Oracle® Database Appliance

Oracle® Database Appliance Simulator Labs

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Simulator Labs for Oracle Database Appliance - Release 19.17

Preface

This document provides instructions for Oracle Database Appliance simulator labs. Additionally, this document provides you with practices for key new features.

Audience

Read Oracle Database Appliance Release Notes if you want to learn about features, options, and enhancements that are new in Oracle Database Appliance release 19.17.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at https://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 https://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit https://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

Related Documents

For more information, see the following documents in the Oracle Database Appliance documentation set:

- Oracle Database Appliance Deployment and User's Guide
- Oracle Database Appliance Frequently Asked Questions
- Oracle Database Licensing Information User Manual
- Oracle Database Security Guide

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 text or the glossary.
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.

Setting Up the Oracle Database Appliance Simulator

- About the Simulator
- Accessing the ODA Simulator
- Prerequisites for Setting up the Simulator
- Installing the Simulator
- Creating a Restore Point or Snapshot for the Oracle Database Simulator
- BUI Agent Certificate Issue
- Restarting ODA Simulator in a Container

About the Simulator

Overview

The Oracle Database Appliance X8-2 simulator application is a container-base simulator on Oracle Cloud Infrastructure (OCI) that simulates the operation of an Oracle Database Appliance X8-2 single-node or high-availability (2 nodes) system. You must have an OCI account to run the Oracle Database Appliance simulator. When you launch the Oracle Database Appliance simulator on the OCI Marketplace, a simulator VM is started in your tenancy. If you use the **Always Free OCI account**, due to the 1 GB memory limitation, it is recommended that you set up the simulator with the single-node option.

Following are the steps to set up the simulator environment so that you can run the Oracle Database Appliance hands-on labs to learn how to deploy, patch, and manage an Oracle Database Appliance.

Accessing the ODA Simulator

For CLI access, connect by SSH to the simulator VM, connect by `sudo` to root, and connect to the container, for example, `odasim-1`. No password is required.

```
# ./connectContainer.sh -n odasim-1
```

For a high-availability system, you can access the second node or container, for example, `oda-1-node1`.

```
# ./connectContainer.sh -n oda-1-node1
```

For BUI access, use the VM IP address and port number, for example, 7095, 7097.

```
# https://server_IP:xxxx/mgmt/index.html
```

Prerequisites for Setting up the Simulator

Requirements

- You must have an OCI account and credentials.
- You must also have the VM IP address to access the simulator VM and setup the environment for the Oracle Database Appliance hands-on labs.

Create a Key with PuTTYgen

If you use Putty to create a key, you must create a key with PuTTYgen:

1. Generate key of type RSA.
2. Save the private key.
3. Under **Public key for pasting into OpenSSH authorized_keys file:**, copy all contents in the box and paste into a text file and save as a `.pub` file. This is the key you use when you setup the Oracle Database Appliance simulator instance.

   Important! You must configure network security rules first to access Oracle Database Appliance BUI.

Configure Network Security Rules

1. Open your OCI application VM and click on your **VCN** link above **Virtual Cloud Network**.
2. Click **Security Lists** in the left panel and click on the **Default Security List for *your_vcn*** in the middle of the screen.

3. Click **Add Ingress Rules** and fill in following information:

```
SOURCE TYPE :CIDR
SOURCE CIDR :  0.0.0.0/0
 IP PROTOCOL : TCP
```

4. Click **Add Ingress Rule**.
5. Similarly add egress rule for outgoing traffic, if not already added.

Installing the Simulator

Docker is installed in the Simulator VM by default.

Log into the simulator VM:

```
ssh -i key opc@IP address      (OCI public IP address)
```

Switch to `root` user:

```
$sudo -s
```

Navigate to the simulator directory, where `19.xx.0.0.0` is the release number.

```
# cd simulator_19.xx.0.0.0
```

Run the following command to make sure that the docker is running:

```
# docker ps
```

You may see a default container running already, for example, `oda-1`. If that is the case, then you are set up to connect to the container to run the ODACLI commands already. Run the following command:

```
# ./connectContainer.sh -n odasim-1
```

No password is required for an OCI VM. Note that if you run the simulator on a Mac system, then use the Mac password to login.

To access the Oracle Database Appliance simulator through GUI or Browser User Interface (BUI):

Ensure that you have access to the port number assigned to the container.

Go to the simulator log directory.

```
//log
```

Run the cat command for the most recent log file.

```
cat
ODA Simulator system info:
Executed on: 2021_06_14_06_33_PM
Executed by:
num= 1
dept= oda
hostpubip=

USERS:
Container : oda-1
ODA Console: https://ip_of_simulator_machine :7095/mgmt/index.html
ODA cli access: Connect to the host and run following command:
sh connectContainer.sh -n oda-1
```

Note the port number, for example, 7095.

Following are optional steps for manually managing the containers.

Note that if you are running the simulator standalone in a Linux or Mac system, then you must run the following steps.

Run the following command to make sure the docker is running and to view which containers are running:

```
#docker ps
```

If you see any unwanted container running, run the cleanup script to start fresh:

```
#./cleanup_odasimulator_sw.sh
```

Run the simulator setup script:

```
# ./setup_odasimulator_sw.sh noportainer
```

For always free OCI account with 1GB memory, it is recommended that you set up the simulator with one user and the single node option.

If a default container is not running, you can manually create a single node container for a user.

```
# ./createOdaSimulatorContainer.sh -d oda -t single -o noportainer
```

A single container called **oda-1** is created.

To view the options, use the following command:

```
# ./createOdaSimulatorContainer.sh -help
```

For standard OCI account with minimum 2GB memory, it is recommended that you set up the simulator with the high-availability option:

```
# ./createOdaSimulatorContainer.sh -d oda -t ha -o noportainer
```

For each Oracle Database Appliance X8-2-HA simulator user, two containers, **oda-1-node0** and **oda-1-node1**, are created.

> Ignore any warning messages about Agent or Zookeeper. Ensure that you can connect to the container.

Note the assigned port numbers in the following output. The port numbers are necessary for logging into the simulator Browser User Interface (BUI).

```
ODA Simulator system info:
Executed on: 2021_04_11_03_23_PM
Executed by:
num= 1
dept= oda
hostpubip= ip_of_simulator_machine

USERS:
Container : oda-1-node0
ODA Console: https://ip_of_simulator_machine:7095/mgmt/index.html
ODA cli access: Connect to the host and run following command:

sh connectContainer.sh -n oda-1-node0
Container : oda-1-node1
ODA Console: https://ip_of_simulator_machine:7097/mgmt/index.html
ODA cli access: Connect to the host and run following command:
sh connectContainer.sh -n oda-1-node1
```

After you have completed the labs, you must clean up the environment by deleting the user containers. The following command deletes instances **oda-1-node0** and **oda-1-node1**:

```
#  ./deleteOdaSimulatorContainer.sh -t ha -i 1 -n 1 -d oda
```

Clean up your log files from the lab by deleting your logs in the `/ simulator_19.16.0.0.0/log` directory.

To completely reset the lab, run the following command:

```
# ./cleanup_odasimulator_sw.sh
```

This deletes all the containers.

Creating a Restore Point or Snapshot for the Oracle Database Simulator

You can create a restore point or snapshot at the end of a lab and go back to it, so you do not have to restart the lab from the beginning. For example, once you complete Lab 3, you create a restore point at the beginning of Lab 4. During Lab 4, if there is any error, then you can go back to the restore point at the beginning of Lab 4 instead of starting from Lab 1 again.

To create a snapshot, run the following command from the simulator directory:

```
# ./snapshot.sh
Usage: snapshot.sh [-c | -r  | -l]  [] | -h


Options:

  create  [ha|single]            Create a new snapshot of the simulator

  restore   [ha|single]       Restore the simulator to a previous snapshot
  list  [ha|single]              List all snapshots created with their IDs
  help, -h                                        Display this help and exit
 is mandatory. You only need the name of the environment
without 'node0' or 'node1' in case the simulator environment is HA
 is either 'ha' or 'single'. Default is 'single'
```

Use this script to create and restore snapshots of the Oracle Database Appliance simulator. This is useful when trying different scenarios or for creating backups.

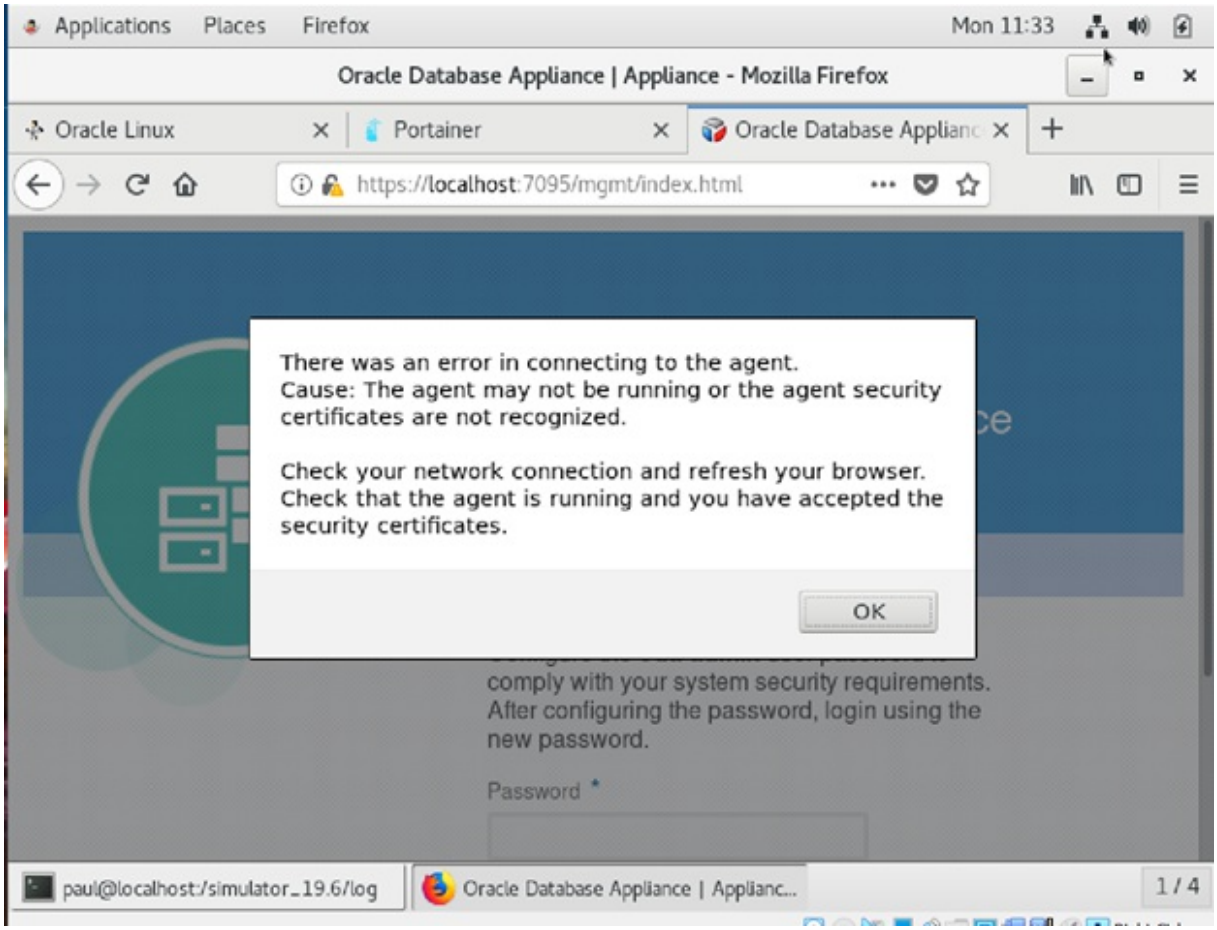
```
# ./snapshot.sh create oda-1
/scratch/user/simulator_19.12_ade/simulator_19.12.0.0.0/snapshots.dat doesn't ex
ist. Creating a new one...
Snapshot with ID: 1 has been created successfully. Timestamp: Wed Sep 22 14:01:2
4 PDT 2022
# ./snapshot.sh list oda-1
ID      CONTAINER NAME             DEPLOYMENT TYPE  TIMESTAMP
1       oda-1                      single           Wed Sep 22 14:01:24 PDT 2021
#  ./snapshot.sh restore 1 oda-1
Snapshot with ID: 1 has been restored successfully!
```

BUI Agent Certificate Issue

You may encounter a BUI Agent Certificate Issue. See the following example:

```
https://server IP:7097/mgmt/index.html
Your assigned port number maybe different
```

You may see a BUI agent security certificate error message:



To fix it, you must add a certificate exception to the BUI agent port, with is your assigned port number -1. In this case, the port number is 7097-1 or 7096.

```
https://:7096
( Your port number maybe different)
```

Go through the certificate exception process and add the exception. Then go back to your assigned port.

```
https://:7097/mgmt/index.html
```

Go through the certificate exception process again and add the exception. Then you can access the BUI to create the appliance.

Restarting ODA Simulator in a Container

If the ODACLI commands fails, then check if the Oracle Database simulator is running in the container.

Run the following command to check the status of the simulator:

```
# /opt/oracle/dcs/bin/statusOdaStack.sh
```

If the simulator is not running, then start the simulator as follows:

```
# /opt/oracle/dcs/bin/startOdaStack.sh
```

About Oracle Database Appliance Simulator Lab Exercises

- Connecting to the Oracle Database Appliance OCI Lab Environment
- Connecting to the Simulator Using BUI
- Connecting to the Simulator Using ODACLI

Connecting to the Oracle Database Appliance OCI Lab Environment

Overview

The exercises in this guide use a container-based Oracle Database Appliance simulator to perform these labs. Performing deployment and patching on an actual ODA would require you to have your own system, and would take a rather long time. The simulator provides a similar experience, but is faster, and you get your own simulator to complete the labs. The simulator simulates an Oracle Database Appliance X8-2 single node or a high-availability (2-node) database appliance.

If you are using the simulator in the OCI Marketplace with an **Always Free OCI Account**, the memory is limited to 1GB. In this case, set up the simulator with the single-node option due to memory limitation. For more information, refer to the Readme.

> Keep in mind this is a simulation. Not all features are supported by the simulator, and no database is actually created and running. Unlike on an actual appliance, the simulator may not display an error if you enter invalid data, and some of the detailed output and screen shots displayed in the command output may not be apply to an actual appliance.

Some command line operations require specifying long UUIDs or file names. Use copy/paste to enter long entries. If you accidentally exit the simulator, simply reconnect to it. It will remember your state.

After the Oracle Database Appliance simulator is set up in the OCI VM, you must log into the Oracle Database Appliance simulator VM with your credentials or key. You can perform the labs in this book with both Command Line Interface (CLI) and a web Browser User Interface (BUI) similar to how you work on an actual Oracle Database Appliance.

Requirements

You need a web browser on your local system to perform the BUI tasks in the labs. Make sure you have the public Oracle Database Appliance simulator VM IP address and the simulator container port number (for example, 7095). Make sure to log in as `odaadmin` with **Enable Multi-User Access** checked.

You need a console on your local system to connect to the ODA simulator container and switch to odaadmin (su odaadmin) user to run the CLI commands in the labs. Make sure you have the container name (e.g odasim-1). By default, a container called odasim-1 is created.

Firefox and Chrome are the recommended web browsers for this lab.

> **If you run into BUI agent credential issue, refer to the Troubleshooting section in the Readme document for details.**

Connecting to the Simulator Using BUI

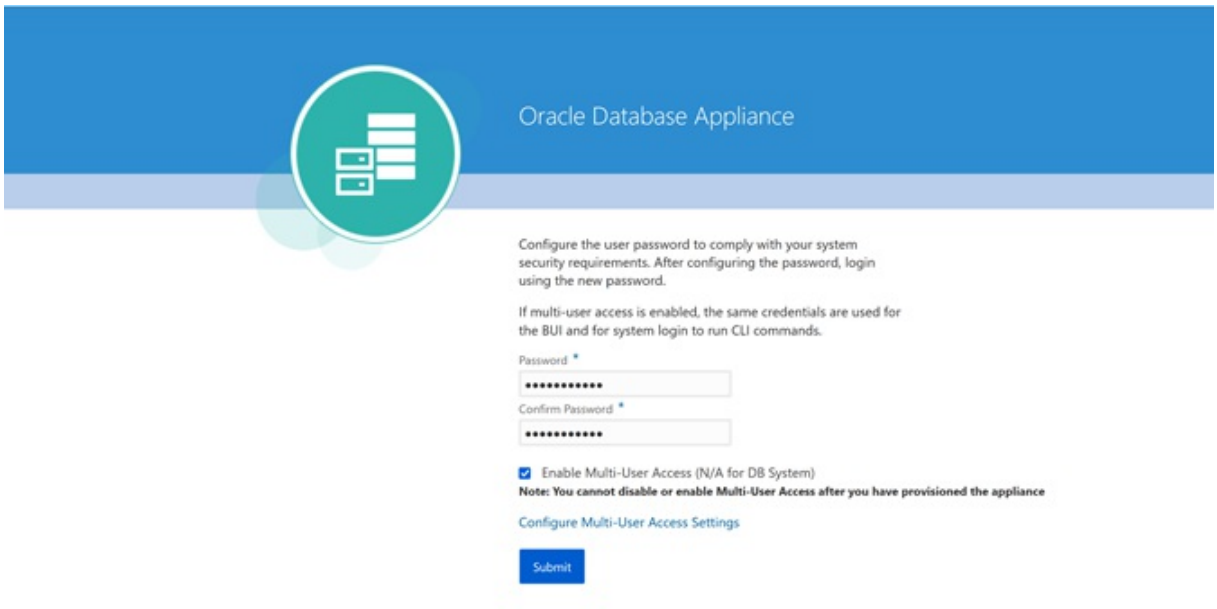
Connect to the simulator as follows:

1. Use the OCI VM public IP address and port number to log into ODA BUI and enable Multi-User Access

   ```
   https://<IP Address>:xxxx/mgmt/index.html (e.g. 7095)
   ```

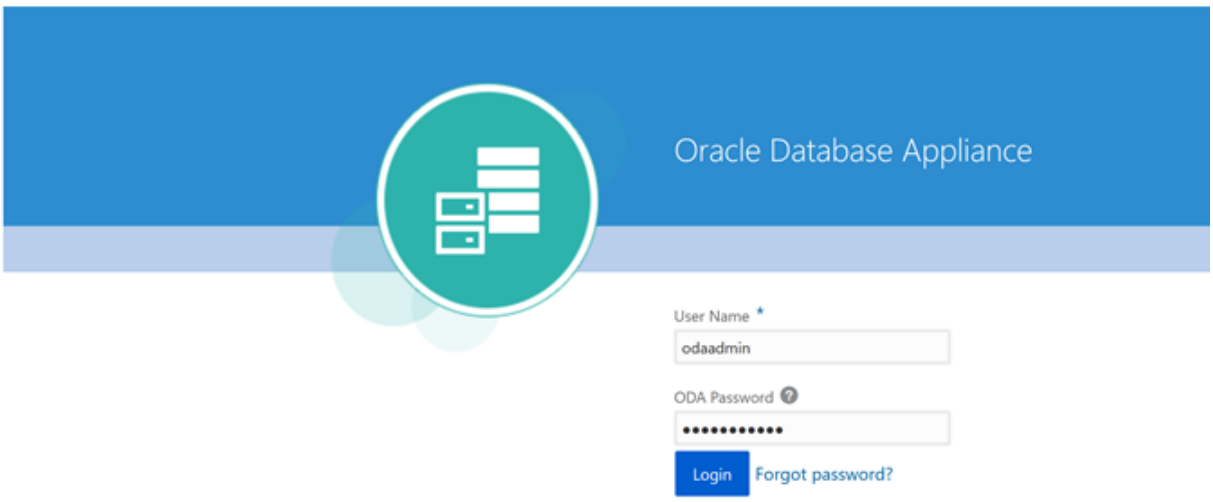
2. You must first complete odacli configure-firstnet and run the odacli update-repository commands in the Lab 1 (using CLI)

   Note that if you run into BUI agent credential issue, refer to the Troubleshooting section in the Readme document for details.

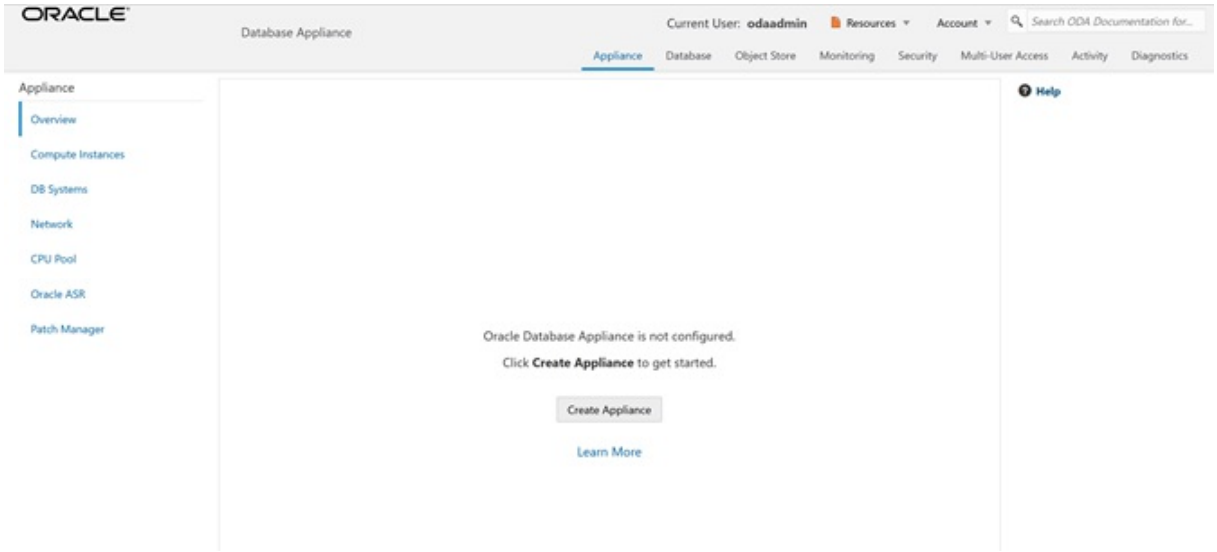


Set a new password based on the required rules. For simplicity, you can use a password similar to `WELcome12##` or come up with your own unique password.

You can then login as `odaadmin` with the new password.



The Appliance page is displayed after you log into Oracle Database Appliance.



Connecting to the Simulator Using ODACLI

Run the following script to connect to the container. This script is usually located in the simulator directory (for example, simulator_19.xx.0.0.0)

To access the default single node simulator (for example, odasim-1), run the following command. You need to switch to the `odaadmin` user with earlier password you set with the Browser UI to run the CLI commands.

```
# ./connectContainer.sh -n odasim-1
[root@odasim-1 /]# su odaadmin
[odaadmin@odasim-1 /]$
```

Or if you have created a 2-node Oracle Database Appliance (high-availability) simulator, you can access each node independently. To access the first node (node0), run the following command.

```
# ./connectContainer.sh -n oda-1-node0
[root@oda-1-node0 /]#
```

To access the second node (node1), run the following command:

```
# ./connectContainer.sh -n oda-1-node1
[root@oda-1-node1 /]#
```

Make sure you have both – a command line window and a web browser open for the lab exercises as some require ODACLI command line input require entries in the web browser (BUI).

Note:

Simulator Labs Overview

The lab exercises use a mix of command line and web-based administration tools. On the BUI, if you encounter any certificate warnings, simply accept them. Note in the output examples below, the text you type is in bold, and the text output in the simulator is not.

Note that some examples in the lab may show steps for a 2-node high-availability simulator, and if you are running a single-node simulator, then you can ignore the information for the second node.

- Lab 1 - Deploy Appliance
- Lab 2 - Manage Databases
- Lab 3 - Patch and Update
- Lab 4 - Virtualization: Create Application and Database KVMs
- Lab 5 - Multi-User Access
- Lab 6 - Monitoring and Resources

Lab 1 - Deploy Appliance

- Step 1 - Enable Multi-User Access
- Step 2 - Add the Appliance to the Network
- Step 3 - Update the Repository with the Oracle Database Appliance Software
- Step 4 - Deploy the Appliance
- Step 5 - Validate the Deployment
- Step 6 - Networking

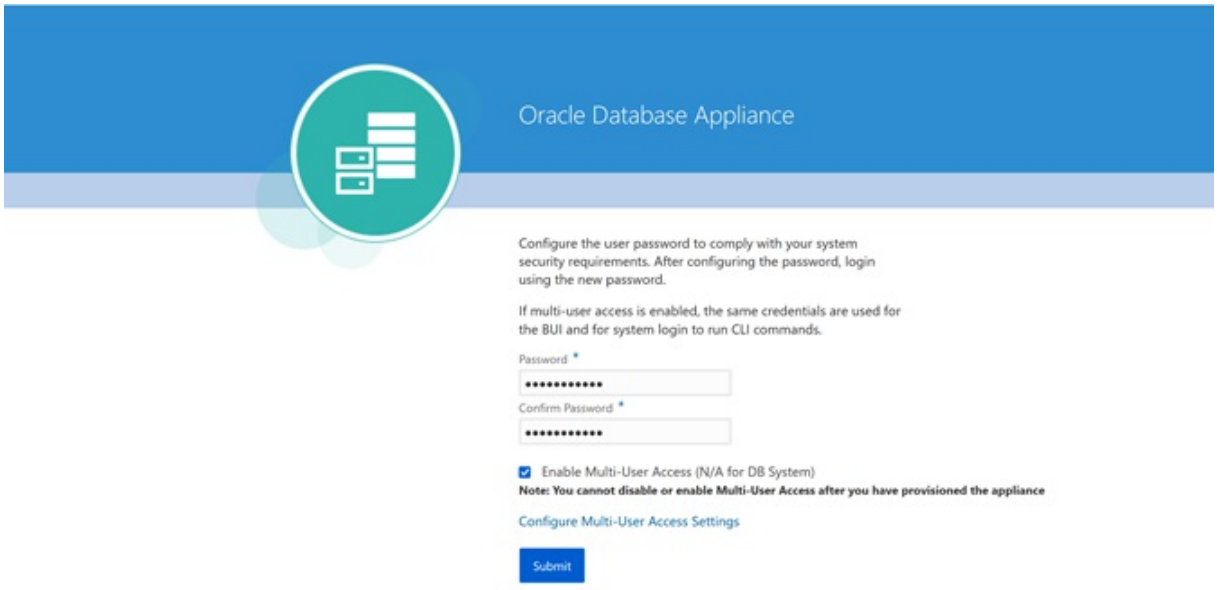
Step 1 - Enable Multi-User Access

You can deploy the appliance using either the BUI or the command line. The command line is useful for scripted and silent installations. This lab uses the BUI.

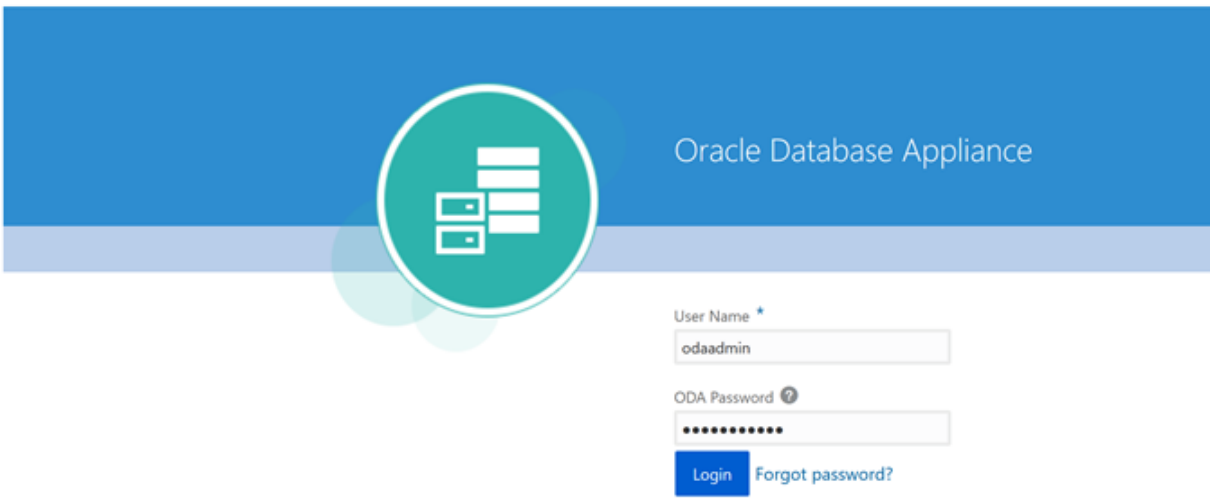
After you configure the firstnet and update the repository, log into Oracle Database Appliance BUI using `odaadmin` and the previously-created password (for example, `WELcome12##`)

```
https://OCI public <IP Address>:xxxx/mgmt/index.html)
```

Multi-User access can only be enabled during initial provisioning of Oracle Database Appliance. Select the **Enable Multi-User Access** checkbox.



Log into BUI:



Step 2 - Add the Appliance to the Network

On an actual appliance, after you first install Oracle Database Appliance into your data center rack, you must configure it to use the IP address your network administrator has assigned it. The easiest way to do this is to first configure ILOM using a network or serial connection. Oracle Database Appliance includes a command `oda cli configure-firstnet` to make it very easy to get Oracle Database Appliance on the network. Once your appliance is on the network, you can complete the rest of the deployment steps from any networked computer.

Run the network configuration command `odacli configure-firstnet` at the Linux prompt. Respond to the prompts as in the example below. Since this is a simulation, to configure the network, you can use any IP address (for example, 192.168.0.100) to complete this step.

```
[oracle@xx ~]$  odacli configure-firstnet
bonding interface is:
Using bonding public interface (yes/no) [yes]:
Select the Interface to configure the network on () [btbond1]:
Configure DHCP on btbond1 (yes/no) [no]:
INFO: You have chosen Static configuration
Use VLAN on btbond1 (yes/no) [no]:
Enter the IP address to configure : 192.168.0.100
Enter the Netmask address to configure : 255.255.255.0
Enter the Gateway address to configure[192.168.0.1] :
INFO: Restarting the network
```

```
Shutting down interface :           [  OK  ]
Shutting down interface em1:            [  OK  ]
Shutting down interface p1p1:           [  OK  ]
Shutting down interface p1p2:           [  OK  ]
Shutting down loopback interface:               [  OK  ]
Bringing up loopback interface:    [  OK  ]
Bringing up interface :     [  OK  ]
Bringing up interface em1:    [  OK  ]
Bringing up interface p1p1: Determining if ip address 192.168.16.24 is already i
n use for device p1p1...    [ OK  ]
Bringing up interface p1p2: Determining if ip address 192.168.17.24 is already i
n use for device p1p2...    [ OK  ]
Bringing up interface btbond1: Determining if ip address 192.168.0.100 is alread
y in use for device btbond1...     [  OK  ]
INFO: Restarting the DCS agent
```

If this is an Oracle Database Appliance X8-2-HA system, you must run the command `odacli configure-firstnet` on the second node (node-1). Log into node-1 and run the command `odacli configure-firstnet` again. You can use 192.168.0.101 for the IP address for node-1.

Step 3 - Update the Repository with the Oracle Database Appliance Software

When you receive your Oracle Database Appliance, you must download the Oracle software prior to deployment from My Oracle Support. Refer to the *Oracle Database Appliance Release Notes* for the latest Oracle Database Appliance release, for details about the patches to download. Specifically, you must download the Oracle Grid Infrastructure Clone files, Oracle Database Clone files, and the Server Patch Bundle. For our lab exercises, the simulated versions of these files in the simulator already exist.

For the labs, you will first deploy the Oracle Database Appliance with the Oracle Database Appliance release 19.16 patches, and then in the third lab you will patch the Oracle Database Appliance and databases to the latest 19.17 release.

The clone files are listed below. The other file in the directory contains patches, and will be used in the patching lab.

Note about file paths: you must specify the full path of the files you specify in the `odacli update-repository` command.

Filename	Description
odacli-dcs-19.16.0.0.0-*date*-GI-19.16.0.0.zip	Oracle Grid Infrastructure 19.16 Clone Files

odacli-dcs-19.16.0.0.0-*date*-DB-19.16.0.0.zip	Oracle Database 19.16 Clone Files
odacli-dcs-19.17.0.0.0-*date*-ODAVM-19.17.0.0.zip	DB 19.17 DB System Template (used in lab 4)
oda-sm-19.17.0.0.0-*date*-server.zip	ODA 19.17 Patch Bundle (used in lab 3)
odacli-dcs-19.17.0.0.0-*date*-GI-19.17.0.0.zip	Oracle Grid Infrastructure 19.17 Clone Files (used in lab 3)
odacli-dcs-19.17.0.0.0-*date*-DB-19.17.0.0.zip	DB 19.17 Clone Files (used in lab 3)
odacli-dcs-12.1.0.2.0-*date*-DB-19.15.0.0.zip	DB 12.1 Clone Files (used in lab 3)

You must update the Oracle Database Appliance repository, so that Oracle Database Appliance knows about the files. Run the `odacli update-repository` command for each clone file.

Hint: to reduce amount of manual typing and typing errors, use copy and paste functions to copy the file name or tab function to auto complete a file name. Also, use the up arrow to repeat the previous command, and then edit the file name.

Note: On an actual Oracle Database Appliance, you must update the DCS agent first, before updating the repositories. It is release dependent, so check the patching steps in the *Oracle Database Appliance Deployment and User's Guide* for your hardware model.

On an actual Oracle Database Appliance, local boot drive storage space is limited. It is recommended that you copy only the Oracle Grid Infrastructure clone file first, update the repository, deploy the Oracle Database Appliance, and then copy the database clone files to Oracle ACFS storage to deploy databases. Check the latest Oracle Database Appliance documentation for the steps.

Go to the command line window and entering the following odacli commands.

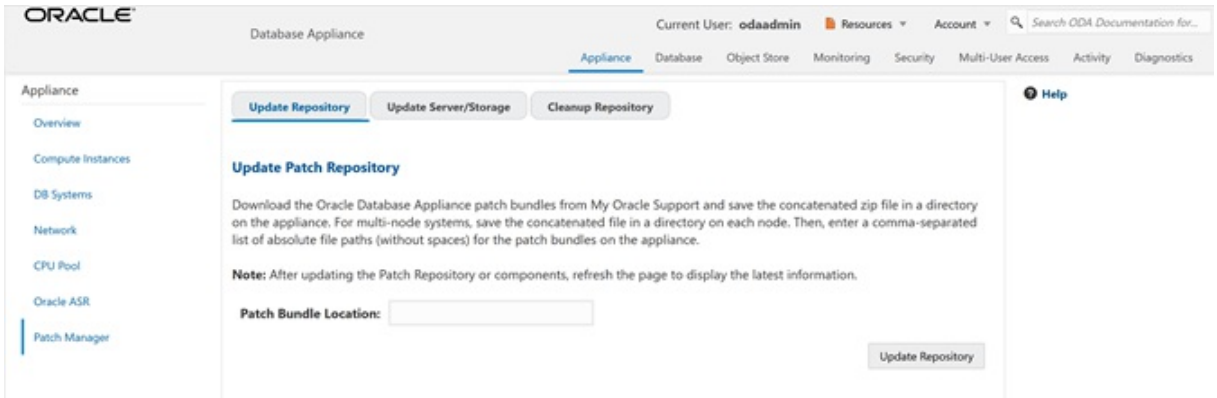
```
$ odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.16.0.0.0-
date-GI-19.16.0.0.zip

{

  "jobId" : "4d428b05-a33f-4fe0-82ec-56849503aa28",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.15.0.0.0-date-GI-19.15.0
.0.zip",
  "reports" : [ ],
  "createTimestamp" : "October 26, 2022 00:05:38 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "October 26, 2022 00:05:38 AM UTC"
```

```
}


$ odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.16.0.0.0-date-DB-19.16.0.0.zip
{
  "jobId" : "bb1caa66-7d19-4de1-a074-f475f4a2505a",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.16.0.0.0-date-DB-19.16.0.0.zip",
  "reports" : [ ],
  "createTimestamp" : "October 26, 2022 00:08:58 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "October 26, 2022 00:08:58 AM UTC"
}
```

When you run commands using the ODACLI command line tool, most operations are asynchronous, meaning that they return a job ID immediately while the job runs in the background. This means that to get information on long running background jobs, you can query the status of the job.

At this point, the clone files are all loaded into the repository, so we are ready to deploy the appliance and create a database.

You can also use the Browser-based User Interface (BUI) to update the Oracle Database Appliance repository, by pasting the complete file path of the patch file or even clone file in the patch bundle location box of the patch manager in the web BUI. However, it is not necessary as you have used command line to update the repository (clone files) already.

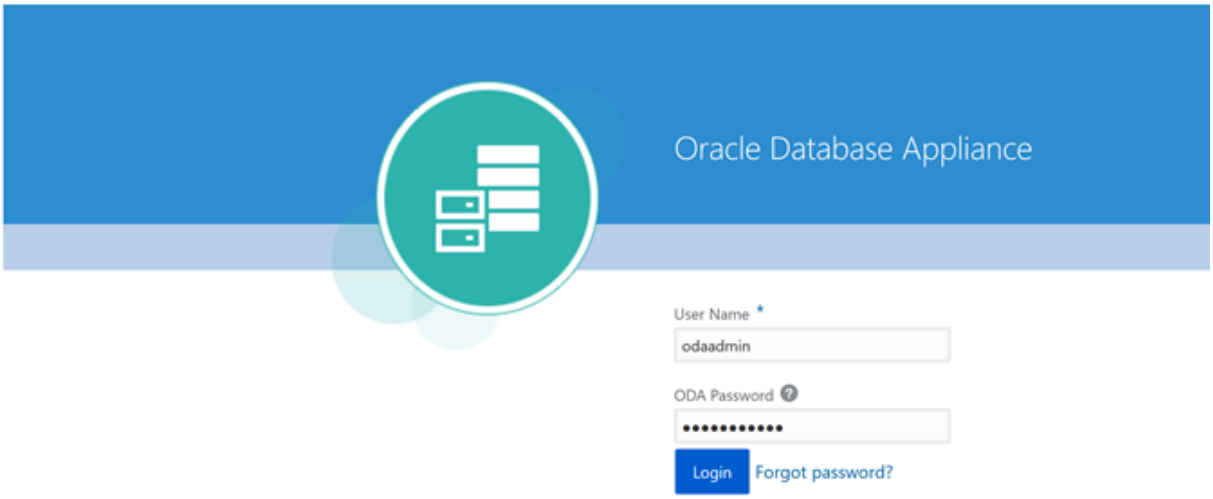


Step 4 - Deploy the Appliance

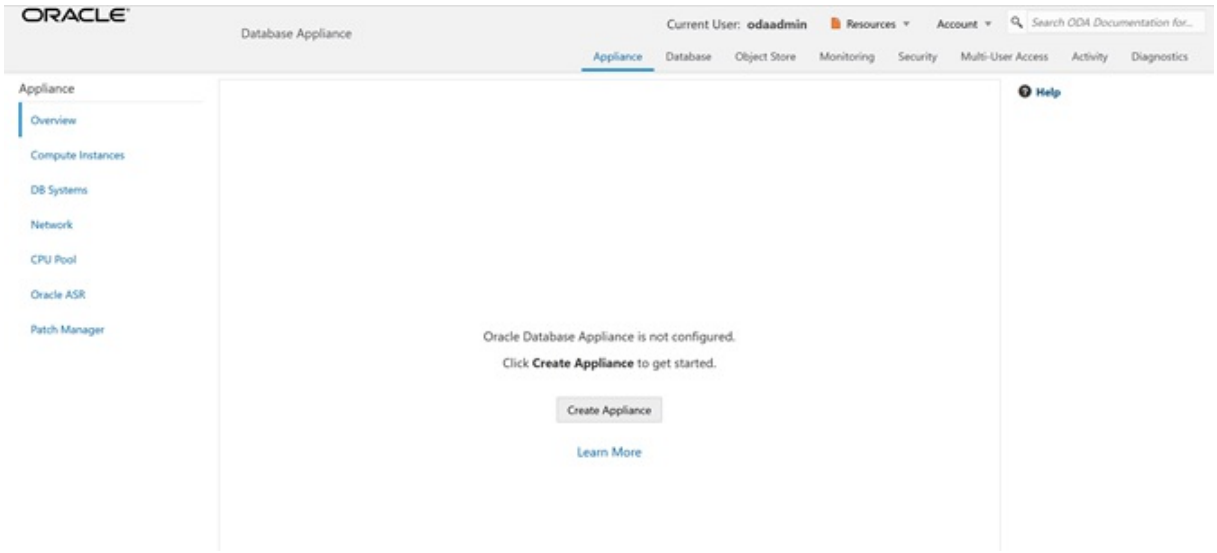
You can deploy the appliance using either the BUI or the command line. The command line is useful for scripted and silent installations. This lab uses the BUI.

After you configure the firstnet and update the repository, log into Oracle Database Appliance BUI using `odaadmin` and previously created password (for example, `WELcome12##`)

```
https://OCI public IP Address>:xxxx/mgmt/index.html
```



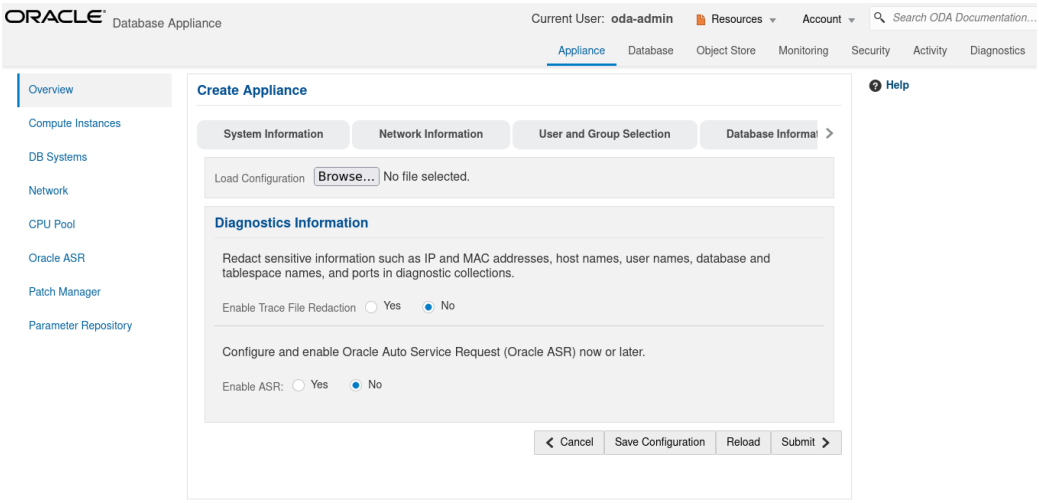
This takes you to the **Appliance** tab in the BUI. It should show that the appliance is not yet deployed:



Click **Create Appliance** to start the deployment wizard. Fill in the first page of the form as shown below. Most fields are self-explanatory. A possible exception is the Data Storage Percentage. This will affect how much space is allocated for backups. By default, 80% is allocated for data and 20% is allocated for archive logs. You can also

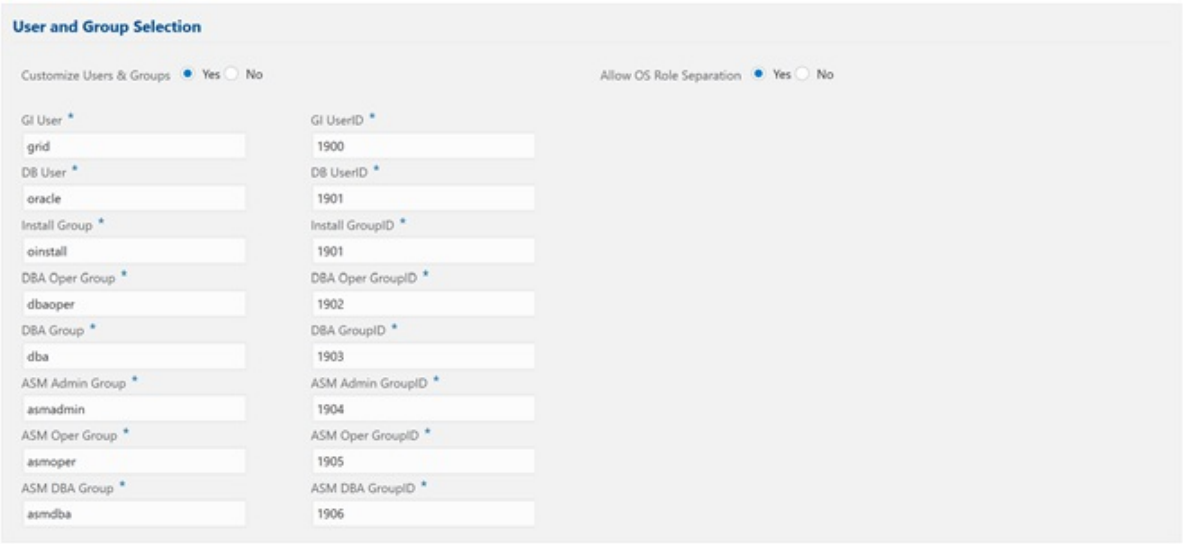
specify a different percentage. Select Disk Group Redundancy as Flex. You can specify individual database storage redundancy later, either Mirror (double mirroring) or High (triple mirroring). Create a password. Be aware there is a password complexity test that will reject simple passwords such as `test` and other common variants. However, `WELcome12##` will work if you want to use that password for these lab exercises.

You can also load a configuration file, for example, `oda.json` that was saved previously to avoid manual entries. To create a configuration file, you manually fill in all the information then click **Save Configuration** at the end.



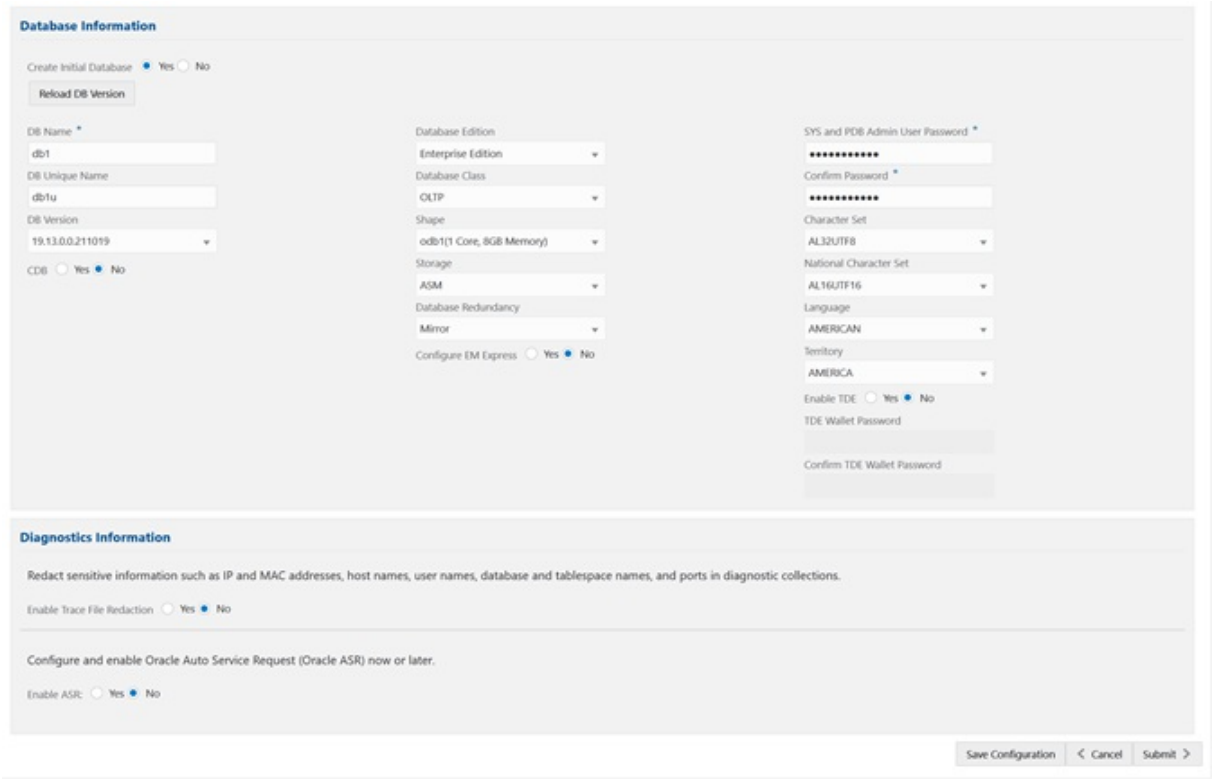
Click on each tab. In the Network Information page, you can configure the network for the public Client Access network here. Since this is a single node simulator, the information is pre-populated from configure-firstnet process. You can also configure the ILOM network if you choose. Enter values for the IP Address, Subnet Mask, Gateway, and specify the interface to be used for the public network.

In the User and Group Selection screen, enter the 19xx ID as shown below.



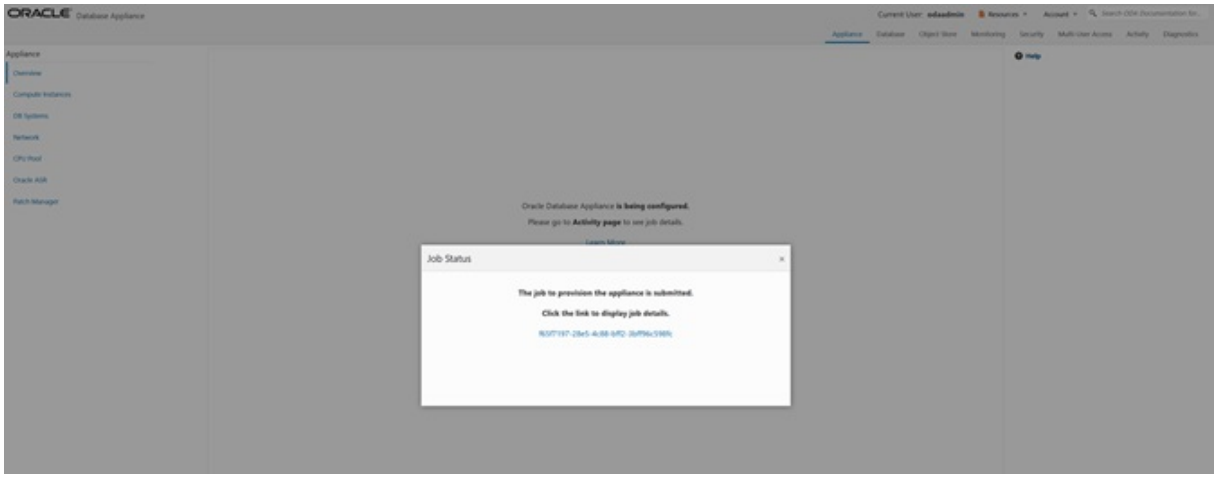
Next is the Database screen.

Specify the database name and other database related information as shown below. Select DB Version as **19.17**.



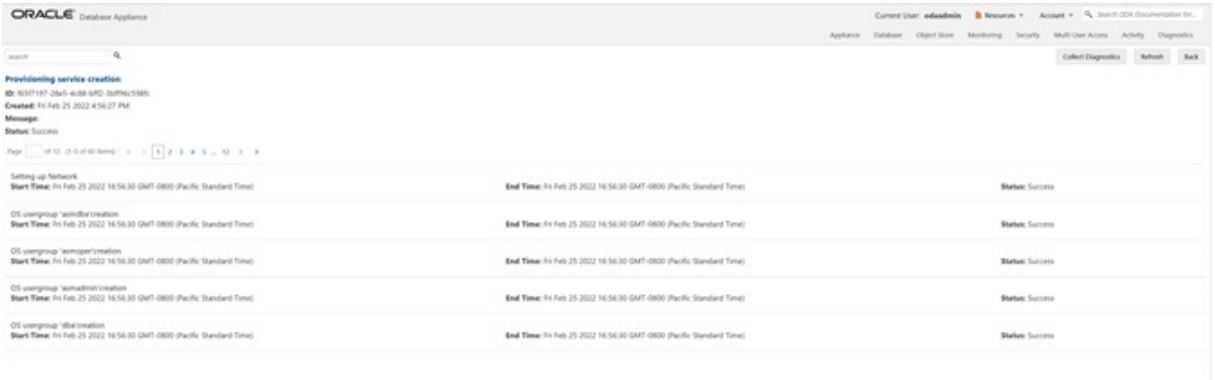
To configure Oracle ASR, specify credentials here. This is also where you can save the configuration file, for example, `oda.json` for later use.

Click **Submit** to continue and click **Yes** in the confirmation box. This will bring up a link to the job status. Similar to ODACLI, operations are asynchronous, and return immediately with a job ID. That job ID can then be used to monitor progress. This allows the administrator to perform other tasks, if desired while the operations completes. Click the job ID to see the status.



In the simulation, the deployment job status will complete within 1-2 minutes. You can see the various steps running, and their status changing to `Success` as they complete. Click the **Refresh** button to more quickly

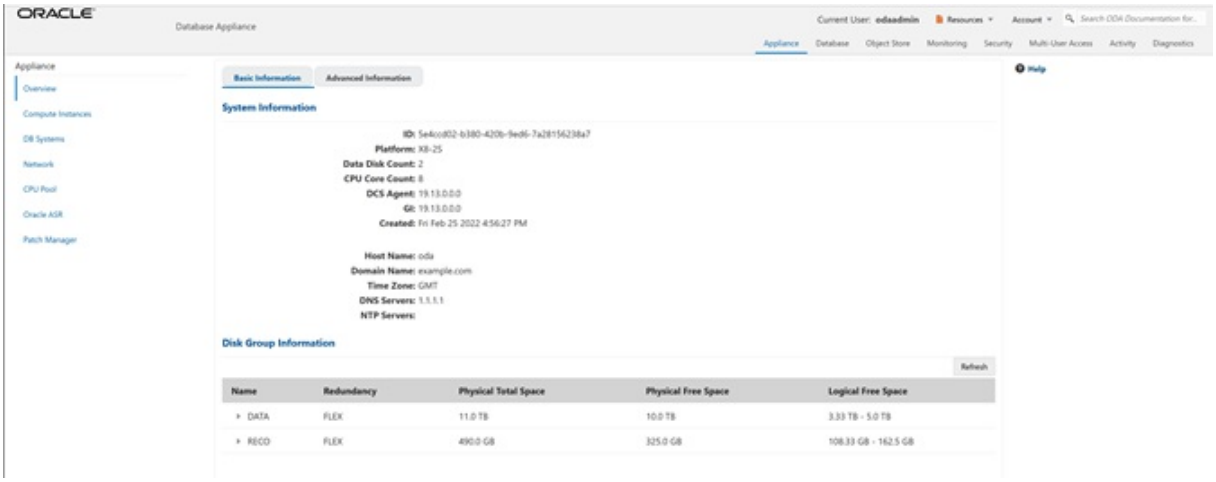
refresh the screen. In an actual appliance, the deployment takes about 60-90 minutes to complete.



Step 5 - Validate the Deployment

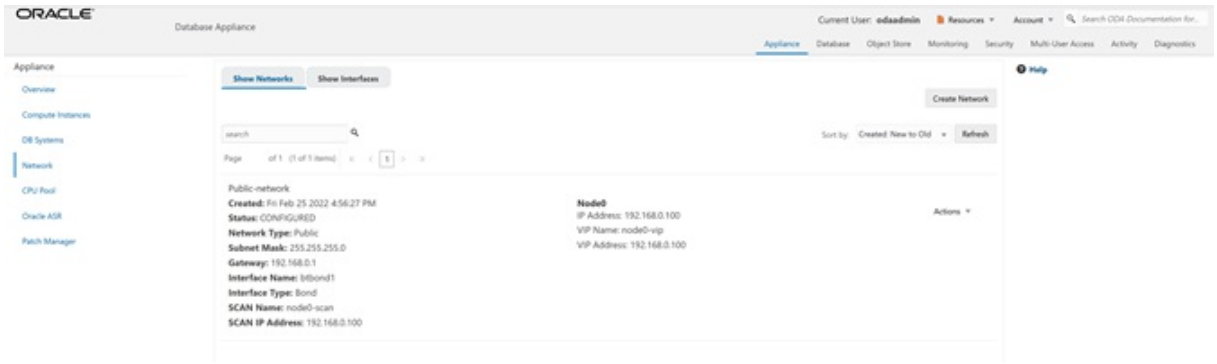
Next, click on the **Database** tab at the top right of the BUI. The deployed database is displayed. The web pages refresh every few seconds, so if the database does not show up at first, wait till the page refreshes. Click on the database name for more details about the database. Click on the **Database Home** link in the left-hand column, when viewing the **Database** tab to see information about the database home. Note this may take up to a minute to display.

You can also verify that the appliance is properly deployed by clicking the **Appliance** tab to see more details. The view is similar to the screen displayed as follows, taking into account that this is a simulation:

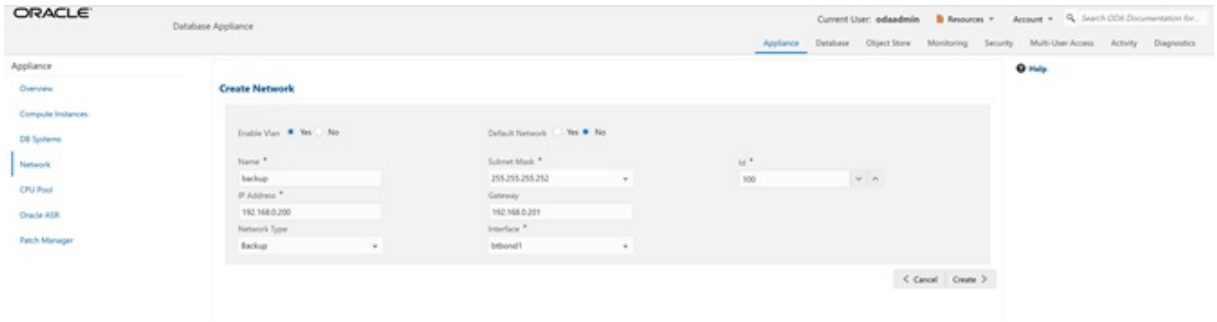


Step 6 - Networking

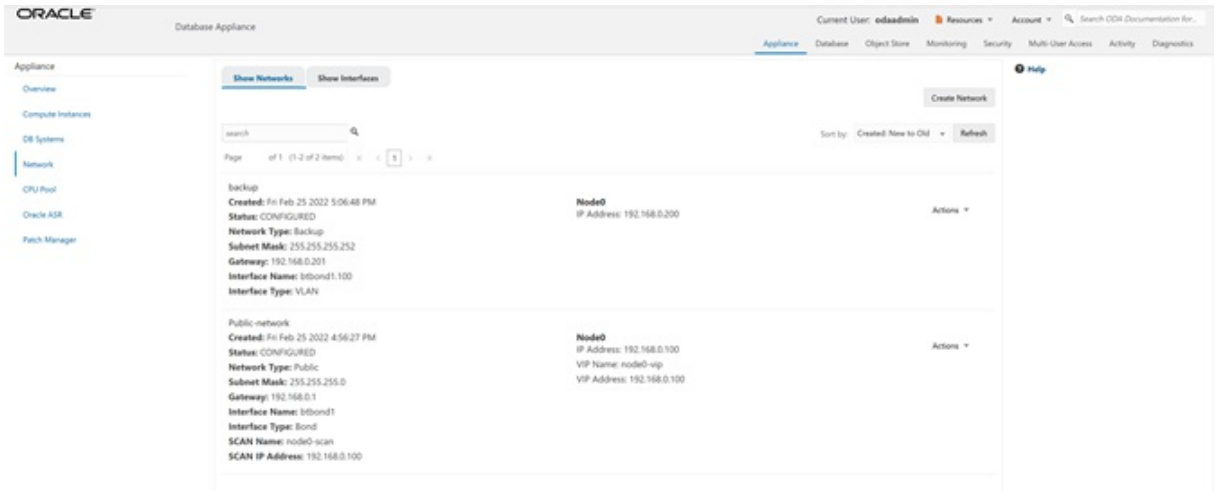
You can check the network by clicking on the **Network** tab on the left hand pane in the BUI.



You can also create a new VLAN by clicking the **Create Network** button and specify the network information below.



Click on the **Create** button, then submit the job. Following is an example that shows the backup VLAN has been created.



This concludes Lab 1.

Lab 2 - Manage Databases

In this lab, we will create and delete databases in the appliance. We can do this using the command line (CLI) or BUI.

> You must complete Lab 1 before starting Lab 2.

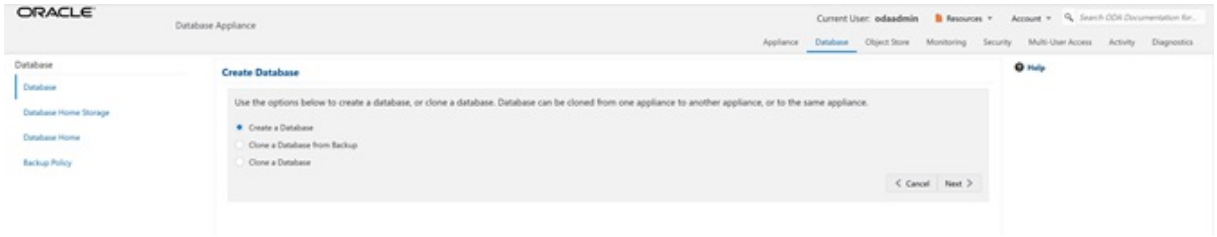
- Step 1 - Create a new database using the Web GUI
- Step 2 - Delete a Database
- Step 3 - View the Databases and Database Homes Using the CLI
- Step 4 - Create a New Database with the CLI
- Step 5 - Delete and Recreate a Database
- Step 6 - Create a CPU Pool for a Database
- Step 7 - Delete a Database Home
- Step 8 - Create Database Backups on Local Disk, External NFS Storage, or on Oracle Cloud

Step 1 - Create a new database using the Web GUI

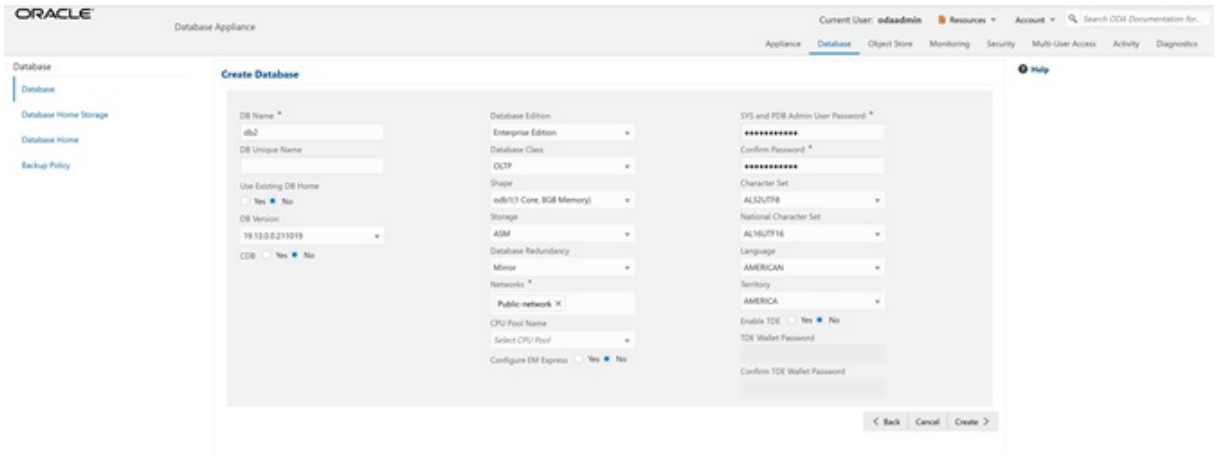
On the Oracle Database Appliance BUI, click the **Database** tab in the web page.

You will see the database `db1` created during deployment. In the upper right-hand corner, there is a **Create Database** button. Click it. It brings up the **Create Database** wizard.

Choose **Create Database**, and click **Next**.

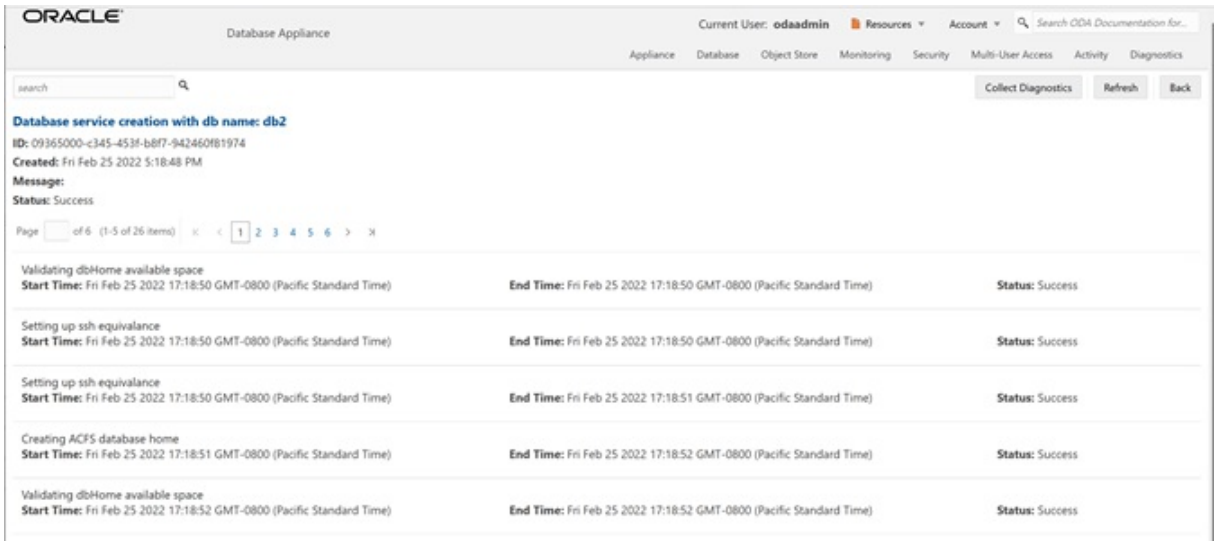


Specify the DB Name, for example, `db2`, and if you are creating a CDB, a PDB Name. Also remember to scroll down and enter a password that would, in an actual appliance be used for SYS, SYSTEM, and PDB Admin. When finished, click on the **Create** button. Click **Yes** to confirm. Beware of the password complexity checker —"WELcome12##" will pass the test.

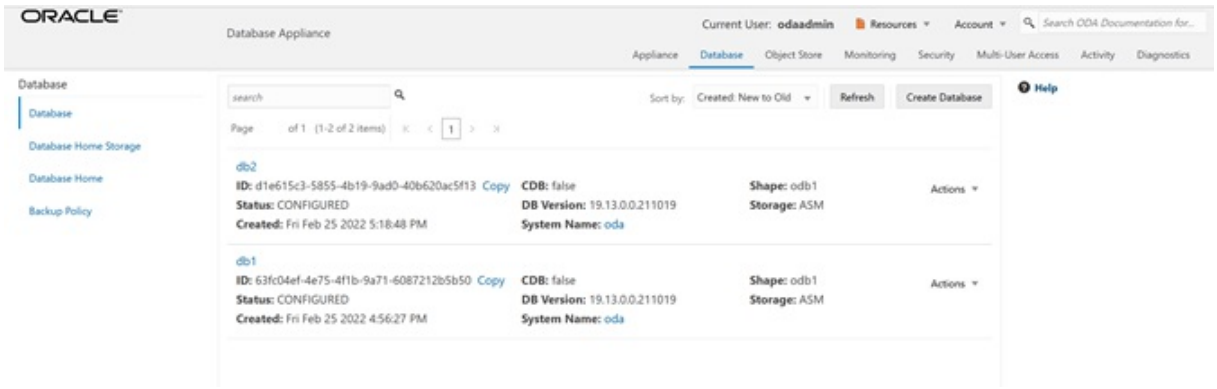


This will bring up a link to the job status. Similar to ODACLI, operations on the BUI are asynchronous, and return immediately with a job ID. That job ID can then be used to monitor progress. This allows the administrator to perform other tasks if desired while long running operations complete. Click the job ID to see the status.

In the simulation, the job will complete within 30 seconds. You can see the various steps running, and their status changing to `Success` as they complete. Click the **Refresh** button to refresh the screen more quickly. On an actual appliance, these steps take about 20 minutes to complete.



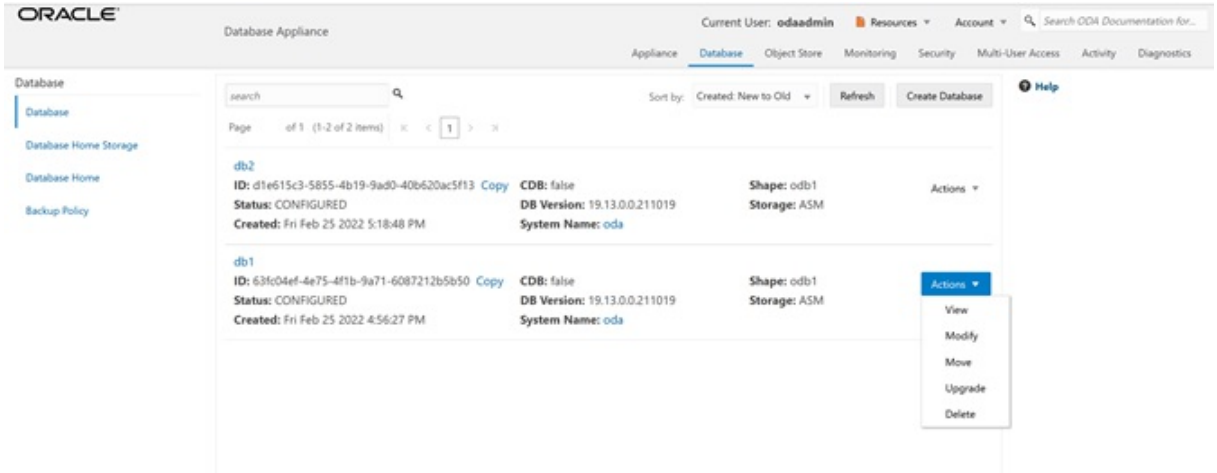
Once the operation completes, click on the **Appliance** tab and then the **Database** tab at the top right of the web page. This should show the newly-created database. The web pages refreshes every few seconds, so if the database does not show up at first, wait till the page refreshes.



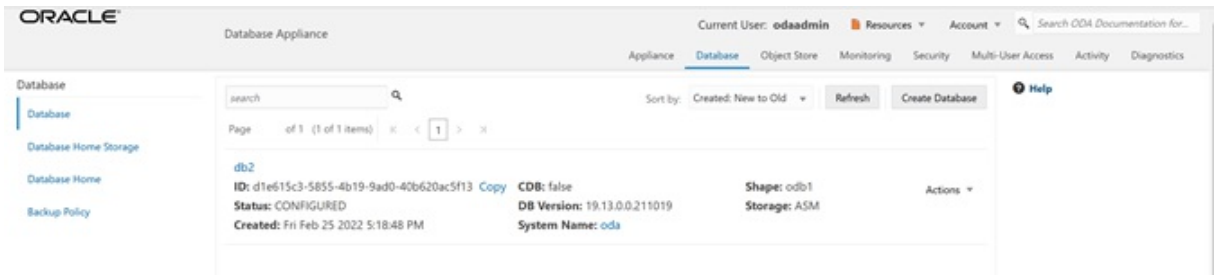
See detailed database information by clicking on the database name, for example, db2. You can also view the newly-created home by clicking on the **Database Home** link in the left-hand column of the **Database** tab.

Step 2 - Delete a Database

You can also delete a database from the **Database** tab. Click the **Appliance** tab and then **Database** tab to view the list of databases. Click the **Action** dropdown to the right of the db1 database, and then select **Delete**. Click **Yes** to confirm, and then close the status box. The Database list should reflect the deletion. Click **Refresh**, if necessary.



After the database delete operation, only db2 is left.



Step 3 - View the Databases and Database Homes Using the CLI

You can also manage databases from the command line. Go to the command line window.

Use the `odacli list-databases` command to view your databases. Then use `odacli describe-database` to see the details for a specific database. Be sure to use the database ID shown in the `odacli list-databases` command, not the ID shown in the example.

```
$ odacli describe-database -i d1e615c3-5855-4b19-9ad0-40b620ac5f13

Database details
----------------------------------------------------------------
      ID: d1e615c3-5855-4b19-9ad0-40b620ac5f13
     Description: db2
         DB Name: db2
      DB Version: 19.17.0.0.221016
         DB Type: SI
         DB Role: PRIMARY
    DB Target Node Name: node_0
     DB Edition: EE
            DBID:
 Instance Only Database: false
             CDB: false
        PDB Name:
    PDB Admin User Name:
     SEHA Enabled: false
           Class: OLTP
           Shape: odb1
         Storage: ASM
    DB Redundancy: MIRROR
     CharacterSet: AL32UTF8
  National CharacterSet: AL16UTF16
        Language: AMERICAN
       Territory: AMERICA
         Home ID: a1314be1-2c6f-411f-b2c7-61444449f02b
   Console Enabled: false
  TDE Wallet Management:
     TDE Enabled: false
    Level 0 Backup Day: Sunday
    AutoBackup Enabled: true
         Created: September 26, 2022 1:18:48 AM UTC
    DB Domain Name: example.com
   Associated Networks:
```

Step 4 - Create a New Database with the CLI

There are many options you can specify when using the CLI to create a new database. Type `odacli create-database -h` to see the options. Note that only the database name is required. Create a new database and database home named `db3` as follows. You will be prompted for a password for SYS, SYSTEM, and PDB admin. To meet password complexity requirements, use `WELcome12##` for this lab.

```
$ odacli create-database -n db3 -v 19.17.0.0

Job details
----------------------------------------------------------------
                     ID:  2051bf5b-4815-4cd2-8d85-e51367ba3269
            Description:  Database service creation with db name: db3
                 Status:  Created
                Created:  September 26, 2022 1:45:49 AM UTC
                Message:
Task Name                                Start Time                          End
Time                          Status
---------------------------------------- ----------------------------------- ---
------------------------------- ----------
$ odacli describe-job -i 2051bf5b-4815-4cd2-8d85-e51367ba3269

Job details
----------------------------------------------------------------
                     ID:  2051bf5b-4815-4cd2-8d85-e51367ba3269
            Description:  Database service creation with db name: db3
                 Status:  Success
                Created:  September 26, 2022 1:45:49 AM UTC
                Message:
Task Name                                Start Time                          End
Time                          Status
---------------------------------------- ----------------------------------- ---
------------------------------- ----------
Validating dbHome available space         September 26, 2022 1:45:50 AM UTC    J
uly 26, 2022 1:45:50 AM UTC    Success
Setting up ssh equivalance                September 26, 2022 1:45:50 AM UTC    J
uly 26, 2022 1:45:50 AM UTC    Success
Setting up ssh equivalance                September 26, 2022 1:45:50 AM UTC    J
uly 26, 2022 1:45:50 AM UTC    Success
Creating ACFS database home               September 26, 2022 1:45:51 AM UTC    J
uly 26, 2022 1:45:51 AM UTC    Success
Validating dbHome available space         September 26, 2022 1:45:51 AM UTC    J
uly 26, 2022 1:45:51 AM UTC    Success
Configuring user access to ACFS DBHome base storage July 26, 2022 1:45:51 AM UTC
    September 26, 2022 1:45:51 AM UTC    Success
Creating DbHome Directory                 September 26, 2022 1:45:51 AM
```

In an actual appliance, this command would run a job in the background for approximately 40 minutes. As with the GUI, you can monitor the progress if you choose, but the Linux prompt returns immediately. Because this is a simulation, you should see your new database and home almost immediately. Verify creation of the new

database using the following odacli command:

```
$ odacli list-databases

ID                                       DB Name    DB Type  DB Version
CDB        Class    Shape    Storage Status  DbHomeID
---------------------------------------- ---------- -------- ------------------
- ---------- -------- -------- ---------------------- -------------------------
--------------
d1e615c3-5855-4b19-9ad0-40b620ac5f13     db2        SI       19.16.0.0.220719
false      OLTP     odb1     ASM      CONFIGURED a1314be1-2c6f-411f-b2c7-6144444
9f02b
324a42ea-bba2-477d-8bca-5a26af159f1c     db3        SI       19.16.0.0.220719
false      OLTP     odb1     ASM      CONFIGURED   ecfa440e-2482-40c1-8ccd-67316
cd48ba2
```

Step 5 - Delete and Recreate a Database

You can also use CLI to delete a database. Run `odacli delete-database` to remove database `db2`. Be sure to use the ID of your `db2` database, which is likely different from the one in this workbook. Note that you can also use the database name instead of the ID.

```
$ odacli delete-database -i d1e615c3-5855-4b19-9ad0-40b620ac5f13
{
  "jobId" : "ccde4700-3c1e-423a-8079-477f49f8cd5f",
  "status" : "Running",
  "message" : null,
  "reports" : [ {
    "taskId" : "TaskZJsonRpcExt_10048",
    "taskName" : "Validate db d1e615c3-5855-4b19-9ad0-40b620ac5f13 for deletion"
,
    "taskResult" : "OK",
    "startTime" : " September 26, 2022 01:49:40 AM UTC",
    "endTime" : " September 26, 2022 01:49:40 AM UTC",
    "status" : "Success",
    "taskDescription" : null,
    "parentTaskId" : "TaskSequential_10046",
    "jobId" : "ccde4700-3c1e-423a-8079-477f49f8cd5f",
    "tags" : [ ],
    "reportLevel" : "Info",

$  odacli list-databases
ID                                       DB Name    DB Type  DB Version
CDB        Class    Shape    Storage    Status        DbHomeID
---------------------------------------- ---------- -------- ------------------
- ---------- -------- -------- ---------- ------------ ----------------------
```

```
---------------
324a42ea-bba2-477d-8bca-5a26af159f1c     db3         SI        19.16.0.0.220719
false      OLTP     odb1     ASM         CONFIGURED   ecfa440e-2482-40c1-8ccd-673
16cd48ba2
```

```
$ odacli delete-database -i d1e615c3-5855-4b19-9ad0-40b620ac5f13
{
  "jobId" : "ccde4700-3c1e-423a-8079-477f49f8cd5f",
  "status" : "Running",
  "message" : null,
  "reports" : [ {
    "taskId" : "TaskZJsonRpcExt_10048",
    "taskName" : "Validate db d1e615c3-5855-4b19-9ad0-40b620ac5f13 for deletion"
,
    "taskResult" : "OK",
    "startTime" : " September 26, 2022 01:49:40 AM UTC",
    "endTime" : " September 26, 2022 01:49:40 AM UTC",
    "status" : "Success",
    "taskDescription" : null,
    "parentTaskId" : "TaskSequential_10046",
    "jobId" : "ccde4700-3c1e-423a-8079-477f49f8cd5f",
    "tags" : [ ],
    "reportLevel" : "Info",

$ odacli list-databases

ID                                       DB Name    DB Type  DB Version
CDB        Class    Shape    Storage    Status        DbHomeID
---------------------------------------- ---------- -------- ----------------
- ---------- -------- -------- ---------- ------------ ------------------------
---------------
324a42ea-bba2-477d-8bca-5a26af159f1c     db3         SI        19.16.0.0.220719
false      OLTP     odb1     ASM         CONFIGURED   ecfa440e-2482-40c1-8ccd-673
16cd48ba2
```

Using the CLI, create a new database db4.

```
$ odacli create-database -n db4 -v 19.16.0.0

Enter SYS, SYSTEM and PDB Admin user password:
Retype SYS, SYSTEM and PDB Admin user password:

Job details
----------------------------------------------------------------
                     ID:  aa259376-4ac0-474a-8730-8c8e1c8ac504
            Description:  Database service creation with db name: db4
                 Status:  Created
```

```
                Created:  September 26, 2022 1:51:50 AM UTC
                Message:
Task Name                                Start Time                          End
Time                           Status
---------------------------------------- ----------------------------------- ---
-------------------------------- ----------

# odacli list-databases

ID                                       DB Name    DB Type  DB Version
CDB        Class     Shape     Storage    Status        DbHomeID

ID                                       DB Name    DB Type  DB Version
CDB        Class     Shape     Storage    Status        DbHomeID
---------------------------------------- ---------- -------- ------------------
- ---------- -------- -------- ---------- ------------ ------------------------
---------------
324a42ea-bba2-477d-8bca-5a26af159f1c     db3        SI       19.17.0.0.221016
false      OLTP     odb1     ASM        CONFIGURED   ecfa440e-2482-40c1-8ccd-673
16cd48ba2
deac01db-eaa8-4f4e-a511-aea042be3a18     db4        SI       19.16.0.0.220719
false      OLTP     odb1     ASM        CONFIGURED   c3c63738-703e-4c1d-98de-95b
551b67468
```

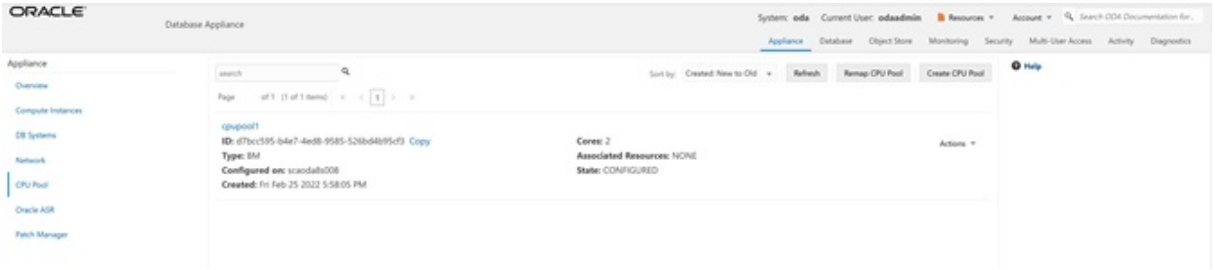
Step 6 - Create a CPU Pool for a Database

You can create a CPU pool for a bare-metal database to improve CPU resource management and quality of service for a database.

Click **CPU Pool** on the left, then click **Create a CPU Pool**.

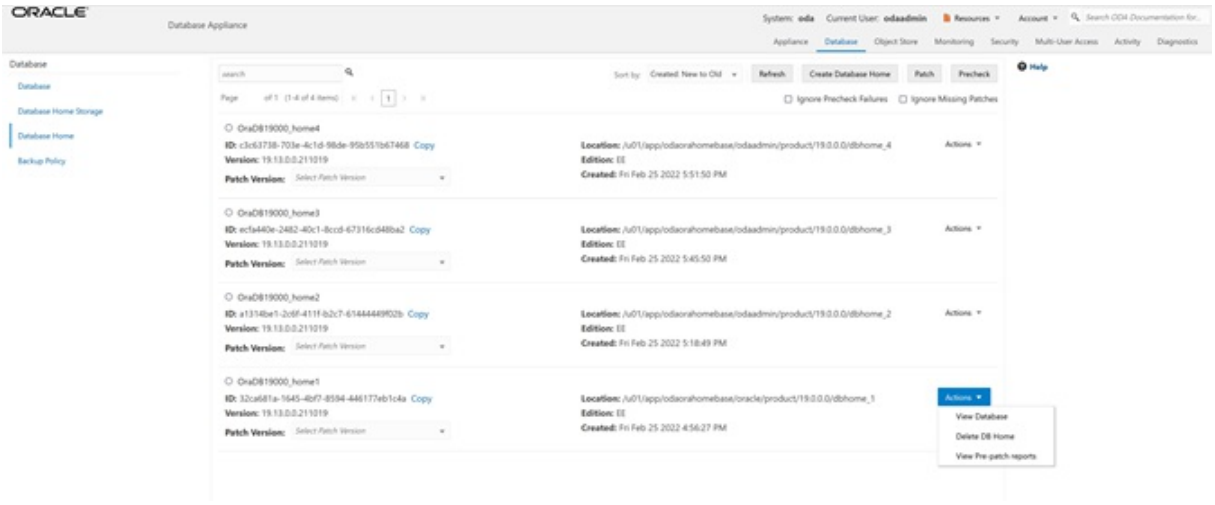
Specify the CPU Pool Name **cpupool1**, select CPU Pool Type **Bare Metal**, and Number of CPU Cores **2**, then click **Create**.

You can see that CPU Pool **cpupool1** has been created:

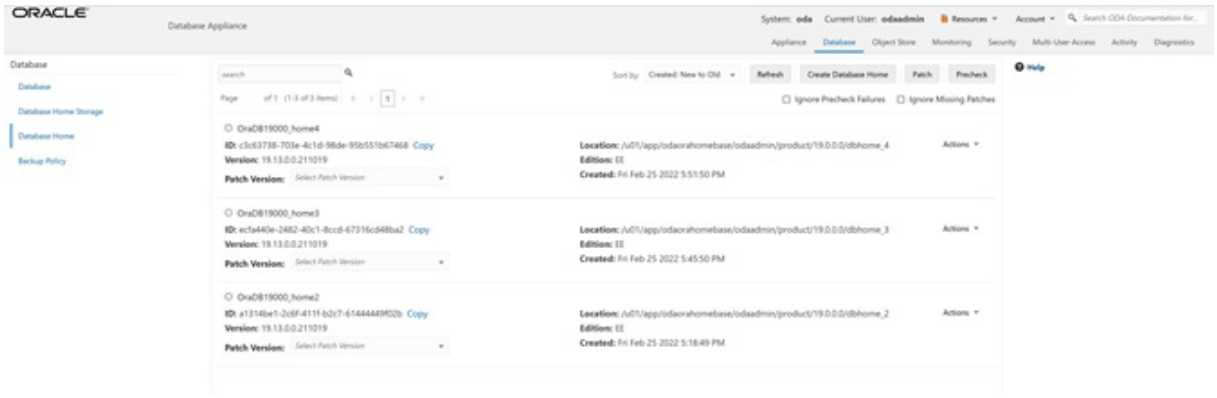


Step 7 - Delete a Database Home

You can delete a database home using the BUI or the command line. We will use BUI to delete a database home. Go to the **Database** tab, then click on the Database Home to see all the database homes. Click on **Actions**, then click on **Delete DB Home** (for home1).



You can see that home1 database home has been deleted.



Step 8 - Create Database Backups on Local Disk, External NFS Storage, or on Oracle Cloud

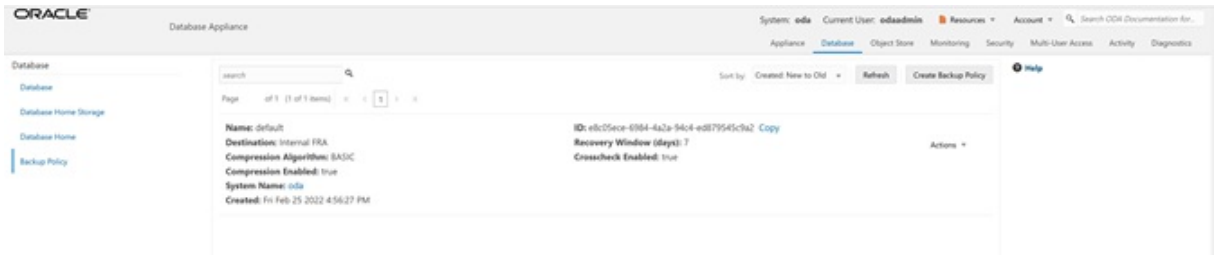
Backing up and restoring Oracle databases on Oracle Database Appliance is very simple. There are two simple steps involved to create a database backup locally or on Oracle Cloud. These can be done using the web GUI:

1. Create a backup policy
2. Attach a backup policy to a database

   To back up to an external NFS storage, you must create an NFS mount point first.

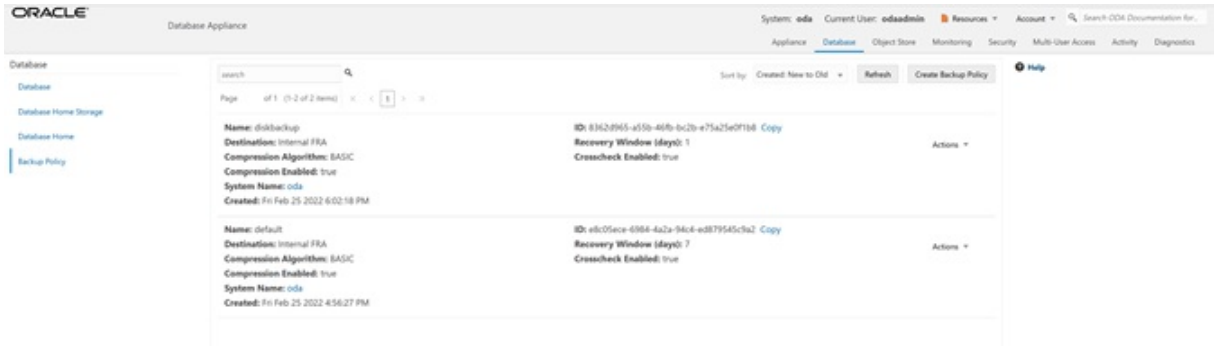
   To back up to the Oracle Cloud, you must obtain and create Object Store credentials first.

There is a default backup policy associated with the database. To create a new backup policy, click on the **Backup Policy** tab and then click **Create Backup Policy**.

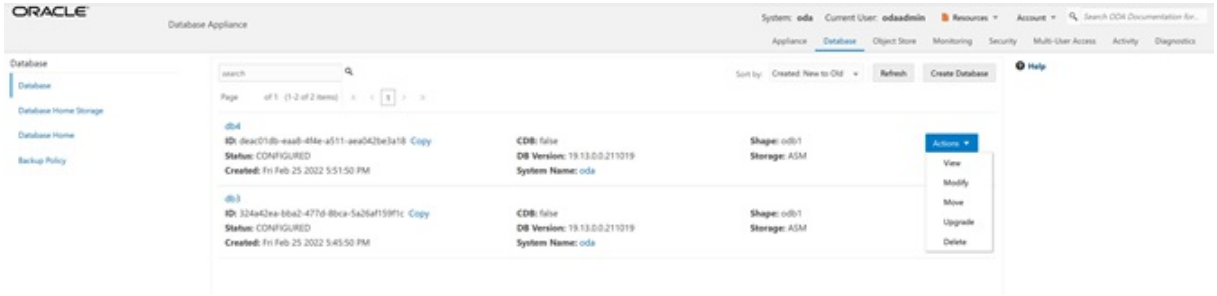


Then, name the Backup Policy (for example, `DiskBackup`), Backup Destination (Internal FRA/Local Disk or External FRA/External NFS Storage or Object Store/Oracle Cloud), and Recovery Window in days, then click **Create**. To back a database to an external NFS storage, you need to specify a mount point such as **/u03/app/oracle/oradata/nfs_backup**.

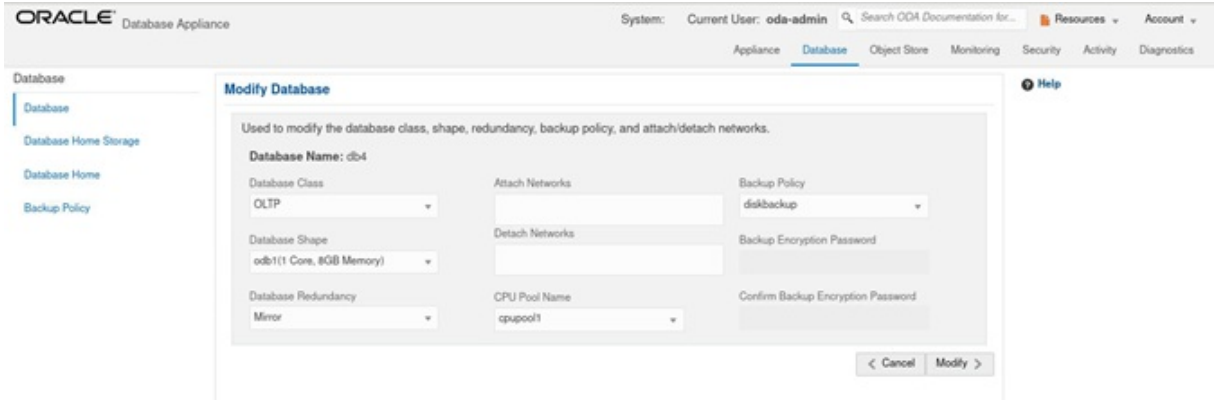
You can see the **DiskBackup** policy has been created.



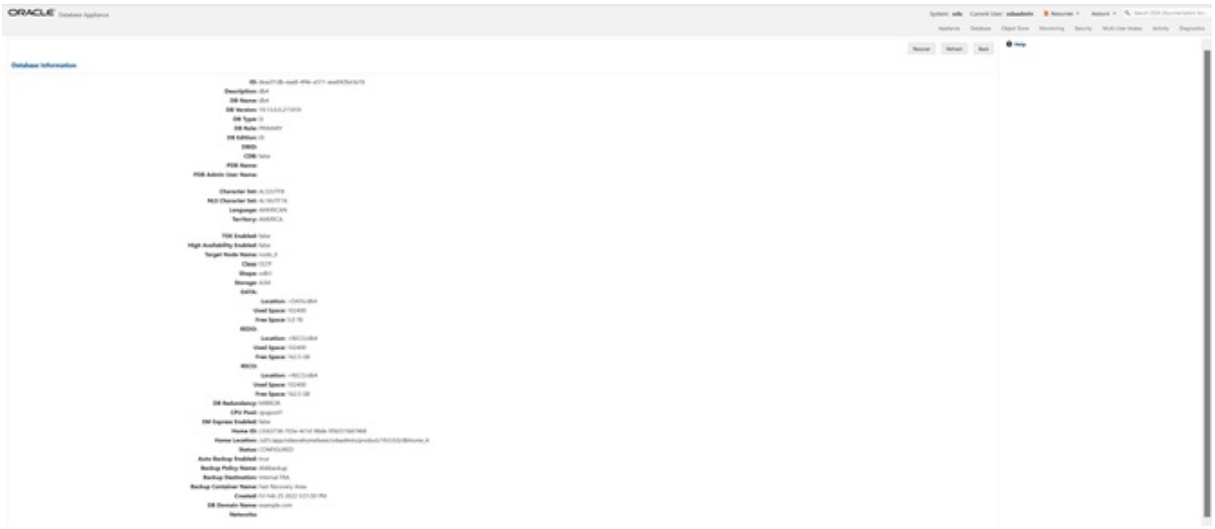
Next you select the database, for example, `db4`, that you want to backup. The `db4` database has the default backup policy, so modify the database first by clicking **Modify** under **Actions**. Assign a CPU pool to `db4` at the same time.



Select **DiskBackup** as the Backup Policy and **cpupool1** as the CPU pool for `db4`, and then click **Modify**.

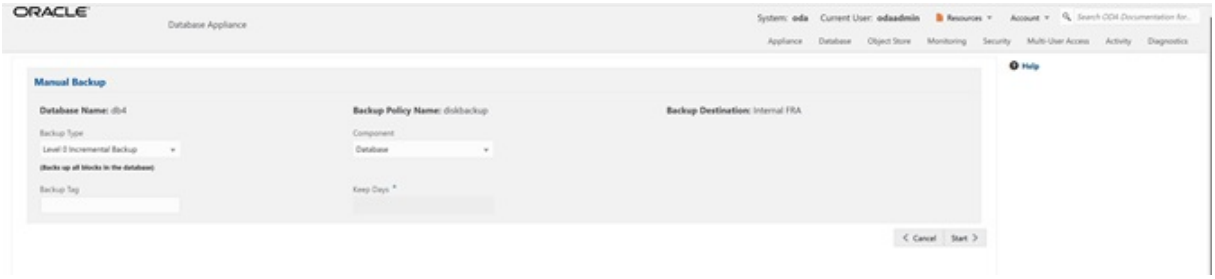


Once the job is completed, you can verify that the backup policy is listed under **Database Information** of the database, for example, **db4**. You can also see that a CPU pool is assigned to **db4**. Once this configuration is completed, Oracle Database Appliance will start backing up the database to the disk regularly and produce backup reports.

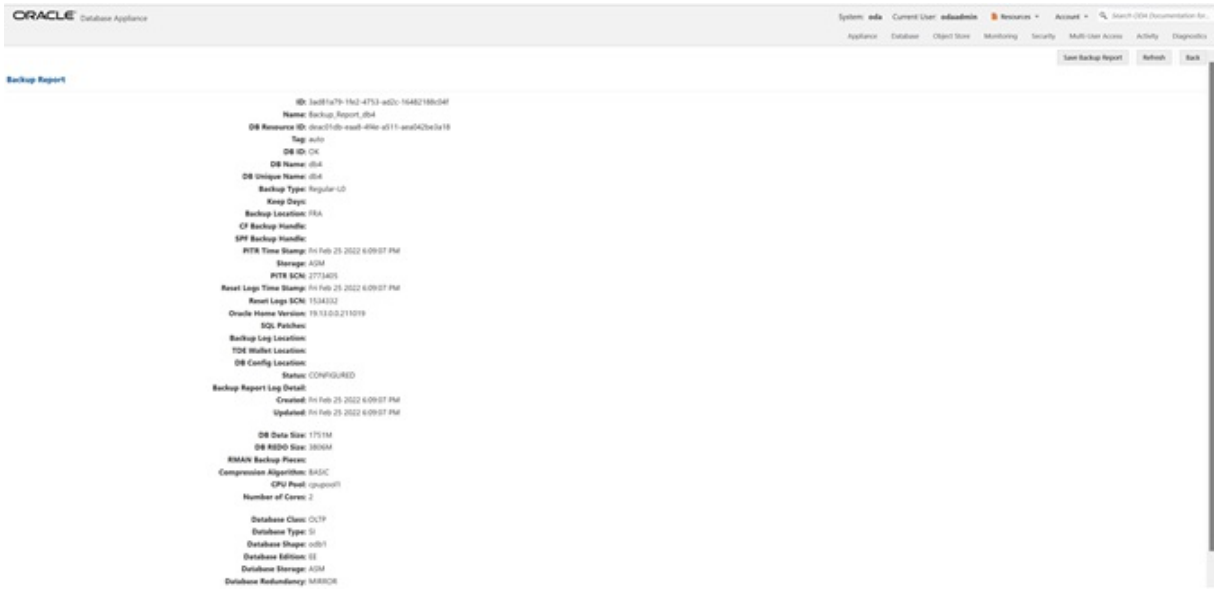


You can see the backup reports under the **Backups** heading below.

You can also click **Manual Backup**, then click **Start** to back up a database manually.



You can see the details of the Backup Report by clicking on the Backup Report ID.



In addition to backing up to local disk, you can back up to Oracle Cloud. To back up databases in Oracle Database Appliance to Oracle Cloud, you must obtain Object Store credentials first. Once you have your credentials, click the **Object Store** tab, then click **Create Object Store Credential**.

Enter the required Object Store Credentials including the name. You can now create a backup policy, attach a database to the policy, and specify the Object Store as the backup destination. Oracle Database Appliance will start backing up the database to the Oracle Cloud regularly.

This concludes Lab 2.

Lab 3 - Patch and Update

If you just completed Lab 2, the simulator should have two databases, `db3` and `db4`.

For Lab 3, you will use the CLI to update the repository and BUI to update the Oracle Database Appliance infrastructure including the server. You will also use the web BUI to patch a database home from release 19.16 to 19.17, and upgrade a database from release 12.2 to 19.17.

Starting with Oracle Database Appliance release 19.11, patching of Oracle Database Appliance is out-of-place. The new Oracle Grid Infrastructure home will be placed on the local system/boot drive, and all new database homes will be placed on Oracle ACFS file system on the data drives. In an Oracle Database Appliance high-availability system, the database homes will be placed on the shared storage.

> Note: on an actual Oracle Database Appliance, you may have to update the server repository and the DCS agent before updating the database and Oracle Grid Infrastructure clone files in the repositories. This is release dependent, so check the patching steps in the Oracle Database Appliance documentation first.

- Step 1 - Update the Oracle Database Appliance Repository with Latest Patches
- Step 2 - Update the DCS Agent (If not done already)
- Step 3 - Update the Server
- Step 4 - Patch a Database: Update a Database to point to a New Database Home
- Step 5 - Upgrade a Database

Step 1 - Update the Oracle Database Appliance Repository with Latest Patches

Refer to the *Oracle Database Appliance Release Notes* for the latest Oracle Database appliance patches.

You must download the server patch file for Oracle Database appliance release 19.17. The server patch updates the firmware and operating system. You must patch the server before you patch the databases. When patching databases, you can choose to patch a subset, if required. However, it is recommended to patch all databases to keep them current.

For this lab, we have downloaded simulated 19.17.0.0.0 patches for the server, Oracle Grid Infrastructure, and database clone files to your simulator.

You must update the repositories with the latest server patch, Oracle Grid Infrastructure, and database clone files, as well as additional applicable database clone files. For example, if you plan to patch Oracle Database from release 19.16 to 19.17, you must update the repository with the 19.16 Oracle Grid Infrastructure and database clone files first.

Before you start patching the server, you can check the current installed components from the web console. Go to the **Appliance** tab, click on **Patch Manager** on the left, and then click the **Update Server/Storage** tab. Note all the installed 19.16.0.0.0 components. Since you have not updated the repository to 19.17.0.0.0, all components are displayed as up to date.

Next, update the server repository. The server patch file is `oda-sm-19.17.0.0.0-date-server.zip`.

```
$ odacli update-repository -f /opt/oracle/dcs/patchfiles/oda-sm-19.17.0.0.0-date
-server.zip

{
  "jobId" : "b3794603-4fbb-42a4-89ee-791d420e68a6",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/oda-sm-19.16.0.0.0-date-server.zip",
  "reports" : [ ],
  "createTimestamp" : "September 26, 2022 06:29:42 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "September 26, 2022 06:29:42 AM UTC"
}
```

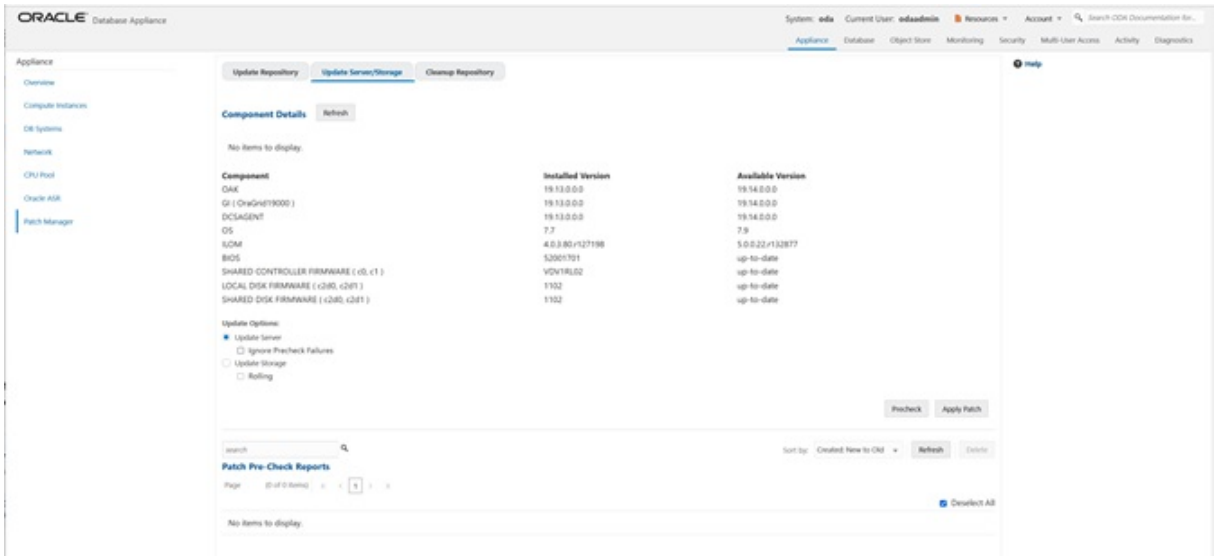
For an actual Oracle Database Appliance, you may need to update the DCS agent first, before updating repository with the 19.16 Oracle Grid Infrastructure and database clone files, if you want to create a 19.16 database or patch a database to 19.16. See the *Oracle Database Appliance Deployment and User's Guide* for your hardware model.

Run the following commands to update the Oracle Database Appliance repository with these patches. **You must use the full path for the file names.**

```
$ odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0-
date-GI-19.17.0.0.zip

{
  "jobId" : "529141f1-c5fb-42a6-ad1e-0b5540781a71",
  "status" : "Waiting",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0-date-GI-19.17.0
.0.zip",
  "reports" : [ ],
  "createTimestamp" : "September 26, 2022 06:32:43 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "September 26, 2022 06:32:43 AM UTC"
}

$ odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0-
date-GI-19.17.0.0.zip

{
  "jobId" : "6478c708-bef8-4d5a-83a6-b411fe9b3e7d",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0-date-DB-19.17.0
.0.zip",
```

```
  "reports" : [ ],
  "createTimestamp" : "September 26, 2022 06:33:13 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "September 26, 2022 06:33:13 AM UTC"
}

$ odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.15.0.0.0-date-DB-12.2.0.1.zip

{
  "jobId" : "76e5156b-160f-41fc-b9aa-580992902d9f",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.15.0.0.0-date-DB-12.2.0.1.zip",
  "reports" : [ ],
  "createTimestamp" : "September 26, 2022 07:06:26 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "September 26, 2022 07:06:27 AM UTC"
}
```

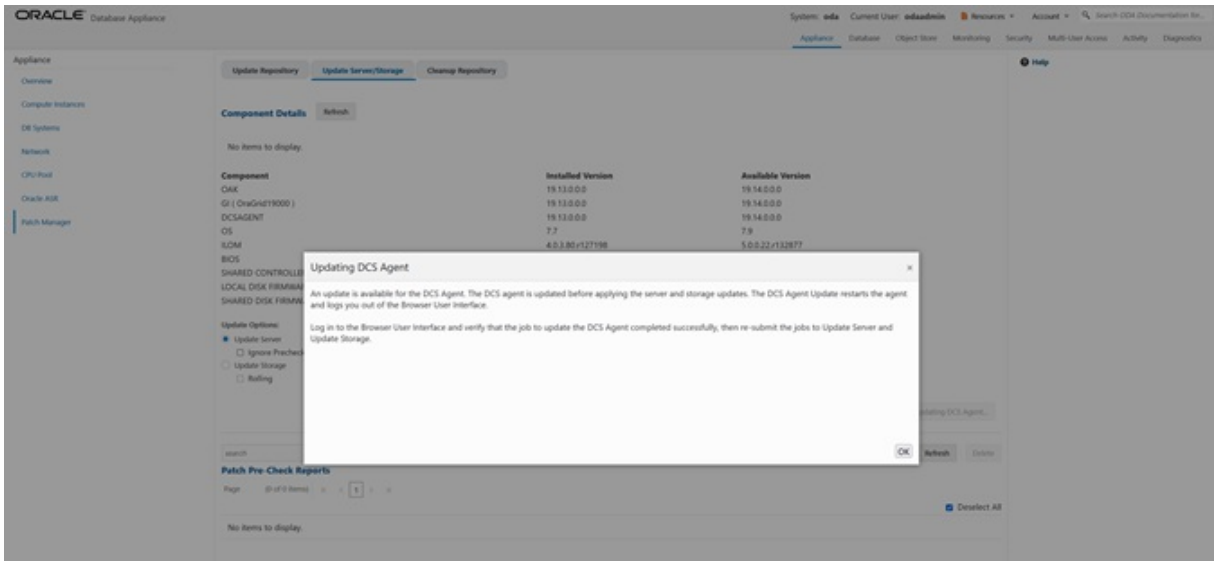
After you update the repository, you can use the web console to see the 19.17.0.0.0 available component versions.



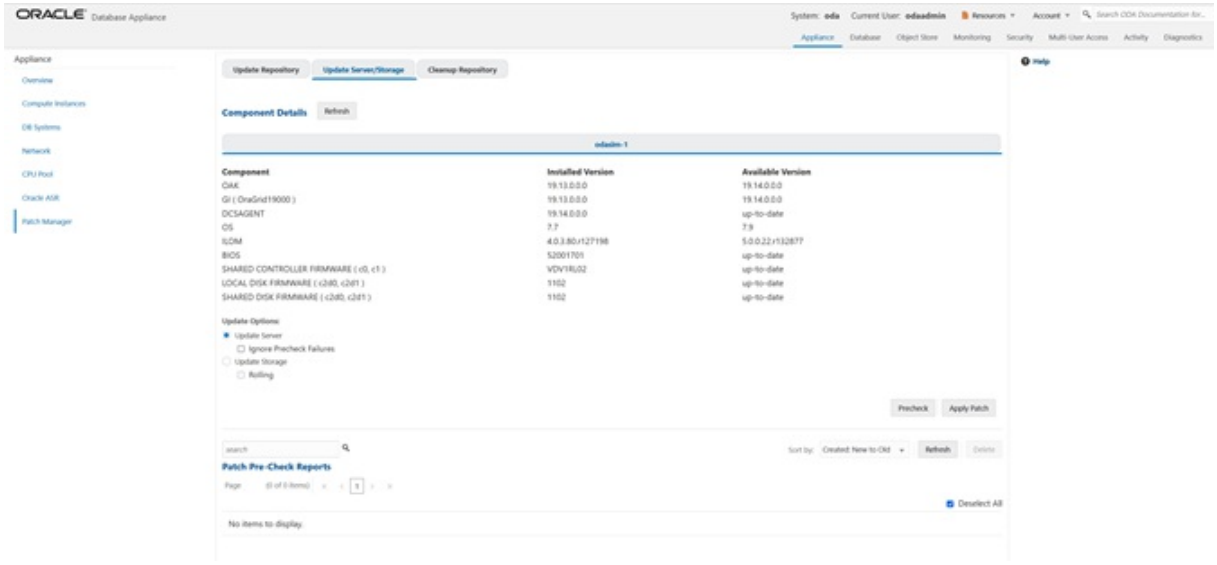
Step 2 - Update the DCS Agent (If not done already)

The next step is to update the DCS agent on both nodes for a high-availability system with the web console, before actually updating the server. The DCS agent is the Oracle Database Appliance software that provides the

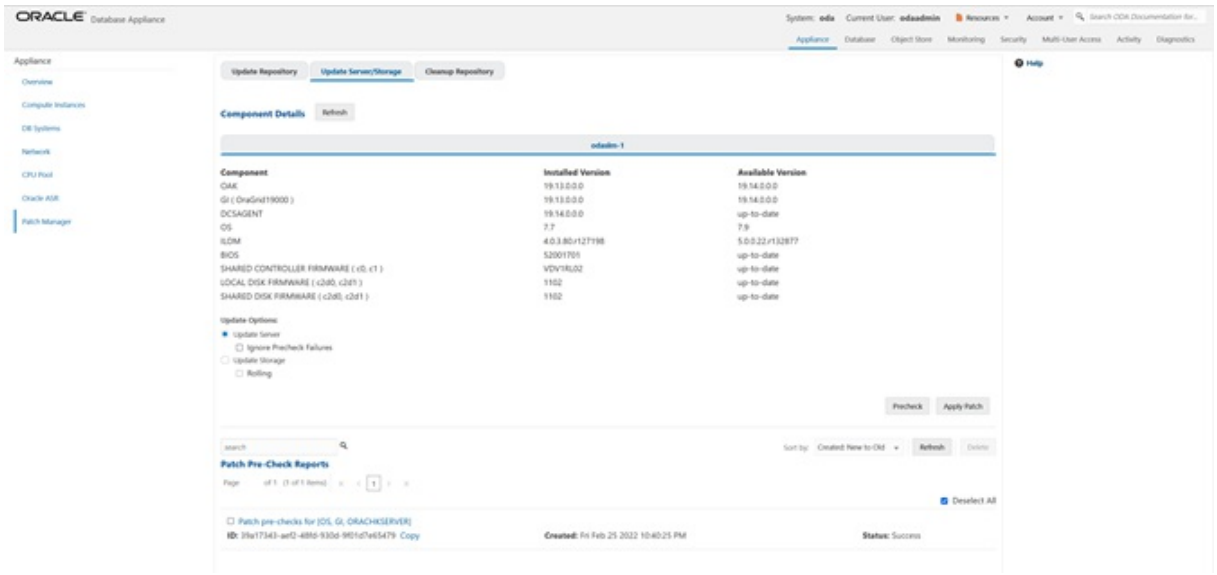
intelligence and automation. In the patching screens, select **Update Server**, then click **Apply Patch**, then click **Submit**, and then click **OK** in the Updating DCS Agent window.



From the BUI, go to the **Appliance** tab, click **Patch Manager**, and click **Refresh** to verify that the DCS Agent is up-to-date.



It is recommended that you run the prechecks for the operating system, Oracle ILOM, and Oracle Grid Infrastructure before patching by clicking **Precheck**. Note that the simulator output maybe different.

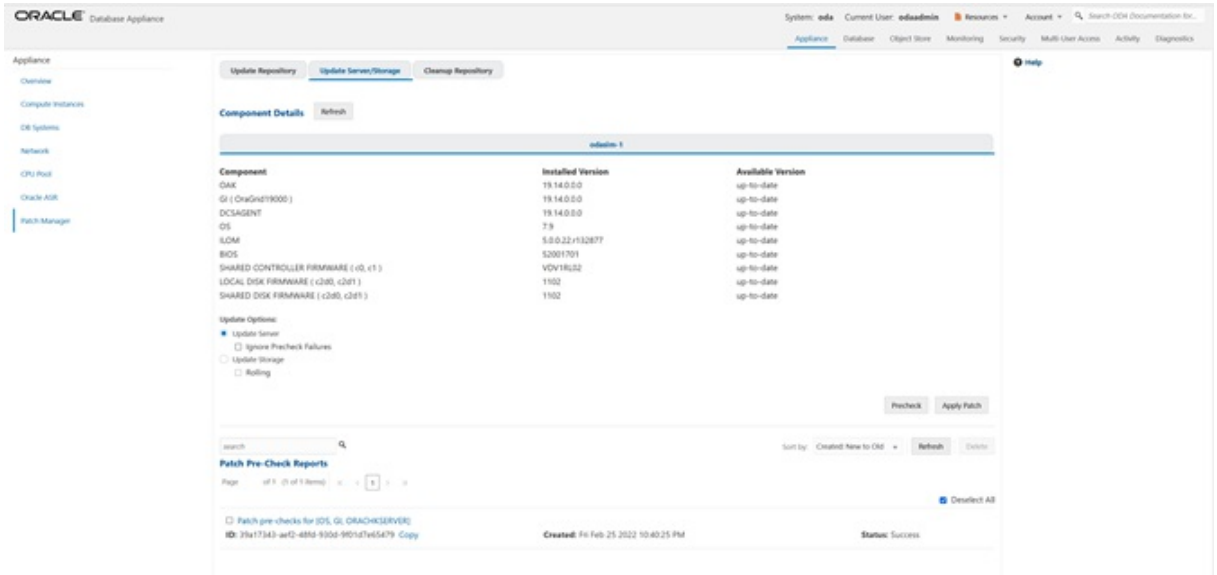


Step 3 - Update the Server

The next step is to update the server. This includes firmware, operating system, and Oracle Grid Infrastructure updates.

To update the server, select **Update Server**, then click **Apply Patch**.

After the job is completed, you can refresh the browser to see that `Node0` has all 19.17.0.0.0 components installed, and everything is up-to-date.



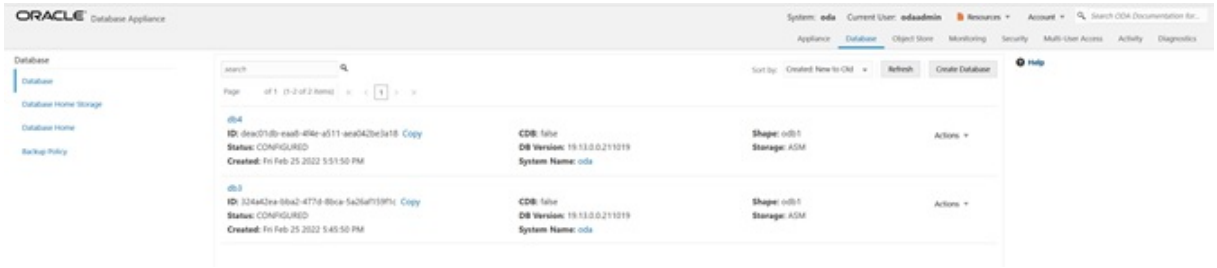
Patching an actual Oracle Database Appliance will take some time, whereas the simulator speeds up the whole process. The Linux prompt returns immediately, and the patch runs in the background. You can monitor the

progress of the patch job by checking the **Activity** tab.

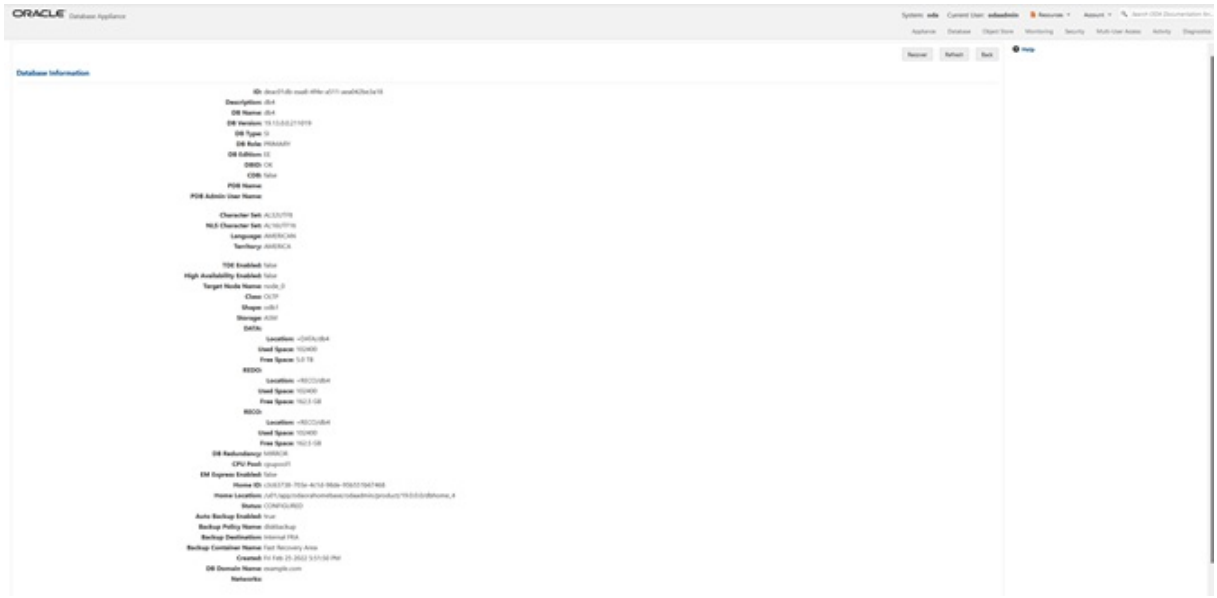
Step 4 - Patch a Database: Update a Database to point to a New Database Home

Because we may not want to patch all databases at once, we must first identify which database home corresponds to which database.

To use the BUI to identify the database homes, go to the **Database** tab.



Click on the database name, for example, `db4` to identify the database home ID for patching.



Note the Database home ID, or the Database home location. You will need this to patch the database by pointing it to a home.

You can use either the command `odacli update-dbhome` or the BUI to update the database homes, and thus the databases, running on the appliance. Each home is updated independently, giving you control over when you patch your databases.

Now, we will use the CLI to patch database `db4`.

The `odacli list-databases` command displays details about each database, its ID and its database home

ID. Those database homes will be the ones we will patch by supplying the database home ID to the patching command. You can also see more information, such as the name of the database home, using the `odacli list-dbhomes` command.

```
$ odacli list-databases

ID                                       DB Name    DB Type  DB Version
CDB        Class    Shape    Storage    Status        DbHomeID
---------------------------------------- ---------- -------- ------------------
- ---------- -------- -------- ---------- ------------ ------------------------
---------------
324a42ea-bba2-477d-8bca-5a26af159f1c     db3        SI       19.15.0.0.220419
false      OLTP     odb1     ASM        CONFIGURED   ecfa440e-2482-40c1-8ccd-673
16cd48ba2
deac01db-eaa8-4f4e-a511-aea042be3a18     db4        SI       19.15.0.0.220419
false      OLTP     odb1     ASM        CONFIGURED   c3c63738-703e-4c1d-98de-95b
551b67468

$ odacli list-dbhomes

ID                                       Name                 DB Version
Home Location                                 Status
---------------------------------------- -------------------- ------------------
---------------------- ---------------------------------------------- ----------
a1314be1-2c6f-411f-b2c7-61444449f02b     OraDB19000_home2     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_2 CONFIGURED
ecfa440e-2482-40c1-8ccd-67316cd48ba2     OraDB19000_home3     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_3 CONFIGURED
c3c63738-703e-4c1d-98de-95b551b67468     OraDB19000_home4     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_4 CONFIGURED
```

Use the clipboard to copy the DB home ID for `db4`. Then use the DB home ID with the `odacli update-dbhome` command to update the home for `db4`. Verify that the job has completed successfully using the command `odacli describe-job`.

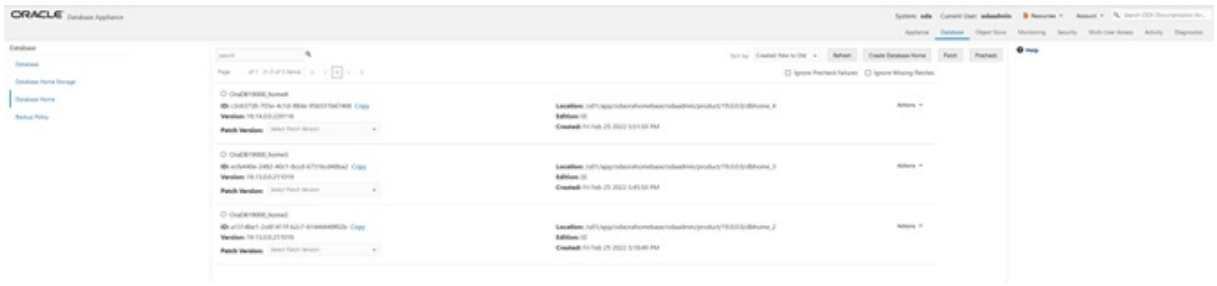
```
$ odacli update-dbhome -i c3c63738-703e-4c1d-98de-95b551b67468 -v 19.16.0.0.0
{
  "jobId" : "af879f3e-9c50-4dfd-86db-5d380a42f8d2",
  "status" : "Created",
  "message" : null,
  "reports" : [ ],
  "createTimestamp" : "July 26, 2022 06:59:59 AM UTC",
  "resourceList" : [ ],
  "description" : "DB Home Patching: Home Id is c3c63738-703e-4c1d-98de-95b551b6
7468",
  "updatedTime" : "July 26, 2022 06:59:59 AM UTC"
```

```
}

$ odacli describe-job -i af879f3e-9c50-4dfd-86db-5d380a42f8d2

Job details
----------------------------------------------------------------
                     ID:  af879f3e-9c50-4dfd-86db-5d380a42f8d2
            Description:  DB Home Patching: Home Id is c3c63738-703e-4c1d-98de-9
5b551b67468
                  Status:  Success
                 Created:  July 26, 2022 6:59:59 AM UTC
                 Message:

Task Name                                Start Time                          End
Time                          Status
---------------------------------------- ---------------------------------- ---
------------------------------ ----------
Adding USER SSH_EQUIVALENCE              July 26, 2022 7:00:02 AM UTC    July 26
, 2022 7:00:02 AM UTC    Success
Adding USER SSH_EQUIVALENCE              July 26, 2022 7:00:02 AM UTC    July 26
, 2022 7:00:02 AM UTC    Success
```

Verify that database home `db4` is updated to the release 19.16. You can use either the BUI or CLI for verification.

```
# odacli list-dbhomes


ID                                       Name                 DB Version
Home Location                                 Status
---------------------------------------- -------------------- ----------------
---------------------- ---------------------------------------------------- ----------
a1314be1-2c6f-411f-b2c7-61444449f02b     OraDB19000_home2     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_2 CONFIGURED
ecfa440e-2482-40c1-8ccd-67316cd48ba2     OraDB19000_home3     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_3 CONFIGURED
c3c63738-703e-4c1d-98de-95b551b67468     OraDB19000_home4     19.15.0.0.220419
/u01/app/odaorahomebase/odaadmin/product/19.0.0.0/dbhome_4 CONFIGURED
```

You can also use the GUI web console to update the database homes by clicking **Patch** on the left panel, and then select **Apply** in the Patch drop-down. We have already updated the `db4` database by pointing to a new home using the command line already.

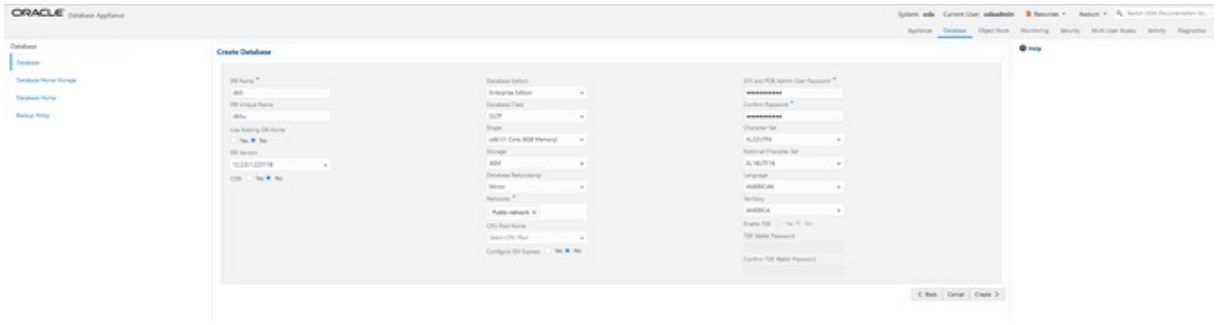


Step 5 - Upgrade a Database

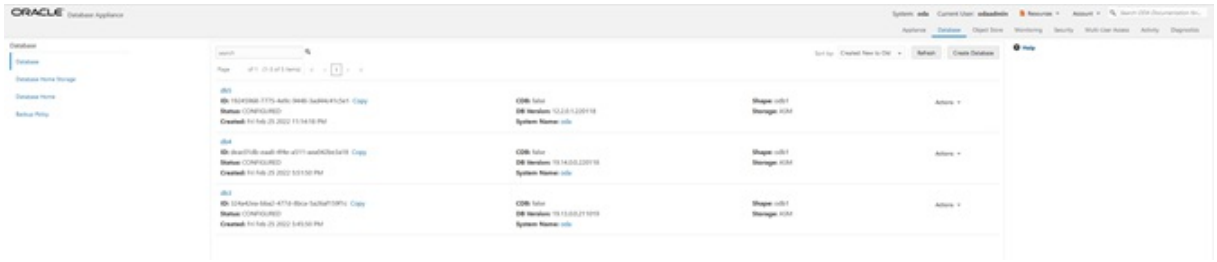
To upgrade a database from release 12.2 to 19.17, we must first create an Oracle Database release 12.2 database.

Create an Oracle 12.2 database `db5`. Select **Create a Database**, then click **Next**.

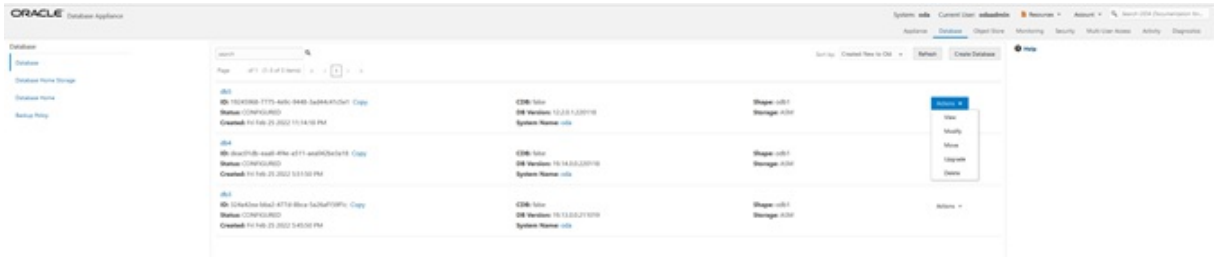
Fill in the information and click **Create**.



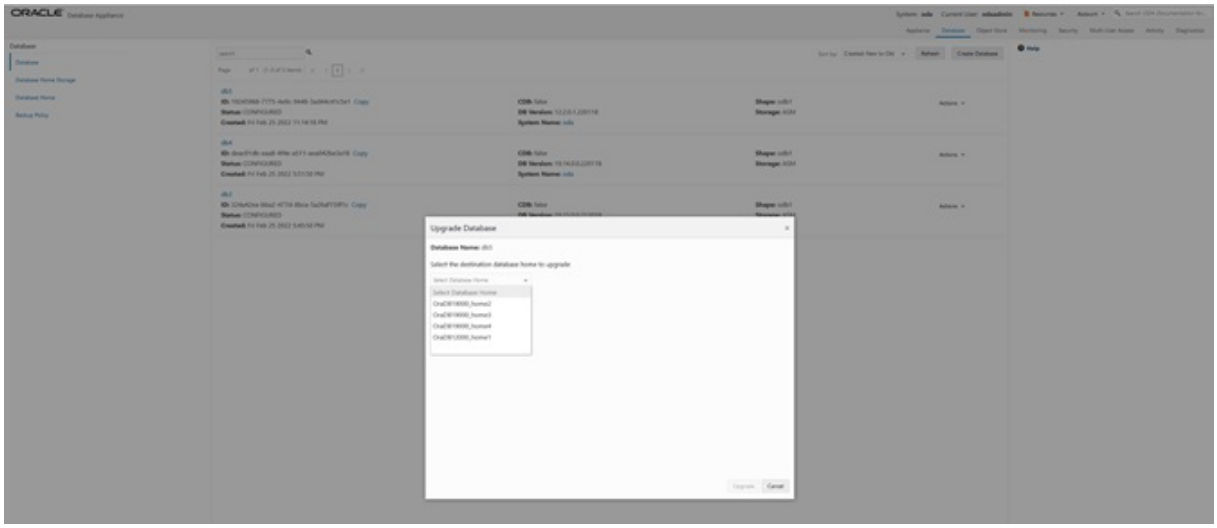
You can see Oracle Database release 12.2 database `db5` is created.



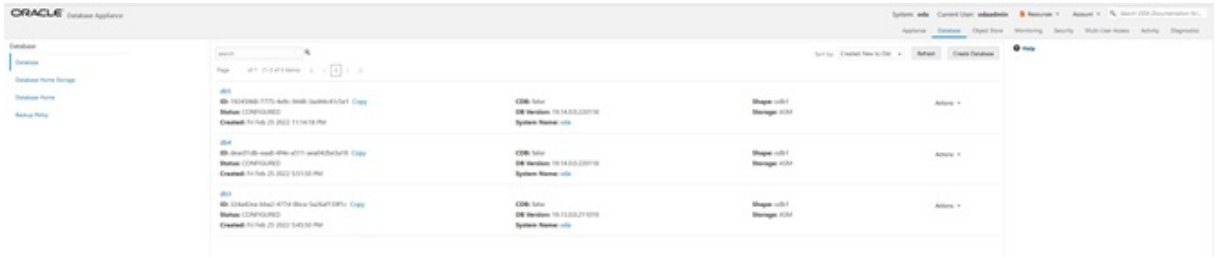
Now we will upgrade database `db5` from release 12.2 to 19.17 by clicking **Actions** and then select **Upgrade**.



Then, select a new database home, for example, `OraDB19000_home4`. Database upgrade is also an out-of-place operation, which means the existing home of the database is not modified.



You can see `db5` is upgraded from Oracle Database release 12.2 to 19.17.



This concludes Lab 3.

Lab 4 - Virtualization: Create Application and Database KVMs

Virtualization provides many benefits to customers such as cost savings through consolidation and better resource utilization, Virtual Machine (VM) isolation that provides better security, and KVM license hard partitioning support. Kernel-based VM (KVM) is an industry standard virtualization technology that is also used in Oracle Cloud and other public clouds.

You will use Oracle Database Appliance BUI to create an application KVM, called Compute Instance, and a database KVM, called Database System.

- Step 1 - Create an Application KVM (Compute Instance)
- Step 2 - Create a Database KVM (Database System)

Step 1 - Create an Application KVM (Compute Instance)

Before you create an application KVM on Oracle Database Appliance, you must create the following:

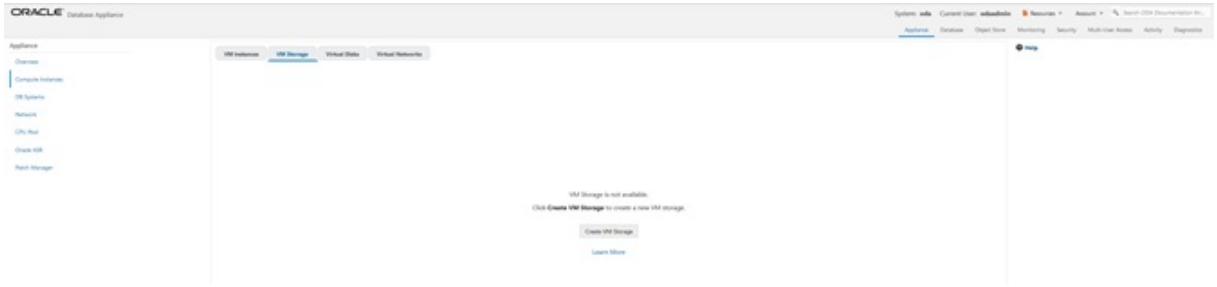
- CPU Pool
- VM Storage
- Virtual Disk
- Virtual Network

You must create a guest operating system (Linux or Windows) ISO image to create the application KVM instance. After that, you must configure the guest operating system, networking (set IP address) so that you can access the VM to install applications. You can also modify and delete an application KVM.

First, create a CPU Pool for the application KVM. In the BUI, click **CPU Pool**, and then click **Create CPU Pool**. Enter the following information, then click **Create**.

You can see the CPU pool `App1` is created. A CPU pool is optional and not required to create an application KVM.

Next, create the VM Storage. Select the **VM Storage** tab, and then click **Create VM Storage**.



Enter the following information for `vmstorage1`, and then click **Create**. VM Storage can be used by different application KVMs.

You can see `vmstorage1` is created.

Next, create a virtual disk `vdisk` to be used by the application KVM. Select the **Virtual Disks** tab and click **Create Virtual Disk**.

Select **Create Virtual Disk**, then click **Next**.

Enter the following information for `vdisk1`, and then click **Create**.

You can see `vdisk1` is created.

Create a virtual network for the KVM. Select the **Virtual Networks** tab, and then click **Create Virtual Network**.

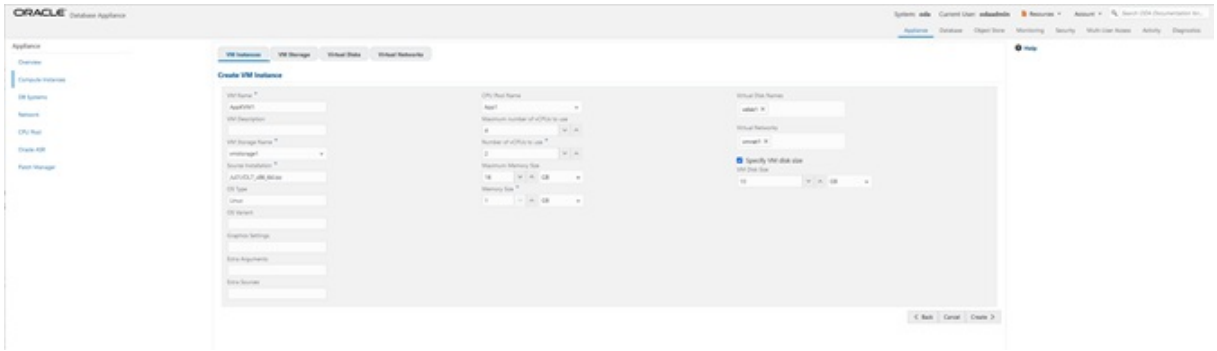
Specify the Virtual Network information, then click **Create**.

You can see the virtual network `vmnet1` is created.

Create an application KVM (Compute Instance). Select the **VM Instances** tab, and then click **Create VM Instance**.

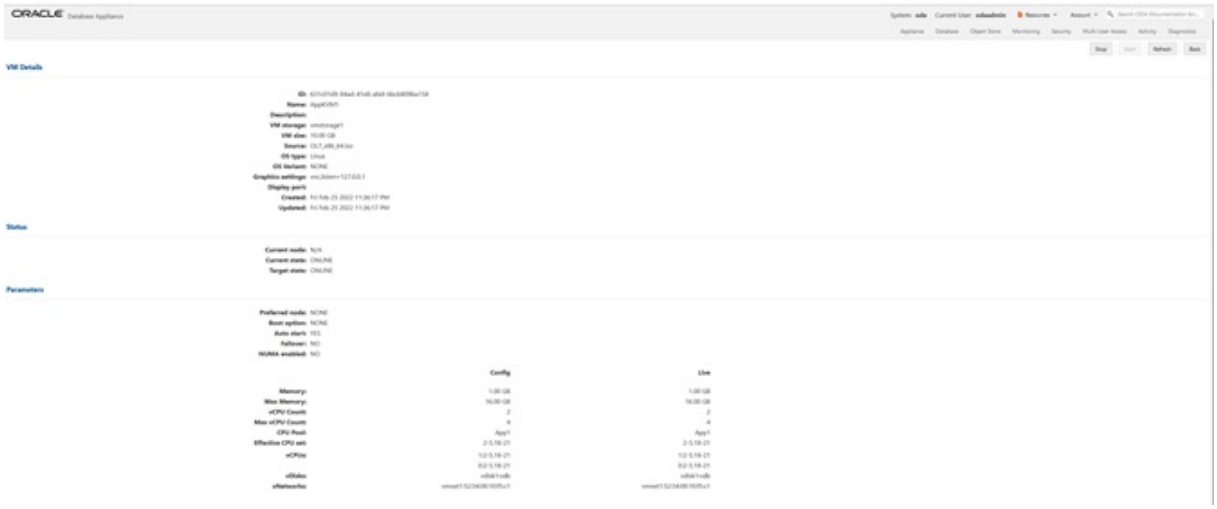
Select **Create VM Instance**, then click **Next**.

Specify the information for AppKVM1, then click **Create**. Note the **Source Installation** path to the Linux ISO image. Note that the VM disk size is 10GB. VM disk is the local system boot disk where the Linux image is installed.

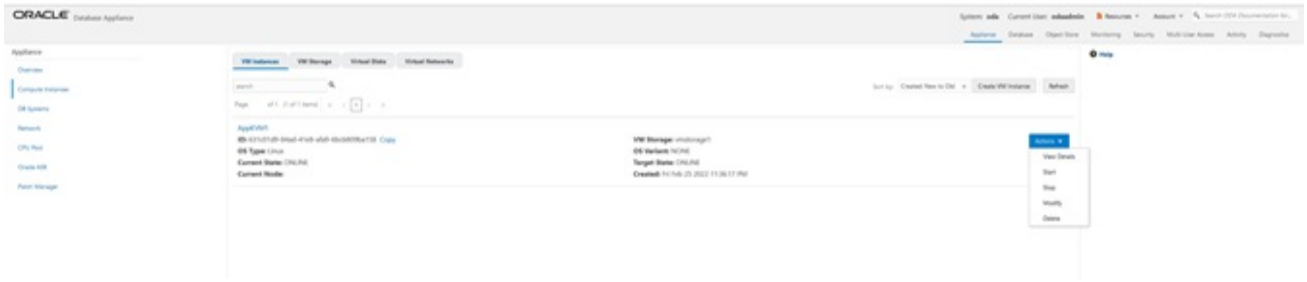


You can see AppKVM1 instance is created.

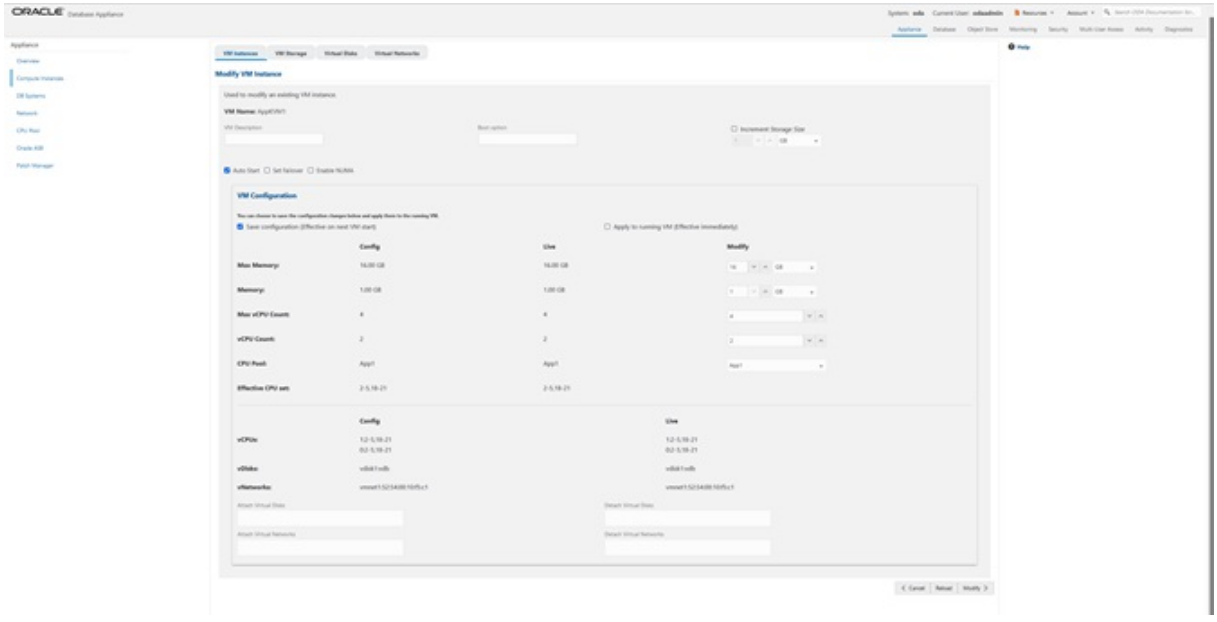
You can see the detailed information for AppKVM1 by clicking on AppKVM1.



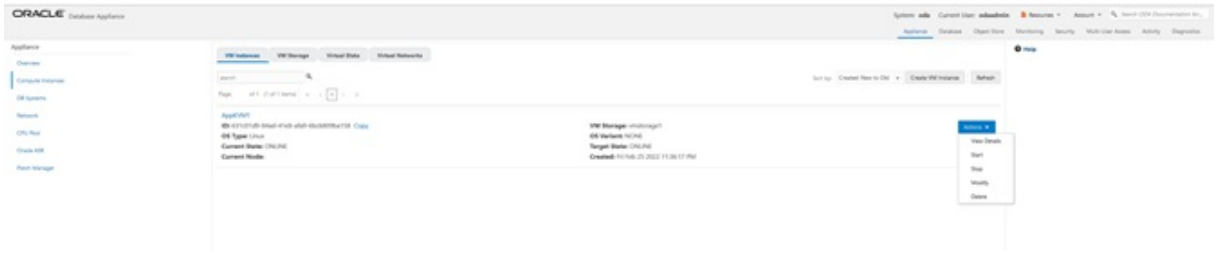
If you want to modify the VM instance, then click the **VM Instance** tab. For AppKVM1, click the **Actions** dropdown and then click **Modify**.



This is where you can modify AppKVM1.



To delete an application KVM, from the **VM Instances** tab, click the **Actions** dropdown, and then click **Delete**.

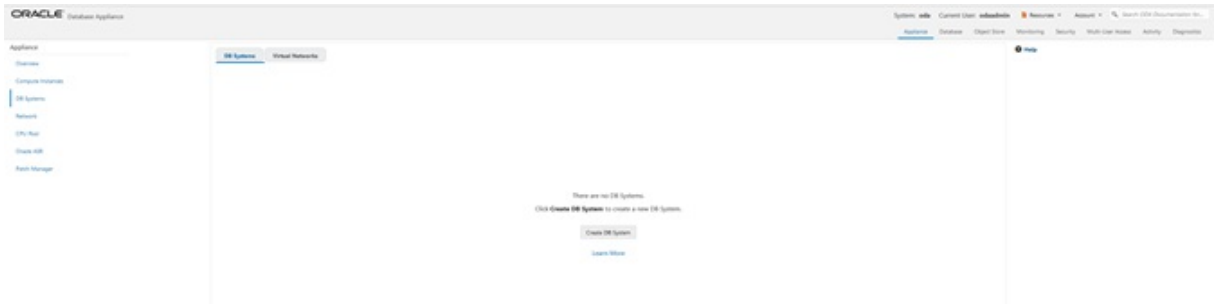


Step 2 - Create a Database KVM (Database System)

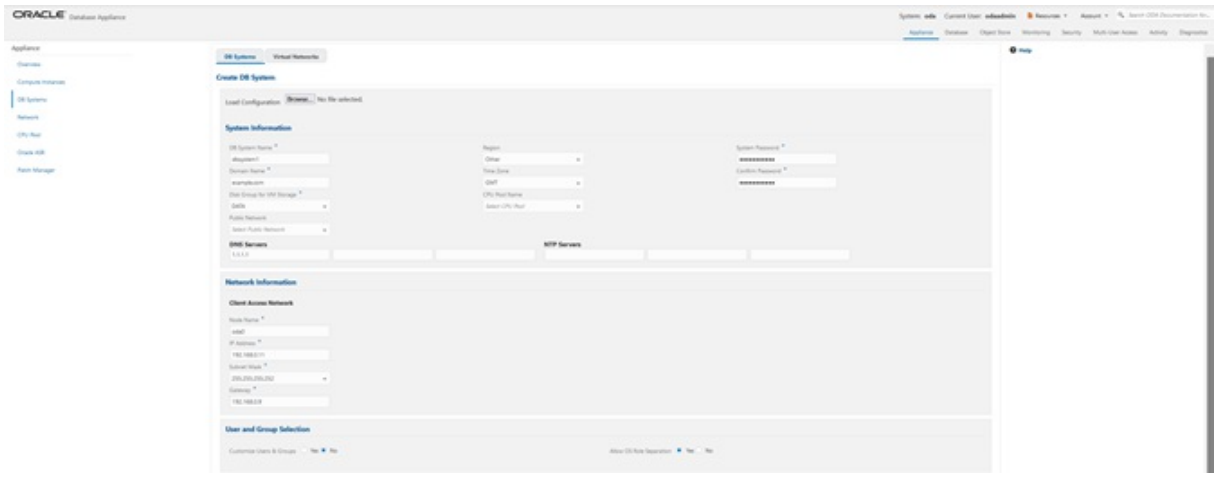
To create a database KVM (Database System) in Oracle Database Appliance, you must first download the DB system image (database VM template) into the appliance, then update the repository so that the database VM template is saved in Oracle Database Appliance.

```
$  odacli update-repository -f /opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0
-date-ODAVM-19.17.0.0.zip
{
  "jobId" : "2d45004d-923b-45d9-b27c-cfbda391edb6",
  "status" : "Running",
  "message" : "/opt/oracle/dcs/patchfiles/odacli-dcs-19.17.0.0.0-date-ODAVM-19.1
7.0.0.zip",
  "reports" : [ ],
  "createTimestamp" : "October 26, 2022 07:45:04 AM UTC",
  "resourceList" : [ ],
  "description" : "Repository Update",
  "updatedTime" : "October 26, 2022 07:45:05 AM UTC"
}
```

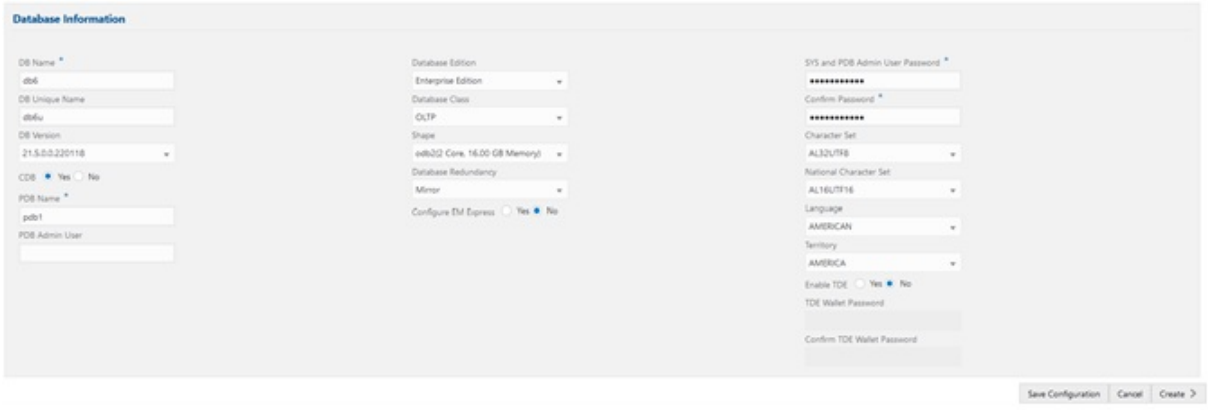
In the BUI, select **DB Systems** on the left, and click **Create DB System**. Then, click **Create**.



Enter the System Information, Network Information, CPU Pool and Database Information, then click **Create**.

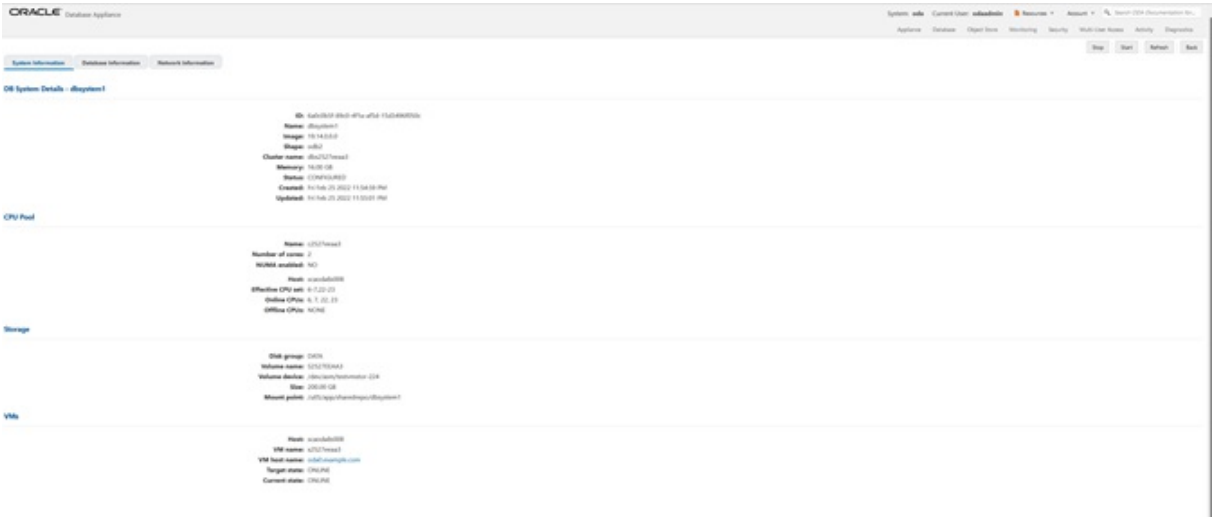


Note the database shape selected will determine the number of CPU cores assigned to the database. A database CPU pool is automatically created, or a database CPU Pool can be selected. A default network is also be automatically assigned to the database, or a network can be selected. Make sure **CDB** is selected.



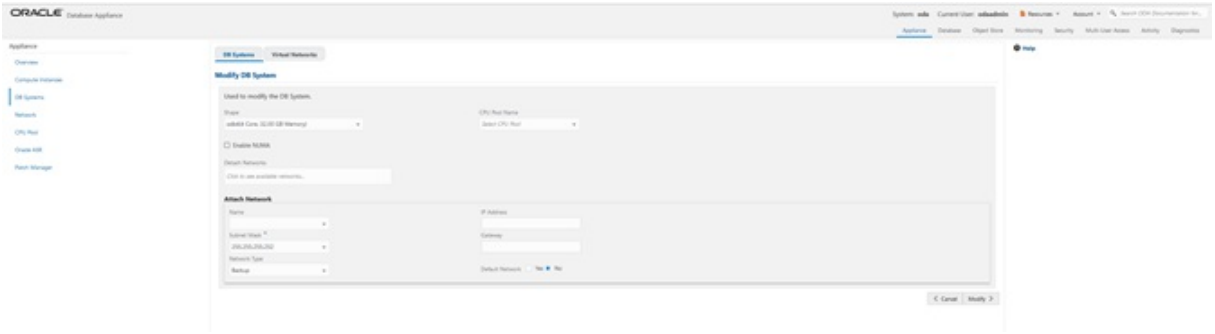
You can see that a database KVM `dbsystem1` is created.

You can find the details for `dbsystem1` by clicking on it.



You can modify the DB System by clicking **Actions** and then selecting **Modify**.

You can change the database shape from `odb2` (2 cores) to `odb4` (4 cores).



Click the **DB Systems** tab on the left to verify that `dbsystem1` has 4 cores now.

This concludes Lab 4.

Lab 5 - Multi-User Access

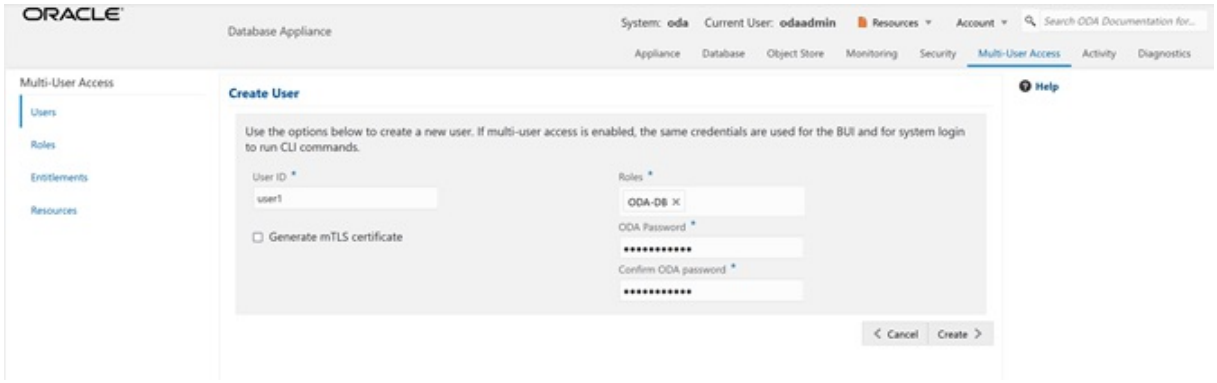
Oracle Database Appliance Multi-User Access can enhance the security of your appliance and provide an efficient mechanism for role separation. With multi-user access, you can provide separate access to database administrators to manage databases and create multiple users with different roles that restrict them from accessing resources created by other users and restrict the set of operations they can perform.

In this lab, you will create two new users, `user1` and `user2`, assign a resource, for example, database to `user1`, then create a database using `user2`. You will verify that both users have access to different resources.

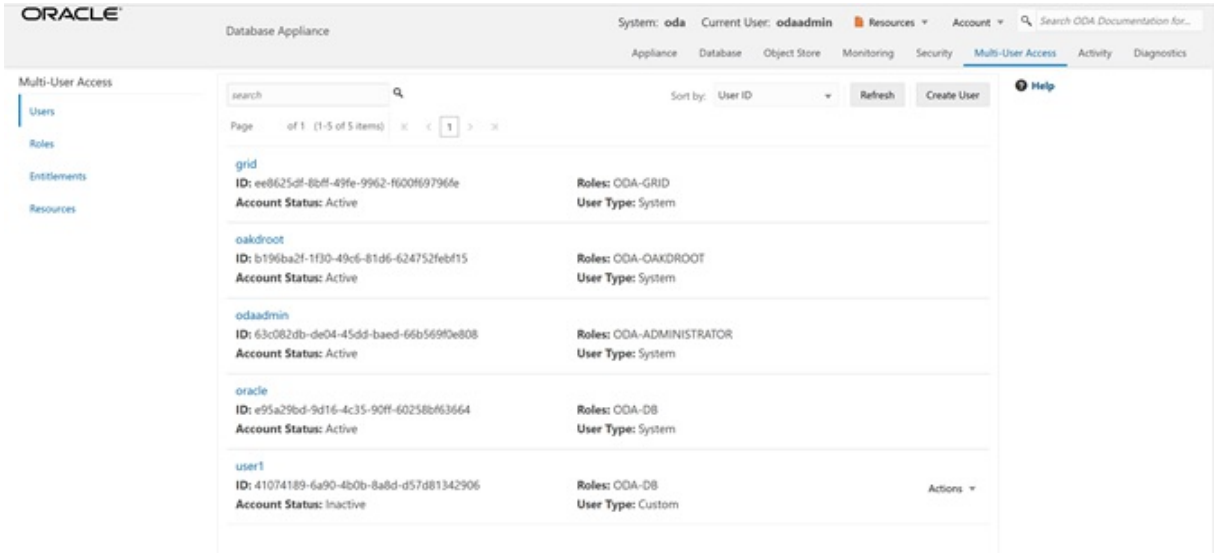
- Step 1 - Create New Users
- Step 2 - Grant a Resource to a User
- Step 3 - Create a Resource by a User

Step 1 - Create New Users

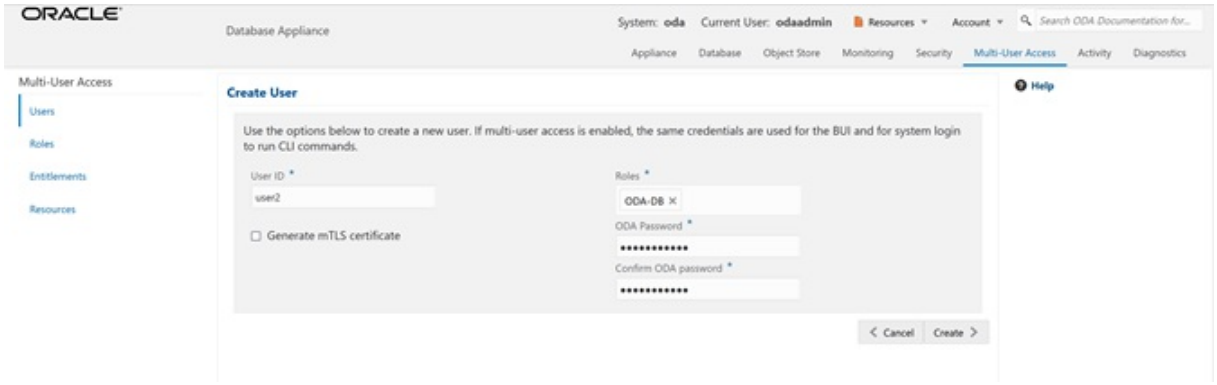
Navigate to the **Multi-User Access** tab in the BUI. Create a new user, `user1`, and provide a temporary password. The password for `user1` must be changed on the first login.



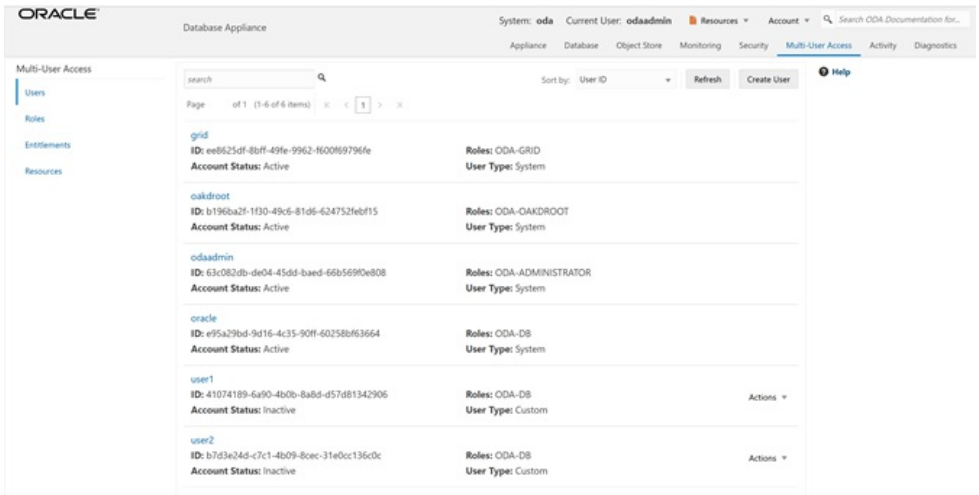
Go to the **Users** tab on the left to verify that the new user, `user1`, is created.



Create a second user, `user2` using the same process.

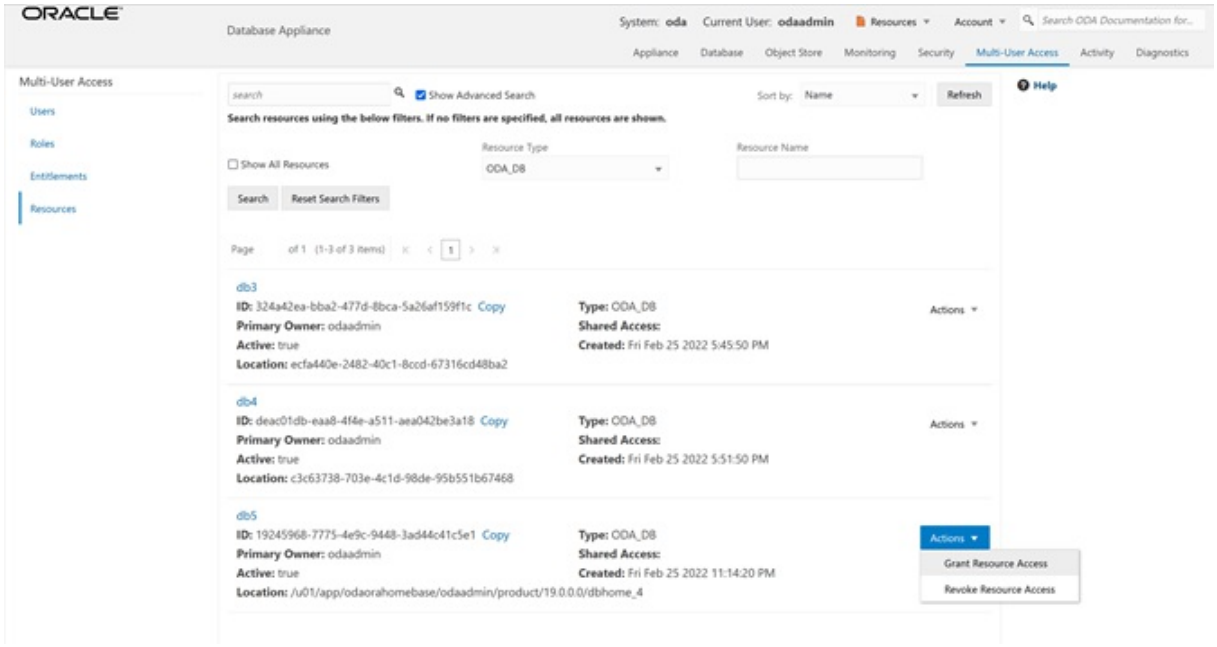


Go to the **Users** tab on the left to verify that `user2` is created.

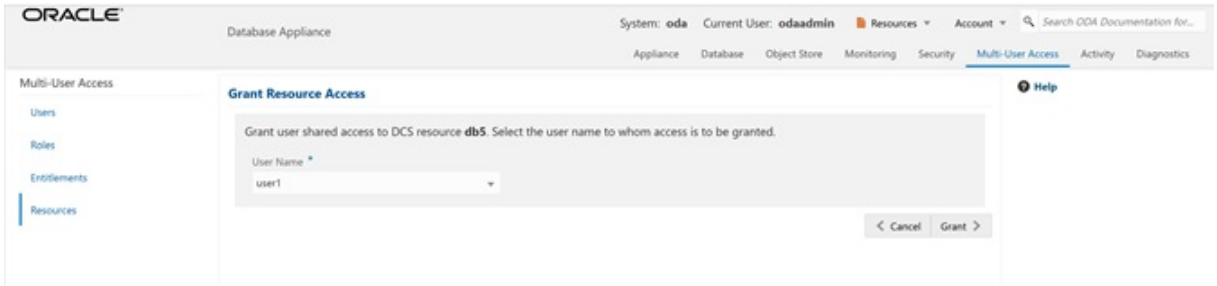


Step 2 - Grant a Resource to a User

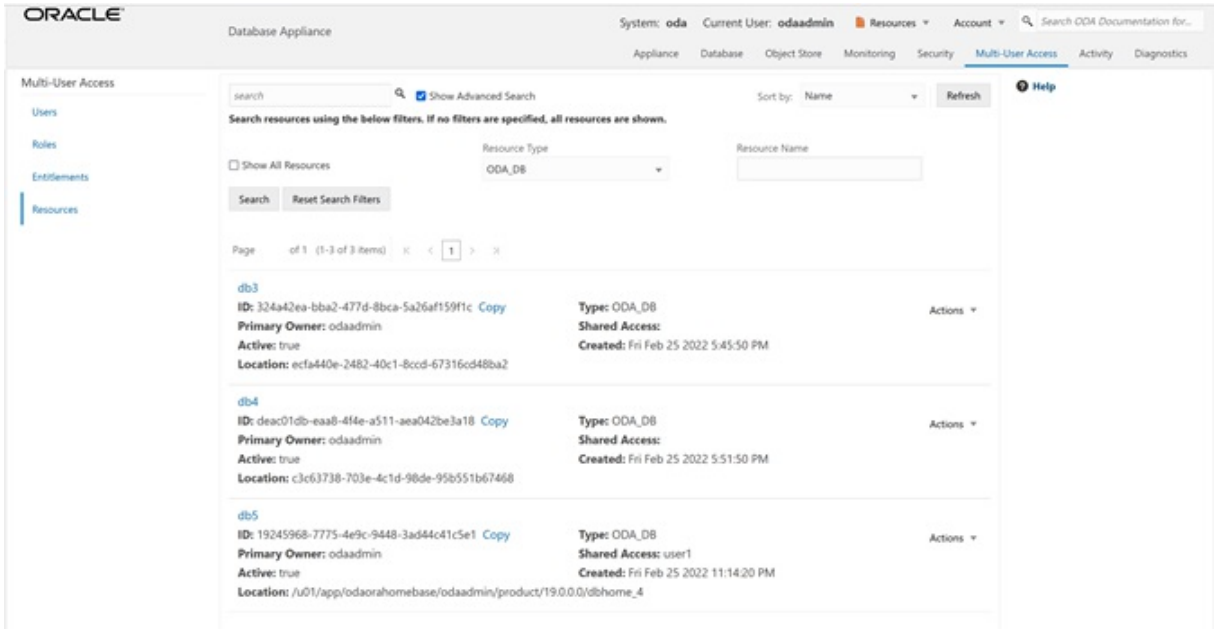
You will grant a resource, `db5`, to `user1`. Go the **Resources** tab on the left, click on **Show Advanced Search**, select **ODA_DB**, and click **Search**. On `db5`, click **Actions**, and then select **Grant Resource Access**.



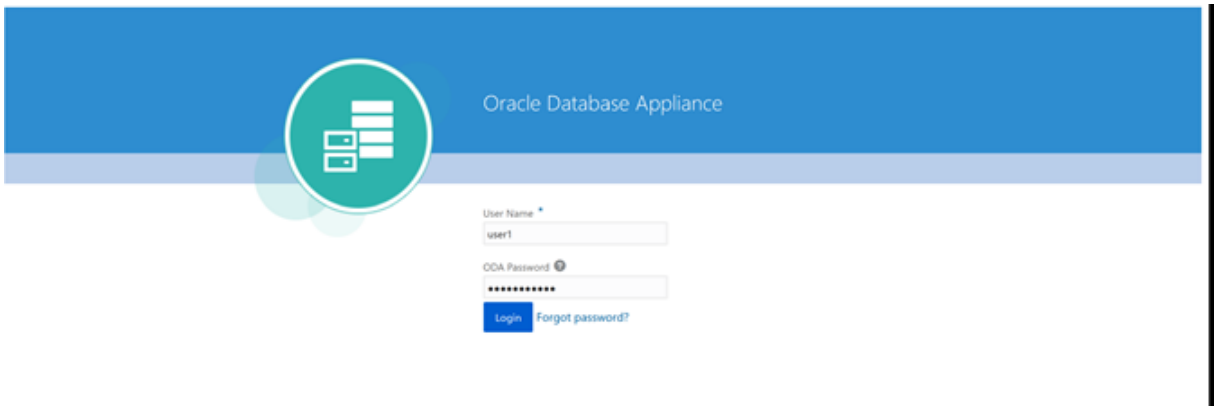
In the **User Name** drop-down, select `user1`, then click **Grant**.



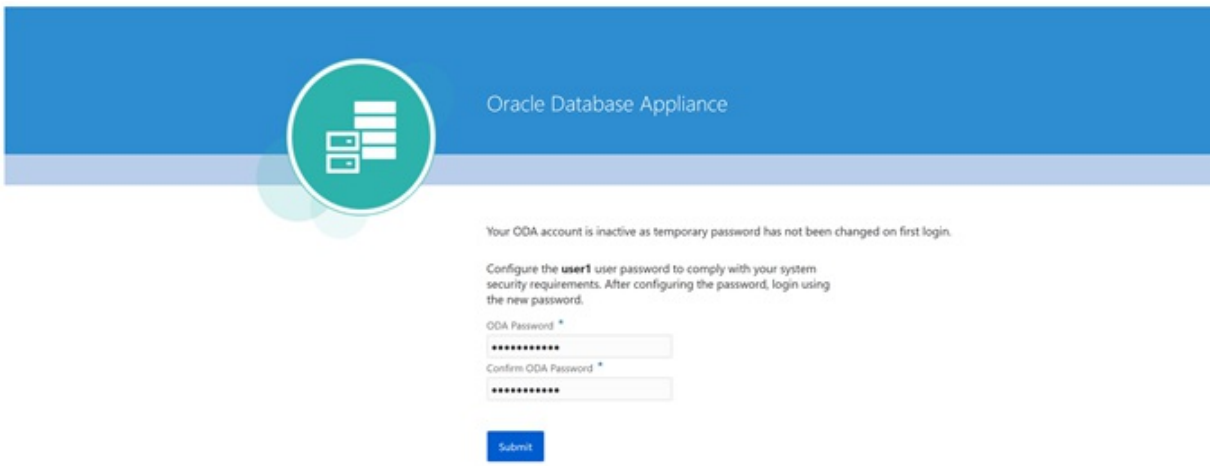
To verify that `user1` has access to `db5`, click on the **Resources** tab on the left again. Note that `user1` now has shared access to `db5`. Note that this database was originally created by the `odaadmin` user.



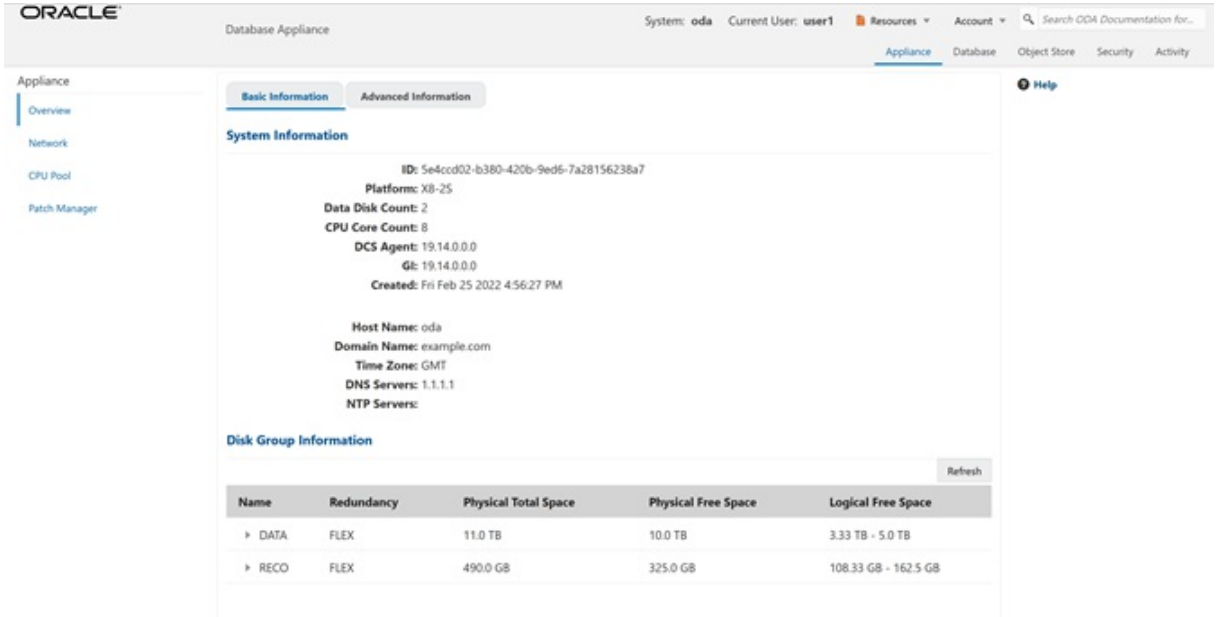
Log in as `user1` to verify access to `db5`.



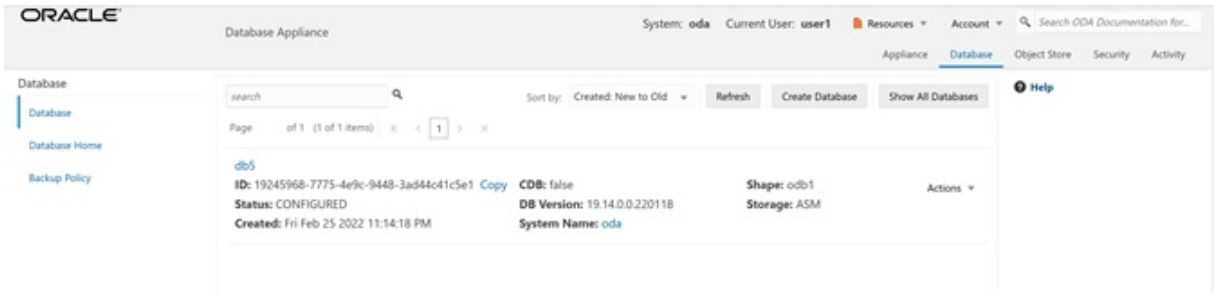
Specify the temporary password created by the `odaadmin` user, and you are prompted to provide a new password. You can use a password similar to `WELcome12##` or create your own.



When you log in with the new password, note that the **Current User** is displayed as `user1`. Note that there are fewer tabs on the top for `user1`.

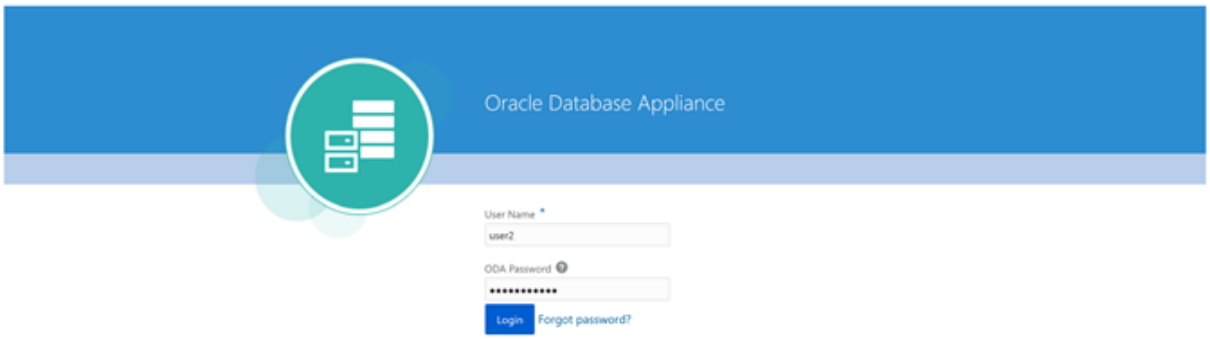


Click on the **Database** tab, and note that `user1` has access to `db5`.

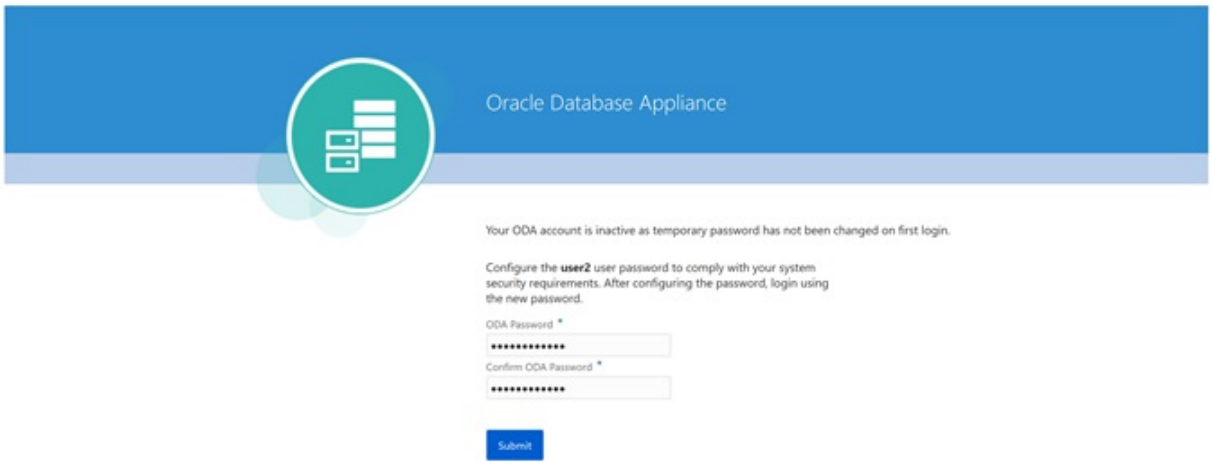


Step 3 - Create a Resource by a User

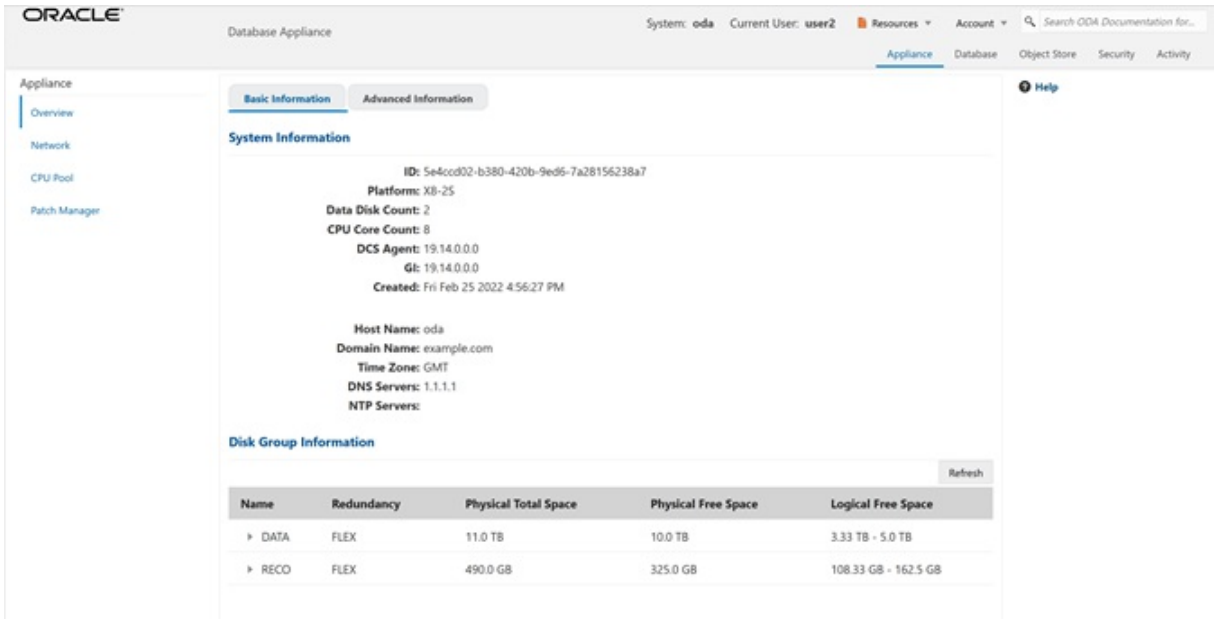
Log in as `user2`, create a database, and have exclusive access to the database. First, log in as `user2` with the temporary password created by `odaadmin`.



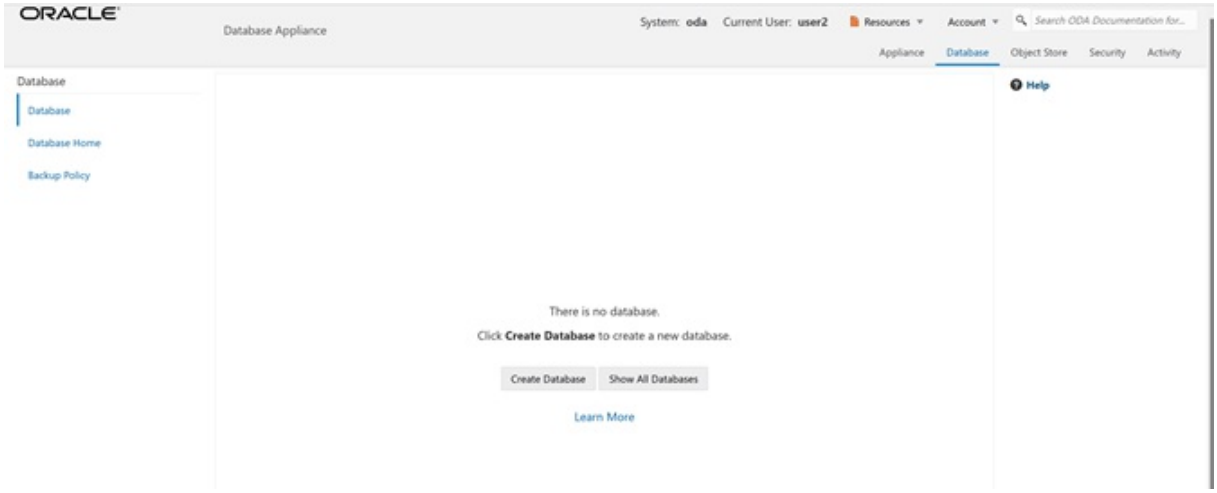
A new password for `user2` is required. You can use a password similar to `WELcome12##`, or create your own.



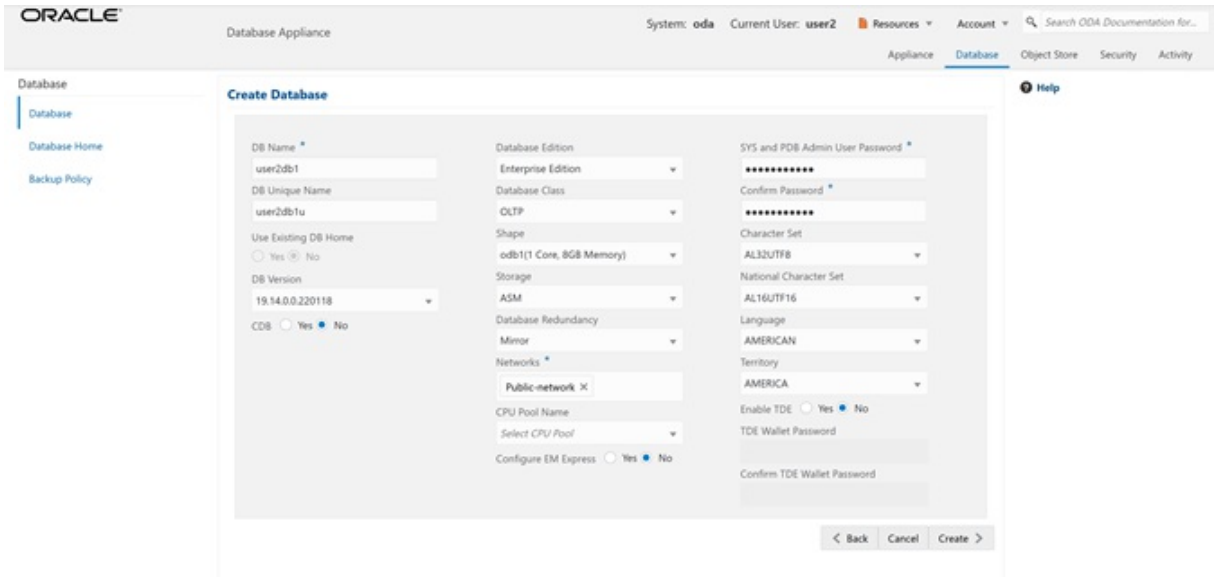
Log in as `user2` with the new password.



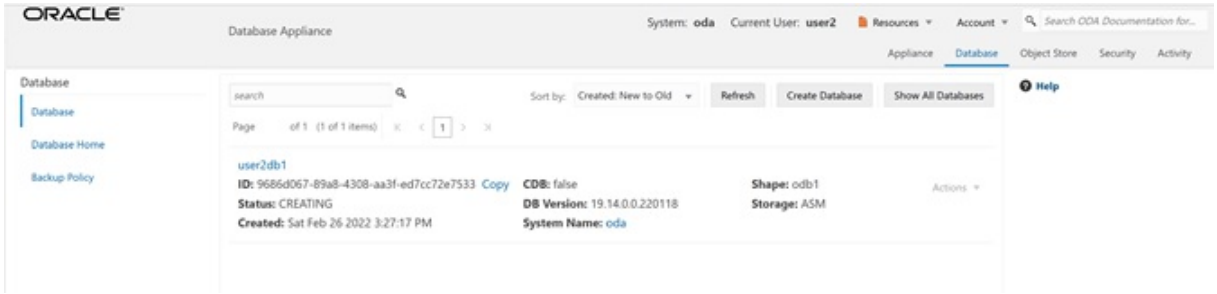
Click on the **Database** tab. There are no database available to `user2`. Click **Create Database**.



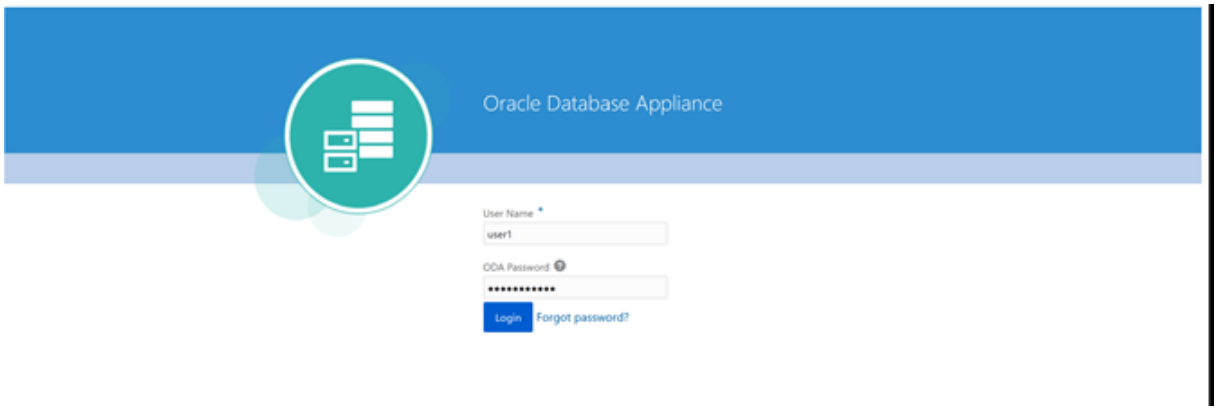
Create a new database, `user2db1`.



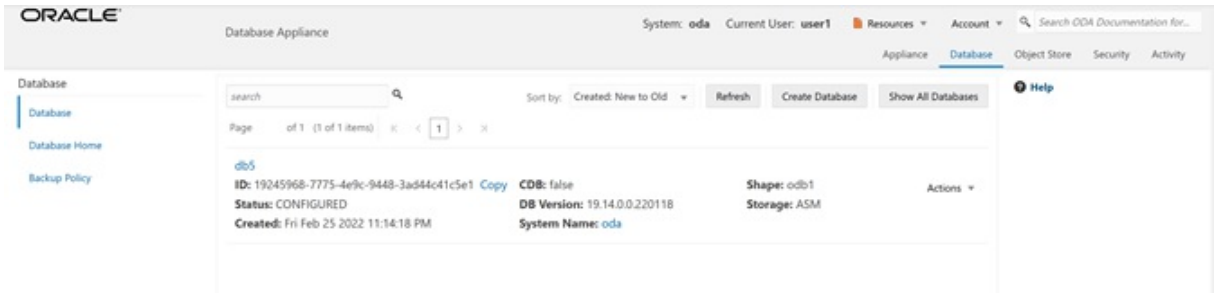
Click **Create** and verify that the database is created.



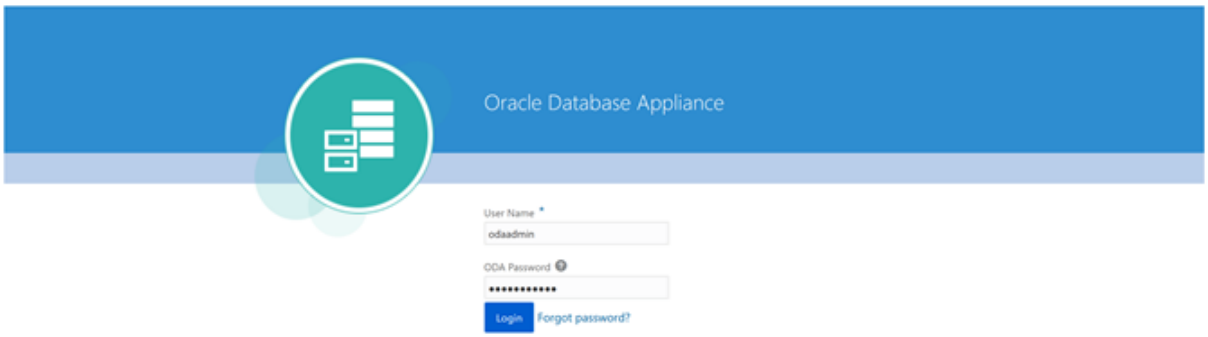
Log in as `user1` to verify that `user1` does not have access to `user2db1`.



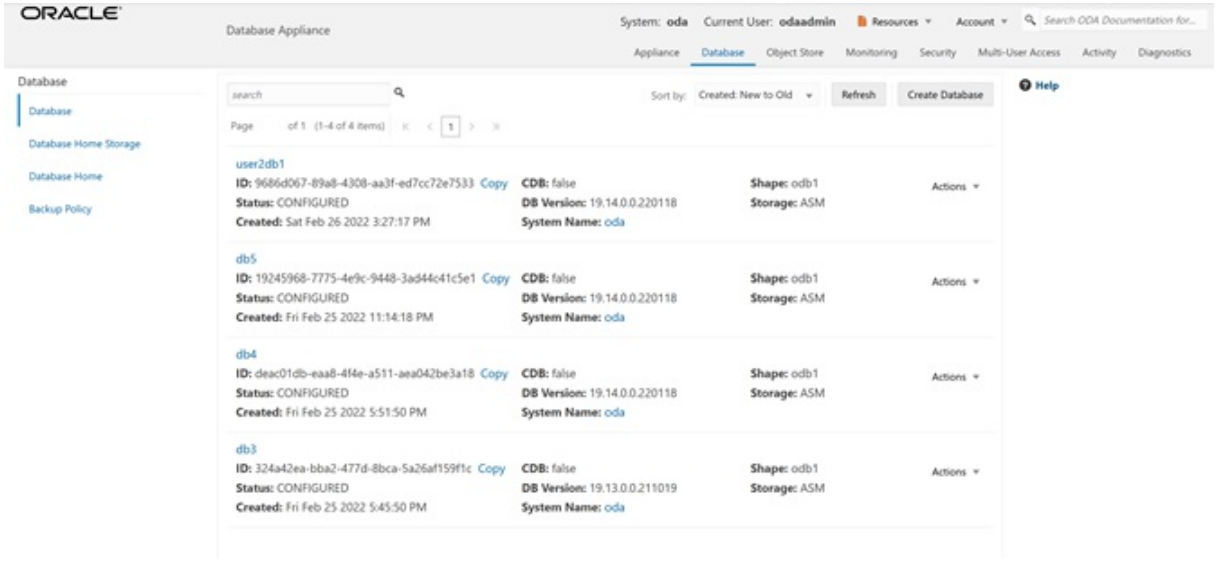
You can verify that `user1` only has access to `db5`.



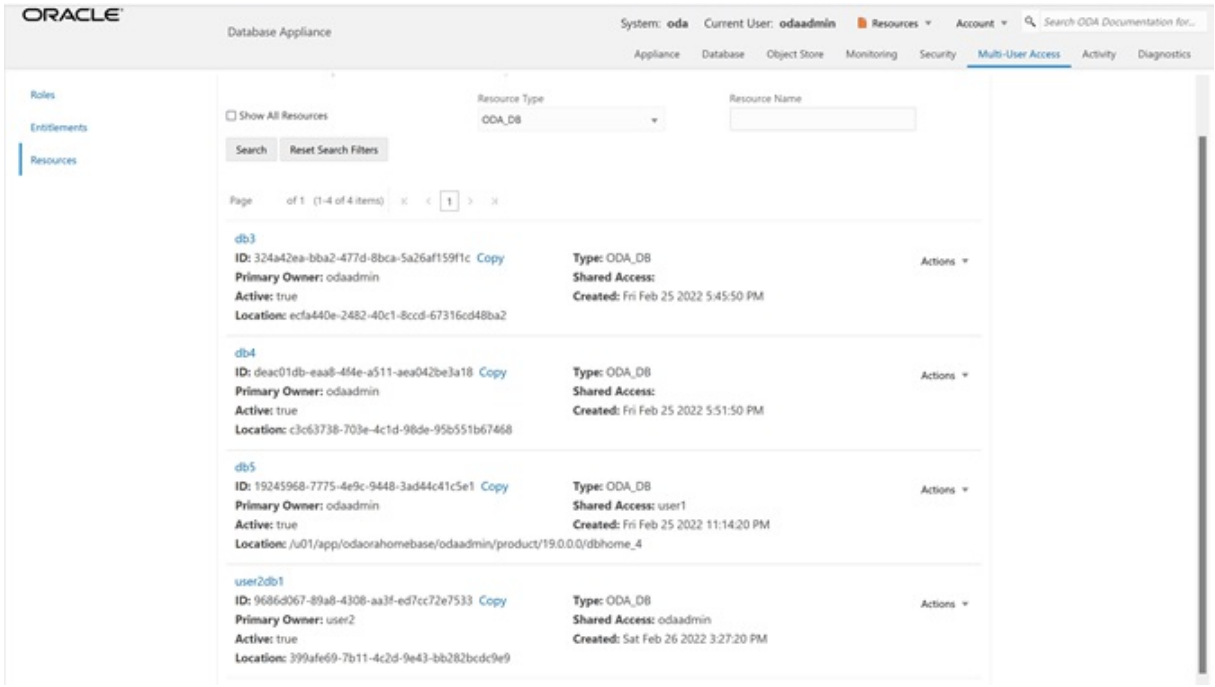
Log in as `odaadmin` to review resources and user access.



When logged in as the `odaadmin` user, you can view all the databases.



Click on the **Multi-User Access** tab, then click on the **Resources** tab on the left. Use the **Advanced Search** feature and search for `ODA_DB`, You can see the Primary Owner of the database and Shared Access users for the databases. The `user1` has access to `db5`, and `user2` has access to `user2db1`.



This concludes Lab 5.

Lab 6 - Monitoring and Resources

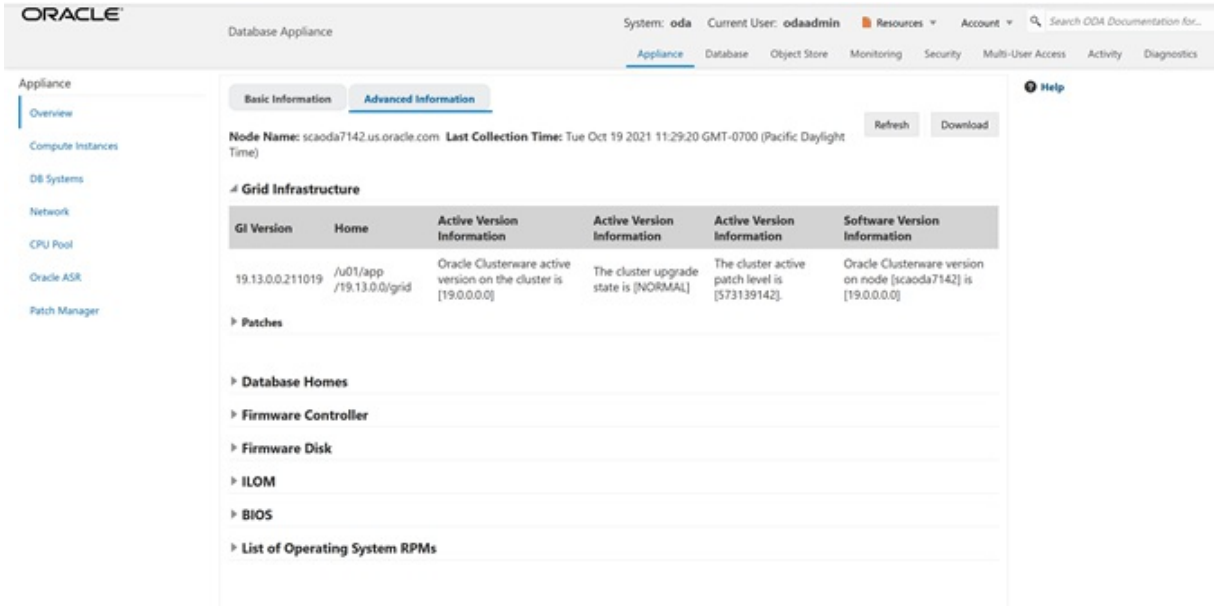
Use either the command line or web BUI to monitor Oracle Database Appliance software, hardware, and feature usage. Oracle Database Appliance also provides security reports, diagnostic information, and context sensitive online help (documentation, FAQ, blogs). An Oracle Enterprise Manager plug-in is available if you want to use Oracle Enterprise Manager to monitor your IT infrastructure.

This lab will demonstrate how to monitor Oracle Database Appliance with BUI and ODACLI commands.

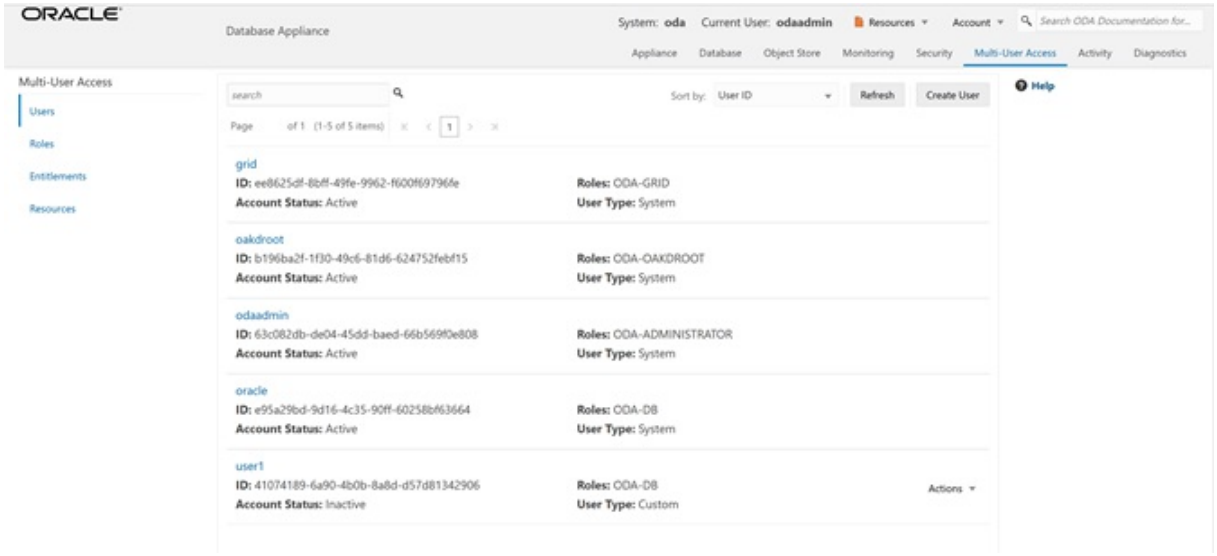
- Step 1 - Advanced Information, Security Reports, Diagnostics, Online Help
- Step 2 - Hardware Monitoring and Feature Tracking
- Step 3 - Review Appliance Configuration
- Step 4 - Review Storage Configuration
- Step 5 - Review Network Status

Step 1 - Advanced Information, Security Reports, Diagnostics, Online Help

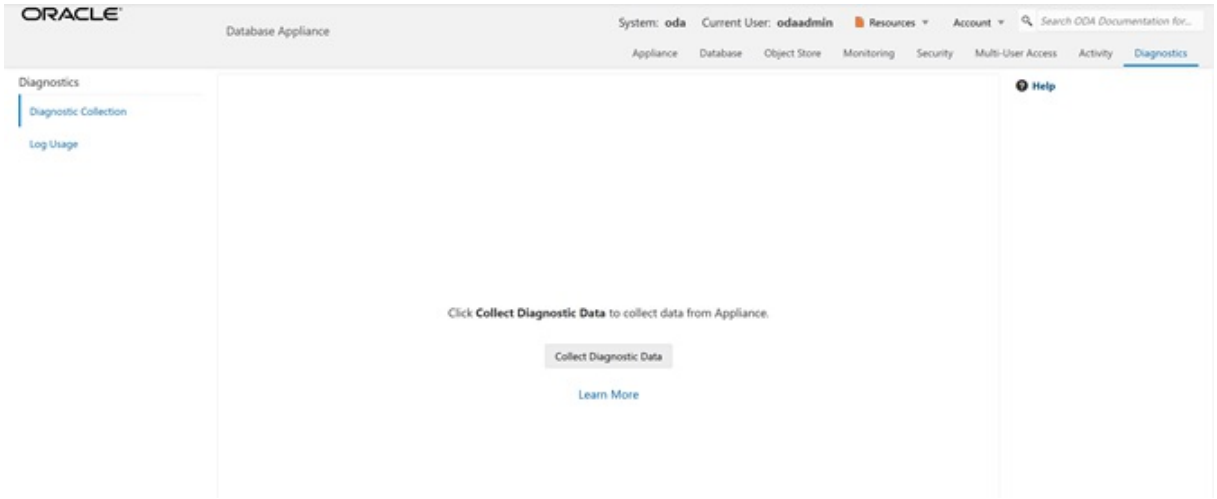
To view the Oracle Database Appliance software components, click on the **Advanced Information** tab on the Appliance Overview page.



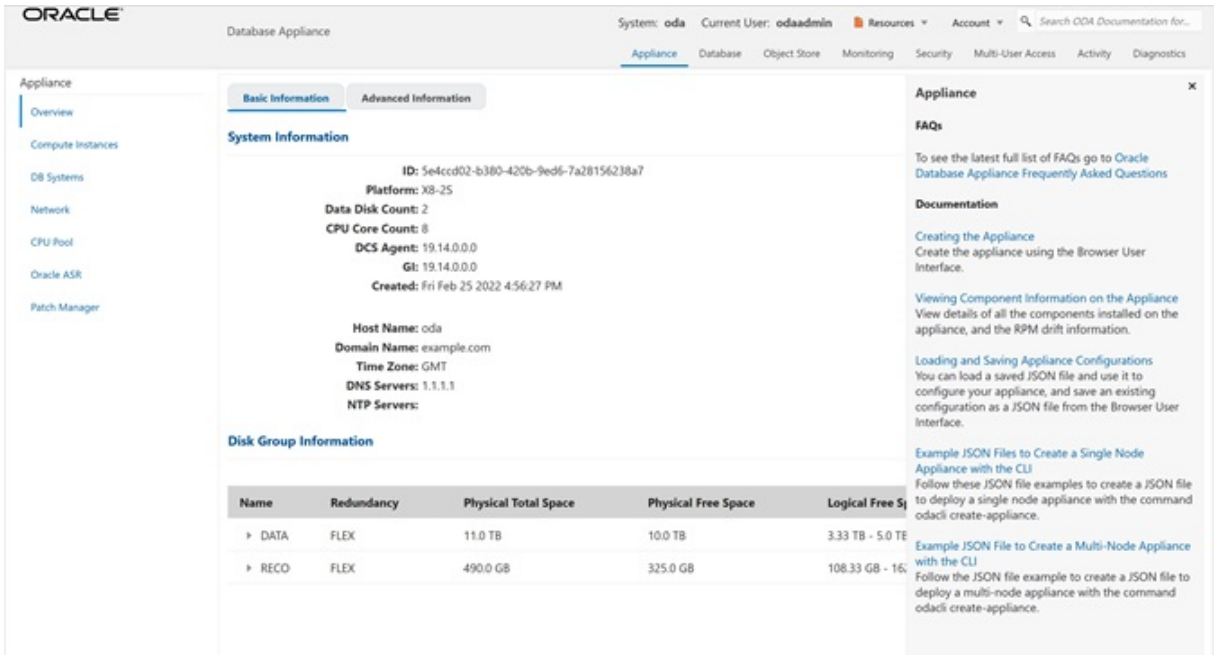
To view security-related information, click on the **Security** tab on the Appliance page.



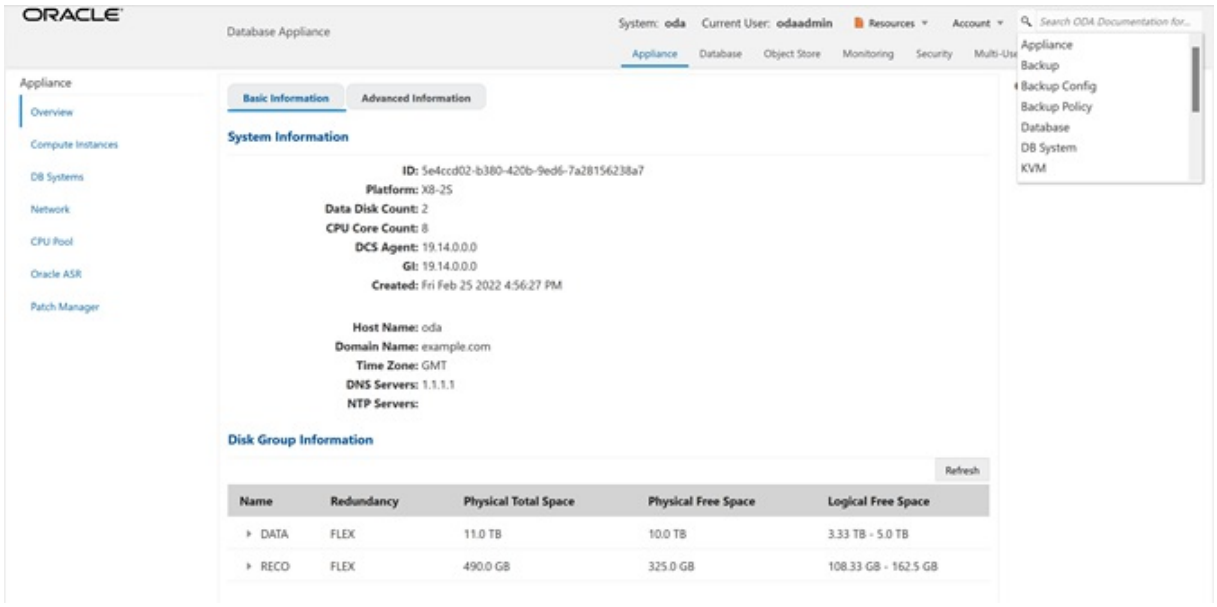
To view diagnostic and log usage information, click on the **Diagnostics** tab on the Appliance page.



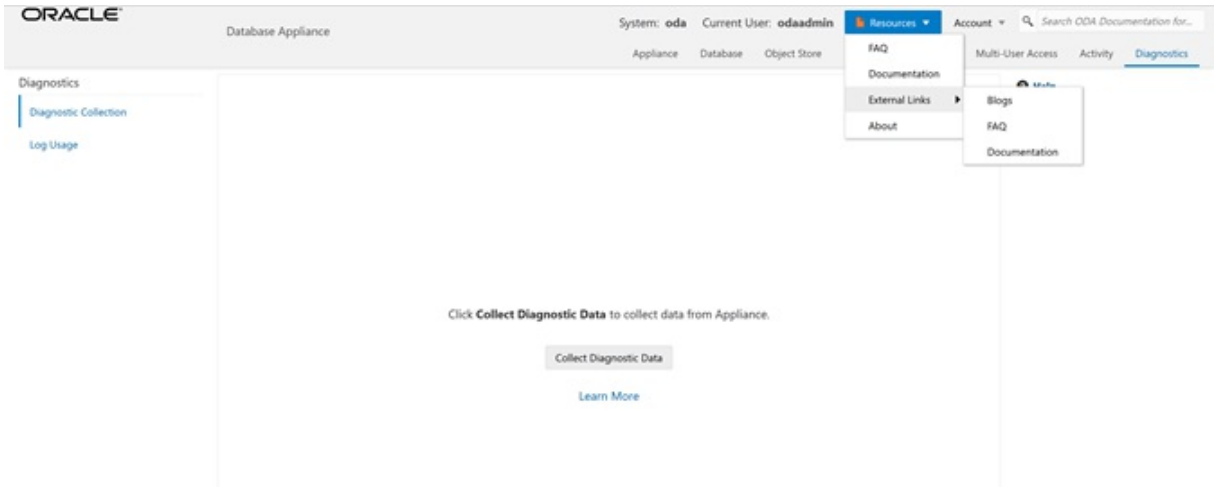
To view context sensitive in-line help information, click on **? Help**.



You can also click inside the search box on the top right corner to search the Oracle Database Appliance documentation by topics.

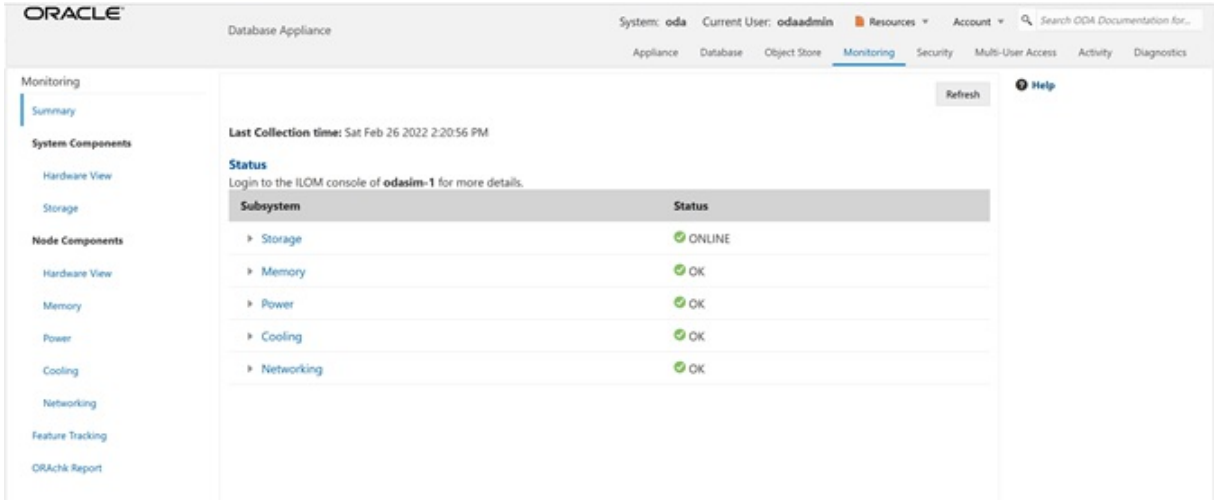


To view online help information such as Oracle Database Appliance documentation, FAQ, and blogs, click on the **Resources** tab on the Appliance page.

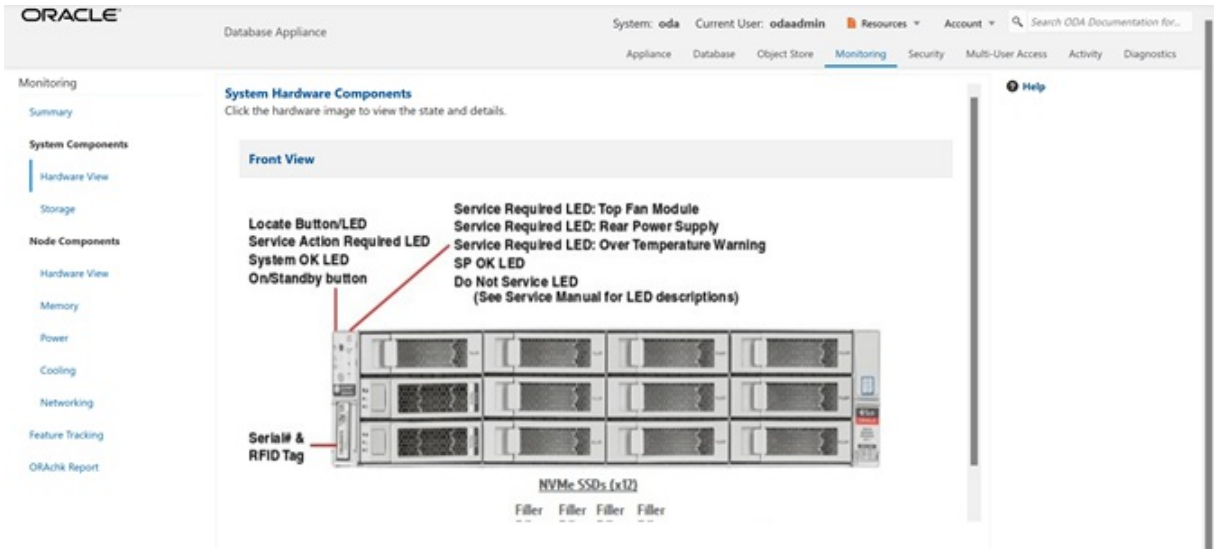


Step 2 - Hardware Monitoring and Feature Tracking

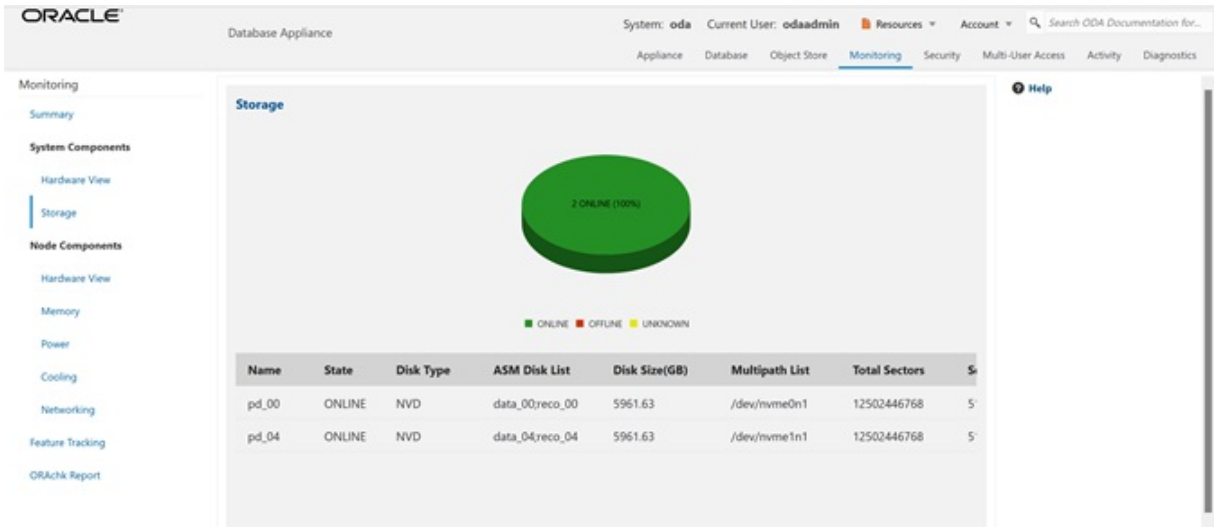
The BUI displays Oracle Database Appliance hardware status and tracks feature usage including High Water Marks.



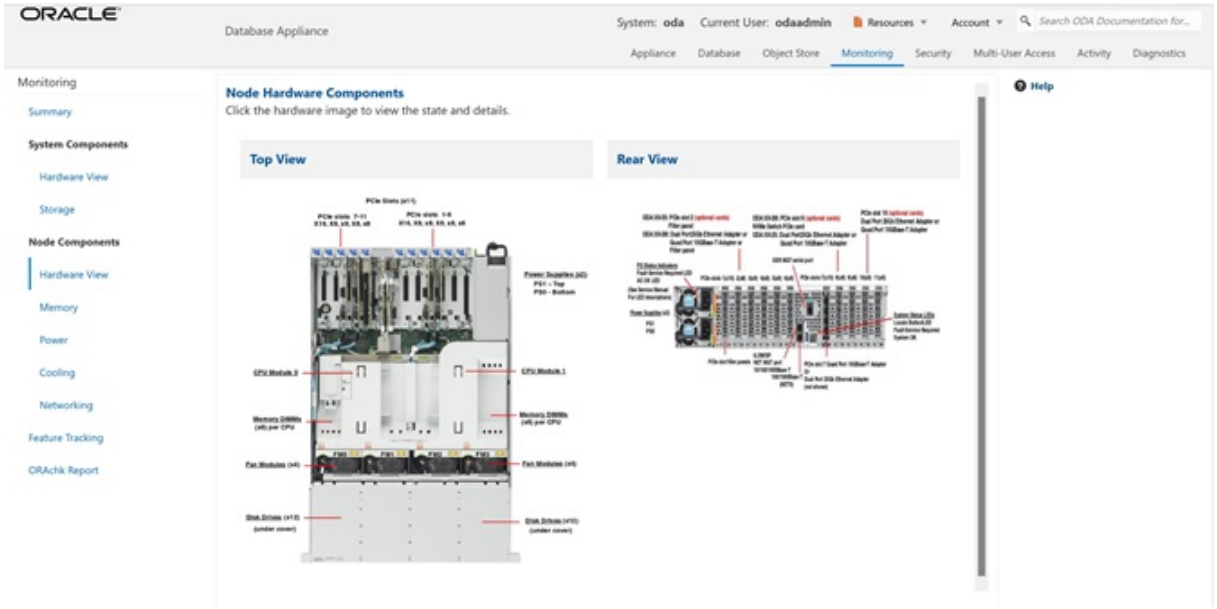
Hardware Status



Storage

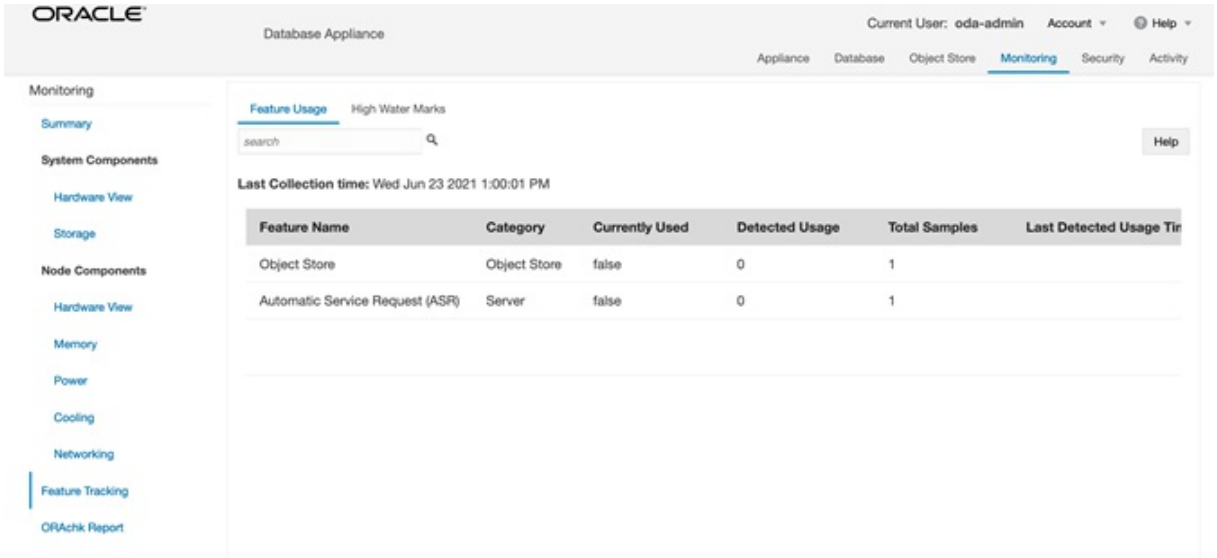


Hardware View



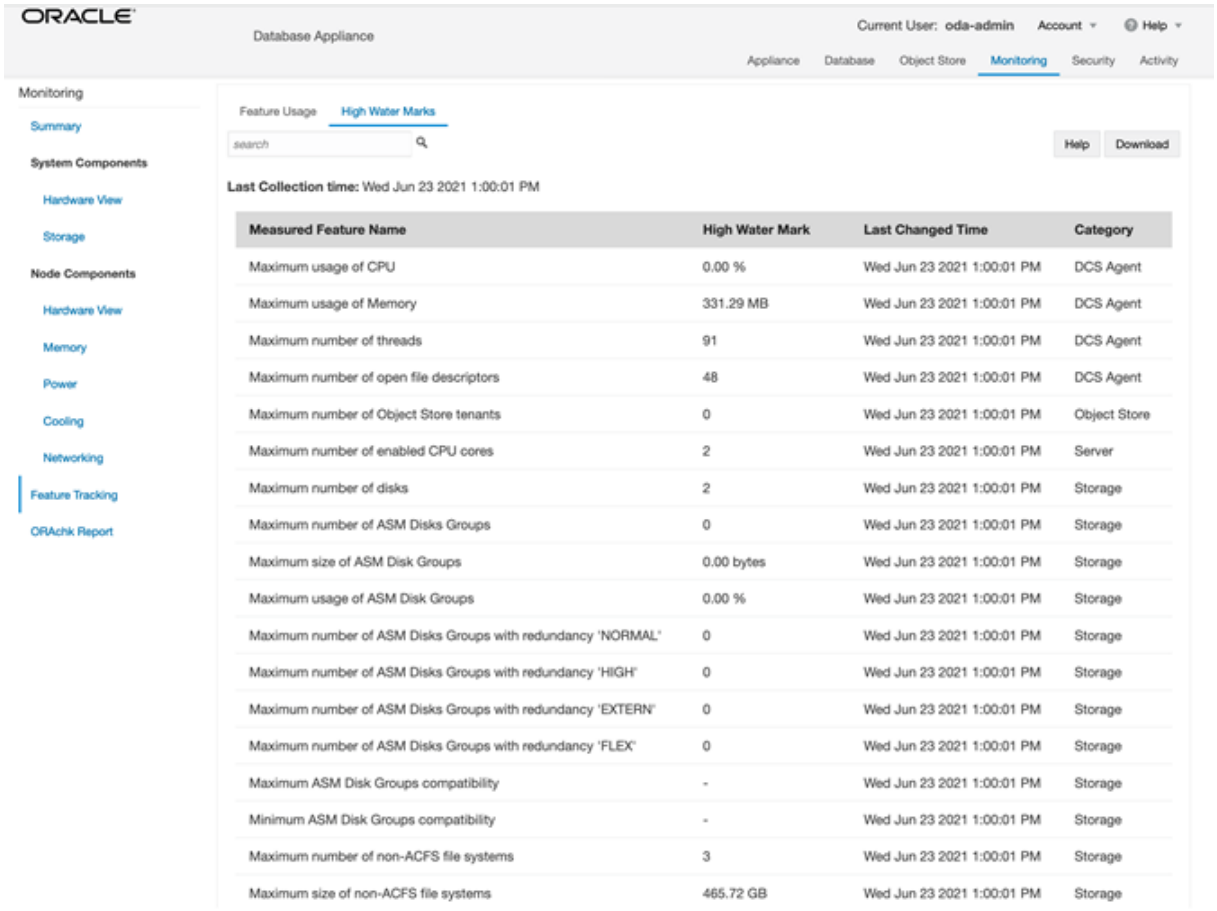
Feature Tracking

The Feature Tracking output displayed in the simulator may not match the display on an actual Oracle Database Appliance. Following is a sample output:



High Water Marks

The High Water Marks output displayed in the simulator may not match the display on an actual Oracle Database Appliance.



Step 3 - Review Appliance Configuration

Oracle Database Appliance Command Line Interface

The Oracle Database Appliance command line interfaces (`odacli`, `odaadmcli`) are tools that can also be used to install, configure, and interrogate the status of Oracle Database Appliance. ODACLI assists in the fast deployment, patching, and easy management of Oracle Database Appliance.

Review the following `odaadmcli` commands that provide information about Oracle Database Appliance configuration.

> The sample output displayed in the simulator may not match exactly with the sample output on an actual appliance. For more details, refer to the Oracle Database Appliance documentation library for the latest release.

Command: odaadmcli show server

Description: Displays the server/node status, including Oracle ILOM IP address, firmware version, power consumption, and other details. This is helpful for an at-a-glance view of basic server and node information.

```
$ sudo odaadmcli show server

         Power State              : On
         Open Problems            : 0
         Model                    : ODA X7-2-HA
         Type                     : Rack Mount
         Part Number              : ODA X7-2-HA
         Serial Number            : 1750XD0003
         Primary OS               : Not Available
         ILOM Address             : 10.145.203.81
         ILOM MAC Address         : 00:10:E0:DA:CD:66
         Description              : Oracle Database Appliance X7-2 High Availabi
lity 1750XD0003
         Locator Light            : Off
         Actual Power Consumption : 302 watts
         Ambient Temperature      : 20.250 degree C
         Open Problems Report     : System is healthy
```

Command: odacli describe-system

Description: Displays Oracle Database Appliance deployment status.

```
$ sudo odacli describe-system

Appliance Information

----------------------------------------------------------------

                     ID: oda

               Platform:

        Data Disk Count: 9

         CPU Core Count: 36

                Created: July 19, 2022 8:25:14 PM GMT


System Information

----------------------------------------------------------------

                   Name: oda
```

```
             Domain Name: example.com
               Time Zone: GMT
              DB Edition: EE
             DNS Servers: 1.1.1.1
             NTP Servers:


Disk Group Information

------------------------------------------------------------

DG Name                   Redundancy                Percentage

------------------------- ------------------------- ------------

Data                      Flex                      80

Reco                      Flex                      20

Redo                      High                      100

Flash                     Flex                      100
```

Command: odaadmcli show processor

Description: This command displays information about the CPUs running in the system.

```
$ sudo odaadmcli show processor


      NAME  HEALTH HEALTH_DETAILS PART_NO. LOCATION   MODEL
MAX_CLK_SPEED TOTAL_CORES ENABLED_CORES
      CPU_0 OK     -              SR3AX    P0 (CPU 0) Intel(R) Xeon(R) Gold 6140
CP 2.300 GHz       18        NA
      CPU_1 OK     -              SR3AX    P1 (CPU 1) Intel(R) Xeon(R) Gold 6140
CP 2.300 GHz       18        NA
```

Command: odaadmcli show memory

Description: This command displays information about the memory.

```
$ sudo odaadmcli show memory

NAME HEALTH HEALTH_DETAILS PART_NO. SERIAL_NO. LOCATION MANUFACTURER MEMORY_SIZE
CURR_CLK_SPEED ECC_Errors

DIMM_0 OK - 3A4K40BB2-CTD 00CE021743373400D8 P0/D0 Samsung 32 GB 2666 MHz 0
DIMM_11 OK - 3A4K40BB2-CTD 00CE02174337340065 P0/D1 Samsung 32 GB 2666 MHz 0
DIMM_12 OK - 3A4K40BB2-CTD 00CE02174337340000D P1/D0 Samsung 32 GB 2666 MHz 0
DIMM_14 OK - 3A4K40BB2-CTD 00CE02174237318364 P1/D2 Samsung 32 GB 2666 MHz 0
DIMM_16 OK - 3A4K40BB2-CTD 00CE0217423731A19A P1/D4 Samsung 32 GB 2666 MHz 0
DIMM_19 OK - 3A4K40BB2-CTD 00CE02174237318394 P1/D7 Samsung 32 GB 2666 MHz 0
DIMM_2 OK - 3A4K40BB2-CTD 00CE02174337340078 P0/D2 Samsung 32 GB 2666 MHz 0
DIMM_21 OK - 3A4K40BB2-CTD 00CE0217423731A195 P1/D9 Samsung 32 GB 2666 MHz 0
DIMM_23 OK - 3A4K40BB2-CTD 00CE02174237318365 P1/D1 Samsung 32 GB 2666 MHz 0
DIMM_4 OK - 3A4K40BB2-CTD 00CE02174337340007B P0/D4 Samsung 32 GB 2666 MHz 0
DIMM_7 OK - 3A4K40BB2-CTD 00CE02174337340013 P0/D7 Samsung 32 GB 2666 MHz 0
DIMM_9 OK - 3A4K40BB2-CTD 00CE02174337340101 P0/D9 Samsung 32 GB 2666 MHz 0
```

Command: odaadmcli show power

Description: This command displays information about the power details for the appliance.

```
$ sudo odaadmcli show power
NAME           HEALTH HEALTH_DETAILS PART_NO. SERIAL_NO. LOCATION INPUT_POWER OU
TPUT_POWER INLET_TEMP EXHAUST_TEMP
Power_Supply_0 OK - 7333459 465824T+1647D30456 PS0 Present 135 watts 20 degrees
C 42.500 degree C
Power_Supply_1 OK - 7333459 465824T+1647D30762 PS1 Present 146 watts 20 degrees
C 51.500 degree C
```

Command: odaadmcli show cooling

Description: This command displays information about the cooling of the appliance.

```
$ sudo odaadmcli show cooling

NAME HEALTH HEALTH_DETAILS LOCATION FAN % FAN SPEED

Fan_0 OK - FM0 35 % 6900 RPM
Fan_1 OK - FM0 34 % 5900 RPM
Fan_10 OK - FM2 32 % 6200 RPM
```

```
Fan_11 OK - FM2 31 % 5500 RPM
Fan_12 OK - FM3 32 % 6300 RPM
Fan_13 OK - FM3 31 % 5500 RPM
Fan_14 OK - FM3 32 % 6300 RPM
Fan_15 OK - FM3 31 % 5500 RPM
Fan_2 OK - FM0 36 % 6800 RPM
Fan_3 OK - FM0 34 % 5900 RPM
Fan_4 OK - FM1 35 % 6800 RPM
Fan_5 OK - FM1 34 % 5900 RPM
Fan_6 OK - FM1 32 % 6300 RPM
Fan_7 OK - FM1 29 % 5100 RPM
Fan_8 OK - FM2 32 % 6300 RPM
Fan_9 OK - FM2 31 % 5500 RPM
```

Step 4 - Review Storage Configuration

Review the following `odaadmcli` commands that provide information about Oracle Database Appliance configuration.

Command: odaadmcli show disk

Description: This command is helpful for getting a view into the device mapping and current state of the hard disks. The output lists the drives in the ODA X7-2-HA.

```
$ sudo odaadmcli show disk

               NAME                    PATH                    TYPE
STATE                    STATE_DETAILS
               e0_pd_00                /dev/sdbv               HDD
ONLINE                   Good
               e0_pd_01                /dev/sdbw               HDD
ONLINE                   Good
               e0_pd_02                /dev/sdbx               HDD
ONLINE                   Good
               e0_pd_03                /dev/sdby               HDD
ONLINE                   Good
               e0_pd_04                /dev/sdbz               HDD
ONLINE                   Good
               e0_pd_05                /dev/sdca               HDD
ONLINE                   Good
               e0_pd_06                /dev/sdcb               HDD
ONLINE                   Good
               e0_pd_07                /dev/sdcc               HDD
ONLINE                   Good
               e0_pd_08                /dev/sdcd               HDD
ONLINE                   Good
```

```
                e0_pd_09                /dev/sdce               HDD
ONLINE                  Good
                e0_pd_10                /dev/sdcf               HDD
ONLINE                  Good
                e0_pd_11                /dev/sdcg               HDD
ONLINE                  Good
                e0_pd_12                /dev/sdch               HDD
ONLINE                  Good
                e0_pd_13                /dev/sdci               HDD
ONLINE                  Good
                e0_pd_14                /dev/sdcj               HDD
ONLINE                  Good
                e0_pd_15                /dev/sdck               SSD
ONLINE                  Good
                e0_pd_16                /dev/sdcl               SSD
ONLINE                  Good
                e0_pd_17                /dev/sdcm               SSD
ONLINE                  Good
                e0_pd_18                /dev/sdcn               SSD
ONLINE                  Good
                e0_pd_19                /dev/sdco               SSD
ONLINE                  Good
                e0_pd_20                /dev/sdcp               SSD
ONLINE                  Good
                e0_pd_21                /dev/sdcq               SSD
ONLINE                  Good
                e0_pd_22                /dev/sdcr               SSD
ONLINE                  Good
                e0_pd_23                /dev/sdcs               SSD
ONLINE                  Good
```

Command: odaadmcli show diskgroup

Description: Lists Oracle ASM disk groups configured on Oracle Database Appliance.

DATA is where the database data files are stored.

FLASH is where the hot files or small databases can be placed to improve performance

RECO is where the backups, archive logs, and redo logs of the database are stored.

REDO is where the redo logs of the database are stored.

```
$ sudo odaadmcli show diskgroup

DiskGroups
----------
DATA
```

```
FLASH
RECO
REDO
```

Command: odaadmcli show fs

Description: Lists the details of the Oracle Database Appliance X8-2 file systems, including total Space, Free Space, Disk Group, and other details.

> The sample output displayed in the simulator may not match exactly with the sample output on an actual appliance. For more details, refer to the Oracle Database Appliance documentation library for the latest release.

```
$ sudo odaadmcli show fs

 Type     Total Space      Free Space  Total DG Space   Free DG Space  Diskgroup
Mount Point
 ext3          30109M          25254M               -               -
/
 ext3            476M            405M               -               -
/boot
 ext3          60347M          22117M               -               -
/opt
 ext3         100665M          72839M               -               -
/u01
 acfs           5120M           4625M      112116480M      111977204M       DATA
/opt/oracle/dcs/commonstore
```

Command: odaadmcli show raidsyncstatus

Description: Lists the status of the boot disk HW RAID.

```
$  sudo odaadmcli show raidsyncstatus

Raid Type  Raid Device      Partitions      RaidStatus Recovery        RecoveryP
ercentage
 S/W Raid          md0      sdb2 sda2            UU       No
N/A
 S/W Raid          md1      sdb3 sda3            UU       No
N/A
```

Command: odaadmcli show storage

Description: The following command displays the storage controllers and drives.

```
$ sudo odaadmcli show storage


==== BEGIN STORAGE DUMP ========
Host Description: Oracle Corporation:ORACLE SERVER X7-2
Total number of controllers: 2
              Id         = 0
              Serial Num = 500605b00d3e88c0
              Vendor     = LSI Logic
              Model      = ORCL-EXT-SAS3
              FwVers     = 13.00.00.00
              strId      = mpt3sas:3b:00.0
              Id         = 1
              Serial Num = 500605b00d3e8450
              Vendor     = LSI Logic
              Model      = ORCL-EXT-SAS3
              FwVers     = 13.00.00.00
              strId      = mpt3sas:5e:00.0

Total number of expanders: 2
              Id         = 0
              Serial Num = 50800200022f163f
              Vendor     = ORACLE
              Model      = DE3-24C
              FwVers     = 0306
              strId      = Secondary
              WWN        = 50800200022e41be
              Id         = 1
              Serial Num = 50800200022f163f
              Vendor     = ORACLE
              Model      = DE3-24C
              FwVers     = 0306
              strId      = Primary
              WWN        = 50800200022e447e

Total number of PDs: 24
              /dev/sdaa       HGST            HDD 9796gb slot:  0  exp:  0   H
7210A520SUN010T
              /dev/sdab       HGST            HDD 9796gb slot:  1  exp:  0   H
7210A520SUN010T
              /dev/sdac       HGST            HDD 9796gb slot:  2  exp:  0   H
7210A520SUN010T
              /dev/sdad       HGST            HDD 9796gb slot:  3  exp:  0   H
7210A520SUN010T
              /dev/sdae       HGST            HDD 9796gb slot:  4  exp:  0   H
7210A520SUN010T
              /dev/sdaf       HGST            HDD 9796gb slot:  5  exp:  0   H
```

```
7210A520SUN010T
              /dev/sdag       HGST             HDD 9796gb slot:  6  exp:  0   H
7210A520SUN010T
              /dev/sdah       HGST             HDD 9796gb slot:  7  exp:  0   H
7210A520SUN010T
              /dev/sdai       HGST             HDD 9796gb slot:  8  exp:  0   H
7210A520SUN010T
              /dev/sdaj       HGST             HDD 9796gb slot:  9  exp:  0   H
7210A520SUN010T
              /dev/sdak       HGST             HDD 9796gb slot: 10  exp:  0   H
7210A520SUN010T
              /dev/sdal       HGST             HDD 9796gb slot: 11  exp:  0   H
7210A520SUN010T
              /dev/sdam       HGST             HDD 9796gb slot: 12  exp:  0   H
7210A520SUN010T
              /dev/sdan       HGST             HDD 9796gb slot: 13  exp:  0   H
7210A520SUN010T
              /dev/sdao       HGST             HDD 9796gb slot: 14  exp:  0   H
7210A520SUN010T
              /dev/sdap       HGST             SSD 3200gb slot: 15  exp:  0   H
BCAC2DH2SUN3.2T
              /dev/sdaq       HGST             SSD 3200gb slot: 16  exp:  0   H
BCAC2DH2SUN3.2T
              /dev/sdar       HGST             SSD 3200gb slot: 17  exp:  0   H
BCAC2DH2SUN3.2T
              /dev/sdas       HGST             SSD 3200gb slot: 18  exp:  0   H
BCAC2DH2SUN3.2T
              /dev/sdat       HGST             SSD 3200gb slot: 19  exp:  0   H
BCAC2DH2SUN3.2T
              /dev/sdau       HGST             SSD  800gb slot: 20  exp:  0   H
BCAC2DH4SUN800G
              /dev/sdav       HGST             SSD  800gb slot: 21  exp:  0   H
BCAC2DH4SUN800G
              /dev/sdaw       HGST             SSD  800gb slot: 22  exp:  0   H
BCAC2DH4SUN800G
              /dev/sdax       HGST             SSD  800gb slot: 23  exp:  0   H
BCAC2DH4SUN800G
==== END STORAGE DUMP =========
```

Step 5 - Review Network Status

Review the following `odaadmcli` command that provide information about Oracle Database Appliance configuration.

Command: odaadmcli show network

Description: Displays the MAC address, health status, and temperature of the network ports.

```
$ sudo odaadmcli show network

        NAME           HEALTH HEALTH_DETAILS LOCATION PART_NO MANUFACTURER MAC_A
DDRESS        LINK_DETECTED DIE_TEMP
        Ethernet_NIC_0 OK     -               NET0     i210    INTEL        00:10
:E0:DA:CD:62  no (em1)       N/A
        Ethernet_NIC_1 OK     -               NET1     BCM57417Broadcom     00:10
:E0:DA:CD:63  yes (em2)      N/A
        Ethernet_NIC_2 OK     -               NET2     BCM57417Broadcom     00:10
:E0:DA:CD:64  yes (em3)      N/A
        Ethernet_NIC_3 -      -               NET3     X540    INTEL        00:0A
:F7:CF:36:38  yes (p1p2)     -
        Ethernet_NIC_4 -      -               NET4     X540    INTEL        00:0A
:F7:CF:36:30  yes (p1p1)     -
```

This concludes Lab 6.