

Alibaba Cloud Elastic Compute Service

Snapshots

Issue: 20190326

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 Note: You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
Bold	It is used for buttons, menus, page names, and other UI elements.	Click OK .
Courier font	It is used for commands.	Run the <code>cd / d C :/ windows</code> command to enter the Windows system folder.
<i>Italics</i>	It is used for parameters and variables.	<code>bae log list --instanceid <i>Instance_ID</i></code>
[] or [a b]	It indicates that it is an optional value, and only one item can be selected.	<code>ipconfig [-all -t]</code>

Style	Description	Example
<code>{}</code> or <code>{a b}</code>	It indicates that it is a required value, and only one item can be selected.	<code>swich {stand slave}</code>

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1 Snapshot overview

A snapshot is a copy of the data stored on a cloud disk or on Shared Block Storage (hereinafter referred to as disks) at a specified point in time. A snapshot is commonly used to back up data, recover disks, replace instance OSs, and create custom images.



Note:

When you create a snapshot, the I/O performance of block storage will be degraded by less than 10%, resulting in an instantaneous I/O speed decrease. Therefore, we recommend that you create snapshots during off-peak hours.

Scenarios

You can create snapshots in the following scenarios:

- **Disaster backup:** [Create a snapshot for a disk](#) and use the snapshot as base data of another disk.
- **Version rollback:** [Roll back a disk by using the disk snapshot](#) if a system error occurs after an upgrade.
- **Environment duplication:** If you want to purchase an instance that has the same environment as an existing instance, [create a custom image by using the system disk snapshot](#) of the existing instance, and then [create an instance by using the custom image](#).
- **Data development:** By creating a snapshot of production data, you can provide near-real-time data for data mining, report query, and development, and testing applications.
- **Data recovery and restoration:**
 - Use a snapshot to recover and restore the data on your disk even if incorrect data is mistakenly stored in the disk, your ECS instance is mistakenly released, an application error results in a data error, or your disk data is hacked.
 - Use a snapshot to regularly back up your critical service data on your disk to eliminate the risk of data loss resulting from incorrect operations, attack, or virus.
 - Create one or more snapshots when you replace your OS, update your applications, or migrate your service data. This way you can use the snapshots to recover your system data if any failure occurs.

Snapshot types

Snapshots can be divided into two types:

- **Manual snapshots:** Snapshots that you manually create for a disk.
- **Auto snapshots:** Snapshots that are created automatically according to an automatic snapshot policy. You can [create an automatic snapshot policy](#) and [apply it to a disk](#). Then, ECS will create snapshots automatically for the disk at specified points in time.

Billing details

Currently, the snapshot service is provided free of charge.

Service advantages

The Alibaba Cloud snapshot service provides higher snapshot quotas and more flexible snapshot policies. The following table describes the user benefits and typical scenarios of the service.

Item	Description	User benefit	Typical scenario
Snapshot quota	Each disk has a quota of 64 snapshots.	Longer protection cycle with a finer granularity.	<ul style="list-style-type: none">· A non-critical service data disk creates a snapshot at 0:00 every day . The snapshot can store backup data of more than two months.· A critical service data disk creates a snapshot every 4 hours. The snapshot can store backup data of more than 10 days.

Item	Description	User benefit	Typical scenario
Automatic snapshot policy	You can customize when a snapshot is created, how often a snapshot is created in a week, and how long a snapshot is stored. You can also query the number and other details relating to the disks associated with automatic snapshot policies.	More flexible protection policies	<ul style="list-style-type: none"> You can select up to 24 specific hour intervals (from 00:00 to 23:00) at which an automatic snapshot is created in each day. Snapshots can be created automatically on multiple days during a week. Snapshots can be stored for a specified period of time or stored permanently. When the snapshot quota is reached, the system deletes the oldest snapshot automatically.

Technical advantages

Alibaba Cloud ECS snapshot service has several advantages over traditional snapshot services in terms of capacity, scalability, cost-effectiveness, and usability, and having less impact on storage I/O performance. The following table describes these advantages.

Metric	ECS snapshot service	Traditional snapshot service
Capacity	Unlimited capacity, allowing you to protect all of your service data.	Limited capacity. Only the initially purchased storage capacity is available and only critical service data can be protected.
Scalability	Support for Auto Scaling. You can quickly scale in or scale out the number of storage devices in one click.	Lower scalability. Storage scaling is limited by the storage performance, available capacity, and vendor support. It takes one or two weeks for a scaling operation.
Total Cost of Ownership (TCO)	Free of charge. You do not need to pay for snapshot storage.	Incurs charges. You need to spend a large upfront investment and pay for software licenses, reserved storage space, upgrade, and maintenance.

Metric	ECS snapshot service	Traditional snapshot service
Usability	Multilingual GUI and 24/7 online after-sales support.	Several complicated operations are required, which heavily rely on the response of the vendor.
Security	Encryption available. You can set ECS disk encryption whenever necessary to encrypt all of you disk snapshots. However, a non-encrypted snapshot cannot be converted to an encrypted snapshot. Similarly, an encrypted snapshot cannot be converted to a non-encrypted snapshot. For more information, see ECS disk encryption .	Encryption attributes and policies rely on the underlying storage logic. Therefore, if the storage architecture has a security design defect, snapshots may be insecure as a result.
Impact on performance	Redirect-On-Write (ROW) <ul style="list-style-type: none"> • The impact of snapshot tasks on storage I/O performance is reduced. • Snapshots are invisible to users and can be created at any time without affecting user experience. 	Copy-On-Write (COW). Snapshots preempt resources against data I/O.

2 Snapshot concepts

Alibaba Cloud ECS offers the snapshot service, which allows for the ability to create snapshots for cloud disks and Shared Block Storage (hereinafter referred to as disks) as scheduled operations. Such operations allow you to retain disk data at one or more specific points in time. Snapshots can effectively guarantee service security while also improving your overall application deployment efficiency.

Incremental snapshots

After you format a disk, data blocks are divided based on Logical Blocking Addressing (LBA). All service data that is written in data blocks is measured by using snapshots. The first snapshot of a disk is a full snapshot that does not contain empty data blocks. Subsequent snapshots after the first snapshot are incremental snapshots, which are copies of service data and dirty data generated since the last snapshot. Therefore, each data block is copied multiple times and is stored across multiple snapshots. The following figure illustrates the preceding concepts. In the figure, snapshots 1, 2, and 3 represent the first, second, and third snapshots of a disk.

When a snapshot is created, the file system checks all data blocks, and only the data blocks with data changes are copied to the snapshot.

- Snapshot 1 copies all data on the disk from a specific point in time.
- Snapshot 2 only copies the changed data blocks B1 and C1. Data blocks A and D are taken from snapshot 1.
- Snapshot 3 copies the changed data block B2. Data blocks A and D are taken from snapshot 1, and data block C1 from snapshot 2.
- If you roll back the disk to snapshot 3, the Disk Rollback feature simultaneously copies data blocks A, B2, C1, and D to the disk to replicate snapshot 3.
- If you delete snapshot 2, data block B1 will be deleted, but data block C1 will be retained because data blocks that are taken by or from other snapshots will not be deleted. Therefore, if you roll back a disk to snapshot 3, data block C1 will be recovered.

Snapshot chain

A snapshot chain contains all the snapshots of a disk. Each disk has a snapshot chain, whose ID is identical to the disk ID. A snapshot chain records the reference relationships among data blocks and contains the following information:

- **Snapshot capacity:** the storage space occupied by all snapshots in the snapshot chain.
- **Snapshot quota:** Each disk can have up to 64 snapshots. For more information, see [Limits](#).



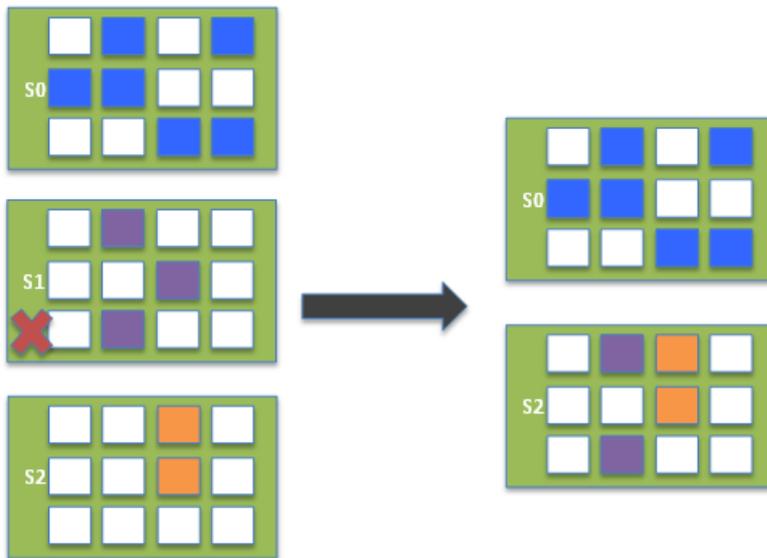
Note:

If the snapshot quota is reached, but you need to create more automatic snapshots, the system will automatically delete automatic snapshots, starting with the oldest one first. If you want to create snapshots manually, then you must first delete unnecessary snapshots manually. For more information, see [Apply automatic snapshot policies to disks](#) and [Delete snapshots or automatic snapshot policies in the User Guide](#).

- **Snapshot node:** Each node in the snapshot chain represents a snapshot of a disk. Each snapshot chain can have up to 64 snapshot nodes, including both manual snapshots and automatic snapshots.

Snapshot deletion

If you no longer need a snapshot, you can delete it. Note that if the number of snapshots exceeds the snapshot quota, you must delete some snapshots to release storage space. The following figure shows the workflow and logic for when you delete a snapshot from a snapshot chain. In this example, snapshot S1 is deleted.



1. Alibaba Cloud ECS conducts an offline analysis on all the data blocks in snapshot S1 to be deleted, and then deletes the data blocks that are not taken by other snapshots in the snapshot chain.
2. Alibaba Cloud ECS adds the dirty data blocks of snapshot S1 to snapshot S2. Other snapshots record the information of 10 data blocks altogether:
 - Six of the data blocks of snapshot S0
 - Two of the dirty data blocks of snapshot S1
 - Two of the data blocks of snapshot S2

3 Use snapshots

3.1 Create a snapshot

This topic describes how to create a snapshot. A snapshot is a copy of data on a disk at a specific point in time. Snapshots are commonly used to back up data and create custom images.

Scenarios

You can create a snapshot in data backup scenarios to eliminate the risk of data loss. Specifically, you can create a snapshot if you need to:

- Modify critical system files.
- [Migrate instances from a classic network to a VPC](#).
- Back up service data.
- Recover mistakenly released instances.
- Mitigate network attacks.
- [Change the operating system](#).
- Provide data support for a production environment.

Additionally, you can use a snapshot to [create a custom image](#) to quickly deploy an application environment for a large number of ECS instances.

Precautions

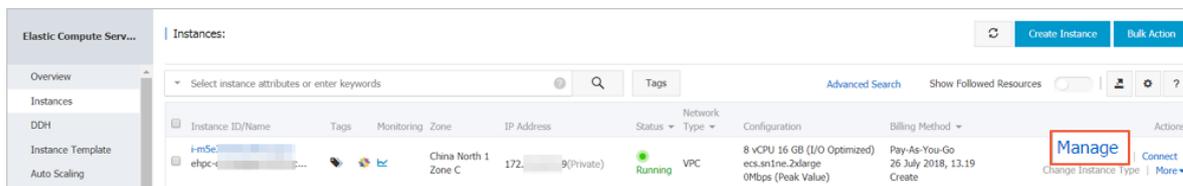
- Creating a snapshot may have a slight impact on disk performance and I/O speeds. We recommend that you create snapshots during off-peak hours.
- A snapshot only records data at a specific point in time. Therefore, incremental data generated when the snapshot is created will not be synchronized to the snapshot.
- To ensure that a snapshot is successfully created, we recommend that you do not modify the ECS instance status (that is, stop or restart the instance) when the snapshot is being created.
- If you want to create a snapshot of an instance, the instance must be in the Running or Stopped state.
- If you want to create a snapshot of a disk, the disk must be in the Running state.

- Manually created snapshots can only be manually deleted. Therefore, you need to [delete unnecessary snapshots](#) regularly.
- If you create an extended volume by using a multi-partition single disk, the snapshot that you created can be used to [roll back the disk](#).
- If you create a dynamic extended volume by using multiple disks and no I/O operation is performed on data in the volume, the snapshot that you created can be used to roll back the disk. If I/O operations are continuously performed in the extended volume, data consistency of the rolled-back disk is uncertain.

Create a snapshot in the ECS console

To create a snapshot in the ECS console, follow these steps:

1. Log on to the [ECS console](#).
2. Select the target region.
3. In the left-side navigation pane, click Instances.
4. Locate the instance for which you want to create a snapshot, and then click Manage in the Actions column.



5. In the left-side navigation pane, click Disks, locate the target disk, and then click Create Snapshot.



Note:

You can select only one disk at a time. The Type can be a system disk or a data disk.



6. Enter a name for the snapshot and click OK.

Create Snapshot

Do not change the status of the instance during snapshot creation (for example, do not stop or restart the instance). Changes to the instance's status may cause the snapshot creation to fail.

ID: d-m5

Instance ID/Name: i-m5

Type: Ultra Disk

*Snapshot Name: CreateSnapshot
The snapshot name can be 2 to 128 characters in length and cannot start with **auto**.

Tag: [Select a key or enter a new one] [Select a value or enter a new one]

1:11

OK Cancel

7. In the left-side navigation pane, click Instance Snapshots. The snapshot creation progress, estimated time remaining, and snapshot status are displayed.

Snapshot ID/Name	Tags	Disk ID	Disk Size	Disk Type(All)	Encrypted/Unencrypted	Created At	Progress	Status
s-m5		d-m5	40GB	System Disk	Unencrypted	15 August 2018, 14:41	48%	Progressing

Create a snapshot using an API

The following procedure describes how to use Alibaba Cloud CLI to call APIs to create a snapshot. For more information about APIs, see [Quick start for ECS APIs](#).

1. Obtain the instance ID.

- If you have remotely connected to an ECS instance, you can obtain the instance ID by using *Metadata*. For example, to query the ID of a Linux instance, run the following command:

```
curl http://100.100.100.200/2016-01-01/meta-data/instance-id
```

- In your local computer, you can obtain the instance ID by calling the API *DescribeInstances*:

```
aliyun ecs DescribeInstances -- output cols = InstanceId, InstanceName
```

2. Obtain the disk ID by calling the API *DescribeInstances*:

```
aliyun ecs DescribeInstances -- RegionId cn -- hangzhou -- InstanceId i-bp1afnc98r8k69XXXXXX -- output cols = DiskId
```

3. Call the API *CreateSnapshot* to create a snapshot based on the disk ID:

```
aliyun ecs CreateSnapshot -- DiskId d-bp19pjyf12hebpXXXXXX
```

The snapshot-creating task is initiated if the following information is returned:

```
{"RequestId":"16B856F6-EFFB-4397-8A8A-CB73FAXXXX","SnapshotId":"s-bp1afnc98r8kjhXXXXXX"}
```

4. Call the API *DescribeSnapshots* to query the progress. When "SnapshotId"="s-bp1afnc98r8kjhXXXXXX" and "Status":"accomplished" are displayed, it means that the snapshot has been created.

```
aliyun ecs DescribeSnapshots -- RegionId cn -- hangzhou -- InstanceId i-bp1afnc98r8k69XXXXXX -- output cols = SnapshotId, Status
```

Time required

The time required for creating a snapshot is dependent on the capacity of the disk.

Following the content covered in *Snapshot concepts*, the first disk snapshot is a full snapshot, and therefore its creation requires a relatively long period of time. In contrast, subsequent snapshots require shorter periods of time. The amount of time needed to create subsequent snapshots is dependent on the amount of data generated since the last snapshot. Generally, the greater the amount of data, the longer time it will take to create the snapshot.

What to do next

After you create a snapshot, you can:

- [Roll back a cloud disk.](#)
- [Create a cloud disk by using the snapshot.](#)
- [Create a custom image by using the snapshot.](#)

3.2 Apply automatic snapshot policies to disks

You can apply an automatic snapshot policy to disks according to your business needs

.

Automatic snapshots are named in the format of `auto_yyyymmdd_1`, for example, `auto_20140418_1`.



Note:

- Creating snapshots may interrupt read/write operations on your disk. We recommend that you set the creation time of automatic snapshots during off-peak business hours to avoid interruptions to your business services.
- Automatic snapshot policies cannot be applied to unused basic cloud disks.
- Snapshots that are manually created do not conflict with automatic snapshots. However, if an automatic snapshot is being created on a disk, you must wait for it to finish before manually creating a snapshot.

You can apply an automatic snapshot policy to a disk using either of the following menus:

- From the Cloud Disks menu. This method is suitable for applying an automatic snapshot policy to a specific disk.
- From the Snapshots and Images menu. This method is suitable for applying a unified automatic snapshot policy to multiple disks.

From the Cloud Disks menu

To apply an automatic snapshot policy through the Cloud Disks menu, follow these steps:

1. Log on to the [ECS console](#).
2. Select the target region.

3. In the left-side navigation pane, click Disks.
4. Select the disk for which you want to execute the policy and click Create Automatic Snapshot Policy.
5. Enable the automatic snapshot function and select the desired snapshot policy.
6. Click OK.

From the Snapshots and Images menu

To apply or disable an automatic snapshot policy, follow these steps:

1. Log on to the [ECS console](#).
2. Select the target region.
3. In the left-side navigation pane, select Snapshots and Images > Automatic Snapshot Policies.
4. Select the automatic snapshot policy that you want to apply and click Apply Policy.
5. To enable an automatic snapshot policy, select Disks without Policy Applied to view the disks. Find the disk for which you want to enable the policy, and then click Apply Policy after it. Alternatively, if you select multiple disks, click Apply Policy at the lower-left corner.
6. To disable the automatic snapshot policy, select the Disks with Policy Applied tab to view the disks, select the disk for which you want to disable the policy, and then click Disable Policy at the right side. Note that if you select multiple disks, you need to click Disable Policy at the lower-left corner to disable the automatic snapshot policy for all selected disks.

3.3 Roll back a disk by using a snapshot

This topic describes how to roll back a disk by using a snapshot. You can perform a disk rollback when your OS is unresponsive, when an incorrect operation was performed, or when rolling back an application version is required. After you roll back the system disk, the current key pair or password of the corresponding instance is attached automatically.



Warning:

Before you roll back a disk, [create a snapshot](#) of the disk to ensure that you can perform data recovery if needed. Disk rollback is irreversible. Exercise caution when performing this action.

Prerequisites

- A snapshot of the disk to be rolled back is created, and no new snapshot is being created for the disk. For more information, see [created a snapshot](#).
- The disk has not been released.
- The disk to be rolled back is attached to an ECS instance, and the corresponding instance is stopped. For more information, see [Attach to an ECS instance](#) and [Stop an instance](#).

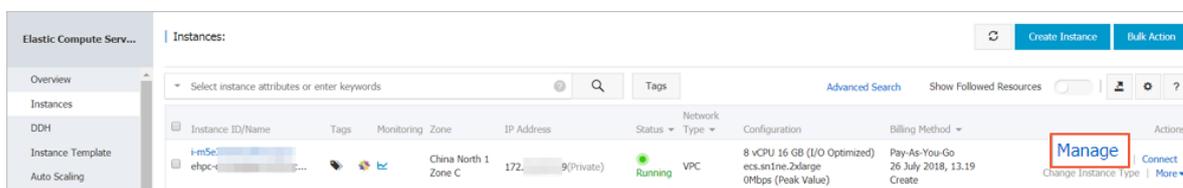


Note:

- After you [replace the system disk](#), old system disk snapshots cannot be used to roll back the new system disk.
- Pay-As-You-Go VPC instances may not be restarted in [No fees for stopped VPC instances](#) mode after you roll back the disk. We recommend that you disable No fees for stopped VPC instances before you stop the instance.

Procedure

1. Log on to the [ECS console](#).
2. In the left-side navigation pane, click Instances.
3. Select the target region.
4. Locate the instance whose disk you want to roll back, and then click Manage.



5. In the left-side navigation pane, click Instance snapshots.
6. Select the target snapshot, and then click Roll Back Disk in the Actions column.



Note:

Only one disk can be rolled back at a time. When you roll back a disk, other disks attached to the instance are not affected. After the rollback, the entire disk (rather than a partition or a directory) recovers to its status at a specified point in time.

7. In the displayed dialog box, click OK.



Note:

If you select Start Instance After Disk Rollback, the instance is restarted after you roll back the disk.

Related APIs

[ResetDisk](#)

What to do next

If you create a snapshot of a disk and then you scale out the disk, you need to log on to the instance to expand the capacity of the file system after disk rollback. For more information, see:

- [Linux - Resize a data disk.](#)
- [Windows - Resize a data disk.](#)

3.4 Manage snapshots

This topic describes how to manage your snapshots.

Maintain an appropriate number of snapshots

The more snapshots you create, the more disk capacity you require. Therefore, we recommend that you maintain an appropriate number of snapshots and snapshot policies depending on your specific service needs.

Item	Snapshot creation frequency	Retention duration or quantity	Note
Critical application	Once every day or every two days	Several months or more	We recommend that you store critical data for a longer time.
Non-critical application	Once every week or every two weeks	Several days or weeks	We recommend that you maintain one or two snapshots for disk rollback.

Item	Snapshot creation frequency	Retention duration or quantity	Note
System disk	Whenever needed	one or two snapshots	We recommend that you do not store critical application data in the system disk.
Software upgrade		We recommend that you delete the snapshot immediately after use.	We recommend that you reserve the necessary space for snapshots. We recommend that you delete the snapshot immediately after use.
Modification of critical files			
Migration of application data			
Test environment			

Delete one or more snapshots

If you no longer need a snapshot, you can delete it. If the number of snapshots exceeds the snapshot quota, you must delete some snapshots to release storage space. The following procedure describes how to delete one or more snapshots in the ECS console. If a snapshot is used to create custom images, you must delete the associated images before you can delete the snapshot.

1. Log on to the [ECS console](#).
2. In the left-side navigation pane, choose Snapshots and Images > Snapshots.
3. Select the target region.
4. Select one or more snapshots to be deleted.
5. Click Delete, and then click OK in the displayed dialog box.

Related API: [DeleteSnapshot](#).

Delete a snapshot that you have used to create images or disks

- You can directly delete a snapshot that you have used to create disks. After you delete the snapshot, services associated with the snapshot (for example, [Reinitialize the disk](#)) will become unavailable.

- To delete a snapshot that you have used to create custom images, you must delete the corresponding images before you can delete the snapshot.
- You can directly delete a snapshot that you have used to create instances. After you delete the snapshot, services associated with the snapshot (for example, [Reinitialize the disk](#)) will become unavailable.

Disable unnecessary snapshot policies

You can disable unnecessary snapshot policies to avoid redundancy and reduce the storage space occupied by your snapshots.



Note:

To increase the fault tolerance of your services, we recommend that you maintain at least one snapshot policy for critical services.

1. Log on to the [ECS console](#).
2. In the left-side navigation pane, choose Snapshots and Images > Automatic Snapshot Policies.
3. Select the target region.
4. Locate the automatic snapshot policy to be disabled, and then click Apply Policy in the Actions column.
5. In the Create Automatic Snapshot Policy dialog box, click the Disks with Policy Applied tab, select the disk for which you want to disable the policy, and then click Disable Policy.

Related API: [CancelAutoSnapshotPolicy](#).

3.5 View the snapshot size

This topic describes how to view the size of all snapshots on a single disk or under a single Alibaba Cloud region.

Prerequisite

At least one snapshot of a disk is created. For more information, see [Create a snapshot](#).

View the snapshot size of a single disk

A snapshot chain records the reference relationships among all the snapshots in a cloud disk or in a shared block storage device (hereinafter referred to as disk). Each disk contains a snapshot chain, whose ID is identical to the disk ID. Additionally, each

snapshot chain contains a number of relationships among data blocks. To view the size of all snapshots in a disk, follow these steps:

1. Log on to the [ECS console](#).
2. Select the target region.
3. In the left-side navigation pane, choose Snapshots and Images > Snapshots.
4. Locate the disk ID of the target snapshot.



Note:

At least one snapshot must be created for the disk.

5. In the left-side navigation pane, click Snapshot Chains.
6. View the number and size of all snapshots in the disk according to the disk ID obtained in step 4.
7. (Optional) In the Actions column of the snapshot chain, click Details to open the Snapshot Chain Details dialog box. You can check the snapshot details of the disk and [roll back a cloud disk](#) or [create a custom image by using a snapshot](#).

Snapshot ID/Name	Tags	Disk ID	Disk Size	Disk Type	Encrypted/Unencrypted	Created At	Keep for	Progress	Status	Actions
s-bp1d1jow...b86k1 kafkaok		d-bp1hddom...	40GB	System Disk	Unencrypted	March 1, 2019, 13:56	Always Keep	100%	Successful	Disk Rollback Create Custom Image
s-bp123v6...t5odn zksverok		d-bp1hddom...	40GB	System Disk	Unencrypted	March 1, 2019, 13:30	Always Keep	100%	Successful	Disk Rollback Create Custom Image

Related API: [DescribeSnapshotLinks](#).

View the snapshot size of a region

To view the size of all the snapshots in a region, follow these steps:

1. Log on to the [ECS console](#).
2. Select the target region.
3. In the left-side navigation pane, choose Snapshots and Images > Snapshots.
4. Set the time duration.



Note:

You can at most query what changes occurred to the snapshot size in the past 15 days.

You can view the size of all snapshots created in the specified time duration in the selected region.

Related API: [DescribeSnapshotsUsage](#).

4 FAQ

4.1 Snapshot FAQ

- **FAQ about snapshot types**
 - [Does a manual snapshot differ from or conflict with an automatic snapshot?](#)
- **FAQ about snapshot size**
 - [Why is the snapshot size larger than the data volume displayed in the file system?](#)
 - [Will the space occupied by the disk be reduced when I delete a file from an ECS instance?](#)
- **FAQ about snapshot deletion**
 - [How do I maintain my snapshots to avoid being deleted by Alibaba Cloud?](#)
 - [How do I delete unnecessary snapshots to reduce backup costs?](#)
 - [Will an automatic snapshot be deleted after I replace the system disk, the instance expires, or the disk is released?](#)
 - [How do I delete a snapshot that I have used to create images or disks?](#)
- **FAQ about automatic snapshot policies**
 - [Will the snapshot policy fail to be implemented if I use an automatic snapshot to create a custom image or disk?](#)
 - [Can I set multiple automatic snapshot policies for a disk?](#)
- **FAQ about using a snapshot to roll back a disk**
 - [Can I use a snapshot of the old system disk to roll back the new system disk after I replace the system disk?](#)

Does a manual snapshot differ from or conflict with an automatic snapshot?

No, both manual and automatic snapshots are copies of the data stored on a cloud disk or on Shared Block Storage at a specified point in time. In this regard, they are neither different from each other nor in conflict with each other.

Why is the size of a snapshot of a disk larger than the disk usage space displayed in the file system?

The simple answer is that data is written is recorder into the snapshot regardless of whether the relevant files have been deleted from file system. For a more detailed

answer, see [Why is the size of a snapshot of a disk larger than the disk space usage displayed in the file system?](#)

Will the space occupied by the disk be reduced when I delete a file from an ECS instance?

No, when you delete a file from an ECS instance, the file system only tags the file head. This does not reduce the space that the disk occupies.

How can I avoid having my snapshots be automatically deleted by Alibaba Cloud?

This is a problem that is particular to automatic snapshots. To avoid your automatic snapshots from being deleted automatically, you can [modify the automatic snapshot policy](#) to change the Keep Snapshots parameter to Always Keep. This way the system will not delete automatic snapshots even if the snapshot quota (by default, 64 snapshots) is reached. However, manual snapshots are different. They are not deleted regardless of whether you have released your disk or instance.

What can I do to delete unnecessary snapshots to reduce backup costs?

The steps you need to take to delete unnecessary snapshots differ between manual and automatic snapshots. For manual snapshots, you can delete unnecessary ones directly. For automatic snapshots, in addition to deleting unnecessary snapshots directly, the system also automatically deletes snapshots, starting with the oldest one, when the snapshot quota (which, by default, is 64 snapshots) specified in the automatic snapshot policy is reached.

Will an automatic snapshot be deleted after I replace the system disk, the instance expires, or the disk is released?

This depends on the settings that you selected when you set the automatic snapshot policy for your automatic snapshots.

- If you selected Delete Automatic Snapshots While Releasing Disk, then automatic snapshots are deleted automatically by the system in the case that you replace the system disk, the corresponding instance expires, or the disk is released.
- If you cleared Delete Automatic Snapshots While Releasing Disk, then automatic snapshots are deleted according to the retention duration you have selected. They are not automatically deleted by the system in the case that you replace the system disk, the corresponding instance expires, or the disk is released. You can [modify the automatic snapshot policy](#) as needed.

How do I delete a snapshot that I have used to create disks, images, or instances?

Snapshots that you have used to create disks or instances can be directly deleted.

However, for snapshots that have been used to create images, you must delete the corresponding image before you delete the snapshot. Otherwise, the snapshot cannot be deleted.

Will the snapshot policy fail to be implemented if I use an automatic snapshot to create a custom image or disk?

No, the snapshot policy will not fail to be implemented.

Can I set multiple automatic snapshot policies for a single disk?

No, you can only have one automatic snapshot policy for a single disk at a time.

Can I use a snapshot of the old system disk to roll back the new system disk after I replace the system disk?

No, you cannot use a snapshot of the old system disk to roll back the new system disk after you replace the system disk.

4.2 Why is the size of a snapshot of a disk larger than the disk space usage displayed in the file system?

Each ECS instance is assigned with one or more disks, which share a file system.

When you delete one or more files from an ECS instance and then create a snapshot of the corresponding disk (EBS), the snapshot size is larger than the space occupied by the disk. This topic gives an explanation.

Probable causes

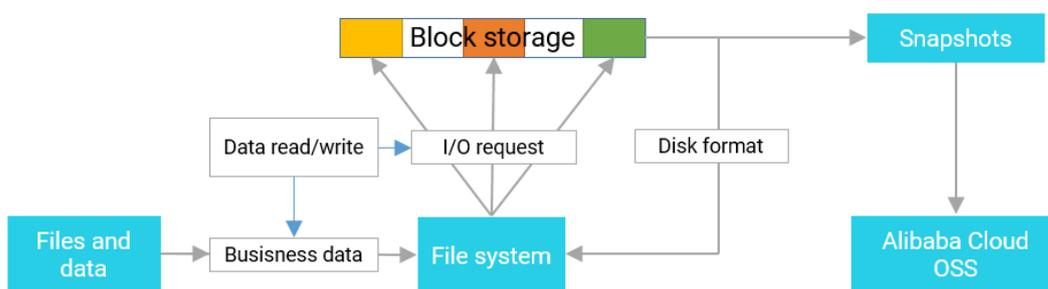
The size of a snapshot of a disk may be inconsistent to the disk usage space displayed in the file system due to one of the following causes:

- The metadata of the file system occupies disk space.
- A large number of blocks are written to the file system when the file system is initialized. These blocks occupy disk space.
- To reduce performance consumption, the file system only creates deprecation tags when files are deleted. However, the disk is unaware of the deletion command and still regards the blocks as assigned. As a result, the blocks are copied to the snapshot, making the snapshot size larger than the disk space usage of the file system.

- The Virtio-block module of KVM and the Block-front module of Xen do not support the TRIM command (which is an I/O command). As a result, the disk is unaware that the data can be deleted.

Relationships among the file system, disk, and snapshot

The file system you create on your disk partitions is responsible for managing disk space. The relevant management operations are finally converted to I/O requests of the disk. The disk records the status of blocks and copies the disk data (including dirty data) to OSS. This is the process in which a snapshot is created. The following figure shows the relationships between the file system and the snapshot.



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The blocks to which data is written will be recorded into the snapshot regardless of whether the relevant files have been deleted from the disk. When deleting a file, the file system tags the file head to indicate that the space occupied by the file becomes available, but this does not reduce the space that the disk occupies.

Relationships between data writes and disk formatting

For distributed storage systems, data write includes business data writes and I/O operations, such as disk formatting. Both business data and file systems occupy disk space.

A new disk or a new disk partition must be formatted and its data structure must be recorded before the disk or disk partition can be used. The purpose of formatting is to create a file system. Data writes are required to create a file system in a disk. The size of files written to the disk varies depending on different file systems during formatting.

- **Disk formatting in Windows, which is classified into quick formatting and normal formatting.**
 - **Quick formatting:** In quick formatting, a file system is assigned to the disk partitions and the File Directory Table (FDT) is rewritten. The data writes during quick formatting occupy relatively small space.
 - **Normal formatting:** In normal formatting, the operations in quick formatting are also performed. Moreover, the disk partitions are scanned sector by sector to identify and tag bad sectors and fill in free disk blocks. This is equivalent to writing the data of the entire disk. Therefore, the size of the full snapshot is almost equal to the disk capacity.
- **Disk formatting in Linux:** After the disk is formatted, the size of the first snapshot depends on the disk file system format before business data is written to the instances.