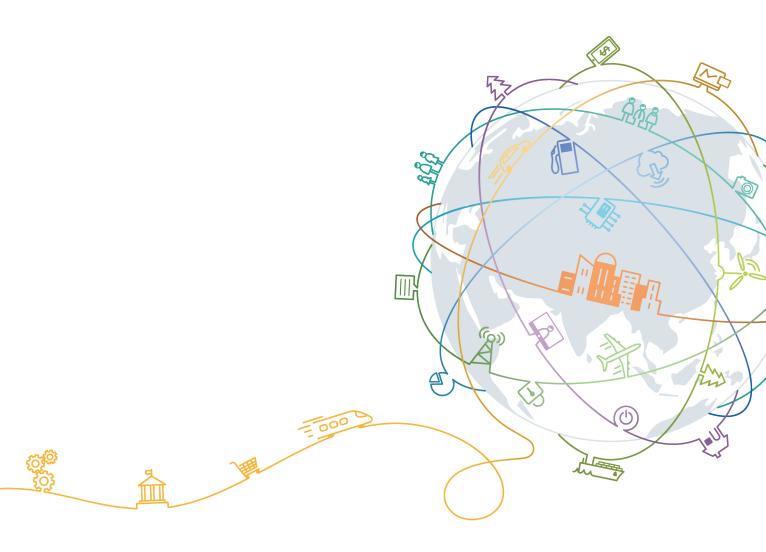
Configuration Guide

FusionStorage OpenStack Driver

Issue 01

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Overview

This chapter describes the definition of Cinder Driver.

Cinder Driver is a plug-in that is deployed on the OpenStack Cinder module. The plug-in can be used to provide functions such as the logical volume and snapshot for virtual machines (VMs) in OpenStack.

2 Version Mappings

This chapter describes the version mappings among Cinder Driver, FusionStorage, and OpenStack.

Version mapping between OpenStack and storage products

OpenStack Version	Storage Product Version
Ocata	FusionStorage V100R006C30
Pike	FusionStorage V100R008C00
Queens	OceanStor 100D 8.0.2/8.0.3
Rocky	
Stein	
Train	

■ NOTE

Pike and Queens only supports iSCSI protocol.

Mappings among Cinder Driver, features, and the OpenStack version ($\sqrt{}$: supported, x: not supported)

Feature	Ocat a	Pike	Quee ns	Rock y	Stein	Train
Create Volume	√	√	√	√	√	√
Delete Volume	√	√	√	√	√	√
Attach Volume	√	√	√	√	√	√
Detach Volume	√	√	√	√	√	√
Extend Volume	√	√	√	√	√	√
Create Snapshot	√	√	√	√	√	√

Feature	Ocat a	Pike	Quee ns	Rock y	Stein	Train
Delete Snapshot	√	√	√	√	√	√
Create Volume from Snapshot	√	√	√	√	√	√
Create Volume from Image	√	√	√	√	√	√
Create Volume from Volume	√	√	√	√	√	√
Create Image from Volume	√	√	√	√	√	√
SmartThin	√	√	√	√	√	√
Manage/Unmanage Volume	√	√	√	√	√	√
Manage/Unmanage Snapshot	√	√	√	√	√	√
Multipath	√	√	√	√	√	√
QoS	√	√	√	√	√	√
Retype	√	√	√	√	√	√
iSCSI	√	√	√	√	√	√
SCSI	х	х	х	√	√	√
MultiAttach	х	х	√	√	√	√
Revert to Snapshot	√	√	√	√	√	√
Backup Volume	√	√	√	√	√	√
HyperMetro	х	х	х	х	х	х
Replication V2.1	х	х	х	х	х	х
HyperMetro Consistency Group	x	x	x	x	x	х
Backup Snapshot	х	х	х	х	х	х
Snapshot Consistency Group	х	х	х	х	х	х
Consistency Group	х	х	х	х	х	х

3 Deployment

- 3.1 Obtaining Cinder Driver
- 3.2 Deploying FusionStorage Driver for the Cinder Volume Service in Non-Containerized Mode
- 3.3 Deploying FusionStorage Driver for the Cinder Volume Service in Containerized Mode

3.1 Obtaining Cinder Driver

You can obtain FusionStorage Cinder Driver in either of the following ways:

- OpenStack community warehouse. Since the Rocky version, FusionStorage Cinder Driver has been integrated into the OpenStack community warehouse. After OpenStack is installed, Cinder Driver is provided. Cinder Driver is stored in the ../cinder/cinder/volume/drivers/fusionstorage directory.
- FusionStorage OpenStack Driver warehouse
- Step 1 Open a browser and enter https://github.com/Huawei/FusionStorage_OpenStack_Driver in the address box.
- **Step 2** Click the **Download ZIP** button to download the Cinder Driver package to a local host.
- **Step 3** Decompress the package.
- **Step 4** In the decompressed directory, find the **Cinder** directory, which contains Cinder Driver of multiple OpenStack versions.

□ NOTE

- After OpenStack community versions are released, new features cannot be integrated.
 The bug fixing period is long and risks exist. FusionStorage Cinder Driver warehouse
 versions ensure that new features are released and bugs are fixed in time. These
 versions are more stable than OpenStack community versions.
- The OpenStack community maintains only two stable versions. FusionStorage Cinder
 Driver warehouse maintains six stable versions, ensuring long-term stable running of
 historical versions.
- It is strongly recommended that OpenStack community versions be replaced by FusionStorage Cinder Driver warehouse versions.

3.2 Deploying FusionStorage Driver for the Cinder Volume Service in Non-Containerized Mode

Red Hat OpenStack deployment steps are as follows:

Step 1 Before installation, delete all the installation files of Huawei OpenStack Driver. The default installation path is /usr/lib/python2.7/site-packages/cinder/volume/drivers/fusionstorage.

◯ NOTE

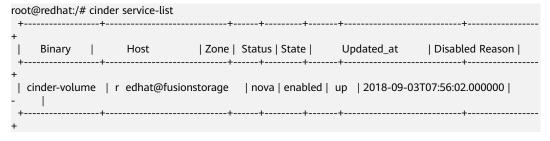
On the host, the version of Python is 2.7. If another version is used, use the correct version number. You can obtain the Cinder Driver installation directory by running the following commands:

root@redhatL004:~# find / -name dsware.py
/usr/lib/python2.7/dist-packages/cinder/volume/drivers/fusionstorage/dsware.py

- **Step 2** Copy OpenStack Cinder Driver to the Cinder Driver installation directory.
- **Step 3** Make configuration by referring to **4 Configuring Basic Properties**.
- **Step 4** After configuration, restart the Cinder-Volume service by running the following command:

systemctl restart openstack-cinder-volume.service

Step 5 Check the status of service restart by running the **cinder service-list** command. If **State** is **up**, the Cinder-Volume service has been restarted.



3.3 Deploying FusionStorage Driver for the Cinder Volume Service in Containerized Mode

Step 1 (Optional) Run the **docker save** command to back up the Cinder Volume container image.

To obtain the image version, run the docker image ls command.

Step 2 Run the following command to create temporary directory **build** in any directory and go to the created directory:

mkdir ***/build;cd ***/build

Step 3 Run the following commands to copy the obtained FusionStorage Driver code files to the current directory:

```
# ls -l
-rw-rw-r-- 1 root root 1138 May 15 08:23 constants.py
-rw-rw-r-- 1 root root 22174 May 15 08:23 dsware.py
-rw-rw-r-- 1 root root 18880 May 15 08:23 fs_client.py
-rw-rw-r-- 1 root root 4799 May 15 08:23 fs_conf.py
-rw-rw-r-- 1 root root 14419 May 15 08:23 fs_flow.py
-rw-rw-r-- 1 root root 2988 May 15 08:23 fs_utils.py
-rw-rw-r-- 1 root root 0 May 15 08:23 __init__.py
```

Step 4 Create the **Dockerfile** file in the current directory and edit the following content:

FROM ***:***
COPY *.py /fusionstorage/cinder/driver/path/

- Replace ***:*** with the name and version of the original Cinder Volume container image.
- Replace /fusionstorage/cinder/driver/path with the path of Huawei Driver in the container.
- **Step 5** Run the following command to build an image:

docker build -t ***:*** .

□ NOTE

Replace ***:*** with the name and version of the original Cinder Volume container image.

- **Step 6** Make configuration by referring to **4 Configuring Basic Properties**.
- **Step 7** Restart the Cinder Volume container.

4 Configuring Basic Properties

This chapter describes how to configure the FusionStorage Cinder Driver.

- 4.1 Configuring a conf File
- 4.2 Configuration File Parameters
- 4.3 Configuring Host Multipathing (iSCSI mode)
- 4.4 Configuring OpenStack Multipathing(iSCSI mode)
- 4.5 Configuring the QoS Property

4.1 Configuring a conf File

At the end of /etc/cinder/cinder.conf, configure the FusionStorage back end with DSWAREDriver. volume_driver indicates the loaded driver file, volume_backend_name indicates the name of the back end, each row of manager_ips indicates the name and IP address of an FSA host, dsware_rest_url indicates the IP address of an FSM, san_login and san_password are the login information of the FSM, and dsware_storage_pools indicates the storage pools name on the FSM. For details, see Table 4-1.

Ensure that both the owner and user group of /etc/cinder/cinder.conf are cinder.

-rw-r--r-- 1 cinder cinder 2839 Aug 29 15:29 cinder.conf

Step 1 Add the FusionStorage back end. Configure parameters for the back end according to **Table 4-1**.

□ NOTE

Once ISCSI mode is used, "volume_driver" needs to be configured as "cinder.volume.drivers.fusionstorage.dsware.DSWAREISCSIDriver"

[fusionstorage]

 $volume_driver = cinder.volume.drivers.fusionstorage.dsware.DSWAREISCSIDriver$

...

Step 2 In the **[DEFAULT]** section, configure the FusionStorage back end.

```
[DEFAULT]
...
enabled backends = fusionstorage
```

----End

4.2 Configuration File Parameters

Table 4-1 Parameter description

Parameter	Description	Mandatory
volume_backe nd_name	Back end name of the default driver.	Yes
volume_driver	Default driver.	Yes
dsware_rest_ur l	URL and port number used by the Cinder node to access FusionStorage (If the management IP of FusionStorage is IPV6 format, please configure https: // [ipv6_ip]: 28443, where ipv6_ip is the management IP of FusionStorage in IPV6 format).	Yes
san_login	User name used by the Cinder node to access FusionStorage.	Yes
san_password	Password used by the Cinder node to access FusionStorage.	Yes
dsware_storag e_pools	Names of existing storage pools on FusionStorage.	Yes
manager_ips	Management host name and its corresponding IP address. ':' is preceded by a host name, and followed by the corresponding host IP address. Each IP host is separated using commas (,). Add spaces at the start of each row.	Yes when selecting SCSI mode
scan_device_ti meout	The waitting time for scanning the device disk on the host. Default value is 3, the type is Int, the unit is seconds.	Option when selecting SCSI mode

Parameter	Description	Mandatory
target_ips	Management IP of the node where the service IP is located. Must specify either target_ips or iscsi_manager_groups	Conditionall y mandatory when selecting iSCSI mode
iscsi_manager_ groups	The IP group formed by the management IP when selecting iSCSI mode, distinguish by using a semicolon(;) within a IP group and separate by using a comma(,) each IP group. Must specify either target_ips or iscsi_manager_groups	Conditionall y mandatory when selecting iSCSI mode
use_ipv6	Whether to use IPV6 as the business IP, the default is False	Option when selecting iSCSI mode

4.3 Configuring Host Multipathing (iSCSI mode)

Multipathing is configured to improve the link reliability of LUNs of SAN storage. If the multipathing configuration is incorrect, an I/O error occurs when a single link is faulty. As a result, the VM file system is read-only or faulty, affecting VM service delivery. When configuring multipathing, install the multipathd service on the host and configure proper parameters. Then, configure multipathing parameters on OpenStack.

4.3.1 Installing the Multipathing Tool Package

Step 1 Install the Multipath tool package based on the operating system.

CentOS:

yum install -y device-mapper-multipath

Ubuntu:

apt-get install -y multipath-tools apt-get install -y multipath-tools-boot

Step 2 Enable the host multipathing service.

CentOS:

/sbin/mpathconf --enable systemctl start multipathd.service systemctl enable multipathd.service systemctl restart multipathd.service

Ubuntu:

systemctl restart multipath-tools.service

4.3.2 Configuring the Multipathing Service

Add the following content to the **devices** field in the multipathing configuration file (/etc/multipath.conf). For details, see the Configuring Multipathing for an Application Server (Red Hat or CentOS) on OceanStor 100D.

```
devices {
  device {
                              "HUAWEI"
          vendor
                               "VBS fileIO"
          product
          path_grouping_policy
                                  multibus
          path_checker
                                tur
          prio
          path selector
                                "service-time 0"
          failback
                              immediate
      }
```

After the configuration is complete, restart the multipathd service.

systemctl restart multipathd.service

4.4 Configuring OpenStack Multipathing(iSCSI mode)

4.4.1 Configuring Multipathing for OpenStack Nova Nodes

Step 1 Configure the /etc/nova/nova.conf file.

Add volume_use_multipath = True in [libvirt] of /etc/nova/nova.conf.

MOTE

If "/etc/nova/nova-cpu.conf" exists in the Nova Compute node, add "volume_use_multipath = True" to its [libvirt].

Step 2 Restart the nova-compute service.

systemctl restart openstack-nova-compute.service

----Fnd

4.4.2 Configuring Multipathing for OpenStack Cinder Nodes

Step 1 Add the following content to the end of BACKEND in the /etc/cinder/cinder.conf file:

```
[fusionstorage]
...
use_multipath_for_image_xfer = true
enforce_multipath_for_image_xfer = true
```

Step 2 Restart the cinder-volume service.

systemctl restart openstack-cinder-volume.service

----End

4.5 Configuring the QoS Property

QoS in OpenStack mainly depends on front-end Hypervisor and back-end storage.

For details about how to configure front-end QoS, see https://docs.openstack.org/cinder/

latest/admin/blockstorage-basic-volume-qos.html.

This section describes how to configure back-end QoS for Huawei storage devices.

- **Step 1** Run the following command to create a volume type. <name> indicates the name of thevolume type.
 - # cinder type-create <name>
- **Step 2** Run the following command to enable QoS. <vtype> indicates the volume type name configured in **Step 1**.
 - # cinder type-key <vtype> set capabilities:QoS_support='<is> true'
- **Step 3** Run the following command to create a QoS specification. <name> indicates the name of a customized QoS specification.

cinder qos-create <name> <qos_key>=*** <qos_trigger_key>=***

Table 4-2 qos_key parameters

Parameter	Description	Remarks	Mandatory
maxIOPS	Maximum IOPS.	The value is a positive integer. The default value is 999999999.	No, but one must be specified. The priority of maxIOPS is higher
maxMBPS	Maximum bandwidth.	The value is a positive integer, expressed in MB/s. The default value is 999999.	than total_iops_sec; the priority of maxMBPS is higher than total_bytes_sec.
total_iops_sec	Maximum IOPS.	The value is a positive integer. The default value is 999999999.	
total_bytes_sec	Maximum bandwidth.	The value is a positive integer, expressed in byte/s. The default value is 999999 * 1024 * 1024.	

Table 4-3 qos_trigger_key parameters

Parameter	Description	Remarks	Mandatory
scheduleType	QoS triggered policy type.	Available values are:0(Always), 1(Oneoff), 2(Daily), 3(Weekly). The default is 0 when not set.	No
startDate	QoS triggered start date.	Not earlier than the current date, the format of the date is: "xx-xx-xx". Such as "2019-06-01".	Yes when the scheduleType is not 0
startTime	QoS triggered start time.	In 24-hour format, the time format is: "xx-xx", such as "08:00".	Yes when the scheduleType is not 0
durationTime	QoS daily duration.	The configuration range is 30 minutes to 24 hours. The format is: "xx:xxx", for example "24:00", "0:30".	Yes when the scheduleType is not 0
dayOfWeek	QoS weekly effective date.	Available values are: "Mon", "Tue", "Wed", "Thur", "Fri", "Sat", "Sun", which means Monday to Sunday respectively. Support for configuring multiple parameters, separated by spaces(" "). For example, "Mon Tue Thur Sun" means that QOS will take effect on Monday, Tuesday, Thursday and Sunday.	Yes when the scheduleType is 3

Step 4 Associate the QoS specification with the volume type. <qos_specs> indicates the QoS specification ID created in **3** and <volume_type_id> indicates the volume type ID created in **Step 1**.

cinder qos-associate <qos_specs> <volume_type_id>

Step 5 Use the volume type in **Step 1** to create a volume.

----End

■ NOTE

When the qos_trigger_key parameter is configured, the storage version is required to be FusionStorage V100R008C00 or later.

When the qos_trigger_key parameter is configured, the user role is required to be a super administrator.

When the qos_trigger_key parameter is configured, change the environment time of OpenStack to the storage time.

5 FAQ

5.1 Create Volume From Image Failed when verify_glance_signatures=enabled

5.1 Create Volume From Image Failed when verify_glance_signatures=enabled

Issue Description

OpenStack executes creating a volume from a image. After copying the image metadata for a period of time, an error is reported: Failed to copy metadata to volume: Glance metadata cannot be updated, key signature_verified exists for volume id b75f957c-0ba4-4099-8706-866c68012779, which eventually causes the volume creation to fail.

Environment

Operating System: CentOS 7.6

Server: Huawei 5288 V5 OpenStack Version: Rocky

Root Cause

BUG Link: https://bugs.launchpad.net/cinder/+bug/1823445

A new field verify_glance_signatures has been added to cinder.image.glance.py since Rocky. The default value is enabled. When CONF.verify_glance_signatures! = 'disabled' and signature_verification in the image also exists, then the DB API does not allow duplicate writes signature_verification flag, thereby throwing an exception.

Solution

In [DEFAULT] of the cinder.conf file, set the verify_glance_signatures field to disabled, for example:

[DEFAULT]

...

verify_glance_signatures = disabled

...