

*North American Technology Division
Solution Engineering Team*

100 Oracle Public Cloud Workshop

Database Cloud Service Workshop

Update Dec 4, 2017

Introduction

This is the first of several labs that are part of the Oracle Public Cloud Database Cloud Service workshop. These labs will give you a basic understanding of the Oracle Database Cloud Service and many of the capabilities around administration and database development.

This lab will walk you through setting up Transparent Data Encryption for your on-premise database and backing it up to the Oracle cloud. You will then create a new Database Cloud Service from the backup, and then connect into the Database image using the ssh private key and familiarize yourself with the image layout. Next you will learn how to create an ssh configuration file that can be used to tunnel simultaneously multiple ports to a remote OPC instance. Using the tunnels, you will learn how to access various Database consoles.

This lab supports the following use cases:

- Migration of on-premise databases to a cloud based environment.
- Rapid creation of test or development database copies in the Cloud.
- Replication of Databases for reporting and analytics.

- To log issues and view the Lab Guide source, go to the [github oracle](#) repository.

Objectives

- Configure archive logging
- Configure Transparent Data Encryption (TDE - required to restore from backup to the cloud)
- Backup your local database to the Oracle Cloud
- Drop a table and then restore it from your cloud backup.
- Create Database Cloud Service from your on-premise backup
- SSH configuration
- Explore VM and consoles

Required Artifacts

- The following lab requires a VNC Viewer to connect to an Image running on Oracle's IaaS Compute Service.

Workshop Image

For the Database Cloud Service Workshop we will be using a Workshop Image that will represent your on-premises environment. In this image we have installed an Oracle 12.2.0.1 database that contains a Pluggable database that we will be migrating to our Oracle Public Cloud Database instance. The image also contains SQL Developer 4.1 that will be used to connect to both your local and cloud database.

The Client Image is a VM that is running on Oracle's IaaS Compute service.

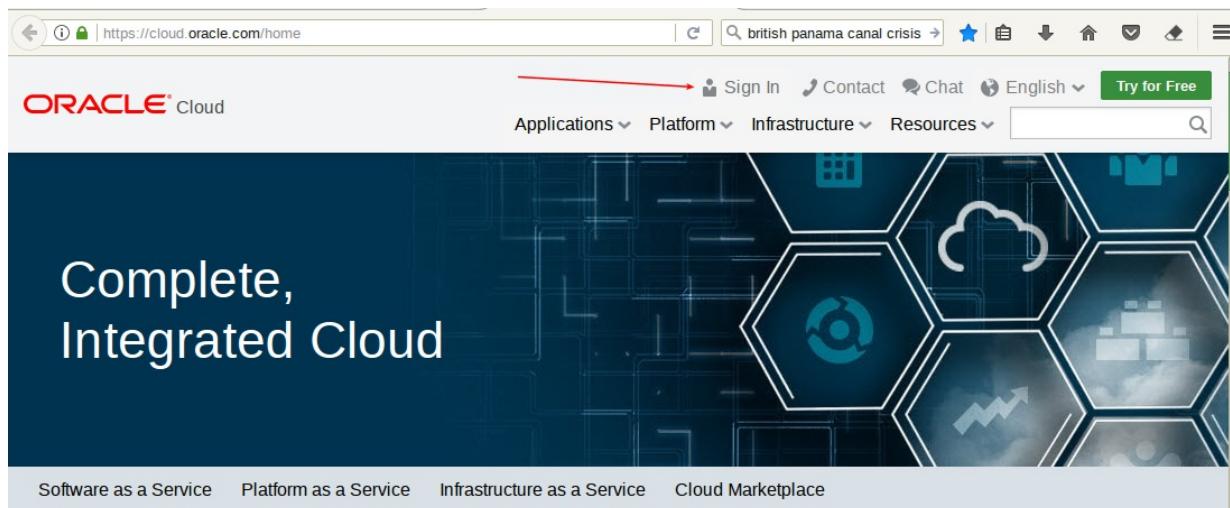
Retrieve Public IP for Client Image

STEP 1: Login to your Oracle Cloud account

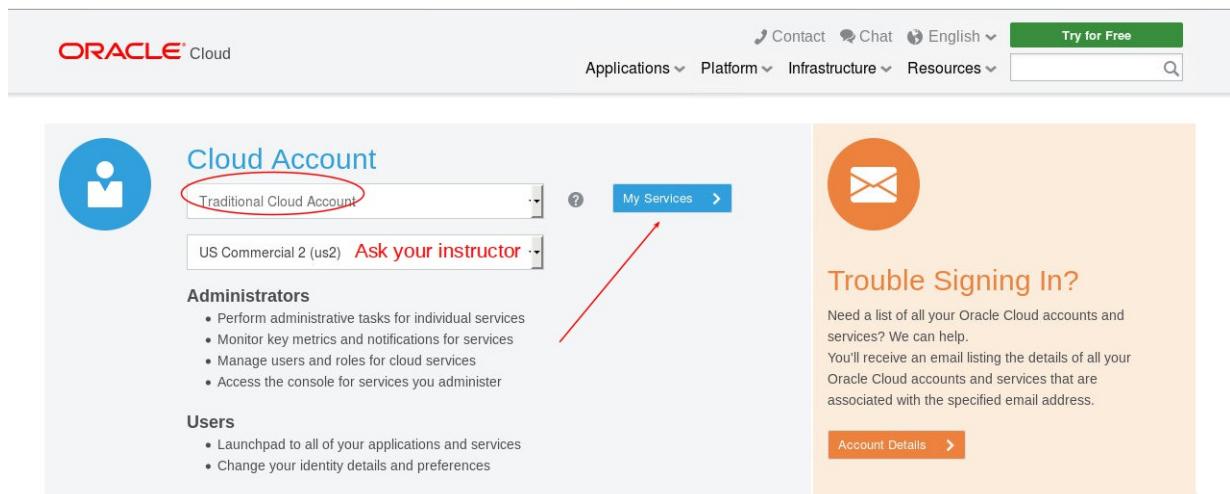
- Open a browser and go to the following URL:

<https://cloud.oracle.com>

- Click **Sign In** in the upper right hand corner of the browser

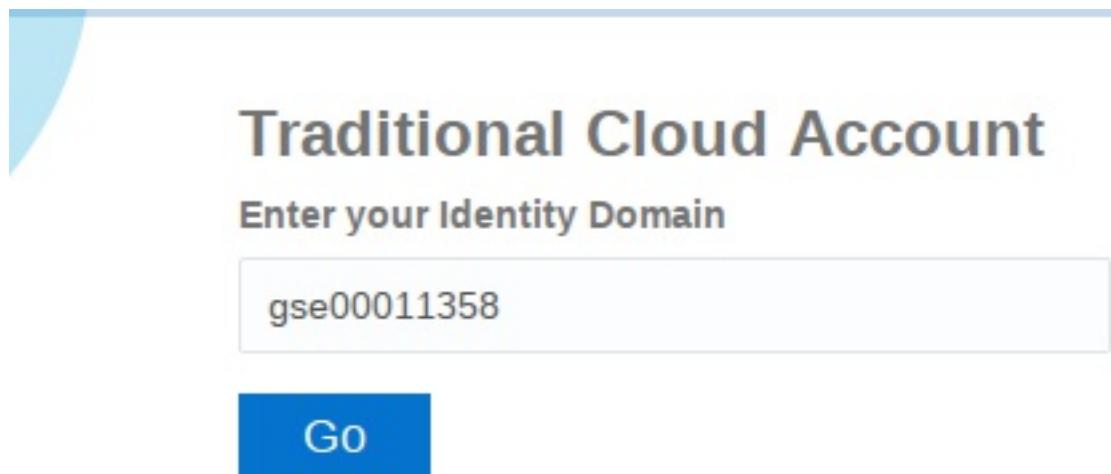


- **IMPORTANT** - Select 'Traditional Cloud Account' and then select from the Data Center drop down list the correct data center and click on **My Services**. If you are unsure of the data center you should select, and this is an in-person training event, **ask your instructor** which **Region** to select from the drop down list. If you received your account through an Oracle Trial, your Trial confirmation email should provide a URL that will pre-select the region for you.



- Enter the **identity domain** and click **Go**. All workshop participants will have their own identity domain. For the purposes of going through the lab

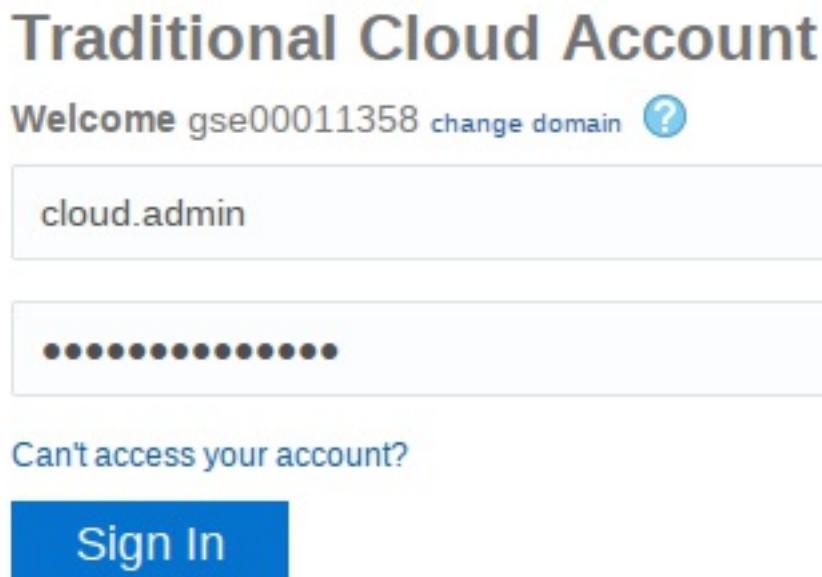
NOTE: The **Identity Domain**, **User Name** and **Password** values will be given to you from your instructor.



The image shows a screenshot of a web-based login interface for a Traditional Cloud Account. At the top, the title "Traditional Cloud Account" is displayed in a large, bold, dark font. Below the title, there is a placeholder text "Enter your Identity Domain". A text input field contains the value "gse00011358". A blue rectangular button labeled "Go" is positioned below the input field. To the left of the input field, there is a small blue triangular graphic element.

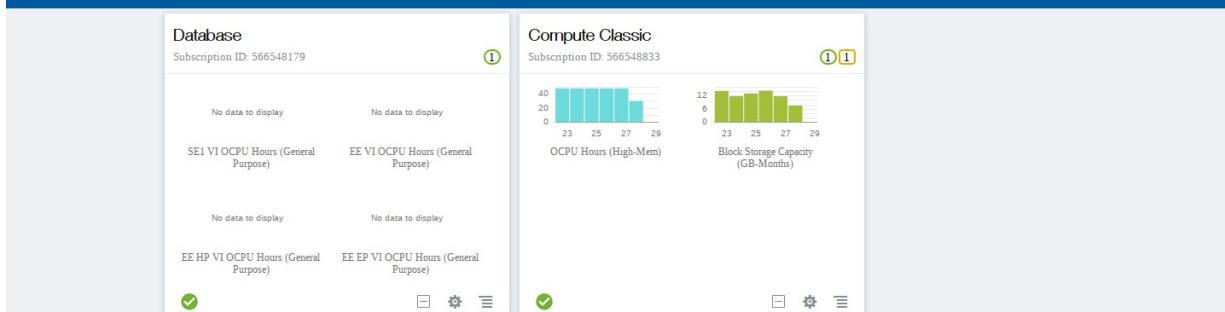
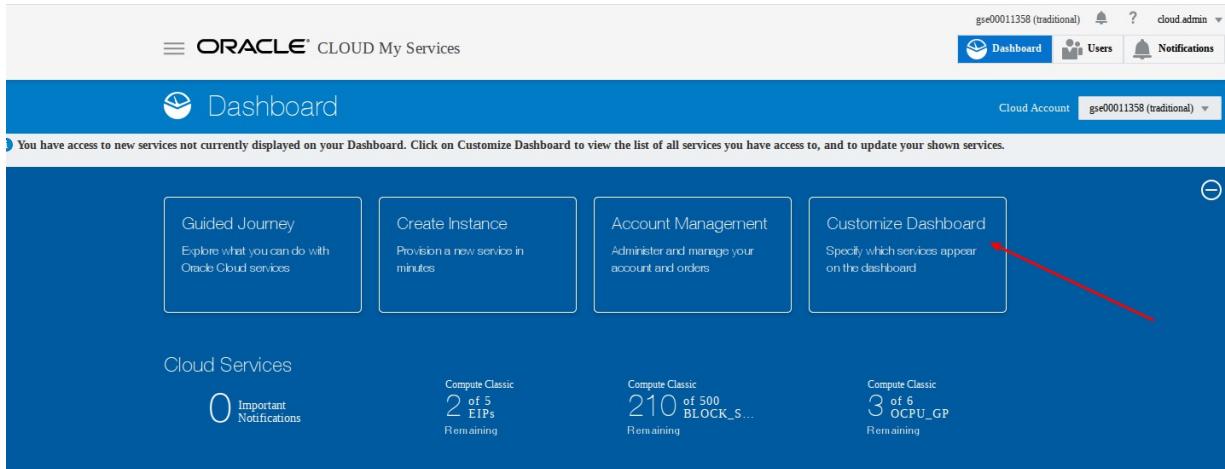
- Once your Identity Domain is set, enter your User Name and Password and click **Sign In**

NOTE: the **Identity Domain**, **User Name** and **Password** values will be given to you from your instructor.



The image shows a screenshot of a web-based sign-in interface for a Traditional Cloud Account. At the top, the title "Traditional Cloud Account" is displayed in a large, bold, dark font. Below the title, the text "Welcome gse00011358" is shown, followed by a "change domain" link and a help icon (?). Two input fields are present: the first contains the user name "cloud.admin" and the second contains a password represented by a series of black dots. Below the input fields, a link "Can't access your account?" is visible. A blue rectangular button labeled "Sign In" is located at the bottom of the form.

- You will be presented with a Dashboard summarizing all of your available services.



- If all of your services are not visible, **click on Customize Dashboard**. You can then add services to the dashboard by clicking **Show**. If you do not want to see a specific service click **Hide**.

Customize Dashboard

Select the services and options you want to display in the Dashboard for the selected Identity Domain or Cloud Account. You can choose to always show (Show) or always hide (Hide), or Show Expanded or Collapsed where applicable, or use the system default. The system default is based on service instance count, upgrade to new version and other criteria.

Section	Service	Status	Action Buttons
Welcome Section		Automatic	Expand Collapse
Big Data	Event Hub - Dedicated	Automatic	Show Hide
	Big Data - Compute Edition	Automatic	Show Hide
Database	Database	Automatic	Show Hide

STEP 2: Access Compute Service Console

- From the main dashboard, click on the **Compute** service link

The screenshot shows the Oracle Cloud Infrastructure main dashboard. At the top, there are three resource summary cards for Compute Classic:

- Compute Classic**: 2 of 5 EIPs Remaining
- Compute Classic**: 210 of 500 BLOCK_S... Remaining
- Compute Classic**: 3 of 6 OCPU_GP Remaining

Below these cards is a grid of service status boxes. The 'Compute Classic' box is highlighted with a red border. It contains the following information:

- Database**: Subscription ID: 566548179
- Compute Classic**: Subscription ID: 566548833

Both sections include bar charts showing usage over time:

- Compute Classic** chart: OCPU Hours (High-Mem) with values 23, 25, 27, 29.
- Compute Classic** chart: Block Storage Capacity (GB-Months) with values 23, 25, 27, 29.

- From this page you can view general information about this Compute Cloud Service. Click on the **Open Service Console** button.

The screenshot shows the 'Service: Oracle Cloud Infrastructure - Compute Classic' overview page. The top navigation bar includes tabs for Overview, Billing Metrics, Resource Quotas, Monitoring Metrics, and Documents. The Overview tab is selected.

Overview Information

Category	Oracle IaaS Public Cloud Services
Data Region	US Commercial 2 (Time zone: US/Central)
Identity Domain Name	gse00011358
Identity Domain Id	gse00011358
Subscription	Trial (Expires: Mar 13, 2019 at 07:51 PDT)

Additional Information

Plan	Oracle Cloud Infrastructure - Compute Classic	Identity Domain Name	gse00011358
Service Start Date	Mar 13, 2017	Identity Domain Id	gse00011358
Service End Date	Mar 13, 2019	Status	Active
Subscription ID	566548833	Domain SFTP Host & Port	sftp.us2.cloud.oracle.com:22
Service Instance ID	566549898	Domain SFTP User Name	gse00VMI
Customer Account	gse00011358 (US)	REST Endpoint	https://api-z65.compute.us6.oraclecloud.com/
CSI Number	Not available		
Buyer	gse-buyer_wv@oracle.com		

STEP 3: Copy Public IP for Client Image

- The Compute Service Console will show you all running VM's. Note: If a compute service is not visible, as shown below, the following task will

provide instructions on how to change to the correct zone.

Summary

3 instances 3 OCPUs 37.5GB memory 185GB volume size in use

Instances

A Compute Classic instance is a virtual machine running a specific operating system, with the CPU and memory resources that you specify. [Learn more.](#)

Name	Status	OCPUs	Memory	Volumes	Public IP	Private IP
Alpha01A-DBCS/db_1/vm-1	Running	1	7.5 GB	185 GB	129.157.187.248	100.65.23.34
OL74_client_for_DBCS	Running	2	30 GB		129.157.187.98	100.65.16.62

- Identity Domains will have multiple sites. Please ask your instructor which site the Client Image is running on. **If needed**, click the **Site drop down** to access the **Site Selector**, and choose the correct site.

ORACLE® CLOUD My Services

Site: US006_Z65 | gse00011358 | cloud.admin

Compute Classic Instances Network Storage Orchestrations Images Visualization

Instances

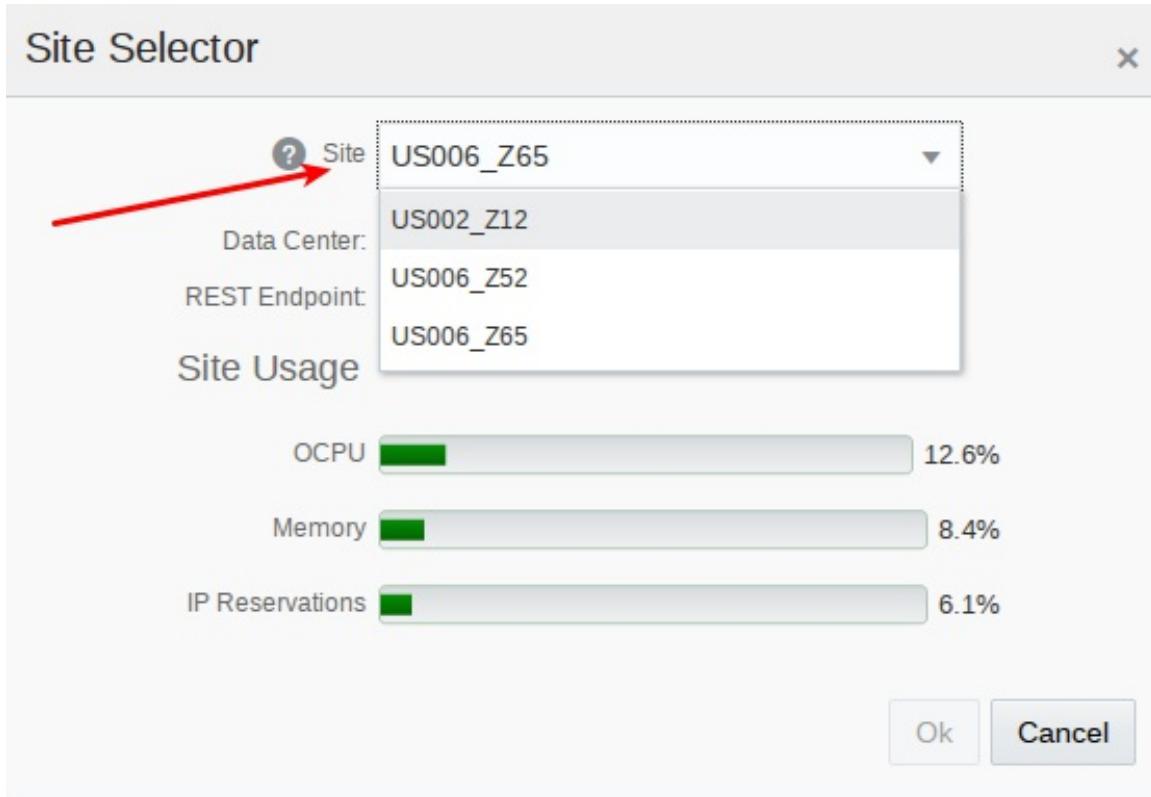
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- Now that you have the correct site selected, find the instance name **OL74_client_for_DBCS** and copy down the **Public IP**

Summary

3 instances	3 OCPUs	37.5GB memory	185GB volume size in use
----------------	------------	------------------	-----------------------------

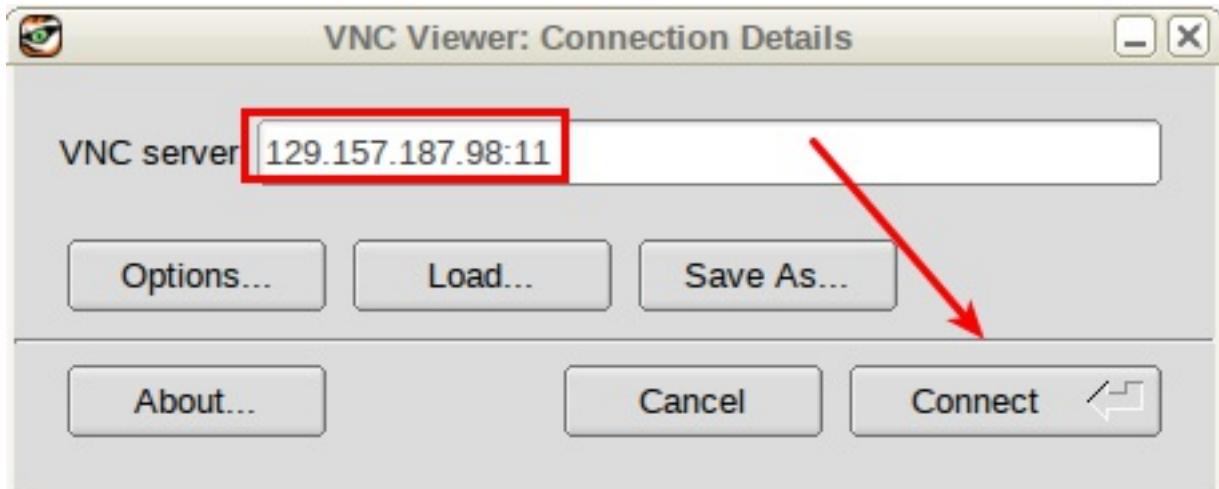
Instances

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Name	Status	OCPUs	Memory	Volumes	Public IP	Private IP
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OL74_client_for_DBCS	Running	2	30 GB		129.157.187.98	100.65.16.62

STEP 4: Connect to Client Image using VNC Viewer

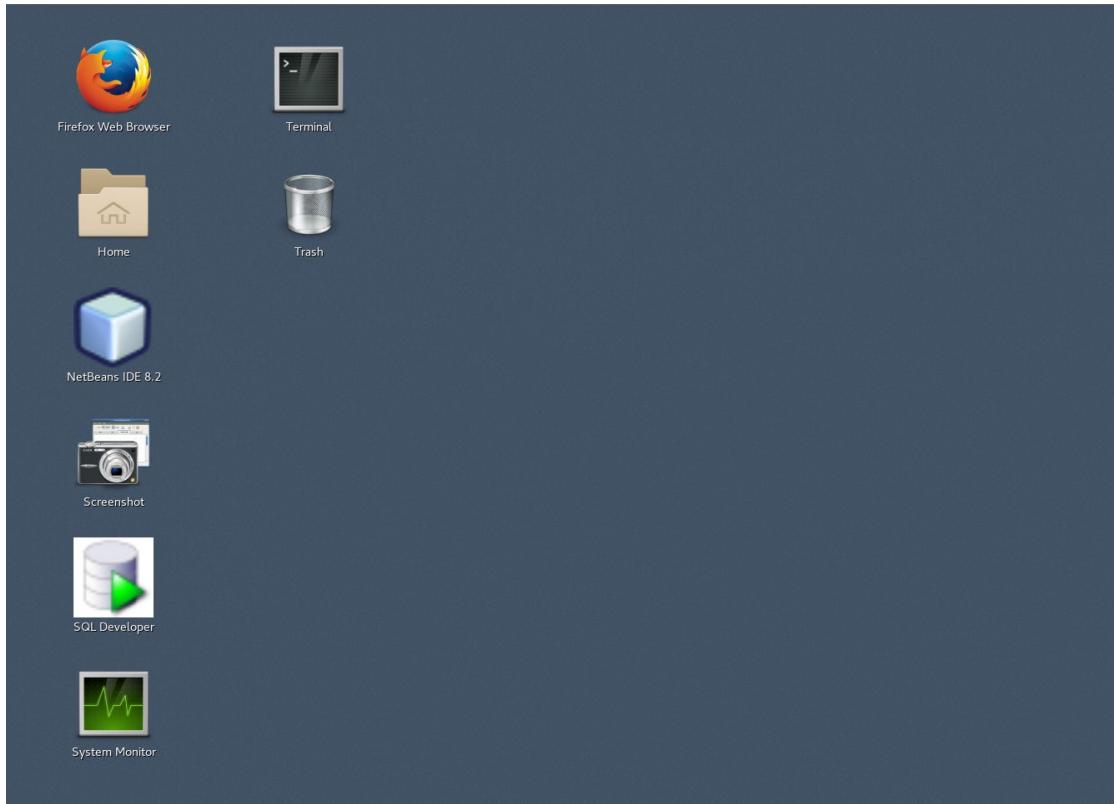
- If you do not already have a VNC Viewer installed on your computer, you will want to download a Viewer, or ask the instructor for the Real VNC Viewer executable. To run the VNC Viewer, enter the Public IP you just copied, along with appending either the display port :443 or :11. Ask your instructor which port is active for this workshop. Note your VNC client might look a bit different. Next, click **Connect**



- Enter the password you used to log into the Oracle Cloud domain, and click **OK**



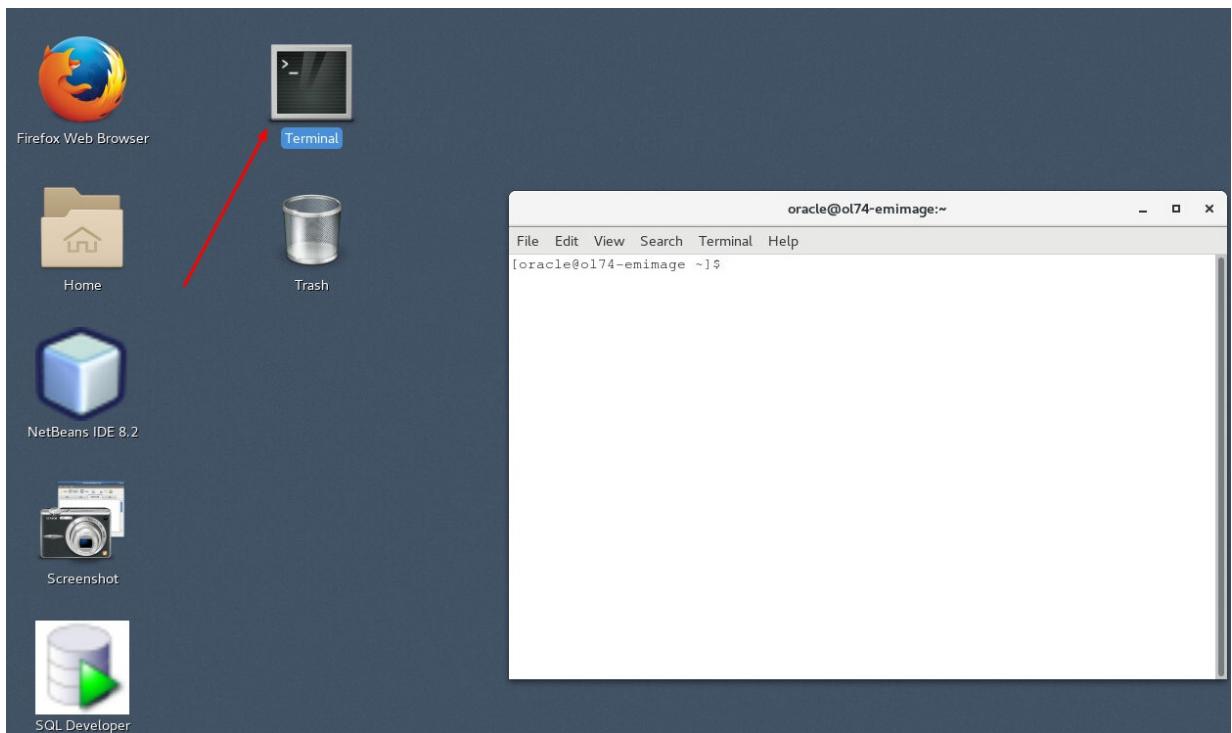
- You are now connected to the Client Image that will be used for all labs. You might want to place the image in full screen mode so that there is no confusion as to which environment you are working in. Note: the use of the compute “Client” image provides us the opportunity to simulate an on premises environment. We have pre-installed several tools, a database, etc. within this compute Client image. Of course, you could install the same tools and database on your laptop or in an on premises environment to accomplish the same functionality provided by the Client Image, but to reduce the time required to complete the workshop, the Client Image just simplifies the configuration you'd be required to perform. Note your desktop might look slightly different.



Configure and Backup the Local Database to the Oracle Cloud

STEP 5: Turn on Database Archivelog Mode

- Open a command window



- Enter the following commands:

- source dbenv.sh
- lsnrctl start
- sqlplus sys/Alpha018_ as sysdba
- startup
- select log_mode from v\$database;
- shutdown immediate
- startup mount;
- alter database archivelog;
- alter database open;
- alter pluggable database all open;
- SELECT open_mode from v\$database;
- exit

```

oracle@ol74-emimage:~$ source dbenv.sh
oracle@ol74-emimage:~$ sqlplus sys/          as sysdba
SQL*Plus: Release 12.2.0.1.0 Production on Wed Nov 29 13:42:49 2017
Copyright (c) 1982, 2016, Oracle. All rights reserved.

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
SQL> select log_mode from v$database;
LOG_MODE
-----
NOARCHIVELOG
SQL> shutdown immediate
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup mount
ORACLE instance started.

Total System Global Area 2516582400 bytes
Fixed Size           8795904 bytes
Variable Size        738199808 bytes
Database Buffers     1761607680 bytes
Redo Buffers          7979008 bytes
Database mounted.
SQL> alter database archivelog;
Database altered.

SQL> alter database open;
Database altered.

SQL> alter pluggable database all open;
Pluggable database altered.

SQL> select open_mode from v$database;
SP2-0734: unknown command beginning "select op..." - rest of line ignored.
SQL> select open_mode from v$database;
OPEN_MODE
-----
READ WRITE

```

STEP 6: Configure Transparent Data Encryption (required to instantiate DBCS from backup in cloud)

- First exit out of sqlplus (in the command window) if you have not already done so (last step above).

- Create TDE Wallet directory in command window

 - `mkdir /u01/app/oracle/product/12.2/wallet`

```
SQL> exit
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
[oracle@ol74-emimage ~]$ mkdir /u01/app/oracle/product/12.2/wallet
[oracle@ol74-emimage ~]$
```

- Edit the `sqlnet.ora` file

 - `gedit`

`/u01/app/oracle/product/12.2/dbhome_1/network/admin/sqlnet.ora`

```
*sqlnet.ora
/u01/app/oracle/product/12.2/dbhome_1/network/admin
# sqlnet.ora Network Configuration File: /u01/app/oracle/product/12.2/dbhome_1//network/
admin/sqlnet.ora
# Generated by Oracle configuration tools.

NAMES.DIRECTORY_PATH= (TNSNAMES, EZCONNECT)
```

- Add the following and then save (spacing does not matter):

`ENCRYPTION_WALLET_LOCATION=(SOURCE=(METHOD=FILE)
(METHOD_DATA=(DIRECTORY=/u01/app/oracle/product/12.2/wallet))`

```
*sqlnet.ora
/u01/app/oracle/product/12.2/dbhome_1/network/admin
# sqlnet.ora Network Configuration File: /u01/app/oracle/product/12.2/dbhome_1//network/admin/
sqlnet.ora
# Generated by Oracle configuration tools.

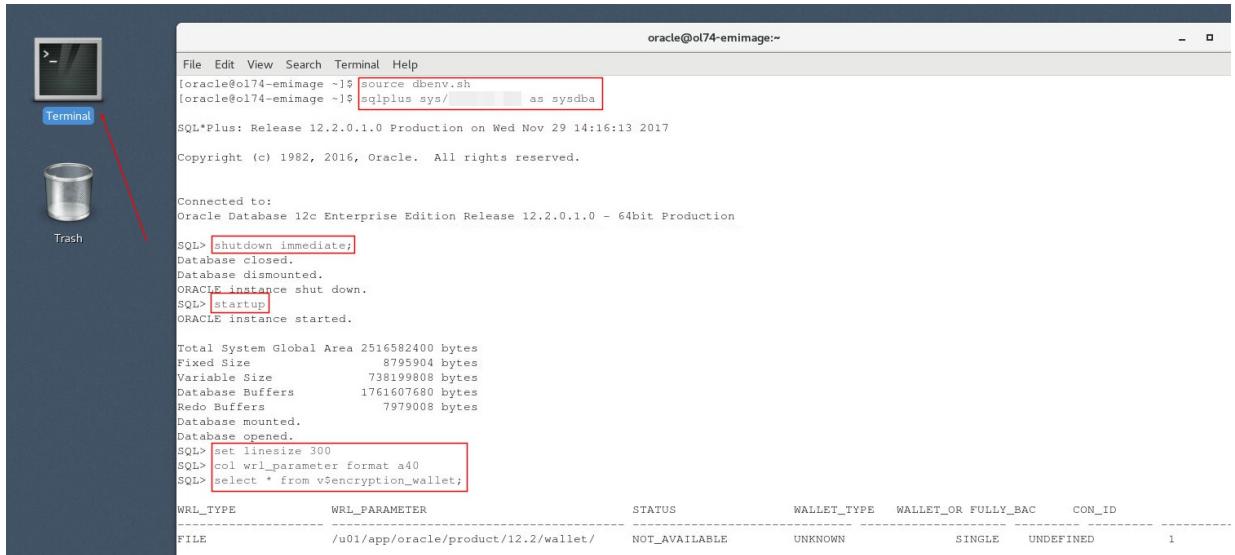
NAMES.DIRECTORY_PATH= (TNSNAMES, EZCONNECT)

ENCRYPTION_WALLET_LOCATION= (SOURCE= (METHOD=FILE) (METHOD_DATA= (DIRECTORY=/u01/app/oracle/
product/12.2/wallet)))
```

- Open a command window and bounce the database. Enter the following:

 - `source dbenv.sh`
 - `sqlplus sys/Alpha2018_ as sysdba`

- shutdown immediate
- startup
- alter pluggable database all open;
- set linesize 300 -- this is so we can read the output easier
- col wrl_parameter format a40 -- easier to read output
- select * from v\$encryption_wallet;



```

oracle@ol74-emimage:~$ source dbenv.sh
oracle@ol74-emimage:~$ sqlplus sys/ as sysdba
SQL*Plus: Release 12.2.0.1.0 Production on Wed Nov 29 14:16:13 2017
Copyright (c) 1982, 2016, Oracle. All rights reserved.

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
SQL> shutdown immediate;
Database closed.
Database dismounted.
ORACLE instance shut down.
SQL> startup
ORACLE instance started.

Total System Global Area 2516582400 bytes
Fixed Size          8795904 bytes
Variable Size       738199808 bytes
Database Buffers   1761607680 bytes
Redo Buffers        7979008 bytes
Database mounted.
Database opened.
SQL> set linesize 300
SQL> col wrl_parameter format a40
SQL> select * from v$encryption_wallet;

WRL_TYPE          WRLL_PARAMETER           STATUS      WALLET_TYPE      WALLET_OR    FULLY_BAC      CON_ID
FILE              /u01/app/oracle/product/12.2/wallet/  NOT_AVAILABLE  UNKNOWN        SINGLE        UNDEFINED      1

```

- Create TDE keystore and auto login keystore.
 - administer key management create keystore '/u01/app/oracle/product/12.2/wallet' identified by oracle;
 - administer key management create auto_login keystore from keystore '/u01/app/oracle/product/12.2/wallet' identified by oracle;

```

SQL> administer key management create keystore '/u01/app/oracle/product/12.2/wallet' identified by oracle;
keystore altered.

SQL> ADMINISTER KEY MANAGEMENT CREATE AUTO_LOGIN KEYSTORE FROM KEYSTORE '/u01/app/oracle/product/12.2/wallet' IDENTIFIED BY oracle;
keystore altered.

```

- Open the software keystore for the password based key (screenshot does not show all of this)
 - ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN IDENTIFIED BY oracle CONTAINER = ALL;
 - ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE IDENTIFIED BY oracle CONTAINER = ALL;

- alter session set container=pdb\$seed
- ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE identified by oracle;
- alter session set container=alphapdb
- ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE identified by oracle;
- alter session set container=pdb1
- ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE identified by oracle;

```
SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN IDENTIFIED BY oracle CONTAINER = ALL;
keystore altered.

SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE IDENTIFIED BY oracle CONTAINER = ALL;
keystore altered.

SQL> alter session set container=pdb$seed
2 ;

Session altered.

SQL> select * from v$encryption_wallet;

WRL_TYPE
-----
WRL_PARAMETER
-----
STATUS          WALLET_TYPE          WALLET_OR_FULLY_BAC
-----          -----          -----
CON_ID          FILE
-----          -----
FILE
OPEN_NO_MASTER_KEY        PASSWORD          SINGLE      UNDEFINED
4
```

(1) (2)

```
SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE OPEN FORCE KEYSTORE identified by oracle;
keystore altered.
```

- Set the Software TDE Master Encryption Key.

- alter session set container=cdb\$root;
- ADMINISTER KEY MANAGEMENT SET KEYSTORE CLOSE;
- ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY oracle WITH BACKUP USING 'key_backup' CONTAINER = ALL;
- ADMINISTER KEY MANAGEMENT SET KEY FORCE KEYSTORE IDENTIFIED BY oracle WITH BACKUP USING 'key_backup' CONTAINER = ALL;

```

SQL> alter session set container=cdb$root;
Session altered.

SQL> ADMINISTER KEY MANAGEMENT SET KEYSTORE CLOSE;
ADMINISTER KEY MANAGEMENT SET KEYSTORE CLOSE
*
ERROR at line 1:
ORA-28389: cannot close auto login wallet  expected

SQL> ADMINISTER KEY MANAGEMENT SET KEY IDENTIFIED BY oracle WITH BACKUP USING 'key_backup' CONTAINER = ALL;
keystore altered.

SQL> ADMINISTER KEY MANAGEMENT SET KEY FORCE KEYSTORE IDENTIFIED BY oracle WITH BACKUP USING 'key_backup' CONTAINER = ALL;
keystore altered.

```

- Zip the TDE wallet. You will need this later when creating a new instance from our cloud backup. Return to your terminal window, exit out of SQLPlus, change your directory, and zip the wallet directory:

- cd /u01/app/oracle/product/12.2
- zip -r wallet.zip wallet

```

[oracle@ol74-clientv22 ~]$ cd /u01/app/oracle/product/12.2
[oracle@ol74-clientv22 12.2]$ zip -r wallet.zip wallet
  adding: wallet/ (stored 0%)
  adding: wallet/ewallet.p12 (stored 0%)
  adding: wallet/cwallet.sso (stored 0%)
  adding: wallet/ewallet_2017121420205422_key_backup.p12 (stored 0%)
  adding: wallet/ewallet_2017121420210558_key_backup.p12 (stored 0%)
[oracle@ol74-clientv22 12.2]$ █

```

STEP 7: Use RMAN to Back Up to the Cloud

- Install the Oracle Cloud Database Backup Module (previously downloaded from the [Oracle website](#)). Open a terminal window and enter the following. Be sure to replace the identity domain and password placeholder with your own:
 - java -jar /u01/OPCWorkshop/opc_install.jar -serviceName Storage -identityDomain <identity domain> -opclId cloud.admin -opcPass <cloud account password> -walletDir /u01/app/oracle/product/12.2/opc_wallet -libDir \$ORACLE_HOME/lib -libPlatform linux64 -container oracle-data-storageg-1

```
[oracle@b09b21 ~]$ java -jar /u01/OPCWorkshop/opc_install.jar -serviceName Storage -identityDomain gse00011358 -opcId cloud.admin
opcPass rAkISh@3Cotton
-oracle-data-storageg-1
Oracle Database Cloud Backup Module Install Tool, build MAIN_2017-08-16
Oracle Database Cloud Backup Module credentials are valid.
Backups would be sent to container oracle-data-storageg-1.
Oracle Database Cloud Backup Module wallet created in directory /u01/app/oracle/product/12.2/opc_wallet.
Oracle Database Cloud Backup Module initialization file /u01/app/oracle/product/12.2/dbhome_1/dbs/ocpcorcl.ora created.
Downloading Oracle Database Cloud Backup Module Software Library from file opc_linux64.zip.
Download complete.
[oracle@b09b21 ~]$
```

- Connect to RMAN

- rman target /

```
[oracle@b09b21 ~]$ rman target /
Recovery Manager: Release 12.2.0.1.0 - Production on Thu Nov 30 11:32:00 2017
Copyright (c) 1982, 2017, Oracle and/or its affiliates. All rights reserved.
connected to target database: ORCL (DBID=1485665021)
RMAN>
```

- Set Configuration parameters

```
run {
configure channel device type 'sbt_tape' MAXPIECESIZE 2
G FORMAT 'alphacloud_%d_%U' PARMS
'SBT_LIBRARY=libopc.so, ENV=
(OPC_PFILE=/u01/app/oracle/product/12.2/dbhome_1/dbs/opc
orcl.ora)';
CONFIGURE COMPRESSION ALGORITHM 'MEDIUM';
CONFIGURE DEVICE TYPE sbt BACKUP TYPE TO COMPRESSED
BACKUPSET;
CONFIGURE CONTROLFILE AUTOBACKUP ON;
configure default device type to sbt;
CONFIGURE DEVICE TYPE SBT_TAPE PARALLELISM 5 BACKUP TYPE
TO COMPRESSED BACKUPSET;
}
```


- List parameters

- show all;

```
RMAN> show all;

RMAN configuration parameters for database with db_unique_name ORCL are:
CONFIGURE RETENTION POLICY TO REDUNDANCY 1; # default
CONFIGURE BACKUP OPTIMIZATION OFF; # default
CONFIGURE DEFAULT DEVICE TYPE TO 'SBT_TAPE';
CONFIGURE CONTROLFILE AUTOBACKUP ON;
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE SBT_TAPE TO '%F'; # default
CONFIGURE CONTROLFILE AUTOBACKUP FORMAT FOR DEVICE TYPE DISK TO '%F'; # default
CONFIGURE DEVICE TYPE 'SBT_TAPE' PARALLELISM 5 BACKUP TYPE TO COMPRESSED BACKUPSET;
CONFIGURE DEVICE TYPE DISK PARALLELISM 1 BACKUP TYPE TO BACKUPSET; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; # default
CONFIGURE DATAFILE BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE SBT_TAPE TO 1; # default
CONFIGURE ARCHIVELOG BACKUP COPIES FOR DEVICE TYPE DISK TO 1; # default
CONFIGURE CHANNEL DEVICE TYPE 'SBT_TAPE' MAXPIECESIZE 2 G FORMAT 'alphacloud_%d_%U' PARMs 'SBT_LIBRARY=libopc.so, ENV=(OPC_PFILE=/u01/app/oracle/product/12.2/dbhome_1/dbs/opcorcl.ora)';
CONFIGURE MAXSETSIZETO UNLIMITED; # default
CONFIGURE ENCRYPTION FOR DATABASE OFF; # default
CONFIGURE ENCRYPTION ALGORITHM 'AES128'; # default
CONFIGURE COMPRESSION ALGORITHM 'MEDIUM' AS OF RELEASE 'DEFAULT' OPTIMIZE FOR LOAD TRUE;
CONFIGURE RMAN OUTPUT TO KEEP FOR 7 DAYS; # default
CONFIGURE ARCHIVELOG DELETION POLICY TO NONE; # default
CONFIGURE SNAPSHOT CONTROLFILE NAME TO '/u01/app/oracle/product/12.2/dbhome_1/dbs/snapcf_orcl.f'; # default
```

- Backup the Database

- set encryption on;
 - alter system archive log current;
 - backup database plus archivelog;

```
channel ORA_SBT_TAPE_4: specifying datafile(s) in backup set
input datafile file number=00018 name=/u01/app/oracle/oradata/orcl/alphadb/users.dbf
channel ORA_SBT_TAPE_4: starting piece 1 at 30-NOV-17
channel ORA_SBT_TAPE_2: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_32sks3fl_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_2: backup set complete, elapsed time: 00:00:16
channel ORA_SBT_TAPE_2: starting compressed full datafile backup set
channel ORA_SBT_TAPE_2: specifying datafile(s) in backup set
input datafile file number=00007 name=/u01/app/oracle/oradata/orcl/users01.dbf
channel ORA_SBT_TAPE_2: starting piece 1 at 30-NOV-17
channel ORA_SBT_TAPE_3: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_33sks3fm_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_3: backup set complete, elapsed time: 00:00:15
channel ORA_SBT_TAPE_4: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_36sks3fu_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_4: backup set complete, elapsed time: 00:00:07
channel ORA_SBT_TAPE_5: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_35sks3ft_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_5: backup set complete, elapsed time: 00:00:08
channel ORA_SBT_TAPE_1: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_34sks3ft_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_1: backup set complete, elapsed time: 00:00:11
channel ORA_SBT_TAPE_2: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_37sks3g5_1_1 tag=TAG20171130T121100 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_2: backup set complete, elapsed time: 00:00:07
Finished backup at 30-NOV-17

Starting backup at 30-NOV-17
current log archived
using channel ORA_SBT_TAPE_1
using channel ORA_SBT_TAPE_2
using channel ORA_SBT_TAPE_3
using channel ORA_SBT_TAPE_4
using channel ORA_SBT_TAPE_5
channel ORA_SBT_TAPE_1: starting compressed archived log backup set
channel ORA_SBT_TAPE_1: specifying archived log(s) in backup set
input archived log thread=1 sequence=261 RECID=18 STAMP=961416717
channel ORA_SBT_TAPE_1: starting piece 1 at 30-NOV-17
channel ORA_SBT_TAPE_1: finished piece 1 at 30-NOV-17
piece handle=alphacloud_ORCL_38sks3ge_1_1 tag=TAG20171130T121157 comment=API Version 2.0,MMS Version 3.17.9.5
channel ORA_SBT_TAPE_1: backup set complete, elapsed time: 00:00:07
Finished backup at 30-NOV-17

Starting Control File and SPFILE Autobackup at 30-NOV-17
piece handle=c-1485665021-20171130-00 comment=API Version 2.0,MMS Version 3.17.9.5
Finished Control File and SPFILE Autobackup at 30-NOV-17
```

- List backups.

- list backup summary;

- Create restore point for later (lab 300)

- create restore point gold preserve;

```
RMAN> create restore point gold preserve;  
using target database control file instead of recovery catalog  
Statement processed
```

Recover Dropped Table

Now that we have a backup of our database we are going to “accidentally” drop a table that will reappear once we perform the restore.

We need to set the de-encryption password we set when encrypting and backing up the database.

STEP 8: Drop Table

- Exit out of RMAN and log into alpha
 - exit;
 - sqlplus alpha/Alpha2018_@alphapdb
 - drop table alpha_services_stats;

```
RMAN> exit

Recovery Manager complete.
[oracle@ol74-clientv22 12.2]$ sqlplus alpha/Alpha2018_@alphapdb

SQL*Plus: Release 12.2.0.1.0 Production on Thu Dec 14 16:36:49 2017

Copyright (c) 1982, 2016, Oracle. All rights reserved.

Last Successful login time: Thu Dec 14 2017 16:34:46 -05:00

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> drop table alpha_services_stats;

Table dropped.

SQL> ■
```

STEP 9: Recover Table

We now need to restore the database to the point in time before the mstars table was accidentally deleted (⇒ The backup files stored in cloud will be used. These steps will bring the entire database to a point where media recovery can occur. This of course takes the database offline. If you had multiple PDBs in the database and only needed to recover data in one PDB while leaving the others on-line, you could use the steps listed in the ALTERNATIVE RESTORE section in Workshop_Commands_URLS.txt under the RMAN FLOW. It takes a little longer using this method, so we'll use the flow under the RESTORE section.

- Exit out of SQLPlus and log into RMAN and recover table. Enter the following commands.
 - exit
 - rman target /

- shutdown immediate;
- startup mount;
- set decryption identified by oracle;

```

SQL> exit
Disconnected from Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production
[oracle@o174-clientv22 12.2]$ rman target /

Recovery Manager: Release 12.2.0.1.0 - Production on Thu Dec 14 16:42:40 2017

Copyright (c) 1982, 2017, Oracle and/or its affiliates. All rights reserved.

connected to target database: ORCL (DBID=1485665021)

RMAN> shutdown immediate;

using target database control file instead of recovery catalog
database closed
database dismounted
Oracle instance shut down

RMAN> startup mount;

connected to target database (not started)
Oracle instance started
database mounted

Total System Global Area    2516582400 bytes

Fixed Size                  8795904 bytes
Variable Size                721422592 bytes
Database Buffers            1778384896 bytes
Redo Buffers                 7979008 bytes

RMAN> set decryption identified by oracle;

executing command: SET decryption

RMAN>

```

- Copy and Paste the RMAN run block that does the restore / recovery to our “gold” restore point. The final step opens the database and resets the logs since we've restored to a previous point in time.
 - run {restore database; recover database to restore point gold; alter database open resetlogs;}

```

channel ORA_SBT_TAPE_5: restoring datafile 00027 to /u01/app/oracle/oradata/orcl/pdb1/gg.dbf
channel ORA_SBT_TAPE_5 reading from backup piece alphacloud_ORCL_3fsm4454_1_1
channel ORA_SBT_TAPE_1 piece handle=alphacloud_ORCL_30sm4436_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_1 restored backup piece 1
channel ORA_SBT_TAPE_1 restore complete, elapsed time: 00:00:34
channel ORA_SBT_TAPE_1: starting datafile backup set restore
channel ORA_SBT_TAPE_1: specifying datafile(s) to restore from backup set
channel ORA_SBT_TAPE_1: restoring datafile 00026 to /u01/app/oracle/oradata/orcl/alphapdb/users.dbf
channel ORA_SBT_TAPE_1 reading from backup piece alphacloud_ORCL_3gsm4455_1_1
channel ORA_SBT_TAPE_2 piece handle=alphacloud_ORCL_3asm444s_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_2 restored backup piece 1
channel ORA_SBT_TAPE_2: restore complete, elapsed time: 00:00:06
channel ORA_SBT_TAPE_2: starting datafile backup set restore
channel ORA_SBT_TAPE_2: specifying datafile(s) to restore from backup set
channel ORA_SBT_TAPE_2: restoring datafile 00007 to /u01/app/oracle/oradata/orcl/users01.dbf
channel ORA_SBT_TAPE_2 reading from backup piece alphacloud_ORCL_3hsm4456_1_1
channel ORA_SBT_TAPE_5 piece handle=alphacloud_ORCL_3fsm4454_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_5 restored backup piece 1
channel ORA_SBT_TAPE_5: restore complete, elapsed time: 00:00:03
channel ORA_SBT_TAPE_1: piece handle=alphacloud_ORCL_3gsm4455_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_1 restored backup piece 1
channel ORA_SBT_TAPE_1: restore complete, elapsed time: 00:00:03
channel ORA_SBT_TAPE_2 piece handle=alphacloud_ORCL_3hsm4456_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_2 restored backup piece 1
channel ORA_SBT_TAPE_2: restore complete, elapsed time: 00:00:03
channel ORA_SBT_TAPE_3 piece handle=alphacloud_ORCL_3csm444s_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_3 restored backup piece 1
channel ORA_SBT_TAPE_3: restore complete, elapsed time: 00:00:09
channel ORA_SBT_TAPE_4 piece handle=alphacloud_ORCL_3dsm444t_1_1 tag=TAG20171214T162717
channel ORA_SBT_TAPE_4 restored backup piece 1
channel ORA_SBT_TAPE_4: restore complete, elapsed time: 00:00:06
Finished restore at 14-DEC-17

Starting recover at 14-DEC-17
using channel ORA_SBT_TAPE_1
using channel ORA_SBT_TAPE_2
using channel ORA_SBT_TAPE_3
using channel ORA_SBT_TAPE_4
using channel ORA_SBT_TAPE_5
using channel ORA_DISK_1

starting media recovery
media recovery complete, elapsed time: 00:00:02

Finished recover at 14-DEC-17

Statement processed

RMAN> 
```

- Once the script completes, go back to the Terminal Window you used to connect with sqlplus and re-connect back into the Alphapdb container as alpha and query to see if the alpha_services_stats table has been recovered.

- exit;
- sqlplus sys/Alpha2018_ as sysdba
- alter pluggable database all open;
- connect alpha/Alpha2018_@alphapdb;
- select count(*) from alpha_services_stats;
- 'exit';

```
[oracle@o174-clientv22 12.2]$ sqlplus sys/Alpha2018_ as sysdba
SQL*Plus: Release 12.2.0.1.0 Production on Thu Dec 14 16:52:33 2017
Copyright (c) 1982, 2016, Oracle. All rights reserved.

Connected to:
Oracle Database 12c Enterprise Edition Release 12.2.0.1.0 - 64bit Production

SQL> alter pluggable database all open;

Pluggable database altered.

SQL> connect alpha/Alpha2018_@alphapdb
Connected.
SQL> select count(*) from alpha_services_stats;

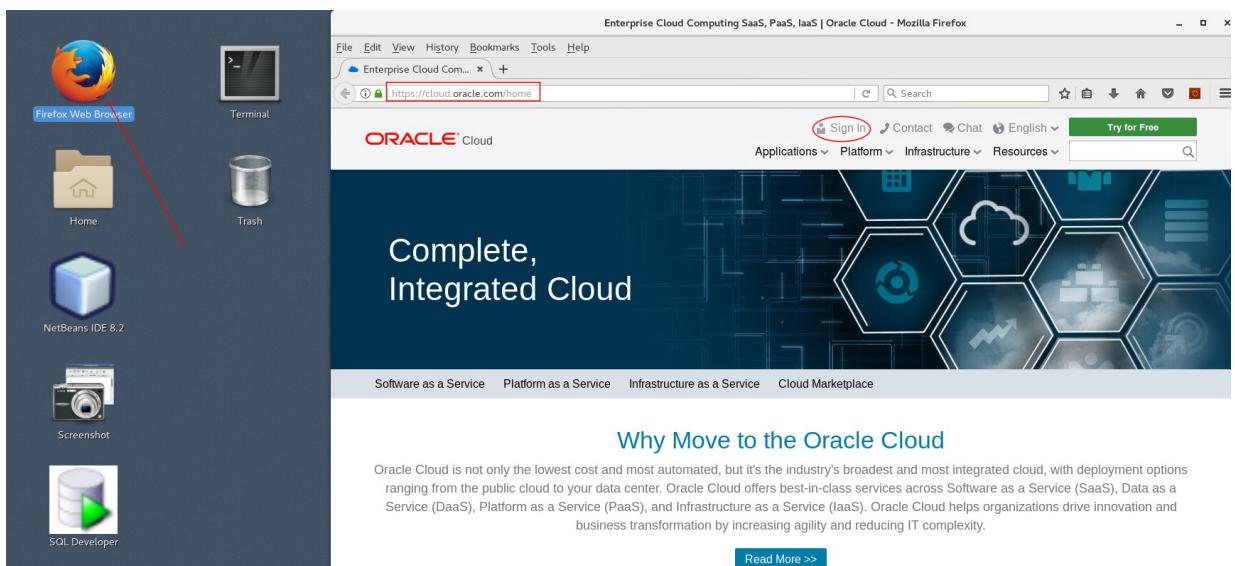
  COUNT(*)
  -----
         33

SQL> [REDACTED]
```

Create Database Cloud Service from Backup

STEP 9: Login to your Oracle Cloud account

- From within the VNC Session, open **Firefox** and go to the following URL: <https://cloud.oracle.com>



- Click **Sign In** in the upper right hand corner of the browser. Note this is the same account/login that you used earlier in this lab.
- IMPORTANT** - Select 'Traditional Cloud Account' and then select from

the Data Center drop down list the correct data center and click on **My Services**. If you are unsure of the data center you should select, and this is an in-person training event, **ask your instructor** which **Region** to select from the drop down list. If you received your account through an Oracle Trial, your Trial confirmation email should provide a URL that will pre-select the region for you.

The screenshot shows the Oracle Cloud console interface. At the top, there's a navigation bar with links for Contact, Chat, English, Try for Free, Applications, Platform, Infrastructure, and Resources. Below the navigation is the 'Cloud Account' section, which includes a profile icon, a dropdown menu set to 'Traditional Cloud Account' (circled in red), and another dropdown menu set to 'US Commercial 2 (us2) Ask your instructor'. A red arrow points from the 'Ask your instructor' link to the 'My Services' button. To the right of the account section is a sidebar titled 'Trouble Signing In?' featuring an envelope icon, a brief description about listing all accounts via email, and a 'Account Details' button.

- Enter the **identity domain** and click **Go**

NOTE: The **Identity Domain**, **User Name** and **Password** values will be given to you from your instructor.

This screenshot shows a sign-in form for a 'Traditional Cloud Account'. The title 'Traditional Cloud Account' is at the top. Below it is the instruction 'Enter your Identity Domain' with a text input field containing 'gse00011358'. At the bottom is a large blue 'Go' button.

- Once your Identity Domain is set, enter your User Name and Password and click **Sign In**

NOTE: the **Identity Domain**, **User Name** and **Password** values will be

given to you from your instructor.

Traditional Cloud Account

Welcome gse00011358 [change domain](#) [?](#)

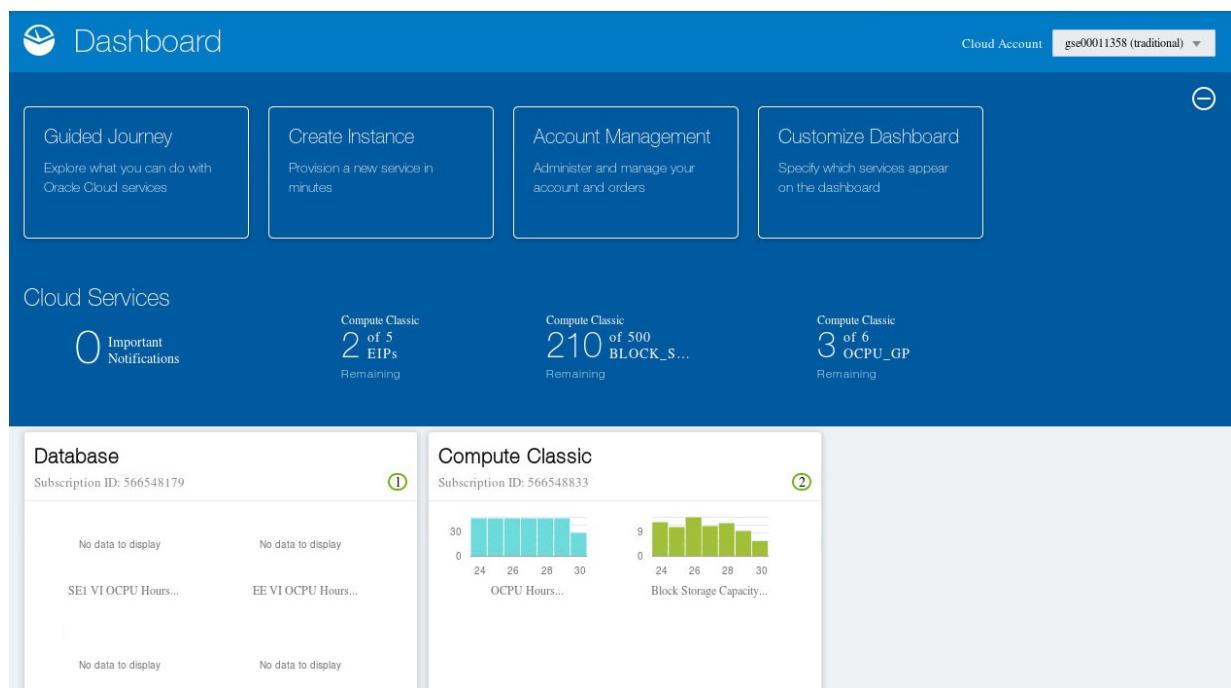
cloud.admin

•••••••••••••••

[Can't access your account?](#)

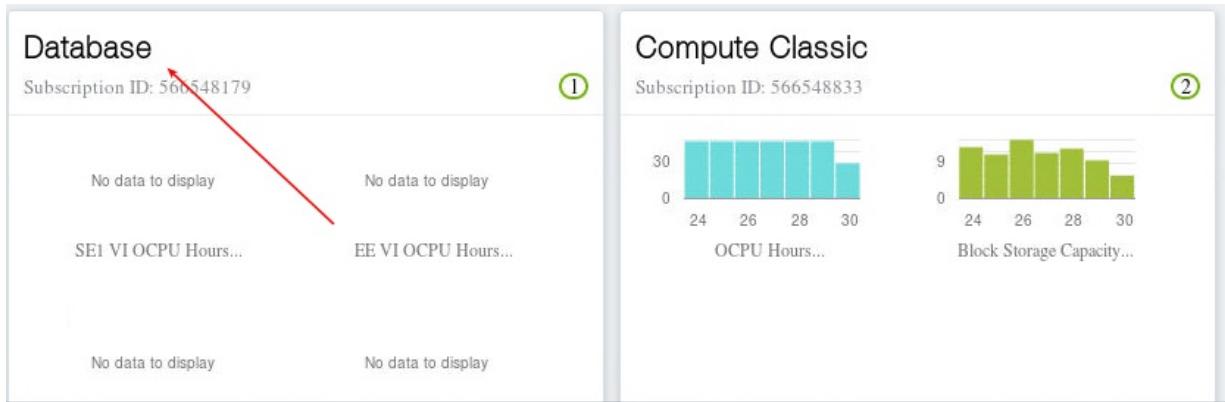
[Sign In](#)

- You will be presented with a Dashboard summarizing all of your available services.



STEP 10: Create Database Cloud Service

- From the main dashboard, click on the **Database** service link



- From this page you can view general information about this Database Cloud Service. Click on the **Open Service Console** button.

The screenshot shows the Oracle Database Cloud Service console with the following details:

- Service: Oracle Database Cloud Service**
- Overview** tab selected (other tabs: Billing Metrics, Monitoring Metrics, Documents)
- Overview Information** section:

Category	Oracle Database Public Cloud Services
Data Region	US Commercial 2 (Time zone: US/Central)
Identity Domain Name	gse00011358
Identity Domain Id	gse00011358
Subscription	Trial (Expires: 13-Mar-2019 11:51 AM BRT)

- From the console, click **Create Service**

The screenshot shows the Oracle Database Cloud Service Create Service page with the following details:

- Summary** section:

1 Services	1 OCPUs	7.5 GB Memory	185 GB Storage	1 Public IPs
------------	---------	---------------	----------------	--------------
- Services** section:

Search by service name	Create Service
Alpha01A-DBCS	Alpha01A-DBCS
Version: 12.2.0.1	Created On: Nov 28, 2017 9:32:08 PM UTC
Edition: Enterprise Edition	OCPUs: 1
	Memory: 7.5 GB
	Storage: 185 GB

STEP 11: Enter the Instance Configuration

When providing a name, please note you may have another service instance already created in your account, so the name must be unique.

- Enter the Service Name (Alpha01B-DBCS) and other fields as noted below. Note it is important you select **Software Release Oracle**

Database 12c Release 2 (default is 1)

Cancel Service Details Confirm Next >

Service
Provide basic service instance information.

* Service Name: Alpha01B-DBCS	* Service Level: Oracle Database Cloud Service
Description: Alpha Office Database Cloud Service	* Metering Frequency: Monthly
Notification Email: user@example.com	* Software Release: Oracle Database 12c Release 2
	* Software Edition: Enterprise Edition
	* Database Type: Single Instance

A red arrow points from the "Software Release" field to the "Software Release" dropdown menu.

- Click on the **Next** Button to navigate to the Service Details page. Enter the DB Name, PDB Name, Administration Password ('Alpha2018_'), and then **select Edit for the SSH Public Key**.

< Previous Cancel Service Details Confirm Next >

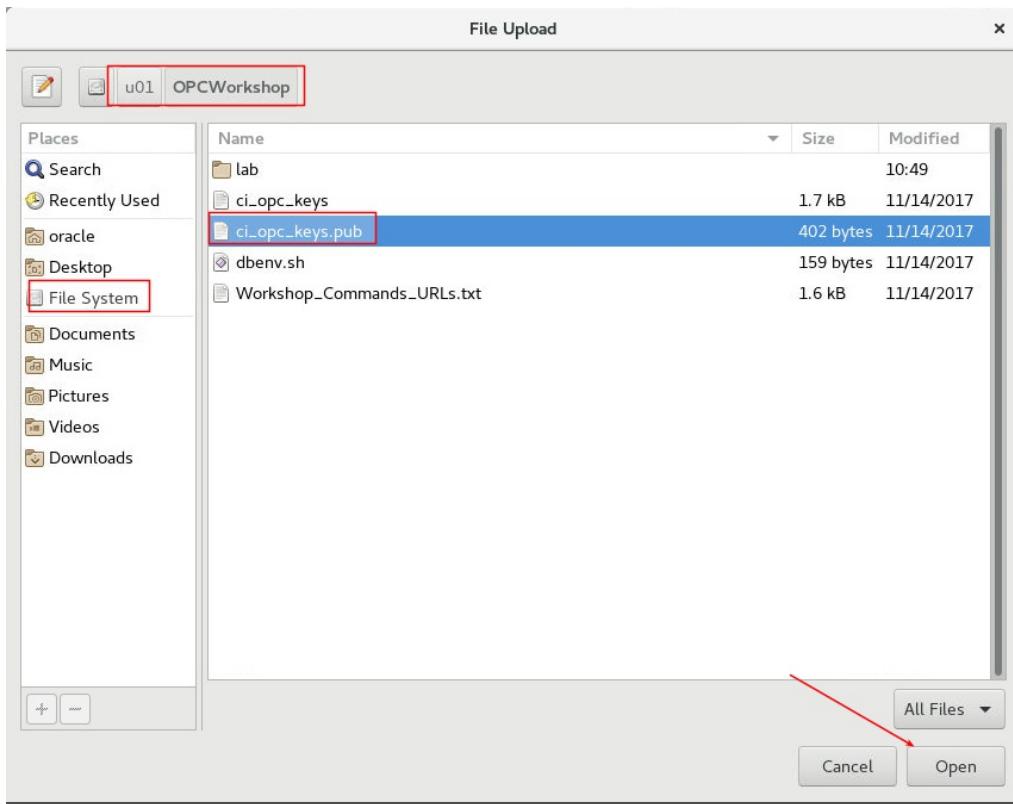
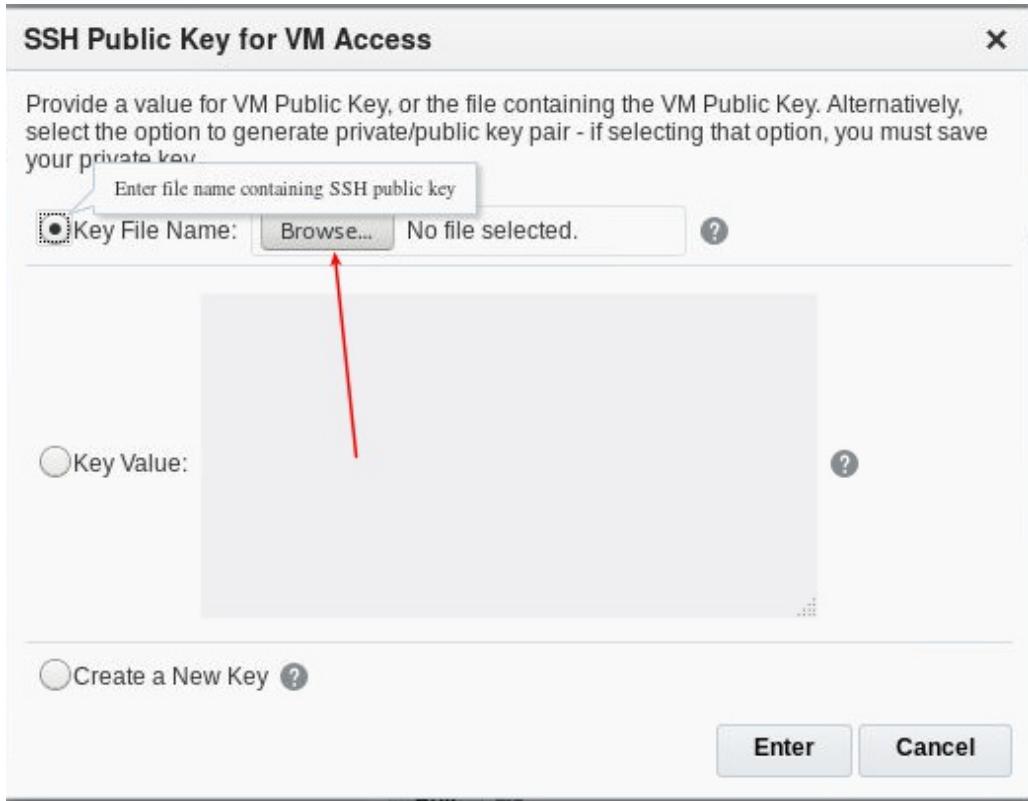
Service Details
Provide details for this Oracle Database Cloud Service instance.

Selection Summary

Database Configuration		Backup and Recovery Configuration	
* DB Name: ORCL	* PDB Name: PDB1	* Backup Destination: Both Cloud Storage and Local	* Cloud Storage Container: Cloud Storage Container
* Administration Password: [REDACTED]		* Username: Username	
* Confirm Password: [REDACTED]		* Password: Password	
* Usable Database Storage (GB): 25	Total Data File Storage (GB): 88.5	Create Cloud Storage Container: <input type="checkbox"/>	Total Estimated Monthly Storage (GB): 140
* Compute Shape: OC3 - 1.0 OCPU, 7.5 GB RAM		Initialize Data From Backup	
* SSH Public Key: [REDACTED] 		* Create Instance from Existing Backup: No	

Advanced Settings

- Click on Browse, select File System on the left, and then navigate to /u01/OPCWorkshop and select the ci_opc_keys.pub file.



- Select **Backup Destination None** and **Create Instance from Existing Backup Yes**.

- In a separate terminal window enter the following to retrieve the dbid which you'll need.

- source dbenv.sh
- sqlplus sys/Alpha2018_ as sysdba
- select dbid from v\$database

- Enter the following fields
 - **On-Premises Backup:** yes
 - **Database ID:** From the query above
 - **Description Method:** see below

- **Cloud Storage Container - note substitutions:**

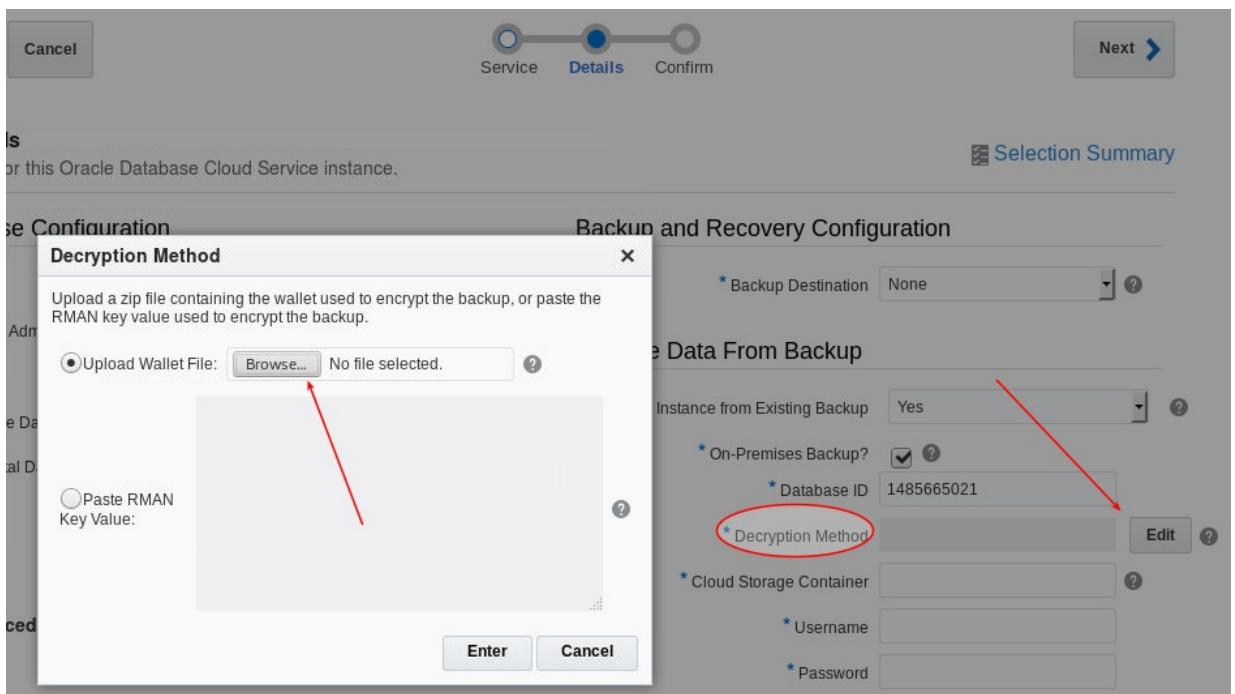
<https://storage.us2.oraclecloud.com/v1/Storage-<IDENTITY DOMAIN>/oracle-data-storageg-1>

- us2 may be em2 if you are in a EMEA data center
- substitute gse00011358 with your own identity domain

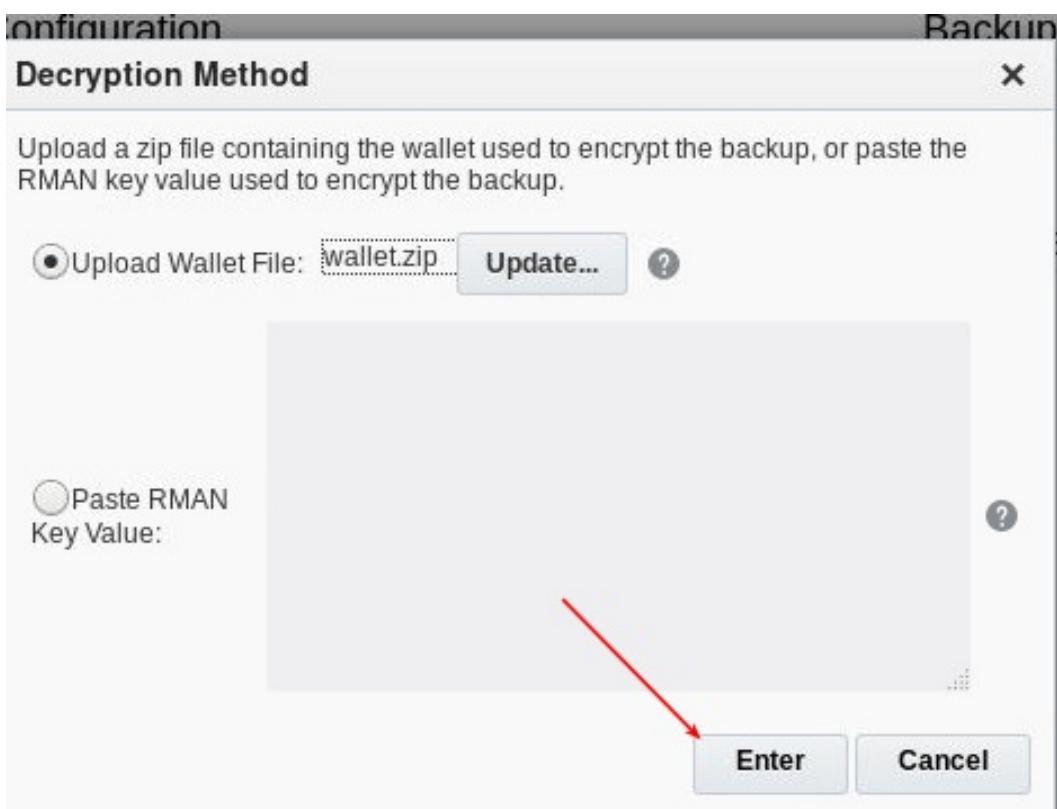
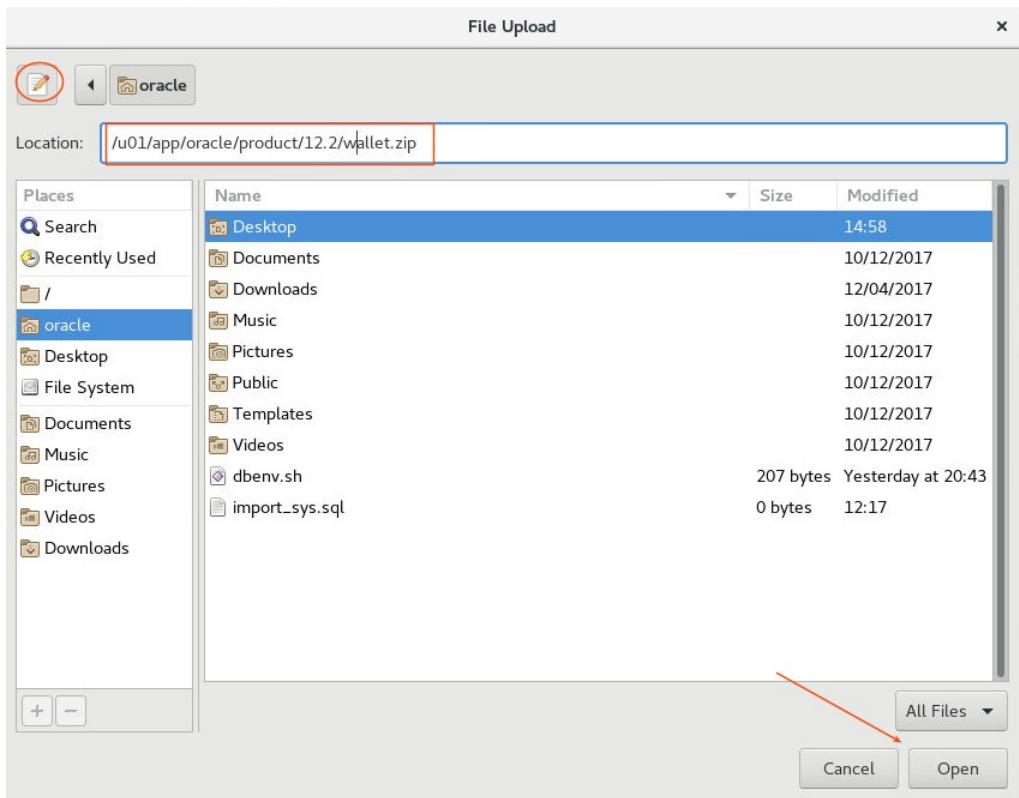
- **Username:** <your cloud account userid>

- **Password:** <your cloud account password>

- Select zipped wallet for the Decryption Method:



- Click on the icon upper left, enter the following path and select the wallet.zip file



- Confirm the following fields are entered correctly and then select Next.

Service Details
Provide details for this Oracle Database Cloud Service instance.

Database Configuration

- * DB Name: ORCL
- * Administration Password:
- * Confirm Password:
- * Usable Database Storage (GB): 105
- Total Data File Storage (GB): 176.5
- * Compute Shape: OC3 - 1.0 OCPU, 7.5 GB RAM
- * SSH Public Key: ci_opc_keys.pub

Backup and Recovery Configuration

- * Backup Destination: None
- * Create Instance from Existing Backup: Yes
- * On-Premises Backup?:
- * Database ID: 1485665021
- * Decryption Method: wallet.zip
- * Cloud Storage Container: 011358/oracle-data-storageg-1
- * Username: cloud.admin
- * Password:

Initialize Data From Backup

Advanced Settings

- Select Create

Confirmation
Confirm your responses and create service instance.

Service

Service Name:	Alpha01B-DBCS
Description:	
Bring Your Own License:	No
Service Level:	Oracle Database Cloud Service
Metering Frequency:	Monthly
Software Release:	Oracle Database 12c Release 2
Software Edition:	Enterprise Edition
Compute Shape:	OC3 - 1.0 OCPU, 7.5 GB RAM
SSH Public Key:	ci_opc_keys.pub
Use High Performance Storage:	No

Backup and Recovery Configuration

Backup Destination:	None
---------------------	------

Instantiate from Backup

Instantiate from Backup:	yes
Database ID:	1485665021
Cloud Storage Container:	https://storage.us2.oraclecloud.com/buckets/011358/oracle-data-storageg-1
Username:	cloud.admin

Database Configuration

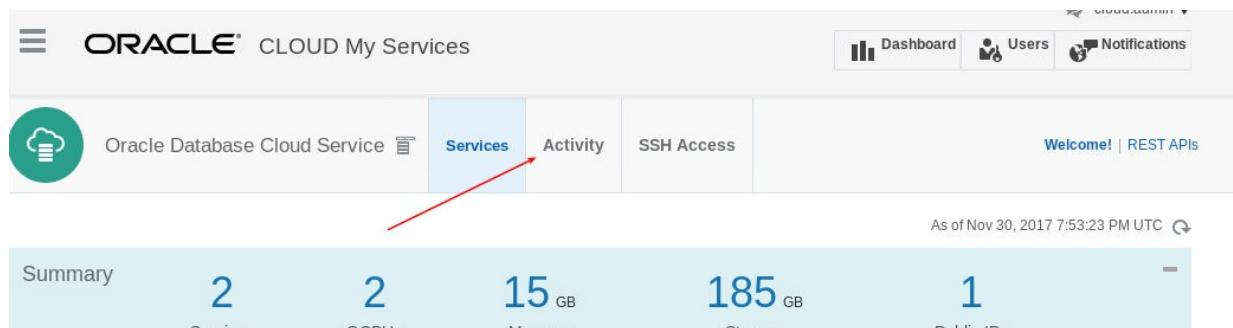
DB Name:	ORCL
Usable Database Storage (GB):	105
Total Data File Storage (GB):	176.5
Listener Port:	1521
Timezone:	(UTC) Coordinated Universal Time
Include "Demos" PDB:	No
Include GoldenGate:	No

Standby Database Configuration

Standby Database with Data Guard:	No
-----------------------------------	----

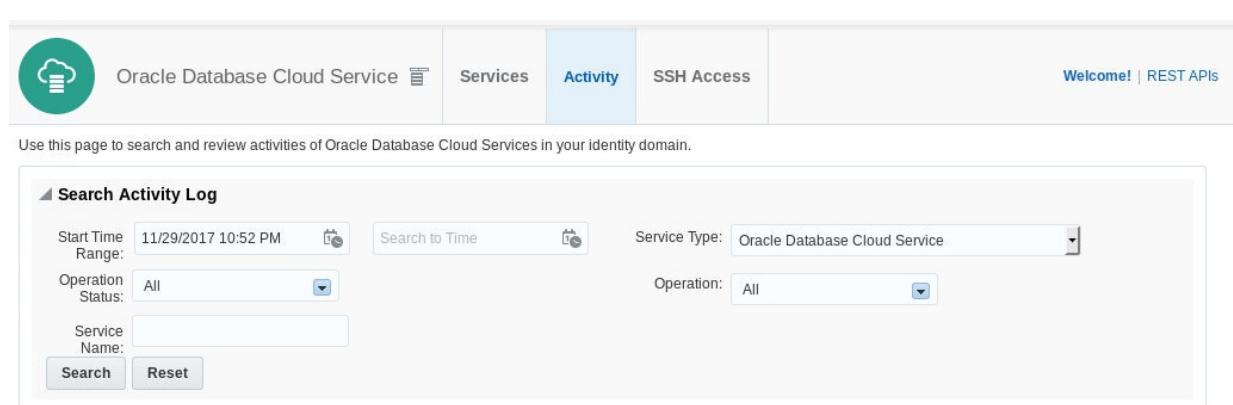
- The creation of the DBCS instance will take approximately 20 minutes. While your DBCS instance is being created, you can monitor the progress by clicking on the **Activity** menu item, and view the current status. **NOTE:** If this process fails it may be due to either you did not properly open the password wallet for the pdb\$seed and pluggable databases prior to backing up the database to the cloud, or that you did

not zip the wallet IMMEDIATELY after opening the password wallets to capture the wallet state properly. If this restore step fails NONE of the rest of the labs depend on this, and due to the time required to fix the issue and backup and restore the database again you should move on rather than trying to fix this.



The screenshot shows the Oracle Cloud My Services dashboard. At the top, there are tabs for Dashboard, Users, and Notifications. Below the tabs, there's a summary section with metrics: 2 Services, 2 OCPUs, 15 GB Memory, 185 GB Storage, and 1 Public IP. A red arrow points to the 'Services' tab in the navigation bar. To the right, it says 'Welcome! | REST APIs' and 'As of Nov 30, 2017 7:53:23 PM UTC'.

Service	Status	Submitted On	OCPUs	Memory	Storage
Alpha01B-DBCS	Creating service ...	Nov 30, 2017 7:53:17 PM UTC	1	7.5 GB	185 GB
Alpha01A-DBCS	12.2.0.1	Nov 28, 2017 9:32:08 PM UTC	1	7.5 GB	185 GB



The screenshot shows the 'Activity' tab selected in the navigation bar. It displays a search bar and a 'Create Service' button. Below that, it lists activities for the Oracle Database Cloud Service. One activity for 'Alpha01B-DBCS' is highlighted with a red box, showing its status as 'Creating service ...'.

Operation	Service Name	Service Type	Operation Status	Start Time	End Time	Initiated By
Instantiate Service ...	Alpha01B-DBCS	Oracle Database ...	Succeeded	Nov 30, 2017 10:57:17 PM UTC	Nov 30, 2017 11:42:11 PM UTC	cloud.admin
Create Service	Alpha01B-DBCS	Oracle Database ...	Succeeded	Nov 30, 2017 10:27:25 PM UTC	Nov 30, 2017 10:57:17 PM UTC	cloud.admin
Delete Service	Alpha01B-DBCS	Oracle Database ...	Succeeded	Nov 30, 2017 9:29:28 PM UTC	Nov 30, 2017 9:33:49 PM UTC	cloud.admin
Instantiate Service ...	Alpha01B-DBCS	Oracle Database ...	Failed	Nov 30, 2017 8:23:13 PM UTC	Nov 30, 2017 8:50:50 PM UTC	cloud.admin
Create Service	Alpha01B-DBCS	Oracle Database ...	Succeeded	Nov 30, 2017 7:53:17 PM UTC	Nov 30, 2017 8:23:13 PM UTC	cloud.admin

NOTE: We will continue with the lab by utilizing **Alpha01A-DBCS** DBCS instance which is already created.

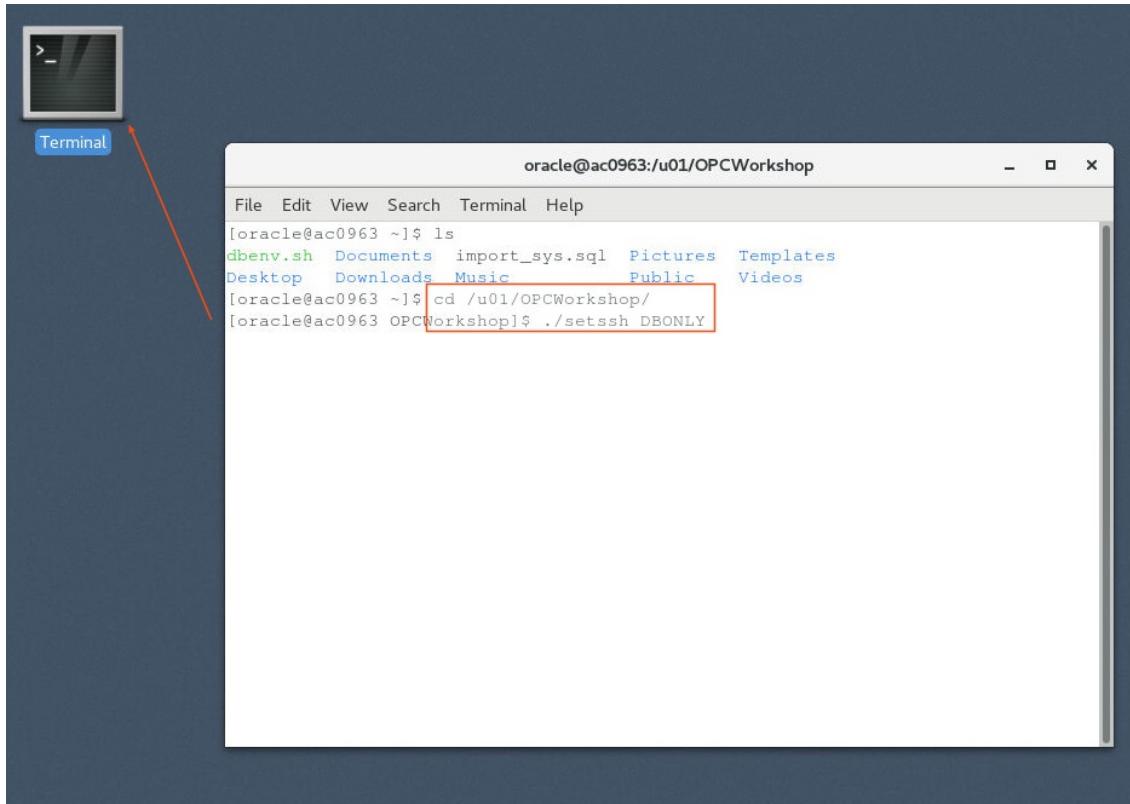
The screenshot shows a 'Services' interface. At the top, there's a search bar with placeholder text 'Enter a full or partial service name' and a magnifying glass icon. Below the search bar, a service card is displayed for 'Alpha'. The card includes a blue cloud icon with a white hourglass, the word 'Alpha' in blue, and a progress bar indicating 'Starting Compute resources...'. To the right of the progress bar, it says 'Submitted On: Jan 6, 2016 2:01:26 AM UTC'. Below the progress bar, the service details are listed: Status: In Progress, Version: 12.1.0.2, and Edition: Enterprise Edition.

STEP 12: Run the SSH configuration script to start tunnels in the background

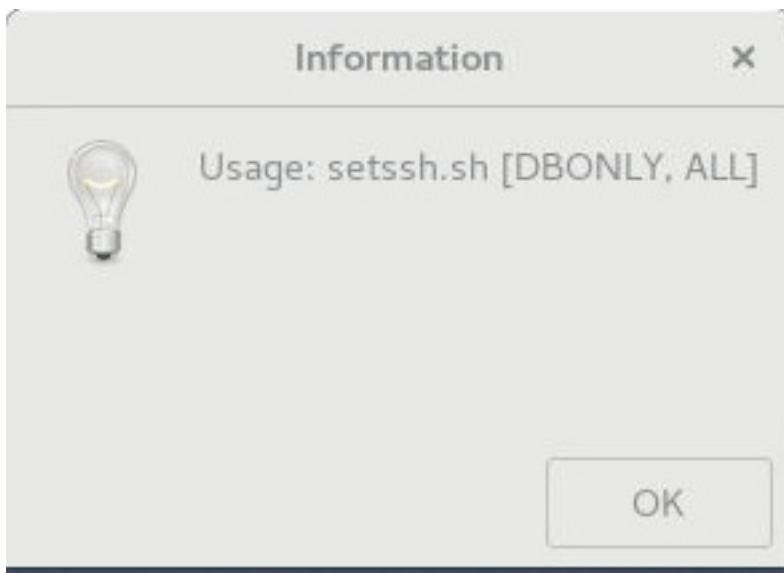
For security reasons, the default Oracle Public Cloud network configuration is locked down. You have the option of opening up ports to the various servers in your environment by either using the Compute Cloud Service console and creating/re-using protocol definitions and access rules, OR you can create SSH tunnels to the specific server/port combinations as needed. This lab and the rest of the labs require access via development tools and the browser to various admin consoles running on the cloud servers themselves.

In this step you will run a script that creates and configures a SSH file used to connect to your various servers. Once the script is generated, it will create SSH tunnels in the background with connections via selected ports used in this and other labs.

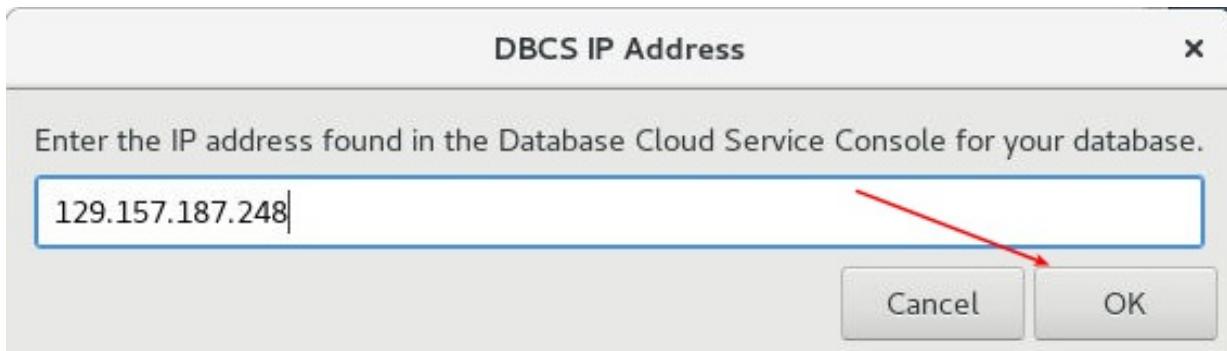
- Open a terminal Window by clicking the terminal icon in the screen's top menu bar and enter the following:
 - `cd /u01/OPCWorkshop`
 - `./setssh.sh DBONLY`



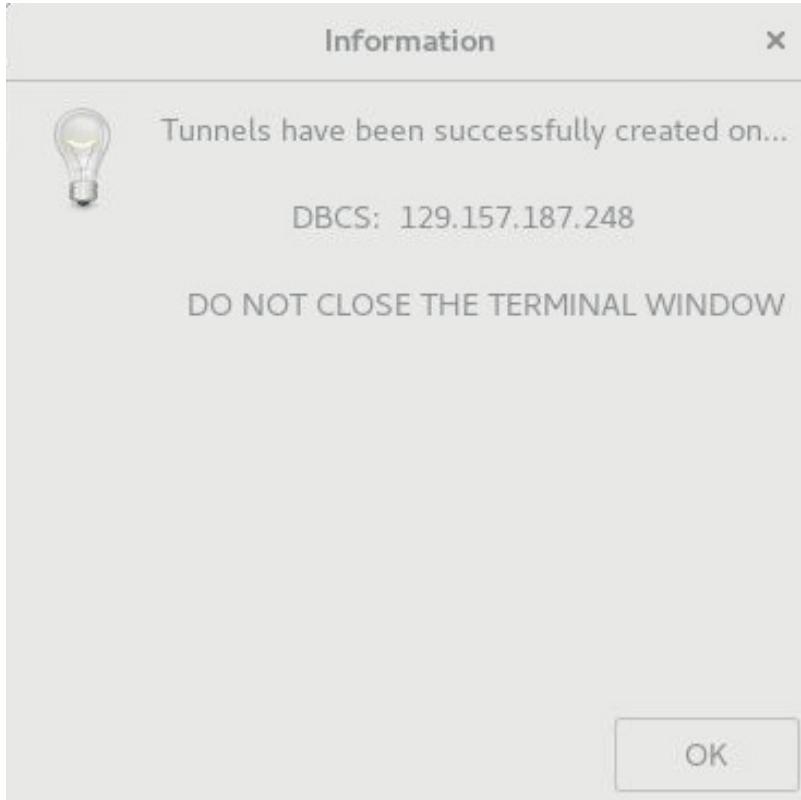
- If you make an error, you'll see:



- If the script runs successfully, you will enter the DB IP address previously obtained and select **OK**.



- The script will try a test connection to your server. If it encounters errors, you will be re-prompted to enter the IP address. If successful, a SSH configuration file is created and a SSH session to the DB server will be placed in the background. A successful completion will show:



- You can look at the generated configuration file by typing `gedit myssh` within the terminal window. Notice under the **Host AlphaDBCS** section of the config file that the DBCS IP address has been inserted in 5 areas defining LocalForward ports (1526, 443, 4848, and 5500). These ports can now be accessed locally using “localhost” in connection information or URLs.
- Close the edit session.

- You can also enter:
 - sudo su
 - ps -ef | grep DBCS to see the running background session.

```

File Edit View Search Terminal Help
[oracle@b09b21 ~]$ ping 129.157.187.248
PING 129.157.187.248 (129.157.187.248) 56(84) bytes of data.
^C
--- 129.157.187.248 ping statistics ---
6 packets transmitted, 0 received, 100% packet loss, time 5000ms

[oracle@b09b21 ~]$ sudo su
[root@b09b21 oracle]# ps -ef|grep DBCS
root    12015 11993  0 11:20 pts/1    00:00:00 sudo ssh -t -t -F myssh AlphaDBCS
oracle   12016 11993  0 11:20 pts/1    00:00:00 zenity --info --text=Tunnels have been successfully created on...\\n
WINDOW
root    12017 12015  0 11:20 pts/1    00:00:00 ssh -t -t -F myssh AlphaDBCS
root    17521 17505  0 12:31 pts/0    00:00:00 grep --color=auto DBCS
[root@b09b21 oracle]#

```

Explore DB image via SSH

Record IP address of Database Cloud Service

In the upcoming steps you will record the IP addresses of the Virtual Machine on which the cloud service runs. You will then update the ssh configuration file for **Alpha01A-DBCS**.

STEP 13: Record the IP address of the Database Cloud Service

- Click on **Alpha01A-DBCS** from the list of Database Instances

The screenshot shows the Oracle Cloud Infrastructure Services page. At the top, there's a summary section with metrics: 1 Service, 1 OCpus, 7.5 GB Memory, and 185 GB Storage. Below this, a red arrow points from the 'Services' heading to a search bar labeled 'Search by service name'. Under the search bar, the service 'Alpha01A-DBCS' is listed, accompanied by a blue cloud icon. To the right of the service name, its version (12.2.0.1) and edition (Enterprise Edition) are shown. Further to the right, the creation date (Nov 28, 2017 9:32:08 PM UTC) is displayed.

Summary	
1 Services	1 OCpus
7.5 GB Memory	185 GB Storage

Services

Search by service name

Alpha01A-DBCS

Version: 12.2.0.1 Created On: Nov 28, 2017 9:32:08 PM UTC

Edition: Enterprise Edition

- Note the IP address of **Alpha01A-DBCS**. In this example, we will note the IP address of 129.144.19.238

Overview

Service Overview

As of Nov 30, 2017 9:52:20 PM UTC

Nodes 1 Nodes **OCPUs** 1 OCPUs **Memory** 7.5 GB **Storage** 185 GB

Status: Ready **Version:** 12.2.0.1
Connect String: Alpha01A-DBCS:1521/PDB1.g... **Edition:** Enterprise Edition
Backup Destination: Both Cloud Storage and... **Cloud Storage Container:** https://storage.us2.oracle...
PDB Name: PDB1 **Container Name:** ORCL

Show more...

Resources

	Host Name: Alpha01A-DBCS Public IP: 129.157.187.248 SID: ORCL	OCPUs: 1 Memory: 7.5 GB Storage: 185 GB
--	--	--

STEP 14: Open a new SSH Connection to browse the database image

- enter the following command using the IP address for your DBCS cloud instance.
 - `ssh -o StrictHostKeyChecking=no -i /u01/OPCWorkshop/ci_opc_keys oracle@<your db ip>`

```
oracle@Alpha01A-DBCS:~
```

File Edit View Search Terminal Help

```
[oracle@b09b21 ~]$ ssh -o StrictHostKeyChecking=no -i /u01/OPCWorkshop/ci_opc_keys oracle@129.157.187.248
[oracle@Alpha01A-DBCS ~]$
```

- Now that you are connected to **Alpha01A-DBCS**, let's look around. Enter the **df** command to see mounted disks.

```
oracle@Alpha01A-DBCS:~ - □ ×
File Edit View Search Terminal Help
[oracle@b09b21 ~]$ ssh -o StrictHostKeyChecking=no -i /u01/OPCWorkshop/ci_opc_ks
ys oracle@129.157.187.248
[oracle@Alpha01A-DBCS ~]$ df
Filesystem      1K-blocks      Used Available Use% Mounted on
/dev/mapper/vg_main-lv_root
                  19155660  12034940   6124576  67% /
tmpfs            3828632        0  3828632   0% /dev/shm
/dev/xvdb1       487652     70101   387855  16% /boot
/dev/xvde1       61795324  19833624  38799640  34% /u01
/dev/mapper/dataVolGroup-lvol0
                  25667900  3934148  20406856  17% /u02
/dev/mapper/fraVolGroup-lvol0
                  43214016 10493108  30502720  26% /u03
/dev/mapper/redoVolGroup-lvol0
                  26700028  3355652  21965048  14% /u04
[oracle@Alpha01A-DBCS ~]$ █
```

- Issue the following command to view the Database environment variable.
 - **env | grep ORA**

```
[oracle@Alpha01A-DBCS ~]$ env|grep ORA
ORACLE_UNQNAME=ORCL
ORACLE_SID=ORCL
ORACLE_BASE=/u01/app/oracle
ORACLE_HOSTNAME=Alpha01A-DBCS.compute-gse00011358.oraclecloud.internal
ORACLE_HOME=/u01/app/oracle/product/12.2.0/dbhome_1
[oracle@Alpha01A-DBCS ~]$ █
```

- Now let's change directories to the Oracle Home and list the directories.
 - **cd \$ORACLE_HOME**
 - **ls**

```
[oracle@Alpha01A-DBCS ~]$ cd $ORACLE_HOME
[oracle@Alpha01A-DBCS dbhome_1]$ ls
addnode      dbjava        inventory   odbc       perl        sqldeveloper
apex         dbs           javavm     olap        plsql       sqlj
assistants   dc_ocm       jdbc        OPatch    precomp    sqlpatch
bin          deinstall    jdk         opc        QOPatch   sqlplus
CCR          demo          jlib        opmn       R          srvm
cdata        diagnostics  ldap        oracore   racq        suptools
cfgtoollogs dmu          lib         oraInst.loc rdbms      sysman
clone        dv            log         ord        relnotes  ucp
crs          env.ora     md          ordim     root.sh    usm
css          has           mgw        ords      root.sh.bkup utl
ctx          hs            network   oss        schagent.conf wwg
cv           install     nls        oui        scheduler xdk
data         instantclient oc4j     owm        slax
```

- Type **exit** to close the remote Database Image ssh session.

NOTE: By typing exit once, you are only exiting the Cloud DBCS Service. Do not exit the Terminal window, as we have the SSH Tunnels running in the background, and these SSH Tunnels will be used during the remainder of the lab.

Access the Database Consoles

Access DB Monitor, Apex, EM Consoles

NOTE: For any of the URLs mentioned in this section you can also use the predefined browser links. If blocked ports on the network cause an issue loading any of these consoles, the predefined browser links will help by routing the traffic through the SSH tunnel that should already be open:



STEP 15: Access Database Monitor

To gain access to the various consoles used by the Database Cloud Service you have two options. You can open up the port on which the monitor is listening, or you can create a SSH tunnels to the specific server/port combinations as needed. We have already created the SSH tunnel, and you will use that tunnel to access most of the consoles.

In this step you will open the port 443 on the VM using a pre-create access rule and protocol definition.

- If not already on the **Alpha01A-DBCS** details page, navigate back to Database Cloud Service console and click on **Alpha01A-DBCS** to get to this page.

The screenshot shows the Oracle Cloud My Services dashboard. At the top, there are summary statistics: 1 Service, 1 OCPUs, 7.5 GB Memory, 185 GB Storage, and 1 Public IP. Below this, the 'Services' section lists the 'Alpha01A-DBCS' instance. The instance details are: Version: 12.2.0.1, Edition: Enterprise Edition, Created On: Nov 28, 2017 9:32:08 PM UTC, OCPUs: 1, Memory: 7.5 GB, and Storage: 185 GB. A red arrow points to the three-dot menu icon next to the instance name.

- At the top of the page click next to the instance name **Alpha01A-DBCS** and select **Access Rules**.

The screenshot shows the Oracle Database Cloud Service / Alpha01A-DBCS details page. In the top right, a context menu is open over the instance name. The 'Access Rules' option is highlighted with a red circle. Other options in the menu include Open DBaaS Monitor Console, Open Application Express Console, Open EM Console, Start, Stop, Restart, Scale Up/Down, SSH Access, and Replace Database using Backup. The main page displays the service overview with 1 Node, Status: Ready, Connect String: Alpha01A-DBCS, Backup Destination: Both Clo..., PDB Name: PDB1, Host Name: Alpha01A-DBCS, Public IP: 129.157.187.248, SID: ORCL, and resource details: OCPUs: 1, Memory: 7.5 GB, Storage: 185 GB. A red arrow points to the 'Access Rules' option in the context menu.

- From this screen you see all the **Access Rules** that have been created

for this instance

The screenshot shows the Oracle Database Cloud Service Access Rules page. At the top, there is a green circular icon with a white cloud and a gear. To its right, the text "Oracle Database Cloud Service / Alpha01A-DBCS / Access Rules" is displayed. On the far right, there is a "Create Rule" button. Below this, a message says "You can use access rules to control network access to service components. On this page, you can manage your access rules." A dropdown menu shows "Results per page: 10". To the right, it says "9 result(s) as of Dec 4, 2017 5:40:54 PM UTC" with a refresh icon. The main area is a table with the following columns: Status, Rule Name, Source, Destination, Ports, Protocol, Description, Rule Type, and Actions. The table contains nine rows, each representing a different access rule. The "ora_p2_httpsl" rule is highlighted with a red arrow pointing to it from the list below.

Status	Rule Name	Source	Destination	Ports	Protocol	Description	Rule Type	Actions
Active	ora_p2_ssh	PUBLIC-INTERNET	DB	22	TCP		DEFAULT	
Inactive	ora_p2_http	PUBLIC-INTERNET	DB	80	TCP		DEFAULT	
Inactive	ora_p2_httpsl	PUBLIC-INTERNET	DB	443	TCP		DEFAULT	
Inactive	ora_p2_httpadmin	PUBLIC-INTERNET	DB	4848	TCP		DEFAULT	
Inactive	ora_p2_dbconsole	PUBLIC-INTERNET	DB	1158	TCP		DEFAULT	
Inactive	ora_p2_dbexpress	PUBLIC-INTERNET	DB	5500	TCP		DEFAULT	
Inactive	ora_p2_dblistener	PUBLIC-INTERNET	DB	1521	TCP		DEFAULT	
Active	sys_infra2db_ssh	PAAS-INFRA	DB	22	TCP	DO NOT MODIFY: Permit P...	SYSTEM	
Active	ora_trusted_hosts dbl...	127.0.0.1/32	DB	1521	TCP	DO NOT MODIFY: A secrule...	SYSTEM	

- The Rule named **ora_p2_httpsl** is setup to open port 443 to the public internet. Click on the **hamburger menu**

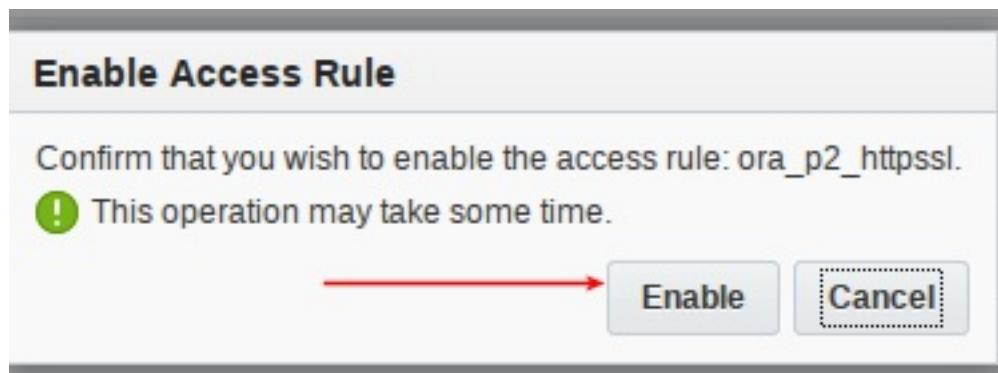
The screenshot shows the Oracle Database Cloud Service Access Rules page, identical to the one above but with a red arrow pointing specifically to the "ora_p2_httpsl" row in the table. This indicates that the user should click on the hamburger menu icon next to this rule to enable it.

Status	Rule Name	Source	Destination	Ports	Protocol	Description	Rule Type	Actions
Active	ora_p2_ssh	PUBLIC-INTERNET	DB	22	TCP		DEFAULT	
Inactive	ora_p2_http	PUBLIC-INTERNET	DB	80	TCP		DEFAULT	
Inactive	ora_p2_httpsl	PUBLIC-INTERNET	DB	443	TCP		DEFAULT	
Inactive	ora_p2_httpadmin	PUBLIC-INTERNET	DB	4848	TCP		DEFAULT	
Inactive	ora_p2_dbconsole	PUBLIC-INTERNET	DB	1158	TCP		DEFAULT	
Inactive	ora_p2_dbexpress	PUBLIC-INTERNET	DB	5500	TCP		DEFAULT	
Inactive	ora_p2_dblistener	PUBLIC-INTERNET	DB	1521	TCP		DEFAULT	
Active	sys_infra2db_ssh	PAAS-INFRA	DB	22	TCP	DO NOT MODIFY: Permit P...	SYSTEM	
Active	ora_trusted_hosts dbl...	127.0.0.1/32	DB	1521	TCP	DO NOT MODIFY: A secrule...	SYSTEM	

for this rule and select **Enable**

Status	Rule Name	Source	Destination	Ports	Protocol	Description	Rule Type	Actions
OK	ora_p2_ssh	PUBLIC-INTERNET	DB	22	TCP		DEFAULT	
OK	ora_p2_http	PUBLIC-INTERNET	DB	80	TCP		DEFAULT	
OK	ora_p2_httpsl	PUBLIC-INTERNET	DB	443	TCP		DEFAULT	Enable
OK	ora_p2_htpasswd	PUBLIC-INTERNET	DB	4848	TCP		DEFAULT	Disable
OK	ora_p2_dbconsole	PUBLIC-INTERNET	DB	1158	TCP		DEFAULT	Delete
OK	ora_p2_dbexpress	PUBLIC-INTERNET	DB	5500	TCP		DEFAULT	
OK	ora_p2_dblistener	PUBLIC-INTERNET	DB	1521	TCP		DEFAULT	
OK	sys_infra2db_ssh	PAAS-INFRA	DB	22	TCP	DO NOT MODIFY: Permit P...	SYSTEM	
OK	ora_trusted_hosts_db...	127.0.0.1/32	DB	1521	TCP	DO NOT MODIFY: A secrule...	SYSTEM	

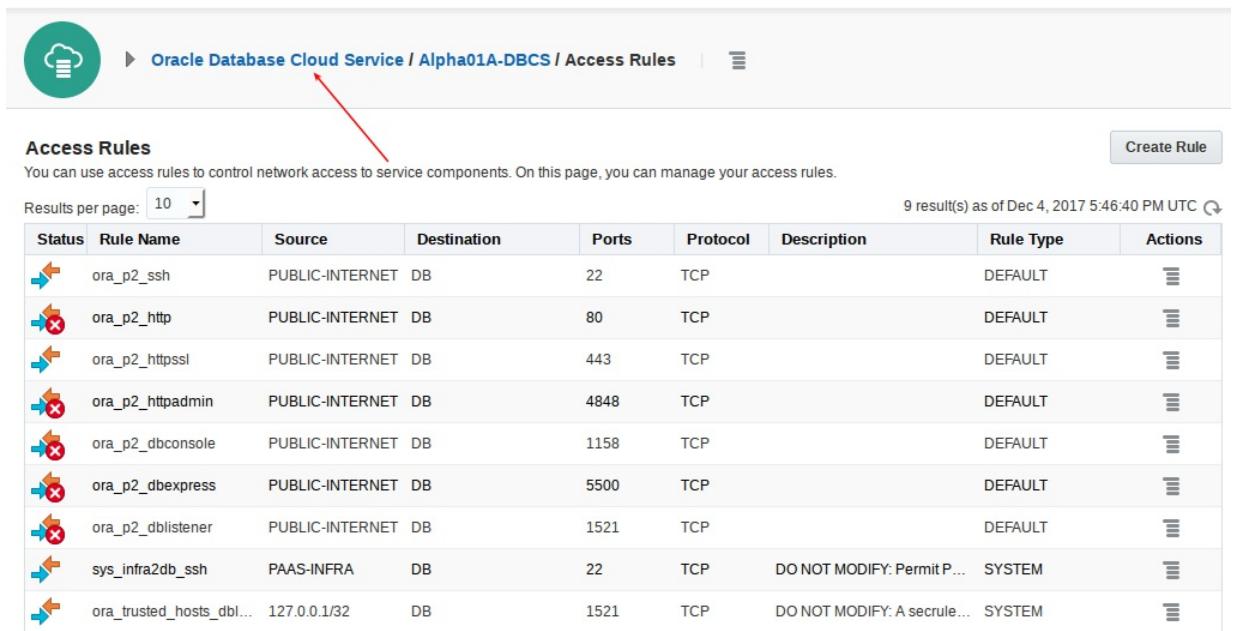
- On Enable Access Rule popup window, click **Enable**.



- You should now see that the Access Rule **ora_p2_httpsl** is enabled. Click on **Oracle Database Cloud Service** link at the top of the window to navigate back to the Service Console

Status	Rule Name	Source	Destination	Ports	Protocol	Description	Rule Type	Actions
OK	ora_p2_ssh	PUBLIC-INTERNET	DB	22	TCP		DEFAULT	
OK	ora_p2_http	PUBLIC-INTERNET	DB	80	TCP		DEFAULT	
OK	ora_p2_httpsl	PUBLIC-INTERNET	DB	443	TCP		DEFAULT	
OK	ora_p2_htpasswd	PUBLIC-INTERNET	DB	4848	TCP		DEFAULT	
OK	ora_p2_dbconsole	PUBLIC-INTERNET	DB	1158	TCP		DEFAULT	
OK	ora_p2_dbexpress	PUBLIC-INTERNET	DB	5500	TCP		DEFAULT	
OK	ora_p2_dblistener	PUBLIC-INTERNET	DB	1521	TCP		DEFAULT	
OK	sys_infra2db_ssh	PAAS-INFRA	DB	22	TCP	DO NOT MODIFY: Permit P...	SYSTEM	
OK	ora_trusted_hosts_db...	127.0.0.1/32	DB	1521	TCP	DO NOT MODIFY: A secrule...	SYSTEM	

- Go back to the list of DBCS services (click on the breadcrumbs) and then select **Open DBaaS Monitor Console**. from the hamburger menu.

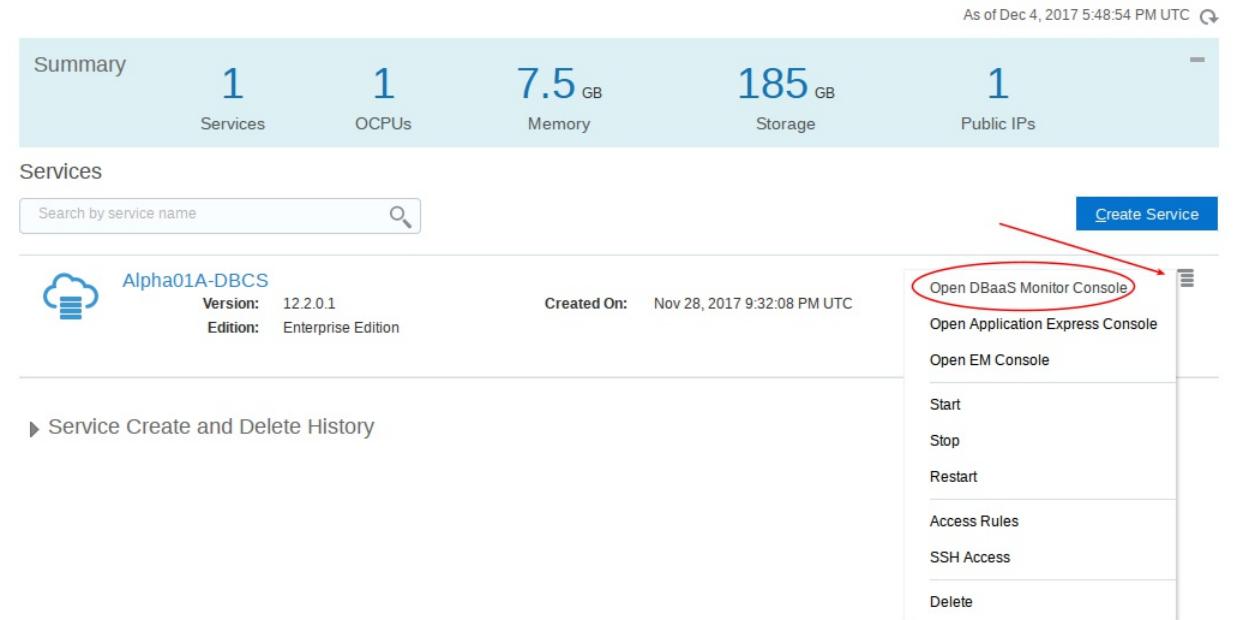


Access Rules

You can use access rules to control network access to service components. On this page, you can manage your access rules.

Results per page: 10 9 result(s) as of Dec 4, 2017 5:46:40 PM UTC

Status	Rule Name	Source	Destination	Ports	Protocol	Description	Rule Type	Actions
Allow	ora_p2_ssh	PUBLIC-INTERNET	DB	22	TCP		DEFAULT	
Allow	ora_p2_http	PUBLIC-INTERNET	DB	80	TCP		DEFAULT	
Allow	ora_p2_https	PUBLIC-INTERNET	DB	443	TCP		DEFAULT	
Allow	ora_p2_httpadmin	PUBLIC-INTERNET	DB	4848	TCP		DEFAULT	
Allow	ora_p2_dbconsole	PUBLIC-INTERNET	DB	1158	TCP		DEFAULT	
Allow	ora_p2_dbexpress	PUBLIC-INTERNET	DB	5500	TCP		DEFAULT	
Allow	ora_p2_dblistener	PUBLIC-INTERNET	DB	1521	TCP		DEFAULT	
Allow	sys_infra2db_ssh	PAAS-INFRA	DB	22	TCP	DO NOT MODIFY: Permit P...	SYSTEM	
Allow	ora_trusted_hosts_db...	127.0.0.1/32	DB	1521	TCP	DO NOT MODIFY: A securle...	SYSTEM	



As of Dec 4, 2017 5:48:54 PM UTC

Summary

1 Services	1 OCPUs	7.5 GB Memory	185 GB Storage	1 Public IPs
------------	---------	---------------	----------------	--------------

Services

Search by service name

Alpha01A-DBCS

Version: 12.2.0.1
Edition: Enterprise Edition

Created On: Nov 28, 2017 9:32:08 PM UTC

Actions

- [Create Service](#)
- [Open DBaaS Monitor Console](#) (circled with a red oval)
- [Open Application Express Console](#)
- [Open EM Console](#)
- [Start](#)
- [Stop](#)
- [Restart](#)
- [Access Rules](#)
- [SSH Access](#)
- [Delete](#)

- If you get a security warning, click **ADVANCED** followed by **Add Exception..**



Your connection is not secure

The owner of 129.157.187.248 has configured their website improperly. To protect your information from being stolen, Firefox has not connected to this website.

[Learn more...](#)

[Go Back](#)

[Advanced](#)

Report errors like this to help Mozilla identify and block malicious sites

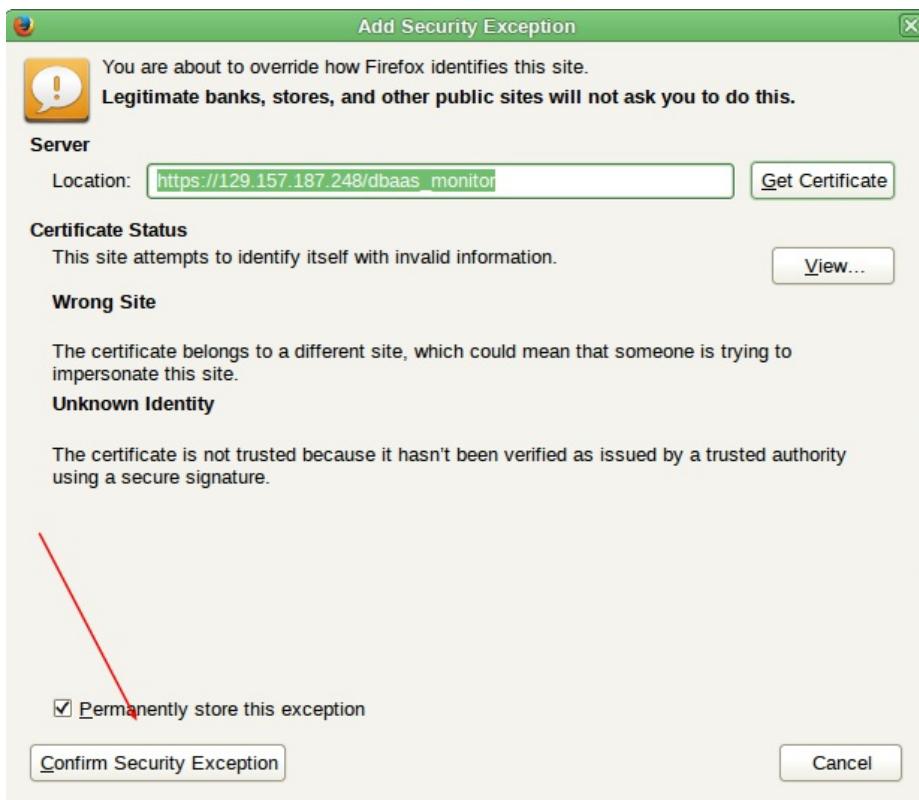
129.157.187.248 uses an invalid security certificate.

The certificate is not trusted because it is self-signed.
The certificate is not valid for the name 129.157.187.248.

Error code: SEC_ERROR_UNKNOWN_ISSUER

[Add Exception...](#)

- Then Confirm Security Exception



- When prompted, enter **dbaas_monitor** for the **User Name** and **Alpha2018_** for the **Password**.

Please enter your credentials

Username

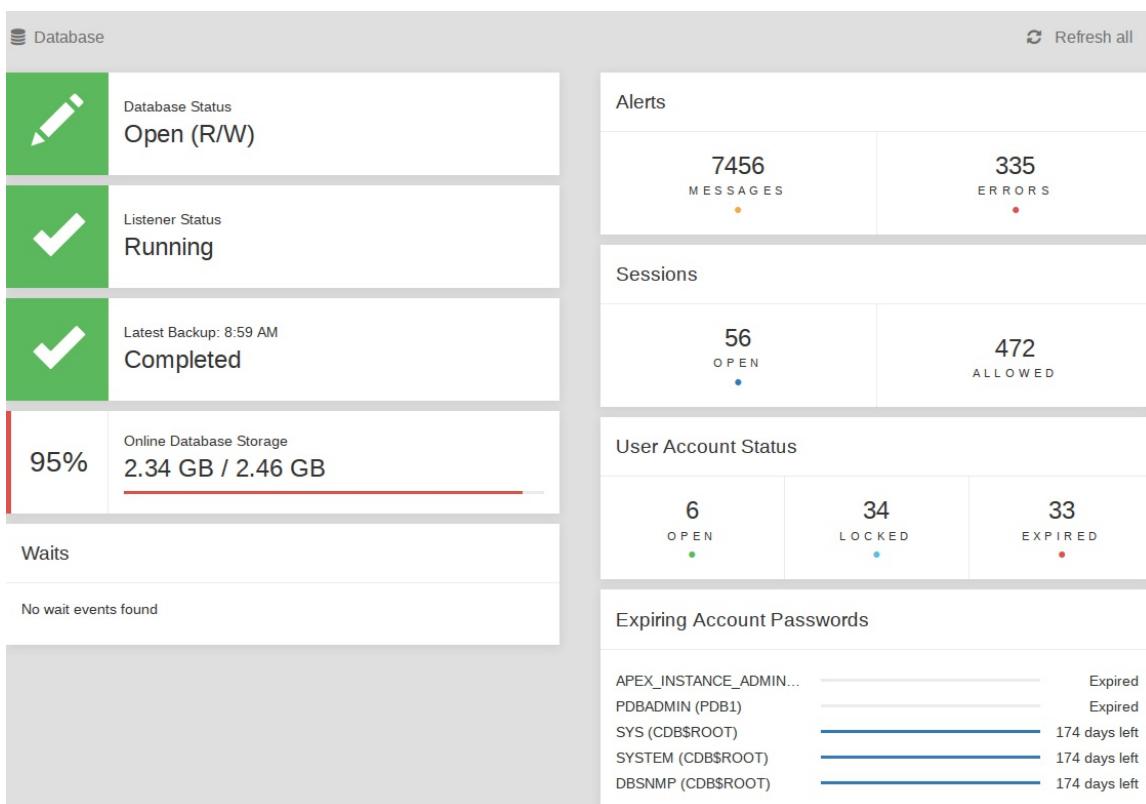
dbaas_monitor

Password

*****|

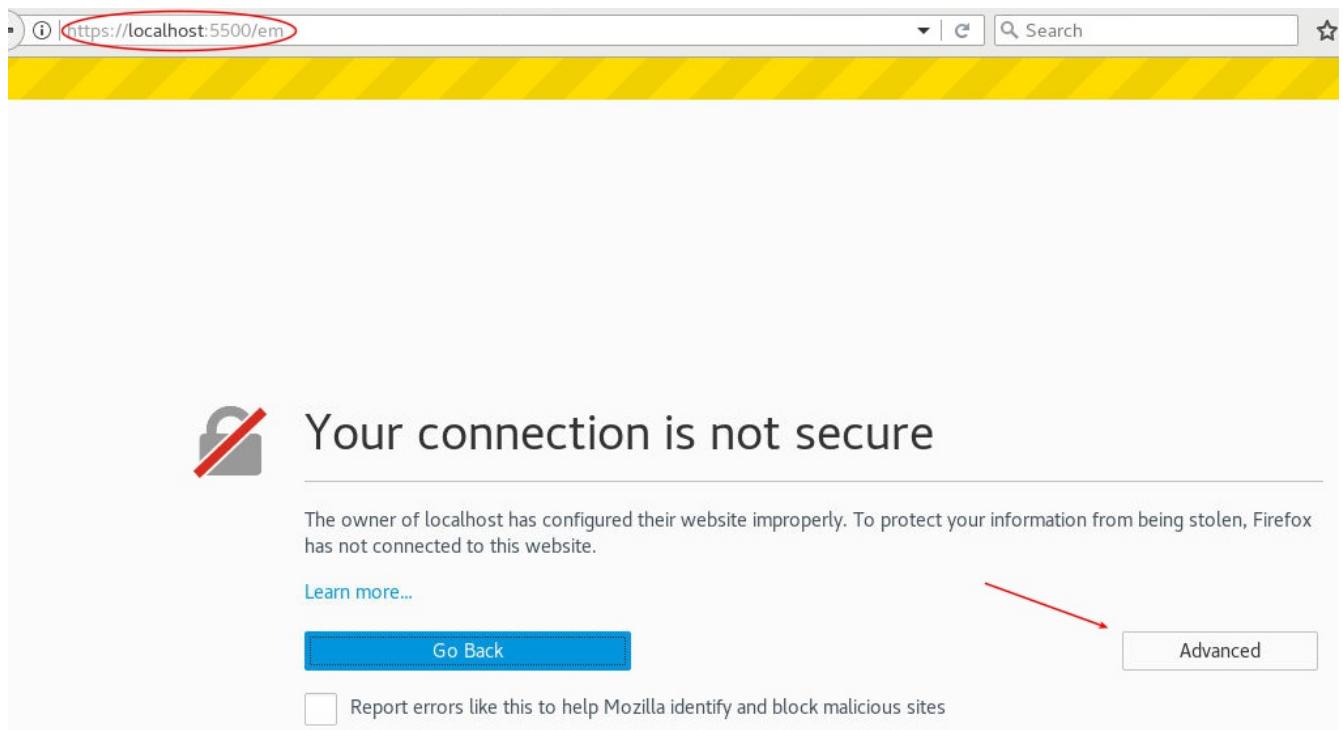
Log In

- Once connected to the Database Monitor Console, feel free to explore the various screens.



STEP 16: Access Enterprise Manager DB Express (inside the workshop image)

- On the browser, open a new tab, and **enter** the following **URL** to access the **EM Express** page. The first time the URL is used, it can take a minute for the console to load. **Note:** The setssh.sh script that you ran earlier in this lab created the ssh tunnel that will cause all traffic referencing localhost:5500 to actually be routed to the database cloud service.
 - **https://localhost:5500/em**



- If you get a security warning, click **ADVANCED** followed by **Add Exception**, and then



Your connection is not secure

The owner of localhost has configured their website improperly. To protect your information from being stolen, Firefox has not connected to this website.

[Learn more...](#)

[Go Back](#)

[Advanced](#)

Report errors like this to help Mozilla identify and block malicious sites

localhost:5500 uses an invalid security certificate.

The certificate is not trusted because it is self-signed.
The certificate is not valid for the name localhost.

Error code: SEC_ERROR_UNKNOWN_ISSUER

[Add Exception...](#)

Add Security Exception

You are about to override how Firefox identifies this site.
Legitimate banks, stores, and other public sites will not ask you to do this.

Server

Location: [Get Certificate](#)

Certificate Status

This site attempts to identify itself with invalid information. [View...](#)

Wrong Site

The certificate belongs to a different site, which could mean that someone is trying to impersonate this site.

Unknown Identity

The certificate is not trusted because it hasn't been verified as issued by a trusted authority using a secure signature.

Permanently store this exception

[Confirm Security Exception](#) [Cancel](#)

- On the EM login page enter the following and click on **Login**:

User Name: sys

Password: Alpha2018_

Container: pdb1

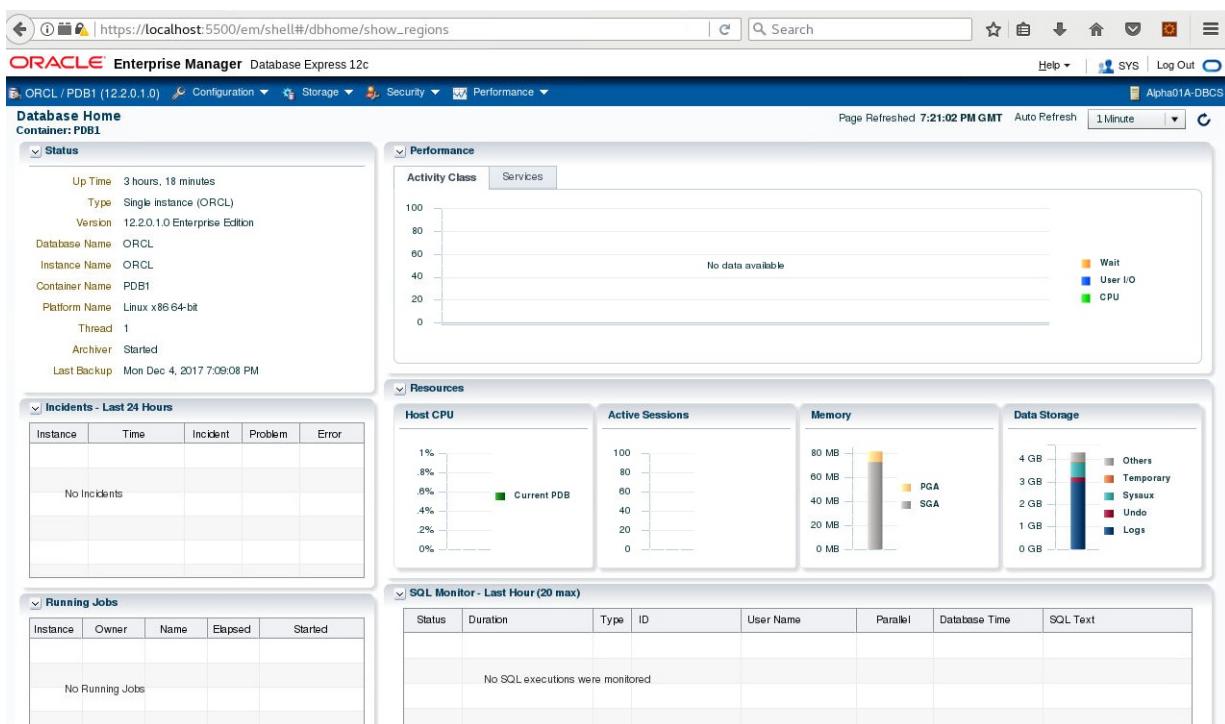
Select the as sysdba box.

The image shows a login interface with the following fields:

- User Name: sys
- Password: (masked)
- Container Name: pdb1
- as sysdba

A "Login" button is at the bottom.

- Feel free to explore the Enterprise Manager console.



STEP 17: Access Apex Monitor

- Enter the following URL into a browser window to access the **Apex console** (click to add a security exception if necessary). **Note:** All traffic to the default https port (443) on local host is also routed through the ssh tunnel to the database cloud service. Click through the security

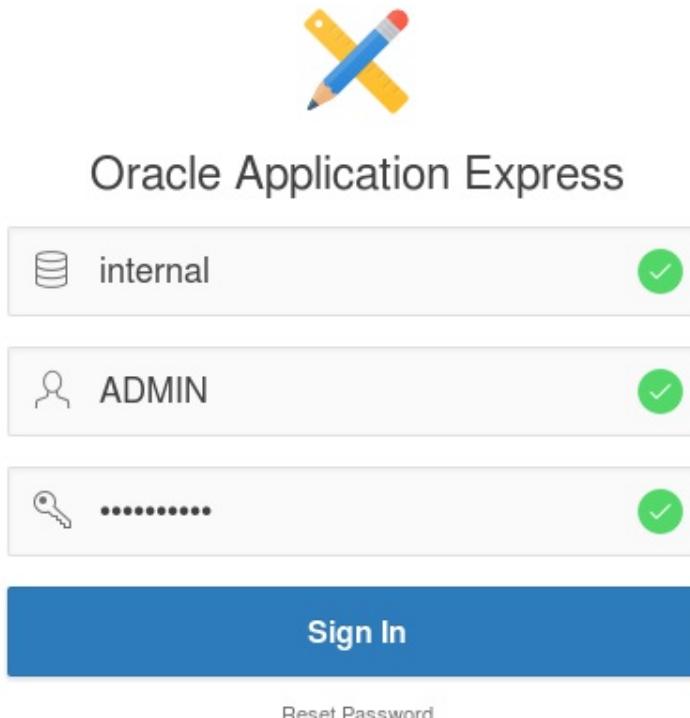
warnings.

- <https://localhost/apex/pdb1/>
- Once the Apex login window is displayed, **enter the following** and click on **Sign In**:

Workspace: internal

Username: ADMIN

Password: Alpha2018_



- You are now connected to Apex. Feel free to explore the menu options.

A screenshot of the Oracle Instance Administration menu. The top bar includes "Instance Administration", "Create Workspace >", and a search bar. Below are four main menu items: "Manage Requests" (with a database plus icon), "Manage Instance" (with a database gear icon), "Manage Workspaces" (with a database gear icon), and "Monitor Activity" (with a chart icon).

- You are now ready to move to the next lab.