

Alibaba Cloud

Elastic Compute Service Snapshots

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Document conventions






Style	Description	Example
 Danger	A danger notice 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.
 Warning	A warning notice 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 restart an instance.
 Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: If the weight is set to 0, the server no longer receives new requests.
 Note	A note indicates supplemental instructions, best practices, tips, and other content.	 Note: You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click Settings > Network > Set network type .
Bold	Bold formatting is used for buttons, menus, page names, and other UI elements.	Click OK .
<code>Courier font</code>	Courier font is used for commands	Run the <code>cd /d C:/window</code> command to enter the Windows system folder.
<i>Italic</i>	Italic formatting is used for parameters and variables.	<code>bae log list --instanceid</code> <i>Instance_ID</i>
[] or [a b]	This format is used for an optional value, where only one item can be selected.	<code>ipconfig [-all -t]</code>
{ } or {a b}	This format is used for a required value, where only one item can be selected.	<code>switch {active stand}</code>

Table of Contents

1. Snapshot overview	06
2. Local snapshot	09
3. Incremental snapshots	12
4. Use snapshots	14
4.1. Activate ECS Snapshot	14
4.2. Create a snapshot of a disk	14
4.3. Create a local snapshot	17
4.4. Enable or disable the instant access feature	21
4.5. Copy a snapshot	23
4.6. Roll back a disk by using a snapshot	25
4.7. Create a custom image from a snapshot	27
4.8. Reduce snapshot fees	30
4.9. View the snapshot size	31
4.10. Delete a snapshot	32
5. Use snapshot-consistent groups	33
5.1. Create a snapshot-consistent group	33
5.2. Roll back disks by using a snapshot-consistent group	37
5.3. Create application-consistent snapshots in the ECS console	38
5.4. Create application-consistent snapshots by using ECS SDK...	48
5.5. Best practices for creating application-consistent snapshots...	58
5.6. Best practice for creating application-consistent snapshots ..	72
6. Automatic snapshot policies	81
6.1. Overview	81
6.2. Create an automatic snapshot policy	83
6.3. Apply or disable an automatic snapshot policy	85
6.4. Delete automatic snapshots while releasing a disk	89

6.5. Modify an automatic snapshot policy	90
6.6. Delete an automatic snapshot policy	92
7.Edit the tags of a snapshot	93
8.Edit the tags of an automatic snapshot policy	94
9.Snapshot FAQ	95

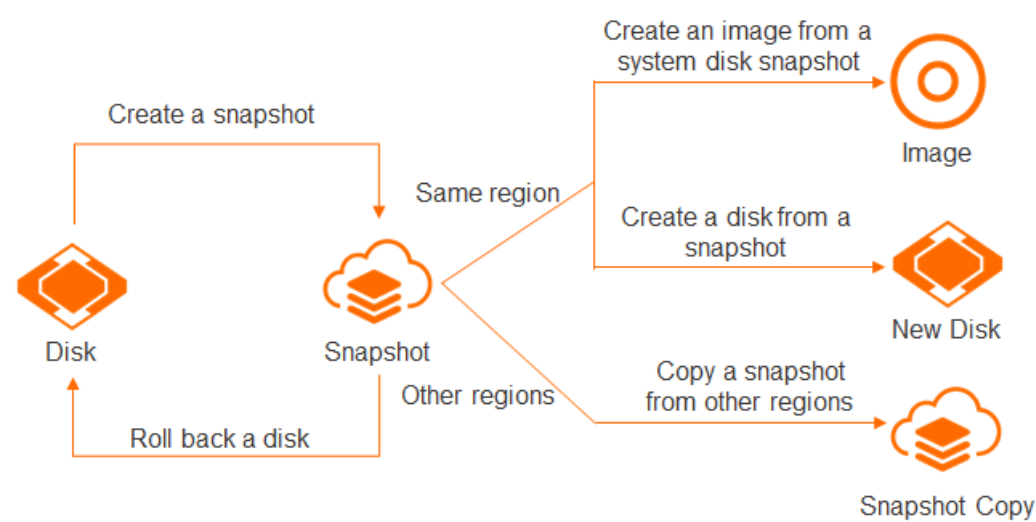
1.Snapshot overview

The Alibaba Cloud snapshot service is an agentless backup service that allows you to create crash-consistent snapshots for all disk categories to back up or restore an entire disk. Crash-consistent snapshots are an effective solution to disaster recovery and can be used to back up data, create images, and implement disaster recovery for applications.


Introduction

A snapshot is a point-in-time backup of a disk. The first snapshot of a disk is a full snapshot that does not contain the copies of empty data blocks. Subsequent snapshots are incremental snapshots that store only changed data blocks. For more information, see [Incremental snapshots](#).

The following figure shows common operations on a snapshot.



Operation	Description	References
Create a snapshot	<p>You can use the following methods to create snapshots:</p> <ul style="list-style-type: none">You can manually create snapshots. Manually created snapshots are called manual snapshots. You can create manual snapshots before you perform high-risk operations to improve fault tolerance. You can create snapshots for a single disk or create snapshots for multiple disks on one or more Elastic Compute Service (ECS) instances by creating a snapshot-consistent group.You can create automatic snapshot policies to create snapshots. Snapshots created based on these policies are called automatic snapshots. After you create an automatic snapshot policy and apply it to a disk, the system creates snapshots for the disk at the points in time specified in the policy. You can use automatic snapshots to back up data and improve the security of your business data.	<ul style="list-style-type: none">Create a snapshot of a diskCreate a snapshot-consistent groupOverview

Operation	Description	References
Roll back a disk	When the system is unresponsive or when accidental changes are made, you can roll back a disk to a previous version by using one of its snapshots.	Roll back a disk by using a snapshot
Create an image from a system disk snapshot	You can create a custom image from a snapshot that contains the operating system and data of an ECS instance. Then, you can use the custom image to create multiple instances that have identical application environments.	Create a custom image from a snapshot
Create a disk from a snapshot	A single snapshot can be used to create multiple identical disks. <div> Note You can use a snapshot to create disks across zones.</div>	Create a disk from a snapshot
Copy a snapshot from other regions	When a snapshot is copied from one region to another, a copy of the snapshot is created in the destination region.	Copy a snapshot

In addition, the snapshot service provides the following advanced features:

- **Instant access:** After the instant access feature is enabled for a snapshot, the snapshot can be used to roll back disks or create disks across zones even when the snapshot is being created. For more information, see [Enable or disable the instant access feature](#).
- **Application-consistent snapshot:** Application-consistent snapshots can be used to roll back applications to ensure that the applications start in a consistent state. For more information, see [Create application-consistent snapshots in the ECS console](#).

Billing

For information about the billing of snapshots, see [Snapshots](#).

Limits

For information about the limits and quotas of snapshots, see the "Snapshot limits" section in [Limits](#).

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 ECS instances that have identical environments.
- **Improvement of fault tolerance:** You can reduce the risk of data loss caused by accidental changes by using a snapshot to roll a disk back to a previous version. Snapshots are suitable for the following scenarios:

- Create snapshots on a regular basis to prevent data loss caused by accidental changes or external attacks. For example, data may be lost due to the fact that invalid data is written to disks, ECS instances are accidentally released, data errors arise from application errors, or hackers exploit application vulnerabilities to delete business data.
- Create snapshots before you perform high-risk O&M operations, such as replacing operating systems, upgrading applications, and migrating data.

Benefits

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

Item	Alibaba Cloud ECS snapshot	Traditional storage service snapshot
Capacity	Unlimited capacity for storing large amounts of business data.	Limited capacity, dependent on the capacity of the storage device.
Scalability	High scalability allows you to extend storage devices to any size within seconds.	Low scalability, dependent on the storage performance, available capacity, and vendor support.
Total cost of ownership (TCO)	You need only to pay for the amount of storage space occupied by your snapshots.	High upfront costs for software licenses, reserved storage space, upgrade, and maintenance.
Security	Supports data encryption. After you encrypt a disk, all snapshots that are created for it are also encrypted. Unencrypted snapshots cannot be converted to or from encrypted snapshots. For more information, see Encryption overview .	Encryption attributes and policies are subject to the underlying storage logic. If the storage architecture has security flaws, snapshots created based on this architecture may also have security flaws.
Impacts on performance	Uses redirect-on-write (ROW). <ul style="list-style-type: none">• Impacts on the I/O performance of the source disk are reduced.• Snapshots do not affect service availability and can be created at any time without affecting user experience.	Typically uses copy-on-write (COW), but may also use ROW or other methods. COW may affect the data write capabilities of the source system.

2. Local snapshot

Local snapshots provide complete copies of disk data at specific points in time and are an important method for disaster recovery. 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 point in time 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:

- Backup of key business systems that contain a large amount of data, such as databases, containers, and SAP High-performance Analytic Appliance (SAP HANA).
- Backup of data before you perform high-risk operations to reduce waiting time, such as replacing system disks, resizing disks, and updating system patches.

Differences between local snapshots and normal snapshots

Compared with normal snapshots, local snapshots are created in less time and are stored in a different location for quick disk rollback. The following table describes the differences between local snapshots and normal snapshots.

Snapshot type	Storage location	Disaster recovery scope	Applicable scope	Data synchronization speed	Business recovery
Normal snapshot	Stored in Object Storage Service (OSS) buckets that are located in the same region as the snapshot	Region-level, geo-disaster recovery	All disk categories	Slow, within minutes	Snapshots are used to roll back or create disks to recover data and restore the business.
Local snapshot	Stored in the same cluster as the source disk (the disk from which the snapshot was created)	Zone-level, zone-disaster recovery	Only enhanced SSDs (ESSDs)	Fast, within seconds	

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

Billing

The local snapshot service is commercially available as of July 8, 2020. For information about the billing methods and prices of local snapshots, see [Snapshots](#).

Limits

- Local snapshots cannot be created for encrypted ESSDs.
- Up to 10 local snapshots can be retained for each ESSD.
- Local snapshots can be created only for ESSDs.
- After an ESSD is re-initialized, you cannot use local snapshots created before the re-initialization to roll back the ESSD.
- After an ESSD that is used as a system disk is replaced, you cannot use its local snapshots to roll back the replacement ESSD.

Related operations

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.

Operation	Supported	References	Related API operation
Create a local snapshot	Yes. You can create a local snapshot only for an unencrypted ESSD.	Create a local snapshot	CreateSnapshot
Query the size of a local snapshot	Yes	View the snapshot size	DescribeSnapshots
Roll back the disk to restore data to the point in time when the local snapshot was created	Yes	Roll back a disk by using a snapshot	ResetDisk
Create another disk from the local snapshot	Yes. You can use a local snapshot to create only an ESSD, and the disk size must be equal to the snapshot size.	Create a disk from a snapshot	CreateDisk
Create a custom image	No	N/A	N/A
Configure local snapshots to be released along with their source disks	No. You can configure only automatic snapshots to be released along with their source disks.	N/A	N/A
Encrypt local snapshots	No	N/A	N/A
Use an automatic snapshot policy to automatically create local snapshots	No	N/A	N/A

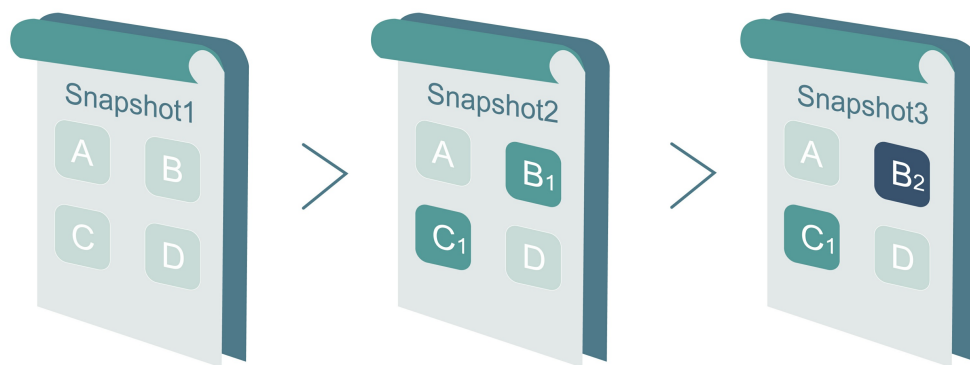
Operation	Supported	References	Related API operation
Delete a snapshot	Yes. We recommend that you delete local snapshots that are no longer needed to maintain a sufficient quota for new local snapshots.	Delete a snapshot	DeleteSnapshot

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 make application deployment more efficient.

Principles

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, every modified data block is marked to be copied at the next snapshot. The first snapshot created for a disk is a full snapshot. A full snapshot does not include empty data blocks of the disk. For example, if the capacity of a disk is 200 GiB and 122 GiB is in use, the first snapshot of the disk is 122 GiB in size. All subsequent snapshots created for the disk are incremental snapshots. Each incremental snapshot includes only the business data that has 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. Snapshots 1, 2, and 3 represent the first, second, and third snapshot of a disk.



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

- Snapshot 1 contains all the data on the disk at the point in time when the snapshot is created.
- Snapshot 2 contains only Data Blocks B₁ and C₁, whose data has changed since Snapshot 1. Data Blocks A and D are referenced from Snapshot 1.
- Snapshot 3 contains only Data Block B₂ whose data has changed since Snapshot 2. Data Blocks A and D are referenced from Snapshot 1, and Data Block C₁ is referenced from Snapshot 2.
- When you 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, but Data Block C₁ is retained because it is referenced by Snapshot 3. When you roll the disk back to the status of Snapshot 3, Data Block C₁ can still be restored.

Snapshot chain

A snapshot chain contains all of 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 between 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 the snapshot size. You can use the snapshot chain to check the snapshot size of a disk.

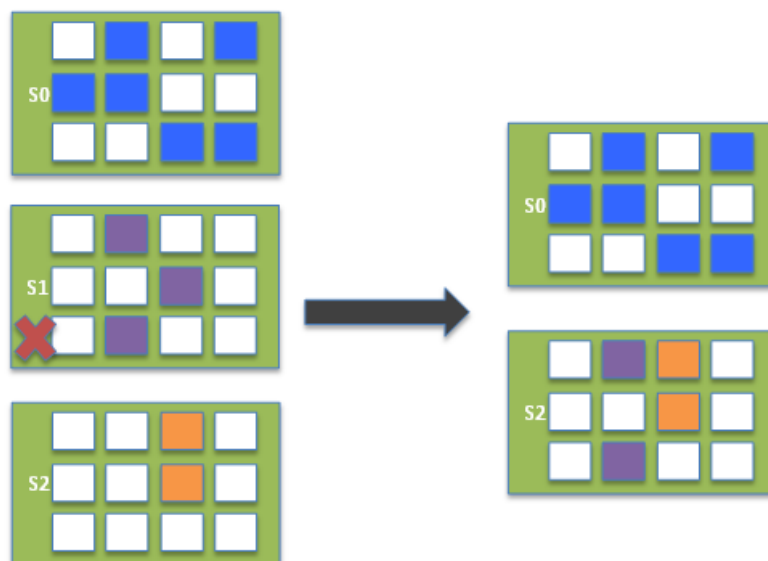
- Snapshot quota: Each disk can have up to 256 manual snapshots and 1,000 automatic snapshots. For more information, see the "Snapshot limits" section in [Limits](#).

Note When the snapshot quota is reached, you must free up storage space to create more snapshots. For automatic snapshots, the system automatically 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

You can delete snapshots that are no longer needed. 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. In this example, Snapshot S1 is deleted.



1. Alibaba Cloud ECS analyzes all data blocks in Snapshot S1, and deletes the data blocks that are not referenced by other snapshots in the snapshot chain.
2. Alibaba Cloud ECS adds the data blocks of Snapshot S1 that are referenced by other snapshots in the snapshot chain to Snapshot S2. The remaining snapshots in the snapshot 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.


Context

After you activate the snapshot service, you are billed based on the size and storage duration of the created snapshots. Snapshot fees will be deducted from your account balance. Make sure that you check the snapshot size and expected fees. For more information about snapshot billing, see [Pricing](#).

Procedure

- 1.
- 2.
3. View the statement on the **Notifications** message that appears, and click **OK** to activate the snapshot service.

Notifications

 On March 28, 2017, Alibaba Cloud ended the beta version of ECS Snapshot and released a commercial version.
You can choose to continue with or disable the ECS Snapshot feature.

☒ **I Fully Understand the Terms and Agree to Enable the Snapshot Service**
Snapshots will be billed based on the snapshot size and storage duration. Verify your snapshot size and make sure that your account has sufficient funds to pay the snapshot fees. Note: If your account does not have sufficient funds, your pay-as-you-go services will be affected. If your account has overdue payments, your instance will be stopped and relevant resources will be released.

OK

Return to ECS Overview

What's next

[Create a normal snapshot](#)

4.2. Create a snapshot of a disk

The Alibaba Cloud snapshot service is an agentless backup service that allows you to create crash-consistent snapshots of system or data disks. You can use snapshots to back up data, restore Elastic Compute Service (ECS) instances that were accidentally released, and create custom images. You can create snapshots of disks to improve fault tolerance before you roll back a disk, modify key system files, or change the operating system of an instance.

Prerequisites

The disk for which you want to create a snapshot is in the **In Use** or **Unattached** state. Take note of the following items:

- If the disk is in the **In Use** state, make sure that the ECS instance to which the disk is attached is in the **Running** or **Stopped** state.
- If the disk is in the **Unattached** state, make sure that the disk was at some point attached to an ECS instance. Snapshots cannot be created for disks that have never been attached to ECS instances.

Context

It can take several minutes to create a snapshot. The amount of time required to create a snapshot of a disk depends on the amount of data written to the disk. The first snapshot of each disk is a full snapshot. Subsequent snapshots of the disk are incremental snapshots. It takes longer to create a full snapshot than an incremental snapshot. The amount of time required to create an incremental snapshot varies based on the amount of data changed since the previous snapshot. The more data that has changed, the longer it takes.

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

- Do not perform operations that change the state of the instance, such as stopping or restarting the instance.
- You are charged for snapshots. For more information, see [Snapshots](#).
- 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 slows down data reads and writes.
- If operations are performed on the disk and generate incremental data while a snapshot is being created, the incremental data is not included in the snapshot.
- 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 a RAID array, we recommend that you create a snapshot-consistent group and enable the application-consistent snapshot feature. For more information, see [Create a snapshot-consistent group](#) and [Create application-consistent snapshots in the ECS console](#).
- Your created snapshots are stored indefinitely until you choose to delete them. We recommend that you delete unneeded snapshots on a regular basis to prevent excess fees caused by snapshot storage.

This topic describes how to create a snapshot of a single disk. If you want to simultaneously create snapshots of multiple disks on one or more instances, use the snapshot-consistent group feature. For more information, see [Create a snapshot-consistent group](#). When a business system spans multiple disks, you can create a snapshot-consistent group to ensure a consistent write order and crash consistency of business system data.

Create a snapshot in the ECS console

You can go to the **Instances** page in the ECS console and perform the following operations to create a snapshot of a disk:

- 1.
- 2.
- 3.
- 4.
5. Find the instance to which the disk is attached and click the instance ID.

- On the **Instance Details** page, click the **Cloud Disk** tab.
- Find the disk for which you want to create a snapshot and click **Create Snapshot** in the **Actions** column.
- In the Create Snapshot dialog box, configure the parameters described in the following table and then click **OK**.

Parameter	Description
Snapshot Name	The name of the snapshot. The name cannot start with auto because a snapshot whose name starts with auto is recognized as an automatic snapshot.
Instant Access	The instance access feature can accelerate the process of snapshot creation. You can use the instant access feature to create snapshots within seconds. If you are using an enhanced SSD (ESSD), you can turn on Instant Access . For more information, see Enable or disable the instant access feature .
Duration of Instant Access	The number of days during which the instant access feature is available. The instant access feature is automatically disabled when the specified duration ends.
Tag	The tag key and value of the snapshot.

After the snapshot is created, you can click the **Snapshot** tab on the **Instance Details** page to view the created snapshot.

You can also create a snapshot of a disk on the Disks page in the ECS console. To go to the Disks page, choose **Storage & Snapshots > Disks** in the left-side navigation pane.

Create a snapshot by using Alibaba Cloud CLI

- Obtain the ID of the instance for which you want to create a disk snapshot.
 - Method 1: If you are connected to the instance, you can obtain the instance ID from the instance metadata. For more information, see [Overview of ECS instance 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
```

- Method 2: Use Alibaba Cloud CLI to call the DescribeInstances operation to obtain the ID of the instance.

```
aliyun ecs DescribeInstances --RegionId <TheRegionId> --output cols=InstanceId, InstanceName rows=Instances.Instance[]
```

- Call the DescribeDisks operation to obtain the ID of a disk based on the obtained instance ID.

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

- Call the CreateSnapshot operation to create a snapshot of the disk.


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

If the task to create a snapshot is initiated, the following response is returned:

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

4. Call the `DescribeSnapshots` operation to query the snapshot creation progress.

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

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

What's next

After a snapshot is created, you can perform the following operations on the snapshot:

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

Related information

- [DescribeInstances](#)
- [DescribeDisks](#)
- [CreateSnapshot](#)
- [DescribeSnapshots](#)

4.3. Create a local snapshot

Local snapshots provide complete copies of disk data at specific points in time and are an important method for disaster recovery. 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 point in time when the snapshot was created.

Prerequisites

The disk for which you want to create a snapshot is in the **In Use** or **Unattached** state. Take note of the following items:

- If the disk is in the **In Use** state, make sure that the ECS instance to which the disk is attached is in the **Running** or **Stopped** state.
- If the disk is in the **Unattached** state, make sure that the disk was at some point attached to an ECS instance. Snapshots cannot be created for disks that have never been attached to ECS instances.

Context

A local snapshot takes seconds to create, whereas a normal snapshot takes minutes. For the differences between normal snapshots and local snapshots, see [Local snapshot](#).

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

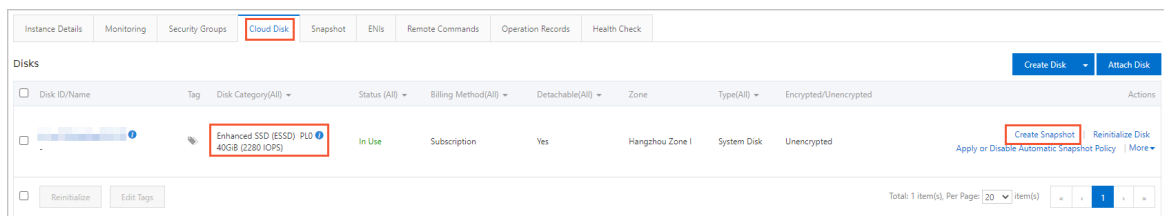
-

- Do not perform operations that change the state of the instance, such as stopping or restarting the instance.
- If operations are performed on the disk and generate incremental data while a snapshot is being created, the incremental data is not included in the snapshot.
- 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 a RAID array, we recommend that you create a snapshot-consistent group and enable the application-consistent snapshot feature. For more information, see [Create a snapshot-consistent group](#) and [Create application-consistent snapshots in the ECS console](#).
- Your created snapshots are stored indefinitely until you choose to delete them. We recommend that you delete unneeded snapshots on a regular basis to prevent excess fees caused by snapshot storage.

Create a local snapshot from the ECS console

You can go to the **Instances** page in the ECS console and perform the following operations to create a snapshot of a disk:

- 1.
- 2.
- 3.
- 4.
5. Find the instance to which the disk is attached and click the instance ID.
6. The **Instance Details** tab appears. Click the **Cloud Disk** tab.
7. Select an enhanced SSD (ESSD), and then click **Create Snapshot** in the Actions column.



You can create a local snapshot for a disk only when the disk meets the following conditions:

- Disk category: ESSD
- Encryption status: unencrypted
- Disk type: system disk or data disk

8. In the dialog box that appears, complete the following operations:

Create Snapshot

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

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 also be deleted.

Disk ID: d-

Instance ID/Name: i-c5

Disk Type: SSD

*Snapshot Name: CreateSnapshotSample

The snapshot name must be 2 to 128 characters in length and cannot start with **auto**.

Tag:

Select a tag key.

Select a value or enter a new one

ECS:Documentation

OK

Cancel

- i. Enter a snapshot name in the **Snapshot Name** field.
 - ii. Select **Create Local Snapshot**.
 - iii. Set the **Retention Period** parameter.
 - iv. (Optional) Binds one or more tags to the snapshot.
 - v. Click **Create**.
9. After the **Instance Details** tab appears, click the **Snapshot** tab.

The normal snapshots and local snapshots that are created for the ESSD are displayed on the **Snapshots** page.

Snapshots

Create Snapshot

<input type="checkbox"/>	Snapshot ID/Name	Tag	Snapshot Type	Disk ID	Disk Size	Disk Type(All)	Encrypted/Unencrypted	Creation Time	Kept For	Progress	Status	Actions
<input type="checkbox"/>	s- <div></div>	<div></div>	Normal Snapshot	d- <div></div>	200GiB	System Disk	Unencrypted	August 12, 2020, 09:48	Always Keep	100%	Successful	Roll Back Disk Create Custom Image
<input type="checkbox"/>	s- <div></div>	<div></div>	Local Snapshot	d- <div></div>	200GiB	System Disk	Unencrypted	August 12, 2020, 09:48	1Days	100%	Successful	Roll Back Disk

You can also create a snapshot of a disk on the **Disks** page in the ECS console. To go to the **Disks** page, choose **Storage & Snapshots > Disks** in the left-side navigation pane.

Create a local snapshot by using Alibaba Cloud CLI

1. Obtain the ID of the instance for which you want to create a disk snapshot.
 - o Method 1: If you are connected to the instance, you can obtain the instance ID from the instance metadata. For more information, see [Overview of ECS instance 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
```

- o Method 2: Use Alibaba Cloud CLI to call the DescribeInstances operation to obtain the ID of the instance.

```
aliyun ecs DescribeInstances --RegionId <TheRegionId> --output cols=InstanceId, InstanceName rows=Instances.Instance[]
```

2. Call the DescribeDisks operation to obtain the ID of a disk based on the obtained instance ID.

```
aliyun ecs DescribeDisks --RegionId <TheRegionId> --InstanceId i-bplafnc98r8k69***** --output cols=DiskId rows=Disks.Disk[]
```

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

```
aliyun ecs CreateSnapshot --DiskId d-bpl9pjyf12hebp***** --Category flash
```

If the task to create a snapshot is initiated, the following response is returned:

```
{"RequestId":"16B856F6-EFFB-4397-8A8A-CB73FA*****", "SnapshotId":"s-bplafnc98r8kjh*****"}
```

4. Call the DescribeSnapshots operation to query the snapshot creation progress.

```
aliyun ecs DescribeSnapshots --RegionId cn-hangzhou --InstanceId i-bplafnc98r8k69***** --output cols=SnapshotId,Status rows=Snapshots.Snapshot[]
```

If the snapshot is created, both `"SnapshotId"="s-bplafnc98r8kjh*****"` and `"Status":"accomplished"` are displayed.

What's next

After a snapshot is created, you can perform the following operations on the snapshot:

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

Related information

- [DescribeInstances](#)
- [DescribeDisks](#)
- [CreateSnapshot](#)
- [DescribeSnapshots](#)

4.4. Enable or disable the instant access feature

The more data that is stored in a disk, the longer it takes to create a snapshot for the disk. For enhanced SSDs (ESSDs), you can use the instant access feature to create snapshots within seconds.

Note

As of December 14, 2020, the local snapshot feature for ESSDs is upgraded to the instant access feature for ESSDs.

Scenarios

The instant access feature has the following benefits:

- **Instant access:** After the instant access feature is enabled for a snapshot, the snapshot can be used to roll back disks or create disks across zones even when the snapshot is being created. This feature ensures instant access to a new snapshot for an ESSD regardless of the ESSD size.
- **Disk rollback without performance loss:** You can use snapshots for which instant access is enabled to roll back ESSDs without performance loss or increase in the I/O latency of the ESSD.

In the scenarios described in the following table, we recommend that you enable the instant access feature to accelerate the creation of snapshots.

Scenario	Description
DevOps scenario	<ul style="list-style-type: none">• Build a development and test environment based on snapshots.• Perform O&M operations in Elastic Compute Service (ECS) by using Operation Orchestration Service (OOS).
Scenario where snapshots need to be created to back up data before high-risk operations are performed	<ul style="list-style-type: none">• Replace system disks or resize disks.• Update business systems.• Execute diagnostic tasks in the ECS console.

Precautions

Before you enable instant access, take note of the following items:

- This feature is applicable only to ESSDs.
- Up to 10 snapshots that have instant access enabled can be retained for a single ESSD. If an ESSD already has 10 snapshots for which instant access is enabled, you cannot enable instant access for more snapshots of the ESSD.
- ESSDs whose snapshots have instant access enabled cannot be re-initialized.
- You can enable instant access only when you manually create a snapshot for an ESSD.

When you disable instant access, take note of the following items:

- You cannot disable the instant access feature when a snapshot is being created. After the snapshot is created, you can disable this feature.

- When you delete snapshots for which instance access is enabled, instant access is automatically disabled.
- When you delete an ESSD for which instance access is enabled for its snapshot, instant access is automatically disabled.

Billing

After the instant access feature is enabled, you are charged both the snapshot storage fee and the instant access feature fee. The billable items of the instant access feature include the number of times the feature is enabled, the size of snapshots for instant access, and the usage duration. For more information, see [Snapshots](#).

Note The instant access feature is separately billed. You can disable the feature to reduce costs after a snapshot is created. You are still charged for the storage of the snapshot.

Enable the instant access feature

- 1.
- 2.
- 3.
4. On the **Instances** page, find the instance that you want to manage and click its ID.
5. On the **Instance Details** page, click the **Cloud Disk** tab.
6. Find the ESSD for which you want to create a snapshot and click **Create Snapshot** in the **Actions** column.
7. In the **Create Snapshot** dialog box, configure the parameters described in the following table.

Parameter	Description
Snapshot Name	Specify a name for the snapshot.
Instant Access	Turn on Instant Access .
Duration of Instant Access	Specify the number of days during which the instant access feature is available. The instant access feature is automatically disabled when the specified duration ends.
Tag	Configure the tag key and value of the snapshot.

8. Click **Create**.

After the snapshot is created, choose **Storage & Snapshots > Snapshots** in the left-side navigation pane to check the state of instant access.

<input type="checkbox"/> Snapshot ID/Name	Tag	Snapshot Type	Snapshot Source	Instant Access	Disk ID	Disk Size	Disk Type(All)	Encrypted/Unencrypted	Creation Time	Kept For	Progress	Status	Actions
<input type="checkbox"/> s-l...		Normal Snapshot	Custom Snapshot	Expires At March 12, 2022, 10:33	d-l...	40GiB	Data Disk	Unencrypted	March 11, 2022, 10:33	Always Keep	0%	Progressing	Roll Back Disk Disable Instant Access Create Custom Image Copy Snapshot
<input type="checkbox"/> s-by...		Normal Snapshot	Custom Snapshot	Disabled	d-l...	40GiB	System Disk	Unencrypted	March 1, 2022, 15:10	Always Keep	100%	Successful	Roll Back Disk Create Custom Image Copy Snapshot

After the instant access feature is enabled for a snapshot, you can use the snapshot to create a disk or roll back the original disk without the need to wait for the snapshot to be created. For more information, see [Create a disk from a snapshot](#).

Disable the instant access feature

When you enable the instant access feature, you must set the **Duration of Instant Access** parameter. This feature is automatically disabled when the specified duration ends. After a snapshot is created, you can also manually disable instant access by performing the following operations:

- 1.
- 2.
- 3.
4. On the **Instances** page, find the instance that you want to manage and click its ID.
5. On the **Instance Details** page, click the **Snapshot** tab.
6. Find the snapshot for which you want to disable instant access and click **Disable Instant Access** in the **Actions** column.
7. In the **Disable Instant Access** message, click **OK**.

References

- [CreateSnapshot](#)
- [ModifySnapshotAttribute](#)


4.5. Copy a snapshot

This topic describes how to copy a created snapshot from one region to another to back up data across regions.

Context

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

- When you copy a snapshot to a new region, a snapshot copy is created. You are charged for copying snapshots and storing the copies. For more information, see [Snapshots](#).

 **Note** The first time a disk snapshot is copied, all data stored in the disk is copied. All subsequent copies of the snapshot in the same region are incremental copies. Snapshots are billed based on snapshot sizes. Incremental copies can significantly reduce the sizes of snapshots to be copied.

- The ID of a new snapshot is different from that of its source snapshot. The new snapshot cannot be used to roll back disks created by the source snapshot.
- Tags added to source snapshots cannot be copied together with the source snapshots.
- Encrypted snapshots cannot be copied.

Scenarios:

- **DevOps:** You can copy snapshots to start business in new regions or migrate business systems to new regions. This helps you reduce O&M costs and improve data availability.
- **Cross-region backup:** Snapshot copying meets the requirements for compliance audit and improvement of business reliability. You can restore your business systems in another region by using new snapshots in the event of a disaster. This reduces recovery time objectives (RTOs) and recovery point objectives (RPOs).

Note

Snapshot copying is fast compared with image copying and can be used to speed up image copying and eliminate capacity constraints. To copy an image, we recommend that you copy a snapshot and use the snapshot to create an image.

Copy a snapshot

-
-
-
-
- Find the snapshot that you want to copy and click **Copy Snapshot** in the **Actions** column.
- In the **Copy Snapshot** dialog box, configure the parameters.

Copy Snapshot

You will be charged for traffic consumed when you copy a snapshot to another region. For more information, see [Snapshot billing](#).

Snapshot ID/Name

s-bp18hga-1demo

Destination Region

China (Hohhot)

* Snapshot Name

demo

The name must be 2 to 128 characters in length and can contain periods (.), underscores (_), hyphens (-), and colons (:). It cannot start with a special character or digit.

* Description:

Copied from a snapshot s-bp18hga-1demo in the China (Hangzhou) region.

It must be 0 to 256 characters in length and cannot start with http:// or https://.

Tag:

Select a tag key

Enter or select a tag value.

OK

Cancel

Parameter	Description
Destination Region	The region to which to copy the snapshot.
Snapshot Name	The name of the new snapshot.
Description	The description of the new snapshot. We recommend that you enter information such as the purpose and environment of the snapshot to facilitate subsequent management.
Tag	The tag of the new snapshot. The tag can facilitate subsequent management.

- Click **OK**.

If ECS instances are affected by viruses or data loss is caused by accidental deletion, you can use snapshots in the source region or snapshots copied to the destination region to create instances or disks to restore data. For more information, see [Create a disk from a snapshot](#).

Cancel snapshot copying

When a snapshot is being copied, you can cancel snapshot copying in the destination region.

- 1.
- 2.
- 3.
- 4.
5. Select the snapshot that is being copied and click **Delete** in the lower part of the page.
6. In the **Delete** message, click **OK**.

Related information

- [CopySnapshot](#)


4.6. 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 when accidental changes are made, you can roll back a disk to a previous version by using one of its snapshots. Before you roll back the disk, you must have created a snapshot of the disk. If you roll back system disks, the current SSH key pairs or usernames and passwords of the Elastic Compute Service (ECS) 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. For more information, see [Create a snapshot of a disk](#).

 **Warning** The rollback operation is irreversible. After a disk is rolled back, the data that you added, removed, or changed from the time when the snapshot is created to the time when the disk is rolled back is lost. To avoid data loss caused by accidental changes, we recommend that you create a snapshot for the disk to back up data before you roll back the disk.

- The disk is not released.
- After the operating system is replaced, 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 [Attach a data disk](#) and [Stop an instance](#).

 **Notice**

Roll back a disk by using a snapshot

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

- 1.
- 2.
- 3.
4. Find the instance whose disk you want to roll back and click **Manage** in the **Actions** column.
5. The **Instance Details** tab appears. Click the **Snapshot** tab.
6. Find the snapshot and click **Roll Back 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 unaffected. After the disk is rolled back, the disk is restored to the state of the entire disk at a certain point in time, instead of the state of a partition or a directory.

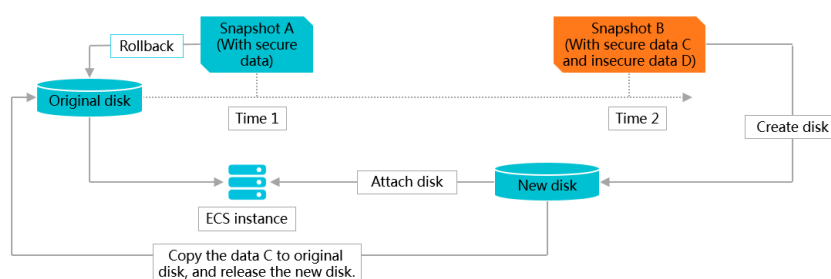
7. In the Roll Back Disk dialog box, click **OK**.

Note

- Before you click **OK**, we recommend that you click **Create Snapshot** to back up the latest data.
- If you select **Start Instance After Disk 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 want to synchronize the data that you added, removed, and changed 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 disk by using Snapshot B.
For more information, see [Create a disk from a snapshot](#).
4. Attach the new disk to the same ECS instance.
For more information, see [Attach a data disk](#).
- 5.

6. View the new disk.
 - Windows instance: The new disk is displayed in the system.
 - Linux instance: Run the mount command to mount the partitions of the new disk.
7. Copy useful data from the new disk to the original disk.
8. (Optional) Release the new disk.

What's next

- After a disk is rolled back, the host configuration file and the configurations such as the host name, SSH key pair, password, network, system source, and clock source are initialized. You must reconfigure the information.
- 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.
 - For information about operations on Linux instances, see [Resize disks online for Linux instances](#).
 - For information about operations on Windows instances, see [Resize disks online for Windows instances](#).

Related information

- [Reset Disk](#)

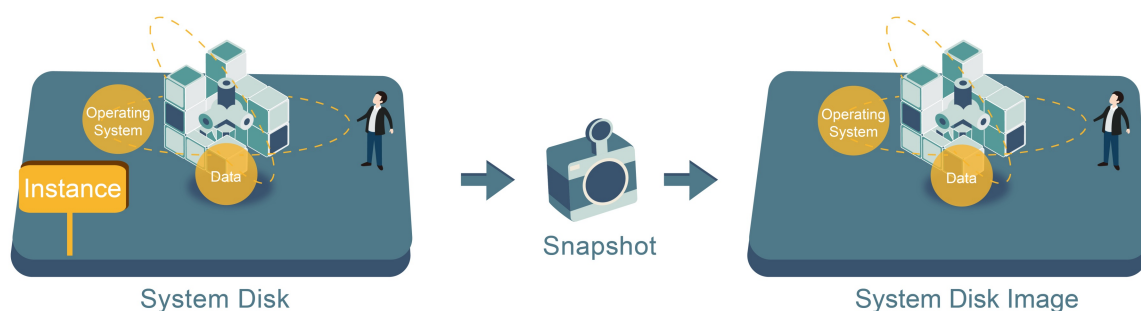
4.7. Create a custom image from a snapshot

You can create a custom image from a snapshot that contains the operating system and data of an Elastic Compute Service (ECS) instance. Then, you can use the custom image to create multiple identical instances.

Prerequisites

A system disk snapshot is created. For more information, see [Create a snapshot of a disk](#).

Context



Before you create custom images from snapshots, take note of the following items:

- Notes on snapshots used to create custom images:
 - A custom image can be created from a system disk snapshot or from a system disk snapshot and one or more data disk snapshots. Data disk snapshots alone cannot be used to create custom images.

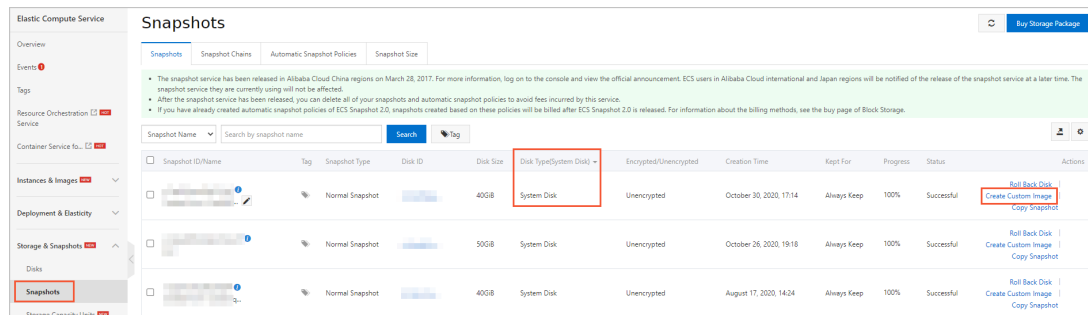
- Both encrypted and unencrypted snapshots can be used to create custom images.
- If the ECS instance from which a snapshot was created expires or is released, the custom image created from the snapshot and the ECS instance created from the image are not affected.
- Notes on custom images:
 - Custom images cannot be used across regions. To use custom images across regions, you can copy custom images from one region to another. For more information, see [Copy a custom image](#).
 - The billing method of custom images is independent of that of the ECS instances from which the custom images were created and that of the ECS instances created from the custom images. For example, custom images created from subscription instances can be used to create pay-as-you-go instances.
- Notes on ECS instances created from custom images:
 - You can upgrade the configurations of ECS instances created from custom images, such as vCPUs, memory, bandwidth, and disks.
 - You can replace the operating systems of ECS instances created from custom images. The custom images are not affected and remain usable. For more information, see [Replace the operating system of an instance by using a non-public image](#).
 - Network connection may fail to be established for some ECS Linux instances in virtual private clouds (VPCs) that are created from custom images. This may be caused by the configurations in `/etc/sysconfig/network`. For more information, see [How to solve unreachable network errors when a VPC-type instance is created from a custom image](#).
- Recommendations for data security:

Delete sensitive data from a snapshot in advance to enhance data security.

Procedure

- 1.
2. Use one of the following methods to find the system disk snapshot from which you want to create a custom image:
 - On the Instances page
 - a.
 - b.
 - c. Find the instance. Click the instance ID or click **Manage** in the **Actions** column.
 - d. On the Instance Details page, click the **Snapshot** tab. Find the snapshot whose **Disk Type(All)** is **System Disk**. Click **Create Custom Image** in the **Actions** column.
 - On the Snapshots page
 - a.
 - b.

- c. Find the snapshot whose **Disk Type(All)** is **System Disk**. Click **Create Custom Image** in the **Actions** column.



3. In the **Create Custom Image** dialog box, configure parameters described in the following table.

Parameter	Description	References
System Snapshot ID	The snapshot must be a system disk snapshot.	N/A
Custom Image Name and Custom Image Description	Enter an image name in the Custom Image Name field and enter a description for the image in the Custom Image Description field.	N/A
Image Family	Optional. Select an image family. Custom images that belong to an image family can be deprecated or restored to allow smooth image updates and rollbacks.	Overview
Resource Group	Optional. Select a resource group to manage the custom image based on the usage and permissions.	Resource groups
Add Data Disk Snapshot	Optional. Select Add Data Disk Snapshot , click Add in the Snapshot Details section, and then select the ID of a data disk snapshot. <ul style="list-style-type: none"> ◦ If you do not select the ID of a data disk snapshot, an empty data disk is created with a default capacity of 5 GiB. ◦ If you select the ID of a data disk snapshot, the capacity of the data disk to be created is the same as the snapshot size. 	Snapshot overview
Tag	Select a tag. <ul style="list-style-type: none"> ◦ Optional: In most scenarios, the tag is optional. ◦ Required: When you log on as a RAM user and a policy attached to the RAM user requires that specific tags be added, you must configure this parameter to specify the tags. Otherwise, an error is reported and indicates insufficient permissions. 	Create a resource with a specific tag

4. Click **Create**.

What's next

After the custom image is created, you can perform operations described in the following topics:

- [Create an ECS instance by using a custom image](#)
- [Replace the operating system of an instance by using a non-public image](#)

Related information

- [CreateImage](#)

4.8. 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.


Scenario	Snapshot creation frequency	Retention period	Description
Core application	Once every day or every other day	Several months or longer	We recommend that you create and store snapshots based on the importance of the data.
Non-core application	Once every week or every other week	Several days or weeks	We recommend that you create and store snapshots based on the importance of the data.
System disk	Whenever needed	One or two snapshots	We recommend that you do not store critical application data in the system disk.
Software upgrade		Delete snapshots immediately after they are used.	We recommend that you delete snapshots immediately after they are used to reduce fees.
Modification of critical files			
Migration of application data			
Test environment			

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.

4.9. View the snapshot size

This topic describes how to view the size of all snapshots of a single disk and the total size of all snapshots in an Alibaba Cloud region.

Prerequisites

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

View the snapshot size of a disk based on its snapshot chain

A snapshot chain is a chain of all the snapshots created for a disk. A disk corresponds to a snapshot chain. A disk and its snapshot chain share the same ID. A snapshot chain records the relationships between data blocks. Perform the following steps to view the size of all snapshots of a disk in the ECS console.


- 1.
- 2.
- 3.
4. On the **Snapshots** page, click the **Snapshots** tab.
5. Find the ID of the disk for which you want to view the snapshot size. Make sure that at least one snapshot is created for the disk.
6. Click the **Snapshot Chains** tab. Find the snapshot chain based on the disk ID obtained in the previous step and view the value in the Snapshot Size column. You can view the number of snapshots and the snapshot size of the disk.
7. (Optional) In the **Actions** column of the specified snapshot chain, click **View Details** to go to the **snapshot chain details** page.

You can view the snapshot information of the disk. You can also use the snapshots to roll back the disk or create custom images. For more information, see [Roll back a disk by using a snapshot](#) and [Create a custom image from a snapshot](#).

View the snapshot size in a region

Perform the following steps to view the total snapshot size in a region in the ECS console.

- 1.
- 2.
- 3.
4. On the **Snapshots** page, click the **Snapshot Size** tab.
5. Set a time period to query the snapshot size.

 **Note** You can query the snapshot size changes within 15 days.

You can view the size of snapshots within the specified time period in the selected region.

Related information

- [DescribeSnapshotLinks](#)
- [DescribeSnapshotsUsage](#)

4.10. 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 a snapshot of a disk](#).
- 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 [Delete a custom image](#).

Context

To delete a snapshot from which you have created disks, you can choose only **Force Delete**. After the snapshot is deleted, the disks cannot be re-initialized.

Procedure

- 1.
- 2.
- 3.
4. Select one or more snapshots to be deleted and click **Delete** at the bottom of the page.
5. In the **Delete** dialog box, select **Delete** or **Force Delete**.

 **Notice** To delete a snapshot from which you have created disks, you can choose only **Force Delete** and then click **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 information

- [DeleteSnapshot](#)

5. Use snapshot-consistent groups

5.1. Create a snapshot-consistent group

You can create a snapshot-consistent group to simultaneously take snapshots for disks on one or more Elastic Compute Service (ECS) instances. When a business system spans multiple disks, you can create a snapshot-consistent group to ensure a consistent write order and crash consistency of business system data.

Context

You can use the snapshot-consistent group feature to simultaneously create snapshots for multiple disks on one or more ECS instances. Snapshot-consistent groups are applicable to cluster services.

Example scenarios that snapshot-consistent groups support:

- A business system is deployed in a cluster file system that spans multiple ECS instances, and point-in-time consistency and crash-consistency are required across databases or enterprise-level applications. For example, a MySQL cluster is built on multiple ECS instances, a single Logical Volume Manager (LVM) logical volume is created across multiple volumes, or Oracle or SAP HANA clusters are migrated to the cloud.
- Snapshots need to be created simultaneously for multiple nodes of a distributed application system such as a large-scale website or a multi-application collaborative system.
- Disks on multiple ECS instances located in the same region need to be batch backed up and high point-in-time consistency is required.

You can use one of the following methods to create a snapshot-consistent group:

- [Method 1: Create a snapshot-consistent group based on a single instance](#)
- [Method 2: Create a snapshot-consistent group based on multiple instances](#)

Precautions

Before you use the snapshot-consistent group feature, take note of the following items:

- When you create a snapshot-consistent group based on an instance, take note of the following items:
 - To ensure that services are not affected, we recommend that you create the snapshot-consistent group during off-peak hours.
 - The instance must be in the **Running** or **Stopped** state.
 - The snapshot-consistent group feature can be used to create snapshots only for enhanced SSDs (ESSDs) that are in the **In Use** state. If the instance has ESSDs and disks of other categories attached, you can select only ESSDs on the instance to create a snapshot-consistent group.
 - A single snapshot-consistent group can contain snapshots of up to 16 disks including the system disk and data disks and cannot exceed 32 TiB in size.

- Snapshots that you created by using the snapshot-consistent group feature are retained until they are deleted. We recommend that you delete unnecessary snapshots on a regular basis to prevent them from incurring excessive fees. For more information, see [Delete a snapshot](#).
- For the amount of time required to create a snapshot-consistent group, take note of the following items:

The amount of time required to create a snapshot-consistent group depends on the sizes of the selected disks for which to create snapshots. The first snapshot of each disk is a full snapshot and takes longer to create than subsequent snapshots. Subsequent snapshots are incremental snapshots and do not take as long to be created as the first snapshot. The amount of time required varies based on the amount of data changed since the previous snapshot. If you want to use a snapshot while it is being created, you can enable the instant access feature. For more information, see [Enable or disable the instant access feature](#).

Billing

Snapshot-consistent groups are free of charge but snapshots contained in snapshot-consistent groups are billed based on the amount of storage space the snapshots consume. After the instant access feature is enabled, you must pay both snapshot storage fees and instant access feature fees. For more information, see [Snapshots](#).

Method 1: Create a snapshot-consistent group based on a single instance

- 1.
- 2.
- 3.
4. Find the instance based on which you want to create a snapshot-consistent group and choose **More > Disk and Image > Create Snapshot-consistent Group** in the **Actions** column.
5. In the **Create Snapshot-consistent Group** dialog box, specify the parameters described in the following table.

Parameter		Description
Select cloud disk		Select the disks for which to create snapshots.
	Snapshot-consistent Group Name	Enter a name for the snapshot-consistent group for easy management.
	Description	Enter a description for the snapshot-consistent group for easy management.
	Tag	Add tag key-value pairs to the snapshot-consistent group for easy management.

Parameter		Description
Snapshot parameter settings	Snapshot speed available	<ul style="list-style-type: none"> ◦ Enable Instant Access: You can select this check box to enable the instant access feature. By default, this feature is disabled. <p>Note The instant access feature supports only ESSDs. For more information, see Enable or disable the instant access feature.</p> <ul style="list-style-type: none"> ◦ Snapshot Speed Available Duration: After you enable the instant access feature, you can specify a validity duration for the feature. The default validity duration is one day. The instant access feature is automatically disabled when the specified duration expires.
	Application-consistent Snapshot	<p>Enable Application-consistent Snapshot: You can select this check box to enable the application-consistent snapshot feature. By default, this feature is disabled.</p> <p>For more information about how to enable the application-consistent snapshot feature, see Create application-consistent snapshots in the ECS console.</p> <p>Note The application-consistent snapshot feature is now available in the China (Hong Kong), Singapore (Singapore), China (Hangzhou), China (Shanghai), and China (Beijing) regions.</p>

6. Click **OK**.

After the snapshot-consistent group is created, you can choose **Storage & Snapshots > Snapshots** and click the **Snapshot-consistent Group** tab to view the snapshot-consistent group.

Method 2: Create a snapshot-consistent group based on multiple instances

Note The application-consistent snapshot feature can be used to create snapshots based only on a single instance at a time. For information about how to use the application-consistent snapshot feature, see the [Method 1: Create a snapshot-consistent group based on a single instance](#) section.

- 1.
- 2.
3. In the upper-left corner of the top navigation bar, select a region.

To create a snapshot-consistent group based on multiple instances, you must select the region where the instances are located. For example, if you want to create a snapshot-consistent group based on your instances deployed in the China (Hohhot) region, you must select China (Hohhot) from the drop-down list.

- Click the **Snapshot-consistent Group** tab. Then, click **Create Snapshot-consistent Group**.
- On the **Create Snapshot-consistent Group** page, specify the parameters described in the following table.

[ECS](#)
[Snapshot-consistent Group](#)
[/ Create Snapshot-consistent Group](#)

Create Snapshot-consistent Group

1. You are charged for resources involved when you create a snapshot-consistent group. For more information, see [Snapshots](#).

2. While a snapshot-consistent group is being created for an instance, do not perform any operations that will change the instance state, such as stopping or restarting the instance. Otherwise, the snapshot-consistent group cannot be created.

3. After you create a snapshot-consistent group, you can obtain notifications about the creation of disk snapshots from system events. [Learn More](#)


Data Source

Select cloud disk: Only ESSDs can be selected.

<input checked="" type="checkbox"/>	Cloud Disk ID/name	Instance ID/Name	Status	Zone	Disk properties	Disk Size	Cloud disk type
<input checked="" type="checkbox"/>	d-0a3ghb8d3g3p3d3e3m3e3	i-OsD5m3w8g3p3d3e3m3e3 launch	In use	Virginia Zone B	System Disks	40G	Enhanced SSD (ESSD)

Selected Disks: 1. Total Size: 0.04 TB (Supported Max Disks: 10, Supported Total Size: 32 TB)

Parameter		Description
Data Source		Select the instances based on which to create the snapshot-consistent group. Instances can be searched only by instance ID. You can select one or more instances.
Select cloud disk		Select the disks for which to create snapshots. Take note of the following items: <ul style="list-style-type: none">Only ESSDs can be selected.Up to 16 disks can be selected, including the system disk and data disks. The total size of the selected disks cannot exceed 32 TiB.
Snapshot parameter settings	Snapshot-consistent Group Name	Enter a name for the snapshot-consistent group for easy management.
	Description	Enter a description for the snapshot-consistent group for easy management.
	Tag	Add tag key-value pairs to the snapshot-consistent group for easy management.

Parameter		Description
	Snapshot speed available	<ul style="list-style-type: none">◦ Enable Instant Access: You can select this check box to enable the instant access feature. By default, this feature is disabled.<div> Note The instant access feature supports only ESSDs. For more information, see Enable or disable the instant access feature.</div>◦ Snapshot Speed Available Duration: After you enable the instant access feature, you can specify a validity duration for the feature. The default validity duration is one day. The instant access feature is automatically disabled when the specified duration expires.

What's next

After a snapshot-consistent group is created, you can perform the following operations:

- Use the snapshot-consistent group to roll back disks. For more information, see [Roll back disks by using a snapshot-consistent group](#).
- Access the snapshot-consistent group and create a custom image from a snapshot contained in the group. For more information, see [Create a custom image from a snapshot](#).


5.2. Roll back disks by using a snapshot-consistent group

After a snapshot-consistent group is created, you can use it to roll back one or more disks in the event of system failures or data errors caused by accidental operations.


Prerequisites

Before you use a snapshot-consistent group to roll back disks on instances, make sure that the following requirements are met:

- A snapshot-consistent group is created based on the instances. For more information, see [Create a snapshot-consistent group](#).

 **Notice** The rollback operation cannot be reversed. When a disk is rolled back, if data changes were made to the disk from the time the snapshot-consistent group was created until the disk is rolled back, all these data changes are lost. To prevent data loss caused by accidental operations, we recommend that you create a snapshot-consistent group to back up disk data before you roll back disks.

- The instances are in the **Stopped** state. For more information, see [Stop an instance](#).

 **Notice**

- The disks that correspond to the snapshots contained in the snapshot-consistent group have not been released or detached or do not have snapshots being created.
- The operating systems of the instances have not been replaced since the snapshot-consistent group was created.
- The snapshots of the disks have not been deleted from the snapshot-consistent group. If the snapshot of a disk has been deleted from the snapshot-consistent group, the disk cannot be rolled back by using the snapshot-consistent group. The snapshot-consistent group can be used to roll back only other disks whose snapshots are contained in the group.

Procedure

- 1.
- 2.
- 3.
4. Click the **Snapshot-consistent Group** tab.
5. Find the snapshot-consistent group that you want to use and click **Roll Back** in the **Actions** column.
6. In the **Roll Back** dialog box, perform the following operations.
 - i. Read the precautions about the rollback operation.
 - ii. In the **Cloud disk snapshot** section, select the snapshots of the disks that you want to roll back.
 - iii. Click **OK Rollback**.

After the selected disks are rolled back, the `Rollback successful` message is displayed.

Result

After disks are rolled back, you can log on to their associated instances to check whether the disk data has been reverted to the state it was in when the snapshots were created.


5.3. Create application-consistent snapshots in the ECS console

The Alibaba Cloud snapshot service works with Cloud Assistant to provide the application-consistent snapshot feature. Application-consistent snapshots can be used for data rollbacks to prevent logs from being rolled back when applications such as databases start and to ensure that applications start in a consistent state.

Prerequisites

- The Elastic Compute Service (ECS) instance based on which you want to create application-consistent snapshots runs one of the following operating systems:
 - Windows: Windows Server 2019, Windows Server 2016, and Windows Server 2012 R2.
 - Linux: CentOS 7.6 or later, Ubuntu 18.04 or later, and Alibaba Cloud Linux 2.1903 LTS 64-bit.
- The disks of the ECS instance are enhanced SSDs (ESSDs) and the file systems are ext3, ext4, XFS, or New Technology File System (NTFS). Network file systems or shared file systems are not supported.
- The Cloud Assistant client is installed on the instance. For more information, see [Install the Cloud](#)

Assistant client.

 **Note** By default, the Cloud Assistant client is pre-installed on ECS instances that were created from public images after December 1, 2017.

Context

By default, the snapshots that you create are crash-consistent. If you enable the application-consistent snapshot feature when you create a snapshot, the system creates an application-consistent snapshot or a file system-consistent snapshot based on the actual scenario.

Snapshot type	Description	Implementation
Application-consistent snapshot	<p>Application-consistent snapshots back up data stored in memory and database transactions in progress when the snapshots are created. This ensures consistency between application system data and database transactions. The application-consistent snapshots can be used for data rollbacks to prevent data corruption and data loss and to ensure that logs are not rolled back when databases start and that applications start in a consistent state.</p> <p>Application-consistent snapshots are identified by the <code>APPConsistent:True</code> tag.</p>	<p>The implementation methods of the application-consistent snapshot feature vary based on operating systems.</p> <ul style="list-style-type: none">• For Windows operating systems, the feature is implemented by using Volume Shadow Copy Service (VSS).• For Linux operating systems, the feature is implemented by using custom shell scripts. You must write your own scripts based on your applications. When you use custom scripts, Alibaba Cloud does not take responsibility for application consistency issues.
File system-consistent snapshot	<p>If the application-consistent snapshot feature is enabled but relevant conditions are not met, file system-consistent snapshots are created.</p> <p>File system-consistent snapshots synchronize the memory and disk information of file systems when the snapshots are created, and freeze write operations on file systems to ensure file system consistency. File system-consistent snapshots can be used to prevent operating systems from performing disk checks (chkdsk) and file system consistency checks (fsck).</p> <p>File system-consistent snapshots are identified by the <code>FsConsistent:True</code> tag.</p>	<p>The implementation methods of the application-consistent snapshot feature vary based on operating systems.</p> <ul style="list-style-type: none">• For Windows operating systems, if no VSS writers are available, file system-consistent snapshots are created by default.• For Linux operating systems, if no application scripts are available, file system-consistent snapshots are created by default.

Procedure

1. Step 1: Configure a RAM role for the ECS instance

Before you enable the application-consistent snapshot feature for an instance, you must configure a Resource Access Management (RAM) role for the instance.

2. Enable the application-consistent snapshot feature based on the operating system of the instance.
 - o [Step 2: Enable the application-consistent snapshot feature for the instance if it is a Windows instance](#)

For Windows instances, you can use VSS to implement application consistency.

- o [Step 2: Enable the application-consistent snapshot feature for the instance if it is a Linux instance](#)

For Linux instances, you must configure shell scripts (application pre-freeze and post-thaw scripts) based on the applications deployed on the instances to implement application consistency.

3. [Step 3: Check whether application-consistent snapshots are created](#)

After you request to create application-consistent snapshots, you can go to the Cloud Assistant page in the ECS console to check whether the snapshots are created and go to the Snapshots page in the ECS console to view snapshot details.

Step 1: Configure a RAM role for the ECS instance

1. Log on to the [RAM console](#) by using your Alibaba Cloud account.
2. Create a RAM role for the application-consistent snapshot feature. For more information, see [Create a RAM role for a trusted Alibaba Cloud service](#).

The following figure shows how to create the AppSnapshotRoleName RAM role.

Create RAM Role

1 Select Role Type — 2 Configure Role — 3 Finish

Select Type of Trusted Entity

Alibaba Cloud Service

Role Type

☒ Normal Service Role ☐ Service Linked Role

* RAM Role Name

AppSnapshotRoleName

The name can contain a maximum of 64 characters, only English letters, numbers, and hyphens (-) are accepted.

Note

* Select Trusted Service

Elastic Compute Service

3. Create a permission policy for the application-consistent snapshot feature. For more information, see [Create a custom policy](#).

* Policy Name
AppSnapshotPolicy

Note

Configuration Mode
☐ Visualized
☒ Script

Policy Document
 Import an existing system policy

```

1 {
2   "Version": "1",
3   "Statement": [
4     {
5       "Effect": "Allow",
6       "Action": [
7         "ecs:DescribeSnapshot*",
8         "ecs:CreateSnapshot*",
9         "ecs:TagResources",
10        "ecs:DescribeDisks"
11      ],
12      "Resource": [
13        "*"
14      ],
15      "Condition": {}
    }
  ]
}
```

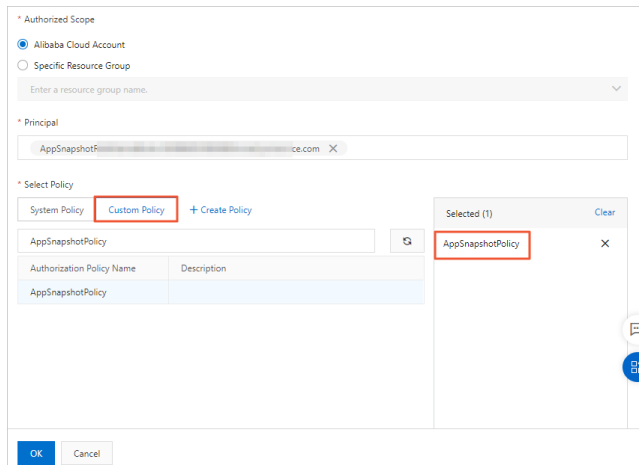
OK Return

Create the AppSnapshotPolicy policy to grant permissions to query snapshot details, create snapshots, configure tags, and query disk details. You can use the following policy:

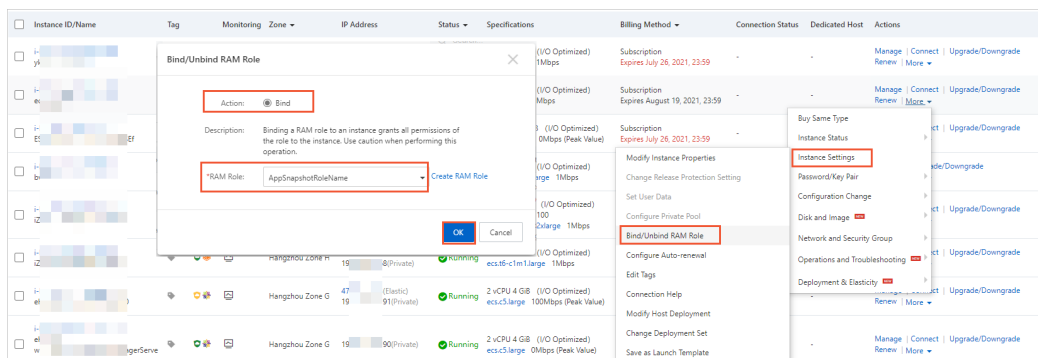
```

{
  "Version": "1",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecs:DescribeSnapshot*",
        "ecs:CreateSnapshot*",
        "ecs:TagResources",
        "ecs:DescribeDisks"
      ],
      "Resource": [
        "*"
      ],
      "Condition": {}
    }
  ]
}
```

4. Attach the AppSnapshotPolicy policy to the AppSnapshotRoleName RAM role. For more information, see [Grant permissions to a RAM role](#).



5. Attach the AppSnapshotRoleName RAM role to the ECS instance. For more information, see [Attach an instance RAM role to an ECS instance](#).



Step 2: Enable the application-consistent snapshot feature for the instance if it is a Windows instance

For Windows instances, you can use VSS to implement application consistency. This section describes how to enable the application-consistent snapshot feature for a Windows instance.

1. Go to the Instances page in the ECS console.
 - i.
 - ii.
 - iii.
2. Find the instance for which you want to enable the application-consistent snapshot feature and choose **More > Disk and Image > Create Snapshot-consistent Group** in the Actions column.
3. In the **Create Snapshot-consistent Group** dialog box, configure parameters to create a snapshot-consistent group and enable the instant access feature.
 - For more information about the parameters, see [Create a snapshot-consistent group](#).
 - For more information about the instant access feature, see [Enable or disable the instant access feature](#).
4. In the **Create Snapshot-consistent Group** dialog box, specify parameters in the Application-consistent Snapshot section.

Snapshot parameter settings

* Snapshot-consistent

Group Name:

Description:

Tag: Tag key : Tag value

Snapshot speed available: ☒ Enable Instant Access

Snapshots that have this feature enabled can be used to create and roll back disks immediately. However, you are charged for using the feature. For more information about billing, see [Snapshots](#)

Snapshot Speed Available Days

Duration: If you do not specify a retention period, the snapshot is permanently retained. You must manually release the snapshot.

Application-consistent ☒ Enable Application-consistent Snapshot ⓘ

Snapshot: When you enable the application-consistent snapshot feature, [Cloud Assistant plug-ins](#) are automatically installed. For Linux instances, you must [upload the script to the specified path within guest OS](#) before you enable the feature. Otherwise, file system-consistent snapshots are created.

Before you enable the application-consistent snapshot feature on an instance, make sure that the instance has the permissions of the corresponding RAM role. [Learn More](#)

Windows Instance Parameters

By default, all existing writers within the system are selected. In some cases, the system can exclude writers provided by applications and instead force only file systems into a consistent state.

☒ Whether Writer is included by default

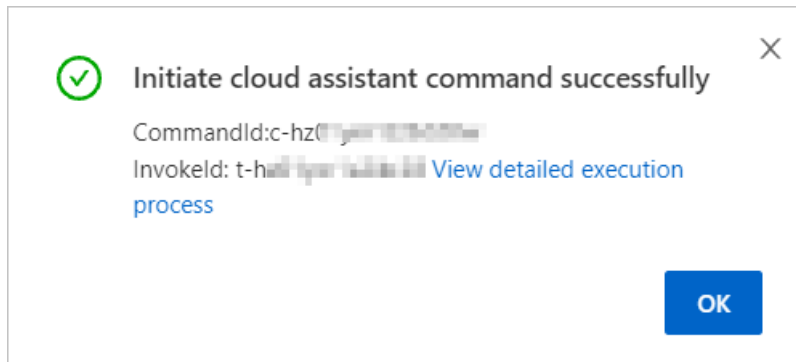
OK Cancel

- If you select **Enable Application-consistent Snapshot** and **Whether Writer is included by default**, application-consistent snapshots are created.
- If you select only **Enable Application-consistent Snapshot**, file system-consistent snapshots are created.

ⓘ **Note** If the Cloud Assistant plug-in is not installed on your instance, the plug-in is automatically installed on the instance after you select **Enable Application-consistent Snapshot**.

5. Click **OK**.

After the snapshot-consistent group is created, a message is displayed and indicates the Cloud Assistant command ID and the execution ID, as shown in the following figure. You can check whether application-consistent snapshots are created based on the execution ID.




Step 2: Enable the application-consistent snapshot feature for the instance if it is a Linux instance

For Linux instances, you must configure shell scripts (application pre-freeze and post-thaw scripts) based on the applications deployed on the instances to implement application consistency. This section describes how to enable the application-consistent snapshot feature for a Linux instance.

1. Write the application pre-freeze and post-thaw scripts based on the applications deployed on the instance and upload the scripts to the instance.

You can use FTP or Cloud Assistant to upload the application pre-freeze and post-thaw scripts to the instance.

- Application pre-freeze script: Grant have read, write, and execute permissions on the script only to the root user. Set the save path of the script to `/tmp/prescript.sh`.
- Application post-thaw script: Grant have read, write, and execute permissions on the script only to the root user. Set the save path of the script to `/tmp/postscript.sh`.

 **Notice** If script configurations such as permissions, save path, or file name are invalid, file system-consistent snapshots are created.

2. Go to the Instances page in the ECS console.
 - i.
 - ii.
 - iii.
3. Find the instance for which you want to enable the application-consistent snapshot feature and choose **More > Disk and Image > Create Snapshot-consistent Group** in the Actions column.
4. In the **Create Snapshot-consistent Group** dialog box, configure parameters to create a snapshot-consistent group and enable the instant access feature.
 - For more information about the parameters, see [Create a snapshot-consistent group](#).
 - For more information about the instant access feature, see [Enable or disable the instant access feature](#).
5. In the **Create Snapshot-consistent Group** dialog box, specify parameters in the Application-consistent Snapshot section.

Application-consistent ☒ Enable Application-consistent Snapshot ?

Snapshot: When you enable the application-consistent snapshot feature, Cloud Assistant plug-ins are automatically installed. For Linux instances, you must upload the script to the specified path within guest OS before you enable the feature. Otherwise, file system-consistent snapshots are created. Before you enable the application-consistent snapshot feature on an instance, make sure that the instance has the permissions of the corresponding RAM role. [Learn More](#)

Linux instance parameter settings
For Linux systems, application freezing and thawing scripts must be executed in pairs or in conjunction with the following file system thawing and thawing operations.

Application Pre-freeze Script Path

ⓘ You must call this script before a snapshot is created to make sure that the application data is read-only before and when you create a snapshot. ✕

You must name the pre-freeze script as prescript.sh and upload it to the preceding path within the ECS instance before you create the snapshot.

Application Post-thaw Script Path

ⓘ Resume writing application data after a snapshot is created. ✕

You must name the pre-freeze script as postscript.sh and upload it to the preceding path within the ECS instance before you create the snapshot.

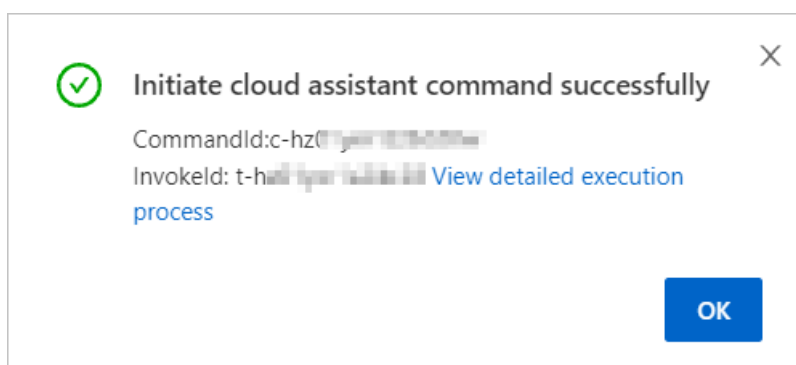
☒ Enable File System Freeze and Thaw Timeout Period: Seconds

- If you select **Enable Application-consistent Snapshot** and **Enable File System Freeze and Thaw** and configure valid scripts, application-consistent snapshots are created.
- If you select **Enable Application-consistent Snapshot** and **Enable File System Freeze and Thaw** but do not configure valid scripts, file system-consistent snapshots are created.

Note If the Cloud Assistant plug-in is not installed on your instance, the plug-in is automatically installed on the instance after you select **Enable Application-consistent Snapshot**.

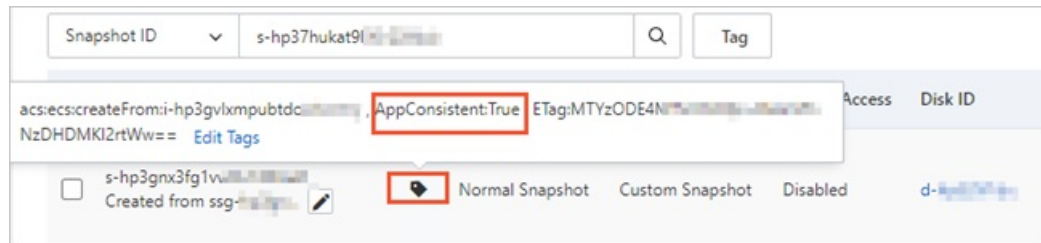
6. Click **OK**.

After the snapshot-consistent group is created, a message is displayed and indicates the Cloud Assistant command ID and the execution ID, as shown in the following figure. You can check whether application-consistent snapshots are created based on the execution ID.

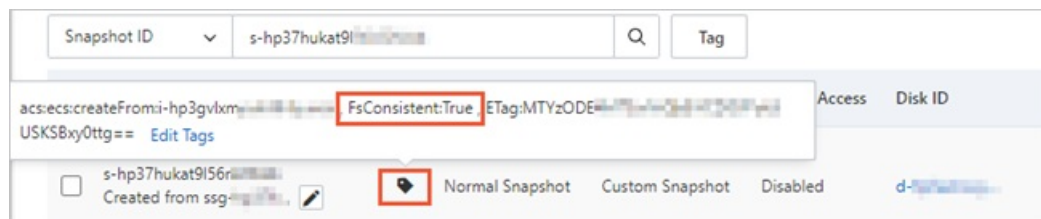


- iv. On the **Snapshots** tab, check whether the disk snapshots contained in the snapshot-consistent group that you created are application-consistent or file system-consistent snapshots based on their tags.

- Application-consistent snapshots are identified by the `AppConsistent:True` tag.



- File system-consistent snapshots are identified by the `FsConsistent:True` tag.



Error codes

After you perform the preceding operations to create an application-consistent snapshot, an error code (ExitCode) may be returned. If an application-consistent snapshot cannot be created, you can troubleshoot the error based on the returned error code.

Error code (ExitCode)	Description
0	The application-consistent snapshot is created.
1	One or more specified conditions are not met. Examples: <ul style="list-style-type: none"> The disk category is not supported. The snapshot name is invalid. The network connection fails. No RAM role is attached to the instance. The operating system of the instance is not supported.
2	The type or number of the parameters that follow <code>--params</code> is invalid.
3	One of the following errors may occur: <ul style="list-style-type: none"> No ESSDs are attached to the instance. The RAM role attached to the instance has no permissions to call snapshot-related API operations.
4	The snapshot-consistent group cannot be created.
5	The snapshot-consistent group is not in the expected state.
6	The request to create the snapshot-consistent group timed out.

Error code (ExitCode)	Description
7	A single disk snapshot in the snapshot-consistent group is not in the expected state.
8	Tags cannot be added to the snapshot.
9	The application pre-freeze script cannot be executed.
10	The application post-thaw script cannot be executed.
11	The I/O of the file systems cannot be frozen.
12	The I/O of the file systems cannot be thawed.
13	No RAM role is attached to the instance.
14	The number of snapshots exceeds the upper limit.
15	The snapshot is not in the expected state.
16	The snapshot cannot be created because the previous snapshot is being created and the instant access feature is disabled.
255	An unknown error has occurred.

References


For information about how to use ECS SDK for Go to create application-consistent snapshots, see [Create application-consistent snapshots by using ECS SDK for Go](#).

5.4. Create application-consistent snapshots by using ECS SDK for Go

Alibaba Cloud allows you to create application-consistent snapshots for Elastic Compute Service (ECS) instances by calling API operations or by using ECS SDKs. These methods of creating application-consistent snapshots are suitable for scenarios such as batch O&M and custom development. This topic describes how to use ECS SDK for Go to create application-consistent snapshots for Linux and Windows instances.

Prerequisites

- The Elastic Compute Service (ECS) instance based on which you want to create application-consistent snapshots runs one of the following operating systems:
 - Windows: Windows Server 2019, Windows Server 2016, and Windows Server 2012 R2.
 - Linux: CentOS 7.6 or later, Ubuntu 18.04 or later, and Alibaba Cloud Linux 2.1903 LTS 64-bit.
- The disks of the ECS instance are enhanced SSDs (ESSDs) and the file systems are ext3, ext4, XFS, or New Technology File System (NTFS). Network file systems or shared file systems are not supported.
- The Cloud Assistant client is installed on the instance. For more information, see [Install the Cloud Assistant client](#).

 **Note** By default, the Cloud Assistant client is pre-installed on ECS instances that were created from public images after December 1, 2017.

Context

The following table describes the differences between file system-consistent snapshots and application-consistent snapshots.

Snapshot type	Description	Implementation
Application-consistent snapshot	<p>Application-consistent snapshots back up data stored in memory and database transactions in progress when the snapshots are created. This ensures consistency between application system data and database transactions. The application-consistent snapshots can be used for data rollbacks to prevent data corruption and data loss and to ensure that logs are not rolled back when databases start and that applications start in a consistent state.</p> <p>Application-consistent snapshots are identified by the <code>APPConsistent:True</code> tag.</p>	<p>The implementation methods of the application-consistent snapshot feature vary based on operating systems.</p> <ul style="list-style-type: none">For Windows operating systems, the feature is implemented by using Volume Shadow Copy Service (VSS).For Linux operating systems, the feature is implemented by using custom shell scripts. You must write your own scripts based on your applications. When you use custom scripts, Alibaba Cloud does not take responsibility for application consistency issues.
File system-consistent snapshot	<p>If the application-consistent snapshot feature is enabled but relevant conditions are not met, file system-consistent snapshots are created.</p> <p>File system-consistent snapshots synchronize the memory and disk information of file systems when the snapshots are created, and freeze write operations on file systems to ensure file system consistency. File system-consistent snapshots can be used to prevent operating systems from performing disk checks (chkdsk) and file system consistency checks (fsck).</p> <p>File system-consistent snapshots are identified by the <code>FsConsistent:True</code> tag.</p>	<p>The implementation methods of the application-consistent snapshot feature vary based on operating systems.</p> <ul style="list-style-type: none">For Windows operating systems, if no VSS writers are available, file system-consistent snapshots are created by default.For Linux operating systems, if no application scripts are available, file system-consistent snapshots are created by default.

Preparations

Before you call an API operation to create file system- or application-consistent snapshots, make the following preparations.

1. Create a Resource Access Management (RAM) role for the application-consistent snapshot feature.
For more information, see Step 1 to Step 4 in [Step 1: Configure a RAM role for the ECS instance](#).

2. Download and install the Go runtime environment.

For more information, see [Download and install](#).

3. Download and install ECS SDK for Go.

For more information, see [Get started with Alibaba Cloud Classic SDK for Go](#).

After the preceding preparations are made, perform the procedures described in the following table based on the operating system of your instance.

Procedure for Linux instances	Procedure for Windows instances
<ol style="list-style-type: none"> 1. Step 1: Configure a RAM role for the ECS instance 2. Step 2: Call the RunCommand operation to create file system-consistent snapshots for Linux instances 3. Step 3: Call the DescribeInvocationResults operation to check whether snapshots are created 	<ol style="list-style-type: none"> 1. Step 1: Configure a RAM role for the ECS instance 2. Step 2: Call the RunCommand operation to create application-consistent snapshots for Windows instances 3. Step 3: Call the DescribeInvocationResults operation to check whether snapshots are created

Step 1: Configure a RAM role for the ECS instance

Call the [AttachInstanceRamRole](#) operation to attach the AppSnapshotRoleName RAM role to the ECS instance.

Sample code of ECS SDK for Go:

```
package main
import (
    "fmt"
    "github.com/aliyun/alibaba-cloud-sdk-go/services/ecs"
)
func main() {
    client, err := ecs.NewClientWithAccessKey(
        "cn-hangzhou", //Specify the region ID of the instance.
        "<accessKeyId>", //Specify your AccessKey ID.
        "<accessKeySecret>") //Specify your AccessKey secret.
    //Call the AttachInstanceRamRole operation to attach the specified RAM role to the instance.
    request := ecs.CreateAttachInstanceRamRoleRequest()
    request.Scheme = "https"
    request.RamRoleName = "AppSnapshotRoleName" //Specify the name of the RAM role
    request.InstanceIds = ["i-bp17r83nppqf141v****"] //Specify the ID of the instance.
    response, err := client.AttachInstanceRamRole(request)
    if err != nil {
        fmt.Println(err.Error())
    }
    fmt.Println(response.String())
}
```

A response similar to the following one is displayed. For more information about the parameters in the response, see [AttachInstanceRamRole](#).

```
API server listening at: 127.0.0.1:26364
HTTP/1.1 200 OK
Date: Tue, 20 Jul 2021 10:36:20 GMT
Content-Type: application/json;charset=utf-8
Content-Length: 255
Connection: keep-alive
Access-Control-Allow-Methods: POST, GET, OPTIONS
Access-Control-Allow-Origin: *
Access-Control-Allow-Headers: X-Requested-With, X-Sequence, _aop_secret, _aop_signature
Access-Control-Max-Age: 172800
X-Acs-Request-Id: 36BF3905-1-9A4E5845AFDB

{"AttachInstanceRamRoleResults":{"AttachInstanceRamRoleResult":[{"Message":"success","InstanceId":"i-bp17r83nppqf141v****","Code":"200"}]},{"TotalCount":1,"RamRoleName":"AppSnapshotRoleName","RequestId":"36BF3905-1-9A4E5845AFDB","FailCount":0}
```

Step 2: Call the RunCommand operation to create file system-consistent snapshots for Linux instances

Call the [RunCommand](#) operation related to Cloud Assistant to create file system-consistent snapshots for one or more Linux instances.

Sample code of ECS SDK for Go:



```
package main
import (
    "fmt"
    "github.com/aliyun/alibaba-cloud-sdk-go/services/ecs"
)
func main() {
    client, err := ecs.NewClientWithAccessKey(
        "cn-hangzhou", //Specify the region ID of the instance.
        "<accessKeyId>", //Specify your AccessKey ID.
        "<accessKeySecret>") //Specify your AccessKey secret.
    //Call the RunCommand operation to create file system-consistent snapshots for the instance.
    request := ecs.CreateRunCommandRequest()
    request.Scheme = "https"
    request.Type = "RunShellScript"
    //For information about the command used to create file system-consistent snapshots, see CommandContent.
    request.CommandContent = "acs-plugin-manager --exec --plugin app-snapshot-plugin --params=-RamRoleName=\"AppSnapshotRoleName\",-InstantAccess=true,-EnableFsFreeze=true,-TimeoutInSeconds=30,-PreScriptPath=\"/tmp/prescript.sh\",-PostScriptPath=\"/tmp/postscript.sh\",-InstantAccessRetentionDays=1,-ExcludeDiskId=\"\",-Name=\"LinuxApp1\""
    request.InstanceId = &[]string{"i-bp17r83nppqf141v****"} //Specify the ID of the instance.
    response, err := client.RunCommand(request)
    if err != nil {
        fmt.Print(err.Error())
    }
    fmt.Printf("response is %#v\n", response)
}
```

Components of the CommandContent value:

- `acs-plugin-manager --exec --plugin app-snapshot-plugin` indicates the `app-snapshot-plugin` plug-in used to run Cloud Assistant commands.

- `--params=` indicates the configuration parameters of the plug-in. The following table describes these parameters.

Parameter	Type	Required	Description
ExcludeDiskId	String	No	The disks to exclude from the snapshots.
InstantAccess	Boolean	No	Specifies whether to enable the instant access feature. Valid values: <ul style="list-style-type: none">◦ true: enables the instant access feature.◦ false: disables the instant access feature.
InstantAccessRetentionDays	Integer	No	The number of days for which the instant access feature remains enabled. The instant access feature is automatically disabled when the specified duration ends. Valid values: 1 to 65536. Default: 1.
Name	String	Yes	The name of the snapshot-consistent group.
Description	String	No	The description of the snapshot-consistent group.
RamRoleName	String	Yes	The RAM role attached to the instance. For more information, see Step 1: Configure a RAM role for the ECS instance .

Parameter	Type	Required	Description
PreScriptPath	String	No	<p>The path of the application pre-freeze script (tmp/prescript.sh). The <i>prescript.sh</i> script must meet the following conditions:</p> <ul style="list-style-type: none"> Only the root user is granted read, write, and execute permissions (chmod 700) on the script as the owner. You must customize the script based on your application. <p> Note To create application-consistent snapshots for Linux instances, you must specify this parameter. If script configurations such as permissions, save path, or file name are invalid, file system-consistent snapshots are created.</p>
PostScriptPath	String	No	<p>The path of the application post-thaw script (/tmp/postscript.sh). The <i>postscript.sh</i> script must meet the following conditions:</p> <ul style="list-style-type: none"> Only the root user is granted read, write, and execute permissions (chmod 700) on the script as the owner. You must customize the script based on your application. <p> Note To create application-consistent snapshots for Linux instances, you must specify this parameter. If script configurations such as permissions, save path, or file name are invalid, file system-consistent snapshots are created.</p>
EnableFsFreeze	Boolean	No	<p>Specifies whether to enable Linux fsfreeze to put file systems into the read-only state before you create snapshots.</p> <p>Default value: True.</p>
TimeoutInSeconds	Integer	No	<p>The I/O freeze timeout period.</p> <p>Default value: 30. Unit: seconds.</p>

Parameter	Type	Required	Description
ScriptTimeoutInSecs	Integer	No	The timeout period for script execution. Default value: 1800. Unit: seconds.

A response similar to the following one is displayed. For more information about the parameters in the response, see [RunCommand](#).

```
API server listening at: 127.0.0.1:14003
response is &ecs.RunCommandResponse{BaseResponse:(*responses.BaseResponse)(0xc0000e8640), RequestId:"11717FEE-0000-4B668-4E37ADB5811F", CommandId:"c-hz01qsegaxi", InvokeId:"t-hz01qsegaxi"}
```

Step 2: Call the RunCommand operation to create application-consistent snapshots for Windows instances

Call the [RunCommand](#) operation related to Cloud Assistant to create application-consistent snapshots for one or more Windows instances.

Sample code of ECS SDK for Go:

```
package main
import (
    "fmt"
    "github.com/aliyun/alibaba-cloud-sdk-go/services/ecs"
)
func main() {
    client, err := ecs.NewClientWithAccessKey(
        "cn-hangzhou", //Specify the region ID of the instance.
        "<accessKeyId>", //Specify your AccessKey ID.
        "<accessKeySecret>") //Specify your AccessKey secret.
    request := ecs.CreateRunCommandRequest()
    request.Scheme = "https"
    request.Type = "RunBatScript"
    //For information about the command used to create application-consistent snapshots, see CommandContent.
    request.CommandContent = "acs-plugin-manager --exec --plugin app-snapshot-plugin-win --params=-RamRoleName=\"AppSnapshotRoleName\",-InstantAccess=true,-EnableWriters=true,-Description=\"AppSnapshot\",-InstantAccessRetentionDays=1,-ExcludeDiskId=\"\",-Name=\"APPSnapshot-1\""
    request.InstanceId = &[]string{"i-bp1lvqwh574****"} //Specify the ID of the instance.
    request.Timeout = "1800"
    response, err := client.RunCommand(request)
    if err != nil {
        fmt.Println(err.Error())
    }
    fmt.Printf("response is %#v\n", response)
}
```

Components of the CommandContent value:

- `acs-plugin-manager --exec --plugin app-snapshot-plugin-win` indicates the `app-snapshot-plugin-win` plug-in used to run Cloud Assistant commands.

- `--params=` indicates the configuration parameters of the plug-in. The following table describes these parameters.

Parameter	Type	Required	Description
ExcludeDiskId	String	No	The disks to exclude from the snapshots.
InstantAccess	Boolean	No	Specifies whether to enable the instant access feature. Valid values: <ul style="list-style-type: none"> ◦ true: enables the instant access feature. ◦ false: disables the instant access feature.
InstantAccessRetentionDays	Integer	No	The number of days for which the instant access feature remains enabled. The instant access feature is automatically disabled when the specified duration ends. Valid values: 1 to 65536. Default: 1.
Name	String	Yes	The name of the snapshot-consistent group.
Description	String	No	The description of the snapshot-consistent group.
RamRoleName	String	Yes	The RAM role attached to the instance. For more information, see Step 1: Configure a RAM role for the ECS instance .
EnableWriters	Boolean	No	Specifies whether to create application-consistent snapshots. Valid values: <ul style="list-style-type: none"> ◦ true: creates application-consistent snapshots. ◦ false: creates file system-consistent snapshots. Default value: true.

A response similar to the following one is displayed. For more information about the parameters in the response, see [RunCommand](#).

```
API server listening at: 127.0.0.1:21321
response is &ecs.RunCommandResponse{BaseResponse:(*responses.BaseResponse)(0xc0000e6640), RequestId:"D4
82D098-9725330A0E98", CommandId:"c-hz01r059gv8", InvokeId:"t-hz01r059gvd"}
```

Step 3: Call the DescribeInvocationResults operation to check whether snapshots are created

Call the [DescribeInvocationResults](#) operation to check whether the Cloud Assistant command is run.

Sample code of ECS SDK for Go:

```
package main
import (
    "fmt"
    "github.com/aliyun/alibaba-cloud-sdk-go/services/ecs"
)
func main() {
    client, err := ecs.NewClientWithAccessKey(
        "cn-hangzhou", //Specify the region ID of the instance.
        "<accessKeyId>", //Specify your AccessKey ID.
        "<accessKeySecret>") //Specify your AccessKey secret.
    //Call the DescribeInvocationResults operation to check whether snapshots are created.
    request := ecs.CreateDescribeInvocationResultsRequest()
    request.Scheme = "https"
    request.InvokeId = "t-hz01qsegaxi****" //The execution ID of the command. You can
n obtain the execution ID in the response in Step 2.
    request.InstanceId = "i-bp17r83nppqf141v****" //The instance ID.
    request.CommandId = "c-hz01qsegaxd****" //The command ID. You can obtain the comm
and ID in the response in Step 2.
    response, err := client.DescribeInvocationResults(request)
    if err != nil {
        fmt.Print(err.Error())
    }
    fmt.Printf("response is %#v\n", response)
}
```

A response similar to the following one is displayed. For more information about the parameters in the response, see [DescribeInvocationResults](#).

```
API server listening at: 127.0.0.1:44789
response is &ecs.DescribeInvocationResultsResponse{BaseResponse:(*responses.BaseResponse)(0xc0000e8600), RequestId:"AAAT7C43F-150C31D36118", Invocation:ecs.Invocation{Name:"", PageSize:10, Timed:false, Frequency:"", Content:"", CommandContent:"", InvocationStatus:"", FileGroup:"", Description:"", Overwrite:"", PageNumber:1, CommandId:"", TargetDir:"", FileMode:"", TotalCount:1, Username:"", ContentType:"", CreationTime:"", Parameters:"", CommandName:"", VmCount:0, InvokeId:"", RepeatMode:"", InvokeStatus:"", FileOwner:"", CommandType:"", InvocationResults:ecs.InvocationResults{InvocationResult:[]ecs.InvocationResult{ecs.InvocationResult{CommandId:"c-hz0tqsega-", InvokeId:"t-hz0tqsega-", InstanceId:"i-bp17r83npqqf141-", StartTime:"2021-07-23T09:34:26Z", StopTime:"", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k", ErrorInfo:""}, StartTime:"2021-07-23T09:34:26Z", StopTime:", FinishedTime:"2021-07-23T09:34:29Z", Repeats:1, Output:"w2xldmvpsPSjpbmzvillbdglTZT0imJajMGO-MuxvW-AwNp-NDOc-WuAn-WU6GQdMuV-4u7L-7nB3-UWU17I-nHh34-MG4-LiuOC3-dCl-zV7l5bQ-4U5mV-4WRpbWU9ijiwzc2Z1bg6g2Z21BgX5IL0k",
```

- **ExitCode** indicates the error code. A value of `0` indicates that command was run in a proper manner. A numeric value other than `0` indicates that an error has occurred. Troubleshoot the error based on the returned error code. For more information, see [Error codes](#).
- **Output** indicates the command output, which is Base64-encoded.

If the command is run in a proper manner, the content of `Output` is Base64-encoded and contains the ID of the created snapshot-consistent group, as shown in the following example.

```
[snapshotgroup="ssg-bp170v57ca9j01jb*****"][message="Finish whole Processes of Snapshot successfully"]
```

Error codes

After you perform the preceding operations to create an application-consistent snapshot, an error code (ExitCode) may be returned. If an application-consistent snapshot cannot be created, you can troubleshoot the error based on the returned error code.


Error code (ExitCode)	Description
0	The application-consistent snapshot is created.
1	One or more specified conditions are not met. Examples: <ul style="list-style-type: none">• The disk category is not supported.• The snapshot name is invalid.• The network connection fails.• No RAM role is attached to the instance.• The operating system of the instance is not supported.
2	The type or number of the parameters that follow <code>--params</code> is invalid.
3	One of the following errors may occur: <ul style="list-style-type: none">• No ESSDs are attached to the instance.• The RAM role attached to the instance has no permissions to call snapshot-related API operations.
4	The snapshot-consistent group cannot be created.
5	The snapshot-consistent group is not in the expected state.
6	The request to create the snapshot-consistent group timed out.
7	A single disk snapshot in the snapshot-consistent group is not in the expected state.
8	Tags cannot be added to the snapshot.
9	The application pre-freeze script cannot be executed.
10	The application post-thaw script cannot be executed.
11	The I/O of the file systems cannot be frozen.
12	The I/O of the file systems cannot be thawed.
13	No RAM role is attached to the instance.
14	The number of snapshots exceeds the upper limit.
15	The snapshot is not in the expected state.
16	The snapshot cannot be created because the previous snapshot is being created and the instant access feature is disabled.
255	An unknown error has occurred.

5.5. Best practices for creating application-consistent snapshots for a Linux instance on which MySQL is deployed

Disks can be rolled back based on application-consistent snapshots without corruption or loss of data. This ensures that applications such as MySQL start in a consistent state and prevents log rollbacks on database startup. This topic describes how to create application-consistent snapshots for a Linux Elastic Compute Service (ECS) instance and how to check whether the snapshots can be used as expected to restore data. MySQL is used in the examples.

Prerequisites


- An ECS instance that runs one of the following operating systems is created: CentOS 7.6 or later, Ubuntu 18.04 or later, and Alibaba Cloud Linux 2.1903 LTS 64-bit.
- The disks of the ECS instance are enhanced SSDs (ESSDs) and the file systems are ext3, ext4, XFS, or New Technology File System (NTFS). Network file systems or shared file systems are not supported.
- The Cloud Assistant client is installed on the instance. For more information, see [Install the Cloud Assistant client](#).

 **Note** By default, the Cloud Assistant client is pre-installed on ECS instances that were created from public images after December 1, 2017.

Context

For information about application-consistent snapshots, see [Create application-consistent snapshots in the ECS console](#).

The following table describes the configurations of the verification environment used in this topic.

Configuration	Description
ECS instance type	ecs.g7.large
Operating system	CentOS 7.9 64-bit
Disk	Enhanced SSDs (ESSDs)
Application	MySQL 5.7  Note For information about how to deploy MySQL, see Manually deploy a MySQL database on an ECS instance that runs CentOS 7 .

Procedure

1. [Step 1: Prepare a database verification environment](#)
2. [Step 2: Create application pre-freeze and post-thaw scripts](#)
3. [Step 3: Attach a Resource Access Management \(RAM\) role to the instance](#)
4. [Step 4: Call the TestPIT stored procedure in the database](#)
5. [Step 5: Create application-consistent snapshots in the ECS console](#)
6. [Step 6: Check whether application-consistent snapshots are created](#)
7. [Step 7: Check whether application-consistent snapshots can be used as expected to restore data](#)

Step 1: Prepare a database verification environment

Before you perform the following operations, make sure that MySQL 5.7 is installed on the ECS instance. This section describes how to prepare a database verification environment on the instance.

1. Connect to the ECS instance.

For more information, see [Connection methods](#) [Guidelines on instance connection](#).

2. Create the /root/test.sql test script.

- i. Create and open the /root/test.sql test script.

```
vi /root/test.sql
```

- ii. Press the `I` key to enter the edit mode.

- iii. Compile the test script.

This script includes the SQL statement used to create a database table named PointInTime and the SQL statement used to create a stored procedure named TestPIT. Example script:

```
USE AdventureWorks;
CREATE TABLE PointInTime(id int, t datetime);
DELIMITER $$
CREATE PROCEDURE `TestPIT`()
BEGIN
  DECLARE i int;
  SET i=1;
  WHILE i < 180
  DO
    INSERT INTO PointInTime VALUES(i, now());
    SELECT SLEEP(1);
    SET i=i+1;
  END WHILE;
END $$
DELIMITER ;
```

- iv. Press the `Esc` key, enter `:wq`, and then press the Enter key to save and close the script.

3. Log on to MySQL.

Enter the following command, press the Enter key, and then enter your MySQL password as prompted:

```
mysql -u <mysqlUserName> -p
```

Replace `<mysqlUserName>` with your MySQL username.

4. Create a database named AdventureWorks.

```
CREATE DATABASE AdventureWorks;
```

5. Run the test script.

```
source /root/test.sql
```

Step 2: Create application pre-freeze and post-thaw scripts

This section describes how to create a pre-freeze script and a post-thaw script for MySQL. These scripts are required to create application-consistent snapshots.

Note The pre-freeze and post-thaw scripts used in this topic are for reference only. When you create application-consistent snapshots, you can compile pre-freeze and post-thaw scripts based on your applications and business scenarios.

1. Create an application pre-freeze script named */tmp/prescript.sh*.i. Use the root account to create the */tmp/prescript.sh* script.

```
vi /tmp/prescript.sh
```

ii. Press the **I** key to enter the edit mode.

iii. Write the script based on your applications.

In this example, the script contains the following content:

```

TIMESTAMP=`date +%s`
MYSQL_TEMP_FILE_NAME="/tmp/mysqlfreeze${TIMESTAMP}.tmp"
LOG_FILE_NAME="/tmp/mysqlfreeze${TIMESTAMP}.log"
# Enter your MySQL username.
export MYSQL_USER="$MYSQL_USER"
# Enter your MySQL password.
export MYSQL_PWD="$MYSQL_PASSWORD"
function Log()
{
    echo "$1"
    echo "$1" >> ${LOG_FILE_NAME}
}
function ExitWithResult()
{
    Log "[INFO]:mysql freeze result is $1."
    exit $1
}
function Main()
{
    Log "*****"
    Log "[INFO]:Begin to freeze mysql."
    which mysql
    if [ $? -ne 0 ]
    then
        Log "[INFO]:mysql is not installed."
        ExitWithResult 0
    fi
    systemctl status mysqld.service && grep "inactive (dead)"

```

```
systemctl status mysqld.service | grep "inactive (dead)"
if [ $? -ne 1 ]
then
    Log "[ERROR]:mysql is not running."
    ExitWithResult 0
fi
mysql -u$MYSQL_USER -e "show processlist;" > "${MYSQL_TEMP_FILE_NAME}" 2>&1
if [ $? -ne 0 ]
then
    cat ${MYSQL_TEMP_FILE_NAME} >>"${LOG_FILE_NAME}"
    [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
    Log "[ERROR]:Show process list failed."
    ExitWithResult 1
fi
process_id=`cat ${MYSQL_TEMP_FILE_NAME} | grep "select 1 and sleep(25)" | awk -
F " " '{print $1}'`
if [ "$process_id" != "" ]
then
    cat ${MYSQL_TEMP_FILE_NAME} >>"${LOG_FILE_NAME}"
    [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
    Log "[ERROR]:MySQL already been freezed "
    ExitWithResult 1
fi
cat ${MYSQL_TEMP_FILE_NAME}
Log "[INFO]:Try to execute flush tables command"
echo "flush tables with read lock;select 1 and sleep(25);" | nohup mysql -u$
MYSQL_USER >> "${LOG_FILE_NAME}" 2>&1 &
if [ $? -ne 0 ]
then
    Log "[ERROR]:Freeze mysql failed."
    ExitWithResult 1
fi
Log "[INFO]:Flush tables command execute success"
checkTime=0
while [ 1 ]
do
    mysql -u$MYSQL_USER -e "show processlist;" > "${MYSQL_TEMP_FILE_NAME}" 2>&1
    if [ $? -ne 0 ]
    then
        cat ${MYSQL_TEMP_FILE_NAME} >>"${LOG_FILE_NAME}"
        [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
        Log "[ERROR]:Show process list failed."
        ExitWithResult 1
    fi
    cat ${MYSQL_TEMP_FILE_NAME}
    process_id=`cat ${MYSQL_TEMP_FILE_NAME} | grep "select 1 and sleep(25)" | a
wk -F " " '{print $1}'`
    if [ "$process_id" = "" ]
    then
        checkTime=`expr $checkTime + 1`
        Log "[INFO]:Mysql is not freeze. checkTime is ${checkTime}"
        sleep 1
    else
        Log "[INFO]:Found sleep command in processlist,freeze success"
        break
    fi
done
```

```

fi
    if [ $checkTime -eq 10 ]
    then
        cat "${MYSQL_TEMP_FILE_NAME}" >>"${LOG_FILE_NAME}" 2>&1
        freeze_id=`cat ${MYSQL_TEMP_FILE_NAME} | grep "flush tables with read l
ock" | awk -F " " '{print $1}'`
        mysql -u$MYSQL_USER -e "kill $freeze_id;" >> "${LOG_FILE_NAME}" 2>&1
        if [ $? -ne 0 ]
        then
            Log "[ERROR]:Thaw mysql failed."
        fi
        [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
        Log "[ERROR]:Mysql is not freeze. Will return error"
        ExitWithResult 1
    fi
done
[ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
Log "[INFO]:Finish freeze mysql."
ExitWithResult 0
}
Main

```

In this script, you must modify the following parameters:

- `$MYSQL_USER` : Set this parameter to your MySQL username.
- `$MYSQL_PASSWORD` : Set this parameter to your MySQL password.

- iv. Press the `Esc` key, enter `:wq`, and then press the Enter key to save and close the script.
- v. Grant read, write, and execute permissions on the script only to the root account.

Note For security purposes, make sure that only the root account are granted read, write, and execute permissions on the script (`chmod 700`). Otherwise, the permission settings are invalid and the script cannot be run.

```
chmod 700 /tmp/prescript.sh
```

2. Create an application post-thaw script named `/tmp/postscript.sh`.

- i. Use the root account to create the `/tmp/postscript.sh` script.

```
vi /tmp/postscript.sh
```

- ii. Press the `I` key to enter the edit mode.
- iii. Write the script based on your applications.

In this example, the script contains the following content:

```

TIMESTAMP=`date +%s`
MYSQL_TEMP_FILE_NAME="/tmp/mysqlthaw${TIMESTAMP}.tmp"
LOG_FILE_NAME="/tmp/mysqlthaw${TIMESTAMP}.log"
# Enter your MySQL username.
export MYSQL_USER="$MYSQL_USER"
# Enter your MySQL password.
export MYSQL_PWD="$MYSQL_PASSWORD"

```

```

function Log()
{
    echo "$1"
    echo "$1" >> ${LOG_FILE_NAME}
}
function ExitWithResult()
{
    Log "[INFO]:mysql unfreeze result is $1."
    exit $1
}
function Main()
{
    Log "*****"
    Log "[INFO]:Begin to thaw mysql."
    which mysql
    if [ $? -ne 0 ]
    then
        Log "[INFO]:mysql is not installed."
        ExitWithResult 0
    fi
    systemctl status mysqld.service | grep "inactive (dead)"
    if [ $? -ne 1 ]
    then
        Log "[ERROR]:mysql is not running."
        ExitWithResult 0
    fi
    mysql -u$MYSQL_USER -e "show processlist;" > "${MYSQL_TEMP_FILE_NAME}" 2>&1
    if [ $? -ne 0 ]
    then
        cat ${MYSQL_TEMP_FILE_NAME} >> "${LOG_FILE_NAME}"
        [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
        Log "[ERROR]:show process list failed."
        ExitWithResult 1
    fi
    Log "[INFO]:show process list success."
    cat ${MYSQL_TEMP_FILE_NAME}
    process_ids=`cat ${MYSQL_TEMP_FILE_NAME} | grep "select 1 and sleep(25)" | awk
-F " " '{print $1}'`
    if [ "$process_ids" = "" ]
    then
        [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
        Log "[ERROR]:Get freeze process_id failed."
        ExitWithResult 1
    fi
    cat ${MYSQL_TEMP_FILE_NAME} | grep "select 1 and sleep(25)" | awk -F " " '{prin
t $1}' | while read pid
do
    Log "[INFO]:Try to stop sql process ${pid}."
    mysql -u$MYSQL_USER -e "kill $pid;" >> "${LOG_FILE_NAME}" 2>&1
    if [ $? -ne 0 ]
    then
        [ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
        Log "[ERROR]:Thaw mysql failed.PIDs is ${process_ids}"
        ExitWithResult 1
    fi
}

```

```

11
    Log "[INFO]:Stop sql process ${pid} success."
done
[ -f ${MYSQL_TEMP_FILE_NAME} ] && rm -rf ${MYSQL_TEMP_FILE_NAME}
Log "[INFO]:Finish thaw mysql."
ExitWithResult 0
}

Main

```

In this script, you must modify the following parameters:

- `$MYSQL_USER` : Set this parameter to your MySQL username.
- `$MYSQL_PASSWORD` : Set this parameter to your MySQL password.

iv. Press the **Esc** key, enter **:wq**, and then press the Enter key to save and close the script.

- v. Grant read, write, and execute permissions on the script only to the root account.

Note For security purposes, make sure that only the root account are granted read, write, and execute permissions on the script (chmod 700). Otherwise, the permission settings are invalid and the script cannot be run.

```
chmod 700 /tmp/postscript.sh
```

3. Go to the `/tmp` directory to check the script permissions.

Go to the `/tmp` directory.

```
cd /tmp
```

Check script permissions.

1s -1

A command output similar to the following one is returned.

```
[root@ecs tmp]# ls -l
total 12
-rw-r--r-- 1 root root 0 Jul 30 11:40 AliyunAssistClientSingleLock.lock
-rwxrwxrwx 1 root root 0 Jul 30 11:41 argus.sock
-rwx----- 1 root root 1993 Jul 30 16:32 postscript.sh
-rwx----- 1 root root 3287 Jul 30 16:31 prescript.sh
drwx----- 3 root root 4096 Jul 30 11:40 systemd-private-7cc58127c28848f1b1c0c0c0c0c0c0c0
[root@ecs tmp]#
```

Step 3: Attach a Resource Access Management (RAM) role to the instance

Before you enable the application-consistent snapshot feature for the ECS instance, you must configure the required RAM role for the instance.

1. Log on to the [RAM console](#) by using your Alibaba Cloud account.
2. Create a RAM role for the application-consistent snapshot feature. For more information, see [Create a RAM role for a trusted Alibaba Cloud service](#).

The following figure shows how to create the AppSnapshotRoleName RAM role.

Create RAM Role

1 Select Role Type — 2 Configure Role — 3 Finish

Select Type of Trusted Entity

Alibaba Cloud Service

Role Type

☒ Normal Service Role ☐ Service Linked Role

* RAM Role Name

AppSnapshotRoleName

The name can contain a maximum of 64 characters, only English letters, numbers, and hyphens (-) are accepted.

Note

* Select Trusted Service

Elastic Compute Service

3. Create a permission policy for the application-consistent snapshot feature. For more information, see [Create a custom policy](#).

* Policy Name

AppSnapshotPolicy

Note

Configuration Mode

☐ Visualized ☒ Script

Policy Document

Import an existing system policy

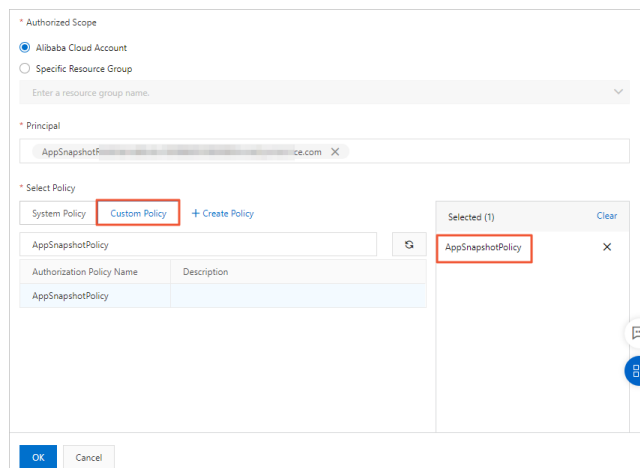
```
1 {
2   "Version": "1",
3   "Statement": [
4     {
5       "Effect": "Allow",
6       "Action": [
7         "ecs:DescribeSnapshot*",
8         "ecs:CreateSnapshot*",
9         "ecs:TagResources",
10        "ecs:DescribeDisks"
11      ],
12      "Resource": [
13        "*"
14      ],
15      "Condition": {}
16    }
17  ]
18 }
```

OK Return

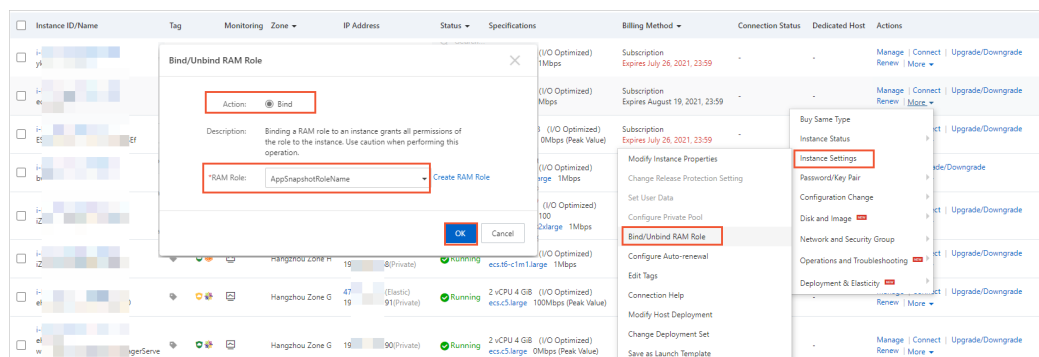
Create the AppSnapshotPolicy policy to grant permissions to query snapshot details, create snapshots, configure tags, and query disk details. You can use the following policy:

```
{
  "Version": "1",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecs:DescribeSnapshot*",
        "ecs:CreateSnapshot*",
        "ecs:TagResources",
        "ecs:DescribeDisks"
      ],
      "Resource": [
        "*"
      ],
      "Condition": {}
    }
  ]
}
```

4. Attach the AppSnapshotPolicy policy to the AppSnapshotRoleName RAM role. For more information, see [Grant permissions to a RAM role](#).



5. Attach the AppSnapshotRoleName RAM role to the ECS instance. For more information, see [Attach an instance RAM role to an ECS instance](#).



Step 4: Call the TestPIT stored procedure in the database

This section describes how to call the stored procedure before you create application-consistent snapshots for the instance, so that you can check afterward whether your application was frozen and whether the snapshots can be used as expected to restore data.

1. Log on to MySQL.

Enter the following command, press the Enter key, and then enter your MySQL password as prompted:

```
mysql -u <mysqlUserName> -p
```


Replace `<mysqlUserName>` with your MySQL username.

2. Switch to the AdventureWorks database.

```
USE AdventureWorks;
```

3. Call the TestPIT stored procedure.

```
CALL TestPIT;
```

 **Note** You must create application-consistent snapshots during the 3 minute window it takes for TestPIT to run.

Step 5: Create application-consistent snapshots in the ECS console

This section describes how to create application-consistent snapshots for the instance that hosts MySQL in the ECS console.

1. Go to the Instances page in the ECS console.
 - i.
 - ii.
 - iii.
2. Find the instance for which you want to enable the application-consistent snapshot feature and choose **More > Disk and Image > Create Snapshot-consistent Group** in the Actions column.
3. In the **Create Snapshot-consistent Group** dialog box, configure parameters to create a snapshot-consistent group and enable the instant access feature.
 - For more information about the parameters, see [Create a snapshot-consistent group](#).
 - For more information about the instant access feature, see [Enable or disable the instant access feature](#).
4. In the **Create Snapshot-consistent Group** dialog box, configure parameters in the Application-consistent Snapshot section.

Select **Enable Application-consistent Snapshot** and specify the Application Pre-freeze Script Path and Application Pre-freeze Script Path parameters. Make sure that your specified paths are consistent with those of the scripts created in Step 2. For more information about the scripts, see [Step 2: Create application pre-freeze and post-thaw scripts](#).

Snapshot speed available:

☒ Enable Instant Access

Snapshots that have this feature enabled can be used to create and roll back disks immediately. However, you are charged for using the feature. For more information about billing, see [Snapshots](#).

Snapshot Speed Available


1

Days

Duration:

If you do not specify a retention period, the snapshot is permanently retained. You must manually release the snapshot.

Application-consistent

☒ Enable Application-consistent Snapshot 

Snapshot:



When you enable the application-consistent snapshot feature, [Cloud Assistant plug-ins](#) are automatically installed. For Linux instances, you must [upload the script to the specified path within guest OS](#) before you enable the feature. Otherwise, file system-consistent snapshots are created.

Before you enable the application-consistent snapshot feature on an instance, make sure that the instance has the permissions of the corresponding RAM role. [Learn More](#)

Linux instance parameter settings

For Linux systems, application freezing and thawing scripts must be executed in pairs or in conjunction with the following file system thawing and thawing operations.



Application Pre-freeze Script Path

 You must call this script before a snapshot is created to make sure that the application data is read-only before and when you create a snapshot. 

/tmp/prescript.sh

You must name the pre-freeze script as prescript.sh and upload it to the preceding path within the ECS instance before you create the snapshot.

Application Post-thaw Script Path

 Resume writing application data after a snapshot is created. 

/tmp/postscript.sh

You must name the pre-freeze script as postscript.sh and upload it to the preceding path within the ECS instance before you create the snapshot.

☒ Enable File System Freeze and Thaw

Timeout Period:

16

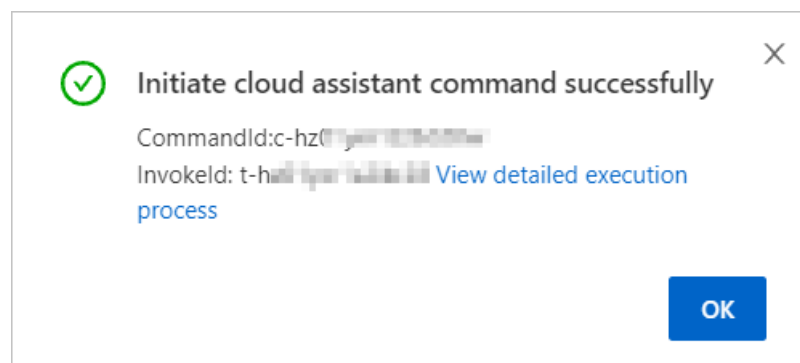
Seconds

OK

Cancel

5. Click **OK**.

After the snapshot-consistent group is created, a message is displayed and indicates the Cloud Assistant command ID and the execution ID, as shown in the following figure. You can check whether application-consistent snapshots are created based on the execution ID.



Step 6: Check whether application-consistent snapshots are created

This section describes how to check whether application-consistent snapshots are created and how to check whether insert operations are suspended for the database.

1. On the **Cloud Assistant** page, view the command execution results.
 - i.
 - ii.
 - iii. Click the **Command Execution Result** tab.
 - iv. Find the execution ID obtained in the previous step and click it to view the execution results.

The screenshot shows the 'Command Execution Results' interface. At the top, there are tabs for 'Instances' and 'Command'. Below the tabs, a summary bar shows 'Total (1)', 'Task Completed (1)', 'Task Failed (0)', and 'Task Running (0)'. A table lists the execution results with columns: Instance ID/Name, Status, IP Address, Execution Time, and Exit Code. One entry is shown with a status of 'Successful' and an 'Exit Code' of '0'. Below the table, the command output is displayed in a dark box with white text. The output includes several log messages, with one line highlighted in red: '[level=info][time=2021-08-03 18:58:41.676752828][message=Take AppConsistent snapshots successfully]'.

If application-consistent snapshots are created, the return value of **ExitCode** is `0`, and the IDs of the created application-consistent snapshots and snapshot-consistent group are displayed in the command output, as shown in the preceding figure.

Note If the return value of **ExitCode** is not `0`, an error has occurred. Troubleshoot the error based on the returned error code in the **ExitCode** column. For more information, see [Error codes](#).

2. View the time when the application was frozen in the return data.

In the return data, find the time when the application pre-freeze script began to run and the time when the application post-thaw script finished running.

- In this example, the application pre-freeze script began to run at `2021-08-03 18:58:41`.

```
[
[level="info"][time="2021-08-03 18:58:41.878228775"][message="AppConsistent Snap
shots with Pre/Post-Script Enabled"]
[level="info"][time="2021-08-03 18:58:41.878238684"][message="Start to Execute P
reScript /tmp/prescript.sh"]
[output="
*****
[INFO]:Begin to freeze mysql.
/usr/bin/mysql
Id      User      Host      db          Command Time      State      Info
2       root      localhost AdventureWorks Sleep      1822      NULL
11      root      localhost AdventureWorks Query      1          User sleep      S
ELECT SLEEP(1)
12      root      localhost NULL        Query      0          starting      show pro
cesslist
[INFO]:Try to execute flush tables command
[INFO]:Flush tables command execute success
Id      User      Host      db          Command Time      State      Info
```

- In this example, the application post-thaw script finished running at 2021-08-03 18:58:44 .

```

al read lock      INSERT INTO PointInTime VALUES(i, now())
14      root      localhost      NULL      Query      3      User sleep      select 1
and sleep(25)
16      root      localhost      NULL      Query      0      starting      show pro
cesslist
[INFO]:Try to stop sql process 14.
[INFO]:Stop sql process 14 success.
[INFO]:Finish thaw mysql.
[INFO]:mysql unfreeze result is 0.
"]
[level="info"][time="2021-08-03 18:58:44.224914208"][message="Execute PostScript
Successfully"]
[level="info"][time="2021-08-03 18:58:44.410140607"][message="Tag snapshots with
AppConsistent"]
[level="info"][time="2021-08-03 18:58:44.410188176"][message="Take AppConsistent
snapshots successfully"]
[level="info"][time="2021-08-03 18:58:44.410220482"][message="Prescript cost=1.0
31426913s, Postscript cost=20.807753ms"]
[level="info"][time="2021-08-03 18:58:44.410239167"][message="Prepare Freeze=8.8

```

3. On the **Snapshots** page, view the created snapshot-consistent group and disk snapshots.
 - i.
 - ii. Click the **Snapshot-consistent Group** tab, find the snapshot-consistent group that you created, and then click the group ID to view the details of the snapshot-consistent group.
 - iii. In the **Cloud disk snapshot** section, click the ID of a snapshot.
 - iv. On the **Snapshots** tab, check based on tags whether application-consistent snapshots are created for the disks on the ECS instance.

If application-consistent snapshots are created, the `APPConsistent:True` tag is displayed in the Tag column corresponding to the snapshots, as shown in the following figure.

Snapshot ID/Name	Tag	Snapshot Type	Snapshot Source	Instant Access
AppConsistent:True, ETag:MTVzN...	Edit Tags	Normal Snapshot	Custom Snapshot	Expires At September 14, 2021, 18:32

4. Connect to the MySQL database to view the time when insert operations were suspended.

- i. Connect to the ECS instance.
- ii. Log on to MySQL.

Enter the following command, press the Enter key, and then enter your MySQL password as prompted:

```
mysql -u <mysqlUserName> -p
```

Replace `<mysqlUserName>` with your MySQL username.

- iii. Query the content of the PointInTime table.

```
SELECT * FROM PointInTime;
```

The following execution results indicate that insert operations were suspended for the database while the application pre-freeze and post-thaw scripts were running.

29	2021-08-03 18:58:37
30	2021-08-03 18:58:38
31	2021-08-03 18:58:39
32	2021-08-03 18:58:40
33	2021-08-03 18:58:41
34	2021-08-03 18:58:45
35	2021-08-03 18:58:46
36	2021-08-03 18:58:47
37	2021-08-03 18:58:48
38	2021-08-03 18:58:49
39	2021-08-03 18:58:50

Step 7: Check whether application-consistent snapshots can be used as expected to restore data

Use application-consistent snapshots to restore data on the ECS instance. Then, check whether the last write time of MySQL data precedes the time when the application pre-freeze script started to run. If yes, the MySQL data was properly backed up in the application-consistent snapshots and is restored as expected on the ECS instance.

1. In the ECS console, use the snapshot-consistent group that you created to roll back data on the ECS instance.

For more information, see [Roll back disks by using a snapshot-consistent group](#).

2. Log on to MySQL and query the content of the PointInTime table.

- i. Connect to the ECS instance.
- ii. Log on to MySQL.

Enter the following command, press the Enter key, and then enter your MySQL password as prompted:

```
mysql -u <mysqlUserName> -p
```

Replace `<mysqlUserName>` with your MySQL username.

- iii. Query the content of the PointInTime table.

```
SELECT * FROM PointInTime;
```

Results similar to the following ones are returned.

25	2021-08-03 18:58:33
26	2021-08-03 18:58:34
27	2021-08-03 18:58:35
28	2021-08-03 18:58:36
29	2021-08-03 18:58:37
30	2021-08-03 18:58:38
31	2021-08-03 18:58:39
32	2021-08-03 18:58:40
+-----+ 32 rows in set (0.00 sec)	
mysql> █	


Insert operations were stopped before the database was frozen. In this example, after you use the application-consistent snapshots in the snapshot-consistent group that you created to restore data, the last write time to the MySQL database is `2021-08-03 18:58:40`. This time precedes the `2021-08-03 18:58:41` freezing time obtained in Step 5. Therefore, the application-consistent snapshots have properly backed up MySQL data.

5.6. Best practice for creating application-consistent snapshots for a Windows instance on which SQL Server is deployed

Disks can be rolled back based on application-consistent snapshots without corruption or loss of data. This ensures that applications such as SQL Server start in a consistent state and prevents log rollbacks on database startup. This topic describes how to create application-consistent snapshots for an Elastic Compute Service (ECS) Windows instance and how to check whether the snapshots can be used as expected to restore data. SQL Server is used in the examples.

Prerequisites


- An ECS instance that runs Windows Server 2019, Windows Server 2016, or Windows Server 2012 R2 is created.
- The disks of the ECS instance are enhanced SSDs (ESSDs) and the file systems are ext3, ext4, XFS, or New Technology File System (NTFS). Network file systems or shared file systems are not supported.
- The Cloud Assistant client is installed on the instance. For more information, see [Install the Cloud Assistant client](#).

 **Note** By default, the Cloud Assistant client is pre-installed on ECS instances that were created from public images after December 1, 2017.

- You are already familiar with how to install and use SQL Server. For more information, see the official SQL Server documentation.

Context

The following table describes the configurations of the verification environment used in this topic.

Configuration	Description
Instance type	ecs.g7.2xlarge
Operating system	Windows Server 2019 Datacenter Edition 64-bit (Chinese)
Disk	Enhanced SSDs (ESSDs)
Application	Microsoft SQL Server 2019 64-bit  Note For information about how to install and deploy Microsoft SQL Server, see the official documentation.

Procedure

1. [Step 1: Prepare a database verification environment](#)

2. [Step 2: Attach a Resource Access Management \(RAM\) role to the instance](#)
3. [Step 3: Create application-consistent snapshots in the ECS console](#)
4. [Step 4: Check whether application-consistent snapshots are created](#)
5. [Step 5: Check whether application-consistent snapshots can be used as expected to restore data](#)

Step 1: Prepare a database verification environment

Before you perform the following operations, make sure that Microsoft SQL Server 2019 64-bit is installed on the ECS instance. This section describes how to prepare a database verification environment on the instance.

1. Connect to the ECS instance.

For more information, see [Connection methods](#) [Guidelines on instance connection](#).

2. Connect to SQL Server.

- i. In the lower-left corner, click the Search icon and enter `ssms` in the search box.
- ii. Click **Microsoft SQL Server Management Studio 18**.
- iii. In the **Connect to Server** dialog box, configure server connection information and click **Connect**.

3. In **Microsoft SQL Server Management Studio 18**, create a test database named AdventureWorks.

- i. Click **New Query**.
- ii. In the query window that appears, enter the following SQL statement:

```
CREATE DATABASE AdventureWorks;
```

- iii. Right-click the query window and select **Execute**.

4. In **Microsoft SQL Server Management Studio 18**, create a test table named PointInTime.

- i. Click **New Query**.
- ii. In the query window that appears, enter the following SQL statements:

```
USE AdventureWorks
GO
IF NOT EXISTS (SELECT name FROM sysobjects WHERE name = 'PointInTime' AND TYPE = 'U'
)
CREATE TABLE PointInTime (PIT datetime)
WHILE ( 1 = 1 )
BEGIN
    INSERT PointInTime SELECT GETDATE()
    WAITFOR DELAY '00:00:001'
END
```

- iii. Right-click the query window and select **Execute**.

5. In the left-side directory tree, view the created database and table.

Step 2: Attach a Resource Access Management (RAM) role to the instance

Before you enable the application-consistent snapshot feature for an ECS instance, you must configure the required RAM role to the instance.

1. Log on to the [RAM console](#) by using your Alibaba Cloud account.
2. Create a RAM role for the application-consistent snapshot feature. For more information, see [Create a RAM role for a trusted Alibaba Cloud service](#).

The following figure shows how to create the AppSnapshotRoleName RAM role.

Create RAM Role

1 Select Role Type — 2 Configure Role — 3 Finish

Select Type of Trusted Entity
Alibaba Cloud Service

Role Type
☒ Normal Service Role ☐ Service Linked Role

* RAM Role Name
AppSnapshotRoleName

Note

* Select Trusted Service
Elastic Compute Service

3. Create a permission policy for the application-consistent snapshot feature. For more information, see [Create a custom policy](#).

* Policy Name
AppSnapshotPolicy

Note

Configuration Mode
☐ Visualized ☒ Script

Policy Document
Import an existing system policy

```

1  {
2    "Version": "1",
3    "Statement": [
4      {
5        "Effect": "Allow",
6        "Action": [
7          "ecs:DescribeSnapshot*",
8          "ecs:CreateSnapshot*",
9          "ecs:TagResources",
10         "ecs:DescribeDisks"
11        ],
12        "Resource": [
13          "*"
14        ],
15        "Condition": {}
16      }
17    ]
18  }

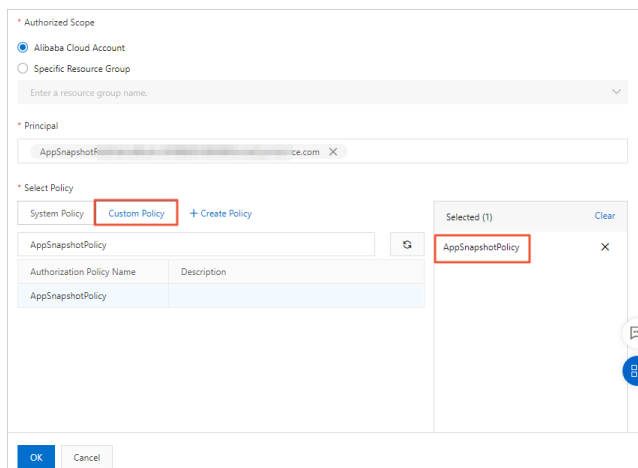
```

OK Return

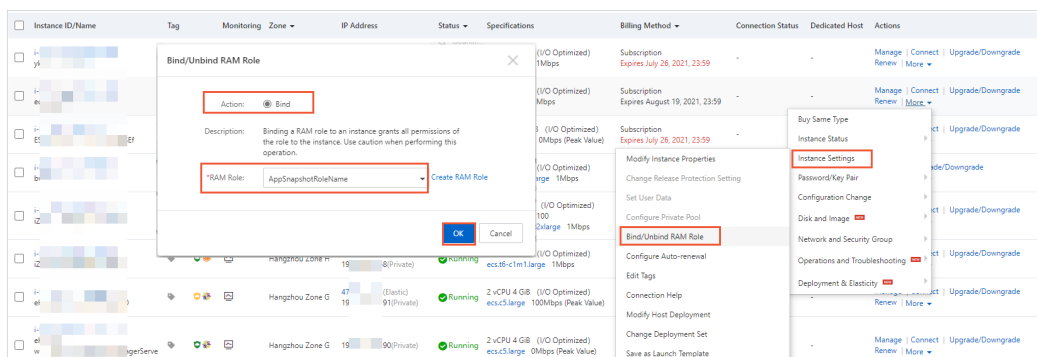
Create the AppSnapshotPolicy policy to grant permissions to query snapshot details, create snapshots, configure tags, and query disk details. You can use the following policy:

```
{
  "Version": "1",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "ecs:DescribeSnapshot*",
        "ecs:CreateSnapshot*",
        "ecs:TagResources",
        "ecs:DescribeDisks"
      ],
      "Resource": [
        "*"
      ],
      "Condition": {}
    }
  ]
}
```

4. Attach the AppSnapshotPolicy policy to the AppSnapshotRoleName RAM role. For more information, see [Grant permissions to a RAM role](#).



5. Attach the AppSnapshotRoleName RAM role to the ECS instance. For more information, see [Attach an instance RAM role to an ECS instance](#).



Step 3: Create application-consistent snapshots in the ECS console

This section describes how to create application-consistent snapshots for a Windows instance on which a SQL Server database resides in the ECS console.

1. Go to the Instances page in the ECS console.
 - i.
 - ii.
 - iii.
2. Find the instance for which you want to enable the application-consistent snapshot feature and choose **More > Disk and Image > Create Snapshot-consistent Group** in the Actions column.
3. In the **Create Snapshot-consistent Group** dialog box, configure parameters to create a snapshot-consistent group and enable the instant access feature.
 - For more information about the parameters, see [Create a snapshot-consistent group](#).
 - For more information about the instant access feature, see [Enable or disable the instant access feature](#).
4. In the **Create Snapshot-consistent Group** dialog box, select **Enable Application-consistent Snapshot** and **Whether Writer is included by default**.

Snapshot speed available: ☒ Enable Instant Access

Snapshots that have this feature enabled can be used to create and roll back disks immediately. However, you are charged for using the feature. For more information about billing, see [Snapshots](#)

Snapshot Speed Available Days

Duration: If you do not specify a retention period, the snapshot is permanently retained. You must manually release the snapshot.

Application-consistent Snapshot: ☒ Enable Application-consistent Snapshot ⓘ

When you enable the application-consistent snapshot feature, [Cloud Assistant plug-ins](#) are automatically installed. For Linux instances, you must [upload the script to the specified path within guest OS](#) before you enable the feature. Otherwise, file system-consistent snapshots are created.

Before you enable the application-consistent snapshot feature on an instance, make sure that the instance has the permissions of the corresponding RAM role. [Learn More](#)

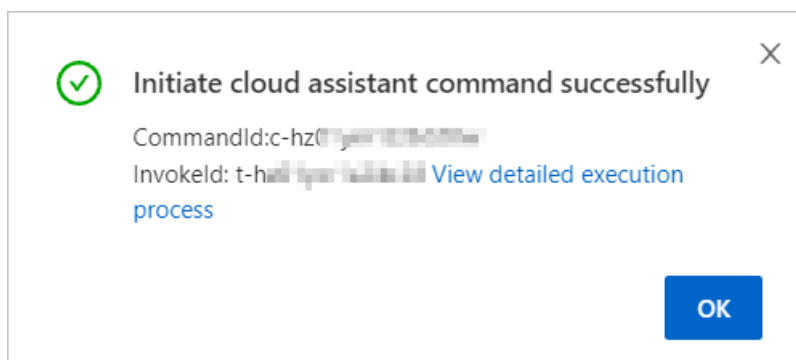
Windows Instance Parameters

By default, all existing writers within the system are selected. In some cases, the system can exclude writers provided by applications and instead force only file systems into a consistent state.

☒ Whether Writer is included by default

OK **Cancel**

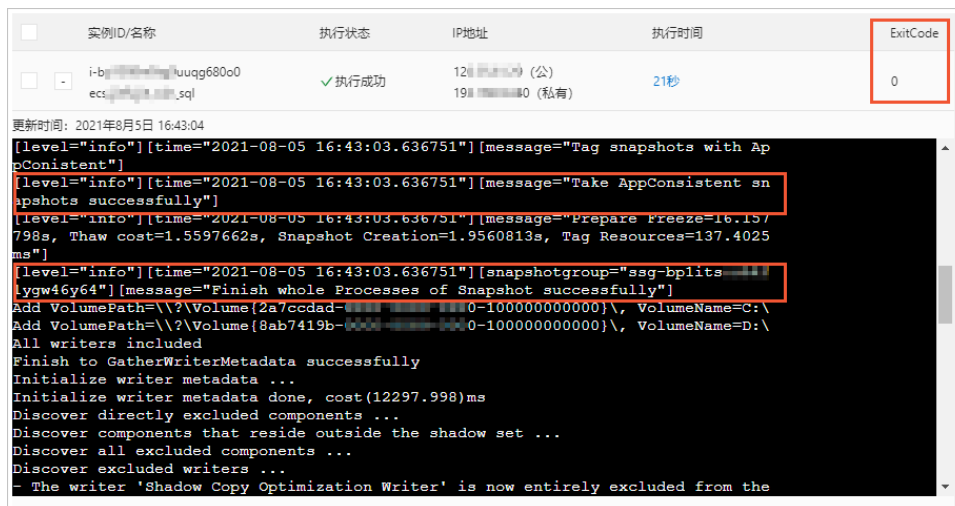
5. Click **OK**.
After the snapshot-consistent group is created, a message is displayed and indicates the Cloud Assistant command ID and the execution ID, as shown in the following figure. You can check whether application-consistent snapshots are created based on the execution ID.



Step 4: Check whether application-consistent snapshots are created

This section describes how to check whether application-consistent snapshots are created and how to check whether insert operations are suspended for the SQL Server database.

1. On the **Cloud Assistant** page, view the command execution results.
 - i.
 - ii.
 - iii. Click the **Command Execution Result** tab.
 - iv. Find the execution ID obtained in the previous step and click it to view the execution results.



If application-consistent snapshots are created, the return value of **ExitCode** is **0** and the IDs of the created application-consistent snapshots and snapshot-consistent group are displayed in the command output, as shown in the preceding figure.

Note If the return value of **ExitCode** is not **0**, an error has occurred. Troubleshoot the error based on the returned error code in the **ExitCode** column. For more information, see [Error codes](#).

2. In the command output, view the actions and information involved in the procedure to create the snapshot-consistent group.
 - o Check consistency components. If consistency components do not exist, they are automatically installed.

```

ifsg6x'...'f...cz8, Device=/dev/xvda, Category=cloud_essd"]
[level="info"][time="2021-08-05 16:42:43.8380118"][message="Required COM+ compon
ents are already installed"]
[level="info"][time="2021-08-05 16:42:43.8446377"][message="Provider version is
already latest"]
[level="info"][time="2021-08-05 16:42:43.8446377"][message="Start to Initialize
VSS Requestor ..."]
[level="info"][time="2021-08-05 16:42:43.8446377"][message="Prepare to Create sn
apshot set"]
[requestor="
"]
[level="info"][time="2021-08-05 16:42:59.9732143"][message="Create Snapshot Set
Successfully"]
[level="info"][time="2021-08-05 16:43:00.5274175"][message="SnapshotGroup, reque
stId=EF85CDE0-0411-56A1-...C38E457AE, GroupId=ssg-bplit...lygw46y64, Cos
t:554.192ms"]
[level="info"][time="2021-08-05 16:43:01.9293351"][message="Finished Quering Sna
pshotGroup Progress"]
[level="info"][time="2021-08-05 16:43:01.9293351"][message="Finish SnapshotGroup
=ssg-bplits-...lygw46y64 Creation, TotalCost=1.9560813s, QueryCost=1.4018893s"]
  
```

- o Automatically recognize and load logical volumes.

```

apshots successfully"]
[level="info"][time="2021-08-05 16:43:03.636751"][message="Prepare Freeze=16.157
798s, Thaw cost=1.5597662s, Snapshot Creation=1.9560813s, Tag Resources=137.4025
ms"]
[level="info"][time="2021-08-05 16:43:03.636751"][snapshotgroup="ssg-bplite-lyq
w46y64"][message="Finish whole Processes of Snapshot successfully"]
Add VolumePath=\\?\\Volume{2a7ccdad-0000-100000000000}\\, VolumeName=C:\\
Add VolumePath=\\?\\Volume{8ab7419b-0000-100000000000}\\, VolumeName=D:\\
All writers included
Finish to GatherWriterMetadata successfully
Initialize writer metadata ...
Initialize writer metadata done, cost(12297.998)ms
Discover directly excluded components ...
Discover components that reside outside the shadow set ...
Discover all excluded components ...
Discover excluded writers ...
- The writer 'Shadow Copy Optimization Writer' is now entirely excluded from the
backup:
(it does not contain any components that can be potentially included in the ba
ckup)

```

- o Automatically add the corresponding SQL Server database.

```

- Add component \WriterMetadataStore
* Writer 'Performance Counters Writer':
- Add component \PerformanceCounters
* Writer 'System Writer':
- Add component \System Files
- Add component \Win32 Services Files
* Writer 'SqlServerWriter':
- Add component \ecs\master
- Add component \ecs\model
- Add component \ecs\msdb
- Add component \ecs\AdventureWorks
* Writer 'ASR Writer':
- Add component \ASR\ASR
- Add component \Volumes\Volume{2a7ccdad-0000-100000000000}
- Add component \Volumes\Volume{8ab7419b-0000-100000000000}
- Add component \Disks\harddisk0
- Add component \Disks\harddisk1
- Add component \BCD\BCD
* Writer 'Registry Writer':
- Add component \Registry

```

- o The time when snapshots were frozen is 2021-08-05 16:42:59 .

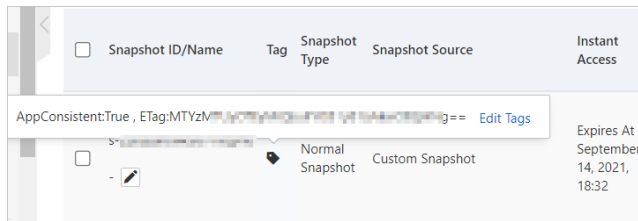
```

[level="info"][time="2021-08-05 16:42:43.8446377"][message="Provider version is
already latest"]
[level="info"][time="2021-08-05 16:42:43.8446377"][message="Start to Initialize
VSS Requestor ..."]
[level="info"][time="2021-08-05 16:42:43.8446377"][message="Prepare to Create sn
apshot set"]
[requestor=""]
[level="info"][time="2021-08-05 16:42:59.9732143"][message="Create Snapshot Set
Successfully"]
[level="info"][time="2021-08-05 16:43:00.5274175"][message="SnapshotGroup, requ
estId=EF85CDE0-679C38E457AE, GroupId=ssg-bplite-lyq-w46y64, Cos
t:554.192ms"]
[level="info"][time="2021-08-05 16:43:01.9293351"][message="Finished Quering Sna
pshotGroup Progress"]
[level="info"][time="2021-08-05 16:43:01.9293351"][message="Finish SnapshotGroup
=ssg-bplite-lyq-w46y64 Creation, TotalCost=1.9560813s, QueryCost=1.4018893s"]
[level="info"][time="2021-08-05 16:43:01.9293351"][message="Prepare to Thaw File
System or Applications"]

```

3. On the **Snapshots** page, view the created snapshot-consistent group and disk snapshots.
 - i.
 - ii. Click the **Snapshot-consistent Group** tab, find the snapshot-consistent group that you created, and then click the group ID to view the details of the snapshot-consistent group.
 - iii. In the **Cloud disk snapshot** section, click the ID of a snapshot.

- If application-consistent snapshots are created, the `APPConsistent:True` tag is displayed in the Tag column corresponding to the snapshots, as shown in the following figure.



- ```
USE AdventureWorks
select * from PointInTime
GO
```

- |     | PIT                     |
|-----|-------------------------|
| 94  | 2021-08-05 16:42:53.913 |
| 95  | 2021-08-05 16:42:54.930 |
| 96  | 2021-08-05 16:42:55.940 |
| 97  | 2021-08-05 16:42:56.963 |
| 98  | 2021-08-05 16:42:57.980 |
| 99  | 2021-08-05 16:42:59.003 |
| 100 | 2021-08-05 16:43:02.957 |
| 101 | 2021-08-05 16:43:03.973 |
| 102 | 2021-08-05 16:43:04.980 |
| 103 | 2021-08-05 16:43:05.990 |
| 104 | 2021-08-05 16:43:06.997 |
| 105 | 2021-08-05 16:43:08.017 |
| 106 | 2021-08-05 16:43:09.030 |

Use application-consistent snapshots to restore data on the ECS instance. Then, check whether the last write time of SQL Server data precedes the time when the application pre-freeze script was executed. If yes, the SQL Server data was properly backed up in the application-consistent snapshots and is restored as expected on the ECS instance.

- > Document Version: 20220624

For more information, see [Roll back disks by using a snapshot-consistent group](#).

2. Log on to SQL Server and query the content of the PointInTime table.
  - i. Connect to the ECS instance.
  - ii. Use **Microsoft SQL Server Management Studio 18** to connect to the SQL Server database.
  - iii. Click **New Query**.
  - iv. In the query window that appears, enter the following SQL statements:

```
USE AdventureWorks
select * from PointInTime
GO
```

- v. Right-click the query window and select **Execute**.
- vi. View the query results. In the query results, you can find the last write time to the SQL Server database after data is restored.

|    | PIT                     |
|----|-------------------------|
| 86 | 2021-08-05 16:42:45.833 |
| 87 | 2021-08-05 16:42:46.847 |
| 88 | 2021-08-05 16:42:47.850 |
| 89 | 2021-08-05 16:42:48.853 |
| 90 | 2021-08-05 16:42:49.867 |
| 91 | 2021-08-05 16:42:50.877 |
| 92 | 2021-08-05 16:42:51.893 |
| 93 | 2021-08-05 16:42:52.897 |
| 94 | 2021-08-05 16:42:53.913 |
| 95 | 2021-08-05 16:42:54.930 |
| 96 | 2021-08-05 16:42:55.940 |
| 97 | 2021-08-05 16:42:56.963 |
| 98 | 2021-08-05 16:42:57.980 |

Insert operations have been stopped before the database was frozen. In this example, after you use the application-consistent snapshots in the snapshot-consistent group that you created to restore data, the last write time to the SQL Server database is 2021-08-05 16:42:57.980. This time precedes the 2021-08-05 16:42:59.9732143 freezing time obtained in Step 4. Application-consistent snapshots have properly backed up SQL Server data.



# 6. Automatic snapshot policies

## 6.1. Overview

Elastic Compute Service (ECS) uses automatic snapshot policies to periodically create automatic snapshots and back up data stored on system and data disks. You can use automatic snapshot policies to improve data security and fault tolerance.

### Use scenarios

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

You can also specify an automatic snapshot policy to create snapshots before you perform regular system maintenance tasks. This ensures that snapshots are created and eliminates the need to manually create snapshots.

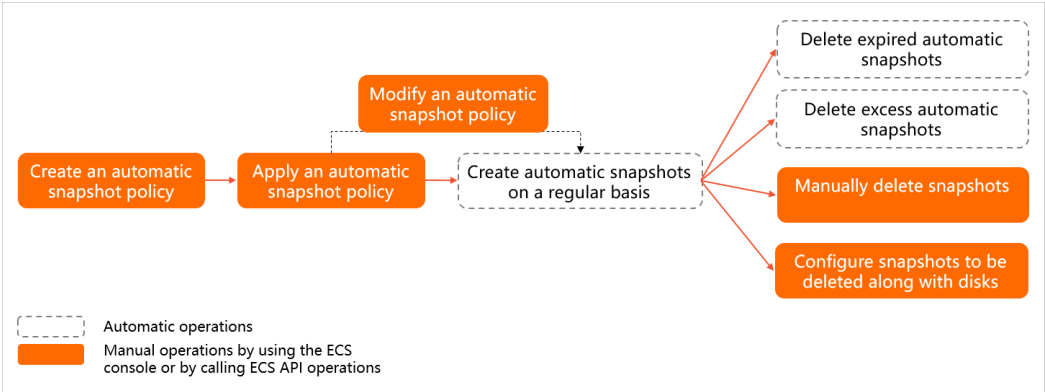
### Limits

When you use automatic snapshot policies, take note of the following items:

- For information about the quota of automatic snapshot policies per region for an Alibaba Cloud account and the maximum number of automatic snapshots that can be retained for a disk, see the "Snapshot limits" section in [Limits](#).
- If the maximum number of automatic snapshots has been reached, the oldest automatic snapshot is automatically deleted when a new automatic snapshot is created.
- If you modify the retention period of automatic snapshots in an automatic snapshot policy, the modification is applied to subsequent snapshots but not to existing snapshots.
- 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.
- If a snapshot is being manually or automatically created at a scheduled point in time of an automatic snapshot policy, the automatic snapshot policy does not create an automatic snapshot at this scheduled point in time.
- When an automatic snapshot is being created for a disk, manual snapshots cannot be created for the disk.

### Common operations

The following figure shows the common operations that you can perform for automatic snapshots from the time when an automatic snapshot policy is created to the time when the automatic snapshots are released.



| Operation                                     | Description                                                                                                                    | References                                                                                                                    |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Create an automatic snapshot policy           | Create an automatic snapshot policy and specify in it when to create automatic snapshots and how long to retain the snapshots. | <ul style="list-style-type: none"><li>Create an automatic snapshot policy</li><li>CreateAutoSnapshotPolicy</li></ul>          |
| Apply an automatic snapshot policy            | Apply an automatic snapshot policy to a disk to automatically create snapshots for the disk on a regular basis.                | <ul style="list-style-type: none"><li>Apply or disable an automatic snapshot policy</li><li>ApplyAutoSnapshotPolicy</li></ul> |
| Modify an automatic snapshot policy           | Modify the information of an automatic snapshot policy, such as the creation time and retention period of automatic snapshots. | <ul style="list-style-type: none"><li>Modify an automatic snapshot policy</li><li>ModifyAutoSnapshotPolicyEx</li></ul>        |
| Create automatic snapshots on a regular basis | ECS creates snapshots on a regular basis based on automatic snapshot policies.                                                 | None                                                                                                                          |

| Operation                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | References                                                                                                                                                                                                                                             |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Release automatic snapshots | <p>Automatic snapshots can be deleted by using one of the following methods:</p> <ul style="list-style-type: none"><li>• Automatic deletion:<ul style="list-style-type: none"><li>◦ When the retention period specified in the associated automatic snapshot policy for an automatic snapshot ends, the snapshot is deleted.</li><li>◦ If the maximum number of automatic snapshots has been reached, the oldest automatic snapshot is deleted when a new automatic snapshot is created.</li><li>◦ After Delete Automatic Snapshots While Releasing Disk is enabled for a disk, the automatic snapshots of the disk are deleted when the disk is released.</li></ul></li><li>• Manual deletion: You can manually specify and delete automatic snapshots.</li></ul> | <ul style="list-style-type: none"><li>• <a href="#">Delete automatic snapshots while releasing a disk</a></li><li>• <a href="#">ModifyDiskAttribute</a></li><li>• <a href="#">Delete a snapshot</a></li><li>• <a href="#">DeleteSnapshot</a></li></ul> |

## 6.2. Create an automatic snapshot policy

This topic describes how to create an automatic snapshot policy in the Elastic Compute Service (ECS) console.


### Prerequisites

The snapshot service is activated. For more information, see [Activate ECS Snapshot](#).

### Procedure

- 1.
- 2.
- 3.
4. On the **Snapshots** page, click the **Automatic Snapshot Policies** tab.
5. In the upper-right corner of the **Automatic Snapshot Policies** tab, click **Create Policy**.
6. In the **Create Policy** dialog box, specify the parameters described in the following table.

| Parameter   | Description                                |
|-------------|--------------------------------------------|
| <b>Name</b> | The name of the automatic snapshot policy. |

| Parameter                              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Executed At                            | <p>The hours of the day at which to create automatic snapshots. You can select one or more hours from 00:00 to 23:00.</p> <div>  <b>Note</b> When a snapshot is created for an Elastic Block Storage (EBS) device, the I/O performance of the device can degrade by as much as 10%. This can result in a brief I/O speed decrease. We recommend that you create automatic snapshots during off-peak hours. </div>                                              |
| Execution Frequency                    | The days of the week on which to create automatic snapshots. You can select one or more days from Monday to Sunday.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Keep Snapshots                         | <p>The retention period of automatic snapshots. The default retention period is 30 days. The following options are available:</p> <ul style="list-style-type: none"> <li>◦ <b>Keep For:</b> Specify a retention period for automatic snapshots. Unit: days. Valid values: 1 to 65536.</li> <li>◦ <b>Always Keep:</b> After the maximum number of automatic snapshots for a disk is reached, the earliest snapshot is deleted when a new snapshot is created.</li> </ul>                                                                         |
| Tag                                    | <p>The tags. Automatic snapshots created based on the automatic snapshot policy have the specified tags added. Select existing tag keys and values, or enter new tag keys and values. For more information about tags, see <a href="#">Overview</a>.</p> <p>You can modify the tags of an automatic snapshot policy after the policy is created. For more information, see <a href="#">Edit the tags of an automatic snapshot policy</a>.</p>                                                                                                   |
| Resource Group                         | The resource group to which to assign the automatic snapshot policy. For more information about resource groups, see <a href="#">Resource groups</a> .                                                                                                                                                                                                                                                                                                                                                                                          |
| Cross-Region Replication for Snapshots | <p>If the Cross-Region Replication for Snapshots feature is enabled, automatic snapshots that are created based on the automatic snapshot policy are copied to a specified destination region.</p> <p>After you select <b>Enabled</b>, you must specify the <b>Destination Region</b> and <b>Retention Time of Snapshot Copies</b> parameters.</p> <p>For information about regions that support cross-region snapshot replication and billing rules of snapshot copies, see <a href="#">Copy a snapshot</a> and <a href="#">Snapshots</a>.</p> |
| Destination Region                     | The region to which to copy snapshots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Retention Time of Snapshot Copies      | <p>The retention period of snapshot copies in the destination region.</p> <ul style="list-style-type: none"> <li>◦ <b>Keep For:</b> Specify a retention period for snapshot copies. Unit: days. Valid values: 1 to 65536.</li> <li>◦ <b>Always Keep Snapshots Regardless of the Limit of Snapshots:</b> Snapshot copies are retained in the destination region until they are deleted.</li> </ul>                                                                                                                                               |

7. Click **OK**.

## What's next

We recommend that you specify disks to execute an automatic snapshot policy immediately after the policy is created. For more information, see [Apply or disable an automatic snapshot policy](#).

## Related information

- [CreateAutoSnapshotPolicy](#)

# 6.3. 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.
- 2.
- 3.
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.

Create Automatic Snapshot Policy

After you have applied the policy, the system will automatically create snapshots based on your settings, including the creation time, frequency, and snapshot storage duration.

Disks without Policy Applied    Disks with Policy Applied

|                          |                     |                    |                     |             |              |
|--------------------------|---------------------|--------------------|---------------------|-------------|--------------|
| <input type="checkbox"/> | d-bp1-...np2iodx9l  | i-bp1-...cgw0e6g1q | Ultra Disk<br>40GiB | System Disk | Apply Policy |
| <input type="checkbox"/> | d-bp1-...0d3sbpxap  | i-bp1-...5219qfxp  | Ultra Disk<br>40GiB | System Disk | Apply Policy |
| <input type="checkbox"/> | d-bp1-...nycmi4voqy | i-bp1-...g3pgjez   | Ultra Disk<br>20GiB | Data Disk   | Apply Policy |
| <input type="checkbox"/> | d-bp1-...xqcut6dix  | i-bp1-...g3pgjez   | Ultra Disk<br>40GiB | System Disk | Apply Policy |
| <input type="checkbox"/> | d-bp1-...4dsebz3p6r | i-bp1-...k818a03k  | Ultra Disk<br>40GiB | System Disk | Apply Policy |

Cancel

- 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.

Create Automatic Snapshot Policy

After you have applied the policy, the system will automatically create snapshots based on your settings, including the creation time, frequency, and snapshot storage duration.

Disks without Policy Applied    **Disks with Policy Applied**

Disk Name    Search by disk name.    Search

| <input type="checkbox"/> | ID/Name          | Instance ID/Name | Disk Type(All) | Type(All) | Actions        |
|--------------------------|------------------|------------------|----------------|-----------|----------------|
| <input type="checkbox"/> | d-bp1-...w64udjx | -                | SSD<br>20GiB   | Data Disk | Disable Policy |

Disable Policy

Total: 1 item(s), Per Page: 20 item(s)    << < 1 > >>

Cancel

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.
- 2.
3. In the upper-right corner of the Instances page, click **Create Instance**. For more information about how to create an ECS instance, see [Create an instance by using the wizard](#).

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.

The screenshot shows the 'Storage' configuration page in the ECS console. It is divided into two sections: 'System Disk' and 'Data Disk'. In the 'System Disk' section, the disk type is 'Enhanced SSD (ESSD)', size is '40 GiB', and performance level is 'PL1 (up to 50,000 IOPS per disk)'. The 'Disk Backup' checkbox is checked, and a dropdown menu for selecting a snapshot policy is highlighted with a red box. Below it, a button 'Create Automatic Snapshot Policy' is visible. In the 'Data Disk' section, the disk type is also 'Enhanced SSD (ESSD)', size is '40 GiB', and performance level is 'PL1 (up to 50,000 IOPS per disk)'. The 'Disk Backup' checkbox is also checked, and a similar dropdown menu for selecting a snapshot policy is highlighted with a red box, with the 'Create Automatic Snapshot Policy' button below it. There is also an 'Add Disk' button at the bottom.

## 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.
- 2.
3. In the upper-right corner of the Disks page, click **Create Disk**. For more information about how to create a disk, see [Create a disk](#) or [Create a subscription disk](#).

Select **Disk Backup** and then select an automatic snapshot policy.

The screenshot shows the 'Storage' configuration page in the ECS console for creating a new disk. The disk type is 'Enhanced SSD (ESSD)', size is '100 GiB', and performance level is 'PL1 (up to 50,000 IOPS per disk)'. The 'Disk Backup' checkbox is checked, and a dropdown menu for selecting a snapshot policy is highlighted with a red box. Below it, a button 'Create Automatic Snapshot Policy' is visible. There is also a 'Create from Snapshot' button and a 'Disk Encryption' checkbox.

## 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.
- 2.
- 3.

- Find the target disk and click **Apply or Disable Automatic Snapshot Policy** in the **Actions** column.
- In the **Apply or Disable Automatic Snapshot Policy** dialog box that appears, turn on or off **Automatic Snapshot Policy**.

Apply or Disable Automatic Snapshot Policy

After an automatic snapshot policy is applied, the system automatically creates snapshots based on the policy settings, including the Executed At, Execution Frequency, and Keep Snapshots parameter settings.

Automatic Snapshot Policy: ☒

Name:  [Create Policy](#)

Executed At: 00:00

Execution Frequency: Sunday

Keep Snapshots: 30Days

[OK](#) [Cancel](#)

- 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.

Snapshots

Snapshots

Snapshot Chains

Automatic Snapshot Policies

Snapshot Size

- The snapshot service has been released in Alibaba Cloud China regions on March 28, 2017. For more information, log on to the console. You will be notified of the release of the snapshot service at a later time. The snapshot service they are currently using will not be affected.
- After the snapshot service has been released, you can delete all of your snapshots and automatic snapshot policies to avoid fees incurred.
- If you have already created automatic snapshot policies of ECS Snapshot 2.0, snapshots created based on these policies will be billed at the standard Block Storage price.

Auto Snapshot Policy ID

Enter an automatic snapshot policy ID

Search

Tag

| Name      | Auto Snapshot Policy ID | Tag | Details                                                                     | Applied Disks |
|-----------|-------------------------|-----|-----------------------------------------------------------------------------|---------------|
| SnapshotP | sp-bp                   |     | Executed At: 00:00<br>Execution Frequency: Sunday<br>Keep Snapshots: 30Days | 1             |



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 information

- [ApplyAutoSnapshotPolicy](#)
- [CancelAutoSnapshotPolicy](#)
- [CreateDisk](#)
- [RunInstances](#)

# 6.4. Delete automatic snapshots while releasing a disk

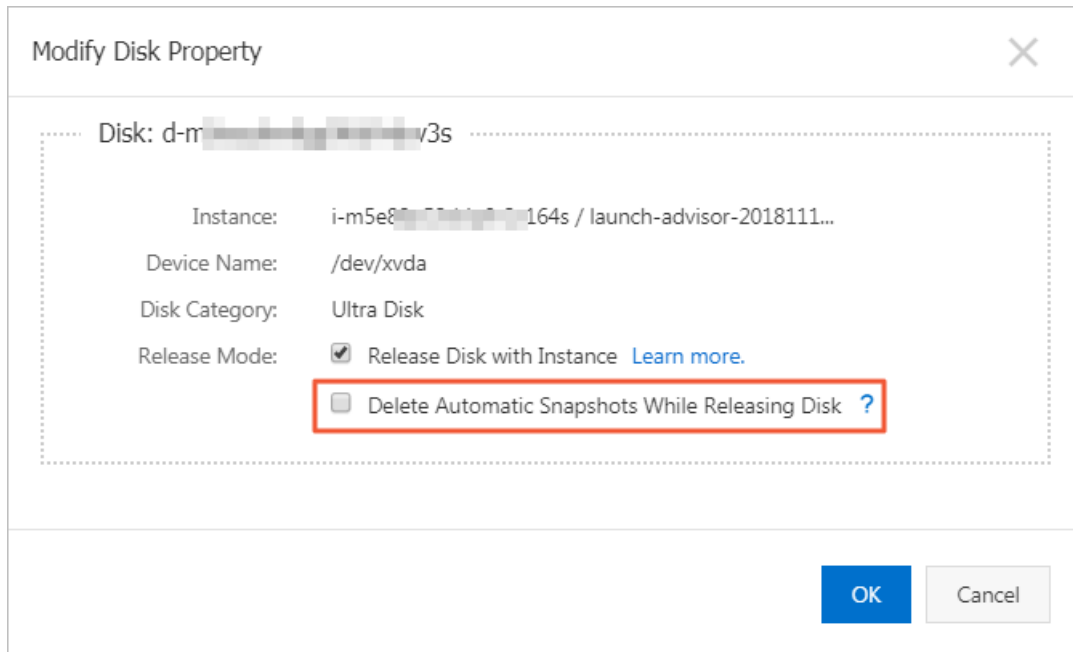
You can enable the Delete Automatic Snapshots While Releasing Disk feature to delete automatic snapshots of a disk when the disk is released and reduce the amount of disk space occupied by snapshots.

## Prerequisites

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

## Procedure

- 1.
- 2.
- 3.
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**.



Modify Disk Property

Disk: d-m...v3s

Instance: i-m5e8...164s / launch-advisor-2018111...


Device Name: /dev/xvda

Disk Category: Ultra Disk

Release Mode:

- ☒ Release Disk with Instance [Learn more.](#)
- ☐ Delete Automatic Snapshots While Releasing Disk ?

OK Cancel

 **Note** After 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 information

- [ModifyDiskAttribute](#)

# 6.5. 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

At least one automatic snapshot policy is created. For more information, see [Create an automatic snapshot policy](#).

## Procedure

- 1.
- 2.
- 3.
4. On the **Snapshots** page, click the **Automatic Snapshot Policies** tab.
5. On the **Automatic Snapshot Policies** tab, find the automatic snapshot policy that you want to modify and click **Modify Policy** in the **Actions** column.

6. In the **Modify Policy** dialog box, configure the parameters for the automatic snapshot policy.

| Parameter                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Name</b>                                   | The name of the automatic snapshot policy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Executed At</b>                            | <p>The hour of the day at which to create automatic snapshots. You can select one or more hours from 00:00 to 23:00.</p> <div><p> <b>Note</b> When a snapshot is being created, the I/O performance of Elastic Block Storage devices degrades by up to 10%. This can result in a transient I/O speed decrease. We recommend that you create automatic snapshots during off-peak hours.</p></div>                                      |
| <b>Execution Frequency</b>                    | The days of the week on which to create automatic snapshots. You can select one or more days from Monday to Sunday.                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Keep Snapshots</b>                         | <p>The retention period of the automatic snapshots. The default retention period is 30 days. The following options are available:</p> <ul style="list-style-type: none"><li>◦ <b>Keep For:</b> Specify the retention period of the snapshots. Unit: days. Valid values: 1 to 65536.</li><li>◦ <b>Always Keep:</b> If the maximum number of automatic snapshots for a disk is reached, the earliest snapshot created based on the automatic snapshot policy is deleted when a new snapshot is created.</li></ul>        |
| <b>Cross-Region Replication for Snapshots</b> | <p>If the Cross-Region Replication for Snapshots feature is enabled, automatic snapshots that are created based on the automatic snapshot policy are copied to the destination region.</p> <p>After you select <b>Enabled</b>, you must specify the <b>Destination Region</b> and <b>Retention Time of Snapshot Copies</b> parameters.</p> <p>For information about regions that support snapshot copying and billing rules of snapshot copies, see <a href="#">Copy a snapshot</a> and <a href="#">Snapshots</a>.</p> |
| <b>Destination Region</b>                     | The region to which to copy the snapshots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Retention Time of Snapshot Copies</b>      | <p>The retention period of snapshot copies within the destination region.</p> <ul style="list-style-type: none"><li>◦ <b>Keep For:</b> Specify the retention period of the snapshots. Unit: days. Valid values: 1 to 65536.</li><li>◦ <b>Always Keep Snapshots Regardless of the Limit of Snapshots:</b> The snapshot copies in the destination region are permanently retained.</li></ul>                                                                                                                             |

7. Click **OK**.

## Related information

- [ModifyAutoSnapshotPolicyEx](#)

## 6.6. Delete an automatic snapshot policy

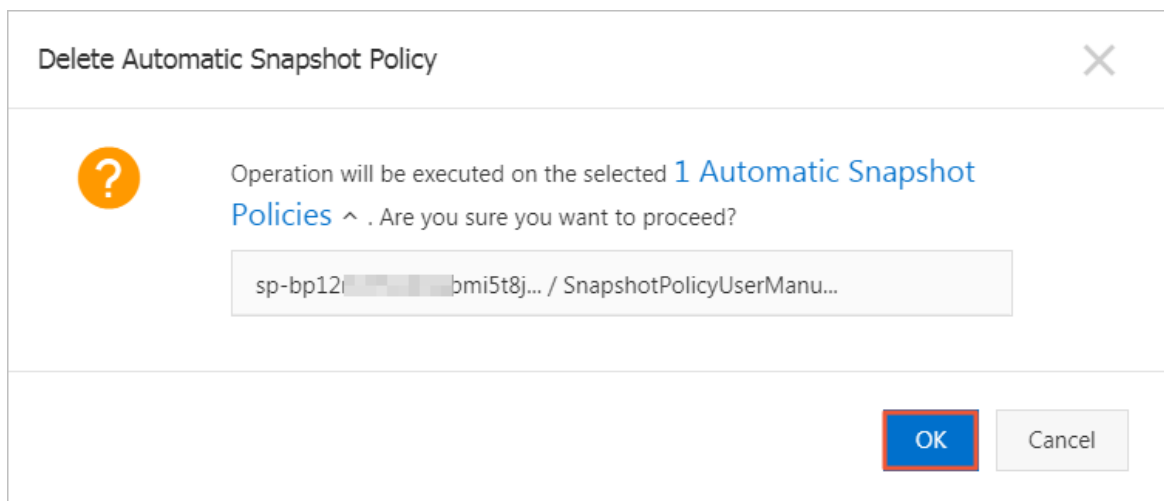
You can delete automatic snapshot policies that are no longer needed. After you delete a policy, all cloud disks to which the policy was applied are no longer affected.

### Prerequisites

At least one automatic snapshot policy is created. For more information, see [Create an automatic snapshot policy](#).

### Procedure

- 1.
- 2.
- 3.
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**.



### Related information

- [DeleteAutoSnapshotPolicy](#)


# 7. Edit the tags of a snapshot

Tags can be used to identify resources with the same characteristics (such as snapshots that belong to the same organization or that serve the same purpose) for easy search and management. This topic describes how to edit the tags of an existing snapshot.

## Context

For information about how to use tags, the resources that support tags, and the limits on tags, see [Overview](#) and the "Tag limits" section of the [Limits](#) topic.

## Procedure

- 1.
- 2.
- 3.
4. Find the snapshot whose tags you want to edit, move the pointer over the  icon in the **Tag** column, and then click **Edit Tags**.
5. In the **Edit Tags** dialog box, click Available Tags to select existing tags or click Create to create tags. Then, click **OK**.

## What's next

After tags are added to your snapshots, you can filter the snapshots by tag to perform different operations. For example, you can copy snapshots that have a set of tags to a different region and calculate the costs for snapshots that have a different set of tags.


## 8. Edit the tags of an automatic snapshot policy

Tags can be used to identify resources with the same characteristics (such as automatic snapshot policies that belong to the same organization or that serve the same purpose) for easy search and management. This topic describes how to edit the tags of an existing automatic snapshot policy.

### Context

For information about how to use tags, the resources that support tags, and the limits on tags, see [Overview](#) and the "Tag limits" section of the [Limits](#) topic.

### Procedure

- 1.
- 2.
- 3.
4. Click the **Automatic Snapshot Policies** tab.
5. Find the automatic snapshot policy whose tags you want to edit, move the pointer over the  icon in the **Tag** column, and then click **Edit Tags**.
6. In the **Edit Tags** dialog box, click Available Tags to select existing tags or click Create to create tags. Then, click **OK**.

### What's next

After tags are added to your automatic snapshot policies, you can filter the policies by tag to perform different operations. For example, you can change the snapshot retention periods in policies that have a set of tags and configure Cross-Region Replication for Snapshots in policies that have a different set of tags.

# 9. Snapshot FAQ

This topic provides answers to frequently asked questions about Elastic Compute Service (ECS) snapshots.

- Common FAQ
  - [How is the size of the first full snapshot of a disk calculated?](#)
  - [Where can I view snapshot prices in different Alibaba Cloud regions?](#)
  - [Does the snapshot feature provide a free tier?](#)
  - [Can I download or export ECS instance snapshots to my on-premises device?](#)
- FAQ about Object Storage Service (OSS)
  - [If I have activated OSS, are snapshots automatically saved to my existing OSS buckets?](#)
  - [Can a custom image that was created from a snapshot be saved to an OSS bucket?](#)
- FAQ about billing
  - [How is the storage fee for snapshots calculated?](#)
  - [Where can I view snapshot prices in different Alibaba Cloud regions?](#)
  - [What impact do overdue payments have on my stored snapshots?](#)
  - [I use snapshots frequently. How can I reduce the amount of fees for snapshots?](#)
  - [Does the snapshot feature provide a free tier?](#)
- FAQ about snapshot and Elastic Block Storage (EBS) types
  - [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?](#)
- FAQ about snapshot sizes
  - [How is the size of the first full snapshot of a disk calculated?](#)
  - [Is the storage space released if I delete files from an ECS instance?](#)
  - [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?](#)
- FAQ about snapshot deletion
  - [How can I prevent snapshots from being deleted by Alibaba Cloud?](#)
  - [How can I delete snapshots to reduce backup costs?](#)
  - [An automatic snapshot is created for a disk of an instance. Will the snapshot be deleted after the system disk of the instance 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 "RequestId: xxx" error message appear when I delete a snapshot in the snapshot chain?](#)
- FAQ about automatic snapshot policies
  - [If I have used an automatic snapshot to create a custom image or a disk, does the automatic snapshot policy fail to be executed?](#)

- [Can I create multiple automatic snapshot policies for a disk?](#)
- FAQ about the disk rollback by using snapshots
  - [How can I prevent data loss caused by accidental operations?](#)
  - [After I change the system disk of an instance, can I use a snapshot of the previous system disk to roll back the new system disk?](#)
  - [I created Instance A in the China \(Hangzhou\) region and created snapshots for data disks of Instance A. After Instance A expired and was released, I created Instance B in the China \(Hangzhou\) region. Can I use the data disk snapshots of Instance A to restore Instance A?](#)
  - [Why cannot snapshots of an instance be used to roll back the disks of the instance?](#)
- FAQ about the relationship between snapshots and images
  - [What are the differences and relationship 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 my on-premises device?](#)
  - [Why does the "RequestId: xxx" error message appear when I delete a snapshot in the snapshot chain?](#)

## If I have activated OSS, are snapshots automatically saved to my existing OSS buckets?

No, snapshots are not automatically saved to existing OSS buckets. Snapshots are stored independently from your OSS buckets. You do not need to create OSS buckets for snapshots.

## Can a custom image that was created from a snapshot be saved to an OSS bucket?

Yes, you can export a custom image to your OSS bucket for future download. For more information, see [Export a custom image](#). However, custom images cannot be saved directly to OSS buckets.

## How is the storage fee for snapshots calculated?

Snapshots are billed monthly on a pay-as-you-go basis. The price per GiB for snapshot storage is the same as that for the OSS Standard storage class. For more information about snapshot prices in different Alibaba Cloud regions, see the Pricing tab on the [Elastic Compute Service](#) product page.

For more information about examples of how to use the pay-as-you-go billing method, see [Snapshots](#).

## Where can I view snapshot prices in different Alibaba Cloud regions?



Snapshots are billed on a monthly basis. The price per GiB for snapshot storage is the same as that for the OSS Standard storage class. For more information about snapshot prices in different Alibaba Cloud regions, see the Pricing tab on the [Elastic Compute Service](#) product page. Scroll down to the **Snapshot** tab. You can view the snapshot prices by region in the **Snapshot service fee details** section of the Snapshot tab.

| Asia Pacific      |                  |                     |                                  |                                |                  |
|-------------------|------------------|---------------------|----------------------------------|--------------------------------|------------------|
| Europe & Americas |                  | Middle East & India |                                  |                                |                  |
| China (Hong Kong) | Singapore        | Australia (Sydney)  | Malaysia (Kuala Lumpur)          | Indonesia (Jakarta)            | Japan (Tokyo)    |
| China (Qingdao)   | China (Beijing)  | China (Zhangjiakou) | China (Hohhot)                   | China (Ulanqab) <sup>New</sup> | China (Hangzhou) |
| China (Shanghai)  | China (Shenzhen) | China (Heyuan)      | China (Guangzhou) <sup>New</sup> | China (Chengdu)                |                  |

|          |                   |                |         |                        |                 |          |
|----------|-------------------|----------------|---------|------------------------|-----------------|----------|
| Instance | Reserved Instance | Dedicated Host | Storage | Storage Capacity Units | Network Traffic | Snapshot |
|----------|-------------------|----------------|---------|------------------------|-----------------|----------|

Snapshot service fee details (Pay-As-You-Go) [View Subscription Fee](#)

1. The snapshot service for International site (alibabacloud.com) users was billed at August 21, 2019.  
 2. The snapshot fee is charged according to the storage space occupied by the snapshot. When the product is opened, it is charged by hour according to the actual usage by default (pay-as-you-go mode).  
 3. Note: the snapshot prepaid storage package reuses the OSS storage resource package (monthly package). The charges are the same as the OSS standard storage. After the customer purchases the prepaid storage package, the snapshot fee will be deducted from the snapshot bill of the current hour. also **OSS storage resource package can only deduct "standard snapshot" and does not support deducting "flash snapshot"**.

| Type                        | Capacity Range | Monthly Subscription  |
|-----------------------------|----------------|-----------------------|
| Standard Snapshot           | 0 ~ 5GB        | \$0.0 USD/GB/Month    |
| Standard Snapshot           | >5GB           | \$0.0200 USD/GB/Month |
| Instant Access              | 1GB            | \$0.224 USD/GB/Month  |
| Use times of Instant Access | Times          | \$0.1415 USD/Once     |

## What impact do overdue payments have on my stored snapshots?

The snapshot feature is disabled within 24 hours after your payment becomes overdue. The length of time that your payment becomes overdue determines whether snapshots are retained. For more information, see [Overdue payments](#).

## I use snapshots frequently. How can I reduce the amount of fees for snapshots?

We recommend that you maintain a manageable number of snapshots and delete snapshots that are no longer needed. For more information, see [Reduce snapshot fees](#).

## Does the snapshot feature provide a free tier?

No, you must pay for the snapshot feature. You are charged for snapshots after the first snapshot is created. For more information, see [Snapshots](#).

## Do automatic snapshots differ from or conflict with manual snapshots?

No, both manual and automatic snapshots are data files that capture the point-in-time status of a disk. However, when an automatic snapshot is being created for a disk, you cannot create a manual snapshot for the disk. You must wait until the automatic snapshot is created.

## Can I create snapshots for local disks?

No, snapshots cannot be created for local disks. If you want to improve the availability of applications, we recommend that you implement data redundancy at the application layer or create deployment sets for instances.

## 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 that you can share the images with other users.

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

The first snapshot created for a disk is a full snapshot. This snapshot contains all the data stored on the disk at the time when you create the snapshot. Therefore, the snapshot size is equal to the used capacity of the disk. For example, if the capacity of a disk is 200 GiB and 122 GiB has been used, the first full snapshot of the disk is 122 GiB in size. For more information, see [Incremental snapshots](#) and [View the snapshot size](#).

## Is the storage space released if I delete files from an ECS instance?

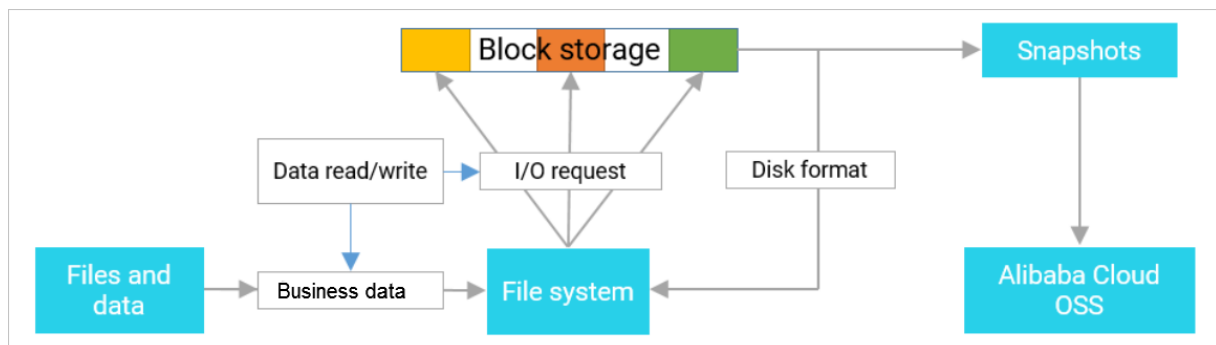
No, no storage space is released. When you delete files from an ECS instance, only delete tags are added to the headers of the files, but the used storage space of the disks is not reduced.

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

- Problem description: After you delete files from an instance and create a snapshot for the instance, you find that the size of the snapshot is not reduced or is larger than the disk capacity displayed in the file system.
- Cause analysis: When a snapshot is being created, the system identifies empty blocks to reduce the size of the snapshot. However, some empty blocks are filled when you format the file system, delete files, or write data to the blocks. Therefore, the snapshot size may be larger than the disk capacity that is displayed in the file system. Possible causes:
  - File system metadata occupies disk space.
  - Logical Block Addressing (LBA) is used to divide disks into blocks that have the same size. When the file system is initialized, data is written into a large number of blocks. This write operation also occupies disk space.
  - To reduce resource consumption, the file system only adds delete tags to the headers of files instead of actually deleting the data when you delete the files. The disk cannot detect the delete operation, and the system allocates the data blocks and copies the blocks to the snapshot. Therefore, the size of the snapshot is larger than the disk capacity displayed in the file system.
  - Kernel-based Virtual Machine (KVM) virtio block and Xen block front modules do not support the TRIM command. The TRIM command informs a disk which data blocks in the LBA range are no longer considered to be in use and therefore can be erased. As a result, the disk cannot determine whether the 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 buckets. Snapshots are created in this process. The following figure shows the relationship between a file system and a snapshot.



**Note** The preceding figure indicates that if data has been written to data blocks, the blocks are recorded in the snapshot regardless of whether the related files have been deleted from the disks. In the file system, when you delete files, only tags are added to the headers of the files, but the disk space used by the files is not released on the disks.

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

- Manual snapshots are never deleted by Alibaba Cloud regardless of whether the corresponding disks or instances have been released.
- To prevent automatic snapshots from being deleted, you can modify the corresponding automatic snapshot policy by setting **Keep Snapshots** to **Always Keep**. After the maximum number of automatic snapshots for a disk is reached, the earliest snapshot is deleted when a new snapshot is created. For more information, see [Modify an automatic snapshot policy](#). For more information about the snapshot quota, see [使用限制](#).

## How can I delete snapshots to reduce backup costs?

- Manual snapshots: You can manually delete manual snapshots.
- Automatic snapshots: You can manually delete automatic snapshots. In addition, when the maximum number of automatic snapshots is reached, the earliest snapshot is deleted when a new snapshot is created.

## An automatic snapshot is created for a disk of an instance. Will the snapshot be deleted after the system disk of the instance 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, automatic snapshots are retained for the period of time specified by the automatic snapshot policy. You can modify the automatic snapshot policy. For more information, see [Modify an automatic snapshot policy](#).

## 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, operations that require the original snapshot data, such as re-initializing the system disk cannot be performed. For more information, see [Reinitialize a system disk](#).
- If a 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, operations that require the original snapshot data, such as re-initializing the system disk cannot be performed. For more information, see [Reinitialize a system disk](#).

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

No, the automatic snapshot policy can be executed.

## **Can I create multiple automatic snapshot policies for a disk?**

No, you cannot create multiple automatic snapshot policies for a disk.

## **How can I prevent data loss caused by accidental operations?**

You can create snapshots to back up data before you perform high-risk operations. For example, you can create snapshots if you want to modify critical system files, migrate instances from the classic network to a virtual private cloud (VPC), back up data, or restore an instance that was accidentally released. You can also create snapshots to recover from network attacks, change operating systems, or provide data support for a production environment. If an error occurs, you can use snapshots to roll back disks to reduce risks. For more information, see [Create a snapshot of a disk](#) and [Roll back a disk by using a snapshot](#).

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

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

## **I created Instance A in the China (Hangzhou) region and created snapshots for data disks of Instance A. After Instance A expired and was released, I created Instance B in the China (Hangzhou) region. Can I use the data disk snapshots of Instance A to restore Instance A?**

No, you cannot use the data disk snapshots of Instance A to restore the Instance A after Instance A is released. If you want to use disk snapshots to restore an instance, you must make sure that the instance for which the snapshots are created is not released. To restore the data of Instance A, you can use the data disk snapshots of Instance A to create disks and attach the disks to Instance B. For more information, see [Create a disk from a snapshot](#) and [Attach a data disk](#).

## **Why cannot snapshots of an instance be used to roll back the disks of the instance?**

You can check the snapshots based on the returned error message. For more information about the common issues and corresponding solutions, see [FAQ](#).

## What are the differences and relationship between snapshots and images?

Differences between snapshots and images:

- Images can be used directly to create ECS instances, but snapshots cannot.
- Images can be used to restore instance data across regions, but snapshots cannot. For more information, see [Copy a custom image](#).
- A snapshot can be a data backup of the system disk or a data disk of an ECS instance, whereas an image must contain the system disk data of an ECS instance.
- Snapshots can be used to back up data stored on disks. Images can be used to create one or more ECS instances.

Relationship between snapshots and images:

- 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 from an instance](#).
- You can also create custom images from system disk snapshots. For more information, see [Create a custom image from a snapshot](#).

## How do I migrate snapshots from one account to another?

Snapshots cannot be migrated across accounts. 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 from a snapshot](#) and [Share or unshare a custom image](#).

To migrate a data disk snapshot from Account A to Account B, perform the following operations:

1. Create an image from the original instance to which the data disk is attached. For more information, see [Create a custom image from a snapshot](#).
2. Share the image to Account B. For more information, see [Share or unshare a custom image](#).
3. Within Account B, use the image to create a pay-as-you-go instance. For more information, see [Create an ECS instance by using a custom image](#).
4. Create a snapshot for a data disk of the new instance. For more information, see [Create a snapshot of a disk](#).
5. Release the new instance. For more information, see [Release an instance](#).

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

No, data disk snapshots cannot be used to create custom images. Only system disk snapshots can be used to create custom images.

## Can I download or export ECS instance snapshots to my on-premises device?

No, snapshots cannot be downloaded or exported to on-premises devices. You can create images from snapshots and then export the images. For more information, see [Create a custom image from a snapshot](#) and [Export a custom image](#). You can also use the OOS template named `ACS-ECS-BulkyCreateAndExportImage` to create multiple custom images at a time and export the images to an OSS bucket in a specific region. Then, you can download the custom images in the OSS console.

## Why does the "RequestId: xxx" error message appear 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 [Delete a custom image](#).