

Replacement of OSD-Compute UCS 240M4 - CPAR

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Introduction

This document describes the steps that are required to replace a faulty Object Storage Disk (OSD) - Compute server in an Ultra-M setup.

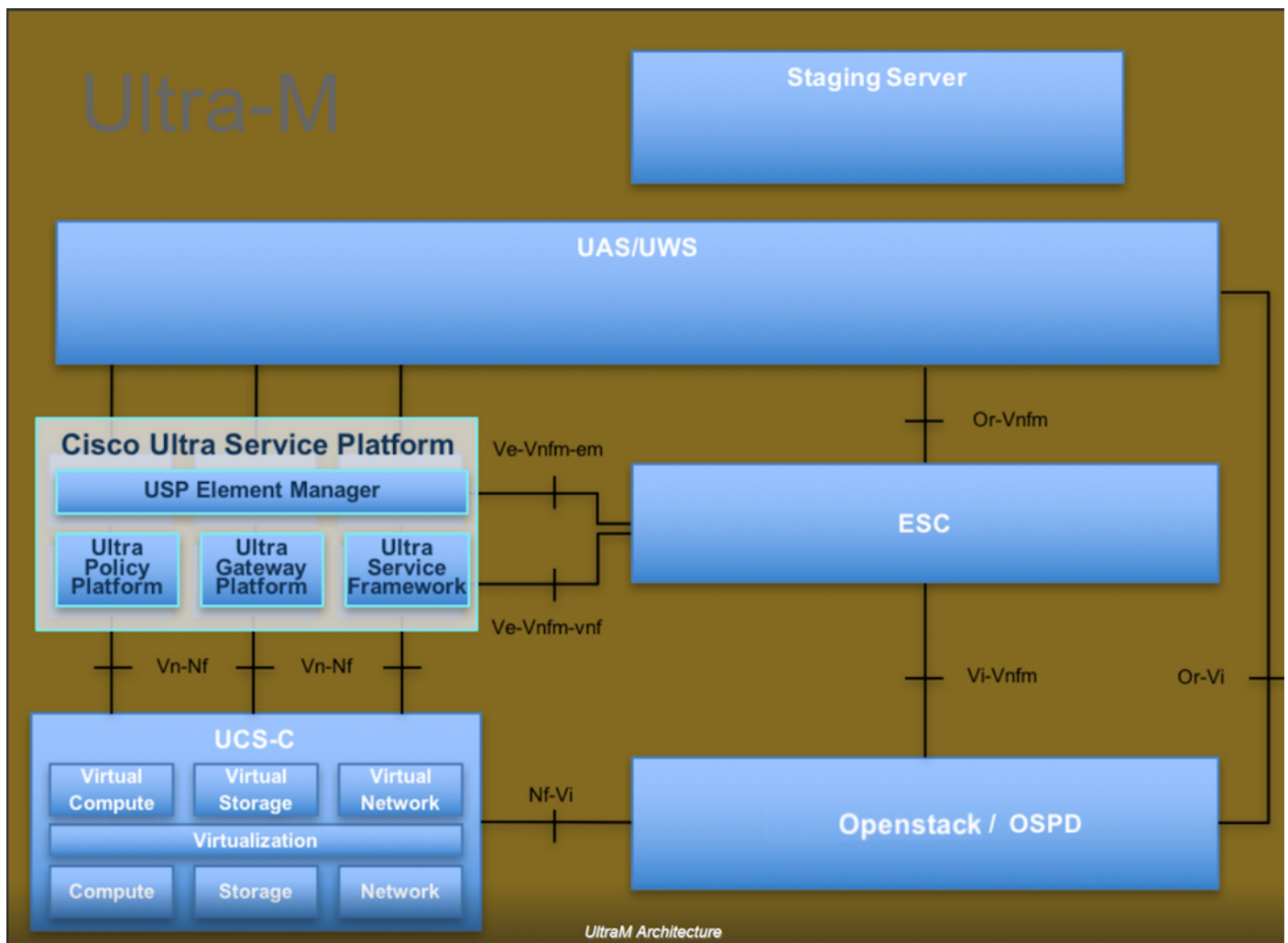
This procedure applies for an Openstack environment with NEWTON version where ESC does not manage CPAR and CPAR is installed directly on the Virtual Machine (VM) deployed on Openstack.

Background Information

Ultra-M is a pre-packaged and validated virtualized mobile packet core solution that is designed in order to simplify the deployment of VNFs. OpenStack is the Virtual Infrastructure Manager (VIM) for Ultra-M and consists of these node types:

- Compute
- OSD - Compute
- Controller
- OpenStack Platform - Director (OSPD)

The high-level architecture of Ultra-M and the components involved are depicted in this image:



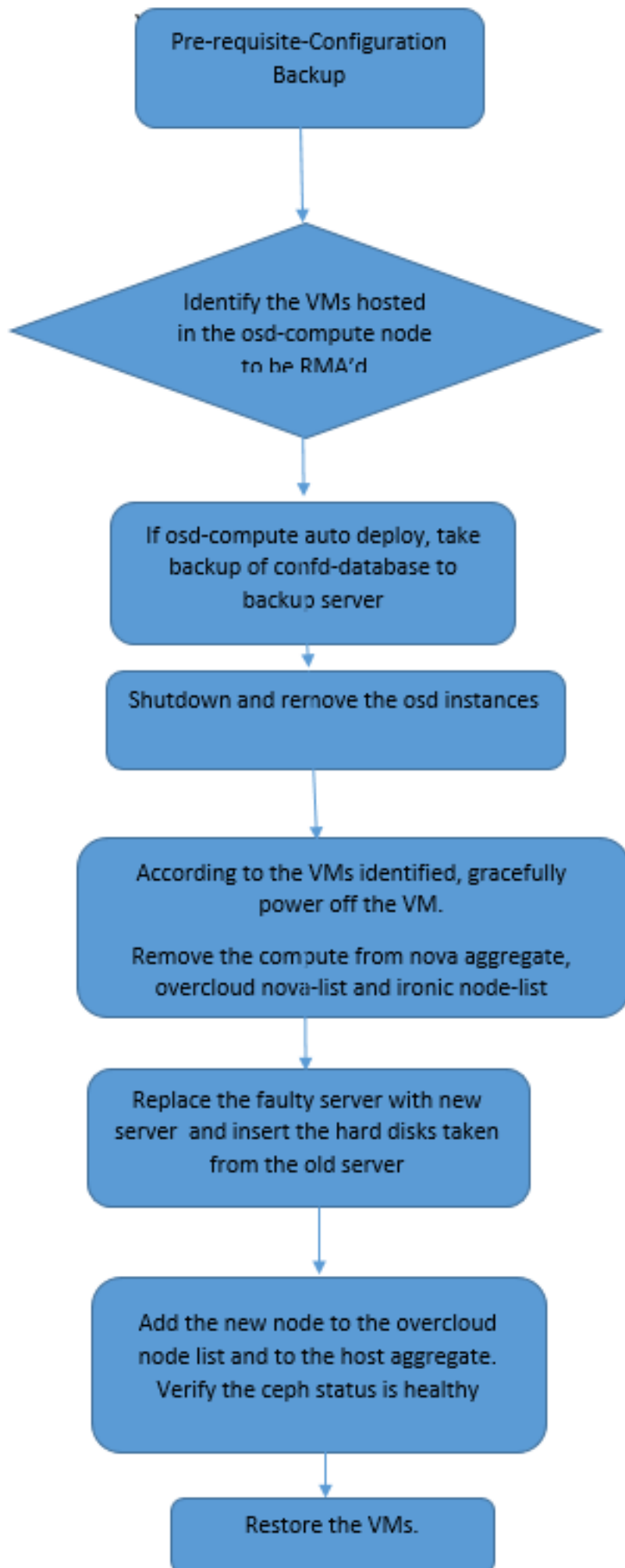
This document is intended for Cisco personnel who are familiar with Cisco Ultra-M platform and it details the steps required to be carried out at OpenStack and Redhat Operating System (OS).

Note: Ultra M 5.1.x release is considered in order to define the procedures in this document.

Abbreviations

MoP	Method of Procedure
OSD	Object Storage Disks
OSPD	OpenStack Platform Director
HDD	Hard Disk Drive
SSD	Solid State Drive
VIM	Virtual Infrastructure Manager
VM	Virtual Machine
EM	Element Manager
UAS	Ultra Automation Services
UUID	Universally Unique Identifier

Workflow of MoP



Backup

Before you replace a **Compute** node, it is important to check the current state of your Red Hat OpenStack Platform environment. It is recommended that you check the current state in order to avoid complications when the **Compute** replacement process is on. It can be achieved by this flow of replacement.

In case of recovery, Cisco recommends to take a backup of the OSPD database with the use of these steps:

```
[root@director ~]# mysqldump --opt --all-databases > /root/undercloud-all-databases.sql
[root@director ~]# tar --xattrs -czf undercloud-backup-`date +%F`.tar.gz /root/undercloud-all-databases.sql
/etc/my.cnf.d/server.cnf /var/lib/glance/images /srv/node /home/stack
tar: Removing leading `/' from member names
```

This process ensures that a node can be replaced without affecting the availability of any instances.

Note: Ensure that you have the snapshot of the instance so that you can restore the VM when needed. Follow the procedure on how to take snapshot of the VM.

1. Identify the VMs Hosted in the OSD-Compute Node.
2. Identify the VMs that are hosted on the server.

```
[stack@director ~]$ nova list --field name,host | grep osd-compute-0
| 46b4b9eb-ala6-425d-b886-a0ba760e6114 | AAA-CPAR-testing-instance | pod2-stack-compute-4.localdomain |
```

Note: In the output shown here, the first column corresponds to the Universally Unique Identifier (UUID), the second column is the VM name and the third column is the hostname where the VM is present. The parameters from this output are used in subsequent sections.

CPAR Application Shutdown

Step 1. Open any Secure Shell (SSH) client connected to the network and connect to the CPAR instance.

It is important not to shutdown all 4 AAA instances within one site at the same time, do it in a one by one fashion.

Step 2. In order to shut down the CPAR application, run the command:

```
/opt/CSC0ar/bin/arserver stop
```

A Message "Cisco Prime Access Registrar Server Agent shutdown complete." must show up.

Note: If a user left a Command Line Interface (CLI) session open, the **arserver stop** command won't work and this message is displayed.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

In this example, the highlighted process id 2903 needs to be terminated before CPAR can be stopped. If this is the case, run the command in order to terminate this process:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Then repeat Step 1.

Step 3. In order to verify that the CPAR application was indeed shutdown, run the command:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

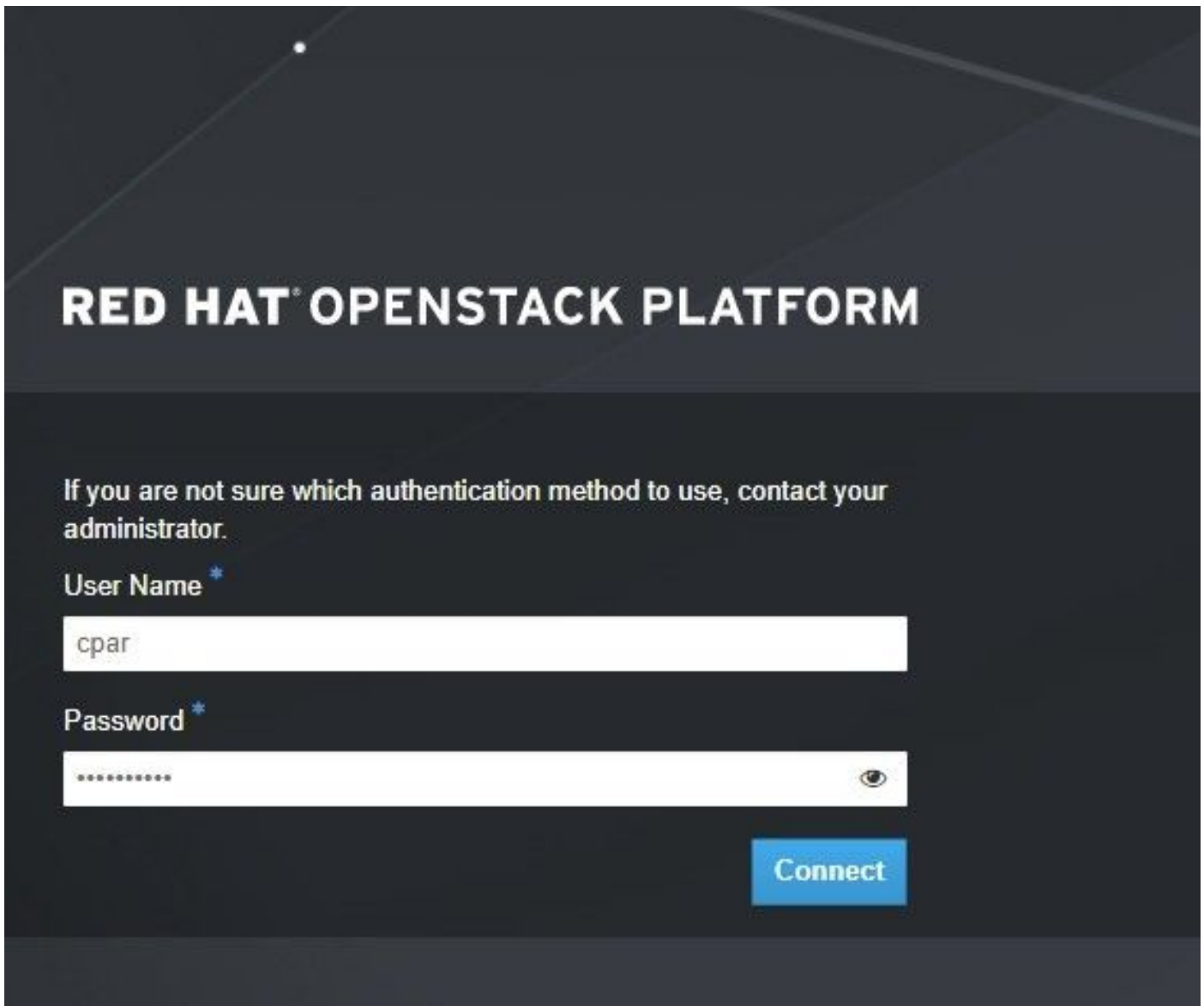
This messages must appear:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

VM Snapshot Task

Step 1. Enter the Horizon GUI website that corresponds to the Site (City) currently being worked on.

When you access Horizon, the screen observed is as shown in this image.



RED HAT® OPENSTACK PLATFORM

If you are not sure which authentication method to use, contact your administrator.

User Name *

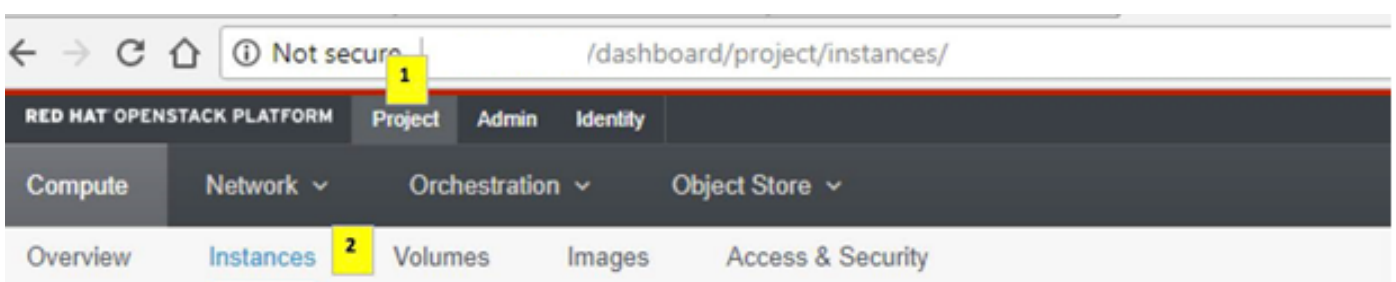
cpa

Password *

.....

Connect

Step 2. Navigate to **Project > Instances** as shown in this image.



If the user used was CPAR, then only the 4 AAA instances appear in this menu.

Step 3. Shut down only one instance at a time and repeat the whole process in this document. In order to shutdown the VM, navigate to **Actions > Shut Off Instance** as shown in the image and confirm your selection.



Step 4. Validate that the instance was indeed shut down by checking the Status = **Shutoff** and Power State = **Shut Down** as shown in this image.

Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
AAA-CPAR	-	Shutoff	AZ-dalaaa09	None	Shut Down	3 months, 2 weeks	Start Instance ▼

This step ends the CPAR shutdown process.

VM Snapshot

Once the CPAR VMs are down, the snapshots can be taken in parallel as they belong to independent computes.

The four QCOW2 files are created in parallel.

Take a snapshot of each AAA instance. (25 minutes -1 hour) (25 minutes for instances that used a qcow image as a source and 1 hour for instances that user a raw image as a source)

1. Login to POD's Openstack's Horizon GUI.
2. Once logged in, navigate to **Project > Compute > Instances** section on the top menu and look for the AAA instances as shown in this image.

RED HAT OPENSTACK PLATFORM Project Admin Identity Project ▼ Help cpar ▼

Compute Network ▼ Orchestration ▼ Object Store ▼

Overview Instances Volumes Images Access & Security

Project / Compute / Instances

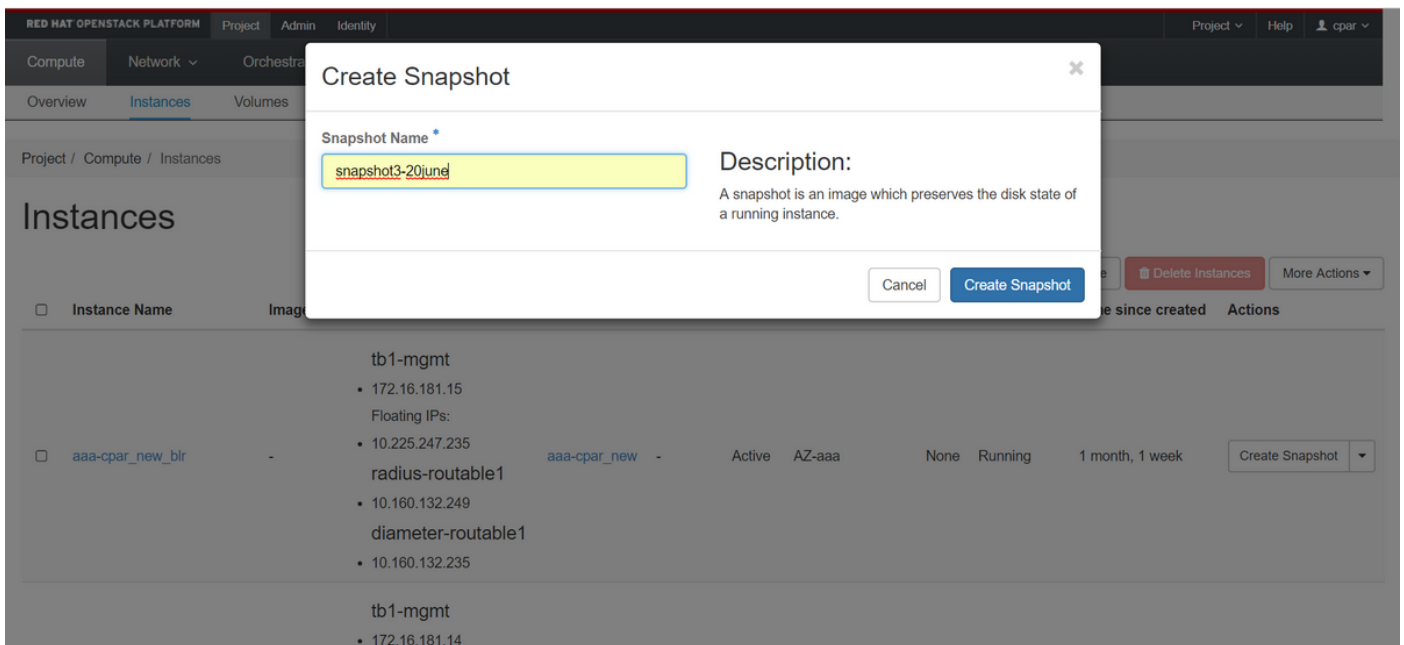
Instances

Instance Name = Filter Launch Instance Delete Instances More Actions ▼

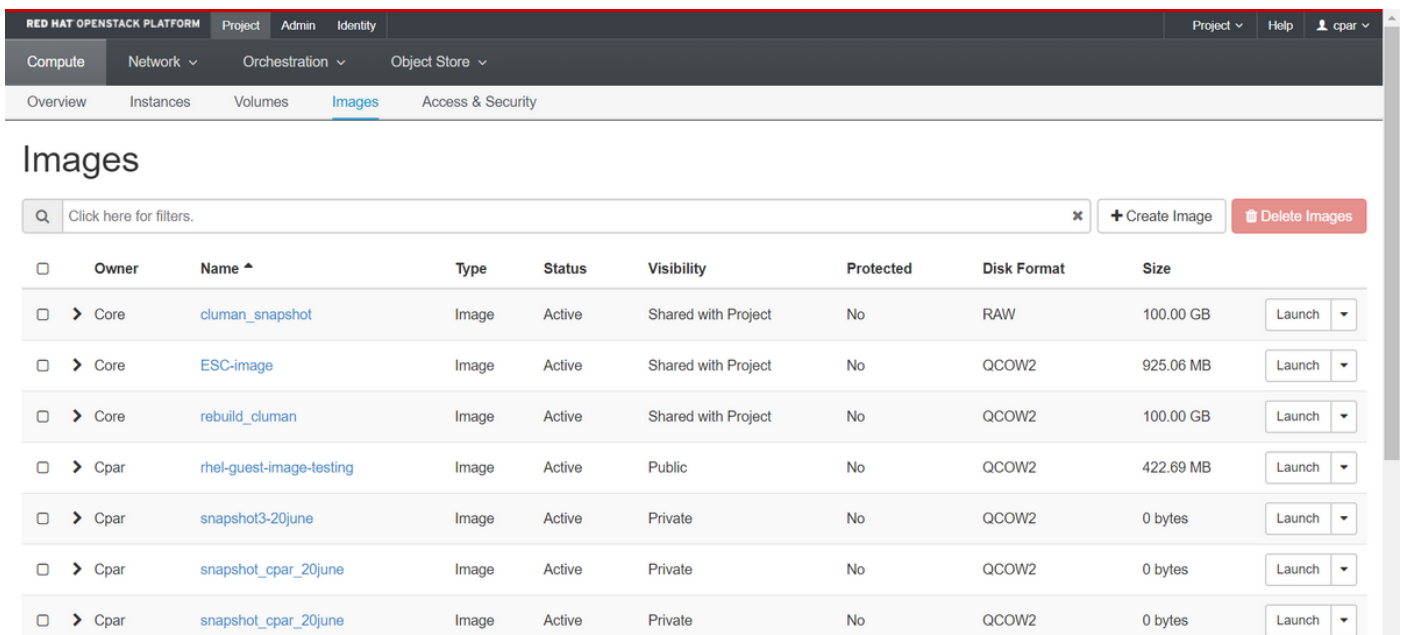
<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
<input type="checkbox"/>	aaa-cpar_new_blr	-	tb1-mgmt • 172.16.181.15 Floating IPs: • 10.225.247.235 radius-routable1 • 10.160.132.249 diameter-routable1 • 10.160.132.235 tb1-mgmt	aaa-cpar_new	-	Active	AZ-aaa	None	Running	1 month, 1 week	Create Snapshot ▼

10.225.247.214/dashboard/project/images/.../create/

3. Click **Create Snapshot** in order to proceed with snapshot creation (this needs to be executed on the corresponding AAA instance) as shown in this image.



4. Once the snapshot is executed, click **Images** and verify that all finish and report no problems as shown in this image.



5. The next step is to download the snapshot on a QCOW2 format and transfer it to a remote entity, in case the OSPD is lost during this process. In order to achieve this, identify the snapshot by running the command **glance image-list** at OSPD level.

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
2903 /opt/CSC0ar/bin/aregcmd -s
```

6. Once you identify the snapshot to be downloaded (the one marked in green), you can download it on a QCOW2 format with the command **glance image-download** as depicted.

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
```



```
2903 /opt/CSCOar/bin/aregcmd -s
```

- The **&** sends the process to background. It takes some time to complete this action, once it is done, the image can be located at **/tmp** directory.
- On sending the process to background, if connectivity is lost, then the process is also stopped.
- Run the command **disown -h** so that in case SSH connection is lost, the process still runs and finishes on the OSPD.

7. Once the download process finishes, a compression process needs to be executed as that snapshot might be filled with ZEROES because of processes, tasks and temporary files handled by the OS. The command to be used for file compression is **virt-sparsify**.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

This process can take some time (around 10-15 minutes). Once finished, the resulting file is the one that needs to be transferred to an external entity as specified on next step.

Verification of the file integrity is required, in order to achieve this, run the next command and look for the “corrupt” attribute at the end of its output.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- In order to avoid a problem where the OSPD is lost, the recently created snapshot on QCOW2 format needs to be transferred to an external entity. Before you start the file transfer, you have to check if the destination has enough available disk space, run the command **df -kh** in order to verify the memory space. One advice is to transfer it to another site's OSPD temporarily with the SFTP **sftp root@x.x.x.x**” where **x.x.x.x** is the IP of a remote OSPD. In order to speed up the transfer, the destination can be sent to multiple OSPDs. In the same way, you can run the command **scp *name_of_the_file*.qcow2 root@ x.x.x.x:/tmp** (where **x.x.x.x** is the IP of a remote OSPD) in order to transfer the file to another OSPD.

1. Identify the VMs Hosted in the OSD-Compute Node.
2. Identify the VMs that are hosted on the server.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

Note: In the output shown here, the first column corresponds to the Universally Unique Identifier (UUID), the second column is the VM name and the third column is the hostname where the VM is present. The parameters from this output are used in subsequent sections.

- Verify that CEPH has available capacity in order to allow a single OSD server to be removed.

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- Verify **ceph osd tree** status are up on the osd-compute server.

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- CEPH processes are active on the osd-compute server.

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- Disable and stop each ceph instance and remove each instance from osd and unmount the directory. Repeat for each ceph instance.

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- marked out osd.0.

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- removed item id 0 name 'osd.0' from crush map

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- updated

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

2903 /opt/CSCOar/bin/aregcmd -s

- removed osd.0

ERROR: You cannot shut down Cisco Prime Access Registrar while the
CLI is being used. Current list of running
CLI with process id is:

```
2903 /opt/CSCOar/bin/aregcmd -s
```

Or,

- **Clean.sh** script can be used for this task at once.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

After all the OSD processes have been migrated/deleted, the node can be removed from the overcloud.

Note: When CEPH is removed, VNF HD RAID goes into Degraded state but hd-disk must still be accessible.

Graceful Power Off

- **Power off Node**

1. In order to power off the instance: **nova stop <INSTANCE_NAME>**
2. You can see the instance name with the status shutoff.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- **Node Deletion**

The steps mentioned in this section are common irrespective of the VMs hosted in the **compute** node.

Delete **OSD-Compute Node** from the Service List.

- Delete the **compute** service from the service list:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- **openstack compute service delete <ID>**

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

Delete Neutron Agents

- Delete the old associated neutron agent and open vswitch agent for the **computeserver**:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- **openstack network agent delete <ID>**

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Delete from Ironic Database

- Delete a node from the ironic database and verify it:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- **nova show < compute -node> | grep hypervisor**

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- **ironic node-delete <ID>**

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Node deleted must not be listed now in ironic node-list.

Delete from Overcloud

- Create a script file named delete_node.sh with the contents as shown. Ensure that the templates mentioned are same as the ones used in the deploy.sh script used for the stack deployment:
- **delete_node.sh:**

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- Wait for the OpenStack stack operation to move to the COMPLETE state:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.    Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Install New Compute Node

- The steps in order to install a new UCS C240 M4 server and the initial setup steps can be referred from:

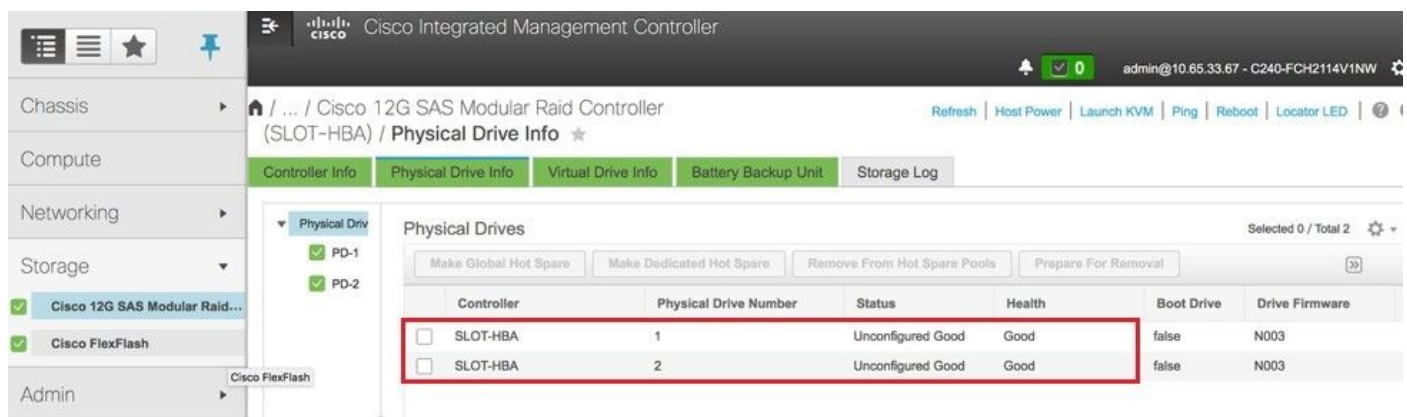
[Cisco UCS C240 M4 Server Installation and Service Guide](#)

- After the installation of the server, insert the hard disks in the respective slots as the old server.
- Log in to server with the use of the CIMC IP.
- Perform BIOS upgrade if the firmware is not as per the recommended version used previously. Steps for BIOS upgrade are given here:

[Cisco UCS C-Series Rack-Mount Server BIOS Upgrade Guide](#)

- Verify the status of Physical drives. It must be **Unconfigured Good**:

Navigate to **Storage > Cisco 12G SAS Modular Raid Controller (SLOT-HBA) > Physical Drive Info** as shown in this image.



- Create a virtual drive from the physical drives with RAID Level 1:

Navigate to **Storage > Cisco 12G SAS Modular Raid Controller (SLOT-HBA) > Controller Info > Create Virtual Drive from Unused Physical Drives** as shown in this image.

Cisco Integrated Management Controller

Create Virtual Drive from Unused Physical Drives

RAID Level: 1 ☐ Enable Full Disk Encryption

Create Drive Groups

Physical Drives Selected 2 / Total 2

ID	Size(MB)	Model	Interface	Type
<input checked="" type="checkbox"/> 1	1906394 MB	SEAGA...	HDD	SAS
<input checked="" type="checkbox"/> 2	1906394 MB	SEAGA...	HDD	SAS

Drive Groups

No data available

Virtual Drive Properties

Name: RAID1

Access Policy: Read Write

Read Policy: No Read Ahead

Cache Policy: Direct IO

Disk Cache Policy: Unchanged

Write Policy: Write Through

Strip Size (MB): 64k

Size: MB

Cisco Integrated Management Controller

Create Virtual Drive from Unused Physical Drives

RAID Level: 1 ☐ Enable Full Disk Encryption

Create Drive Groups

Physical Drives Selected 0 / Total 0

No data available

Drive Groups

☐ DG [1,2]

Virtual Drive Properties

Name:

Access Policy: Read Write

Read Policy: No Read Ahead

Cache Policy: Direct IO

Disk Cache Policy: Unchanged

Write Policy: Write Through

Strip Size (MB): 64k

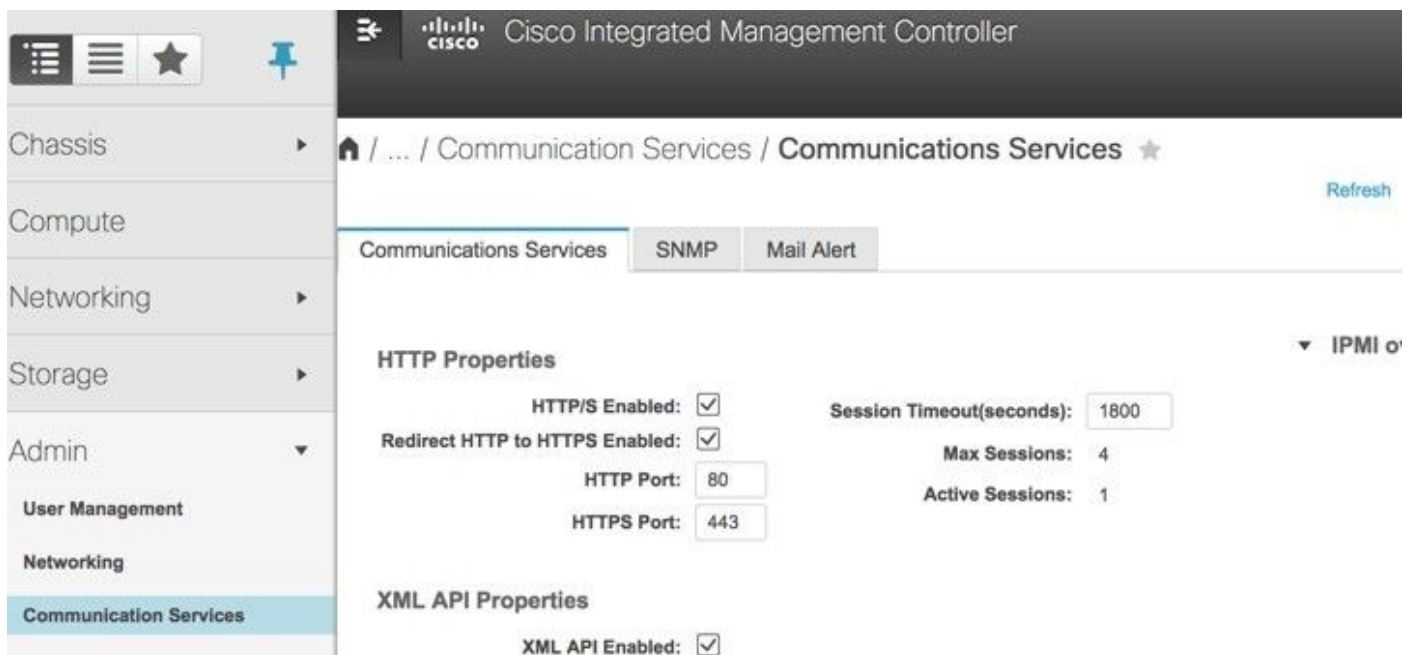
Size: 1906394 MB

- Select the VD and configure **Set as Boot Drive** as shown in the image.



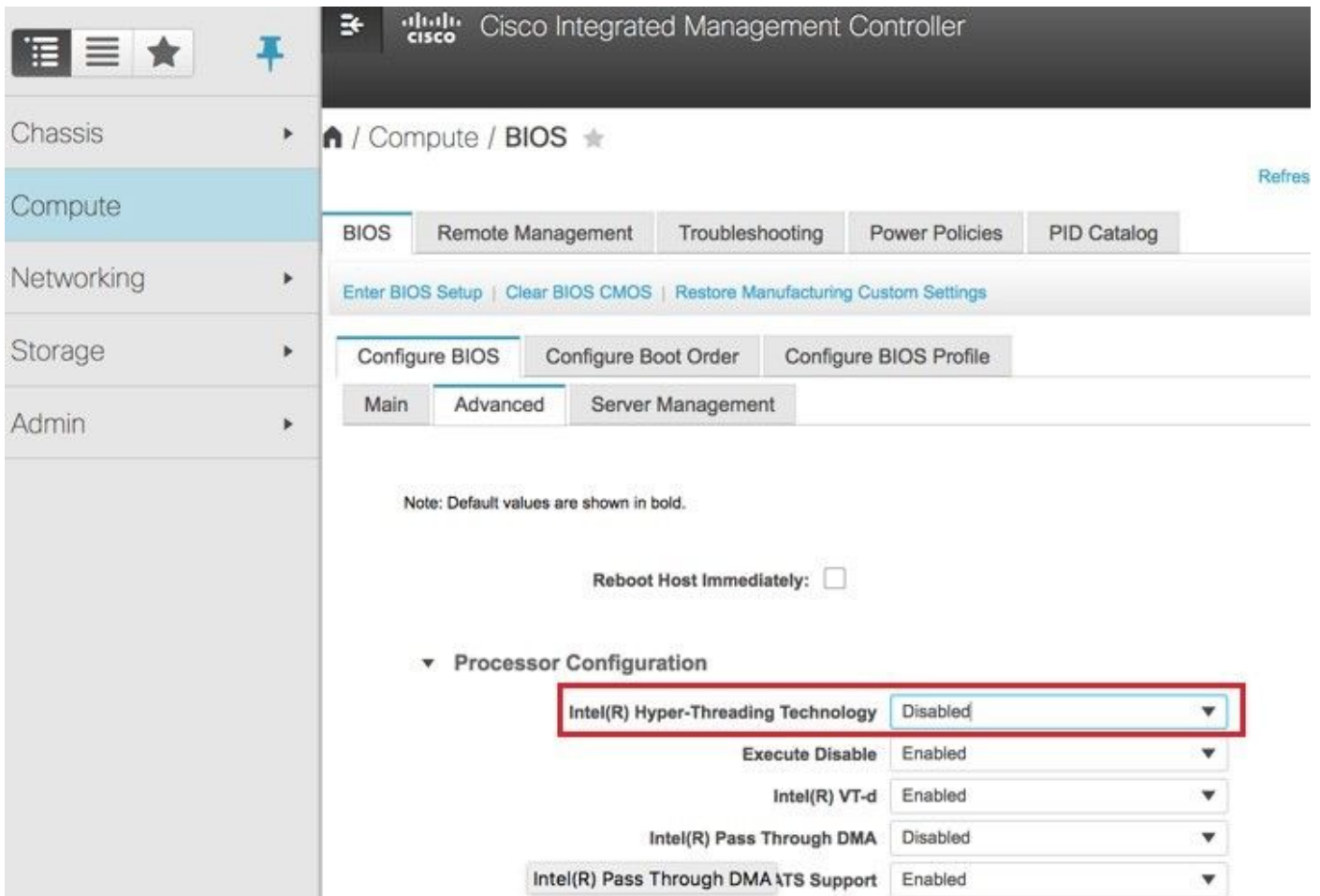
- Enable IPMI over LAN:

Navigate to **Admin > Communication Services > Communication Services** as shown in the image.



- Disable hyperthreading:

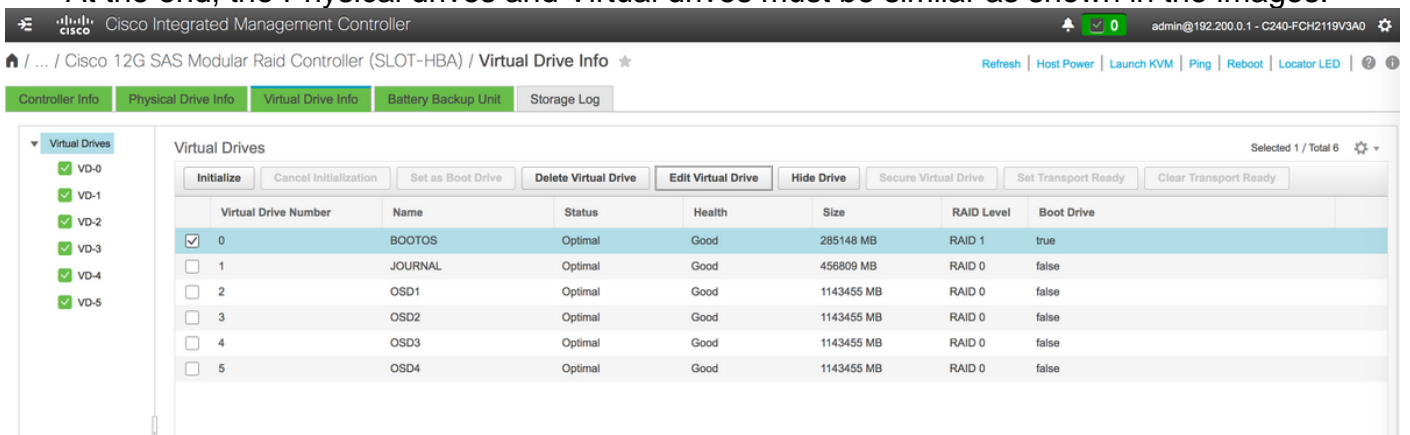
Navigate to **Compute > BIOS > Configure BIOS > Advanced > Processor Configuration** as shown in the image.



- Similar to BOOTOS VD created with physical drives 1 and 2, create four more virtual drives as:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.  Current list of running
            CLI with process id is:
2903 /opt/CSC0ar/bin/aregcmd -s
```

- At the end, the Physical drives and Virtual drives must be similar as shown in the images.



Controller	Physical Drive Number	Status	Health	Boot Drive	Drive Firmware	Coerced Size	Model	Type
<input type="checkbox"/> SLOT-HBA	1	Online	Good	false	5704	1143455 MB	TOSHIBA	HDD
<input type="checkbox"/> SLOT-HBA	2	Online	Good	false	5704	1143455 MB	TOSHIBA	HDD
<input type="checkbox"/> SLOT-HBA	3	Online	Good	false	CS01	456809 MB	ATA	SSD
<input type="checkbox"/> SLOT-HBA	7	Online	Good	false	N004	1143455 MB	SEAGATE	HDD
<input type="checkbox"/> SLOT-HBA	8	Online	Good	false	5704	1143455 MB	TOSHIBA	HDD
<input type="checkbox"/> SLOT-HBA	9	Online	Good	false	N004	1143455 MB	SEAGATE	HDD
<input type="checkbox"/> SLOT-HBA	10	Online	Good	false	N004	1143455 MB	SEAGATE	HDD

Note: The image shown here and the configuration steps mentioned in this section are with reference to the firmware version 3.0(3e) and there might be slight variations if you work on other versions.

Add New OSD-Compute Node to Overcloud

The steps mentioned in this section are common irrespective of the VM hosted by the **compute** node.

- Add **Compute** server with a different index.

Create an **add_node.json** file with only the details of the new **compute** server to be added. Ensure that the index number for the new **compute** server has not been used before. Typically, increment the next highest **compute** value.

Example: Highest prior was **osd-compute-17**, therefore, created **osd-compute-18** in case of 2-vnf system.

Note: Be mindful of the json format.

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- Import the json file.

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- Run **node introspection** with the use of the UUID noted from the previous step.

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

- Add IP addresses to **custom-templates/layout.yml** under **Osd Compute** IPs. In this case, by replacing the **osd-compute-0** you add that address to the end of the list for each type

OsdComputeIPs:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- Run **deploy.sh** script that was previously used to deploy the stack, in order to add the new **compute** node to the overcloud stack:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- Wait for the openstack stack status to be Complete:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- Check that new **compute** node is in the Active state:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- Log into new osd-compute server and check ceph processes. Initially, status is in HEALTH_WARN as ceph recovers.

-

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

- But after a short period (20 minutes), CEPH returns to a HEALTH_OK state.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
             CLI is being used.    Current list of running
             CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

Restore VMs

Recover Instance with Snapshot

It is possible to redeploy the previous instance with the snapshot taken in previous steps.

Step 1. (Optional) If there is no previous VM snapshot available then connect to the OSPD node where the backup was sent and SFTP the backup back to its original OSPD node. Using **sftp root@x.x.x.x** where x.x.x.x is the IP of the original OSPD. Save the snapshot file in **/tmp** directory.

Step 2. Connect to the OSPD node where the instance is redeployed.

```
Last login: wed May 9 06:42:27 2018 from 10.169.119.213
[root@daucs01-ospd ~]#
```

Source the environment variables with this command:

```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
```

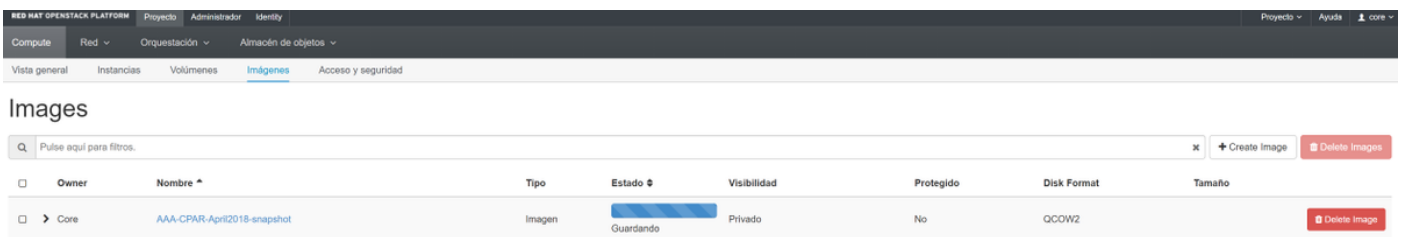
```
2903 /opt/CSCOar/bin/aregcmd -s
```

Step 3. In order to use the snapshot as an image it is necessary to upload it to horizon as such. Run the next command to do so.

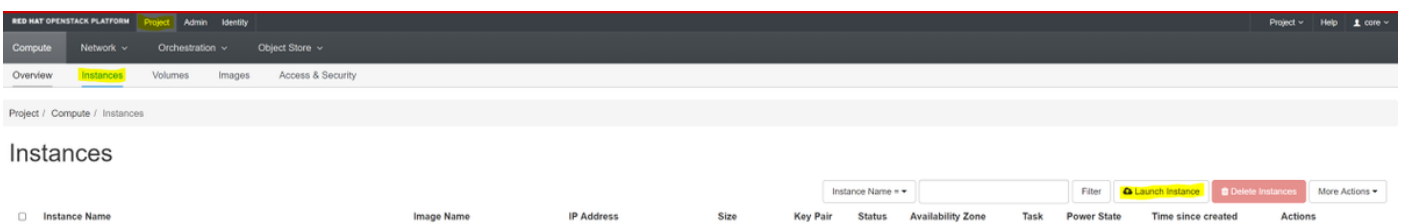
```
ERROR: You cannot shut down Cisco Prime Access Registrar while the
        CLI is being used. Current list of running
        CLI with process id is:
```

```
2903 /opt/CSCOar/bin/aregcmd -s
```

The process can be seen in horizon as shown in this image.



Step 4. In Horizon, navigate to **Project > Instances** and click **Launch Instance** as shown in this image.



Step 5. Enter the **Instance Name** and choose the **Availability Zone** as shown in this image.

Details

Source *

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Please provide the initial hostname for the instance, the availability zone where it will be deployed, and the instance count. Increase the Count to create multiple instances with the same settings.

Instance Name *

dalaaa10

Availability Zone

AZ-dalaaa10 ▼

Count *

1

Total Instances (100 Max)

27%

26 Current Usage

1 Added

73 Remaining

✕ Cancel

< Back

Next >

Launch Instance

Step 6. In the **Source** tab, choose the image in order to create the instance. In the **Select Boot Source** menu, select **image**, a list of images are shown, choose the one that was previously uploaded by clickin on its + sign and as shown in this image.

Details

Source

Flavor *

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Instance source is the template used to create an instance. You can use a snapshot of an existing instance, an image, or a volume (if enabled). You can also choose to use persistent storage by creating a new volume.

Select Boot Source

Image

Create New Volume

Yes

No

Allocated					
Name	Updated	Size	Type	Visibility	
> AAA-CPAR-April2018-snapshot	5/10/18 9:56 AM	5.43 GB	qcow2	Private	-

▼ Available 8

Select one

Q

Click here for filters.

✕

Name	Updated	Size	Type	Visibility	
> redhat72-image	4/10/18 1:00 PM	469.87 MB	qcow2	Private	+
> tmobile-pcrf-13.1.1.qcow2	9/9/17 1:01 PM	2.46 GB	qcow2	Public	+
> tmobile-pcrf-13.1.1.iso	9/9/17 8:13 AM	2.76 GB	iso	Private	+
> AAA-Temporary	9/5/17 2:11 AM	180.00 GB	qcow2	Private	+
> CPAR_AAATEMPLATE_AUGUST222017	8/22/17 3:33 PM	16.37 GB	qcow2	Private	+
> tmobile-pcrf-13.1.0.iso	7/11/17 7:51 AM	2.82 GB	iso	Public	+
> tmobile-pcrf-13.1.0.qcow2	7/11/17 7:48 AM	2.46 GB	qcow2	Public	+
> ESC-image	6/27/17 12:45 PM	925.06 MB	qcow2	Private	+

✕ Cancel

< Back

Next >

Launch Instance

Step 7. In the **Flavor** tab, choose the **AAA** flavor by clicking on the **+** sign as shown in this image.

Details

Source

Flavor

Networks *

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Flavors manage the sizing for the compute, memory and storage capacity of the instance.

Allocated

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public	
> AAA-CPAR	36	32 GB	180 GB	180 GB	0 GB	No	-

▼ Available 7 Select one

Click here for filters. ✕

Name	VCPUS	RAM	Total Disk	Root Disk	Ephemeral Disk	Public	
> pcrf-oam	10	24 GB	100 GB	100 GB	0 GB	Yes	+
> pcrf-pd	12	16 GB	100 GB	100 GB	0 GB	Yes	+
> pcrf-qns	10	16 GB	100 GB	100 GB	0 GB	Yes	+
> pcrf-arb	4	16 GB	100 GB	100 GB	0 GB	Yes	+
> esc-flavor	4	4 GB	0 GB	0 GB	0 GB	Yes	+
> pcrf-sm	10	104 GB	100 GB	100 GB	0 GB	Yes	+
> pcrf-cm	6	16 GB	100 GB	100 GB	0 GB	Yes	+

✕ Cancel

< Back

Next >

Launch Instance

Step 8. Finally, navigate to the **Network** tab and choose the networks that the instance needs by clicking on the + sign. For this case, select **diameter-soutable1**, **radius-routable1** and **tb1-mgmt** as shown in this image.

Details

Source

Flavor

Networks

Network Ports

Security Groups

Key Pair

Configuration

Server Groups

Scheduler Hints

Metadata

Networks provide the communication channels for instances in the cloud.

▼ Allocated 3 Select networks from those listed below.

	Network	Subnets Associated	Shared	Admin State	Status	
1	> radius-routable1	radius-routable-subnet	Yes	Up	Active	−
2	> diameter-routable1	sub-diameter-routable1	Yes	Up	Active	−
3	> tb1-mgmt	tb1-subnet-mgmt	Yes	Up	Active	−

▼ Available 16 Select at least one network

	Network	Subnets Associated	Shared	Admin State	Status	
>	Internal	Internal	Yes	Up	Active	+
>	pcrf_dap2_ldap	pcrf_dap2_ldap	Yes	Up	Active	+
>	pcrf_dap2_usd	pcrf_dap2_usd	Yes	Up	Active	+
>	tb1-orch	tb1-subnet-orch	Yes	Up	Active	+
>	pcrf_dap1_usd	pcrf_dap1_usd	Yes	Up	Active	+
>	pcrf_dap1_sy	pcrf_dap1_sy	Yes	Up	Active	+
>	pcrf_dap1_gx	pcrf_dap1_gx	Yes	Up	Active	+
>	pcrf_dap1_nap	pcrf_dap1_nap	Yes	Up	Active	+
>	pcrf_dap2_sy	pcrf_dap2_sy	Yes	Up	Active	+
>	pcrf_dap2_rx	pcrf_dap2_rx	Yes	Up	Active	+

Step 9. Finally, click on **Launch Instance** to create it. The progress can be monitored in Horizon is as shown in this image.

RED HAT OPENSTACK PLATFORM

Proyecto

Administrador

Identity

Proyecto

Ayuda

core

Sistema

Vista general

Hipervisores

Agregados de host

Instancias

Volumenes

Sabores

Imágenes

Redes

Routers

IPs flotantes

Predeterminados

Definiciones de los metadatos

Información del Sistema

Administrador / Sistema / Instancias

Instancias

Proyecto

Host

Nombre

Nombre de la imagen

Dirección IP

Tamaño

Estado

Tarea

Estado de energía

Tiempo desde su creación

Acciones

☐

Core

pod1-stack-compute-5.localdomain

dalaaa10

AAA-CPAR-April2018-snapshot

tb1-mgmt

• 172.16.181.11

radius-routable1

• 10.178.6.56

diameter-routable1

• 10.178.6.40

AAA-CPAR

Construir

Generando

Sin estado

1 minuto

Editar instancia

After a few minutes the instance will be completely deployed and ready for use.

		tb1-mgmt			
		• 172.16.181.16			
		IPs flotantes:			
		• 10.145.0.62			
		radius-routable1		AAA-CPAR	
		• 10.178.6.56		Activo	
		diameter-routable1		Ninguno	
		• 10.178.6.40		Ejecutando	
				8 minutos	
				Editar instancia	

Create and Assign Floating IP Address

A floating IP address is a routable address, which means that it's reachable from the outside of Ultra M/Openstack architecture, and it's able to communicate with other nodes from the network.

Step 1. In the Horizon top menu, navigate to **Admin > Floating IPs**.

Step 2. Click **Allocate IP to Project**.

Step 3. In the **Allocate Floating IP** window, select the **Pool** from which the new floating IP belongs, the **Project** where it is going to be assigned, and the new **Floating IP Address** itself.

For example:

Allocate Floating IP

Pool *

10.145.0.192/26 Management

Project *

Core

Floating IP Address (optional) ?

10.145.0.249

Description:
 From here you can allocate a floating IP to a specific project.

Cancel

Allocate Floating IP

Step 4. Click **Allocate Floating IP**.

Step 5. In the Horizon top menu, navigate to **Project > Instances**.

Step 6. In the **Action** column, click on the arrow that points down in the **Create Snapshot** button, a menu must be displayed. Select **Associate Floating IP** option.

Step 7. Select the corresponding floating IP address intended to be used in the **IP Address** field, and choose the corresponding management interface (eth0) from the new instance where this floating IP is going to be assigned in the **Port to be associated**. Refer the next image as an example of this procedure.

Manage Floating IP Associations

IP Address *

10.145.0.249

+

Port to be associated *

AAA-CPAR-testing instance: 172.16.181.17

Select the IP address you wish to associate with the selected instance or port.

Cancel

Associate

Step 8. Finally, click **Associate**.

Enable SSH

Step 1. In the Horizon top menu, navigate to **Project > Instances**.

Step 2. Click on the name of the instance/VM that was created in section **Lunch a New Instance**.

Step 3. Click **Console**. This will display the CLI of the VM.

Step 4. Once the CLI is displayed, enter the proper login credentials:

Username: **root**

Password: **cisco123** as shown in this image.

```
Red Hat Enterprise Linux Server 7.0 (Maipo)
Kernel 3.10.0-514.el7.x86_64 on an x86_64

aaa-cpar-testing-instance login: root
Password:
Last login: Thu Jun 29 12:59:59 from 5.232.63.159
[root@aaa-cpar-testing-instance ~]#
```

Step 5. In the CLI, run the command **vi /etc/ssh/sshd_config** in order to edit the ssh configuration.

Step 6. Once the SSH configuration file is open, press **I** in order to edit the file. Then look for the section shown here and change the first line from **PasswordAuthentication no** to

PasswordAuthentication yes.

```
# To disable tunneled clear text passwords, change to no here!  
PasswordAuthentication yes_  
#PermitEmptyPasswords no  
PasswordAuthentication no
```

Step 7. Press **ESC** and enter **:wq!** to save sshd_config file changes.

Step 8. Run the command **service sshd restart**.

```
[root@aaa-cpar-testing-instance ssh]# service sshd restart  
Redirecting to /bin/systemctl restart sshd.service  
[root@aaa-cpar-testing-instance ssh]#
```

Step 9. In order to test SSH configuration changes have been correctly applied, open any SSH client and try to establish a remote secure connection **using the floating IP** assigned to the instance (i.e. **10.145.0.249**) and the user **root**.

```
[2017-07-13 12:12.09] ~  
[dieaguil.DIEAGUIL-CWRQ7] > ssh root@10.145.0.249  
Warning: Permanently added '10.145.0.249' (RSA) to the list of known hosts  
.  
root@10.145.0.249's password:  
X11 forwarding request failed on channel 0  
Last login: Thu Jul 13 12:58:18 2017  
[root@aaa-cpar-testing-instance ~]#  
[root@aaa-cpar-testing-instance ~]#
```

Establish SSH Session

Step 1. Open a SSH session with the IP address of the corresponding VM/server where the application is installed as shown in this image.

```
[dieaguil.DIEAGUIL-CWRQ7] > ssh root@10.145.0.59  
X11 forwarding request failed on channel 0  
Last login: Wed Jun 14 17:12:22 2017 from 5.232.63.147  
[root@dalaaa07 ~]#
```

CPAR Instance Start

Follow these steps, once the activity has been completed and CPAR services can be re-established in the Site that was shut down.

Step 1. Login back to Horizon, navigate to **Project > Instance > Start Instance**.

Step 2. Verify that the status of the instance is **Active** and the power state is **Running** as shown in

this image.

Instances

Instance Name ▾										
Filter Launch Instance Delete Instances More Actions ▾										
<input type="checkbox"/>	Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created
<input type="checkbox"/>	dlaaaa04	dlaaaa01-sept092017	diameter-routable1 • 10.160.132.231 radius-routable1 • 10.160.132.247 tb1-mgmt • 172.16.181.16 Floating IPs: • 10.250.122.114	AAA-CPAR		Active	AZ-dlaaaa04	None	Running	3 months
Create Snapshot ▾										

Post-Activity Health Check

Step 1. Run the command **/opt/CSCOar/bin/arstatus** at OS level:

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.  Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Step 2. Run the command **/opt/CSCOar/bin/aregcmd** at OS level and enter the admin credentials. Verify that CPAR Health is 10 out of 10 and the exit CPAR CLI.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.  Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Step 3. Run the command **netstat | grep diameter** and verify that all DRA connections are established.

The output mentioned here is for an environment where Diameter links are expected. If fewer links are displayed, this represents a disconnection from the DRA that needs to be analyzed.

```
ERROR:      You cannot shut down Cisco Prime Access Registrar while the
            CLI is being used.  Current list of running
            CLI with process id is:
2903 /opt/CSCOar/bin/aregcmd -s
```

Step 4. Check that the TPS log shows requests being processed by CPAR. The values highlighted represent the TPS and those are the ones you need to pay attention to.

The value of TPS must not exceed 1500.

```
[root@wscaaa04 ~]# tail -f /opt/CSCOar/logs/tps-11-21-2017.csv
```

```
11-21-2017,23:57:35,263,0
11-21-2017,23:57:50,237,0
11-21-2017,23:58:05,237,0
11-21-2017,23:58:20,257,0
11-21-2017,23:58:35,254,0
11-21-2017,23:58:50,248,0
11-21-2017,23:59:05,272,0
11-21-2017,23:59:20,243,0
11-21-2017,23:59:35,244,0
11-21-2017,23:59:50,233,0
```

Step 5. Look for any “error” or “alarm” messages in name_radius_1_log.

```
[root@wscaaa04 ~]# tail -f /opt/CSCOar/logs/tps-11-21-2017.csv
11-21-2017,23:57:35,263,0
11-21-2017,23:57:50,237,0
11-21-2017,23:58:05,237,0
11-21-2017,23:58:20,257,0
11-21-2017,23:58:35,254,0
11-21-2017,23:58:50,248,0
11-21-2017,23:59:05,272,0
11-21-2017,23:59:20,243,0
11-21-2017,23:59:35,244,0
11-21-2017,23:59:50,233,0
```

Step 6. In order to verify the amount of memory that the CPAR process used, run the command:

```
top | grep radius
[root@sfraaa02 ~]# top | grep radius 27008 root      20    0 20.228g 2.413g 11408 S 128.3  7.7
1165:41 radius
```

This highlighted value must be lower than 7Gb, which is the maximum allowed at application level.