ORACLE

Setup Cross Region Block Volume Replication for Oracle Analytics Server Disaster Recovery using RCU Schemas Replication

Describes how to create block volume and attach it to the Oracle Analytics Server Compute Instance.
Also explains how to replicate the block volume to OCI DR region and attach the new block volume to the DR Oracle Analytics Server Compute Instance.

March 2024, version 1.0

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Revision History

The following revisions have been made to this document since its initial publication.

DATE	REVISION
March 2024	Initial publication

Authors: Veera Raghavendra Rao Koka.

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In the Oracle Cloud Infrastructure Home Region (Ashburn)

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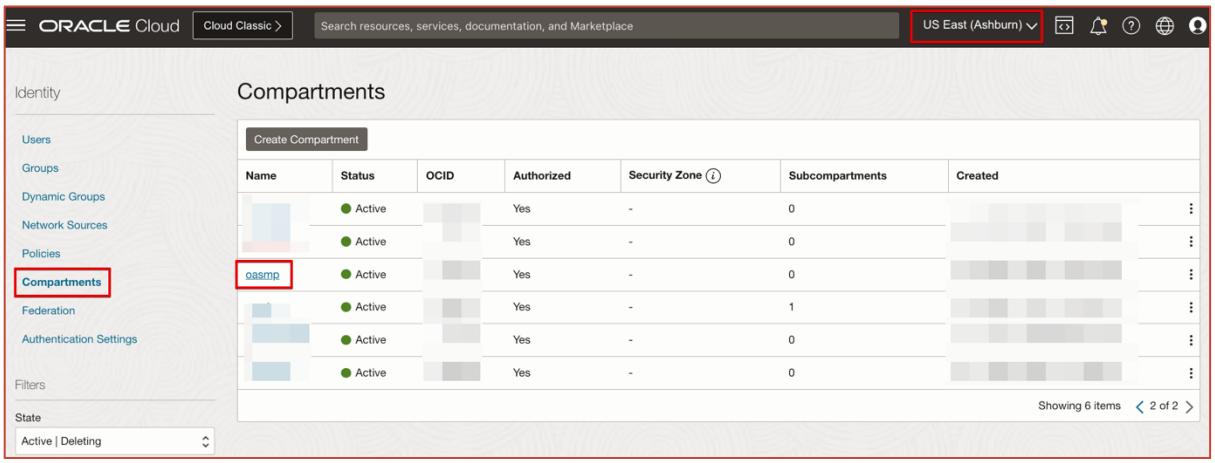
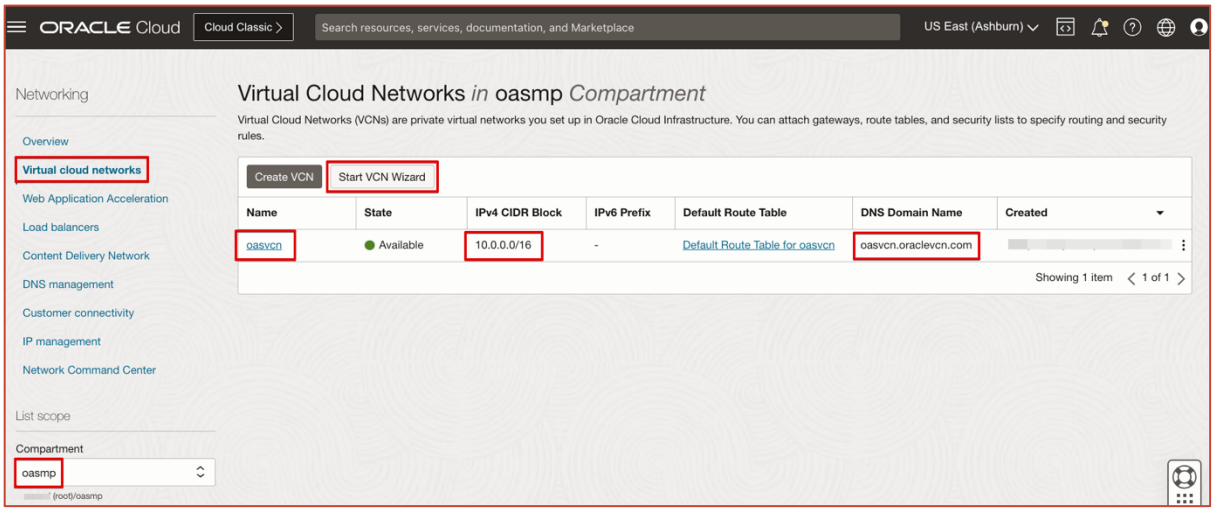
Create a Compartment

Create a compartment under the root compartment.

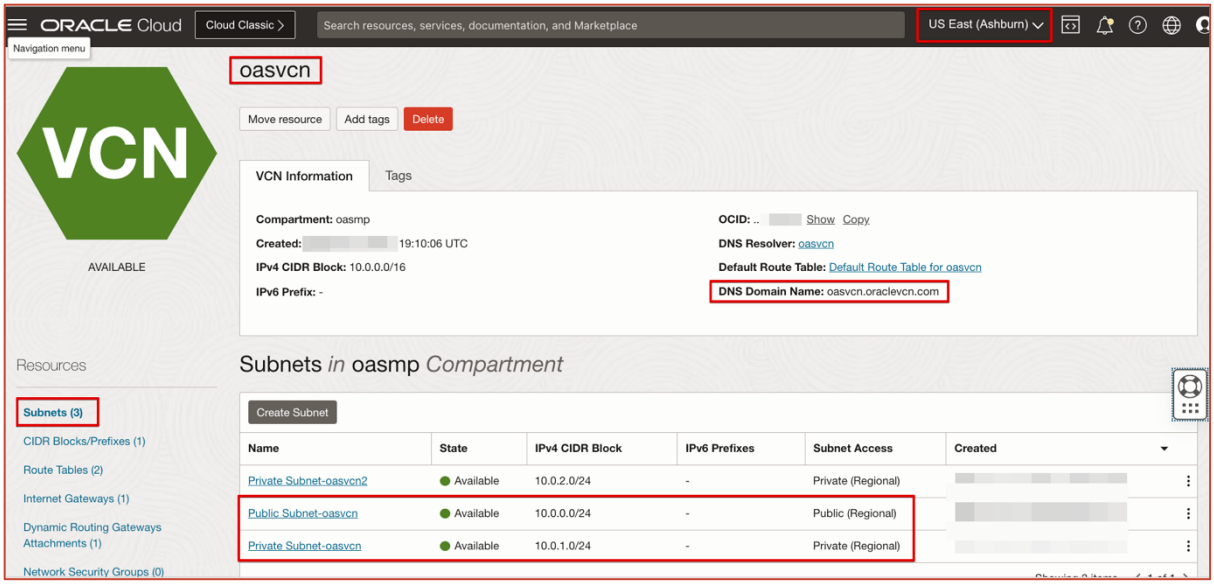


Create a Virtual Cloud Network

Create a Virtual Cloud Network (VCN) in the compartment using the wizard.



Public and Private Subnets are created while creating the VCN using the wizard.



Create an OAS Marketplace Instance

For the OAS DR using Database RCU schema replication, we need the OAS instances to have the same hostnames, including the domain names; for example, the FQDN of the primary OAS instance and the DR instance should be the same as “oas.oase.oasvcn.oraclevcn.com”.

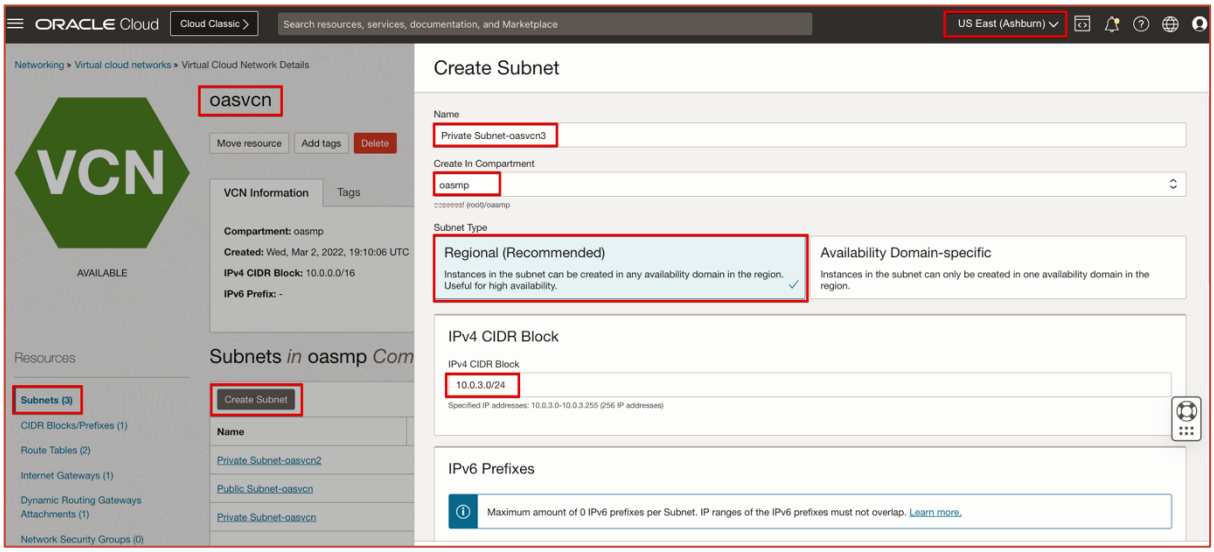
To do so we need to create a compartment, VCN, and private subnet in OCI’s primary (home) region, for example, Ashburn, and in OCI’s DR region, for example, Phoenix to be the same names.

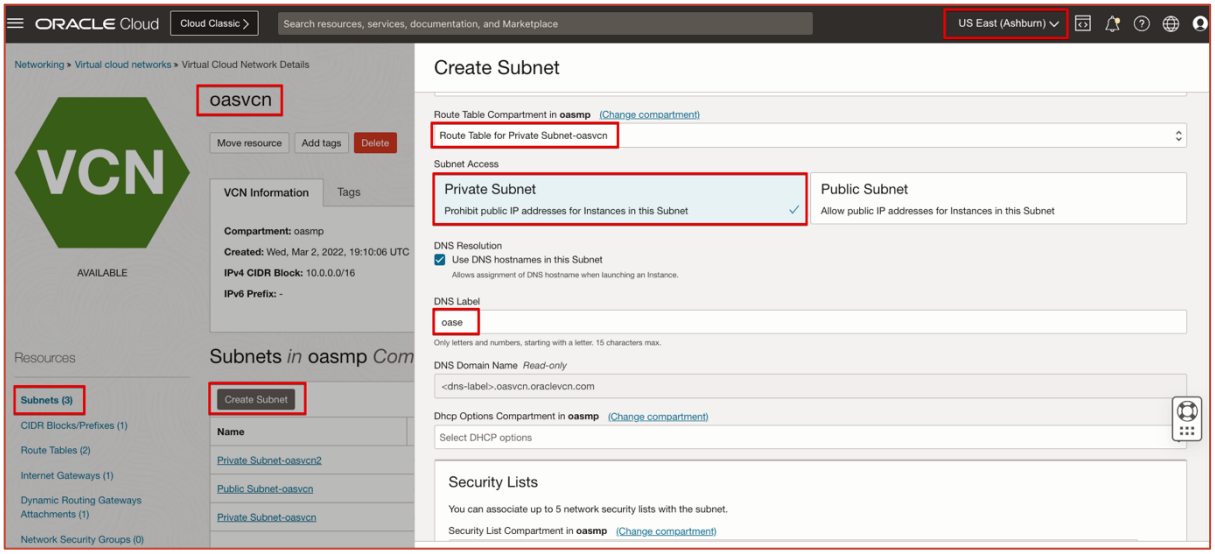
NOTE: The compartment is not limited to the OCI region, so it is available in both regions once it is created.

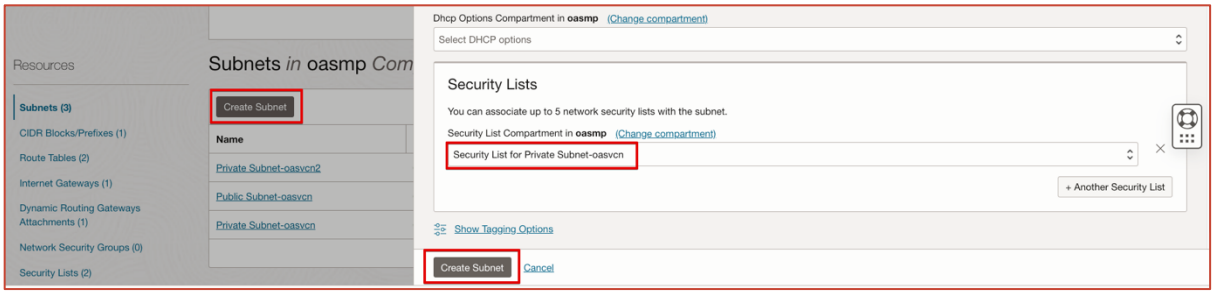
Since we already have a compartment, for example, “oasmp,” and a VCN, “oasvcn,” use the existing one.

Create Private Subnets

Create a new private subnet in both regions without overlapping their CIDR blocks.

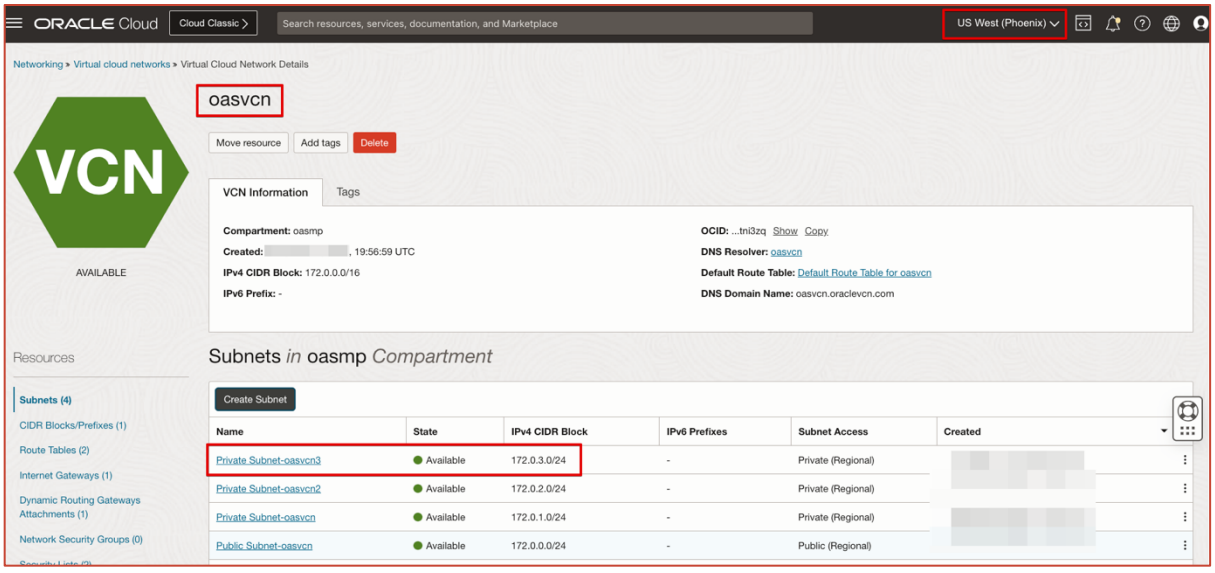


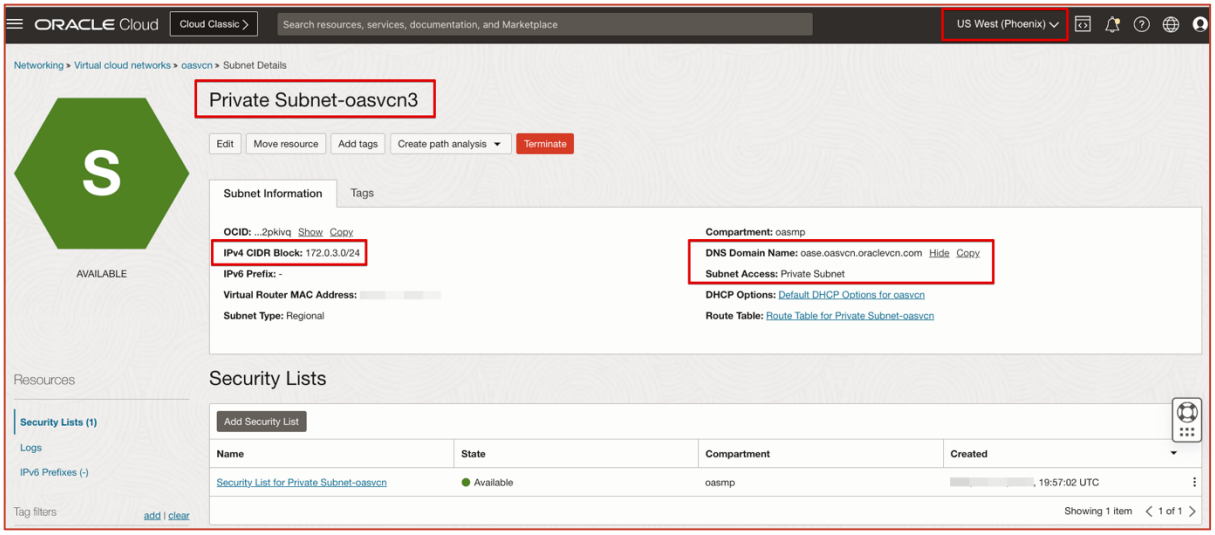




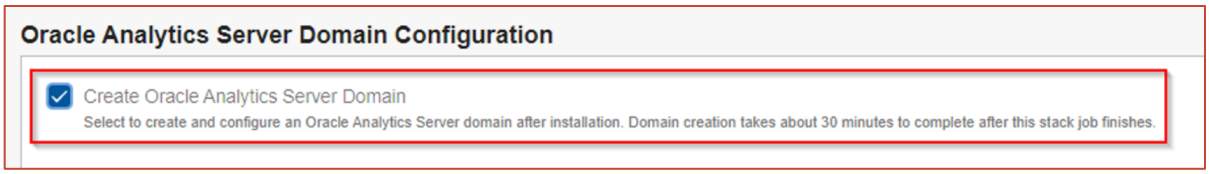
NOTE: Ensure the ingress security rules exist for the DBCS host and port from the OAS server subnet.

Similarly, create the same subnet in the OCI DR region, for example, Phoenix.



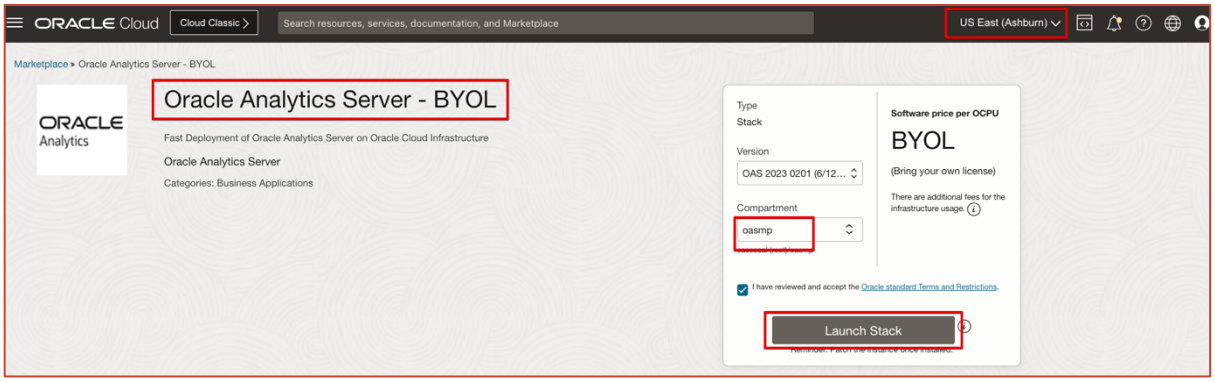


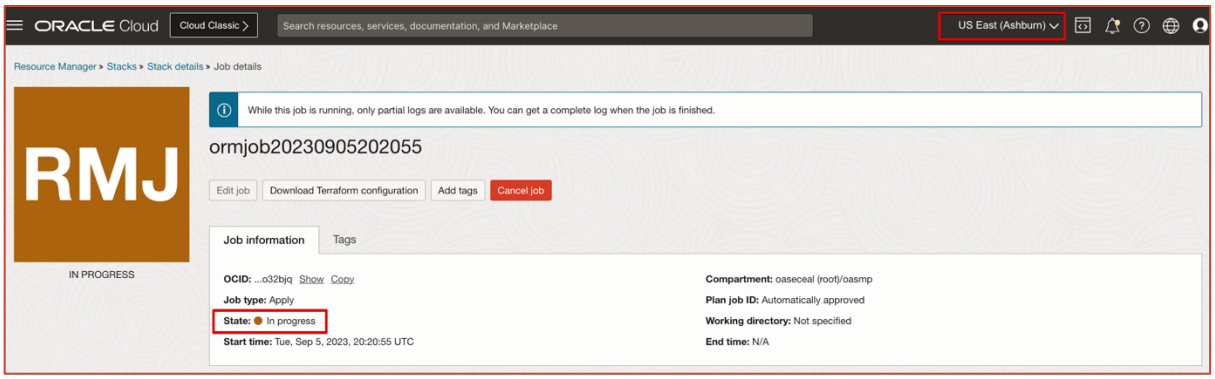
Create the primary OAS Marketplace instance with a domain in the OCI's home region, for example, Ashburn.



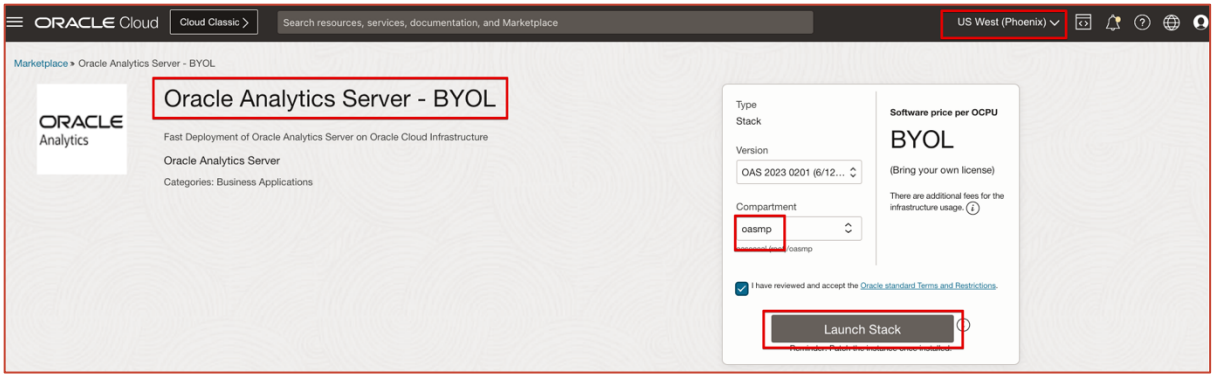
While creating the OAS instance, use the below DBCS pluggable database connection string.

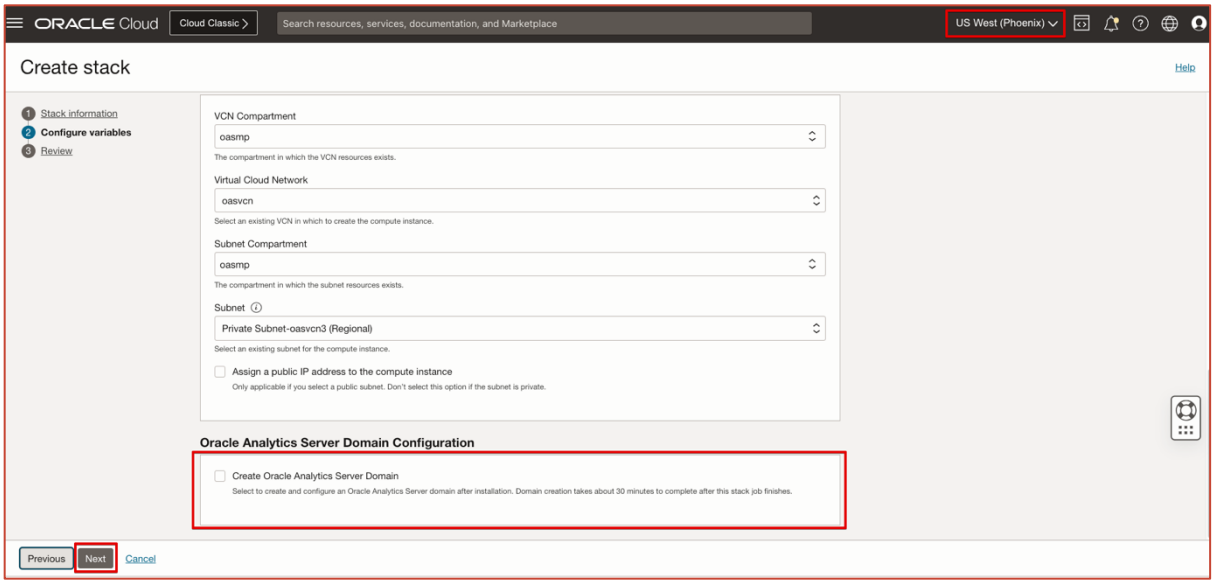
db19rac-scan.ceal.oracle.com:1521:pdb19rac.ceal.oasvcn.oraclevcn.com

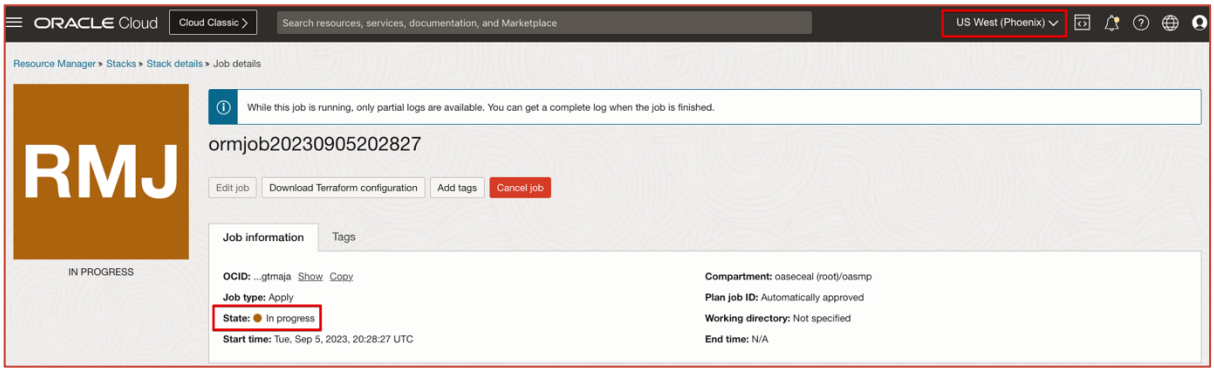




Similarly, create an OAS marketplace instance without domain config in OCI's DR region, for example, Phoenix, with the same hostname.

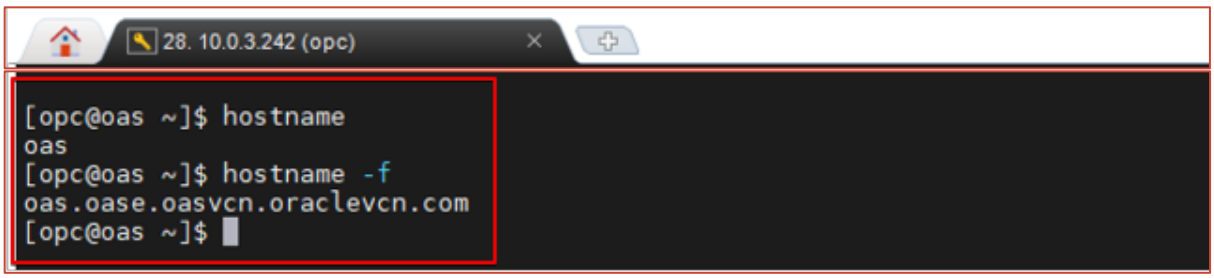




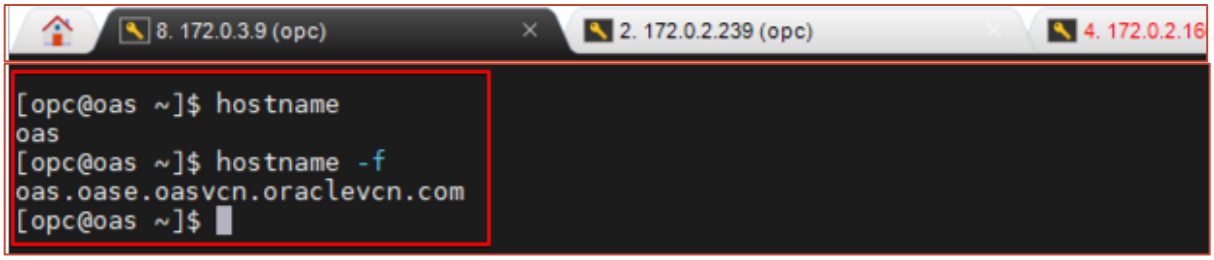


Check the hostnames of both the OAS instances.

Ashburn:



Phoenix:



Test that the Domain is created successfully and the OAS URL is accessible from the primary OAS instance on the OCI's home region.

Stop all the services on OAS primary compute instance.

/u01/data/domains/bi/bitools/bin/stop.sh

Since no domain is created in the OAS DR compute instance, run the script to open the required ports in the compute instance as the **root** user.

/u01/app/oas-scripts/open_oas_firewall_ports.sh

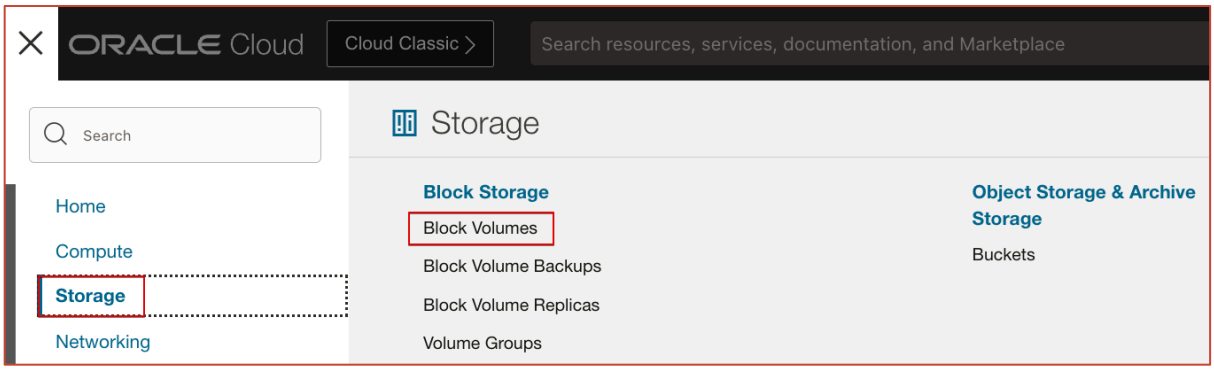
Create a Block Volume

Create a Block Volume in OCI Console, For more details, see Block Volume, see Creating a Block Volume.

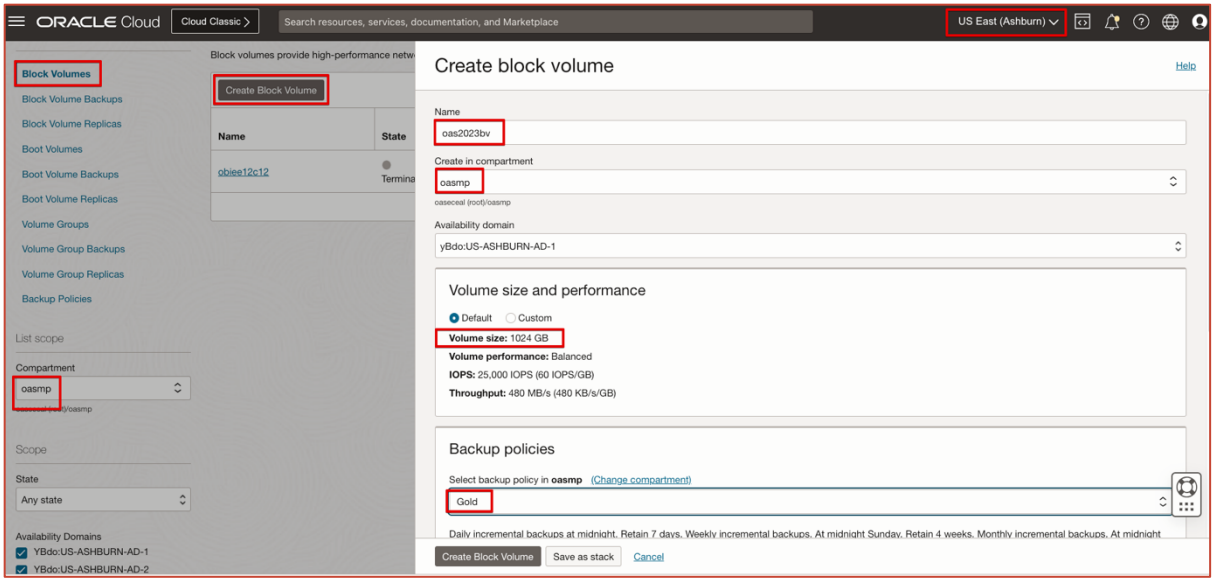
Create a block volume for the OAS (primary) compute instance in OCI's home region, for example, Ashburn.

Sign-in to OCI Console

Navigate to Storage → Block Volumes



Create Block Volume

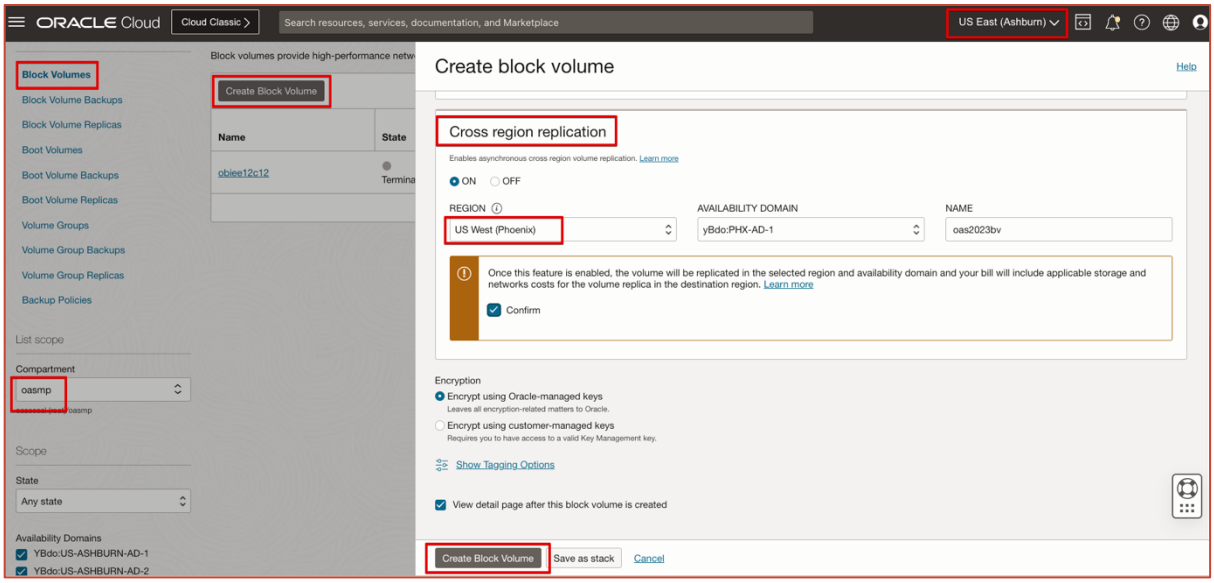


Select the same compartment as the OAS compute instance exists.

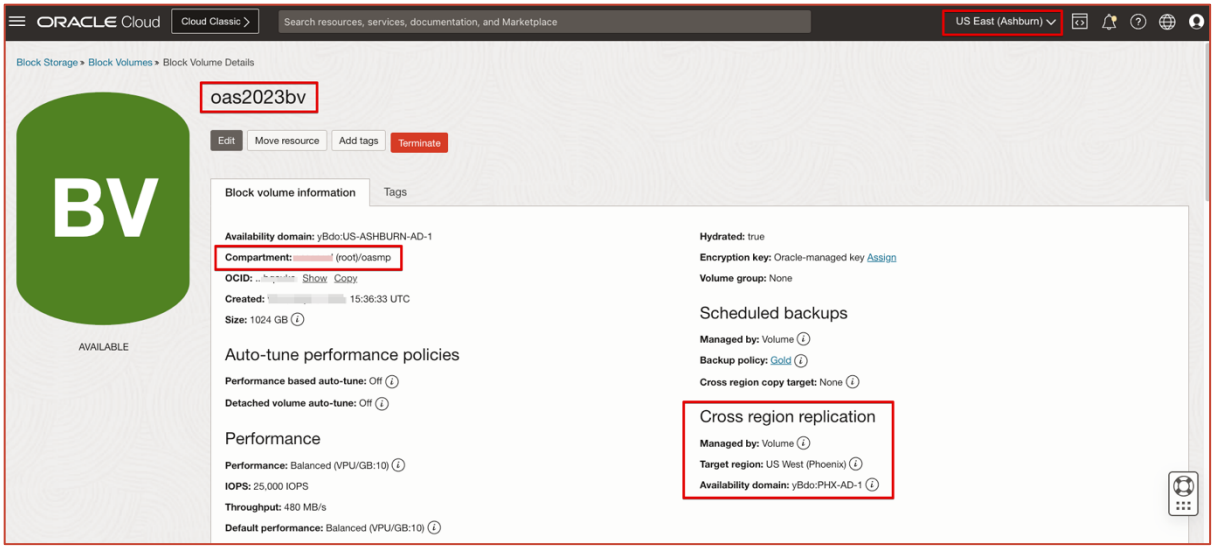
Select the volume size (1024 GB or 512 GB) per your requirement.

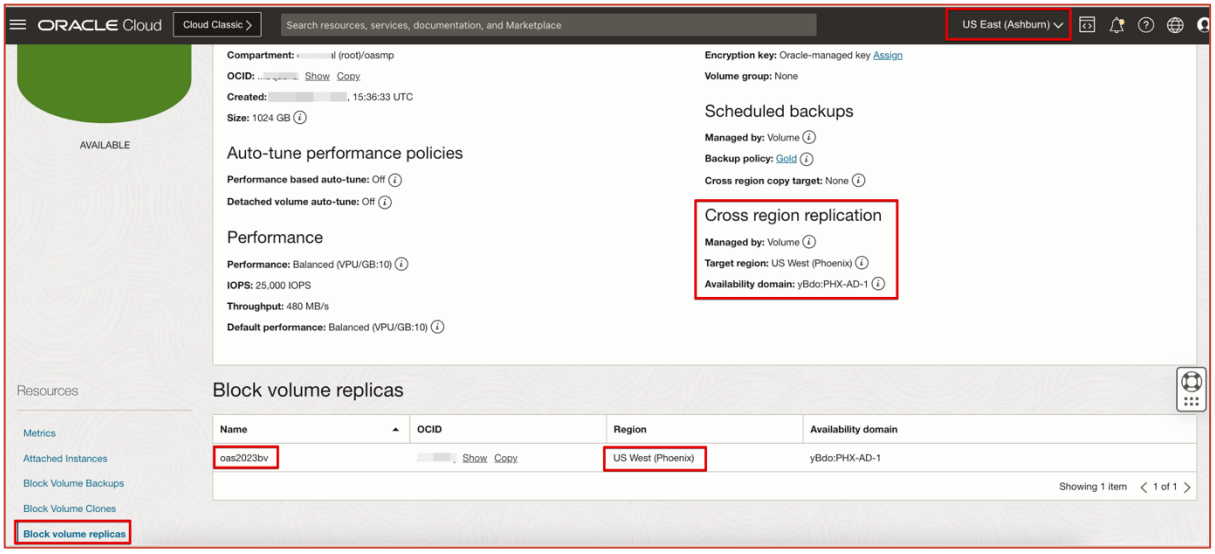
Select the Backup policy per your requirement between (Gold or Silver or Bronze).

For more details, see the OCI Documentation.

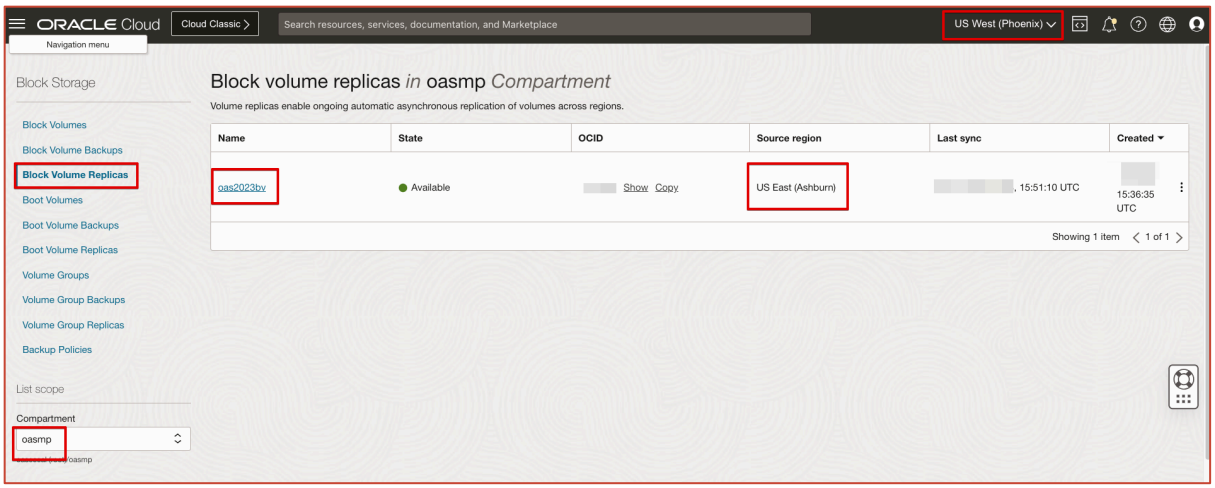


Enable cross-region replication to the OCI's DR region, for example, Phoenix.





Check the same in the OCI's DR region. For example, Phoenix.



The replicated block volume is listed under the Block Volume Replicas.

Attach the Block Volume

Attach the Block Volume to the OAS compute instance, For more details, see Attaching a Volume

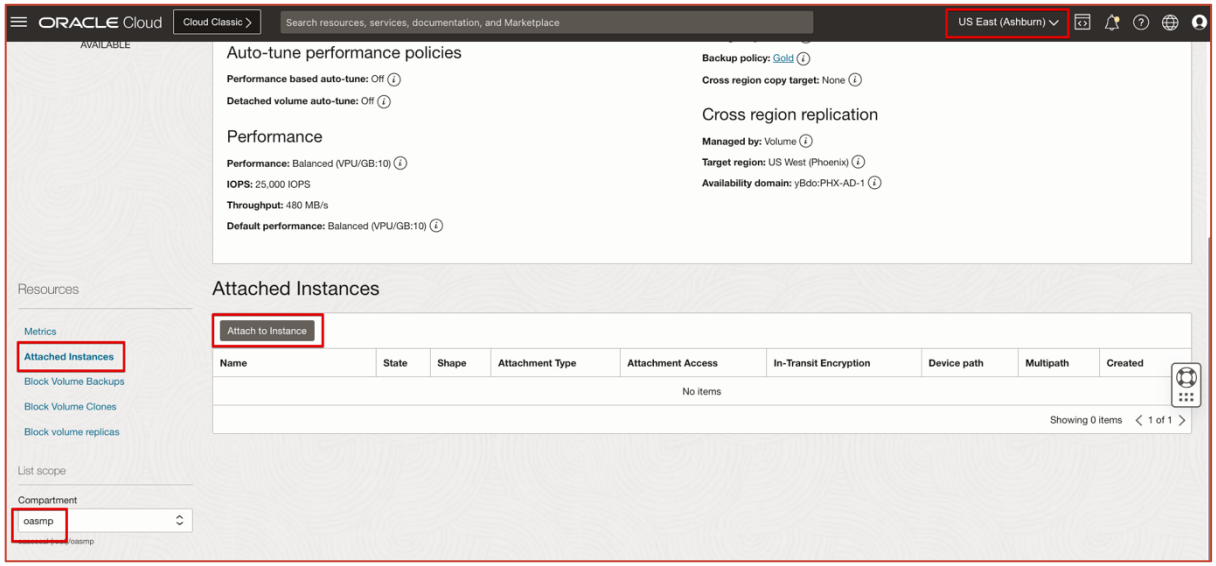
NOTE: Do not mount the same block volume to multiple compute instances; better to have a dedicated block volume for each compute instance.

In the case of OAS with clustered nodes, create the SSD with NFS mount. For more details, see Mounting File Systems and Mounting OCI File Storage.

Go to OCI's home region, such as Ashburn.

Add the block volume to the OAS (primary) compute instance.

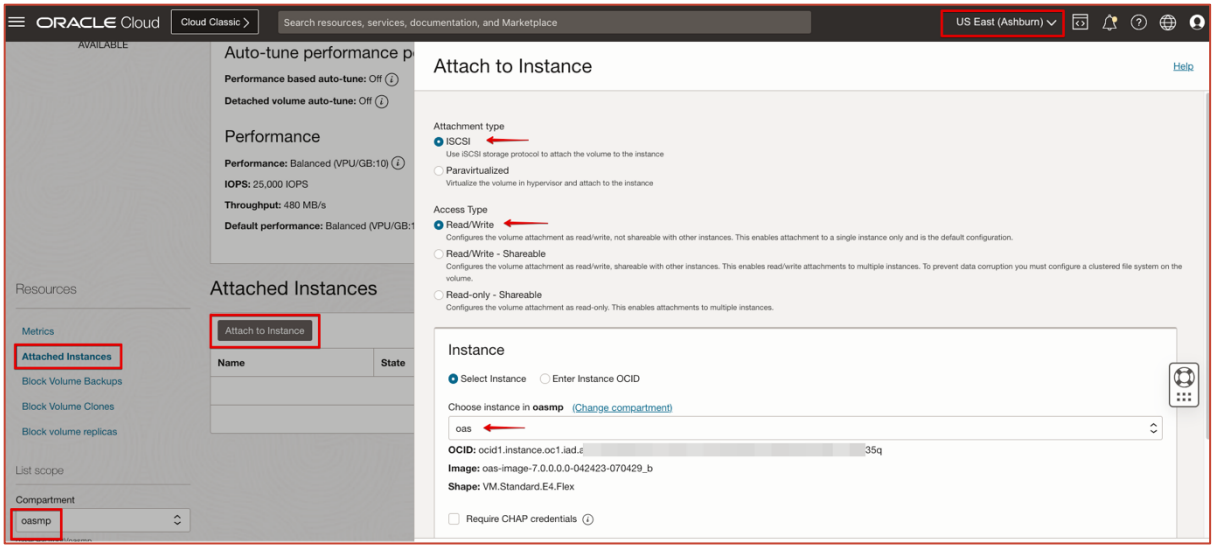
Navigate to the block volume → Attached Instances



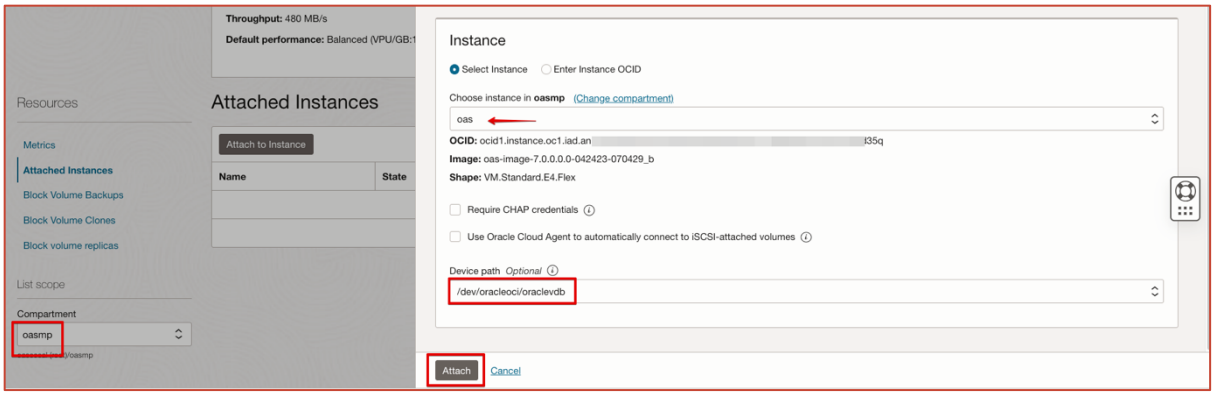
While attaching the block volume to the OAS compute instance, choose the attachment type based on your requirement. See the OCI documentation, Overview of Block Volume.

In this example, choose the **iSCSI attachment type** as the IOPS performance is better with iSCSI attachments compared to paravirtualized attachments.

For more information about iSCSI-attached volume performance, see Block Volume Performance.

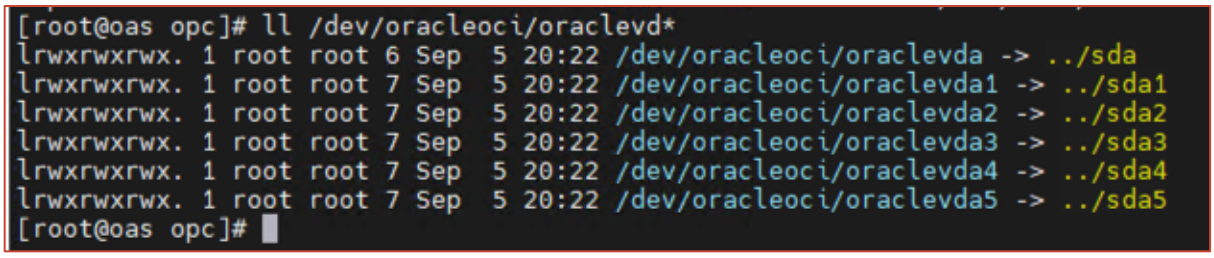


Select the OAS instance for which you need to attach the Block volume.



To list the existing Device Paths on the OAS Compute instance, run the below command.

```
ll /dev/oracleoci/oraclevd*
```




```
fdisk -l
```

```
[root@oas opc]# fdisk -l
WARNING: fdisk GPT support is currently new, and therefore in an experimental phase. Use at your own discretion.

Disk /dev/sda: 751.6 GB, 751619276800 bytes, 1468006400 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes
Disk label type: gpt
Disk identifier: C964E8FC-5212-4DFD-9771-F2F8D1E5EE86


#         Start          End    Size  Type            Name
 1         2048       411647    200M  EFI System      EFI System Partition
 2       411648     17188863      8G  Linux swap
 3     17188864    226904063    100G  Linux filesyste
 4    226904064    436619263    100G  Microsoft basic primary
 5    436619264   1468004351  491.8G  Microsoft basic primary

Disk /dev/mapper/vg_app-vg_app--lv_app: 107.4 GB, 107369988096 bytes, 209707008 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes


Disk /dev/mapper/vg_data-vg_data--lv_data: 528.1 GB, 528067067904 bytes, 1031380992 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes
```

`df -h`

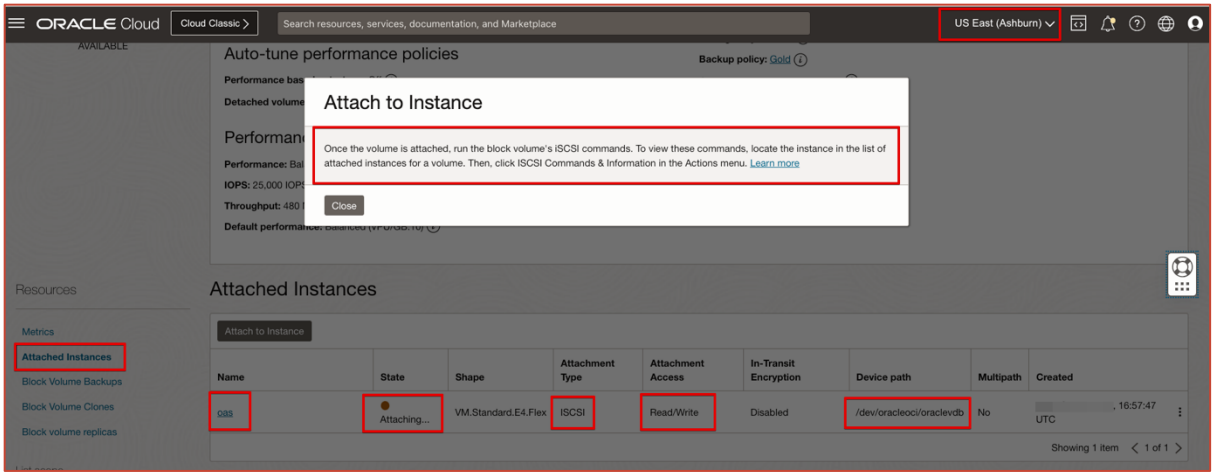
```
[root@oas opc]# df -h
Filesystem                             Size  Used Avail Use% Mounted on
devtmpfs                                32G     0   32G   0% /dev
tmpfs                                   32G     0   32G   0% /dev/shm
tmpfs                                   32G   17M   32G   1% /run
tmpfs                                   32G     0   32G   0% /sys/fs/cgroup
/dev/sda3                              100G  4.0G   97G   4% /
/dev/sda1                              200M  7.4M  193M   4% /boot/efi
/dev/mapper/vg_app-vg_app--lv_app       98G   13G   81G  14% /u01/app
tmpfs                                  6.3G     0  6.3G   0% /run/user/0
/dev/mapper/vg_data-vg_data--lv_data   484G  2.5G  456G   1% /u01/data
tmpfs                                  6.3G     0  6.3G   0% /run/user/1000
tmpfs                                  6.3G     0  6.3G   0% /run/user/994
```

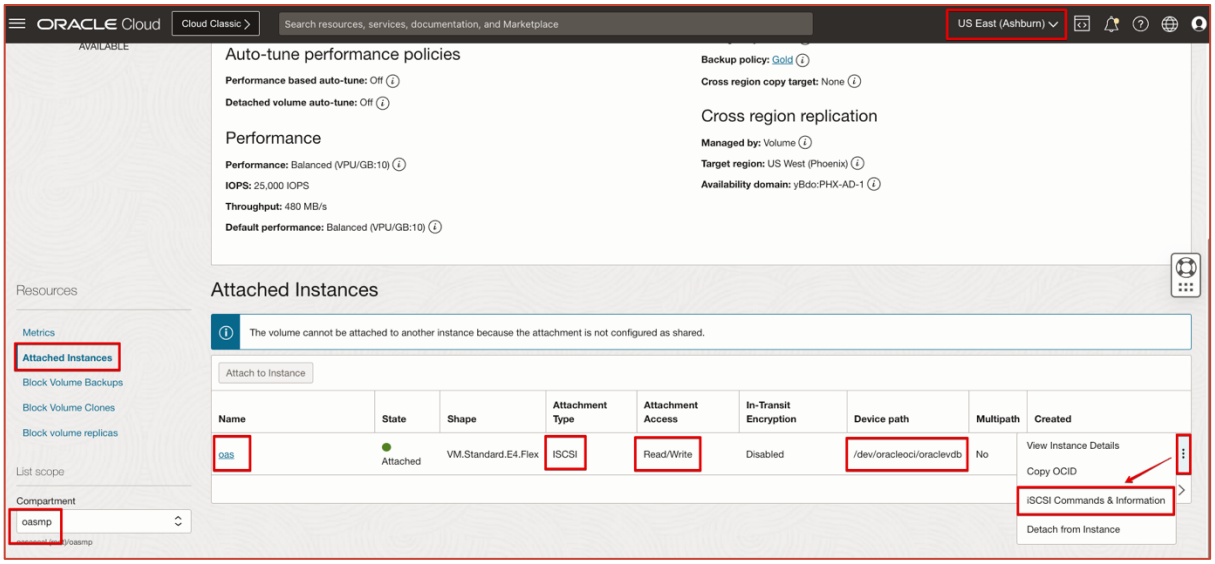
`lsblk`

```
[root@oas opc]# lsblk
NAME                          MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sda                             8:0    0   700G  0 disk
├─sda4                          8:4    0   100G  0 part
│ └─vg_app-vg_app--lv_app     252:0    0   100G  0 lvm  /u01/app
├─sda2                          8:2    0     8G  0 part [SWAP]
├─sda5                          8:5    0 491.8G  0 part
│ └─vg_data-vg_data--lv_data 252:1    0 491.8G  0 lvm  /u01/data
├─sda3                          8:3    0   100G  0 part /
└─sda1                          8:1    0   200M  0 part /boot/efi
[root@oas opc]#
```

Since the device path `/dev/oracleoci/oraclevda` is already used, we can select below device path "`/dev/oracleoci/oraclevdb`".

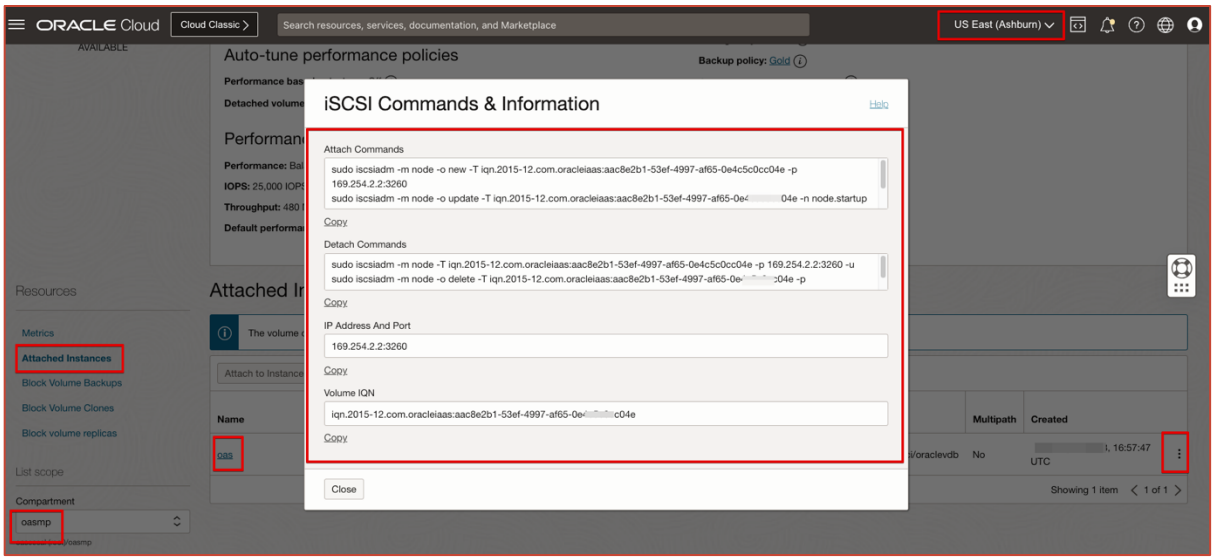
Click on Attach.





Select the **Actions** menu and click on the **iSCSI commands & Information**.

NOTE: If you chose the Attachment type as Paravirtualized, you need not run the iSCSI commands.



Attach commands should be run on the Target OAS compute instance.

```
[root@oas opc]# sudo iscsiadm -m node -o new -T iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e -p 169.254.2.2:3260
New iSCSI node [tcp:[hw=,ip=,net_if=,iscsi_if=default] 169.254.2.2,3260,-1 iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e] added
[root@oas opc]#
[root@oas opc]# sudo iscsiadm -m node -o update -T iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e -n node.startup -v automatic
[root@oas opc]#
[root@oas opc]# sudo iscsiadm -m node -T iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e -p 169.254.2.2:3260 -l
Logging in to [iface: default, target: iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e, portal: 169.254.2.2,3260] (multiple)
Login to [iface: default, target: iqn.2015-12.com.oracleiaas:aac8e2b1-53ef-4997-af65-0e4c5c0cc04e, portal: 169.254.2.2,3260] successful.
[root@oas opc]#
```

Run the command to check the attachment.

`lsblk`

```
[root@oas opc]#
[root@oas opc]# lsblk
NAME                          MAJ:MIN RM   SIZE RO TYPE MOUNTPOINT
sdb                             8:16   0     1T  0 disk
sda                             8:0    0   700G  0 disk
├─sda4                          8:4    0   100G  0 part
│ └─vg_app-vg_app--lv_app     252:0    0   100G  0 lvm  /u01/app
├─sda2                          8:2    0     8G  0 part [SWAP]
├─sda5                          8:5    0 491.8G  0 part
│ └─vg_data-vg_data--lv_data  252:1    0 491.8G  0 lvm  /u01/data
├─sda3                          8:3    0   100G  0 part /
└─sda1                          8:1    0   200M  0 part /boot/efi
[root@oas opc]#
```

`fdisk -l`

```
[root@oas opc]# fdisk -l
WARNING: fdisk GPT support is currently new, and therefore in an experimental phase. Use at your own discretion.

Disk /dev/sda: 751.6 GB, 751619276800 bytes, 1468006400 sectors
  .config          2023-04-24 05:38   opc   opc   drwxrwxr-x
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes
Disk label type: gpt
Disk identifier: C964E8FC-5212-4DFD-9771-F2F8D1E5EE86


#         Start          End    Size  Type            Name
 1        2048       411647    200M  EFI System      EFI System Partition
 2      411648     17188863      8G  Linux swap
 3    17188864    226904063    100G  Linux filesyste
 4   226904064    436619263    100G  Microsoft basic primary
 5   436619264   1468004351  491.8G  Microsoft basic primary

Disk /dev/mapper/vg_app-vg_app--lv_app: 107.4 GB, 107369988096 bytes, 209707008 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes


Disk /dev/mapper/vg_data-vg_data--lv_data: 528.1 GB, 528067067904 bytes, 1031380992 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes


Disk /dev/sdb: 1099.5 GB, 1099511627776 bytes, 2147483648 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes
```

`ll /dev/oracleoci/oraclevd*`

```
[root@oas opc]# ll /dev/oracleoci/oraclevd*
lrwxrwxrwx. 1 root root 6 Sep  5 20:22 /dev/oracleoci/oraclevda -> ../sda
lrwxrwxrwx. 1 root root 7 Sep  5 20:22 /dev/oracleoci/oraclevda1 -> ../sda1
lrwxrwxrwx. 1 root root 7 Sep  5 20:22 /dev/oracleoci/oraclevda2 -> ../sda2
lrwxrwxrwx. 1 root root 7 Sep  5 20:22 /dev/oracleoci/oraclevda3 -> ../sda3
lrwxrwxrwx. 1 root root 7 Sep  5 20:22 /dev/oracleoci/oraclevda4 -> ../sda4
lrwxrwxrwx. 1 root root 7 Sep  5 20:22 /dev/oracleoci/oraclevda5 -> ../sda5
lrwxrwxrwx. 1 root root 6 Sep  6 17:20 /dev/oracleoci/oraclevdb -> ../sdb
[root@oas opc]#
```

`/dev/sdb` is created as `xfs` file system, change it to `ext4` file system.

Run the command: `mkfs.ext4 /dev/sdb`

```
[root@oas u01]# mkfs.ext4 /dev/sdb
mke2fs 1.45.4 (23-Sep-2019)
Discarding device blocks: done
Creating filesystem with 268435456 4k blocks and 67108864 inodes
Filesystem UUID: f402aa8f-beaf-4bc9-ba16-a1bade079e36
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000, 7962624, 11239424, 20480000, 23887872, 71663616, 78675968,
        102400000, 214990848

Allocating group tables: done
Writing inode tables: done
Creating journal (262144 blocks): done
Writing superblocks and filesystem accounting information: done

[root@oas u01]#
```

Check the file system, run the command: `sudo blkid`

```
[root@oas u01]# sudo blkid
/dev/sda3: UUID="544006b2-b9e2-4a20-8fc3-9c9857d2f741" TYPE="xfs" PARTUUID="c8d76213-0a0a-4d29-9f5f-29b5c05847f2"
/dev/sda1: SEC_TYPE="msdos" UUID="6AA8-4D0D" TYPE="vfat" PARTLABEL="EFI System Partition" PARTUUID="11d0e5a8-1560-4e2
b-9c25-3e040e8f6073"
/dev/sda2: UUID="04bcf4b0-6498-4157-8d46-cefd16d0079c" TYPE="swap" PARTUUID="ba42ad6a-9ebc-444f-9b06-0d8d97173961"
/dev/sda4: UUID="zQP7wh-ylKM-NXQ3-QSzb-xv6V-5cJG-enXotK" TYPE="LVM2_member" PARTLABEL="primary" PARTUUID="2a5a43cd-1d
df-43f9-b32a-5abf20408daf"
/dev/sda5: UUID="nh8Sx0-Gn8G-98hF-r5OB-s22F-vg6y-fQMIlr" TYPE="LVM2_member" PARTLABEL="primary" PARTUUID="d924ff91-f0
e3-41e8-89b0-10cfddac5b1b"
/dev/mapper/vg_app-vg_app--lv_app: UUID="c8e08d0d-6431-47c8-859a-a3a9d6cde4b7" TYPE="ext4"
/dev/mapper/vg_data-vg_data--lv_data: UUID="8751d458-3767-47e7-bcfb-17e0db58fb8b" TYPE="ext4"
/dev/sdb: UUID="f402aa8f-beaf-4bc9-ba16-a1bade079e36" TYPE="ext4"
[root@oas u01]#
```

As root user

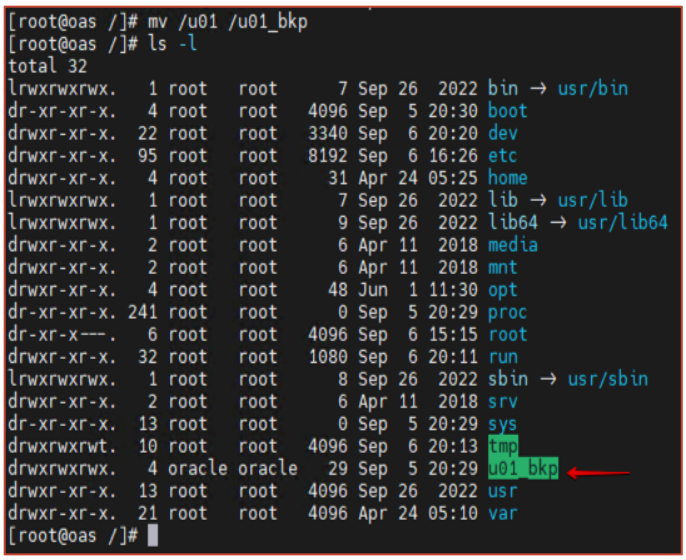
```
cd /
```

```
ls -l
```

```
[root@oas /]# ls -l
total 36
lrwxrwxrwx.   1 root   root      7 Sep 26  2022 bin -> usr/bin
dr-xr-xr-x.   4 root   root   4096 Sep  5 20:22 boot
drwxr-xr-x.  22 root   root   3340 Sep  6 17:20 dev
drwxr-xr-x.  95 root   root   8192 Sep  6 17:36 etc
drwxr-xr-x.   4 root   root     31 Apr 24 05:25 home
lrwxrwxrwx.   1 root   root      7 Sep 26  2022 lib -> usr/lib
lrwxrwxrwx.   1 root   root      9 Sep 26  2022 lib64 -> usr/lib64
drwxr-xr-x.   2 root   root      6 Apr 11  2018 media
drwxr-xr-x.   2 root   root      6 Apr 11  2018 mnt
drwxr-xr-x.   4 root   root     48 Jun  1 11:30 opt
dr-xr-xr-x. 241 root   root      0 Sep  5 20:22 proc
dr-xr-x---.   6 root   root   4096 Sep  6 16:38 root
drwxr-xr-x.  32 root   root   1080 Sep  6 17:16 run
lrwxrwxrwx.   1 root   root      8 Sep 26  2022 sbin -> usr/sbin
drwxr-xr-x.   2 root   root      6 Apr 11  2018 srv
dr-xr-xr-x.  13 root   root      0 Sep  5 20:22 sys
drwxrwxrwt.  17 root   root   4096 Sep  6 15:06 tmp
drwxrwxrwx.   4 oracle oracle   29 Sep  5 20:22 u01
drwxr-xr-x.  13 root   root   4096 Sep 26  2022 usr
drwxr-xr-x.  21 root   root   4096 Apr 24 05:10 var
```

Rename the `/u01` folder to `/u01_bkp`

```
mv /u01 /u01_bkp
```



Create a folder `/u01` and mount the `/dev/sdb` path which is the path due to attaching the Block volume.

As root user

```
mkdir /u01
```

Take backup of `/etc/fstab` file.

```
cp /etc/fstab /etc/fstab_orig
```

Edit the `/etc/fstab` and add the line to mount the path

Change the existing mount points

From:

```
/dev/vg_app/vg_app-lv_app /u01/app
```

```
/dev/vg_data/vg_data-lv_data /u01/data
```

To:

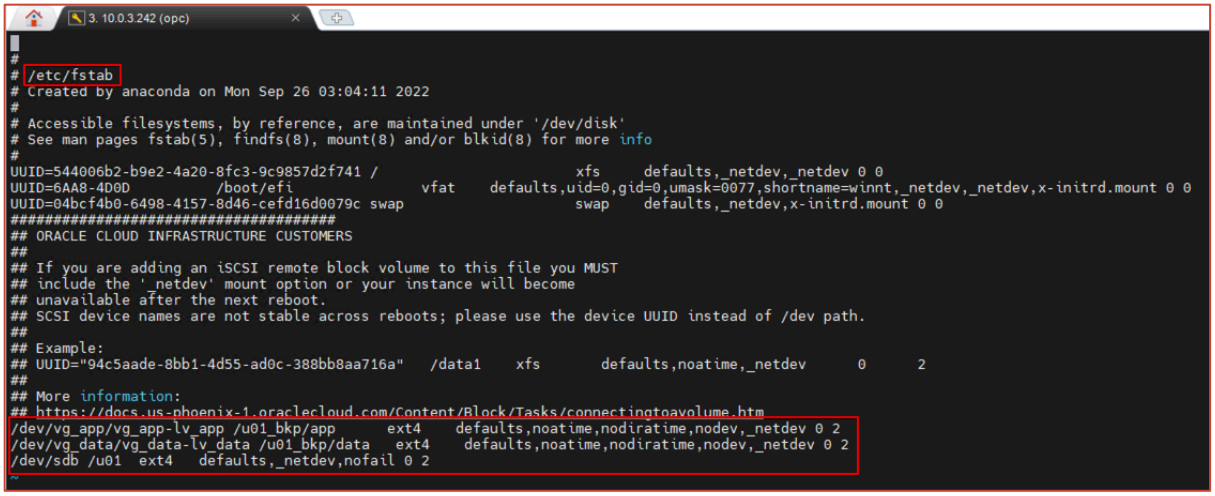
```
/dev/vg_app/vg_app-lv_app /u01_bkp/app
```

```
/dev/vg_data/vg_data-lv_data /u01_bkp/data
```

Add new line to mount the attached block volume device path `/dev/sdb` as `/u01`

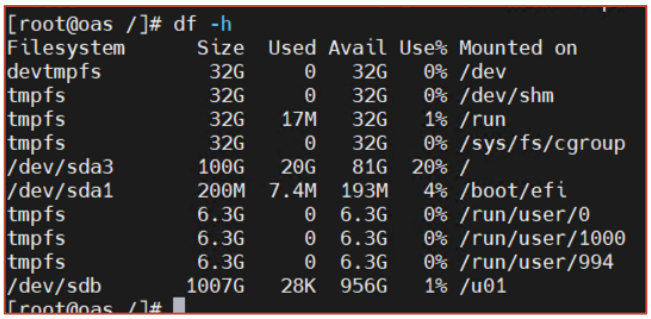
`fdisk -l` command shows that the attached path as `/dev/sdb`

```
/dev/sdb /u01 ext4 defaults,_netdev,nofail 0 2
```




```
sudo mount -a
```

```
df -h
```

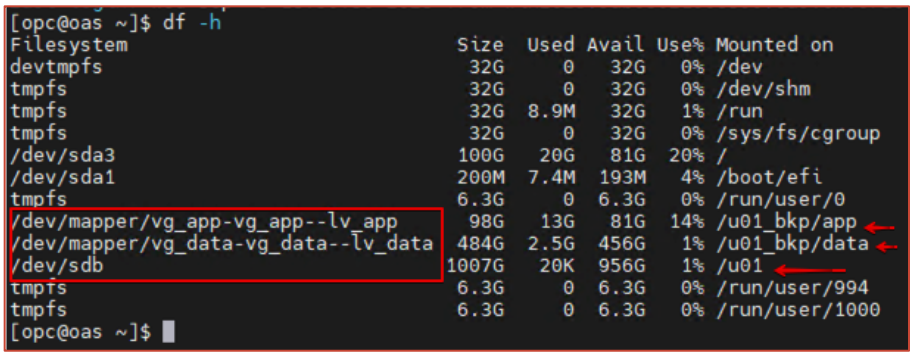


Reboot the OAS compute instance either from the ssh terminal or from the OCI console

```
reboot -f
```

After restart, check the mount point.

```
df -h
```




```
chown -R oracle:oracle /u01
```

```
chmod 777 /u01
```

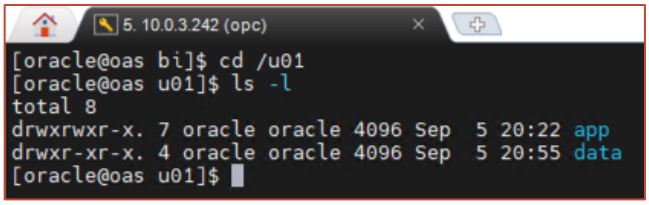
Copy the app and data folder from `/u01_bkp` to `/u01`

```
cd /u01_bkp
```

```
cp -rp * /u01
```

```
cd /u01
```

```
ls -l
```



Start the services in the primary OAS instance and test the access of the OAS.

After the test, stop all services in the OCI primary (home) region OAS instance.

Since the primary (Ashburn) block volume oas2023bv is attached to the primary OAS instance and the app and data folders are copied from the /u01_bkp to /u01, the block volume has the data.

The source block volume oas2023bv continues to replicate to the block volume replica in the OCI DR region, for example, Phoenix.

In the Oracle Cloud Infrastructure DR Region (Phoenix)

Create a new Block Volume from the Replica

Using the block volume replica, create a new block volume by activating the replica and attach it to the OAS compute instance.

The source block volume continues to replicate the block volume replica, which is created from the source block volume.

NOTE: If new data is created in the source block volume, it will be replicated continuously in the block volume replica.

Activating the block volume replica creates a point-in-time copy of the block volume replica as a new block volume.

In the case of OAS with clustered nodes, create the SSD with nfs mount. For more details, see Mounting File Systems and Mounting OCI File Storage.

NOTE: The source block volume and the new block volume that you copied from the replica are now two different block volumes.

NOTE: If the source block volume of the primary OAS instance changes, you need to detach the existing block volume from the OAS DR instance, create a new block volume from the replica, and attach it to the OAS DR instance.

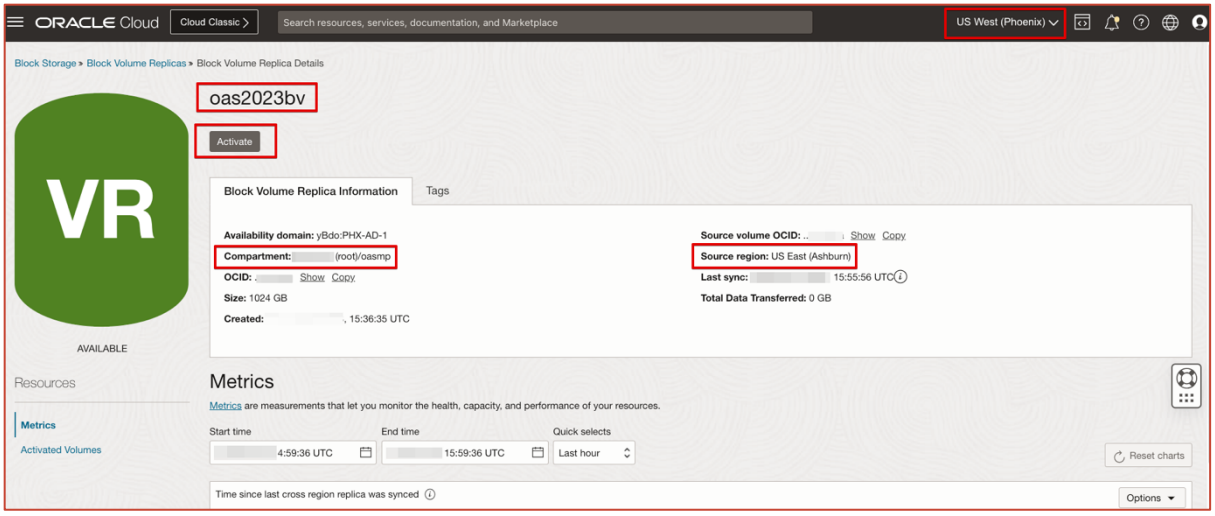
NOTE: For any changes in the OAS DR instance during the DR, you need to replicate the block volume on the DR instance, create a new block volume from the replica, and attach it to the primary OAS compute instance.

Activate the Block Volume Replica to create a Block volume from the replica.

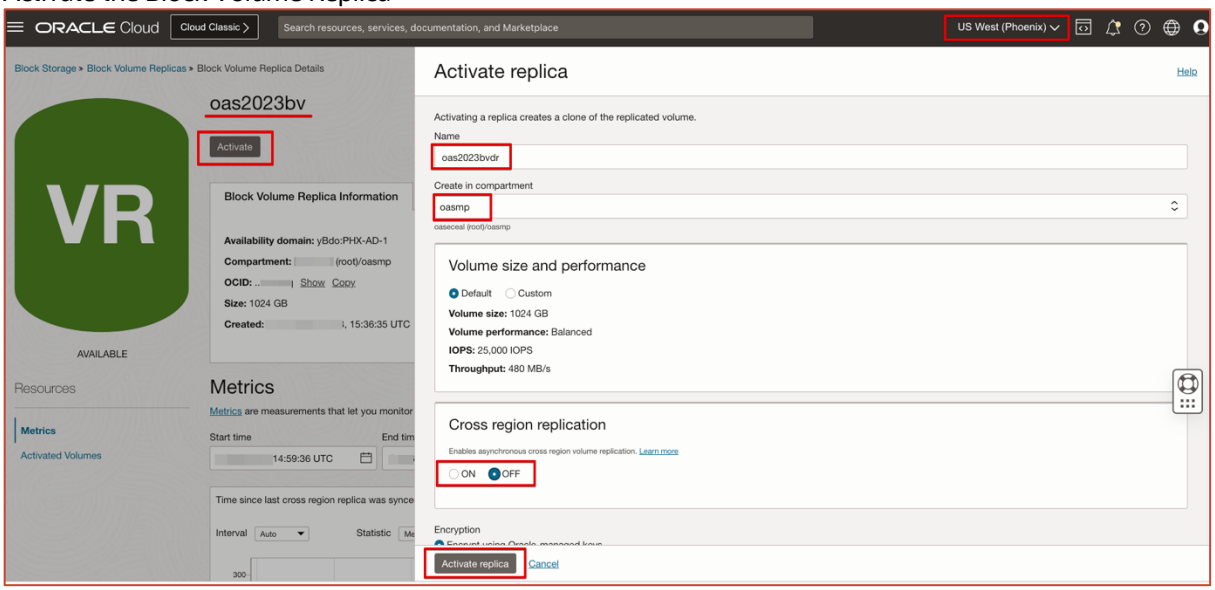
Sign in to the OCI console and change the region to OCI's DR region, for example, Phoenix.

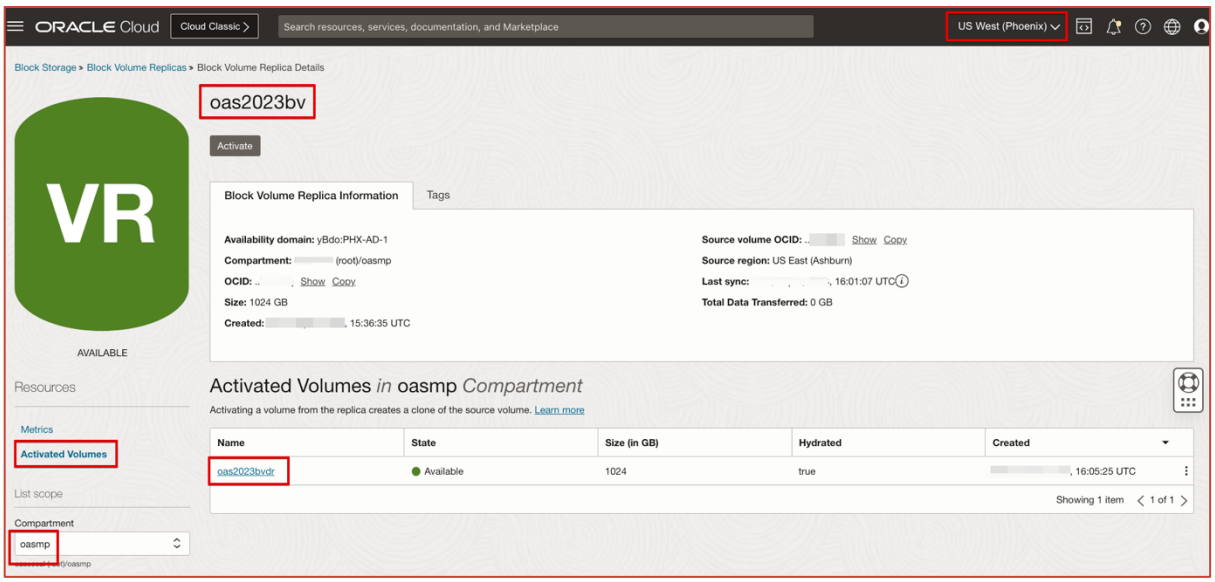
Navigate to the Block Volume Replicas.

Select the compartment, for example, oasmp.



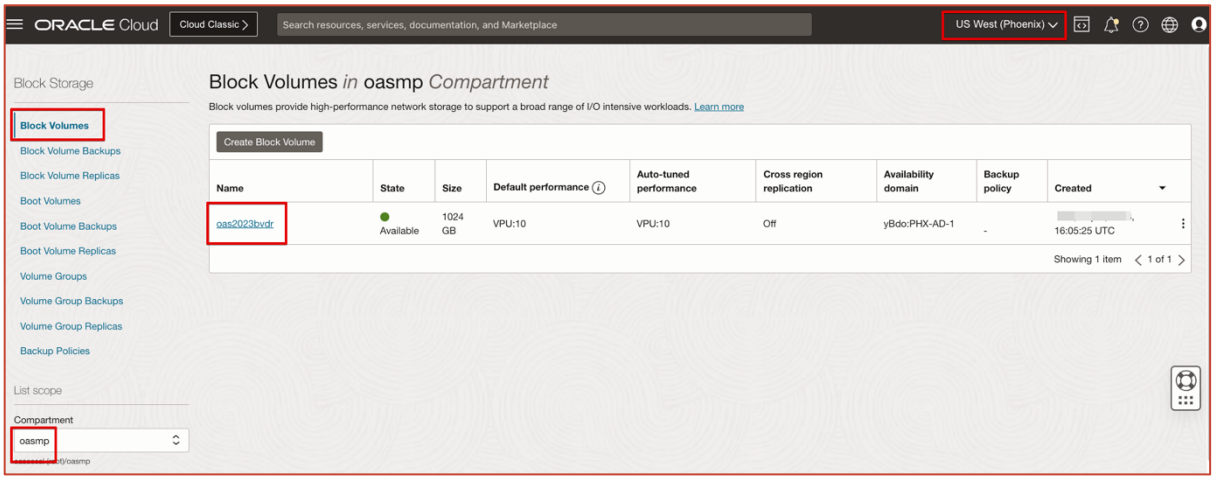
Activate the Block Volume Replica





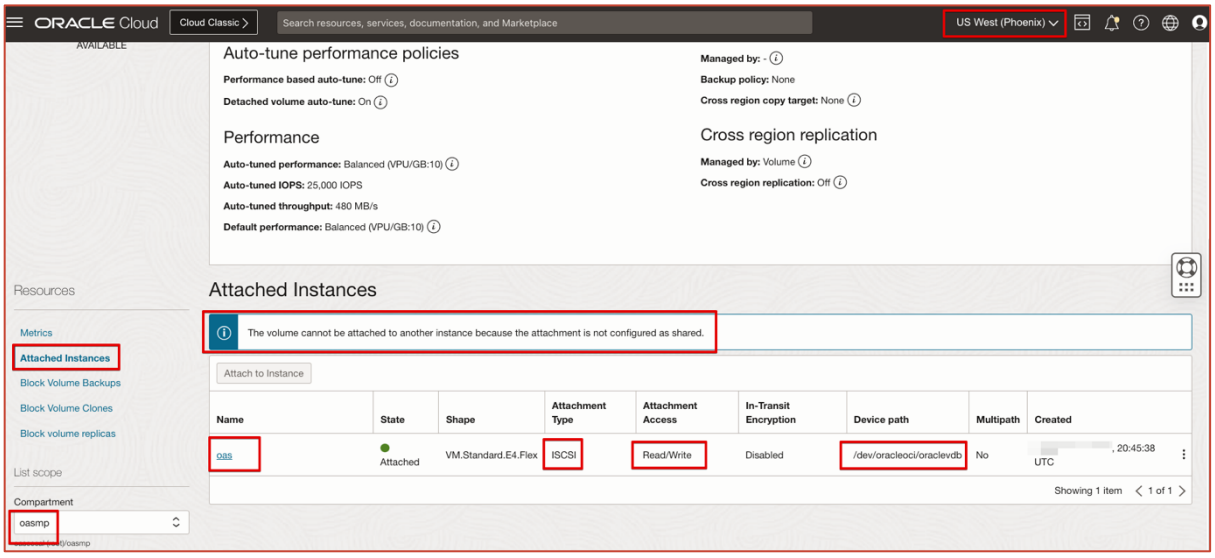
NOTE: If new data is created in the source block volume, it will get replicated to the block volume replica continuously.

Activating the Block Volume Replica, the point-in-time copy of the block volume replica is created as a new Block Volume and should be listed in the available Block Volumes.



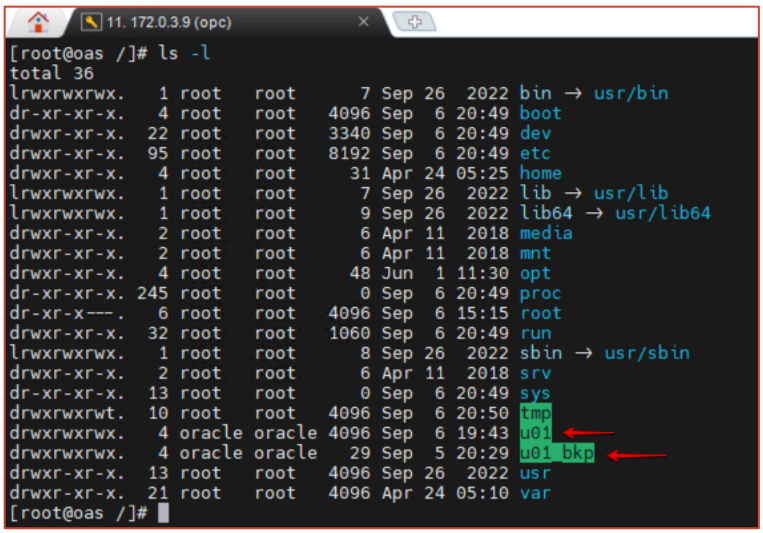
Attach the Block Volume

Repeat the steps to Attach the Block volume to the OAS DR instance.



Block volume attachment to the DR OAS compute instance is successful.

Since we have a single-node OAS environment, we selected the Block volume without a shareable option, so we cannot attach the same volume to another instance again.



Reboot the compute instance.

Check the mount points /u01

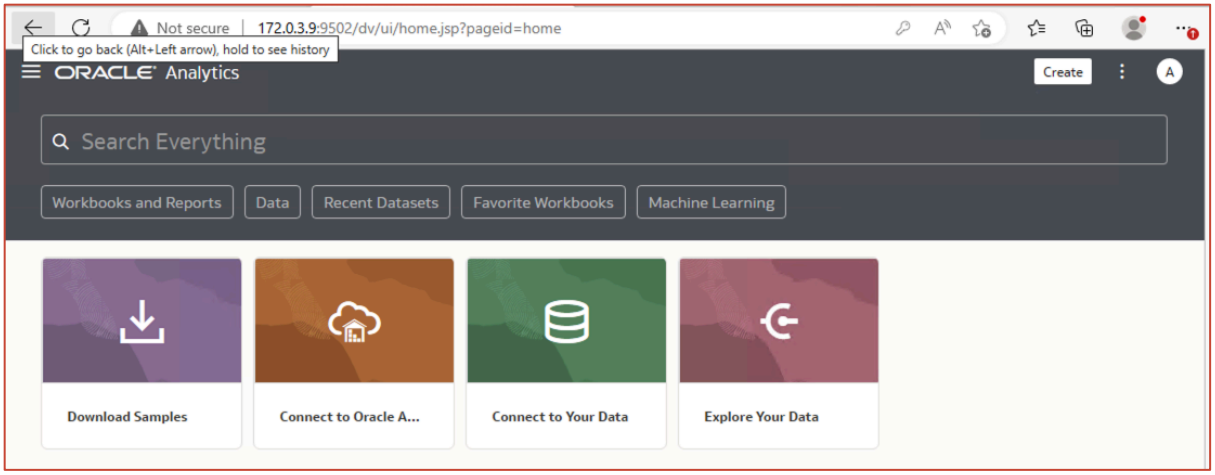
The domain home configured in the primary OAS instance is available in the DR OAS instance.

NOTE: If you need the latest updated data from the source block volume since it gets continuously replicated to the block volume replica, repeat the steps to activate the replica to create a new block volume and attach it to the OAS DR compute instance.

If needed, you can automate these steps using the OCI CLI and bash scripts.

Switchover the DBCS instance in the OCI DR region from Standby to Primary.

Start the services in the DR OAS instance.



NOTE: Use the OAS DR instance only for consuming tasks and don't create new reports or upload new Datasets in the OAS DR instance, as the DR block volume needs to be replicated to the primary region, and a new block volume needs to be created and attached to the primary OAS instance.

NOTE: The source block volume and the new block volume that you copied from the replica are now two different block volumes.

NOTE: For any changes in the source block volume of the primary OAS instance, you need to detach the existing block volume from the OAS DR instance, create a new block volume from the replica, and attach it to the OAS DR instance.

NOTE: For any changes in the OAS DR instance during the DR, you need to replicate the block volume on the DR instance, create a new block volume from the replica, and attach it to the primary OAS compute instance.

If you need point-to-point replicated content (with a delay) from Source to DR, use RSYNC or FPSYNC to copy files from Region to Region.

Summary

Here you have understood the steps to create a block volume and attach it to the OAS compute instance.
You also covered the steps to replicate the block volume, create a new block volume from the replica, and attach it to the DR OAS compute instance.

You also know the limitations of the block volume replication, so use the DR OAS instance for DR availability and not create new objects in the OAS instance.

If you have created new objects in the DR OAS instance, you may need to replicate the DR block volume to the primary OAS block volume.

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