP supports the above versions for RAC One Node and RAC. The above versions of Single Instance Databases are supported running standalone (with no Grid Infrastructure), running on Grid Infrastructure, and running on Oracle Restart.

Note also that Oracle Restart homes are **not** supported with RHP. Therefore to use RHP to patch or upgrade a SI DB running on Oracle Restart, you must first manually patch or upgrade the Oracle Restart binary to the same or higher level as the version of SI DB you will move to.

Database Consolidation during Patch or Upgrade

Often customers will have several database homes on a cluster, with each home running one (or a few) database instance(s). The homes may proliferate over time, and it would be desirable to reduce the number of homes by consolidating multiple instances on to one shared home. Rapid Home Provisioning supports this use case by design.

Suppose a cluster hosts two separate Oracle Database Homes (A and B), each running one or a few database instance(s).

You would then provision a new Database Home onto the cluster - the Database version you want to patch or upgrade the homes A and B to.

You can then switch any or all of the databases running on home A to the new home, and the same for the databases running on home B. RHP understands how to merge the configurations from homes A and B into the new home.

The source home (A or B) can be a database home that was provisioned before you brought RHP into the picture, or it can be a home that was provisioned by RHP.

If the source home was provisioned by RHP, then after a patch operation you can easily move the database instance(s) back to the source home - you simply execute the command that switched you to the patched home, but with the source and destination homes reversed.

"RHP by osmosis" – organic uptake of the current estate

As noted earlier, a Rapid Home Provisioning Service can operate directly on existing deployments. No changes are required on the existing deployments. Since the targets can be 11.2.0.4, 12.1.0.2 and 12.2 Grid Infrastructure and Database homes, there is probably a large portion of your estate that the RHP Service can immediately provide value to.

The homes on the existing deployments are referred to as unmanaged homes – i.e., homes that were not provisioned by RHP. Converting these to managed homes will take place seamlessly as part of the maintenance cycle: when you use RHP to provision the new home and then patch or upgrade to that copy, the target will organically become a managed target with all the benefits that accrue.

RHP Clients can be created several ways.

1. When a pre-12.2 cluster (unmanaged or managed) is upgraded to 12.2, the client will automatically be configured and started.

2. When an unmanaged 12.2 cluster is patched, the RHP Client will be automatically configured and started.

3. An unmanaged 12.2 cluster can be configured and started as a Client by the RHP Service with the 'rhpctl add client' command.

4. When the RHP Service deploys new 12.2 clusters, the RHP Client is automatically configured and started.

Also, recall that any homes in the data center can be imported as Gold Images, so you can choose which images will be your standardized deployment foundations.

Notifications

The Rapid Home Provisioning Service is the central repository for the software homes available to the data center. Therefore, it is essential that administrators throughout the data center be aware of changes to the inventory which might impact their areas of responsibility. In addition to the notification for image series changes described above, users can be notified by email when a copy is provisioned or deleted.

Custom Workflow Support with User Action scripts

For various Rapid Home Provisioning operations, such as importing images, adding or deleting copies, and managing a software home, you can create scripts that will become part of the workflow. You can define different actions for each operation, and further differentiate by the type of image to which the operation applies. Actions that you define can be executed before or after the given operation, and are executed on the target the operation applies to, whether it is the Rapid Home Provisioning Service, a target that is not running a Rapid Home Provisioning Client, or a target that is running a Rapid Home Provisioning Client.

User-defined actions are shell scripts which are stored on the Rapid Home Provisioning Service. When a script runs, it is given relevant information about the operation on the command line, including a free-form string in which you can pass any information you wish. Also, you can associate a file with the script. The Rapid Home Provisioning Service will copy that file to the same location where the script is run on the target.

Custom scripts can apply to a variety of use cases. For example, after creating a new database instance, you may wish to register it with an RMAN catalog. This could be done in a custom script. Or, you may wish to disable a monitor while a Database is being upgraded, and re-enable it afterwards. And, workflows for any type of software home can be created, allowing you to leverage RHP to provision and configure middleware and applications.

Administrative Roles

An authorized administrator assigns roles to RHP users, with access-level permissions defined for each role. This applies to users on both RHP Services and Clients. Rapid Home Provisioning includes basic and composite built-in roles to simplify the assignment of administrative and end-user capabilities.

The composite role GH_CA includes all the basic roles needed to administer an RHP Client. The Oracle Grid Infrastructure user on a Rapid Home Provisioning Client automatically inherits this role.

Similarly, the composite role GH_SA includes all the basic roles needed to administer an RHP Service. This role includes the roles available to GH_CA, plus the ability to administer roles and everything related to RHP clients. The Oracle Grid Infrastructure user on a Rapid Home Provisioning Service automatically inherits the GH_SA role.

There is a need for security and isolation if there are multiple user-communities involved in a single domain of an RHP Service and RHP Clients. The roles-based approach controls access to various entities, providing the

necessary separation and security within the deployment. Assigning roles to a community prevents other community users from acting on entities not belonging to them.

Managing Clients

Rapid Home Provisioning Client management tasks include:

- Enabling and disabling RHP Clients. If an RHP client is disabled, all `rhpctl` commands from that client cluster will be rejected by the RHP Service.

- Creating users and assigning roles on RHP Clients

- Managing the RHP Client Password. Each RHP Client uses a password stored internally to authenticate itself with the RHP Service. The GH_CA user on the client cannot query this password. If there is a need to reset this password, this task is done by the GH_SA user on the RHP Service.

All of the above operations are performed on the RHP Service.

Credentials

Some `rhpctl` commands show root or sudo credentials as a parameter. Credentials are not required when executing an `rhpctl` command on an RHP Client, but credentials may be required when executing an `rhpctl` command on the RHP Server.

Credentials are always required on the 12.2 RHP Service for the commands

addnode gihome

add workingcopy of a Grid Infrastructure Home (unless "-local" is used OR if "-softwareonly" is used and the target is a 12.2 RHP Client)

deletenode gihome

discover client

verify client

Credentials are required for these commands on the 12.2 RHP Service if the target is 11.2 or 12.1 Grid Infrastructure, or a standalone server (no Grid Infrastructure installed).   (If the target is a 12.2 RHP Client, credentials are **not** required for these commands(*)):

add workingcopy (when the workingcopy is not a Grid Infrastructure home – see above)

add database

addnode database

addnode workingcopy

delete workingcopy

delete database

deletenode database

deletenode workingcopy

move database

move gihome

upgrade database

upgrade gihome

import image

(*) with one exception: if you execute 'rhpctl delete workingcopy' and the workingcopy is an active Grid Infrastructure home on the 12.2 RHP Client, then credentials are needed.

Auditing

The Rapid Home Provisioning Service records the execution of all Rapid Home Provisioning operations and also records their outcome (whether success or failure). An audit mechanism enables you to query the audit log in a variety of dimensions, and also to manage its contents and size.

How To: An RHP Cookbook

This workflow will walk through typical use cases for Rapid Home Provisioning, including

- Populate RHP Service with gold images

- Organize gold images in to series

- Create and start a 12.2 RHP Client from the RHP Service

- Move an unmanaged 12.2 database (not created with RHP) to a managed copy

- Create a 12.1 GI deployment from the RHP Service

- Provision an 11.2 database on the target

- Upgrade the database to 12.1

- Patch the GI

- User actions and image types

The workflow assumes the existence of a 12.2 RHP Service. For guidance on creating an RHP Service, refer to MOS Note "How to Setup a Rapid Home Provisioning (RHP) Server and Client (Doc ID 2097026.1)."

Also, the cluster running the RHP Service will need several Oracle Homes (Database and Grid Infrastructure). These are used to create the gold images stored in the RHP Service.

Populate RHP Service with Gold Images and Organize Gold Images in to Series

There are two `rhpctl` commands to create a gold image: "`add image`" and "`import image`."

"`add image`" is used to create a gold image based on a provisioned copy. For "`add image`" the provisioned copy must be on the RHP Service and stored in RHP_MANAGED storage.

"`import image`" is used to create a gold image from an installed home. The home can be on the RHP Service, an RHP Client-enabled installation, or a target that is not client-enabled (11.2, 12.1 or 12.2).

In this workflow we import our gold images from homes installed on the RHP Service using "`import image`" as shown below:

```
[GRID:grid@rhps101:~]>  rhpctl import image -image DB112 -path
/share/software/112/dbhome -imagetype ORACLEDBSOFTWARE

rhps101: Creating a new ACFS file system for image "DB112" ...
rhps101: Copying files...
rhps101: Copying home contents...
rhps101: Changing the home ownership to user grid...
rhps101: Transferring data to 1 nodes
rhps101: 10% complete
rhps101: 20% complete
….
rhps101: 100% complete
rhps101: Changing the home ownership to user grid...

[GRID:grid@rhps101:~]>
```

The above assumes an 11.2.0.4 database home is installed at the path shown.

The supported database and GI versions for "import image" are 11.2.0.4, 12.1.0.2, and 12.2.0.1.

Additional gold images are created with the following syntax:

```
rhpctl import image -image DB12102_PSU -path <installed_home_path> -imagetype
ORACLEDBSOFTWARE

rhpctl import image -image DB122 -path <installed_home_path> -imagetype ORACLEDBSOFTWARE

rhpctl import image -image DB122_PATCH1 -path <installed_home_path> -imagetype
ORACLEDBSOFTWARE

rhpctl import image -image GRID12102 -path <installed_home_path> -imagetype
ORACLEGISOFTWARE

rhpctl import image -image GRID12102_PSU -path <installed_home_path> -imagetype
ORACLEGISOFTWARE

rhpctl import image -image GRID122 -path <installed_home_path> -imagetype
ORACLEGISOFTWARE
```

This shows that on the service there are several gold images of both Oracle Database and Grid Infrastructure Homes.

```
[GRID:grid@rhps101:~]> rhpctl query image
Image name: GRID122
Image name: DB112
Image name: GRID12102
Image name: GRID12102_PSU
Image name: DB12102_PSU
Image name: DB122_PATCH1

[GRID:grid@rhps101:~]> rhpctl query image -image GRID122
Image name: GRID122
Owner: grid@dscluster1
Site: dscluster1
Access control: USER:grid@dscluster1
Access control: ROLE:OTHER
Access control: ROLE:GH_IMG_PUBLISH
Access control: ROLE:GH_IMG_ADMIN
Access control: ROLE:GH_IMG_VISIBILITY
Parent Image:
Software home path: /scratch/rhpstorage/images/iGI122492652/swhome
Image state: PUBLISHED
Image size: 13202 Megabytes
Image Type: ORACLEGISOFTWARE
Image Version: 12.2.0.0.0
Groups configured in the image:
OSDBA=asmdba,OSOPER=asmoper,OSASM=asmadmin,OSBACKUP=asmadmin,OSDG=asmadmin,OSKM=asma
dmin,OSRAC=asmadmin
Image platform: Linux_AMD64
Interim patches installed:
Complete: TRUE
[GRID:grid@rhps101:~]>
```

Details of the GRID122 gold image are provided. Note that the image state is PUBLISHED. This is the default state. The other options are RESTRICTED and TESTABLE. Moving an image through these states enables

lifecycle management of the image. The state can be specified during image creation with the "-state" option, and changed afterwards with the "promote image" command.

Several series are created as logical groupings. Each series is independent and may reference zero, one or many gold images. A gold image may belong to zero, one or many series. Users may subscribe to a series so that they are notified by email whenever a gold image is added to or removed from the series.

```
rhpctl add series –series DB112_series
rhpctl insertimage series -series DB112_series -image DB112
rhpctl add series –series DB12_series
rhpctl insertimage series -series DB12_series -image DB12102_PSU
rhpctl insertimage series -series DB12_series -image DB122_PATCH1
rhpctl add series –series GRID_series
rhpctl insertimage series -series GRID_series -image GRID12102
rhpctl insertimage series -series GRID_series -image GRID12102_PSU
rhpctl insertimage series -series GRID_series -image GRID122
```

```
[GRID:grid@rhps101:~]> rhpctl query series
Image series: DB12_series
Image series: GRID_series
Image series: DB112_series

[GRID:grid@rhps101:~]> rhpctl query series -
series GRID_series
Image name: GRID12102
Image name: GRID12102_PSU
Image name: GRID122
[GRID:grid@rhps101:~]>
```

RHP Server
GRID_series

| GRID12102 |
| GRID12102_PSU |
| GRID122 |

DB112_series

DB112

DB12_series

DB12102_PSU

DB122_PATCH1

Create and start a 12.2 RHP Client from the RHP Service

We have two machines, vmsvr041 and vmsvr042 configured with OS, storage and network to support a Grid Infrastructure installation. Before the following step is taken, there is no GI software on the two machines. Afterwards, the two nodes will be up and running as a 12.2 GI cluster, and enabled as an RHP Client.

```
[grid@rhps101 bin]$ /rhpctl add workingcopy -workingcopy gridmbcl13 -image
GRID122 -responsefile /home/grid/stdcluster-13.rsp -path /u01/app/12.2.0/grid -
oraclebase /u01/app/gridbase -user grid -root -ignoreprereq
Enter user "root" password:
rhps101: Changing the home ownership to user grid...
…
rhps101: Executing root script on nodes [vmsvr041, vmsvr042].
vmsvr041: Changing permissions of /u01/app/oraInventory.
vmsvr041: Adding read,write permissions for group.
……
vmsvr041: The execution of the script is complete.
vmsvr042: Changing permissions of /u01/app/oraInventory.
….
vmsvr042: Changing groupname of /u01/app/oraInventory to oinstall.
vmsvr042: The execution of the script is complete.
rhps101: Successfully executed root script on nodes [vmsvr041, vmsvr042].
rhps101: Executing configuration script on nodes [vmsvr041]
rhps101: Successfully executed configuration script on nodes [vmsvr041]
rhps101: Executing root script on nodes [vmsvr041].
vmsvr041: Check /u01/app/12.2.0/grid/install/root_vmsvr041.oracle.com_2016-02-
16_17-32-16.log for the output of root script
rhps101: Successfully executed root script on nodes [vmsvr041].
rhps101: Executing root script on nodes [vmsvr042].
vmsvr042: Check /u01/app/12.2.0/grid/install/root_vmsvr042.oracle.com_2016-02-
16_17-43-46.log for the output of root script
rhps101: Successfully executed root script on nodes [vmsvr042].
rhps101: Executing post configuration script on nodes [vmsvr041]
rhps101: Successfully executed post configuration script on nodes [vmsvr041]
rhps101: Working copy creation completed.
rhps101: Creating client data ...
rhps101: Client data created for client "stdcluster-13".
rhps101: Executing Rapid Home Provisioning Client add operation on node
[vmsvr041]
rhps101: Executing Rapid Home Provisioning Client start operation on node
[vmsvr041]
rhps101: Oracle home provisioned.
```

The above command provisioned a workingcopy (gridmbcl13) based on the Grid Infrastructure 12.2 gold image GRID122. Configuration of the home was directed by the response file stdcluster-13.rsp (see Appendix C for this responsefile).

Once this client cluster is up and running, we can query its status (numbers in bold refer to notes below):

```
[grid@rhps101 bin]$ ./rhpctl query client -client stdcluster-13
Site: stdcluster-13
Rapid Home Provisioning Client Version: 12.2.0.0.0
Enabled: true ==> (1)
Host from which RHPC last registered: vmsvr041.us.oracle.com
Port number last registered by RHPC: 23795
RHP Enabled: true    ==> (2)
Standalone: false
Managed: true  ==> (3)
[grid@rhps101 bin]$
```

(1) - Controlled from the RHP Service with the command 'rhpctl modify client -enabled TRUE|FALSE'. When set to false, no RHP operations can be performed from/to that client cluster. It's a way for the RHP Service administrator to say - "I don't want that cluster to participate in any RHP operations at this time".

(2) - When 'true', it indicates that this client cluster has been configured with an "RHP Client" daemon, and could therefore perform operations on that cluster through this local daemon. It does NOT reflect the status of the RHP Client itself, i.e., whether it is running or not. It only reflects that the RHP Client has been configured on that cluster. This field will always be false for GI 11.2 and GI 12.1 targets, since they cannot be configured as RHP Clients.

(3) - When 'true', it indicates that the CRSHome of this client cluster is a workingcopy that was provisioned from one of the RHP Service's gold images. This can be true for 11.2, 12.1 and 12.2 clusters. It will be false, for example, in a situation where the user provisions a database home to a GI cluster that was not provisioned by RHP. (In this case, the action of provisioning the database to the target will cause the RHP Service to collect information about the target and make it available through the query command.)

Next, we deploy and configure a 12.2 RAC database named orcl13db on this cluster. We do this in the traditional, non-RHP fashion (e.g. with DBCA) to create a database that RHP is not aware of (an "unmanaged home"). We do not show these steps here.

Next, we provision a workingcopy (mbcl13db1220patch) based on the DB122_PATCH1 gold image to the client cluster. This will prepare us for moving the orcl13db database from the unmanaged home to this copy.

```
rhpctl add workingcopy -workingcopy mbcl13db1220patch  -image DB122_PATCH1 -
path /u01/app/orabase/product/12.2.0/mbcl13db1220patch -client stdcluster-13
```

Now let's examine the working copies deployed on the RHP Client cluster:

```
[GRID:grid@rhps101:~]> rhpctl query workingcopy -client stdcluster-13
Working copy name: gridmbcl13
Working copy name: mbcl13db1220patch

[GRID:grid@rhps101:~]> rhpctl query workingcopy -workingcopy mbcl13db1220patch
Working copy name: mbcl13db1220patch
Image name: DB122_PATCH1
Groups configured in the working copy:
OSDBA=oinstall,OSBACKUP=asmadmin,OSDG=asmadmin,OSKM=asmadmin,OSRAC=asmadmin
Owner: oracle@stdcluster-13
Site: stdcluster-13
Access control: USER:oracle@stdcluster-13
Access control: USER:grid@dscluster1
Access control: ROLE:GH_WC_ADMIN
Software home path: /u01/app/orabase/product/12.2.0/mbcl13db1220patch
Storage type: LOCAL
Image Type: ORACLEDBSOFTWARE
Oracle base: /u01/app/orabase
Configured databases:
All patches available in this home: 22222222
Additional patches compared to the image:
Additional bug fixes that are not in the image:
Complete: TRUE
[GRID:grid@rhps101:~]>
```

There is one Grid Infrastructure Home working copy (gridmbcl13) and a workingcopy of an Oracle Database Home. There could be more Homes deployed as you choose. Only one GI Home would be in use of course. If multiple Database Homes are deployed, any or all of them may host one or more databases. To see which (if any) are hosting a database, check the "Configured databases:" line in the output of the "query workingcopy –workingcopy <wcpy of interest>".

Note that provisioning a workingcopy to a client is non-disruptive. So while you are running databases on your cluster, you can provision new working copies without impacting any operations, i.e., prepare for out-of-place patching or for an upgrade. Then when you are ready to switch to the patched home, you can do so with minimal impact to users and applications.

Patch 12.2 database

Recall that on the RHP Client cluster we configured a 12.2 database (orcl13db) on a home that was not provisioned by RHP. In RHP terms this is an unmanaged home. We will now patch move database by moving it to the working copy that was provisioned by RHP, i.e., a managed home.

```
[GRID:grid@vmsvr041 bin]$ /rhpctl move database -sourcehome
/u01/app/orabase/product/12.2.0/dbhome_1 -patchedwc mbcl13db1220patch -dbname
orcl13db
vmsvr041.us.oracle.com: Starting to move database from
"/u01/app/orabase/product/12.2.0/dbhome_1" to
"/u01/app/orabase/product/12.2.0/mbcl13db1220patch" on client cluster
vmsvr041.us.oracle.com: starting to move the following databases: "orcl13db"
=====================================
vmsvr041.us.oracle.com:
SQL Patching tool version 12.2.0.0.3 Production on Sat Feb 20 15:42:21 2016
Copyright (c) 2012, 2016, Oracle.  All rights reserved.

Connecting to database...OK
Note:  Datapatch will only apply or rollback SQL fixes for PDBs
       that are in an open state, no patches will be applied to closed PDBs.
       Please refer to Note: Datapatch: Database 12c Post Patch SQL Automation
       (Doc ID 1585822.1)
Determining current state...done
Adding patches to installation queue and performing prereq checks...done
Installation queue:
  For the following PDBs: CDB$ROOT PDB$SEED PROD1 PROD2
    Nothing to roll back
    Nothing to apply
SQL Patching tool complete on Sat Feb 20 15:45:32 2016
vmsvr041.us.oracle.com: Completed the 'move database' operation on client
cluster

[GRID:grid@vmsvr041:~]> rhpctl query workingcopy -workingcopy mbcl13db1220patch
```

Running the "`query workingcopy -workingcopy mbcl13db1220patch`" command after the move will show that the database is configured on the workingcopy.

Here is an overview of the steps just completed above:

RHP Server
GRID_series
- GRID12102
- GRID12102_PSU
- GRID122

DB112_series
- DB112

DB12_series
- DB12102_PSU
- DB122_PATCH1

RHP Client 13
- gridmbcl13

orcl13db
- ① 12.2 DB

- mbcl13db1220patch

1. Create GI 12.2 cluster
2. Create DB 12.2 (unmanaged)
3. Add DB 12.2_PATCH1 workingcopy
4. Move `orcl13db` from unmanaged 12.2 home to managed home
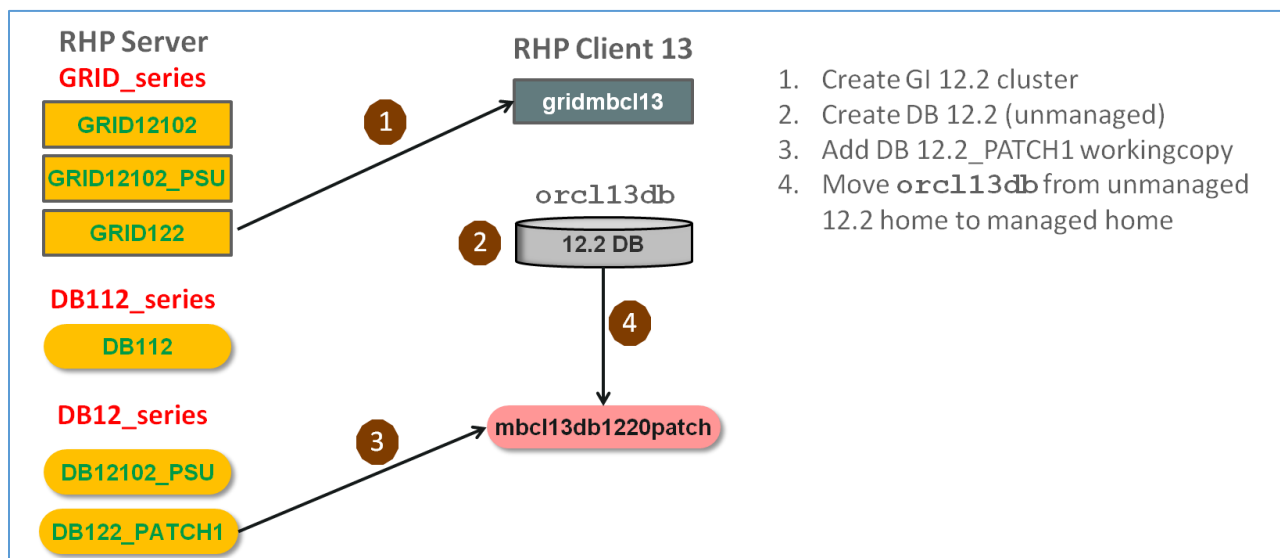
Create a 12.1 Grid Infrastructure deployment

A 12.2 Rapid Home Provisioning Service can create and manage 11.2 and 12.1 GI installations. These installations are not Rapid Home Provisioning Clients – i.e., you cannot execute `rhpctl` on these installations. We refer to them as targets, and all RHP operations that act upon them must be executed on the RHP Service.

The following creates the 12.1 GI Cluster using the responsefile in Appendix D:

```
[GRID:grid@rhps101:~]>  rhpctl add workingcopy -workingcopy grid121mbc143 -
image GRID12102 -responsefile /home/grid/stdcluster-43.rsp -path
/u01/app/12102/grid -oraclebase /u01/app/gridbase -user grid -root -
ignoreprereq
   Enter user "root" password:
   rhps101: Changing the home ownership to user grid...
   rhps101: Mounting file system...
   rhps101: Executing root script on nodes [vmsvr141.oracle.com,
vmsvr142.oracle.com].
   vmsvr142.oracle.com: Changing permissions of /u01/app/oraInventory.
   vmsvr142.oracle.com: Adding read,write permissions for group.
…..
   rhps101: Successfully executed post configuration script on nodes
[vmsvr141.oracle.com]
   rhps101: Working copy creation completed.
   rhps101: Creating client data ...
   rhps101: Client data created for client "stdcluster-43".
   rhps101: Executing Rapid Home Provisioning Client add operation on node
[vmsvr141.oracle.com]
   rhps101: Oracle home provisioned.
```

When the cluster is up and running, we can see the GI version, and the fact that the target is not RHP Enabled:

```
[GRID:grid@rhps101:~]> rhpctl query client -client stdcluster43
Site: stdcluster43
Rapid Home Provisioning Client Version: 12.1.0.2.0
Enabled: true
Host from which RHPC last registered:
Port number last registered by RHPC:
RHP Enabled: false
Standalone: false
Managed: true
[GRID:grid@rhps101:~]>
```

Next, we add a workingcopy of an 11.2 database to the target:

```
[GRID:grid@rhps101:/scratch]>  rhpctl add workingcopy -workingcopy db112mbcl43
-image DB112 -path /u01/app/orabase/product/11.2/wcdb112 -root -targetnode
vmsvr141 -oraclebase /u01/app/orabase      -user oracle
```

Now provision a 12.1.0.2 database workingcopy to the target. We will later upgrade the 11.2 database to 12.1.

```
[GRID:grid@rhps101:/scratch]> rhpctl add workingcopy -workingcopy db12102mbcl43
-image DB12102_PSU -path /u01/app/orabase/product/12.1/wcdb12102 -root -
targetnode vmsvr141 -oraclebase /u01/app/orabase -user oracle
```

In preparation for patching the 12.1 GI home, provision a patched GI home. Note that we use the "-softwareonly" option so that the home is installed but not configured and started:

```
[GRID:grid@rhps101:/scratch]>  rhpctl add workingcopy -softwareonly -image
GRID12102_PSU -path /u01/app/12102_psu/grid -oraclebase /u01/app/gridbase -
targetnode vmsvr141 -root -workingcopy grid12102PSUmbcl43
```

Next, create a database named 'testy' on the 11.2 database home.

```
[GRID:grid@rhps101:/scratch]>  rhpctl add database -workingcopy db112mbcl43 -
dbname testy -node vmsvr141 -root -user oracle
```

Upgrade the Database from 11.2 to 12.1

```
[GRID:grid@rhps101:/scratch]>  rhpctl upgrade database -dbname testy -sourcewc
db112mbcl43 -destwc db12102mbcl43 -root -targetnode vmsvr141
Enter user "root" password:
vmsvr141: Log files for the upgrade operation are located at:
/u01/app/orabase/cfgtoollogs/dbua/testy/upgrade1
vmsvr141: Performing Pre Upgrade
vmsvr141: 5% complete
vmsvr141: 25% complete
vmsvr141: Performing RDBMS Upgrade
vmsvr141: 25% complete
vmsvr141: 26% complete
…..
vmsvr141: 50% complete
vmsvr141: Performing Post Upgrade
vmsvr141: 52% complete
vmsvr141: 55% complete
vmsvr141: 75% complete
vmsvr141: Generating Summary
vmsvr141: Database upgrade has been completed successfully, and the database is
ready to use.
vmsvr141: 100% complete
vmsvr141: Check the log file
"/u01/app/orabase/cfgtoollogs/dbua/logs/silent.log_1421792176768" for upgrade
details.
rhps101: Completed the upgrade database operation on server cluster
[GRID:grid@rhps101:/scratch]>
```

Patch the GI from 12102 to 12102 PSU

```
rhpctl move gihome -sourcewc grid121mbc143 -destwc grid12102PSUmbcl43 -root  -
targetnode vmsvr141
```

Overview of steps completed above:

1. Create GI 12.1.0.2 cluster
2. Add DB 11.2.0.4 wcpy, create DB
3. Add DB 12.1.0.2_PSU workingcopy
4. Add GI 12.1.0.2_PSU workingcopy
5. Upgrade DB 11.2 to DB 12.1.0.2
6. Move GI 12.1.0.2 to GI 12.1.0.2_PSU
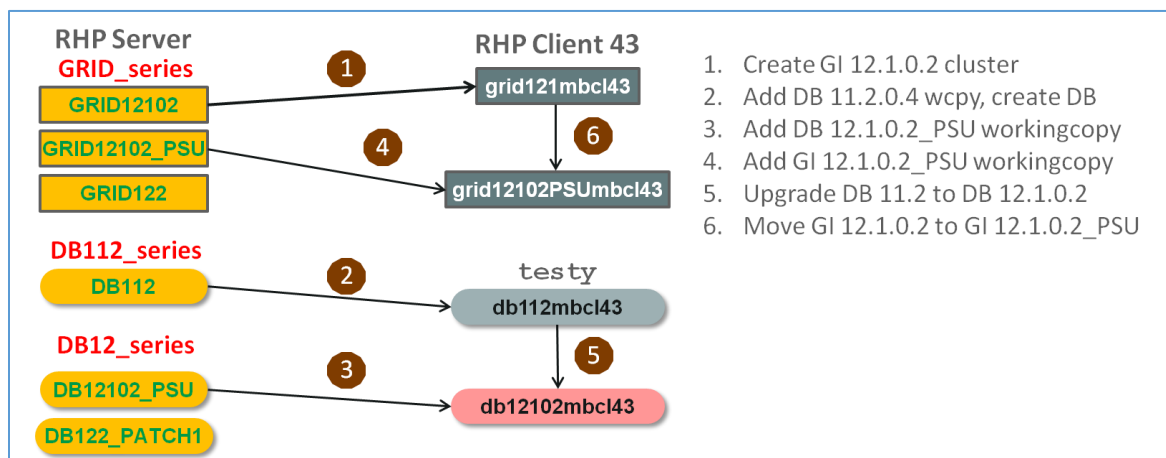
User Actions

We now illustrate an implementation of user actions. We will specify an action that will take place at the start of a "move database" operation performed on any workingcopy that was created from a gold image of type ORACLEDBSOFTWARE.

Our example is a simple script that simply touches a file. More interesting actions could include items such as:

- Registering a new database with a backup procedure

- Turning off monitoring at the start of an upgrade, and turning it back on after the upgrade is complete

- Configuring and starting an application after installing its software home

First, we place the following script in /home/grid/useractionscripts/movepre.sh.

```
#!/bin/sh

PATH=
DBNAME=

for var in $@
do
    if [[ $var == *"RHP_PATH="* ]]
    then
        IFS='=' read -ra PATHARR <<< "$var"
        PATH=${PATHARR[1]}
    fi

    if [[ $var == *"RHP_DBNAME="* ]]
    then
        IFS='=' read -ra DBARR <<< "$var"
```

```
        DBNAME=${DBARR[1]}
    fi
done

timestamp=$(/bin/date +%Y-%m-%d-%I-%M-%S%p)
FILEDIR=$PATH/srvm/admin/
PREUSER=_pre_useraction_done_
FILENAME=$FILEDIR$DBNAME$PREUSER$timestamp

/bin/touch $FILENAME

for var in $@
do
    /bin/echo $var >> $FILENAME
done
```

Next, create the user action:

```
[GRID:grid@rhps101:~]> rhpctl add useraction -optype MOVE_DATABASE -pre  -onerror
ABORT -useraction movedbpre -actionscript /home/grid/useractionscripts/movepre.sh -
runscope ONENODE
```

Confirm its existence:

```
[GRID:grid@rhps101:~]> rhpctl query useraction
User action name: movedbpre
```

Examine its specifics:

```
[GRID:grid@rhps101:~]> rhpctl query useraction -useraction movedbpre
User action name: movedbpre
Action script: movepre.sh
Action file:
Operation type: MOVE_DATABASE
Pre-operation or post-operation: PRE
On error: ABORT
Run scope: ONENODE
[GRID:grid@rhps101:~]>
```

This will command will execute prior to the move operation. If it fails, the move operation will be aborted. (We could also choose to ignore any errors and continue with the move.) Also note that the script will be run only one node of the target cluster. We could also specify that it run on all nodes.

In the above output, you see that "Action file:" is blank. This is because we have not exercised one of the other capabilities of user actions, which is to define a file (of any format you choose) which is placed in the same directory where the script executes.

Currently the image type ORACLEDBSOFTWARE has no user actions associated:

```
[GRID:grid@rhps101:~]> rhpctl query imagetype -imagetype ORACLEDBSOFTWARE
Image type: ORACLEDBSOFTWARE
Base image type: BASE_SOFTWARE
User actions:
Images: DB112, DB122_PATCH1,DB12102_PSU
[GRID:grid@rhps101:~]>
```

Add our new user action to ORACLEDBSOFTWARE:

```
[GRID:grid@rhps101:~]> rhpctl modify imagetype -imagetype ORACLEDBSOFTWARE -
useractions movedbpre
```

And confirm this change with two different approaches:

```
[GRID:grid@rhps101:~]> rhpctl query imagetype -imagetype ORACLEDBSOFTWARE
Image type: ORACLEDBSOFTWARE
Base image type: BASE_SOFTWARE
User actions: movedbpre
Images: DB112, DB122_PATCH1, DB12102_PSU
[GRID:grid@rhps101:~]>

[GRID:grid@rhps101:~]> rhpctl query useraction -imagetype ORACLEDBSOFTWARE
User action name: movedbpre
[GRID:grid@rhps101:~]>


[GRID:grid@rhps101:~]> srvctl config rhpserver
Storage base path: /scratch/rhpstorage
Disk Groups: RHPDATA1
Port number: 23795
Rapid Home Provisioning Server is enabled
Rapid Home Provisioning Server is individually enabled on nodes:
Rapid Home Provisioning Server is individually disabled on nodes:
Email address:
Mail server address:
Mail server port:
[GRID:grid@rhps101:~]>



[GRID:grid@rhps101:/scratch/rhpstorage/chkbase/useractions/movedbpre]> ls
movepre.sh
[GRID:grid@rhps101:/scratch/rhpstorage/chkbase/useractions/movedbpre]> more
movepre.sh

#!/bin/sh

PATH=
DBNAME=
…..
[GRID:grid@rhps101:/scratch/rhpstorage/chkbase/useractions/movedbpre]>
```

Note that the same action takes place for all workingcopies created from gold images of type
ORACLEDBSOFTWARE. Suppose that we decide we wish to specify a different user action for workingcopies of a
specific gold image lineage, for example, from the gold image DB122_PATCH1. To do this we will need to create a

new image type, and change DB122_PATCH1 to that new image type. We can then define new user action(s) for that image type.

First, create the new image type:

```
[GRID:grid@rhps101:~]> rhpctl add imagetype -imagetype DB122_PATCH_TYPE -basetype
ORACLEDBSOFTWARE

[GRID:grid@rhps101:~]> rhpctl query imagetype -imagetype DB122_PATCH_TYPE
Image type: DB122_PATCH_TYPE
Base image type: ORACLEDBSOFTWARE
User actions:
Images:
```

Note that this new type does not show the user action that we defined for its base image type. (This omission may be fixed by the time you are reading this.) However, if user actions are defined for the base type of a user-defined image type (in this case the base type is ORACLEDBSOFTWARE), those actions **will be** performed **before** the actions for the user-defined image type.

Also, note that the `-basetype` specified in "`rhpctl add imagetype`" must be one of the built-in image types, i.e., you cannot create a new image type based on DB122_PATCH_TYPE.

Let's review the images of type ORACLEDBSOFTWARE:

```
[GRID:grid@rhps101:~]> rhpctl query imagetype -imagetype ORACLEDBSOFTWARE
Image type: ORACLEDBSOFTWARE
Base image type: BASE_SOFTWARE
User actions: movedbpre
Images: DB112, DB122_PATCH1, DB12102_PSU
[GRID:grid@rhps101:~]>
```

Now change the gold image DB122_PATCH1 to the new image type. We can then define new user actions for this image type.

```
[GRID:grid@rhps101:~]> rhpctl modify image -image DB122_PATCH1 -imagetype
DB122_PATCH_TYPE

[GRID:grid@rhps101:~]> rhpctl query image -image DB122_PATCH1
Image name: DB122_PATCH1
Owner: grid@dscluster1
Site: dscluster1
Access control: USER:grid@dscluster1
Access control: ROLE:OTHER
Access control: ROLE:GH_IMG_PUBLISH
Access control: ROLE:GH_IMG_ADMIN
Access control: ROLE:GH_IMG_VISIBILITY
Parent Image:
Software home path: /scratch/rhpstorage/images/iDB122_PATCH385109/swhome
Image state: PUBLISHED
Image size: 10240 Megabytes
Image Type: DB122_PATCH_TYPE
Image Version:
Image platform:
Interim patches installed:
Complete: TRUE
```

A few more notes on user actions:

'rhpctl delete useraction' removes the user action from all image types that were using that action.

If a user action is referenced by more than one image type and you do not wish to remove it from all image types, then use the "rhpctl modify imagetype" command. You will need to specify all the useractions for the imagetype that you wish to have in place.

Conclusion

Rapid Home Provisioning is a single tool for provisioning, patching and upgrading software homes at an organizational level, in a unified manner, across all architectural layers of software infrastructure.

Key benefits include:

» Enables and enforces standardization
» Simplifies provisioning, patching and upgrading
» Minimizes the impact and risk of maintenance
» Increases automation and reduces touch points
» Supports large scale deployments

An RHP Service can manage existing and create new Grid Infrastructure and Database deployments, so you can leverage its benefits today with your 11.2 and 12.1 estate.

FURTHER READING	LOCATION
RHP on OTN	http://www.oracle.com/goto/rhp
RHP on YouTube	https://www.youtube.com/playlist?list=PLKCk3OyNwIztV7AjjHoM8KSnLlCpL4Tzt
Plug in to the Cloud with Oracle Database 12*c*	http://www.oracle.com/technetwork/database/plug-into-cloud-wp-12c-1896100.pdf
Oracle Clusterware 12*c* Documentation – Rapid Home Provisioning	https://docs.oracle.com/database/122/CWADD/rapid-home-provisioning.htm#CWADD92402
MOS Note: How to Setup an RHP Server and Client	https://support.oracle.com/epmos/faces/DocumentDisplay?id=2097026.1
MOS Note: RHP Setup in "1 click"	https://support.oracle.com/epmos/faces/DocumentDisplay?id=2124960.1

Appendix A: Reference for `rhpctl add workingcopy`

command option	Database provisioning scenario			
	Provision from the RHPS to itself	**Provision from the RHPS to a 12.2 RHPC**	**Command executed on a 12.2 RHPC**	**Provision from the RHPS to a target that is not RHPC-enabled (11.2 or 12.1)**
Workingcopy	R	R	R	R
Image	R	R	R	R
Oraclebase	R	R	R	R
Storagetype	LOCAL or RHP_MANAGED	NFS, LOCAL or RHP_MANAGED		LOCAL
Path (*)	R for LOCAL and NFS. Invalid for RHP_MANAGED			
If agpath and/or aupath are specified (to provide persistent Home path), -storagetype must be LOCAL.				
Agpath	O	O	O	-
Aupath	O	O	O	-
user	O	O	O	O
client	-	R	-	-
targetnode	-	-	-	R
clusternodes	-	-	-	-
groups	O (see Groups section below)			
ignoreprereq	O	O	O	O
Notify	O	O	O	O
cc	O w/ notify	O w/ notify	O w/ notify	O w/ notify
Root or sudouser	-	-	-	R
sudopath	-	-	-	R w/ sudouser else '-'
useractiondata	O	O	O	O
inventory	-	-	-	R if the target has no Oracle software inventory (e.g., first time provisioning). Else '-'.
Items below apply only if you create a database on the new workingcopy as part of the 'add workingcopy' command. Refer to the 'add database' command for details.				
Dbname	Dbtemplate	newpool	Newpqpool	Pdbname
Dbtype	Node	Cardinality	Pqcardinality	Numberofpdbs
Datafiledestination	Serverpool	Pqpool	Cdb	

R = always required   **O** = optional   **'-'** = never valid

command option	Grid Infrastructure Provisioning scenario		
	RHPS installs and configures GI for first time on a target	RHPS provisions GI software to a target where cluster already exists	Command executed on 12.2 RHPC To install s/w only, no configuration
Workingcopy	R	R	R
Image	R	R	R
Oraclebase	O	R	R
Softwareonly	-	R	R
Inventory	R if not in response file, else O to override	-	-
Storagetype	LOCAL	LOCAL	LOCAL
Path (*)	R	R	R
Agpath, aupath	O if target will be 12.2 RHPC enabled else '-'	O if target is 12.2 RHPC enabled else '-'	O
User	O	O	O
Client	R	R if target is 12.2 RHPC enabled else '-'	-
node	-	-	-
clusternodes	O (overrides values in responsefile)	-	-
Targetnode	-	R if target is not 12.2 RHPC enabled else '-'	-
ignoreprereq	O	O	O
responsefile	R	-	-
Root or sudouser	R	R if target is not 12.2 RHPC enabled	-
Sudopath	R w/ sudouser else '-'	R w/ sudouser else '-'	-
Notify	O	O	O
cc	O with notify	O with notify	O with notify
Asmclientdata	O	-	-
Gnsclientdata	O	-	-
Clustermanifest	O for Domain clusters	-	-
Useractiondata	O	O	O
groups	O (see Groups below)		

Local see **Note 1**	-	-	-

If an option is not listed in a table, it is never valid for that use case. (For example, 'responsefile' is not in the Database table since it applies to Grid Infrastructure only.)

(*) In cases where you specify the –path parameter, if the file system is shared among all of the nodes in the target, then the working copy gets created on this shared storage. If the file system is not shared, then the working copy gets created in the location of the given path on every node in the cluster.

For online assistance with 'rhpctl add workingcopy', there is a '-help' option to the command. The '-help' option accepts several values, and guidance is provided on the selected deployment option: REMOTEPROVISIONING, STORAGETYPE, ADMINDB, POLICYDB, DBWITHPQPOOLS, DBTEMPLATE, PDB, GRIDHOMEPROV, SWONLYGRIDHOMEPROV, STANDALONEPROVISIONING.

Note 1: '-local' is a special case of Grid Infrastructure provisioning. It supports the creation of space-efficient gold images of patched Grid Infrastructure homes.

'-local' is valid for provisioning onto the RHP Service only. It performs a software-only GI provisioning onto the RHPS.

The workingcopy you create with 'add workingcopy -local' option is for temporary use and is not used as an active home. You use it with the workflow described in Appendix B: Workflow for creating delta Gold Images of patched DB and GI homes

Groups

When an ORACLEDBSOFTWARE or ORACLEGISOFTWARE gold image is created from a source home (with "import image") or from a working copy (with "add image"), it will inherit the groups that were configured in the source. There are no options to override this.

When creating an image of type SOFTWARE, any groups in the source are not inherited. SOFTWARE images never contain groups information.

When a working copy is provisioned with 'add workingcopy', the default groups configured in the working copy can in some cases be overridden with the optional "-groups" parameter.

The simplest case is for gold images of type SOFTWARE. Gold images of SOFTWARE do not contain any groups information. When a working copy is created from a SOFTWARE gold image, the working copy will be provisioned with any groups specified in the "add workingcopy" command. (None are required.)

The behavior for ORACLEDBSOFTWARE and ORACLEGISOFTWARE gold images and their working copies is as follows.

First, be aware that when you "move" or "upgrade" a source home (unmanaged or workingcopy) to an existing destination working copy that was created with "add workingcopy", the groups configured in the destination working copy must match those of the source home.

[Note: "move database/gihome" and "upgrade database/gihome" will create the destination working copy if it does not exist and the "-image" option is used. Groups are handled as follows: the destination working copy will inherit the groups configured in the source home (whether unmanaged home or managed working copy). The groups configured in the specified gold image are not used.]

Now we need to understand the different ways groups can be defined with "`rhpctl add workingcopy`":

	ORACLEDBSOFTWARE		
	11.2	**12.1**	**12.2**
Groups	OSDBA OSOPER	OSDBA OSOPER OSBACKUP OSDG OSKM	OSDBA OSOPER OSBACKUP OSDG OSKM OSRAC

Action for each group	Use value from command line if provided
	
	If not provided, retrieve from the gold image as follows:
	
	    If the "-user" option was specified in "add workingcopy"
	        Then if the user specified in that option belongs to the group retrieved from the gold image, use it.
	            Otherwise use the installer default.
	
	    Else if the user executing "add workingcopy" belongs to the retrieved group, use it.
	            Otherwise use the installer default.

	ORACLEGISOFTWARE versions 11.2, 12.1, 12.2	
	Provision and configure new cluster, working copy is created with information from response file	**"-softwareonly" option, working copy based on a gold image**
OSDBA and OSASM	Use value from command line if provided If not provided, use the value from the response file. Note: Values for OSDBA and OSASM must be provided in the response file, even if they are overridden by the command line.	The "-groups" option is not valid in this case. The new workingcopy will inherit the groups specified in the active Grid Infrastructure on the target machine. The active GI may be a managed or unmanaged home.
OSOPER	Use value from command line if provided Else use value from response file, if provided Otherwise leave undefined	
Installer defaults	OSDBA - group 'dba' if the user is a member of the group, else user's primary group. OSBACKUP - group 'backupdba' if the user is a member of the group, else OSDBA default (that is group 'dba' or the primary group). OSDG - group 'dg dba' if the user is a member of the group, else OSDBA default. OSKM - group 'km dba' if the user is a member of the group, else OSDBA default. OSRAC - group 'rac dba' if the user is a member of the group, else OSDBA default.	

Appendix B: Workflow for creating delta Gold Images of patched DB and GI homes

When a new patch or PSU is available and you wish to deploy it to target clusters in preparation for the 'switch home' to the patched home, you will need to create a new gold image that has the patch/PSU applied.

To create the new gold image, you can first create an installed, patched home of the new software on any machine, and use 'import image' to create the new gold image based on that home. Note that this new gold image will be "full-sized" – i.e., it will be a complete representation of the home.

Since you may be building a large library of gold images over time, RHP offers a workflow that stores only the delta of the new gold image versus the prior home. This can result in significant space savings. This approach is available for Database and Grid Infrastructure homes. The workflow is as follows:

Provision a workingcopy of the gold image which you wish to patch. This workingcopy is provisioned onto the RHPS. The workingcopy is for temporary use and is not used as an active home.

1a. if you are provisioning a Database home, provision it on to the RHP Service. Then proceed to step 2.

1b. If you are provisioning a Grid home, use the '-local' option and '-softwareonly' of 'add workingcopy.' This performs a software-only GI provisioning onto the RHPS. This workingcopy will be used in the next steps.

2. Patch the new (temporary) workingcopy

3. Create a gold image from the patched workingcopy using the 'add image' command

4. To validate the new gold image, you 'add workingcopy' of the new gold image to a test machine and execute your test cycle.

5. After validating the home, 'delete workingcopy' of the temporary workingcopy from step 1. (Do not use a command such as 'rm' because this would circumvent the inventory update that 'delete workingcopy' performs.)

The benefit of this approach is that RHP will store the new gold image as a delta of the prior gold image. The savings observed in one test were as follows:

An Oracle Database 11.2.0.4 home (and therefore a gold image) is approximately 4.5 GB. When we went through the workflow for creating a new gold image with a recent CPU patch applied, the resulting delta consumed only 340 MB of storage, a savings of over 4 GB:

```
[root@rws15:/u01/app/grid/usm/install/cmds/bin][1]#./acfsutil snap info
/mnt/oracle/rhpimages/images/i11204DB499920

snapshot name:                 idb11204CPU
snapshot location:
/mnt/oracle/rhpimages/images/i11204DB499920/.ACFS/snaps/idb11204CPU
RO snapshot or RW snapshot:  RO
parent name:                   wwc_db11204PSU
snapshot creation time:     Tue Sep 13 09:43:03 2016
storage added to snapshot:   358854656    ( 342.23 MB )
```

The patchset itself was 54 MB; 342 MB for the snapshot represents the files that the patch touched.

Appendix C: Sample response file for provisioning a new 12.2 GI Cluster

Note – the below is referred to as stdcluster-13.rsp in the section 'Create and start a 12.2 RHP Client from the RHP Service'.

```
###############################################################################
## Copyright(c) Oracle Corporation 1998,2017. All rights reserved.         ##
##                                                                         ##
## Specify values for the variables listed below to customize              ##
## your installation.                                                      ##
##                                                                         ##
## Each variable is associated with a comment. The comment                 ##
## can help to populate the variables with the appropriate                 ##
## values.                                                                 ##
##                                                                         ##
## IMPORTANT NOTE: This file contains plain text passwords and             ##
## should be secured to have read permission only by oracle user           ##
## or db administrator who owns this installation.                         ##
##                                                                         ##
###############################################################################


###############################################################################
##                                                                         ##
## Instructions to fill this response file                                 ##
## To register and configure 'Grid Infrastructure for Cluster'             ##
##  - Fill out sections A,B,C,D,E,F and G                                   ##
##  - Fill out section G if OCR and voting disk should be placed on ASM     ##
##                                                                         ##
## To register and configure 'Grid Infrastructure for Standalone server'   ##
##  - Fill out sections A,B and G                                           ##
##                                                                         ##
## To register software for 'Grid Infrastructure'                          ##
##  - Fill out sections A,B and D                                           ##
##  - Provide the cluster nodes in section D when choosing CRS_SWONLY as    ##
##    installation option in section A                                      ##
##                                                                         ##
## To upgrade clusterware and/or Automatic storage management of earlier   ##
## releases                                                                ##
##  - Fill out sections A,B,C,D and H                                       ##
##                                                                         ##
## To add more nodes to the cluster                                        ##
##  - Fill out sections A and D                                             ##
##  - Provide the cluster nodes in section D when choosing CRS_ADDNODE as   ##
##    installation option in section A                                      ##
##                                                                         ##
###############################################################################

#-------------------------------------------------------------------------------
# Do not change the following system generated value.
#-------------------------------------------------------------------------------
oracle.install.responseFileVersion=/oracle/install/rspfmt_crsinstall_response_schema_v12.
2.0


###############################################################################
#                                                                           #
#                        SECTION A - BASIC                                  #
#                                                                           #
###############################################################################
```

```
#-------------------------------------------------------------------------------
# Specify the location which holds the inventory files.
# This is an optional parameter if installing on
# Windows based Operating System.
#-------------------------------------------------------------------------------
INVENTORY_LOCATION=/u01/app/oraInventory


#-------------------------------------------------------------------------------
# Specify the installation option.
# Allowed values: CRS_CONFIG or HA_CONFIG or UPGRADE or CRS_SWONLY or HA_SWONLY
#    - CRS_CONFIG  : To register home and configure Grid Infrastructure for cluster
#    - HA_CONFIG   : To register home and configure Grid Infrastructure for stand alone
server
#    - UPGRADE     : To register home and upgrade clusterware software of earlier release
#    - CRS_SWONLY  : To register Grid Infrastructure Software home (can be configured for
cluster
#                    or stand alone server later)
#    - HA_SWONLY   : To register Grid Infrastructure Software home (can be configured for
stand
#                    alone server later. This is only supported on Windows.)
#    - CRS_ADDNODE : To add more nodes to the cluster
#-------------------------------------------------------------------------------
oracle.install.option=CRS_CONFIG


#-------------------------------------------------------------------------------
# Specify the complete path of the Oracle Base.
#-------------------------------------------------------------------------------
ORACLE_BASE=/u01/app/gridbase


###############################################################################
#                                                                             #
#                          SECTION B - GROUPS                                 #
#                                                                             #
#    The following three groups need to be assigned for all GI installations. #
#    OSDBA and OSOPER can be the same or different.  OSASM must be different   #
#    than the other two.                                                      #
#    The value to be specified for OSDBA, OSOPER and OSASM group is only for   #
#    Unix based Operating System.                                             #
#                                                                             #
###############################################################################
#-------------------------------------------------------------------------------
# The OSDBA_GROUP is the OS group which is to be granted SYSDBA privileges.
#-------------------------------------------------------------------------------
oracle.install.asm.OSDBA=asmdba


#-------------------------------------------------------------------------------
# The OSOPER_GROUP is the OS group which is to be granted SYSOPER privileges.
# The value to be specified for OSOPER group is optional.
# Value should not be provided if configuring Client Cluster - i.e.
storageOption=CLIENT_ASM_STORAGE.
#-------------------------------------------------------------------------------
oracle.install.asm.OSOPER=asmoper


#-------------------------------------------------------------------------------
# The OSASM_GROUP is the OS group which is to be granted SYSASM privileges. This
# must be different than the previous two.
#-------------------------------------------------------------------------------
oracle.install.asm.OSASM=asmadmin


###############################################################################
#                                                                             #
#                          SECTION C - SCAN                                    #
#                                                                             #
###############################################################################
```

```
#-------------------------------------------------------------------------------
# Specify a name for SCAN
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.scanName=scan-stdcluster-13


#-------------------------------------------------------------------------------
# Specify a unused port number for SCAN service
#-------------------------------------------------------------------------------

oracle.install.crs.config.gpnp.scanPort=1521

################################################################################
#                                                                              #
#                         SECTION D - CLUSTER & GNS                            #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify the required cluster configuration
# Allowed values: STANDALONE, DOMAIN, MEMBERDB, MEMBERAPP
#-------------------------------------------------------------------------------
oracle.install.crs.config.ClusterConfiguration=STANDALONE


#-------------------------------------------------------------------------------
# Specify 'true' if you would like to configure the cluster as Extended, else
# specify 'false'
#
# Applicable only for STANDALONE and DOMAIN cluster configuration
#-------------------------------------------------------------------------------
oracle.install.crs.config.configureAsExtendedCluster=false



#-------------------------------------------------------------------------------
# Specify the Member Cluster Manifest file
#
# Applicable only for MEMBERDB and MEMBERAPP cluster configuration
#-------------------------------------------------------------------------------
oracle.install.crs.config.memberClusterManifestFile=


#-------------------------------------------------------------------------------
# Specify a name for the Cluster you are creating.
#
# The maximum length allowed for clustername is 15 characters. The name can be
# any combination of lower and uppercase alphabets (A - Z), (0 - 9), hyphen(-)
# and underscore(_).
#
# Applicable only for STANDALONE and DOMAIN cluster configuration
#-------------------------------------------------------------------------------
oracle.install.crs.config.clusterName=stdcluster-13


#-------------------------------------------------------------------------------
# Applicable only for STANDALONE, DOMAIN, MEMBERDB cluster configuration.
# Specify 'true' if you would like to configure Grid Naming Service(GNS), else
# specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.configureGNS=false


#-------------------------------------------------------------------------------
# Applicable only for STANDALONE and DOMAIN cluster configuration if you choose to
configure GNS.
# Specify 'true' if you would like to assign SCAN name VIP and Node VIPs by DHCP
# , else specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.autoConfigureClusterNodeVIP=false


#-------------------------------------------------------------------------------
# Applicable only if you choose to configure GNS.
```

```
# Specify the type of GNS configuration for cluster
# Allowed values are: CREATE_NEW_GNS and USE_SHARED_GNS
# Only USE_SHARED_GNS value is allowed for MEMBERDB cluster configuration.
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsOption=

#-------------------------------------------------------------------------------
# Applicable only if SHARED_GNS is being configured for cluster
# Specify the path to the GNS client data file
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsClientDataFile=

#-------------------------------------------------------------------------------
# Applicable only for STANDALONE and DOMAIN cluster configuration if you choose to
# configure GNS for this cluster oracle.install.crs.config.gpnp.gnsOption=CREATE_NEW_GNS
# Specify the GNS subdomain and an unused virtual hostname for GNS service
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsSubDomain=
oracle.install.crs.config.gpnp.gnsVIPAddress=

#-------------------------------------------------------------------------------
# Specify the list of sites - only if configuring an Extended Cluster
#-------------------------------------------------------------------------------
oracle.install.crs.config.sites=

#-------------------------------------------------------------------------------
# Specify the list of nodes that have to be configured to be part of the cluster.
#
# The list should a comma-separated list of tuples.  Each tuple should be a
# colon-separated string that contains
# - 1 field if you have chosen CRS_SWONLY as installation option, or
# - 1 field if configuring an Application Cluster, or
# - 3 fields if configuring a Flex Cluster
# - 3 fields if adding more nodes to the configured cluster, or
# - 4 fields if configuring an Extended Cluster
#
# The fields should be ordered as follows:
# 1. The first field should be the public node name.
# 2. The second field should be the virtual host name
#    (Should be specified as AUTO if you have chosen 'auto configure for VIP'
#     i.e. autoConfigureClusterNodeVIP=true)
# 3. The third field indicates the role of node (HUB,LEAF). This has to
#    be provided only if Flex Cluster is being configured.
#    For Extended Cluster only HUB should be specified for all nodes
# 4. The fourth field indicates the site designation for the node. To be specified only
if configuring an Extended Cluster.
# The 2nd and 3rd fields are not applicable if you have chosen CRS_SWONLY as installation
option
# The 2nd and 3rd fields are not applicable if configuring an Application Cluster
#
# Examples
# For registering GI for a cluster software:
oracle.install.crs.config.clusterNodes=node1,node2
# For adding more nodes to the configured cluster:
oracle.install.crs.config.clusterNodes=node1:node1-vip:HUB,node2:node2-vip:LEAF
# For configuring Application Cluster: oracle.install.crs.config.clusterNodes=node1,node2
# For configuring Flex Cluster: oracle.install.crs.config.clusterNodes=node1:node1-
vip:HUB,node2:node2-vip:LEAF
# For configuring Extended Cluster: oracle.install.crs.config.clusterNodes=node1:node1-
vip:HUB:site1,node2:node2-vip:HUB:site2
# You can specify a range of nodes in the tuple using colon separated fields of format
# hostnameprefix:lowerbound-upperbound:hostnamesuffix:vipsuffix:role of node
#
#-------------------------------------------------------------------------------
oracle.install.crs.config.clusterNodes=vmsvr071:vmsvr043-vip:HUB,vmsvr072:vmsvr044-
vip:HUB
```

```
#--------------------------------------------------------------------------------
# The value should be a comma separated strings where each string is as shown below
# InterfaceName:SubnetAddress:InterfaceType
# where InterfaceType can be either "1", "2", "3", "4", or "5"
# InterfaceType stand for the following values
#    - 1 : PUBLIC
#    - 2 : PRIVATE
#    - 3 : DO NOT USE
#    - 4 : ASM
#    - 5 : ASM & PRIVATE
#
# For example: eth0:140.87.24.0:1,eth1:10.2.1.0:2,eth2:140.87.52.0:3
#
#--------------------------------------------------------------------------------
oracle.install.crs.config.networkInterfaceList=eth0:148.87.8.0:1,eth3:192.168.7.0:5,eth2:
10.212.144.0:3


#--------------------------------------------------------------------------------
# Create a separate ASM DiskGroup to store GIMR data.
# Specify 'true' if you would like to separate GIMR data with clusterware data,
# else specify 'false'
# Value should be 'true' for DOMAIN cluster configurations
# Value can be true/false for STANDALONE cluster configurations.
#--------------------------------------------------------------------------------
oracle.install.asm.configureGIMRDataDG=false


################################################################################
#                                                                              #
#                          SECTION E - STORAGE                                 #
#                                                                              #
################################################################################


#--------------------------------------------------------------------------------
# Specify the type of storage to use for Oracle Cluster Registry(OCR) and Voting
# Disks files
#    - FLEX_ASM_STORAGE
#    - CLIENT_ASM_STORAGE
#
# Applicable only for MEMBERDB cluster configuration
#--------------------------------------------------------------------------------
oracle.install.crs.config.storageOption=
################################################################################
#                                                                              #
#                          SECTION F - IPMI                                    #
#                                                                              #
################################################################################


#--------------------------------------------------------------------------------
# Specify 'true' if you would like to configure Intelligent Power Management interface
# (IPMI), else specify 'false'
#--------------------------------------------------------------------------------
oracle.install.crs.config.useIPMI=false


#--------------------------------------------------------------------------------
# Applicable only if you choose to configure IPMI
# i.e. oracle.install.crs.config.useIPMI=true
# Specify the username and password for using IPMI service
#--------------------------------------------------------------------------------
oracle.install.crs.config.ipmi.bmcUsername=
oracle.install.crs.config.ipmi.bmcPassword=
################################################################################
#                                                                              #
#                          SECTION G - ASM                                     #
#                                                                              #
################################################################################
```

```
#-------------------------------------------------------------------------------
# ASM Storage Type
# Allowed values are : ASM and ASM_ON_NAS
# ASM_ON_NAS applicable only if
# oracle.install.crs.config.ClusterConfiguration=STANDALONE
#-------------------------------------------------------------------------------
oracle.install.asm.storageOption=ASM

#-------------------------------------------------------------------------------
# NAS location to create ASM disk group for storing OCR/VDSK
# Specify the NAS location where you want the ASM disk group to be created
# to be used to store OCR/VDSK files
# Applicable only if oracle.install.asm.storageOption=ASM_ON_NAS
#-------------------------------------------------------------------------------
oracle.install.asmOnNAS.ocrLocation=
#-------------------------------------------------------------------------------
# Create a separate ASM DiskGroup on NAS to store GIMR data
# Specify 'true' if you would like to separate GIMR data with clusterware data, else
# specify 'false'
# Applicable only if oracle.install.asm.storageOption=ASM_ON_NAS
#-------------------------------------------------------------------------------
oracle.install.asmOnNAS.configureGIMRDataDG=false

#-------------------------------------------------------------------------------
# NAS location to create ASM disk group for storing GIMR data
# Specify the NAS location where you want the ASM disk group to be created
# to be used to store the GIMR database
# Applicable only if oracle.install.asm.storageOption=ASM_ON_NAS
# and oracle.install.asmOnNAS.configureGIMRDataDG=true
#-------------------------------------------------------------------------------
oracle.install.asmOnNAS.gimrLocation=

#-------------------------------------------------------------------------------
# Password for SYS user of Oracle ASM
#-------------------------------------------------------------------------------
oracle.install.asm.SYSASMPassword=oracle

#-------------------------------------------------------------------------------
# The ASM DiskGroup
#
# Example: oracle.install.asm.diskGroup.name=data
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.name=MEM22_DG

#-------------------------------------------------------------------------------
# Redundancy level to be used by ASM.
# It can be one of the following
#    - NORMAL
#    - HIGH
#    - EXTERNAL
#    - FLEX#    - EXTENDED (required if
oracle.install.crs.config.ClusterConfiguration=EXTENDED)
# Example: oracle.install.asm.diskGroup.redundancy=NORMAL
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.redundancy=EXTERNAL

#-------------------------------------------------------------------------------
# Allocation unit size to be used by ASM.
# It can be one of the following values
#    - 1
#    - 2
#    - 4
#    - 8
```

```
#   - 16
# Example: oracle.install.asm.diskGroup.AUSize=4
# size unit is MB
#
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.AUSize=4


#--------------------------------------------------------------------------------
# Failure Groups for the disk group
# If configuring for Extended cluster specify as list of "failure group name:site"
# tuples.
# Else just specify as list of failure group names
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.FailureGroups=


#--------------------------------------------------------------------------------
# List of disks and their failure groups to create a ASM DiskGroup
# (Use this if each of the disks have an associated failure group)
# Failure Groups are not required if oracle.install.asm.diskGroup.redundancy=EXTERNAL
# Example:
#     For Unix based Operating System:
#
oracle.install.asm.diskGroup.disksWithFailureGroupNames=/oracle/asm/disk1,FGName,/oracle/
asm/disk2,FGName
#     For Windows based Operating System:
#
oracle.install.asm.diskGroup.disksWithFailureGroupNames=\\.\ORCLDISKDATA0,FGName,\\.\ORCL
DISKDATA1,FGName
#
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.disksWithFailureGroupNames=/dev/xvdb,


#--------------------------------------------------------------------------------
# List of disks to create a ASM DiskGroup
# (Use this variable only if failure groups configuration is not required)
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.disks=/oracle/asm/disk1,/oracle/asm/disk2
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.disks=\\.\ORCLDISKDATA0,\\.\ORCLDISKDATA1
#
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.disks=/dev/xvdb


#--------------------------------------------------------------------------------
# List of failure groups to be marked as QUORUM.
# Quorum failure groups contain only voting disk data, no user data is stored
# Example:
#       oracle.install.asm.diskGroup.quorumFailureGroupNames=FGName1,FGName2
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.quorumFailureGroupNames=
#--------------------------------------------------------------------------------
# The disk discovery string to be used to discover the disks used create a ASM DiskGroup
#
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=/oracle/asm/*
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=\\.\ORCLDISK*
#
#--------------------------------------------------------------------------------
oracle.install.asm.diskGroup.diskDiscoveryString=/dev/xvd*


#--------------------------------------------------------------------------------
# Password for ASMSNMP account
# ASMSNMP account is used by Oracle Enterprise Manager to monitor Oracle ASM instances
```

```
#-------------------------------------------------------------------------------
oracle.install.asm.monitorPassword=oracle

#-------------------------------------------------------------------------------
# GIMR Storage data ASM DiskGroup
# Applicable only when
# oracle.install.asm.configureGIMRDataDG=true
# Example: oracle.install.asm.GIMRDG.name=MGMT
#
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.name=

#-------------------------------------------------------------------------------
# Redundancy level to be used by ASM.
# It can be one of the following
#    - NORMAL
#    - HIGH
#    - EXTERNAL
#    - FLEX#   - EXTENDED (only if
oracle.install.crs.config.ClusterConfiguration=EXTENDED)
# Example: oracle.install.asm.gimrDG.redundancy=NORMAL
#
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.redundancy=

#-------------------------------------------------------------------------------
# Allocation unit size to be used by ASM.
# It can be one of the following values
#    - 1
#    - 2
#    - 4
#    - 8
#    - 16
# Example: oracle.install.asm.gimrDG.AUSize=4
# size unit is MB
#
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.AUSize=

#-------------------------------------------------------------------------------
# Failure Groups for the GIMR storage data ASM disk group
# If configuring for Extended cluster specify as list of "failure group name:site"
# tuples.
# Else just specify as list of failure group names
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.FailureGroups=

#-------------------------------------------------------------------------------
# List of disks and their failure groups to create GIMR data ASM DiskGroup
# (Use this if each of the disks have an associated failure group)
# Failure Groups are not required if oracle.install.asm.gimrDG.redundancy=EXTERNAL
# Example:
#      For Unix based Operating System:
#
oracle.install.asm.gimrDG.disksWithFailureGroupNames=/oracle/asm/disk1,FGName,/oracle/asm
/disk2,FGName
#      For Windows based Operating System:
#
oracle.install.asm.gimrDG.disksWithFailureGroupNames=\\.\ORCLDISKDATA0,FGName,\\.\ORCLDIS
KDATA1,FGName
#
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.disksWithFailureGroupNames=

#-------------------------------------------------------------------------------
# List of disks to create GIMR data ASM DiskGroup
```

```
# (Use this variable only if failure groups configuration is not required)
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.gimrDG.disks=/oracle/asm/disk1,/oracle/asm/disk2
#     For Windows based Operating System:
#     oracle.install.asm.gimrDG.disks=\\.\ORCLDISKDATA0,\\.\ORCLDISKDATA1
#
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.disks=

#-------------------------------------------------------------------------------
# List of failure groups to be marked as QUORUM.
# Quorum failure groups contain only voting disk data, no user data is stored
# Example:
#       oracle.install.asm.gimrDG.quorumFailureGroupNames=FGName1,FGName2
#-------------------------------------------------------------------------------
oracle.install.asm.gimrDG.quorumFailureGroupNames=

#-------------------------------------------------------------------------------
# Configure AFD - ASM Filter Driver
# Applicable only for FLEX_ASM_STORAGE option
# Specify 'true' if you want to configure AFD, else specify 'false'
#-------------------------------------------------------------------------------
oracle.install.asm.configureAFD=false
#-------------------------------------------------------------------------------
# Configure RHPS - Rapid Home Provisioning Service
# Applicable only for DOMAIN cluster configuration
# Specify 'true' if you want to configure RHP service, else specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.configureRHPS=false

################################################################################
#                                                                              #
#                        SECTION H - UPGRADE                                    #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify whether to ignore down nodes during upgrade operation.
# Value should be 'true' to ignore down nodes otherwise specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.ignoreDownNodes=false
################################################################################
#                                                                              #
#                        MANAGEMENT OPTIONS                                     #
#                                                                              #
################################################################################

#-------------------------------------------------------------------------------
# Specify the management option to use for managing Oracle Grid Infrastructure
# Options are:
# 1. CLOUD_CONTROL - If you want to manage your Oracle Grid Infrastructure with
# Enterprise Manager Cloud Control.
# 2. NONE    -If you do not want to manage your Oracle Grid Infrastructure with Enterprise
# Manager Cloud Control.
#-------------------------------------------------------------------------------
oracle.install.config.managementOption=NONE

#-------------------------------------------------------------------------------
# Specify the OMS host to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#-------------------------------------------------------------------------------
oracle.install.config.omsHost=

#-------------------------------------------------------------------------------
# Specify the OMS port to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
```

```
#--------------------------------------------------------------------------------
oracle.install.config.omsPort=

#--------------------------------------------------------------------------------
# Specify the EM Admin user name to use to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#--------------------------------------------------------------------------------
oracle.install.config.emAdminUser=

#--------------------------------------------------------------------------------
# Specify the EM Admin password to use to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#--------------------------------------------------------------------------------
oracle.install.config.emAdminPassword=
################################################################################
#                                                                              #
#                    Root script execution configuration                       #
#                                                                              #
################################################################################

#------------------------------------------------------------------------------------------
---------------
# Specify the root script execution mode.
#
#    - true  : To execute the root script automatically by using the appropriate
configuration methods.
#    - false : To execute the root script manually.
#
# If this option is selected, password should be specified on the console.
#------------------------------------------------------------------------------------------
---------------
oracle.install.crs.rootconfig.executeRootScript=false

#------------------------------------------------------------------------------------------
# Specify the configuration method to be used for automatic root script execution.
#
# Following are the possible choices:
#    - ROOT
#    - SUDO
#------------------------------------------------------------------------------------------
oracle.install.crs.rootconfig.configMethod=
#------------------------------------------------------------------------------------------
# Specify the absolute path of the sudo program.
#
# Applicable only when SUDO configuration method was chosen.
#------------------------------------------------------------------------------------------
oracle.install.crs.rootconfig.sudoPath=

#------------------------------------------------------------------------------------------
# Specify the name of the user who is in the sudoers list.
#
# Applicable only when SUDO configuration method was chosen.
#------------------------------------------------------------------------------------------
oracle.install.crs.rootconfig.sudoUserName=
#------------------------------------------------------------------------------------------
# Specify the nodes batch map.
#
# This should be a comma separated list of node:batch pairs.
# During upgrade, you can sequence the automatic execution of root scripts
# by pooling the nodes into batches.
# A maximum of three batches can be specified.
# Installer will execute the root scripts on all the nodes in one batch before
# proceeding to next batch.
# Root script execution on the local node must be in Batch 1.
# Only one type of node role can be used for each batch.
# Root script execution should be done first in all HUB nodes and then, when
```

```
# existent, in all the LEAF nodes.
#
# Examples:
# 1. oracle.install.crs.config.batchinfo=HUBNode1:1,HUBNode2:2,HUBNode3:2,LEAFNode4:3
# 2. oracle.install.crs.config.batchinfo=HUBNode1:1,LEAFNode2:2,LEAFNode3:2,LEAFNode4:2
# 3. oracle.install.crs.config.batchinfo=HUBNode1:1,HUBNode2:1,LEAFNode3:2,LEAFNode4:3
#
# Applicable only for UPGRADE install option.
#-------------------------------------------------------------------------------------
oracle.install.crs.config.batchinfo=
################################################################################
#                                                                              #
#                          APPLICATION CLUSTER OPTIONS                         #
#                                                                              #
################################################################################

#------------------------------------------------------------------------------
# Specify the Virtual hostname to configure virtual access for your Application
# The value to be specified for Virtual hostname is optional.
#------------------------------------------------------------------------------
oracle.install.crs.app.applicationAddress=
```

Appendix D: Response File for provisioning a new 12.1.0.2 GI Cluster

```
################################################################################
## Copyright(c) Oracle Corporation 1998,2014. All rights reserved.        ##
##                                                                        ##
## Specify values for the variables listed below to customize             ##
## your installation.                                                     ##
##                                                                        ##
## Each variable is associated with a comment. The comment                ##
## can help to populate the variables with the appropriate                ##
## values.                                                                ##
##                                                                        ##
## IMPORTANT NOTE: This file contains plain text passwords and            ##
## should be secured to have read permission only by oracle user          ##
## or db administrator who owns this installation.                        ##
##                                                                        ##
################################################################################

################################################################################
##                                                                        ##
## Instructions to fill this response file                                ##
## To install and configure 'Grid Infrastructure for Cluster'             ##
##  - Fill out sections A,B,C,D,E,F and G                                  ##
##  - Fill out section G if OCR and voting disk should be placed on ASM    ##
##                                                                        ##
## To install and configure 'Grid Infrastructure for Standalone server'   ##
##  - Fill out sections A,B and G                                          ##
##                                                                        ##
## To install software for 'Grid Infrastructure'                          ##
##  - Fill out sections A,B and C                                          ##
##                                                                        ##
## To upgrade clusterware and/or Automatic storage management of earlier  ##
## releases                                                               ##
##  - Fill out sections A,B,C,D and H                                      ##
##                                                                        ##
################################################################################

#------------------------------------------------------------------------------
# Do not change the following system generated value.
```

```
#-------------------------------------------------------------------------------
oracle.install.responseFileVersion=/oracle/install/rspfmt_crsinstall_response_schema_v12.
1.0

################################################################################
#                                                                              #
#                           SECTION A - BASIC                                  #
#                                                                              #
################################################################################

#-------------------------------------------------------------------------------
# Specify the hostname of the system as set during the install. It can be used
# to force the installation to use an alternative hostname rather than using the
# first hostname found on the system. (e.g., for systems with multiple hostnames
# and network interfaces)
#-------------------------------------------------------------------------------
ORACLE_HOSTNAME=vmsvr141.oracle.com
#-------------------------------------------------------------------------------
# Specify the location which holds the inventory files.
# This is an optional parameter if installing on
# Windows based Operating System.
#-------------------------------------------------------------------------------
INVENTORY_LOCATION=/u01/app/oraInventory
#-------------------------------------------------------------------------------
# Specify the languages in which the components will be installed.
#
# en   : English                   ja   : Japanese
# fr   : French                    ko   : Korean
# ar   : Arabic                    es   : Latin American Spanish
# bn   : Bengali                   lv   : Latvian
# pt_BR: Brazilian Portuguese      lt   : Lithuanian
# bg   : Bulgarian                 ms   : Malay
# fr_CA: Canadian French           es_MX: Mexican Spanish
# ca   : Catalan                   no   : Norwegian
# hr   : Croatian                  pl   : Polish
# cs   : Czech                     pt   : Portuguese
# da   : Danish                    ro   : Romanian
# nl   : Dutch                     ru   : Russian
# ar_EG: Egyptian                  zh_CN: Simplified Chinese
# en_GB: English (Great Britain)   sk   : Slovak
# et   : Estonian                  sl   : Slovenian
# fi   : Finnish                   es_ES: Spanish
# de   : German                    sv   : Swedish
# el   : Greek                     th   : Thai
# iw   : Hebrew                    zh_TW: Traditional Chinese
# hu   : Hungarian                 tr   : Turkish
# is   : Icelandic                 uk   : Ukrainian
# in   : Indonesian                vi   : Vietnamese
# it   : Italian
#
# all_langs   : All languages
#
# Specify value as the following to select any of the languages.
# Example : SELECTED_LANGUAGES=en,fr,ja
#
# Specify value as the following to select all the languages.
# Example : SELECTED_LANGUAGES=all_langs
#-------------------------------------------------------------------------------
SELECTED_LANGUAGES=en

#-------------------------------------------------------------------------------
# Specify the installation option.
# Allowed values: CRS_CONFIG or HA_CONFIG or UPGRADE or CRS_SWONLY or HA_SWONLY
#    - CRS_CONFIG : To configure Grid Infrastructure for cluster
#    - HA_CONFIG  : To configure Grid Infrastructure for stand alone server
#    - UPGRADE    : To upgrade clusterware software of earlier release
```

```
#    - CRS_SWONLY : To install clusterware files only (can be configured for cluster
#                   or stand alone server later)
#    - HA_SWONLY  : To install clusterware files only (can be configured for stand
#                   alone server later. This is only supported on Windows.)
#-------------------------------------------------------------------------------
oracle.install.option=CRS_CONFIG

#-------------------------------------------------------------------------------
# Specify the complete path of the Oracle Base.
#-------------------------------------------------------------------------------
ORACLE_BASE=/u01/app/gridbase

#-------------------------------------------------------------------------------
# Specify the complete path of the Oracle Home.
#-------------------------------------------------------------------------------
ORACLE_HOME=/u01/app/12102/grid

################################################################################
#                                                                              #
#                          SECTION B - GROUPS                                  #
#                                                                              #
#    The following three groups need to be assigned for all GI installations.  #
#    OSDBA and OSOPER can be the same or different.  OSASM must be different    #
#    than the other two.                                                        #
#    The value to be specified for OSDBA, OSOPER and OSASM group is only for    #
#    Unix based Operating System.                                              #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# The DBA_GROUP is the OS group which is to be granted OSDBA privileges.
#-------------------------------------------------------------------------------
oracle.install.asm.OSDBA=asmdba

#-------------------------------------------------------------------------------
# The OPER_GROUP is the OS group which is to be granted OSOPER privileges.
# The value to be specified for OSOPER group is optional.
# Value should not be provided if configuring Client Cluster - i.e.
storageOption=CLIENT_ASM_STORAGE.
#-------------------------------------------------------------------------------
oracle.install.asm.OSOPER=asmoper

#-------------------------------------------------------------------------------
# The OSASM_GROUP is the OS group which is to be granted OSASM privileges. This
# must be different than the previous two.
#-------------------------------------------------------------------------------
oracle.install.asm.OSASM=asmadmin

################################################################################
#                                                                              #
#                          SECTION C - SCAN                                    #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify a name for SCAN
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.scanName=scan-stdcluster-43

#-------------------------------------------------------------------------------
# Specify a unused port number for SCAN service
#-------------------------------------------------------------------------------

oracle.install.crs.config.gpnp.scanPort=1521


################################################################################
#                                                                              #
```

```
#                          SECTION D - CLUSTER & GNS                          #
#                                                                             #
###############################################################################
#-----------------------------------------------------------------------------
# Specify the type of cluster you would like to configure
# Allowed values: FLEX and STANDARD
#-----------------------------------------------------------------------------
oracle.install.crs.config.ClusterType=STANDARD


#-----------------------------------------------------------------------------
# Specify a name for the Cluster you are creating.
#
# The maximum length allowed for clustername is 15 characters. The name can be
# any combination of lower and uppercase alphabets (A - Z), (0 - 9), hyphen(-)
# and underscore(_).
#-----------------------------------------------------------------------------
oracle.install.crs.config.clusterName=stdcluster-43

#-----------------------------------------------------------------------------
# Specify 'true' if you would like to configure Grid Naming Service(GNS), else
# specify 'false'
#-----------------------------------------------------------------------------
oracle.install.crs.config.gpnp.configureGNS=false

#-----------------------------------------------------------------------------
# Applicable only if you choose to configure GNS
# Specify 'true' if you would like to assign SCAN name VIP and Node VIPs by DHCP
# , else specify 'false'
#-----------------------------------------------------------------------------
oracle.install.crs.config.autoConfigureClusterNodeVIP=false

#-----------------------------------------------------------------------------
# Applicable only if you choose to configure GNS
# Specify the type of GNS configuration for cluster
# Allowed values are: CREATE_NEW_GNS and USE_SHARED_GNS
#-----------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsOption=CREATE_NEW_GNS

#-----------------------------------------------------------------------------
# Applicable only if SHARED_GNS is being configured for cluster
# Specify the path to the GNS client data file
#-----------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsClientDataFile=

#-----------------------------------------------------------------------------
# Applicable only if you choose to configure GNS for this cluster
# oracle.install.crs.config.gpnp.gnsOption=CREATE_NEW_GNS
# Specify the GNS subdomain and an unused virtual hostname for GNS service
#-----------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsSubDomain=
oracle.install.crs.config.gpnp.gnsVIPAddress=



#-----------------------------------------------------------------------------
# Specify the list of nodes that have to be configured to be part of the cluster.
#
# The list should a comma-separated list of tuples.  Each tuple should be a
# colon-separated string that contains
# - 2 fields if configuring a Standard Cluster, or
# - 3 fields if configuring a Flex Cluster
#
# The fields should be ordered as follows:
# 1. The first field should be the public node name.
# 2. The second field should be the virtual host name
```

```
#     (Should be specified as AUTO if you have chosen 'auto configure for VIP'
#      i.e. autoConfigureClusterNodeVIP=true)
# 3. The third field indicates the role of node (HUB,LEAF). This has to
#    be provide only if Flex Cluster is being configured.
#
# Examples
# For configuring Standard Cluster: oracle.install.crs.config.clusterNodes=node1:node1-
vip,node2:node2-vip
# For configuring Flex Cluster: oracle.install.crs.config.clusterNodes=node1:node1-
vip:HUB,node2:node2-vip:LEAF
#
#
#-------------------------------------------------------------------------------
oracle.install.crs.config.clusterNodes=vmsvr141.oracle.com:vmsvr085-
vip.oracle.com,vmsvr142.oracle.com:vmsvr086-vip.oracle.com

#-------------------------------------------------------------------------------
# The value should be a comma separated strings where each string is as shown below
# InterfaceName:SubnetAddress:InterfaceType
# where InterfaceType can be either "1", "2", "3", "4", or "5"
# InterfaceType stand for the following values
#    - 1 : PUBLIC
#    - 2 : PRIVATE
#    - 3 : DO NOT USE
#    - 4 : ASM
#    - 5 : ASM & PRIVATE
#
# For example: eth0:140.87.24.0:1,eth1:10.2.1.0:2,eth2:140.87.52.0:3
#
#-------------------------------------------------------------------------------
oracle.install.crs.config.networkInterfaceList=eth0:148.87.8.0:1,eth1:10.212.144.0:3,eth3
:192.168.14.0:2


################################################################################
#                                                                              #
#                           SECTION E - STORAGE                                #
#                                                                              #
################################################################################

#-------------------------------------------------------------------------------
# Specify the type of storage to use for Oracle Cluster Registry(OCR) and Voting
# Disks files
#    - LOCAL_ASM_STORAGE
#    - FLEX_ASM_STORAGE
#    - CLIENT_ASM_STORAGE
#    - FILE_SYSTEM_STORAGE
# If configuring a Flex Cluster, FLEX_ASM_STORAGE is the only allowed value
#-------------------------------------------------------------------------------
oracle.install.crs.config.storageOption=LOCAL_ASM_STORAGE

#-------------------------------------------------------------------------------
# These properties are applicable only if FILE_SYSTEM_STORAGE is chosen for
# storing OCR and voting disk
# Specify the location(s) and redundancy for OCR and voting disks
# Multiple locations can be specified, separated by commas.
# In case of windows, mention the drive location that is specified to be
# formatted for DATA in the above property.
# Redundancy can be one of these:
#     EXTERNAL - one(1) location should be specified for OCR and voting disk
#     NORMAL - three(3) locations should be specified for OCR and voting disk
# Example:
#     For Unix based Operating System:
#
oracle.install.crs.config.sharedFileSystemStorage.votingDiskLocations=/oradbocfs/storage/
vdsk1,/oradbocfs/storage/vdsk2,/oradbocfs/storage/vdsk3
```

```
#
oracle.install.crs.config.sharedFileSystemStorage.ocrLocations=/oradbocfs/storage/ocr1,/o
radbocfs/storage/ocr2,/oradbocfs/storage/ocr3
#      For Windows based Operating System OCR/VDSK on shared storage is not supported.
#-------------------------------------------------------------------------------
oracle.install.crs.config.sharedFileSystemStorage.votingDiskLocations=
oracle.install.crs.config.sharedFileSystemStorage.votingDiskRedundancy=NORMAL
oracle.install.crs.config.sharedFileSystemStorage.ocrLocations=
oracle.install.crs.config.sharedFileSystemStorage.ocrRedundancy=NORMAL
################################################################################
#                                                                              #
#                              SECTION F - IPMI                                #
#                                                                              #
################################################################################

#-------------------------------------------------------------------------------
# Specify 'true' if you would like to configure Intelligent Power Management interface
# (IPMI), else specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.useIPMI=false

#-------------------------------------------------------------------------------
# Applicable only if you choose to configure IPMI
# i.e. oracle.install.crs.config.useIPMI=true
# Specify the username and password for using IPMI service
#-------------------------------------------------------------------------------
oracle.install.crs.config.ipmi.bmcUsername=
oracle.install.crs.config.ipmi.bmcPassword=
################################################################################
#                                                                              #
#                              SECTION G - ASM                                 #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify a password for SYSASM user of the ASM instance
#-------------------------------------------------------------------------------
oracle.install.asm.SYSASMPassword=oracle

#-------------------------------------------------------------------------------
# The ASM DiskGroup
#
# Example: oracle.install.asm.diskGroup.name=data
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.name=MEM40_DG

#-------------------------------------------------------------------------------
# Redundancy level to be used by ASM.
# It can be one of the following
#    - NORMAL
#    - HIGH
#    - EXTERNAL
# Example: oracle.install.asm.diskGroup.redundancy=NORMAL
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.redundancy=EXTERNAL

#-------------------------------------------------------------------------------
# Allocation unit size to be used by ASM.
# It can be one of the following values
#    - 1
#    - 2
#    - 4
#    - 8
#    - 16
#    - 32
```

```
#    - 64
# Example: oracle.install.asm.diskGroup.AUSize=4
# size unit is MB
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.AUSize=1

#-------------------------------------------------------------------------------
# List of disks to create a ASM DiskGroup
#
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.disks=/oracle/asm/disk1,/oracle/asm/disk2
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.disks=\\.\ORCLDISKDATA0,\\.\ORCLDISKDATA1
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.disks=/dev/xvdb,/dev/xvdc

#-------------------------------------------------------------------------------
# The disk discovery string to be used to discover the disks used create a ASM DiskGroup
#
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=/oracle/asm/*
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=\\.\ORCLDISK*
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.diskDiscoveryString=/dev/xvd*

#-------------------------------------------------------------------------------
# oracle.install.asm.monitorPassword=password
#-------------------------------------------------------------------------------
oracle.install.asm.monitorPassword=oracle

#-------------------------------------------------------------------------------
# Applicable only if configuring CLIENT_ASM_STORAGE for OCR/Voting Disk storage
# Specify the path to Client ASM Data file
#-------------------------------------------------------------------------------
oracle.install.asm.ClientDataFile=

###############################################################################
#                                                                             #
#                        SECTION H - UPGRADE                                  #
#                                                                             #
###############################################################################
#-------------------------------------------------------------------------------
# Specify whether to ignore down nodes during upgrade operation.
# Value should be 'true' to ignore down nodes otherwise specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.ignoreDownNodes=false
###############################################################################
#                                                                             #
#                        MANAGEMENT OPTIONS                                   #
#                                                                             #
###############################################################################

#-------------------------------------------------------------------------------
# Specify the management option to use for managing Oracle Grid Infrastructure
# Options are:
# 1. CLOUD_CONTROL - If you want to manage your Oracle Grid Infrastructure with
# Enterprise Manager Cloud Control.
# 2. NONE    -If you do not want to manage your Oracle Grid Infrastructure with Enterprise
# Manager Cloud Control.
#-------------------------------------------------------------------------------
```

```
oracle.install.config.managementOption=NONE

#-------------------------------------------------------------------------------
# Specify the OMS host to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#-------------------------------------------------------------------------------
oracle.install.config.omsHost=

#-------------------------------------------------------------------------------
# Specify the OMS port to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#-------------------------------------------------------------------------------
oracle.install.config.omsPort=0

#-------------------------------------------------------------------------------
# Specify the EM Admin user name to use to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#-------------------------------------------------------------------------------
oracle.install.config.emAdminUser=

#-------------------------------------------------------------------------------
# Specify the EM Admin password to use to connect to Cloud Control.
# Applicable only when oracle.install.config.managementOption=CLOUD_CONTROL
#-------------------------------------------------------------------------------
oracle.install.config.emAdminPassword=
```

Appendix E: Response File for creating a new 11.2.0.4 Grid Infrastructure

```
###############################################################################
## Copyright(c) Oracle Corporation 1998, 2013. All rights reserved.        ##
##                                                                         ##
## Specify values for the variables listed below to customize             ##
## your installation.                                                      ##
##                                                                         ##
## Each variable is associated with a comment. The comment                ##
## can help to populate the variables with the appropriate                ##
## values.                                                       ##        ##
##                                                                         ##
## IMPORTANT NOTE: This file contains plain text passwords and            ##
## should be secured to have read permission only by oracle user          ##
## or db administrator who owns this installation.                        ##
##                                                                         ##
###############################################################################


###############################################################################
##                                                                         ##
## Instructions to fill this response file                                 ##
## To install and configure 'Grid Infrastructure for Cluster'             ##
##  - Fill out sections A,B,C,D,E,F and G                                  ##
##  - Fill out section G if OCR and voting disk should be placed on ASM    ##
##                                                                         ##
## To install and configure 'Grid Infrastructure for Standalone server'   ##
##  - Fill out sections A,B and G                                          ##
##                                                                         ##
## To install software for 'Grid Infrastructure'                          ##
##  - Fill out sections A,B and C                                          ##
##                                                                         ##
## To upgrade clusterware and/or Automatic storage management of earlier  ##
## releases                                                               ##
```

```
##   - Fill out sections A,B,C,D and H                                        ##
##                                                                            ##
################################################################################

#-------------------------------------------------------------------------------
# Do not change the following system generated value.
#-------------------------------------------------------------------------------
oracle.install.responseFileVersion=/oracle/install/rspfmt_crsinstall_response_schema
_v11_2_0


################################################################################
#                                                                              #
#                          SECTION A - BASIC                                   #
#                                                                              #
################################################################################

#-------------------------------------------------------------------------------
# Specify the hostname of the system as set during the install. It can be used
# to force the installation to use an alternative hostname rather than using the
# first hostname found on the system. (e.g., for systems with multiple hostnames
# and network interfaces)
#-------------------------------------------------------------------------------
ORACLE_HOSTNAME=rws1270095.us.oracle.com
#-------------------------------------------------------------------------------
# Specify the location which holds the inventory files.
# This is an optional parameter if installing on
# Windows based Operating System.
#-------------------------------------------------------------------------------
INVENTORY_LOCATION=/scratch/ksviswan/ks112/oraInventory
#-------------------------------------------------------------------------------
# Specify the languages in which the components will be installed.
#
# en   : English                    ja   : Japanese
# fr   : French                     ko   : Korean
# ar   : Arabic                     es   : Latin American Spanish
# bn   : Bengali                    lv   : Latvian
# pt_BR: Brazilian Portuguese       lt   : Lithuanian
# bg   : Bulgarian                  ms   : Malay
# fr_CA: Canadian French            es_MX: Mexican Spanish
# ca   : Catalan                    no   : Norwegian
# hr   : Croatian                   pl   : Polish
# cs   : Czech                      pt   : Portuguese
# da   : Danish                     ro   : Romanian
# nl   : Dutch                      ru   : Russian
# ar_EG: Egyptian                   zh_CN: Simplified Chinese
# en_GB: English (Great Britain)    sk   : Slovak
# et   : Estonian                   sl   : Slovenian
# fi   : Finnish                    es_ES: Spanish
# de   : German                     sv   : Swedish
# el   : Greek                      th   : Thai
# iw   : Hebrew                     zh_TW: Traditional Chinese
# hu   : Hungarian                  tr   : Turkish
# is   : Icelandic                  uk   : Ukrainian
# in   : Indonesian                 vi   : Vietnamese
# it   : Italian
#
# all_langs   : All languages
#
# Specify value as the following to select any of the languages.
# Example : SELECTED_LANGUAGES=en,fr,ja
#
# Specify value as the following to select all the languages.
```

```
# Example : SELECTED_LANGUAGES=all_langs
#-------------------------------------------------------------------------------
SELECTED_LANGUAGES=en

#-------------------------------------------------------------------------------
# Specify the installation option.
# Allowed values: CRS_CONFIG or HA_CONFIG or UPGRADE or CRS_SWONLY
#    - CRS_CONFIG : To configure Grid Infrastructure for cluster
#    - HA_CONFIG  : To configure Grid Infrastructure for stand alone server
#    - UPGRADE    : To upgrade clusterware software of earlier release
#    - CRS_SWONLY : To install clusterware files only (can be configured for cluster
#                   or stand alone server later)
#-------------------------------------------------------------------------------
oracle.install.option=CRS_CONFIG

#-------------------------------------------------------------------------------
# Specify the complete path of the Oracle Base.
#-------------------------------------------------------------------------------

ORACLE_BASE=/scratch/ksviswan/ks112/obase

#-------------------------------------------------------------------------------
# Specify the complete path of the Oracle Home.
#-------------------------------------------------------------------------------
ORACLE_HOME=/scratch/ksviswan/ks112/grid

################################################################################
#                                                                              #
#                          SECTION B - GROUPS                                  #
#                                                                              #
#    The following three groups need to be assigned for all GI installations.  #
#    OSDBA and OSOPER can be the same or different.  OSASM must be different    #
#    than the other two.                                                       #
#    The value to be specified for OSDBA, OSOPER and OSASM group is only for    #
#    Unix based Operating System.                                              #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# The DBA_GROUP is the OS group which is to be granted OSDBA privileges.
#-------------------------------------------------------------------------------
oracle.install.asm.OSDBA=svrtech

#-------------------------------------------------------------------------------
# The OPER_GROUP is the OS group which is to be granted OSOPER privileges.
# The value to be specified for OSOPER group is optional.
#-------------------------------------------------------------------------------
oracle.install.asm.OSOPER=

#-------------------------------------------------------------------------------
# The OSASM_GROUP is the OS group which is to be granted OSASM privileges. This
# must be different than the previous two.
#-------------------------------------------------------------------------------
oracle.install.asm.OSASM=dba

################################################################################
#                                                                              #
#                           SECTION C - SCAN                                   #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify a name for SCAN
#-------------------------------------------------------------------------------
```

```
oracle.install.crs.config.gpnp.scanName=rws12700950096-r

#-------------------------------------------------------------------------------
# Specify a unused port number for SCAN service
#-------------------------------------------------------------------------------

oracle.install.crs.config.gpnp.scanPort=1528


################################################################################
#                                                                              #
#                         SECTION D - CLUSTER & GNS                      #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify a name for the Cluster you are creating.
#
# The maximum length allowed for clustername is 15 characters. The name can be
# any combination of lower and uppercase alphabets (A - Z), (0 - 9), hyphen(-)
# and underscore(_).
#-------------------------------------------------------------------------------
oracle.install.crs.config.clusterName=rws9596

#-------------------------------------------------------------------------------
# Specify 'true' if you would like to configure Grid Naming Service(GNS), else
# specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.configureGNS=false

#-------------------------------------------------------------------------------
# Applicable only if you choose to configure GNS
# Specify the GNS subdomain and an unused virtual hostname for GNS service
# Additionally you may also specify if VIPs have to be autoconfigured
#
# Value for oracle.install.crs.config.autoConfigureClusterNodeVIP should be true
# if GNS is being configured(oracle.install.crs.config.gpnp.configureGNS), false
# otherwise.
#-------------------------------------------------------------------------------
oracle.install.crs.config.gpnp.gnsSubDomain=
oracle.install.crs.config.gpnp.gnsVIPAddress=
oracle.install.crs.config.autoConfigureClusterNodeVIP=false

#-------------------------------------------------------------------------------
# Specify a list of public node names, and virtual hostnames that have to be
# part of the cluster.
#
# The list should a comma-separated list of nodes.  Each entry in the list
# should be a colon-separated string that contains 2 fields.
#
# The fields should be ordered as follows:
# 1. The first field is for public node name.
# 2. The second field is for virtual host name
#    (specify as AUTO if you have chosen 'auto configure for VIP'
#     i.e. autoConfigureClusterNodeVIP=true)
#
# Example: oracle.install.crs.config.clusterNodes=node1:node1-vip,node2:node2-vip
#-------------------------------------------------------------------------------
oracle.install.crs.config.clusterNodes=rws1270095:rws1270095-
v,rws1270096:rws1270096-v

#-------------------------------------------------------------------------------
# The value should be a comma separated strings where each string is as shown below
```

```
# InterfaceName:SubnetAddress:InterfaceType
# where InterfaceType can be either "1", "2", or "3"
# (1 indicates public, 2 indicates private, and 3 indicates the interface is not
used)
#
# For example: eth0:140.87.24.0:1,eth1:10.2.1.0:2,eth2:140.87.52.0:3
#
#-------------------------------------------------------------------------------
oracle.install.crs.config.networkInterfaceList=eth0:10.214.104.0:1,eth1:192.168.11.0
:2,eth2:192.168.12.0:3


################################################################################
#                                                                              #
#                          SECTION E - STORAGE                                 #
#                                                                              #
################################################################################


#-------------------------------------------------------------------------------
# Specify the type of storage to use for Oracle Cluster Registry(OCR) and Voting
# Disks files
#    - ASM_STORAGE
#    - FILE_SYSTEM_STORAGE
#-------------------------------------------------------------------------------
oracle.install.crs.config.storageOption=ASM_STORAGE


#-------------------------------------------------------------------------------
# THIS PROPERTY NEEDS TO BE FILLED ONLY IN CASE OF WINDOWS INSTALL.
# Specify a comma separated list of strings where each string is as shown below:
# Disk Number:Partition Number:Drive Letter:Format Option
# The Disk Number and Partition Number should refer to the location which has to be
# be formatted. The Drive Letter should refer to the drive letter that has to be
# assigned. "Format Option" can be either of the following -
#    - SOFTWARE : Format to place software binaries.
#    - DATA     : Format to place the OCR/VDSK files.
#
# For example: 1:2:P:DATA,1:3:Q:SOFTWARE,1:4:R:DATA,1:5:S:DATA
#
#-------------------------------------------------------------------------------
oracle.install.crs.config.sharedFileSystemStorage.diskDriveMapping=

#-------------------------------------------------------------------------------
# These properties are applicable only if FILE_SYSTEM_STORAGE is chosen for
# storing OCR and voting disk
# Specify the location(s) and redundancy for OCR and voting disks
# Multiple locations can be specified, separated by commas.
# In case of windows, mention the drive location that is specified to be
# formatted for DATA in the above property.
# Redundancy can be one of these:
#     EXTERNAL - one(1) location should be specified for OCR and voting disk
#     NORMAL - three(3) locations should be specified for OCR and voting disk
# Example:
#     For Unix based Operating System:
#
oracle.install.crs.config.sharedFileSystemStorage.votingDiskLocations=/oradbocfs/sto
rage/vdsk1,/oradbocfs/storage/vdsk2,/oradbocfs/storage/vdsk3
#
oracle.install.crs.config.sharedFileSystemStorage.ocrLocations=/oradbocfs/storage/oc
r1,/oradbocfs/storage/ocr2,/oradbocfs/storage/ocr3
#     For Windows based Operating System:
```

```
#
oracle.install.crs.config.sharedFileSystemStorage.votingDiskLocations=P:\vdsk1,R:\vd
sk2,S:\vdsk3
#
oracle.install.crs.config.sharedFileSystemStorage.ocrLocations=P:\ocr1,R:\ocr2,S:\oc
r3
#-------------------------------------------------------------------------------
oracle.install.crs.config.sharedFileSystemStorage.votingDiskLocations=
oracle.install.crs.config.sharedFileSystemStorage.votingDiskRedundancy=NORMAL
oracle.install.crs.config.sharedFileSystemStorage.ocrLocations=
oracle.install.crs.config.sharedFileSystemStorage.ocrRedundancy=NORMAL

#################################################################################
#                                                                               #
#                             SECTION F - IPMI                                   #
#                                                                               #
#################################################################################

#-------------------------------------------------------------------------------
# Specify 'true' if you would like to configure Intelligent Power Management
interface
# (IPMI), else specify 'false'
#-------------------------------------------------------------------------------
oracle.install.crs.config.useIPMI=false

#-------------------------------------------------------------------------------
# Applicable only if you choose to configure IPMI
# i.e. oracle.install.crs.config.useIPMI=true
# Specify the username and password for using IPMI service
#-------------------------------------------------------------------------------
oracle.install.crs.config.ipmi.bmcUsername=
oracle.install.crs.config.ipmi.bmcPassword=

#################################################################################
#                                                                               #
#                             SECTION G - ASM                                    #
#                                                                               #
#################################################################################
#-------------------------------------------------------------------------------
# Specify a password for SYSASM user of the ASM instance
#-------------------------------------------------------------------------------
oracle.install.asm.SYSASMPassword=Oracle123

#-------------------------------------------------------------------------------
# The ASM DiskGroup
#
# Example: oracle.install.asm.diskGroup.name=data
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.name=ks112dg

#-------------------------------------------------------------------------------
# Redundancy level to be used by ASM.
# It can be one of the following
#    - NORMAL
#    - HIGH
#    - EXTERNAL
# Example: oracle.install.asm.diskGroup.redundancy=NORMAL
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.redundancy=EXTERNAL
```

```
#-------------------------------------------------------------------------------
# Allocation unit size to be used by ASM.
# It can be one of the following values
#    - 1
#    - 2
#    - 4
#    - 8
#    - 16
#    - 32
#    - 64
# Example: oracle.install.asm.diskGroup.AUSize=4
# size unit is MB
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.AUSize=1


#-------------------------------------------------------------------------------
# List of disks to create a ASM DiskGroup
#
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.disks=/oracle/asm/disk1,/oracle/asm/disk2
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.disks=\\.\ORCLDISKDATA0,\\.\ORCLDISKDATA1
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.disks=/dev/xvdao1

#-------------------------------------------------------------------------------
# The disk discovery string to be used to discover the disks used create a ASM
DiskGroup
#
# Example:
#     For Unix based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=/oracle/asm/*
#     For Windows based Operating System:
#     oracle.install.asm.diskGroup.diskDiscoveryString=\\.\ORCLDISK*
#
#-------------------------------------------------------------------------------
oracle.install.asm.diskGroup.diskDiscoveryString=/dev/xvda*

#-------------------------------------------------------------------------------
# oracle.install.asm.monitorPassword=password
#-------------------------------------------------------------------------------
oracle.install.asm.monitorPassword=Oracle123

################################################################################
#                                                                              #
#                          SECTION H - UPGRADE                                 #
#                                                                              #
################################################################################
#-------------------------------------------------------------------------------
# Specify nodes for Upgrade.
# For upgrade on Windows, installer overrides the value of this parameter to include
# all the nodes of the cluster. However, the stack is upgraded one node at a time.
# Hence, this parameter may be left blank for Windows.
# Example: oracle.install.crs.upgrade.clusterNodes=node1,node2
#-------------------------------------------------------------------------------
oracle.install.crs.upgrade.clusterNodes=

#-------------------------------------------------------------------------------
```

```
# For RAC-ASM only. oracle.install.asm.upgradeASM=true/false
# Value should be 'true' while upgrading Cluster ASM of version 11gR2(11.2.0.1.0)
and above
#-------------------------------------------------------------------------------
oracle.install.asm.upgradeASM=false
#-------------------------------------------------------------------------------
# Specify the auto-updates option. It can be one of the following:
#    - MYORACLESUPPORT_DOWNLOAD
#    - OFFLINE_UPDATES
#    - SKIP_UPDATES
#-------------------------------------------------------------------------------
oracle.installer.autoupdates.option=SKIP_UPDATES
#-------------------------------------------------------------------------------
# In case MYORACLESUPPORT_DOWNLOAD option is chosen, specify the location where
# the updates are to be downloaded.
# In case OFFLINE_UPDATES option is chosen, specify the location where the updates
# are present.
#-------------------------------------------------------------------------------
oracle.installer.autoupdates.downloadUpdatesLoc=
#-------------------------------------------------------------------------------
# Specify the My Oracle Support Account Username which has the patches download
privileges
# to be used for software updates.
#  Example   : AUTOUPDATES_MYORACLESUPPORT_USERNAME=abc@oracle.com
#-------------------------------------------------------------------------------
AUTOUPDATES_MYORACLESUPPORT_USERNAME=

#-------------------------------------------------------------------------------
# Specify the My Oracle Support Account Username password which has the patches
download privileges
# to be used for software updates.
#
# Example    : AUTOUPDATES_MYORACLESUPPORT_PASSWORD=password
#-------------------------------------------------------------------------------
AUTOUPDATES_MYORACLESUPPORT_PASSWORD=

#-------------------------------------------------------------------------------
# Specify the Proxy server name. Length should be greater than zero.
#
# Example    : PROXY_HOST=proxy.domain.com
#-------------------------------------------------------------------------------
PROXY_HOST=

#-------------------------------------------------------------------------------
# Specify the proxy port number. Should be Numeric and at least 2 chars.
#
# Example    : PROXY_PORT=25
#-------------------------------------------------------------------------------
PROXY_PORT=0
#-------------------------------------------------------------------------------
# Specify the proxy user name. Leave PROXY_USER and PROXY_PWD
# blank if your proxy server requires no authentication.
#
# Example    : PROXY_USER=username
#-------------------------------------------------------------------------------
PROXY_USER=

#-------------------------------------------------------------------------------
# Specify the proxy password. Leave PROXY_USER and PROXY_PWD
# blank if your proxy server requires no authentication.
#
# Example    : PROXY_PWD=password
```

```
#--------------------------------------------------------------------------
PROXY_PWD=
#--------------------------------------------------------------------------
# Specify the proxy realm.
#
# Example    : PROXY_REALM=metalink
#--------------------------------------------------------------------------
PROXY_REALM=
```

ORACLE®

Rapid Home Provisioning and Maintenance
March 2017   Authors: Troy Anthony, Ruggero
Citton, Burt Clouse

CONNECT WITH US

blogs.oracle.com/oracle

facebook.com/oracle

twitter.com/oracle

oracle.com

Oracle Corporation, World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065, USA

Worldwide Inquiries
Phone: +1.650.506.7000
Fax: +1.650.506.7200

Hardware and Software, Engineered to Work Together

Oracle is committed to developing practices and products that help protect the environment