Alibaba Cloud
Elastic Compute Service

Images

Issue: 20190718

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Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 Danger: Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 Warning: Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 Notice: Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 Note: You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
Bold	It is used for buttons, menus , page names, and other UI elements.	Click OK.
`Courier font`	It is used for commands.	Run the `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]*

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

Contents

1 Image overview

This topic provides an overview of the different types of ECS images provided by Alibaba Cloud, including their types and lifecycle. It also describes the common image operations. An image works as a file copy that includes all the data from the system disk or from the system disk and data disks of an ECS instance.

Type of images

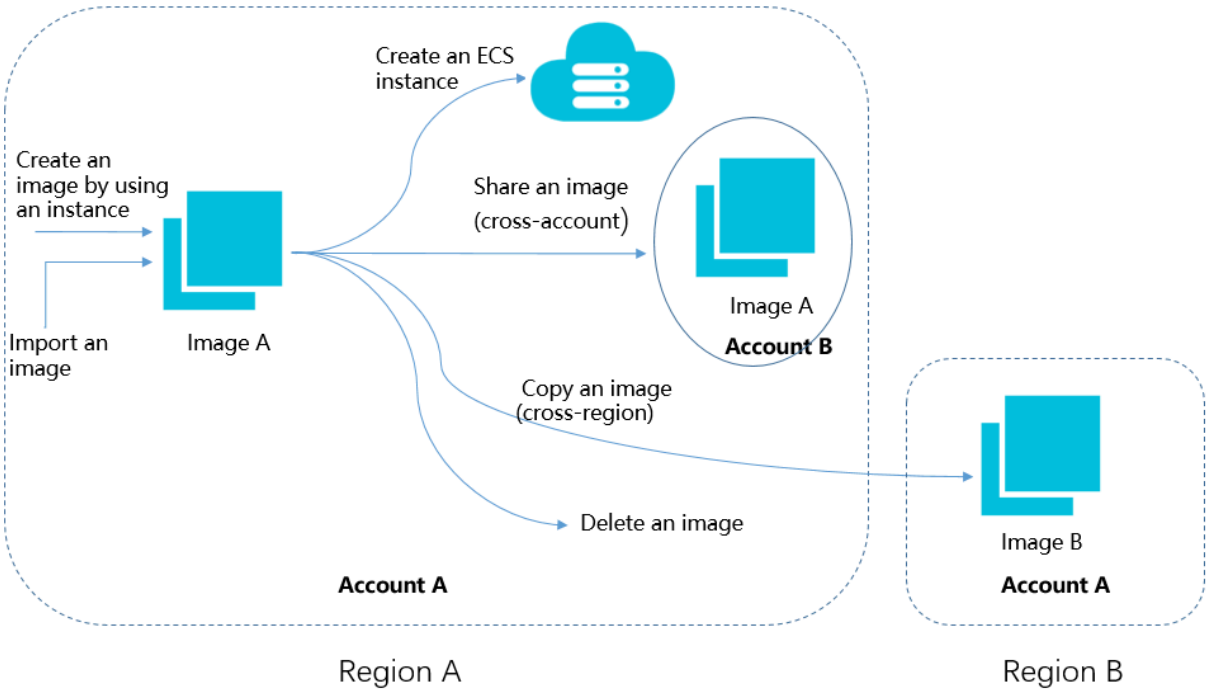
ECS images are classified into public images, custom images, shared images, and Marketplace images. We recommend that you maintain a sufficient balance in the linked credit card or PayPal account to complete the payment or preauthorization. For more information, see Pricing overview.

Image type	Description	Is payment required?
Public image	Public images are fully licensed images that are provided by Alibaba Cloud to ensure a stable, secure operating environment. They can run in all Windows Server and leading Linux operating systems. For more information, see Public images.	Only public images that run in the Red Hat Enterprise Linux and Windows Server operating systems are charged fees because they are licensed by Red Hat and Microsoft, respectively. All other public images are provided free of charge. The details of the fee for Red Hat Enterprise Linux and Windows Server public images are as follows: · Red Hat Enterprise Linux: Fees vary depending on the instance type. · Windows Server: If the public image is used in ECS instances in regions of Mainland China, the public image is provided free of charge. If the public image is used in ECS instances in other regions, a fee is charged. The public images that run in other operating systems than Windows Server and Red Hat Enterprise Linux are provided free of charge.
Custom image	Custom images are created from ECS instances or snapshots, or imported from your computer. A custom image can be used, shared, copied, and deleted only by the user who created it. For more information, see Life cycle of a custom image.	The account under which a custom image is created is charged a fee when the custom image is referenced as a Marketplace image.

Image type	Description	Is payment required?
Shared image	Images can be shared among Alibaba Cloud accounts. For more information, see Share images.	When you use a shared Marketplace image, you are charged a fee according to the billing method specified by the ISV in the Alibaba Cloud Marketplace.
Marketplace image	Marketplace images are categorized into the following two types: · Marketplace images that are provided by Alibaba Cloud · Marketplace images that are provided by independent software vendors (ISVs) upon authorization of the Alibaba Cloud Marketplace A Marketplace image contains an operating system and pre-installed software. The operating system and pre-installed software have been tested and verified by Alibaba Cloud to ensure that the image content is secure. For more information, see Marketplace images.	A Marketplace image is charged according to the billing method specified by the specific ISV in the Cloud Marketplace.

Lifecycle of a custom image

After you create or import a custom image, this image is the `Available` state. You can use this image to create an ECS instance, share it with another Alibaba Cloud account, copy it to another region, or delete it when you no longer need it. The following figure shows the lifecycle of a custom image.



Create a custom image

After you create an ECS instance by using an existing custom image, you can configure the instance as needed. For example, you can install software and deploy projects in the instance. Additionally, you can create a custom image for the instance. For more information, see Create a custom image by using an instance.

> **Note:**
> An ECS instance that is created by using this custom image contains all the configuration items that you have defined. For more information, see Create an instance by using a custom image.

You can create a custom image by using a system disk or by using a system disk and data disks. For more information, see Create a custom image by using a snapshot.

You can also import a custom image from your computer. For more information, see Import custom images.

Share and copy a custom image

Each image belongs to a region. For example, if you create a custom image in China North 2 (Beijing), you can use this image to create an ECS instance only in the region.

- You can only share the image with a user who is located in the same region. To share the image with a user who is located in a different region, you need to copy the image to the region first. For more information, see Share images.

- If you want to use this image in a different region, you need to copy this image to the region. The image copy is independent and has a unique ID. For more information, see Copy images.

Change the image for an ECS instance

After you create an ECS instance, you can change its image by replacing its system disk.

- If you want to change the image to a public image, see Replace the system disk by using a public image.
- If you want to change the image to a custom, Marketplace, or shared image, see Replace the system disk (non-public image).

Delete a custom image

You can delete a custom image when you no longer need it. After you delete a custom image, you cannot create an ECS instance by using this image or reinitialize the cloud disk for an ECS instance created by using this image. For more information, see Reinitialize a cloud disk.

A custom image consists of the disks of an ECS instance. After you delete a custom image, the snapshots in it are not deleted. If you no longer need the snapshots, you can delete them from the snapshot list. For more information, see Delete custom images.

APIs

You can call ECS API actions to operate images. For more information, see API overview.

2 Select an image

This topic describes how to select an appropriate image for your instance.

We recommend that you take the following items into consideration when selecting an image for your instance:

- Region
- Image type and billing method
- Operating system
- Built-in software (such as MySQL and other applications)

Region

Images are regional resources. An image that is used to create instances must belong to the same region as the instances. For example, if you create an instance in China North 2, you can use images only in China North 2. For more information, see Regions and zones.

To create an instance by using an image located in a different region, you must first copy the image to the current region. For more information, see Copy images.

Image types and billing methods

ECS images are classified into public images, custom images, shared images, and Marketplace images, according to the image source. For information about image types and billing methods, see Image overview.

Operating system

You must select an operating system (OS) during instance creation.

- OS architecture

  You can select a 32-bit or 64-bit OS architecture for your instance.

  - 32-bit OS architecture supports a maximum of 4 GiB memory. Additionally, a 32-bit Windows OS supports a maximum of four CPU cores.
  - 64-bit OS architecture supports at least 4 GiB memory and larger.

- OS type (Windows or Linux/Unix-like OS)

OS type	Logon mode	Feature	Scenario
Windows	Remote Desktop Connection	A Windows public image is installed with a genuine activated system.	- Supporting programs developed based on Windows, such as .NET - Supporting SQL Server and other databases (you need to manually install a database first.)
Linux/Unix-like	SSH	A common server-side open-source operating system that features high security and stability, fast deployment, and easy source code compilation.	- Generally used for server applications such as high-performance web servers - Supporting common programming languages such as PHP and Python - Supporting MySQL and other databases (you need to manually install a database first.)

Alibaba Cloud provides a list of public images that run Windows or Linux/Unix-like OS. For more information, see Overview of public images.

- Considerations for Windows

The following information is provided for your consideration if you select to run Windows on your instance. Generally, we recommend that you use a later version of Windows for ease of use and better security.

- Instance types with one vCPU core and 1 GiB memory cannot start the MySQL database.
- We recommend that your target instances have at least 2 GiB memory or larger if you want to host one or more websites, deploy web environments, or use Windows Server 2008, Windows Server 2012, Windows Server 2016, or Windows Server 2019. Otherwise, the selected image may not be displayed on the purchase page, instance performance may be degraded, or both.
- Alibaba Cloud no longer provides technical support for Windows Server 2003 system images. For more information, see Offline announcement of Windows Server 2003 system image.

- Considerations for Linux and Unix-like OSs

  The following information is provided for your consideration if you run a Linux or Unix-like operating system on your instance, and includes detailed information about the supported image versions.

  - Aliyun Linux

    Aliyun Linux is an operating system developed by Alibaba Cloud that provides a safer, more stable, and high-performance running environment for applications on ECS instances. Aliyun Linux 2 supports various cloud scenarios and instance types (except for instances in a classic network and non-I/O-optimized instances). For more information, see Aliyun Linux 2.

  - Red Hat series

    ■ CentOS

    ■ Red Hat

    The following table compares CentOS with Red Hat.

OS	Software package format	Package manager	Billing method	Feature	Relationship
CentOS	.rpm	yum	Free usage	■ Stable, but lower patch update speed than Red Hat ■ Supporting online instant upgrades	■ CentOS is an open-source version of Red Hat. ■ They can use the same RPM package and commands.

OS	Software package format	Package manager	Billing method	Feature	Relationship
Red Hat			Paid usage	Stable with enterprise-level technical support	

- Debian series

  ■ Debian

  ■ Ubuntu

  The following table compares Debian with Ubuntu.

OS	Software package format	Package manager	Feature	Relationship
Debian	.deb	aptitude	Stable	Ubuntu builds on the Debian architecture and infrastructure.
Ubuntu		apt-get	■ User-friendly system configuration ■ Timely software updates ■ Easy to use	

- SUSE

  ■ SUSE Linux

  ■ openSUSE

  The following table compares SUSE Linux with openSUSE.

OS	Feature	Relationship
openSUSE SUSE Linux	■ openSUSE is the community version of SUSE Linux. It features advanced software versions, better extensibility (desktop and server installation are supported), and free updates (you can also purchase official technical support). ■ SUSE Linux Enterprise is the enterprise version of SUSE Linux. It is more mature and stable, but its official release contains fewer software features than openSUSE. ■ SUSE Linux Enterprise offers better work and production environments, whereas openSUSE delivers a superior entertainment experience and professional services.	■ As of version 10.2, SUSE Linux was officially renamed openSUSE. ■ openSUSE uses the same kernel as SUSE Linux.

- CoreOS

  CoreOS is an open-source lightweight operating system based on the Linux kernel and designed to provide infrastructure for clustered deployments. It focuses on automation, ease of application deployment, security, reliability, and scalability. CoreOS provides the underlying functionality required for deploying applications inside software containers, together with a set of built-in tools for service discovery and configuration sharing.

- FreeBSD

  FreeBSD is a Unix-like operating system for a variety of platforms which focuses on features, speed, and stability. FreeBSD offers advanced networking, performance, security and compatibility features today which are still missing in other operating systems, even some of the best commercial ones. For more information, see FreeBSD official documentation.

Built-in software

Alibaba Cloud Marketplace images are typically provided pre-installed with a running environment and software applications that you can apply to target ECS instances as needed. For more information, see Marketplace images.

What to do next

- Use a target image to create instances. For more information, see Create an instance by using the wizard.
- Use a target image to change the operating system of a current image. For more information, see Change the operating system.

3 Search for an image

This topic describes how to search for a specific image through the ECS console or by calling the related API action.

Use the ECS console

You can search for a specific image on the Images page of the ECS console.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Custom Images.
3. Click the tab of a specific image type.
4. In the drop-down list, select a search item such as image name, image ID, or snapshot ID.
5. Enter one or more keywords in the search bar.

   For an ID search, you must enter an exact keyword item. For an image name search, you can enter partial keyword items (such as `win` to return Windows public image results).
6. Click Search.

Call an API action

You can call `DescribeImages` to search for an image through the API Explorer or Alibaba Cloud CLI. The following procedure uses the API Explorer as an example.

1. Log on to the API Explorer.
2. In the drop-down list of RegionId, select the target region.
3. Optional. Specify other parameters, such as ImageName and ImageId.

Note:

The naming rules of image IDs are as follows:

- Public image: The image ID is named by the version, architecture, language, and release date of the operating system. For example, the image ID of a 64-bit Windows Server 2008 R2 Enterprise Edition (English version) is `win2008r2_64_ent_sp1_en-us_40G_alibase_20190318.vhd`.
- Custom image and Marketplace image: The image ID starts with an `m-`.

- Shared image: The image ID is the same as the ID of the source custom image.

4. Click Submit Request.
5. Click the Debugging Result tab.

   If the required image is found, detailed information of the image, such as the image ID, image description, and operating system type is displayed on the Debugging Result tab. For more information, see DescribeInstances.

What to do next

After you find the required image, you can:

- Create an instance by using the wizard.
- Share images.
- Copy custom images.
- #unique_26.
- Delete custom images.
- Modify custom images.

4 Public image

4.1 Public images

This topic describes the public images provided by Alibaba Cloud. Alibaba Cloud provides Aliyun Linux, a customized public image type that is natively supported by ECS, in addition to public images that are authorized by corresponding third-party vendors and have been tested by Alibaba Cloud to provide a secure and stable operating environment for applications in ECS instances. All users can create ECS instances using public images (except for the Windows Server and Red Hat Enterprise Linux images) for free.

Types of public images

Alibaba Cloud provides two types of public images.

Type	Description	Technical support
Aliyun Linux images	The Aliyun Linux images are custom, native operating systems provided by Alibaba Cloud for ECS. Each Aliyun Linux image has undergone stringent testing to guarantee its security, stability, and normal startup and operation.	Alibaba Cloud provides technical support. To access support, open a ticket.
Third-party and open source images	These images have undergone stringent testing conducted by Alibaba Cloud to guarantee their security, stability, and normal startup and operation. Such images include: · Windows: Windows Server · Linux: Ubuntu, CentOS, Redhat Enterprise Linux, Debian, SUSE Linux, FreeBSD, and CoreOS	We recommend that you contact the corresponding OS vendors or open source communities for technical support. In addition, Alibaba Cloud provides technical support to assist with investigation into various image-related and system-related problems.

Aliyun Linux images

Aliyun Linux is a Linux public image independently developed by Alibaba Cloud. The following table describes the available versions of Aliyun Linux.

Operating system	Version	Description
Aliyun Linux 2	Aliyun Linux 2.1903 64-bit	A next-generation OS that supports more Alibaba Cloud instance types (including ECS Bare Metal Instances) than the previous Aliyun Linux image. Aliyun Linux 2 is also equipped with Alibaba Cloud command line tools and other software packages by default. If you are replacing other Linux distributions with Aliyun Linux, we recommend that you switch to Aliyun Linux 2. If you are currently using the Aliyun Linux image, we recommend that you replace the current distribution with Aliyun Linux 2 by creating a new instance or replacing the system disk. For more information, see Aliyun Linux 2.
Aliyun Linux	Aliyun Linux 17.1 64-bit	A secure, stable, and high-performance Linux image that interoperates natively with Alibaba Cloud ECS. For more information, see Aliyun Linux 17.1.

Third-party and open source images

Alibaba Cloud regularly releases or updates the public images of third-party and open source vendors. For more information, see Image release records. You can also view all available public images on the public images page in the corresponding region in the ECS console.

The following tables provide references regarding the current third-party and open source image versions provided by Alibaba Cloud (Windows and Linux).

- Windows images

Operating system	Version
Windows Server 2019	- Windows Server 2019 data center 64-bit (Chinese edition) - Windows Server 2019 data center 64-bit (English edition)
Windows Server 2016	- Windows Server 2016 data center 64-bit (Chinese edition) - Windows Server 2016 data center 64-bit (English edition)
Windows Server 2012	- Windows Server 2012 R2 data center 64-bit (Chinese edition) - Windows Server 2012 R2 data center 64-bit (English edition)
Windows Server 2008	- Windows Server 2008 standard SP2 32-bit (Chinese edition) - Windows Server 2008 R2 enterprise 64-bit (Chinese edition) - Windows Server 2008 R2 enterprise 64-bit (English edition)  Note: If you are using a 32-bit operating system, select an instance type with a memory capacity that does not exceed 4 GiB. For more information, see Select an image.
Windows Server Version 1809	- Windows Server Version 1809 data center 64-bit (Chinese edition) - Windows Server Version 1809 data center 64-bit (English edition)

- Linux images

Operating system	Version
CentOS	- CentOS 7.6 64-bit - CentOS 7.5 64-bit - CentOS 7.4 64-bit - CentOS 7.3 64-bit - CentOS 7.2 64-bit - CentOS 6.10 64-bit - CentOS 6.9 64-bit - CentOS 6.8 32-bit  Note: If you are using a 32-bit operating system, select an instance type with a memory capacity that does not exceed 4 GiB. For more information, see Select an image.
CoreOS	- CoreOS 2023.4.0 64-bit - CoreOS 1745.7.0 64-bit
Debian	- Debian 9.8 64-bit - Debian 9.6 64-bit - Debian 8.11 64-bit - Debian 8.9 64-bit
FreeBSD	FreeBSD 11.1 64-bit
OpenSUSE	OpenSUSE 42.3 64-bit
Red Hat	- Red Hat Enterprise Linux 7.5 64-bit - Red Hat Enterprise Linux 7.4 64-bit - Red Hat Enterprise Linux 6.9 64-bit
SUSE Linux	- SUSE Linux Enterprise Server 12 SP2 64-bit - SUSE Linux Enterprise Server 11 SP4 64-bit

Operating system	Version
Ubuntu	- Ubuntu 18.04 64-bit - Ubuntu 16.04 64-bit - Ubuntu 16.04 32-bit - Ubuntu 14.04 64-bit - Ubuntu 14.04 32-bit  Note: If you are using a 32-bit operating system, select an instance type with a memory capacity that does not exceed 4 GiB. For more information, see Select an image.

4.2 Release notes

This topic describes the release notes of images and relevant updates.

May 28, 2019

Release	Description
Windows Server 2019 Datacenter Edition	· Image ID: - win2019_64_dtc_1809_zh-cn_40G_alibase_20190528.vhd (Chinese edition) - win2019_64_dtc_1809_en-us_40G_alibase_20190528.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches
Windows Server Version 1809 Datacenter Edition	· Image ID: - winsvr_64_dtcC_1809_zh-cn_40G_alibase_20190528.vhd (Chinese edition) - winsvr_64_dtcC_1809_en-us_40G_alibase_20190528.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches

May 23, 2019

Release	Description
Windows Server 2016 Datacenter Edition	· Image ID: - win2016_64_dtc_1607_zh-cn_40G_alibase_20190523.vhd (Chinese edition) - win2016_64_dtc_1607_en-us_40G_alibase_20190523.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches
Windows Server 2012 R2 Datacenter Edition	· Image ID: - win2012r2_64_dtc_9600_zh-cn_40G_alibase_20190523.vhd (Chinese edition) - win2012r2_64_dtc_9600_en-us_40G_alibase_20190523.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches

May 17, 2019

Release	Description
Windows Server 2008 Standard Edition SP2	· Image ID: win2008_32_std_sp2_zh-cn_40G_alibase_20190517.vhd (Chinese edition) · Released in: all regions · Changes: - Updated to the latest operating system patches - Fixed a remote code execution vulnerability (CVE-2019-0708) in Microsoft Windows Remote Desktop Services

May 15, 2019

Release	Description
Windows Server 2008 R2 Enterprise Edition	· Image ID: - win2008r2_64_ent_sp1_zh-cn_40G_alibase_20190515.vhd (Chinese edition) - win2008r2_64_ent_sp1_en-us_40G_alibase_20190515.vhd (English edition) · Released in: all regions · Changes: - Updated to the latest operating system patches - Fixed a remote code execution vulnerability (CVE-2019-0708) in Microsoft Windows Remote Desktop Services

May 13, 2019

Release	Description
Ubuntu 16.04	· Image ID: ubuntu_16_04_64_20G_alibase_20190513.vhd · Kernel version: 4.4.0-146-generic · Released in: all regions · Changes: updated to the latest operating system patches

May 10, 2019

Release	Description
Debian 9.9	· Image ID: debian_9_09_64_20G_alibase_20190510.vhd · Kernel version: 4.9.0-9-amd64 · Released in: all regions · Changes: updated to the latest operating system patches

May 9, 2019

Release	Description
Ubuntu 18.04	· Image ID: ubuntu_18_04_64_20G_alibase_20190509.vhd · Kernel version: 4.15.0-48-generic · Released in: all regions · Changes: - Updated cloud-init to speed up boot time - Updated to the latest operating system patches

May 7, 2019

Release	Description
Aliyun Linux 2	· Image ID: aliyun-2.1903-x64-20G-alibase-20190507.vhd · Kernel version: 4.19.34-11.al7.x86_64 · Released in: all regions · Changes: - Updated the system kernel and user mode package - Fixed the time synchronization latency at instance startup

March 27, 2019

Release	Description
Aliyun Linux 2	· Image ID: aliyun-2.1903-x64-20G-alibase-20190327.vhd · Kernel version: 4.19.24-9.al7.x86_64 · Released in: all regions · Changes: released Aliyun Linux 2

March 19, 2019

Release	Description
CoreOS 2023.4.0	· Image ID: coreos_2023_4_0_64_30G_alibase_20190319.vhd · Kernel version: 4.19.25-coreos · Released in: all regions · Changes: updated to the latest operating system patches

March 18, 2019

Release	Description
Windows Server 2019 Datacenter Edition	· Image ID: - win2019_64_dtc_1809_zh-cn_40G_alibase_20190318.vhd (Chinese edition) - win2019_64_dtc_1809_en-us_40G_alibase_20190318.vhd (English edition) · Released in: all regions · Changes: new release
Windows Server 2016 Datacenter Edition	· Image ID: - win2016_64_dtc_1607_zh-cn_40G_alibase_20190318.vhd (Chinese edition) - win2016_64_dtc_1607_en-us_40G_alibase_20190318.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches
Windows Server 2012 R2 Datacenter Edition	· Image ID: - win2012r2_64_dtc_9600_zh-cn_40G_alibase_20190318.vhd (Chinese edition) - win2012r2_64_dtc_9600_en-us_40G_alibase_20190318.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches

Release	Description
Windows Server 2008 R2 Enterprise Edition	· Image ID: - win2008r2_64_ent_sp1_zh-cn_40G_alibase_20190318.vhd (Chinese edition) - win2008r2_64_ent_sp1_en-us_40G_alibase_20190318.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches
Windows Server Version 1809 Datacenter Edition	· Image ID: - winsvr_64_dtcC_1809_zh-cn_40G_alibase_20190318.vhd (Chinese edition) - winsvr_64_dtcC_1809_en-us_40G_alibase_20190318.vhd (English edition) · Released in: all regions · Changes: updated to the latest operating system patches

March 11, 2019

Release	Description
Debian 8.11	· Image ID: debian_8.11_64_20G_alibase_20190311.vhd · Kernel version: 3.16.0-7-amd64 · Released in: all regions · Changes: - Updated to the latest operating system patches - Fixed invalid apt source configurations in Debian 8.9

March 1, 2019

Release	Description
Ubuntu 16.04	· Image ID: ubuntu_16_04_64_20G_alibase_20190301.vhd · Kernel version: 4.4.0-142-generic · Released in: all regions · Changes: updated to the latest operating system patches

February 25, 2019

Release	Description
Debian 9.8	· Image ID: debian_9_08_64_20G_alibase_20190225.vhd · Kernel version: 4.9.0-8-amd64 · Released in: China North 2, China North 3, and China North 5 · Changes: updated to the latest operating system patches

February 23, 2019

Release	Description
Ubuntu 18.04	· Image ID: ubuntu_18_04_64_20G_alibase_20190223.vhd · Kernel version: 4.15.0-45-generic · Released in: all regions · Changes: updated to the latest operating system patches

February 18, 2019

Release	Description
CentOS 7.6	· Image ID: centos_7_06_64_20G_alibase_20190218.vhd · Kernel version: 3.10.0-957.5.1.el7.x86_64 · Released in: all regions · Changes: updated to the latest operating system patches

January 3, 2019

Release	Description
Debian9.6	· Image ID: debian_9_06_64_20G_alibase_20190103.vhd · Kernel version: 4.9.0-8-amd64 · Released in: all regions · Changes: enabled the systemd-networkd service

December 22, 2018

Release	Description
Windows Server version 1809 Datacenter Edition	· Image ID: - winsvr_64_dtcC_1809_zh-cn_40G_alibase_20181222.vhd (Chinese version) - winsvr_64_dtcC_1809_en-us_40G_alibase_20181222.vhd (English version) · Released in: all regions · Changes: - Updated the image to the latest patch KB4483235 (released in December 2018) - Used the Sysprep tool to generalize the image
Windows Server 2008 R2 Enterprise Edition	· Image ID: win2008r2_64_ent_sp1_en-us_40G_alibase_20181222.vhd (English version) · Released in: all regions · Changes: - Updated the image to the latest patch KB3371318 (released in December 2018). As a result, Windows clients need to be updated with the latest patches to establish RDP connections. - Upgraded NET Framework to 4.7.2 - Used the Sysprep tool to generalize the image

December 20, 2018

Release	Description
Windows Server 2008 R2 Enterprise Edition	· Image ID: win2008r2_64_ent_sp1_zh-cn_40G_alibase_20181220.vhd (Chinese version) · Released in: all regions · Changes: - Updated the image to the latest patch KB4471318 (released in December 2018). As a result, Windows clients need to be updated with the latest patches to establish RDP connections. - Upgraded NET Framework to 4.7.2 - Used the Sysprep tool to generalize the image

Release	Description
Windows Server 2012 R2 Datacenter Edition	· Image ID: - win2012r2_64_dtc_9600_zh-cn_40G_alibase_20181220.vhd (Chinese version) - win2012r2_64_dtc_9600_en-us_40G_alibase_20181220.vhd (English version) · Released in: all regions · Changes: - Updated the image to the latest patch KB4471320 (released in December 2018). As a result, Windows clients need to be updated with the latest patches to establish RDP connections. - Upgraded NET Framework to 4.7.2 - Used the Sysprep tool to generalize the image
Windows Server 2016 Datacenter Edition	· Image ID: - win2016_64_dtc_1607_zh-cn_40G_alibase_20181220.vhd (Chinese version) - win2016_64_dtc_1607_en-us_40G_alibase_20181220.vhd (English version) · Released in: all regions · Changes: - Updated the image to the latest patch KB4471321 (released in December 2018). As a result, Windows clients need to be updated with the latest patches to establish RDP connections. - Upgraded NET Framework to 4.7.2 - Used the Sysprep tool to generalize the image

December 12, 2018

Release	Description
CentOS 7.6	· Image ID: centos_7_05_64_20G_alibase_20181212.vhd · Kernel version: 3.10.0-957.1.3.el7.x86_64 · Released in: all regions · Changes: updated to the latest operating system patches

Release	Description
Debian 9.6	· Image ID: debian_9_06_64_20G_alibase_20181212.vhd · Kernel version: 4.9.0-8-amd64 · Released in: all regions · Changes: - Updated to the latest operating system patches - Updated the cloud-init version - Enabled the chrony service (time synchronization) - Set GRUB_TIMEOUT=1 · Known issues: Classic network configuration issues
Ubuntu 18.04	· Image ID: ubuntu_18_04_64_20G_alibase_20181212.vhd · Kernel version: 4.15.0-42-generic · Released in: all regions · Changes: - Updated to the latest operating system patches - Updated the cloud-init version - Enabled the chrony service (time synchronization) - Set GRUB_TIMEOUT=1

December 10, 2018

Release	Description
CentOS 7.5	· Image ID: centos_7_05_64_20G_alibase_20181210.vhd · Kernel version: 3.10.0-862.3.3.el7.x86_64 · Released in: all regions · Changes: - Updated to the latest operating system patches - Updated the cloud-init version - Enabled the chrony service (time synchronization) - Disabled password logon by default - Set GRUB_TIMEOUT=1

4.3 Aliyun Linux 2

Aliyun Linux 2 is a next-generation Aliyun Linux operating system developed by Alibaba Cloud. It is intended to provide a safer, more stable, and high-performance

running environment for applications on ECS instances. You can create an instance by using the Aliyun Linux 2 public image for free.

Scope of application

- Various workloads on cloud. For example, you can run databases, data analytics , Web applications, and other workloads in a production environment on Aliyun Linux 2.
- Various instance type families, including ECS Bare Metal Instances. The supported instance specifications are as follows:
  - vCPU: 1 vCPU - 160 vCPU
  - Memory: 0.5 GiB - 3,840 GiB

  Note:
  Aliyun Linux 2 does not support instances that use the Xen virtual infrastructure or instances that use the classic network.

Advantages

Compared with other Linux systems, Aliyun Linux 2 has the following advantages:

- Tailor-made for Alibaba Cloud ECS instances, featuring faster system startup and better runtime performance.
- Provides richer operating system features through the updated Linux kernel, user-mode software, and toolkits.
- Streamlined kernel and reduced potential security risks.
- Free to use (technical support is available).

Features

New version of the Alibaba Cloud kernel

Aliyun Linux 2 is equipped with the latest version of the Alibaba Cloud kernel, which provides the following features:

- Customized based on version 4.19.24 that has been supported by the kernel community by adding new features for cloud scenarios, improving performance, and fixing major bugs.
- Customized and optimized kernel startup parameters and system configuration parameters intended for the ECS instance environment.

- Kernel crash dumping (Kdump). You can enable or disable it without rebooting the operating system.
- Kernel Live Patching (KLP).

Software package

Aliyun Linux 2 is equipped with the Alibaba Cloud command line tool by default. The package updates are as follows:

- `network . service` is changed to `systemd - networkd` .
- The user mode package is compatible with CentOS 7.6.1810. That is, the user mode package of CentOS 7.6.1810 can be used on Aliyun Linux 2 directly.
- Fixes for Common Vulnerabilities and Exposures (CVEs) are continuously updated until the end of life (EOL) of Aliyun Linux 2 is reached. For information about the release notes of Aliyun Linux 2, see Release notes.

Performance optimization

Aliyun Linux 2 increases the boot speed and improves system performance at runtime, including:

- Greatly optimized startup speed for ECS instance environments.
- Optimized multi-threaded scenarios for ECS instance environments and improved multi-threaded performance for large-scale instances.
- Significantly improved performance thanks to full link optimization for MySQL database scenarios (combined with ESSD cloud disks).

Get Aliyun Linux 2

Aliyun Linux 2 is officially available in the ECS console of Alibaba Cloud. You can use Aliyun Linux 2 in the following ways:

- Select Public Image and then Aliyun Linux 2 when creating an ECS instance. For more information, see Create an instance by using the wizard.
- Update the operating system of an existing ECS instance to Aliyun Linux 2 by replacing its system disk. For more information, see Replace the system disk by using a public image.

Use Aliyun Linux 2

Updated system parameters

Aliyun Linux 2 updated the following kernel configuration parameters in the configuration file `/etc/sysctl.d/50-aliyun.conf`:

- `kernel.hung_task_timeout_secs = 240`: Increases the kernel hung_task timeout seconds to avoid frequent hung_task prompts.
- `kernel.panic_on_oops = 1`: Throws the Kernel Panic exception when the kernel is experiencing an Oops error. Moreover, crash details are automatically captured if Kdump is configured.
- `kernel.watchdog_thresh = 50`: Increases the thresholds for events such as hrtimer, NMI, Soft Lockup, and Hard Lockup to avoid possible kernel false positives.
- `kernel.hardlockup_panic = 1`: Throws the Kernel Panic exception when the kernel is experiencing a Hard Lockup error. Moreover, crash details are automatically captured if Kdump is configured.

You can use the `sysctl` command to view or modify the system parameters of Aliyun Linux 2 at runtime.

Updated kernel parameters

Aliyun Linux 2 updated the following kernel parameters:

- `crashkernel=0M-2G:0M,2G-8G:192M,8G-:256M`: Reserves the memory space for the Kdump function.
- `cryptomgr.notests`: Turns off the self-check of crypto during kernel startup to speed up the startup.
- `cgroup.memory=nokmem`: Turns off the kernel memory statistics function of Memory Cgroup to avoid potential kernel instability.
- `rcupdate.rcu_cpu_stall_timeout=300`: Increases the timeout threshold of RCU CPU Stall Detector to 300 seconds to avoid kernel false positives.

Run the `cat /proc/cmdline` command to view the kernel startup parameters of Aliyun Linux 2 at runtime.

Kernel version

Aliyun Linux 2 is equipped with the 4.19.24 version of Alibaba Cloud kernel by default (the current version is kernel-4.19.24-9.al7).

You can install and switch to a v3.10 series kernel compatible with CentOS 7.6.1810 as needed, and run the following command to roll back to a v3.10 kernel:

> **Note:**
> Replacing the kernel version may result in boot failure. Exercise caution when you perform this operation.

```
sudo yum install -y kernel-3.10.0
sudo grub2-set-default "$(grep ^menuentry /boot/grub2/grub.cfg | grep 3.10.0 | awk -F \' '{print $2}')"
sudo grub2-mkconfig -o /boot/grub2/grub.cfg
# Restart the system
sudo reboot
```

Kdump

Aliyun Linux 2 provides the Kdump service. Kernel errors can be captured after the service is turned on, allowing you to analyze kernel crashes.

You can turn on/off the Kdump service by using the following command:

- Run the following command to turn on the Kdump service:

```
sudo systemctl enable kdump.service
sudo systemctl restart kdump.service
```

> **Note:**
> If the memory of the selected instance type is less than or equal to 2 GiB, the Kdump service cannot be used.

- Run the following command to return the memory address space reserved by the Kdump service to the operating system and turn off the Kdump service:

```
sudo sh -c 'echo 0 > /sys/kernel/kexec_crash_size'
sudo systemctl disable kdump.service
sudo systemctl stop kdump.service
```

> **Note:**
> After the memory address space reserved by the Kdump service is returned to the operating system, the operating system must be restarted in order to enable the Kdump service again.

Configure the network

Aliyun Linux 2 uses `systemd-networkd` to configure the network by default. When you configure the network, note the following:

- The configuration file for DHCP or static IP addresses is located in the `/etc/systemd/network/` directory.
- The command to restart the network is `sudo systemctl restart systemd-networkd`.

Get the Debuginfo package and the source code package

- Run the following command to get the Debuginfo package:

```
sudo yum install -y yum-utils
sudo debuginfo-install -y <packageName>
```

- Run the following command to get the source package:

```
sudo yum install -y alinux-release-source
sudo yum install -y yum-utils
sudo yumdownloader --source <sourcePackageName>
```

Experimental software packages

Experimental software packages are provided by Alibaba Cloud, but not rigorously tested. Therefore, their quality is not guaranteed. Aliyun Linux 2 provides the following types of experimental packages:

- Ordinary experimental software packages
  - `Python 3.6`
  - `Golang 1.11` and `Golang 1.12`
- Experimental software packages that support SCL plugins
  - `GCC 7.3.1`
  - `GDB 8.0.1`
  - `Binutils 2.28`
  - `Make 4.2.1`

Install a package:

- Ordinary experimental software packages
  1. Run the following command to enable YUM store:

     ```
     sudo yum install -y alinux-release-experiment als
     ```

  2. Run the following command to install a package:

     ```
     sudo yum install -y <package name>
     ```

- Experimental software packages that support SCL plugins
  1. Run the following command to install `scl-utils`:

     ```
     sudo yum install -y scl-utils
     ```

  2. Run the following command to enable YUM store:

     ```
     sudo yum install -y alinux-release-experiment als
     ```

  3. Install the packages you need from the YUM source. The following command installs GCC, GDB, Binutils, and Make tools.

     ```
     sudo yum install -y devtoolset-7-gcc devtoolset-7
     -gdb devtoolset-7-binutils devtoolset-7-make
     ```

     After the installation is complete, you can use the newer version of GCC and related tools. The sample code is as follows:

     ```
     # To view an existing SCL, you need to specify
      the library name:
      scl -l devtoolset-7
     # Run the related SCL software:
      scl enable devtoolset-7 'gcc --version'
     ```

Technical support

Alibaba Cloud provides the following technical support for Aliyun Linux 2:

- The version support period is 3 years, and the version life cycle is ended by March 31, 2022.
- Security updates in the YUM source. You can run the `yum update` command to update to the latest version.

4.4 Known issues

This topic describes the known issues of Alibaba Cloud images on different platforms, the scope of these issues, and the corresponding solution.

Debian 9.6: Classic network configuration

- Issue: Classic network instances created by using Debian 9 public images fail to be pinged.
- Cause: Classic network instances cannot obtain IP addresses automatically through the Dynamic Host Configuration Protocol (DHCP) because Debian 9 disables the systemd-networkd service by default.
- Image: debian_9_06_64_20G_alibase_20181212.vhd
- Solution: Run the following command:

```
systemctl   enable   systemd - networkd
systemctl   start   systemd - networkd
```

CentOS 6.8: An instance installed with the NFS Client fails to respond

- Issue: An instance that is running CentOS 6.8 and has NFS Client installed fails repeatedly to respond and must be restarted.
- Cause: When you use the NFS service, the NFS Client attempts to end the TCP connection if a glitch occurs due to communication latency. Specifically, if the NFS Server is delayed in sending a response to the NFS Client, the connection initiated by the NFS Client may be stalled in the FIN_WAIT2 state. Normally, the FIN_WAIT2 connection expires and closes after one minute and the NFS Client initiates another connection. However, a kernel of version 2.6.32-696 to 2.6.32-696.10 has a defect in TCP connection establishment. As a result, the FIN_WAIT2 connection will remain indefinitely, which means the NFS Client cannot end the TCP connection and then initiate a new TCP connection.
- Image: centos_6_08_32_40G_alibase_20170710.vhd and centos_6_08_64_20G_alibase_20170824.vhd
- Solution: Run the following command to upgrade the kernel to v2.6.32-696.11 or a later version.

```
yum   update
```

Note:

> Before you perform any operations on the instance, you must create a snapshot to back up your data.

CentOS 7: The hostname changes from uppercase to lowercase letters after the instance is restarted

- Issue: After an ECS instance is restarted for the first time, the hostname of some CentOS 7 instances is changed from uppercase letters to lowercase letters. The following table shows some examples.

Hostname	Hostname after the instance is restarted for the first time	Does the hostname remain in lowercase after the restart?
iZm5e1qe*****sxx1ps5zX	izm5e1qe*****sxx1ps5zx	Yes
ZZHost	zzhost	Yes
NetworkNode	networknode	Yes

- Image: The following CentOS public images (and custom images created based on them) are affected:
  - centos_7_2_64_40G_base_20170222.vhd
  - centos_7_3_64_40G_base_20170322.vhd
  - centos_7_03_64_40G_alibase_20170503.vhd
  - centos_7_03_64_40G_alibase_20170523.vhd
  - centos_7_03_64_40G_alibase_20170625.vhd
  - centos_7_03_64_40G_alibase_20170710.vhd
  - centos_7_02_64_20G_alibase_20170818.vhd
  - centos_7_03_64_20G_alibase_20170818.vhd
  - centos_7_04_64_20G_alibase_201701015.vhd
- Hostname: If your applications are sensitive to the letter casing of hostnames, restarting such instances may affect the availability of corresponding services. The

following table describes whether the hostname is changed after an instance is restarted.

Current state of hostname	Will the hostname change after an instance restart?	When will the change take effect?
The hostname contains uppercase letters at the time of instance creation (either in the ECS console or through APIs).	Yes	When the instance is restarted for the first time.
The hostname contains no uppercase letters at the time of instance creation (either in the ECS console or through APIs).	No	N/A
The hostname contains uppercase letters because the hostname is modified after you log on to an instance.	No	N/A

- Solution: To retain uppercase letters in a hostname after you restart an instance, follow these steps:

  1. Connect to the target instance.
  2. View the existing hostname:

     ```
     [ root @ izbp193 ***** 3i161uynzz  x  ~]#  hostname
      izbp193 ***** 3i161uynzz  x
     ```

  3. Run the following command:

     ```
      hostnamect  l   set - hostname  -- static   iZbp193 *****
      3i161uynzz  X
     ```

  4. View the updated hostname.

     ```
     [ root @ izbp193 ***** 3i161uynzz  x  ~]#  hostname
      iZbp193 ***** 3i161uynzz  X
     ```

- Additional actions: If you are using a custom image, we recommend that you update the cloud-init software to the latest version and create a custom image again. Such an action prevents the custom image from being affected by the aforementioned issue. For more information, see Install cloud-init and Create a custom image by using an instance.

Linux: The pip requests time out

- **Issue: The pip requests occasionally time out or fail.**
- **Image: CentOS, Debian, Ubuntu, SUSE, OpenSUSE, and Aliyun Linux.**
- **Cause: Alibaba Cloud provides the following three pip source addresses, and the default address is mirrors.aliyun.com. To access this address, instances need to be able to access Internet. If your instance has no public IP address assigned, a pip request timeout will occur.**
  - **(Default) Internet: mirrors.aliyun.com**
  - **VPC intranet: mirrors.cloud.aliyuncs.com**
  - **Classic network intranet: mirrors.aliyuncs.com**

- Solution: You can solve the problem through one of the following methods:
  - Method 1

    Assign a public IP address to your instance, that is, attaching an Elastic IP address (EIP) to your instance. For more information, see Bind EIP to an ENI.

    A Subscription instance can also be reassigned a public IP address through changing its configurations. For more information, see Upgrade configurations of Subscription instances.
  - Method 2

    Once a pip request fails, you can run the script `fix_pypi . sh` in your ECS instance and then retry the pip operation. The specific steps are as follows:

    1. Connect to your ECS instance. For more information, see Connect to an instance by using the Management Terminal.
    2. Run the following command to get the script file:

       ```
       wget   http :// image - offline . oss - cn - hangzhou .
       aliyuncs . com / fix / fix_pypi . sh
       ```
    3. Run the script.
       - For VPC instances, run the command `bash   fix_pypi . sh  " mirrors . cloud . aliyuncs . com "`.
       - For Classic network instances, run the command `bash   fix_pypi . sh  " mirrors . aliyuncs . com "`.
    4. Retry the pip operation.

    The content of `fix_pypi . sh` is as follows:

    ```
    #!/ bin / bash
     function   config_pip () {
         pypi_sourc  e =$ 1
         if  [[ ! - f  ~/. pydistutil  s . cfg  ]];  then
     cat  > ~/. pydistutil  s . cfg  <<  EOF
    [ easy_insta  ll ]
     index - url = http ://$ pypi_sourc  e / pypi / simple /
     EOF
         else
             sed  - i  “ s # index - url .# index - url = http ://$
     pypi_sourc  e / pypi / simple /#“ ~/. pydistutil  s . cfg
         fi
         if  [[ ! - f  ~/. pip / pip . conf  ]];  then
         mkdir  - p  ~/. pip
     cat  > ~/. pip / pip . conf  <<  EOF
    [ global ]
     index - url = http ://$ pypi_sourc  e / pypi / simple /
    [ install ]
    ```

```
 trusted - host =$ pypi_sourc  e
 EOF
     else
         sed  - i  “ s # index - url .# index - url = http ://$
 pypi_sourc  e / pypi / simple /#“ ~/. pip / pip . conf
         sed  - i  “ s # trusted - host .*# trusted - host =$
 pypi_sourc  e #” ~/. pip / pip . conf
     fi
}
 config_pip  $ 1
```

Aliyun Linux 2: Enabling the CONFIG_PARAVIRT_SPINLOCK kernel feature causes performance issues

- Issue: After you enable the `CONFIG_PAR AVIRT_SPIN LOCK` kernel feature, application performance is significantly impacted if there are a large number of vCPUs in an ECS instance and lock contentions in applications. For example, timed out connections degrade the performance of an Nginx application.
- Image: Aliyun Linux 2
- Solution: We recommend that you do not enable the `CONFIG_PAR AVIRT_SPIN LOCK` kernel feature for Aliyun Linux 2 (disabled by default).

Aliyun Linux 2: Setting the THP switch to `always` impacts system stability and causes performance issues

- Issue: After you set the Transparent Hugepage (THP) switch in your production environment to `always` , the system becomes unstable and performance is noticeably degraded.
- Image: Aliyun Linux 2
- Solution: Set the THP switch to `madvise` . In outlier scenarios (for example, if you run some performance benchmark test suites), although performance is impacted if this switch is set to `madvise` , we recommend that you do so to prevent the system from being impacted by other contentions.

Aliyun Linux 2: A delegation conflict occurred in NFS v4.0

- Issue: A delegation conflict occurred in NFS v4.0. For more information, see Delegation in NFS Version 4.
- Image: Aliyun Linux 2
- Solution: We recommend that you do not enable the Delegation feature when you use NFS v4.0. For information on how to disable this feature at the server side, see How to Select Different Versions of NFS on a Server.

Aliyun Linux 2: NFS v4.1/4.2 has a defect that may cause logout failure of applications

- Issue: In NFS v4.1 or v4.2, if you use Asynchronous I/O (AIO) in applications to distribute requests, and close the corresponding file descriptors before all I/Os are returned, a livelock may be triggered and the corresponding process cannot be ended.
- Image: Aliyun Linux 2
- Solution: This problem has been fixed in kernel v4.13.10-10.al7 and higher. To upgrade the kernel version, run the command `sudo yum update kernel -y`

   Notice:

  - Upgrading the kernel may result in system boot failure. Please exercise caution when performing this action.
  - Before you upgrade the kernel, make sure you have created a snapshot or custom image to back up data. For more information, see Create a snapshot or Create a custom image by using an instance.

Aliyun Linux 2: System performance is impacted when a high-risk security vulnerability (such as Spectre or Meltdown) is fixed

- Issue: In the kernel of Aliyun Linux 2, the repair of high-risk security vulnerabilities (Meltdown and Spectre) in processor hardware is enabled by default, which impacts system performance. As a result, performance degradation may be recorded during performance benchmark suite tests.
- Image: Aliyun Linux 2
- Solution: We recommend that in normal circumstances you do not disable the repair function. However, if you need to maximize system performance, you can run the following command to disable the repair function:

```
# Add nopti nospectre_ v2 to the kernel startup parameters .
sudo sed -i ' s /\( GRUB_CMDLI NE_LINUX =".*\)"/\ 1 nopti nospectre_ v2 "/' / etc / default / grub
sudo grub2 - mkconfig -o / boot / grub2 / grub . cfg

# Restart the system .
sudo reboot
```

5 Custom image

5.1 Create custom image

5.1.1 Create a custom image by using a snapshot

Custom images allow you to create multiple ECS instances with identical OS and environment data.

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

You can also use an instance to create an image. For more information, see create a custom image by using an instance.

To enhance the security of custom images created from snapshots, see security suggestions for Alibaba Cloud custom images.

Note:

- Custom images cannot be used across regions.
- You can change the operating system of an instance created from a custom image, and the custom image remains usable. For details, 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 created independently from the billing methods of the instances from which they were created. For example, custom images created from Subscription instances can used for creating Pay-As-You-Go instances. The converse method also applies.
- If the ECS instance 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, automatic snapshots are cleared when an ECS instance is released.

Restrictions 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 you `umount` all data disks before creating a custom image, and then use 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 partitions. The system disk only supports single root partitions.
- We recommend you check the available space of the system disk to make sure that the system has available space.
- Do not modify critical system files such as `/sbin`, `/bin`, `/lib`, and so on.
- Do not modify the default logon user name root.

Procedure

1. Log on to the ECS console.
2. Select the region.
3. In the left-side navigation pane, click Instances.
4. Find the target instance and click its instance ID, or click Manage in the Actions column.
5. In the left-side navigation pane, click Instance Snapshots. Find the target system disk and then click Create Custom Image in the Actions column.

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

   You can also click Snapshots and Images > Snapshots, and select a snapshot created from a system disk to Create Custom Image.
6. In the Create Custom Image dialog box, complete the following:
   - Confirm the snapshot ID.
   - Enter a name and description of the custom image.
   - Optional. Check Add Data Disk Snapshot, select multiple snapshots of data disks for the image, and click Add to add a data disk.

     Note:

- We recommend that you remove sensitive data from the data disk before creating a custom image to guarantee 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 the snapshots.

7. Click Create. Then, in the left-side navigation pane, select Snapshots and Images > Images to view the images you have created.

Linux instance image FAQ

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 the details of mounting the file system and storage devices upon startup. If you do not want to mount a specified partition when starting the instance, 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 statement line for automatically attaching mounting data disk has been deleted from the fstab file.

Use the `mount` command to view the information of 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 listed in the following table have not been modified. Otherwise, the new instance cannot start.

Configuration file	Related to	Risks if modified
`/etc/issue*`, `/etc/*-release`, and `/etc/*_version`	System release version	Modifying /etc/issue* makes the system release version unidentifiable, which can cause instance creation failure.
`/boot/grub/menu.lst` and `/boot/grub/grub.conf`	System startup	Modifying /boot/grub/menu.lst results in kernel loading failure, which means the system cannot start.
/etc/fstab	Partitions upon startup	Modifying /etc/fstab causes partition mounting failure, which means the system cannot start.
/etc/shadow	System passwords	If this file is set to read-only, the password file cannot be edited, which means instance creation fails.
/etc/selinux/config	System security policies	Modifying /etc/selinux/config and enabling SELinux results in start failure.

5.1.2 Create a custom image by using an instance

You can create a custom image based on an ECS instance. That is, you can fully copy all its disks and pack the data 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. The following figure details this process.

For information about creating an image from a snapshot, see create a custom image by using a snapshot.

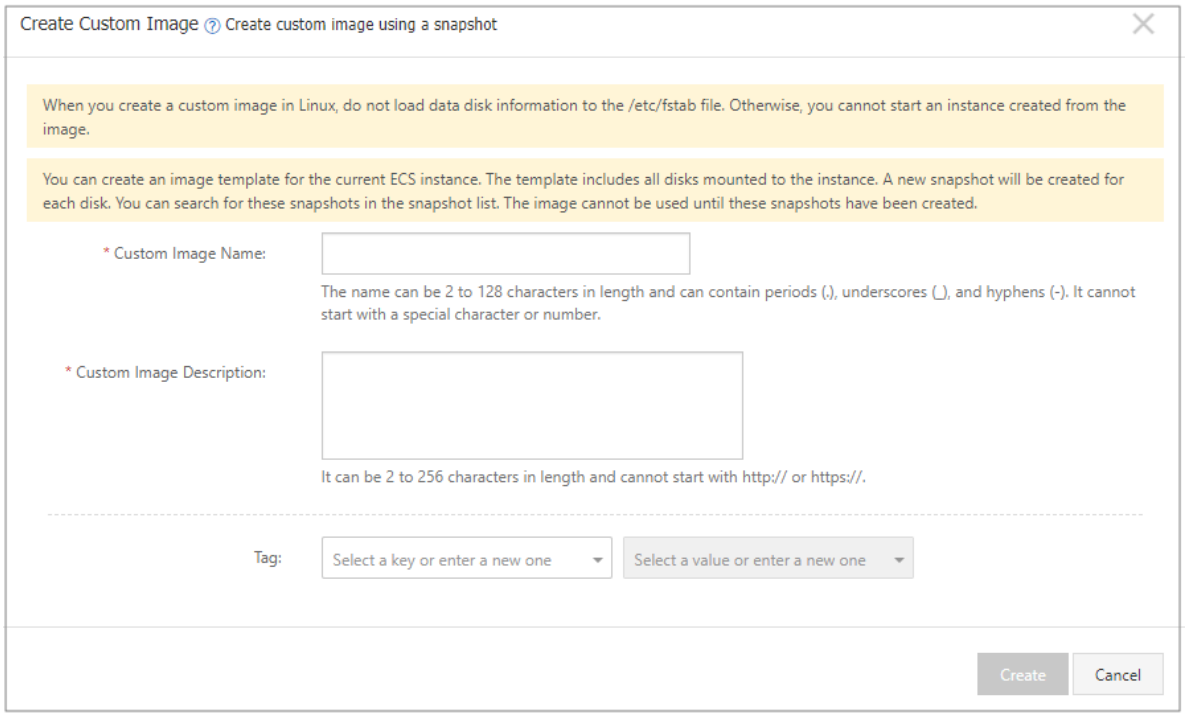
Considerations

- Make sure you have deleted all confidential data in the ECS instance before creating a custom image to guarantee data security.
- During creation, do not change the status of the instance. Specifically, do not stop, start, or restart the instance.

- If your custom image contains data disks, new data disks 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 disks.
- You cannot use a custom image which contains data disks to replace the system disk.

Procedure

1. Log on to the ECS console.
2. Select the target region.
3. In the left-side navigation pane, click Instances.
4. Find the target instance and click More > Disk and Image > Create Custom Image.
5. Enter a name and description for the image.
6. Click Create.



The image is available after all snapshots of all disks have been created.

Additional operation

See create a custom image by using a snapshot.

5.1.3 Use Packer to create a custom image

This topic provides information about how to install and use Packer to create a custom image.

Prerequisites

You must have an AccessKey.

> Note:
> Do not use the AccessKey of your Alibaba Cloud account. Instead, create a RAM user and use the RAM account to create the necessary AccessKey to maintain account security.

Step 1. Install Packer

Go to the official Packer download page where you can choose required version of Packer for your operating system.

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. You 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

The following examples uses Windows Server 2012 64-bit:

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, you must first create a JSON format template file. In the template, you must specify theAlibaba Cloud Image Builder andProvisioner for the custom image to be created. Packer offers a diverse range of provisioners for you to choose from when configuring the content generation mode of the custom image. In the following JSON file example, the Shell provisioner is used 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_A  CCESS_KEY `}}",
       " secret_key ": "{{ env  ` ALICLOUD_S  ECRET_KEY `}}"
     },
     " builders ": [{
       " type ":" alicloud - ecs ",
       " access_key ":"{{ user  ` access_key `}}",
       " secret_key ":"{{ user  ` secret_key `}}",
       " region ":" cn - beijing ",
       " image_name ":" packer_bas  ic ",
```

```
      " source_ima  ge ":" centos_7_0  2_64_20G_a  libase_201  70818
. vhd ",
      " ssh_userna  me ":" root ",
      " instance_t  ype ":" ecs . n1 . tiny ",
      " internet_c  harge_type ":" PayByTraff  ic ",
      " io_optimiz  ed ":" true "
    }],
    " provisione  rs ": [{
      " type ": " shell ",
      " inline ": [
        " sleep  30 ",
        " yum  install  redis . x86_64  - y "
      ]
    }]
  }
```

Note:

Customize the values of the following parameters according to your actual requirements.

Parameter	Description
access_key	Your AccessKey ID. For more details, see create an Accesskey.
secret_key	Your AccessKey Secret. For more information, see create an AccessKey.
region	The region of the temporary instance used to create the custom image.
image_name	The custom image’s name
source_image	The name of the basic image name retrieved from Alibaba Cloud public image list.
instance_type	Type of temporary instance generated to create the custom image.
internet_charge_type	The 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

To specify the Packer template file and create a custom image, follow these steps:

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 following example 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-shell25746 6182
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
```

What to do next

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.

5.1.4 Create and import on-premises images by using Packer

Packer is a convenient open-source tool to create on-premises image files. It runs on the most major operating systems.

By using Packer, you can create identical on-premises images for multiple platforms from a single source configuration. This topic details steps to create an on-premises

image for CentOS 6.9 on an Ubuntu 16.04 server and to upload it to Alibaba Cloud. For actual scenarios, you can customize your Packer templates as required.

Prerequisites

- You must have an AccessKey for the configuration file.

  > Note:
  > Do not use the AccessKey of your Alibaba Cloud account. Instead, create a RAM user and use the RAM account to create the necessary AccessKey to maintain account security.

- You must have purchased OSS.

Example 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_t  sc   art   arch_perfm  on   pebs   bts   rep_good
nopl   xtopology   nonstop_ts  c   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_deadli  ne_timer   aes   xsave   avx
  f16c   rdrand   lahf_lm   abm   3dnowprefe  tch   epb   intel_pt
  tpr_shadow   vnmi   flexpriori  ty   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_wi  ndow   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   dependenci  es .
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.

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 the configuration file centos.json as required.

```
cd / user / local # Switch the directory .
wget https :// raw . githubuser content . com / alibaba / packer
- provider / master / examples / alicloud / local / centos . json
 # Download file centos . json that is released by
Alibaba Cloud .
wget https :// raw . githubuser content . 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_A CCESS_KEY = SpecifyYou rAccessKey IDHere
# Import your AccessKeyI D ,
export ALICLOUD_S ECRET_KEY = SpecifyYou rAccessKey
SecretHere # Import your AccessKeyS ecret .
packer build centos . json # Create an on - premises
image .
```

An example result is as follows.

```
qemu output will be in this color .
==> qemu : Downloadin g or copying ISO
    qemu : Downloadin g 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).

Customize a Packer template

In this example, the following JSON file is customized based on the template used to create an image for the CentOS 6.9.

```
{" variables ": {
        " box_basena me ": " centos - 6 . 9 ",
```

```
      " build_time  stamp ": "{{ isotime  \" 2006010215  0405 \"}}",
      " cpus ": " 1 ",
      " disk_size ": " 4096 ",
      " git_revisi  on ": " __unknown_  git_revisi  on__ ",
      " headless ": "",
      " http_proxy ": "{{ env  ` http_proxy `}}",
      " https_prox  y ": "{{ env  ` https_prox  y `}}",
      " iso_checks  um_type ": " md5 ",
      " iso_checks  um ": " af4a1640c0  c6f348c6c4  1f1ea9e192  a2
",
      " iso_name ": " CentOS - 6 . 9 - x86_64 - minimal . iso ",
      " ks_path ": " centos - 6 . 9 / ks . cfg ",
      " memory ": " 512 ",
      " metadata ": " floppy / dummy_meta  data . json ",
      " mirror ": " http :// mirrors . aliyun . com / centos ",
      " mirror_dir  ectory ": " 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_comma  nd ": [
          "< tab >  text   ks = http ://{{ . HTTPIP  }}:{{ .
HTTPPort  }}/{{ user  ` ks_path `}}< enter >< wait >"
        ],
        " boot_wait ": " 10s ",
        " disk_size ": "{{ user  ` disk_size `}}",
        " headless ": "{{  user  ` headless ` }}",
        " http_direc  tory ": " http ",
        " iso_checks  um ": "{{ user  ` iso_checks  um `}}",
        " iso_checks  um_type ": "{{ user  ` iso_checks  um_type
`}}",
        " iso_url ": "{{ user  ` mirror `}}/{{ user  ` mirror_dir
ectory `}}/{{ user  ` iso_name `}}",
        " output_dir  ectory ": " packer -{{ user  ` template `}}-
qemu ",
        " shutdown_c  ommand ": " echo  ' vagrant '| sudo  - S  /
sbin / halt  - h  - p ",
        " ssh_passwo  rd ": " vagrant ",
        " ssh_port ":  22 ,
        " ssh_userna  me ": " root ",
        " ssh_wait_t  imeout ": " 10000s ",
        " type ": " qemu ",
        " vm_name ": "{{  user  ` template ` }}. raw ",
        " net_device ": " virtio - net ",
        " disk_inter  face ": " virtio ",
        " format ": " raw "
      }
    ],
  " provisione  rs ": [{
        " type ": " shell ",
        " inline ": [
            " sleep   30 ",
            " yum   install   cloud - util   cloud - init  - y "
          ]
      }],
    " post - processors ":[
      {
        " type ":" alicloud - import ",
        " oss_bucket  _name ": " packer ",
        " image_name ": " packer_imp  ort ",
        " image_os_t  ype ": " linux ",
```

```
            " image_plat  form ": " CentOS ",
            " image_arch  itecture ": " x86_64 ",
            " image_syst  em_size ": " 40 ",
            " region ":" cn - beijing "
          }
        ]
}
```

Parameters in a Packer builder

QEMU builder is used in the preceding example 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` parameters. If you have specified the `iso_checksum` parameter, the `iso_checksum_url` parameter is automatically ignored.
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. This value is not recommended. · md5 · sha1 · sha256 · sha512
iso_checksum_url	String	A URL that points 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 either the `iso_checksum` or the `iso_checksum_url` parameter. If you specify the iso_checksum parameter, the `iso_checksum_url` parameter is automatically ignored.

Parameter	Type	Description
iso_url	String	A URL that points to the ISO file, and contains 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 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, see Packer QEMU Builder.

Parameters in a Packer provisioner

The provisioner in the preceding example 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 maintain security of your Alibaba Cloud account.
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 maintain security of your Alibaba Cloud account.
region	String	Select the region where you want to upload your on-premises image. In this example, the region is cn-beijing. For more information, see regions and zones.

Parameter	Type	Description
image_name	String	The name of your on-premises image. The name is a string of 2 to 128 characters. It must begin with an English or a Chinese character. It can contain A-Z, a-z, Chinese characters, numbers , periods (.), colons (:), underscores (_), and hyphens (-).
oss_bucket _name	String	The 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_plat form	String	Distribution of the image. For example, CentOS.
image_arch itecture	String	The instruction set architecture of the image. Optional values: · i386 · x86_64
format	String	Image format. Optional values: · RAW · VHD

For more information, see Packer Alicloud Post-Processor.

Next step

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 the Alibaba Cloud repository on GitHub opstools.

- For more information about Alibaba Cloud and Packer project, visit the Alibaba Cloud & Packer repositories on GitHub packer-provider.
- For more information about configuration file ks.cfg, see Anaconda Kickstart .

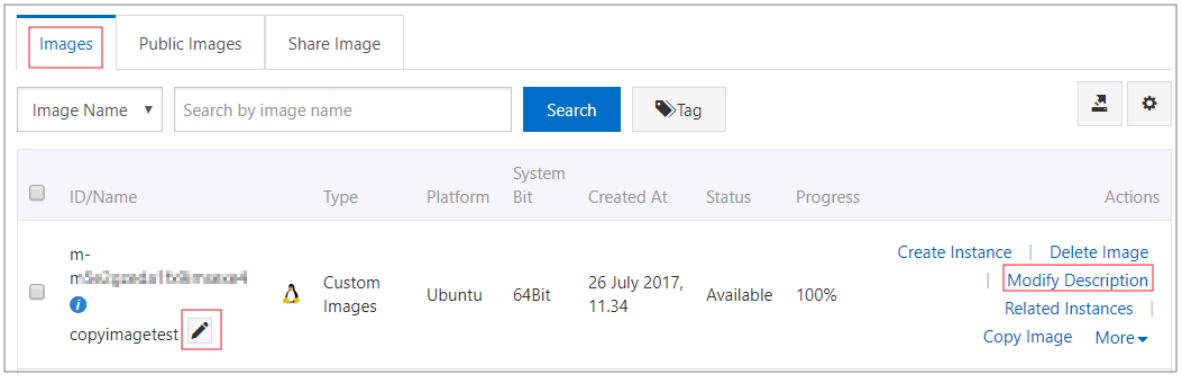
5.2 Modify custom images

This topic describes how to modify the name and description of your custom images.

Procedure

To modify the name and description of a custom image, follow these steps:

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Custom Images.
3. Find the target custom image and then click the icon.
4. Enter a new name for the custom image.



5. In the Actions column, click Modify Description.
6. In the displayed dialog box, enter a Custom Image Description
7. Click Save.

Alternatively, you can modify the name and description of a custom image by calling the ECS API `ModifyImageAttribute`.

5.3 Import images

5.3.1 Image compliance tool

This topic describes how to use the image compliance tool provided by Alibaba Cloud to check the validity of a custom Linux image and whether it meets the image import conditions.

Background information

ECS allows you to create instances from custom images. However, the custom images must meet certain requirements before they can be used in Alibaba Cloud. For more information, see Notes for importing images.

To reduce the time needed to create a custom image, we recommend that you use the image compliance tool of ECS. The image compliance tool is designed to automatically validate configuration items in a target Linux server environment to locate non-compliant items, generate TXT and JSON detection reports, and provide possible troubleshooting actions if required.

This topic uses a server running the CentOS 7.4 64-bit OS as an example.

Scenarios

The image 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.

Procedure

1. Log on to your server, VM, or cloud host.
2. Download the image compliance tool to the current directory of your server:

   ```
   wget   http :// docs - aliyun . cn - hangzhou . oss . aliyun -
   inc . com / assets / attach / 73848 / cn_zh / 1557459863  884 /
   image_chec  k
   ```

   You can also download the image compliance tool directly.
3. Run the image compliance tool with root privileges to ensure that the image compliance tool can read configuration files under permission control.

   ```
   chmod  + x   image_chec  k
   ```

```
sudo < path of the image compliance tool >/ image_chec
k - p [ destinatio n path ]
```

In the preceding code example, `< path of the image compliance tool >` is also the path where the detection report is generated. Therefore, run the following command to start the image compliance tool:

```
sudo ./ image_chec k
```

Note:

You can use the `- p [ destinatio n path ]` command to specify the path where the detection report is generated. If this parameter is not specified, the detection report will be generated in the path of the image compliance tool by default.

4. **Wait for the image compliance tool to check the system configuration.**

```
Begin check your system ......
The report is generating .
---------------------------------------
The informatio n you need to input when you import
  your image to Alibaba Cloud website :
Current system : CentOS
Architectu re : x86_64
System disk size : 42 GB
---------------------------------------
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 lib [
OK ]
Check disk size [
OK ]
Check disk use rate [
  OK ]
```

```
 Check   inode   use   rate                                                [
   OK   ]
---------------------------------------
 16   items   are   OK .
 0   items   are   failed .
 0   items   are   warning .
---------------------------------------
 The   report   is   generated : / root / image_chec  k_report_2
 019 - 05 - 10_13 - 28 - 21 . txt
 Please   read   the   report   to   check   the   details .
```

5. View the detection report.

   The path of the detection report is displayed in the tool execution result.

   In this example, the path is `/ root` . The report is named in the format of `image_check_report_date_time.txt` or `image_chec  k_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 issue	Suggestion
driver	The ECS instance cannot start normally.	Install a virtualization driver. For more information, see #unique_65.
/etc/shadow	You cannot modify the password file. As a result, 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 start SELinux by modifying `/ etc / selinux / config` .
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.
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 automatically configure your ECS instance environment.	Disable the firewall iptables, firewalld, IPFilter (IPF), IPFireWall (IPFW), or PacketFilter (PF).

Detection item	Non-compliance issue	Suggestion
file system	You cannot resize the disk.	· The XFS, Ext3, and Ext4 file systems are recommended. · The Ext2, UFS, and UDF file systems are allowed. · Do not use the `64 bit` feature for the Ext4 file system. Note: The `64 bit` feature is one feature of the Ext4 file system. You can use the `man ext4` command to view detailed descriptions.
root	You cannot use your username and password to remotely connect to the ECS instance.	Reserve the root account.
passwd	You cannot add users to the ECS instance.	Retain or reinstall the `passwd` command.
Partition table	The ECS instance cannot start normally.	Use MBR partitioning.
/lib	The ECS instance cannot be automatically configured.	The `/lib` and `/lib64` files cannot be stored in absolute paths. Modify the storage paths of the files 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 allocated.

Detection item	Non-compliance issue	Suggestion
inode usage	You cannot install the necessary drivers or services for the ECS instance.	Make sure that sufficient inode resources are allocated.

The image 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, which means an 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, which means an 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 retain the items and create an image.

Output items

The image compliance tool generates detection reports in both TXT and JSON formats in the destination path after it detects the system environment.

Note:

You can use the `-p [destination path]` command to specify the path where the detection report is generated. If this parameter is not specified, the detection report will be generated in the path of the compliance tool 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 server running the CentOS 7.4 64-bit OS.

```
The information you need to input when you import
  your image to Alibaba Cloud Website :
  Current system is : CentOS # Server operating system
  Architectu re : x86_64 # System architectu re
  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   virtualiza  tion
technology
    We   strongly   recommend   installing   kvm   driver .
```

- Reports in JSON format are named `image_chec k_report . json`. The reports include server configuration information and detection results. The following example uses a server running the CentOS 7.4 64-bit OS.

```
" platform ": " CentOS ", \\ Server   operating   system
 " os_big_ver  sion ": " 7 ", \\ Operating   system   version
number  ( major )
 " os_small_v  ersion ": " 4 ", \\ Operating   system   version
number  ( minor )
 " architectu  re ": " x86_64 ", \\ System   architectu  re
 " system_dis  k_size ": " 42 ", \\ Server   system   disk
capacity
 " version ": " 1 . 0 . 2 ", \\ Compliance   tool   version
 " time ": " 2018 - 05 - 14_19 - 18 - 10 ", \\ Detection   time
 " check_item  s ": [{
     " name ": " driver ", \\ Detection   item   name
     " result ": " OK ", \\ Detection   result
     " error_code ": " 0 ", \\ Error   code
     " descriptio  n ": " Pass :  kvm   driver   exists .", \\
Descriptio  n
     " comment ": " Alibaba   Cloud   supports   kvm   virtualiza
tion   technology .  We   strongly   recommend   installing   kvm
driver ."
  }]
}
```

What to do next

1. View the notes for importing images.
2. #unique_65.
3. (Optional) Convert the image file format.
4. #unique_11.
5. #unique_9.

5.3.2 Notes for importing images

To guarantee a successful image import and usability of the image, the following considerations must be noted before you import an image:

Windows images

Considerations

- Verify the integrity of the file system before you import images.
- Do not modify critical system files.
- Check that there is enough space on the system disk for the image to be installed.

- Configure the system disk size for importing the image based on the virtual disk size rather than the used space of the image. The system disk size ranges from 40 GiB to 500 GiB.
- Disable the firewall and allow access to RDP port 3389.
- The logon password for the administrator account must be 8 to 30 characters in length and must contain three out of the four types of characterss, namely small and capital letters, numbers, and special characters. Specifically, special characters can be `( ) ` ~ ! @ # $ % ^ & * - _ + = | { } [ ] : ; ' < > , . ? /`. Additionally, the forward slash (/) cannot be the first character of the password.

Not supported

- ISO images are not supported. However, you can create ISO images by using tools such as VirtualBox installed on-premises, and then convert the images to the RAW, VHD, or qcow2 format before importing them to Alibaba Cloud ECS.
- qemu-ga cannot be installed in the image because it will impact the availability of services needed by ECS.
- Images with the following operating systems cannot be imported: Windows XP, Windows 7 (professional and enterprise editions), Windows 8, and Windows 10.

Supported

- Multi-partition system disks.
- NTFS file systems and MBR partitions.
- Images in RAW, qcow2, or VHD format. If the target image is not in any of the preceding formats, you need to convert image file format before importing it.
- Images of the following operating systems can be imported:
  - Windows Server 2016
  - Windows Server 2012 R2
  - Windows Server 2012
  - Windows Server 2008 R2
  - Windows Server 2008
  - Windows Server 2003 with Service Pack 1 (SP1) or higher

Linux images

Considerations

- Verify the integrity of the file system before you import images.
- Do not modify critical system files, such as `/sbin`, `/bin`, and `/lib*`.
  - Do not modify `/etc/issue*`. Otherwise, the system release cannot be identified by ECS, which means the system cannot be created.
  - Do not modify `/boot/grub/menu.lst`. Otherwise, the ECS instance cannot be started.
  - Do not modify `/etc/fstab`. Otherwise, the exception partition cannot be loaded, which means the ECS instance cannot be started.
  - Do not modify `/etc/shadow` as Read-Only. Otherwise, the password file cannot be modified, which means the system cannot be created.
  - Do not modify `/etc/selinux/config` to enable SELinux. Otherwise, the system cannot be started.
- Check that there is enough space on the system disk for the image to be installed.
- Disable the firewall and allow access to SSH port 22.
- Enable Dynamic Host Configuration Protocol (DHCP).
- Install the virtualization platform XEN or KVM drives. For more information, see Install the virtio driver.
- We recommended that you install cloud-init, so as to guarantee that hostname, NTP, and yum sources can be configured successfully.
- The logon password for the root account must be 8 to 30 characters in length and must contain three out of the four types of characterss, namely small and capital letters, numbers, and special characters. Specifically, special characters can be `( ) ` ~ ! @ # $ % ^ & * - _ + = | { } [ ] : ; ' < > , . ? /`.

Not supported

- ISO images are not supported. However, you can create ISO images by using tools such as VirtualBox installed on-premises, and then convert the images to the RAW, VHD, or qcow2 format before importing them to Alibaba Cloud ECS.
- Multiple network interfaces.
- IPv6 addresses.
- System disk partitions cannot be adjusted. Currently, only a single root partition is supported.
- qemu-ga cannot be installed in the image because it will impact the availability of services needed by ECS.

Supported

- Images in RAW, qcow2, or VHD format. If the target image is not in any of the preceding formats, you need to convert image file format before importing it.
- xfs, ext3, and ext4 file systems and MBR partitions.

   Note:
  The ext4 file system cannot contain the feature `64bit`, and the features `project` and `quota` cannot appear in pairs. To check the features, run the `tune2fs -l <ext4 file system disk directory> | grep features` command to view a list of features contained in the ext4 file system.
- Images of the following operating systems can be imported:
  - Aliyun Linux
  - CentOS 5/6/7
  - CoreOS 681.2.0 and later
  - Debian 6/7
  - FreeBSD
  - OpenSUSE 13.1
  - RedHat
  - RHEL (Red Hat Enterprise Linux)
  - SUSE Linux 10/11/12
  - Ubuntu 10/12/13/14/16/18

Non-standard image usage notes (Linux)

Any Linux images that are not listed as public images provided by ECS are considered as non-standard platform images. Such images do not comply with ECS requirements for a standard operating system regarding critical system configuration files, basic system environments, and applications. If you want to use a non-standard platform image, perform the following actions as indicated by the image type:

- Others Linux: Alibaba Cloud identifies all images of this type as other Linux systems. Alibaba Cloud does not handle any instances created if you import an image of Others Linux type. If you enable DHCP before you create an image, Alibaba Cloud automatically configures your network. After creating the instance, you need to connect to the instance by using the Management Terminal feature in the console, and then manually configure the IP address, router, and password.

- Customized Linux: Customized images. After importing a customized Linux image, configure the network and password of the instance according to the standard system configuration mode of Alibaba Cloud. For more information, see customize Linux images.

5.3.3 Install cloud-init for Linux images

When you use a custom Linux image, we recommend that you install cloud-init in your servers to guarantee successful initialization of the instances running that image.

What is cloud-init?

cloud-init is an open source software used by cloud-based platforms to configure system initialization of Linux instances. It is supported by major platforms such as Alibaba Cloud, AWS, Azure, and OpenStack. For more information, see cloud-init documentation.

Alibaba Cloud cloud-init initializes the configurations of instances during their startup, including the network, NTP, software source, host name, and SSH key pair. It also executes the user data script.

Scenarios

Cloud-init is installed by default for all public images of Alibaba Cloud. If you use custom images in the following scenarios, we recommend that you install Alibaba Cloud cloud-init for your Linux servers so as to ensure the system configurations of created instances can be automatically initialized:

- Linux servers that will be migrated to Alibaba Cloud, but have not installed cloud-init.
- Linux servers that have installed cloud-init whose version is earlier than 0.7.9.
- Alibaba Cloud ECS instances that have not installed cloud-init.

Check the cloud-init version

Different cloud platforms may use different versions of cloud-init. Please select the appropriate version and configure the appropriate datasource. Alibaba Cloud uses cloud-init 0.7.6a and the data source is `Aliyun`.

After cloud-init is installed, its option of self-start upon instance startup is enabled by default. If the selected cloud-init version or data source is not suitable, cloud-init may run abnormally and the instance may start slowly (or fail to start) the next time

you restart your instance. As a result, we recommend that you back up your data before you install it. Exercise caution when you install it if you are not fully ready to migrate your servers onto Alibaba Cloud.

- Check if cloud-init is installed: `which cloud-init`

  > Note:
  > No output indicates that it is not installed and you need to install the Alibaba Cloud cloud-init.

- Check the cloud-init version: `cloud-init --version`

  > Note:
  > If the version is earlier than the community version 0.7.9 (except 0.7.6a), you need to install the Alibaba Cloud cloud-init.

(Recommended) Install the Alibaba Cloud cloud-init

1. Check and install the python-pip dependency.
2. Download the Alibaba Cloud cloud-init and decompress it to the current directory:

```
wget http://ecs-image-utils.oss-cn-hangzhou.aliyuncs.com/cloudinit/ali-cloud-init-latest.tgz
```

```
tar - zxvf ali - cloud - init - latest . tgz
```

3. Enter the *tools* directory of *cloud - init* , and then run the cloud-init installation script *deploy . sh* :

```
bash ./ deploy . sh < issue > < major_vers ion >
```

- The parameters are described as follows:
  - issue : The operating system platform. The value range is: centos | redhat | rhel | debian | ubuntu | opensuse | sles . The parameter values are case sensitive. sles represents SUSE/SLES.
  - major_vers ion : The major version of an operating system platform. For example, the major version of CentOS 6.5 is 6 .
- The following are command examples:
  - Install cloud-init in CentOS 6.5:

```
bash ./ deploy . sh centos 6
```

  - Install cloud-init in Ubuntu 14.04:

```
bash ./ deploy . sh ubuntu 14
```

4. Confirm that the installation is successful. If " descriptio n ": " success " is returned, the installation is successful.

Install the Alibaba Cloud cloud-init in different platforms

Installation commands for different platforms are shown as follows:

- CentOS 6/7

```
# Check and install python - pip
if ! python - c ' import setuptools ' >& / dev / null ;
then
  yum - y install python - pip
fi
# Back up the legacy cloud - init configurat ion
test - d / etc / cloud && mv / etc / cloud / etc / cloud -
old
# Download and decompress the Alibaba Cloud cloud -
init
wget http :// ecs - image - utils . oss - cn - hangzhou .
aliyuncs . com / cloudinit / ali - cloud - init - latest . tgz
tar - zxvf ./ ali - cloud - init - latest . tgz
# Install cloud - init
issue_majo r =$( cat / etc / redhat - release | awk '{ printf
 $ 3 }' | awk - F '.' '{ printf $ 1 }')
```

```
bash ./cloud-init-*/tools/deploy.sh centos "$
issue_major"
```

- **RHEL 6/7**

```
# Check and install python-pip
if ! python -c 'import setuptools' >&/dev/null;
then
  yum -y install python-pip
fi
# Back up the legacy cloud-init configuration
test -d /etc/cloud && mv /etc/cloud /etc/cloud-
old
# Download and decompress the Alibaba Cloud cloud-
init
wget http://ecs-image-utils.oss-cn-hangzhou.
aliyuncs.com/cloudinit/ali-cloud-init-latest.tgz
tar -zxvf ./ali-cloud-init-latest.tgz
# Install cloud-init
issue_major=$(cat /etc/os-release | grep VERSION_ID
 | awk -F '"' '{printf $2}' | awk -F '.' '{printf $1
}')
bash ./cloud-init-*/tools/deploy.sh rhel "$
issue_major"
```

- **Ubuntu 14/16/18**

```
# Check and install python-pip
if ! python -c 'import setuptools' >&/dev/null;
then
  apt-get install python-pip -y
fi
# Back up the legacy cloud-init configuration
test -d /etc/cloud && mv /etc/cloud /etc/cloud-
old
# Download and decompress the Alibaba Cloud cloud-
init
wget http://ecs-image-utils.oss-cn-hangzhou.
aliyuncs.com/cloudinit/ali-cloud-init-latest.tgz
tar -zxvf ./ali-cloud-init-latest.tgz
# Install cloud-init
issue_major=$(cat /etc/os-release | grep VERSION_ID
 | awk -F '"' '{printf $2}' | awk -F '.' '{printf $1
}')
bash ./cloud-init-*/tools/deploy.sh ubuntu "$
issue_major"
```

- **Debian 8/9**

```
# Check and install python-pip
if ! python -c 'import setuptools' >&/dev/null;
then
  apt-get -y install python-pip
fi
# Back up the legacy cloud-init configuration
test -d /etc/cloud && mv /etc/cloud /etc/cloud-
old
# Download and decompress the Alibaba Cloud cloud-
init
wget http://ecs-image-utils.oss-cn-hangzhou.
aliyuncs.com/cloudinit/ali-cloud-init-latest.tgz
tar -zxvf ./ali-cloud-init-latest.tgz
```

```
#  Install   cloud - init
 issue_majo  r =$( cat  / etc / os - release  |  grep   VERSION_ID
  |  awk  - F '"' '{ printf  $ 2 }' |  awk  - F '.' '{ printf  $ 1
 }')
 bash  ./ cloud - init -*/ tools / deploy . sh   debian  "$
 issue_majo  r "
```

- SUSE 11/12

```
#  Check   and   install   python - pip
 if  !  python  - c  ' import   setuptools '>& / dev / null ;  then
   zypper  - n   install   python - pip
 fi
#  Back   up   the   legacy   cloud - init   configurat  ion
 test  - d  / etc / cloud  &&  mv  / etc / cloud / etc / cloud -
 old
#  Download   and   decompress   the   Alibaba   Cloud   cloud -
 init
 wget   http :// ecs - image - utils . oss - cn - hangzhou .
 aliyuncs . com / cloudinit / ali - cloud - init - latest . tgz
 tar  - zxvf  ./ ali - cloud - init - latest . tgz
#  Install   cloud - init
 issue_majo  r =$( cat  / etc / os - release  |  grep   VERSION_ID
  |  awk  - F '"' '{ printf  $ 2 }' |  awk  - F '.' '{ printf  $ 1
 }')
 bash  ./ cloud - init -*/ tools / deploy . sh   sles  "$
 issue_majo  r "
```

- OpenSUSE 13/42

```
#  Check   and   install   python - pip
 if  !  python  - c  ' import   setuptools '>& / dev / null ;  then
   zypper  - n   install   python - pip
 fi
#  Back   up   the   legacy   cloud - init   configurat  ion
 test  - d  / etc / cloud  &&  mv  / etc / cloud / etc / cloud -
 old
#  Download   and   decompress   the   Alibaba   Cloud   cloud -
 init
 wget   http :// ecs - image - utils . oss - cn - hangzhou .
 aliyuncs . com / cloudinit / ali - cloud - init - latest . tgz
 tar  - zxvf  ./ ali - cloud - init - latest . tgz
#  Install   cloud - init
 issue_majo  r =$( cat  / etc / os - release  |  grep   VERSION_ID
  |  awk  - F '"' '{ printf  $ 2 }' |  awk  - F '.' '{ printf  $ 1
 }')
 bash  ./ cloud - init -*/ tools / deploy . sh   opensuse "$
 issue_majo  r "
```

(Optional) Install the community cloud-init

Prerequisites

Before installing cloud-init, you must install the git, python 2.7, and python-pip dependencies. The installation commands are as follows:

- CentOS/RedHat:

```
yum - y install git python python - pip
```

- Ubuntu/Debian:

```
apt - get - y install git python python - pip
```

- OpenSUSE/SUSE:

```
zypper - n install git python python - pip
```

Procedure

1. Log on to the source server.
2. Download the cloud-init package through git and enter the cloud-init directory:

```
git clone https :// git . launchpad . net / cloud - init
cd ./ cloud - init
```

3. Install all the dependencies:

```
pip install - r ./ requiremen ts . txt
```

4. Install cloud-init:

```
python setup . py install
```

5. Run `vi / etc / cloud / cloud . cfg` to modify the configuration file cloud.cfg.

   Modify the configurations of `cloud_init _modules :` as follows:

```
# Example datasource config
# The top level settings are used as module
# and system configurat ion .
# 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_us er '
# from the distro configurat ion specified below
 users :
   - default
 user :
     name : root
     lock_passw d : 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_ro ot : false
# This will cause the set + update hostname module to
   not operate ( if true )
 preserve_h ostname : false
 syslog_fix _perms : root : root
```

```
 datasource  _list : [  AliYun  ]
#  Example   datasource   config
 datasource :
     AliYun :
         support_xe  n :  false
         timeout :  5  # ( defaults   to   50   seconds )
         max_wait :  60  # ( defaults   to   120   seconds )
#       metadata_u  rls : [ ' blah . com ' ]
#  The   modules   that   run   in   the  ' init '  stage
 cloud_init  _modules :
```

What to do next

- For Linux servers that are ready for migration to the cloud, you can migrate them to Alibaba Cloud by using the Cloud Migration tool or import custom images.
- For ECS instances with custom Linux images that are already running on Alibaba Cloud, you can restart the system for verification. If the system is automatically configured with the host name, software source, and NTP, cloud-init is successfully installed.

Troubleshooting

Note:

- The libraries that are missing may vary according to the images. To resolve this issue, you can install them through pip, and then install cloud-init again.
- If the default package manager (for example `yum`) and the `pip` manager have installed different versions of libraries, library version conflicts may occur and lead to cloud-init running abnormally. We recommend that you download the dependency libraries according to the reported errors.

Error: no setuptools module in python

The error prompt `no setuptools module in python` means you need to install python setuptools. You can fix it in the following ways:

- CentOS/RedHat: `yum - y install python - pip`
- Ubuntu/Debian: `apt - get - y install python - pip`
- OpenSUSE/SUSE: `zypper - n install python - pip`

Error: No module named six

Run `pip install six` to resolve the following error.

```
File  "/ root / cloud - init / cloudinit / log . py ",  line  19 ,
in  < module >
     import  six
```

```
    ImportErro  r :  No   module   named   six   )
```

Error: No module named oauthlib.oauth1

Run `pip install oauthlib` to resolve the following error.

```
File  "/ root / cloud - init / cloudinit / url_helper . py ",  line
20 ,  in  < module >
      import   oauthlib . oauth1   as   oauth1
  ImportErro  r :  No   module   named   oauthlib . oauth1   )
```

Error messages do not indicate the missing libraries

If error messages do not indicate the missing libraries during installation, you can install all the dependency libraries displayed in the file requirements.txt of cloud-init.

```
pip   install  - r   requiremen  ts . txt
```

References

cloud-init website - Alibaba Cloud (AliYun)

5.3.4 Install virtio driver

This topic details which images do and do not require the virtio driver to be installed on the source server before import.

Images requiring no manual installation

After you import custom images, if the operating systems of your images are listed as follows, 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.

   Note:

   - If VIRTIO_BLK and VIRTIO_NET do not exist in the output, the virtio driver is not built in the kernel. 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 parameter `CONFIG_VIRTIO_NET` are `y`, the virtio driver is already built in the kernel. For more information, see notes for importing images and import custom images.
   - If the values of parameter `CONFIG_VIRTIO_BLK` and parameter `CONFIG_VIRTIO_NET` are `m`, continue to step 2.

2. Run `lsinitrd /boot/initramfs-$(uname -r).img | grep virtio` to make sure the virtio driver has been complied in the temporary root file system of initramfs or initrd.

   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. For more information, see notes for importing images and 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

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. The following example uses CentOS:

- 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_con  sole  -- preload = virtio_con
sole  \
```

- 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_con  sole  -- preload = virtio_con
sole  \
            / boot / initramfs -$( uname  - r ). img  $( uname  - r
)
```

- Debian/Ubuntu

```
echo  - e  ' xen - blkfront \ nvirtio_bl  k \ nvirtio_pc  i \
nvirtio_co  nsole ' >> \
/ etc / initramfs - tools / modules
mkinitramf  s  - o  / boot / initrd . img -$( uname  - r )"
```

To compile and install virtio driver

The following example uses a Red Hat server:

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_pa  th =$( find  / usr / src / - name  " Module . symvers
")
 test  - f  $ symvers_pa  th  &&  cp  $ symvers_pa  th  .
 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   --->
  [*]  Paravirtua  lized   guest   support   --->
    ---  Paravirtua  lized   guest   support
( 128 )    Maximum   allowed   size   of   a   domain   in
gigabytes
[*]    KVM   paravirtua  lized   clock
[*]    KVM   Guest   support
```

```
Device   Drivers   --->
 [*]  Block   devices   --->
< M >    Virtio   block   driver  ( EXPERIMENT  AL )
-*-  Network   device   support   --->
    < M >    Virtio   network   driver  ( EXPERIMENT  AL )
```

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.

```
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.

What to do next

After compiling the virtio driver, you can migrate your server to Alibaba Cloud by using the Cloud Migration Tool.

5.3.5 Customize Linux images

If your selected OS is not supported by Alibaba Cloud, and cloud-int cannot be installed, you can select Customized Linux when importing a customized image. Alibaba Cloud will then regard the customized Linux image as an unrecognized OS type (that is, it lacks necessary standard configuration information for ECS instance start for the first time). In this case, you need to add a parsing script to the customized image before importing the image, so as to facilitate automatic configuration of the instance at the first start.

Limitations

- The first partition of the customized Linux image must be writable.
- The first partition type of the customized Linux image must be FAT32, EXT2, EXT3, EXT4, or UFS.
- The size of the virtual file of the customized Linux image must be larger than 5 GiB.
- Security requirements for customized Linux images are as follows:
  - There is no high-risk vulnerability that can be remotely exploited.
  - When you log on to an instance for the first time through the Management Terminal of the ECS console, you must change the initial default password (if there is any) before performing subsequent actions.
  - There is no default SSH private key pair. The initial SSH private key pair must be randomly generated by Alibaba Cloud.

Procedure

1. Create the `aliyun_cus tom_image` directory in the root directory of the first image partition.

   When the instance that is created using the customized Linux image is started for the first time, Alibaba Cloud will write configuration information into the os.conf file in the `aliyun_cus tom_image` directory. Alibaba Cloud will automatically create an os.conf file if there is none.
2. Create a parsing script in the image to parse system configurations of the os.conf file. For details about how to write a script, see attentions on script parsing and parsing script example.

Example of the os.conf file

For instances using classic networks

```
hostname = iZ23r29djm  jZ
password = cXdlcjEyMz  QK
eth0_ip_ad  dr = 10 . 171 . 254 . 123
eth0_mac_a  ddr = 00 : 8c : fa : 5e : 14 : 23
eth0_netma  sk = 255 . 255 . 255 . 0
eth0_gatew  ay = 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_ad  dr = 42 . 120 . 74 . 105
eth1_mac_a  ddr = 00 : 8c : fa : 5e : 14 : 24
eth1_netma  sk = 255 . 255 . 255 . 0
eth1_gatew  ay = 42 . 120 . 74 . 1
eth1_route =" 0 . 0 . 0 . 0 / 0   42 . 120 . 74 . 1 "
dns_namese  rver =" 7 . 7 . 7 . 7   8 . 8 . 8 . 8 "
```

The following table describes the parameters.

Parameter	Parameter description
hostname	The host name
password	The password, which is Base64-encoded
eth0_ip_addr	The IP address of the eth0 NIC
eth0_mac_addr	The MAC address of the eth0 NIC
eth0_netmask	The network mask of the eth0 NIC
eth0_gateway	The default gateway of the eth0 NIC
eth0_route	The eth0 intranet route list, in which routes are separated by semicolons (;) by default
eth1_ip_addr	The IP address of the eth1 NIC

Parameter	Parameter description
eth1_mac_addr	The MAC address of the eth1 NIC
eth1_netmask	The network mask of the eth1 NIC
eth1_gateway	The default gateway of the eth1 NIC
eth1_route	The eth1 internet route list, in which routes are separated by semicolons (;) by default
dns_nameserver	The DNS address list, in which addresses are separated by spaces by default

For instances using VPCs

```
hostname = iZ23r29djm  jZ
password = cXdlcjEyMz  QK
eth0_ip_ad  dr = 10 . 171 . 254 . 123
eth0_mac_a  ddr = 00 : 8c : fa : 5e : 14 : 23
eth0_netma  sk = 255 . 255 . 255 . 0
eth0_gatew  ay = 10 . 171 . 254 . 1
eth0_route =" 0 . 0 . 0 . 0 / 0   10 . 171 . 254 . 1 "
dns_namese  rver =" 7 . 7 . 7 . 7   8 . 8 . 8 . 8 "
```

The following table describes the parameters.

Parameter	Parameter description
hostname	The host name
password	The password, which is Base64-encoded
eth0_ip_addr	The IP address of the eth0 NIC
eth0_mac_addr	The MAC address of the eth0 NIC
eth0_netmask	The network mask of the eth0 NIC
eth0_gateway	The default gateway of the eth0 NIC
eth0_route	The eth0 intranet route list, in which routes are separated by semicolons (;) by default
dns_nameserver	The DNS address list, in which addresses are separated by spaces by default

Script parsing considerations

In normal cases, when an instance is started for the first time, Alibaba Cloud automatically writes information about configuration items into the os.conf file in the `aliyun_cus tom_image` directory in the root directory of the first partition. To configure a customized Linux image, you must create a pre-defined parsing script in

the image. Then, Alibaba Cloud reads configuration information about the instance from the os.conf file to complete instance configuration. The following conditions must be met for script parsing:

- Automatic start: The parsing script should be automatically started. To do so, place the script in the `/etc/init.d/` directory.
- Configuration item value rules: As described in example of the os.conf file , instances using classic networks and those using VPCs differ in rules of the number of configuration items and values of some configuration items.
- Configuration file read path: By default, names of the devices allocated for the first partition vary with types of the instances created for the customized Linux image, including I/O optimization instances and non-I/O optimization instances. Therefore, you are recommended to use `uuid` or `label` to indicate devices in the first partition. Because the user password is a Base64-encoded string, it therefore must be Base64-encoded in the script.
- Network type: When using the parsing script to determine the network type, you can check whether there is `eth1_route` or other eth1-related configuration item. To do so, parse and process the instance accordingly after determining whether it uses a classic network or VPC.
  - Instances using VPCs are configured with Internet routes that are specified by the `eth0_route` parameter in the os.conf file.
  - Instances using classic networks are configured with Internet routes that are specified by the `eth1_route` parameter in the os.conf file, and intranet routes are specified by the `eth0_route` parameter.
- Configuration optimization: Configurations in the os.conf file are executed only once during the instance life cycle. You are recommended to delete the os.conf file after the parsing script is successfully executed. The parsing script does not execute configurations in the os.conf file if it does not read any.
- Customized image processing: When you create a customized image based on the customized Linux image, the script requiring automatic start is also included in the new image. Alibaba Cloud will write os.conf file configurations when the instance is started for the first time. Then, the parsing script immediately executes the configurations upon detection.
- Configuration change processing: When instance configurations are changed through the Alibaba Cloud console or APIs, Alibaba Cloud writes related

information into the os.conf file. Then, the parsing script executes the configurations again to issue the changes.

Parsing script example

The following uses a parsing script used for CentOS as an example. You can change the script content as needed. Make sure that the script has been successfully debugged in the image before you use the script.

```
#! / 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 - Descriptio  n :  The   initial   os - conf   job ,  config
   the   system .
###  END   INIT   INFO

 first_part  ition_dir ='/ boot /'
 os_conf_di  r =${ first_part  ition_dir }/ aliyun_cus  tom_image
 os_conf_fi  le =${ os_conf_di  r }/ os . conf

 load_os_co  nf () {
  if  [[ - f  $ os_conf_fi  le  ]];  then
  . $ os_conf_fi  le
   return   0
  else
   return   1
  fi
}

 cleanup () {
 #  ensure  $ os_conf_fi  le   is   deleted ,  to   avoid   repeating
   config   system
  rm  $ os_conf_fi  le  >& / dev / null
 #  ensure  $ os_conf_di  r   is   exitst
  mkdir  - p  $ os_conf_di  r
}

 config_pas  sword () {
  if  [[ - n  $ password  ]];  then
   password =$( echo  $ password  |  base64  - d )
   if  [[ $? ==  0  && - n  $ password  ]];  then
    echo  " root :$ password " |  chpasswd
   fi
  fi
}

 config_hos  tname () {
  if  [[ - n  $ hostname  ]];  then
   sed  - i  " s /^ HOSTNAME =. */ HOSTNAME =$ hostname /" / etc /
 sysconfig / network
   hostname  $ hostname
  fi
}
```

```
 config_dns () {
  if  [[ - n  $ dns_namese  rver  ]];  then
   dns_conf =/ etc / resolv . conf
   sed  - i  '/^ nameserver .*/ d ' $ dns_conf
   for   i   in  $ dns_namese  rver ;  do
    echo  " nameserver  $ i " >> $ dns_conf
   done
  fi
}

 is_classic  _network () {
 #  vpc :  eth0
 #  classic :  eth0   eth1
  grep  - q  ' eth1 ' $ os_conf_fi  le
}

 config_net  work () {
 / etc / init . d / network   stop
  config_int  erface   eth0  ${ eth0_ip_ad  dr } ${ eth0_netma  sk }
 ${ eth0_mac_a  ddr }
  config_rou  te   eth0  ${ eth0_route }
  if   is_classic  _network  ;  then
   config_int  erface   eth1  ${ eth1_ip_ad  dr } ${ eth1_netma  sk }
 ${ eth1_mac_a  ddr }
   config_rou  te   eth1  ${ eth1_route }
  fi
 / etc / init . d / network   start
}

 config_int  erface () {
  local   interface =$ 1
  local   ip =$ 2
  local   netmask =$ 3
  local   mac =$ 4
  inteface_c  fg ="/ etc / sysconfig / network - scripts / ifcfg -${
 interface }"
  cat  <<  EOF  > $ inteface_c  fg
 DEVICE =$ interface
 IPADDR =$ ip
 NETMASK =$ netmask
 HWADDR =$ mac
 ONBOOT = yes
 BOOTPROTO = static
 EOF
}

 config_def  ault_gatew  ay () {
  local   gateway =$ 1
  sed  - i  " s /^ GATEWAY =. */ GATEWAY =$ gateway /" / etc /
 sysconfig / network
}

 config_rou  te () {
  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_def  ault_gatew  ay  $ gw
    fi
   done
}

##################  sysvinit   service   portal  ####################

 start () {
  if   load_os_co  nf  ;  then
   config_pas  sword
   config_net  work
   config_hos  tname
   config_dns
   cleanup
   return   0
  else
   echo  " not   load  $ os_conf_fi  le "
   return   0
  fi
}

 RETVAL = 0

 case  "$ 1 "  in
     start )
         start
         RETVAL =$?
    ;;
    *)
         echo  " Usage : $ 0  { start }"
         RETVAL = 3
    ;;
 esac

 exit  $ RETVAL
```

5.3.6 Convert image file format

Only image files in qcow2, RAW, or VHD format can be imported. If you want to import images in other formats, you need to convert the format before importing the image. This topic describes how to use the qemu-img tool to convert other image file formats to VHD or RAW. Using qemu-img, you can convert RAW, qcow2, VMDK, VDI, VHD (vpc), VHDX, qcow1, or QED, to VHD, or implement conversion between RAW and VHD.

Windows

To install qemu-img and convert the image file format, follow these steps:

1. Log on to your server or VM, download qemu-img and complete the installation. Installation path: `C :\ Program   Files \ qemu .`

2. Perform the following actions to create an environment variable for qemu-img:
   a. Choose Start > Computer, then 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 then click Environment Variables.
   d. In the Environment Variables dialog box, find the Path variable in the System Variables part, and then click Edit. If the Path variable does not exist, click New.
   e. Add a system variable value:
      - In the case of Edit System Variable: In the Variable Value field, add `C :\ Program Files \ qemu` . Different variable values are separated with a semicolon (;).
      - In the case of New System Variable: In the Variable Name field, enter `Path` . In the Variable Value field, enter `C :\ Program Files \ qemu` .
3. Open Command Prompt in Windows and run the `qemu - img -- help` command. If the result is displayed correctly, the environment variable is configured successfully.
4. In the Command prompt, run the `cd [ directory of the source image file ]` command to change the directory. For example, `cd D :\ ConvertIma ge` .
5. Run the `qemu - img convert - f qcow2 - O raw centos . qcow2 centos . raw` command to convert the image file format. Where:
   - `- 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

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 - get install qemu - utils` .
   - For CentOS, run the command `yum install qemu - img` .

2. Run the `qemu-img convert -f qcow2 -O raw centos.qcow2 centos.raw` command to convert the image file format. Where:
   - `-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.

FAQ

- What do I do if an error occurs during qemu-img installation and the error message does not indicate which dependent libraries are missing?

  Run `pip install -r requirements.txt` to install all the dependent libraries based on the libraries contained in the *requirements.txt* file of cloud-init.
- What do I do if the error `Unable to locate package qemu-utils` is returned during the installation of qemu-img on the Ubuntu?

  Run the following commands to install qemu-img:

```
apt-get update # Updating the package list
apt-get install qemu-utils # Installing qemu-img
```

What to do next

Import custom images.

5.3.7 Import custom images

You can import on-premises image files to your ECS environment to create ECS instances or change system disks

Note:

- The time it takes to import an image depends on the size of the image file and the number of concurrent tasks.
- When you import an image, a snapshot is automatically generated. You can view the snapshot information on the Snapshots page in the ECS Console. Before the import image task is completed, the status of the snapshot is displayed as Failed. When the task is completed, the status is automatically updated to Successful. The

> snapshot capacity is the size of the imported image file, regardless of the system disk size that was set when the image was imported.

Prerequisites

Before importing an image, we recommend that you:

- Review the notes for importing images, customize Linux images, and convert image format to understand the limitations of importing an on-premises image.
- Activate OSS.
- (Optional) If you are using a RAM sub-account, you need to contact the master account in advance to obtain the permission for the `AliyunECSI mageImport DefaultRol e` role.

Procedure

To import custom images in the ECS console, follow these steps:

1. Use an OSS third-party client, OSS API or OSS SDK to upload the prepared custom image. If the file you want to upload is larger than 5 GiB, see multipart upload.
2. Log on to the ECS console.
3. In the left-side navigation pane, choose Snapshots and Images > Images.
4. Click Import Image.
5. In the Import Image dialog box, click Confirm Address as follows.
6. In the Cloud Resource Access Authorization window, select `AliyunECSI mageImport DefaultRol e` and `AliyunECSE xportDefau ltRole`, then click Confirm Authorization Policy to allow the ECS service to access your OSS resources.
7. On the Images page, click Import Image again.

8. In the Import Image dialog box, enter the following information:
   - Region of Image: Select the region where the OSS Bucket of the image file to upload is located.
   - OSS Object Address: Copy the object address of the image file from the OSS console. For more information, see download an object.
   - Image Name: Enter a name for the custom image. The name must be 2 to 128 characters in length and can contain letters, numbers, Chinese characters, periods (.), underscores (_), colons (:), and hyphens (-).
   - Operating System: Select Windows or Linux, that is, the same as that of your image. If you want to import a non-standard platform image, select Linux.
   - System Disk Size: The system disk size, which ranges from 40 GiB to 500 GiB.
   - System Architecture: Choose x86_64 for 64 bit operating systems and choose i386 for 32 bit operating systems.
   - Platform: The options depend on the Operating System you chose.
     - Windows: Windows Server 2003, Windows Server 2008, and Windows Server 2012.
     - Linux: Centos, SUSE, Ubuntu, Debian, FreeBSD, CoreOS, Aliyun, Customized Linux, and Others Linux (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 qcow2, RAW, and VHD. Qcow2 or VHD is recommended.
   - Image Description: Enter a description of the custom image.
   - Add Images of Data Disks: Choose this option if you want to import an image that contains data disks. Supported data disk capacity ranges from 5 GiB to 2,000 GiB.
9. Click OK.
10. (Optional) You can view the task progress in the image list of the import region. Before the task is completed, you can find the imported custom image through Tasks management, and, if needed, cancel the import task.

You can also use the ECS API #unique_86 to import a custom image.

Next step

Create an instance from a custom image.

References

- Custom images FAQ
- Create and import on-premise images by using Packer

5.4 Copy custom images

This topic describes how to copy a custom image that is under your Alibaba Cloud account. This action enables you to create identical ECS instances across regions, allowing you to implement seamless data backups of the target instances.

Background information

An image is a regional resource, and a custom image belongs to the region where it is created. The following table lists the different scenarios of using custom images.

Scenario	Procedure	Description
Copy images across regions under the same account	See Copy images.	When an image is copied, the correspond ing snapshot is generated in the target region at the same time. After the copy operation is completed, a new image is generated in the target region, and it has a unique image ID.
Copy images across regions under different accounts	See Copy images and Share images.	An image is copied to the target region and then shared with the target account.
Share images in the same region under different accounts	See Share images.	This operation does not create a new image . The shared image still belongs to you.

Limits

Before you copy a custom image, note the following:

- Only custom images can be copied across regions. If you need to copy an image of another type, you need to first use that image to create an instance and then use

that instance to create a custom image. Afterwards, you can copy the newly created custom image to the target region.

- When an image is copied, a corresponding snapshot is generated in the target region at the same time, and then a custom image is generated based on the snapshot. Therefore, data traffic occurs between the source and target regions. Currently, no fees are charged for this traffic. For the latest billing details, see the official Alibaba Cloud website for announcements.
- The created custom image in the target region has the same configuration as the original custom image. However, the related role authorization and service authorization information is not copied, nor are the settings of instance user data.
- The task completion time depends on the image size, the network transmission speed, and the number of concurrent tasks in the queue.
- Images with encrypted snapshots cannot be copied across regions.

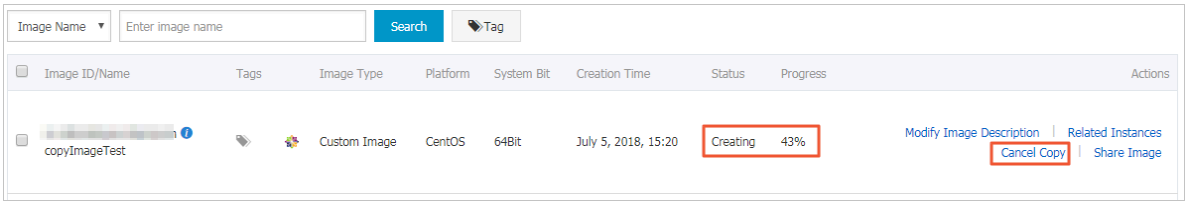
Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Custom Images.
3. Select the custom image to be copied. Note that Type must be Custom Images. Then, in the Actions column, click Copy Image.

   Note:
   If your custom image is larger than 500 GiB, when you click Copy Image, you will be directed to open a ticket to complete the operation.
4. In the Copy Image dialog box, verify the ID of the selected image is the target image, and then complete the following configurations:
   a. Select the Target Region.
   b. Enter Custom Image Name and Custom Image Description that are shown in the target region.
   c. Click OK.
5. (Optional) Switch to the target region and check the progress. When 100% is displayed, the image is copied successfully.

   Note:

If Progress is not 100%, Status is Creating. In this case, you can click Cancel Copy to cancel the operation. After the operation is canceled, the image information is removed from the target region.



You can also call the ECS APIs CopyImage and CancelCopyImage to perform the preceding operations.

What to do next

When a copied image is in the Available status, you can use it to create an instance or change the system disk.

You can also view the copied snapshot in the target region.

5.5 Share images

After creating a custom image, you can share it with other Alibaba Cloud users. Shared images help new users adapt to ECS faster as they can quickly create ECS instances and set up business environments based on your custom images. Moreover, shared images do not consume the image quota of the account from which an image is shared.

Attention

You can only share custom images you have created, not custom images created and shared by other users. Each custom image can be shared with up to 50 users within the same Alibaba Cloud region. That is, an image cannot be shared across regions.

Before sharing an image, make sure that all sensitive data and files have been deleted from the image.

Note:
The integrity or security of shared images is not guaranteed. Make sure that you use only images shared by trusted accounts before using shared images. Besides, you shall bear the risk on your own. After you create an instance based on a shared

image, be sure to connect the instance to check the integrity and security of the image.

Sharing image restrictions

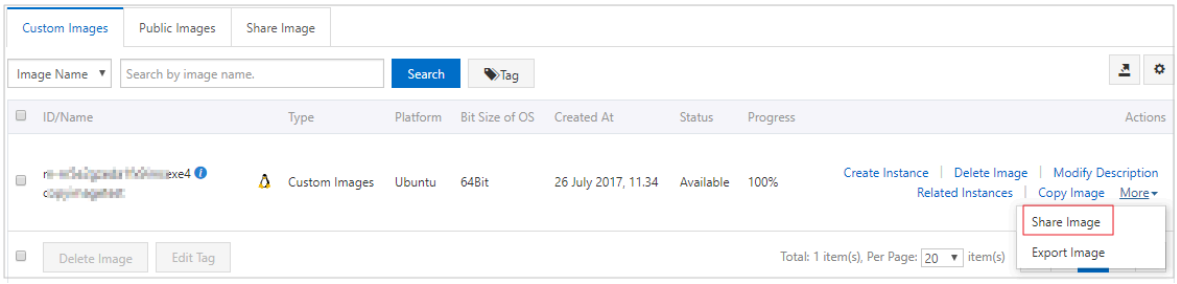
If your custom image has been shared with other accounts, you must remove all the sharing relationships for that image before you can delete the image. After deleting a shared custom image:

- Users who are using the shared image will no longer be able to find the image through the ECS console or ECS API, nor can they use the image to create ECS instances or replace system disks.
- ECS instances that are created from the shared image cannot re-initialize their system disks.

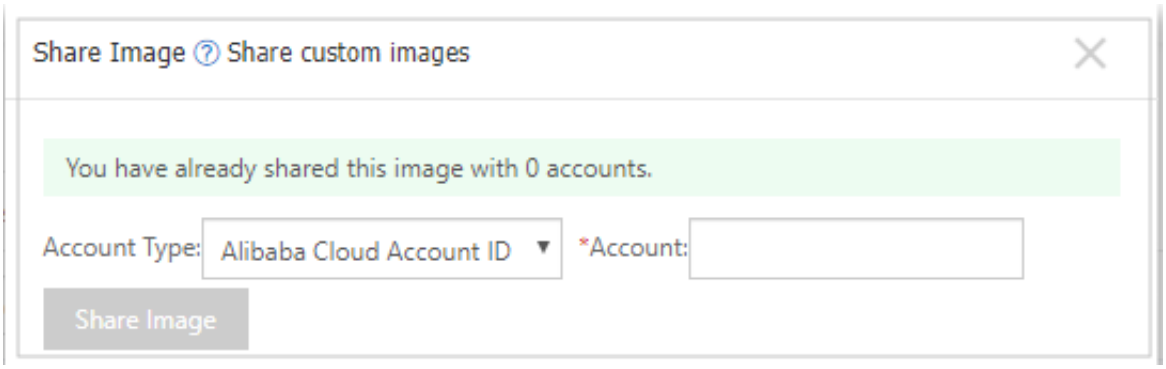
Share an image

To share an image in the ECS console, follow these steps:

1. Log on to the ECS console.
2. Select the target region.
3. In the left-side navigation pane, choose Snapshots and Images > Images.
4. Select the target Custom Image the, in the Actions column, click Share Image.



5. In the pop-up dialog box, select Alibaba Cloud Account ID in the Account Type drop-down list. Then, enter the account ID that you want to share the image with in the Account box. For more information, see Appendix:How to get the account ID?.



> Note:
> If you want to stop sharing the image with an account, click Unshare next to the account. After you cancel the sharing, that account will be unable to query and use the image. This means that i that account has already created an instance by using this shared image, the instance will be unable to re-initialize the system disk.

6. (Optional) For the accounts with whom you share an image, these account can view the shared image in Snapshots and Images > Images > Share Image in the same region in the ECS console.

You can also use the ECS APIs `ModifyImageSharePermission` and `DescribeImageSharePermission` to share an image.

Next steps

After an image is shared with other users, they can use it to create one or more instances.

1. Log on to the ECS console.
2. Create one or more instances by referring to Step 2. Create an instanceCreate an instance in *Quick Start*. Note that you should select Shared Image during the procedure.

They can also use the shared image to #unique_46 for instances.

Appendix: How to get the account ID?

To find your account ID, follow these steps:

1. Log on to the ECS console.
2. Hover your mouse over your avatar and then click Security Settings from the account menu.
3. On the page that appears, the account ID is displayed at the right as follows.

5.6 Export custom images

You can export custom images for on-premises testing or for Apsara stack environments.

Note:

- The time it takes to export an image depends on the size of the image file and the number of export tasks in the queue.
- Exported images are stored in your OSS bucket. This means you are billed for the OSS storage and download traffic. For more information, see OSSbilling items.

Limitations

Currently, the image export function has the following limitations:

- You cannot export custom images that are created by a system disk snapshot from the Alibaba Cloud 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 no greater than 500 GiB.
- When using exported custom images to create an instance by using the wizard, you must confirm that the file device recorded in /etc/fstab corresponds to the exported data disk snapshot information.

Prerequisites

Before exporting a custom image, you must:

- Open a ticket to activate the image export feature, and 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. For more information, seecreate a bucket.

Procedure

To export a custom image in the ECS console, follow these steps:

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Snapshot & Images > Images.
3. Select the target region.
4. Find the custom image you want to export and then, in the Actions column, click Export Image.
   a. In the Export Image dialog box, clickConform Address.
   b. In the Cloud Resource Access Authorization window, click Confirm Authorization Policy to allow ECS to access your OSS resources.
5. Return to the ECS console homepage. In the Actions column of the Images page, click Export Image again.
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.
8. (Optional) Cancel the image export task. Before the task is completed, you can go to the Tasksmanagement page in the ECS console, find the relevant task in the specified region and cancel the task.

You can also use the ECS APIs `ExportImage` and `CancelTask` to perform the preceding operations.

Next steps

When an exported custom image contains a data disk snapshot, multiple files appear in your OSS. The file name with `system` indicates a system disk shapshot and the file name with `data` indicates a data disk snapshot. A data disk snapshot has an identifier corresponding to the data disk, which is the mount point of the data disk, such as xvdb or xvdc.

1. Log on to the OSS console to query the export result.
2. After the custom image is exported successful, download the object and then download the custom image file.

Note:

The format of the image file is RAW by default. However, the .tar.gz format is also available during the gated launch period, and the file is in the .raw format after you unzip the .tar.gz file. If you are using Mac OS X operating system, the agent gnu-tar is recommended to unzip the file.

5.7 Delete custom images

This topic describes how to delete a custom image. You can delete a custom image if you no longer need it. Deleting a custom image does not impact the instances created from the image or images copied from this image. Similarly, deleting image copies of a custom image has no impact on this custom image.

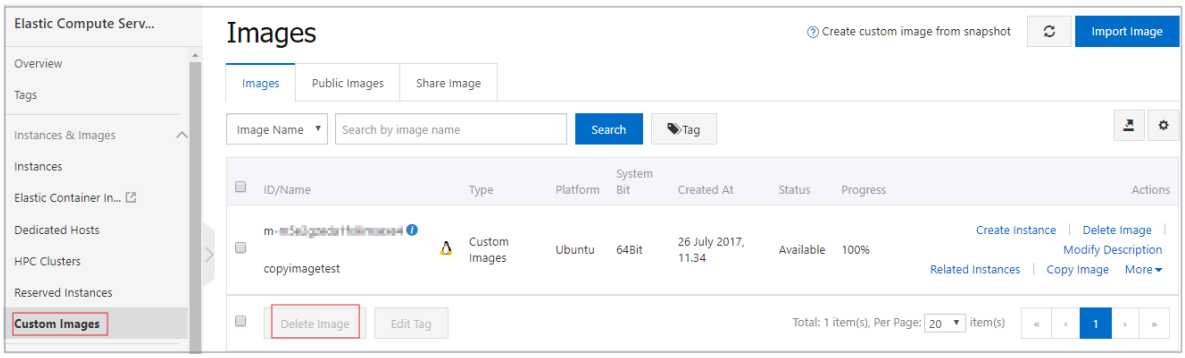
Limits

- After a custom image is deleted, it cannot be used to create new ECS instances . However, ECS instances created from the deleted custom image can still run normally (that is, continue to incur fees), but these instances cannot reinitialize their cloud disks.
- If the to be deleted custom image has been shared to other accounts, you must remove all permissions that allow shared access to the custom image before you can delete the image. After a shared image is deleted:
  - Users who are using the shared image will no longer be able to find the image through the ECS console or ECS API, nor can they use the image to create ECS instances or replace cloud disks.
  - ECS instances that are created from the shared image cannot reinitialize their cloud disks.

Procedure

1. Log on to the ECS console.
2. In the left-side navigation pane, choose Instances & Images > Custom Images.

3. On the Images tab page, select the image you want to delete. Note that the image type must be Custom Images.



4. Click Delete Image.
5. In the displayed dialog box, select the deletion method.
   - Delete: Delete a custom image by following the general procedures.
   - Force Delete: Forcibly delete a customer image. Select this option if you have created ECS instances by using this image.

> **Notice:**
> After a custom image is forcibly deleted, instances created by using this image cannot reinitialize their cloud disks.

6. Click OK.

You can also call DeleteImage to delete a custom image.

6 Marketplace images

An Alibaba Cloud Marketplace image is equivalent to the installation disk for an Elastic Compute Service (ECS) instance. A Marketplace image allows you to quickly obtain a running environment for ECS instances and any pre-installed software applications. Such an image can be used for site deployment, application development, and visualized management. Marketplace images effectively allow ECS instances to be used out-of-the-box, helping to reduce costs.

Select a Marketplace image when creating an instance

We recommend that you use a Marketplace image if you are new to working with ECS instances. To deploy a Marketplace image, follow these steps:

1. Go to the ECS purchase page.
2. Select and configure your image. For more information, see create an Instance. Then, on the Image configuration page, choose Marketplace Image > Select from image market (including operating system).

Purchase an image from Alibaba Cloud Marketplace and create an instance

1. Go to Alibaba Cloud Marketplace.
2. Select the required image and click Buy Now.
3. You may be required to log on to the Alibaba Cloud console before proceeding.

4. Select and configure your image. For more information, see create an instance.

Change the operating system by using the Marketplace image

If you have purchased ECS instances, use an image to deploy the running environmen t or install software applications as follows:

Note:
If you change the image, the data on the system disk will be lost. Therefore, we recommend that you back up your data before changing your operating system. For more information, see Create snapshots.

1. Log on to the ECS console.

2. Stop the target instance.
3. On the Replace System Disk page, select Marketplace Image in the Image Type setting. For more information, see replace the system disk (non-public image).

7 Open source tools

8 Change the operating system

You can convert the OS running on your ECS instance to another supported OS through the ECS console.

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 want to use a public image, see change a system disk (public image).

Note:
Currently, instances that are hosted in regions outside of mainland China do not support swapping between Linux and Windows OSs. If your instance is hosted in one of these regions, you can only change its version of Windows OS to another version of Windows, or replace its current Linux OS with another Linux OS.

9 FAQ

9.1 Image FAQ

What differences are there between Aliyun Linux 2 and Aliyun Linux?

Aliyun Linux 2 differs from Aliyun Linux in the following aspects:

- Aliyun Linux 2 is optimized for containers to better support cloud-native applications.
- Aliyun Linux 2 is equipped with an updated Linux kernel mode and updated user mode packages.

How do I use Aliyun Linux 2 in Alibaba Cloud?

Alibaba Cloud provides an official public image for Aliyun Linux 2. You can select this image when you create an ECS instance.

Am I charged for the use of Aliyun Linux 2 in Alibaba Cloud ECS?

No, the Aliyun Linux 2 image is free to use. You are only charged for the usage of the corresponding ECS instance to which the image is applied.

Which ECS instance types does Aliyun Linux 2 support?

Aliyun Linux 2 supports most ECS instance types, including ECS Bare Metal Instance.

> Note:
> Aliyun Linux 2 cannot be applied to instances that use the Xen virtual machine platform or a classic network, and will not be displayed as an image option.

Does Aliyun Linux 2 support 32-bit applications and databases?

No. Currently, Aliyun Linux 2 does not support 32-bit applications or databases.

Does Aliyun Linux 2 provide a GUI desktop?

No. Currently, Aliyun Linux 2 does not provide a GUI desktop.

Can I view the source code of Aliyun Linux 2 components?

Yes. Aliyun Linux 2 complies with open source protocols. You can use the yumdownloader tool or visit official Alibaba Cloud download pages to download the

source code package. You can also download the source code tree of the Aliyun Linux kernel from Github.

Is Aliyun Linux 2 backward-compatible with the current Aliyun Linux version?

Yes. Aliyun Linux 2 is fully compatible with Aliyun Linux 17.01.

> Note:
> If you use a kernel module that you compiled, you may need to re-compile it on Aliyun Linux 2 before you can use it.

Can I use Aliyun Linux 2 locally?

No. Currently, Aliyun Linux 2 only supports Alibaba Cloud ECS. Third-party virtualized platforms are not supported.

Which third-party applications can run on Aliyun Linux 2?

Currently, Aliyun Linux 2 is binary-code compatible with CentOS 7.6.1810. Therefore, applications that can run on CentOS can also run on Aliyun Linux 2.

What are the advantages of Aliyun Linux 2 when compared with other Linux operating systems?

Compared with CentOS and RHEL, Aliyun Linux 2 has the following advantages:

- Updates are released at a faster, and provide more advanced Linux kernels, user mode software, and toolkit
- No configuration required, out-of-the-box functionality
- Zero run-time billing (compared with RHEL) and provided with commercial support (compared with CentOS)

What data protection functions are included with Aliyun Linux 2?

Aliyun Linux 2 protects your data by using the following methods:

- It uses industry standard vulnerability scanning and security test tools to conduct periodical security scanning.
- It periodically accesses the CVE patch of CentOS 7 to fix OS security vulnerabilities.
- It supports existing OS security solutions of Alibaba Cloud.
- It uses the same mechanism as CentOS 7 to release user security alerts and patch updates.

> Note:

Aliyun Linux 2 is binary-code compatible with CentOS 7.6.1810 and RHEL 7.6, and is security compliant with the RHEL safety specifications.

Does Aliyun Linux 2 support data encryption?

Yes. Aliyun Linux 2 retains the data encryption toolkit of CentOS 7 to support data encryption implemented by CentOS 7 and KMS.

How do I grant permissions to manage Aliyun Linux 2?

The method to grant permissions to manage Aliyun Linux 2 is the same as that of Alibaba Cloud CentOS 7. This means that an administrator of CentOS 7 can use the same management commands to grant permissions of Aliyun Linux 2.

Does the system disk of an ECS instance support KMS encryption, and can I use KMS encryption through Terraform or Packer?

The system disk of an ECS instance supports KMS encryption by using the key that is automatically generated by KMS. After you select KMS encryption, ECS automatically creates a dedicated CMK in the region where KMS is used. For more information, see #unique_115.

Support for Terraform is available, while support BYOK encryption and Packer encryption is in development.

In Terraform, you can set the `encrypted` parameter to enable or disable KMS encryption. For more information, see alicloud_disks.

9.2 Manage Windows Server Semi-Annual Channel images and instances

This topic describes the various methods you can use to manage an Alibaba Cloud ECS instance created from a Windows Server Semi-Annual Channel image.

Image overview

ECS now supports Windows Server Semi-Annual Channel images. When creating an instance, you can find the Version 1809 Datacenter image in the list of Windows Server public images. Windows Server Semi-Annual Channel images are operating system images running in pure Server Core mode and do not provide a graphical user interface. Windows Server Semi-Annual Channel images have much looser requirements for hardware, thus reducing the update frequency and supporting

remote management. Alibaba Cloud ECS currently supports the following Windows Server Semi-Annual Channel versions:

- Windows Server 1809 Datacenter edition
- Windows Server 1709 Datacenter edition

Instance management tools

Instances that run Windows Server Semi-Annual Channel are not provided with the resource manager or control panel functions, or Windows Explorer, and do not support any .msc features (such as devmgmt.msc). However, you can manage Windows Server Semi-Annual Channel instances by using such tools as Sconfig, Server Manager, PowerShell, and Windows Admin Center.

Additionally, Windows Server Semi-Annual Channel instances run in Server Core mode. In this case, we recommend that you use PowerShell and Windows Admin Center to manage your instances. Procedures for the preceding management tools are provided in the following sections For more information, see Manage a Server Core server.

PowerShell

In the following example, assume that the public IP address of your instance is 172.16.1XX.183. To implement PowerShell for remote management, follow these steps:

1. Connect to the target instance. For more information, see Connect to a Windows instance.
2. Enter `PowerShell` in the command line of the target instance.
3. Run the following command in PowerShell:

```
Enable - PSRemoting  - Force
Set - NetFirewal  lRule  - Name  " WINRM - HTTP - In - TCP - PUBLIC
" - RemoteAddr  ess   Any
```

4. Add a rule to the security group of the target instance to allow access to the HTTP port 5985 and the HTTPS port 5986. For more information, see Add security group rules.
5. Enter `PowerShell` in the command line of your client.

6. Run the following command in PowerShell:

```
Set - Item   WSMan : localhost \ client \ trustedhos  ts  - value
172 . 16 . 1XX . 183  - Force
```

Note:

172.16.1XX.183 indicates that only your instance is trusted. You can also use `*` to indicate that all computers are trusted.

7. Run `Enter - PSSession  ' 172 . 16 . 1XX . 183 ' - Credential :' administra  tor '` in PowerShell and enter the instance password as prompted.

Now you can manage your Windows instance on your client computer.

Windows Admin Center

In the following examples, assume that the public IP address of your instance is 172.16.1XX.183. You can install Windows Admin Center either by using the command line or by downloading the installation package from the official website.

- Install Windows Admin Center through the command line

1. Connect to the target instance. For more information, see Connect to a Windows instance.
2. Add a rule to the security group of the target instance to allow access to the HTTP 5985 and the HTTPS port 5986. For more information, see Add security group rules.
3. Enter `PowerShell` in the command line of the target instance.
4. Run the following command in PowerShell:

```
Enable - PSRemoting  - Force
Set - NetFirewal  lRule  - Name  " WINRM - HTTP - In - TCP -
PUBLIC " - RemoteAddr  ess   Any
```

5. Run the following command to download Windows Admin Center.

```
wget  - Uri   http :// download . microsoft . com / download
/ E / 8 / A / E8A26016 - 25A4 - 49EE - 8200 - E4BCBF292C  4A /
HonoluluTe  chnicalPre  view1802 . msi  - UseBasicPa  rsing  -
OutFile   c :\ HonoluluTe  chnicalPre  view1802 . msi
```

```
msiexec / i c :\ HonoluluTe chnicalPre view1802 . msi / qn
/ L * v log . txt SME_PORT = 443 SSL_CERTIF ICATE_OPTI ON
= generate
```

6. Run the `cat log . txt` command to check the download progress. When the following information appears in the log file, Windows Admin Center is installed.

```
MSI ( s ) ( 14 : 44 ) [ 09 : 48 : 37 : 885 ]: Product :
Project ' Honolulu '( technical preview ) -- Installati on
completed successful ly .
MSI ( s ) ( 14 : 44 ) [ 09 : 48 : 37 : 885 ]: Windows
Installer has installed this product . Product name :
Project ' Honolulu '( technical preview ). Product version
: 1 . 1 . 10326 . 0 . Language : 1033 . Producer : Microsoft
Corporatio n . Installati on success or error status
: 0 .
```

- Download and install Windows Admin Center through a browser

  Prerequisites

  Make sure that you are using a browser in the target client where Windows Admin Center is to be downloaded. PowerShell is configured. For more information, see PowerShell remote management.

  Procedure

  1. Download and install Windows Admin Center.
  2. Open https://localhost/.
  3. Click Add to add the instance IP address in the displayed window.

  Now you can manage your instance through Microsoft Edge or Chrome from the client computer of Windows Admin Center.

FAQ

How do I copy files to a Windows Server Semi-Annual Channel instance?

You can use RDP applications, PowerShell, or the Windows Admin Center to copy files from a client to a Windows Server Semi-Annual Channel instance.

- Through RDP applications
  1. Connect to the target instance. For more information, see Connect to a Windows instance.
  2. On the client, copy the target files.
  3. In the CMD utility of your instance, enter `notepad`.
  4. Click File > Open. In the displayed window, select the destination directory for the files, then right-click and choose Paste.
- Through PowerShell
  1. Start the target instance.
  2. Open the CMD utility on the client, and enter `PowerShell`.
  3. Access the target instance remotely through PowerShell. For more information, see PowerShell remote management.
  4. Run the following command on the client:

```
$ session  =  New - PSSession  - ComputerNa  me   172 . 16 . 1XX .
 183
 Copy - Item  - ToSession  $ session  - Path   C :\ 1 . txt  -
 Destinatio  n   c :\ 2 . txt
```

  > Note:
  > `C :\ 1 . txt` is the source file directory on the client computer, while `C :\ 2 . txt` is the target file directory on the Windows instance.

- Through Windows Admin Center
  1. Start the target instance.
  2. Configure Windows Admin Center. For more information, see Windows Admin Center.
  3. Open Windows Admin Center, and click the managed instance.
  4. Click File, select the target files and then click Upload.

How do I shut down or restart a Windows Server Semi-Annual Channel instance in the instance itself?

- Through RDP applications
  1. Connect to the target instance. For more information, see Connect to a Windows instance.
  2. In the CMD utility, enter `sconfig`. Then, enter `13` to restart your instance or `14` to shut it down, and press Enter.
- Through PowerShell
  1. Connect to the target instance. For more information, see Connect to a Windows instance.
  2. In the CMD utility, enter `PowerShell`.
  3. Enter one of the following commands to restart or shut down your instance:

```
shutdown -r -t 00 :: # Restart your instance in 0
  seconds through the command - line command
shutdown -s -t 00 :: # Shut down your instance in
  0 seconds through the command - line command
Stop - Computer - Force # Shut down your instance
immediatel y through the Powershell command
Restart - Computer - Force # Restart your instance
immediatel y through the Powershell command
```

- Through PowerShell remote management
  1. Start the target instance.
  2. Open the CMD utility on the client, and enter `PowerShell`.
  3. Access the target instance remotely through PowerShell. For more information, see PowerShell remote management.
  4. Enter one of the following commands on the client:

```
Enter - PsSession -ComputerNa me 172 . 16 . 1XX . 183
Restart - Computer - Force # Restart
Stop - Computer - Force # Shut down
```

- Through Windows Admin Center
  1. Start the target instance.
  2. Configure Windows Admin Center. For more information, see Windows Admin Center.
  3. Open Windows Admin Center, and click the managed instance. Then, click Overview, and select Restart or Shut down.

How do I install the IIS service?

- Through RDP applications

  1. Connect to the target instance. For more information, see Connect to a Windows instance.
  2. In the CMD utility, enter `PowerShell`.
  3. Run the following command to install IIS:

```
Import - Module   ServerMana  ger
Add - WindowsFea  ture   Web - Server ,  Web - CGI ,  Web - Mgmt
- Console
```

- Through PowerShell remote management

  1. Start the target instance.
  2. Open the CMD utility on the client, and enter `PowerShell`.
  3. Access the target instance remotely through PowerShell. For more information, see PowerShell remote management.
  4. Run the following command on the client:

```
Enter - PsSession  - ComputerNa  me   172 . 16 . 1XX . 183
Import - Module   ServerMana  ger
Add - WindowsFea  ture   Web - Server ,  Web - CGI ,  Web - Mgmt
- Console
```

- Through Windows Admin Center

  1. Start the target instance.
  2. Configure Windows Admin Center. For more information, see Windows Admin Center.
  3. Open Windows Admin Center, and click the managed instance. Click Roles and Features and Web Server in sequence, select the desired function, and click Yes.

How do I re-open a command line window that was accidentally closed in an RDP session?

To re-open a command line window, follow these steps:

1. Press Ctrl + Alt + End. If the preceding combination does not work, press Ctrl + Alt + Del.
2. In the interface that appears, select Task Manager and press Enter.
3. Click File > New Task, enter `cmd`, and click OK.

References

- Windows Server Semi-Annual Channel overview.

- Introducing Windows Server, version 1709
- Windows Admin Center
- About Remote Troubleshooting

9.3 Install GRUB v1.99 in a Linux server

This topic describes how to install GRand Unified Bootloader (GRUB) in a Linux server by using GRUB v1.99 as an example. To install GRUB of a later version, you need to download the relevant GRUB package.

Background information

When you migrate a source Linux server by using the Cloud Migration tool, if the source Linux server has a low kernel version (such as CentOS 5 and Debian 7), and the version of the built-in system boot program GRUB is lower than v1.99, the log file indicates `Do Grub Failed`. In this case, you need to upgrade GRUB to v1.99 or later.

Procedure

1. Log on to the source Linux server.
2. Run the following commands to view the directories of the original *grub*, *grub-install*, and *grub-mkconfig*:

```
# which grub
# which grub-install
# which grub-mkconfig
```

3. Run the `mv` command to rename the original *grub*, *grub-install*, and *grub-mkconfig* files for backup.

> **Note:**
> After you migrate your server by using the Cloud Migration tool, you can reinstate the original files by changing their names back to the original ones.

```
# mv /sbin/grub /sbin/grub-old
# mv /sbin/grub-install /sbin/grub-install-old
# mv /sbin/grub-mkconfig /sbin/grub-mkconfig-old
```

4. Run the `yum install -y bison gcc make` command to install the dependencies of GRUB, which include bison, gcc, and make.
5. Run the following commands to install flex.

```
# test -d /root/tools || mkdir -p /root/tools
```

```
#  cd  / root / tools
#  wget   https :// github . com / westes / flex / releases /
 download / v2 . 6 . 4 / flex - 2 . 6 . 4 . tar . gz
#  tar   xzf   flex - 2 . 6 . 4 . tar . gz
#  cd   flex - 2 . 6 . 4
#  mkdir  - p   build
#  cd   build
# ../ configure
#  make  &&  make   install
#  ln  - s  / usr / local / bin / flex  / usr / bin / flex
```

6. Run the following commands to install the dependencies of GRUB v1.99.

```
#  test  - d  / root / tools  ||  mkdir  - p  / root / tools
#  cd  / root / tools
#  wget   https :// alpha . gnu . org / gnu / grub / grub - 1 . 99 ~
 rc1 . tar . gz
#  tar   xzf   grub - 1 . 99 ~ rc1 . tar . gz
#  cd   grub - 1 . 99 ~ rc1
#  mkdir  - p   build
#  cd   build
# ../ configure
#  sed  - i  - e  " s /- Werror //" ./ grub - core / Makefile
#  sed  - i  - e  " s /- Werror //" ./ Makefile
#  make  &&  make   install
#  ln  - s  / usr / local / sbin / grub - install  / sbin / grub -
 install
#  ln  - s  / usr / local / sbin / grub - mkconfig  / sbin / grub -
 mkconfig
```

Note:

If the error `- Werror` occurs, we recommend that you locate the error in the *`makefile`* , remove the `- Werror` option, and then try again.

7. Run the `grub - install  -- version` command to verify GRUB is updated to v1.99.

What to do next

1. After you update GRUB to v1.99, you can migrate your server to Alibaba Cloud by using the Cloud Migration tool.
2. (Optional) After your servers are successfully migrated to Alibaba Cloud, run the following commands to use the earlier version of GRUB.

```
#  rm  / sbin / grub - install
#  rm  / sbin / grub - mkconfig
#  rm  / boot / grub / grub . cfg
#  mv  / sbin / grub - old  / sbin / grub
```

```
# mv /sbin/grub-install-old /sbin/grub-install
```

9.4 How do I enable or disable the Meltdown and Spectre patches for Linux images?

This topic describes how Alibaba Cloud ECS responds to the Meltdown and Spectre vulnerabilities. You can learn about our measures for protecting ECS instances against these vulnerabilities.

Context

The Meltdown and Spectre vulnerabilities exist in the Intel chips. Caused by the design flaw of the chip hardware, the vulnerabilities may lead to problems such as leakage of operating system kernel information, unauthorized access to system kernel data by applications, and more. You can go to the CVE website to check the vulnerability IDs:

- CVE-2017-5753
- CVE-2017-5715
- CVE-2017-5754

On January 20, 2018, Alibaba Cloud released a security vulnerability notice, describing the vulnerability details and impacts.

This topic describes the Alibaba Cloud public images that have been patched against these vulnerabilities, and how to disable the patches for better instance performance. The default security policy is as follows:

- To protect against the Meltdown vulnerability, Page Table Isolation (PTI) is enabled by default.
- To protect against the Spectre vulnerability, by default No Indirect Branch Restricted Speculation (NOIBRS) is enabled and is integrated with Retpoline and Indirect Branch Prediction Barriers (IBPB).

How to enable or disable the Meltdown patch

The following public images have enabled the Meltdown patch (PTI On):

- CentOS 7.5/7.6
- Debian 9.6/8.10
- Red Hat 7.5/7.6
- SUSE Linux 15

- Ubuntu 18.04
- CoreOS 1911.3.0
- FreeBSD 11.2
- OpenSUSE 15

The above list is subject to change due to updates of Alibaba Cloud public images.

If you find enabling PTI impacts your instance performance, or you have other protective measures, you can disable PTI by following the steps below:

1. Connect to your instance.
2. Do the following according to your Linux distribution:
   - CentOS, Debian, OpenSUSE, Red Hat, SUSE Linux and Ubuntu: Add the kernel parameter `nopti`.
   - CoreOS: Run `vi /usr/share/oem/grub.cfg` to configure `pti=off`.
   - FreeBSD: Run `vi /boot/loader.conf` to configure `vm.pmap.pti=0`.
3. Restart the instance.

How to enable or disable the Spectre patch

Alibaba Cloud currently allows you to configure Indirect Branch Restricted Speculation (IBRS) and IBPB. By default, public images are protected against Spectre through Reptpoline and IBPB. Moreover, IBRS is disabled through the noibrs parameter. The following public images are involved:

- CentOS 7.5/7.6
- Debian 9.6/8.10
- Red Hat 7.5/7.6
- SUSE Linux 15
- Ubuntu 18.04
- CoreOS 1911.3.0
- FreeBSD 11.2
- OpenSUSE 15

The above list is subject to change due to updates of Alibaba Cloud public images.

If you need to restore the default settings of your operating system, or you find the current settings impact your instance performance, or you have other protective measures, you can disable the Spectre patch by following the steps below:

1. Connect to your instance.
2. Perform the corresponding operation according to the instructions in the following table.

Linux distribution	To restore the default settings of Alibaba Cloud images	To restore the default settings of operating systems	To disable the Spectre patch
CentOS	Add the kernel parameter noibrs.	Remove the kernel parameter noibrs.	Add the kernel parameter spectre_v2=off.
Red Hat			
CoreOS	Run `vi /usr/oem/share/grub.cfg` to add the kernel parameter spectre_v2=off.	Remove the kernel parameter spectre_v2=off.	
OpenSUSE	Add the kernel parameter spectre_v2=off.		
Debian	Retpoline and IBPB are enabled by default.	No need to modify the settings.	
Ubuntu			
SUSE Linux	Retpoline is enabled by default.		
FreeBSD	Add the kernel parameter hw.ibrs_disable.	Remove the kernel parameter hw.ibrs_disable.	Add the kernel parameter hw.ibrs_disable.

Note:

The kernel parameter `noibrs` does not work for OpenSUSE and CoreOS. You need to set `spectre_v2 = off` for them.

3. Restart the instance.

How to detect whether protections are enabled

1. Connect to your instance.

2. From GitHub spectre-meltdown-checker Repo, obtain the spectre-meltdown-checker.sh script.
3. Run the following commands in your instance:

```
chmod + x spectre-meltdown-checker.sh
sudo bash spectre-meltdown-checker.sh
```

4. Judge whether the Meltdown or Spectre patch has been enabled according to the script prompts.

Reference

For the following operating systems, you can go to their website for more details:

- Red Hat
- SUSE Linux
- Ubuntu