Image Management Service

User Guide (Paris Regions)

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Contents

1 Overview	1
1.1 What Is Image Management Service?	1
1.2 Product Advantages	
1.3 Application Scenarios	5
1.4 Features	5
1.5 Constraints	8
1.6 Supported OSs	12
1.6.1 External Image File Formats and Supported OSs	12
1.6.2 OSs Supporting UEFI Boot Mode	17
1.7 Permissions	19
1.8 Basic Concepts	21
1.8.1 Region and AZ	21
1.8.2 Common Image Formats	22
1.9 Related Services	24
2 Creating a Private Image	27
2.1 Introduction	27
2.2 Creating a System Disk Image from a Windows ECS	28
2.3 Creating a System Disk Image from a Linux ECS	31
2.4 Creating a Windows System Disk Image from an External Image File	35
2.4.1 Overview	35
2.4.2 Preparing an Image File	35
2.4.3 Uploading an External Image File	37
2.4.4 Registering an External Image File as a Private Image	38
2.4.5 Creating a Windows ECS from an Image	40
2.5 Creating a Linux System Disk Image from an External Image File	41
2.5.1 Overview	41
2.5.2 Preparing an Image File	42
2.5.3 Uploading an External Image File	
2.5.4 Registering an External Image File as a Private Image	44
2.5.5 Creating a Linux ECS from an Image	47
2.6 Creating a Data Disk Image from an External Image File	48
2.7 Creating a Full-ECS Image from an ECS	50
2.8 Creating a Full-ECS Image from a CSBS Backup	53

2.9 Creating a Full-ECS Image from a CBR Backup	55
2.10 Creating a Windows System Disk Image from an ISO File	56
2.10.1 Overview	57
2.10.2 Integrating the VMTools Driver into an ISO File	58
2.10.3 Registering an ISO File as an ISO Image	63
2.10.4 Creating a Windows ECS from an ISO Image	64
2.10.5 Installing a Windows OS and the VMTools Driver	65
2.10.6 Configuring the ECS and Creating a Windows System Disk Image	75
2.11 Creating a Linux System Disk Image from an ISO File	76
2.11.1 Overview	76
2.11.2 Registering an ISO File as an ISO Image	78
2.11.3 Creating a Linux ECS from an ISO Image	79
2.11.4 Installing a Linux OS	80
2.11.5 Configuring the ECS and Creating a Linux System Disk Image	85
2.12 Importing an Image	86
2.13 Quickly Importing an Image File	87
2.13.1 Overview	87
2.13.2 Quickly Importing an Image File (Linux)	90
2.13.3 Quickly Importing an Image File (Windows)	95
3 Managing Private Images	98
3.1 Modifying an Image	98
3.2 Exporting Image List	99
3.3 Checking the Disk Capacity of an Image	100
3.4 Creating an ECS from an Image	102
3.5 Deleting Images	102
3.6 Sharing Images	103
3.6.1 Overview	103
3.6.2 Obtaining the Project ID	104
3.6.3 Sharing Specified Images	104
3.6.4 Accepting or Rejecting Shared Images	106
3.6.5 Rejecting Accepted Images	108
3.6.6 Accepting Rejected Images	108
3.6.7 Stopping Sharing Images	109
3.6.8 Adding Tenants Who Can Use Shared Images	109
3.6.9 Deleting Image Recipients Who Can Use Shared Images	110
3.7 Exporting an Image	110
3.8 Optimizing a Windows Private Image	
3.8.1 Optimization Process	112
3.8.2 Viewing the Virtualization Type of a Windows ECS	113
3.8.3 Obtaining Required Software Packages	113
3.8.4 Installing the PV Driver	115
3.8.5 Installing UVP VMTools	117

3.8.6 Clearing System Logs	119
3.9 Optimizing a Linux Private Image	119
3.9.1 Optimization Process	119
3.9.2 Checking Whether a Private Image Needs to be Optimized	120
3.9.3 Uninstalling PV Drivers from a Linux ECS	122
3.9.4 Changing the Disk Identifier in the GRUB Configuration File to UUID	123
3.9.5 Changing the Disk Identifier in the fstab File to UUID	127
3.9.6 Install the Native Xen and KVM Drivers	128
3.9.7 Installing Native KVM Drivers	136
3.9.8 Clearing System Logs	142
3.10 Encrypting Images	142
3.10.1 Overview	142
3.10.2 Creating Encrypted Images	143
3.11 Replicating Images Within a Region	143
3.12 Tagging an Image	144
3.13 Auditing Key Operations	145
3.13.1 IMS Operations Recorded by CTS	146
3.13.2 Viewing Traces	147
3.14 Converting the Image Format	148
3.14.1 Converting the Image Format Using qemu-img	148
3.14.2 Converting the Image Format Using qemu-img-hw	153
4 Windows Operations	156
4.1 Setting the NIC to DHCP	156
4.2 Enabling Remote Desktop Connection	158
4.3 Installing and Configuring Cloudbase-Init	159
4.4 Running Sysprep	165
4.5 Installing Special Windows Drivers	
5 Linux Operations	169
5.1 Setting the NIC to DHCP	
5.2 Deleting Files from the Network Rule Directory	171
5.3 Installing Cloud-Init	173
5.4 Configuring Cloud-Init	
5.5 Detaching Data Disks from an ECS	10/
5.5 Detactility Data Disks Hoff all ECS	104
6 Permissions Management	186
	186
6 Permissions Management	186 186 188
6 Permissions Management	
6 Permissions Management	186 188 190
6 Permissions Management	186188190

7.1.4 How Do I Increase the Image Quota?	. 193
7.1.5 What Are the Differences Between Images and Backups?	194
7.1.6 Can I Tailor an Image?	. 196
7.1.7 How Can I Back Up the Current Status of an ECS for Restoration in the Case of a System Fault?	.196
7.1.8 How Can I Apply a Private Image to an Existing ECS?	. 196
7.1.9 Can I Import Data from a Data Disk Image to a Data Disk?	. 196
7.1.10 Can I Use Private Images of Other Tenants?	. 197
7.2 End-of-Support for OSs	. 197
7.2.1 What Do I Do If CentOS Linux Is No Longer Maintained?	.197
7.3 Image Creation	. 198
7.3.1 Image Creation FAQs	. 198
7.3.2 Full-ECS Image FAQs	. 199
7.3.3 How Can I Use a Backup to Create an EVS Disk or ECS?	. 200
7.3.4 Is There Any Difference Between the Image Created from a CSBS/CBR Backup and That Created from an ECS?	
7.3.5 Why Can't I Find an ISO Image When I Want to Use It to Create an ECS or Change the OS of an ECS?	
7.3.6 How Do I Create a Full-ECS Image Using an ECS That Has a Spanned Volume?	.201
7.3.7 Why Is Sysprep Required for Creating a Private Image from a Windows ECS?	. 201
7.3.8 What Do I Do If an ECS Created from a Windows Image Failed to Start After Running Sysprep?	. 202
7.3.9 What Do I Do If I Cannot Create an Image in ZVHD2 Format Using an API?	. 203
7.4 Image Sharing	204
7.4.1 Image Sharing FAQs	204
7.4.2 What Are the Differences Between Sharing Images and Replicating Images?	.206
7.4.3 What Do I Do If I Cannot Share My Images?	.206
7.5 OS	
7.5.1 How Do I Select an OS?	
7.5.2 How Is BIOS Different from UEFI?	
7.5.3 How Do I Delete Redundant Network Connections from a Windows ECS?	. 207
7.5.4 What Do I Do If an ECS Starts Slowly?	
7.5.5 What Do I Do If a Windows 7 ECS Equipped with an Intel 82599 NIC Reports an Error in SR-IOV Scenarios?	
7.5.6 Why Can't I Find My Private Image When I Want to Use It to Create an ECS or Change the OS of ECS?	
7.6 Image Importing	. 210
7.6.1 Can I Use Images in Formats Other Than the Specified Ones?	.210
7.6.2 What Are the Impacts If I Do Not Pre-configure an ECS Used to Create a Private Image?	.211
7.6.3 What Do I Do If I Configured an Incorrect OS or System Disk Size During Private Image Registra Using an Image File?	
7.6.4 What Do I Do If the System Disk Size in a VHD Image File Exceeds the One I Have Specified on	
Management Console When I Use This File to Register a Private Image?	
7.7 Image Exporting	
7.7.1 Can I Download My Private Images to a Local PC?	
7.7.2 Can I Use the System Disk Image of an ECS on a RMS After I Export It from the Cloud Platform?	212

7.7.3 Why Is the Image Size in an OBS Bucket Different from That Displayed in IMS?	212
7.7.4 Can I Download a Public Image to My Local PC?	212
7.7.5 What Are the Differences Between Import/Export and Fast Import/Export?	213
7.7.6 What Do I Do If the Export Option Is Unavailable for My Image?	
7.8 Image Optimization	214
7.8.1 Must I Install Guest OS Drivers on an ECS?	214
7.8.2 Why Do I Need to Install and Update VMTools for Windows?	215
7.8.3 What Will the System Do to an Image File When I Use the File to Register a Private Image?	215
7.8.4 How Do I Configure an ECS, BMS, or Image File Before I Use It to Create an Image?	217
7.8.5 What Do I Do If a Windows Image File Is Not Pre-Configured When I Use It to Register a Privat Image?	
7.8.6 What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?	223
7.8.7 How Do I Enable NIC Multi-Queue for an Image?	225
7.8.8 How Do I Make a System Disk Image Support Fast ECS Creation?	231
7.8.9 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?	231
7.8.10 How Do I Install the Native Xen and KVM Drivers?	232
7.9 Image Replication	239
7.10 Image Deletion	240
7.11 Image Encryption	240
7.12 Accounts and Permissions	240
7.12.1 What Do I Do If Private Images Cannot Be Found on the Enterprise Project Management Servi Page After EPS Is Enabled?	
7.12.2 What Do I Do If I Cannot Create an Image from a CSBS Backup or BMS Using a Subaccount w the Allow_all Permission After EPS Is Enabled?	
7.13 Cloud-Init	241
7.13.1 Cloud-Init	241
7.13.2 What Can I Do with a Cloud-Init ECS?	245
7.13.3 What Do I Do If Injecting the Key or Password Using Cloud-Init Failed After NetworkManager Installed?	
7.13.4 How Do I Install growpart for SUSE 11 SP4?	246
7.14 ECS Creation	247
7.14.1 Can I Change the Image of a Purchased ECS?	247
7.14.2 Can I Use a Private Image to Create ECSs with Different Hardware Specifications from the ECS Used to Create the Private Image?	
7.14.3 Can I Specify the System Disk Size When I Create an ECS Using an Image?	248
7.14.4 What Do I Do If No Partition Is Found During the Startup of an ECS Created from an Imported Private Image?	
7.14.5 What Do I Do If the Disks of an ECS Created from a CentOS Image Cannot Be Found?	251
7.14.6 What Do I Do If an ECS Created from a Windows Image Failed to Start When I Have Enabled Automatic Configuration During Image Registration?	252
7.14.7 What Do I Do If an Exception Occurs When I Start an ECS Created from an Image Using the U Boot Mode?	
7.15 Driver Installation	253
7.15.1 Must I Install Guest OS Drivers on an ECS?	253

A Change History	264
7.16.3 How Do I Search for Private Images by Tag?	263
7.16.2 How Do I Add, Delete, and Modify Image Tags?	
7.16.1 How Many Tags Can I Add to an Image?	
7.16 Image Tags	
7.15.6 How Do I Install the Native Xen and KVM Drivers?	
7.15.5 How Do I Install Native KVM Drivers in Linux?	254
7.15.4 How Do I Install UVP VMTools in Windows?	254
7.15.3 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?	254
7.15.2 Why Do I Need to Install and Update VMTools for Windows?	253

1 Overview

1.1 What Is Image Management Service?

Overview

An image is a cloud server or disk template that contains an operating system (OS), service data, or necessary software.

Image Management Service (IMS) allows you to manage the entire lifecycle of your images. You can create ECSs or BMSs from public, private, or shared images. You can also create a private image from a cloud server or an external image file to make it easier to migrate workloads to the cloud or on the cloud.

Image Types

IMS provides public, private, and shared images. Public images are provided by the cloud platform, private images are created by users, and shared images are private images that other users shared with you.

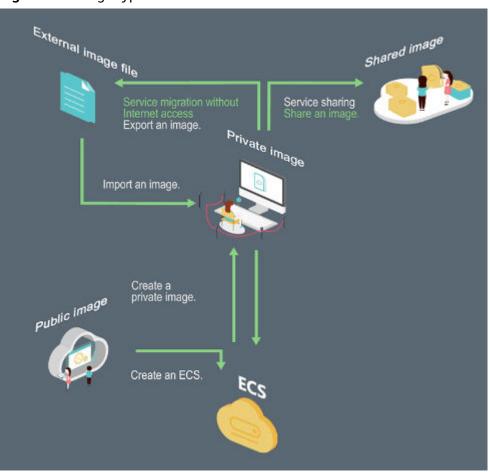


Figure 1-1 Image types

Image Type	Description
Public image	A public image is a standard, widely used image. It contains an OS and preinstalled public applications and is available to all users. Public images are very stable and their OS and any included software have been officially authorized for use. If a public image does not contain the environments or software you need, you can use a public image to create an ECS and then deploy the required environments or software on it.

Image Type	Description	
Private image	A private image contains an OS or service data, preinstalled public applications, and a user's personal applications. Private images are only available to the users who created them.	
	A private image can be a system disk image, data disk image, ISO image, or full-ECS image.	
	 A system disk image contains an OS and preinstalled software for various services. You can use a system disk image to create ECSs and migrate your services to the cloud. 	
	 A data disk image contains only service data. You can use a data disk image to create EVS disks and use them to migrate your service data to the cloud. 	
	An ISO image is created from an external ISO image file. It is a special image that is not available on the ECS console.	
	 A full-ECS image contains an OS, preinstalled software, and service data. A full-ECS image is created using differential backups and the creation takes less time than creating a system or data disk image of the same size. 	
Shared image	A shared image is a private image another user has shared with you.	
	For more information about shared images, see "Sharing Images" in <i>Image Management Service User Guide</i> .	

IMS Functions

IMS provides:

- Public images that contain common OSs
- Creation of a private image from an ECS or external image file
- Public image management, such as searching for images by OS type, name, or ID, and viewing the image ID, system disk size, and image features such as user data injection and disk hot swap
- Private image management, such as modifying image attributes, sharing images, and replicating images
- Creation of ECSs using an image

Access Methods

The public cloud provides a web-based service management platform (a management console). You can access the IMS service through HTTPS APIs or from the management console.

API

If you need to integrate IMS into a third-party system for secondary development, use APIs to access the IMS service. For details, see *Image Management Service API Reference*.

Management console

If no integration with a third-party system is needed, use the management console. Log in to the management console and choose **Computing > Image**Management Service on the homepage.

1.2 Product Advantages

IMS provides convenient, secure, flexible, and efficient image management. Images allow you to deploy services faster, more easily and more securely.

Saving Time and Effort

- Deploying services on cloud servers is much faster and easier when you use images.
- A private image can be created from an ECS, a BMS, or an external image file. It can be a system, disk, or full-ECS image that suites your different needs.
- Private images can be transferred between accounts, regions, or cloud platforms through image sharing, replication, and export.

Secure

- Public images use mainstream OSs such as Ubuntu and CentOS. These OSs have been thoroughly tested to provide secure and stable services.
- Multiple copies of image files are stored on Object Storage Service (OBS), which provides excellent data reliability and durability.
- Private images can be encrypted for data security by using envelope encryption provided by Key Management Service (KMS).

Flexible

- You can manage images through the management console or using APIs.
- You can use a public image to deploy a general-purpose environment, or use a private image to deploy a custom environment.
- You can use IMS to migrate servers to the cloud or on the cloud, and back up server running environments.

Unified

- IMS provides a self-service platform to simplify image management and maintenance.
- IMS allows you to batch deploy and upgrade application systems, improving O&M efficiency and ensuring consistency.
- Public images comply with industry standards. Preinstalled components only include clean installs, and only kernels from well-known third-party vendors are used to make it easier to transfer images from or to other cloud platforms.

Comparison Between Image-based Deployment and Manual Deployment

Table 1-1 Image-based deployment and manual deployment

Item	Image-based Deployment	Manual Deployment
Time required	2 to 5 minutes	1 to 2 days
Complexity	Quickly create ECSs by using public images or private images.	Select an appropriate OS, database, and various software packages based on your service requirements. Then, install and commission them.
Security	You only need to identify sources of shared images. Public and private images have been thoroughly tested to ensure security and stability.	The security depends on the skills of the R&D or O&M personnel.

1.3 Application Scenarios

- Migrating servers to the cloud or on the cloud
 - You can import local images to the cloud platform and use the images to quickly create cloud servers for service migration to the cloud. A variety of image types can be imported, including VHD, VMDK, QCOW2, and RAW.
- Deploying a specific software environment
 - Use shared images to quickly build custom software environments without having to manually configure environments or install any software. This is especially useful for Internet startups.
- Batch deploying software environments
 - Prepare an ECS with an OS, the partition arrangement you prefer, and software installed to create a private image. You can use the image to create batch clones of your custom ECS.
- Backing up server environments
 - Create an image from an ECS to back up the ECS. If the ECS breaks down due to software faults, you can use the image to restore the ECS.

1.4 Features

Private Image Lifecycle

After you create a private image, you can use it to create cloud servers or EVS disks. You can also share the image with other tenants. **Figure 1-2** shows the lifecycle of a private image.

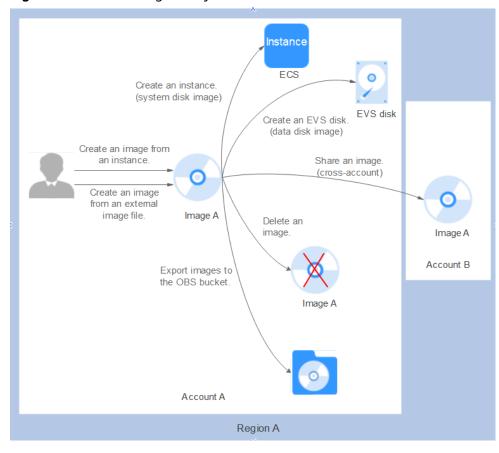


Figure 1-2 Private Image Lifecycle

Features

Table 1-2 Creating a private image

Feature	Description	Helpful Link
Creating a system disk image from an ECS or BMS	After creating a cloud server, you can set it up, installing whatever software or application environment you need, and then use the preconfigured server to create a system disk image. You can create new cloud servers with the custom configurations from the image, which frees you from a lot of repetitive work.	 Creating a System Disk Image from a Windows ECS Creating a System Disk Image from a Linux ECS

Feature	Description	Helpful Link
Creating a system disk image from an external image file	You can import a system disk from your local PC or other cloud platforms, and use the imported image to create new cloud servers or reinstall or change the OSs of existing cloud servers.	 Creating a Windows System Disk Image from an External Image File Creating a Linux System Disk Image from an External Image File Quickly Importing an Image File
Creating a data disk image from an external image file	You can import the data disk image of a local server or a server on another cloud platform to and then the image can be used to create EVS disks.	Creating a Data Disk Image from an External Image File
Creating a full- ECS image from an ECS, CSBS backup, or CBR backup	You can use an ECS with data disks to create a full-ECS image, complete with an OS, various applications, and your service data. The full-ECS image then can be used to quickly provision identical ECSs for data migration. A full-ECS image can be created by using an ECS, CSBS backup, or CBR backup.	 Creating a Full-ECS Image from an ECS Creating a Full-ECS Image from a CSBS Backup Creating a Full-ECS Image from a CBR Backup
Creating an ECS from a private image	After a system disk image or full-ECS image is created, you can click Apply for Server in the row that contains the image to create an ECS.	Creating an ECS from an Image

Table 1-3 Managing private images

Feature	Description	Helpful Link
Modifying an image	To facilitate private image management, you can modify the following attributes of an image: name, description, minimum memory, maximum memory, and advanced functions such as NIC multi-queue and SR-IOV driver.	Modifying an Image

Feature	Description	Helpful Link
Sharing images	You can share an image with other accounts. These accounts can use your shared private image to quickly create ECSs or EVS disks.	Sharing ImagesImage Sharing
Exporting images	You can export private images to your OBS bucket and download them to your local PC for backup.	Exporting an ImageImage Exporting
Encrypting images	You can create encrypted images to improve data security. The encryption mode is KMS envelope encryption.	• Encrypting Images
	Encrypted images can be created from external image files or encrypted ECSs.	
Replicating images	By replicating images, you can convert encrypted and unencrypted images into each other or enable some advanced features, for example, quick instance provisioning.	Replicating Images Within a Region
Tagging an image	You can tag your private images for easy management and search.	Tagging an Image
Exporting image list	You can export the public or private image list in a given region in CSV format, facilitating local maintenance and query.	Exporting Image List
Deleting images	You can delete images that will be no longer used. Deleting an image does not affect the ECSs created from that image.	Deleting Images

1.5 Constraints

This section describes the constraints on using IMS.

- Creating a private image
- Importing a private image
- Sharing images
- Replicating an image
- Exporting an image
- Encrypting an image
- Deleting images
- Creating cloud servers from an image

• Tagging an image

Table 1-4 Constraints on creating a private image

Item	Constraint
Maximum number of private images that can be created in a region	If you need more, submit a service ticket to increase your quota. For details, see
Maximum number of concurrent tasks for creating private images	40 NOTE Currently, only one image can be created in each task.
Creating a system disk image from an ECS	The ECS must be in the Stopped or Running state.
Creating a full-ECS image from an ECS or a CSBS or CBR backup	 The ECS must be in the Stopped or Running state. A CSBS or CBR backup can be used to create only one full-ECS image at a time. A full-ECS image cannot be exported, replicated, or shared.

Table 1-5 Constraints on importing a private image

Item	Constraint
Importing a system disk image from an external image file	For details about constraints on external image files, see Preparing an Image File or Preparing an Image File.
Importing a system disk image from an ISO file	 Register the ISO file as an ISO image, use the ISO image to create a temporary ECS, install an OS and related drivers on the ECS, and use the ECS to create a system disk image. The ISO image cannot be replicated, exported, or
	encrypted.
Importing a data disk image from an external image file	The data disk capacity can be 40–2048 GB, and it must also be at least as big as the data disk in the image file.
Image format	VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD

Item	Constraint	
Image size	The image size cannot exceed 128 GB. If the image size is between 128 GB and 1 TB, convert the image file into the RAW or ZVHD2 format and import the image through fast import.	
	 For details about how to convert the image file format, see Converting the Image Format Using qemu-img- hw. 	
	For details about fast import, see Quickly Importing an Image File.	

Table 1-6 Constrains on sharing images

Item	Constraint
Maximum number of tenants an image can be shared with	System disk image or data disk image: 128 Full-ECS image: 10
Maximum number of shared images that a tenant can receive	No limit
Private image status	Normal
Image sharing	Encrypted images and full-ECS images created from a CSBS backup cannot be shared with others.
Region	There are constraints on the region when cloud servers are created from a shared image. For example, a shared image can be used to create cloud servers only in the same region.

Table 1-7 Constraints on replicating an image

Item	Constraint
Maximum size of an image	128 GB
Maximum number of concurrent replication tasks per tenant	5
Private image status	Normal

Item	Constraint
Replicating images within a region	Full-ECS images cannot be replicated within the same region.
	 Private images created using ISO files do not support in-region replication.

Table 1-8 Constraints on exporting an image

Item	Constraint
Maximum size of an exported image	1 TB Images larger than 128 GB only support fast export.
Formats of exported image files	VMDK, VHD, QCOW2, ZVHD, and ZVHD2
Private image status	Normal
Exporting an image	Encrypted images cannot be exported through fast export. An image can only be exported to a Standard.
	 An image can only be exported to a Standard bucket that is in the same region as the image.
	The following private images cannot be exported:
	Full-ECS images
	– ISO images
	 Private images created from a Windows, SUSE, Red Hat, Ubuntu, or Oracle Linux public image
	The image size must be less than 1 TB. Images larger than 128 GB support only fast export.

Table 1-9 Constraints on other image operations

Operation	Item	Constraint
Encrypting an image	Creating an encrypted image from an encrypted ECS or an external image file	 An encrypted image cannot be shared with other tenants. The key used for encrypting an image cannot be changed.
Deleting images	Private image status	A published private image cannot be deleted.

Operation	Item	Constraint
Creating cloud servers from an image	Number of cloud servers that can be concurrently created using a system disk image	Recommended value: ≤ 100
Tagging an image	Maximum number of tags that can be added to a private image	10

Other Constraints

- If an ECS is frozen due to overdue payment, it cannot be used to create a private image. You must renew the ECS before using it to create a private image.
- A private image containing a 32-bit OS cannot be used to create an ECS with larger than 4 GB of memory because the total available address space for a 32-bit OS is 4 GB.

1.6 Supported OSs

1.6.1 External Image File Formats and Supported OSs

External File Formats

Image files in VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ISO, ZVHD2, or ZVHD format can be used to create private images. Select whichever format best meeting your requirements.

Supported OSs

When you upload an external image file to an OBS bucket on the management console, the OS contained in the image file will be checked. **Table 1-10** lists the OSs supported by external image files. (If you use a public image to create an ECS and then use the ECS to create a private image, the private image also supports the OSs listed in **Table 1-10**.)

- For details about OSs supported by BIOS image files, see Table 1-10. If the OS is not included in the table, either Other Windows(64bit) or Other Windows(32bit) will be used for Windows, and either Other Linux(64bit) or Other Linux(32bit) for Linux during image registration.
- For more information about the OSs supported by UEFI image files, see OSs Supporting UEFI Boot Mode.

□ NOTE

- Uploading image files containing OSs not listed in **Table 1-10** may fail. You are advised to contact the customer service before uploading these image files.
- When uploading a CoreOS image file, set the OS type to CoreOS. Otherwise, the OS type will be set to **Other (64bit)**. In addition, ensure that coreos-cloudinit has been installed and configured for CoreOS. Automatic system upgrades must be disabled. Otherwise, they may make ECSs created using this image unavailable.

Table 1-10 Supported OSs

os	Version
Windows	Windows 10 64bit
	Windows Server 2019 Standard 64bit
	Windows Server 2019 Datacenter 64bit
	Windows Server 2016 Standard 64bit
	Windows Server 2016 Datacenter 64bit
	Windows Server 2012 R2 Standard 64bit
	Windows Server 2012 R2 Essentials 64bit
	Windows Server 2012 R2 Datacenter 64bit
	Windows Server 2012 Datacenter 64bit
	Windows Server 2012 Standard 64bit
	Windows Server 2008 WEB R2 64bit
	Windows Server 2008 R2 Standard 64bit
	Windows Server 2008 R2 Enterprise 64bit
	Windows Server 2008 R2 Datacenter 64bit
SUSE	SUSE Linux Enterprise Server 15 SP1 64bit
	SUSE Linux Enterprise Server 15 64bit
	SUSE Linux Enterprise Server 12 SP5 64bit
	SUSE Linux Enterprise Server 12 SP4 64bit
	SUSE Linux Enterprise Server 12 SP3 64bit
	SUSE Linux Enterprise Server 12 SP2 64bit
	SUSE Linux Enterprise Server 12 SP1 64bit
	SUSE Linux Enterprise Server 12 64bit
	SUSE Linux Enterprise Server 11 SP4 64bit
	SUSE Linux Enterprise Server 11 SP3 64bit
	SUSE Linux Enterprise Server 11 SP3 32bit
	SUSE Linux Enterprise Server 11 SP1 32bit

OS	Version
Oracle Linux	Oracle Linux Server release 7.6 64bit
	Oracle Linux Server release 7.5 64bit
	Oracle Linux Server release 7.4 64bit
	Oracle Linux Server release 7.3 64bit
	Oracle Linux Server release 7.2 64bit
	Oracle Linux Server release 7.1 64bit
	Oracle Linux Server release 7.0 64bit
	Oracle Linux Server release 6.10 64bit
	Oracle Linux Server release 6.9 64bit
	Oracle Linux Server release 6.8 64bit
	Oracle Linux Server release 6.7 64bit
	Oracle Linux Server release 6.5 64bit
Red Hat	Red Hat Linux Enterprise 8.0 64bit
	Red Hat Linux Enterprise 7.6 64bit
	Red Hat Linux Enterprise 7.5 64bit
	Red Hat Linux Enterprise 7.4 64bit
	Red Hat Linux Enterprise 7.3 64bit
	Red Hat Linux Enterprise 7.2 64bit
	Red Hat Linux Enterprise 7.1 64bit
	Red Hat Linux Enterprise 7.0 64bit
	Red Hat Linux Enterprise 6.10 64bit
	Red Hat Linux Enterprise 6.9 64bit
	Red Hat Linux Enterprise 6.8 64bit
	Red Hat Linux Enterprise 6.7 64bit
	Red Hat Linux Enterprise 6.6 64bit
	Red Hat Linux Enterprise 6.6 32bit
	Red Hat Linux Enterprise 6.5 64bit
	Red Hat Linux Enterprise 6.4 64bit
	Red Hat Linux Enterprise 6.4 32bit

OS	Version	
Ubuntu	Ubuntu 20.04 Server 64bit	
	Ubuntu 19.04 Server 64bit	
	Ubuntu 18.04.2 Server 64bit	
	Ubuntu 18.04.1 Server 64bit	
	Ubuntu 18.04 Server 64bit	
	Ubuntu 16.04.6 Server 64bit	
	Ubuntu 16.04.5 Server 64bit	
	Ubuntu 16.04.4 Server 64bit	
	Ubuntu 16.04.3 Server 64bit	
	Ubuntu 16.04.2 Server 64bit	
	Ubuntu 16.04 Server 64bit	
	Ubuntu 14.04.5 Server 64bit	
	Ubuntu 14.04.4 Server 64bit	
	Ubuntu 14.04.4 Server 32bit	
	Ubuntu 14.04.3 Server 64bit	
	Ubuntu 14.04.3 Server 32bit	
	Ubuntu 14.04.1 Server 64bit	
	Ubuntu 14.04.1 Server 32bit	
	Ubuntu 14.04 Server 64bit	
	Ubuntu 14.04 Server 32bit	
openSUSE	openSUSE 42.3 64bit	
	openSUSE 42.2 64bit	
	openSUSE 42.1 64bit	
	openSUSE 15.1 64bit	
	openSUSE 15.0 64bit	
	openSUSE 13.2 64bit	
	openSUSE 11.3 64bit	

OS	Version	
CentOS	CentOS 8.0 64bit	
	CentOS 7.9 64bit	
	CentOS 7.8 64bit	
	CentOS 7.7 64bit	
	CentOS 7.6 64bit	
	CentOS 7.5 64bit	
	CentOS 7.4 64bit	
	CentOS 7.3 64bit	
	CentOS 7.2 64bit	
	CentOS 7.1 64bit	
	CentOS 7.0 64bit	
	CentOS 7.0 32bit	
	CentOS 6.10 64bit	
	CentOS 6.10 32bit	
	CentOS 6.9 64bit	
	CentOS 6.8 64bit	
	CentOS 6.7 64bit	
	CentOS 6.7 32bit	
	CentOS 6.6 64bit	
	CentOS 6.6 32bit	
	CentOS 6.5 64bit	
	CentOS 6.5 32bit	
	CentOS 6.4 64bit	
	CentOS 6.4 32bit	
	CentOS 6.3 64bit	
	CentOS 6.3 32bit	
Debian	Debian GNU/Linux 10.0.0 64bit	
	Debian GNU/Linux 9.3.0 64bit	
	Debian GNU/Linux 9.0.0 64bit	
	Debian GNU/Linux 8.8.0 64bit	
	Debian GNU/Linux 8.7.0 64bit	
	Debian GNU/Linux 8.6.0 64bit	
	Debian GNU/Linux 8.5.0 64bit	
	Debian GNU/Linux 8.4.0 64bit	
	Debian GNU/Linux 8.2.0 64bit	
	Debian GNU/Linux 8.1.0 64bit	

OS	Version
Fedora	Fedora 30 64bit
	Fedora 29 64bit
	Fedora 28 64bit
	Fedora 27 64bit
	Fedora 26 64bit
	Fedora 25 64bit
	Fedora 24 64bit
	Fedora 23 64bit
	Fedora 22 64bit
EulerOS	EulerOS 2.9 64bit
	EulerOS 2.5 64bit
	EulerOS 2.3 64bit
	EulerOS 2.2 64bit
	EulerOS 2.1 64bit
CoreOS	CoreOS 1068.10.0
	CoreOS 1010.5.0
	CoreOS 1298.6.0
openEuler	openEuler 20.03 64bit

Related Operations

For how to upload an external image file, see **Uploading an External Image File** and **Uploading an External Image File**.

After an external image file is successfully uploaded, you can register this image file as a private image on the cloud platform. For details, see **Registering an External Image File as a Private Image** and **Registering an External Image File as a Private Image**.

1.6.2 OSs Supporting UEFI Boot Mode

The ECS boot mode can be BIOS or UEFI. For details about the differences between them, see **How Is BIOS Different from UEFI?**

Table 1-11 lists the OSs that support the UEFI boot mode.

Table 1-11 OSs supporting UEFI boot mode

os	Version	
Windows	Windows Server 2019 Datacenter 64bit	
	Windows Server 2019 Standard 64bit	

os	Version		
	Windows Server 2016 Standard 64bit		
	Windows Server 2016 Datacenter 64bit		
	Windows Server 2012 R2 Standard 64bit		
	Windows Server 2012 R2 Datacenter 64bit		
	Windows Server 2012 Essentials R2 64bit		
	Windows Server 2012 Standard 64bit		
	Windows Server 2012 Datacenter 64bit		
	Windows 10 64bit		
Ubuntu	Ubuntu 19.04 Server 64bit		
	Ubuntu 18.04 Server 64bit		
	Ubuntu 16.04 Server 64bit		
	Ubuntu 14.04 Server 64bit		
Red Hat	Red Hat Linux Enterprise 7.4 64bit		
	Red Hat Linux Enterprise 7.3 64bit		
	Red Hat Linux Enterprise 7.1 64bit		
	Red Hat Linux Enterprise 7.0 64bit		
	Red Hat Linux Enterprise 6.9 64bit		
	Red Hat Linux Enterprise 6.6 32bit		
	Red Hat Linux Enterprise 6.5 64bit		
Oracle Linux	Oracle Linux Server release 7.4 64bit		
	Oracle Linux Server release 6.9 64bit		
openSUSE	openSUSE 42.1 64bit		
SUSE	SUSE Linux Enterprise Server 12 SP5 64bit		
	SUSE Linux Enterprise Server 12 SP1 64bit		
	SUSE Linux Enterprise Server 11 SP3 64bit		
Fedora 29 64bit			
	Fedora 24 64bit		
Debian	Debian GNU/Linux 8.8.0 64bit		
CentOS	CentOS 7.6 64bit		
	CentOS 7.5 64bit		

os	Version
	CentOS 7.4 64bit
	CentOS 7.0 64bit
	CentOS 6.9 64bit
	CentOS 6.6 64bit
EulerOS	EulerOS 2.8 64bit
	EulerOS 2.5 64bit
	EulerOS 2.3 64bit
	EulerOS 2.2 64bit
openEuler	openEuler 20.03 64bit

1.7 Permissions

If you need to assign different permissions to personnel in your enterprise to access your images, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you secure access to your resources.

With IAM, you can create IAM users and assign permissions to control their access to specific resources. For example, if you want some software developers in your enterprise to use images but do not want them to delete the images or perform any other high-risk operations, you can create IAM users and grant permission to use the images but not permission to delete them.

If your account does not require individual IAM users for permissions management, you can skip this section.

IAM is a free service. You pay only for the resources in your account. For more information about IAM, see IAM Service Overview.

IMS Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

IMS is a project-level service deployed for specific regions. When you set **Scope** to **Region-specific projects** and select the specified projects in the specified regions, the users only have permissions for images in the selected projects. If you set **Scope** to **All resources**, the users have permissions for images in all region-specific projects. When accessing IMS, the users need to switch to the authorized region.

You can grant permissions by using roles and policies.

Roles: A coarse-grained authorization strategy provided by IAM to assign
permissions based on users' job responsibilities. Only a limited number of
service-level roles are available for authorization. Cloud services depend on
each other. When you grant permissions using roles, you also need to attach
any existing role dependencies. Roles are not ideal for fine-grained
authorization and least privilege access.

Table 1-12 System-defined IMS roles

Role	Description	Dependencies
IMS Administrator	Administrator permissions for IMS	This role depends on the Tenant Administrator role.
Server Administrator	Permissions for creating, deleting, querying, modifying, and uploading images	This role depends on the IMS Administrator role in the same project.

Policies (recommended): A fine-grained authorization strategy that defines
permissions required to perform operations on specific cloud resources under
certain conditions. This type of authorization is more flexible and is ideal for
least privilege access. For example, you can grant users only the permission to
manage images of a certain type.

A majority of fine-grained policies contain permissions for specific APIs, and permissions are defined using API actions. For the API actions supported by IMS, see "Permissions and Supported Actions" in *Elastic Cloud Server API Reference*.

Table 1-13 System-defined policies for IMS

Policy	Description	Dependencies
IMS FullAccess	All permissions for IMS	None
IMS ReadOnlyAccess	Read-only permissions for IMS. Users with these permissions can only view IMS data.	None

Table 1-14 lists the common operations supported by system-defined permissions for IMS.

Operation	IMS FullAccess	IMS ReadOnlyAccess	IMS Administrator (Depending on Tenant Administrator)
Creating images	√	х	√
Deleting images	√	х	√
Querying images	√	√	√
Updating image information	√	х	√

Table 1-14 Common operations supported by system-defined permissions

Helpful Links

What Is IAM?

1.8 Basic Concepts

1.8.1 Region and AZ

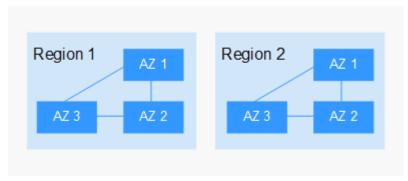
Concept

A region and availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- A region is a physical data center, which is completely isolated to improve fault tolerance and stability. The region that is selected during resource creation cannot be changed after the resource is created.
- An AZ is a physical location where resources use independent power supplies and networks. A region contains one or more AZs that are physically isolated but interconnected through internal networks. Because AZs are isolated from each other, any fault that occurs in one AZ will not affect others.

Figure 1-3 shows the relationship between regions and AZs.

Figure 1-3 Regions and AZs



Selecting a Region

Select a region closest to your target users for lower network latency and quick access.

Selecting an AZ

When deploying resources, consider your applications' requirements on disaster recovery (DR) and network latency.

- For high DR capability, deploy resources in different AZs within the same region.
- For lower network latency, deploy resources in the same AZ.

Regions and Endpoints

Before you use an API to call resources, specify its region and endpoint. For more details, see **Regions and Endpoints**.

1.8.2 Common Image Formats

IMS supports multiple image formats, but the system uses ZVHD or ZVHD2 by default.

Table 1-15 lists the common image formats.

Table 1-15 Common image formats

lmage Format	Description	Remarks
ZVHD	This format uses the ZLIB compression algorithm and supports sequential read and write.	A universal format supported by IaaS OpenStack; a format supported for imported and exported images NOTE ZVHD image files do not support lazy loading. To import large ZVHD image files fast, convert them into ZVHD2 files first.
ZVHD2	This format uses the ZSTD algorithm and supports lazy loading.	A format for the lazy loading feature; a format supported for imported images

Image Format	Description	Remarks
QCOW2	This is a disk image supported by the QEMU simulator. It is a file that indicates a block device disk of a fixed size. Compared with the RAW format, the QCOW2 format has the following features: Supports a lower disk usage. Supports Copy-On-Write (CoW). The image file only reflects disk changes. Supports snapshots. Supports zlib compression and encryption by following Advanced Encryption Standard (AES).	A format supported for imported and exported images
VMDK	VMDK is a virtual disk format from VMware. A VMDK file represents a physical disk drive of the virtual machine file system (VMFS) on an ECS.	A format supported for imported and exported images
VHD	VHD is a virtual disk file format from Microsoft. A VHD file is a compressed file stored in the file system of the host machine. It mainly contains a file system required for starting ECSs.	A format supported for imported and exported images NOTE VHD image files do not support lazy loading. To import large VHD image files fast, convert them into ZVHD2 files first.
VHDX	VHDX is a new VHD format introduced into Hyper-V of Windows Server 2012 by Microsoft. Compared with the VHD format, VHDX has a larger storage capacity. It provides protection against data damage during power supply failures, and the disk structure alignment has been optimized to prevent performance degradation of new physical disks in a large sector.	A format supported for imported images
RAW	A RAW file can be directly read and written by ECSs. This format delivers higher I/O performance but does not support dynamic space expansion.	A format supported for imported images

Image Format	Description	Remarks
QCOW	QCOW manages the space allocation of an image through the secondary index table. The secondary index uses the memory cache technology and needs the query operation, which results in performance loss. The performance of QCOW is inferior to that of QCOW2, and the read and write performance is inferior to that of RAW.	A format supported for imported images
VDI	VDI is the disk image file format used by the VirtualBOX virtualization software from Oracle. It supports snapshots.	A format supported for imported images
QED	The QED format is an evolved version of the QCOW2 format. Its storage location query mode and data block size are the same as those of the QCOW2 format. However, QED implements Copy-On-Write (CoW) in a different way as it uses a dirty flag to replace the reference count table of QCOW2.	A format supported for imported images

1.9 Related Services

Figure 1-4 shows the relationships between IMS and other services.

Figure 1-4 Related Services

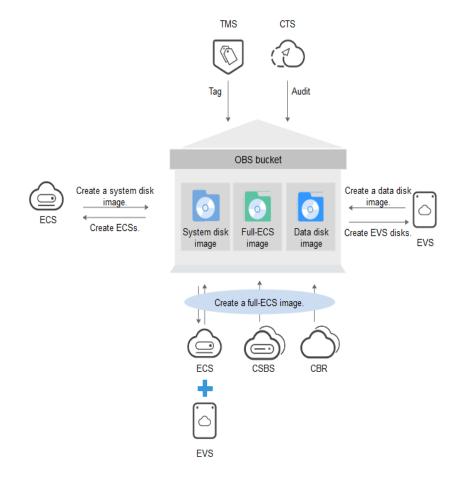


Table 1-16 Related services

Service	Relationship with IMS	Related Operation
Elastic Cloud Server (ECS)	You can use an image to create ECSs or use an ECS to create an image.	 Creating an ECS from an Image Creating a System Disk Image from a Windows ECS Creating a System Disk Image from a Linux ECS
Object Storage Service (OBS)	Images are stored in OBS buckets. External image files to be uploaded to the system are stored in OBS buckets, and private images are exported to OBS buckets.	Exporting an Image

Service	Relationship with IMS	Related Operation
Key Management Service (KMS)	KMS provides the keys used for encrypting images.	Encrypting Images
Cloud Server Backup Service (CSBS)	You can use a CSBS backup to create a full-ECS image.	Creating a Full-ECS Image from a CSBS Backup
Cloud Backup and Recovery (CBR)	You can use a CBR backup to create a full-ECS image.	Creating a Full-ECS Image from a CBR Backup
Tag Management Service (TMS)	You can add tags to images for convenient classification and search.	Tagging an Image
Cloud Trace Service (CTS)	CTS records IMS operations for query, auditing, or backtracking.	Auditing Key Operations

2 Creating a Private Image

2.1 Introduction

A private image is an image available only to the user who created it. It contains an OS, preinstalled public applications, and a user's personal applications. A private image can be a system disk image, data disk image, or full-ECS image. It can be created from a cloud server or an external image file.

Creating a private image does not affect the running of services on the cloud server or cause data loss.

This section describes how to create a private image using any of the following methods:

- Creating a System Disk Image from a Windows ECS
- Creating a System Disk Image from a Linux ECS
- Creating a Windows System Disk Image from an External Image File
- Creating a Linux System Disk Image from an External Image File
- Creating a Full-ECS Image from an ECS
- Creating a Full-ECS Image from a CSBS Backup
- Creating a Windows System Disk Image from an ISO File
- Creating a Linux System Disk Image from an ISO File

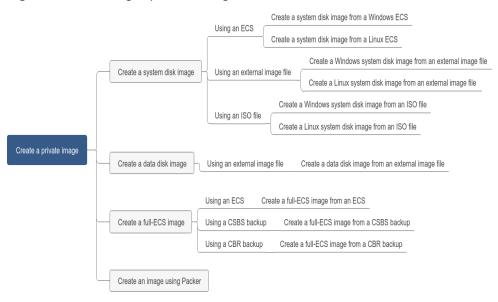


Figure 2-1 Creating a private image

After a system disk image is created, you can use it to create an ECS or change the OS of an ECS.

2.2 Creating a System Disk Image from a Windows ECS

Scenarios

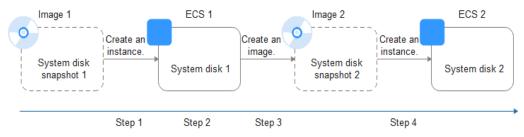
If you have created and configured a Windows ECS based on your service requirements (for example, by installing software and setting up an application environment), you can create a system disk image based on this configured ECS. Then, all new ECSs created from this image will have the same software and environment preinstalled.

Creating a system disk image does not affect the running of services on the ECS or cause data loss.

Background

The following figure shows the process of creating a system disk image from an ECS.

Figure 2-2 Creating a system disk image and using it to create ECSs



- System disk images are often used for application scale-out. They can also be used for hybrid cloud deployment. You can create system disk images for resource synchronization on and off cloud. The procedure is as follows:
 - a. Create a system disk image from an ECS.

The ECS must be created from a private image. If it is created from a public image, the system disk image cannot be exported.

- b. Export the image to an OBS bucket. For details, see **Exporting an Image**.
- c. Download the image file from the OBS bucket.
- You can create an image from a running ECS.
 - The image creation does not affect service running on the ECS.
 - In this process, do not stop, start, or restart the ECS, or the image creation may fail.
- The time required for creating an image depends on the ECS system disk size, network quality, and the number of concurrent tasks.
- A system disk image will be created in the same region as the ECS that was used to create it.
- If an ECS has expired or been released, you can use the system disk image created from the ECS to restore it.

Prerequisites

Before creating a private image from an ECS:

- Delete any sensitive data the ECS may contain.
- Ensure that the ECS is in the **Running** or **Stopped** state.
- Check network configuration of the ECS and ensure that DHCP is configured for the NICs. Enable remote desktop connection if needed. For details, see Setting the NIC to DHCP and Enabling Remote Desktop Connection.
- Install special drivers. The normal running and advanced functions of some ECSs depend on certain drivers. For example, GPU-accelerated ECSs depend on the Tesla and GRID/vGPU drivers. For details, see Installing Special Windows Drivers.
- Check whether Cloudbase-Init has been installed on the ECS. The user data
 injection function on the management console is only available for new ECSs
 that have this tool installed. You can use data injection, for example, to set
 the login password for a new ECS. For details, see Installing and Configuring
 Cloudbase-Init.
- Check and install the PV driver and UVP VMTools driver to ensure that new ECSs created from the image support both KVM and Xen virtualization and to improve network performance.
 - For details, see steps 2 to 5 in Optimization Process.
- Run Sysprep to ensure that the SIDs of the new ECSs created from the image are unique within their domain. In a cluster deployment scenario, the SIDs must be unique. For details, see **Running Sysprep**.

□ NOTE

If an ECS is created from a public image, Cloudbase-Init has been installed by default. You can follow the guide in the prerequisites to verify the installation.

Procedure

Step 1 Access the IMS console.

- 1. Log in to the management console.
- Under Computing, click Image Management Service.
 The IMS console is displayed.

Step 2 Create a system disk image.

- 1. Click **Create Image** in the upper right corner.
- 2. Set image parameters.

Table 2-1 and **Table 2-2** list the parameters in the **Image Type and Source** and **Image Information** areas, respectively.

Table 2-1 Image type and source

Parameter	Description
Туре	Select System disk image .
Source	Select ECS and select an ECS with required configurations.

Table 2-2 Image information

Parameter	Description
Encryption	This parameter specifies whether the image will be encrypted. The value is provided by the system and cannot be changed.
	Only an unencrypted private image can be created from an unencrypted ECS.
	Only an encrypted private image can be created from an encrypted ECS.
Name	Set a name for the image.
Enterprise Project	Select an enterprise project from the drop-down list. This parameter is available only if you have enabled enterprise projects or your account is an enterprise account. To enable this function, contact your customer manager.
	An enterprise project provides central management of cloud resources on a project.

Parameter	Description
Tag	(Optional) Set a tag key and a tag value for the image to make identification and management of your images easier.
Description	(Optional) Enter a description of the image.

- 3. Click Create Now.
- 4. Confirm the settings and click **Submit**.

Step 3 Go back to the **Private Images** page and view the new system disk image.

The time required for creating an image depends on the ECS system disk size, network quality, and the number of concurrent tasks. When the image status changes to **Normal**, the image creation is complete.

- Do not perform any operations on the selected ECS or its associated resources during image creation.
- An ECS created from an encrypted image is also encrypted. The key used for encrypting the ECS is the same as that used for encrypting the image.
- An image created from an encrypted ECS is also encrypted. The key used for encrypting the image is the same as that used for encrypting the ECS.

----End

Follow-up Procedure

After a system disk image is created, you can use either of the following methods to migrate data between two servers:

- Use the image to create new ECSs. For details, see **Creating an ECS from an Image**.
- Use the image to change the OSs of existing ECSs.

2.3 Creating a System Disk Image from a Linux ECS

Scenarios

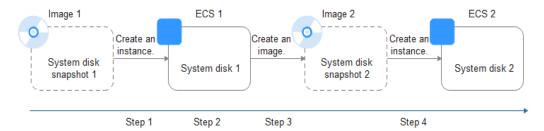
If you have created and configured a Linux ECS based on your service requirements (for example, by installing software and setting up an application environment), you can create a system disk image based on this configured ECS. Then, all new ECSs created from this image will have the same software and environment preinstalled.

Creating a system disk image does not affect the running of services on the ECS or cause data loss.

Background

The following figure shows the process of creating a system disk image from an ECS.

Figure 2-3 Creating a system disk image and using it to create ECSs



- System disk images are often used for application scale-out. They can also be used for hybrid cloud deployment. You can create system disk images for resource synchronization on and off cloud. The procedure is as follows:
 - a. Create a system disk image from an ECS.

If the ECS is created from any of the following images, the system disk image cannot be exported:

- ISO image
- Private image created from a SUSE, Red Hat, Ubuntu, or Oracle Linux public image
- Export the image to an OBS bucket. For details, see Exporting an Image.
- c. Download the image file from the OBS bucket.
- You can create an image from a running ECS.
 The image creation does not affect service running on the ECS.
 In this process, do not stop, start, or restart the ECS, or the image creation may fail.
- The time required for creating an image depends on the ECS system disk size, network quality, and the number of concurrent tasks.
- A system disk image will be created in the same region as the ECS that was used to create it.
- If an ECS has expired or been released, you can use the system disk image created from the ECS to restore it.

Prerequisites

Before creating a private image from an ECS:

- Delete any sensitive data the ECS may contain.
- Ensure that the ECS is in the **Running** or **Stopped** state.
- Check network configuration of the ECS and ensure that DHCP is configured for the NICs. For details, see **Setting the NIC to DHCP**.
- Check whether Cloud-Init has been installed on the ECS. The user data injection function on the management console is only available for new ECSs

that have this tool installed. You can use data injection, for example, to set the login password for a new ECS. For details, see **Installing Cloud-Init** and **Configuring Cloud-Init**.

- Delete any network rules to prevent NIC name drift on the ECSs created from the image. For details, see Deleting Files from the Network Rule Directory.
- To ensure that the ECSs created from the image support both Xen and KVM virtualization, the Linux ECS used to create the image has to be modified. For instance, the disk IDs in the GRUB and fstab files need to be UUID and native Xen and KVM drivers need to be installed.

For details, see steps 2 to 6 in Optimization Process.

- If multiple data disks are attached to an ECS used to create a private image, the ECSs created from the image may be unavailable. You need to detach all data disks from the ECS before using it to create an image. For details, see Detaching Data Disks from an ECS.
- If data disks have been attached to the ECS and automatic partition mounting has been configured in the fstab file for the ECS, delete these configurations from the file before using the ECS to create a system disk image.

□ NOTE

If an ECS is created from a public image, Cloud-Init has been installed by default. You can follow the guide to verify the installation.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- Step 2 Create a system disk image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. Set image parameters.

Table 2-3 and **Table 2-4** list the parameters in the **Image Type and Source** and **Image Information** areas, respectively.

Table 2-3 Image type and source

Parameter	Description
Туре	Select System disk image .
Source	Select ECS and select an ECS with required configurations.

Parameter Description Encryption This parameter specifies whether the image will be encrypted. The value is provided by the system and cannot be changed. - Only an unencrypted private image can be created from an unencrypted ECS. Only an encrypted private image can be created from an encrypted ECS. Name Set a name for the image. **Enterprise Project** Select an enterprise project from the drop-down list. This parameter is available only if you have enabled enterprise projects or your account is an enterprise account. To enable this function, contact your customer manager.

cloud resources on a project.

An enterprise project provides central management of

(Optional) Set a tag key and a tag value for the image

to make identification and management of your

(Optional) Enter a description of the image.

Table 2-4 Image information

3. Click Create Now.

Description

Tag

4. Confirm the settings and click **Submit**.

Step 3 Go back to the **Private Images** page and view the new system disk image.

images easier.

The time required for creating an image depends on the ECS system disk size, network quality, and the number of concurrent tasks. When the image status changes to **Normal**, the image creation is complete.

□ NOTE

- Do not perform any operations on the selected ECS or its associated resources during image creation.
- An ECS created from an encrypted image is also encrypted. The key used for encrypting the ECS is the same as that used for encrypting the image.
- An image created from an encrypted ECS is also encrypted. The key used for encrypting
 the image is the same as that used for encrypting the ECS.

----End

Follow-up Procedure

After a system disk image is created, you can use either of the following methods to migrate data between two servers:

Use the image to create new ECSs. For details, see Creating an ECS from an Image.

• Use the image to change the OSs of existing ECSs.

2.4 Creating a Windows System Disk Image from an External Image File

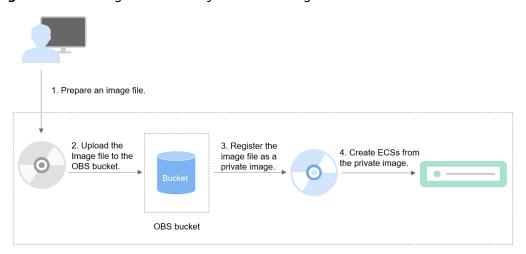
2.4.1 Overview

You can import a local image or a system disk image from another cloud platform to the current cloud. After an image is imported, you can use it to create ECSs or reinstall the OSs of existing ECSs.

Creation Process

Figure 2-4 shows the process of creating a private image.

Figure 2-4 Creating a Windows system disk image



As shown in the figure, the following steps are required to register an external image file as a private image:

- Prepare an external image file that meets platform requirements. For details, see Preparing an Image File.
- 2. Upload the external image file to your OBS bucket. For details, see **Uploading** an External Image File.
- On the management console, select the uploaded image file and register it as a private image. For details, see Registering an External Image File as a Private Image.
- 4. After the private image is registered, you can use it to create ECSs. For details, see **Creating a Windows ECS from an Image**.

2.4.2 Preparing an Image File

You need to prepare an image file that meets the platform requirements.

■ NOTE

- You are advised to complete the network, tool, and driver configurations in Table 2-5
 on the source VM and then export the image file. You can also complete the
 configurations on the created ECSs. For details, see What Do I Do If a Windows Image
 File Is Not Pre-Configured When I Use It to Register a Private Image?
- Currently, a large image file (maximum: 1 TB) can be imported only in RAW or ZVHD2 format. In addition to the requirements described in Table 2-5, a bitmap file needs to be generated for each RAW image file. The bitmap file is uploaded together with the image file. For details, see Quickly Importing an Image File.

Table 2-5 Windows image file requirements

Image File Property	Requirement
OS	Windows Server 2008, Windows Server 2012, Windows Server 2016
	• 32-bit or 64-bit
	The OS cannot be bound to specific hardware.
	The OS must support full virtualization.
	For details about the supported OS versions, see External Image File Formats and Supported OSs. These OSs support automatic configuration. For details, see What Will the System Do to an Image File When I Use the File to Register a Private Image? For other OSs, check and install the Guest OS driver. On the image registration page, select Other Windows. After the image is imported, whether the system is started depends on the driver integrity.
Image format	VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD
Image size	Maximum file size: 128 GB
	If the image size is between 128 GB and 1 TB, convert the image file into the RAW or ZVHD2 format and import the image using fast import.
	For details about how to convert the image file format, see Converting the Image Format Using qemu-img-hw.
	• For details about fast import, see fast image file import .
Network	The NIC must be set to DHCP. Otherwise, the ECS startup or network capability will be abnormal. For details, see:
	Setting the NIC to DHCP
	The following value-added operations are optional:
	 Enabling NIC multi-queue NIC multi-queue enables multiple vCPUs to process NIC interruptions, thereby improving network PPS and I/O performance. For details, see How Do I Enable NIC Multi-Queue for an Image?

Image File Property	Requirement
Tool	You are advised to install Cloudbase-Init.
	Cloudbase-Init is an open-source tool for cloud instance initialization. When creating ECSs from an image with Cloudbase-Init, you can use user data injection to inject customized initialization details (for example, an ECS login password) to the ECSs. You can also configure and manage a running ECS by querying and using metadata. If Cloudbase-Init is not installed, you cannot apply custom configurations to the ECSs. You will have to use the original password in the image file to log in to the ECSs.
	For details, see Installing and Configuring Cloudbase-Init.
Driver	Installing the PV Driver
	Installing UVP VMTools
Other requirements	 Currently, images with data disks cannot be created. The image file must contain only the system disk, and the system disk size must be [40 GB, 1024 GB].
	• The initial password in the image file must contain uppercase letters, lowercase letters, digits, and special characters (!@\$%^=+[{}]:,./?).
	The boot partition and system partition must be on the same disk.
	For an external image file, you need a tenant administrator account and password combination.
	 Generally, the boot mode is BIOS in an image. Some OS images support the UEFI boot mode. For details, see OSs Supporting UEFI Boot Mode.
	The image file cannot be encrypted, or ECSs created from the registered image may not work properly.

2.4.3 Uploading an External Image File

You are advised to use OBS Browser to upload external image files to OBS buckets. For details, see *Object Storage Service User Guide*.

■ NOTE

- The bucket file and the image to be registered must belong to the same region.
- Only unencrypted external image files or those encrypted using SSE-KMS can be uploaded to the OBS bucket.
- The storage class of the OBS bucket must be Standard.
- Do not upload image files using the OBS server-side encryption function.
- If you want to create a data disk image along with the system disk image, you also need to upload an image file containing data disks to the OBS bucket. You can create one system disk image and no more than three data disk images.

2.4.4 Registering an External Image File as a Private Image

Scenarios

Register an image file uploaded to the OBS bucket as a private image.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- **Step 2** Register an external image file as a private image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. Set image parameters.

Table 2-6 and **Table 2-7** list the parameters in the **Image Type and Source** and **Image Information** areas, respectively.

Table 2-6 Image type and source

Parameter	Description
Туре	Select System disk image .
Source	Select Image File for Source . Select the bucket storing the image file from the list and then select the image file.
Enable Fast Create	This parameter is available only when you select a ZVHD2 or RAW image file.
	This function enables fast image creation and supports import of large files (maximum: 1 TB) as long as the files to be uploaded are converted to ZVHD2 or RAW format and optimized. If you have a file that meets the requirements, select Enable Fast Create and select the confirmation information following Image File Preparation .
	NOTE To learn how to convert image file formats and generate bitmap files, see Quickly Importing an Image File.

Table 2-7 Image information

Parameter	Description
Enable automatic configuration	If you select this option, the system will automatically check and optimize the image file. For details, see What Will the System Do to an Image File When I Use the File to Register a Private Image?
Function	Specifies whether the image is used to create ECSs or BMSs. The value can be ECS system disk image or BMS system disk image . This section uses ECS system disk image as an example.
Boot Mode	This parameter is optional. The value can be BIOS or UEFI. For details about the differences between the two, see How Is BIOS Different from UEFI?
	For details about which OSs support UEFI boot, see OSs Supporting UEFI Boot Mode
	The boot mode must be the same as that in the image file. You need to confirm which boot mode is used in the image file. After you select the correct boot mode, the boot mode will be configured for the image at the background. Select the right boot mode, or ECSs created using the image will not be able to boot up.
OS	To ensure that the image can be created and used properly, select an OS consistent with that in the image file. If you do not select an OS, the system attempts to automatically identify the OS in the image file.
	NOTE
	If the system detects that the image file OS is different from the one you selected, the OS detected by the system will be used.
	If the system cannot detect the OS in the image file, the OS you selected will be used.
	If the OS you selected or identified by the system is incorrect, ECSs created from the image file may be affected.
System Disk (GB)	The system disk capacity (value range: 40 GB to 1024 GB). Ensure that this value is at least equal to the system disk size in the image file. NOTE
	If the uploaded VHD image is generated using qemu-img or similar tools, check the system disk size based on What Do I Do If the System Disk Size in a VHD Image File Exceeds the One I Have Specified on the Management Console When I Use This File to Register a Private Image?

Parameter	Description
Data Disk (GB)	You can also add data disks to the image. You need to obtain an image file containing data disks in advance. This function is used to migrate VMs and data disks from other platforms to the current platform.
	To add data disks, click , set the data disk size, and click Select Image File . In the displayed dialog box, select the target bucket and then the target image file containing the data disk.
	A maximum of three data disks can be added.
Name	Set a name for the image.
Encryption	(Optional) If you want to encrypt the image, select KMS encryption and select the key to be used from the key list. After you select KMS encryption , the system will create a default key ims/default for you. You can also select a key from the key list.
	For how to encrypt an image, see Creating Encrypted Images.
Tag	(Optional) Set a tag key and a tag value for the image to make identification and management of your images easier.
Description	(Optional) Enter a description of the image.

3. Click Create Now, confirm the configurations, and click Submit.

Step 3 Go back to the **Private Images** page. The image is successfully registered when its status becomes **Normal**.

If you add data disks during image creation, a system disk image and data disk images will be generated. The number of data disk images depends on the number of data disks you add (a maximum of 3).

∩ NOTE

The time required for image registration is determined by the image file size. You may need to wait a long period of time for the image file to be successfully registered as a private image.

----End

2.4.5 Creating a Windows ECS from an Image

Scenarios

After registering an external image file as a private image on the cloud platform, you can use the image to create ECSs or change the OSs of existing ECSs.

This section describes how to create an ECS from an image.

Procedure

Create an ECS by referring to Creating an ECS from an Image.

Note the following when setting the parameters:

- **Region**: Select the region where the private image is located.
- **Image**: Select **Private image** and then the created image from the drop-down list.
- (Optional) Data Disk: Add data disks. These data disks are created from a
 data disk image generated together with a system disk image. In this way,
 you can migrate the data of data disks together with system disk data from
 the VM on the original platform to the current cloud platform.

Follow-up Procedure

After a system disk image is created, you can use it to change the OS of an ECS.

2.5 Creating a Linux System Disk Image from an External Image File

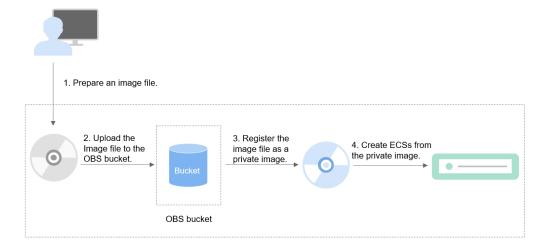
2.5.1 Overview

You can import a local image or a system disk image from another cloud platform to the current cloud. After an image is imported, you can use it to create ECSs or reinstall the OSs of existing ECSs.

Creation Process

Figure 2-5 shows the process of creating a private image.

Figure 2-5 Creating a Linux system disk image



The procedure is as follows:

- 1. Prepare an external image file that meets platform requirements. For details, see **Preparing an Image File**.
- Upload the external image file to your OBS bucket. For details, see Uploading an External Image File.
- 3. On the management console, select the uploaded image file and register it as a private image. For details, see **Registering an External Image File as a Private Image**.
- 4. After the private image is registered, you can use it to create ECSs. For details, see **Creating a Linux ECS from an Image**.

2.5.2 Preparing an Image File

You need to prepare an image file that meets the platform requirements.

□ NOTE

- You are advised to complete the file system, network, and driver configurations in Table 2-8 on the source VM and then export the image file. You can also complete the configurations on the created ECSs. For details, see What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?
- Currently, a large image file (maximum: 1 TB) can be imported only in RAW or ZVHD2 format. In addition to the requirements described in Table 2-8, a bitmap file needs to be generated for each RAW image file. The bitmap file is uploaded together with the image file. For details, see Quickly Importing an Image File.

Table 2-8 Linux image file requirements

Image File Property	Requirement
OS	 SUSE, Oracle Linux, Red Hat, Ubuntu, openSUSE, CentOS, Debian, Fedora, EulerOS, and NeoKylin 32-bit or 64-bit
	The OS cannot be bound to specific hardware.
	The OS must support full virtualization.
	For details about the supported OS versions, see External Image File Formats and Supported OSs. These OSs support automatic configuration. For details, see What Will the System Do to an Image File When I Use the File to Register a Private Image? For other OSs, check and install the VirtlO driver (see Installing Native KVM Drivers). On the image registration page, select Other Linux. After the image is imported, whether the system is started depends on the driver integrity.
Image format	VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD
Image size	Maximum file size: 128 GB

Image File Property	Requirement
Network	The NIC must be set to DHCP and files must be deleted from the network role directory. Otherwise, the ECS startup or network capability will be abnormal. For details, see:
	Deleting files from the network rule directory
	Setting the NIC to DHCP
	The following value-added operations are optional:
	 Enabling NIC multi-queue NIC multi-queue enables multiple vCPUs to process NIC interruptions, thereby improving network PPS and I/O performance. For details, see How Do I Enable NIC Multi-Queue for an Image?
Tool	You are advised to install Cloud-Init.
	Cloud-Init is an open-source tool for cloud instance initialization. When creating ECSs from an image with Cloud-Init, you can use user data injection to inject customized initialization details (for example, an ECS login password) to the ECSs. You can also configure and manage a running ECS by querying and using metadata. If Cloud-Init is not installed, you cannot apply custom configurations to the ECSs. You will have to use the original password in the image file to log in to the ECSs.
	For details, see Installing Cloud-Init.
Driver	Installing native KVM drivers
File system	• Changing the disk identifier in the GRUB configuration file to UUID
	Changing the disk identifier in the fstab file to UUID

Image File Property	Requirement
Other requirements	 Currently, images with data disks cannot be created. The image file must contain only the system disk, and the system disk size must be [40 GB, 1024 GB].
	 The initial password in the image file must contain uppercase letters, lowercase letters, digits, and special characters (!@\$%^=+[{}]:,./?).
	The boot partition and system partition must be on the same disk.
	 Generally, the boot mode is BIOS in an image. Some OS images support the UEFI boot mode. For details, see "OSs Supporting UEFI Boot Mode" in <i>Image Service</i> <i>Management User Guide</i>.
	The image file cannot be encrypted, or ECSs created from the registered image may not work properly.
	• The /etc/fstab file cannot contain automatic mounting information of non-system disks. Otherwise, the login to the created ECS may fail.
	 If the external image file uses LVM as the system disk, ECSs created from the private image do not support file injection.
	If the VM where the external image file is located has been shut down, it must be a graceful shutdown. Otherwise, a blue screen may occur when the ECS created from the private image is started.

2.5.3 Uploading an External Image File

You are advised to use OBS Browser to upload external image files to OBS buckets. For details, see *Object Storage Service User Guide*.

Ⅲ NOTE

- The bucket file and the image to be registered must belong to the same region.
- Only unencrypted external image files or those encrypted using SSE-KMS can be uploaded to the OBS bucket.
- The storage class of the OBS bucket must be Standard.
- Do not upload image files using the OBS server-side encryption function.
- If you want to create a data disk image along with the system disk image, you also need to upload an image file containing data disks to the OBS bucket. You can create one system disk image and no more than three data disk images.

2.5.4 Registering an External Image File as a Private Image

Scenarios

Register an image file uploaded to the OBS bucket as a private image.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- **Step 2** Register an external image file as a private image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. Set image parameters.

Table 2-9 and **Table 2-10** list the parameters in the **Image Type and Source** and **Image Information** areas, respectively.

Table 2-9 Image type and source

Parameter	Description
Туре	Select System disk image .
Source	Select Image File for Source . Select the bucket storing the image file from the list and then select the image file.
Enable Fast Create	This parameter is available only when you select a ZVHD2 or RAW image file.
	This function enables fast image creation and supports import of large files (maximum: 1 TB) as long as the files to be uploaded are converted to ZVHD2 or RAW format and optimized. If you have a file that meets the requirements, select Enable Fast Create and select the confirmation information following Image File Preparation .
	NOTE To learn how to convert image file formats and generate bitmap files, see Quickly Importing an Image File.

Table 2-10 Image information

Parameter	Description
Enable automatic configuration	If you select this option, the system will automatically check and optimize the image file. For details, see What Will the System Do to an Image File When I Use the File to Register a Private Image?
Function	Specifies whether the image is used to create ECSs or BMSs. The value can be ECS system disk image or BMS system disk image. This section uses ECS system disk image as an example.

Parameter	Description
Boot Mode	This parameter is optional. The value can be BIOS or UEFI. For details about the differences between the two, see How Is BIOS Different from UEFI?
	For details about which OSs support UEFI boot, see OSs Supporting UEFI Boot Mode
	The boot mode must be the same as that in the image file. You need to confirm which boot mode is used in the image file. After you select the correct boot mode, the boot mode will be configured for the image at the background. Select the right boot mode, or ECSs created using the image will not be able to boot up.
OS	To ensure that the image can be created and used properly, select an OS consistent with that in the image file. If you do not select an OS, the system attempts to automatically identify the OS in the image file. NOTE
	- If the system detects that the image file OS is different from the one you selected, the OS detected by the system will be used.
	 If the system cannot detect the OS in the image file, the OS you selected will be used.
	 If the OS you selected or identified by the system is incorrect, ECSs created from the image file may be affected.
System Disk (GB)	The system disk capacity (value range: 40 GB to 1024 GB). Ensure that this value is at least equal to the system disk size in the image file.
	If the uploaded VHD image is generated using qemu-img or similar tools, check the system disk size based on What Do I Do If the System Disk Size in a VHD Image File Exceeds the One I Have Specified on the Management Console When I Use This File to Register a Private Image?
Data Disk (GB)	You can also add data disks to the image. You need to obtain an image file containing data disks in advance. This function is used to migrate VMs and data disks from other platforms to the current platform.
	To add data disks, click , set the data disk size, and click Select Image File . In the displayed dialog box, select the target bucket and then the target image file containing the data disk.
	A maximum of three data disks can be added.
Name	Set a name for the image.

Parameter	Description
Encryption	(Optional) If you want to encrypt the image, select KMS encryption and select the key to be used from the key list. After you select KMS encryption , the system will create a default key ims/default for you. You can also select a key from the key list. For how to encrypt an image, see Creating Encrypted
	Images.
Tag	(Optional) Set a tag key and a tag value for the image to make identification and management of your images easier.
Description	(Optional) Enter a description of the image.

- 3. Click **Create Now**, confirm the configurations, and click **Submit**.
- **Step 3** Go back to the **Private Images** page. The image is successfully registered when its status becomes **Normal**.

If you add data disks during image creation, a system disk image and data disk images will be generated. The number of data disk images depends on the number of data disks you add (a maximum of 3).

The time required for image registration is determined by the image file size. You may need to wait a long period of time for the image file to be successfully registered as a private image.

----End

2.5.5 Creating a Linux ECS from an Image

Scenarios

After registering an external image file as a private image on the cloud platform, you can use the image to create ECSs or change the OSs of existing ECSs.

This section describes how to create an ECS from an image.

Procedure

Create an ECS by referring to **Creating an ECS from an Image**.

Note the following when setting the parameters:

- **Region**: Select the region where the private image is located.
- Image: Select Private image and then the created image from the dropdown list.
- (Optional) Data Disk: Add data disks. These data disks are created from a
 data disk image generated together with a system disk image. In this way,
 you can migrate the data of data disks together with system disk data from
 the VM on the original platform to the current cloud platform.

Follow-up Procedure

After a system disk image is created, you can use it to change the OS of an ECS.

2.6 Creating a Data Disk Image from an External Image File

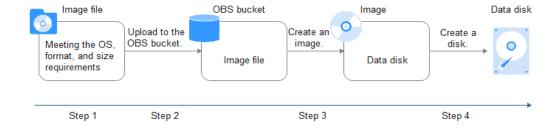
Scenarios

A data disk image contains only service data. You can create a data disk image using a local image file or an external image file (image file on another cloud platform). Then, you can use the data disk image to create EVS disks and migrate your service data to the cloud.

Background

The following figure shows the process of creating a data disk image from an external image file.

Figure 2-6 Creating a data disk image from an external image file



- Prepare an external image file. The file must be in VHD, VMDK, QCOW2, RAW, VHDX, QCOW, VDI, QED, ZVHD, or ZVHD2 format. If you want to use an image file in other formats, convert the file into any of the listed formats before importing it to the cloud platform.
- 2. When uploading the external image file, you must select an OBS bucket with standard storage. For details, see **Uploading an External Image File**.
- 3. Create a data disk image. For details, see **Procedure**.
- 4. Use the data disk image to create data disks. For details, see **Follow-up Procedure**.

Procedure

Step 1 Access the IMS console.

- 1. Log in to the management console.
- Under Computing, click Image Management Service.
 The IMS console is displayed.

Step 2 Create a data disk image.

- 1. Click **Create Image** in the upper right corner.
- 2. In the **Image Type and Source** area, select **Data disk image** for **Type**.
- 3. Select **Image File** for **Source**. Select the bucket storing the image file from the list and then select the image file.
- 4. To register the image file using the Fast Create function, select **Enable Fast Create**.

□ NOTE

- Currently, this function supports only image files in ZVHD2 or RAW format.
- For how to convert image file formats and generate bitmap files, see Quickly Importing an Image File.

After you select **Enable Fast Create**, select the confirmation information following **Image File Preparation** if you have prepared the required files.

- 5. In the **Image Information** area, set the following parameters.
 - OS Type: The value is Windows or Linux.
 - Data Disk: The value ranges from 40 GB to 2048 GB and must be no less than the data disk size in the image file.
 - Name: Enter a name for the image.
 - (Optional) Encryption: If you want to encrypt the image, select KMS encryption and then select the key to be used from the key list.
 - Enterprise Project: Select an enterprise project from the drop-down list.
 This parameter is available only if you have enabled enterprise projects or your account is an enterprise account. To enable this function, contact your customer manager. An enterprise project provides central management of cloud resources on a project.
 - (Optional) **Tag**: Set a tag key and a tag value for the image to easily identify and manage it.
 - (Optional) **Description**: Enter description of the image.
- 6. Click Create Now.
- 7. Confirm the settings and click **Submit**.

Step 3 Go back to the **Private Images** page and view the new data disk image.

When the image status changes to **Normal**, the image creation is complete.

----End

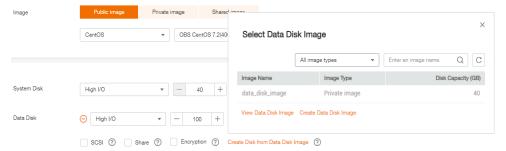
Follow-up Procedure

If you want to use the created data disk image to create an EVS disk and attach it to an ECS, you can perform either of the following operations:

- Locate the row that contains the created data disk image and click Create
 Data Disk to create one or multiple data disks. Then attach the data disks to an ECS.
- On the page for creating ECSs, click **Create Disk from Data Disk Image** and select the data disk image.

In this way, a data disk image can be used to create a data disk for an ECS only once. For example, a data disk created from data disk image data_disk_image has been added to the ECS. No any other data disk created from this image can be added to the ECS.

Figure 2-7 Adding data disks



2.7 Creating a Full-ECS Image from an ECS

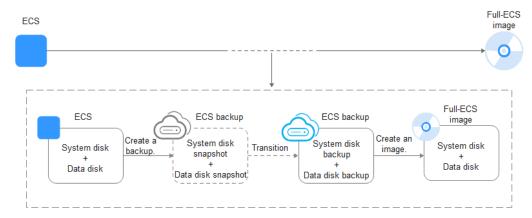
Scenarios

You can create an image of an entire ECS, including not just the OS, but also the software and all the service data. You can then use this image to migrate data by quickly provisioning exact clones of the original ECS.

Background

The following figure shows the process of creating an image from an entire ECS, with both the system and data disks included.

Figure 2-8 Creating a full-ECS image from an ECS



- The time required for creating a full-ECS image depends on the disk size, network quality, and the number of concurrent tasks.
- The ECS used to create a full-ECS image must be in **Running** or **Stopped** state. To create a full-ECS image containing a database, use a stopped ECS.

- If an ECS is in **Stopped** state, do not start it when you are using it to create a full-ECS image.
- When a full-ECS image is being created from an ECS, do not perform any operations on the ECS, or the image creation may fail.
- In Figure 2-8, if there are snapshots of the system disk and data disks but the ECS backup creation is not complete, the full-ECS image you create will only be available in the AZ where the source ECS is and can only be used to provision ECSs in this AZ. You cannot provision ECSs in other AZs in the region until the original ECS is fully backed up and the full-ECS image is in the Normal state.
- If you use a full-ECS image to change an ECS OS, only the system disk data can be written into the ECS. Therefore, if you want to restore or migrate the data disk data of an ECS by using a full-ECS image, you can only use the image to create a new ECS rather than use it to change the ECS OS.

Constraints

- When creating a full-ECS image from an ECS, ensure that the ECS has been properly configured, or the image creation may fail.
- A Windows ECS used to create a full-ECS image cannot have a spanned volume, or data may be lost when ECSs are created from that image.
- A Linux ECS used to create a full-ECS image cannot have a disk group or logical disk that contains multiple physical disks, or data may be lost when ECSs are created from that image.
- An ECS used to create a full-ECS image cannot contain a Dedicated Storage Service disk.
- A full-ECS image cannot be exported, replicated, or shared.
- When creating a full-ECS image from a Windows ECS, you need to change the SAN policy of the ECS to OnlineAll. Otherwise, EVS disks attached to the ECSs created from the image may be offline.

Windows has three types of SAN policies: **OnlineAll**, **OfflineShared**, and **OfflineInternal**.

Table 2-11 SAN policies in Windows

Туре	Description
OnlineAll	All newly detected disks are automatically brought online.
OfflineSh ared	All disks on sharable buses, such as iSCSI and FC, are left offline by default, while disks on non-sharable buses are kept online.
OfflineIn ternal	All newly detected disks are left offline.

a. Execute **cmd.exe** and run the following command to query the current SAN policy of the ECS:

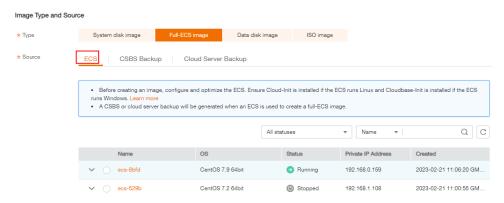
diskpart

- b. Run the following command to view the SAN policy of the ECS:san
 - If the SAN policy is OnlineAll, run the exit command to exit DiskPart.
 - If the SAN policy is not OnlineAll, go to c.
- c. Run the following command to change the SAN policy of the ECS to **OnlineAll**:
 - san policy=onlineall

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- **Step 2** Create a full-ECS image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. In the **Image Type and Source** area, select **Full-ECS image** for **Type**.
 - 3. Select ECS for Source and then select an ECS from the list.

Figure 2-9 Creating a full-ECS image using an ECS



- 4. In the **Image Information** area, configure basic image details, such as the image name and description.
- 5. Click Create Now.
- 6. Confirm the settings and click **Submit**.
- **Step 3** Go back to the **Private Images** page and view the new full-ECS image.
 - When the image status changes to **Normal**, the image creation is complete.
 - If **Available in AZ**X is displayed under **Normal** in the **Status** column for a full-ECS image, the backup for this ECS has not been created and only a disk snapshot is created. (**AZ**X indicates the AZ where the source ECS of the image resides.)

In this case, the full-ECS image can be used to provision ECSs only in the specified AZ. If you want to use this image to provision ECSs in other AZs of

the region, you need to wait until **Available in AZ**X disappears from under **Normal**, which indicates that the ECS backup has been successfully created. This process takes about 10 minutes, depending on the data volume of the source ECS.

Figure 2-10 Full-ECS image status



----End

Follow-up Procedure

• If you want to use the full-ECS image to create ECSs, click **Apply for Server** in the **Operation** column. On the displayed page, create ECSs by following the instructions in *Elastic Cloud Server User Guide*.

□ NOTE

When you use a full-ECS image to create an ECS:

- The system and data disk information defaulted by the image will be automatically displayed.
- If the full-ECS image contains multiple data disks, it takes some time to load and display the disk information.
- If you use a full-ECS image to change an ECS OS, only the system disk data can be written into the ECS. Therefore, if you want to restore or migrate the data disk data of an ECS by using a full-ECS image, you can only use the image to create a new ECS rather than use it to change the ECS OS.

2.8 Creating a Full-ECS Image from a CSBS Backup

Scenarios

Create a full-ECS image from a CSBS backup. This image can then be used to create ECSs.

Constraints

- When creating a full-ECS image from a CSBS backup, ensure that the source ECS of the CSBS backup has been properly configured, or the image creation may fail.
- If an ECS is in **Stopped** state, do not start it when you are using it to create a full-ECS image.
- A CSBS backup used to create a full-ECS image cannot have shared disks.
- Only an available CSBS backup can be used to create a full-ECS image. A CSBS backup can be used to create only one full-ECS image.
- A full-ECS image cannot be exported, replicated, or shared.

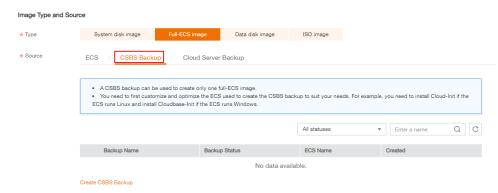
Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under **Computing**, click **Image Management Service**. The IMS console is displayed.

Step 2 Create a full-ECS image.

- 1. Click **Create Image** in the upper right corner.
- 2. In the **Image Type and Source** area, select **Full-ECS image** for **Type**.
- 3. Select **CSBS Backup** for **Source** and then select a backup from the list.

Figure 2-11 Creating a full-ECS image using a CSBS backup



- 4. In the **Image Information** area, configure basic image details, such as the image name and description.
- 5. Click Create Now.
- 6. Confirm the settings and click **Submit**.
- **Step 3** Switch back to the **Image Management Service** page to monitor the image status.

When the image status changes to **Normal**, the image creation is complete.

----End

Follow-up Procedure

• If you want to use the full-ECS image to create ECSs, click **Apply for Server** in the **Operation** column. On the displayed page, create ECSs by following the instructions in *Elastic Cloud Server User Guide*.

MOTE

When you use a full-ECS image to create an ECS:

- The system and data disk information defaulted by the image will be automatically displayed.
- If the full-ECS image contains multiple data disks, it takes some time to load and display the disk information.
- If you use a full-ECS image to change an ECS OS, only the system disk data can be written into the ECS. Therefore, if you want to restore or migrate the

- data disk data of an ECS by using a full-ECS image, you can only use the image to create a new ECS rather than use it to change the ECS OS.
- If you want to share a full-ECS image with other tenants, you must migrate resources to the CBR service because only full-ECS images created from CBR backups can be shared.

2.9 Creating a Full-ECS Image from a CBR Backup

Scenarios

You can use a Cloud Backup and Recovery (CBR) backup to create a full-ECS image, which can be used to create ECSs.

Background

- The Cloud Backup and Recovery (CBR) service provides backup services for EVS disks, ECSs, and BMSs, and supports restoring data of servers and disks using backups. If you have created a backup for an ECS using CBR, you can use the backup to create a full-ECS image.
- If you use a full-ECS image to change an ECS OS, only the system disk data can be written into the ECS. Therefore, if you want to restore or migrate the data disk data of an ECS by using a full-ECS image, you can only use the image to create a new ECS rather than use it to change the ECS OS.

Constraints

- When creating a full-ECS image from a CBR backup, ensure that the source ECS of the CBR backup has been properly configured, or the image creation may fail.
- A CBR backup can be used to create only one full-ECS image.
- If an ECS is in **Stopped** state, do not start it when you are using it to create a full-ECS image.
- A full-ECS image cannot be exported, replicated, or shared.

Procedure

Step 1 Access the IMS console.

- 1. Log in to the management console.
- Under Computing, click Image Management Service.
 The IMS console is displayed.

Step 2 Create a full-ECS image.

- 1. Click **Create Image** in the upper right corner.
- 2. In the **Image Type and Source** area, select **Full-ECS image** for **Type**.
- 3. Select **Cloud Server Backup** for **Source** and then select a backup from the list.

Image Type and Source

* Type System disk image Full-ECS image Data disk image ISO image

* Source ECS CSBS Backup Cloud Server Backup

- A cloud server backup can be used to create only one full-ECS image.
- You need to first customize the ECS used to create the vault backup to suit your needs. Learn more

All statuses
- Enter a name. Q C

Backup Name Backup Status ECS Name Created

No data available.

Create Server Backup

Figure 2-12 Creating a full-ECS image using a CBR backup

- 4. In the **Image Information** area, configure basic image details, such as the image name and description.
- 5. Click Create Now.
- 6. Confirm the settings and click **Submit**.
- **Step 3** Switch back to the **Image Management Service** page to monitor the image status.

When the image status changes to **Normal**, the image creation is complete.

----End

Follow-up Procedure

After the full-ECS image creation is complete, you can perform the following operations:

If you want to use the image to create ECSs, click Apply for Server in the
Operation column. On the displayed page, select Private image and then
select the created full-ECS image. For details, see Elastic Cloud Server User
Guide.

MOTE

When you use a full-ECS image to create an ECS:

- The system and data disk information defaulted by the image will be automatically displayed.
- If the full-ECS image contains multiple data disks, it takes some time to load and display the disk information.
- If you want to share the image with other tenants, click **More** in the **Operation** column and select **Share** from the drop-down list. In the displayed dialog box, enter the account names of the image recipients.
- If you use a full-ECS image to change an ECS OS, only the system disk data can be written into the ECS. Therefore, if you want to restore or migrate the data disk data of an ECS by using a full-ECS image, you can only use the image to create a new ECS rather than use it to change the ECS OS.

2.10 Creating a Windows System Disk Image from an ISO File

2.10.1 Overview

An ISO file is a disk image of an optical disc. A large number of data files can be compressed into a single ISO file. Likewise, to access the files stored in an ISO, the ISO file needs to be decompressed. For example, you can use a virtual CD-ROM to open an ISO file, or burn the ISO file to a CD or DVD and then use the CD-ROM to read the image.

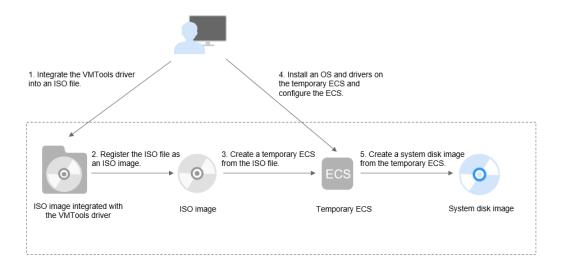
This section describes how to create a Windows system disk image from an ISO file.

This section is applicable only to the management console. If you are an API user, see "Creating an Image from an ISO File" in *Image Management Service User Guide*.

Creation Process

Figure 2-13 shows the process of creating a Windows system disk image from an ISO file.

Figure 2-13 Creating a Windows system disk image



The procedure is as follows:

- Integrate the VMTools driver into the ISO file
 Windows uses the IDE disk and VirtIO NIC. Before registering an image on the cloud platform, integrate the VMTools driver into the Windows ISO file. For details, see Integrating the VMTools Driver into an ISO File.
- Register the ISO file as an ISO image.
 On the management console, register the ISO file that has integrated the VMTools driver as an image. The image is an ISO image and cannot be used to provision ECSs. For details, see Registering an ISO File as an ISO Image.
- 3. Create a temporary ECS from the ISO image.

Use the registered ISO image to create a temporary ECS. The ECS has no OS or driver installed. For details, see **Creating a Windows ECS from an ISO Image**.

4. Install an OS and necessary drivers for the temporary ECS and configure related settings.

The operations include installing an OS, PV driver, and VMTools driver, and configuring NIC attributes. For details, see Installing a Windows OS and the VMTools Driver and Step 1 in Configuring the ECS and Creating a Windows System Disk Image.

5. Create a system disk image from the temporary ECS.

On the management console, create a system disk image from the temporary ECS on which the installation and configuration have been completed. After the image is created, delete the temporary ECS to prevent it from occupying compute resources. For details, see **Creating a System Disk Image from a Windows ECS**.

Constraints

- An ISO image created from an ISO file is used only for creating a temporary ECS. It will not be available on the ECS console. You cannot use it to create ECSs or change ECS OSs. You need to install an OS on the temporary ECS and use that ECS to create a system disk image which can be used to create ECSs or change ECS OSs.
- A temporary ECS has limited functionality. For example, you cannot attach disks to it. You are not advised to use it as a normal ECS.

2.10.2 Integrating the VMTools Driver into an ISO File

Scenarios

A Windows system with the Integrated Drive Electronics (IDE) hard drive and Virtio NIC is used on the cloud. Therefore, you need to integrate the VMTools driver into the ISO file of Windows before registering an image on the cloud platform. Typically, an ISO file contains all the files that would be included on an optical disc. Some software can be installed only from a CD-ROM drive. So, a virtual CD-ROM drive is required.

This section uses AnyBurn and UltraISO as examples to describe how to integrate the VMTools driver into an ISO file.

□ NOTE

- AnyBurn is lightweight CD/DVD/Blu-ray burning software with a free version.
- UltraISO is an ISO CD/DVD image file handling tool. A free trial version is limited to ISO files of 300 MB or less. You are advised to buy a standard version.

Prerequisites

You have obtained an ISO file.

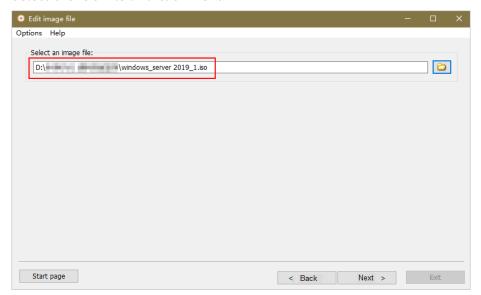
The ISO file name can contain only letters, digits, hyphens (-), and underscores (_). If the name does not meet the requirements, change it.

AnyBurn

- 1. Download AnyBurn and install it on your local PC.
- Download the VMTools driver package and decompress it to your local PC.
 For the mapping between Windows versions and VMTools packages, see
 Obtaining Required Software Packages.
- 3. Use AnyBurn to open the ISO file.
 - a. Open AnyBurn and select Edit Image File.



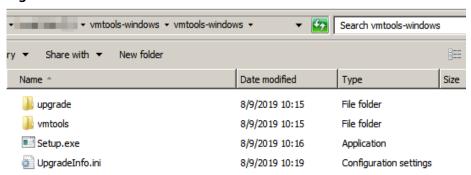
b. Select the ISO file and click Next.



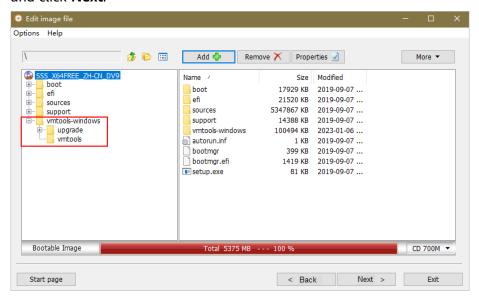
4. Edit the ISO file to integrate the VMTools driver into it.

a. Decompress the vmtools-windows.zip file downloaded in 2 to obtain vmtools-windows.iso, and then decompress vmtools-windows.iso to obtain the vmtools-windows folder.

Figure 2-14 vmtools-windows folder

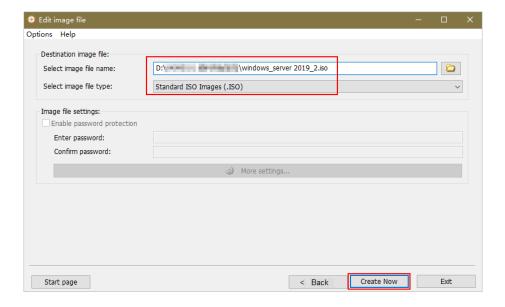


b. Drag and drop the vmtools-windows folder to the parent node of the ISO file (or click Add and select the folder to add it to the parent node), and click Next.



c. Select a path to save the new ISO file and specify a name for the new file. Select **ISO** as the file type. Click **Create Now**.

After the new ISO file is generated, view the VMTools driver in it.



UltraISO

- Download UltraISO and install it on your local PC.
 Download address: https://www.ultraiso.com/
- Download the VMTools driver package and decompress it to your local PC.
 For the mapping between Windows versions and VMTools packages, see
 Obtaining Required Software Packages.
- 3. Use UltraISO to open the ISO file.

(ItraISO (Trial Version) -\WindowsServer... X File Actions Bootable Tools Options Help 📄 🤌 + 🔕 🖟 🞼 🚇 📮 🔬 🚇 🧬 **(i)** Total Size: 4689MB 4.7GE Bootable EFI 🧦 🗙 🃂 🕝 (A) 4 (C) Path: 7 Image: IR3_SSS Filename Size Type i boot aboot 17 696 KB Folder 🗓 🦲 efi 🛅 efi 21,875 KB Folder sources 4,594,500 KB Folder a sources 🚞 support 14,562 KB Folder vmtools-windows 147,477 KB Folder autorun.inf
bootmgr 128 Setup Information 390 KB File bootmgr.efi 1,565 KB efi File setup.exe 76 KB Application Local: 🕏 📂 🗙 🗔 🚳 🌼 🗟 Path: C:\ Computer Filename Size Type 🚊 🌓 🧗 My ISO Files a \$RECYCLE.BIN Folder abackup 6 41 cabb5c18e33f17ce28 Folder endrivers 🛅 Folder 🚞 appdata eal lang 🛅 Boot Folder Documents Documents and Settings Folder - 🔼 Desktop ⊕ • Windows(C:) Copyright (c)2002-2018 EZB Systems, Inc. Image: 4 files, 2034 KB Local: 17 files, 4882 MB

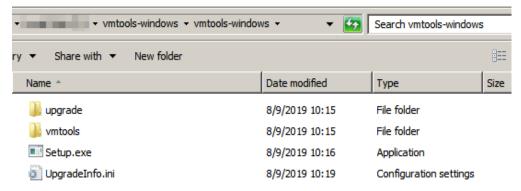
Figure 2-15 Opening the ISO file

CAUTION

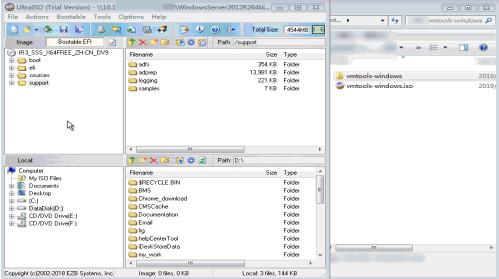
Do not extract the ISO file or open it with some tool other than UltraISO, or the boot data will be lost.

 Decompress the vmtools-windows.zip file downloaded in 2 to obtain vmtools-windows.iso, and then decompress vmtools-windows.iso to obtain the vmtools-windows folder.

Figure 2-16 vmtools-windows folder



5. Drag and drop the **vmtools-windows** folder obtained in **4** to the parent node of the ISO file.



6. Use UltraISO to export the ISO file with the VMTools driver to an .iso file on your local PC.

2.10.3 Registering an ISO File as an ISO Image

Scenarios

Register an external ISO file on the cloud platform as a private image (ISO image). Before registering an image, upload the ISO file exported in **Integrating the VMTools Driver into an ISO File** to the OBS bucket.

The ISO image cannot be replicated, exported, or encrypted.

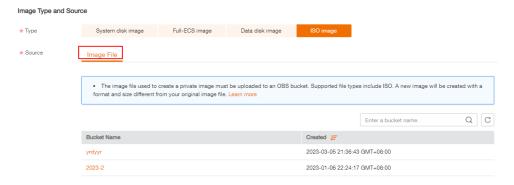
Prerequisites

- The file to be registered must be in ISO format.
- The ISO image file has been uploaded to the OBS bucket. For details, see
 Uploading an External Image File.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- **Step 2** Register an ISO file as an ISO image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. In the **Image Type and Source** area, select **ISO image** for **Type**.
 - 3. In the image file list, select the bucket and then the image file.

Figure 2-18 Creating a private image from an ISO file



4. In the **Image Information** area, set the following parameters.

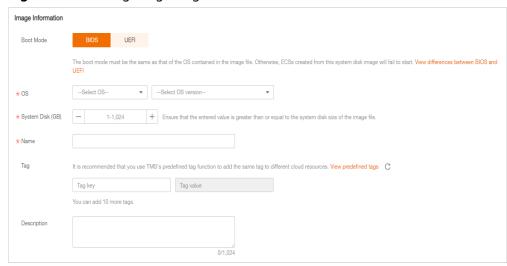


Figure 2-19 Configuring image information

- Boot Mode: Select BIOS or UEFI. Ensure that the selected boot mode is the same as that in the image file, or the ECSs created from this image will not be able to boot up.
- OS: Select the OS specified in the ISO file. To ensure that the image can be created and used properly, select an OS consistent with that in the image file.
- System Disk: Set the system disk capacity (value range: 40 GB to 1024 GB), which must be no less than the size of the system disk in the image file.
- Name: Enter a name for the image to be created.
- Tag: (Optional) Add a tag to the image to be created.
- **Description**: (Optional) Enter image description as needed.
- 5. Click Create Now.
- 6. Confirm the settings and click **Submit**.
- **Step 3** Switch back to the **Image Management Service** page to monitor the image status.

When the image status changes to **Normal**, the image is registered successfully.

----End

2.10.4 Creating a Windows ECS from an ISO Image

Scenarios

This section describes how to create an ECS from a registered ISO image.

Constraints

Dedicated Cloud (DeC) users cannot create ECSs from ISO images.

If the service is enabled for a user in a specified region, the user will be a DeC user.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under Computing, click Image Management Service.

The IMS console is displayed.

Step 2 Use an ISO image to create a Windows ECS.

1. Click the **Private Images** tab. Locate the row that contains the ISO image and click **Create ECS** in the **Operation** column.

∩ NOTE

If you are a **DeC** user, the **Create ECS** button in the **Operation** column will be unavailable for you because a DeC user cannot use an ISO image to create an ECS.

2. Configure the ECS as prompted and click **OK**.

----End

Follow-up Procedure

After the ECS is created, you can log in remotely to continue with OS and drivers installation.

2.10.5 Installing a Windows OS and the VMTools Driver

Scenarios

This section uses Windows Server 2008 R2 64-bit as an example to describe how to install Windows on an ECS.

The installation procedure varies depending on the image file you use. Perform operations as prompted.

Set the time zone, KMS address, patch server, input method, and language based on service requirements.

Prerequisites

You have remotely logged in to the ECS and entered the installation page.

Procedure



Do not stop or restart the ECS during the OS installation. Otherwise, the OS installation will fail.

Step 1 Install the Windows OS.

1. Specify the parameters on the **Install Windows** page.

Figure 2-20 Install Windows



2. Click Next.

The installation confirmation window is displayed.

Figure 2-21 Installation confirmation window



3. Click Install now.

The **Select the operating system you want to install** window is displayed.

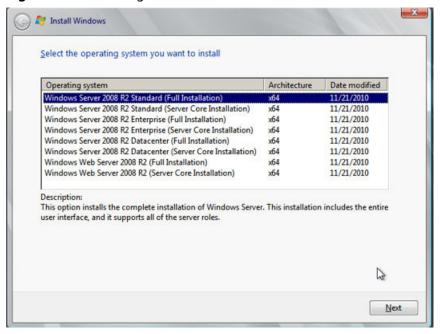
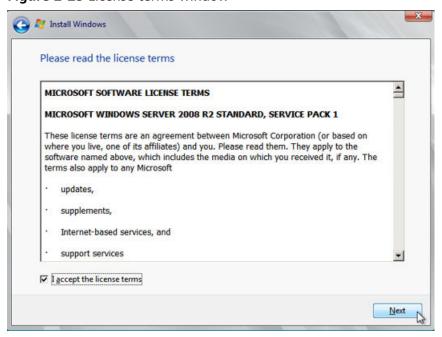


Figure 2-22 Selecting the OS version

Select the version of the OS to be installed and click Next.
 The Please read the license terms window is displayed.

Figure 2-23 License terms window



Select I accept the license terms, and click Next.
 The Which type of installation do you want? window is displayed.

Which type of installation do you want?

Upgrade
Upgrade to a newer version of Windows and keep your files, settings, and programs. The option to upgrade is only available when an existing version of Windows is running. We recommend backing up your files before you proceed.

Custom (advanced)
Install a new copy of Windows. This option does not keep your files, settings, and programs. The option to make changes to disks and partitions is available when you start your computer using the installation disc. We recommend backing up your files before you proceed.

Help me decide

Figure 2-24 Installation type

6. Select Custom (advanced).

The Where do you want to install Windows? window is displayed.

 If the system displays a message indicating that no driver is found, go to Step 1.7.

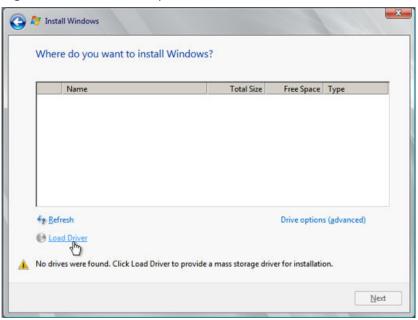


Figure 2-25 Installation path

If a disk is displayed, go to Step 1.10.

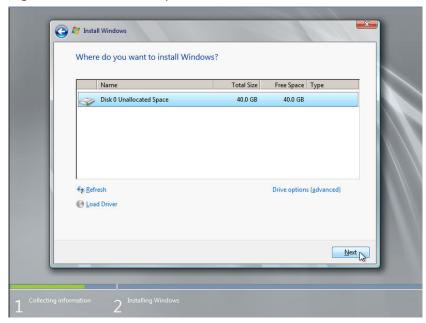
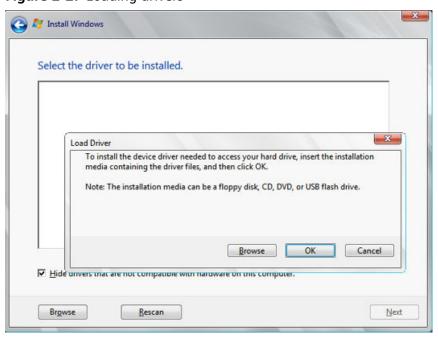


Figure 2-26 Installation path

7. Click Load Driver and then Browse.

Figure 2-27 Loading drivers



- 8. Choose the following path and click **OK**. vmtools-windows/upgrade/\$OS_Version/drivers/viostor
- Select the driver matching the OS and click Next.
 The system may provide multiple drivers. Select VISOTOR.INF shown in the following figure.

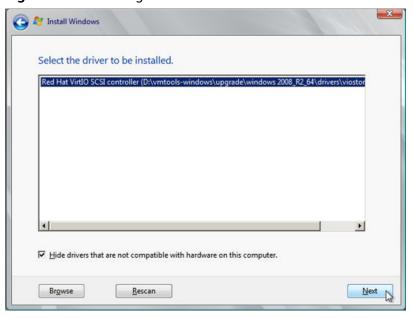
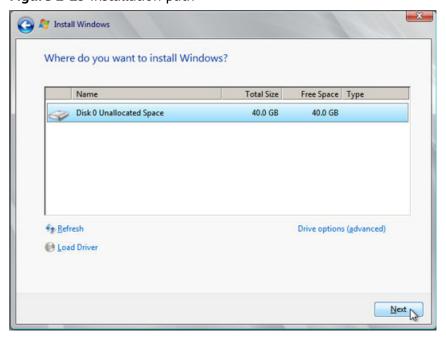


Figure 2-28 Selecting the driver to install

10. Select the disk and click Next.

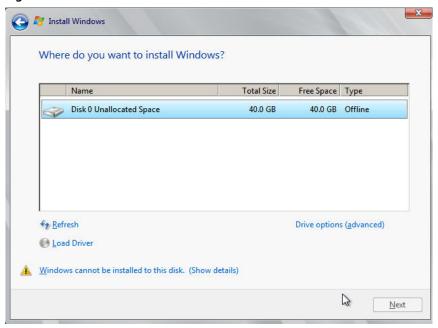
Figure 2-29 Installation path



■ NOTE

If the disk type is **Offline**, you can stop and then start the ECS, and restart the OS installation process.

Figure 2-30 Offline disk



11. The Installing Windows window is displayed, and the OS installation starts.

The installation takes about 50 minutes. The ECS restarts during the installation. After the ECS successfully restarts, log in to it again and configure the OS as prompted.

MOTE

You are required to set a password for the OS user. Supported special characters include !@\$%^-_=+[{}]:,/?

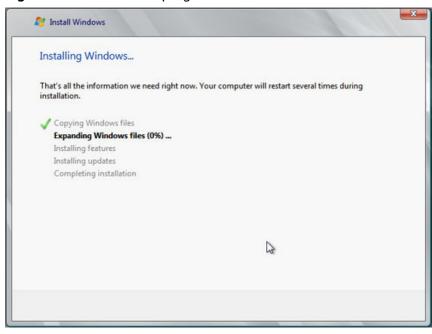
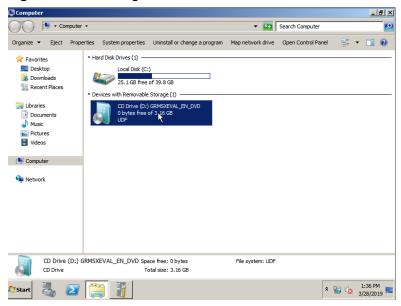


Figure 2-31 Installation progress

Step 2 Install related drivers.

1. Open Computer and double-click the CD driver.

Figure 2-32 Starting the CD driver



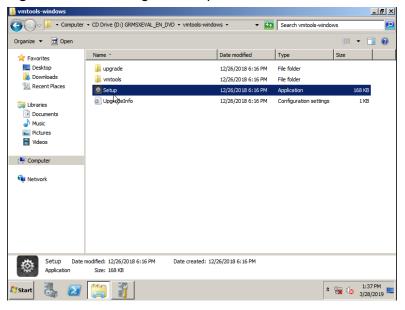
2. Double-click the **vmtools-windows** folder.

○ ○ ○ · Computer • CD Drive (D:) GRMSXEVAL_EN_DVD • ▼ Search CD Drive (D:) GRMSXEVAL_EN_... **■ • □ ②** Organize ▼ 🤚 Open Share with ▼ Name ^ Date modified Type Size * Favorites Desktop ll boot 11/21/2010 12:38 AM File folder 📗 efi 11/21/2010 12:38 AM File folder Recent Places 11/21/2010 12:38 AM File folder sources 11/21/2010 12:38 AM File folder support Libraries 11/21/2010 12:38 AM File folder Documents
Music upgrąde 3/5/2019 11:56 PM File folder Pictures
Videos 11/21/2010 12:38 AM Setup Information bootmgr 11/21/2010 12:38 AM File 375 KB bootmgr.efi 11/21/2010 12:38 AM EFI File 654 KB : Computer setup 11/21/2010 12:38 AM Application 105 KB Network vmtools-windows Date modified: 3/5/2019 11:56 PM File folder 2 1:37 PM 1:37 PM 3/28/2019 ■ Start 📗 🗾 🦷

Figure 2-33 Opening the vmtools-windows folder

Double-click the Setup file.

Figure 2-34 Executing the Setup file



4. Install drivers as prompted.



Figure 2-35 Installing UVP VMTools for Windows

5. After the driver is installed, start **Device Manager** and verify that the drivers shown in the red box in the following figure are successfully installed.

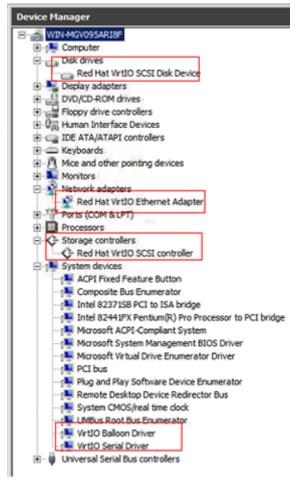


Figure 2-36 Device Manager

----End

2.10.6 Configuring the ECS and Creating a Windows System Disk Image

Scenarios

After installing an OS for the temporary ECS, configure the ECS and install the Guest OS drivers provided by the cloud platform to ensure that ECSs created subsequently are available.

□ NOTE

The Guest OS drivers include UVP VMTools and PV driver. The UVP VMTools has been installed on the ECS in the preceding section, so this section only describes how to install the PV driver.

This section describes how to configure a Windows ECS, install the Guest OS drivers, and create a Windows system disk image.

Procedure

Step 1 Configure the ECS.

- Check whether NICs are set to DHCP. If the ECS is configured with a static IP address, change its IP address assignment mode to DHCP as instructed in Setting the NIC to DHCP.
- 2. Enable remote desktop connection for the ECS as needed. For details about how to enable this function, see **Enabling Remote Desktop Connection**.
- Install the PV driver. For details, see Installing the PV Driver.
 After the driver is installed, you need to clear system logs. For details, see Clearing System Logs.
- 4. Install and configure Cloudbase-Init. User data injection on the management console is available for the new ECSs created from the image only after this tool is installed. For example, you can use data injection to set the login password for a new ECS. For details, see Installing and Configuring Cloudbase-Init.
- 5. (Optional) Configure value-added functions.
 - Enable NIC multi-queue. For details, see How Do I Enable NIC Multi-Queue for an Image?
- **Step 2** Stop the ECS to make the configurations take effect.
- **Step 3** Use the ECS to create a Windows system disk image.

For details, see Creating a System Disk Image from a Windows ECS.

----End

Follow-up Procedure

After the system disk image is created, delete the temporary ECS in a timely manner to prevent it from occupying compute resources.

2.11 Creating a Linux System Disk Image from an ISO File

2.11.1 Overview

An ISO file is a disk image of an optical disc. A large number of data files can be compressed into a single ISO file. Likewise, to access the files stored in an ISO, the ISO file needs to be decompressed. For example, you can use a virtual CD-ROM to open an ISO file, or burn the ISO file to a CD or DVD and then use the CD-ROM to read the image.

This section describes how to create a Linux system disk image using an ISO file.

Creation Process

Figure 2-37 shows the process of creating a Linux system disk image from an ISO file.

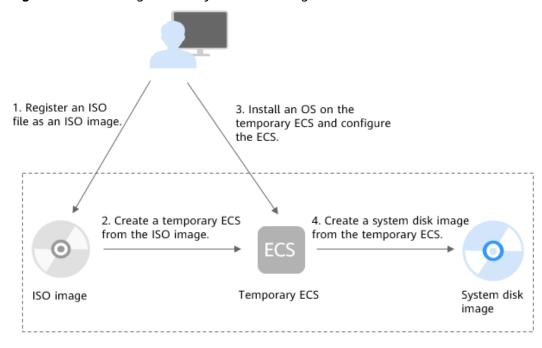


Figure 2-37 Creating a Linux system disk image

The procedure is as follows:

1. Register an ISO file as an ISO image.

On the management console, register the prepared ISO file as an image. The image is an ISO image and cannot be used to provision ECSs. For details, see **Registering an ISO File as an ISO Image**.

- 2. Create a temporary ECS from the ISO image.
 - Use the registered ISO image to create a temporary ECS. The ECS has no OS or driver installed. For details, see **Creating a Linux ECS from an ISO Image**.
- 3. Install an OS and necessary drivers for the temporary ECS and configure related settings.
 - The operations include installing an OS, installing native Xen and KVM drivers, configuring NIC attributes, and deleting files from the network rule directory. For details, see Installing a Linux OS and Step 1 in Configuring the ECS and Creating a Linux System Disk Image.
- 4. Create a system disk image from the temporary ECS.

On the management console, create a system disk image from the temporary ECS on which the installation and configuration have been completed. After the image is created, delete the temporary ECS to prevent it from occupying compute resources. For details, see **Creating a System Disk Image from a Linux ECS**.

Constraints

 An ISO image created from an ISO file is used only for creating a temporary ECS. It will not be available on the ECS console. You cannot use it to create ECSs or change ECS OSs. You need to install an OS on the temporary ECS and use that ECS to create a system disk image which can be used to create ECSs or change ECS OSs. • A temporary ECS has limited functionality. For example, you cannot attach disks to it. You are not advised to use it as a normal ECS.

2.11.2 Registering an ISO File as an ISO Image

Scenarios

Register an external ISO file on the cloud platform as a private image (ISO image). Before registering an image, upload the ISO file to the OBS bucket.

The ISO image cannot be replicated, exported, or encrypted.

Prerequisites

- The file to be registered must be in ISO format.
- The ISO image file has been uploaded to the OBS bucket. For details, see
 Uploading an External Image File.

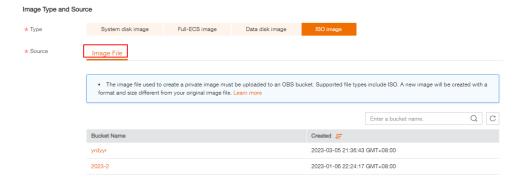


The ISO image file name can contain only letters, digits, hyphens (-), and underscores (_). If the image file name does not meet the requirements, change the name before uploading the image file to the OBS bucket.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- **Step 2** Register an ISO file as an ISO image.
 - 1. Click **Create Image** in the upper right corner.
 - 2. In the **Image Type and Source** area, select **ISO image** for **Type**.
 - 3. In the image file list, select the bucket and then the image file.

Figure 2-38 Creating a private image from an ISO file



4. In the **Image Information** area, set the following parameters.

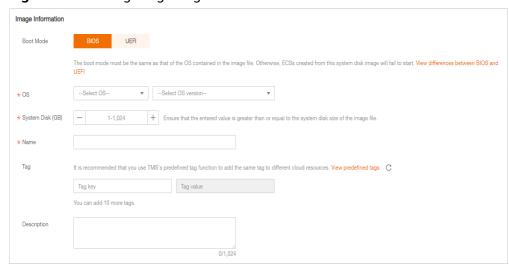


Figure 2-39 Configuring image information

- Boot Mode: Select BIOS or UEFI. Ensure that the selected boot mode is the same as that in the image file, or the ECSs created from this image will not be able to boot up.
- OS: Select the OS specified in the ISO file. To ensure that the image can be created and used properly, select an OS consistent with that in the image file.
- System Disk: Set the system disk capacity (value range: 40 GB to 1024 GB), which must be no less than the size of the system disk in the image file.
- Name: Enter a name for the image to be created.
- Tag: (Optional) Add a tag to the image to be created.
- Description: (Optional) Enter image description as needed.
- 5. Click Create Now.
- 6. Confirm the settings and click **Submit**.
- **Step 3** Switch back to the **Image Management Service** page to monitor the image status.

When the image status changes to **Normal**, the image is registered successfully.

----End

2.11.3 Creating a Linux ECS from an ISO Image

Scenarios

This section describes how to create an ECS from a registered ISO image.

Constraints

Dedicated Cloud (DeC) users cannot create ECSs from ISO images.

If the service is enabled for a user in a specified region, the user will be a DeC user.

Procedure

- **Step 1** Access the IMS console.
 - 1. Log in to the management console.
 - 2. Under Computing, click Image Management Service.

The IMS console is displayed.

Step 2 Use an ISO image to create a Linux ECS.

1. Click the **Private Images** tab. Locate the row that contains the ISO image and click **Create ECS** in the **Operation** column.

□ NOTE

If you are a **DeC** user, the **Create ECS** button in the **Operation** column will be unavailable for you because a DeC user cannot use an ISO image to create an ECS.

2. Configure the ECS as prompted and click OK.

----End

Follow-up Procedure

After the ECS is created, you can log in remotely to continue with OS and drivers installation.

2.11.4 Installing a Linux OS

Scenarios

This section uses CentOS 7 64-bit as an example to describe how to install Linux on an ECS.

The installation procedure varies depending on the image file you use. Perform operations as prompted.

Set the time zone, repo source update address, input method, language, and other items based on service requirements.

Prerequisites

You have remotely logged in to the ECS and entered the installation page.

Procedure



Do not stop or restart the ECS during the OS installation. Otherwise, the OS installation will fail.

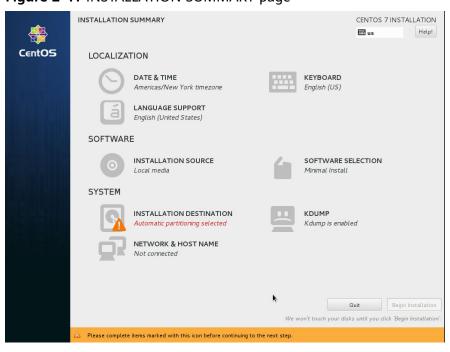
1. On the installation page, select the language and click **Continue**.

CENTOS 7 INSTALLATION Help! EE us CentOS WELCOME TO CENTOS 7. What language would you like to use during the installation process? English 🗲 English (United Kingdom) Afrikaans English (India) አማርኛ Amharic English (Australia) العربية Arabic English (Canada) অসমীয়া Assamese English (Denmark) Asturianu Asturian English (Ireland) English (New Zealand) Беларуская Belarusian English (Nigeria) Български Bulgarian English (Hong Kong SAR China) Bengali English (Philippines) Bosanski English (Singapore) Català Catalan English (South Africa) Čeština Czech English (Zambia) Cymraeg Welsh English (Zimbabwe) Danish English (Botswana) Dansk -CI Quit

Figure 2-40 Installation page

2. On the **INSTALLATION SUMMARY** page, choose **SYSTEM** > **INSTALLATION DESTINATION**.

Figure 2-41 INSTALLATION SUMMARY page



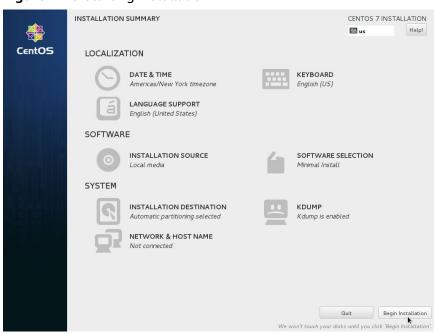
3. Select the target disk and click **Done**.

INSTALLATION DESTINATION ⊞ us Device Selection Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button. Local Standard Disks **Virtio Block Devic** vda / 40 GiB free Specialized & Network Disks Add a disk... Disks left unselected here will not be touched. Other Storage Options Partitioning I would like to <u>m</u>ake additional space available. Encryption Encrypt my data. You'll set a passphrase later Full disk summary and boot loader... 1 disk selected; 40 GiB capacity; 40 GiB free

Figure 2-42 Installation location

4. Click **Begin Installation**.

Figure 2-43 Starting installation



5. Wait for the automatic OS installation to complete. When the progress reaches 100%, CentOS is installed successfully.

CENTOS 7 INSTALLATION

STATE USER SETTINGS

USER CREATION
Root password is not set

Complete!

CentOS is now successfully installed on your system, but some configuration still needs to be done. Finish it and then click the Finish configuration button please.

Finish configuration

Please complete items marked with this icon before continuing to the next step.

Figure 2-44 Successful installation

- In the USER SETTINGS area, click ROOT PASSWORD.
 The ROOT PASSWORD page is displayed.
- 7. Set a password for user **root** as prompted and click **Done**.

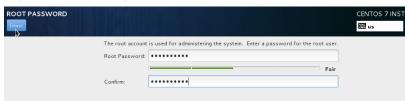


Figure 2-45 Setting a password for user root

8. Click Finish configuration.

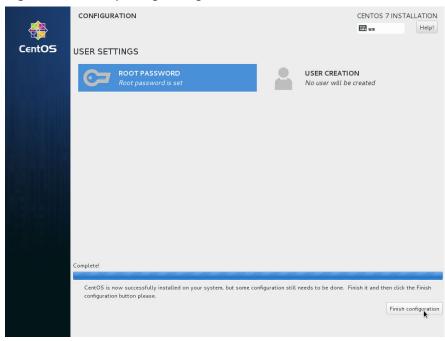


Figure 2-46 Completing configuration

9. Click Reboot.

If you are prompted to install the OS again after the ECS is restarted, exit the VNC login page and restart the ECS on the console.

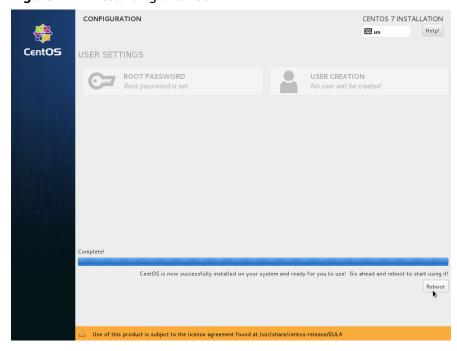


Figure 2-47 Restarting the ECS

2.11.5 Configuring the ECS and Creating a Linux System Disk Image

Scenarios

After installing an OS for the temporary ECS, configure the ECS and install the native Xen and KVM drivers to ensure that ECSs created subsequently are available.

This section describes how to configure a Linux ECS, install drivers, and create a Linux system disk image.

Procedure

Step 1 Configure the ECS.

- 1. Configure the network.
 - Run the ifconfig command to check whether the private IP address of the ECS is the same as that displayed on the console. If they are inconsistent, delete files from the network rule directory as instructed in Deleting Files from the Network Rule Directory.
 - Check whether NICs are set to DHCP. If the ECS is configured with a static IP address, change its IP address assignment mode to DHCP as instructed in Setting the NIC to DHCP.
 - Run the service sshd status command to check whether SSH is enabled.
 If it is disabled, run the service sshd start command to enable it. Ensure that your ECS firewall, for example, Linux iptables, allows access to SSH.
- 2. Install the drivers.

To ensure that the network performance and basic functions of the ECSs created from the private image are normal, install native Xen and KVM drivers on the ECS used to create the image. Before installing native Xen and KVM drivers, uninstall the PV driver.

□ NOTE

Disable your antivirus and intrusion detection software. You can enable them after installation of the Xen and KVM drivers.

- Uninstall the PV driver. For details, see Uninstalling PV Drivers from a Linux ECS.
- Install native Xen and KVM drivers. For details, see How Do I Install the Native Xen and KVM Drivers?
- After the drivers are installed, you need to clear log files and historical records. For details, see Clearing System Logs.
- 3. Configure a file system.
 - Change the disk identifier in the GRUB configuration file to UUID. For details, see Changing the Disk Identifier in the GRUB Configuration File to UUID.
 - Change the disk identifier in the fstab file to UUID. For details, see
 Changing the Disk Identifier in the fstab File to UUID.

- Clear the automatic attachment information of non-system disks in the /etc/fstab file to prevent impacts on subsequent data disk attachment. For details, see Detaching Data Disks from an ECS.
- 4. (Optional) Configure value-added functions.
 - Install and configure Cloud-Init. For details, see Installing Cloud-Init and Configuring Cloud-Init.
 - Enable NIC multi-queue. For details, see How Do I Enable NIC Multi-Queue for an Image?

Step 2 Create a Linux system disk image.

For details, see Creating a System Disk Image from a Linux ECS.

----End

Follow-up Procedure

After the system disk image is created, delete the temporary ECS in a timely manner to prevent it from occupying compute resources.

2.12 Importing an Image

You need to prepare an image file that meets the platform requirements.

Constraints

- For details about the restrictions on Windows image files, see **Preparing an Image file (Windows)**.
- For details about the restrictions on Linux image files, see **Preparing an Image file (Linux)**.

■ NOTE

- You are advised to complete network, tool, and driver configurations on the source VM and then export the image file. You can also complete the configurations on the created ECSs. For details, see What Do I Do If a Windows Image File Is Not Pre-Configured When I Use It to Register a Private Image? and What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?
- Currently, a large image file (maximum: 1 TB) can be imported only in RAW or ZVHD2 format. In addition to meeting the requirements for common image files, a bitmap file needs to be generated for each RAW image file. The bitmap file will be uploaded together with the image file. For details, see Quickly Importing an Image File.

Import

IMS provides multiple methods for importing images. You can select a method based on the image file type, format, or size.

Format	File Size	Reference
VMDK, VHD, QCOW2, VHDX, QED, VDI, QCOW, or ZVHD	Not larger than 128 GB	Creating a Windows System Disk Image from an External Image File
		 Creating a Linux System Disk Image from an External Image File
		 Creating a Data Disk Image from an External Image File
RAW or ZVHD2	No larger than 1 TB	 Creating a Data Disk Image from an External Image File
ISO	Not larger than 128 GB	 Creating a Windows System Disk Image from an ISO File Creating a Linux System Disk Image from an ISO File

Table 2-12 Importing an image

2.13 Quickly Importing an Image File

2.13.1 Overview

If an image file is larger than 128 GB, you can import it using fast import. Only the RAW and ZVHD2 formats support fast import. The image file to be imported cannot exceed 1 TB.

Methods

You can import an image file in any of the following methods depending on the file format:

- ZVHD2
 - a. Optimize the image file.
 - b. Upload the image file to an OBS bucket.
 - c. Register the image file on the cloud platform.
- RAW
 - a. Optimize the image file.
 - b. Generate a bitmap file for the image file.
 - c. Upload the image file and bitmap file to an OBS bucket.
 - d. Register the image file on the cloud platform.
- Others
 - If the file format is converted to ZVHD2:
 - i. Optimize the image file.

- ii. Convert the image file format to ZVHD2.
- iii. Upload the image file to an OBS bucket.
- iv. Register the image file on the cloud platform.
- If the file format is converted to RAW:
 - i. Optimize the image file.
 - ii. Convert the image file format to RAW and generate a bitmap file for the image file.
 - iii. Upload the image file and bitmap file to an OBS bucket.
 - iv. Register the image file on the cloud platform.

■ NOTE

- The import of large files depends on lazy loading which defers loading of file data until it is needed. This reduces the initial loading time. However, RAW files do not support this feature. When you upload a RAW file, you need to upload its bitmap together.
- For details about how to optimize an image file, see Optimization Process (Windows) or Optimization Process (Linux) depending on the OS type specified in the image file.

Import Process

The following describes how to import an external image file. Assume that you need to convert the file format to ZVHD2 or RAW.

You can use **qemu-img-hw** or the open-source tool **qemu-img** to convert the image format. **qemu-img-hw** can only be used in Linux.

□ NOTE

The tool package contains **qemu-img-hw** (for converting image formats) and **CreateMF.jar** (for generating bitmap files).

Linux

You are advised to use an EulerOS ECS to convert the file format.

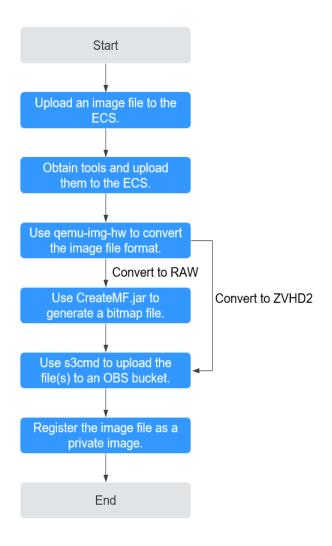


Figure 2-48 Import process

For details, see **Quickly Importing an Image File (Linux)**.

Windows

You are advised to use a local PC running Windows to convert the file format.

Ⅲ NOTE

qemu-img cannot convert image files to the ZVHD2 format. You need to convert an image file to the RAW format and then use **CreateMF.jar** to generate a bitmap file.

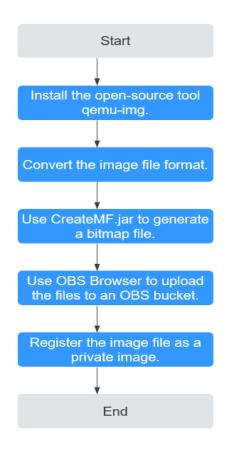


Figure 2-49 Import process (Windows)

For details, see Quickly Importing an Image File (Windows).

2.13.2 Quickly Importing an Image File (Linux)

Scenarios

This section describes how to convert the format of an image file on a Linux server and then quickly import it to the cloud platform. You are advised to use an EulerOS ECS for converting image file formats and generating bitmap files.

In Linux, you are advised to use **qemu-img-hw** to convert image formats.

Prerequisites

• The image file has been optimized. For details, see Optimization Process (Windows) or Optimization Process (Linux). Ensure that the image file meets the requirements in Table 2-5 (Windows) or Table 2-8 (Linux).

Select the reference content based on the OS type in the image file.

- You have created an ECS running EulerOS on the management console and bound an EIP to the ECS.
- An OBS bucket has been created on the management console.

Procedure

- **Step 1** Upload an image file.
 - If the image file is uploaded from a Linux PC, run the **scp** command.

For example, to upload **image01.qcow2** to the **/usr/** directory of the ECS, run the following command:

scp /var/image01.gcow2 root@xxx.xxx.xxx./usr/

xxx.xxx.xxx indicates the EIP bound to the ECS.

- If the image file is uploaded from a Windows PC, use a file transfer tool, such as WinSCP, to upload the image file.
- **Step 2** Obtain the fast import tool package, upload it to the ECS, and then decompress the package.
- **Step 3** Use **qemu-img-hw** to convert the image format.
 - Go to the directory where qemu-img-hw is stored, for example, /usr/quick-import-tools/qemu-img-hw.
 - cd /usr/quick-import-tools/qemu-img-hw
 - 2. Run the following command to make **qemu-img-hw** executable:
 - chmod +x qemu-img-hw
 - 3. Execute **qemu-img-hw** to convert the image file format to ZVHD2 (recommended) or RAW.

Command format:

./qemu-img-hw convert -p -O Target_image_format Source_image_file
Target image file

For example, run the following command to convert an **image01.qcow2** file to an **image01.zvhd2** file:

- ./qemu-img-hw convert -p -O zvhd2 image01.qcow2 image01.zvhd2
- If the image file is converted to the ZVHD2 format, go to **Step 5**.
- If the image file is converted to the RAW format, go to Step 4.
- **Step 4** Use **CreateMF.jar** to generate a bitmap file.
 - 1. Ensure that JDK has been installed on the ECS.

Run the following commands to check whether JDK is installed:

source /etc/profile

java -version

If a Java version is displayed, JDK has been installed.

- Run the following command to enter the directory where CreateMF.jar is stored:
 - cd /usr/quick-import-tools/createMF
- 3. Run the following command to generate a bitmap file:

java -jar CreateMF.jar /Original RAW file path/Generated .mf file path Example:

java -jar CreateMF.jar image01.raw image01.mf

CAUTION

The generated .mf bitmap file must have the same name as the RAW image file. For example, if the image file name is image01.raw, the generated bitmap name is image01.mf.

Step 5 Use **s3cmd** to upload the file(s) to an OBS bucket.

1. Install **s3cmd** on the ECS.

If **s3cmd** has been installed, skip this step.

a. Run the following command to install setuptools:

yum install python-setuptools

b. Run the following command to install wget:

yum install wget

c. Run the following commands to obtain the **s3cmd** software package:

wget https://github.com/s3tools/s3cmd/archive/master.zip mv master.zip s3cmd-master.zip

d. Run the following commands to install **s3cmd**:

unzip s3cmd-master.zip cd s3cmd-master python setup.py install

2. Configure **s3cmd**.

Run the following command to configure **s3cmd**:

s3cmd --configure

Access Key: *Enter an AK.* Secret Key: *Enter an SK.*

Default Region: Enter the region where the bucket is located.

S3 Endpoint: Refer to the OBS endpoint.

DNS-style bucket+hostname:port template for accessing a bucket: *Enter a server address with a bucket name, for example, mybucket.obs.myclouds.com.*

Encryption password: *Press Enter.*

Path to GPG program: Press Enter.

Use HTTPS protocol: Specifies whether to use HTTPS. The value can be Yes or No.

HTTP Proxy server name: Specifies the proxy address used to connect the cloud from an external network. (If you do not need it, press Enter.)

HTTP Proxy server port: Specifies the proxy port used to connect to the cloud from an external network (If you do not need it, press Enter.)

Test access with supplied credentials? y

(If "Success. Your access key and secret key worked fine :-)" is displayed, the connection is successful.) Save settings? y (Specifies whether to save the configurations. If you enter y, the configuration will be saved.)

□ NOTE

The configurations will be stored in /root/.s3cfg. If you want to modify these configurations, run the s3cmd --configure command to configure the parameters or run the vi .s3cfg command to edit the .s3cfg file.

3. Run the following command to upload the ZVHD2 image file (or the RAW image file and its bitmap file) to an OBS bucket.

s3cmd put image01.zvhd2 s3://mybucket/

CAUTION

The .mf bitmap file must be in the same OBS bucket as the RAW image file.

Step 6 Register a private image.

You can register a private image using the converted ZVHD2 or RAW file on the console or using an API.

Method 1: Register a private image on the console.

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. In the upper right corner, click **Create Image**.
- 3. In the Image Type and Source area, select System disk image or Data disk image for Type.
- 4. Select **Image File** for **Source**. Select the bucket storing the ZVHD2 or RAW image file and then select the image file. If the image file is in the RAW format, you also need to select its bitmap file.
- 5. Select **Enable Fast Create**, and select the sentence following **Image File Preparation**.
- 6. Set parameters as prompted.

For details about the parameters, see **Registering an External Image File as a Private Image**.

<u>A</u> CAUTION

- The OS must be the same as that in the image file.
- The system disk size must be greater than the one specified in the image file.

Run the following command to check the system disk size in the image file:

qemu-img-hw info test.zvhd2

Method 2: Register a private image using an API.

You can use the POST /v2/cloudimages/quickimport/action API to quickly import an image file.

For details about how to call this API, see "Importing an Image File Quickly" in *Image Management Service API Reference*.

----End

Appendix 1: Common gemu-img-hw Commands

Converting image file formats: qemu-img-hw convert -p -O
 Target_image_format Source_image_file Target_image_file

The parameters are described as follows:

-p: indicates the conversion progress.

The part following **-O** (which must be in upper case) consists of the target image format, source image file, and target image file.

For example, run the following command to convert a QCOW2 image file to a ZVHD2 file:

qemu-img-hw convert -p -O zvhd2 test.qcow2 test.zvhd2

- Querying image file information: qemu-img-hw info Source image file
 An example command is qemu-img-hw info test.zvhd2.
- Viewing help information: **qemu-img-hw -help**

Appendix 2: Common Errors During qemu-img-hw Running

Symptom:

The following information is displayed when you run the **qemu-img-hw** command:

./qemu-img-hw: /lib64/libc.so.6: version `GLIBC_2.14' not found (required by ./qemu-img-hw)

Solution:

Run the **strings /lib64/libc.so.6 | grep glibc** command to check the glibc version. If the version is too early, install the latest version. Run the following commands in sequence:

wget http://ftp.gnu.org/gnu/glibc/glibc-2.15.tar.gz

wget http://ftp.gnu.org/gnu/glibc/glibc-ports-2.15.tar.gz

tar -xvf glibc-2.15.tar.gz

tar -xvf glibc-ports-2.15.tar.gz

mv glibc-ports-2.15 glibc-2.15/ports

mkdir glibc-build-2.15

cd glibc-build-2.15

../glibc-2.15/configure --prefix=/usr --disable-profile --enable-add-ons -with-headers=/usr/include --with-binutils=/usr/bin

□ NOTE

If **configure: error: no acceptable C compiler found in \$PATH** is displayed, run the **yum -y install gcc** command.

make

make install

Symptom:

The following information is displayed when you run the **qemu-img-hw** command:

./qemu-img-hw: error while loading shared libraries: libaio.so.1: cannot open shared object file: No such file or directory

Solution: Run the **yum install libaio** command first.

2.13.3 Quickly Importing an Image File (Windows)

Scenarios

This section describes how to convert the format of an image file on a Windows server and then quickly import it to the cloud platform. You are advised to use a local Windows PC for converting image formats and generating bitmap files.

In Windows, use the open-source tool **qemu-img** to convert image formats. **qemu-img** supports conversion between image files of the VHD, VMDK, QCOW2, RAW, VHDX, QCOW, VDI, and QED formats. Convert an image to the RAW format and then use the **CreateMF.jar** tool to generate a bitmap file.

Prerequisites

The image file has been optimized. For details, see Optimization Process
(Windows) or Optimization Process (Linux). Ensure that the image file meets
the requirements in Table 2-5 (Windows) or Table 2-8 (Linux).

□ NOTE

Select the reference content based on the OS type in the image file.

• An OBS bucket has been created on the management console, and OBS Browser has been ready.

Procedure

- **Step 1** Install the open-source image conversion tool **qemu-img**.
- **Step 2** Run the **cmd** command to go to the **qemu-img** installation directory and run the **qemu-img** command to convert the image file to the RAW format.

For example, run the following command to convert an **image.qcow2** file to an **image.raw** file:

qemu-img convert -p -O raw image.qcow2 image.raw

- **Step 3** Use **CreateMF.jar** to generate a bitmap file.
 - 1. Obtain the **CreateMF.jar** package and decompress it.

Table 2-13 CreateMF.jar package

Tool Package	How to Obtain	
quick-import-tools	https://oss.prod-cloud-ocb.orange-business.com/download/ims/OCB-image-convert-tools.zip	

- 2. Ensure that JDK has been installed in the current environment.
 - You can verify the installation by running **cmd.exe** and then **java -version**. If Java version information is displayed, JDK has been installed.
- 3. Go to the directory where **CreateMF.jar** is stored.

For example, if you have downloaded **CreateMF.jar** to **D:/test**, run the following commands to access the directory:

D:

cd test

4. Run the following command to generate a bitmap file for the RAW image file: java -jar CreateMF.jar D:/image01.raw D:/image01.mf

CAUTION

- The generated .mf bitmap file must have the same name as the RAW image file. For example, if the image file name is image01.raw, the generated bitmap name is image01.mf.
- **Step 4** Use OBS Browser to upload the converted image file and its bitmap file to an OBS bucket.

You must upload the RAW image file and its bitmap file to the same OBS bucket.

Step 5 Register a private image.

You can register a private image using the converted ZVHD2 or RAW file on the console or using an API.

Method 1: Register a private image on the console.

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. In the upper right corner, click **Create Image**.
- 3. In the **Image Type and Source** area, select **System disk image** or **Data disk image** for **Type**.
- 4. Select **Image File** for **Source**. Select the bucket storing the ZVHD2 or RAW image file and then select the image file. If the image file is in the RAW format, you also need to select its bitmap file.
- Select Enable Fast Create, and select the sentence following Image File Preparation.
- 6. Set parameters as prompted.

For details about the parameters, see **Registering an External Image File as a Private Image**.

♠ CAUTION

- The OS must be the same as that in the image file.
- The system disk size must be greater than the one specified in the image file

Run the following command to check the system disk size in the image file:

qemu-img-hw info test.zvhd2

Method 2: Register a private image using an API.

You can use the POST /v2/cloudimages/quickimport/action API to quickly import an image file.

For details about how to call this API, see "Importing an Image File Quickly" in *Image Management Service API Reference*.

----End

3 Managing Private Images

3.1 Modifying an Image

Scenarios

You can modify the following attributes of a private image:

- Name
- Description
- Minimum Memory
- Maximum Memory
- NIC Multi-Queue

NIC multi-queue enables multiple CPUs to process NIC interruptions for load balancing. For details, see **How Do I Enable NIC Multi-Queue for an Image?**

Boot Mode

Constraints

You can only modify a private image in the Normal state.

Procedure

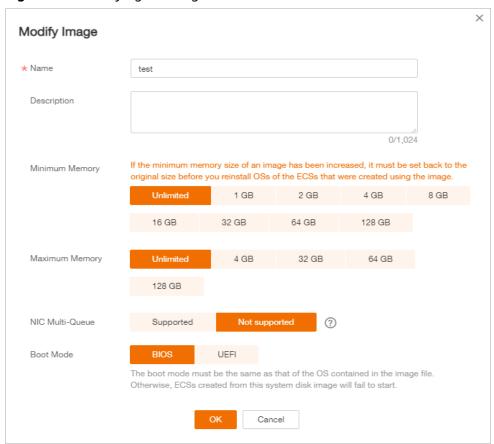
Use any of the following methods to modify an image:

Method 1:

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.
- 3. Locate the row that contains the image and click **Modify** in the **Operation** column.

4. In the **Modify Image** dialog box, modify the image.

Figure 3-1 Modifying an image



Method 2:

- Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.
- 3. On the image list, click the name of the target image.
- 4. On the image details page, click **Modify** in the upper right corner. In the **Modify Image** dialog box, modify image attributes.

3.2 Exporting Image List

Scenarios

You can export the public or private image list in the current region as a CSV file to your local PC.

• For public images, the file describes the image name, image status, OS, image type, image creation time, system disk, and minimum memory.

 For private images, the file describes the image name, image ID, image status, OS, image type, image creation time, disk sizes, shared disks, image size, minimum memory, and encryption.

Exporting Private Image Information

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab and click

The system will automatically export the private image list in the current region under your account to a local directory.

◯ NOTE

The file name is in the format of private-images-Region ID-Export time.

Exporting Public Image Information

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Public Images** tab and click

The system will automatically export all public images in the current region to a local directory.

□ NOTE

The file name is in the format of **public-images-**Region ID-Export time.

3.3 Checking the Disk Capacity of an Image

Scenarios

You can check the disk capacity of a private image.

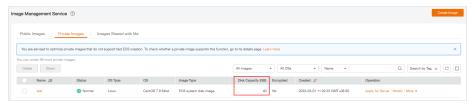
- To check the disk capacity of a system disk image, data disk image, or ISO image, see Check the Disk Capacity of a System Disk Image, Data Disk Image, or ISO Image.
- To check the disk capacity of a full-ECS image, see Check the Disk Capacity
 of a Full-ECS Image.

Check the Disk Capacity of a System Disk Image, Data Disk Image, or ISO Image

Check the disk capacity in the **Disk Capacity** column of the private image list.

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.
- 3. Check the value in the **Disk Capacity** column. The unit is **GB**.

Figure 3-2 Checking the disk capacity of a system disk image, data disk image, or ISO image



Check the Disk Capacity of a Full-ECS Image

The disk capacity of a full-ECS image is the sum of the system disk capacity and data disk capacity in the backup from which the full-ECS image is created.

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.

The value in the **Disk Capacity** column is --.

- 3. Click the full-ECS image name.
- 4. Click the **Backups** tab and view the capacities of the system disk and data disks in the backup.

Disk capacity of a full-ECS image = Capacity of the system disk in the backup + Capacity of data disks in the backup

For example:

- If the system disk capacity is 40 GB and no data disk is attached, the capacity of the full-ECS image disk is 40 GB.
- If the system disk capacity is 40 GB and data disk capacity is 40 GB, the full-ECS image disk capacity is 80 GB.

Figure 3-3 Checking backup details



3.4 Creating an ECS from an Image

Scenarios

You can use a public, private, or shared image to create an ECS.

- If you use a public image, the created ECS contains an OS and preinstalled public applications. You need to install applications as needed.
- If you use a private or shared image, the created ECS contains an OS, preinstalled public applications, and a user's personal applications.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Public Images**, **Private Images**, or **Images Shared with Me** tab to display the image list.
- 3. Locate the row that contains your desired image and click **Apply for Server** in the **Operation** column.
- 4. For details about how to create an ECS, see *Elastic Cloud Server User Guide*. When you use a system disk image to create an ECS, you can set the ECS specifications and system disk type without considering those in the image, but the system disk size can only be larger than that in the image.

When you use a full-ECS image to create an ECS, the system and data disk information defaulted by the image will be automatically displayed. You can increase the capacity of a system disk or data disks, but cannot decrease it.

□ NOTE

If a full-ECS image contains multiple data disks, it takes some time to load and display the disk information.

3.5 Deleting Images

Scenarios

You can delete private images that will no longer be used.

- Deleted private images cannot be retrieved. Perform this operation only when absolutely necessary.
- After a private image is deleted, it cannot be used to create ECSs or EVS disks.
- After a private image is deleted, ECSs created from the image can still be used and are still billed. However, the OS cannot be reinstalled for the ECSs and ECSs with the same configuration cannot be created.

• Deleting the source image of a replicated image has no effect on the replicated image. Similarly, deleting a replicated image has no effect on its source.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.
- 3. Locate the row that contains the image, choose **More** > **Delete** in the **Operation** column.

○ NOTE

To delete multiple images:

- 1. Select the images you want to delete in the image list.
- 2. Click **Delete** above the image list.
- 4. (Optional) Select **Delete CSBS backups of the full-ECS images**.

This parameter is available only when you have selected full-ECS images from the image list.

If you select this option, the system will delete CSBS backups of the full-ECS images.

□ NOTE

If CSBS backups failed to be deleted, the cause may be that these backups are being created and cannot be deleted. In this case, manually delete them as prompted.

5. Click Yes.

3.6 Sharing Images

3.6.1 Overview

You can share your private images with other tenants. The tenants who accept the shared images can use the images to create ECSs of the same specifications.



The cloud platform is not responsible for the integrity or security of shared images. When you use a shared image, ensure that the image is from a trusted sharer.

Constraints

- You can share images only within the region where they reside.
- Each image can be shared with a maximum of 128 tenants.

- Encrypted images cannot be shared.
- Full-ECS images cannot be shared.

Procedure

If you want to share a private image with another tenant, the procedure is as follows:

- 1. You obtain the project ID from the tenant.
- 2. You share an image with the tenant.
- The tenant accepts the shared image.
 After accepting the image, the tenant can use it to create ECSs.

Related FAQs

If you have any questions, see Image Sharing FAQs.

3.6.2 Obtaining the Project ID

Scenarios

Before a tenant shares an image with you, you need to provide your project ID.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the username in the upper right corner and select **My Credentials** from the drop-down list.

On the ${\bf My} \ {\bf Credentials}$ page, view the project ID in the project list.

Images can be shared only within the region where they reside. So, obtain the project ID in the same region.

3.6.3 Sharing Specified Images

Scenarios

After obtaining the project ID from a tenant, you can share specified private images with the tenant. You can share a single image or multiple images as needed.

Prerequisites

- You have obtained the project ID from the target tenant.
- Before sharing an image, ensure that any sensitive data has been deleted from the image.

Procedure

- Share multiple images.
 - Access the IMS console.
 - i. Log in to the management console.
 - ii. Under Computing, click Image Management Service.The IMS console is displayed.
 - b. Click the **Private Images** tab.
 - c. Select the private images to share and click **Share** above the image list.
 - d. In the **Share Image** dialog box, enter the project ID of the target tenant. To share images with more than one tenant, separate their project IDs with commas (,).

○ NOTE

- You can enter a maximum of 100 project IDs at a time.
- You can share images only within the region where they reside.
- If the target tenant is a multi-project user, you can share images to any project of the tenant.
- e. Click **OK**.
- Share a single image.
 - a. Access the IMS console.
 - i. Log in to the management console.
 - ii. Under Computing, click Image Management Service.The IMS console is displayed.
 - b. Click the **Private Images** tab.
 - c. Locate the row that contains the private image you are to share, click **More** in the **Operation** column, and select **Share** from the drop-down list
 - d. In the **Share Image** dialog box, enter the project ID of the target tenant. To share an image with more than one tenant, separate their project IDs with commas (,).

□ NOTE

- You can enter a maximum of 100 project IDs at a time.
- You can share images only within the region where they reside.
- If the target tenant is a multi-project user, you can share images to any project of the tenant.

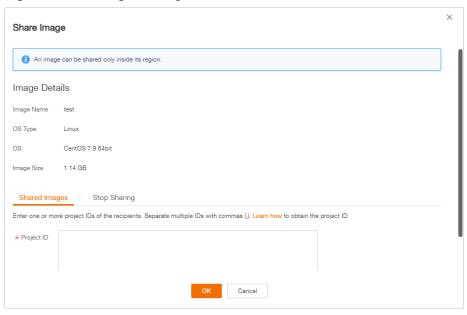


Figure 3-4 Sharing an image

e. Click **OK**.

Related Operations

After you share images with a tenant, the tenant can accept the shared images on the **Images Shared with Me** page on the IMS console. For detailed operations, see **Accepting or Rejecting Shared Images**.

3.6.4 Accepting or Rejecting Shared Images

Scenarios

After another tenant shares images with you, you will receive a message. You can choose to accept or reject all or some of the shared images.

□ NOTE

• If you are not in the same region as the tenant sharing the images with you, you will not receive the message.

Prerequisites

- Another tenant has shared images with you.
- If the shared image is a full-ECS image, you need to create a server backup vault to store the full-ECS image and the backups of the full-ECS image before accepting the shared image. When creating a server backup vault, set **Protection Type** to **Backup**.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.

- b. Under Computing, click Image Management Service.
 - The IMS console is displayed.
- 2. In the upper left corner, switch to the region where the target project resides and then select the project.
- 3. Click the **Images Shared with Me** tab.

A message is displayed above the image list asking you whether to accept the shared images.

- To accept all the shared images, click **Accept All** in the upper right corner.
- To accept some images, select the images and click **Accept**.
- To reject some images, select the images and click Reject.

□ NOTE

If no message is displayed, check whether you have selected a correct region.

4. (Optional) In the **Accept Full-ECS Image** dialog box, select a server backup vault with the **Backup** protection type and click **OK**.

This dialog box is displayed when the shared image is a full-ECS image.

When accepting a full-ECS image, you must specify a vault for storing the CBR backups associated with the full-ECS image. The vault capacity must be no less than the total capacities of the system disk and data disk backups.

For more information about server backup vaults, see *Cloud Backup and Recovery User Guide*.

Results

• **Pending**: If you do not immediately accept or reject a shared image, the image is in the **Pending** state.

A pending shared image is not displayed in the shared image list.

- **Accepted**: After an image is accepted, it is displayed in the shared image list. You can use the image to create ECSs.
- Rejected: After an image is rejected, it is not displayed in the shared image
 list. You can click Rejected Images to view the images you have rejected and
 you can still choose to accept them.

Follow-up Procedure

After accepting a system disk image shared by another tenant, you can:

- Use the image to create one or more ECSs (select **Shared Image** during ECS creation). For details, see "Purchasing an ECS" in *Elastic Cloud Server User Guide*.
- Use the image to change the OS of existing ECSs. For details, see "Changing the OS" in *Elastic Cloud Server User Guide*.

After accepting a data disk image shared by another tenant, you can use the image to create EVS disks (locate the row that contains the image and click **Create Data Disk** in the **Operation** column).

3.6.5 Rejecting Accepted Images

Scenarios

You can reject accepted images if you no longer need them.

After an image is rejected, it will not be displayed on the **Images Shared with Me** page.

Prerequisites

You have accepted images shared by other users.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the Images Shared with Me tab.
- 3. Determine the next step based on how many images you are to reject.
 - To reject multiple images: select the images to be rejected and click
 Reject above the image list. In the displayed dialog box, click Yes.
 - To reject a specific image: locate the image to be rejected and click
 Reject in the Operation column. In the displayed dialog box, click Yes.

3.6.6 Accepting Rejected Images

Scenarios

If you want to use the shared images you have rejected, you can accept them from the list of rejected images.

Prerequisites

- You have rejected the images shared by others.
- The image owners have not stopped sharing the images.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the **Images Shared with Me** tab.
- 3. Click **Rejected Images**. All the rejected images are displayed.
- 4. Select the images you want to accept and click **Accept**.
- 5. Check the accepted images in the shared image list.

3.6.7 Stopping Sharing Images

Scenarios

You can stop sharing images. After you stop sharing an image:

- The image will be invisible to the recipient on the management console and no data will be returned when the recipient query the image through an API.
- The recipient cannot use the image to create an ECS or EVS disk, or change the OS of an ECS.
- The recipient cannot reinstall the OS of the ECSs created from the shared image or create instances identical with these ECSs.

Prerequisites

You have shared private images with others.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab.
- 3. Locate the row that contains the private image that you no longer want to share, and choose **More** > **Share** in the **Operation** column.
- 4. In the **Share Image** dialog box, click the **Stop Sharing** tab.
- 5. Select the project ID for which you want to stop image sharing and click **OK**.

3.6.8 Adding Tenants Who Can Use Shared Images

Scenarios

In addition to the tenants you have shared images with, you can add more tenants who can use the shared images.

Prerequisites

- You have shared private images.
- You have obtained the project IDs of the tenants to be added.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the **Private Images** tab.

- 3. Click the image name to view image details.
- 4. Click Add Tenant.
- 5. In the **Add Tenant** dialog box, enter the project ID of the tenant to be added and click **OK**.

To add multiple tenants, enter their project IDs and separate them with commas. Click **OK**.

NOTE

- You can share images only within the region where they reside.
- A project ID uniquely identifies a tenant in a specific region. If you enter a project ID that belongs to a different region from the images, a message will display indicating that the tenant cannot be found.

3.6.9 Deleting Image Recipients Who Can Use Shared Images

Scenarios

This section describes how to delete image recipients who can use shared images.

Prerequisites

- You have shared private images.
- You have obtained project IDs of the image recipients.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. Click the **Private Images** tab.
- 3. Click the image name to view image details.
- 4. View the tenants who can use shared image.
- 5. Delete one or all of the recipients:
 - To delete a single image recipient, locate the target recipient and click Delete.
 - To delete all image recipients, click **Delete All** above the image recipient list.
- 6. Click Yes.

3.7 Exporting an Image

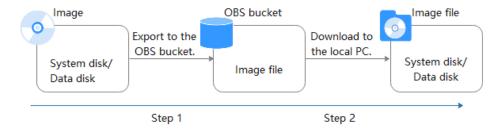
Scenarios

You can export a private image to a standard OBS bucket and then download it to your local PC.

Background

• You can reproduce cloud servers and their running environments in onpromises clusters or private clouds by exporting their images from the cloud platform. The following figure shows the process of exporting an image.

Figure 3-5 Exporting an image



- The time required for exporting an image depends on the image size and the number of concurrent export tasks.
- You can export images in ZVHD2, QCOW2, VMDK, VHD, or ZVHD format. The
 default format of a private image is ZVHD2. Images exported in different
 formats may vary in size.
- If an image is greater than 128 GB, you can select **Enable** for **Fast Export** when exporting the image to an OBS bucket. In this case, you cannot specify the format of the exported image. You can convert the image format after it is exported.

Ⅲ NOTE

Fast Export is unavailable for encrypted images. To export an encrypted image, decrypt it first.

Constraints

- An image can only be exported to a Standard bucket that is in the same region as the image.
- The following private images cannot be exported:
 - Full-ECS images
 - ISO images
 - Private images created from a Windows, SUSE, Red Hat, Ubuntu, or Oracle Linux public image
- The image size must be less than 1 TB. Images larger than 128 GB support only fast export.

Prerequisites

- You have Administrator permissions for OBS.
- An OBS bucket is available in the region where the private image is located.
 If no OBS bucket is available, create one by referring to *Object Storage Service User Guide*. Select **Standard** for **Storage Class**.

Procedure

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Locate the row that contains the image to be exported, click **More** in the **Operation** column and select **Export**.
- 3. In the displayed **Export Image** dialog box, set the following parameters:
 - Fast Export: To export an image larger than 128 GB, you must enable fast export, and you cannot specify the format of the exported image (which can only be ZVHD2). After exporting the image, you can use qemu-img-hw to convert it to your desired format. For details, see Converting the Image Format Using qemu-img-hw.

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For details about differences between export and fast export, see What Are the Differences Between Import/Export and Fast Import/Export?

- **Format**: Select one from **qcow2**, **vmdk**, **vhd**, and **zvhd** as you need.
- Name: Enter a name that is easy to identify.
- Storage Path: Click to expand the bucket list and select an OBS bucket for storing the exported image.

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An image can only be exported to a Standard bucket that is in the same region as the image. So, only such buckets are available in the list.

4 Click OK

You can view the image export progress above the private image list.

Follow-up Procedure

After the image is exported successfully, you can download it from the OBS bucket through the management console or OBS Browser+.

3.8 Optimizing a Windows Private Image

3.8.1 Optimization Process

The proper running of ECSs depends on Xen Guest OS driver (PV driver) and KVM Guest OS driver (UVP VMTools). To ensure that ECSs support both Xen and KVM and to improve network performance, the PV driver and UVP VMTools must be installed for the image.

- 1. Create an ECS using the Windows private image to be optimized and log in to the ECS.
- Install the latest version of PV driver on the ECS.For details, see Installing the PV Driver.

3. Install the UVP VMTools required for creating ECSs in the KVM virtual resource pool.

For details, see **Installing UVP VMTools**.

- 4. On the ECS, choose **Control Panel** > **Power Options**. Click **Choose when to turn off the display**, select **Never** for **Turn off the display**, and save the changes.
- Clear system logs and then stop the ECS.For details, see Clearing System Logs.
- 6. Create a Windows private image using the ECS.

3.8.2 Viewing the Virtualization Type of a Windows ECS

Open the cmd window and run the following command to query the virtualization type of the ECS:

systeminfo

If the values of **System Manufacturer** and **BIOS Version** are **Xen**, the ECS uses Xen. If KVM is required, perform the operations in this section to optimize a Windows private image.

□ NOTE

If the ECS uses KVM, you are also advised to optimize the private image to prevent any exceptions with the ECSs created from the image.

Figure 3-6 Viewing the virtualization type of a Windows ECS

3.8.3 Obtaining Required Software Packages

PV Driver

Table 3-1 lists the PV driver software packages required for optimizing Windows private images.

Table 3-1 PV driver software packages

Software Package	OS	How to Obtain
pvdriver- win2008R2-64bit. zip	Windows Server 2008 R2 64bit	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ pvdriver-win2008R2-64bit.zip
pvdriver- win2012-64bit.zip	Windows Server 2012 64bit	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ pvdriver-win2012-64bit.zip
pvdriver- win2012R2-64bit. zip	Windows Server 2012 R2 64bit	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ pvdriver-win2012R2-64bit.zip
pvdriver- win2016-64bit.zip	Windows Server 2016 64bit	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ pvdriver-win2016-64bit.zip

UVP VMTools

Table 3-2 lists the UVP VMTools software packages required for optimizing Windows private images.

Table 3-2 UVP VMTools software packages

Software Package	OS	How to Obtain
vmtools- WIN2008-x86.zip	Windows Server 2008-x86	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2008-x86.zip
vmtools- WIN2008-x64.zip	Windows Server 2008-x64	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2008-x64.zip
vmtools- WIN2008R2- x64.zip	Windows Server 2008 R2-x64	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2008R2-x64.zip
vmtools- WIN2012-x64.zip	Windows Server 2012-x64	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2012-x64.zip
vmtools- WIN2012R2- x64.zip	Windows Server 2012 R2-x64	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2012R2-x64.zip

Software Package	os	How to Obtain
vmtools- WIN2016-x64.zip	 Windows Server 2016- x64 Windows Server 2019- x64 	https://ecs-instance-driver.obs.cn- north-1.myhuaweicloud.com/ vmtools-WIN2016-x64.zip

3.8.4 Installing the PV Driver

This section only applies to Xen ECSs, which have been discontinued and no longer been available for new users. If you are a new user or you are an existing user that will use this image to create a non-Xen ECS, skip this section.

Scenarios

When using an ECS or external image file to create a private image, ensure that the PV driver has been installed in the OS to enable Xen virtualization for subsequently created ECSs, improve the I/O processing performance of the ECSs, and implement advanced functions such as monitoring hardware of the ECSs.

<u>A</u> CAUTION

If you do not install the PV driver, the ECS network performance will be poor, and the security group and firewall configured for the ECS will not take effect.

The PV driver has been installed by default when you use a public image to create ECSs. You can perform the following operations to verify the installation:

Open the **version** configuration file to check whether the PV driver is the latest:

C:\Program Files (x86)\Xen PV Drivers\bin\version

Prerequisites

- An OS has been installed for the ECS, and an EIP has been bound to the ECS.
- The remaining capacity of the ECS system disk must be greater than 32 MB.
- If the ECS uses Windows 2008, you must install the PV driver using the administrator account.
- The PV driver software package has been downloaded on the ECS. For how to obtain the software package, see Obtaining Required Software Packages.
- To avoid an installation failure, perform the following operations before starting the installation:
 - Uninstall third-party virtualization platform tools, such as Citrix Xen Tools and VMware Tools. For how to uninstall the tools, see the corresponding official documents of the tools.

 Disable your anti-virus and intrusion detection software. You can enable the software after the PV driver is installed.

Installing the PV Driver

Log in to the Windows ECS using VNC.
 For details about how to log in to an ECS, see *Elastic Cloud Server User Guide*.

□ NOTE

You must log in to the ECS using VNC. Remote desktop connection is not allowed because the NIC driver needs to be updated during the installation but the NIC is in use for the remote desktop connection. As a result, the installation will fail.

- 2. On the ECS, choose **Start** > **Control Panel**.
- 3. Click **Uninstall a program**.
- 4. Uninstall **GPL PV drivers for Windows** *x.x.x.xx* as prompted.
- 5. Download the required PV driver based on the ECS OS and **Obtaining** Required Software Packages.
- 6. Decompress the PV driver software package.
- 7. Right-click **GPL PV Drivers for Windows** *x.x.x.xx*, select **Run as administrator**, and complete the installation as prompted.
- 8. Restart the ECS as prompted to make the PV driver take effect. ECSs running Windows Server 2008 must be restarted twice.

Ⅲ NOTE

After the PV driver is installed, the ECS NIC configuration will be lost. If you have configured NICs before, you need to configure them again.

Verifying the Installation

Perform the following steps to verify the installation of the PV driver:

- 1. Click Start. Choose Control Panel > Programs and Features.
- Locate the PV driver for Windows.
 If UVP VMTools for Windows exists, the installation is successful, as shown in Figure 3-7.

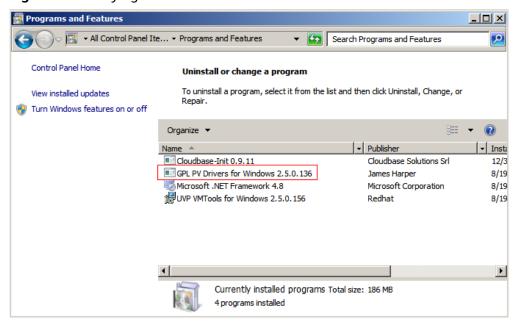


Figure 3-7 Verifying the installation

3.8.5 Installing UVP VMTools

Scenarios

This section only applies to KVM ECSs, which will replace Xen ECSs gradually. Before using an ECS or external image file to create a private image, ensure that UVP VMTools has been installed in the OS to enable subsequently created ECSs to support KVM virtualization and improve network performance.



If you do not install UVP VMTools, NICs of the ECS may not be detected and the ECS cannot communicate with other resources.

UVP VMTools has been installed by default when you use a public image to create ECSs. You can perform the following operations to verify the installation:

Open the **version** configuration file to check whether UVP VMTools is the latest:

C:\Program Files (x86)\virtio\bin\version

If the version is 2.5.0 or later, the current UVP VMTools can be used. Otherwise, perform operations in **Installing UVP VMTools** to install UVP VMTools.

Prerequisites

- An EIP has been bound to the ECS.
- The UVP VMTools installation package has been downloaded on the ECS. For how to obtain the installation package, see Obtaining Required Software Packages.
- Ensure that the ECS has at least 50 MB disk space.

- To avoid an installation failure, perform the following operations before starting the installation:
 - Uninstall third-party virtualization platform tools, such as Citrix Xen Tools and VMware Tools. For how to uninstall the tools, see the corresponding official documents of the tools.
 - Disable your antivirus and intrusion detection software. You can enable the software after UVP VMTools is installed.

Installing UVP VMTools

The following operations describe how to install UVP VMTools. **vmtools-WIN2016-x64.exe** extracted from **vmtools-WIN2016-x64.zip** is used as an example.

1. Log in to the Windows ECS using VNC.

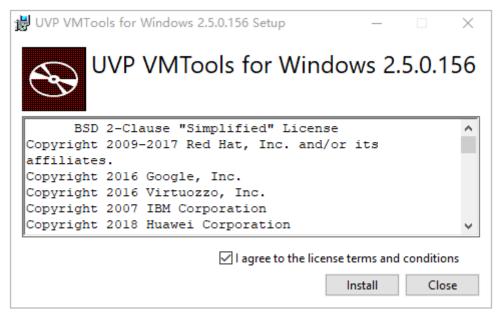
For details about how to log in to an ECS, see *Elastic Cloud Server User Guide*.

◯ NOTE

You must log in to the ECS using VNC. Remote desktop connection is not allowed because the NIC driver needs to be updated during the installation but the NIC is in use for the remote desktop connection. As a result, the installation will fail.

- Download the required UVP VMTools based on the ECS OS and Obtaining Required Software Packages.
- 3. Decompress the UVP Tools software package vmtools-WIN2016-x64.zip.
- 4. Right-click **vmtools-WIN2016-x64.exe**, and select **Run as administrator** from the shortcut menu.
- 5. In the displayed dialog box, select I agree to the license terms and conditions and click Install.

Figure 3-8 Installing UVP VMTools



6. Restart the OS for UVP VMTools to take effect.

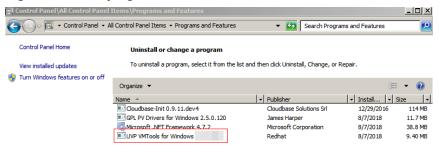
7. Perform the operations in **Verifying the Installation** to check whether UVP VMTools is successfully installed.

Verifying the Installation

Perform the following steps to verify the installation of UVP VMTools:

- 1. Click Start. Choose Control Panel > Programs and Features.
- Locate UVP VMTools for Windows.
 If UVP VMTools for Windows exists, the installation is successful, as shown in Figure 3-9.

Figure 3-9 Verifying the installation



3.8.6 Clearing System Logs

After installing the PV driver and UVP VMTools, perform the following operations to clear system logs:

- 1. For Windows Server 2008 and Windows Server 2012, right-click **Computer** and select **Manage**.
- In the displayed dialog box, choose System Tools > Event Viewer > Windows Logs and delete logs of five items.
- 3. Stop the ECS.

3.9 Optimizing a Linux Private Image

3.9.1 Optimization Process

The virtualization of ECSs is gradually changing from Xen to KVM. Therefore, private images need to support both Xen and KVM. To ensure that ECSs created from a private image can run properly, you are advised to optimize it no matter it is using Xen or KVM.

A Linux ECS can run properly only when xen-pv and VirtIO drivers have been installed on it and the disk ID in its GRUB configuration file and fstab file has been changed to UUID.

Preparations

1. Use the Linux image to be optimized to create an ECS, and start and log in to the ECS.

2. Check whether the private image needs to be optimized.

For details, see Checking Whether a Private Image Needs to be Optimized.

The virtualization type may cause slice differences in an optimization process.

Process

1. Uninstall PV drivers from the ECS.

For details, see Uninstalling PV Drivers from a Linux ECS.

∩ NOTE

If the ECS is using KVM virtualization, skip this step.

2. Change the disk ID in the GRUB configuration file to UUID.

For details, see Changing the Disk Identifier in the GRUB Configuration File to UUID.

3. Change the disk ID in the fstab file to UUID.

For details, see Changing the Disk Identifier in the fstab File to UUID.

- 4. Install native virtualization drivers.
 - For Xen, install native Xen and KVM drivers. For details, see Install the Native Xen and KVM Drivers
 - For KVM, install native KVM drivers. For details, see Installing Native KVM Drivers.
- 5. Delete log files and historical records, and stop the ECS.

For details, see **Clearing System Logs**.

6. Create a Linux private image using the ECS.

3.9.2 Checking Whether a Private Image Needs to be Optimized

- If the virtualization type is Xen, optimization is required.
- If the virtualization type is KVM and VirtIO drivers are not installed, optimization is required.
- If the virtualization type is KVM and VirtIO drivers are installed, optimization is not required.

Procedure

1. Run the following command to check the virtualization type of an ECS:

lscpu

- If the value of Hypervisor vendor is Xen, optimize the private image as instructed in Process.
- If the value of Hypervisor vendor is KVM, go to the next step for further check.

lscpu Architecture: x86 64 32-bit, 64-bit Little Endian CPU op-mode(s): Byte Order: CPU(s): On-line CPU(s) list: 0 - 3Thread(s) per core: Core(s) per socket: Socket(s): 4 NUMA node(s): Vendor ID: GenuineIntel CPU family: 62 Model: Model name: Intel(R) Xeon(R) CPU E5-2690 v2 @ 3.00GHz Stepping: 3000.079 CPU MHz: BogoMIPS: 6000.15 Hypervisor vendor: Xen

Figure 3-10 Checking the virtualization type of a Linux ECS

2. Check whether VirtIO drivers have been installed.

You have new mail_in /var/spool/mail/root

full

32K 32K

256K

0-3

25600K

CentOS/EulerOS

Virtualization type:

NUMA node0 CPU(s):

L1d cache:

L1i cache:

L2 cache: L3 cache:

For initramfs, run the following command:

lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

For initrd, run the following command:

lsinitrd /boot/initrd-`uname -r` | grep virtio

Ubuntu/Debian

lsinitramfs /boot/initrd.img-`uname -r` |grep virtio

- SUSE/openSUSE
 - SUSE 12 SP1/openSUSE 13 or earlier:lsinitrd /boot/initrd-`uname -r` | grep virtio
 - SUSE 12 SP1 or later than SUSE 12 SP1/openSUSE 13:
 For initramfs, run the following command:
 lsinitrd /boot/initramfs-`uname -r`.img | grep virtio
 For initrd, run the following command:

lsinitrd /boot/initrd-`uname -r` | grep virtio

If **virtio** is displayed, VirtIO drivers have been installed. For more information, see **Creating a Linux System Disk Image from an External Image File**.

Otherwise, VirtIO drivers have not been installed. Optimize the private image as instructed in **Process**.

3.9.3 Uninstalling PV Drivers from a Linux ECS

Scenarios

When optimizing a Linux private image with Xen virtualization, you need to install native Xen and KVM drivers on the source ECS of the image.

To ensure that you can successfully install the native Xen and KVM drivers, you must uninstall PV drivers from the ECS first.

Procedure

- 1. Log in to the ECS as user **root** using VNC.
- 2. Run the following command to check whether PV drivers are installed in the OS:

ps -ef | grep uvp-monitor

- If the following information is displayed, PV drivers have been installed.
- Otherwise, PV drivers are not installed. No further actions will be required.

```
root 4561 1 0 Jun29 ? 00:00:00 /usr/bin/uvp-monitor
root 4567 4561 0 Jun29 ? 00:00:00 /usr/bin/uvp-monitor
root 6185 6085 0 03:04 pts/2 00:00:00 grep uvp-monitor
```

3. In the VNC login window, open the CLI.

For how to open the CLI, see the OS manual.

4. Run the following command to uninstall PV drivers:

/etc/.uvp-monitor/uninstall

 PV drivers are uninstalled successfully if the following command output is displayed:

The PV driver is uninstalled successfully. Reboot the system for the uninstallation to take effect.

- If the command output indicates that .uvp-monitor is not found, go to 5.
 -bash: /etc/.uvp-monitor/uninstall: No such file or directory
- 5. Perform the following operations to delete uvp-monitor that failed to take effect, preventing log overflow:
 - a. Run the following command to check whether UVP user-mode programs are installed in the OS:

rpm -qa | grep uvp

Information similar to the following is displayed:

```
libxenstore_uvp3_0-3.00-36.1.x86_64
uvp-monitor-2.2.0.315-3.1.x86_64
kmod-uvpmod-2.2.0.315-3.1.x86_64
```

b. Run the following commands to delete the installation packages:

```
rpm -e kmod-uvpmod
rpm -e uvp-monitor
rpm -e libxenstore_uvp
```

3.9.4 Changing the Disk Identifier in the GRUB Configuration File to UUID

Scenarios

When optimizing a Linux private image, you need to change the disk identifier to UUID in the GRUB configuration file of the ECS.

Modify the menu.lst or grub.cfg configuration file (/boot/grub/menu.lst, /boot/grub/grub.cfg, /boot/grub2/grub.cfg, /boot/grub/grub.conf, or /boot/efi/EFI/euleros/grub.cfg), and configure the boot partition using the UUID.

The root partition identified in the configuration file varies depending on the OS. It may be root=/dev/xvda or root=/dev/disk.

Procedure

- Ubuntu 14.04: Run blkid to obtain the UUID of the root partition. Modify the /boot/grub/grub.cfg file and use the UUID of the root partition to configure the boot item. If the root partition already uses UUID, no modification is required. The procedure is as follows:
 - a. Log in to the ECS as user **root**.
 - b. Run the following command to query all types of mounted file systems and device UUIDs:

blkid

The following information is displayed:

```
/dev/xvda1: UUID="ec51d860-34bf-4374-ad46-a0c3e337fd34" TYPE="ext3" /dev/xvda5: UUID="7a44a9ce-9281-4740-b95f-c8de33ae5c11" TYPE="swap"
```

c. Run the following command to guery the **grub.cfg** file:

cat /boot/grub/grub.cfg

The following information is displayed:

```
.....menuentry 'Ubuntu Linux, with Linux 3.13.0-24-generic' --class ubuntu --class gnu-linux --
class gnu --class os --unrestricted $menuentry_id_option 'gnulinux-3.13.0-24-generic-advanced-
ec51d860-34bf-4374-ad46-a0c3e337fd34' {
recordfail
load_video
gfxmode $linux_gfx_mode
insmod gzio
insmod part_msdos
insmod ext2
if [ x$feature_platform_search_hint = xy ]; then
search --no-floppy --fs-uuid --set=root ec51d860-34bf-4374-ad46-a0c3e337fd34
search --no-floppy --fs-uuid --set=root ec51d860-34bf-4374-ad46-a0c3e337fd34
echo 'Loading Linux 3.13.0-24-generic ...'
linux /boot/vmlinuz-3.13.0-24-generic root=/dev/xvda1 ro
echo 'Loading initial ramdisk ..
initrd /boot/initrd.img-3.13.0-24-generic
```

d. Check whether the root partition in the /boot/grub/grub.cfg configuration file contains root=/dev/xvda1 or root=UUID=ec51d860-34bf-4374-ad46-a0c3e337fd34.

- If root=UUID=ec51d860-34bf-4374-ad46-a0c3e337fd34 is contained, the root partition is in the UUID format and requires no change.
- If root=/dev/xvda1 is contained, the root partition is in the device name format. Go to 5.
- e. Identify the UUID of the root partition device based on root=/dev/xvda1 (device name of the root partition) and the partition information obtained by running the blkid command.
- f. Run the following command to open the **grub.cfg** file:

vi /boot/grub/grub.cfg

- g. Press i to enter editing mode and change the root partition to the UUID format, for example, from root=/dev/xvda1 to root=UUID=ec51d860-34bf-4374-ad46-a0c3e337fd34.
- h. Press **Esc**, enter :wq, and press **Enter**. The system saves the configuration and exits the vi editor.
- i. Run the following command to verify the change:

cat /boot/grub/grub.cfg

The change is successful if information similar to the following is displayed:

```
.....menuentry 'Ubuntu Linux, with Linux 3.13.0-24-generic' --class ubuntu --class gnu-linux --
class gnu --class os --unrestricted $menuentry_id_option 'gnulinux-3.13.0-24-generic-advanced-
ec51d860-34bf-4374-ad46-a0c3e337fd34' {
recordfail
load_video
gfxmode $linux_gfx_mode
insmod gzio
insmod part_msdos
insmod ext2
if [ x$feature_platform_search_hint = xy ]; then
search --no-floppy --fs-uuid --set=root ec51d860-34bf-4374-ad46-a0c3e337fd34
else
search --no-floppy --fs-uuid --set=root ec51d860-34bf-4374-ad46-a0c3e337fd34
echo 'Loading Linux 3.13.0-24-generic ...'
linux /boot/vmlinuz-3.13.0-24-generic root=UUID=ec51d860-34bf-4374-ad46-a0c3e337fd34 ro
echo 'Loading initial ramdisk ..
initrd /boot/initrd.img-3.13.0-24-generic
```

- CentOS 6.5: Run blkid to obtain the UUID of the root partition. Modify the / boot/grub/grub.conf file and use the UUID of the root partition to configure the boot item. If the root partition already uses UUID, no modification is required. The procedure is as follows:
 - a. Log in to the ECS as user root.
 - Run the following command to query all types of mounted file systems and device UUIDs:

blkid

The following information is displayed:

```
/dev/xvda1: UUID="749d6c0c-990a-4661-bed1-46769388365a" TYPE="swap" /dev/xvda2: UUID="f382872b-eda6-43df-9516-5a687fecdce6" TYPE="ext4"
```

c. Run the following command to query the **grub.conf** file:

cat /boot/grub/grub.conf

The following information is displayed:

default=0
timeout=5
splashimage=(hd0,1)/boot/grub/splash.xpm.gz
hiddenmenu
title CentOS (2.6.32-573.8.1.el6.x86_64)
root (hd0,1)
kernel /boot/vmlinuz-2.6.32-573.8.1.el6.x86_64 ro root=/dev/xvda2 rd_NO_LUKS rd_NO_LVM
LANG=en_US.UTF-8 rd_NO_MD SYSFONT=latarcyrheb-sun16
crashkernel=autoKEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM rhgb quiet
initrd /boot/initramfs-2.6.32-573.8.1.el6.x86_64.imq

- d. Check whether the root partition in the /boot/grub/grub.conf configuration file contains root=/dev/xvda2 or root=UUID=f382872b-eda6-43df-9516-5a687fecdce6.
 - If root=UUID=f382872b-eda6-43df-9516-5a687fecdce6 is contained, the root partition is in the UUID format and requires no change.
 - If root=/dev/xvda2 is contained, the root partition is in the device name format. Go to 5.
- Identify the UUID of the root partition device based on root=/dev/xvda2 (device name of the root partition) and the partition information obtained by running the blkid command.
- f. Run the following command to open the **grub.conf** file:

vi /boot/grub/grub.conf

- g. Press i to enter editing mode and change the root partition to the UUID format, for example, from root=/dev/xvda2 to root=UUID=f382872b-eda6-43df-9516-5a687fecdce6.
- h. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the configuration and exits the vi editor.
- i. Run the following command to verify the change:

cat /boot/grub/grub.conf

The change is successful if information similar to the following is displayed:

```
default=0
timeout=5
splashimage=(hd0,1)/boot/grub/splash.xpm.gz
hiddenmenu
title CentOS (2.6.32-573.8.1.el6.x86_64)
root (hd0,1)
kernel /boot/vmlinuz-2.6.32-573.8.1.el6.x86_64 ro root=UUID=f382872b-eda6-43df-9516-5a687fecdce6 rd_NO_LUKS rd_NO_LVM LANG=en_US.UTF-8 rd_NO_MD
SYSFONT=latarcyrheb-sun16 crashkernel=autoKEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM
rhgb quiet
initrd /boot/initramfs-2.6.32-573.8.1.el6.x86_64.img
```

- CentOS 7.0: Run blkid to obtain the UUID of the root partition. Modify the / boot/grub2/grub.cfg file and use the UUID of the root partition to configure the boot item. If the root partition already uses UUID, no modification is required.
 - a. Log in to the ECS as user root.
 - b. Run the following command to query all types of mounted file systems and device UUIDs:

blkid

The following information is displayed:

```
/dev/xvda2: UUID="4eb40294-4c6f-4384-bbb6-b8795bbb1130" TYPE="xfs" /dev/xvda1: UUID="2de37c6b-2648-43b4-a4f5-40162154e135" TYPE="swap"
```

Run the following command to query the grub.cfg file:

cat /boot/grub2/grub.cfg

The following information is displayed:

```
menuentry 'CentOS Linux (3.10.0-229.el7.x86_64) 7 (Core)' --class fedora --class gnu-linux --
class gnu --class os --unrestricted $menuentry_id_option 'gnulinux-3.10.0-229.el7.x86_64-
advanced-4eb40294-4c6f-4384-bbb6-b8795bbb1130' {
load_video
set gfxpayload=keep
insmod gzio
insmod part_msdos
insmod xfs
set root='hd0,msdos2'
if [ x$feature_platform_search_hint = xy ]; then
search --no-floppy --fs-uuid --set=root --hint='hd0,msdos2'4eb40294-4c6f-4384-bbb6-
b8795bbb1130
search --no-floppy --fs-uuid --set=root 4eb40294-4c6f-4384-bbb6-b8795bbb1130
linux16 /boot/vmlinuz-3.10.0-229.el7.x86_64 root=/dev/xvda2 ro crashkernel=auto rhgb quiet
LANG=en_US.UTF-8
initrd16 /boot/initramfs-3.10.0-229.el7.x86_64.img
```

- d. Check whether the root partition in the /boot/grub2/grub.cfg configuration file contains root=/dev/xvda2 or root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130.
 - If root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 is contained, the root partition is in the UUID format and requires no change.
 - If root=/dev/xvda2 is contained, the root partition is in the device name format. Go to 5.
- e. Identify the UUID of the root partition device based on **root=/dev/xvda2** (device name of the root partition) and the partition information obtained by running the **blkid** command.
- f. Run the following command to open the **grub.cfg** file:

vi /boot/grub2/grub.cfg

g. Press i to enter editing mode and change the root partition to the UUID format, for example, from root=/dev/xvda2 to root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130.

- h. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the configuration and exits the vi editor.
- i. Run the following command to verify the change:

cat /boot/grub2/grub.cfg

The change is successful if information similar to the following is displayed:

```
menuentry 'CentOS Linux (3.10.0-229.el7.x86_64) 7 (Core)' --class fedora --class gnu-linux --class gnu --class os --unrestricted $menuentry_id_option 'gnulinux-3.10.0-229.el7.x86_64-advanced-4eb40294-4c6f-4384-bbb6-b8795bbb1130' { load_video
```

```
set gfxpayload=keep
insmod gzio
insmod part_msdos
insmod xfs
set root='hd0,msdos2'
if [ x$feature_platform_search_hint = xy ]; then
search --no-floppy --fs-uuid --set=root --hint='hd0,msdos2'4eb40294-4c6f-4384-bbb6-
b8795bbb1130
else
search --no-floppy --fs-uuid --set=root 4eb40294-4c6f-4384-bbb6-b8795bbb1130
fi
iinux16 /boot/vmlinuz-3.10.0-229.el7.x86_64 root=UUID=4eb40294-4c6f-4384-bbb6-
b8795bbb1130 ro crashkernel=auto rhgb quiet LANG=en_US.UTF-8
initrd16 /boot/initramfs-3.10.0-229.el7.x86_64.img
}
```

3.9.5 Changing the Disk Identifier in the fstab File to UUID

Scenarios

When optimizing a Linux private image, you need to change the disk identifier to UUID in the fstab configuration file of the ECS.

Procedure

- Take CentOS 7.0 as an example. Run blkid to obtain the UUIDs of all
 partitions. Modify the /etc/fstab file and use the partition UUIDs to configure
 automatic partition mounting.
- 1. Log in to the ECS as user **root**.
- 2. Run the following command to query all types of mounted file systems and device UUIDs:

blkid

The following information is displayed:

```
/dev/xvda2: UUID="4eb40294-4c6f-4384-bbb6-b8795bbb1130" TYPE="xfs" /dev/xvda1: UUID="2de37c6b-2648-43b4-a4f5-40162154e135" TYPE="swap"
```

3. Run the following command to guery the **fstab** file:

cat /etc/fstab

The following information is displayed:

```
[root@CTU1000028010 ~]# cat /etc/fstab
/dev/xvda2 / xfs defaults 0 0
/dev/xvda1 swap swap defaults 0 0
```

- 4. Check whether the disk identifier in the **fstab** file is the device name.
 - If the disk is represented by UUID, no further operation is required.
 - If the disk is represented by the device name, go to 5.
- 5. Run the following command to open the **fstab** file:

vi /etc/fstab

- 6. Press **i** to enter editing mode and change the disk identifier in the **fstab** file to UUID.
- Take CentOS 7.1 as an example. Run blkid to obtain the UUIDs of all
 partitions. Modify the /etc/fstab file and use the partition UUIDs to configure
 automatic partition mounting.
- 1. Log in to the ECS as user **root**.

2. Run the following command to query all types of mounted file systems and device UUIDs:

blkid

```
/dev/xvda2: UUID="4eb40294-4c6f-4384-bbb6-b8795bbb1130" TYPE="xfs" /dev/xvda1: UUID="2de37c6b-2648-43b4-a4f5-40162154e135" TYPE="swap"
```

Before the change:

```
[root@CTU1000028010 ~]# cat /etc/fstab
/dev/xvda2 / xfs defaults 0 0
/dev/xvda1 swap swap defaults 0 0
```

After the change:

```
[root@CTU1000028010 ~]# cat /etc/fstab
UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 / xfs defaults 0 0
UUID=2de37c6b-2648-43b4-a4f5-40162154e135 swap swap defaults 0 0
```

- 3. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the configuration and exits the vi editor.
- 4. Run the following command to verify the change:

cat /etc/fstab

The change is successful if information similar to the following is displayed:

```
[root@CTU1000028010 ~]# cat /etc/fstab

UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 / xfs defaults 0 0

UUID=2de37c6b-2648-43b4-a4f5-40162154e135 swap swap defaults 0 0
```

3.9.6 Install the Native Xen and KVM Drivers

Scenarios

When optimizing a Linux private image with Xen virtualization, you need to install native Xen and KVM drivers on the source ECS of the image.

This section describes how to install the native Xen and KVM drivers.



Xen: If you do not install the Xen driver for the image, the network performance of the ECSs created from this image will be poor, and the security groups and firewall configured for the ECSs will not take effect.

KVM: If you do not install the KVM driver for the image, the NICs of the ECSs may not be detected and the ECSs will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen. For details, see .
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after installation of the Xen and KVM drivers.

Procedure

Modify the configuration file depending on the OS.

CentOS, EulerOS

Take CentOS 7.0 as an example. Modify the /etc/dracut.conf file. Add the xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see CentOS and EulerOS.

Ubuntu and Debian

Modify the /etc/initramfs-tools/modules file. Add the xen-pv and VirtIO drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/initramfs-tools/modules file. Run the update-initramfs -u command to regenerate initrd.

For details, see **Ubuntu and Debian**.

• SUSE and openSUSE

- If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file and add xen-pv and VirtlO drivers to INITRD_MODULES="". xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtlO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the mkinitrd command to regenerate initrd.
- If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the dracut -f command to regenerate initrd.
- If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/ dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see **SUSE** and openSUSE.

□ NOTE

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed in the OS: xen-kmp-default-4.2.2_04_3.0.76_0.11-0.7.5

If xen-kmp is not installed, obtain it from the ISO file and install it.

If you add built-in drivers to the initrd or initramfs file by mistake, the ECS will not be affected.

CentOS and EulerOS

 Run the following command to open the /etc/dracut.conf file: vi /etc/dracut.conf 2. Press i to enter editing mode and add the xen-pv and VirtlO drivers to **add drivers** (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-2.6.32-573.8.1.el6.x86 64.img

If the virtual file system is not the default initramfs, run the **dracut** -f Name of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be /boot/grub/grub.cfg, /boot/grub2/grub.cfg, or /boot/grub/grub.conf depending on the OS.

5. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initramfs. The following command output will be displayed:

```
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.img | grep xen
-rwxr--r-- 1 root root
                             54888 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
block/xen-blkfront.ko
-rwxr--r-- 1 root root
                             45664 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
drivers/net/xen-netfront.ko
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.imq | grep virtio
-rwxr--r-- 1 root root
                             23448 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
block/virtio_blk.ko
                             50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
-rwxr--r-- 1 root root
drivers/net/virtio_net.ko
-rwxr--r-- 1 root root
                             28424 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
scsi/virtio_scsi.ko
                                 0 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
drwxr-xr-x 2 root root
virtio
-rwxr--r-- 1 root
                             14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/virtio.ko
                             21040 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
                    root
virtio/virtio_pci.ko
                             18016 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root root
virtio/virtio_ring.ko
```

☐ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y cat /boot/config-`uname -r` | grep CONFIG XEN | grep y

Ubuntu and Debian

1. Run the following command to open the **modules** file:

vi /etc/initramfs-tools/modules

2. Press **i** to enter editing mode and add the xen-pv and VirtlO drivers to the **/etc/initramfs-tools/modules** file (the format varies depending on the OS).

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/initramfs-tools/modules file.
- 4. Run the following command to regenerate initrd:

update-initramfs -u

5. Run the following commands to check whether native Xen and KVM drivers have been installed:

lsinitramfs /boot/initrd.img-`uname -r` |grep xen lsinitramfs /boot/initrd.img-`uname -r` |grep virtio

```
[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep xen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen/netxen_nic.ko lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback/xen-netback.ko lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback/xen-blkback.ko [root@ CTU10000xxxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep virtio lib/modules/3.5.0-23-generic/kernel/drivers/scsi/virtio_scsi.ko
```

Ⅲ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

```
[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
CONFIG_VIRTIO_BLK=y
CONFIG_VIRTIO_NET=y
CONFIG_VIRTIO=y
CONFIG_VIRTIO_RING=y
CONFIG_VIRTIO_PCI=y
CONFIG_VIRTIO_MMIO_CMDLINE_DEVICES=y
[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y
CONFIG_XEN_BLKDEV_FRONTEND=y
CONFIG_XEN_NETDEV_FRONTEND=y
```

SUSE and openSUSE

If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file. For details, see scenario 1.

If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers. For details, see scenario 2.

If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/ dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. For details, see scenario 3.

• If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, perform the following steps:

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed in the OS:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed:

xen-kmp-default-4.2.2_04_3.0.76_0.11-0.7.5

If xen-kmp is not installed, obtain it from the installation ISO and install it first.

a. Run the following command to open the /etc/sysconfig/kernel file:

vi /etc/sysconfig/kernel

b. Add the xen-pv and VirtlO drivers after **INITRD_MODULES**= (the format of drivers depends on the OS).

```
SIA10000xxxxx:~ # vi /etc/sysconfig/kernel
# (like drivers for scsi-controllers, for lym or reiserfs)
```

INITRD_MODULES="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio scsi virtio net virtio pci virtio ring virtio"

c. Run the **mkinitrd** command to regenerate initrd:

∩ NOTE

If the virtual file system is not the default initramfs or initrd, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **menu.lst** or **grub.cfg** file (/boot/grub/menu.lst, /boot/grub/grub.cfg, or /boot/grub2/grub.cfg).

The following is an example initrd file of SUSE 11 SP4:

default 0
timeout 10
gfxmenu (hd0,0)/boot/message
title sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent console=ttyS0,115200n8 console=tty0
net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1 showopts
initrd /boot/initrd.vmx
title Failsafe_sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent ide=nodma apm=off noresume edd=off
powersaved=off nohz=off highres=off processsor.max+cstate=1 nomodeset x11failsafe
console=ttyS0,115200n8 console=tty0 net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1
showopts
initrd /boot/initrd.vmx

/boot/initrd.vmx in the initrd line is the initrd file actually used. Run the dracut -f /boot/initrd.vmx command. If the initrd file does not contain

the **/boot** directory, such as **/initramfs-**xxx, run the **dracut -f /boot/ initramfs-**xxx command.

d. Run the following commands to check whether the PVOPS module for Xen or VirtIO module for KVM is loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen

lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen

-rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/xen-blkfront.ko

-rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio_net.ko

- e. Restart the ECS.
- f. Modify the /boot/grub/menu.lst file. Add xen_platform_pci.dev_unplug=all and modify the root configuration.

Before the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default) root (hd0,0) kernel /boot/vmlinuz-3.0.76-0.11-default root=UUID=4eb40294-4c6f-4384-bbb6-

b8795bbb1130 splash=silentcrashkernel=256M-:128M showopts vga=0x314 initrd /boot/initrd-3.0.76-0.11-default

After the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default) root (hd0,0) kernel /boot/vmlinuz-3.0.76-0.11-default root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 splash=silentcrashkernel=256M-:128M showopts vga=0x314 xen_platform_pci.dev_unplug=all initrd /boot/initrd-3.0.76-0.11-default

- Ensure that the root partition is in the UUID format.
- xen_platform_pci.dev_unplug=all is added to shield QEMU devices.
- For SUSE 11 SP1 64bit to SUSE 11 SP4 64bit, add xen_platform_pci.dev_unplug=all to the menu.lst file. For SUSE 12 or later, this function is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether the Xen drivers exist in initrd:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/

xen-blkfront.ko

-rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio_scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr-r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio_net.ko

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

- If the OS version is SUSE 12 SP1, perform the following steps:
 - a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add-drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

• If the OS version is later than SUSE 12 SP1 or openSUSE 13, perform the following steps:

Take SUSE Linux Enterprise Server 12 SP2 (x86_64) as an example.

a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press Esc, enter:wq, and press Enter. The system saves the change and exits the /etc/dracut.conf file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether the native Xen and KVM driver modules are successfully loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initrd. The following command output will be displayed:

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rw-r--r-- 1 root root 69575 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/xen-blkfront.ko

-rw-r--r- 1 root root 53415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/xen-netfront.ko

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall-rwxr-xr-x 1 root root 8320 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall/xen-hcall.ko

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rw-r--r-- 1 root root 29335 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/virtio blk.ko

-rw-r--r- 1 root root 57007 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/virtio_net.ko

-rw-r--r- 1 root root 32415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/scsi/virtio_scsi.ko

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/kernel/drivers/virtio-rw-r--r-- 1 root root 19623 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio/virtio/kernel/drivers/virtio

-rw-r--r- 1 root root 38943 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_pci.ko

-rw-r--r-- 1 root root 24431 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_ring.ko

☐ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

3.9.7 Installing Native KVM Drivers

Scenarios

When optimizing a Linux private image, you need to install native KVM drivers on the ECS. If the drivers have been installed, skip this section.



If you do not install KVM drivers, NICs of the ECS may not be detected and the ECS cannot communicate with other resources.

Prerequisites

- The ECS needs to be optimized. For details, see Checking Whether a Private Image Needs to be Optimized.
- If the ECS uses native Linux KVM drivers, its kernel must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable the software after KVM drivers are installed.

Procedure

Modify the configuration file based on the OS version.

Table 3-3 Modifying configuration files for different OSs

os	Configuration	Reference
CentOS/EulerOS	Take CentOS 7.0 as an example.	CentOS, EulerOS
	1. In the /etc/dracut.conf file, add VirtIO drivers to add_drivers, including virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces.	
	2. Save and exit the /etc/dracut.conf file and run the dracut -f command to generate initrd again.	

OS	Configuration	Reference
Ubuntu/Debian	 In the /etc/initramfs-tools/modules file, add VirtIO drivers, including virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/initramfs-tools/modules file and run the update-initramfs -u command to generate initrd again. 	Ubuntu and Debian
SUSE and openSUSE	If the OS version is earlier than SUSE 12 SP1 or openSUSE 13: 1. In the /etc/sysconfig/kernel file, add VirtIO drivers to INITRD_MODULES="". VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. 2. Run the mkinitrd command to generate initrd again.	SUSE and openSUSE (Earlier than SUSE 12 SP1 or openSUSE 13)
	If the OS version is SUSE 12 SP1: 1. In the /etc/dracut.conf file, add VirtIO drivers to add_drivers. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. 2. Run the dracut -f command to generate initrd again.	SUSE and openSUSE (SUSE 12 SP1)
	If the OS version is later than SUSE 12 SP1 or openSUSE 13: 1. In the /etc/dracut.conf file, add VirtIO drivers to add_drivers, including virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. 2. Save and exit the /etc/dracut.conf file and run the dracut -f command to generate initrd again.	SUSE and openSUSE (Later than SUSE 12 SP1 or openSUSE 13)

CentOS, EulerOS

1. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

2. Press **i** to enter the editing mode and add VirtlO drivers to **add_drivers** (the format depends on the OS requirements).

```
[root@CTU10000xxxxx ~]# vi /etc/dracut.conf
# additional kernel modules to the default
add_drivers+="virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"
....
```

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

```
dracut -f /boot/initramfs-2.6.32-573.8.1.el6.x86_64.img
```

If the virtual file system is not the default initramfs, run the **dracut -f** *Name* of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

5. If the virtual file system is initramfs, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initramfs. The following command output will be displayed:

[root@CTU10000xxxxx home	e]# lsinitrd /boot/initramfs-`uname -r`.img grep virtio
-rwxrr 1 root root	23448 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
block/ virtio_blk.ko	
-rwxrr 1 root root	50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
drivers/net/ virtio_net.ko	
-rwxrr 1 root root	28424 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
scsi/ virtio_scsi.ko	
drwxr-xr-x 2 root root	0 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio	
-rwxrr 1 root root	14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/ virtio.ko	
-rwxrr 1 root root	21040 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/ virtio_pci.ko	
-rwxrr 1 root root	18016 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/ virtio_ring.ko	

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following command to check whether the drivers are built-in ones in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y

Ubuntu and Debian

1. Run the following command to open the **modules** file:

vi /etc/initramfs-tools/modules

2. Press **i** to enter the editing mode and add VirtlO drivers to the **/etc/initramfs-tools/modules** file (the format depends on the OS requirements).

```
[root@CTU10000xxxxx ~]#vi /etc/initramfs-tools/modules ...
```

```
# Examples:
# raid1
# sd_mOd
virtio_blk
virtio_scsi
virtio_net
virtio_pci
virtio_ring
virtio
```

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/initramfs-tools/modules file.
- 4. Run the following command to regenerate initrd:

update-initramfs -u

5. Run the following command to check whether native KVM drivers have been installed:

lsinitramfs /boot/initrd.img-`uname -r` |grep virtio

[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep virtio lib/modules/3.5.0-23-generic/kernel/drivers/scsi/**virtio_scsi.ko**

◯ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following command to check whether the drivers are built-in ones in the kernel:

```
[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
CONFIG_VIRTIO_BLK=y
CONFIG_VIRTIO_NET=y
CONFIG_VIRTIO=y
CONFIG_VIRTIO_RING=y
CONFIG_VIRTIO_PCI=y
CONFIG_VIRTIO_MMIO_CMDLINE_DEVICES=y
```

SUSE and openSUSE (Earlier than SUSE 12 SP1 or openSUSE 13)

Modify the /etc/sysconfig/kernel file.

1. Run the following command to modify the /etc/sysconfig/kernel file:

vi /etc/sysconfig/kernel

2. Add VirtlO drivers to **INITRD_MODULES=""** (the format of drivers depends on the OS).

```
SIA10000xxxxx:~ # vi /etc/sysconfig/kernel
# (like drivers for scsi-controllers, for lvm or reiserfs)
#
INITRD_MODULES="ata_piix ata_generic virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring
virtio"
```

3. Run the **mkinitrd** command to generate **initrd** again.

□ NOTE

If the virtual file system is not the default initramfs or initrd, run the **dracut -f** *Name* of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **menu.lst** or **grub.cfg** file (/boot/grub/menu.lst, / boot/grub/grub.cfg, or /boot/grub2/grub.cfg).

The following is an example initrd file of SUSE 11 SP4:

```
default 0
timeout 10
gfxmenu (hd0,0)/boot/message
```

title sles11sp4_001_[_VMX_]

root (hd0,0)

kernel /boot/linux.vmx vga=0x314 splash=silent console=ttyS0,115200n8 console=tty0 net.ifnames=0 NON PERSISTENT_DEVICE_NAMES=1 showopts

initrd /boot/initrd.vmx

title Failsafe_sles11sp4_001_[_VMX_]

root (hd0,0)

kernel /boot/linux.vmx vga=0x314 splash=silent ide=nodma apm=off noresume edd=off powersaved=off nohz=off highres=off processsor.max+cstate=1 nomodeset x11failsafe console=ttyS0,115200n8 console=tty0 net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1 showopts initrd /boot/initrd.vmx

/boot/initrd.vmx in the initrd line is the initrd file actually used. Run the dracut -f /boot/initrd.vmx command. If the initrd file does not contain the / boot directory, such as /initramfs-xxx, run the dracut -f /boot/initramfs-xxx command.

4. Run the following command to check whether the VirtIO module for KVM is loaded:

lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio_scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio net.ko

- 5. Restart the ECS.
- 6. Run the following command to check whether KVM drivers exist in initrd:

lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio_scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio-ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio_net.ko

□ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following command to check whether the drivers are built-in ones in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y

SUSE and openSUSE (SUSE 12 SP1)

Modify the /etc/dracut.conf file.

1. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

2. Press **i** to enter the editing mode and add VirtlO drivers to **add-drivers** (the format depends on the OS requirements).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name* of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

5. If the virtual file system is initramfs, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep virtio

SUSE and openSUSE (Later than SUSE 12 SP1 or openSUSE 13)

Modify the /etc/dracut.conf file.

Take SUSE Linux Enterprise Server 12 SP2 (x86 64) as an example.

1. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

2. Press **i** to enter the editing mode and add VirtlO drivers to **add_drivers** (the format depends on the OS requirements).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name* of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

5. If the virtual file system is initramfs, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following command to check whether native KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initrd. The following command output will be displayed:

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio
-rw-r--r-- 1 root root 29335 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/
virtio_blk.ko
-rw-r--r-- 1 root root 57007 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/
virtio_net.ko
-rw-r--r-- 1 root root 32415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/scsi/
virtio_scsi.ko
drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/kernel/drivers/virtio
-rw-r--r-- 1 root root 19623 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_rw-r--r-- 1 root root 38943 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/
virtio_pci.ko
-rw-r--r-- 1 root root 24431 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/
virtio_ring.ko

□ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following command to check whether the drivers are built-in ones in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y

3.9.8 Clearing System Logs

Delete log files and historical records, and stop the ECS.

1. Run the following commands to delete redundant key files:

echo > /\$path/\$to/\$root|.ssh/authorized_keys

An example command is echo > /root/.ssh/authorized_keys.

echo > /\$path/\$to/\$none-root/.ssh/authorized_keys

An example command is **echo** > /home/linux/.ssh/authorized_keys.

2. Run the following command to clear log files in the /var/log directory:

rm -rf /var/log/*

Before deleting log files, back up log directories and log files required by application startup. For example, if the default Nginx log directory /var/log/nginx is deleted, Nginx may fail to be started.

3. Run the following commands to delete historical records:

echo > /root/.bash_history history -c

3.10 Encrypting Images

3.10.1 Overview

IMS allows you to create encrypted images to ensure data security.

To use the image encryption function, you must apply for KMS Administrator permissions.

Constraints

- KMS must be enabled.
- Encrypted images cannot be shared with others.
- The system disk of an ECS created from an encrypted image is also encrypted, and its key is the same as the image key.
- If an ECS has an encrypted system disk, private images created from the ECS are also encrypted.
- The key used for encrypting an image cannot be changed.
- If the key used for encrypting an image is disabled or deleted, the image is unavailable.
- Images of multi-project users cannot be encrypted.

3.10.2 Creating Encrypted Images

You can create an encrypted image using an external image file or an encrypted ECS.

- Create an encrypted image using an external image file.
 When you register the external image file as a private image, select KMS encryption and select a key. For details, see Creating a Windows System Disk Image from an External Image File and Creating a Linux System Disk Image from an External Image File.
- Create an encrypted image using an encrypted ECS.

When you use an ECS to create a private image, if the system disk of the ECS is encrypted, the private image created using the ECS is also encrypted. The key used for encrypting the image must be the same as that used for encrypting the system disk. For details, see Creating a System Disk Image from a Windows ECS and Creating a System Disk Image from a Linux ECS.

3.11 Replicating Images Within a Region

Scenarios

You can convert encrypted and unencrypted images into each other or enable some advanced features (such as fast ECS creation from an image) using the image replication function. You may need to replicate an image in the following scenarios:

- Replicate an encrypted image to an unencrypted one.
 Encrypted images cannot be shared. If you want to share an encrypted image, you can replicate it to an unencrypted one.
- Replicate an encrypted image to an encrypted one.
 Keys for encrypting the images cannot be changed. If you want to change the key of an encrypted image, you can replicate this image to a new one and encrypt the new image using an encryption key.

- Replicate an unencrypted image to an encrypted one.
 If you want to store an unencrypted image in an encrypted way, you can replicate this image as a new one and encrypt the new image using a key.
- Optimize a system disk image so that it can be used to quickly create ECSs. Fast Create greatly reduces the time required for creating ECSs from a system disk image. Currently, this feature is supported by all newly created system disk images by default. Existing system disk images may not support this function. You can optimize the images using the image replication function. For example, if image A does not support fast ECS creation, you can replicate it to generate image copy_A that supports fast ECS creation.

Constraints

- Full-ECS images cannot be replicated within the same region.
- Private images created using ISO files do not support in-region replication.

Prerequisites

The images to be replicated are in the **Normal** state.

Procedure

- Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Locate the row that contains the image to be replicated, click **More** in the **Operation** column, and select **Replicate**.
- 3. In the displayed **Replicate Image** dialog box, set the following parameters:
 - Name: Enter a name that is easy to identify.
 - Description: This parameter is optional. Enter description of the replication.
 - Encryption: If you want to encrypt the image or change a key, select KMS encryption and select the key you want to use from the drop-down list.
- 4. Click OK.

On the **Private Images** page, view the replication progress. If the status of the new image becomes **Normal**, the image replication is successful.

3.12 Tagging an Image

Scenarios

You can use tags to classify images. You can add, modify, or delete image tags, or search for required images by tag in the image list.

• When adding predefined tags to an image or searching for an image using predefined tags, you must have permission to access the Tag Management Service (TMS).

Constraints

An image can have a maximum of 10 tags.

Add, Delete, and Modify Image Tags

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**.

The IMS console is displayed.

- Click the **Private Images** tab and click the image name to display the image details.
 - To modify an image tag, go to 3.
 - To delete an image tag, go to 4.
 - To add an image tag, go to 5.
- 3. Click the **Tags** tab, locate the target tag, and click **Edit** in the **Operation** column. In the displayed dialog box, modify the tag.
- 4. Click the **Tags** tab, locate the target tag, and click **Delete** in the **Operation** column. In the displayed dialog box, click **Yes**.
- 5. Click the **Tags** tab and then **Add Tag**. In the displayed dialog box, add a tag.

Search for Private Images by Tag

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab and then **Search by Tag**.
- 3. Enter the tag key and value.

Neither the tag key nor tag value can be empty. When the tag key and tag value are matched, the system automatically shows your desired private images.

4. Click to add a tag.

You can add multiple tags to search for private images. The system will display private images that match all tags.

5. Click Search.

The system searches for private images based on tag keys or tag values.

3.13 Auditing Key Operations

3.13.1 IMS Operations Recorded by CTS

Scenarios

Cloud Trace Service (CTS) is a log audit service provided by the public cloud and intended for cloud security. It allows you to collect, store, and query cloud resource operation records and use these records for security analysis, compliance auditing, resource tracking, and fault locating.

You can use CTS to record IMS operations for later querying, auditing, and backtracking.

Prerequisites

You need to enable CTS before using it. If it is not enabled, IMS operations cannot be recorded. After being enabled, CTS automatically creates a tracker to record all your operations. The tracker stores only the operations of the last seven days. To store the operations for a longer time, store trace files in OBS buckets.

IMS Operations Recorded by CTS

Table 3-4 IMS operations that can be recorded by CTS

Operation	Resource Type	Trace Name
Creating an Image	ims	createlmage
Modifying an image	ims	updatelmage
Deleting images in a batch	ims	deleteImage
Replicating an image	ims	copylmage
Exporting an image	ims	exportImage
Adding a tenant that can use a shared image	ims	addMember
Modifying tenants that can use a shared image	ims	updateMember
Deleting tenants from the group where the members can use a shared image	ims	deleteMemeber

Table 3-5 Relationship between IMS operations and native OpenStack APIs

Operation	Trace Name	Service Type	Resource Type	OpenStack Component
Creating an Image	createlmage	IMS	image	glance
Modifying/ Uploading an image	updatelmage	IMS	image	glance
Deleting an image	deleteImage	IMS	image	glance
Tagging an image	addTag	IMS	image	glance
Deleting an image tag	deleteTag	IMS	image	glance
Adding a tenant that can use a shared image	addMember	IMS	image	glance
Modifying information about a tenant that can use a shared image	updateMemb er	IMS	image	glance
Deleting a tenant from the group where the members can use a shared image	deleteMembe r	IMS	image	glance

3.13.2 Viewing Traces

Scenarios

Once CTS is enabled, it starts recording IMS operations. You can view operations recorded in the last seven days on the CTS management console.

This section describes how to view the records.

Procedure

1. Access the CTS console.

- a. Log in to the management console.
- b. Click Cloud Trace Service under Management & Governance.
- 2. In the navigation pane on the left, choose **Trace List**.
- 3. Set the filter criteria and click **Query**.

The following filters are available:

- Trace Type, Trace Source, Resource Type, and Search By.
 Select Management for Trace Type and IMS for Trace Source.
 Note that:
 - If you select Resource ID for Search By, you need to enter a resource ID. Only whole word match is supported.
 - If you select Resource name for Search By, you need to select or enter a specific resource name.
- **Operator**: Select a specific operator from the drop-down list.
- Trace Status: Available values are All trace statuses, Normal, Warning, and Incident.
- Time Range: You can select Last 1 hour, Last 1 day, Last 1 week, or Customize.
- Locate the target trace and click
 [™] to expand the trace details.
- 5. Click **View Trace** in the upper right corner of the trace details area.

3.14 Converting the Image Format

3.14.1 Converting the Image Format Using gemu-img

Scenarios

You can import an image file in VHD, VMDK, QCOW2, RAW, VHDX, QCOW, VDI, QED, ZVHD, or ZVHD2 format to the cloud platform. Image files in other formats need to be converted before being imported. The open-source tool **qemu-img** is provided for you to convert image file formats.

Description

This section describes how to convert an image format on a local Windows or Linux PC.

Tool and Costs

Table 3-6 Tool and costs

Tool	Description	Costs
qemu-img	qemu-img is an open-source tool for converting image formats.	Free
	You can obtain it from:	
	https://qemu.weilnetz.de/w64/	

Constraints

- **qemu-img** supports the mutual conversion of image formats VHD, VMDK, QCOW2, RAW, VHDX, QCOW, VDI, and QED.
- ZVHD and ZVHD2 are self-developed image file formats and cannot be identified by qemu-img. To convert image files to any of the two formats, use the qemu-img-hw tool. For details, see Converting the Image Format Using qemu-img-hw
- When you run a command to convert the format of VHD image files, use VPC to replace VHD. Otherwise, qemu-img cannot identify the image format.
 For example, to convert a CentOS 6.9 image file from VHD to QCOW2, run the following command:

qemu-img convert -p -f vpc -O qcow2 centos6.9.vhd centos6.9.qcow2

Windows

- 1. Install gemu-img.
 - Download the qemu-img installation package from https:// qemu.weilnetz.de/w64/.
 - b. Double-click the setup file to install qemu-img in **D:\Program Files** \qemu (an example installation path).
- 2. Configure environment variables.
 - a. Choose **Start** > **Computer** and right-click **Properties**.
 - b. Click **Advanced system settings**.
 - c. In the **System Properties** dialog box, click **Advanced > Environment Variables**.
 - d. In the **Environment Variables** dialog box, search for **Path** in the **System Variable** area and click **Edit**. Add **D:\Program Files\qemu** to **Variable Value**. Use semicolons (;) to separate variable values.

If Path does not exist, add it and set its value to D:\Program Files\gemu.

- e. Click **OK**.
- 3. Verify the installation.

Choose **Start** > **Run**, enter **cmd**, and press **Enter**. In the **cmd** window, enter **qemu-img --help**. If the qemu-img version information is contained in the command output, the installation is successful.

- 4. Convert the image format.
 - a. In the **cmd** window, run the following commands to switch to **D:\Program Files\qemu**:

d:

cd D:\Program Files\qemu

b. Run the following command to convert the image file format from VMDK to OCOW2:

qemu-img convert -p -f vmdk -O qcow2 centos6.9.vmdk centos6.9.qcow2

The parameters are described as follows:

- -p indicates the image conversion progress.
- -f indicates the source image format.
- The part following -O (which must be in upper case) consists of the required format, source image file, and target image file.

After the conversion is complete, the target image file is displayed in the directory where the source image file is located.

The following information is displayed:

```
# qemu-img convert -p -f vmdk -O qcow2 centos6.9.vmdk centos6.9.qcow2 (100.00/100%)
```

 Run the following command to query details about the converted image file in QCOW2 format:

qemu-img info centos6.9.qcow2

The following information is displayed:

qemu-img info centos6.9.qcow2

image: centos6.9.qcow2 file format: qcow2

virtual size: 1.0G (1073741824 bytes)

disk size: 200K cluster_size: 65536

Format specific information:

compat: 1.1

lazy refcounts: false

Linux

- 1. Install qemu-img.
 - For Ubuntu or Debian, run the following command:

apt install qemu-img

- For CentOS, Red Hat, or Oracle, run the following command:

yum install gemu-img

- For SUSE or openSUSE, run the following command:

zypper install qemu-img

2. Run the following command to check whether the installation is successful:

qemu-img -v

If the version information and help manual of the qemu-img tool are contained in the command output, the installation is successful. If CentOS 7 is used, the command output is as follows:

```
[root@CentOS7 ~]# qemu-img -v
qemu-img version 1.5.3, Copyright (c) 2004-2008 Fabrice Bellard
usage: qemu-img command [command options]
QEMU disk image utility

Command syntax:
check [-q] [-f fmt] [--output=ofmt] [-r [leaks | all]] [-T src_cache] filename
create [-q] [-f fmt] [-o options] filename [size]
commit [-q] [-f fmt] [-t cache] filename
compare [-f fmt] [-F fmt] [-T src_cach]
```

- 3. Convert the image format. For example, perform the following steps to convert a VMDK image file running CentOS 7 to a QCOW2 image file:
 - a. Run the following command to convert the image file format to QCOW2:

qemu-img convert -p -f vmdk -O qcow2 centos6.9.vmdk centos6.9.qcow2

The parameters are described as follows:

- -p: indicates the conversion progress.
- -f indicates the source image format.
- The part following **-O** (which must be in upper case) is the converted image format + source image file name + target image file name.

After the conversion is complete, the target image file is displayed in the directory where the source image file is located.

The following information is displayed:

```
[root@CentOS7 home]# qemu-img convert -p -f vmdk -O qcow2 centos6.9.vmdk centos6.9.qcow2 (100.00/100%)
```

b. Run the following command to query details about the converted image file in QCOW2 format:

gemu-img info centos6.9.gcow2

The following information is displayed:

```
[root@CentOS7 home]# qemu-img info centos6.9.qcow2
image: centos6.9.qcow2
file format: qcow2
virtual size: 1.0G (1073741824 bytes)
disk size: 200K
cluster_size: 65536
Format specific information:
    compat: 1.1
    lazy refcounts: false
```

Examples

Scenario

A pre-allocated image depends on two files: xxxx.vmdk (configuration file) and xxxx-flat.vmdk (data file) and cannot be directly imported to the cloud platform. When you export a pre-allocated image file in VMDK monolithic Flat format from the VMware platform, you must convert its format to common VMDK or QCOW2 before it can be imported to the cloud platform.

The following uses the image files **centos6.9-64bit-flat.vmdk** and **centos6.9-64bit.vmdk** as an example to describe how to use qemu-img to convert image formats.

- Procedure
- 1. Run the following commands to query the image file details:

ls -lh centos6.9-64bit*

qemu-img info centos6.9-64bit.vmdk

qemu-img info centos6.9-64bit-flat.vmdk

The following information is displayed:

```
[root@CentOS7 tmp]# ls -lh centos6.9-64bit*
-rw-r--r-. 1 root root 10G Jun 13 05:30 centos6.9-64bit-flat.vmdk
-rw-r--r--. 1 root root 327 Jun 13 05:30 centos6.9-64bit.vmdk
[root@CentOS7 tmp]# qemu-img info centos6.9-64bit.vmdk
image: centos6.9-64bit.vmdk
file format: vmdk
virtual size: 10G (10737418240 bytes)
disk size: 4.0K
Format specific information:
  cid: 3302005459
  parent cid: 4294967295
  create type: monolithicFlat
  extents:
     [0]:
        virtual size: 10737418240
        filename: centos6.9-64bit-flat.vmdk
        format: FLAT
[root@CentOS7 tmp]# qemu-img info centos6.9-64bit-flat.vmdk
image: centos6.9-64bit-flat.vmdk
file format: raw
virtual size: 10G (10737418240 bytes)
disk size: 0
```

◯ NOTE

The command output shows that the format of **centos6.9-64bit.vmdk** is VMDK and that of **centos6.9-64bit-flat.vmdk** is RAW. You can convert the format of only **centos6.9-64bit.vmdk**. For details about how to convert it, see **3**.

2. Run the following command to query the configuration of the pre-allocated image file:

cat centos6.9-64bit.vmdk

The following information is displayed:

```
[root@CentOS7 tmp]# cat centos6.9-64bit.vmdk
# Disk DescriptorFile
version=1
CID=c4d09ad3
parentCID=ffffffff
createType="monolithicFlat"

# Extent description
RW 20971520 FLAT "centos6.9-64bit-flat.vmdk" 0

# The Disk Data Base
#DDB

ddb.virtualHWVersion = "4"
ddb.geometry.cylinders = "20805"
ddb.geometry.heads = "16"
ddb.geometry.sectors = "63"
ddb.adapterType = "ide"
```

3. Place **centos6.9-64bit-flat.vmdk** and **centos6.9-64bit.vmdk** in the same directory. Run the following command to convert the format of **centos6.9-64bit.vmdk** to QCOW2 using qemu-img:

[root@CentOS7 tmp]# qemu-img convert -p -f vmdk -O qcow2 centos6.9-64bit.vmdk centos6.9-64bit.qcow2 (100.00/100%)

4. Run the following command to query details about the converted image file in QCOW2 format:

qemu-img info centos6.9-64bit.qcow2

The following information is displayed:

[root@CentOS7 tmp]# qemu-img info centos6.9-64bit.qcow2 image: centos6.9-64bit.qcow2 file format: qcow2 virtual size: 10G (10737418240 bytes)

disk size: 200K cluster size: 65536

Format specific information: compat: 1.1

lazy refcounts: false

3.14.2 Converting the Image Format Using qemu-img-hw

Scenarios

You can import an image file in VHD, VMDK, QCOW2, RAW, VHDX, QCOW, VDI, QED, ZVHD, or ZVHD2 format to the cloud platform. Image files in other formats need to be converted into any of these formats using the open-source tool **qemuimg** before being imported. However, the **qemu-img** tool cannot convert image files to the ZVHD or ZVHD2 format. To convert image files to any of the two formats, use the self-developed tool **qemu-img-hw**. This section describes how to use **qemu-img-hw** to convert an image file to ZVHD2.

Tool and Costs

Table 3-7 Tool and costs

Tool	Description	Costs
qemu-img-hw	qemu-img-hw is used for converting image formats.	Free
	You can obtain it from:	
	https://helpcenter-scripts.oss.eu- west-0.prod-cloud-ocb.orange- business.com/OCB-image-convert- tools/OCB-image-convert-tools.zip	

Constraints

qemu-img-hw can be used only in Linux. You can run it on a local Linux server or a Linux ECS on the cloud platform. The following procedure uses an EulerOS ECS as an example.

Procedure

- 1. Upload the image file to be converted to the ECS.
 - If the local host runs a Linux OS, run the **scp** command.

For example, to upload **image01.qcow2** to the **/usr/** directory of the ECS, run the following command:

scp /var/image01.qcow2 root@xxx.xxx.xxx./usr/

xxx.xxx.xxx indicates the EIP bound to the ECS.

- If the local host runs a Windows OS, use a file transfer tool, such as WinSCP, to upload the image file to the ECS.
- 2. Obtain the **qemu-img-hw** software package, upload it to the ECS, and then decompress the package.

Table 3-8 qemu-img-hw package

Tool Package	How to Obtain
quick-import-tools	https://helpcenter-scripts.oss.eu-west-0.prod-cloud- ocb.orange-business.com/OCB-image-convert-tools/ OCB-image-convert-tools.zip

This tool can be used only on x86 servers.

- 3. Convert the image format.
 - a. Go to the directory where **qemu-img-hw** is stored, for example, **/usr/ quick-import-tools/qemu-img-hw**.
 - cd /usr/quick-import-tools/qemu-img-hw
 - b. Run the following command to change file permissions:
 - chmod +x qemu-img-hw
 - c. Run the **qemu-img-hw** command to convert the image file to the ZVHD2 format.

The command format of **qemu-img-hw** is as follows:

./qemu-img-hw convert -p -O Target_image_format Source_image_file
Target_image_file

For example, run the following command to convert an **image01.qcow2** file to an **image01.zvhd2** file:

./qemu-img-hw convert -p -O zvhd2 image01.qcow2 image01.zvhd2

Appendix 1: Common gemu-img-hw Commands

Converting image file formats: qemu-img-hw convert -p -O
 Target_image_format Source_image_file Target_image_file

The parameters are described as follows:

-p: indicates the conversion progress.

The part following **-O** (which must be in upper case) consists of the target image format, source image file, and target image file.

For example, run the following command to convert a QCOW2 image file to a ZVHD2 file:

qemu-img-hw convert -p -O zvhd2 test.qcow2 test.zvhd2

- Querying image file information: **qemu-img-hw info** *Image file* An example command is **qemu-img-hw info test.zvhd2**.
- Viewing help information: qemu-img-hw -help

Appendix 2: Common Errors During gemu-img-hw Running

• Symptom:

The following information is displayed when you run the **qemu-img-hw** command:

./qemu-img-hw: /lib64/libc.so.6: version `GLIBC_2.14' not found (required by ./qemu-img-hw)

Solution:

Run the **strings** /lib64/libc.so.6 | **grep glibc** command to check the glibc version. If the version is too early, install the latest version. Run the following commands in sequence:

wget http://ftp.gnu.org/gnu/glibc/glibc-2.15.tar.gz wget http://ftp.gnu.org/gnu/glibc/glibc-ports-2.15.tar.gz

tar -xvf glibc-2.15.tar.gz

tar -xvf glibc-ports-2.15.tar.gz

mv glibc-ports-2.15 glibc-2.15/ports

mkdir glibc-build-2.15

cd glibc-build-2.15

../glibc-2.15/configure --prefix=/usr --disable-profile --enable-add-ons -with-headers=/usr/include --with-binutils=/usr/bin

If **configure: error: no acceptable C compiler found in \$PATH** is displayed, run the **yum -y install gcc** command.

make

make install

• Symptom:

The following information is displayed when you run the **qemu-img-hw** command:

./qemu-img-hw: error while loading shared libraries: libaio.so.1: cannot open shared object file: No such file or directory

Solution: Run the **yum install libaio** command.

4 Windows Operations

4.1 Setting the NIC to DHCP

Scenarios

If a private image is created from an ECS or external image file and the VM where the ECS or external image file is located is configured with a static IP address, you need to change the NIC attribute to DHCP so that the new ECSs created from the private image can dynamically obtain an IP address.

This section uses Windows Server 2008 R2 as an example to describe how to configure DHCP. For details about how to configure DHCP on ECSs running other OSs, see the relevant OS documentation.

□ NOTE

When registering an external image file as a private image, configure DHCP on the VM where the external image file is located. You are advised to configure DHCP on the VM and then export the image file.

Prerequisites

You have logged in to the ECS used to create a Windows private image.

For details about how to log in to an ECS, see *Elastic Cloud Server User Guide*.

Procedure

- 1. On the ECS, choose **Start** > **Control Panel**.
- 2. Click Network and Internet Connections.
- 3. Click **Network and Sharing Center**.

Network and Sharing Center

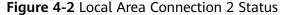
All Control Panel Rems Network and Sharing Center

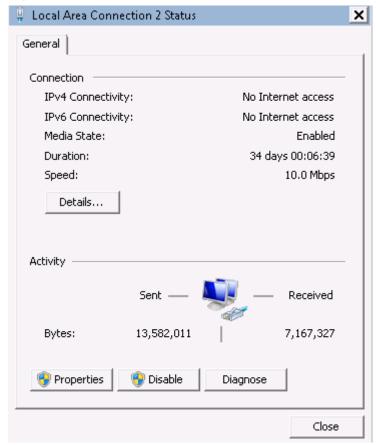
View your basic network information and set up connections

Change adapter settings
Change advanced sharing
Stationous Station Station

Figure 4-1 Network and Sharing Center

4. Select the connection configured with the static IP address. For example, click **Local Area Connection 2**.





- 5. Click **Properties** and select the configured Internet protocol version.
- 6. On the **General** tab, select **Obtain an IP address automatically** and **Obtain DNS server address automatically** and click **OK**. **Figure 4-3** shows the dialog box for configuring the IP address obtaining mode.

Ⅲ NOTE

You are advised to record the original network information so that you can restore the network if necessary.

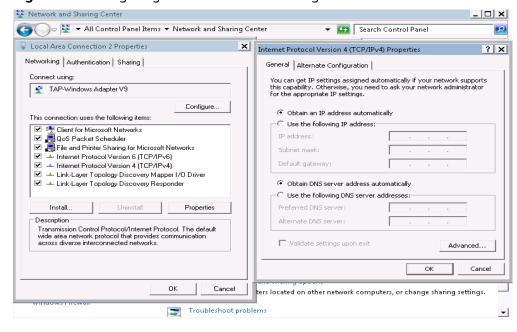


Figure 4-3 Configuring the IP address obtaining mode

4.2 Enabling Remote Desktop Connection

Scenarios

If you want to remotely access an ECS, enable remote desktop connection for the source ECS when creating a private image. This function must be enabled for GPU-accelerated ECSs.

Ⅲ NOTE

When registering an external image file as a private image, enable remote desktop connection on the VM where the external image file is located. You are advised to enable this function on the VM and then export the image file.

Prerequisites

You have logged in to the ECS used to create a Windows private image.

For details about how to log in to an ECS, see *Elastic Cloud Server User Guide*.

Procedure

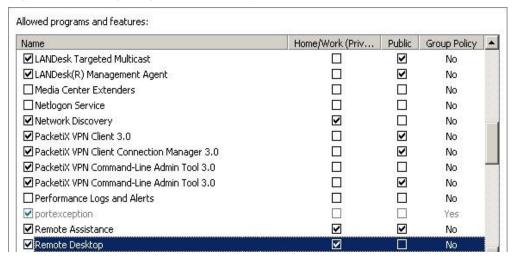
1. Before enabling this function, you are advised to set the resolution of the ECS to 1920×1080.

On the ECS, choose **Start** > **Control Panel**. Under **Appearance and Personalization**, click **Adjust screen resolution**. Then select a proper value from the **Resolution** drop-down list box.

2. Choose **Start**, right-click **Computer**, and choose **Properties** from the shortcut menu.

- 3. Click Remote settings.
- 4. In the Remote tab, select Allow connections from computers running any version of Remote Desktop (less secure).
- 5. Click OK.
- 6. Choose **Start** > **Control Panel** and navigate to **Windows Firewall**.
- 7. Choose **Allow a program or feature through Windows Firewall** in the left pane.
- 8. Select programs and features that are allowed by the Windows firewall for **Remote Desktop** based on your network requirements and click **OK** in the lower part.

Figure 4-4 Configuring remote desktop



4.3 Installing and Configuring Cloudbase-Init

Scenarios

To ensure that you can use the user data injection function to inject initial custom information into ECSs created from a private image (such as setting the ECS login password), install Cloudbase-Init on the ECS used to create the image.

- If Cloudbase-Init is not installed, you cannot configure an ECS. As a result, you can only use the password in the image file to log in to the ECS.
- By default, ECSs created from a public image have Cloudbase-Init installed. You do not need to install or configure Cloudbase-Init on such ECSs.
- For ECSs created from external image files, install and configure Cloudbase-Init by performing the operations in this section.

Prerequisites

- An EIP has been bound to the ECS.
- You have logged in to the ECS.
- The IP address obtaining mode of the ECS is DHCP.

Install Cloudbase-Init

- 1. On the Windows **Start** menu, choose **Control Panel** > **Programs** > **Programs** and **Features** and check whether Cloudbase-Init 1.1.2 is installed.
 - If Cloudbase-Init 1.1.2 is installed, skip the subsequent steps and go to Configure Cloudbase-Init.
 - If Cloudbase-Init is installed but the version is not 1.1.2, uninstall Cloudbase-Init and go to the next step.
 - If Cloudbase-Init is not installed, go to the next step.
- 2. Check whether the version of the OS is Windows desktop.
 - If yes, go to 3.
 - If the OS is Windows Server, go to 4.
- 3. Enable the administrator account (Windows 7 is used as an example).
 - a. Click Start and choose Control Panel > System and Security > Administrative Tools.
 - b. Double-click Computer Management.
 - c. Choose **System Tools** > **Local Users and Groups** > **Users**.
 - d. Right-click **Administrator** and select **Properties**.
 - e. Deselect Account is disabled.
- 4. Download the Cloudbase-Init installation package.

Download the Cloudbase-Init installation package of the appropriate version based on the OS architecture from the Cloudbase-Init official website (http://www.cloudbase.it/cloud-init-for-windows-instances/).

To obtain the stable version, visit the following paths:

- 64-bit: https://www.cloudbase.it/downloads/ CloudbaseInitSetup_Stable_x64.msi
- 32-bit: https://www.cloudbase.it/downloads/ CloudbaseInitSetup_Stable_x86.msi
- 5. Double-click the Cloudbase-Init installation package.
- 6. Click Next.
- 7. Select I accept the terms in the License Agreement and click Next.
- 8. Retain the default path and click Next.
- 9. In the **Configuration options** window, enter **Administrator** for **Username**, select **COM1** for **Serial port for logging**, and ensure that **Run Cloudbase-Init service as LocalSystem** is not selected.

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		N	11	

The version number shown in the figure is for reference only.

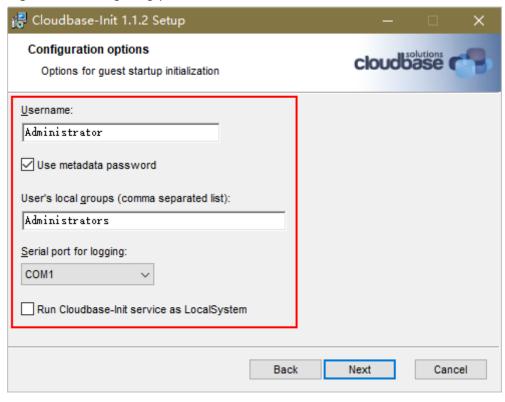


Figure 4-5 Configuring parameters

- 10. Click Next.
- 11. Click Install.
- 12. In the Files in Use dialog box, select Close the application and attempt to restart them and click OK.
- 13. Check whether the version of the OS is Windows desktop.
 - If yes, go to 15.
 - If no, go to 14.
- 14. In the **Completed the Cloudbase-Init Setup Wizard** window, ensure that neither option is selected.



Figure 4-6 Completing the Cloudbase-Init installation

◯ NOTE

The version number shown in the figure is for reference only.

15. Click Finish.

Configure Cloudbase-Init

- 1. Edit the configuration file **C:\Program Files\Cloudbase Solutions\Cloudbase-Init\conf\cloudbase-init.conf** in the Cloudbase-Init installation path.
 - a. Add **netbios_host_name_compatibility=false** to the last line of the file so that the hostname supports a maximum of 63 characters.

NetBIOS contains no more than 15 characters due to Windows system restrictions.

- b. Add metadata_services=cloudbaseinit.metadata.services.httpservice.HttpS ervice to enable the agent to access the laaS OpenStack data source.
- c. Add **plugins** to configure the plugins that will be loaded. Separate different plugins with commas (,). The information in bold is the keyword of each plugin.
 - The following plugins are loaded by default. You can keep all or some of them as needed.

 plugins=cloudbaseinit.plugins.common.localscripts.LocalScriptsPlugin,cloudbaseinit.plugins.common.mtu.MTUPlugin,cloudbaseinit.plugins.windows.createuser.CreateUserPlugin,cloudbaseinit.plugins.common.setuserpassword.SetUserPasswordPlugin,cloudbaseinit.plugins.common.sshpublickeys.SetUserSSHPublicKeysPlugin,cloudbaseinit.plugins.common.sethost name.SetHostNamePlugin,cloudbaseinit.plugins.windows.extendvolumes.ExtendVolumes Plugin,cloudbaseinit.plugins.common.userdata.UserDataPlugin,cloudbaseinit.plugins.windows.licensing.WindowsLicensingPlugin

Plugin functions:

- LocalScriptsPlugin configures scripts.
- o **MTUPlugin** configures MTU network interfaces.
- o CreateUserPlugin creates a user.
- **SetUserPasswordPlugin** configures a password.
- **SetUserSSHPublicKeysPlugin** configures a key.
- **SetHostNamePlugin** configures a hostname.
- ExtendVolumesPlugin expands disk space.
- **UserDataPlugin** injects user data.
- WindowsLicensingPlugin activates Windows instances.

∩ NOTE

If you may change the hostname of ECSs after they are created from this image and services on the ECSs are sensitive to hostname changes, you are not advised to configure the **SetHostNamePlugin** here.

Optional plugins:

plugins=cloudbaseinit.plugins.windows.winrmlistener.ConfigWinRMListenerPlugin,cloudbaseinit.plugins.windows.winrmcertificateauth.ConfigWinRMCertificateAuthPlugin

Plugin functions:

- ConfigWinRMListenerPlugin configures listening to remote logins.
- **ConfigWinRMCertificateAuthPlugin** configures remote logins without password authentication.

<u>A</u> CAUTION

The WinRM plug-ins use weak cryptographic algorithm, which may cause security risks. So, you are advised not to load the plug-ins.

- d. (Optional) Add the following configuration items to configure the number of retry times and interval for obtaining metadata:

 retry_count=40
 retry_count interval=5
- e. (Optional) Add the following configuration item to prevent metadata network disconnections caused by the default route added by Windows: [openstack] add_metadata_private_ip_route=False
- f. (Optional) If the Cloudbase-Init version is 0.9.12 or later, you can customize the length of the password.
 - Change the value of **user_password_length** to customize the password length.
- g. (Optional) Add the following configuration item to ensure that time synchronization from BIOS persists through system restarts:

real_time_clock_utc=true

☐ NOTE

The registry entry **RealTimeIsUniversal=1** allows the system to synchronize time from BIOS. If **real_time_clock_utc=true** is not configured, Cloudbase-Init will revert **RealTimeIsUniversal** back to **0**. As a result, the system cannot synchronize time from BIOS after a restart.

2. Release the current DHCP address so that the created ECSs can obtain correct addresses.

In the Windows command line, run the following command to release the current DHCP address:

ipconfig /release

This operation will interrupt network connection and adversely affect ECS use. The network will automatically recover after the ECSs are started again.

3. When creating an image using a Windows ECS, you need to change the SAN policy of the ECS to **OnlineAll**. Otherwise, EVS disks attached to the ECSs created from the image may be offline.

Windows has three types of SAN policies: **OnlineAll**, **OfflineShared**, and **OfflineInternal**.

Table 4-1 SAN policies

Туре	Description
OnlineAll	All newly detected disks are automatically brought online.
OfflineSh ared	All disks on sharable buses, such as iSCSI and FC, are left offline by default, while disks on non-sharable buses are kept online.
OfflineIn ternal	All newly detected disks are left offline.

a. Execute **cmd.exe** and run the following command to query the current SAN policy of the ECS using DiskPart:

diskpart

b. Run the following command to view the SAN policy of the ECS:

san

- If the SAN policy is OnlineAll, run the exit command to exit DiskPart.
- If the SAN policy is not OnlineAll, go to 3.c.
- c. Run the following command to change the SAN policy of the ECS to **OnlineAll**:

san policy=onlineall

4.4 Running Sysprep

Scenarios

Running Sysprep ensures that an ECS has a unique SID after it is added to a domain.

After installing Cloudbase-Init on an ECS, you need to decide whether the ECS needs to be added to a domain or whether it must have a unique SID. If yes, run Sysprep as instructed in this section.

Prerequisites

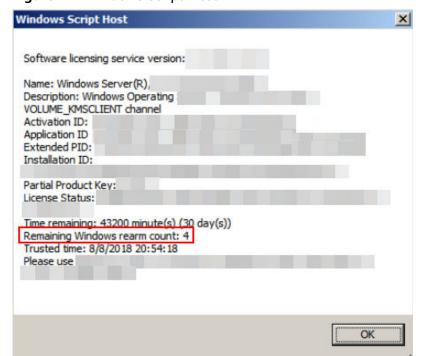
- Run Sysprep as the administrator.
- For a newly activated Windows ECS, you can run Sysprep only once at a time.
- If an ECS is created from an image file, only Sysprep provided by the image file can be used. In addition, Sysprep must always reside in the **%WINDIR%** \system32\sysprep directory.
- Windows must be in the activated state, and the remaining Windows rearm count must be greater than or equal to 1. Otherwise, the Sysprep encapsulation cannot be executed.

Run the following command in the Windows command line and check how many times you can run Sysprep in the displayed **Windows Script Host** dialog box:

slmgr.vbs /dlv

If the value of **Remaining Windows rearm count** is **0**, you cannot run Sysprep.

Figure 4-7 Windows Script Host



Procedure

Enter the Cloudbase-Init installation directory.

C:\Program Files\Cloudbase Solutions\ is used as an example of the Cloudbase-Init installation directory. Switch to the root directory of drive C and run the following command to enter the installation directory:

cd C:\Program Files\Cloudbase Solutions\Cloudbase-Init\conf

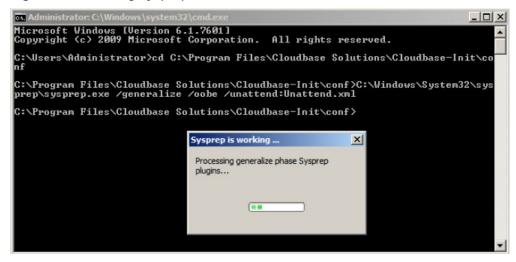
2. Run the following command to encapsulate Windows:

C:\Windows\System32\sysprep\sysprep.exe /generalize /oobe / unattend:Unattend.xml



- Ensure that /unattend:Unattend.xml is contained in the preceding command. Otherwise, the username, password, and other important configuration information of the ECS will be reset, and you must configure the OS manually when you use ECSs created from the Windows private image.
- After this command is executed, the ECS will be automatically stopped.
 After the ECS is stopped, use the ECS to create an image. ECSs created using the image have unique SIDs. If you restart a Windows ECS on which Sysprep has been executed, Sysprep takes effect only for the current ECS.
 Before creating an image using the ECS, you must run Sysprep again.
- For Windows Server 2012 and Windows Server 2012 R2, the administrator
 password of the ECS will be deleted after Sysprep is executed on the ECS.
 You need to log in to the ECS and reset the administrator password. In this
 case, the administrator password set on the management console will be
 invalid. Keep the password you set secure.
- If a domain account is required for logins, run Sysprep on the ECS before
 using it to create a private image. For details about the impact of Sysprep
 operations, see Why Is Sysprep Required for Creating a Private Image
 from a Windows ECS?
- The Cloudbase-Init account of a Windows ECS is an internal account of the Cloudbase-Init agent. This account is used for obtaining metadata and completing relevant configuration when the Windows ECS starts. If you modify or delete this account, or uninstall the Cloudbase-Init agent, you will be unable to inject initial custom information into an ECS created from a Windows private image. Therefore, you are not advised to modify or delete the Cloudbase-Init account.

Figure 4-8 Running Sysprep



Follow-up Procedure

- Create a private image from the ECS on which Sysprep is executed. For details, see Creating a System Disk Image from a Windows ECS.
- You can use the image to create ECSs. Each ECS has a unique SID. Run the following command to query the ECS SID: whoami /user

Figure 4-9 ECS SID before Sysprep is executed

Figure 4-10 ECS SID after Sysprep is executed

4.5 Installing Special Windows Drivers

Scenarios

Before using some types of ECSs to create private images, you need to install special drivers on the ECSs.

GPU Driver

If you want to use the created private image to create GPU-accelerated ECSs, install a proper GPU driver for the image to enable GPU acceleration. There are two types of NVIDIA Tesla GPU drivers for GPU-accelerated ECSs, Tesla and GRID/vGPU drivers.

- To use graphics acceleration, such as OpenGL, DirectX, or Vulcan, install the GRID/vGPU driver and separately configure a GRID license. The GRID/vGPU driver with a vDWS license also supports CUDA for both computing and graphics acceleration.
- To use NVIDIA CUDA computing acceleration, install the Tesla driver.

Table 4-2 Installing the GRID driver

ECS Type	How to Install the Driver
G1	For details, see Instances > Installing a Driver and Toolkit > Installing a GRID Driver on a GPU-accelerated ECS > Downloading GRID Driver and Software License Packages in Elastic Cloud Server User Guide (Paris Region).
G3	For details, see Instances > Installing a Driver and Toolkit > Installing a GRID Driver on a GPU-accelerated ECS > Downloading GRID Driver and Software License Packages in Elastic Cloud Server User Guide (Paris Region).
G2	Log in at http://www.nvidia.com/Download/index.aspx?lang=en-us. You are advised to select the latest CUDA Toolkit version.
	NOTICE After the GPU driver is installed, run the following command to switch the GPU working mode and restart the ECS (for example, the GPU driver is installed in C:\Program Files \NVIDIA Corporation\NVSMI\nvidia-smi.exe):
	"C:\Program Files\NVIDIA Corporation\NVSMI\nvidia- smi.exe" -dm 0

SR-IOV NIC Driver

If you want to use the created private image to create G2 ECSs, install the SR-IOV NIC driver for the image to improve performance and scalability.

To download the SR-IOV driver, log in at https://downloadcenter.intel.com/search?keyword=Intel++Ethernet+Connections+CD. You are advised to select version 20.4.1 or later.

If error "No Intel adapter found" occurs during the driver installation, refer to What Do I Do If a Windows 7 ECS Equipped with an Intel 82599 NIC Reports an Error in SR-IOV Scenarios? for troubleshooting.

5 Linux Operations

5.1 Setting the NIC to DHCP

Scenarios

If a private image is created from an ECS or external image file and the VM where the ECS or external image file is located is configured with a static IP address, you need to change the NIC attribute to DHCP so that the new ECSs created from the private image can dynamically obtain an IP address.

The configuration method varies depending on OSs.

□ NOTE

When registering an external image file as a private image, configure DHCP on the VM where the external image file is located. You are advised to configure DHCP on the VM and then export the image file.

Prerequisites

You have logged in to the ECS used to create a Windows private image.

For details about how to log in to an ECS, see *Elastic Cloud Server User Guide*.

Ubuntu 18 or Later

- Run vi /etc/netplan/01-netcfg.yaml on the ECS to open the /etc/ netplan/01-netcfg.yaml file, and check whether the value of dhcp4 is true.
 - If dhcp4 is set to true, enter :q to exit the editor. No further action will be required.

```
network:
version:2
renderer:NetworkManager
ethernets:
eth0:
dhcp4: true
```

 If dhcp4 is set to no and a static IP address is configured, go to the next step.

```
network:
version:2
renderer:NetworkManager
ethernets:
eth0:
dhcp4: no
addresses: [192.168.1.109/24]
gateway4: 192.168.1.1
nameservers:
addresses: [8.8.8.8,114.114.114]
```

2. Press i to enter the editing mode.

Delete the static IP address settings and set **dhcp4** to **true**. You can also use a number sign (#) to comment out the static IP address settings.

```
network:
version:2
renderer:NetworkManager
ethernets:
eth0:
dhcp4: true # Set dhcp4 to true.
#dhcp4: no # Delete or comment out the static IP address settings.
#addresses: [192.168.1.109]
#gateway4: 192.168.1.1
#nameservers:
# addresses: [8.8.8.8,114.114.114.]
```

3. If your ECS has more than one NIC, configure DHCP for all of them.

```
network:
version:2
renderer:NetworkManager
ethernets:
eth0:
dhcp4: true
eth1:
dhcp4: true
eth2:
dhcp4: true
eth3:
dhcp4: true
```

- 4. Press **Esc**, enter :wq, and press **Enter** to save the settings and exit the vi editor.
- 5. Run the **netplan apply** command to make the settings take effect.

Ubuntu 16.04

1. Run the following command on the ECS to open the /etc/network/interfaces file:

vi /etc/network/interfaces

- If DHCP has been configured for all NICs, enter :q to exit the vi editor.

```
auto lo
iface lo inet loopback
auto eth0
iface eth0 inet dhcp
auto eth1
iface eth1 inet dhcp
```

- If static IP addresses are set on the NICs, go to 2.

```
auto lo
iface lo inet loopback
auto eth0
#iface eth0 inet dhcp
iface eth0 inet static
address 192.168.1.109
```

netmask 255.255.255.0 gateway 192.168.1.1

- 2. Press i to enter the editing mode.
- 3. Delete the static IP address settings and configure DHCP for the NICs.

You can also use a number sign (#) to comment out the static IP address settings.

auto lo iface lo inet loopback auto eth0 iface eth0 inet dhcp

If the ECS has multiple NICs, you must configure DHCP for all the NICs.

auto lo iface lo inet loopback auto eth0 iface eth0 inet dhcp auto eth1 iface eth1 inet dhcp

4. Press **Esc**, enter :wq, and press **Enter**.

The system saves the settings and exits the vi editor.

Related Operations

Configure DHCP to enable the ECS to obtain IP addresses continuously.

- For CentOS and EulerOS, use the vi editor to add PERSISTENT_DHCLIENT="y" to configuration file /etc/sysconfig/networkscripts/ifcfg-ethX.
- For SUSE Linux Enterprise, use the vi editor to set
 DHCLIENT_USE_LAST_LEASE to no in the configuration file /etc/sysconfig/network/dhcp.
- For Ubuntu 12.04 or later, upgrade dhclient to ISC dhclient 4.2.4 so that the NIC can consistently obtain IP addresses from the DHCP server. To perform the upgrade, you need to install isc-dhcp-server first.

5.2 Deleting Files from the Network Rule Directory

Scenarios

To prevent NIC name drift when you use a private image to create ECSs, you need to delete files from the network rule directory of the VM where the ECS or image file is located during the private image creation.

□ NOTE

When registering an external image file as a private image, delete files from the network rule directory on the VM where the external image file is located. You are advised to delete the files on the VM and then export the image file.

Prerequisites

An OS and VirtIO drivers have been installed on the ECS.

Procedure

1. Run the following command to query files in the network rule directory:

ls -l /etc/udev/rules.d

2. Run the following commands to delete the files whose names contain **persistent** and **net** from the network rule directory:

Example:

rm /etc/udev/rules.d/30-net_persistent-names.rules rm /etc/udev/rules.d/70-persistent-net.rules

The italic content in the commands varies depending on your environment.

For CentOS 6 images, to prevent NIC name drift, you need to create an empty rules configuration file.

Example:

touch /etc/udev/rules.d/*75***-persistent-net-generator.rules** //Replace *75* with the actual value in the environment.

- 3. Delete network rules.
 - If the OS uses the initrd system image, perform the following operations:
 - i. Run the following command to check whether the initrd image file whose name starts with **initrd** and ends with **default** contains the **persistent** and **net** network device rule files (replace the italic content in the following command with the actual OS version):

lsinitrd /boot/initrd-2.6.32.12-0.7-default |grep persistent|grep net

- If no, no further action is required.
- o If yes, go to 3.ii.
- ii. Run the following command to back up the initrd image files (replace the italic part in the following command with the actual OS version):
 - cp /boot/initrd-2.6.32.12-0.7-default /boot/initrd-2.6.32.12-0.7-default bak
- iii. Run the following command to generate the initrd file again:

mkinitrd

- If the OS uses the initramfs system image (such as Ubuntu), perform the following operations:
 - Run the following command to check whether the initramfs image file whose name starts with **initrd** and ends with **generic** contains persistent and net rule files.

lsinitramfs /boot/initrd.img-3.19.0-25-generic|grep persistent| grep net

- If no, no further action is required.
- o If yes, go to 3.ii.
- ii. Run the following command to back up the initrd image files:

cp /boot/initrd.img-3.19.0-25-generic /boot/initrd.img-3.19.0-25-generic_bak

iii. Run the following command to generate the initramfs image files again:

update-initramfs -u

5.3 Installing Cloud-Init

Scenarios

To ensure that you can use the user data injection function to inject initial custom information into ECSs created from a private image (such as setting the ECS login password), install Cloud-Init on the ECS used to create the image.

- You need to download Cloud-Init from its official website. Therefore, you must bind an EIP to the ECS.
- If Cloud-Init is not installed, you cannot configure an ECS. As a result, you can only use the password in the image file to log in to the created ECSs.
- By default, ECSs created from a public image have Cloud-Init installed. You do not need to install or configure Cloud-Init on such ECSs.
- For ECSs created using an external image file, install and configure Cloud-Init by performing the operations in this section. For how to configure Cloud-Init, see Configuring Cloud-Init.

Prerequisites

- An EIP has been bound to the ECS.
- You have logged in to the ECS.
- The IP address obtaining mode of the ECS is DHCP.

Procedure

- 1. Check whether Cloud-Init has been installed.
 - For details, see Check Whether Cloud-Init Has Been Installed.
- 2. Install Cloud-Init.

You can install Cloud-Init using either of the following methods: (Recommended) Install Cloud-Init Using the Official Installation Package and Install Cloud-Init Using the Official Source Code Package and pip.

Check Whether Cloud-Init Has Been Installed

Perform the operations provided here to check whether Cloud-Init has been installed. The methods of checking whether Cloud-Init is installed vary depending on the OSs.

• If you are in a Python 3 environment, run the following command to check whether Cloud-Init is installed (Ubuntu22.0.4 is used as an example):

which cloud-init

If information similar to the following is displayed, Cloud-Init has been installed:

/usr/bin/cloud-init

If information similar to the following is displayed, Cloud-Init is not installed:

/usr/bin/which: no cloud-init in (/usr/local/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin/usr/bin)

• If you are in a Python 2 environment, run the following command to check whether Cloud-Init is installed (CentOS 6 is used as an example):

which cloud-init

 If information similar to the following is displayed, Cloud-Init has been installed:

cloud-init-0.7.5-10.el6.centos.2.x86 64

- If no information is returned, Cloud-Init is not installed.

To confirm Cloud-Init is really not installed, you are advised to run **rpm -qa |grep cloud-init** to check again. If either of **which cloud-init** and **rpm -qa |grep cloud-init** shows that Cloud-Init has been installed, Cloud-Init is installed.

If Cloud-Init has been installed, perform the following operations:

- Check whether to use the certificate in the ECS OS. If the certificate is no longer used, delete it.
 - If the certificate is stored in a directory of user root, for example, / \$path/\$to/\$root/.ssh/authorized keys, run the following commands:

cd /root/.ssh

rm authorized_keys

If the certificate is not stored in a directory of user root, for example, / \$path/\$to/\$none-root/.ssh/authorized_keys, run the following commands:

cd /home/centos/.ssh rm authorized keys

 Run the following command to delete the cache generated by Cloud-Init and ensure that the ECS created from the private image can be logged in by using the certificate:

sudo rm -rf /var/lib/cloud/*

□ NOTE

Do not restart the ECS after performing the configuration. Otherwise, you need to configure it again.

(Recommended) Install Cloud-Init Using the Official Installation Package

The method of installing Cloud-Init on an ECS varies depending on the OS. Perform the installation operations as user **root**.

The following describes how to install Cloud-Init on an ECS running SUSE Linux, CentOS, Fedora, Debian, and Ubuntu. For other OS types, install the required type of Cloud-Init. For example, you need to install coreos-cloudinit on ECSs running CoreOS.

SUSE Linux

Paths for obtaining the Cloud-Init installation package for SUSE Linux

https://ftp5.gwdg.de/pub/opensuse/repositories/Cloud:/Tools/http://download.opensuse.org/repositories/Cloud:/Tools/

Select the required repo installation package in the provided paths.

Take SUSE Enterprise Linux Server 12 as an example. Perform the following steps to install Cloud-Init:

- a. Log in to the ECS used to create a Linux private image.
- b. Run the following command to install the network installation source for SUSE Enterprise Linux Server 12:

zypper ar https://ftp5.gwdg.de/pub/opensuse/repositories/Cloud:/ Tools/SLE_12_SP3/Cloud:Tools.repo

- Run the following command to update the network installation source:zypper refresh
- d. Run the following command to install Cloud-Init:

zypper install cloud-init

- e. Run the following commands to enable Cloud-Init to automatically start upon system boot:
 - SUSE 11
 - chkconfig cloud-init-local on; chkconfig cloud-init on; chkconfig cloud-config on; chkconfig cloud-final on
 - service cloud-init-local status; service cloud-init status; service cloud-config status; service cloud-final status
 - SUSE 12 and openSUSE 12/13/42
 - systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
 - systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

<u>^</u> CAUTION

For SUSE and openSUSE, perform the following steps to disable dynamic change of the ECS name:

- Run the following command to open the dhcp file using the vi editor: vi etc/sysconfig/network/dhcp
- 2. Change the value of **DHCLIENT_SET_HOSTNAME** in the **dhcp** file to **no**.

CentOS

Table 5-1 lists the Cloud-Init installation paths for CentOS. Select the required installation package from the following addresses.

OS Type	Version	How to Obtain	
CentOS	6 32-bit	https://archives.fedoraproject.org/pub/ archive/epel/6/i386/	
	6 64-bit	https://archives.fedoraproject.org/pub/ archive/epel/6/x86_64/	
	7 64-bit	https://archives.fedoraproject.org/pub/ epel/7/x86_64/Packages/e/	

Table 5-1 Cloud-Init installation package addresses

a. Run the following commands to install Cloud-Init:

yum install *Cloud-Init installation package address*/epel-release-*x-y.*noarch.rpm

yum install cloud-init



Cloud-Init installation package address indicates the address of the Cloud-Init epel-release installation package, and x-y indicates the version of the Cloud-Init epel-release required by the current OS. Replace them with the actual values according to Table 5-1.

 Take CentOS 6 64-bit as an example. If the version is 6.8, the command is as follows:

yum install https://archives.fedoraproject.org/pub/archive/epel/6/x86_64/epel-release-6-8.noarch.rpm

 Take CentOS 7 64-bit as an example. If the version is 7.14, the command is as follows:

yum install https://archives.fedoraproject.org/pub/epel/7/x86_64/ Packages/e/epel-release-7-14.noarch.rpm

b. Run the following commands to enable Cloud-Init to automatically start upon system boot:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Fedora

Before installing Cloud-Init, ensure that the network installation source address has been configured for the OS by checking whether the /etc/yum.repo.d/fedora.repo file contains the installation source address of the software package. If the file does not contain the address, configure the address by following the instructions on the Fedora official website.

- a. Run the following command to install Cloud-Init:
 - yum install cloud-init
- b. Run the following commands to enable Cloud-Init to automatically start upon system boot:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Debian and Ubuntu

Before installing Cloud-Init, ensure that the network installation source address has been configured for the OS by checking whether the /etc/apt/sources.list file contains the installation source address of the software package. If the file does not contain the address, configure the address by following the instructions on the Debian or Ubuntu official website.

a. Run the following commands to install Cloud-Init:

apt-get update

apt-get install cloud-init

b. Run the following commands to enable Cloud-Init to automatically start upon system boot:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Install Cloud-Init Using the Official Source Code Package and pip

The following operations use Cloud-Init 0.7.9 as an example to describe how to install Cloud-Init.

1. Download the **cloud-init-0.7.9.tar.gz** source code package (version 0.7.9 is recommended) and upload it to the **/home/** directory of the ECS.

Download cloud-init-0.7.9.tar.gz from the following path:

https://launchpad.net/cloud-init/trunk/0.7.9/+download/cloud-init-0.7.9.tar.gz

Create a pip.conf file in the ~/.pip/ directory and edit the following co	ntent:
---	--------

□ NOTE

If the ~/.pip/ directory does not exist, run the mkdir ~/.pip command to create it.

[global] index-url = https://<**\$mirror**>/simple/ trusted-host = **<\$mirror**>

 Run the following command to install the downloaded Cloud-Init source code package (select --upgrade as needed during installation):

pip install [--upgrade] /home/cloud-init-0.7.9.tar.gz

■ NOTE

For details about how to install a Cloud-Init source code package, see **Cloud-Init Documentation**

- 4. Run the **cloud-init -v** command. Cloud-Init is installed successfully if the following information is displayed: cloud-init 0.7.9
- 5. Enable Cloud-Init to automatically start upon system boot.
 - If the OS uses SysVinit to manage automatic start of services, run the following commands:

chkconfig --add cloud-init-local; chkconfig --add cloud-init; chkconfig --add cloud-config; chkconfig --add cloud-final

chkconfig cloud-init-local on; chkconfig cloud-init on; chkconfig cloud-config on; chkconfig cloud-final on

service cloud-init-local status; service cloud-init status; service cloud-config status; service cloud-final status

- If the OS uses Systemd to manage automatic start of services, run the following commands:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

<u>A</u> CAUTION

If you install Cloud-Init using the official source code package and pip, pay attention to the following:

1. Add user **syslog** to the **adm** group during the installation. If user **syslog** exists, add it to the **adm** group. For some OSs (such as CentOS and SUSE), user **syslog** may not exist. Run the following commands to create user **syslog** and add it to the **adm** group:

useradd syslog groupadd adm usermod -g adm syslog

2. Change the value of **distro** in **system_info** in the **/etc/cloud/cloud.cfg** file based on the OS release version, such as **distro**: **ubuntu**, **distro**: **sles**, **distro**: **debian**, and **distro**: **fedora**.

5.4 Configuring Cloud-Init

Scenarios

You need to configure Cloud-Init after it is installed.

Prerequisites

- Cloud-Init has been installed.
- An EIP has been bound to the ECS.
- You have logged in to the ECS.
- The IP address obtaining mode of the ECS is DHCP.

Procedure

The following operations are required:

1. Configure Cloud-Init.

For details, see Configure Cloud-Init.

Check whether Cloud-Init is successfully configured.
 For details, see Check the Cloud-Init Configuration.

Configure Cloud-Init

- 1. Configure the user permissions for logging in to the ECS. If you use a common account (not user **root**) to log in to the ECS, disable the SSH permissions of user **root** and remote login using a password to improve the ECS security.
 - You can remotely log in to the ECS using SSH and a key pair injected into your account. (It is recommended that you select the key pair login mode when creating an ECS.)
 - You can also use a random password to log in to the ECS through noVNC.
 Run the following command to open the sshd_config file using the vi editor:
 vi /etc/ssh/sshd config
- 2. Change the value of **PasswordAuthentication** in the **sshd_config** file to **no**.

□ NOTE

For SUSE and openSUSE, change the values of the following parameters in the **sshd_config** file to **no**:

- PasswordAuthentication
- ChallengeResponseAuthentication
- 3. Run the following command to open the **cloud.cfg** file using the vi editor: vi /etc/cloud/cloud.cfg
- (Optional) In /etc/cloud/cloud.cfg, set apply_network_config to false.
 This step is only for Cloud-Init 18.3 or later.

Figure 5-1 Example configuration

5. Disable the SSH permissions of user **root** in **/etc/cloud/cloud.cfg**, add a common user (which is used for logging in to the ECS using VNC), and configure a password for the added user and assign sudo permissions to it.

□ NOTE

For Ubuntu and Debian, set the value of **manage_etc_hosts** in the **/etc/cloud/cloud.cfg** file to **localhost**. Otherwise, switching to user **root** may time out.

Take Ubuntu as an example.

 Run the following command to create script /etc/cloud/ set_linux_random_password.sh, which is executable and can be used to generate random passwords:

cat /etc/cloud/set_linux_random_password.sh

```
The file content is as follows:
```

```
#!/bin/bash

password=$(cat /dev/urandom | tr -dc 'A-Za-z0-9!@#$%&+=' | head -c 9)

echo "linux:$password" | chpasswd

sed -i -e '/^Login/d' /etc/issue

sed -i -e '/^Initial/d' /etc/issue

sed -i -c -e '/^$/d' /etc/issue

echo -e "\nInitial login with linux:$password\n" >> /etc/issue
```

∩ NOTE

You can run the **chmod +x /etc/cloud/set_linux_random_password.sh** command to add execute permissions of **set_linux_random_password.sh**.

 After you log in to the ECS, run the following commands to add a userfriendly prompt "Please change password for user linux after first login."

```
echo -e '\e[1;31m##################\\e[0m' > /etc/motd
```

echo -e '\e[1;31m# Important !!! #\e[0m' >> /etc/motd

echo -e '\e[1;31m# Please change password for user linux after first login. #\e[0m' >> /etc/motd

echo -e '\e[1;31m##################### \e[0m' >> /etc/motd

echo -e " >> /etc/motd

6. Add a common login user, set its password, assign sudo permissions to it, and use bootcmd to create a script used for generating a random password for each created ECS.

<u>A</u> CAUTION

Ensure that the configuration file format (such as alignment and spaces) is consistent with the provided example.

```
system info:
  # This will affect which distro class gets used
  distro: rhel
  # Default user name + that default users groups (if added/used)
  default_user:
   name: linux #Username for login
   lock_passwd: False #Login using a password is enabled. Note that some OSs use value 0 to
enable the password login.
   gecos: Cloud User
   groups: users #Optional. Add users to other groups that have been configured in /etc/group.
   passwd: $6$163DBVKK
$ZhAlchiJR7NuZvtJHsYBQJIq5RoQCRLS1X2Hsqj2s5JwXI7KUO1we8WYcwbzeaS2VNpRmNo28vmxx
CyU6LwoD0
   sudo: ["ALL=(ALL) NOPASSWD:ALL"] # Assign the root rights to the user.
   shell: /bin/bash #Execute shell in bash mode.
  # Other config here will be given to the distro class and/or path classes
    cloud_dir: /var/lib/cloud/
    templates_dir: /etc/cloud/templates/
```

ssh_svcname: sshd

bootcmd:
- [cloud-init-per, instance, password, bash, /etc/cloud/set_linux_random_password.sh]

□ NOTE

The value of **passwd** is encrypted using SHA512 (which is used as an example). For more details, see https://cloudinit.readthedocs.io/en/latest/topics/examples.html.

For details about how to encrypt a password and generate ciphertext, see the following (encrypting password **cloud.1234** is used as an example):

[root@** ~]# python -c "import crypt, getpass, pwd; print crypt.mksalt()"
\$6\$|63DBVKK
[root@** ~]# python -c "import crypt, getpass, pwd; print crypt.crypt('cloud.1234, '\\$6\
\$163DBVKK')"
\$6\$|63DBVKK
\$Zh4lchiJR7NuZvtJHsYBQJIg5RoQCRLS1X2Hsgj2s5JwXI7KUO1we8WYcwbzeaS2VNpRmNo28vmxx
CyU6LwoD0

7. Enable the agent to access the laaS OpenStack data source.

Add the following information to the last line of /etc/cloud/cloud.cfg:

datasource_list: [OpenStack]
datasource:
OpenStack:
metadata_urls: ['http://169.254.169.254']
max_wait: 120
timeout: 5

□ NOTE

- You can decide whether to set max_wait and timeout. The values of max_wait and timeout in the preceding example are only for reference.
- If the OS version is earlier than Debian 8 or CentOS 5, you cannot enable the agent to access the laaS OpenStack data source.
- The default zeroconf route must be disabled for CentOS and EulerOS ECSs for accurate access to the IaaS OpenStack data source.

echo "NOZEROCONF=yes" >> /etc/sysconfig/network

Prevent Cloud-Init from taking over the network in /etc/cloud/cloud.cfg.
 If the Cloud-Init version is 0.7.9 or later, add the following content to /etc/cloud/cloud.cfg:

network: config: disabled

The added content must be in the YAML format.

Figure 5-2 Preventing Cloud-Init from taking over the network

```
users:
    default

disable_root: 1
ssh_pwauth: 0

datasource_list: [ OpenStack ]
datasource:
    OpenStack:
     metadata_urls: ['http://www.wait: 120
     timeout: 50

network:
    config: disabled
```

9. Modify **cloud_init_modules** in the **cloud.cfg** configuration file.

Move **ssh** from the bottom to the top to speed up the SSH login.

Figure 5-3 Speeding up the SSH login to the ECS

```
cloud_init_modules:
- ssh
- migrator
- bootcmd
- write-files
- growpart
- resizefs
- set_hostname
- update_hostname
- update_etc_hosts
- rsyslog
- users-groups
```

- 10. Modify the configuration so that the hostname of the ECS created from the image does not contain the **.novalocal** suffix and can contain a dot (.).
 - a. Run the following command to modify the **__init__.py** file:

```
vi /usr/lib/python2.7/site-packages/cloudinit/sources/ init .py
```

Press ${\bf i}$ to enter editing mode. Modify the file content as follows based on the keyword ${\bf toks}$:

```
if toks:
    toks = str(toks).split('.')
else:
    #toks = ["ip-%s" % lhost.replace(".", "-")] # Comment out this line.
    toks = lhost.split(".novalocal") # Add this line.

if len(toks) > 1:
    hostname = toks[0]
    #domain = '.'.join(toks[1:]) # Comment out this line.
else:
    hostname = toks[0]

if fqdn and domain != defdomain:
```

```
#return hostname # Comment out this line.
return "%s.%s" % (hostname, domain) # Add this line.
else:
return hostname
```

After the modification is complete, press **Esc** to exit the editing mode and enter :wq! to save the settings and exit.

Figure 5-4 Modifying the __init__.py file

```
# if there is an ip∨4 address in 'local-hostname', then
# make up a hostname (LP: #475354) in format ip-xx.xx.xx
     lhost = self.metadata['local-hostname']
     if util.is_ipv4(lhost):
    toks = []
         if resolve_ip:
              toks = util.gethostbyaddr(lhost)
         if toks:
              toks = str(toks).split('.')
              toks = ["ip-%s" % lhost.replace(".", "-")]
         toks = lhost.split(".novalocal")
if len(toks) > 1:
   hostname = toks[0]
    #domain = '.'.join(toks[1:1)
else:
    hostname = toks[0]
if fqdn and domain != defdomain:
    return "xs.xs" x (hostname, domain)
else:
     return hostname
```

- b. Run the following command to switch to the **cloudinit/sources** folder:
 - cd /usr/lib/python2.7/site-packages/cloudinit/sources/
- c. Run the following commands to delete the **__init__.pyc** file and the optimized **__init__.pyo** file:

```
rm -rf __init__.pyc
rm -rf init .pyo
```

d. Run the following commands to clear the logs:

```
rm -rf /var/lib/cloud/*
rm -rf /var/log/cloud-init*
```

Run the following command to edit the /etc/cloud/cloud.cfg.d/
 05_logging.cfg file to use cloudLogHandler to process logs:

vim /etc/cloud/cloud.cfg.d/05_logging.cfg

Figure 5-5 Setting the parameter value to cloudLogHandler

```
[logger_cloudinit]
level=DEBUG
qualname=cloudinit
<u>h</u>andlers=cloudLogHandler
propagate=1
```

Check the Cloud-Init Configuration

Run the following command to check whether Cloud-Init has been properly configured:

cloud-init init --local

If Cloud-Init has been properly installed, the version information is displayed and no error occurs. For example, messages indicating lack of files will not be displayed.

□ NOTE

(Optional) Run the following command to set the password validity period to the maximum:

chage -M 99999 \$user_name

user_name is a system user, such as user root.

You are advised to set the password validity period to 99999.

5.5 Detaching Data Disks from an ECS

Scenarios

If multiple data disks are attached to the ECS used to create a private image, ECSs created from the image may be unavailable. Therefore, you need to detach all data disks from the ECS before using it to create a private image.

This section describes how to detach all data disks from an ECS.

Prerequisites

You have logged in to the ECS used to create a Linux private image.

Procedure

Check whether the ECS has data disks.

Run the following command to check the number of disks attached to the ECS:

fdisk -l

- If the number is greater than 1, the ECS has data disks. Go to 2.
- If the number is equal to 1, no data disk is attached to the ECS. Go to 3.
- 2. Run the following command to check the data disks attached to the ECS:

mount

- If the command output does not contain any EVS disk information, no EVS data disks need to be detached. /dev/vda1 on / type ext4 (rw,relatime,data=ordered)
- If information similar to the following is displayed, go to 3: /dev/vda1 on / type ext4 (rw,relatime,data=ordered) /dev/vdb1 on /mnt/test type ext4 (rw,relatime,data=ordered)
- 3. Delete the configuration information in the **fstab** file.

a. Run the following command to edit the **fstab** file:

vi /etc/fstab

b. Delete the disk configuration from the **fstab** file.

The /etc/fstab file contains information about the file systems and storage devices automatically attached to the ECS when the ECS starts. The configuration about data disks automatically attached to the ECS needs to be deleted, for example, the last line shown in the following figure.

Figure 5-6 EVS disk configuration in the fstab file

```
#
# /etc/fstab
# /etc/fstab
# Cat /etc/fstab
# Cat/fstab
# Cat/fstab
# Cat/fstab
# Cat/fstab
# Cat/fstab
# Cat/fstab
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
# UUID=4c2c090d-4228-49fc-9cbe-3920b3bf287c / ext4 defaults 1 1
UUID=9c29104b-31b8-4421-a207-102f86ec7ae5 /mnt/test ext4 defaults 1 1
```

4. Run the following command to detach data disks from the ECS: Run the following command to detach the disks:

umount /dev/vdb1

5. Run the following command to check the data disks attached to the ECS:

mount

If the command output contains no information about the data disks, they have been detached from the ECS.

6 Permissions Management

6.1 Creating a User and Granting Permissions

Scenarios

This section describes how to use **Identity and Access Management** (IAM) to implement fine-grained permissions control for your images. With IAM, you can:

- Create IAM users for employees based on the organizational structure of your enterprise. Each IAM user has their own security credentials, providing access to images.
- Grant only the permissions required for users to perform a task.
- Entrust an account or cloud service to perform professional and efficient O&M on your images.

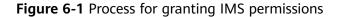
If your account does not need individual IAM users for permissions management, you can skip this section.

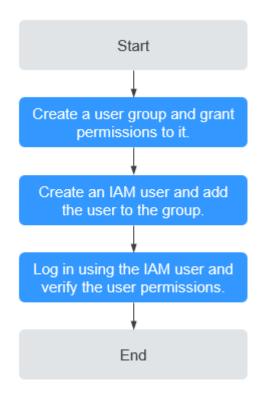
This section uses the **IMS ReadOnlyAccess** permission as an example to describe how to grant permissions to a user. **Figure 6-1** shows the process.

Prerequisites

Learn about the permissions (see **IMS Permissions**) supported by IMS. For the system permissions of other services, see **System Permissions**.

Process Flow





1. Create a user group and assign permissions.

Create a user group on the IAM console, and grant the read-only permission to the group by assigning the **IMS ReadOnlyAccess** permission.

- 2. Create an IAM user and add it to the user group.
 - Create a user on the IAM console and add the user to the group created in 1.
- 3. Log in and verify permissions.
 - Log in to the management console using the IAM user, switch to a region where the permissions take effect, and verify the permissions (assume that the user has only the **IMS ReadOnlyAccess** permission).
 - In the Service List, choose Image Management Service. On the IMS console, perform operations except querying images, such as creating, modifying, and deleting an image.
 - For example, click **Create Private Image** in the upper right corner. If you are prompted insufficient permissions, the **IMS ReadOnlyAccess** permission has taken effect.
 - Choose any other service in the Service List, such as Virtual Private
 Cloud. If a message appears indicating insufficient permissions to access
 the service, the IMS ReadOnlyAccess permission has taken effect.

6.2 Creating a Custom Policy

Scenarios

Custom policies can be created as a supplement to the system permissions of IMS. For the actions supported for custom policies, see "Permissions Policies and Supported Actions" in *Image Management Service API Reference*.

You can create custom policies in either of the following two ways:

- Visual editor: Select cloud services, actions, resources, and request conditions without the need to know policy syntax.
- JSON: Edit JSON policies from scratch or based on an existing policy.

For details, see "Creating a Custom Policy" in *Identity and Access Management User Guide*. This section provides examples of common IMS custom policies.

Example Policies

Example 1: Allowing users to create images

```
"Version": "1.1".
"Statement": [
  {
     "Effect": "Allow",
     "Action": [
        "ims:serverImages:create"
  },
     "Effect": "Allow",
     "Action": [
        "KMS:*:*"
     ]
  },
     "Effect": "Allow",
     "Action": [
        "ecs:cloudServers:get",
        "ecs:servers:get",
        "ecs:serverVolumes:use",
        "ecs:cloudServers:list",
        "ecs:serverVolumeAttachments:list",
        "ecs:servers:list"
     ]
     "Effect": "Allow",
     "Action": [
        "bms:servers:list",
        "bms:servers:get",
        "bms:serverFlavors:get"
     ]
  },
     "Effect": "Allow",
     "Action": [
        "evs:volumes:*"
  }
```

□ NOTE

The action required for creating an image is **ims:serverImages:create**. Others are dependent actions for creating an image.

• Example 2: Denying image deletion

A deny policy must be used in conjunction with other policies to take effect. If the policies assigned to a user contain both Allow and Deny actions, the Deny actions take precedence over the Allow actions.

The following method can be used if you need to assign the **IMS FullAccess** policy to a user but also forbid the user from deleting images. Create a custom policy for denying image deletion, and assign both the policies to the group the user belongs to. Then, the user can perform all operations on IMS except deleting images. The following is an example deny policy:

7 FAQs

7.1 Image Consulting

7.1.1 Basic Concepts

Images are classified as public, private, and shared.

Image Type	Description	
Public image	A public image is a standard, widely used image. It contains an OS and preinstalled public applications and is available to all users. Public images are very stable and their OS and any included software have been officially authorized for use. If a public image does not contain the environments or software you need, you can use a public image to create an ECS and then deploy the required environments or software on it.	
Private image	 A private image contains an OS or service data, preinstalled public applications, and a user's personal applications. Private images are only available to the users who created them. A private image can be a system disk image, data disk image, ISO image, or full-ECS image. A system disk image contains an OS and preinstalled software for various services. You can use a system disk image to create ECSs and migrate your services to the cloud. A data disk image contains only service data. You can use a data disk image to create EVS disks and use them to migrate your service data to the cloud. An ISO image is created from an external ISO image file. It is a special image that is not available on the ECS console. A full-ECS image contains an OS, preinstalled software, and service data. A full-ECS image is created using differential backups and the creation takes less time than creating a system or data disk image of the same size. 	

Image Type	Description
Shared image	A shared image is a private image another user has shared with you.
	For more information about shared images, see "Sharing Images" in <i>Image Management Service User Guide</i> .

You can modify an image, share images, export images, encrypt images, replicate images, export an image list, and delete images.

Table 7-1 Managing private images

Feature	Description	Helpful Link
Modifying an image	To facilitate private image management, you can modify the following attributes of an image: name, description, minimum memory, maximum memory, and advanced functions such as NIC multi-queue and SR-IOV driver.	Modifying an Image
Sharing images	You can share an image with other accounts. These accounts can use your shared private image to quickly create ECSs or EVS disks.	Sharing ImagesImage Sharing
Exporting images	You can export private images to your OBS bucket and download them to your local PC for backup.	Exporting an ImageImage Exporting
Encrypting images	You can create encrypted images to improve data security. The encryption mode is KMS envelope encryption. Encrypted images can be created from external image files or encrypted ECSs.	• Encrypting Images
Replicating images	By replicating images, you can convert encrypted and unencrypted images into each other or enable some advanced features, for example, quick instance provisioning.	Replicating Images Within a Region
Tagging an image	You can tag your private images for easy management and search.	Tagging an Image
Exporting image list	You can export the public or private image list in a given region in CSV format, facilitating local maintenance and query.	Exporting Image List

Feature	Description	Helpful Link
Deleting images	You can delete images that will be no longer used. Deleting an image does not affect the ECSs created from that image.	Deleting Images

7.1.2 How Do I Select an Image?

When creating an ECS or BMS, you can select an image based on the following factors:

- Image Type
- OS

Image Type

Images are classified into public images, private images, and shared images. A private image can be a system disk image, data disk image, or full-ECS image. For details, see **What Is Image Management Service?**

OS

When selecting an OS, consider the following factors:

Architecture types

System Architecture	Applicable Memory	Constraints	
32-bit	Smaller than 4 GB	 If the instance memory is greater than 4 GB, a 32-bit OS cannot be used. A 32-bit OS only allows addressing 	
		within a 4 GB memory range. An OS with more than 4 GB memory cannot be accessed.	
64-bit	4 GB or larger	If your application requires more than 4 GB of memory or the memory may need to be expanded to more than 4 GB, use a 64-bit OS.	

OS types

OS Type	Applicable Scenario	Constraints
Windows	 Programs developed for Windows (for example, .NET). Databases such as SQL Server. (You need to install the database.) 	The system disk must be at least 1 GB, and there must be at least 1 GB of memory.
Linux	 High-performance server applications (for example, Web) and working with common programming languages such as PHP and Python. Databases such as MySQL. (You need to install the database.) 	The system disk must be at least 1 GB, and there must be at least 512 MB of memory.

7.1.3 What Do I Do If I Cannot Find a Desired Image?

You can view OS types and versions on the **Public Images** page on the management console. If you cannot find a desired image, you have the following options:

- Download an image file from the official OS website and then use the file to create a private image. For details, see Creating a Windows System Disk Image from an External Image File or Creating a Linux System Disk Image from an External Image File. The external image file can be in the VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, or ZVHD format.
- If you already have an ISO file and the OS is supported by the cloud platform, you can create a private image as follows:
 - a. Create a private image on the management console. For details, see

 Creating a Windows System Disk Image from an ISO File or Creating
 a Linux System Disk Image from an ISO File.
- If the image belongs to another tenant, ask the tenant to share it with you. For details about image sharing, see **Sharing Specified Images**.

7.1.4 How Do I Increase the Image Quota?

What Is Quota?

Quotas can limit the number or amount of resources available to users, such as the maximum number of ECSs or EVS disks that can be created.

If the existing resource quota cannot meet your service requirements, you can apply for a higher quota.

How Do I View My Quotas?

- 1. Log in to the management console.
- 2. In the upper right corner of the page, click The **Service Quota** page is displayed.
- 3. View the used and total quota of each type of resources on the displayed page.

If a quota cannot meet service requirements, apply for a higher quota.

How Do I Apply for a Higher Quota?

The system does not support online quota adjustment.

If you need to adjust a quota, contact the operations administrator.

7.1.5 What Are the Differences Between Images and Backups?

CBR and Image Management Service (IMS) have some complementary functions and can be used together in certain scenarios. Like CBR, IMS can also be used to back up ECSs.

Differences Between Backups and Images

Table 7-2 lists the differences between them.

Table 7-2 Differences between backups and images

Item	CBR	IMS
Concept	A backup contains the status, configuration, and data of a cloud server or disk stored at a specific time point for recovery in case of a fault. It is used to ensure data security and improve availability.	An image provides all information required for starting a cloud server. It is used to create a cloud server and deploy software environments in batches. A system disk image contains an OS and pre-installed application software for running services. A data disk image contains service data. A full-ECS image contains data of the system disk and data disks.

Item	CBR	IMS
Usage method	 Data storage location: Unlike server or disk data, backups are stored in OBS. Deleting a disk will not clear its backups. Operation object: A server or disk can be backed up at a given point in time. CBR supports automatic backup and automatic deletion by configuring backup policies. Usage: Backups can be used to restore data to the original server or disk, or to create a new disk or full- ECS image. Support exporting to a local PC: No 	 Data storage location: Unlike server or disk data, backups are stored in OBS. If a server or disk that is created using an image is deleted, the image will not be cleared. Operation object: The system disk and data disks of a server can be used to create private images. You can also create private images using external image files. Usage: System disk images or full-ECS images can be used to create new servers, and data disk images can be used to create new disks for service migration. Support exporting to a local PC: Yes However, full-ECS images cannot be exported to a local PC.
Application scenarios	 Data backup and restoration Rapid service deployment and migration 	 Server migration to the cloud or between clouds Deploying a specific software environment Deploying software environments in batches Backing up server operating environments
Advantages	Supports automatic backup. Data on a server or disk at a certain time point can be retained periodically or quantitatively. You can back up on-premises VMware VMs, synchronize the backups to the cloud, and then use the backups to restore data to new ECSs.	Supports system disk backup. You can import the data disk image of a local server or a server provided by another cloud platform to IMS and then use the image to create an EVS disk.

□ NOTE

Although backups and images are stored in OBS, you cannot view backup and image data in OBS, because they do not occupy your resources.

Relationship Between Backups and Images

- 1. You can use an ECS backup to create a full-ECS image.
- 2. Before creating a full-ECS image for an ECS, you need to back up the target ECS.
- 3. A backup is compressed when it is used to create an image, so the size of the generated image may be smaller than the backup size.

7.1.6 Can I Tailor an Image?

When you import an external image file, you are advised to import the image that contains the official OS release version. Do not tailor or highly customize the release version. Otherwise, problems may occur.

OS vendors do not always update OS release versions regularly. Some versions are no longer maintained, and these deprecated versions no longer receive security patches. Ensure that you read the update notifications from OS vendors and update your OS so that it runs properly.

7.1.7 How Can I Back Up the Current Status of an ECS for Restoration in the Case of a System Fault?

You can back up the ECS in any of the following ways:

- (Recommended) Use CBR to create a scheduled backup task for the ECS. If the ECS fails, select a backup corresponding to the time you want the ECS to restore to, create a full-ECS image from the backup, and use the image to apply for a new ECS or to reinstall the OS.
- Create a system disk image from the ECS. If the ECS fails, use the system disk image to apply for a new ECS or to reinstall the OS.
- Create a snapshot for the system disk of the ECS. If the ECS fails, you can roll
 it back from the snapshot.

7.1.8 How Can I Apply a Private Image to an Existing ECS?

• You can change the OS of the ECS later. When you change the OS, select the created private image. For details about how to change the OS, see "Changing the OS" in *Elastic Cloud Server User Guide*.

7.1.9 Can I Import Data from a Data Disk Image to a Data Disk?

No.

A data disk image can only be used to apply for a new disk and its data cannot be imported to a disk. To import the data, perform the following operations:

- 1. Use the data disk image to create a temporary disk.
- 2. Attach the temporary disk to the ECS where the target disk is located.
- 3. Copy data from the temporary disk to the target disk. Then, delete the temporary disk.

7.1.10 Can I Use Private Images of Other Tenants?

Yes.

Other tenants can share a private image with you. You can use it after accepting it. For details about image sharing, see **Sharing Specified Images**.

7.2 End-of-Support for OSs

7.2.1 What Do I Do If CentOS Linux Is No Longer Maintained?

CentOS has planned to stop maintaining CentOS Linux. The cloud platform will stop providing CentOS Linux public images. This section describes the impacts and tells you how to address the situation.

Background

On December 8, 2020, CentOS announced its plan to stop maintaining CentOS Linux and launched CentOS Stream. For more information, see CentOS Project shifts focus to CentOS Stream.

CentOS Linux 8 ended on December 31, 2021, and CentOS Linux 7 will end on June 30, 2024. CentOS Linux 9 and later versions will not be released, and patches will no longer be updated.

Impacts

CenterOS Linux users will be affected as follows:

- After December 31, 2021, CentOS Linux 8 users will not be able to obtain any maintenance or support services, including problem fixing and function updates.
- After June 30, 2024, CentOS Linux 7 users will not be able to obtain any maintenance or support services, including problem fixing and function updates.

The cloud users will be affected as follows:

- CentOS Linux 8 public images will continue for a certain time. ECSs created from CentOS Linux 8 images will not be affected, but the images will no longer be updated.
- The cloud platform will synchronize with CentOS for the support of CentOS Linux. After December 31, 2021, support services will no longer be available for CentOS 8. The support for CentOS 7 will continue until June 30, 2024.

Solution

You can **change** the OS so that the services originally running in CentOS Linux can continue to run in other OSs.

For details about how to change to Debian, Rocky Linux, or Ubuntu, see "Instances > Managing ECSs > Changing the OS" in *Elastic Cloud Server User Guide*.

Table 7-3 Precautions for changing the OS

Item	Precautions for Changing the OS	
Data backup	Data in all partitions of the system disk will be cleared, so you are advised to back up the system disk data prior to an OS change.	
	Data in data disks remains unchanged.	
Custom settings	After the OS is changed, custom settings such as DNS and hostname will be reset and need to be reconfigured.	

Table 7-4 Available OSs

os	Description	Intended User
Rocky Linux	Rocky Linux is a community-driven enterprise-class OS. It is a downstream release of Red Hat Enterprise Linux (RHEL). Rocky Linux is fully compatible with and as stable as CentOS.	Individuals or enterprises that want to continue to use free images in an open source community
Debian and Ubuntu	They are Linux distributions that differ in use and compatibilities.	Individuals or enterprises that can afford the OS change costs

7.3 Image Creation

7.3.1 Image Creation FAQs

How Can I Use an ECS to Quickly Provision Identical ECSs?

If you have an ECS with applications deployed, you can use the ECS to create a private image and then use the image to create identical ECSs. In this way, you do not need to deploy applications repeatedly.

- Creating a System Disk Image from a Windows ECS
- Creating a System Disk Image from a Linux ECS
- Creating ECSs from an Image

How Many Private Images Can I Create Under an Account?

Currently, you can create a maximum of 100 private images under an account in a region.

Do I Have to Stop the ECS Before Using It to Create a Private Image?

No. You can create an image from a running ECS. However, if data is written to the ECS during image creation, that new data will not be included in the created image.

Where Can I View the Image Creation Progress? How Long Does It Take to Create an Image?

Log in to the management console. Choose **Computing** > **Image Management Service** and click the **Private Images** tab. Monitor the image creation progress in the **Status** column.

The image creation involves the installation of Xen and KVM drivers, OS kernel loading, and GRUB boot configuration, which may take a long time. In addition, the network speed, image file type, and disk size have an impact on how long image creation takes.

Can I Select a Private Image Created Under a Subaccount When Creating an ECS Under the Main Account?

Yes.

Private images created under a subaccount are visible to the main account and all the other subaccounts (if any) under the main account.

- If the private image is a system disk image or full-ECS image, you can select
 Private Image for Image when creating an ECS. Then, select this image from
 the drop-down list.
- If the private image is a data disk image, select Create from image for Select
 Data Source when creating an EVS disk. Then, select this image in the
 displayed dialog box.

In addition, private images created under the main account are visible to all of its subaccounts.

7.3.2 Full-ECS Image FAQs

What Is a Full-ECS Image?

A full-ECS image contains the OS, applications, and service data of an ECS. Generally, a full-ECS image is used to migrate all data of an ECS. For example:

• Migrating data from an old ECS to a new one

Why Do I Have to Select a Vault When Creating a Full-ECS Image? Do I Need to Pay for the Vault?

When creating a full-ECS image from a CBR backup, you must select a vault. The vault is where your images and backups are stored. You need to pay for the vault.

When creating a full-ECS image from a CSBS backup, the vaults storing CSBS backups are not open to users but still need to be billed.

Therefore, no matter which backup type you select, you need to pay for the vault. Selecting a vault does not mean that you need to pay extra fees.

Where Can I View the Data Disk Information of a Successfully Created Full-ECS Image?

After a full-ECS image is created, only the system disk information (**Disk Capacity**) is displayed in the image list and image details. You can view the data disk information on the CSBS or CBR console, depending on where the full-ECS image is created from.

The following describes how to view the data disk details in CBR:

- 1. In the private image list, click the full-ECS image name. Image details are displayed.
- 2. Locate **Source** and click the backup ID following it. The CBR details page is displayed.
- 3. Click the **Disk Backup** tab. Details about the system disk and data disks are displayed.

What Are the Restrictions on Using a Full-ECS Image?

- A full-ECS image cannot be exported. You are advised to create images for the system disk and data disks separately and then export the images.
- A full-ECS image cannot be shared.
- A full-ECS image cannot be replicated within the same region.

7.3.3 How Can I Use a Backup to Create an EVS Disk or ECS?

You can use CSBS backups to create ECSs and use VBS backups to create EVS disks.

- CSBS backups cannot be directly used to create ECSs. You need to use a
 backup to create a private image and then use the private image to create
 ECSs.
 - For details about how to create a private image from a CSBS backup, see **Creating a Full-ECS Image from a CSBS Backup**. For details about how to create ECSs from a private image, see **Creating an ECS from an Image**.
- VBS backups can be directly used to create EVS disks. For details, see "Using a Backup to Create a Disk" in *Cloud Backup and Recovery User Guide*.

7.3.4 Is There Any Difference Between the Image Created from a CSBS/CBR Backup and That Created from an ECS?

No.

You can create a full-ECS image from an ECS, a CSBS backup, or a CBR backup.

When you create a full-ECS image from an ECS, the system first creates a backup for the ECS and then uses the backup to create an image. Therefore, the image is essentially created from an ECS backup no matter you use an ECS or a CSBS/CBR backup.

7.3.5 Why Can't I Find an ISO Image When I Want to Use It to Create an ECS or Change the OS of an ECS?

- An ISO image created from an ISO file is used only for creating a temporary ECS. It will not be available on the ECS console. You cannot use it to create ECSs or change ECS OSs. You need to install an OS on the temporary ECS and use that ECS to create a system disk image which can be used to create ECSs or change ECS OSs.
- You are not advised to use a temporary ECS as a normal ECS because it has limited functionality. For example, disks cannot be attached to it.

For details about how to create a private image using an ISO file, see:

- Creating a Windows System Disk Image from an ISO File
- Creating a Linux System Disk Image from an ISO File

7.3.6 How Do I Create a Full-ECS Image Using an ECS That Has a Spanned Volume?

An ECS used to create a Windows full-ECS image cannot have a spanned volume. If you attempt to create an image from an ECS with a spanned volume, when the image is used to create new ECSs, data may be lost.

If an ECS has a spanned volume, back up data in the spanned volume and then delete this volume from the ECS. Use the ECS to create a full-ECS image. Use the full-ECS image to create an ECS. Then, use the backup to create a spanned volume for the new ECS if necessary.

If a Linux ECS has a volume group or a logical volume consisting of multiple physical volumes, to ensure you do not lose any data, back up data in the volume group or logical volume and delete the volume group or logical volume before using this ECS to create a full-ECS image.

7.3.7 Why Is Sysprep Required for Creating a Private Image from a Windows ECS?

Why Is Sysprep Required?

For a user that needs to be added to a domain and uses the domain account to log in to Windows, Sysprep is required before a private image is created. Otherwise, the image will contain information about the original ECS, especially the SID. ECSs with the same SID cannot be added to a domain. If Windows does not require any user or ECS to be added to a domain, you do not need to run Sysprep.

CAUTION

- Before running Sysprep, ensure that Windows is activated.
- For details about Sysprep, visit https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-vista/cc721940(v=ws.10)?
 redirectedfrom=MSDN.

Restrictions on Running Sysprep

Sysprep can only be used for configuring a new Windows installation. You can run Sysprep multiple times to install and configure Windows. However, you can reset and activate a Windows OS only three times, and you are not allowed to use Sysprep to re-configure an existing Windows OS.

□ NOTE

In the Windows command line, enter the following command to check how many times you can run Sysprep in the displayed **Windows Script Host** dialog box:

slmgr /dlv

If the value of **Remaining Windows rearm count** is **0**, you cannot run Sysprep.

7.3.8 What Do I Do If an ECS Created from a Windows Image Failed to Start After Running Sysprep?

Symptom

1. After Sysprep is executed, the following message is displayed when you start the ECS.

Figure 7-1 Message displayed

```
Option "logdir" from group "DEFAULT" is deprecated. Use option "log-dir" from group "DEFAULT".

Option "logfile" from group "DEFAULT" is deprecated. Use option "log-file" from group "DEFAULT".

Option "DEFAULT".

Option "verbose" from group "DEFAULT" is deprecated for removal. Its value may be silently ignored in the future.
```

Then, the following information is displayed in the dialog box:

Windows could not parse or process the unattend answer file for pass [specialize]. A component or setting specified in the answer file does not exist. The error was detected while processing settings for component [Microsoft-Windows-Shell-Setup].

- 2. Click **OK**. The following information is displayed in the dialog box: The computer accidentally restarts or encounters an error. Windows installation cannot continue. Click OK to restart the computer and restart the installation.
- 3. Open **setupact.log** in **C:\Windows\Panther**. The log contains the following information.

Figure 7-2 Viewing ECS logs

```
135 2015-05-28 2014715, Info

[SCHUPDOLDES] Numering containing commands is already in propress.

[SCHUPDOLDES] A propriet in the containing commands in a livedy in propress.

[SCHUPDOLDES] A propriet in the containing c
```

Solution

- 1. Create an ECS from a public image. (You are advised to use a public image to create another ECS because Sysprep can be executed only for certain times.)
- 2. Create an **Unattend.xml** file or modify the **Unattend.xml** file provided by the system.
 - If you create an **Unattend.xml** file, ensure that the created file is used when you run Sysprep. For details about the file, visit:
 - https://docs.microsoft.com/en-us/windows-hardware/ manufacture/desktop/update-windows-settings-and-scriptscreate-your-own-answer-file-sxs
 - https://docs.microsoft.com/en-us/windows-hardware/ manufacture/desktop/sysprep--system-preparation--overview
 - If you modify the Unattend.xml file (in the C:\Program Files\Cloudbase Solutions\Cloudbase-Init\conf directory), delete the RunSynchronous part from the file.

Figure 7-3 Deleting the RunSynchronous part

```
- <settings pass="specialize">
- <component language="neutral" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xwcm="http://schemas.microsoft.com
versinoscope="neutral" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:xwcm="http://schemas.microsoft.com
versinoscope="neutral" xmlns:xwcm="http://
```

3. Run Sysprep. For details, see Running Sysprep.

NOTICE

If you use the **Unattend.xml** file created by yourself, check the **Unattend.xml** path when running Sysprep to ensure that the newly created **Unattend.xml** file is used.

4. Create an image from the ECS where Sysprep has been executed.

7.3.9 What Do I Do If I Cannot Create an Image in ZVHD2 Format Using an API?

Symptom

When you create a ZVHD2 image using an API, the image is created in the ZVHD format.

Solution

Check whether your token contains the **op_gated_lld** role (**op_gated_lld** is the OBT tag, which can be viewed in the body of the response message of the API used to obtain a user token). The ZVHD2 image has the lazy loading feature. If

the current environment does not support this feature or this feature is in the OBT phase, the ZVHD2 image will fail to be created.

Contact the customer service to ensure that the current environment supports lazy loading, obtain a new token, and use the new token to create an image.

7.4 Image Sharing

7.4.1 Image Sharing FAQs

How Many Tenants Can I Share an Image with?

128

How Many Images Can Be Shared with Me?

There is no limit.

Do Shared Images Affect My Private Image Quota?

No.

I Shared an Image to an Account But the Account Did Not Accept or Reject the Image. Will My Image Sharing Quota Be Consumed?

No.

Where Can I View the Images Shared with Me?

Switch to the region where the shared image is located, choose **Service List** > **Computing** > **Image Management Service** > **Images Shared with Me**.

If you are a multi-project user, make clear which of your projects will receive the shared image. Switch to the region where the project resides and select the project. Then, choose Service List > Computing > Image Management Service > Images Shared with Me.

If the image is not accepted, a red dot is displayed on the **Images Shared with**Me tab page and a message is displayed, asking you whether to accept the shared image. After the image is accepted, it is displayed in the list on the **Images**Shared with Me tab page.

If I Want to Share a System Disk Image with Another Account, Should the Account Purchase an ECS in Advance?

No. The account can use the shared image to apply for ECSs.

Is There Any Restriction on the Region When I Create ECSs Using a Shared Image?

Yes. You can only create ECSs in the same region as the shared image.

Can I Share Images Shared with Me with Other Tenants?

You cannot directly share such images with other tenants. If you do need to do so, you can replicate a shared image to a private image and then share the private image.

Can I Use an Image I Have Shared with Others to Create an ECS?

Yes. After sharing an image with other tenants, you can still use the image to create an ECS and use the created ECS to create a private image.

What Are the Risks of Creating ECSs Using a Shared Image?

The image owner can view, stop sharing, or delete the image at any time. After the shared image is deleted, you will be unable to use the shared image to reinstall the OSs of the ECSs created from the shared image or create ECSs with the same configurations.

The cloud platform does not ensure the integrity or security of images shared by other accounts. For security reasons, you are advised to choose only images shared by trusted accounts.

What Are the Risks of Sharing Images with Other Tenants?

Data, files, and software may be disclosed. Before sharing an image, you must take care to delete any sensitive data or important files from the image. The image recipient can use the shared image to create ECSs and use the created ECSs to create private images. If the created private images are shared with other tenants, any data leakage that occurs can be quite widespread.

Can I Specify a Region or an AZ for Sharing an Image?

No. When sharing an image, you can only specify a project ID. You cannot specify a region or an AZ. An image can only be shared within a given region, but once shared, it can be used in any AZ in that region.

Can I Restore My Data Disks from a Data Disk Image Shared by Another Account?

No. You can only use the shared image to apply for a new data disk and cannot use it to restore your existing data disks. However, you can use the new data disk for restoration by referring to Can I Import Data from a Data Disk Image to a Data Disk?

What Can I Do If I Want to Use a Rejected Image?

If you have rejected an image shared by another tenant, but now want to use it, two methods are available:

Method 1

Ask the image owner to add you to the tenants the image is shared with. For details, see **Adding Tenants Who Can Use Shared Images**.

Method 2
 Accept the rejected image again. For details, see Accepting Rejected Images.

7.4.2 What Are the Differences Between Sharing Images and Replicating Images?

Sharing images:

You can only share images within a region with other users. To share an image across regions, replicate the image to the target region and then share it. For details, see **Overview**.

- Replicating images:
 - In-region: You can convert encrypted and unencrypted images into each other or enable some advanced features (such as fast ECS creation from an image) using the image replication function.

The following table describes the details.

Scenario	Opera tion	Description	Helpful Links
Sharing	Share	The image is shared with another user in the same region. The target user can use the image (with the same ID as the source image) but the image owner is still the user who shared it.	For details, see Sharing Specified Images.
In-region replication under the same account	Replica te	This is used for conversion between encrypted images and unencrypted images or for enabling advanced features (such as fast ECS creation from an image).	For details, see Replicating Images Within a Region.

7.4.3 What Do I Do If I Cannot Share My Images?

- Some images cannot be shared. Therefore, the **Share** option is not provided for them in the **Operation** column. The following images cannot be shared:
 - Encrypted images
 - Full-ECS images created from a CSBS backup

7.5 OS

7.5.1 How Do I Select an OS?

Windows
 Used for development platforms or services that run Windows.

The system disk must be at least 40 GB, and there must be at least 1 GB of memory.

Internet Information Services (IIS) and SQL Server can be installed.

• Linux

Used for development platforms or services that run Linux. CentOS and Ubuntu are provided. CentOS is recommended.

The system disk must be no less than 40 GB, and the memory must be no less than 512 MB.

OS selection for servers that require memory greater than 4 GB
 Because 32-bit OSs allow addressing only within a 4 GB memory range, if the required memory capacity is 4 GB or larger, select a 64-bit OS.

7.5.2 How Is BIOS Different from UEFI?

Table 7-5 Differences between the UEFI and BIOS boot modes

Boot Mode	Description	Highlight
BIOS	Basic Input Output System (BIOS) stores important basic input/output programs of ECSs, system settings, self-test programs upon system startup, and automatic startup programs.	Provides basic settings and control for ECSs.
UEFI	Unified Extensible Firmware Interface (UEFI) is a specification that defines a software interface between an OS and platform firmware. UEFI can be used to automatically load an OS from a pre-boot operating environment.	Boots up or recovers from sleep state faster.

7.5.3 How Do I Delete Redundant Network Connections from a Windows ECS?

Method 1

1. Press **Win+R**. In the displayed dialog box, enter **regedit** and press **Enter** to open the registry editor.

□ NOTE

Modifying a registry may cause a system startup failure. So, back up the registry before modifying it.

2. Open the following registry key:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT \CurrentVersion\NetworkList\Profiles

Click each item under **Profiles** and query the **Data** column of **ProfileName** in the right pane.

- 3. Double-click **ProfileName** and set **Value Data** to the name of a new network.
- 4. Restart the ECS for the change to take effect.

Method 2

1. Press **Win+R**. In the displayed dialog box, enter **regedit** and press **Enter** to open the registry editor.

□ NOTE

Modifying a registry may cause a system startup failure. So, back up the registry before modifying it.

2. Open the following registry keys:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT \CurrentVersion\NetworkList\Profiles

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT \CurrentVersion\NetworkList\Signatures\Unmanaged

3. Delete the directories shown in the following figure.

LicensingDiag MCI Extensions MCI32 MiniDumpAuxiliaryDlls MsiCorruptedFileRecovery Multimedia NetworkCards NetworkList DefaultMediaCost NewNetworks Nla Permissions Profiles {BF3A5230-B502-46EF-AE72-0024BCC91845} Signatures Managed Unmanaged 010103000F0000F0080000000F0000F02DDCD355DAC218

Figure 7-4 Registry directory

7.5.4 What Do I Do If an ECS Starts Slowly?

Symptom

If an ECS starts slowly, you can change the default timeout duration to speed up the startup.

Solution

- 1. Log in to the ECS.
- 2. Run the following command to switch to user **root**:

sudo su

3. Run the following command to query the version of the GRUB file:

```
rpm -qa | grep grub
```

Figure 7-5 Querying the GRUB file version

- 4. Set timeout in the GRUB file to 0.
 - If the GRUB file version is earlier than 2:

 Open /boot/grub/grub.cfg or /boot/grub/menu.lst and set timeout to
 0
 - If the GRUB file version is 2:
 Open /boot/grub2/grub.cfg and set the value of timeout to 0.

Figure 7-6 Modifying the timeout duration

```
#boot=/dev/sda
dcfault=8
timeout=8
Splash:mage=(hd0,1)/boot/grub/splash.xpm.gz
hiddenmenu
title Cent0S (2.6.32-696.16.1.el6.x86_64)
root (hd0,1)
kernel /boot/vmlinuz-2.6.32-696.16.1.el6.x86_64 ro root=UUID=2bc0f5fd-e0
19-4ba5-8ce0-8fe12b6efc24 rd_NO_LUKS rd_NO_LUM LANG=en_US.UTF-8 rd_NO_MD SYSFONT
=latarcyrheb-sun16 crashkernel=auto KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM rhgb q
```

7.5.5 What Do I Do If a Windows 7 ECS Equipped with an Intel 82599 NIC Reports an Error in SR-IOV Scenarios?

Symptom

When the 20.4.1 driver package downloaded at Intel website https://downloadcenter.intel.com/search?keyword=Intel++Ethernet+Connections+CD was installed in a Windows 7 64bit ECS with SR-IOV passthrough enabled, the system displayed the message "No Intel adapter found".

Cause Analysis

The OS identifies an Intel 82599 passthrough NIC without a driver installed as an Ethernet controller. When the 20.4.1 driver package was installed, the OS did not identify the Intel NIC, leading to the error.

Solution

Run **Autorun.exe** in the folder where the 20.4.1 driver package is stored. Install a driver on the NIC before installing the driver package so that the NIC can be identified as an Intel 82599 virtual function (VF) device by the OS. Use either of the following methods to install the driver:

- Method 1: Update the version.
 - a. Download the 18.6 driver package at the Intel website.
 - b. Run **Autorun.exe**.
 - c. Run **Autorun.exe** in the folder where the 20.4.1 driver package is stored to update the driver.
- Method 2: Use the device manager.
 - a. Start the Windows resource manager. Right-click Computer and choose Manage from the shortcut menu. In the Device Manager window, locate the NIC. When the NIC has no driver installed, the NIC locates in Other devices and is named Ethernet Controller.
 - b. Right-click **Ethernet Controller** and choose **Update Driver Software**.
 - c. Click **Browse**, select the path where the driver package is stored, and click **Next**.
 - d. Locate the NIC in **Network Adapter** of **Device Manager**.
 - e. Run **Autorun.exe** to install the 20.4.1 driver package.

7.5.6 Why Can't I Find My Private Image When I Want to Use It to Create an ECS or Change the OS of an ECS?

When you create an ECS or change the OS of an existing ECS, some of your private images are not shown. One possible cause is that the x86 and Arm architectures are incompatible with each other, or that there is an incompatibility issue between UEFI and BIOS boot modes.

- If a private image is created from an x86 ECS or if you use an external image file to create an image and select x86, this image will not be available as a choice when you create an ARM (Kunpeng) ECS or change the OS of an ARM (Kunpeng) ECS. Likewise, if the image is configured for ARM, it will not be available as a choice when you create an x86 ECS or change the OS of an x86 ECS
- If a private image is created from an ECS configured for BIOS boot or if you use an external image file to create such an image, this image will not be available as a choice when you create an ECS configured for UEFI boot or change the OS of an ECS booted from UEFI. Likewise, images configured for UEFI will not be available as a choice when you create an ECS configured for BIOS boot or change the OS of an ECS booted from BIOS.

7.6 Image Importing

7.6.1 Can I Use Images in Formats Other Than the Specified Ones?

No. Currently, only the VMDK, VHD, RAW, QCOW2, VHDX, QED, VDI, QCOW, ZVHD2, ISO, and ZVHD formats are supported.

Images of the -flat.vmdk format and image file packages containing snapshot volumes or delta volumes are not supported. You can use **qemu-img** to convert

an image to one of the supported formats before uploading it to the cloud platform.

Ⅲ NOTE

For how to install and use **qemu-img** in Windows, visit:

https://cloudbase.it/qemu-img-windows/

7.6.2 What Are the Impacts If I Do Not Pre-configure an ECS Used to Create a Private Image?

Before using an ECS or external image file to create a private image, you need to pre-configure the ECS or the source VM of the image file. If you do not perform the pre-configuration, there will be the following impacts:

- 1. If you do not delete residual rule files from the **udev** directory, new ECSs will retain the configurations of the source ECS or image file. If you do not set the IP address assignment mode to DHCP, NICs of new ECSs will not start from eth0. You need to remotely log in to the new ECSs to perform configurations.
- 2. For Linux, the following issues may occur during the ECS creation:
 - Custom passwords cannot be injected.
 - Certificates cannot be injected.
 - Other custom configurations cannot be applied on new ECSs.
- 3. If you do not delete information about automatic disk attachment detection from the **fstab** file, new ECSs may fail to start.

7.6.3 What Do I Do If I Configured an Incorrect OS or System Disk Size During Private Image Registration Using an Image File?

If you selected an incorrect OS, ECSs may fail to be created from the private image. If the configured system disk size is less than the one in the image file, image registration will fail.

In such cases, delete the incorrect image and create a new one using correct parameter settings.

7.6.4 What Do I Do If the System Disk Size in a VHD Image File Exceeds the One I Have Specified on the Management Console When I Use This File to Register a Private Image?

The possible causes may be:

- You have specified a small value.
 Check the system disk size in the VHD image file. Specify a value no less than this size when you use the VHD image file to register an image.
- The actual size of the VHD image file is larger than its virtual size, if this VHD image file is generated using qemu-img or a similar tool. For details, see https://bugs.launchpad.net/qemu/+bug/1490611.

Run the following command to check the VHD image file information:

[xxxx@xxxxx test]\$ qemu-img info 2g.vhd image: 2g.vhd file format: vpc

virtual size: 2.0G (2147991552 bytes)

disk size: 8.0K cluster_size: 2097152

The virtual size is converted from the actual size (unit: byte) to an integer in GB. As a result, the actual file size **2147991552 bytes** (**2.0004 GB**) is larger than the virtual size **2 GB**. Therefore, you need to specify a value larger than the actual size **2.0004 GB**. (The system disk size value on the management can only be an integer, so you only need to enter a value larger than **2**.)

7.7 Image Exporting

7.7.1 Can I Download My Private Images to a Local PC?

Yes. You can download private images in VMDK, VHD, QCOW2, or ZVHD format as instructed in **Exporting an Image**.

7.7.2 Can I Use the System Disk Image of an ECS on a BMS After I Export It from the Cloud Platform?

No. The system disk image of an ECS is a VM file that contains a system running environment and does not have an installation boot program. Therefore, it cannot be used on a BMS.

7.7.3 Why Is the Image Size in an OBS Bucket Different from That Displayed in IMS?

Symptom

After a private image is exported to an OBS bucket, the image size in the bucket is different from that displayed in IMS. For example, the size of a private image is 1.04 GB on the IMS console. After it is exported to an OBS bucket, the size is displayed as 2.91 GB.

Cause Analysis

The size of an image in an OBS bucket varies depending on the file's storage format in the bucket.

7.7.4 Can I Download a Public Image to My Local PC?

Currently, you cannot directly download a public image. You can use the public image to create an ECS, use the ECS to create a private image, export the private image to your OBS bucket, and download the private image to your local PC.

Helpful links:

• Creating a System Disk Image from a Windows ECS or Creating a System Disk Image from a Linux ECS

Exporting an Image

■ NOTE

- Windows, SUSE, Red Hat, Ubuntu, and Oracle Linux public images and the private images created from these public images cannot be exported.
- However, if a Windows, SUSE, Red Hat, Ubuntu, or Oracle Linux private image is created from an external image file, this private image can be exported.

7.7.5 What Are the Differences Between Import/Export and Fast Import/Export?

Item	Description	Helpful Link	
Import	Import an external image file to the management console for creating a private image. External image files in the following formats can be imported: VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD. Maximum file size: 128 GB During the import, operations such as driver injection will be performed in the background. Therefore, the import takes a longer time than fast import.	 Creating a Windows System Disk Image from an External Image File Creating a Linux System Disk Image from an External Image File 	
Fast import	When importing an external image file in the RAW or ZVHD2 format to the management console, you can select Enable Fast Create . The system does not perform any operations such as driver injection. Verify that: • The image file converted to the RAW format has been entimized as	Quickly Importing an Image File	
	format has been optimized as required and a bitmap file has been generated for it.		
	 The image file converted to the ZVHD2 format has been optimized as required. 		
	Maximum file size: 1 TB		

Item	Description	Helpful Link
Export	You can export private images to OBS buckets and download them to your local PC for further use on other cloud platforms.	Exporting an Image
	Maximum file size: 128 GB (If an image file is larger than 128 GB, use fast export to export it.)	
	You can specify the format of the exported image file. Currently, only QCOW2, VMDK, VHD, and ZVHD are supported.	
Fast export	On the Export Image page, select Enable following Fast Export . You cannot specify the format of the exported image file. After the export is complete, you can use a tool to convert the exported image to your desired format.	Exporting an Image
	The file size is not limited.	
	Encrypted images do not support fast export.	

7.7.6 What Do I Do If the Export Option Is Unavailable for My Image?

Some images cannot be exported. Therefore, the **Export** option is not provided for them in the **Operation** column. The following images cannot be exported:

- Public images
- Full-ECS images
- ISO images
- Private images created from a Windows or SUSE public image

7.8 Image Optimization

7.8.1 Must I Install Guest OS Drivers on an ECS?

Installing Guest OS drivers on an ECS improves your experience in using the ECS. In addition, it also ensures high reliability and stability of ECSs.

- Windows ECSs: Install the PV driver and UVP VMTools on ECSs.
- Linux ECSs: Install xen-pv and VirtIO drivers and load them in initrd.

7.8.2 Why Do I Need to Install and Update VMTools for Windows?

Why Do I Need to Install VMTools?

VMTools is a VirtIO driver (para-virtualization driver) that provides high-performance disks and NICs for ECSs.

- A standard Windows OS does not have the VirtIO driver.
- Public images have VMTools by default.
- You need to install VMTools for private images. For details, see Installing UVP VMTools.

Why Do I Need to Update VMTools?

The cloud platform periodically synchronizes issue-fixed versions from the VirtlO community and releases updated versions every month. This ensures that known issues identified in the community or R&D tests can be avoided on the latest driver.

When Do I Need to Update VMTools?

- If a major error is fixed, you are advised to update VMTools immediately. (Major errors have not occurred by now.) If other issues are fixed, choose whether to update VMTools based on your needs.
- The cloud platform updates the VMTools stored in an OBS bucket on a regular basis to ensure that you can download the latest version of VMTools for private images.
- The cloud platform updates public images on a regular basis to ensure that these images have the latest version of VMTools.
- The document is updated on a regular basis in accordance with VMTools in an OBS bucket to ensure that the download link of VMTools provided in the document is the latest.

What Do I Need to Do After VMTools Is Updated?

- Update Windows private images or drivers in running Windows ECSs.
- If you have any technical issue or question, contact the customer service.

7.8.3 What Will the System Do to an Image File When I Use the File to Register a Private Image?

You are advised to enable automatic configuration when registering a private image using an image file. Then, the system will perform the following operations:

Linux

- Check whether any PV drivers exist. If yes, the system deletes them.
- Modify the grub and syslinux configuration files to add the OS kernel boot parameters and change the disk partition name (UUID=UUID of the disk partition).

- Change the names of the disk partitions in the /etc/fstab file (UUID=UUID of the disk partition).
- Check whether the initrd file has the Xen and IDE drivers. If no, the system will load the Xen and IDE drivers.
- Modify the X Window configuration file /etc/X11/xorg.conf to prevent display failures.
- Delete services of VMware tools.
- Record the latest automatic modification made to the image into /var/log/ rainbow modification record.log.

■ NOTE

For the following image files, the system does not copy this driver after **Enable automatic configuration** is selected:

- Image files whose /usr directory is an independent partition
- Fedora 29 64bit, Fedora 30 64bit, and CentOS 8.0 64bit image files that use the XFS file system
- SUSE 12 SP4 64bit image files that use the ext4 file system

Windows

- Restore the IDE driver to enable the OS to use this driver for its initial start.
- Delete the registry keys of the mouse and keyboard and generate the registry keys on the new platform to ensure that the mouse and keyboard are available.
- Restore the PV driver registry key to rectify driver installation failures and Xen driver conflicts.
- Inject the VirtIO driver offline so that the system can start without UVP VMTools installed.
- Restore DHCP. The system will dynamically obtain information such as the IP address based on the DHCP protocol.

7.8.4 How Do I Configure an ECS, BMS, or Image File Before I Use It to Create an Image?

ECS or Image File Configurations

Table 7-6 ECS configurations

os	Configuration	Reference
Windows	Set the NIC to DHCP.	Creating a System Disk
	 Enable remote desktop connection. 	Image from a Windows ECS
	 (Optional) install special Windows drivers. 	
	(Optional) Install Cloudbase- Init.	
	 Install the Guest OS drivers, including the PV driver and UVP VMTools. 	
	Run Sysprep.	
Linux	Set the NIC to DHCP.	Creating a System Disk
	• (Optional) Install Cloud-Init.	Image from a Linux ECS
	 Delete files from the network rule directory. 	
	 Change the disk identifier in the GRUB configuration file to UUID. 	
	 Change the disk identifier in the fstab file to UUID. 	
	 Install native Xen and KVM drivers. 	
	Detach data disks from the ECS.	

Table 7-7 Image file configurations

OS	Configuration	Reference
Windows	Set the NIC to DHCP.Enable remote desktop connection.	Preparing an Image File
	 Install the Guest OS drivers, including the PV driver and UVP VMTools. 	
	(Optional) Install Cloudbase- Init.	
	(Optional) Enable NIC multi- queue.	
Linux	Delete files from the network rule directory.	Preparing an Image File
	Set the NIC to DHCP.	
	 Install native Xen and KVM drivers. 	
	 Change the disk identifier in the GRUB configuration file to UUID. 	
	 Change the disk identifier in the fstab file to UUID. 	
	Delete the automatic attachment information of non-system disks from the /etc/fstab file.	
	(Optional) Install Cloud-Init.	
	(Optional) Enable NIC multi- queue.	

□ NOTE

- When registering an external image file as a private image, you are advised to perform the preceding operations on the VM where the external image file is located.
- When registering a Windows external image file as a private image, if the Guest OS
 drivers are installed, the cloud platform will check the image file after you select Enable
 automatic configuration. If the GuestOS drivers are not installed, the cloud platform
 will try to install them.

BMS or Image File Configurations

Table 7-8 BMS configurations

os	Configuration	Reference
Windows	 Install software in the bms-network-config package. Install Cloudbase-Init. Delete residual files from the OS. 	"Creating a Private Image from a BMS" in <i>Bare Metal</i> <i>Server User Guide</i>
Linux	 Install software in the bms-network-config package. Install Cloud-Init. Delete residual files from the OS. 	"Creating a Private Image from a BMS" in <i>Bare Metal</i> <i>Server User Guide</i>

Table 7-9 Image file configurations

os	Configuration	Reference
Windows	 Install drivers for x86 V5 BMSs. Install Cloudbase-Init. Install software in the bms-network-config package. (Optional) Install the SDI iNIC driver. 	Bare Metal Server Image Creation Guide
	 Set the Windows time zone. Set the virtual memory. (Optional) Configure automatic Windows update. Configure SID. 	

os	Configuration	Reference
Linux	 Install and configure Cloud-Init. Modify the hardware device driver that boots the OS. Install software in the bms- 	Bare Metal Server Image Creation Guide
	network-config package.	
	(Optional) Install the SDI iNIC driver.	
	(Optional) Install the Hi1822 NIC driver.	
	(Optional) Install the IB driver.	
	 (Optional) Install drivers for x86 V5 BMSs. 	
	 (Optional) Install the UltraPath software. 	
	Perform security configuration.	
	 Configure remote login to the BMS. 	
	Configure automatic root partition expansion.	

7.8.5 What Do I Do If a Windows Image File Is Not Pre-Configured When I Use It to Register a Private Image?

If an image file is not configured as instructed in **Table 2-5** before it is exported from the original platform, configure it by referring to **Figure 7-7**.

A CAUTION

The proper running of ECSs depends on the Xen Guest OS driver (PV driver) and KVM Guest OS driver (UVP VMTools), without which the performance of ECSs will be affected and some functions will be unavailable. Ensure that the driver installation has been completed for the image file before it is exported from the original platform. Otherwise, the ECSs created from the image will fail to start.

- Install the PV driver. For details, see Installing the PV Driver.
- Install UVP VMTools. For details, see Installing UVP VMTools.

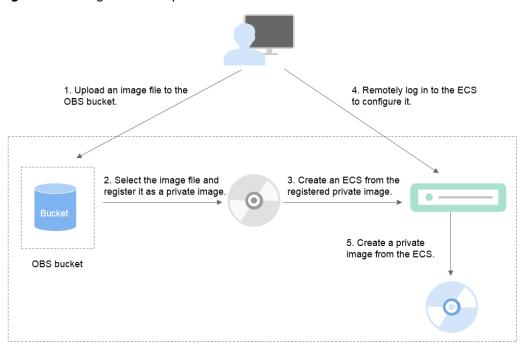


Figure 7-7 Image creation process

Step 1: Upload the Image File

Upload the external image file to an OBS bucket. For details, see **Uploading an External Image File**.

Step 2 Register the Image File as a Private Image

On the management console, select the uploaded image file and register it as a private image. For details, see **Registering an External Image File as a Private Image**.

Step 3: Create an ECS

- Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab.
- 3. Locate the row that contains the private image and click **Apply for Server** in the **Operation** column.
- 4. Set parameters as promoted to create an ECS. Pay attention to the following:
 - Bind an EIP to the ECS so that you can upload installation packages to the ECS or download installation packages from the ECS.
 - You must add inbound rules for security groups of the ECS to ensure that the ECS can be accessed.
 - If the image file has Cloudbase-Init installed, set a password and log in to the ECS using the password as prompted. If Cloudbase-Init is not

installed, use the password or certificate contained in the image file to log in the ECS.

For details, see *Elastic Cloud Server User Guide*.

- 5. Perform the following steps to check whether the private image has been preconfigured:
 - a. Check whether the ECS can be successfully started. If the start succeeds, a Guest OS driver has been installed for the image file on the original platform or the driver has been automatically installed for the private image on the cloud platform. If the start failed, install a Guest OS driver for the image file on the original platform and start from Step 1: Upload the Image File again.
 - b. Check whether you can log in to the ECS using your configured password or key. If you can, Cloudbase-Init has been installed. If you cannot, use the password or key contained in the image file to log in to the ECS and install Cloudbase-Init as instructed in Installing and Configuring Cloudbase-Init.
 - c. Check whether NICs are set to DHCP by referring to 2 in **Step 4**: **Configure the ECS**.
 - d. Use MSTSC to log in to the ECS. If the login is successful, remote desktop connection is enabled on the ECS. If the login fails, enable remote desktop connection by referring to 3 in Step 4: Configure the ECS.

If the ECS meets the preceding requirements, the private image has been preconfigured. Skip Step 4: Configure the ECS and Step 5: Create a Private Image from the ECS.

Step 4: Configure the ECS

Remotely log in to the ECS created in **Step 3: Create an ECS** to configure it.

- 1. Log in to the ECS.
- 2. Check whether NICs are set to DHCP. If the ECS is configured with a static IP address, change its IP address assignment mode to DHCP as instructed in **Setting the NIC to DHCP**.
- 3. Enable remote desktop connection for the ECS as needed. For details about how to enable this function, see **Enabling Remote Desktop Connection**.
- 4. (Optional) Configure value-added functions.
 - Install and configure Cloudbase-Init. For details, see Installing and Configuring Cloudbase-Init.
 - Enable NIC multi-queue. For details, see How Do I Enable NIC Multi-Queue for an Image?

Step 5: Create a Private Image from the ECS

For details, see Creating a System Disk Image from a Windows ECS.

(Optional) Clear the Environment

After the image registration is complete, delete the image file as well as the intermediate private image and ECS to prevent them from occupying storage and compute resources.

- Delete the image registered in Step 2 Register the Image File as a Private Image.
- Delete the ECS created in Step 3: Create an ECS.
- Delete the image file from the OBS bucket.

7.8.6 What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?

If an image file is not configured as instructed in **Table 2-8** before it is exported from the original platform, configure it by referring to **Figure 7-8**.



The proper running of ECSs depends on the Xen or KVM driver. If no such a driver is installed, the performance of ECSs will be affected and some functions will be unavailable. Ensure that the KVM driver has been installed for the image file before it is exported from the original platform. Otherwise, the ECSs created from the image will fail to start.

- For Xen, install native Xen and KVM drivers. For details, see **How Do I Install** the Native Xen and KVM Drivers?.
- For KVM, install native KVM drivers. For details, see Installing Native KVM Drivers.

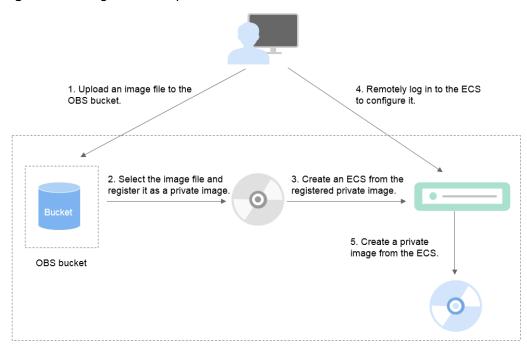


Figure 7-8 Image creation process

Step 1: Upload the Image File

Upload the external image file to an OBS bucket. For details, see **Uploading an External Image File**.

Step 2 Register the Image File as a Private Image

On the management console, select the uploaded image file and register it as a private image. For details, see **Registering an External Image File as a Private Image**.

Step 3: Create an ECS

Create an ECS from the private image.

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab.
- 3. Locate the row that contains the private image and click **Apply for Server** in the **Operation** column.
- 4. Set parameters as promoted to create an ECS. Pay attention to the following:
 - You must add inbound rules for security groups of the ECS to ensure that the ECS can be accessed.
 - If Cloud-Init has been installed in the image file, set a login password as prompted. If Cloud-Init is not installed, use the password or certificate contained in the image file to log in.

For details, see *Elastic Cloud Server User Guide*.

- 5. Perform the following steps to check whether the private image has been preconfigured:
 - a. Check whether the ECS can be successfully started. If the start succeeds, the Xen or KVM driver has been installed for the external image file on the original platform or the driver has been automatically installed for the private image on the cloud platform. If the start failed, install the Xen or KVM driver as needed for the image file and start from Step 1: Upload the Image File again.
 - b. Check whether you can log in to the ECS using your configured password or key. If you can, Cloud-Init has been installed. If you cannot, use the password or key contained in the image file to log in to the ECS and install Cloud-Init as instructed in Installing Cloud-Init.
 - c. Check the network configuration by referring to **Step 4: Configure the ECS**.

If the ECS meets the preceding requirements, the private image has been preconfigured. Skip Step 4: Configure the ECS and Step 5: Create a Private Image from the ECS.

Step 4: Configure the ECS

Remotely log in to the ECS created in **Step 3: Create an ECS** to configure it.

- 1. Log in to the ECS.
- 2. Configure the network.

- Run the ifconfig command to check whether the private IP address of the ECS is the same as that displayed on the console. If they are inconsistent, delete files from the network rule directory as instructed in Deleting Files from the Network Rule Directory.
- Check whether NICs are set to DHCP. If the ECS is configured with a static IP address, change its IP address assignment mode to DHCP as instructed in Setting the NIC to DHCP.
- Run the service sshd status command to check whether SSH is enabled.
 If it is disabled, run the service sshd start command to enable it. Ensure that your firewall (for example, Linux iptables) allows SSH access.
- 3. Configure a file system.
 - Change the disk identifier in the GRUB configuration file to UUID. For details, see Changing the Disk Identifier in the GRUB Configuration File to UUID.
 - Change the disk identifier in the fstab file to UUID. For details, see
 Changing the Disk Identifier in the fstab File to UUID.
 - Clear the automatic attachment information of non-system disks in the /etc/fstab file to prevent impacts on subsequent data disk attachment. For details, see Detaching Data Disks from an ECS.
- 4. (Optional) Configure value-added functions.
 - Install and configure Cloud-Init. For details, see Installing Cloud-Init and Configuring Cloud-Init.
 - Enable NIC multi-queue. For details, see How Do I Enable NIC Multi-Queue for an Image?

Step 5: Create a Private Image from the ECS

Create a private image from the ECS. For details, see **Creating a System Disk Image from a Linux ECS**.

(Optional) Clear the Environment

After the image registration is complete, delete the image file as well as the intermediate private image and ECS to prevent them from occupying storage and compute resources.

- Delete the image registered in **Step 2 Register the Image File as a Private Image**.
- Delete the ECS created in Step 3: Create an ECS.
- Delete the image file from the OBS bucket.

7.8.7 How Do I Enable NIC Multi-Queue for an Image?

Scenarios

With the increase of network I/O bandwidth, a single vCPU cannot meet the requirement of processing NIC interruptions. NIC multi-queue allows multiple vCPUs to process NIC interruptions, thereby improving network PPS and I/O performance.

ECSs Supporting NIC Multi-Queue

NIC multi-queue can be enabled on an ECS only when the ECS specifications, virtualization type, and image meet the requirements described in this section.

• For details about the ECS flavors that support NIC multi-queue, see section "Instances" in *Elastic Cloud Server User Guide*.

□ NOTE

If the number of NIC queues is greater than 1, NIC multi-queue is supported.

- Only KVM ECSs support NIC multi-queue.
- The Linux public images listed in **Table 7-10** support NIC multi-queue.

◯ NOTE

- Windows public images have not supported NIC multi-queue. If you enable NIC multi-queue for a Windows public image, starting an ECS created using such an image may be slow.
- You are advised to upgrade the kernel version of Linux ECSs to 2.6.35 or later. Otherwise, NIC multi-queue is not supported.

Run the **uname -r** command to check the kernel version. If the version is earlier than 2.6.35, contact technical support to upgrade it.

Table 7-10 KVM ECSs that support NIC multi-queue

os	Image	Supported By
Windows	Windows Server 2008 WEB R2 64bit	Private images
	Windows Server 2008 R2 Standard/Datacenter/ Enterprise 64bit	Private images
	Windows Server 2012 R2 Standard/Datacenter 64bit	Private images
	Windows Server 2016 Standard/Datacenter 64bit	Private images
Linux	Ubuntu 14.04/16.04 Server 64bit	Public images
	openSUSE 42.2 64bit	Public images
	SUSE Enterprise 12 SP1/SP2 64bit	Public images
	CentOS 6.8/6.9/7.0/7.1/7.2/7.3/7.4/7.5/7.6 64bit	Public images
	Debian 8.0.0/8.8.0/8.9.0/9.0.0 64bit	Public images
	Fedora 24/25 64bit	Public images
	EulerOS 2.2 64bit	Public images

Operation Instructions

Assume that an ECS has the required specifications and virtualization type.

- If the ECS was created using a public image listed in ECSs Supporting NIC Multi-Queue, NIC multi-queue has been enabled on the ECS by default.
 Therefore, you do not need to manually enable NIC multi-queue for it.
- If the ECS was created using an external image file with an OS listed in ECSs Supporting NIC Multi-Queue, perform the following operations to enable NIC multi-queue:
 - a. Register the External Image File as a Private Image.
 - b. Set NIC Multi-Queue for the Image.
 - c. Create an ECS from the Private Image.
 - d. Enable NIC Multi-Queue.

Register the External Image File as a Private Image

Register the external image file as a private image. For details, see **Registering an External Image File as a Private Image**.

Set NIC Multi-Queue for the Image

Windows OSs have not commercially supported NIC multi-queue. If you enable NIC multi-queue for a Windows image, starting an ECS created using such an image may be slow.

Use either of the following methods to set NIC multi-queue.

Method 1:

- 1. Access the IMS console.
 - a. Log in to the management console.
 - Under Computing, click Image Management Service.
 The IMS console is displayed.
- 2. On the displayed **Private Images** page, locate the row that contains the target image and click **Modify** in the **Operation** column.
- 3. Set NIC multi-queue for the image.

Method 2:

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. On the displayed **Private Images** page, click the name of the target image.
- 3. In the upper right corner of the displayed image details page, click **Modify**. In the displayed **Modify Image** dialog box, set NIC multi-queue for the image.

Method 3: Add hw_vif_multiqueue_enabled to the image using an API.

- 1. Obtain a token. For details, see **Calling APIs** > **Authentication** in *Image Management Service API Reference*.
- 2. Call an API to update image information. For details, see "Updating Image Information (Native OpenStack API)" in *Image Management Service API Reference*.

3. Add X-Auth-Token to the request header.

The value of **X-Auth-Token** is the token obtained in step **1**.

4. Add **Content-Type** to the request header.

The value of **Content-Type** is **application/openstack-images-v2.1-json-patch**.

The request URI is in the following format:

PATCH /v2/images/{image_id}

The request body is as follows:

```
[
     {
      "op":"add",
      "path":"/hw_vif_multiqueue_enabled",
      "value": "true"
     }
]
```

Figure 7-9 shows an example request body for setting NIC multi-queue.

Figure 7-9 Example request body

```
PATCH \( \times \text{https://172.30.50.64:7443/v2/images/9fifa349-3594-4b99-a213-65167145f746} \)

Params Send \( \times \text{Save} \)

Authorization Headers (2) Body \( \times \text{ Pre-request Script} \)

Fets (Code of form-data (Code of the second of the second
```

Create an ECS from the Private Image

Use the registered private image to create an ECS. For details, see the *Elastic Cloud Server User Guide*. Note the following when setting the parameters:

- **Region**: Select the region where the private image is located.
- **Image**: Select **Private image** and then the desired image from the drop-down list.

Enable NIC Multi-Queue

KVM ECSs running Windows use private images to support NIC multi-queue.

For Linux ECSs, which run CentOS 7.4 as an example, perform the following operations to enable NIC multi-queue:

Step 1 Enable NIC multi-queue.

- 1. Log in to the ECS.
- 2. Run the following command to obtain the number of queues supported by the NIC and the number of queues with NIC multi-queue enabled:

ethtool -l N/C

3. Run the following command to configure the number of queues used by the NIC:

ethtool -L N/C combined Number of queues

Example:

```
[root@localhost ~]# ethtool -l eth0 #View the number of queues used by NIC eth0.
Channel parameters for eth0:
Pre-set maximums:
RX:
TX:
Other:
Combined: 4 #Indicates that a maximum of four queues can be enabled for the NIC.
Current hardware settings:
RX:
            0
TX:
            0
Other:
                 0
Combined: 1 #Indicates that one queue has been enabled.
[root@localhost ~]# ethtool -L eth0 combined 4 #Enable four queues on NIC eth0.
```

- **Step 2** (Optional) Enable irqbalance so that the system automatically allocates NIC interruptions to multiple vCPUs.
 - 1. Run the following command to enable irgbalance:

service irqbalance start

2. Run the following command to view the irqbalance status:

service irqbalance status

If the **Active** value in the command output contains **active** (running), irqbalance has been enabled.

Figure 7-10 Enabled irgbalance

```
Iroot@localhost "1# service irqbalance status
Redirecting to /bin/systemctl status irqbalance.service
■ irqbalance.service - irqbalance daemon
Loaded: loaded (/usr/llb/systemd/system/irqbalance.service; enabled; vendor preset; enabled)
Active: active (running) since bed 2018-08-15 10:27:30 CST: 4h 5min ago
Main PID: 850 (irqbalance)
CGroup: /system.slice/irqbalance.service
L650 /usr/sbin/irqbalance --foreground
Aug 15 10:27:30 localhost.localdomain systemd[1]: Started irqbalance daemon.
Aug 15 10:27:30 localhost.localdomain systemd[1]: Starting irqbalance daemon...
```

Step 3 (Optional) Enable interrupt binding.

Enabling irqbalance allows the system to automatically allocate NIC interruptions, improving network performance. If the improved network performance fails to meet your expectations, manually configure interrupt affinity on the target ECS.

The detailed operations are as follows:

Run the following script so that each ECS vCPU responds the interrupt requests initialized by one queue. That is, one queue corresponds to one interrupt, and one interrupt binds to one vCPU.

```
#!/bin/bash
service irqbalance stop

eth_dirs=$(ls -d /sys/class/net/eth*)
if [ $? -ne 0 ];then
    echo "Failed to find eth* , sleep 30" >> $ecs_network_log
    sleep 30
    eth_dirs=$(ls -d /sys/class/net/eth*)
fi
```

```
for eth in $eth_dirs
do
  cur_eth=$(basename $eth)
  cpu_count=`cat /proc/cpuinfo| grep "processor"| wc -l`
  virtio_name=$(ls -l /sys/class/net/"$cur_eth"/device/driver/ | grep pci |awk {'print $9'})
  affinity_cpu=0
  virtio_input="$virtio_name""-input"
  irqs_in=$(grep "$virtio_input" /proc/interrupts | awk -F ":" '{print $1}')
  for irq in ${irqs_in[*]}
  do
     echo $((affinity_cpu%cpu_count)) > /proc/irq/"$irq"/smp_affinity_list
     affinity_cpu=$[affinity_cpu+2]
  done
  affinity_cpu=1
  virtio_output="$virtio_name""-output"
  irqs_out=$(grep "$virtio_output" /proc/interrupts | awk -F ":" '{print $1}')
  for irq in ${irqs_out[*]}
     echo $((affinity_cpu%cpu_count)) > /proc/irq/"$irq"/smp_affinity_list
     affinity_cpu=$[affinity_cpu+2]
  done
done
```

Step 4 (Optional) Enable XPS and RPS.

XPS allows the system with NIC multi-queue enabled to select a queue by vCPU when sending a data packet.

```
#!/bin/bash
# enable XPS feature
cpu_count=$(grep -c processor /proc/cpuinfo)
dec2hex(){
 echo $(printf "%x" $1)
eth_dirs=$(ls -d /sys/class/net/eth*)
if [ $? -ne 0 ];then
  echo "Failed to find eth* , sleep 30" >> $ecs_network_log
  sleep 30
  eth_dirs=$(ls -d /sys/class/net/eth*)
for eth in $eth_dirs
do
  cpu_id=1
  cur_eth=$(basename $eth)
  cur_q_num=$(ethtool -l $cur_eth | grep -iA5 current | grep -i combined | awk {'print $2'})
  for((i=0;i<cur_q_num;i++))</pre>
     if [ $i -eq $ cpu_count ];then
        cpu_id=1
     xps_file="/sys/class/net/${cur_eth}/queues/tx-$i/xps_cpus"
     rps_file="/sys/class/net/${cur_eth}/queues/rx-$i/rps_cpus"
     cpuset=$(dec2hex "$cpu_id")
     echo $cpuset > $xps_file
     echo $cpuset > $rps_file
     let cpu_id=cpu_id*2
  done
done
```

----End

7.8.8 How Do I Make a System Disk Image Support Fast ECS Creation?

Scenarios

Fast Create greatly reduces the time required for creating ECSs from a system disk image. Currently, this feature is supported by all newly created system disk images by default. Some existing system disk images may not support this feature, you can make them support it through image replication.

For example, if image A does not support fast ECS creation, you can replicate it to generate image copy_A that supports fast ECS creation.

Constraints

Full-ECS images and ISO images cannot be configured using this method.

Check Whether an Image Supports Fast ECS Creation

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab to display the image list.
- 3. Click the name of the target image.
- 4. On the displayed image details page, check the value of **Fast ECS Creation**.

Configure an Image to Make It Support Fast ECS Creation

- Locate the target system disk image, click More in the Operation column, and select Replicate from the drop-down list.
 - The **Replicate Image** dialog box is displayed.
- 2. Set parameters based on Replicating Images Within a Region.
- 3. After the image is successfully replicated, the generated image can be used to quickly create ECSs.

7.8.9 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?

Possible causes:

- Your image file was exported from a VMware VM, and VMware Tools was not uninstalled or not completely uninstalled.
- You have downloaded the Guest OS driver of an incorrect version for your Windows ECS.
- The disk space available for installing the Guest OS driver is insufficient. Ensure that the disk where the Guest OS driver is installed has at least 300 MB space available.

7.8.10 How Do I Install the Native Xen and KVM Drivers?

Scenarios

When optimizing a Linux private image with Xen virtualization, you need to install native Xen and KVM drivers on the source ECS of the image.

This section describes how to install the native Xen and KVM drivers.

♠ CAUTION

Xen: If you do not install the Xen driver for the image, the network performance of the ECSs created from this image will be poor, and the security groups and firewall configured for the ECSs will not take effect.

KVM: If you do not install the KVM driver for the image, the NICs of the ECSs may not be detected and the ECSs will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen. For details, see .
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after installation of the Xen and KVM drivers.

Procedure

Modify the configuration file depending on the OS.

CentOS, EulerOS

Take CentOS 7.0 as an example. Modify the /etc/dracut.conf file. Add the xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see CentOS and EulerOS.

Ubuntu and Debian

Modify the /etc/initramfs-tools/modules file. Add the xen-pv and VirtIO drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/initramfs-tools/modules file. Run the update-initramfs -u command to regenerate initrd.

For details, see **Ubuntu and Debian**.

- SUSE and openSUSE
 - If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file and add xen-pv and VirtIO drivers to INITRD_MODULES="". xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the mkinitrd command to regenerate initrd.

- If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the dracut -f command to regenerate initrd.
- If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/ dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see **SUSE** and openSUSE.

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed in the OS: xen-kmp-default-4.2.2_04_3.0.76_0.11-0.7.5

If xen-kmp is not installed, obtain it from the ISO file and install it.

If you add built-in drivers to the initrd or initramfs file by mistake, the ECS will not be affected.

CentOS and EulerOS

1. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

2. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add_drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-2.6.32-573.8.1.el6.x86 64.img

If the virtual file system is not the default initramfs, run the **dracut** -f Name of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be /boot/grub/grub.cfg, /boot/grub2/grub.cfg, or /boot/grub/grub.conf depending on the OS.

5. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen

lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initramfs. The following command output will be displayed:

```
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.img | grep xen
                             54888 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root root
block/xen-blkfront.ko
                             45664 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86 64/kernel/
-rwxr--r-- 1 root root
drivers/net/xen-netfront.ko
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.img | grep virtio
-rwxr--r-- 1 root root
                              23448 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
block/virtio_blk.ko
-rwxr--r-- 1 root
                              50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
drivers/net/virtio_net.ko
                    root
                              28424 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
scsi/virtio_scsi.ko
                                 0 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
drwxr-xr-x 2 root
                    root
virtio
                             14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
                    root
virtio/virtio.ko
-rwxr--r-- 1 root
                              21040 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
                    root
virtio/virtio_pci.ko
                              18016 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
                    root
virtio/virtio_ring.ko
```


If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

```
cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y
```

Ubuntu and Debian

1. Run the following command to open the **modules** file:

vi /etc/initramfs-tools/modules

 Press i to enter editing mode and add the xen-pv and VirtIO drivers to the /etc/initramfs-tools/modules file (the format varies depending on the OS).

```
[root@CTU10000xxxxx ~]#vi /etc/initramfs-tools/modules
.....
# Examples:
# raid1
# sd_mOd
xen-blkfront
xen-netfront
virtio_blk
virtio_scsi
virtio_net
virtio_pci
virtio_ring
virtio
```

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/initramfs-tools/modules file.
- 4. Run the following command to regenerate initrd:

update-initramfs -u

5. Run the following commands to check whether native Xen and KVM drivers have been installed:

lsinitramfs /boot/initrd.img-`uname -r` |grep xen lsinitramfs /boot/initrd.img-`uname -r` |grep virtio

[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep xen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen/netxen_nic.ko lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback/xen-netback.ko lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback/xen-blkback.ko

[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep virtio lib/modules/3.5.0-23-generic/kernel/drivers/scsi/**virtio_scsi.ko**

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
CONFIG_VIRTIO_BLK=y
CONFIG_VIRTIO_NET=y
CONFIG_VIRTIO=y
CONFIG_VIRTIO_RING=y
CONFIG_VIRTIO_PCI=y
CONFIG_VIRTIO_MMIO_CMDLINE_DEVICES=y
[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y
CONFIG_XEN_BLKDEV_FRONTEND=y
CONFIG_XEN_NETDEV_FRONTEND=y

SUSE and openSUSE

If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file. For details, see scenario 1.

If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers. For details, see scenario 2.

If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. For details, see scenario 3.

• If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, perform the following steps:

∩ NOTE

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed in the OS:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed:

xen-kmp-default-4.2.2 04 3.0.76 0.11-0.7.5

If xen-kmp is not installed, obtain it from the installation ISO and install it first.

a. Run the following command to open the /etc/sysconfig/kernel file:

vi /etc/sysconfig/kernel

b. Add the xen-pv and VirtlO drivers after **INITRD_MODULES**= (the format of drivers depends on the OS).

SIA10000xxxxx:~ # vi /etc/sysconfig/kernel # (like drivers for scsi-controllers, for lvm or reiserfs) #

INITRD_MODULES="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

c. Run the **mkinitrd** command to regenerate initrd:

□ NOTE

If the virtual file system is not the default initramfs or initrd, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **menu.lst** or **grub.cfg** file (/boot/grub/menu.lst, /boot/grub/grub.cfg, or /boot/grub2/grub.cfg).

The following is an example initrd file of SUSE 11 SP4:

default 0
timeout 10
gfxmenu (hd0,0)/boot/message
title sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent console=ttyS0,115200n8 console=tty0
net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1 showopts
initrd /boot/initrd.vmx
title Failsafe_sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent ide=nodma apm=off noresume edd=off
powersaved=off nohz=off highres=off processsor.max+cstate=1 nomodeset x11failsafe
console=ttyS0,115200n8 console=tty0 net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1
showopts
initrd /boot/initrd.vmx

/boot/initrd.vmx in the initrd line is the initrd file actually used. Run the dracut -f /boot/initrd.vmx command. If the initrd file does not contain the /boot directory, such as /initramfs-xxx, run the dracut -f /boot/initramfs-xxx command.

 Run the following commands to check whether the PVOPS module for Xen or VirtIO module for KVM is loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen

lsinitrd /boot/initrd-`uname -r` | grep virtio SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen

rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/ xen-blkfront.ko

-rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio -rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio net.ko

- e. Restart the ECS.
- f. Modify the /boot/grub/menu.lst file. Add xen_platform_pci.dev_unplug=all and modify the root configuration.

Before the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default)

root (hd0,0)

kernel /boot/vmlinuz-3.0.76-0.11-default **root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130** splash=silentcrashkernel=256M-:128M showopts vga=0x314 initrd /boot/initrd-3.0.76-0.11-default

After the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default) root (hd0,0) kernel /boot/vmlinuz-3.0.76-0.11-default root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 splash=silentcrashkernel=256M-:128M showopts vga=0x314 xen_platform_pci.dev_unplug=all initrd /boot/initrd-3.0.76-0.11-default

NOTE

- Ensure that the root partition is in the UUID format.
- xen_platform_pci.dev_unplug=all is added to shield QEMU devices.
- For SUSE 11 SP1 64bit to SUSE 11 SP4 64bit, add xen_platform_pci.dev_unplug=all to the menu.lst file. For SUSE 12 or later, this function is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether the Xen drivers exist in initrd:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/ xen-blkfront.ko -rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/ xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio -rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/ virtio_scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio_net.ko

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

- If the OS version is SUSE 12 SP1, perform the following steps:
 - a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press **i** to enter editing mode and add the xen-pv and VirtlO drivers to **add-drivers** (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default

add_drivers+="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the change and exits the /**etc/dracut.conf** file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

• If the OS version is later than SUSE 12 SP1 or openSUSE 13, perform the following steps:

Take SUSE Linux Enterprise Server 12 SP2 (x86_64) as an example.

a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add_drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut** -f Name of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be /boot/grub/grub.cfg, /boot/grub2/grub.cfg, or /boot/grub/grub.conf depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether the native Xen and KVM driver modules are successfully loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initrd. The following command output will be displayed:

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rw-r--r-- 1 root root 69575 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/xenblkfront.ko

-rw-r--r-- 1 root root 53415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/xennetfront.ko

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall -rwxr-xr-x 1 root root 8320 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall/xen-hcall.ko

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rw-r--r- 1 root root 29335 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/virtio_blk.ko

-rw-r--r- 1 root root 57007 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/virtio_net.ko

-rw-r--r- 1 root root 32415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/scsi/virtio scsi.ko

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/kernel/drivers/virtio-rw-r--r-- 1 root root 19623 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio.ko

-rw-r--r- 1 root root 38943 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_pci.ko

-rw-r--r-- 1 root root 24431 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_ring.ko

□ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

7.9 Image Replication

When Do I Need to Replicate an Image?

In-region replication

This is used for conversion between encrypted and unencrypted images or for enabling advanced features (such as fast ECS creation) for images. For details, see **Replicating Images Within a Region**.

How Long Does It Take to Replicate an Image?

The time required for replicating an image depends on the network transmission speed and the number of tasks in the queue.

What Is the Charge for Image Replication?

In-region replication

The replicas of system disk and data disk images are stored in OBS buckets for free.

∩ NOTE

Full-ECS images cannot be replicated within the same region.

How Do I Replicate an Image to a Different Region of Another Account?

Replicate the image to the target region under your account and share it with the target account. Then, the image will be displayed in the shared image list of the target account.

7.10 Image Deletion

Will a Private Image Be Automatically Deleted If I Delete or Unsubscribe from the ECS Used to Create the Image?

No. Private images created using ECSs are stored in OBS buckets. Deleting or unsubscribing from the ECS used to create a private image does not affect the image.

Can I Delete an Image I Shared with Others If My Image Quota Becomes Insufficient?

Yes. You can delete a shared image without requiring any operation by image recipients. After you delete the image, the image recipients cannot use it any longer. Inform the image recipients to back up their data before you delete the image.

How Do I Delete a Shared Image? Does the Deletion Affect an ECS or EVS Disk Created from It?

Reject this image on the **Images Shared with Me** tab page. This does not affect an ECS or EVS disk created from it.

7.11 Image Encryption

How Can I Change an Unencrypted Image to an Encrypted One?

If you want to store an unencrypted image in an encrypted way, you can select an encryption key when you replicate the image. Then, the system will generate an encrypted replica of the unencrypted image.

7.12 Accounts and Permissions

7.12.1 What Do I Do If Private Images Cannot Be Found on the Enterprise Project Management Service Page After EPS Is Enabled?

Scenarios

If you cannot find the private images on the **Enterprise Project Management Service** page, add the private images to their associated enterprise project.

Procedure

- 1. Log in to the management console.
- 2. Under Computing, click Image Management Service.
- 3. Click the **Private Images** tab.
- 4. Locate the row that contains the image, click **More** in the **Operation** column, and select **Allocate to Enterprise Project**.
- 5. In the displayed dialog box, select the target enterprise project.

7.12.2 What Do I Do If I Cannot Create an Image from a CSBS Backup or BMS Using a Subaccount with the Allow_all Permission After EPS Is Enabled?

When an enterprise project subaccount is used to create an image, the system displays a message indicating that CSBS or BMS is not supported by EPS. This is because CSBS and BMS are not interconnected with EPS regionally or globally. The global resource viewing permission must be granted to the subaccount in IAM. For example, you can view resources of other cloud services if you have the Tenant Guest permission.

7.13 Cloud-Init

7.13.1 Cloud-Init

You are advised to install Cloud-Init on the ECS that will be used to create a private image so that new ECSs created from the private image support custom configurations (for example, changing the ECS login password).

For details about how to install Cloud-Init, see Installing Cloud-Init.

For details about how to configure Cloud-Init, see Configuring Cloud-Init.

The following describes common problems you may encounter when installing Cloud-Init and their solutions.

Ubuntu 16.04/CentOS 7: Failed to Set Cloud-Init Automatic Start

• Symptom:

After Cloud-Init is installed, run the following command to set Cloud-Init automatic start:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Information similar to the following is displayed:

Figure 7-11 Failed to enable Cloud-Init to start automatically

```
root@ecs-wjq-ubuntu14:~# systemctl enable cloud-init-local.service cloud-init.se
rvice cloud-config.service cloud-final.service
Failed to execute operation: Unit file is masked
root@ecs-wjq-ubuntu14:~#
```

• Solution:

- Run the following command to roll back the configuration:
 systemctl unmask cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
- Run the following command to set automatic start again:
 systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
- Run the following command to check the Cloud-Init status:
 systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

As shown in the following figures, **failed** is displayed and all services are in the **inactive** state.

Figure 7-12 Checking Cloud-Init status

```
root@ecs-wjq-ubuntu14:~# systemctl status cloud-init-local.service

cloud-init-local.service - Initial cloud-init job (pre-networking)
Loaded: loaded (/lib/systemd/system/cloud-init-local.service; enabled; vendor
Active: failed (Result: exit-code) since Fri 2018-08-17 07:12:20 UTC; 1min 25
Process: 4418 ExecStart=/usr/bin/cloud-init init --local (code=exited, status=
Main PID: 4418 (code=exited, status=203/EXEC)

Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: Starting Initial cloud-init job (pr
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Main proc
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: Failed to start Initial cloud-init
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Unit ente
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Failed wi
Bines 1-11/11 (END)
```

Figure 7-13 Checking Cloud-Init status

```
cloud-init-local.service - Initial cloud-init job (pre-networking)
Loaded: loaded (/lib/systemd/system/cloud-init-local.service; enabled; vendor
preset: enabled)
Active: failed (Result: exit-code) since Fri 2018-08-17 07:12:20 UTC; 59s ago
Process: 4418 ExecStart=/usr/bin/cloud-init init --local (code=exited, status=
203/EXEC)
Main PIO: 4418 (code=exited, status=203/EXEC)
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: Starting Initial cloud-init job (pre-networking)...
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Main proc
ess exited, code=exited, status=203/EXEC
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: Failed to start Initial cloud-init
job (pre-networking).
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Unit ente
red failed state.
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: cloud-init-local.service: Failed wi
th result 'exit-code'.
```

This is because the address that the system uses to access Cloud-Init is redirected to /usr/bin/, but the actual installation path is /usr/local/bin.

- Run the following command to copy Cloud-Init to the usr/bin directory:
 cp /usr/local/cloud-init /usr/bin/
- e. Run the following command to restart Cloud-Init: systemctl restart cloud-init-local.service cloud-init.service cloudconfig.service cloud-final.service

Figure 7-14 Restarting Cloud-Init

```
root@ecs-wjq-ubuntui4:"# systemctl start cloud-init-local.service; systemctl sta
tus cloud-init-local.service
- cloud-init-local.service - Initial cloud-init job (pre-networking)
Loaded: loaded (/lib/systemd/system/cloud-init-local.service; enabled; vendor
Active: active (exited) since Fri 2018-08-17 07:18:01 UTC; 4ms ago
Process: 4491 ExecStart=/usr/bin/cloud-init init --local (code=exited, status=
Main PID: 4491 (code=exited, status=0/SUCCESS)

Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] util.py[DEBUG]: R
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] util.py[DEBUG]: R
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] __init__.py[DEBUG]
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] util.py[DEBUG]: R
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] util.py[DEBUG]: C
Iines 1-16/16 (END)_
```

f. Run the following command to check the Cloud-Init status: systemctl status cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Ubuntu 14.04: chkconfig and systemctl Not Installed

Symptom:

chkconfig is not installed.

Solution:

Run the following commands to install chkconfig:

apt-get update

apt-get install sysv-rc-conf

cp /usr/sbin/sysv-rc-conf /usr/sbin/chkconfig

Run the following command to query the Cloud-Init version:

cloud-init -v

Information similar to the following is displayed:

-bash:/usr/bin/cloud-init:not found this command

Solution: Run the following command to copy Cloud-Init to the **usr/bin** directory:

cp /usr/local/bin/cloud-init /usr/bin/

Debian 9.5: Failed to Query the Cloud-Init Version and Set Automatic Start

1. Run the following command to query the Cloud-Init version:

cloud-init -v

Information similar to the following is displayed:

-bash:/usr/bin/cloud-init:not found this command

Solution: Run the **cp /usr/local/bin/cloud-init /usr/bin/** command to copy Cloud-Init to the **usr/bin** directory.

2. Run the cloud-init init --local command.

Information similar to the following is displayed:

Figure 7-15 Information returned when Cloud-Init automatic start successfully set

rootBecs-debian-9::/tmp/CLOUD-INIT/hauseicloud-cloud-initH cloud-init init —local
vurs/local/lib/python2.7/dist-packages/Chectah-2/d.4-py2.7.cgg/Chectah-2/onpiler.py:1509: UserWarning:
You don't have the C version of ManeHapper installed! I'n disabling Chectah's useStackFrances option as it is painfully slow with
the Python version of ManeHapper. You should get a copy of Chectah with the compiled C version of ManeHapper installed! "
"\nYou don't have the C version of ManeHapper installed!"
Cloud-init v. 0.7.6 running 'init-local' at Mon, 20 Aug 2018 02:31:45 +0000. Up 704.40 seconds.
rootBecs-debian-9:/tmp/CLOUD-INIT/hawaeicloud-cloud-initH

Cause analysis: The compilation fails because GCC is not installed.

Solution

Run the following command to install GCC. Then, install Cloud-Init again.

yum -y install gcc

3. After Cloud-Init is installed, run the following command to set Cloud-Init automatic start:

systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Information similar to the following is displayed.

Figure 7-16 Prompt indicating the failure to set Cloud-Init automatic start

```
Failed to enable unit: Unit file /etc/systemd/system/cloud-init-local.service is masked.
```

Solution:

- Run the following command to roll back the configuration:
 systemctl unmask cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
- Run the following command to set automatic start again:
 systemctl enable cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
- c. Run the following command to restart Cloud-Init:

systemctl restart cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service

Run the **systemctl status** command to check the Cloud-Init status. Information similar to the following is displayed:

Figure 7-17 Verifying the service status

CentOS 7/Fedora 28: Required C Compiler Not Installed

Symptom

After Cloud-Init is successfully installed, run the following command:

cloud-init init --local

The following information is displayed:

/usr/lib/python2.5/site-packages/Cheetah/Compiler.py:1532: UserWarning: You don't have the C version of NameMapper installed! I'm disabling Cheetah's useStackFrames option as it is painfully slow with the Python version of NameMapper. You should get a copy of Cheetah with the compiled C version of NameMapper.

"\nYou don't have the C version of NameMapper installed!

Cause analysis

This alarm is generated because C version of NameMapper needs to be compiled when Cloud-Init is installed. However, GCC is not installed in the system, and the compilation cannot be performed. As a result, NameMapper is missing.

Solution

Run the following command to install GCC:

yum -y install gcc

Reinstall Cloud-Init.

CentOS 7/Fedora: Failed to Use the New Password to Log In to an ECS Created from an Image

Symptom

After Cloud-Init is successfully installed on an ECS, an image is created from the ECS. You cannot use a new password to log in to the ECSs created from this image. When you log in to the ECSs using the old password, you find that NICs of these ECSs are not started.

Figure 7-18 NIC not started

```
Iroot@ecs-fedora28-wjq-test ~1# ifconfig
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
TX packets 0 bytes 0 (0.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

• Solution:

Log in to the ECS used to create the image, open the DHCP configuration file /etc/sysconfig/network-scripts/ifcfg-ethX, and comment out HWADDR.

7.13.2 What Can I Do with a Cloud-Init ECS?

Introduction to Cloud-Init

Cloud-Init is an open-source tool for cloud instance initialization. When creating ECSs from an image with Cloud-Init, you can use user data injection to inject customized initialization details (for example, an ECS login password) to the ECSs.

You can also configure and manage a running ECS by querying and using metadata. If Cloud-Init is not installed, you cannot apply custom configurations to the ECSs. You will have to use the original password in the image file to log in to the ECSs.

Installation Methods

You are advised to install Cloud-Init or Cloudbase-Init on the ECS to be used to create a private image so that new ECSs created from the private image support custom configurations.

- For Windows OSs, download and install Cloudbase-Init.
 For how to install Cloudbase-Init, see Installing and Configuring Cloudbase-Init.
- For Linux OSs, download and install Cloud-Init.
 For how to install Cloud-Init, see Installing Cloud-Init.
 For how to configure Cloud-Init, see Configuring Cloud-Init.

7.13.3 What Do I Do If Injecting the Key or Password Using Cloud-Init Failed After NetworkManager Is Installed?

Symptom

A major cause is that the version of Cloud-Init is incompatible with that of NetworkManager. In Debian 9.0 and later versions, NetworkManager is incompatible with Cloud-Init 0.7.9.

Solution

Uninstall the current Cloud-Init and install Cloud-Init 0.7.6 or an earlier version.

For details about how to install Cloud-Init, see Installing Cloud-Init.

7.13.4 How Do I Install growpart for SUSE 11 SP4?

Scenarios

growpart for SUSE and openSUSE is an independent toolkit that does not start with **cloud-***. Perform operations in this section to install growpart.

Procedure

1. Run the following commands to check whether Cloud-Init and growpart have been installed:

rpm -qa | grep cloud-init

The command output is as follows:

cloud-init-0.7.8-39.2

rpm -qa | grep growpart

The command output is as follows:

growpart-0.29-8.1

2. Run the following command to uninstall Cloud-Init and growpart:

zypper remove cloud-init growpart

3. Run the following commands to delete residual files:

rm -fr /etc/cloud/*

rm -fr /var/lib/cloud/*

4. Run the following command to install growpart:

zypper install http://download.opensuse.org/repositories/home:/garloff:/OTC:/cloudinit/SLE_11_SP4/noarch/growpart-0.27-1.1.noarch.rpm

5. Run the following command to install python-oauth:

zypper install http://download.opensuse.org/repositories/home:/garloff:/OTC:/cloudinit/SLE_11_SP4/x86_64/python-oauth-1.0.1-35.1.x86_64.rpm

6. Run the following command to install Cloud-Init:

zypper install http://download.opensuse.org/repositories/home:/garloff:/OTC:/cloudinit/SLE_11_SP4/x86_64/cloud-init-0.7.6-27.23.1.x86_64.rpm

7. Run the following commands to check whether growpart, python-oauth, and Cloud-Init have been installed successfully:

rpm -qa | grep growpart

The command output is as follows:

growpart-0.27-1.1

rpm -qa | grep python-oauth

The command output is as follows:

python-oauthlib-0.6.0-1.5 python-oauth-1.0.1-35.1

rpm -qa | grep cloud-init

The command output is as follows:

cloud-init-0.7.6-27.19.1

8. Run the following command to check the configuration:

chkconfig cloud-init-local on; chkconfig cloud-init on; chkconfig cloud-config on; chkconfig cloud-final on

7.14 ECS Creation

7.14.1 Can I Change the Image of a Purchased ECS?

Yes.

If you have selected an incorrect image or your service requirements have changed, you can change the image of your ECS.

You can change the image type (public, private, and shared images) and OS. For details, see "Changing the OS" in *Elastic Cloud Server User Guide*.

7.14.2 Can I Use a Private Image to Create ECSs with Different Hardware Specifications from the ECS Used to Create the Private Image?

Yes. You can specify the CPU, memory, bandwidth, data disks of the new ECSs if necessary. You can also specify their system disk size. The value must be smaller than 1024 GB but no less than the system disk size in the image.

7.14.3 Can I Specify the System Disk Size When I Create an ECS Using an Image?

Yes. However, the value must be smaller than 30,768 GB but no less than the system disk size in the image.

■ NOTE

Ensure that your ECS OS supports the system disk size you specified.

7.14.4 What Do I Do If No Partition Is Found During the Startup of an ECS Created from an Imported Private Image?

Symptom

This may be caused by a disk partition ID change after the cross-platform image import. As a result, no partition can be found based on the original disk partition ID in the image. In this case, you need to change the disk partition in the image (**UUID**=*UUID* of the disk partition).

Solution

The following uses openSUSE 13.2 as an example to describe how to change the partition name.

1. Run the following command to query the disk partition ID:

ls -l /dev/disk/by-id/

The example command output is as follows.

```
lrwxrwxrwx 1 root root 10 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001 -> ../../xvda
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part1 -> ../../xvda1
lrwxrwxrwx 1 root root 12 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part10 -> ../../xvda10
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part2 -> ../../xvda2
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part5 -> ../../xvda5
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part6 -> ../../xvda6
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part7 -> ../../xvda7
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part8 -> ../../xvda8
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ata-QEMU_HARDDISK_QM00001-part9 -> ../../xvda9
lrwxrwxrwx 1 root root 10 Jul 22 01:35 ata-QEMU_HARDDISK_QM00005 -> ../../xvde
lrwxrwxrwx 1 root root 10 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001 -> ../../xvda
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part1 -> ../../xvda1
lrwxrwxrwx 1 root root 12 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part10 -> ../../xvda10
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part2 -> ../../xvda2
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part5 -> ../../xvda5
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part6 -> ../../xvda6
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part7 -> ../../xvda7
lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part8 -> ../../xvda8
```

lrwxrwxrwx 1 root root 11 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00001-part9 -> ../../xvda9 lrwxrwxrwx 1 root root 10 Jul 22 01:35 scsi-SATA_QEMU_HARDDISK_QM00005 -> ../../xvde

ata-QEMU_HARDDISK_xxx and **scsi-SATA_QEMU_HARDDISK_xxx** indicate that the disk of the ECS is simulated using Quick EMUlator (QEMU). The content on the left of -> is the disk partition ID, and that on the right of -> is the partition name.

2. Run the following command to query the disk partition UUID:

ls -l /dev/disk/by-uuid/

The example command output is as follows.

```
total 0
lrwxrwxrwx 1 root root 11 Jul 22 01:35 45ecd7a0-29da-4402-a017-4564a62308b8 -> ../../xvda5
lrwxrwxrwx 1 root root 11 Jul 22 01:35 55386c6a-9e32-41d4-af7a-e79596221f51 -> ../../xvda9
lrwxrwxrwx 1 root root 11 Jul 22 01:35 55f36660-9bac-478c-a701-7ecc5347f789 -> ../../xvda8
lrwxrwxrwx 1 root root 11 Jul 22 01:35 780f36bc-0ada-4c98-9a8d-44570d65333d -> ../../xvda1
lrwxrwxrwx 1 root root 11 Jul 22 01:35 b3b7c47f-6a91-45ef-80d6-275b1cc16e19 -> ../../xvda6
lrwxrwxrwx 1 root root 11 Jul 22 01:35 ea63b55d-3b6e-4dcd-8986-956b72bac3e9 -> ../../xvda7
lrwxrwxrwx 1 root root 12 Jul 22 01:35 eb3cc645-925e-4bc5-bedf-c2a6f3b65809 -> ../../xvda10
```

The content on the left of -> is the disk partition UUID, and that on the right of -> is the partition name. Obtain the relationship between the disk partition name, partition ID, and partition UUID.

3. Run the following command to check the partition names in the /etc/fstab file:

vi /etc/fstab

The example command output is as follows.

```
/dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part5 / ext3 defaults,errors=panic 1 1 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part1 /boot ext3 defaults,errors=panic 1 2 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part6 /home ext3 nosuid,errors=panic 1 2 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part10 /opt ext3 defaults,errors=panic 1 2 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part7 /tmp ext3 nodev,nosuid,errors=panic 1 2 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part9 /usr ext3 defaults,errors=panic 1 2 /dev/disk/by-id/scsi-SATA_QEMU_HARDDISK_QM00001-part8 /var ext3 nodev,nosuid,errors=panic 1 2 sysfs /sys sysfs noauto 0 0 proc /proc proc defaults 0 0 usbfs /proc/bus/usb usbfs noauto 0 0 devpts /dev/pts devpts mode=0620,gid=5 0 0 /dev/cdrom /media/ udf,iso9660 noexec,noauto,nouser,nodev,nosuid 1 2 tmpfs /dev/shm tmpfs noexec,nodev,nosuid 0 0
```

The values in the first column are the disk partition IDs.

4. Press i to enter editing mode. Change the disk partition ID in the row that contains /dev/disk/xxx in the /etc/fstab file in step 3 to UUID=UUID of the disk partition based on the query results in step 1 and step 2.

The modified content is as follows.

```
UUID=45ecd7a0-29da-4402-a017-4564a62308b8 / ext3 defaults,errors=panic 1 1
UUID=780f36bc-0ada-4c98-9a8d-44570d65333d /boot ext3 defaults,errors=panic 1 2
UUID=b3b7c47f-6a91-45ef-80d6-275b1cc16e19 /home ext3 nosuid,errors=panic 1 2
UUID=eb3cc645-925e-4bc5-bedf-c2a6f3b65809 /opt ext3 defaults,errors=panic 1 2
UUID=ea63b55d-3b6e-4dcd-8986-956b72bac3e9 /tmp ext3 nodev,nosuid,errors=panic 1 2
UUID=55386c6a-9e32-41d4-af7a-e79596221f51 /usr ext3 defaults,errors=panic 1 2
UUID=55f36660-9bac-478c-a701-7ecc5347f789 /var ext3 nodev,nosuid,errors=panic 1 2
sysfs /sys sysfs noauto 0 0
proc /proc proc defaults 0 0
usbfs /proc/bus/usb usbfs noauto 0 0
devpts /dev/pts devpts mode=0620,gid=5 0 0
/dev/cdrom /media/ udf,iso9660 noexec,noauto,nouser,nodev,nosuid 1 2
tmpfs /dev/shm tmpfs noexec,nodev,nosuid 0 0
```


Ensure that the UUIDs are correct. Otherwise, the ECS cannot start properly.

- 5. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the configuration and exits the vi editor.
- 6. Check the partition names in the system boot configuration file.

The system boot configuration files vary depending on the OS. Confirm the boot configuration file of the current OS.

- Grand Unified Boot Loader (GRUB) configuration file
 - /boot/grub/grub.conf
 - /boot/grub/menu.lst
 - /boot/grub/grub.cfg
 - /boot/grub2/grub.cfg
- Syslinux configuration file
 - /extlinux.conf
 - /boot/syslinux/extlinux.conf
 - /boot/extlinux/extlinux.conf
 - /boot/syslinux/syslinux.cfg
 - /syslinux/syslinux.cfg
 - /syslinux.cfg

The boot file in this example is **/boot/grub/menu.lst**. Run the following command to check it:

vi /boot/grub/menu.lst

default 0
timeout 3
title xxx Server OS - xxxxxx
kernel /boot/vmlinuz-3.0.101-0.47.52-default root=/dev/disk/by-id/scsiSATA_QEMU_HARDDISK_QM00001-part5 resume= memmap=0x2000000\$0x3E000000
nmi_watchdog=2 crashkernel=512M-:256M console=ttyS0,115200 console=tty0 xen_emul_unplug=all
initrd /boot/initrd-3.0.101-0.47.52-default

7. Press **i** to enter editing mode and change the partition names in the system boot configuration file.

Change the disk partition name in the /boot/grub/menu.lst file in 6 to UUID=UUID of the disk partition based on the query results in 1 and 2.

default 0
timeout 3
title xxx Server OS - xxxxxx
kernel /boot/vmlinuz-3.0.101-0.47.52-default root=UUID=45ecd7a0-29da-4402-a017-4564a62308b8
resume= memmap=0x2000000\$0x3E000000 nmi_watchdog=2 crashkernel=512M-:256M
console=ttyS0,115200 console=tty0 xen_emul_unplug=all
initrd /boot/initrd-3.0.101-0.47.52-default

8. Press **Esc**, enter :**wq**, and press **Enter**. The system saves the configuration and exits the vi editor.

7.14.5 What Do I Do If the Disks of an ECS Created from a CentOS Image Cannot Be Found?

Symptom

Generally, this is because the xen-blkfront.ko module is not loaded during the startup. You need to modify OS kernel startup parameters. Figure 7-19 shows the startup screen after the login to the ECS.

Figure 7-19 Startup screen

Solution

Perform the following operations to modify OS kernel boot parameters:

NOTE

These operations must be performed after the OS starts. You are advised to modify kernel boot parameters in the ECS used for creating the image.

1. Run the following command to log in to the OS:

lsinitrd /boot/initramfs- `uname -r `.img |grep -i xen

- If the command output contains xen-blkfront.ko, contact the customer service.
- If no command output is displayed, go to 2.
- 2. Back up the GRUB configuration file.
 - If the ECS runs CentOS 6, run the following command:

cp /boot/grub/grub.conf /boot/grub/grub.conf.bak

- If the ECS runs CentOS 7, run the following command:

cp /boot/grub2/grub.cfg /boot/grub2/grub.cfg.bak

3. Use the **vi** editor to open the GRUB configuration file. Run the following command (using CentOS 7 as an example):

vi /boot/grub2/grub.cfg

4. Add xen_emul_unplug=all to the default boot kernel.

Search for the line that contains **root=UUID=** and add **xen_emul_unplug=all** to the end of the line.

```
menuentry 'CentOS Linux (3.10.0-229.el7.x86_64) 7 (Core) with debugging' --class centos --class gnu-
linux --class gnu --class os --unrestricted $menuentry_id_option 'gnulinux-3.10.0-229.el7.x86_64-
advanced-bf3cc825-7638-48d8-8222-cd2f412dd0de' {
     set qfxpayload=keep
     insmod gzio
     insmod part_msdos
     insmod ext2
     set root='hd0,msdos1'
     if [ x$feature_platform_search_hint = xy ]; then
      search --no-floppy --fs-uuid --set=root --hint='hd0,msdos1' bf3cc825-7638-48d8-8222-
cd2f412dd0de
     else
      search --no-floppy --fs-uuid --set=root bf3cc825-7638-48d8-8222-cd2f412dd0de
     linux16 /boot/vmlinuz-3.10.0-229.el7.x86_64 root=UUID=bf3cc825-7638-48d8-8222-
cd2f412dd0de xen_emul_unplug=all ro crashkernel=auto rhgb quiet systemd.log_level=debug
systemd.log_target=kmsg
     initrd16 /boot/initramfs-3.10.0-229.el7.x86 64.img
```

- 5. Press **Esc**, enter :wq, and press **Enter** to exit the vi editor.
- 6. Create an image using the ECS, upload and register the image on the cloud platform.

7.14.6 What Do I Do If an ECS Created from a Windows Image Failed to Start When I Have Enabled Automatic Configuration During Image Registration?

Symptom

This issue is probably caused by the failure of offline VirtIO driver injection.

Solution

When you inject the VirtIO driver for a Windows ECS offline, there are some restrictions:

- If the boot mode in the image file is UEFI, the VirtIO driver cannot be injected offline.
- It is recommended that you disable Group Policy Object (GPO). Some policies may cause the failure of VirtIO driver injection offline.
- It is recommended that you stop antivirus software. Otherwise, the VirtlO driver may fail to be injected offline.

To update the VirtIO driver, you must install UVP VMTools. For how to install UVP VMTools, see **Optimizing a Windows Private Image**.

7.14.7 What Do I Do If an Exception Occurs When I Start an ECS Created from an Image Using the UEFI Boot Mode?

Symptom

An ECS created from a private image using the UEFI boot mode cannot start.

Possible Causes

The image OS uses the UEFI boot mode, but the uefi attribute is not added to the image.

Solution

- 1. Delete the ECS that failed to start.
- 2. Call the API to update the image attributes and change the value of **hw_firmware_type** to **uefi**.

API URI: PATCH /v2/cloudimages/{image_id}

For details about how to call the API, see "Updating Image Information" in *Image Management Service API Reference*.

3. Use the updated image to create an ECS.

7.15 Driver Installation

7.15.1 Must I Install Guest OS Drivers on an ECS?

Installing Guest OS drivers on an ECS improves your experience in using the ECS. In addition, it also ensures high reliability and stability of ECSs.

- Windows ECSs: Install the PV driver and UVP VMTools on ECSs.
- Linux ECSs: Install xen-py and VirtIO drivers and load them in initrd.

7.15.2 Why Do I Need to Install and Update VMTools for Windows?

Why Do I Need to Install VMTools?

VMTools is a VirtIO driver (para-virtualization driver) that provides high-performance disks and NICs for ECSs.

- A standard Windows OS does not have the VirtlO driver.
- Public images have VMTools by default.
- You need to install VMTools for private images. For details, see Installing UVP VMTools.

Why Do I Need to Update VMTools?

The cloud platform periodically synchronizes issue-fixed versions from the VirtIO community and releases updated versions every month. This ensures that known

issues identified in the community or R&D tests can be avoided on the latest driver.

When Do I Need to Update VMTools?

- If a major error is fixed, you are advised to update VMTools immediately. (Major errors have not occurred by now.) If other issues are fixed, choose whether to update VMTools based on your needs.
- The cloud platform updates the VMTools stored in an OBS bucket on a regular basis to ensure that you can download the latest version of VMTools for private images.
- The cloud platform updates public images on a regular basis to ensure that these images have the latest version of VMTools.
- The document is updated on a regular basis in accordance with VMTools in an OBS bucket to ensure that the download link of VMTools provided in the document is the latest.

What Do I Need to Do After VMTools Is Updated?

- Update Windows private images or drivers in running Windows ECSs.
- If you have any technical issue or question, contact the customer service.

7.15.3 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?

Possible causes:

- Your image file was exported from a VMware VM, and VMware Tools was not uninstalled or not completely uninstalled.
- You have downloaded the Guest OS driver of an incorrect version for your Windows ECS.
- The disk space available for installing the Guest OS driver is insufficient.
 Ensure that the disk where the Guest OS driver is installed has at least 300 MB space available.

7.15.4 How Do I Install UVP VMTools in Windows?

This only applies to KVM ECSs. Before using an ECS or external image file to create a private image, ensure that UVP VMTools has been installed in the OS to enable subsequently created ECSs to support KVM virtualization and improve network performance.

For details, see Installing UVP VMTools.

7.15.5 How Do I Install Native KVM Drivers in Linux?

When optimizing a Linux private image, you need to install native KVM drivers on the ECS from which the image will be created. If you ECS already has native KVM drivers installed, you do not need to install the drivers again.

For details, see **Installing Native KVM Drivers**.

7.15.6 How Do I Install the Native Xen and KVM Drivers?

Scenarios

When optimizing a Linux private image with Xen virtualization, you need to install native Xen and KVM drivers on the source ECS of the image.

This section describes how to install the native Xen and KVM drivers.

♠ CAUTION

Xen: If you do not install the Xen driver for the image, the network performance of the ECSs created from this image will be poor, and the security groups and firewall configured for the ECSs will not take effect.

KVM: If you do not install the KVM driver for the image, the NICs of the ECSs may not be detected and the ECSs will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen. For details, see .
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after installation of the Xen and KVM drivers.

Procedure

Modify the configuration file depending on the OS.

CentOS, EulerOS

Take CentOS 7.0 as an example. Modify the /etc/dracut.conf file. Add the xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see CentOS and EulerOS.

Ubuntu and Debian

Modify the /etc/initramfs-tools/modules file. Add the xen-pv and VirtIO drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/initramfs-tools/modules file. Run the update-initramfs -u command to regenerate initrd.

For details, see **Ubuntu and Debian**.

- SUSE and openSUSE
 - If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file and add xen-pv and VirtIO drivers to INITRD_MODULES="". xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the mkinitrd command to regenerate initrd.

- If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen_vnif, xen_vbd, and xen_platform_pci. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Run the dracut -f command to regenerate initrd.
- If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. xen-pv drivers include xen-blkfront and xen-netfront. VirtIO drivers include virtio_blk, virtio_scsi, virtio_net, virtio_pci, virtio_ring, and virtio. Separate driver names with spaces. Save and exit the /etc/ dracut.conf file. Run the dracut -f command to regenerate initrd.

For details, see **SUSE** and openSUSE.

◯ NOTE

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed in the OS: xen-kmp-default-4.2.2_04_3.0.76_0.11-0.7.5

If xen-kmp is not installed, obtain it from the ISO file and install it.

If you add built-in drivers to the initrd or initramfs file by mistake, the ECS will not be affected.

CentOS and EulerOS

1. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

2. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add_drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~] # vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- 4. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-2.6.32-573.8.1.el6.x86 64.img

If the virtual file system is not the default initramfs, run the **dracut** -f Name of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be /boot/grub/grub.cfg, /boot/grub2/grub.cfg, or /boot/grub/grub.conf depending on the OS.

5. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen

lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initramfs. The following command output will be displayed:

```
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.img | grep xen
                             54888 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root root
block/xen-blkfront.ko
                             45664 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86 64/kernel/
-rwxr--r-- 1 root root
drivers/net/xen-netfront.ko
[root@CTU10000xxxxx home]# lsinitrd /boot/initramfs-`uname -r`.img | grep virtio
-rwxr--r-- 1 root root
                              23448 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
block/virtio_blk.ko
-rwxr--r-- 1 root
                              50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
drivers/net/virtio_net.ko
                    root
                              28424 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
scsi/virtio_scsi.ko
                                 0 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
drwxr-xr-x 2 root
                    root
virtio
                             14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
                    root
virtio/virtio.ko
-rwxr--r-- 1 root
                              21040 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
                    root
virtio/virtio_pci.ko
                              18016 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
-rwxr--r-- 1 root
                    root
virtio/virtio_ring.ko
```


If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

```
cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y
```

Ubuntu and Debian

1. Run the following command to open the **modules** file:

vi /etc/initramfs-tools/modules

 Press i to enter editing mode and add the xen-pv and VirtIO drivers to the /etc/initramfs-tools/modules file (the format varies depending on the OS).

```
[root@CTU10000xxxxx ~]#vi /etc/initramfs-tools/modules
.....
# Examples:
# raid1
# sd_mOd
xen-blkfront
xen-netfront
virtio_blk
virtio_scsi
virtio_net
virtio_pci
virtio_pri
virtio_ring
virtio
```

- 3. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/initramfs-tools/modules file.
- 4. Run the following command to regenerate initrd:

update-initramfs -u

5. Run the following commands to check whether native Xen and KVM drivers have been installed:

lsinitramfs /boot/initrd.img-`uname -r` |grep xen lsinitramfs /boot/initrd.img-`uname -r` |grep virtio

[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep xen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen lib/modules/3.5.0-23-generic/kernel/drivers/net/ethernet/qlogic/netxen/netxen_nic.ko lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback lib/modules/3.5.0-23-generic/kernel/drivers/net/xen-netback/xen-netback.ko lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback lib/modules/3.5.0-23-generic/kernel/drivers/block/xen-blkback/xen-blkback.ko

[root@ CTU10000xxxxx home]# lsinitramfs /boot/initrd.img-`uname -r` |grep virtio lib/modules/3.5.0-23-generic/kernel/drivers/scsi/**virtio_scsi.ko**

■ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
CONFIG_VIRTIO_BLK=y
CONFIG_VIRTIO_NET=y
CONFIG_VIRTIO_RING=y
CONFIG_VIRTIO_PCI=y
CONFIG_VIRTIO_PCI=y
CONFIG_VIRTIO_MMIO_CMDLINE_DEVICES=y
[root@ CTU10000xxxxx home]# cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y
CONFIG_XEN_BLKDEV_FRONTEND=y
CONFIG_XEN_NETDEV_FRONTEND=y

SUSE and openSUSE

If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, modify the /etc/sysconfig/kernel file. For details, see scenario 1.

If the OS version is SUSE 12 SP1, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers. For details, see scenario 2.

If the OS version is later than SUSE 12 SP1 or openSUSE 13, modify the /etc/dracut.conf file and add xen-pv and VirtIO drivers to add_drivers. For details, see scenario 3.

• If the OS version is earlier than SUSE 12 SP1 or openSUSE 13, perform the following steps:

∩ NOTE

For SUSE, run the following command to check whether xen-kmp (driver package for xen-pv) is installed in the OS:

rpm -qa |grep xen-kmp

If information similar to the following is displayed, xen-kmp is installed:

xen-kmp-default-4.2.2 04 3.0.76 0.11-0.7.5

If xen-kmp is not installed, obtain it from the installation ISO and install it first.

a. Run the following command to open the /etc/sysconfig/kernel file:

vi /etc/sysconfig/kernel

b. Add the xen-pv and VirtlO drivers after **INITRD_MODULES**= (the format of drivers depends on the OS).

SIA10000xxxxx:~ # vi /etc/sysconfig/kernel # (like drivers for scsi-controllers, for lvm or reiserfs) #

INITRD_MODULES="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

c. Run the **mkinitrd** command to regenerate initrd:

If the virtual file system is not the default initramfs or initrd, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **menu.lst** or **grub.cfg** file (/boot/grub/menu.lst, /boot/grub/grub.cfg, or /boot/grub2/grub.cfg).

The following is an example initrd file of SUSE 11 SP4:

default 0
timeout 10
gfxmenu (hd0,0)/boot/message
title sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent console=ttyS0,115200n8 console=tty0
net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1 showopts
initrd /boot/initrd.vmx
title Failsafe_sles11sp4_001_[_VMX_]
root (hd0,0)
kernel /boot/linux.vmx vga=0x314 splash=silent ide=nodma apm=off noresume edd=off
powersaved=off nohz=off highres=off processsor.max+cstate=1 nomodeset x11failsafe
console=ttyS0,115200n8 console=tty0 net.ifnames=0 NON_PERSISTENT_DEVICE_NAMES=1
showopts
initrd /boot/initrd.vmx

/boot/initrd.vmx in the initrd line is the initrd file actually used. Run the dracut -f /boot/initrd.vmx command. If the initrd file does not contain the /boot directory, such as /initramfs-xxx, run the dracut -f /boot/initramfs-xxx command.

 Run the following commands to check whether the PVOPS module for Xen or VirtIO module for KVM is loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen

lsinitrd /boot/initrd-`uname -r` | grep virtio SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen

rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/ xen-blkfront.ko

-rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/virtio scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio -rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rvxxr-r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio net.ko

- e. Restart the ECS.
- f. Modify the /boot/grub/menu.lst file. Add xen_platform_pci.dev_unplug=all and modify the root configuration.

Before the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default)

root (hd0,0)

kernel /boot/vmlinuz-3.0.76-0.11-default **root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130** splash=silentcrashkernel=256M-:128M showopts vga=0x314 initrd /boot/initrd-3.0.76-0.11-default

After the modification:

###Don't change this comment -YaST2 identifier: Original name: linux### title SUSE Linux Enterprise Server 11SP4 - 3.0.76-0.11 (default) root (hd0,0) kernel /boot/vmlinuz-3.0.76-0.11-default root=UUID=4eb40294-4c6f-4384-bbb6-b8795bbb1130 splash=silentcrashkernel=256M-:128M showopts vga=0x314 xen_platform_pci.dev_unplug=all initrd /boot/initrd-3.0.76-0.11-default

- Ensure that the root partition is in the UUID format.
- xen_platform_pci.dev_unplug=all is added to shield QEMU devices.
- For SUSE 11 SP1 64bit to SUSE 11 SP4 64bit, add xen_platform_pci.dev_unplug=all to the menu.lst file. For SUSE 12 or later, this function is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether the Xen drivers exist in initrd:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rwxr--r-- 1 root root 42400 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/ xen-blkfront.ko -rwxr--r-- 1 root root 44200 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/

xen-netfront.ko

SIA10000xxxxx:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio -rwxr--r-- 1 root root 19248 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/scsi/ virtio_scsi.ko

-rwxr--r-- 1 root root 23856 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/block/virtio_blk.ko

drwxr-xr-x 2 root root 0 Jul 12 14:53 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio-rwxr--r-- 1 root root 15848 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_ring.ko

-rwxr--r-- 1 root root 20008 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio_pci.ko

-rwxr--r-- 1 root root 12272 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/virtio/virtio.ko

-rwxr--r-- 1 root root 38208 Jun 22 2012 lib/modules/2.6.32-279.el6.x86_64/kernel/drivers/net/virtio_net.ko

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

- If the OS version is SUSE 12 SP1, perform the following steps:
 - a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add-drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default

add_drivers+="ata_piix ata_generic xen_vnif xen_vbd xen_platform_pci virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut -f** *Name of the initramfs or initrd file actually used* command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be **/boot/grub/grub.cfg**, **/boot/grub2/grub.cfg**, or **/boot/grub/grub.conf** depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

• If the OS version is later than SUSE 12 SP1 or openSUSE 13, perform the following steps:

Take SUSE Linux Enterprise Server 12 SP2 (x86_64) as an example.

a. Run the following command to open the /etc/dracut.conf file:

vi /etc/dracut.conf

b. Press i to enter editing mode and add the xen-pv and VirtlO drivers to add_drivers (the format varies depending on the OS).

[root@CTU10000xxxxx ~]# vi /etc/dracut.conf # additional kernel modules to the default add_drivers+="ata_piix ata_generic xen-blkfront xen-netfront virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"

- c. Press **Esc**, enter :wq, and press **Enter**. The system saves the change and exits the /etc/dracut.conf file.
- d. Run the following command to regenerate initrd:

dracut -f /boot/initramfs-File name

If the virtual file system is not the default initramfs, run the **dracut** -f Name of the initramfs or initrd file actually used command. The actual initramfs or initrd file name can be obtained from the **grub.cfg** file, which can be /boot/grub/grub.cfg, /boot/grub2/grub.cfg, or /boot/grub/grub.conf depending on the OS.

e. If the virtual file system is initramfs, run the following commands to check whether native Xen and KVM drivers have been loaded:

lsinitrd /boot/initramfs-`uname -r`.img | grep xen lsinitrd /boot/initramfs-`uname -r`.img | grep virtio

If the virtual file system is initrd, run the following commands to check whether the native Xen and KVM driver modules are successfully loaded:

lsinitrd /boot/initrd-`uname -r` | grep xen lsinitrd /boot/initrd-`uname -r` | grep virtio

Assume that the virtual file system is initrd. The following command output will be displayed:

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep xen -rw-r--r-- 1 root root 69575 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/xen-blkfront.ko

-rw-r--r-- 1 root root 53415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/**xen-netfront.ko**

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall -rwxr-xr-x 1 root root 8320 Sep 28 10:21 lib/modules/4.4.21-69-default/updates/pvdriver/xen-hcall/xen-hcall.ko

sluo-ecs-30dc:~ # lsinitrd /boot/initrd-`uname -r` | grep virtio

-rw-r--r-- 1 root root 29335 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/block/virtio_blk.ko

-rw-r--r- 1 root root 57007 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/net/virtio_net.ko

-rw-r--r- 1 root root 32415 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/scsi/virtio scsi.ko

drwxr-xr-x 2 root root 0 Sep 28 10:21 lib/modules/4.4.21-69-default/kernel/drivers/virtio-rw-r--r-- 1 root root 19623 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio.ko

-rw-r--r-- 1 root root 38943 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_pci.ko

-rw-r--r- 1 root root 24431 Oct 26 2016 lib/modules/4.4.21-69-default/kernel/drivers/virtio/virtio_ring.ko

□ NOTE

If you add built-in drivers to the initrd or initramfs file, the ECS will not be affected. This makes it easy to modify the drivers. However, you cannot check the drivers by running the **lsinitrd** command. You can run the following commands to check whether built-in drivers are in the kernel:

cat /boot/config-`uname -r` | grep CONFIG_VIRTIO | grep y
cat /boot/config-`uname -r` | grep CONFIG_XEN | grep y

7.16 Image Tags

7.16.1 How Many Tags Can I Add to an Image?

An image can have a maximum of 10 tags.

7.16.2 How Do I Add, Delete, and Modify Image Tags?

□ NOTE

- When adding predefined tags to an image or searching for an image using predefined tags, you must have permission to access the Tag Management Service (TMS).
- 1. Access the IMS console.
 - Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**.

The IMS console is displayed.

- 2. Click the **Private Images** tab and click the image name to display the image details.
 - To modify an image tag, go to 3.
 - To delete an image tag, go to 4.

- To add an image tag, go to 5.
- 3. Click the **Tags** tab, locate the target tag, and click **Edit** in the **Operation** column. In the displayed dialog box, modify the tag.
- 4. Click the **Tags** tab, locate the target tag, and click **Delete** in the **Operation** column. In the displayed dialog box, click **Yes**.
- 5. Click the **Tags** tab and then **Add Tag**. In the displayed dialog box, add a tag.

7.16.3 How Do I Search for Private Images by Tag?

□ NOTE

• When adding predefined tags to an image or searching for an image using predefined tags, you must have permission to access the Tag Management Service (TMS).

Search for Private Images by Tag

- 1. Access the IMS console.
 - a. Log in to the management console.
 - b. Under **Computing**, click **Image Management Service**. The IMS console is displayed.
- 2. Click the **Private Images** tab and then **Search by Tag**.
- 3. Enter the tag key and value.

Neither the tag key nor tag value can be empty. When the tag key and tag value are matched, the system automatically shows your desired private images.

4. Click to add a tag.

You can add multiple tags to search for shared images. The system will display private images that match all tags.

5. Click Search.

The system searches for private images based on tag keys or tag values.

A Change History

Released On	Description
2023-03-30	This issue is the tenth official release.
	Added the following content:
	Product Advantages
	Application Scenarios
	• Features
	Constraints
	• Permissions
	Creating a Data Disk Image from an External Image File
	Creating a Full-ECS Image from a CBR Backup
	Importing an Image
	Permissions Management
	Creating a User and Granting Permissions
	Creating a Custom Policy
	Basic Concepts
	What Do I Do If I Cannot Find a Desired Image?
	What Are the Differences Between Images and Backups?
	Can I Tailor an Image?
	 How Can I Back Up the Current Status of an ECS for Restoration in the Case of a System Fault?
	How Can I Apply a Private Image to an Existing ECS?
	• Can I Import Data from a Data Disk Image to a Data Disk?
	End-of-Support for OSs
	What Do I Do If CentOS Linux Is No Longer Maintained?
	Full-ECS Image FAQs
	How Can I Use a Backup to Create an EVS Disk or ECS?

Released On	Description
	• Is There Any Difference Between the Image Created from a CSBS/CBR Backup and That Created from an ECS?
	 What Do I Do If an ECS Created from a Windows Image Failed to Start After Running Sysprep?
	 What Are the Differences Between Sharing Images and Replicating Images?
	 Why Can't I Find My Private Image When I Want to Use It to Create an ECS or Change the OS of an ECS?
	Image Replication
	Image Deletion
	 What Do I Do If Private Images Cannot Be Found on the Enterprise Project Management Service Page After EPS Is Enabled?
	 What Do I Do If I Cannot Create an Image from a CSBS Backup or BMS Using a Subaccount with the Allow_all Permission After EPS Is Enabled?
	Cloud-Init
	Can I Change the Image of a Purchased ECS?
	Driver Installation
	Must I Install Guest OS Drivers on an ECS?
	Why Do I Need to Install and Update VMTools for Windows?
	 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?
	How Do I Install UVP VMTools in Windows?
	How Do I Install Native KVM Drivers in Linux?
	• Image Tags
	How Many Tags Can I Add to an Image?
	How Do I Add, Delete, and Modify Image Tags?
	How Do I Search for Private Images by Tag?
	Modified the following content:
	 Added a figure to show image types in What Is Image Management Service?
	 Added the Object Storage Service (OBS) and the figure showing relationships between IMS and other services in Related Services
	Added figures in Introduction.
	 Updated the description that system disk images cannot be exported in Creating a System Disk Image from a Linux ECS.
	Added restrictions on VMDK image files in Preparing an Image File.

Released On	Description
	Added that the bucket file and the image to be registered must be in the same region in Uploading an External Image File and Uploading an External Image File.
	• Clarified that the operations in Overview and Overview are only applicable to the management console.
	Added the Boot Mode attribute and updated the console operation screenshot accordingly in Modifying an Image .
	 Added a screenshot of the console operations in Checking the Disk Capacity of an Image.
	 Added the description of using a full-ECS private image to create an ECS in Creating an ECS from an Image.
	Added new scenarios in Deleting Images .
	 Clarified that the cloud platform does not ensure the integrity or security of shared images and advised users to use images from a trusted sharer in Overview.
	Added notes for a step in Sharing Specified Images.
	 Added follow-up operations in Accepting or Rejecting Shared Images.
	Added new questions and answers in Image Creation FAQs.
	Added new questions and answers in Image Sharing FAQs.
	 Updated the console operation screenshot in How Do I Make a System Disk Image Support Fast ECS Creation?.
2023-01-10	This issue is the ninth official release.
	Added the following content:
	What Are the Differences Between Import/Export and Fast Import/Export?
	Modified the following content:
	 Modified the description in Preparing an Image File and Preparing an Image File.
	 Updated the link for obtaining qemu-img-hw in Converting the Image Format Using qemu-img-hw.
	Added fast export in Exporting an Image.
2022-05-24	This issue is the eighth official release.
	Added the following content:
	How Do I Select an OS?

Released On	Description
2021-11-30	This issue is the seventh official release. Added the following content:
	• 5.7 "Creating a Data Disk Image from an ECS"
	Modified the following content:
	 Added the relationship between IMS and EVS in Related Services.
	Added the method of creating a data disk image from an ECS in Introduction.
2021-10-30	This issue is the sixth official release.
	Added the following content:
	What Do I Do If I Cannot Share My Images?
	Modified the following content:
	 Added the description of a full-ECS image's status in Creating a Full-ECS Image from an ECS.
2021-06-30	This issue is the fifth official release.
	Added the following content:
	• Why Can't I Find an ISO Image When I Want to Use It to Create an ECS or Change the OS of an ECS?
	Can I Download My Private Images to a Local PC?
	 Can I Use the System Disk Image of an ECS on a BMS After I Export It from the Cloud Platform?
	• Why Is the Image Size in an OBS Bucket Different from That Displayed in IMS?
	Can I Download a Public Image to My Local PC?
	 What Do I Do If the Export Option Is Unavailable for My Image?
2021-03-30	This issue is the fourth official release.
	Modified the following content:
	 Added CentOS 7.8/7.9, Ubuntu 20.04, and SLES 12 SP5 in External Image File Formats and Supported OSs.
	 Added the startup file /boot/efi/EFI/euleros/grub.cfg of EulerOS 2.9 in Changing the Disk Identifier in the GRUB Configuration File to UUID.
	• Added the configuration of Cloud-Init 18.3 and later versions in Configuring Cloud-Init.
2020-12-31	This issue is the third official release.
	Added the following content:
	Checking the Disk Capacity of an Image

Released On	Description
2019-11-30	This issue is the second official release. Optimized the document, including structure adjustment, content optimization, and flowchart supplementation.
2018-08-16	This issue is the first official release.