Alibaba Cloud
Elastic Compute Service

User Guide

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Generic conventions

Table -1: Style conventions

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

Contents

1 Quick reference

When using ECS, you may encounter various issues, such as connecting to the instance, resizing the disk, upgrading or downgrading the instance configurations, and using snapshots or images. This article provides you with a quick reference to popular features of ECS resources.

Watch 2 minutes of video to learn more about common operations.

Go Cloud

Operation instructions and limits

To guarantee proper operation of your ECS instance, You must carefully read all the *ECS operation instructions* and *Limits* before you use it.

Create and manage ECS instances

Basic operations

To use an ECS instances, follow these steps:

1. *Create an ECS instance*.
2. Connect to the ECS instance. Use different methods according to its operating system:
   a. Use the *Management Terminal* regardless of the operating system. Generally, this method is used for troubleshooting and maintenance.
   b. For Linux or Unix-like OS: *Connect to a Linux instance by using a password*, or *Connect to a Linux instance by using an SSH key pair*.
   c. For Windows OS: *Connect to a Windows instance*
3. *Stop the ECS instance*.
4. *Release the instance*.

Change configurations

You can change the instance type, IP addresses, and network bandwidth of your instance if the configurations cannot meet your business needs.

- Prepaid instance: *Upgrade configurations of Subscription instances* or *Renew for configuration downgrade*
- *Change configurations of Pay-As-You-Go instances*
- *Change public IP address*
- *Convert public IP address to EIP address*

- *Change EIP Internet bandwidth*

If the current operating system does not meet your needs, you can *change the operating system*.

Billing

You can *switch from Pay-As-You-Go to subscription*.

Elaborate management of and control over ECS instances

You can use the following features to elaborate management of and control over ECS instances:

- *User data*
- *Metadata*, including *instance identity*
- *Instance RAM roles*

Create and manage cloud disks

Basic operations

To use a cloud disk as a data disk, follow these steps:

1. *Create a cloud disk*.
2. *Attach a cloud disk*.
3. *(Linux) Format and mount a data disk* or *(Windows) Format a data disk*.
4. *Create snapshots* to back up data.
5. *Detach a cloud disk*.
6. *Release a cloud disk*.

Change configurations

When the capacity of the system disks or data disks cannot meet your business needs, you can *increase system disk size* or resize the data disks. For more information about resizing a data disk, see *Linux _ Resize a data disk* and *Windows _ Resize a data disk*.

Manage data on a cloud disk

When errors occur to data on a cloud disk, you can use a snapshot to *roll back a cloud disk* of the disk to restore data.

If you want to restore a cloud disk to its initial status after it is created, you can *reinitialize a cloud disk*.

If you want to copy data on an existing cloud disk to a new, empty cloud disk, you can *create a cloud disk from a snapshot*.

Create and manage snapshots

Basic operations

To use a snapshot, follow these steps:

1. Create a snapshot by using either of the following methods:
   - *Create snapshots*.
   - *Create and delete an automatic snapshot policy*, and *apply automatic snapshot policies to disks*, to enable creating snapshots automatically.
2. *View a snapshot chain*.
3. To save space occupied by snapshots, *delete unnecessary snapshots*.

Using snapshots

To copy or back up data: you can use a snapshot to *create a cloud disk from a snapshot*, or *roll back a cloud disk*.

To ease environment deployment, you can use a system disk snapshot to *create a custom image using a snapshot*, and *create an instance from a custom Image*.

Create and manage custom images

Only custom images can be operated in the ECS console. Using custom images can simplify environment deployment.

You can own a custom image by using the following methods:

- *Create a custom image using a snapshot*
- *Create a custom image by using an instance*
- *Use Packer to create a custom image*
- *Copy custom images* across different regions.
- *Share images* across different accounts.
- *Import custom images*
- *Create and import on-premise images by using Packer*

You can *export custom images* to back up the environment and *delete custom images*.

Create and manage security groups

Basic operations

To use a security group, follow these steps:

1. *Create a Security Group*.
2. *Add security group rules*.
3. *Add to or remove from a security group*
4. *Delete a security group rule*.
5. *Delete a security group*.

Manage security groups and their rules

To simplify business deployment, you can *clone a security group* across regions or network types.

When new security group rules impair the online business application, you can *restore security group rules* fully or partially.

Create and manage SSH key pairs

To use an SSH key pair, follow these steps:

1. *Create an SSH key pair*, or *import an SSH key pair*.
2. *Bind a SSH key pair*, or bind the SSH key pair after a Linux instance is created or when you *create an instance*.
3. *Connect to a Linux instance by using an SSH key pair*.
4. *Unbind an SSH key pair*.
5. *Delete a SSH key pair*.

Create and manage ENIs

To use an ENI, follow these steps:

1. *Create an ENI*.
2. *Attach an ENI to an instance*, or *attach an ENI when creating an instance*.
3. Optional. *Configure an ENI*.
4. *Detach an ENI from an instance*.
5. *Delete an ENI*.

Use tags

You can use tags to group resources to improve efficiency. To use tags, follow these steps:

1. *Add a tag to resources*.
2. *Filter resources by tags*.
3. *Delete a tag*.

2 ECS operation instructions

To guarantee proper operation of your ECS instance, you must take the considerations outlined in this section into account before use.

Prohibitions

- Alibaba Cloud prohibits you from using your instance for flow-through services. Any violation results in punishment up to shutdown and lockout of instance, and termination of services.
- Alibaba Cloud prohibits you from using your instance for click farming, advertising, or fictitious transactions.
- Alibaba Cloud prohibits you from activating SELinux.
- Alibaba Cloud prohibits you from uninstalling hardware related drivers.
- Alibaba Cloud prohibits you from arbitrarily modifying the MAC address of the network adapter.

Suggestions

- For an ECS with more than 4 GiB RAM, we recommend that you use a 64-bit OS, because a 32-bit OS supports a maximum of 4 GiB RAM. Currently available 64-bit systems include:
  - Aliyun Linux
  - CoreOS
  - CentOS
  - Debian
  - FreeBSD
  - OpenSUSE
  - SUSE Linux
  - Ubuntu
  - Windows
- 32-bit Windows OS supports CPUs with up to 4 cores.
- A minimum of 2 GiB RAM is needed for buiding a website on a Windows instance, and an instance type with 1 vCPU core and 1 GiB RAM cannot be used for MySQL service.
- To guarantee service continuity and avoid service downtime, you must enable auto-start of service applications upon OS boot.
- For I/O-optimized instances, do not stop the aliyun-service process.
- We do not recommmend that you update the kernel and the OS. For more information, see *How to avoid Linux instance startup failure after kernel upgrade*.

Windows restrictions

- Do not close the built-in shutdownmon.exe process, which may delay the restart of your Windows server.
- Do not rename, delete, or disable the Administrator account.
- We do not recommend that you use virtual memory.

Linux restrictions

- Do not modify the content of the default /etc/issue file. Otherwise, if you create a custom image of the ECS instance and create a new ECS instance based on the image, the new instance cannot start because the operating system edition cannot be recognized.
- Proceed with caution when modifying permissions of the directories in the root partition, such as `/etc`, `/sbin`, `/bin`, `/boot`, `/dev`, `/usr` and `/lib`. Improper modification of permissions may cause errors. Such modifications may cause system errors.
- Do not rename, delete, or disable the Linux root account.
- Do not compile or perform any other operations on the Linux kernel.
- We do not recommend that you use swap partition.
- Do not enable the NetWorkManager service. This service conflicts with the internal network service of the system and causes network errors.

For more information, see *Limits*.

3 Limits

When using ECS, consider the following:

- ECS does not support virtual application installation or subsequent virtualization such as when using VMware. Currently, only *ECS Bare Metal Instance and Super Computing Clusters* supports virtualization.
- ECS does not support sound card applications.
- ECS does not support the installation of external hardware devices such as hardware dongles, USB drives, external hard drives, and the USB security keys issued by banks.
- ECS does not support SNAT and other IP packet address translation services. You can achieve this by using an external VPN or proxy.
- ECS does not support multicast protocol. If multicasting services are required, we recommend that you use unicast point-to-point method.
- Currently, Log Service does not support 32-bit Linux ECS instance. To know the regions that support Log Service, see *Service endpoint*. See *Overview* to know the server operating systems that support Log Service.

Besides the preceding limit, the additional limits of ECS are mentioned in the following table.

ECS instances

Item	Limit	Supply for higher configuration or unlock configuration rights
Permission to create instances	Complete real-name registration to create ECS instances in the mainland China regions	Not supported
Default quota of Pay-As-You-Go ECS instances in all regions for one account	The sum of account balance, voucher and credit must not be less than 100 yuan	Open a ticket
Number of instance startup templates for one account per region	30	Not supported.
Number of versions in an instance startup Template	30	Not supported.

Item	Limit	Supply for higher configuration or unlock configuration rights
Paid Transfer to package year and month	The following instance specification (family) is not supported: • Series II: N1, ne2 and E3 • Series I all specifications	Not supported.
Default available instance types for creating Pay-As-You-Go ECS instances (New generation)	ecs.sn1.large (2 vCPU 4 GiB)	Open a ticket
	ecs.sn1.xlarge (4 vCPU 8 GiB)	
	ecs.sn2.large (2 vCPU 8 GiB)	
	ecs.sn2.xlarge (4 vCPU 16 GiB)	
	ecs.se1.large (2 vCPU 16 GiB)	
	ecs.xn4.small (1 vCPU 1 GiB)	
	ecs.n4.large (2 vCPU 4 GiB)	
	ecs.n4.xlarge (4 vCPU 8 GiB)	
	ecs.mn4.small (1 vCPU 4 GiB)	
	ecs.mn4.large (2 vCPU 8 GiB)	
	ecs.mn4.xlarge (4 vCPU 16 GiB)	
	ecs.se1.large (2 vCPU 16 GiB)	
	ecs.c4.xlarge (4 vCPU 8 GiB)	
	ecs.cm4.xlarge (4 vCPU 16 GiB)	

Item	Limit	Supply for higher configuration or unlock configuration rights
	ecs.ce4.large (4 vCPU 32 GiB)	
	ecs.i1.large (4 vCPU 16 GiB)	
Default available instance types for creating Pay-As-You-Go ECS instances (Previous generation)	ecs.t1.small (1 vCPU 1 GiB)	Open a ticket
	ecs.s1.small (1 vCPU 2 GiB)	
	ecs.s1.medium (1 vCPU 4 GiB)	
	ecs.s2.small (2 vCPU 2 GiB)	
	ecs.s2.large (2 vCPU 4 GiB)	
	ecs.s2.xlarge (2 vCPU 8 GiB)	
	ecs.s3.medium (4 vCPU 4 GiB)	
	ecs.s3.large (4 vCPU 8 GiB)	
	ecs.m1.medium (4 vCPU 16 GiB)	
	ecs.n1.small (1 vCPU 2 G)	
	ecs.n1.medium (2 vCPU 4 GiB)	
	ecs.n1.large (4 vCPU 8 GiB)	
	ecs.n2.small (1 vCPU 4 GiB)	
	ecs.n2.medium (2 vCPU 8 GiB)	
	ecs.n2.large (4 vCPU 16 GiB)	
	ecs.e3.small (1 vCPU 8 GiB)	
	ecs.e3.medium (2 vCPU 16 GiB)	

Block storage

Item	Limit	Exception application method (exception limit)
Create User restrictions for pay-per-volume clouds	The user must be real-name certified, and the sum of account balance, voucher and credit must not be less than 100 yuan	Not supported.
Paid cloud quota for one account in all regions	Number of paid instances for all regions under the user account * 5	Open a ticket
Number of single-instance system Disks	1	Not supported.
Number of single instance data disks	16 blocks (including cloud and shared block storage)	Not supported.
Number of instances allowed to be mounted simultaneously in a single block shared Block Store	16 (4 instances for public test period)	Not supported.
A shared block storage quota for a single account across the territory	10	Open a ticket
Single Common cloud capacity	5 gib ~ 2000 Gib	Not supported.
Single SSD cloud capacity	20 gib ~ 32768 Gib	Not supported.
Single-block high-efficiency cloud capacity	20 gib ~ 32768 Gib	Not supported.
Single SSD local disk capacity	5 gib ~ 800 Gib	Not supported.
Total capacity of a single-instance SSD local disk	1024 Gib	Not supported.
Single block nvme SSD local disk capacity	1456 Gib	Not supported.
Total capacity of a single instance nvme SSD local disk	2912 Gib	Not supported.
Single-block SATA hdds local disk capacity	5500 Gib	Not supported.

Item	Limit	Exception application method (exception limit)
Total capacity of single-instance SATA hdds local disk	154000 Gib	Not supported.
Single-block SSD shared Block Storage	32768 Gib	Not supported.
Total capacity of single-instance SSD shared Block Storage	128 Tib.	Not supported.
Single block efficient shared Block Storage	32768 Gib	Not supported.
Total capacity of single-instance efficient shared Block Storage	128 Tib.	Not supported.
1-piece ESSD Disc	32768 Gib	Not supported.
System Disk single disk capacity limit	Windows 40 gib ~ 500 giblinux (excluding coreos) + freewd: 20 gib ~ 500 Gibcoreos: 30 gib ~ 500 Gib	Not supported.
Data disk single disk capacity limit	General cloud: 5 gib ~ 2000 gibssd cloud/efficient cloud /SSD shared block storage/ efficient shared Block Storage: 20 gib ~ 32768 Gib local disk: shall be subject to the capacity of each local disk	Not supported.
Can the local disk instance mount the new local disk itself?	No	Not supported.
Does the local disk instance support the change configuration?	Only bandwidth changes allowed	Not supported.
System Disk mount point range	/Dev/xvda	Not supported.
Data disk mount point range	/Dev/xvd [B-Z]	Not supported.

Snapshots

Item	Limit	Supply for higher configuration or unlock configuration rights
Quota of snapshots	Number of elastic block storage devices * 64	Not supported

Images

Item	Regular user restrictions	Exception application method (exception limit)
One account to retain a custom mirror quota throughout the territory	100	Open a ticket
Maximum number of users that a single mirror can share	50.	Open a ticket
Restrictions on mirroring and instance specifications	4 gib and above memory instance specifications cannot use 32-bit mirrors	Not supported.

Key pairs

Item	Limit	Supply for higher configuration or unlock configuration rights
Quota of key pairs in all regions for one account	500	Not supported
Instance types supporting key pairs	All instance types, except those non-I/O optimized instance types in Generation I	Not supported
Images supporting key pairs	Linux images only	Not supported

Public network bandwidth

Item	Limit	Exception application method (exception limit)
Optional network-in bandwidth range	200 Mbit/s	Not supported.

Item	Limit	Exception application method (exception limit)
Public out bandwidth optional range	Pre-payment: 200 Mbit/s pay per volume: 100 Mbit/s	Submit a job with a maximum configuration of 400 Mbit/s
Limit for single instance replacement of assigned public network IP address	The public network IP address can be replaced within 6 hours of the new instance. One instance can be replaced up to 3 times	Not supported.

Security groups

Item	Limit	Supply for higher configuration or unlock configuration rights
Quota of ECS instances for one security group	1000	Not supported
Quota of rules for one security groups	100	Not supported
Quota of security groups in all regions for one account	At least 100 (Varies as user levels)	Open a ticket
Quota of security groups for one ECS instances	5	Not supported
Port	Access to TCP Port 25, which is the default port for the STMP service, is denied. It cannot be allowed by adding a security group rule.	Open a ticket. For more information, see *Apply to open TCP port 25*

ENI

Item	Limit	Supply for higher configuration or unlock configuration rights
Quota of ENI in one region for one account	At least 100 (Varies as user levels)	Open a ticket

Tags

Item	Limit	Supply for higher configuration or unlock configuration rights
Quota of tags for one ECS instance	10	Not supported

API

Item	Limit	Supply for higher configuration or unlock configuration rights
Invocation quota of CreateInstance	At most 200 times per minute	Open a ticket

Note:

For more information about the limits for VPC, see *Limits*.

4 Connect to instances

4.1 Overview

Based on the network type and operating system of your ECS instance, and the operating system of your local machine, you can choose an ideal method to connect to an ECS instance.

Connect to a Linux instance

Choose an ideal method from the following table to create remote connection to your Linux instance.

Internet access	Operating system of the local machine	Connection option
Yes/No	Windows or Unix-like OS	*Connect to an instance by using the Management Terminal*
Yes	Windows	Use a remote connection tool to create remote connection: • Use an SSH key pair as the credential: *Connect to a Linux instance by using an SSH key pair* • Use a password as the credential: *Connect to a Linux instance by using a password*
Yes	Linux, Mac OS, or other Unix-like OS	Use commands to create remote connection: • Use an SSH key pair as the credential: *Connect to a Linux instance by using an SSH key pair* • Use a password as the credential: *Connect to a Linux instance by using a password*
Yes	iOS or Android	User apps, such as SSH Control Lite or JuiceSSH, to create remote connection:

Internet access	Operating system of the local machine	Connection option
		Connect to an instance on a mobile device

Connect to a Windows instance

Choose an ideal method from the following table to create remote connection to your Windows instance.

Internet access	Operating system of the local machine	Connection option
Yes/No	Windows or Unix-like OS	*Connect to an instance by using the Management Terminal*
Yes	Windows	Use mstsc to create remote connection: *Connect to a Windows instance*
Yes	Linux	Use a remote connection tool, such as rdesktop, to create remote connection: *Connect to a Windows instance*
Yes	Mac OS	Use Microsoft Remote Desktop Connection for Mac to create remote connection: *Connect to a Windows instance*
Yes	iOS or Android	Use Microsoft Remote Desktop to create a remote connection: *Connect to an instance on a mobile device*

4.2 Connect to an instance by using the Management Terminal

You can use the Management Terminal, also known as VNC, to connect to an ECS instance. Specifically, when the remote access software programs that you are using, such as PuTTy, Xshell, or SecureCRT, do not work.

Scenarios

The Management Terminal can be used to:

- Check the status of an ECS instance if it starts slowly.
- Reconfigure the firewall if a remote connection fails because of any software error within the ECS instance.
- End abnormal processes that consume excessive CPU usage or bandwidth.

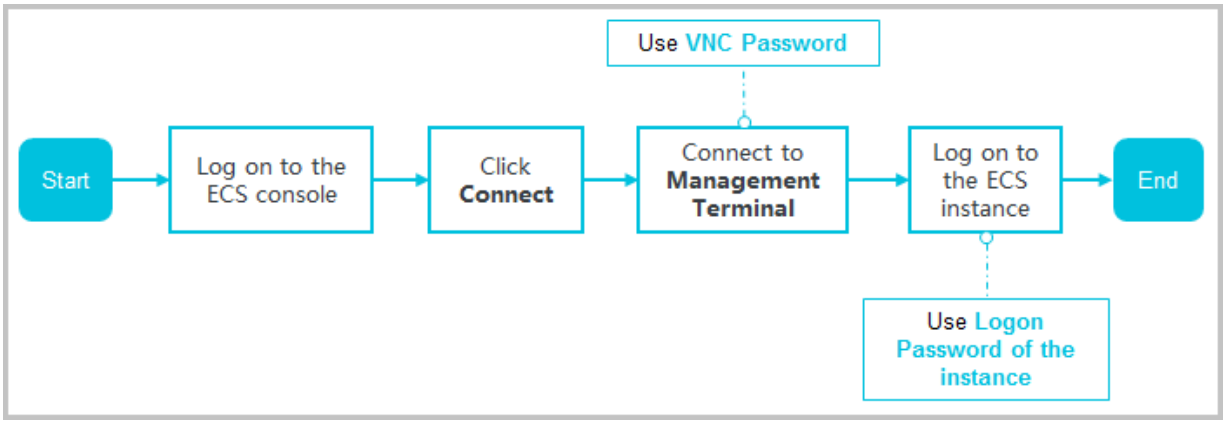
Note:
The Management Terminal can be used to connect to an instance even if no public IP address is assigned to your instance.

Prerequisites

- You have an ECS instance. For more information, see *Create an ECS instance*.
- You have set the logon password of the ECS instance. If not, use the *Reset Password* feature to set a password.

Procedure

The following figure illustrates how to use the Management Terminal to connect to an ECS instance.



To connect to the ECS instance by using the Management Terminal, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. In the instance list, find your instance, and in the **Actions** column, click **Connect**.
5. In the **Management Terminal** page, follow the instructions to connect to the Management Terminal:

- If you log on as an Alibaba Cloud account to connect to the Management Terminal for the first time, follow these steps:

  1. In the **VNC Connection Password** dialog box, copy the password and click **Close**.

     Note:

     - The VNC password appears only once. You must save and secure password immediately for future use. If you need to change the VNC password, see *Change the VNC connection password*.
     - If you log on as a RAM user to connect to the Management Terminal for the first time , you will not see this dialog box.

  2. In the **Enter VNC Password** dialog box, paste the VNC connection password that you have copied, and click **OK**.

- If you log on as a RAM user to connect to the Management Terminal for the first time or in case you have forgotten your VNC connection password, follow these steps to connect to the Management Terminal:

  — *Change the VNC connection password*.

  — In the upper-left corner of the **Management Terminal** page, select **Send Remote Command** > **Connect to Management Terminal**.

  — In the **Enter VNC Password** dialog box, enter the new password and click **OK**.

- If this is not your first connection to the Management Terminal, enter the VNC connection password in the **Enter VNC Password** dialog box and click **OK**.

6. To log on to the ECS instance, follow these steps according to the operating system:

   - For a Linux instance: Enter the user name (`root`) and the logon password.

     Note:

     - If you forget the logon password of your instance, *reset the password*.
     - The logon password input is invisible.
     - If you want to do different operations within the instance, in the upper-left corner of the **Management Terminal** page, select **Send Remote Command** > **CTRL + ALT + Fx**, of which **Fx** can be any key from **F1** to **F10**, to switch the interfaces for different operations.

- In case you see a black screen, the Linux instance may be in sleep mode. To exit sleep mode, click the mouse or press any key.

- For a Windows instance: In the upper-left corner of the **Management Terminal** page, select **Send Remote Command** > **CTRL+ALT+DELETE**. The Windows logon interface is displayed. Enter the user name (**`Administrator`**) and the logon password.

> **Note:**
> If you forget the logon password of your instance, *reset the password*.

Other Operations

Change the VNC connection password

If you forget the VNC connection password, follow these steps to change the password.

> **Note:**
> If the instance that you are connecting to is not I/O optimized, you must restart your instance in the ECS console to apply new VNC password. The restart operation stops your instance and interrupts your business operations. Therefore, proceed with caution.

1. Open the **Management Terminal** page.
2. Close the VNC **Connection Password** dialog box or the **Enter VNC Password** dialog box.
3. In the upper-right corner of the **Management Terminal** page, click **Modify Management Terminal Password**.
4. Enter a new password, which must be six characters in length and may contain uppercase letters, lowercase letters, and digits. Special characters are not supported.
5. A new password can be effective in the following events:

   - For an I/O-optimized instance, the new password takes effect immediately.
   - For a non-I/O-optimized instance, *restart the instance* in the ECS console.

> **Note:**
> Restarting the operating system does not apply the new password.

Input commands

If you are connecting to a Linux instance, use the **Input Commands** feature to type long text, such as a complex command or a URL.

Follow these steps:

1. Open the **Management Terminal** page.
2. In the upper-right corner of the **Management Terminal** page, click **Input Commands**.
3. In the **Copy Commands** dialog box, enter the commands and click **OK**.
4. Press the **Enter** key to run the commands.

FAQ

- Can multiple users simultaneously connect to the Management Terminal?

  No. Only one user can connect to the Management Terminal at a time.

- Why am I unable to connect to an instance by using the Management Terminal even after changing the password?

  Make sure that you enter the correct VNC password. If the instance that you are connecting to is not I/O optimized, you must restart the instance in the ECS console. This action helps the new VNC password to take effect.

- Why do I see a black screen after logging on to my instance?

  A black screen indicates that the instance is in sleep mode.

  For a Linux instance, click mouse or press any key to activate the screen.

  For a Windows instance, click **Send remote command** > **CTRL+ALT+DELETE** to view logon interface.

- Why am I unable to access the Management Terminal?

  To resolve logon issues, open your browser and connect to the Management Terminal. Press **F12** to open the developer tool. The Management Terminal information can be analyzed to locate errors under the Console tab.

- Can I use IE or Firefox to access the Management Terminal?

  You can access the Management Terminal only if you have IE10 or later versions installed . Only certain versions of Firefox are supported. You can resolve this issue by updating or changing your browser to a recommended version.

  Note:

  We recommend that you use Google Chrome because it offers the best support for the Management Terminal function.

4.4 Connect to a Linux instance by using a password

You can connect to a Linux instance by using different authentication methods:

- If you are using an SSH key pair, see *##SSH#####Linux##*.
- If you are using a password, you can connect to an instance *## 3###ECS##* or by using software applications or command lines.

Prerequisites

Before you begin, make sure the following:

- The instance is in the **Running** status. If not, *#######*.
- You have set a logon password for the instance. If the password is lost, *######*.
- The instance can access Internet:
  - In a VPC, a public IP address is assigned to the instance or *an EIP address is bound to the instance*.
  - In the classic network, a public IP address is assigned to the instance by using either of the following methods:
    - For a Subscription or a Pay-As-You-Go instance, you can select Assign public IP when creating the instance.
    - For a Subscription instance without public IP address, you can assign one by ##### .
- The following security group rules must be added to the security group that the instance joins. For more information, see *#######*.

Network Type	NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority
VPC	N/A	Inbound	Allow	SSH(22)	22/22	Address Field Access	0.0.0.0/0	1
Classic	Internet							

Procedure

Based on the operating system of your local machine, you have various options to connect to a Linux instance by using the SSH protocol:

- *Windows OS*
- *Linux or Mac OS X*

- *Android or iOS*

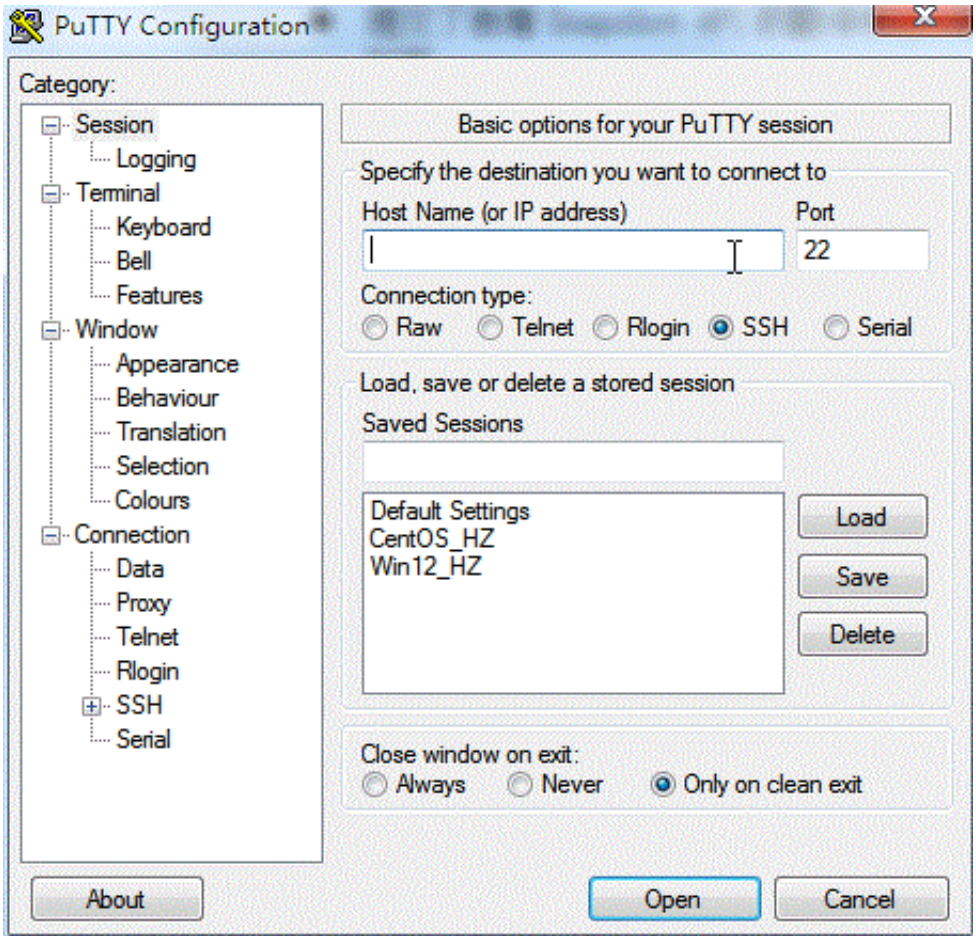
Windows OS

If your local machine is running Windows OS, you can use a remote connection tool, such as PuTTY, to connect to a Linux instance. In this article, we use PuTTY as an example to describe how to connect to a Linux instance by using the password authentication method. Before you start, download *PuTTY*.

Note:
To do so, you can also watch the video: *How the small assistant family can connect to a Linux instance remotely*.

Follow these steps to connect to a Linux instance.

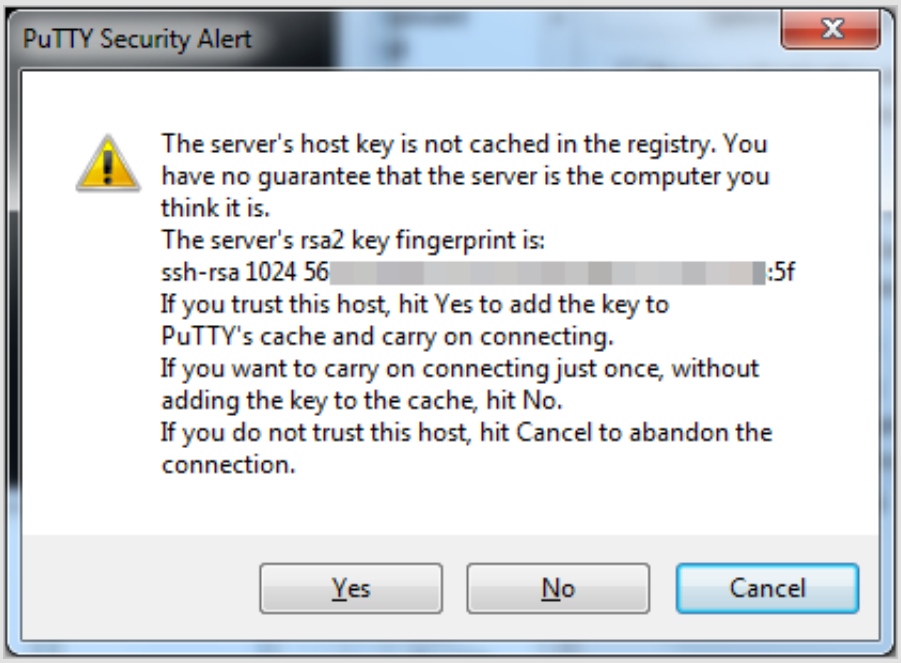
1. Start putty.exe.
2. In the left-side navigation pane, click **Session**, and configure the following parameters:
   - **Host Name**: Type the public IP address or EIP address of the instance.
   - **Port**: Type 22.
   - **Connection Type**: Select SSH.
   - : Optional. If you do not want to repeat the configurations during the next logon, add a name for the session, and click **Save**.



3. Click **Open** to connect.

Note:

For the first connection to an ECS instance, you have the PuTTY Security Alert as follows, which means PuTTY cannot guarantee the instance is the one that you think it is, so it can only provide the public key fingerprint of the instance for you to decide to trust the instance or not. If you select Yes, the public key will be added to the PuTTY's cache and you will not be alerted again during your next connection. If you select **Yes** but are alerted again, a *man-in-the-middle attack (MITM)* may occur. For more information, see *PuTTY User Manual*.



4. As prompted, type the username and password for the Linux instance, and press the Enter key.

> **Note:**
> The password is not displayed on screen.

When you see the following message, you have successfully connected to an instance.

```
Welcome to Alibaba Cloud Elastic Compute Service !
```

Now, you can start working on your instance.

Linux or Mac OS X

If your local machine is running Linux OS or Mac OS X, follow these steps:

1. Run the command `ssh root@[Public IP address or EIP address of the instance]`.
2. Type the password and press the Enter key.

When you see the following message, you have successfully connected to an instance.

```
Welcome to Alibaba Cloud Elastic Compute Service !
```

Now, you can start working on your instance.

Android or iOS

If your local machine is running Android OS or iOS, you can use various apps to connect to a Linux instance. For more information, see ##########.

Reference

The connection failed, and you can refer to this document for troubleshooting issues: unable to connect to the Linux instance.

You can run a script to install a graphical desktop on an instance running CentOS. For more information, see *Automatic installation tool for Linux instance*.

4.5 Connect to a Windows instance

If your Windows instance can access Internet, you can use remote connection tools to connect to it. Otherwise, you can use the *Management Terminal*.

Prerequisites

Before you start, complete the following:

- The instance is in the **Running** status. If not, *start it*.
- You have set a logon password for the instance. If the password is lost, *reset the password*.
- The instance can access Internet:
  - In a VPC, a public IP address is assigned to the instance or *an EIP address is bound to the instance*.
  - In the classic network, a public IP address is assigned to the instance by using either of the following methods:
    - For a Subscription or a Pay-As-You-Go instance, you can select Assign public IP when creating the instance.
    - For a Subscription instance without public IP address, you can assign one by *upgrading bandwidth*.
- The following security group rules must be added to the security group that the instance joins. For more information, see *Add security group rules*.

Network Type	NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority
VPC	N/A	Inbound	Allow	RDP(3389)	3389/3389	Address Field Access	0.0.0.0/0	1
Classic	Internet							

Procedure

Based on the operating system of your local machine, you have various options to connect to a Windows instance:

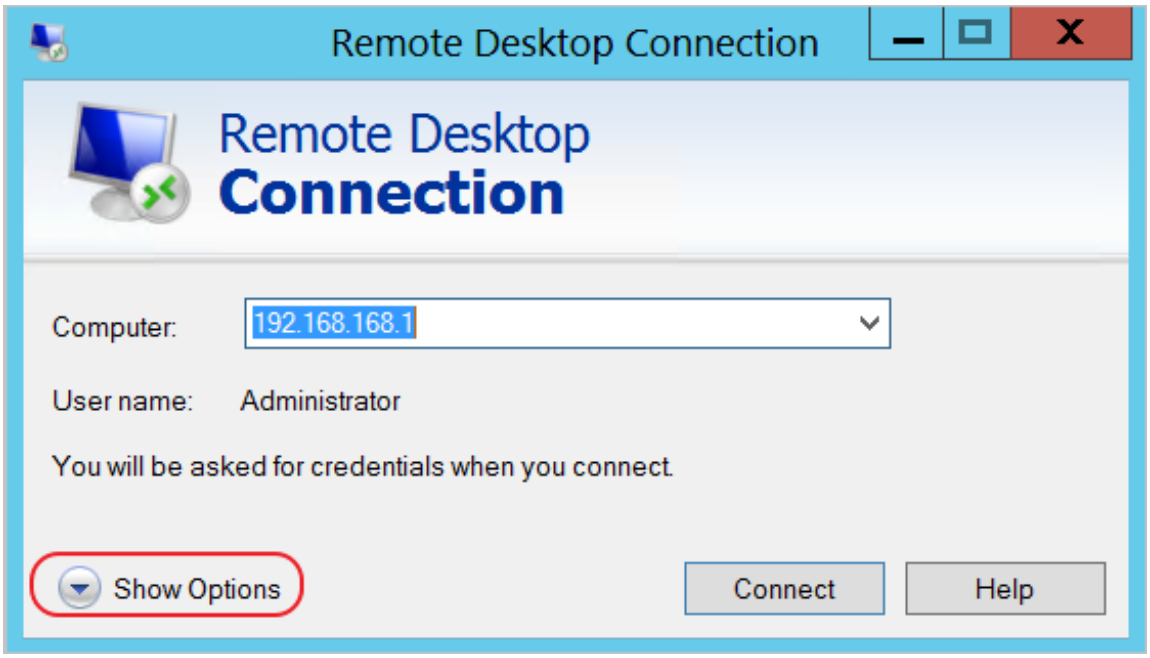
- *Windows OS*
- *Linux*
- *Local devices use Mac OS Operating System*
- *Android or iOS*

Windows OS

If the local machine is running Windows OS, you can use the mstsc to create a remote connection to a Windows instance.

> **Note:**
> To do so, you can also watch the video: How the small assistant family can connect to Windows instance remotely.

1. Use any one of the following methods to start **mstsc**:
   - Select **Start** > **icon** > **Remote Desktop Connection**.
   - Click the **Start** icon and search for mstsc.
   - Press the shortcut key **Windows Logo** + **R** to open the **Run** windows, type **`mstsc`**, and then press the Enter key.
2. In the **Remote Desktop Connection** dialog box, follow these steps:
   a. Click the **Show Options** drop-down box.

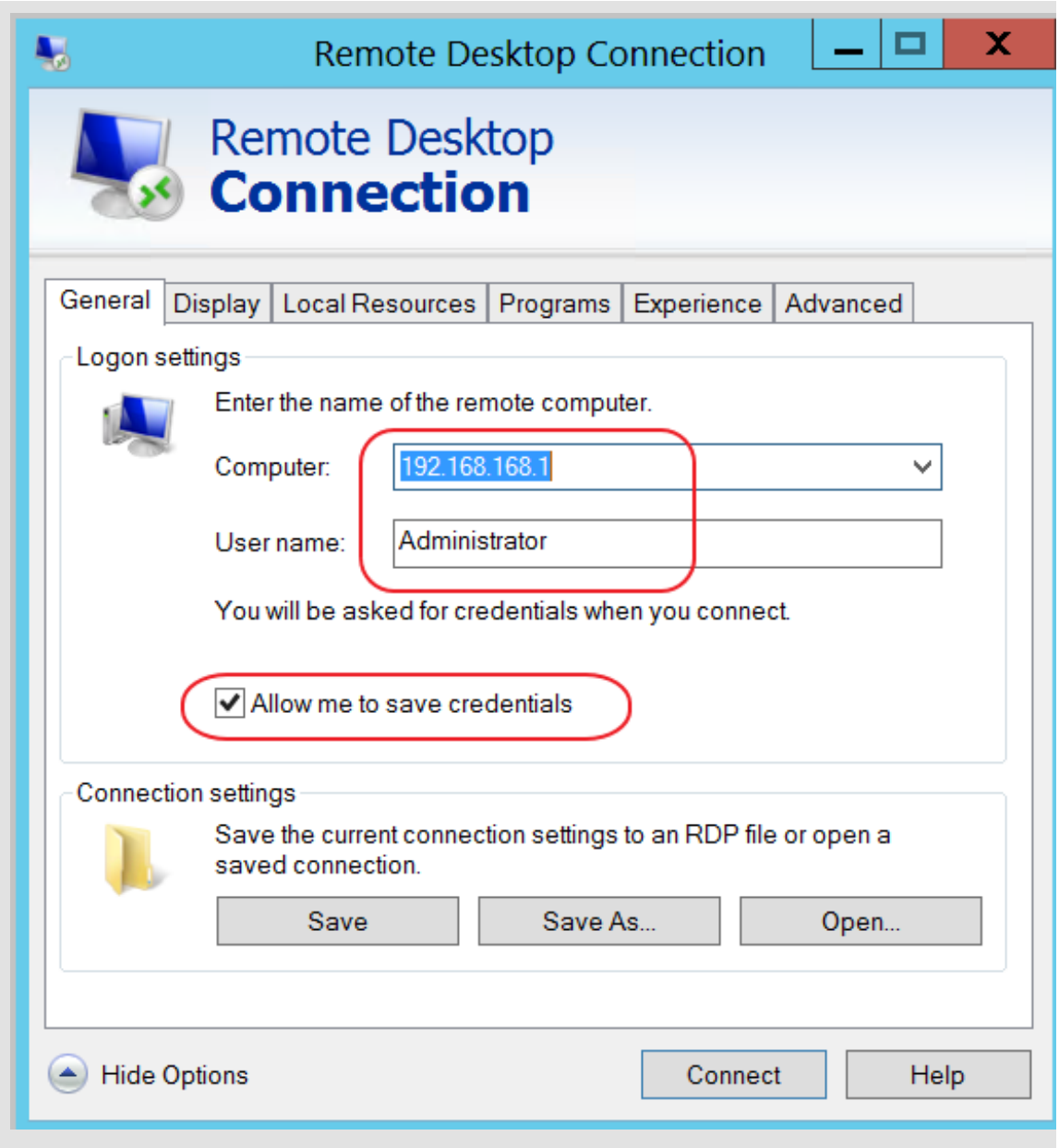


b. Type the public IP address or EIP address of the instance.

c. Type the user name. The default user name is **`Administrator`**

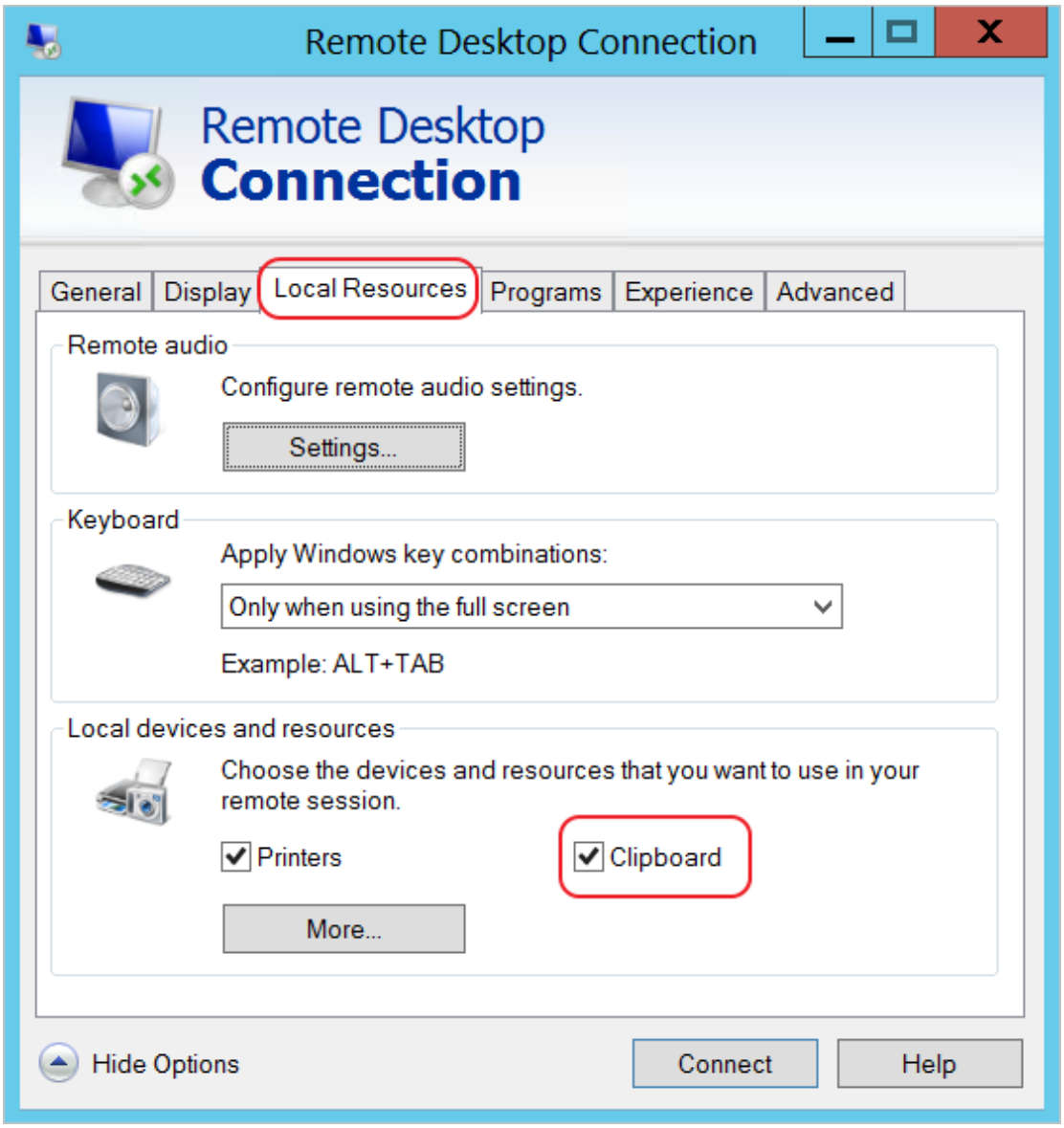
Note:

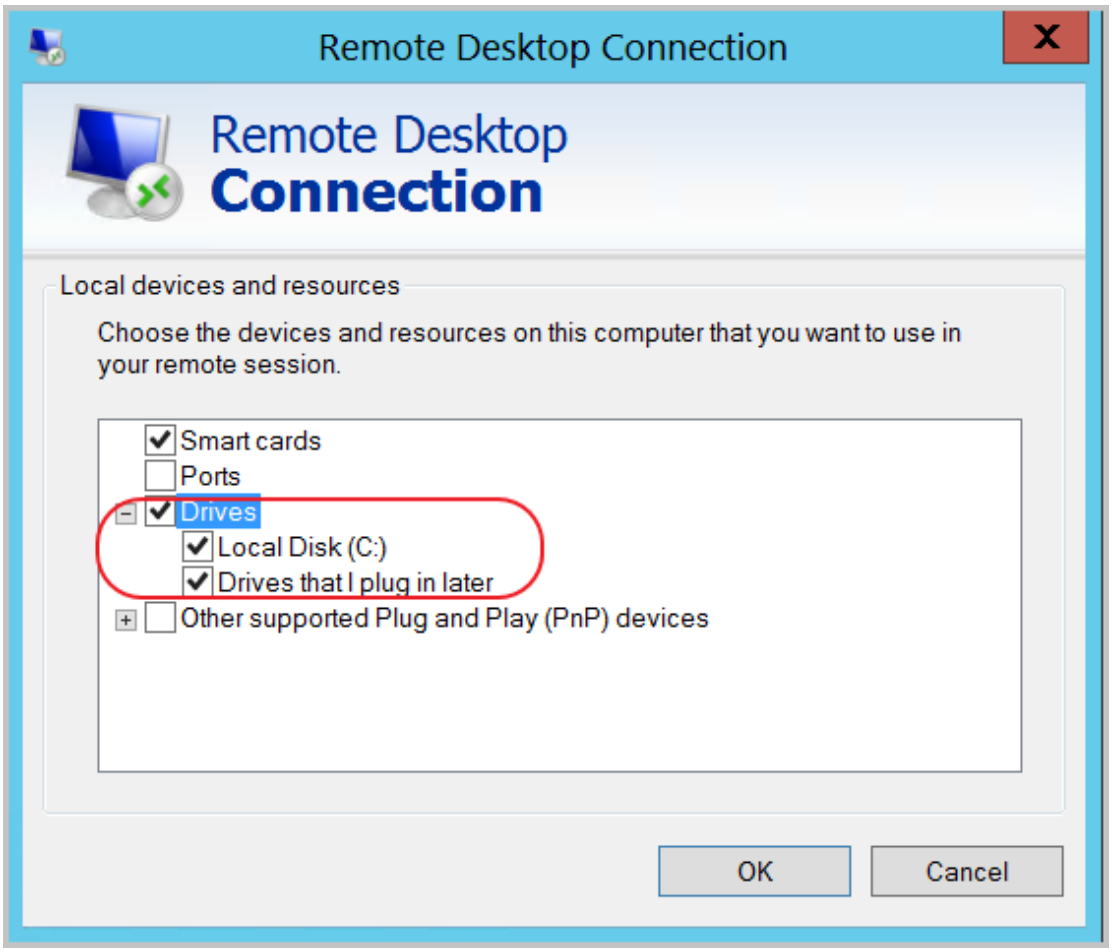
If you want to log on to the instance next time without repeating these steps, select **Allow me to save credentials**.



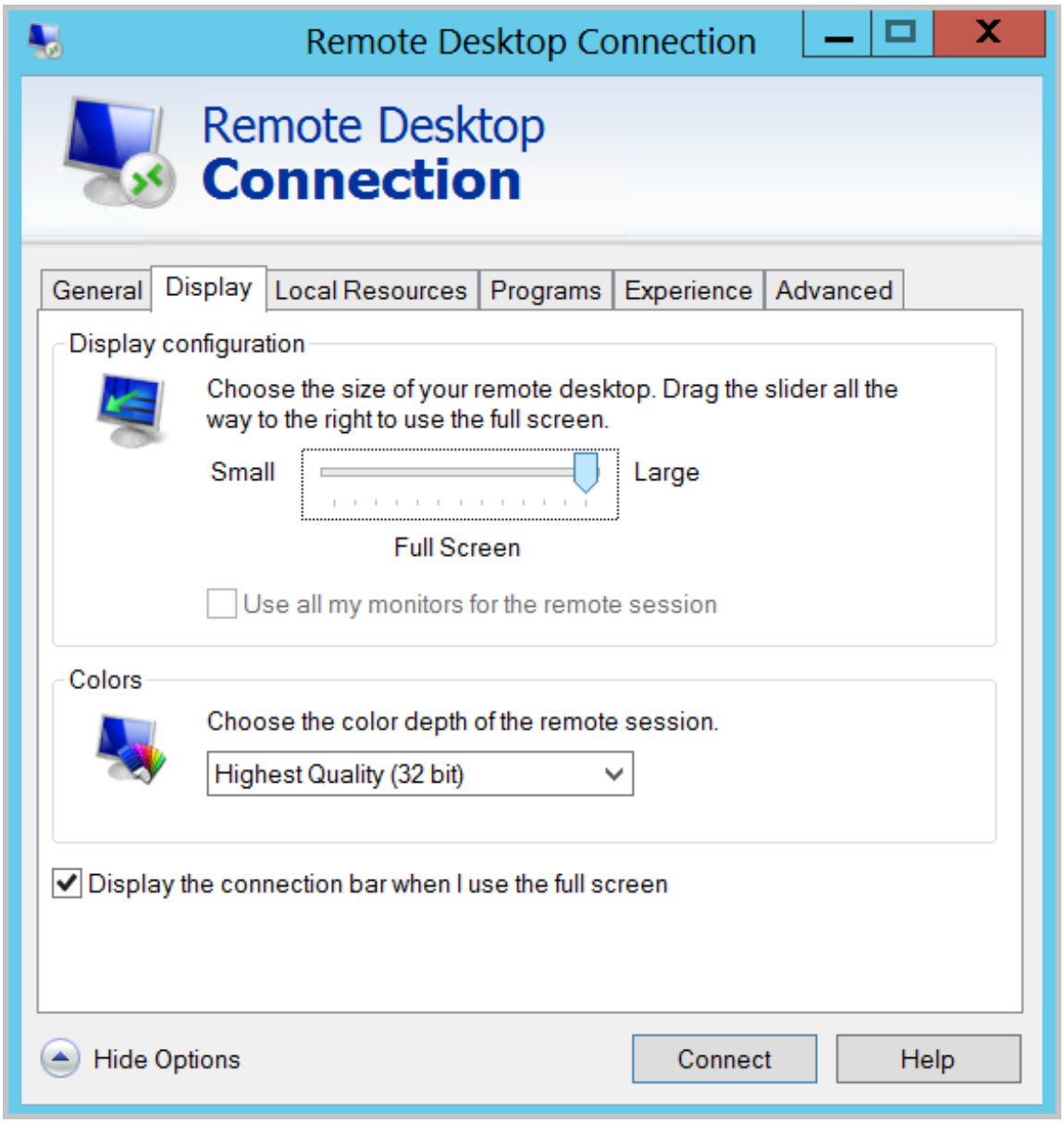
d. Optional. If you want to copy text or files from the local machine to the instance, click the **Local Resources** tab to see options for sharing local computer resources.

- If you want to copy text only, select **Clipboard**.
- If you also want to copy files, select **More** and select drive letters from which you want to copy files to your instance and click OK.


Remote Desktop Connection
Remote Desktop
Connection
General
Display
Local Resources
Programs
Experience
Advanced
Remote audio
Configure remote audio settings.
Settings...
Keyboard
Apply Windows key combinations:
Only when using the full screen
Example: ALT+TAB
Local devices and resources
Choose the devices and resources that you want to use in your remote session.
Printers
Clipboard
More...
Hide Options
Connect
Help



e. Optional. Click the **Display** tab and resize the remote desktop window. Full Screen is recommended.



f. Click **Connect**.

Now, you can operate on the instance.

Linux

If the local machine is running Linux OS, you can use a remote connection tool to create a remote connection to a Windows instance. This article takes rdesktop as an example to describe how to connect a Windows instance from a local machine running Linux.

1. Download and start rdesktop.

2. Run the command to connect to a Windows instance. Replace the parameter values with your own configurations.

```
rdesktop -u administrator -p password -f -g 1024*720 192.168.1.1 -r
clipboard:PRIMARYCLIPBOARD -r disk:sunray=/home/yz16184
```

The parameter descriptions are as follows.

Parameters	Description
-u	The user name. The default user name for Windows instance is Administrator.
-p	The password used to log on to the windows instance.
-f	Full screen by default. Use **Ctrl**+**Alt**+**Enter** to switched the mode.
-g	Resolution. Asterisks (*) are used for separation. If omitted, full-screen display by default.
192.168.1.1	The IP address of the server that requires remote connection. Replace it with the public IP or EIP address of your windows instance.
-d	Domain name. For example, if the domain name is INC, then the parameter is `-d inc`.
-r	Multimedia reorientation. For example: • Turn on the sound:`--r sound`. • Use a local sound card:-r sound: `-r sound : local`. • Open the U Disk: `-r disk:usb=/mnt/usbdevice`.
-r clipboard:PRIMARYCLIPBOARD	Realizes direct word copying and pasting between Linux and Windows instances of local devices. Supports Chinese words copying and pasteing.
-r disk:sunray=/home/yz16184	Specifies that a directory on Linux system of a local device maps to a hard disk on a Windows instance. In this way, you can no longer rely on Samba or FTP to transfer files.

For more information about all the parameters of the `rdesktop` command, see *rdesktop documentation*.

Local devices use Mac OS Operating System

When connecting windows instances from Mac OS, must first download install Microsoft Remote on Mac App Store Desktop Connection for Mac. If you only have a Chinese apple account, you can download microsoft's official Microsoft remote from the hockeyapp. Desktop for Mac beta. This software applies only to Mac OS 10.10 and later systems.

This section is Microsoft Remote Desktop for Mac beta (MRD beta) for example, how to use Mac Connect windows instances on OS:

- *First connection*
- *Connect again*

First connection

Your first MRD on Mac OS When beta connects windows instance, follow these steps:

1. Start MRD beta.
2. Click get started.

3. In the quick connect window, enter the public or EIP address of Windows instance, and click Connect.

4. In the pop-up dialog box, enter your login information:
   - User name: Enter Administrator. The Default User Name For Windows instances is Administrator.
   - Password: Enter the instance login password.

5. In the pop-up dialog box, click Continue.

At this point, you have successfully logged on Windows instance desktop.

Connect again

MRD on Mac OS for the second time and later When beta connects windows instance, follow these steps:

1. Start MRD beta.
2. Click Add desktop, and on the pop-up add Desktop Dialog box, set PC name and select how to connect later (User Account), and click Save.
3. Select the instance icon.
4. In the toolbar, select  > **Connect**.
5. In the pop-up dialog box, enter your login information:
   - User name: Enter Administrator. The Default User Name For Windows instances is Administrator.
   - Password: Enter the instance login password.
6. In the pop-up dialog box, click Continue.

At this point, you have successfully logged on Windows instance desktop.

Android or iOS

If your local machine is running Android OS or iOS, you can use various apps to connect to a Linux instance. For more information, see *Connect to an instance on a mobile device*.

Reference Links

Connection failed, you can refer to this document for troubleshooting issues: you cannot connect windows instance.

4.6 Connect to an instance on a mobile device

This documentation describes how to connect to an ECS instance on a mobile device. The procedure varies with the operating system of your instance.

- *Connect to a Linux instance*: We take SSH Control Lite as an example to describe how to connect to a Linux instance on an iOS device, and JuiceSSH to describe how to connect to a Linux instance on an Android device.

- *Connect to Windows instances*: We take Microsoft Remote Desktop as an example to describe how to connect to a Windows instance on an iOS or Android device.

Connect to a Linux instance

Prerequisites

Confirm the following before connecting to your instance:

- The instance is **Running** .
- The instance has a public IP address and is accessible from public network.
- You have set the logon password for the instance. If the password is lost, you must *reset the instance password*.
- The security group of the instance has the *the following security group rules*:

Network type	NIC	Rule direction	Authorization policy	Protocol type	Port range	Authorization type	Authorization object	Priority
VPC	No configuration required	Inbound	Allow	SSH(22)	22/22	Address Field Access	0.0.0.0/0	1
Classic	Internet							

- You have downloaded and installed the appropriate app:
  - The iOS device has SSH Control Lite installed.
  - The Android device has JuiceSSH installed. You can get it from various Android app markets.

Procedure

For iOS devices, see *Use SSH Control Lite to connect to a Linux instance*. In this example, user name and password are used for authentication.

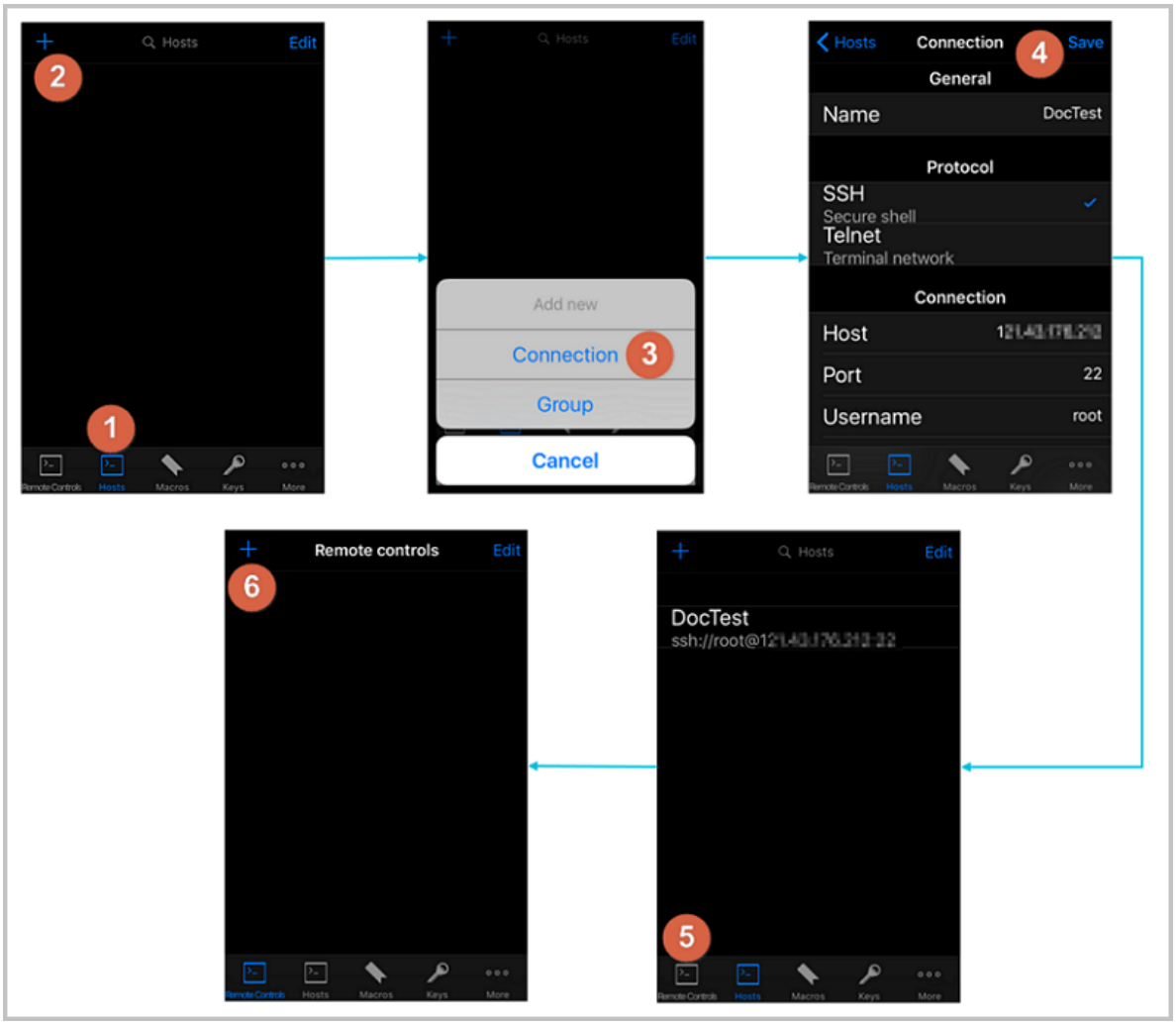
For Android devices, see *Use JuiceSSH to connect to a Linux instance*. In this example, user name and password are used for the authentication.

Use SSH Control Lite to connect to a Linux instance

1. Start SSH Control Lite, and tap **Hosts**.
2. Tap the **+** icon in the upper left corner of the **Hosts** page.
3. In the action sheet, tap **Connection**.

4. On the **Connection** page, set the connection information and tap . The following connection information is required:
   - **`Name`**: Specify the Host name. `DocTest` is used in this example. .
   - **`Protocol`**: Use the default value SSH.
   - **`Host`**: Type the public IP address of the Linux instance to connect to.
   - **`Port`**: Type the port number for SSH protocol. 22 is used in this example.
   - **`Username`**: Type `root` for the user name.
   - **`Password`**: Type the logon password of the instance.
5. In the tool bar, tap **Remote Controls**.
6. On the **Remote Controls** page, tap the **+** icon in the upper left corner to create a remote connection session. `New remote` is used in this example.

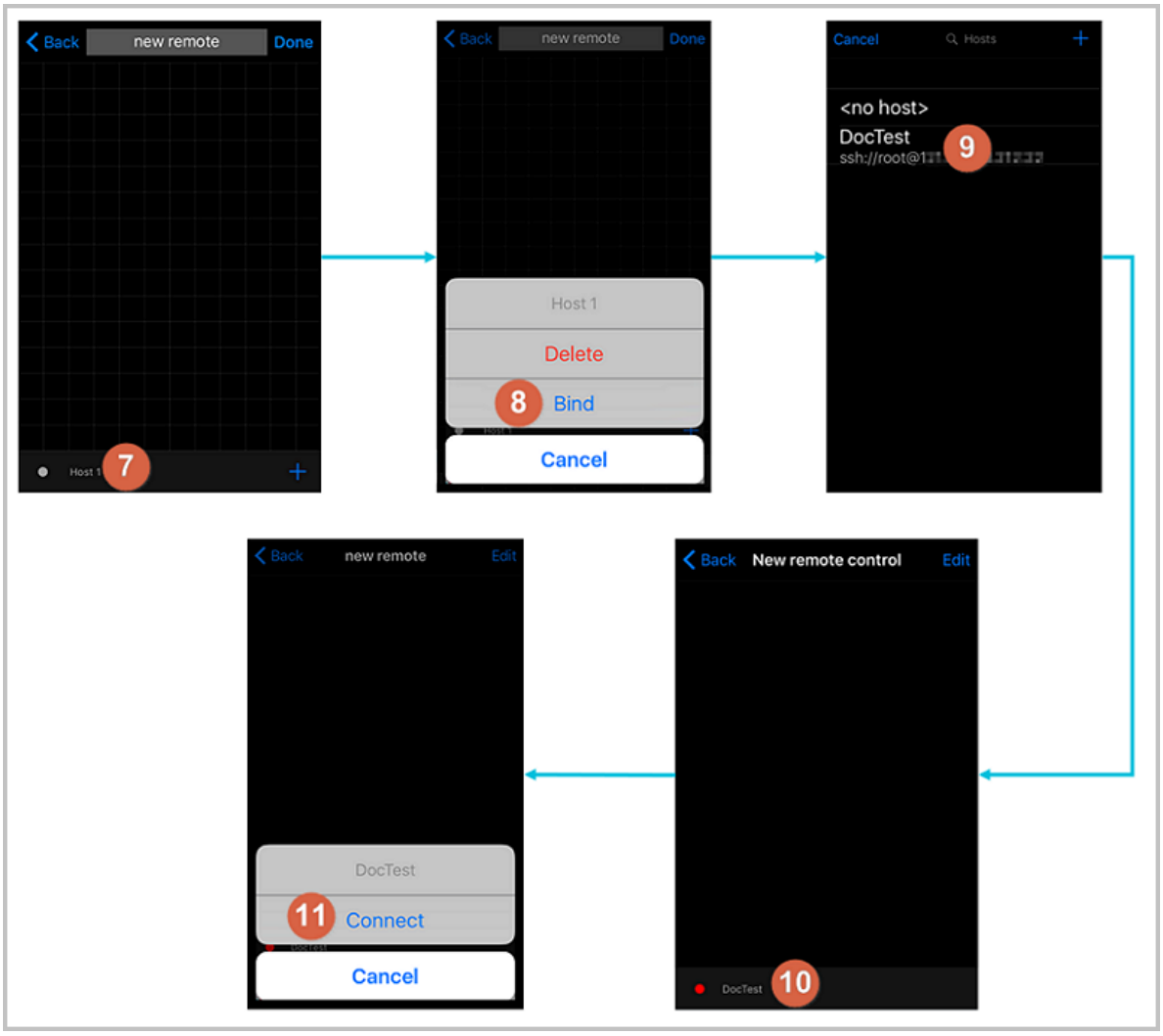
   The following figure shows Steps 1 through 6.



7. On the **New remote** page, tap **Host1**.

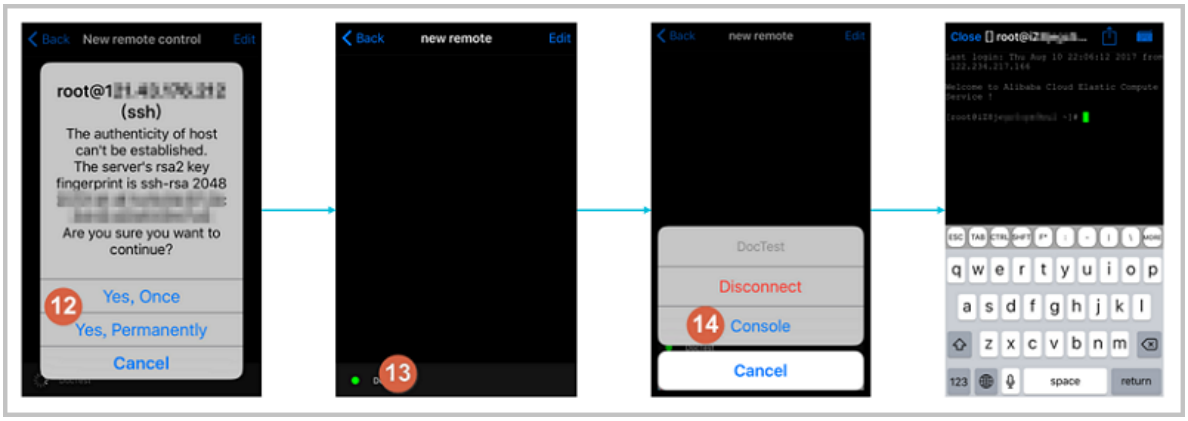
8. In the action sheet, tap **Bind**.
9. Select the new Linux instance. In this example, select `DocTest`.
10. On the **New remote** page, tap **Done** to switch it to the **Edit** mode, and then tap **DocTest**.
11. In the action sheet, tap **Connect**.

The following figure shows Steps 7 through 11.



12. In the action sheet, select **Yes, Once** or **Yes, Permanently**. Once the connection is successful, the indicator in front of **DocTest** turns green.
13. On the **New remote** page, tap **DocTest**.
14. In the action sheet, tap **Console** to open Linux instance console.

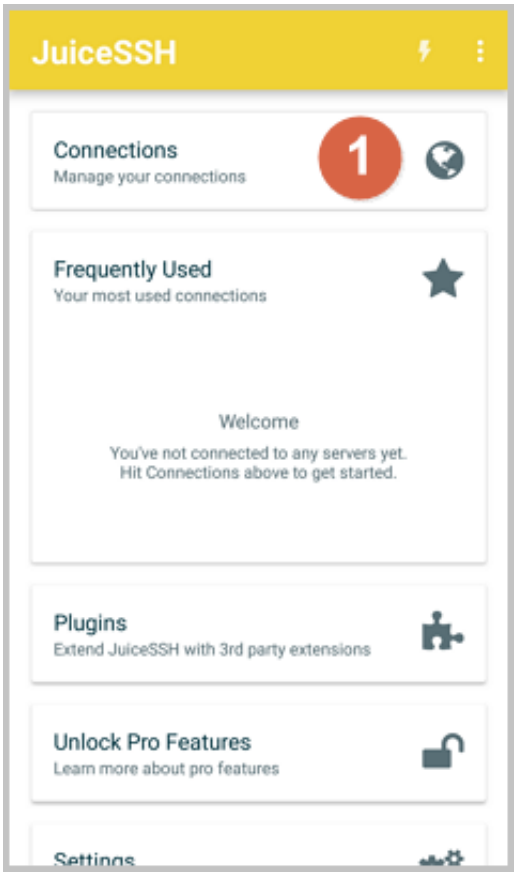
The following figure shows Steps 12 through 14:



Now, you are connected to the Linux instance.

Use JuiceSSH to connect to a Linux instance

1. Start JuiceSSH, and tap **Connections**.



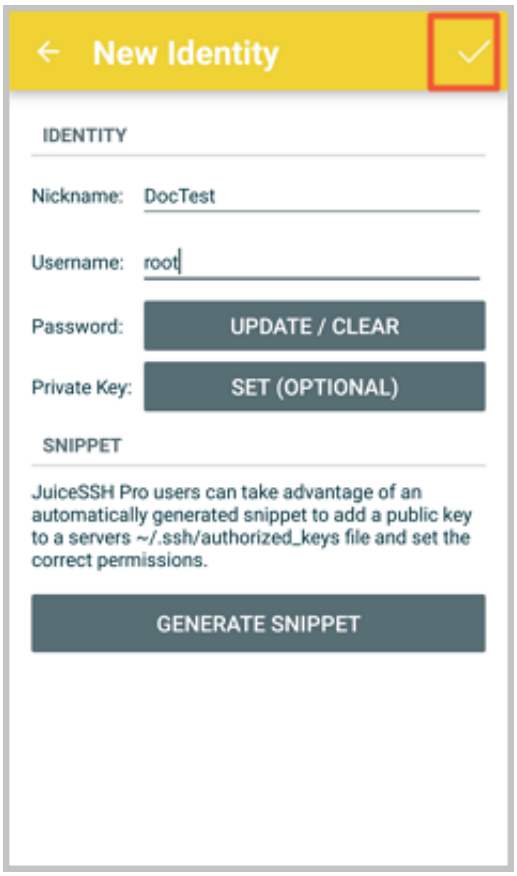
2. Under the **Connections** tab, tap the **+** icon.

3. On the **New Connection** page, add the connection information and tap the icon. The following connection information is required:

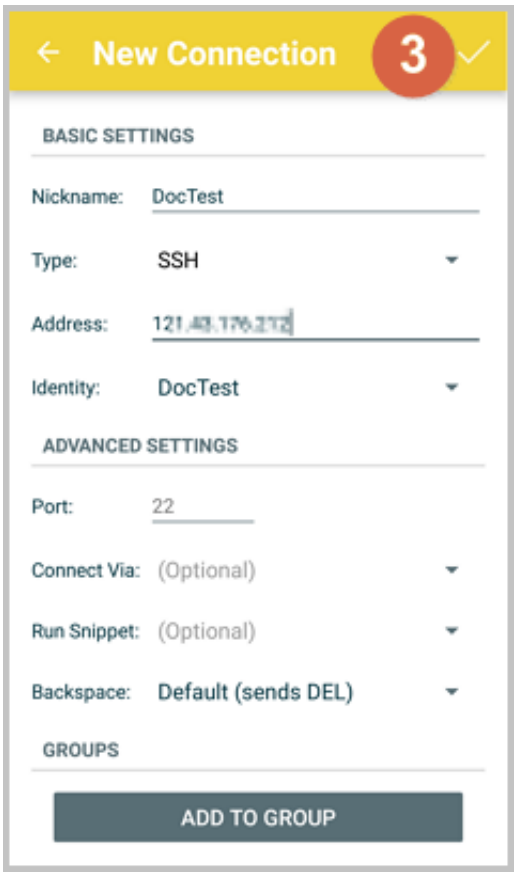
   - **Nickname**: Specify the name of the connection session. `DocTest` is used in this example.
   - **Type**: Use the default value SSH.
   - **Address**: Type the public IP address of the Linux instance to connect to.
   - To set**I Identity**, follow these steps:

     1. Tap **Identity**, and tap **New** in the drop-down list.
     2. On the **New Identity** page, add the following information and tap the icon. The following connection information is required:

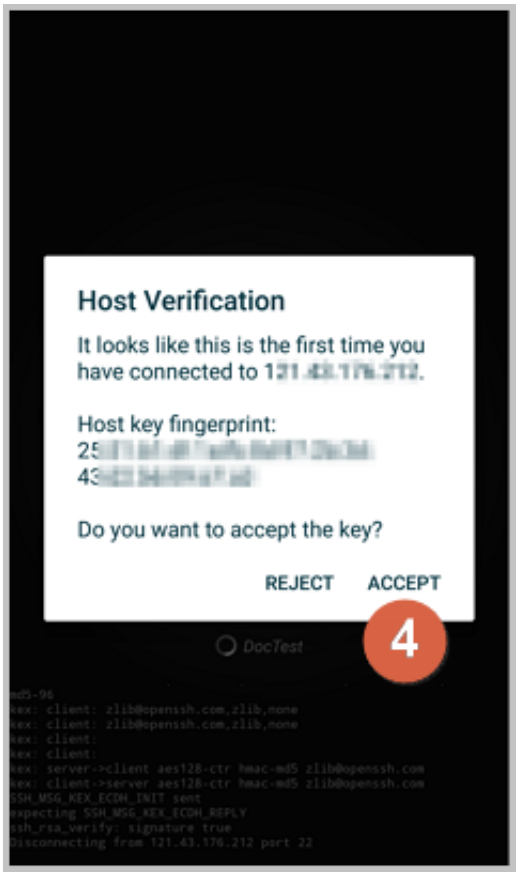
        - **Nickname**: Optional. You may set a nickname to ease management. `DocTest` is used in this example.
        - **Username**: Type `root` for the user name.
        - **Password**: Tap **SET(OPTIONAL)**, and type the logon password of the instance.



- **`Port`**: Type the port number for SSH protocol. In this example, 22 is used.

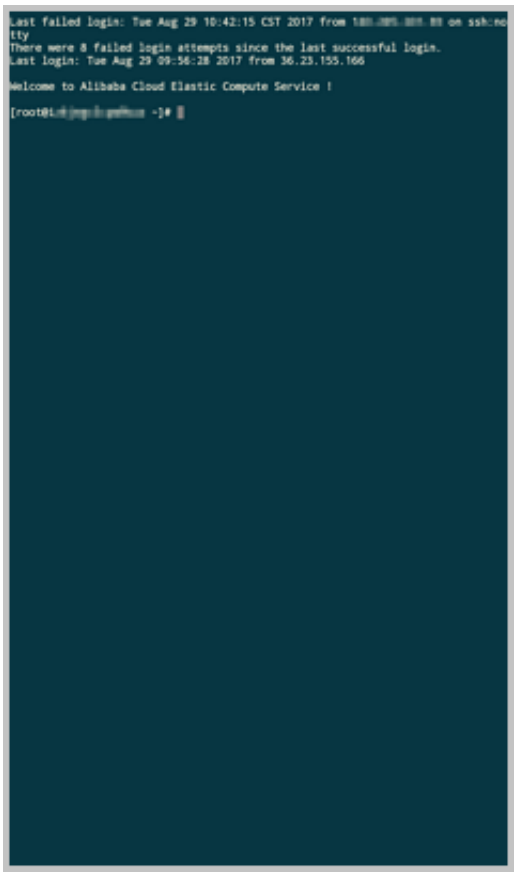


4. Confirm the message, and tap **ACCEPT**.



5. (Optional) For the first connection, the app would offer you some tips about font setting and the like. Confirm the message, and tap **OK - I'VE GOT IT!**.

Now, you are connected to the Linux instance.



Connect to Windows instances

In this section, we take Microsoft Remote Desktop as an example to describe how to use an app to connect to a Windows instance on a mobile device.

Prerequisites

Confirm the following before connecting to your instance:

- The instance is **Running**.
- The instance has a public IP address and is accessible from public network.
- You have set the logon password for the instance. If the password is lost, you must *reset the instance password*.
- The security group of the instance has *the following security group rules*:

Network type	NIC	Rule direction	Authorization policy	Protocol type	Port range	Authorization type	Authorization object	Priority
VPC	No configurat	Inbound	Allow	RDP(3389)	3389/3389	Address field access	0.0.0.0/0	1

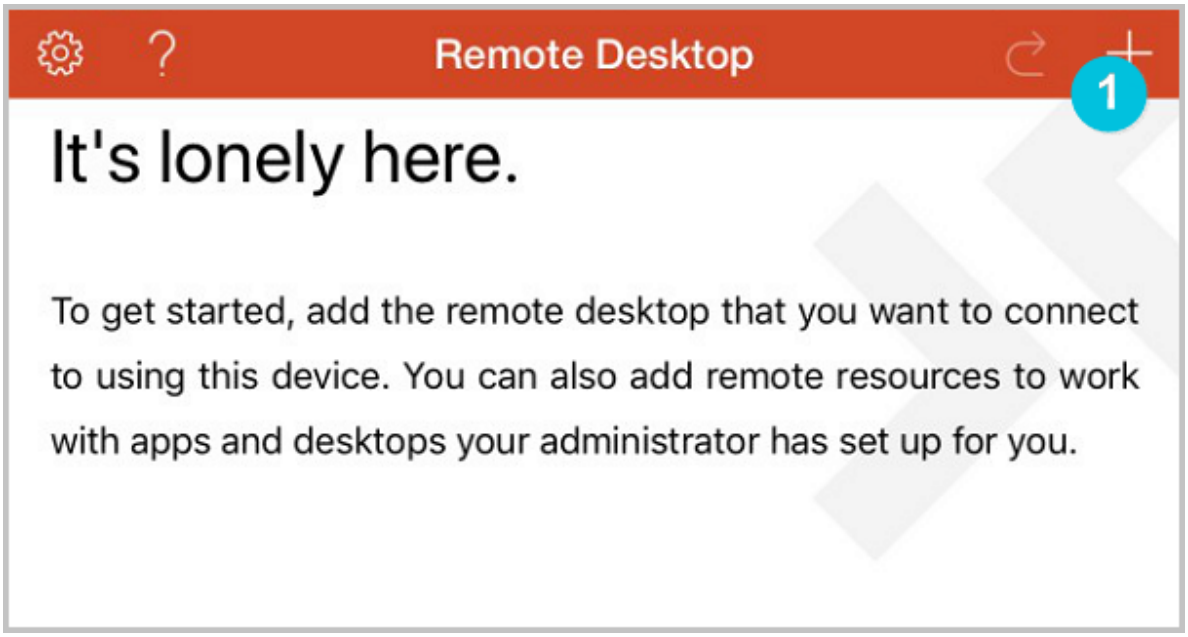
Network type	NIC	Rule direction	Authorization policy	Protocol type	Port range	Authorization type	Authorization object	Priority
	ion required							
Classic	Internet							

- You have downloaded and installed Microsoft Remote Desktop.
  - For iOS devices, download the app from iTunes.
  - For Android devices, download the app from Google Play.

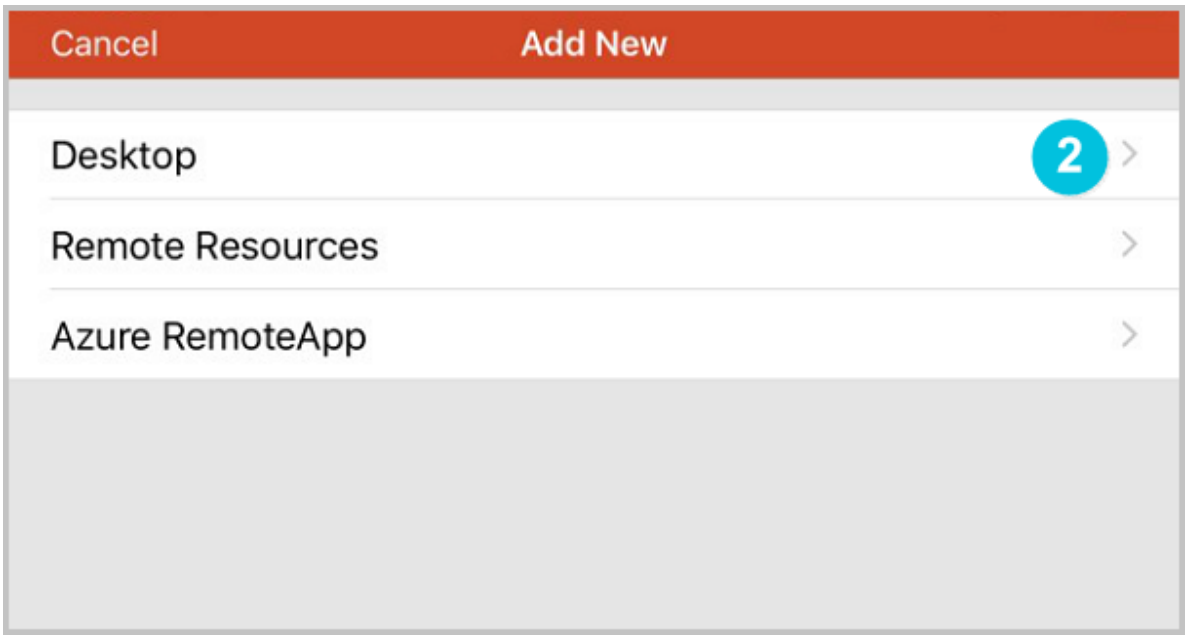
Procedure

To connect to a Windows instance by using Microsoft Remote Desktop, follow these steps:

1. Start RD Client. In the navigation bar, tap the **+** icon.

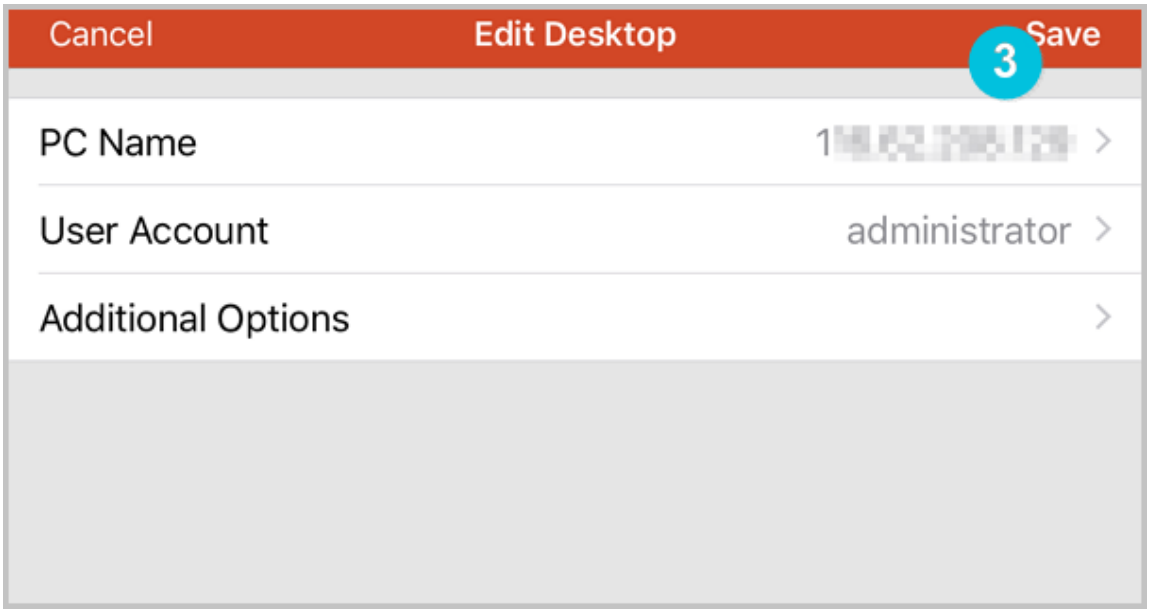


2. On the **Add New** page, select **Desktop**.

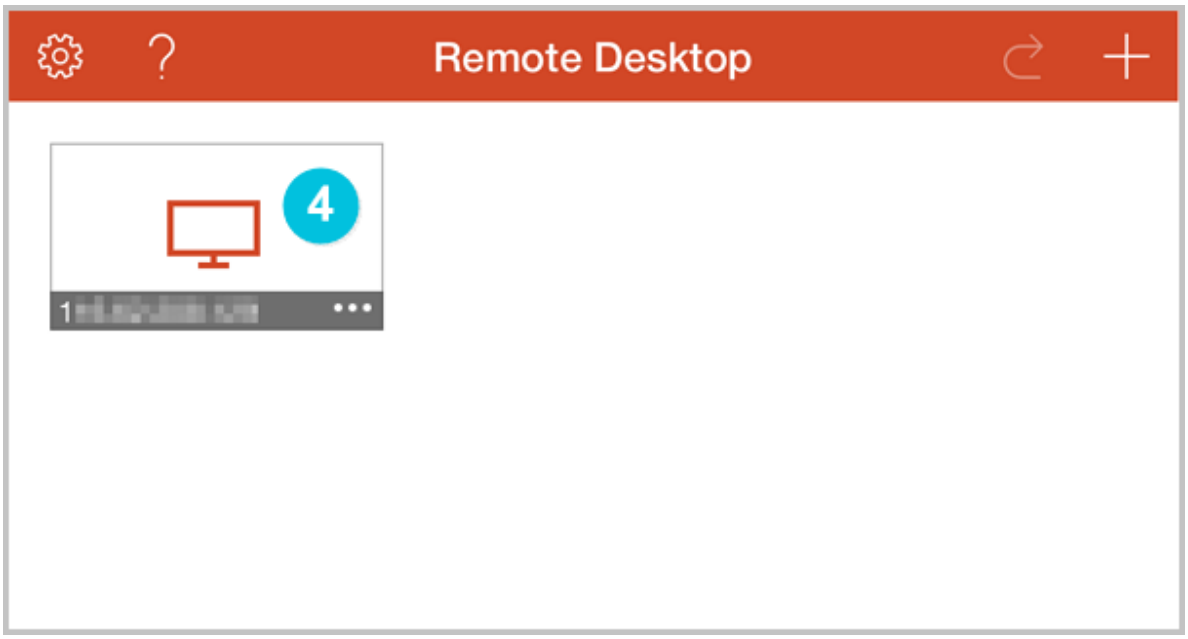


3. On the **Edit Desktop** page, type the connection information and tap **Save**. The following connection information is required:

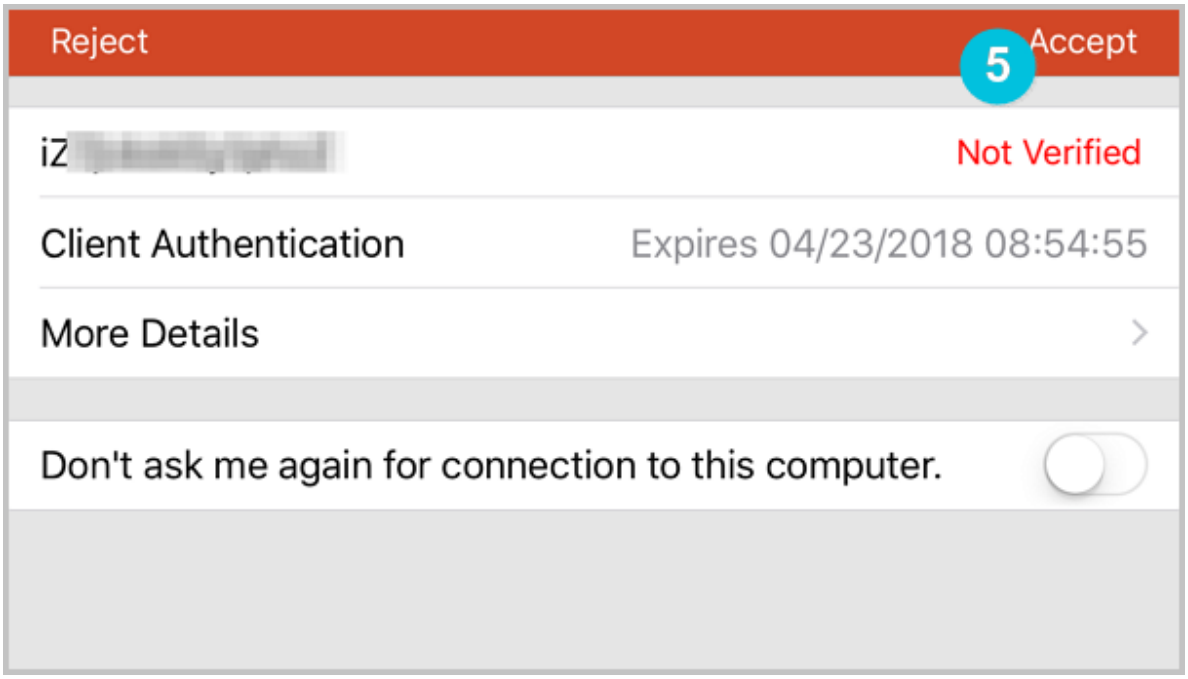
   - **`PC Name`**: Type the public IP address of the Windows instance to connect to.
   - **`User Account`**: Type the account name `administrator` and the logon password of the Windows instance.



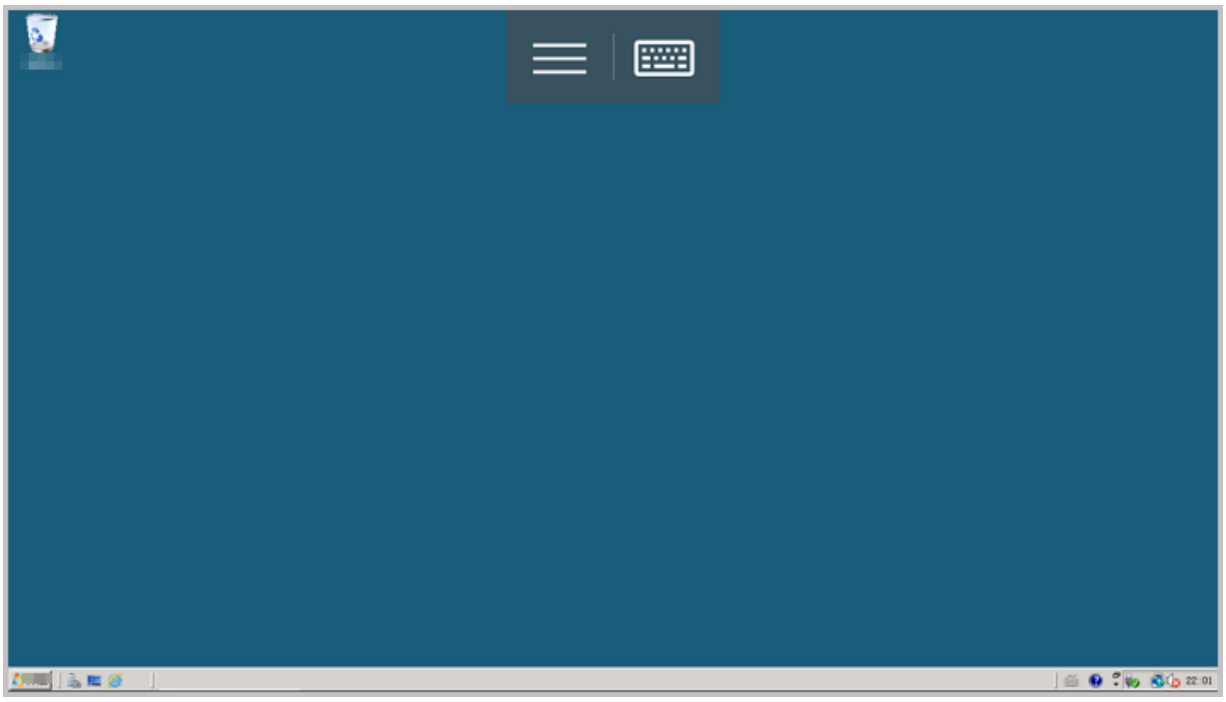
4. On the **Remote Desktop** page, tap the icon of a Windows instance.



5. On the confirmation page, confirm the message and tap **Accept**.



Now, you are connected to the Windows instance.



5 Instances

5.1 Create an instance

5.1.1 Create an instance of the same configuration

Context

To meet your growing business demands of having more ECS instances of the same configurations, use the **Buy the Same Configuration** feature.

Procedure

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click **Instances**.
4. Find your ECS instance, and in the **Actions** column, select **More >** > **Buy the Same Configuration**.
5. On the **Buy the Same Configuration** page, confirm the selected configurations in the Overview section. If you want to change other configurations, select **View More** and change the billing method, security group, network billing method, bandwidth, logon credential, or instance name.
6. To purchase a Subscription ECS instance, you can change its purchase cycle.
7. Set a **quantity**.
8. Read and confirm the ECS Service Terms.
9. To purchase a Subscription ECS instance, click **Create Order**. To purchase a Pay-As-You-Go ECS instance, click **Activate**.

5.1.2 Create an instance from a custom image

If you want to run an ECS instance on Alibaba Cloud that runs an operating system, software applications, and data on an ECS instance, a virtual machine, or a cloud server, you can create a custom image and use it to create an ECS instance. This method improves the deployment efficiency.

Context

- If the image and the instance are in the same region, create a custom image by using one the following methods:

- *Import images*
- *Create a custom image by using an instance*
- *Create a custom mirror using a snapshot*

- If the custom image and the instance are in different regions, copy the custom image to the target region. For more information, see *Copy custom images*.
- If the image to be used is not owned by another account, it must be shared with you. For more information, see *Share images*.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. In the upper-right corner of the page, click **Create Instance**.
4. On the purchase page, follow the steps mentioned in *Create an ECS instance* in the Quick Start. However, before doing so, consider the following:
   - Region: Select the region where the image is located.
   - Image: Select **Custom Image** or **Shared Image**, and then select an image from the drop-down list.

   Note:
   If the selected custom image contains more than one data disk snapshot, an equal number of cloud disks are automatically created to work as data disks. By default, the size of each data disk is equal to that of the source snapshot. You are only allowed to increase the size of a data disk and you cannot decrease it.
5. Confirm the order.

5.1.3 Create an f1 instance

This article describes how to create an f1 instance.

Procedure

Follow the steps described in the Procedure section of *Create an ECS instance*, but before doing so, consider the following:

- **Region**: Select **China East 1 (Hangzhou)** > **China East 1 Zone F**.
- **Instance Type**: Select **Heterogeneous Computing** > **FPGA** > **Compute**. And select the appropriate F1 instance type.

- **Image**: In the **image market**, select **FaaS F1 image**.

  Note:
  You can find quartus17.0, vcs2017.3, dcp sdk in the *opt* directory.

- **Network**: Select VPC, and select a **VPC and VSwitch**.

After an f1 instance is created, *connect to the instance*, and run the following command to check whether the License is configured.

```
echo $LM_LICENSE_FILE #To check whether the variable is set.
```

Best practices

See best practices of f1 instances:

- *Use OpenCL on an f1 instance*
- *Using f1 RTL (Register Transfer Level)*

5.1.4 Create an f2 instance

This article describes how to create an f2 instance.

Operation Steps

Follow the steps described in the Procedure section of *Create an ECS instance* , but before doing so, consider the following:

- **Region**: Select **China East 1 (Hangzhou) >** > **China East 1 Zone B**.
- **Instance Type**: Select **Heterogeneous Computing > FPGA** > **Compute**.
- **Image**: In the **image market**, select FA**FaaS F2 image**.
- **Network**: Select **VPC**, and select a VPC and VSwitch.

Best practices

Use OpenCL on an f2 instance

5.1.5 Create an f3 instance

This article describes how to create an f3 instance.

Note:

Due to limited computing resources, we recommend that you use instances with four cores or more for testing, for example, instance type family g5-ecs.g5.2xlarge (8 vCPU core, 32 GiB). Create an f3 instance when you need to download the image to the FPGA chipset.

Prerequisites

The f3 instance type family is currently available for testing by invited users. *Open a ticket* to request a free f3 instance test.

Procedure

For more information about how to create an f3 instance, see *Create an ECS instance*. When you create an f3 instance, follow these guidelines:

- **Billing method**: Select **Pay-As-You-Go** or **Subscription**.

  Note:

  - During the testing phase, f3 instances are available for free. Other ECS resources including cloud disks, public network bandwidth, and snapshots will incur usage fees.
  - f3 instances are not available as preemptible instances.
- **Region**: Select **China East 2 (Shanghai)**.
- **Instance Type**: Select **Heterogeneous Computing** > **FPGA Compute**, and then select your required instance type.
- **Image**: Click **Shared Image**, and then select the specified image.

  Note:
  We have provided a Xilinx image for development use. At present, the image can only be retrieved through image sharing.
- **System Disk**: We recommend that you allocate a 200 GiB Ultra Cloud Disk for the system image.
- **Network**: Select **VPC**.

Best practices

For the best practices of f3 instances, see *Use RTL compiler on an f3 instance*.

5.1.6 Create an EBM instance

You can see *create an ECS instance* to create an EBM instance. When creating an EBM instance, consider the following:

- **Region**: Currently, EBM instances are available in the following regions and zones: **China East 2 (Shanghai), Zone D**, **China North 2 (Beijing), Zone C**, **China East 1 (Hangzhou), Zone G**, **China South 1 (Shenzhen), Zone D**.
- **Instance Type**: The ebmhfg5, ebmc4, and ebmg5 type families are available. For more information about instance types, see*Instance type families*.
- **Image**: Only the following public images are supported.

Operating system	Image
Linux	• CentOS 7.2/7.3/7.4/6.9/6.8 64-bit • Ubuntu 14.04/16.04 64-bit • Debian 8.9/9.2 64-bit • OpenSUE 42.3 64-bit • SUSE Linux Enterprise Server 12 SP2 64-bit • Aliyun Linux 17.1 64-bit
Windows	• 2016 Data Center Edition 64-bit Chinese Edition • 2016 Data Center Edition 64-bit English Edition • 2012 R2 Data Center Edition 64-bit Chinese Edition • 2012 R2 Data Center Edition 64-bit English Edition

- **Storage**: EBM instances support up to 16 data disks. You can add a data disk here, or you can *add a disk* after the instance has been created, and *mount the data disk*.
- **Network**: Supports VPC only.

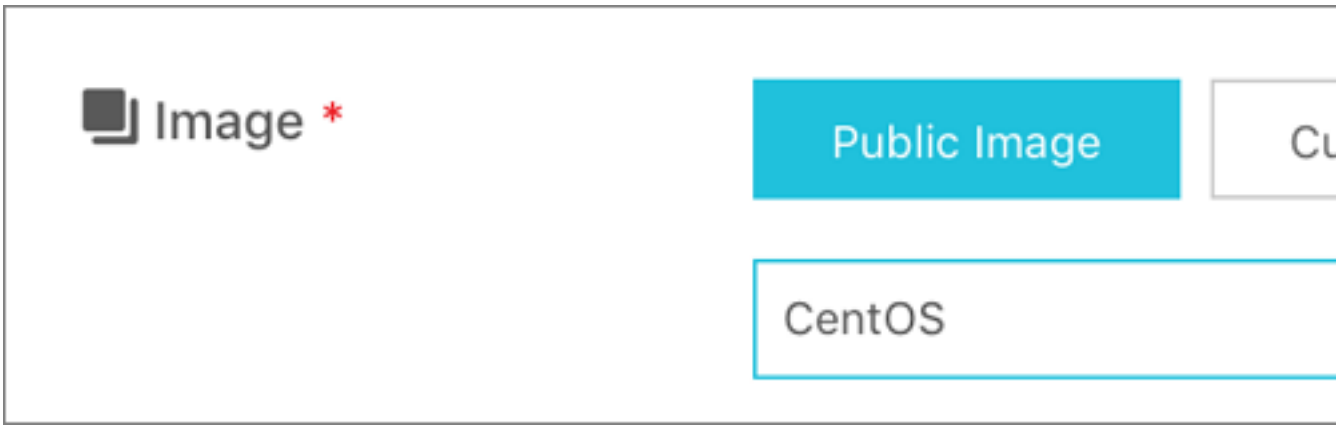
5.1.7 Create an SCC server instance

SCC are based on ECS Bare Metal (EBM) Instances. With the help of the high-speed interconnectivity of RDMA (Remote Direct Memory Access) technology, SCC greatly improve network performance and increase the acceleration ratio of large-scale clusters. Therefore, SCC have all the advantages of EBM Instances and they can provide high-quality network performance featuring high bandwidth and low latency. For more information, see *ECS Bare Metal Instance and Super Computing Clusters*.

This article describes some consideration when you create an SCC instance. For more information about creating an SCC instance, see *Create an ECS instance*.

You must consider the following when creating an SCC instance:

- **Region**: Currently, only **Zone D** and **Zone B** of **China East 2 (Shanghai)** provide SCC instances.
- **Instance type**: The scch5 and sccg5 type families are available. For more information about instance types, see *Instance type families*.
- **Image**: Select **Public Image**. Currently, only CentOS 7.5 For SCC is supported.



- **Storage**: SCC support up to 16 data disks. You can add a data disk during instance creation, or you can *add a disk* after the instance is created, and then*mount the data disk*.
- **Network**: Only VPC supports SCC.

5.2 Instance startup Templates

5.2.1 Create a template

You can create a template using the following methods:

- If you do not want to create instances at this time, you can still *Create a template in the ECS console* create templates using the ECS console, and then create instances using your required template in one click when needed.
- If you want to create an instance and save its configuration information, *Create a template on the ECS buy page* go to the ECS buy page to create templates.

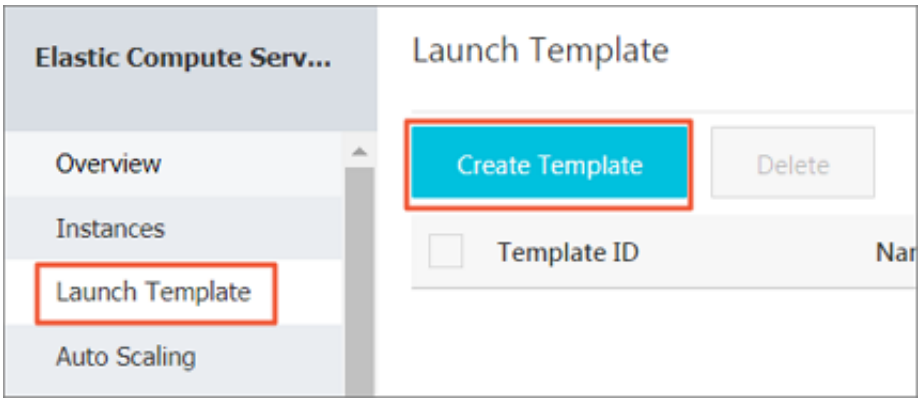
Note:

- In each region, one user account can only create a maximum of 30 launch templates.
- All parameters are optional when you create a template using the ECS console. However, if the template that you want to use to create an instance does not have all required parameters (such as an image), then you must specify the required parameters at instance creation.

- A template cannot be modified once you have created it.

Create a template in the ECS console

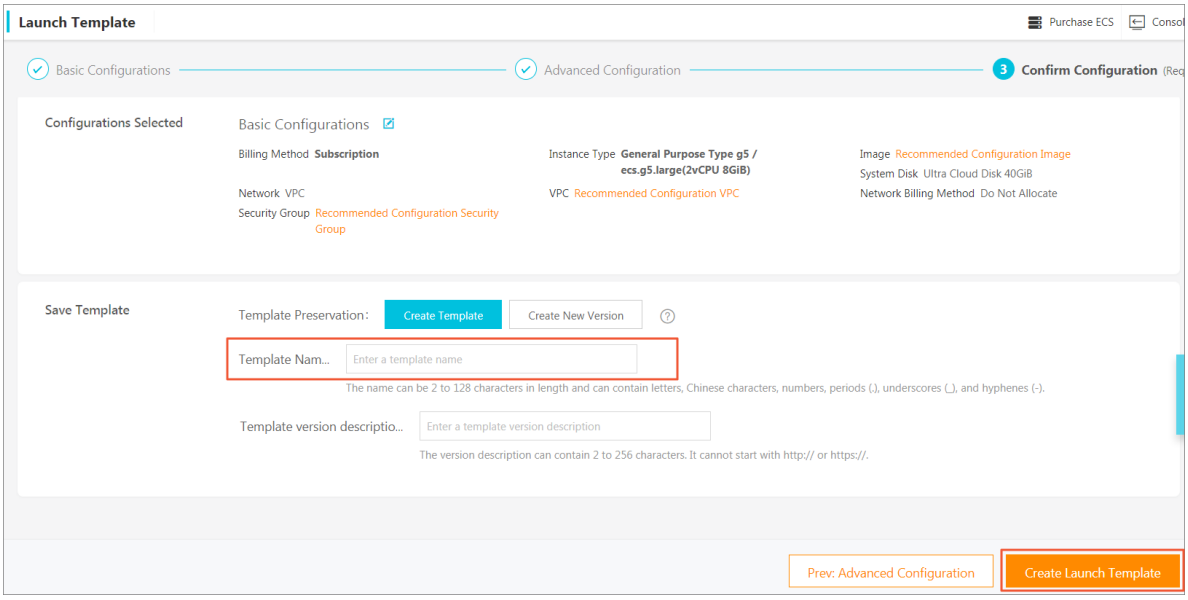
1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Launch Template**, and then click **Create Template**.



3. Go to the **Launch Template** page and complete the basic configurations and advanced configurations.

> **Note:**
> During your first template creation, the **Clone Template** area is unavailable. If you have already created templates, you can select an existing template, and version, and then modify its configurations.

4. On the **Confirm Configuration** page, enter a template name and description, and then click **Create Launch Template**.



> **Note:**
> All parameters are optional when you create a template. On the **Confirm Configuration** page, we recommend that you configure the required parameters so that you can create instances in one click later. You can also leave the parameter settings unchanged.

5. In the **Activated** dialog box, click **View Template** to view the template you have created.

Create a template on the ECS buy page

1. Go to the *ECS product details page*, and then click **Buy Now**.
2. On the **ECS buy page**, configure the parameters.
3. On the **Preview** page, click **Save as launch template**.
4. In the dialog box that appears, select **Create Template**, enter a template name and description, and then click **Save**.
5. In the **Activated** dialog box, click **View Template** to view the template you have created.

5.2.2 Create a template version

One template can have multiple versions. The default version number of a newly created template is 1. You can create additional versions based on this template. The version number automatically increments as you create a new version. You cannot customize the version number. You can set any of the template versions as the default version.

> **Note:**
> - Each template can have a maximum of 30 versions.
> - All parameters are optional when you create a template version.
> - The version cannot be modified once you have created it.

You can create a version using the following methods:

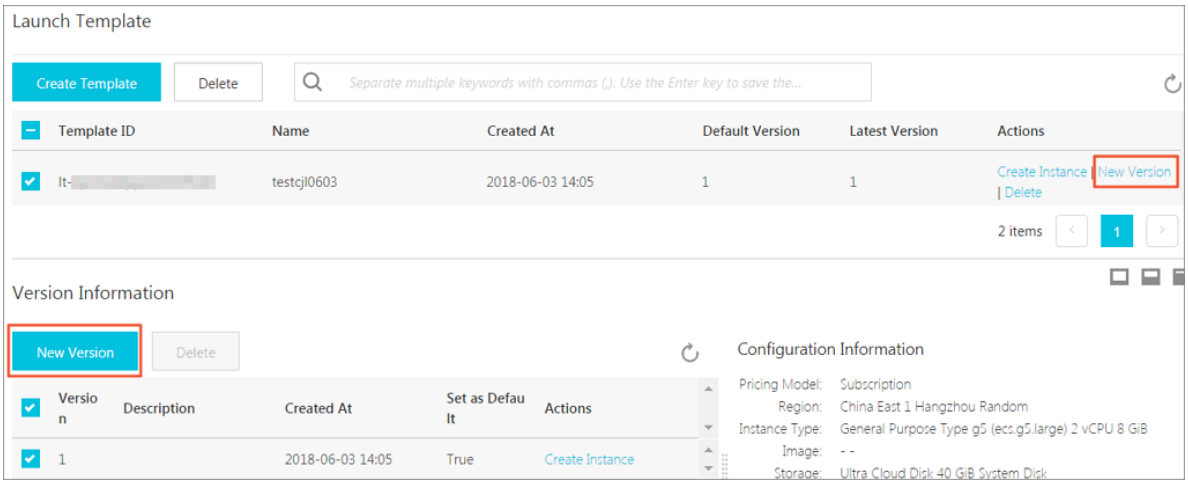
- If you do not want to create an instance now, you can still create multiple versions of a template *Create an instance using the ECS console* and create instances using your specified version later.
- If you want to create an instance and save the configuration information, go to the ECS buy page *Create an instance on the ECS buy page* to create versions of a template.

Prerequisites

You have already *Create a template*.

Create an instance using the ECS console

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Launch Template**.
3. Select a template ID to view its configurations, and then click **New Version**. You can also click **New Version** in the **Actions** column.



4. On the **Launch Template** page, set the parameters.

> **Note:**
> You can also go to the **Clone Template** area, select an existing template and version, and then set the parameters.

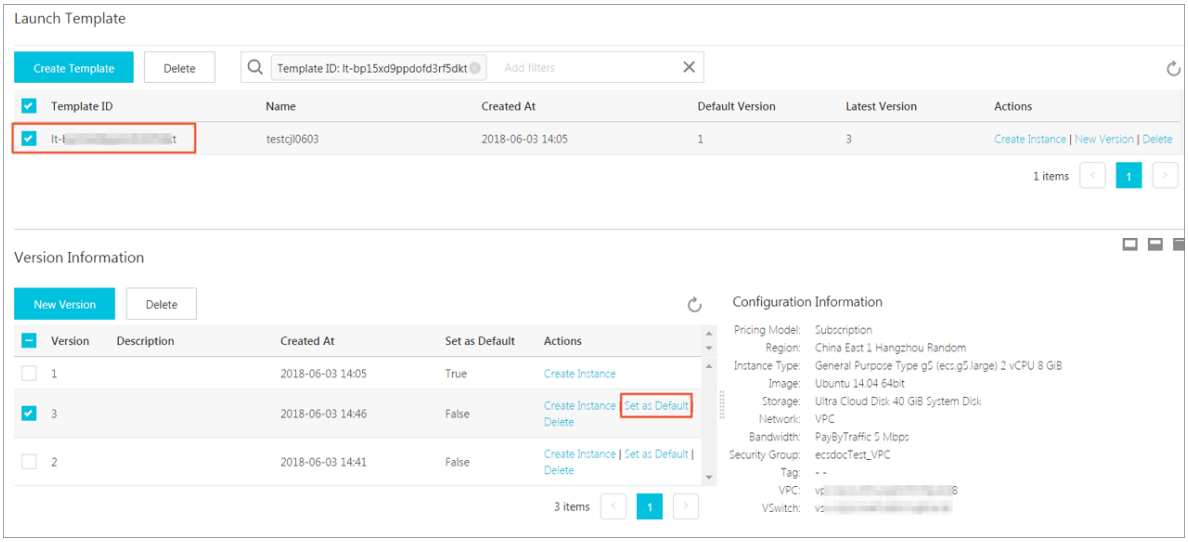
5. On the **Confirm Configuration** page, select **Create New Version**, and then select a template to save the version.
6. Click **Create Launch Template**.
7. In the dialog box that appears, click **View New Version** to view the version you have created.

Create an instance on the ECS buy page

1. Go to the *ECS product details page*, and then click **Buy Now**.
2. On the **ECS buy page**, configure the parameters.
3. On the **Preview** page, click **Save as launch template**.
4. In the dialog box that appears, click **Create New Version**, and then select a template to save the version.
5. In the **Activated** dialog box, click **View New Version** to view the version you have created.

Change the default version

1. In the ECS console, select a template ID that has multiple versions to view its version details.
2. Locate the version you want to set as default, and then click **Set as Default** in the **Actions** column.



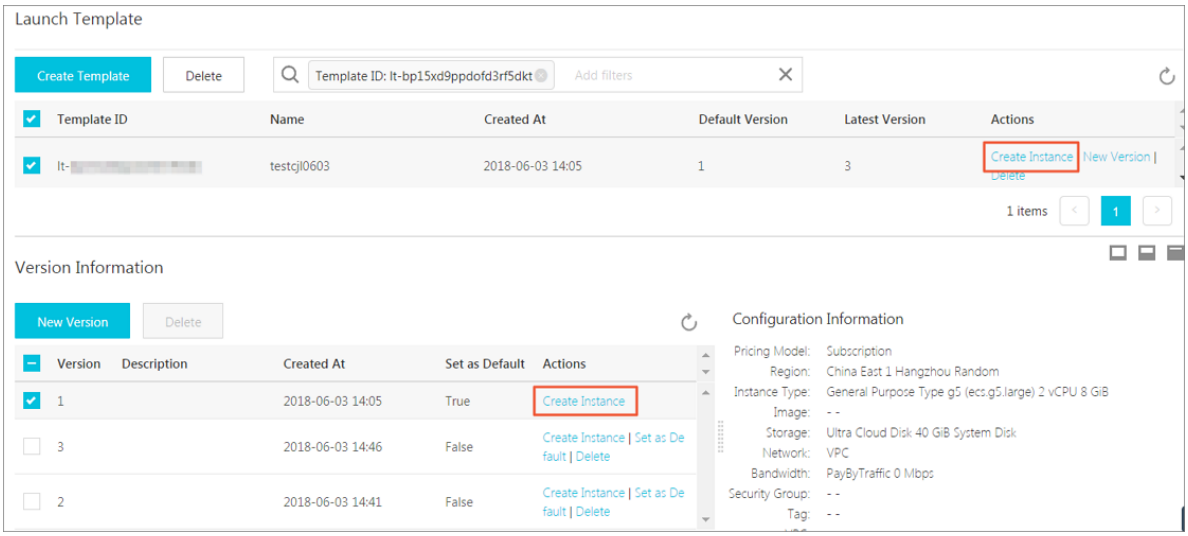
5.2.3 Use a launch template

Prerequisites

You have completed the *Create a template* or *Create a template version* step.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Launch Template**.
3. Locate the template or version that you want to use, click **Create Instance** in the **Actions** column.



4. On the **ECS buy page**, select the template and version. Verify the configurations when they are displayed.

> **Note:**
> If you want to modify the configurations, or the selected template does not have the required parameters, you can click the Change settings icon to modify the configurations.

5. If you want to create an instance using the Subscription billing method, choose a subscription duration, read and confirm you agree to the Terms of Service, and then click **Create Order**. After you complete the payment, you can view the newly created instance in the ECS console.

   If you want to create an instance using the Pay-As-You-Go billing method, read and confirm you agree to the Terms of Service, and then click **Create Instance**. After the instance is created successfully, you can view its details in the ECS console.

5.2.4 Delete a template or version

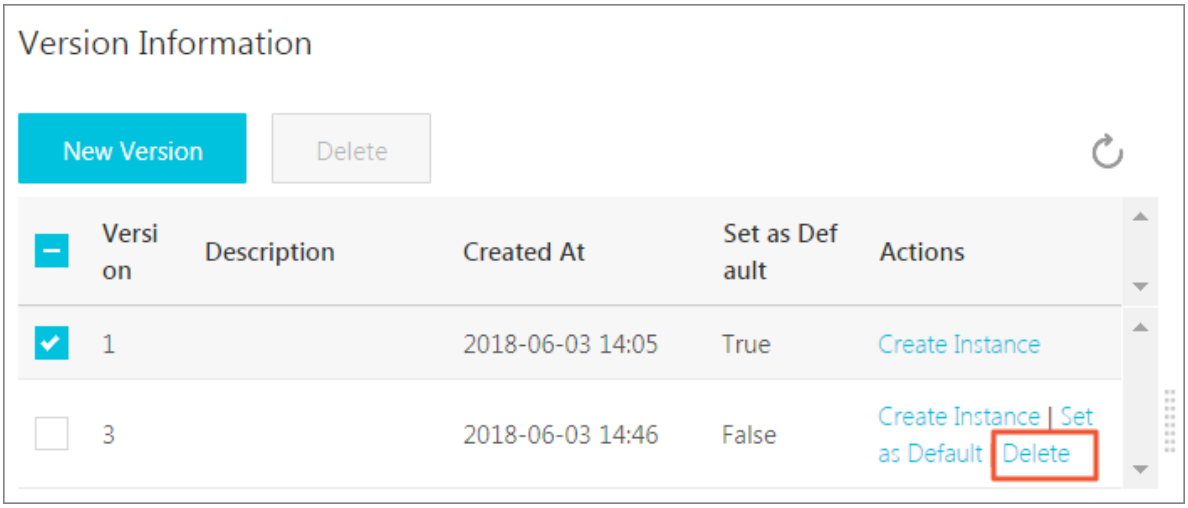
You can delete templates and versions using the ECS console. Once you delete a template, all the versions of that template are also deleted.

Delete a version

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Launch Template**.
3. Select a template ID and check its version details.
4. In the **Version Information** area, locate the version you want to delete, and in **Actions** column, click **Delete**.

Note:

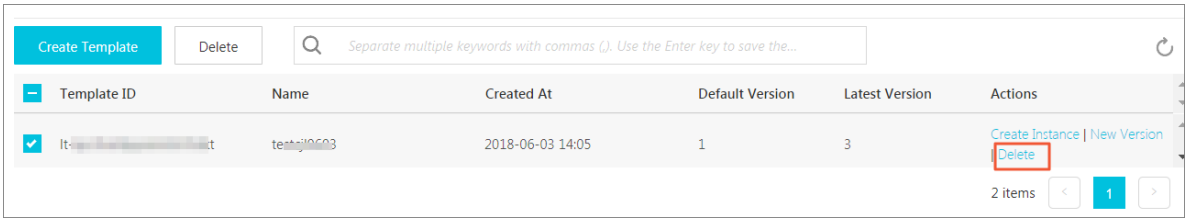
You cannot delete the default template version. You only can delete non-default versions. If the version you want to delete is the default version, change it to a non-default version, and then delete it. If all versions in a single template are not needed, we recommend that you delete the template.



5. In the dialog box that appears, click **OK**.

Delete a template

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Launch Template**.
3. Locate the version you want to delete, and click **Delete** in the **Actions** column.



4. In the dialog box that appears, click **OK**.

Note:

When you delete a template, all versions of the template are also deleted.

5.3 Check instance information

Through the console, you can check all the ECS instances you own. You can check the:

- On the *View all ECS instances under your account on the Overview page* or *View all ECS instances under your account on the Overview page* page, all ESC instances in all regions and their status under your account can be viewed.
- View all the ECS instances in a specified region on the Instance List page For details, see *View the information of ECS instances on the Instance List page*.
- Detailed information of any ECS instance on its **Instance Details** page. For details, see *View details of an ECS instance on Instance Details page*.

View all ECS instances under your account on the Overview page

You can view information of all the ECS instances created by your account on the ECS Overview page, including:

- Total number of ECS instance, and numbers of instances under each status.
- Number of resources in different regions and numbers of ECS instances under each status.
- Whether the ECS instance is attacked.

The homepage of the ECS console is the **Overview** page by default.

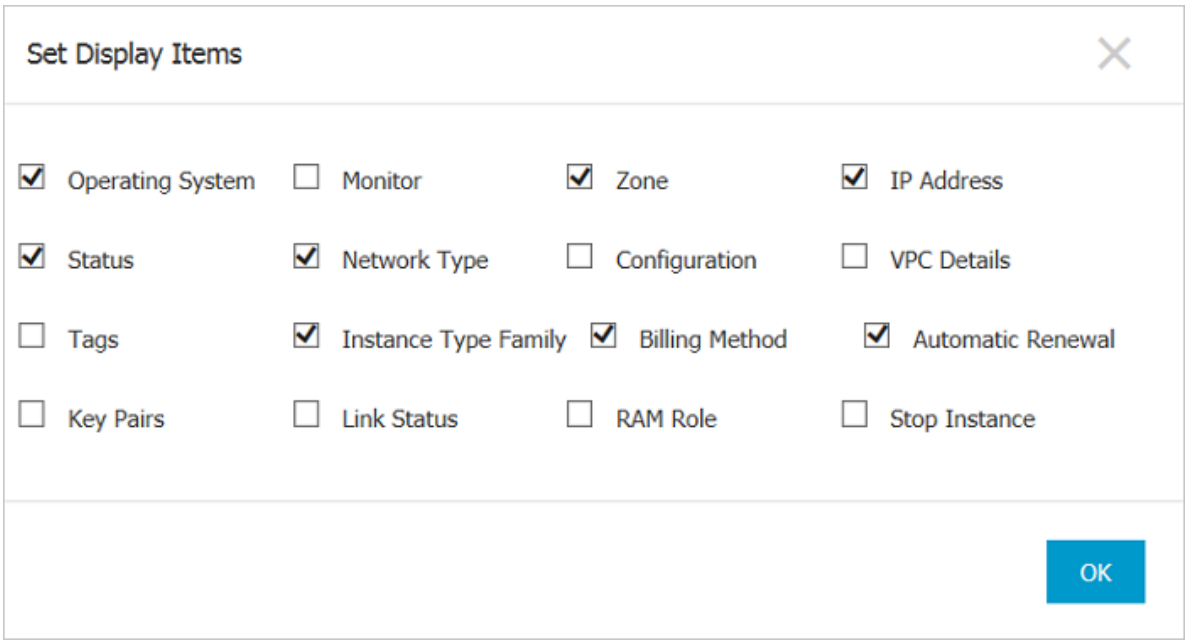
View the information of ECS instances on the Instance List page

To navigate to the Instance List page, follow these steps:

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**.
3. Select a region.

You can see information of all the existing ECS instances in the selected region, including ECS instance ID/name, zone, IP addresses, status, network type, billing method, and actions. You can show or hide the displayed information of an instance by using the **Set Display Items** feature.

1. In the upper-right corner of the Instance List, click the  icon.
2. In the dialog box of **Set Display Items** , select the instance information to be displayed and click **OK**.



View all ECS instances under your account on the Overview page

On the **Instance Overview** page of the **Resource Overview**, you can visualize all instances in a single region from multiple perspectives. You can filter instances based on network type (including proprietary networks and classic networks) or *Add a tag to resources* and export all statistics in one click.

Follow these steps to go to the **Instance Overview** page:

1. Log on to the *ECS Console*.
2. In the left navigation bar, click **Overview**.
3. Above **Common Actions**, click **Resource Overview**.

4. In the left navigation bar, click **Instance Overview**.

Instance overview page information

On the **Examples Overview** page, you can view and export instance information by region, network type, and tag, including status, payment type, availability zone, instance types, number of mirrored instances, and the number of instances created in the last month. The exported instance information is a CSV file that includes all instance information displayed on the current page.

See the last 30 days expired instance

If you have a prepaid instance, you can also view instances that have expired in the last 30 days , or even instances that will expire in different periods in the future, to provide you with more basis for renewals and budgets. As shown in the figure below, one instance will expire in the next 15 days to 30 days.

See instance type distribution

You can use **instance type** distribution graph which shows the proportion of instance types for different architectures or levels, to help you determine if the current instance type ratio is appropriate. For example, in a large mature enterprise, if the proportion of entry-level instances is too high, it may not be appropriate; or all the entry-level instances are Burstable instances(t5 instances), you may need to re-examine whether the configuration is suitable for the current business demand for CPU.

View the instance image distribution

You can use **instance image distribution** graph to view the distribution of the mirror, which is easy to manage. For example, if you deploy the same application on multiple instances, these instances should use the same image as much as possible. At this time, you can use **Instance Image Distribution**graph to confirm the image distribution.

View details of an ECS instance on Instance Details page

You can navigate to the **Instance Details** page to view detailed information of an ECS instance.

To navigate to the **Instance Details** page, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find the ECS instance you want to view the details of, and then click its instance ID.

On the **Instance Details** page, you can view the following information:

- **`Basic Information`**, including ECS instance ID, instance name, region, zone, instance type, instance type family, image ID, key pair name (applies to Linux instances only), instance RAM role, and tags.

- **Configuration Information**, including CPU, memory, I/O optimization, operating system, IP addresses, billing method for bandwidth, current bandwidth, and VPC network information (applies to VPC instances only).
- **Payment Information**, including billing method, the mode to stop an instance, creation time, and automatic release schedule (applies to Pay-As-You-Go instances only).
- **Monitoring Information**, including CPU and network usage.

You can also switch from the **Instance Details** page to the **Instance Disks**, the **Shared Block Storage**, the **Instance Snapshots**, the **Security Groups**, or the **Security** page to view resources related to this instance.

5.4 Change the operating system

Use the management console to convert the instance OS to your preferred OS.

To change the operating system, you must change the system disk of an instance.

- If you want to use a custom image, see *Change the system disk (custom image)*.
- If you wan to use a public image, see *Change a system disk (public image)*.

Note:

Regions outside of mainland China do not currently support transition between Linux and Windows OSs. If your instance is hosted in one of these regions, you are not allowed to change the operating system between Windows and Linux. You can only change the version of Windows OS, or replace one Linux OS with another Linux OS.

5.5 Change configurations

5.5.1 Overview of configuration changes

You can change the configurations of an instance and its Internet bandwidth after it is created.

Upgrade or downgrade instance configurations

You can only upgrade or downgrade the configurations of vCPU and memory (######) simultaneously by changing instance types. The methods to change an instance type vary according to the billing method of the instance:

- Prepaid:

- Upgrade: See ######### . The new configurations are effective after you #### in the console or by using the *RebootInstance* interface. Applies to year-to-month instances and paid-per-week instances.
- Downgrade: See #### . You can downgrade the configuration of an instance when you renew the instance. The new configuration takes effect after you #### in the ECS console within the first seven days of the new billing cycle. Renewal Scaledown can only be used for Subscription instances.

- Pay-As-You-Go:

  See ############ . You must stop the instance to use this feature.

  Note:
  Stopping an instance disrupts your business traffic. Proceed with caution.

Adjust Internet bandwidth

You can adjust the Internet bandwidth of an instance. The methods vary according to your business needs and the billing method of the instance. The following table lists the methods.

Billing method of instances	Do you want to upgrade your bandwidth permanently?	Effective immediately	Available feature	Available feature
Subscription	Yes	Yes	#########	Only applicable to VPC-Connected ECS instances to which no EIP addresses are attached or classic network -connected ECS instances . The Internet and intranet IP addresses remain unchanged after you upgrade your configurations.
Subscription	No	Yes	######	Only applicable to VPC-Connected

Billing method of instances	Do you want to upgrade your bandwidth permanently?	Effective immediately	Available feature	Available feature
				ECS instances to which no EIP addresses are attached or classic network -connected ECS instances . Temporarily adjust bandwidth at any time during the current life cycle of the instance , bandwidth automatically drops back to its original value after completing the task. The Internet and intranet IP addresses remain unchanged after you upgrade your configurations.
Prepaid	Yes	Effective from next billing cycle	####	Adjust bandwidth in the new billing cycle. Renewal Scaledown can only be used for Subscription instances. • If the bandwidth of an instance is charged for a fixed bandwidth, the

Billing method of instances	Do you want to upgrade your bandwidth permanently?	Effective immediately	Available feature	Available feature
				public network bandwidth can only be reduced. The Internet and intranet IP addresses remain unchanged after you upgrade your configurations. • If the bandwidth of the instance is based on the Usage flow meter, you can increase or decrease the peak of the public network bandwidth. When the Internet bandwidth is set to 0 Mbit/s, the Internet IP address of a VPC-Connected instance is released in the new billing cycle, but that of a classic network-connected ECS instance is retained.

Billing method of instances	Do you want to upgrade your bandwidth permanently?	Effective immediately	Available feature	Available feature
Pay-As-You-Go or Subscription	Yes	Yes	##########	Only applicable to those *VPC -Connected instances* that are bound to. You can adjust the Internet bandwidth on an EIP address at any time.
Pay by volume	Yes	Yes	##########	Applies only to a VPC type ECs instance that has a public network IP address assigned to it, or to a classic network type ECs instance. You can adjust bandwidth at any time in the current lifecycle of an instance.

Assign a public IP address

Assign a public IP address to an ECS instance while *## 2###ECS##* . If you skip it, you can even assign after an ECS instance is created. However, the feature is only available for Prepaid instances. For more information, see the following table.

Feature	Effective immediately	Description
#########	Yes	Only applicable to VPC-Connected ECS instances to which no EIP addresses are attached or classic network-connected ECS instances. Set

Feature	Effective immediately	Description
		the Internet bandwidth to a non-zero value to assign a public IP address.
######	Yes	Only applicable to VPC-Connected ECS instances to which no EIP addresses are attached or classic network-connected ECS instances. Set the Internet bandwidth to a non-zero value to assign a public IP address.
####	Effective from next billing cycle	Only applicable to VPC-Connected ECS instances to which no EIP addresses are attached or classic network-connected ECS instances. Select use flow meter fee, and then set the peak bandwidth to a non-zero value, assign the public network IP address to the instance.

Change public network bandwidth Billing

Depending on how the instance is billing, you can change the public network bandwidth billing in different ways:

- Only applicable to VPC-Connected ECS instances to which no EIP addresses are attached or classic network-connected ECS instances.
  - Charge by use flow meter-> charge by fixed bandwidth: You can use ######### Function, effective immediately. Applies to examples of package year, package month, and pay by week.
  - Charge by fixed bandwidth-> use flow meter fee: You can use #### Function to change the billing method of public network bandwidth at the same time. The change takes effect after entering the new billing cycle. Renewal Scaledown can only be used for Subscription instances.

- Pay by volume: applies to a VPC type ECs instance or a classic network type ECs instance that has been assigned a public network IP address. You can use to change the public network bandwidth billing at any time. Effective immediately.

5.5.2 Upgrade configurations of Subscription instances

The **Upgrade Configuration** feature helps you to upgrade the specifications of your prepaid instances to meet your business needs. However, you may have to pay the price difference for the upgrade. While you are changing the instance type, you can also perform any of the following operations:

- **Convert the billing method of cloud disks** that are used as data disks from Pay-As-You-Go to Subscription. Note that you cannot change the billing method of system disks.
- **Adjust the Internet bandwidth** of a VPC-Connected ECS instance that no EIP address is bound to or a classic network-connected ECS instance. You can use this feature to assign an Internet IP address to the instance.
- **Change the public network bandwidth billing method**: If your current public network bandwidth is charged by the use flow meter (that is **traffic bandwidth**), you can use this function to change the billing method to fixed bandwidth (that is **fixed bandwidth**).

Fees

After upgrading the configuration, you must make up the difference for the rest of the current billing cycle.

Limits

This section introduces how to **upgrade configurations** in the ECS console.

- Applies to pre-payment instances only, including year-to-month instances and paid-per-week instances.
- You can use it to upgrade the specifications of vCPU and RAM simultaneously, but not separately, by changing the instance type.
- Some instance types are not supported. For more information, see *Instance type families*.
- It can be used to change Internet bandwidth of only VPC-Connected ECS instances that no EIP address is bound to and classic network-connected ECS instances.
- It can be used to change the billing method of cloud disks that are used as data disks, but not that of system disk.

- During the current billing cycle, if you have performed the Renew for Configuration Downgrade operation, *Renew for configuration downgrade* you cannot upgrade configurations until the next billing cycle.
- After you change the instance types or increase the Internet bandwidth of a classic network-connected ECS instance from 0 Mbit/s to a non-zero value for the first time, you must restart the instance in the ECS console *RebootInstance* or by using the RebootInstance interface for the new configuration to take effect.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. In the instance list, find your , and in the **Actions** column, click **Change Configuration**.
5. In the **Configuration Change Guide** dialog box, select **Upgrade Configuration** and click **Continue**.
6. On the **Upgrade Configuration** page, perform any of the following operations:
   - Select a new **Instance Type**.

     Note:
     The page displays all the new instance types that are available for your instance.
   - If a Pay-As-You-Go data disk is *Attach a cloud disk* to your instance, you can **convert its billing method to Subscription**.
   - If the instance is a classic network type ECs instance or a VPC type ECs instance that is not bound to an EIP,, you can modify the bandwidth: select **whether to permanently upgrade the base bandwidth** and set the upgraded bandwidth.

     Note:
     If you do not purchase public network bandwidth when you create an instance, the public network IP address is not assigned, you can assign a public network IP address here by setting the public network bandwidth to a non-zero value.
   - If your current public network bandwidth is charged by the use flow meter (that is **traffic bandwidth**), you can use this function to change the billing method to fixed bandwidth (that is **fixed bandwidth**).

7. Click **Pay** to complete the order.
8. If you have changed the instance type, or if you have increased the bandwidth from 0 Mbit/s for your classic network-connected ECS instance, restart the instance in the console *RebootInstance* or by using the RebootInstance interface.

> **Note:**
> You do not have to restart a VPC-Connected ECS instance if its bandwidth is increased from 0 Mbit/s for the first time.

5.5.3 Change configurations of Pay-As-You-Go instances

If you find that the instance specifications exceed or are insufficient for your application requirements, you can change the instance type, that is, the specification of the memory and the CPU. Different operations are allowed based on the billing method of an instance: Note: You must stop your instance to change the instance type,

> **Note:**
> which may lead to interruptions in your service. We recommend that you perform this operation during non-peak hours.

Limits

Pay-As-You-Go instances are subject to the following limits for configuration change:

- The interval between two configuration change operations must be more than five minutes.
- You cannot change the instance type across instance generations. For example, instance types of Generation I are not allowed to be changed to those of Generation II or Generation III.
- For instance types of Generation III, you cannot change the configuration within or between the following instance type families:
  - GPU-based instance type families, including gn5, gn4, and ga1.
  - FPGA-based instance type families, including f1.
  - Big data instance type families, including d1 and d1ne.
  - Local SSD instance type families, including i1 and i2.
- For instance types of Generation III, you can change the instance types according to the following table.

Instance type families	ecs.sn1ne	ecs.sn2ne	ecs.mn4	ecs.se1ne	ecs.cm4	ecs.c4	ecs.se1	ecs.ce4	ecs.xn4	ecs.e4	ecs.n4
ecs.sn1ne	Y	Y	—	Y	Y	Y	Y	Y	—	—	—
ecs.sn2ne	Y	Y	—	Y	Y	Y	Y	Y	—	—	—
ecs.mn4	—	—	Y	—	—	—	—	—	Y	Y	Y
ecs.se1ne	Y	Y	—	Y	Y	Y	Y	Y	—	—	-
ecs.cm4	Y	Y	—	Y	Y	Y	Y	Y	—	—	—
ecs.c4	Y	Y	—	Y	Y	Y	Y	Y	—	—	—
ecs.se1	Y	Y	—	Y	Y	Y	Y	Y	—	—	—
ecs.ce4	Y	Y	—	Y	Y	Y	Y	Y	-	—	—
ecs.xn4	—	—	Y	—	—	—	—	—	Y	Y	Y
ecs.e4	-	—	Y	—	—	—	—	—	Y	Y	Y
ecs.n4	—	—	Y	—	—	—	—	—	Y	Y	Y

- For instance types of Generation II, you can change the instance type according to the following table.

Instance type families	ecs.n2	ecs.e3	ecs.n1	ecs.sn2	ecs.sn1
ecs.n2	Y	Y	Y	—	—
ecs.e3	Y	Y	Y	—	—
ecs.n1	Y	Y	Y	—	—
ecs.sn2	—	—	—	Y	Y

Instance type families	ecs.n2	ecs.e3	ecs.n1	ecs.sn2	ecs.sn1
ecs.sn1	—	—	—	Y	Y

- You can change the configuration of all instance types within Generation I.

> **Note:**
> In the preceding table, “Y” indicates that you can change the configuration between the instance type families, and “-“ indicates that you are not allowed to change the configuration between the instance type families.

Prerequisites

You must stop the instance.

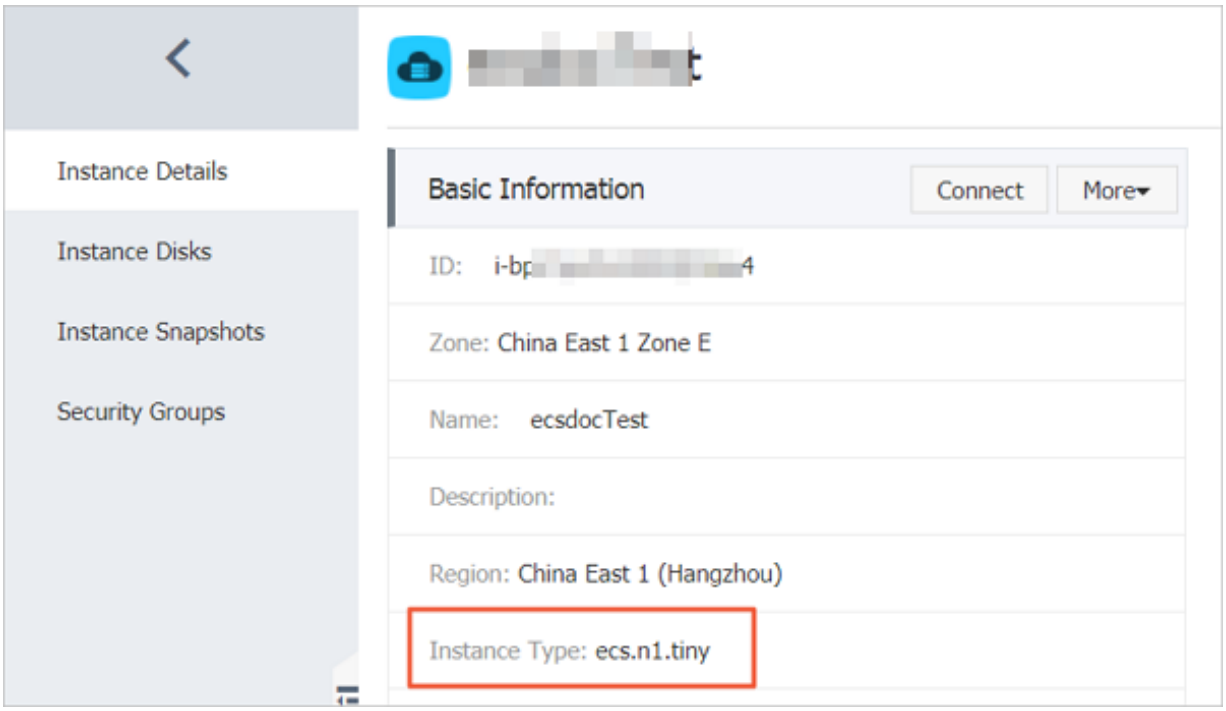
Procedure

To change the memory and vCPU configurations of a Pay-As-You-Go instance, follow these steps :

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find the Pay-As-You-Go instance you want to change the configuration, and in the **Actions** column, click **Change Instance Type**.
5. In the **Change Instance Type** dialog box, select an instance type and click OK. **OK**.

> **Note:**
> You can enter the instance type information in the search box to filter instance types in real time.

The change is immediately effective after you complete the operation. You can view the **instance type information** in the **Basic Information** area of the Instance Details page.



Then, start the instance to provide services again.

5.5.4 Change EIP Internet bandwidth

When using a pay-per-order instance, if you find that public network bandwidth does not meet or exceed your business requirements, you can select different ways to modify the public network bandwidth based on the type of network and the public network IP category of the instance, as shown in the following table.

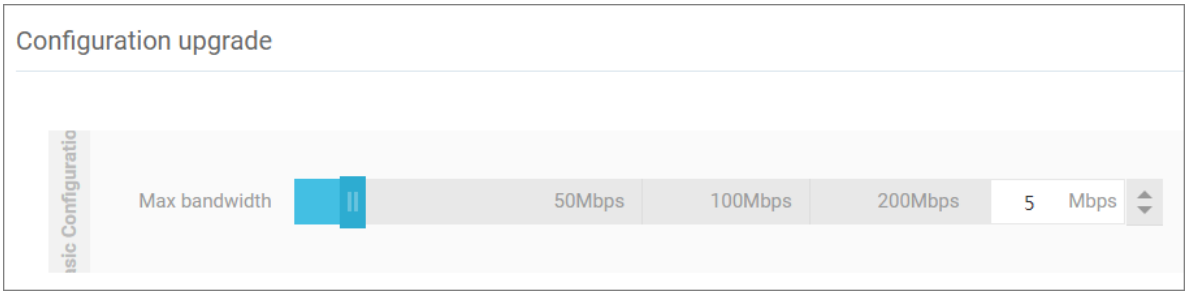
Network types	Public Network IP category	Applicable features
VPC	Elastic public network IP address	**Lifting and lifting>** > *Procedure*
	Assigned public network IP address	**More** > *Change bandwidth by volume instance*
Classic network	Assigned public network IP address	**More>** > *Change bandwidth by volume instance*

Procedure

If the instance is a dedicated network (VPC) Paying instance, and the elastic public network IP (EIP) address is bound, you can change the network bandwidth of An EIP address by following these steps.

1. Log on to the *ECS Management Console*.

2. In the left-hand navigation bar, click **instances**.
3. Select your region.
4. Select the pay-per-order instance that is bound to the elastic public network IP address, and in the **action** column, click **Lift up and down**.
5. In the **lifting wizard** dialog box, select **change bandwidth**, and click **Continue**.
6. On the **Confirm order** page, set a new bandwidth peak.



7. Click **to open**, and follow the page to display information to complete the bandwidth change.

Change bandwidth by volume instance

Whether it's a proprietary network (VPC) or a classic network, if your pay-per-sum instance is assigned a public network IP address, you can **change the bandwidth** using the on-order instance Function Changes public network bandwidth.

> **Note:**
> After a successful change, the second operation cannot be performed in 5 minutes.

Follow these steps to change public network bandwidth:

1. Log on to the *ECS Management Console*.
2. In the left-hand navigation bar, click **instances**.
3. Select a region.
4. Locate the pay per volume instance, and in the **action** column, select **More** > **Change bandwidth by volume instance**.

> **Note:**
> You can also select multiple pay-per-order instances and, at the bottom of the list, select **More** > **Change bandwidth by volume instance**.

5. On the **Change bandwidth** by volume instance page, click, bulk change.

6. In the **change bandwidth** dialog box, you can complete the following settings:

- (Optional) change the billing method for public network bandwidth: Select `fixed bandwidth`, or `traffic bandwidth`.
- Optionally, select the new public network bandwidth value.

> **Note:**
>
> If the public network bandwidth is set to 0 Mbps here, after the change is successful:
>
> - The public IP address of the private network instance is released immediately.
> - Classic Network instances no longer provide public network access, but the public network IP address is retained.

When the settings are complete, click, **OK**.

7. On the **Change bandwidth/g> by volume instance page, click** OK/g>.

The new public network bandwidth setting takes effect immediately after the change has been completed.

5.6 Reset an instance password

If you did not specify a logon password for an instance at the time of creation, or the password is lost, specify a new password in the ECS console. This article describes how to use the Reset Password feature to specify a new logon password.

> **Note:**
> You must restart an instance after its password is reset, which may impact the service. To reduce the impact, we recommend that you reset the password when the related service is not busy.

Prerequisites

The instance must be in a stable status, such as **Stopped** and **Running**. For more information, see *ECS instance life cycle*.

Procedure

To reset a password for one or multiple ECS instances, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. According to the number of instances to be operated, do the following:

- To reset the password for one instance, find the instance, and in the **Actions** column, select **More** > **Reset Password**.
- To reset the passwords for multiple instances, select the instances, and under the instance list, click **Reset Password**.

5. In the **Reset Password** dialog box, specify a new valid password, and click **Submit**.
6. (Optional), for an Alibaba account, obtain and enter the verification code sent to your phone, and then click **OK**.

> **Note:**
> This step is optional for a*Subaccount* depending on the authorizations.

7. Operate different actions to make the password effective according to the instance status:
   - **Running**: *Restart an instance* in the console.
   - **Stopped**: Start the instance in the console.

Related APIs

To modify the password: *Step 3. Connect to an instance ModifyInstanceAttribute*.

5.8 Restart an instance

Instances can be restarted from within or through the management console.

> **Note:**
> - Only instances in the Running status can be restarted.
> - Restarting an instance may disrupt your business traffic. Proceed with caution.

Procedure

1. Log on to the *ECS console*.
2. Click **Instances** in the left-side navigation pane.
3. Select your desired region.
4. Select the desired instance. You can select multiple instances, as long as they are all in the Running status.
5. Click **Restart**.
6. In the displayed dialog box, click **Restart**, and then click **OK**.

5.9 Reactivate an instance

For a Pay-As-You-Go instance, in the event of payment failure within 15 days (T+15) after the due date (T), the instance is stopped due to overdue payment and becomes **Expired**.

The classic network instance must clear the bill within 7 days after the cost is down, otherwise, the bill will re-boot, the instance is released and all data cannot be recovered.

After a VPC instance is down within 15 days, it will enter from the expiration at any time. Tax Recovery in progress. Enter tax recovery Before, you can clear the bill to re-boot. If the reboot is successful at this time, all resources are retained and will not be affected. Instance into tax recovery After the status, you can still clear the bill and re-boot, however, you may fail to boot again, please try again or submit a job solution after a period of time. If the bill cannot be cleared within 15 days, the instance will be released, all data cannot be recovered.

Note:

If you don't re-boot your account after closing your bill, the VPC instance is released automatically after 15 days from the date of its debt, classic Network instances are automatically released seven days from the date of the loss, and the data cannot be recovered.

Prerequisites

The pay per volume instance is in a State that has expired, or is in the form of a fee recovery.

Your account has been charged, and the balance of the account is not less than 100 RMB. For value-filling operations, please refer to, financial documents How to charge a value.

Procedure

To reactivate an instance, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Select the instance to be reactivated, and at the bottom of the instance list, select **More** > **Reactivate**.
5. Determine that you reactivate the instance immediately or later at a specified time.

If you choose to reactivate immediately, the selected instance returns to the Running status in about 10 minutes.

5.11 Add to or remove from a security group

Add an instance to a security group

You can add an instance to a security group using the ECS Management console. One ECS instance can be added to up to five security groups.

1. Log on to the *ECS console*.
2. Click **Instances** in the left-side navigation pane.
3. Select your desired region.
4. Select the desired instance. Click the instance name or corresponding **Manage** button.
5. Click **Security Groups** in the left-side navigation pane.
6. Click **Add Security Group**. In the displayed dialog box, select the appropriate security group.
7. Click **OK**.

After you add an instance to the security group, the rules apply to the instance automatically.

Remove an instance from a security group

You can remove instances from security groups.

Note:

- Note that an instance must be in at least two security group for this action to be performed
- , and you have done enough test before this operation to avoid any intranet communication error between instances.

1. Log on to the *ECS console*.
2. Click **Instances** in the left-side navigation pane.
3. Select your desired region.
4. Select the desired instance. Click the instance name or corresponding **Manage** button.
5. Click **Security Groups** in the left-side navigation pane. You can view the security group list that this instance belongs to.
6. Select the security group to remove from and click **Remove**.
7. Click **OK**.

For use cases of security groups, see *Scenarios*.

5.12 Change IP addresses

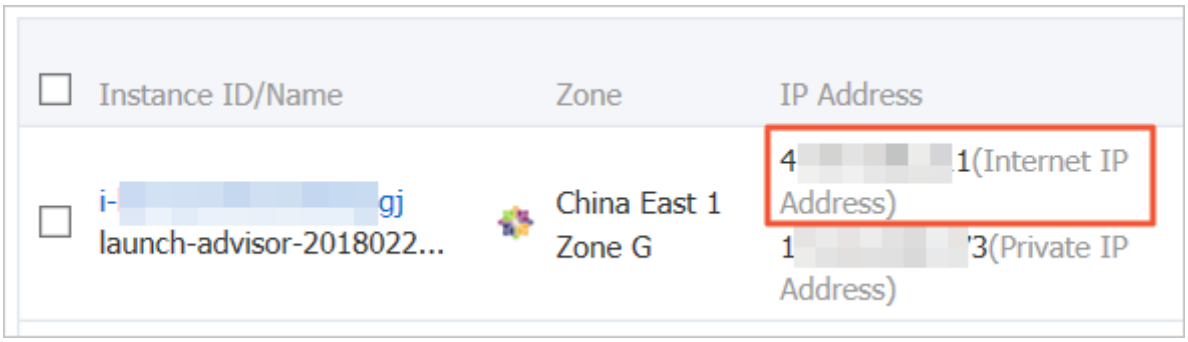
5.12.1 Change public IP address

If your instance is assigned a public IP address, you can change the address within six hours after the instance is created, either in the Classic network or in a VPC network.

Limits

Following are the limits to change the public IP address of an ECS instance:

- The instance must be assigned a public IP address, which means you can view the public IP address in the **IP Address** column from the **Instance List** in the ECS console, as displayed in the following figure.



> **Note:**
>
> - If the public network IP address is not assigned at the time of creation of the instance, after the instance is created successfully, you can assign the public IP address by upgrading or downgrading the network bandwidth configuration. For more information, see *Overview of configuration changes*.
> - If the public network IP address is not assigned during the creation of a Pay-As-You-Go instance, after the instance is created successfully, public IP address cannot be assigned. You can only *bind an elastic IP (EIP) address*.

- The instance must be in the **Stopped** status.
- The instance has been existing for less than six hours.

> **Note:**
>
> After six hours, for a VPC instance, you can *Convert public IP address to EIP address* convert the public IP address to an EIP address, but you cannot change the public IP address of an instance in the Classic network.

- You can change the public IP address of an instance three times.

Prerequisites

Before you change the public IP address of an instance, stop the instance.

Procedure

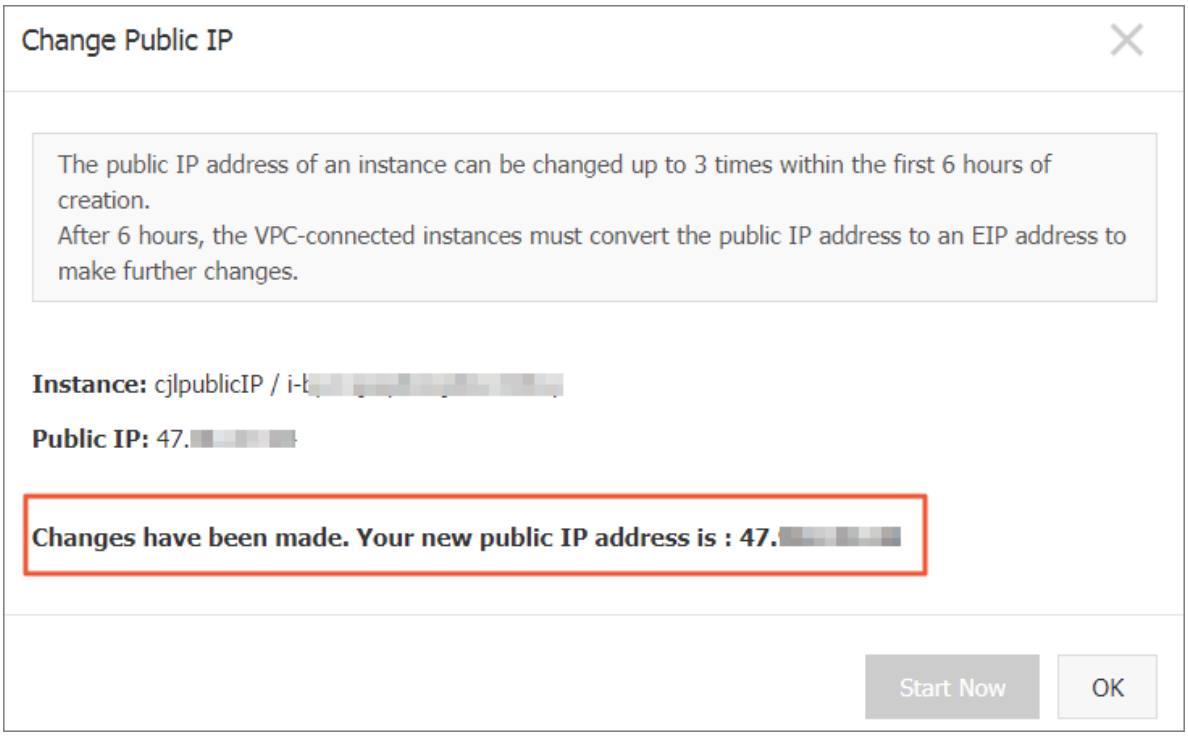
To change the public IP address, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find the instance to change the public IP address. In the **Actions** column, select **More >** > **Replace public IP**.

   Note:
   If your instance has been existing for more than six hours, you cannot get the **Replace public IP** option in the More drop-down menu.

5. On the **Replace public IP** dialog box, click **Start to change**.

   When a new public IP address shows on the dialog box,



6. click **OK**.

Related operations

You can *Change the private IP of an ECS instance*.

5.12.2 Convert public IP address to EIP address

This article describes how to convert the assigned public IP address of an ECS instance in a VPC network, which is called **VPC instance** for short in this article, to an elastic public IP (EIP) address. After conversion, you can keep the public IP address and bind it to another ECS instance.

Limits

To convert a public IP address to an EIP address, consider the following limits:

- The action is irreversible.
- Only a VPC instance assigned a public IP address is supported.
- Only a VPC instance in the **Stopped** or **Running** status is supported.
- Only a VPC instance that does not have any inactivated specification changes is supported.
- Only a VPC instance that is not within the last 24 hours of its life cycle is supported.
- You can only use this feature to convert a public IP address to an EIP address.

Note

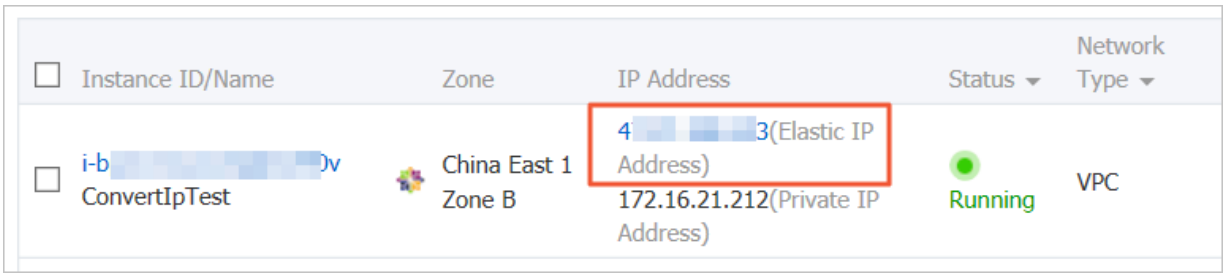
- The conversion has no effect on the Internet access of the VPC instance. It does not cause transient traffic interruption.
- The billing method of the public traffic remains unchanged.
- After conversion, the EIP address is charged separately. For more information about billing of EIP addresses, see *EIP billing*. You can go to the *Usage Records* page in the **Billing Management** to download the **Elastic Public IP** usage record.

Procedure

To convert a public IP address to an elastic public IP (EIP) address, follow these steps:

1. Log on to the *ECS Console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find a **VPC instance** to convert the public IP address, in the **Actions** column, select **More** > **Convert to EIP**.
5. In the **Convert the public IP address to EIP** dialog box, read the note and click **OK**.
6. Refresh the instance list.

After the public IP address is converted to an EIP address, the IP address is followed by (**Elastic IP Address**).



Click the IP address to go to the EIP console to manage the EIP address.

Follow-up operations

After the public IP address is converted to an EIP address, you can unbind the EIP address from the instance and bind it to another instance. Besides, you can release the EIP address. For more information, see *EIP User Guide*.

Related APIs

You can use the *ConvertNatPublicIpToEip* interface to convert a public IP address to an EIP address. Currently, only SDK 4.3.0 or a higher version supports this interface.

Download the latest version.

5.12.3 Change the private IP of an ECS instance

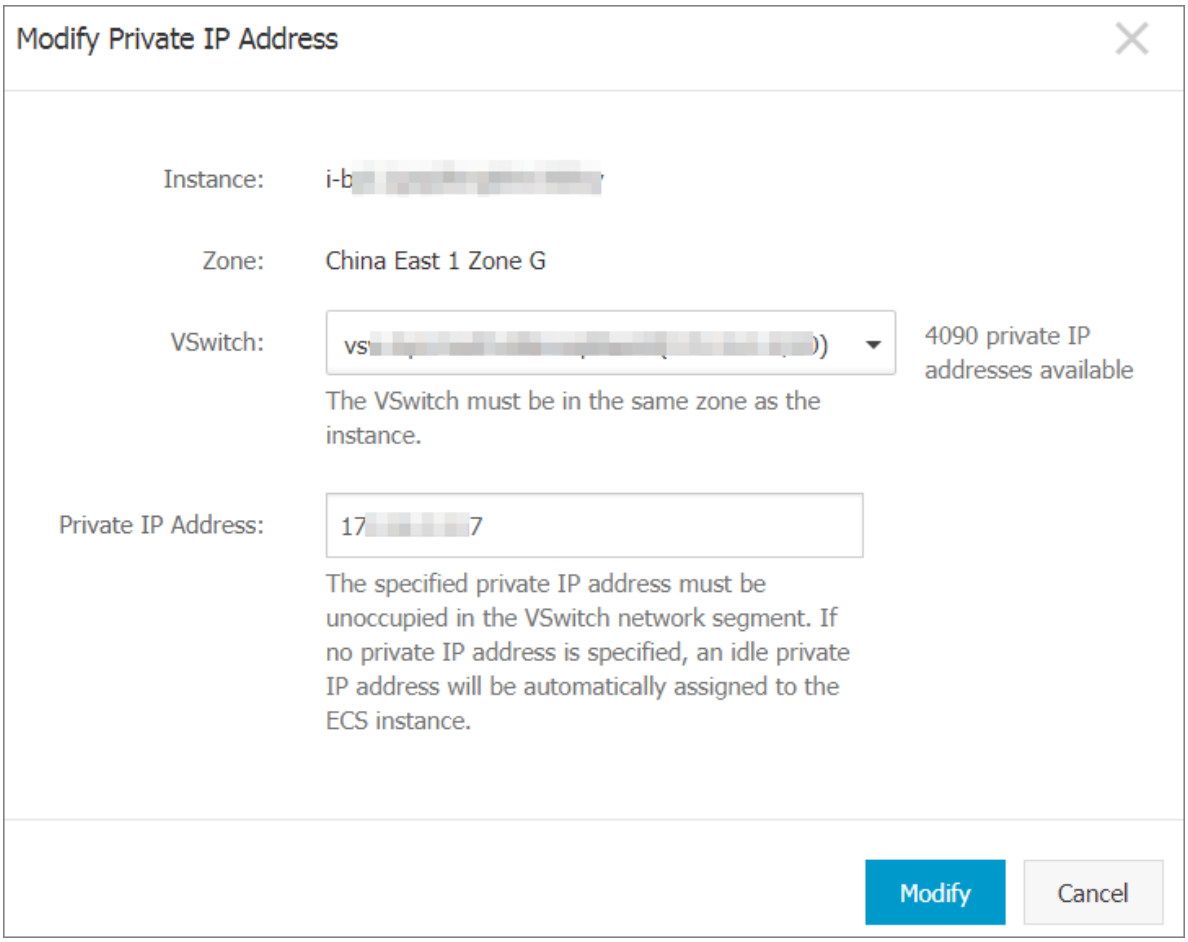
After creating a VPC ECS instance, you can change the private IP address and also can change the VSwitch of the ECS instance.

Procedure

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**. Click a region and then click the ID of the target ECS instance.
3. In the **Actions** column, click **More >** > **Stop**.
4. When the instance is stopped, click the instance ID to go to the **Instance Details** page.
5. In the **Configuration Information** panel, click **More >** > **Modify Private IP Address**.
6. In **Modify Private IP** Address dialog, select a VSwitch, and then click **Modify**.

   Ensure the zone of the selected VSwitch and the current VSwitch is the same.

> **Note:**
> Enter the new IP address if you do not want to change the VSwitch of the ECS instance.



7. Go back to the instance page, and in the **Actions** column, click **More >** > **Restart**to make the new private IP take effect.

5.13 User-defined data and metadata

5.13.2 Metadata

The metadata of an instance is the basic information of the ECS instance including Instance ID, IP Address, Operating System, and so on. You can use the metadata to manage and/or configure an instance.

Note:
If you manually change some instance information, this change will not be reflected in the instance metadata.

Limits

The metadata is only applicable for VPC-Connected instances.

Get the metadata

Linux instance

Connect to a Linux instance by using a password.

- Run `curl http://100.100.100.200/latest/meta-data/` to access the root directory of the metadata.
- Add the specific metadata name to the preceding command to access the specified metadata. For example:
  - Run `curl http://100.100.100.200/latest/meta-data/instance-id` to get the ID of an instance. ID.
  - Run `curl http://100.100.100.200/latest/meta-data/image-id` to get the image ID of an ECS instance. ID.

Windows instance

Connect to a Windows instance.

- Use PowerShell to run `Invoke-RestMethod http://100.100.100.200/latest/meta-data/` to get the metadata.
- Add the specific metadata name to the preceding command to access the specified metadata. For example:
  - Run `Invoke-RestMethod http://100.100.100.200/latest/meta-data/instance-id` to get the instance ID.
  - Run `Invoke-RestMethod http://100.100.100.200/latest/meta-data/image-id` to get the image ID of an ECS instance.

List of instance metadata

Metadata name	Description	Version
dns-conf/nameservers	**DNS configurations for an instance.**	**2016/1/1**
eipv4	EIP address	2016/1/1
hostname	The OS name of an instance.	2016/1/1
image-id	ID of the image that is selected at the time of instance creation.	2016/1/1

Metadata name	Description	Version
dns-conf/nameservers	**DNS configurations for an instance.**	**2016/1/1**
image/market-place/product-code	Product code of the image in the marketpalce.	2016/1/1
image/market-place/charge-type	Billing method of the image in the marketplace.	2016/1/1
instance-id	Instance ID	2016/1/1
mac	The MAC address of an instance. When multiple network interface cards exist in an instance, this metadata indicates the MAC address of eth0.	2016/1/1
network-type	Network type, only applicable for VPC.	2016/1/1
ntp-conf/ntp-servers	The address of a NTP server.	2016/1/1
owner-account-id	The aliuid of the instance owner.	2016/1/1
private-ipv4	Private IP address.	2016/1/1
public-ipv4	Public network IP address.	2016/1/1
public-keys	The list of all public keys of the current instance.	2016/1/1
region-id	The region where the instance is located.	2016/1/1
zone-id	Zone ID of the zone where the ENS instance is located.	2016/1/1
serial-number	The serial number of an instance.	2016/1/1
source-address	The source of Yum/apt, only applicable for a Linux instance.	2016/1/1
kms-server	Activate the server, only applicable for a Windows instance.	2016/1/1

Metadata name	Description	Version
dns-conf/nameservers	**DNS configurations for an instance.**	**2016/1/1**
wsus-server/wu-server	Update the server, only applicable for a Windows instance.	2016/1/1
wsus-server/wu-status-server	The server that monitors the update status of an instance, only applicable for a Windows instance.	2016/1/1
vpc-id	ID of the VPC that an instance is in.	2016/1/1
vpc-cidr-block	The CIDR block of the VPC that an instance is in.	2016/1/1
vswitch-cidr-block	The CIDR block of the VSwitch that an instance is in.	2016/1/1
vswitch-id	ID of the VSwitch that an instance is in.	2016/1/1
ram/security-credentials/[role-name]	The temporary STS credential is generated according to the policy of a RAM role. Only available when you specify a RAM role to an ECS instance. When you use this metadata to get the STS credential, **`[role-name]`** must be replaced with the actual RAM role name you create or you have created.  **Note:** STS The new STS credential is available 30 minutes prior to the expiration of the old one.	2016/1/1
instance/spot/termination-time	The spot instance release time is based on the instance operating system time zone . It is specified in the UTC time standard. For example,	2016/1/1

Metadata name	Description	Version
dns-conf/nameservers	**DNS configurations for an instance.**	**2016/1/1**
	YYYY-MM-DDThh:mm:ssZ For example, 2018-04-07T17:03:00Z.	
network/interfaces/macs	The MAC address list of the multiple NIC (Network Interface Controller).	2016/1/1
network/interfaces/macs/[mac]/network-interface-id	The unique ID of the NIC, **[mac]** must be replaced with the actual MAC address.	2016/1/1
instance/virtualization-solution	The virtualization solution: ECS Virt 1.0 / 2.0	2016/1/1
instance/virtualization-solution-version	The internal Build version.	2016/1/1
instance/last-host-landing-time	The latest update time of the physical server, which your instance is hosted on.	2016/1/1
instance-identity/document	*Instance identity* Instance identity document.	2016/1/1
instance-identity/pkcs7	Instance identity signature.	2016/1/1

5.15 Instance RAM roles

5.15.2 Use the instance RAM role in the console

Limits

The instance RAM role has the following limits:

- The instance RAM role is only applicable to VPC instances.
- One instance RAM role can be bound to one instance at a time.
- After an instance RAM role is attached to an ECS instance, if you want to access other cloud services, such as OSS, SLB, or ApsaraDB for RDS, from the applications within the ECS instance, you must *Metadata* of the instance RAM role by using metadata. See *6. (Optional). Obtain the authorization credential*.

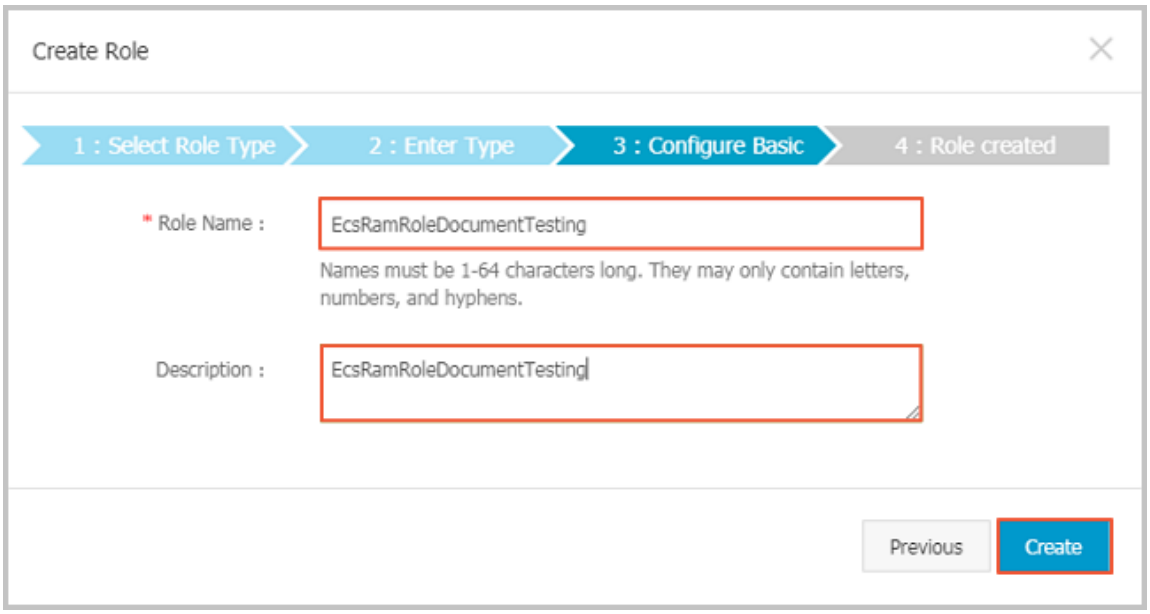
- Before using this feature, the RAM user must be *7. (Optional). Authorize a RAM user to use the instance RAM role*.

Prerequisites

You must have activated the RAM service. See *Activation method* to activate the RAM service.

1. Create an instance RAM role

1. Log on to the *RAM console*.
2. On the left-side navigation pane, click **Roles**.
3. Click **Create Role**.
4. In the dialog box:
   a. Select **Service Role** for **Role Type**.
   b. Select **ECS (Elastic Compute Service)** for **Type**.
   c. Enter the role name and description, for example, EcsRamRoleDocumentTesting.



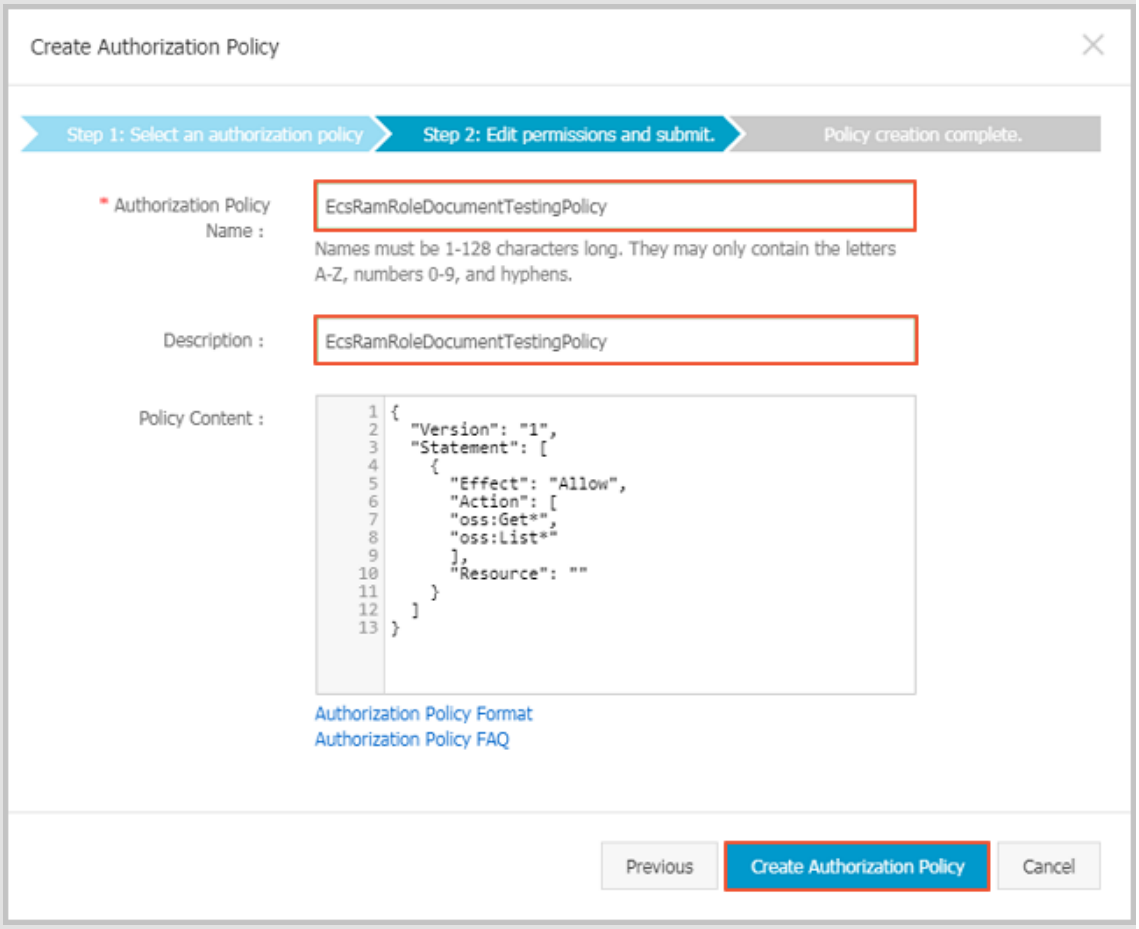
   d. Click **Create** to create the instance RAM role.

2. Authorize the instance RAM role

1. Log on to the *RAM console*.
2. On the left-side navigation pane, click **Policy**.
3. Click **Create Authorization Policy**.
4. In the dialog box:
   a. Select **Blank Template** for **authorization policy template**.

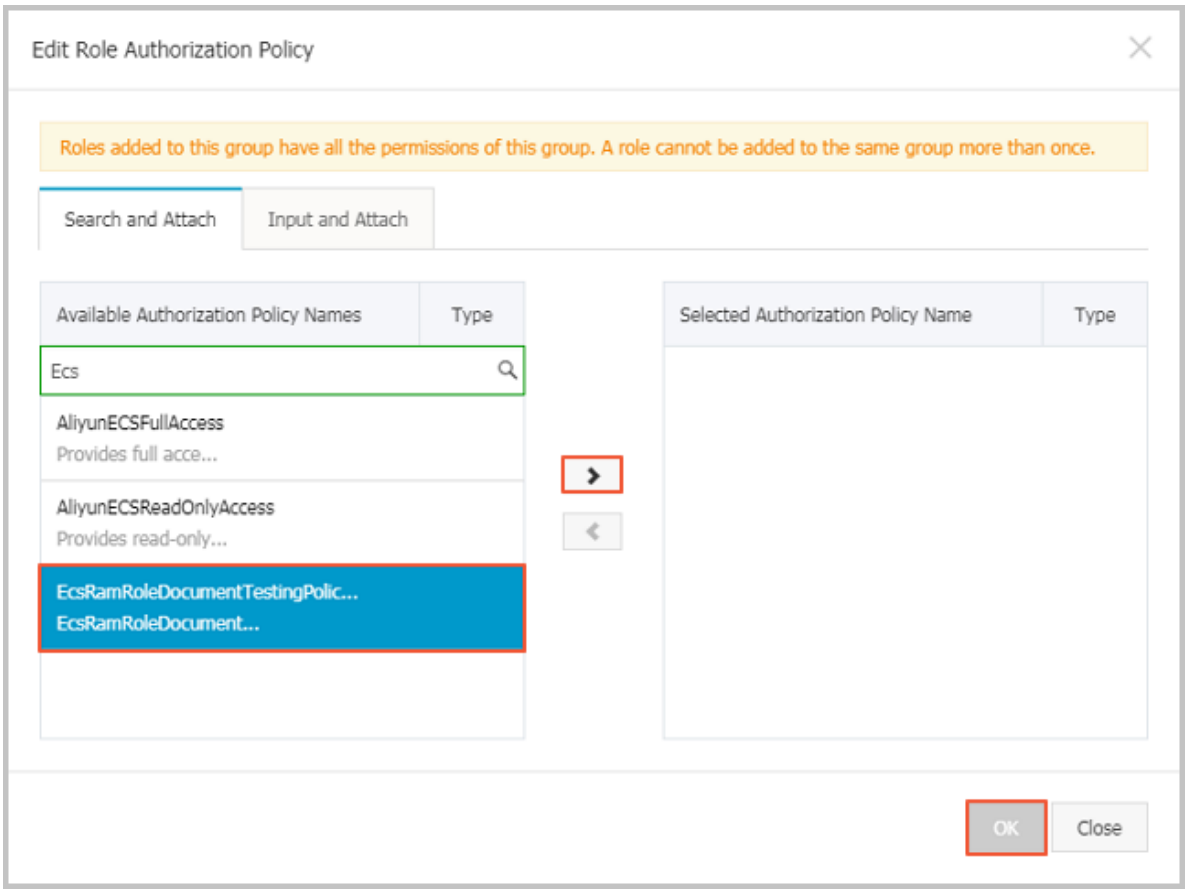
b. Enter the **Authorization Policy Name** and **Policy Content**, for example, EcsRamRoleDocumentTestingPolicy.

> **Note:**
> For more information about how to write the authorization policy by using the JSON language, see *Policy syntax structure*.



c. Click **Create Authorization Policy** to complete authorization.

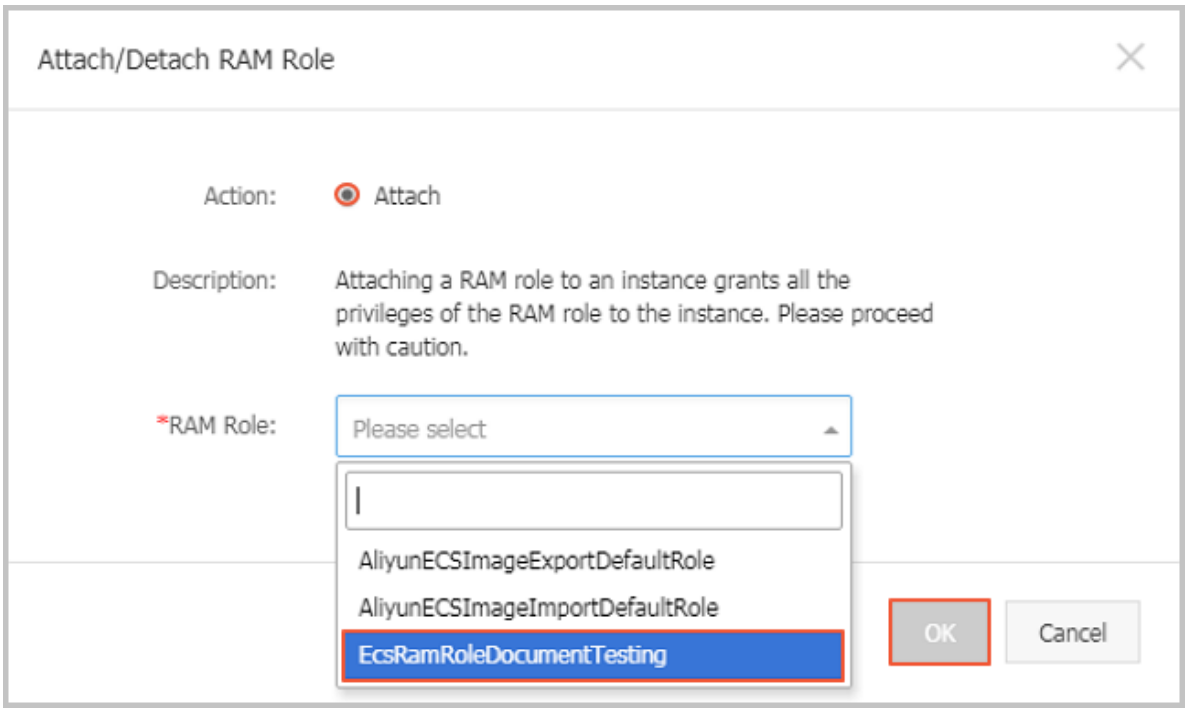
5. On the left-side navigation pane, click **Roles**.
6. On the **Roles** page, select the created role, for example, EcsRamRoleDocumentTesting, and click **Authorize**.
7. Enter the **authorization policy name** and click it, for example, EcsRamRoleDocumentTestingPolicy.
8. Click the icon **>** to select the policy name, and click **OK**.



3. Attach an instance RAM role

Method 1: Attach an instance RAM role in the console

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find the target ECS instance and select **More >** > **Attach/Detach RAM Role**.
5. Select Attach for Action, select the created role, for example, EcsRamRoleDocumentTesting, and click **OK** to attach the instance RAM role.



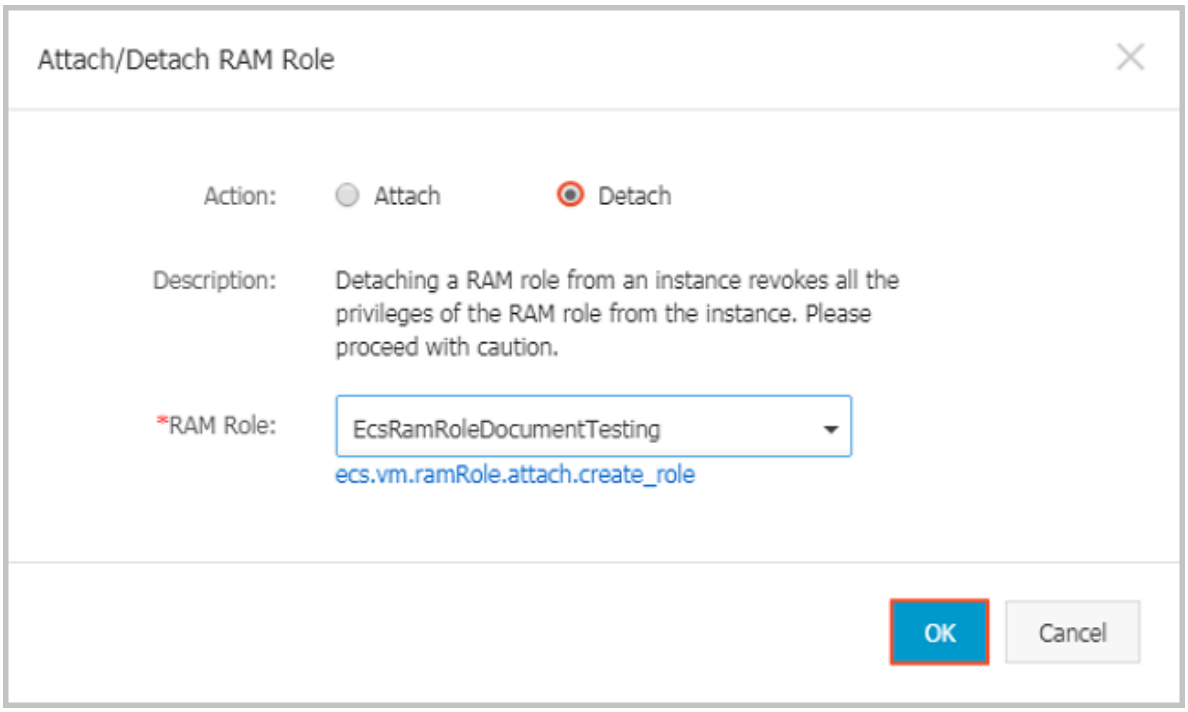
Method 2: Attach an instance RAM role when creating the ECS instance

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**.
3. Click **Create Instance**.
4. See *Step 2. Create an instance* relevant information about the instance setting, and in **RAM Roles**, select the created instance RAM role, such as EcsRamRoleDocumentTesting.

When an instance is created, it has the permissions granted in the instance RAM role policy.

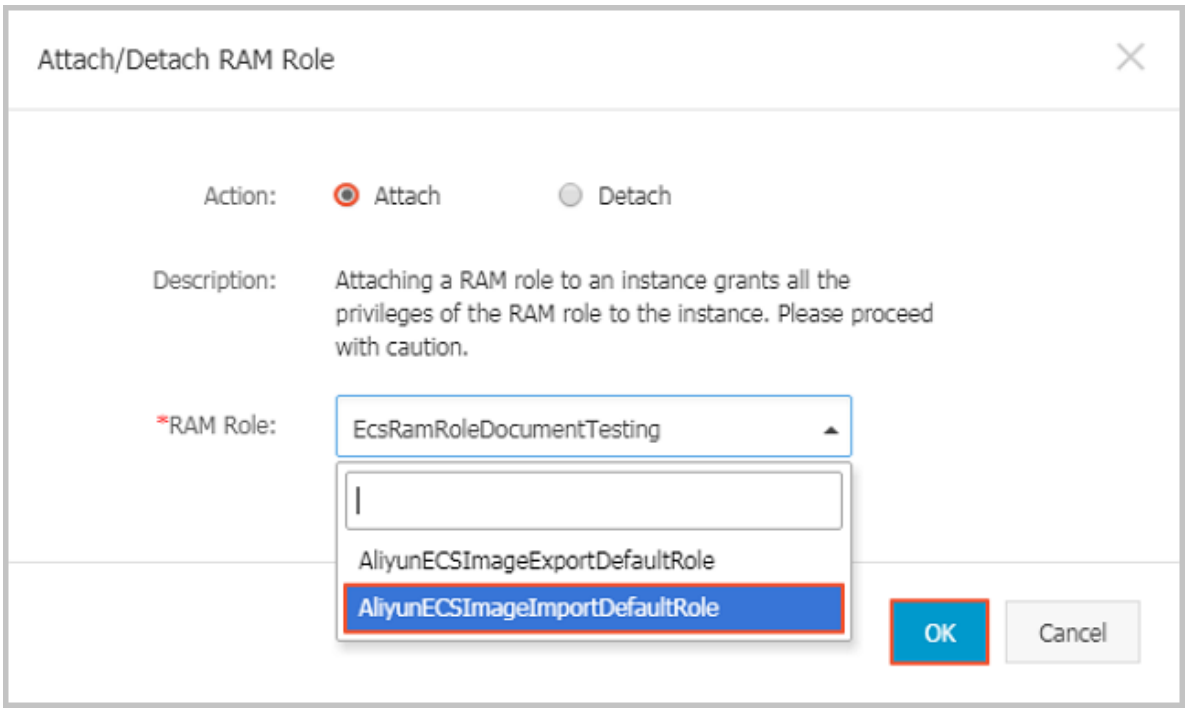
(Optional). Detach an instance RAM role

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**.
3. Select a region.
4. Select an ECS instance, and select **More >** > **Attach/Detach RAM Role**.
5. Select **Detach** for **Action**, and click **OK** to detach the instance RAM role.



5. (Optional). Replace an instance RAM role

1. Log on to the *ECS console*.
2. On the left-side navigation pane, click **Instances**.
3. Select a region.
4. Select an ECS instance, and select **More >** > **Attach/Detach RAM Role**.
5. Select **Attach** for **Action**, select another instance RAM role in the list of RAM Role, and click **OK** to replace the current RAM role.



6. (Optional). Obtain the authorization credential

For the internal application of an ECS instance, you can obtain the STS credential of the instance RAM role, which is a metadata of an instance, to access the role-authorized permissions and resources. The credential is updated periodically. Example:

1. Connect and log on to your ECS instance.
2. Obtain the STS credential of the instance RAM role, for example, EcsRamRoleDocumentTesting:
   - Linux instance: run `curl http://100.100.100.200/latest/meta-data/Ram/security-credentials/EcsRamRoleDocumentTesting`.
   - Windows instance: see *Metadata*.
3. Get the credential. Return example:

```
"AccessKeyId" : "XXXXXXXXX",
"AccessKeySecret" : "XXXXXXXXX",
"Expiration" : "2017-11-01T05:20:01Z",
"SecurityToken" : "XXXXXXXXX",
"LastUpdated" : "2017-10-31T23:20:01Z",
```

```
"Code" : "Success"
```

7. (Optional). Authorize a RAM user to use the instance RAM role

> **Note:**
> You must grant the RAM user with the **PassRole** permission to use the instance RAM role feature. Without the **PassRole** permission, a RAM user cannot carry out the permission of the authorization policy that is attached to the RAM user.

Log on to the RAM console and authorize a RAM user *Attach policies to a RAM user* to complete the authorization, see the following code snippet as an authorization policy example:

```
"Version": "2016-10-17",
"Statement": [

    "Effect": "Allow",
    "Action": [
        "ecs: [ECS RAM Action]",
        "ecs: CreateInstance",
        "ecs: AttachInstanceRamRole",
        "ecs: DetachInstanceRAMRole"

    "Resource": "*"


"Effect": "Allow",
"Action": "ram:PassRole",
"Resource": "*"
```

The parameter **[ECS RAM Action]** indicates the action that a ram user can be authorized. For more information, see *Authorization rules*.

References

- You can also *Use the instance RAM role by calling APIs*.
- You may want to *Access other cloud products by using the instance RAM role*.

5.15.3 Use the instance RAM role by calling APIs

Limits

The instance RAM role has the following limits:

- The instance RAM role is only applicable to VPC instances.
- One instance RAM role can be bound to one instance at a time.

- After an instance RAM role is attached to an ECS instance, if you want to access other cloud services, such as OSS, SLB, or ApsaraDB for RDS, from the applications within the ECS instance, you must obtain the authorization credential of the instance RAM role by using *Metadata*. See *5. (Optional). Obtain the on-demand authorization credential*.
- If you are using an instance RAM role through a RAM user sub-account, you need to use a cloud account*6. (Optional). Authorize a RAM user to use the instance RAM role*.

Prerequisites

Before using this feature, the RAM user must be authorized to use the instance RAM role. See *Activation method* to activate the RAM service.

1. Create an instance RAM role

1. Call the CreateRole *CreateRole* to create an instance RAM role.
2. Set the parameter RoleName, for example, EcsRamRoleDocumentTesting.
3. Set the **`AssumeRolePolicyDocument`**as follows:

```
"Statement": [

"Action": "sts:AssumeRole",
"Effect": "Allow",
"Principal": {
"Service": [
"ecs.aliyuncs.com"

}


"Version": "1"
```

2. Authorize the instance RAM role

1. Call the CreatePolicy to *CreatePolicy* create an authorization policy.
2. Set the parameter RoleName, for example, set it to EcsRamRoleDocumentTestingPolicy.
3. Set the **`PolicyDocument`**as follows.

```
"Statement": [

"Action": [
"oss:Get*",
"oss:List*"

"Effect": "Allow",
"Resource": "*"


"Version": "1"
```

4. Call the *AttachPolicyToRole* to authorize the role policy.

5. Set **PolicyType** to Custom.
6. Set the parameter **PolicyName**, for example, EcsRamRoleDocumentTestingPolicy.
7. Set the parameter **RoleName**, for example, EcsRamRoleDocumentTesting.

Attach the instance RAM role

1. Call the *AttachInstanceRamRole* to attach an instance RAM role to an ECS instance.
2. Set the parameters **RegionId** and **InstanceIds** to specify an ECS instance.
3. Set the parameter **RamRoleName**, for example, EcsRamRoleDocumentTesting.

4. (Optional). Detach an instance RAM role

1. Call the *DetachInstanceRamRole* to detach an instance RAM role.
2. Set the parameters **RegionId** and **InstanceIds** to specify an ECS instance.
3. Set the parameter **RamRoleName**, for example, EcsRamRoleDocumentTesting.

5. (Optional). Obtain the on-demand authorization credential

For the internal application of an ECS instance, you can obtain the STS credential of the instance RAM role, which is a metadata of an instance, to access the role-authorized permissions and resources. The credential is updated periodically. Example:

1. Obtain the STS credential of the instance RAM role, for example, EcsRamRoleDocumentTesting:
   - Linux instance: run `curl http://100.100.100.200/latest/meta-data/Ram/security-credentials/EcsRamRoleDocumentTesting` .
   - Windows instance: see *Metadata*.
2. Get the credential Token. Return example:

```
"AccessKeyId" : "XXXXXXXXX",
"AccessKeySecret" : "XXXXXXXXX",
"Expiration" : "2017-11-01T05:20:01Z",
"SecurityToken" : "XXXXXXXXX",
"LastUpdated" : "2017-10-31T23:20:01Z",
"Code" : "Success"
```

6. (Optional). Authorize a RAM user to use the instance RAM role

Note:

You must grant the RAM user with the **PassRole** permission to use the instance RAM role feature. Without the **PassRole** permission, a RAM user cannot carry out the permission of the authorization policy that is attached to the RAM user.

Log on to the RAM console and *Attach policies to a RAM user* authorize a RAM user to complete the authorization, see the following code snippet as an authorization policy example:

```
"Version": "2016-10-17",
"Statement": [

"Effect": "Allow",
"Action": [
"ecs: [ECS RAM Action]",
"ecs: CreateInstance",
"ecs: AttachInstanceRamRole",
"ecs: DetachInstanceRAMRole"

"Resource": "*"


"Effect": "Allow",
"Action": "ram:PassRole",
"Resource": "*"
```

The parameter **[ECS RAM Action]** indicates the action that a RAM user can be authorized. See *Authorization rules*.

References

- You can also *Use the instance RAM role in the console*.
- For instruction on how to access other cloud services, see *Access other cloud products by using the instance RAM role*.
- APIs related to the instance RAM role include:
  - *CreateRole*: Create an instance RAM role
  - *ListRoles*: Query the list of instance RAM roles
  - *CreatePolicy*: Create an instance RAM role policy
  - *AttachPolicyToRole*: Authorize an instance RAM role policy
  - *AttachInstanceRamRole*: Attach an instance RAM role
  - *DetachInstanceRamRole*: Detach an instance RAM role
  - *DescribeInstanceRamRole*: Query an instance RAM role

6 Cloud disks

6.1 Create a cloud disk

You can create a cloud disk to work as a data disk to expand the storage space in the ECS console or by using the API. This article introduces how to create a new empty cloud disk in the ECS console.

Note

Before you create a cloud disk, consider the following:

- Only #### cloud disks can be created in this way, and they can be used as data disks only.

  Note:
  You can create cloud disks as data disks when creating an ECS instance. Those disks have the same billing method of the instance.
- You can create a new empty cloud disk or ########.
- The quota of the Pay-As-You-Go cloud disks that are used as data disks of each account in all regions is five times than that of the Pay-As-You-Go instances. For more information, see ### #.
- Currently, you cannot merge multiple cloud disks. After cloud disks are created, they are independent from each other, and you cannot merge their space by formatting. We recommend that you determine the number and size before you create cloud disks.
- You can create a snapshot for a single cloud disk, so we do not recommend that you create LVM (Logical Volume Manager) volumes, which may cause data loss when you use the snapshot to roll back the cloud disk.
- After a Pay-As-You-Go cloud disk is created, you can convert its billing method to Subscription:
  - If it is attached to a Subscription instance, use the ########## feature.
  - If it is attached to a Pay-As-You-Go instance, use the ######### to convert its billing method to Subscription.
- If a cloud disk is created in this way, and its billing method is not converted, you can ####and# ### at any time.

Prerequisites

If you want to attach a cloud disk to an instance, make sure they are in the same region and zone.

- Your account balance must be more than RMB 100 yuan or an equivalent voucher or coupon. Because a cloud disk separately created is billed as Pay-As-You-Go.
- Select a region and zone.#### A cloud disk can be attached to an ECS instance in the same region and zone.
- Choose whether to encrypt the disk. For more information, see *ECS ####*.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Block Storage** > **Cloud Disks**.
3. In the upper-right corner of the **Disk List** page, click **Create Cloud Disk** .
4. Select a region and zone.

   Note:
   A cloud disk can be attached to an ECS instance in the same region and zone.
5. Select a cloud disk category and specify the disk size and the quantity. Choose whether to **Encrypt** it, and specify the number of disks you want to buy. You can also choose ########.
6. Confirm the configuration and the **cost**.
7. Click **Buy Now** and complete the purchase by following the prompts.

When the cloud disk is created, go back to the **Disk List** page, refresh the list, and you can see **Disk Status** is **Available**.

Follow-up operations

####

Related videos

You can watch the video *Attach a disk to a Windows instance*.

Related APIs

To create a cloud disk independently:*CreateDisk*

To create a cloud disk when creating an instance:*RunInstances* or *CreateInstance*

6.2 Create a cloud disk from a snapshot

You can take a snapshot of an existing system disk or data disk, and create a cloud disk from the snapshot. The new disk can be attached to any instance in the same zone of the same region. This article describes how to create a cloud disk from a snapshot in the ECS console.

Scenarios

If you have to access data from a snapshot, but do not want to #### rollback your cloud disk, you can create a cloud disk from the snapshot to access data that you need. For example, if your instance encounters a system disk failure, you can use an existing snapshot to create a cloud disk, and attach the disk to a healthy instance. By doing so, you can restore the data of the impaired instance.

Disk Performance

SSD Cloud Disks and Ultra Cloud Disks that are not created from snapshots can exhibit the maximum performance to its capacity, and no preconditioning is needed. However, for cloud disks created from snapshots, the initial performance decreases because data has to be accessed from OSS before being written into the disk. We recommend that you write and read every data block at least once before production use. For more information about OSS, see ####### *OSS*.

Note

Before you start, you must know the following:

- Clouds created in this way can only be used #### Way of charging, And, can only be used for data disks.

  Note:
  You can create cloud disks to work as data disks when creating an ECS instance. Those disks have the same billing method as that of the instance.

- You can create a new empty cloud disk. For more information, see ####.
- The quota of the Pay-As-You-Go cloud disks that are used as data disks of each account in all regions is five times than that of the Pay-As-You-Go instances. For more information, see ### #.
- Currently, you cannot merge multiple cloud disks. After cloud disks are created, they are independent from each other, and you cannot merge their space by formatting. We recommend that you determine the number and size before you create a cloud disk.

- You can create a snapshot for a single cloud disk, so we do not recommend that you create LVM (Logical Volume Manager) volumes, which may cause data loss when you use the snapshot to rollback the cloud disk.
- After a Pay-As-You-Go cloud disk is created, you can convert its billing method to Subscription:
  - If it is attached to a prepaid instance, use the ######### feature.
  - If it is attached to a Pay-As-You-Go instance, use the ######## feature.
- If a cloud disk is created in this way, and its billing method is not converted, you can #### and #### it at any time.

Prerequisites

Before you start, make sure the following:

- You have created a snapshot for your instance, and you make sure the region and zone. For more information, see ####.
- Your account balance must not be less than $100 or an equivalent voucher or coupon. Because a separate cloud was created using a pay-per-order method.
- because, to attach a cloud disk to an instance, they must be in the same zone of the same region.#### because, to attach a cloud disk to an instance, they must be in the same zone of the same region.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Snapshots and Images >** > **Snapshots**,
3. In the upper-right corner of the **Disk List** page, click **Create Cloud Disk** to go to the **Create Cloud Disk** page.
4. Select a region and a zone.

   Note:
   If you want to attach the cloud disk to an ECS instance, they must be in the same zone of the same region.
5. Configure the cloud disk:
   a. Select a cloud disk category. The category of the source disk of the snapshot has no influence on this configuration.
   b. Click **Create a disk with snapshot** and select a snapshot.

> **Note:**
> If the selected snapshot is a dense snapshot, the **Encryption** item is automatically selected. Otherwise, you cannot select **Encryption**. For more information about disk encryption, see *ECS ####*.

c. Specify the size of the cloud disk. The size range is 20 GiB~32768 GiB. If the selected snapshot is smaller than 20 GiB, you can adjust the size manually. For a snapshot larger than 20 GiB, the size is adjusted automatically according to the snapshot size. However, if you replace the snapshot, you must manually set the size.

d. For Purchase Plan, set the quantity.

6. Check Overview and the **cost**.
7. Click **Buy Now**, confirm you order, and make the payment.

Go back to the **Cloud Disks** page and refresh it. You can find the new **cloud disk status** is **Available** when the new disk is created successfully.

Follow-up operations

####

Related APIs

CreateDisk*CreateDisk*

6.3 Attach a cloud disk

You can create a cloud disk and attach it to an ECS instance to work as a data disk. You have two options to attach a cloud disk: attach them on the Instance Disks page or on the Disk List page. Before you attach a cloud disk to an ECS instance, consider the following:

- If you want to attach multiple cloud disks to one ECS instance, attach them on the Instance Disks page.
- If you want to attach multiple cloud disks to various ECS instances, attach them on the Disk List page.

Note

Before you attach a cloud disk to an ECS instance, consider the following:

- If a cloud disk is created together with an ECS instance, you do not have to attach the disk.

- You can attach a cloud disk to work as a data disk only, but not as a system disk.
- To attach a cloud disk to an ECS instance, the instance must meet the following requirements:
  - The instance must be in the **Running** (Running) or **Stopped** status (Stopped) , but not in the **Locked** status (Locked).
  - The instance must not have payment overdue.
- The disk to be attached must be in the **Available** status.
- The cloud disk and the ECS instance must be in the same region and the same zone.
- Up to 16 cloud disks can be attached to an ECS instance to work as data disks. One cloud disk cannot be attached to multiple instances simultaneously.
- A cloud disk can be attached to an ECS instance, regardless of the billing method of the instance.

Prerequisites

You must create an ECS instance and a cloud disk in the same region and zone. For more information, see *Create a cloud disk* and the *Step 2. Create an instance* in Quick Start.

Attach a cloud disk on the Instance Disks page

To attach one or multiple cloud disks to a specified ECS instance, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **instances**.
3. Select a region.
4. Find an ECS instance and click its ID to go to the Instance Details page.
5. In the left-side navigation pane, click **Instance Disks**, and on the Disk List page, click **Attach Disk**.

6. In the dialog box, complete the following configurations:
   - **Target Disk**: Select a cloud disk in the **Available** status in the same region and zone.
   - **Release Disk with Instance**: If you select this option, the disk is released when you release its instance.
   - **Delete automatic snapshots when releasing disk**: If you select this option, all the automatic snapshots of the target disk are deleted when you release it. However, all the manual snapshots are retained. To keep complete data backup, we recommend that you do not select this option.

Click **OK** , and then **Attach.**.

7. Refresh the Disk List.

   When the status of the cloud disk is **In Use**, the attachment is successful.

8. According to the content of the cloud disk and the operating system of the ECS instance, perform different operations to make the disk ready for use. As shown in the following table.

Disk content	Operating system of the ECS instance	Follow-up operations
A new empty cloud disk	Linux	*Linux _ Format and mount a data disk*. If the cloud disk is larger than 2 TiB, see *Partition and format data disk more than 2 TB*.
	Windows	*Windows _ Format a data disk*. If the cloud disk is larger than 2 TiB, see *Partition and format data disk more than 2 TB*.
A cloud disk from a snapshot	Linux	Connect to the Linux instance and run the `mount` command to mount the partitions to make the disk ready for use.
	Windows	The cloud disk is ready for use.

Attach a cloud disk on the Disk List page

To attach a cloud disks to an ECS instances, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Block Storage >** > **Cloud Disks**.
3. Select a region.
4. Find a cloud disk in the **Available** status, and in the **Actions** column, select **More >** > **Attach**.

5. In the dialog box, complete the following configurations:

- **Target Instance**: Select an ECS instance in the same zone.
- **Release Disk with Instance**: If you select this option, the disk is released when you release its instance.
- **Delete automatic snapshots when releasing disk**: If you select this option, all the automatic snapshots of the selected disk are deleted when you release the disk. However, all the manual snapshots are retained. To keep complete data backup, we recommend that you do not select this option.

  Click **Attach**.

6. Refresh the disk list.

   When the status of the cloud disk is **In Use**, the attachment is successful.

7. According to the content of the cloud disk and the operating system of the ECS instance, perform different operations to make the disk ready for use. As shown in the following table.

Disk content	Operating system of the ECS instance	Follow-up operations
A new empty cloud disk	Linux	*Linux _ Format and mount a data disk*. If the cloud disk is larger than 2 TiB, see *Partition and format data disk more than 2 TB*.
	Windows	*Windows _ Format a data disk*. If the cloud disk is larger than 2 TiB, see *Partition and format data disk more than 2 TB*.
A cloud disk from a snapshot	Linux	Connect to the Linux instance and run the `mount` command to mount the partitions to make the disk ready for use.
	Windows	The cloud disk is ready for use.

Follow-up operations

After a cloud disk is attached to an ECS instance, you can perform one of the following operations according to your business needs:

- Reinitialize *#unique_38*a cloud disk to restore it to the initial status after it is created.
- You can increase the size of the cloud disk by resizing it. For more information, see *Linux _ Resize a data disk* or *Windows _ Resize a data disk*.
- You can create a snapshot *Create snapshots* of the cloud disk to back up data. Alternatively, you can *Apply automatic snapshot policies to disks* create an automatic snapshot policy and apply it to the disk to create snapshots automatically.
- If you want to restore the cloud disk to the status at a given time point, you can use its snapshot to *Roll back a cloud disk* roll back the disk.
- If your instance does not need a cloud disk, to reduce the cost, you can *Detach a cloud disk* detach and *Release a cloud disk* release it.

Related APIs

AttachDisk

Related documents

You can also watch the video *Attach a Cloud Disk Windows ECs Instance* to check how to create, attach, and format the data disk.

6.4 Partition and format data disk more than 2 TB

If you want to partition and format a data disk more than 2 TB (referred to as a **large data disk** in this article, and a disk smaller than 2 TB is a **small data disk**), you must use the GPT format. This document describes how to partition and format a large data disk in different operating systems.

Note:

If you want to partition and format a data disk less than 2 TiB, please see *Linux _ Format and mount a data disk* and *Windows _ Format a data disk*.

Note

Before partition and formatting a large data disk, note the following:

- Large data disks support the partition tool and file system shown in the following table.

Operating system	Partition tool	File system
Linux	`parted`	ext4 or xfs
Windows	**Disk management**	NTFS

- **We do not recommend that you create a large data disk by using a snapshot of a small data disk.**

  Theoretically, this can work. But we recommend that you do not try this practice. Instead, create an empty large data disk, or create large data disk by using snapshots of large data disks, because of the following reasons:

  — While creating a large data disk by using a snapshot of a small data disk, the system completes expansion at the block device level disk only, but not automatic conversion between the partition format and file system.

  — If the MBR format is used in the snapshot of the small data disk, neither partition tool mentioned (`parted`on Linux and **Disk Management** on Windows) can convert the MBR to GPT and retain the data. Therefore, even if you create a large data disk by using a snapshot of a small data disk, while partitioning and initializing, you must delete the original data and partition with the GPT format. If you have created large data disk by using a snapshot of a small data disk, see *Use windows to partition and format a large data disk created by a snapshot of a small data disk* .

  > **Note:**
  > This is not the case if the snapshot of the small data disk is in GPT format, or if you have another powerful partitioning tool. You can select based on your own situation.

- **Effect of data disk snapshots**

  Effect of Data Disk SnapshotsThe volume of data on a large data disk is huge, but the process for creating a snapshot of it is the same as for a small disk data, so the total time required for creating snapshots each day is proportional to the total data volume. Because the total time required to create snapshots is proportional to the total data volume, the more the dirty data is, the longer the snapshot creation time will be.

Windows _ Partition and format an empty large data disk

Consider Windows Server 2008 R2 64-bit system as example to describe how to partition and format a large data disk in Windows instance. Assume the data disk to be processed is a 4 TiB empty disk.

Prerequisites

The data disk has been attached to an instance. For detailed operation, see *Attach a cloud disk*.

Procedure

To partition and format a large data disk, follow these steps:

1. *Connect to a Windows instance*.
2. Click the  icon in the task bar.
3. In the left-side navigation pane of **Server Manager**, select **Storage >** > **Disk Management**.
4. Find the disk that is to be partitioned and formatted (in this example, **Disk 4**). The disk status shows as **Offline**.
5. Right click the blank area around Disk 4, and then click **Online**.

   After going online, Disk 4 is in the **Not Initialized** status.
6. Right click the blank area around Disk 4, and then select **Initialize Disk** in the context menu.
7. In the **Initialize Disk** dialog box, select **Disk 4** and select **GPT** as the disk partitioning method.
8. In the **Disk Management** window, right click the **Unallocated** area of Disk 4, and then select **New Simple Volume** to create a 4 TiB volume in the NTFS format.
9. In the **New Simple Volume Wizard**, follow these steps:

   a. Click **Next**.

   b. Choose a volume size: designate size of simple volume. If you need to create a master area only, use the default value. Click **Next**. You can also partition **Disk 4** into several partitions.

   > **Note:**
   > The maximum NTFS volume, in theory, is the maximum volume of NTFS containing 2^{64}-1 clusters. Actually, in WinXP Pro, the maximum volume of NTFS is 2^{32}-1 clusters. For example, for a 64 KiB cluster, the maximum NTFS volume is approximately 256 TiB. If you select a 4 KiB cluster, the maximum NTFS volume is 16 TiB. NTFS selects the size of a cluster automatically based on the disk capacity.

   c. Distribute drive letter and path: select a drive letter, then select G in this instance. Click **Next**.

d. Format Partition: Select the formatting settings, including file system, distributed unit size, and volume label, and then confirm whether to **Perform a quick format** and **Enable file and folder compression**. Select **Perform a quick format** here only. Click **Next**.

e. Start creating a new simple volume. After the wizard to create a new simple volume is completed, click **Finish** to close **New Simple Volume Wizard**.

After the formatted partition is completed, in **Disk Management** , the status of **Disk 4** is shown in the following screenshot.

Use windows to partition and format a large data disk created by a snapshot of a small data disk

If you created a large data disk by using snapshots of a small data disk, you first need to convert the partition format of data disk from MNR to GPT, and then format the data disk. Data of the original snapshots will not be saved, so we recommend you do not create large data disk by using a snapshot of a small data disk.

If you have already created large data disk like this, do the following to partition and format this data disk. The example operating system is Windows Server 2012 R2 64-bit, and we assume capacity of the data disk to be processed is 3 Tib.

Prerequisites

The data disk has been *attached* to an instance.

Procedure

To partition and format a large data disk, follow these steps:

1. *Connect to a Windows instance*.
2. On Windows Server desktop, right click the **Start** icon, and select **Disk Management**.

   The data disk (Disk 2 in this example) that has not been formatted or partitioned is in the **Offline** status.
3. Right click the blank area around Disk 2, and then select **Offline** in the context menu.
4. Right click a simple volume, and then select **Delete Volume** in the context menu.
5. Right click the blank area around Disk 2, and then select **Convert to GPT Disk** in the context menu.
6. In the **Disk Management** window, right click **Unallocated** area of Disk 2, and then select **New Simple Volume** to create a 3 TiB volume in the NTFS format.
7. In the **New Simple Volume Wizard**, follow these steps:

   a. Click **Next**.

b. Specify Volume Size: Specify the size of the simple volume. If you need only one primary partition, use the default value, and then click **Next**. You can also partition **Disk 2** into several partitions.

> **Note:**
> The maximum NTFS volume, in theory, is the maximum volume of NTFS containing 2^{64}-1 clusters. Actually, in WinXP Pro, the maximum volume of NTFS is 2^{32}-1 clusters. For example, for a 64 KiB cluster, the maximum NTFS volume is approximately 256 TiB. If you select a 4 KiB cluster, the maximum NTFS volume is 16 TiB. NTFS selects the size of a cluster automatically based on the disk capacity.

c. Assign Drive Letter or Path: Select a drive letter. Click **Next**.

d. Format Partition: Select the formatting settings, including file system, distributed unit size and volume label, and then confirm whether to **Perform a quick format** and **Enable file and folder compression**. Select **Perform a quick format** here only. Click **Next**.

e. Start creating a new simple volume. After the wizard to create a new simple volume is completed, click **Finish** to close **New Simple Volume Wizard**.

After the formatted partition is completed, in **Disk Management** , the status of **Disk 4** is shown in the following screenshot.

Linux _ Partition and format a large data disk

To partition and format a large data disk that is attached to a Linux instance, use the GPT format. In Linux system, large data disk normally uses xfs or ext4 file system.

The example operating system is CentOS 7.4 64-bit.This section describes how to use **parted** and **e2fsprogs** tools to partition and format a large data disk on a Linux instance. Assume the data disk to be processed is an empty 3 TiB new disk, and the device name is `/dev/vdd`.

Prerequisites

Your Linux instance has installed **parted**. If not, run `yum install -y parted`.

Your Linux instance has installed **e2fsprogs**. If not, run `yum install -y e2fsprogs`.

The data disk has been attached to the instance. For more information, see *Attach a cloud disk*.

Procedure

To partition and format a large data disk and mount the file system, follow these steps:

1. Run `fdisk -l` to check whether the data disk exists. The expected result is as follows. If you see different returned information, you haven't mounted data disk.

```
Disk /dev/vdd: 3221.2 GB, 3221225472000 bytes, 6291456000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
```

2. Run `parted /dev/vdd` to start partitioning:

   a. Run `mklabel gpt`, to convert partitioning format from MBR to GPT.

   b. Run `mkpart primary ext4 <StartSector> <EndSector>` to partition a primary partition by using the ext4 file system, and specify a start sector and end sector for the partition. If a data disk is partitioned into one partition only, run `mkpart primary ext4 0 -1`.

   Note:

   You can also use xfs file system.

   c. Run `print` to check partition table.

```
(parted) mkpart primary ext4 0 -1
Warning: The resulting partition is not properly aligned for best
performance.
Ignore/Cancel? ignore
(parted) print
Model: Virtio Block Device (virtblk)
Disk /dev/vdd: 3221 GB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:
Number Start End Size File system Name Flags
1 17.4kB 3221GB 3221GB primary
```

   d. Run `quit`to exit **parted** .

3. Run `partprobe` to make system re-read the partition table.

4. Run the following commands to create an ext4 file system, and make /dev/vdd1 partition use ext4.

```
mke2fs -O 64bit,has_journal,extents,huge_file,flex_bg,uninit_bg,
dir_nlink,extra_isize /dev/vdd1
```

Note:

- If you want to disable the lazy init function of ext4 file system to avoid its effect on data disk I/O performance, see *Appendix2: Disable lazy init function.*.

- If capacity of the data disk is 16 TiB, you have to format it by using e2fsprogs in the designated version. See*Appendix1: update e2fsprogs*.
- If you want to create an xfs file system, run `mkfs -t xfs /dev/vdd1`.

5. Run `mkdir /test` to create a mount point with the name /test.
6. Run `mount /dev/vdd1 /test` to mount /dev/vdd1 to /test.
7. Run `df -h` to check current disk space and usage.

   If it shows the new file system information in the returned result, the mount operation was successful and you can use the new file system. After mounting, do not need to restart the instance to use the new file system directly.

```
[root@izXXXXz ~]# df -h
Filesystem Size Used Avail Use% Mounted on
/dev/vda1 40G 6.4G 31G 18% /
devtmpfs 487M 0 487M 0% /dev
tmpfs 497M 0 497M 0% /dev/shm
tmpfs 497M 364K 496M 1% /run
tmpfs 497M 0 497M 0% /sys/fs/cgroup
tmpfs 100M 0 100M 0% /run/user/0
/dev/vdd1 2.9T 89M 2.8T 1% /test
```

8. (Optional) Write new partition information to */etc/fstab* to enable automatic mount partition while the instance is started.

   a. (Optional) Run `cp /etc/fstab /etc/fstab.bak` to back up etc/fstab.

   b. Run `echo /dev/vdd1 /test ext4 defaults 0 0 >> /etc/fstab` to write new partition information to /etc/fstab.

   c. Run `cat /etc/fstab` to check /etc/fstab information.

      If the new partition information is in the returned result, the write operation was successful.

You have now successfully partitioned and formatted a 3 TiB data disk.

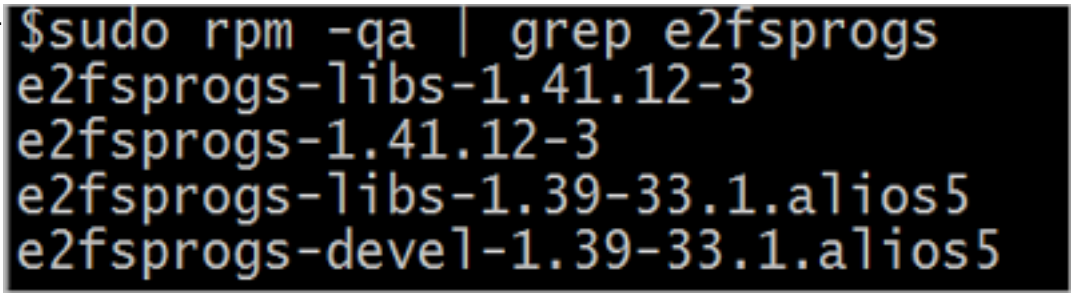
Appendix 1: Update e2fsprogs

If the disk capacity is 16 TiB, you must use e2fsprogs of version1.42 or later to format its partitions to ext4 file system. If e2fsprogs version is too low (for example, e2fsprogs 1.41.11), the following error occurs.

```
mkfs.ext4: Size of device /dev/vdd too big to be expressed in 32 bits
using a blocksize of 4096.
```

To install e2fsprogs of later version, such as 1.42.8 in this example, follow these steps:

1. Run `rpm -qa | grep e2fsprogs` to check the current version of e2fsprogs.



   If the current version is earlier than 1.42, update the software by following these steps.

2. Run the following command to download e2fsprogs in version1.42.8. You can go to *e2fsprogs* to find the latest software package.

```
wget https://www.kernel.org/pub/linux/kernel/people/tytso/e2fsprogs/v1.42.8/e2fsprogs-1.42.8.tar.gz
```

3. Run the following commands in turn to compile tools in later versions.

```
tar xvzf e2fsprogs-1.42.8.tar.gz
cd e2fsprogs-1.42.8
./configure
make
make install
```

4. Run `rpm -qa | grep e2fsprogs` to check whether the software of the later version has been installed successfully.

Appendix 2: Disable lazy init function

The lazy init function of ext4 file system is enabled by default. While the function is enabled, in the system background, it will initiate a thread to initialize metadata of ext4 file system continuously to delay metadata initialization. Therefore, right after formatting a data disk, IOPS can be affected. For example, IOPS performance testing data in data disk will obviously be lower.

If you need to test performance of data disk right after formatting, you need to run the following commands to disable lazy init function while formatting the file system.

```
mke2fs -O 64bit,has_journal,extents,huge_file,flex_bg,uninit_bg,dir_nlink,extra_isize -E lazy_itable_init=0,lazy_journal_init=0   /dev/vdd1
```

If the lazy init is disabled, it may take longer time to format a partition. For example, it may take 10−30 minutes to format a 32 TiB data disk.

You can use the lazy init function according to your needs.

6.5 Detach a cloud disk

When a Pay-As-You-Go cloud disk is attached to an ECS instance as a data disk, you can detach it from the instance and release it. However, if the disk is used as a system disk, you cannot detach it.

When detaching a cloud disk, consider the following:

- Only the Pay-As-You-Go cloud disks in the **In Use** status and used as a **Data Disk** can be detached.
- You cannot detach a local disk.
- On a Windows instance, consider the following:
  - To guarantee the data integrity, we recommend that you stop writing or reading the files on the cloud disk. Otherwise, data may be lost.
  - Before detaching a cloud disk in the ECS console, you must *connect to the instance* and set it offline in **Disk Management** .
- On a Linux instance, consider the following:
  - Before detaching a cloud disk in the ECS console, you must *connect to the instance* and run `umount` to unmount the partitions.
  - If you have configured the /etc/fstab file to automatically mount the partitions at the startup of the instance, before detaching it, you must delete the configurations from the /etc/fstab file. Otherwise, you cannot connect to the instance after the instance is restarted.

The following table shows the options available for you to detach a cloud disk in the ECS console.

Scenario	Applicable action
You want to detach one or more cloud disks from one instance.	*Detach cloud disks on the Instance Disk page*
You want to detach one specified cloud disk.	*Detach a cloud disks on the Disk List page*

Detach cloud disks on the Instance Disk page

On the Instance Disk page, you can delete one or more cloud disks that are attached to the instance.

Prerequisites

The cloud disks have been *attached to the instance* and are in the **In Use** status

If you are detaching a cloud disk from a Linux instance, and you have configured the /etc/fstab file to mount the partitions at the startup of the instance, delete the configurations.

Procedure

To detach a cloud disk from the Instance Disks page, follow these steps:

1. Connect to the instance and unmount the partitions. Follow different steps according to the operating system, as shown in the following table.

Operating system	Steps
Linux	Run `umount [partition]`. For example, `umount /dev/vdb1`.
Windows	Start **Disk Management**, right-click the disk name (For example, **Disk 2**) and then click **Offline**.

2. Log on to the *ECS console*.
3. In the left-side navigation pane, click **Instances**.
4. Select a region.
5. Find an instance and click its ID to go to the Instance Details page.
6. In the left-side navigation pane, click**Instance Disks**.
7. Find a cloud disk, in the **Actions** column, select **More** > **Detach**.

   Only the cloud disks that have the following attributes can be detached:

   - **Disk Status** must be **In Use**.
   - **Detachable** must be **Yes**.
   - **Used As** must be **Data Disk**.
8. In the dialog box, click **Confirm Detaching**.
9. Optional. If you want to detach more cloud disks, repeat step 7 and step 8.

When the status of the cloud disk becomes **Available** , the disk is detached.

Detach a cloud disks on the Disk List page

You can detach one specified cloud disk from an ECS instance.

Prerequisites

The cloud disk has been *attached to the instance* and are in the **In Use** status.

If you are detaching a cloud disk from a Linux instance, and you have configured the `/etc/fstab` file to mount the partitions at the startup of the instance, delete the configurations.

Procedure

To detach a cloud disk on the Disk List page, follow these steps:

1. Connect to the instance and unmount the partitions. Follow different steps according to the operating system, as shown in the following table.

Operating system	Steps
Linux	Run `umount [partition]`. For example, `umount /dev/vdb1`.
Windows	Start **Disk Management**, right-click the disk name (For example, **Disk 2**) and then click **Offline**.

2. Log on to the *ECS console*.
3. In the left-side navigation pane, select **Block Storage** > **Cloud Disks**.
4. Select a region.
5. Find a cloud disk, in the **Actions** column, select **More** > **Detach**.

   Only the cloud disks that have the following attributes can be detached:

   - **Disk Status** must be **In Use**.
   - **Detachable** must be **Yes**.
   - **Used As** must be **Data Disk**.
6. In the dialog box, click **Confirm Detaching**.

When the status of the cloud disk becomes **Available** , the disk is detached.

Related APIs

DetachDisk

Follow-up operations

If you no longer need the disk, you can *release it*.

6.6 Resize cloud disks

6.6.3 Windows _ Resize a data disk

As your business grows, the current capacity of your data disks may not be able to meet your data storage needs. You can use the **Resize Disk** function to resize your data disks as necessary.

Note:

- We recommend that you manually create a snapshot to back up your data before resizing a data disk.
- You can resize a data disk when the data disk is either in the **Available** status or in the **In Use** status.
- If a snapshot is being created for a data disk, you cannot resize the data disk.
- If you have renewed a Subscription ECS instance for configration downgrade (*Renew for configuration downgrade*) during its current billing cycle, you cannot resize the attached Subscription cloud disks, including its data or system disks.
- You can resize data disks, but not file system.
- You can resize data disks, but not system disks or local disks.
- Resize the data disks that are attached to the instance only when the instance is in the **Running** (**Running**) or **Stopped** (**Stopped**) status. The changes are applied when you restart the instance in the ECS console. This action stops your instance from working and interrupts your business. Hence, **proceed with caution**.

This example uses a data disk of the ultra cloud disk type and an ECS instance running 64-bit Windows Server 2008 R2 Enterprise Edition to show how to resize a data disk and extend the available capacity. In this example, the current disk capacity is 20 GiB, and we resize it to 24 GiB.

To resize a data disk, follow these steps:

Step 1. Resize a data disk in the ECS console

Step 2. Log on to the instance to enable the extended storage space

Step 1. Resize a data disk in the ECS console

To resize a data disk in the ECS console, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, choose **Block Storage** > **Cloud Disks**.

> **Note:**
> If the data disk you want to resize is attached to an instance, click **Instances** in the left-side navigation pane, find the instance, go to the Instance Details page, and then click. **Instance Disks**.

3. Select a region.
4. Find the disk to be resized, and in the **Actions** column, choose **More** > **Resize Disk**.
5. On the **Resize Disk** page, set **Capacity after resizing**. In this example, 24 GiB. The capacity after resizing must be larger than the current capacity.
6. When the cost is calculated, click. **Confirm to resize**.

> **Note:**
> If your data disk is attached to an instance, restart the instance in the ECS console *Restart an instance* to make the disk resize take effect.

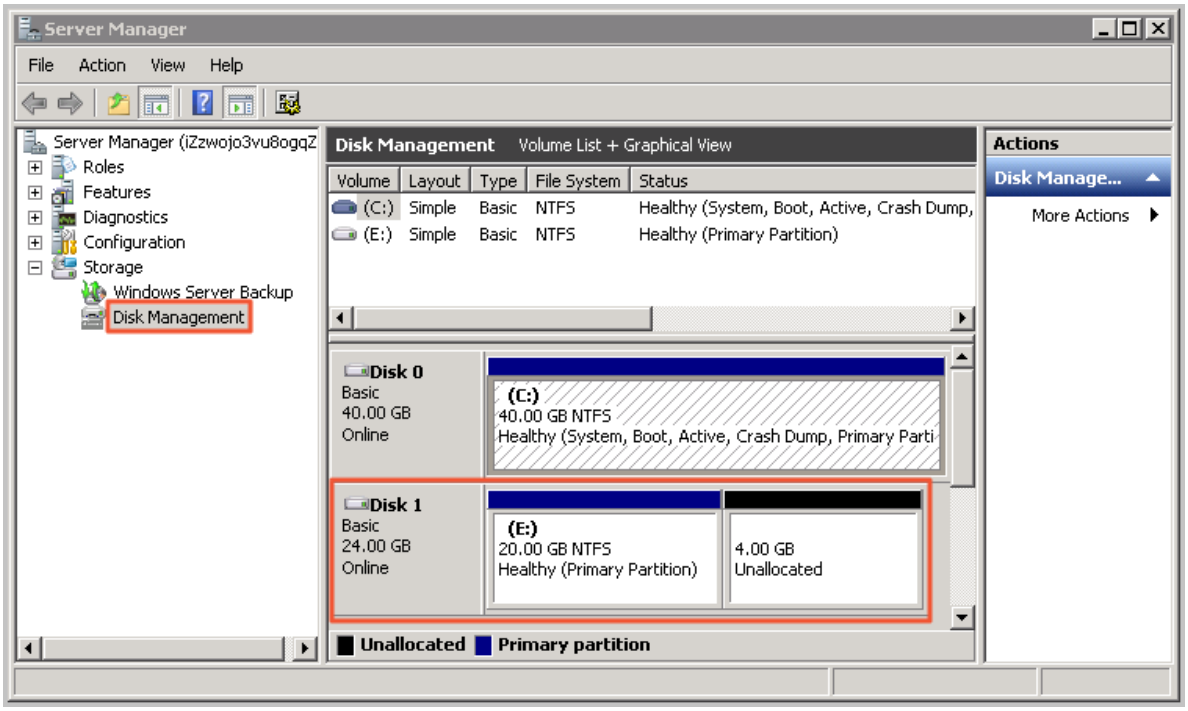
Once the data disk resizing completes, you can do the following:

- If the data disk is attached to an instance, *Step 2. Log on to the instance to enable the extended storage space*.
- If the data disk is not attached to an instance, attach the disk to an instance in the console (x id="1"/>) first, and then proceed depending on the data disk:
  - If it is not formatted or partitioned, format and mount the data disk. For more information, see *Windows _ Format a data disk*.
  - If it is formatted and partitioned, *Step 2. Log on to the instance to enable the extended storage space*.

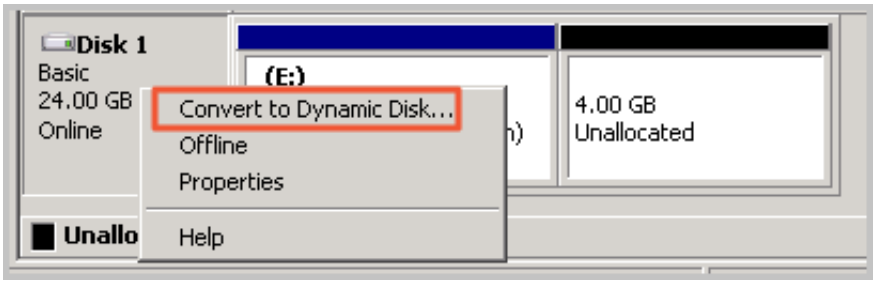
Step 2. Log on to the instance to enable the extended storage space

To resize a data disk within the instance, follow these steps:

1. *Connect to a Windows instance*.
2. On the Windows Server desktop, click the Server Manager icon  .
3. In the left-side navigation pane of **Server Manager**, choose **Storage** > **Disk Management**. In the disk management area, you can see the relationship between the new and the original data disk spaces. In this example, **Disk 1** is the resized data disk.



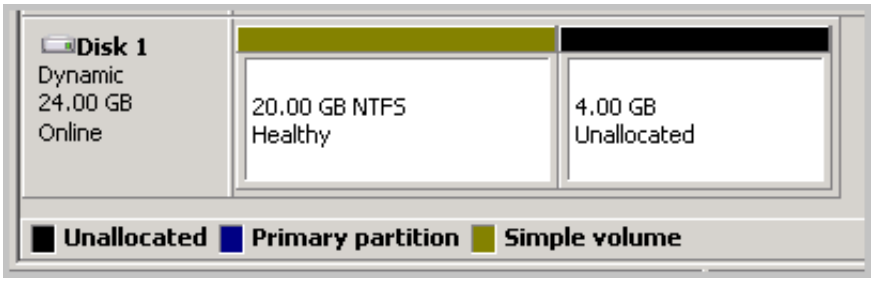
4. Right click **Disk 1**, select **Convert to Dynamic Disk**, and follow the wizard to convert a basic disk to a dynamic disk.



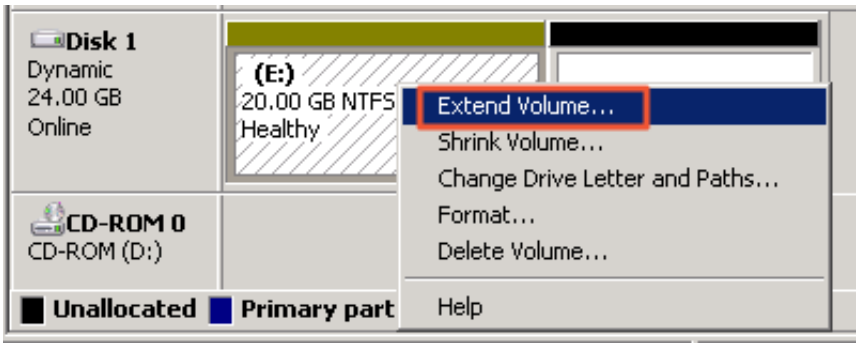
Note:

Converting a basic disk into a dynamic disk unmounts the disk from the system. Applications installed on the data disk, if any, are temporarily unavailable during the conversion process. The conversion process does not cause any data loss.

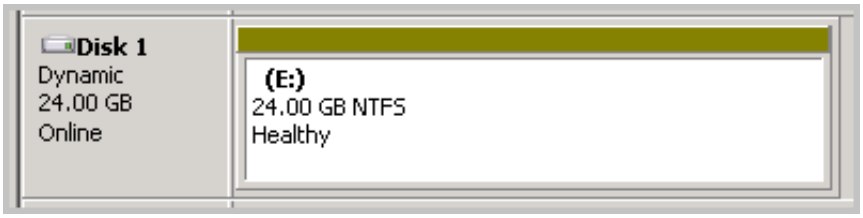
After the conversion, the **Disk 1** information shows in the Disk Manager as follows.



5. Right click an empty area of the simple volume of Disk 1, and select **Extend Volume**.



6. Follow the **Extend Volume Wizard** to extend the volume. When the wizard is complete, the new data disk space is automatically merged into the original volume and the **Disk 1** information showed in the Disk Manager as follows.



Note:

On Windows Server 2003, the extended storage space is added to the data disk but it is displayed as a separate volume in Disk Manager. On Windows Server 2003, one separate volume is created for each expansion and is not merged into the original volume, which does not affect the availability of the extended storage space.

You have resized a data disk successfully and the extended storage space is ready for use.

6.6.4 Linux _ Resize a data disk

As your business grows, the current capacity of your data disks may not be able to meet your data storage needs. You can use the **Resize Disk** feature to resize your data disks as necessary.

Note:

- Resize the data disks that are attached to an instance only when the instance is in the **Running** or **Stopped** status. **You must restart the instance in the ECS console to apply the changes. This action causes your instance to stop working and may cause your business to be interrupted, so please proceed with caution.**
- We recommend that you manually create a snapshot to back up your data before resizing your data disk.

- You can resize a data disk when the data disk is either in the **Available** status or in the **In Use** status.
- If you have renewed a Subscription ECS instance for configration downgrade (*Renew for configuration downgrade*), during its current billing cycle, you cannot resize the attached Subscription cloud disks, including its data or system disks.
- If a snapshot is being created for a data disk, you cannot resize the data disk.
- You can resize data disks, but not system disks or local disks.

This example uses a data disk of the ultra cloud disk type and an ECS instance running 64-bit CentOS 7.3 to describe how to resize data disk and extend the available capacity.

To resize a data disk, follow these steps:

Step 1. Increase the size of a data disk in the ECS console

Step 2. Log on to the instance to resize the file system

Step 1. Increase the size of a data disk in the ECS console

To increase the size of a data disk in the ECS console, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Block Storage** > **Cloud Disks**.

   Note:
   If the data disk you want to resize has been attached to an instance, in the left-side navigation pane, click **Instances**, find the corresponding instance, go to the instance details page, and click **Instance Disks**.
3. Select a region.
4. Find the disk to be resized, and in the **Actions** column, select **More** > **Resize Disk.**.
5. On the **Resize Disk** page, set **Capacity after resizing** (In this example, 30 GiB). The capacity after resizing must be larger than the current capacity.
6. When the cost is calculated, click **Confirm to resize**.

   Note:
   After the resizing, you can view the new disk size in the console. However, if the data disk is attached to an ECS instance, you must *Restart an instance* restart the instance in the ECS console to view the new disk size when you log on to the instance.

After the disk size is increased,

- If the data disk is attached to an instance, *Step 2. Log on to the instance to resize the file system*.
- If the data disk is not attached to an instance, attach the disk to an instance in the console (*Attach a cloud disk*) first, and then proceed depending on the data disk:
  - If it is a new data disk, which has not been formatted, format it. For more information, see *Linux _ Format and mount a data disk*.
  - If it has been formatted and partitioned, *Step 2. Log on to the instance to resize the file system*.

Step 2. Log on to the instance to resize the file system

After the disk size is increased, you must log on to the instance to resize the file system.

In this example, the data disk is attached to a Linux instance running the 64-bit CentOS 7.3. The data disk before resizing has only one primary partition (/dev/vdb1, ext4 file system), the mount point of the file system is `/resizetest`, and after resizing is completed, the data disk still has only one primary partition.

1. *Connect to a Linux instance by using a password*.
2. Run the `umount [file system name]` command to unmount the primary partition.

```
umount /dev/vdb1
```

Note:

Run the `df -h` command to check whether the unmounting is successful. If you do not see the /dev/vdb1 information, unmounting is successful. The following is the sample output.

```
[root@iXXXXXX ~]# df -h
Filesystem Size Used Avail Use% Mounted on
/dev/vda1 40G 1.5G 36G 4% /
devtmpfs 487M 0 487M 0% /dev
tmpfs 497M 0 497M 0% /dev/shm
tmpfs 497M 312K 496M 1% /run
tmpfs 497M 0 497M 0% /sys/fs/cgroup
tmpfs 100M 0 100M 0% /run/user/0
```

3. Run the `fdisk` command to delete the original partition and create a new partition:

Note:

If you use the `parted` tool to manipulate partitions, you cannot use it in conjunction with `fdisk`. Otherwise, this results in an inconsistent first sector of the partition. Instructions on how to use the `parted` tool can be found *here*.

a. Run the `fdisk -l` command to list the partition details and record the final size of the partition and its first sector before resizing.

b. Run the `fdisk [device name of data disk]` command to go to `fdisk` . In this example, the device name is `/dev/vdb`.

c. Type `d` and press the Enter key to delete the original partition.

Note:

Deleting a partition does not cause loss of data in the data disk.

d. Type `d` and press the Enter key to start creating a new partition.

e. Type `p` and press the Enter key to create a primary partition. In this example, you are creating a single-partition data disk, so it is sufficient to create one primary partition.

Note:

If you want to create more than four partitions, create at least one extended partition, that is, type `e`.

f. Type the partition number and press the Enter key. In this example, only one partition is to be created, so type `1`.

g. Type a number for the First sector: For data consistency, the number for the First sector must be identical with that of the original partition. In this example, press the Enter key to use the default value of 1.

Note:

If you find that the First sector is not identical with the recorded one, you may have used the `parted` tool for partitioning. In that case, stop the current `fdisk` operation and use *`parted`* to start over again.

h. Type a number for the last sector: Because only one partition is to be created in this example, press the Enter key to use the default value.

i. Type `wq` and press the Enter key to start partitioning.

```
[root@iXXXXXX ~]# fdisk /dev/vdb
Welcome to fdisk (util-linux 2.23.2).
```

```
Changes will remain in memory only, until you decide to write them
.
Be careful before using the write command.
Command (m for help): d
Selected partition 1
Partition 1 is deleted
Command (m for help): n
Partition type:
p primary (0 primary, 0 extended, 4 free)
e extended
Select (default p):
Using default response p
Partition number (1-4, default 1):
First sector (2048-62914559, default 2048):
Using default value 2048
Last sector, +sectors or +size{K,M,G} (2048-62914559, default
62914559):
Using default value 62914559
Partition 1 of type Linux and of size 30 GiB is set
Command (m for help): wq
The partition table has been altered!
Calling ioctl() to re-read partition table.
Syncing disks.
```

Note:

If you are using the `parted` tool, type `p` in the `parted` window to list the current partition details. If any partition is displayed, use rm + serial number to delete the original partition table, then run the `unit s` command to specify the start unit, calculated by the number of sectors, and finally run the `mkpart` command to create it, as shown in the following figure.

```
[root@          ~]# parted /dev/xvdb
GNU Parted 3.1
Using /dev/xvdb
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 5369MB
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End  Size  File system  Name  Flags

(parted) unit s
(parted) mkpart primary ext3 56 5369MB
Warning: The resulting partition is not properly aligned for best performance.
Ignore/Cancel? i
(parted) p
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvdb: 10485760s
Sector size (logical/physical): 512B/512B
Partition Table: gpt
Disk Flags:

Number  Start  End        Size       File system  Name     Flags
 1      56s    10485726s  10485671s  ext3         primary
```

4. For some operating systems, the file system may be automatically mounted to the mount point after partitioning. We recommend that you run the `df -h` command to check the file system space and usage. Run the `umount [file system name]` to unmount the file system again.
5. Check the file system and resize the file system.

```
e2fsck -f /dev/vdb1 # check the file system
resize2fs /dev/vdb1 # resize the file system
```

Note:

- Running the `e2fsck` command is time-consuming because the system needs to check and revise the file system metadata during that process, so be patient.
- Properly running the `e2fsck` command and the `resize2fs` command does not cause data loss.

The following is the sample output.

```
[root@iXXXXXX ~]# e2fsck -f /dev/vdb1
e2fsck 1.42.9 (28-Dec-2013)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/vdb1: 11/1835008 files (0.0% non-contiguous), 159218/7339776
blocks
[root@iXXXXXX ~]# resize2fs /dev/vdb1
resize2fs 1.42.9 (28-Dec-2013)
Resizing the filesystem on /dev/vdb1 to 7864064 (4k) blocks.
The filesystem on /dev/vdb1 is now 7864064 blocks long.
```

6. Mount the resized file system to the original mount point (in this example, */resizetest*).

```
mount /dev/vdb1 /resizetest
```

7. Run the `df -h` command to check file system space and usage. If the correct information about the resized file system is displayed, the mounting is successful and the resized file system is ready for use.

Note:

After the mounting is completed, you can use the resized file system without restarting the instance.

The following is the sample output.

```
[root@iXXXXXX ~]# df -h
Filesystem Size Used Avail Use% Mounted on
/dev/vda1 40G 1.5G 36G 4% /
devtmpfs 487M 0 487M 0% /dev
tmpfs 497M 0 497M 0% /dev/shm
tmpfs 497M 312K 496M 1% /run
tmpfs 497M 0 497M 0% /sys/fs/cgroup
tmpfs 100M 0 100M 0% /run/user/0
/dev/vdb1 30G 44M 28G 1% /resizetest
```

6.8 Roll back a cloud disk

When errors occur to a cloud disk, if you have #### for it, you can use the **Disk Rollback** feature to restore the disk to a healthy status at a given time point.

Note

Before you roll back a cloud disk, consider the following:

- Rolling back a cloud disk is an irreversible action. Once rollback is complete, data cannot be restored. Therefore, proceed with caution.
- After the disk is rolled back, data from the creation date of the snapshot to the rollback date is lost. If you want to keep this part of the data, see *synchronizing data after rolling back the disks*.
- By default, the current SSH keypair or password of the corresponding instance is bound automatically after the system disk is rolled back.

Prerequisites

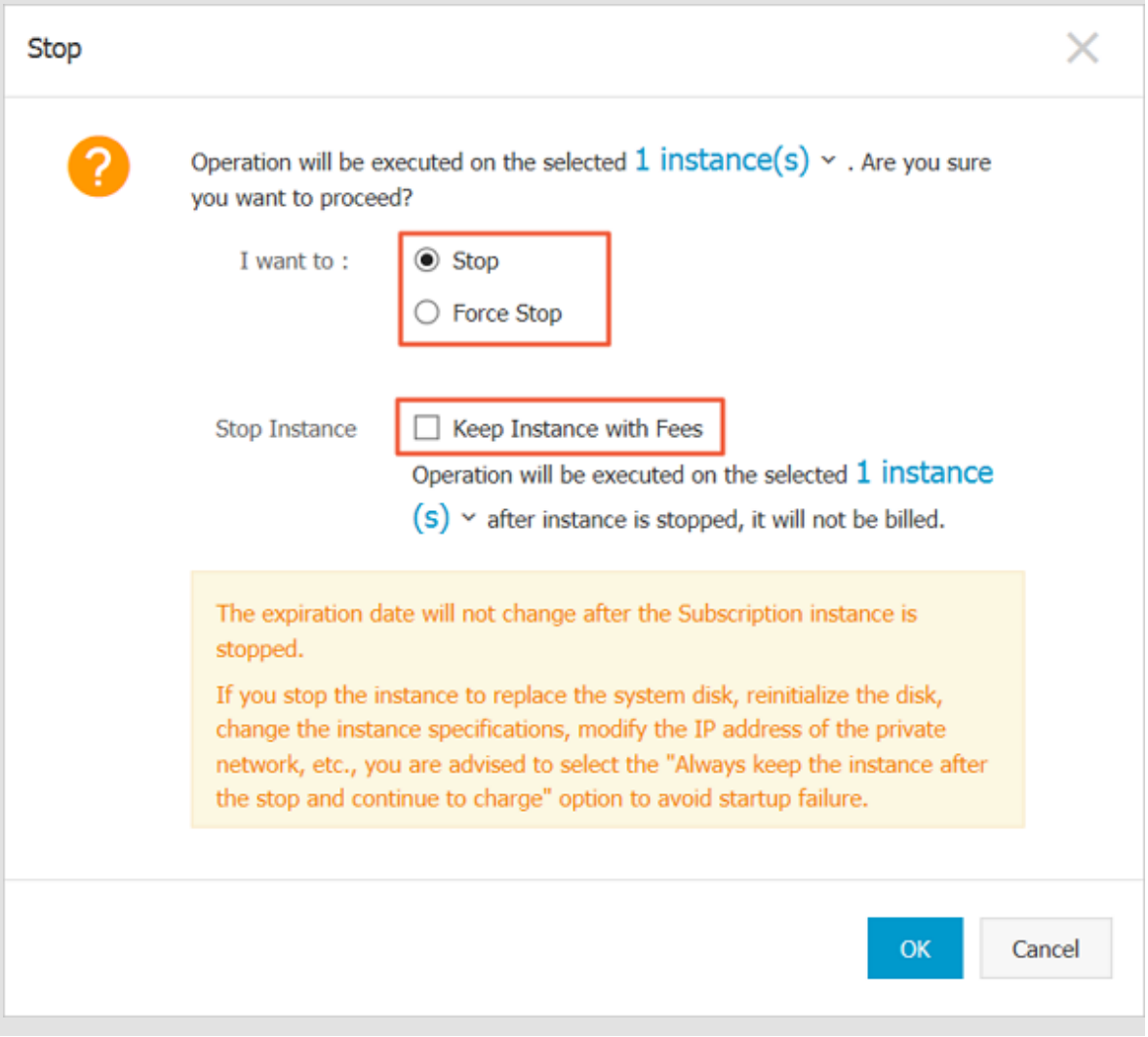
Before rolling back a cloud disk, ascertain the following:

- #### for the cloud disk, and no snapshot creation is in progress.
- The cloud disk has not been released.
- The cloud disk has been *attached to an ECS instance* and the instance is in the *Stopped* status.

Note:

For a Pay-As-You-Go VPC-Connected ECS instance, if the ########## feature is enabled, to stop an instance, in the **Notice** dialog box, click **OK**. Then in the **Stop** dialog box, select **Keep Instance with Fees**. If the **No fees for stopped instances (VPC-Connected)** feature

is enabled, you may not be able to start the instance successfully after you roll back the cloud disk.



Procedure

Follow these steps to roll back the cloud:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find an instance and click its ID to go to the **Instance Details** page.
5. In the left-side navigation pane, click **Instance Snapshots**.
6. Find a snapshot, and in the **Actions** column, click **Disk Rollback**.
7. In the dialog box, click **OK**.

Note:

If you select **Start the instance immediately after the rollback**, the instance starts automatically after the disk is restored.

Related APIs

ResetDisk

Follow-up operations

If you resize a cloud disk after creating a snapshot, connect to the instance to resize its file system . For more information, see

- *#####_Linux*
- *#####_Windows*

6.9 Convert billing methods of cloud disks

The billing method of a cloud disk depends on how it is created:

- For cloud disks created with Subscription (monthly, yearly or weekly subscription) instances, upfront payment is required for the service to be ready for use. For more information, see *Subscription*.
- For cloud disks created jointly with Pay-As-You-Go instances or separately created are billed on a Pay-As-You-Go basis. For more information, see *Pay-As-You-Go*.

You can change the billing method of a cloud disk, as shown in the following table.

Conversion of billing methods	Features	Effective data	Suitable for
Subscription —> Pay-As-You-Go	*Renew for configuration downgrade*	Effective from the next billing cycle	Subscription (monthly or yearly) cloud disks attached to Subscription instances. The billing method of the system disk cannot be changed. **Note:** Subscription (weekly) instances do not support downgraded configurations. You cannot change

Conversion of billing methods	Features	Effective data	Suitable for
			the billing method of Subscription (monthly or yearly) cloud disks attached to the weekly subscription instances.
Pay-As-You-Go —> Subscription	*Upgrade configurations*	Effective immediately	Pay-As-You-Go data disks attached to Subscription instances. The billing method of the system disk cannot be changed.
	Switch from Pay-As-You-Go to subscription		The system disks and data disks attached to the Pay-As-You-Go instances.

6.11 Change the system disk (custom image)

By changing a system disk, the system disk of your instance is replaced with a new cloud disk with a new disk ID, and the original system disk is released. If you want to change the operating system running on your instance, you can use the **Change System Disk** feature to complete it. You can replace the OS image with a public image, shared image, custom image, or an image from the image marketplace.

Note:
Microsoft has terminated technical support for Windows Server 2003. To guarantee your data security, we do not recommend that you continue running Windows Server 2003 on your ECS instance, and we have stopped providing Windows Server 2003 image. For more information, see *Offline announcement of Windows Server 2003 system image*.

After a system disk is changed,

- A new system disk with a new disk ID is assigned to your instance, and the original one is released.
- The cloud disk category is retained.

- The IP addresses and the MAC address of the instance are retained.
- To make sure that your account have enough snapshot quota for the new system disk, you can delete unnecessary snapshots of the original system disk.

This article describes how to replace an existing image with a non-public image. If you want to use a public image, see *Change a system disk (public image)*.

Note

Before you begin, consider the following.

Risks

Changing a system disk has the following risks:

- You have to stop your instance to change its system disk, which may interrupt your business operations.
- Once you change the system disk, you have to deploy your runtime environment on the new system disk, which may cause prolonged interruption to business operations.
- Once you change the system disk, a new system disk with a new disk ID is assigned. It means you cannot use all the snapshots of the original system disk to roll back the new system disk.

> **Note:**
> Changing a system disk has no effect on all the manual snapshots. You can use them to create custom images. If you have applied automatic snapshot policies to the original system disk, and set the auto snapshots to be released with the disk, the snapshot policies cannot work any more and all the auto snapshots of the original system disk are deleted automatically.

Considerations for changing between Windows and Linux

Regions that are not in mainland China do not support replacement between Linux and Windows.

> **Note:**
> For instances in those regions, a Linux or Windows edition can be only replaced by another edition of the same operating system type.

After the OS is changed between Windows and Linux, the file systems of the data disks cannot be recognized.

- If you do not have important data on the data disk, we recommend that you reinitialize the disk and format it to a recognizable file system.

- If you have important data on the data disk, follow these tips:
  - Replacing Windows with Linux: Install a software application, such as NTFS-3G, because the NTFS file system cannot be recognized by a Linux OS by default.
  - Replacing Linux with Windows: Install a software application, such as Ext2Read or Ext2Fsd , because ext3, ext4, and xfs cannot be recognized by a Windows OS by default.

When you replace a Windows edition with a Linux edition, two authentication methods are available: a password and an SSH key pair.

Prerequisites

Before replacing the existing image with a non-public image, complete the following:

- To replace the existing image with a custom image:If you change to a custom mirror:
  - To use an image running on an ECS instance, create a snapshot for the system disk of the instance, and create a custom image from the snapshot. If both the instances are not in the same region, copy the image.
  - To use an on-premises image, import it in the ECS console or use Packer to create and import an image. The image and the instance must be in the same region.
  - To use an image in a region other than that of the instance, copy the image.

  Note:
  When you change a system disk, all the images obtained by using the preceding methods are displayed in the drop-down list of **Custom Image**.
- To use an image owned by other Alibaba Cloud account, share the image.
- If you want to change the OS to a Linux edition and to use an SSH key pair as the authentica tion method, create an SSH key pair.

Changing a system disk is so highly risky that it may cause data loss and business interruption. To minimize the impact of the operation, we recommend that you create a snapshot for the system disk.

Note:

- We recommend that you create snapshots at off-peak business hours. It may take about 40 minutes to create a snapshot of 40 GiB. to create a snapshot of 40 GiB. Therefore, leave sufficient time to create a snapshot. Creation of a snapshot may reduce the I/O performance

of a block storage device, generally it is less than 10%, which results in sharp decrease in I/O speed.

- To create a snapshot, make sure the system disk has sufficient space available. We recommend that at least 1 GiB storage space is reserved. Otherwise, the instance cannot be started after the system disk is changed.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Instances**.
3. Select a region.
4. Find an instance, and in the **Actions column**, select **More** > **Stop**.

   When the instance is in the **Stopped** status,
5. in the **Actions** column, select **More** > **Change System Disk**.
6. In the dialog box, read the note and click **Yes. Change system disk**.
7. On the **Change System Disk** page, complete the configurations:

   a. **Image type**: Select **Custom Image**, **Shared Image** , or **Marketplace Image**, and select an image from the drop-down list.

   b. **System Disk**: You cannot change the cloud disk category. However, you can change the size of the disk to meet the requirements of your system disk. The maximum size is 500 GiB. The minimum size of the system disk is determined by the current size of the system disk and the image size.

Image	Size limit (GiB)
Linux (excluding CoreOS) + FreeBSD	[Max{20, current size of the system disk}, 500]
CoreOS	[Max{30, current size of the system disk}, 500]
Windows	[Max{40, current size of the system disk}, 500]

Note:

If your instance was renewed for configuration downgrade, you cannot change the system disk size until the next billing cycle.

   c. **Security**:

- If the new operating system is a Windows edition, a password is the only authentication method.
- If you are changing the system disk of an I/O optimized instance, and the new operating system is a Linux edition, a password or an SSH key pair can be used as the authentica tion method. Set a password or bind an SSH key pair.

d. Confirm the cost, which includes cost of the image and the system disk. For more information about pricing, see *Pricing of Elastic Compute Service*. If you select a custom image that comes from a mirror market, you may be charged for it, also included in the configuration fee. For mirrored billing information, please refer to billing overview.

Note:

System Disk price Description: System Tray is sold at the starting capacity, priced at the starting price, and exceeds the starting capacity, 1 per increase Gib charges at Linear Charge price. Start capacity of the system disk, package annual monthly price in Yuan/ month, units of pay price per volume are Yuan/hour.

e. Click **Confirm** to change and follow the prompts to complete the order.

Log on to the ECS console to monitor the system status. It may take about 10 minutes to change the system disk. After the system disk is changed, the instance starts automatically.

Follow-up operations

After the system disk is changed, you may have to perform the following:

- Optional. Apply an automatic snapshot policy to the new system disk. The auto-Snapshot policy is bound to the disk ID. The automatic snapshot policy applied on the old disk automatica lly fails after a new system disk has been replaced. You need to set up an automatic snapshot policy for the new system disk.
- If the original operating system is a Linux edition, data disks are attached to the instance, and the disks are set to be mounted automatically at startup of the instance, all mounting informatio n is lost. Follow these steps to add new partition and mounting information to the /etc/fstab file . You do not have to partition or format the data disks again. For more information, see Linux _ Format and mount a data disk.

  1. Optional. Back up /etc/fstab.
  2. Write new partition information to the /etc/fstab file.
  3. Check new partition information in the /etc/fstab file.

4. Run `mount` to mount the partitions.
5. Run `df -h` to check the file system space and usage.

   After the data partitions are mounted, the data disks are ready for use. You do not have to restart the instance.

Related APIs

ReplaceSystemDisk

6.12 Monitor a cloud disk

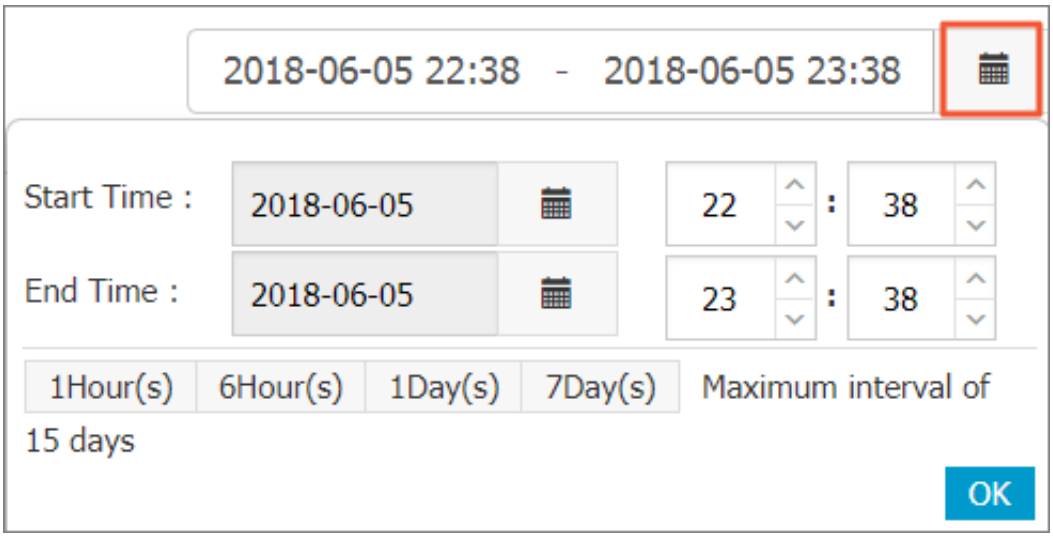
When using a cloud disk, consider the following performance parameters:

- IOPS: Indicates Input/Output Operations per Second, which means the amount of write or read operations can be performed in one second. Transaction-intensive applications are sensitive to IOPS.
- Throughput: Measures the data size successfully transferred per second, measured in MBps. Applications that require mass read or write operations are sensitive to throughput.

You can monitor the IOPS and throughput of a cloud disk in the ECS console. Alternatively, if you have *installed CloudMonitor agent*, you can monitor the disk in the CloudMonitor console.

To monitor the IOPS and throughput of a cloud disk in the ECS console, follow these steps:

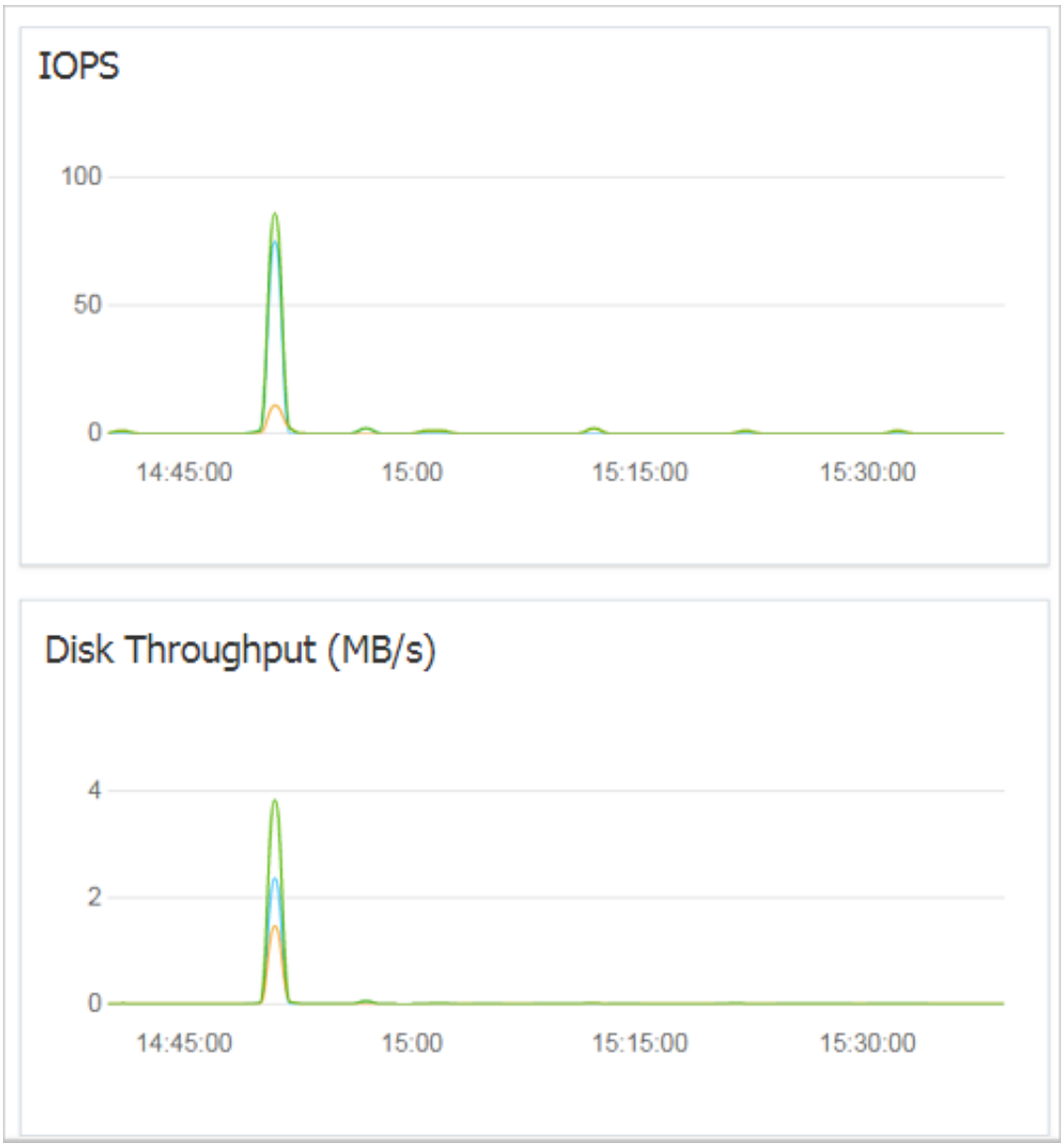
1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Block Storage** > **Cloud Disks**.
3. Select a region.
4. Find a cloud disk and click its ID to go to the **Disk Details** page.
5. In the left-side navigation pane, click **Disk Monitoring**.
6. On the **Monitoring Information** page, click the  icon and set Start Time and End Time for monitoring information. You can check the monitoring information of a cloud disk for up to 15 days.



7. View the IOPS and throughput of the cloud disk.

Note:

Click a legend in the chart to view a single performance index of a cloud disk.



6.13 Release a cloud disk

Release a cloud disk in the Available status if your business does not require it. Otherwise, you are charged for it. Releasing a data disk is a permanent action and is irreversible. After release, the data on the data disk cannot be restored. Proceed with caution.

Note

When releasing a cloud disk, consider the following:

- Only the cloud disks that are in the **Available** status can be released independently. Other cloud disks, such as those used as system disks or those Subscription cloud disks used as data disks, can only be released together with ECS instances. If a cloud disk is in the **In Use** status, you must first Detach it from the instance.

- By default, the automatic snapshots are released together with their cloud disks. However, those created manually are not. You can change the snapshot release configuration when attaching a cloud disk.

  Note:
  Each cloud disk can have up to 64 snapshots. To make sure you have sufficient storage space for the automatic snapshots, we recommend that you release automatically or manually created snapshots that your business no longer require.

- You can have data backed up before releasing a cloud disk. For example, Create a snapshot.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select **Block Storage** > **Cloud Disks**.
3. Select a region.
4. Select the disk that you want to release (in the **Available** status), and in the **Actions** column, select **More** > **Release**.
5. In the Release dialog box, read the note and click **Confirm Release**.

Related APIs

DeleteDisk

7 Snapshots

7.1 Create snapshots

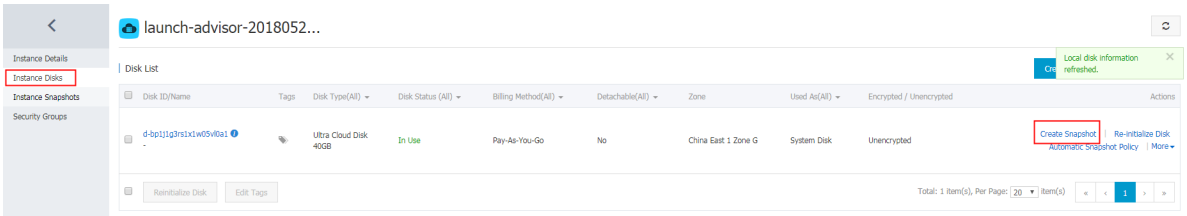
You can create instance snapshots to save the system state from a certain point in time for data backup or to create images.

Note:

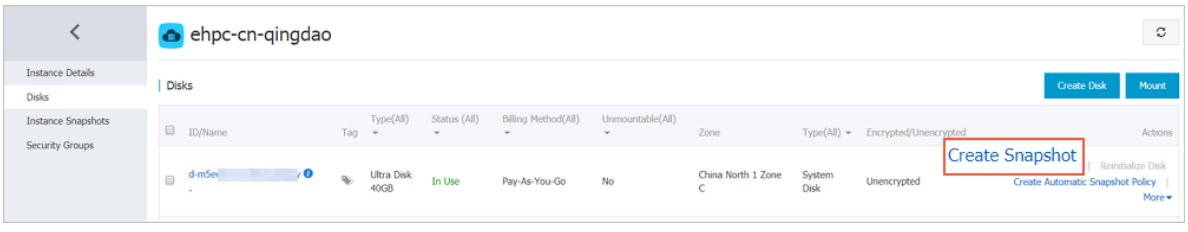
- Starting in March 28, 2017, the snapshot service starts charging fees. For more information on Snapshot charges, see the snapshot commercialization FAQ.
- Avoid business peaks. Creating snapshots of a disk may reduce disk performance.
- The instance must in the **Running** or **Stopped** status.
- Manually created snapshots, unlike automatic snapshots, will be retained until they are manually deleted. unlike automatic snapshots, will be retained until they are *manually deleted*.
- During snapshot creation, operation performed on the disk does not affect the data intergrety in the snapshot. Because the snapshot backs up the data from the moment you create the snapshot, instead of creating data for the entire time period of the snapshot process.

Procedures

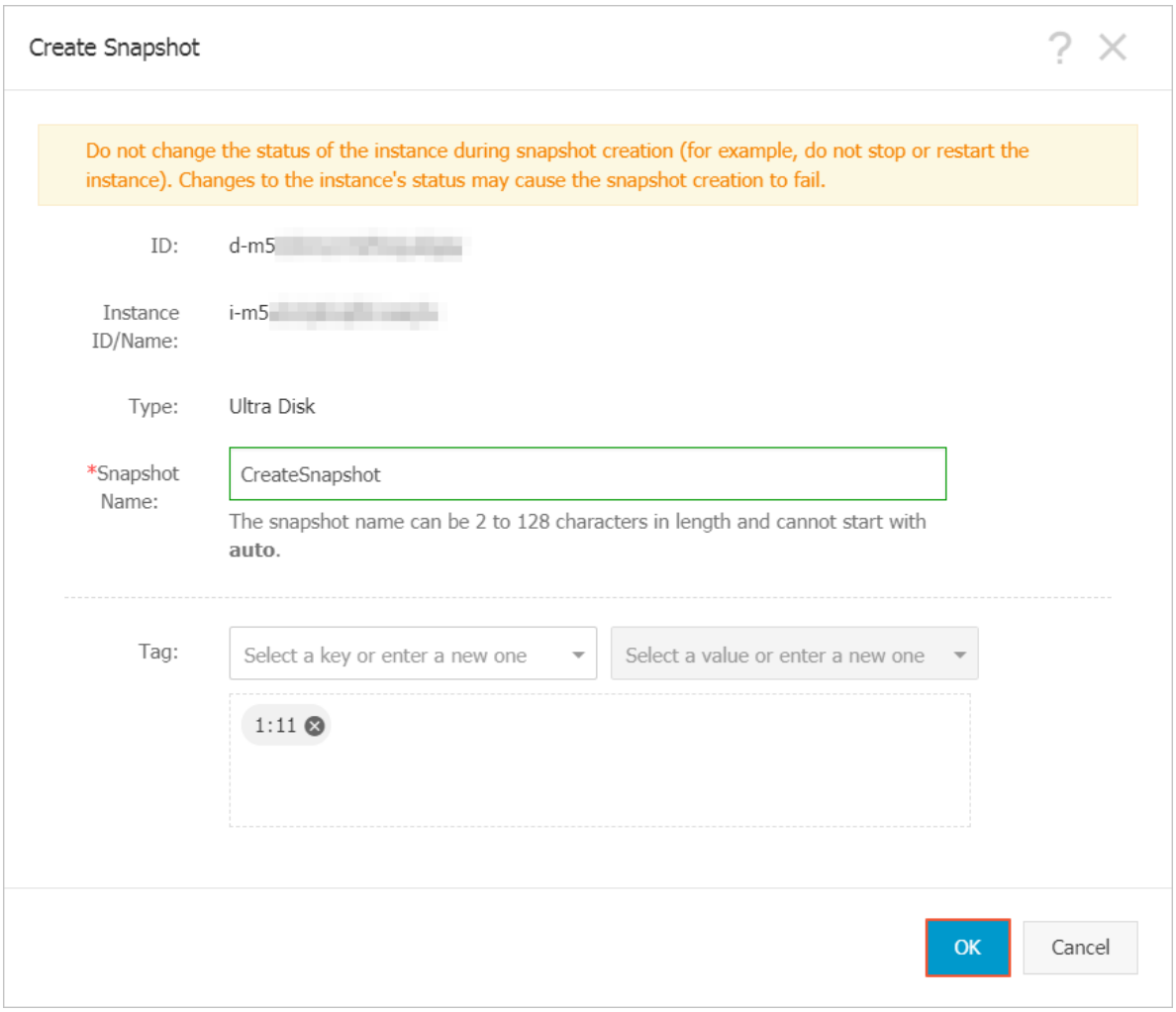
1. Log on to the *ECS console*.
2. Select a region. In the left-side navigation pane, click Instances, and click **Manage**.



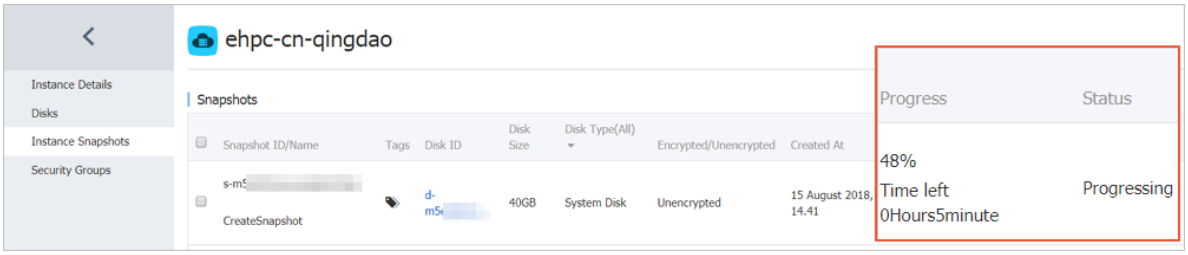
3. In the left-side navigation pane, click **Instance Disks**. And click **Create Snapshot** for the target disk. You can select only one disk at a time, either system disk or data disk.



4. Enter the name for the snapshot, click, **OK**.



5. To view the snapshots, go to left-side navigation pane and click **Instance Snapshots**. You can see the progress and status of the snapshot.



Time required for each snapshot creation may vary because of the

- disk volume.
- Creation of the first snapshot will take relatively longer than subsequent snapshots due to the first snapshot being a full snapshot.
- However, depending on the amount of changed data since previous snapshots, the length of time for each snapshot creation varies.

7.3 Apply automatic snapshot policies to disks

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

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

Note:

- Creating snapshots may disturb read and write operations on your disk. We recommend that you set the creation time of automatic snapshots to periods when service load is low to reduce effects on your service.
- Automatic snapshot policies cannot be applied to basic cloud disks when they are not in use.
- Snapshots that are manually created do not conflict with automatic snapshots. However, if an automatic snapshot is being created on a disk, you must wait for it to finish before manually creating a snapshot.

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

- Cloud Disks menu: For applying an automatic snapshot policy to a specific disk.
- Snapshots & Images menu: For applying a unified automatic snapshot policy to several or all disks.

From the Cloud Disks menu

To apply an automatic snapshot policy through the Cloud Disks menu,

follow these steps:

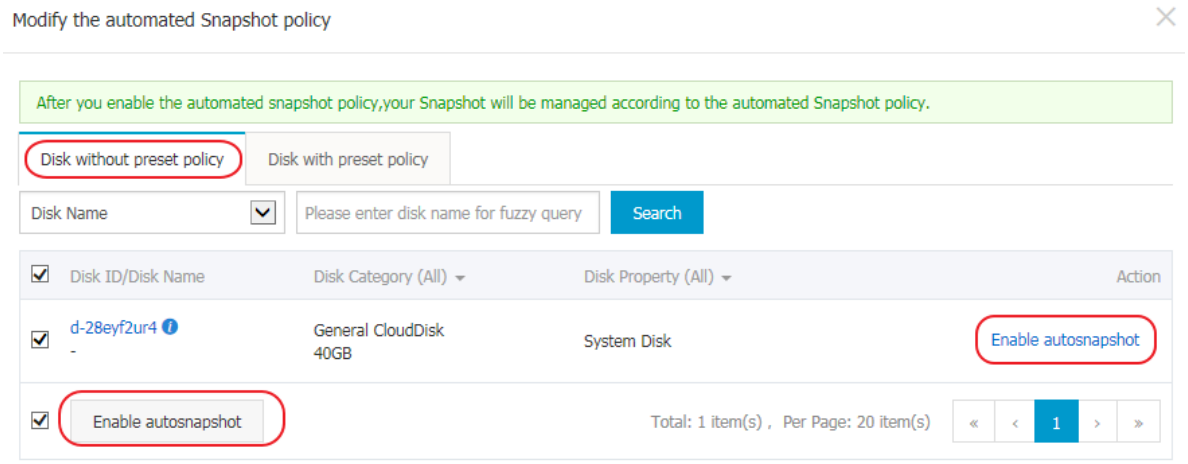
1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click Cloud Disks.
4. Select the disk for which you want to execute the policy and click Automatic Snapshot Policy.
5. Enable the automatic snapshot function and select the desired snapshot policy.
6. Click **OK**.

From the Snapshots & Images menu

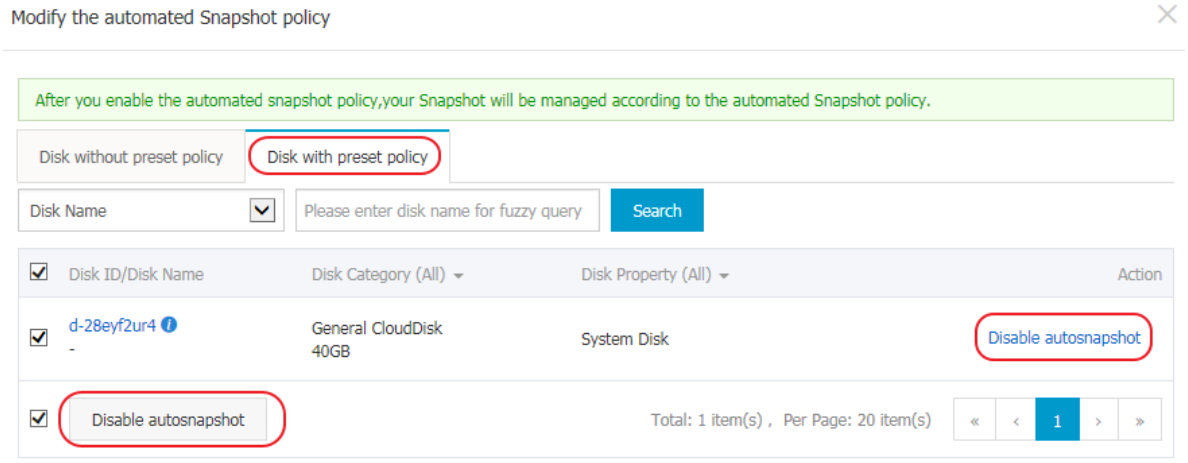
To apply or disable an automatic snapshot policy, follow these steps:

1. Log on to the *ECS console*.
2. Select a region. You can see a list of all automatic snapshot policies in the region.

3. In the left-side navigation pane, choose **Snapshots & Images** > **Automatic Snapshot Policy**.
4. Select the automatic snapshot policy you want to apply and click **Set Disk**.
5. To enable the automatic snapshot policy, select the **Disk without Preset Policy** tab to view the disks. Select the disks in which you want to enable the policy, and then click **Enable the Automatic Snapshot**. Alternatively, click **Enable the Automatic Snapshot** after select multiple disks.



6. To disable the automatic snapshot policy, select the **Disk with Preset Policy** tab to view the disks. Select the disks in which you want to disable the policy, and then click **Disable the Automatic Snapshot**. Alternatively, click **Disable the Automatic Snapshot** after select multiple disks.



7.4 Delete automatic snapshots when releasing disk

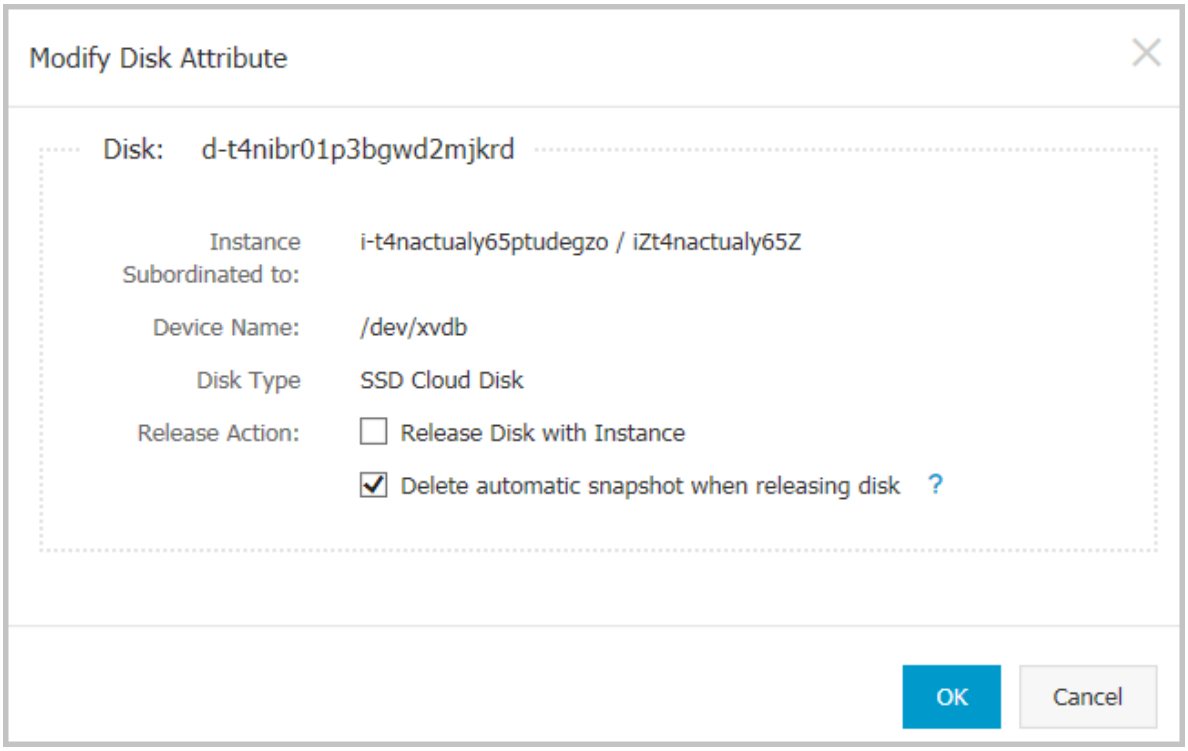
The automatic snapshots of cloud disks are not released along with the cloud by default. However , you can change the property so that automatic snapshots are released with the following:

- *Change the system disk (custom image)*: The previous system disks are releases. If an automatic snapshot has been set up to release with the cloud disks, the automatic snapshots of the previous system disks are automatically deleted.
- *Detach a cloud disk*

Procedures

To retain auto snapshots when releasing the disk, perform the following:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click **Storage** > **Cloud Disks** .
4. Select the disk that you want to configure and click **Actions** > **More** > **Modify Attributes**.
5. In the **Modify Disk Attributes** dialog box, select **Delete automatic snapshots when releasing disk**, and then click OK.



Related API

ModifyDiskAttribute

7.6 View a snapshot chain

On March 28, 2017, Alibaba Cloud began to commercialize the snapshot service. After commercialization, the snapshot service will charge for the snapshot capacity, for detailed pricing

information, *block storage for detailed pricing information* . For more information about Snapshot commercialization, see the *snapshot commercialization FAQ*.

The snapshot service fee is related to the snapshot capacity. This article describes how to view the capacity of all snapshots on a single disk and all snapshot capacity on a region.

View individual disk snapshot capacity

When you create snapshots of an elastic block storage device, such as a cloud disk or a shared block storage device, you can view the size of all the snapshots of the device by using the **Snapshot Chain** feature in the ECS console.

A snapshot chain is composed of all the snapshots of an elastic block storage device. After you create a snapshot, the device has a snapshot chain. The chain has the identical ID with that of the device. A snapshot chain provides the following information:

- Snapshot node: one node in the snapshot chain represents a single snapshot of the disk.
- Snapshot nodes: Each snapshot node of the chain represents one snapshot of the device.
- Snapshot capacity: The storage space occupied by all the snapshots of the device. Snapshot quota: Each device has up to 64 snapshots, including those created manually or automatically.

Prerequisites

You have *Create snapshots*.

Procedure

To view the total size of all the snapshots of an elastic block storage device, follow these steps:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, select **Snapshots & Images** > **Snapshot list** .
4. Find the disk ID of the snapshot. The disk should have at least one snapshot.

5. In the left-side navigation pane, click **Snapshot Chain**.
6. View all the snapshot capacities for the disk according to the disk ID that was found in step 4. You can view the total number and size of snapshots of the disk in the list.

In the **Actions** column, click **Details** to go to the **Snapshot Chain Details** page. On the page, you can see all the snapshots of the disk, which you can use to *Roll back a cloud disk* or *Create a custom mirror using a snapshot*.

View all snapshot capacities under a region.

Follow these steps to view all snapshot capacities in a region:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-hand navigation bar, select **Snapshots & Images** > **Snapshots** .

You can view the total number and size of snapshots of the disk in the list.

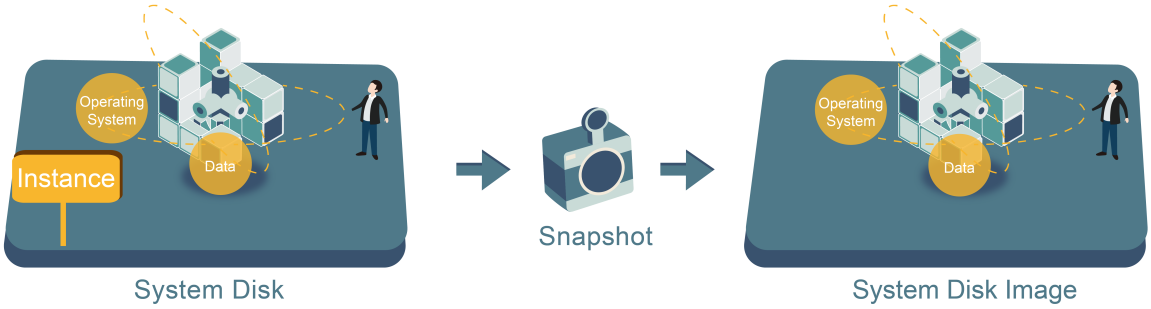
8 Images

8.1 Create custom image

8.1.1 Create a custom image by using a snapshot

Custom images help you run ECS instances effectively by allowing you to create multiple ECS instances with identical OS and environment data to meet scaling requirements.

Custom images are based on ECS disk snapshots. You can set up identical or different configurat ions for ECS instances that are created from images.



You can use a snapshot to create a custom image, including the operating system and data environment of the snapshot in the image. You can then use the custom mirror to create multiple instances with the same operating system and data environment, replicating instances easily.

You can also use an instance to create a image. See *Create a custom image by using an instance*.

To enhance the security of creating custom imags from snapshots, operation, *Alibaba Cloud custom mirror security recommendations*.

Note:

- Custom images cannot be used across regions.
- You can change the operating system of an instance created from a custom image. The custom image can still to be used after the operating system is changed. See *Change the system disk (custom image)*.
- You can upgrade the instance created from a custom image, including upgrading the CPU, memory, bandwidth, and disks.

- Custom images are independent from billing methods. Both Subscription and Pay-As-You-Go billing methods work. Custom images created from Subscription instances can used for creating Pay-As-You-Go instances. The opposite is also true.
- If the ECS used for creating a custom image expires, or the data is erased (that is, the system disk used for the snapshot expires or is released), the custom image and the ECS instances created from the custom image are not affected. However, auto snapshots are cleared when an ECS instance is released.

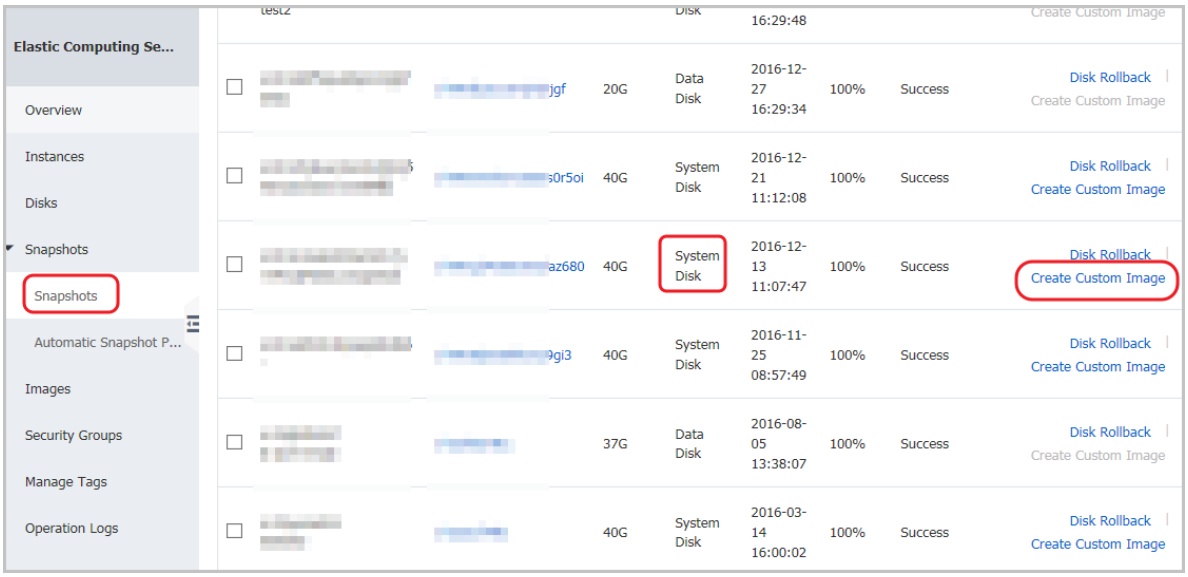
Considerations for Linux instances

- Do not load data disk information in the `/etc/fstab` file. Otherwise, instances created using this image cannot start.
- We recommend that before taking a snapshot and creating an image, **`umount`** all data disks, and then create a snapshot to create a custom image. Otherwise, ECS instances that are created based on this custom image may not start.
- Do not upgrade the kernel or operating system version.
- Do not change the system disk partition. The system disk only support a single root partition.
- Check the availabe space of the the system disk to make sure that the system disk is not full.
- Do not modify critical system files such as `/sbin`, `/bin` and `/lib` etc.
- Do not modify the default logon user name root.

Procedure

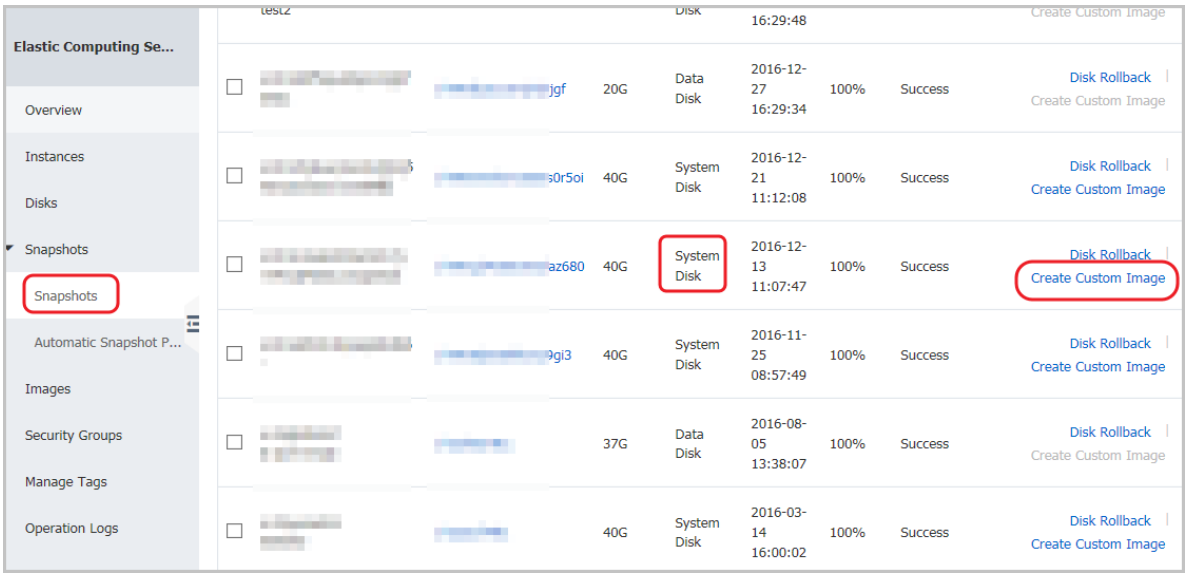
1. Log on to the *ECS console*.
2. Select a region.
3. In the left-hand navigation pane, click **Instances**.
4. Find the target instance, click the instance ID, or in the **Actions** column, click **Manage**.

5. In the left-hand navigation pane, click **Snapshots**. Find the target system disk, in the **Actions** column, click **Create Custom Image**.



The snapshot must be created from Data disks cannot be used to create custom images.

You can also use **Snapshots** > **Snapshot list**and select a snapshot created from a system disk to **create a custom image**.



6. In the **Create a custom image** dialog box, do the following:

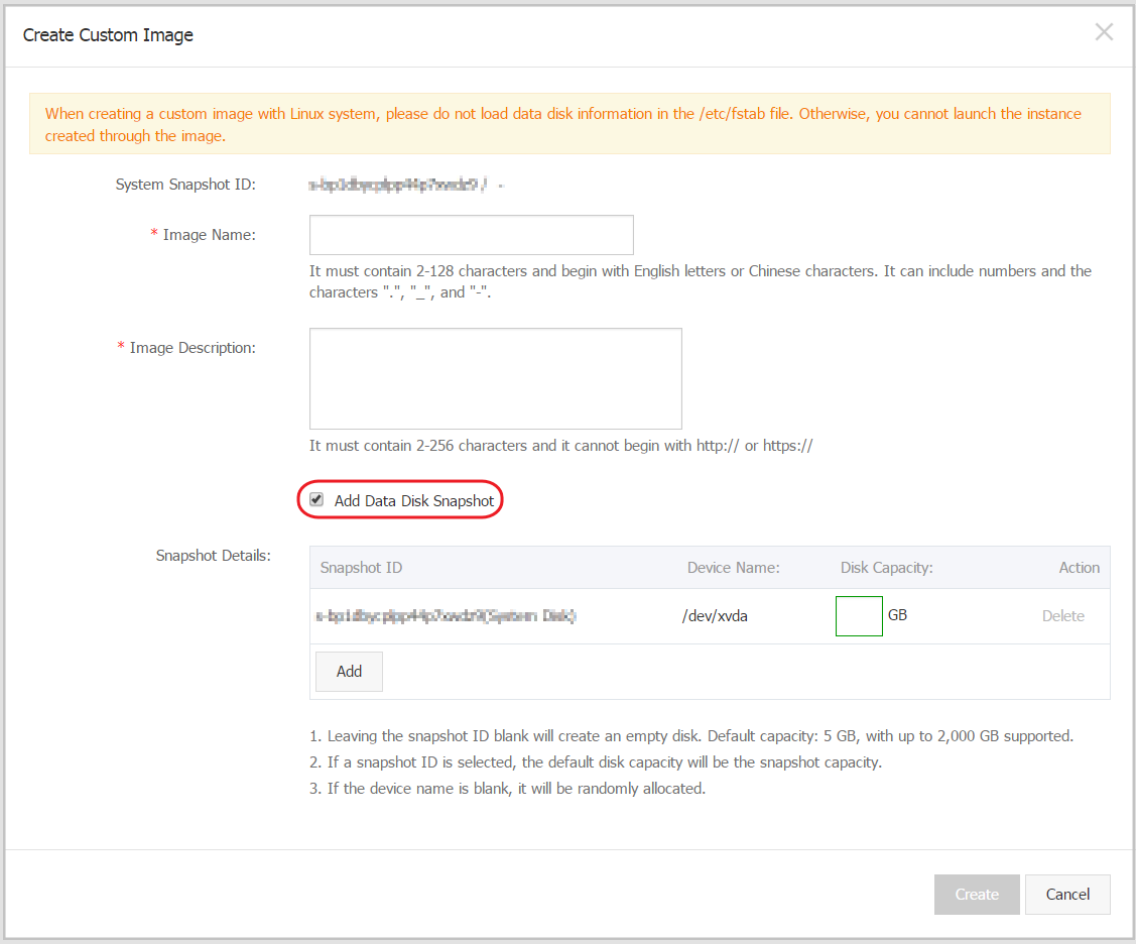
   - Confirm the snapshot ID.
   - Specify the name and description of the custom image.
   - Optional. Click **Add Data Disk Snapshot** to select multiple snapshots of data disks for the image. Click **Add** to add a data disk.

   Note:

Remove sensitive data from the data disk before creating a custom image to avoid the risk of data security.

If the snapshot disk capacity is left blank, an empty disk is created with the default capacity of 5 GiB.

If you select available snapshots, the disk size is the same as the size of these snapshots.



7. Click **Create**. The custom image is successfully created. In the left-side navigation pane, select **Snapshots & Images > Images** to view images you have created.

FAQ for images of Linux instances

How to `umount` a disk and delete disk table data?

If /dev/hda5 is attached to /mnt/hda5, run any of the following three commands to detach the file system:

```
umount/dev/hda5
umount/mnt/hda5
```

```
umount/dev/hda5/mnt/hda5
```

`/Etc/fstab` is an important configuration file in Linux. It contains file system details and storage devices attached at startup. If you do not want to mount a specified partition when starting the VM, delete the corresponding lines from /etc/fstab. For example, you can delete the following statement to disconnect xvdb1 upon startup: `/dev/xvdb1 /leejd ext4 defaults 0 0`

How to determine whether a data disk is detached and a custom image can be created?

You must make sure that the auto attach data disk statement line has been deleted from the fstab file.

Use the **`mount`** command to view information on all mounted devices. Make sure that the execution results do not contain the information of the data disk partition.

Relevant configuration files

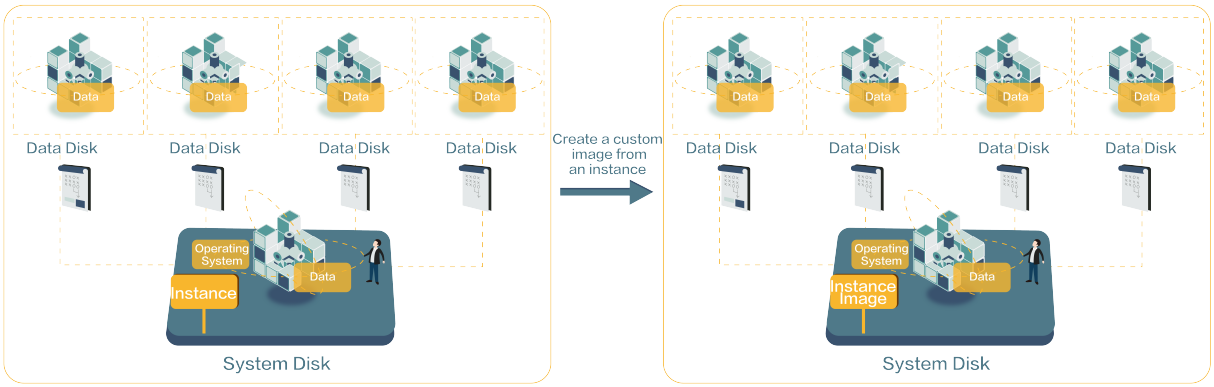
Before creating an image, make sure that the key configuration files from the following table have not been modified. Otherwise, the new instance is unable to start.

Configuration File	Purpose	Risks if changed
/etc/issue*, /etc/*-release, /etc/*_version	For system release and version	Modifying /etc/issue* makes the system release version unidentifiable, and cause instance creation failure.
/boot/grub/menu.lst, /boot/grub/grub.conf	For system startup	Modifying /boot/grub/menu.lst results in kernel loading failure, and the system is unable to start.
/etc/fstab	For mounting partitions during startup.	Modifying it causes partition mounting failure, and the system is unable to start.
/etc/shadow	For storing system passwords.	If this file is set to read-only, the password file cannot be edited, and instance creation fails.
/etc/selinux/config	For system security policies	Modifying /etc/selinux/config and enabling SELinux results in start failure.

8.1.2 Create a custom image by using an instance

You can create a custom image using an ECS instance, namely, you fully copy all its disks and pack them into an image.

During this process, snapshots are automatically created for all disks of the instance, including the system disk and data disks. All the created snapshots compose a new custom image. See the following picture.



In addition, you can create a custom image based on the snapshot. See *Create a custom mirror using a snapshot*.

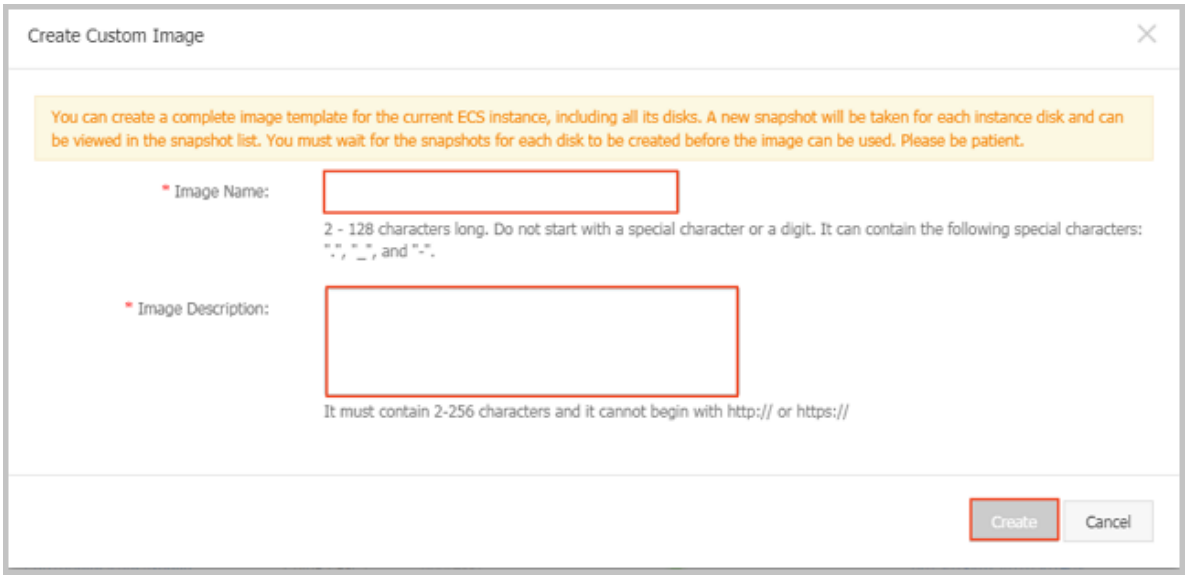
Prerequisites

- To prevent the data privacy breach, make sure you delete all the confidential data in the ECS instance before creating a custom image.
- During creation, do not change the status of the instance. Do not stop, start, or restart the instance.
- If your custom image contains the data on the data disk, new data disk along with the ECS instance are created together. The data on the data disk duplicates the data disk snapshot in your custom image according to the mount device.
- You can export custom images that contain data of data disks.
- You cannot use a custom image which contains the data on the data disk to replace the system disk.

Procedure

1. Log on to the *ECS console*.
2. At the top of the Instance list page, select the region where the target instance is located.
3. Click **Instances** on the left-side navigation pane.
4. Find the required instance. Choose **More** > **Create Custom Image**.

5. Enter the name and description.
6. Click **create**.



The image is available after all snapshots of all disks have been created. Please be patient.

Follow-up operation

After creating the custom image, you may want to *Create an instance from a custom Image*.

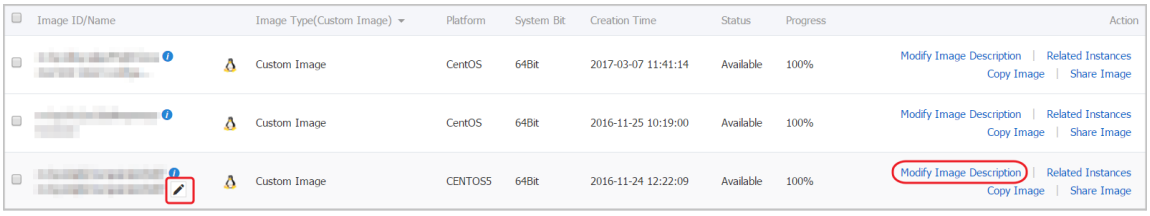
8.2 Change name and description of custom images

You can modify the names and descriptions of custom images at any time.

To modify the names and descriptions of custom images, perform the following:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click **Images**. Select the
4. image to edit. The image type must be **Custom Image**.

- Modify the image name by hovering the cursor over the image name, and then clicking the pen icon that appears.
- Modify the description of an image by clicking **Modify Image Description**, and then entering a description.



5. Click **OK**.

The name and description of the custom iamge are changed.

8.3 Copy custom images

Copying an image is a process in which a custom image is copied from one region to another region. Copying images across regions allows you to deploy a backup image system, or an identical application environment, in different regions. When a request of copying a custom image is initiated, ECS copies the snapshot that the custom image is created from the source region to the target region, and then creates a custom image from the copied snapshot in the target region. The speed of the process of copying the snapshot between regions depends on the network status. Moreover, Alibaba Cloud supports processing concurrent requests of copying images and your request maybe in a long queue. Therefore, it may take long time to complete the copying images operation.

Precautions

- ECS copies the snapshot that the custom image is created from the source region to the target region, and then creates a custom image from the copied snapshot in the target region. Therefore, you may be charged for:
  - Data transferring between regions. Currently, there is no charge for this part of the flow, and the specific charge time is subject to the official website announcement.
  - The copied snapshot occupies the snapshot capacity.

    The Snapshot capacity is currently available for a fee and for more details, please refer to the snapshot commercialization FAQ.
- Currently, copying images is only allowed among regions in mainland China. However, you can *open a ticket* to apply for coping images to an international region, and indicate the source region, the destination region, and the image ID in your ticket.

Procedures

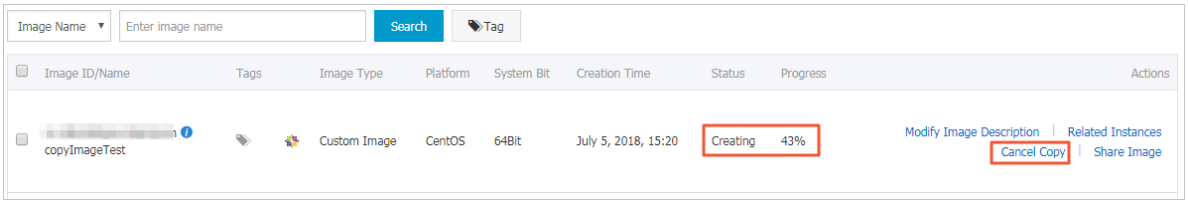
The steps for copying a mirror on the Administration Console are as follows:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, choose **Snapshots & Images** > **Images**.
4. Select the custom image you want to copy, and in the **Actions** column, click **Copy Image**.

> **Note:**
>
> If your custom image is larger than 200 GB, when you click **Copy Image**, you are directed to open a ticket to complete copying the image.

5. In the **Copy Image** dialog box, the ID of the selected image is displayed, and you have to complete the configurations:
   a. Select the **target region**. Currently, copying images is only allowed between regions in mainland China.
   b. **Custom Image** and **Custom Image Description**: Specify a name for the image to be displayed in the target region, and give a brief description of the image to ease future management.
   c. Click **OK**.
6. Click the target region and check the progress. When 100% progress is displayed, the image is copied successfully.

> **Note:**
>
> When the progress is not 100% and the status of the image is **Creating**, you can click **Cancel Copy** to cancel the copying process. After the process is canceled, the image information is removed from the target region.



Next step

After the copied image is ready, it is in the **Available** status, you can use the custom image to *Step 2. Create an instance*create an ECS instance or *Change the system disk (custom image)*change a system disk.

In the *ECS console*, check the snapshot for creating the custom image in the **Snapshot List**.

FAQ

FAQs about copying images

8.4 Share images

You can share your custom images with other users. Through the ECS console or ECS API, you can query images shared by other accounts with your own account, and select images shared by other accounts to create ECS instances. and replace system disk.

Before sharing an image, make sure that no confidential data is accessible on the disks to be shared.

Note:

The integrity or security of images is not guaranteed. Make sure that you use only images shared by trusted accounts. Before using shared images to create ECS instances, log on to the ECS instances to which the shared images belong and verify that the images are secure and complete .

Precautions

Limits

- One image can be shared with a maximum of 50 accounts.
- Shared images do not count towards your image quota.
- Shared images can only be used to create instances in the same region as the source image.
- Only image owners can share images with other accounts.

Impact of deleting shared images

- You can delete a custom image even you have shared it with other accounts. Before deleting the shared image, however, you must unassociate it from other accounts.
- If you delete an account that has shared a custom image, the users who are using the shared image can no longer find the image through the ECS console or ECS API, or use the image to create ECS instances and replace system disks.
- Deleting shared custom images may cause system disk re-initialization to fail for ECS instances created from these images.

You can share your custom images with other users. Through the ECS console or ECS API, you can query images shared by other accounts with your own account, and select images shared by other accounts to create ECS instances and replace system disk..

Procedure

1. Log on to the *ECS console*. In the left-side navigation pane, click Images. Select a region. Select the Custom Image you want to share. Click **Share Image**.

2. In the displayed dialog box, select the Account Type and enter the account ID you want to share the image with. To obtain the account ID, logg on to Security Settings

3. of the Alibaba Cloud console and click**Account Management** > **Security Settings** > **Account ID**.

4. View accounts using your shared images.

Creating ECs instances using shared mirrors

Note:

The integrity or security of images is not guaranteed. Make sure that you use only images shared by trusted accounts. If you delete an account that has shared a custom image, the users who are using the shared image can no longer find the image through the ECS console or ECS API, or use the image to create ECS instances.

Cancel the sharing of an image

You can cancel the sharing of an image to specific accounts at any time. After you cancel the sharing, the user is unable to query and use the image.

Note:

Any instances using the image, including instances of other accounts using the shared image, will not be able to reinitialize the system disk.

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click **Images**. Select the
4. image you want to cancel sharing. The image type must be Custom Image. Click **Share Image**.

5. A list of the accounts using the selected image is displayed. Click **Unshare** next to the account with which you want to stop sharing the image.

View the shared images

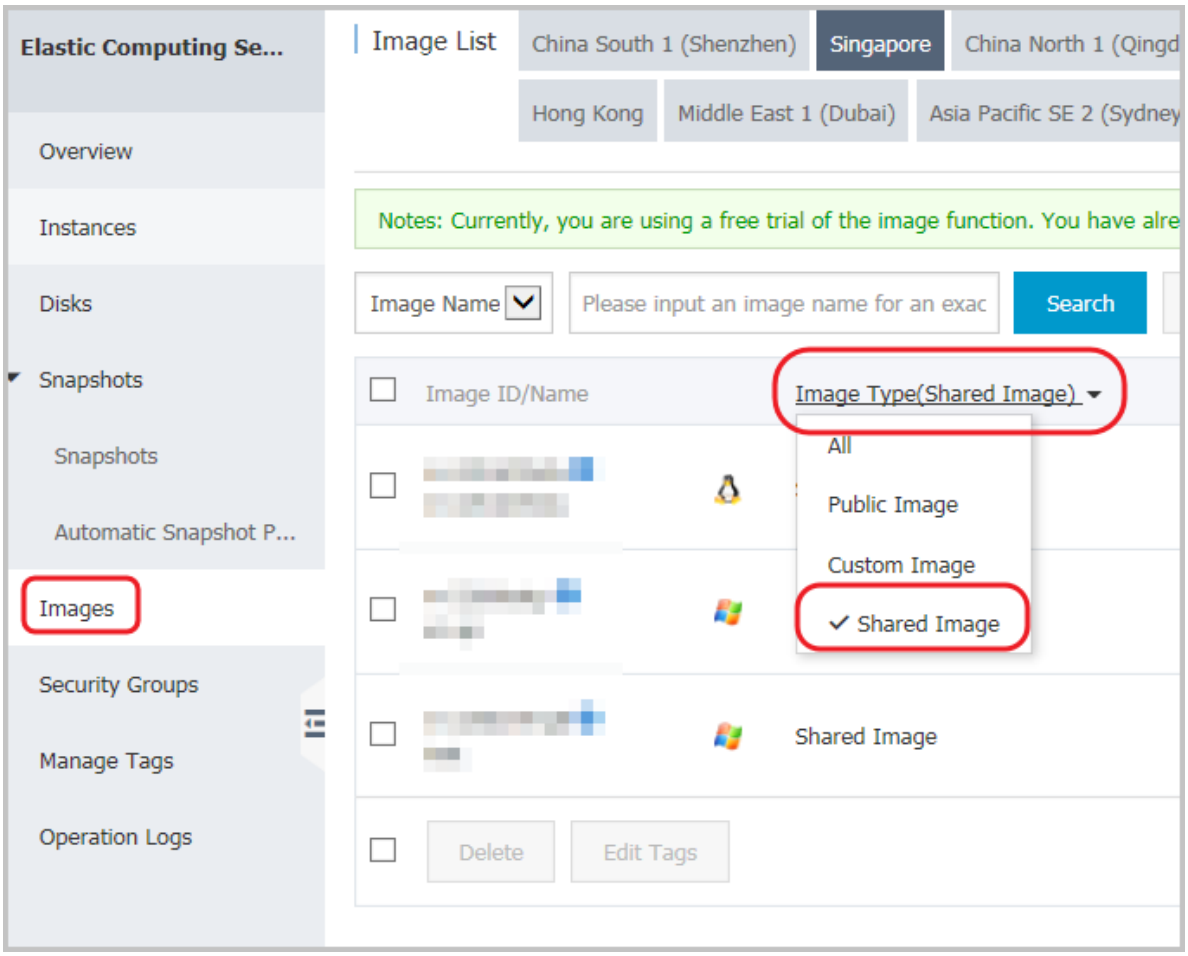
You can view which accounts are using your shared images. To view accounts using your shared images, perform the following:

1. Log on to the *ECS console*.
2. Select a region.
3. In the left-side navigation pane, click **Images**. You can see the list of images.
4. Click Images, you can see the list of images.
5. select image you want to vie. The image type must be **Custom Image**. Click Click **Share Image**.
6. A list of the accounts using the selected image is displayed.

View the shared images you are using

You can view a list of the shared images from other accounts that you are using. To view a list of the shared images you are using, perform the following:

1. Log on to the *ECS console*.
2. Select a region.
3. In the image type dropdown, select the **Image Type**. as **Shared Image**, A list of the shared images you are using will be displayed.



8.5 Import images

8.5.1 Image compliance tool

ECS allows you to create instances from imported custom images. The imported custom images can be created based on your offline server, virtual machine, or a cloud host on any cloud platform. The images you import must meet certain requirements. For more information, see *Notes for importing images*. To reduce the time required for creating images and instances, we recommend that you use the **image compliance tool** of ECS (hereinafter referred to as **compliance tool**) to create images that comply with the relevant standards. The compliance tool can detect non-compliance of various configuration indicators and locations based on a given server environment, generate TXT and JSON detection reports, and offer possible solutions.

Limits

The compliance tool currently supports Linux images only, such as Ubuntu, CentOS, Debian, RedHat, SUSE Linux Enterprise Server (SLES), OpenSUSE, FreeBSD, CoreOS, and other Linux versions.

Sample

The following sample use a CentOS 7.4 64-bit server.

1. Log on to your server, virtual machine, or cloud host on any cloud platform.
2. *Download* the compliance tool.
3. Run `image_check` with root permissions to guarantee that the compliance tool can read configuration files under permission control.

```
chmod +x image_check
sudo image_check –p [destination path]
```

> **Note:**
> You can use `-p [destination path]` to specify the path where detection reports are generated. If you do not set this parameter, reports are generated in the compliance tool path by default.

4. Wait for the compliance tool to detect the system configuration.

```
Begin check your system...
 The report is generating.
 ----------------------------------------
 The information you need to enter when you import your image to the
 Alibaba Cloud website:
 Current system: CentOS # System information 1: Server operating
system
 Architecture: x86_64 # System information 2: System architecture
 System disk size: 42 GB # System information 3: Server system disk
capacity
 ----------------------------------------
 # Detection item
 Check driver [ OK ]
 Check shadow file authority [ OK ]
 Check security [ OK ]
 Check qemu-ga [ OK ]
 Check network [ OK ]
 Check ssh [ OK ]
 Check firewall [ OK ]
 Check filesystem [ OK ]
 Check device id [ OK ]
 Check root account [ OK ]
 Check password [ OK ]
 Check partition table [ OK ]
 Check lvm [ FAILED ]
 Check lib [ OK ]
 Check disk size [ OK ]
 Check disk use rate [ WARNING ]
 Check inode use rate [ OK ]
 ----------------------------------------
 15 items are OK
 1 items are failed
 1 items are warning
 ----------------------------------------
```

```
 The report is generated: /root/image_check_report_2018-05-14_18-18-
10.txt
 Please read the report to check the details
```

5. View the detection report. The report is generated in the format of `image_check_report_date_time.txt` or `image_check_report.json`.

Detection items

The compliance tool detects the following server configuration items to ensure that the ECS instances created from your custom image are fully functional.

Detection item	Non-compliance	Suggestion
driver	The ECS instance cannot start normally.	Install a virtualization driver. For example, *install a virtio driver*
/etc/shadow	You cannot modify the password file, so you cannot create an ECS instance from the custom image.	Do not use the `chattr` command to lock the /etc/shadow file.
SElinux	The ECS instance cannot start normally.	Do not modify /etc/selinux/config to start SELinux.
qemu-ga	Some of the services required by ECS are unavailable, and the instance is not fully functional.	Uninstall qemu-ga.
network	Network functions of the ECS instance are unstable.	Disable or delete the Network Manager and enable the network service. For the latest Linux versions , we recommend that you use the Network Manager and run the nmcli command to configure the network.
ssh	You cannot *connect* to the ECS instance from the console.	Enable the SSH service and do not set PermitRootLogin.
firewall	The system does not automatica lly configure your ECS instance environment.	Disable the firewall iptables, firewalld , IPFilter (IPF), IPFireWall (IPFW), or PacketFilter (PF).
file system	You cannot *resize the disk*.	The XFS, Ext3, and Ext4 file systems are used, and the Ext2, UFS, and UDF file systems are allowed. The Ext4 file system does not support 64-bit features.

Detection item	Non-compliance	Suggestion
root	You cannot use your username and password to remotely connect to the ECS instance.	Reserve the root account.
passwd	You cannot add users for the ECS instance.	Retain or reinstall the passwd command.
Partition table	The ECS instance cannot start normally.	Use MBR partitioning.
Logical Volume Manager (LVM)	The ECS instance cannot start normally.	Switch to another partitioning service.
/lib	The ECS instance cannot be automatically configured.	The /lib and /lib64 files cannot be stored in absolute paths. Modify the storage paths of /lib and /lib64 to their relative paths.
system disk	N/A	Increase the system disk capacity. The optimal system disk capacity is 40 GiB to 500 GiB. When you import images, configure the system disk capacity based on the virtual file size of images, instead of the usage capacity of images.
disk_usage	You cannot install the necessary drivers or services for the ECS instance.	Make sure that sufficient disk space is available.
inode usage	You cannot install the necessary drivers or services for the ECS instance.	Make sure that sufficient inode resources are available.

The compliance tool provides a detection result `OK`, `FAILED`, or `WARNING` based on detection items.

- `OK`: The detection items all comply with requirements.
- `FAILED`: The detection items do not comply with requirements. The ECS instance created from the custom image cannot start normally. We recommend that you rectify the non-compliant items and recreate the image to improve instance startup efficiency.
- `WARNING`: The detection items do not comply with requirements. The ECS instance created from the custom image can start normally, but ECS cannot use valid methods to configure your

instance. You can choose to immediately rectify the non-compliant items or temporarily neglect the items and create an image.

Output items

The compliance tool provides detection reports in both TXT and JSON formats after it detects the system environment. You can use `-p [destination path]` to specify the path where detection reports are generated. If you do not specify this parameter, reports are generated in the compliance tool path by default.

- Reports in TXT format are named `image_check_report_date_time.txt`. The reports include server configuration information and detection results. The following example uses a CentOS 7.4 64-bit server.

```
The information you need to input when you import your image to
Alibaba Cloud Website:
  Current system is: CentOS #Server operating system
  Architecture: x86_64 #System architecture
  System disk size: 42 GB #Server system disk capacity
  ----------------------------------------
   Check driver #Detection item name
   Pass: kvm drive is exist #Detection result
   Alibaba Cloud supports kvm virtualization technology
   We strongly recommend installing kvm driver.
```

- Reports in JSON format are named `image_check_report.json`. The reports include server configuration information and detection results. The following example uses a CentOS 7.4 64-bit server.

```
"platform": "CentOS", \\Server operating system
  "os_big_version": "7", \\Operating system version number (major)
  "os_small_version": "4", \\Operating system version number (minor)
  "architecture": "x86_64", \\System architecture
  "system_disk_size": "42", \\Server system disk capacity
  "version": "1.0.2", \\Compliance tool version
  "time": "2018-05-14_19-18-10", \\Detection time
  "check_items": [{
      "name": "driver", \\Detection item name
      "result": "OK", \\Detection result
      "error_code": "0", \\Error code
      "description": "Pass: kvm driver exists.", \\Description
      "comment": "Alibaba Cloud supports kvm virtualization
technology. We strongly recommend installing kvm driver."
  }]
}
```

Next steps

1. View *Notes for importing images*.
2. *Install the virtio driver.*

3. (Optional) *Convert the image file format.*
4. *Import custom images.*
5. *Create an instance from a custom image.*

8.5.3 Install cloud-init

If you need to create ECS instances by using existing images, you can importing them to Alibaba Cloud ECS. To guarantee the successful configuration of the hostname, NTP source, and yum source of the imported image, we recommend that you install cloud-init in your on-premise server, virtual machine, or cloud host before importing an image.

Limits

- Currently, cloud-init supports the Linux distributions of CentOS, Debian, Fedora, FreeBSD, Gentoo, RHEL (Red Hat Enterprise Linux), SLES (SUSE Linux Enterprise Server), and Ubuntu .
- The AliYun datasource support is present in cloud-init since 0.7.9. If your on-premise server , virtual machine, or cloud host already has cloud-init installed, make sure that the version is later than 0.7.9.

  1. Connect to your on-premise server, virtual machine or cloud host.
  2. Run `cloud-init --version` to confirm the version.

     If the version is later than 0.7.9, you can skip this tutorial and start to make your image. Otherwise, follow the tutorial to install cloud-init*Install cloud-init*.

Prerequisites

Make sure that you have installed the following programs. We use yum as an example to describe the installation. If you manage packages by using zypper or apt-get, the installation methods are similar.

- git: Downloads the source code package of cloud-init.

  Command: `yum install git`
- Python2.7: The basis of running and installing cloud-init.

  Command: `yum install python`
- pip: Installs certain Python libraries on which cloud-init depends.

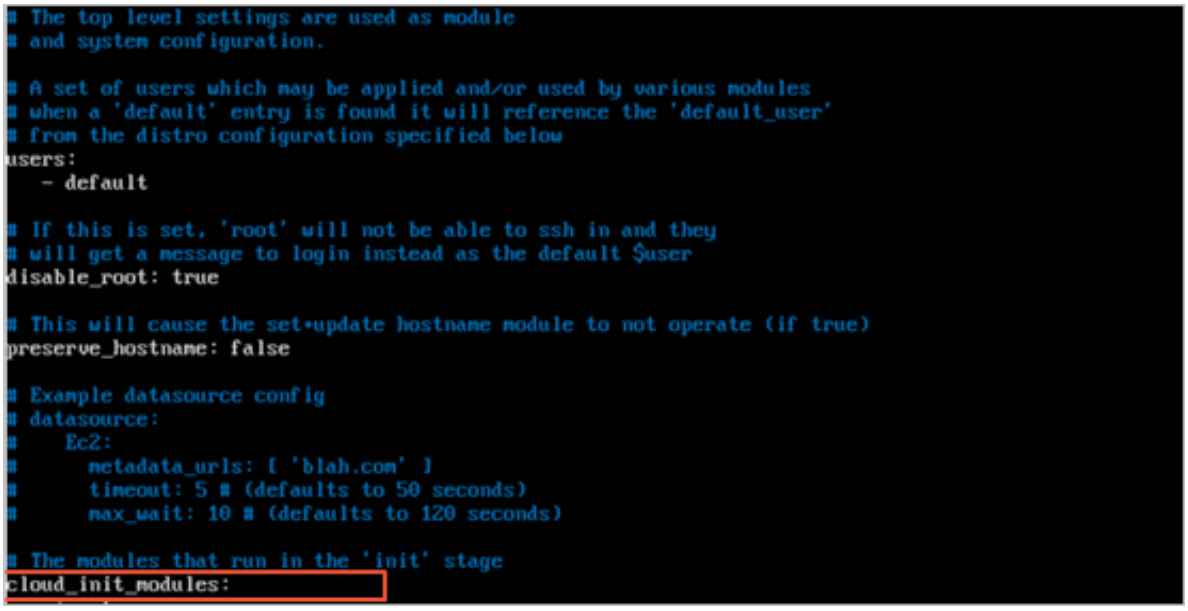
  Command: `yum install python-pip`

We use `yum` as an example to describe the installation. If you manage packages by using `zypper` or `apt-get`, the installation methods are similar to `yum`.

Install cloud-init

Follow these steps to install cloud-init:

1. Connect to your on-premise server, virtual machine or cloud host.
2. Run `git clone https://git.launchpad.net/cloud-init` to download the cloud-init project.
3. Run `cd cloud-init` to change the directory to cloud-init.
4. Run `python setup.py install` to install setup.py, which is the installation file of cloud-init.
5. Run `vi /etc/cloud/cloud.cfg` to modify configuration file cloud.cfg.



Change the preceding content of cloud_init_modules `cloud_init_modules` to the following:

```
# Example datasource config
# The top level settings are used as module
# and system configuration.
# A set of users which may be applied and/or used by various modules
# When a' default' entry is found it will reference the 'default _
user'
# From the distro configuration specified below
users:
-default
user:
name: root
lock_passwd: False
# If this is set, 'root' will not be able to SSH in and they
# Will get a message to login instead as the above $user
disable_root: false
```

```
# This will cause the set + update hostname module to not operate (
if true)
preserve_hostname: false
syslog_fix_perms: root:root
datasource_list: [aliyun]
# Example datasource config
datasource:
Aliyun:
support x en: false
timeout: 5 # (defaults to 50 seconds)
max_wait: 60 # (defaults to 120 seconds)
# metadata_urls: ['blah. com']
# The modules that run in the 'init 'stage
cloud_init_modules:
```

Troubleshooting

The missing libraries may vary depending on the operating system. You can use pip to install the missing libraries. After you install the missing libraries, install setup.py again.

Library six or library oauthlib is missing

- If the following message appears, it indicates the six library is missing from Python. Run `pip install six` to install the six library.

```
File "/root/cloud-init/cloudinit/log. py", line 19, in
import six
Importerror: No module named Six
```

- If the following message appears, it means the oauthlib library is missing from Python. Run `pip install oauthlib` to install the oauthlib library.

```
File "/root/cloud-init/cloudinit/fig", line 20, in
import oauthlib.oauth1 as oauth1
Importerror: No module named oauthlib.oauth1
```

No library is specified when an error occurs during installation

If no dependency library is specified according to the error output, you may `pip install -r requirements.txt` to install all the dependency libraries listed in file requirements.txt of cloud-init.

Next step

Make an image and *Import custom images*.

Reference

cloud-init *Alibaba Cloud (AliYun)*

8.5.4 Install virtio driver

To avoid failure in starting the Linux instances created by using the imported images of your server, virtual machines, or cloud hosts, *Import custom images* an Xen (pv) or virtio driver must be installed on your on-premises image and configured before importing. Follow these steps to check whether you must install the driver manually, and then install and configure the virtio driver for a Linux server if needed.

Images requiring no manual installation

After you import images in *Import custom images*, if the operating systems of your image is listed in the following, Alibaba Cloud automatically processes the virtio driver for you:

- Windows Server 2008
- Windows Server 2012
- Windows Server 2016
- CentOS 6/7
- Ubuntu 12/14/16
- Debian 7/8/9
- SUSE 11/12

You can skip to *recover the temporary root file system of initramfs or initrd*.

Images requiring manual installation

For Linux images that are not included in the preceding list, you must install the virtio driver on-premises before importing the images.

To check the availability of virtio driver on a server

1. Run `grep -i virtio /boot/config-$(uname -r)` to inspect whether the virtio driver is already built in the kernel of your server.

```
[root@izbp1[illegible] ~]# grep -i virtio /boot/config-$(uname -r)
CONFIG_VIRTIO_VSOCKETS=m
CONFIG_VIRTIO_VSOCKETS_COMMON=m
CONFIG_VIRTIO_BLK=m
CONFIG_SCSI_VIRTIO=m
CONFIG_VIRTIO_NET=m
CONFIG_VIRTIO_CONSOLE=m
CONFIG_HW_RANDOM_VIRTIO=m
CONFIG_DRM_VIRTIO_GPU=m
CONFIG_VIRTIO=m
# Virtio drivers
CONFIG_VIRTIO_PCI=m
CONFIG_VIRTIO_PCI_LEGACY=y
CONFIG_VIRTIO_BALLOON=m
CONFIG_VIRTIO_INPUT=m
# CONFIG_VIRTIO_MMIO is not set
```

Note:

- If VIRTIO_BLK and VIRTIO_NET do not exist in the output, the virtio driver is not built in the kernel, and you must install and configure the virtio driver on your server *To compile and install virtio driver*.
- If the values of parameter **CONFIG_VIRTIO_BLK** and and parameter **CONFIG_VIRTIO_NET** are y, the virtio driver is already built in the kernel.You can read Notes for importing custom images *Notes for importing custom images* and import the image *Import custom images*.
- If the values of parameter **CONFIG_VIRTIO_BLK** and and parameter **CONFIG_VIRTIO_NET** are `m`, continue to step 2.

2. Run `lsinitrd /boot/initramfs-$(uname -r).img | grep virtio` to make sure virtio driver has been complied in the temporary root file system of initramfs or initrd.

```
[root@izbp1[illegible] ~]# lsinitrd /boot/initramfs-$(uname -r).img | grep virtio
Arguments: -f --add-drivers ' xen-blkfront virtio_blk virtio_blk virtio_pci virtio_pci virtio_console virtio_console'
-rw-r--r--   1 root     root         7628 Sep 13 07:14 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/block/virtio_blk.ko.xz
-rw-r--r--   1 root     root        12820 Sep 13 07:15 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/char/virtio_console.ko.xz
-rw-r--r--   1 root     root         7980 Sep 13 07:16 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/scsi/virtio_scsi.ko.xz
drwxr-xr-x   2 root     root            0 Oct 24 14:09 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/virtio
-rw-r--r--   1 root     root         4340 Sep 13 07:16 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/virtio/virtio.ko.xz
-rw-r--r--   1 root     root         9480 Sep 13 07:16 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/virtio/virtio_pci.ko.xz
-rw-r--r--   1 root     root         8136 Sep 13 07:16 usr/lib/modules/3.10.0-693.2.2.el7.x86_64/kernel/drivers/virtio/virtio_ring.ko.xz
[root@izbp1[illegible] ~]#
```

Note:

- According to the preceding figure, the virtio_blk driver, including its dependency virtio.ko, virtio_pci.ko and virtio_ring.ko, has been compiled in the temporary root file system initramfs. After reading Notes for importing custom images *Notes for importing custom images*, you can directly import the image *Import custom images*.

- If virtio driver is unavailable in the initramfs, you must recover the temporary root file system of initramfs or initrd before importing images or migration.

To recover the temporary root file system

After *checking*, if the virtio driver is supported by the kernel but not compiled in the temporary root file system, you must recover the temporary root file system. Take CentOS as an example:

- CentOS/RedHat 5

```
mkinitrd -f --allow-missing \
--with=xen-vbd --preload=xen-vbd \
--with=xen-platform-pci --preload=xen-platform-pci \
--with=virtio_blk --preload=virtio_blk \
--with=virtio_pci --preload=virtio_pci \
--with=virtio_console --preload=virtio_console \
```

- CentOS/RedHat 6/7

```
mkinitrd -f --allow-missing \
--with=xen-blkfront --preload=xen-blkfront \
--with=virtio_blk --preload=virtio_blk \
--with=virtio_pci --preload=virtio_pci \
--with=virtio_console --preload=virtio_console \
/boot/initramfs-$(uname -r).img $(uname -r)
```

- Debian/Ubuntu

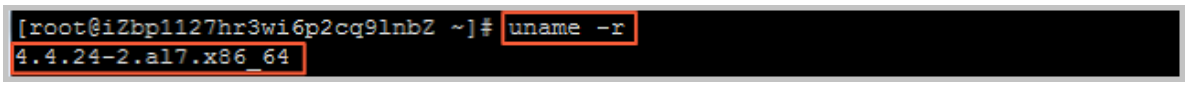
```
echo -e 'xen-blkfront\nvirtio_blk\nvirtio_pci\nvirtio_console' >> \
/etc/initramfs-tools/modules
mkinitramfs -o /boot/initrd.img-$(uname -r)"
```

To compile and install virtio driver

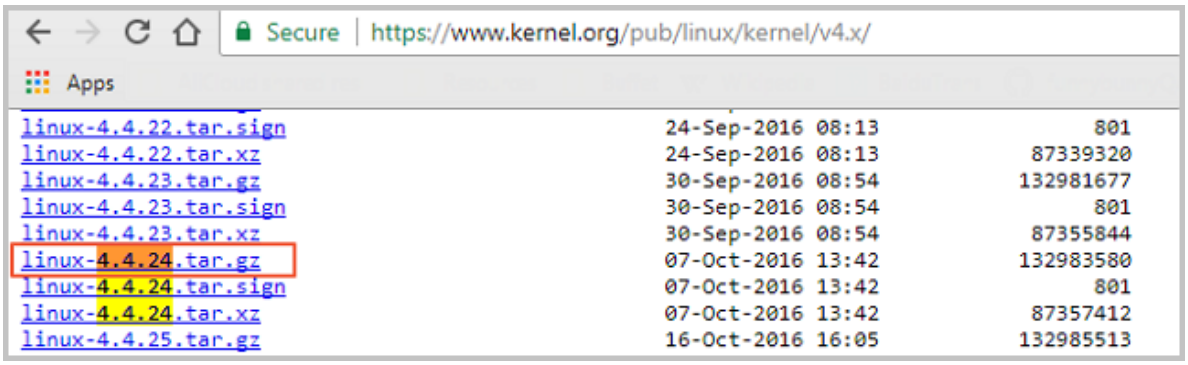
Take Redhat server as an example:

To download the kernel package

1. Run `yum install -y ncurses-devel gcc make wget` to install necessary components to compile the kernel.
2. Run `uname -r` to query the kernel version of your server, such as 4.4.24-2.a17.x86_64.



3. Visit *published Linux Kernel Archives* to download the source codes of kernel, for example, the download link of kernel version starting with 4.4.24 is *https://www.kernel.org/pub/linux/kernel/v4.x/linux-4.4.24.tar.gz*.



4. Run `cd /usr/src/` to change the directory.
5. Run `wget https://www.kernel.org/pub/linux/kernel/v4.x/linux-4.4.24.tar.gz` to download the installation package.
6. Run `tar -xzf linux-4.4.24.tar.gz` to decompress the package.
7. Run `ln -s linux-4.4.24 linux` to establish a link.
8. Run `cd /usr/src/linux` to change the directory.

To compile the kernel

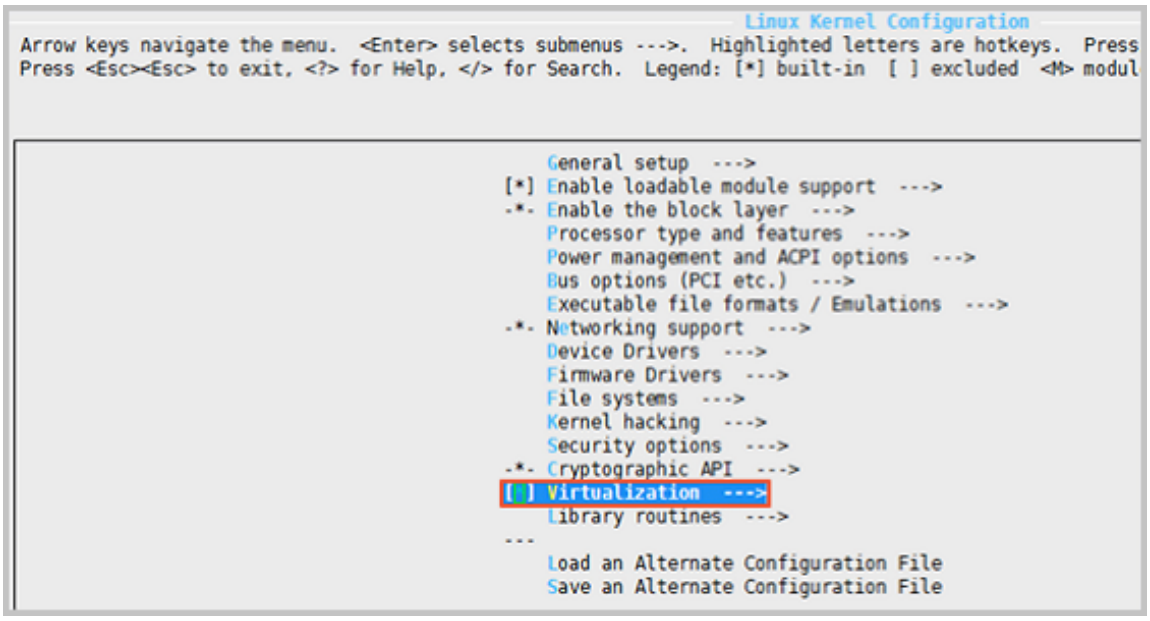
1. Run the following commands to compile the driver into the kernel.

```
make mrproper
symvers_path=$(find /usr/src/ -name "Module.symvers")
test -f $symvers_path && cp $symvers_path .
cp /boot/config-$(uname -r) . /.config
make menuconfig
```

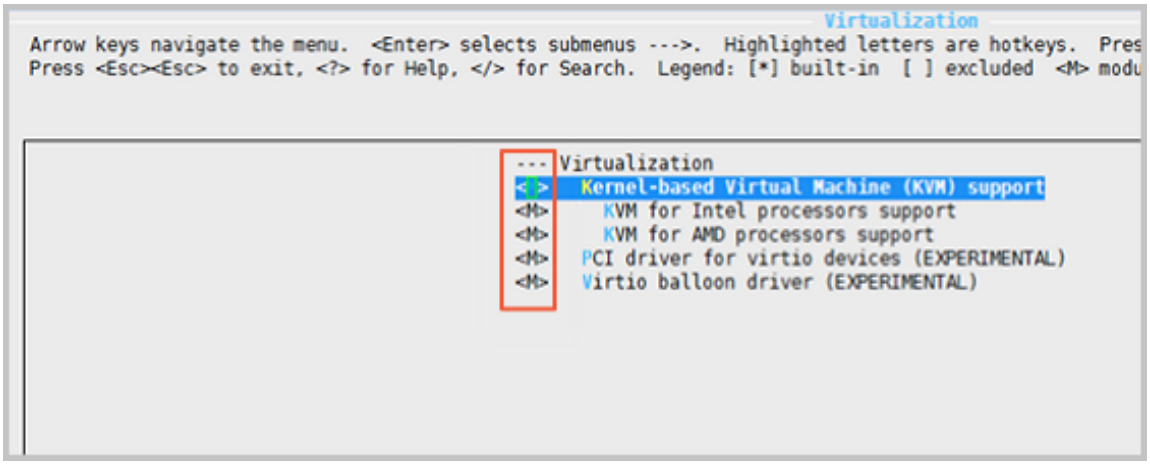
2. Configure the corresponding settings of virtio driver in the following windows:

> **Note:**
> Select *to build the driver in the kernel, select `m` to compile it as a module.

   a. Press the space bar to select Virtualization.

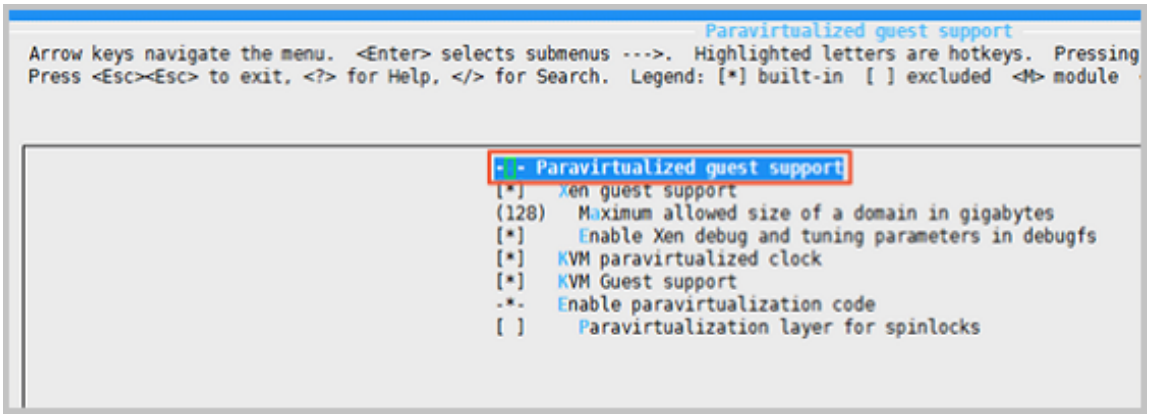


Make sure that you have selected the option of KVM (Kernel-based Virtual Machine).




```
Processor type and features --->
[*] Paravirtualized guest support --->
--- Paravirtualized guest support
(128) Maximum allowed size of a domain in gigabytes
[*] KVM paravirtualized clock
```

```
[*] KVM Guest support
```




```
Device Drivers --->
[*] Block devices --->
 Virtio block driver (EXPERIMENTAL)
-*- Network device support --->
 Virtio network driver (EXPERIMENTAL)
```

b. Press the Esc key to exit the kernel configuration windows, and save changes to file .config according to the dialog box.

c. *Inspect* whether all the corresponding settings of virtio driver has been correctly configured or not.

d. (Optional) If no configuration of virtio driver is settled after the *inspect*, run the following commands to edit the file .config manually.

```
make oldconfig
make prepare
make scripts
make
make install
```

e. Run the following commands to check whether the virtio driver is installed. whether the virtio driver is installed.

```
find /lib/modules/"$(uname -r)"/ -name "virtio.*" | grep -E "
virtio.*"
grep -E "virtio.*" < /lib/modules/"$(uname -r)"/modules.builtin
```

Note:

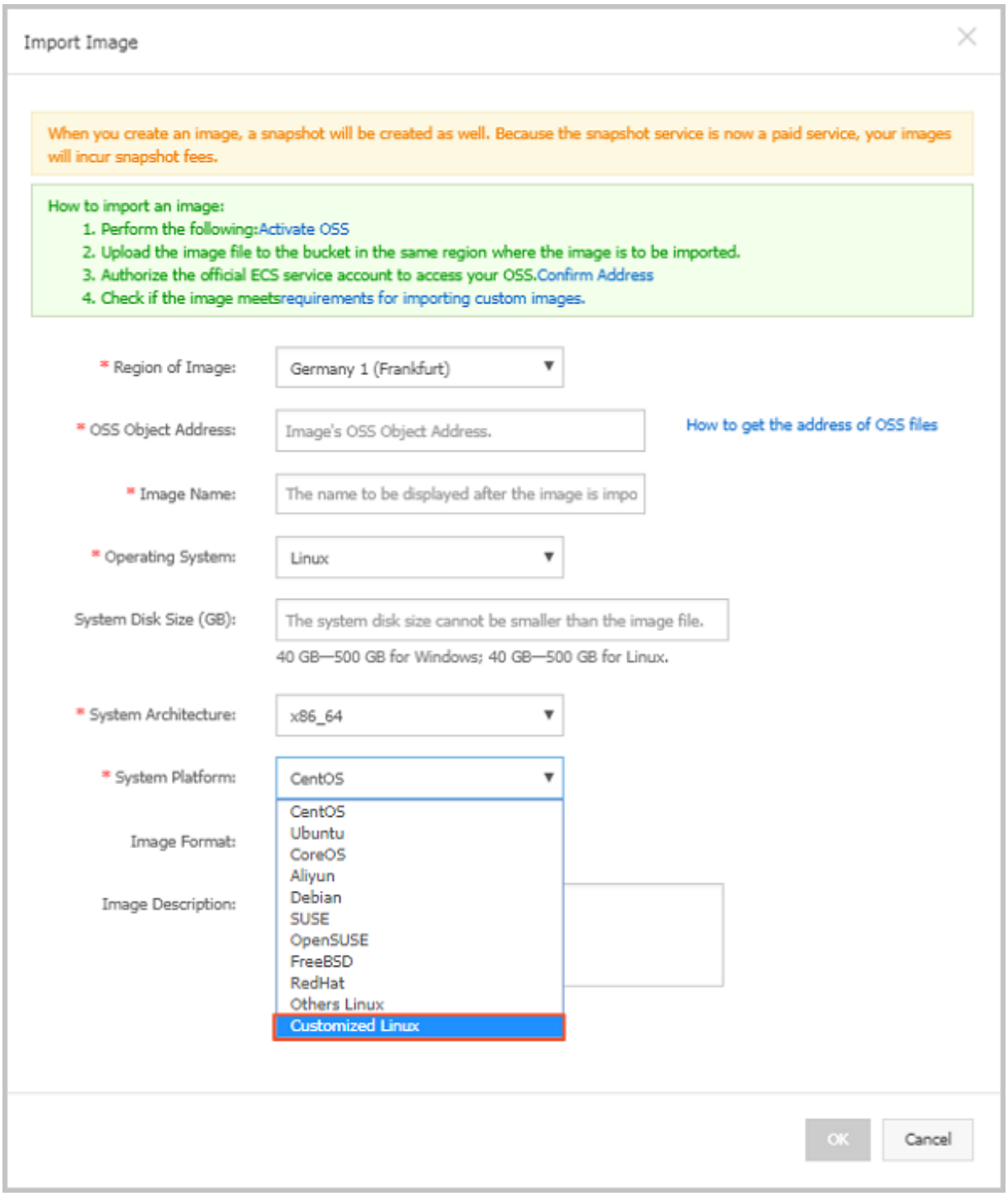
If any of the output includes virtio_blk and virtio_pci.virtio_console, your server has correctly installed the virtio driver.

Next steps

After compiling the virtio driver, You can *Migrate your server to Alibaba Cloud by using Cloud Migration Tool*.

8.5.5 Configure Customized Linux images

Customized Linux images are Linux images that currently ECS cannot provide. If you want to run Customized Linux image on your ECS instances, you can import the Customized Linux image in the *ECS console* and configure **Customized Linux** according to this tutorial, see the following image.



A Customized Linux image is treated as an unknown operating system. ECS configures the Customized Linux image by writing the necessary configuration information, such as SSH configuration, to the instance, and then runs a predefined script at the instance startup to process the configuration information.

Limits an procedures

Limits

- The first primary partition of the custom image must be writable.
- The first primary partition type of the custom image must be FAT32, EXT2, EXT3, EXT4, or UFS.
- The virtual file size of the image must be greater than 5 GB.

Procedures

1. Create the directory `aliyun_custom_image` in the root directory of the first primary partition.
2. When the Customized Linux instance starts up, ECS either writes the instance-related configuration information to the os.conf file in the `aliyun_custom_image` directory or, if this file does not exist, a new file with the name as **os.conf** is automatically created.
3. The image must contain a pre-defined startup script to parse various configuration parameters in the **os.conf** file and implement the configuration. For more information, see *Configure the parsing script* t and *Script sample*.

Security requirements

The basic security requirements for Customized Linux are as follows:

- No high-risk vulnerabilities that can be exploited remotely.
- If a default initial password exists for **VNC**, the password must be changed at the first log on. Access of the default VNC account is denied until the password is changed.
- No default initial password for SSH. A random initial password must be generated and distributed by the Alibaba Cloud ECS control system.

Samples of os.conf configuration file

Sample for the classic network-connected instances

```
hostname=iZ23r29djmjZ
password=cXdlcjEyMzQK
eth0_ip_addr=10.171.254.123
eth0_mac_addr=00:8c:fa:5e:14:23
eth0_netmask=255.255.255.0
eth0_gateway=10.171.254.1
eth0_route="10.0.0.0/8 10.171.254.1;172.16.0.0/12 10.171.254.1"
eth1_ip_addr=42.120.74.105
eth1_mac_addr=00:8c:fa:5e:14:24
eth1_netmask=255.255.255.0
eth1_gateway=42.120.74.1
eth1_route="0.0.0.0/0 42.120.74.1"
dns_nameserver="7.7.7.7 8.8.8.8"
```

The description of the parameters is as follows.

Parameter	Description
hostname	The host name
password	The password, in the format of a Base64-encoded string
eth0_ip_addr	The IP address of eth0 NIC
eth0_mac_addr	The MAC address of eth0 NIC
eth0_netmask	The network mask of eth0 NIC
eth0_gateway	The default gateway of eth0 NIC
eth0_route	The route list (intranet route list) of eth0, separated with semicolons by default
eth1_ip_addr	The IP address of eth1 NIC
eth1_mac_addr	The MAC address of eth1 NIC
eth1_netmask	The network mask of eth1 NIC
eth1_gateway	The default gateway of eth1 NIC
eth1_route	The route (default Internet route) list of eth1, separated with semicolons by default
dns_nameserver	DNS address list, separated with spaces by default

Sample for VPC-Connected instances

```
hostname=iZ23r29djmjZ
password=cXdlcjEyMzQK
eth0_ip_addr=10.171.254.123
eth0_mac_addr=00:8c:fa:5e:14:23
eth0_netmask=255.255.255.0
eth0_gateway=10.171.254.1
eth0_route="0.0.0.0/0 10.171.254.1"
dns_nameserver="7.7.7.7 8.8.8.8"
```

The parameter definitions are as follows.

Parameter	Description
hostname	The host name
password	The password, in the format of a Base64-encoded string
eth0_ip_addr	The IP address of eth0 NIC
eth0_mac_addr	The MAC address of eth0 NIC

Parameter	Description
eth0_netmask	The network mask of eth0 NIC
eth0_gateway	The default gateway of eth0 NIC
eth0_route	The route list of eth0, separated with semicolons by default
dns_nameserver	DNS address list, separated with spaces by default

Configure the parsing script

For an optimized Customized Linux configuration, we recommend you predefine the script in the image. When you create an instance, ECS writes information related to the configuration parameters to the os.conf file in the `aliyun_custom_image` directory, in the first primary partition. The script then reads the relevant configuration information from the os.conf file and implements the configuration. During script creation, pay attention to the following:

- Rules for configuring parameters: As stated in *Samples of os.conf configuration file*, the number of configuration parameters and rules for some configuration parameter values for instances are different for VPC and classic networks.
- Boot start: The script must be set to boot automatically at system startup.
- Configuration file path: When you use the image to create an instance, the default device name assigned to the first primary partition varies between I/O-optimized and non-I/O-optimized instances. We recommend you use the `uuid` or `label` in the script to identify the device in the first primary partition. The user password is a Base64-encoded string, and must be entered the same way in the script.
- Identify VPC or classic network: You must determine the instance network type in the script as either VPC or classic network. The easiest method is to identify whether `eth1_route` or other eth1-related configuration items exist.
- Configuration differences between the VPC and classic network:
  - For a VPC instance, the default Internet route is configured in the `eth0_route` parameter in the os.conf file.
  - For a classic network instance, the default route is configured in the `eth1_route` parameter, and the intranet route is configured in the `eth0_route` parameter.

  Therefore, it is necessary in the script to determine the network type of the instance, and then have a specific analysis and processing.

- Configuration optimization: During the life cycle of an instance, the os.conf file must be executed only once, so we recommend that you delete the os.conf configuration file after the script runs successfully. If the script fails to read the os.conf configuration, no configuration is executed.
- Process a custom image: The custom image created on the Customized Linux instance must include the boot script. When you create an instance using the custom image, ECS writes the os.conf configuration when the instance is started for the first time. The script then implements the related configuration items when it detects the configuration.
- Modify related configuration: When the instance configuration information is changed in the ECS console or by an API, ECS writes the relevant information to the os.conf file. Changes are implemented when the script runs again.

Script sample

See the following script example for a CentOS image.

- The script is for reference only. You must modify it based on the actual operating system type to get a valid script.
- Before you use the script, make sure that the script passes the debugging process.
- The script must be configured to run at boot automatically, for example, by putting the script in the `/etc/init.d/` directory.

```
/bin/bash
### BEGIN INIT INFO
# Provides: os-conf
# Required-Start: $local_fs $network $named $remote_fs
# Required-Stop:
# Should-Stop:
# Default-Start: 2 3 4 5
# Default-Stop: 0 1 6
# Short-Description: The initial os-conf job, config the system.
### END INIT INFO
first_partition_dir='/boot/'
os_conf_dir=${first_partition_dir}/aliyun_custom_image
os_conf_file=${os_conf_dir}/os.conf
load_os_conf() {
if [[ -f $os_conf_file ]]; then
. $os_conf_file
return 0
else
return 1
fi

cleanup() {
# ensure $os_conf_file is deleted, to avoid repeating config system
rm $os_conf_file >& /dev/null
# ensure $os_conf_dir is exitst
mkdir -p $os_conf_dir
```

```
config_password() {
if [[ -n $password ]]; then
password=$(echo $password | base64 -d)
if [[ $? == 0 && -n $password ]]; then
echo "root:$password" | chpasswd
fi
fi

config_hostname() {
if [[ -n $hostname ]]; then
sed -i "s/^HOSTNAME=. */HOSTNAME=$hostname/" /etc/sysconfig/network
hostname $hostname
fi

config_dns() {
if [[ -n $dns_nameserver ]]; then
dns_conf=/etc/resolv.conf
sed -i '/^nameserver.*/d' $dns_conf
for i in $dns_nameserver; do
echo "nameserver $i" >> $dns_conf
done
fi

is_classic_network() {
# vpc: eth0
# classic: eth0 eth1
grep -q 'eth1' $os_conf_file

config_network() {
/etc/init.d/network stop
config_interface eth0 ${eth0_ip_addr} ${eth0_netmask} ${eth0_mac_addr}
config_route eth0 ${eth0_route}
If; then
Config_interface eth1 $ {eth1_ip_addr} $ {eth1_netmask} $ {eth1_mac_a
ddr}
config_route eth1 ${eth1_route}
fi
/etc/init.d/network start

config_interface() {
local interface=$1
local ip=$2
local netmask=$3
local mac=$4
inteface_cfg="/etc/sysconfig/network-scripts/ifcfg-${interface}"
cat << EOF > $inteface_cfg
DEVICE=$interface
IPADDR=$ip
NETMASK=$netmask
HWADDR=$mac
ONBOOT=yes
BOOTPROTO=static
EOF

config_default_gateway() {
Local gateway = $1
sed -i "s/^GATEWAY=. */GATEWAY=$gateway/" /etc/sysconfig/network

config_route() {
local interface=$1
local route=$2
```

```
route_conf=/etc/sysconfig/network-scripts/route-${interface}
> $route_conf
echo $route | sed 's/;/\n/' | \
while read line; do
dst=$(echo $line | awk '{print $1}')
gw=$(echo $line | awk '{print $2}')
if ! grep -q "$dst" $route_conf 2> /dev/null; then
echo "$dst via $gw dev $interface" >> $route_conf
fi
if [[ "$dst" == "0.0.0.0/0" ]]; then
config_default_gateway $gw
fi
done

################## sysvinit service portal ####################
start() {
if load_os_conf ; then
config_password
config_network
config_hostname
config_dns
cleanup
return 0
else
echo "not load $os_conf_file"
return 0
fi

RETVAL=0
case "$1" in
start)
start
RETVAL=$?


echo "Usage: $0 {start}"
RETVAL=3

esac
exit $RETVAL
```

8.5.6 Convert image file format

Only image files in RAW or VHD format can be imported. If you want to import images in other formats, convert the format before importing the image. This tutorial describes how to use qemu-img tool to converts custom image file format

such as RAW, Qcow2, VMDK, VDI, VHD (vpc), VHDX, qcow1, or QED to vhd or raw format.

Install qemu-img

You can use different methods to install qemu-img and convert the image file format based on operating system of your computer:

- *Windows operationg system*
- *Linux operationg system*

Windows operationg system

Follow these steps to install qemu-IMG and convert the image file format:

1. Download and install qemu from *https://qemu.weilnetz.de/w64/*. Installation path: *C:\Program Files\qemu*.
2. Perform the following to create an environment variable (For Windows 7):
   a. Choose **Start** > **Computer**, right click **properties**.
   b. In the left-side navigation pane, click **Advanced system settings**.
   c. In the **System Properties** dialog box, click the **Advanced** tab and click **Environment Variables**.
   d. In the **Environment Variables** dialog box, in the **System variables**, find the **Path** variable, and click **Edit**. If the **Path** variable does not exist, click **New**.
   e. Add a variable value:
   - In the **Edit System Variable**: In the **Variable** value, add `C:\Program Files\qemu`. Different variable values are separated with semicolon (;).
   - In the **New System Variable**: In the **Variable** name, enter `Path`. In the **Variable** value, enter `C:\Program Files\qemu`.
3. Open **Command** Prompt in Windows and run the `qemu-img --help` command. If it is displayed successfully, the installation was successful.
4. In the **Command** prompt, run the **`cd [directory of the source image file]`** command to change the directory. For example, `cd D:\ConvertImage`.
5. In **Command** prompt, run the `qemu-img convert -f raw -O qcow2 centos.raw centos.qcow2` command to convert the image file format.

   The command parameters are described as follows:
   - **`-f`** is followed by the source image format.
   - **`-O`** (uppercase is required) is followed by the converted image format, the source file name, and the target file name.

When the conversion is complete, the target file appears in the directory where the source image file is located.

Linux operationg system

To install qemu-img and convert the image file format, follow these steps:

1. Install qemu-img, for example:
   - For Ubuntu, run the command: `apt install qemu-img`.
   - For CentOS, run the command: `yum install qemu-img`.
2. Run the `qemu-img convert -f raw -O qcow2 centos.raw centos.qcow2` command to convert the image file format.

   The command parameters are described as follows:

   - **`-f`** is followed by the source image format.
   - **`-O`** (uppercase is required) is followed by the converted image format, the source file name, and the target file name.

8.5.7 Import custom images

You can import image files to the ECS environment to create custom images. You can then use these images to create ECS instances or change system disks.

Note:

When you import a mirror, a snapshot is created, because the snapshot service has already started charging for it. The Snapshot capacity is the size of the imported mirror file, regardless of the System Disk size that was set when the mirror was imported.

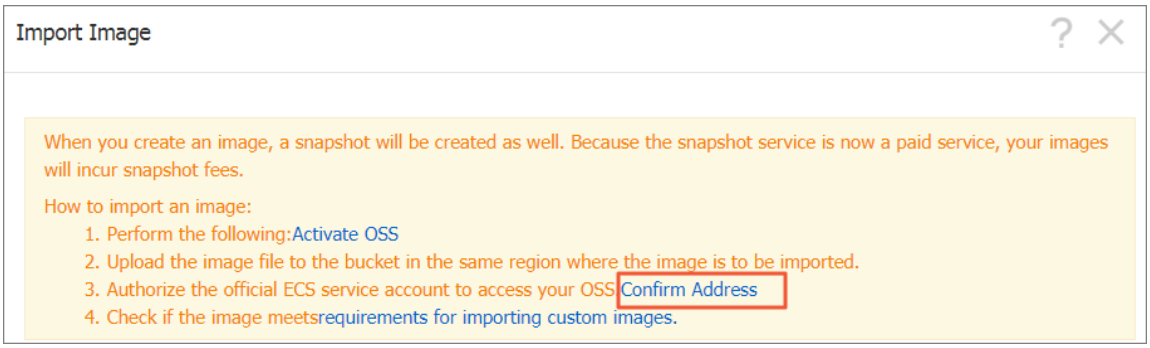
Prerequisite

Before importing a mirror, you should have done the following:

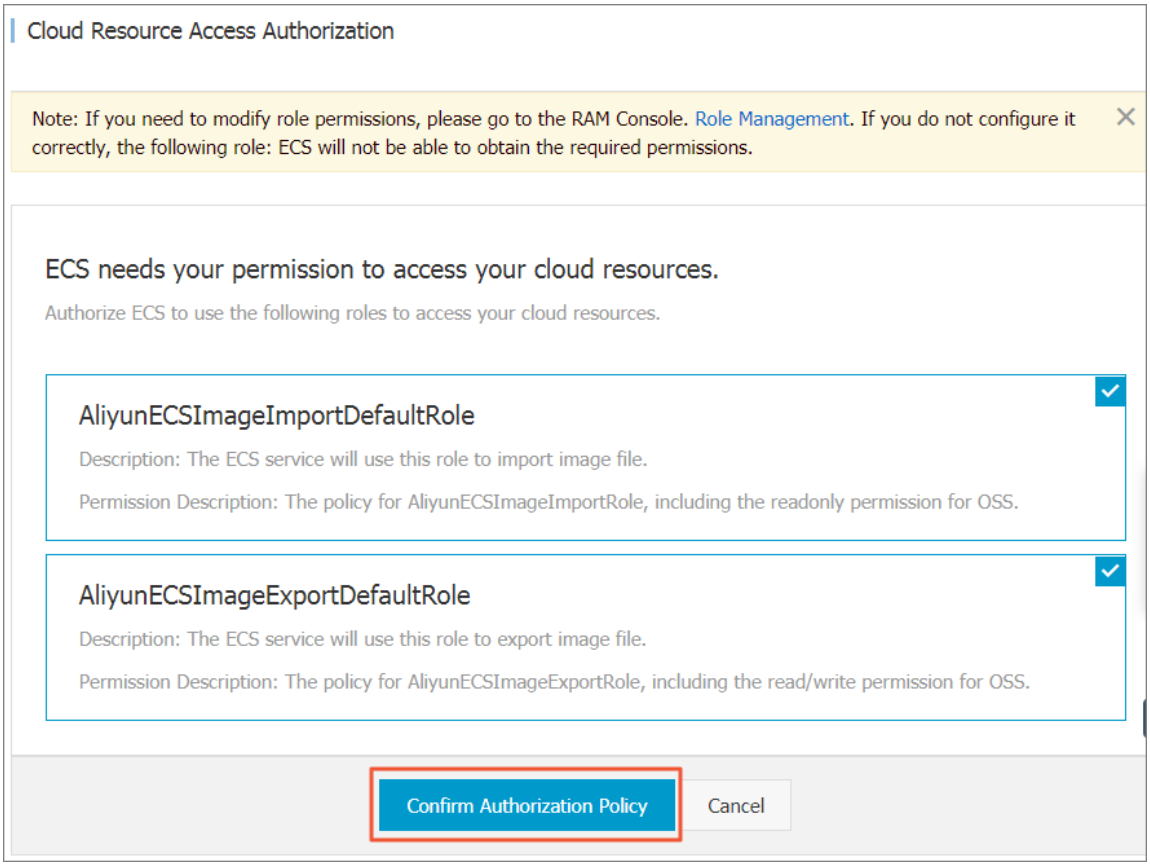
- For the limits and requirements of importing custom images, See *Notes for importing custom images*, *Configure Customized Linux images*, and *Convert image file format*
- *#unique_232*.
- You can only import an image file to a region from OSS in the same region. The image and the OSS must belong to one account.
- You can use an OSS third-party tool client, OSS API or OSS SDK, to upload the file to a bucket in the same region as the ECS custom image to import. See *Multipart upload* to upload an image file that is larger than 5 GiB.

Procedures

1. Log on to the OSS console, *Get object URL*.
2. Follow these steps to authorize the ECS service to access your OSS resources:
   a. Log on to the *ECS console*.
   b. In the left-side navigation pane, choose **Snapshots and Images** > **Images**.
   c. Click **Import Image**.
   d. On the third items of How to import an image. Click **Confirm Address**.



   e. Click Confirm Authorization Policy on the **Cloud Resource Access Authorization** page. Go back to the ECS console.



3. In the left-side navigation pane, choose **Snapshots and Images** > **Images**.

4. Click **Import Image**,
5. Enter the following information in the **Import Image** pop-up window:
   - **Region of image**: Select the region where you want to deploy the application.
   - **OSS Object Address**: Copy the object address taken from the OSS console.
   - **OSS Object Address**: Copy the object address taken from the OSS console. It can be 2 to 128 characters in length. Begins with lower case Latin letters or Chinese characters. Allows numbers, periods (.), underscores (_), colons (:), and hyphens (-).
   - **Operating System** : Supported OS releases are Windows or Linux. If you want to import a non-standard platform image, select Linux.
   - **System Disk size**: The system disk size range is 40 Gib-500 Gib.
   - **System Architecture**: Choose **x86_64** for 64 bit operating systems and choose **i386** for 32 bit operating systems and choose.
   - **System Platform**: The system platform Depends on the **Operating System** you choosed. Avaliable options:
     - Windows: Windows Server 2003, Windows Server 2008, and Windows Server 2012.
     - Linux: Centos, Suse, Ubuntu, Debian, FreeBSD, CoreOS, Aliyun, Customized Linux, and Others Linux. (Linux only) *Open a ticket* to confirm the selected edition is supported.
     - If your image OS is a custom edition developed from Linux kernel, *open a ticket* to contact us.
   - **Image Format** : Supports RAW and VHD format. RAW format is recommended. Note that you cannot use qemu-image to create VHD images.
   - **Image Description**: The description of the image.
   - (Optional) If you want to import an image that contains data disks, choose **Add Images of Data Disks**, and follow the page prompts to set information. Supported data disk capacity range is 5 GiB-2000 GiB.
   - After the information is confirmed, click **OK** to create a task to import the image.

Note:

- It usually takes 1 to 4 hours to import an image. The duration of the task depends on the size of your image file and the amount of concurrent tasks. You can view the task progress in the image list of the import region.

- We create snapshots for you when importing images, you can check the **Snapshot** list for progress monitoring. Before the import mirror task is complete, the status of the snapshot is displayed as **Failed**. When the task completes, the status is automatically updated **Available**.

You can find and cancel the image import task in the *task manager*.

Next steps

After you import the custom image, you may want to *Create an instance from a custom Image*.

See also

- *Images*
- *Custom images FAQ*
- *Export custom images*
- *ECS custom mirroring operation practice*
- *Create and import on-premise images by using Packer*
- *Use Packer to create a custom image*
- *Copy custom images*
- *Share images*

8.6 Export custom images

You can export custom images to a local device for test purposes or to offline private stack. This topic describes the limits of the image export function, and provides instructions on how to export images in the ECS console.

Note:

Note that exported images are stored in your OSS bucket, which must be in the same region as the custom images. You are biiled for the data used of for OSS storage and downloading.

Limits

Currently, the image export function has the following constraints and restrictions:

- The image export function is usable before it is *whitelisted*.
- You cannot export the custom images that are created by a system disk snapshot from the marketplace.
- You can export the custom images that contain four snapshots of data disks at most, and for a single data disk, the maximum volume must be less than 500 GB.

- The default format of exported image files is RAW.

Precautions

- When you export images that contain data disk snapshot, the snapshot and image files are shown in your OSS bucket.
  - A snapshot of the system disk has a system in the file name.
  - A snapshot of the data disk has data in the file name. The data disk snapshot will have the identity corresponding to the data disk, which is the mount point of the data disk, such as xvdb or xvdc.
- When using exported images *#unique_237*, you need to confirm that the file device recorded in /etc/fstab records corresponds to the exported data disk snapshot information.

Prerequisites

Before exporting a custom mirror, you need to do the following:

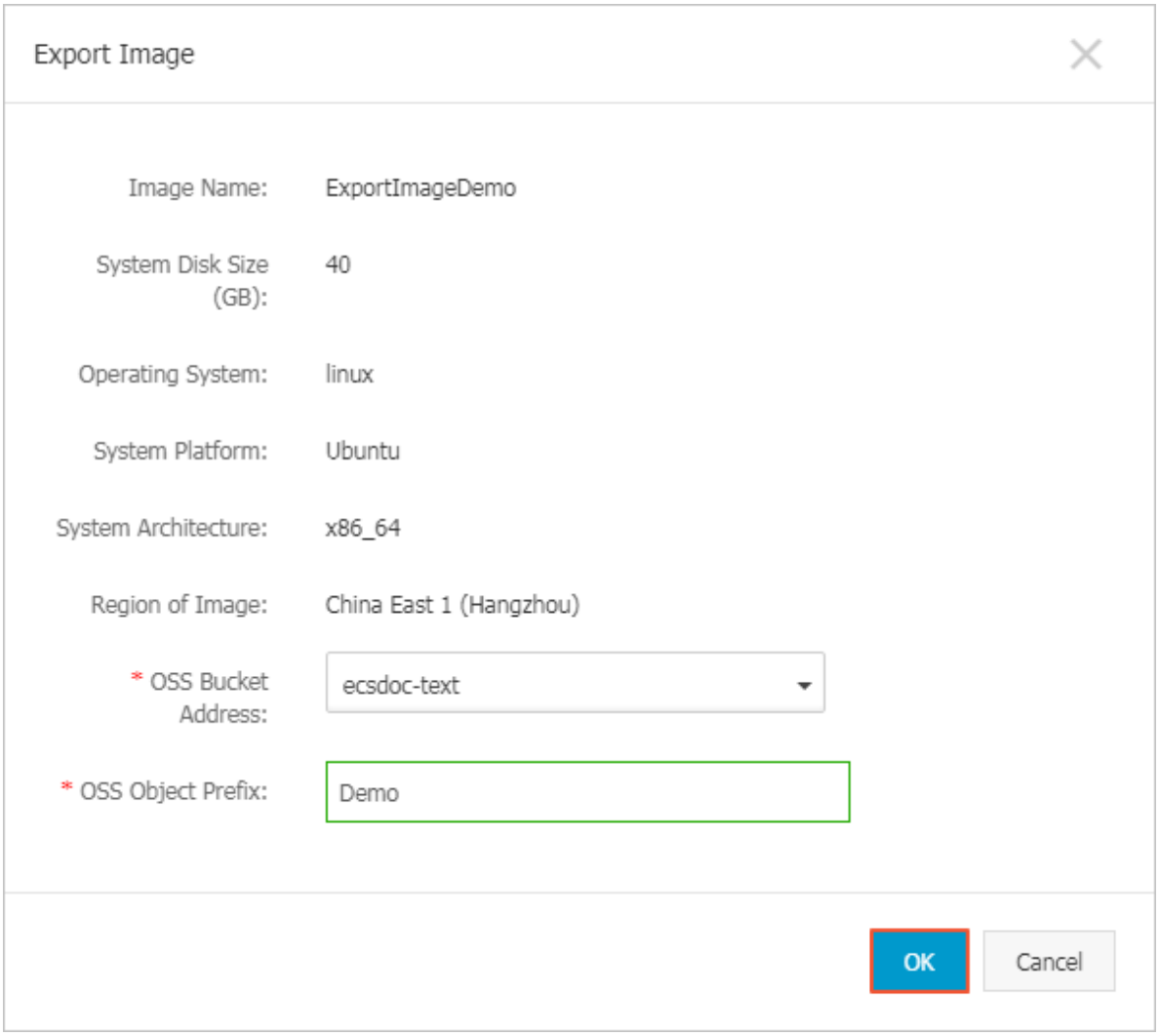
- *Open a ticket* to activate the image export feature. Describe the use cases of the exported images in the ticket.
- Activate OSS and make sure that the region where your custom images are located has an available OSS bucket. See *Create a bucket*. to create an OSS bucket.

Procedure

1. Log on to the *ECS console*.
2. Select a region.
3. (Optional) Authorize the ECS service to access your OSS bucket:
   a. Choose **Snapshots & Images** > **Images**in the left-side navigation pane.
   b. Find the custom image you want to export. In the **Action** column, click **Export** Image.
   c. In the **Export Image** dialog box, click **Confirm Address** in Step 3 of the prompt message.
   d. In the **Cloud Resource Access Authorization** window, click **Confirm Authorization Policy**. Return to the ECS console homepage.
4. In the left-side navigation pane, choose **Snapshot & Images** > **Images**.
5. Find the custom image you want to export, In the **Action** column, click **Export Image**.
6. In the Export Image dialog box:
   - Select the OSS bucket in the specified region.

- Set the prefix of the object name of the exported image. For example, if you set Demo as the prefix, then the exported image file displayed in the OSS bucket is named Demo-[automatically generated file name].

7. Click **OK** to export the image.



The duration of exporting depends on the size of the image file and the number of other export tasks in the queue. Be patient. You can go to the ***Manage Tasks*** page in the ECS console to query the task progress based on the task ID. When the **Task Status** is Task **Completed**, the image is successfully exported.

To cancel the export task, go to the ***Manage Tasks*** page and find the task.

Next step

- To query the export result, log on to the *OSS console*.
- To download the exported image file, log on to the OSS console *Get object URL* and Get object URL.

8.7 Open source tools

8.7.1 Create and import on-premise images by using Packer

Packers Packer is a convenient open-source tool to create on-premises image files. It runs on the most major operating systems.

To create an on-premises image by yourself and then upload it on a cloud platform is a complex process. However, by using Packer, you can create identical on-premises images for multiple platforms from a single source configuration. Follow these steps to create an on-premises image for CentOS 6.9 on an Ubuntu 16.04 server and to upload it to Alibaba Cloud. To create on-premises images for other operating systems, you can **customize your Packer templates** as necessary.

Prerequisites

- You must have the *AccessKey* ready to fill out the configuration file. .

  Note:
  The AccessKey has a high level of account privileges. We recommend that you *Create a RAM user* and use the RAM account to *create an AccessKey* to prevent data breach.
- Before uploading your on-premises images to Alibaba Cloud, you must *#unique_232*.

Sample of creating and importing an on-premises image

1. Run `egrep "(svm|vmx)" /proc/cpuinfo` to check whether your on-premises server or virtual machine supports KVM. If the following output returns, KVM is supported.

```
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx
 pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good
nopl xtopology nonstop_tsc aperfmperf tsc_known_freq pni pclmulqdq
 dtes64 monitor ds_cpl vmx est tm2 ssse3 sdbg fma cx16 xtpr pdcm
pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
 avx f16c rdrand lahf_lm abm 3dnowprefetch epb intel_pt tpr_shadow
vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 avx2 smep bmi2
erms invpcid mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1
xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
flags : fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
cmov
```

2. Run the following commands to install the KVM:

```
sudo apt-get install qemu-kvm qemu virt-manager virt-viewer libvirt-
bin bridge-utils # Install KVM and related dependencies.
```

```
sudo virt-manager # Enable virt-manager.
```

If a GUI runs in the VM console window, you have successfully installed the KVM.

3. Install Packer.

   To install Packer, see *Use Packer to create a custom image* Use Packer to Create a Custom Image.

4. Run the following commands to define a Packer template.

   Note:
   The on-premises image created in the following configuration is for the CentOS 6.9 operating system only. To create images for other operating systems, *Customize a Packer template*customize configuration file centos.json as needed.

```
cd /user/local # Switch the directory.
wget https://raw.githubusercontent.com/alibaba/packer-provider/
master/examples/alicloud/local/centos.json # Download file centos.
json that is released by Alibaba Cloud.
wget https://raw.githubusercontent.com/alibaba/packer-provider/
master/examples/alicloud/local/http/centos-6.9/ks.cfg # Download
file ks.cfg that is released by Alibaba Cloud.
mkdir -p http/centos-6.9 # Create a directory.
mv ks.cfg http/centos-6.9/ # Move file ks.cfg to the http/centos-6.9
 directory.
```

5. Run the following commands to create an on-premises image.

```
export ALICLOUD_ACCESS_KEY= SpecifyYourAccessKeyIDHere # Import your
 AccessKeyID,
export ALICLOUD_SECRET_KEY= SpecifyYourAccessKeySecretHere # Import
your AccessKeySecret.
packer build centos.json # Create an on-premises image.
```

The running result of the sample is as follows.

```
qemu output will be in this color.
==> qemu: Downloading or copying ISO
qemu: Downloading or copying: http://mirrors.aliyun.com/centos/6.9/
isos/x86_64/CentOS-6.9-x86_64-minimal.iso

==> qemu: Running post-processor: alicloud-import
qemu (alicloud-import): Deleting import source https://oss-cn-
beijing.aliyuncs.com/packer/centos_x86_64
Build 'qemu 'finished.
=> Builds finished.  The artifacts of successful builds are:
--> qemu: Alicloud images were created:
```

```
cn-beijing: XXXXXXXX
```

6. Wait for a few minutes, log on to the *ECS console* and check your custom image in the image list that is in the corresponding region. In this sample, the region is China North 2 (cn-beijing).

Next steps

You can use the created image to create an ECS instance. For more information, see *Create an instance from a custom Image*.

Customize a Packer template

The image file created in the preceding *Sample of creating and importing an on-premises image* is for the CentOS 6.9 operating system only. To create images for other operating systems, you must customize the Packer template.

For example, the following JSON file is customized based on the template to create an image for the CentOS 6.9.

```
{"variables": {
"box_basename": "centos-6.9",
"build_timestamp": "{{isotime \"20060102150405\"}}",
"cpus": "1",
"disk_size": "4096",
"git_revision": "__unknown_git_revision__",
"headless": "",
"http_proxy": "{{env `http_proxy`}}",
"https_proxy": "{{env `https_proxy`}}",
"iso_checksum_type": "md5",
"iso_checksum": "af4a1640c0c6f348c6c41f1ea9e192a2",
"iso_name": "CentOS-6.9-x86_64-minimal.iso",
"ks_path": "centos-6.9/ks.cfg",
"memory": "512",
"metadata": "floppy/dummy_metadata.json",
"mirror": "http://mirrors.aliyun.com/centos",
"mirror_directory": "6.9/isos/x86_64",
"name": "centos-6.9",
"no_proxy": "{{env `no_proxy`}}",
"template": "centos-6.9-x86_64",
"version": "2.1. TIMESTAMP"

"builders":[

"boot_command": [
" text ks=http://{{ . HTTPIP }}:{{ . HTTPPort }}/{{user `ks_path`}}"

"boot_wait": "10s",
"disk_size": "{{user `disk_size`}}",
"headless": "{{ user `headless` }}",
"http_directory": "http",
"iso_checksum": "{{user `iso_checksum`}}",
"iso_checksum_type": "{{user `iso_checksum_type`}}",
"iso_url": "{{user `mirror`}}/{{user `mirror_directory`}}/{{user `
iso_name`}}",
"output_directory": "packer-{{user `template`}}-qemu",
```

```
"shutdown_command": "echo 'vagrant'|sudo -S /sbin/halt -h -p",
"ssh_password": "vagrant",
"ssh_port": 22,
"ssh_username": "root",
"ssh_wait_timeout": "10000s",
"type": "qemu",
"vm_name": "{{ user `template` }}.raw",
"net_device": "virtio-net",
"disk_interface": "virtio",
"format": "raw"


"provisioners": [{
"type": "shell",
"inline": [
"sleep 30",
"yum install cloud-util cloud-init -y"


"post-processors":[

"type":"alicloud-import",
"oss_bucket_name": "packer",
"image_name": "packer_import",
"image_os_type": "linux",
"image_platform": "CentOS",
"image_architecture": "x86_64",
"image_system_size": "40",
"RegionId": "cn-beijing"
```

Parameters in a Packer builder

Sample of creating and importing an on-premises image QEMU builder is used in the preceding sample to create a virtual machine image. Required parameters for the builder are as follows.

Parameter	Type	Description
iso_checksum	String	The checksum for the OS ISO file. Packer verifies this parameter before starting a virtual machine with the ISO attached. Make sure you specify at least one of the **iso_checksum** or **iso_checksum_url** parameter. If you have the **iso_checksum** parameter specified, the **iso_checksum_url** parameter is ignored automatically.

iso_checksum_type	String	The type of the checksum specified in iso_checksum. Optional values: • none: If you specify none for iso_checksum_type, the checksuming is ignored, thus none is not recommended. • md5 • sha1 • sha256 • sha512
iso_checksum_url	String	This is a URL pointing to a GNU or BSD style checksum file that contains the ISO file checksum of an operating system. It may come in either the GNU or BSD pattern. Make sure you specify at least one of the **iso_checksum** or the **iso_checksum_url** parameter. If you have the iso_checksum parameter specified, the **iso_checksum_url** parameter is ignored automatically.
iso_url	String	This is a URL pointing to the ISO file and containing the installation image. This URL may be an HTTP URL or a file path: • If it is an HTTP URL, Packer downloads the file from the HTTP link and caches the file for running it later. • If it is a file path to the IMG or QCOW2 file, QEMU directly starts the file. If you have the file path

		specified, set parameter **disk_image** to true.
headless	boolean	By default, Packer starts the virtual machine GUI to build a QEMU virtual machine. If you set **headless** to True, a virtual machine without any console is started.

For more information about other optional parameters, see Packer *QEMU Builder*.

Parameters in a Packer provisioner

Sample of creating and importing an on-premises image The provisioner in the preceding sample contains a Post-Processor module that enables automated upload of on-premises images to Alibaba Cloud. Required parameters for the provisioner are as follows:

Parameter	Type	Description
access_key	String	Your AccessKeyID. The AccessKey has a high privilege. We recommend that you first *Create a RAM user* and use the RAM account to create an AccessKey to prevent data breach.
secret_key	String	Your AccessKeySecret. The AccessKey has a high privilege. We recommend that you first *Create a RAM user* and use the RAM account to create an AccessKey to prevent data breach.
region	String	Select the region where you want to upload your on-premises image. In the sample, the region is cn-beijing. For more information, see *Regions and zones*.
image_name	String	The name of your on-premises image. The value: • Can contain [2, 128] characters in length.

		• Must start with an either upper case or lower case letter. • Can contain digits, underscores (_), colons(:), or hyphens (-). • Cannot start with acs, http ://, or https://.
oss_bucket_name	String	Your OSS bucket name. If you specify a bucket name that does not exist, Packer creates a bucket automatically with the specified oss_bucket_name when uploading the image.
image_os_type	String	Image type. Optional values: • linux • windows
image_platform	String	Distribution of the image. For example, CentOS.
image_architecture	String	The instruction set architecture of the image. Optional values: • i386 • x86_64
format	String	Image format. Optional values: • RAW • VHD

For more information about other optional parameters, see Packer *Alicloud Post-Processor*.

Next steps

You can use the created image to create an ECS instance. For more information, see *Create an instance from a custom Image*.

References

- For more information about how to use Packer, see *Packer* documentation.
- For more information about release information, visit the Packer repository on GitHub *packer*.

- For more information about Alibaba Cloud open source tools, visit Alibaba repository on GitHub *opstools*.
- For more information about Alibaba Cloud and Packer project, visit the Alibaba & Packer repositories on GitHub *packer-provider*.
- For more information about configuration file ks.cfg, see *Anaconda Kickstart* .

8.7.2 Use Packer to create a custom image

Packer is a convenient open-source tool to create custom images. It runs on major operating systems. This document provides information about how to install and use Packer. With Packer, you can easily create a custom image by using only one or two lines of commands.

Prerequisites

You must have the AccessKey ready. For more information, see *Create AccessKey* .

> **Note:**
>
> The AccessKey has a high level of account privileges. To avoid improper operations and data breach, we recommend that you *Create a RAM user*, and act as a RAM user to *create your AccessKey*.

Step 1. Install Packer

Go to the official *download page of Packer* where you can choose and download the version of Packer for your operating system. Follow these steps or visit the official *installation page of Packer* for how to install Packer.

To install Packer on a Linux server

1. Connect and log on to the Linux server. If the server you want to connect to is an ECS Linux instance, see *Connect to a Linux instance by using a password*.
2. Run `cd /usr/local/bin` to go to the *`/usr/local/bin`* directory.

   > **Note:**
   >
   > The *`/usr/local/bin`* directory is an environment variable directory. ou can install Packer to this directory or another directory that has been added to the environment variable.

3. Run `wget https://releases.hashicorp.com/packer/1.1.1/packer_1.1.1_linux_amd64.zip` to download the Packer installer. You can visit the official *download page of Packer* to download installers for other versions of Packer.
4. Run `unzip packer_1.1.1_linux_amd64.zip` to unzip the package.

5. Run `packer -v` to verify Packer's installation status. If the Packer version number is returned, you have successfully installed Packer. If error **command not found** is returned, Packer has not been correctly installed.

To install Packer on a Windows server

Take Windows Server 2012 64-bit as an example:

1. Connect and log on to the Windows server. If the server you want to connect to is an ECS Windows instance, see *Connect to a Windows instance*.
2. Open the official *download page of Packer* and select an appropriate Packer installer for 64-bit Windows.
3. Unzip the package to a specified directory and install Packer.
4. Define the directory for Packer in the PATH environment variable.
   a. Open the **Control Panel**.
   b. Select **All Control Panel Items** > **System** > **Advanced System Settings**.
   c. Click **Environment Variable**.
   d. Find **Path** in the system variable list.
   e. Add the Packer installation directory to the **Variable Value**, such as `C:\Packer` as seen in this example. Separate multiple directories with half-width semicolons (;). Click **OK**.
5. Run `packer.exe -v` in CMD to verify Packer's installation status. If the Packer version number is returned, you have successfully installed Packer. If error **command not found** prompt is returned, Packer has not been correctly installed.

Step 2. Define a Packer template

Note:

To create a custom image by using Packer, firstly, create a JSON format template file. In the template, specify the *Alibaba Cloud Image Builder* and *Provisioner* for the custom image to be created. Packer has diverse provisioners for you to choose from when configuring the content generation mode of the custom image.In the following alicloud JSON file, we have used the *Shell* provisioner as an example to illustrate how to define a Packer template.

Create a JSON file named alicloud and paste the following content:

```
"variables": {
"access_key": "{{env `ALICLOUD_ACCESS_KEY`}}",
"secret_key": "{{env `ALICLOUD_SECRET_KEY`}}"

"builders": [{
"type":"alicloud-ecs",
"access_key":"{{user `access_key`}}",
"secret_key":"{{user `secret_key`}}",
"region":"cn-beijing",
"image_name":"packer_basic",
"source_image":"centos_7_02_64_20G_alibase_20170818.vhd",
"ssh_username":"root",
"instance_type":"ecs.n1.tiny",
"internet_charge_type":"PayByTraffic",
"io_optimized":"true"

"provisioners": [{
"type": "shell",
"inline": [
"sleep 30",
"yum install redis.x86_64 -y"
```

Note:

You must customize the values of the following parameters.

Parameter	Description
access_key	Your AccessKey ID For more details, see creating an accesskey.
secret_key	Your AccessKey Secret For more information, see *Create AccessKey*.
region	The region of the temporary instance used to create the custom image.
image_name	The custom image's name
source_image	You can retrieve the basic image name from Alibaba Cloud public image list.
instance_type	Type of the temporary instance generated to create the custom image.
internet_charge_type	Internet bandwidth billing method for the temporary instance generated for creating the custom image.

provisioners	Type of *Packer Provisioner* used for creating the custom image

Step 3. Create a custom image by using Packer

Follow these step to specify the Packer template file and create a custom image:

1. Run `export ALICLOUD_ACCESS_KEY=your AccessKeyID` to import your AccessKey ID.
2. Run `export ALICLOUD_SECRET_KEY=your AccessKeySecret` to import your AccessKey Secret.
3. Run `packer build alicloud.json` to create the custom image.

The sample runs like follows. The sample creates a custom image containing ApsaraDB for Redis and runs as follows:

```
alicloud-ecs output will be in this color.
==> alicloud-ecs: Prevalidating alicloud image name...
alicloud-ecs: Found image ID: centos_7_02_64_20G_alibase_20170818.vhd
==> alicloud-ecs: Start creating temporary keypair: packer_59e44f40-
c8d6-0ee3-7fd8-b1ba08ea94b8
==> alicloud-ecs: Start creating alicloud vpc

==> alicloud-ecs: Provisioning with shell script: /var/folders/3q/
w38xx_js6cl6k5mwkrqsnw7w0000gn/T/packer-shell257466182
alicloud-ecs: Loaded plugins: fastestmirror

alicloud-ecs: Total 1.3 MB/s | 650 kB 00:00
alicloud-ecs: Running transaction check

==> alicloud-ecs: Deleting temporary keypair...
Build 'alicloud-ecs' finished.
==> Builds finished. The artifacts of successful builds are:
--> alicloud-ecs: Alicloud images were created:
cn-beijing: m-2ze12578be1oa4ovs6r9
```

Next steps

You can use this custom image to create an ECS instance. For more information, see *Create an instance from a custom Image*.

References

- For more information, visit *packer-provider* , the Packer repository of Alibaba Cloud Github.
- See the *Packer Official Documents* to learn more about how to use Packer.

9 Security groups

9.1 Typical application of security group rules

This article introduces the typical application of security group rules. Documentation applies to both classic and VPC network instances. For specific actions to add security group rules, refer to the Documentation :.

The typical applications listed in this article include:

- *SSH remote connection to Linux instances*
- *RDP remote connection windows instance*
- *Public Network Ping ECs instance*
- *ECS instance as a Web Server*
- *Upload or download files using FTP*

SSH remote connection to Linux instances

Once you 've created a Linux ECs instance, you can connect to the ECS instance remotely for SSH, you need to add the following security group rules:

Network types	Network Card Type	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC network	No configuration required	Direction of entry	Allow	SSH (22)	22/22	Address segment access	0.5.0.0/0	1
Classic network	Alibaba Cloud							

RDP remote connection windows instance

After the Windows ECs instance has been created, connect to the ECS instance remotely for RDP , you need to add the following security group rules:

Network Type	Network Card Type	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority

VPC network	No configuration required	Direction of entry	Allow	RDP (3389)	3389/3389	Address segment access	0.5.0.0/0	1.
Classic Network	Public Network							

Public Network Ping ECs instance

After creating the ECS instance, in order to use Ping program to test the communication status between the ECS instances, you need to add the following security group rules:

Network Type	Network Card Type	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC network	No configuration required	Direction of entry	Allow	ICMP	-1/-1	Address segment or security group access	Fill in according to license type, reference.	1.
Classic Network	Public Network							

ECS instance as a Web Server

If the instance you created is used by the Web server, you need to install the Web server program on the instance, add the following security group rules.

Note:

You need to start the Web server program before checking that the 80 ports are working properly. For detailed operation, refer to the Documentation: check if the TCP 80 port is working properly.

Network Type	Network Card Type	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC network	No configuration required	Direction of entry	Allow	HTTP (80)	80/80	Address segment access	0.5.0.0/0	1.
Classic Network	Public Network							

If you are unable to access your instance via http: // public network IP address, please refer to check if the TCP 80 port is working properly.

Upload or download files using FTP

If you need to use the FTP software to upload or download files to the ECS instance, you need to add the following security group rules:

Note:

You need to install the FTP server program on the instance before checking that port 20/21 is working properly. To install the FTP server program, you can refer to the documentation: the configuration and use of the FTP service under the cloud server ECS.

Network Type	Network Card Type	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC network	No configuration required	Direction of entry	Allow	Custom TCP	20/21	Address segment access	0.5.0.0/0	1.
Classic Network	Public Network							

9.2 Scenarios of security groups

This article introduces several common scenarios of of VPC-connected and classic network-connected security groups.

Note:

- For more information about how to create a security group and its rules, see ##### and ##########.
- For commonly used ports, see *ECS ########*.
- For more information on how to configure security group rules for commonly used ports, see ##########.

- *Scenario 1: Enable intranet communication*

Example: If you want to copy files between two classic network-connected ECS instances owned by different accounts or in different security groups, you can enable intranet communication between both instances by configuring security group rules and then copy files.

- *Scenario 2: Allow remote connection from a specified IP address only*

  Example: When your ECS instance is compromised by hackers as a zombie, you can modify the port for remote connection, and configure security group rules to allow access from a specified IP address only.

- *Scenario 3: Allow remote connection from a specified IP address only*

  Example: When your ECS instance is compromised by hackers as a zombie and scan or send packets maliciously, you can configure security group rules to allow the instance to access to a specified IP address.

- *Scenario 4: Allow an instance to access a specified IP address only*

  Example: When your ECS instance is compromised by hackers as a zombie and scan or send packets maliciously, you can configure security group rules to allow the instance to access to a specified IP address.

- *Scenario 5: Allow remote connection to an ECS instance*

  Scenario example: You can remotely connect to an instance through a public or endogenous network to manage the instance.

- *Scenario 6: Allow access to an ECS instance over HTTP or HTTPS service*

  Example: If you build a website on your instance, you can configure security group rules to enable your users to access the website.

Scenario 1: Enable intranet communication

Security group rules can be used to enable intranet communication between ECS instances that belong to different accounts or security groups in the same region: There are two cases:

- Case 1: Instances belong to one region and one account
- Case 2: Instances belong to one region but different accounts

Note:

For VPC-Connected ECS instances, If they are in one VPC, you can *configure their security group rules to enable intranet communication*.

Case 1: Instances belong to one region and one account

For two instances in one region but owned by one account, if they are in one security group, intranet communication is enabled by default. If they are in different security groups, you must configure security group rules to enable intranet communication according to the network types.

- VPC: If they are in one VPC, add a rule in their security groups respectively to authorize the security groups to access each other. The rule must be as follows.

NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Priority	Authorization Type	Authorization Object
N/A	Inbound	Allow	Select the required protocol	Set the required port range	1	Security Group Access (Authorize This Account)	Type the other security group ID

- Classic network: Add a rule in their security groups respectively to authorize the security groups to access each other. The rule must be as follows.

Network Type	NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Priority	Authorization Type	Authorization Object
Classic network	Intranet	Inbound	Allow	Select the required protocol	Set the required port range	1	Security Group Access (Authorize This Account)	Type the other security group ID

Case 2: Instances belong to one region but different accounts

For classic network-connected ECS instances only.

Authorize the security groups to access each other. For example:

- UserA owns a classic network-connected ECS instance in the East China 1 region, named InstanceA, with the private IP address A.A.A.A. The security group is GroupA.
- UserB owns a classic network-connected ECS instance in the East China 1 region, named InstanceB, with the private IP address B.B.B.B. The security group is GroupB.
- Add a rule in GroupA to authorize access of InstanceA to InstanceB, as shown in the following table.

NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority
Intranet	Inbound	Allow	Select the required protocol	Set the required port range	Security Group Access (Authorize Other Account)	Type the 账号**ID** of UserB and the security group ID of GroupB	1

- Add a rule in GroupB to authorize access of InstanceB to InstanceA, as shown in the following table.

NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority
Intranet	Inbound	Allow	Select the required protocol	Set the required port range	Security Group Access (Authorize Other Account)	Type the **account ID** of UserA and the security group ID of GroupA	1

Note:

To guarantee the security of your instances, when you are configuring an intranet inbound rule for a classic network-connected security group, **Security Group Access** is the top priority for Authorization Type. If you select **Address Field Access**, you must enter an IP address with CIDR prefix, “/32”, in the format of `a.b.c.d/32`. Only IPv4 is supported.

Scenario 2: Allow remote connection from a specified IP address only

If you want to allow remote connection to your instance from the specified public IP addresses, add the following rule. In this example, we allow remote connection to an instance on TCP Port 22 from a specified IP address.

- If you want to deny access to all instance ports for a specific Internet IP address segment, add the security group rules shown in the following table:

Network type	NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority

VPC	N/A	Inbound	Deny	All	-1/-1	Address segment access	The IP address segment to be blocked in CIDR format, such as. b. c. d/27. For a CIDR format introduction, see the *ECS instance subnet partition and mask representation method*.	1
Classic Network	Internet							

- If you want to deny access to a specific IP address segment to an ECS-specific port, such as a TCP 22 port, add the following security group rules:

Network Type	NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Authorization Type	Authorization Object	Priority
VPC	Do not need to set	Inbound	Deny	SSH (22)	22/22	Address segment access	The IP address segment to be blocked in CIDR format, such as. b. c. d/27. For a CIDR format	1
Classic Network	Internet							

							introduction, see the *ECS instance subnet partition and mask representation method*.	

Scenario 3: Allow remote connection from a specified IP address only

If you want to allow remote connection to your instance from the specified public IP addresses, add the following rule. In this example, we allow remote connection to an instance on TCP Port 22 from a specified IP address.

1. Allow specific IP addresses to access the TCP 22 port with priority 1, highest priority, and first execution. Security group rules are shown in the following table.

Network type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Inbound	Allow	SSH (22)	22/22	Address Field Access	The IP address to allow access, such as 1.2.3.4.	1
Classic network	Internet							

2. Deny other IP addresses access to TCP 22 ports with a priority of 2 and a lower priority of 1. Security group rules are shown in the following table.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Inbound	Deny	SSH (22)	22/22	Address segment access	0.5.0.0/0	2
Classic Network	Internet							

After the settings have been completed:

- When you remotely connect to a Linux instance using a computer with an IP address of 1.2.3.4 , it means the connection succeeds.
- When the computer with a different IP address connects to the Linux instance remotely, it fails.

Scenario 4: Allow an instance to access a specified IP address only

If you want your instance to access a specified IP address, add the following rules in its security group.

1. If you want to prohibit the instance from accessing all public network IP addresses with any protocol, the priority should be less than the rule that allows access (such as set priority to 2 in this example). Security Group rules are shown in the following table.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Outbound	Drop	All	-1/-1	Address Field Access	0.0.0.0/0	2
Classic	Internet							

2. Add the following rule to allow access to the specified IP address, with a higher priority than that in step 1.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Outbound	Allow	Select the required protocol	Set the required port range	Address Field Access	Type the specified IP address , such as 1.2.3.4	1
Classic network	Internet							

After you add the rules, connect to the instance and try to `ping` or `telnet` the instance from the specified IP address and other IP addresses to test the configuration. If the instance can be accessed by the specified IP address, it means the rules work.

Scenario 5: Allow remote connection to an ECS instance

You may want to connect to your instance in the following cases:

- Case 1: Allow remote connection to your instance from Internet
- Case 2: Allow remote connection to your instance from intranet

Case 1: Allow remote connection to your instance from Internet

To allow remote connection to your instance from Internet, add the following rule according to the network type and the operating system of your instance.

- VPC

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Inbound	Allow	Windows: RDP (3389)	3389/3389	Address Field Access	To allow Internet access from any public IP address, type 0.0.0.0/0. To allow Internet access from a specified Internet IP address, see *Scenario 3: Allow remote connection from a specified IP address only*.	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customize			

- Classic network

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority

Classic Network	Internet	Direction of entry	Allow	Windows: RDP (3389)	3389/3389	Address field access	To allow Internet access from any public IP address, type 0.0.0.0/0. To allow Internet access from a specified Internet IP address, see *Scenario 3: Allow remote connection from a specified IP address only*.	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customized			

To customize the port for remote connection, see *Modify the default remote access port*.

Case 2: Allow remote connection to your instance from intranet

If you have enabled intranet communication between instances that belong to one region but different accounts, and you want to allow the instances in different security groups to connect to each other, add the following rules as needed.

- To allow a private IP address to connect to an instance.
  - VPC: Make sure that intranet communication has been built between both accounts by using Express Connect, and then add any one of the following rule.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority

VPC	N/A	Inbound	Allow	Windows: RDP (3389)	3389/3389	Address field access	Specify the private IP address of the peer instance	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customized			

- Classic network: Add any one of the following rules.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
Classic Network	Intranet	Inbound	Allow	Windows: RDP (3389)	3389/3389	Address field access	Specify the private IP address of the peer instance. To secure the instance, only an IP address with CIDR prefix, “/32”, in the format of a.b.c.d/32, is allowed.	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customized			

- To allow all the instances in a security group of another account to connect to your instance:
  - VPC: Make sure that intranet communication is built between both accounts by using *### VPC##*, and then add any one of the following rules.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Inbound	Allow	Windows: RDP (3389)	3389/3389	Security Group Access (Authorize Other Account)	Type the account ID of the peer and the security group ID	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customized			

- Classic network: Add any one of the following rules.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
Classic Network	Intranet	Inbound	Allow	Windows: RDP (3389)	3389/3389	Security Group Access (Authorize Other Account)	Type the account ID of the peer and the security group ID	1
				Linux: SSH (22)	22/22			
				Custom TCP	Customized			

Scenario 6: Allow access to an ECS instance over HTTP or HTTPS service

If you have built a website on your instance and expect your users to visit the site over HTTP or HTTPS service, add any one of the following rules.

- VPC: To allow all public IP addresses to access your site, add any one of the following rules.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
VPC	N/A	Inbound	Allow	HTTP (80)	80/80	Address field access	0.5.0.0/0	1
				HTTPS, 443)	443/443			

				Custom TCP	Custom, like 8080/8080			

- Classic network: To allow all public IP addresses to access your site, add any one of the following rules.

Network Type	NIC	Rule direction	Authorization Policy	Protocol Type	Port range	Authorization type	Authorization object	Priority
Classic Network	Public Network	Inbound	Allow	HTTP (80)	80/80	Address field access	0.5.0.0/0	1
				HTTPS, 443)	443/443			
				Custom TCP	Custom, like 8080/8080			

Note:

- If your users cannot access your instance by using `http://Public IP address`, *verify if TCP port 80 works properly*.
- TCP Port 80 is the default port for HTTP service. If you want to use other ports, suc as 8080, you must modify the port in the configuration file of the Web server. For more information, see *Modify listening address of nginx/Tomcat* or *Modify the listening IP addess of ECS Windows Servers*

9.3 Default security group rules

This article introduces the default rules in the default security groups created manually or automatically.

Note:

Security groups are stateful. If an outbound packet is allowed, inbound packets corresponding to this connection are also allowed. For more information about security groups, see *Security groups*.

Security groups created by the system

When you create an ECS instance in a region where you have not created a security group, use the default one provided by the system.

Such a security group only has the default rules for access over the ICMP protocol, TCP Port 22 (for SSH), TCP Port 3389 (for RDP), TCP Port 80 (for HTTP), and TCP Port 443 (for HTTPS). The default rules vary according to the network type of the security group.

- VPC: The rules apply to Internet and intranet access at the same time. The Internet access of the VPC type instance is realized through the private NIC mapping. So, you cannot see the Internet NIC inside the instance, and you can only set intranet rules in the security group. The security group rules take effect for both the intranet and the Internet. The default rules of the default VPC-Connected security group are shown in the following table.

NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Priority	Authorization Type	Authorization Object
N/A	Inbound	Allow	Custom TCP (SSH)	22/22	110	Address Field Access	0.0.0.0/0
			Custom TCP (RDP)	3389/ 3389			
			All ICMP	-1/-1			
			Custom TCP (HTTP), optional	80/80			
			Custom TCP (HTTPS), optional	443			

- Classic network: The default rules of a classic network-connected security group are shown in the following table.

NIC	Rule Direction	Authorization Policy	Protocol Type	Port Range	Priority	Authorization Type	Authorization Object
Internet	Inbound	Allow	Custom TCP (SSH)	22/22	110	Address Field Access	0.0.0.0/0

			Custom TCP (RDP)	3389/ 3389				
			All ICMP	-1/-1				
			Custom TCP (HTTP), optional	80/80				
			Custom TCP (HTTPS), optional	443				

Note:
Rules with priority 110 means that they have the lowest priority in the security group. When you manually create a security group, only values from 1 to 100 are valid for Priority. For more information about the rule priority, see *Add security group rules*.

To meet your business needs, you can *Add security group rules* in the default security group.

In a manually created security group,

Creating a Security Group before you add rules, the following default rules apply to the communication of all the instances in the group over Internet or intranet:

- Outbound: Allow all for outbound traffic.
- Inbound: Drop all for inbound traffic.

If your instance has joined such a security group, you *Terminal* whether *Connect to a Linux instance by using a password* or *Connect to a Windows instance*.

To meet your business needs, you can *Add security group rules* in the manually created security groups.

9.6 View the security group list

You can view the security groups on the ECS console at any time. To view the security groups list , perform the following:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Security Groups**.

3. Select a region. A list of all the security groups in the specified region will be displayed.
4. You can select VPC ID in the filter input box, and enter a specific VPC ID to search, then all the security groups under this VPC appear.

9.7 Modify security group attributes

You can modify the name and description of a security group at any time. To modify the name and description of a security group, perform the following:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Security Groups**.
3. Select a region to display all all the security groups in this region.
4. Modify attributes of a security group. Two methods are supported:
   - Modify the name: Hover the cursor over the name of a security group, and then click the pen icon that appears.
   - Modify the name and description: Click Modify, and then enter a new name and description in the dialog box.
5. Click **OK**.

9.8 View the rules of a security group

You can view the rules of a security group at any time. To view the rules of a security group, perform the following:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click Networks & Security > **Security Groups**.
3. Select a region.
4. Select a security group, and click **Configure Rules**.
5. The following security group rule tabs will be displayed for Classic Networks and VPCs:
   - For VPCs, Inbound and Outbound can be seen.
   - For Classic networks, Internet Inbound , Internet Outbound, Intranet Inbound and Intranet Outbound can be seen.
6. Click a tab to view the security group rules for that type.

9.9 Delete a security group rule

You can delete security group rules if you no longer need them. To delete rules in a security group , perform the following:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Security Groups**.
3. Select a region.
4. Find the security group where you want to delete rules, and in the **Action** column, click **Configure Rules**.
5. On the security group management page, choose the rule direction and find the rule you want to delete.
   - f the security group is for Classic network, the rule directions are Internet Inbound, Internet Outbound, Intranet Inbound, and Intranet Outbound.
   - If the security group is for VPC network, the rule directions are Inbound and Outbound.
6. In the **Action** column, click **Delete**.
7. On **Delete Security Group Rules** dialog box, read and confirm the notes, and then click **OK**.

You have successfully deleted a security group rule.

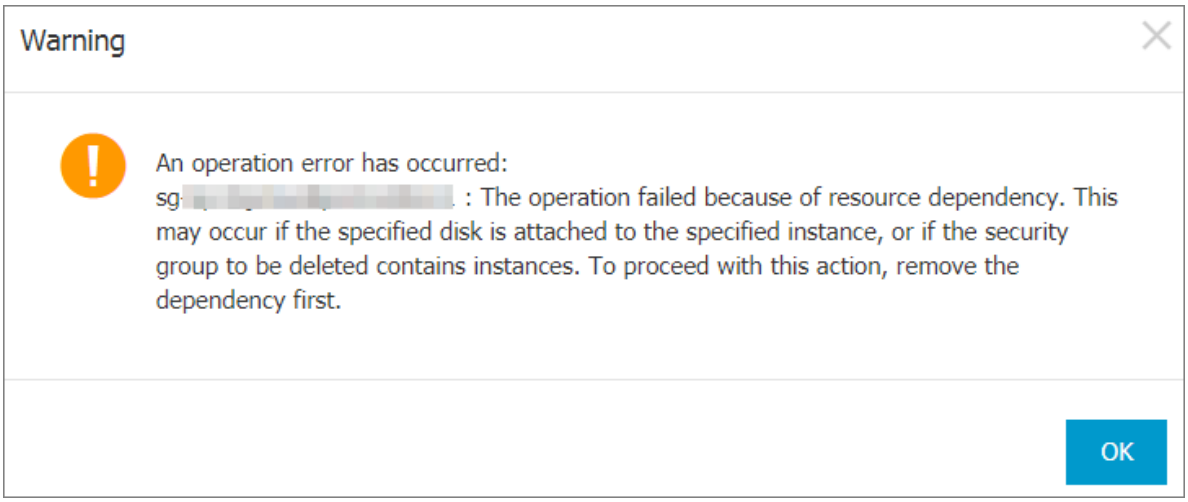
9.10 Delete a security group

You can delete security groups, if you no longer require them. Deleting a security group will delete all its rules.

Note:

Deleting a security group must meet the following conditions:

- There are no ECS instances in the security group. About how to move the ECS instance out of the security group, see *Add to or remove from a security group*.
- Ensure it is not referenced in the rules of another security group *Add security group rules*. You can delete a security group directly by following the steps described in this document, if the security group is authorized by another security group, you will see the error message shown in the following figure. Delete the corresponding authorization rule.



Procedure

To delete a security group, follow these steps:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, click **Networks & Security** > **Security Groups**.
3. Select a region to display a list of all the security groups in the region.
4. Select one or more security groups. Click **Delete**.
5. In the displayed **Delete a security group** dialog box, click **OK**.

Related API

- Delete a security group: *DeleteSecurityGroup*
- To query authorization relationships between a security group and another security group: *DescribeSecurityGroupReferences*
- Move the ECS instance out of the security group: *LeaveSecurityGroup*

9.11 Clone a security group

Alibaba Cloud supports cloning a security group across regions and network types.

Scenarios

You may need to clone a security group in the following scenarios:

- You have created a security group, named SG1, in Region A, and you want to apply the same rules of SG1 to ECS instances in Region B. Then you can clone SG1 to Region B without creating a new security group in Region B.
- You have a security group in Classic network, named SG2. You want to apply the rules of SG2 to instances in a VPC. You can clone SG2 and choose VPC as the network type when

configuring the cloning. Then in VPC network, you have a new security group that has same rules with SG2.

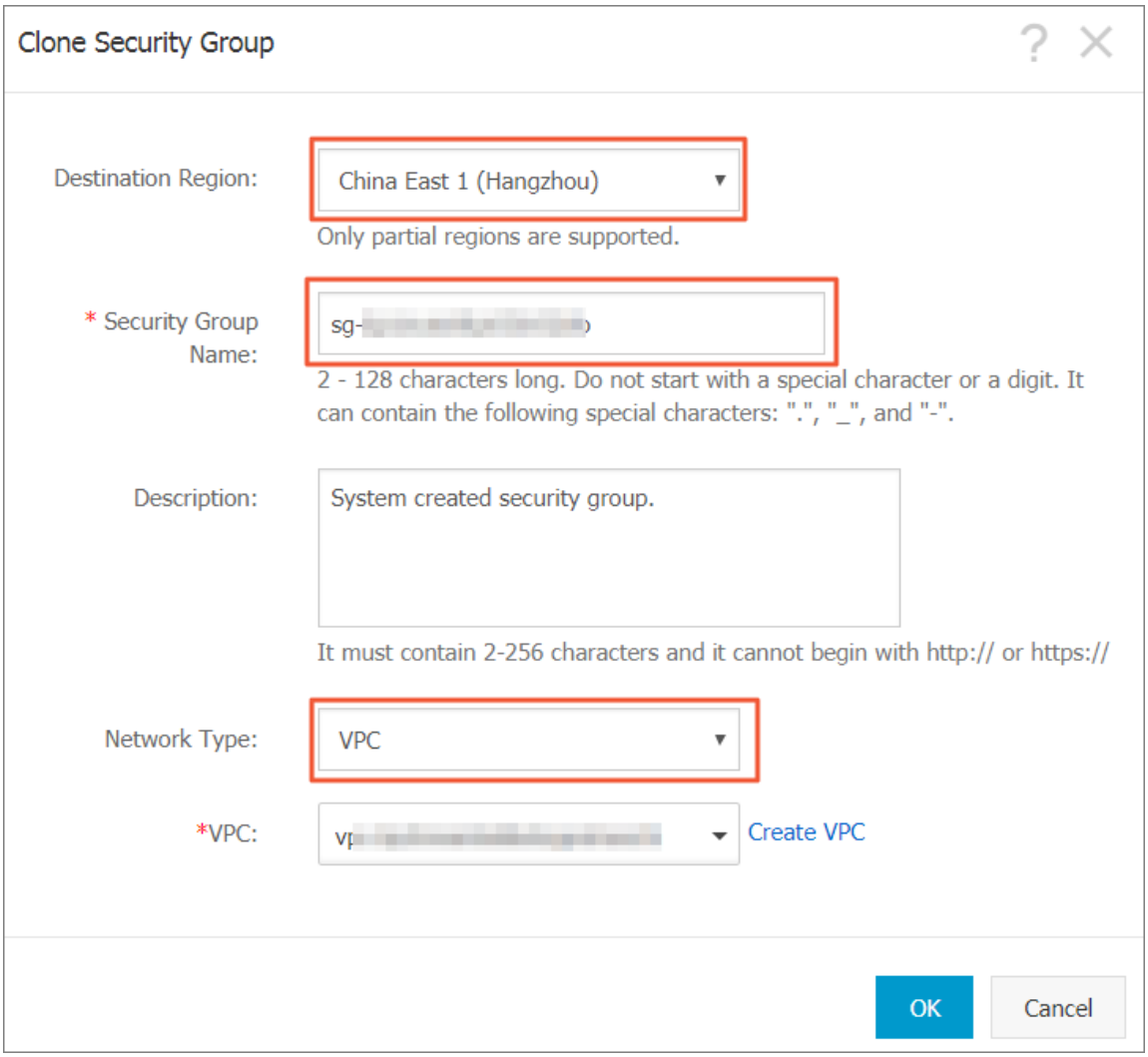
- If you want to apply new security group rules to an ECS instance that are running an online business application, we recommend that you clone the security group as a backup before modifying the rules. If the new security group rules are disadvantageous to the online business application, you can restore the rules completely or partly.

Prerequisite

If you want to change the network type of a security group from Classic to VPC, you have to *create a VPC and VSwitch* in the target region first.

Procedure

1. Log on to the *ECS console*.
2. In the left-side navigation pane, choose **Security Groups**.
3. Select a region.
4. Find the target security group, and in the **Action** column, click **Clone Security Group**.
5. In the **Clone Security Group** dialog box, set the new security group information:
   - **Destination Region**: Select a region suitable for the new security group. Not all regions are supported now. The supported regions are displayed in the drop-down list.
   - **Security Group Name**: Specify a new name for the new security group.
   - **Network Type**: Select a network type suitable for the new security group. If VPC is selected, you have to choose one VPC in the drop-down list.



6. Click **OK**.

Upon successful creation, the **Clone Security Group** dialog box closes automatically. The new security group is displayed in the **Security Group List** You see the new security group there.

9.12 Introduction to common ECS instance ports

The following is a list of commonly used ECS instance ports:

Port	Service	Description
21	FTP	A port opened by the FTP service is used for uploading and downloading files.
22	SSH	An SSH port is used to pass through command-line mode *Connect to a Linux instance by using a password*.

23	Telnet	The telnet port is used for telnet to log on to the ECS instance.
25	SMTP	The port that is open to the SMTP service is used for sending mail. Based on security concerns, ECS instance 25 Port is restricted by default. Please submit a job request to unseal. See *request to unseal TCP 25 Port* .
80	HTTP	Provides access to HTTP services, such as IIS, Apache, and Nginx. You can see *Check if the TCP 80 port is working* for port troubleshooting.
110	POP3	Used for the POP3 protocol , POP3 is the protocol for sending and receiving emails.
143	IMAP	Used for IMAP (Internet Message Access Protocol) protocol, IMAP is the protocol for receiving emails.
443	HTTPS	Used to provide access to the HTTPS service. HTTPS is a protocol that provides encryption and transmission through secure ports.
1433	SQL Server	The TCP port of the SQL Server is used to serve the SQL Server out-of-the-box.
1434	SQL Server	SQL Server's UDP port used to return which TCP/IP port SQL Server uses
1521	Oracle	Oracle communications port, the port on the ECS instance where Oracle SQL needs to be released.

3306	MySQL	The port on which the MySQL database provides services to the outside world.
3389	Windows Server Remote Desktop Services	Windows Server Remote Desktop Services port can be used through *Connect to a Windows instance*.
8080	Proxy port	As with 80 port, port 8080 is commonly used in WWW agent service to achieve web browsing. If you are using port 8080, when you visit a Web site or use a proxy server, you need to add `:8080` after the IP Address: 8080. After you install the Apache Tomcat service, the default service port is 8080.
137, 138, 139	NetBIOS protocol	• 137 and 138 are UDP ports that are used when transferring files through a network neighbor. • 139 the connection entered through this port attempts to obtain the NetBIOS/smb service. NetBIOS protocols are often used for Windows files, printer sharing, and samba.

Some ports cannot be accessed

Phenomenon: the ECS instance listens for the corresponding port, but the port is not accessible in some areas, while other ports access normal conditions.

Analysis: some operators judge ports 135, 139, 444, 445, 5800, 5900, and so on as high-risk ports , the default is blocked.

Workaround: It is recommended that you modify the sensitive port to host the business for other non-high-risk ports.

Reference Links

- More about Windows instance service port instructions, refer to the *Microsoft documentation Windows Server System Service overview and network port requirements*.
- About how to release a service port through a security group, see *Add security group rules*.

9.13 Restore security group rules

Restoring security group rules refers to the process of completely or partially restoring the rules in the original security group to those of a target security group. Specifically:

- **Completely restoring** refers to moving the rules that do not exist in the target security group from the original security group and adding the rules that only exist in the target security group to the original security group. After restoration, rules in the original security group are identical with those in the target security group.
- **Partially restoring** refers to adding the rules that only exist in the target security group to the original security group and ignoring the rules that only exist in the original group.

Limits

Restoring security group rules has the following limits:

- The original security group and the target security group must be in the same region.
- The original security group and the target security group must be of the same network type.
- If any system-level security group rules, of which the priority is 110, exist in the target security group, they are not created during restoration. After restoration, the rules in the original security group may be different from what is expected. If you need the system-level security group rules, you have to manually create the rules and set their priority to 100.

Use cases

If you want to apply new security group rules to an ECS instance that is running an online business application, you can clone the former security group as a backup, and then modify the rules inside. If the new security group rules impair the online business application, you can restore the rules fully or partially.

Prerequisites

You must own at least one security group of the same network type in the same region.

Procedure

1. Log on to the *ECS console* .

2. In the left-side navigation pane, choose **Network & Security** > **Security Groups**.
3. Select a region.
4. Find the security group you want to restore rules for as the original security group, and in the **Action** column, click **Restore rules**.
5. In the **Restore rules** dialog box, follow these steps:
   a. Select the **Target security group**: Select a security group as the target security group that must have different rules from the original security group.
   b. Select a **Restore type**:
      - If you want the original security group to have the same rules as the target security group, select **Completely restored**.
      - If you only want to add the rules that only exist in the target security group to the original security group, select **Partially restored**.
   c. In the Result preview area, preview the restoration result:
      - Rules highlighted in green only exist in the target security group. No matter whether you choose **Completely restored** or **Partially restored**, these rules are added to the original security group.
      - Rules highlighted in red are the rules that do not exist in the target security group. If **Completely restored** is selected, the system removes these rules from the original security group. If **Partially restored** is selected, the rules are retained in the original security group.
   d. Click **OK**.

The **Restore rules** dialog box is closed automatically after successful creation. In the **Security Group List** find the original security group you restored the rules for. In the **Action** column, click **Configure Rules** to enter the **Security Group Rules** page, and view the updated security group rules.

10 Key pairs

10.2 Import an SSH key pair

If you prefer to use another key generation tool, you can use it to generate an RSA key pair and then import its public key into Alibaba Cloud. See *SSH key pairs* for the supported types of imported key pairs.

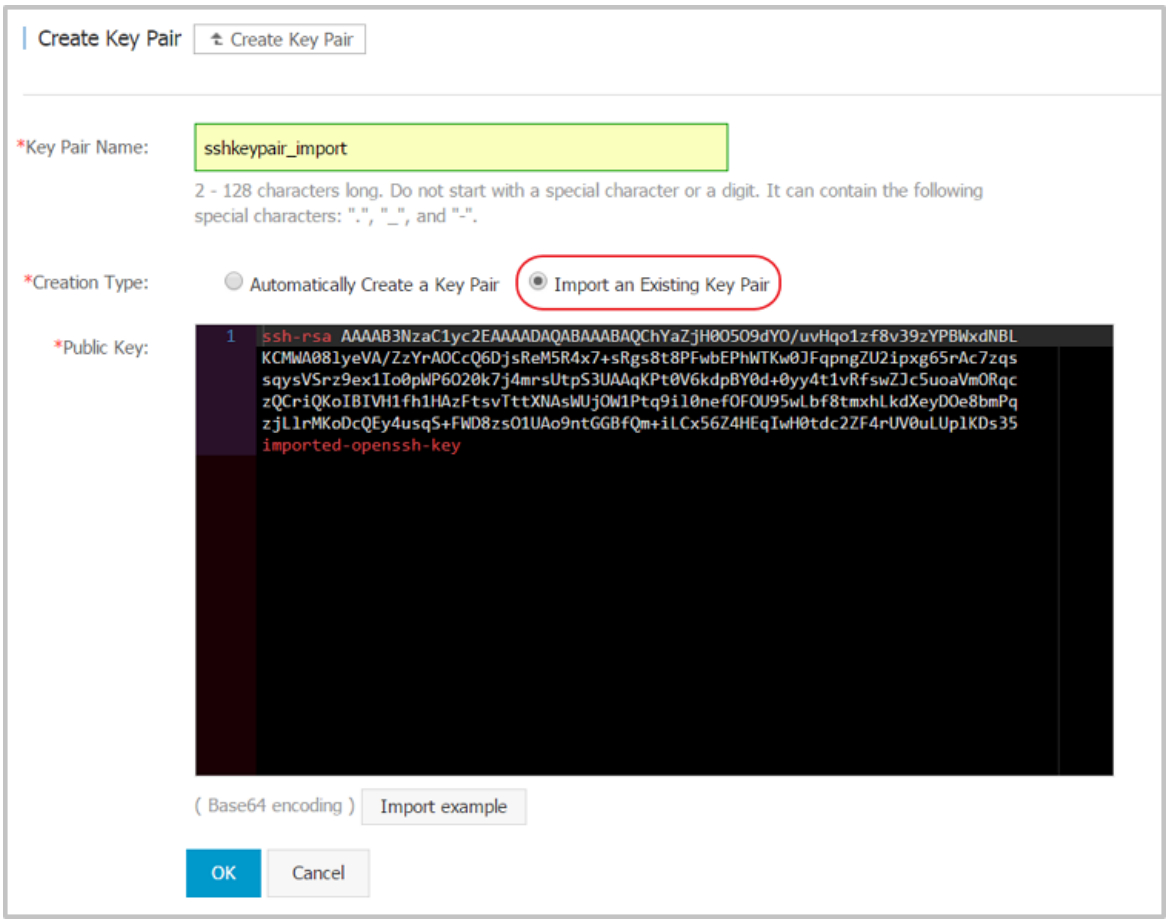
Note:
To guarantee your instance security, keep the private key of the key pair secure and do not import the private key to Alibaba Cloud.

To import an SSH key pair, you must have a key pair that has been generated using another tool. The public key to be imported into Alibaba Cloud must be Base64-encoded.

To import an SSH key pair, follow these steps.

1. Log on to the *ECS console*.
2. On the **Key Pair** page, click **Create Key Pair**.
3. Select a region.
4. On the **Create Key Pair** page, enter a name for the key pair, and select **Import an Existing Key Pair**. **And then, Enter the public key** Enter the public key.

   Note:
   The specified key pair name must not be the same with that of an existing key pair or a key pair that was deleted when it was still bound to an instance. Otherwise, an error message “The key pair already exists.” will appear.



5. Click **OK**.

After creation, you can view the information, including **Key Pair Name** and **Key Pair Fingerprint**, in the key pair list.

11 Cloud assistant

12 Elastic Network Interfaces

12.1 Attach an ENI when creating an instance

You can attach an ENI when creating an ECS instance in the ECS console. For more informatio n about instance creation, see Create an ECS Instance. This document focuses on notes for attaching an ENI during ECS instance creation.

We recommend that you consider the following items when attaching an ENI during ECS instance creation:

1. Basic Configurations:
   - Region: elastic network cards are supported in all regions.
   - Instance Type: Select an instance type that supports ENI. The selected instance type must be I/O optimized. For more information, see Instance type families.
   - Image: Only the following images can automatically recognize ENIs without any additional configuration.
     - Centos 7.3 64-bit
     - Centos 6.8 64-bit
     - Windows Server 2016 Data Center Edition 64-bit
     - Windows Server 2012 R2 Data Center Edition 64-bit

     For other images, you must configure ENI to enable the created instance to recognize the ENI.
2. Networking:
   - Network: Select VPC, and then select a VPC and a VSwitch.
   - Elastic Network Interface: Click Add ENI to attach an ENI, and then select the VSwitch for the ENI.

   Note:

   You are only allowed to attach a maximum of two ENIs when creating an instance in the console. One of them is the primary network interface, which is attached automatically, and the other one is a secondary network interface.

   - After the instance is started, you can attach more secondary network interfaces to the instance based on the instance type in the console or

- by using the *AttachNetworkInterface* API.

If you want to keep the secondary network interface that is created in this way, detach it from the instance before you release the instance.

12.7 Configure an ENI

If your instance is running one of the following images, you do not have to configure the Elastic Network Interfaces (ENI) manually to have them recognized by the OS.

- Centos 7.3 64-bit
- Centos 6.8 64-bit
- 64-bit Windows Server 2016 data center Edition
- Windows Server 2012 R2 Data Center Edition 64-bit64-bit Windows Server 2012 R2 data center Edition

If your instance is running none of the preceding images, and you want to attach an ENI to your instance, you must manually configure the ENI to be recognizable.If your instance does not use these images, however, if you want to attach a flexible network card to an instance, You need to manually configure the elastic network card. This document uses an instance running CentOS 7.2 64-bit as an example to introduce how to configure an ENI to make the interface recognizable.

Prerequisite

You have attached an elastic network card to an ECS instance.

Procedure

To configure the ENI, follow these steps:

1. Use the *DescribeNetworkInterfaces* interface or log on to the ECS console to obtain the following attributes of the ENI: primary private IP address, subnet mask, the default route, and the MAC address. To obtain these attributes in the ECS console, follow these steps: MAC address. Do the following on the console.
   a. Log on to the *ECS Management Console*.
   b. Find a network interface, and obtain its primary private IP address, subnet mask, default route, and MAC address.Locate the primary private IP address, mask address, default route, MAC for each network cardAddress. Example

```
eth1 10.0.0.20/24 10.0.0.253 00: 16: 12: E7: 27
```

```
eth2 10.0.0.21/24 10.0.0.253 00: 16: 12: 16: EC
```

2. *Connect to the ECS Instance*.
3. Run the command to generate the confic`at /etc/sysconfig/network-scripts/ifcfg-[network interface name in the OS]`.

Note:

- Pay attention to the relation between network interface name in the OS and the MAC address.
- Pay attention to the relation between network interface name in the OS and the MAC address. The default route must be set to `DEFROUTE=no` . Other editions must have the same configuration. Note that running the `ifup` command may change the active default route configuration after configuring the network interface.
- Example:

```
# cat /etc/sysconfig/network-scripts/ifcfg-eth1
DEVICE=eth1
BOOTPROTO=dhcp
ONBOOT=yes
TYPE=Ethernet
USERCTL=yes
PEERDNS=no
IPV6INIT = No
PERSISTENT_DHCLIENT = Yes
HWADDR=00:16:3e:12:e7:27
DEFROUTE=noDefroute = No
```

4. Follow these steps to start the network interface:

   a. Run the `ifup [network interface name in the OS]` command to start the dhclient process, and initiate a DHCP request. Example

```
# ifup eth1
# ifup eth2
```

   b. After a response is received, run the `ip a` a command to check the IP allocation on the network interfaces, which must match with the information displayed on the ECS console. Example:

```
# ip a
1: lo: mtu 65536 qdisc noqueue state UNKNOWN qlen 1
link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host loInet 125.0.0.1/8 Scope host Lo
valid_lft forever preferred_lft forever
```

```
2: eth0: mtu 1500 qdisc pfifo_fast state UP qlen 10002: eth0: MTU
1500 qdisc glasstate up qlen 1000
link/ether 00:16:3e:0e:16:21 brd ff:ff:ff:ff:ff:ff
Inet 10.0.0.19/24 BRD glasscope Global Dynamic eth0
valid_lft 31506157sec preferred_lft 31506157secValid_lft
31506157sec preferred_lft 31506157sec
3: eth1: MTU 1500 qdisc glasstate up qlen 1000
link/ether 00:16:3e:12:e7:27 brd ff:ff:ff:ff:ff:ff
inet 10.0.0.20/24 brd 10.0.0.255 scope global dynamic eth1Inet 10.
0.0.20/24 BRD glasscope Global Dynamic eth1
Valid_lft 31525994sec preferred_lft 31525994sec
4: eth2: MTU 1500 qdisc glasstate up qlen 1000
Link/ether 00: 16: Rye: 12: 16: ec brd ff: FF: FF
inet 10.0.0.21/24 brd 10.0.0.255 scope global dynamic eth2
valid_lft 31526009sec preferred_lft 31526009sec
```

5. Set the metric for each network interface in the route table. In this example, set the metric parameters of eth1 and eth2 as follows.

```
eth1: gw: 10.0.0.253 metric: 1001
eth2: gw: 10.0.0.253 metric: 1002
```

   a. Run the following command to set the metric parameters.

```
# Ip-4 route add default via glasdev eth1 metric 1001
# ip -4 route add default via 10.0.0.253 dev eth2 metric 1002
```

   b. Run the`route -n` command to check whether the configuration is successful or not.

   Example:

```
# route -n
Kernel IP routing table
Destination Gateway Genmask Flags Metric Ref Use Iface
0.0.0.0 10.0.0.253 0.0.0.0 UG 0 0 0 eth0
0.0.0.0 10.0.0.253 0.0.0.0 UG 1001 0 0 eth1
0.5.0.0 10.0.0.253 ug ub1002 0 0 eth2
10.0.0.0 0.5.0.0 255.25.25.0 u 0 0 0 eth0
10.0.0.0 0.0.0.0 255.255.255.0 U 0 0 0 eth1
10.0.0.0 0.5.0.0 255.25.25.0 u 0 0 0 eth2
169.254.0.0 0.0.0 255.0.0 U 1002 0 0 eth0
169.254.0.0 0.0.0.0 255.255.0.0 U 1003 0 0 eth1
169.254.0.0 0.0.0.0 255.255.0.0 U 1004 0 0 eth2169.254.0.0 0.0.0
255.0.0 U 1004 0 0 eth2
```

6. Follow these steps to build a route table:

Note:

We recommend that you use the metric value as the route table name.

   a. Run the command to build a route table.

```
# ip -4 route add default via 10.0.0.253 dev eth1 table 1001
# Ip-4 route add default via glasdev eth2 table 1002
```

b. Run the command to check whether the route table is built successfully or not.

```
# ip route list table 1001
default via 10.0.0.253 dev eth1
# ip route list table 1002
default via 10.0.0.253 dev eth2
```

7. Configure policy routing.

a. Run the following command .

```
# ip -4 rule add from 10.0.0.20 lookup 1001
# ip -4 rule add from 10.0.0.21 lookup 1002
```

b. 运行命令 `ip rule list` View routing rules.

```
# ip rule list
0: from all lookup local
32764: from 10.0.0.21 lookup 1002
32765: from 10.0.0.20 lookup 1001
32766: from all lookup main
32767: from all lookup default
```

At this point, you have completed the configuration of the elastic network card.

13 Tags

13.1 Limits

You can bind tags to the following resources in the ECS console: ECS instance, storage, snapshot , image, and security group.

Tags have the following limits:

- Each tag has a key-value pair.
- You can bind 20 tags to an instance at most. You can bind 20 tags at most to an instance at a time.
- Every tag key of a resource must be unique. A tag with the same key as an existing one will be overwritten.
- Tag information is not shared across regions. For example, tags created in China East 1 (Hangzhou) are invisible to China East 2 (Shanghai).
- If a tag is unbound and no longer bound to any other resource, the tag will be automatically deleted.

13.2 Add a tag to resources

If your account maintains various types of resources that are associated with each other in different ways, you can bind tags to the resources to categorize and manage the resources in a unified manner.

You can bind 20 tags to a resource at most. You can bind/unbind 20 tags at most for the resource each time.

Take the following steps to bind resources with tags:

1. Log on to the*ECS console*.
2. Select the resource type in the left-side navigation bar for the binding operation, such as Instance, Cloud Disks, Snapshot, Image, and Security Groups.
3. Select a region.
4. Select the resources in the resource list to bind tags.
5. Click Edit Tags at the bottom of the resource list.

Note:

Choose **More** > **Edit Tags at the bottom of the resource list if the selected resources are Instance.** .

6. In the edit label dialog box,
   - If the selected resource has already been created a label, click the existing label, and select the available labels.
   - Click **Create** and set Key and Value if no tags are available for the selected resource: Note when entering:
     - Key is mandatory whereas Value is optional.
     - Key cannot start with aliyun, http://, or https://. The key is case-insensitive and can contain up to 64 characters.
     - Value cannot start with http:// or https://. The value is case-insensitive and can contain up to 128 characters. It can be empty.
     - Any tag Key of a resource must be unique. A tag with the same key as an existing one will be overwritten.
     - Available Tags and Create are grayed out if the selected resources are already bound with 20 tags. You need to unbind some tags before binding new tags.
7. Click **Confirm**.

To check if tags are successfully bound, use the Edit Tags function of the resource or click Tags in the left-side navigation bar of the ECS console. You can click Tags with a tag symbol at the top of the resource list to filter resources.

13.3 Delete a tag

You can unbind a tag from the resource if the tag is no longer applicable to resource management . After a tag is unbound and is no longer bound to any other resource, the tag will be automatically deleted.

- The Delete Tags function unbinds one or more tags from an instance at a time.

  Note:
  Currently, this function is only available for instances. It is unavailable for other resource types.

- The Edit Tags function unbinds tags one by one.

  Note:
  You can unbind 20 tags from a resource each time.

Unbind tags from instances using the tag deletion function

Currently, the Delete Tags function is only available for instances.

See the following steps to delete tags:

1. Log on to the *ECS console*.
2. Click Instance in the left-side navigation pane.
3. Select a region.
4. Select the instance(s) from which you want to unbind tags in the instance list.

> **Note:**
> You can also filter instances by tag and select the expected instance.

5. Choose **More** > **Delete Tags**.
6. In the **Delete Tags** dialog box, enter the **Tag Key** of the tags you want to unbind.
7. Click **OK** to complete tag unbinding.

To check whether the tags are successfully unbound, use the Edit Tags function of the instance or click Tags in the left-side navigation pane of the ECS console.

Unbind tags from resources using the tag edit function

The Edit Tags function unbinds one or more tags from a resource.

See the following steps to unbind tags:

1. Log on to the *ECS console*.
2. In the left-side navigation pane, select the resource type for the unbinding operation, such as Instance, Cloud Disks, Snapshots, Images, or Security Groups.

> **Note:**
> The block storage function is now in beta. For more information, see *block storage FAQ* Learn more.

3. Select a region.
4. In the resource list, select the resource from which you want to unbind tags.

> **Note:**
> You can also filter resources by tag and select the expected resource.

5. Click **Edit Tags** at the bottom of the resource list.

6. In the **Edit Tags** dialog box, click the deletion icon next to a tag.
7. Click **Confirm** to complete tag unbinding.

To check whether the tags are successfully unbound, use the Edit Tags function of the resource or click **Tags** in the left-side navigation pane of the ECS console.

13.4 Filter resources by tags

After you bind the tags to the resources, use any of the following methods to filter resources by tags.

Filter resources in resource lists

See the following steps to filter resources:

1. Log on to *ECS console*.
2. In the left-side navigation pane, select the resource type you want to view, such as Instances, Cloud Disks, Snapshots, Images, or Security Groups.
3. Select a region.
4. Click **Tag** at the top of the resource list.
   - Click a key to filter out the resources that are bound with this key, which may have multiple values.
   - Click a key and value to filter out the resources that are bound with this key-value pair (tag).

The console returns a list of resources that are bound with the key or a key-value pair.

Filter resources by tags

See the following steps to filter resources:

1. Log on to *ECS console*.
2. Click **Tags** in the left-side navigation pane.
3. Select a region.
4. Enter a key in the search box and click **Search**.

The console returns a list of resources that are bound with the key.

14 Monitoring

14.1 Monitor

You can monitor the operating statuses of instances to ensure optimal performance.

You can monitor the status of instances using the following two portals:

- Instance Details page
- CloudMonitor

Monitor the status of an instance by using Instance Details page

1. *Log on to the ECS console*.
2. In the left-side navigation pane, click **Instances**. Select a region.
3. Click an instance to go to the Instance Details page.
4. On the **Instance Details** page, you can view the monitoring information, including CPU utilization and outbound/inbound network traffic information.
5.

Note:

- Information about CPU monitoring: For Linux instances, use the top command to view CPU usage details. Log on to the instance and run the top command in the command line.
  - Then, pressShift+P key to list programs by CPU utilization to view which processes are using the most CPU resources.
  - For Windows instances, use the Task Manager on an instance to view the CPU utilization to view which programs are using the CPU resources of the server.
- The displayed monitoring data shows the Internet traffic of the instance in Kbps (1 Mbps = 1, 024 Kbps). The monitoring data shows inbound and outbound instance traffic. For 1 Mbps of bandwidth, the bandwidth is working at full capacity if the outbound network traffic reaches 1, 024 Kbps.

CloudMonitor

1. To install a CloudMonitor, follow these steps:**In the Alibaba Cloud Console, choose Products and Services >** > **CloudMonitor**.
2. In the left-side navigation pane, click Host Monitoring, and then select the name of the instance you want to monitor.
3. Click Install to monitor the operating system of the instance. Click Batch Install to monitor the instance OS, click Monitoring Chart to view basic parameters, and click Alarm Rules to set alarm rules.

For more information about CloudMonitor, see CloudMonitor Product Documentation.

-
-
-

14.3 Console output and screenshot

ECS instances are virtualized cloud-based services that cannot be connected to any display devices and prohibit mobile snapshots. However, the console output of instances are cached at the time of the last startup, restart, or shutdown event. Moreover, you can obtain instance screenshots in real time. We recommend that you can use these features to analyze and troubleshoot instance faults, such as operating system exception diagnosis, abnormal reboots, or unable to connect to instances.

Limits

- Instances running Windows Server image do not allow you to obtain console ouput.
- *Phased-out instance types* do not allow you to obtain instance console ouput or screenshots.
- You cannot obtain console ouput or screenshots for instances created before January 1, 2018.

Prerequisites

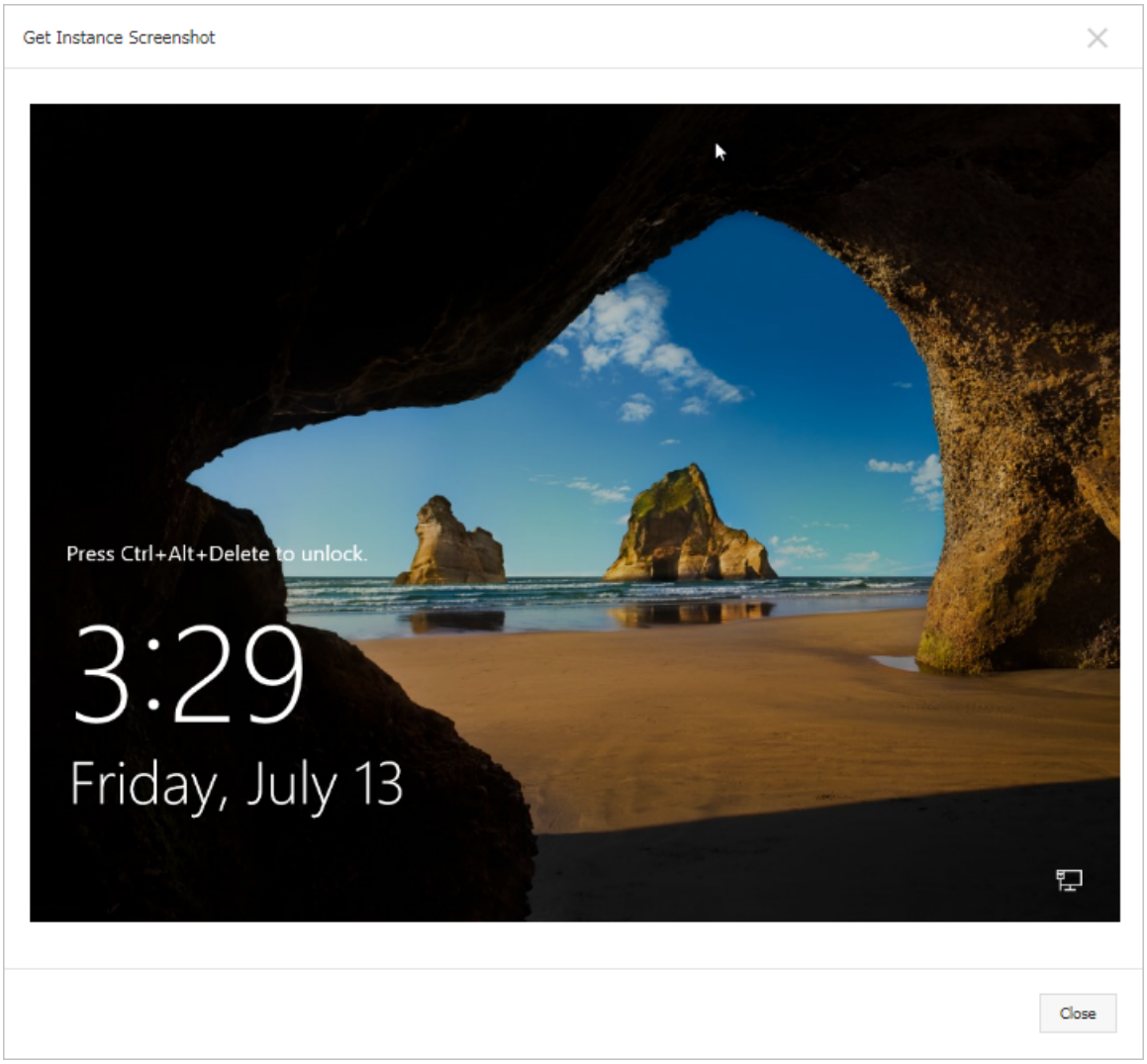
The instance must be in the **Running** (`Running`) status. For more information, see *Overview*.

Procedure

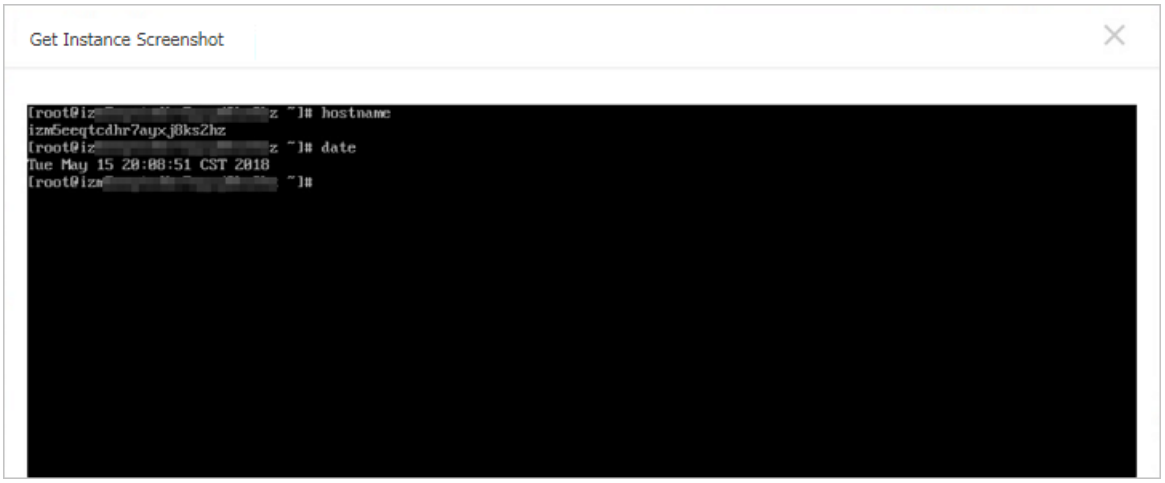
You can view instance console output and screenshot from the Instance Details page, the Instances list page, or by calling API.

Operation in Instance Details page

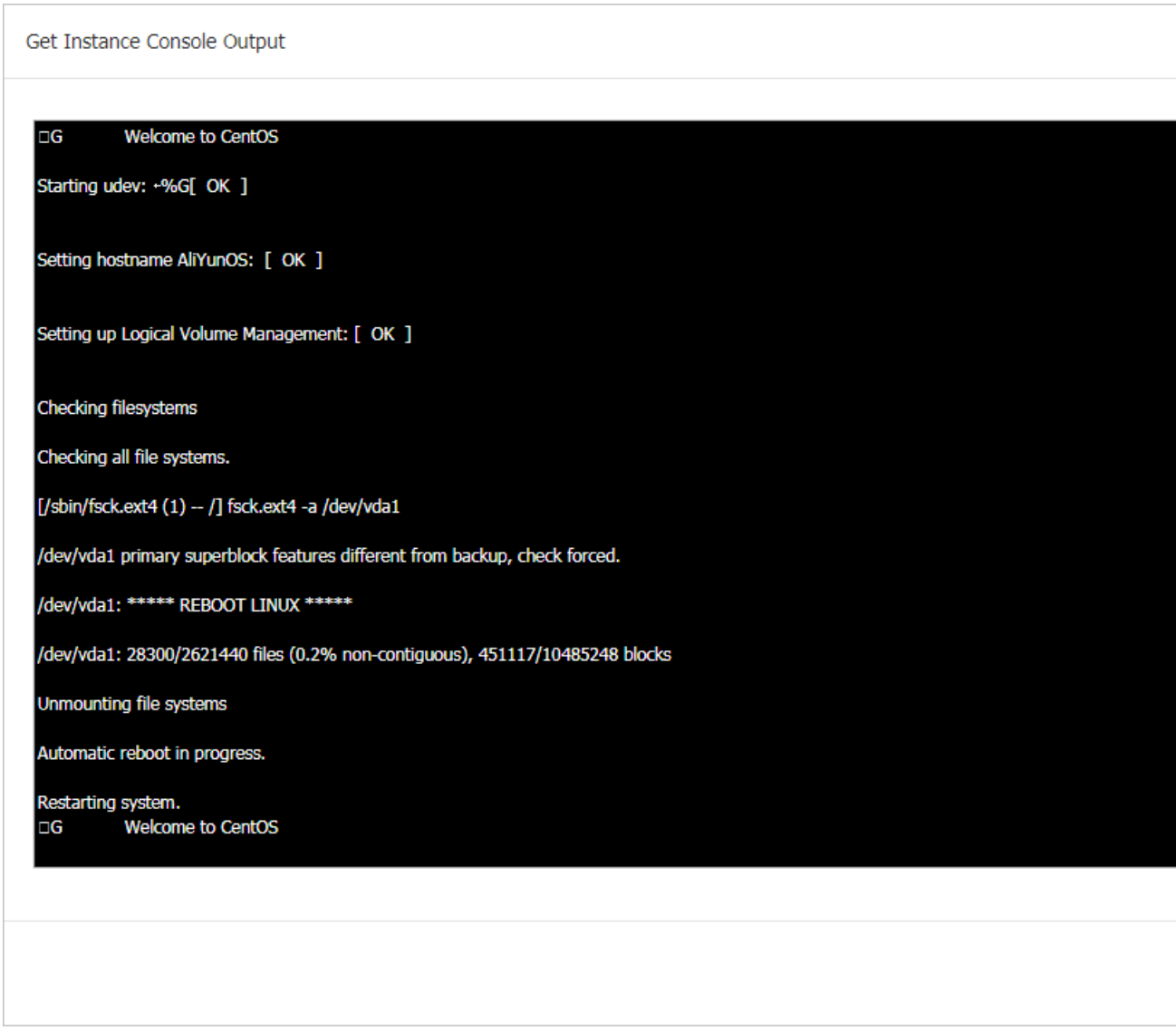
1. Log on to the *ECS Management Console*.
2. In the left-side navigation pane, click **Instances**.
3. Select the **region**.
4. Select and click the instance to troubleshoot and go to the **Instance Details** page.
5. Click **More** > **Get Instance Screenshot** to view the screenshot. Alternatively, click **More** > **Get Instance Console Output** to monitor the root console.
6. Check the instance screenshot or console output.
   - Windows instance screenshot sample:



- Linux instance screenshot sample:



- Linux instance console output sample:



Operation in Instances list page

1. Log on to the *ECS Management Console*.
2. In the left-side navigation pane, click **Instances**.
3. Select the **region**.
4. Locate the instance to troubleshoot and move to the **Actions** column.
5. Click **More** > **Operations and Troubleshooting** > **Get Instance Screenshot** to view the screenshot. Alternatively, click **More** > **Operations and Troubleshooting** > **Get Instance Console Output** to monitor the root console.
6. Check the instance screenshot or console output.

API operations

- Instance screenshots: *GetInstanceScreenshot*

- Instance console output: *GetInstanceConsoleOutput*

Next step

For other troubleshooting instructions, see .

- *Unable to connect Windows instances*
- *Unable to connect to Linux instances*