Oracle® Database Appliance

Administration and Reference Guide

Release 12.1.2.4.0 for Linux x86-64

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Preface

Oracle Database Appliance is an optimized, prebuilt and ready-to-use clustered database system that is easy to deploy, operate, and manage. By integrating hardware and software, Oracle Database Appliance eliminates the complexities of nonintegrated, manually assembled solutions. Oracle Database Appliance reduces the installation and software deployment times from weeks or months to just a few hours while preventing configuration and setup errors that often result in suboptimal, hard-to-manage database environments.

Audience

This guide is intended for anyone who configures, maintains, or uses Oracle Database Appliance. This includes:

- system administrators
- network administrators
- database administrators
- application administrators and users

This book does not include information about Oracle Database architecture, tools, management, or application development that is covered in the main body of Oracle Documentation unless there are features specific to Oracle Database Appliance. Users of Oracle Database Appliance software are expected to have the same skills as users of any other Linux-based Oracle Database and Oracle Real Application Clusters installations.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Access to Oracle Support

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Related Documents

The following documents are published in the Oracle Database Appliance online documentation library, available at http://www.oracle.com/goto/oda/docs:

- *Oracle Database Appliance Setup Poster* (a full-size printed copy ships with Oracle Database Appliance)
- *Oracle Database Appliance Getting Started Guide*
- *Oracle Database Appliance Release Notes*
- *Oracle Database Appliance Owner's Guide*
- *Oracle Database Appliance Service Manual*
- *Oracle Database Appliance Safety and Compliance Guide*
- *Oracle Database Appliance Licensing Information*
- *Oracle Database Appliance Security Guide*
- *Oracle Enterprise Manager Plug-in for Oracle Database Appliance User's Guide*

For more information about using Oracle Database, see the following documents:

- *Oracle Database Concepts*
- *Oracle Database Administrator's Guide*
- *Oracle Database SQL Language Quick Reference*
- *Oracle Database Reference*
- *Oracle Database 2 Day + Real Application Clusters Guide*
- *Oracle Real Application Clusters Administration and Deployment Guide*
- *Oracle Clusterware Administration and Deployment Guide*

For more details about other Oracle products that are mentioned in Oracle Database Appliance documentation, such as Oracle VM, Oracle Integrated Lights Out Manager, and so on, see the Oracle Documentation home page at the following address:

http://docs.oracle.com

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action or terms defined in the text.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
`monospace`	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.
#	The pound (#) prompt precedes a Linux command.

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Updating Oracle Database Appliance Software

To keep Oracle Database Appliance running with the latest software, check for and apply patches when they are released. As well as offering new features, patches may improve the functionality of existing features.

Oracle Database Appliance patch bundles are released on a quarterly schedule. My Oracle Support note 888888.1 provides information about the latest Oracle Database Appliance patch bundle.

Overview of Patching Oracle Database Appliance Software

Here are the basic steps for patching Oracle Database Appliance Software

Step 1: Select and Download Patches on My Oracle Support

Step 2: Copy and Unpack the Patch Bundle

Step 3: Verify Components to be Updated

Step 4: Patch the Infrastructure (INFRA)

Step 5: Apply the Patch to the Grid Infrastructure (GI) Components

Step 6: Apply the Patch to the Database

Step 7: Validate the Installation

About the Oracle Database Appliance Patch Bundle

All patching of Oracle Database Appliance is done with the regular Oracle Database Appliance Patch Bundle. The Patch Bundle provides all relevant patches for the entire system, including:

- BIOS
- Hardware drivers and management pack and firmware drivers for various components
- Oracle Appliance Manager Software
- Oracle Linux
- Oracle VM
- Java Development Kit (JDK)
- Oracle Integrated Lights Out Manager (Oracle ILOM)
- Oracle Database Patch Set Update (PSU)

- Oracle Automated Service Request (ASR)
- Oracle Grid Infrastructure
- Oracle Intelligent Platform Management Interface (IPMI)

The patch bundle is divided into three logical groups:

Patch Component	Components to be Patched
Infrastructure (INFRA)	Disk firmware, Controller Firmware, Linux Operating System, ILOM, BIOS, Hardware Management Pack, IPMI, OAKCLI, ASR For the virtualized platform, this component also includes Dom0 updates
Oracle Grid Infrastructure (GI)	Oracle Grid Infrastructure stack
Database	RDBMS Stack

Important: The patch bundle must be applied to the Infrastructure components first, followed by the Oracle Grid Infrastructure stack and then the Oracle Database.

Patching Oracle Database Appliance Software

This section outlines the general procedure, with examples, for patching the software on Oracle Database Appliance. Read the specific patch Readme file and any help information for details on how to apply each particular patch.

Note: Read the MOS doc 888888.1 for more information on patching and bugs. To find information specific to a given patch, read the Readme for the patch.

Infrastructure patches (OS, Firmware, Oracle ILOM, and so on) will require a short downtime of Oracle Database Appliance while the patch is being applied. Oracle Appliance Manager verifies that a patch meets all prerequisites to prevent you from installing patches in the wrong order. For example, you cannot patch the Oracle Grid Infrastructure without first updating the Infrastructure.

Most new patches will automatically install themselves on both nodes. The output displayed by the patch process advises you if the patch is being installed on one or both nodes. For older patches that only install on a single node, you will need to run the `oakcli update -patch` command on the second node.

Step 1: Select and Download Patches on My Oracle Support

1. From an external client machine, log on to My Oracle Support and access note 888888.1 at

   `https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=888888.1`

2. Under Patch Search, select **Oracle Database Appliance** from the Product list.
3. Select the patch release number from the Select a Release list.
4. Click **Search**.
5. Select the patch or patches and click **Download**.

Caution: You must use an Oracle Database Appliance patch bundle or SAP patch bundle (downloaded from the SAP Service Marketplace) to patch Oracle Database Appliance. Do not use individual patches for Oracle Grid Infrastructure, Oracle Database patches, or Oracle Linux. If you use patches that are not intended for Oracle Database Appliance, or if you use Opatch or a similar patching tool, then Oracle Database Appliance inventory is not updated, and you cannot complete future patch updates.

Step 2: Copy and Unpack the Patch Bundle

1. Log in to Oracle Database Appliance as `root`.
2. Move the patch to a temporary directory (for example `/tmp`) on each node of Oracle Database Appliance.

   Note: On the Oracle Database Appliance Virtualized Platform, copy the patch bundle to the ODA_BASE (Dom1).

3. To prepare the patch for installation, use the `oakcli unpack -package` command to unpack the patch files on each node. This command will unzip/extract the patch bundle and copy the contents of the patch bundle into the patch repository. Use the following syntax to specify the complete path to the patch bundle file, where *`path`* is the absolute path to the patch file:

   ```
   # oakcli unpack -package path
   ```

Example

To prepare the patch files for Oracle Database Appliance release 12.1.2.4.0:

1. Copy the patch files (`p21204676_121240_Linux-x86-64_1of2.zip` and `p21204676_121240_Linux-x86-64_2of2.zip`) into the /tmp directory on each node.
2. Run the following `oakcli unpack -package` commands:

On Node 0:

```
# oakcli unpack -package /tmp/p21204676_121240_Linux-x86-64_1of2.zip
# oakcli unpack -package /tmp/p21204676_121240_Linux-x86-64_2of2.zip
```

On Node 1:

```
# oakcli unpack -package /tmp/p21204676_121240_Linux-x86-64_1of2.zip
# oakcli unpack -package /tmp/p21204676_121240_Linux-x86-64_2of2.zip
```

Step 3: Verify Components to be Updated

Before installing the patch, run the `oakcli validate -c ospatch -ver` *`patch_version`* command on Node 0 to verify the components to be patched and identify any possible problems. This command shows a report which lists the components that require patching. If a component is listed as "Up-to-date" for the Supported Version, then the component will not be patched.

For example, use the following command to check for possible problems with the 12.1.2.4.0 patch:

```
# oakcli validate -c ospatch -ver 12.1.2.4.0
```

The command output will inform you whether the patch will succeed. If the output indicates a possible problem, for example, if there are RPM dependency deficiencies, you may want to defer applying the patch until you have downtime to fix the expected problem.

Step 4: Patch the Infrastructure (INFRA)

When you are upgrading to a newer patch version than what is currently installed on Oracle Database Appliance, then you need to patch the Infrastructure (INFRA) to the version level you are deploying in order to get the correct version of the Oracle Appliance Manager.

Patching the Infrastructure requires downtime when shared components are being patched. Should there be a failure, you can restart the patching process by re-issuing the same command.

To patch the Infrastructure:

1. To start the patching process, run the following command on Node 0 **ONLY**. It will patch both nodes at the same time:

   ```
   #/opt/oracle/oak/bin/oakcli update -patch <version> --infra
   ```

   version is the patch update version number. For example:

   ```
   #/opt/oracle/oak/bin/oakcli update -patch 12.1.2.4.0 --infra
   ```

   The Infrastructure patch will install itself on both nodes automatically. The output displayed by the patch process advises you if the patch is being installed on one of both nodes.

Step 5: Apply the Patch to the Grid Infrastructure (GI) Components

> **Important:** You must patch the Infrastructure before you attempt to patch the Grid Infrastructure.

The Grid Infrastructure patching process is a rolling upgrade that automatically patches Node 1 after patching Node 0. This allows the Grid Infrastructure stack to be up and running on one of the nodes during patching.

To start the Grid Infrastructure patching process, run the `oakcli update -patch <version> --gi` command:

```
#/opt/oracle/oak/bin/oakcli update -patch <version> --gi
```

version is the patch update version number. For example:

```
#/opt/oracle/oak/bin/oakcli update -patch 12.1.2.4.0 --gi
```

Step 6: Apply the Patch to the Database

Refer to"Updating and Upgrading the Oracle Database on Oracle Database Appliance" and follow the steps for patching your specific deployment:

- "Example 1 Updating to Oracle Database 12.1.0.2.4 from Previous Oracle Database 12.1.0.2.x Releases"
- "Example 2 Upgrading to Oracle Database 12.1.0.2.4 from Oracle Database 11.2.0.4.x Releases"

Important: You must patch the Infrastructure and Grid Infrastructure before you attempt to patch the Oracle Database.

Step 7: Validate the Installation

Run the `oakcli validate -d` command to validate the Oracle Database Appliance patch installation. This command runs all system checks, including Disk Calibration.

```
# /opt/oracle/oak/bin/oakcli validate -d
```

Re-imaging Oracle Database Appliance

Oracle Database Appliance ships from the factory with a default iso image pre-installed. This iso image can be used to re-image the Oracle Database Appliance for Bare Metal Restore.

To re-image Oracle Database Appliance, download the following file: p12999313_121240_Linux-x86-64.zip and refer to My Oracle Support Note 1373599.1 for detailed installation instructions.

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Managing Oracle Database on Oracle Database Appliance

This chapter describes how to create and manage databases on Oracle Database Appliance. It also covers how to use Oracle Database Appliance SSDs and how to update and upgrade the Oracle Database on Oracle Database Appliance.

Managing and Maintaining Oracle Database

Many tasks related to managing Oracle Databases, described in the Oracle Database documents on the Oracle Help Center page at `http://docs.oracle.com`, are also required with databases on Oracle Database Appliance. However, Oracle Database Appliance provides its own command line tool, Oracle Appliance Kit Command Line Interface, or OAKCLI, to manage all components on the system. This includes commands to create, upgrade, and patch databases; create and upgrade Oracle homes; create and modify database creation parameter files, and so on.

Additionally, because Oracle Database Appliance combines the capabilities of the database administrator role into its `root` user, database creation and related tasks are simplified and should always be performed using OAKCLI. Refer to "Oracle Appliance Manager Command-Line Interface" for detailed syntax and usage information of all OAKCLI commands.

Oracle Database Appliance Plug-in for Enterprise Manager

The recommended tool for managing your database is the Oracle Database Appliance plug-in for Oracle Enterprise Manager. With the Oracle Database Appliance plug-in, you can monitor Oracle Database Appliance targets using Oracle Enterprise Manager Cloud Control 12c. The plug-in provides configuration and monitoring information about any Oracle Database Appliance target running Appliance Manager 12.1.2.2 or higher.

Oracle Enterprise Manager Express

You can also manage your database with Oracle Enterprise Manager Database Express (formerly known as Database Control). Oracle Enterprise Manager Database Express is a web-based tool for managing Oracle Database 12c. Built inside the database server, it offers support for basic administrative tasks such as storage and user management. Oracle Enterprise Manager Express also provides comprehensive solutions for performance diagnostics and tuning. Oracle Enterprise Manager Express also provides an interface for performance advisors and for Oracle Database utilities such as SQL*Loader and Oracle Recovery Manager (RMAN).

See Also

- *Oracle Database 2 Day DBA* for an introduction to Database Control

Data Migration and Management

If you are loading data or migrating data from an existing database to Oracle Database Appliance, then you can use tools such as SQL*Loader, Oracle Data Pump, transportable tablespaces, and RMAN. You can also use the RMAN utility to back up and recover databases on Oracle Database Appliance.

See Also

- *Oracle Database Backup and Recovery User's Guide*
- *Oracle Database Backup and Recovery Reference*
- Oracle Database Utilities for information about data loading
- "Performing Oracle ASM Data Migration with RMAN" in *Oracle Automatic Storage Management Administrator's Guide* for an overview of how to migrate data to Oracle Automatic Storage Management (Oracle ASM).

Oracle Clusterware

Oracle Clusterware provides the cluster technology required for Oracle Real Application Clusters (Oracle RAC). In addition, Oracle Clusterware manages applications and processes as resources that you register with Oracle Clusterware. The number of resources that you register with Oracle Clusterware to manage an application depends on the application. Applications that consist of only one process are usually represented by only one resource. More complex applications, that were built on multiple processes or components, might require multiple resources.

See Also

- *Oracle Clusterware Administration and Deployment Guide* for information about making applications highly available with Oracle Clusterware

Oracle RAC One Node

Oracle RAC One Node is a single instance of an Oracle RAC database that runs on one node in a cluster. Instead of stopping and starting instances, you can use the Oracle RAC One Node online database relocation feature to relocate an Oracle RAC One Node instance to another server.

Oracle RAC One Node databases are administered slightly differently from Oracle RAC or single-instance Oracle Databases. For Oracle RAC One Node databases, one node is the primary node, and the other node is a candidate node, which is available to accommodate services if the primary node fails or is shut down for maintenance. The nodes, databases, and database services reside in the generic server pool.

See Also

- *Oracle Real Application Clusters Administration and Deployment Guide* for more information about administering Oracle RAC One Node

Oracle Real Application Clusters

Oracle RAC provides technology that links two or more individual computers so that they function as one system. Oracle RAC deployed on Oracle Database Appliance

enables each node to share access to a database. If one node fails or is taken offline, then the other node continues operating and the entire Oracle RAC database remains available. To applications, each node appears as a single computer.

Oracle Database Appliance currently supports only administrator-managed databases, where the database administrator allocates each instance of the database to a specific node in the cluster. Policy-managed databases, where the database administrator defines the number of database instances required, but not the nodes where they will run, are not available on Oracle Database Appliance.

When you review the database resource for an administrator-managed database, you see a server pool defined with the same name as the Oracle database. This server pool is part of a special Oracle-defined server pool called Generic. Oracle RAC manages the Generic server pool to support administrator-managed databases. When you add or remove an administrator-managed database using either the Server Control utility (SRVCTL) or Oracle Database Configuration Assistant (DBCA), Oracle RAC creates or removes the server pools that are members of Generic. You cannot use SRVCTL or Oracle Clusterware Control (CRSCTL) utility commands to modify the Generic server pool.

See Also

- *Oracle Clusterware Administration and Deployment Guide*
- *Oracle Real Application Clusters Administration and Deployment Guide*

Administrative Groups and Users

During configuration, two administrative accounts are created for Oracle Database Appliance: the user `grid`, with a user ID (UID) of 1000, and the user `oracle`, with a UID of 1001. The user `grid` is the Oracle Grid Infrastructure installation owner and the user `oracle` is the Oracle Database installation owner and the owner of all Oracle Database homes. By default, these users belong to groups shown in the following table.

Group Name	Group ID (GID)	*grid* is a member	*oracle* is a member
`oinstall`	1001	yes (primary group)	yes (primary group
`dba`	1002	no	yes
`racoper`	1003	yes	yes
`asmdba`	1004	yes	yes
`asmoper`	1005	yes	no
`asmadmin`	1006	yes	no

If you create an initial database during deployment, then the password for the `SYS` and `SYSTEM` users is `welcome1`. You should change this password for both users as soon as possible to prevent unauthorized access to your database using these privileged accounts.

See Also

- *Oracle Grid Infrastructure for Linux* for information about operating system privileges groups
- *Oracle Automatic Storage Management Administrator's Guide* for information about Oracle ASM system privileges

Creating and Converting Databases

Use the Oracle Appliance Manager commands, described in "Oracle Appliance Manager Command-Line Interface" to create and manage databases on Oracle Database Appliance. This will help you avoid using commands and parameters that could reduce the functionality of your databases, such as changing parameters associated with database file locations, including `control_files`, `db_create_file_dest`, `db_recovery_file_dest`, and so on.

Creating Databases with Oracle Appliance Manager Commands

Use the `oakcli create database` command to create additional databases on Oracle Database Appliance.

When you run this command, respond to each prompt by entering the number that corresponds with the option you want to apply to your database. When a default is supplied and is the value you want to use, typically shown as option 1, then press the Enter key to accept that value. When there are many options, then you might need to press 0 to reveal all of the options if the value you want is not displayed.

Creating Database Configuration Files with Oracle Appliance Manager Commands

Use the `oakcli create db_config_params` *params_file* command to create a configuration file for configuring multiple databases on Oracle Database Appliance. *params_file* is the name of the configuration file that you generate.

When you run this command, respond to each prompt by entering the number that corresponds with the option you want to apply to your database. When a default is supplied and is the value you want to use, typically shown as option 1, press Enter to accept that value. When there are many options, you might need to press 0 to reveal all of the options if the value you want is not displayed.

To see your existing database configuration files, use the `oakcli show db_config_params` command. For example:

```
# oakcli show db_config_params
Available DB configuration files are:
default
largedb
extralargedb
mytest.params
```

Note that only non-default extensions are included in the output. The default extension, `.dbconf`, is not shown.

To use a database configuration file to create a database, or many databases with identical profiles, use the `oakcli create database -db -params` *db_nameparams_file* command where *db_name* is the name of the database you want to create and *params_file* is the name of the configuration file. For example, `oakcli create database -db myxldb -params myxldb.dbconf`.

Remove unwanted database configuration files with the `oakcli delete db_config_params params_file`command, providing the name of the configuration file name as the *params_file* value. As with other Oracle Appliance Manager commands related to database configuration files, you do not need to include the extension if your file has the default extension value, which is `.dbconf`.

Creating Snapshot Databases

An Oracle snapshot database is created by taking a snapshot of the ACFS file system where the source datafiles reside. The source database can be a single instance, Oracle RAC, or Oracle RAC One Node. Compared to other methods of creating copies of databases, snapshot databases require less time and storage space and involve no downtime of the source database. Additionally, you can create any database type and class from any other type and class. For example, you can create an Oracle RAC database from an Oracle RAC One Node database. Similarly, you can create a database that is different in size than the source database.

On Oracle Database Appliance, you can create snapshot databases from any Oracle Database stored on Oracle ASM Cluster File Systems (ACFS). Beginning with Oracle Database Appliance Release 12.1.2.0.0, this includes any Oracle Database Release 11.2.0.4 or later database created or upgraded on the system. Additional requirements for a database to be used as the source for a snapshot database include:

- must not be a standby or container database
- must not be running in read-only mode, or in restricted mode, or in online backup mode
- must be in ARCHIVELOG mode
- must have all defined datafiles available and online

Also, ensure that the system clocks on the two Oracle Database Appliance nodes are synchronized before creating a snapshot database.

To create a snapshot database, use the `oakcli create snapshotdb` command. The following example creates a snapshot database named `snapprod` from the database named `prod`.

```
oakcli create snapshotdb -db snapprod -from prod
```

Before issuing the command, ensure that the system clocks on the two Oracle Database Appliance nodes are synchronized. If the clocks are sufficiently different, the command may fail.

Caution: Oracle Database Appliance does not support centralized wallets with Transparent Data Encryption. Recovery of encrypted data may fail in the snapshot database if the source database relies on an external, centralized wallet.

Converting Single-Instance Databases to Oracle RAC or Oracle RAC One Node

Use the `rconfig` command line utility as described in the *Oracle Real Application Clusters Installation and Configuration Guide* to convert a single-instance database to either Oracle RAC or Oracle RAC One Node. The contents of a `ConvertToRAC_AdminManaged.xml` file determine the type and other characteristics of the converted database.

See Also

- Oracle Real Application Clusters Installation and Configuration Guide, "Converting to Oracle RAC and Oracle RAC One Node from Single-Instance Oracle Databases"

Managing Multiple Databases on Oracle Database Appliance

An Oracle home is the directory in which you install Oracle Database binaries, and from which Oracle Database runs. Use Oracle Appliance Manager (through `oakcli` commands) to create and manage multiple Oracle homes and databases on Oracle Database Appliance. Oracle Appliance Manager automatically creates an Oracle Database Oracle home that is compliant with the Optimal Flexible Architecture (OFA) standards.

Oracle Database Appliance supports multiple Oracle Homes including different versions for Oracle Database 11g Release 2, 11gR2 and Oracle Database Release 12c Release 1. The exact releases differ from version to version. Check the related README files or Release Notes for specific versions.

Refer to My Oracle Support note 888888.1, at `https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=888888.1`, for more details about the available database versions.

When you use `oakcli` commands to create multiple homes on Oracle Database Appliance, the commands start the cloning process used by Oracle Grid Infrastructure. In the current release, the user `oracle` owns all of the Oracle homes.

Note: If you are not upgrading from an earlier release, then download the Oracle Database Appliance End-User Bundle for the Oracle Database version that you want to install. See Note 888888.1 for more details:

`https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=888888.1`

Use `oakcli` commands to create, manage, patch, and upgrade multiple databases on Oracle Database Appliance using the multiple Oracle home feature. The `oakcli create database` command enables you to create a database with minimal user input. When used without any additional options, the command creates a new database home. Alternatively, create a database in an existing home by using the `-oh` option. Note that Oracle does not recommend applying RDBMS patches directly, you should only use Oracle Database Appliance Patch Bundles, which are tested to work across the whole software stack.

Note: Use `oakcli` commands to create new databases in either existing Oracle homes or in new Oracle homes.

Managing Multiple Database Instances Using Instance Caging

Oracle Database provides a method for managing CPU allocations on a multi-CPU server that runs multiple database instances. This method is called *instance caging*. Instance caging and Oracle Database Resource Manager (the Resource Manager) collaborate to support your desired service levels across multiple instances. Consolidation can minimize idle resources, maximize efficiency, and lower costs.

Oracle Database Appliance templates are already tuned for the size of each database instance workload. They are designed to run on a specific number of cores. Instance caging assures that each database workload is restricted to the set of cores allocated by the template, enabling multiple databases to run concurrently with no performance degradation, up to the capacity of Oracle Database Appliance. You could select database template sizes larger than your current needs to provide for planned growth.

Note: Oracle strongly recommends that you use the Oracle Database Appliance templates, because they implement best practices and are configured specifically for Oracle Database Appliance.

Tip: Oracle Appliance Manager configurator refers to the database sizing templates as *classes* of databases.

By default, instance caging is not enabled on Oracle Database Appliance. To enable instance caging, set the initialization parameter, `RESOURCE_MANAGER_PLAN`, for each database on Oracle Database Appliance. The parameter specifies the plan to be used by Resource Manager for the current instance. Setting this parameter will direct Resource Manager to allocate core resources among databases. If no plan is specified with this parameter, then the Resource Manager is not enabled and instance caging will not be enabled.

Instance caging allocation of core resources is enabled in accordance with the Oracle Database Appliance database template size that you select for each database. The `CPU_COUNT` initialization parameter is set in the template. Use the `CPU_COUNT` setting that matches the size of each database to consolidate, and follow the standard instructions for configuring instance caging.

See Also

- *Oracle Database Administrator's Guide* for more information about enabling and configuring instance caging and the Resource Manager.

Using Oracle Database Appliance SSDs

Oracle Database Appliance includes SSDs to enhance the performance of certain operations. SSDs are used for:

- Accelerating Redo Log Writes
- Caching Database Data
- Improving I/O Performance for Database Files

Accelerating Redo Log Writes

Oracle Database Appliance contains four dedicated SSDs in slots 20-23 specifically for database redo logs. An ASM diskgroup named +REDO with High Redundancy is provisioned during the deployment process to accelerate database redo log write operations and improve latency. Databases automatically utilize these SSDs, and no other files can be hosted on them.

Caching Database Data

Oracle Database Appliance X5-2 introduces four additional 400 GB SSDs in slot numbers 16-19 that can be used to host database files, or they can be used as a database flash cache in addition to the buffer cache.

An ASM diskgroup named +FLASH with Normal Redundancy is provisioned on these SSDs. All of the storage in the +FLASH diskgroup is allocated to an ASM Dynamic Volume (flashdata), and formatted as an ACFS file system. Storage in this flashdata file system is then made available as an ACFS file system and is used to create database flash cache files that accelerate read operations. The file that contains

the flash cache is automatically created for each database and is specified using the database init.ora parameter `db_flash_cache_file`. By default, `flash_cache_file_size` is set to 3 times the size of SGA, up to 196 GB, unless there is not enough space, in which case the size parameter is set to 0. Changing the `flash_cache_file_size` parameter requires restarting the database in order to use the newly sized flash cache.

See Also

- *Oracle Database Administrator's Guide* for information about Configuring Database Smart Flash Cache

Improving I/O Performance for Database Files

Oracle Appliance Manager configurator and the `oakcli create database` command provide the option to store entire databases in flash using the flashdata ACFS file system on the 400 GB SSDs (also used for the flash cache).

If there is not enough space available in flash, the `oakcli create database` command will not prompt you with an option to store databases in flash, and the databases files will automatically be created in the +DATA diskgroup. You can also store database data files on both flash and HDDs, but this must be manually managed. It requires a thorough understanding of database usage patterns and is only recommended for advanced administrators.

The limitations of this strategy are:

- Oracle Database versions must be 11.2.0.4 or later
- Database type must be OLTP
- Only non-CDB databases can be completely stored in flash
- There must be 160 GB of available space in the +FLASH diskgroup

See Also

- "Storage on Oracle Database Appliance" for information about ASM Cluster File System (ACFS) Storage Architecture on Oracle Database Appliance
- oakcli create database command reference

Updating and Upgrading the Oracle Database on Oracle Database Appliance

To patch Oracle Database, use the appropriate Oracle Database Appliance Patch Bundle. Typically, you would perform infrastructure patching, then Grid infrastructure patching, and then the Oracle Database patching. This section contains the instructions for applying each of the available database patches. These patches perform rolling upgrades that automatically patch Node 1 after patching Node 0.

The following examples outline the steps required to update or upgrade the Oracle Database on Oracle Database Appliance.

- Example 1 Updating to Oracle Database 12.1.0.2.4 from Previous Oracle Database 12.1.0.2.x Releases
- Example 2 Upgrading to Oracle Database 12.1.0.2.4 from Oracle Database 11.2.0.4.x Releases

Example 1 Updating to Oracle Database 12.1.0.2.4 from Previous Oracle Database 12.1.0.2.x Releases

1. Run the `oakcli show databases` command, on Node 0 only, to confirm that you have a database with the appropriate release number for this update. The command and output should look similar to the following example.

```
# oakcli show databases
Database Name     Database Type     Database HomeName
    Database HomeLocation                    Database Version
tpcc              RAC               dbhome12102
    /u01/app/oracle/product/12.1.0.2/dbhome_1  12.1.0.2.3(20299023,20299022
RACOne            RACOneNode        dbhome12102
    /u01/app/oracle/product/12.1.0.2/dbhome_1  12.1.0.2.3(20299023,20299022)
```

2. Run the `oakcli update -patch 12.1.2.4.0 --database` command on Node 0 only, the command automatically patches both nodes. If you have more than one database home that could be patched, then the software provides a select list from which you pick one, some, or all of the database homes to update.

> **Note:** You cannot perform individual database updates for databases running in the same home. All databases running in the homes that you update, such as the two databases listed in the example in Step 1, will be patched to Oracle Database 12.1.0.2.4.

3. After the command completes on both nodes, check your database version with the `oakcli show databases` command on Node 0. The command and output should now look similar to the following example.

```
# oakcli show databases
Database Name     Database Type     Database HomeName
    Database HomeLocation                    Database Version
tpcc              RAC               dbhome12102
    /u01/app/oracle/product/12.1.0.2/dbhome_1  12.1.0.2.4(20831110,20831113)
RACOne            RACOneNode        dbhome12102
    /u01/app/oracle/product/12.1.0.2/dbhome_1  12.1.0.2.4(20831110,20831113)
```

Example 2 Upgrading to Oracle Database 12.1.0.2.4 from Oracle Database 11.2.0.4.x Releases

Create the required 12.1.0.2.4 home:

1. Download the 12.1.0.2.4 RDBMS Clone Patch 19520042 (file name p19520042_121200_Linux-x86-64.zip) from My Oracle Support.
2. Create an 12.1.0.2.4 database home on Node 0 with the following command:

```
# opt/oracle/oak/bin/oakcli create dbhome -version 12.1.0.2.4
```

3. Run the command `oakcli show dbhome`. The output appears similar to the result in the following example.

```
Oracle Home Name       Oracle Home version
                             Home Location
dbhome11204            11.2.0.4.7 (20760982,20831122)
                             /u01/app/oracle/product/11.2.0.4/dbhome_1
dbhome12102_home1       12.1.0.2.4 (20831110,20831113)
                             /u01/app/oracle/product/12.1.0.2/dbhome_1
```

4. Run the `oakcli show databases` command, on Node 0 only, to confirm that you have a database with the appropriate release number for this upgrade. The command and output should look similar to the following example, which shows two databases that are candidates to be upgraded.

```
# oakcli show databases
Database Name      Database Type     Database HomeName
    Database HomeLocation                      Database Version
tpcc               RAC               dbhome11204
    /u01/app/oracle/product/11.2.0.4/dbhome_1   11.2.0.4.7(20760982,20831122)
RACOne             RACOneNode        dbhome11204
      /u01/app/oracle/product/11.2.0.4/dbhome_1 11.2.0.4.7(20760982,20831122)
```

5. Upgrade a database by running the `oakcli upgrade database` command, on Node 0 only, providing the name of the database to upgrade and the 12.1.0.2.4 database home name from Step 1. The following example shows how to upgrade the tpcc database, listed in Step 2, using the `dbhome12102_home1` identified in the example shown in Step 1:

```
# oakcli upgrade database -db tpcc -to dbhome12102_home1
```

6. After the command completes, verify your database version with the `oakcli show databases` command on Node 0 again. The command and output should now look similar to the following example:

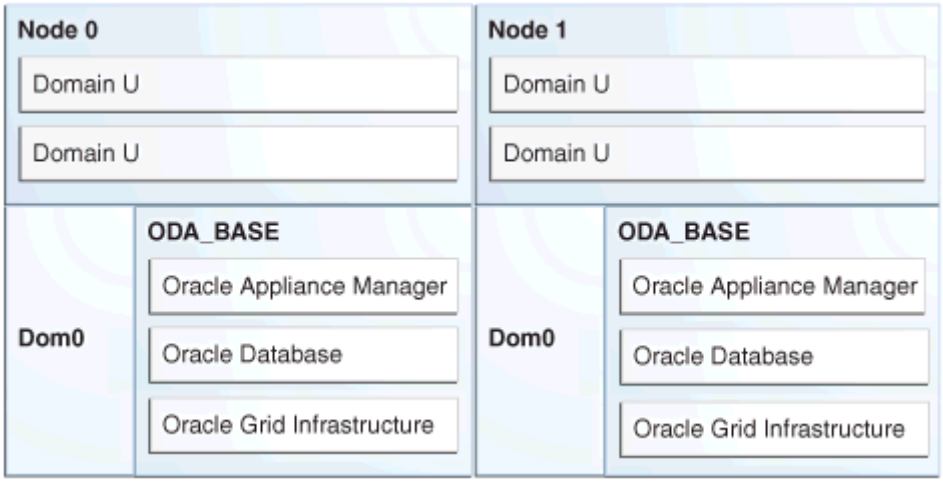
```
# oakcli show databases
Database Name      Database Type     Database HomeName
    Database HomeLocation                      Database Version
tpcc               RAC               dbhome12102_home1
    /u01/app/oracle/product/12.1.0.2/dbhome_1    12.1.0.2.4(20831110,20831113)
RACOne             RACOneNode        dbhome11202
    /u01/app/oracle/product/11.2.0.4/dbhome_1   11.2.0.4.7(20760982,20831122)
```

3

Managing Oracle Database Appliance Virtualized Platform

After you deploy Oracle Database Appliance Virtualized Platform, your system will have two domains on each server node, Dom0 and ODA_BASE (also known as Dom1). You can use the CPU cores not assigned to Oracle Database (ODA_BASE) for virtual machines, each of which is referred to as user domain or a Domain (Dom) U. The following figure shows the virtualized structure as a block diagram.

Figure 3–1 Oracle Database Appliance Virtualized Platform



Oracle recommends that you use shared repositories with Oracle Database Appliance Virtualized Platform for high availability. The virtual machine files can be stored on shared disks, providing shared storage for the database as well as the application virtual machines. Additionally, CPU pools and a resizeable Oracle Database domain (ODA_BASE) ensure that the virtual machines do not consume cycles from each other or from your assigned database CPU cores. Find details about the uses and configuration of these features, as well as information about resizing your Oracle Database domain (ODA_BASE), in the following sections of this chapter:

- Overview of Guest Virtual Machine Deployments
- About Shared Repositories and Virtual Machines on Oracle Database Appliance Virtualized Platform
- Managing Shared Repositories and Virtual Disks on Oracle Database Appliance Virtualized Platform

- About Virtual Machine Templates and Assemblies on Oracle Database Appliance Virtualized Platform
- Managing Virtual Machine Templates and Assemblies on Oracle Database Appliance Virtualized Platform
- About Virtual Machines on Oracle Database Appliance Virtualized Platform
- Managing Virtual Machines High Availability on Oracle Database Appliance Virtualized Platform
- Managing Virtual Machines on Oracle Database Appliance Virtualized Platform
- About CPU Pools on Oracle Database Appliance Virtualized Platform
- Managing CPU Pools on Oracle Database Appliance Virtualized Platform
- About Network Infrastructure and Virtual Local Area Networks on Oracle Database Appliance Virtualized Platform
- Resizing ODA_BASE

Many of the sections that cover management of a feature include a set of related examples.

Overview of Guest Virtual Machine Deployments

The main steps to deploy a guest virtual machine are as follows:

1. Create a new repository if necessary.
2. Import the required template or assembly.
3. Configure the template or assembly.
4. Clone the template or assembly.
5. Update the virtual machine as required.
6. Start the virtual machine.
7. Access the virtual machine using the virtual machine console.

For additional details and options available to complete each of the preceding steps, see the remaining sections in this chapter.

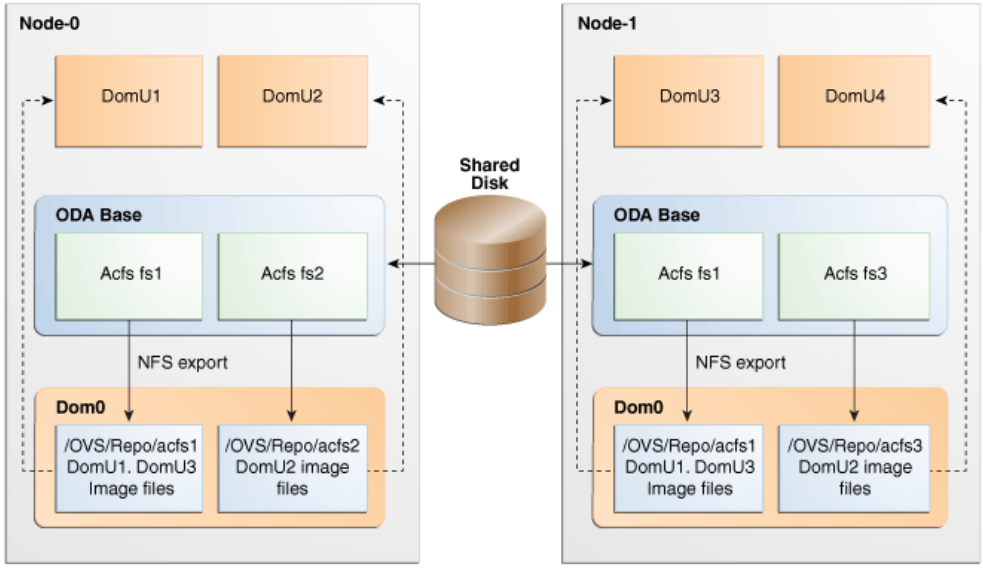
About Shared Repositories and Virtual Machines on Oracle Database Appliance Virtualized Platform

Oracle Database Appliance Virtualized Platform enables you to create one or more shared repositories for the storage of virtual machine (VM) files. A VM shared repository provides high availability support. A VM can be configured to fail over from one node to another node in case of node failure, and a VM can auto-restart on the failover node if the preferred node is not available.

Additionally, you can create virtual disks in shared repositories. Virtual disks provide additional storage options for virtual machines, by allowing you to attach additional block storage to your VMs. Similarly, you can detach the storage if you no longer need the additional space. You can use virtual disks to expand existing file system storage inside the VM by extending the storage volume onto a virtual disk or creating a new file system on a virtual disk. Your virtual disks can also be shared by multiple VMs running on same shared repository.

The following figure shows a typical architecture of Oracle Database Appliance Virtualized Platform with a shared storage system.

Figure 3–2 Architecture Overview of Oracle Database Appliance Virtualized Platform Shared Repositories



The preceding figure shows the shared disks on Oracle Database Appliance Virtualized Platform connected directly to ODA_BASE. ODA_BASE contains three shared repositories named fs1, fs2, and fs3. Each shared repository is an Oracle Automatic Storage Management Cluster File System (Oracle ACFS) in ODA_BASE created on top of the ASM disk group (DATA or RECO) chosen for the repository. The process that creates a repository also performs an NFS export of the repository to the respective Dom0 via the private network. The export enables shared storage for the virtual machine files.

With the configuration shown in the figure, you can create multiple repositories. Mount these repositories either on the nodes where the virtual machine needs to run (such as fs1 and fs3 in the figure), or on both the nodes (such as fs2 in the illustration). Create one or more virtual machines or virtual machine templates on these shared repositories.

Create and manage shared repositories, virtual disks, and their virtual machines, including all of the underlying architecture shown in the figure, with Oracle Appliance Manager commands.

Managing Shared Repositories and Virtual Disks on Oracle Database Appliance Virtualized Platform

To create a shared repository, use the `oakcli create repo` command to identify the repository name, the disk group to use for its storage (DATA or RECO), and its size (in Gigabytes). Once you have created a shared repository, start the repository with the `oakcli start repo` command to make the storage available before assigning a virtual machine to the repository. Note that this command will also start any virtual machines assigned to the repository that are defined to be automatically started.

Other Oracle Appliance Manager shared repository commands, including commands to show and to stop (dismount) existing repositories, are similar to those used for

non-shared repositories. Unlike the default repositories, which are permanent, you may delete a shared repository that has no active (mounted) virtual machines.

> **Note:** Do not issue an `oakcli stop repo` command while virtual machines are still active in the repository for the selected node.

The following commands have additional options for managing virtual machines on shared repositories:

- `oakcli configure vm`

  Include a `-prefnode` clause, to identify the node where you want the virtual machine to run by default, and a `-failover` clause, to indicate if you want the virtual machine to use the other node when the preferred node is not available (either at startup or while already active).

  > **Note:** If your virtual machine is assigned to a specific CPU pool and is allowed to failover, then the virtual machine will try to use the same CPU pool on the secondary node. If the CPU pool exists but is a different size, then the performance of your virtual machine might be impacted when running on the secondary node. If the assigned CPU pool does not exist on the secondary node, then the virtual machine will not fail over.

- `oakcli clone vm`

  Use the name of the shared repository in the `-repo` clause and include a `-node` clause to identify the node on which you want to perform the cloning process.

- `oakcli configure repo`

  Use the name of the shared repository in the `repo` clause and include the `-incsize` parameter to increase the size of the repository. The number you provide in the -incsize clause defaults to gigabytes but you can changed the unit to megabytes by appending `M` to the size.

- `oakcli import vmtemplate`

  Use the name of the shared repository in the `-repo` clause and include a `-node` clause to identify the node where you want to import a template or an assembly.

To create a virtual disk within a shared repository, use an `oakcli create vdisk` command to define the size of the virtual disk, the shared repository in which it will reside, a unique name within that shared repository, and whether or not the virtual disk can be shared by multiple virtual machines.

After you create one or more virtual disks, you can see information about them all using an `oakcli show vdisk` command. To see details about an individual virtual disk, use the same command but include the virtual disk name and a `-repo` clause to name the shared repository where you created the virtual disk. You may also clone virtual disks using an `oakcli clone vdisk` *`clone_vdisk`* `-repo` *`repo_name`* `-src` *`src_vdisk`* command, where *`clone_vdisk`* is the name to assign to the cloned virtual disk, *`repo_name`* is the repository where the original virtual disk resides, and *`src_vdisk`* is the name of the virtual disk that you are cloning.

You can also delete a virtual disk with an `oakcli delete vdisk` command that includes the virtual disk name and a `-repo` clause to name shared repository.

The section "Examples of Oracle Appliance Manager Commands for Shared Repositories, Virtual Disks, and Virtual Machines" contains examples of commands used to manage shared repositories and virtual disks.

See Also:

- oakcli create repo
- oakcli start repo
- oakcli configure vm
- oakcli clone vm
- oakcli configure repo
- oakcli import vmtemplate
- oakcli create vdisk

Examples of Oracle Appliance Manager Commands for Shared Repositories, Virtual Disks, and Virtual Machines

Example 1 Create a Shared Repository

This command creates a shared repository named *repo1* in the ASM DATA disk group with 30 gigabytes of available storage:

```
oakcli create repo repo1 -dg data -size 30
```

Example 2 Show the Status of All Shared Repositories

This command displays information about all existing repositories, which includes the default, local repositories as well as the shared repositories:

```
oakcli show repo
```

```
      NAME                    TYPE          NODENUM  FREE SPACE     STATE

      odarepo1                local          0             N/A     N/A
      odarepo2                local          1             N/A     N/A
      repo1                   shared         0           68.25%    ONLINE
      repo1                   shared         1           68.25%    ONLINE
      repo2                   shared         0             N/A     OFFLINE
      repo2                   shared         1           89.83%    ONLINE
```

Example 3 Start a Shared Repository

This command starts the shared repository named repo1 on Node 1:

```
oakcli start repo repo1 -node 1
```

Example 4 Stop a Shared Repository

This command stops the shared repository named repo1 on Node 0:

```
oakcli stop repo repo1 -node 0
```

Example 5 Show the Status of Named Shared Repository

This command displays information from Node 1 about the shared repository named repo1:

```
oakcli show repo repo1 -node 1
```

```
Resource: repo1_1
        AutoStart       :       restore
        DG              :       DATA
        Device          :       /dev/asm/repo1-286
        ExpectedState   :       Online
        FreeSpace       :       87.703125M
        MountPoint      :       /u01/app/repo1
        Name            :       repo1_0
        Node            :       all
        RepoType        :       shared
        Size            :       30720
        State           :       Online
        Version         :       2
```

Example 6 Delete a Shared Repository

This command deletes the shared repository named repo1 if the repository is offline (stopped) on both nodes:

```
oakcli delete repo repo1
```

Example 7 Import Virtual Machine Templates from an External Repository Assembly into a Shared Repository

This command imports virtual machine templates contained in an external repository template assembly file. Note the single quotation marks that enclose the URL. Assuming that the assembly contains three different templates, they are assigned the names *myol6u_15gb1*, *myol6u_15gb2*, and *myol6u_15gb3*, and they are imported into the shared repository, *repo2*, on Node 1.

```
oakcli import vmtemplate myol6u_15gb -assembly
'http://example.com/assemblies/OEL6/OVM_OL6U1_x86_PVHVM_15GB.ova'
-repo repo2 -node 1
```

Example 8 Create a Virtual Machine from a Template in a Shared Repository

This command creates a virtual machine named *myol6u_test* from the virtual machine template named myol6u_15gb1, which is stored in shared repository named repo2 on Node 0.

```
oakcli clone vm myol6u_test -vmtemplate myol6u_15gb1 -repo repo2 -node 0
```

> **Note:** The `-node` clause identifies the node where the cloning activity is to be run. Also, the node value does not assign the default startup node for the virtual machine, this assignment is set by the `oakcli configure vm` command.

Example 9 Configure a Virtual Machine for Use on a Shared Repository

This command sets values for specific resources in the virtual machine named *myol16u_test*:

- number of CPUs assigned to the virtual machine when started (vcpu)
- CPU access priority (cpuprio)
- maximum percentage of a CPU's capacity that will be assigned to the virtual machine (cpucap)
- amount of memory assigned when the virtual machine starts up (memory)

- the node where the virtual machine would normally start automatically when the shared repository is started or when the virtual machine is started manually (prefnode)
- enable automatic failover if the default node (prefnode) is not available (failover)

These values will override values assigned to these same parameters in the virtual template from which this virtual machine was derived. The virtual machine will use default values for parameters that are not defined in either the parent template or in a configuration command.

```
oakcli configure vm myol16u_test
-vcpu 2 -cpuprio 150 -cpucap 20 -memory 1G
-prefnode 0 -failover true
```

Example 10 Create a Virtual Disk for Use in a Shared Repository

This command creates a virtual disk named *sdisk1* in the *repo2* shared repository with a size of 1 gigabyte and the ability to be shared by virtual machines:

```
oakcli create vdisk sdisk1 -repo repo2 -size 1G -type shared
```

Example 11 Attach a Virtual Disk to a Virtual Machine

This command attaches the virtual disk named *sdisk1*, as created in Example 11, to the virtual machine named *myol6u_test* in the *repo2* shared repository, as created in Example 8:

```
oakcli modify vm myol6u_test -attachvdisk sdisk1
```

About Virtual Machine Templates and Assemblies on Oracle Database Appliance Virtualized Platform

Import and configure virtual machine templates as the source for the virtual machines deployed on Oracle Database Appliance Virtualized Platform. If you have created shared repositories, then import templates into the desired repository, otherwise import templates into the local repository on the desired node.

You might also import assemblies that contain one or more templates. When you import a template or assembly into a shared repository, identify the node that will perform the operation. Avoid overworking a busy node by selecting the node carefully. The repository will be available to both nodes no matter which node performs the import.

Templates imported into local nodes use the repository name supplied in the import command to identify the node that will complete the import and provide the storage. On Node 0, the local repository is named `odarepo1` and on Node 1, the local repository is named `odarepo2`..If you want to import a template to both local repositories, then you must provide a different template name when you import the template into the second node.

Note: You cannot create or clone templates directly on Oracle Database Appliance Virtualized Platform. Find virtual machine templates at `http://edelivery.oracle.com/linux`.

If you import an assembly that contains more than one template, then the command automatically modifies the template name that you provide so that all template names

remain unique. The first template will have the number "1" appended to the name, the second template will have the number "2" appended, and so on.

Once you have imported a virtual machine template, you can customize the template with Oracle Appliance Manager commands. For details about all the commands to manage virtual machines, see the section "Managing Virtual Machine Templates and Assemblies on Oracle Database Appliance Virtualized Platform".

Managing Virtual Machine Templates and Assemblies on Oracle Database Appliance Virtualized Platform

Use Oracle Appliance Manager `import` commands to store and name virtual machine templates for Oracle Database Appliance Virtualized Platform. Customize and manage the templates with additional Oracle Appliance Manager commands.

Examples of the commands described in this section are available in "Examples of Oracle Appliance Manager Virtual Machine Templates and Assembly Management Commands".

Importing Virtual Machine Templates

Use the Oracle Appliance Manager `oakcli import vmtemplate` command to import virtual machine templates and assemblies. You can import virtual machine templates and assemblies directly from a remote repository using a URL to identify the source of the files. Optionally, use a remote copy command to copy files from the remote repository into your Dom0 `/OVS` directory and then import the files using the path and names to identify the downloaded files.

Note: When importing templates or assemblies to a local repository, do not use the `-node` clause. The target node is implicit in the name of the repository.

Displaying and Modify Virtual Machine Template Configurations

Once you have imported a virtual machine template to a storage repository, examine the template configuration parameters with the Oracle Appliance Manager `oakcli show vmtemplate` command. If you need to reconfigure the template for specific requirements, then use the Oracle Appliance Manager `oakcli configure vmtemplate` command. This is useful if you plan to deploy multiple virtual machines with the same characteristics from a single template. If you will be deploying only one virtual machine or many virtual machines but with different characteristics, then set required values in the virtual machines with the `oakcli configure vm` command after you deployed the template.

Listing Stored Virtual Machine Templates

To find all your stored virtual machine templates, use the Oracle Appliance Manager `oakcli show vmtemplate` command with no parameters. If you no longer need a template that you previously stored, then remove the template from the repository with the Oracle Appliance Manager `oakcli delete vmtemplate` command.

Examples of Oracle Appliance Manager Virtual Machine Templates and Assembly Management Commands

Example 1 Import a Virtual Machine Template from Dom0

This command imports a virtual machine template that is defined in the file named `OVM_OL5U5_X86_64_PVM_10GB.tgz`. This file was previously copied from an external template repository into the `/OVS` file system on Dom0. The template is assigned the name *`myol5u1`* and is imported into the repository on Node 0.

```
oakcli import vmtemplate myol5u
-files /OVS/OVM_OL5U5_X86_64_PVM_10GB.tgz -repo odarepo1
```

Example 2 Import a Virtual Machine Template Using an External Repository URL

This command imports a virtual machine template file named `OVM_OL5U7_X86_64_PVM_10GB.tgz` from an external template repository. Note the single quotation marks that enclose the URL. The templates is assigned the name *`myol5u7_10gb`* and is imported into the repository on Node 1.

```
oakcli import vmtemplate myol5u7_10gb -files
'http://example.com/vmtmplt/OEL5/OVM_OL5U7_X86_64_PVM_10GB.tgz'
-repo odarepo2
```

Example 3 Import Virtual Machine Templates from an External Repository Assembly

This command imports virtual machine templates contained in an external template repository assembly file. Note the single quotation marks that enclose the URL. Assuming that the assembly contains three different templates, they are assigned the names *`myol6u_15gb1`*, *`myol6u_15gb2`*, and *`myol6u_15gb3`*, and they are imported into the repository on Node 1.

```
oakcli import vmtemplate myol6u_15gb -assembly
'http://example.com/assemblies/OEL6/OVM_OL6U1_x86_PVHVM_15GB.ova'
-repo odarepo2
```

Example 4 Configure a Virtual Machine Template

This command sets values for specific resources in the virtual machine template named *myol5u7_10gb*:

- Number of CPUs assigned when the virtual machine starts up (vcpu)
- Maximum number of CPUs that can be assigned to the virtual machine (maxvcpu)
- Maximum percentage of a CPU's capacity that will be assigned to the virtual machine (cpucap)
- Amount of memory assigned when the virtual machine starts up (memory)
- Maximum amount of memory that can be assigned to the virtual machine (maxmemory)
- Operating system used by the virtual machine (os)

These values will become the default values for any virtual machine cloned from this template, although you can change any or all them later with the Oracle Appliance Manager `oakcli configure vm` command.

```
oakcli configure vmtemplate myol5u7_10gb -vcpu 2 -maxvcpu 4 -cpucap 40
-memory 1536M -maxmemory 2G -os OTHER_LINUX
```

Example 5 Configure Network Information in a Virtual Machine Template

This command sets *net1* as the network used to access a virtual machine cloned from the *myol5u7_10gb* virtual machine template.

```
oakcli modify vmtemplate myol5u7_10gb -addnetwork net1
```

Example 6 List the Existing Virtual Machine Templates

This command displays the name and repository for each virtual machine template as well as the default number of CPUs and default amount of memory that Oracle Database Appliance Virtualized Platform would assign to a virtual machine created from the template.

```
oakcli show vmtemplate
```

Example 7 Show Configured Values for a Virtual Machine Template

This command displays the values for the configurable options in the virtual machine template named *myol5u7_10gb*.

```
oakcli show vmtemplate myol5u7_10gb
```

Example 8 Remove a Virtual Machine Template

This command removes the virtual machine template named myol6u_15gb3 from Oracle Database Appliance Virtualized Platform.

```
oakcli delete vmtemplate my0l6u_15gb3
```

About Virtual Machines on Oracle Database Appliance Virtualized Platform

Deploy virtual machines on Oracle Database Appliance Virtualized Platform to run applications and other software on CPUs that are independent of Oracle Database software running in ODA_BASE. Use Oracle Appliance Manager to create and manage virtual machines, including starting and stopping them, and opening consoles for GUI access.

Note: You can use a VNC session to open a GUI console for a virtual machine.

You create ("clone") virtual machines from imported templates (or assemblies) or else from an existing virtual machine. In the former case, your virtual machine can be a complete clone of the contents of the template or assembly, or it can be a snap clone, which contains only the metadata of the virtual machine definition. In the latter case, all copies of existing virtual machines must be snap clones, either of a complete virtual machine or a snap clone.

You can clone virtual machines that have attached virtual disks. In such cases, a clone of a virtual machine will contain the contents of virtual disks attached locally but not of virtual disks attached in shared mode. If needed, clone the virtual disks required by a cloned virtual machine in a separate step.

Note: Creating snap clones is a very fast operation compared to cloning the entire template or assembly. However, if you update the contents of a snap clone, your system will acquire additional storage for the clone to retain the original content as well as the changed content, unless the changes are on shared virtual disks.

Unless you are using local repositories, you could set high-availability options for your virtual machines. These include identifying the node where the virtual should be started by default and whether the virtual machine should be failed over to the other node. Failover can occur if the node where the virtual is already running should fail or if the preferred node is not available when the virtual attempts to start.

Although it is possible to reconfigure an active virtual machine, your changes would not take effect until you stopped and restarted the virtual machine. You can also display high level information about all of your virtual machines or detailed information about the configuration of single virtual machines. When you no longer have use for a particular virtual machine, then delete the virtual machine to regain storage.

For details about the commands you use to manage virtual machines, see "Managing Virtual Machines on Oracle Database Appliance Virtualized Platform".

See Also: *Oracle Database Appliance Release Notes* for the version of Oracle VM supported by each release of Oracle Database Appliance. Oracle Database Appliance Virtualized Platformsupports all guest operating systems provided by the supported version of Oracle VM. Find the supported guest operating systems in the related Oracle VM Release Notes.

Managing Virtual Machines High Availability on Oracle Database Appliance Virtualized Platform

A system that is highly available is designed to provide uninterrupted computing services during essential time periods, during most hours of the day, and most days of the week throughout the year. Reliability, recoverability, timely error detection, and continuous operations are primary characteristics of a highly available solution. Two essential parts of high availability are automatic restart and failover.

Automatic Restart

A virtual machine automatically restarts after a hardware or software failure or whenever your database host computer restarts. Using the `oakcli configure vm` command, you can start a virtual machine on a preferred node by setting the `-prefnode` parameter.

Failover

Failover lets the virtual machine be restarted on the other node with no manual intervention in the event of an unplanned node failure. The `-failover` parameter, used with the `oakcli configure vm` command, enables a virtual machine to fail over from one node to another.

See Also: oakcli configure vm for information about using the `-prefnode` and `-failover` parameters

Managing Virtual Machines on Oracle Database Appliance Virtualized Platform

Create and manage user domain virtual machines on Oracle Database Appliance Virtualized Platform using Oracle Appliance Manager commands. Access your active virtual machines using the command line (after configuring the virtual machine with commands similar to those in Example 7 later in this section) or GUI VM consoles opened with Oracle Appliance Manager.

Use Oracle Appliance Manager commands for the following tasks:

- Creating an image for a new virtual machine

  Use the `oakcli clone vm` command to create an image for a new virtual machine on Oracle Database Appliance. By default, the image inherits the content and configuration information from the template or from the virtual machine that you are cloning and resides in the same repository as the source. To create a snap clone, which will only contain the configuration metadata, include the `-snap` clause in the `oakcli clone` command.

  Unless you are using local repositories for your virtual machines, include the `-node` clause in the `oakcli clone` command to identify the node that should run the cloning process. To create a snap clone, include the `-snap` clause in the `oakcli clone` command.

- Displaying and Modifying virtual machine configurations

  To see the current configuration of a virtual machine image, use the Oracle Appliance Manager `oakcli show vm` command. If you need to make changes to the configuration, such as setting high-availability options, then run the Oracle Appliance Manager `oakcli configure vm` command.

  Note: CPU capacity is controlled either by the CPU pool assigned to a virtual machine (by the `-cpupool` parameter), or by the default_unpinned_pool if the virtual machine is configured without a `-cpupool` parameter.

  Note: If you reconfigure a virtual machine that is currently running, then your changes will not be effective until you stop and restart the virtual machine.

- Starting and stopping virtual machines

  When you are ready to start a virtual machine on Oracle Database Appliance Virtualized Platform, run the Oracle Appliance Manager `oakcli start vm` command Similarly, to stop a virtual machine, run the `oakcli stop vm` command.

- Sending messages to active virtual machines

  New Oracle Virtual Machine Templates include a utility, Oracle VM Guest Additions (ovmd) that provides a messaging interface for first-boot installation configuration. To send such messages to a virtual machine on Oracle Database Appliance Virtualized Platform, use the `oakcli modify vm` command with the `-s` parameter, where the argument for the parameter is list of parameters enclosed in single or double quotation marks. The elements in the list are key and value pairs with a colon delimiter to separate the pair of values and a semi-colon to separate value pairs from each other. The following example has two value pairs.

```
oakcli modify vm vmo16u3 -s
'com.oracle.linux.network.device.0:eth0;com.oracle.linux.network.ipaddr.0:192.1
.2.18'
```

> **See Also:** The section *Using the Oracle VM Guest Additions* in *Oracle VM Utilities Guide for x86* for more information about ovmd, and the Oracle VM Guest Additions.

- Accessing an active virtual machine

  To open a GUI virtual machine console for an active virtual machine, run the Oracle Appliance Manager `oakcli show vmconsole` command. If the console does not display correctly, then close the console, set the DISPLAY environment variable to an appropriate value for your monitor, and then rerun the `oakcli show vmconsole` command.

  You can also configure your virtual machine (using `oakcli modify vm` commands with the `-s` parameter) to allow access from the Oracle Database Appliance command line instead of a virtual machine console.

- Listing the virtual machines in your repositories

  Display a list your existing virtual machines, including some basic information about each one, with the Oracle Appliance Manager `oakcli show vm` command.

- Adding a virtual disk to or removing a virtual disk from a virtual machine

  Use an `oakcli modify vm` *`virtual_machine_name`* command with an `-attachvdisk` or a `-detachvdisk` clause that names the virtual disk to add or remove the virtual disk.

- Removing a virtual machine from a repository

  Remove an unwanted virtual machine with the Oracle Appliance Manager `oakcli delete vm` command.

For examples of the commands to manage virtual machines described in this section, see "Examples of Oracle Appliance Manager Virtual Machine Commands".

Performing a Live Migration for an Oracle Database Appliance Virtual Machine

Live Migration refers to the process of moving a running virtual machine between physical machines without disconnecting the client or application running in the virtual machine. Memory, storage and network connectivity of the virtual machine are transferred from the original host machine to the destination.

Requirements

- The virtual machine must be on shared repo and repo must be online on both nodes.
- The virtual machine must be running.
- The destination host must have the required resources (memory, CPUs etc.) for successful migration.
- The destination host must have a CPU Pool with the same name as the CPU Pool of the virtual machine that is being migrated.

Migrating a Virtual Machine from the Currently Running Node to Another Node

Use the `oakcli migrate vm <vmname>` command to migrate a virtual machine from the currently running node to another node. *vname* is the name of the virtual machine to be migrated.

When you run this command, the virtual machine must be online and corresponding, and shared repo must be online on both nodes. If a virtual machine is in the migration process, then OAKCLI will display the virtual machine state as "MIGRATING".

Examples of Oracle Appliance Manager Virtual Machine Commands

Example 1 Create a Virtual Machine Image from a Template

This command creates a complete virtual machine image named *myol15u_test* from the virtual machine template named *myol15u* which is stored in the shared repository *shrepo* on Node 0.

```
oakcli clone vm myol15u_test -vmtemplate myol5u -repo shrepo -node 1
```

Example 2 Create a Snap Clone from a Template

This command creates a snap clone named *myol15u_snap* from the virtual machine template named *myol15u*.

```
oakcli clone vm myol15u_snap -vmtemplate myol5u -snap
```

Example 3 Create a Snap Clone of an Existing Virtual Machine

This command creates a snap clone named *myol15u_test1* from a virtual machine named *myol15u_test*.

```
oakcli clone vm myol15u_test1 -vm myol5u_test1 -snap
```

Example 4 Configure a Virtual Machine

This command sets values for specific resources in the virtual machine named *myol5u_test*:

- Number of CPUs assigned to the virtual machine when started (vcpu)
- CPU access priority (cpuprio)
- Maximum percentage of a CPU's capacity that will be assigned to the virtual machine (cpucap)
- Amount of memory assigned when the virtual machine starts up (memory)
- CPU pool to be assigned to the virtual machine (cpupool)
- Definition of the keyboard type to be used for virtual machine access (keyboard)
- Definition of the mouse type to be used for virtual machine access (mouse)

These values will override values assigned to these same parameters in the virtual template from which this virtual machine was derived. The virtual machine will use default values for parameters that are not defined in either the parent template or in a configuration command.

```
oakcli configure vm myol5u_test
-vcpu 2 -cpuprio 150 -cpucap 20 -memory 1G
-cpupool linpool -keyboard en-us -mouse USB_MOUSE
```

Note: CPU capacity is controlled by the CPU pool assigned to a virtual machine by either the `-cpupool` parameter or by the default_unpinned_pool (if the virtual machine is not configured with a `-cpupool` parameter). Values for `-vcpu` and `-maxcpu` parameters that are larger than the number of CPUs in the assigned CPU pool are ignored.

Example 5 List the Existing Virtual Machine Images

This command displays the name, the repository, and the current state (online or offline) for each virtual machine. The output also contains the default number of CPUs and default amount of memory that Oracle Database Appliance Virtualized Platform will assign to each virtual machine.

```
oakcli show vm
```

Example 6 Show Configured Values for a Virtual Machine

This command displays the definition of a virtual machine named *myol5u_test*. The output contains the current values for all of the configurable parameters along with additional information such as the virtual machine autostart setting.

```
oakcli show vmtemplate myol5u_test
```

Example 7 Start a Virtual Machine

This command starts the virtual machine named *myol5u_test*.

```
oakcli start vm myol5u_test
```

Example 8 Open a VM Console for a Virtual Machine

This command opens a GUI VM console window to an active virtual machine named *myol5u_test*.

```
oakcli show vmconsole myol5u_test
```

Note: The `oakcli show vmconsole` command requires a valid definition for the DISPLAY environment variable to work correctly.

Example 9 Set Up a Virtual Machine for Access from eth0 Using an IP Address

The following set of commands configures the virtual machine vmol6u3 (which has ovmd) with the IP address 192.168.16.51 for the eth0 interface and sets the `root` password to `password123a`.

```
oakcli clone vm vmol6u3 -vmtemplate ol6u3 -repo shrepo -node 0
oakcli modify vm vmol6u3 -addnetwork priv1
oakcli start vm vmol6u3
oakcli modify vm vmol6u3 -s 'com.oracle.linux.network.device.0:eth0'
oakcli modify vm vmol6u3 -s 'com.oracle.linux.network.onboot.0:yes'
oakcli modify vm vmol6u3 -s 'com.oracle.linux.network.bootproto.0:static'
oakcli modify vm vmol6u3 -s 'com.oracle.linux.network.ipaddr.0:192.168.16.51'
oakcli modify vm vmol6u3 -s 'com.oracle.linux.network.netmask.0:255.255.255.0'
oakcli modify vm vmol6u3 -s 'com.oracle.linux.root-password:password123'
```

Example 10 Add a Virtual Disk to a Virtual Machine

This command adds a virtual disk named *sdisk1* to the virtual machine named *myol5u_test*.

```
oakcli modify vm myol5u_test -attachvdisk sdisk1
```

Example 11 Stop a Virtual Machine

This command stops the virtual machine named *myol5u_test*.

```
oakcli stop vm myol5u_test
```

Example 12 Remove a Virtual Machine

This command removes the virtual machine named myol5u_test from Oracle Database Appliance Virtualized Platform.

```
oakcli delete vm my0l5u_test
```

About CPU Pools on Oracle Database Appliance Virtualized Platform

Isolate workloads by creating CPU pools and assigning (pinning) virtual machines to a specific CPU pool. When you pin a virtual machine to a CPU pool, you ensure that the virtual machine will use CPUs in that pool only.

When Oracle Database Appliance Virtualized Platform is configured, a *default-unpinned-pool* is created on each node. The size of this pool depends on the hardware model as follows:

- On Oracle Database Appliance X5-2 Virtualized Platform, the default-unpinned-pool contains 72 CPUs
- On Oracle Database Appliance X4-2 Virtualized Platform, the default-unpinned-pool contains 48 CPUs
- On Oracle Database Appliance X3-2 Virtualized Platform, the default-unpinned-pool contains 32 CPUs
- On Oracle Database Appliance Version 1 Virtualized Platform, the default-unpinned-pool contains 24 CPUs.

When you create the ODA_BASE domain, a new CPU pool, named *odaBaseCpuPool*, is created on both nodes and the required CPUs are removed from the default-unpinned-pool. ODA_BASE is the only domain allowed to use the CPUS in the odaBaseCpuPool. When you start other virtual machines they run on CPUs that were left in the default-unpinned-pool, effectively ODA_BASE from the work being done by other virtual machines.

You might also cage groups of virtual machines by creating additional CPU pools. These additional pools enable you to pin a virtual machine, or a set of machines, to its own CPU pool. Virtual machines running in a specific CPU pool do not share CPU cycles with virtual machines running in other CPU pools. Define as many CPU pools as you want, up to the number of available CPUs on your system.

If your application requirements change over time, resize, add, or drop CPU pools as needed. Resize ODA_BASE if necessary, although this requires a special command that also updates your Oracle Database Appliance Virtualized Platform license. See the section "Resizing ODA_BASE" for details.

A CPU pool can have a different size on each node (except for the odaBaseCpuPool), as shown by the following `oakcli show cpupool` commands, one for each node:

```
oakcli show cpupool -node 0
```

```
                  Pool                            Cpu List
default-unpinned-pool   [14, 15, 16, 17, 18, 19, 20, 2
                                              1, 22, 23]
               twocpu                              [12, 13]
       odaBaseCpuPool   [0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
                                               10, 11]

oakcli show cpupool -node 1
                  Pool                            Cpu List
default-unpinned-pool   [12, 13, 14, 15, 16, 17, 18, 1
                                          9, 20, 21, 22, 23]
       odaBaseCpuPool   [0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
                                             10,11]
```

For commands to manage CPU pools, other than odaBaseCpuPool, see "Managing CPU Pools on Oracle Database Appliance Virtualized Platform".

Over-Subscribing CPU Pools

A CPU can belong to one and only one CPU pool, although you can assign multiple virtual machines to a CPU pool. A CPU pool becomes over-subscribed when the virtual machines that are active in the pool require more CPUs than you configured for the pool. For example, if a CPU pool has four CPUs, then you might start two virtual machines that have been defined to use four CPUs each. In this case, the CPU pool is over-subscribed because each of the four CPUs is supporting two virtual machines. Similarly, if you stop one of those virtual machines but start another one that requires two CPUs, then the CPU pool is still over-subscribed because two of the CPUs are supporting both virtual machines. When over-subscribing a CPU pool, you need to assess the performance of the virtual machines in that pool. You should be prepared to re-assign one or more virtual machines to a different CPU pool if sharing an over-subscribed pool degrades performance to unacceptable levels.

Managing CPU Pools on Oracle Database Appliance Virtualized Platform

Use Oracle Appliance Manager commands to manage CPU pools on each node of Oracle Database Appliance Virtualized Platform.

The actions you could perform on CPU pools include:

- Creating additional CPU pools with the Oracle Appliance Manager `oakcli create cpupool` command.
- Changing the number of CPUs allocated to a CPU pool with the Oracle Appliance Manager `oakcli configure cpupool` command.
- Examining your existing CPU pools with the Oracle Appliance Manager `oakcli show cpupool` command.
- Pinning a virtual machine to a specific CPU pool with the `-cpupool` option of the Oracle Appliance Manager `oakcli configure vm` command. You can pin multiple virtual machines to the same CPU pool.

See examples of the commands discussed in this section in "Examples of Oracle Appliance Manager CPU Pool Management Commands".

Examples of Oracle Appliance Manager CPU Pool Management Commands

Example 1 Create a New CPU Pool on Oracle Database Appliance Virtualized Platform

This command creates CPU pool named *winpool* with 4 CPUs on Node 0.

```
oakcli create cpupool winpool -numcpu 4 -node 0
```

Example 2 Change the Number of CPUs Assigned to a CPU Pool on Oracle Database Appliance Virtualized Platform

This command changes the number CPUs assigned to the CPU pool named *linpool* on Node 1. The new number of CPUs will be six after the command runs.

```
oakcli configure cpupool linpool -numcpu 6 -node 1
```

Example 3 Show the CPU Pools Configured on Oracle Database Appliance Virtualized Platform Nodes

This command displays the CPUs assigned to each defined CPU pool on Node 0. The command also lists the virtual machines, if any, assigned to each CPU pool.

```
oakcli show cpupool -node 0
```

Example 4 Assign a Virtual Machine to a CPU Pool on Oracle Database Appliance Virtualized Platform

This command pins the virtual machine named *wintest* to the CPU pool named *winpool*.

```
oakcli configure vm wintest -cpupool winpool
```

Note: You do not manage odaBaseCpuPool with `oakcli cpupool` commands. Instead, you have to use commands that configure ODA_BASE, as discussed in "Resizing ODA_BASE".

About Network Infrastructure and Virtual Local Area Networks on Oracle Database Appliance Virtualized Platform

To specify which network should access a virtual machine, you employ network infrastructure components of Oracle Database Appliance Virtualized Platform. This section describes these infrastructure components.

Oracle Database Appliance Virtualized Platform manages all the high level network infrastructure components for you by precreating the bonds and bridges for all networks. The front end point for accessing a virtual machine will be one of the bridges defined for Dom0.

The following tables show the default network interfaces and are categorized by hardware as listed here:

- Table 3–1 and Table 3–2 list the default network interfaces for Oracle Database Appliance Virtualized Platform on systems with a storage shelf.
- Table 3–3 lists the default network interfaces for Oracle Database Appliance Virtualized Platform on systems without a storage shelf.

In all cases, connections to user domains are through the selected interfaces.

Table 3–1 Oracle Database Appliance Virtualized Platform Dual Port 10-GbE Network Interfaces

Interfaces at Dom0	Bond Devices at Dom0	Bridge in Dom0	Interfaces in ODA_BASE Domain
1. eth0	icbond0	priv1	eth0
2. eth1			

Table 3–2 Oracle Database Appliance Virtualized Platform On Board Quad Port 10-GbE Network Interfaces

Interfaces at Dom0	Bond Devices at Dom0	Bridge in Dom0	Interfaces in ODA_BASE Domain
1. eth2	bond0	net1	eth1
2. eth3			
1. eth4	bond1	net2	eth2
2. eth5			

Note: If you define a fiber public network connection, then bond0 is configured on PCIe boards.

Table 3–3 Oracle Database Appliance Version 1 Virtualized Platform Network Interfaces

Type	Interfaces at Dom0	Bond Devices at Dom0	Bridge in Dom0	Interfaces in ODA_BASE Domain
Private	eth0	bond0	priv1	eth0
	eth1			
On Board Public	eth2	bond1	net1	eth1
	eth3			
1st Pair Quad Port	eth4	bond2	net2	eth2
	eth5			
2nd Pair Quad Port	eth6	bond3	net3	eth3
	eth7			
10-GbE Interface	eth8	xbond0	net4	eth4
	eth9			

Note: If you define a fiber public network connection, then bond0 is configured on PCIe boards.

When you configure a virtual machine, you define which network the virtual machine should use by identifying the related bridge. For example, to connect a virtual machine named `myvm1` to the net1 network, you would use the following command:

```
oakcli modify vm myvm1 -addnetwork net1
```

Figure 3–3 Basic Virtual Machine Local Area Network

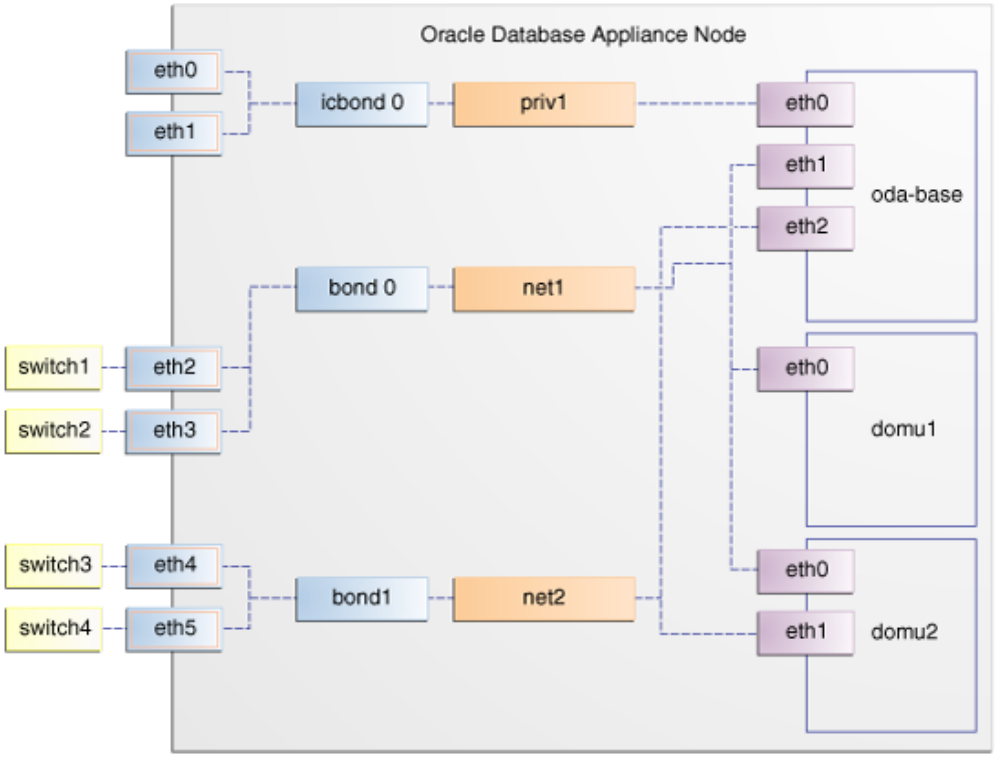
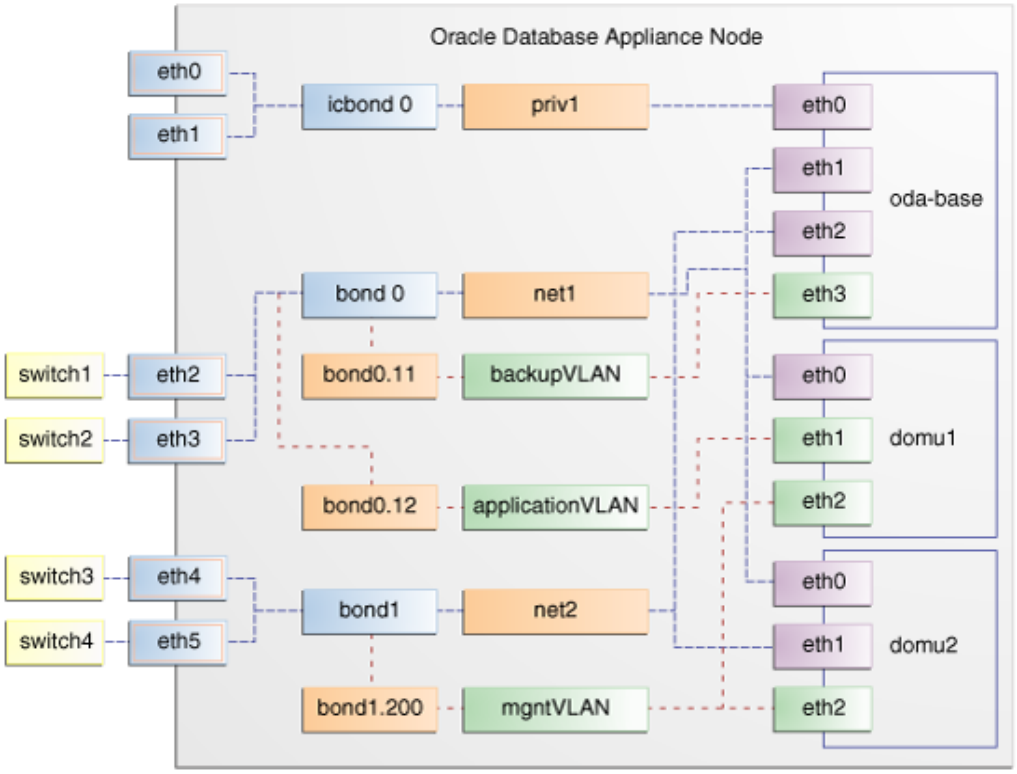


Figure 3–3 shows a typical Oracle Database Appliance configuration based on the preceding information.

During the installation and configuration of Oracle software on Oracle Database Appliance Virtualized Platform, you had an opportunity to assign default Virtual Local Area Networks (VLANs) to ODA_BASE. Figure 3–4, "Oracle Database Appliance Virtualized Platform with Virtual Local Area Networks" shows a typical Oracle Database Appliance configuration using VLANs. The figure shows the same configuration as Figure 3–3 but with three tagged VLANs added for backups (backup), for applications (application), and for management (mgnt).

Figure 3–4 Oracle Database Appliance Virtualized Platform with Virtual Local Area Networks



The following section, "Managing Virtual Local Area Networks on User Domains and on ODA_BASE", describe how to create new or remove existing VLANs in ODA_BASE and in your user domains respectively.

Managing Virtual Local Area Networks on User Domains and on ODA_BASE

Manage VLANs with Oracle Appliance Manager commands that are fully documented in Chapter 4, "Oracle Appliance Manager Command-Line Interface." To manage VLANs for user domains, log into ODA_BASE, and to manage VLANs for ODA_BASE, log into Dom0. The examples in this section use a VLAN named *sample10*.

> **Note:** You can create VLANs from Dom0 only before your deployment of Oracle Database Appliance or Oracle Database Appliance Virtualized Platform.

Creating a Virtual Local Area Network

To create a VLAN, use the `oakcli create vlan` command. You need to provide the following information to create a VLAN:

- VLAN name that is unique on the node where the VLAN is created (but which can be the same as a VLAN name on the other node of Oracle Database Appliance Virtualized Platform)
- VLAN tag number between 2 to 4096 inclusive that is unique on the node where the VLAN is created (but which can be the same as a VLAN tag number on the other node of Oracle Database Appliance Virtualized Platform)

- Name of the interface on which the VLAN is to be created. Find the available interfaces for your hardware listed in the *Bond Devices at Dom0* column in either Table 3–2 or Table 3–3.
- Node on which to create the VLAN

> **Note:** Create the same VLAN on both nodes, if needed, by issuing the `oakcli create vlan` command twice, once for node 0 and once for node 1.

The following example shows one option for creating the sample10 VLAN on node 0:

```
oakcli create vlan sample10 -vlanid 10 -if bond0 -node 0
```

> **WARNING: If you are planning to use a VLAN with a virtual machine created in a shared repository, then you should create that VLAN on both nodes. A virtual machine fails if an assigned network is not available on the node where the virtual machine is trying to run by default or following a failover.**

Assigning and Removing a Virtual Local Area Network for a User Domain

Use the oakcli modify vm command with an `-addnetwork` clause to assign an existing VLAN to a virtual machine and with a `-deletenetwork` clause to remove a VLAN from a virtual machine. The clauses must also contain the name of the VLAN.

The following example shows how to assign the sample10 VLAN to the myol5u_test virtual machine:

```
oakcli modify vm myol5u_test -addnetwork sample10
```

Assigning and Removing a Virtual Local Area Network for ODA_BASE

Use the `oakcli configure oda_base` command to add an existing VLAN to ODA_BASE or to remove a VLAN from ODA_BASE. Note that this command will also let you resize ODA_BASE and domain memory size. If you only want to manage VLANs, enter the number that corresponds to the number of your current CPU cores and current number for your memory.

In the following partial example, the CPU core count and default memory values are left unchanged, while the test01 VLAN is assigned to ODA_BASE. Note that the current CPU core count, 6, corresponds to selection number 3 in Core Licensing Options list of values.

```
# oakcli configure oda_base
Core Licensing Options:
        1. 2 CPU Cores
        2. 4 CPU Cores
        3. 6 CPU Cores
        4. 8 CPU Cores
        5. 10 CPU Cores
        6. 12 CPU Cores
        Current CPU Cores       :6
        Selection[1 : 6](default 12 CPU Cores) : 3
        ODA base domain memory in GB(min 8, max 88)(Current Memory 48G)[default
64]     : 48
INFO: Using default memory size i.e. 64 GB
Additional vlan networks to be assigned to oda_base? (y/n) [n]: y
```

```
Select the network to assign (test00,test01,test02,test03): test01
Additional vlan networks to be assigned to oda_base? (y/n) [n]:
Vlan network to be removed from oda_base (y/n) [n]:
INFO: . . .
```

Viewing and Deleting Virtual Local Area Networks

To see what VLANs currently exist in ODA_BASE, run the `oakcli show vlan` command. In the following example, we show a number of VLANs in addition to the sample10 VLAN used in previous examples:

```
oakcli show vlan

NAME                 ID    INTERFACE   NODENUM

net1                 1     bond0       0
net1                 1     bond0       1
net2                 1     bond1       0
net2                 1     bond1       1
net3                 2     bond1       0
net3                 4     bond0       1
net10                20    bond1       0
net10                20    bond1       1
```

To remove an unwanted VLAN from a node, use an `oakcli delete vlan` command, providing the VLAN name and the node number. The following command would remove the sample10 VLAN from node 0 (where the VLAN was assigned in the earlier `oakcli create vlan` example):

```
oakcli delete vlan sample10 -node 0
```

Note: You cannot delete a native VLAN, that is, a virtual local area network configured during the deployment of Oracle Database Appliance Virtualized Platform software.

Resizing ODA_BASE

Increase the number of CPU cores assigned to the ODA_BASE domain on Oracle Database Appliance Virtualized Platform if you need more computing power or memory for your installed Oracle databases. Alternatively, decrease the CPU cores if you need more CPUs assigned to your virtual machine domains. You must increase or decrease the assigned CPU core count on each node by two or multiples of two.

Oracle recommends that you use templates to size the databases that you deploy in ODA_BASE, following the guidelines in *Appendix A* of Oracle Database Appliance Getting Started Guide. Sum the number of CPUs that these databases require, using the tables in that Appendix, and divide the value by two determine the number of CPU cores you will need for ODA_BASE.

Plan to change your ODA_BASE core count when there is no critical activity running on your Oracle databases. This is because the ODA_BASE domain shuts down during the resizing process. When you are ready to proceed, complete these steps:

1. Log onto Dom0 and run the `oakcli configure oda_base` command as shown in this example, which changes the CPU core count from six to eight in ODA_BASE:

```
# oakcli configure oda_base
Core Licensing Options:
        1. 2 CPU Cores
```

```
        2. 4 CPU Cores
        3. 6 CPU Cores
        4. 8 CPU Cores
        5. 10 CPU Cores
        6. 12 CPU Cores
        Current CPU Cores       :6
        Selection[1 : 6](default 12 CPU Cores) : 10
        ODA base domain memory in GB(min 8, max 88)(Current Memory 64G)[default
32]     :
INFO: Using default memory size i.e. 32 GB
Additional vlan networks to be assigned to oda_base? (y/n) [n]:
Vlan network to be removed from oda_base (y/n) [n]
INFO: Node 0:Configured oda base pool
INFO: Node 1:Configured oda base pool
INFO: Node 0:ODA Base configured with new memory
INFO: Node 0:ODA Base configured with new vcpus
INFO: Changes will be incorporated after the domain is restarted on Node 0
INFO: Node 1:ODA Base configured with new memory
INFO: Node 1:ODA Base configured with new vcpus
INFO: Changes will be incorporated after the domain is restarted on Node 1
```

2. Perform any actions listed in the output from the command. Not all versions of the software, such as the one shown in the preceding example, require any additional actions before restarting ODA_BASE.
3. Restart the domain to implement the changed configuration for ODA_BASE by running the following restart command on Dom0 of both nodes:

```
oakcli restart oda_base
```

4

Oracle Appliance Manager Command-Line Interface

This chapter describes the content and use of the Oracle Appliance Manager command-line interface, also known as known as OAKCLI. The current set of `oakcli` commands along with their syntax and usage notes are included, as well as examples of many of the commands.

About Oracle Appliance Manager Command-Line Interface

The Oracle Appliance Manager command-line interface is used to perform Oracle Database Appliance management tasks such as deploying the software, configuring core keys, applying patches, monitoring and troubleshooting, managing virtual machines, and creating Oracle Database homes and databases.

Depending on your version of Oracle Appliance Manager and your hardware, some of the commands described in this chapter may not be available to you. To see which `oakcli` commands are supported on your version of Oracle Appliance Manager and your hardware, enter the following command: `oakcli -h`.

Oracle Appliance Manager Command-Line Interface Operational Notes

Usage Information

The Oracle Appliance Manager command-line interface is in the following directory:

```
/opt/oracle/oak/bin/oakcli
```

The `root` user account should have the `oakcli` PATH variable defined as the path to the directory where oakcli is located.

Oracle Database Appliance maintains logs of `oakcli` command executions and output in the following directory.

```
/opt/oracle/oak/log/hostname/client/oakcli.log
```

Syntax

Oracle Appliance Manager command-line interface commands and parameters are not case sensitive. An `oakcli` command uses the following command syntax:

```
oakcli command object [parameters]
```

In `oakcli` syntax:

- *command* is a verb such as `show`, `locate`, `apply`, and so on

- *object* (also known as a noun) is the target or object on which the oakcli command performs the operation, such as a disk or controller. You can also use object abbreviations.
- *parameters* extend the use of a preceding command combination to include additional options for the command. Parameter names are preceded with a dash, for example, -h, which is the help parameter available with every command.

Using Oracle Appliance Manager Command-Line Interface Help

Run the following command to see the usage information for all oakcli commands:

```
oakcli -h
```

Run the following command to see detailed help about a specific oakcli command:

```
oakcli command -h
```

Run the following command to see detailed help about a specific oakcli command's objects and its options:

```
oakcli command object -h
```

Privileges and Security

You should typically use Oracle Appliance Manager command-line interface when logged into Oracle Database Appliance as the root user. If you are not logged in as root, then you will be unable to complete particular tasks. For example, you could view storage information but not modify the storage configuration.

Allowing Root User Access in SUDO

In environments where the system administration is handled by a different group than the database administration or where security is a large concern, you may want to limit access to the root user account and password. SUDO allows a system administrator to give certain users (or groups of users) the ability to run commands as root while logging all commands and arguments.

A SUDO security policy is configured via the file /etc/sudoers. Within the sudoers file, you can configure groups of users and sets of commands to simplify SUDO administration.

Caution: Configuring SUDO to allow a user to perform any operation is equivalent to giving that user root privileges. Consider carefully if this is appropriate for your security needs.

To configure SUDO to allow a user to perform any operation as root, add lines to the commands section in the /etc/sudoers file as follows:

```
## The commands section may have other options added to it.
##
## Allow root to run any commands anywhere
root    ALL=(ALL)       ALL
jdoe    ALL=(ALL)       NOPASSWD: ALL
```

In this example, *jdoe* is the username. ALL=(ALL) grants the *jdoe* user permission to run commands as root on any host this sudoers file is on. NOPASSWD allows *jdoe* permissions without a password. The sudoers file is designed so that one sudoers file

can be copied to multiple hosts with different rules on each host. `ALL` indicates that the *jdoe* user can run any command.

Example

After you configure the sudoer file with the user, the oakcli commands can be run by *jdoe* as the following. The root, oracle, and grid passwords will not be prompted.

```
$ sudo oakcli create database -db newdb

INFO: 2015-08-05 14:40:55: Look at the logfile
'/opt/oracle/oak/log/scaoda1011/tools/12.1.2.4.0/createdb_newdb_91715.log' for
more details

INFO: 2015-08-05 14:40:59: Database parameter file is not provided. Will be using
default parameters for DB creation
Please enter the 'SYSASM'  password : (During deployment we set the SYSASM
password to 'welcome1'):
Please re-enter the 'SYSASM' password:

INFO: 2015-08-05 14:41:10: Installing a new home: OraDb12102_home3 at
/u01/app/oracle/product/12.1.0.2/dbhome_3

Please select one of the following for Database type  [1 .. 3]:
1    => OLTP
2    => DSS
3    => In-Memory
```

See Also

For more information about configuring and using SUDO, refer to the SUDO man pages at `http://www.sudo.ws/sudo.html`

oakcli Commands

The remainder of this chapter contains syntax and other details about the `oakcli` commands available in this release, sorted alphabetically. Here is a list of the commands in this release.

oakcli add disk -local

Adds a local disk to the system after physically replacing a failed disk. This command is available only for V1, X4-2, and X3-2.

oakcli apply

Reconfigures Oracle Database Appliance core capacity. This command applies only to Bare Metal implementations.

oakcli clone commands

Commands to clone virtual machines and virtual disks.

oakcli configure commands

Commands for configuring Oracle Database Appliance components.

oakcli copy

Prepares a copy of the configuration file for use during deployment.

oakcli create commands
Commands for creating Oracle Database Appliance components.

oakcli delete commands
Commands for removing Oracle Database Appliance components.

oakcli deploy
Deploys Oracle Database Appliance.

oakcli diskwritecache
Manages disk write cache.

oakcli import vmtemplate
Imports a virtual machine template.

oakcli locate
Locates a shared disk on a storage shelf by turning on an indicator light.

oakcli manage diagcollect
Collects diagnostic statistics and information, primarily for use when working with Oracle Support.

oakcli migrate vm
Migrates a currently running virtual machine to another node.

oakcli modify
Adds, updates, or removes a network from a virtual machine or template configuration.

oakcli orachk
Audits configuration settings.

oakcli resize dbstorage
Resizes the space used for an ACFS storage structure.

oakcli restart oda_base
Restarts ODA_BASE on the local node.

oakcli show commands
Commands for displaying information about various Oracle Database Appliance components.

oakcli start commands
Commands for starting a Domain U or ODA_BASE virtual machine.

oakcli stop commands
Commands for stopping a Domain U or ODA_BASE virtual machine.

oakcli stordiag
Runs tests on a storage shelf or storage expansion shelf device.

oakcli test asr

Checks if Oracle Auto Service Request (Oracle ASR) is functioning properly.

oakcli unpack

Unpacks the given package to the Oracle Appliance Manager command-line interface repository.

oakcli update

Updates software such as the infrastructure, grid infrastructure, and database, and verifies patching.

oakcli upgrade

Upgrades one or more databases to a newer version.

oakcli validate

Validates the state of Oracle Database Appliance or the viability of an operating system patch.

oakcli add disk -local

Use the `oakcli add disk -local` command to add a local disk to the system after physically replacing a failed disk.

Syntax

```
oakcli add disk -local
```

Usage Notes

- You cannot add more than two disks per node.
- You must remove the failed drive and replace it with a new drive before running the `oakcli add disk -local` command.
- The new disk must be inserted into the slot before you run this command.
- The `oakcli add disk -local` command is supported only on bare metal deployments. It is not supported on virtualized configurations.

oakcli apply

Use the `oakcli apply` command to reconfigure your Oracle Database Appliance core capacity.

Syntax

Use the following syntax where *`core_config_key_file`* is the full path name of a configuration key file generated on My Oracle Support and copied to Oracle Database Appliance:

```
oakcli apply core_configuration_key core_config_key_file [-h]
```

Parameters

Parameter	Description
`core_config_key_file`	Identifies the full path and name of the configuration key file

Usage Notes

- Run the `oakcli apply` command from the first node in Oracle Database Appliance as `root`.
- After you run the `oakcli apply` command, Oracle Database Appliance applies the key to both nodes and reboots both nodes.
- Run the `oakcli show core_config_key` command to view the core_config_key. See oakcli show core_config_key.
- The core key application is applicable only to Bare Metal implementations. It is not available on the Oracle Database Appliance Virtualized Platform.

Example

Reconfigure Oracle Database Appliance with a new core count using the configuration key file `/tmp/set8cores.conf`:

```
oakcli apply core_configuration_key /tmp/set8cores.conf
..................done
INFO: Cluster will be rebooted after applying the core_configuration_key
successfully
INFO: ................................

INFO: Applying core_configuration_key on '192.0.2.21'
INFO: ..........................................................................
INFO: Running as root: /usr/bin/ssh -1 root 192.0.2.21 /tmp/tmp_lic_exec.pl
INFO: Running as root: /usr/bin/ssh -1 root 192.0.2.21 /opt/oracle/oak/bin/oakcli
enforce core_configuration_key /tmp/.lic_file
INFO: Applying core_configuration_key on '192.0.2.20'

INFO: ..........................................................................
INFO: Running as root: /usr/bin/ssh -1 root 192.0.2.20 /tmp/tmp_lic_exec.pl
INFO: Running as root: /usr/bin/ssh -1 root 192.0.2.20 /opt/oracle/oak/bin/oakcli
enforce core_configuration_key /tmp/.lic_file
INFO: Applying core_configuration_key on '192.0.2.20'
```

oakcli clone commands

Use the `oakcli clone` commands to clone virtual machines or virtual disks.

oakcli clone vdisk

Use the `oakcli clone vdisk` command to create clones of virtual disks.

Syntax

```
oakcli clone vdisk new_vdisk_name -repo repo_name -src source_vdisk_name [-h]
```

Parameters

Parameter	Description
`new_vdisk_name`	Name given to the clone virtual disk
`repo_name`	Name of the repository source for the virtual disk being cloned
`source_vdisk_name`	Name of the virtual disk being cloned
`-h`	(Optional) Display help for using the command

Example

Clone a virtual disk named *my_vdisk2* from an existing virtual disk named vdisk1 that is stored in the repository named *vrepo1*:

```
oakcli clone vdisk my_vdisk2 -repo vrepo1 -src vdisk1
```

oakcli clone vm

Use the oakcli clone vm command to create clones and snap clones of virtual machines.

Syntax

To create a virtual machine from a template:

```
oakcli clone vm vm_name -vmtemplate template_name -repo repo_name [-node 0|1]
```

To create a snapshot clone of an existing virtual machine:

```
oakcli clone vm vm_name -vm src_name -snap
```

To create a virtual machine snapshot from a template:

```
oakcli clone vm vm_name -vmtemplate template_name -snap
```

Parameters

Parameter	Description
vm_name	Name given to the cloned virtual machine.
-vmtemplate *vmtemplate_name*	Name of the template containing the virtual machine that you want to clone.
-repo *repo_name*	Name of the repository that contains the template being cloned.
-node 0 | 1	Identifies the Oracle Database Appliance node that contains the shared repository from which the virtual machine is to be cloned. The -node parameter must be used when cloning from a shared repository and is invalid for non-shared repositories.
-vm *src_name*	Name of the virtual machine that is to be cloned.
-snap	Creates a snapshot of the source virtual machine or virtual machine template.

Examples

Creating a virtual machine image from the virtual machine template

Create a virtual machine image named *myol6u_test* from the virtual machine template named *myol6u_15gb1*, which is stored in the shared repository named repo2 on Node 0:

```
oakcli clone vm myol6u_test -vmtemplate myol6u_15gb1 -repo repo2 -node 0
```

oakcli configure commands

Use the oakcli configure commands to configure components on Oracle Database Appliance.

oakcli configure additionalnet

Configures any un-configured public networks in Bare Metal, Domain 0, and ODA_BASE.

oakcli configure additionalnet

Configures Oracle Auto Service Request for Oracle Database Appliance

oakcli configure cpupool

Configures a CPU pool

oakcli configure firstnet

Configures initial network connection.

oakcli configure ib2fiber

Configures 10GbE SFP+ (fiber) cards after they have replaces InfiniBand cards.

oakcli configure network

Configures the network after either replacing a network card or swapping the public network from copper to fiber and vice versa

oakcli configure oda_base

Configures CPU core count, memory allocation, virtual local area networks for ODA_BASE

oakcli configure repo

Configures a shared repository by increasing its size

oakcli configure vm

Configures a virtual machine

oakcli configure vmtemplate

Configures a virtual machine template

oakcli configure additionalnet

Use the `oakcli configure additionalnet` command to configure any un-configured public networks in Bare Metal, Domain 0, and ODA_BASE. This command automatically detects any un-configured networks and runs a script which guides you through how to configure the network.

Syntax

```
oakcli configure additionalnet  [h]
```

Parameter

-h displays online help for using the command.

Usage Notes

The `oakcli configure additionalnet` command runs an interactive script which requires the following input:

- Interface name

- DHCP [Y/N]
- IP
- Netmask

Note: If you are running the command on a bare metal deployment, then the interface name expects a bond name. If you are running the command on Dom0, then the interface name expects a net name. If you are running the command on Dom1, then the interface name expects an eth name.

oakcli configure asr

Use the `oakcli configure asr` command to configure Oracle Auto Service Request (Oracle ASR) on Oracle Database Appliance.

Syntax

```
oakcli configure asr [-h]
```

Parameter

-h displays help for using the command.

Usage Notes

- The `oakcli configure asr` command initiates an interactive script that requests the following information to implement Oracle ASR on your Oracle Database Appliance:
  - Action to be performed (internal or external install, deinstall, or reconfigure)
  - PROXY server name, port, user ID, and password
  - ASR user ID and password
  - ASR Manager IP and port

Example

```
# oakcli configure asr

INFO   : Logging all actions in
/opt/oracle/oak/onecmd/tmp/scaoda1011-20150805153300.log and traces in
/opt/oracle/oak/onecmd/tmp/scaoda1011-20150805153300.trc

Please enter
1 to setup Internal ASR
2 to setup External ASR
3 to Deinstall ASR
0 to Exit

 [1]:INFO   : Logging all actions in
/opt/oracle/oak/onecmd/tmp/scaoda1011-20150805153300.log and traces in
/opt/oracle/oak/onecmd/tmp/scaoda1011-20150805153300.trc
```

oakcli configure cpupool

Use the `oakcli configure cpupool` command to configure a CPU pool on one Oracle Database Appliance Virtualized Platform node.

Syntax

```
oakcli configure cpupool poolname -numcpu cpu_count -node nodenum [-h]
```

Parameters

Parameter	Description
poolname	Unique name for the CPU pool.
-numcpu *cpu_count*	Number of CPUs for the CPU pool.
-node *nodenum*	Node where the CPU pool will be created (0 or 1).
-h	(Optional) Displays help for using the command

Example

Configuring a Two Core CPU Pool

Configure a CPU pool with two cores on Node 1 of Oracle Database Appliance Virtualized Platform:

```
oakcli configure cpupool twonode -numcpu 2 -node 1
```

oakcli configure firstnet

Use the `oakcli configure firstnet` command to configure an initial network on Oracle Database Appliance that enables you to download deployment software.

Syntax

```
oakcli configure firstnet
```

Example

Configuring the Initial Network on Bare Metal Oracle Database Appliance

The `oakcli configure firstnet` command creates an initial network on a new Oracle Database Appliance using the interactive script, as shown in the following example:

```
oakcli configure firstnet
Select the interface to  configure network on [bond0 bond1 bond2 xbond0]:bond0
Configure DHCP on bond0?(yes/no):no
       INFO: Static configuration selected
       Enter the IP address to configure:192.0.2.18
       Enter the netmask address to configure:255.255.252.0
       Enter the gateway address to configure:192.0.2.1
Plumbing the IPs now
Restarting the network
::::::::::::::::::
```

Note: Oracle recommends using the `oakcli configure firstnet` command only one time on Oracle Database Appliance. Subsequent use after configuring the initial network can cause unpredictable changes to your network settings.

oakcli configure ib2fiber

Run the `oakcli configure ib2fiber` command after replacing Infiniband 10GbE SFP+ cards with (fiber) cards and before deployment to de-configure IB setup and configure fiber cards.

> **Note:** The command is supported only on X5-2. If you are using Oracle Database Appliance virtualized platform, then the command must be executed from Dom0.

Usage Notes

This command must be run before deployment to configure 10GbE SFP+ (fiber) cards.

Syntax

```
oakcli configure ib2fiber -h
```

Parameter

`-h` displays help for using the command.

oakcli configure network

Use the `oakcli configure network` command to configure the network after either replacing a network card or swapping the public network from copper to fiber and vice versa. The meaning of the command changes depending on which parameter you use.

Syntax

```
oakcli configure network [-changeNetCard|-publicNet]
```

Parameters

Parameter	Description
`-changeNetCard`	Configures the network card after it has been replaced. You must run the `oakcli configure network -changeNetCard` command on each node if the network card has been replaced on each node. This parameter is supported on all Oracle Database Appliance hardware models. This command must be executed from Dom0 on virtualized platforms
`-publicNet`	Used to swap the public network from copper to fiber and vice versa. You must run the `oakcli configure network -publicNet` command on each node, and this requires the stack to be down. The stack includes GI and RDBMS. When running in virtualization mode, the virtual machines need to be down and may need some configuration changes, especially if they are using VLANs. This parameter is only supported on Oracle Database Appliance X4-2 hardware models.
`-h`	(Optional) Displays help for using the command.

oakcli configure oda_base

Use the `oakcli configure oda_base` command to:

- Change the CPU core count assigned to ODA_BASE

- Add or remove virtual local area networks assigned to ODA_BASE
- Adjust resource allocation among User Domains and between ODA_BASE and other User Domains.
- Increase or decrease resource allocation to the ODA_BASE domain.

You must restart the domain for the resource allocation change to take effect.

Syntax

```
oakcli configure oda_base
```

Example

Changing the CPU Core Count in ODA_BASE

Change the CPU core count from six to eight in ODA_BASE:

```
# oakcli configure oda_base
Core Licensing Options:
        1. 2 CPU Cores
        2. 4 CPU Cores
        3. 6 CPU Cores
        4. 8 CPU Cores
        5. 10 CPU Cores
        6. 12 CPU Cores
        Current CPU Cores       :6
        Selection[1 : 6](default 12 CPU Cores) : 4
        ODA base domain memory in GB(min 8, max 88)(Current Memory 64G)[default
32]     :
INFO: Using default memory size i.e. 32 GB
Additional vlan networks to be assigned to oda_base? (y/n) [n]:
Vlan network to be removed from oda_base (y/n) [n]
INFO: Node 0:Configured oda base pool
INFO: Node 1:Configured oda base pool
INFO: Node 0:ODA Base configured with new memory
INFO: Node 0:ODA Base configured with new vcpus
INFO: Changes will be incorporated after the domain is restarted on Node 0
INFO: Node 1:ODA Base configured with new memory
INFO: Node 1:ODA Base configured with new vcpus
INFO: Changes will be incorporated after the domain is restarted on Node 1
```

Changing the Amount of Memory Allocated to ODA_BASE

1. Log in to Dom0.
2. Execute the `oakcli configure oda_base` command and change the configuration.
3. Restart ODA_BASE.

Assigning additional VLANs to ODA_BASE

1. Log in to Dom0.
2. Execute the `oakcli configure oda_base` command.
3. Change the setting for `Additional vlan networks to be assigned to oda_base? (y/n)` to **y**.
4. Follow the prompts to assign additional VLANs to ODA_BASE.
5. Restart ODA_BASE.

oakcli configure repo

Use the `oakcli configure repo` command to increase the size of a shared repository.

Syntax

```
oakcli configure repo reponame -incsize size [M|G]
```

Parameter	Description
reponame	Name of the shared repository
size	Number that can be followed by M to define the size as megabytes or by G to define as size as gigabytes

Example

Increasing the Size of a Shared Repository

Change the size of the repo1 shared repository by 2 gigabytes:

```
# oakcli configure repo repo1 -incsize 2G

Configured Shared Repo : repo1 with new size 3712.0.
```

oakcli configure vm

Use the `oakcli configure vm` command to configure a virtual machine on the Oracle Database Appliance Virtualized Platform and to increase or decrease resource allocation to user domains. You must restart the domain for the resource allocation change to take effect.

Syntax

```
oakcli configure vm name [-vcpu cpucount -maxvcpu maxcpu -cpuprio priority
-cpucap cap -memory memsize -maxmemory max_memsize -os sys -keyboard lang -mouse
mouse_type -domain dom -network netlist -autostart astart -disk disks -bootoption
bootstrap -cpupool pool -prefnode 0|1 -failover true|false]
```

Parameters

Parameter	Description
name	The name assigned to the virtual machine.
-vcpu *cpucount*	Number of nodes assigned to the virtual machine. This number depends on your Oracle Database Appliance configuration: ■ On Oracle Database Appliance X5-2, the range is from 1 to 72 ■ On Oracle Database Appliance X4-2, the range is from 1 to 48 ■ On Oracle Database Appliance X3-2, the range is from 1 to 32 ■ On Oracle Database Appliance, the range is 1 to 24

Parameter	Description
-maxvcpu *maxcpu*	Maximum number of CPUs that the virtual machine can consume. This number depends on your Oracle Database Appliance configuration: ■ On Oracle Database Appliance X5-2, the range is from 1 to 72 ■ On Oracle Database Appliance X4-2, the range is from 1 to 48. ■ On Oracle Database Appliance X3-2, the range is from 1 to 32 ■ On Oracle Database Appliance, the range is 1 to 24
-cpuprio *priority*	Priority for CPU usage, where larger values have higher priority (1 - 256).
-cpucap *cap*	Percentage of a CPU the virtual machine can receive (1 - 100).
-memory *memsize*	Amount of memory given to the virtual machine: (1-88)G or (1-90112)M. Default is M.
-maxmemory *max_memsize*	Maximum amount of memory allowed for the virtual machine: (1-88)G or (1-90112)M. Default is M.
-os *sys*	Operating system used by the virtual machine (WIN_2003, WIN_2008, WIN_7, WIN_VISTA, OTHER_WIN, OL_4, OL_5, OL_6, RHL_4, RHL_5, RHL_6, LINUX_RECOVERY, OTHER_LINUX, SOLARIS_10, SOLARIS_11, OTHER_SOLARIS, or NONE).
-keyboard *lang*	Keyboard used by virtual machine (en-us, ar, da, de, de-ch, en-gb, es, et, fi, fo, fr, fr-be, fr-ca, hr, hu, is, it, ja, lt, lv, mk, nl, n--be, no, pl, pt, pt-br, ru, sl, sv, th, or tr).
-mouse *mouse_type*	Mouse type used by the virtual machine (OS_DEFAULT, PS2_MOUSE, USB_MOUSE, or USB_TABLET).
-domain *dom*	Domain type from the following options: ■ Hardware virtualized guest (XEN_HVM) - The kernel or operating system is not virtualization-aware and can run unmodified. - Device drivers are emulated. ■ Para virtualized guest (XEN_PVM) - The guest is virtualization-aware and is optimized for a virtualized environment. - PV guests use generic, idealized device drivers. ■ Hardware virtualized guest (XEN_HVM_PV_DRIVERS) The PV drivers are hypervisor-aware and significantly reduce the overhead of emulated device input/output.
-network *netlist*	MAC address and list of networks used by the virtual machine.
-autostart *astart*	Startup option for virtual machine (always, restore, or never).
-disk *disks*	List of disks (slot, disktype, and content) used by virtual machine.
-bootoption *bootstrap*	Boot option used to bootstrap virtual machine (PXE, DISK, or CDROM).
-cpupool *pool*	Named CPU pool assigned to the virtual machine.

Parameter	Description
`-prefnode 0|1`	Node 0 or 1 where the virtual machine should attempt to start. This parameter is only valid for virtual machines created in shared repositories.
`-failover true|false`	Allow (use the keyword "true") or disallow (use the keyword "false") the virtual machine to start or restart on a node other than the node defined by the `-prefnode` parameter. This parameter is only valid for virtual machines created in shared repositories.

Usage Notes

- All of the parameters, except for *name*, are optional.
- You must include at least one optional parameter for the command to work.
- When you create a virtual machine, select the Processor Cap as a percentage, between 10 and 100%. The default is 100%. This value is then converted to a CPU utilization limit in the vm.cfg file for the virtual machine. The value set in the vm.cfg file limits the amount of CPU a guest is allowed to consume. If the Processor Cap is set at 100% in Oracle Virtual Machine, then the value set in vm.cfg is 0, which means there is no limit to CPU utilization.

See Also: Oracle VM Release 3.1 documentation at http://docs.oracle.com/cd/E27300_01 for more information about the options in the preceding table. For example, see http://docs.oracle.com/cd/E27300_01/E27309/html/vmusg-ovm-vms.html for details about the `-domain` *dom* options

Example

Changing the Virtual Machine Count and Virtual Memory Size for a Virtual Machine

Change the number of virtual CPUs to 3 and the virtual memory size to 4GB in a virtual machine named `sample_odarep01`:

```
oakcli configure vm sample_odarep01 -vcpu 3 -memory 4196
```

oakcli configure vmtemplate

Use the `oakcli configure vmtemplate` command to configure a virtual machine template on Oracle Database Appliance Virtualized Platform.

Syntax

```
oakcli configure vmtemplate name [-vcpu cpucount -maxvcpu maxcpu -cpuprio
 priority -cpucap cap -memory memsize -maxmemory max_memsize -os sys -keyboard
 lang -mouse mouse_type -domain dom -network netlist -disk disks]
```

Parameters

Parameter	Description
name	Name assigned to the virtual machine template.

Parameter	Description
-vcpu *cpucount*	Number of nodes assigned to virtual machines cloned from the template. ■ On Oracle Database Appliance X5-2, the range is from 1 to 72 ■ On Oracle Database Appliance X4-2, the range is from 1 to 48. ■ On Oracle Database Appliance X3-2, the range is from 1 to 32 ■ On Oracle Database Appliance, the range is 1 to 24
-maxvcpu *maxcpu*	Maximum number of CPUs that virtual machines cloned from the template can consume. ■ On Oracle Database Appliance X5-2, the range is from 1 to 72 ■ On Oracle Database Appliance X4-2, the range is from 1 to 48. ■ On Oracle Database Appliance X3-2, the range is from 1 to 32 ■ On Oracle Database Appliance, the range is 1 to 24
-cpuprio *priority*	Priority for CPU usage, where larger values have higher priority (1 - 256).
-cpucap *cap*	Percentage of a CPU that virtual machines cloned from the template can receive (1 - 100).
-memory *memsize*	Amount of memory given to virtual machines cloned from the template (1G - 88 G or 1M - 90112M).
-maxmemory *max_memsize*	Maximum amount of memory allowed for virtual machines cloned from the template.
-os *sys*	Operating system used by virtual machines cloned from the template (WIN_2003, WIN_2008, WIN_7, WIN_VISTA, OTHER_WIN, OL_4, OL_5, OL_6, RHL_4, RHL_5, RHL_6, LINUX_RECOVERY, OTHER_LINUX, SOLARIS_10, SOLARIS_11, OTHER_SOLARIS, or NONE).
-keyboard *lang*	Keyboard used by virtual machines cloned from the template (en-us, ar, da, de, de-ch, en-gb, es, et, fi, fo, fr, fr-be, fr-ca, hr, hu, is, it, ja, lt, lv, mk, nl, n--be, no, pl, pt, pt-br, ru, sl, sv, th, or tr).
-mouse *mouse_type*	Mouse type used by virtual machines cloned from the template (OS_DEFAULT, PS2_MOUSE, USB_MOUSE, or USB_TABLET).
-domain *dom*	Domain type from the following options: ■ Hardware virtualized guest (XEN_HVM) - The kernel or operating system is not virtualization-aware and can run unmodified. - Device drivers are emulated. ■ Para virtualized guest (XEN_PVM) - The guest is virtualization-aware and is optimized for a virtualized environment. - PV guests use generic, idealized device drivers. ■ Hardware virtualized guest (XEN_HVM_PV_DRIVERS) The PV drivers are hypervisor-aware and significantly reduce the overhead of emulated device input/output.

Parameter	Description
`-network` *`netlist`*	MAC address and list of networks used by virtual machines cloned from the template.
`-disk` *`disks`*	List of disks (slot, disktype, and content) used by virtual machines cloned from the template.

Usage Notes

- All of the parameters, except for `name`, are optional.
- You must include at least one optional parameter for the command to work.

> **See Also:** Oracle VM Release 3.1 documentation at `http://docs.oracle.com/cd/E27300_01` for more information about the options in the preceding table. For example, see `http://docs.oracle.com/cd/E27300_01/E27309/html/vmusg-ovm-vms.html` for details about the `-domain` *`dom`* options

Examples

Configuring a Virtual Machine Template

Set values for the following configuration values in the virtual machine template named *myol5u7_10gb*:

```
oakcli configure vmtemplate myol5u7_10gb
-vcpu 2 -maxvcpu 4 -cpucap 40 -memory 1536M -maxmemory 2G
-network "['type=netfront,bridge=net1']" -os OTHER_LINUX
```

- `-vcpu 2` = 2 CPUs will assigned when the virtual machine starts up
- `-maxvcpu 4` = The maximum number of CPUs that can be assigned to the virtual machine is 4.
- `-cucap 40` = The maximum percentage of a CPU's capacity that will be assigned to the virtual machine is 40%.
- `-memory 1536M` = The amount of memory assigned when the virtual machine starts up is 1536 MB.
- `-maxmemory 2G` = The maximum amount of memory that can be assigned to the virtual machine is 2 GB.
- `-network type=netfront,bridge=net1` = The list of networks used by virtual machines cloned from the template.
- `-os` = The operating system used by the virtual machine is OTHER_LINUX.

oakcli copy

Use the `oakcli copy` command to prepare a copy of the configuration file for use during the configuration of Oracle Database Appliance.

Syntax

```
oakcli copy -conf absolute_conf_file [-h]
```

Parameters

Parameter	Description
`-conf` *`absolute_conf_file`*	Specifies the full path name of the configuration file.
`-h`	(Optional) Displays help for using the command.

Examples

Preparing a copy of the configuration file

If you created a configuration file previously and copied this file to Oracle Database Appliance, then prepare the configuration file to be used during the configuration process. For example, if you copied the file `myserver1.conf` to `/tmp`, then enter the following command:

```
oakcli copy -conf /tmp/myserver1.conf
```

oakcli create commands

Use the `oakcli create` commands to create components on Oracle Database Appliance.

oakcli create cpupool

Creates a new CPU pool

oakcli create database

Creates a new database

oakcli create dbhome

Creates a new database home

oakcli create dbstorage

Creates a new ACFS storage structure

oakcli create db_config_params

Creates a database configuration file

oakcli create repo

Creates a virtual local area network on a Oracle Database Appliance Virtualized Platform node

oakcli create snapshotdb

Creates a snapshot database from an existing database

oakcli create vdisk

Creates a virtual disk in a shared repository on the Oracle Database Appliance Virtualized Platform

oakcli create vlan

Creates a virtual local area network on a Oracle Database Appliance Virtualized Platform node

oakcli create cpupool

Use the `oakcli create cpupool` command to create a CPU pool on one Oracle Database Appliance Virtualized Platform node.

Syntax

```
oakcli create cpupool poolname -numcpu cpu_count -node nodenum [-h]
```

Parameters

Parameter	Description
poolname	Uniquely names the CPU pool.
-numcpu *cpu_count*	Defines the number of CPUs for the CPU pool.
-node *nodenum*	Defines the node where the CPU pool will be created (0 or 1).
`-h`	(Optional) Display help for using the command.

Example

Creating a Two Core CPU Pool

Create a CPU pool with two CPUs on Node 1 of Oracle Database Appliance Virtualized Platform:

```
oakcli create cpupool twonode -numcpu 2 -node 1
```

oakcli create database

Use the `oakcli create database` command to create additional databases on Oracle Database Appliance.

When you run `oakcli create database`, the command prompts you for further inputs.

Syntax

```
oakcli create database -db db_name [[[-oh home] | [-version version]] [-params
params_file] [-cdb]]
```

Parameters

Parameter	Description
`-db` *db_name*	Name of the database that you want to create.
`-oh` *home*	(Optional) Name of an existing Oracle home to use when creating the database. By default, the command creates a new database home.
`-version` *version*	(Optional) Version of the database that you want to create. By default, Oracle Database Appliance uses the highest version that you have downloaded.
`-params` *params_file*	(Optional) Name of the configuration file. By default, Oracle Database Appliance uses the default configuration file.
`-cdb`	(Optional) Creates the database as a container database.

Usage Notes

- The `-oh` and the `-version` parameters are mutually exclusive. Attempting to use both in the same command will generate an error.
- When a database is created without identifying an Oracle Home, a new Oracle Home is created, using a standard naming convention, for example, OraDb11203_home3. The number at the end of the name is incremented by one for each new home created with the same version number.
- When you upgrade the database, infrastructure, and Oracle Grid Infrastructure, you must specify an existing home to create a new database.
- If you try to create a database using the option `-version` *`version`* before downloading and unpacking the specific version DB clone files, then the command will fail.
- You can create configuration files with the `oakcli create db_config_params` command.
- The prompt "Do you want to keep the data files on FLASH storage: [Y | N] " is only shown if you choose the OLTP database type and if there is some free space available on flash storage. See "Improving I/O Performance for Database Files" for more information about this option.

Examples

Creating a new database showing prompts

When you run `oakcli create database` you are prompted for several inputs. The options listed for each input requested depend on the platform you run the command on. For example, Database Class options 9 and 10 are only available on Oracle Database Appliance X5-2.

```
oakcli create database -db mydb -oh OraDb12102_home1

Please enter the 'root'  password :
Please re-enter the 'root' password:

Please enter the 'oracle'  password :
Please re-enter the 'oracle' password:

Please enter the 'SYSASM'  password : (During deployment we set the
SYSASM password to 'welcome1'):
Please re-enter the 'SYSASM' password:
Please select one of the following for Database type  [1 .. 3]:
1    => OLTP
2    => DSS
3    => In-Memory
1
Selected value is : OLTP
Please select one of the following for Database Deployment  [1 .. 3]:
1    => EE : Enterprise Edition
2    => RACONE
3    => RAC
3
Selected value is : RAC

Do you want to keep the data files on FLASH storage: [ Y | N ]?N

Specify the  Database Class (1. odb-01 '1 core, 8 GB memory'   2.
Others) [1]:2
```

```
Please select one of the following for Database Class    [1 .. 10]:
1    => odb-01s  (   1 cores ,     4 GB memory)
2    =>  odb-01  (   1 cores ,     8 GB memory)
3    =>  odb-02  (   2 cores ,    16 GB memory)
4    =>  odb-04  (   4 cores ,    32 GB memory)
5    =>  odb-06  (   6 cores ,    48 GB memory)
6    =>  odb-12  (  12 cores ,    96 GB memory)
7    =>  odb-16  (  16 cores ,   128 GB memory)
8    =>  odb-24  (  24 cores ,   192 GB memory)
9    =>  odb-32  (  32 cores ,   256 GB memory)
10    =>  odb-36  (  36 cores ,   256 GB memory)
```

Creating a New Database in an Existing Oracle Home

Create a database called `sales1` in `OraDb11203_home2`:

```
oakcli create database -db sales1 -oh OraDb11203_home2
```

Creating a New Database From a Template

Create a database called `sales2` from the `salesdbtemplated.dbconf` file (by appending the default file extension to the file name provided). This example also creates a new Oracle Home:

```
oakcli create database -db sales2 -params salesdbtemplate
```

Creating A New Database as a Container Database

Create a container database called `sales3`:

```
oakcli create database -db sales3 -version 12.1.0.2 -cdb
```

oakcli create dbhome

Use the `oakcli create dbhome` command to create a new database home on Oracle Database Appliance.

Syntax

```
oakcli create dbhome [-version version] [-h]
```

Parameters

Parameter	Description
`-version` *version*	(Optional) Version that you want to install. If not provided, Oracle Database Appliance uses the latest available version.
`-h`	(Optional) Display help for using the command

Example

Create a database home called `sales1` using version 12.1.0.2.4

```
oakcli create dbhome -version 12.1.0.2.4
```

oakcli create dbstorage

Use the `oakcli create dbstorage` command to create a storage structure for migrating databases from ASM to ACFS.

Syntax

```
oakcli create dbstorage -db db_name [-cdb]
```

Parameters

Parameter	Description
-db *dbname*	Sets up the required ACFS storage structure for the database to be created called *db_name*
-cdb	Must be passed if you are creating a multitenant container database
-h	(Optional) Display help for using the command

Example

The `oakcli create dbstorage` command requests user input to determine the size of the storage structure to create as shown in this example.

```
oakcli create dbstorage -db sales

Please enter the 'root' password :
Please re-enter the 'root' password:

Please enter the 'oracle' password :
Please re-enter the 'oracle' password:

Please enter the 'SYSASM' password : (During deployment we set the SYSASM password
to 'welcome1'):
Please re-enter the 'SYSASM' password:

Specify the Database Class (1. odb-01 '1 core, 8 GB memory' 2. Others) [1]:2

Please select one of the following for Database Class [1 .. 8] :
1 => odb-01s ( 1 cores , 4 GB memory)
2 => odb-01 ( 1 cores , 8 GB memory)
3 => odb-02 ( 2 cores , 16 GB memory)
4 => odb-04 ( 4 cores , 32 GB memory)
5 => odb-06 ( 6 cores , 48 GB memory)
6 => odb-12 ( 12 cores , 96 GB memory)
7 => odb-16 ( 16 cores , 128 GB memory)
8 => odb-24 ( 24 cores , 192 GB memory)


Selected value is: odb-01s ( 1 cores , 4 GB memory)
...
```

oakcli create db_config_params

Use the `oakcli create db_config_params` command to generate a database configuration file. The configuration file is created in `/opt/oracle/oak/install/dbconf` and is given the default extension `.dbconf`.

Syntax

```
oakcli create db_config_params -conf filename -h
```

Parameters

Parameter	Description
-conf *filename*	Name you want to give to the configuration file, without its pathname.
-h	(Optional) Display help for using the command

Example

Create the database parameter file:
/opt/oracle/oak/install/dbconf/newconf.dbconf:

```
# oakcli create db_config_params -conf newconf

Please select one of the following for Database Block Size  [1 .. 4]:
1 ==> 4096
2 ==> 8192
3 ==> 16384
4 ==> 32768
2
Selected value is: 8192

Specify the  Database Language (1. AMERICAN 2. Others) [1]:
Selected value is: AMERICAN

Specify the  Database Characterset (1. AL32UTF8 2. Others) [1]:2

Please select one of the following for Database Characterset [0 .. 10] :
0 => Others
1 => AL32UTF8
2 => AR8ADOS710
3 => AR8ADOS710T
4 => AR8ADOS720
5 => AR8ADOS720T
6 => AR8APTEC715
7 => AR8APTEC715T
8 => AR8ARABICMACS
9 => AR8ASMO708PLUS
10 => AR8ASMO8X
1
Selected value is: AL32UTF8

Specify the  Database Territory (1. AMERICA 2. Others) [1]:2

Please select one of the following for Database Territory [0 .. 10] :
0 => Others
1 => ALBANIA
2 => ALGERIA
3 => AMERICA
4 => ARGENTINA
5 => AUSTRALIA
6 => AUSTRIA
7 => AZERBAIJAN
8 => BAHRAIN
9 => BANGLADESH
10 => BELARUS
3
Selected value is: AMERICA
```

```
Specify the  Component Language (1. en 2. Others) [1]:2

Please select one of the following for Component Language [0 .. 10] :
0 => Others
1 => en : English
2 => fr : French
3 => ar : Arabic
4 => bn : Bengali
5 => pt_BR : Brazilian Portuguese
6 => bg : Bulgarian
7 => fr_CA : Canadian French
8 => ca : Catalan
9 => hr : Croatian
10 => cs : Czech
1
Selected value is: en
Successfully generated the Database parameter file 'newconf'
```

oakcli create repo

Use the `oakcli create repo` command to create a new shared repository on Oracle Database Appliance Virtualized Platform.

Syntax

```
oakcli create repo repo_name -size size [M|G] -dg DATA|RECO  -h
```

Parameters

Parameter	Description
repo_name	Name assigned to the shared repository
`-size` *size* [M|G]	Amount of storage to be assigned to the shared repository which can be defined as megabytes, with the M option or in gigabytes with the G option.
`-dg DATA|RECO`	ASM disk group in which the shared repository is to be stored, either the DATA+ disk group or the RECO+ disk group, selected by using the DATA or RECO option respectively.
`-h`	(Optional) Display help for using the command.

Usage Notes

- The `-size` parameter requires a whole number for size.
- The minimum value for *size* is 500 when M is used or 1 when G is used for the sizing unit.
- The default sizing unit for *size* is G (gigabytes).
- A shared repository should only be used for the virtual machine and not as a file staging area. Avoid copying or moving files into a shared repository.

Example

Create a 25 gigabyte shared repository named `repoprod1` in the DATA+ disk group:

```
oakcli create repo repoprod1 -dg DATA -size 25
```

oakcli create snapshotdb

Use the `oakcli create snapshotdb` command to create a snapshot database from an existing database.

Syntax

```
oakcli create snapshotdb [-db snap_dbname -from dbname] | [-h]
```

Parameters

Parameter	Description
snap_dbname	Name of the snapshot database to be created
dbname	Name of the source database
-db	This parameter precedes the name to be given to the new snapshot database
-from	This parameter precedes the name of the database from which the snapshot database is to be built
-h	(Optional) Display help for using the command

Example

Create a new snapshot database, name `snapprod`, from the database named `prod`:

```
oakcli create snapshotdb database -db snapprod -from prod
```

oakcli create vdisk

Use the `oakcli create vdisk` command to create a new virtual disk in a shared repository on Oracle Database Appliance Virtualized Platform.

Syntax

```
oakcli create vdisk vdisk_name -repo repository_name -size size -type shared|local
-sparse -h
```

Parameters

Parameter	Description
vdisk_name	Name assigned to the virtual disk that is unique within the name repository
-repo *repository_name*	Name of the shared repository where the virtual disk will be created and from which it will acquire its storage
-size *size*	Amount of storage to be assigned from the shared repository to the shared disk, where the default unit is G (for gigabytes) and the minimum size is 500M
-type shared | local	Sets the option of allowing the virtual disk to be shared by more than one virtual machine (`shared`) or used by only one virtual machine (`local`)
-sparse	Creates a sparse vdisk
-h	(Optional) Display help for using the command

Example

Create a virtual disk named `t2g` in the shared repository named `repoprod1` for use by only one virtual machine at a time in that repository:

```
oakcli create vdisk t2g -repo repoprod1 -type local -size 2G
```

oakcli create vlan

Use the `oakcli create vlan` command to create a new virtual local area network (VLAN) on an Oracle Database Appliance Virtualized Platform node.

Syntax

```
oakcli create vlan vlan_name -vlanid tag_id -if interface_name -node 0|1 -h
```

Parameters

Parameter	Description
`vlan_name`	Name assigned to the VLAN.
`-vlanid tag_id`	Tag number, used for packet routing, from 2 to 4096 inclusive that uniquely identifies the VLAN on a node. The same tag number can be used on both nodes.
`-if interface_name`	Name of the interface on which the VLAN network is created.
`-node 0 | 1`	Node on which the VLAN is created, either 1 or 2.
`-h`	(Optional) Display help for using the command.

Examples

Creating a New VLAN

Create a VLAN named `sample10` on Node 1 using the `bond1` interface and a tag with the number `10`:

```
oakcli create vlan sample10 -vlanid 10 -if bond1 -node 1
```

Duplicating a VLAN on the Second Node

Create the a VLAN named `sample10` on Node 0:

```
oakcli create vlan sample10 -vlanid 10 -if bond1 -node 0
```

oakcli delete commands

Use the `oakcli delete` commands to delete components from Oracle Database Appliance.

oakcli delete cpupool

Deletes an existing CPU pool

oakcli delete database

Removes an existing database

oakcli delete dbhome

Deletes an existing database home

oakcli delete dbstorage
Deletes an ACFS storage structure

oakcli delete db_config_params
Deletes a database configuration file

oakcli delete repo
Deletes an existing shared repository

oakcli delete vdisk
Deletes a virtual disk from a shared repository

oakcli delete vlan
Deletes an existing virtual machine

oakcli delete vm
Deletes an existing virtual machine

oakcli delete vmtemplate
Deletes an existing VM template

oakcli delete cpupool

Use the `oakcli delete cpupool` command to delete a CPU pool from one Oracle Database Appliance Virtualized Platform node.

Syntax

```
oakcli delete cpupool poolname -node nodenum [-h]
```

Parameters

Parameter	Description
poolname	Name of the CPU pool to be deleted
-node *nodenum*	Node from which the CPU pool will be deleted (0 or 1).
`-h`	(Optional) Display help for using the command.

Example

Deleting a CPU Pool

Delete the CPU pool named *twonode* from Node 1 of Oracle Database Appliance Virtualized Platform:

```
oakcli delete cpupool twonode -node 1
```

oakcli delete database

Use the `oakcli delete database` command to delete a database from Oracle Database Appliance.

Syntax

```
oakcli delete database -db db_name [-h]
```

Parameters

Parameter	Description
db_name	Name of the database to be deleted.
-h	(Optional) Display help for using the command

Example

Deleting a database

Delete the database named sales1:

```
oakcli delete database -db sales2
```

oakcli delete dbhome

Use the oakcli delete dbhome command to delete a database home from Oracle Database Appliance.

Syntax

```
oakcli delete dbhome -oh oracle_home [-h]
```

Parameters

Parameter	Description
oracle_home	The database home to be un-installed.
-h	(Optional) Display help for using the command

Example

Deleting an existing database home

Delete a database home called ora11_1:

```
oakcli delete dbhome -oh ora11_1
```

oakcli delete dbstorage

Use the oakcli delete dbstorage command to delete a storage structure that was created for the purpose of migrating databases from ASM to ACFS. For example, run this command if you created a storage structure using create dbstorage that is no longer required.

Syntax

```
oakcli delete dbstorage -db  db_name [-cdb]
```

Parameters

Parameter	Description
db *dbname*	Name of the database structure to be deleted
cdb	Must be passed if you are deleting a multitenant container database
-h	(Optional) Display help for using the command

Example

Delete a storage structure:

```
oakcli delete dbstorage -db sales
```

oakcli delete db_config_params

Use the `oakcli delete db_config_params` command to delete a database configuration file.

Syntax

```
oakcli delete db_config_params -conf filename -h
```

Parameters

Parameter	Description
conf *filename*	Name of the configuration file that you want to remove, without its path name.
-h	(Optional) Display help for using the command

oakcli delete repo

Use the `oakcli delete repo` command to remove a shared repository.

Syntax

```
oakcli delete repo repository_name [-h]
```

Parameter

repository_name is the name of the shared repository to be deleted.

Example

Deleting a shared repository

Delete the `testrepo01` shared repository:

```
oakcli delete repo testrepo01
```

The command will not succeed if testrepo01 is active on one or both nodes.

oakcli delete vdisk

Use the `oakcli delete vdisk` command to remove a virtual disk from a shared repository on Oracle Database Appliance Virtualized Platform.

Syntax

```
oakcli delete vdisk vdisk_name -repo repository_name -h
```

Parameters

Parameter	Description
vdisk_name	Name assigned to the virtual disk
r*epository_name*	Name of the shared repository where the virtual disk was created
-h	Shows the help text for the command

Example

Remove a virtual disk named `t2g` from the shared repository named `repoprod1`:

```
oakcli delete vdisk t2g -repo repoprod1
```

oakcli delete vlan

Use the `oakcli delete vlan` command to remove a virtual local area network.

Syntax

```
oakcli delete vlan vlan_name -node node_number [-h]
```

Parameters

Parameter	Description
vlan *vlan_name*	Name of the virtual local area network to be deleted
-node *node_number*	Oracle Database Appliance node from which you want to remove the virtual local area network
-h	(Optional) Displays the help text

Examples

Deleting a Virtual Local Area Network

Delete the `sample1` virtual local area network from node 1:

```
oakcli delete vlan sample1 -node 1
```

oakcli delete vm

Use the `oakcli delete vm` command to remove a virtual machine.

Syntax

```
oakcli delete vm vm_name [-server node_number] [-h]
```

Parameters

Parameter	Description
vm *vm_name*	(Optional) Name of the virtual machine to be deleted.

Parameter	Description
`-server` *node_number*	Oracle Database Appliance node from which you want to remove the virtual machine. If this optional parameter is not included, then the virtual machine is removed from both nodes.
`-h`	(Optional) Displays help for using the command.

Example

Deleting a virtual machine

Delete the `ovu22` virtual machine from node 1:

```
oakcli delete vm ovu22 -server 1
```

oakcli delete vmtemplate

Use the `oakcli delete vmtemplate` command to remove a virtual machine template.

Syntax

```
oakcli delete vmtemplate template_name [-server=node_number][-h]
```

Parameters

Parameter	Description
`vmtemplate` *template_name*	Name of the virtual machine template to be removed.
`-server` *node_number*	Oracle Database Appliance node from which you want to remove the virtual machine template. If this optional parameter is not included, then the virtual machine template is removed from both nodes.
`-h`	(Optional) Displays help for using the command.

Example

Deleting a Virtual Machine Template

Delete the `ovu22` virtual machine template from both nodes:

```
oakcli delete vmtemplate ovu22
```

oakcli deploy

Use the `oakcli deploy` command to deploy Oracle Grid Infrastructure for a cluster on Oracle Database Appliance.

Syntax

```
oakcli deploy [config] [-conf config_file] [-advance][-h]
```

Parameters

Parameter	Description
`-config`	(Optional) Runs the Oracle Appliance Manager Configurator.

Parameter	Description
`-conf` *`config_file`*	(Optional) Preloads the configuration stored in the named configuration file, *`config_file`*..
-advance	(Optional) Performs the deployment, or runs the deployment configurator, in advance mode.
-h	(Optional) Displays the help text.

Examples

Deploying the Complete Oracle Database Appliance

```
oakcli deploy
```

Running the Oracle Database Appliance Configurator

```
oakcli deploy -config
```

Preloading an Existing Configuration File

Preload the configuration stored in the MYCONFIG-VM configuration file:

```
oakcli deploy -conf myconfig-vm_file
```

Viewing the Log File

The `oakcli deploy` command creates a log file with the file name STEP* at /opt/oracle/oak/onecmd/tmp/

oakcli diskwritecache

Use the `oakcli diskwritecache` command to locate disks with write cache enabled and to disable disk write cache for those disks. Enabled write caches should be disabled as soon as downtime for Oracle Database Appliance can be scheduled. During the downtime, use this command with the `disable` option for each disk in turn that has an enabled write cache.

Syntax

```
oakcli diskwritecache  [disable disk_name | enable disk_name | status ] -h
```

Parameter

`-h` displays the help text for this command.

Example

Identifying disks with cache enabled

Write cache status of all disks:

```
oakcli diskwritecache status
```

oakcli import vmtemplate

Use the `oakcli import vmtemplate` command to import virtual machine templates.

Syntax

```
oakcli import vmtemplate vmtemplatename -files image_files | -assembly assembly_
```

file -repo *repo_name* [- node 0 | 1]

Parameters

Parameter	Description
vmtemplatename	Name that you want to assign to the template.
-files	Use the -files option when importing one or more files that comprise a template.
image_files	*image_files* is one of the following: ■ a single template file name ■ a comma-separated list of files that comprise a single template ■ a URL enclosed in single quotes that links to a template file
-assembly	Use the -assembly option when importing an assembly file.
assembly_file	An assembly file or a URL enclosed in single quotes that links to an assembly file.
repo_name	Name of the repository to store the template or templates that you are importing.
-node	Use the -node option when importing into a shared repository with a value of 0 or 1 to identify the node.

Usage Notes

- Include only one of the options, -files or -assembly, each time you run this command. You cannot include both of these options in the same statement.
- If the command imports more than one template from an assembly, then each template will automatically be given a unique name. These template names will include the name given in the vmtemplate *vmtemplatename* clause followed by a sequence number, such as *vmtemplatename1*, *vmtemplatename2*, *vmtemplatename3*, and so on.
- When importing into a shared repository, you must include the -node option with a valid node number, 0 or 1. Using the -node option for imports into non-shared repositories will cause the command to fail.

Examples

Importing a VIrtual Machine Template From Dom0

Import the required template (OVM_OL5U7_X86_64_PVM_10GB.tgz) from the /OVS directory in Dom0 into the odarepo1 repository:

```
oakcli import vmtemplate OL5U7 -files /OVS/OVM_OL5U7_X86_64_PVM_10GB.tgz -repo
odarepo1
```

Importing a Virtual Machine Template From a Remote Server

Import a template from a remote server using a URL to identify the server and the template file:

```
oakcli import vmtemplate OL5U6 -files 'http://example.com/vm-template/OEL-5/OVM_
OL5U6_X86_64_PVM_10GB.tgz' -repo odarepo2
```

Importing Virtual Machine Templates From an Assembly on a Remote Server

Import the templates contained in the assembly stored on a remote server at the URL provided:

```
oakcli import vmtemplate OL6U1 -assembly 'http://example.com/assemblies/OEL6/OVM_
OL6U1_x86_PVHVM.ova' -repo odarepo1
```

Importing Virtual Machine Templates Into a Shared Repository From an Assembly On A Remote Server

Import the templates contained in the assembly stored on a remote server at the URL provided into a shared repository named `repo4` on Node 1:

```
oakcli import vmtemplate OL6U1 -assembly 'http://example.com/assemblies/OEL6/OVM_
OL6U1_x86_PVHVM.ova' -repo repo4 -node 1
```

oakcli locate

The `oakcli locate` command helps you locate the physical disk that is associated with a named Oracle Automatic Storage Management disk by turning on (or off) the disk's LED light.

Syntax

```
oakcli locate disk diskname on|off
```

Parameters

Parameter	Description
`disk` *diskname*	Name of the Oracle ASM disk to locate
`on`	(Optional) Turns on the LED of the named disk
`off`	(Optional) Turns off the LED of the named disk

Examples

Turning on the LED of a Selected Disk

Turn on the LED of the ASM disk `disk_pd_23`:

```
oakcli locate disk pd_23 on
```

oakcli manage diagcollect

Use the `oakcli manage diagcollect` command to collect diagnostic information about your Oracle Database Appliance for troubleshooting purposes, and for working with Oracle Support.

Syntax

```
oakcli manage diagcollect [--all | --crs [--crshome crs_home_dir] [--core] |
--install | --chmos [--incidenttime time [--incidentduration time] |
--adr adr_location [--afterdate date] [--aftertime time] [--beforetime time] ]
 [excl comp1,comp2,...] [--clean] [--storage]
```

Parameters

Parameter	Description
`--all`	Collect all of the diagnostic information excluding Automatic Diagnostic Repository (ADR) and Cluster Health Monitor. This is the default option.
`--crs`	Collect Oracle Clusterware diagnostic information.
`--crshome` *crs_home_dir*	Specifies the location of the Oracle Clusterware home directory.
`--core`	Package core files with the Oracle Clusterware diagnostic data.
`--install`	Collect the installation logs when the installation failed before running the script `root.sh`.
`--adr` *adr_location*	Collect diagnostic information for ADR, where *adr_location* specifies the location of the ADR information.
`--afterdate` *date*	Collect archives from the specified date. Specify the date in the `mm/dd/yyyy` format.
`--aftertime` *time*	Collect the archives after the specified time. Enter the time using the format `YYYYMMDDHHMISS24`. Supported only the with the `-adr` parameter.
`--beforetime` *time*	Collect the archives before the specified time. Enter the time using the format: `YYYYMMDDHHMISS24`. Supported only the with the `-adr` parameter.
`--chmos`	Collect Cluster Health Monitor data.
`--incidenttime` *time*	Collect Cluster Health Monitor data from the specified time. Enter the time using the format: `YYYYMMDDHHMISS24`. If you do not use the `--incidenttime` parameter, then the command collects data for the past 24 hours.
`--incidentduration` *time*	Collect Cluster Health Monitor data for the duration after the specified time. Enter the time using the format: HH:MM. If you do not specify a duration, then the commands collects all Cluster Health Monitor data after the specified incident time.
`--excl` [*comp1*,*comp2*]	Exclude the specified component logs. Valid components are: `acfs`, `invt`, `sys`, `ocr`, `crs`, `home`, and `base`.
`--clean`	Remove the diagnosability information gathered by this command.
`--storage`	Collect all of the logs for any storage issues. This can be used when you are experiencing any problems with storage and need support to diagnose the logs.

oakcli migrate vm

Use the `oakcli migrate vm` command to migrate a currently running virtual machine to another node.

Syntax

`oakcli migrate vm <vmname> -h`

vname is the name of the virtual machine to be migrated.

Parameter

(Optional) `-h` displays help for using the command.

oakcli modify

Use the `oakcli modify` command to:

- attach virtual disks to or detach virtual disks from virtual machines
- transmit first-boot installation configuration messages to virtual machines
- assign networks to or delete networks from virtual machines and virtual machine templates

Syntax

Use the following `oakcli modify` command syntax to modify a virtual machine or virtual machine template:

```
oakcli modify [vm vmname [-attachvdisk vdisk_name | -detachvdisk vdisk_name | -s
key1:value1;key2:value2;...]] | [[vm vmname | vmtemplate vmtemplatename]
[-addnetwork network | -deletenetwork network]] [-h]
```

Parameters

Parameter	Description
vmname	Name of the virtual machine.
vmtemplatename	Virtual machine template being modified.
`-attachvdisk` *vdisk_name*	Attaches the named virtual disk to the named virtual machine.
`-detachvdisk` *vdisk_name*	Detaches the named virtual disk from the named virtual machine.
`-s` *key1*:*value1*;*key2*:*value2*;...	Identifies a message consisting of one or more key/value pairs to send to the ovmd utility, where each key and value is separated by a colon (:) and each key/value pair is separated from the next key/value pair by a semicolon (;).
`-addnetwork` *network*	Identifies a new network to be assigned to the named virtual machine or template.
`-deletenetwork` *network*	Identifies the network to be deleted from the named virtual machine or template.
`-h`	(Optional) Displays the help text.

Usage Notes

- The `vmtemplate` object is valid with only the `-addnetwork` or `-deletenetwork` parameters.
- Do not use the `-attachvdisk` or the `-detachvdisk` option with the `-addnetwork`, `-deletenetwork`, or `-s` parameters.
- Include only one of the `-addnetwork`, `-deletenetwork`, or `-s` parameters when you use this command.

Examples

Modifying The Network Defined in a Virtual Machine Template

Replace the network assigned to the `gc_11g` virtual machine template with the net1 network:

```
oakcli modify vmtemplate gc_11g -addnetwork net1
```

Sending a message to a running virtual machine

Update the `root` user password for the `gc_11g` virtual machine:

```
oakcli modify vm gc_11g -s "com.oracle.linux.root-password:root123"
```

oakcli orachk

Use the `oakcli orachk` command to audit configuration settings with the ORAchk utility.

Syntax

`oakcli orachk` [-abvhpfm[u -o][o]ct] [-clusternodes *list* | -localonly] [-debug] [-dbnames *list* |-dbnone | -dball] [upgrade]

Parameters

Parameter	Description
`-a`	Perform a best practice check and recommended patch check.
`-b`	Perform a best practice check only without the recommended patch check.
`-v`	Display version.
`-h`	Display command usage (help).
`-p`	Perform patch check only.
-f	Run the command offline.
`-m`	Exclude checks for Maximum Availability scorecards.
`-u` -o	Perform check on pre-upgrade best practices (-u -o pre) or on post-upgrade best practices (-u -o post) .
`-o`	As an argument to an option, if `-o` is followed by `v`, `V`, `Verbose`, or `VERBOSE`, output will display checks that pass on the display. Without the `-o` option, only failures will display on the screen.
`-c`	Determines granularity of information displayed on the screen. For use only when working with Oracle Support.
`-clusternodes` *list*	*list* is a comma delimited list containing the names of the nodes where the command should run.
`-localonly`	Run the command only on the local node.
--debug	Creates a debug log.
-dbnames list	*list* is a comma delimited list containing the names of the subset of databases on which the command should run.
-dbnone	Skip all database-related checks on all databases without prompting to select which database to skip.
-dball	Run all database-related checks on all databases without prompting to select which databases to check.
-upgrade	Force upgrade of the version of the ORAchk being run.

Usage Notes

- The command offers multiple options that are generic to the ORAchk command when run on servers other than Oracle Database Appliance. You can find details about these options by running the `oakcli orachk -h` command. The options are

grouped into the following categories, but this document does not list the options for each category:

- Report Options
- Auto Restart Options
- Daemon Options
- Profile Run Options

- For more information about ORAchk, see the My Oracle Support note 1268927.2, "ORAchk Health Checks for the Oracle Stack" at https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=1268927.2.

oakcli resize dbstorage

Use the `oakcli resize dbstorage` command to resize the space used for a storage structure that was created for the purpose of migrating databases from ASM to ACFS. You can check the current space usage using `oakcli show fs` and then add or remove space using `oakcli resize dbstorage`.

Syntax

```
oakcli resize dbstorage -data size -reco size -redo size -db  db_name
```

Parameters

Parameter	Description
`-data` *size*	Extendable size in GB for the DATA volume
`-reco` *size*	Extendable size in GB for the REDO volume
`-redo` *size*	Extendable size in GB for the RECO volume
`-db` *dbname*	Database for which these volumes must be resized
`-h`	(Optional) Display help for using the command

Examples

Increase the size of the volume by 10 GB on the Data disk group.

```
oakcli resize dbstorage -data 10G
```

oakcli restart oda_base

Use the `oakcli restart oda_base` command to stop and restart ODA_BASE on the local node. Use this command when you are not concerned about the current status of ODA_BASE because it performs a forced shut down. You must run this command from Dom0 and, typically, if ODA_BASE needs to be restarted, you need to restart it on both nodes.

Syntax

```
oakcli restart oda_base | -h
```

The ODA_BASE to be restarted is on the same node as the Dom0 from which you run this command.

oakcli show commands

Use the `oakcli show` commands to display the status of Oracle Database Appliance components.

The `oakcli show` commands display status information for the node where you run the command. Use the help option, `oakcli show -h`, to see the list of components available on the current node.

oakcli show asr

Displays the Oracle Auto Service Request configuration

oakcli show cooling

Displays the status of the cooling units

oakcli show controller

Displays information about the disk controllers

oakcli show core_config_key

Displays information about the core deployment

oakcli show cpupool

Displays information about mappings between cores and virtual machines

oakcli show databases

Displays information about the databases

oakcli show dbhomes

Displays information about the database homes

oakcli show db_config_params

Displays configuration file names and parameters

oakcli show dbstorage

Displays database storage information for databases created on ASM Cluster File System (ACFS)

oakcli show disk

Displays information about shared or local disks

oakcli show diskgroup

Displays information about Oracle ASM disk groups

oakcli show env_hw

Displays the current server's environment type and hardware version

oakcli show expander

Displays information about the expanders

oakcli show enclosure

Displays information about the storage enclosure

oakcli show fs

Displays information about all database and cloudfs file systems created on ASM Cluster File System (ACFS) in addition to the local file systems on the Oracle Database Appliance node

oakcli show ib

Displays information about the infiniBand card and port

oakcli show iraid

Displays information about the internal RAID

oakcli show memory

Displays information about the memory subsystem

oakcli show network

Displays information about the network subsystem

oakcli show power

Displays the status of the power supply subsystem

oakcli show processor

Displays processor (CPU) information

oakcli show raidsyncstatus

Displays internal RAID sync information

oakcli show repo

Displays information about virtual machine repositories

oakcli show server

Displays information about the server subsystem

oakcli show storage

Displays information about the storage

oakcli show validation storage

Displays status (enabled or disabled) of validation storage error reporting

oakcli show validation storage errors

Displays hard storage errors

oakcli show validation storage failures

Displays soft storage errors

oakcli show vdisk

Displays information about virtual disks

oakcli show version

Displays version information for the software and firmware

oakcli show vlan

Displays version information about virtual local area networks

oakcli show vm

Displays version information about virtual machines

oakcli show vmconsole

Opens a GUI VM console for a virtual machine.

oakcli show vmtemplate

Displays information about virtual machine templates

Note: Depending on your model and version of Oracle Database Appliance software, the `oakcli show` command options may differ from the ones shown in the preceding table and explained in the following sections. Run the command `oakcli show -h` for an annotated list of components covered on your system.

---

oakcli show asr

Use the `oakcli show asr` command to display your Oracle Auto Service Request configuration details.

Syntax

```
oakcli show asr [-h]
```

Parameters

`-h` displays the help for using this command.

oakcli show cooling

Syntax

```
oakcli show cooling [-h]
```

Parameters

`-h` displays the help usage for this command.

Example

Displaying the cooling unit information

Use this command to display the cooling unit information for the node where the command is executed:

```
oakcli show cooling
        NAME   HEALTH HEALTH_DETAILS LOCATION FAN % FAN SPEED
        Fan_0  OK     -              FM0      30 %  6300 RPM
        Fan_1  OK     -              FM0      19 %  3800 RPM
        Fan_10 OK     -              FM2      34 %  6600 RPM
        Fan_11 OK     -              FM2      23 %  4100 RPM
        Fan_12 OK     -              FM3      32 %  6300 RPM
        Fan_13 OK     -              FM3      22 %  3900 RPM
        Fan_14 OK     -              FM3      24 %  4700 RPM
```

```
Fan_15 OK     -              FM3      14 %  2500 RPM
Fan_2  OK     -              FM0      29 %  6400 RPM
Fan_3  OK     -              FM0      18 %  3700 RPM
Fan_4  OK     -              FM1      32 %  6400 RPM
Fan_5  OK     -              FM1      20 %  3700 RPM
Fan_6  OK     -              FM1      33 %  6400 RPM
Fan_7  OK     -              FM1      22 %  3800 RPM
Fan_8  OK     -              FM2      33 %  6400 RPM
Fan_9  OK     -              FM2      22 %  3900 RPM
```

oakcli show controller

Use the `oakcli show controller` command to display information about the controllers.

Syntax

```
oakcli show controller controller_id [-h]
```

Parameters

Parameter	Description
controller_id	Specifies the controller for which the information should be displayed.
-h	(Optional) Display help for using the command.

Examples

Displaying information about controller 0 or controller 1

Display details of controller 0:

```
oakcli show controller 0
```

oakcli show core_config_key

Use the `oakcli show core_config_key` command to display information about how to deploy your Oracle Database Appliance cores.

Syntax

```
oakcli show core_config_key
```

Examples

Determining Whether The Oracle Database Appliance Core Configuration Key Has Been Applied

Show the core count status on a new Oracle Database Appliance that has not been configured:

```
oakcli show core_config_key
Optional core_config_key is not applied on this machine yet!
```

Displaying the Oracle Database Appliance Core Count Status on a Configured Oracle Database Appliance

Show the core count status on a previously configured Oracle Database Appliance:

```
oakcli show core_config_key
Host's serialnumber = 1132FMW003
Configured Cores = 20
```

oakcli show cpupool

Use the `oakcli show cpupool` command to display core allocations to virtual machine mappings.

Syntax

```
oakcli show cpupool -node nodenum
```

nodenum is the number of the Oracle Database Appliance node that you wish to examine, either 0 or 1.

Example

Displaying core allocations to virtual machine mappings for a node

Display the core mapping information for Node 0:

```
oakcli show cpupool -node 0
         Pool           Cpu List          VM List
default-unpinned-pool   [14, 15, 16, 17,  ['test1_odarepo1','sample5_odarepo1',
                         18, 19, 20, 21,   'vm_very_long_name_sample1_odarepo1',
                         22, 23]           'win_vm1']
         twocpu          [12, 13]         ['vm1_odarepo1']
      odaBaseCpuPool     [0, 1, 2, 3, 10  ['oakDom1']
                          , 11]
```

oakcli show databases

Use the `oakcli show databases` command to display information about each existing database, including database name, database type, database home name and location, and database version.

Syntax

```
oakcli show databases [-h]
```

Parameters

`-h` displays the help usage for this command.

oakcli show dbhomes

Use the `oakcli show dbhomes` command to display information about each existing Oracle database home, including home name, home location, and database version.

Syntax

```
oakcli show dbhomes [-detail] [-h]
```

Parameters

Parameter	Description
`-detail`	(Optional) Include a list of databases associated with each home.

Parameter	Description
-h	(Optional) Display help for using the command.

oakcli show db_config_params

Use the `oakcli show db_config_params` command to display information about each existing Oracle database home, including home name, home location, and database version. By default, the command will search for files with the extension `.dbconf` located in the `/opt/oracle/oak/install/dbconf` directory.

Syntax

```
oakcli show db_config_params [-conf filename] [-detail] [-h]
```

Parameters

Parameter	Description
-conf *filename*	(Optional) Name of configuration file to be displayed. If not included, then the command displays all configuration files.
-detail	(Optional) Display the parameter values stored in the configuration file or files.
-h	(Optional) Display help for using the command.

Example

Displaying the Default Database Configuration Parameter Values

```
oakcli show db_config_params -detail
Available DB configuration files are:
          Default
          DATABASE_BLOCK_SIZE       =>    8192
          DATABASE_LANGUAGE         =>    AMERICAN
          DATABASE_CHARACTERSET     =>    AL32UTF8
          DATABASE_TERRITORY        =>    AMERICA
          COMPONENT_LANGUAGES       =>    en
```

oakcli show dbstorage

Use the `oakcli show dbstorage` command to display database storage information for databases created on ASM Cluster File System (ACFS). By default, all non-cdb databases will be listed together as they share a common set of volumes. Each cdb database will be listed separately.

Syntax

```
oakcli show dbstorage [-db dbname]
```

Parameters

Parameter	Description
-db dbname	(Optional) Display the name of the database for the storage information

oakcli show disk

Use the `oakcli show disk` command to display disk information.

Syntax

```
oakcli show  disk  [-shared | -local | <shared_diskname> [-all][-h]
```

Parameters

Parameter	Description
`-local`	(Optional) Display information for all of the local disks
`-shared`	(Optional) Display information for all of the shared disks
`shared_disk_name`	(Optional) Display information for only the specific shared disk
`-asm`	(Optional) Displays information for an assembly
`-all`	(Optional) Display complete details of the selected disk or disks
`-h`	(Optional) Display help for using the command.

Usage Notes

- Running the command with no parameters is identical to running the `oakcli show disk -shared` command.
- The `-all` parameter produces valid output only when used with the *`shared_disk_name`* parameter. All other parameters are optional and cannot be combined with other parameters.

Examples

Displaying Information About the Local Disks

```
#oakcli show disk -local
```

Displaying Information About the Shared Disks

```
# oakcli show disk -shared
```

Displaying Information About a Specific Shared Disk

Display information about the shared disk named `pd_01`:

oakcli show diskgroup

Use the `oakcli show diskgroup` command to display Oracle ASM disk group information.

Syntax

```
oakcli show diskgroup [disk_group_name]
```

Parameters

Parameter	Description
disk_group_name	(Optional) The name of an Oracle ASM disk group for which complete details should be displayed. If you do not specify this parameter, then information for all of the Oracle ASM disk groups is displayed.
-h	(Optional) Display help for using the command.

oakcli show env_hw

Use the `oakcli show env_hw` command to display the environment type and hardware version of the current node.

Syntax

```
oakcli show env_hw [-h]
```

Parameter

`-h` displays the help information for the command.

Examples

Showing the environment type and hardware model

The following example shows the output from the `oakcli show env_hw` command when logged onto ODA_BASE on Oracle Database Appliance X3-2 Virtualized Platform:

```
oakcli show env_hw
VM-ODA_BASE ODA X3-2
```

oakcli show enclosure

Use the `oakcli show enclosure` command to display information about the storage enclosure subsystem on the node where the command is executed.

Syntax

```
oakcli show enclosure
```

Parameter

`-h` displays the help information for the command.

Examples

Displaying storage enclosure subsystem information

Display the storage enclosure subsystem information of the node where the command is executed:

oakcli show expander

Use the `oakcli show expander` command to display information about an expander.

Syntax

```
oakcli show expander expander_id
```

Parameter

expander_id identifies the specific expander.

oakcli show fs

Use the `oakcli show fs` command to display all database and cloudfs file systems created on ASM Cluster File System (ACFS) in addition to the local file systems on the Oracle Database Appliance node.

Syntax

```
oakcli show fs
```

oakcli show ib

Use the `oakcli show ib` command to display InfiniBand card and port information if Infiniband exists in the system.

Syntax

```
oakcli show ib
```

oakcli show iraid

Use the `oakcli show iraid` command to display internal RAID and local disk information. This command is only available on X5-2 systems and later.

Syntax

```
oakcli show iraid
```

oakcli show memory

Use the `oakcli show memory` command to display information about memory modules.

Syntax

```
oakcli show memory
```

Example

Displaying memory module information

Display the memory information of the node where the command is executed:

```
oakcli show memory
```

oakcli show network

Use the `oakcli show network` command to display information about the network subsystem.

Syntax

```
oakcli show network
```

oakcli show power

Use the `oakcli show power` command to display information about the power supply subsystem.

Syntax

```
oakcli show power
```

Example

Displaying the Power Supply Information

Display the power supply information of the node where the command is executed:

```
oakcli show power
        NAME            HEALTH HEALTH_DETAILS PART_NO. SERIAL_NO.         LOCATION
INPUT_POWER OUTPUT_POWER INLET_TEMP      EXHAUST_TEMP

        Power_Supply_0  OK     -              7047410  476856F+1242CE0020 PS0
Present     113 watts    33.250 degree C 36.688 degree C
        Power_Supply_1  OK     -              7047410  476856F+1242CE004J PS1
Present     89 watts     37.000 degree C 39.438 degree C
```

oakcli show processor

Use the `oakcli show processor` command to display information about CPU processors.

Syntax

```
oakcli show processor
```

Example

Displaying the CPU Processor Information

Display the CPU processor information of the node where the command is executed:

```
oakcli show processor
        NAME  HEALTH HEALTH_DETAILS PART_NO. LOCATION
MODEL                         MAX_CLK_SPEED TOTAL_CORES ENABLED_CORES

        CPU_0 OK     -              060D     P0 (CPU 0)
Intel(R) Xeon(R) CPU E5-2690  2.900 GHZ         8           8
        CPU_1 OK     -              060D     P1 (CPU 1)
Intel(R) Xeon(R) CPU E5-2690  2.900 GHZ     8           8
```

oakcli show raidsyncstatus

Use the `oakcli show raidsyncstatus` command to display the status of the RAID rebuild after a failed local disk is replaced.

Note: The `show raidsyncstatus` command is only supported on a bare metal platform; it is not supported on the virtualized platform. For general raid information, use the `oakcli show iraid` command.

Syntax

```
oakcli show raidsyncstatus
```

oakcli show repo

Use the `oakcli show repo` command to display information about virtual machine repositories. To see all repositories, do not include the repository name and node number. To see a specific shared repository, include the repository name and node.

Syntax

```
oakcli show repo [reponame -node 0|1]
```

Parameter

reponame identifies a specific repository name.

Examples

Displaying the Available Virtual Machine Repositories

Display the virtual machined repositories on the two nodes of your Oracle Database Appliance Virtualized Platform:

```
oakcli show repo
        NAME      REPOTYPE  NODENUM
        odarepo1  local     0
        odarepo2  local     1
        repo1     shared    0
        repo1     shared    1
```

Displaying Details About a Specific Shared Repository

Display information about the repository named repo1 on Node 1:

```
oakcli show repo repo1 -node 1

Resource: repo1_1
        AutoStart       :       restore
        DG              :       DATA
        Device          :       /dev/asm/repo1-286
        ExpectedState   :       Online
        MountPoint      :       /u01/app/repo1
        Name            :       repo1_0
        Node            :       all
        RepoType        :       shared
        Size            :       102400
        State           :       Online
```

oakcli show server

Use the `oakcli show server` command to display information about the server subsystem.

Syntax

```
oakcli show server
```

oakcli show storage

Use the `oakcli show storage` command to display information about the storage for controllers, expanders, and disks.

Syntax

```
oakcli show storage -errors
```

Parameter

`-errors` parameter displays detailed information about reported errors.

oakcli show validation storage

Use the `oakcli show validation storage` command to show whether validation storage is enabled or disabled.

Syntax

```
oakcli show validation storage
```

Example

```
oakcli show validation storage
Enabled
```

oakcli show validation storage errors

Use the `oakcli show validation storage errors` command to show hard storage errors. Hard errors include having the wrong type of disk inserted into a particular slot, an invalid disk model, or an incorrect disk size.

Syntax

```
oakcli show validation storage errors
```

oakcli show validation storage failures

Use the `oakcli show validation storage failures` command to show soft validation errors. A typical soft disk error would be an invalid version of the disk firmware.

Syntax

```
oakcli show validation storage failures
```

oakcli show vdisk

Use the `oakcli show vdisk` command to display information about virtual disks on Oracle Database Appliance Virtualized Platform.

Syntax

```
oakcli show vdisk [vdisk_name -repo repository_name]
```

Parameters

Parameter	Description
vdisk_name	(Optional) Display information for just one virtual disk

Parameter	Description
`-repo` *`repository_name`*	Required parameter if a vdisk is specified in the command

Examples

Display the Information for All Vdisks

Display information about all vdisks on your Oracle Database Appliance:

```
# oakcli show vdisk

    NAME                          SIZE     TYPE    REPOSITORY
    myvdisk                       10G      local   vdiskrepo
    newv                          1G       local   vdiskrepo
```

Display Information for a Single Vdisk

Display information for the vdisk named `myvdisk`:

```
# oakcli show vdisk myvdisk1
Resource: myvdisk_vdiskrepo
        Name          :     myvdisk_vdiskrepo
        RepoName      :     vdiskrepo
        Size          :     10G
        Type          :     local
        VmAttached    :     0
```

oakcli show version

Use the `oakcli show version` command to display patch versions for Oracle Database Appliance software and firmware.

Syntax

```
oakcli show version [-detail]
```

Parameter

`-detail` option displays detailed version information.

Examples

Displaying Basic Version Information

Display the version information for the software and firmware on your Oracle Database Appliance:

```
oakcli show version
Version
-------
12.1.2.4.0
```

oakcli show vlan

Use the `oakcli show vlan` command to display information about virtual local area networks configured on Oracle Database Appliance.

Syntax

```
oakcli show vlan
```

Examples

Displaying Virtual Local Area Network Information

Display the names, tag ID numbers, networks, and node assignments for the available local virtual area networks:

```
oakcli show vlan
        NAME                    ID    INTERFACE   NODENUM

        net1                    1     bond1       0
        net1                    1     bond1       1
        net2                    1     bond2       0
        net2                    1     bond2       1
        net3                    1     bond3       0
        net3                    1     bond3       1
        net4                    1     xbond0      0
        net4                    1     xbond0      1
        priv1                   1     bond0       0
        priv1                   1     bond0       1
```

oakcli show vm

Use the `oakcli show vm` command to display information about virtual machines.

Syntax

```
oakcli show vm [vm_name | -h]
```

Parameters

Parameter	Description
vm_name	(Optional) The name of the virtual machine for which details should be displayed. If you do not specify this parameter, then information for all the virtual machines is displayed.
-h	(Optional) Display help for using the command.

Examples

Displaying Details for All Virtual Machines

Display the virtual machine names, memory and vCPU allocations, status, virtual disks, and repository name for all virtual machines:

```
oakcli show vm

NAME                 MEMORY          VCPU          STATE           REPOSITORY

sample5_odarepo1       2048             2         OFFLINE         odarepo1
sample6_odarepo1       2048             2         OFFLINE         odarepo2
test1_odarepo1         2048             2         OFFLINE         odarepo1
test2_odarepo2         2048             2         OFFLINE         odarepo2
vm1_odarepo1           4096             4         ONLINE          odarepo1
vm2_odarepo2           2048             2         OFFLINE         odarepo2
win_vm1                1500             1         ONLINE          odarepo1
```

Displaying Information for a Single Virtual Machine

Display information about the `vm1_odarepo1` virtual machine:

```
oakcli show vm vm1_odarepo1
Resource: vm1_odarepo1
        AutoStart       :       restore
        CPUPriority     :       100
        Disks           :       |file:/OVS/Repositories/odarepo1/Vi
                                rtualMachines/vm1_odarepo1/System.i
                                mg,xvda,w||file:/OVS/Repositories/o
                                darepo1/VirtualMachines/vm1_odarepo
                                1/u01.img,xvdb,w|
        Domain          :       XEN_PVM
        ExpectedState   :       online
        FailOver        :       false
        IsSharedRepo    :       false
        Keyboard        :       en-us
        MaxMemory       :       3000
        MaxVcpu         :       4
        Memory          :       4096
        Mouse           :       OS_DEFAULT
        Name            :       vm1_odarepo1
        Networks        :       |mac=00:21:F6:00:00:E4|
        NodeNum         :       0
        NodeNumStart    :
        OS              :       OL_5
        PrivateIP       :       None
        ProcessorCap    :       100
        RepoName        :       odarepo1
        State           :       Online
        TemplateName    :       otml_sample1_odarepo1
        Vcpu            :       4
        cpupool         :       twocpu
        vncport         :       5901
```

oakcli show vmtemplate

Use the `oakcli show vmtemplate` command to display information about virtual machine templates.

Syntax

```
oakcli show vmtemplate [vmtemplate_name | -h]
```

Parameters

Parameter	Description
vmtemplate_name	(Optional) The name of the virtual template for which details should be displayed. If you do not specify this parameter, then information for all of the virtual templates is displayed.
`-h`	(Optional) Display help for using the command.

Examples

Displaying Details for a Single Virtual Template

Display information about the `sample1_odarepo1` virtual template:

```
oakcli show vmtemplate sample_odarepo1
Resource: sample1_odarepo1
        CPUPriority     :       100
```

```
Disks          :       |file:/OVS/Repositories/odarepo1/Te
                       mplates/otml_sample1_odarepo1/Syste
                       m.img,xvda,w||file:/OVS/Repositorie
                       s/odarepo1/Templates/otml_sample1_o
                       darepo1/u01.img,xvdb,w|
Domain         :       XEN_PVM
Keyboard       :       en-us
MaxMemory      :       2048
MaxVcpu        :       2
Memory         :       2048
Mouse          :       OS_DEFAULT
Name           :       sample1_odarepo1
Networks       :       |bridge=priv1||bridge=net1||bridge=
                       net2|
NodeNum        :       0
OS             :       OL_5
ProcessorCap   :       100
RepoName       :       odarepo1
Vcpu           :       2
```

oakcli show vmconsole

Use the `oakcli show vmconsole` command to open a GUI VM console to manage a specific virtual machine.

Syntax

`oakcli show vmconsole` *`vmname`* `[-h]`

Parameters

Parameter	Description
vm_name	Name of the virtual machine for which you want to open a console.
-h	(Optional) Display help for using the command.

Example

Opening a Virtual Machine Console

Open a console for the virtual machine named `vm1_odarepo1`:

```
oakcli show vmconsole vm1_odarepo1
```

oakcli start commands

Use the `oakcli start` commands to start a virtual machine, to start a shared repository on a node, or to start ODA_BASE on the local node.

oakcli start oda_base

Starts ODA_BASE on the local node

oakcli start repo

Starts a shared repository on the specified node

oakcli start vm

Starts a virtual machine on the specified node

oakcli start oda_base

Use the `oakcli start oda_base` command to start ODA_BASE on the local node.

Syntax

```
oakcli start oda_base [-h]
```

Parameter

`-h` displays help for using the command.

Example

Connect to Dom0 on the desired node and enter the following command to start ODA_BASE on that node:

```
oakcli start oda_base
```

oakcli start repo

Use the `oakcli start repo` command to start a shared repository on a node.

Syntax

```
oakcli start repo repo_name [-node node_number] [-h]
```

Parameters

Parameter	Description
repo_name	*repo_name* is the name of the shared repository to be started.
-node *node_number*	Specifies the node on which to start the shared repository. *node_number* is the number of the node where it is to be started, either 0 or 1. If `-node` is not specified, the shared repository is started on both nodes.
`-h`	(Optional) Displays the online help.

Example

Start the shared repository named `repo1` on Node 0:

```
oakcli start repo repo1 -node 0
```

oakcli start vm

Use the `oakcli start vm` command to start a virtual machine on a node.

Syntax

```
oakcli start vm vm_name [-node node_number] [-d] [-h]
```

Parameters

Parameter	Description
vm_name	*vm_name* is the name of the virtual machine to be started.
-node *node_number*	Specifies the node on which to start the virtual machine. *node_number* is the number of the node where it is to be started, either 0 or 1. If -node is not specified, a virtual machine is started on both nodes.
-d	Provides details about the virtual machine starting procedure
-h	(Optional) Displays the online help.

Example

Start the virtual machine named vm1_odarepo1 on Node 0.

```
oakcli start vm vm_odarepo1 -node 0
```

oakcli stop commands

Use the oakcli stop commands to stop a virtual machine, to stop a shared repository on a node, or to stop ODA_BASE on the local node.

Syntax

```
oakcli stop [vm vm_name [-force] | repo repo_name [-node node_number] | oda_base ]
[-h]
```

Parameters

Parameter	Description
vm *vm_name*	*vm_name* is the name of the virtual machine to be stopped.
-force	(Optional) forces the virtual machine to stop.
repo *repo_name*	*repo_name* is the name of the shared repository to be stopped.
-node *node_number*	*node_number* is the number of the node where the shared repository is to be stopped, either 0 or 1. The -node parameter is only valid when stopping a virtual machine on a shared repository. If -node is not specified, the shared repository is stopped on both nodes.
oda_base	stops ODA_BASE on the local node.
-h	(Optional) Displays the online help.

Examples

Forcing a Virtual Machine to Stop

Force the virtual machine named vm1_odarepo1 to stop:

```
oakcli stop vm vm_odarepo1 -force
```

Stopping a Shared Repository

Stop the shared repository named repo1 on Node 0:

```
oakcli stop repo repo1 -node 0
```

Stopping the Local ODA_Base

Connect to Dom0 on the desired node and enter the following command to stop ODA_BASE on that node:

```
oakcli stop oda_base
```

oakcli stordiag

Use the `oakcli stordiag` command to run diagnostic tests on a disk in the storage shelf or storage expansion shelf.

Syntax

```
oakcli stordiag resource_type | -h
```

Parameters

Parameter	Description
resource_type	Prefix that depends on the configuration. See "Usage Notes" below.
n	Disk number (starting with 0 and increasing to one less than the number of disks)
-h	Displays the online help

Usage Notes

Select the value for *resource_type* based from one of the following options:

- on Oracle Database Appliance Version 1, use `d`
- on Oracle Database Appliance with a single storage shelf, use `pd_`
- on Oracle Database Appliance with an expansion storage shelf, use `e0_pd_` for a disk in the storage shelf and use `e1_pd_` for a disk in the expansion storage shelf

For Oracle Database Appliance systems that have internal storage, use the format d_[..] to identify the disk to be diagnosed, for Oracle Database Appliance system that have connected a connected shelf (and optional storage expansion shelf), use the format e[0..1]_p[0..23] to identify the disk to be diagnosed.

Example

Run Diagnostic Tests on a Disk in a Storage Expansion Shelf

The following command runs the diagnostic tests on disk 4 in the storage shelf where there is no expansion storage shelf:

```
# oakcli stordiag e1_pd_3
 Node Name : hr0
 Test : Diagnostic Test Description

   1  : OAK Check
        NAME          PATH          TYPE          STATE         STATE_DETAILS
        pd_03         /dev/sdw      HDD           ONLINE        Good

   2  : ASM Check
. . .
<output truncated>
```

oakcli test asr

Use the `oakcli test asr` command to send a test trap to determine if Oracle Auto Service Request (Oracle ASR) is configured and working correctly. The command returns a success message if Oracle ASR is functioning properly.

Syntax

```
oakcli test asr [-h]
```

Parameter

`-h` displays help for using the command

oakcli unpack

Use the `oakcli unpack` command to unpack packages into the Oracle Appliance Manager repository.

Syntax

```
oakcli unpack -package absolute_package_name
```

Parameters

Parameters	Description
absolute_package_name	Identifies the package to be unpacked using the package's full absolute path and file name.
-h	Displays help for using the command.

Examples

Unpacking A Patch Package into the Oracle Appliance Manager Command-line Interface Repository

Unpack the `p13982331_23000_Linux-86-64.zip` package, which was previously copied to `/tmp` on the current node, into the node's Oracle Appliance Manager command-line interface repository:

```
oakcli unpack -package /tmp/p13982331_23000_Linux-86-62.zip
```

oakcli update

Use the `oakcli update` command to apply Oracle Database Appliance patches. For upgrading only the Oracle Database software, see the `oakcli upgrade` command.

Syntax

```
oakcli update -patch version [[--infra] | [[--gi][--database]]] [--noreboot] |
[--clean] | [--verify]
```

Parameters

Parameter	Description
-patch *version*	Patch update that you want to install.

Parameter	Description
--infra	Infrastructure is to be patched, including firmware, OS, ASR, HMP, OAK, and so on. This is the default option.
--gi	Grid Infrastructure is to be patched.
--database	Database homes to be patched.
--noreboot	Node will not be rebooted after patching.
--clean	Clean up all temporary files on the local node.
--verify	Show the patchable components on the node.

Examples

Patching a node

Update the current node with the 12.1.2.4.0 patch:

```
oakcli update -patch 12.1.2.4.0
```

oakcli upgrade

Use the `oakcli upgrade` command to upgrade Oracle Databases on Oracle Database Appliance. For patching Oracle Database Appliance itself, see the `oakcli update` command.

Syntax

```
oakcli upgrade database [-db db_names | -from source_home] -to destination_home
```

Parameters

Parameter	Description
-db *db_names*	Specifies the name or names (in a comma-delimited list) of the database or databases you want to upgrade.
-from *source_home*	Specifies the current Oracle Database home of the databases you are upgrading.
-to *destination_home*	Specifies the Oracle Database home containing the version to which you want to upgrade the databases.
-h	(Optional) Displays online help.

Usage Notes

- You must include either a `-db` parameter or a `-from` parameter.
- Running the command with a `-db` parameter upgrades only the named databases, regardless of their current Oracle Database homes. If you include a `-from` parameter, in addition to a `-db` parameter, then the command ignores the `-from` parameter. That is, the command upgrades named databases from other homes and ignores the databases in the named home if they are not listed in the `-db` parameter.
- Running the command without a `-db` parameter will upgrade all of the databases in the named Oracle Database home.
- You must always provide a `-to` parameter which names an existing Oracle Database home.

Examples

Upgrading an Oracle Database

Upgrade an 11.2.0.2.5 database named `tpcc` to version 11.2.0.3.1 using the Oracle Database home directory `OraDb11203_home1`:

```
oakcli upgrade database -db tpcc -to OraDb11203_home1
```

oakcli validate

Use the `oakcli validate` command to validate the state of an Oracle Database Appliance or the viability of an operating system patch.

Syntax

Use the following `oakcli validate` syntax to validate an Oracle Database Appliance:

```
oakcli validate [[-V | -l | -h]] | [[-v][-f output_file] [-a | -d | -c
checklist][-ver patch_version]]
```

Parameters

Parameter	Description
-v	Display the version of oakValidation.
-l	List the items that can be checked along with their descriptions.
-h	Display the online help.
-v	Show verbose output (must be used with a parameter that generates a validation report).
-f *output_file*	Send output to a file with a fully-qualified file name, *output_file*, instead of to the screen (`stdout`).
-a	Run all system checks, including `DiskCalibration`. Oracle recommends that you use this command to validate system readiness before deployment. Do not run `oakcli validate` with this option on a busy production system, because the `DiskCalibration` system check can cause performance issues.
-d	Run only the default checks.
-c *checklist*	Run the validation checks for the items identified in *checklist*, a comma-delimited list. Use this parameter to check either a single item or subset of items.

Examples

Listing all Checks and Their Descriptions

List all of the checks available with `oakcli validate` along with their descriptions:

```
oakcli validate -l

        Checkname -- Description
        =========    ===========
        *SystemComponents -- Validate system components based on ilom sensor data
        readings
        *OSDiskStorage -- Validate OS disks and filesystem information
        *SharedStorage -- Validate Shared storage and multipathing information
        DiskCalibration -- Check disk performance with orion
```

```
        *NetworkComponents -- Validate public and private network components
        *StorageTopology -- Validate external JBOD connectivity
        asr -- Validate asr components based on asr config file and ilom sensor
        data readings

* -- These checks are also performed as part of default checks
```

Note: The `NetworkComponents` validation check is not available on hardware prior to Oracle Database Appliance X3-2.

Running All Checks

Enter the following command to run all checks

```
oakcli validate -a
```

Validating Storage Cable Connections

Enter the following command to validate the connections to your storage shelf and, if connected, your storage expansion shelf:

```
oakcli validate -c storagetopology
```

Validating ASR

Enter the following syntax to validate your ASR configuration:

```
# oakcli validate -c asr
INFO: oak Asr information and Validations
RESULT: /opt/oracle/oak/conf/asr.conf exist
RESULT: ASR Manager ip:10.139.154.17
RESULT: ASR Manager port:1162
SUCCESS: ASR configuration file validation successfully completed
RESULT: /etc/hosts has entry 141.146.156.46 transport.oracle.com
RESULT: ilom alertmgmt level is set to minor
RESULT: ilom alertmgmt type is set to snmptrap
RESULT: alertmgmt snmp_version is set to 2c
RESULT: alertmgmt community_or_username is set to public
RESULT: alertmgmt destination is set to 10.139.154.17
RESULT: alertmgmt destination_port is set to 1162
SUCCESS: Ilom snmp confguration for asr set correctly
RESULT: notification trap configured to ip:10.139.154.17
RESULT: notification trap configured to port:1162
SUCCESS: Asr notification trap set correctly
INFO: IP_ADDRESS HOST_NAME SERIAL_NUMBER ASR PROTOCOL SOURCE PRODUCT_NAME
INFO: --------------- ------------------------------
------------------------------ -------- --------- --------------
------------------------------
10.170.79.98 oda-02-c 1130FMW00D Enabled SNMP ILOM SUN FIRE X4370 M2 SERVER
10.170.79.97 oda-01-c 1130FMW00D Enabled SNMP ILOM SUN FIRE X4370 M2 SERVER
INFO: Please use My Oracle Support 'http://support.oracle.com' to view the
activation status.
SUCCESS: asr log level is already set to Fine.
RESULT: Registered with ASR backend.
RESULT: test connection successfully completed.
RESULT: submitted test event for asset:10.139.154.17
RESULT: bundle com.sun.svc.asr.sw is in active state
RESULT: bundle com.sun.svc.asr.sw-frag is in resolved state
RESULT: bundle com.sun.svc.asr.sw-rulesdefinitions is in resolved state
RESULT: bundle com.sun.svc.ServiceActivation is in active state
```

```
SUCCESS: ASR diag successfully completed
```

Checking the Viability of a Patch

Use the `oakcli validate ospatch -ver` *patch_version* command to report any reasons for not being able to patch Oracle Database Appliance with the patch named in *patch_version*. Run this command before attempting to patch Oracle Database Appliance to determine if it will succeed or if changes need to be made before applying the patch. Warning and error labels in the command output are highlighted in magenta and red font, respectively.

```
# oakcli validate ospatch -ver 12.1.2.3.0
INFO: Validating the OS patch for the version 12.1.2.3.0
WARNING: 2015-02-10 06:30:32: Patching sub directory
/opt/oracle/oak/pkgrepos/orapkgs/OEL/5.10/Patches/5.10.1 is not existing
INFO: 2015-02-10 06:30:32: May need to unpack the Infra patch bundle for the
version: 12.1.2.3.0
ERROR: 2015-02-10 06:30:32: No OS patch directory found in the repository
```

5

Validating and Troubleshooting Oracle Database Appliance

This chapter contains information about how to validate changes and troubleshoot Oracle Database Appliance problems.

Oracle Database Appliance Diagnostics and Validation

The Oracle Appliance Manager diagnostics are managed with the `oakcli validate` command and options. The `oakcli validate` command provides diagnostic and validation functions to resolve support issues. If you experience problems with Oracle Database Appliance, then use the `oakcli validate` command options to verify that your environment is properly configured and that best practices are in effect. When placing a service request, also use Oracle Appliance Manager as described in this chapter to prepare the log files to send to Oracle Support Services.

Oracle Database Appliance Validation Commands Overview

Use the command `oakcli validate` command and options to validate the status of Oracle Database Appliance. You must run the `oakcli validate` command as the `root` user.

The command uses the following syntax, where *`checklist`* is a single check or a comma-delimited list of checks, and *`output_file_name`* is the name that you designate for a validation output file:

```
oakcli validate -h
oakcli validate [-V | -l | -h]
oakcli validate [-v] [-f output_file] [-a | -d | -c checklist] [-v patch_version]
```

See the following two tables for a summary of the `oakcli validate` command options and system checks.

Table 5–1 Oracle Database Appliance Validation Command Options

Option	Purpose
`-a`	Run all system checks, including `DiskCalibration`. Oracle recommends that you use this command to validate system readiness before deployment. Do not run `oakcli validate` with this option on a busy production system, because the `DiskCalibration` system check can cause performance degradation. See Table 5–2 for details about each check.
`-c` *`checklist`*	Run the validation checks for the items identified in *`checklist`*, a comma-delimited list. Use this parameter to check either a single item or subset of items.
`-d`	Run only the default checks. The default checks are `NetworkComponents`, `OSDiskStorage`, `SharedStorage`, and `SystemComponents`. See Table 5–2 for details about each check.
`-f` *`output_file`*	Send output to a file with a fully-qualified file name, *`output_file`*, instead of to the screen (`stdout`).
`-h`	Display the online help.
`-l`	List the items that can be checked along with their descriptions.
`-v`	Show verbose output (must be used with a parameter that generates a validation report).
`-V`	Display the version of oakValidation.
-ver *`patch_version`*	Report any reasons for not being able to patch Oracle Database Appliance with the patch named in patch_version.

Table 5–2 Oracle Database Appliance Validation Checks

Check	Purpose
`asr`	Validate Oracle Auto Service Request (Oracle ASR) components based on Oracle ASR configuration file and Oracle Integrated Lights Out Manager (Oracle ILOM) sensor data.
`DiskCalibration`	Preinstallation check for the storage disk performance using `/opt/oracle/oak/bin/orion`. Do not run this check after you have deployed Oracle software on Oracle Database Appliance, because running the `DiskCalibration` command on a deployed system creates performance issues.
`NetworkComponents`	Validate public and private network hardware connections.
`OSDiskStorage`	Validate the operating system disks, and file system information.
`ospatch`	Validates that the system will be able to complete an upgrade successfully using the named patch
`SharedStorage`	Validate shared storage and multipathing information
`StorageTopology`	Validate the storage shelf connectivity
`SystemComponents`	Validate system components, based on Oracle ILOM sensor data readings.

Examples of Oracle Database Appliance Validation Commands

The following command lists and describes all validation command options:

```
# oakcli validate -l
```

The following command runs all system checks:

```
# oakcli validate -a
```

The following command performs a system check for disk calibration:

```
# oakcli validate -c DiskCalibration
```

Note: Use the default check option (`oakcli validate -d`) if you do not want to perform a system check for disk calibration.

The following command runs system checks to validate hardware system components and Oracle Database Appliance network components:

```
# oakcli validate -c SystemComponents,NetworkComponents
```

The `oakcli validate -c StorageTopology` command performs a check of the cable configuration between the system controllers and the storage shelf, as well as the storage expansion shelf if one is installed. Oracle recommends that you run the `oakcli validate -c StorageTopology` command BEFORE deploying the system. This will avoid and prevent problems during deployment due to wrong or missing cable connections. The output shown in the following example reports a successful configuration. If the cabling is not correct, you will see errors in your output.

```
# oakcli validate -c storagetopology
 It may take a while. Please wait...
 INFO : ODA Topology Verification
 INFO : Running on Node0
 INFO : Check hardware type
 SUCCESS : Type of hardware found : X4-2
 INFO : Check for Environment(Bare Metal or Virtual Machine)
 SUCCESS : Type of environment found : Virtual Machine(ODA BASE)
 SUCCESS : Number of External LSI SAS controller found : 2
 INFO : Check for Controllers correct PCIe slot address
 SUCCESS : External LSI SAS controller 0 : 00:15.0
 SUCCESS : External LSI SAS controller 1 : 00:16.0
 INFO : Check if  powered on
 SUCCESS : 1 : Powered-on
 INFO : Check for correct number of EBODS(2 or 4)
 SUCCESS : EBOD found : 2
 INFO : Check for External Controller 0
 SUCCESS : Controller connected to correct ebod number
 SUCCESS : Controller port connected to correct ebod port
 SUCCESS : Overall Cable check for controller 0
 INFO : Check for External Controller 1
 SUCCESS : Controller connected to correct ebod number
 SUCCESS : Controller port connected to correct ebod port
 SUCCESS : Overall Cable check for controller 1
 INFO : Check for overall status of cable validation on Node0
 SUCCESS : Overall Cable Validation on Node0
 INFO : Check Node Identification status
 SUCCESS : Node Identification
 SUCCESS : Node name based on cable configuration found : NODE0
 INFO : Check  Nickname
 SUCCESS :  Nickname set correctly : Oracle Database Appliance - E0
 INFO : The details for Storage Topology Validation can also be found in log
file=/opt/oracle/oak/log/<hostname>/storagetopology/StorageTopology-2014-07-03-08:
57:31_7661_15914.log
```

Oracle Database Appliance Configuration Error Messages

If you encounter errors while configuring Oracle Database Appliance, then review the following messages and actions:

Error Encountered in Step 11 Validation VIP appears to be up on the network

Cause: This message is most likely to occur when you attempt to redeploy the End-User Bundle without cleaning up a previous deployment. This error occurs because an existing VIP is configured for the addresses assigned to Oracle Database Appliance.

Action: Run cleanupDeploy.pl on Node 0, and then restart Oracle Appliance Manager.

Error "CRS-4402: The CSS daemon was started in exclusive mode but found an active CSS daemon on node oda2-1, number 1, and is terminating"

Cause: This error occurs when the Oracle Grid Infrastructure CSS daemon attempts to start the node as a standalone cluster node, but during startup discovers that the other cluster node is running, and changes to cluster mode to join the cluster.

Action: Ignore this error

Installation requires partitioning of your hard drive

Cause: This message occurs on a node if one of the two operating system disks is not installed, but you are attempting to reimage the operating system.

Action: Ensure that both operating system disks are installed and are available.

Machine Check Exception ...This is not a software problem

Cause: There is a hardware system error.

Action: Log in to the Oracle ILOM Remote Console to determine the specific hardware error.

No volume control GStreamer plugins and/or devices found

Cause: Operating system plug-ins required for sound cards for the Oracle ILOM remote redirection console are not installed.

Action: Ignore this message. You do not require volume control for the console.

Reboot and Select proper Boot device Or Insert Boot Media in selected Boot device and press a key

Cause: One or both operating system disks are not available. This message occurs if you select "Default hard disk" during reimaging the system, but that disk is not available.

Action: Ensure that both operating system disks are installed and are available.

The AoDB Linux installation tree in that directory does not seem to match your boot media

Cause: This message occurs on a node if both operating disks are installed, and you choose to reimage the operating system disks. If you select "Default (use BIOS settings)" as your imaging option, but one or both of the disks is not available.

Action: Ensure that both operating system disks are available for use.

ERROR: Gateway IP is not pingable

Cause: On Windows platforms, the Oracle Appliance Manager configurator uses the echo service on port 7 to contact the gateway. If the echo service is disabled, possibly for security reasons, the ping fails.

Action: Run the native platform ping command. If the ping is successful, then the configurator validation output can be ignored.

ACFS Resources Failed to Start After Applying 2.2 INFRA Patch

Cause: Oracle Database Appliance operating system upgrade includes upgrade of Oracle Enterprise Linux to Oracle Unbreakable Enterprise Kernel (Oracle UEK). Since Oracle Automatic Storage Management Cluster File System (ACFS) is not supported on all versions of Oracle Linux, a successful upgrade of the operating system may effectively disable Oracle ACFS.

Upgrade to Oracle Database Appliance 2.2 has three options: `–infra`, `–gi`, and `–database`. The `–infra` option includes upgrade from Oracle Enterprise Linux to Oracle UEK. Before the `–infra` upgrade to 2.2, the operating system is Oracle Enterprise Linux with 11.2.0.2.*x* Grid Infrastructure. After the `–infra` upgrade, the operating system is Oracle UEK and 11.2.0.2.*x* ACFS, which is not compatible with Oracle UEK.

For example, upgrade to Oracle Linux 2.6.32-300.11.1.el5uek causes `reco.acfsvol.acfs` and `ora.registry.acfs` to temporarily go to an OFFLINE state, because 2.6.32-300.11.1.el5uek does not support Oracle 11.2.0.2.*x* ACFS. However, when Oracle Grid Infrastructure is upgraded to 11.2.0.3.2, these components are online again.

Action: Upgrade to Oracle Database Appliance 2.2 with the `–gi` option. This version of the software includes Oracle Grid Infrastructure 11.2.0.3.2, which includes Oracle ACFS modules that works with Oracle UEK.

For more information, see My Oracle Support note 1369107.1:

https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=1369107.1

Preparing Log Files for Oracle Support Services

If you have a system fault that requires help from Oracle Support Services, you might need to provide log records. Collect log file information by running the `oakcli manage diagcollect` command. This command consolidates information from log files stored on Oracle Database Appliance into a single log file for use by Oracle Support Services. The location of the file is specified in the command output.

Additional Troubleshooting Tools and Commands

This section describes additional tools and commands to diagnose and troubleshoot problems with Oracle Database Appliance, some of which are specific to Oracle Database Appliance while others are tools for all clustered systems. The section provides information about the following resources:

- Oracle Appliance Manager Tools for Configuration Auditing and Disk Diagnosis
- Trace File Analyzer Collector

Oracle Appliance Manager Tools for Configuration Auditing and Disk Diagnosis

Oracle Appliance Manager provides access to a number of sophisticated monitoring and reporting tools, some of them derived from standalone tools that require their

own syntax and command sets. The following list briefly describes the ORAchk command and the disk diagnostic tool:

- ORAchk

  The ORAchk Configuration Audit Tool audits important configuration settings for Oracle RAC two node deployments in categories such as:

  - Operating system kernel parameters, packages, and so on
  - RDBMDS
  - Database parameters and other database configuration settings
  - CRS/Grid infrastructure
  - ASM

  ORAchk is system-aware and checks for best practices, for example, that are specific to Oracle Database Appliance when run by Oracle Appliance Manager. To explore ORAchk on Oracle Database Appliance use the `oakcli orachk -h` command. Find more details about ORAchk at https://support.oracle.com/epmos/faces/DocContentDisplay?id=1268927.2.

- Disk Diagnostic Tool

  Use the Disk Diagnostic Tool to help identify the cause of disk problems. The tool produces a list of fourteen disk checks for each node. To run the tool, enter the following command:

  ```
  # oakcli stordiag eshelf_pd_unit
  ```

Trace File Analyzer Collector

Trace File Analyzer (TFA) Collector simplifies diagnostic data collection on Oracle Clusterware/Grid Infrastructure and Oracle RAC systems. TFA behaves in a similar manner to the ion utility packaged with Oracle Clusterware. Both tools collect and package diagnostic data. However, TFA is much more powerful than ion because TFA centralizes and automates the collection of diagnostic information.

TFA provides the following key benefits and options:

- Encapsulation of diagnostic data collection for all CRS/GI and Oracle RAC components on all cluster nodes into a single command executed from a single node
- Option to "trim" diagnostic files during data collection to reduce data upload size
- Options to isolate diagnostic data collection to a given time period and to a particular product component, such as ASM, RDBMS, or Clusterware
- Centralization of collected diagnostic output to a single node in Oracle Database Appliance, if desired
- On-Demand Scans of all log and trace files for conditions indicating a problem
- Real-Time Scan Alert Logs for conditions indicating a problem (DB Alert Logs, ASM Alert Logs, Clusterware Alert Logs, etc.)

> **See Also:** My Oracle Support note "TFA Collector- Tool for Enhanced Diagnostic Gathering" at https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=1513912.1

Oracle Database Appliance Hardware Monitoring Tool

The Oracle Database Appliance Hardware Monitoring Tool, implemented with the Oracle Appliance Manager `show` command, displays the status of different hardware components in Oracle Database Appliance server nodes. Use the tool on bare metal and on virtualized systems.

See the list of monitored components in the output of the `oakcli show -h` command.

```
oakcli show power

NAME            HEALTH HEALTH DETAILS PART_NO. SERIAL_NO.          LOCATION
INPUT POWER OUTPUT POWER INLET TEMP      EXHAUST TEMP

Power Supply_0  OK     -              7047410   476856F+1242CE0020 PS0
Present     88 watts     31.250 degree C 34.188 degree C
Power Supply_1  OK     -              7047410   476856F+1242CE004J PS1
Present     66 watts     31.250 degree C 34.188 degree C
```

Note: Upon initial startup of ODA_BASE on Oracle Database Appliance Virtualized Platform, the Oracle Database Appliance Server Hardware Monitoring Tool is enabled and collects base statistics for about 5 minutes. During this time, the tool displays a "Gathering Statistics…" message.

The information reported by the Oracle Database Appliance Hardware Monitoring Tool is only for the node on which you run the command. Details in the output depend on the component you select to review.

A

Oracle Database Appliance Software Configuration Defaults

The Oracle Database Appliance software configuration defaults are detailed in the following sections:

- Directory Paths for Oracle Database Appliance
- Oracle Groups and Users Configuration for Oracle Database Appliance
- Database Disk Group Sizes for Oracle Database Appliance
- Storage on Oracle Database Appliance
- System Configuration for Oracle Database Appliance

Directory Paths for Oracle Database Appliance

Table A–1 Directory Paths for Oracle Database Appliance

Item	Directory Path
Grid home	/u01/app/*release-specific_name*/grid
Grid base	/u01/app/grid
Oracle home	/u01/app/oracle/product/*release-specific_name*/dbhome_*sequence_number*
Oracle base	/u01/app/oracle
Oracle Inventory	/u01/app/oraInventory

Oracle Groups and Users Configuration for Oracle Database Appliance

Table A–2 Oracle Groups and Users Configuration for Oracle Database Appliance

Groups and Users	Default Value
Oracle Grid Infrastructure installation owner	`grid`, password `welcome1` (change after installation), UID 1000
Oracle Database installation owner	`oracle`, password `welcome1` (change after installation), UID 1001
Oracle Database system administrator	`sys`, password `welcome1` (change after installation)
Oracle Database generic administrator	`system`, password `welcome1` (change after installation)
Oracle Inventory system privileges group	`oinstall`, GID 1001
Oracle ASM Administrators system privileges	`asmadmin`, GID 1006
Oracle ASM Users system privileges	`asmdba`, GID 1004

Table A–2 (Cont.) Oracle Groups and Users Configuration for Oracle Database Appliance

Groups and Users	Default Value
Oracle ASM Operator system privileges	`asmoper`, GID 1005
Oracle Database Administrators system privileges	`dba`, GID 1002
Oracle Database Operator system privileges	`racoper`, GID 1003

Database Disk Group Sizes for Oracle Database Appliance

Table A–3 shows the sizes for DATA, RECO, REDO, and FLASH disk groups on various configurations of Oracle Database Appliance. Each row has values for either normal or for high redundancy levels. The disk capacities shown in the table vary because they are derived by converting disk hardware terabytes (based on 1 kilobyte=1,000 bytes) into data storage terabytes (based on 1 kilobyte=1,024 bytes).

The space calculated with a storage expansion shelf approximately doubles the space mentioned in Table A–3. Note that the storage expansion shelf can only be used in Oracle Database Appliance X3-2, X4-2, and X5-2.

Table A–3 Database Disk Group Sizes for Oracle Database Appliance

Sizing	Version 1 (GB)	X3-2 and X4-2 (GB)	X5-2 (GB)
HDD Size	559	838	3,600
Total HDD	11,180	16,760	57,600
Total SSD (REDO Diskgroup)	272	744	744
Total SSD (FLASH Diskgroup	N/A	N/A	1,492
Total HDD with **High** Redundancy	3,727	5,587	19,200
Total HDD with **Normal** Redundancy	5,590	8,380	28,800
DATA Diskgroup with **High** Redundancy - External Backup	3,205	4,805	16,512
RECO Diskgroup with **High** Redundancy - External Backup	522	782	2,688
DATA Diskgroup with **High** Redundancy - Local Backup	1,603	2,402	8,256
RECO Diskgroup with **High** Redundancy - Local Backup	2,124	3,185	10,944
DATA Diskgroup with **Normal** Redundancy - External Backup	4,807	7,207	24,768
RECO Diskgroup with **Normal** Redundancy - External Backup	783	1,173	4,032
DATA Diskgroup with **Normal** Redundancy - Local Backup	2,404	3,603	12,384
RECO Diskgroup with **Normal** Redundancy - Local Backup	3,186	4,777	16,416
REDO Diskgroup	91	248	248
FLASH Diskgroup	N/A	N/A	746

Note: High Redundancy is triple-mirroring and Normal Redundancy is double-mirroring. REDO Diskgroup is always High Redundancy. FLASH Diskgroup is always Normal Redundancy.

See Also: "Managing Capacity in Disk Groups" in *Oracle Automatic Storage Management Administrator's Guide* for more information about determining the amount of free space in your Oracle Database Appliance ASM diskgroups. Table A–3 only provides the raw disk information.

Storage on Oracle Database Appliance

Oracle Database Appliance uses the ASM Cluster File System (ACFS) for storage of database and virtual machine files. ACFS provides both servers with concurrent access to some or all of the shared storage on Oracle Database Appliance. ACFS supports space-efficient storage snapshots, which provides fast provisioning databases and virtual machines within Oracle Database Appliance.

There are three types of ACFS file systems that are used in Oracle Database Appliance:

- Database
- Shared Repositories
- General Purpose Storage

Database file systems are used exclusively for storing database files, and they include a FLASH file system for storing database data files and flash cache files, a DATA file system for database data files, a RECO file system for storing archive files and backups, and a REDO file system for storing redo log files.

Shared Repositories are file systems created on Oracle Database Appliance Virtualized Platform, and they are used to store virtual machine templates, run-time images, and virtual disks.

A general purpose cluster file system, cloudfs, is also created by default on every Oracle Database Appliance, and cloudfs can be used for general purpose storage that must be shared between the servers, for example, staging for data loads.

All ACFS file systems are created on ASM Dynamic Volumes provisioned from ASM diskgroups created in the shared disk storage pool. In a bare metal deployment, these file systems are mounted directly in the OS hosting the databases. In a virtualized deployment, these file systems are managed and mounted directly in ODA_BASE.

ACFS Mount Points

The various ACFS file systems are mounted in the OS, or in ODA_BASE (Virtualized Platform) in different locations. Table A–4 describes the various mount points and related ASM diskgroups and volume information.

Table A–4 ACFS Mount Points and Related ASM Diskgroups and Volume Information

File System	ASM Diskgroup	ASM Dynamic Volume	Mount Point
DATA (Non-CDB)	+DATA	/dev/asm/datastore-<nnn>	/u02/app/oracle/oradata/datastore
RECO (Non-CDB)	+RECO	/dev/asm/datastore-<nnn>	/u01/app/oracle/fast_recovery_area/datastore
REDO (Non-CDB)	+REDO	/dev/asm/datastore-<nnn>	/u01/app/oracle/oradata/datastore
DATA (per CDB)	+DATA	/dev/asm/dat<dbname>-<nnn>	/u02/app/oracle/oradata/dat<dbname>
RECO (per CDB)	+RECO	/dev/asm/rco<dbname>-<nnn>	/u01/app/oracle/fast_recovery_area/rco<dbname>
REDO (per CDB)	+REDO	/dev/asm/rdo<dbname>-<nnn>	/u01/app/oracle/oradata/rdo<dbname>
FLASH	+FLASH	/dev/asm/flashdata-<nnn>	/u02/app/oracle/oradata/flashdata
Shared Repository <name>	+DATA or +RECO	/dev/asm/<reponame>-<nnn>	/u01/app/sharedrepo/<reponame>
General ACFS Storage	+RECO	/dev/asm/acfsvol-<nnn>	/cloudfs (default)

Space Management

The ACFS file systems are automatically created when you create a shared repository, or when you create a database. However, the file systems do not initially consume all of the storage in the appliance, preserving space for additional repositories, or in some cases, database files stored directly in ASM. In Oracle Database Appliance software releases 12.1.2.2 and earlier, the ACFS file systems do not automatically extend should they run low on space, even if there is still storage space available in the shared storage pool. You can check for available storage space in your file systems by running the OS command `df -h` as shown in the following example.

```
df -h
Filesystem        Size  Used Avail Use% Mounted on
/dev/mapper/VolGroupSys-LogVolRoot
                  30G  8.6G   20G  31% /
/dev/mapper/VolGroupSys-LogVolU01
                  97G   23G   70G  25% /u01
/dev/mapper/VolGroupSys-LogVolOpt
                  59G  6.8G   49G  13% /opt
/dev/sda1         99M   26M   68M  28% /boot
tmpfs            127G  1.2G  125G   1% /dev/shm
/dev/asm/datafsvol-352
                 5.0G   87M  5.0G   2% /odadatafs
/dev/asm/rdocdb1-66
                 5.0G  4.2G  874M  83% /u01/app/oracle/oradata/rdocdb1
/dev/asm/datcdb1-303
                 100G  4.2G  96G    4% /u02/app/oracle/oradata/datcdb1
/dev/asm/flashdata-138
                 558G  1.4G  557G   1% /u02/app/oracle/oradata/flashdata
/dev/asm/rcocdb1-352
                 132G  788M  132G   1% /u01/app/oracle/fast_recovery_area/rcocdb1
/dev/asm/acfsvol-352   50G  178M   50G   1% /cloudfs
/dev/asm/datastore-66
                 59G  4.3G   55G   8% /u01/app/oracle/oradata/datastore
/dev/asm/datastore-303
                 3.6T  2.1G  3.6T   1% /u02/app/oracle/oradata/datastore
/dev/asm/datastore-352
```

```
                  4.8T   10G  4.8T   1% /u01/app/oracle/fast_recovery_
area/datastore
```

If you need to extend the size of one of your file systems to accommodate growth in your data, you must manually expand the pool.

See Also:

- oakcli resize dbstorage to expand space for database files
- oakcli configure repo to expand shared repositories
- My Oracle Support note 1437717.1 "Expanding /cloudfs File System" at https://support.oracle.com/CSP/main/article?cmd=show&type=NOT&id=1437717.1

System Configuration for Oracle Database Appliance

Table A–5 System Configuration for Oracle Database Appliance

Item	Value
Oracle Linux with the Red Hat compatible kernel	Oracle Linux 5.11 UEK2
Oracle Grid Infrastructure and Oracle Database Version (initial release)	Release 12.1.2.4.0: Oracle Database 12c Release 1 (12.1.0.2) with PSU4, optionally Oracle Database 11*g* Release 2 (11.2.0.4) with PSU7, and Oracle Database 11*g* Release 2 (11.2.0.3) with PSU 15 Release 12.1.2.3.0: Oracle Database 12c Release 1 (12.1.0.2) with PSU3, optionally Oracle Database 11*g* Release 2 (11.2.0.4) with PSU6, and Oracle Database 11*g* Release 2 (11.2.0.3) with PSU14 Release 12.1.2.2.0: Oracle Database 12*c* Release 1 (12.1.0.2) with PSU2, optionally Oracle Database 11*g* Release 2 (11.2.0.4) with PSU5, and Oracle Database 11*g* Release 2 (11.2.0.3) with PSU13 Release 12.1.2.1.0: Oracle Database 12*c* Release 1 (12.1.0.2) with PSU1, optionally Oracle Database 11*g* Release 2 (11.2.0.4) with PSU4, and Oracle Database 11*g* Release 2 (11.2.0.3) with PSU12 Release 12.1.2: Oracle Database 12*c* Release 1 (12.1.0.2.0) and optionally 11.2.0.2.12, 11.2.0.3.11, and 11.2.0.4.3 Release 2.9: Oracle Database 11*g* Release 2 (11.2.0.2.12, 11.2.0.3.9 and 11.2.0.4.1), with DB PSU 1 Release 2.10: Oracle Database 11*g* Release 2 (11.2.0.4.2 with PSU2), optionally Oracle Database 11*g* Release 11.2.0.2 with PSU9, and 11.2.0.2.12 and 11.2.0.3.10 Release 2.8: Oracle Database 11*g* Release 2 (11.2.0.2.12 and 11.2.0.3.8 with PSU8, and 11.2.0.4) Release 2.7: Oracle Database 11*g* Release 2 (11.2.0.2.11 and 11.2.0.3.7), with PSU7 Release 2.6: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU6 Release 2.5.5: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU5 Release 2.5: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU5 Release 2.4: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU4 Release 2.3: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU3 Release 2.2: Oracle Database 11*g* Release 2 (11.2.0.3), with PSU2 Release 2.1.0.3: Oracle Database 11*g* Release 2 (11.2.0.2), with PSU7 Release 2.1.0.3: Oracle Database 11*g* Release 2 (11.2.0.2), with PSU5 Release 2.1: Oracle Database 11*g* Release 2 (11.2.0.2), with PSU 3 and patches 12639177 (ASM), 12914151 (MLR on Grid Infrastructure PSU3), and 12419331 (Database PSU3)
SCAN port number	1521
Oracle Enterprise Edition DB control port	1158 Use: `https://`*`hostname`*`:1158/em`, where *`hostname`* is the name of one of the Oracle Database Appliance server nodes.

B

Database Sizing for Oracle Database Appliance

Use the information in this appendix to select database templates for your planned databases. Oracle strongly recommends that you use the Oracle Database Appliance templates, because they implement best practices and are configured specifically for Oracle Database Appliance.

The templates not only define databases with parameters that have been selected specifically to optimize performance on Oracle Database Appliance but also help you to set up appropriate instance caging, to create ODA_BASE with a matching template on Oracle Database Appliance Virtualized Platform, and to acquire an appropriate license on bare metal installations.

> **Tip:** Oracle Appliance Manager configurator refers to the database sizing templates as *classes* of databases.

Choosing a Database Template

With its multiple CPUs, Oracle Database Appliance enables you to consolidate many databases onto a single system. Consolidation can minimize idle resources, maximize efficiency, and lower costs. By using instance caging, in conjunction with Oracle Database Resource Manager (the Resource Manager) you can provide the desired levels of service across multiple instances on a single Oracle Database Appliance.

Oracle Database Appliance templates are already tuned for the size of each database instance workload. They are designed to run on a specific number of cores. Caging assures that each database workload is restricted to the set of cores allocated by the template, enabling multiple databases to run concurrently with no performance degradation, up to the capacity of Oracle Database Appliance. You could select database template sizes larger than your current needs to provide for planned growth, which you accommodate later by adjusting System Global Area (SGA) and Program Global Area (PGA) sizes as well as the number of cores.

> **Note:** Oracle strongly recommends that you use the Oracle Database Appliance templates, because they implement best practices and are configured specifically for Oracle Database Appliance.

Use the following tables to help select the best templates for your databases. When using these tables remember:

- The information in the tables assume that you are creating disk backups. The information in the tables assume that you are creating local disk backups.

Consider the space requirements for your database and the policy for local disk backups vs external backups. With external backups, there is more space available for the database versus the local backups where backups are stored locally.

- Container databases are created on Oracle ACFS and the following tables show the amount space taken in the ACFS file system. Note that an Oracle ACFS file system can be extended to avoid running out of space.
- I/O per second (IOps) values are derived from an 8 K random read-write response time of 10-12 milliseconds for HDDs, and less than 1 millisecond for Flash, for Oracle Database Appliance X5-2; 5-7 milliseconds for Oracle Database Appliance X4-2 and X3-2; and 5 milliseconds for Oracle Database Appliance Version 1 to service an online transaction processing (OLTP) I/O request. The rates are not based on the number of CPUs and assume that the system is running at capacity.
- Throughput, in MB per second (MBps). is based on a 1 MB sequential read/write for a data warehousing system. As with IOps, the MBps is a measure of throughput when the system is at capacity. With just a single small database running, the MBps would be the maximum available on the system for a large database.
- The log file size assumes four redo log groups for each instance with a log switch every 15 minutes when the system is running at full capacity.

Find the information that is appropriate to your database workload and hardware:

- Use Table B–2 if your database workload is of type OLTP
- Use Table B–3 if your database workload is of type DSS (Data Warehouse)
- Use Table B–4 if your database workload is of type In-Memory
- Use Table B–5 if your database is on Oracle Database Appliance X5-2
- Use Table B–6 if your database is on Oracle Database Appliance X4-2
- Use Table B–7 if your database is on Oracle Database Appliance X3-2
- Use Table B–8 if your database is on original model of Oracle Database Appliance.

Note: Oracle Appliance Manager Release 12.1.2.2.0 and later provide improved database templates that are specific to the type of database workload (OLTP, DSS, In-Memory). The improved templates replace the generic database templates from previous releases that only provided sizing parameters for OLTP workloads. The database sizing tables provide updated template names and sizing based on the number of CPUs and memory attributes for each type of database workload. Table B–1 provides a reference between the generic database template names and the database template names based on CPU cores.

Table B–1 Oracle Database Appliance Database Template Name Conversions

CPU Core-Based Database Template Names	odb-01s	odb-01	odb-02	odb-04	odb-06	odb-12	odb-16	odb-24
Generic Database Template Names	Very Very Small	Very Small	Small	Medium	Large	Extra Large	Extra Extra Large[1]	Extra Extra Extra Large[1]

[1] Extra Extra Large is applicable to Oracle Database Appliance X3-2 and Oracle Database Appliance X4-2. Extra Extra Extra Large is applicable to Oracle Database Appliance X4-2 only.

Table B–2 Oracle Database Appliance OLTP Database Template Size

Template	CPU Cores	SGA	PGA	Flash	Processors	LOG buffer, Redo Log
odb-01s (All Hardware Versions)	1	2 GB	1 GB	6 GB	200	16 MB, 1 GB
odb-01 (All Hardware Versions)	1	4 GB	2 GB	12 GB	200	16 MB, 1 GB
odb-02 (All Hardware Versions)	2	8 GB	4 GB	24 GB	400	16 MB, 1 GB
odb-04 (All Hardware Versions)	4	16 GB	8 GB	48 GB	800	32 MB, 1 GB
odb-06 (All Hardware Versions)	6	24 GB	12 GB	72 GB	1200	64 MB, 2 GB
odb-12 (All Hardware Versions)	12	48 GB	24 GB	144 GB	2400	64 MB, 4 GB
odb-16 (X5-2, X4-2, X3-2 Only)	16	64 GB	32 GB	192 GB	3200	64 MB, 4 GB
odb-24 (X5-2, X4-2 Only)	24	96 GB	48 GB	192 GB	4800	64 MB, 4 GB
odb-32 (X5-2 Only)	32	128 GB	64 GB	192 GB	6400	64 MB, 4 GB
odb-36 (X5-2 Only)	36	128 GB	64 GB	192 GB	7200	64 MB, 4 GB

Note: Flash is applicable to Oracle Database Appliance X5-2 only.

Table B–3 Oracle Database Appliance DSS Database Template Size

Template	CPU Cores	SGA (GB)	PGA (GB)	Processors	Redo log file size (GB)	Log buffer (MB)
odb-01s (All Hardware Versions)	1	1	2	200	1	16
odb-01 (All Hardware Versions)	1	2	4	200	1	16
odb-02 (All Hardware Versions)	2	4	8	400	1	16
odb-04 (All Hardware Versions)	4	8	16	800	1	32
odb-06 (All Hardware Versions)	6	12	24	1200	2	64
odb-12 (All Hardware Versions)	12	24	48	2400	4	64
odb-16 (X5-2, X4-2, X3-2 Only)	16	32	64	3200	4	64
odb-24 (X5-2, X4-2 Only)	24	48	96	4800	4	64
odb-32 (X5-2 Only)	32	64	128	6400	4	64
odb-36 (X5-2 Only)	36	64	128	7200	4	64

Table B–4 Oracle Database Appliance In-Memory Database Template Size

Template	CPU Cores	SGA (GB)	PGA (GB)	In-Memory (GB)	Processors	Redo log file size (GB)	Log buffer (MB)
odb-01s (All Hardware Versions)	1	2	1	1	200	1	16
odb-01 (All Hardware Versions)	1	4	2	2	200	1	16
odb-02 (All Hardware Versions)	2	8	4	4	400	1	16
odb-04 (All Hardware Versions)	4	16	8	8	800	1	32
odb-06 (All Hardware Versions)	6	24	12	12	1200	2	64
odb-12 (All Hardware Versions)	12	48	24	24	2400	4	64
odb-16 (X5-2, X4-2, X3-2 Only)	16	64	32	32	3200	4	64

Table B–4 (Cont.) Oracle Database Appliance In-Memory Database Template Size

Template	CPU Cores	SGA (GB)	PGA (GB)	In-Memory (GB)	Processors	Redo log file size (GB)	Log buffer (MB)
odb-24 (X5-2, X4-2 Only)	24	96	48	48	4800	4	64
odb-32 (X5-2 Only)	32	128	64	64	6400	4	64
odb-36 (X5-2 Only)	36	128	64	64	7200	4	64

Table B–5 Oracle Database Appliance X5-2 Database Template Size Storage Performance

Template	Number of databases using this template that you can deploy	Container Database ACFS Size on DATA Diskgroup (GB)	I/O per second with single storage shelf (HDD/FLASH)	Throughput (MB/second) with single storage shelf (HDD/FLASH)	I/O per second with storage shelf plus storage expansion shelf (HDD/FLASH)	Throughput (MB/second) with storage shelf plus storage expansion shelf (HDD/FLASH)	Log generation (MB/second)
odb-01s	36	100	42/4167	83/83	83/8333	167/167	6.83
odb-01	36	100	42/4167	83/83	83/8333	167/167	6.83
odb-02	18	200	83/8.3K	167/167	167/16.7K	333/333	6.83
odb-04	9	400	167/16.7K	333/333	333/33.3K	667/667	13.65
odb-06	6	800	250/25K	500/500	500/50K	1000/1000	27.3
odb-12	3	1600	500/50K	1000/1000	1000/100K	2000/2000	27.3
odb-16	2	1600	750/75K	1500/1500	1500/150K	3000/3000	27.3
odb-24	1	1600	1500/150K	3000/3000	3000/300K	6000/6000	27.3
odb-32	1	1600	1500/150K	3000/3000	3000/300K	6000/6000	27.3
odb-36	1	1600	1500/150K	3000/3000	3000/300K	6000/6000	27.3

Note: Actual IOps and throughput for a given database will depend on the percentage of I/O operations that are serviced through the FLASH versus the HDDs. An OLTP workload whose working set fits in FLASH will be 80% reads (serviced through the flash cache) and 20% writes (serviced through the HDDs). Thus, the actual IO performance will be weighted appropriately.

Table B–6 Oracle Database Appliance X4-2 Database Template Size Storage Performance

Template	Number of databases using this template that you can deploy	Container Database ACFS Size on DATA Diskgroup (GB)	I/O per second with single storage shelf	Throughput (MB/second) with single storage shelf	I/O per second with storage shelf plus storage expansion shelf	Throughput (MB/second) with storage shelf plus storage expansion shelf	Log generation (MB/second)
odb-01s	24	100	138	146	275	229	6.83
odb-01	24	100	138	146	275	230	6.83
odb-02	12	200	275	292	550	458	6.83
odb-04	6	400	550	583	1100	917	13.65
odb-06	4	800	825	875	1650	1375	27.3

Table B–6 (Cont.) Oracle Database Appliance X4-2 Database Template Size Storage Performance

Template	Number of databases using this template that you can deploy	Container Database ACFS Size on DATA Diskgroup (GB)	I/O per second with single storage shelf	Throughput (MB/second) with single storage shelf	I/O per second with storage shelf plus storage expansion shelf	Throughput (MB/second) with storage shelf plus storage expansion shelf	Log generation (MB/second)
odb-12	2	1600	1650	1750	3300	2750	27.3
odb-16	1	1600	3300	3500	6600	5500	27.3
odb-24	1	1600	3300	3500	6600	5500	27.3

Table B–7 Oracle Database Appliance X3-2 Database Template Size Storage Performance

Template	Number of databases using this template that you can deploy	Container Database ACFS Size on DATA Diskgroup (GB)	I/O per second with single storage shelf	Throughput (MB/second) with single storage shelf	I/O per second with storage shelf plus storage expansion shelf	Throughput (MB/second) with storage shelf plus storage expansion shelf	Log generation (MB/second)
odb-01s	16	100	206	219	413	344	6.83
odb-01	16	100	206	219	413	344	6.83
odb-02	8	200	413	438	825	688	6.83
odb-04	4	400	825	875	1650	1375	13.65
odb-06	2	800	1650	1750	3300	2750	27.3
odb-12	1	1600	3300	3500	6600	5500	27.3
odb-16	1	1600	3300	3500	6600	5500	27.3

Table B–8 Oracle Database Appliance Version 1 Database Template Size Storage Performance

Template	Number of databases using this template that you can deploy	Container Database ACFS Size on DATA Diskgroup (GB)	I/O per second	Throughput (MB/second)	Log generation (MB/second)
odb-01s	12	100	333	250	6.83
odb-01	12	100	333	250	6.83
odb-02	6	200	667	500	6.83
odb-04	3	400	1333	1000	13.65
odb-06	2	800	2000	1500	27.3
odb-12	1	1600	4000	3000	27.3

For a single database, select a template that best fits your expected workload on the hardware you are using in terms of required CPU and IOps. When creating multiple databases, the overall workload will be affected by the CPU and IOps consumed by the existing databases that are already on the system.

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