



INSTALLATION RUNBOOK FOR Huawei Technologies Co., Ltd + Huawei Volume Driver

Product Name:	Huawei Volume Driver
Driver Version:	Liberty
MOS Version:	8.0
OpenStack Version:	Liberty
Product Type:	Cinder Driver

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Document History

Version	Revision Date	Description
0.1	11-29-2016	Initial Version
0.2	3-20-2017	Modify the part of cinder configuration
0.3	07-24-2017	Add support for Huawei OceanStor Dorado V3 series storage.

1. Introduction

This document is to serve as a detailed Deployment Guide for Huawei Volume driver with Mirantis OpenStack 8.0. Huawei Technologies Co., Ltd offers Huawei Volume Driver to support iSCSI and Fibre Channel connections and enables Huawei Storages such as, OceanStor Dorado V3 series, OceanStor V3 series storage, OceanStor TV2 storage, and OceanStor 18000 high-end storage to provide block storage services for OpenStack cloud environment. This document describes the reference architecture, installation steps for certified MOS + Huawei Volume Driver, limitations and testing procedures.

1.1 Target Audience

This documentation is intended for OpenStack administrators provided with the details of the setup, configuration and tests run on Mirantis OpenStack with Huawei Volume driver for the purpose of Unlocked OpenStack Driver Validation. It assumes that you have experience with network and cloud concepts.

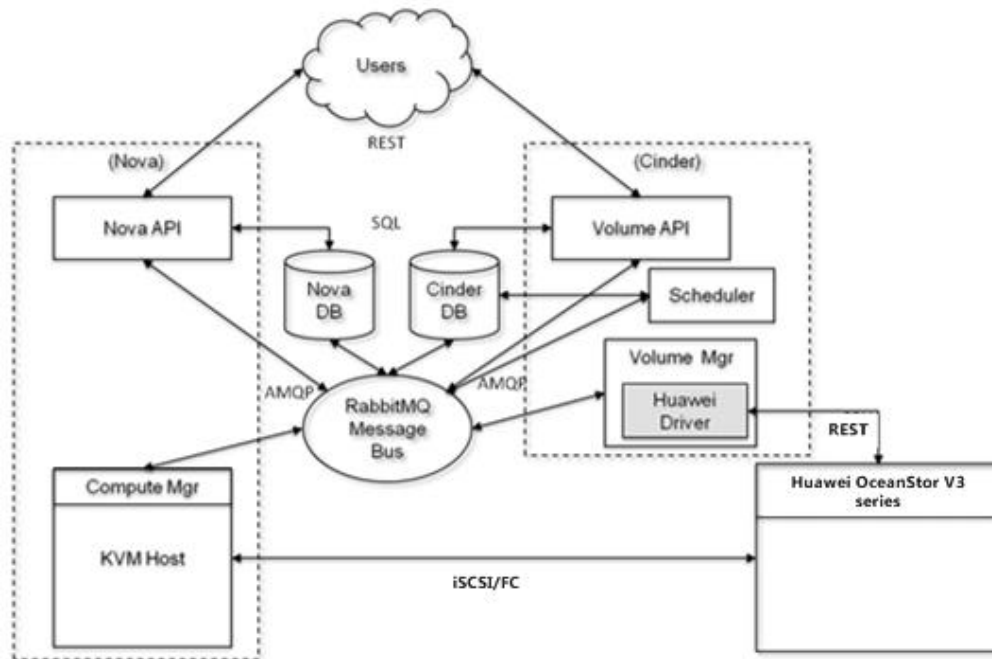
2. Product Overview

Huawei Volume Driver enables integration between OpenStack Cloud and Huawei Storages such as, OceanStor Dorado V3 series, OceanStor V3 series storage, OceanStor TV2 storage, and OceanStor 18000 high-end storage to provide block storage services for OpenStack.

Huawei Volume Driver implemented OpenStack Cinder accesses Huawei storage service APIs, such as volume, snapshot, Qos etc and supports various operations.

3. Joint reference architecture

Huawei Volume Driver architecture. Prints in red modules are implemented by Huawei Volume Driver.

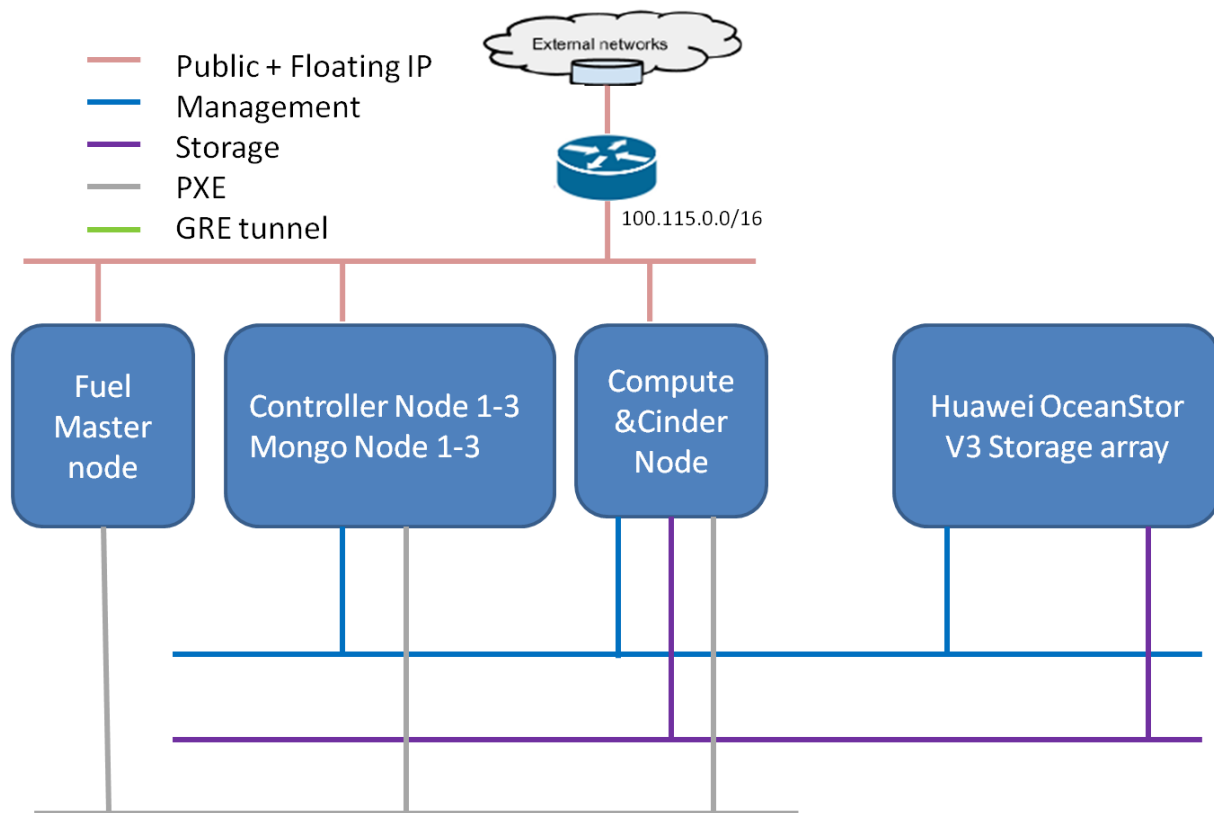


4. Physical and Logical Network Topology

It is highly recommended that the storage network is broken out as either a physical interface, or as a separate VLAN, to keep the traffic segregated from other traffic types. If you have enough physical interfaces, we strongly recommend using a separate physical interface for storage network.

Each Server at least 2 NICs are required.

- eth0 - untagged port for PXE network (Fuel network), Management (VLAN 101), Public/Floating (VLAN 102)
- eth1 - port for networks: Storage (untagged)



5. Installation and Configuration

5.1 Overview of MOS installation steps

- ◇ Setup OpenStack Network configuration in Switch device.
- ◇ Install Fuel Master Node on Physical Server. Customer can use a VM for fuel master by following the MOS user guide. In this demo, we use a physical server instead.
- ◇ Deploy MOS Slave nodes on Fuel UI
- ◇ Run Fuel Health Check, make sure all cases pass.
- ◇ Manually integrated Huawei OceanStor V3 storage and Huawei Volume driver with MOS.
- ◇ Run Fuel Health Check test on Fuel UI
- ◇ Verify Huawei Volume Driver basic functions on MOS, plus additional manual/automated acceptance tests.

5.2 MOS Installation in details

5.2.1 Hardware and environment

The following hardware devices are used in this demo.

Name	Device	Count
Server	Huawei RH2288-v2	2
	Huawei RH2285	1
Network Switch	Huawei Quidway S3300	1
Storage	Huawei OceanStor 5800 V3	1

5.2.2 Switch configuration

Use the following configuration to deploy Mirantis OpenStack using Huawei Quidway S3300 network switch.

For one master node and four Openstack nodes of physical servers, each server have two NICs with following VLAN IDs are used:

- eth0 - untagged port for PXE network (Fuel network), Management (VLAN 101), Public/Floating (VLAN 102)
- eth1- port for networks: Storage (untagged)

The connection between switch port and server NIC as below: each switch port used for one sever NIC.

Switch Port	Server name	Server NIC
E0/0/1	Fuel Master	eth0
E0/0/2	Controller Node 1	eth0
E0/0/3	Compute&Cinder Node 1	eth0
E0/0/6	Fuel Master	eth1
E0/0/7	Controller Node 1	eth1
E0/0/8	Compute&Cinder Node 1	eth1

The details port configuration for Huawei Quidway S3300 network switch is below:

```
#
!Software Version V100R005C01SPC100
sysname openstack_sw
#
vlan batch 101 to 102 1000 to 1030
#
vlan 1
interface Vlanif1
ip address 100.115.114.254 255.255.0.0
#
interface Ethernet0/0/1
port link-type trunk
port trunk allow-pass vlan 101 to 102 1000 to 1030
ntdp enable
ndp enable
bpdu enable
#
interface Ethernet0/0/2
port link-type trunk
port trunk allow-pass vlan 101 to 102 1000 to 1030
ntdp enable
ndp enable
bpdu enable
dhcp snooping trusted
#
```

```

interface Ethernet0/0/3
port link-type trunk
port trunk allow-pass vlan 101 to 102 1000 to 1030
ntdp enable
ndp enable
bpdu enable
#
interface Ethernet0/0/6
ntdp enable
ndp enable
bpdu enable
#
interface Ethernet0/0/7
ntdp enable
ndp enable
bpdu enable
#
interface Ethernet0/0/8
ntdp enable
ndp enable
bpdu enable

```

5.2.3 Install Fuel Master Node

- ◇ Mount MirantisOpenStack-8.0.iso through IPMI on one Huawei RH2285-V2 server and power the machine on. Set the boot order for the system with the Huawei DVD media. Using the Fuel User guide, go through the installation process until Fuel Setup will appear. Enter into it.
- ◇ Navigate to Network Setup menu, adjust configuration to one provided in the table below and then click 'Check' button to ensure the configuration is valid.

Interface	IP address	Netmask	Default Gateway
eth0	100.115.4.95	255.255. 0.0	100.115.0.1
eth1(PXE)	192.168.10.10	255.255.255.0	-

- ◇ Navigate to PXE Setup menu, adjust configuration to one provided in the table below and then click 'Check' button to ensure the configuration is valid.

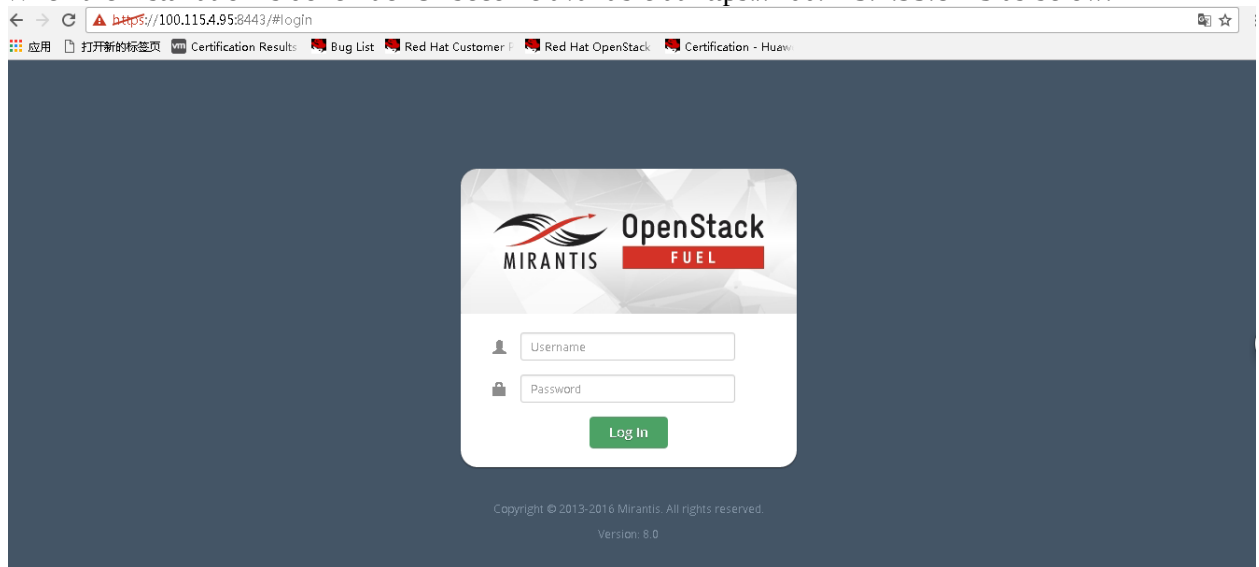
Interface	DHCP Pool Start	DHCP Pool End	DHCP Gateway
eth1(PXE)	192.168.10.110	192.168.10.254	192.168.10.10

- ◇ Navigate to DNS & Hostname menu, adjust configuration to one provided in the table below and then click 'Check' button to ensure the configuration is valid. It will also check that the Internet is reachable by the Fuel node because it will be required for the MOS installation later.

Hostname	Domain	Search Domain	External DNS	Hostname to test DNS

fuel	Domain.tld	Domain.tld	8.8.4.4, 8.8.8.8	baidu.com
------	------------	------------	------------------	-----------

- ◇ Keep Time Sync menu untouched with default settings entered. Click to ‘Check’ button to ensure NTP servers are reachable.
- ◇ Change default root password to make sure Fuel Health Check cases pass.
- ◇ Save and Quit Setup and boot the Fuel Master Node.
- ◇ When the installation is done Fuel UI become available at https://100.115.4.95:8443 as below.



5.3 Creation of OpenStack environment

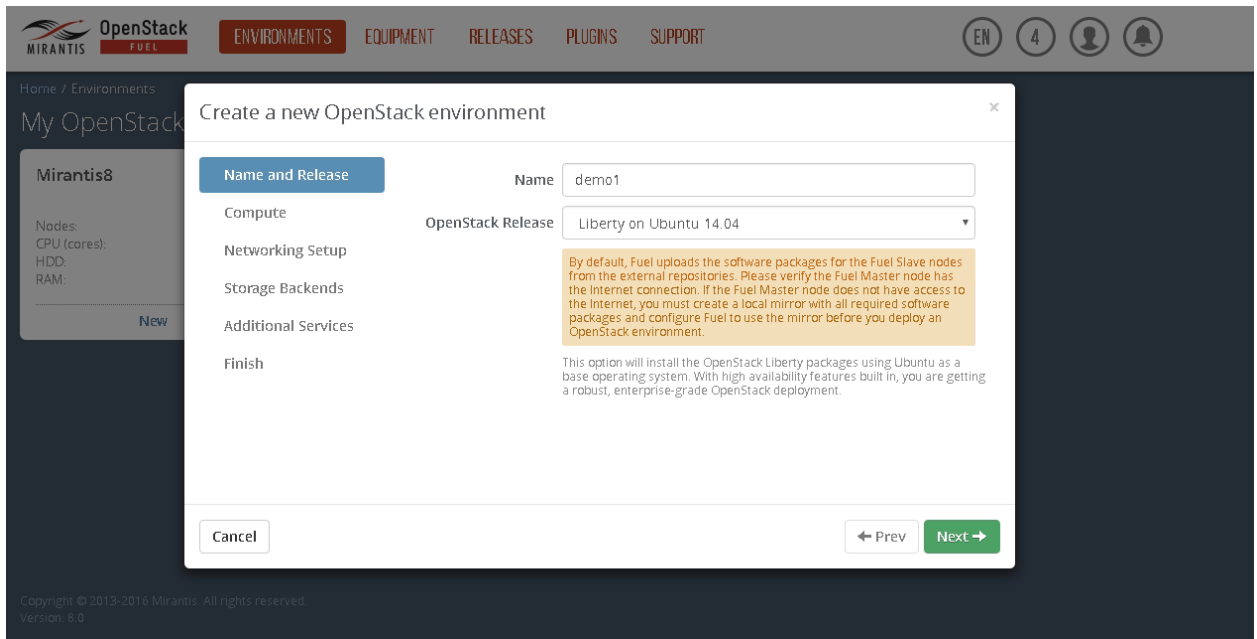
The settings for the OpenStack cloud in this demo are below:

- Name: Mirantis8
- OpenStack re: Liberty on Ubuntu 14.04
- Deployment mode: Single (one controller)
- Compute: KVM
- Cinder backend: Cinder LVM over iSCSI for volumes (Use default providers)
- Glance backend: Swift (Use default providers)
- Network setup: Neutron with VLAN segmentation
- Ceilometer: Not Install, please install them if need
- Murano and Sahara: Not Install, please install them if need.

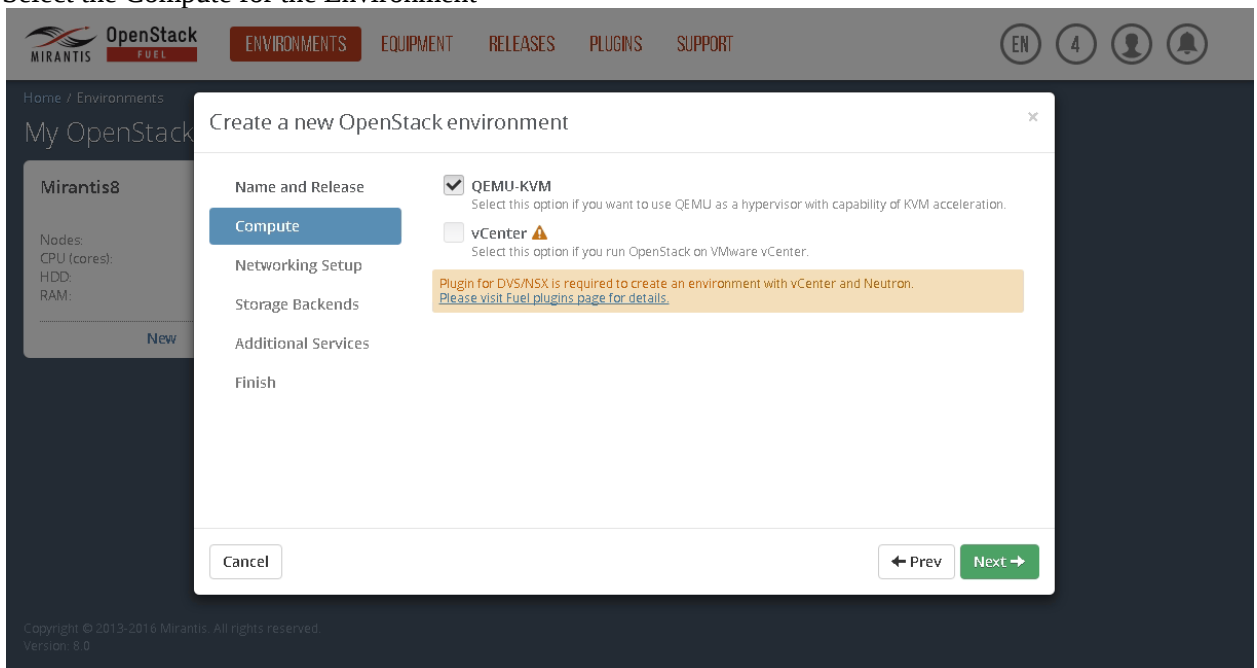
Note:

For creating OpenStack environment, please find the detail description in MOS quickstart guide:
<https://docs.mirantis.com/openstack/fuel/fuel-8.0/quickstart-guide.html#quickstart-guide>

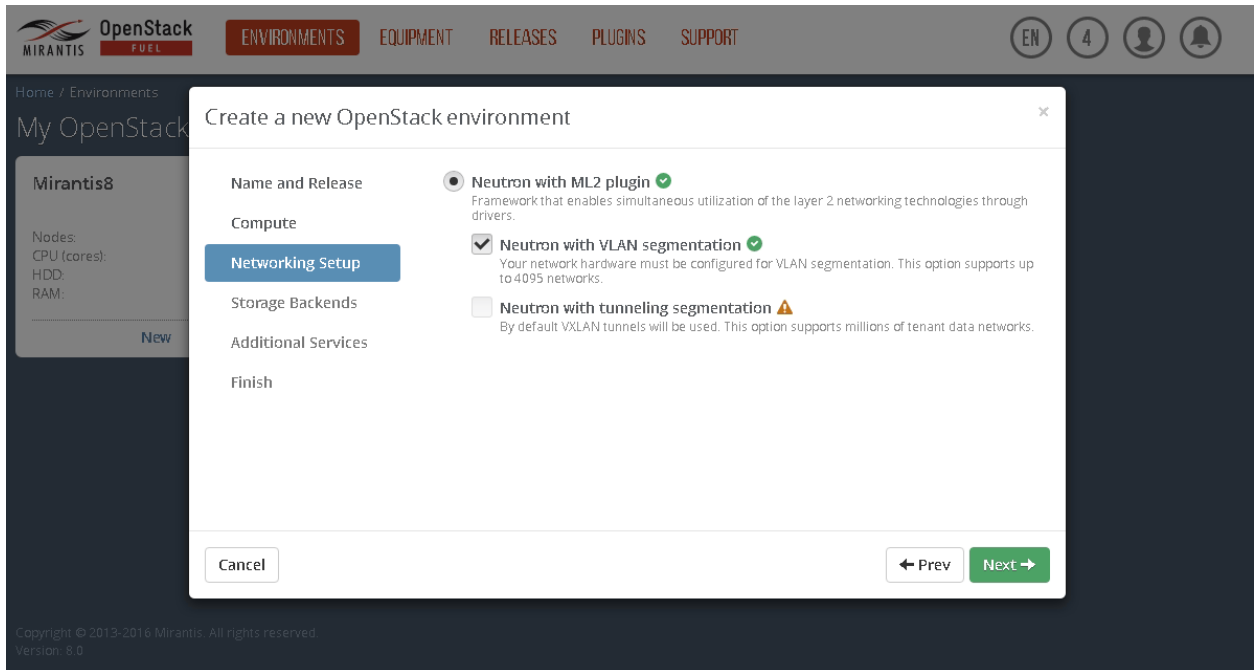
- 1) On the Fuel UI, click on “New OpenStack Environment”.
- 2) When the wizard opens, enter the name and the desired OpenStack Release.



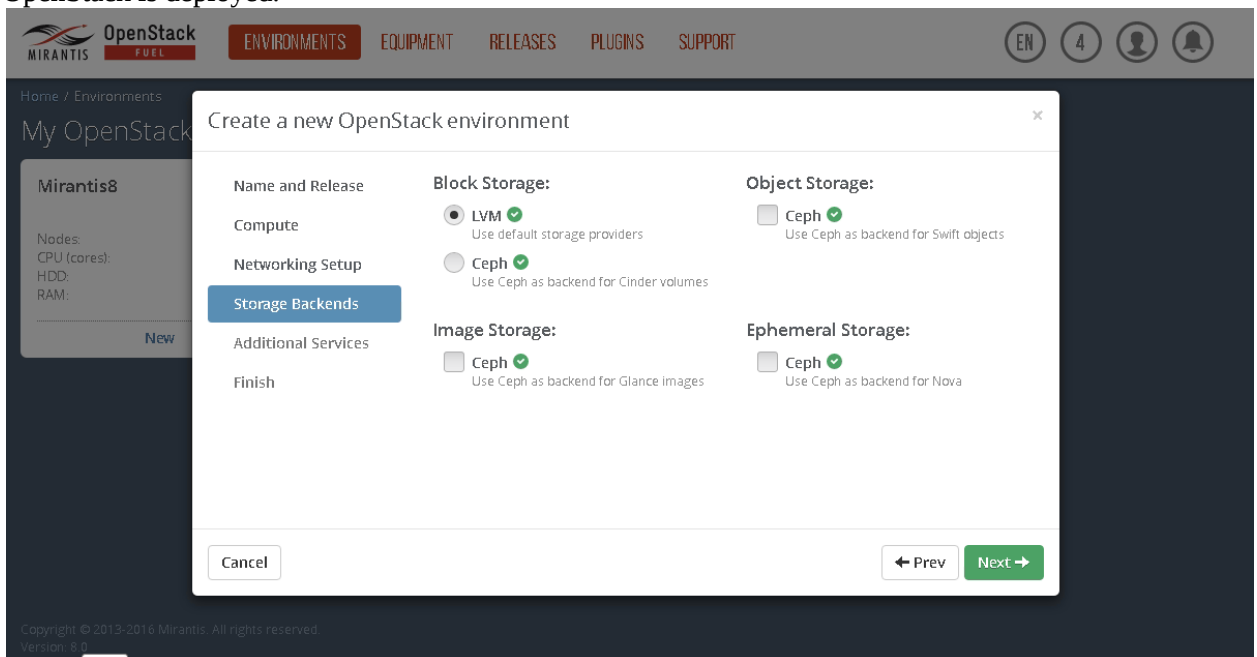
3) Select the Compute for the Environment



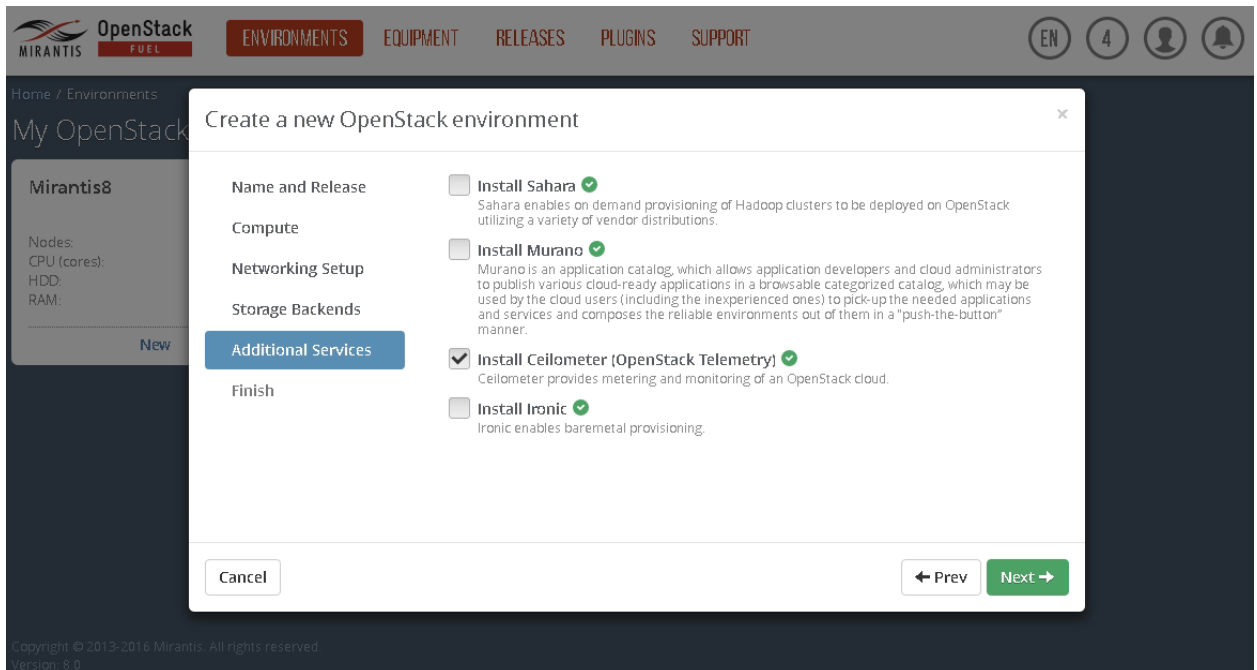
4) Select the required Neutron Setup.



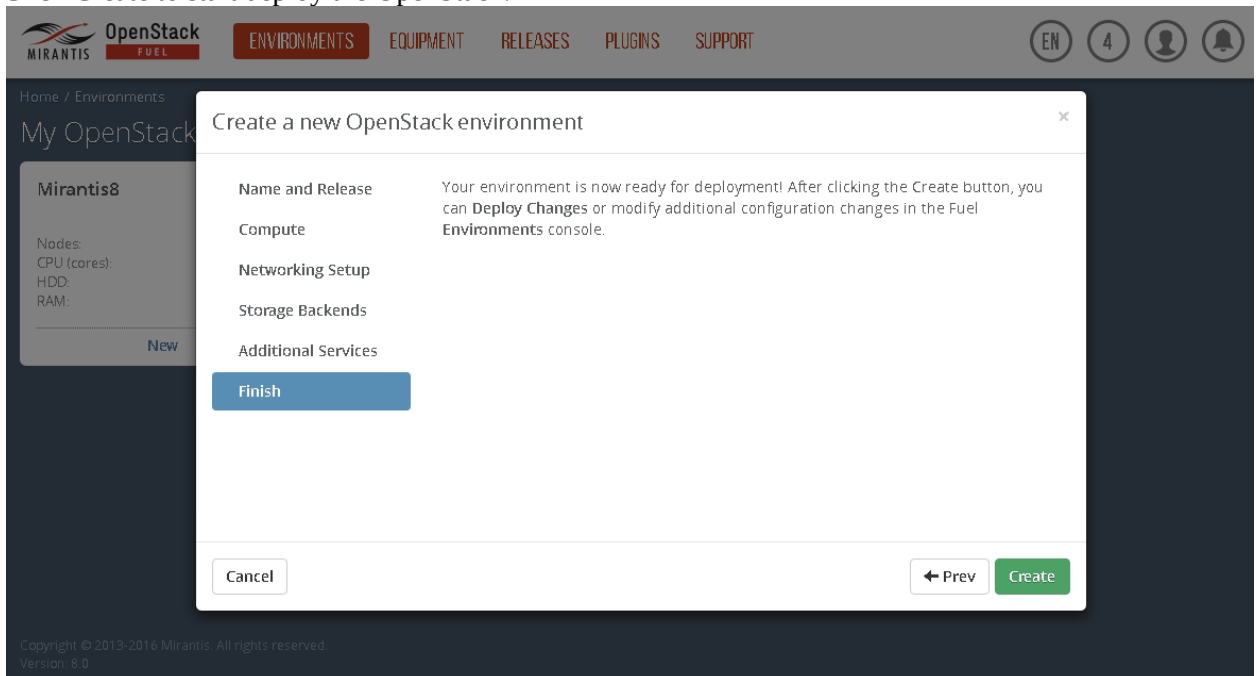
- 5) Under Storage Backends, leave the default option. Huawei Volume driver can be installed after the OpenStack is deployed.



- 6) Select the additional services and click on next.



7) Click Create to start deploy the OpenStack.



5.4 MOS Installation

5.4.1 Nodes

All nodes: 1 Controller nodes, and 1 Compute node combined with Storage-Cinder.

For this demo, hardware model information as follow:

Controller Node 1	Compute Node
RH2288-v2	RH2288-v2

Once all the nodes have booted up through PXE, they appear on the Fuel UI. Configure controllers, cinder and compute.

DashboardNodesNetworksSettingsLogsHealth Check

Configure DisksConfigure InterfacesAdd Nodes

Sort ByRoles

Select All

Controller (1)

Select All

Untitled (f2:34)CONTROLLER

READY

CPU: 2 (24) HDD: 0.5 TB RAM: 32.0 GB

Compute, Storage - Cinder, Operating System (1)

Select All

Untitled (4f:7f)COMPUTE - CINDER - BASE-OS

READY

CPU: 1 (8) HDD: 18.2 TB RAM: 24.0 GB

Compute Node (94:e3) disks configuration:

DashboardNodesNetworksSettingsLogsHealth Check

Configure disks on Untitled (94:e3)

sda (disk/by-path/pci-0000:04:00.0-sas-0x5286ed44327c0001-lun-0)Total Space : 1.8 TB

Base74.0Cinder1.7 TB

Disk Information

Name

sda

Model

WDC WD2003FYYS-3

Size

1.8 TB

Extra

disk/by-id/wwn-0x50014ee25c16ba65disk/by-id/ata-WDC_WD2003FYYS-36W0B0_WD-WMAY04496342

Removable

0

Disk

disk/by-path/pci-0000:04:00.0-sas-0x5286ed44327c0001-lun-0

Volume Groups

Base System

75776

MB

Cinder

1831261

MB

Virtual Storage

0

MB

Minimum allowed size reached.

sdb (disk/by-path/pci-0000:04:00.0-sas-0x5286ed44327c0002-lun-0)Total Space : 1.8 TB

Virtual Storage1.8 TB

Back To Node List

Load DefaultsCancel ChangesApply

Compute Node (94:e3) network interfaces configuration:

DashboardNodesNetworksSettingsLogsHealth Check

Configure interfaces on Untitled (94:e3)

Bond Network InterfacesUnbond Network Interfaces

Name: enp1s0f0
MAC: 08:19:a6:9a:94:e3
Speed: 1.0 Gbps

Admin (PXE)

Public
VLAN ID:102

Management
VLAN ID:101

Private
VLAN IDs:1000-1030

Offloading Modes: Default

MTUDefault

Name: enp1s0f1
MAC: 08:19:a6:9a:94:e4
Speed: 1.0 Gbps

Storage

Offloading Modes: Default

MTUDefault

Back To Node List

Load DefaultsCancel ChangesApply

Controller node (b0:7f) disks configuration:

DashboardNodesNetworksSettingsLogsHealth Check

Configure disks on Untitled (b0:7f)

sda (disk/by-path/pci-0000:04:00.0-sas-0x580fb06b0b8b6000-lun-0)

Total Space : 0.9 TB

Base158.0 GB1

Image Storage0.8 TB

Disk Information

Name

sda

Model

ST31000524NS

Size

0.9 TB

Extra

disk/by-id/wwn-0x5000c5002e6ef293disk/by-id/ata-ST31000524NS_9WK4BJLQ

Removable

0

Disk

disk/by-path/pci-0000:04:00.0-sas-0x580fb06b0b8b6000-lun-0

Volume Groups

Base System

Logs

Image Storage

Mysql Database

Horizon Temp Storage

59392 MB

10240 MB

851673 MB

20480 MB

11264 MB

Minimum allowed size reached.

Minimum allowed size reached.

Minimum allowed size reached.

Minimum allowed size reached.

Minimum allowed size reached.

sdb (disk/by-path/pci-0000:04:00.0-sas-0x580fb06b0b8b6001-lun-0)

Total Space : 0.9 TB

Image Storage0.9 TB

Controller node (b0:7f) network Interfaces configuration:

Dashboard
Nodes
Networks
Settings
Logs
Health Check

Configure interfaces on Untitled (b0:7f)

Bond Network Interfaces
Unbond Network Interfaces

☐

Name: enp1s0f0
MAC: 54:89:98:00:b0:7f
Speed: 1.0 Gbps

Admin (PXE)
Public
VLAN ID:102
Management
VLAN ID:101
Private
VLAN IDs:1000-1030

Offloading Modes: Default

MTU Default

☐

Name: enp1s0f1
MAC: 54:89:98:00:b0:80
Speed: 1.0 Gbps

Storage

Offloading Modes: Default

MTU Default

☐

Name: enp3s0f0
MAC: 00:15:17:fc:ef:ec
Speed: N/A

You can drag and drop logical networks between the interfaces

Offloading Modes: Default

MTU Default

5.4.2 Network Setting

Change the Public, Storage, Management and Private network as your plan. After configuring the nodes, run “Verify Networks” under Networks tab. The test should pass.

Dashboard
Nodes
Networks
Settings
Logs
Health Check

Network Settings (Neutron with VLAN segmentation)

Add New Node Network Group

Node Network Groups

default

This node network group uses a shared admin network and cannot be deleted

Settings

Neutron L2

Neutron L3

Other

Network Verification

IP Range

100.115.114.0/16
☐ Use the whole CIDR

Start

End

100.115.114.235
100.115.114.240

Gateway

100.115.0.1

Use VLAN tagging

☒ 102

Storage

The Storage network is used to provide storage services such as replication traffic from Ceph. The Management network is used for Ceph Public traffic.

CIDR

192.168.1.0/24

☒ Use the whole CIDR

IP Range

Start

192.168.1.1

End

192.168.1.254



Use VLAN tagging

☐

Management

The Management network is primarily used for OpenStack Cloud Management. It is used to access OpenStack services (nova-api, OpenStack dashboard, etc).

CIDR

192.168.0.0/24

☒ Use the whole CIDR

IP Range

Start

192.168.0.1

End

192.168.0.254

Use VLAN tagging

☒ 101

Dashboard

Nodes

Networks

Settings

Logs

Health Check

Network Settings

(Neutron with VLAN segmentation)

Add New Node Network Group

Node Network Groups

default

Settings

Neutron L2

Neutron L3

Other

Neutron L2 Configuration

Neutron supports different types of network segmentation such as VLAN, GRE, VXLAN etc. This section is specific to VLAN segmentation related parameters such as VLAN ID ranges for tenant separation and the Base MAC address.

VLAN ID range

Start

1000

End

1030

Base MAC address

fa:16:3e:00:00:00

Network Verification

Connectivity Check

Dashboard
Nodes
Networks
Settings
Logs
Health Check

Network Settings (Neutron with VLAN segmentation)

Add New Node Network Group

Node Network Groups

default

Settings

Neutron L2

Neutron L3

Other

Network Verification

Connectivity Check

Floating Network Parameters

This network is used to assign Floating IPs to tenant VMs.

Floating IP range

Start

End

100.115.114.241

100.115.114.255

Floating network name

admin_floating_net

Internal Network Parameters

The Internal network connects all OpenStack nodes in the environment. All components of an OpenStack environment communicate with each other using this network.

Internal network CIDR

192.168.111.0/24

Internal network gateway

192.168.111.1

Internal network name

admin_internal_net

Dashboard
Nodes
Networks
Settings
Logs
Health Check

Network Settings (Neutron with VLAN segmentation)

Add New Node Network Group

Node Network Groups

default

Settings

Neutron L2

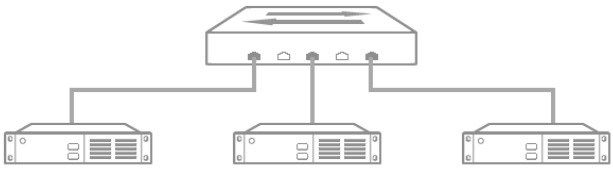
Neutron L3

Other

Network Verification

Connectivity Check

Connectivity Check



Network verification checks the following:

1. L2 connectivity checks between nodes in the environment.
2. DHCP discover check on all nodes.
3. Repository connectivity check from the Fuel Master node.
4. Repository connectivity check from the Fuel Slave nodes through the public & admin (PXE) networks.

Verify Networks

Verification succeeded. Your network is configured correctly.

5.4.3 OpenStack Settings

The "Settings" tab allows you to set or modify various values for the system. Many other values can be set by editing configuration files and running command-line tools on the nodes. You can find the details description in user guide:

<https://docs.mirantis.com/openstack/fuel/fuel-8.0/fuel-user-guide.html#configure-your-environment>

In this demo, we change the default horizon setting, DNS and NTP setting as blew. The other settings are keep default.

DashboardNodesNetworksSettingsLogsHealth Check

OpenStack Settings

General

Access

Security

Compute

Storage

Logging

OpenStack Services

Username

huawei

Username for Administrator

Password

.....

Password for Administrator

Tenant

tenant_huawei

Tenant (project) name for Administrator

Email

huawei@localhost

Email address for Administrator

Repositories

Please note: the first repository will be considered the operating system mirror that will be used during node provisioning. To create a local repository mirror on the Fuel master node, please follow the instructions provided by running "fuel-createmirror --help" on the Fuel master node. Please make sure your Fuel master node has Internet access to the repository before attempting to create a mirror. For more details, please refer to the documentation (<https://docs.mirantis.com/openstack/fuel/fuel-8.0/operations.html#external-ubuntu-ops>).

Name	URI	Priority	
ubuntu	deb http://10.20.0.2:8080/mirrors/ubuntu	None	
ubuntu-updates	deb http://10.20.0.2:8080/mirrors/ubuntu	None	⊖
ubuntu-security	deb http://10.20.0.2:8080/mirrors/ubuntu	None	⊖
mos	deb http://10.20.0.2:8080/mirrors/mos-rep	1000	⊖
mos-updates	deb http://10.20.0.2:8080/mirrors/mos-rep	1000	⊖
mos-security	deb http://10.20.0.2:8080/mirrors/mos-rep	1000	⊖
mos-holdback	deb http://10.20.0.2:8080/mirrors/mos-rep	1000	⊖
Auxiliary	deb http://10.20.0.2:8080/liberty-8.0/ubun	1150	⊖

OpenStack Settings

- General
- Security
- Compute**
- Storage
- Logging
- OpenStack Services

Common

Hypervisor type

- ☒ **KVM**
Choose this type of hypervisor if you run OpenStack on hardware

☐ **QEMU**
Choose this type of hypervisor if you run OpenStack on virtual hosts.

☐ **Nova quotas**
Quotas are used to limit CPU and memory usage for tenants. Enabling quotas will increase load on the Nova database.

☒ **Resume guests state on host boot**
Whether to resume previous guests state when the host reboots. If enabled, this option causes guests assigned to the host to resume their previous state. If the guest was running a restart will be attempted when nova-compute starts. If the guest was not running previously, a restart will not be attempted.

OpenStack Settings

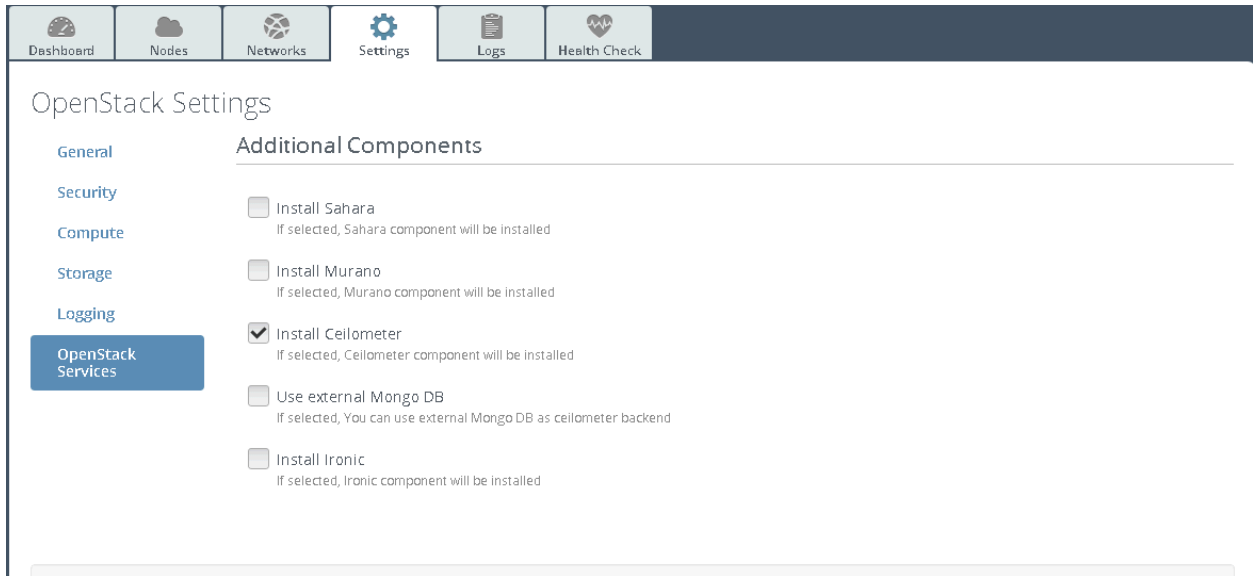
- General
- Security
- Compute
- Storage**
- Logging
- OpenStack Services

Common

- ☒ Use qcow format for images
- For most cases you will want qcow format. If it's disabled, raw image format will be used to run VMs. OpenStack with raw format currently does not support snapshotting.

Storage Backends

- ☒ **Cinder LVM over iSCSI for volumes**
It is recommended to have at least one Storage - Cinder LVM node.
- ☒ **Cinder Block device driver**
High performance block device storage. It is recommended to have at least one Storage - Cinder Block Device
- ☐ **Ceph RBD for volumes (Cinder)**
Configures Cinder to store volumes in Ceph RBD images.
- ☐ **Ceph RBD for images (Glance)**
Configures Glance to use the Ceph RBD backend to store images. If enabled, this option will prevent Swift from installing.



5.4.4 The followings are bridge names and their IP addresses after the deployment for the reference:

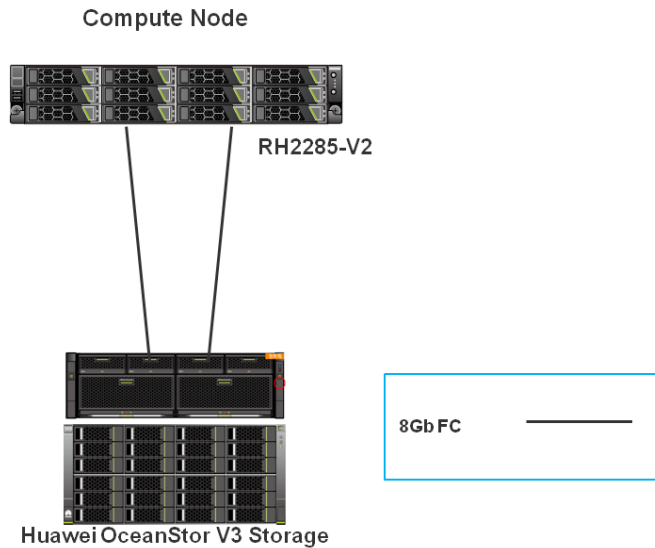
Network Interface	Controller (combine Mongo)Node 1	Compute (combine Cinder) Node
eth0 (br-fw-admin)	192.168.10.110	192.168.10.116
eth1(br-ex/public)	IP: 100.115.114.236	100.115.114.237
eth1 (br-mgmt)	192.168.0.12	192.168.0.13
eth1 (br-storage)	192.168.1.10	192.168.1.11

5.5 Huawei Volume Driver Installation Procedure

The following is the procedure that can be followed to install the Huawei Volume Driver. Make sure all cable connection between Compute node and Huawei OceanStor V3 storage are finished. In this demo, we use fibre to connect computer node and storage device directly.

Note:

In production environment, Huawei still recommends to using a dedicated SAN network for OpenStack environment.



- 1) Hardware Preparation:
 - ◇ Huawei OceanStor V3 series storage (Huawei OceanStor 5800 V3 is used in this demo)
- 2) Software Preparation:
 - ◇ Huawei Volume Driver

5.5.1 Get Huawei Volume Driver

You can get the Huawei Volume Driver for Huawei Storage from GitHub website in below link:
https://github.com/huaweistorage/OpenStack_Driver/tree/master

Unzip OpenStack_Driver-master.rar , it has the following 1 folder

📁 OpenStack_Driver-master

Inside of the folder it has two folders

📁 Cinder
 📁 Manila

Inside of the Cinder, there are five versions of the OpenStack,

📁 Havana_And_Icehouse
 📁 Juno
 📁 Kilo
 📁 Liberty
 📁 Mitaka

5.5.2 Cinder configuration on all cinder nodes

In this demo, Cinder component is installed in compute node. The following configuration is done on compute node.

- 1) Please create a folder names '*huawei*' in path `/usr/lib/python2.7/dist-packages/cinder/volume/drivers/`. If it exists, backup this folder and remove all files that already in *huawei* folder.

2) using SCP to upload all files from above *Liberty* folder to */usr/lib/python2.7/dist-packages/cinder/volume/drivers/huawei/*.

After you done, all files should show as below:

```
root@node-1:/usr/lib/python2.7/dist-packages/cinder/volume/drivers/huawei# ll
total 396
drwxr-xr-x  3 root root  4096 Nov 28 11:12 ./
drwxr-xr-x 19 root root  4096 Nov 28 12:25 ../
-rw-r--r--  1 root root    33 Nov 28 11:12 __init__.py
-rw-r--r--  1 root root  3434 Nov 28 11:12 constants.py
drwxr-xr-x  2 root root  4096 Nov 28 11:12 extend/
-rw-r--r--  1 root root 11163 Nov 28 11:12 fc_zone_helper.py
-rw-r--r--  1 root root 10577 Nov 28 11:12 huawei_conf.py
-rw-r--r--  1 root root 91780 Nov 28 11:12 huawei_driver.py
-rw-r--r--  1 root root 26672 Nov 28 11:12 huawei_t.py
-rw-r--r--  1 root root  3215 Nov 28 11:12 huawei_utils.py
-rw-r--r--  1 root root 14811 Nov 28 11:12 hypermetro.py
-rw-r--r--  1 root root 23397 Nov 28 11:12 replication.py
-rw-r--r--  1 root root 84774 Nov 28 11:12 rest_client.py
-rw-r--r--  1 root root  8867 Nov 28 11:12 smartx.py
-rw-r--r--  1 root root 94071 Nov 28 11:12 ssh_client.py
```

3) Configuring the volume driver for V3 (Fibre Channel)

This configuration file is an example for this certification scenario, for details please checks below description of Parameters in the Configuration File.

- In */etc/cinder*, use *vi* command to create a Huawei-customized driver configuration file names *"/etc/cinder/cinder_huawei_conf.xml"*.
- Configure parameters in the driver configuration file. You must change the value of bold parameters in this configuration files according to your production environment, such as RestURL, account, LUNType ,StoragePool and Cinder node HostIP etc.

```
<?xml version='1.0' encoding='UTF-8'?>
<config>
  <Storage>
    <Product>V3</Product>
    <Protocol>FC</Protocol>
    <RestURL>https://100.115.10.224:8088/deviceManager/rest</RestURL>
    <UserName>admin</UserName>
    <UserPassword>Admin@storage1</UserPassword>
  </Storage>
  <LUN>
    <LUNType>Thick</LUNType>
    <WriteType>1</WriteType>
    <LUNcopyWaitInterval>5</LUNcopyWaitInterval>
    <Timeout>432000</Timeout>
    <StoragePool>StoragePoolName</StoragePool>
  </LUN>
  <Host HostIP="192.168.8.6" HostType="Linux" />
</config>
```

Important notes:

- For more details about the parameters in the configuration file, please check below Parameters in the Configuration File. You can also find the details in section 4.2.7

Parameters in the Configuration File at below link:

https://github.com/huaweistorage/OpenStack_Driver/blob/master/ReleaseDoc/en/OpenStack%20Cinder%20Driver%20Configuration%20Guide.pdf

Table 1 Mandatory parameters

Parameter	Default Value	Description	Applicable To
Product	-	Type of a storage product. Such as V3 .	All
Protocol	-	Type of a connection protocol. Possible value is FC .	All
RestURL	-	Access address of the REST interface, https://x.x.x.x:8088/devicemanager/rest/ . x.x.x.x is the management IP address.	V3
UserName	-	Storage administrator username.	All
UserPassword	-	Storage Password of an administrator.	All
StoragePool	-	Name of a storage pool to be used.	All

Note:

For the configuration of other products like OceanStor Dorado V3 series, TV2 storage and OceanStor 18000 high-end storage or other protocol like iSCSI, please also reference:

https://github.com/huaweistorage/OpenStack_Driver/blob/master/ReleaseDoc/en/OpenStack%20Cinder%20Driver%20Configuration%20Guide.pdf

Table 2 Optional parameters

Parameter	Default Value	Description	Applicable To
LUNType	Thick	Type of the LUNs to be created. The value can be Thick or Thin .	V3
WriteType	1	Cache write type. Possible values are: 1 (write back), 2 (write through), and 3 (mandatory write back).	All
LUNcopyWaitInterval	5	After LUN copy is enabled, the plug-in frequently queries the copy progress. You can set a value to specify the query interval.	All
Timeout	432000	Timeout interval for waiting LUN copy of a storage device to complete. The unit is second.	V3
OSType	Linux	Operating system of the Nova compute node's host.	All
HostIP	-	IP address of the Nova compute node's host.	All

Notes:

You need to get Huawei's license first before creating thin lun.

- c. Change *cinder_huawei_conf.xml* file owner to cinder user and cinder user group to allow cinder service to full access permission.

```
root@node-6:~# chown cinder:cinder /etc/cinder/cinder_huawei_conf.xml
```

- d. Configure the *cinder.conf* file

Backup the */etc/cinder/cinder.conf* file before any modify. In the *[default]* block of */etc/cinder/cinder.conf*, add the following contents. *enabled_backends* indicates the default backend will be used when creating volumes. *volume_driver* indicates the loaded driver file, and *cinder_huawei_conf_file* indicates the specified Huawei-customized configuration file.

```
enabled_backends=OceanStor_V3
```

```
[OceanStor_V3]
```

```
volume_driver = cinder.volume.drivers.huawei.huawei_driver.HuaweiFCDriver
```

```
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf.xml
```

```
volume_backend_name = OceanStor_V3
```

- e. Run the service *cinder-volume* restart command to restart the Block Storage service.

```
root@node-6:~# service cinder-volume restart
```

- f. Once the *cinder.conf* and Huawei customized driver configuration files have been created, cinder commands need to be issued in order to create and associate OpenStack volume types with the declared *volume_backend_names*:

```
root@node-6:~# cinder type-create OceanStor_V3
```

```
root@node-6:~# cinder type-key OceanStor_V3 set volume_backend_name=OceanStor_V3
```

- g. Check cinder *OceanStor_V3* volume type on OpenStack Dashboard:

The screenshot shows the OpenStack Horizon interface. The left sidebar has a 'Volumes' link highlighted. The main panel shows the 'Volume Types' tab with a table listing three types: 'volumes_lvm', 'volumes_block_device', and 'OceanStor_V3'. Each type has a 'Create Encryption' button. Below this, the 'QoS Specs' section shows a table with no items.

6. Testing

6.1 Test tools

Equipment	Purpose
Fuel health check scripts	Functional/acceptance testing
other	Test Huawei Volume Driver Function

6.2 Test cases

- Fuel Health Check test cases, see Fuel Health Check test result [6.3.1](#)
- Other manually test cases:

Function	Description	Remark
Create Volume	Create OceanStor_V3 volume type empty volume on OpenStack Dashboard or CLI	pass
Show Volume	Query OceanStor_V3 volume type volume on OpenStack Dashboard or CLI	pass
Delete Volume	Delete OceanStor_V3 volume type volume on OpenStack Dashboard or CLI	pass
Create Snapshot	Create OceanStor_V3 volume type volume snapshot on OpenStack Dashboard or CLI	pass
Show Snapshot	Query OceanStor_V3 volume type volume snapshot on OpenStack Dashboard or CLI	pass
Delete Snapshot	Delete OceanStor_V3 volume type volume snapshot on OpenStack Dashboard or CLI	pass

Create Volume From Image	Create OceanStor_V3 volume type volume from image on OpenStack Dashboard or CLI	pass
Create Volume From Volume	Create OceanStor_V3 volume type volume from volume on OpenStack Dashboard or CLI	pass
Create Volume From Snapshot	Create OceanStor_V3 volume type volume from snapshot on OpenStack Dashboard or CLI	pass
Launch Instance From Volume	Launch Instance From Volume on OpenStack Dashboard or CLI	pass
Attach Volume to Instance	Attach Volume to Instance on OpenStack Dashboard or CLI	pass
Detach Volume to Instance	Detach Volume to Instance on OpenStack Dashboard or CLI	pass

6.2.1 Target Use case(s)

1) Large-scale cloud computing data centers

Huawei Volume Driver enables Huawei Storages integrate with MOS, providing converged functionality that maximizes performance and capacity utilization, Huawei storage products meet a wide range of needs: entry-level, mid-range, and high-end enterprise applications; Big Data; vertical industry applications; and cloud storage applications.

2) Critical enterprise IT infrastructure

MOS integrate with Huawei Storages, providing the best data services for enterprise, mission-critical businesses.

6.2.2 Deployment modes and configuration options

OS	Mode	HV	Network	Storage
			Neutron with VLAN	Cinder driver
Ubuntu	single	KVM	x	x

6.3 Test results

6.3.1 Fuel Health Check Result

The Fuel Health Check result is tested with Huawei Volume Driver and Huawei OceanStor V3 storage. Because this OpenStack environment is configured with just one controller, so the HA tests are skipped.

Dashboard

Nodes

Networks

Settings

Logs

Health Check

OpenStack Health Check

☐ Select All

Provide credentials

Stop Tests

☐ Sanity tests. Duration 30 sec - 2 min	Expected Duration	Actual Duration	Status
☐ Request flavor list	20 s.	1.1	✓
☐ Request image list using Nova	20 s.	0.6	✓
☐ Request instance list	20 s.	0.1	✓
☐ Request absolute limits list	20 s.	0.0	✓
☐ Request snapshot list	20 s.	0.5	✓
☐ Request volume list	20 s.	0.5	✓
☐ Request image list using Glance v1	10 s.	0.0	✓
☐ Request image list using Glance v2	10 s.	0.0	✓
☐ Request stack list	20 s.	0.0	✓
☐ Request active services list	20 s.	1.0	✓
☐ Request user list	20 s.	0.1	✓
☐ Check that required services are running	180 s.	2.4	✓
☐ Request list of networks	20 s.	0.2	✓
☐ Functional tests. Duration 3 min - 14 min	Expected Duration	Actual Duration	Status
☐ Create instance flavor	30 s.	2.2	✓
☐ Check create, update and delete image actions using Glance v2	70 s.	4.4	✓
☐ Create volume and boot instance from it	350 s.	72.8	✓
☐ Create volume and attach it to instance	350 s.	84.8	✓

☐	Check network connectivity from instance via floating IP	300 s.	109.3	✓
☐	Create keypair	25 s.	1.2	✓
☐	Create security group	25 s.	1.1	✓
☐	Check network parameters	50 s.	0.2	✓
☐	Launch instance	200 s.	25.2	✓
☐	Launch instance with file injection	200 s.	29.6	✓
☐	Launch instance, create snapshot, launch instance from snapshot	300 s.	52.6	✓
☐	Create user and authenticate with it.	80 s.	5.5	✓
☐	HA tests. Duration 30 sec - 8 min	Expected Duration	Actual Duration	Status
☐	Check state of haproxy backends on controllers	10 s.	—	—
☐	Check data replication over mysql	10 s.	—	—
☐	Check if amount of tables in databases is the same on each node	10 s.	—	—
☐	Check galera environment state	10 s.	—	—
☐	Check pacemaker status	10 s.	—	—
☐	RabbitMQ availability	100 s.	—	—
☐	RabbitMQ replication	100 s.	—	—
☐	Platform services functional tests. Duration 3 min - 60 min	Expected Duration	Actual Duration	Status
☐	Typical stack actions: create, delete, show details, etc.	560 s.	39.3	✓
☐	Advanced stack actions: suspend, resume and check	660 s.	58.4	✓
☐	Check stack rollback	310 s.	105.0	✓
☐	Update stack actions: inplace, replace and update whole template	950 s.	80.1	✓

☐ Cloud validation tests. Duration 30 sec - 2 min	Expected Duration	Actual Duration	Status
☐ Check disk space outage on controller and compute nodes	20 s.	0.8	✓
☐ Check log rotation configuration on all nodes	20 s.	0.5	✓
☐ Configuration tests. Duration 30 sec - 2 min	Expected Duration	Actual Duration	Status
☐ Check usage of default credentials on master node	20 s.	41.6	✓
☐ Check if default credentials for OpenStack cluster have changed	20 s.	0.0	✓
☐ Check usage of default credentials for keystone on master node	20 s.	0.1	✓

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6.3.2 Other manually testing result screenshots.

We want to check that all the volume operations for Huawei OceanStor_V3 volume type are working normally. The volumes used in following test cases are all created in OceanStor_V3 volume type.

a. Created cirros image list on OpenStack Dashboard. We use the default cirros image which created by installing OpenStack cloud environment for creating volume from image test case.

The screenshot shows the OpenStack Dashboard interface. The main content area is titled 'Images' and displays a table with the following data:

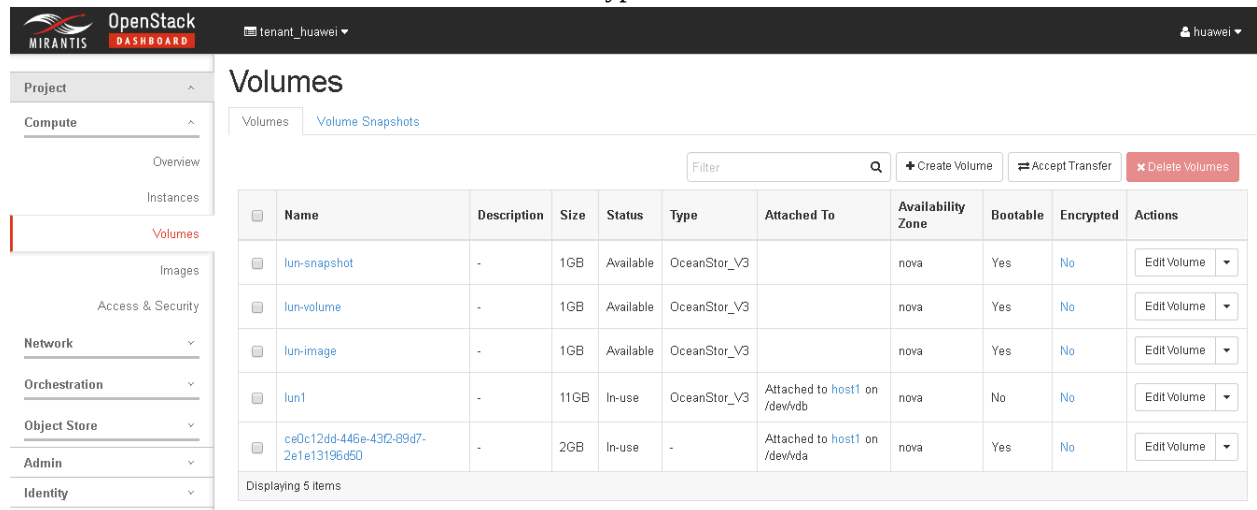
Image Name	Type	Status	Public	Protected	Format	Size	Actions
TestVM	Image	Active	Yes	No	QCOW2	12.7 MB	Launch Instance

Below the table, it says 'Displaying 1 item'. The left sidebar contains a navigation menu with options: Project, Compute, Overview, Instances, Volumes, Images (highlighted), Access & Security, Network, Orchestration, Object Store, Admin, and Identity.

b. Volume operations: Created OceanStor_V3 type volume list on Openstack Dashboard.

- Create empty volume: create a empty volume from OceanStor_V3 volume type.
- Create volume from image: create a volume from cirros image.
- Create volume from snapshot: take a snapshot for a specific volume and create a volume from the snapshot.
- Create volume from volume: create a volume from an OceanStor_V3 volume.
- Delete: delete an OceanStor_V3 type volume.
- Modify: modify the size of a OceanStor_V3 type volume.

The volume list created in OceanStor_V3 volume type.

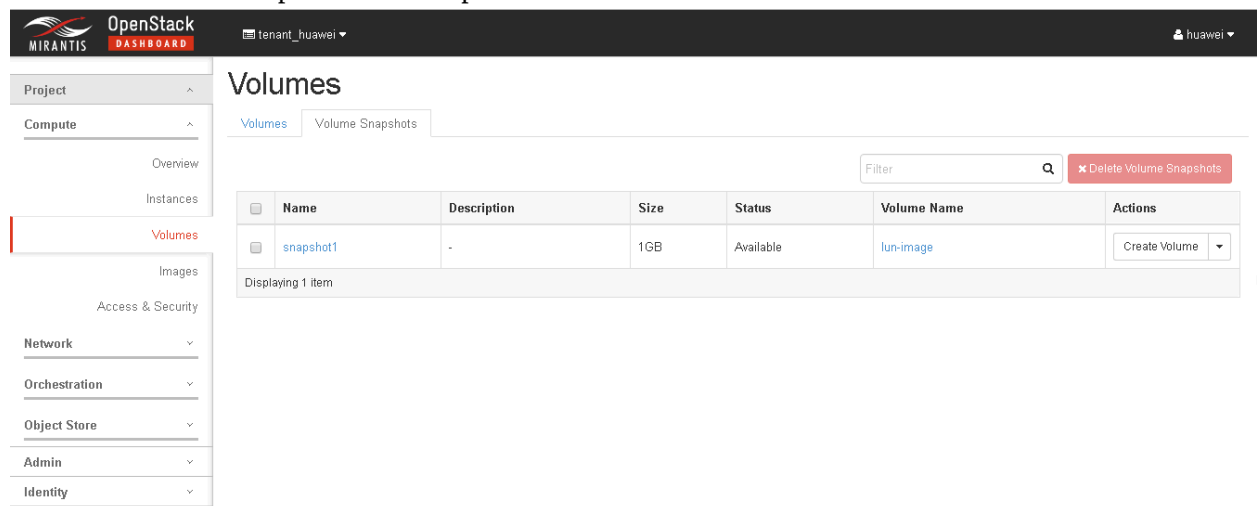


The screenshot shows the OpenStack Dashboard interface. The left sidebar contains navigation links: Project, Compute, Overview, Instances, Volumes (highlighted in red), Images, Access & Security, Network, Orchestration, Object Store, Admin, and Identity. The main content area is titled 'Volumes' and has tabs for 'Volumes' and 'Volume Snapshots'. Below the tabs is a search bar and three buttons: '+ Create Volume', 'Accept Transfer', and 'Delete Volumes'. A table lists five volumes:

Name	Description	Size	Status	Type	Attached To	Availability Zone	Bootable	Encrypted	Actions
lun-snapshot	-	1GB	Available	OceanStor_V3		nova	Yes	No	Edit Volume
lun-volume	-	1GB	Available	OceanStor_V3		nova	Yes	No	Edit Volume
lun-image	-	1GB	Available	OceanStor_V3		nova	Yes	No	Edit Volume
lun1	-	11GB	In-use	OceanStor_V3	Attached to host1 on /dev/vdb	nova	No	No	Edit Volume
ce0c12dd-446e-43f2-89d7-2e1e13196d50	-	2GB	In-use	-	Attached to host1 on /dev/vda	nova	Yes	No	Edit Volume

Displaying 5 items

c. Created Volume Snapshots list on Openstack Dashboard.

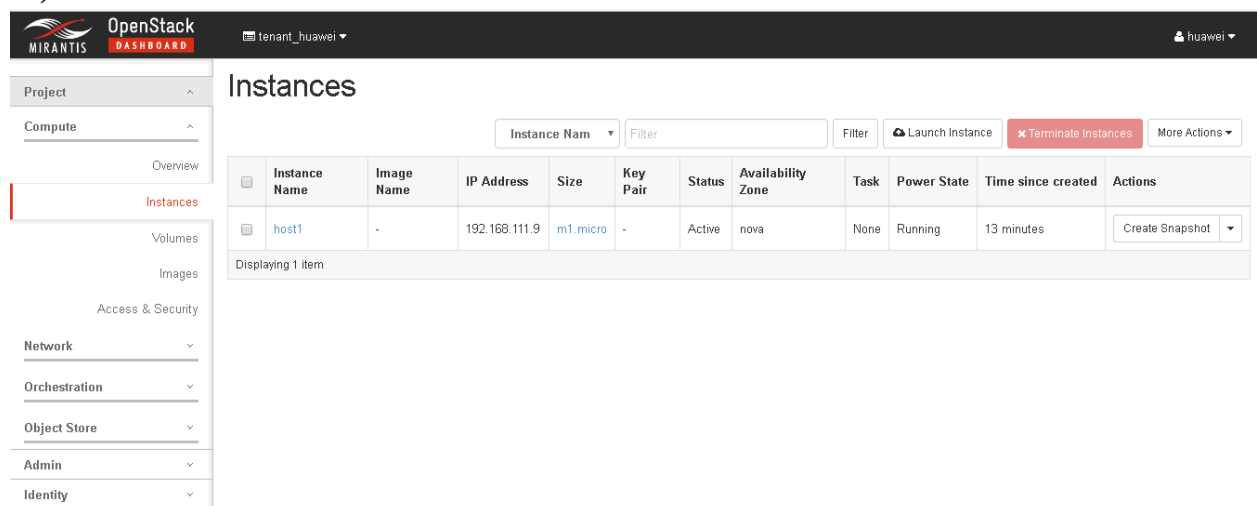


The screenshot shows the OpenStack Dashboard interface with the 'Volume Snapshots' tab selected. The table lists one snapshot:

Name	Description	Size	Status	Volume Name	Actions
snapshot1	-	1GB	Available	lun-image	Create Volume

Displaying 1 item

d. Created Instances with OceanStor_V3 volumes on Openstack dashboard. (Also checked delete, modify, etc)



The screenshot shows the OpenStack Dashboard interface with the 'Instances' tab selected. The table lists one instance:

Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created	Actions
host1	-	192.168.111.9	m1.micro	-	Active	nova	None	Running	13 minutes	Create Snapshot

Displaying 1 item

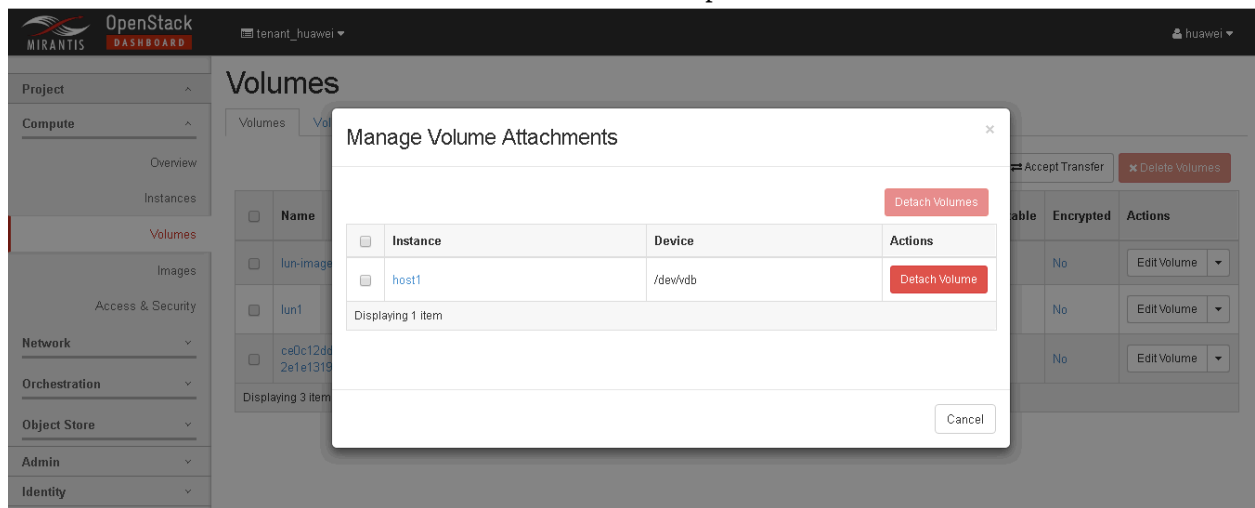
VM instance console screenshot on Openstack dashboard.

```
100.115.100.23:6080/vnc_auto.html?token=1975c7fc-17bb-4a2b-8358-436fd527bc71&title=host1(7c59bd4d-3b34-447d-b7f5-9cd15e8a0d06)
Connected (unencrypted) to: QEMU (instance-00000015)
Send Ctrl+Alt+Del

further output written to /dev/ttyS0

login as 'cirros' user, default password: 'cubswin:)'. use 'sudo' for root.
host1 login: [ 490.320990] pci 0000:00:00.0: no hotplug settings from platform
[ 490.322120] pci 0000:00:01.0: no hotplug settings from platform
[ 490.323275] ata_piix 0000:00:01.1: no hotplug settings from platform
[ 490.324513] uhci_hcd 0000:00:01.2: no hotplug settings from platform
[ 490.325710] pci 0000:00:01.3: no hotplug settings from platform
[ 490.326867] pci 0000:00:02.0: no hotplug settings from platform
[ 490.327996] virtio-pci 0000:00:03.0: no hotplug settings from platform
[ 490.329241] virtio-pci 0000:00:04.0: no hotplug settings from platform
[ 490.330421] virtio-pci 0000:00:05.0: no hotplug settings from platform
[ 490.331646] pci 0000:00:06.0: no hotplug settings from platform
[ 490.335515] ACPI: PCI Interrupt Link [LNKB] enabled at IRQ 11
[0]B[0]A[0]A
Password:
Login incorrect
host1 login:
host1 login: host1 login: host1 login: cirros
Password:
Login incorrect
host1 login: _
```

e. Attach/detach an OceanStor_V3 volume to instance on Openstack Dashboard



```
100.115.100.23:6080/vnc_auto.html?token=30400bbc-adc2-4538-b8ca-a5a5dd90bbcd&title=host1(7c59bd4d-3b34-447d-b7f5-9cd15e8a0d06)
Connected (unencrypted) to: QEMU (instance-00000015)
Send Ctrl+Alt+Del

Password for root changed by root
$ su - root
Password:
# fdisk -l

Disk /dev/vda: 2147 MB, 2147483648 bytes
255 heads, 63 sectors/track, 261 cylinders, total 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/vda1  *        16065       4192964       2088450    83  Linux

Disk /dev/vdb: 11.8 GB, 11811160064 bytes
16 heads, 63 sectors/track, 22885 cylinders, total 23068672 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

Disk /dev/vdb doesn't contain a valid partition table
#
```

7. Appendix.

7.1 How to download Huawei Volume Driver software.

Visiting https://github.com/huaweistorage/OpenStack_Driver/tree/master

7.2 How to get the Huawei Volume Driver configuration guide

https://github.com/huaweistorage/OpenStack_Driver/blob/master/ReleaseDoc/en/OpenStack%20Cinder%20Driver%20Configuration%20Guide.pdf

7.3 How to get the Huawei Storage document

Visiting <http://e.huawei.com/en/products/cloud-computing-dc/storage>