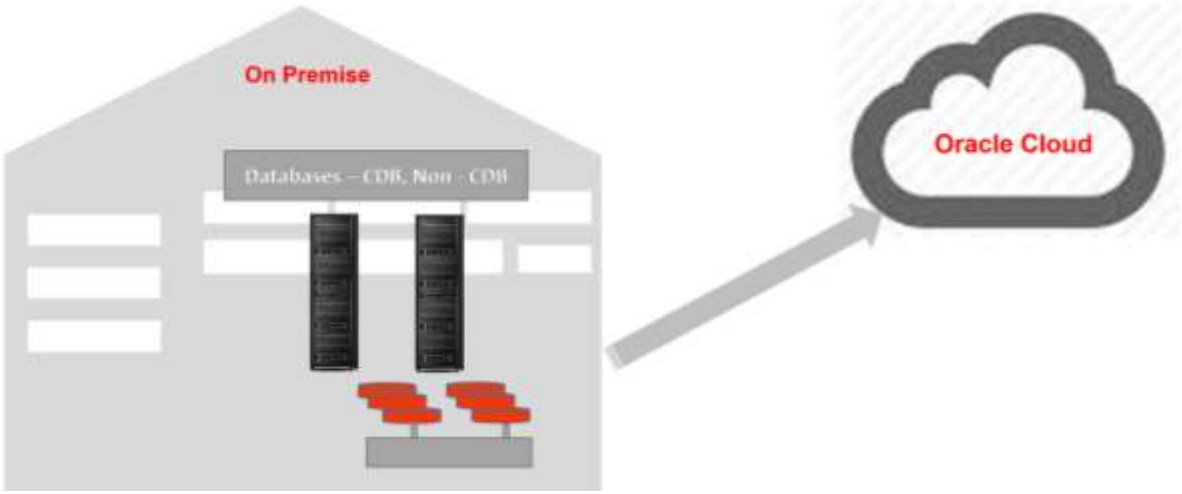


Mastering Oracle Database Cloud

Sudipta Ganguly

Table of Contents

Introduction

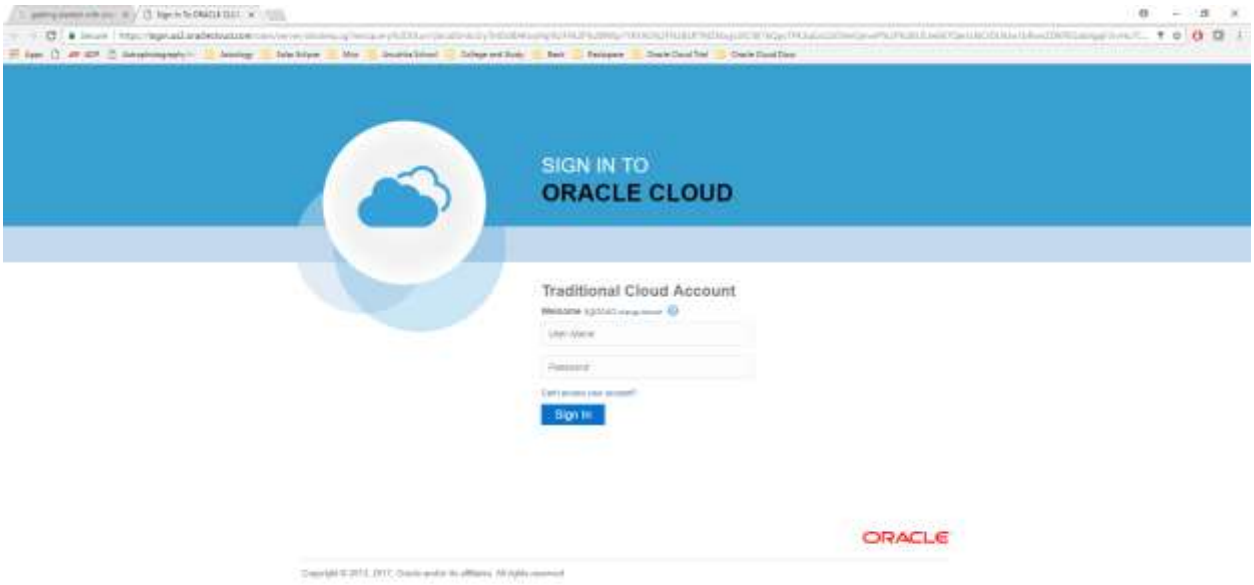
Oracle Cloud is the industry's broadest and most integrated cloud provider, with deployment options ranging from the public cloud to your data center. Oracle Cloud offers best-in-class services across Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

In this document we will mostly discuss about various scenarios to deploy Oracle Database on Cloud (DBaaS) which is a part of Platform as a Service (PaaS)

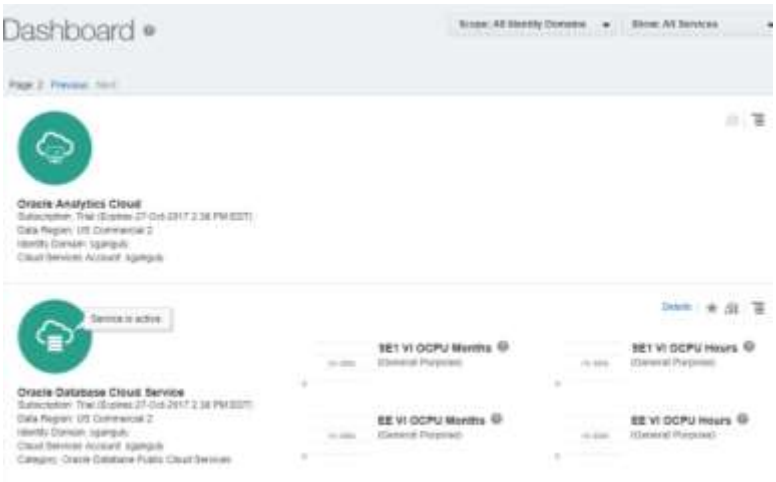
Getting Started

Before using Oracle Cloud, you have to setup your account.

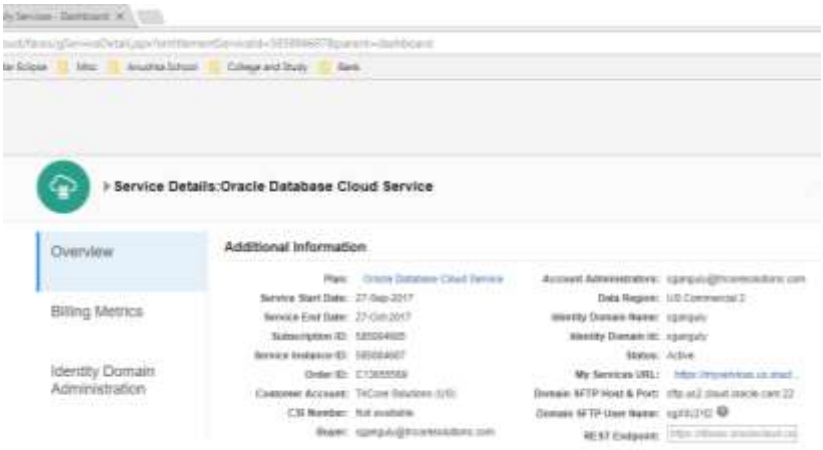
Click on “My Account Services” link that you have received in your Welcome Cloud email from Oracle and enter your Oracle account credentials to log in.



After sign in you will be taken to dashboard as shown below



Click on Oracle Database Cloud Service. This will show all your details



Dashboard – Oracle Database Cloud Service

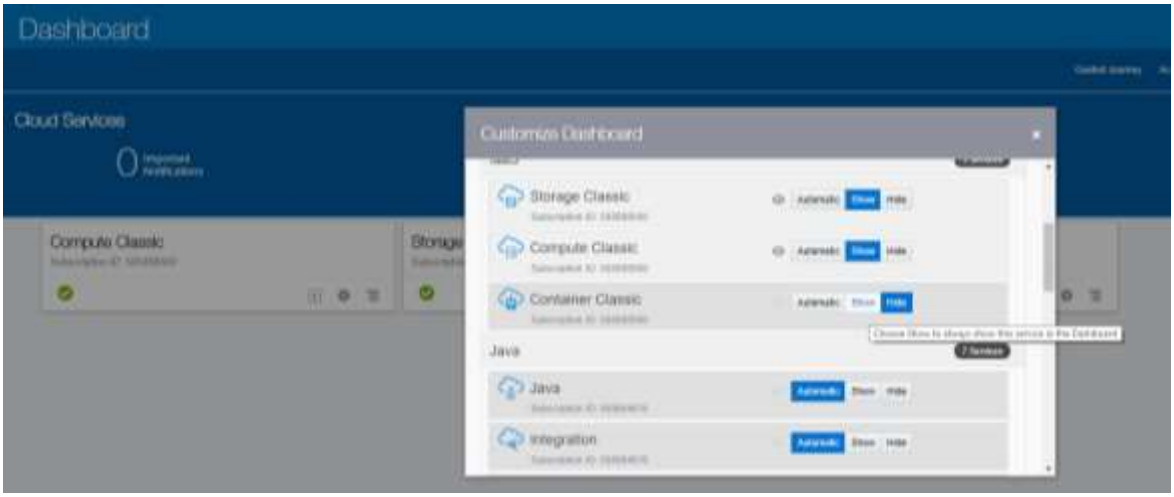
Dashboard – It is a collection of all the services available to you. Also, it has the option to make selections on what needs to be shown on the dashboard and what not.

Click on “My Service URL” from the overview page. This will take you to your Oracke Database Cloud Service Dashboard. Enter your credentials here along with Domain. This will launch your Dashboard

Click on My Services Administration and enter the credentials you received in mail to login. This will launch your dashboard

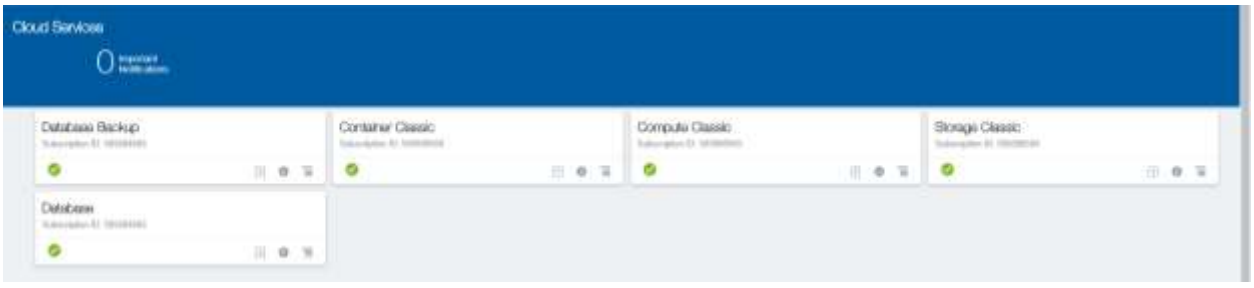
Customize Dashboard

In case you need to customize your dash board, click on Customize dashboard button, which will pop up Customize Dashboard window. Here you can select, what all you want to display on your dashboard



Once the selection is done, close the window

Now your dashboard will have all the services that you have selected



Now let’s create a database instance in Oracle cloud.

Creating First Oracle Database Cloud Instance

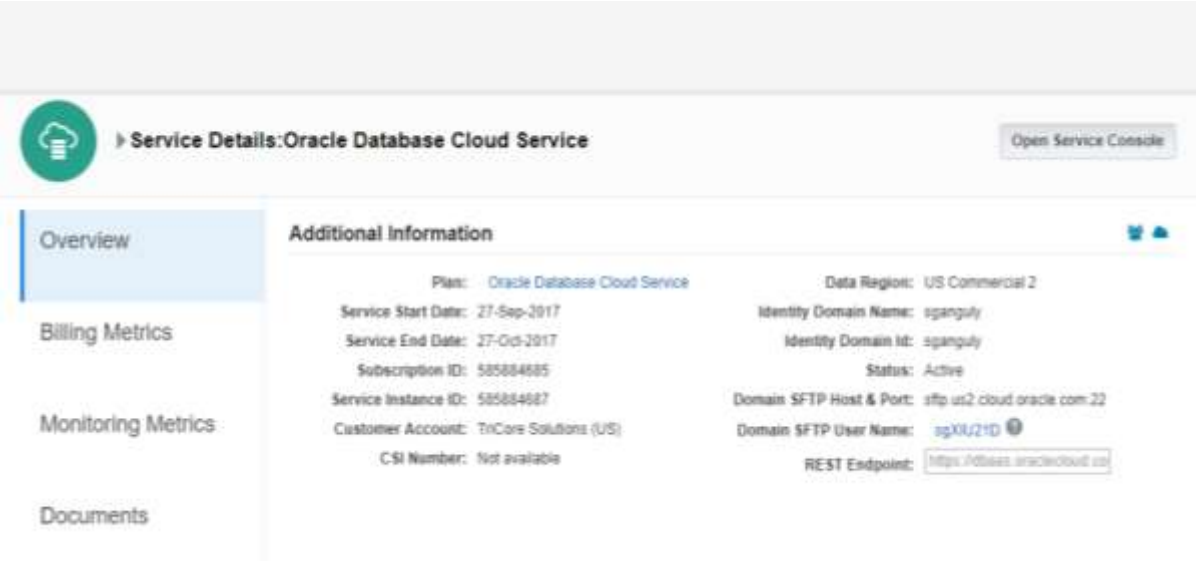
Here we will list step by step instruction on how to create an Oracle Database on Oracle Cloud, how to setup Network components, SSH, creating tunnels and how to connect to the database from outside Cloud (On-Premise).

Create Database Service

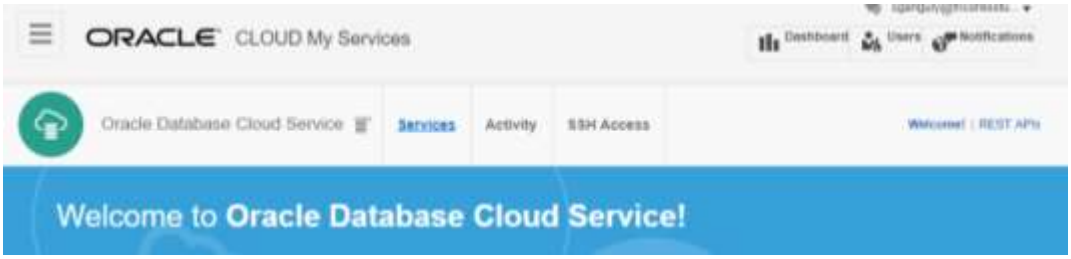
Click on the Dashed Line  under Database. This will pop-up the list of services under database.

At this moment we do not have any database instances.

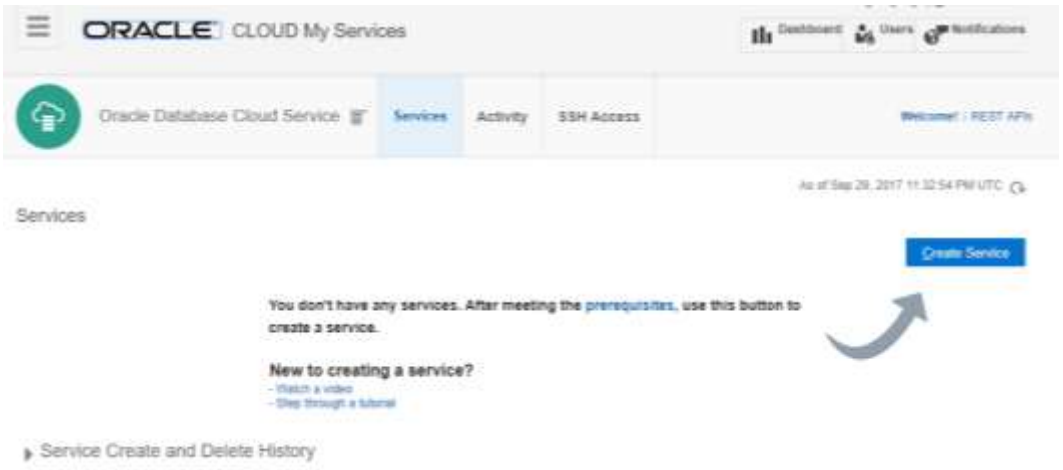
To create a Database either click view details → select Service Console or directly click on Open Service Console as shown in the above image



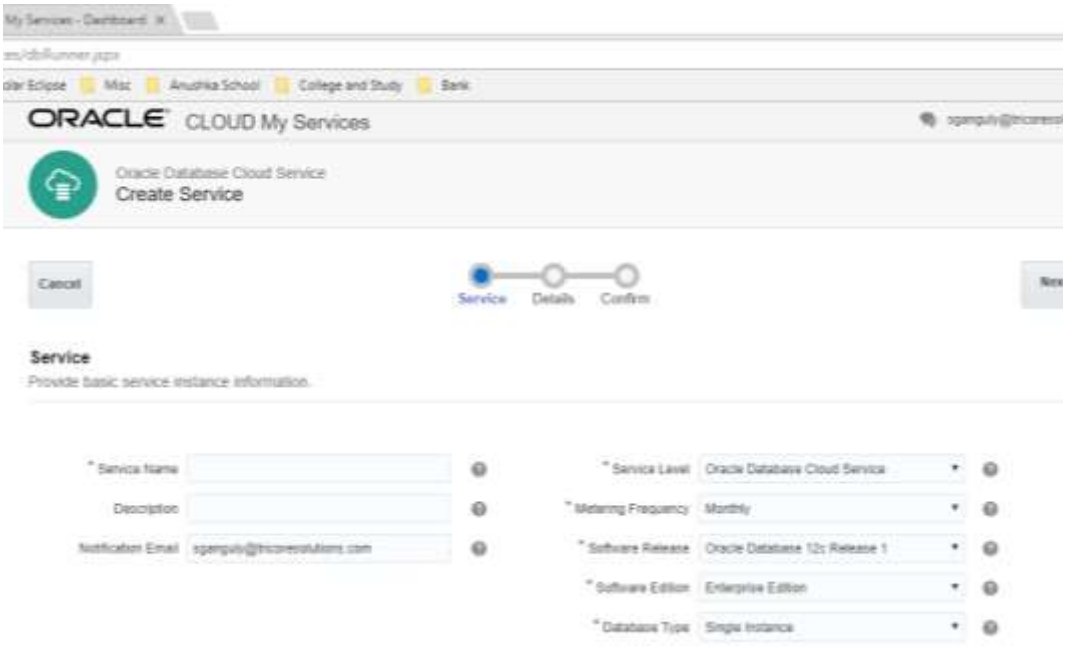
Click on Open Service Console to launch Oracle Database Cloud Services page.



Once on Services Page



Click on Create Service to create a database instance. This will launch Service Detail screen



Enter the following information

Service Instance Information and click next

Service Name	
Description	
Region	
Service Level	
Software Release	
Software Edition	
Database Type	

There are two options for Service Level. Here is the comparison of the Service Levels

	Oracle Database Cloud Service	Oracle Database Cloud Service – Virtual Image
Database	Multitenant	Go as you like
Database Release	11g Rel 2, 12c Rel 1 & 2, 18c Rel. 1	11g Rel 2, 12c Rel 1 & 2
Edition	Standard, Enterprise, Enterprise – High and Extreme	Standard, Enterprise, Enterprise – High and Extreme
Database Type	Single Instance, RAC, RAC with DG	Single Instance, RAC, RAC with DG

Note: At the moment Virtual Image is only providing Single Instance Databases.

This will bring us to Database Details page. Enter Database Information here. This is the starting instance so please select Backup Destination as None. We will see how to use Backups in subsequent sections. For the time being let's start with Backup Destination as None.

Database Details and Click Next

Database Configuration	DB Name (SID)	
	PDB Name	
	Administrator Password	
	Confirm Password	
	Usable Database Storage	
	Compute Shape	
	SSH Public Key	
Backup and Recovery Config	Backup Destination	
Initialize Data from Backup	Create Instance from Backup	

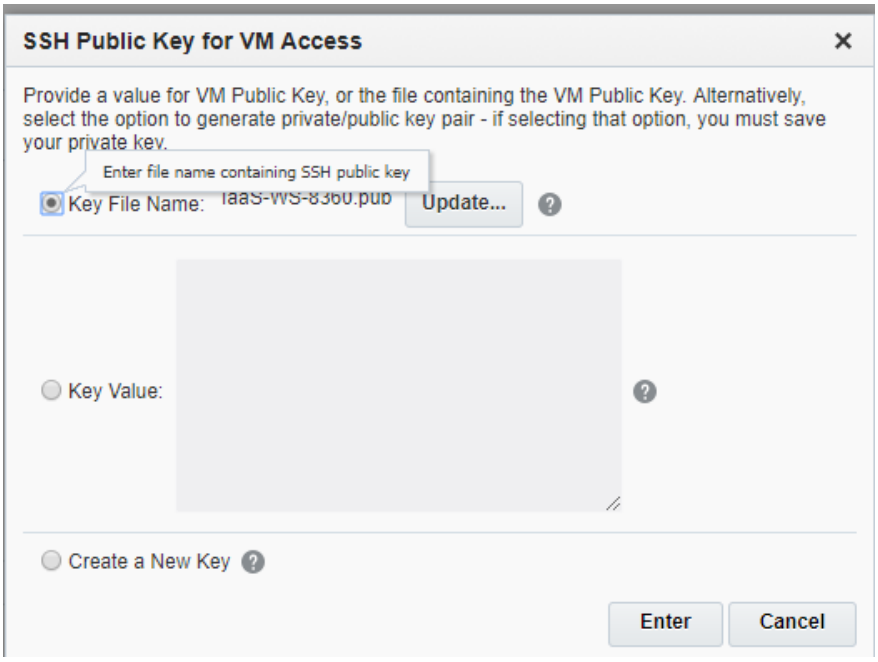
Select Database Storage, Total Datafile Storage and Compute Shape as required. For now, take default value.

SSH Public Key

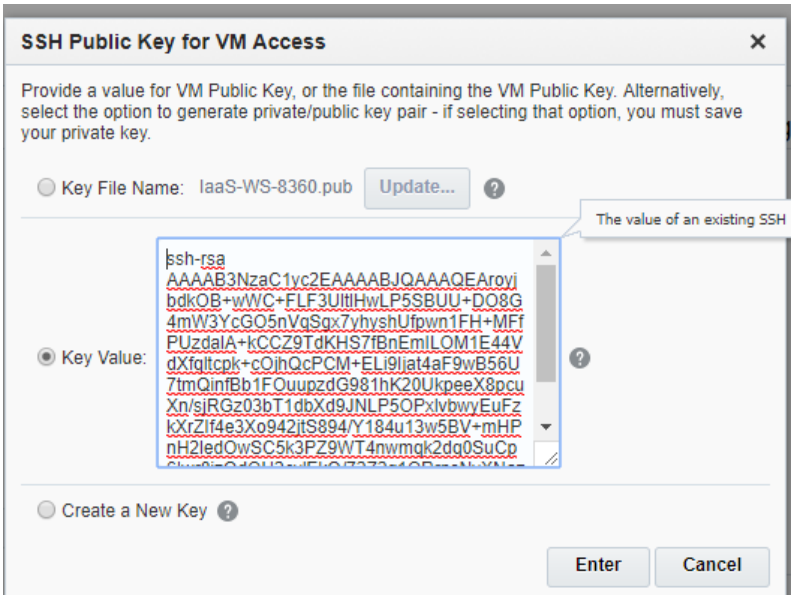
Click on the Edit button beside SSH Public Key to upload public key.

Following option can be selected

Key File Name: Select this if Public and Private Keys are already generated



Key Value: Alternate option, wherein instead of uploading Public key, value of the Public Key can be pasted directly

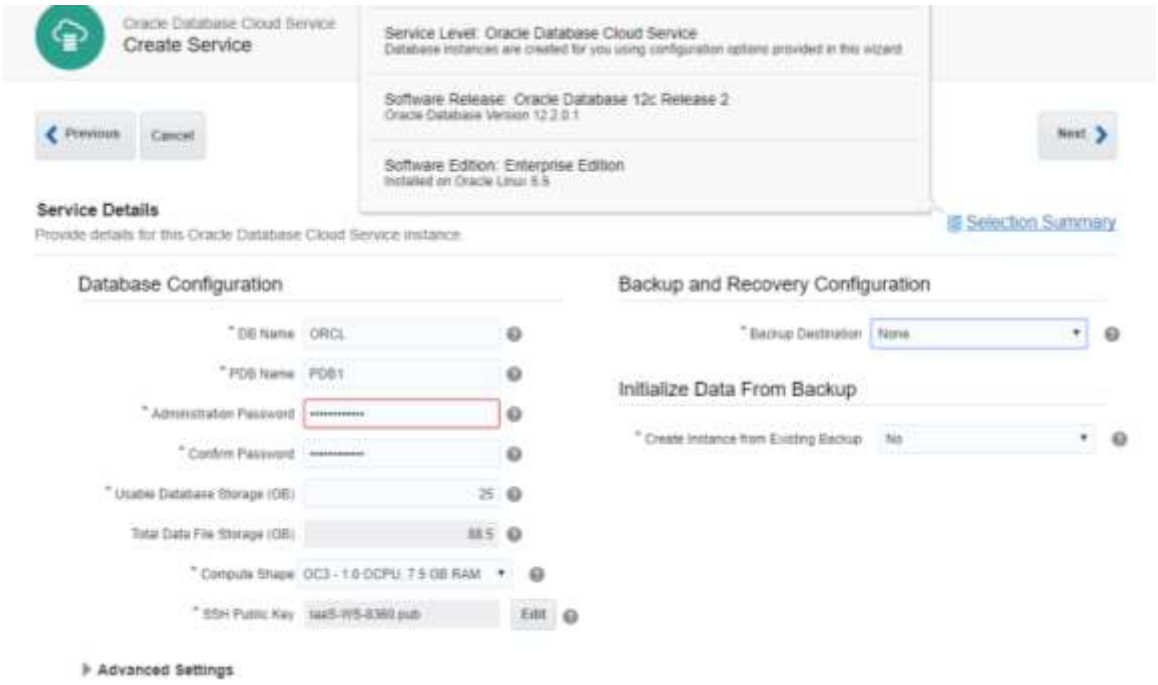


Create a New Key: Select this option in case we like system to generate Public and Private Key for you.

Once an option is selected click enter.

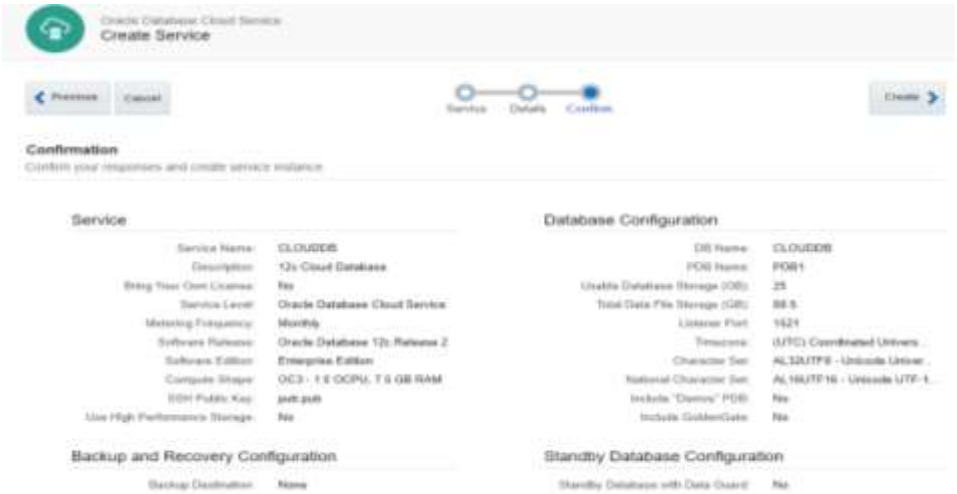
Click Next to move to the confirmation screen

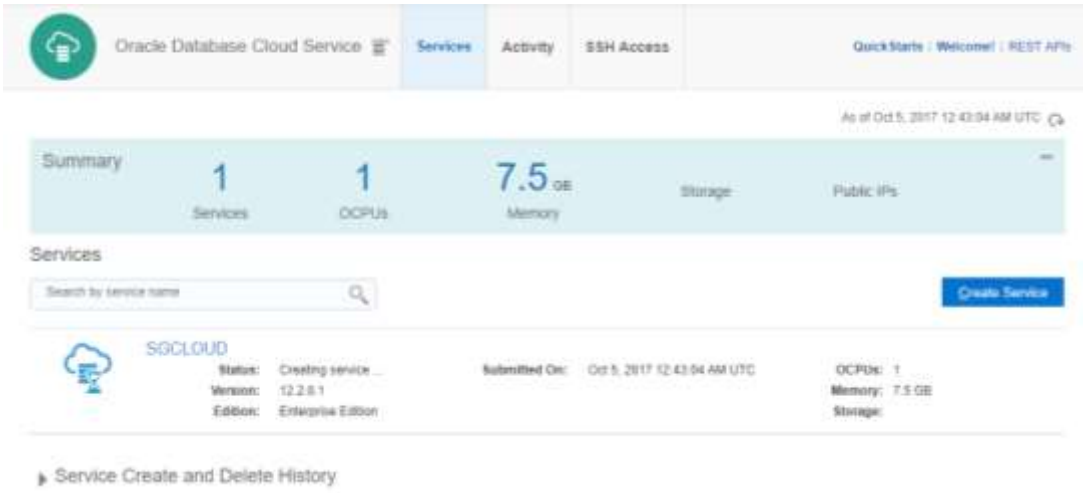
You can hover around Selection Summary Link to see what all configuration has been selected



Confirmation

This is the third and final section before Oracle Service Instance gets created. Check all the details and if everything is ok, click Create to create the service

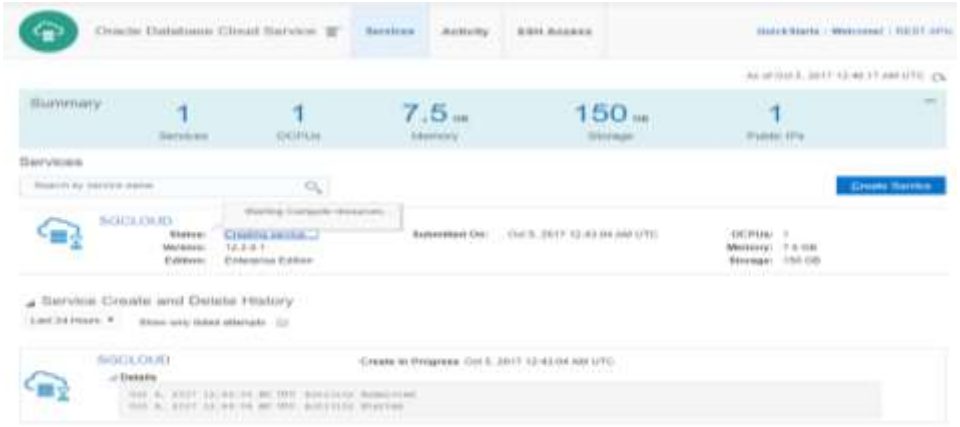




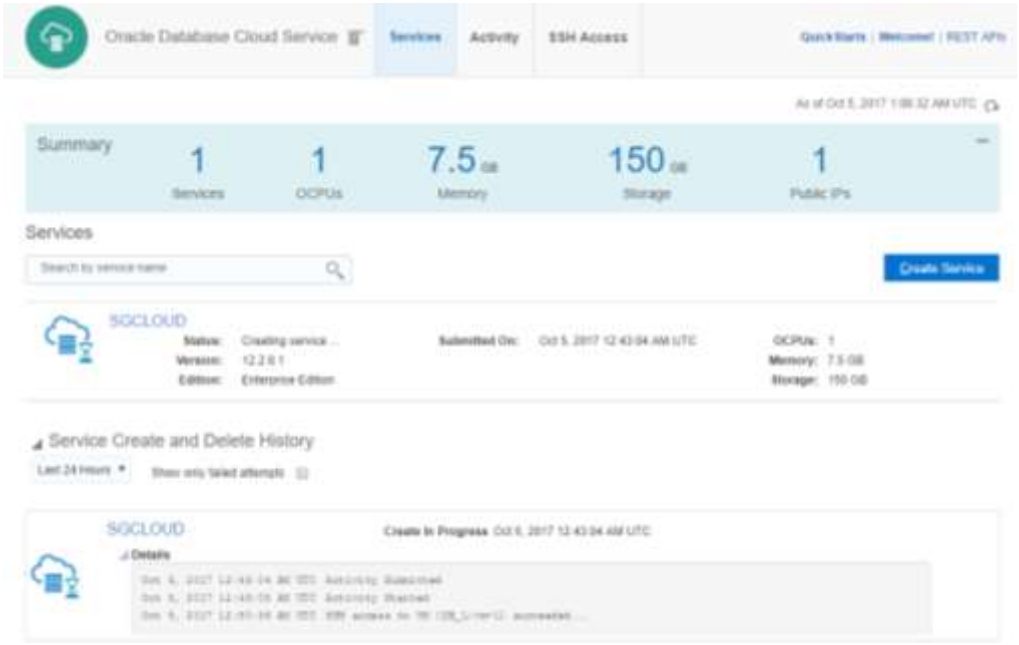
Wait for 30-40 minutes for complete database to be up and ready. Instance creation progress can be by clicking “CREATING SERVICE” link.

It will show Status as “CREATING SERVICE” until the instance is created. In background it does the following

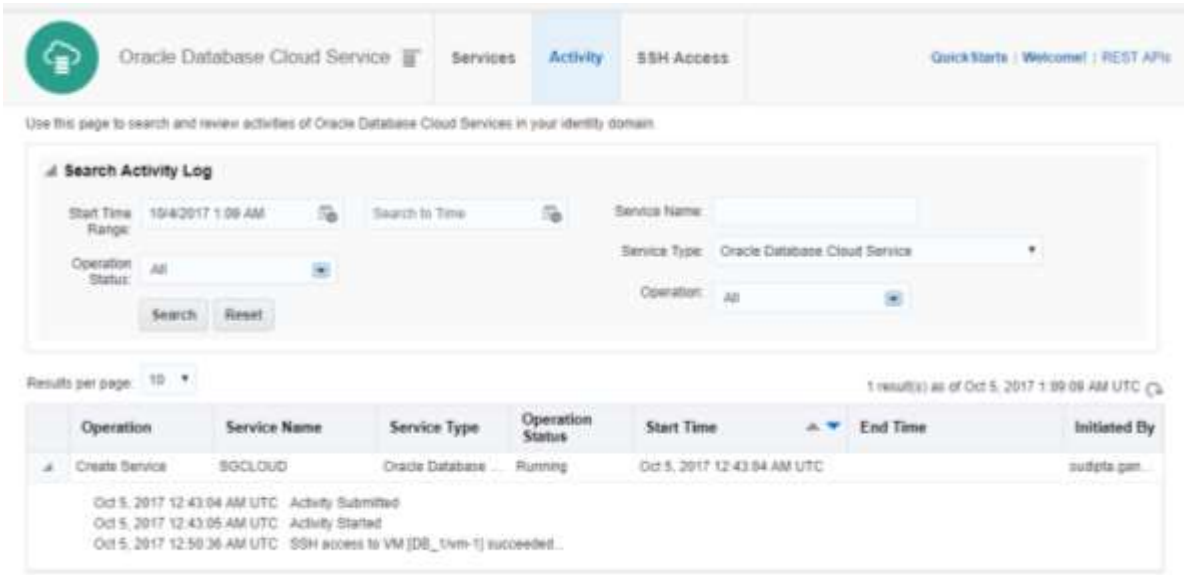
1. Compute Resources
2. Database Server configuration and Database Creation
3. Network Allocation



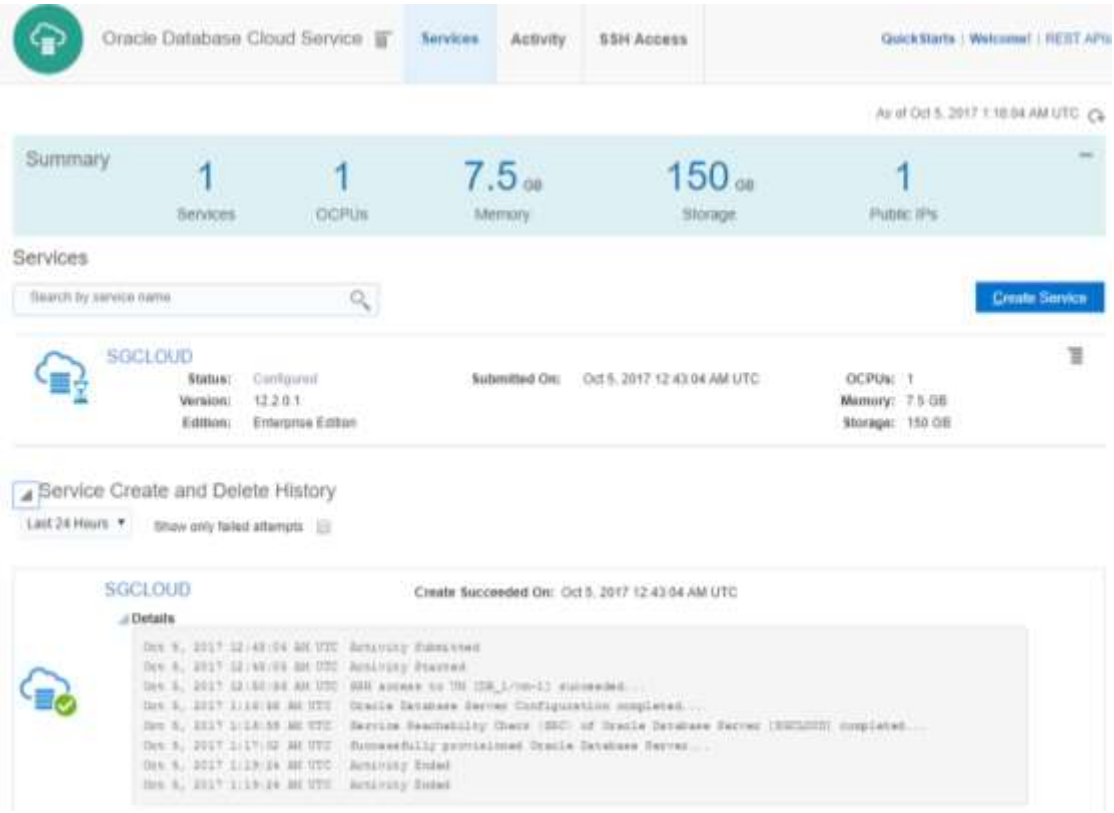
Check the image below to see SSH configuration succeeded and now “Database Server” configuration has started.



Activity link can also be click to see progress on Database creation



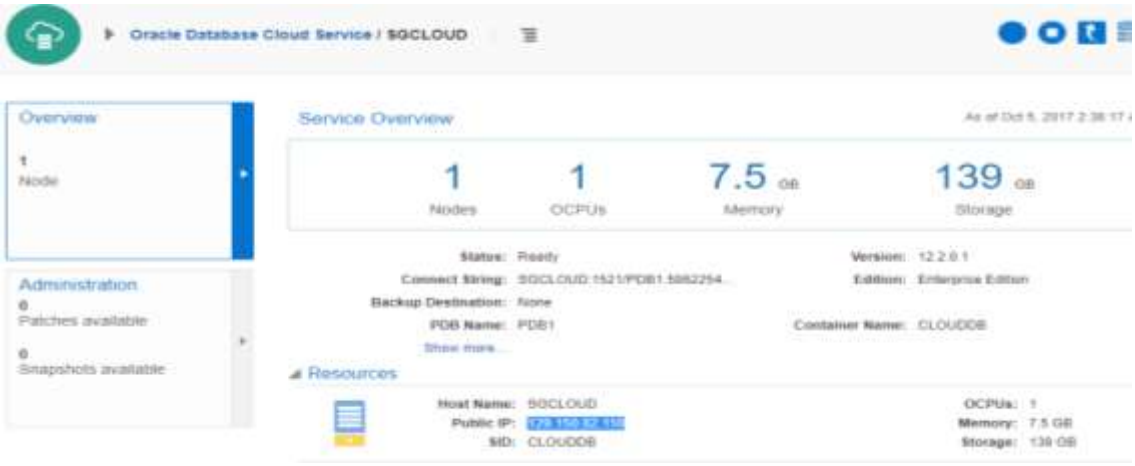
Check the screen below, status has changed to “Configured” means Database Services are completely configured and Database is up and running on Oracle Cloud for operations.



Network Configuration

In this section, we will describe steps on how to configure the network to access Cloud Database Instance from outside Cloud Network (On-Premise).

Once again, click on Database link to open the service



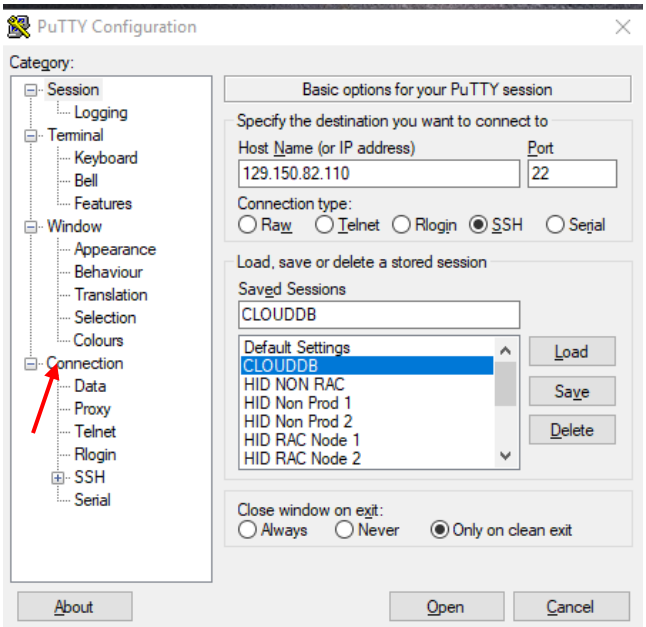
Make a note of the following details which are required to configure the network

- Host Name
- Public IP
- SID

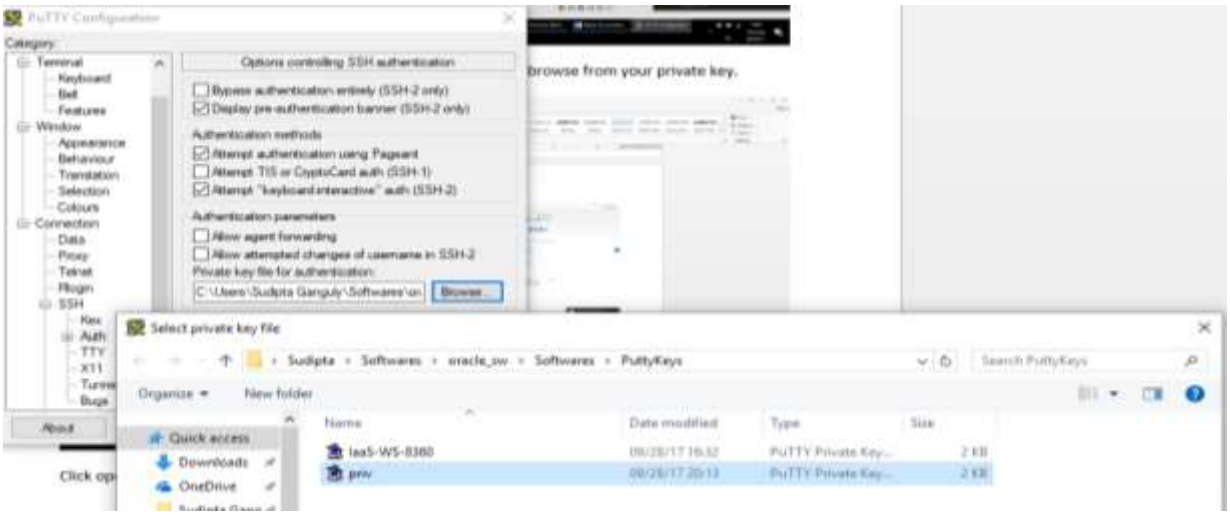
To connect to the Cloud Instance from Outside, only SSH port 22 is open, rest are disabled.

Steps to connect from Windows

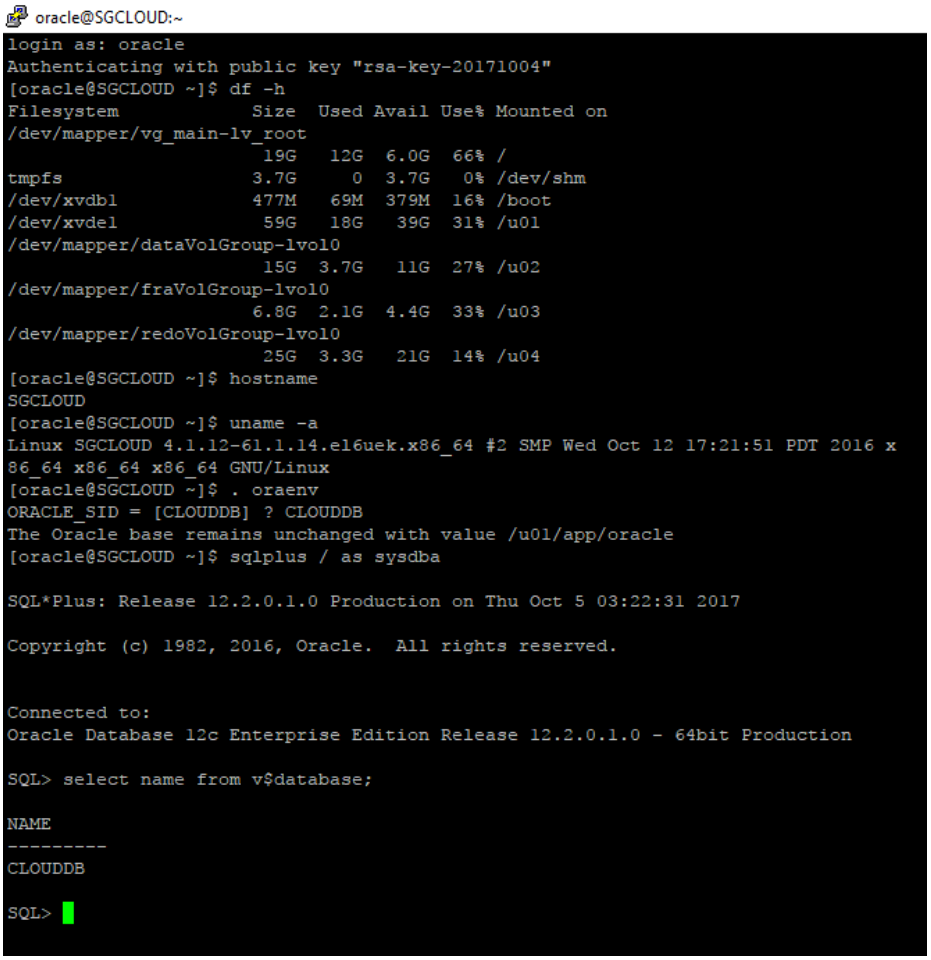
Invoke Putty and enter IP address noted above and set Port to 22



Go to Connection → select SSH → select Auth → browse – Select Private key.



Click on Open, type username as “oracle” and click enter. That’s it, you are accessing Cloud Database from Outside. See screenshot below.



Steps to Connect from Linux

Open Linux Terminal Window → Enter ssh -o ServerAliveInterval=60 -i <private key> oracle@<IP Address> to connect to DBCS cloud instance

ssh -o ServerAliveInterval=60 -i cloud-private-lin.ppk oracle@129.150.82.110

* In case Private Key is created in Windows, convert it to OpenSSH format before using it in Linux else Private Keys created in windows will not work on Linux Terminal. Also, you can create Private Keys directly on Linux machines

```
[oracle@lab PuttyKeys]$ ssh -o ServerAliveInterval=60 -i cloud-private-lin.ppk oracle@129.150.82.110
[oracle@SGCLOUD ~]$ . oraenv
ORACLE_SID = [CLOUDDB] ? CLOUDDB
The Oracle base remains unchanged with value /u01/app/oracle
[oracle@SGCLOUD ~]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Thu Oct 5 04:01:54 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 name from v$datafile;

NAME
--------------------------------------------------------------------------------
/u02/app/oracle/oradata/CLOUDDB/system01.dbf
/u02/app/oracle/oradata/CLOUDDB/sysaux01.dbf
/u02/app/oracle/oradata/CLOUDDB/undotbs01.dbf
/u02/app/oracle/oradata/CLOUDDB/pdbseed/system01.dbf
/u02/app/oracle/oradata/CLOUDDB/pdbseed/sysaux01.dbf
/u02/app/oracle/oradata/CLOUDDB/users01.dbf
/u02/app/oracle/oradata/CLOUDDB/pdbseed/undotbs01.dbf
/u02/app/oracle/oradata/CLOUDDB/PDB1/system01.dbf
/u02/app/oracle/oradata/CLOUDDB/PDB1/sysaux01.dbf
/u02/app/oracle/oradata/CLOUDDB/PDB1/undotbs01.dbf
/u02/app/oracle/oradata/CLOUDDB/PDB1/PDB1_users01.dbf

11 rows selected.

SQL> select name from v$controlfile;

NAME
--------------------------------------------------------------------------------
/u02/app/oracle/oradata/CLOUDDB/control01.ctl
/u03/app/oracle/fast_recovery_area/CLOUDDB/control02.ctl

SQL>
```

At this moment database is accessible outside cloud

Exit to close the connection

Oracle Cloud Service (DBaas) – Management Tools

There are two ways to access Cloud Service Management and Monitoring tools.

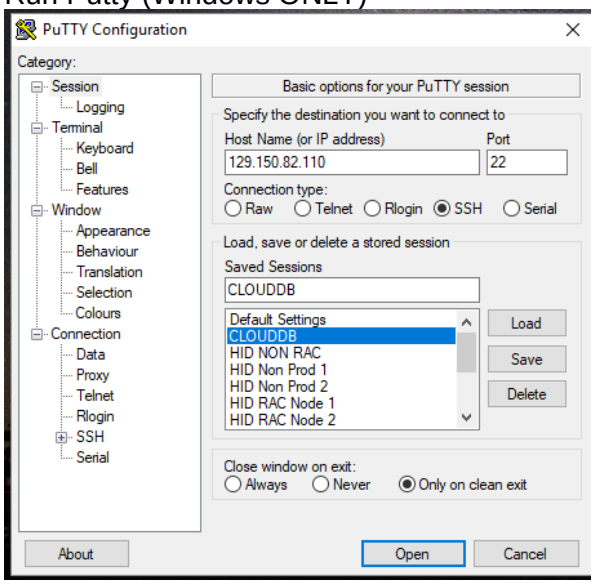
- Access from local Desktop – We have to enable SSH tunnel
- Access from Oracle Database Cloud Service – Enable Network Security Rules from Oracle Compute Service Console

Access Management tool from Desktop – Configure SSH Tunnels

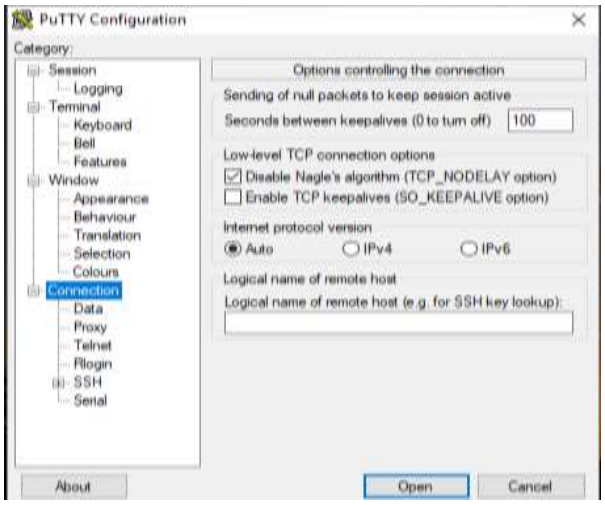
To access Cloud Service Management and Monitoring tools from On-Premise, it needs SSH tunnel configuration. This section lists steps involved in configuring SSH tunnel

Step 1: Record IP address of CLOUDDB

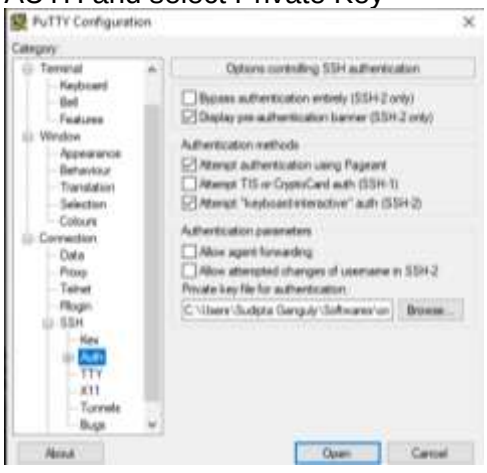
Run Putty (Windows ONLY)



Click on Connection, on Seconds between keep alives, type 100, this will prevent session to time-out.



From Connection, expand SSH and select AUTH and select Private Key



Next Select Tunnel and add the following forwarded ports

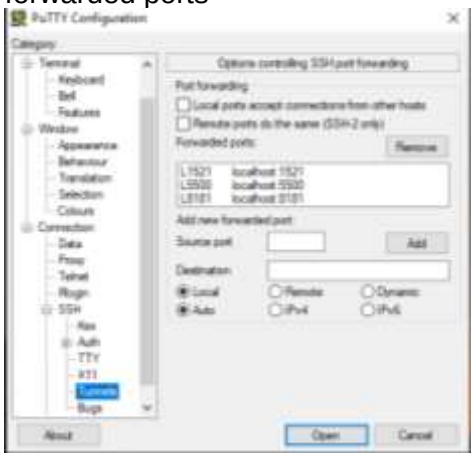


Table showing SSH Tunnel Port forwarding for various tools

Port	Tool	URL	User
L8181	DBaaS Monitor	https://localhost:8181/dbaas_monitor	dbaas_monitor
	Application Express Console	https://localhost:8181/apex/pdb1/	ADMIN
L5500	Enterprise Manager Express	https://localhost:5500/em	SYS
L1521	SQL PLUS	NA	ALL

SSH Tunnel with Local Port Forwarding is now created to access the Oracle Database Cloud (DBaaS) Management and Monitoring tools

Now click open to open the connection to CLOUDDB. When prompted, login as oracle.

Keep your session open to keep the Tunnel session alive

Oracle Database Cloud Service Consoles

There are three Cloud Service Management and Monitoring tools available.

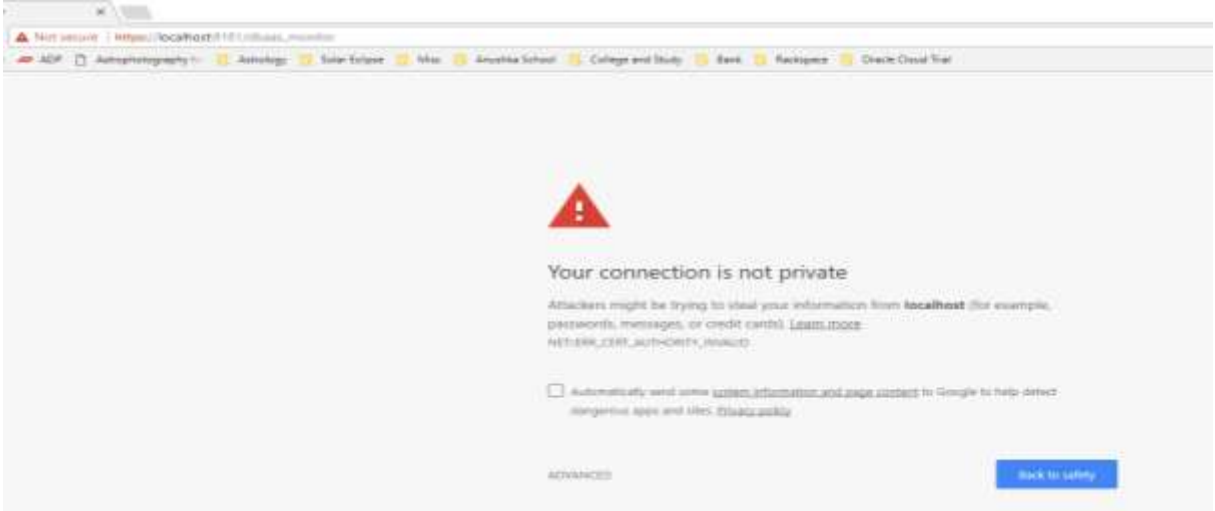
- Database As a Service Monitor
- Application Express Console
- Enterprise Manager Express

This section will show how to access each of the Management and Monitoring tools.

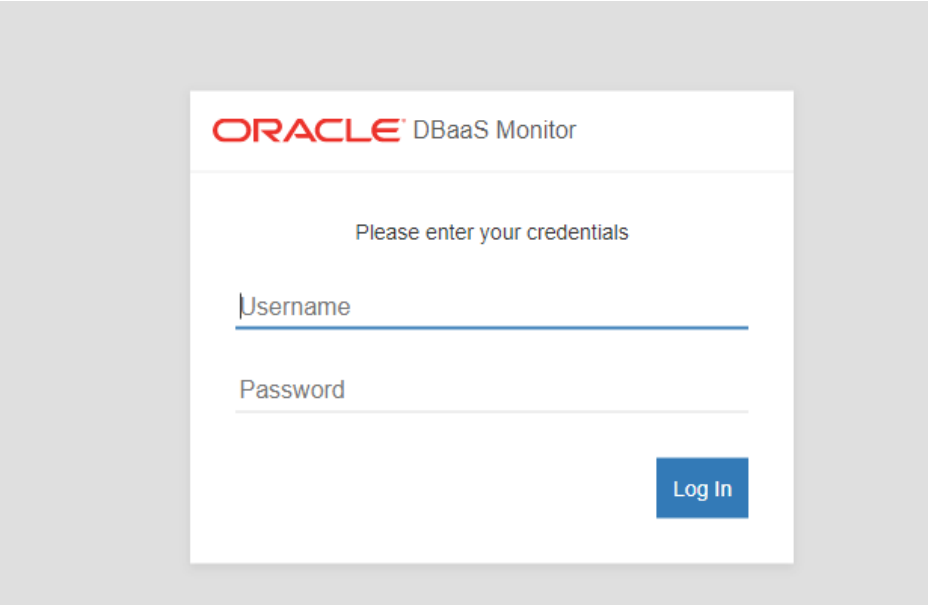
Database As A Service Monitor

This section will show how to access DBaaS Monitor Page

URL - https://localhost:8181/dbaas_monitor
Username – dbaas_monitor
Password – XXXXXX

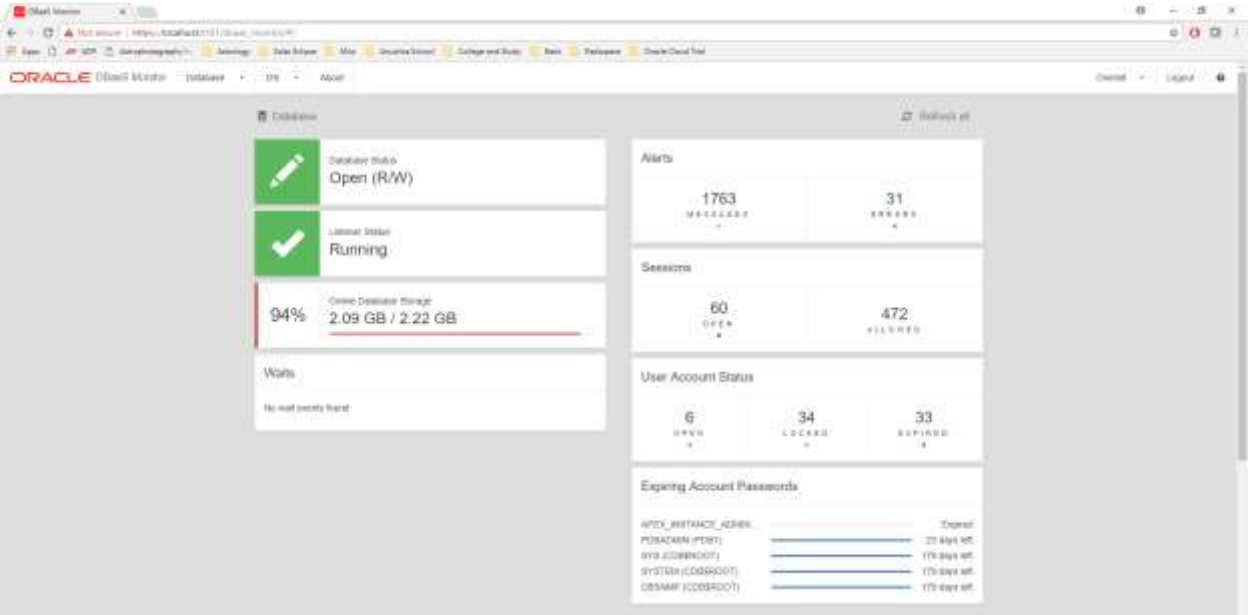


Warning can be received that connection is untrusted. Click on Advanced and click Proceed to localhost (unsafe)



Enter dbaas_monitor username and password and click login

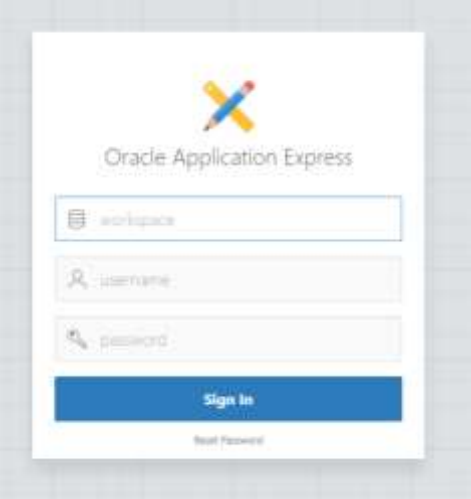
Once connected to DbaaS Monitor console, feel free to explore



Application Express Console

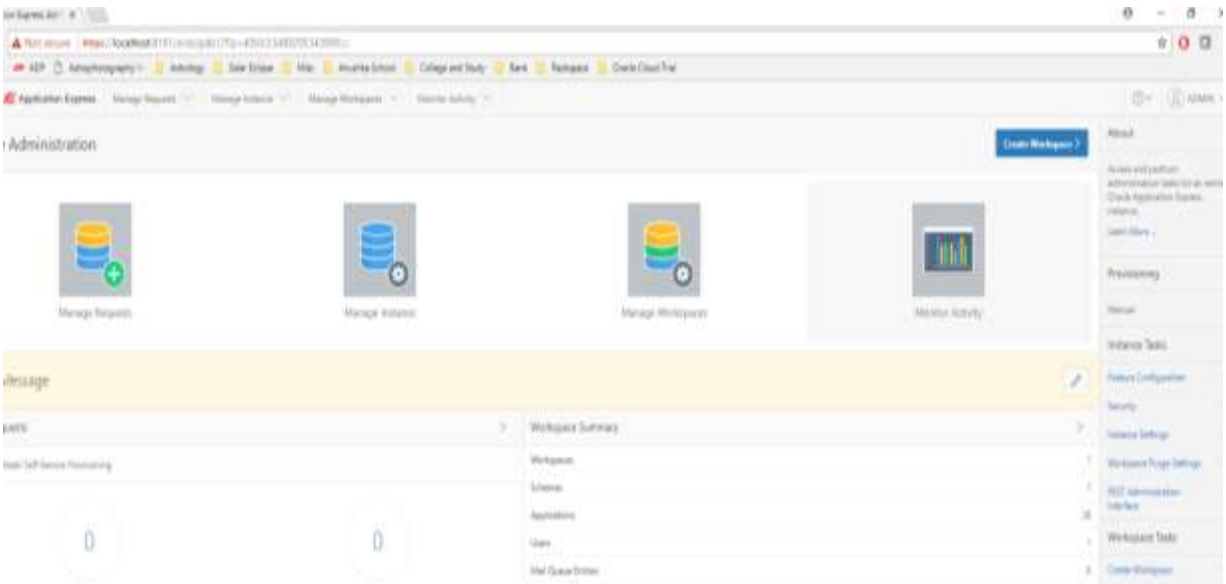
This section will show how to access Application Express Console

URL - https://localhost:8181/apex/pdb1/
Workspace - internal
Username – ADMIN
Password – XXXXX



Enter the credentials mentioned above and click sign in

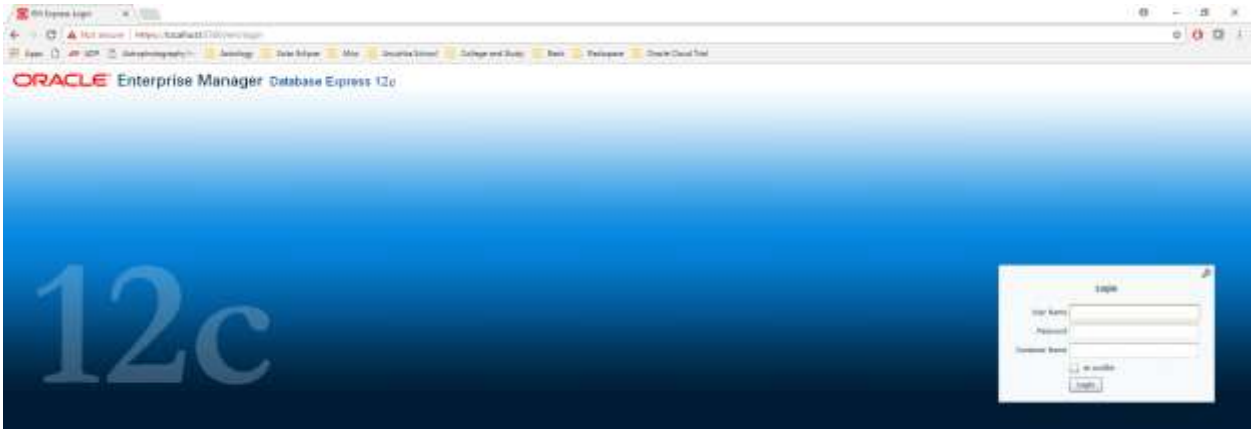
Once connected to Application Express console, feel free to explore



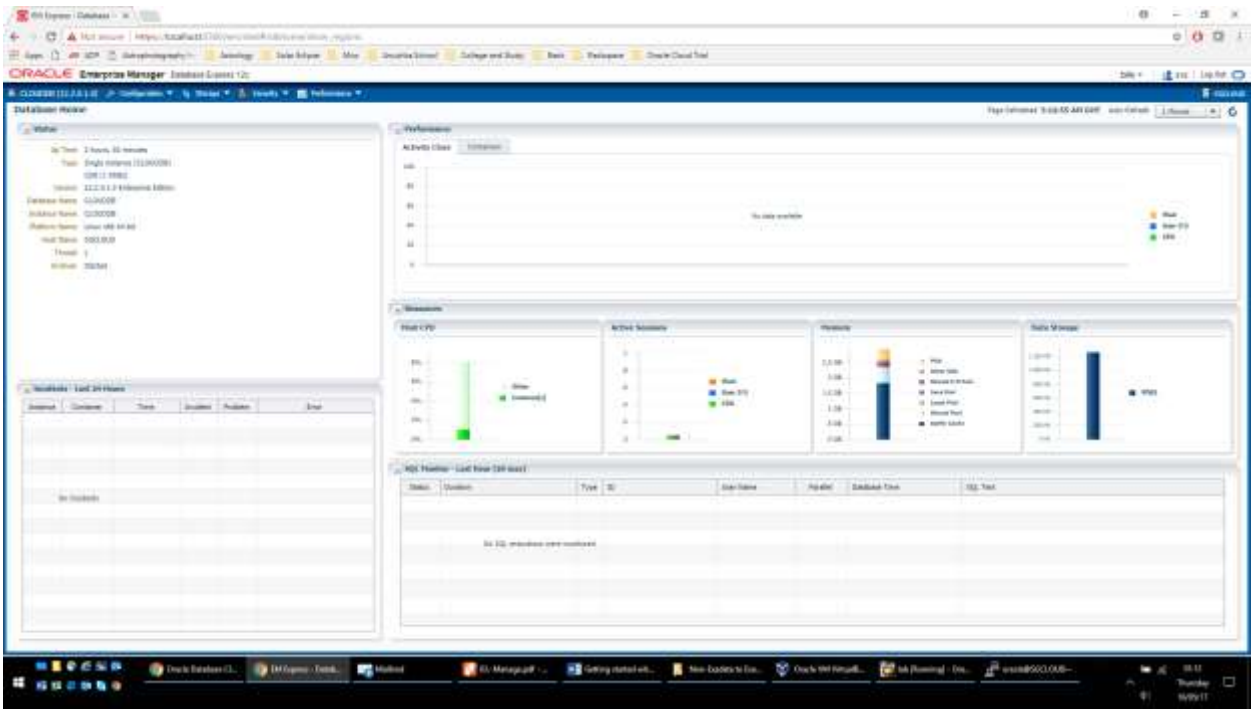
Enterprise Manager Express

This section will show how to access Enterprise Manager Express

URL - https://localhost:5500/em
Username – SYS
Password – XXXXX
Select “as dba” checkbox



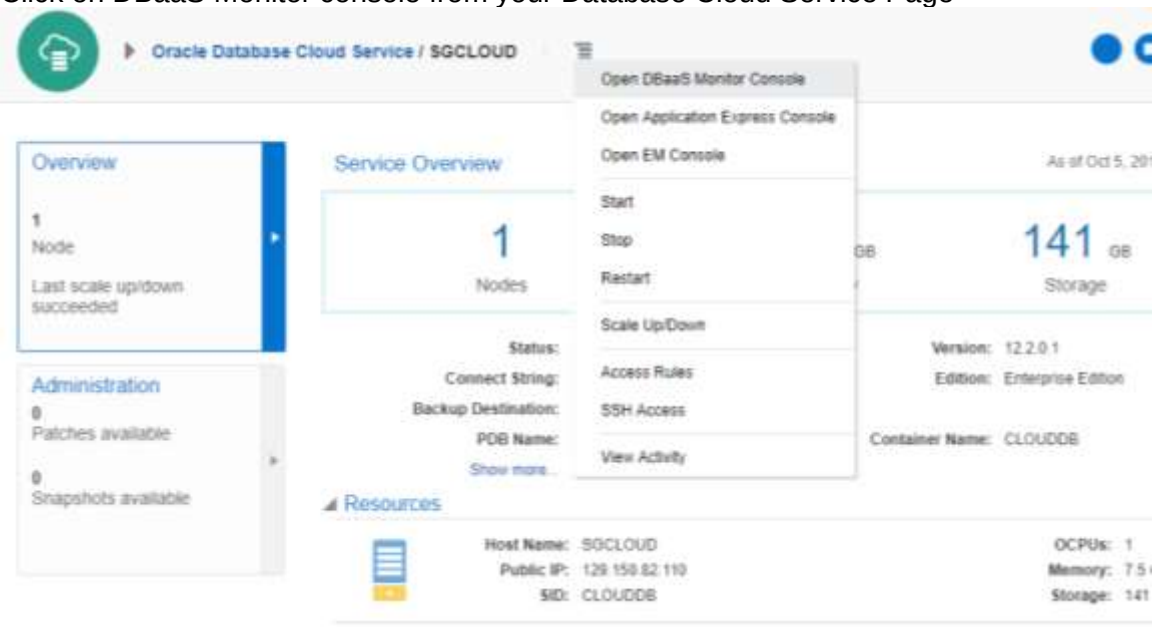
Feel free to explore



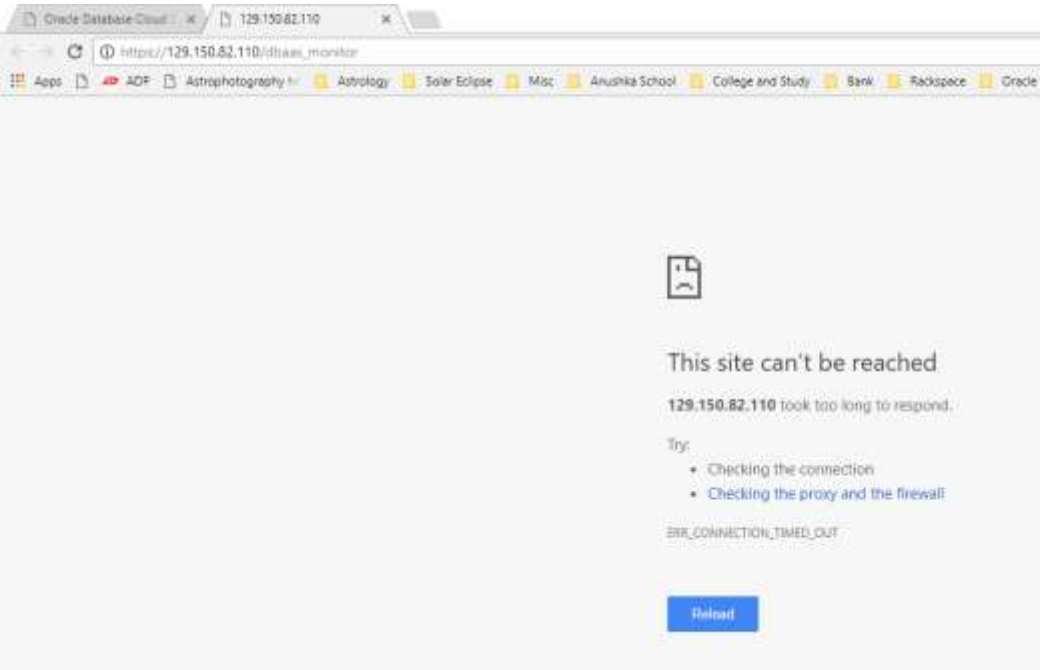
Accessing Management and Monitoring tool from Database Cloud Control

To access Management and monitoring tools from within database cloud control we need to enable Network Security rules else we cannot access.

Click on DBaaS Monitor console from your Database Cloud Service Page

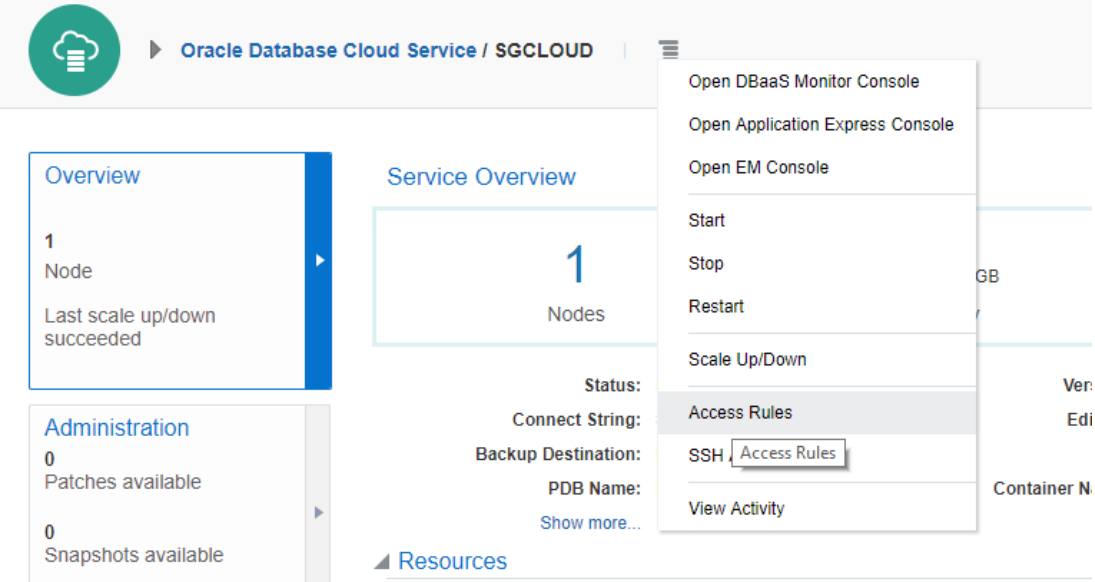


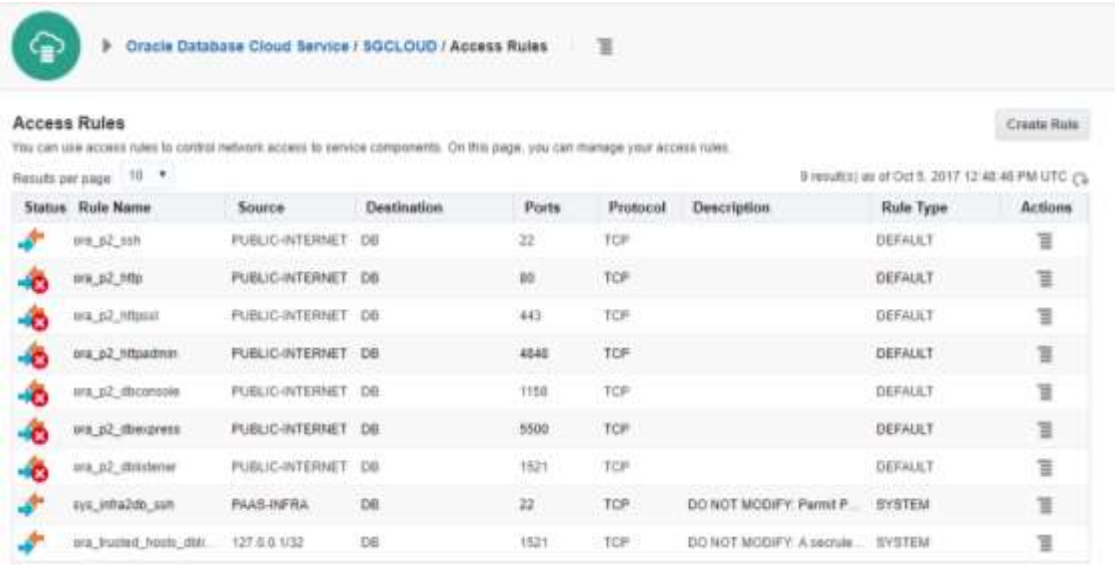
It does not open the page and display connection time out because the port is not open.



Enable Network Rule

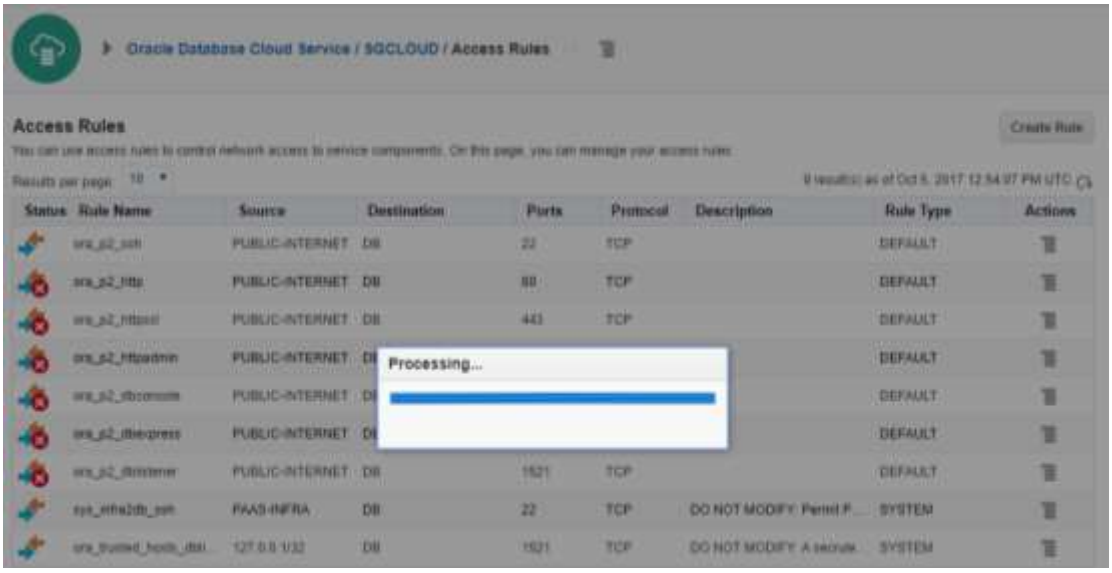
To Enable Network Rule, click on , then select Access rules from the menu. It displays all the access rules currently available for this service



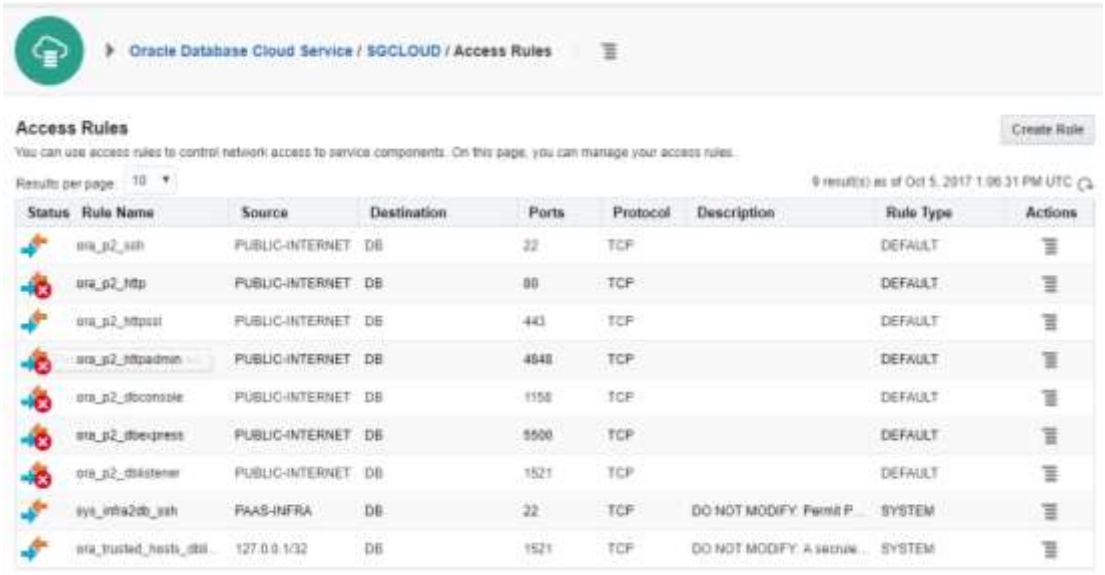


From the above image it can be seen that ora_p2_ssh rule is enabled because this is required port that is needed to connect Cloud Service from Outside Cloud Network. However, rest of the ports are disabled.

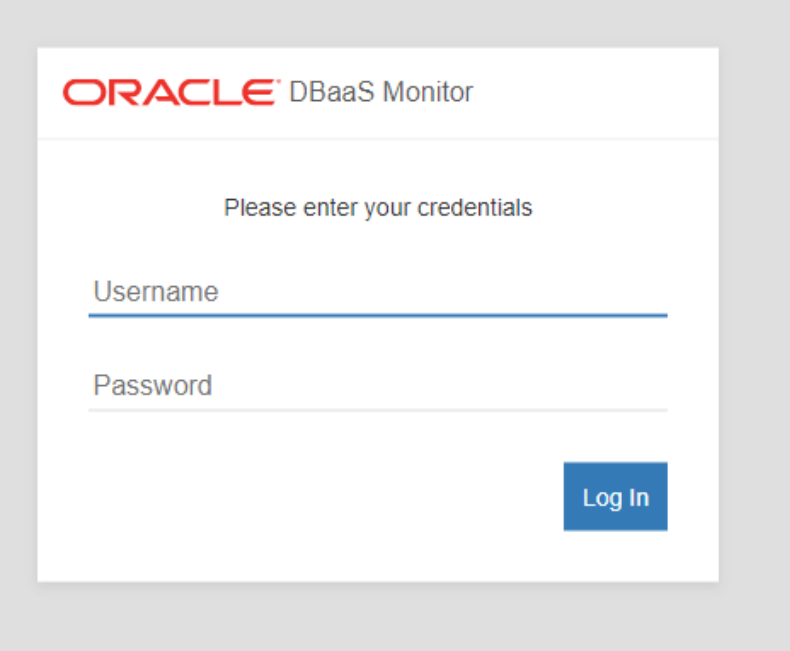
Now let's enable ora_p2_httpssl rule. Select next to the rule and click enable and press "Enable/Disable" button again to finally enable or disable the rule.



Notice that the status has been changed to enable for ora_P2_httpssl access rule to enable



Navigate back to dashboard and select Oracle Database Cloud Service. Click on the button next to cloud service and select Open DBaaS Monitor Console



Yes now, DBaaS monitor console is accessible from Database Cloud Service itself. This way we can access these tools without opening SSH tunnel. Similarly try to access Application Express Console and Enterprise Manager console by clicking next to Oracle Cloud Database Service Name

SQL Client Configuration to access Cloud Database

This section will list out steps that can be configured to access Oracle Cloud Database (DBaaS) instance from On-Premise SQL PLUS clients.

To access Cloud databases from SQL*PLUS we need to add TNS entry on the client machine. Open tnsnames.ora on oracle client and the following entry

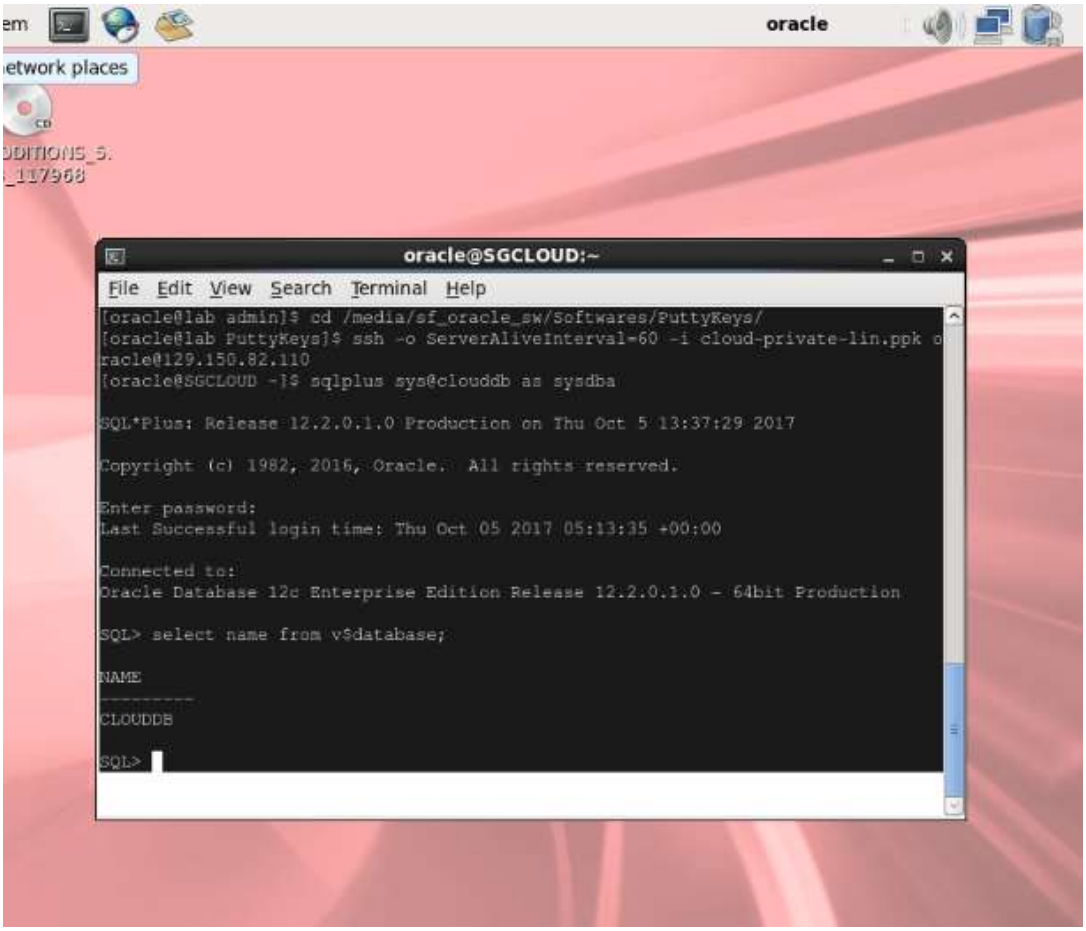
```
CLOUDDB =
(DESCRIPTION =
(ADDRESS = (PROTOCOL = TCP)(HOST = 129.150.82.110)(PORT = 1521))
(CONNECT_DATA =
(SID = CLOUDDB)
)
```

After making TNS Entry try to connect to Cloud Database Instance. Session will hang or timed out because to receive outside connection port 1521 needs to be enable on Oracle Database Cloud Service Access rules.

```
[oracle@lab admin]$ sqlplus sys@clouddb as sysdba

SQL*Plus: Release 12.1.0.2.0 Production on Thu Oct 5 09:24:24 2017

Copyright (c) 1982, 2014, Oracle.  All rights reserved.
```

```
Enter password:
ERROR:
ORA-12154: TNS:could not resolve the connect identifier specified


Enter user-name:
```

In order for SQL PLUS clients from On-Premise to connect to Cloud Database we need to enable **ora_p2_dblistener** over port 1521. Enable **ora_p2_dblistener** access rule the same way ora_p2_httpssl access rule is enabled (Refer Section Enable Network Rule). Once **ora_p2_dblistener** is enabled try to connect again from SQL PLUS



Create Cloud Database in Silent Mode

Step 1: Initiate a connection to Cloud Database Service using SSH

```
 [oracle@lab PuttyKeys]$ ssh -o ServerAliveInterval=60 -i cloud-private-lin.ppk
oracle@129.150.82.110

[oracle@SGCLOUD ~]$ cd /u01/app/oracle/product/12.2.0/dbhome_1/
```

Step 2: DBCA command to create Database in Silent Mode

```
[oracle@SGCLOUD dbhome_1]$ dbca -silent -createDatabase -templateName
/u01/app/oracle/product/12.2.0/dbhome_1/assistants/dbca/templates/General_Purpose.dbc
-gdbname cldb -sid cldb -responseFile NO_VALUE -syspassword oracle -systempassword
oracle -emConfiguration none -datafileDestination /u02/app/oracle/oradata/cldb -
memoryPercentage 40

[WARNING] [DBT-11209] Current available physical memory is less than the required
physical memory (2,990MB) for creating the database.

Copying database files
1% complete
33% complete
Creating and starting Oracle instance
35% complete
55% complete
Completing Database Creation
56% complete
66% complete
Executing Post Configuration Actions
100% complete
Look at the log file "/u01/app/oracle/cfgtoollogs/dbca/cldb/cldb.log" for further
details.
[oracle@SGCLOUD dbhome_1]$
```

Step 3: Check if Database is up and running

```
[oracle@SGCLOUD dbhome_1]$ ps -ef|grep pmon
oracle    2632     1  0 06:10 ?        00:00:00 ora_pmon_cldb
oracle    3351 30763  0 06:13 pts/1    00:00:00 grep pmon
oracle    8777     1  0 02:22 ?        00:00:00 ora_pmon_CLOUDDB

oracle@SGCLOUD templates]$ . oraenv
ORACLE_SID = [CLOUDDB] ? cldb

The Oracle base remains unchanged with value /u01/app/oracle
[oracle@SGCLOUD templates]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Thu Oct 5 06:16:49 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 name from v$database;

NAME
---------
CLDB
```

Scale Up/Down

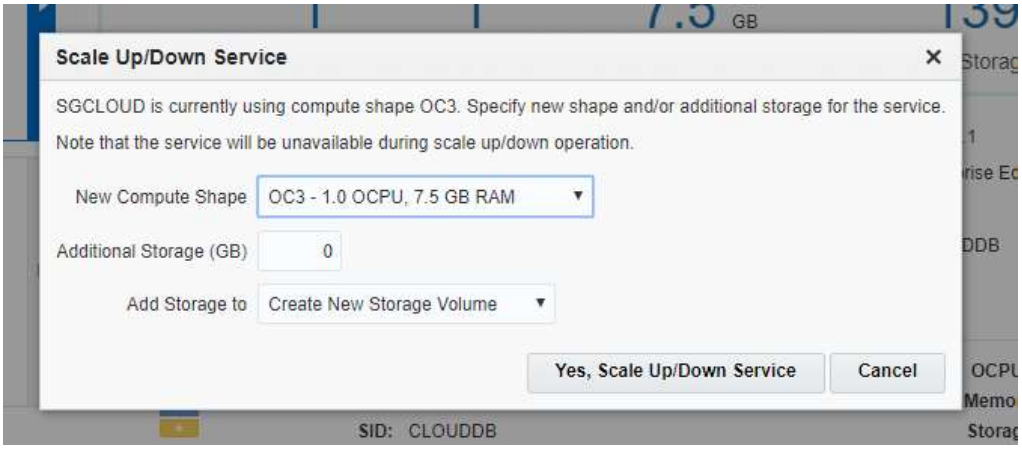
Run free command to check amount of free space available on the machine

```
[oracle@SGCLOUD dbhome_1]$ free
             total       used       free     shared    buffers     cached
Mem:       7657264    7422212     235052    2039796      17724    2656596
-/+ buffers/cache:    4747892    2909372
Swap:      4194300     251336    3942964
```

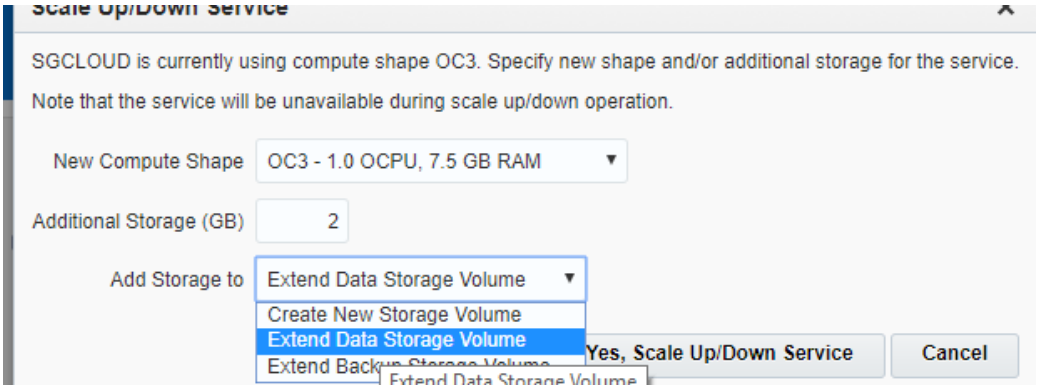
As 2 databases are running with limited resources, let us add some space to the machine.

Step 1: Click on the dashed line and select Scale up/down from the menu

Scale up/down service window will pop up



Increase Memory or Storage as per the requirement. Let us add 2 GB of Storage to expand Existing Storage. If Storage needs to added to a new volume, select “Create New Volume”



Once done, click on “Yes Scale up/down services” to increase the storage. Just keep in mind Cloud Service will not be available during Scale up/down. The moment Scale up/down starts Service status changes to Service Maintenance. and 2 GB is being added to existing storage volume