Alibaba Cloud
Elastic Compute Service
Snapshots

Issue: 20200617
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# Document conventions

<table>
<thead>
<tr>
<th>Style</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Danger]</td>
<td>A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.</td>
<td>Danger: Resetting will result in the loss of user configuration data.</td>
</tr>
<tr>
<td>![Warning]</td>
<td>A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.</td>
<td>Warning: Restarting will cause business interruption. About 10 minutes are required to restart an instance.</td>
</tr>
<tr>
<td>![Notice]</td>
<td>A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.</td>
<td>Notice: If the weight is set to 0, the server no longer receives new requests.</td>
</tr>
<tr>
<td>![Note]</td>
<td>A note indicates supplemental instructions, best practices, tips, and other content.</td>
<td>Note: You can use Ctrl + A to select all files.</td>
</tr>
<tr>
<td>&gt;</td>
<td>Closing angle brackets are used to indicate a multi-level menu cascade.</td>
<td>Click Settings &gt; Network &gt; Set network type.</td>
</tr>
<tr>
<td><strong>Bold</strong></td>
<td>Bold formatting is used for buttons, menus, page names, and other UI elements.</td>
<td>Click OK.</td>
</tr>
<tr>
<td><strong>Courier font</strong></td>
<td>Courier font is used for commands.</td>
<td>Run the cd /d C:/window command to enter the Windows system folder.</td>
</tr>
<tr>
<td><em>Italic</em></td>
<td>Italic formatting is used for parameters and variables.</td>
<td>bae log list --instanceid Instance_ID</td>
</tr>
<tr>
<td>[] or [a</td>
<td>b]</td>
<td>This format is used for an optional value, where only one item can be selected.</td>
</tr>
<tr>
<td>Style</td>
<td>Description</td>
<td>Example</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>---------</td>
</tr>
<tr>
<td>{} or {a</td>
<td>b}</td>
<td>This format is used for a required value, where only one item can be selected.</td>
</tr>
</tbody>
</table>
Contents

Legal disclaimer................................................................. I
Document conventions......................................................... I

1 Snapshot overview.............................................................. 1

2 Local snapshots.................................................................... 6

3 Incremental snapshots........................................................... 9

4 Use snapshots...................................................................... 12

4.1 Activate ECS Snapshot....................................................... 12
4.2 Create a normal snapshot................................................... 12
4.3 Roll back a disk by using a snapshot..................................... 17
4.4 Reduce snapshot fees.......................................................... 20
4.5 View the snapshot size.......................................................... 21
4.6 Delete a snapshot................................................................. 22

5 Automatic snapshot policies............................................... 24

5.1 Overview............................................................................. 24
5.2 Create an automatic snapshot policy..................................... 25
5.3 Apply or disable an automatic snapshot policy......................... 27
5.4 Delete automatic snapshots when releasing a disk.................. 31
5.5 Modify an automatic snapshot policy.................................... 33
5.6 Delete an automatic snapshot policy..................................... 34

6 Snapshot FAQ.................................................................... 36
# 1 Snapshot overview

The Alibaba Cloud snapshot service allows you to create crash-consistent snapshots for all disk categories. Crash-consistent snapshots are an effective solution to disaster recovery and are used to back up data, create custom images, and implement disaster recovery for applications.

**Scenarios**

You can use snapshots for the following scenarios:

- **Disaster recovery and backup**: You can create a snapshot for a disk, and then use the snapshot to create another disk to implement zone- or geo-disaster recovery.
- **Environment clone**: You can use a system disk snapshot to create a custom image, and then use the custom image to create an ECS instance to clone the environment.
- **Data development**: Snapshots can provide near-real-time production data for applications such as data mining, report queries, and development and tests.
- **Enhanced fault tolerance**: You can roll a disk back to a previous point in time by using a snapshot to reduce the risk of data loss caused by unexpected occurrences. You can create snapshots in the following cases:
  - Create snapshots on a regular basis to prevent losses caused by unexpected occurrences. These unexpected occurrences include: writing incorrect data to disks, accidentally releasing ECS instances, data errors caused by application errors, and data loss due to hacking attempts.
  - Create a snapshot before you perform high-risk O&M operations, such as changing operating systems, upgrading applications, and migrating business data.

**Snapshot classification**

Snapshots include normal and local snapshots. Snapshots are classified based on how they are stored. The following table describes the classification of snapshots based on different standards.
<table>
<thead>
<tr>
<th>Classification standard</th>
<th>Type</th>
<th>Description</th>
<th>Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage method</td>
<td>Normal snapshot</td>
<td>A snapshot is stored in an OSS bucket that resides in the same region as the disk for which the snapshot is created. You can create normal snapshots for disks. Normal snapshots can be created for system disks and data disks.</td>
<td>Normal snapshots are applicable to scenarios that require high disaster recovery capabilities. However, it takes a long time to create normal snapshots.</td>
</tr>
<tr>
<td>Local snapshots</td>
<td>A local snapshot is stored in the same storage cluster as the disk for which the snapshot is created and can be used to perform data backup and disk rollback within a few seconds. Local snapshots can be created only for enhanced SSDs (ESSDs).</td>
<td>• You can use local snapshots to quickly back up key business systems that contain huge data, such as databases, containers, and SAP HANA. • You can also use local snapshots to quickly back up data before you perform high-risk operations. High-risk operations include changing system disks, resizing disks, and updating system patches. • You can use local snapshots in DevOps applications to accelerate the creation of custom images and the startup of ECS instances.</td>
<td></td>
</tr>
<tr>
<td>Creation method</td>
<td>Manual snapshot</td>
<td>A manual snapshot is a snapshot that you manually create.</td>
<td>You can create a manual snapshot before you perform high-risk operations to enhance fault tolerance.</td>
</tr>
<tr>
<td>Classification standard</td>
<td>Type</td>
<td>Description</td>
<td>Scenario</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Automatic snapshot</td>
<td>An automatic snapshot is a snapshot that is created automatically based on an automatic snapshot policy. You can create and apply an automatic snapshot policy to a disk. Then, ECS automatically creates snapshots for the disk at specified points in time.</td>
<td>You can use automatic snapshots to back up data and improve the security of business data.</td>
</tr>
<tr>
<td></td>
<td>Full snapshot</td>
<td>A full snapshot is the first snapshot created for a disk. This snapshot contains all the data stored on the disk at the time the snapshot is created.</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Incremental snapshot</td>
<td>An incremental snapshot is a snapshot created after the full snapshot. The snapshot contains only incremental data blocks.</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Encrypted snapshot</td>
<td>An encrypted snapshot is a snapshot created from an encrypted disk.</td>
<td>You can create encrypted snapshots if your business is required to comply with certain security standards.</td>
</tr>
</tbody>
</table>

**Note:**
All automatic snapshots are normal snapshots.

**Note:**
All encrypted snapshots are normal snapshots.
### Classification standard

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unencrypted snapshot</td>
<td>An unencrypted snapshot is a snapshot created from an unencrypted disk.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Billing

Snapshots are billed based on their sizes. They can be billed on a pay-as-you-go basis. For more information, see #unique_6.

**Note:**

Local snapshots can be billed only on a pay-as-you-go basis and cannot be offset by OSS storage plans.

### Limits

For more information about the limits and quotas of snapshots, see the "Snapshot limits" section in Limits.

Local snapshots have the following limits:

- Local snapshots can be created only for ESSDs.
- A maximum of 10 local snapshots can be retained for an ESSD.
- When you use a local snapshot to create a disk, the specified disk size cannot be larger than the snapshot size.
- You cannot use automatic snapshot policies to create local snapshots.
- Local snapshots cannot be created for encrypted disks or local disks.

### Benefits

The following table describes the benefits of Alibaba Cloud ECS snapshots compared with the snapshot feature of traditional storage services.

<table>
<thead>
<tr>
<th>Item</th>
<th>Alibaba Cloud ECS snapshot</th>
<th>Snapshot of traditional storage service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>Unlimited capacity for storing large amounts of business data.</td>
<td>Limited capacity based on the capacity of the storage device.</td>
</tr>
<tr>
<td>Item</td>
<td>Alibaba Cloud ECS snapshot</td>
<td>Snapshot of traditional storage service</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Scalability</td>
<td>High scalability allows you to extend storage devices to any size within seconds.</td>
<td>Low scalability due to limited storage performance, available capacity, and vendor support.</td>
</tr>
<tr>
<td>Total cost of ownership (TCO)</td>
<td>Pay only for the storage space occupied by your snapshots.</td>
<td>Pay large upfront costs for software licenses, reserved storage space, upgrade, and maintenance.</td>
</tr>
<tr>
<td>Security</td>
<td>Support data encryption. If you encrypt your source disk, all snapshots created for the disk are encrypted. Unencrypted snapshots cannot be directly converted to encrypted snapshots, and encrypted snapshots cannot be directly converted to unencrypted snapshots. For more information, see Encryption overview.</td>
<td>Encryption attributes and policies are subject to the underlying storage logic. If the storage architecture has a security flaw, snapshots created based on this architecture may not be secure.</td>
</tr>
<tr>
<td>Implementation method and impact on performance</td>
<td>Redirect-on-write (ROW)</td>
<td>Typically copy-on-write (COW), but probably ROW or other methods. COW negatively affects the data write capabilities of the source system.</td>
</tr>
<tr>
<td></td>
<td>• Reduce impacts on the I/O performance of the source disk.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Snapshots do not affect service availability and can be created at any time without affecting user experience.</td>
<td></td>
</tr>
</tbody>
</table>

**Related operations**

- You can perform the following operations in the ECS console:
  - Create a normal snapshot
  - #unique_10
  - Roll back a disk by using a snapshot
  - #unique_12
  - #unique_13
- For more information about API operations, see the "Snapshots" section in #unique_14.
Local snapshots provide complete copies of disk data at specific points in time and are an important data disaster recovery method. Local snapshots are stored in the same storage cluster as their source disks for fast backup and recovery of disk data. When disk data is lost, you can use a snapshot to restore the disk data to the status when the snapshot was created.

**Scenarios**

Local snapshots can back up disk data within seconds, which reduces waiting time for business. Local snapshots are applicable to the following scenarios:

- You can use local snapshots to quickly back up key business systems that contain huge data, such as databases, containers, and SAP HANA.
- You can also use local snapshots to quickly back up data before you perform high-risk operations. High-risk operations include changing system disks, resizing disks, and updating system patches.
- In common DevOps scenarios, ECS instances must be quickly started. If you want to clone the environment of an ECS instance, you can use a local snapshot to quickly create a custom image, and then copy the image to migrate the instance data to another region.

**Differences between local and normal snapshots**

Compared with normal snapshots, local snapshots are stored in a different location, are created within a shorter period of time and provide quicker disk rollback capabilities. The following table describes the differences between local snapshots and normal snapshots.
### Elastic Compute Service

#### Snapshots

<table>
<thead>
<tr>
<th>Snapshot type</th>
<th>Storage location</th>
<th>Disaster recovery scope</th>
<th>Applicable to</th>
<th>Data synchronization speed</th>
<th>Business recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal snapshot</td>
<td>Stored in Object Storage Service (OSS) in the region of the snapshot</td>
<td>Region-level, geo-disaster recovery</td>
<td>All disk categories</td>
<td>Slow, in minutes</td>
<td>Snapshots are used to roll back disks or create new disks to recover data and restore the business.</td>
</tr>
<tr>
<td>Local snapshot</td>
<td>Stored in the same cluster as the disk</td>
<td>Zone-level, zone-disaster recovery</td>
<td>Only enhanced SSDs (ESSDs)</td>
<td>Fast, in seconds</td>
<td></td>
</tr>
</tbody>
</table>

For more information about snapshot types, see [Snapshot overview](#unique_6).

### Billing

Local snapshots are billed by size on a pay-as-you-go basis. For more information, see [#unique_6](#unique_6).

### Operations and limits

You can use a local snapshot in the ECS console or by calling an API operation. The following table describes the operations that local snapshots support and do not support.

<table>
<thead>
<tr>
<th>Business requirement</th>
<th>Supported</th>
<th>Reference</th>
<th>Related API operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create a local snapshot</td>
<td>Yes. You can create a local snapshot only for an unencrypted ESSD.</td>
<td><a href="#unique_16">Create a normal snapshot</a></td>
<td>#unique_16</td>
</tr>
<tr>
<td>Query the size of a local snapshot</td>
<td>Yes</td>
<td><a href="#unique_18">View the snapshot size</a></td>
<td>#unique_18</td>
</tr>
<tr>
<td>Roll back the disk to restore data to the status when the local snapshot was created</td>
<td>Yes</td>
<td><a href="#unique_19">#unique_19</a></td>
<td>#unique_20</td>
</tr>
<tr>
<td>Business requirement</td>
<td>Supported</td>
<td>Reference</td>
<td>Related API operation</td>
</tr>
<tr>
<td>------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>-------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Create another disk from the local snapshot</td>
<td>Yes. You can use a local snapshot to only create an ESSD and must set the disk size equal to the snapshot size.</td>
<td>#unique_10</td>
<td>#unique_21</td>
</tr>
<tr>
<td>Create a custom image</td>
<td>Yes. You can only use a data disk snapshot to create a custom image.</td>
<td>#unique_12</td>
<td>#unique_22</td>
</tr>
<tr>
<td>Set local snapshots to be released along with the disk</td>
<td>No. You can only set automatic snapshots to be released along with their source disks.</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Encrypt local snapshots</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Use an automatic snapshot policy to create local snapshots</td>
<td>No</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>automatically</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete snapshots</td>
<td>Yes. You can retain 10 local snapshots for a single ESSD. We recommend that you delete unnecessary local snapshots when the quota is reached.</td>
<td>Delete a snapshot</td>
<td>#unique_24</td>
</tr>
</tbody>
</table>
3 Incremental snapshots

Snapshots are used to back up the data of disks at one or more points in time. Snapshots ensure service security and improve application deployment efficiency.

Incremental concepts

After a disk is formatted, it is divided into multiple data blocks based on logical block addresses (LBAs). When new data is written to the data blocks, these data blocks are marked to create incremental snapshots. The first snapshot created for a disk is a full snapshot. A full snapshot does not include empty data blocks of the disk. All subsequent snapshots created after the first snapshot are incremental snapshots. Incremental snapshots include only new data blocks and data blocks that have changed since the last snapshot. Therefore, snapshots can contain the same data blocks, but the data on the data blocks may be different. The following figure illustrates how incremental snapshots work. In the figure, Snapshots 1, 2, and 3 represent the first, second, and third snapshot of a disk.

Before a snapshot is created, the file system checks all the data blocks, and only data blocks whose data is modified are copied to the snapshot.

- Snapshot 1 copies and stores all the data on the disk at the specific point in time when the snapshot is created.
- Snapshot 2 copies and stores only Data Blocks B1 and C1, because the data on these data blocks has been modified since Snapshot 1 is created. Data Blocks A and D are referenced from Snapshot 1.
- Snapshot 3 copies and stores only Data Block B2, because the data on this data block has been modified since Snapshot 2 is created. Data Blocks A and D are referenced from Snapshot 1, and Data Block C1 is referenced from Snapshot 2.
• If you need to roll the disk back to the status of Snapshot 3, the **Roll Back Disk** feature copies Data Blocks A, B2, C1, and D to the disk.

• If you delete Snapshot 2, Data Block B1 is deleted. Data Block C1 is retained because it is referenced by Snapshot 3. If you roll the disk back to the status of Snapshot 3, Data Block C1 can be recovered.

**Snapshot chain**

A snapshot chain contains all the snapshots of a specific disk. Each disk has a snapshot chain. A disk and its snapshot chain have the same ID. A snapshot chain records the relationships among data blocks and contains the following information:

• Snapshot size: the size of storage space occupied by all snapshots in the snapshot chain.

**Note:**
You are charged based on snapshot size. You can use the snapshot chain to check the size of a snapshot.

• Snapshot quota: Each disk can have up to 256 manual snapshots and 1,000 automatic snapshots. For more information, see **Limits**.

**Note:**
When the snapshot quota is reached, you must free up storage space to create more snapshots. For automatic snapshots, the system deletes the earliest automatic snapshot to free up storage space. For manual snapshots, you must manually delete snapshots to free up storage space. For more information, see **Apply or disable an automatic snapshot policy** and **Delete a snapshot**.

• Node: Each node in the snapshot chain represents a snapshot of the source disk. Each snapshot chain can have up to 1,256 nodes, which is equal to the sum of quotas of manual snapshots and automatic snapshots.

**Snapshot deletion**

If you no longer need a snapshot, you can delete it. If the number of snapshots reaches the snapshot quota, you must delete some snapshots to free up storage space. The following figure shows the workflow and logic when you delete a snapshot from a snapshot chain. This example deletes Snapshot S1.
1. Alibaba Cloud ECS analyzes all the data blocks in Snapshot S1, and deletes the data blocks that are not referenced by other snapshots in the chain.

2. Alibaba Cloud ECS adds the data blocks of Snapshot S1 that are referenced by other snapshots in the chain to Snapshot S2. The remaining snapshots in the chain record the information of 10 data blocks:
   - Six data blocks from Snapshot S0
   - Two data blocks from Snapshot S1
   - Two data blocks from Snapshot S2
4 Use snapshots

4.1 Activate ECS Snapshot

You must activate the Alibaba Cloud ECS Snapshot service before you can create snapshots.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Snapshots.
3. View the statement on the Notifications page that appears, and click OK to activate the ECS Snapshot service.

Note:
After you activate ECS Snapshot, you are billed based on the size and storage duration of the created snapshot. Snapshot fees will be deducted from your account balance. Make sure you have compared the snapshot size and the expected fees. For more information about snapshot billing, see Pricing.

What's next
Create a snapshot

4.2 Create a normal snapshot

A snapshot is a backup file of the data on a disk for a specific point in time. A snapshot is used for data backup, data recovery after accidental instance releases, data recovery after network attacks, and the creation of custom images. You can create snapshots of disks to improve fault tolerance for operations before you roll back a disk, modify key system files, or change the operating system of an instance. This topic describes how to create a normal snapshot in the ECS console or by calling an API operation in Alibaba Cloud CLI.

Prerequisites

- The ECS instance must be in the Running or Stopped state.
- The disk must be in the In Use or Expired state.

Note:
If a disk in the **Expired** state reaches its scheduled release time when a snapshot is being created for the disk, the snapshot in the **Creating (Creating)** state will also be released together with the disk.

**Context**

It takes you several minutes to create a normal snapshot, and the specific duration of time depends on the size of the disk. The first snapshot of a disk is a full snapshot, so creating the first snapshot takes an extended period of time. Creating subsequent snapshots takes less time, but the duration of time depends on the amount of data changed since the last snapshot. The more data that has changed, the longer it will take.

**Note:**

If you are using an enhanced SSD, we recommend that you create a local snapshot. Local snapshots are under public preview. You can create a local snapshot within seconds.

When you create a snapshot, take note of the following items:

- You must not perform operations that change the state of the ECS instance such as stopping or restarting the instance.
- Snapshots are billed resources. For more information, see #unique_6.
- We recommend that you create snapshots during off-peak hours because snapshot creation degrades the I/O performance of disks by up to 10% and lowers data read/write speeds.
- While snapshots are being created, incremental data generated by operations on disks will not be included in the snapshots.
- If you create an extended volume from a single multi-partition disk, the snapshot that you created can be used to roll back the disk.
- When a disk is used to create a dynamic extended volume or RAID array, we recommend that you stop applications from writing data to the dynamic extended volume or RAID array and refresh the cached data to the disk. Stop all I/O operations before you create a snapshot.
- Created snapshots are permanently stored unless you delete them. We recommend that you delete unnecessary snapshots at regular intervals to prevent extra fees incurred by snapshot storage.
Create a normal snapshot from the ECS console

The following operations demonstrate how to create a snapshot for an instance from the Instances page in the ECS console:

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Instances.
3. In the top navigation bar, select a region.
4. Find the ECS instance for which you need to create a snapshot, click the instance ID, or click Manage in the Actions column corresponding to the instance to go to the Instance Details page.
5. In the left-side navigation pane, click Disks.
6. Select a disk category, select System Disk or Data Disk for Type, and then click Create Snapshot in the Actions column.
7. In the dialog box that appears, complete the following operations:
   a) Enter a snapshot name in the **Snapshot Name** field.
   b) Binds one or more tags to the snapshot.
   c) Click **OK**.

   ![Create Snapshot dialog](image)

   1. When a snapshot is being created from a disk, do not change the status of the instance to which the disk is attached (for example, do not stop or restart the instance). Instance status changes may cause the snapshot creation to fail.
   2. When a snapshot is being created for a disk in the Expired state and the disk reaches its release time, the disk is released, and the snapshot is deleted.
   3. Note: When a snapshot is being created for a disk in the Expired state and the disk reaches its release time, the disk will be released and the snapshot will be deleted.

8. In the left-side navigation pane, click **Snapshots** to view the snapshot task.

   ![Snapshots](image)

   You can also choose **Storage & Snapshots > Disks** from the left-side navigation pane in the ECS console to create a snapshot for a disk as prompted.
Create a snapshot by using Alibaba Cloud CLI

1. Obtain the instance ID.
   - Method 1: If you have connected to the ECS instance, you can obtain the instance ID from the instance metadata. For more information, see Metadata.
     
     For example, to query the ID of a Linux instance, run the following command:
     
     ```bash
     curl http://100.100.100.200/2016-01-01/meta-data/instance-id
     ```
   - Method 2: Use Alibaba Cloud CLI to call the `DescribeInstances` operation to obtain the instance ID.
     
     ```bash
     aliyun ecs DescribeInstances --RegionId <TheRegionId> --output cols=InstanceId, InstanceName rows=Instances.Instance[]
     ```

2. Obtain the disk ID by calling the `DescribeDisks` operation.

   ```bash
   aliyun ecs DescribeDisks --RegionId <TheRegionId> --InstanceId i-bp1afnc98r8k69****** --output cols=DiskId rows=Disks.Disk[]
   ```

3. Call the `CreateSnapshot` operation to create a snapshot based on a specified disk.

   ```bash
   aliyun ecs CreateSnapshot --DiskId d-bp19pjyf12hebp******
   ```

   The snapshot creation task is initiated if the following information is returned:

   ```json
   {"RequestId":"16B856F6-EFFB-4397-8A8A-CB73FA******","SnapshotId":"s-bp1afnc98r8kjh******"}
   ```

4. Query the snapshot creation progress by calling the `DescribeSnapshots` operation.

   ```bash
   aliyun ecs DescribeSnapshots --RegionId cn-hangzhou --InstanceId i-bp1afnc98r8k69****** --output cols=SnapshotId,Status rows=Snapshots.Snapshot[]
   ```

   If both "SnapshotId":"s-bp1afnc98r8kjh******" and "Status":"accomplished" are displayed, the snapshot is created.

What's next

After the snapshot is created, you can proceed with the following operations:

- Roll back a disk by using a snapshot
- #unique_10
- #unique_12

Related topics
#unique_30
#unique_31
#unique_16
4.3 Roll back a disk by using a snapshot

This topic describes how to roll back a disk by using a snapshot. When the system is unresponsive or an incorrect operation was performed, you can roll back a disk to a previous version by using its snapshots. Before you roll back a disk, you must have created at least a snapshot of the disk. If you roll back system disks, the current SSH key pairs or usernames and passwords of the instances remain bound to the disks after the disks are rolled back.

Prerequisites

Before you roll back a disk by using a snapshot, take note of the following items:

- A snapshot of the disk to be rolled back is created, and no new snapshot is being created for the disk.

⚠️ Warning:
The rollback operation is irreversible. After a disk is rolled back, the data from the creation of the snapshot to when the disk is rolled back is lost. To avoid data losses caused by incorrect operations, we recommend that you create a snapshot for the current disk before you roll back the disk.

- The disk has not been released.
- After you replace the system disk, snapshots of the previous system disk cannot be used to roll back the new system disk.
- If you use a disk to create a dynamic extended volume or redundant array of independent disks (RAID), you must stop all I/O operations on the disk before you roll back the disk.
- The disk is attached to an ECS instance and the instance is in the Stopped state. For more information, see #unique_32 and #unique_33.

🔍 Note:
A pay-as-you-go instance in a VPC may not be restarted after its disk is rolled back if the No Fees for Stopped Instances (VPC-Connected) feature is enabled. We recommend that you disable the No Fees for Stopped Instances (VPC-Connected) feature before you stop the instance. For more information, see #unique_34.
Roll back a disk by using a snapshot

You can roll back a disk from the Snapshots or Instances page. The following example shows how to roll back a disk from the Instances page.

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Instances.
3. In the top navigation bar, select a region.
4. Find the instance whose disk you want to roll back the disk and click Manage in the Actions column.
5. In the left-side navigation pane, click Snapshots.
6. Find the target snapshot and click Rollback Disk in the Actions column.

Note:
You can roll back only one disk at a time. Other disks that are attached to the instance are not affected. After the disk is rolled back, the disk is restored to the status of the entire disk at a certain point in time, instead of the status of a partition or a directory.

7. In the dialog box that appears, click OK.

Note:
If you select Start Instance Immediately after Rollback, the instance automatically starts after the disk is rolled back.

(Optional) Synchronize data after a disk is rolled back

If you roll back a disk by using Snapshot A that was created at the point in time T1 and you need to synchronize the data after T1, you can perform the following operations:
1. Create Snapshot B for the original disk at the point in time T2.

2. Roll back the original disk by using Snapshot A.

3. Create a new disk by using Snapshot B.
   For more information, see #unique_10.

4. Attach the new disk to the same ECS instance.
   For more information, see #unique_32.

5. Remotely connect to an ECS instance. For more information, see #unique_35.

6. View the new disk.
   
   - Windows instances: The new disk is displayed in the system.
   - Linux instances: Run the `mount` command to mount the new disk.

7. Copy useful data from the new disk to the original disk.

8. Optional: Release the new disk as needed.

**What's next**

If you resize a disk after you create a snapshot for the disk, the size of the disk is also rolled back after you roll back the disk. To make the disk revert to the size before the rollback, you must log on to the instance to resize the file system again.

- #unique_36
- #unique_37

**Related topics**

#unique_20
4.4 Reduce snapshot fees

This topic describes how to manage your snapshots and reduce fees.

Maintain an appropriate number of snapshots

Snapshot fees are based on the amount of storage space used by snapshots. More snapshots require more disk storage space and result in higher snapshot fees. We recommend that you maintain an appropriate number of snapshots for your specific service requirements. The following table lists recommended retention periods for different scenarios.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Snapshot creation frequency</th>
<th>Retention period</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core application</td>
<td>Once every day or every other day</td>
<td>Several months or longer</td>
<td>We recommend that you create and store snapshots based on the importance of the data.</td>
</tr>
<tr>
<td>Non-core application</td>
<td>Once every week or every other week</td>
<td>Several days or weeks</td>
<td>We recommend that you create and store snapshots based on the importance of the data.</td>
</tr>
<tr>
<td>System disk</td>
<td>Whenever needed</td>
<td>One or two snapshots</td>
<td>We recommend that you do not store critical application data in the system disk.</td>
</tr>
<tr>
<td>Software upgrade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modification of critical files</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Migration of application data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test environment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Delete snapshots

When you need to free up space or when the maximum number of snapshots has been reached, you can delete snapshots that are no longer needed. For more information, see Delete a snapshot.
Disable unnecessary snapshot policies

You can disable snapshot policies that are no longer needed to avoid redundancy and reduce the amount of storage space used by snapshots. For more information, see Apply or disable an automatic snapshot policy.

Note:
To improve the operation error tolerance of your services, we recommend that you retain at least one snapshot policy for core services.

4.5 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.

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**.

**4.6 Delete a snapshot**

You can delete snapshots that are no longer needed to free up space or when the maximum number of snapshots has been reached. This topic describes the procedure to delete a snapshot in the ECS console. This procedure applies to both manual snapshots and automatic snapshots.

**Prerequisites**

- You have created a snapshot. For more information, see **Create snapshot**.
• If a snapshot has been used to create custom images, you must delete those custom images before the snapshot can be deleted. For more information, see #unique_40.

Procedure

1. Log on to the ECS console.

2. In the left-side navigation pane, choose **Storage & Snapshots > Snapshots**.

3. In the top navigation bar, select a region.

4. Select one or more snapshots to be deleted and click **Delete** at the bottom of the page.

5. In the **Delete** dialog box that appears, select **Delete** or **Force Delete**.

(Note: To delete snapshots that have been used to create cloud disks, you must select **Force Delete** and then Proceed to Forcibly Delete. After a snapshot is deleted, you cannot perform operations that depend on the status of the original snapshot data, such as the operation to **reinitialize a cloud disk**.

6. Click **OK**.

**Related topics**

*DeleteSnapshot*
5 Automatic snapshot policies

5.1 Overview

Automatic snapshot policies allow ECS to create normal snapshots and back up data for a disk on a regular basis. These policies can be applied to both system disks and data disks. Automatic snapshot policies improve data security and operation fault tolerance.

Use scenarios

Automatic snapshot policies allow ECS to create snapshots on a regular basis at the scheduled time. They can protect disk data and improve system security and operation fault tolerance. When applications such as websites or databases deployed on an ECS instance are exposed to attacks due to system vulnerabilities, you may not be able to create snapshots in time. In these cases, you can use the most recent automatic snapshot to roll back the affected disk and reduce losses.

You can also specify an automatic snapshot policy to create snapshots before you perform regular system maintenance tasks. This can also prevent losses due to unexpected problems during system maintenance.

Limits

Take note of the following points when you use automatic snapshot policies:

• For information about the quota of automatic snapshot policies for an Alibaba Cloud account in a region and the maximum number of automatic snapshots that can be retained for a disk, see the "Snapshot limits" section in Limits.

• When the quota of automatic snapshots for a disk is reached, the earliest automatic snapshot is deleted.

• If you modify the retention duration of automatic snapshots in an automatic snapshot policy, the modification applies only to subsequent snapshots, but not to existing snapshots.

• You cannot create manual snapshots for a disk when an automatic snapshot is being created. You must wait until the automatic snapshot has been created.

• You can create automatic snapshots only for disks that are in the In Use state.

• Automatic snapshot policies cannot be applied to local disks.
• Automatic snapshot policies can create only normal snapshots. They cannot create local snapshots.

Related operations

• Create an automatic snapshot policy
• Apply or disable an automatic snapshot policy
• Delete automatic snapshots when releasing a disk
• Modify an automatic snapshot policy
• Delete an automatic snapshot policy

API operations

• #unique_47
• #unique_48
• #unique_49
• #unique_50
• #unique_51
• #unique_52

5.2 Create an automatic snapshot policy

This topic describes how to create an automatic snapshot policy in the ECS console.

Prerequisites

The snapshot feature has been enabled. For more information, see Activate ECS Snapshot.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Snapshots.
3. In the top navigation bar, select a region.
4. On the Snapshots page, click the Automatic Snapshot Policies tab.
5. In the upper-right corner of the Automatic Snapshot Policies page, click Create Policy.
6. In the **Create Policy** dialog box that appears, configure the following parameters as prompted.

- **Name**: Specify the policy name.
- **Executed At**: Select one or more points in time from 00:00 to 23:00.

**Note:**
Creating a snapshot may temporarily reduce the I/O performance of a block storage device by about 10%. We recommend that you create snapshots during off-peak hours.

- **Execution Frequency**: Select one or more days of the week.
- **Keep Snapshots**: Specify the number of days to retain the snapshot. Valid values: 1 to 65,536. Default value: 30. If you select **Always Keep** and the maximum number of snapshots is reached, the system will delete the earliest automatic snapshot.
- **Tag**: Select existing tag keys and values or enter new tag keys and values. Automatic snapshots created by the policy are assigned these tags by default.

**Note:**
Regions that support the feature include China (Hohhot), China (Chengdu), US (Silicon Valley), and US (Virginia).

- **Snapshot cross-region replication**: Select destination regions and a setting for **Keep Snapshots**. When you select a setting for **Keep Snapshots**, enter the number of days that snapshots are retained for or select **Continuous retention, not affected by the maximum number of snapshots**. After you enable the feature, automatic snapshot replicas are automatically stored in each of the destination regions.

**Note:**
Regions that support the feature include China (Hohhot), China (Chengdu), US (Silicon Valley), and US (Virginia).

7. Click **OK**.

**What's next**

We recommend that you specify cloud disks to execute an automatic snapshot policy immediately after the policy is created. Click **Apply or Disable Policy** to go to the **Apply or Disable Automatic Snapshot Policy** page. For more information, see **Apply or disable an automatic snapshot policy**.
5.3 Apply or disable an automatic snapshot policy

You can apply automatic snapshot policies to disks. After an automatic snapshot policy is applied to a disk, snapshots are automatically created for the disk based on the policy.

Prerequisites

At least one automatic snapshot policy is created.

Method 1: Apply or disable an automatic snapshot policy on the Snapshots page

On the Snapshots page of the ECS console, you can apply or disable an automatic snapshot policy on a system or data disk.

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Snapshots.
3. In the top navigation bar, select a region.
4. On the Snapshots page, click the Automatic Snapshot Policies tab.
5. On the Automatic Snapshot Policies tab, find the target automatic snapshot policy and click Apply or Disable Policy in the Actions column.
6. In the Apply or Disable Automatic Snapshot Policy dialog box that appears, click the Disks Without Policy Applied tab.
   • If you want to apply the automatic snapshot policy, click the Disks Without Policy Applied tab, find the disk to which you want to apply the policy, and then click Apply...
**Policy** in the Actions column. You can also select multiple disks and click **Apply Policy** in the lower part of the dialog box.

- If you want to disable the automatic snapshot policy, click the **Disks with Policy Applied** tab, find the disk on which you want to disable the policy, and then click **Disable Policy** in the Actions column. You can also select multiple disks and click **Disable Policy** in the lower part of the dialog box.
7. In the upper-right corner of the **Apply or Disable Automatic Snapshot Policy** dialog box, click the icon to close the dialog box.

**Method 2: Apply an automatic snapshot policy when you create an ECS instance**

When you create an ECS instance, you can apply an automatic snapshot policy to a system or data disk.

1. Log on to the **ECS console**.
2. In the left-side navigation pane, choose **Instances & Images > Instances**.
3. In the upper-right corner of the Instances page, click **Create Instance**. For more information about how to create an ECS instance, see #unique_53.

In the **Storage** section of the **Basic Configurations** page, select **Disk Backup** for the system disk or data disks and then select an automatic snapshot policy.

![Storage configuration](image)

**Method 3: Apply an automatic snapshot policy when you create a disk**

You can apply an automatic snapshot policy to a disk when you create the disk.

1. Log on to the **ECS console**.
2. In the left-side navigation pane, choose **Storage & Snapshots > Disks**.
3. In the upper-right corner of the Disks page, click **Create Disk**. For more information about how to create a disk, see #unique_54 or #unique_55.

Select **Disk Backup** and then select an automatic snapshot policy.
Method 4: Apply or disable an automatic snapshot policy on the Disks page

On the Disks page of the ECS console, you can apply or disable an automatic snapshot policy on a system or data disk.

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Disks.
3. In the top navigation bar, select a region.
4. Find the target disk and click Apply or Disable Automatic Snapshot Policy in the Actions column.
5. In the Apply or Disable Automatic Snapshot Policy dialog box that appears, turn on or off Automatic Snapshot Policy.

6. Click OK.

Result

After you apply or disable an automatic snapshot policy on a disk, you can view the changed number of disks to which the policy is applied in the Applied Disks column corresponding to the policy on the Automatic Snapshot Policies tab.
When an automatic snapshot policy is triggered, an automatic snapshot whose prefix is auto2.0 is created for the disk. All automatic snapshots are named in the auto2.0_yyyyMMdd_SnapshotPolicyId format. For example, auto2.0_20170731_sp-m5e2w2jutw8bv31***** indicates that the automatic snapshot was created on July 31, 2017, where:

- auto2.0: the automatic snapshot.
- yyyyMMdd: the date when the snapshot is created. yyyy stands for year, MM for month, and dd for date.
- SnapshotPolicyId: the ID of the automatic snapshot policy used.

**Related topics**

- #unique_48
- #unique_49
- #unique_21
- #unique_56

### 5.4 Delete automatic snapshots when releasing a disk

You can enable the delete automatic snapshots when releasing a disk feature to delete automatic snapshots of a disk when the disk is released and reduce the amount of disk space occupied by snapshots.

**Prerequisites**

- You have created at least one automatic snapshot policy. For more information, see [Create an automatic snapshot policy](#).
You have applied an automatic snapshot policy to a cloud disk. For more information, see Apply or disable an automatic snapshot policy.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Disks.
3. In the top navigation bar, select a region.
4. Find the cloud disk for which you want to enable the feature, choose More > Modify Disk Property in the Actions column.
5. In the Modify Disk Property dialog box that appears, select or clear Delete Automatic Snapshots While Releasing Disk.

Note:
When you clear Delete Automatic Snapshots While Releasing Disk, the retention period of the automatic snapshot policy applies. You can also modify the retention period of the automatic snapshot policy. For more information, see Modify an automatic snapshot policy.

6. Click OK.

Related topics
#unique_57
5.5 Modify an automatic snapshot policy

You can modify the name, creation time, execution frequency, and retention period of an automatic snapshot policy at any time after the policy is created.

Prerequisites

You have created at least one automatic snapshot policy. For more information, see Create an automatic snapshot policy.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Storage & Snapshots > Snapshots.
3. In the top navigation bar, select a region.
4. On the Snapshots page, click the Automatic Snapshot Policies tab.
5. On the Automatic Snapshot Policies page, find the automatic snapshot policy to be modified and click Modify Policy in the Actions column.

- **Name**: Specify the policy name.
- **Executed At**: Select one or more points in time from 00:00 to 23:00.

**Note:**
Creating a snapshot may temporarily reduce the I/O performance of a block storage device by about 10%. We recommend that you create snapshots during off-peak hours.

- **Execution Frequency**: Select one or more days of the week.
- **Keep Snapshots**: Specify the number of days to retain the snapshot. Valid values: 1 to 65,536. Default value: 30. If you select Always Keep and the maximum number of snapshots is reached, the system will delete the earliest automatic snapshot.

**Note:**
Modifying the snapshot retention period of an automatic snapshot policy will only affect new snapshots created after the modification. The retention period of existing snapshots will not be modified.

- **Tag**: Select existing tag keys and values or enter new tag keys and values. Automatic snapshots created by the policy are assigned these tags by default.

**Note:**
Regions that support the feature include China (Hohhot), China (Chengdu), US (Silicon Valley), and US (Virginia).

- **Snapshot cross-region replication**: Select destination regions and a setting for *Keep Snapshots*. When you select a setting for *Keep Snapshots*, enter the number of days that snapshots are retained for or select *Continuous retention, not affected by the maximum number of snapshots*. After you enable the feature, automatic snapshot replicas are automatically stored in each of the destination regions.

**Note:**
Regions that support the feature include China (Hohhot), China (Chengdu), US (Silicon Valley), and US (Virginia).

6. Click OK.

**Related topics**
#unique_52

### 5.6 Delete an automatic snapshot policy

You can delete automatic snapshot policies that are no longer needed. When you delete the policy, all cloud disks to which the policy was applied are no longer affected.

**Prerequisites**

You have created at least one automatic snapshot policy. For more information, see *Create an automatic snapshot policy*.

**Procedure**

1. Log on to the ECS console.
2. In the left-side navigation pane, choose *Storage & Snapshots > Snapshots*.
3. In the top navigation bar, select a region.
4. On the *Snapshots* page, click the *Automatic Snapshot Policies* tab.
5. Find the automatic snapshot policy to be deleted and click **Delete Policy** in the Actions column.

6. In the message that appears, click **OK**.

![Delete Automatic Snapshot Policy](image)

**Related topics**

#unique_50
6 Snapshot FAQ

This topic lists frequently asked questions related to ECS snapshots.

- Frequently asked questions
  - How is the size of the first snapshot of a disk calculated?
  - Where can I view a list of snapshot prices by Alibaba Cloud region?
  - Is there a free tier for the snapshot service?
  - Can I download or export ECS instance snapshots to a local device?
- Questions concerning OSS
  - If I have activated OSS, will snapshots be automatically saved to my OSS buckets?
  - Can a custom image that was created from a snapshot be saved to an OSS bucket?
- Questions concerning billing
  - How is the storage fee for snapshots calculated?
  - Where can I view a list of snapshot prices by Alibaba Cloud region?
  - What impact will overdue payments have on my stored snapshots?
  - I use snapshots frequently. How can I reduce the amount of fees incurred?
  - Is there a free tier for the snapshot service?
- Questions concerning snapshot and block storage type
  - Do automatic snapshots differ from or conflict with manual snapshots?
  - Can I create snapshots for local disks?
  - I have created a snapshot for an encrypted data disk and generated an image, but I cannot share the image. Why?
- Questions concerning snapshot size
  - How is the size of the first snapshot of a disk calculated?
  - Will deleting files from an ECS instance free up storage space?
  - Why is the size of a snapshot larger than the disk capacity displayed in the file system?
  - What is the relationship between a file system and a disk or a snapshot?
• Questions concerning snapshot deletion
  - How can I prevent snapshots from being deleted by Alibaba Cloud?
  - How can I delete snapshots to reduce backup costs?
  - Are automatic snapshots deleted after the system disk is changed, the instance expires, or the disk is released?
  - How can I delete snapshots that have been used to create images and disks?
  - Why does the system prompt "RequestId: xxx" when I delete a snapshot in the snapshot chain?

• Questions concerning automatic snapshot policy
  - If I have used an automatic snapshot to create a custom image or a disk, will the automatic snapshot policy fail to be executed?
  - Can I create multiple automatic snapshot policies for a disk?

• Questions concerning disk rollback by using snapshots
  - How can I avoid losing data due to incorrect operations?
  - After I change the system disk, can I use a snapshot of the previous system disk to roll back the new system disk?
  - I created an instance in China (Hangzhou) and created snapshots for data disks of the instance. I purchased another instance in China (Hangzhou) after the previous one expired and was released. Can I use the snapshots from my original instance to restore the instance?
  - Why am I unable to use a snapshot to roll back a disk of an ECS instance?

• Questions concerning relationship between snapshots and images
  - What are the differences and relationships between snapshots and images?
  - How do I migrate snapshots from one account to another?
  - Can I use a data disk snapshot to create a custom image?
  - Can I download or export ECS instance snapshots to a local device?
  - Why does the system prompt "RequestId: xxx" when I delete a snapshot in the snapshot chain?

If I have activated OSS, will snapshots be automatically saved to my OSS buckets?

No. Snapshots are not saved to existing OSS buckets. Snapshots are stored independently of your OSS buckets. You do not need to create new buckets for snapshots.
Can a custom image that was created from a snapshot be saved to an OSS bucket?

Yes. You can export the image to your OSS bucket to download in the future. For more information, see #unique_59. However, custom images cannot be directly saved to an OSS bucket.

How is the storage fee for snapshots calculated?

Snapshots are billed on a pay-as-you-go basis. The price per GiB used to store snapshots is the same as that defined in the OSS standard storage plan and is charged on a monthly basis. For information about snapshot prices of various Alibaba Cloud regions, see the Pricing tab on the Elastic Compute Service page.

For information about examples of pay-as-you-go billing, see Billing of snapshots.

Where can I view a list of snapshot prices by Alibaba Cloud region?

The price per GiB used to store snapshots is the same as that defined in the OSS standard storage plan and is charged on a monthly basis. For information about snapshot prices of various Alibaba Cloud regions, see the Pricing tab on the Elastic Compute Service page. Scroll down to the Snapshot Fee section to view the price list by region. You can also download a list of snapshot prices in CSV or JSON format by clicking Download price.

What impact will overdue payments have on my stored snapshots?

Snapshots are suspended 24 hours after your account payments become overdue. After your account has overdue payments:

- In the first 15 days, all existing snapshots are retained, but no snapshots can be created. All automatic snapshots whose retention period is less than 15 days are deleted.
- After 15 days, all snapshots are deleted, except for those that have been used to create disks or custom images. The automatic snapshot policy is also deleted.
I use snapshots frequently. How can I reduce the amount of fees incurred?

We recommend that you maintain a manageable number of snapshots, and delete unneeded snapshots. For more information, see Reduce snapshot fees.

Is there a free tier for the snapshot service?

No. You need to pay for the snapshot service. Snapshots start to incur fees after you create them. For more information, see #unique_6.

Do automatic snapshots differ from or conflict with manual snapshots?

No. Both manual and automatic snapshots are data files of a disk at a point in time. However, you cannot create manual snapshots while automatic snapshots are being created. You must wait until automatic snapshots have been created.

Can I create snapshots for local disks?

No. If you want to improve the availability of applications, we recommend that you use data redundancy at the application layer or create deployment sets for clusters.

I have created a snapshot for an encrypted data disk and generated an image, but I cannot share the image. Why?

To ensure data privacy, custom images created from encrypted snapshots cannot be shared. We recommend that you use unencrypted snapshots to create custom images, so you can share with other users.

How is the size of the first snapshot of a disk calculated?

The first snapshot taken of a disk is a full snapshot that copies all the data of the disk at a point in time. The snapshot size equals the disk capacity. For example, if the capacity of a disk is 200 GiB and 122 GiB of the storage space is used, the size of the first snapshot is 200 GiB. For more information, see Incremental snapshots.

Will deleting files from an ECS instance free up storage space?

No. When you delete files from an ECS instance, the space is not cleared in the disks, only tags are added to the headers of the files.

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

- Issue: You have created a snapshot after deleting files from the ECS instance. However, the size of the snapshot has not been reduced or is larger than the disk capacity displayed in the file system.
• Cause: After snapshots are created, a mechanism identifies empty blocks to reduce the size of the snapshot. However, these empty blocks are filled when you format the file system, delete files, or write data to blocks. Therefore, the snapshot size may be larger than the disk capacity currently displayed in the file system. Specific causes:
  - File system metadata occupies disk space.
  - During file system initialization, data is written into a large number of blocks divided equally from the logical block address (LBA). This operation also occupies disk space.
  - To improve performance, the file system only adds tags to the headers of files when they are deleted. The disk cannot detect the delete instruction, so the deleted data blocks are still allocated and copied to snapshots.
  - The KVM virtio block and Xen block front drivers do not support the TRIM instruction (which signals that data in the LBA is no longer in use and can be deleted). As a result, the disk cannot determine whether data can be deleted.

What is the relationship between a file system and a disk or a snapshot?

You can create a file system in a disk partition. The file system manages disk space. These management tasks take the form of I/O requests in the disk. The disk records the status of data blocks and copies data to OSS as needed. This process is how snapshots are created. The following figure shows the relationship between a file system and a snapshot.

![Diagram showing the relationship between a file system and a snapshot]

Note:
In the preceding figure, all data blocks with data written to them are recorded in the snapshot, even if the related files have been deleted from the disk. In the file system, only tags are added to the headers of files to be deleted but space is not cleared in the disks.

How can I prevent snapshots from being deleted by Alibaba Cloud?

• Manual snapshots are never deleted by Alibaba Cloud regardless of whether their corresponding disk or instance has been released.
• To prevent automatic snapshots from being deleted, you can set the Keep Snapshots parameter to Always Keep when modifying the automatic snapshot policy. Then, only the earliest snapshots are deleted when the quota of the snapshots is reached. For more information, see Modify an automatic snapshot policy. For the snapshot quota, see unique_7.

How can I delete snapshots to reduce backup costs?

• Manual snapshots: You can delete manual snapshots.
• Automatic snapshots: You can delete automatic snapshots. When the maximum number of snapshots has been reached, the system deletes the earliest automatic snapshot.

Are automatic snapshots deleted after the system disk is changed, the instance expires, or the disk is released?

• If Delete Automatic Snapshots While Releasing Disk is selected for the automatic snapshot policy, automatic snapshots are deleted when the corresponding instance or disk is released.
• If Delete Automatic Snapshots While Releasing Disk is not selected for the automatic snapshot policy, the retention period specified by the automatic snapshot policy applies. You can Modify an automatic snapshot policy as needed.

How can I delete snapshots that have been used to create images and disks?

• You can delete snapshots that have been used to create disks. After a snapshot is deleted, you cannot perform operations that depend on the status of the original snapshot data, such as the operation to reinitialize a disk.
• If the snapshot has been used to create custom images, you must delete those custom images before you can delete the snapshot.
• You can delete images that have been used to create instances. After an image is deleted, you cannot perform operations that depend on the status of the original snapshot data, such as the operation to reinitialize a disk.

If I have used an automatic snapshot to create a custom image or a disk, will the automatic snapshot policy fail to be executed?

No.

Can I create multiple automatic snapshot policies for a disk?

No.
How can I avoid losing data due to incorrect operations?

You can create snapshots to back up data before you perform risky operations. For example, you can create a snapshot if you need to modify critical system files, migrate instances from a classic network to a VPC, back up data, restore an instance that was released accidentally, prevent network attacks, change operating systems, or provide data support for a production environment. If an error occurs, you can roll back the disk to reduce risks. For more information, see Create a normal snapshot and Roll back a disk by using a snapshot.

After I change the system disk, can I use a snapshot of the previous system disk to roll back the new system disk?

No.

I created an instance in China (Hangzhou) and created snapshots for data disks of the instance. I purchased another instance in China (Hangzhou) after the previous one expired and was released. Can I use the snapshots from my original instance to restore the instance?

No. To use snapshots to restore an original instance, you must make sure that the disks from which the snapshots were created are not released. You can use one of these snapshots to create a data disk and attach the new disk to the new instance. For more information, see #unique_10 and #unique_32.

Why am I unable to use a snapshot to roll back a disk of an ECS instance?

You can check the snapshot based on the returned error message. For the common issues and solutions regarding using snapshots to roll back disks, see #unique_60.

What are the differences and relationships between snapshots and images?

The differences between snapshots and images are as follows:

- Images can be directly used to create ECS instances, while snapshots cannot.
- Images can be used to restore instance data across regions, while snapshots cannot. For more information, see #unique_61.
- A snapshot can be a data backup of either the system disk or a data disk of an ECS instance, while an image must contain the system disk data of an ECS instance.
- You can use snapshots to back up data on a disk, and use images to create one or more ECS instances.

The relationships between snapshots and images are as follows:
• When you create a custom image from an instance, ECS creates a snapshot for each disk of the instance. The created custom image contains the snapshots of all the disks of this ECS instance. For more information, see Create a custom image by using an instance.

• You can also create custom images by using system disk snapshots. For more information, see Create a custom image by using a snapshot.

How do I migrate snapshots from one account to another?

Snapshots cannot be migrated. If needed, you can create an image from the snapshot that you want to migrate and share the image with another account. For more information, see Create a custom image by using a snapshot and #unique_63.

To migrate a data disk snapshot from account A to account B, follow these steps:

1. Create an image from the original instance. For more information, see Create a custom image by using a snapshot.
2. Share the image with account B. For more information, see #unique_63.
3. In account B, use the image to create a pay-as-you-go instance. For more information, see #unique_13.
4. Create a snapshot from a data disk of the newly created instance. For more information, see Create a normal snapshot.
5. Release the newly created instance. For more information, see #unique_64.

Can I use a data disk snapshot to create a custom image?

No. The snapshot used to create a custom image must be a snapshot of a system disk.

Can I download or export ECS instance snapshots to a local device?

No. Snapshots cannot be downloaded to local devices. You can create an image from a system disk snapshot and then export the image. For more information, see #unique_12 and #unique_59.

Why does the system prompt "RequestId: xxx" when I delete a snapshot in the snapshot chain?

Your snapshot was used to create a custom image. You must delete the custom image before you can delete the snapshot. For more information, see #unique_40.