Oracle Cloud Infrastructure Labs

Database Cloud Service Basics

V2.0

ORACLE LAB BOOK | APRIL 2018

By
Oracle Sales Consulting Norway
Inge Os

1. Disclaimer

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

Overview

Lab Overview

The lab exercises are designed to complement your training, reinforcing the key concepts by applying and demonstrating what you learned in the presentation sessions. This lab book is comprised of individual exercises. These exercises allow you to get first hands-on exposure working with the Oracle Cloud Infrastructure, Oracle OCI, using a demo environment, where you will see how key features and functionality are deployed in the software. Using what you learn in the presentations and individual exercises working with the software, you will collaborate as a team in developing and delivering practice presentations.

HOL for Database Service

12.3.17.7

Creating a Database with Database Cloud Service on OCI

The Database Service lets you quickly launch an Oracle Database System (DB System) and create one or more databases on it.

Supported Database Editions and Versions

One- and two-node RAC DB Systems support the following Oracle Database editions:

- Standard Edition
- Enterprise Edition
- Enterprise Edition - High Performance
- Enterprise Edition - Extreme Performance (required for two-node RAC DB Systems)
-

The supported database versions are the following:

- Oracle Database 11g Release 2
- Oracle Database 12c Release 1
- Oracle Database 12c Release 2

Assumptions

You are familiar with the key concepts and terminology of Oracle Cloud Infrastructure and have been provisioned with a tenancy with the required access permissions.

Note: Some of the UIs might look a little different than the screenshots included in the instructions, but students can still use the instructions to complete the hands-on labs.

Prerequisites

a. The SSH public key from the key pair that you plan to use for connecting to the DB System via SSH

b. The name of a Virtual Cloud Network (VCN) to launch the DB System in

c. Each VCN subnet has a default security list that contains a rule to allow TCP traffic on destination port 22 (SSH) from source 0.0.0.0/0 and any source port.

   Note: Do not use a subnet that overlaps with 192.168.16.16/28, which is used by the Oracle Clusterware private interconnect on the database instance.

Create a Virtual Cloud Network (VCN)

A Virtual Cloud Network (VCN) is a virtual version of a traditional network—including subnets, route tables, and gateways—on which your compute instances run. Customers can bring their network topology to the cloud with VCN. Creating a VCN involves a few key aspects such as:

- Allocate a private IP block for the cloud (CIDR range for the VCN). Customers can bring their own RFC1918 IP addresses.

- Create Subnets by partitioning the CIDR range into smaller networks (sub networks for front end, back end, database)
- Create an optional Internet Gateway to connect VCN subnet with Internet. Instances created in this subnet will have a public IP address.
- Create Route table with route rules for Internet access
- Create Security Group to allow relevant ports for ingress and egress access

Creating a VCN involves allocating a CIDR range (IP address block) for the network, creating a Route Table with custom route rules and path to Internet, carving out a subnet from the IP address block allocated to the VCN.

1. After you login, navigate to the networking tab and select Virtual Cloud Networks.

Lab performed with allocated Oracle Demo Account, STOP and make sure you're in the correct compartment.
Any oracle supplied demo accounts uses the demo compartment.
2. Click on the create Virtual Cloud Network button, assuming you're in the correct compartment number. The steps below shows the demo compartment, but you should select your specific compartment as per above.

3. Create a Cloud Network by specifying a name for your VCN and selecting the "Create VIRTUAL CLOUD NETWORK PLUS RELATED RESOURCES" option. This will create a VCN, Subnets, Routing Table, Security Groups and Internet Gateway using a 10.0.0.0/16 CIDR range. Scroll to the bottom of the screen and click "create Virtual Cloud Network" button.

4. Name your VNC with your compartment number ie. NOLABCxx

5. Once the VCN is created, navigating to list of VCN's, you can see the "NOLABCxx", which you just created in the step above.

6. Click on the NOLABCxx link above and it displays the three subnets within this network.

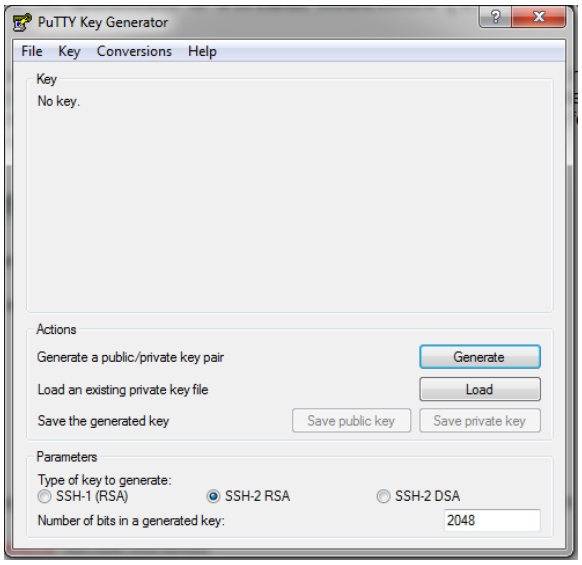
Create SSH public and private Key

To build the instance is to have a public/private key set, used for ssh authentication. It is strongly recommended to use public/private key and block for any login with username/password. Always protect the private key with a passphrase.

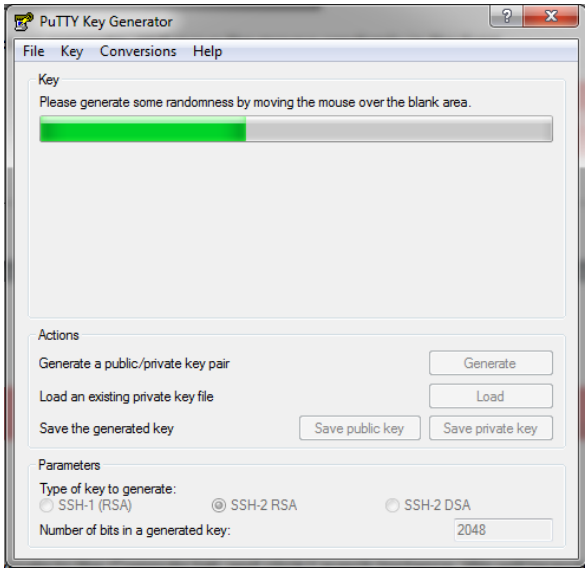
Generation of public and private key, with putty

For the generation of a public/private key set.

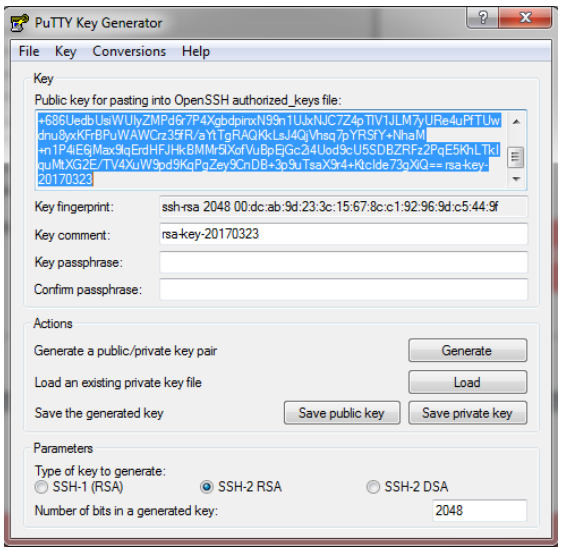
1. For windows with putty installed, start puttygen

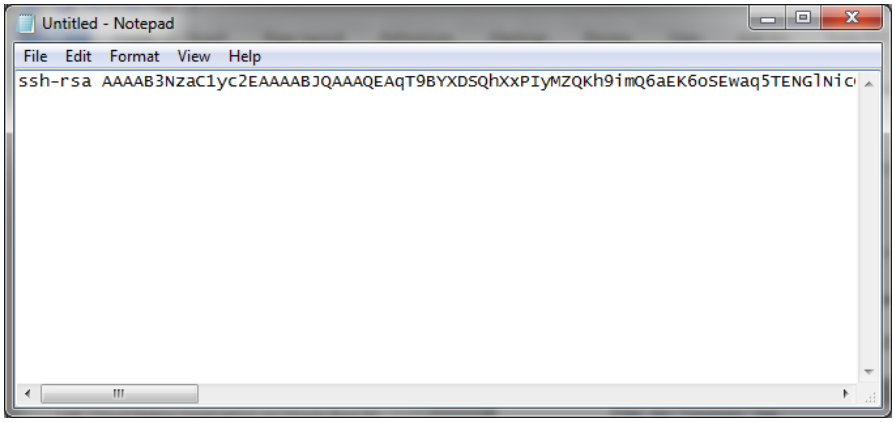


2. Click on generate, and move the mouse randomly in the field

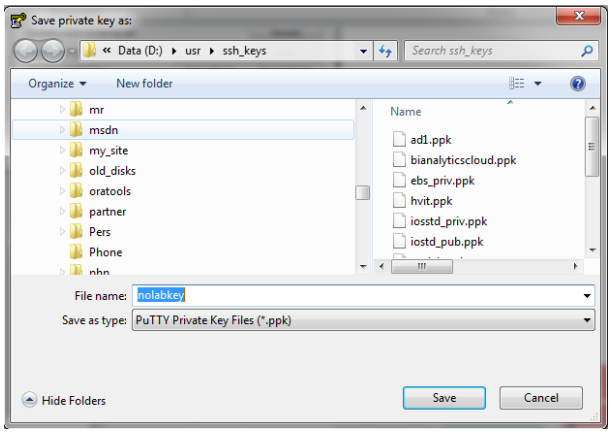


3. When the key is generated, copy the public key onto ie. notepad





4. Save the private key and add a passphrase.



Generation of public and private key, with Linux, Mac

The public, private keypair is created with ssh-keygen command as follows:

sh-keygen -t rsa -b 4096 -C "your mailadress"

The keys will be stored in $HOME/.ssh with id_rsa as private key and id_rsa.pub as the public key. The latter is used as ssh key for instance creating on Oracle OCI.

```
[oracle@myvbox ~]$ ssh-keygen -t rsa -b 4096 -C "demo@oracle.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/oracle/.ssh/id rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/oracle/.ssh/id_rsa.
Your public key has been saved in /home/oracle/.ssh/id_rsa.pub.
The key fingerprint is:
ac:a0:7d:c1:05:e7:ad:cc:81:4e:3b:7a:55:11:b8:93 demo@oracle.com
The key's randomart image is:
+--[ RSA 4096]----+
|      . ..o.     |
```

```
|        =.. .      |
|       o +oo       |
|      + *E+        |
|     . * S.        |
|    o o =          |
|   . o +           |
|      o            |
|                   |
+-----------------+
```

The key is now stored locally in $HOME/.ssh:
id_rsa, your private key
id_rsa.pub your public key.

Cat $HOME/.ssh/id_rsa.pub and copy to your OCI environment.

```
[oracle@myvbox ~]$ cat ~/.ssh/id_rsa.pub

ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAgEA6qGAwZZIajAQJN/aSKK9b+P9I/s2IVbuLIxpnzmldJU35BWIedbzKH
KwmNoktbUnPj4RvGrKMU+69gApfTTPa2jfHgQYBGMzOzmPc/k8kNQmcQpgQGZADSXDxfNqcJbVdNI1FJNx
VgFg1cDANhddMrIcumBbbNAtuxg0g0dA5p61iX2mDQd9d6C8Ecs6msphXnZ8YczAi1/q04X6xxj42bsX0s
ZONLG//du1hKua+6dzjYuoPgztizyYi6OObu6rM9m+Mz1bFQkhuRo2Q9vxzRthVkp1/zzEmJq1gC4WLMRe
u+FF+SuYeqvZ1ng8XmlD/bg/kgdlcmIok+Tav52kZVz212VSx5M3yOJx3q/5gj2h5SF7xiiS8yPPWEOfUf
bN1uruvGejBdcoIVeK6G9P5XrlOXygG5VO+PZ4GYQBc1XyY44xDw4nC1gpug0dPN6Lq8rRat2R3TZ+44lK
MiHMWTbgzWlLizX4833YmEcAJq2MXOQHYs7iZZ/nNtW98GAkt96lLUv1IBgbSR2IEr6Hv0lNfjLtH3lALg
7+TMnwGEu9nFsRiNCYYnndq9xV/OYWYF490asemVj+MBIVPURq7YbmQCX2GOTdsiExy+KvtGwtF6lhboqM
40saAer8wuEFOVlzQ5ADGCtpcgtCaPno7EX05KGD54vo9p8jE/QWO9M= demo@oracle.com
```

Example of later logon to the image:

```
[oracle@myvbox ~]$ ssh -i ~/.ssh/id_rsa opc@129.213.25.205
The authenticity of host '129.213.25.205 (129.213.25.205)' can't be established.
RSA key fingerprint is 7c:5b:2d:bd:d6:ba:c2:a3:e8:d7:62:37:1e:8d:d7:0b.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '129.213.25.205' (RSA) to the list of known hosts.
Enter passphrase for key '/home/oracle/.ssh/id_rsa':
```

For additional example on Mac and Linux, please refer to ie. https://help.github.com/articles/generating-a-new-ssh-key-and-adding-it-to-the-ssh-agent/#platform-mac

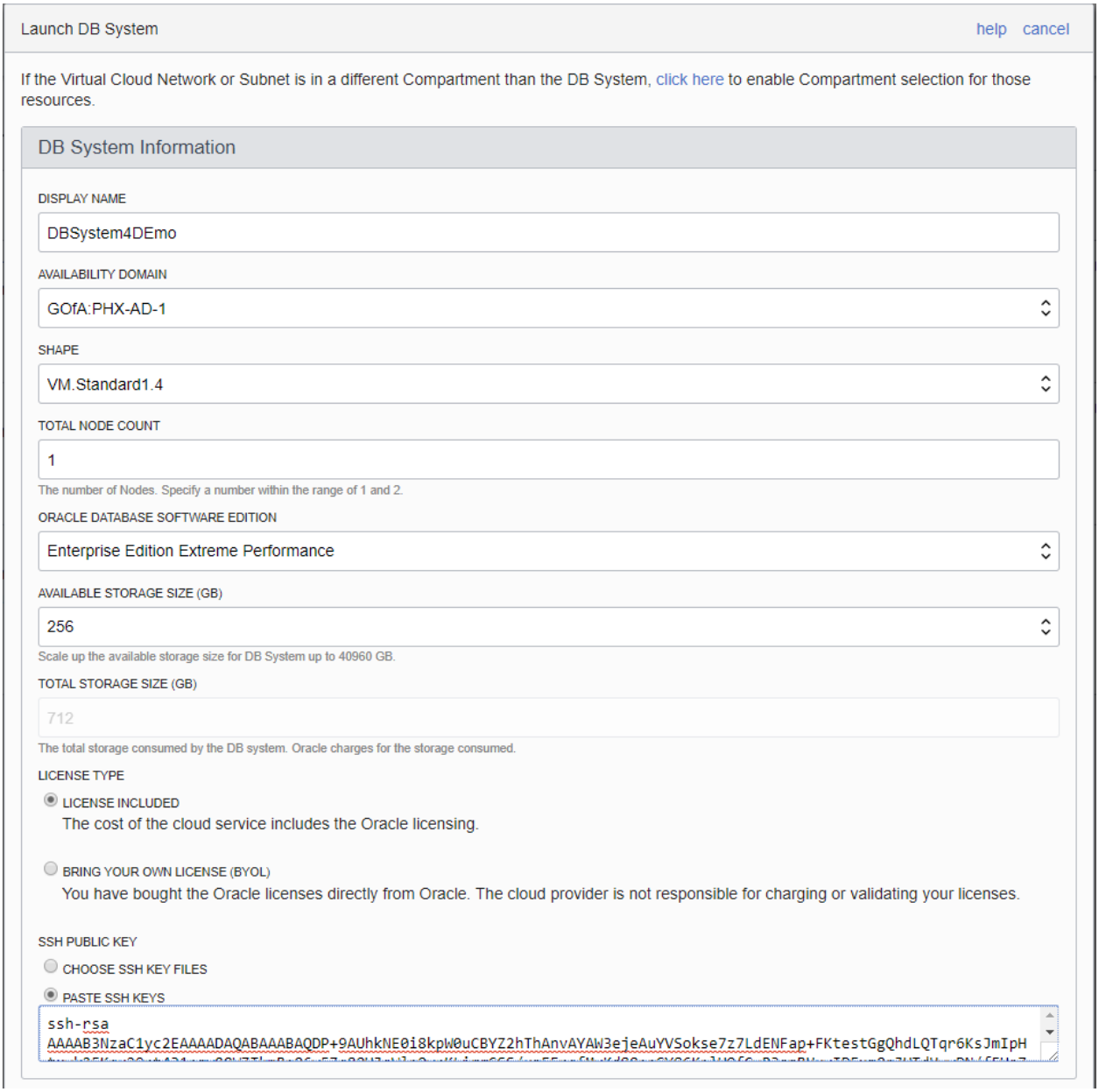
Creating a DB System

1. Launch a DB System
   a. Sign in to your Cloud Account, open the Console, click **Database**, choose your **Compartment**, then click **Launch DB System**.
   b. In the **Launch DB System** dialog box, enter the following:

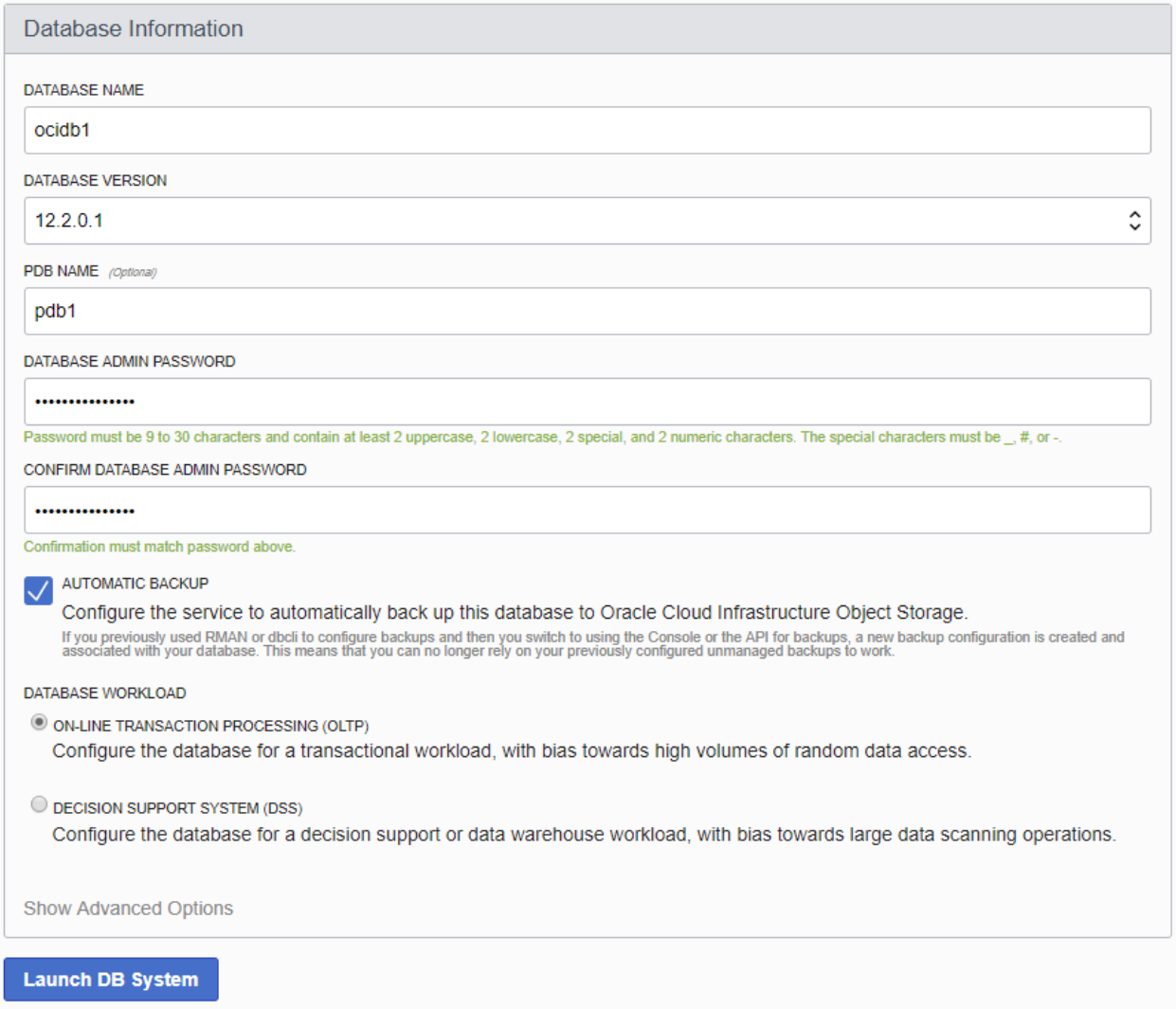
DB System Information	
Display Name	Enter a display name for the DB System.

Availability Domain	Enter the Availability Domain Name in which the DB System resides.
Shape	Select **VM.Standard1.2**
Oracle Database Software Edition	Select **Enterprise Edition**.
Total Node Count	Select the default option, 1.
Available Storage Size	256GB
SSH Public Key	Paste your ssh public key value into this field.
Network Information	
Virtual Cloud Network	Enter the VCN in which to launch the DB System.
Client Subnet	Enter the subnet name to which the DB System should attach.
Host Name Prefix	Enter your choice of host name for the DB System. Example: ocidb1.
Database Information	
Database Name	Enter a name for the database (db1).
Database Version	Select **12.2.0.1**.
PDB Name	Enter **pdb1.**
Database Admin Password	Enter **Welc0me2##OCIBM** for the SYS password.
Confirm Database Admin Password	Enter **Welc0me2##OCIBM**.
Database Workload	Select **Online Transactional Processing** for this practice.

The following is a sample DB System Information screen:


Launch DB System
help
cancel
If the Virtual Cloud Network or Subnet is in a different Compartment than the DB System, click here to enable Compartment selection for those resources.
DB System Information
DISPLAY NAME
DBSystem4DEmo
AVAILABILITY DOMAIN
GOfA:PHX-AD-1
SHAPE
VM.Standard1.4
TOTAL NODE COUNT
1
The number of Nodes. Specify a number within the range of 1 and 2.
ORACLE DATABASE SOFTWARE EDITION
Enterprise Edition Extreme Performance
AVAILABLE STORAGE SIZE (GB)
256
Scale up the available storage size for DB System up to 40960 GB.
TOTAL STORAGE SIZE (GB)
712
The total storage consumed by the DB system. Oracle charges for the storage consumed.
LICENSE TYPE
LICENSE INCLUDED
The cost of the cloud service includes the Oracle licensing.
BRING YOUR OWN LICENSE (BYOL)
You have bought the Oracle licenses directly from Oracle. The cloud provider is not responsible for charging or validating your licenses.
SSH PUBLIC KEY
CHOOSE SSH KEY FILES
PASTE SSH KEYS
ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAABAQDP+9AUhkNE0i8kpW0uCBYZ2hThAnvAYAW3ejeAuYVSokse7z7LdENFap+FKtestGgQhdLQTqr6KsJmIpH


Network Information
VIRTUAL CLOUD NETWORK
VCN1
CLIENT SUBNET
SUB1
HOSTNAME PREFIX
ocibmdb
HOST DOMAIN NAME
sub1.vcn1.oraclevcn.com
Each part must contain only letters and numbers, starting with a letter. 63 characters max.
HOST AND DOMAIN URL
ocibmdb.sub1.vcn1.oraclevcn.com



c. Click **Launch DB System.**

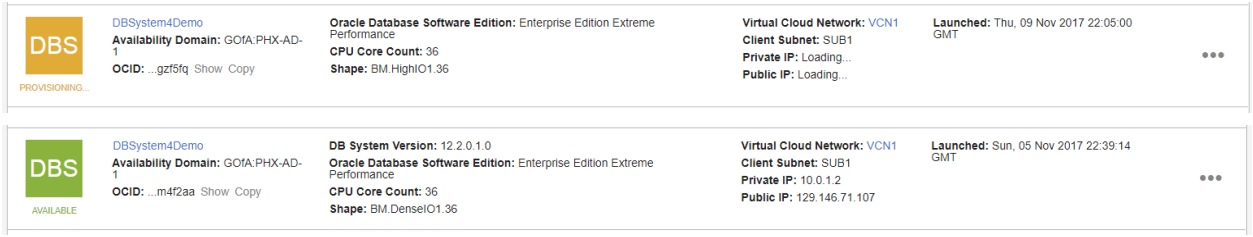
2. Check the Status of the DB System

a. Open the Console, click **Database**, then choose your **Compartment**.

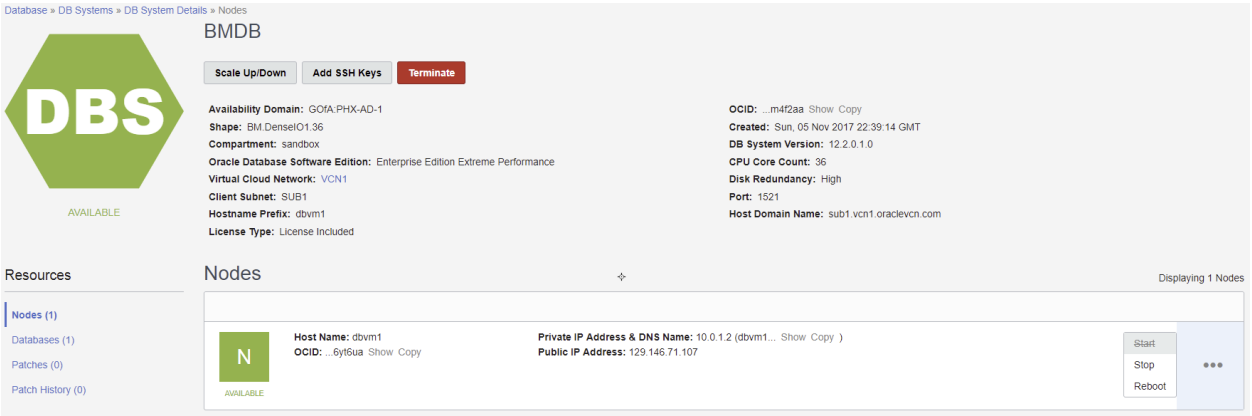
b. From the list of DB Systems, find the system that you're interested in and check its icon. The color of the icon and the text below it indicates the status of the system. The available statuses and their icon colors are:

- **Provisioning:** Yellow icon
- **Available:** Green icon
- **Starting:** Yellow icon
- **Stopping:** Yellow icon
- **Stopped:** Yellow icon
- **Terminating:** Gray icon
- **Terminated:** Gray icon

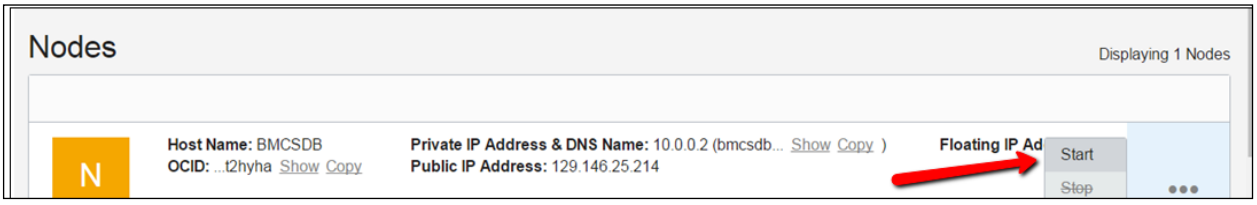
– **Failed:** Red icon

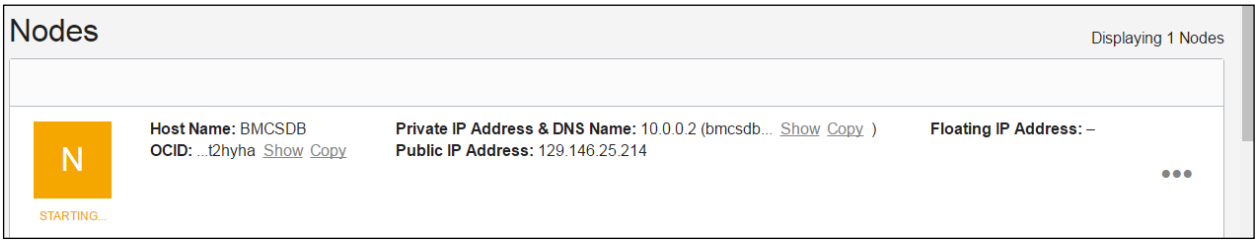


3. To Start, Stop, or Reboot a DB System:
   a. Open the Console, click **Database,** then choose your **Compartment**.
   b. In the list of DB Systems, find the DB System that you want to stop, start, or reboot, then click its name to display its details.

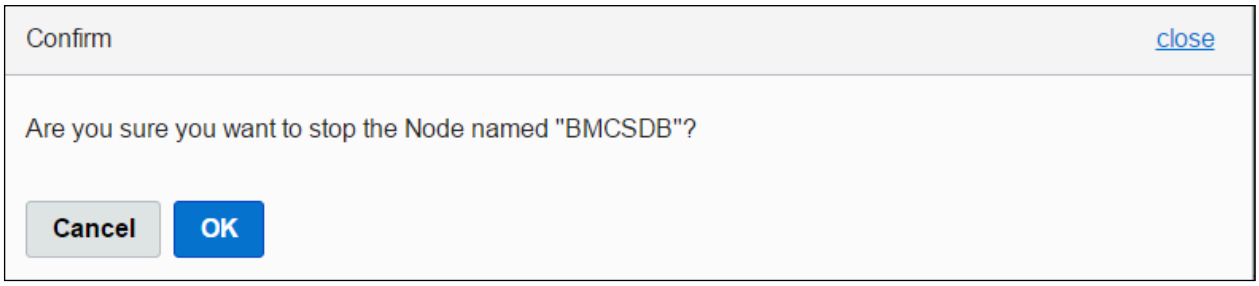


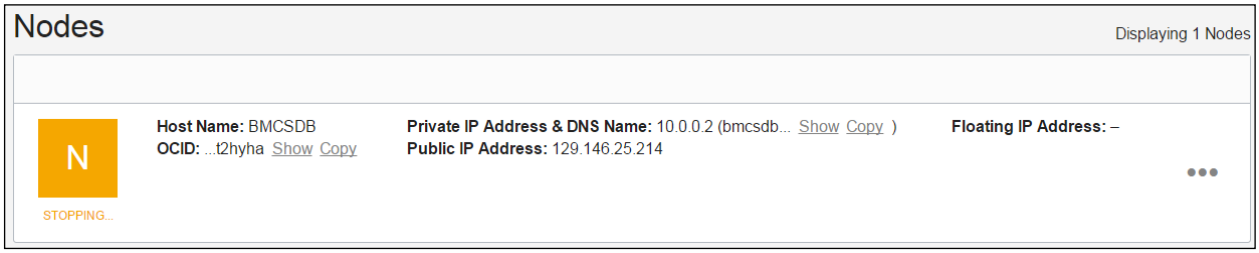
   c. In the list of nodes, click the **Actions** icon (● ● ●) for a node, then click one of the following actions:
      - **Start:** Restarts a stopped node. After the node has restarted, the **Stop** action is enabled.

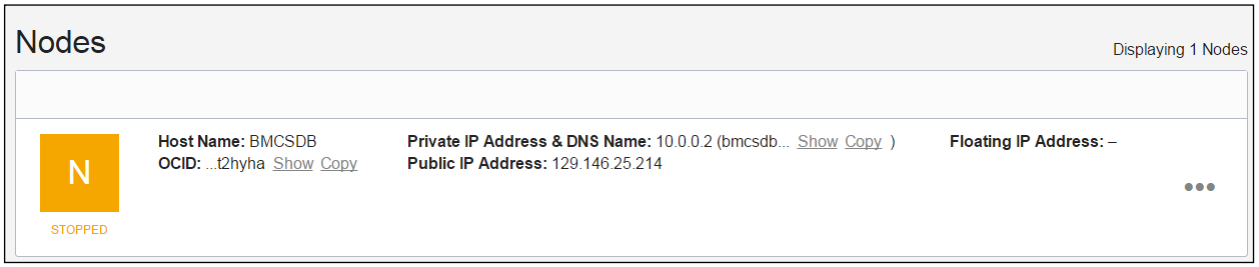




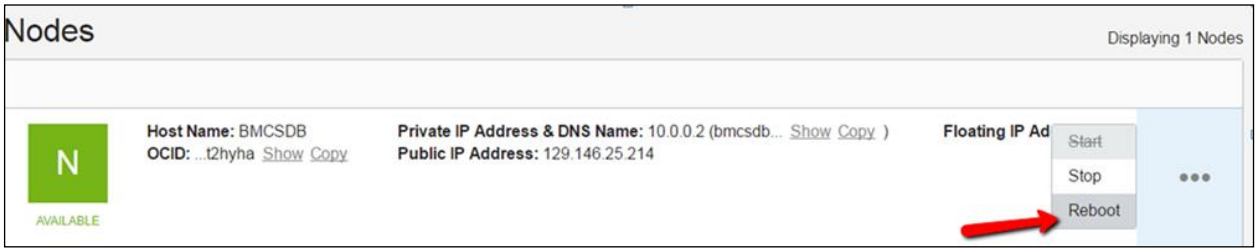
- **Stop:** Shuts down the node. After the node is powered off, the **Start** action is enabled.

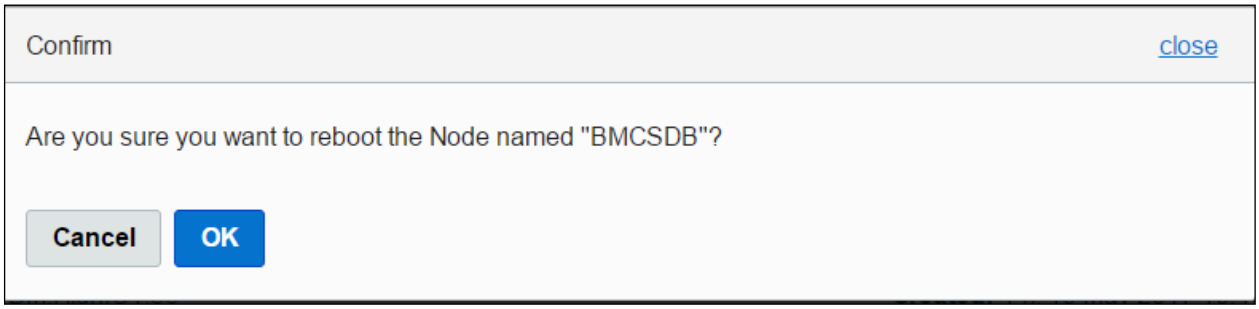


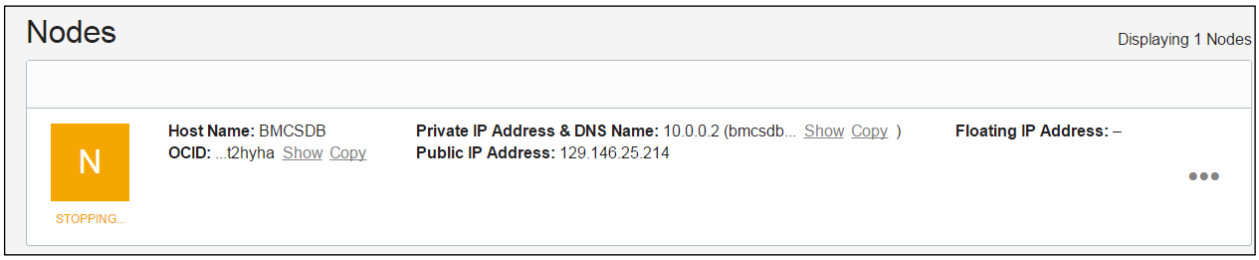


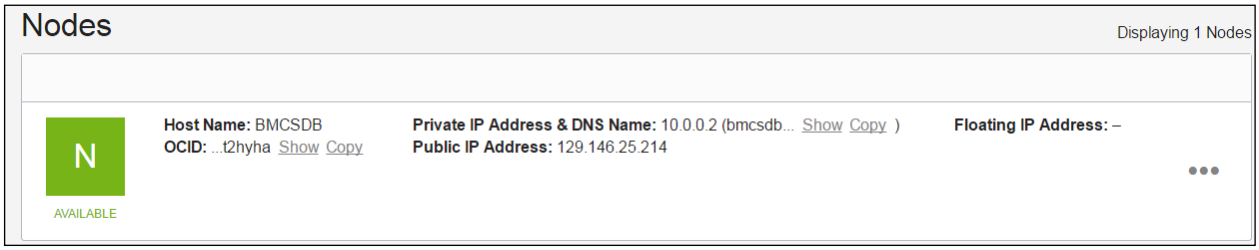


- **Reboot:** Shuts down the node, and then restarts it.









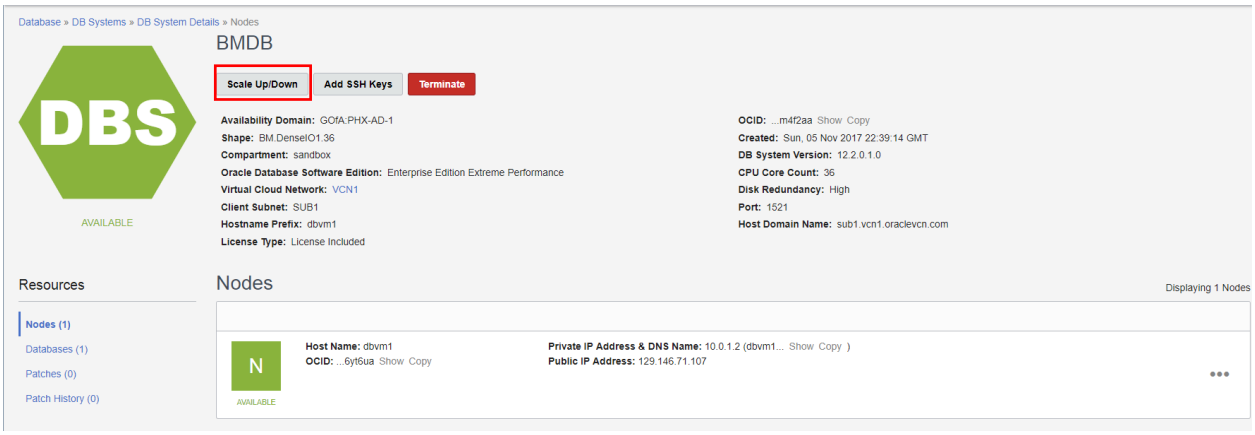
4. To Scale a DB System:

   If a multi-node DB System requires more compute node processing power, you can scale up (burst) the number of enabled CPU cores in the system.

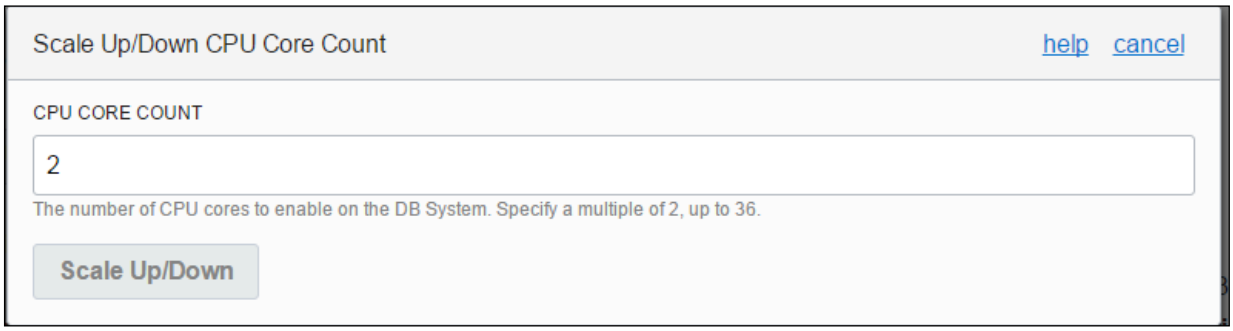
   a. Open the Console, click **Database**, and then choose your **Compartment**.

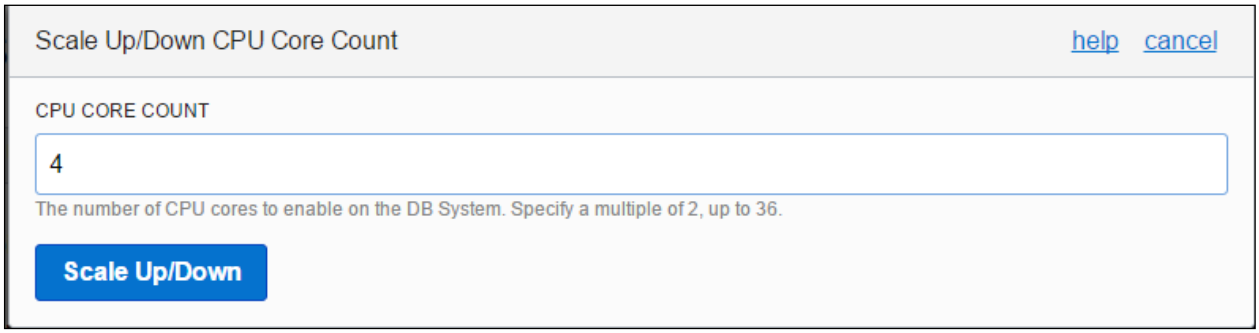
   b. From the list of DB Systems, find the system that you want to scale and click its highlighted name.

      The system details are displayed.

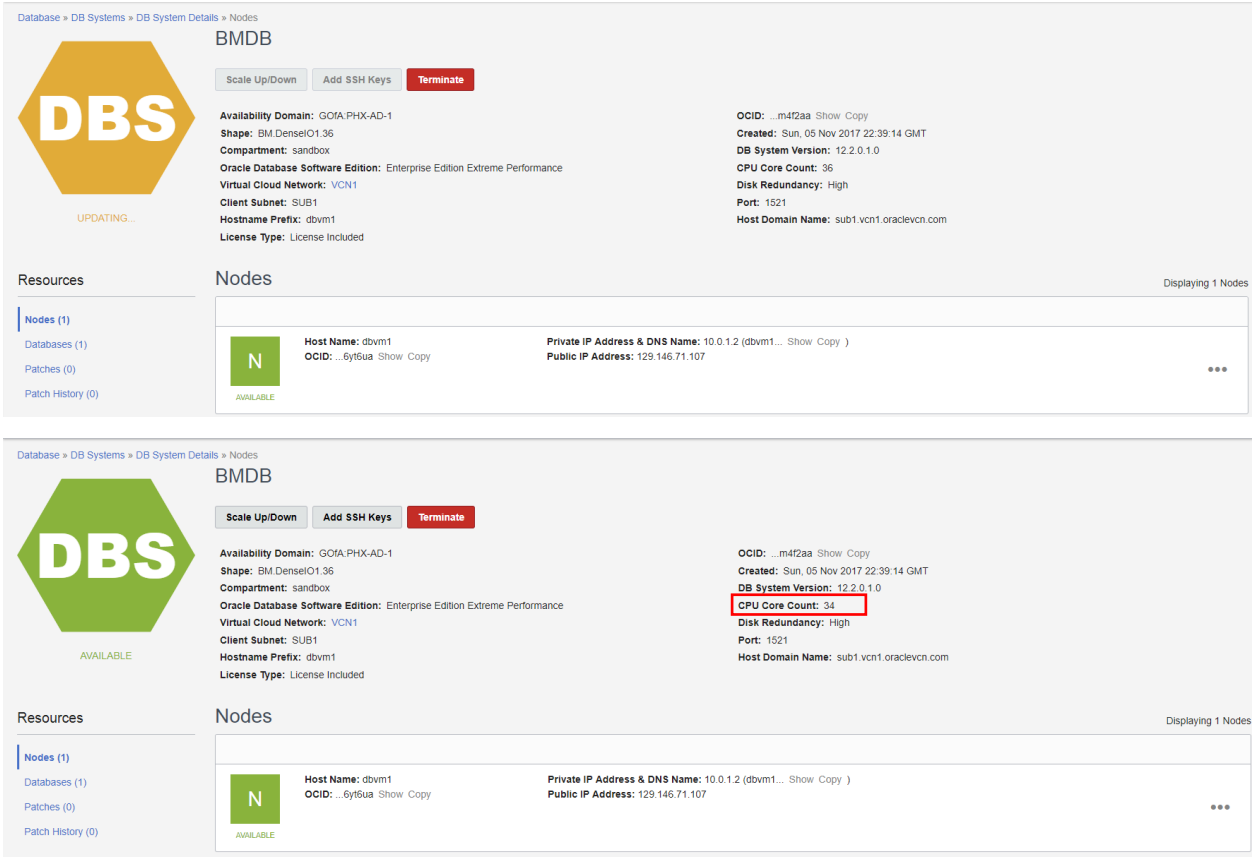


   c. Click **Scale Up/Down** and then change the number in **Total CPU Core Count**. The text below the field indicates the acceptable values, based on the shape used when the DB System was launched.

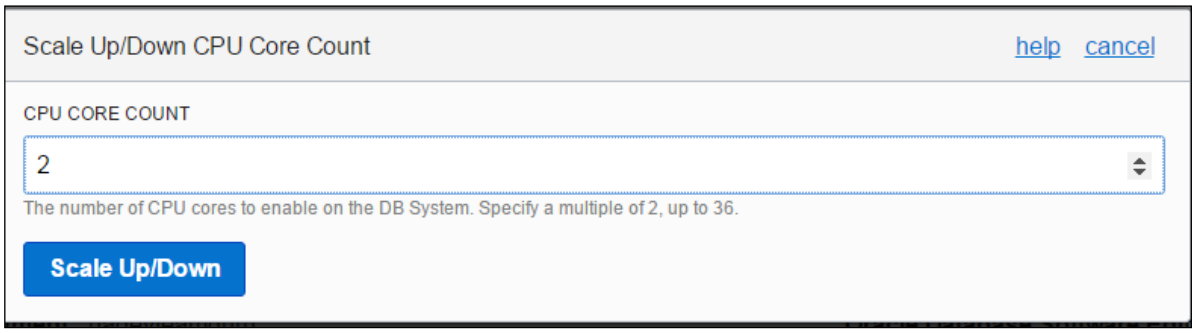




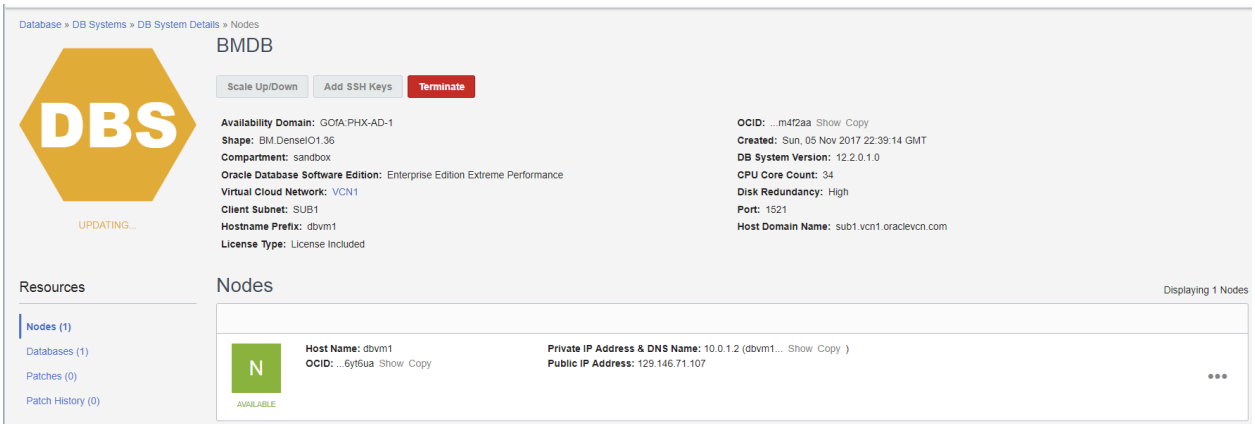
d. Click **Scale Up/Down**.

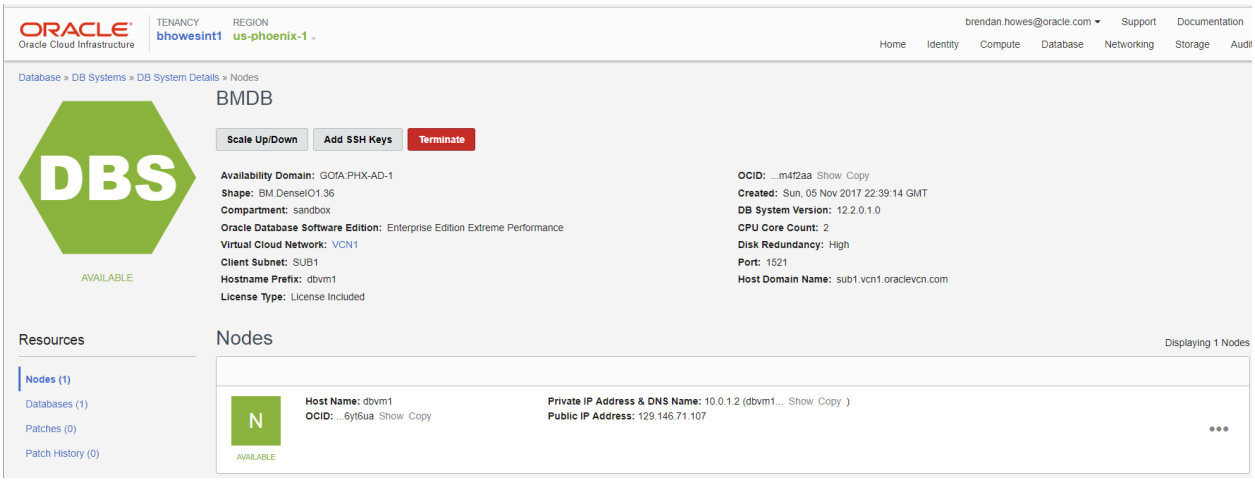


e. Click **Scale Up/Down** and then change the number (change to 2) in **Total CPU Core Count**.



f. Click **Scale Up/Down**.





5. Connect to a DB System

Prerequisites:

- SSH Public key that you used when the DB System was launched
- The public IP address of the DB System

a. Connecting to a database from a Linux/UNIX-style system

1) Open a shell and run the following SSH command to access the DB System:

```
$ ssh -i <private key> opc@<DB System IP address>
```

- <private key> is the full path and name of the file that contains the private key associated with the DB System you want to access.
- Use the DB System's private or public IP address depending on your network configuration.

6. Accessing a Database After You Connect

a. You have logged in as user opc, now sudo to the oracle user.

```
[opc@dbvm1 ~]$ sudo su - oracle
[oracle@dbvm1 ~]$
```

b. Set the environment to the ocidb1 instance and Perform a SQL query.

Note: If you forget your database name you can grep for it as follows:
"$ **ps auxw | grep ora_** " and look for process like:

oracle 12112 0.0 0.0 8830804 67248 ? Ss 20:28 0:00 ora_w000_db1

In this case "db1" is one of the database names on the system.

```
[oracle@dbvm1 ~]$ . oraenv
ORACLE_SID = [oracle] ? db1
The Oracle base has been set to /u01/app/oracle
[oracle@dbvm1 ~]$ sqlplus / as sysdba
SQL*Plus: Release 12.2.0.1.0 Production on Mon Nov 13 20:40:27 2017
Copyright (c) 1982, 2016, Oracle.  All rights reserved.
Connected to:
Oracle Database 12c EE Extreme Perf Release 12.2.0.1.0 - 64bit Production
SQL> select username from dba_users;
SQL> select * from dba_users;
SQL> select tablespace_name, table_name from all_tables;
SQL> exit
```

```
[oracle@dbvm1 ~]$ . oraenv
ORACLE_SID = [oracle] ? db1
The Oracle base has been set to /u01/app/oracle
[oracle@dbvm1 ~]$ sqlplus / as sysdba

SQL*Plus: Release 12.2.0.1.0 Production on Mon Nov 13 20:40:27 2017

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


Connected to:
Oracle Database 12c EE Extreme Perf Release 12.2.0.1.0 - 64bit Production

SQL> select username from dba_users;

USERNAME
--------------------------------------------------------------------------------
SYS
SYSTEM
XS$NULL
LBACSYS
OUTLN
DBSNMP
```

```
SYSTEM
UTL_RECOMP_SORTED

SYSAUX
WRI$_REPT_FORMATS

SYSAUX
WRM$_WR_SETTINGS


TABLESPACE_NAME
------------------------------
TABLE_NAME
--------------------------------------------------------------------------------
SYSTEM
UTL_RECOMP_COMPILED

SYSAUX
WRI$_REPT_COMPONENTS

SYSTEM
JAVA$MC$


2106 rows selected.

SQL> Disconnected from Oracle Database 12c EE Extreme Perf Release 12.2.0.1.0 - 64bit Production
[oracle@dbvm1 ~]$
```

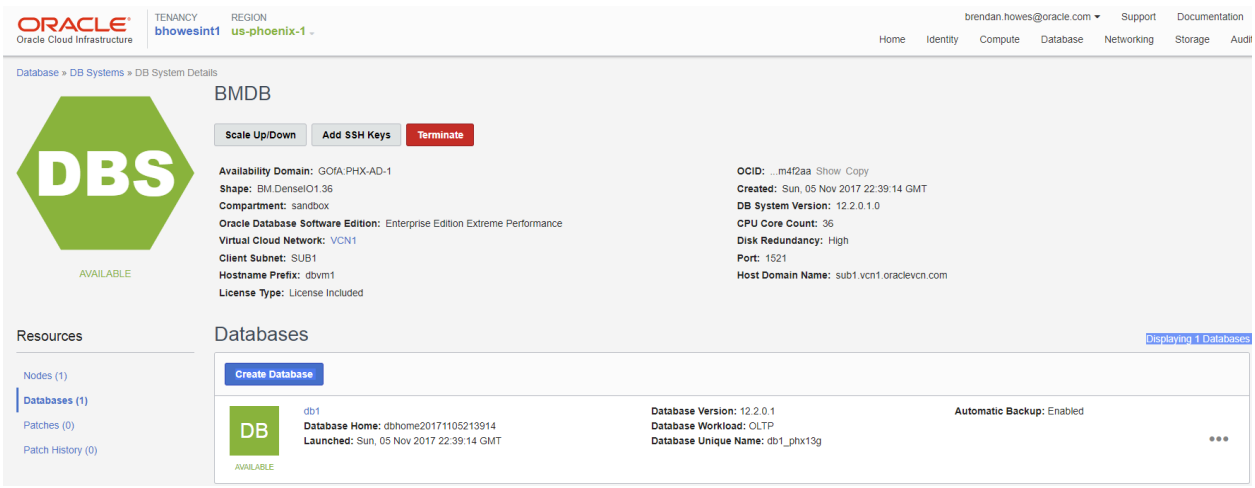
7. To terminate a DB System (Optional):

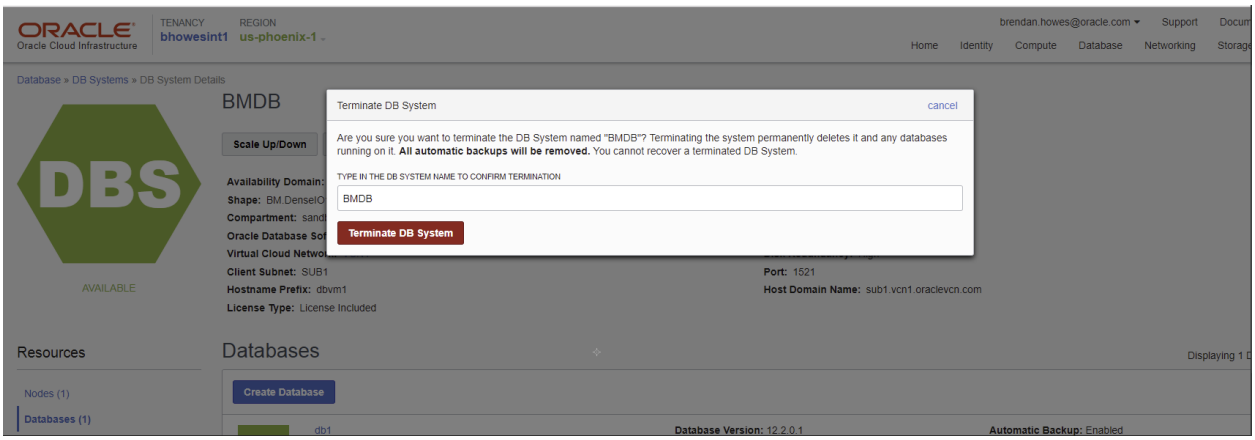
   Terminating a DB System permanently deletes it and any databases running on it.

   a. Open the Console, click **Database**, and then choose your **Compartment**.

      A list of DB Systems is displayed.

   b. For the DB System that you want to terminate, click the **Actions** icon (● ● ●),then click **Terminate**.





c. Confirm when prompted.

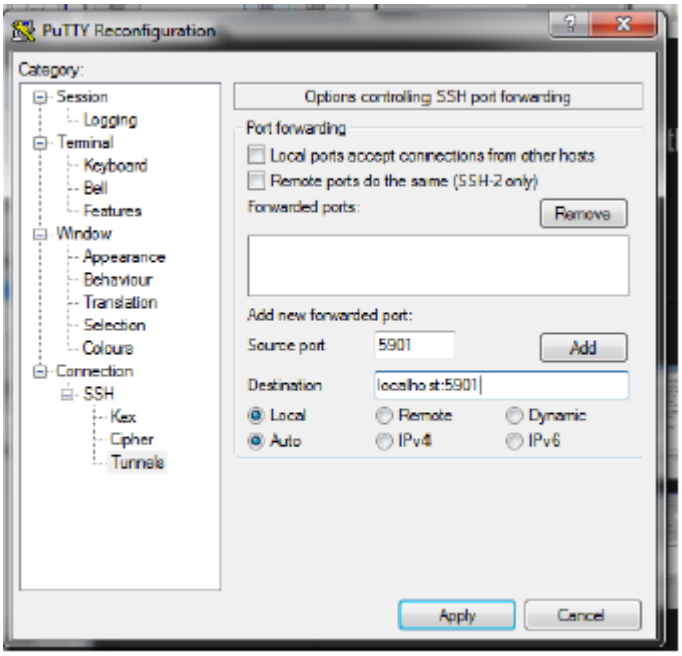
The DB System's icon indicates Terminating.

At this point, you cannot connect to the system and any open connections will be terminated.

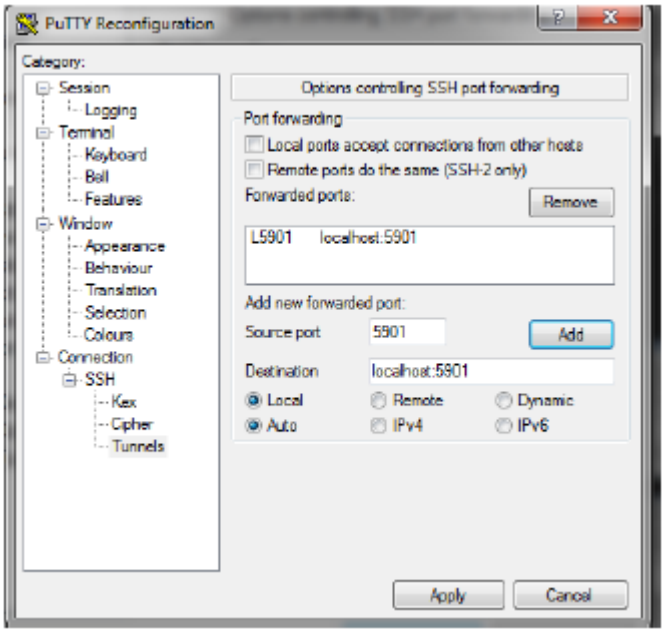
Configuring an SSH tunnel

Putty

Go to putty change setting, and click on connection ->ssh->Tunnels

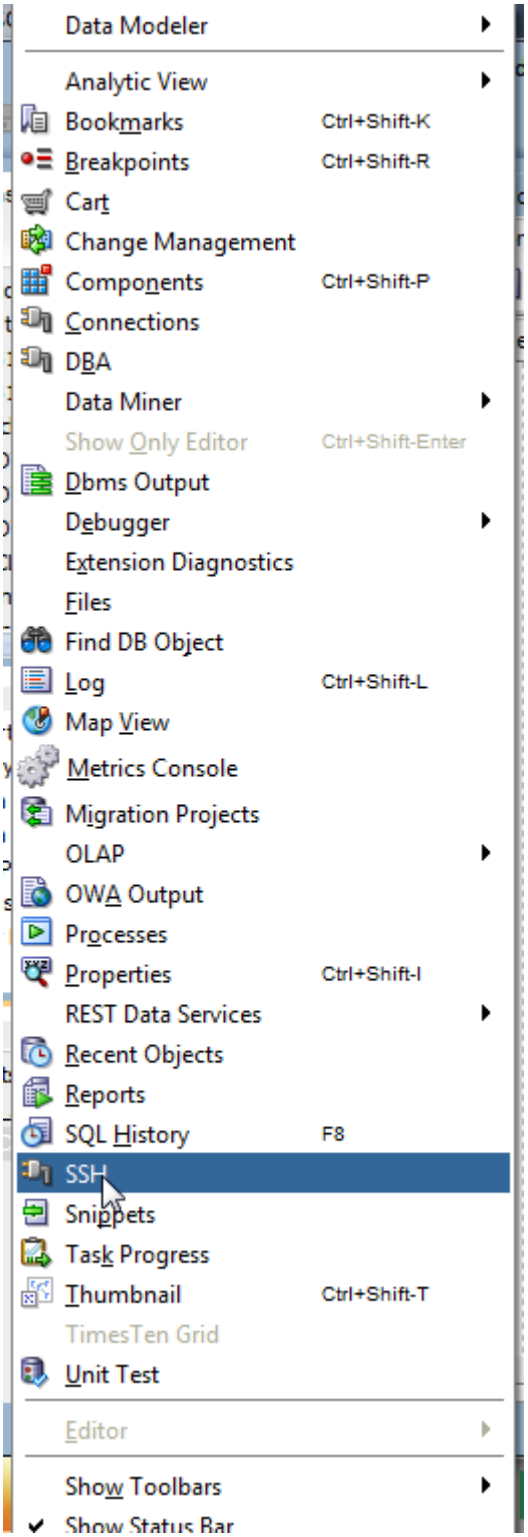


Your putty session should now look like below

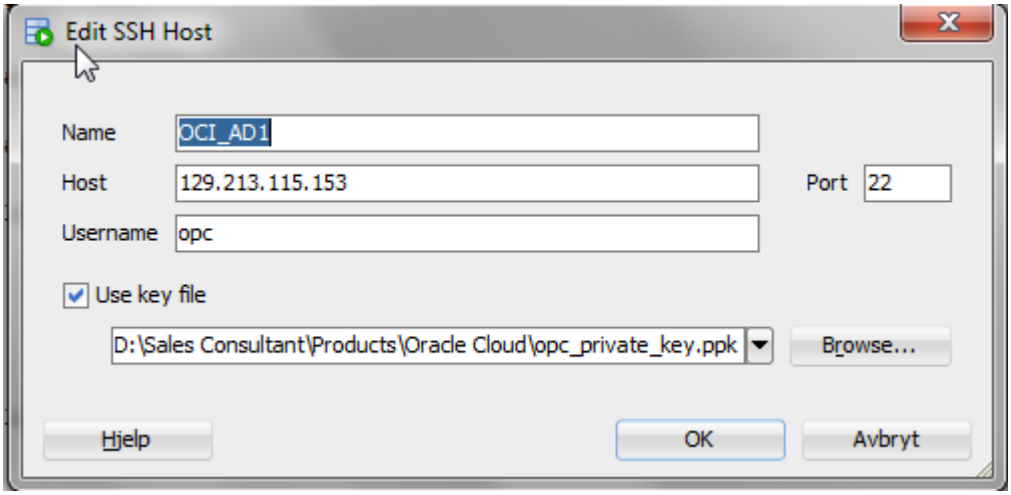


SQL Developer

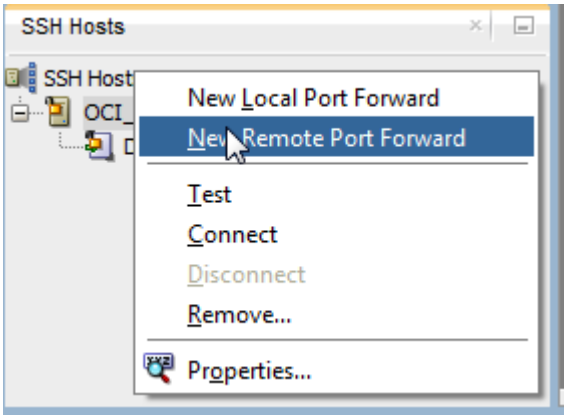
Choose View meny and click on SSH

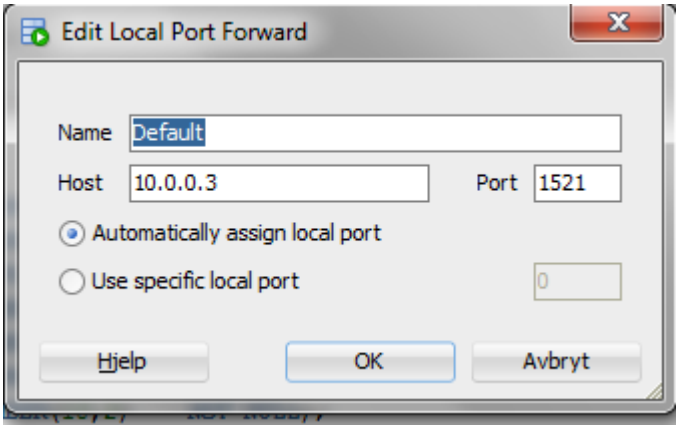


Right click on SSH Host and add new SSH host.



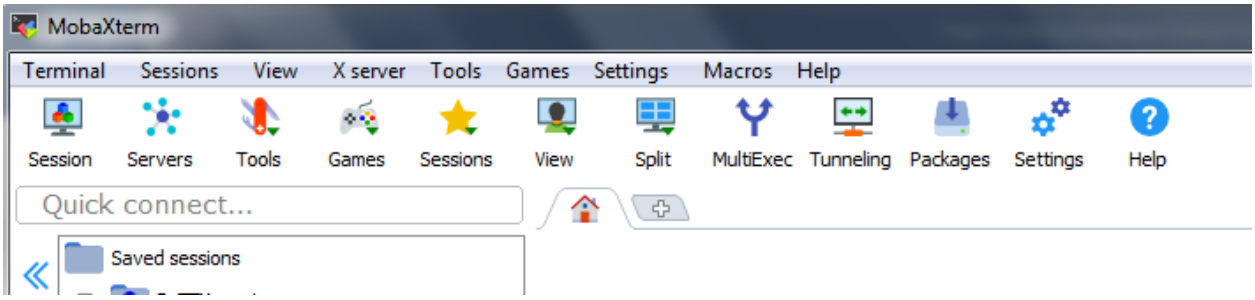
Add a remote port forwariding



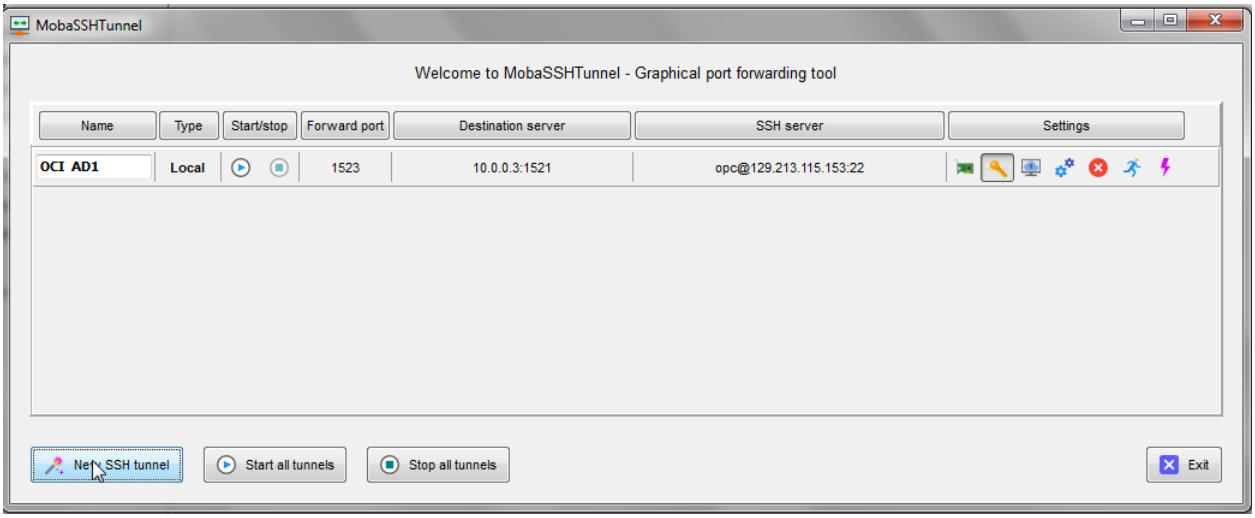


Mobaxterm

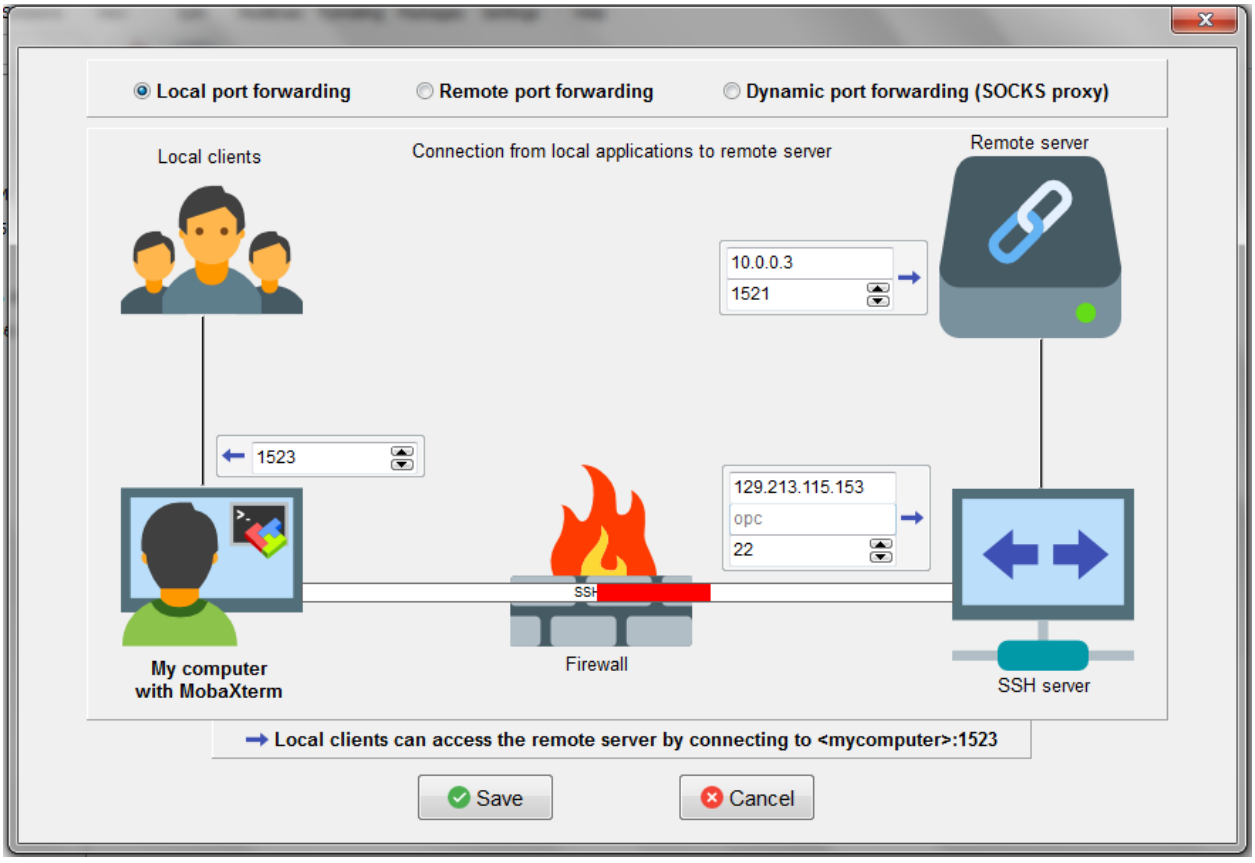
Click on **Tunneling** icon



Click on **New SSH tunnel**



Fill in your ip addresses and port numbers and click on Save



Click on yellow key symbol to add the path to your private SSH key.