eSDK Enterprise Storage Plugins 2.7.RC2

OpenStack Cinder Driver Configuration Guide

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Intended Audience

This document is intended for:

- Technical support engineers
- O&M engineers
- Engineers with basic knowledge of storage and OpenStack

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
▲ DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
□ NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Issue	Date	Description	
01	2024-04-16	This issue is the first official release.	

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1 Overview

Huawei Cinder Driver is a plug-in deployed on the OpenStack Cinder module. It connects to Huawei storage to provide volume storage capabilities for the OpenStack platform. Huawei Cinder Driver supports iSCSI, FC, and RoCE protocols.

2 Version Mappings

This chapter describes the version mappings among Huawei Cinder Driver, Huawei storage, and OpenStack, as well as the mappings between Cinder Driver and storage licenses.

- 2.1 Storage Product Versions Supported by Cinder Driver
- 2.2 Support for Cinder Driver Features
- 2.3 Mappings Between Cinder Driver Features and Storage Licenses

2.1 Storage Product Versions Supported by Cinder Driver

Table 2-1 Storage product versions supported by Cinder Driver

OpenStack Version	Storage Product Version	
Mitaka/Newton/Ocata/Pike/ Queens/Rocky/Stein/Train/Ussuri/ Victoria/Wallaby/Xena/Yoga/Zed/ Antelope/Bobcat	 OceanStor V5 V500R007C61/ V500R007C70/V500R007C71 OceanStor 6.1.3/6.1.5/6.1.6/6.1.7/6.1.8 OceanStor Dorado V3 V300R002C10/ 	
	V300R002C20	
	• OceanStor Dorado 6.1.0/6.1.2/6.1.3/6.1.5/6.1.6/6.1.7/6.1.8	

MOTE

Huawei only maintains Cinder Driver for 16 stable OpenStack versions (M-B). Earlier versions can still be obtained from Huawei warehouse but are no longer maintained. Exercise caution when selecting the version.

2.2 Support for Cinder Driver Features

Table 2-2 Support for Cinder Driver features (√: supported; x: not supported)

Feature	Normal LUN	HyperMetro LUN	Remarks
OpenStack	Mitaka/ Newton/ Ocata/Pike/ Queens/ Rocky/Stein/ Train/Ussuri/ Victoria/ Wallaby/ Xena/ Yoga/Zed/ Antelope/ Bobcat	Mitaka/ Newton/ Ocata/Pike/ Queens/ Rocky/Stein/ Train/Ussuri/ Victoria/ Wallaby/ Xena/ Yoga/Zed/ Antelope/ Bobcat	 The following features are applicable to scenarios where HyperMetro storage is normal. √ indicates that a feature is supported by all OpenStack versions listed on the left but not supported by other OpenStack versions. If some features are not supported by a specific version, they will be listed separately in brackets (). x indicates that a feature is not supported by any OpenStack version. HyperMetro LUNs of the following features are applicable to iSCSI and FC networks. RoCE networks do not support HyperMetro LUNs.
Create Volume	√	√	N/A
Delete Volume	√	√	N/A
Attach Volume	√	√	N/A
Detach Volume	√	√	N/A
Extend Volume	√	√	N/A
Create Snapshot	√	√	Snapshots can be created only for the local HyperMetro LUN.
Delete Snapshot	√	√	Snapshots can be deleted only for the local HyperMetro LUN.

Feature	Normal LUN	HyperMetro LUN	Remarks
Create Volume from Snapshot	√	√	Volumes can be created using snapshots only for the local HyperMetro LUN.
Create Volume from Image	√	√	N/A
Create Volume from Volume	√	√	N/A
Create Image from Volume	√	√	N/A
Volume Migration	√	х	N/A
Thin Volume	√	√	N/A
Thick Volume	√	√	N/A
QoS	√	√	SmartQoS can be configured only for the local HyperMetro LUN.
FC Zoning	√	√	N/A
Manage/ Unmanage Volume	√	х	N/A
Manage/ Unmanage Snapshot	√	х	N/A
Replication V2.1	√	х	N/A
Backup Snapshot	√	√	Snapshots can be backed up only for the local HyperMetro LUN.
Revert to Snapshot	√ (not supported by the Mitaka version)	х	N/A
Retype	√	√	N/A
Multipath	√	√	N/A
Multi-Attach	√	√	N/A
Consistency Group	√	х	N/A
Snapshot Consistency Group	√	✓	Snapshots can be created only for the local HyperMetro LUN.

Feature	Normal LUN	HyperMetro LUN	Remarks
HyperMetro Consistency Group	х	√	N/A
Replication Consistency Group	√	X	N/A
SmartTier	√	√	SmartTier can be configured only for the local HyperMetro LUN.
SmartCache	√	√	SmartCache can be configured only for the local HyperMetro LUN.
SmartPartition	√	√	SmartPartition can be configured only for the local HyperMetro LUN.
Create a volume on a certain storage pool	√	x	N/A
Create a volume with certain disk type	√	х	N/A
Tempest test_force_detach	√	√	The community Tempest script can be forcibly detached.

NOTICE

- OceanStor Dorado and OceanStor 6.1.x do not support the Thick Volume.
- OceanStor Dorado does not support SmartTier, SmartCache, and SmartPartition.
- Entry-level storage devices do not support some value-added features. For details, see the feature specifications of the specific storage device model.
 For details about the specifications of different storage models, see https://info.support.huawei.com/storage/spec/#/home.

2.3 Mappings Between Cinder Driver Features and Storage Licenses

Table 2-3 Mappings between Cinder Driver features and storage licenses

Feature	Storage License	
Create Volume	N/A	
Delete Volume	N/A	
Attach Volume	N/A	
Detach Volume	N/A	
Extend Volume	N/A	
Create Snapshot	HyperSnap	
Delete Snapshot	N/A	
Create Volume from Snapshot	HyperCopy/HyperClone	
Create Volume from Image	HyperSnap & HyperCopy/HyperClone	
Create Volume from Volume	HyperSnap & HyperCopy/HyperClone	
Create Image from Volume	N/A	
Volume Migration	SmartMigration	
QoS	SmartQoS	
FC Zoning	N/A	
SmartTier	SmartTier	
SmartCache	SmartCache	
Thin Volume	SmartThin	
Thick Volume	N/A	
SmartPartition	SmartPartition	
HyperMetro	HyperMetro	
Retype	N/A	
Manage/Unmanage Volume	N/A	
Manage/Unmanage Snapshot	N/A	
Replication V2.1	HyperReplication	
Create a volume on a certain storage pool	N/A	

Feature	Storage License
Create a volume with certain disk type	N/A
Backup Snapshot	HyperCopy/HyperClone
Revert to Snapshot	HyperSnap
Multipath	N/A
Multi-Attach	N/A
Consistency Group	N/A
Snapshot Consistency Group	HyperSnap
HyperMetro Consistency Group	HyperMetro
Replication Consistency Group	HyperReplication

3 Specifications

Table 3-1 Specifications

Feature	Sub-feature	Description	Remarks
Mapping platform	Native OpenStack platform	OpenStack versions: Mitaka/Newton/ Ocata/Pike/ Queens/Rocky/ Stein/Train/ Ussuri/Victoria/ Wallaby/Xena/ Yoga/Zed/ Antelope/Bobcat	 Resources created using OpenStack, such as hosts, host groups, LUNs, LUN groups, snapshots, mapping views, QoS policies, and HyperMetro pairs, cannot be shared with other platform applications or manually modified. The storage access address, user name, password, and storage pool information provided for OpenStack cannot be modified. RoCE networking supports only the following OpenStack versions: Pika (customized for the cloud platform developed by China Mobile Suzhou Research Center)

Feature	Sub-feature	Description	Remarks
			 Zed (developed for the OpenStack community)
Configuration	XML configuration file	Ensure that the storage pool used for configuring Cinder Driver exists on Huawei storage. Otherwise, you need to manually create one. In addition, the type of this storage pool must be the block storage service.	
		For an FC network, the sg tool must be installed so that storage resources can be used.	-
		All parameter values in the Huawei Cinder Driver configuration file cannot contain the following XML special characters: <>&'''	-
		Set Product based on the actual back-end storage model.	-

Feature	Sub-feature	Description	Remarks
		The value of HostName in the Initiator configuration item is a regular expression.	 For details about how to configure it, see Regular expression. When HostName is set to *, the common configuration is used and takes effect on hosts with any name. When HostName is set to another value, the general configuration is used. Configuration policy rules: Priority: General host name configuration > Common host name configuration. In the general configuration, use the first ALUA section that meets the configuration policy.
	Multipathing configuration	Host multipathing: You need to manually install multipathing software and enable the multipathing service.	-

Feature	Sub-feature	Description	Remarks
		OpenStack multipathing: OpenStack multipathing is disabled by default. You need to manually modify Nova and Cinder configurations.	-
	LUN type	OceanStor Dorado and OceanStor 6.1.x support only Thin volumes.	-
Policy	SmartQoS	Different protection policy parameters or restriction policy parameters can be specified at the same time. However, protection policy parameters cannot coexist with restriction policy parameters. For OceanStor Dorado, IOType must be set to 2, and only	 Restriction policy parameters: maxIOPS and maxBandWidth Protection policy parameters: minIOPS, minBandWidth, and latency
		restriction policy parameters are supported.	
Data copy	FastClone	Only some storage devices support FastClone (fast data clone).	 OceanStor Dorado: 6.1.0 and later versions OceanStor Dorado V3: V300R001C20 and later versions OceanStor 6.1.x When FastClone is used, there are restrictions on the HyperMetro, remote replication, snapshot, and clone features.

Feature	Sub-feature	Description	Remarks
	Full data copy	The copy speed can be configured. The default LUN copy speed is medium.	 Low: 0 MB/s to 5 MB/s Medium: 10 MB/s to 20 MB/s High: 50 MB/s to 70 MB/s Highest: above 100 MB/s
License	Creating a snapshot	The license of HyperSnap is required.	-
	Creating a QoS volume	The license of SmartQoS is required.	-
	Creating a HyperMetro volume	The license of HyperMetro is required.	-
	Creating a volume using a snapshot	The license of HyperCopy/HyperClone is required.	-
	Creating a mirrored volume	The license of HyperSnap & HyperCopy/ HyperClone is required.	-
	Creating a clone volume	The license of HyperSnap & HyperCopy/ HyperClone is required.	-
RESTful request	Maximum number of RESTful requests that can be sent by a Cinder Driver to a storage device at the same time	20	It is recommended that each storage device be connected to two Cinder Drivers.

4 Installing Cinder Driver

NOTICE

- Resources created using OpenStack, such as hosts, host groups, LUNs, LUN groups, snapshots, mapping views, QoS policies, and HyperMetro pairs, cannot be shared with other platform applications or manually modified.
- The storage access address, user name, password, and storage pool information provided for OpenStack cannot be modified.
- 4.1 Obtaining Huawei Cinder Driver
- 4.2 Deploying Cinder Driver for the Cinder Volume Service in Non-Containerized Mode
- 4.3 Deploying Cinder Driver for the Cinder Volume Service in Containerized Mode

4.1 Obtaining Huawei Cinder Driver

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

- Method 1: OpenStack community warehouse.
 Since the Kilo version, Huawei Cinder Driver has been integrated into the OpenStack community warehouse. After OpenStack is installed, Cinder Driver is provided and stored in the ../cinder/cinder/volume/drivers/huawei directory.
- Method 2: Huawei warehouse. Perform the following steps.
- **Step 1** Open a browser and enter https://github.com/Huawei/OpenStack_Driver in the address box.
- **Step 2** Click **Download ZIP** to download Huawei Cinder Driver package to a local PC.
- **Step 3** Decompress the package.
- **Step 4** In the decompressed directory, find the **Cinder** directory (path: ../ OpenStack_Driver-master/Cinder), which contains Huawei Cinder Driver of multiple OpenStack versions.

----End

□ NOTE

- After OpenStack community versions are released, new features cannot be integrated. The bug fixing period is long and risks exist. Huawei OpenStack 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 2 stable versions. Huawei OpenStack Cinder Driver warehouse maintains 16 stable versions (M-B), ensuring long-term stable running of historical versions.
- It is strongly recommended that OpenStack community versions be replaced by Huawei warehouse versions.

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

Step 1 Use a remote access tool (for example, PuTTY) to log in to an OpenStack Cinder Volume node through the management IP address, and search for the original Huawei Cinder Driver code in the system. For details about how to search for the code, see the following note.

□ NOTE

The absolute path may vary in different systems. You can search for the code directory of Huawei Cinder Driver as follows:

Method 1:

Run the following command. In the command output, /usr/lib/python2.7/site-packages/cinder/volume/drivers/huawei is the code directory.

python -c "from cinder.volume.drivers import huawei; print (huawei.__path__)"
['/usr/lib/python2.7/site-packages/cinder/volume/drivers/huawei']

Method 2:

Run the following command. In the command output, /usr/lib/python3.7/site-packages/cinder/volume/drivers/huawei is the code directory.

```
# python3 -c "from cinder.volume.drivers import huawei; print (huawei.__path__)" ['/usr/lib/python3.7/site-packages/cinder/volume/drivers/huawei']
```

- **Step 2** Delete all Huawei Cinder Driver code files in the directory returned in **Step 1**.
- **Step 3** Copy all Huawei Cinder Driver code files of the corresponding version to the directory returned in **Step 1**. The minimum permission required for the Cinder Driver code files is **644**. (**644** is a Linux system permission. **-rw-r--r-** indicates the minimum permission required.)

```
# Is -l
-rw-r--r-- 1 root root 4787 Mar 4 23:40 cipher.py
-rw-r--r-- 1 root root 4787 Mar 4 23:40 constants.py
-rw-r--r-- 1 root root 10316 Mar 4 23:40 fc_zone_helper.py
-rw-r--r-- 1 root root 17905 Mar 4 23:40 huawei_conf.py
-rw-r--r-- 1 root root 125657 Mar 4 23:48 huawei_driver.py
-rw-r--r-- 1 root root 24276 Mar 4 23:40 huawei_t.py
-rw-r--r-- 1 root root 6698 Mar 4 23:40 huawei_utils.py
-rw-r--r-- 1 root root 18437 Mar 4 23:40 hypermetro.py
-rw-r--r-- 1 root root 38948 Mar 4 23:40 replication.py
-rw-r--r-- 1 root root 97236 Mar 4 23:40 smartx.py
```

```
Or:
# ls -l
```

```
-rw-r--r-- 1 root root 5631 Mar 18 11:43 cipher.py
```

```
-rw-r--r-- 1 root root 5631 Mar 18 11:43 constants.py
-rw-r--r-- 1 root root 33401 Mar 18 11:43 huawei_base_driver.py
-rw-r--r-- 1 root root 21773 Mar 18 11:43 huawei_conf.py
-rw-r--r-- 1 root root 12116 Mar 18 11:43 huawei_driver.py
-rw-r--r-- 1 root root 99727 Mar 18 11:43 huawei_flow.py
-rw-r--r-- 1 root root 19599 Mar 18 11:43 huawei_utils.py
-rw-r--r-- 1 root root 14733 Mar 18 11:43 huawei_utils.py
-rw-r--r-- 1 root root 23 Mar 18 11:43 __init__.py
-rw-r--r-- 1 root root 20056 Mar 18 11:43 replication.py
-rw-r--r-- 1 root root 5082 Mar 18 11:43 smartx.py
```

----End

4.3 Deploying Cinder Driver for the Cinder Volume Service in Containerized Mode

Step 1 Log in to a node that has a Cinder Volume container image and run the **docker image ls** command to query the Cinder Volume container image.

Step 2 Run the **docker save -o cinder_volume.tar kolla/centos-source-cinder-volume** command to back up the Cinder Volume container image to an image file.

```
[root@control ~]# docker save -o cinder_volume.tar kolla/centos-source-cinder-volume]

NOTE
```

cinder_volume.tar is a user-defined name of the backup image, and **kolla/centos-source-cinder-volume** is the name of the Cinder Volume container image.

- **Step 3** Create a temporary directory named **huawei** in any directory.
 - # mkdir huawei

Step 4 Copy the obtained Huawei Cinder Driver code files of the corresponding version to the **huawei** directory. The minimum permission required for the Cinder Driver code files is **644**.

Step 5 Run the **docker ps | grep cinder** command to list Cinder Volume containers. In the command output, **cinder_volume** indicates the container name.

```
| Trestgeontrol | -js docker ps | grep cinder | Selly 275808 | Sel
```

Step 6 Run the **docker exec -it -u 0 cinder_volume bash** command to access the **cinder volume** container.

```
[root@control ~]# docker exec -it -u 0 cinder_volume bash (cinder-volume)[root@control /]#
```

Step 7 Run the python -c "from cinder.volume import drivers; print (drivers.__path__)" command to query the path of the original Huawei Cinder Driver code.

(cinder-volume)[root@control /]# python -c "from cinder.volume import drivers; print (drivers.__path__)"
['/var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers']
(cinder-volume)[root@control /]#

- cinder_volume is the container name obtained in Step 5.
- /var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers is the path of the original Huawei Cinder Driver code.
- If an error is reported, change the preceding command to python3 -c "from manila.share import drivers; print (drivers.__path__)" based on the Python environment variables.
- **Step 8** Run the **exit** command to exit the **cinder_volume** container, go to the upper-level directory of the **huawei** directory created in **Step 3**, and copy the **huawei** directory to the path of the original Huawei Cinder Driver code in **Step 7**.

```
(cinder-volume)[root@control /]# exit
exit
[root@control ~]# docker cp huawei/ cinder_volume:/var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers
[root@control ~]# ||
```

docker cp huawei/ cinder_volume:/var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers

Step 9 Run the following command to restart the Cinder Volume service (**cinder_volume** indicates the container name obtained in **Step 5**).

docker restart cinder_volume

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

5 Upgrading Cinder Driver

NOTICE

- To upgrade OpenStack Cinder Driver, perform the operations described in this chapter. If you install Cinder Driver for the first time, skip this chapter.
- During the upgrade, do not perform other operations on the management plane, such as delivering VMs or creating volumes.

5.1 Upgrading Cinder Driver for the Cinder Volume Service in Non-Containerized Mode

5.2 Upgrading Cinder Driver for the Cinder Volume Service in Containerized Mode

5.1 Upgrading Cinder Driver for the Cinder Volume Service in Non-Containerized Mode

Procedure

Step 1 Use a remote access tool (for example, PuTTY) to log in to an OpenStack Cinder Volume node through the management IP address, and search for the original Huawei Cinder Driver code in the system. For details about how to search for the code, see the following note.

□ NOTE

The absolute path may vary in different systems. You can search for the code directory of Huawei Cinder Driver as follows:

Method 1

Run the following command. In the command output, /usr/lib/python2.7/site-packages/cinder/volume/drivers/huawei is the code directory.

python -c "from cinder.volume.drivers import huawei; print (huawei.__path__)"
['/usr/lib/python2.7/site-packages/cinder/volume/drivers/huawei']

Method 2:

Run the following command. In the command output, /usr/lib/python3.7/site-packages/cinder/volume/drivers/huawei is the code directory.

python3 -c "from cinder.volume.drivers import huawei; print (huawei.__path__)" ['/usr/lib/python3.7/site-packages/cinder/volume/drivers/huawei']

Step 2 Back up all Huawei Cinder Driver code files in the directory returned in **Step 1**.

The backup command is as follows:

cp -rf Source directory Backup directory

□ NOTE

- Source directory. directory returned in **Step 1**.
- Backup directory. directory to which data is backed up.
- **Step 3** Copy all Huawei Cinder Driver code files of the corresponding version to the directory returned in **Step 1**. The minimum permission required for the Cinder Driver code files is **644**. (**644** is a Linux system permission. **-rw-r--r-** indicates the minimum permission required.)

Step 4 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

◯ NOTE

If the upgrade fails, restore the code backed up in **Step 2** and restart the Cinder Volume service.

5.2 Upgrading Cinder Driver for the Cinder Volume Service in Containerized Mode

Step 1 Log in to a node that has a Cinder Volume container image and run the **docker image ls** command to query the Cinder Volume container image.

Step 2 Run the **docker save -o cinder_volume.tar kolla/centos-source-cinder-volume** command to back up the Cinder Volume container image to an image file.

[root@control ~]# docker save -o cinder_volume.tar kolla/centos-source-cinder-volume]

NOTE

cinder_volume.tar is a user-defined name of the backup image, and **kolla/centos-source-cinder-volume** is the name of the Cinder Volume container image.

- **Step 3** Create a temporary directory named **huawei** in any directory.

 # mkdir huawei
- **Step 4** Copy the obtained Huawei Cinder Driver code files of the corresponding version to the **huawei** directory. The minimum permission required for the Cinder Driver code files is **644**.

Step 5 Run the **docker ps | grep cinder** command to list Cinder Volume containers. In the command output, **cinder_volume** indicates the container name.

```
| Trostgeontrol | 3d docker ps | grap cinder | Scinder |
```

Step 6 Run the **docker exec -it -u 0 cinder_volume bash** command to access the **cinder volume** container.

Step 7 Run the python -c "from cinder.volume import drivers; print (drivers.__path__)" command to query the path of the original Huawei Cinder Driver code.

- □ NOTE
 - cinder_volume is the container name obtained in Step 5.
 - /var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers is the path of the original Huawei Cinder Driver code.
- **Step 8** Exit the **cinder_volume** container, go to the upper-level directory of the **huawei** directory created in **Step 3**, and copy the **huawei** directory to the path of the original Huawei Cinder Driver code in **Step 7**.

docker cp huawei/ cinder_volume:/var/lib/kolla/venv/lib/python3.6/site-packages/cinder/volume/drivers
End
□ NOTE

If the upgrade fails, restore the container image backed up in **Step 2**.

6 Configuring Basic Properties of Cinder Driver

This chapter describes how to configure Huawei Cinder Driver to connect to Huawei storage on an iSCSI or FC network.

NOTICE

- Ensure that the storage pool used for configuring Cinder Driver exists on Huawei storage. Otherwise, you need to manually create one. In addition, the type of this storage pool must be the block storage service.
- For an FC network, the sg tool must be installed so that storage resources can be used.
- All parameter values in the Huawei Cinder Driver configuration file cannot contain the following XML special characters: <>&'"
- When FastClone is used for LUN cloning, the mutually exclusive relationship between the clone feature and other features or functions varies depending on the product model. For details about the specifications, see the *Product Description* of the corresponding product model. You can log in to Huawei technical support website (https://support.huawei.com/enterprise/) and enter the product model + document name in the search box to search for, browse, and download the desired documents.
- 6.1 Configuring Cinder Driver in Non-Containerized Mode
- 6.2 Configuring Cinder Driver in Containerized Mode

6.1 Configuring Cinder Driver in Non-Containerized Mode

6.1.1 Configuring Cinder Driver on an iSCSI Network

This section describes how to configure Cinder Driver for Huawei storage products when the iSCSI protocol is used.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address.
- **Step 2** Run the following commands to go to the /etc/cinder directory and create a Huawei Cinder Driver configuration file in xml format. You can customize the configuration file name, for example, cinder_huawei_conf.xml.

```
cd /etc/cinder
vi cinder_huawei_conf.xml
```

Step 3 Configure mandatory parameters in the Huawei Cinder Driver configuration file. Use the Linux text editor to open the configuration file created in Step 2. Take the default vi editor of Linux as an example. Run the vi cinder_huawei_conf.xml command to open and edit the configuration file. The following lists the parameters in the configuration file. For details about the parameter values and more information, see Table 6-1 and Table 6-2.

```
<?xml version='1.0' encoding='UTF-8'?>
<config>
 <Storage>
   <Product>***</Product>
   <Protocol>iSCSI</Protocol>
   <RestURL>https://*.*.*:8088/deviceManager/rest/;https://*.*.*:8088/deviceManager/rest/</RestURL>
   <UserName>***</UserName>
   <UserPassword>***</UserPassword>
 </Storage>
  <LUN>
   <StoragePool>***</StoragePool>
   <LUNType>***</LUNType>
    <LUNCopySpeed>***</LUNCopySpeed>
 </LUN>
  <iSCSI>
   <Initiator HostName="******" ALUA="*" FAILOVERMODE="*" SPECIALMODETYPE="*" PATHTYPE="*"
TargetIP="x.x.x.x y.y.y.y"/>
   <Initiator HostName="*****" ALUA="*" FAILOVERMODE="*" SPECIALMODETYPE="*" PATHTYPE="*"</p>
TargetIP="x.x.x.x y.y.y.y"/>
 </iSCSI>
</config>
```

Alternatively, you can set **Name** in **<iSCSI>** for OceanStor V5 and OceanStor Dorado V3.

```
...
<iSCSI>
<Initiator Name="******" ALUA="*" FAILOVERMODE="*" SPECIALMODETYPE="*" PATHTYPE="*"
TargetIP="x.x.x.x y.y.y.y"/>
</iSCSI>
...
```

The ALUA policies of OceanStor Dorado and OceanStor 6.1.x are different. See the following.

```
...
<iSCSI>
<Initiator HostName="******" ACCESSMODE="*" HYPERMETROPATHOPTIMIZED="*" TargetIP="x.x.x.x
y.y.y.y"/>
<Initiator HostName="******" ACCESSMODE="*" HYPERMETROPATHOPTIMIZED="*" TargetIP="x.x.x.x
y.y.y.y"/>
</iSCSI>
...
```

Table 6-1 Mandatory parameters

Parameter	Description	
Product	Storage product type. The value can be V5 , V6 , or Dorado .	
Protocol	Connection protocol type. Set this parameter to iSCSI in iSCSI scenarios.	
RestURL	Access address of the REST interface. If you need to configure multiple addresses, separate them by using semicolons (;).	
UserName	User name of a storage administrator. NOTICE Do not directly use the super administrator account.	
UserPassword	Password of the storage administrator. NOTE If the customer has security requirements, see 11.4 Security Hardening.	
StoragePool	Name of a storage pool to be used. The storage pool must be created on the target storage in advance. If you need to configure multiple storage pools, separate them by using semicolons (;).	
LUNType	Type of a LUN to be created. The value can be Thick or Thin . OceanStor Dorado and OceanStor 6.1. <i>x</i> support only Thin .	
LUNCopySpeed	LUN copy speed. The value can be: 1: low 2: medium 3: high 4: highest	
Initiator	For parameter details, see Table 6-2. NOTE Name or HostName can be configured (but cannot be configured at the same time). HostName is recommended.	

Table 6-2 Initiator configuration description

Parameter	Description
HostName	The value of HostName is the regular expression of the host name of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .
	In Linux, you can run the cat /etc/hostname or hostname command to obtain the host name.
	 If the host names obtained using the two methods are the same, configure the host name by referring to Regular expression.
	 If the host names obtained using the two methods are different, configure the host name in any of the following ways:
	 Change the host names obtained using the two methods to be the same, and then configure the host name by referring to Regular expression.
	 Configure the host names obtained using the two modes separately by referring to Regular expression.
	 Use the common configuration HostName="*".
	 Specify Name rather than HostName.
Name	The value of Name is the host iSCSI initiator name of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .
	You can run the cat /etc/iscsi/initiatorname.iscsi command to obtain the value.
ALUA parameters	ALUA parameters that can be configured include ALUA, FAILOVERMODE, SPECIALMODETYPE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED. For details, see 11.1 ALUA Parameter Description.

Parameter	Description
TargetIP	TargetIP indicates the IP address of the iSCSI target port. You can enter multiple IP addresses and separate them with spaces. Different TargetIP values can be configured for different hosts.
	You can log in to DeviceManager to obtain the IP address of the iSCSI target port.
	 OceanStor V5 series: To obtain the IP address of an Ethernet port on a specified storage device, choose Provisioning > Port > Ethernet Ports on DeviceManager.
	 OceanStor Dorado V3 series: To obtain the IP address of an Ethernet port on a specified storage device, choose Provisioning > Port > Ethernet Ports on DeviceManager.
	 OceanStor Dorado series: To obtain the IP address of a logical port on a specified storage device, choose Services > Network > Logical Ports on DeviceManager and obtain the IP address whose data protocol is iSCSI.
	 OceanStor 6.1.x series: To obtain the IP address of a logical port on a specified storage device, choose Services > Network > Logical Ports on DeviceManager and obtain the IP address whose data protocol is iSCSI.

NOTICE

- Set Product based on the actual back-end storage model.
 For OceanStor V5 series, enter V5. For OceanStor 6.1.x series, enter V6. For OceanStor Dorado series, enter Dorado.
- The value of **HostName** in the **Initiator** configuration item is a regular expression. For details about how to configure it, see **Regular expression**.
 - When HostName is set to *, the common configuration is used and takes effect on hosts with any name. When HostName is set to another value, the general configuration is used.
 - When you configure HostName, the number of host connections is limited. For details about the limitation, see Specifications Query and search for Maximum number of iSCSI connections per controller enclosure. If the number of host connections is less than or equal to the upper limit, you are advised to use the common configuration. If the number of host connections is greater than the upper limit, use the general configuration.
- Configuration policy rules:
 - Priority: General host name configuration > Common host name configuration. For details, see example 1 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, use the first ALUA section that meets the configuration policy. For details, see example 2 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, if you need to exactly match a host, refer to example 5 in **9.2 Initiator Configuration Policy Examples**.

Step 4 (Optional) Configure optional parameters in the Huawei Cinder Driver configuration file.

```
<Storage>
 <Semaphore>20</Semaphore>
</Storage>
<LUN>
  <WriteType>***</WriteType>
  <Prefetch Type="***" Value="***"/>
  <LUNcopyWaitInterval>***</LUNcopyWaitInterval>
  <Timeout>***</Timeout>
 <LUNCloneMode>***</LUNCloneMode>
  <HyperSyncSpeed>***</HyperSyncSpeed>
  <ReplicaSyncSpeed>***</ReplicaSyncSpeed>
  <ForceDeleteVolume>***/ForceDeleteVolume>
  <HyperEnforceMultipath>***</HyperEnforceMultipath>
  <SnapshotRollbackSpeed>***</SnapshotRollbackSpeed>
  <QoslgnoredParam>xxx;xxx</QoslgnoredParam>
</LUN>
```

Table 6-3 Optional parameters

Parameter	Default Value	Description
Semaphore	20	Maximum number of RESTful requests that can be sent by a Cinder Driver to a storage device at the same time.

Parameter	Default Value	Description
WriteType	1	Cache write mode. The value can be: 1: write back 2: write through Volumes created on OceanStor Dorado series storage support write back only.
Prefetch Type	3	Cache prefetch policy. The value can be: • 0: no prefetch • 1: constant prefetch • 2: variable prefetch • 3: intelligent prefetch
Prefetch Value	0	Cache prefetch value.
LUNcopyWaitInterv al	5	After starting the LUN copy, the plug-in needs to continuously query the LUN copy progress. This parameter is used to specify the query interval, expressed in seconds.
Timeout	2592000	Timeout period of waiting for a storage device to perform the LUN copy, expressed in seconds.
LUNCloneMode	luncopy	 LUN clone mode. The value can be: fastclone luncopy OceanStor Dorado V300R001C20 and later versions and OceanStor Dorado 6.1.0 and later versions support fastclone and luncopy. Other storage devices support only luncopy. NOTE When FastClone is used, there are restrictions on the following features: HyperMetro, remote replication, snapshot, creating a consistency group from a snapshot consistency group or consistency group, and clone.
HyperSyncSpeed	2	Synchronization speed of a HyperMetro pair. The value can be: 1: low 2: medium 3: high 4: highest

Parameter	Default Value	Description
ReplicaSyncSpeed	2 Synchronization speed of a remote replication pair. The value can be: • 1: low • 2: medium • 3: high	
		• 4: highest
ForceDeleteVolume	False	Whether to forcibly delete a LUN that exists in multiple mapping views. The value can be:
		True: forcibly
		• False: not forcibly
HyperEnforceMulti- path	True	Whether to enable multipathing in HyperMetro scenarios.
SnapshotRollback- Speed	3	Snapshot rollback speed. The value can be: 1: low 2: medium 3: high 4: highest
QoslgnoredParam	-	Front-end QoS parameters that need to be ignored by the driver backend. Multiple parameters can be configured and separated by semicolons (;).

Step 5 Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file. If they are different, run Linux command chown to change the owner and user group of the cinder_huawei_conf.xml file to be the same as those of the /etc/cinder/cinder.conf file. After the change, the result is similar to the following:

-rw-r--r-- 1 cinder cinder 2662 Jul 29 02:13 cinder.conf -rw-r--r-- 1 cinder cinder 778 Jul 30 02:56 cinder_huawei_conf.xml

Step 6 Add the following information to the end of the /etc/cinder/cinder.conf file.

[huawei_backend]
volume_driver = cinder.volume.drivers.huawei.huawei_driver.HuaweiISCSIDriver
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf.xml
volume_backend_name = huawei_backend
retain_storage_mapping = False

□ NOTE

- huawei_backend indicates the backend name. It can be customized.
- **volume_driver** indicates the type of Cinder Driver to be used. Set this parameter to **cinder.volume.drivers.huawei.huawei_driver.HuaweiISCSIDriver**.
- cinder_huawei_conf_file indicates the path of the Huawei Cinder Driver configuration file.
- retain_storage_mapping indicates whether to retain the storage mapping relationship
 when the last volume on the host is not mapped. False indicates no and True indicates
 yes. This parameter is optional. The default value is False.

In the [DEFAULT] section, set enabled_backends to huawei_backend.

[DEFAULT]

enabled_backends=huawei_backend

Step 7 If Cinder Volume is deployed on multiple nodes, you need to configure a distributed lock in the [coordination] section. For details about <user>, <password>, <host>, and <database>, see the value of connection under [database] in the configuration file.

[coordination]

backend_url = mysql://<user>:<password>@<host>/<database>?charset=utf8

For example, if the configuration of [database] is as follows:

[database]

connection = mysql+pymysql://cinder:302824058e9a4f31@127.0.0.1/cinder

You can configure [database] as follows:

[coordination]

backend_url = mysql://cinder:302824058e9a4f31@127.0.0.1/cinder

Step 8 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

6.1.2 Configuring Cinder Driver on an FC Network

This section describes how to configure Cinder Driver for Huawei storage products when the FC protocol is used.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address.
- **Step 2** Run the following commands to go to the /etc/cinder directory and create a Huawei Cinder Driver configuration file in xml format. You can customize the configuration file name, for example, cinder_huawei_conf.xml.

```
cd /etc/cinder
vi cinder_huawei_conf.xml
```

Step 3 Configure mandatory parameters in the Huawei Cinder Driver configuration file. Use the Linux text editor to open the configuration file created in Step 2. Take the default vi editor of Linux as an example. Run the vi cinder_huawei_conf.xml command to open and edit the configuration file. The following lists the parameters in the configuration file. For details about the parameter values and more information, see Table 6-4 and Table 6-5.

```
<?xml version='1.0' encoding='UTF-8'?>
<confia>
  <Storage>
   <Product>***</Product>
   <Protocol>FC</Protocol>
   <RestURL>https://*.*.*.*:8088/deviceManager/rest/;https://*.*.**:8088/deviceManager/rest/</RestURL>
   <UserName>***</UserName>
   <UserPassword>***</UserPassword>
   <SSLCertVerify>True</SSLCertVerify>
   <SSLCertPath>xxx</SSLCertPath>
 </Storage>
 <LUN>
   <StoragePool>***</StoragePool>
   <LUNType>***</LUNType>
   <LUNCopySpeed>***</LUNCopySpeed>
  </LUN>
  <FC>
   <MinOnlineFCInitiator>xx</MinOnlineFCInitiator>
   <Initiator HostName="xxx" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
   <Initiator HostName="xxx" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
  </FC>
</config>
```

Alternatively, you can set **Name** in **<FC>** for OceanStor V5 and OceanStor Dorado V3.

```
...
<FC>
<MinOnlineFCInitiator>xx</MinOnlineFCInitiator>
<Initiator Name="xxx" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
</FC>
...
```

The ALUA policies of OceanStor Dorado and OceanStor 6.1.x are different. See the following.

```
""
<FC>
    <MinOnlineFCInitiator>xx</MinOnlineFCInitiator>
    <Initiator HostName="xxx" ACCESSMODE="xxx" HYPERMETROPATHOPTIMIZED="xxx"/>
    <Initiator HostName="xxx" ACCESSMODE="xxx" HYPERMETROPATHOPTIMIZED="xxx"
    </FC>
...
```

Table 6-4 Mandatory parameters

Parameter	Description
Product	Storage product type. The value can be V5 , V6 , or Dorado .
Protocol	Connection protocol type. Set this parameter to FC in FC scenarios.

Parameter	Description	
RestURL	Access address of the REST interface. If you need to configure multiple addresses, separate them by using semicolons (;).	
UserName	User name of a storage administrator. The user name must be an administrator or super administrator.	
UserPassword	Password of the storage administrator. NOTE If the customer has security requirements, see 11.4 Security Hardening.	
SSLCertVerify	Whether to enable certificate authentication. The value can be True or False . If the parameter is not set, the value is True by default. If certificate authentication is not required, set this parameter to False .	
SSLCertPath	Certificate path for authentication. It is valid only when SSLCertVerify is set to True . If this parameter is not set when SSLCertVerify is set to True , interconnection with storage will fail.	
StoragePool	Name of a storage pool to be used. The storage pool must be created on the target storage in advance. If you need to configure multiple storage pools, separate them by using semicolons (;).	
LUNType	Type of a LUN to be created. The value can be Thick or Thin . OceanStor Dorado and OceanStor 6.1.x support only Thin .	
LUNCopySpeed	LUN copy speed. The value can be: 1: low 2: medium 3: high 4: highest	
MinOnlineFCInitiator	Minimum number of available FC initiators. The value is an Arabic numeral. The default value indicates that all initiators must be online to complete volume mounting.	
Initiator	For parameter details, see Table 6-5 . NOTE Name or HostName can be configured (but cannot be configured at the same time). HostName is recommended.	

Table 6-5 Initiator configuration description

Parameter	Description	
HostName	The value of HostName is the regular expression of the host name of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .	
	In Linux, you can run the cat /etc/hostname or hostname command to obtain the host name.	
	 If the host names obtained using the two methods are the same, configure the host name by referring to Regular expression. 	
	 If the host names obtained using the two methods are different, configure the host name in any of the following ways: 	
	 Change the host names obtained using the two methods to be the same, and then configure the host name by referring to Regular expression. 	
	 Configure the host names obtained using the two modes separately by referring to Regular expression. 	
	 Use the common configuration HostName="*". 	
	 Specify Name rather than HostName. 	
Name	The value of Name is the host FC initiator WWN of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .	
	You can run the cat /sys/class/fc_host/*/port_name command to obtain the value.	
ALUA parameters	ALUA parameters that can be configured include ALUA, FAILOVERMODE, SPECIALMODETYPE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED. For details, see 11.1 ALUA Parameter Description.	

NOTICE

- Set Product based on the actual back-end storage model.
 For OceanStor V5 series, enter V5. For OceanStor 6.1.x series, enter V6. For OceanStor Dorado series, enter Dorado.
- The value of HostName in the Initiator configuration item is a regular expression. For details about how to configure it, see Regular expression.
 - When HostName is set to *, the common configuration is used and takes effect on hosts with any name. When HostName is set to another value, the general configuration is used.
 - When you configure HostName, the number of host connections is limited. For details about the limitation, see Specifications Query and search for Maximum number of Fibre Channel connections per controller enclosure. If the number of host connections is less than or equal to the upper limit, you are advised to use the common configuration. If the number of host connections is greater than the upper limit, use the general configuration.
- Configuration policy rules:
 - Priority: General host name configuration > Common host name configuration. For details, see example 3 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, use the first ALUA section that meets the configuration policy. For details, see example 4 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, if you need to exactly match a host, refer to example 6 in **9.2 Initiator Configuration Policy Examples**.

Step 4 (Optional) Configure optional parameters in the Huawei Cinder Driver configuration file.

```
<Storage>
  <Semaphore>20</Semaphore>
</Storage>
<LUN>
  <WriteType>***</WriteType>
  <Prefetch Type="***" Value="***"/>
  <LUNcopyWaitInterval>***</LUNcopyWaitInterval>
 <Timeout>***</Timeout>
  <LUNCloneMode>***</LUNCloneMode>
  <HyperSyncSpeed>***</HyperSyncSpeed>
  <ReplicaSyncSpeed>***</ReplicaSyncSpeed>
  <ForceDeleteVolume>***</ForceDeleteVolume>
  <HyperEnforceMultipath>***</HyperEnforceMultipath>
  <SnapshotRollbackSpeed>***</SnapshotRollbackSpeed>
  <QoslgnoredParam>xxx;xxx</QoslgnoredParam>
</LUN>
```

Table 6-6 Optional parameters

Parameter	Default Value	Description
Semaphore	20	Maximum number of RESTful requests that can be sent by a Cinder Driver to a storage device at the same time.
WriteType	1	Cache write mode. The value can be: 1: write back 2: write through Volumes created on OceanStor Dorado series storage support write back only.
Prefetch Type	3	Cache prefetch policy. The value can be: • 0: no prefetch • 1: constant prefetch • 2: variable prefetch • 3: intelligent prefetch
Prefetch Value	0	Cache prefetch value.
LUNcopyWaitInterv- al	5	After starting the LUN copy, the plugin needs to continuously query the LUN copy progress. This parameter is used to specify the query interval, expressed in seconds.
Timeout	2592000	Timeout period of waiting for a storage device to perform the LUN copy, expressed in seconds.
LUNCloneMode	luncopy	LUN clone mode. The value can be: fastclone luncopy OceanStor Dorado V300R001C20 and later versions and OceanStor Dorado 6.1.0 and later versions support fastclone and luncopy. Other storage devices support only luncopy.
HyperSyncSpeed	2	Synchronization speed of a HyperMetro pair. The value can be: 1: low 2: medium 3: high 4: highest

Parameter	Default Value	Description
ReplicaSyncSpeed	2	Synchronization speed of a remote replication pair. The value can be: 1: low 2: medium 3: high 4: highest
ForceDeleteVolume	False	Whether to forcibly delete a LUN that exists in multiple mapping views. The value can be: • True: forcibly • False: not forcibly
HyperEnforceMulti- path	True	Whether to enable multipathing in HyperMetro scenarios.
SnapshotRollback- Speed	3	Snapshot rollback speed. The value can be: • 1: low • 2: medium • 3: high • 4: highest
QoslgnoredParam	-	Front-end QoS parameters that need to be ignored by the driver backend. Multiple parameters can be configured and separated by semicolons (;).

Step 5 Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file. If they are different, run Linux command chown to change the owner and user group of the cinder_huawei_conf.xml file to be the same as those of the /etc/cinder/cinder.conf file. After the change, the result is similar to the following:

-rw-r--r-- 1 cinder cinder 2662 Jul 29 02:13 cinder.conf -rw-r--r-- 1 cinder cinder 778 Jul 30 02:56 cinder_huawei_conf.xml

Step 6 Add the following information to the end of the /etc/cinder/cinder.conf file.

[huawei_backend]
volume_driver = cinder.volume.drivers.huawei.huawei_driver.HuaweiFCDriver
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf.xml
volume_backend_name = huawei_backend
retain_storage_mapping = False

□ NOTE

- huawei_backend indicates the backend name. It can be customized.
- volume_driver indicates the type of Cinder Driver to be used. Set this parameter to cinder.volume.drivers.huawei.huawei driver.HuaweiFCDriver.
- **cinder_huawei_conf_file** indicates the path of the Huawei Cinder Driver configuration file.
- retain_storage_mapping indicates whether to retain the storage mapping relationship when the last volume on the host is not mapped. False indicates no and True indicates yes. This parameter is optional. The default value is False.

In the [DEFAULT] section, set enabled_backends to huawei_backend.

[DEFAULT]
...
enabled_backends=huawei_backend

Step 7 If Cinder Volume is deployed on multiple nodes, you need to configure a distributed lock in the [coordination] section. For details about <user>, <password>, <host>, and <database>, see the value of connection under [database] in the configuration file.

[coordination] backend_url = mysql://<user>:<password>@<host>/<database>?charset=utf8

Step 8 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

6.1.3 Configuring Cinder Driver on a RoCE Network

This section describes how to configure Cinder Driver for Huawei storage products when the RoCE protocol is used.

■ NOTE

- 1. Only the following OpenStack versions are supported:
 - Pika: customized for the cloud platform developed by China Mobile Suzhou Research Center
 - Zed: developed based on OpenStack community standards
- 2. Only the following storage device versions are supported:
 - OceanStor 6.1.6/6.1.7/6.1.8
 - OceanStor Dorado 6.1.6/6.1.7/6.1.8
- 3. HyperMetro LUNs are not supported in RoCE networking.
- 4. If the host machine of a compute node has been connected to an iSCSI or FC network and you want to switch to a RoCE network, only the following two solutions are supported due to storage restrictions and mapping model changes:
 - Solution 1: Use a new host machine to connect to the RoCE network (recommended).
 - Solution 2: Delete all VMs from the host machine that has been mapped to the iSCSI or FC network and use the RoCE network for connection.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address.
- **Step 2** Run the following commands to go to the /etc/cinder directory and create a Huawei Cinder Driver configuration file in xml format. You can customize the configuration file name, for example, cinder_huawei_conf.xml.

```
cd /etc/cinder
vi cinder_huawei_conf.xml
```

Step 3 Configure mandatory parameters in the Huawei Cinder Driver configuration file. Use the Linux text editor to open the configuration file created in Step 2. Take the default vi editor of Linux as an example. Run the vi cinder_huawei_conf.xml command to open and edit the configuration file. The following lists the parameters in the configuration file. For details about the parameter values and more information, see Table 6-7 and Table 6-8.

```
<?xml version='1.0' encoding='UTF-8'?>
<config>
  <Storage>
   <Product>***</Product>
    <Protocol>nvmeof</Protocol>
   <RestURL>https://*.*.*:8088/deviceManager/rest/;https://*.*.*:8088/deviceManager/rest/</RestURL>
   <UserName>***</UserName>
    <UserPassword>***</UserPassword>
 </Storage>
  <LUN>
   <StoragePool>***</StoragePool>
   <LUNType>***</LUNType>
   <LUNCopySpeed>***</LUNCopySpeed>
 </LUN>
   <Initiator HostName="******" TargetIP="x.x.x.x y.y.y.y"/>
   <Initiator HostName="******" TargetIP="x.x.x.x y.y.y.y"/>
  </RoCE>
</config>
```

Table 6-7 Mandatory parameters

Parameter	Description	
Product	Storage product type. The value can be V6 or Dorado .	
Protocol	Connection protocol type. Set this parameter to nvmeof in RoCE scenarios.	
RestURL	Access address of the REST interface. If you need to configure multiple addresses, separate them by using semicolons (;).	
UserName	User name of a storage administrator. The user name must be an administrator or super administrator.	
UserPassword	Password of the storage administrator.	
StoragePool	Name of a storage pool to be used. The storage pool must be created on the target storage in advance. If you need to configure multiple storage pools, separate them by using semicolons (;).	
LUNType	Type of a LUN to be created. The value can be Thick or Thin . OceanStor Dorado and OceanStor 6.1. <i>x</i> support only Thin .	
LUNCopySpeed	LUN copy speed. The value can be: 1: low 2: medium 3: high 4: highest	
Initiator	For parameter details, see Table 6-8. NOTE Name or HostName can be configured (but cannot be configured at the same time). HostName is recommended. ALUA parameters do not need to be configured in RoCE networking.	

Table 6-8 Initiator configuration description

Parameter	Description
HostName	The value of HostName is the regular expression of the host name of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .
	In Linux, you can run the cat /etc/hostname or hostname command to obtain the host name.
	 If the host names obtained using the two methods are the same, configure the host name by referring to Regular expression.
	 If the host names obtained using the two methods are different, configure the host name in any of the following ways:
	 Change the host names obtained using the two methods to be the same, and then configure the host name by referring to Regular expression.
	 Configure the host names obtained using the two modes separately by referring to Regular expression.
	 Use the common configuration HostName="*".
	 Specify Name rather than HostName.
Name	The value of Name is the host RoCE initiator name of the node where Nova-compute or Cinder-volume resides. Specify either HostName or Name .
	You can run the cat /etc/nvme/hostnqn command to obtain the value.
ALUA parameters	ALUA parameters that can be configured include ALUA, FAILOVERMODE, SPECIALMODETYPE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED. For details, see 11.1 ALUA Parameter Description.

Parameter	Description	
TargetIP	TargetIP indicates the IP address of the RoCE target port. You can enter multiple IP addresses and separate them with spaces. Different TargetIP values can be configured for different hosts.	
	You can log in to DeviceManager to obtain the IP address of the RoCE target port.	
	 OceanStor Dorado series: To obtain the IP address of a logical port on a specified storage device, choose Services > Network > Logical Ports on DeviceManager and obtain the IP address whose data protocol is RoCE. 	
	 OceanStor 6.1.x series: To obtain the IP address of a logical port on a specified storage device, choose Services > Network > Logical Ports on DeviceManager and obtain the IP address whose data protocol is RoCE. 	

NOTICE

- Set Product based on the actual back-end storage model.
 For OceanStor 6.1.x series, enter V6. For OceanStor Dorado series, enter Dorado.
- The value of **HostName** in the **Initiator** configuration item is a regular expression. For details about how to configure it, see **Regular expression**.
 - When HostName is set to *, the common configuration is used and takes
 effect on hosts with any name. When HostName is set to another value,
 the general configuration is used.
 - When you configure HostName, the number of host connections is limited. For details about the limitation, see Specifications Query and search for Maximum number of RoCE connections per controller enclosure. If the number of host connections is less than or equal to the upper limit, you are advised to use the common configuration. If the number of host connections is greater than the upper limit, use the general configuration.
- Configuration policy rules:
 - Priority: General host name configuration > Common host name configuration. For details, see example 1 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, use the first ALUA section that meets the configuration policy. For details, see example 2 in 9.2 Initiator Configuration Policy Examples.
 - In the general configuration, if you need to exactly match a host, refer to example 5 in **9.2 Initiator Configuration Policy Examples**.

Step 4 (Optional) Configure optional parameters in the Huawei Cinder Driver configuration file.

```
<Storage>
</Storage>
</LUN>
</WriteType>****</WriteType>
</Prefetch Type="***" Value="***"/>
<LUNcopyWaitInterval>***</LUNcopyWaitInterval>
<Timeout>***</Timeout>
<LUNCloneMode>***</LUNCloneMode>
<HyperSyncSpeed>***</HyperSyncSpeed>
<ReplicaSyncSpeed>***</ReplicaSyncSpeed>
<ForceDeleteVolume>***</ForceDeleteVolume>
<HyperEnforceMultipath>***</HyperEnforceMultipath>
<SnapshotRollbackSpeed>***</NapshotRollbackSpeed>
<QoslgnoredParam>xxx;xxxx</QoslgnoredParam>
</LUN>
```

Table 6-9 Optional parameters

Parameter	Default Value	Description
Semaphore	20	Maximum number of RESTful requests that can be sent by a Cinder Driver to a storage device at the same time.
WriteType	1	Cache write mode. The value can be: 1: write back 2: write through Volumes created on OceanStor Dorado series storage support write back only.
Prefetch Type	3	Cache prefetch policy. The value can be: • 0: no prefetch • 1: constant prefetch • 2: variable prefetch • 3: intelligent prefetch
Prefetch Value	0	Cache prefetch value.
LUNcopyWaitInterval	5	After starting the LUN copy, the plug-in needs to continuously query the LUN copy progress. This parameter is used to specify the query interval, expressed in seconds.
Timeout	2592000	Timeout period of waiting for a storage device to perform the LUN copy, expressed in seconds.

Parameter	Default Value	Description
LUNCloneMode	luncopy	LUN clone mode. The value can be:
		• fastclone
		 luncopy OceanStor Dorado 6.1.x series supports fastclone and luncopy. Other storage devices support only luncopy.
		NOTE When FastClone is used, there are restrictions on the following features: HyperMetro, remote replication, snapshot, creating a consistency group from a snapshot consistency group or consistency group, and clone.
ReplicaSyncSpeed	2	Synchronization speed of a remote replication pair. The value can be:
		• 1: low
		• 2 : medium
		• 3 : high
		• 4: highest
ForceDeleteVolume	False	Whether to forcibly delete a LUN that is mapped to multiple hosts. The value can be:
		True: forcibly
		False: not forcibly
SnapshotRollbackSpeed	3	Snapshot rollback speed. The value can be:
		• 1: low
		• 2: medium
		• 3: high
		• 4: highest
QoslgnoredParam	-	Front-end QoS parameters that need to be ignored by the driver backend. Multiple parameters can be configured and separated by semicolons (;).

Step 5 Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file. If they are different, run Linux command chown to change the owner and user group of the cinder_huawei_conf.xml file to be the same as those of the /etc/cinder/cinder.conf file. After the change, the result is similar to the following:

```
-rw-r--r- 1 cinder cinder 2662 Jul 29 02:13 cinder.conf
-rw-r--r- 1 cinder cinder 778 Jul 30 02:56 cinder_huawei_conf.xml
```

Step 6 Add the following information to the end of the /etc/cinder/cinder.conf file.

[huawei_backend]
volume_driver = cinder.volume.drivers.huawei.huawei_roce_driver.HuaweiROCEDriver
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf.xml
volume_backend_name = huawei_backend
retain_storage_mapping = False

□ NOTE

- 1. **huawei backend** indicates the backend name. It can be customized.
- 2. **volume_driver** indicates the type of Cinder Driver to be used. Set this parameter based on the version.
 - Pika: cinder.volume.drivers.huawei.huawei driver.HuaweiROCEDriver
 - Zed: cinder.volume.drivers.huawei.huawei_roce_driver.HuaweiROCEDriver
- 3. **cinder_huawei_conf_file** indicates the path of the Huawei Cinder Driver configuration file.
- 4. **retain_storage_mapping** indicates whether to retain the storage mapping relationship when the last volume on the host is not mapped. **False** indicates no and **True** indicates yes. This parameter is optional. The default value is **False**.

In the [DEFAULT] section, set enabled_backends to huawei_backend.

```
[DEFAULT]
...
enabled_backends=huawei_backend
```

```
[coordination] backend_url = mysql://<user>:<password>@<host>/<database>?charset=utf8
```

For example, if the configuration of **[database]** is as follows:

```
[database]
connection = mysql+pymysql://cinder:302824058e9a4f31@127.0.0.1/cinder
```

You can configure [database] as follows:

```
[coordination]
backend_url = mysql://cinder:302824058e9a4f31@127.0.0.1/cinder
```

Step 8 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



6.2 Configuring Cinder Driver in Containerized Mode

This section describes how to configure Cinder Driver for Huawei storage products in containerized mode. The following uses OpenStack Kolla as an example.

6.2.1 Configuring Cinder Driver on an iSCSI Network

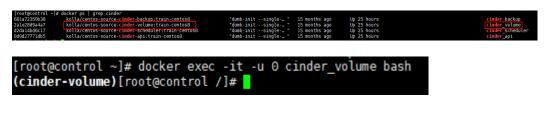
This section describes how to configure Cinder Driver for Huawei storage products when the iSCSI protocol is used.

Procedure

Step 1 Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address. Run the following command on a host to find the cinder.conf file and configure parameters by referring to 6.1.1 Configuring Cinder Driver on an iSCSI Network.

find / -name cinder.conf | grep volume

Step 2 Run the docker ps | grep cinder command to query the Cinder Volume container.
Then run the docker exec -it -u 0 cinder_volume bash command to access the Cinder Volume container.



□ NOTE

cinder_volume is the name of the Cinder Volume container.

- Step 3 Create a Huawei Cinder Driver configuration file in xml format in the /etc/cinder directory of the Cinder Volume container and configure parameters by referring to 6.1.1 Configuring Cinder Driver on an iSCSI Network. You can customize the configuration file name, for example, cinder_huawei_conf.xml.
- **Step 4** Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file.

```
-rw-----. 1 cinder cinder 2962 Sep 22 07:17 cinder.conf
-rw-----. 1 cinder cinder 443 Sep 14 03:43 cinder_huawei_conf.xml
```

Step 5 Run the following command to restart the Cinder Volume service.

docker restart cinder_volume

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



6.2.2 Configuring Cinder Driver on an FC Network

This section describes how to configure Cinder Driver for Huawei storage products when the FC protocol is used.

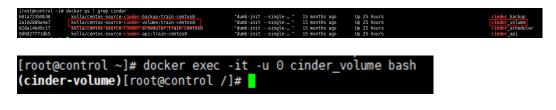
Procedure

Step 1 Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address. Run the following command on a host to find the cinder.conf file and configure parameters by referring to 6.1.2 Configuring Cinder Driver on an FC Network.

find / -name cinder.conf | grep volume

Step 2 Run the docker ps | grep cinder command to query the Cinder Volume container.

Then run the docker exec -it -u 0 cinder_volume bash command to access the Cinder Volume container.



cinder volume is the name of the Cinder Volume container.

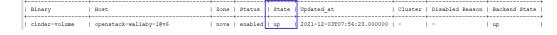
- Step 3 Create a Huawei Cinder Driver configuration file in xml format in the /etc/cinder directory of the Cinder Volume container and configure parameters by referring to 6.1.2 Configuring Cinder Driver on an FC Network. You can customize the configuration file name, for example, cinder_huawei_conf.xml.
- **Step 4** Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file.

```
-rw-----. 1 cinder cinder 2962 Sep 22 07:17 cinder.conf
-rw----. 1 cinder cinder 443 Sep 14 03:43 cinder_huawei_conf.xml
```

Step 5 Run the following command to restart the Cinder Volume service.

docker restart cinder volume

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

6.2.3 Configuring Cinder Driver on a RoCE Network

This section describes how to configure Cinder Driver for Huawei storage products when the RoCE protocol is used.

- 1. Only the following OpenStack versions are supported:
 - Pika: customized for the cloud platform developed by China Mobile Suzhou Research Center
 - Zed: developed based on OpenStack community standards
- 2. Only the following storage device versions are supported:
 - OceanStor 6.1.6/6.1.7/6.1.8
 - OceanStor Dorado 6.1.6/6.1.7/6.1.8
- 3. HyperMetro LUNs are not supported in RoCE networking.
- 4. If the host machine of a compute node has been connected to an iSCSI or FC network and you want to switch to a RoCE network, only the following two solutions are supported due to storage restrictions and mapping model changes:
 - Solution 1: Use a new host machine to connect to the RoCE network (recommended).
 - Solution 2: Delete all VMs from the host machine that has been mapped to the iSCSI or FC network and use the RoCE network for connection.

Procedure

Step 1 Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder Volume node through the management IP address. Run the following command on a host to find the cinder.conf file and configure parameters by referring to 6.1.3 Configuring Cinder Driver on a Roce Network.

find / -name cinder.conf | grep volume

Step 2 Run the docker ps | grep cinder command to query the Cinder Volume container. Then run the docker exec -it -u 0 cinder_volume bash command to access the Cinder Volume container.



□ NOTE

cinder_volume is the name of the Cinder Volume container.

- Step 3 Create a Huawei Cinder Driver configuration file in xml format in the /etc/cinder directory of the Cinder Volume container and configure parameters by referring to 6.1.3 Configuring Cinder Driver on a RoCE Network. You can customize the configuration file name, for example, cinder_huawei_conf.xml.
- **Step 4** Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file.

```
-rw-----. 1 cinder cinder 2962 Sep 22 07:17 cinder.conf
-rw-----. 1 cinder cinder 443 Sep 14 03:43 cinder_huawei_conf.xml
```

Step 5 Run the following command to restart the Cinder Volume service.

docker restart cinder_volume

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



Configuring Multipathing

Multipathing is configured to improve the link reliability of LUNs on SAN storage. If multipathing is incorrectly configured, I/O errors will occur when a single link is faulty. As a result, VM file systems are 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.

7.1 Configuring Host Multipathing

7.2 Configuring OpenStack Multipathing

7.1 Configuring Host Multipathing

7.1.1 Installing the Multipathing Tool Package

This section describes how to install the multipathing tool package.

Prerequisites

OpenStack nodes can access the Internet (only used to download the multipathing tool package).

Precautions

The host multipathing service needs to be configured only when storage devices are connected over an iSCSI or FC network.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Nova node through the management IP address.
- **Step 2** Install the multipathing tool package based on the OS.
 - CentOS: yum install -y device-mapper-multipath
 - Ubuntu:

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

 SUSE: zypper install -y multipath-tools

Step 3 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
- SUSE: systemctl restart multipath-tools.service chkconfig multipathd on

Step 4 Repeat **Step 1** to **Step 3** to install the multipathing tool on all Nova nodes.

----End

7.1.2 Configuring the Multipathing Service

Multipathing is configured to improve the link reliability of LUNs on SAN storage. If multipathing is incorrectly configured, I/O errors will occur when a single link is faulty. As a result, the file systems or disks managed by OpenStack are read-only or faulty, affecting I/O delivery.

Precautions

When RoCE is used to connect to storage, you do not need to perform the following operations. In instead, perform the operations in NVMe Native Multipathing Software in OceanStor Dorado 6.x and OceanStor 6.x Host Connectivity Guide for Connecting to Linux Hosts Using NVMe over Fabrics.

When iSCSI or FC is used to connect to storage, perform the following steps to configure multipathing.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Nova node through the management IP address.
- Step 2 Run the vi /etc/multipath.conf command to modify the multipath.conf file.

 Press I or Insert to enter the editing mode and modify related parameters. After the modification is complete, press Esc and enter :wq! to save the modification.

NOTICE

- Load balancing mode: During service read and write, the I/O paths from a host to all controllers on a storage device are the same. For details, see Configuring Multipathing > Concepts in Huawei SAN Storage Host Connectivity Guide for Red Hat.
- Local preferred mode: When a host delivers I/Os to controllers, the storage device with better performance is accessed because the service link distances from storage devices are different. For details, see Configuring Multipathing > Concepts in *Huawei SAN Storage Host Connectivity Guide for Red Hat*.
- If the load balancing mode is used, you are advised to add the following content to the devices field in the multipathing configuration file (/etc/multipath.conf). The following is a typical example. For details about all scenarios and examples, see OceanStor Dorado Host Connectivity Guide for Red Hat.

```
devices {
  device {
          vendor
                               "HUAWEI"
          product
                                "XSG1"
          path_grouping_policy
                                    multibus
          path_checker
                                 tur
          prio
                              const
                                 "service-time 0"
          path_selector
          failback
                               immediate
          no_path_retry
                                 15
      }
}
```

If the local preferred mode is used, you are advised to add the following content to the devices field in the multipathing configuration file (/etc/multipath.conf). The following is a typical example. For details about all scenarios and examples, see Huawei SAN Storage Host Connectivity Guide for Red Hat.

```
devices {
  device {
         vendor
                            "HUAWEI"
                            "XSG1"
         product
         path_grouping_policy group_by_prio
         path_checker
                              tur
         prio
         path_selector
                             "round-robin 0"
         failback
                           immediate
         no_path_retry
      }
```

Step 3 After the configuration is complete, run the following command to restart the multipathd service.

systemctl restart multipathd.service

Step 4 Repeat **Step 1** to **Step 3** to configure the multipathing service for all Nova nodes.

----End

□ NOTE

When OceanStor converged storage and OceanStor Dorado all-flash storage coexist, that is, you use OceanStor converged storage and then expand the capacity using OceanStor Dorado all-flash storage, retain the multipathing configuration file (/etc/multipath.conf) unchanged.

7.2 Configuring OpenStack Multipathing

7.2.1 Configuring Multipathing for OpenStack Nova Nodes

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Nova node through the management IP address.
- Step 2 Configure the /etc/nova/nova.conf file.

Add **volume_use_multipath** = **True** to **[libvirt]** in the **/etc/nova/nova.conf** file of the Nova Compute node.

□ NOTE

- If the OpenStack version is Mitaka or earlier, add iscsi_use_multipath = True to [libvirt] in the /etc/nova/nova.conf file of the Nova Compute node.
- If the OpenStack version is Newton or earlier, add **volume_use_multipath** = **True** to **[libvirt]** in the **/etc/nova/nova.conf** file of the Nova Compute node.

Step 3 Restart the Nova-compute service.

systemctl restart openstack-nova-compute.service

----End

7.2.2 Configuring Multipathing for OpenStack Cinder Nodes

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Add the following content to the end of **BACKEND** in the /etc/cinder/cinder.conf file.

[huawei_backend]

use_multipath_for_image_xfer = true enforce_multipath_for_image_xfer = true

Step 3 Restart the Cinder-volume service.

systemctl restart openstack-cinder-volume.service

8 Configuring Advanced Features of Cinder Driver

Huawei storage supports a series of advanced features. You can create volumes with advanced features by configuring specific volume types.

NOTICE

Licenses of advanced features must be imported onto Huawei storage devices in advance.

- 8.1 Configuring the Thick Property
- 8.2 Configuring the Thin Property
- 8.3 Configuring the SmartQoS Property
- 8.4 Configuring the SmartPartition Property
- 8.5 Configuring the SmartCache Property
- 8.6 Configuring the SmartTier Property
- 8.7 Configuring the HyperMetro Property
- 8.8 Configuring the Remote Replication Property
- 8.9 Creating a Volume in a Specified Storage Pool
- 8.10 Creating a Volume on a Disk of a Specified Type
- 8.11 Creating a Volume on a Specified Backend
- 8.12 Configuring Snapshot Backup
- 8.13 Configuring Certificate Authentication
- 8.14 Configuring the Owning Controller of a LUN
- 8.15 Configuring the SmartDedupe Property
- 8.16 Configuring the SmartCompression Property

- 8.17 Creating a Volume Using FastClone
- 8.18 Configuring the LUN Copy Speed
- 8.19 Configuring the Application Type of a LUN
- 8.20 Configuring a vStore User
- 8.21 Configuring Multiple Backends
- 8.22 Configuring Automatic Zoning
- 8.23 Configuring the CHAP Feature
- 8.24 Configuring the In-band Feature

8.1 Configuring the Thick Property

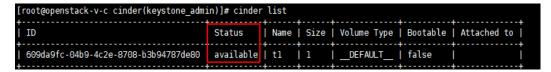
This section describes how to configure the Thick property.

NOTICE

OceanStor Dorado and OceanStor 6.1.x do not support the Thick property.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Set the Thick volume type. *<vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set capabilities:thick_provisioning_support='<is> true'
- **Step 4** Set the scheduling mechanism for the Thick volume. *<vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set provisioning:type='thick'
- **Step 5** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.
 - # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 6** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



8.2 Configuring the Thin Property

This section describes how to configure the Thin property.

Procedure

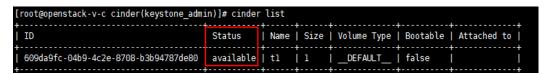
- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Set the Thin volume type. *<vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true'

Step 4 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.3 Configuring the SmartQoS Property

The QoS feature of OpenStack depends on the front-end hypervisor and back-end storage.

For details about front-end QoS configuration, see https://docs.openstack.org/cinder/latest/admin/blockstorage-basic-volume-gos.html.

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

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the SmartQoS property. *<vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set capabilities:QoS_support='<is> true'

Step 4 Create a QoS specification. <*name>* indicates the name of the QoS specification. # cinder qos-create <name> IOType=* <qos_key>=***

Table 8-1 IOType parameters

Parameter	Description	Remarks
ЮТуре	Read/write type.	The value can be:
		• 0 : read I/O
		• 1: write I/O
		• 2 : read and write I/Os

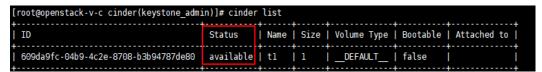
Table 8-2 Optional qos_key parameters

Parameter	Description	Remarks
maxIOPS	Maximum IOPS. This is a restriction policy parameter.	The value is an integer greater than 0. For OceanStor Dorado series, the value is an integer greater than or equal to 100.
minIOPS	Minimum IOPS. This is a protection policy parameter.	The value is an integer greater than 0. For OceanStor Dorado series, the value is an integer greater than or equal to 100.
maxBandWidth	Maximum bandwidth. This is a restriction policy parameter.	The value is an integer greater than 0, expressed in MB/s.
minBandWidth	Minimum bandwidth. This is a protection policy parameter.	The value is an integer greater than 0, expressed in MB/s.
latency	Maximum latency. This is a protection policy parameter.	The value is an integer greater than 0, expressed in ms. For OceanStor Dorado and OceanStor 6.1.x storage, latency cannot be configured.
burstIOPS	Maximum burst IOPS.	Only OceanStor Dorado and OceanStor 6.1.x series are supported. The value is an integer greater than or equal to 100. When setting burstIOPS, you also need to set maxIOPS and burstTime. Moreover, the value of this parameter must be greater than that of maxIOPS.

Parameter	Description	Remarks
burstBandWidth	Maximum burst bandwidth.	Only OceanStor Dorado and OceanStor 6.1.x series are supported. The unit is MB/s. The value is an integer greater than 0. When setting burstBandWidth, you also need to set maxBandWidth and burstTime. Moreover, the value of this parameter must be greater than that of maxBandWidth.
burstTime	Burst duration.	Only OceanStor Dorado and OceanStor 6.1.x series are supported. The unit is s. The value is an integer greater than 0. When setting burstIOPS or burstBandWidth, you must also set burstTime.

◯ NOTE

- Different protection policy parameters or restriction policy parameters can be specified
 at the same time. However, protection policy parameters cannot coexist with restriction
 policy parameters.
- For OceanStor Dorado and OceanStor 6.1.x storage, **IOType** must be set to **2**, the protection policy and restriction policy parameters can be specified at the same time, but **latency** cannot be configured.
- **latency**, **burstIOPS**, **burstBandWidth**, **burstTime**, and protection policy parameters support only OpenStack R and later versions.
- For OceanStor Dorado and OceanStor 6.1.x storage, versions earlier than R do not support minIOPS, minBandWidth, and latency.
- **Step 5** Associate the QoS specification with the volume type. <qos_specs> indicates the ID of the QoS specifications created in **Step 4**, and <volume_type_id> indicates the ID of the volume type created in **Step 2**.
 - # cinder qos-associate <qos_specs> <volume_type_id>
- **Step 6** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.
 - # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 7** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



8.4 Configuring the SmartPartition Property

This section describes how to configure the SmartPartition property.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the SmartPartition property. *<vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set capabilities:smartpartition='<is> true'
- **Step 4** Configure the name of existing SmartPartition on the back-end storage.

 # cinder type-key <vtype> set smartpartition:partitionname='***'
- Step 5 Use the volume type created in Step 2 to create a volume. 10 indicates the volume size (unit: GB), <volume-name> indicates the volume name, and <name> indicates the name of the volume type.
 # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 6** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.

----End

8.5 Configuring the SmartCache Property

This section describes how to configure the SmartCache property.

Procedure

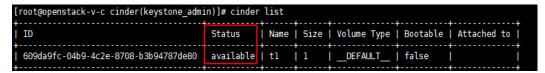
- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the SmartCache property. *<vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set capabilities:smartcache='<is> true'
- **Step 4** Configure the name of existing SmartCache on the back-end storage.

 # cinder type-key <vtype> set smartcache:cachename='***

Step 5 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 6 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.6 Configuring the SmartTier Property

This section describes how to configure the SmartTier property.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <name>
- **Step 3** Enable the SmartTier property. <*vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set capabilities:smarttier='<is> true'

Step 4 Configure a SmartTier migration policy.

cinder type-key <vtype> set smarttier:policy=***

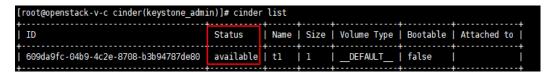
◯ NOTE

policy indicates a migration policy. The value can be:

- 0: no migration
- 1: automatic migration
- 2: migration to a high-performance tier
- 3: migration to a low-performance tier
- **Step 5** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 6 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



8.7 Configuring the HyperMetro Property

This section describes how to configure the HyperMetro property.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Configure the remote device information in the specified backend in **/etc/cinder/cinder.conf**.

```
hypermetro_device =
storage_pool:***,
san_address:https://*.*.**:8088/deviceManager/rest/,
san_user:***,
san_password:***,
vstore_name:***,
ssl_cert_verify:false,
ssl_cert_path: ***,
metro_domain:***,
metro_sync_completed:***,
iscsi_info: {HostName:xxx;ALUA:xxx;FAILOVERMODE:xxx;PATHTYPE:xxx;TargetIP:x.x.x.x z.z.z.z},
fc_info: {HostName:xxx;ALUA:xxx;FAILOVERMODE:xxx;PATHTYPE:xxx}
{HostName:xxx;ALUA:xxx;FAILOVERMODE:xxx;PATHTYPE:xxx};
{HostName:xxx;ALUA:xxx;FAILOVERMODE:xxx;PATHTYPE:xxx};
```

The ALUA policy of OceanStor Dorado is different. See the following.

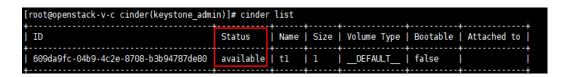
Table 8-3 Parameter description

Parameter	Description	Mandatory
storage_pool	Name of the remote storage pool.	Yes
san_address	Access address of the REST interface.	Yes
san_user	User name of a storage administrator or vStore of the remote device.	Yes
san_password	Password of a storage administrator or vStore of the remote device.	Yes
	NOTE If the customer has security requirements, see 11.4 Security Hardening.	
vstore_name	vStore name of the remote device. This parameter needs to be configured only when a vStore user is used.	No

Parameter	Description	Mandatory
ssl_cert_verify	Whether to enable certificate authentication. The value can be True or False . If the parameter is not set, the value is True by default. If certificate authentication is not required, set this parameter to False .	For versions earlier than Rocky, you do not need to set this parameter and the storage certificates at both ends must be issued by the same CA certificate. For Rocky and later versions, this parameter is mandatory and the storage certificates at both ends do not need to be issued by the same CA certificate.
ssl_sert_path	Certificate path for authentication. It is valid only when SSLCertVerify is set to True. If this parameter is not set when SSLCertVerify is set to True, interconnection with storage will fail.	For versions earlier than Rocky, you do not need to set this parameter and the storage certificates at both ends must be issued by the same CA certificate. For Rocky and later versions, this parameter is mandatory and the storage certificates at both ends do not need to be issued by the same CA certificate.
metro_domain	HyperMetro domain name.	Yes
metro_sync_compl eted	Whether to wait for the synchronization to complete during HyperMetro creation. The value can be True or False . The default value is True .	No

Parameter	Description	Mandatory
iscsi_info	HostName is the regular expression of the host name of the Nova or Cinder node.	Mandatory for iSCSI networking
	Configuration rule and priority description:	
	ALUA, FAILOVERMODE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED indicate ALUA parameters of the storage device. For details, see 11.1 ALUA Parameter Description.	
	TargetIP indicates the IP address of the iSCSI target port. You can enter multiple IP addresses and separate them with spaces. Different TargetIP values can be configured for different hosts.	
fc_info	HostName is the regular expression of the host name of the Nova or Cinder node.	Mandatory for FC networking
	Configuration rule and priority description:	
	ALUA, FAILOVERMODE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED indicate ALUA parameters of the storage device. For details, see 11.1 ALUA Parameter Description. This parameter are be set for	
	 This parameter can be set for different hosts. 	

- **Step 3** Restart the Cinder Volume service.
- **Step 4** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 5** Enable the HyperMetro property. *<vtype>* indicates the name of the volume type created in **Step 4**.
 - # cinder type-key <vtype> set capabilities:hypermetro='<is> true'
- **Step 6** Use the volume type created in **Step 4** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.
 - # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 7** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.8 Configuring the Remote Replication Property

This section describes how to configure the remote replication property.

□ NOTE

Currently, the remote replication property can be configured only when the iSCSI or FC protocol is used.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Configure the remote device information in the specified backend in /etc/cinder/cinder.conf.

The ALUA policy of OceanStor Dorado is different. See the following.

Table 8-4 Parameter description

Parameter	Description	Mandatory
backend_id	Target device ID. This parameter must be specified in the event of failover.	Yes
storage_pool	Storage pool name of the target backend in the event of failover.	Yes
san_address	Access address of the REST interface.	Yes

Parameter	Description	Mandatory
san_user	User name of a storage administrator or vStore of the remote device.	Yes
san_passwor d	Password of a storage administrator or vStore of the remote device. NOTE If the customer has security requirements, see 11.4 Security Hardening.	Yes
vstore_name	vStore name of the remote device. This parameter needs to be configured only when a vStore user is used.	No
ssl_cert_verif y	Whether to enable certificate authentication. The value can be True or False . If the parameter is not set, the value is True by default. If certificate authentication is not required, set this parameter to False .	For versions earlier than Rocky, you do not need to set this parameter and the storage certificates at both ends must be issued by the same CA certificate. For Rocky and later versions, this parameter is mandatory and the storage certificates at both ends do not need to be issued by the same CA certificate.
ssl_sert_path	Certificate path for authentication. It is valid only when SSLCertVerify is set to True. If this parameter is not set when SSLCertVerify is set to True, interconnection with storage will fail.	For versions earlier than Rocky, you do not need to set this parameter and the storage certificates at both ends must be issued by the same CA certificate. For Rocky and later versions, this parameter is mandatory and the storage certificates at both ends do not need to be issued by the same CA certificate.

Parameter	Description	Mandatory
iscsi_info	HostName is the regular expression of the host name of the Nova or Cinder node.	Mandatory for iSCSI networking
	Configuration rule and priority description:	
	ALUA, FAILOVERMODE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED indicate ALUA parameters of the storage device. For details, see 11.1 ALUA Parameter Description.	
	TargetIP indicates the IP address of the iSCSI target port. You can enter multiple IP addresses and separate them with spaces. Different TargetIP values can be configured for different hosts.	
fc_info	HostName is the regular expression of the host name of the Nova or Cinder node.	Mandatory for FC networking
	Configuration rule and priority description:	
	ALUA, FAILOVERMODE, PATHTYPE, ACCESSMODE, and HYPERMETROPATHOPTIMIZED indicate ALUA parameters of the storage device. For details, see 11.1 ALUA Parameter Description. This parameter can be set for	
	This parameter can be set for different hosts.	

- **Step 3** Restart the Cinder Volume service.
- **Step 4** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <name>
- **Step 5** Enable the remote replication property. *<vtype>* indicates the name of the volume type created in **Step 4**.
 - # cinder type-key <vtype> set capabilities:replication_enabled='<is> true'
- **Step 6** (Optional) Set the replication type.
 - # cinder type-key <vtype> set replication_type='<in> ***'

The value of *** can be:

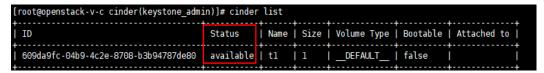
- **sync**: synchronous replication
- async: asynchronous replication

If replication_type is not set, asynchronous replication is used by default.

Step 7 Use the volume type created in **Step 4** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 8 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.9 Creating a Volume in a Specified Storage Pool

This section describes how to create a volume in a specified storage pool.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. *<name>* indicates the name of the volume type. # cinder type-create <name>
- **Step 3** Configure a single storage pool. *<vtype>* indicates the name of the volume type created in **Step 2**.

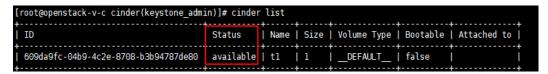
cinder type-key <vtype> set pool_name=StoragePool001

Alternatively, configure multiple storage pools.
cinder type-key <vtype> set pool_name="<or> StoragePool001 <or> StoragePool002"

Step 4 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.10 Creating a Volume on a Disk of a Specified Type

This section describes how to create a volume on a disk of a specified type.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Configure a disk type. *<vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set disk_type=sas

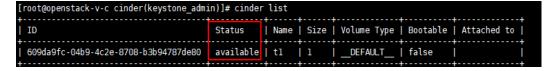
Alternatively, configure multiple disk types. # cinder type-key <vtype> set disk_type="<or> sas <or> ssd"

The value of disk_type can be ssd, sas, nl_sas, or mix, where mix indicates that two or more of ssd, sas, and nl_sas are used.

Step 4 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.11 Creating a Volume on a Specified Backend

This section describes how to create a volume on a specified backend.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Configure the backend name *<vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set volume_backend_name=***

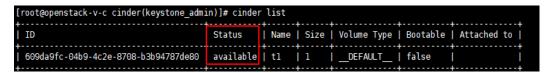
■ NOTE

Set **volume_backend_name** to the value of **volume_backend_name** in the **/etc/cinder/cinder.conf** configuration file of the backend.

Step 4 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.12 Configuring Snapshot Backup

This section describes how to configure the snapshot backup function.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Configure a backup driver by referring to https://docs.openstack.org/ocata/config-reference/block-storage/backup-drivers.html. Ensure that the Cinder Backup service is running properly.
- **Step 3** Run the **vi /etc/cinder/cinder.conf** command to configure the backend of the configuration file. Add the following configuration to the file.

backup_use_temp_snapshot = True

Step 4 Restart the Cinder Volume and Cinder Backup services.

systemctl restart openstack-cinder-backup.service systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume and Cinder Backup services are successfully started.

Binary	Host				Updated_at		Disabled Reason		
cinder-back	openstack-wallaby-1 openstack-wallaby-10v6	nova	enabled	up	2021-12-03T07:56:23.000000 2021-12-03T07:56:23.000000	-	-	 up	Ī

----End

8.13 Configuring Certificate Authentication

This section describes how to configure certificate authentication to connect to back-end storage.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Set the configuration file of Huawei Cinder Driver. Add **SSLCertVerify** and **SSLCertPath** in the **<Storage>** section.

◯ NOTE

- **SSLCertVerify** indicates whether to enable certificate authentication. The value can be **True** or **False**. If the parameter is not set, the value is **False** by default. You are advised to enable certificate authentication.
- SSLCertPath indicates the certificate path for authentication and is valid only when SSLCertVerify is set to True.
- **Step 3** Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

8.14 Configuring the Owning Controller of a LUN

This section describes how to configure the owning controller of a LUN.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <name>
- **Step 3** Enable the **huawei_controller** property. *<vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set capabilities:huawei_controller='<is> true'
- **Step 4** Configure the owning controller name.
 - # cinder type-key <vtype> set huawei_controller:controllername=***

■ NOTE

The format of the owning controller name is **CTE0.A**. Take OceanStor Dorado as an example. On DeviceManager, choose **System** > **Hardware** > **Controllers** to obtain the controller name.

Step 5 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 6 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.

[root@openstack-v-c cinder(keystone_admin)]# cinder list							
ID				Volume Type		Attached to	
609da9fc-04b9-4c2e-8708-b3b94787de80	available	t1	1	DEFAULT	false	i i	

----End

8.15 Configuring the SmartDedupe Property

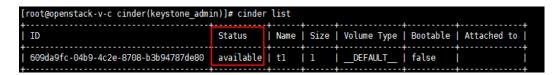
This section describes how to configure the SmartDedupe property. Only Thin volumes support this property.

Enabling SmartDedupe

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the SmartDedupe property.
 - For Newton and later versions, run the following command to enable the SmartDedupe property. <vtype> indicates the name of the volume type created in Step 2.
 - # cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true'
 capabilities:dedup='<is> true'
 - For Mitaka and earlier versions, run the following command to enable the SmartDedupe property. <vtype> indicates the name of the volume type created in Step 2.
 - # cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true'
 capabilities:dedup='<in> true'
- **Step 4** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.

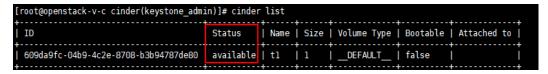


----End

OceanStor Dorado supports only Thin volumes. The **capabilities:thin_provisioning_support** parameter in **Step 3** is optional.

Disabling SmartDedupe

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Disable the SmartDedupe property.
 - For Newton and later versions, run the following command to disable the SmartDedupe property. <*vtype>* indicates the name of the volume type created in **Step 2**.
 - # cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true' capabilities:dedup='<is> false'
 - For Mitaka and earlier versions, run the following command to disable the SmartDedupe property. <vtype> indicates the name of the volume type created in Step 2.
 - # cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true' capabilities:dedup='<in> false'
- **Step 4** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.
 - # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 5** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

■ NOTE

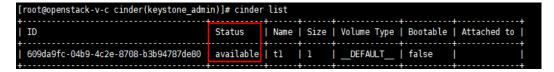
OceanStor Dorado supports only Thin volumes. The **capabilities:thin_provisioning_support** parameter in **Step 3** is optional.

8.16 Configuring the SmartCompression Property

This section describes how to configure the SmartCompression property. Only Thin volumes support this property.

Enabling SmartCompression

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the SmartCompression property.
 - For Newton and later versions, run the following command to enable the SmartCompression property. <*vtype>* indicates the name of the volume type created in Step 2.
 - # cinder type-key vtype set capabilities:thin_provisioning_support='<is> true' capabilities:compression='<is> true'
 - For Mitaka and earlier versions, run the following command to enable the SmartCompression property. <vtype> indicates the name of the volume type created in Step 2.
- **Step 4** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.
 - # cinder create 10 --name <volume-name> --volume-type <name>
- **Step 5** Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

◯ NOTE

OceanStor Dorado supports only Thin volumes. The **capabilities:thin_provisioning_support** parameter in **Step 3** is optional.

Disabling SmartCompression

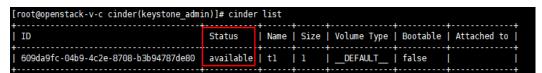
- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Disable the SmartCompression property.
 - For Newton and later versions, run the following command to disable the SmartCompression property. <*vtype>* indicates the name of the volume type created in Step 2.
 - # cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true' capabilities:compression='<is> false'
 - For Mitaka and earlier versions, run the following command to disable the SmartCompression property. <*vtype>* indicates the name of the volume type created in **Step 2**.

cinder type-key <vtype> set capabilities:thin_provisioning_support='<is> true' capabilities:compression='<in> false'

Step 4 Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 5 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

OceanStor Dorado supports only Thin volumes. The **capabilities:thin_provisioning_support** parameter in **Step 3** is optional.

8.17 Creating a Volume Using FastClone

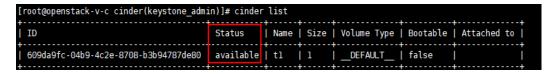
This section describes how to configure FastClone to create volumes from snapshots or clone volumes.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** When creating volumes from snapshots or cloning volumes, specify the -- **metadata** parameter with the **fastclone** item as follows:

```
# cinder create --snapshot-id *** --metadata fastclone=True
# cinder create --source-volid *** --metadata fastclone=True
```

Step 3 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

□ NOTE

- If **fastclone** is not set, LUN copy is used by default.
- Only the following storage devices support FastClone. For details, contact Huawei storage R&D engineers.
 - OceanStor Dorado: 6.1.0 and later versions
 - OceanStor Dorado V3: V300R001C20 and later versions
 - OceanStor 6.1.x
- When FastClone is used, there are restrictions on the following features: HyperMetro, remote replication, snapshot, creating a consistency group from a snapshot consistency group or consistency group, and clone.

8.18 Configuring the LUN Copy Speed

When you create volumes from snapshots or clone volumes, LUN copy is used by default. This section describes how to configure the LUN copy speed.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** When creating volumes from snapshots or cloning volumes, specify the -- metadata parameter with the copyspeed item as follows: For details about the value of copyspeed, see Table 8-5.

```
# cinder create --snapshot-id *** --metadata copyspeed=2
# cinder create --source-volid *** --metadata copyspeed=2
```

Table 8-5 copyspeed parameter description

Value	Description
1	Low
2	Medium
3	High
4	Highest

----End

□ NOTE

If copyspeed is not set, the medium speed is used by default.

8.19 Configuring the Application Type of a LUN

This section describes how to configure the application type of a LUN.

□ NOTE

- This configuration applies only to OceanStor Dorado V300R001C20 and later versions.
- This configuration also includes compression and deduplication. Their priorities are higher than those of SmartDedupe and SmartCompression. If both of them are configured, the configuration of the application type takes precedence.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Create a volume type. <*name>* indicates the name of the volume type. # cinder type-create <*name>*
- **Step 3** Enable the **huawei_application_type** property. <*vtype>* indicates the name of the volume type created in **Step 2**.

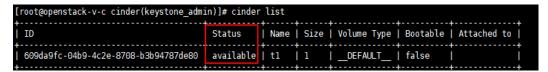
cinder type-key <vtype> set capabilities:huawei_application_type='<is> true'

- **Step 4** Configure the application type name of the LUN.

 # cinder type-key <vtype> set huawei_application_type:applicationname='****'
- **Step 5** Use the volume type created in **Step 2** to create a volume. *10* indicates the volume size (unit: GB), *<volume-name>* indicates the volume name, and *<name>* indicates the name of the volume type.

cinder create 10 --name <volume-name> --volume-type <name>

Step 6 Run the **cinder list** command. Check the command output. If the volume status is **available**, the volume is successfully created.



----End

8.20 Configuring a vStore User

This section describes how to configure a vStore user.

Prerequisites

For OceanStor Dorado storage, only OceanStor Dorado 6.1.3 and later versions support this feature.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Run the **vi /etc/cinder/cinder_huawei_conf.xml** command. Modify the **cinder_huawei_conf.xml** configuration file as follows:

<?xml version='1.0' encoding='UTF-8'?>

```
<Storage>
...
<UserName>xxx</UserName>
<UserPassword>xxx</UserPassword>
<vStoreName>xxx</vStoreName>
</Storage>
...
</config>
```

Table 8-6 vStore parameters

Parameter	Description
UserName	User name of the storage vStore.
UserPassword	User password of the storage vStore.
vStoreName	vStore name.

NOTICE

- For details about how to configure other parameters in the cinder_huawei_conf.xml configuration file, see Step 3.
- vStore users can be configured only when the storage system version supports the multi-tenant feature.
- **Step 3** Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

8.21 Configuring Multiple Backends

This section describes how to configure multiple backends.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Run the **vi /etc/cinder/cinder.conf** command. Modify the **cinder.conf** configuration file. The following is an example:

```
[DEFAULT]
...
enabled_backends = v3_fc,v5_fc
[v3_fc]
volume_driver = cinder.volume.drivers.huawei_driver.HuaweiFCDriver
```

cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf_v3_fc.xml
volume_backend_name = v3_fc
[v5_fc]
volume_driver = cinder.volume.drivers.huawei.huawei_driver.HuaweiFCDriver
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf_v5_fc.xml
volume_backend_name = v5_fc

Step 3 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.

Binary	Host	Zone	Status	State	Updated_at	Cluster	Disabled Reason	Backend State	İ
cinder-volume	openstack-wallaby-10v6	nova	enabled	up	2021-12-03T07:56:23.000000	-	-	l up	Ī

----End

8.22 Configuring Automatic Zoning

The automatic zoning function is optional. To use it, perform the following operations.

NOTICE

vStore users do not support automatic zoning.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Configure the **cinder.conf** file. Configure switch parameters by referring to **https://docs.openstack.org/cinder/latest/configuration/block-storage/fc-zoning.html**.
- **Step 3** Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

8.23 Configuring the CHAP Feature

On a public network, any application server that resides on the same network as the iSCSI front-end port of a storage system can access the storage system and perform read and write operations on the system. Therefore, data security risks arise. To ensure the security of storage systems, you can configure CHAP authentication to restrict application servers' access permissions on storage systems.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Add the following information to the **Initiator** configuration item in the Huawei Cinder Driver configuration file:

```
<iSCSI>
    <!nitiator ... CHAPinfo="xxx"/>
    <!nitiator ... CHAPinfo="xxx"/>
    </iSCSI>
```

Table 8-7 Parameter description

Parameter	Default Value	Description
CHAPinfo	-	 User-defined CHAP name and password for CHAP authentication. The format is mm-user;mm-user@storage1. The CHAP name and password are separated by a semicolon (;).
		• The CHAP name contains 4 to 223 characters.
		The password contains 12 to 16 characters.
		 The password must contain any three types of uppercase letters, lowercase letters, digits, and special characters (`~! @#\$%^*()=+\ [{}];:,/? and spaces).
		The password cannot be the same as the CHAP name or the CHAP name spelled backward.
		NOTE If the customer has security requirements, see 11.4 Security Hardening.

Step 3 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the following information is displayed and the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

8.24 Configuring the In-band Feature

The Cinder Driver plug-in adapts to the in-band command channel (service data and management and control data is transmitted through the same channel). In this way, requests delivered by Cinder can be sent to a storage array using the host agent to complete go-online, go-offline, and resource switchover requests.

This section describes how to configure the in-band feature.

NOTICE

The in-band feature is supported only by OceanStor Dorado 6.1.3 and later versions. The OpenStack version must be version O. The host agent version must be In-Band_Agent 1.0.RC1.

Prerequisites

The host agent has been configured on the host. For details about the host agent, see https://support.huawei.com/enterprise/en/centralized-storage/ultrapath-pid-8576127.

A CAUTION

After an in-band LUN is configured, this plug-in does not clear the in-band LUN resource of the host during resource clearing. You need to manually clear resources after the storage device where the LUN resides no longer provides services to reclaim resources in time.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- Step 2 Run the following commands to open the xml file (cinder_huawei_conf.xml is used as an example) created in 6 Configuring Basic Properties of Cinder Driver: cd /etc/cinder vi cinder_huawei_conf.xml
- **Step 3** Modify and add parameters under **Storage** as follows. **Table 8-8** describes the parameters.

```
...
<Storage>
<InBandOrNot>True</InBandOrNot>
<Storagesn>xxxxxxxxxxx</Storagesn>
<RestURL>https://127.0.0.1:8889/deviceManager/rest/</RestURL>
<UserName>***</UserName>
<UserPassword>***</UserPassword>
</Storage>
...
```

Table 8-8 In-band parameters

Parameter	Optional/ Mandatory/ Conditionally Mandatory	Description
InBandOrNot	Optional	 Whether in-band commands are supported. The value can be True or False. The default value is False.
Storagesn	Conditionally mandatory	 When the value of InBandOrNot is True: Enter the SN of the storage device, which can be queried on the storage device to be connected. When the value of InBandOrNot is False: This parameter is optional.
RestURL	Conditionally mandatory	URL for logging in to the storage device. • When the value of InBandOrNot is True: This parameter indicates the address for accessing the host agent. If the host agent is not modified, set this parameter to https://127.0.0.1:8889/deviceManager/rest/. • When the value of InBandOrNot is False: Enter the URL of the storage device.

Parameter	Optional/ Mandatory/ Conditionally Mandatory	Description
UserName	Conditionally mandatory	User name for logging in to the storage device. • When the value of InBandOrNot is True: Enter the user name of the inband account. For details about how to create and obtain the inband account, see the host agent documentation. • When the value of InBandOrNot is False: Enter the user name of the storage administrator. The user name must be an administrator or super administrator.
UserPassword	Conditionally mandatory	Password for logging in to the storage device. This parameter is mandatory. • When the value of InBandOrNot is True: Enter the password of the inband account. For details about how to create and obtain the inband account, see the host agent documentation. • When the value of InBandOrNot is False: Enter the password of the storage administrator.
san_address	Conditionally mandatory	This parameter is available only for configuration items that require HyperMetro or remote replication. • When the value of InBandOrNot is True: This parameter indicates the address for accessing the host agent. If the host agent is not modified, set this parameter to https://127.0.0.1:8889/deviceManager/rest/. • When the value of InBandOrNot is False: Enter the URL of the storage device.

Parameter	Optional/ Mandatory/ Conditionally Mandatory	Description
san_user	Conditionally mandatory	This parameter is available only for configuration items that require HyperMetro or remote replication. • When the value of InBandOrNot is True: Enter the user name of the inband account of the remote storage device. For details about how to create and obtain the inband account, see the host agent documentation. • When the value of InBandOrNot is False: Enter the user name or vStore user name of the remote storage administrator.
san_password	Conditionally mandatory	This parameter is available only for configuration items that require HyperMetro or remote replication. • When the value of InBandOrNot is True: Enter the password of the inband account of the remote storage device. For details about how to create and obtain the inband account, see the host agent documentation. • When the value of InBandOrNot is False: Enter the password or vStore user password of the remote storage administrator.

Step 4 (Optional) Configure the HyperMetro property.

Run the **vi /etc/cinder/cinder.conf** command to modify the information about the remote device configured in the specified backend. Modify the in-band command parameters as follows. For details about the parameters, see **Table 8-8**.

After the configuration is modified, if you want to use the HyperMetro property, restart the Cinder Volume service, and create a volume type, see **8.7 Configuring the HyperMetro Property**. hypermetro_device =

```
in_band_or_not:True,
storage_sn:xxxxxxxx,
san_address:https://127.0.0.1:8889/deviceManager/rest/,
```

```
san_user:***,
san_password:***,
...
```

Step 5 (Optional) Configure the remote replication property.

Run the **vi /etc/cinder/cinder.conf** command to modify the information about the remote device configured in the specified backend. Modify the in-band command parameters as follows. For details about the parameters, see **Table 8-8**.

After the configuration is modified, if you want to use the remote replication property, restart the Cinder Volume service, and create a volume type, see **8.8** Configuring the Remote Replication Property.

```
replication_device =
...
in_band_or_not:True,
storage_sn:xxxxxxxx,
san_address:https://127.0.0.1:8889/deviceManager/rest/,
san_user:***,
san_password:***,
...
```

Step 6 Run the following command to restart the Cinder Volume service.

systemctl restart openstack-cinder-volume.service

Wait about 30 seconds and run the **cinder service-list** command. If the value of **State** is **up**, the Cinder Volume service is successfully started.



----End

9 Best Practices

- 9.1 Configuring Basic Properties for Interconnection Between iSCSI and OceanStor Dorado V3
- 9.2 Initiator Configuration Policy Examples

9.1 Configuring Basic Properties for Interconnection Between iSCSI and OceanStor Dorado V3

This section describes the best practices of the xml file for interconnection between iSCSI and OceanStor Dorado V3.

Prerequisites

The following configuration must be performed after the operations in 4 **Installing Cinder Driver** and **7.1 Configuring Host Multipathing** are complete.

Procedure

- **Step 1** Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- **Step 2** Configure the /etc/cinder/cinder_huawei_conf.xml file as follows (for iSCSI networking).

```
<?xml version='1.0' encoding='UTF-8'?>
<config>
 <Storage>
   <Product>Dorado</Product>
   <Protocol>iSCSI</Protocol>
   <RestURL>https://192.168.128.100:8088/deviceManager/rest/</RestURL>
   <UserName>user</UserName>
   <UserPassword>password</UserPassword>
  </Storage>
  <LUN>
   <StoragePool>StoragePool001</StoragePool>
   <LUNType>Thin</LUNType>
   <LUNCopySpeed>3</LUNCopySpeed>
  </LUN>
   <Initiator HostName="host[0-4]" ALUA="1" FAILOVERMODE="3" SPECIALMODETYPE="0"</pre>
PATHTYPE="0" TargetIP="192.168.128.100 192.168.128.101"/>
```


- This configuration example applies to iSCSI networking. For details about FC networking, see Step 3.
- For details about the parameter description and procedure, see 6.1.1 Configuring Cinder Driver on an iSCSI Network.
- ALUA parameter settings vary depending on the OS type. For details, see 11.1 ALUA Parameter Description.

Step 3 Configure the /etc/cinder/cinder_huawei_conf.xml file as follows (for FC networking).

```
<?xml version='1.0' encoding='UTF-8'?>
<config>
         <Storage>
                <Product>Dorado</Product>
               <Protocol>FC</Protocol>
               <RestURL>https://192.168.128.100:8088/deviceManager/rest/</RestURL>
               <UserName>user</UserName>
                <use><UserPassword</userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></userPassword></u
       </Storage>
        <LUN>
                <StoragePool>StoragePool001</StoragePool>
               <LUNType>Thin</LUNType>
                <LUNCopySpeed>3</LUNCopySpeed>
        </LUN>
          <FC>
               <MinOnlineFCInitiator>1</MinOnlineFCInitiator>
               <Initiator HostName="xxx" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
               <Initiator HostName="xxx" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
          </FC>
</config>
```

■ NOTE

- This configuration example applies to FC networking. For details about iSCSI networking, see **Step 2**.
- For details about the parameter description and procedure, see 6.1.2 Configuring Cinder Driver on an FC Network.
- ALUA parameter settings vary depending on the OS type. For details, see 11.1 ALUA Parameter Description.
- **Step 4** Change the owner and user group of the Huawei Cinder Driver configuration file to be the same as those of the /etc/cinder/cinder.conf file.

```
-rw-r--r-- 1 cinder cinder 2662 Jul 11 11:25 cinder.conf
-rw-r--r-- 1 cinder cinder 778 Jul 11 11:25 cinder_huawei_conf.xml
```

Step 5 Configure the /etc/cinder/cinder.conf file.

```
[huawei_backend]
volume_driver = cinder.volume.drivers.huawei.huawei_driver.HuaweiISCSIDriver
cinder_huawei_conf_file = /etc/cinder/cinder_huawei_conf.xml
volume_backend_name = huawei_backend
use_multipath_for_image_xfer = true
enforce_multipath_for_image_xfer = true
```

Add backend huawei_backend in the [DEFAULT] section.

```
[DEFAULT]
...
enabled backends=..., huawei backend
```

Step 6 Configure OpenStack Nova multipathing.

Add the following content to the [libvirt] section in the /etc/nova/nova.conf file.

```
[libvirt]
...
volume_use_multipath = True
```

Step 7 Restart the Nova-compute and Cinder-volume services.

```
systemctl restart openstack-nova-compute.service systemctl restart openstack-cinder-volume.service
```

----End

9.2 Initiator Configuration Policy Examples

Example 1

The configuration file content is as follows:

```
<iSCSI>
<Initiator HostName="*" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
<Initiator HostName="host" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
</iSCSI>
```

If the host name is **host**, both of the preceding configuration items can be used to configure information for the initiator, such as ALUA and port group. According to the rules (subject to the precise configuration), the priority of the second configuration item (**HostName="host"**) is higher than that of the first configuration item (**HostName="**"**).

Example 2

The configuration file content is as follows:

```
<iSCSI>
<Initiator HostName="Host[0-9]" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
<Initiator HostName="Host[5-7]" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
</iSCSI>
```

If the host name is **Host6**, both of the preceding configuration items meet the configuration rules. According to the rules (subject to the first configuration item), the first configuration item is used to configure the initiator.

Example 3

The configuration file content is as follows:

```
<FC>
<Initiator HostName="*" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
<Initiator HostName="host" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
</FC>
```

If the host name is **host**, both of the preceding configuration items can be used to configure information for the initiator, such as ALUA and port group. According to the rules (subject to the precise configuration), the priority of the second configuration item (**HostName="host"**) is higher than that of the first configuration item (**HostName="**"**).

Example 4

The configuration file content is as follows:

```
<FC>
<Initiator HostName="Host[0-9]" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
<Initiator HostName="Host[5-7]" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
</FC>
```

If the host name is **Host6**, both of the preceding configuration items meet the configuration rules. According to the rules (subject to the first configuration item), the first configuration item is used to configure the initiator.

Example 5:

The configuration file content is as follows:

```
<iSCSI>
<Initiator HostName="^Host1$" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
<Initiator HostName="^Host10$" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx" TargetIP="x.x.x.x y.y.y.y"/>
</iSCSI>
```

If the host name is **Host1**, the first configuration item is used to configure the initiator. If the host name is **Host10**, the second configuration item is used to configure the initiator. ^ matches the beginning of a character string, and \$ matches the end of a character string.

Example 6:

The configuration file content is as follows:

```
<FC>
<Initiator HostName="^Host1$" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
<Initiator HostName="^Host10$" ALUA="xxx" FAILOVERMODE="XXX" PATHTYPE="xxx"/>
</FC>
```

If the host name is **Host1**, the first configuration item is used to configure the initiator. If the host name is **Host10**, the second configuration item is used to configure the initiator. ^ matches the beginning of a character string, and \$ matches the end of a character string.

 $10_{\sf FAQ}$

10.1 Do I Need to Create Hosts, Host Groups, LUN Groups, and Other Associated Objects on Huawei Storage Before Using Cinder Driver to Map Volumes?

10.2 What Can I Do If Mapping Fails Because Nova Logs Indicate That the lsblk Command Fails to Be Executed During Volume Mapping?

10.3 Failed to Create a Volume from an Image After verify_glance_signatures = enabled Is Configured

10.4 "alua not supported" Is Displayed in the Command Output When I Run the multipath -ll Command to Query Multipathing Information

10.5 Failed to Delete or Live Migrate a VM

10.6 After a Volume is Deleted from OpenStack, the Volume Enters the Recycle Bin. When You Try to Create the Volume Again, the Volume Fails to Be Created Due to Duplicate Names.

10.7 How Do I Manually Map a LUN to an OpenStack Node Without Affecting the Volume Mapping of Cinder Driver?

10.8 Image Volumes Fail to Be Created in Batches for the Mitaka Version Due to Residual Paths

10.1 Do I Need to Create Hosts, Host Groups, LUN Groups, and Other Associated Objects on Huawei Storage Before Using Cinder Driver to Map Volumes?

No, because Cinder Driver will automatically create the associated objects and mapping views. If these objects are manually created on the storage, the mapping logic of Cinder Driver will be affected. Therefore, ensure that these objects are deleted before mapping volumes using Cinder Driver.

10.2 What Can I Do If Mapping Fails Because Nova Logs Indicate That the lsblk Command Fails to Be Executed During Volume Mapping?

Nova will invoke the **lsblk** command in the volume mapping process to query the information of the mapped volume. This error occurs generally because the lsblk tool is not installed. Ensure that the tool is installed in the Nova system and you have the execute permission.

10.3 Failed to Create a Volume from an Image After verify_glance_signatures = enabled Is Configured

Symptom

OpenStack creates a volume from an image. After the image is copied for a period of time, the error message Failed to copy metadata to volume: Glance metadata cannot be updated, key signature_verified exists for volume id b75f957c-0ba4-4099-8706-866c68012779 is displayed. As a result, the volume fails to be created.

Environment Configuration

OS: CentOS 7.6

Server model: 5288 V5OpenStack version: Rocky

Root Cause Analysis

Community bug link: https://bugs.launchpad.net/cinder/+bug/1823445

In Rocky and later versions, the **verify_glance_signatures** field is added to **cinder.image.glance.py**. The default value is **enabled**. When **CONF.verify_glance_signatures != 'disabled'** is configured and **signature_verification** exists in the image, the DB API does not allow **signature_verification** to be written repeatedly. As a result, an exception is thrown.

Solution or Workaround

In the **[DEFAULT]** section of the **/etc/cinder/cinder.conf** file on the OpenStack Cinder node, set the value of the **verify_glance_signatures** field to **disabled**. An example is provided as follows:

```
[DEFAULT]
...
verify_glance_signatures = disabled
...
```

10.4 "alua not supported" Is Displayed in the Command Output When I Run the multipath -ll Command to Query Multipathing Information

Symptom

After host multipathing and OpenStack multipathing are configured, a VM is created or migrated and the **multipath** -ll command is run to query multipathing information. As a result, **alua not supported** is displayed for some drive letters.

Environment Configuration

OpenStack version: all

Root Cause Analysis

Host multipathing (/etc/multipath.conf) and ALUA (../cinder/cinder_huawei_conf.xml) are incorrectly configured.

Solution or Workaround

- 1. Use a remote access tool, such as PuTTY, to log in to an OpenStack Cinder node through the management IP address.
- 2. Set the host multipathing parameters by referring to **7.1 Configuring Host Multipathing**. Perform this step on all compute nodes.
- Configure ALUA by referring to the Initiator field in 6.1.1 Configuring Cinder
 Driver on an iSCSI Network or 6.1.2 Configuring Cinder Driver on an FC
 Network. For details about the parameters, see 11.1 ALUA Parameter
 Description. Perform this step on all Cinder Volume nodes.
- 4. Restart the multipathd service. systemctl restart multipathd.service
- Restart the Cinder-volume service. systematl restart openstack-cinder-volume.service
- 6. Re-map all created VMs (unmap volumes and then map volumes again). You can perform operations such as rebuilding and migration.

10.5 Failed to Delete or Live Migrate a VM

Symptom

A VM fails to be deleted or live migrated. The following information is displayed in the Nova Compute log:

Command: multipath -f mpath**
Exit code: 1
Stdout: ***** | mpath**: map in use\n ***** | failed to remove multipath map mpath**

Run the **multipath -ll** command to query multipathing information. **failed faulty** is displayed for some paths.

Environment Configuration

OpenStack version: all

Root Cause Analysis

The /dev/sd* drive letter forming dm-* has an LVM partition on the host machine. When the dm-* drive letter is removed, the LVM partition is not cleared on the host machine. As a result, the drive letter fails to be removed.

Solution or Workaround

Take the Train version as an example. The recommended configuration is as follows: https://docs.openstack.org/cinder/train/install/cinder-storage-install-rdo.html#install-and-configure-components

- 1. Use a remote access tool, such as PuTTY, to log in to an OpenStack Nova node through the management IP address.
- Configure the filter field in the devices section of the /etc/lvm/lvm.conf file.
 The following is an example. Perform this step on all compute nodes.
 devices {

... filter=["a/sdb/", "r/.*/"]

10.6 After a Volume is Deleted from OpenStack, the Volume Enters the Recycle Bin. When You Try to Create the Volume Again, the Volume Fails to Be Created Due to Duplicate Names.

Symptom

Creating a HyperMetro volume fails due to timeout. You need to delete the volume and then create it again. The deleted volume is in the recycle bin. As a result, the volume with the same name fails to be created again.

Environment Configuration

- OpenStack version: all
- Storage versions:
 - OceanStor Dorado 6.1.x
 - OceanStor 6.1.x

Root Cause Analysis

The recycle bin function is added to the storage system, and the default interface for deleting volumes is changed. When a volume is deleted, it is placed in the recycle bin by default. When a volume with the same name is created, an error message is displayed indicating that the volume already exists.

Solution or Workaround

Disable the recycle bin function of the storage system. For details, see *OceanStor Dorado 3000, Dorado 5000, and Dorado 6000 Product Documentation* and choose Configure > Basic Storage Service Configuration Guide for Block > Managing Basic Storage Services > Managing LUNs > Managing the Recycle Bin > Configuring the Recycle Bin.

10.7 How Do I Manually Map a LUN to an OpenStack Node Without Affecting the Volume Mapping of Cinder Driver?

□ NOTE

If you use the LUNs of the OpenStack Glance remote storage to create volumes or use the LUNs of the remote storage to create the **image_cache** partition on the system disk, you need to manually create LUNs on the storage and map them to the OpenStack node based on the following rules.

Solution

Manually create host groups, LUN groups, and mapping views on the storage based on the following Cinder Driver rules.

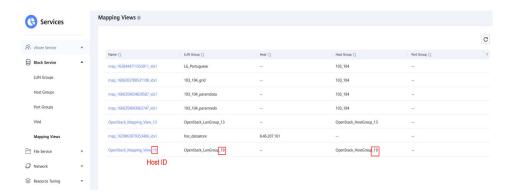
□ NOTE

In principle, all LUNs and hosts on a storage device connected to the OpenStack platform are created, managed, and deleted by Cinder Driver based on specified rules. Therefore, if you want to manually create these objects, ensure that the rules for manually creating them are the same as the creation rules of Cinder Driver so that the platform will not fail to invoke Cinder Driver to manage them due to conflicts.

- 1. Create a host. If the host name contains 32 or fewer characters, use the host name. If the host name contains more than 32 characters, use the **hashlib.md5()** method to process the host name. The details are as follows:
 - a. Log in to the OpenStack node and run the **cat /etc/hostname** command to obtain the host name.
 - b. Run the python or python3 command.
 - c. Run the **import hashlib** command.
 - d. Run the **print(hashlib.md5(("openstack-w").encode()).hexdigest())** command.

```
[root@openstack-w ~]# cat /etc/hostname
openstack-w
[root@openstack-w ~]# python3
Python 3.6.8 (default, May 8 2021, 09:11:34)
[GCC 8.4.1 20210423 (Red Hat 8.4.1-2)] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import hashlib
>>> print(hashlib.md5(("openstack-w").encode()).hexdigest())
0e4ed842f0lb44143dd03dab6e04739f
```

2. Create a mapping view.



□ NOTE

- The following mapping views need to be created only in iSCSI and FC networking scenarios:
- Create a separate host group, LUN group, and mapping view for each host. The
 naming rules are as follows. host_id is the host ID automatically generated by the
 storage device after the host is created in 1.

Cinder Driver identifies the mapping views of the OpenStack node based on the following naming rules.

- A host group is named as follows:

OpenStack_HostGroup_host_id

Example: OpenStack_HostGroup_1

- A LUN group is named as follows:

OpenStack_LunGroup_host_id

Example: OpenStack_LunGroup_1

A mapping view is named as follows:

OpenStack_Mapping_View_host_id

Example: OpenStack_Mapping_View_1

□ NOTE

Mapping view names of OceanStor Dorado cannot be changed on DeviceManager. Perform the following steps to change the name:

- 1. Run the **ssh** *Username@IP* command to go to the CLI of the storage device. (The password for logging in to the CLI is the same as that for logging in to the GUI.)
- 2. Run the **change mapping_view mapping_view_name**=*Old_map* **name**=*New_map* command to change the name of a mapping view.

Parameters in the command are described as follows:

- Username: user name for logging in to the storage device.
- *IP*. IP address of the storage device.
- Old map: old name.
- *New_map*: new name.

10.8 Image Volumes Fail to Be Created in Batches for the Mitaka Version Due to Residual Paths

Symptom

When the system is interconnected with OpenStack Mitaka, image volumes fail to be created in batches due to residual paths.

Environment Configuration

OpenStack version: Mitaka

Root Cause Analysis

For details about problems in disk scanning and detaching on the OpenStack cloud platform, see https://bugs.launchpad.net/os-brick/+bug/1553730.

Solution or Workaround

Contact the corresponding cloud platform vendor for maintenance and modification, or manually clear the paths that do not exist.

11 Appendix

- 11.1 ALUA Parameter Description
- 11.2 Configuring a Volume-backend Image
- 11.3 Configuring the Image-Volume Cache
- 11.4 Security Hardening

11.1 ALUA Parameter Description

11.1.1 ALUA Parameter Description for OceanStor Converged Storage

To improve the performance of links between hosts and storage, configure ALUA. This section describes how to set ALUA parameters in different scenarios.

- In non-HyperMetro scenarios, see Huawei SAN Storage Host Connectivity
 Guide for Red Hat and choose Configuring Multipathing > Configuring
 Multipathing in Non-HyperMetro Scenarios.
- In HyperMetro scenarios, see Huawei SAN Storage Host Connectivity Guide for Red Hat and choose Configuring Multipathing > Configuring Multipathing in HyperMetro Scenarios.

Table 11-1 ALUA parameter description

Parameter	Default Value	Description	
ALUA	0	Multipathing type. The value can be:	
		• 0 : default (Huawei UltraPath)	
		• 1: third-party multipathing	

Parameter	Default Value	Description
FAILOVERMOD E	-	Initiator switchover mode. This parameter needs to be specified only when third-party multipathing is used. The value can be: • 0: early-version ALUA • 1: common ALUA • 2: ALUA not used • 3: special ALUA
SPECIALMODE TYPE	-	Special mode type of the initiator. This parameter needs to be specified only when the initiator switchover mode is special ALUA. The value can be: • 0: mode 0 (special mode 0) • 1: mode 1 (special mode 1) • 2: mode 2 (special mode 2) • 3: mode 3 (special mode 3)
PATHTYPE	-	Initiator path type. This parameter needs to be specified only when third-party multipathing is used. The value can be: • 0: preferred path • 1: non-preferred path NOTE Set this parameter to 0 for the storage device that is accessed preferentially and to 1 for the storage device that is not accessed preferentially.

NOTICE

HyperMetro scenarios:

For OceanStor V5 and OceanStor Dorado V3, ALUA must be configured as follows:

- For hosts running CentOS/RHEL series:
 - Storage with the preferred path: ALUA="1" FAILOVERMODE="3" SPECIALMODETYPE="0" PATHTYPE="0"
 - Storage with the non-preferred path: ALUA="1" FAILOVERMODE="3"
 SPECIALMODETYPE="0" PATHTYPE="1"
- For hosts running Ubuntu/SUSE/Debain series:
 - Storage with the preferred path: ALUA="1" FAILOVERMODE="1" PATHTYPE="0"
 - Storage with the non-preferred path: ALUA="1" FAILOVERMODE="1" PATHTYPE="1"

Non-HyperMetro scenarios:

For OceanStor V5 and OceanStor Dorado V3:

- Method 1 (recommended): Configure ALUA as follows:
 - For hosts running CentOS/RHEL series:
 - ALUA="1" FAILOVERMODE="3" SPECIALMODETYPE="0" PATHTYPE="0"
 - For hosts running Ubuntu/SUSE/Debain series:
 ALUA="1" FAILOVERMODE="1" PATHTYPE="0"
- Method 2: Do not configure ALUA.

11.1.2 ALUA Parameter Description for OceanStor Dorado

To improve the performance of links between hosts and storage, configure ALUA. This section describes how to set ALUA parameters in different scenarios.

- In non-HyperMetro scenarios, see OceanStor Dorado Host Connectivity
 Guide for Red Hat and choose Configuring Multipathing > Non HyperMetro Scenarios.
- In HyperMetro scenarios, see OceanStor Dorado Host Connectivity Guide for Red Hat and choose Configuring Multipathing > HyperMetro Scenarios.

Table 11-2 ALUA parameter description

Parameter	Default Value	Description
ACCESSMODE	0	Host access mode. This parameter is applicable only to OceanStor Dorado. The value can be: • 0: balanced (default) • 1: asymmetric
		If both ACCESSMODE and ALUA are configured, ACCESSMODE takes precedence.
HYPERMETROPATHO PTIMIZED	-	HyperMetro preferred path. This parameter is optional when the host access mode is asymmetric. The value can be: • 0: no • 1: yes

Creating OceanStor Dorado All-Flash Storage

If you connect only the OceanStor Dorado all-flash storage, configure the **initiator** parameter in the Cinder Driver configuration file by referring to **Table 11-3**.

Table 11-3 ALUA parameters for OceanStor Dorado

Customer Scenario	Host OS type	Parameter Configuration
HyperMetro scenario: load balancing	CentOS/RHEL/Ubuntu/ SUSE/Debain	You do not need to configure ALUA. That is, delete the ACCESSMODE and HYPERMETROPATHOPTI-MIZED parameters from the initiator property.
HyperMetro scenario: local preferred – storage with the preferred path	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="1"
HyperMetro scenario: local preferred – storage with the non- preferred path	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="0"

Customer Scenario	Host OS type	Parameter Configuration
Non-HyperMetro scenario	CentOS/RHEL/Ubuntu/ SUSE/Debain	You do not need to configure ALUA. That is, delete the ACCESSMODE and HYPERMETROPATHOPTI-MIZED parameters from the initiator property.

Coexistence of OceanStor Converged Storage and OceanStor Dorado All-Flash Storage

If you use OceanStor converged storage and then expand the capacity using OceanStor Dorado all-flash storage, that is, multiple back-end storage devices are connected, configure the **initiator** parameter in the Cinder Driver configuration file by referring to **Table 11-4**.

Table 11-4 ALUA parameters for OceanStor Dorado

Customer Scenario	Host OS type	Parameter Configuration
HyperMetro scenario: load balancing	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="1"
HyperMetro scenario: local preferred – storage with the preferred path	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="1"
HyperMetro scenario: local preferred – storage with the non- preferred path	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="0"
Non-HyperMetro scenario	CentOS/RHEL/Ubuntu/ SUSE/Debain	ACCESSMODE="1" HYPERMETROPATHOPTI- MIZED="1"

11.2 Configuring a Volume-backend Image

This function is provided by the native OpenStack platform. It is used to store images in the storage backend of Cinder to accelerate the speed of creating volumes from images. Official link: https://docs.openstack.org/cinder/stein/admin/blockstorage-volume-backed-image.html.

For details about the configuration, see OpenStack official documentation of the desired version.

11.3 Configuring the Image-Volume Cache

This function is provided by the native OpenStack platform. Image volume cache can significantly improve the performance of creating EVS disks from images. Official link: https://docs.openstack.org/cinder/stein/admin/blockstorage-image-volume-cache.html.

For details about the configuration, see OpenStack official documentation of the desired version.

11.4 Security Hardening

◯ NOTE

The OpenStack platform does not have a good solution to encrypting and decrypting plaintext passwords in configuration files. Therefore, in open-source scenarios, the driver stores plaintext passwords in configuration files.

The driver is released as Python source code and provides a security hardening entry for users to perform secondary development to meet their security requirements.

The secondary development entry code is as follows:

Find the **cipher.py** file in the driver code in **Step 3** and modify the following code in the file.

```
def decrypt_cipher(text_info, is_need_decrypt=False):
"""

This interface is used to decrypt sensitive information.
When text_info is a plaintext password, no decryption is required by default.

When cipher_text is set to text_info, please set is_need_decrypt to True
and use your own decryption component to decrypt the ciphertext

"""

if is_need_decrypt:

# Please modify this interface and use your own decryption

# component to decrypt the ciphertext.

pass

return text_info
```

■ NOTE

After the code is modified, pay attention to the following when configuring the driver configuration file:

- When configuring a password, configure the encrypted ciphertext to the specified
 position. The driver will call the decrypt_cipher method in the corresponding position to
 decrypt the ciphertext.
- The following configuration items involve ciphertext configuration. You need to configure ciphertext for the following objects (if involved):
 - **UserPassword** configuration item in the .xml configuration file (for example, cinder_huawei_conf.xml) of the driver
 - Password of the CHAP user in the iSCSI scenario
 - san_password configuration item of hypermetro_device in the cinder.conf file during HyperMetro property configuration
 - san_password configuration item of replication_device in the cinder.conf file during remote replication property configuration