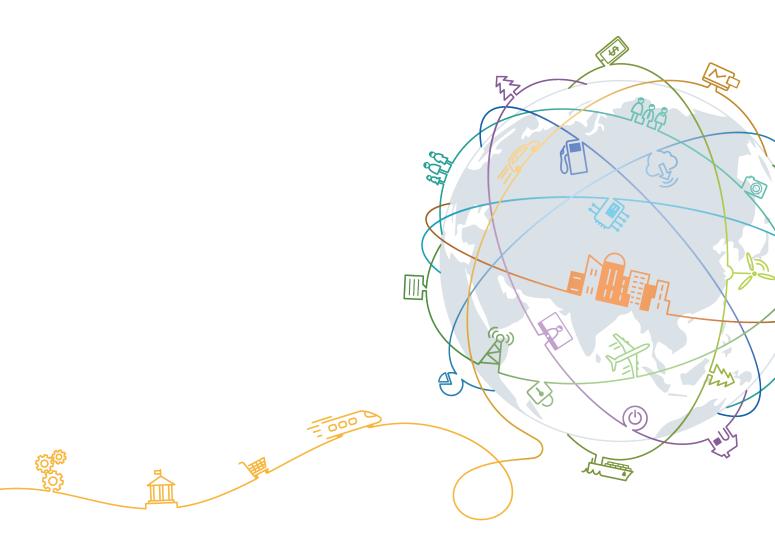
Elastic Volume Service

FAQs

Issue 01

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Contents

1 Summary	1
2 General FAQs	. 4
2.1 How Can I Use a Newly Purchased Disk?	
2.2 Are EVS Disks Online Disks?	4
2.3 Can EVS Disks Be Used Alone?	4
2.4 Will I Be Billed If I Have Purchased an EVS Disk But Not Attached It?	4
2.5 How Can I Stop the Billing on My Disk?	5
2.6 How Can I View the Details of My Disk?	5
2.7 Can I Change the AZ of My Disk?	5
2.8 Can I Change the Sharing Attribute from Shared to Non-shared or the Disk Type from Common I/O to Ultra-high I/O for a Disk?	
2.9 Can I Recover My Disk Data If the Disk Is Unsubscribed, Deleted by Mistake, or Released After the Retention Period?	7
2.10 What Should I Do If an Error Occurs on My EVS Disk?	7
2.11 Why Some of My EVS Disks Do Not Have WWN Information?	8
2.12 How Can I Migrate Data from an EVS Disk?	9
3 Disk Capacity Expansion FAQs	10
3.1 Can I Reduce or Expand the Disk Capacity?	10
3.2 What Are the Differences Between Expanding an EVS Disk and Creating an EVS Disk?	10
3.3 Will My Disk Data Be Lost After I Expand the Disk Capacity?	10
3.4 Can I Use Backups or Snapshots Created Before Capacity Expansion to Restore Data on Expanded Disks?	11
3.5 Do I Need to Restart the Server After Expanding the Disk Capacity?	11
3.6 Do I Need to Detach an EVS Disk Before Expanding Its Capacity?	
3.7 What Should I Do If My Disk Capacity Exceeds 2 TB After Expansion?	12
3.8 How Can I Add the Additional Space to a New Partition (Volume (E:) or Partition dev/vdb2)?	13
3.9 How Can I Add the Additional Space to an Existing Partition (Volume (D:) or Partition dev/vdb1)?	13
3.10 Why My Disk Capacity Remains Unchanged on the Server After Capacity Expansion?	14
3.11 What Should I Do If My EVS Disk Cannot Be Expanded?	14
3.12 How Do I Extend the Root Partition of a Quickly Provisioned BMS?	16
4 Disk Attachment FAQs	20
4.1 Can I Attach a Disk to Multiple Servers?	20
4.2 Can I Attach a Disk to a Server That Belongs to Another AZ?	20

FAQs

_						
•	\sim	n	÷.	$^{\circ}$	n	tc

4.3 Why My Disk Cannot Be Attached?	21
4.4 Why I Cannot View the Attached Data Disk on the Server?	24
4.5 How Can I Add a Data Disk (Disk (D:) or dev/vdb1) to a Server?	26
4.6 Can I Attach a Yearly/Monthly-Billed Disk to Another Server?	27
4.7 Can I Attach Disks of Different Types to the Same Server?	27
4.8 Can I Switch Between System Disks and Data Disks?	27
4.9 What Should I Do If a Linux EVS Disk Is Attached to a Windows Server?	28
4.10 Can I Attach an EVS Disk Purchased with a Yearly/Monthly Server to Another Yearly/Monthly S	
4.11 Can I Change the Mount Point of a System Disk or Data Disk Purchased Along with a Server?.	29
5 Disk Detachment FAQs	30
5.1 Will Data in My Disk Be Lost After I Detach the Disk?	30
5.2 Why My Disk Cannot Be Detached?	31
6 Disk Deletion FAQs	32
6.1 How Can I Delete or Unsubscribe from a Yearly/Monthly Disk?	32
6.2 Can I Get Back Data on the Disk That I Have Mistakenly Deleted?	32
6.3 Why I Cannot Delete My Disk?	32
7 Capacity FAQs	34
7.1 What Is the Maximum Capacity Supported for System Disk and Data Disk Respectively?	34
7.2 What Should I Do If My Disk Space Is Insufficient?	34
7.3 What Can I Do If the Capacity of My Disk Reaches the Maximum But Is Still Insufficient?	35
7.4 What Should I Do When My Disk Capacity That Exceeds 2 TB Cannot Be Displayed After I Initia Using fdisk?	lize It 35
7.5 How Can I View My Disk Usage?	
7.6 How Can I Monitor My Disk Usages?	
7.7 Can I Transfer the Data Disk Capacity to a System Disk?	
8 Performance FAQs	49
8.1 How Can I Test My Disk Performance?	49
8.2 Why My Disk Performance Test Using Fio Has Incorrect Results?	54
8.3 How Can I Handle a Slowdown in Disk Read/Write Speed and Increased I/O?	
8.4 How Can I Improve My Disk Performance?	57
9 Shared Disk FAQs	58
9.1 Do I Must Deploy a Cluster for Using Shared Disks?	58
9.2 How Many Servers Can I Attach a Shared Disk to?	58
9.3 How Can I Attach a Shared Disk to Multiple Servers?	58
9.4 Can a Shared Disk Be Attached to Servers That Belong to Multiple Accounts?	58
9.5 Can I Attach a Shared Disk to Servers Running Different OSs?	59
10 Snapshot FAQs	60
10.1 What May Be the Causes of a Snapshot Creation Failure?	
10.2 Does EVS Support Automatic Snapshot Creation?	60
10.3 Can I Create Snapshots for Multiple Disks at a Time?	60

rays	Contents
10.4 How Is a Snapshot Created for My Disk?	60
10.5 Why I Cannot Roll Back My Disk Data from a Snapshot?	61
10.6 Can I Roll Back the Data from a Snapshot After Reinstalling the OS or Formatting the Disk?	² 61
10.7 How Is the Snapshot Size Calculated?	61
10.8 Do Snapshots Occupy the Disk Space?	61

1 Summary

General FAQs

- How Can I Use a Newly Purchased Disk?
- Are EVS Disks Online Disks?
- Can EVS Disks Be Used Alone?
- Will I Be Billed If I Have Purchased an EVS Disk But Not Attached It?
- How Can I Stop the Billing on My Disk?
- How Can I View the Details of My Disk?
- Can I Change the AZ of My Disk?
- Can I Change the Sharing Attribute from Shared to Non-shared or the Disk Type from Common I/O to Ultra-high I/O for a Disk?
- Can I Recover My Disk Data If the Disk Is Unsubscribed, Deleted by Mistake, or Released After the Retention Period?
- What Should I Do If an Error Occurs on My EVS Disk?
- Why Some of My EVS Disks Do Not Have WWN Information?
- How Can I Migrate Data from an EVS Disk?

Disk Capacity Expansion FAQs

- Can I Reduce or Expand the Disk Capacity?
- What Are the Differences Between Expanding an EVS Disk and Creating an EVS Disk?
- Will My Disk Data Be Lost After I Expand the Disk Capacity?
- Can I Use Backups or Snapshots Created Before Capacity Expansion to Restore Data on Expanded Disks?
- Do I Need to Restart the Server After Expanding the Disk Capacity?
- Do I Need to Detach an EVS Disk Before Expanding Its Capacity?
- What Should I Do If My Disk Capacity Exceeds 2 TB After Expansion?
- How Can I Add the Additional Space to a New Partition (Volume (E:) or Partition dev/vdb2)?
- How Can I Add the Additional Space to an Existing Partition (Volume (D:) or Partition dev/vdb1)?

- Why My Disk Capacity Remains Unchanged on the Server After Capacity Expansion?
- What Should I Do If My EVS Disk Cannot Be Expanded?
- How Do I Extend the Root Partition of a Quickly Provisioned BMS?

Disk Attachment FAQs

- Can I Attach a Disk to Multiple Servers?
- Can I Attach a Disk to a Server That Belongs to Another AZ?
- Why My Disk Cannot Be Attached?
- Why I Cannot View the Attached Data Disk on the Server?
- How Can I Add a Data Disk (Disk (D:) or dev/vdb1) to a Server?
- Can I Attach a Yearly/Monthly-Billed Disk to Another Server?
- Can I Attach Disks of Different Types to the Same Server?
- Can I Switch Between System Disks and Data Disks?
- What Should I Do If a Linux EVS Disk Is Attached to a Windows Server?
- Can I Attach an EVS Disk Purchased with a Yearly/Monthly Server to Another Yearly/Monthly Server?

Disk Detachment FAQs

- Will Data in My Disk Be Lost After I Detach the Disk?
- Why My Disk Cannot Be Detached?

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- How Can I Delete or Unsubscribe from a Yearly/Monthly Disk?
- Can I Get Back Data on the Disk That I Have Mistakenly Deleted?
- Why I Cannot Delete My Disk?

Capacity FAQs

- What Is the Maximum Capacity Supported for System Disk and Data Disk Respectively?
- What Should I Do If My Disk Space Is Insufficient?
- What Can I Do If the Capacity of My Disk Reaches the Maximum But Is Still Insufficient?
- What Should I Do When My Disk Capacity That Exceeds 2 TB Cannot Be Displayed After I Initialize It Using fdisk?
- How Can I View My Disk Usage?
- How Can I Monitor My Disk Usages?
- Can I Transfer the Data Disk Capacity to a System Disk?

Performance FAQs

- How Can I Test My Disk Performance?
- Why My Disk Performance Test Using Fio Has Incorrect Results?

- How Can I Handle a Slowdown in Disk Read/Write Speed and Increased I/O?
- How Can I Improve My Disk Performance?

Shared Disk FAQs

- Do I Must Deploy a Cluster for Using Shared Disks?
- How Many Servers Can I Attach a Shared Disk to?
- How Can I Attach a Shared Disk to Multiple Servers?
- Can I Attach a Shared Disk to Servers Running Different OSs?

Snapshot FAQs

- What May Be the Causes of a Snapshot Creation Failure?
- Does EVS Support Automatic Snapshot Creation?
- Can I Create Snapshots for Multiple Disks at a Time?
- How Is a Snapshot Created for My Disk?
- Why I Cannot Roll Back My Disk Data from a Snapshot?
- Can I Roll Back the Data from a Snapshot After Reinstalling the OS or Formatting the Disk?
- How Is the Snapshot Size Calculated?
- Do Snapshots Occupy the Disk Space?

2 General FAQs

2.1 How Can I Use a Newly Purchased Disk?

You need to first attach the disk to a server, and then log in to the server and initialize the disk.

For details, see Quickly Creating and Using an EVS Disk.

2.2 Are EVS Disks Online Disks?

No.

EVS disks must be attached to cloud servers before use. You cannot use EVS disks alone to store data.

2.3 Can EVS Disks Be Used Alone?

No.

EVS disks must be attached to servers before you store data on them.

2.4 Will I Be Billed If I Have Purchased an EVS Disk But Not Attached It?

You will be billed for the EVS disks right after you have purchased them, regardless of whether they are attached or not.

If your disks are no longer needed, perform the following operations to stop the billing:

- Pay-per-use disk: Simply delete the disk. You will no longer be billed for a disk after it is deleted. For more information, see Deleting an EVS Disk.
- Yearly/monthly disk: A yearly/monthly-billed disk cannot be deleted, but you can unsubscribe from the disk if needed. For the unsubscription rules and operation methods, see **Billing Center User Guide**.

2.5 How Can I Stop the Billing on My Disk?

- Pay-per-use disk: Simply delete the disk. You will no longer be billed for a disk after it is deleted. For more information, see Deleting an EVS Disk.
- Yearly/monthly disk: A yearly/monthly-billed disk cannot be deleted, but you can unsubscribe from the disk if needed. For the unsubscription rules and operation methods, see Billing Center User Guide.

2.6 How Can I View the Details of My Disk?

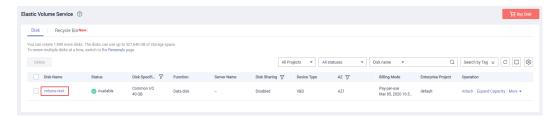
To do so, perform the following operations:

- **Step 1** Log in to the management console.
- Step 2 Under Storage, click Elastic Volume Service.

The disk list page is displayed.

- **Step 3** Locate the row that contains the target disk and view the disk specifications, attributes, and billing mode.
- **Step 4** (Optional) Click the disk name to view more information, such as the disk backup and snapshot information.

View more information on the **Summary** tab.



----End

2.7 Can I Change the AZ of My Disk?

Nο

The AZ of a disk cannot be changed after you have purchased the disk. If you want to change the AZ, unsubscribe or delete the disk and then purchase a new one.

2.8 Can I Change the Sharing Attribute from Shared to Non-shared or the Disk Type from Common I/O to Ultra-high I/O for a Disk?

No.

After a disk is purchased, the disk attributes listed in the following table cannot be changed.

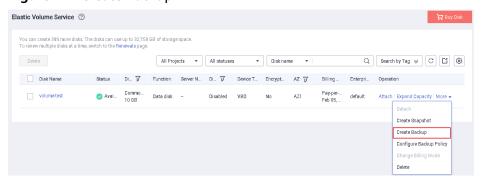
Table 2-1 Disk attributes that cannot be changed

Attribute	Change Direction
Sharing	From shared to non-shared
	From non-shared to shared
Disk type	From common I/O to ultra-high I/O
	From ultra-high I/O to common I/O
	From high I/O to common I/O
	The preceding descriptions are examples only. The disk type cannot be changed.
Device type	From SCSI to VBD
	From VBD to SCSI
Encryption	From non-encrypted to encrypted
	From encrypted to non-encrypted

Is there other change approaches available? You are advised to:

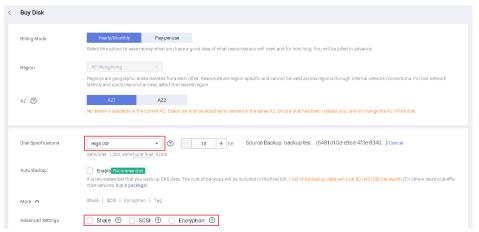
1. Create a backup for the disk.

Figure 2-1 Create Backup



2. Create a new disk from this backup. During the creation, set the disk type and advanced setting (sharing, SCSI, and encryption) that meet your requirement.

Figure 2-2 Buy Disk



2.9 Can I Recover My Disk Data If the Disk Is Unsubscribed, Deleted by Mistake, or Released After the Retention Period?

Check whether a VBS backup is available.

If a VBS backup is available, you can use it to restored data. If you use a VBS backup to create an EVS disk, the EVS disk contains the backup data in its initial state. For details, see Using a Backup to Create a Disk.

Ⅲ NOTE

Disks created from backups do not need to be initialized. Initialization will cause data loss.

If no VBS backups are available, the disk data cannot be recovered.

2.10 What Should I Do If an Error Occurs on My EVS Disk?

If an error occurs, the disk may show one of the states listed in the following table. Take the following measures to handle the exceptions.

Table 2-2 Solutions for disk errors

Error Status	Handling Suggestion
Error	Delete the EVS disk in the Error state and create another one.
	If you select Metered to create the disk and an error occurs during disk creation, no fees are incurred.
	If you select Yearly/Monthly to create the disk and an error occurs during disk creation, customer service personnel will help you handle the error. If you require that the error be handled as soon as possible, contact our customer service personnel.
Deletion failed	Contact customer service personnel.
Expansion failed	Our customer service personnel will contact you and help you handle this error. Do not perform any operations on the disk before the customer service personnel contact you. If you require that the error be handled as soon as possible, contact our customer service personnel.
Restoratio n failed	Our customer service personnel will contact you and help you handle this error. Do not perform any operations on the disk before the customer service personnel contact you. If you require that the error be handled as soon as possible, contact our customer service personnel.
Rollback failed	You can roll back the snapshot to the EVS disk again.

2.11 Why Some of My EVS Disks Do Not Have WWN Information?

EVS disks have two device types: VBD and SCSI. WWNs are used as the unique identifiers for SCSI EVS disks, and VBD EVS disks do not have WWNs.

You can view the WWN of a SCSI EVS disk on the management console. The details are as follows:

• If the SCSI EVS disk is brand new, you can view the disk WWN on the disk details page.

Figure 2-3 shows the query result.

Figure 2-3 Queried WWN information

WWN: (2) 6888603000038430fa17a17502223655

 If the SCSI EVS disk is created before the WWN feature rollout, the disk WWN will fail to obtain.

Figure 2-4 shows the query result.

Figure 2-4 No WWN information



2.12 How Can I Migrate Data from an EVS Disk?

Data migration involves the following scenarios:

- Cross-AZ data migration: Disk data can be migrated from one AZ to another through disk backups. You may create backups for your disks using the CBR service, and then create new disks from these backups in the target AZ. For details, see Creating a Cloud Disk Backup and Using a Backup to Create a Disk.
- Cross-region data migration: Create a data disk image from the data disk in the current region and replicate the image to the other region. Then you can use the data disk image to create data disks. For details, see Creating a Data Disk Image from an ECS Data Disk.
- Cross-account data migration: Create a data disk image from the data disk under an account (account 1) and share the image with another account (account 2). Then you can use the data disk image under account 2 to create data disks. For details, see Creating a Data Disk Image from an ECS Data Disk.

Disk Capacity Expansion FAQs

3.1 Can I Reduce or Expand the Disk Capacity?

Currently, disk capacities can be expanded only.

3.2 What Are the Differences Between Expanding an EVS Disk and Creating an EVS Disk?

The differences are as follows:

- Expanding an EVS disk is to expand the capacity of an existing EVS disk. Some systems support the capacity expansion of in-use EVS disks. In this case, services are not interrupted.
- If you create an EVS disk and attach it to a server, the new EVS disk and the original EVS disk are attached to the same server but independent from each other.

3.3 Will My Disk Data Be Lost After I Expand the Disk Capacity?

Data will not be cleared during a system disk or data disk capacity expansion. However, misoperations during an expansion may cause data loss or exceptions. Therefore, exercise caution when performing capacity expansions. You are advised to back up the disk data before capacity expansions.

- For details about disk backups, see **Cloud Backup and Recovery User Guide**.
- For details about disk snapshots, see Creating a Snapshot (OBT).

3.4 Can I Use Backups or Snapshots Created Before Capacity Expansion to Restore Data on Expanded Disks?

Yes. If backups or snapshots have been created for disks before capacity expansion, you can restore your disk data using these backups or snapshots even after the disk capacity is expanded. Expansion operations do not affect backups and snapshots.

After the disk data is restored, the disk capacity is increased, but the additional space is not allocated. To use the additional space, you must log in to the server and extend the partitions and file systems.

To extend disk partitions and file systems, see the following topics

- Extending Disk Partitions and File Systems (Windows)
- Partition and File System Extension Preparations (Linux)

3.5 Do I Need to Restart the Server After Expanding the Disk Capacity?

An EVS disk can be expanded either in the Available or In-use state. Expanding the disk capacity on the management console only enlarges the disk storage capacity. You must then log in to the server and extend the disk partitions and file systems. You may need to restart the server during the partition and file system extension. The details are as follows:

- After expanding an In-use disk on the management console, log in to the server and view the disk capacity.
 - If the additional space can be viewed, extend the partition and file system directly without a restart.
 - If the additional space cannot be viewed, the server OS may not be included in the compatibility list. Stop and then start the server (do not restart the server). When the additional space can be viewed, extend the partition and file system.
- After expanding an Available disk on the management console, attach the disk to the server and extend the partition and file system on the server. In this case, a server restart is not required.

3.6 Do I Need to Detach an EVS Disk Before Expanding Its Capacity?

An expansion consists of two phases:

- 1. Expand the disk capacity on the management console.
 - A shared, In-use disk cannot be expanded. You must detach the shared disk from all its servers and then expand its capacity.

- A non-shared, In-use disk can be expanded, but you can leave the disk attached during expansion only when all the following conditions are met:
 - The disk's server is in the Running or Stopped state.
 - The disk's server OS supports the expansion of In-use disks.

Only some server OSs support the expansion of In-use disks. For details, see **Expanding Capacity for an In-use EVS Disk**.

- 2. Log in to the server and allocate the additional space to an existing partition or a new partition.
 - In Windows: A partition unmount is not required whatever the extension operation is performed.
 - In Linux:
 - When allocating the additional space to an existing partition, that is, extending an existing partition, you must use the umount command to unmount the partition first and then perform subsequent operations.
 - When allocating the additional space to a new partition, that is, creating a new partition, you do not need to unmount the existing partition.

3.7 What Should I Do If My Disk Capacity Exceeds 2 TB After Expansion?

An EVS system disk supports up to 1 TB (1024 GB). You can expand the capacity of a system disk to up to 1 TB.

An EVS data disk supports up to 32 TB (32768 GB).

- With MBR, the disk space exceeding 2 TB cannot be allocated and used, because the maximum disk capacity supported by MBR is 2 TB (2048 GB).
 - In this case, if you want to expand the disk capacity to over 2 TB, change the partition style from MBR to GPT. Ensure that the disk data has been backed up before changing the partition style because services will be interrupted and data on the disk will be cleared during this change.
- With GPT, you can expand the capacity of a data disk to up to 32 TB because the maximum disk capacity supported by GPT is 18 EB (19327352832 GB).
 - If the in-use partition style is GPT, perform the extension operation according to the following topics:
 - Windows:
 - Extending Disk Partitions and File Systems (Windows)
 - Linux:

Extending Partitions and File Systems for Data Disks (Linux)

3.8 How Can I Add the Additional Space to a New Partition (Volume (E:) or Partition dev/vdb2)?

Windows

In Windows, if your disk already has **Volume (D:)** and you want to create **Volume (E:)**, see **System Disk: Add Additional Space to New Volume (F:)** and **Data Disk: Add Additional Space to New Volume (E:)** in the following topic: (The volume names here are used for reference only.)

Extending Disk Partitions and File Systems (Windows)

Linux

In Linux, if your disk already has partition **dev/vdb1** and you want to create a new partition **dev/vdb2** and allocate the additional space to the new partition, see the following topics: (The partition names here are used for reference only.)

See **Creating a New MBR Partition** and **Creating a New GPT Partition** in the following topics:

- Extending Partitions and File Systems for System Disks (Linux)
- Extending Partitions and File Systems for Data Disks (Linux)

3.9 How Can I Add the Additional Space to an Existing Partition (Volume (D:) or Partition dev/vdb1)?

Windows

In Windows, if your disk already has **Volume (D:)** and you want to add the additional space to this volume, see the following topic: (The volume names here are used for reference only.)

See System Disk: Add Additional Capacity to New Volume (C:) and Data Disk: Add Additional Capacity to New Volume (D:) in the following topic:

Extending Disk Partitions and File Systems (Windows)

Linux

In Linux, if your disk already has partition **dev/vdb1** and you want to allocate the additional space to this partition, see the following topics: (The partition names here are used for reference only.)

See Extending an Existing MBR Partition and Extending an Existing GPT Partition in the following topics:

- Extending Partitions and File Systems for System Disks (Linux)
- Extending Partitions and File Systems for Data Disks (Linux)

3.10 Why My Disk Capacity Remains Unchanged on the Server After Capacity Expansion?

After expanding the disk capacity on the management console, you must log in to the server and extend the disk partition and file system for it to take effect. Otherwise, you cannot view the additional space on the server.

To extend disk partitions and file systems, see the following topics

- Extending Disk Partitions and File Systems (Windows)
- Partition and File System Extension Preparations (Linux)

3.11 What Should I Do If My EVS Disk Cannot Be Expanded?

Symptom

An EVS disk cannot be expanded.

Fault Locating

The following fault causes are sequenced based on their occurrence probability.

If the fault persists after a possible cause is rectified, check other possible causes.

Figure 3-1 Fault locating

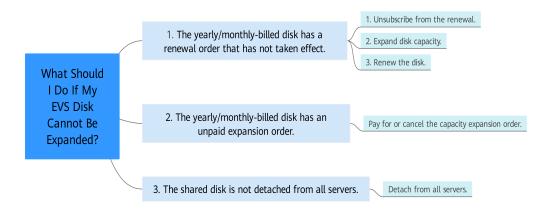


Table 3-1 Fault locating

Probable Cause	Solution
The yearly/monthly-billed disk has a renewal order that has not taken effect.	See Yearly/Monthly-billed Disk Has a Renewal Order That Has Not Taken Effect.

Probable Cause	Solution
The yearly/monthly-billed disk has an unpaid expansion order.	See Yearly/Monthly-billed Disk Has An Unpaid Expansion Order.
The shared disk is not detached from servers.	See Shared Disk Is Not Detached from Servers.

Yearly/Monthly-billed Disk Has a Renewal Order That Has Not Taken Effect

What Is a Renewal Order That Has Not Taken Effect?

For example, a user has purchased a yearly/monthly disk, and the disk expired on December 30, 2019.

If the user renewed the disk on December 15, 2019, the order is a renewal order that has not taken effect before December 30, 2019.

Symptom: A message is displayed in the upper right corner of the console, indicating that the disk cannot be expanded because it has a renewal order that has not taken effect.

Solution: Cancel the renewal order that has not taken effect, expand the disk capacity, and renew the disk again.

- **Step 1** Log in to the management console and click **Billing Center** in the upper right corner.
- **Step 2** In the navigation pane on the left, choose **Unsubscriptions and Changes** > **Unsubscriptions**.
- **Step 3** Locate the target order and choose **More > Unsubscribe from Renewal** in the **Operation** column.
- **Step 4** After the unsubscription is complete, go to the EVS console and expand the disk capacity.
- **Step 5** Renew the disk after the capacity expansion succeeded.

----End

Yearly/Monthly-billed Disk Has An Unpaid Expansion Order

Symptom: The **Expand Capacity** hyperlink is unavailable and the following hover tip is displayed: This operation cannot be performed because the disk has unpaid orders.

Solution: Pay for or cancel the capacity expansion order.

Step 1 On the EVS console, click **Unpaid** in the **Status** column.

The order details page is displayed.

Step 2 Click Pay or Cancel Order.

Step 3 Return to the EVS disk list. If the **Expand Capacity** hyperlink is available, the operation is successful.

----End

Shared Disk Is Not Detached from Servers

Symptom: The **Expand Capacity** hyperlink is unavailable. When you click the capacity expansion button, the following hover tip is displayed: This operation can be performed only when the shared disk is in the Available state.

Solution: Detach the disk from all servers. If the **Expand Capacity** hyperlink is available, you can expand the disk capacity.

Submitting a Service Ticket

If the problem persists, submit a service ticket.

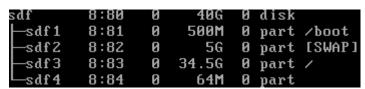
3.12 How Do I Extend the Root Partition of a Quickly Provisioned BMS?

Scenarios

If the root partition size of your quickly provisioned BMS is insufficient, extend the root partition according to the following procedure.

In this example, CentOS 7.3 and system disk /dev/sdf are used. The method for allocating the additional space varies with the server OS. This example is used for reference only. For detailed operations and differences, see the corresponding OS documents.

In this example, the initial size of the BMS system disk is 40 GB and needs to be expanded to 140 GB. Details of the disk partitions are as follows:



Procedure

- **Step 1** Log in to the EVS console and expand the system disk capacity to 140 GB.
- **Step 2** Log in to the BMS and run the following command to view the system disk capacity:

lsblk

Information similar to the following is displayed:

```
8:80
                     140G
-sdf 1
        8:81
                0
                     500M
                            0
                              part /boot
-sdf2
        8:82
                0
                       5G
                            0 part [SWAP]
        8:83
                0
                    34.5G
sdf3
                            0
                              part /
sdf4
        8:84
                0
                      64M
                              part
```

The system disk capacity has been expanded from 40 GB to 140 GB. The **sdf4** partition (64 MB) is the configdriver partition that stores the BMS configuration information.

Step 3 Run the following command to back up the content in the configdriver partition:

dd if=/dev/sdf4 of=/root/configdriver.img

Information similar to the following is displayed:

```
[root@bms-6acd ~]# dd if=/dev/sdf4 of=/root/configdriver.img
131072+0 records in
131072+0 records out
67108864 bytes (67 MB) copied, 0.291739 s, 230 MB/s
```

Step 4 Run the following command to delete the configdriver partition:

fdisk /dev/sdf

```
Iroot@bms-6acd ~1# fdisk /dev/sdf
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
Partition number (1-4, default 4): 4
Partition 4 is deleted

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.
```

Step 5 Run the **partprobe** command to update the partition information.

Information similar to the following is displayed: (Partition configdriver is deleted.)

```
8:80
               0
                    140G
                           0
sdf 1
       8:81
               0
                    500M
                           0
                             part /boot
sdf2
       8:82
               0
                      5G
                           0
                             part [SWAP]
sdf3
       8:83
               0
                   34.5G
                           0 part /
       8:84
               0
                   97.7M 0 part
```

Step 6 Recreate the configdriver partition with 100 MB.

If the available sectors range from 83755008 to 293601279, set 293401279 (293601279 – 200000) as the new partition's start sector and 293601279 (default value) as the end sector.

```
Command (m for help): n
Partition type:
    p    primary (3 primary, 0 extended, 1 free)
    e    e    extended
Select (default e): p
Selected partition 4
First sector (83755008-293601279, default 83755008): 293401279
Last sector, +sectors or +size{K,M,G} (293401279-293601279, default 293601279):
Using default value 293601279
Partition 4 of type Linux and of size 97.7 MiB is set

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.
```

Run the **partprobe** command to update the partition information.

```
0
        8:80
                    140G
                           0 disk
sdf 1
        8:81
                0
                    500M
                           0
                             part /boot
-sdf2
        8:82
                0
                       5G
                           0 part [SWAP]
sdf3
        8:83
                0
                   34.5G
                           0 part /
sdf4
        8:84
                0
                   97.7M
                          0 part
```

Step 7 Run the following command to extend the root partition:

growpart /dev/sdf 3

Information similar to the following is displayed:

```
Iroot@bms-6acd ~1# growpart /dev/sdf 3
CHANGED: partition=3 start=11511808 old: size=72243200 end=83755008 new:size=28
1889471,end=293401279
```

Run the **lsblk** command to view the root partition size after extension.

```
8:80
                  Й
                       140G
                              0 disk
sdf
 -sdf1
          8:81
                  И
                       500M
                              0 part /boot
                  0
                         5G
 -sdf2
          8:82
                              0 part [SWAP]
  sdf3
          8:83
                  0
                    134.4G
                              0 part /
          8:84
                      97.7M
                              0 part
  sdf4
                  0
```

Step 8 Run the following command to extend the file system of the root partition:

resize2fs /dev/sdf3

Information similar to the following is displayed:

```
[root@bms-6acd ~]# resize2fs /dev/sdf3
resize2fs 1.42.9 (28-Dec-2013)
Filesystem at /dev/sdf3 is mounted on /; on-line resizing required
old_desc_blocks = 5, new_desc_blocks = 17
The filesystem on /dev/sdf3 is now 35236183 blocks long.
You have new mail in /var/spool/mail/root
[rootObms-6acd ~]# df -h
Filesystem
                Size Used Avail Use% Mounted on
                      1.9G 125G 2% /
/dev/sdf3
               133G
devtmpfs
                 63G
                         0
                             63G
                                    0% /dev
tmpfs
                 63G
                         0
                             63G
                                    0% /dev/shm
tmpfs
                 63G
                      9.0M
                             63G
                                    1% /run
tmpfs
                 63G
                         0
                             63G
                                    0% /sys/fs/cgroup
                477M
                            344M
/dev/sdf1
                      104M
                                   24% /boot
                              13G
tmpfs
                 13G
                         0
                                    0% /run/user/0
```

Step 9 Run the following command to restore the content of the configdriver partition:

dd if=/root/configdriver.img of=/dev/sdf4

Information similar to the following is displayed:

The root partition of the quickly provisioned BMS has been extended.

----End

4 Disk Attachment FAQs

4.1 Can I Attach a Disk to Multiple Servers?

- A non-shared disk can be attached to one server only.
- A shared disk can be attached to a maximum of 16 servers. For operation details about shared disks, see Shared EVS Disks and Usage Instruction.

- Shared disks are a type of EVS disks that can be attached to multiple servers.
- To use shared disks, you must set up a shared file system or cluster management system. If you directly attach a disk to multiple servers, the disk sharing attribute does not work and data may be overwritten.

4.2 Can I Attach a Disk to a Server That Belongs to Another AZ?

No.

Disks and the servers you attach the disks must be in the same AZ, which is also applicable to shared disks. That is, a shared disk must be attached to the servers in the same AZ.

If your disk and server are in different AZs, do as follows:

- Disk is empty, or data on the disk is no longer needed.
 Delete or unsubscribe from the disk. Then, purchase a new disk in the AZ where the server belongs. For how to delete a disk, see Deleting an EVS Disk.
- Data on the disk is required.

Create a backup for the disk using the CBR service. Then, use this backup to create a new disk. During the disk creation, select the AZ where the server belongs. For details, see Creating a Cloud Disk Backup and Using a Backup to Create a Disk.

4.3 Why My Disk Cannot Be Attached?

Symptom

My disk cannot be attached to a server.

Troubleshooting

Possible causes are sequenced based on their occurrence probability.

If the fault persists after you have ruled out one cause, check other causes.

Figure 4-1 Troubleshooting

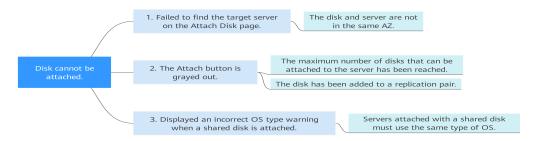


Table 4-1 Troubleshooting

Symptom	Solution
Failed to find the target server on the Attach Disk page.	Go to Check Whether the Disk and Server Are in the Same AZ.
The Attach button is grayed out.	 Go to Maximum Number of Disks That Can Be Attached to the Server Has Been Reached. Go to Check Whether the Disk Has Been Added to a Replication Pair.
Displayed an incorrect OS type warning when a shared disk is attached.	Go to Check Whether the Servers Attached with the Shared Disk Are Running the Same Type of OS.

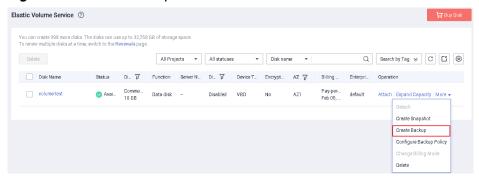
Check Whether the Disk and Server Are in the Same AZ

Symptom: After you click **Attach**, the target server cannot be found on the **Attach Disk** page.

Solution: A disk can only be attached to a server that belongs to the same AZ within a region. The **Attach Disk** page filters and shows all the servers that the disk can be attached to. Determine whether your disk data is required.

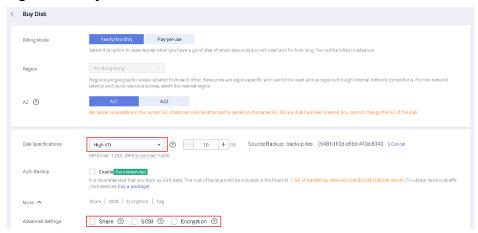
- If the disk data is no longer needed, delete or unsubscribe from the disk, and then purchase a new disk in the AZ where your target server belongs.
- If the disk data is still required, create a new disk with the same data in the target AZ. The procedure is as follows:
 - a. Create a backup for the disk.

Figure 4-2 Create Backup



 Create a new disk from this backup. During the creation, select the target AZ. You can also change the settings of **Disk Type** and **Advanced Settings** if needed.

Figure 4-3 Buy Disk



c. After the disk is created, click **Attach**. Your target server is displayed on the **Attach Disk** page.

Maximum Number of Disks That Can Be Attached to the Server Has Been Reached

Symptom: The **Attach** button is grayed out.

Solution:

 Non-shared disk: When you hover the mouse over the Attach button, message "This operation can be performed only when the disk is in the Available state" is displayed.

A non-shared disk can be attached to one server only. If the disk status is **Inuse**, the disk has been attached. You can detach the disk, wait until the disk status changes to **Available**, and then attach the disk to the target server.

Shared disk: When you hover the mouse over the Attach button, message
"This operation cannot be performed because the maximum number of
servers that a shared disk can be attached to has been reached" is displayed.

A shared disk can be attached to a maximum of 16 servers. You can detach
the shared disk from one server and attach it to the target server based on
service needs.

Check Whether the Disk Has Been Added to a Replication Pair

Symptom: The **Attach** button is grayed out. When you hover the mouse over the **Attach** button, message "This operation cannot be performed on a disk in a replication pair" is displayed.

Solution: Delete the replication pair and attach the disk again.

Step 1 Choose **Storage** > **Storage Disaster Recovery Service**.

The **Storage Disaster Recovery Service** page is displayed.

Step 2 Locate the protection group containing the disk and click the protection group name.

The protection group details page is displayed.

Step 3 Click the Replication Pairs tab.

Check that the disk in the **Production Site Disk** column is the target disk.

- **Step 4** Confirm the information and click **Delete** in the **Operation** column.
- **Step 5** After the replication pair is deleted, return to the disk list, and the disk can be attached.

----End

Check Whether the Servers Attached with the Shared Disk Are Running the Same Type of OS

Symptom: After you click **Attach**, the target server cannot be selected on the **Attach Disk** page, and message "A shared disk must be attached to servers with the same OS type" is displayed.

Solution: This message indicates that the OS type of the target server is inconsistent with that of the servers attached with the shared disk. Change the OS type based your service requirements.

Submit a Service Ticket

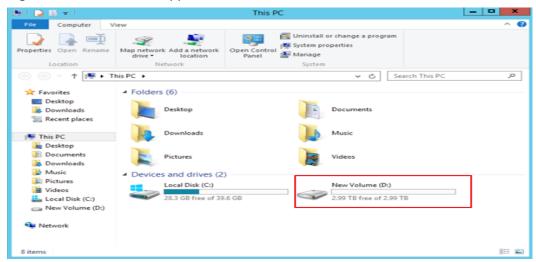
If the problem persists, submit a service ticket.

4.4 Why I Cannot View the Attached Data Disk on the Server?

Windows data disk

Symptom: A data disk has been attached to a Windows server on the management console, but the disk cannot be viewed on the server. For example, Volume (D:) does not appear in **This PC** of a Windows server running Windows Server 2012. Normally, Volume (D:) appears, as shown in **Figure 4-4**.

Figure 4-4 Volume (D:) appears



Solution: A new data disk does not have partitions and file systems by default so that they will not appear in **This PC**. You must manually initialize the disk.

For details, see Introduction to Data Disk Initialization Scenarios and Partition Styles.

Linux data disk

Symptom: A data disk has been attached to a Linux server on the management console, but the disk cannot be viewed on the server. For example, after the **df** - **TH** command is executed to view disk information in a Linux server running CentOS 7.4, only system disk **/dev/vda1** is displayed in the command output. Data disk **/dev/vdb1** does not appear.

```
[root@ecs-test-0001 ~]# df -TH
                  Size Used Avail Use% Mounted on
Filesystem
           Type
                  43G 1.9G 39G 5% /
/dev/vda1
           ext4
           devtmpfs 2.0G 0 2.0G 0% /dev
devtmpfs
tmpfs
          tmpfs 2.0G 0 2.0G 0% /dev/shm
                 2.0G 9.1M 2.0G 1% /run
tmpfs
          tmpfs
tmpfs
          tmpfs
                  2.0G
                      0 2.0G 0% /sys/fs/cgroup
                 398M 0 398M 0% /run/user/0
tmpfs
          tmpfs
/dev/vdb1
           ext4
                 106G 63M 101G 1% /mnt/sdc
```

Solution

• **Method 1**: A new data disk does not have partitions and file systems by default so that they will not appear in the returned disk information. You must manually initialize the disk.

For details, see Introduction to Data Disk Initialization Scenarios and Partition Styles.

- **Method 2**: If the data disk cannot be found after the server is restarted, automatic partition mounting at system start may not be configured. Perform the following steps:
 - a. Run the following command to mount the partition again:

mount Disk partition Mount point

In this example, run the following command:

mount /dev/vdb1 /mnt/sdc

Perform the following steps to enable automatic partition mounting at system start:

b. Run the following command to guery the partition UUID:

blkid Disk partition

In this example, run the following command to query the UUID of the /dev/vdb1 partition:

blkid /dev/vdb1

Information similar to the following is displayed:

[root@ecs-test-0001 ~]# blkid /dev/vdb1 /dev/vdb1: UUID="0b3040e2-1367-4abb-841d-ddb0b92693df" TYPE="ext4"

The UUID of the /dev/vdb1 partition is displayed.

c. Run the following command to open the **fstab** file using the vi editor:

vi /etc/fstab

Press i to enter editing mode.

d. Move the cursor to the end of the file and press Enter. Then, add the following information:

UUID=0b3040e2-1367-4abb-841d-ddb0b92693df /mnt/sdc

ext4 defaults 0 2

The preceding content is used for reference only. Add the information that is used in the environment. The parameters are described as follows:

- The first column indicates the partition UUID obtained in b.
- The second column indicates the directory on which the partition is mounted. You can query the mount point using the df -TH command.
- The third column indicates the file system format of the partition. You can query the file system format using the df -TH command.
- The fourth column indicates the partition mount option. Normally, this parameter is set to defaults.
- The fifth column indicates the Linux dump backup option.
 - **0**: not use Linux dump backup. Normally, dump backup is not used, and you can set this parameter to **0**.
 - 1: use Linux dump backup.

- The sixth column indicates the fsck option, that is, whether to use fsck to check the attached disk during startup.
 - **0**: not use fsck.
 - If the mount point is the root partition (/), this parameter must be set to 1.

When this parameter is set to **1** for the root partition, this parameter for other partitions must start with **2** because the system checks the partitions in the ascending order of the values.

e. Press **Esc**, enter :wq, and press **Enter**.

The system saves the configurations and exits the vi editor.

Perform the following operations to verify the automatic mounting function:

i. Run the following command to unmount the partition:

umount Disk partition

In this example, run the following command:

umount /dev/vdb1

ii. Run the following command to reload all the content in the /etc/ fstab file:

mount -a

iii. Run the following command to query the file system mounting information:

mount | grep Mount point

In this example, run the following command:

mount | grep /mnt/sdc

If information similar to the following is displayed, the automatic mounting function takes effect:

root@ecs-test-0001 ~]# mount | grep /mnt/sdc /dev/vdb1 on /mnt/sdc type ext4 (rw,relatime,data=ordered)

4.5 How Can I Add a Data Disk (Disk (D:) or dev/vdb1) to a Server?

Data disks can be purchased during or after the server purchase. If you purchase data disks during the server purchase, the system will automatically attach the data disks to the server. If you purchase data disks after the server creation, you need to manually attach the purchased data disks to the server.

- On a Windows server:
 - If a data disk is purchased along with the server, you need to log in to the server and initialize the disk. The data disk, for example **Disk (D:)**, can be viewed after the initialization succeeds.
 - If a data disk is not purchased along with the server, you need to purchase a data disk and attach it to the server. Then, log in to the server and initialize the disk. The data disk, for example **Disk (D:)**, can be viewed after the initialization succeeds.

• On a Linux server:

- If a data disk is purchased along with the server, you need to log in to the server and initialize the disk. The data disk, for example dev/vdb1, can be viewed after the initialization succeeds and the disk has been mounted via the mount command.
- If a data disk is not purchased along with the server, you need to purchase a data disk and attach it to the server. Then, log in to the server and initialize the disk. The data disk, for example dev/vdb1, can be viewed after the initialization succeeds and the disk has been mounted via the mount command.

For details, see Introduction to Data Disk Initialization Scenarios and Partition Styles.

4.6 Can I Attach a Yearly/Monthly-Billed Disk to Another Server?

If the yearly/monthly-billed disk is purchased along with a server and they are in the same order, the disk cannot be attached to another server.

If the yearly/monthly-billed disk is purchased on the EVS console and is not in the same order with any server, it can be attached to another server.

4.7 Can I Attach Disks of Different Types to the Same Server?

Yes. EVS disks of different types (high I/O, general purpose SSD, ultra-high I/O, and extreme SSD) can be attached to the same server. You only need to make sure that these disks and the server are in the same AZ.

4.8 Can I Switch Between System Disks and Data Disks?

Whether you can switch between system and data disks is determined by the disk billing mode.

Pay-per-Use Disks

Table 4-2 Detaching and reattaching of pay-per-use EVS disks

Original Mount Point	Attached Server	New Mount Point	Supported
System disk	Attach to the same	System disk	√
(It becomes a boot disk after being detached.)	server	Data disk	√

Original Mount Point	Attached Server	New Mount Point	Supported
	Attach to other		√
servers		Data disk	√
server	Attach to the same	System disk	×
	server	Data disk	√
	Attach to other servers	System disk	×
		Data disk	√

Yearly/Monthly Disks

- Yearly/monthly-billed EVS disks purchased along with yearly/monthly-billed servers belong to the same order and they have attachment relationships. After such EVS disks are detached, they cannot be re-attached to other servers.
 - You can detach a system disk and then re-attach it to the same server as a system disk or data disk.
 - You can detach a data disk and then re-attach it to the same server as a data disk.
- Yearly/monthly-billed EVS disks that are separately purchased can serve as data disks only. You can detach such a disk and then re-attach it to the same server or other servers as a data disk.

4.9 What Should I Do If a Linux EVS Disk Is Attached to a Windows Server?

You are not advised to attach a Linux EVS disk to a Windows server or attach a Windows EVS disk to a Linux server.

The disk information may fail to be displayed due to inconsistent file systems. To solve this issue, you need to initialize and partition the disk again. Formatting a disk will cause data loss. Therefore, create a backup for the data disk in advance to prevent data loss.

4.10 Can I Attach an EVS Disk Purchased with a Yearly/Monthly Server to Another Yearly/Monthly Server?

No.

A yearly/monthly-billed EVS disk purchased with a yearly/monthly-billed server cannot be attached to other servers.

4.11 Can I Change the Mount Point of a System Disk or Data Disk Purchased Along with a Server?

This topic describes how to change the mount point of a disk attached to the same servers. For details about how to attach disks to other servers, seeCan I Switch Between System Disks and Data Disks?

• System disk purchased along with a server: You can detach the system disk and then re-attach it to the same server as a system disk or data disk.

™ NOTE

Each server can have only one system disk. If there is already a system disk attached to the server, then the detached system disk cannot be attached as a system disk.

• Data disk purchased along with a server: You can detach the data disk and then re-attach it to the same server only as a system disk.

5 Disk Detachment FAQs

5.1 Will Data in My Disk Be Lost After I Detach the Disk?

Determine whether your disk is encrypted or not.

- Encrypted disk
 - CMK is disabled or scheduled for deletion.

Before you detach an EVS disk encrypted by a CMK, check whether the CMK is disabled or scheduled for deletion. If the CMK is unavailable, the disk can still be used, but normal read/write operations are not guaranteed permanently. If the disk is detached and then re-attached, reattaching this disk will fail. In this case, do not detach the disk and restore the CMK status first.

The restoration method varies depending on the CMK status. For details, see **EVS Disk Encryption**.

CMK is available.

If the CMK is available, the disk can be detached and re-attached, and data on the disk will not be lost.

To ensure your data safety, you are advised to perform operations according to **Disk detachment process**.

Non-encrypted disk

Data on a disk will not be lost after the disk is detached, and the disk can be re-attached later if needed.

To ensure your data safety, you are advised to perform operations according to **Disk detachment process**.

Disk detachment process

- For disks not supporting online detachment:
 - a. Stop the server where the disk has been attached.
 - b. After the server is stopped, detach the disk.

FAQs

• For disks supporting online detachment:

Detach the disk from a running ECS. For details, see **Management** > **Detaching an EVS Disk from a Running ECS** in the *Elastic Cloud Server User Guide*.

5.2 Why My Disk Cannot Be Detached?

EVS disks can be used as system disks or data disks. The method of detaching a system disk is different from detaching a data disk.

•	System disk detachment: A system disk can only be detached offline. You must first stop the server that uses this system disk and then detach the disk.
	□ NOTE ■
	In Linux, a system disk is mounted on /dev/vda. In Windows, a system disk is Volume

• Data disk detachment: A data disk can be detached online or offline.

□ NOTE

(C:).

In Linux, a data disk is mounted on a mount point other than /dev/vda. In Windows, a data disk is a volume other than Volume (C:).

- Offline detachment: The server must be in the **Stopped** state. If not, stop the server and then detach the data disk.
- Online detachment: Some OSs support online detachment. In this case, you do not need to stop the server before detaching the data disk. For more information, see Detaching an EVS Disk from a Running ECS.

6 Disk Deletion FAQs

6.1 How Can I Delete or Unsubscribe from a Yearly/ Monthly Disk?

Cannot be deleted, but you can unsubscribe from the disk if needed. For details about the unsubscription rules and operation methods, see **Billing Center User Guide**.

If your yearly/monthly disk is purchased along with a yearly/monthly server, the disk cannot be unsubscribed from independently but must be unsubscribed from along with its server.

6.2 Can I Get Back Data on the Disk That I Have Mistakenly Deleted?

Check whether the disk has any snapshot or backup created.

 If yes, use the snapshot or backup to restore the disk data to the time point where the snapshot or backup was created. For details, see Rolling Back Data from a Snapshot (OBT) or Restoring Data Using a Cloud Disk Backup.

NOTICE

If the disk is deleted after the last snapshot or backup was created, the lost data cannot be restored.

• If no, the disk data cannot be restored.

6.3 Why I Cannot Delete My Disk?

Check whether the following conditions are met:

Pay-per-use disk:

Can be deleted only when all the following conditions are met:

- The disk status is Available, Error, Expansion failed, Restoration failed, or Rollback failed.
- The disk is not added to any replication pair in SDRS. If the disk has been added to a replication pair, delete the replication pair and then delete the disk.
- The disk is not locked by any service.
- Yearly/Monthly disk:

Cannot be deleted, but you can unsubscribe from the disk if needed. For details about the unsubscription rules and operation methods, see **Billing Center User Guide**.

7 Capacity FAQs

7.1 What Is the Maximum Capacity Supported for System Disk and Data Disk Respectively?

The maximum capacity supported for a system disk is 1024 GB.

The maximum capacity supported for a data disk is 32768 GB.

7.2 What Should I Do If My Disk Space Is Insufficient?

When your disk space is insufficient, you can handle the insufficiency in the following ways:

- Create a new disk and attach it to a server.
- Expand the capacity of an existing disk. Both system disks and data disks can be expanded.
- Clear the disk space according to the following topic:
 - Handling Insufficient Disk Space on a Windows ECS

Differences Between Expanding an EVS Disk and Creating an EVS Disk

The differences are as follows:

- Expanding an EVS disk is to expand the capacity of an existing EVS disk. Some systems support the capacity expansion of in-use EVS disks. In this case, services are not interrupted.
- If you create an EVS disk and attach it to a server, the new EVS disk and the original EVS disk are attached to the same server but independent from each other.

7.3 What Can I Do If the Capacity of My Disk Reaches the Maximum But Is Still Insufficient?

The capacity of a single disk can be expanded to up to 32 TB. If this still fails to meet your needs, it is recommended that you create RAID arrays with EVS disks or manage EVS disks using LVM.

7.4 What Should I Do When My Disk Capacity That Exceeds 2 TB Cannot Be Displayed After I Initialize It Using fdisk?

If your disk capacity is greater than 2 TB, do not use the fdisk partition tool. Otherwise, the disk capacity exceeding 2 TB cannot be displayed after initialization.

In this case, use the parted partition tool to repartition the disk. Meanwhile, choose the GPT partition style during the repartition because the maximum disk capacity supported by the MBR partition style is 2 TB.

For details, see Introduction to Data Disk Initialization Scenarios and Partition Styles.

7.5 How Can I View My Disk Usage?

You can view disk usages in either of the following ways:

- Install Agent to View Disk Usage
- View disk usages manually.

The method of viewing the disk usage varies depending on the OS in use. This FAQ uses Windows Server 2008, Windows Server 2016, and Linux as the sample OSs to describe how to view the disk usage.

- Windows Server 2008
- Windows Server 2016
- Linux

Install Agent to View Disk Usage

Some disk monitoring metrics require that the agent to be installed.

- For instructions about how to install the agent on a Windows ECS, see "Installing and Configuring the Agent (Windows)" in the *Cloud Eye User Guide*.
- For instructions about how to install the agent on a Linux ECS, see "Installing and Configuring the Agent (Linux)" in the *Cloud Eye User Guide*.

Table 7-1 Disk metrics

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_free	(Agent) Available Disk Space	Free space on the disks Unit: GB Linux: Run the df -h command to check the value in the Avail column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_total	(Agent) Disk Storage Capacity	Total space on the disks, including used and free Unit: GB Linux: Run the df -h command to check the value in the Size column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_used	(Agent) Used Disk Space	Used space on the disks Unit: GB Linux: Run the df -h command to check the value in the Used column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_used Percent	(Agent) Disk Usage	Percentage of total disk space that is used, which is calculated as follows: Disk Usage = Used Disk Space/Disk Storage Capacity Unit: percent Linux: It is calculated as follows: Used/Size. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must	0-100	ECS	-
		start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).			

Windows Server 2008

The version of the sample OS is Windows Server 2008 R2 Enterprise 64bit.

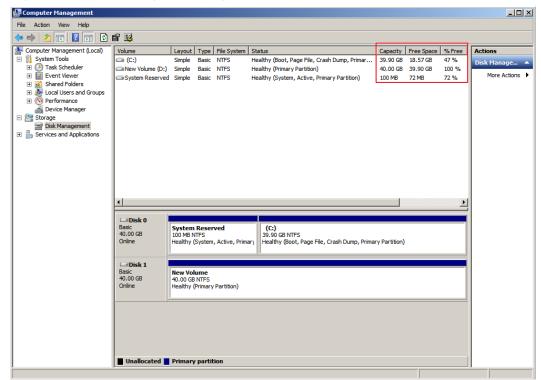
Step 1 On the desktop of the server, right-click **Computer** and choose **Manage** from the shortcut menu.

The **Server Manager** window is displayed.

Step 2 In the navigation tree on the left, choose **Storage** > **Disk Management**.

The sizes and available spaces of the volumes on the current disk are displayed in the right pane.

Figure 7-1 Disk Management page



----End

Windows Server 2016

The version of the sample OS is Windows Server 2016 Standard 64bit.

- **Step 1** On the desktop of the server, click the start icon in the lower left corner. The **Windows Server** window is displayed.
- Step 2 Click Server Manager.

The **Server Manager** window is displayed.

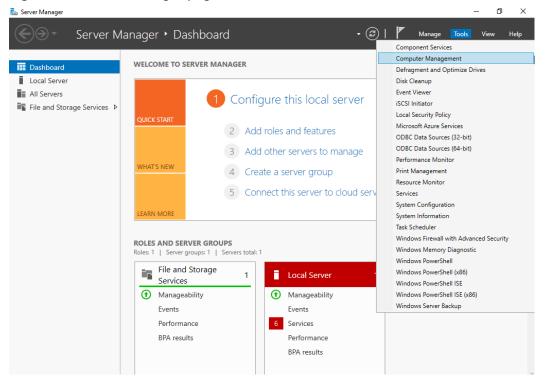


Figure 7-2 Server Manager page

- **Step 3** In the upper right corner, choose **Tools** > **Computer Management**.
- **Step 4** Choose **Storage** > **Disk Management**.

In the right pane, you can view the sizes and available spaces of the volumes on the disk.

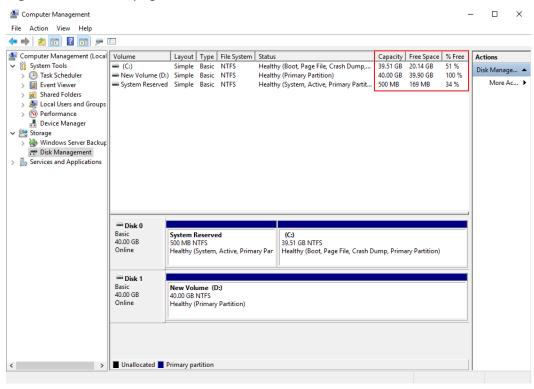


Figure 7-3 Disk list page

----End

Linux

The version of the sample OS is CentOS 7.4 64bit. The operation varies depending on whether you want to view the available space.

To query the total capacity only, run the **lsblk** command.

Information similar to the following is displayed:

```
[root@ecs-test-0001 ~]# lsblk

NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT

vda 253:0 0 40G 0 disk

—vda1 253:1 0 40G 0 part /

vdb 253:16 0 40G 0 disk

—vdb1 253:17 0 40G 0 part
```

In the command output, the server has two disks, /dev/vda and /dev/vdb. Disk /dev/vda has 40 GB and serves as the system disk, and disk /dev/vdb has 40 GB and serves as a data disk.

To query the total capacity and available space, run the df -TH command.
 Ensure that the disk has been attached and initialized before running this command.

Information similar to the following is displayed:

```
[root@ecs-0001 ~]# df -TH
                 Size Used Avail Use% Mounted on
Filesystem
          Type
                  43G 2.0G 39G 5%/
/dev/vda1
           ext4
           devtmpfs 509M 0 509M 0% /dev
devtmpfs
         tmpfs 520M 0 520M 0% /dev/shm
tmpfs
tmpfs
          tmpfs
                520M 7.2M 513M 2% /run
                520M 0 520M 0% /sys/fs/cgroup
tmpfs
         tmpfs
               104M 0 104M 0% /run/user/0
tmpfs
          tmpfs
/dev/vdb1
         ext4
                43G 51M 40G 1% /mnt/sdc
```

In the command output, the server has two partitions, /dev/vda1 and /dev/vdb1. Partition /dev/vda1 is used to deploy the OS, and its total capacity, used capacity, and available capacity are 43 GB, 2 GB, and 39 GB, respectively. Partition /dev/vdb1's total capacity, used capacity, and available capacity are 43 GB, 51 MB, and 40 GB, respectively.

7.6 How Can I Monitor My Disk Usages?

Some disk monitoring metrics require that the agent to be installed.

- For instructions about how to install the agent on a Windows ECS, see "Installing and Configuring the Agent (Windows)" in the *Cloud Eye User Guide*.
- For instructions about how to install the agent on a Linux ECS, see "Installing and Configuring the Agent (Linux)" in the *Cloud Eye User Guide*.

Table 7-2 Disk metrics

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_free	(Agent) Available Disk Space	Free space on the disks Unit: GB Linux: Run the df -h command to check the value in the Avail column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_total	(Agent) Disk Storage Capacity	Total space on the disks, including used and free Unit: GB Linux: Run the df -h command to check the value in the Size column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_used	(Agent) Used Disk Space	Used space on the disks Unit: GB Linux: Run the df -h command to check the value in the Used column. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	≥ 0	ECS	1 minute

Metric	Paramet er	Description	Value Range	Monitore d Object	Monitori ng Period (Raw Data)
mount PointPr efix_dis k_used Percent	(Agent) Disk Usage	Percentage of total disk space that is used, which is calculated as follows: Disk Usage = Used Disk Space/Disk Storage Capacity Unit: percent Linux: It is calculated as follows: Used/Size. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~). Windows: Use the WMI interface to call GetDiskFreeSpaceEx W API to obtain disk space data. The path of the mount point prefix cannot exceed 64 characters. It must start with a letter, and contain only digits, letters, hyphens (-), dots (.), and swung dashes (~).	0-100	ECS	1 minute

7.7 Can I Transfer the Data Disk Capacity to a System Disk?

Sorry, you cannot.

Currently, the capacity of an EVS disk cannot be transferred to another disk. Multiple EVS disks cannot be combined into one, either.

Common Scenarios

- 1. Can I transfer the capacity of a data disk to a system disk after I purchased a data disk?
- 2. Can I transfer the data disk capacity to a system disk capacity after I mistakenly expand the capacity of a data disk?

Recommended Solution

- If you do not need to retain data on the data disk, you can directly delete or unsubscribe from the data disk, and expand the system disk.
- If you need to retain data on the data disk, you can purchase a small-capacity data disk, copy data from the original data disk to the new data disk, and then expand the system disk capacity.
 - a. Back up the data disk using backups via the CBR service or snapshots.
 For more information about disk backup, see Managing EVS Backup. For more information about snapshots, see Creating a Snapshot (OBT).
 - b. Buy new data disks with desired capacities and attach them to the same server. After initializing the disks, copy the data from the original data disks to the new data disks.
 - c. Confirm that the services on the new data disks are available. Then, delete or unsubscribe from the original data disks, and delete the created backups.
 - d. Expand the system disk capacity by referring to **Disk Capacity Expansion**.

8 Performance FAQs

8.1 How Can I Test My Disk Performance?

Precautions

In the disk performance test, if the start sector number is not 4-KB aligned, the disk performance will be greatly affected. Therefore, ensure that the start sector number is 4-KB aligned before you start the test.

□ NOTE

To test the performance of a shared disk, the following requirements must be met:

- The shared disk must be attached to multiple servers (ECSs or BMSs).
- If the shared disk is attached to multiple ECSs, these ECSs must belong to the same anti-affinity ECS group.

If these ECSs fail to meet the anti-affinity requirement, the optimal performance of the shared disk cannot be achieved.

Test the disk performance in the following ways:

- Windows
- Linux

If the test result does not meet your expectation, see Why My Disk Performance Test Using Fio Has Incorrect Results?

Windows

The method for testing the performance of a disk varies depending on the server OS. This topic uses Windows 7 Professional 64-bit as the example OS to describe how to test the disk performance. For other Windows OSs, see the corresponding OS documents.

Install the performance measurement tool lometer before the test. You can obtain the tool at http://www.iometer.org/.

Step 1 Log in to the server.

Step 2 Press win+R to open the Run window. Enter msinfo32 and click OK.

The system information window is displayed.

- **Step 3** Choose **components** > **storage** > **disks**. In the right pane, view the partition offset value.
 - If 4096 can be divided by the parameter value, the partition is 4-KB aligned. Go to **Step 4**.
 - If 4096 cannot be divided by the parameter value, the partition is not 4-KB aligned. Ensure the 4-KB alignment for the partition before continuing the test.

NOTICE

Data loss will occur when you delete the partition and select another start sector number for 4-KB alignment. Exercise caution when performing such an operation.

Step 4 Use lometer to test the disk performance. For details, see the lometer product document.

When the disk IOPS and throughput are tested, the parameter configurations for lometer and fio are the same. For details, see **Table 8-1**.

----End

Linux

When you use an old version Linux OS, for example CentOS 6.5, and run **fdisk** to create partitions, the default start sector number is not 4-KB aligned, which will greatly affect the test performance. For this reason, if such an OS is used, you are advised to select a new start sector number that is 4-KB aligned when creating partitions.

The method for testing the performance of a disk varies depending on the server OS. This topic uses CentOS 7.2 64-bit as the example OS to describe how to test the disk performance. For other Linux OSs, see the corresponding OS documents.

Install performance measurement tool fio before the test.

- **Step 1** Log in to the server and switch to user **root**.
- **Step 2** Before you start the test, run the following command to check whether the start sector number is 4-KB aligned:

fdisk -lu

Information similar to the following is displayed:

[root@ecs-centos sdc]# fdisk -lu

Disk /dev/xvda: 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: 0x7db77aa5

```
Device Boot
                Start
                          End Blocks Id System
                2048 20968919 10483436 83 Linux
/dev/xvda1 *
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 /dev/xvdc: 53.7 GB, 53687091200 bytes, 104857600 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: 0x3cf3265c
 Device Boot
                          End
                                 Blocks Id System
/dev/xvdc1
            2048 41943039 20970496 83 Linux
```

- If 8 can be divided by the start sector number, the number is 4-KB aligned. Go to Step 3.
- If 8 cannot be divided by the start sector number, the number is not 4-KB aligned. Delete the partition and select a 4-KB aligned start sector number for the new partition before continuing the test.

NOTICE

Data loss will occur when you delete the partition and select another start sector number for 4-KB alignment. Exercise caution when performing such an operation.

Step 3 Run commands and use fio to test the disk performance:

- To test random write IOPS, run fio -direct=1 -iodepth=128 -rw=randwrite ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=600 group_reporting -filename= /opt/fiotest/fiotest.txt name=Rand_Write_IOPS_Test.
- To test random read IOPS, run fio -direct=1 -iodepth=128 -rw=randread ioengine=libaio -bs=4k -size=10G -numjobs=1 -runtime=600 group_reporting -filename=/opt/fiotest/fiotest.txt name=Rand_Read_IOPS_Test.
- To test write throughput, run fio -direct=1 -iodepth=32 -rw=write ioengine=libaio -bs=1024k -size=10G -numjobs=1 -runtime=600 group_reporting -filename=/opt/fiotest/fiotest.txt name=Write BandWidth Test.
- To test read throughput, run **fio** -**direct**= 1 -**iodepth**= 32 -**rw**= read **ioengine**= libaio -**bs**= 1024k -**size**= 10G -**numjobs**= 1 -**runtime**= 600 **group_reporting** -**filename**= /opt/fiotest/fiotest.txt **name**= Read_BandWidth_Test.

NOTICE

- When using fio to perform a raw disk performance test, ensure that
 partitions and file systems have not been created on the disk and no data
 exists. Otherwise, the raw disk test will damage the file system, and data
 on the disk will become read-only. In this case, you can only delete the disk
 and buy a new one to continue the test.
- Do not perform the test on a disk carrying the service data. If such test is a must, you are advised to perform the test as follows:
 - Back up the disk data before the test to prevent data loss caused by misoperation.
 - Specify a file, for example -filename=/opt/fiotest/fiotest.txt, to test the performance of the file system.

Table 8-1 lists the fio test parameters.

Table 8-1 Parameter description

Parameter	Description
direct	Defines whether direct I/O is used. The values are as follows: - If the value is set to 0 , buffered I/O is used. - If the value is set to 1 , direct I/O is used.
iodepth	Defines the I/O queue depth. The default value is 1. The defined queue depth refers to the queue depth of each thread. That said, when multiple threads are tested, the parameter defines the queue depth of each thread. Total fio concurrent I/Os = iodepth x numjobs
rw	Defines the test read/write policy. The parameter value can be as follows: - Random read: randread - Random write: randwrite - Sequential read: read - Sequential write: write - Mixed random read/write: randrw

Parameter	Description
ioengine	Defines how fio delivers the I/O request (synchronously or asynchronously). - Synchronous I/O: Only one I/O request is delivered at a time, and the response is returned after the kernel has processed the request. That said, the single-thread I/O queue depth is always less than 1, and multi-
	thread concurrent processing can be used to handle such issues. Normally, 16 to 32 concurrent working threads fully occupy the I/O queue depth.
	 Asynchronous I/O: Multiple I/O requests are delivered using libaio at a time. Wait for the process to complete and reduce the interaction times to improve efficiency.
bs	Defines the I/O block size. The unit can be KB, Kb, MB, and Mb, and the default value is 4 KB.
size	Defines the amount of data processed by the test I/Os. If parameters, such as runtime , are not specified, the test ends until fio has processed all the specified data amount.
	The value can be a number with a unit or percentage. A number with a unit indicates the read/write data amount, for example size=10G , indicating a 10-GB read/write data amount. A percentage indicates the ratio of read/write data amount to the capacity of total files, for example size=20% , indicating the read/write data amount takes 20% of the total file space.
numjobs	Defines the number of concurrent threads.
runtime	Defines the test time. If this parameter is not specified, the test ends until the specified data amount is processed by the block size defined using parameter size .
group_reporting	Defines the test result display mode. The parameter value displays the statistics on a single thread instead of that on all jobs.
filename	Defines the name of the test file or device. - If a file is specified, the performance of the file system is tested. Example: -filename=/opt/fiotest/fiotest.txt
	 If a device name is specified, the performance of the raw disk is tested. Example: -filename=/dev/vdb1 NOTICE
	If the test is performed on a disk already has partitions and file systems created as well as data on it, user parameter filename to specify a file so that the original file system is not damaged and the data is not overwritten.

Parameter	Description
name	Defines the test task name.

----End

8.2 Why My Disk Performance Test Using Fio Has Incorrect Results?

Symptom

You have followed the test performance method, but the test results do not meet expectation.

Troubleshooting

During a disk performance test, the disk and stress test conditions play an important role.

Possible causes are sequenced based on their occurrence probability.

If the fault persists after you have ruled out one cause, check other causes.

NOTICE

Some operations may result in data loss. It is recommended that you use raw disks for performance test.

Figure 8-1 Troubleshooting

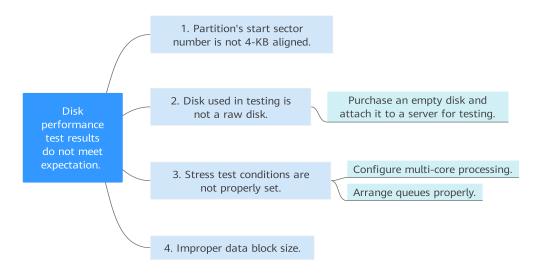


Table 8-2 Troubleshooting

Probable Cause	Solution
Partition's start sector number is not 4-KB	Go Check Whether Partition's Start Sector Number Is 4-KB Aligned.
aligned.	Delete the partition and select a 4-KB aligned start sector number for the new partition.
Disk used in testing is not a raw disk.	Purchase an empty disk and attach it to a server for testing.
Stress test conditions are not properly set.	Configure multi-core processing and arrange queues properly to maximize the concurrent performance.
Improper data block size.	 Set a proper data block size. When testing the disk IOPS, set the data block size to a small value, for example, 4 KB.
	When testing the disk throughput, set the data block size to a large value, for example, 1024 KB.

Check Whether Partition's Start Sector Number Is 4-KB Aligned

- **Step 1** Log in to the server and switch to user **root**.
- **Step 2** Before you start the test, run the following command to check whether the start sector number is 4-KB aligned:

fdisk -lu

Information similar to the following is displayed:

[root@ecs-centos sdc]# fdisk -lu

Disk /dev/xvda: 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: 0x7db77aa5

Device Boot Start End Blocks Id System /dev/xvda1 * 2048 20968919 10483436 83 Linux

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 /dev/xvdc: 53.7 GB, 53687091200 bytes, 104857600 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: 0x3cf3265c

Device Boot Start End Blocks Id System /dev/xvdc1 2048 41943039 20970496 83 Linux

- If 8 can be divided by the start sector number, the number is 4-KB aligned.
- If 8 cannot be divided by the start sector number, the number is not 4-KB aligned. Delete the partition and select a 4-KB aligned start sector number for the new partition before continuing the test.

NOTICE

Data loss will occur when you delete the partition and select another start sector number for 4-KB alignment. Exercise caution when performing this operation.

----End

Submit a Service Ticket

If the problem persists, submit a service ticket.

8.3 How Can I Handle a Slowdown in Disk Read/Write Speed and Increased I/O?

Symptom

If you are aware of a service slowdown, perform either of the following operations to find out the reason:

- Windows: Open **Task Manager** and view the average response time.
- Linux: Run the **iostat -dx** command to view the I/O performance.

If the disk read/write speed is slowed down, disk I/O increases, or the await time increases, the disk encounters a performance bottleneck.

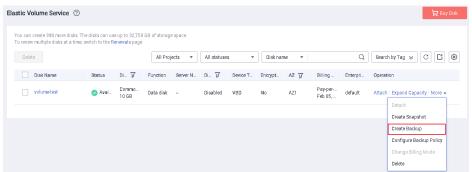
Solution

It is recommended that you choose a disk type with higher performance.

If your disk contains important data, create a new disk from the backup to retain the disk data. The procedure is as follows:

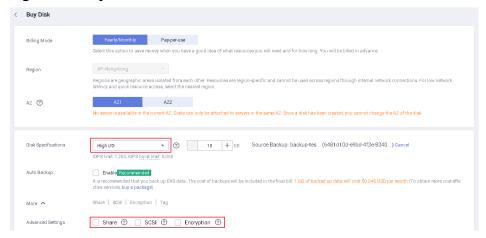
1. Create a backup for the disk.

Figure 8-2 Create Backup



2. Create a new disk from this backup. During the creation, set the disk type and advanced setting (sharing, SCSI, and encryption) that meet your requirement.

Figure 8-3 Buy Disk



8.4 How Can I Improve My Disk Performance?

You can use the following methods to improve your disk performance:

- Using EVS Disks to Create RAID Arrays
- Using LVM to Manage EVS Disks

9 Shared Disk FAQs

9.1 Do I Must Deploy a Cluster for Using Shared Disks?

Yes.

If you simply attach a shared disk to multiple servers, files cannot be shared between the servers. If the rules for reading and writing data are not mutually agreed, the read and write operations may interfere with each other or other unpredictable errors may occur.

Shared EVS disks do not have the cluster management capability. Therefore, you need to build a cluster system for data sharing, such as Windows MSCS, Veritas VCS, and Veritas CFS clusters.

9.2 How Many Servers Can I Attach a Shared Disk to?

A shared disk can be attached to a maximum of 16 servers.

9.3 How Can I Attach a Shared Disk to Multiple Servers?

A shared disk can be attached to multiple servers on the management console. You can choose to attach it to servers one by one or in a batch.

For details, see Attaching a Shared Disk.

9.4 Can a Shared Disk Be Attached to Servers That Belong to Multiple Accounts?

No. A Shared disk must be attached to the servers that belong to the same account and are in the same AZ.

9.5 Can I Attach a Shared Disk to Servers Running Different OSs?

- It is recommended that you do not attach a shared disk to servers running Linux and Windows.
- If a shared disk is attached to servers running different versions of the same OS type, it can be used normally. For example, a shared disk attached to servers running CentOS 6 and CentOS 7 can work properly.

10 Snapshot FAQs

10.1 What May Be the Causes of a Snapshot Creation Failure?

A snapshot will fail to create if its source disk is in an intermediate state, such as **Attaching** and **Expanding**, or an abnormal state, such as **Error** and **Restoration failed**.

Ensure that a disk is in the In-use or Available state before creating a snapshot.

10.2 Does EVS Support Automatic Snapshot Creation?

No. You can develop a program to periodically create snapshots through APIs. Alternatively, you may use the CBR service and enable auto backup to create backups periodically. For details, see **Creating a Backup Policy**.

10.3 Can I Create Snapshots for Multiple Disks at a Time?

No.

Snapshots cannot be created for multiple disks at a time. You must create snapshots for disks one by one.

10.4 How Is a Snapshot Created for My Disk?

There are two types of snapshots: manual snapshots created by users and automatic snapshots created by the system.

Manual snapshots: You may manually create snapshots to rapidly save the
disk data at specific points of time. This feature is now in open beta testing
and is free for trial use. For details about how to create snapshots, see
Creating a Snapshot (OBT).

FAQs

 Automatic snapshots: During the creation of a cloud server backup, or a disk backup with the CBR service, the system automatically creates a snapshot and saves the latest snapshot for each disk. If the disk already has a backup and a new backup is created, the system will automatically delete the old snapshot and save the latest one generated. This snapshot is free of charge. You can view the snapshot details only but cannot perform any operations on it.

10.5 Why I Cannot Roll Back My Disk Data from a Snapshot?

Possible causes are as follows:

- Snapshot data can be rolled back only when the status of the snapshot's source disk is Available or Rollback failed. If the snapshot's source disk is in the In-use state, detach the disk first and then roll back the snapshot data. After the rollback succeeds, re-attach the disk.
- When a backup is created for a disk, the system automatically creates a snapshot, and the snapshot name starts with autobk_snapshot_vbs_. Only the snapshot automatically created during the latest backup is retained. This snapshot can be viewed only, but cannot be used to roll back the disk data.

10.6 Can I Roll Back the Data from a Snapshot After Reinstalling the OS or Formatting the Disk?

- If you have reinstalled or changed the OS, snapshots of system disks cannot be used to roll back the disk data.
- If you have formatted a disk, snapshots can still be used to roll back the disk data.

10.7 How Is the Snapshot Size Calculated?

When you create a snapshot for a disk for the first time, the snapshot is a full snapshot, and its size is the same as the disk size. Subsequent snapshots created for the same disk are incremental snapshots, and the snapshot size is the same as the incremental size.

10.8 Do Snapshots Occupy the Disk Space?

No.

Snapshots are stored in the physical disks that provide storage resources for EVS disks. Therefore, snapshots do not use the EVS disk space.