# Dedicated Enterprise Storage Service

# User Guide

**Issue** 01

**Date** 2020-03-18

HUAWEI TECHNOLOGIES CO., LTD.

### Trademarks and Permissions


and other Huawei trademarks are trademarks of Huawei Technologies Co., Ltd.
All other trademarks and trade names mentioned in this document are the property of their respective holders.

### Notice

The purchased products, services and features are stipulated by the contract made between Huawei and the customer. All or part of the products, services and features described in this document may not be within the purchase scope or the usage scope. Unless otherwise specified in the contract, all statements, information, and recommendations in this document are provided "AS IS" without warranties, guarantees or representations of any kind, either express or implied.

The information in this document is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

## Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: https://www.huawei.com

Email: support@huawei.com

# Contents



# 1 Introduction



## 1.1 Service Introduction

Dedicated Enterprise Storage Service (DESS) provides dedicated HUAWEI CLOUD-based storage services to enterprises. Optimized for enterprises' mission critical applications such as Oracle RAC and SAP HANA TDI, DESS provides the same superb performance and reliability as enterprise private cloud and simplifies service deployment on public cloud for enterprise users.

DESS provides the following advantages:

- Dedicated storage

  Each tenant exclusively uses one or multiple sets of enterprise storage devices, which are not shared by others.
- Minimized stable latency

  DESS ensures fast response for applications with minimized stable latency as low as 0.5 ms and maintains a high performance at 3000 IOPS/TB.
- Enterprise-class features

  Because DESS provides the same performance and reliability as enterprise private cloud, it is perfectly suited for mission critical applications, such as Oracle RAC and SAP HANA TDI.
- Fast provisioning

  With a range of flexible options to purchase enterprise-class resources, DESS ensures resources can be provisioned within 30 minutes.

# 1.2 Application Scenarios

DESS is a great choice in the following scenarios:

## Security-Demanding Scenarios

Equipped with exclusive resource pools and data isolation technologies, DESS is perfectly suited for industries whose strict compliance requirements are directly related to customer satisfaction, such as finance and security.

## Core Database Scenarios

Customers require their core database services be deployed on storage media with exclusively used resources, isolated networks, and assured performance, instead of VMs.

# 1.3 Related Services

DESS provides storage services for Bare Metal Servers (BMSs) in Dedicated Cloud (DeC). Users can subscribe to DESS only when they have been provisioned with DeC.

Resources on DESS are only available to BMSs in availability zones (AZ) in DeC. For details about how to enable DeC, see the **Dedicated Computing Cluster User Guide**.

# 1.4 Common Concepts

This section introduces the common concepts about DESS.

## Region

A region is a geographical area. A country can be geographically divided into different regions. The proximity principle is followed when selecting a region. This principle helps reduce network latencies to improve access to services.

## Availability Zone

An availability zone (AZ) is a geographical area with an independent network and an isolated power supply in the same service zone. In general, an AZ is an independent physical equipment room to ensure its independence. One region has multiple AZs. If one AZ becomes faulty, the other AZs in the same region can still provide services. AZs in the same region access each other through the intranet.

## Dedicated Cloud

The Huawei Dedicated Cloud (DeC) is a service that provides a physically isolated virtual resource pool exclusively for a user. A DeC is similar to a self-built and dedicated private cloud. Users can centrally manage and exclusively use

computing, storage, and network resources in the DeC through a management console.

# 1.5 Accessing and Using DESS

## 1.5.1 Access to DESS

DESS provides a web-based service management platform, the management console. If you have registered with HUAWEI CLOUD and have been provisioned with DeC, you can directly log in to the management console by choosing **Service List** > **Dedicated Cloud** > **Dedicated Enterprise Storage** on the home page. If you do not have an account, register one on HUAWEI CLOUD. For details, see **2.1 Registering a Cloud Service Account**.

## 1.5.2 Restrictions

Restrictions on DESS are as follows:

- Only users provisioned with DeC can purchase DESS devices.
- DESS provides only block storage services.
- DESS provides data disks for BMSs only.

# 2 Registration and Login



## 2.1 Registering a Cloud Service Account

If you have a cloud service account, you can directly log in to management console and access cloud services. If you do not have, register one by following introductions in this section. You can access all cloud services with a cloud service account.

### Procedure

**Step 1** Log in to the HUAWEI CLOUD website at **https://www.huaweicloud.com/intl/en-us/**.

**Step 2** Click **Register** in the upper right corner of the displayed page.

Complete the registration as instructed.

After the registration is completed, your personal settings page is displayed.

**----End**

## 2.2 Logging In to the Management Console

This section describes how to log in to the management console, on which you can access and use cloud services.

### Prerequisites

DeC has been provisioned. For details, see the **Dedicated Computing Cluster User Guide**.

## Procedure

**Step 1** Log in to the HUAWEI CLOUD website at **https://www.huaweicloud.com/intl/en-us/**.

**Step 2** Click **Console** in the upper left corner of the displayed page.

**Step 3** Log in using your account.

If you do not have a cloud account, click **Register** and register one as prompted.

**----End**

# 3 Quick Start



## 3.1 Applying for DESS Devices

You can apply for the monthly or yearly package of DESS devices based on service requirements.

### Prerequisites

You have registered a HUAWEI CLOUD account. For details, see **2.1 Registering a Cloud Service Account**.

### Context

- Only users provisioned with DeC can apply for DESS devices. DESS adopts Huawei OceanStor enterprise storage devices to provide block storage resources for enterprise users on HUAWEI CLOUD.
- If you select **HyperMetro** when you apply for DESS devices, a HyperMetro resource will be created, containing two associated DESS devices, one as the preferred DESS device and the other non-preferred.

### Precautions

To apply for DESS, you must be provisioned with DeC first. For details about how to subscribe to DeC, see the **Dedicated Computing Cluster User Guide**.

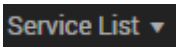
DESS charges on a yearly/monthly basis. You can select a package based on your own need, which can be 1 month to 3 years.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

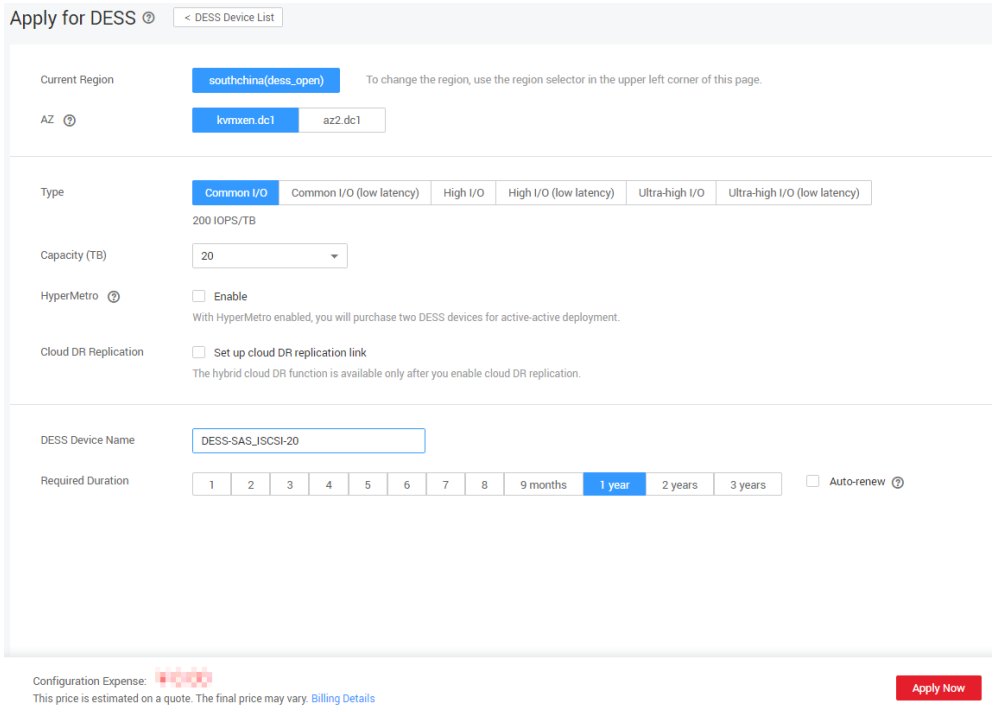
and select the wanted region.

**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the displayed page, click **Apply for DESS**.

The **Apply for DESS** page is displayed.




**Step 5** Set the following parameters.

**Table 3-1** Parameter description

| Parameter | Description |
| --- | --- |
| Current Region | Region where the tenant resides. Select the region from the drop-down list in the upper left corner of the page.<br>The system will automatically obtain the region based on the DeC you are provisioned with. You can change the region in the upper left corner of the page. |

| Parameter | Description |
| --- | --- |
| AZ | An AZ is a physical region where the power supply and network are isolated from those of other regions. AZs are physically isolated but interconnected through the intranet.<br>**NOTE**<br>The current AZ must be the AZ where the resources of the dedicated computing cluster are located. The AZ cannot be changed after the application is complete. |
| Type | DESS device type. Set the parameter based on your own demands.<br>● Common I/O<br>Huawei OceanStor enterprise storage, using iSCSI SAS disks<br>● Common I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SAS disks<br>● High I/O<br>Huawei OceanStor enterprise storage, using iSCSI SAS disks and SSDs<br>● High I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SAS disks and SSDs<br>● Ultra-high I/O<br>Huawei OceanStor enterprise storage, using iSCSI SSDs. Ultra-high I/O DESS devices do not support creation of clone disks using snapshots.<br>● Ultra-high I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SSDs. Ultra-high I/O (low latency) DESS devices do not support creation of clone disks using snapshots.<br>**NOTE**<br>DESS devices with low latency can be connected to BMSs only through Fibre Channel (FC) switches. When you apply for a DESS device with low latency, the system configures the FC switches based on the value of **Connected BMSs (Max.)**. |
| Capacity (TB) | Capacity of the DESS device.<br>Options available are: 10, 20, 40, 60, 80, and 100 (TB).<br>**NOTE**<br>● The 10 TB specification is available only for DESS devices of the common I/O, common I/O (low latency), ultra-high I/O, or ultra-high I/O (low latency) type.<br>● If you want to modify this configuration, contact Huawei technical support engineers to change the value of **capacity_nosupport_extend**. |

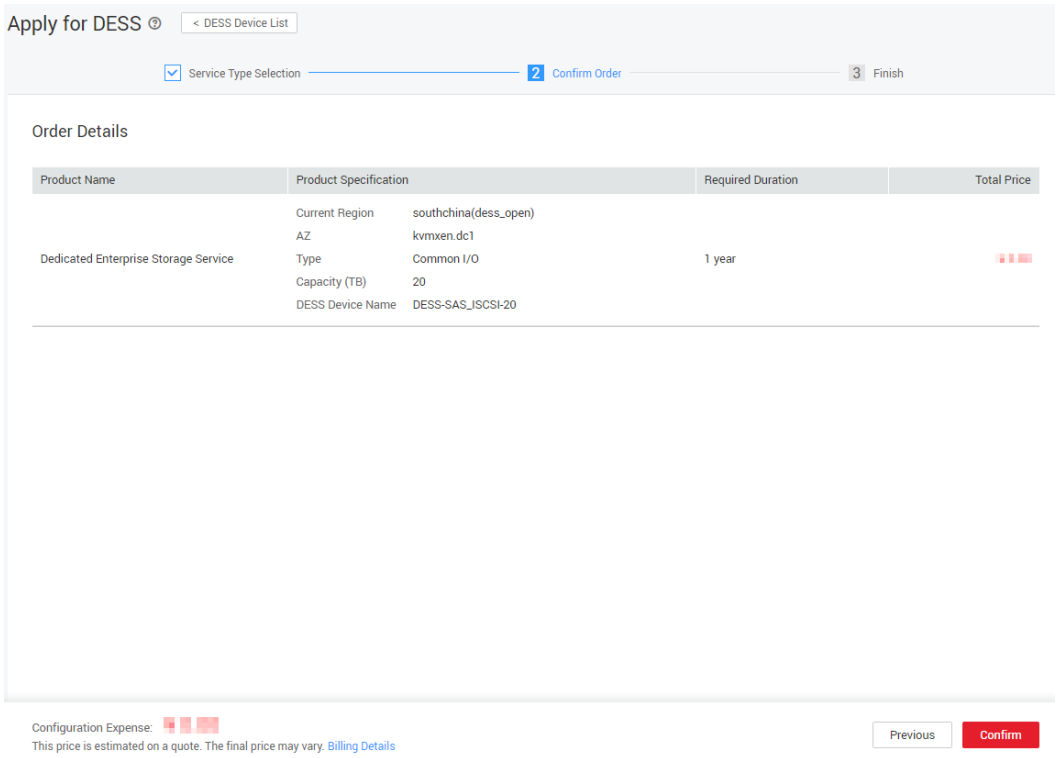
| Parameter | Description |
| --- | --- |
| HyperMetro | HyperMetro enables real-time data synchronization between and concurrent access to two DESS device systems, improving resource utilization. When data access fails in one DESS device system, seamless service switchover is implemented, ensuring data security and service continuity.<br>With HyperMetro enabled, you will purchase two DESS devices for HyperMetro deployment.<br>**NOTE**<br>• If you select **Cloud DR Replication**, this parameter will not be available.<br>• After this option is enabled, two associated DESS devices are generated, that is, preferred DESS device and non-preferred one. |
| Cloud DR Replication | Cloud DR replication provides remote data backup, disaster recovery, and continuous support for service data. Remote replication is a data mirroring technology. It copies data from a local storage device to a remote storage device and maintains several data copies at two or more sites to avoid data loss when a disaster occurs. When the remote device is a DESS device, this parameter is called cloud DR replication.<br>**NOTE**<br>If you select **HyperMetro**, this parameter will not be available. |
| Connected BMSs (Max.) | Maximum number of BMSs that can be connected to the DESS device. After applying for a DESS device with low latency, you can create disks and attach them to BMSs. For this reason, you need to configure **Connected BMSs (Max.)**.<br>This parameter is displayed only when **Type** is set to **Common I/O (low latency)**, **High I/O (low latency)**, or **Ultra-high I/O (low latency)**.<br>Specifications of connections:<br>• If **HyperMetro** is not enabled, available options are **6**, **14**, and **22**.<br>• If **HyperMetro** is enabled, available options are **4**, **12**, and **20**. |
| DESS Device Name | DESS device name. This parameter is displayed when **HyperMetro** is not enabled.<br>Enter a maximum of 64 halfwidth characters, chosen from letters, digits, underscores (_), and hyphens (-). The value must start with a letter.<br>**NOTE**<br>The default name is **DESS-***disk type_protocol-capacity size*. You can change the name according to the actual situation. |

| Parameter | Description |
| --- | --- |
| HyperMetro Name | HyperMetro resource name. The names of the two associated DESS devices will be automatically suffixed with **-DESS-01** and **-DESS-02** respectively. This parameter is displayed when **HyperMetro** is enabled.<br>Enter a maximum of 56 halfwidth characters, chosen from letters, digits, underscores (_), and hyphens (-). The value must start with a letter.<br>**NOTE**<br>The default name is **HyperMetro***disk type_protocol-capacity size*. You can change the name according to the actual situation. |
| Required Duration | The validity period ranges from 1 month to 3 years. |
| Auto-renew | After you select this option, the system will renew your DESS order for the originally specified required duration upon expiration. |

**Step 6** Click **Apply Now**.

**Step 7** On the **Apply for DESS** page that is displayed, view the order details and price.




**Step 8** Confirm the configuration and click **Submit**.

**----End**

## Follow-Up Procedure

After submitting an order, in the upper right corner on the DESS home page, choose **Fees** > **My Orders** and click **Details** to view the order details.

Table 3-2 describes the DESS order statuses.

**Table 3-2** Order status description

| State | Description |
| --- | --- |
| Pending Approval | Your order is in the **Pending Approval** state as soon as you submit the order. |
| Pending | The system administrator approves the order within three days. After the approval, the order status changes to **Pending**. |
| Processing | You can click **Pay** to pay for the order. After the payment, the order status changes to **Processing**.<br>Then, you can view the DESS device that you purchase in the list, but cannot use it yet. |
| Completed | After receiving the notification, O&M personnel access the storage device, FC switch (for low-latency DESS devices), and HyperMetro. The order status changes to **Completed**.<br>Now, you can view DESS information on DESS management console.<br>1. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage**.<br>2. In the navigation tree on the left, choose **Dedicated Enterprise Storage** > **Storage** > **Dedicated Enterprise Storage** > **FC Switch**. Alternatively, choose **Dedicated Enterprise Storage** > **HyperMetro** in the navigation tree on the left.<br>3. Check the information and status of DESS storage resources, FC switches, or HyperMetro resources. |

# 3.2 Creating Disks

After purchasing a DESS device or HyperMetro resource, you can create disks to deploy services. Disks are classified into common disks and HyperMetro disks.

## Prerequisites

The DESS device or HyperMetro resource is in the **Available**, **Expired**, or **Expanding** state. Its available capacity is larger than 10 GB, and the existing disk quantity does not exceed the upper limit.

## Context

- DESS allows you to create 1 to 10 common disks at a time.
- You can create HyperMetro disks or common disks on HyperMetro resources. When **HyperMetro** is enabled, the disks you created are HyperMetro disks.
- HyperMetro disks appear in pairs and each pair consists of a preferred disk and a non-preferred disk, which are respectively located on the two associated DESS devices. The preferred one is directly created by the user and the non-preferred one is automatically created by the system.
- HyperMetro disks do not support batch creation.
- When the DESS device is of the common I/O or common I/O (low latency) type, up to 512 common disks or 128 HyperMetro disks can be created (HyperMetro disks are created in pairs and located in two DESS devices that are associated with HyperMetro).
- When the DESS device is of the high I/O, high I/O (low latency), ultra-high I/O, or ultra-high I/O (low latency) type, up to 512 common disks or 256 HyperMetro disks can be created. (HyperMetro disks are created in pairs and located in two DESS devices that are associated with HyperMetro.)

## Procedure

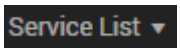
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Create a disk using any of the following methods:

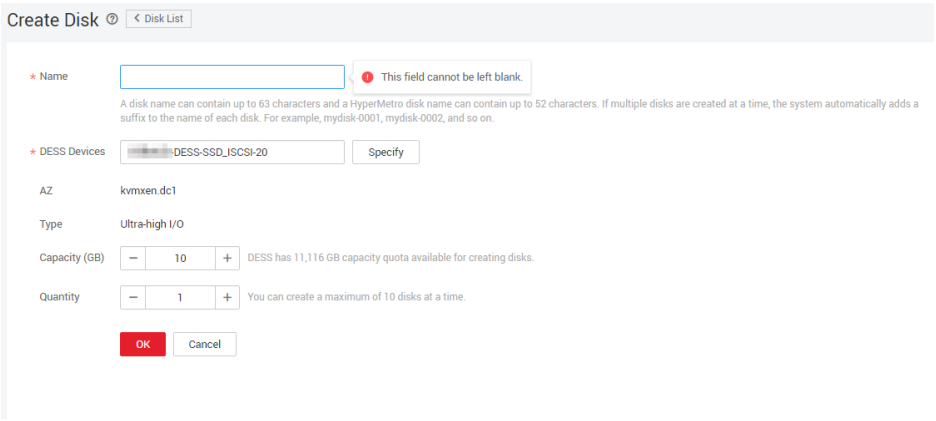
- Method 1: Via the button in the row of the disk-residing DESS device

  a. Click 

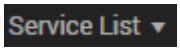
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

  b. In the row of the desired DESS device, click **Create Disk**.

  The **Create Disk** dialog box is displayed.




- Method 2: From the disk list page of the wanted DESS device

  a. Click 

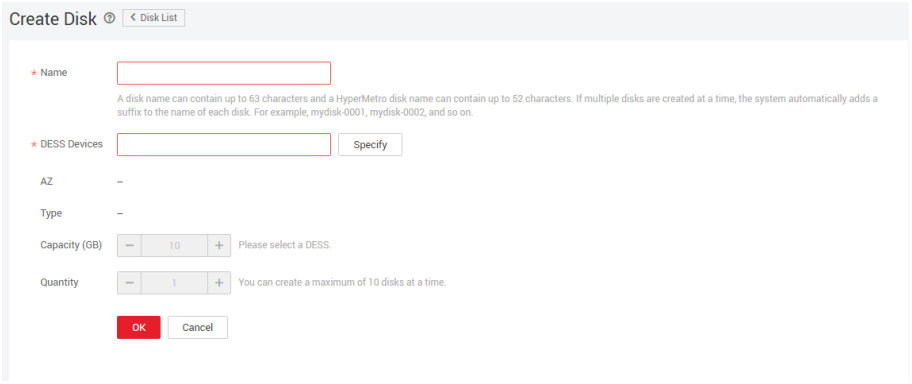
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the DESS device.

c. Click **Create Disk** in the upper left corner.

The **Create Disk** dialog box is displayed.




- Method 3: From the disk list page of the wanted HyperMetro resource

a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

By default, HyperMetro resources in all statuses are listed.

c. Click next to the resource name to view the HyperMetro resource details.

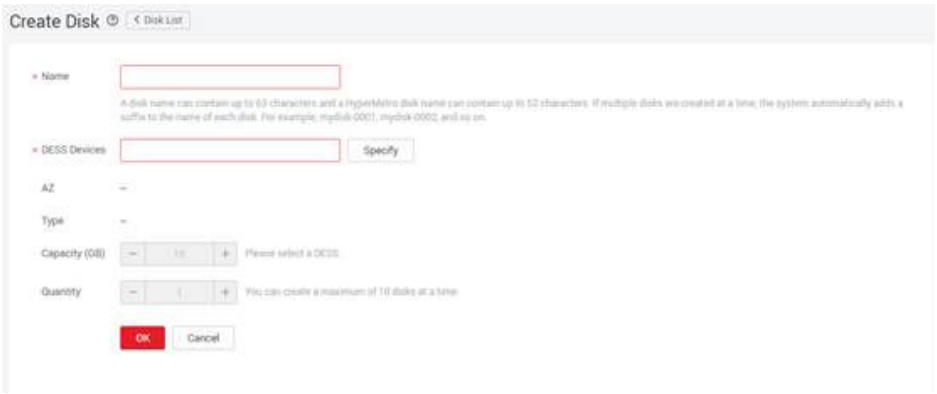
d. Click next to the associated DESS device list. The details are displayed.

e. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the HyperMetro resource.

f. Click **Create Disk** in the upper left corner.

The **Create Disk** dialog box is displayed.




- Method 4: On the page of a DESS device in the HyperMetro resource

a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

By default, HyperMetro resources in all statuses are listed.

c. In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.

d. Perform the operation according to **Step 3.b** in method 1 or **Step 3.c** in method 2.

- Method 5: On the disk list page

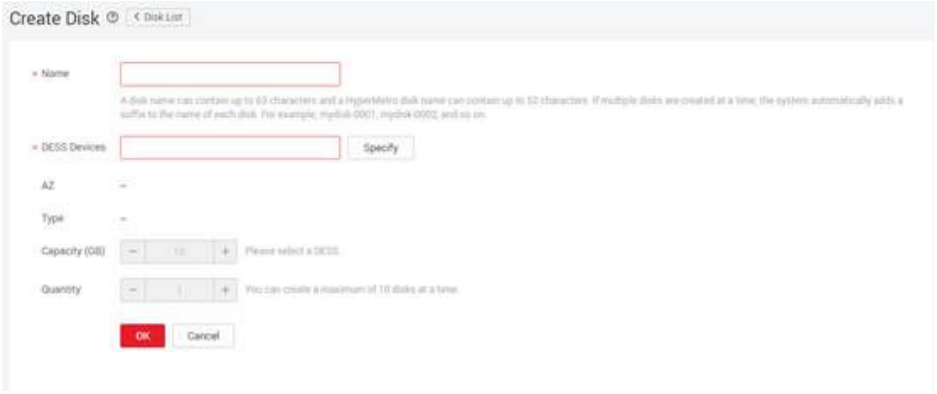
a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage Service** > **Disks** to go to the disk list page.

By default, disks in all statuses are displayed.

c. Click **Create Disk** in the upper left corner.

The **Create Disk** dialog box is displayed.




**Step 4** Set disk parameters.

**Table 3-3** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Disk name<br>• If you create more than one common disk in a batch, the system automatically adds suffixes to their names, for example: **disk-0001**, **disk-0002**.<br>• The disk name cannot contain spaces.<br>• For single disk creation, the maximum name length for a common disk is 63 characters and that for a HyperMetro disk is 52 characters.<br>• For batch disk creation, the disk name can contain a maximum of 58 characters. HyperMetro disks do not support batch creation. |
| DESS Device | Select the DESS device to which the disk belongs. |
| AZ | Name of the AZ to which the disk-residing DESS device or HyperMetro resource belongs |
| Type | Type of the DESS device or HyperMetro resource to which a disk belongs |
| HyperMetro | If you select this parameter, the system will create two disks enabled with HyperMetro (referred to as HyperMetro disks), one on the preferred DESS device and the other on the non-preferred DESS device.<br>This parameter is available only when HyperMetro is enabled when you apply for DESS devices. |
| Capacity (GB) | Disk capacity, which cannot be larger than the available capacity of the DESS device or HyperMetro resource |
| Quantity | Number of disks to be created<br>• When the DESS device is of the common I/O or common I/O (low latency) type, up to 512 common disks or 128 HyperMetro disks can be created (HyperMetro disks are created in pairs and located in two DESS devices that are associated with HyperMetro).<br>• When the DESS device is of the high I/O, high I/O (low latency), ultra-high I/O, or ultra-high I/O (low latency) type, up to 512 common disks or 256 HypermMetro disks can be created. (HyperMetro disks are created in pairs and located in two DESS devices that are associated with HyperMetro.)<br>• Up to 10 common disks can be created in a batch whereas HyperMetro disks do not support batch creation. |

**Step 5** Click **OK**.

A message is displayed indicating that the creation command is issued successfully.

**----End**

## Follow-Up Procedure

After a disk is created successfully, you can attach it to BMSs. For detailed operations, see **3.5 Attaching a Disk**.

# 3.3 (Optional) Creating a HyperMetro Consistency Group

You can create HyperMetro consistency groups to centrally manage HyperMetro disks. If an application or one type of services uses multiple HyperMetro disks and a preferred service site needs to be determined by the system upon faults, you can add the HyperMetro disks of the application and services to a HyperMetro consistency group for unified maintenance.

## Context

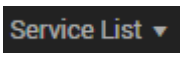
HyperMetro consistency groups are used to centrally manage HyperMetro disks.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Click 

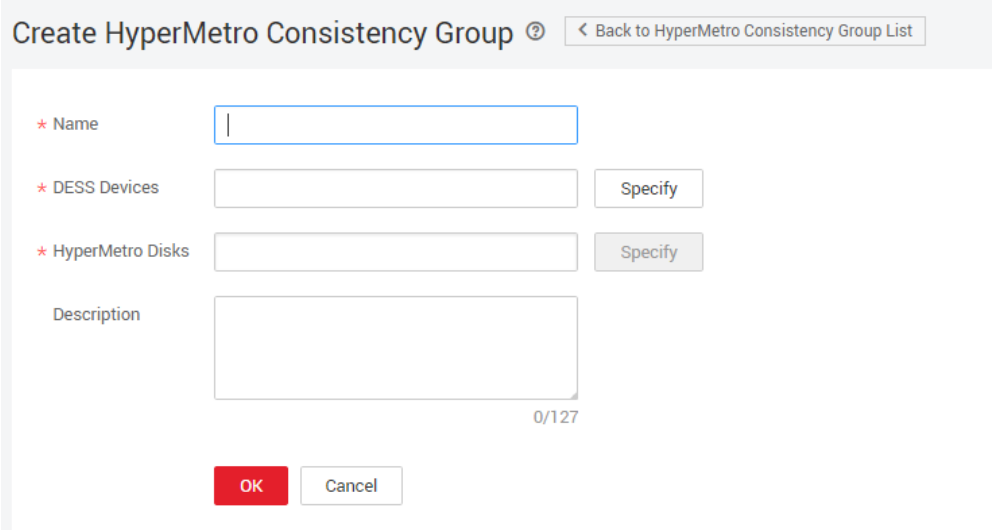
and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage Service** > **HyperMetro Consistency Groups** to go to the consistency group information page.

By default, HyperMetro consistency groups in all statuses are displayed.

**Step 5** Click **Create Consistency Group**.

The **Create Consistency Group** dialog box is displayed.




**Step 6** Set parameters for the consistency group. **Table 3-4** describes the parameters.

**Table 3-4** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Consistency group name, which can contain a maximum of 63 characters without any spaces. |
| DESS Devices | Select a DESS device to create the consistency group, which will serve as the preferred DESS device. |
| HyperMetro Disks | Select HyperMetro disks. |
| Description | Consistency group description |

**Step 7** Click **OK**.

The system displays a message indicating that the creation command is issued successfully.

**----End**

## Follow-Up Procedure

After creating a HyperMetro consistency group successfully, you can add HypeMetro disks to or remove HyperMetro disks from the consistency groups. For detailed operations, see **3.4 (Optional) Adding HyperMetro Disks**.

# 3.4 (Optional) Adding HyperMetro Disks

This section introduces how to add HyperMetro disks to HyperMetro consistency groups.

## Prerequisites

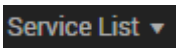
- At least one HyperMetro consistency group exists. For details about how to create one, see **3.3 (Optional) Creating a HyperMetro Consistency Group**.
- There are HyperMetro disks available.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Click 

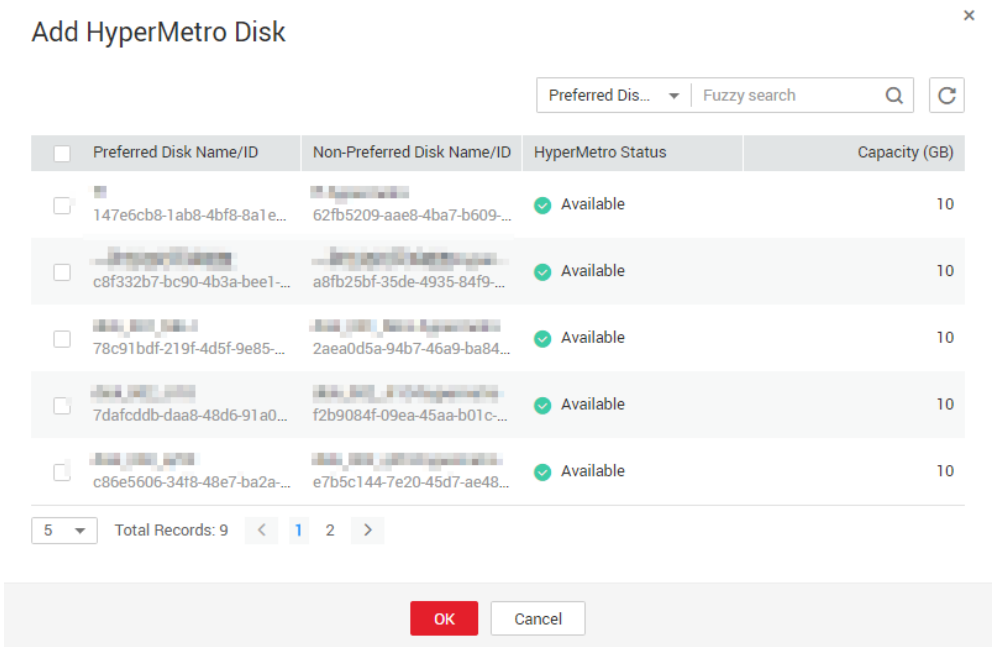
and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage Service** > **HyperMetro Consistency Groups** to go to the consistency group information page.

**Step 5** (Optional) Set the search criteria to look for the desired consistency group.

**Step 6** In the row of the consistency group, click **Add HyperMetro Disk**.

The **Add HyperMetro Disk** dialog box is displayed.




**Step 7** Select the HyperMetro disks you want to add.

**NOTE**

For HyperMetro disks being synchronized, click **Pause** before selecting disks.

**Step 8** Click **OK**.

The system displays a message indicating that the creation command is issued successfully.

**----End**

# 3.5 Attaching a Disk

After creating a disk, you need to attach it to BMSs. The BMSs use the disk as a data disk.

## Context

Pay attention to the following restrictions when attaching disks:

- The disk is in the **Available** or **In use** state, and the number of attached BMSs is smaller than 16.
- A disk can be attached to a maximum of 16 BMSs.
- The BMSs to which a non-preferred disk is attached are automatically identified by the system, and cannot be manually specified.
- You can view the maximum number of disks that can be attached to a BMS on the BMS management console.

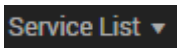
## Procedure

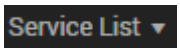
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Search for a desired disk using any of the following methods:

- Method 1: Via the disk-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
  c. Set the search criteria to look for the desired disk.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
     - Method 1

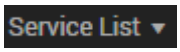
1) Click  next to the resource name to view the HyperMetro resource details.
2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

   The disk tab page lists the disks of the HyperMetro resource.

- Method 2
  1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
  2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

     The disk tab page lists the disks of the DESS device.

d. Set the search criteria to look for the desired disk.

- Method 3: From the disk list of all DESS devices
  a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. Set the search criteria to look for the desired disk.

**Step 4** Attach the disk using either of the following methods:

- Method 1: In the row of the disk, click **Attach**. The **Attach Disk** dialog box is displayed.
- Method 2: Click the disk name. On the **Disk Details** page that is displayed, click the **Mounting Point** tab and then **Attach**. The **Attach Disk** dialog box is displayed.

**Step 5** Select the desired BMSs.

The page automatically queries the BMS that the disk can be attached to. The displayed information includes name/ID, status, flavor, image, private IP address, and AZ.

**Step 6** Click **OK**.

A message is displayed indicating that the command for attaching the disk is successfully delivered.

**----End**

## Follow-Up Procedure

After attaching disks on a common I/O, high I/O, or ultra-high I/O DESS device, you can log in to the BMSs to initialize your disks.

After attaching disks on a common I/O (low latency), high I/O (low latency), or ultra-high I/O (low latency) DESS device, you can log in to the BMSs, run the **hot_add** command to find the disks that have been attached, and initialize your disks.

For detailed operations, see **3.6 Initializing a Data Disk**.

# 3.6 Initializing a Data Disk

## 3.6.1 Disk Partition Style

After a disk is attached to a BMS, you need to log in to the BMS to initialize the disk, that is, create partitions for the disk. The disk can be used after being initialized.

### Context

- After attaching disks on a common I/O, high I/O, and ultra-high I/O DESS device, you can log in to the BMSs to initialize your disks.
- After attaching disks on a common I/O (low latency), high I/O (low latency), and ultra-high I/O (low latency) DESS device, you can log in to the BMSs, run the **hot_add** command to find the disks that have been attached, and initialize your disks.

### Disk Partition Style

**Table 3-5** lists the common disk partition styles. For Linux operation systems (OSs), different disk partition styles require different partitioning tools.

**Table 3-5** Disk Partition Style

| Disk Partition Style | Maximum Disk Capacity | Maximum Number of Partitions | Linux Partitioning Tool |
| --- | --- | --- | --- |
| Master Boot Record (MBR) | 2 TB | • 4 primary partitions<br>• 3 primary partitions and 1 extended partition<br>**NOTE**<br>With the MBR partition style, primary partitions and an extended partition can be included, where the extended partition can contain several logical partitions.<br>For example, if 6 partitions need to be created, you can create the partitions in the following two ways:<br>• 3 primary partitions and 1 extended partition, with the extended partition containing 3 logical partitions<br>• 1 primary partition and 1 extended partition, with the extended partition containing 5 logical partitions | You can use either of the following tools:<br>• fdisk<br>• parted |
| Guid Partition Table (GPT)<br>(GPT, Guid Partition Table) | 18 EB<br>**NOTE**<br>1 EB = 1048576 TB | Unlimited<br>**NOTE**<br>Disk partitions allocated using GPT are not categorized. | parted |

**NOTICE**

The maximum disk capacity supported by MBR is 2 TB, and that supported by GPT is 18 EB. Currently, an EVS data disk supports up to 32 TB. Therefore, use the GPT partition style if your disk capacity is greater than 2 TB.

If you change the disk partition style after the disk has been used, the original data on the disk will be cleared. Therefore, select a proper disk partition style when initializing the disk.

# 3.6.2 Initializing a Windows Data Disk

## Scenarios

This section uses Windows Server 2008 R2 Enterprise as an example.

The method for initializing a disk varies depending on the OSs running on the server. This document is for reference only. For detailed operations and differences, see the product documents of the OSs running on the corresponding BMSs.

## Prerequisites

- You have logged in to the BMS. For details, see section "Logging In to a Windows BMS" in ***Bare Metal Server User Guide***.
- A data disk has been attached to the BMS and has not been initialized.

## Procedure

**Step 1** On the desktop of the BMS, click **Start**. Right-click **Computer** and choose **Manage** from the short-cut menu.

The **Server Manager** window is displayed.

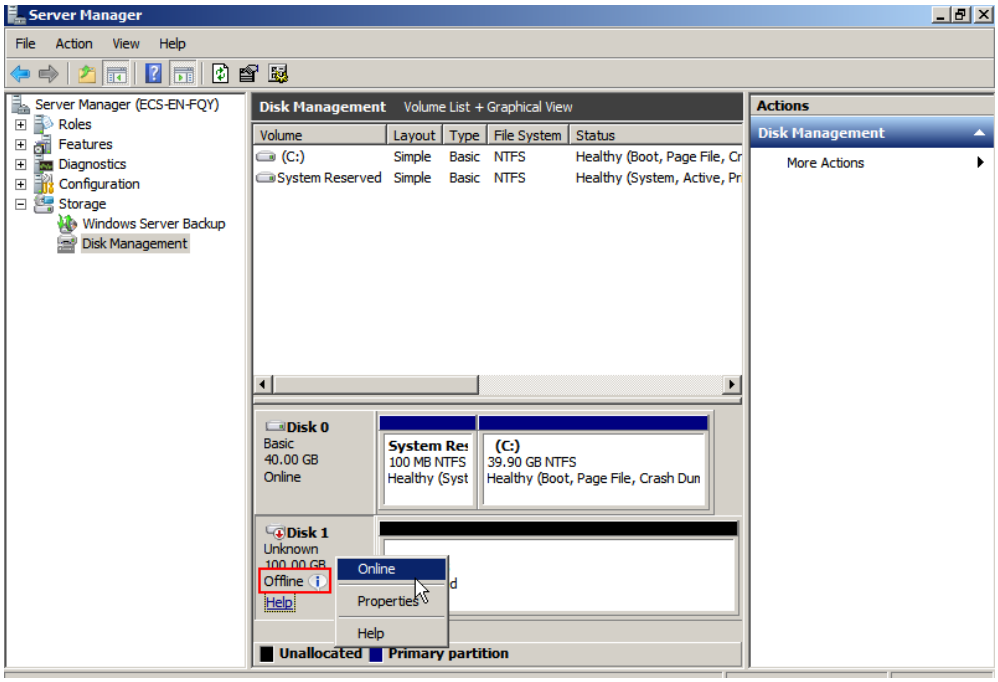
**Step 2** On the navigation pane on the left, choose **Storage** > **Disk Management**.

The **Disk Management** window is displayed.

**Step 3** Disks are listed in the right pane. If the added disk is in the **Offline** state, set it to **Online**.

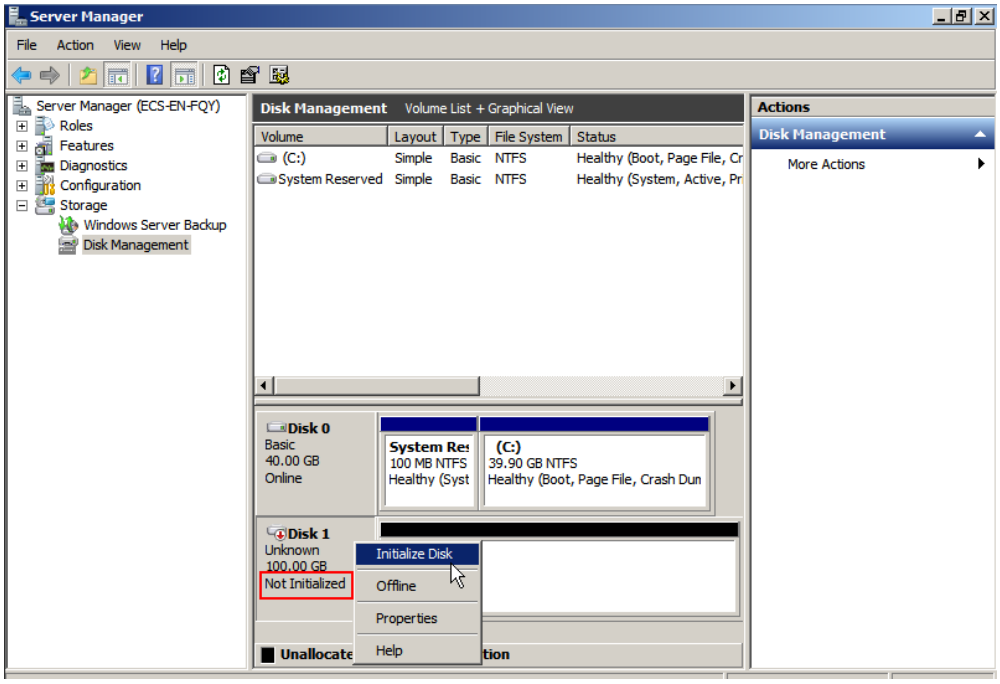
Then, initialize the disk.

**Step 4** Disks are listed in the right pane. In the **Disk 1** area, right-click **Offline** and choose **Online** from the displayed menu to set the disk online.

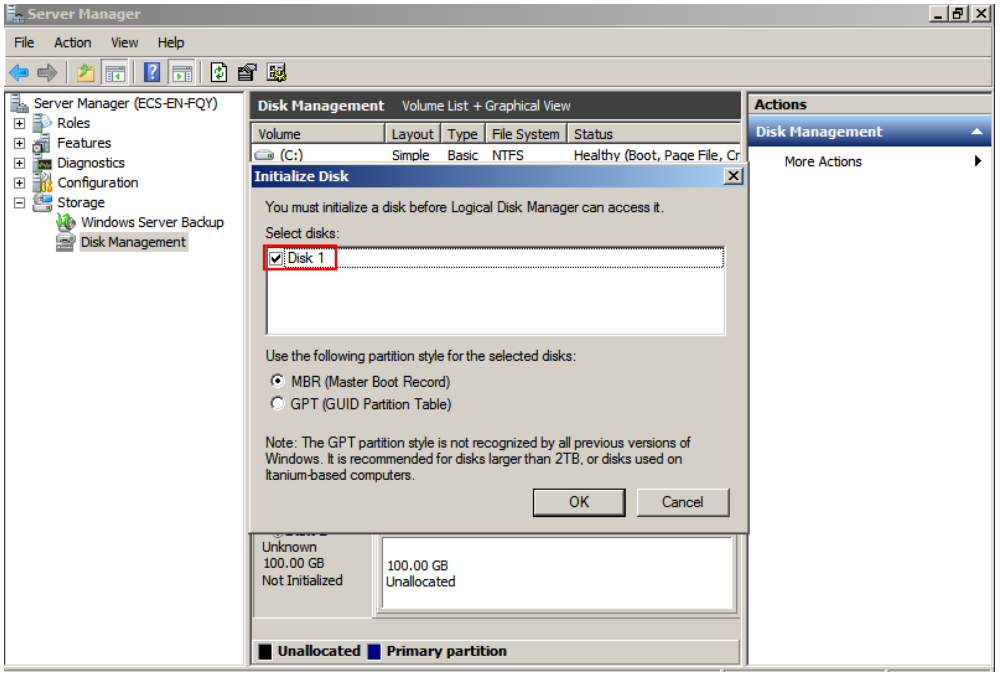


**Step 5** After setting the disk online, the disk 1 status changes from **Offline** to **Not Initialized**. Right-click the disk status and choose **Initialize Disk** from the displayed menu.




**Step 6** In the **Initialize Disk** dialog box, select the target disk, click **MBR (Master Boot Record)**, and click **OK**.

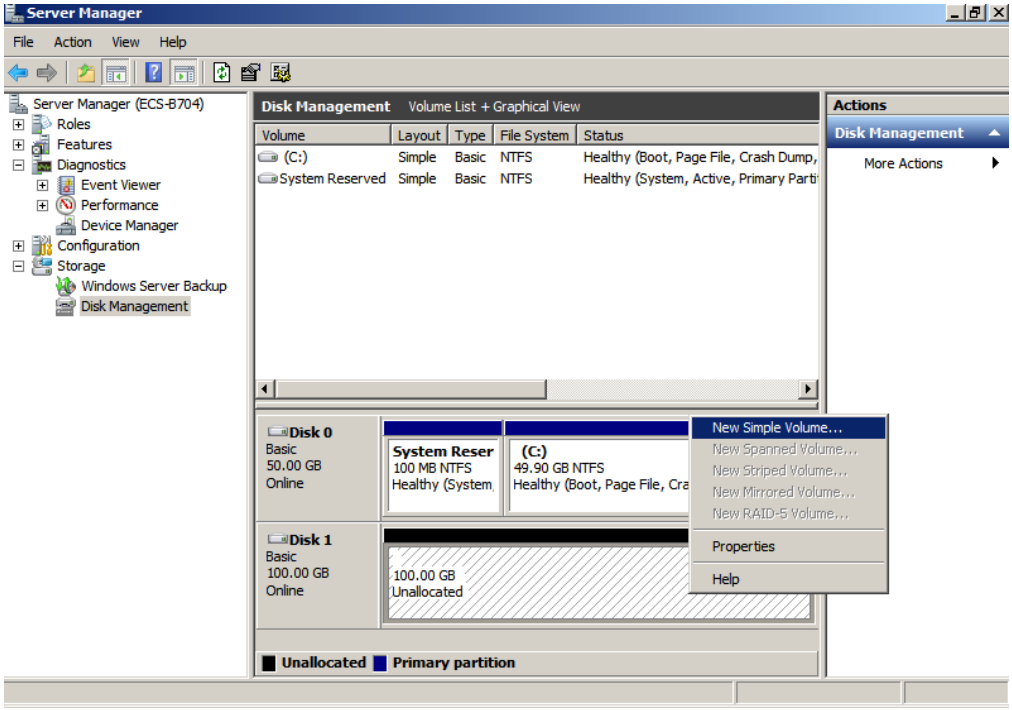


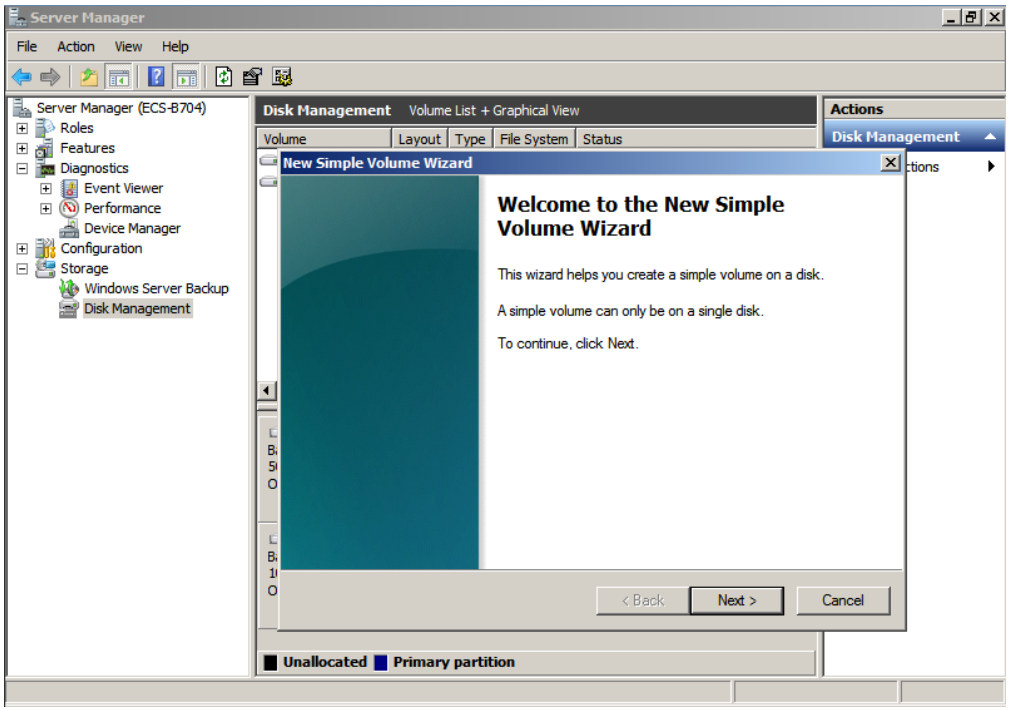
**NOTICE**

If you change the disk partition style after the disk has been used, the original data on the disk will be cleared. Therefore, select a proper disk partition style when initializing the disk.

**Step 7** Right-click the unallocated disk space and choose **New Simple Volume**.

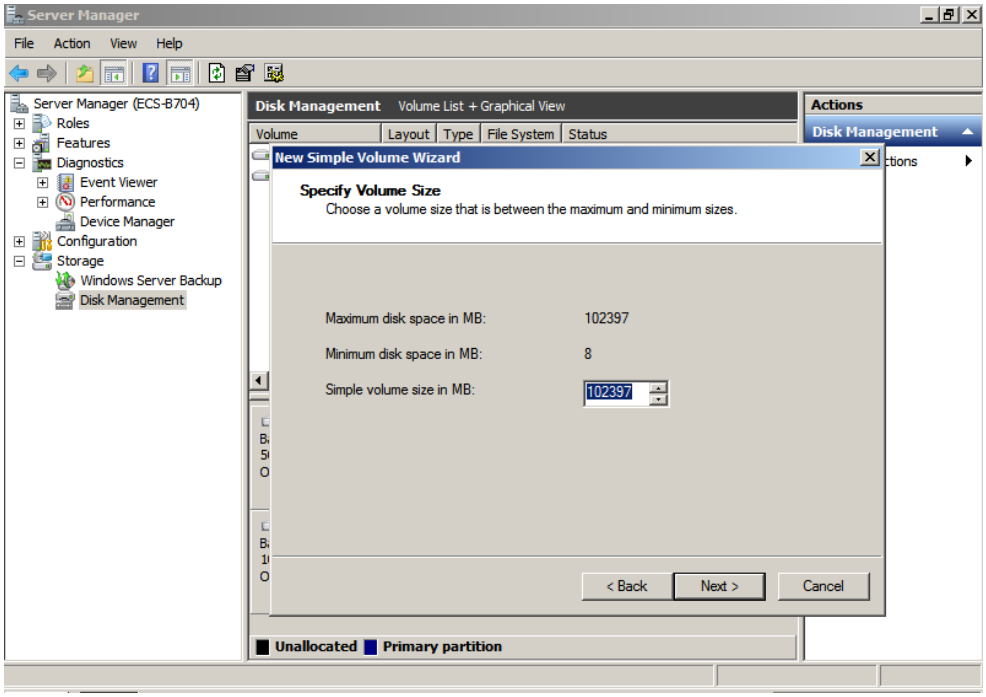



**Step 8** On the displayed **New Simple Volume Wizard** window, click **Next**.

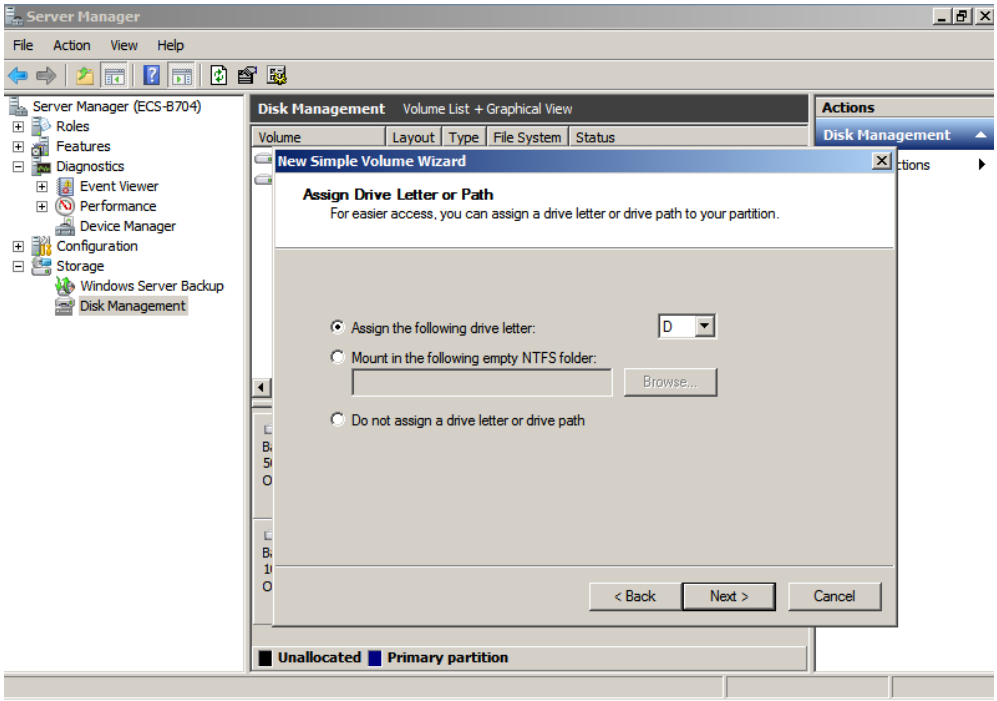


**Step 9** Specify the simple volume size as required (the default value is the maximum) and click **Next**.

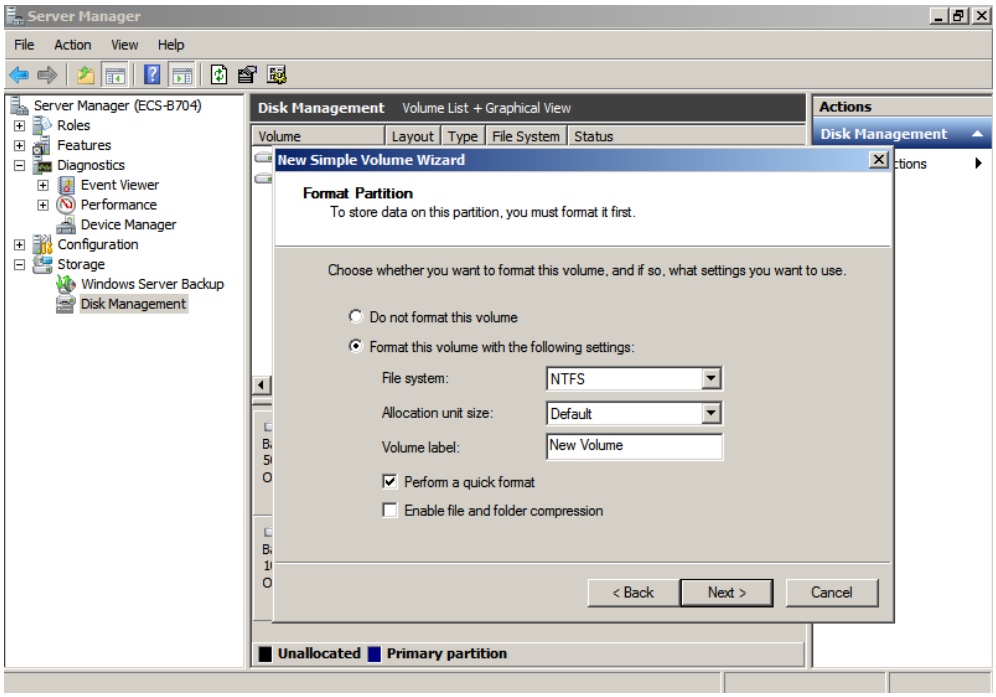



**Step 10** Assign the drive letter and click **Next**.



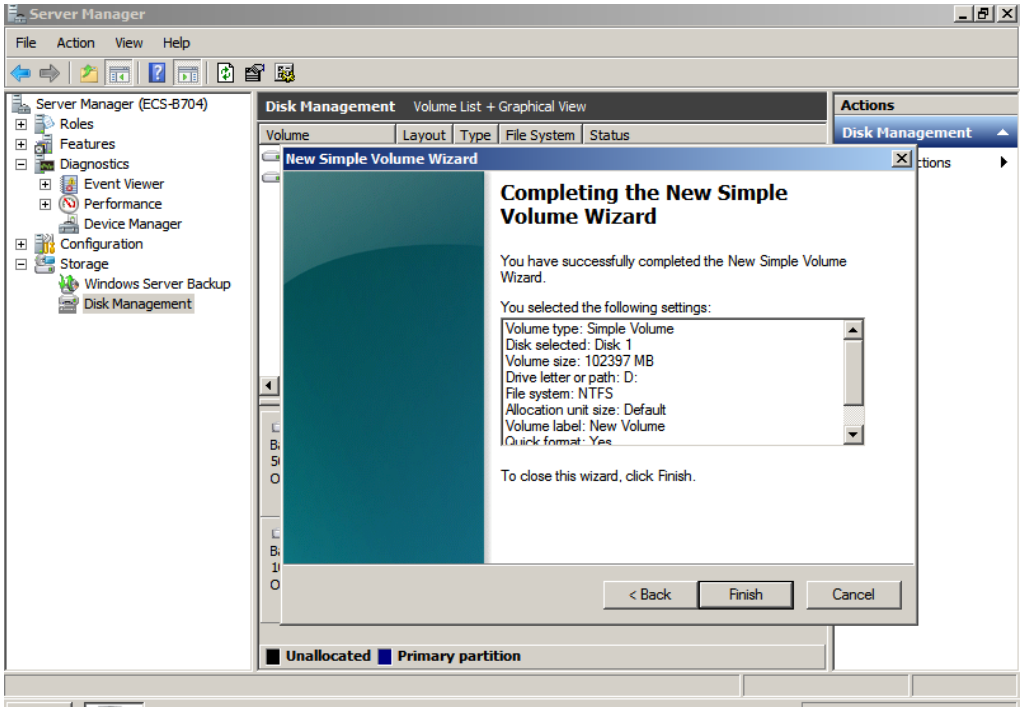

**Step 11** Select **Format this volume with the following settings**, set parameters based on the actual requirements.




**Step 12** Click **Next**.

**Figure 3-1** Completing the partition creation

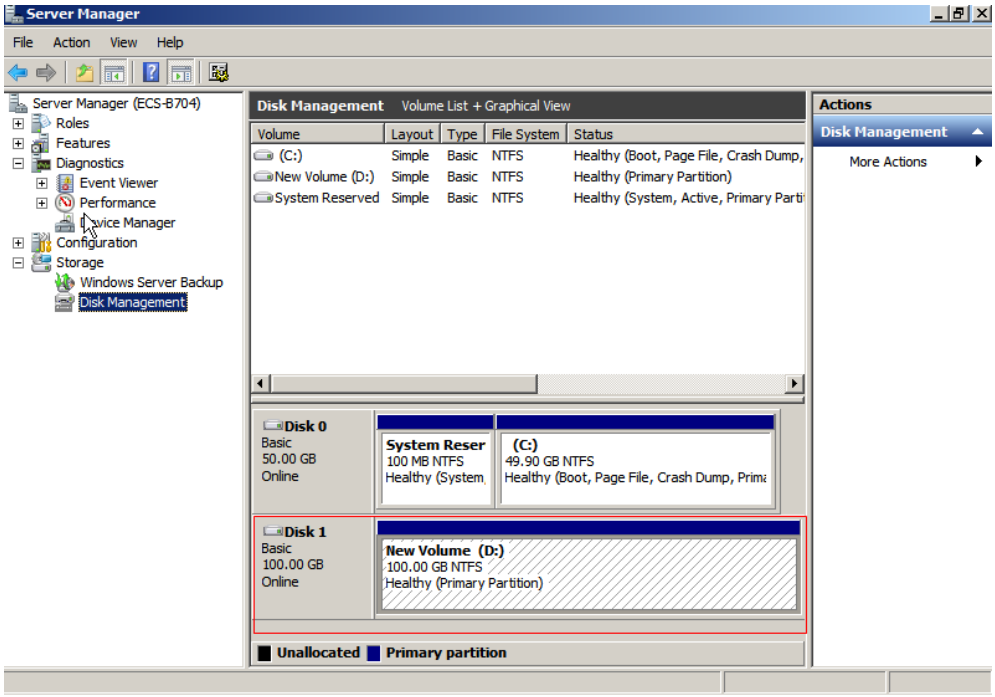



**NOTICE**

The partition sizes supported by file systems vary. Therefore, you are advised to choose an appropriate file system based on your service requirements.

**Step 13** Click **Finish** to complete the wizard. Wait for the initialization to complete. When the volume status changes to **Healthy**, the initialization has succeeded.




**----End**

## 3.6.3 Initializing a Linux Data Disk (fdisk)

### Scenarios

This section uses CentOS 7.0 64-bit as an example to describe how to initialize a data disk attached to a Linux BMS and use fdisk to partition the data disk.

The method for initializing a disk varies depending on the OSs running on the server. This document is for reference only. For detailed operations and differences, see the product documents of the OSs running on the corresponding BMSs.

### Prerequisites

- You have logged in to the BMS as user **root**. For details, see section "Logging In to a Linux BMS" in *Bare Metal Server User Guide*.
- A data disk has been attached to the BMS and has not been initialized.

### Creating Partitions and Mounting a Disk

The following example shows you how to use fdisk to create a primary partition on a data disk that has been attached to the BMS. The default partitioning style is MBR and the default file system format is **ext4**. Mount the file system to **/mnt/sdc**, and configure automatic mounting upon system start.

**Step 1** Run the following command to view information about the added disk:

**fdisk -l**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# fdisk -l

Disk /dev/xvda: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000cc4ad

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1   *        2048     2050047     1024000   83  Linux
/dev/xvda2         2050048    22530047    10240000   83  Linux
/dev/xvda3        22530048    24578047     1024000   83  Linux
/dev/xvda4        24578048    83886079    29654016    5  Extended
/dev/xvda5        24580096    26628095     1024000   82  Linux swap / Solaris

Disk /dev/xvdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

This command output indicates that the BMS contains two disks. **/dev/xvda** is used as the system disk, and **/dev/xvdb** is the newly added data disk.

**Step 2** Run the following command to use fdisk to partition the added data disk:

**fdisk** *Added data disk*

In this example, **/dev/xvdb** is the added data disk.

**fdisk /dev/xvdb**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# fdisk /dev/xvdb
Welcome to fdisk (util-linux 2.23.2).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.
Device does not contain a recognized partition table
Building a new DOS disklabel with disk identifier 0xb00005bd.
Command (m for help):
```

**Step 3** Enter **n** and press **Enter** to create a partition.

Information similar to the following is displayed:

```
Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
```

There are two types of disk partition:

- **p** indicates the primary partition.
- **e** indicates an extended partition.

**Step 4** A primary partition is used in this example. Enter **p** and press **Enter** to create a primary partition.

Information similar to the following is displayed:

```
Select (default p): p
Partition number (1-4, default 1):
```

**Partition number** indicates the serial number of the primary partition. The value can be **1** to **4**.

**Step 5** Enter the serial number of the primary partition and press **Enter**. Primary partition number **1** is used in this example.

Information similar to the following is displayed:

```
Partition number (1-4, default 1): 1
First sector (2048-20971519, default 2048):
```

**First sector** indicates the first sector. The value can be **2048** to **20971519**, and the default value is **2048**.

**Step 6** Select the default first sector **2048** and press **Enter**.

Information similar to the following is displayed:

```
First sector (2048-20971519, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519):
```

**Last sector** indicates the last sector. The value can be **2048** to **20971519**, and the default value is **20971519**.

**Step 7** Select the default last sector **20971519** and press **Enter**.

Information similar to the following is displayed:

```
Last sector, +sectors or +size{K,M,G} (2048-20971519, default 20971519):
Using default value 20971519
Partition 1 of type Linux and of size 10 GiB is set
Command (m for help):
```

A primary partition has been created for a 10 GB data disk.

**Step 8** Enter **p** and press **Enter** to view the details about the created partition.

Information similar to the following is displayed:

```
Command (m for help): p

Disk /dev/xvdb: 10.7 GB, 10737418240 bytes, 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xb00005bd

   Device Boot      Start         End      Blocks   Id  System
/dev/xvdb1            2048    20971519    10484736   83  Linux

Command (m for help):
```

Details about the **/dev/xvdb1** partition are displayed.

**Step 9** Enter **w** and press **Enter** to write the changes into the partition table.

Information similar to the following is displayed:

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

The partition is successfully created.

**NOTE**

In case that you want to discard the changes made before, you can exit fdisk by entering **q**.

**Step 10** Run the following command to synchronize the new partition table to the OS:

**partprobe**

**Step 11** Run the following command to set the file system format of the created partition:

**mkfs -t** *File system format* **/dev/xvdb1**

For example, run the following command to set the file system format to **ext4**:

**mkfs -t ext4 /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# mkfs -t ext4 /dev/xvdb1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
655360 inodes, 2621184 blocks
131059 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2151677952
80 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

The formatting takes a period of time. Wait for the system running, and do not exit.

**NOTICE**

The partition sizes supported by file systems vary. Therefore, you are advised to choose an appropriate file system based on your service requirements.

**Step 12** Run the following command to create a mounting point:

**mkdir** *Mounting point*

For example, run the following command to create a mounting point **/mnt/sdc**:

**mkdir /mnt/sdc**

**Step 13** Run the following command to mount the new partition to the mounting point created in **Step 12**.

**mount /dev/xvdb1** *Mounting point*

For example, run the following command to mount the created partition to **/mnt/sdc**:

**mount /dev/xvdb1 /mnt/sdc**

**Step 14** Run the following command to check the mounting result:

**df -TH**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/xvda2     xfs        11G  7.4G  3.2G  71% /
devtmpfs       devtmpfs  4.1G     0  4.1G   0% /dev
tmpfs          tmpfs     4.1G   82k  4.1G   1% /dev/shm
tmpfs          tmpfs     4.1G  9.2M  4.1G   1% /run
tmpfs          tmpfs     4.1G     0  4.1G   0% /sys/fs/cgroup
/dev/xvda3     xfs       1.1G   39M  1.1G   4% /home
/dev/xvda1     xfs       1.1G  131M  915M  13% /boot
/dev/xvdb1     ext4       11G   38M  9.9G   1% /mnt/sdc
```

The new partition **/dev/xvdb1** is mounted to **/mnt/sdc**.

**----End**

## Setting Automatic Disk Mounting at System Start

To automatically mount a disk when a BMS starts, you should not specify its partition, for example **/dev/xvdb1**, in **/etc/fstab**. This is because the sequence of cloud devices may change during the BMS stop and start. For example, **/dev/xvdb1** may change to **/dev/xvdb2**. You are advised to use the universally unique identifier (UUID) to automatically mount data disks.

**NOTE**

The universally unique identifier (UUID) is the unique character string for disk partitions in a Linux system.

**Step 1** Run the following command to query the partition UUID:

**blkid** *Disk partition*

For example, run the following command to query the UUID of **/dev/xvdb1**:

**blkid /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# blkid /dev/xvdb1
/dev/xvdb1: UUID="1851e23f-1c57-40ab-86bb-5fc5fc606ffa" TYPE="ext4"
```

The UUID of **/dev/xvdb1** is displayed.

**Step 2** Run the following command to open the **fstab** file using the vi editor:

**vi /etc/fstab**

**Step 3** Press **i** to enter the editing mode.

**Step 4** Move the cursor to the end of the file and press **Enter**. Then add the following information:

```
UUID=1851e23f-1c57-40ab-86bb-5fc5fc606ffa /mnt/sdc      ext4 defaults     0   2
```

**Step 5** Press **Esc**, enter **:wq**, and press **Enter**.

The system saves the configurations and exits the vi editor.

**----End**

# 3.6.4 Initializing a Linux Data Disk (Using Parted)

## Scenarios

This section uses CentOS 7.0 64-bit as an example to describe how to initialize a data disk attached to a Linux BMS and use Parted to partition the data disk.

The method for initializing a disk varies depending on the OSs running on the server. This document is for reference only. For detailed operations and differences, see the product documents of the OSs running on the corresponding BMSs.

## Prerequisites

- You have logged in to the BMS as user **root**. For details, see section "Logging In to a Linux BMS" in ***Bare Metal Server User Guide***.
- A data disk has been attached to the BMS and has not been initialized.

## Creating Partitions and Mounting a Disk

The following example shows you how to use Parted to create a partition on a new data disk that has been attached to the BMS. The default partitioning style is GPT and the default file system format is **ext4**. Mount the file system to **/mnt/sdc**, and configure automatic mounting upon system start.

**Step 1** Run the following command to view information about the added disk:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-centos-70 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   40G  0 disk
├─xvda1 202:1    0    4G  0 part [SWAP]
└─xvda2 202:2    0   36G  0 part /
xvdb    202:16   0  10G  0 disk
```

This command output indicates that the BMS contains two disks. **/dev/xvda** is used as the system disk, and **/dev/xvdb** is the newly added data disk.

**Step 2** Run the following command to use Parted to partition the added data disk:

**parted** *Added data disk*

In this example, **/dev/xvdb** is the added data disk.

**parted /dev/xvdb**

Information similar to the following is displayed:

```
[root@ecs-centos-70 linux]# parted /dev/xvdb
GNU Parted 3.1
Using /dev/xvdb
Welcome to GNU Parted! Type 'help' to view a list of commands.
```

**Step 3** Enter **p** and press **Enter** to view the current disk partition style.

Information similar to the following is displayed:

```
(parted) p
Error: /dev/xvdb: unrecognised disk label
```

```
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 10.7GB
Sector size (logical/physical): 512B/512B
Partition Table: unknown
Disk Flags:
```

In the command output, the **Partition Table** value is **unknown**, indicating that the disk partition style is unknown.

**Step 4** Run the following command to set the disk partition style:

**mklabel** *Disk partition style*

For example, run the following command to set the partition style to GPT: (The disk partition styles include MBR and GPT.)

**mklabel gpt**

**NOTICE**

If you change the disk partition style after the disk has been used, the original data on the disk will be cleared. Therefore, select a proper disk partition style when initializing the disk.

**Step 5** Enter **p** and press **Enter** to view the disk partition style.

Information similar to the following is displayed:

```
(parted) mklabel gpt
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 20971520s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End  Size  File system  Name  Flags
```

**Step 6** Enter **unit s** and press **Enter** to set the measurement unit of the disk to sector numbers.

**Step 7** Enter **mkpart opt 2048s 100%** and press **Enter**. In this example, one partition is created for the added data disk.

**2048s** indicates the initial disk capacity, and **100%**indicates the final disk capacity. You can determine the number of partitions and the partition capacity based on your service requirements.

Information similar to the following is displayed:

```
(parted) mkpart opt 2048s 100%
Warning: The resulting partition is not properly aligned for best performance.
Ignore/Cancel? Cancel
```

If the preceding warning message is displayed, enter **Cancel** to stop partitioning. Then, find the first sector with the best disk performance and use that value to partition the disk. In this example, the first sector with the best disk performance is **2048s**. Therefore, the system does not display the warning message.

**Step 8** Enter **p** and press **Enter** to view the details about the created partition.

Information similar to the following is displayed:

```
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 20971520s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End        Size       File system  Name  Flags
 1      2048s   20969471s  20967424s               opt
```

Details about the **/dev/xvdb1** partition are displayed.

**Step 9** Enter **q** and press **Enter** to exit Parted.

**Step 10** Run the following command to view information about partitioning:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-centos-70 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   40G  0 disk
├─xvda1 202:1    0    4G  0 part [SWAP]
└─xvda2 202:2    0   36G  0 part /
xvdb    202:16   0  100G  0 disk
└─xvdb1 202:17   0  100G  0 part
```

In the command output, **/dev/xvdb1** is the partition you created.

**Step 11** Run the following command to set the file system format of the created partition:

**mkfs -t** *File system format* **/dev/xvdb1**

For example, run the following command to set the file system format to **ext4**:

**mkfs -t ext4 /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-centos-70 linux]# mkfs -t ext4 /dev/xvdb1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
655360 inodes, 2620928 blocks
131046 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2151677925
80 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

The formatting takes a period of time. Wait for the system running, and do not exit.

**NOTICE**

The partition sizes supported by file systems vary. Therefore, you are advised to choose an appropriate file system based on your service requirements.

**Step 12** Run the following command to create a mounting point:

**mkdir** *Mounting point*

For example, run the following command to create a mounting point **/mnt/sdc**:

**mkdir /mnt/sdc**

**Step 13** Run the following command to mount the new partition to the mounting point created in **Step 12**.

**mount /dev/xvdb1** *Mounting point*

For example, run the following command to mount the created partition to **/mnt/sdc**:

**mount /dev/xvdb1 /mnt/sdc**

**Step 14** Run the following command to check the mounting result:

**df -TH**

Information similar to the following is displayed:

```
[root@ecs-centos-70 linux]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/xvda2     xfs        39G  4.0G   35G  11% /
devtmpfs       devtmpfs  946M     0  946M   0% /dev
tmpfs          tmpfs     954M     0  954M   0% /dev/shm
tmpfs          tmpfs     954M  9.1M  945M   1% /run
tmpfs          tmpfs     954M     0  954M   0% /sys/fs/cgroup
/dev/xvdb1     ext4       11G   38M  101G   1% /mnt/sdc
```

The new partition **/dev/xvdb1** is mounted to **/mnt/sdc**.

**----End**

## Setting Automatic Disk Mounting at System Start

To automatically mount a disk when a BMS starts, you should not specify its partition, for example **/dev/xvdb1**, in **/etc/fstab**. This is because the sequence of cloud devices may change during the BMS stop and start. For example, **/dev/xvdb1** may change to **/dev/xvdb2**. You are advised to use the UUID to automatically mount data disks.

**NOTE**

The UUID is the unique character string for disk partitions in a Linux system.

**Step 1** Run the following command to query the partition UUID:

**blkid** *Disk partition*

For example, run the following command to query the UUID of **/dev/xvdb1**:

**blkid /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# blkid /dev/xvdb1
/dev/xvdb1: UUID="1851e23f-1c57-40ab-86bb-5fc5fc606ffa" TYPE="ext4"
```

The UUID of **/dev/xvdb1** is displayed.

**Step 2** Run the following command to open the **fstab** file using the vi editor:

**vi /etc/fstab**

**Step 3** Press **i** to enter the editing mode.

**Step 4** Move the cursor to the end of the file and press **Enter**. Then add the following information:

```
UUID=1851e23f-1c57-40ab-86bb-5fc5fc606ffa /mnt/sdc      ext4 defaults     0   2
```

**Step 5** Press **Esc**, enter **:wq**, and press **Enter**.

The system saves the configurations and exits the vi editor.

**----End**

# 3.7 Detaching a Disk

This section introduces how to detach unwanted disks from BMSs.

## Prerequisites

The disk can be detached only when it is in the **In use** state.

## Context

- HyperMetro disks are detached in pairs: Once you detach a preferred disk, the corresponding non-preferred disk is automatically detached.
- Non-preferred disks cannot be detached separately. For details about how to downgrade a preferred disk to a common disk, see **5.1.5 Degrading a HyperMetro Disk to a Common Disk**.

## Precautions

Ensure that services running on the BMSs from which the disk will be detached are stopped. Otherwise, services may be interrupted and data may be lost. After the disk is detached, the BMSs cannot connect to the disk.

- A disk can be detached when its residing DESS device is of the common I/O, high I/O, or ultra-high I/O type, and the BMSs it attaches to are **Stopped** or **Running**.
- A disk can be detached when its residing DESS device is of the common I/O (low latency), high I/O (low latency), or ultra-high I/O (low latency) type and the BMS is **Running**.

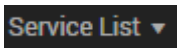
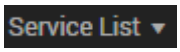
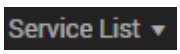
## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click  and select the wanted region.

**Step 3** Search for a desired disk using any of the following methods:

- Method 1: Via the disk-residing DESS device
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
  c. Set the search criteria to look for the desired disk.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the DESS device.
  d. Set the search criteria to look for the desired disk.
- Method 3: From the disk list of all DESS devices
  a. Click  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. Set the search criteria to look for the desired disk.

**Step 4** Detach the disk using either of the following methods:

- Method 1
  a. In the row of the disk, choose **More** > **Detach**.
     The **Detach Disk** dialog box is displayed.

b. Select the unwanted BMSs.

NOTE

- You can select one or more BMSs.
- Ensure that services running on the BMSs from which the disk will be detached are stopped. Otherwise, services may be interrupted and data may be lost. After the disk is detached, the BMSs cannot connect to the disk.

- Method 2
  a. Click the disk name to go to the disk details page.
  b. Click the **Mounting Point** tab.
  c. Select the unwanted BMSs.

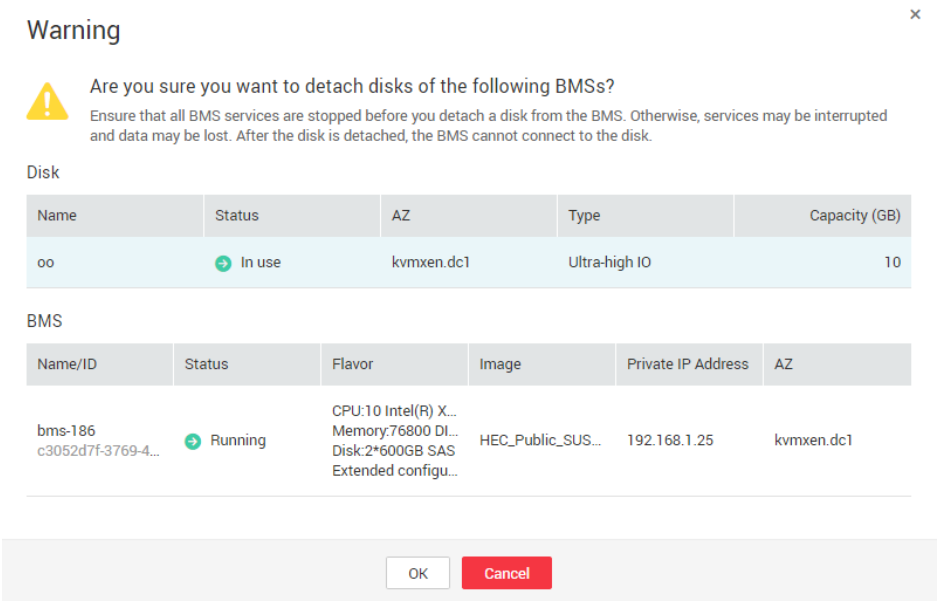
NOTE

- You can select one or more BMSs.
- Ensure that services running on the BMSs from which the disk will be detached are stopped. Otherwise, services may be interrupted and data may be lost. After the disk is detached, the BMSs cannot connect to the disk.

  d. Click **Detach**. The **Warning** dialog box is displayed.

NOTE

- If you select one BMS, click **Detach** in the row of the BMS or click the **Mounting Point** tab and then **Detach**.
- If you select more than one BMS, click the **Mounting Point** tab and then **Detach**.




**Step 5** Click **OK**.

**WARNING**

A confirmation dialog box is displayed, indicating that once a disk is detached from a BMS, the BMS cannot use the disk.

A message is displayed indicating that the task for detaching the disk is successfully created.

**----End**

## Follow-Up Procedure

After detaching a disk residing on a DESS device of the common I/O (low latency), high I/O (low latency), or ultra-high I/O (low latency) type, log in to the OS of the BMS and run the **hot_add** command to refresh the disk list.

# 4 DESS Device Management



## 4.1 Managing DESS Devices

### 4.1.1 Viewing DESS Device Information

This section introduces how to view DESS device information.

#### Context

You can query DESS device by status:

- **Available**

  The DESS device is successfully applied for and can be used.
- **Deploying**

  The DESS device is being deployed.
- **Expanding**

  The DESS device is being expanded.
- **Expired**

  The DESS device has expired. The DESS device in the **Expired** state can be used normally. You can renew the device.
- **Frozen**

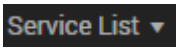
  If an expired DESS device is not renewed, it enters the **Frozen** state. A frozen DESS device cannot be used. You can use it only after renewal.

#### Procedure

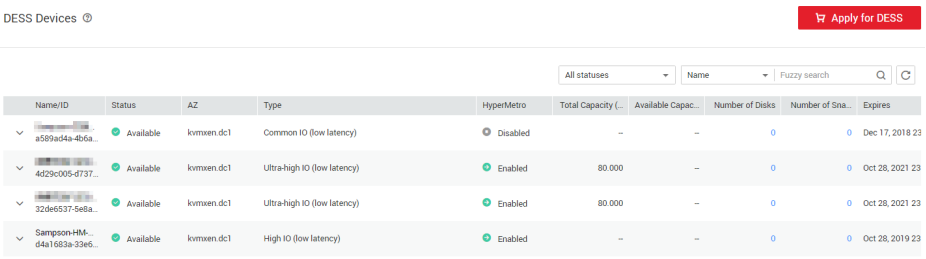
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click  and select the wanted region.

**Step 3** Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **DESS Devices** to go to the DESS device list page.




**NOTE**

Click a DESS device name in the **Name/ID** column on the disk page or snapshot page to go to the storage list page. For details, see **5.1.7 Querying DESS Information on the Disk List Page** and **5.2.8 Querying DESS Information on the Snapshot List Page**.

**Step 5** Click  next to the HyperMetro resource name to expand its details. **Table 4-1** describes the parameters.

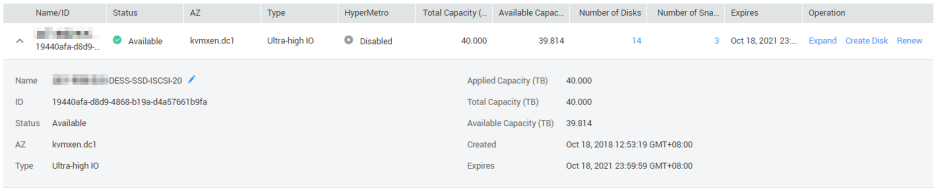



**Table 4-1** Basic DESS device parameters

| Parameter | Description |
| --- | --- |
| Name | DESS device name |
| ID | DESS device ID |
| Status | DESS device status |
| AZ | An AZ is a physical region where the power supply and network are isolated from those of other regions. AZs are physically isolated but interconnected through the intranet. |

| Parameter | Description |
| --- | --- |
| Type | DESS device type, which can be:<br>• Common I/O<br>Huawei OceanStor enterprise storage, using iSCSI SAS disks<br>• Common I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SAS disks<br>• High I/O<br>Huawei OceanStor enterprise storage, using iSCSI SAS disks and SSDs<br>• High I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SAS disks and SSDs<br>• Ultra-high I/O<br>Huawei OceanStor enterprise storage, using iSCSI SSDs<br>• Ultra-high I/O (low latency)<br>Huawei OceanStor enterprise storage, using FC SSDs |
| Connected BMSs (Max.) | Maximum number of BMSs that can be connected to the DESS device. This parameter is available for low latency DESS devices. |
| Applied Capacity (TB) | DESS device capacity defined in orders. |
| Total Capacity (TB) | Total capacity of the DESS device. |
| Available Capacity (TB) | Available capacity of the DESS device, after the capacity occupied by the system is deducted. |
| Created | DESS device creation time |
| Expired | Expiration time of the DESS device. When a DESS device is to expire or expired, you can renew it. |
| HyperMetro | Whether to enable the HyperMetro function. This parameter is valid only when HyperMetro is enabled for the DESS device. |
| Associated HyperMetro Name | Name of the HyperMetro resource hosting the DESS device. This parameter is valid only when HyperMetro is enabled for the DESS device. |
| Associated HyperMetro ID | ID of the HyperMetro resource hosting the DESS device. This parameter is valid only when HyperMetro is enabled for the DESS device. |
| Remote DESS Device Name | Name of a remote DESS device. This parameter is valid only when HyperMetro is enabled for the DESS device. |
| Remote DESS Device ID | ID of a remote DESS device. This parameter is valid only when HyperMetro is enabled for the DESS device. |

**----End**

## 4.1.2 Modifying a DESS Device Name

After you have created a DESS device, you can change its name.

### Prerequisites

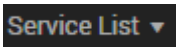
The DESS device is in the **Available**, **Expired**, or **Expanding** state.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

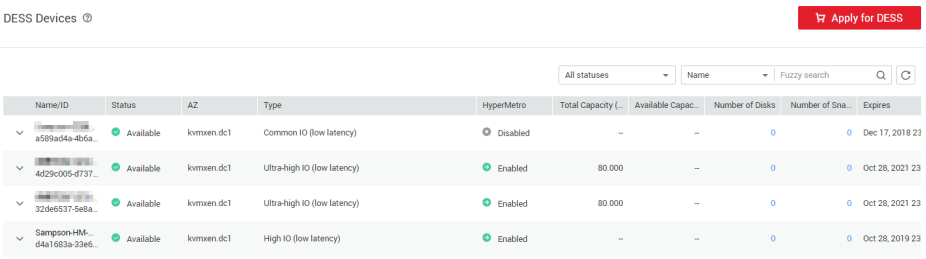
**Step 2** Click 

and select the wanted region.

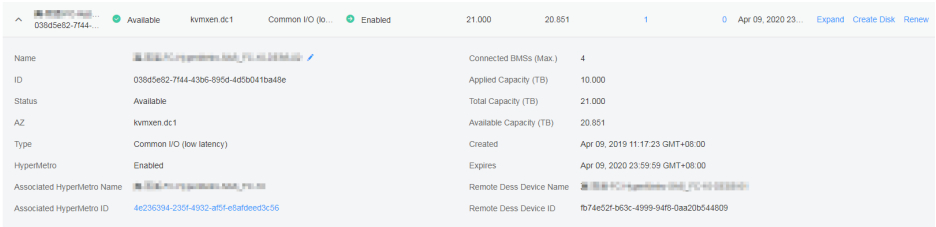
**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **DESS Devices** to go to the DESS device list page.




**Step 5** Click  next to the storage name to expand its details.




**Step 6** Click  next to the name.

**Step 7** Enter the new name.

Enter a maximum of 64 halfwidth characters, chosen from letters, digits, underscores (_), and hyphens (-). The value must start with a letter.

**Step 8** Click  to save the modification.

**----End**

# 4.1.3 Expanding a DESS Device

If the capacity of your DESS device is insufficient, you can expand it.

## Context

For details about the capacity expansion of DESS device, see the following table.

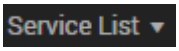
**Table 4-2** Description of capacity expansion of DESS device

| Type | Description |
| --- | --- |
| Common I/O, common I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• The initial capacity of a DESS device is as follows:<br>– 10 TB: Capacity expansion can be performed once after capacity expansion to 20 TB. The capacity expansion specification is 20 TB.<br>– Other capacity: Only one capacity expansion is supported, and the capacity expansion specification is 20 TB. |
| High I/O, high I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• Only one capacity expansion is supported, and the capacity expansion specification is 20 TB. |
| Ultra-high I/O, ultra-high I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• The initial capacity of a DESS device is as follows:<br>– 10 TB: Capacity expansion can be performed multiple times after capacity expansion to 20 TB. The subsequent capacity expansion specifications are 20 TB, 40 TB, 60 TB, and 80 TB.<br>– Other capacity: Capacity expansion can be performed for multiple times. The capacity expansion specifications are 20 TB, 40 TB, 60 TB, and 80 TB. |

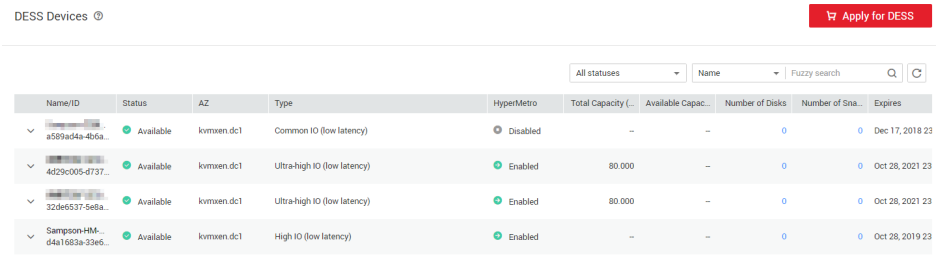
## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

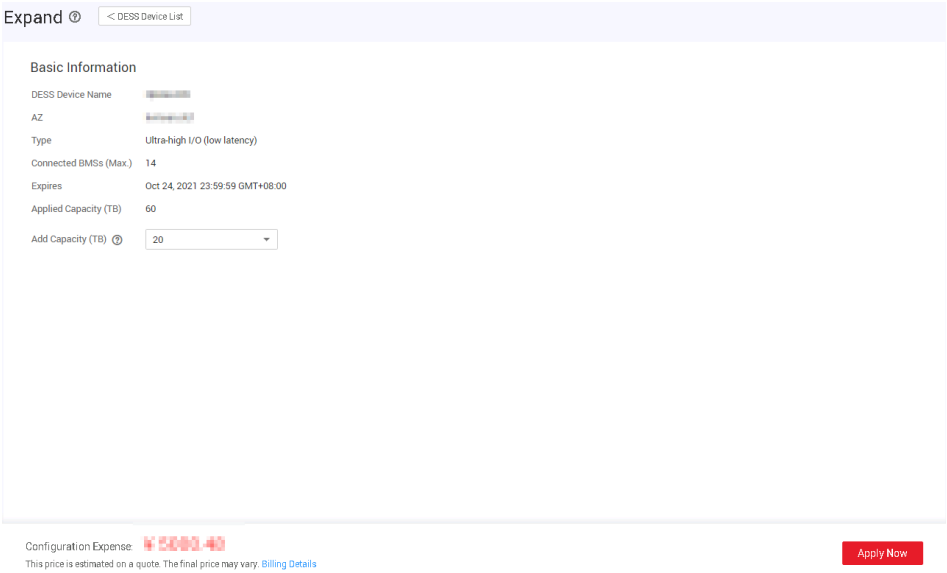
**Step 2** Click  and select the wanted region.

**Step 3** Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **DESS Devices** to go to the DESS device list page.




**Step 5** Click **Expand** in the row of the wanted DESS device. The **Expand** dialog box is displayed.




**Step 6** Select the capacity to be added.

**NOTE**

The total capacity must be 100 TB or less after expansion.

**Step 7** Click **Apply Now**.

**Step 8** Confirm the order information and click **Submit**.

**----End**

## Follow-Up Procedure

After submitting an order, in the upper right corner on the DESS home page, choose **Fees** > **My Orders** and click **Details** to view the order details.

For details about the DESS device capacity expansion order status, see **Table 4-3**.

**Table 4-3** Order status description

| Status | Description |
| --- | --- |
| Pending Approval | Your order is in the **Pending Approval** state as soon as you submit the order. |
| Pending | The system administrator approves the order within three days. After the approval, the order status changes to **Pending**. |
| Processing | You can click **Pay** to pay for the order. After the payment, the order status changes to **Processing**. |
| Completed | The O&M personnel, after being notified, expands the capacity of the DESS device. When the order status changes to **Completed**, the capacity is successfully expanded. |

## 4.1.4 Renewing a DESS Device

If your DESS device has expired and you still need it, you can renew it. If the HyperMetro feature is enabled for the DESS device, the associated DESS devices and FC switches will be automatically renewed. (Low-latency DESS devices have FC switches.)

### Prerequisites

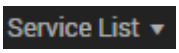
The DESS device is in the **Available**, **Expired**, or **Frozen** state.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

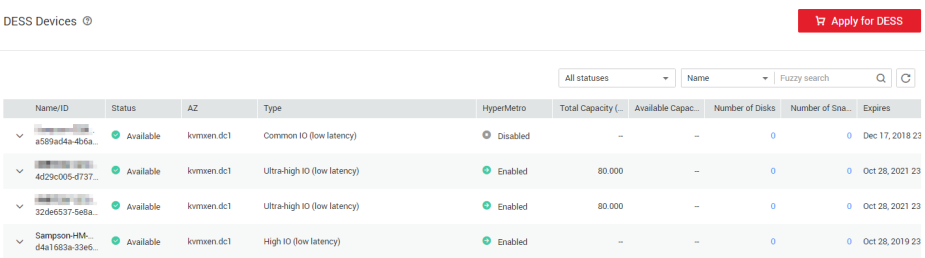
**Step 2** Click 

and select the wanted region.

**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **DESS Devices** to go to the DESS device list page.



**Step 5** In the row of the DESS device list, click **Renew**.

The **Renewals** page is displayed.

**Step 6** In the row of the DESS device list, click **Renew**.

**Step 7** Confirm the renewal information and click **Pay**.

The **Pay** page is displayed.

**Step 8** Select a payment method and click **Confirm**.

**----End**

## 4.1.5 Unsubscribing from a DESS Device

If you do not need your DESS device, you can unsubscribe from it.

### Precautions

After the unsubscription succeeds, all data on the DESS device will be cleared. Make sure that the data is no longer needed before performing this operation.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** In the upper right corner of the management console, click **Fees**.

The **Billing Center** page is displayed.

**Step 3** On the navigation pane on the left, choose **Unsubscriptions and Changes** > **Unsubscriptions**.

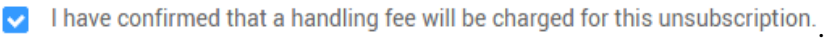
The **Unsubscriptions** page is displayed.

**Step 4** Set the filtering criteria and click  .

**Step 5** In the row of the unwanted resource instance, click **Unsubscribe**.

The **Unsubscribe** page is displayed.

**Step 6** View the unsubscribe details and select the reason for the unsubscription.

**Step 7** Select 

.

**Step 8** Click **Unsubscribe**.

**----End**

# 4.2 Managing FC Switches

## 4.2.1 Viewing FC Switches

FC switches are required for applying for DESS devices of the common I/O (low latency), high I/O (low latency), or ultra-high I/O (low latency) types. An FC

switch is a high-speed network transfer device that uses optical fibers as the media. It features high-speed transfer and strong anti-interference capability. This section introduces how to view basic information about an FC switch.

## Prerequisites

The DESS device is of the common I/O (low latency), high I/O (low latency), or ultra-high I/O (low latency) type.

## Context

You can query FC switches by status:

- **Available**

  The FC switch is successfully applied for and can be used.
- **Deploying**

  The FC switch is being deployed.
- **Expanding**

  The FC switch is being expanded.
- **Expired**

  The FC switch has expired. The FC switch in the **Expired** state can be used normally. You can renew the switch.
- **Frozen**

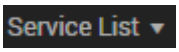
  If an expired FC switch is not renewed, it enters the **Frozen** state. A frozen FC switch cannot be used. You can use it only after renewal.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

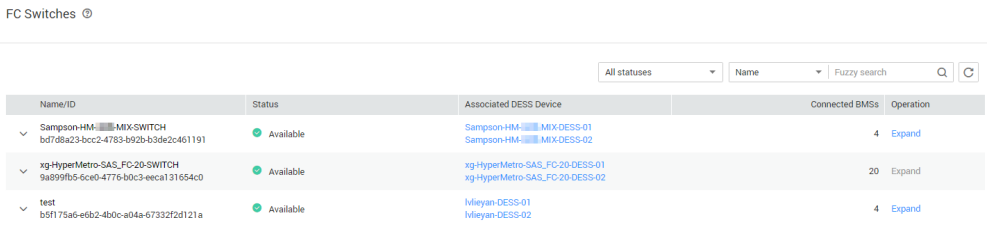
**Step 2** Click 

and select the wanted region.

**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **FC Switches** to go to the FC switch list page.




**Step 5** Click  next to the FC switch name to expand its details. **Table 4-4** describes the parameters.

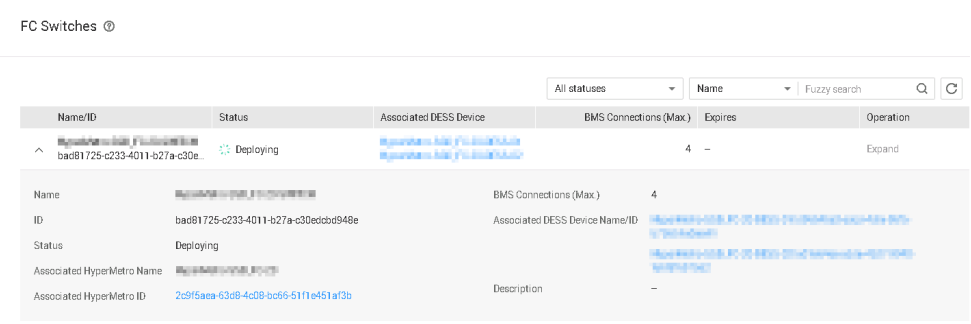



**Table 4-4** Parameter description

| Parameter | Description |
| --- | --- |
| Name | FC switch name |
| ID | FC switch ID |
| Status | Status of the FC switch, which can be:<br>• Available<br>The FC switch is successfully applied for and can be used.<br>• Deploying<br>The FC switch is being deployed.<br>• Expanding<br>The FC switch is being expanded.<br>• Expired<br>The FC switch has expired. The FC switch in the **Expired** state can be used normally. You can renew the switch.<br>• Frozen<br>If an expired FC switch is not renewed, it enters the **Frozen** state. A frozen FC switch cannot be used. Users can use it only after renewing it. |
| Connected BMSs (Max.) | Maximum number of BMSs that can be connected to the FC switch |
| Associated HyperMetro Name | HyperMetro Name associated with the FC switches. This parameter is available only when FC switches are associated with HyperMetro. |
| Associated HyperMetro ID | HyperMetro ID associated with the FC switches. This parameter is available only when FC switches are associated with HyperMetro. |
| Associated DESS Device Name | Name of the DESS device associated with the FC switches If the DESS device associated with the FC switch is enabled with HyperMetro, this parameter is displayed as **Associated DESS Device Name/ID**. |

| Parameter | Description |
| --- | --- |
| Associated DESS Device ID | ID of the DESS device associated with the FC switch If the DESS device associated with the FC switch is enabled with HyperMetro, this parameter is displayed as **Associated DESS Device Name/ID**. |
| Description | Description of the FC switch |

**----End**

## 4.2.2 Modifying an FC Switch

This section introduces how to modify the name and description of an FC switch.

### Prerequisites

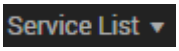
The FC switch is in the **Available**, **Expired**, or **Expanding** state.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

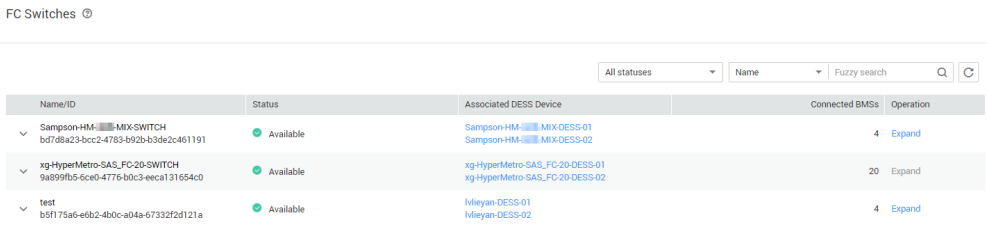
**Step 2** Click 

and select the wanted region.

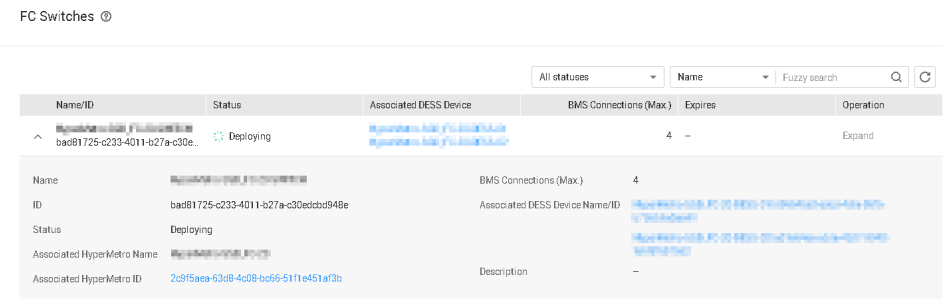
**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **FC Switches** to go to the FC switch list page.




**Step 5** Click  next to the FC switch name to expand its details.



**Step 6** Click next to the name or description.

**Step 7** Enter the new name or description.

Enter a maximum of 64 halfwidth characters, chosen from letters, digits, underscores (_), and hyphens (-). The value must start with a letter.

The description can contain a maximum of 127 characters.

**Step 8** Click to save the modification.

**----End**

## 4.2.3 Expanding FC Switches

If the number of your BMS connections of the switch is insufficient, you can add new ones.

### Prerequisites

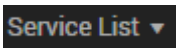
- The FC switch is in the **Available** state.
- The number of applied BMS connections of the FC switch does not reach the maximum.
  - On a DESS device with HyperMetro enabled, the maximum number is 20.
  - On a DESS device with HyperMetro disabled, the maximum number is 22.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

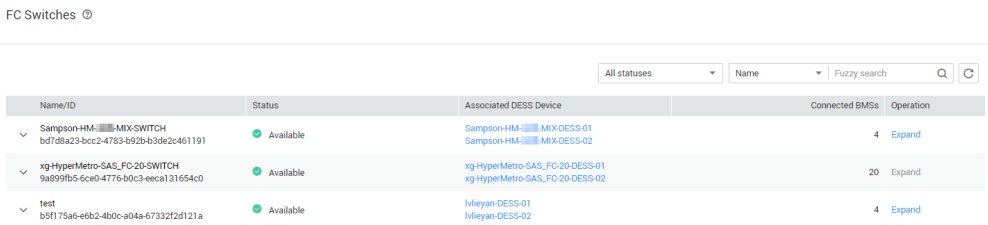
**Step 2** Click 

and select the wanted region.

**Step 3** Click 

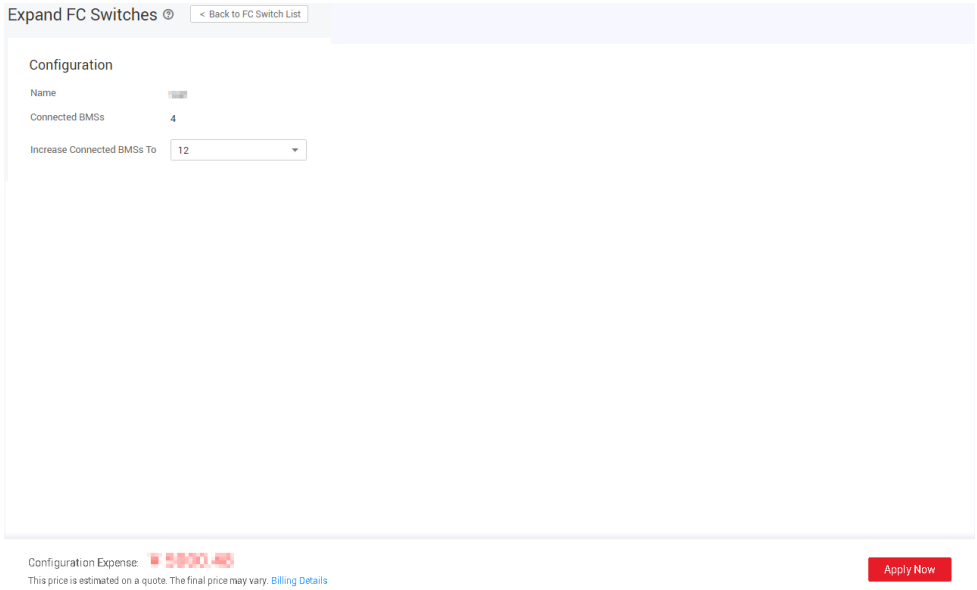
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **FC Switches** to go to the FC switch list page.




**Step 5** In the row of the desired FC switch, click **Expand Capacity**.

The **Expand FC Switch** page is displayed.




**Step 6** Select BMSs allowed to be connected after the capacity expansion.

**Step 7** Click **Apply Now**.

**Step 8** Confirm the order information and click **Submit**.

**----End**

## Follow-Up Procedure

After submitting an order, in the upper right corner on the DESS home page, choose **Fees** > **My Orders** and click **Details** to view the order details.

For details about the status of the FC switch expansion order, see **Table 4-5**.

**Table 4-5** Status description of the FC switch expansion order

| Status | Description |
| --- | --- |
| Pending Approval | After you submit an application for expanding the capacity of an FC switch expansion order, the order is in the **Pending Approval**. |
| Pending | The system administrator approves the order within three days. After the approval, the order status changes to **Pending**. |
| Processing | You can click **Pay** to pay for the order. After the payment, the order status changes to **Processing**. |
| Completed | The O&M personnel, after being notified, expands the capacity of the FC switch. When the order status changes to **Completed**, the capacity is successfully expanded. |

# 4.3 Managing HyperMetro Resources

## 4.3.1 Viewing HyperMetro Resources

HyperMetro is a storage value-added service. It enables data sets of two storage systems to provide storage services as one dataset, achieving load balancing and failover without interruption. If you enable **HyperMetro** when you subscribe to DESS, a HyperMetro resource will be created after the deployment is complete. A HyperMetro resource is composed of two associated DESS devices. This section introduces how to view basic information about a HyperMetro resource.

### Prerequisites

A HyperMetro resource exists.

### Context

You can query HyperMetro resources by status:

- **Available**

  The HyperMetro resource is successfully applied for and can be used.
- **Deploying**

  The HyperMetro resource is being deployed.
- **Expired**

  The HyperMetro resource has expired. The HyperMetro resource in the **Expired** state can be used normally. You can renew the resource.
- **Frozen**

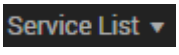
  If the expired HyperMetro resource is not renewed, it enters the **Frozen** state. The frozen HyperMetro resource cannot be used. You can use it only after renewal.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

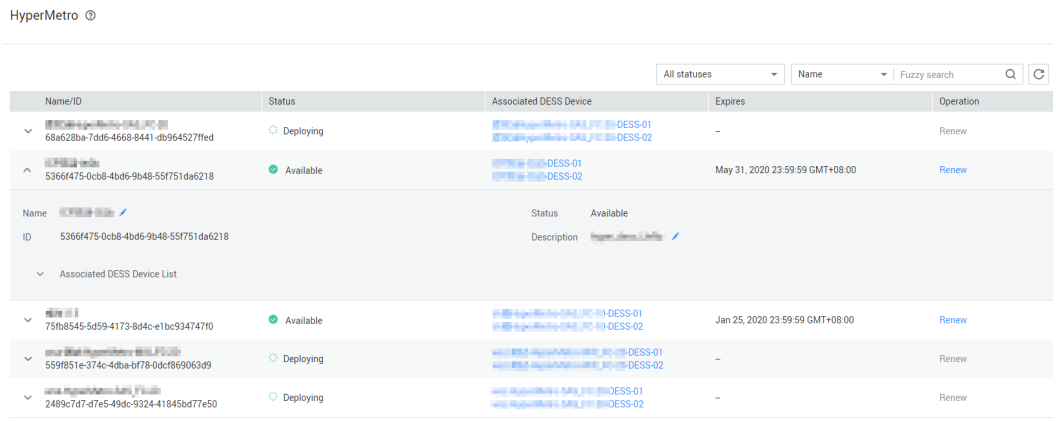
**Step 2** Click 

and select the wanted region.

**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.




**Step 5** Click ⌄ next to the HyperMetro resource name to expand its details. **Table 4-6** describes the parameters.

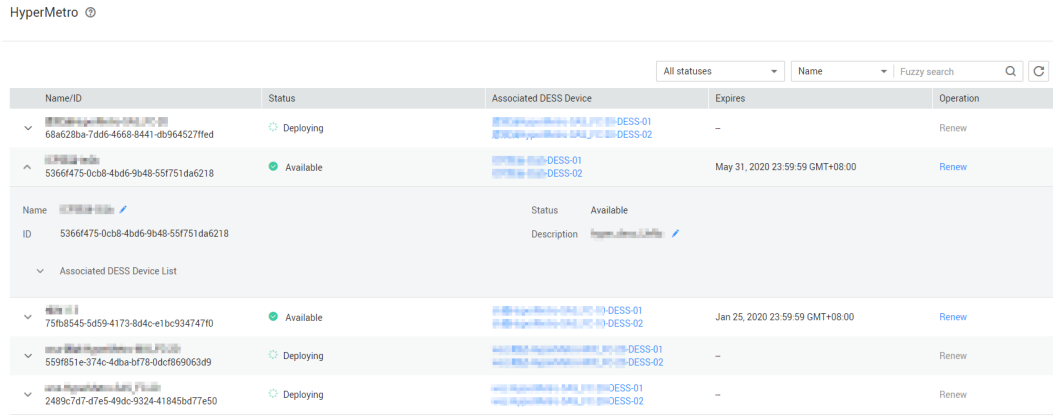



**Table 4-6** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Name of the HyperMetro resource. |
| ID | ID of the HyperMetro resource. |

| Parameter | Description |
| --- | --- |
| Status | Status of the HyperMetro resource, which can be:<br>• Available<br>The HyperMetro resource is successfully applied for and can be used.<br>• Deploying<br>The HyperMetro resource is being deployed.<br>• Expired<br>The HyperMetro resource has expired. The HyperMetro resource in the **Expired** state can be used normally. You can renew the resource.<br>• Frozen<br>If the expired HyperMetro resource is not renewed, it enters the **Frozen** state. The frozen HyperMetro resource cannot be used. You can use it only after renewal. |
| Description | Description of the HyperMetro resource. |
| Associated DESS Device | Information about the two associated DESS devices. |

**----End**

## 4.3.2 Modifying a HyperMetro Resource

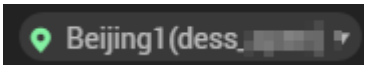
This section introduces how to modify the name and description of a HyperMetro resource.

### Prerequisites

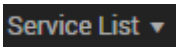
The HyperMetro resource is in the **Available** or **Expired** state.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

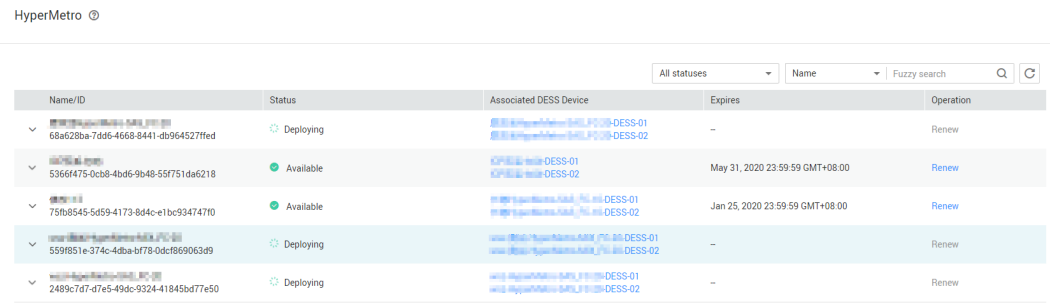
**Step 2** Click 

and select the wanted region.

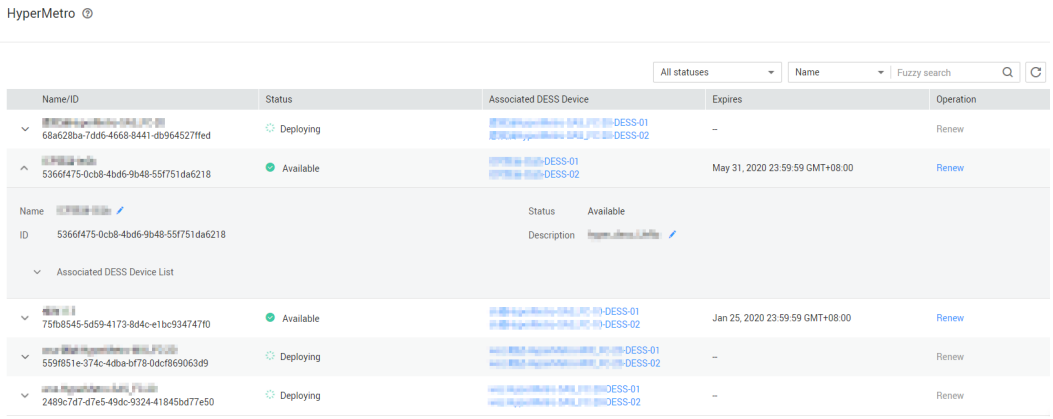
**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.




**Step 5** Click next to the HyperMetro resource name to expand its details.




**Step 6** Click next to the name or description.

**Step 7** Enter the new name or description.

- Enter a maximum of 64 halfwidth characters, chosen from letters, digits, underscores (_), and hyphens (-). The value must start with a letter.
- The description can contain a maximum of 127 characters.

**Step 8** Click to save the modification.

**----End**

## 4.3.3 Expanding HyperMetro Resource Capacity

When the capacity of the associated DESS devices in a HyperMetro resource is insufficient, you can expand it.

### Prerequisites

The associated DESS devices in the HyperMetro resource are available and both their available capacities do not reach 100 TB.

### Precautions

For details about the DESS device capacity expansion rules associated with HyperMetro, see the following table.

| Type | Description |
| --- | --- |
| Common I/O, common I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• The initial capacity of a DESS device is as follows:<br>– 10 TB: Capacity expansion can be performed once after capacity expansion to 20 TB. The capacity expansion specification is 20 TB.<br>– Other capacity: Only one capacity expansion is supported, and the capacity expansion specification is 20 TB. |
| High I/O, high I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• Only one capacity expansion is supported, and the capacity expansion specification is 20 TB. |
| Ultra-high I/O, ultra-high I/O (low latency) | • The capacity of a DESS device can be expanded only when the device is in the **Available** state and the device capacity you have applied for does not reach the maximum capacity - 100 TB.<br>• The initial capacity of a DESS device is as follows:<br>– 10 TB: Capacity expansion can be performed multiple times after capacity expansion to 20 TB. The subsequent capacity expansion specifications are 20 TB, 40 TB, 60 TB, and 80 TB.<br>– Other capacity: Capacity expansion can be performed for multiple times. The capacity expansion specifications are 20 TB, 40 TB, 60 TB, and 80 TB. |

**NOTE**

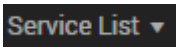
If both associated DESS devices require larger capacities, you need to manually perform capacity expansion on them one by one.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

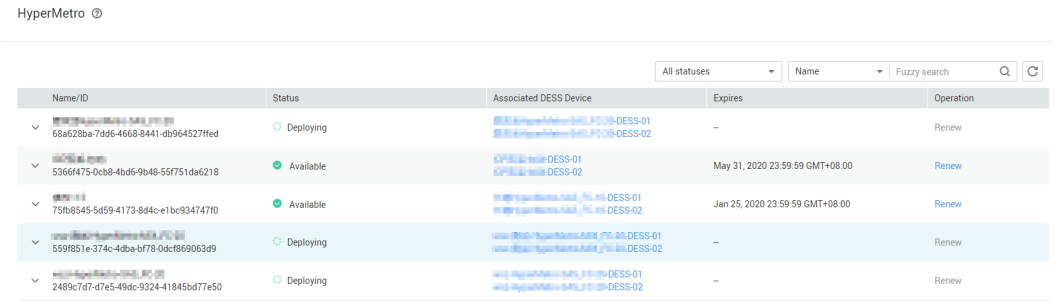
**Step 2** Click 

and select the wanted region.

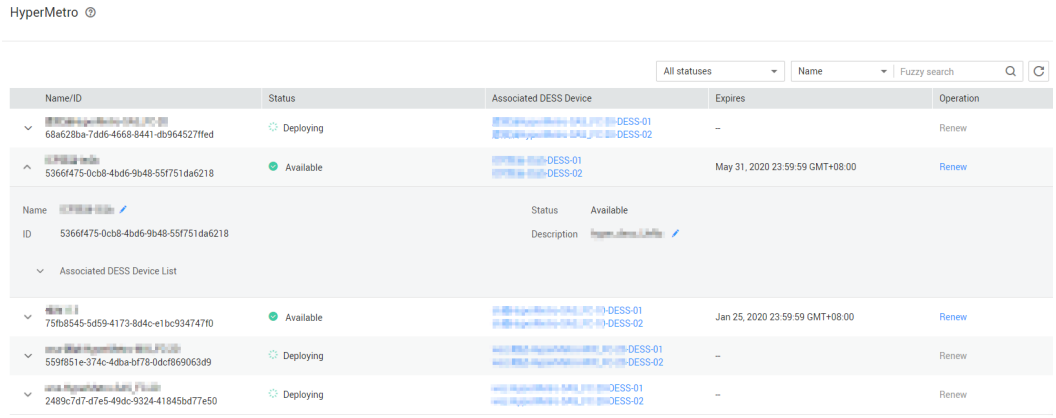
**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

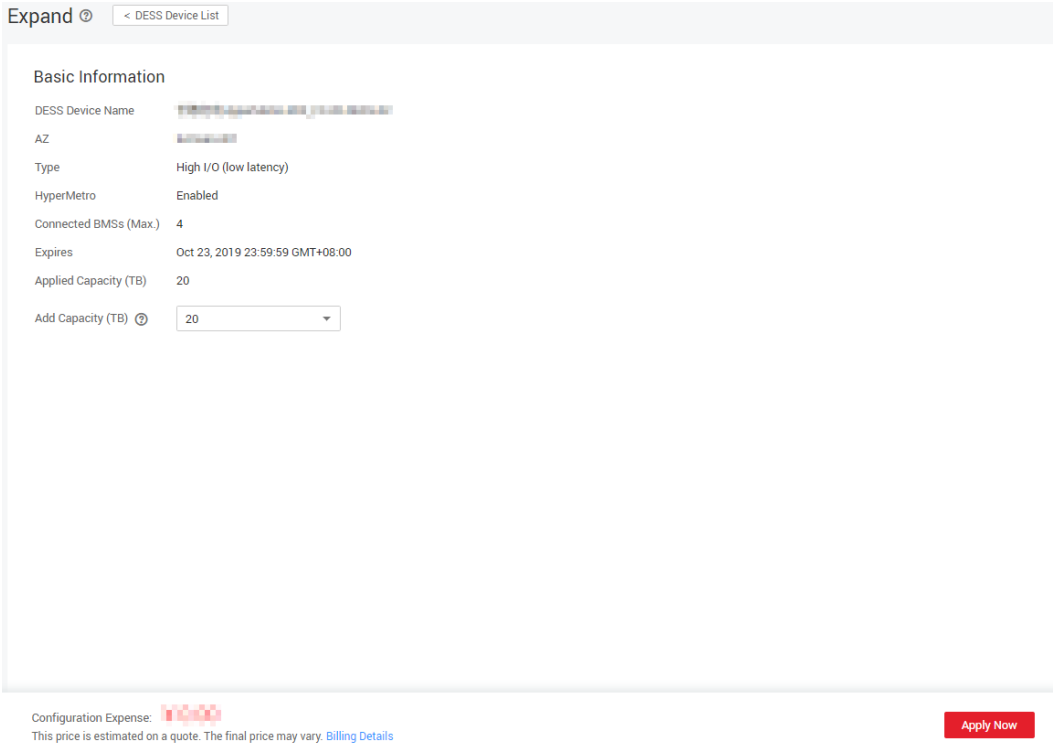
**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.




**Step 5** Click ⌄ next to the HyperMetro resource name to expand its details.




**Step 6** Click **Expand** on the row of the associated storage device. The **Expand** page is displayed.



**Step 7** Select the capacity to be added.

NOTE

The post-expansion capacity of the DESS device can be 100 TB at the maximum.

**Step 8** Click **Apply Now**.

**Step 9** Confirm the order information and click **Submit**.

**----End**

## Follow-Up Procedure

After submitting an order, in the upper right corner on the DESS home page, choose **Fees** > **My Orders** and click **Details** to view the order details.

For details about the HyperMetro order status, see **Table 4-7**.

**Table 4-7** HyperMetro order status description

| HyperMetro Order Status | Description |
| --- | --- |
| Pending Approval | Your order is in the **Pending Approval** state as soon as you submit the order. |
| Pending | The system administrator approves the order within three days. After the approval, the order status changes to **Pending**. |
| Processing | You can click **Pay** to pay for the order. After the payment, the order status changes to **Processing**. |
| Completed | The O&M personnel, after being notified, expands the capacity of the HyperMetro resource. When the order status changes to **Completed**, the capacity is successfully expanded. |

# 4.3.4 Renewing a HyperMetro Resource

If your HyperMetro resource has expired and you still need it, you can renew it. The renewal of a HyperMetro resource includes the renewal of the two associated DESS devices and the FC switches (for DESS devices of the low-latency type).

## Prerequisites

The HyperMetro resource is in the **Available**, **Expired**, or **Frozen** state.

## Context

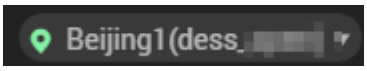
HyperMetro resource can be renewed directly. It also can be renewed through associated DESS device. When either DESS device is renewed, the entire HyperMetro resource will be renewed. A HyperMetro resource contains two

associated DESS devices and an FC switch. (for DESS devices of the low-latency type)

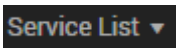
This section introduces how to renew the HyperMetro resource directly. Refer to **4.1.4 Renewing a DESS Device** to learn how to renew a DESS device.

## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

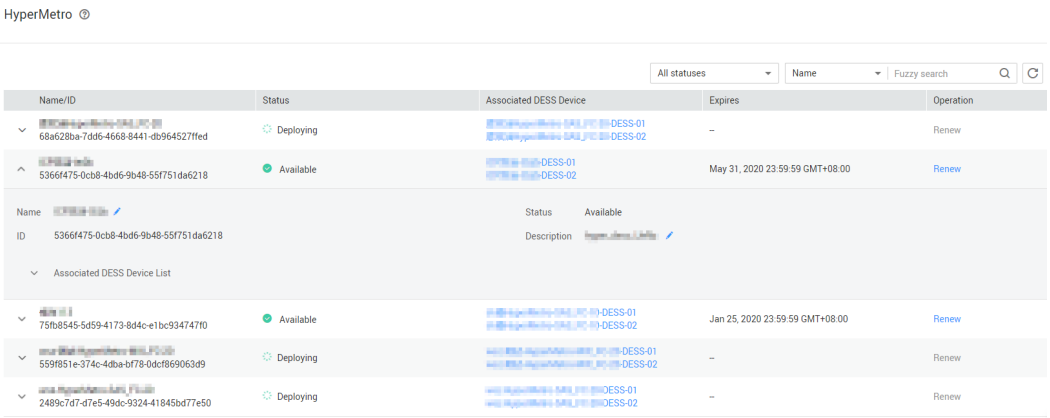
**Step 2** Click 

and select the wanted region.

**Step 3** Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

**Step 4** On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.




**Step 5** In the row of the HyperMetro resource, click **Renew**.

The **Renewals** page is displayed.

**Step 6** Click **Renew** in the row of the order you want to renew.

The **Renew** page is displayed.

**Step 7** Confirm the renewal information and click **Pay**.

The **Pay** page is displayed.

**Step 8** Select a payment method and click **Confirm**.

**----End**

# 5 DESS Management



## 5.1 Managing Disks

### 5.1.1 Querying a Disk

Disks are used to provide storage space for BMSs. You can create disks as required and attach them to BMSs. The disks are scalable. This section introduces how to query disk information.

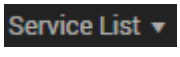
#### Procedure

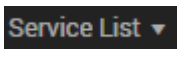
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

By default, HyperMetro resources in all statuses are listed.

c. Use any of the following methods to display the disk list:

- Method 1

1) Click  next to the resource name to view the HyperMetro resource details.

2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the HyperMetro resource.

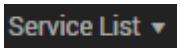
- Method 2

1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.

2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the DESS device.

- Method 3: Via the disk list of the DESS device

a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set the search criteria to look for the desired disk.

**Step 5** Click the name of the wanted disk.

The disk details page is displayed.

**Step 6** View the disks created on the DESS device.

**Table 5-1** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Disk name |
| ID | Disk ID |
| HyperMetro Role | Indicates whether the disk is a preferred or non-preferred disk. This parameter is displayed only when the disk is a HyperMetro disk.<br>• **Preferred**: Allows users to mount, create snapshots, downgrade to common disks, and edit operations.<br>• **Non-preferred**: The system automatically performs operations according to the corresponding preferred disk. Users can edit and create snapshots for non-preferred disks, but cannot attach, delete, or degrade them. |

| Parameter | Description |
| --- | --- |
| Remote Disk ID | ID of the peer disk in the HyperMetro disk pair. This parameter is displayed only when the disk is a HyperMetro disk. |
| WWN | Disk WWN, the unique identifier of a SCSI disk |
| Status | Disk status.<br>• Available<br>The disk has been created and can be properly used.<br>• In use<br>The disk is in use.<br>• Error<br>This disk is incorrectly read. Contact the system administrator for help.<br>• Expansion failed<br>Disk capacity expansion failed. Contact the system administrator for help.<br>• Deletion failed<br>Disk deletion failed. Contact the system administrator for help.<br>• Creating<br>The disk is being created.<br>• Deleting<br>The disk is being deleted.<br>• Attaching<br>This disk is being attached.<br>• Detaching<br>This disk is being detached.<br>• Expanding<br>The disk is being expanded.<br>• Rollback failed<br>Disk rollback using a snapshot fails. |
| AZ | Name of the AZ to which the disk-residing DESS device belongs |
| Type | Type of the DESS device where the disk is located |
| Storage Name/ID | Name and ID of the residing DESS device |
| Capacity (GB) | Disk capacity, which cannot be larger than the available capacity of the DESS device<br>**NOTE**<br>The value ranges from 10 GB to 64 TB. |
| Created | Time when the disk was created |

| Parameter | Description |
| --- | --- |
| Source Snapshot ID | ID of the snapshot that is used to create the disk<br>**NOTE**<br>• This parameter is available when you create the disk using a snapshot. Otherwise the value is --.<br>• You can click the source snapshot ID to go to the **Snapshots** tab page of the DESS device to view the snapshot information. |

**Step 7** Click **Mounting Point** to view the list of BMSs to which the disk can be attached.

The BMS list provides the name, status, flavor, image, private IP address, AZ, and available operations of each member BMS.

NOTE

- Click **Attach** to attach the current disk to specified BMSs. Non-preferred disks cannot be attached separately.
- Click **Detach** to detach a disk from specified BMSs. Non-preferred disks cannot be detached separately.

**Step 8** Click the **Snapshots** tab to view information about snapshots of the disk.

Information about the snapshot includes the snapshot name or ID, status, creation time, and available operations.

NOTE

- If the disk is a linked clone disk, the **Snapshot** tab page is not displayed.
- Click **Create Snapshot** to create a snapshot for the disk.
- Click **Delete** to delete an existing snapshot.

**----End**

## 5.1.2 Modifying a Disk Name

After creating a disk on your DESS device, you can modify its name.

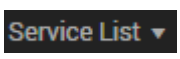
### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.

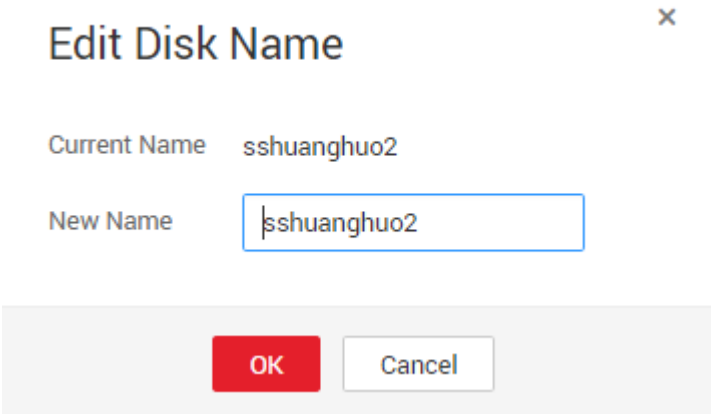
- Method 2: Via the disk-residing HyperMetro resource
  a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
     - Method 1
       1) Click next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the DESS device.
- Method 3: Via the disk list of the DESS device
  a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set the search criteria to look for the desired disk.

**Step 5** Edit the disk name using either of the following methods:

- Method 1
  a. Click the name of the disk to be modified.
     The disk details page is displayed.
  b. Click next to the disk name.
  c. Enter a new name.
     A disk name cannot start or end with a space and can contain a maximum of 63 characters.
  d. Click to save the modification.
- Method 2
  a. Click **More** > **Edit** in the operation column of the disk.
     The **Edit Disk Name** dialog box is displayed.




b. Enter a new name.

   A disk name cannot start or end with a space and can contain a maximum of 63 characters.

c. Click **OK**.

**----End**

## 5.1.3 Expanding Disk Capacity

If the capacity of a created disk is insufficient, you can expand its capacity. HyperMetro disks do not support capacity expansion.

### Prerequisites

The disk-residing DESS device has more than 1 GB available capacity. The disk is in the **Available** state (not attached to any BMSs) and its current capacity is smaller than 64 TB.

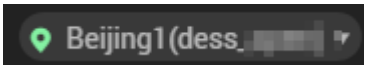
### Context

Pay attention to the following restrictions when expanding disks:

- The capacity expansion can be performed for data disks only. Currently, disks created on DESS devices are all data disks and system disk creation is not supported.
- Disk capacity can be expanded for multiple times as needed.
- Disks with snapshots created do not support capacity expansion.
- HyperMetro disks do not support capacity expansion.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

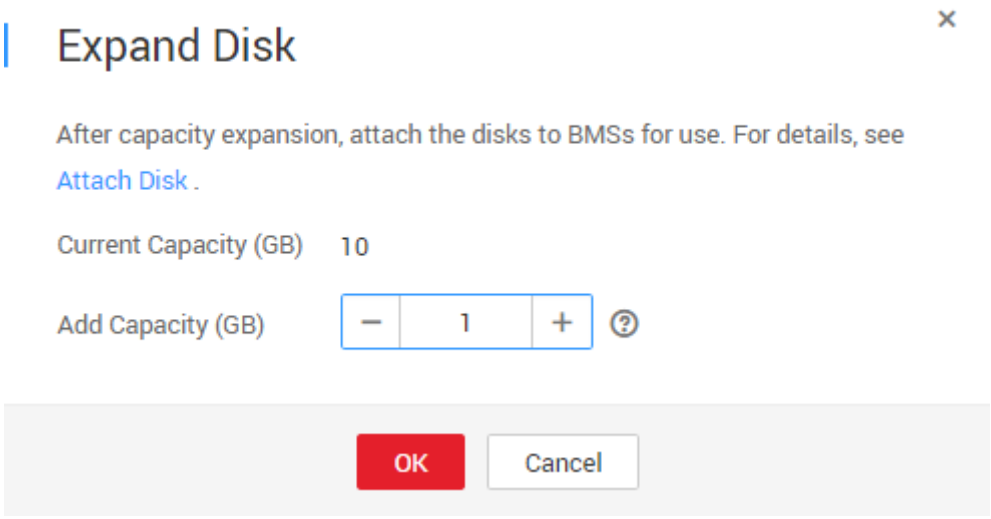
- Method 1: Via the disk-residing DESS device
  a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
     - Method 1
       1) Click next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
          The disk tab page lists the disks of the DESS device.
- Method 3: Via the disk list of the DESS device
  a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set the search criteria to look for the desired disk.

**Step 5** Expand a disk using either of the following methods:

- Method 1: In the row of the disk, click **Expand Capacity**. The **Expand Disk** dialog box is displayed.
- Method 2: Click the name of the desired disk to go to the details page. Click **Expand** on the upper right corner to open the dialog box for capacity expansion.




**Step 6** Enter the capacity to be added and click **OK**.

NOTE

The expanded capacity cannot be larger than the available capacity of your DESS device.

**Step 7** On the disk list page, view the disk capacity.

If the disk capacity has increased, the expansion is successful.

NOTE

After a disk is expanded successfully, the available capacity of its residing DESS device will not immediately decrease but in approximately 3 minutes.

**----End**

## Follow-Up Procedure

After expanding the disk capacity, you can attach it to a BMS. For details, see **3.5 Attaching a Disk**

After the disk is attached successfully, you can expand the capacity of the disk in the BMS OS.

- For Windows, see **7.4 Performing Post-Expansion Operations for a Windows Disk**.
- For Linux, see **7.5 Performing Post-Expansion Operations for a Linux Disk (fdisk)**, **7.6 Performing Post-Expansion Operations for a Linux Disk (Using Parted)**, and **7.7 Performing Post-Expansion Operations for a SLES Disk (fdisk)**.

# 5.1.4 Upgrading a Common Disk to a HyperMetro Disk

A common disk created on a HyperMetro DESS device can be upgraded to a HyperMetro disk. A HyperMetro disk is a disk that is enabled with the HyperMetro feature.

## Prerequisites

The HyperMetro DESS device contains a common disk that is in the **Available** state.

## Context

- Common disks and HyperMetro disks can be created on HyperMetro DESS devices. A HyperMetro disk pair consists of a preferred disk and a non-preferred disk, which are located on the two associated DESS devices in a HyperMetro resource.
- A common disk can be upgraded to a HyperMetro disk. After the disk is upgraded to a HyperMetro disk, the disk becomes a preferred disk. The system automatically generates a non-preferred disk.

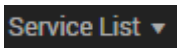
## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

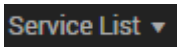
**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing HyperMetro DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

  NOTE

  The device is the HyperMetro DESS device. If HyperMetro is enabled, it is a HyperMetro DESS device array.

- Method 2: Via the disk-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

  By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
    - Method 1
      1) Click  to view the HyperMetro resource details.
      2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

      The disk tab page lists the disks of the existing disks.
    - Method 2

1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

   The disk tab page lists the disks of the existing disks.

- Method 3: From the disk list of all DESS devices

  a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

  b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set search parameters and search for common disks on the HyperMetro DESS device.

NOTE

The disk with the HyperMetro role column **--** is a common disk. Disks whose HyperMetro role is **Preferred** or **Non-preferred** are HyperMetro disks.

**Step 5** Choose **More** > **Upgrade to HyperMetro Disk** in the row of the wanted disk.

The confirmation dialog box is displayed.

**Step 6** Click **OK**.

**----End**

## 5.1.5 Degrading a HyperMetro Disk to a Common Disk

A common disk created on a HyperMetro DESS device can be degraded to a HyperMetro disk. A HyperMetro disk is a disk that is enabled with the HyperMetro feature. A HyperMetro disk pair consists of a preferred disk and a non-preferred disk. After a preferred disk is degraded to a common disk, its corresponding non-preferred disk will be deleted automatically.

### Prerequisites

- The HyperMetro DESS device contains a HyperMetro disk that is in the **Available** state.
- The disk no longer requires the HyperMetro feature.

### Context

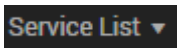
- After a preferred disk is degraded to a common disk, its corresponding non-preferred disk will be deleted automatically.
- Non-preferred disks do not support degrade.

### Procedure

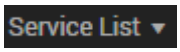
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

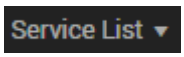
**Step 2** Click  and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing HyperMetro DESS device
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

  NOTE

  The device is the HyperMetro DESS device. If HyperMetro is enabled, it is a HyperMetro DESS device array.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

  By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the disk list:
     - Method 1
       1) Click  to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
- Method 3: From the disk list of all DESS devices
  a. Click  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set search parameters and search for the preferred HyperMetro disks on the HyperMetro DESS device.

NOTE

Disks whose HyperMetro role is **Preferred** can be degraded to common disks. Non-preferred disks do not support degrade.

**Step 5** Choose **More** > **Degrade to Common Disk**.

The **Confirm** dialog box is displayed.

**Step 6** Click **OK**. The HyperMetro disk is degraded to a common disk.

**----End**

## 5.1.6 Deleting a Disk

If a disk is no longer needed, you can delete it.

### Prerequisites

A disk can be deleted only when it is in the **Available**, **Expansion failed**, **Rollback failed**, or **Error** and the snapshots of the disk does not have linked clone volumes.

### Context

- Common disks support direct deletion while HyperMetro disks do not.
- Preferred disks must be degraded to common disks before being deleted. Non-preferred disks will be automatically deleted once their corresponding preferred disks are degraded.
- Non-preferred disks do not support manual deletion.

### Precautions

After a disk is deleted, data on the disk will be cleared. Ensure that the to-be-deleted disk is no longer needed.

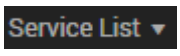
### Procedure

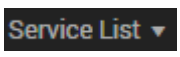
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.

c. Use any of the following methods to display the disk list:

- Method 1

  1) Click  next to the resource name to view the HyperMetro resource details.
  2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

     The disk tab page lists the disks of the HyperMetro resource.

- Method 2

  1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
  2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

     The disk tab page lists the disks of the DESS device.

- Method 3: Via the disk list of the DESS device

  a. Click 
  
  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Disks**. The disk list page is displayed.

**Step 4** Set the search criteria to look for the desired disk.

**Step 5** Check the disk type:

- If it is a non-preferred disk, perform **Step 6** and no further operation is required.
- If it is a preferred disk, perform **Step 6**, **Step 7**, and **Step 8**.
- If it is a common disk, perform **Step 7** and **Step 8**.

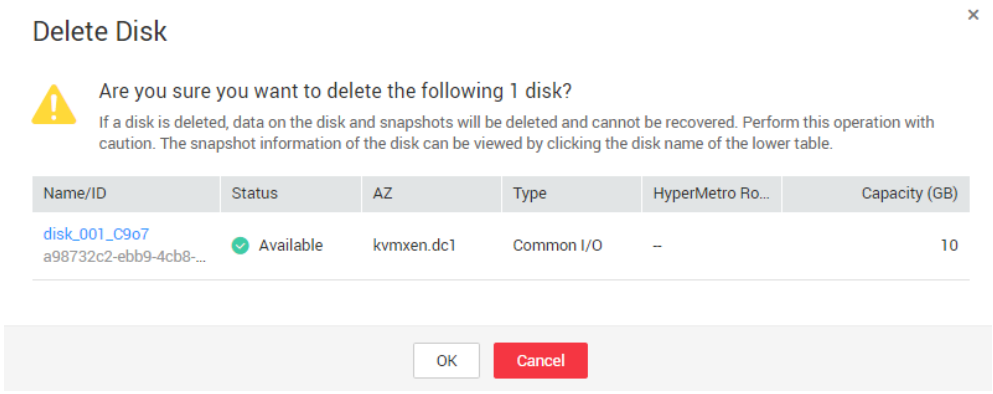
**Step 6** In the row of the disk, choose **More** > **Degrade to Common Disk**.

NOTE

- After a preferred disk is degraded to a common disk, its corresponding non-preferred disk will be deleted automatically.
- Deleting a disk will clear data on the disk. Exercise caution when performing this operation.

**Step 7** In the row of the disk you want to delete, choose **More** > **Delete**.

The **Delete Disk** dialog box is displayed.




**NOTICE**

Deleting a disk will clear data on the disk. Exercise caution when performing this operation.

**Step 8** Understand the risks and click **OK**.

A message is displayed indicating that the disk has been deleted successfully.

**----End**

## 5.1.7 Querying DESS Information on the Disk List Page

After creating a disk, you can view the DESS details on the disk list page.

### Prerequisites

You have created a disk. For details, see **3.2 Creating Disks**.

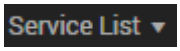
### Procedure

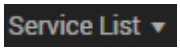
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the disk list:

- Method 1: Via the disk-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.
     The disk tab page lists the disks of the DESS device.
- Method 2: Via the disk-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

By default, HyperMetro resources in all statuses are listed.

c. Use any of the following methods to display the disk list:

- Method 1

1) Click  next to the resource name to view the HyperMetro resource details.

2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the HyperMetro resource.

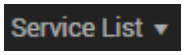
- Method 2

1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.

2) In the row of the desired DESS device, click the number in the **Number of Disks** column to go to the **Disks** tab page.

The disk tab page lists the disks of the DESS device.

- Method 3: Via the disk list of the DESS device

a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

b. On the navigation pane on the left, choose **Disks**.

**Step 4** Set the search criteria to look for the desired disk.

**Step 5** Click the storage name in the row where the desired disk resides.

The storage list page is displayed.

**Step 6** Click  next to the storage name to expand its details. **Table 4-1** describes the parameters.

**----End**

# 5.2 Managing Snapshots

## 5.2.1 Creating a Snapshot

After creating a disk on your DESS device, you can create a snapshot of the disk at a specific point in time. Snapshots are used to quickly back up and restore data on source disks, providing continuous protection on your service data.

### Context

The snapshot function helps you to save your disk data at specific points in time in a quick manner. You can use this function to back up your critical service data periodically. After the snapshot service for volumes is configured, DESS can use the

snapshot capabilities of the storage device to create snapshots on the storage device in an instantaneous manner, reducing the backup window to zero and meeting enterprise's requirements on service continuity and data reliability. This section describes how to create, query, and delete snapshots for disks on a DESS device, and how to use snapshots to roll back data.

## Prerequisites

- You have created a disk. For details, see **3.2 Creating Disks**.
- A maximum of 512 snapshots can be created for a DESS device.
- The disk is in **Available** or **In use** state.
- The available capacity of the DESS device is larger than the capacity of the current disk.
- The available capacity of the DESS device is larger than 10 GB.

## Precautions

You can create a maximum of 512 snapshots for a DESS device and up to 7 snapshots for a disk.

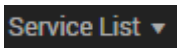
## Procedure

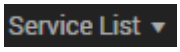
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.

The snapshot tab page lists the snapshots of the HyperMetro resource.

- Method 2

  1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
  2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.

     The snapshot tab page lists the snapshots of the DESS device.

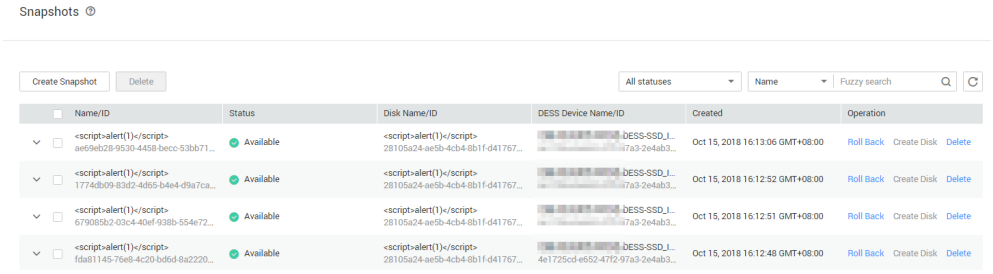
- Method 3: Via the snapshot list of all DESS devices

  a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

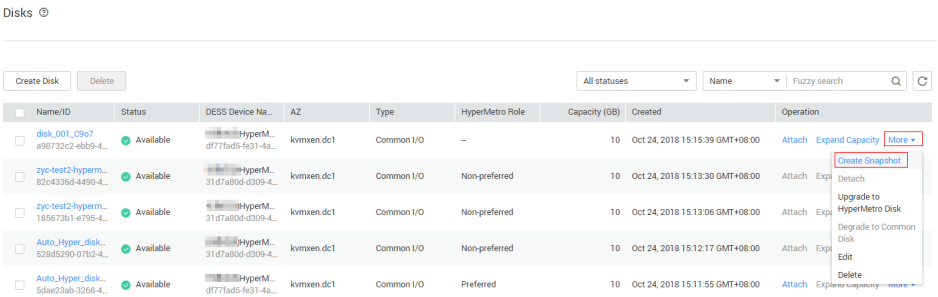
  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Create a snapshot using any of the following methods:

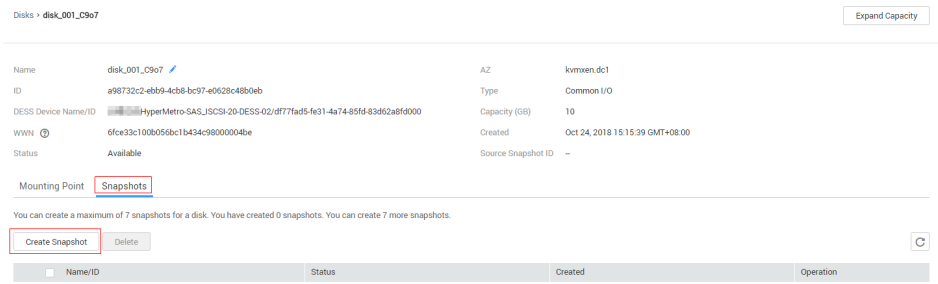
- Method 1: Click **Create Snapshot** on the upper left corner.




- Method 2: On the **Disks** tab page, choose **More** > **Create Snapshot** in the row of the desired disk.




- Method 3: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then click **Create Snapshot**.



**Step 5** Set parameters for the snapshot.

**Table 5-2** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Snapshot name<br>The name cannot start with **autobk_snapshot_** and can contain a maximum of 63 characters without any spaces. |
| DESS | DESS device on which the snapshot is created. This parameter is available only when you use method 1 for snapshot creation.<br>Click **Specify** to select a DESS device for creating the snapshot. |
| Disk | Disk used to create the snapshot. This parameter is available only when you use method 1 for snapshot creation.<br>Click **Specify** to select a disk for creating the snapshot. |
| Description | Snapshot description<br>The description contains a maximum of 63 characters. |

**Step 6** Click **OK**.

**----End**

## 5.2.2 Creating a Consistency Snapshot

After creating disks on a DESS device, you can create snapshots of multiple disks at the same point in time to ensure time consistency of all snapshots created at a time. Snapshots are used to quickly back up and restore data on source disks, providing continuous protection on your service data.

### Context

The consistency snapshot function helps you quickly save the data on multiple disks at the same point in time. You can use this function to back up your critical service data periodically. After the snapshot service for volumes is configured, DESS can use the snapshot capabilities of the storage device to create snapshots on the storage device in an instantaneous manner, reducing the backup window to zero and meeting enterprise's requirements on service continuity and data reliability.

### Prerequisites

- You have created a disk. For details, see **3.2 Creating Disks**.
- A maximum of 512 snapshots can be created for a DESS device.
- A consistency snapshot can be created only for disks on the same DESS device.
- The available capacity of the DESS device is larger than the total capacity of the current disks.
- The available capacity of the DESS device is larger than 10 GB.

- The disks are in the **In use** state.

## Precautions

- You can create a maximum of 512 snapshots for a DESS device and up to 7 snapshots for a disk.
- You can select a maximum of 40 disks to create a consistency snapshot at a time.

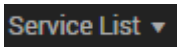
## Procedure

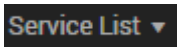
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

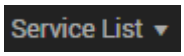
**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.

- Method 3: Via the snapshot list of all DESS devices

  a. Click 
  
  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** On the snapshot list page, click **Create Consistency Snapshot** in the upper left corner.

**Step 5** In the **Select Disks** area, select the disks for which you want to create a consistency snapshot. The selected disks are automatically generated in the right pane.

**Step 6** Set parameters for the consistency snapshot.

**Table 5-3** Parameters for the consistency snapshot

| Parameter | Description |
| --- | --- |
| Consistency Snapshot Name | Name of the consistency snapshot.<br>The name cannot be or start with **autobk_snapshot_** and can contain a maximum of 63 characters without any spaces. |
| Description | Description of the consistency snapshot.<br>The description contains a maximum of 63 characters. |

**Step 7** Click **OK**.

**----End**

## 5.2.3 Querying a Snapshot

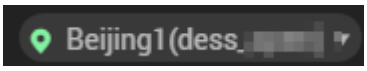
After creating a snapshot, you can view the details in the snapshot list.

### Prerequisites

You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device

a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.

The snapshot tab page lists the snapshots of the DESS device.

- Method 2: Via the snapshot-residing HyperMetro resource

a. Click Service List and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.

b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.

By default, HyperMetro resources in all statuses are listed.

c. Use any of the following methods to display the snapshot list:

- Method 1

1) Click next to the resource name to view the HyperMetro resource details.

2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.

The snapshot tab page lists the snapshots of the HyperMetro resource.

- Method 2

1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.

2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.

The snapshot tab page lists the snapshots of the DESS device.

- Method 3: Via the snapshot list of all DESS devices

a. Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

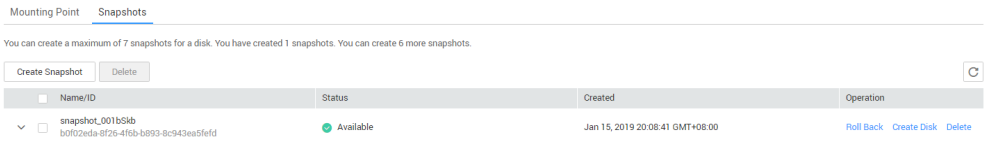
b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Search for a snapshot using either of the following methods:

- Method 1: On the **Snapshots** page, set search parameters to query the desired snapshot.


- Method 2: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then search for the wanted snapshot.




**Step 5** Click ⌄ next to the snapshot name to expand the snapshot information.

Table 5-4 describes the snapshot parameters.

**Table 5-4** Parameter description

| Parameter | Description |
| --- | --- |
| Name | Snapshot name |
| ID | Snapshot ID |
| Disk Name | Name of the disk used to create the snapshot |
| Disk ID | ID of the disk used to create the snapshot |
| Status | Snapshot status<br>Possible values are **Creating**, **Available**, **Error**, **Deleting**, **Deletion failed**, and **Rolling back**. |
| Used As | Properties of the disk used to create the snapshot. Currently, disks created on DESS devices are all data disks and system disk creation is not supported. |
| Capacity (GB) | Snapshot capacity |
| Encrypted | Indicates whether the snapshot is encrypted.<br>The value can be **Yes** or **No**. |
| AZ | Name of the AZ to which the snapshot-residing DESS device belongs |
| Description | Snapshot description |
| Created | Creation time of the snapshot |

**----End**

## 5.2.4 Modifying a Snapshot

After creating a snapshot, you can modify the name and description of the snapshot.

### Prerequisites

You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.

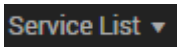
## Procedure

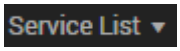
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

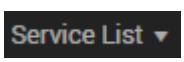
**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click 

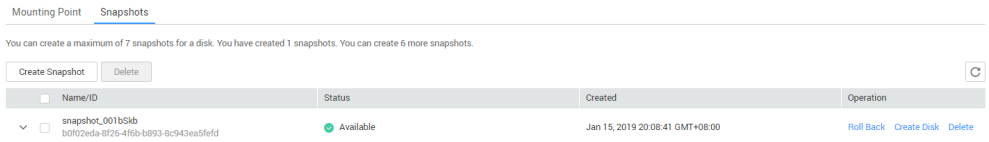
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.
- Method 3: Via the snapshot list of all DESS devices
  a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Search for a snapshot using either of the following methods:

- Method 1: On the **Snapshots** page, set search parameters to query the desired snapshot.


- Method 2: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then search for the wanted snapshot.




**Step 5** Click next to the snapshot name to expand the snapshot details.

**Step 6** Click next to the snapshot name or description to modify the information.

- The name cannot start with **autobk_snapshot_** and can contain a maximum of 63 characters without any spaces.
- The description can contain a maximum of 63 characters.

**Step 7** Click to save and complete modification.

**----End**

## 5.2.5 Using a Snapshot to Create a Disk

After creating a snapshot, you can create a disk based on the existing snapshot.

### Prerequisites

- You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.
- A snapshot can be used to create a disk only when:
- It is in the **Available** state.
- Its DESS device is in the **Available**, **Expired**, or **Expanding** state and its available capacity is larger than the snapshot size.
- Its DESS device has not more than 512 disks.

NOTE

New disks created using snapshots of HyperMetro disks (both preferred and non-preferred one) are common disks.

### Precautions

Ultra-high I/O and Ultra-high I/O (low latency) DESS devices do not support disk creation using snapshots.

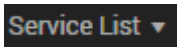
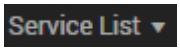
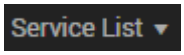
### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click  and select the wanted region.

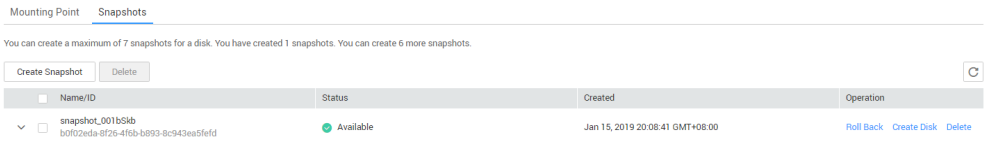
**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.
- Method 3: Via the snapshot list of all DESS devices
  a. Click  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Search for a snapshot using any of the following methods:

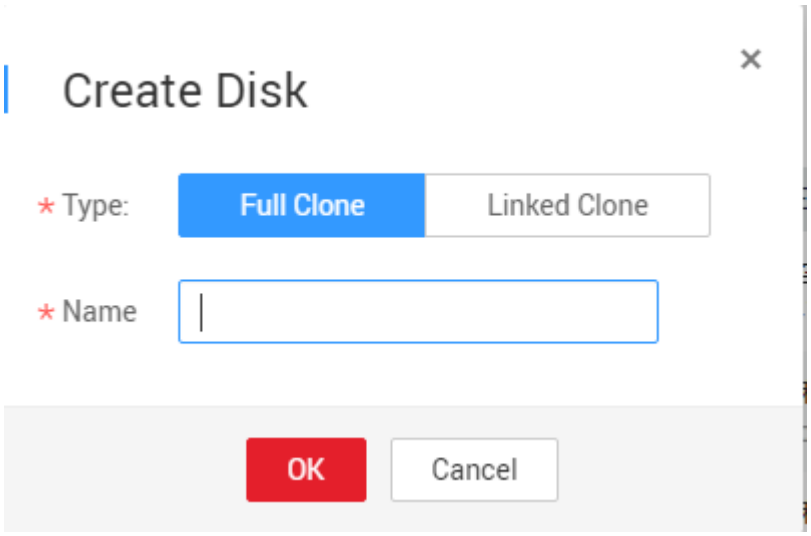
- Method 1: On the **Snapshots** page, set search parameters to query the desired snapshot.
- Method 2: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then search for the wanted snapshot.




**Step 5** In the row of the snapshot you want to use for disk creation, click **Create Disk**.

**Step 6** The **Create Disk** dialog box is displayed. Select **Full Clone** or **Linked Clone** and enter a disk name.




NOTE

A linked clone disk cannot be used to modify source data and to generate snapshots. Besides, it cannot be expanded, upgraded, or degraded. After been attached, it can be used to perform DR drills.

A full clone disk is a common disk.

Ultra-high I/O and ultra-high I/O (low latency) DESS devices do not support full clone disk creation using snapshots.

**Step 7** Click **OK**.

**----End**

## 5.2.6 Using a Snapshot to Roll Back a Disk

After a snapshot is created, you can use the snapshot to roll back the disk data. When a snapshot is used to roll back data, the data on the source disk can be quickly restored to the data at a certain point in time, reducing the lost data of the source disk.

### Prerequisites

- You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.
- The snapshot is in the **Available** state, and the disk is in the **Available**, or **Rollback failed**.

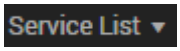
## Procedure

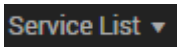
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

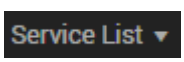
**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click 

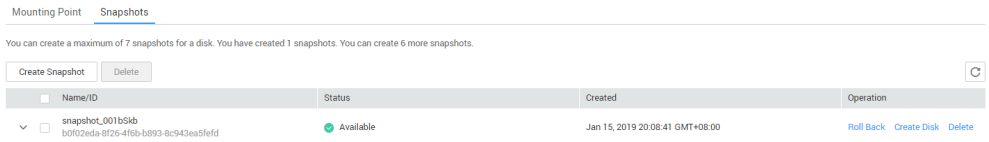
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.
- Method 3: Via the snapshot list of all DESS devices
  a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Search for a snapshot using either of the following methods:

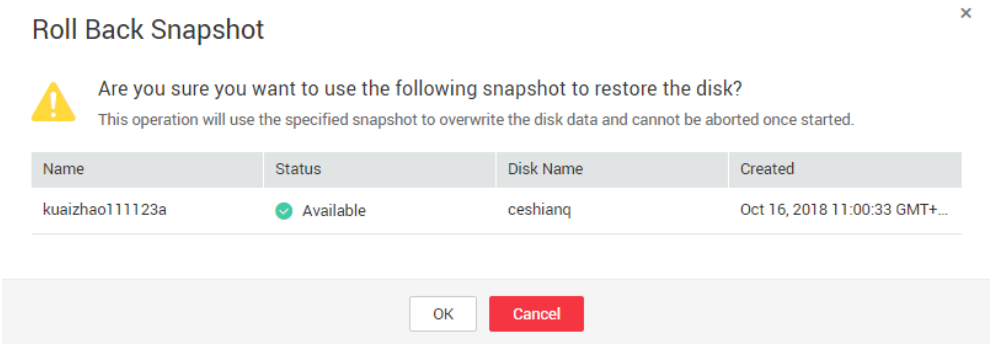
- Method 1: On the **Snapshots** page, set search parameters to query the desired snapshot.


- Method 2: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then search for the wanted snapshot.




**Step 5** In the row of the snapshot you want to use, click **Roll Back**.

The **Roll Back Using a Snapshot** dialog box is displayed.




**NOTICE**

This operation will use the specified snapshot to overwrite the disk data. Once started, the rollback process cannot be stopped.

**Step 6** Confirm the information and click **OK**.

**----End**

# 5.2.7 Deleting a Snapshot

If a snapshot is no longer needed, you can delete it.

## Prerequisites

- You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.
- A snapshot in the **Available** or **Error** state can be deleted only when the snapshot does not have a linked clone volume.

## Precautions

Once a snapshot is deleted, the snapshot data cannot be restored. Before performing this operation, ensure that the snapshot is no longer needed.

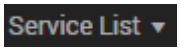
## Procedure

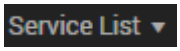
**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

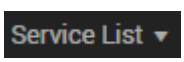
**Step 2** Click 

and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click 

and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click 

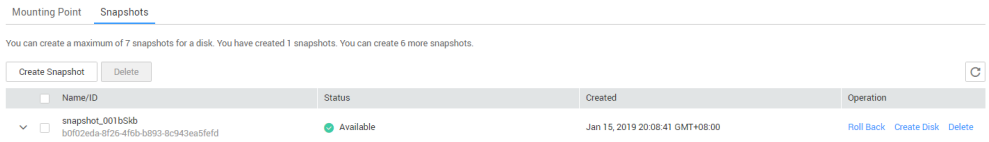
and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.
- Method 3: Via the snapshot list of all DESS devices
  a. Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Snapshots**.

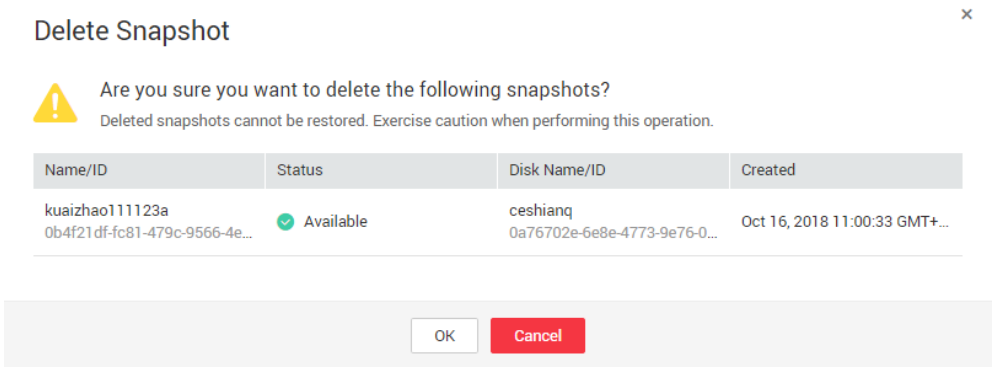
**Step 4** Search for a snapshot using either of the following methods:

- Method 1: On the **Snapshots** page, set search parameters to query the desired snapshot.


- Method 2: On the **Disks** tab page, click the desired disk name to go to the disk details page. Click the **Snapshots** tab and then search for the wanted snapshot.




**Step 5** In the row of the snapshot you want to delete, click **Delete**.




**WARNING**

Once a snapshot is deleted, its data cannot be restored. Exercise caution when performing this operation.

**Step 6** Understand the risks and click **OK**.

A message is displayed indicating that the snapshots have been deleted successfully.

**----End**

# 5.2.8 Querying DESS Information on the Snapshot List Page

After creating a snapshot, you can view the DESS details on the snapshot list page.

## Prerequisites

You have created a snapshot. For details, see **5.2.1 Creating a Snapshot**.

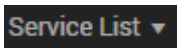
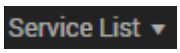
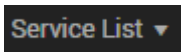
## Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click  and select the wanted region.

**Step 3** Use any of the following methods to display the snapshot list:

- Method 1: Via the snapshot-residing DESS device
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
     The snapshot tab page lists the snapshots of the DESS device.
- Method 2: Via the snapshot-residing HyperMetro resource
  a. Click  and choose **Dedicated Cloud** > **Dedicated Enterprise Storage** to go to the DeC management console.
  b. On the navigation pane on the left, choose **Dedicated Enterprise Storage** > **HyperMetro** to go to the HyperMetro resource list page.
     By default, HyperMetro resources in all statuses are listed.
  c. Use any of the following methods to display the snapshot list:
     - Method 1
       1) Click  next to the resource name to view the HyperMetro resource details.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the HyperMetro resource.
     - Method 2
       1) In the row of the wanted HyperMetro resource, click the DESS device name in the **Associated DESS Devices** column to go to the device details page.
       2) In the row of the desired DESS device, click the number in the **Number of Snapshots** column to go to the **Snapshots** tab page.
          The snapshot tab page lists the snapshots of the DESS device.
- Method 3: Via the snapshot list of all DESS devices
  a. Click  and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.
  b. On the navigation pane on the left, choose **Snapshots**.

**Step 4** Click the storage name in the row where the desired snapshot resides.

The storage list page is displayed.

**Step 5** Click  next to the storage name to expand its details. **Table 4-1** describes the parameters.

**----End**

# 5.3 Managing HyperMetro Consistency Groups

## 5.3.1 Viewing HyperMetro Consistency Group Information

A HyperMetro consistency group is a collection of HyperMetro disks that have related services. In a consistency group, data on all non-preferred HyperMetro disks is time-consistent, ensuring the availability of preferred HyperMetro disk data for disaster recovery. You can view information about existing HyperMetro consistency groups.

### Prerequisites

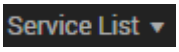
At least one HyperMetro consistency group exists. For details about how to create one, see **3.3 (Optional) Creating a HyperMetro Consistency Group**.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

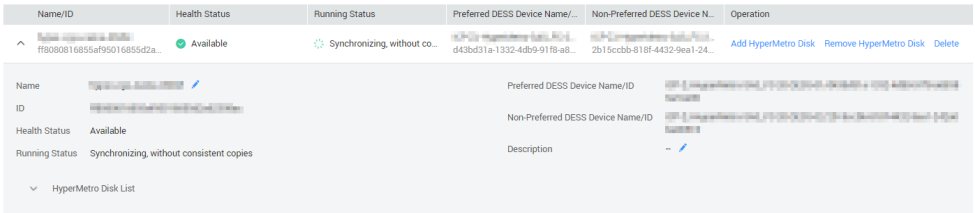
**Step 3** Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

**Step 4** On the navigation pane on the left, choose **HyperMetro Consistency Groups**.

**Step 5** (Optional) Set the search criteria to look for the consistency group to be queried.

**Step 6** Click  next to the consistency group name to expand its details.




**----End**

## 5.3.2 Modifying the Name of a HyperMetro Consistency Group

This section introduces how to change the name and description of a HyperMetro consistency group.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

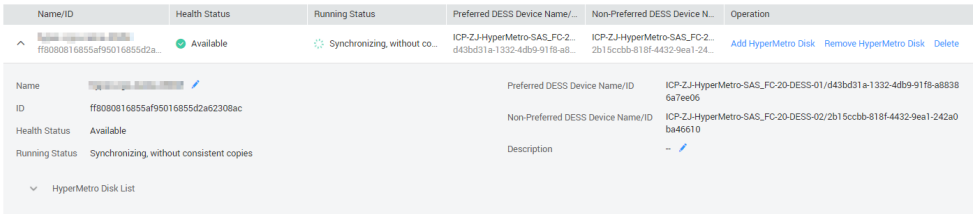
**Step 2** Click Beijing1(dess_ and select the wanted region.

**Step 3** Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

**Step 4** On the navigation pane on the left, choose **HyperMetro Consistency Groups**.

**Step 5** (Optional) Set the search criteria to look for the consistency group whose information you want to modify

**Step 6** Click next to the consistency group name to expand its details.




**Step 7** Click next to the name.

**Step 8** Enter the new name.

The HyperMetro name can contain a maximum of 63 characters without any spaces.

**Step 9** Click to save the modification.

**----End**

## 5.3.3 Removing HyperMetro Disks

This section introduces how to remove HyperMetro disks from a HyperMetro consistency group.

### Prerequisites

There are HyperMetro disks in the consistency group.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click Beijing1(dess_ and select the wanted region.

**Step 3** Click Service List and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

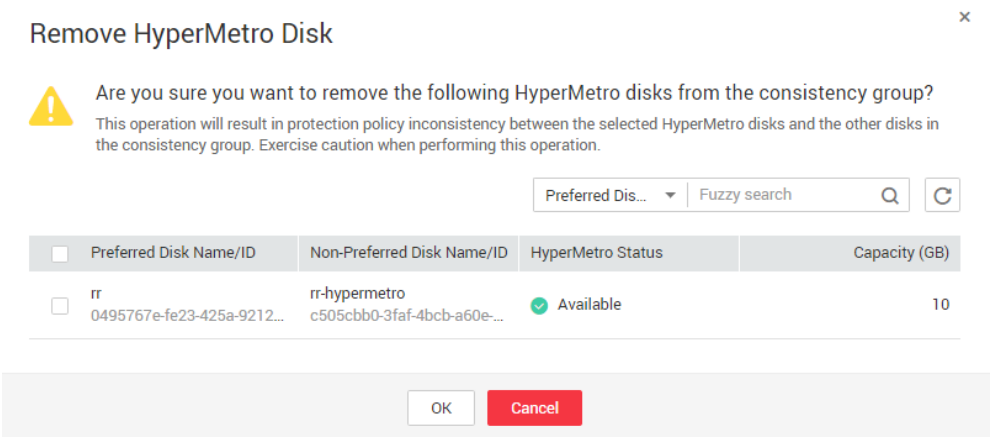
**Step 4** On the navigation pane on the left, choose **HyperMetro Consistency Groups**.

**Step 5** (Optional) Set the search criteria to look for the desired consistency group.

**Step 6** In the row of the consistency group, click **Remove HyperMetro Disk**.

The **Remove HyperMetro Disk** dialog box is displayed.




**Step 7** Select the HyperMetro disks you want to remove.

**Step 8** Click **OK**.

**----End**

## 5.3.4 Deleting a HyperMetro Consistency Group

If a HyperMetro consistency group is no longer needed, you can delete it.

### Prerequisites

- A HyperMetro consistency group has been created and is in the **Available** state.
- You have confirmed that the HyperMetro consistency group to be deleted is no longer used.

### Precautions

After a consistency group is deleted, the system cannot use the protection function of the HyperMetro consistency group. Before you perform this operation, ensure that the selected HyperMetro consistency group is no longer needed.

### Procedure

**Step 1** Log in to the management console. For details, see **Logging In to the Management Console**.

**Step 2** Click 

and select the wanted region.

**Step 3** Click 

and choose **Storage** > **Dedicated Enterprise Storage Service** to go to DESS Console.

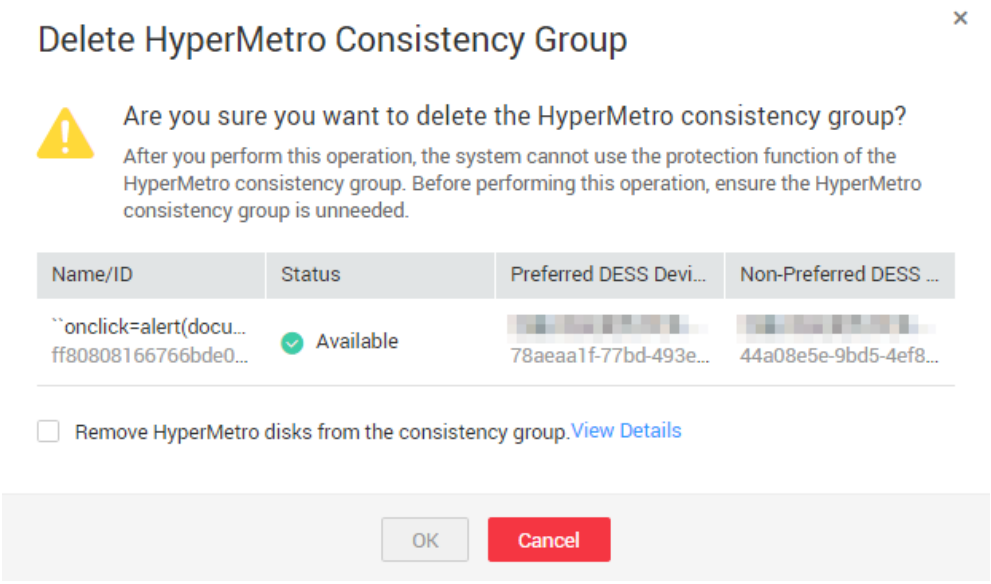
**Step 4** On the navigation pane on the left, choose **HyperMetro Consistency Groups**.

**Step 5** (Optional) Set the search criteria to look for the desired consistency group.

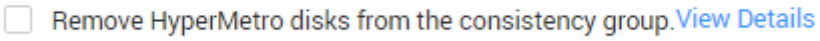
**Step 6** In the row of the consistency group, click **Delete**.

The **Delete HyperMetro Consistency Group** dialog box is displayed.




**NOTE**

- If all disks are removed from the consistency group, you can directly delete them.
- If there are unmoved disks in the row, select

  . If this option is selected, all disks will be removed.

**Step 7** Understand the potential risk of this operation and click **OK**.

A message is displayed indicating a successful deletion.

**----End**

# 6 Cloud DR Replication

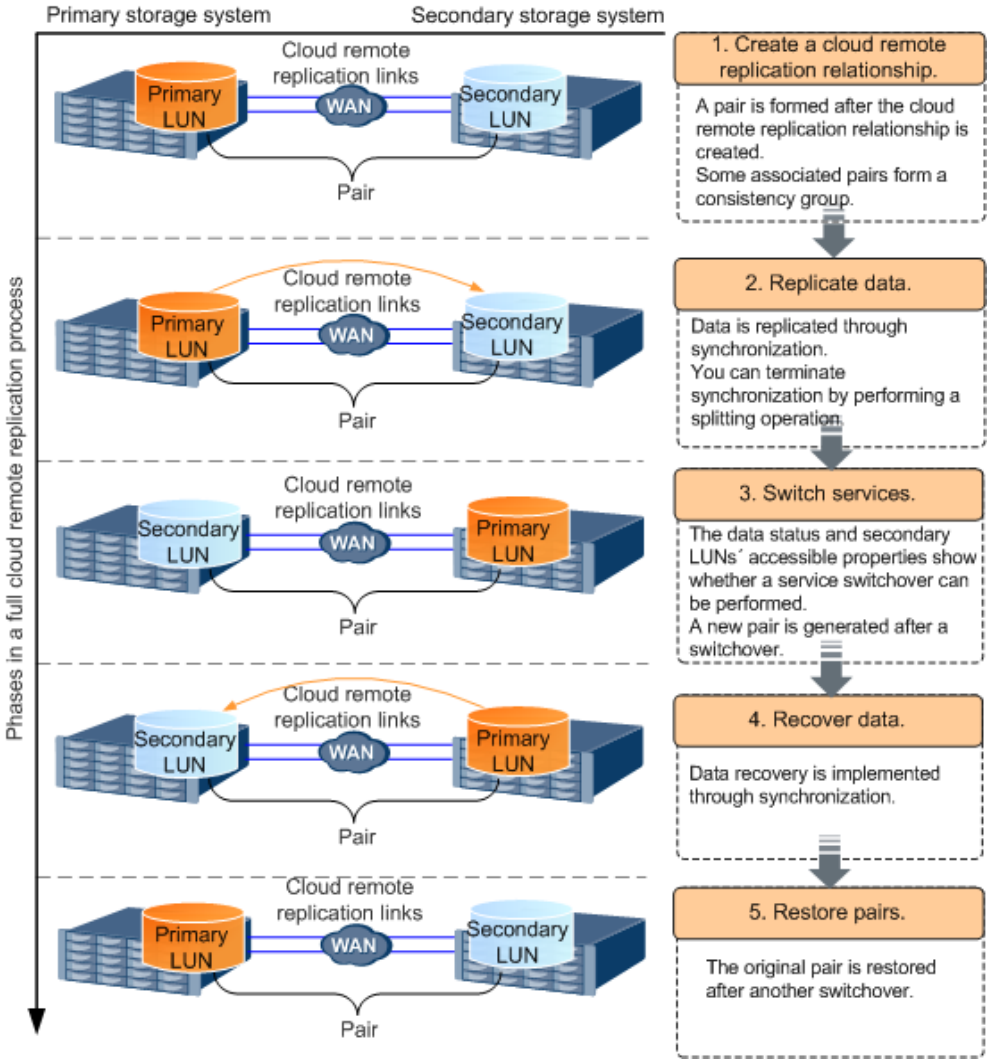
Cloud DR replication provides you with flexible and superb data replication functions, including remote data backup and restoration, continuous support for service data, and disaster recovery. Remote replication is a data mirroring technology that copies data on a local storage device to a remote storage device. It retains multiple data replicas at two or more sites, removing single-site data loss risks. Cloud remote replication specifically refers to remote replication with a DESS device as the remote device.

## Implementation of Cloud Remote Replication

Cloud remote replication replicates data based on storage systems and is independent of upper-layer host services. Full implementation of cloud remote replication consists of five phases: creating a cloud remote replication pair, replicating data, switching services, restoring data, and restoring the pair.

**Figure 6-1** Cloud remote replication process




## Constraints

- Disk sizes of the primary end and secondary end must be the same.
- The DR switchover cannot be implemented automatically.

# 7 FAQs



## 7.1 What Is DESS?

DESS provides dedicated HUAWEI CLOUD-based storage services to enterprises. Optimized for enterprises' mission critical applications such as Oracle RAC and SAP HANA TDI, DESS provides the same superb performance and reliability as enterprise private cloud and simplifies service deployment on public cloud for enterprise users.

## 7.2 How Can I Select the Region?

DESS provides storage resources for BMSs in DeC, so the region and AZ selected for the DESS devices must be the same as those of the BMSs.

## 7.3 Is DESS Exclusively Used?

Once you applied for a DESS device, you have full control on the device that is not shared by other users.

# 7.4 Performing Post-Expansion Operations for a Windows Disk

After the capacity expansion of the DESS disk is successful, allocate the partition for the extended space of the DESS disk in the BMS OS.

## Prerequisites

- You have logged in to the BMS. For details, see section "Logging In to a Windows BMS" in ***Bare Metal Server User Guide***.
- You have attached the EVS disk to the BMS and the additional disk space remains to be allocated.

## Context

The OS used in the following example is Windows Server 2008 R2 Enterprise. The following example is for reference only. For the detailed operations, see the corresponding OS documents.

After the disk capacity is successfully expanded, the subsequent steps including how the disk will be partitioned and on which directory the partition will be mounted are depended on your environment. This section only provides an example.

## Procedure

**Step 1** On the desktop of the BMS OS, right-click **Computer** and choose **Manage** from the shortcut menu.

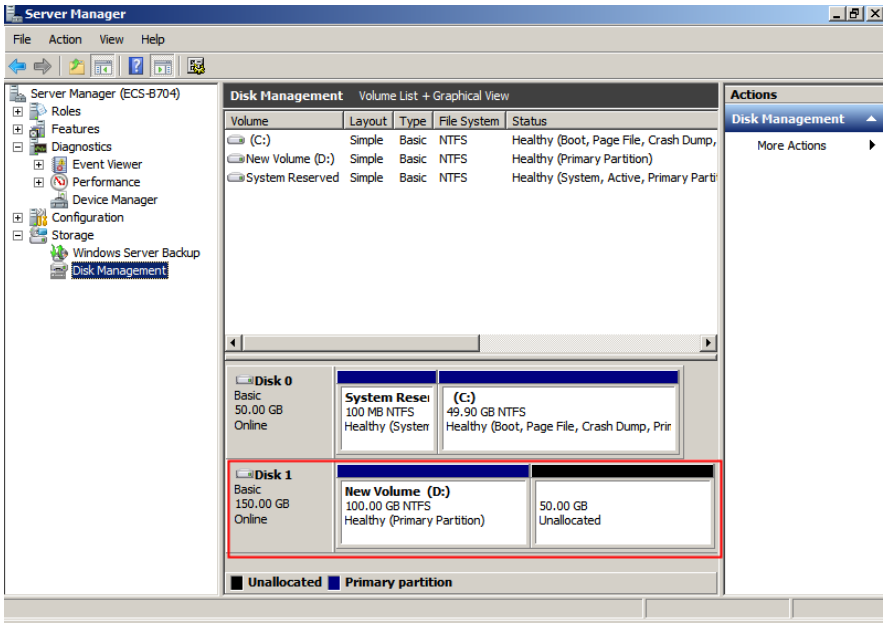
The **Server Manager** window is displayed.

**Step 2** On the navigation pane on the left, choose **Storage** > **Disk Management**.

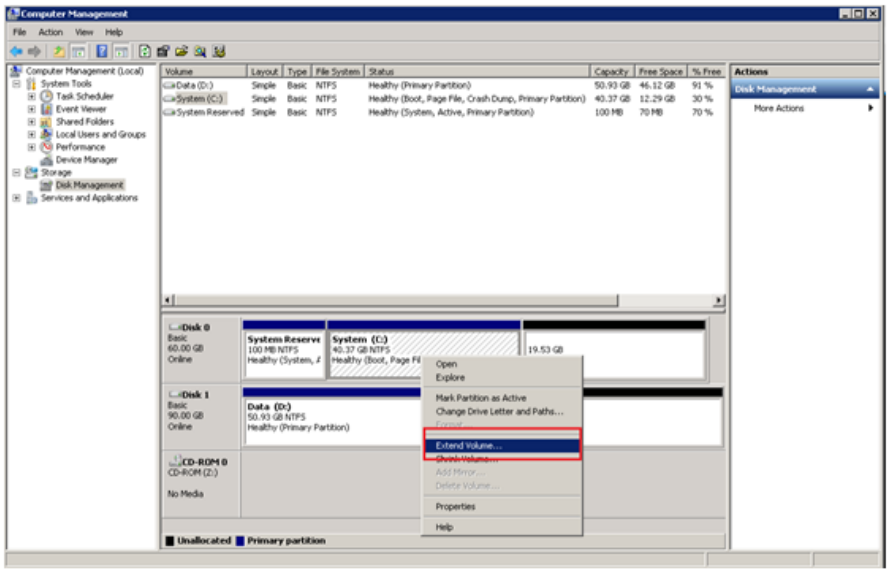
The **Disk Management** window is displayed.

**Step 3** On the **Disk Management** page, select the disk and partition that needs to be extended. The current partition size and unallocated disk space are displayed.

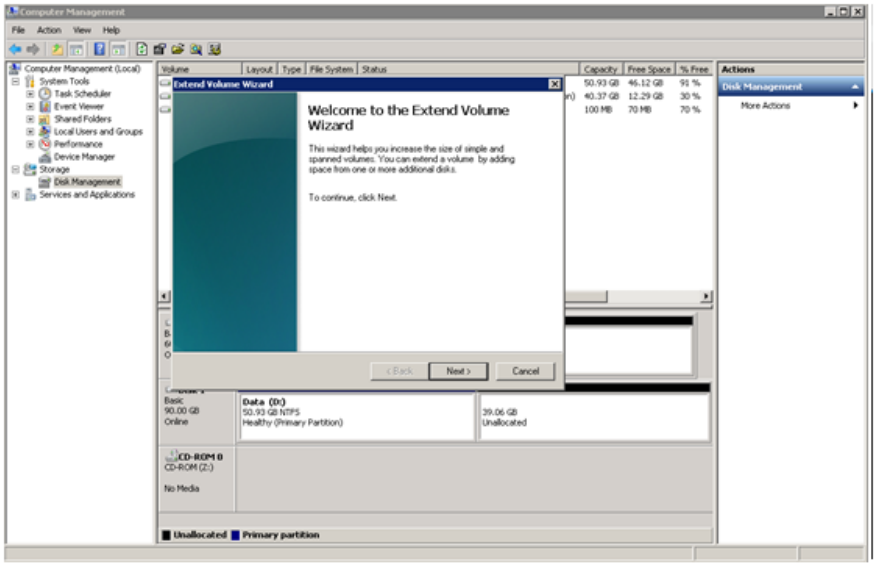



**Step 4** Right-click the selected disk and choose **Extend Volume**.

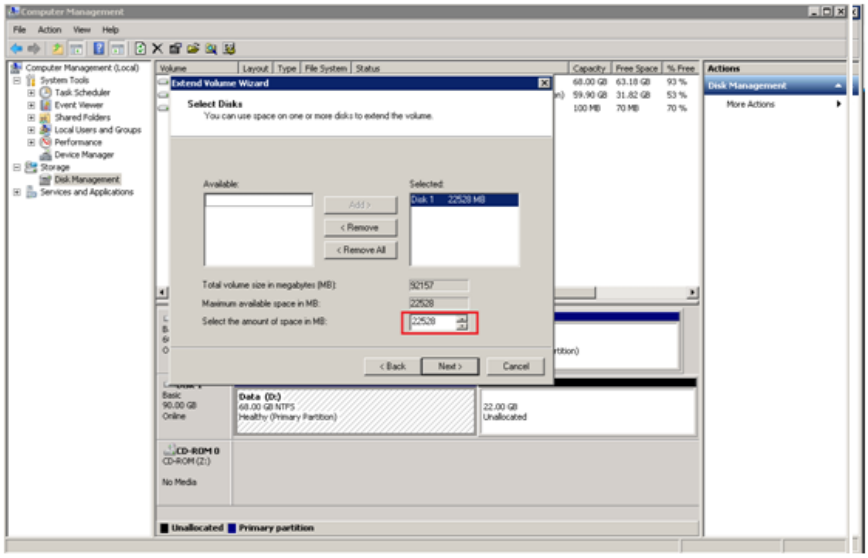



**Step 5** On the displayed **Extend Volume Wizard** page, click **Next**.



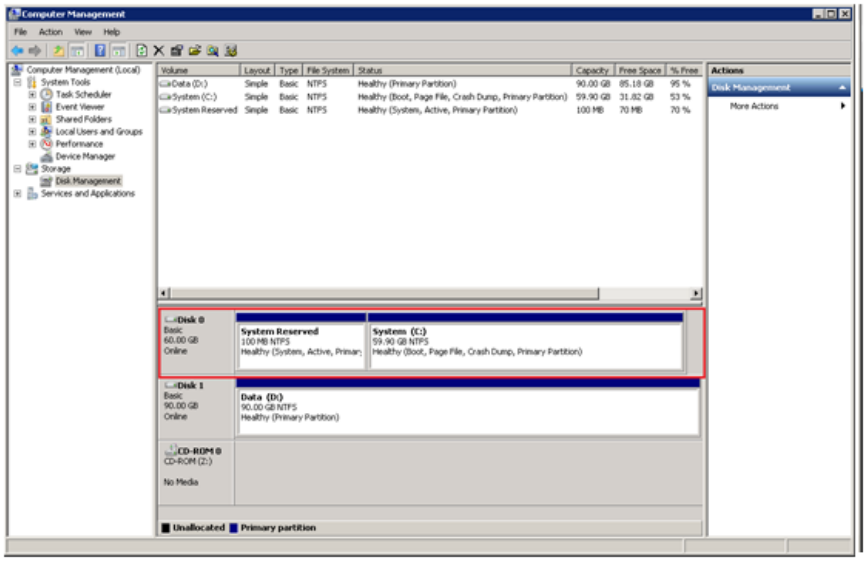

**Step 6** In the text box to the right of **Select the amount of space in MB (E)**, enter the extended capacity and click **Next**.




**Step 7** Click **Finish** to complete the wizard.

After the expansion is successful, the disk capacity is increased.




**----End**

# 7.5 Performing Post-Expansion Operations for a Linux Disk (fdisk)

After the capacity expansion has succeeded, you need to allocate the extended space to an existing partition, or allocate new partitions to the expanded disks.

## Prerequisites

- You have logged in to the BMS. For details, see section "Logging In to a Linux BMS" in ***Bare Metal Server User Guide***.
- You have attached the EVS disk to the BMS and the additional disk space remains to be allocated.

## Context

The OS used in the following example is CentOS 7.0 (64-bit).

The method for allocating the additional space varies depending on the server OS. This document is used for reference only. For the detailed operations and differences, see the corresponding OS documents.

Based on your service requirements and disk condition, you can choose either of the following ways to allocate the additional disk space:

- Create a partition (services will not be interrupted)

  You can create a partition for the expanded disk without the need of detaching the original partitions. The impacts on services are smaller than expanding an existing partition. This method is recommended for system disks or disks carrying services that cannot be interrupted.

  If the MBR partition style is used, the disk capacity cannot exceed 2 TB and the number of partitions cannot exceed the upper limit after the expansion completes.

- Expand an existing partition (services will be interrupted)

  If the MBR partition style is used and the number of partitions has reached the upper limit, the existing partition needs to be expanded. Expanding an existing partition does not delete its data, but requires the partition to unmount. Therefore, the services will be interrupted.

  If the MBR partition style is used and the disk capacity after expansion has exceeded 2 TB, the excessive disk space cannot be partitioned. In this case, if you change the partition style from MBR to GPT, the original disk data will be cleared. Therefore, back up the disk data before you change the partition style.

## Viewing the Partition Style

Before allocating the additional space, query the current disk partition style. If MBR is used, you can use either the fdisk or Parted partitioning tool. If GPT is used, only the Parted partitioning tool can be used.

**Step 1** Run the following command to view the current disk partition style:

**fdisk -l**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# fdisk -l

Disk /dev/xvda: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000c5712

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1            2048    83886079    41942016   83  Linux
WARNING: fdisk GPT support is currently new, and therefore in an experimental phase. Use at your own
discretion.

Disk /dev/xvdb: 161.1 GB, 161061273600 bytes, 314572800 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: gpt


#         Start          End    Size  Type            Name
 1          34    209715166    100G  Microsoft basic opt
 2   209715167    314572766     50G  Microsoft basic opt1
WARNING: fdisk GPT support is currently new, and therefore in an experimental phase. Use at your own
discretion.

Disk /dev/xvdc: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: gpt


#         Start          End    Size  Type            Name
 1          34     16777215      8G  Microsoft basic opt
 2    16777216     83884031     32G  Microsoft basic opt
```

In the command output, parameter **Disk label type** indicates the disk partition style. Value **dos** indicates the MBR partition style, and value **gpt** indicates the GPT partition style.

**----End**

## Creating a Partition

The following example shows you how to create a partition for the expanded space of the system disk and mount the partition to **/opt** without interrupting services.

**Step 1** Run the following command to view information about partitioning:

**fdisk -l**

Information similar to the following is displayed: (**/dev/xvda** is the system disk.)

```
[root@ecs-bab9 test]# fdisk -l

Disk /dev/xvda: 64.4 GB, 64424509440 bytes, 125829120 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000cc4ad

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1   *        2048     2050047     1024000   83  Linux
/dev/xvda2         2050048    22530047    10240000   83  Linux
/dev/xvda3        22530048    24578047     1024000   83  Linux
/dev/xvda4        24578048    83886079    29654016    5  Extended
/dev/xvda5        24580096    26628095     1024000   82  Linux swap / Solaris
```

**Step 2** Run the following command to enter fdisk (**/dev/xvda** is used in this example):

**fdisk /dev/xvda**

Information similar to the following is displayed:

```
[root@ecs-bab9 test]# fdisk /dev/xvda
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help):
```

**Step 3** Enter **n** and press **Enter** to create a partition.

Because the system disk has five existing partitions, the system automatically creates the sixth one.

Information similar to the following is displayed:

```
Command (m for help): n
All primary partitions are in use
Adding logical partition 6
First sector (26630144-83886079, default 26630144):
```

**Step 4** Enter the new partition's first sector number, for example the default value, and press **Enter**.

The serial number of first sector must be greater than that of the last sector of the existing partition.

Information similar to the following is displayed:

```
First sector (26630144-83886079, default 26630144):
Using default value 26630144
Last sector, +sectors or +size{K,M,G} (26630144-83886079, default 83886079):
```

**Step 5** Enter the new partition's last sector number and press **Enter**.

The default last sector is used in this example.

Information similar to the following is displayed:

```
Last sector, +sectors or +size{K,M,G} (26630144-83886079, default 83886079):
Using default value 83886079
Partition 6 of type Linux and of size 27.3 GiB is set

Command (m for help):
```

**Step 6** Enter **p** and press **Enter** to view the created partition.

Information similar to the following is displayed:

```
Disk /dev/xvda: 64.4 GB, 64424509440 bytes, 125829120 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000cc4ad

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1   *        2048     2050047     1024000   83  Linux
/dev/xvda2         2050048    22530047    10240000   83  Linux
/dev/xvda3        22530048    24578047     1024000   83  Linux
/dev/xvda4        24578048    83886079    29654016    5  Extended
/dev/xvda5        24580096    26628095     1024000   82  Linux swap / Solaris
/dev/xvda6         26630144    83886079    28627968   83  Linux

Command (m for help):
```

**Step 7** Enter **w** and press **Enter** to write the changes into the partition table.

Information similar to the following is displayed:

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.

WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table. The new table will be used at
the next reboot or after you run partprobe(8) or kpartx(8)
Syncing disks.
```

The partition is successfully created.

**NOTE**

In case that you want to discard the changes made before, you can exit fdisk by entering **q**.

**Step 8** Run the following command to synchronize the new partition table to the OS:

**partprobe**

**Step 9** Run the following command to set the file system format of the new partition:

In this example, the ext4 file system is used.

**mkfs -t ext4 /dev/xvda6**

Information similar to the following is displayed:

```
[root@ecs-bab9 test]# mkfs -t ext4 /dev/xvda6
mke2fs 1.42.9 (28-Dec-2013)
```

```
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
1790544 inodes, 7156992 blocks
357849 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=2155872256
219 block groups
32768 blocks per group, 32768 fragments per group
8176 inodes per group
Superblock backups stored on blocks:
        32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
        4096000

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

The formatting takes a while. When **done** is displayed in the command output, the formatting is complete.

**Step 10** Run the following command to mount the new partition on the space-demanding directory, for example **/opt**:

**mount /dev/xvda6 /opt**

Information similar to the following is displayed:

```
[root@ecs-bab9 test]# mount /dev/xvda6 /opt
[root@ecs-bab9 test]#
```

**NOTE**

If the new partition is mounted to a directory that is not empty, the subdirectories and files in the directory will be hidden. In this situation, you are advised to mount the new partition to an empty directory or a new directory. If the new partition must be mounted to a directory that is not empty, move the subdirectories and files in this directory to another directory temporarily. After the partition is successfully mounted, move the subdirectories and files back.

**Step 11** Run the following command to check the mounting result:

**df -TH**

Information similar to the following is displayed:

```
[root@ecs-bab9 test]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/xvda2     xfs        11G  7.4G  3.2G  71% /
devtmpfs       devtmpfs  4.1G     0  4.1G   0% /dev
tmpfs          tmpfs     4.1G   82k  4.1G   1% /dev/shm
tmpfs          tmpfs     4.1G  9.2M  4.1G   1% /run
tmpfs          tmpfs     4.1G     0  4.1G   0% /sys/fs/cgroup
/dev/xvda3     xfs       1.1G   39M  1.1G   4% /home
/dev/xvda1     xfs       1.1G  131M  915M  13% /boot
/dev/xvda6     ext4       29G   47M   28G   1% /opt
```

**----End**

## Replacing the Existing Partition

In the following example, a disk has been attached to the BMS, and the partition **/dev/xvdb1** has been mounted to **/mnt/sdc**. During the process of

replacing the original partition **/dev/xvdb1** and adding new capacity to it, services will be interrupted.

**NOTICE**

After the disk capacity has been expanded, the additional space is added to the end of the disk. When the disk has multiple partitions, only the partition at the end of the disk can be expanded.

**Step 1** Run the following command to view information about partitioning:

**fdisk -l**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# fdisk -l

Disk /dev/xvda: 42.9 GB, 42949672960 bytes, 83886080 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x000cc4ad

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1   *        2048     2050047     1024000   83  Linux
/dev/xvda2         2050048    22530047    10240000   83  Linux
/dev/xvda3        22530048    24578047     1024000   83  Linux
/dev/xvda4        24578048    83886079    29654016    5  Extended
/dev/xvda5        24580096    26628095     1024000   82  Linux swap / Solaris

Disk /dev/xvdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xb00005bd

   Device Boot      Start         End      Blocks   Id  System
/dev/xvdb1            2048    20971519    10484736   83  Linux
```

In the command output, the total capacity of the **/dev/xvdb** disk is 21.5 GB, and the disk has only one partition, **dev/xvdb1**. The partition's first sector is **2048**, and its last sector is **20971519**.

View the **/dev/xvdb** capacity and check whether the additional space is included.

- If the additional space is not included, refresh the capacity according to section **7.7 Performing Post-Expansion Operations for a SLES Disk (fdisk)**.
- If the additional space is included, take note of the first and last sectors of the **dev/xvdb1** partition and then go to **Step 2**. These values will be used in the follow-up operations.

**Step 2** Run the following command to unmount the disk partition:

**umount /mnt/sdc**

**Step 3** Run the following command to enter fdisk and enter **d** to delete the **/dev/xvdb1** partition:

**fdisk /dev/xvdb**

The command output is as follows:

```
[root@ecs-b656 test]# fdisk /dev/xvdb
Welcome to fdisk (util-linux 2.23.2).

Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): d
Selected partition 1
Partition 1 is deleted

Command (m for help):
```

**NOTE**

If the partitions are recreated according to the following steps, deleting partitions will not cause data loss on the data disk.

**Step 4** Enter **n** and press **Enter** to create a partition.

To create a partition, enter **n**.

Information similar to the following is displayed:

```
Command (m for help): n
Partition type:
   p   primary (0 primary, 0 extended, 4 free)
   e   extended
```

There are two types of disk partition:

- **p** indicates a primary partition.
- **e** indicates an extended partition.

**Step 5** Ensure that the entered partition type is the same as the original partition type, which is the primary partition in this example. Enter **p** and press **Enter** to create a primary partition.

Information similar to the following is displayed:

```
Select (default p): p
Partition number (1-4, default 1):
```

In the command output, **Partition number** specifies the serial number of the primary partition.

**Step 6** Ensure that the serial number you entered is the same as the original partition's, which is **1** in this example. Enter **1** and press **Enter**.

Information similar to the following is displayed:

```
Partition number (1-4, default 1): 1
First sector (2048-41943039, default 2048):
```

In the command output, **First sector** specifies the first sector.

**NOTE**

Data will be lost if:

- The first sector you selected is inconsistent with the original partition.
- The last sector you selected is smaller than that of the original partition.

**Step 7** Ensure that the entered first sector is the same as that of the original partition. In this example, first sector **2048** is recorded in **Step 1**. Enter **2048** and press **Enter**.

Information similar to the following is displayed:

```
First sector (2048-41943039, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):
```

In the command output, **Last sector** specifies the last sector.

**Step 8** Ensure that the entered last sector is equal to or larger than the last sector recorded in **Step 1**. In this example, the recorded last sector is **20971519**, and the default last sector **41943039** is used. Enter **41943039** and press **Enter**.

Information similar to the following is displayed:

```
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):
Using default value 41943039
Partition 1 of type Linux and of size 20 GiB is set
Command (m for help):
```

The primary partition is successfully created.

**Step 9** Enter **p** and press **Enter** to view the details about the created partition.

Information similar to the following is displayed:

```
Command (m for help): p

Disk /dev/xvdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0xb00005bd

   Device Boot      Start         End      Blocks   Id  System
/dev/xvdb1            2048    41943039    20970496   83  Linux

Command (m for help):
```

Details about the **/dev/xvdb1** partition are displayed.

**Step 10** Enter **w** and press **Enter** to write the changes into the partition table.

Information similar to the following is displayed:

```
Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

The partition is successfully created.

**NOTE**

In case that you want to discard the changes made before, you can exit fdisk by entering **q**.

**Step 11** Run the following command to check the correctness of the file system on **/dev/xvdb1**:

**e2fsck -f /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# e2fsck -f /dev/xvdb1
e2fsck 1.42.9 (28-Dec-2013)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/xvdb1: 11/655360 files (0.0% non-contiguous), 83137/2621184 blocks
```

**Step 12** Run the following command to expand the size of the file system on **/dev/xvdb1**:

**resize2fs /dev/xvdb1**

Information similar to the following is displayed:

```
[root@ecs-b656 test]# resize2fs /dev/xvdb1
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/xvdb1 to 5242624 (4k) blocks.
The filesystem on /dev/xvdb1 is now 5242624 blocks long.
```

**Step 13** Run the following command to mount the created partition to the **/mnt/sdc** directory:

**mount /dev/xvdb1 /mnt/sdc**

**Step 14** Run the following command to view the mounting result of **/dev/xvdb2**:

**df -TH**

**----End**

# 7.6 Performing Post-Expansion Operations for a Linux Disk (Using Parted)

After the capacity expansion has succeeded, you need to allocate the extended space to an existing partition, or allocate new partitions to the expanded disks.

## Prerequisites

- You have logged in to the BMS. For details, see section "Logging In to a Linux BMS" in *Bare Metal Server User Guide*.
- You have attached the EVS disk to the BMS and the additional disk space remains to be allocated.

## Context

This section uses EulerOS 2.0 64-bit to describe how to allocate the additional EVS disk space to a partition using Parted.

The method for allocating the additional space varies depending on the server OS. This document is used for reference only. For the detailed operations and differences, see the corresponding OS documents.

Based on your service requirements and disk condition, you can choose either of the following ways to allocate the additional disk space:

- Create a partition (services will not be interrupted)

  You can create a partition for the expanded disk without the need of detaching the original partitions. The impacts on services are smaller than expanding an existing partition. This method is recommended for system disks or disks carrying services that cannot be interrupted.

  If the MBR partition style is used, the disk capacity cannot exceed 2 TB and the number of partitions cannot exceed the upper limit after the expansion completes.
- Expand an existing partition (services will be interrupted)

If the MBR partition style is used and the number of partitions has reached the upper limit, the existing partition needs to be expanded. Expanding an existing partition does not delete its data, but requires the partition to unmount. Therefore, the services will be interrupted.

If the MBR partition style is used and the disk capacity after expansion has exceeded 2 TB, the excessive disk space cannot be partitioned. In this case, if you change the partition style from MBR to GPT, the original disk data will be cleared. Therefore, back up the disk data before you change the partition style.

## Viewing the Partition Style

Before allocating the additional space, query the current disk partition style. If MBR is used, you can use either the fdisk or Parted partitioning tool. If GPT is used, only the Parted partitioning tool can be used.

**Step 1** Run the following command to view the disk information:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   40G  0 disk
└─xvda1 202:1    0   40G  0 part /
xvdb    202:16   0  150G  0 disk
├─xvdb1 202:17   0  100G  0 part /mnt/sdc
└─xvdb2 202:18   0   50G  0 part /mnt/opt
xvdc    202:32   0   40G  0 disk
├─xvdc1 202:33   0    8G  0 part
└─xvdc2 202:34   0   32G  0 part
```

**Step 2** Run the following command and enter **p** to view the current disk partition style:

**parted** *Disk*

For example, run the following command to view the partition style of the **/dev/xvdb** disk:

**parted /dev/xvdb**

Information similar to the following is displayed:

```
root@ecs-1120 linux]# parted /dev/xvdb
GNU Parted 3.1
Using /dev/xvdb
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 161GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start   End    Size    File system  Name  Flags
 1      17.4kB  107GB  107GB   ext4         opt
 2      107GB   161GB  53.7GB  ext4         opt1
```

In the command output, parameter **Partition Table** indicates the disk partition style. Value **msdos** indicates MBR and value **gpt** indicates GPT.

**Step 3** Enter **q** and press **Enter** to exit Parted.

**Step 4** Check the disk partition style of other disks. For details, see **Step 2** to **Step 3**.

**----End**

## Creating a Partition

The following example shows you how to create a partition for the expanded space of the system disk and mount the partition to **/opt** without interrupting services.

**Step 1** Run the following command to view information about partitioning:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   80G  0 disk
└─xvda1 202:1    0   40G  0 part /
xvdb    202:16   0  250G  0 disk
├─xvdb1 202:17   0  100G  0 part
└─xvdb2 202:18   0   50G  0 part
xvdc    202:32   0   40G  0 disk
├─xvdc1 202:33   0    8G  0 part
└─xvdc2 202:34   0   32G  0 part
```

In the command output, the capacity of the **dev/xvda** system disk is 80 GB, in which the in-use **dev/xvda1** partition takes 40 GB and the added 40 GB remains unallocated.

**Step 2** Run the following command to enter Parted to allocate the additional space of the system disk to a partition:

**parted** *System disk*

In this example, **/dev/xvda** is the system disk.

**parted /dev/xvda**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# parted /dev/xvda
GNU Parted 3.1
Using /dev/xvda
Welcome to GNU Parted! Type 'help' to view a list of commands.
```

**Step 3** Enter **unit s** and press **Enter** to set the measurement unit of the disk to sector numbers.

**Step 4** Enter **p** and press **Enter** to view the current disk partition style.

Information similar to the following is displayed:

```
(parted) unit s
(parted) p                                                Model: Xen Virtual Block Device (xvd)
Disk /dev/xvda: 167772160s
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start  End        Size       Type     File system  Flags
 1      2048s  83886079s  83884032s  primary  ext4
```

**Step 5** Enter **mkpart** and press **Enter** to create a partition.

**Step 6** Enter **p** and press **Enter** to create a primary partition. Creating a primary partition is used as an example.

Information similar to the following is displayed:

```
(parted) mkpart
Partition type?  primary/extended? p
File system type?  [ext2]? ext4
Start? 83886080
End? 1677722159
```

**Step 7** Set the file system type and the size of the new partition.

Value **83886080** indicates the first sector of the **dev/xvda2** partition you created, and value **167772159** indicates the last sector. The two values are used for reference only. You can determine the number of partitions and partition sizes based on your service requirements.

Information similar to the following is displayed:

```
(parted) mkpart
Partition type?  primary/extended? p
File system type?  [ext2]? ext4
Start? 83886080
End? 1677722159
```

**NOTE**

The file system type may fail to be set in this step. Therefore, reconfigure the file system type according to **Step 10** after the partition is created.

**Step 8** Enter **p** and press **Enter** to view the created partition.

Information similar to the following is displayed:

```
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvda: 167772160s
Sector size (logical/physical): 512B/512B
Partition Table: msdos
Disk Flags:

Number  Start     End         Size      Type     File system  Flags
 1      2048s     83886079s   83884032s  primary  ext4
 2      83886080s  167772159s  83886080s  primary
```

The **dev/xvda2** partition is created.

**Step 9** Enter **q** and press **Enter** to exit Parted.

**Step 10** Run the following command to set the file system format of the new partition:

In this example, **ext4 ext3** is used:

**mkfs -t ext4 /dev/xvda2**

Information similar to the following is displayed:

```
[[root@ecs-1120 linux]# mkfs -t ext4 /dev/xvda2
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
2621440 inodes, 10485760 blocks
524288 blocks (5.00%) reserved for the super user
First data block=0
```

```
Maximum filesystem blocks=2157969408
320 block groups
32768 blocks per group, 32768 fragments per group
8192 inodes per group
Superblock backups stored on blocks:
?32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
?4096000, 7962624

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

The formatting takes a while. When **done** is displayed in the command output, the formatting is complete.

**Step 11** Run the following command to mount the new partition on the space-demanding directory, for example **/opt**:

**mount /dev/xvda6 /opt**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# mount /dev/xvda2 /opt
[root@ecs-1120 linux]#
```

**NOTE**

If the new partition is mounted to a directory that is not empty, the subdirectories and files in the directory will be hidden. In this situation, you are advised to mount the new partition to an empty directory or a new directory. If the new partition must be mounted to a directory that is not empty, move the subdirectories and files in this directory to another directory temporarily. After the partition is successfully mounted, move the subdirectories and files back.

**Step 12** Run the following command to check the mounting result:

**df -TH**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/xvda1     ext4       43G  8.3G   33G  21% /
devtmpfs       devtmpfs  885M     0  885M   0% /dev
tmpfs          tmpfs     894M     0  894M   0% /dev/shm
tmpfs          tmpfs     894M   18M  877M   2% /run
tmpfs          tmpfs     894M     0  894M   0% /sys/fs/cgroup
tmpfs          tmpfs     179M     0  179M   0% /run/user/2000
tmpfs          tmpfs     179M     0  179M   0% /run/user/0
tmpfs          tmpfs     179M     0  179M   0% /run/user/1001
/dev/xvda2     ext4       43G   51M   40G   1% /opt
```

**----End**

## Replacing the Existing Partition

In the following example, two disks have been attached to the BMS, and the partition **/dev/xvdc1** has been mounted to **/mnt/sdc**. Because the **/dev/xvdc** disk only has one partition, this partition can be regarded as the partition at the disk end. During the partition creation, services will be interrupted.

**NOTICE**

After the disk capacity has been expanded, the additional space is added to the end of the disk. When the disk has multiple partitions, only the partition at the end of the disk can be expanded.

**Step 1** Run the following command to view information about partitioning:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-1120 sdc]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   80G  0 disk
├─xvda1 202:1    0   40G  0 part /
└─xvda2 202:2    0   40G  0 part /opt
xvdb    202:16   0  350G  0 disk
├─xvdb1 202:17   0  100G  0 part
└─xvdb2 202:18   0  200G  0 part
xvdc    202:32   0   60G  0 disk
└─xvdc1 202:33   0    10G  0 part /mnt/sdc
```

In the command output, the total capacity of the **/dev/xvdc** disk is 60 GB, in which the existing partition takes 10 GB. The **/dev/xvdc1** partition is at the end of the disk and has been mounted on **/mnt/sdc**.

View the **/dev/xvdc** capacity and check whether the additional space is included.

- If the additional space is not included, refresh the capacity according to section **7.7 Performing Post-Expansion Operations for a SLES Disk (fdisk)**.
- If the additional space is included, go to **Step 2**.

**Step 2** Run the following command to unmount the disk partition:

**umount /mnt/sdc**

**Step 3** Run the following command to view the unmounting result:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# umount /mnt/sdc
[root@ecs-1120 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   80G  0 disk
├─xvda1 202:1    0   40G  0 part /
└─xvda2 202:2    0   40G  0 part /opt
xvdb    202:16   0  350G  0 disk
├─xvdb1 202:17   0  100G  0 part
└─xvdb2 202:18   0  200G  0 part
xvdc    202:32   0   60G  0 disk
└─xvdc1 202:33   0    10G  0 part
```

**Step 4** Run the following command to enter Parted to allocate the additional space of the data disk to a partition:

**parted** *Data disk*

In this example, **/dev/xvdc** is the data disk.

**parted /dev/xvdc**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# parted /dev/xvdc
GNU Parted 3.1
Using /dev/xvdc
Welcome to GNU Parted! Type 'help' to view a list of commands.
```

**Step 5** Enter **unit s** and press **Enter** to set the measurement unit of the disk to sector numbers.

**Step 6** Enter **p** and press **Enter** to view the current disk partition style.

Information similar to the following is displayed:

```
(parted) unit s
(parted) p
Error: The backup GPT table is not at the end of the disk, as it should be.  This might mean that another operating system believes the disk is smaller.  Fix, by moving the
backup to the end (and removing the old backup)?
Fix/Ignore/Cancel? Fix
Warning: Not all of the space available to /dev/xvdb appears to be used, you can fix the GPT to use all of the space (an extra 104857600 blocks) or continue with the current
setting?
Fix/Ignore? Fix
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdc: 125829120s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start      End         Size       File system  Name  Flags
 1      2048s      20969471s   20967424s  ext4         opt
```

If the preceding information is displayed, enter **Fix** to rectify the disk exception. Then take note of the first and last sectors of the **/dev/xvdc1** partition. These values will be used during the partition recreation. In this example, the partition's first sector is **2048**, and its last sector is **20969471**.

**Step 7** The **/dev/xvdc1** partition number is **1**. Therefore, enter **rm 1** and press **Enter** to delete the partition.

**Step 8** Enter **p** and press **Enter** to check whether the **/dev/xvdc1** partition has been deleted.

Information similar to the following is displayed:

```
(parted) rm 1
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdc: 125829120s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End        Size       File system  Name  Flags
```

**Step 9** Enter **mkpart opt** *2048s 125829119* and press **Enter** to recreate the partition.

*2048* specifies the first sector recorded in **Step 6**, and **125829119** specifies the last sector, which must be greater than or equal to the last sector recorded in **Step 6**.

Information similar to the following is displayed:

```
(parted) mkpart opt 2048s 125829119s
Warning: You requested a partition from 2048s to 125829199s (sectors 2048..125829199).
The closest location we can manage is 2048s to 125829036s (sectors 2048..125829036).
Is this still acceptable to you?
Yes/No? Yes
```

Enter **Yes** as prompted to set the last sector.

If the following warning message is displayed, enter **Cancel** to stop the partitioning. Then, find the first sector with the best disk performance and use that value to partition the disk. The warning message will not be displayed if the first sector with the best disk performance has been entered. In this example, **2048s** is one of such first sectors. Therefore, the system does not display the warning message.

```
Warning: The resulting partition is not properly aligned for best performance.
Ignore/Cancel? Cancel
```

**NOTE**

Data will be lost if:

- The first sector you selected is inconsistent with the original partition.
- The last sector you selected is smaller than that of the original partition.

**Step 10** Enter **p** and press **Enter** to check whether the **/dev/xvdc1** partition has been recreated.

Information similar to the following is displayed:

```
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 125829120s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start       End          Size         File system  Name  Flags
 1      2048s       125829086s  125827039s  ext4          opt
```

The **/dev/xvdc1** partition has been recreated.

**Step 11** Enter **q** and press **Enter** to exit Parted.

**Step 12** Run the following command to check the correctness of the file system on **/dev/xvdc1**:

**e2fsck -f /dev/xvdc1**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# e2fsck -f /dev/xvdb2
e2fsck 1.42.9 (28-Dec-2013)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/xvdc1: 11/655360 files (0.0% non-contiguous), 83137/2620928 blocks
```

**Step 13** Run the following command to expand the size of the file system on **/dev/xvdc1**:

**resize2fs /dev/xvdc1**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# resize2fs /dev/xvdc1
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/xvdc1 to 15728379 (4k) blocks.
The filesystem on /dev/xvdc1 is now 15728379 blocks long.
```

**Step 14** Run the following command to view the disk partition information after the partition expansion:

**lsblk**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# lsblk
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
NAME    MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
xvda    202:0    0   80G  0 disk
├─xvda1 202:1    0   40G  0 part /
└─xvda2 202:2    0   40G  0 part /opt
xvdb    202:16   0  350G  0 disk
├─xvdb1 202:17   0  100G  0 part
└─xvdb2 202:18   0  200G  0 part
xvdc    202:32   0   60G  0 disk
└─xvdc1 202:33   0    60G  0 part
```

In the command output, the total capacity of the **/dev/xvdc** disk is 60 GB, in which the additional 50 GB has been allocated to the **dev/xvdc1** partition.

**Step 15** Run the following command to mount the created partition to the **/mnt/sdc** directory:

**mount /dev/xvdc1 /mnt/sdc**

**Step 16** Run the following command to view the mounting result for **/dev/xvdc1**:

**df -TH**

Information similar to the following is displayed:

```
[root@ecs-1120 linux]# mount /dev/xvdc1 /mnt/sdc
[root@ecs-1120 linux]# df -TH
Filesystem     Type      Size  Used Avail Use% Mounted on
/dev/xvda1     ext4       43G  8.3G   33G  21% /
devtmpfs       devtmpfs  885M     0  885M   0% /dev
tmpfs          tmpfs     894M     0  894M   0% /dev/shm
tmpfs          tmpfs     894M   18M  877M   2% /run
tmpfs          tmpfs     894M     0  894M   0% /sys/fs/cgroup
tmpfs          tmpfs     179M     0  179M   0% /run/user/2000
tmpfs          tmpfs     179M     0  179M   0% /run/user/0
tmpfs          tmpfs     179M     0  179M   0% /run/user/1001
/dev/xvda2     ext4       43G   51M   40G   1% /opt
/dev/xvdc1     ext4       64G   55M   60G   1% /mnt/sdc
```

The **/dev/xvdc1** partition has been mounted on the **/mnt/sdc** directory.

**----End**

# 7.7 Performing Post-Expansion Operations for a SLES Disk (fdisk)

After the capacity expansion has succeeded, you need to allocate the extended space to an existing partition, or allocate new partitions to the expanded disks.

## Prerequisites

- You have logged in to the BMS. For details, see section "Logging In to a Linux BMS" in ***Bare Metal Server User Guide***.
- You have attached the EVS disk to the BMS and the additional disk space remains to be allocated.

## Context

This section uses SUSE Linux Enterprise Server 11 SP4 (64-bit) to describe how to allocate the additional space of an attached SCSI data disk to a partition using fdisk.

Currently, a disk has been attached to a BMS, and the original disk capacity is 10 GB. In addition, a 10-GB space has been added to the disk through the management console, and the total disk capacity should be 20 GB. However, the added space cannot be viewed on the server. The following operations provide guidance for you to query the added space and expand the partition.

The method for allocating the additional space varies depending on the server OS. This document is used for reference only. For the detailed operations and differences, see the corresponding OS documents.

Based on your service requirements and disk condition, you can choose either of the following ways to allocate the additional disk space:

- Create a partition (services will not be interrupted)

  You can create a partition for the expanded disk without the need of detaching the original partitions. The impacts on services are smaller than expanding an existing partition. This method is recommended for system disks or disks carrying services that cannot be interrupted.

  If the MBR partition style is used, the disk capacity cannot exceed 2 TB and the number of partitions cannot exceed the upper limit after the expansion completes.

- Expand an existing partition (services will be interrupted)

  If the MBR partition style is used and the number of partitions has reached the upper limit, the existing partition needs to be expanded. Expanding an existing partition does not delete its data, but requires the partition to unmount. Therefore, the services will be interrupted.

  If the MBR partition style is used and the disk capacity after expansion has exceeded 2 TB, the excessive disk space cannot be partitioned. In this case, if you change the partition style from MBR to GPT, the original disk data will be cleared. Therefore, back up the disk data before you change the partition style.

## Replacing the Existing Partition

In the following example, a disk has been attached to the BMS, and the partition **/dev/sda1** has been mounted to **/mnt/sdc**. During the process of replacing the original partition **/dev/sda1** and adding new capacity to it, services will be interrupted.

**Step 1** Run the following command to view information about partitioning:

**fdisk -l**

Information similar to the following is displayed:

```
ecs-xen-02:/home/linux # fdisk -l

Disk /dev/xvda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders, total 209715200 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00065c40

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1            2048    41945087    20971520   82  Linux swap / Solaris
/dev/xvda2   *    41945088    83892223    20973568   83  Linux
/dev/xvda3        83892224   209715199    62911488   83  Linux
```

```
Disk /dev/sda: 10.7 GB, 10737418240 bytes
64 heads, 32 sectors/track, 10240 cylinders, total 20971520 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x2f1c057a

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1            2048    20971519    10484736   83  Linux
```

The 10 GB has been added to data disk **/dev/sda** on the management console, and the total capacity should be 20 GB. However, the additional capacity is not included in the command output. In this case, update the data disk capacity of the server by running the command.

**Step 2** Run the following command to update the data disk capacity of the server:

**echo 1 > /sys/class/scsi_device/*%d:%d:%d:%d*/device/rescan &**

In the command, **%d:%d:%d:%d** indicates a folder in the **/sys/class/scsi_device/** directory and can be obtained running **ll /sys/class/scsi_device/** command.

Information similar to the following is displayed: (**2:0:0:0** indicates the folder to be obtained.)

```
cs-xen-02:/sys/class/scsi_device # ll /sys/class/scsi_device/
total 0
lrwxrwxrwx 1 root root 0 Sep 26 11:37 2:0:0:0 -> ../../devices/xen/vscsi-2064/host2/target2:0:0/2:0:0:0/
scsi_device/2:0:0:0
```

Example command:

**echo 1 > /sys/class/scsi_device/2:0:0:0/device/rescan &**

**Step 3** After the update is complete, run the following command to view the disk partition information again:

**fdisk -l**

Information similar to the following is displayed:

```
ecs-xen-02:/sys/class/scsi_device # fdisk -l

Disk /dev/xvda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders, total 209715200 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00065c40

   Device Boot      Start         End      Blocks   Id  System
/dev/xvda1            2048    41945087    20971520   82  Linux swap / Solaris
/dev/xvda2   *    41945088    83892223    20973568   83  Linux
/dev/xvda3        83892224   209715199    62911488   83  Linux

Disk /dev/sda: 21.5 GB, 21474836480 bytes
64 heads, 32 sectors/track, 20480 cylinders, total 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x2f1c057a

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1            2048    20971519    10484736   83  Linux
```

In the command output, the additional space has been added to the **/dev/sda** data disk, and the update is successful. The **/dev/sda** disk has only one

partition, **/dev/sda1**. Take note of first and last sectors of the **/dev/sda1** partition. These values will be used during the partition recreation. The partition's first sector is **2048**, and its last sector is **20971519**.

**Step 4** Run the following command to unmount the disk partition:

**umount /mnt/sdc**

**Step 5** Run the following command to enter fdisk and enter **d** to delete the **/dev/sda1** partition:

**fdisk /dev/sda1**

Information similar to the following is displayed:

```
[ecs-xen-02:/sys/class/scsi_device # fdisk /dev/sda

Command (m for help): d
Selected partition 1

Command (m for help):
```

**Step 6** Enter **n** and press **Enter** to create a partition.

To create a partition, enter **n**.

Information similar to the following is displayed:

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
```

There are two types of disk partition:

- **p** indicates a primary partition.
- **e** indicates an extended partition.

**Step 7** Ensure that the entered partition type is the same as the partition had before. In this example, a primary partition is used. Therefore, enter **p** and press **Enter** to create a primary partition.

Information similar to the following is displayed:

```
p
Partition number (1-4, default 1):
```

In the command output, **Partition number** specifies the serial number of the primary partition.

**Step 8** Ensure that the serial number you entered is the same as the original partition's, which is **1** in this example. Enter **1** and press **Enter**.

Information similar to the following is displayed:

```
Partition number (1-4, default 1): 1
First sector (2048-41943039, default 2048):
```

In the command output, **First sector** specifies the first sector.

**NOTE**

Data will be lost if:

- The first sector you selected is inconsistent with the original partition.
- The last sector you selected is smaller than that of the original partition.

**Step 9** Ensure that the entered first sector is the same as that of the original partition. In this example, first sector **2048** is recorded in **Step 3**. Enter **2048** and press **Enter**.

Information similar to the following is displayed:

```
First sector (2048-41943039, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):
```

In the command output, **Last sector** specifies the last sector.

**Step 10** Ensure that the entered last sector is equal to or larger than the last sector recorded in **Step 3**. In this example, the recorded last sector is **20971519**, and the default last sector **41943039** is used. Enter **41943039** and press **Enter**.

Information similar to the following is displayed:

```
Last sector, +sectors or +size{K,M,G} (2048-41943039, default 41943039):
Using default value 41943039

Command (m for help):
```

The primary partition is successfully created.

**Step 11** Enter **p** and press **Enter** to view the details about the created partition.

Information similar to the following is displayed: (Details about the **/dev/sda1** partition are displayed.)

```
CCommand (m for help): p

Disk /dev/sda: 21.5 GB, 21474836480 bytes
64 heads, 32 sectors/track, 20480 cylinders, total 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x2f1c057a

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1            2048    41943039    20970496   83  Linux
Command (m for help):
```

**Step 12** Enter **w** and press **Enter** to write the changes into the partition table.

If information similar to the following is displayed, the partition is successfully created:

```
Command (m for help): w
The partitI/On table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
```

**NOTE**

In case that you want to discard the changes made before, you can exit fdisk by entering **q**.

**Step 13** Run the following command to check the correctness of the file system on **/dev/sda1**:

**e2fsck -f /dev/sda1**

Information similar to the following is displayed:

```
ecs-xen-02:/sys/class/scsi_device # e2fsck -f /dev/sda1
e2fsck 1.41.9 (22-Aug-2009)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
```

```
Pass 5: Checking group summary information
/dev/sda1: 11/655360 files (0.0% non-contiguous), 79663/2621184 blocks
```

**Step 14** Run the following command to expand the size of the file system on **/dev/sda1**:

**resize2fs /dev/sda1**

Information similar to the following is displayed:

```
ecs-xen-02:/sys/class/scsi_device # resize2fs /dev/sda1
resize2fs 1.41.9 (22-Aug-2009)
Resizing the filesystem on /dev/sda1 to 5242624 (4k) blocks.
The filesystem on /dev/sda1 is now 5242624 blocks long.
```

**Step 15** Run the following command to mount the created partition to the **/mnt/sdc** directory:

**mount /dev/sda1 /mnt/sdc**

**Step 16** Run the following command to view the mounting result for **/dev/sda1**:

**df -TH**

**----End**

# A Change History

| Release Date | Description |
| --- | --- |
| 2019-05-31 | This issue is the eighth official release.<br>This release incorporates the following change:<br>• Added **5.1.7 Querying DESS Information on the Disk List Page**.<br>• Added **5.2.2 Creating a Consistency Snapshot**.<br>• Added **5.2.8 Querying DESS Information on the Snapshot List Page**. |
| 2019-01-31 | This issue is the seventh official release.<br>This release incorporates the following change:<br>• Updated **3.1 Applying for DESS Devices**.<br>• Updated **4.1.3 Expanding a DESS Device**. |
| 2018-12-20 | This issue is the sixth official release.<br>This release incorporates the following change:<br>• Updated **3.3 (Optional) Creating a HyperMetro Consistency Group**.<br>• Updated **3.4 (Optional) Adding HyperMetro Disks**.<br>• Updated **5.3 Managing HyperMetro Consistency Groups**. |
| 2018-10-30 | This issue is the fifth official release.<br>This release incorporates the following change:<br>• Updated **3 Quick Start**.<br>• Updated **4.1 Managing DESS Devices**.<br>• Added **4.2 Managing FC Switches**.<br>• Added **4.3 Managing HyperMetro Resources**.<br>• Updated **5.1 Managing Disks**.<br>• Updated **5.2 Managing Snapshots**.<br>• Added **5.3 Managing HyperMetro Consistency Groups**. |

| Release Date | Description |
| --- | --- |
| 2018-7-30 | This issue is the fourth official release.<br>This release incorporates the following change:<br>• Updated **3.1 Applying for DESS Devices**.<br>• Updated **3.2 Creating Disks**.<br>• Updated **3.5 Attaching a Disk**.<br>• Updated **4 DESS Device Management**.<br>• Updated **5.1.1 Querying a Disk**.<br>• Updated **6 Cloud DR Replication**. |
| 2018-5-30 | This issue is the third official release.<br>This release incorporates the following change:<br>• Updated **3.1 Applying for DESS Devices**.<br>• Updated **3.6 Initializing a Data Disk**.<br>• Updated **4.1.3 Expanding a DESS Device**.<br>• Updated **5.1.1 Querying a Disk**.<br>• Updated **7.4 Performing Post-Expansion Operations for a Windows Disk**. |
| 2018-03-30 | This issue is the second official release.<br>This release incorporates the following change:<br>• Added **3.6 Initializing a Data Disk** and its sections<br>• Added **5.2 Managing Snapshots** and its sections<br>• Updated **3.1 Applying for DESS Devices**.<br>• Updated **7.4 Performing Post-Expansion Operations for a Windows Disk**.<br>• Updated **7.5 Performing Post-Expansion Operations for a Linux Disk (fdisk)**.<br>• Updated **7.6 Performing Post-Expansion Operations for a Linux Disk (Using Parted)**.<br>• Updated **7.7 Performing Post-Expansion Operations for a SLES Disk (fdisk)**. |
| 2018-01-30 | This issue is the first official release. |