



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

Product Name: Driver Version: MOS Version: OpenStack Version: Product Type: Huawei Volume Driver Mitaka 9.0 Mitaka Cinder Driver

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Document History

Version	Revision Date	Description
0.1	12-02-2016	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 9.0. 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 and 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.
- \diamond Deploy MOS Slave nodes on Fuel UI
- \diamond Run Fuel Health Check, make sure all cases pass.
- ♦ Manually integrated Huawei OceanStor V3 storage and Huawei Volume driver with MOS.
- ♦ Run Fuel Heath 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	eth0
	1	
E0/0/6	Fuel Master	eth1
E0/0/7	Controller Node 1	eth1
E0/0/8	Compute&Cinder Node	eth1
	1	

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-9.0.iso through IPMI on one Huawei RH2285 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	100.115.114.14	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.
- \diamond Change default root password to make sure Fuel Health Check cases pass.
- \diamond Save and Quit Setup and boot the Fuel Master Node.
- ♦ When the installation is done Fuel UI become available at https://100.115.114.14:8443 as below.
 ♦ A A P A A P E



5.3 Creation of OpenStack environment

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

- Name: Mirantis9.0
- OpenStack release: Mitaka 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: <u>https://docs.mirantis.com/openstack/fuel/fuel-9.0/quickstart-guide.html#quickstart-guide</u>

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



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.

y OpenStack	Create a new OpenS	Stack environment		×
/irantis9	Name and Release	Block Storage:	Object Storage:	
odes: PU (cores):	Compute	LVM Use default storage providers	■ Ceph ● Use Ceph as backend for Swift object	s
AM: DD:	Networking Setup	Ceph 🕑 Use Ceph as backend for Cinder volumes		
New	Storage Backends	lauran Stewart	Endermand Stevenses	
	Additional Services	Ceph 📀	Ceph 🖸	
	Finish	Use Ceph as backend for Glance images	Use Ceph as backend for Nova	

6) Select the additional services and click on next.



5.4 MOS Installation

5.4.1 Add the bootstrap source

root@node-6:~# fuel-bootstrap build –activate

5.4.2 Make the mirror source

root@node-6:~# fuel-createmirror

5.4.3 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.

Dashboard Nodes	Networks Setting	s Logs	Health Check			
	ŢQ		Configure Disks	Configure Interfaces	💼 Delete 📝 Edit Roles	+ Add Nodes
Sort By Roles						
						Select All
Controller (1)						Select All
)4:93)		B ()	PENDING ADDITION	CPU: 4(4) RAM: 24.0 GB HI	DD: 300.0 GB 🔅
Compute, Cinder, Ope	erating System (1)					Select All
	18:12) IDER · BASE-OS		b 0	PENDING ADDITION	CPU: 4(4) RAM: 24.0 GB HE	DD: 400.0 GB 🔅
Copyright © 2013-2016 Mirantis. All righ Version: 9.0	nts reserved.	i quanti o pu				
			•			
Dashboard Nodes	Networks Setting		Health Check			
sda (disk/by-path/pci-0000:	00:10.0-scsi-0:0:0:0)	8: <i>と)</i> Total Space : 199.3	GB		E	Boot from this disk 💿
Base System 52.0 GB				Cinder 147.3 GB		×
sdb (disk/by-path/pci-0000:	00:10.0-scsi-0:0:1:0)	Total Space : 199.3	GB		E	Boot from this disk
Cinder × 26.0 GB			Virtua 17	Il Storage 3.3 GB		
Back To Node List					Load Defaults Cancel Cha	nges Apply
Copyright © 2013-2016 Mirantis. All rig Version: 9.0	thts reserved.					

Compute Node (48:12) network interfaces configuration:

Image: Construction of the sector of the
Configure interfaces on Untitled (48:12)
Bond Interfaces Unbond Interfaces
ens160
MAC: 00:50:56:80:48:12 Speed: N/A Admin (PXE) Admin (PXE) Public Management VLAN ID:101 VLAN ID:101 VLAN ID:101
Offloading Modes: Default MTU: Default
ens192
MAC: 00:50:56:80:5e:28 Speed: N/A Storage
Offloading Modes: Default MTU: Default
Controller node (04:93) disks configuration:
Image: Construction of the second
Configure disks on Untitled (04:93)
sda (disk/by-path/pci-0000:00:10.0-scsi-0:0:0:0) Total Space : 149.2 GB Boot from this disk •
420 GB 100 GB 66.2 GB 200 GB 110 GB
sdb (disk/by-path/pci-0000:00:10.0-scsi-0:0:1:0) Total Space : 149.2 GB Boot from this disk
image storage * 149.2 GB
Back To Node List Load Defaults Cancel Changes Apply
Copyright © 2013-2016 Mirantis. All rights reserved. ∕ersion: 9 0

Controller node (04:93) network Interfaces configuration:

Dashboard	Nodes	Networks	Ö Settings	Logs	Health Che	ck			
Configu	ire interfa	ces on U	ntitled (C)4:93)					
								Bond Interfaces	Unbond Interfaces
ens16	50								
S S	MAC: 00:50:56:80:04 Speed: N/A	:93	Admin (PXE) Pu Vlan	iblic HD:102	Management VLAN ID:101	Private VLAN IDs:1000-1030		
Offloading	g Modes: <u>Defaul</u> i	MTU: <u>Def</u>	ault						~
ens19	92								
S	MAC: 00:50:56:80:16 Speed: N/A	:43	Storage						
Offloading	g Modes: <u>Defaul</u> i	: MTU: <u>Def</u>	ault						~

5.4.4 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	W Health Check					
Network Settings (Neutron with VLAN segmentation) + Add New Node Network Group										
Node Netw default	rork Groups	defaul This node r	t 🖍 network group	uses a shared a	admin network	and cannot be del	eted			
Settings		Public (9							
Neutror	n L2	The Public ne from VMs to t	twork allows inbo he external netwo	und connections to orks.	VMs (Controllers	and Tenant VMs) from	external networks (e.g., th	ie Internet) as well as i	outbound connections	
Neutror	n L3	CIDR		100.115.0	0.0/16		Use the whole CIDF	2		
Other				Start			End			
Network Ve	erification	IP Range		100.115.1	114.54		100.115.114.104		•	
Connectivity Check		Gateway		100.115.0.1						
		Use VLAN to	agging	102						

	The Storage network is used	to provide storage services such as replica	tion traffic from Ceph. The Management network is used f	om Ceph. The Management network is used for Ceph Public traffic.		
	CIDR	192.168.1.0/24	Use the whole CIDR			
		Start	End			
	IP Range	192.168.1.1	192.168.1.254	•		
	Use VLAN tagging					
	Management 🕄)				
	The Management network is	primarily used for OpenStack Cloud Manag	gement. It is used to access OpenStack services (nova-api,	OpenStack dashboard, etc).		
	CIDR	192.168.0.0/24	✓ Use the whole CIDR			
		Start	End			
	IP Range	192.168.0.1	192.168.0.254	•		
	Use VLAN tagging	✓ 101				
	55 5					
			Cancel C	hanges Save Settings		
right © 2013-2016 Mirantis. All ri; on: 9.0	ghts reserved.		Cancel C	hanges Save Settings		
right © 2013-2016 Mirantis. All ri on: 9 0 @@@ ashboard Nodes	ghts reserved.	Logs Health Check	Cancel G	Save Settings		
ight © 2013-2016 Mirantis. All ri in: 9.0 Shboard Nodes	ghts reserved.	Logs Health Check	Cancel C	hanges Save Settings		
ight © 2013-2016 Mirantis. All ri m: 9.0 Shboard Nodes Jetwork Settings	ghts reserved. Networks Settings S (Neutron with VLAN	Logs Health Check	Cancel C + Add N	ew Node Network Group		
ight © 2013-2016 Mirantis. All ri n: 9.0 Shiboard Nodes Vetwork Settings ode Network Groups	ghts reserved. Networks Settings S (Neutron with VLAN Neutron L2 Conf	Logs Health Check segmentation)	tancel (ew Node Network Group		
ight © 2013-2016 Mirantis. All ri n: 9.0 Shboard Nodes Jetwork Settings ode Network Groups default	ghts reserved. Networks S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges fortenant	Logs Health Check Segmentation) figuration @ ypes of network segmentation such as VLAN t separation and the Base MAC address.	Lancel C Add N J, GRE, VXLAN etc. This section is specific to VLAN segment	ew Node Network Group		
Ight © 2013-2016 Mirantis. All ri m: 9.0 Shiboard Nodes Vetwork Settings ode Network Groups default ettings	ghts reserved. Networks S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges for tenant	Logs Health Check segmentation) figuration @ ypes of network segmentation such as VLAN t separation and the Base MAC address.	Add N	ew Node Network Group ation related parameters such		
Ight © 2013-2016 Mirantis. All ri m: 9.0 Subboard Nodes Network Settings ode Network Groups default ettings Neutron L2	ghts reserved. Networks Settings S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges	Image: book state Image: book state Segmentation) Image: book state figuration Image: book state Image: book state ypes of network segmentation such as VLAN is separation and the Base MAC address. Start End 1000 1030	Add N I, GRE, VXLAN etc. This section is specific to VLAN segment	ew Node Network Group		
ght © 2013-2016 Mirantis. All ri m: 9.0 Subboard Nodes Jetwork Settings default ettings Neutron L2 Neutron L3	chts reserved. Networks Settings S (Neutron with VLAN Neutron L2 Conf Neutron L2 Conf Neutron supports different ty as VLAN ID range Base MAC address	Logs Health Check Segmentation) figuration © ypes of network segmentation such as VLAN t separation and the Base MAC address. Start End 1000 1030 fa:16:3e:00:00:00	A GRE, VXLAN etc. This section is specific to VLAN segment	ew Node Network Group		
Ight © 2013-2016 Mirantis. All ri, m: 9.0 Shiboard Nodes Network Settings ode Network Groups default ettings Neutron L2 Neutron L3 Other	ghts reserved. Stream Settings S (Neutron with VLAN) Neutron L2 Conf Neutron supports different ty as VLAN ID ranges for tenant VLAN ID range Base MAC address	Image: Degree table Image: Degree table Segmentation) Figuration Image: Degree table figuration Image: Degree table Image: Degree table separation and the Base MAC address. Image: Degree table Start Image: Degree table 1000 1030 fa:16:3e:00:00:00 Image: Degree table	+ Add N	ew Node Network Group ation related parameters such		
ight © 2013-2016 Mirantis. All ri sabboard Nodes Nodes Nodes Network Settings Ode Network Groups Odefault ettings Neutron L2 Neutron L3 Other ettwork Verification	ghts reserved. Retworks Settings S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges Base MAC address	Image: Degs Image: Degs Segmentation) Figuration Image: Degaration and the Base MAC address. Start End 1000 1030 fa:16:3e:00:00:00 Fa:16:3e:00:00:00	Add N	ew Node Network Group ation related parameters such		
Ight © 2013-2016 Mirantis. All ri white 9.0 Weight Work Settings ode Network Groups default ettings Neutron L2 Neutron L3 Other etwork Verification Connectivity Check	ghts reserved. Networks Settings S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges fortenant VLAN ID range Base MAC address	Image: Constraint of the segment at	Add N	ew Node Network Group ation related parameters such		
Ight © 2012-2016 Mirantis. All ri shboard Nodes Nodes Nodes Nodes Network Settings Ode Network Groups default ettings Neutron L2 Neutron L3 Other etwork Verification Connectivity Check	ghts reserved. Retworks Settings S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID ranges Base MAC address	Logs Health Check segmentation) Figuration © figuration © Start Start End 1000 1030 fa:16:3e:00:00:00 Fa:16:3e:00:00:00	Add N	ew Node Network Group ation related parameters such		
Ight © 2013-2016 Mirantis. All rt m: 9.0	ghts reserved. Networks S (Neutron with VLAN Neutron L2 Conf Neutron supports different ty as VLAN ID range Base MAC address	Logs Health Check segmentation) Figuration © right of the work segmentation such as VLAN to separation and the Base MAC address. Start End 1000 1030 fa:16:3e:00:00:00	Add N	ew Node Network Group ation related parameters such		

Dashboard Nodes	Networks	Elegs Health Check								
Network Setting	S (Neutron with VLAN segm	nentation)	I	+ Add New Node Network Group						
Node Network Groups	Floating Network Parameters 🚱									
default	This network is used to assign Floating IPs to tenant VMs.									
Settings		Start	End							
Neutron L2	Floating IP range	100.115.114.105	100.115.114.155							
Neutron L3	Floating network name	admin_floating_net								
Other	Admin Tenant Netwo	ork Parameters 😮								
Network Verification	This Admin Tenant network provide	s internal network access for instances. It can be	used only by the Admin tenant.							
Connectivity Check	Admin Tenant network CIDR	192.168.111.0/24								
	Admin Tenant network gateway	192.168.111.1								
	Admin Tenant network name	admin_internal_net								
	Guest OS DNS Serve	ers 😮								
	This setting is used to specify the up servers outside the environment.	ostream name servers for the environment. These	e servers will be used to forward [ONS queries for external DNS names to DNS						
	Guest OS DNS Servers	10.20.0.2	•							
Dashboard Nodes	Image: Networks Image: Settings	Logs Health Check								
Network Setting	S (Neutron with VLAN segm	nentation)		Add New Node Network Group						
Node Network Groups	Connectivity Check									
default Settings Neutron L2 Neutron L3 Other	€ ⊙ e									
Network Verification 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. You	ir network is configured correctly.								

5.4.5 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.

Dashboard	Nodes	Networks	Settings	Logs	W Health Check					
OpenS [.]	OpenStack Settings									
General		OpenStac	ck Access							
Security	r.	Username		huawei				Username for Administrator		
Comput	e									
Storage		Password		*****		<	۲	Password for Administrator		
Logging		Tenant		admin_hu	awei			Tenant (project) name for Administrator		
OpenSta Services	ack ;	Email		huawei@l	ocalhost			Email address for Administrator		
Reposit	ories									

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.

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/mitaka-9.0/ubun	1150	•

Add Extra Repo

Dashboard Nodes	Image: Networks Image: Settings Image: Set
OpenStack Sett	tings
General	Common
Security Compute Storage Logging OpenStack Services	 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.
OnenStack Set	Networks Settings Logs Health Check
General	Common
Security Compute	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.
Logging	Storage Backends
OpenStack Services	 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) Ceph RBD for images (Glance)

Dashboard Node	es Networks Settings Logs Health Check
OpenStack S General Security	Additional Components
Compute Storage Logging	If selected, Sahara component will be installed Install Murano If selected, Murano component will be installed If selected install Ceilometer
OpenStack Services	If selected, Ceilometer component will be installed Use external Mongo DB If selected, You can use external Mongo DB as ceilometer backend Install Ironic If selected, Ironic component will be installed

5.4.6 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)	10.20.0.10	10.20.0.3
eth1(br- ex/public)	IP: 100.115.114.55	100.115.114.56
eth1 (br-mgmt)	192.169.0.3	192.169.0.4
eth1 (br-storage)	192.168.1.1	192.168.1.2

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.

Compute Node



Huawei OceanStor V3 Storage

- 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

DpenStack_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 Mitaka folder to /usr/lib/python2.7/dist-

packages/cinder/volume/drivers/huawei/.

After you done, all files should show as below:

root@node-S	5:/u	usr/li	ib/py1	thon2.7	7/dis	t-p	backage	es/cinder/volume/drivers/huawei# ll
total 396								
drwxr-xr-x	З	root	root	4096	Dec	6	10:55	./
drwxr-xr-x	23	root	root	4096	Dec	6	10:56	/
- rw- r r	1	root	root	3434	Dec	6	10:55	constants.py
drwxr-xr-x	2	root	root	4096	Dec	6	10:55	extend/
- rw- r r	1	root	root	11163	Dec	6	10:55	fc_zone_helper.py
- rw- r r	1	root	root	10577	Dec	6	10:55	huawei_conf.py
- rw- r r	1	root	root	91780	Dec	6	10:55	huawei_driver.py
- rw- r r	1	root	root	26672	Dec	6	10:55	huawei_t.py
- rw- r r	1	root	root	3390	Dec	6	10:55	huawei_utils.py
- rw- r r	1	root	root	14811	Dec	6	10:55	hypermetro.py
- rw- r r	1	root	root	33	Dec	6	10:55	initpy
- rw- r r	1	root	root	23397	Dec	6	10:55	replication.py
- rw- r r	1	root	root	84774	Dec	6	10:55	rest_client.py
- rw- r r	1	root	root	8867	Dec	6	10:55	smartx.py
- rw- r r	1	root	root	94052	Dec	6	10:55	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.

- a. In */etc/cinder*, use *vi* command to create a Huawei-customized driver configuration file names *"/etc/cinder_huawei_conf.xml"*.
- b. Configure parameters in the driver configuration file. You must change the 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%20 Cinder%20Driver%20Configuration%20Guide.pdf

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, <u>https://x.x.x.8088/devicemanager/rest/</u> . 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

Table 1 Mandatory parameters

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
LUNcopyWaitI nterval	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:

€ 3 100.115.113.11/	orizon/admin/vo	slumes/				7	▼ Ĉ		ዖ ☆	â ♣ ♠ ♥ ☰
MIRANTIS DASH	Stack	🖬 admin_hu	iawel 🗸 📈	×				A. D.		🔺 🔺 huawei 🔻
Project	~	Volun	nes							
Admin	^	Volumes	Volume Types	Volume Snapshots						
System		Volume	Types				Filter	۹	+ Create Volume Type	Delete Volume Types
	Overview	NAME			DESCRIPTION	ASSOCIATED QOS SPEC		ENCRYPTI	ON	ACTIONS
H	rpervisors	Oceans	Stor_V3							Create Encryption 💌
Host A	ggregates	volume	es_block_device							Create Encryption 👻
	Instances	volume	es_lvm							Create Encryption 👻
	Volumes	Displaying 3 if	tems							
	Flavors	005 500								+ Crosto Oni Spor
	Images	NAME	:05	CON	ISUMER	SPECS		ACTIONS		+ create dos spec
	Networks					No items to display.				
	Routers									
	Defaults									
Metadata D	ennitions									
System In	formation									
Identity	Ý									

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 <u>6.3.1</u>

• Other manually test c	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	х	Х

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.

Image: Section of the section of t			
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	4
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
HA tests. Duration 30 sec - 8 min Check state of haproxy backends on controllers	Expected Duration	Actual Duration	Status —
HA tests. Duration 30 sec - 8 min Check state of haproxy backends on controllers Check data replication over mysql	Expected Duration 10 s. 10 s.	Actual Duration — —	Status —
HA tests. Duration 30 sec - 8 min Check state of haproxy backends on controllers Check data replication over mysql Check if amount of tables in databases is the same on each node	Expected Duration 10 s. 10 s. 10 s.	Actual Duration	Status
HA tests. Duration 30 sec - 8 min Check state of haproxy backends on controllers Check data replication over mysql Check if amount of tables in databases is the same on each node Check galera environment state	Expected Duration 10 s. 10 s. 10 s. 10 s. 10 s.	Actual Duration	Status — — —
HA tests. Duration 30 sec - 8 min Check state of haproxy backends on controllers Check data replication over mysql Check if amount of tables in databases is the same on each node Check galera environment state Check pacemaker status	Expected Duration 10 s. 10 s. 10 s. 10 s. 10 s. 10 s. 10 s.	Actual Duration	Status — — — —

RabbitMQ replication

100 s.

_

_

Platform services functional tests. D	uration 3 min - 60 min	Expected Duration	Actual Duration	Status
Typical stack actions: create, delete, s	how details, etc.	720 s.	44.3	
Advanced stack actions: suspend, res	ume and check	900 s.	75.4	1
Check stack rollback		470 s.	110.6	
Update stack actions: inplace, replace	e and update whole template	1300 s.	103.9	
Check creation of stack with Wait Cor	dition/Handle resources	820 s.	34.2	
_				
Cloud validation tests. Duration 30 s	sec - 2 min	Expected Duration	Actual Duration	Status
Check disk space outage on controlle	r and compute nodes	20 s.	0.6	
Check log rotation configuration on a	ll nodes	20 s.	0.4	
Configuration tests. Duration 30 sec	- 2 min	Expected Duration	Actual Duration	Status
Check usage of default credentials or	n master node	20 s.	48.2	
Check if default credentials for Open	Stack cluster have changed	20 s.	0.0	
Check usage of default credentials fo	r keystone on master node	20 s.	0.0	1
opyright © 2013-2016 Mirantis. All rights reserved. ersion: 9.0				

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.

€ 3 100.11	00.115.113.11/horizon/project/images/							T C 📓 - E8		▶ ☆ 自 🖡 🎓 🗩 🚍		
MIRANTIS	OpenStack DASHBOARD	admin_huawei 🗸	$M \times .$	·· .· ·/			Mr.			1- into		🛔 huawei 🔻
Project	^	Images										
Compute	^							Project (0)	🖻 Shared with Me (0)	🔮 Public (1)	+ Create Image	Delete Images
	Overview	IMAGE NAME	ТҮ	PE	STATUS	PUBLIC	PROTECTED		FORMAT	SIZE		ACTION5
	Instances	TestVM	Im	age	Active	Yes	No		QCOW2	21.5 N	ИВ	Launch 👻
	Volumes	Displaying 1 item										
	Images											
	Access & Security											
Network	~											
Orchestratio	~ nc											
Object Store	• · ·											
Admin	~											
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.

MIRANTIS	OpenStack DASHBOARD	🖬 admin_huawei 🕶		X	A.		M.	•	XV			🛔 huawei 🔻
Project	^	Volumes										
Compute	^	Volumes Volume Snapshots Volume Consi	istency Groups									
	Overview							Filter	۹	+ Create Volume	≓ Accept Transfer	Delete Volumes
	Instances	NAME	DESCRIPTION	SIZE	STATUS	TYPE	ATTACHED TO		AVAILABILITY Z	ONE BOOTABLE	ENCRYPTED	ACTIONS
	Volumes	Iun-snapshot		1GiB	Available	OceanStor_V3			nova	Yes	No	Edit Volume 💌
	Images	Iun-volume		1GiB	Available	OceanStor_V3			nova	Yes	No	Edit Volume 💌
A	ccess & Security	Iun-image		1GiB	Available	OceanStor_V3			nova	Yes	No	Edit Volume 👻
Network		🗆 lun1		90GiB	In-use	OceanStor_V3	Attached to host1 or	n /dev/vdb	nova	No	No	Edit Volume 💌
Orchestration	<u> </u>	C8dcbee0-24c1-4276-a684-1969b93e728e		1GIB	In-use		Attached to host1 or	n /dev/vda	nova	Yes	No	Edit Volume 💌
Object Store	~	Displaying 5 items										
Admin	~											
Identity	~											

c. Created Volume Snapshots list on Openstack Dashboard.

MIRANTIS OpenStack	🖬 admin_huawei 👻	X		Mer.	···· ···	🔺 huawei 🔻
Project ^	Volumes					
Compute ^	Volumes Volume Snapshots	Volume Consistency Groups				
Overview					Filter	Q Delete Volume Snapshots
Instances	NAME	DESCRIPTION	SIZE	STATUS	VOLUME NAME	ACTIONS
Volumes	shapshot1		1GiB	Available	lun-image	Create Volume 💌
Images	Displaying 1 item					
Access & Security						
Network ~						
Orchestration ~						
Object Store v						
Admin ~						
Identity ~						

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

MIRANTIS DASHBO	tack	🖬 admin_huawei 🔹 💦 👘		KA A		M.	X	····	1/			🖴 huawei 🔻
Project	^	Instances										
Compute	~					Instance Na	ame = 💌			Filter 🗳 Laun	ich Instance 🛛 🛍 Delete Ins	tances More Actions 🕶
0.	verview	INSTANCE NAME	IMAGE NAME	IP ADDRESS	SIZE	KEY PAIR	STATUS	AVAILABILITY ZONE	TASK	POWER STATE	TIME SINCE CREATED	ACTIONS
In	stances	D host1		192.168.111.9	m1.tiny	-	Active	nova	None	Running	1 minute	Create Snapshot 👻
X	'olumes Images	ost1_test-server-smoke-file_inj-1844574281	TestVM	192.168.111.8 Floating IPs: 100.115.113.115	m1.micro		Active	nova	None	Running	5 minutes	Create Snapshot 👻
Access & S	Security	Displaying 2 items										
Network	·											
Orchestration	<u> </u>											
Object Store	~											
Admin	×											
Identity	Ý											

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

										🗳 huaw	
Project ^	Volumes	Mar	Manage Volume Attachments 🛛 🕺								
					Detach Volumes						
	volumes volume snapshots		INSTANCE	DEVICE	ACTIONS						
Overview		0	host1	/dev/vdb	Detach Volume	Q	Create Volume	Accept Transfer	10 Del	ete Volum	es
Instances		Displa	aving 1 item			AILABILITY ZU	JNE BUULABL	E ENCRIPTED	ACTIO	42	
Volumes			-)			ма	No		Edit \	olume	•
Images	c8dcbee0-24c1-4276-a684-1969) ak				wa	Yes	No	Edit \	olume	•
Access & Security	Displaying 2 items				Cancel						
Network ~					Canter						
Orchestration *											
Object Store											
Admin											
Identity											
👻 🖗 100.115.113.1116080/mc_auto.htmi?toke=146d5810-cc5e-4b5c-ac25-650407eebe968bHe=host1(70e7/hb6-a80b-4809-b1cc-497b212d50e9) 🔍 🖸 📓 - 🖬								▶ ☆ 🖻	+ 1	9	=
Connected (unencrypted) to: OEMU (instance 00000009)						_	_	_	S	end CtrlAl	ltDel
		Disk / Units: Sector I/O siz Diskla	devvoda: 1 GiB, 1073741824 byt sectors of 1 * 512 = 512 byte size (logical/physical): 512 ze (minimum/optimal): 512 byte bel type: dos dentifier: 0x00000000	es, 2097152 sectors s bytes / 512 bytes s / 512 bytes							
		Device /dev/v	e Boot Start End Sector da1 * 2048 2097118 209507	s Size Id Type 1 1023M 83 Linux							
		Disk / Units: Sector I/O sis Disklai Disk i Disk / Units:	<pre>devvvdb: 64 HiB, 67108864 byte sectors of 1 = 512 = 512 byte size (log(cal/physical)) = 512 sectors of 1 = 512 byte dentifier: 0x0000000 devvdc: 90 618, 96636764160 b sectors of 1 = 512 byte</pre>	s, 131072 sectors s bytes / 512 bytes s / 512 bytes ytes, 188743680 sectors							
		Sector I∕O si: #	ze (minimum/optimal): 512 ze (minimum/optimal): 512 byte	bytes / 512 bytes s / 512 bytes							

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