

Image Management Service

User Guide

Issue 01
Date 2024-04-15



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Contents

1 Overview.....	1
1.1 What Is Image Management Service?.....	1
1.2 Supported OSs.....	3
1.2.1 OSs Supported by Different Types of ECSs.....	3
1.2.2 External Image File Formats and Supported OSs.....	8
1.2.3 OSs Supporting UEFI Boot Mode.....	15
1.3 Permissions.....	17
1.4 Basic Concepts.....	19
1.4.1 Region and AZ.....	19
1.4.2 Common Image Formats.....	20
1.5 Related Services.....	22
2 Creating a Private Image.....	23
2.1 Introduction.....	23
2.2 Creating a System Disk Image from a Windows ECS.....	23
2.3 Creating a System Disk Image from a Linux ECS.....	26
2.4 Creating a Windows System Disk Image from an External Image File.....	29
2.4.1 Overview.....	29
2.4.2 Preparing an Image File.....	30
2.4.3 Uploading an External Image File.....	32
2.4.4 Registering an External Image File as a Private Image.....	32
2.4.5 Creating a Windows ECS from an Image.....	35
2.5 Creating a Linux System Disk Image from an External Image File.....	36
2.5.1 Overview.....	36
2.5.2 Preparing an Image File.....	36
2.5.3 Uploading an External Image File.....	39
2.5.4 Registering an External Image File as a Private Image.....	39
2.5.5 Creating a Linux ECS from an Image.....	42
2.6 Creating a Data Disk Image from an ECS.....	42
2.7 Creating a Data Disk Image from an External Image File.....	44
2.8 Creating a Full-ECS Image from an ECS.....	46
2.9 Creating a Full-ECS Image from a CSBS Backup.....	49
2.10 Creating a Full-ECS Image from a CBR Backup.....	50
2.11 Creating a Windows System Disk Image from an ISO File.....	52

2.11.1 Overview.....	52
2.11.2 Integrating the VMTools Driver into an ISO File.....	54
2.11.3 Registering an ISO File as an ISO Image.....	58
2.11.4 Creating a Windows ECS from an ISO Image.....	59
2.11.5 Installing a Windows OS and the VMTools Driver.....	60
2.11.6 Configuring the ECS and Creating a Windows System Disk Image.....	70
2.12 Creating a Linux System Disk Image from an ISO File.....	71
2.12.1 Overview.....	71
2.12.2 Registering an ISO File as an ISO Image.....	73
2.12.3 Creating a Linux ECS from an ISO Image.....	74
2.12.4 Installing a Linux OS.....	75
2.12.5 Configuring the ECS and Creating a Linux System Disk Image.....	79
2.13 Quickly Importing an Image File.....	80
2.13.1 Overview.....	80
2.13.2 Quickly Importing an Image File (Linux).....	83
2.13.3 Quickly Importing an Image File (Windows).....	88
3 Managing Private Images.....	91
3.1 Modifying an Image.....	91
3.2 Exporting Image List.....	92
3.3 Checking the Disk Capacity of an Image.....	93
3.4 Creating an ECS from an Image.....	94
3.5 Deleting Images.....	95
3.6 Sharing Images.....	96
3.6.1 Overview.....	96
3.6.2 Obtaining the Project ID.....	96
3.6.3 Sharing Specified Images.....	97
3.6.4 Accepting or Rejecting Shared Images.....	98
3.6.5 Rejecting Accepted Images.....	99
3.6.6 Accepting Rejected Images.....	100
3.6.7 Stopping Sharing Images.....	101
3.6.8 Adding Tenants Who Can Use Shared Images.....	101
3.6.9 Deleting Image Recipients Who Can Use Shared Images.....	102
3.6.10 Replicating a Shared Image.....	102
3.7 Exporting an Image.....	103
3.8 Optimizing a Windows Private Image.....	105
3.8.1 Optimization Process.....	105
3.8.2 Viewing the Virtualization Type of a Windows ECS.....	105
3.8.3 Obtaining Required Software Packages.....	106
3.8.4 Installing the PV Driver.....	107
3.8.5 Installing UVP VMTools.....	109
3.8.6 Clearing System Logs.....	111
3.9 Optimizing a Linux Private Image.....	112

3.9.1 Optimization Process.....	112
3.9.2 Checking Whether a Private Image Needs to be Optimized.....	113
3.9.3 Uninstalling PV Drivers from a Linux ECS.....	114
3.9.4 Changing the Disk Identifier in the GRUB Configuration File to UUID.....	115
3.9.5 Changing the Disk Identifier in the fstab File to UUID.....	119
3.9.6 Installing Native Xen and KVM Drivers.....	120
3.9.7 Installing Native KVM Drivers.....	128
3.9.8 Clearing System Logs.....	134
3.10 Replicating Images.....	135
3.11 Tagging an Image.....	136
3.12 Auditing Key Operations.....	137
3.12.1 IMS Operations Recorded by CTS.....	137
3.12.2 Viewing Traces.....	139
3.13 Converting the Image Format.....	139
4 Windows Operations.....	145
4.1 Setting the NIC to DHCP.....	145
4.2 Enabling Remote Desktop Connection.....	147
4.3 Installing and Configuring Cloudbase-Init.....	148
4.4 Installing the One-Click Password Reset Plug-In.....	154
4.5 Running Sysprep.....	157
5 Linux Operations.....	160
5.1 Setting the NIC to DHCP.....	160
5.2 Deleting Files from the Network Rule Directory.....	162
5.3 Installing Cloud-Init.....	164
5.4 Configuring Cloud-Init.....	169
5.5 Installing the One-Click Password Reset Plug-In.....	173
5.6 Installing Special Linux Drivers.....	177
5.7 Detaching Data Disks from an ECS.....	178
6 Permissions Management.....	180
6.1 Creating a User and Granting Permissions.....	180
6.2 Creating a Custom Policy.....	182
7 FAQs.....	184
7.1 Image Consulting.....	184
7.1.1 How Do I Select an Image?.....	184
7.1.2 How Do I Increase the Image Quota?.....	185
7.1.3 What Are the Differences Between Images and Backups?.....	186
7.1.4 Can I Tailor an Image?.....	188
7.1.5 How Can I Back Up the Current Status of an ECS for Restoration in the Case of a System Fault?...	188
7.1.6 How Can I Apply a Private Image to an Existing ECS?.....	188
7.1.7 Can I Import Data from a Data Disk Image to a Data Disk?.....	188
7.1.8 Can I Use Private Images of Other Tenants?.....	189

7.2 Image Creation.....	189
7.2.1 Image Creation FAQs.....	189
7.2.2 Full-ECS Image FAQs.....	190
7.2.3 Is There Any Difference Between the Image Created from a CSBS/CBR Backup and That Created from an ECS?.....	191
7.2.4 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?.....	191
7.2.5 How Do I Create a Full-ECS Image Using an ECS That Has a Spanned Volume?.....	191
7.2.6 Why Is Sysprep Required for Creating a Private Image from a Windows ECS?.....	192
7.2.7 What Do I Do If an ECS Created from a Windows Image Failed to Start After Running Sysprep?...	192
7.2.8 What Do I Do If I Cannot Create an Image in ZVHD2 Format Using an API?.....	194
7.3 Image Sharing.....	194
7.3.1 Image Sharing FAQs.....	194
7.3.2 What Are the Differences Between Sharing Images and Replicating Images?.....	196
7.3.3 What Do I Do If I Cannot Share My Images?.....	197
7.4 OS.....	197
7.4.1 How Do I Select an OS?.....	197
7.4.2 How Is BIOS Different from UEFI?.....	197
7.4.3 How Do I Delete Redundant Network Connections from a Windows ECS?.....	198
7.4.4 What Do I Do If an ECS Starts Slowly?.....	199
7.4.5 What Do I Do If the One-Click Password Resetting Plug-In Failed to Start?.....	200
7.4.6 What Do I Do If a Windows 7 ECS Equipped with an Intel 82599 NIC Reports an Error in SR-IOV Scenarios?.....	202
7.4.7 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?.....	202
7.5 Image Importing.....	203
7.5.1 Can I Use Images in Formats Other Than the Specified Ones?.....	203
7.5.2 What Are the Impacts If I Do Not Pre-configure an ECS Used to Create a Private Image?.....	203
7.5.3 What Do I Do If I Configured an Incorrect OS or System Disk Capacity During Private Image Registration Using an Image File?.....	204
7.5.4 What Do I Do If the System Disk Capacity 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?.....	204
7.6 Image Exporting.....	204
7.6.1 Can I Download My Private Images to a Local PC?.....	204
7.6.2 Can I Use the System Disk Image of an ECS on a BMS After I Export It from the Cloud Platform?.....	204
7.6.3 Why Is the Image Size in an OBS Bucket Different from That Displayed in IMS?.....	205
7.6.4 Can I Download a Public Image to My Local PC?.....	205
7.6.5 What Do I Do If the Export Option Is Unavailable for My Image?.....	205
7.7 Image Optimization.....	205
7.7.1 Must I Install Guest OS Drivers on an ECS?.....	205
7.7.2 Why Do I Need to Install and Update VMTools for Windows?.....	206
7.7.3 What Will the System Do to an Image File When I Use the File to Register a Private Image?.....	206
7.7.4 How Do I Configure an ECS or Image File Before I Use It to Create an Image?.....	208

7.7.5 What Do I Do If a Windows Image File Is Not Pre-Configured When I Use It to Register a Private Image?.....	210
7.7.6 What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?.....	212
7.7.7 How Do I Enable NIC Multi-Queue for an Image?.....	215
7.7.8 How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?.....	220
7.7.9 How Do I Make a System Disk Image Support Fast ECS Creation?.....	238
7.7.10 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?.....	238
7.7.11 How Do I Install Native Xen and KVM Drivers?.....	239
7.8 Image Replication.....	246
7.9 Image Deletion.....	247
7.10 Image Encryption.....	247
7.11 Cloud-Init.....	247
7.11.1 Cloud-Init Installation FAQ.....	247
7.11.2 What Can I Do with a Cloud-Init ECS?.....	252
7.11.3 What Do I Do If Injecting the Key or Password Using Cloud-Init Failed After NetworkManager Is Installed?.....	252
7.11.4 How Do I Install growpart for SUSE 11 SP4?.....	253
7.12 ECS Creation.....	254
7.12.1 Can I Change the Image of a Purchased ECS?.....	254
7.12.2 Can I Use a Private Image to Create ECSs with Different Hardware Specifications from the ECS Used to Create the Private Image?.....	254
7.12.3 Can I Specify the System Disk Capacity When I Create an ECS Using an Image?.....	254
7.12.4 What Do I Do If No Partition Is Found During the Startup of an ECS Created from an Imported Private Image?.....	254
7.12.5 What Do I Do If the Disks of an ECS Created from a CentOS Image Cannot Be Found?.....	257
7.12.6 What Do I Do If an ECS Created from a Windows Image Failed to Start When I Have Enabled Automatic Configuration During Image Registration?.....	258
7.12.7 What Do I Do If an Exception Occurs When I Start an ECS Created from an Image Using the UEFI Boot Mode?.....	259
7.13 Driver Installation.....	259
7.13.1 Must I Install Guest OS Drivers on an ECS?.....	259
7.13.2 Why Do I Need to Install and Update VMTools for Windows?.....	259
7.13.3 What Is the Cause of the Failure to Install a Guest OS Driver on a Windows ECS?.....	260
7.13.4 How Do I Install UVP VMTools in Windows?.....	260
7.13.5 How Do I Install Native KVM Drivers in Linux?.....	261
7.13.6 How Do I Install Native Xen and KVM Drivers?.....	261
7.14 Image Tags.....	268
7.14.1 How Many Tags Can I Add to an Image?.....	268
7.14.2 How Do I Add, Delete, and Modify Image Tags?.....	268
7.14.3 How Do I Search for Private Images by Tag?.....	269
A Change History.....	270

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 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.

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	<p>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.</p> <p>A private image can be a system disk image, data disk image, ISO image, or full-ECS image.</p> <ul style="list-style-type: none">• 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 that has the same disk capacity.
Shared image	<p>A shared image is a private image another user has shared with you.</p> <p>For more information about shared images, see "Sharing Images" in <i>Image Management Service User Guide</i>.</p>

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 capacity, 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 cloud platform 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 Supported OSs

1.2.1 OSs Supported by Different Types of ECSs

This section describes the OSs supported by different types of ECSs.

x86 ECSs

- **Table 1-1** lists the OSs supported by the following ECSs:
General-purpose T6
General computing S2, S3, S6, SN3
General computing-plus C3, C6
Memory-optimized M2, M3, M6
High-performance computing HC2, H3
Disk-intensive D2, D3, D6
- **Table 1-2** lists the OSs supported by the following ECSs:
General computing-plus C3ne, C6, C6s
Memory-optimized M3ne
- **Table 1-3** lists the OSs supported by the following ECSs:
Large-memory E3
- **Table 1-4** lists the OSs supported by the following ECSs:
Ultra-high I/O I3, IR3
- **Table 1-5** lists the OSs supported by the following ECSs:
General-purpose: Gs
General computing-plus: Gc
Memory-optimized: Gm
- For the OSs supported by GPU-accelerated ECSs, see the GPU product description.

NOTE

- It is recommended that you use the official OS release versions. Do not tailor or customize the release versions, or 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.

Table 1-1 Supported OS versions

OS	OS Version
Windows	Windows Server 2008 R2 Standard/Enterprise/ Datacenter/Web Windows Server 2012 Standard/Datacenter Windows Server 2012 R2 Standard/Datacenter Windows Server 2016 Standard/Datacenter Windows Server 2019 Standard/Datacenter Windows Server Core Version 1709
CentOS	64-bit: CentOS 6.10, 6.9, 6.8, 6.7, 6.6, 6.5, 6.4, and 6.3 64-bit: CentOS 7.9, 7.8, 7.7, 7.6, 7.5, 7.4, 7.3, 7.2, 7.1, and 7.0 64-bit: CentOS 8.3, 8.2, 8.1, and 8.0
Ubuntu	64-bit: Ubuntu 22.04, 20.04, 18.04, 16.04, 14.04, and 12.04 Server
EulerOS	64-bit: EulerOS 2.5, 2.3, and 2.2
Red Hat	64-bit: Red Hat 6.10, 6.9, 6.8, 6.7, 6.6, 6.5, and 6.4 64-bit: Red Hat 7.9, 7.8, 7.6, 7.5, 7.4, 7.3, 7.2, 7.1, and 7.0 64-bit: Red Hat 8.0
SUSE Linux Enterprise	64-bit: SLES 11 SP4 and 11 SP3 64-bit: SLES 12 SP4, 12 SP3, 12 SP2, 12 SP1, and 12 64-bit: SLES 15, 15 SP1, 15 SP2
Debian	64-bit: Debian 8.0.0–8.10.0 64-bit: Debian 9.13.0, 9.12.0, 9.11.0, 9.9.0, 9.8.0, 9.7.0, 9.6.0, 9.5.0, 9.4.0, 9.3.0, and 9.0.0 64-bit: Debian 10.0.0–10.5.0, 10.7.0
openSUSE	64-bit: openSUSE 13.2 64-bit: openSUSE Leap 15.1 and 15.0 64-bit: openSUSE Leap 42.3, 42.2, and 42.1
Fedora	64-bit: Fedora 22–32
CoreOS	64-bit: CoreOS 2079.4.0
FreeBSD	64-bit: FreeBSD 12.1, 11.0, and 10.3
openEuler	64-bit: openEuler 20.03

Table 1-2 Supported OS versions

OS	OS Version
Windows	Windows Server 2008 R2 Enterprise/ Datacenter/Web/Standard Windows Server 2012 R2 Standard/Datacenter Windows Server 2016 Standard/Datacenter Windows Server 2019 Datacenter Windows Server Version 1709 Datacenter
CentOS	64-bit: CentOS 6 CentOS 7 CentOS 8
Ubuntu	64-bit: Ubuntu 14.04 Server Ubuntu 16.04 Server Ubuntu 18.04 Server Ubuntu 20.04 Server Ubuntu 22.04 Server
EulerOS	64-bit: EulerOS 2.2 EulerOS 2.3 EulerOS 2.5
Red Hat	64-bit: Red Hat 6 Red Hat 7
SUSE Linux Enterprise	64-bit: SLES 11 SLES 12
Debian	64-bit: Debian 8 Debian 9
openSUSE	64-bit: openSUSE 15.0 openSUSE 15.1
Fedora	64-bit: Fedora 2x

OS	OS Version
openEuler	64-bit: openEuler 20.03

Table 1-3 Supported OS versions

OS	OS Version
CentOS	64-bit: CentOS 6 CentOS 7 CentOS 8
Ubuntu	64-bit: Ubuntu 14.04 Server Ubuntu 16.04 Server Ubuntu 18.04 Server Ubuntu 20.04 Server
EulerOS	64-bit: EulerOS 2.2 EulerOS 2.3 EulerOS 2.5
Red Hat	64-bit: Red Hat 6 Red Hat 7
SUSE Linux Enterprise	64-bit: SLES 11 SLES 12 SLES 15
Debian	64-bit: Debian 8 Debian 9 Debian 10
openSUSE	64-bit: openSUSE 15.0 openSUSE 15.1
Fedora	64-bit: Fedora 2x Fedora 3x

OS	OS Version
openEuler	64-bit: openEuler 20.03

Table 1-4 Supported OS versions

OS	OS Version
CentOS	64-bit: CentOS 7
Ubuntu	64-bit: Ubuntu 14.04 Server Ubuntu 16.04 Server Ubuntu 18.04 Server
EulerOS	64-bit: EulerOS 2.2 EulerOS 2.3
SUSE Linux Enterprise	64-bit: SLES 12
Debian NOTE IR3 ECSs do not support Debian.	64-bit: Debian 8 Debian 9

Table 1-5 Supported OS versions

OS	OS Version
openEuler	64-bit: OpenEuler 22.03
Kylin	64-bit: KylinOS_V10_SP1 64-bit: KylinOS_V10_SP2 64-bit: KylinOS_V10_SP3
UnionTechOS	64-bit: UnionTechOS Server 20 1050e
Ubuntu	Ubuntu Server 20.04.2 Ubuntu Server 20.10

Kunpeng ECSs

- **Table 1-6** lists the OSs supported by the following ECSs:
Kunpeng general computing-plus kC1
Kunpeng memory-optimized kM1
- Kunpeng ultra-high I/O (kI1) ECSs support only CentOS 7.6.
- Kunpeng AI inference-accelerated ECSs (kAi1s) support only CentOS 7.6 and Ubuntu 18.04 Server.

Table 1-6 Supported OS versions

OS	OS Version
CentOS	64-bit: CentOS 7.6, 7.5, and 7.4 64-bit: CentOS 8.0
Ubuntu	64-bit: Ubuntu 18.04 Server
EulerOS	64-bit: EulerOS 2.8
Red Hat	64-bit: Red Hat 7.6 and 7.5
SUSE Linux Enterprise	64-bit: SLES 12 SP5 and SP4 64-bit: SLES 15
openSUSE	64-bit: openSUSE Leap 15.0
Fedora	64-bit: Fedora 29
Debian	64-bit: Debian 10.2.0
openEuler	64-bit: openEuler 20.03
Kylin	64-bit: KylinOS_V10_SP1 64-bit: KylinOS_V10_SP2 64-bit: KylinOS_V10_SP3
UnionTechOS	64-bit: UnionTechOS Server 20 1050e
NeoKylin	64-bit: NeoKylin 7.6

1.2.2 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 1-7](#) and [Table 1-8](#) list the OSs supported by external image files.

If the OS cannot be identified or is not supported:

- For Windows, **Other_Windows (64_bit)** or **Other_Windows (32_bit)** will be selected during image registration.
- For Linux, **Other_Linux (64_bit)** or **Other_Linux (32_bit)** will be selected during image registration.

NOTE

- Uploading image files containing OSs not listed in [Table 1-7](#) and [Table 1-8](#) may fail. You are advised to contact the administrator 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 1-7 Supported OSs (x86)

OS	Version
Rocky Linux	Rocky Linux 8.5 64bit Rocky Linux 8.4 64bit Rocky Linux 8.3 64bit
AlmaLinux	AlmaLinux 8.4 64bit AlmaLinux 8.3 64bit
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

OS	Version
SUSE	SUSE Linux Enterprise Server 15 SP3 64bit SUSE Linux Enterprise Server 15 SP2 64bit 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 11 SP4 64bit SUSE Linux Enterprise Server 11 SP3 64bit SUSE Linux Enterprise Server 11 SP3 32bit
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

OS	Version
Red Hat	Red Hat Linux Enterprise 8.0 64bit Red Hat Linux Enterprise 7.9 64bit Red Hat Linux Enterprise 7.8 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
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 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

OS	Version
openSUSE	openSUSE 42.3 64bit openSUSE 42.2 64bit openSUSE 42.1 64bit openSUSE 15.3 64bit openSUSE 15.1 64bit openSUSE 15.0 64bit openSUSE 13.2 64bit openSUSE 11.3 64bit
CentOS	CentOS 8.3 64bit CentOS 8.2 64bit CentOS 8.1 64bit CentOS 8.0 64bit 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

OS	Version
Debian	Debian GNU/Linux 10.7.0 64bit Debian GNU/Linux 10.5.0 64bit Debian GNU/Linux 10.4.0 64bit Debian GNU/Linux 10.3.0 64bit Debian GNU/Linux 10.2.0 64bit Debian GNU/Linux 10.1.0 64bit Debian GNU/Linux 10.0.0 64bit Debian GNU/Linux 9.13.0 64bit Debian GNU/Linux 9.3.0 64bit Debian GNU/Linux 9.0.0 64bit Debian GNU/Linux 8.10.0 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
Fedora	Fedora 32 64bit Fedora 31 64bit 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 2.10 64bit EulerOS 2.9 64bit EulerOS 2.5 64bit EulerOS 2.3 64bit EulerOS 2.2 64bit EulerOS 2.1 64bit

OS	Version
CoreOS	CoreOS 1800.1.0 CoreOS 1745.2.0 CoreOS 1632.0.0 CoreOS 1520.8.0 CoreOS 1465.8.0 CoreOS 1298.5.0 CoreOS 1122.3.0 CoreOS 1122.2.0 CoreOS 1185.5.0 CoreOS 1068.10.0 CoreOS 1010.5.0 CoreOS 1298.6.0
openEuler	openEuler 20.03 64bit
NeoKylin	NeoKylin 7.6 64bit NeoKylin 7.4 64bit NeoKylin Server release 5.0 U2 64bit NeoKylin Linux Advanced Server release 7.0 U5 64bit

Table 1-8 Supported OSs (Arm)

OS	Version
AlmaLinux	AlmaLinux 8.4 64bit AlmaLinux 8.3 64bit
CentOS	CentOS 7.6 64bit CentOS 7.5 64bit CentOS 7.4 64bit
Debian	Debian GNU/Linux 10.2.0 64bit
EulerOS	EulerOS 2.10 64bit EulerOS 2.9 64bit EulerOS 2.8 64bit
Fedora	Fedora 29 64bit
Ubuntu	Ubuntu 20.04 Server 64bit Ubuntu 19.04 Server 64bit Ubuntu 18.04 Server 64bit
SUSE	SUSE Linux Enterprise Server 12 SP5 64bit

OS	Version
openEuler	openEuler 20.03 64bit
openSUSE	openSUSE 15.0 64bit
NeoKylin	NeoKylin V7 64bit NeoKylin 7.7 64bit
UnionTech	UOS 20 64bit
Kylin	Kylin V10 64bit Kylin Desktop V10 64bit
Kylinsec	KylinSec 3.3 64bit
NeoShine	iSoft 5.1 64bit

Related Operations

For how to upload external image files, see "Uploading an Image File (Windows)" and "Uploading an Image File (Linux)".

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 (Windows)" and "Registering an External Image File as a Private Image (Linux)".

1.2.3 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?" in the FAQ.

Table 1-9 lists the OSs that support the UEFI boot mode.

Table 1-9 OSs supporting UEFI boot mode

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

OS	Version
	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	Fedora 29 64bit
	Fedora 24 64bit
Debian	Debian GNU/Linux 8.8.0 64bit
CentOS	CentOS 7.6 64bit
	CentOS 7.5 64bit
	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

OS	Version
	EulerOS 2.3 64bit
	EulerOS 2.2 64bit
openEuler	openEuler 20.03 64bit

1.3 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 *Identity and Access Management 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 1-10 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 1-11 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 1-12 lists the common operations supported by system-defined permissions for IMS.

Table 1-12 Common operations supported by system-defined permissions

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

1.4 Basic Concepts

1.4.1 Region and AZ

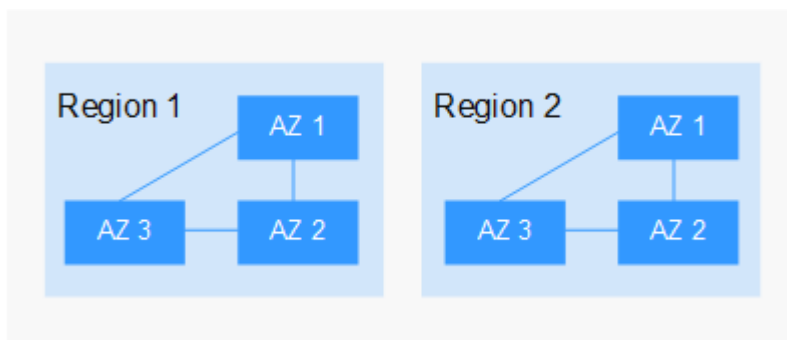
Concept

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 1-1](#) shows the relationship between regions and AZs.

Figure 1-1 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](#).

1.4.2 Common Image Formats

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

Table 1-13 lists the common image formats.

Table 1-13 Common image formats

Image 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
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: <ul style="list-style-type: none">• 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

Image Format	Description	Remarks
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
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

Image Format	Description	Remarks
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

1.5 Related Services

Table 1-14 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.	<ul style="list-style-type: none">• 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 images
Elastic Volume Service (EVS)	You can create a data disk image using a data disk of an ECS. The created data disk image can be used to create other EVS disks.	Creating a data disk image from an ECS
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

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 Data Disk Image from an ECS](#)
- [Creating a Data 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 Full-ECS Image from a CBR Backup](#)
- [Creating a Windows System Disk Image from an ISO File](#)
- [Creating a Linux System Disk Image from an ISO File](#)

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

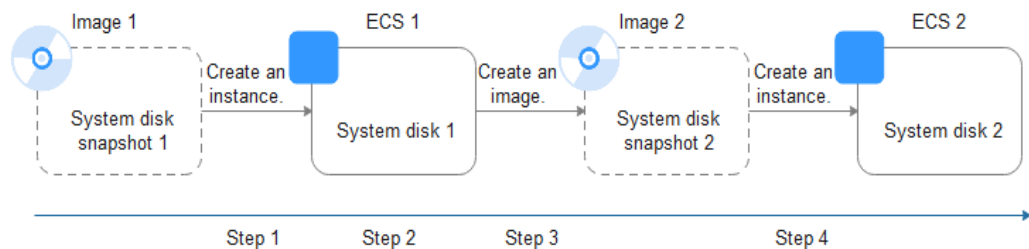
environment), you can create a system disk image based on this configured ECS. Then, all new ECSs created from this image will have the same software and environment preinstalled.

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 2-1 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.

NOTE

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](#).
- Check whether the one-click password reset plug-in has been installed on the ECS. The password reset function on the management console is only available for new ECSs that have this plug-in installed. For details, see [Installing the One-Click Password Reset Plug-In](#).
- 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 VMTTools 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, the one-click password reset plug-in and Cloudbase-Init have been installed by default. You can follow the guide in the prerequisites to verify the installation.

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.
2. 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
Type	Select System disk image .
Source	Select ECS and select an ECS with required configurations.

Table 2-2 Image information

Parameter	Description
Name	Set a name for the image.
Description	(Optional) Enter a description of the image.

NOTE

The parameters may vary depending on enterprises and organizations.

3. Click **Apply Now**.
4. Confirm the settings and click **Submit Application**.

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.

NOTE

- Do not perform any operations on the selected ECS or its associated resources during image creation.

----End

Follow-up Procedure

After a system disk image is created, you can:

- 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

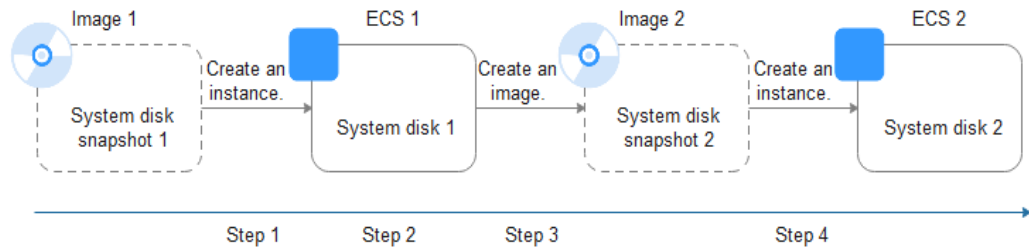
Scenarios

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 2-2 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.

NOTE

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
- 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. For details, see [Setting the NIC to DHCP](#).
- Install special drivers. The normal running and advanced functions of some ECSs depend on certain drivers. For example, H2 ECSs depend on the InfiniBand NIC driver. For details, see [Installing Special Linux Drivers](#).
- Check whether the one-click password reset plug-in has been installed on the ECS. The password reset function on the management console is only available for new ECSs that have this plug-in installed. For details, see [Installing the One-Click Password Reset Plug-In](#).

- 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, the one-click password reset plug-in and Cloud-Init have been installed by default. You can follow the guide to verify the installation.

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.
2. 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
Type	Select System disk image .
Source	Select ECS and select an ECS with required configurations.

Table 2-4 Image information

Parameter	Description
Name	Set a name for the image.
Description	(Optional) Enter a description of the image.

 **NOTE**

The parameters may vary depending on enterprises and organizations.

3. Click **Apply Now**.
4. Confirm the settings and click **Submit Application**.

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.

 **NOTE**

- Do not perform any operations on the selected ECS or its associated resources during image creation.

----End

Follow-up Procedure

After a system disk image is created, you can:

- 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.

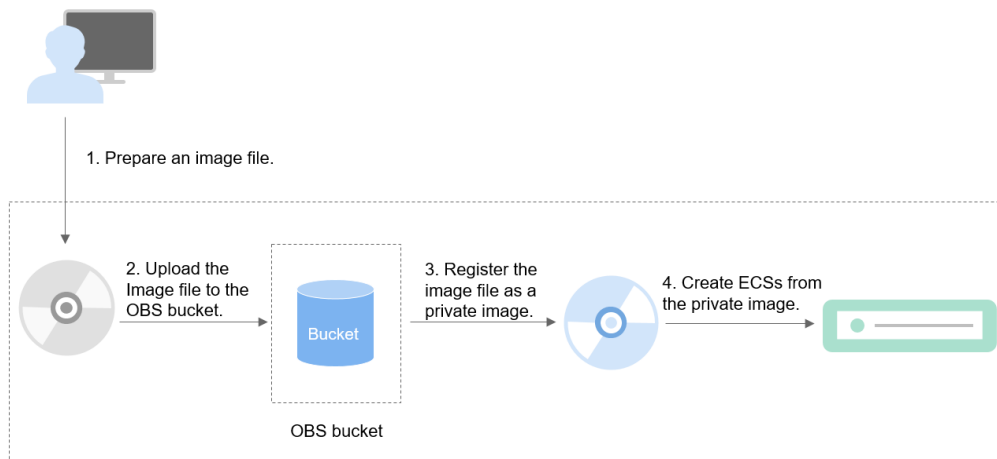
2.4 Creating a Windows System Disk Image from an External Image File

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 2-3](#) shows the process of creating a private image.

Figure 2-3 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:

1. 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](#).
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 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	<ul style="list-style-type: none">• 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. <p>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.</p>
Image format	VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD
Image size	<p>Maximum file size: 128 GB</p> <p>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.</p> <ul style="list-style-type: none">• For details about how to convert the image file format, see Converting the Image Format.• For details about fast import, see fast image file import.
Network	<p>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</p> <p>The following value-added operations are optional:</p> <ul style="list-style-type: none">• 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?• Configuring dynamic assignment of IPv6 addresses IPv6 addresses are used to deal with IPv4 address exhaustion. If dynamic configuration is enabled in an image file, the ECSs created from this file will be automatically assigned an IPv6 address. These ECSs will support both IPv4 and IPv6 addresses. Configure dynamic assignment of IPv6 addresses. For details, see How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?

Image File Property	Requirement
Tool	<p>You are advised to install Cloudbase-Init.</p> <p>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.</p> <p>For details, see Installing and Configuring Cloudbase-Init.</p>
Driver	<ul style="list-style-type: none">• Installing the PV Driver• Installing UVP VMTools
Other requirements	<ul style="list-style-type: none">• Currently, images with data disks cannot be created. The image file must contain only the system disk, and the system disk capacity 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.

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 "OBS Console Operation Guide" > "Getting Started" > "Uploading a File" in *Object Storage Service User Guide*.

NOTE

- The storage class of the OBS bucket must be Standard.

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
Type	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	<p>This parameter is available only when you select a ZVHD2 or RAW image file.</p> <p>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.</p> <p>NOTE To learn how to convert image file formats and generate bitmap files, see Quickly Importing an Image File.</p>

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?

Parameter	Description
Auto sign	<p>If you select this option, the system will sign the image for high data reliability.</p> <ul style="list-style-type: none">- Key Name: Select a key from the drop-down list. The key is used to sign the image. If no key is available, go to the DEW console to create one.- Key ID: After you select a key, its ID will be automatically displayed.
Function	<p>The value can be ECS system disk image, indicating that the image is used to create ECSs.</p>
Boot Mode	<p>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?</p> <p>For details about which OSs support UEFI boot, see OSs Supporting UEFI Boot Mode.</p> <p>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.</p>
OS	<p>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.</p> <p>NOTE</p> <ul style="list-style-type: none">- 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)	<p>The system disk capacity (value range: 40 GB to 1024 GB). Ensure that this value is at least equal to the system disk capacity in the image file.</p> <p>NOTE</p> <p>If the uploaded VHD image is generated using qemu-img or similar tools, check the system disk capacity based on What Do I Do If the System Disk Capacity 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?</p>

Parameter	Description
Data Disk (GB)	<p>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.</p> <p>To add data disks, click , set the data disk capacity, and click Select Image File. In the displayed dialog box, select the target bucket and then the target image file containing the data disk.</p> <p>A maximum of three data disks can be added.</p>
Name	Set a name for the image.
Description	(Optional) Enter a description of the image.

 **NOTE**

The parameters may vary depending on enterprises and organizations.

3. Click **Apply Now**, confirm the configurations, and click **Submit Application**.

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

 **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.
- **Specifications:** Select a flavor based on the OS type in the image and the OS versions described in [OSs Supported by Different Types of ECSs](#).
- **Image:** Select **Private image** and then the created image from the drop-down list.

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

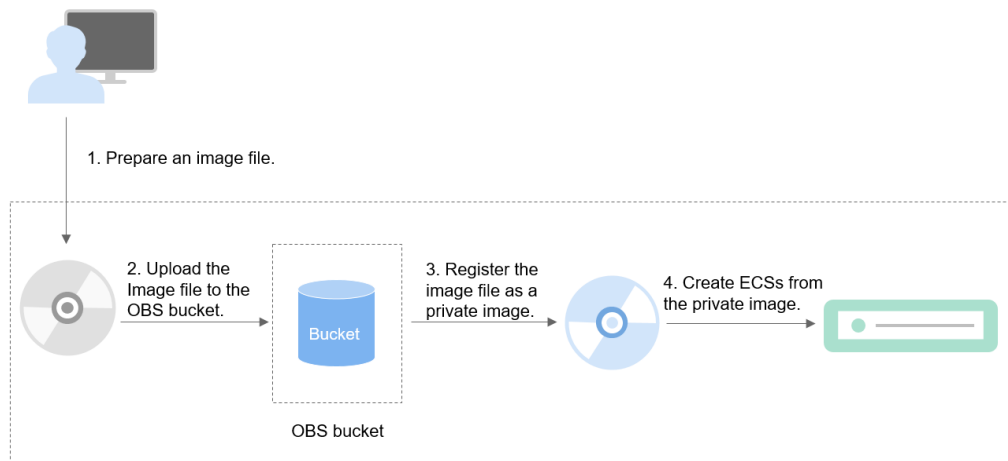
2.5.1 Overview

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

Figure 2-4 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](#).
2. 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	<ul style="list-style-type: none">• 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. <p>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 VirtIO drivers (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.</p>
Image format	VMDK, VHD, QCOW2, RAW, VHDX, QED, VDI, QCOW, ZVHD2, and ZVHD
Image size	<p>Maximum file size: 128 GB</p> <p>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.</p> <ul style="list-style-type: none">• For details about how to convert the image file format, see Converting the Image Format.• For details about fast import, see fast image file import.

Image File Property	Requirement
Network	<p>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:</p> <ul style="list-style-type: none">• Deleting files from the network rule directory• Setting the NIC to DHCP <p>The following value-added operations are optional:</p> <ul style="list-style-type: none">• 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?• Configuring dynamic assignment of IPv6 addresses IPv6 addresses are used to deal with IPv4 address exhaustion. If dynamic configuration is enabled in an image file, the ECSs created from this file will be automatically assigned an IPv6 address. These ECSs will support both IPv4 and IPv6 addresses. Configure dynamic assignment of IPv6 addresses. For details, see How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?
Tool	<p>You are advised to install Cloud-Init.</p> <p>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.</p> <p>For details, see Installing Cloud-Init.</p>
Driver	Installing native KVM drivers
File system	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• Currently, images with data disks cannot be created. The image file must contain only the system disk, and the system disk capacity 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 Management User Guide</i>.• The <code>/etc/fstab</code> 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 "OBS Console Operation Guide" > "Getting Started" > "Uploading a File" in *Object Storage Service User Guide*.

NOTE

- The storage class of the OBS bucket must be Standard.

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.
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 2-9 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
Type	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	<p>This parameter is available only when you select a ZVHD2 or RAW image file.</p> <p>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.</p> <p>NOTE To learn how to convert image file formats and generate bitmap files, see Quickly Importing an Image File.</p>

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?
Auto sign	<p>If you select this option, the system will sign the image for high data reliability.</p> <ul style="list-style-type: none">– Key Name: Select a key from the drop-down list. The key is used to sign the image. If no key is available, go to the DEW console to create one.– Key ID: After you select a key, its ID will be automatically displayed.
Function	The value can be ECS system disk image , indicating that the image is used to create ECSs.

Parameter	Description
Boot Mode	<p>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?</p> <p>For details about which OSs support UEFI boot, see OSs Supporting UEFI Boot Mode.</p> <p>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.</p>
OS	<p>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.</p> <p>NOTE</p> <ul style="list-style-type: none">- 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)	<p>The system disk capacity (value range: 40 GB to 1024 GB). Ensure that this value is at least equal to the system disk capacity in the image file.</p> <p>NOTE</p> <p>If the uploaded VHD image is generated using qemu-img or similar tools, check the system disk capacity based on What Do I Do If the System Disk Capacity 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?</p>
Data Disk (GB)	<p>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.</p> <p>To add data disks, click , set the data disk capacity, and click Select Image File. In the displayed dialog box, select the target bucket and then the target image file containing the data disk.</p> <p>A maximum of three data disks can be added.</p>
Name	Set a name for the image.
Description	(Optional) Enter a description of the image.

 NOTE

The parameters may vary depending on enterprises and organizations.

3. Click **Apply Now**, confirm the configurations, and click **Submit Application**.

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

 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

2.5.5 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.
- **Specifications:** Select a flavor based on the OS type in the image and the OS versions described in [OSs Supported by Different Types of ECSs](#).
- **Image:** Select **Private image** and then the created image from the drop-down list.

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 ECS

Scenarios

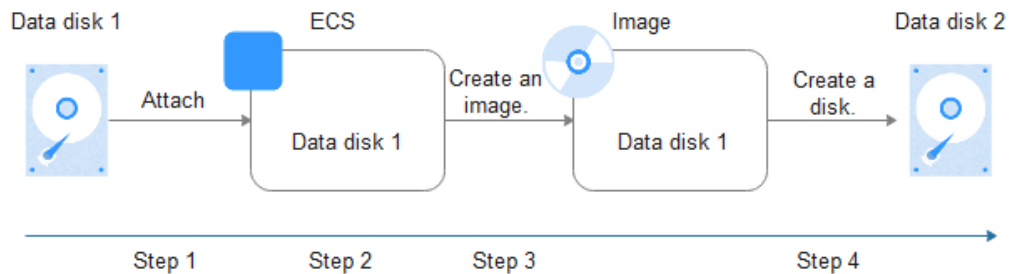
A data disk image contains only service data. You can create a data disk image from an ECS and then use the image to create new EVS disks. This is a convenient way to migrate data from an ECS to EVS disks.

For example, you can create a data disk image to clone the data of an ECS whose disk is about to expire.

Background

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

Figure 2-5 Creating a data disk image and using it to create data disks



Prerequisites

- A data disk has been attached to the ECS, and the ECS is running or stopped. For details about how to attach a data disk, see *Elastic Cloud Server User Guide*.
- The data disk capacity of the ECS must be no greater than 1 TB. If the capacity is greater than 1 TB, you can only use the ECS to create a full-ECS 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 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 **ECS** for **Source** and then select a data disk of the ECS.
4. In the **Image Information** area, set **Name** and **Description**.

NOTE

The parameters may vary depending on enterprises and organizations.

5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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

----End

Follow-up Procedure

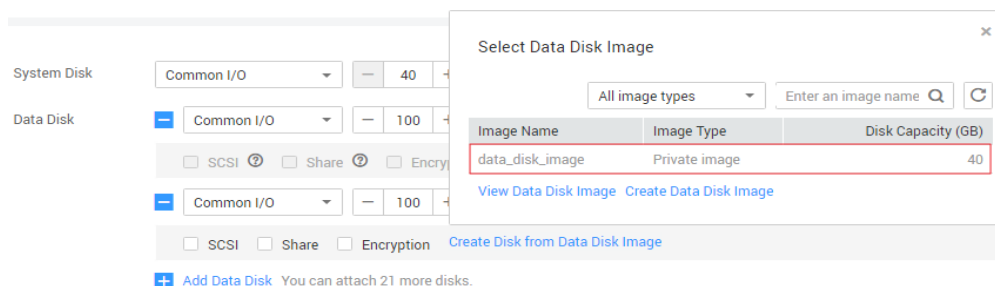
If you want to use the created data disk image to create an EVS disk and attach it to an ECS, you can perform either of the following operations:

- 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.

NOTE

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 2-6 Adding data disks



2.7 Creating a Data Disk Image from an External Image File

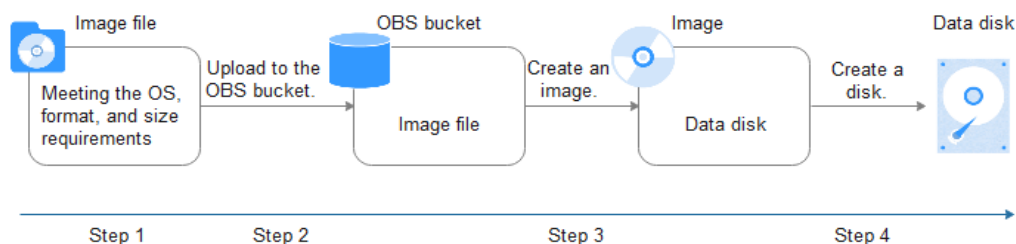
Scenarios

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 2-7 Creating a data disk image from an external image file



1. 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.
2. 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. In the **Image Information** area, set the following parameters.
 - **OS Type**: The value is **Windows** or **Linux**.
 - **Data Disk**: The value ranges from 1 GB to 2048 GB and must be no less than the data disk capacity in the image file.
 - **Name**: Enter a name for the image.
 - (Optional) **Description**: Enter description of the image.

NOTE

The parameters may vary depending on enterprises and organizations.

5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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

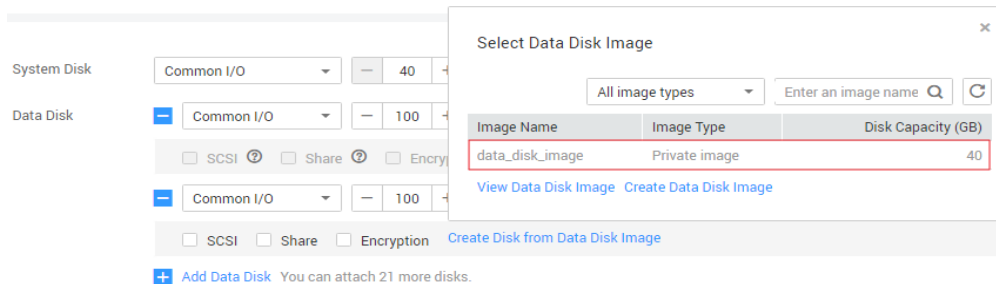
If you want to use the created data disk image to create an EVS disk and attach it to an ECS, you can perform either of the following operations:

- 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.

NOTE

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 2-8 Adding data disks



2.8 Creating a Full-ECS Image from an ECS

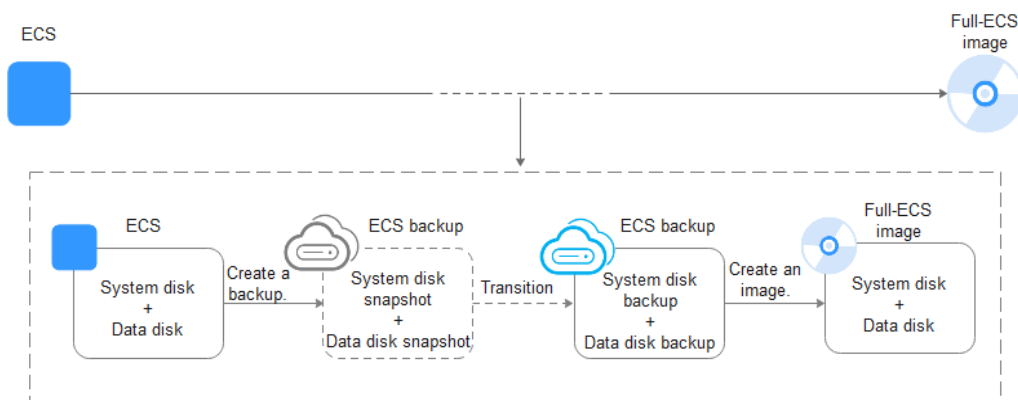
Scenarios

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 2-9 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 2-9**, 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

Type	Description
OnlineAll	All newly detected disks are automatically brought online.
OfflineShared	All disks on sharable buses, such as iSCSI and FC, are left offline by default, while disks on non-sharable buses are kept online.
OfflineInternal	All newly detected disks are left offline.

- 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.
4. Specify **Server Backup Vault** to store backups.

The created full-ECS image and backup are stored in the server backup vault.

If no server backup vault is available, click **Create Server Backup Vault** to create one. Ensure that you select **Backup** for **Protection Type**. For more information about CBR backups and vaults, see *Cloud Backup and Recovery User Guide*.

5. In the **Image Information** area, configure basic image details, such as the image name and description.
6. Click **Apply Now**.
7. Confirm the settings and click **Submit Application**.

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 AZX** 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. (**AZX** 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 AZX** 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

Name	Status	OS Type	OS	Image Type
full-image-ecs-00	Normal Available in AZ1	Linux	Ubuntu 16.04 server 64bit	Full-ECS image(x86)

----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.

2.9 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.

- 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 **CSBS Backup** for **Source** and then select a backup from the list.
4. In the **Image Information** area, configure basic image details, such as the image name and description.
5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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*.

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.
- If you want to share a full-ECS image with other tenants, you must migrate the associated backup to CBR first because only full-ECS images created from CBR backups can be shared.

2.10 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 CBR service provides backup services for EVS disks and ECSs, 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.
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 **Cloud Server Backup** for **Source** and then select an ECS from the list.
4. In the **Image Information** area, configure basic image details, such as the image name and description.
5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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*.

 **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 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. For details, see [Sharing Specified Images](#).
- 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.

2.11 Creating a Windows 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.

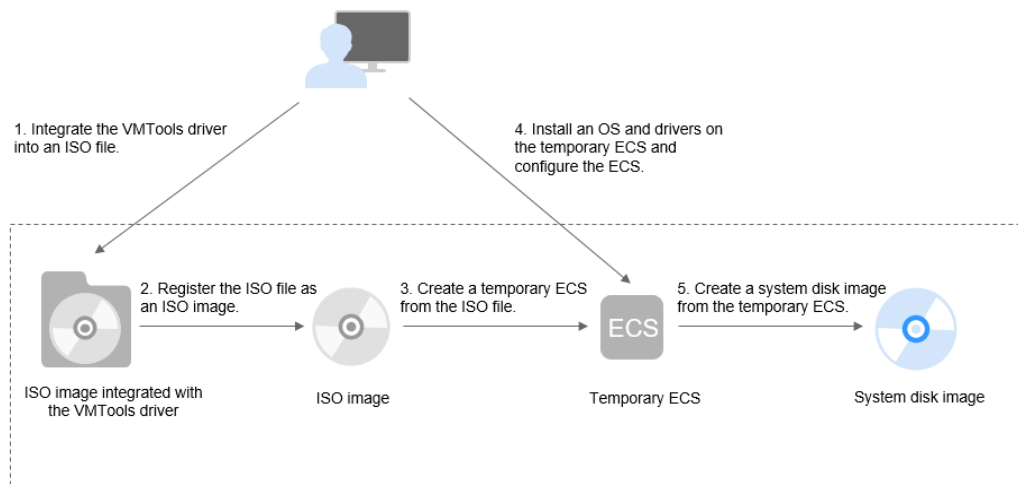
This section describes how to create a Windows system disk image from an ISO file.

 **NOTE**

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 2-11 shows the process of creating a Windows system disk image from an ISO file.

Figure 2-11 Creating a Windows system disk image

The procedure is as follows:

1. 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](#).
2. 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.

2.11.2 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

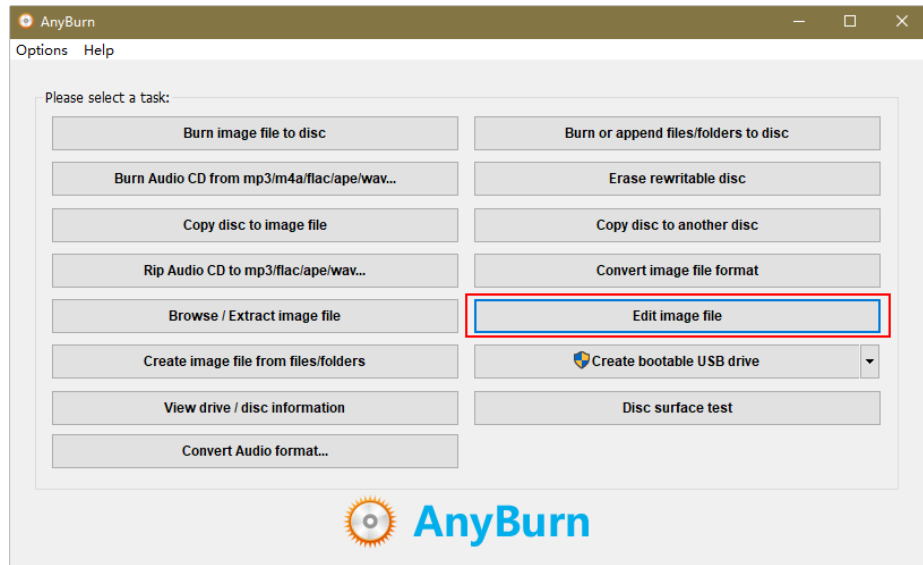
You have obtained an ISO file.

NOTE

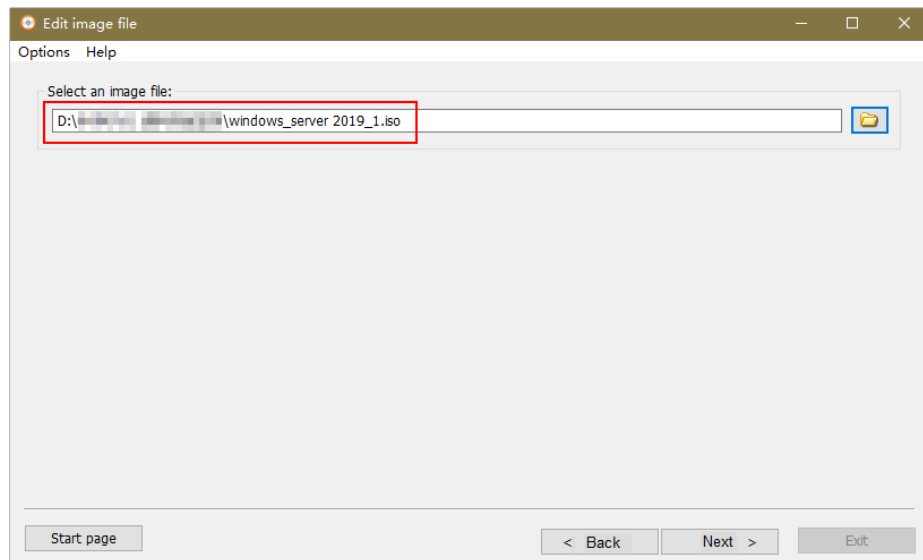
The ISO file name can contain only letters, digits, hyphens (-), and underscores (_). If the name does not meet the requirements, change it.

AnyBurn

1. Download [AnyBurn](#) and install it on your local PC.
2. Download the VMTools driver package and decompress it to your local PC. Contact the administrator to obtain the package.
3. Use AnyBurn to open the ISO file.
 - a. Open AnyBurn and select **Edit Image File**.

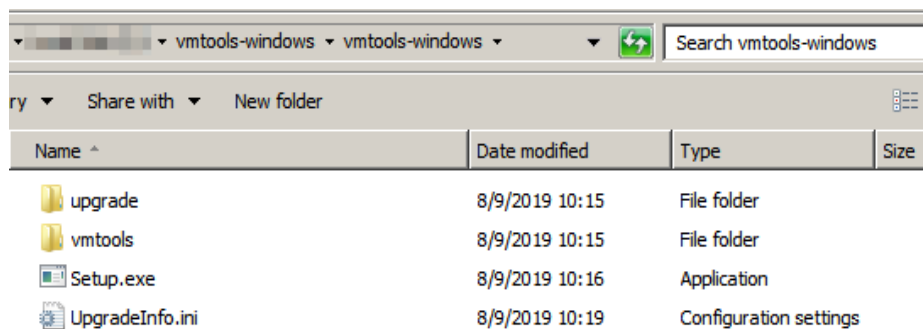


b. Select the ISO file and click **Next**.

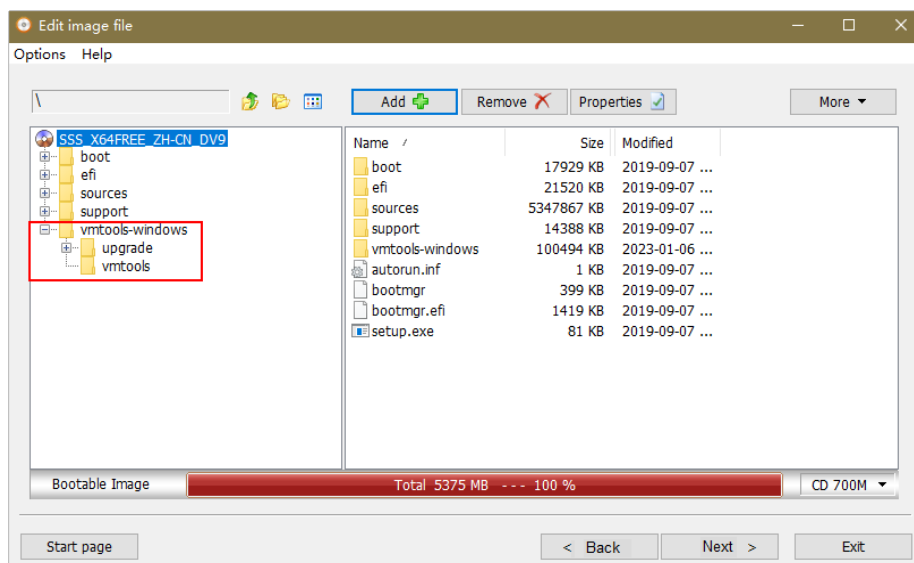


4. Edit the ISO file to integrate the VMTools driver into it.
 - a. Decompress the **vmtools-windows.zip** file downloaded in 2 to obtain **vmtools-windows.iso**, and then decompress **vmtools-windows.iso** to obtain the **vmtools-windows** folder.

Figure 2-12 vmtools-windows folder

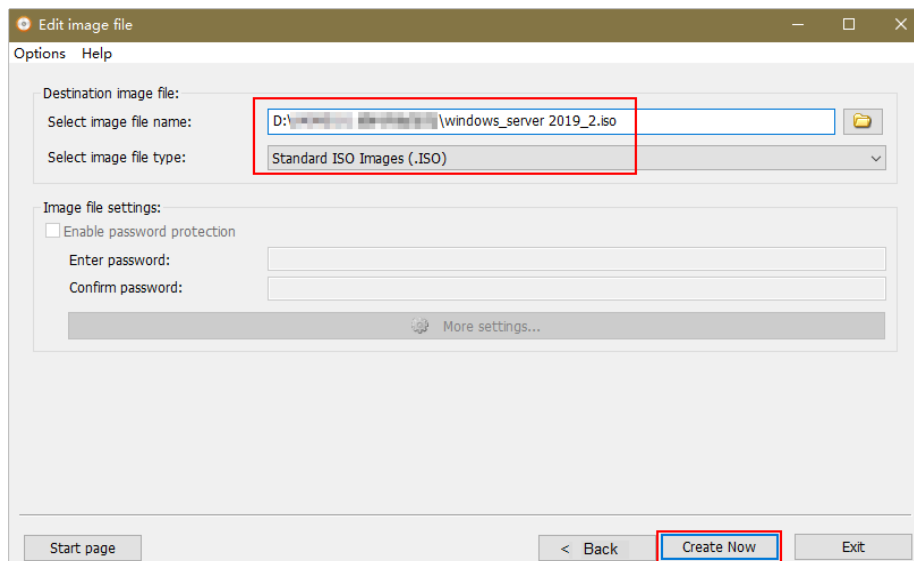


- b. Drag and drop the **vmtools-windows** folder to the parent node of the ISO file (or click **Add** and select the folder to add it to the parent node), and click **Next**.



- 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**.

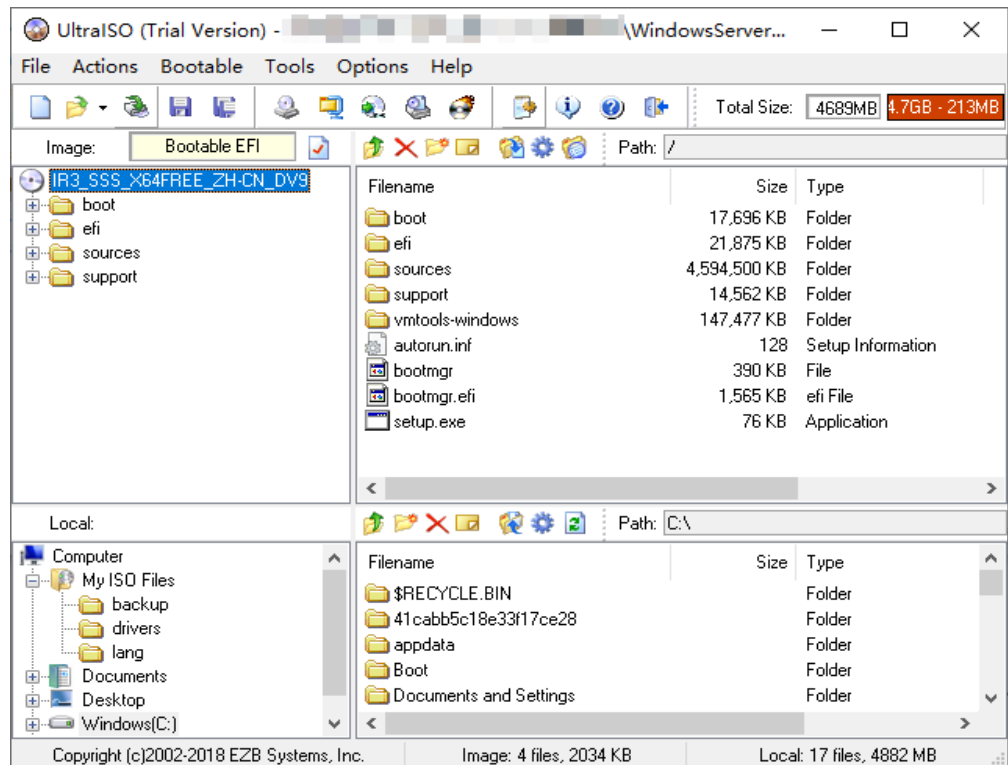
After the new ISO file is generated, view the VMTools driver in it.



UltraISO

1. Download UltraISO and install it on your local PC.
Download address: <https://www.ultraiso.com/>
2. Download the VMTools driver package and decompress it to your local PC.
Contact the administrator to obtain the package.
3. Use UltraISO to open the ISO file.

Figure 2-13 Opening the ISO file

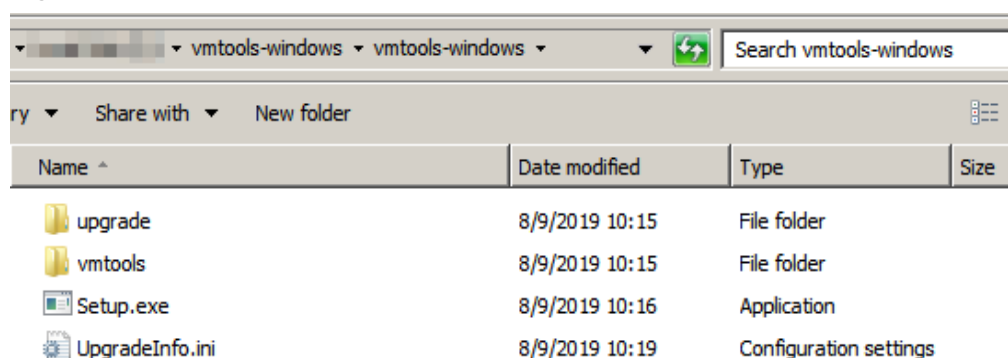


CAUTION

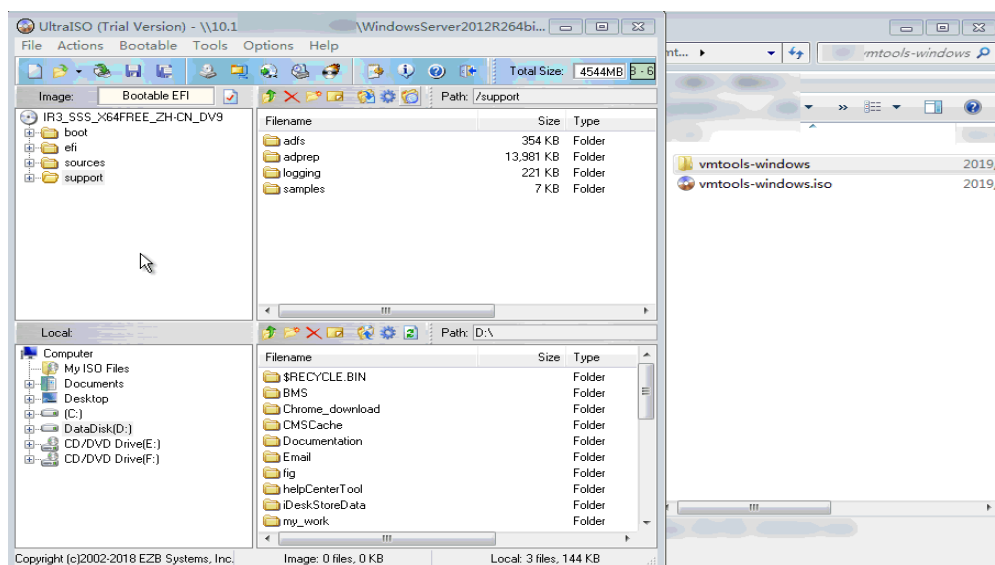
Do not extract the ISO file or open it with some tool other than UltraISO, or the boot data will be lost.

- 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 2-14 vmtools-windows folder



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

Figure 2-15 Adding the vmtools-windows folder to the ISO file

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

2.11.3 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.
4. In the **Image Information** area, set the following parameters.

- **Architecture.** Select **x86** or **ARM**.

 **NOTE**

This parameter is required only in regions that support both x86 and Arm.

- **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. The Arm architecture does not support the BIOS boot mode.
- **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 capacity of the system disk in the image file.
- **Name:** Enter a name for the image to be created.
- **Description:** (Optional) Enter image description as needed.

 **NOTE**

The parameters may vary depending on enterprises and organizations.

5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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

2.11.4 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 DeC 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.
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.

2.11.5 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.

NOTE

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

CAUTION

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 2-16 Install Windows



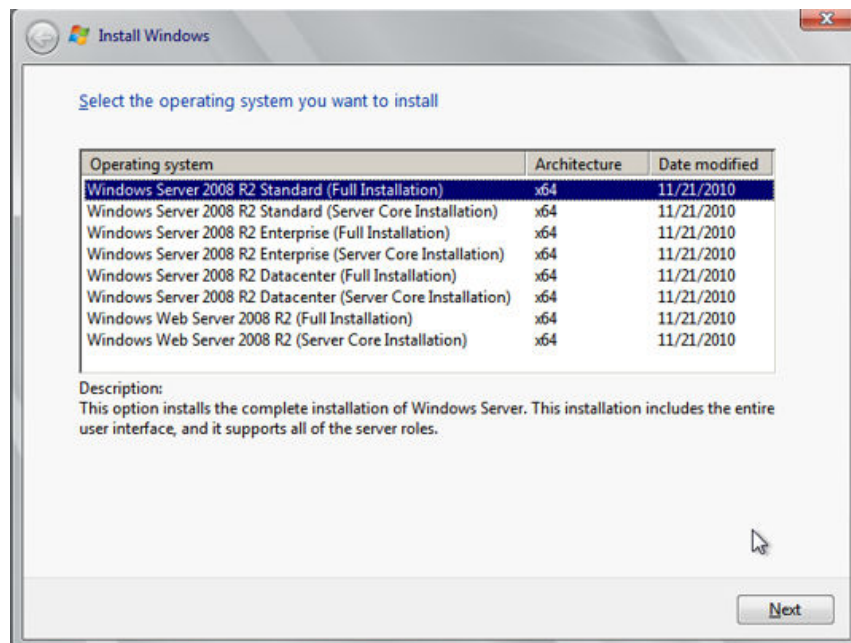
2. Click **Next**.
The installation confirmation window is displayed.

Figure 2-17 Installation confirmation window



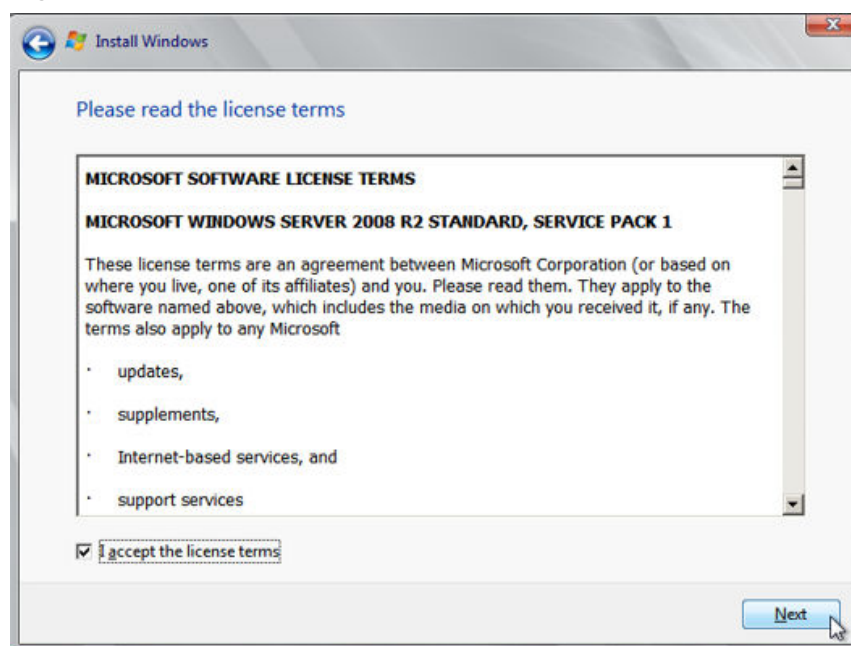
3. Click **Install now**.
The **Select the operating system you want to install** window is displayed.

Figure 2-18 Selecting the OS version



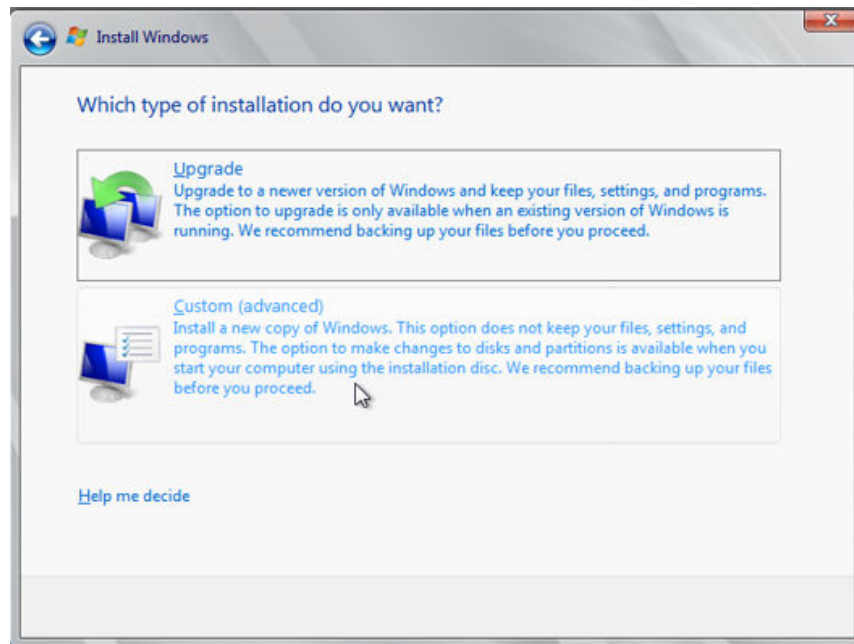
4. Select the version of the OS to be installed and click **Next**.
The **Please read the license terms** window is displayed.

Figure 2-19 License terms window



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

Figure 2-20 Installation type

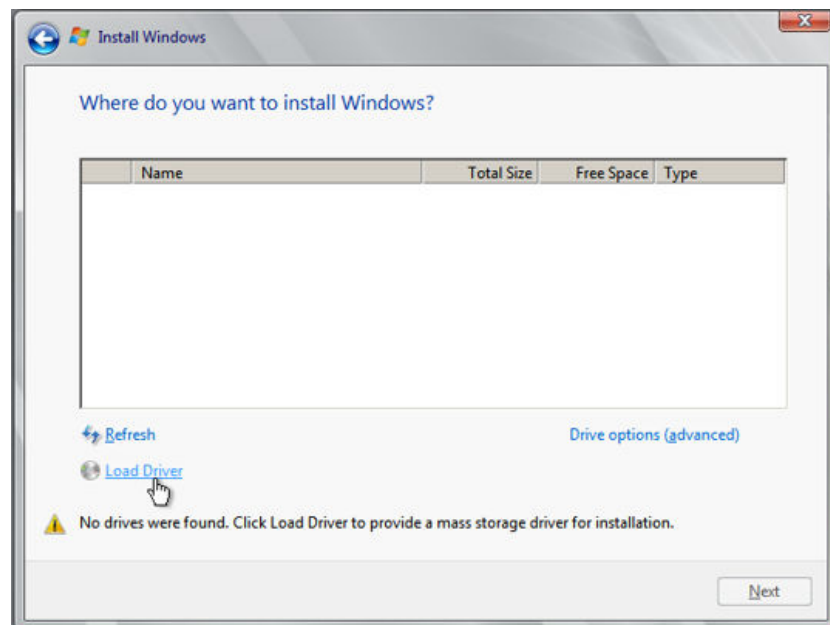


- 6. Select **Custom (advanced)**.

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

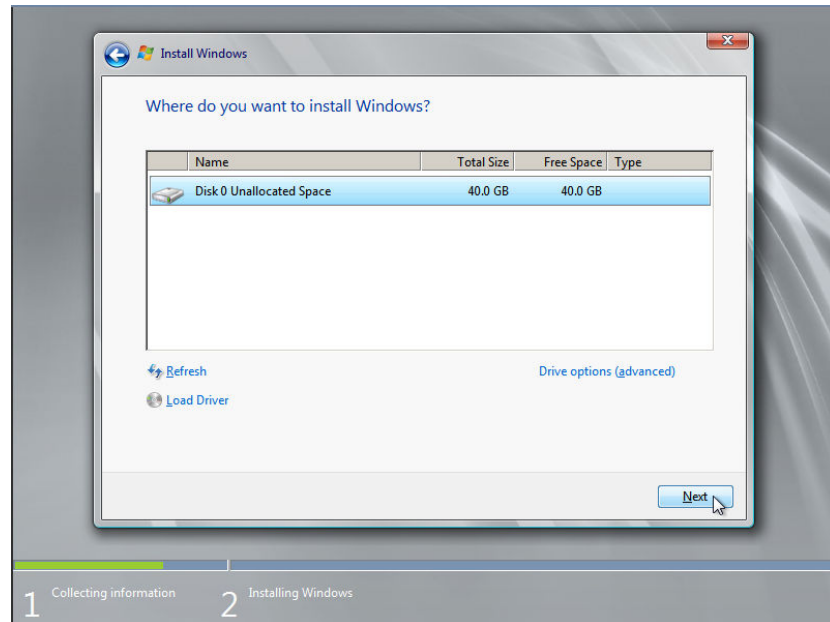
- If the system displays a message indicating that no driver is found, go to [Step 1.7](#).

Figure 2-21 Installation path



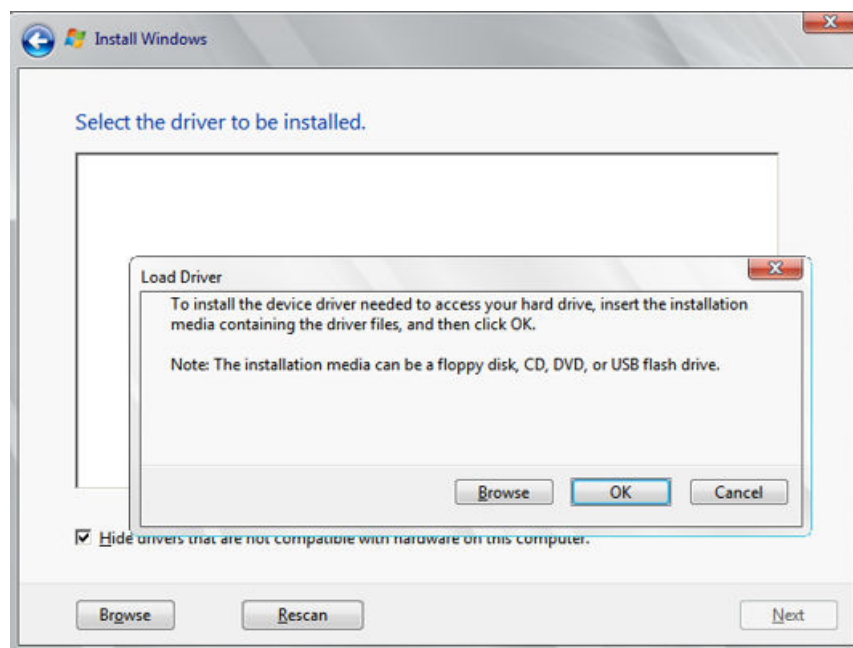
- If a disk is displayed, go to [Step 1.10](#).

Figure 2-22 Installation path



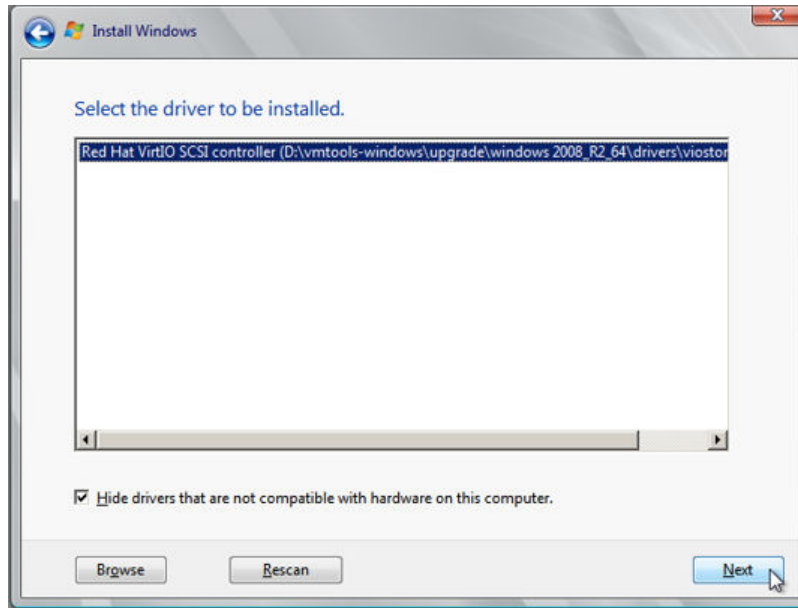
7. Click **Load Driver** and then **Browse**.

Figure 2-23 Loading drivers



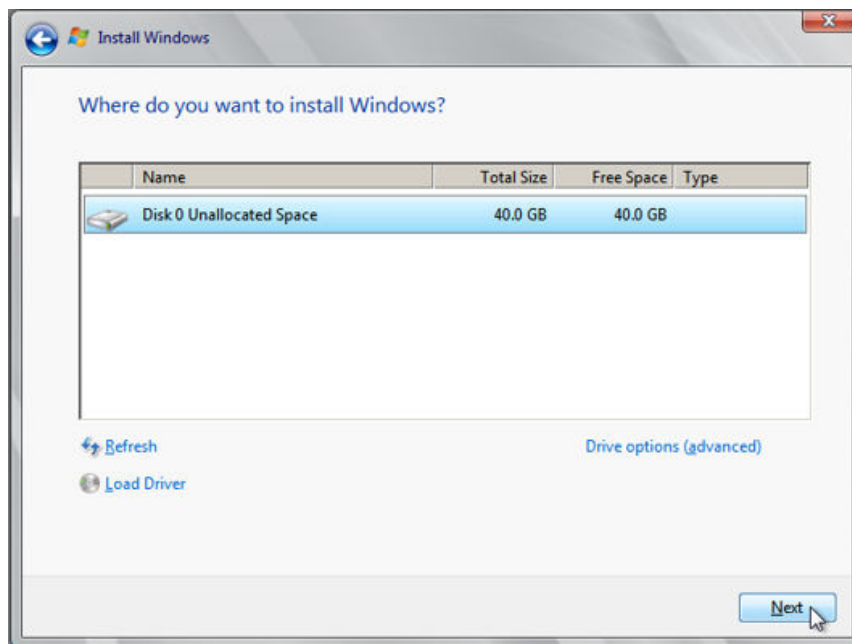
8. Choose the following path and click **OK**.
vmttools-windows/upgrade/\$OS_Version/drivers/viostor
9. Select the driver matching the OS and click **Next**.
The system may provide multiple drivers. Select **VISOTOR.INF** shown in the following figure.

Figure 2-24 Selecting the driver to install



10. Select the disk and click **Next**.

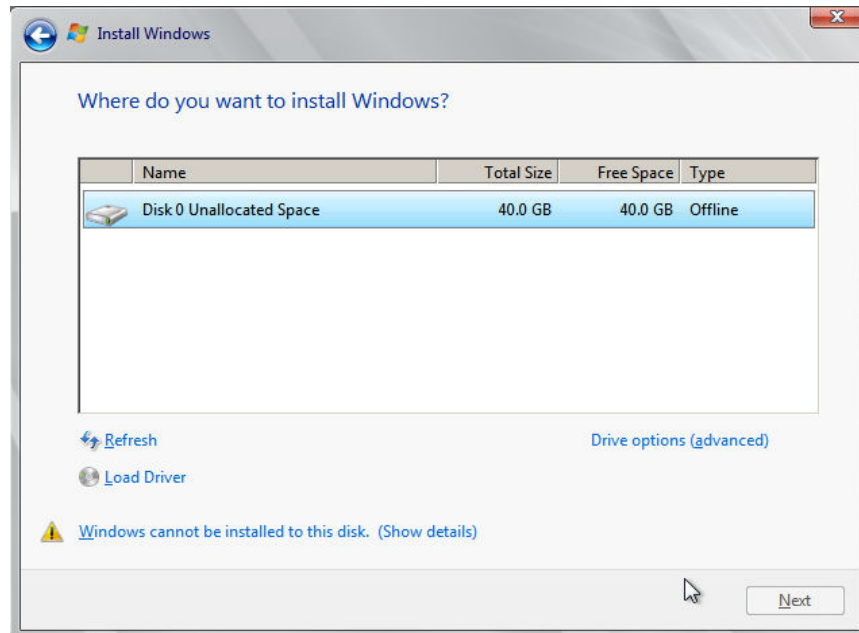
Figure 2-25 Installation path



 **NOTE**

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

Figure 2-26 Offline disk



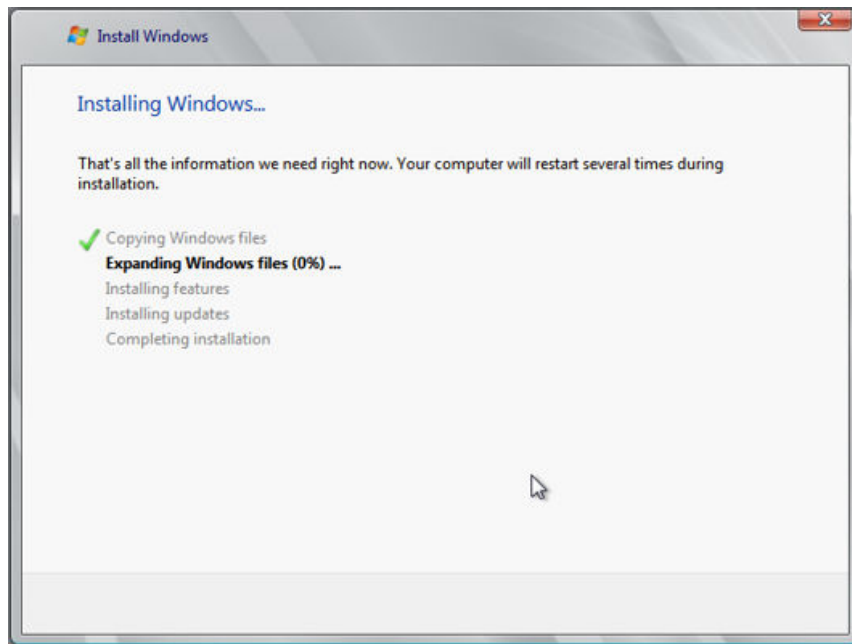
11. The **Installing Windows** window is displayed, and the OS installation starts. The installation takes about 50 minutes. The ECS restarts during the installation. After the ECS successfully restarts, log in to it again and configure the OS as prompted.

 **NOTE**

You are required to set a password for the OS user.

Supported special characters include !@\$%^_-=+[{]}.,./?

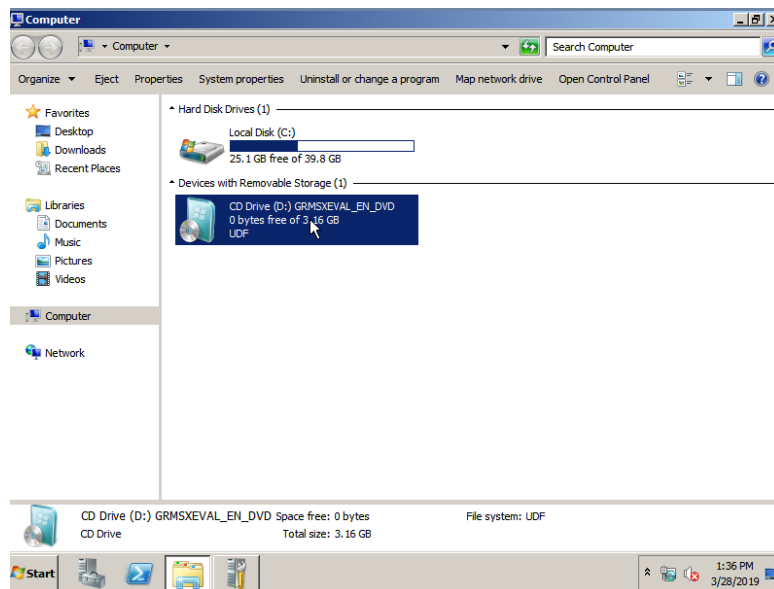
Figure 2-27 Installation progress



Step 2 Install related drivers.

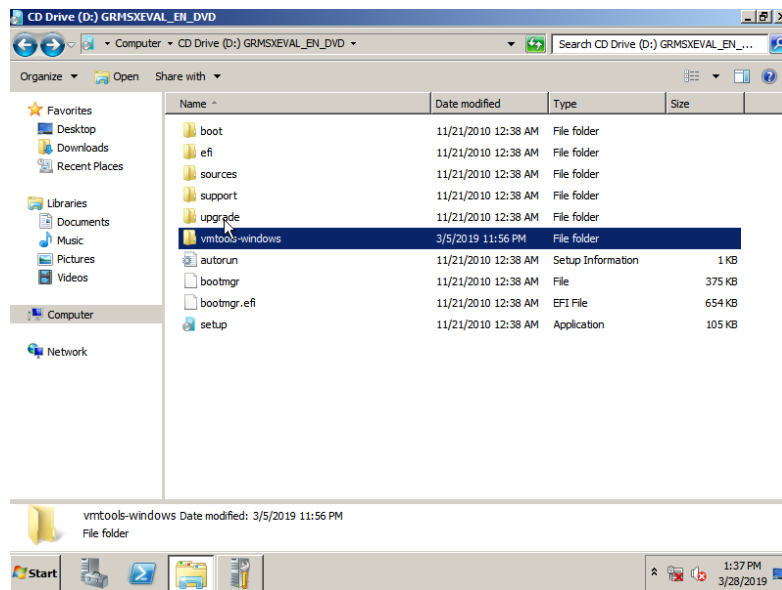
1. Open **Computer** and double-click the CD drive.

Figure 2-28 Starting the CD drive



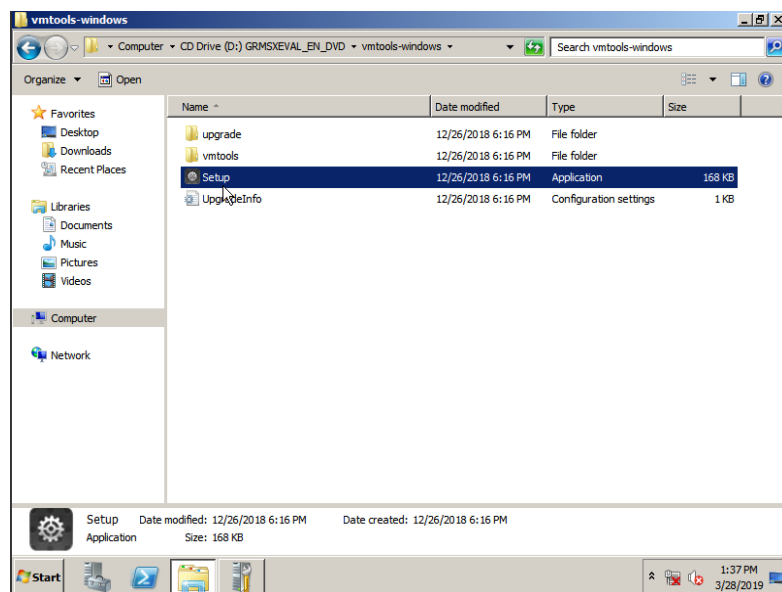
2. Double-click the **vmtools-windows** folder.

Figure 2-29 Opening the `vmtools-windows` folder



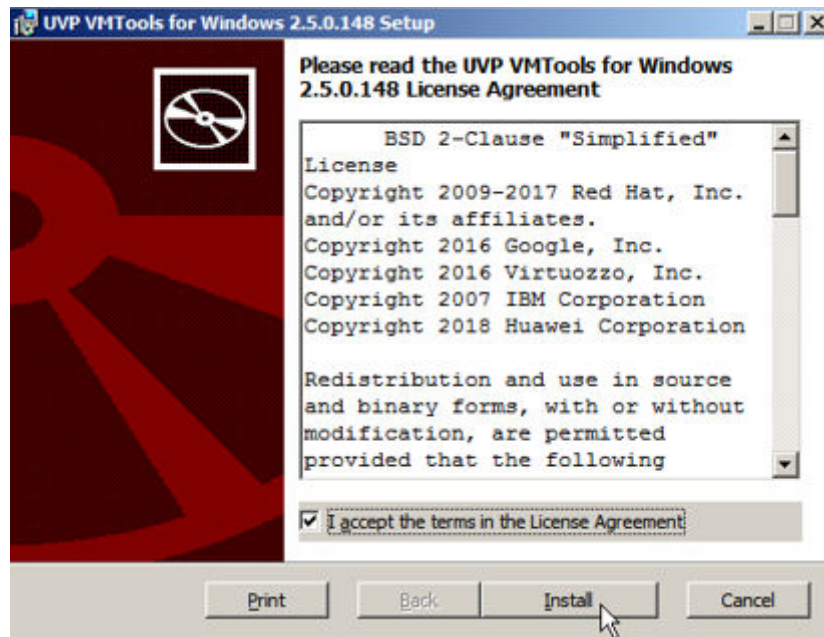
3. Double-click the **Setup** file.

Figure 2-30 Executing the Setup file



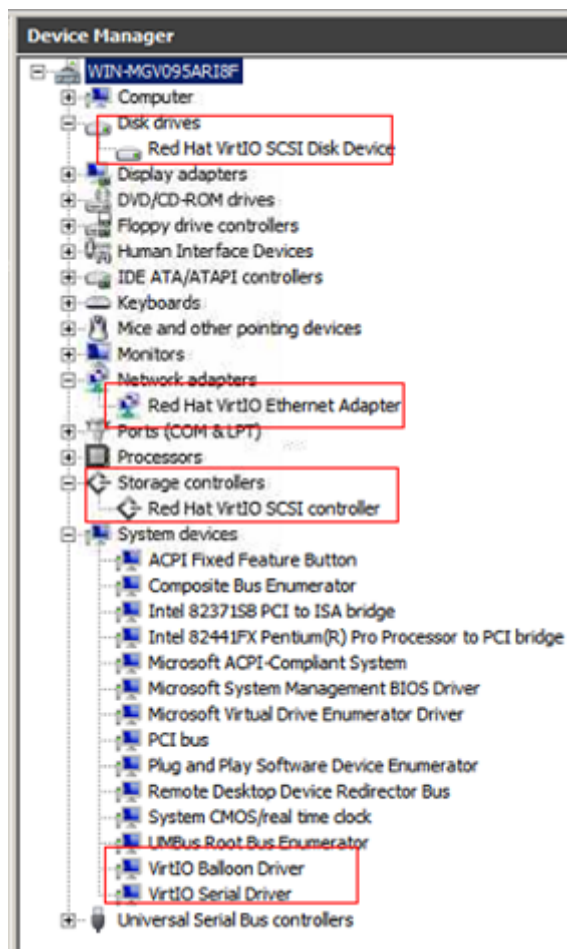
4. Install the driver as prompted.

Figure 2-31 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 2-32 Device Manager



----End

2.11.6 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 the 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.

1. 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](#).
3. 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?](#)
 - Configure dynamic assignment of IPv6 addresses. For details, see [How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?](#)

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.

2.12 Creating a Linux System Disk Image from an ISO File

2.12.1 Overview

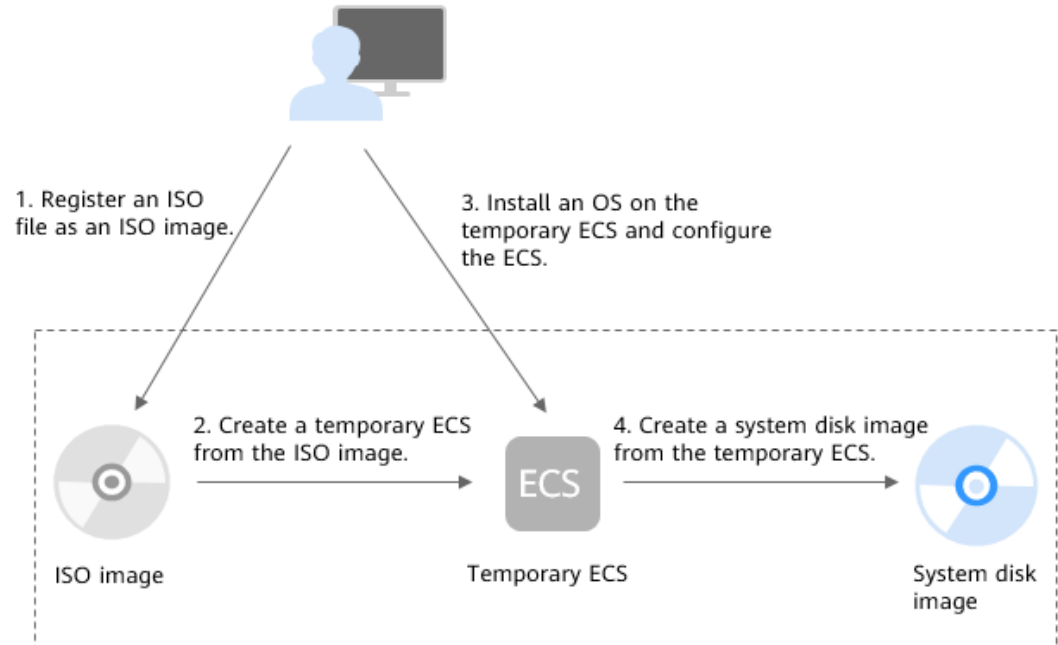
An ISO file is a disk image of an optical disc. A large number of data files can be compressed into a single ISO file. Likewise, to access the files stored in an ISO, the ISO file needs to be decompressed. For example, you can use a virtual CD-ROM to open an ISO file, or burn the ISO file to a CD or 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 2-33 shows the process of creating a Linux system disk image from an ISO file.

Figure 2-33 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.

2.12.2 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](#).

NOTE

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

- **Architecture**. Select **x86** or **ARM**.

NOTE

This parameter is required only in regions that support both x86 and Arm.

- **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. The Arm architecture does not support the BIOS boot mode.

- **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 capacity of the system disk in the image file.
- **Name:** Enter a name for the image to be created.
- **Description:** (Optional) Enter image description as needed.

 **NOTE**

The parameters may vary depending on enterprises and organizations.

5. Click **Apply Now**.
6. Confirm the settings and click **Submit Application**.

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

2.12.3 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 DeC 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.

2.12.4 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.

NOTE

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.

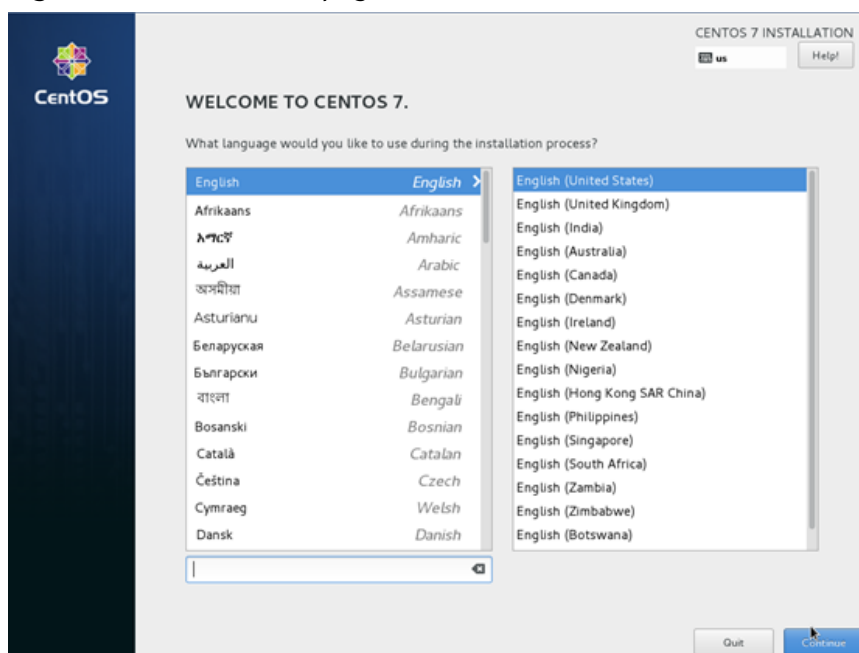
Procedure

CAUTION

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

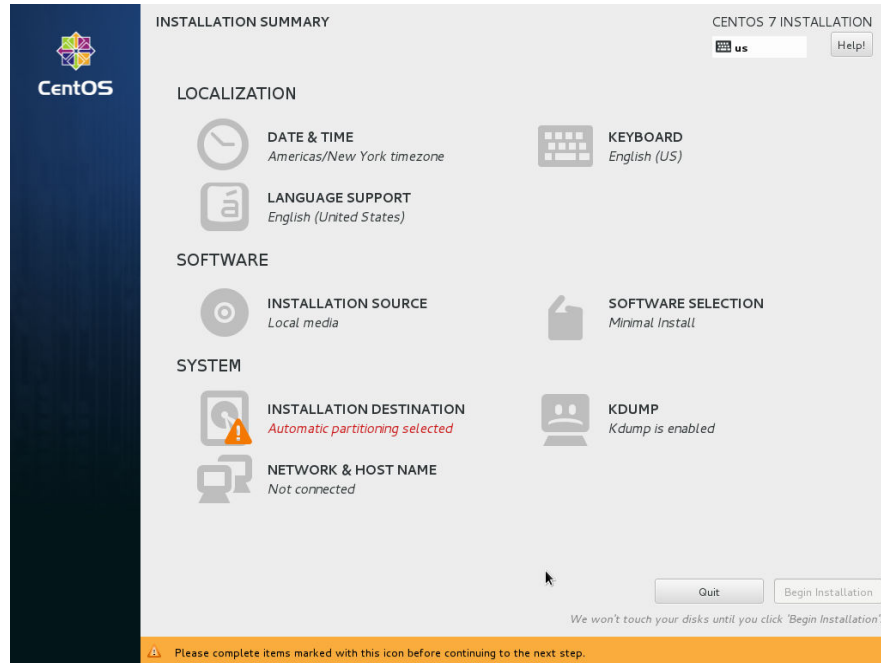
1. On the installation page, select the language and click **Continue**.

Figure 2-34 Installation page



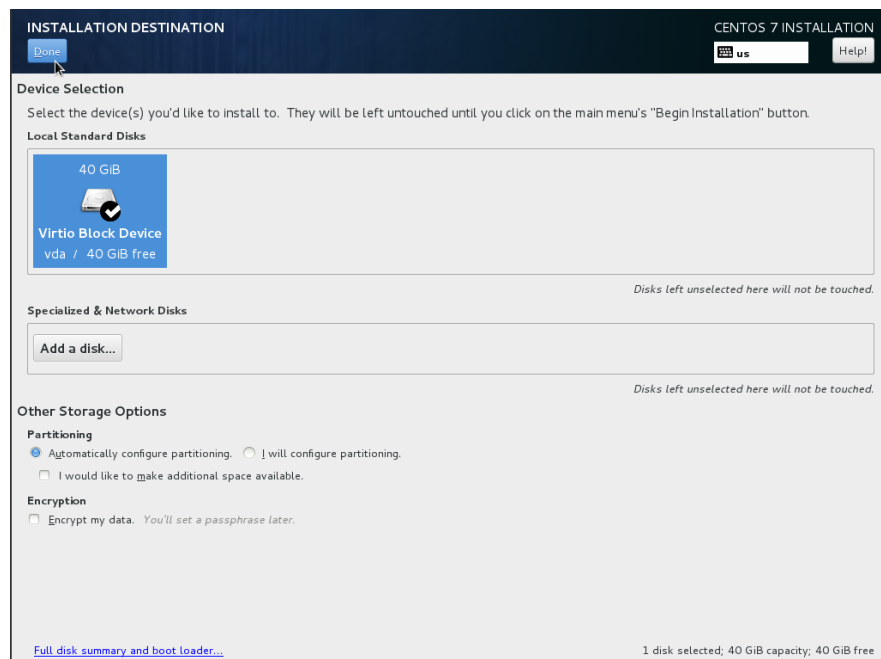
2. On the **INSTALLATION SUMMARY** page, choose **SYSTEM > INSTALLATION DESTINATION**.

Figure 2-35 INSTALLATION SUMMARY page



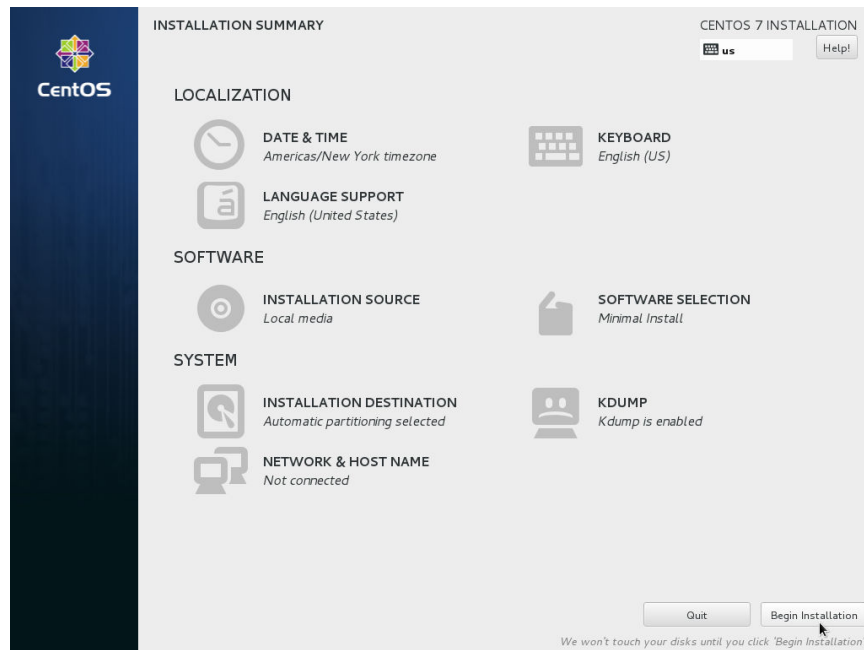
3. Select the target disk and click **Done**.

Figure 2-36 Installation location



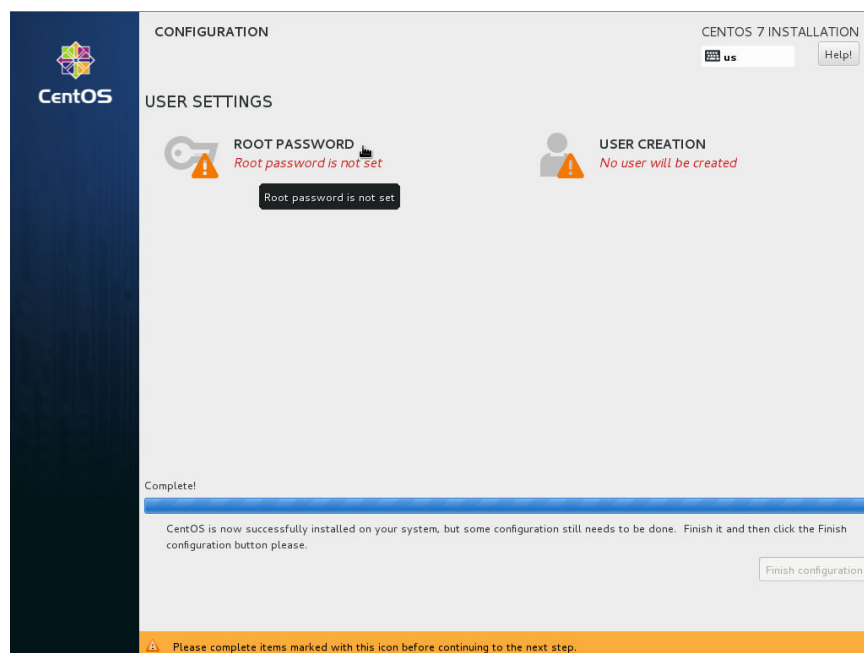
4. Click **Begin Installation**.

Figure 2-37 Starting installation



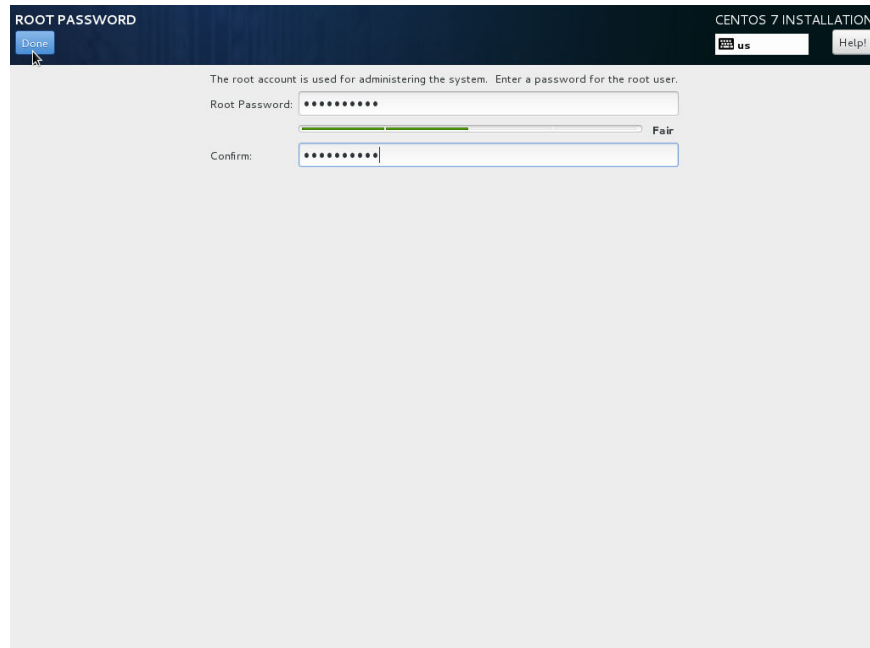
5. Wait for the automatic OS installation to complete. When the progress reaches 100%, CentOS is installed successfully.

Figure 2-38 Successful installation



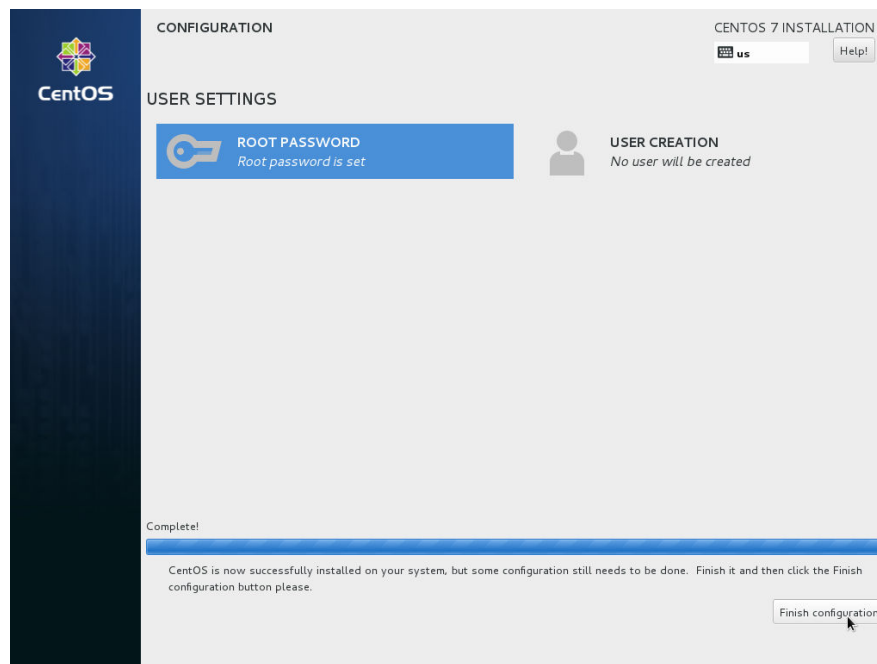
6. In the **USER SETTINGS** area, click **ROOT PASSWORD**.
The **ROOT PASSWORD** page is displayed.
7. Set a password for user **root** as prompted and click **Done**.

Figure 2-39 Setting a password for user root



8. Click **Finish configuration**.

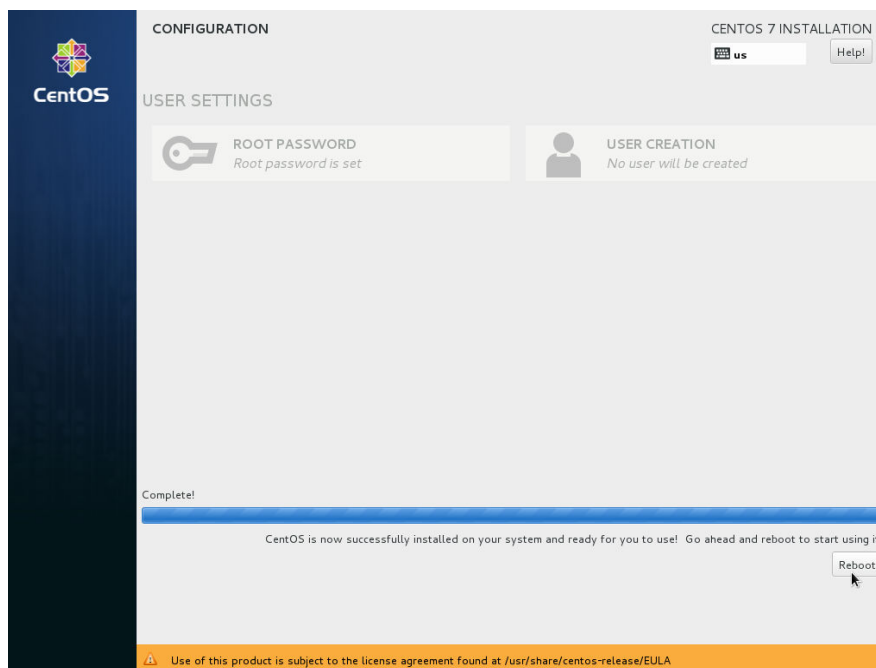
Figure 2-40 Completing configuration



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 2-41 Restarting the ECS



2.12.5 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 driver.

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 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?](#)
 - Configure dynamic assignment of IPv6 addresses. For details, see [How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?](#)

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.

2.13 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.

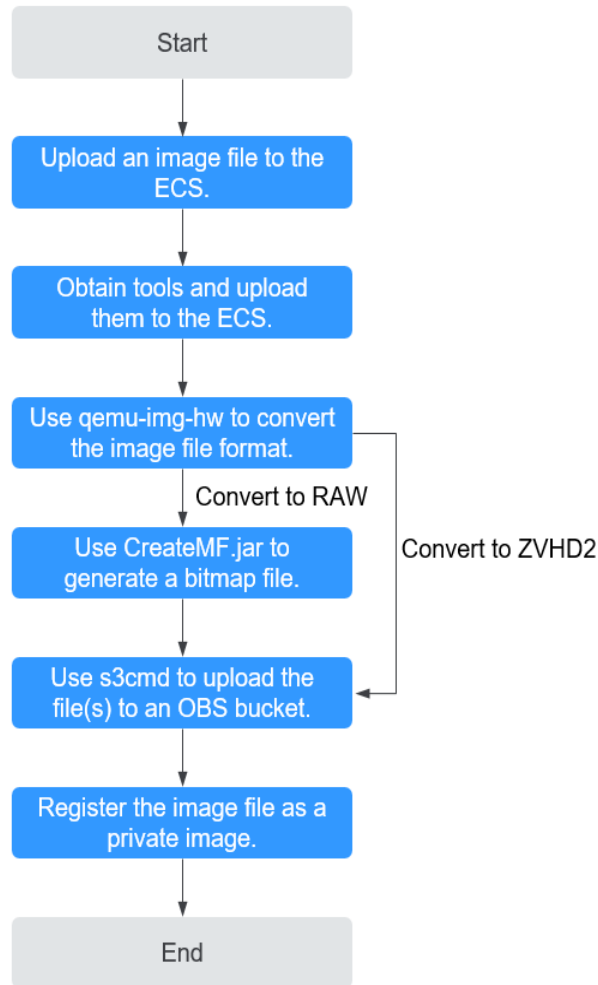
You can use **qemu-img-hw** or the open-source tool **qemu-img** to convert the image format. **qemu-img-hw** can only be used in Linux.

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 2-42 Import process



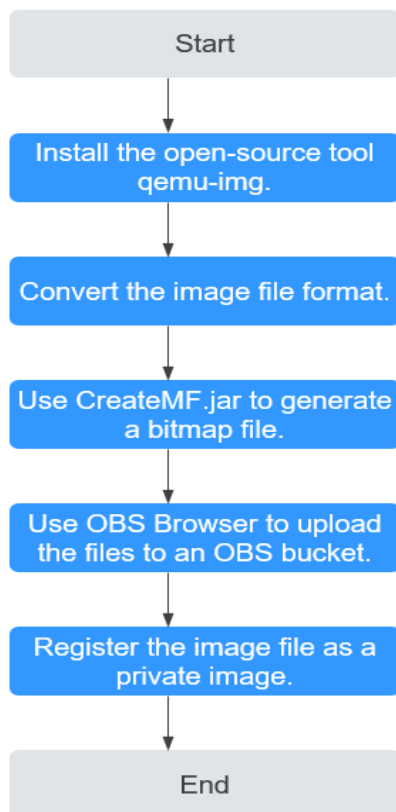
For details, see [Quickly Importing an Image File \(Linux\)](#).

- Windows

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

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 2-43 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 \(Linux\)](#).

NOTE

- 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.qcow2 root@xxx.xxx.xx.xxx:/usr/
xxx.xxx.xx.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.

Contact the administrator to obtain the fast import tool.

Step 3 Use **qemu-img-hw** to convert the image format.

1. 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.
2. 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.
 - 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.
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](#).

CAUTION

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

Run the following command to check the system disk capacity 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 `qemu-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.
Contact the administrator to obtain the package.
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.
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](#).

 **CAUTION**

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

Run the following command to check the system disk capacity 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?](#)

- Cloud-Init

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.

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. 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.

Method 3:

The system allows you to quickly change the name of a 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. In the private image list, locate the target image and move the cursor to the **Name** column.
4. Click  to change the image name.
5. Click **OK**.


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 capacities, 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**.

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.
 - b. 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.

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 capacity 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 cloud server 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 CBR backups of the full-ECS images.

 **NOTE**

If CBR 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.

CAUTION

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.
- A system disk image or data disk image can be shared with up to 128 tenants, and a full-ECS image can be shared with up to 10 tenants.
- 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.
3. 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.
 - b. 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 **My Credentials** page, view the project ID.

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.
 - 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. 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.
- 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.

- 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.

 **NOTE**

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.
 - b. 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** choose **More > 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 for which you want to stop the 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.
 - b. 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 the project IDs of the image recipients.

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. 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**.

3.6.10 Replicating a Shared Image

Scenarios

Replicate a private image that was shared with you. The image is displayed in the private image list. You can export, share, and replicate this image, or use it to create ECSs.

Constraints

- Currently, only system and data disk images can be replicated. Full-ECS images are not supported.
- Currently, images can only be replicated within a region.
- An image to be replicated cannot be larger than 128 GB.

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. On the displayed IMS console, click the **Images Shared with Me** tab.
Shared images that are accepted are displayed.
3. Locate a shared image, click **More** in the **Operation** column, and select **Replicate** from the drop-down list.
4. In the displayed **Replicate Image** dialog box, enter the name and description of the image you want to obtain.
5. Click **OK**.

You can click the **Private Images** tab and view the creation progress of the image in the private image list. When the image status changes to **Normal**, the image creation is complete.

3.7 Exporting an Image

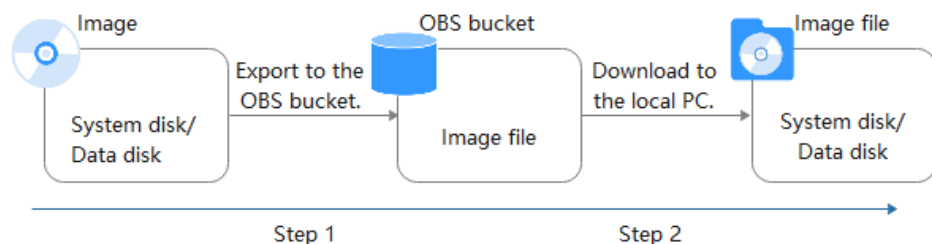
Scenarios

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 on-premises clusters or private clouds by exporting their images from the cloud platform. The following figure shows the process of exporting an image.

Figure 3-1 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 QCOW2, VMDK, VHD, or ZVHD format. The default format of a private image is ZVHD2. Images exported in different formats may vary in size.


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 128 GB.

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:
 - **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.

NOTE

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.
2. Install the latest version of PV driver on the ECS.
For details, see [Installing the PV Driver](#).
3. Install the UVP VMTools which is required to create ECSs using KVM virtual resources.
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.
5. Clear system logs and then stop the ECS.
For details, see [Clearing System Logs](#).
6. Create a Windows private image from 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. To make the Windows private image support KVM at the same time, perform operations in the following sections on the ECS.

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 3-2 Viewing the virtualization type of a Windows ECS

```
>systeminfo
Host Name: ECS-E5AF
OS Name: Microsoft Windows Server 2012 R2 Datacenter
OS Version: 6.3.9600 N/A Build 9600
OS Manufacturer: Microsoft Corporation
OS Configuration: Standalone Server
OS Build Type: Multiprocessor Free
Registered Owner: Windows User
Registered Organization:
Product ID: 00253-50000-00000-AA442
Original Install Date: 11/2/2015, 21:05:21
System Boot Time: 8/2/2018, 10:31:04
System Manufacturer: Xen
System Model: HVM domU
System Type: x64-based PC
Processor(s): 1 Processor(s) Installed.
[01]: Intel64 Family 6 Model 62 Stepping 4 GenuineInt
... 1.000 Mb
BIOS Version: Xen 4.1.2_115-908.762., 3/21/2018
Windows Directory: C:\Windows
System Directory: C:\Windows\system32
Boot Device: \Device\HarddiskVolume1
System Locale: en-us;English (United States)
Input Locale: en-us;English (United States)
Time Zone: (UTC+08:00) Beijing, Chongqing, Hong Kong, Urumqi
Total Physical Memory: 1.016 MB
Available Physical Memory: 226 MB
Virtual Memory: Max Size: 1.336 MB
Virtual Memory: Available: 476 MB
Virtual Memory: In Use: 860 MB
```

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
vmtools-WIN2016-x64.zip	<ul style="list-style-type: none">Windows Server 2016-x64Windows 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.

⚠ CAUTION

If you do not install the PV driver, the ECS network performance will be poor, and the security groups 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

- If the PV driver version is later than 2.5, you do not need to install the PV driver.
- If the PV driver version is not displayed or the version is 2.5 or earlier, perform operations in [Installing the PV Driver](#).

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

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.

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.

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.

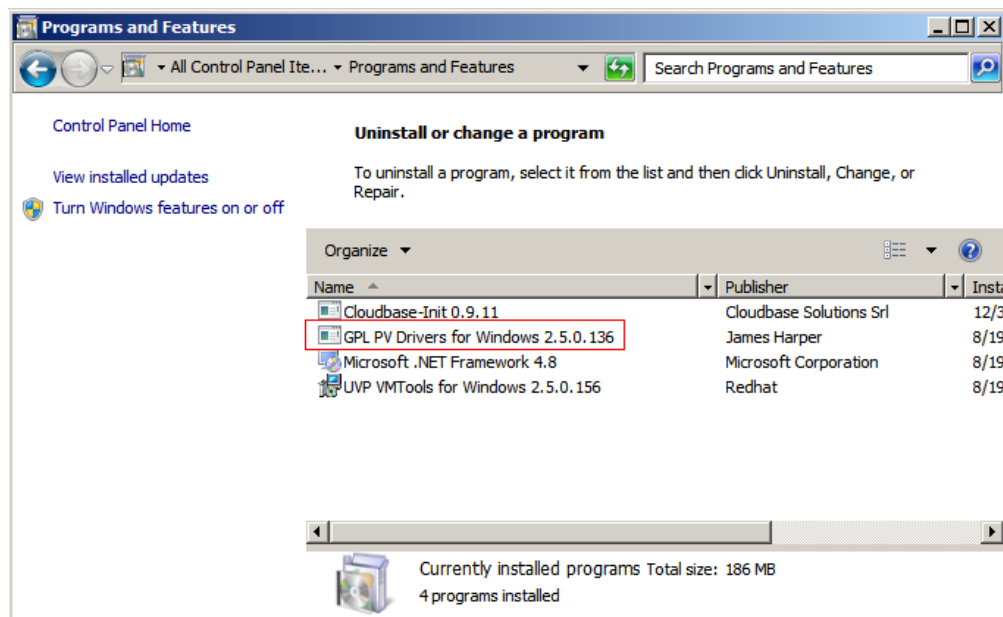
Verifying the Installation

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

1. Click **Start**. Choose **Control Panel > Programs and Features**.
2. Locate the PV driver for Windows.

If UVP VMTools for Windows exists, the installation is successful, as shown in [Figure 3-3](#).

Figure 3-3 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.

CAUTION

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

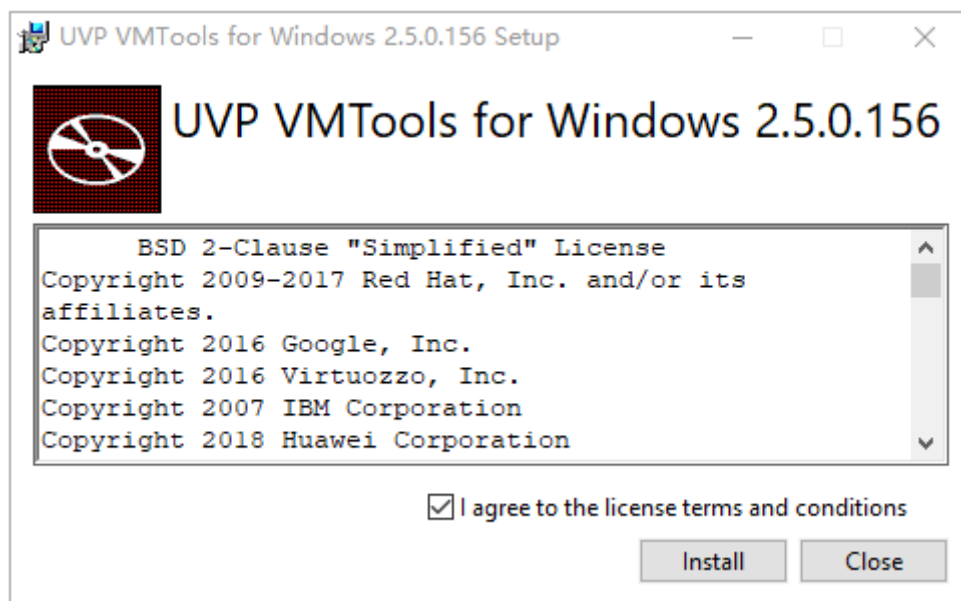
The following operations describe how to install UVP VMTools. **vmtools-WIN2016-x64.exe** extracted from **vmtools-WIN2016-x64.zip** is used as an example.

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.

2. 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 3-4 Installing UVP VMTools

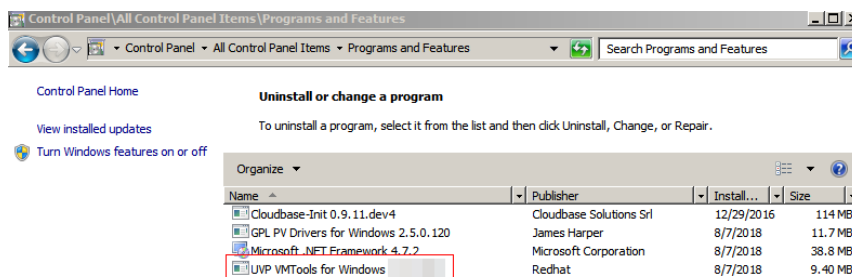
6. Restart the OS for UVP VMTools to take effect.
7. Perform the operations in [Verifying the Installation](#) to check whether UVP VMTools is successfully installed.

Verifying the Installation

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

1. Click **Start**. Choose **Control Panel > Programs and Features**.
2. Locate UVP VMTools for Windows.

If UVP VMTools for Windows exists, the installation is successful, as shown in [Figure 3-5](#).

Figure 3-5 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**.
2. 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 native Xen (Xen PV) drivers and KVM (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 [Installing 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 from 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.

Figure 3-6 Checking the virtualization type of a Linux ECS

```
# lscpu
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                 4
On-line CPU(s) list:   0-3
Thread(s) per core:    1
Core(s) per socket:    4
Socket(s):              1
NUMA node(s):          1
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  62
Model name:             Intel(R) Xeon(R) CPU E5-2690 v2 @ 3.00GHz
Stepping:               4
CPU MHz:                3000.079
BogoMIPS:               6000.15
Hypervisor vendor:     Xen
Virtualization type:   full
L1d cache:              32K
L1i cache:              32K
L2 cache:               256K
L3 cache:               25600K
NUMA node0 CPU(s):     0-3
You have new mail in /var/spool/mail/root
root@SZV-home1#
```

2. Check whether VirtIO drivers have been installed.

- CentOS/EulerOS

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](#).

```
[root@~]# lsinitrd /boot/initramfs-$(uname -r).img | grep virtio
-rw-r--r-- 1 root root      8384 Sep 30  2021 usr/lib/modules/4.18.0-348.7.1.el8_5.x86_64/kernel/drivers/block/virtio_b
lk.ko.xz
-rw-r--r-- 1 root root    14836 Sep 30  2021 usr/lib/modules/4.18.0-348.7.1.el8_5.x86_64/kernel/drivers/char/virtio_co
nsole.ko.xz
-rw-r--r-- 1 root root    25740 Sep 30  2021 usr/lib/modules/4.18.0-348.7.1.el8_5.x86_64/kernel/drivers/net/virtio_net
.ko.xz
-rw-r--r-- 1 root root     8684 Sep 30  2021 usr/lib/modules/4.18.0-348.7.1.el8_5.x86_64/kernel/drivers/scsi/virtio_sc
si.ko.xz
```

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.

NOTE

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 query 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
else
search --no-floppy --fs-uuid --set=root ec51d860-34bf-4374-ad46-a0c3e337fd34
fi
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 'gnulinuz-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
fi
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**.
- 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="749d6c0c-990a-4661-bed1-46769388365a" TYPE="swap"  
/dev/xvda2: UUID="f382872b-eda6-43df-9516-5a687fecdc6" 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.img
```

- d. Check whether the root partition in the **/boot/grub/grub.conf** configuration file contains **root=/dev/xvda2** or **root=UUID=f382872b-eda6-43df-9516-5a687fecdc6**.
 - If **root=UUID=f382872b-eda6-43df-9516-5a687fecdc6** 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.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-9516-5a687fecdc6**.
- 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-9516-5a687fecdc66 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"
```

- c. 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
else
search --no-floppy --fs-uuid --set=root 4eb40294-4c6f-4384-bbb6-b8795bbb1130
fi
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
linux16 /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 query 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:
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:

```
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.

```
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 Installing 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 native Xen and KVM drivers.

 **CAUTION**

If an ECS has no Xen drivers installed, the network performance of the ECS will be poor, and the security groups and firewall configured for the ECS will not take effect.

If an ECS has no KVM drivers installed, the NICs of the ECS may not be detected and the ECS will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen.
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after the driver installation is complete.

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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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@CTU10000xxxx 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@CTU10000xxxx 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 root 50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
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
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
-rwxr--r-- 1 root root 14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/virtio.ko
-rwxr--r-- 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
-rwxr--r-- 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
```

NOTE

If you add built-in drivers to the `initrd` or `initramfs` file by mistake, the ECS will not be affected. The drivers cannot be found 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 Xen PV and VirtIO drivers to the `/etc/initramfs-tools/modules` file (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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@ CTU10000xxxx 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@ CTU10000xxxx 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 by mistake, the ECS will not be affected. The drivers cannot be found 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 to add drivers. For details, see [scenario 1](#).

If the OS version is SUSE 12 SP1, modify the `/etc/dracut.conf` file to add 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 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 Xen PV and VirtIO drivers after `INITRD_MODULES=` (the format varies depending 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 processor.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 Xen PVOPS and KVM VirtIO have been installed:

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

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

```

SIA10000xxxx:~ # 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

```

```

SIA10000xxxx:~ # 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, QEMU device shield is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether Xen drivers exist in initrd:

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

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

```
SIA10000xxxx:~ # 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

SIA10000xxxx:~ # 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 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 Xen PV and VirtIO drivers to **add-drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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 Xen PV and VirtIO drivers to `add_drivers` (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 drivers have been installed:

```
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
```

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.

CAUTION

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](#).
- The ECS 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	<p>Take CentOS 7.0 as an example.</p> <ol style="list-style-type: none">1. In the <code>/etc/dracut.conf</code> file, add VirtIO drivers to add_drivers, including <code>virtio_blk</code>, <code>virtio_scsi</code>, <code>virtio_net</code>, <code>virtio_pci</code>, <code>virtio_ring</code>, and <code>virtio</code>. Separate driver names with spaces.2. Save and exit the <code>/etc/dracut.conf</code> file and run the <code>dracut -f</code> command to generate initrd again.	CentOS and EulerOS
Ubuntu/Debian	<ol style="list-style-type: none">1. In the <code>/etc/initramfs-tools/modules</code> file, add VirtIO drivers, including <code>virtio_blk</code>, <code>virtio_scsi</code>, <code>virtio_net</code>, <code>virtio_pci</code>, <code>virtio_ring</code>, and <code>virtio</code>. Separate driver names with spaces.2. Save and exit the <code>/etc/initramfs-tools/modules</code> file and run the <code>update-initramfs -u</code> command to generate initrd again.	Ubuntu and Debian
SUSE and openSUSE	<p>If the OS version is earlier than SUSE 12 SP1 or openSUSE 13:</p> <ol style="list-style-type: none">1. In the <code>/etc/sysconfig/kernel</code> file, add VirtIO drivers to INITRD_MODULES="". VirtIO drivers include <code>virtio_blk</code>, <code>virtio_scsi</code>, <code>virtio_net</code>, <code>virtio_pci</code>, <code>virtio_ring</code>, and <code>virtio</code>. Separate driver names with spaces.2. Run the <code>mkinitrd</code> command to generate initrd again.	SUSE and openSUSE (Earlier than SUSE 12 SP1 or openSUSE 13)
	<p>If the OS version is SUSE 12 SP1:</p> <ol style="list-style-type: none">1. In the <code>/etc/dracut.conf</code> file, add VirtIO drivers to add_drivers. VirtIO drivers include <code>virtio_blk</code>, <code>virtio_scsi</code>, <code>virtio_net</code>, <code>virtio_pci</code>, <code>virtio_ring</code>, and <code>virtio</code>. Separate driver names with spaces.2. Run the <code>dracut -f</code> command to generate initrd again.	SUSE and openSUSE (SUSE 12 SP1)

OS	Configuration	Reference
	<p>If the OS version is later than SUSE 12 SP1 or openSUSE 13:</p> <ol style="list-style-type: none"> In the <code>/etc/dracut.conf</code> file, add VirtIO drivers to add_drivers, including <code>virtio_blk</code>, <code>virtio_scsi</code>, <code>virtio_net</code>, <code>virtio_pci</code>, <code>virtio_ring</code>, and <code>virtio</code>. Separate driver names with spaces. Save and exit the <code>/etc/dracut.conf</code> file and run the dracut -f command to generate initrd again. 	SUSE and openSUSE (Later than SUSE 12 SP1 or openSUSE 13)

CentOS and EulerOS

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

```
[root@CTU10000xxxx ~]# vi /etc/dracut.conf
# additional kernel modules to the default
add_drivers+="virtio_blk virtio_scsi virtio_net virtio_pci virtio_ring virtio"
....
```
- Press **Esc**, enter **:wq**, and press **Enter**. The system saves the change and exits the `/etc/dracut.conf` file.

- 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.

- If the virtual file system is `initramfs`, run the following command to check whether native KVM drivers have been installed:

```
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 installed:

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

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

```
[root@CTU10000xxxx 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 root 50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
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
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
```

```
-rwxr--r-- 1 root root 14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/virtio.ko
-rwxr--r-- 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
-rwxr--r-- 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
```

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
```

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 VirtIO drivers to the `/etc/initramfs-tools/modules` file (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]#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@ CTU10000xxxx 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@ CTU10000xxxx 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 VirtIO 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 processor.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 KVM VirtIO drivers have been installed:

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 VirtIO drivers to **add-drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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 VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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.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 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/*
```

 **NOTE**

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 Replicating Images

Scenarios

You can enable some advanced features (such as fast ECS creation from an image) using the image replication function. You may need to replicate an image to:

- 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.
- Private images created using ISO files do not support in-region replication.

Prerequisites

The images to be replicated are in the **Normal** state.

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 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.
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.

3.11 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.

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).

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.
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.

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.

3.12 Auditing Key Operations

3.12.1 IMS Operations Recorded by CTS

Scenarios

Cloud Trace Service (CTS) is a log audit service provided by the cloud platform 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	createImage
Modifying an image	ims	updateImage
Deleting images in a batch	ims	deleteImage
Replicating an image	ims	copyImage
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

Operation	Resource Type	Trace Name
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	createImage	IMS	image	glance
Modifying/ Uploading an image	updateImage	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	updateMember	IMS	image	glance
Deleting a tenant from the group where the members can use a shared image	deleteMember	IMS	image	glance

3.12.2 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**.
4. 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.

3.13 Converting the Image Format

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. You can obtain it from: https://qemu.weilnetz.de/w64/	Free

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**.
- 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 **qemu-img**.
 - a. 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.

NOTE

If **Path** does not exist, add it and set its value to **D:\Program Files\qemu**.

- 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 QCOW2:

```
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%)
```

- c. 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 qemu-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:

```
qemu-img info centos6.9.qcow2
```

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=ffffff
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
```

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

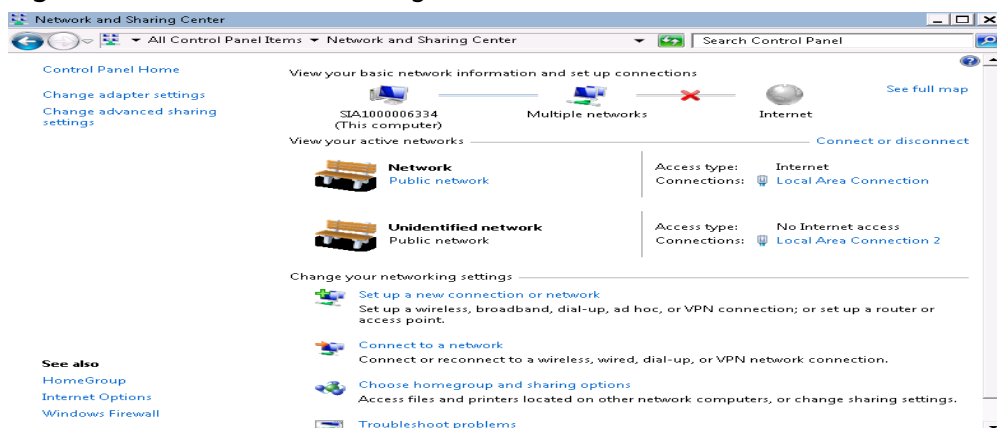
You have logged in to the ECS used to create a Windows private image.

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

Procedure

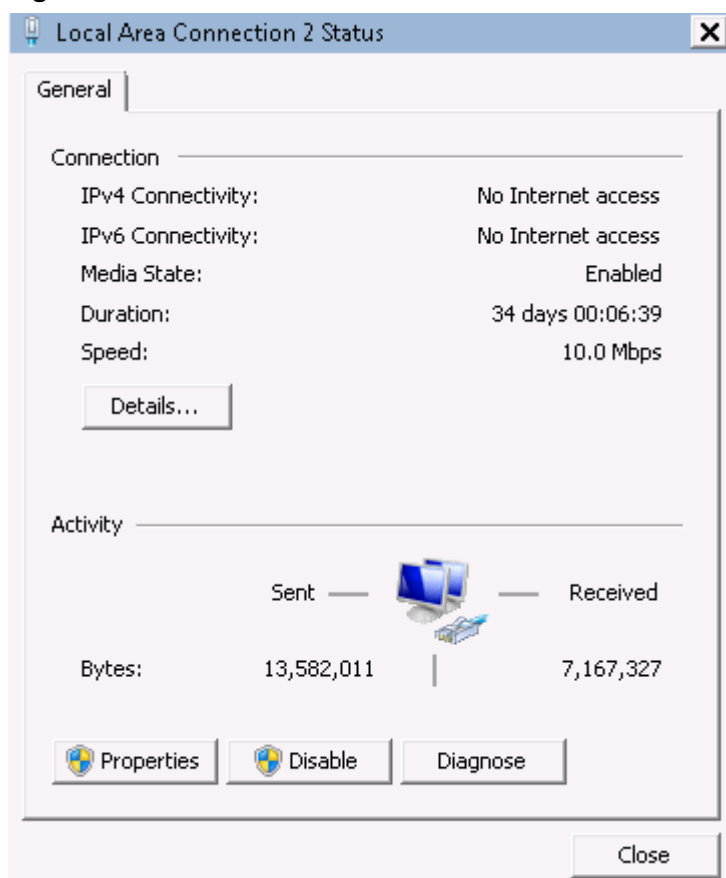
1. On the ECS, choose **Start > Control Panel**.
2. Click **Network and Internet Connections**.
3. Click **Network and Sharing Center**.

Figure 4-1 Network and Sharing Center



4. Select the connection configured with the static IP address. For example, click **Local Area Connection 2**.

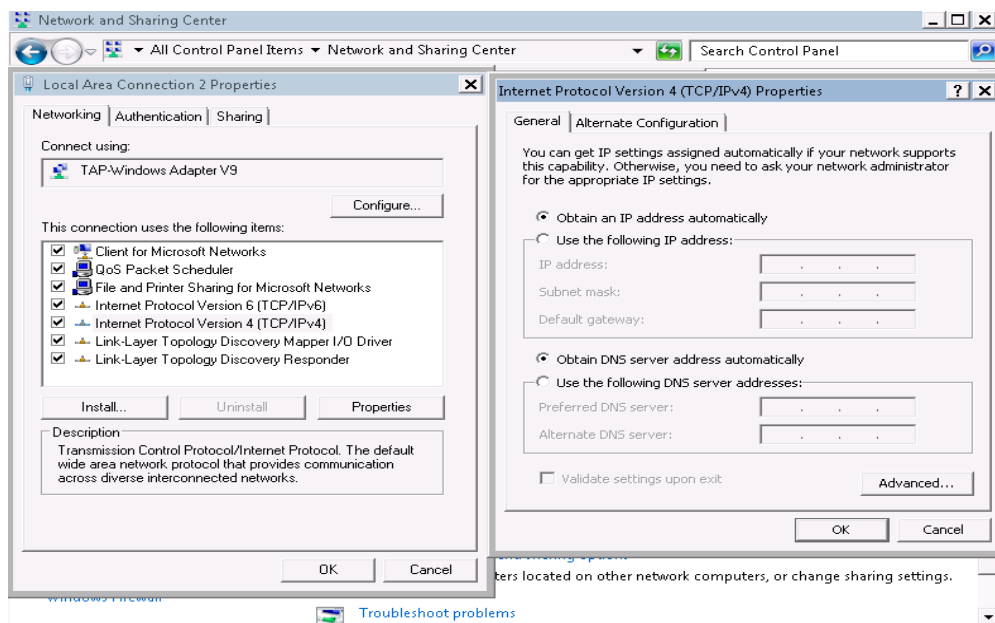
Figure 4-2 Local Area Connection 2 Status



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.

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.

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

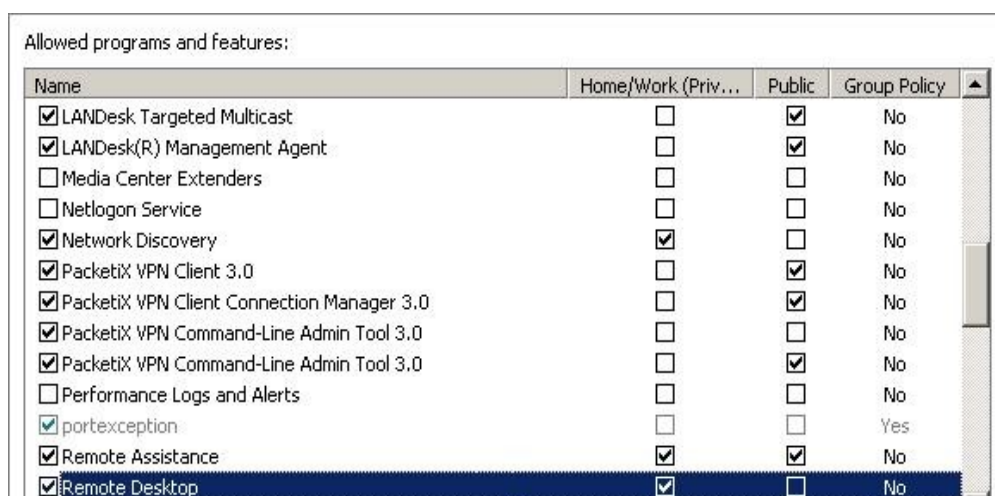
1. Before enabling this function, you are advised to set the resolution of the ECS to 1920×1080.

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.

NOTE

Cloudbase-Init is open-source software. If the installed version has security vulnerabilities, you are advised to upgrade it to the latest version.

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.
- The one-click password reset plug-in has been installed on the ECS.

If you restart the ECS when installing Cloudbase-Init on it, the password may be changed to a random one. Therefore, you need to install the one-click password reset plug-in on the ECS. For details, see [Installing the One-Click Password Reset Plug-In](#).

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/>).

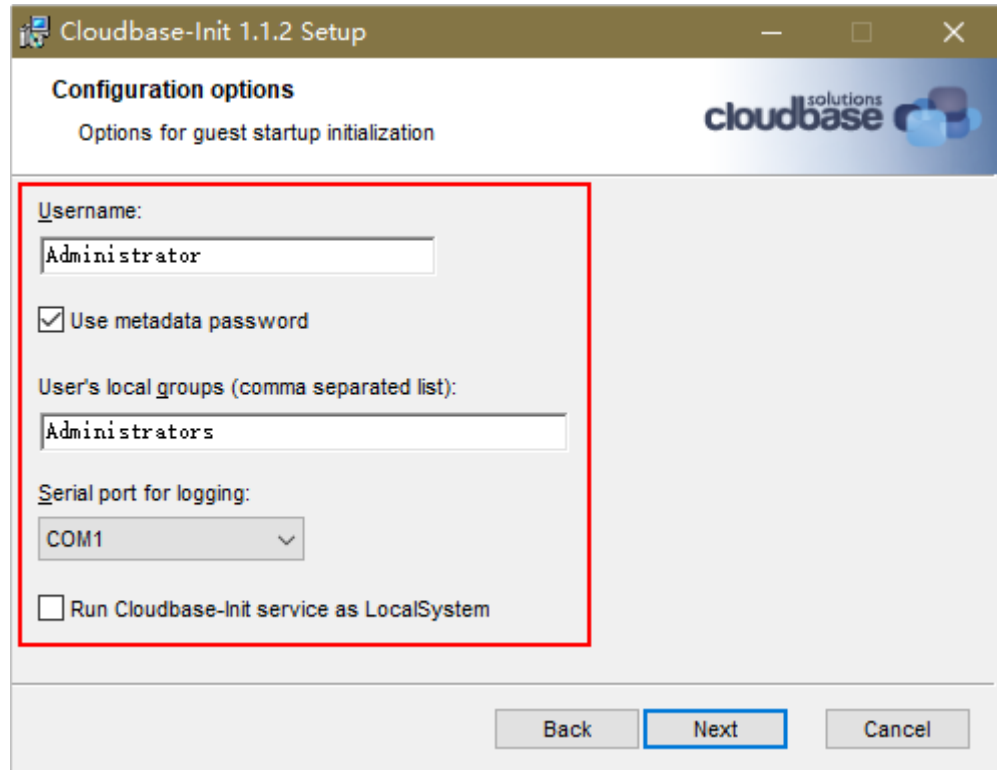
To obtain the stable version, visit the following paths:

 - 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.

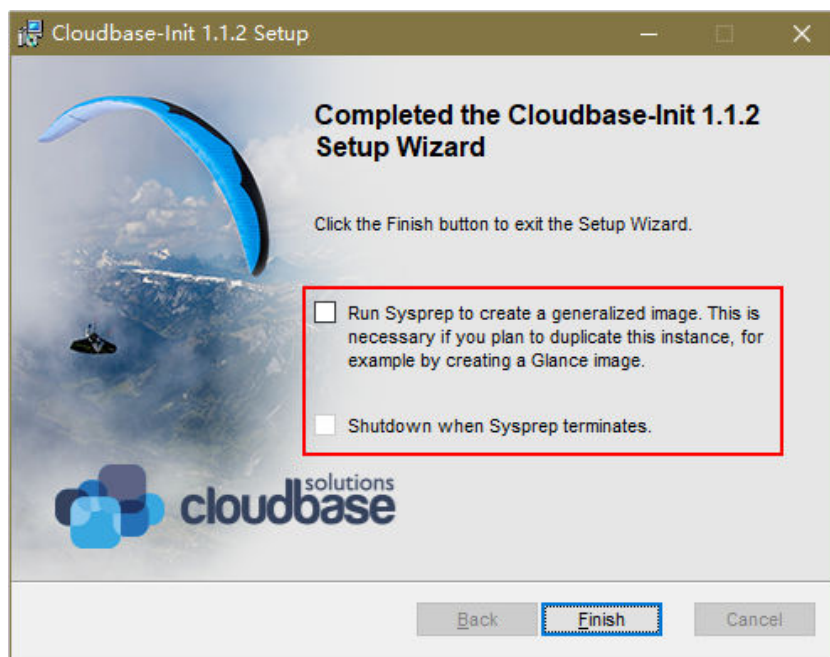
 **NOTE**

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.

NOTE

NetBIOS contains no more than 15 characters due to Windows system restrictions.

- b. Add **metadata_services=cloudbaseinit.metadata.services.httpservice.HttpService** to enable the agent to access the IaaS 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.sethostname.SetHostNamePlugin,cloudbaseinit.plugins.windows.extendvolumes.ExtendVolumesPlugin,cloudbaseinit.plugins.common.userdata.UserDataPlugin,cloudbaseinit.plugins.windows.licensing.WindowsLicensingPlugin
```

Plugin functions:

- **LocalScriptsPlugin** configures scripts.
- **MTUPlugin** configures MTU network interfaces.
- **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.

 **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 disable password changing upon first login:
first_logon_behaviour=no
- h. (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

 NOTE

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

Type	Description
OnlineAll	All newly detected disks are automatically brought online.
OfflineShared	All disks on sharable buses, such as iSCSI and FC, are left offline by default, while disks on non-sharable buses are kept online.
OfflineInternal	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 Installing the One-Click Password Reset Plug-In

Scenarios

You are advised to install the password reset plug-in CloudResetPwdAgent before creating a private image. In this way, you can reset the password of ECSs created from the image by a few clicks.

- ECSs created from a public image have this plug-in installed by default.
- For ECSs created from an external image file, install the plug-in by performing the operations in this section.

NOTE

The installation of this plug-in is optional. If you want to use the one-click password resetting function on the management console, install the plug-in by following the instructions provided in this section.

Precautions

- You can decide whether to install the CloudResetPwdAgent plug-in.
- [Table 4-2](#) lists the OSs that support this plug-in.

Table 4-2 OSs that support the one-click password reset plug-in

OS Type	OS Version
Windows	Windows Server 2016 Datacenter 64bit Windows Server 2012 R2 Standard 64bit Windows Server 2012 R2 Datacenter 64bit Windows Server 2008 R2 Enterprise 64bit Windows Server 2008 SP2 Enterprise 64bit Windows Server 2008 R2 Datacenter 64bit Windows Server 2008 R2 Standard 64bit Windows Server 2008 R2 WEB 64bit

Prerequisites

- The ECS status is **Running**.
- The ECS must have a remaining space of more than 300 MB, and data can be written to its drive C.
- DHCP must be enabled for the VPC used by the ECS.
- Networks of the ECS are normal.
- The outbound security group rule of the ECS must meet the following requirements:
 - **Protocol: TCP**

- **Port Range: 80**
- **Remote End: 169.254.0.0/16**

If you use the default outbound security group rule, preceding requirements can be met, and the ECS can be initialized. The default outbound security group rule is as follows:

- **Protocol: All**
- **Port Range: All**
- **Remote End: 0.0.0.0/16**

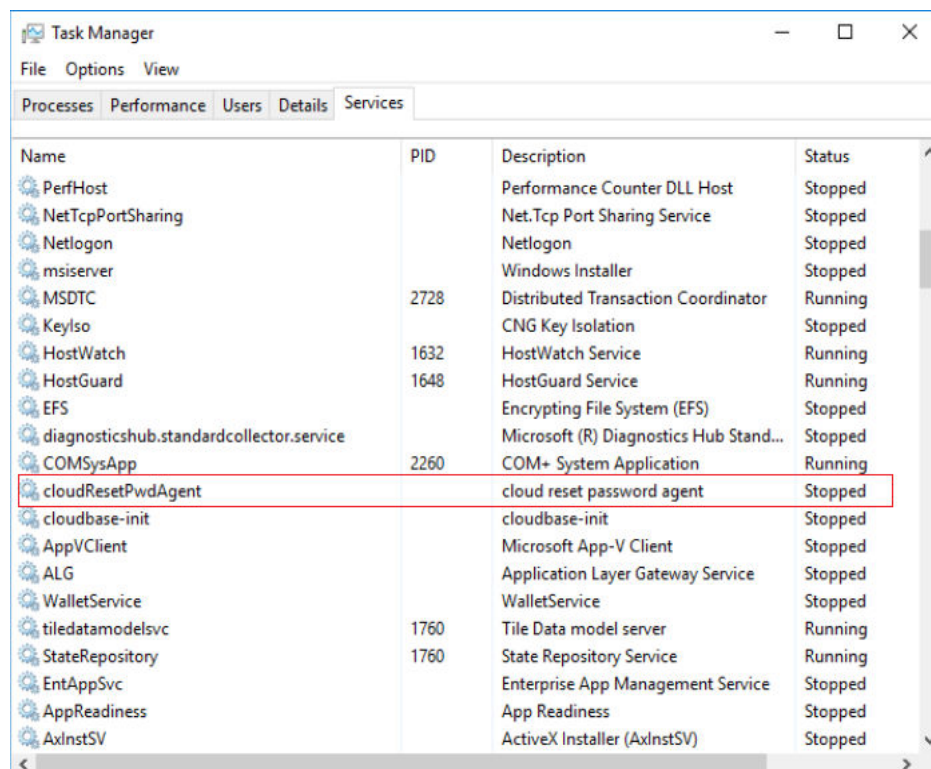
Procedure

Step 1 Log in to the ECS.

Step 2 Check whether the password reset plug-in CloudResetPwdAgent has been installed on the ECS.

Start the **Task Manager** and check whether **cloudResetPwdAgent** is displayed on the **Services** tab. As shown in **Figure 4-7**, the password reset plug-in has been installed on the ECS.

Figure 4-7 Successful plug-in installation



- If the installation is successful, no further action is required.
- Otherwise, go to **3**.

Step 3 Download the one-click password reset plug-in **CloudResetPwdAgent.zip**.

There is no special requirement for the directory that stores **CloudResetPwdAgent.zip**.

Contact the administrator to obtain the path of the OBS bucket from which the plug-in will be downloaded.

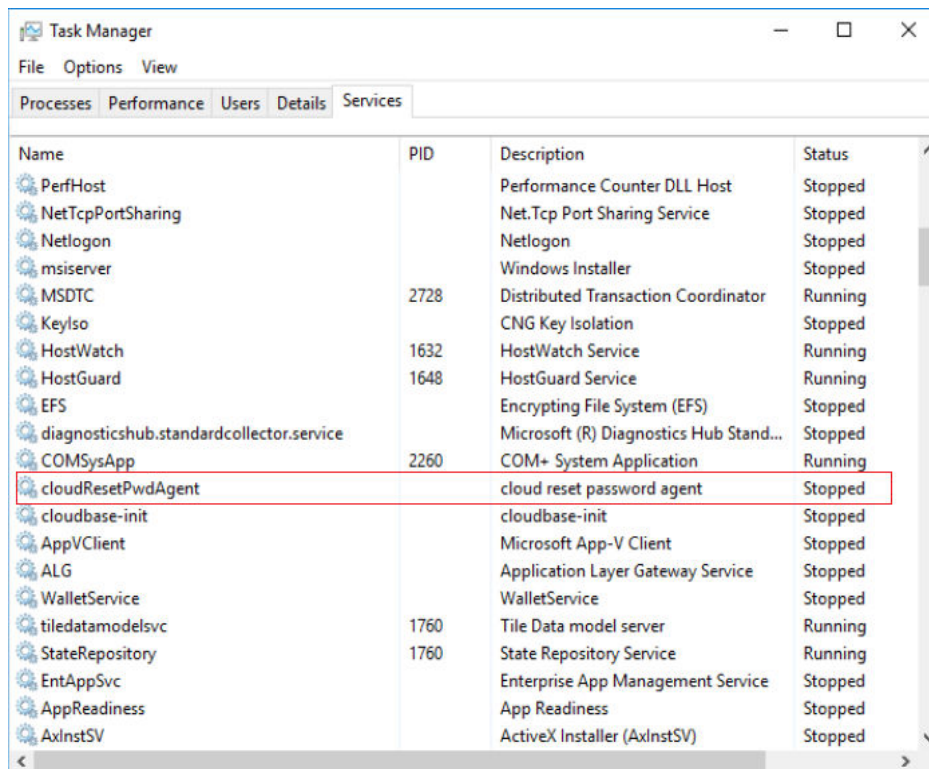
Step 4 Decompress **CloudResetPwdAgent.zip**.

There is no special requirement for the directory that stores the decompressed **CloudResetPwdAgent.zip**.

Step 5

1. Double-click **setup.bat** in **CloudResetPwdAgent.Windows**.
The password reset plug-in starts to be installed.
2. View the **Task Manager** and check whether the installation was successful.
If **cloudResetPwdAgent** is displayed in the **Task Manager**, as shown in **Figure 4-8**, the installation was successful. Otherwise, the installation failed.

Figure 4-8 Successful plug-in installation



NOTE

If the installation failed, check whether the installation environment meets requirements and install the plug-in again.

----End

4.5 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

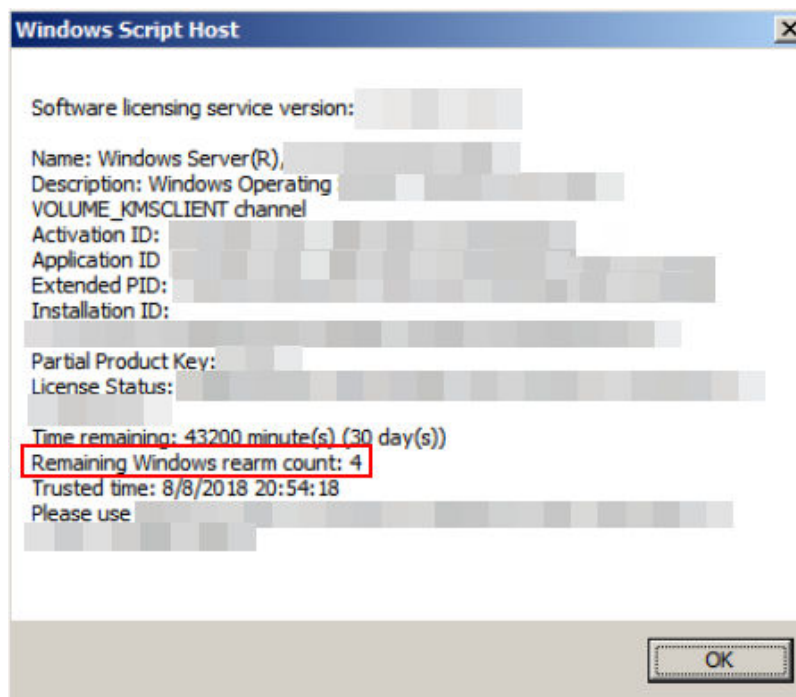
- Run Sysprep as the administrator.
- For a newly activated Windows ECS, you can run Sysprep only once at a time.
- If an ECS is created from an image file, only Sysprep provided by the image file can be used. In addition, Sysprep must always reside in the **%WINDIR%\system32\sysprep** directory.
- Windows 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 4-9 Windows Script Host



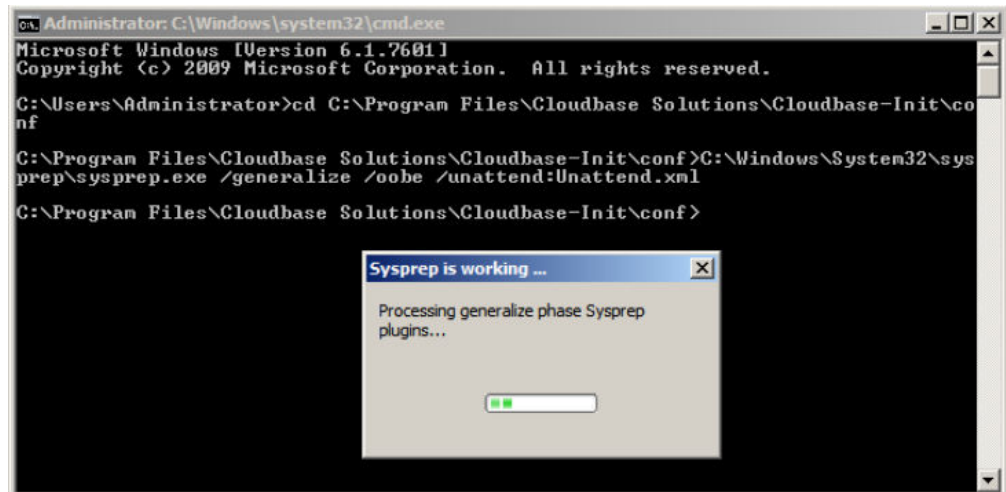
Procedure

1. 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

CAUTION

- 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 4-10 Running Sysprep



Follow-up Procedure

1. Create a private image from the ECS on which Sysprep is executed. For details, see [Creating a System Disk Image from a Windows ECS](#).
2. You can use the image to create ECSs. Each ECS has a unique SID.

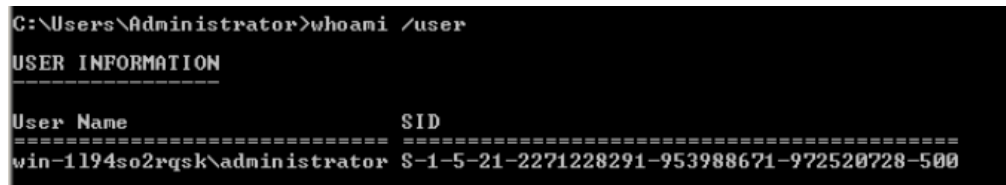
Run the following command to query the ECS SID:

```
whoami /user
```

Figure 4-11 ECS SID before Sysprep is executed



Figure 4-12 ECS SID after Sysprep is executed



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

1. 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: [8.8.8.8,114.114.114.114]
```

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: [8.8.8.8,114.114.114.114]
```

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/network-scripts/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.

NOTE

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
```

 - o 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:
 - i. 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
```

 - o 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](#).

NOTE

Cloud-Init is open-source software. If the installed version has security vulnerabilities, you are advised to upgrade it to the latest version.

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:/sbin:/bin:/usr/sbin:/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.

NOTE

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 SSH 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/>

 NOTE

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
```

- c. 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
```

 CAUTION

For SUSE and openSUSE, perform the following steps to disable dynamic change of the ECS name:

1. 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.

Table 5-1 Cloud-Init installation package 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/

- 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
```

 **NOTE**

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>

2. Create a **pip.conf** file in the `~/.pip/` directory and edit the following content:

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>
```

NOTE

Replace `<$mirror>` with a public network PyPI source.

Public network PyPI source: <https://pypi.python.org/>

NOTE

Replace `<$mirror>` with a public network PyPI source.

Public network PyPI source: <https://pypi.python.org/>

3. 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
```

 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](#).
2. 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 select user **root**, enable the SSH permissions of user **root** and enable remote login to the ECS using a password.
 - If you inject a password, use it to log in to the ECS remotely using SSH or noVNC.
 - If you inject a key, use it to log in to the ECS remotely using SSH.
2. Enable remote login using the password of user **root** and enable the SSH permissions of user **root**.

Take CentOS 6.7 as an example. If the value of **disable_root** in the **/etc/cloud/cloud.cfg** file is **0**, the permissions are enabled. (In some OSs, value **true** indicates that the permissions are disabled, and **false** indicates that the permissions are enabled). Set **ssh_pwauth** to **1**, and **lock_passwd** to **False** (indicating that user passwords are not locked).

```
users:  
- name: root  
  lock_passwd: False
```

```
disable_root: 0  
ssh_pwauth: 1
```

3. 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**:

Figure 5-1 Preventing Cloud-Init from taking over the network

```
users:  
- name: root  
  lock_passwd: False  
  
disable_root: 0  
ssh_pwauth: 1  
  
datasource_list: ['OpenStack']  
  
network:  
  config: disabled
```

NOTE

The added content must be in the YAML format.

4. Enable the agent to access the IaaS 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
    apply_network_config: false
```

NOTE

- You can decide whether to set **max_wait** and **timeout**. The values of **max_wait** and **timeout** in the preceding command output are only for reference.
- If the OS version is earlier than Debian 8 or CentOS 5, you cannot enable the agent to access the IaaS 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
- **apply_network_config: false** is only required by users who use Cloud-Init 18.3 or later.

5. Add the following content to `/etc/cloud/cloud.cfg`:

manage_etc_hosts: localhost

This prevents the system from staying in the **Waiting for cloudResetPwdAgent** state for a long time during ECS startup.

Figure 5-2 Adding `manage_etc_hosts: localhost`

```
datasource_list: ['OpenStack']
manage_etc_hosts: localhost

datasource:
  OpenStack:
    # timeout: the timeout value for a request at metadata service
    timeout : 50
    # The length in seconds to wait before giving up on the metadata
    # service. The actual total wait could be up to
    # len(resolvable_metadata_urls)*timeout
    max_wait : 120
```

6. Run the `vi /etc/ssh/sshd_config` command to open the `/etc/ssh/sshd_config` file using the vi editor.

Change the value of **PasswordAuthentication** in the `sshd_config` file to **yes**.

NOTE

For SUSE and openSUSE, change the values of the following parameters in the `sshd_config` file to **yes**:

- PasswordAuthentication
- ChallengeResponseAuthentication

7. Modify **cloud_init_modules** in the `cloud.cfg` configuration file.

– Move **ssh** from the bottom to the top to speed up the SSH login.

- Enable the hostname update. Do not comment out or delete the - **update_hostname** statement.

```
cloud_init_modules:  
- ssh  
- migrator  
- bootcmd  
- write-files  
- growpart  
- resizefs  
- set_hostname  
- update_hostname  
- update_etc_hosts  
- rsyslog  
- users-groups
```

8. 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/python*/site-packages/cloudinit/sources/__init__.py
```

The Python version varies depending on the OS.

Press **i** to enter editing mode. Modify the file content as follows based on the keyword **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.

- b. Run the following command to switch to the **cloudinit/sources** folder:

```
cd /usr/lib/python*/site-packages/cloudinit/sources/
```

The Python version varies depending on the OS.

- 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*
```

9. 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
```

```
[logger_cloudinit]  
level=DEBUG
```

```
qualname=cloudinit  
handlers=cloudLogHandler  
propagate=1
```

10. Delete user **linux** and the **/home/linux** directory from the image template.

```
userdel linux
```

```
rm -fr /home/linux
```

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 Installing the One-Click Password Reset Plug-In

Scenarios

You are advised to install the password reset plug-in CloudResetPwdAgent before creating a private image. In this way, you can reset the password of ECSs created from the image by a few clicks.

- ECSs created from a public image have this plug-in installed by default.
- For ECSs created from an external image file, install the plug-in by performing the operations in this section.

NOTE

The installation of this plug-in is optional. If you want to use the one-click password resetting function on the management console, install the plug-in by following the instructions provided in this section.

Precautions

- You can decide whether to install the CloudResetPwdAgent plug-in.
- Not all OSs support the one-click password reset plug-in. [Table 5-2](#) lists the OSs that support this plug-in.

Table 5-2 OSs that support the one-click password reset plug-in

OS Type	OS Version
CentOS	CentOS 8.3 64bit CentOS 8.2 64bit CentOS 8.1 64bit CentOS 8.0 64bit CentOS 7.3 64bit CentOS 7.2 64bit CentOS 7.0 64bit CentOS 7.1 64bit CentOS 6.9 64bit CentOS 6.8 64bit CentOS 6.8 32bit CentOS 6.6 32bit CentOS 6.6 64bit CentOS 6.5 64bit CentOS 6.4 64bit CentOS 6.3 64bit NOTE For CentOS 8, disable SELinux before you install the one-click password reset plug-in. After the plug-in is installed, you can determine whether to enable SELinux as needed.
Debian	Debian 9.0 64bit Debian 8.8 64bit Debian 8.2 64bit Debian 7.5 64bit Debian 7.5 32bit
openSUSE	openSUSE 42.2 64bit openSUSE 13.2 64bit openSUSE Leap 42.2 64bit openSUSE Leap 42.1 64bit
SUSE	SUSE 12 SP2 64bit SUSE 12 SP1 64bit SUSE 11 SP4 64bit
Ubuntu	Ubuntu 16.10 32bit Ubuntu 16.04 32bit Ubuntu Server 16.04 64bit Ubuntu Server 14.04 64bit Ubuntu Server 14.04 32bit

OS Type	OS Version
EulerOS	EulerOS 2.2 64bit
Fedora	Fedora 25 64bit Fedora 24 64bit
Oracle Linux	Oracle Linux 7.3 64bit Oracle Linux 6.9 64bit Oracle Linux 6.5 64bit

Prerequisites

- The ECS status is **Running**.
- The ECS must have a remaining space of more than 300 MB, and data can be written to its root directory.
- SELinux affects the password reset plug-in of Linux ECSs. You can disable it by referring to "Disabling SELinux" in *Elastic Cloud Server User Guide*.
- ECSs created using a SUSE 11 SP4 image must have 4 GB or a larger memory.
- DHCP must be enabled for the VPC used by the ECS.
- Networks of the ECS are normal.
- The outbound security group rule of the ECS must meet the following requirements:
 - **Protocol: TCP**
 - **Port Range: 80**
 - **Remote End: 169.254.0.0/16**

If you use the default outbound security group rule, preceding requirements can be met, and the ECS can be initialized. The default outbound security group rule is as follows:

- **Protocol: All**
- **Port Range: All**
- **Remote End: 0.0.0.0/16**

Procedure

- Step 1** Use either of the following methods to check whether the password reset plug-in has been installed on the ECS:

Method 1: Use the management console for query.

1. Log in to the management console.
2. Under **Computing**, click **Elastic Cloud Server**.
3. Locate the row containing the target ECS, click **More** in the **Operation** column, and select **Reset Password** from the drop-down list.
 - If a dialog box is displayed, asking you to enter the new password, the password reset plug-in has been installed. No further action is required.

- If a dialog box is displayed, asking you to download a password reset script, the password reset plug-in has not been installed. Then, install it.

Method 2: Use the ECS for query.

1. Log in to the ECS as user **root**.
2. Run the following command to check whether CloudResetPwdAgent has been installed:

```
ls -lh /Cloud*
```

Figure 5-3 Checking whether the plug-in has been installed

```
[root@ecs-test ~]# ls -lh /Cloud*
total 20K
drwx----- 2 root root 4.0K Jun 13 14:13 bin
drwxr-xr-x 2 root root 4.0K Jun 13 11:53 conf
drwx----- 3 root root 4.0K Jun 13 11:53 depend
drwx----- 2 root root 4.0K Jun 13 11:53 lib
drwx----- 2 root root 4.0K Jun 13 14:13 logs
[root@ecs-test ~]#
[root@ecs-test ~]#
```

Check whether the obtained information is similar to that shown in [Figure 5-3](#).

- If yes, the plug-in has been installed.
- If no, the plug-in has not been installed. Then, install it.

Step 2 Download the one-click password reset plug-in **CloudResetPwdAgent.zip**.

Contact the administrator to obtain the path of the OBS bucket from which the plug-in will be downloaded.

For example, the download path is http://xxx-cloud-reset-pwd.obs.com/linux/64/reset_pwd_agent/CloudResetPwdAgent.zip.

Run the following command to download the plug-in:

```
wget http://xxx-cloud-reset-pwd.obs.com/linux/64/reset_pwd_agent/CloudResetPwdAgent.zip
```

Step 3 Run the following command to decompress **CloudResetPwdAgent.zip**:

There is no special requirement for the directory that stores the decompressed **CloudResetPwdAgent.zip**. Use any directory.

```
unzip -o -d Decompressed directory CloudResetPwdAgent.zip
```

An example is provided as follows:

If the plug-in is decompressed to **/home/linux/test**, run the following command:

```
unzip -o -d /home/linux/test CloudResetPwdAgent.zip
```

Step 4 Install the one-click password reset plug-in.

1. Run the following command to open the **CloudResetPwdAgent.Linux** file:

```
cd CloudResetPwdAgent/CloudResetPwdAgent.Linux
```

2. Run the following command to add the execute permission for the **setup.sh** file:

```
chmod +x setup.sh
```

3. Run the following command to install the plug-in:

```
sudo sh setup.sh
```

If "cloudResetPwdAgent install successfully." is displayed and "Failed to start service cloudResetPwdAgent" is not displayed, the installation is successful.

NOTE

- You can also check whether the plug-in has been installed using the methods provided in [Step 1](#).
- If the installation failed, check whether the installation environment meets the requirements and install the plug-in again.

Step 5 Modify the file permission of the password reset plug-in.

```
chmod 700 /CloudrResetPwdAgent/bin/cloudResetPwdAgent.script
```

```
chmod 700 /CloudrResetPwdAgent/bin/wrapper
```

```
chmod 600 /CloudrResetPwdAgent/lib/*
```

```
----End
```

5.6 Installing Special Linux Drivers

Scenarios

Before using some types of ECSs to create private images, you need to install special drivers on the ECSs.

InfiniBand NIC Driver

1. If you want to use the private image to create H2 ECSs, install the InfiniBand NIC driver for the image. Download the required version (4.2-1.0.0.0) of InfiniBand NIC driver from the official website and install the driver by following the instructions provided by Mellanox.
 - InfiniBand NIC: **Mellanox Technologies ConnectX-4 Infiniband HBA (MCX455A-ECAT)**
 - Mellanox official website: <http://www.mellanox.com/>
 - NIC driver download path: https://network.nvidia.com/products/infiniband-drivers/linux/mlnx_ofed/
2. If you want to use the private image to create HL1 ECSs, install the InfiniBand NIC driver for the image. Download the required version (4.2-1.0.0.0) of InfiniBand NIC driver from the official website and install the driver by following the instructions provided by Mellanox.
 - InfiniBand NIC: **Mellanox Technologies ConnectX-4 Infiniband HBA (MCX455A-ECAT)**
 - Mellanox official website: <http://www.mellanox.com/>

5.7 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

1. 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 5-4 EVS disk configuration in the **fstab** file

```
[root@ecs-bf78 ~]# cat /etc/fstab
#
# /etc/fstab
# Created by anaconda on Wed Feb 27 06:58:16 2019
#
# 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 over 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 identity credentials for accessing images.
- Grant only the permissions required for users to perform a specific 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.

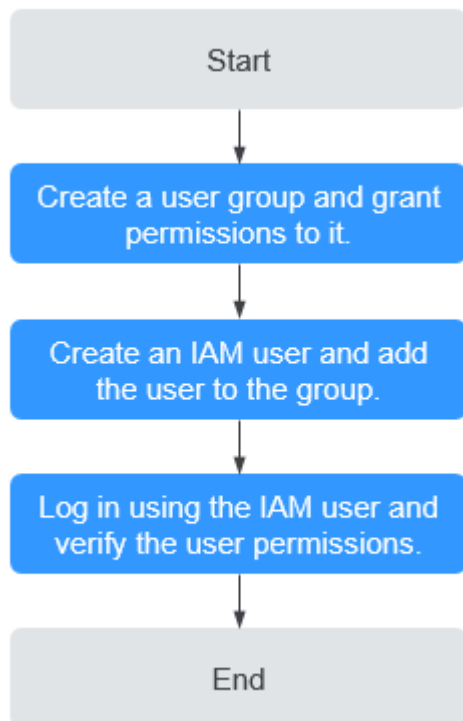
This section uses the **IMS ReadOnlyAccess** permission as an example to describe how to grant permissions to a user. [Figure 6-1](#) shows the process.

Prerequisites

Learn about the permissions (see [IMS Permissions](#)) supported by IMS.

Process Flow

Figure 6-1 Process for granting IMS permissions



1. Create a user group and grant permissions to it.
Create a user group on the IAM console and click **Authorize** in the **Operation** column to assign the **IMS ReadOnlyAccess** permissions to the group.
2. Create an IAM user and add it to the user group.
Create a user on the IAM console and add it to the user group created in **1** by choosing **Authorize** in the **Operation** column.
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 the *Identity and Access Management User Guide (Old Edition)*. The following 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:*"
      ]
    }
  ]
}
```

```
]
}
{
  "Version": "1.1",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "OBS:*:*"
      ]
    }
  ]
}
```

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:

```
{
  "Version": "1.1",
  "Statement": [
    {
      "Effect": "Deny",
      "Action": [
        "ims:images:delete"
      ]
    }
  ]
}
```

7 FAQs

7.1 Image Consulting

7.1.1 How Do I Select an Image?

When creating an ECS, 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	<ul style="list-style-type: none">• 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.

System Architecture	Applicable Memory	Constraints
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	<ul style="list-style-type: none">• 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 40 GB, and there must be at least 1 GB of memory.
Linux	<ul style="list-style-type: none">• 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 40 GB, and there must be at least 512 MB of memory.


7.1.2 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.

Before contacting the operations administrator, make sure that the following information has been obtained:

- Account name, which can be obtained by performing the following operations:
Log in to the management console using the cloud account, click the username in the upper right corner, select **My Credentials** from the drop-down list, and obtain the account name on the **My Credentials** page.
- Quota information, which includes service name, quota type, and required quota

7.1.3 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 7-1](#) lists the differences between them.

Table 7-1 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	<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Data backup and restoration • Rapid service deployment and migration 	<ul style="list-style-type: none"> • 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.

7.1.4 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.

7.1.5 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.

7.1.6 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*.

7.1.7 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.

7.1.8 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 Image Creation

7.2.1 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.

7.2.2 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.

7.2.3 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 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.

7.2.4 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](#)

7.2.5 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.

NOTE

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.

7.2.6 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](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
```

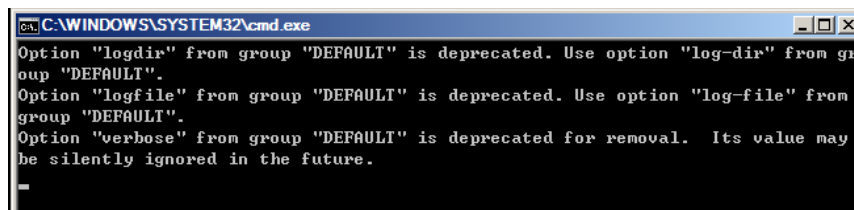
If the value of **Remaining Windows rearm count** is 0, you cannot run Sysprep.

7.2.7 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



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

```
115 2018-08-28 23:43:15, Info [SETUPGDC.EXE] Running commands is already in progress.
116 2018-08-28 23:43:15, Info [0x000000] PANTER CRackboard:Open: C:\Windows\panther\command.exe(CommandExec) succeeded.
117 2018-08-28 23:44:33, Error [SETUPGDC.EXE] Hit an error (0x = 0x00000001) while running cmd.exe (c:"C:\Program Files\Cloudbase Solutions\Cloudbase-Init\Python
C:\Program Files\Cloudbase Solutions\Cloudbase-Init\conf\cloudbase-init-unattend.conf" %* exit 1 || exit 2)
118 2018-08-28 23:44:33, Info [0x000000] PANTER CRackboard:Close: c:\windows\panther\command.exe(CommandExec)...
119 2018-08-28 23:44:33, Info [SETUPGDC.EXE] SetupGDC returning with exit code (4).
120 2018-08-28 23:44:53, Info [windeploy.exe] Process exited with exit code (0x1f).
121 2018-08-28 23:44:53, Error [windeploy.exe] Setup.exe failed, returning exit code (0x1f).
122 2018-08-28 23:44:53, Error [windeploy.exe] Failure occurred during online installation. Online installation cannot complete at this time. hr = 0x80004003
123 2018-08-28 23:44:53, Info [windeploy.exe] Flushing registry to disk....
124 2018-08-28 23:44:53, Info [windeploy.exe] Flush took 16 ms..
```

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-scripts-create-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:wcm="http://schemas.microsoft.com
versionScope="nonSxS" publicKeyToken="31bf3856ad364e35" processorArchitecture="amd64" name="Microsoft-Windows-Deployment">
- <RunSynchronous>
- <RunSynchronousCommand wcm:action="add">
- <Order>1</Order>
- <Path>cmd.exe /c "C:\Program Files\Cloudbase Solutions\Cloudbase-Init\Python\Scripts\cloudbase-init.exe" --config-file
Solutions\Cloudbase-Init\conf\cloudbase-init-unattend.conf" && exit 1 || exit 2"</Path>
- <Description>Run Cloudbase-Init to set the hostname</Description>
- <WillReboot>OnRequest</WillReboot>
- </RunSynchronousCommand>
- </RunSynchronous>
</component>
</settings>
</unattend>
```

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.

7.2.8 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_ild** role (**op_gated_ild** 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 administrator to ensure that the current environment supports lazy loading, obtain a new token, and use the new token to create an image.

7.3 Image Sharing

7.3.1 Image Sharing FAQs

How Many Tenants Can I Share an Image with?

A system disk image or data disk image can be shared with up to 128 tenants, but a full-ECS image can only be shared with up to 10 tenants.

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](#).

7.3.2 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:
 - You can enable some advanced features (such as fast ECS creation from an image) using the image replication function.

The following table describes the details.

Scenario	Operation	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	Replicate	This is used for enabling advanced features (such as fast ECS creation from an image).	For details, see Replicating Images .

7.3.3 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:
 - Full-ECS images created from a CSBS backup

7.4 OS

7.4.1 How Do I Select an OS?

- 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.

7.4.2 How Is BIOS Different from UEFI?

Table 7-2 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.

7.4.3 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

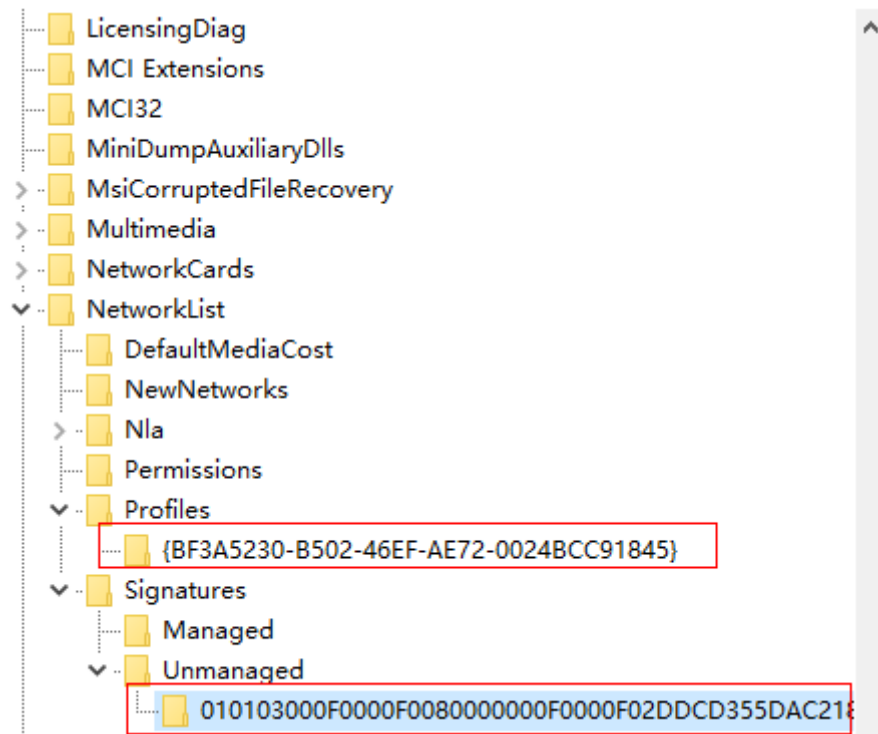
1. Press **Win+R**. In the displayed dialog box, enter **regedit** and press **Enter** to open the registry editor.

 **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.

Figure 7-4 Registry directory



7.4.4 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

```
[root@... ]# rpm -qa | grep grub  
grub2-2.02-0.44.el7.centos.x86_64
```

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
default=0
timeout=8
splashimage=(hd0,1)/boot/grub/splash.xpm.gz
hiddenmenu
title CentOS (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-e8
19-4ba5-8ce8-8fe12b6efc24 rd_NO_LUKS rd_NO_LVM LANG=en_US.UTF-8 rd_NO_MD SYSFONT
=latarcyrheb-sun16 crashkernel=auto KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM rhgb q
quiet
```

7.4.5 What Do I Do If the One-Click Password Resetting Plug-In Failed to Start?

Symptom

The one-click password reset plug-in failed to start after it is installed.

Solution

Add the following content to the ECS configuration (the configuration file path varies depending on the OS. For details, see [Procedure](#)):

```
/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start
```

NOTE

- If **exit 0** is displayed at the end of the file, add the preceding content to the line just before **exit 0**. If **exit 0** is not displayed, add the preceding content to the end of the file.
- ECSs created from a SUSE 11 SP4 image must have 4 GB or a larger memory.

Procedure

- CoreOS

Run the following commands to start the plug-in:

```
cat >/etc/systemd/system/cloudResetPwdAgent.service <<EOT
[Unit]
Description=cloudResetPwdAgent service
Wants=local-fs.target
Requires=local-fs.target
[Service]
Type=simple
ExecStart=/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start
RemainAfterExit=yes
ExecStop=/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script stop
KillMode=none
[Install]
WantedBy=multi-user.target
EOT
systemctl enable cloudResetPwdAgent.service
```

- SUSE, Ubuntu, and Debian

a. Run the following command to open the **rc** file:

```
vi /etc/init.d/rc
```

b. Press **i** to enter the editing mode and add the following content to the end of the file:

```
/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start
```

c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.

- CentOS Linux 7
 - a. Run the following commands to make **rc.local** executable, and then to open the file:
chmod +x /etc/rc.d/rc.local
vi /etc/rc.d/rc.local
 - b. Press **i** to enter the editing mode and add the following content to the end of the file:
`/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start`
 - c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.
- openSUSE 13
 - a. Run the following command to open the **boot.local** file:
vi /etc/init.d/boot.local
 - b. Press **i** to enter the editing mode and add the following content to the end of the file:
`/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start`
 - c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.
- Debian 8
 - a. Run the following command to open the **rc.local** file:
vi /etc/rc.local
 - b. Press **i** to enter the editing mode and add the following content to the end of the file:
`/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start`
 - c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.
- Fedora 20
 - a. Run the following commands to open the **rc.local** file:
touch /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local
vi /etc/rc.d/rc.local
 - b. Press **i** to enter the editing mode and add the following content to the end of the file:
`/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start`
 - c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.
- Other OSs
 - a. Run the following command to open the **rc.local** file:
vi /etc/rc.d/rc
 - b. Press **i** to enter the editing mode and add the following content to the end of the file:
`/CloudrResetPwdAgent/bin/cloudResetPwdAgent.script start`
 - c. Press **Esc**, enter **:wq**, and press **Enter** to save the configuration and exit.

7.4.6 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.

7.4.7 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 a x86 ECS, this image will be invisible to you when you create an Arm (Kunpeng) ECS or change the OS of an Arm (Kunpeng) ECS, and vice versa.

- If you use an external image file to create a private image and select the x86 architecture, this image will be invisible to you when you create an Arm (Kunpeng) ECS or change the OS of an Arm (Kunpeng) ECS, and vice versa.
- If a private image is created from an ECS in BIOS boot mode, this image will be invisible to you when you create an ECS in UEFI boot mode or change the OS of an ECS in UEFI boot mode, and vice versa.
- If you use an external image file to create a private image and select the BIOS boot mode, this image will be invisible to you when you create an ECS in UEFI boot mode or change the OS of an ECS in UEFI boot mode, and vice versa.

7.5 Image Importing

7.5.1 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.

NOTE

For how to install and use **qemu-img** in Windows, visit:

<https://cloudbase.it/qemu-img-windows/>

7.5.2 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.

7.5.3 What Do I Do If I Configured an Incorrect OS or System Disk Capacity 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 capacity 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.

7.5.4 What Do I Do If the System Disk Capacity 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:

1. You have specified a small value.

Check the system disk capacity in the VHD image file. Specify a value no less than this value when you use the VHD image file to register an image.

2. After being converted using `qemu-img` or a similar tool, the VHD's virtual disk size becomes smaller than the actual system disk size. For details, see <https://bugs.launchpad.net/qemu/+bug/1490611>.

Run the following command to check the VHD image file information:

```
[xxxx@xxxx 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. After the conversion, the output virtual size **2 GB** is smaller than the input actual size **2.0004 GB (2147991552 bytes)**. You need to specify an integer larger than the actual size 2.0004 GB on the management console.

7.6 Image Exporting

7.6.1 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](#).

7.6.2 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.

7.6.3 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.

7.6.4 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.

7.6.5 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

7.7 Image Optimization

7.7.1 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 add them to initrd.

7.7.2 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 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 administrator.

7.7.3 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**.
- Copy built-in VirtIO drivers to **initrd** or **initramfs**. For details, see [External Image File Formats and Supported OSs](#).

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 so that the OS can use this driver for its initial start.
- Delete the registry keys of the mouse and keyboard and generate the registry keys again to ensure that the mouse and keyboard are available on the new cloud platform.
- Restore the PV driver registry key to rectify driver installation failures and Xen driver conflicts.
- Inject VirtIO drivers offline so that the OS can start without UVP VMTools installed.
- Restore DHCP. The OS will dynamically obtain information such as the IP address based on the DHCP protocol.

7.7.4 How Do I Configure an ECS or Image File Before I Use It to Create an Image?

ECS or Image File Configurations

Table 7-3 ECS configurations

OS	Configuration	Reference
Windows	<ul style="list-style-type: none"> • Set the NIC to DHCP. • Enable remote desktop connection. • Install the one-click password reset plug-in. • (Optional) Install Cloudbase-Init. • Install the Guest OS drivers, including the PV driver and UVP VMTools. • Run Sysprep. 	Creating a System Disk Image from a Windows ECS
Linux	<ul style="list-style-type: none"> • Set the NIC to DHCP. • (Optional) install special Linux drivers. • Install the one-click password reset plug-in. • (Optional) Install Cloud-Init. • 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. 	Creating a System Disk Image from a Linux ECS

Table 7-4 Image file configurations

OS	Configuration	Reference
Windows	<ul style="list-style-type: none">• Set the NIC to DHCP.• Enable remote desktop connection.• Install the Guest OS drivers, including the PV driver and UVP VMTools.• (Optional) Install Cloudbase-Init.• (Optional) Enable NIC multi-queue.• (Optional) Configure an IPv6 address.	Preparing an Image File
Linux	<ul style="list-style-type: none">• Delete files from the network rule directory.• 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.• (Optional) Configure an IPv6 address.	Preparing an Image File

 **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.

7.7.5 What Do I Do If a Windows Image File Is Not Pre-Configured When I Use It to Register a Private Image?

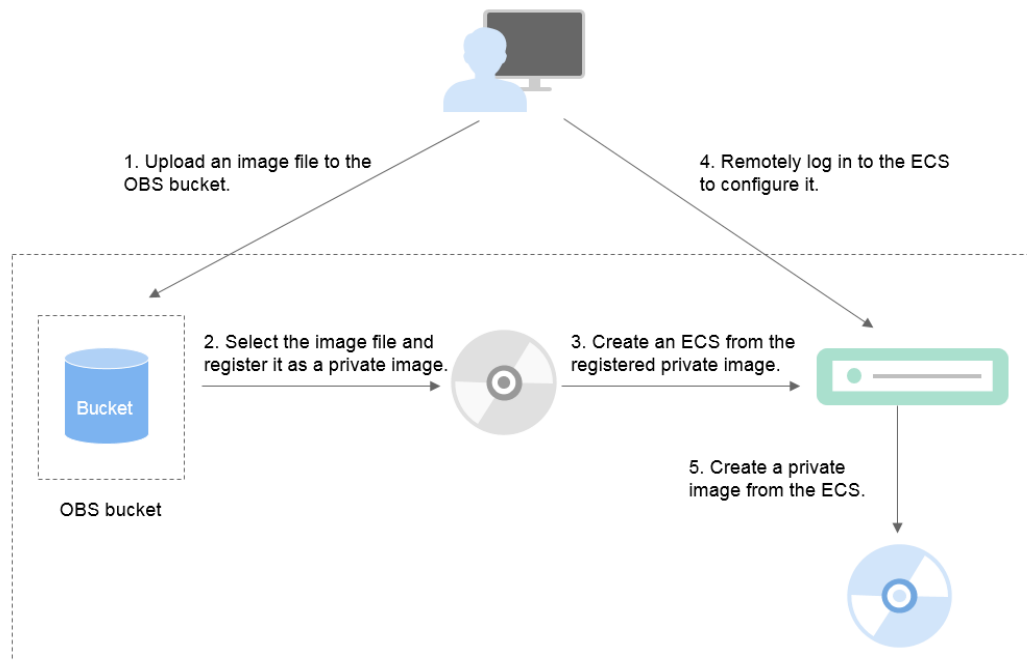
If an image file is not configured as instructed in [Table 2-5](#) before it is exported from the original platform, configure it by referring to [Figure 7-7](#).

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

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:
 - 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 to the ECS.

For details, see *Elastic Cloud Server User Guide*.

5. Perform the following steps to check whether the private image has been pre-configured:
 - 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 pre-configured. 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?](#)
 - Configure an IPv6 address. For details, see [How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?](#)

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.

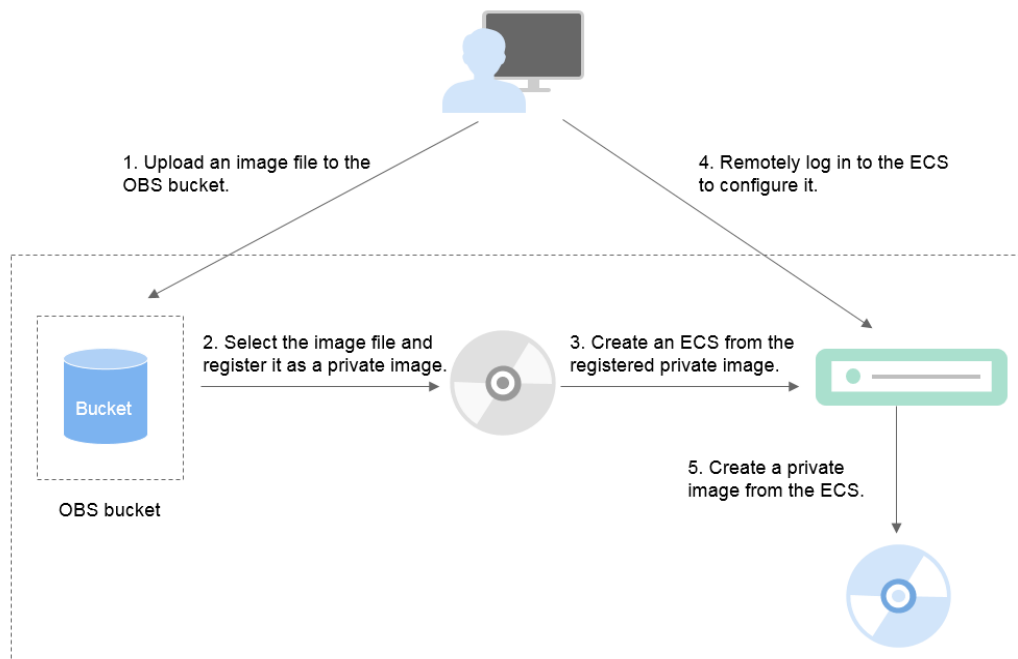
7.7.6 What Do I Do If a Linux Image File Is Not Pre-Configured When I Use It to Register a Private Image?

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](#).

CAUTION

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 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 pre-configured:
 - 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 pre-configured. 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?**

- Configure an IPv6 address. For details, see [How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?](#)

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.

7.7.7 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 7-5](#) 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 7-5 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.
 - b. 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:

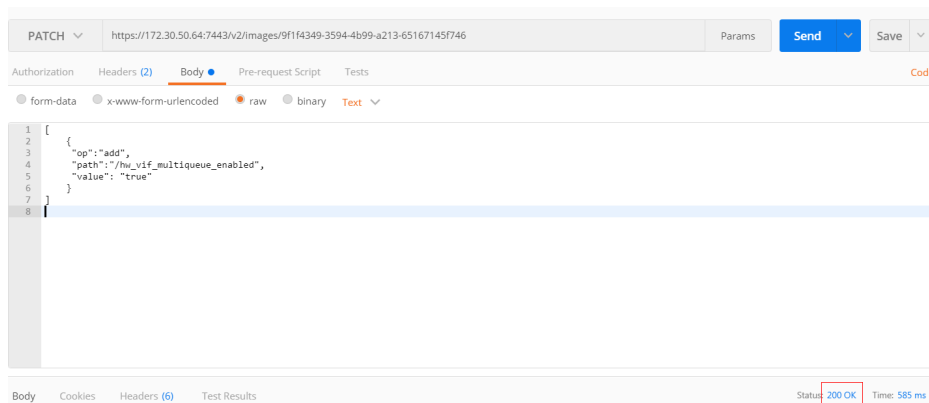
```
PATCH /v2/images/{image_id}
```

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



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 NIC
```

3. Run the following command to configure the number of queues used by the NIC:

```
ethtool -L NIC 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:          0
TX:          0
Other:       0
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 irqbalance:

```
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 irqbalance

```
root@localhost ~# service irqbalance status
Redirecting to /bin/systemctl status irqbalance.service
● irqbalance.service - irqbalance daemon
   Loaded: loaded (/usr/lib/systemd/system/irqbalance.service; enabled; vendor preset: enabled)
   Active: active (running) since Wed 2018-08-15 10:27:30 CST; 4h 5min ago
     Main PID: 858 (irqbalance)
    CGroup: /system.slice/irqbalance.service
            └─858 /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[*]}
    do
        echo $((affinity_cpu%cpu_count)) > /proc/irq/"$irq"/smp_affinity_list
        affinity_cpu=$((affinity_cpu+2))
    done
done
```

```
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" >> $secs_network_log  
  sleep 30  
  eth_dirs=$(ls -d /sys/class/net/eth*)  
fi  
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++))  
  do  
    if [ $i -eq $cpu_count ];then  
      cpu_id=1  
    fi  
    xps_file="/sys/class/net/${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

7.7.8 How Do I Configure an ECS to Dynamically Acquire IPv6 Addresses?

Scenarios

IPv6 addresses are used to deal with IPv4 address exhaustion. If an ECS uses an IPv4 address, the ECS can run in dual-stack mode after IPv6 is enabled for it. Then, the ECS will have two IP addresses to access the intranet and Internet: an IPv4 address and an IPv6 address.

In some cases, an ECS cannot dynamically acquire an IPv6 address even if it meets all the requirements in [Constraints](#). You need to configure the ECS to dynamically acquire IPv6 addresses. For public images:

- By default, dynamic IPv6 address assignment is enabled for Windows public images. You do not need to configure it. The operations in [Windows Server 2012](#) and [Windows Server 2008](#) are for your reference only.
- Before enabling dynamic IPv6 address assignment for a Linux public image, check whether IPv6 has been enabled and then whether dynamic IPv6 address assignment has been enabled. Currently, IPv6 is enabled for all Linux public images.

Constraints

- Ensure that IPv6 has been enabled on the subnet where the ECS works. If IPv6 is not enabled on the subnet, enable it by referring to [Enabling IPv6 for an ECS](#). IPv6 cannot be disabled once it is enabled.
- Ensure that **Self-assigned IPv6 address** is selected during ECS creation.
- After the ECS is started, its hot-swappable NICs cannot automatically acquire IPv6 addresses.
- Only ECSs can work in dual-stack mode and BMSs cannot.
- Only one IPv6 address can be bound to a NIC.

Procedure

- Windows: Windows Server 2012/2008 is used as an example to describe how to enable dynamic assignment of IPv6 addresses in Windows.
- Linux: Dynamic assignment of IPv6 addresses can be enabled automatically (recommended) or manually.

If a private image created from a CentOS 6.x or Debian ECS with automatic IPv6 address assignment enabled is used to create an ECS in an environment that does not support IPv6, the ECS may start slow because of IPv6 address assignment timeout. You can set the timeout duration for assigning IPv6 addresses by referring to [Setting the Timeout Duration for IPv6 Address Assignment](#).

Table 7-6 Enabling dynamic assignment of IPv6 addresses for different OSs

OS	Automatically/ Manually Enabling	Reference
Windows Server 2012	Automatically	Windows Server 2012
Windows Server 2008	Automatically	Windows Server 2008
Linux	Automatically (recommended)	Linux (Automatically Enabling Dynamic Assignment of IPv6 Addresses)
Linux	Manually	Linux (Manually Enabling Dynamic Assignment of IPv6 Addresses)

Enabling IPv6 for an ECS

Enabling IPv6 on a Subnet

NOTE

After IPv6 is enabled on the subnet where the ECS works, an IPv6 CIDR block is automatically assigned to the subnet. IPv6 cannot be disabled once it is enabled.

1. Log in to the management console.
2. Under **Computing**, click **Elastic Cloud Server**.
3. Click the target ECS to go to the detail page.
4. In the **ECS Information** area, click the VPC name.
5. Click the number in the **Subnets** column.
The **Subnets** page is displayed.
6. In the subnet list, locate the target subnet and click its name.
The subnet details page is displayed.
7. In the **Subnet Information** area, click **Enable** for **IPv6 CIDR Block**.
8. Click **Yes**.

Enabling IPv6 on a Network Interface

1. Go back to the ECS details page.
2. On the **Network Interfaces** tab, click **Enable IPv6** in the upper right corner of the folded panel.

NOTE

You can disable IPv6 on this page if it is no longer used. After IPv6 is disabled, the IPv6 address of the network interface is empty.

If you want to enable IPv6 again after it is disabled, you need to restart the ECS, log in to the ECS and manually clear the IPv6 cache, and request an IPv6 address again.

3. Click **OK**.

Windows Server 2012

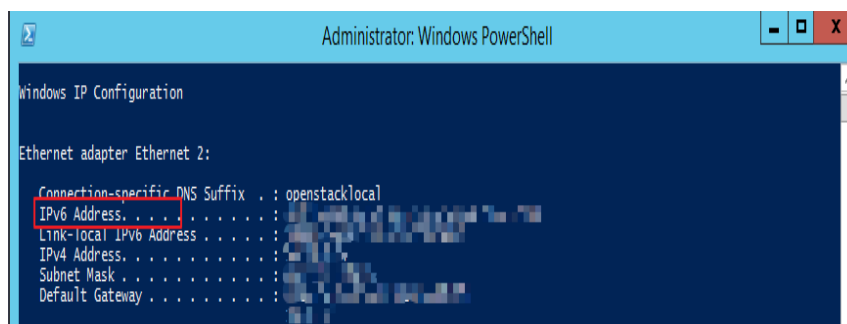
Step 1 Check whether IPv6 is enabled for the ECS.

Run the following command in the CMD window to check it:

ipconfig

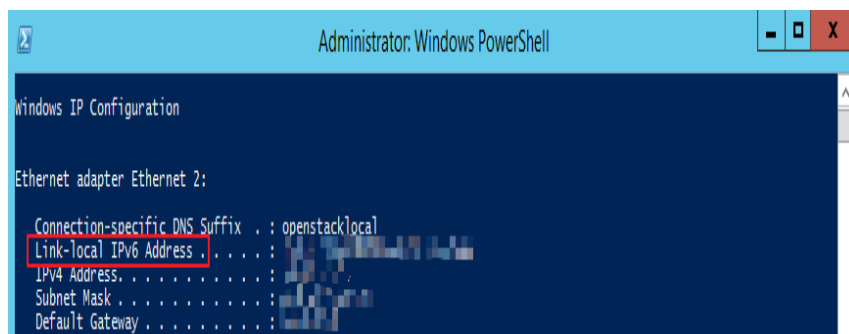
- If an IPv6 address and a link-local IPv6 address are displayed, IPv6 is enabled and dynamic IPv6 assignment is also enabled.

Figure 7-11 Querying the IPv6 address



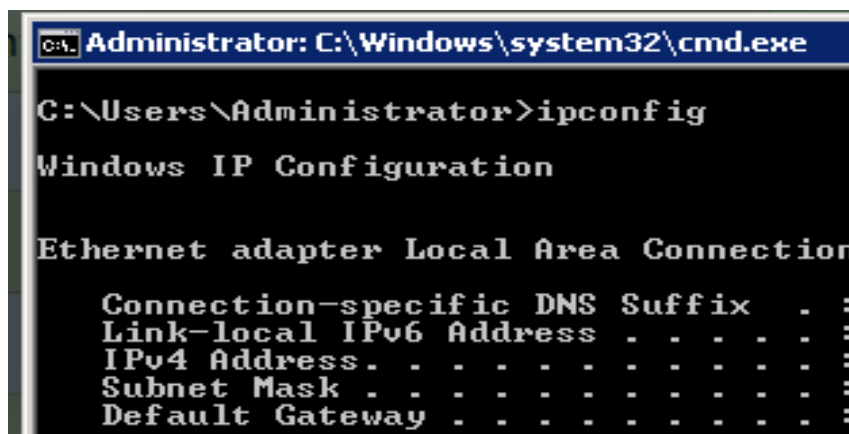
- If only a link-local IPv6 address is displayed, IPv6 is enabled but dynamic IPv6 assignment is not enabled. Go to [Step 2](#).

Figure 7-12 Link-local IPv6 address



- If neither an IPv6 address nor link-local IPv6 address is displayed, IPv6 is disabled. Go to [Step 3](#).

Figure 7-13 IPv6 disabled



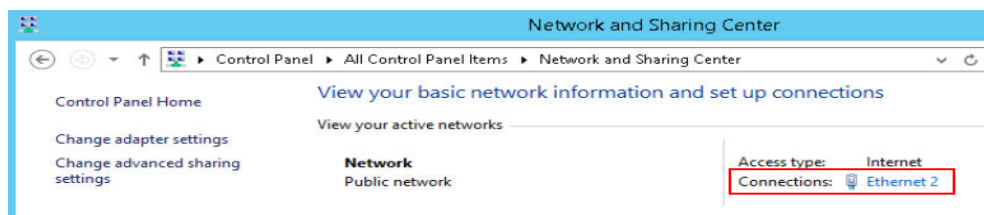
NOTE

By default, dynamic IPv6 address assignment is enabled for Windows public images, as shown in [Figure 7-11](#). No additional configuration is required.

Step 2 Enable dynamic IPv6 address assignment.

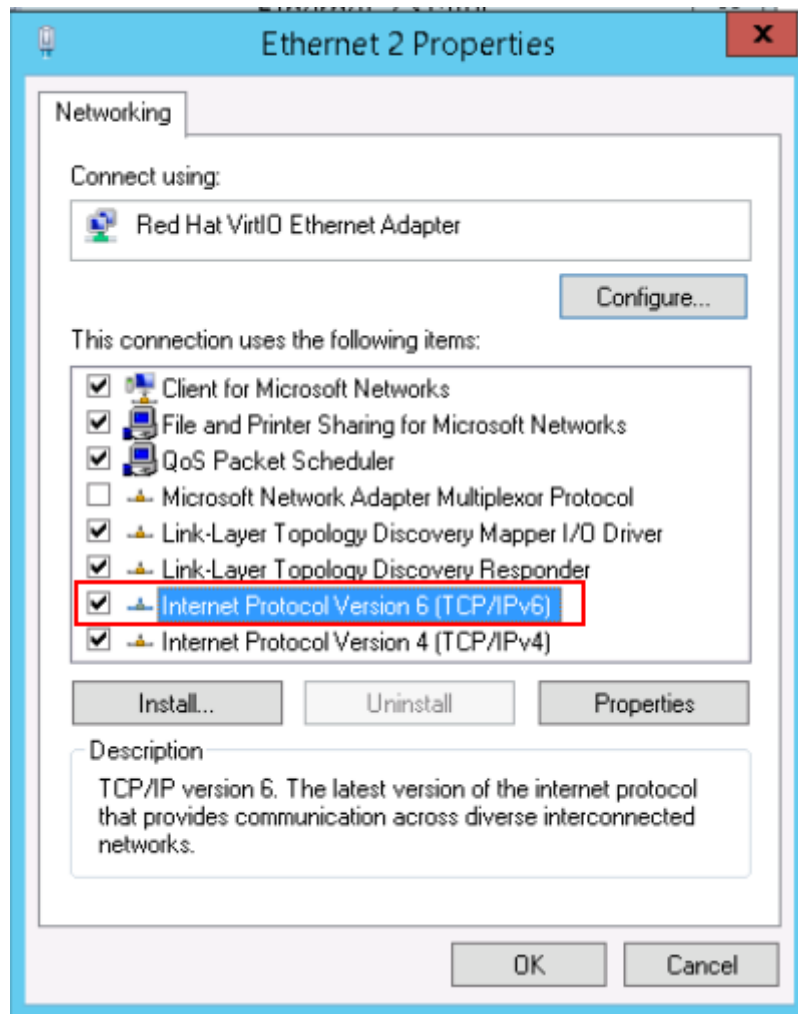
1. Choose **Start > Control Panel**.
2. Click **Network and Sharing Center**.
3. Click the Ethernet connection.

Figure 7-14 Ethernet connection



4. In the **Ethernet Status** dialog box, click **Properties** in the lower left corner.
5. Select **Internet Protocol Version 6 (TCP/IPv6)** and click **OK**.

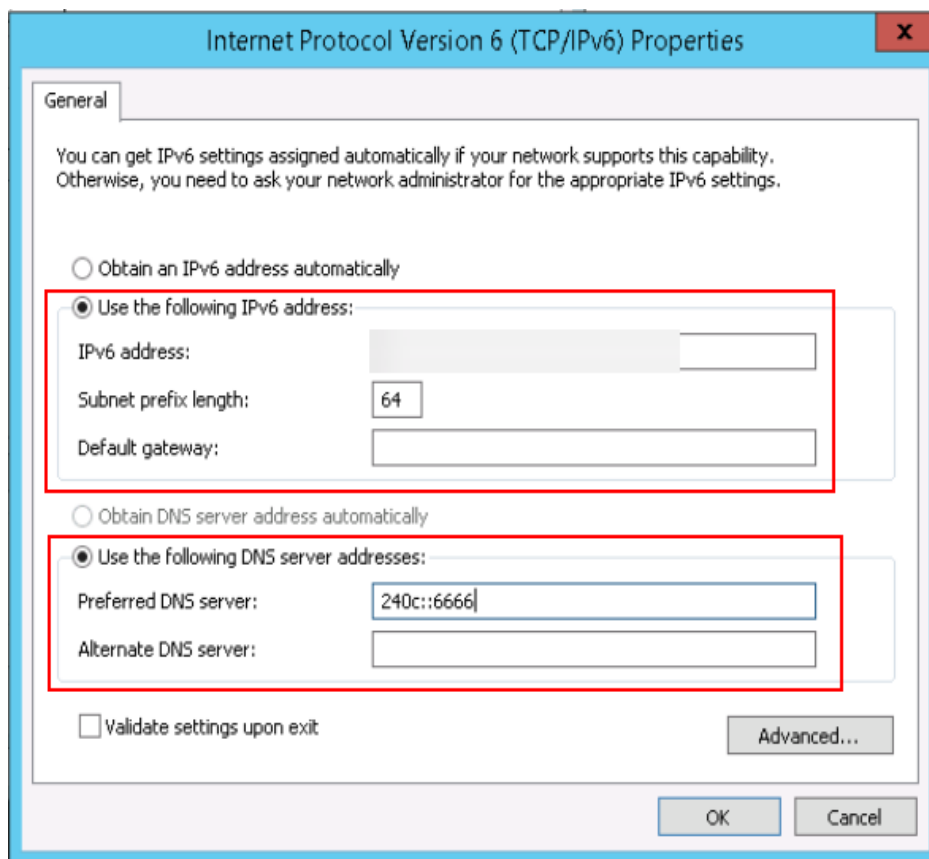
Figure 7-15 Configuring dynamic IPv6 address assignment



6. Perform [Step 1](#) to check whether dynamic IPv6 address assignment is enabled.

Step 3 Enable and configure IPv6.

1. In the **Internet Protocol Version 6 (TCP/IPv6) Properties** dialog box, configure an IPv6 address and a DNS server address.
 - **IPv6 address:** IPv6 address allocated during ECS creation. Obtain the value from the ECS list on the console.
 - **Subnet prefix length: 64**
 - **Preferred DNS server: 240c::6666** (recommended)

Figure 7-16 Configuring an IPv6 address and a DNS server address

- (Optional) Run the following command depending on your ECS OS.
For Windows Server 2012, run the following command in PowerShell or CMD:
Set-NetIPv6Protocol -RandomizeIdentifiers disabled
- Perform [Step 1](#) to check whether dynamic IPv6 address assignment is enabled.

----End

Windows Server 2008

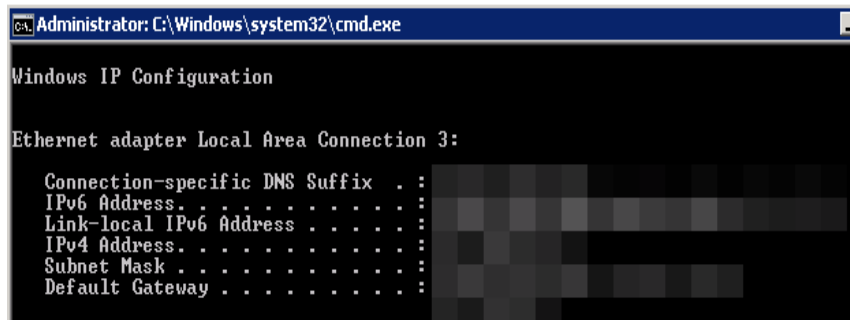
Step 1 Check whether IPv6 is enabled for the ECS.

Run the following command in the CMD window to check it:

ipconfig

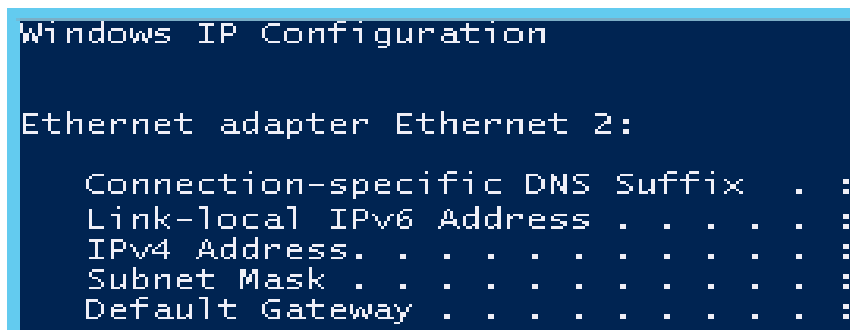
- If an IPv6 address and a link-local IPv6 address are displayed, IPv6 is enabled and dynamic IPv6 assignment is also enabled.

Figure 7-17 Querying the IPv6 address



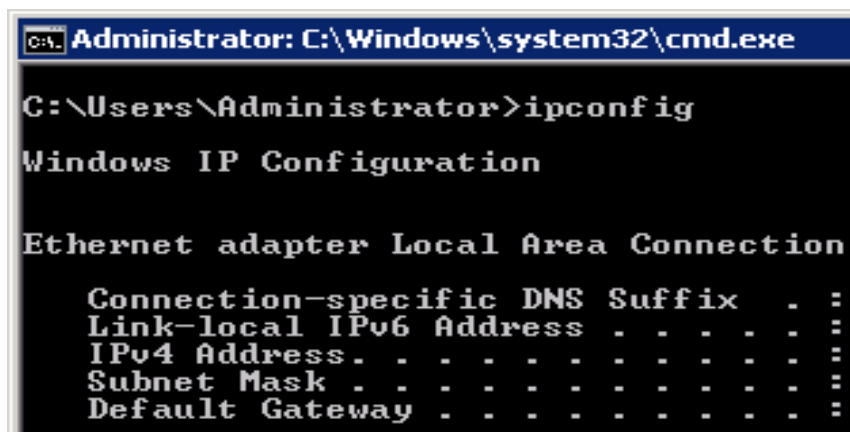
- If only a link-local IPv6 address is displayed, IPv6 is enabled but dynamic IPv6 assignment is not enabled. Go to [Step 2](#).

Figure 7-18 Link-local IPv6 address



- If neither an IPv6 address nor link-local IPv6 address is displayed, IPv6 is disabled. Go to [Step 3](#).

Figure 7-19 IPv6 disabled



NOTE

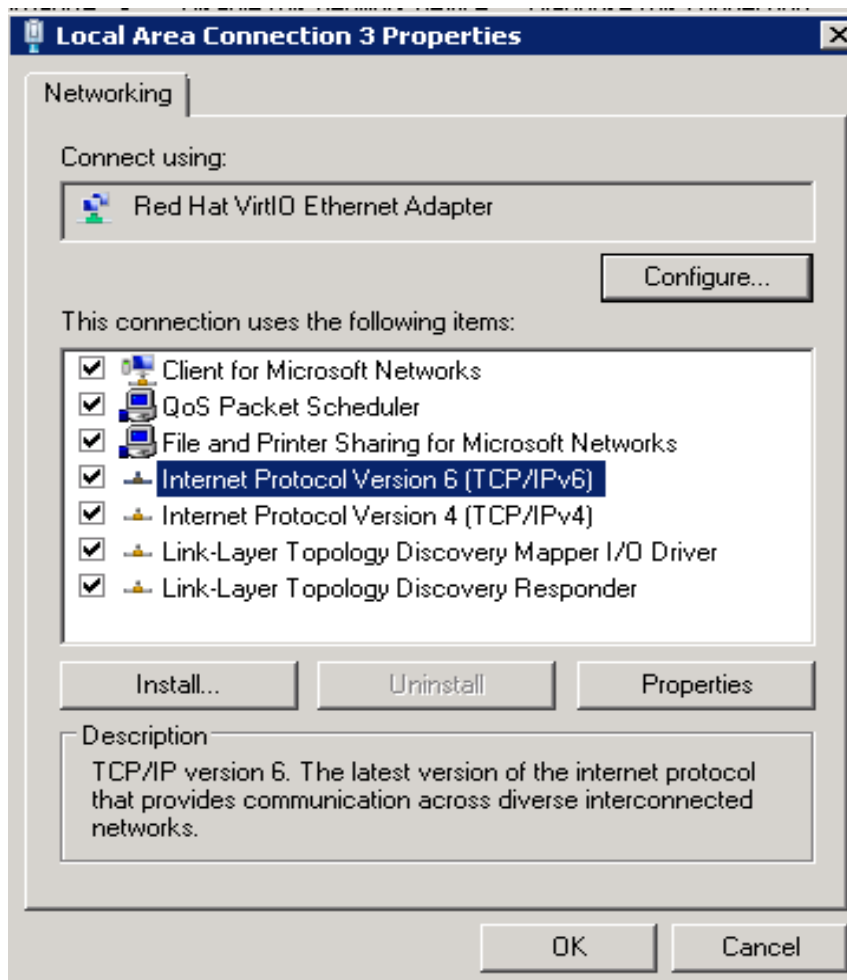
By default, dynamic IPv6 address assignment is enabled for Windows public images, as shown in [Figure 7-17](#). No additional configuration is required.

Step 2 Enable dynamic IPv6 address assignment.

1. Choose **Start > Control Panel**.

2. Click **Network and Sharing Center**.
3. Click **Change adapter settings**.
4. Right-click the local network connection and choose **Properties**.
5. Select **Internet Protocol Version 6 (TCP/IPv6)** and click **OK**.

Figure 7-20 Configuring dynamic IPv6 address assignment

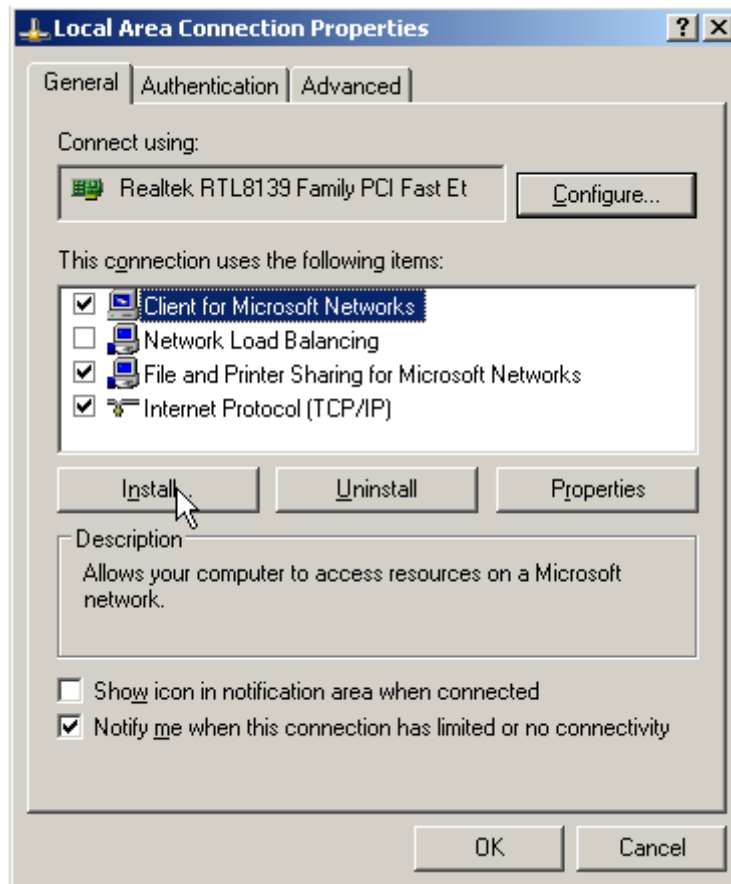


6. Perform **Step 1** to check whether dynamic IPv6 address assignment is enabled.

Step 3 Enable and configure IPv6.

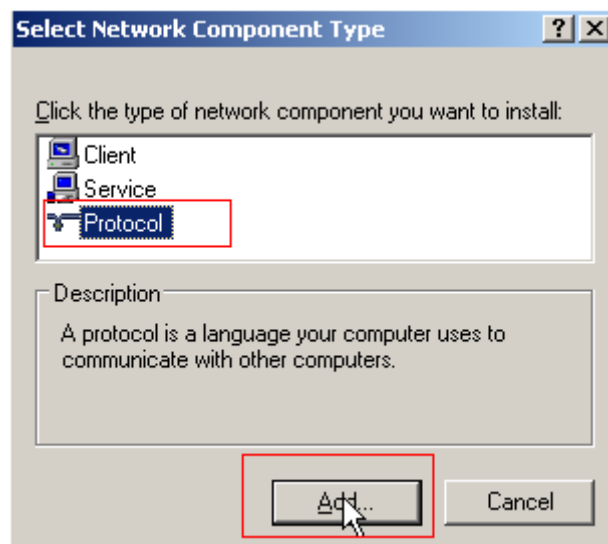
1. Choose **Start > Control Panel > Network Connection > Local Connection**.
2. Select **Properties**, select the following options, and click **Install**.

Figure 7-21 Enabling and configuring IPv6



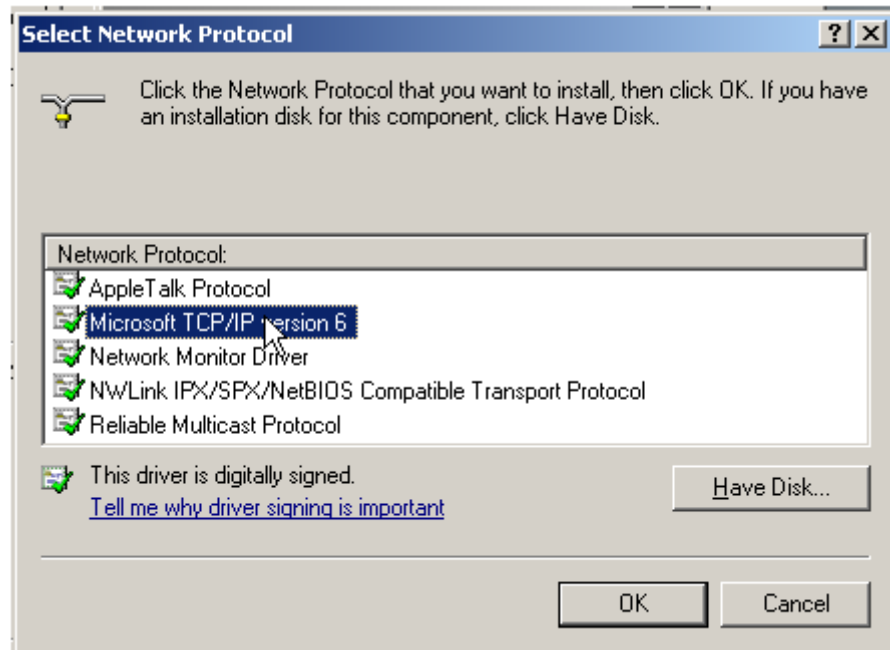
3. Select **Protocol** and click **Add**.

Figure 7-22 Adding the protocol



4. Select **Microsoft TCP/IP Version 6** and click **OK**.

Figure 7-23 Network protocols



- (Optional) Run the following commands depending on your ECS OS.
For Windows Server 2008, run the following command in PowerShell or CMD:
netsh interface ipv6 set global randomizeidentifiers=disable
Disable the local connection and then enable it again.
To disable the local connection, choose **Start > Control Panel > Network and Internet > Network and Sharing Center > Change Adapter Options**. Right-click the local connection and choose **Disable** from the shortcut menu.
To enable the local connection, choose **Start > Control Panel > Network and Internet > Network and Sharing Center > Change Adapter Options**. Right-click the local connection and choose **Enable** from the shortcut menu.
- Perform [Step 1](#) to check whether dynamic IPv6 address assignment is enabled.

----End

Linux (Automatically Enabling Dynamic Assignment of IPv6 Addresses)

The **ipv6-setup-xxx** tool can be used to enable Linux OSs to automatically acquire IPv6 addresses. *xxx* indicates a tool, which can be *rhel* or *debian*.

You can also enable dynamic IPv6 address assignment by following the instructions in [Linux \(Manually Enabling Dynamic Assignment of IPv6 Addresses\)](#).

CAUTION

- When you run **ipv6-setup-xxx**, the network service will be automatically restarted. As a result, the network is temporarily disconnected.
- If a private image created from a CentOS 6.x or Debian ECS with automatic IPv6 address assignment enabled is used to create an ECS in an environment that does not support IPv6, the ECS may start slow because of IPv6 address assignment timeout. Set the timeout duration for assigning IPv6 addresses to 30s by referring to [Setting the Timeout Duration for IPv6 Address Assignment](#) and try to create a new private image again.

Step 1 Run the following command to check whether IPv6 is enabled for the ECS:

ip addr

- If only an IPv4 address is displayed, IPv6 is disabled. Enable it by referring to [Setting the Timeout Duration for IPv6 Address Assignment](#).

Figure 7-24 IPv6 disabled

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
link/ether fa:16:3e: b8:00:00 b8:00:00 b8:00:00
inet 192.168.1.1 brd 192.168.1.255 scope global noprefixroute dynamic eth0
    valid_lft 1193sec preferred_lft 1193sec
```

- If a link-local address (starting with fe80) is displayed, IPv6 is enabled but dynamic assignment of IPv6 addresses is not enabled.

Figure 7-25 IPv6 enabled

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether fa:16:3e:75:af:4c b8:00:00 b8:00:00 b8:00:00
inet 192.168.1.1 brd 192.168.1.255 scope global noprefixroute dynamic eth0
    valid_lft 76391sec preferred_lft 76391sec
inet6 fe80::f816:3eff:fe00:0000/64 scope link
    valid_lft forever preferred_lft forever
```

- If the following address is displayed, IPv6 is enabled and an IPv6 address has been assigned:

Figure 7-26 IPv6 enabled and an IPv6 address assigned

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether fa:16:3e:75:af:4c b8:00:00 b8:00:00 b8:00:00
inet 192.168.1.1 brd 192.168.1.255 scope global noprefixroute dynamic eth0
    valid_lft 86395sec preferred_lft 86395sec
inet6 2407:c080:802:0000:0000:0000:0000:0000/128 scope global dynamic
    valid_lft 7496sec preferred_lft 7196sec
inet6 fe80::f816:3eff:fe00:0000/64 scope link noprefixroute
    valid_lft forever preferred_lft forever
```

NOTE

IPv6 is enabled for Linux public images by default, as shown in [Figure 7-25](#).

Step 2 Enable IPv6 for the ECS.

1. Run the following command to check whether IPv6 is enabled for the kernel:
sysctl -a | grep ipv6
 - If a command output is displayed, IPv6 is enabled.
 - If no information is displayed, IPv6 is disabled. Go to [Step 2.2](#) to load the IPv6 module.

2. Run the following command to load the IPv6 module:
modprobe ipv6
3. Add the following content to the `/etc/sysctl.conf` file:
net.ipv6.conf.all.disable_ipv6=0
4. Save the configuration and exit. Then, run the following command to load the configuration:
sysctl -p

Step 3 Enable dynamic IPv6 address assignment for the ECS.

1. Download **ipv6-setup-rhel** or **ipv6-setup-debian** with a required version and upload it to the target ECS.
ipv6-setup-xxx modifies the configuration file of a NIC to enable dynamic IPv6 address assignment or adds such a configuration file for a NIC, and then restarts the NIC or network service.
Contact the administrator to obtain the download paths of **ipv6-setup-rhel** and **ipv6-setup-debian**.
2. Run the following command to make **ipv6-setup-xxx** executable:
chmod +x ipv6-setup-xxx
3. Run the following command to enable dynamic IPv6 address assignment for a NIC:

```
./ipv6-setup-xxx --dev [dev]
```

Example:

```
./ipv6-setup-xxx --dev eth0
```

 **NOTE**

- To enable dynamic IPv6 address assignment for all NICs, run the `./ipv6-setup-xxx` command.
- To learn how to use **ipv6-setup-xxx**, run the `./ipv6-setup-xxx --help` command.

----End

Linux (Manually Enabling Dynamic Assignment of IPv6 Addresses)

 **CAUTION**

If a private image created from a CentOS 6.x or Debian ECS with automatic IPv6 address assignment enabled is used to create an ECS in an environment that does not support IPv6, the ECS may start slow because of IPv6 address assignment timeout. Set the timeout duration for assigning IPv6 addresses to 30s by referring to [Setting the Timeout Duration for IPv6 Address Assignment](#) and try to create a new private image again.

Step 1 Run the following command to check whether IPv6 is enabled for the ECS:

```
ip addr
```

- If only an IPv4 address is displayed, IPv6 is disabled. Enable it by referring to [Step 2](#).

Figure 7-27 IPv6 disabled

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP qlen 1000
link/ether fa:16:3e:  brd ff:ff:ff:ff:ff:ff
inet  brd  scope global noprefixroute dynamic eth0
valid_lft 1193sec preferred_lft 1193sec
```

- If a link-local address (starting with fe80) is displayed, IPv6 is enabled but dynamic assignment of IPv6 addresses is not enabled.

Figure 7-28 IPv6 enabled

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether fa:16:3e:  brd ff:ff:ff:ff:ff:ff
inet  brd  scope global noprefixroute dynamic eth0
valid_lft 76391sec preferred_lft 76391sec
inet6 fe80::f816:  /64 scope link
valid_lft forever preferred_lft forever
```

- If the following address is displayed, IPv6 is enabled and an IPv6 address has been assigned:

Figure 7-29 IPv6 enabled and an IPv6 address assigned

```
eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
link/ether fa:16:3e:75:af:4c brd ff:ff:ff:ff:ff:ff
inet  brd  scope global noprefixroute dynamic eth0
valid_lft 86395sec preferred_lft 86395sec
inet6 2407:c080:802:  /128 scope global dynamic
valid_lft 7496sec preferred_lft 7196sec
inet6 fe80::f816:3eff:  /64 scope link noprefixroute
valid_lft forever preferred_lft forever
```

NOTE

IPv6 is enabled for Linux public images by default, as shown in [Figure 7-28](#).

Step 2 Enable IPv6 for the ECS.

1. Run the following command to check whether IPv6 is enabled for the kernel:
sysctl -a | grep ipv6
 - If a command output is displayed, IPv6 is enabled.
 - If no information is displayed, IPv6 is disabled. Go to [Step 2.2](#) to load the IPv6 module.
2. Run the following command to load the IPv6 module:
modprobe ipv6
3. Add the following content to the `/etc/sysctl.conf` file:
net.ipv6.conf.all.disable_ipv6=0
4. Save the configuration and exit. Then, run the following command to load the configuration:
sysctl -p

Step 3 Enable dynamic IPv6 address assignment for the ECS.

- Ubuntu 18.04/20.04
 - a. Run the following command to access `/etc/netplan/`:
cd /etc/netplan/
 - b. Run the following command to list the configuration file:
ls

Figure 7-30 Configuration file name

```
root@ecs- :/etc/netplan# ls  
01-netcfg.yaml 01-network-manager-all.yaml
```

- c. Run the following command to edit the configuration file:
vi 01-network-manager-all.yaml
- d. Append the following content to the configuration file (pay attention to the yaml syntax and text indentation):
ethernets:
 eth0:
 dhcp6: true

Figure 7-31 Edited configuration file

```
# Let NetworkManager manage all devices on this system  
network:  
  version: 2  
  renderer: NetworkManager  
  ethernets:  
    eth0:  
      dhcp6: true
```

Save the changes and exit.

- e. Run the following command to make the changes take effect:
sudo netplan apply
- Ubuntu 22.04
 - a. Run the following command to access `/etc/netplan/`:
cd /etc/netplan
 - b. Run the following command to list the configuration file:
ls

Figure 7-32 Configuration file name

```
root@ecs-485b:/etc/netplan# ls  
01-netcfg.yaml
```

- c. Run the following command to edit the configuration file:
vi 01-netcfg.yaml
- d. Append the following content to the configuration file **01-netcfg.yaml** (pay attention to the yaml syntax and text indentation):
ethernets:
 eth0:
 dhcp6: true

Figure 7-33 Edited configuration file

```
network:
  version: 2
  renderer: NetworkManager
  ethernets:
    eth0:
      dhcp4: true
      dhcp6: true
    eth1:
      dhcp4: true
    eth2:
      dhcp4: true
    eth3:
      dhcp4: true
    eth4:
      dhcp4: true
```

Save the changes and exit.

- e. Run the following command to make the changes take effect:
sudo netplan apply
- f. Run the following command to edit `/etc/NetworkManager/NetworkManager.conf`:
vi /etc/NetworkManager/NetworkManager.conf
- g. Append the following content to the configuration file **NetworkManager.conf** (pay attention to the file format and indentation):

```
[main]
plugins=ifupdown,keyfile
dhcp=dhclient

[ifupdown]
managed=true

[device]
wifi.scan-rand-mac-address=no
```

Figure 7-34 Modification result

```
[main]
plugins=ifupdown,keyfile
dhcp=dhclient

[ifupdown]
managed=true

[device]
wifi.scan-rand-mac-address=no
```

- h. Run the following command for the configuration to take effect:
systemctl restart NetworkManager
- Debian
 - a. Add the following content to the `/etc/network/interfaces` file:

```
auto lo
iface lo inet loopback
```

```
auto eth0
iface eth0 inet dhcp
iface eth0 inet6 dhcp
pre-up sleep 3
```

- b. Add configurations for each NIC to the `/etc/network/interfaces` file. The following uses eth1 as an example:

```
auto eth1
iface eth1 inet dhcp
iface eth1 inet6 dhcp
pre-up sleep 3
```

- c. Run the following command to restart the network service:

```
service networking restart
```

NOTE

If no IPv6 address is assigned after the NICs are brought down and up, you can run this command to restart the network.

- d. Perform [Step 1](#) to check whether dynamic IPv6 address assignment is enabled.
- CentOS, EulerOS, or Fedora
 - a. Open the configuration file `/etc/sysconfig/network-scripts/ifcfg-eth0` of the primary NIC.

Add the following configuration items to the file:

```
IPV6INIT=yes
DHCPV6C=yes
```

- b. Edit the `/etc/sysconfig/network` file to add or modify the following line:
`NETWORKING_IPV6=yes`
- c. For an ECS running CentOS 6, you need to edit the configuration files of its extension NICs. For example, if the extension NIC is eth1, you need to edit `/etc/sysconfig/network-scripts/ifcfg-eth1`.

Add the following configuration items to the file:

```
IPV6INIT=yes
DHCPV6C=yes
```

In CentOS 6.3, dhcpv6-client requests are filtered by **ip6tables** by default. So, you also need to add a rule allowing the dhcpv6-client request to the **ip6tables** file.

- i. Run the following command to add the rule to **ip6tables**:
ip6tables -A INPUT -m state --state NEW -m udp -p udp --dport 546 -d fe80::/64 -j ACCEPT
- ii. Run the following command to save the rule in **ip6tables**:
service ip6tables save

Figure 7-35 Example command

```
root@ecs-cd02 log1# ip6tables -A INPUT -m state --state NEW -m udp -p udp --dport 546 -d fe80::/64 -j ACCEPT
nf_conntrack version 0.5.0 (7964 buckets, 31856 max)
root@ecs-cd02 log1# service ip6tables save
ip6tables: Saving firewall rules to /etc/sysconfig/ip6tablef OK ]
```

- d. (Optional) For CentOS 7/CentOS 8, change the IPv6 link-local address mode of extension NICs to EUI64.
 - i. Run the following command to query the NIC information:
nmcli con

Figure 7-36 Querying NIC information

```
[root@ecs-166b ~]# nmcli con
NAME                UUID                                TYPE      DEVICE
System eth0         5fb06bd0-0bb0-7ffb-45f1-d6edd65f3e03  ethernet  eth0
Wired connection 1  9c92fad9-6ecb-3e6c-eb4d-8a47c6f50c04  ethernet  eth1
Wired connection 1  3a73717e-65ab-93e8-b518-24f5af32dc0d  ethernet  eth2
```

- ii. Run the following command to change the IPv6 link-local address mode of eth1 to EUI64:

```
nmcli con modify "Wired connection 1" ipv6.addr-gen-mode eui64
```

NOTE

The NIC information varies depending on the CentOS series. In the command, *Wired connection 1* needs to be replaced with the value in the **NAME** column of the queried NIC information.

- iii. Run the following commands to bring eth1 down and up:

```
ifdown eth1
```

```
ifup eth1
```

- e. Restart the network service.

- i. For CentOS 6, run the following command to restart the network service:

```
service network restart
```

- ii. For CentOS 7/EulerOS/Fedora, run the following command to restart the network service:

```
systemctl restart NetworkManager
```

- f. Perform [Step 1](#) to check whether dynamic IPv6 address assignment is enabled.

- SUSE, openSUSE, or CoreOS

SUSE 11 SP4 does not support dynamic IPv6 address assignment.

No additional configuration is required for SUSE 12 SP1 or SUSE 12 SP2.

No additional configuration is required for openSUSE 13.2 or openSUSE 42.2.

No additional configuration is required for CoreOS 10.10.5.

----End

Setting the Timeout Duration for IPv6 Address Assignment

After automatic IPv6 address assignment is configured on an ECS running CentOS 6.x or Debian, the ECS will be created as a private image. When this image is used to create an ECS in an environment that IPv6 is unavailable, the ECS may start slow because acquiring an IPv6 address times out. Before creating the private image, you can set the timeout duration for acquiring IPv6 addresses to 30s as follows:

- CentOS 6.x:

- a. Run the following command to edit the **dhclient.conf** file:

```
vi /etc/dhcp/dhclient.conf
```

- b. Press **i** to enter editing mode and add the timeout attribute to the file.
timeout 30;

- c. Enter **:wq** to save the settings and exit.
- Debian 7.5:
 - a. Run the following command to edit the **networking** file:
vi /etc/init.d/networking
 - b. Press **i** to enter editing mode and add the timeout attribute.

Figure 7-37 Modification 1

```
115 case "$1" in
116 start)
117     if init_is_upstart; then
118         exit 1
119     fi
120     process_options
121     check_ifstate
122
123     if [ "$CONFIGURE_INTERFACES" = no ]
124     then
125         log_action_msg "Not configuring network interfaces, see /etc/default/networking"
126         exit 0
127     fi
128     set -f
129     exclusions=$(process_exclusions)
130     log_action_begin_msg "Configuring network interfaces"
131     if /usr/bin/timeout 30 ifup -a $exclusions $verbose && ifup_hotplug $exclusions $verbose
132     then
133         log_action_end_msg $?
134     else
135         log_action_end_msg $?
136     fi
137     ;;
138
139 stop)
140     if init_is_upstart; then
141         exit 0
142     fi
143     check_network_file_systems
144     check_network_swap
145
146     log_action_begin_msg "Deconfiguring network interfaces"
147     if /usr/bin/timeout 30 ifdown -a --exclude=lo $verbose; then
148         log_action_end_msg $?
```

Figure 7-38 Modification 2

```
154 reload)
155     process_options
156
157     log_action_begin_msg "Reloading network interfaces configuration"
158     state=$(cat /run/network/ifstate)
159     if /usr/bin/timeout 30 ifdown -a --exclude=lo $verbose || true
160     then /usr/bin/timeout 30 ifup --exclude=lo $state $verbose ; then
161         log_action_end_msg $?
162     else
163         log_action_end_msg $?
164     fi
165     ;;
166
167 force-reload|restart)
168     if init_is_upstart; then
169         exit 1
170     fi
171     process_options
172
173     log_warning_msg "Running $0 $1 is deprecated because it may not re-enable some interfaces"
174     log_action_begin_msg "Reconfiguring network interfaces"
175     if /usr/bin/timeout 30 ifdown -a --exclude=lo $verbose || true
176     then
177         set -f
178         exclusions=$(process_exclusions)
179         if /usr/bin/timeout 30 ifup -a --exclude=lo $exclusions $verbose && ifup_hotplug $exclusions $verbose
180     then
181         log_action_end_msg $?
182     else
183         log_action_end_msg $?
```

- Debian 8.2.0/8.8.0
 - a. Run the following command to edit the **network-pre.conf** file:
vi /lib/systemd/system/networking.service.d/network-pre.conf
 - b. Press **i** to enter editing mode and add the timeout attribute to the file.
[Service]
TimeoutStartSec=30
- Debian 9.0
 - a. Run the following command to edit the **networking.service** file:
vi /etc/systemd/system/network-online.target.wants/networking.service

- b. Press **i** to enter editing mode and change **TimeoutStartSec=5min** to **TimeoutStartSec=30**.

7.7.9 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

1. 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](#).
3. After the image is successfully replicated, the generated image can be used to quickly create ECSs.

7.7.10 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.

7.7.11 How Do I Install 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 native Xen and KVM drivers.

CAUTION

If an ECS has no Xen drivers installed, the network performance of the ECS will be poor, and the security groups and firewall configured for the ECS will not take effect.

If an ECS has no KVM drivers installed, the NICs of the ECS may not be detected and the ECS will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen.
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after the driver installation is complete.

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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:
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 installed:

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@CTU10000xxxx 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@CTU10000xxxx 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 root 50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
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
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
-rwxr--r-- 1 root root 14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/virtio.ko
-rwxr--r-- 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
-rwxr--r-- 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
```

NOTE

If you add built-in drivers to the `initrd` or `initramfs` file by mistake, the ECS will not be affected. The drivers cannot be found 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 Xen PV and VirtIO drivers to the `/etc/initramfs-tools/modules` file (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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
```

NOTE

If you add built-in drivers to the initrd or initramfs file by mistake, the ECS will not be affected. The drivers cannot be found 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 to add drivers. For details, see [scenario 1](#).

If the OS version is SUSE 12 SP1, modify the **/etc/dracut.conf** file to add 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 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 Xen PV and VirtIO drivers after **INITRD_MODULES=** (the format varies depending 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 processor.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 Xen PVOPS and KVM VirtIO have been installed:

```
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, QEMU device shield is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether Xen drivers exist in **initrd**:

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

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

```
SIA10000xxxx:~ # 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
```

```
SIA10000xxxx:~ # 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 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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 drivers have been installed:

```
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
```

7.8 Image Replication

When Do I Need to Replicate an Image?

- In-region replication

This is used for enabling advanced features (such as fast ECS creation) for images. For details, see [Replicating Images](#).

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.

7.9 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.

7.10 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.

7.11 Cloud-Init

7.11.1 Cloud-Init Installation FAQ

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 7-39 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:
 - a. Run the following command to roll back the configuration:
**systemctl unmask cloud-init-local.service cloud-init.service cloud-
config.service cloud-final.service**
 - b. 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 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 7-40 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  
lines 1-11/11 (END)
```

Figure 7-41 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=  
   Main PID: 4418 (code=exited, status=203/EXEC)  
  
Aug 17 07:12:20 ecs-wjq-ubuntu14 systemd[1]: Starting Initial cloud-init job (pr  
e-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`.

- d. 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 cloud-config.service cloud-final.service

Figure 7-42 Restarting Cloud-Init

```
root@ecs-wjq-ubuntu14: # systemctl start cloud-init-local.service; 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 preset: enabled)
   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=0/SUCCESS)
    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]: 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] util.py[DEBUG]: F
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] cloud-init[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] util.py[DEBUG]: R
Aug 17 07:18:01 ecs-wjq-ubuntu14 cloud-init[4491]: [CLOUDINIT] util.py[DEBUG]: c
lines 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 7-43 Information returned when Cloud-Init automatic start successfully set

```
root@ecs-debian-9:/tmp/CL000-INIT/haueicloud-cloud-init# cloud-init init --local
/usr/local/lib/python2.7/dist-packages/Cheetah-2.4.4-py2.7.egg/Cheetah/Compiler.py:1509: 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!
Cloud-Init v. 0.7.6 running 'init-local' at Mon, 20 Aug 2018 02:31:45 +0000. Up 704.40 seconds.
root@ecs-debian-9:/tmp/CL000-INIT/haueicloud-cloud-init#
```

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 7-44 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:

- a. Run the following command to roll back the configuration:
systemctl unmask cloud-init-local.service cloud-init.service cloud-config.service cloud-final.service
- b. 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 7-45 Verifying the service 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: active (exited) since Mon 2018-08-20 02:48:37 UTC; 6s ago
Process: 1082 ExecStart=/usr/bin/cloud-init init --local (code=exited, status=0/SUCCESS)
Main PID: 1082 (code=exited, status=0/SUCCESS)
Tasks: 0 (limit: 4915)
CGroup: /system.slice/cloud-init-local.service

Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Running command ['blkid', '-tLABEL-config-2', '-odev
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] _init_.py[DEBUG]: Seeing if we can get any data from class 'cloudi
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Reading from /proc/mounts (quiet=False)
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Read 1947 bytes from /proc/mounts
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Fetched 'depts': {'mountpoint': '/dev/pts', 'opts':
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] cloud-init[DEBUG]: No local datasource found
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Reading from /proc/uptime (quiet=False)
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: Read 14 bytes from /proc/uptime
Aug 20 02:48:37 ecs-debian-9 cloud-init[1082]: [CLOUDINIT] util.py[DEBUG]: cloud-init mode 'init' took 0.104 seconds (0.10)
Aug 20 02:48:37 ecs-debian-9 systemd[1]: Started Initial cloud-init job (pre-networking).

cloud-init.service - Initial cloud-init job (metadata service crawler)
Loaded: loaded (/lib/systemd/system/cloud-init.service; enabled; vendor preset: enabled)
Active: active (exited) since Mon 2018-08-20 02:48:40 UTC; 2s ago
Process: 1096 ExecStart=/usr/bin/cloud-init init (code=exited, status=0/SUCCESS)
Main PID: 1096 (code=exited, status=0/SUCCESS)
Tasks: 0 (limit: 4915)
CGroup: /system.slice/cloud-init.service

Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] helpers.py[DEBUG]: config-ca-certs already ran (freq=once-per-instanc
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] stages.py[DEBUG]: Running module rsyslog (module 'cloudinit.config.c
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] helpers.py[DEBUG]: config-rsyslog already ran (freq=once-per-instanc
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] stages.py[DEBUG]: Running module users-groups (module 'cloudinit.con
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] helpers.py[DEBUG]: config-users-groups already ran (freq=once-per-ins
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] cloud-init[DEBUG]: Ran 13 modules with 0 failures
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] util.py[DEBUG]: Reading from /proc/uptime (quiet=False)
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] util.py[DEBUG]: Read 14 bytes from /proc/uptime
Aug 20 02:48:40 ecs-debian-9 cloud-init[1096]: [CLOUDINIT] util.py[DEBUG]: cloud-init mode 'init' took 2.657 seconds (2.66)
Aug 20 02:48:40 ecs-debian-9 systemd[1]: Started Initial cloud-init job (metadata service crawler).

cloud-config.service - Apply the settings specified in cloud-config
Loaded: loaded (/lib/systemd/system/cloud-config.service; enabled; vendor preset: enabled)
Active: active (exited) since Mon 2018-08-20 02:48:41 UTC; 2s ago
Process: 1140 ExecStart=/usr/bin/cloud-init modules --mode=config (code=exited, status=0/SUCCESS)
Main PID: 1140 (code=exited, status=0/SUCCESS)
Tasks: 0 (limit: 4915)
CGroup: /system.slice/cloud-config.service
```

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 7-46 NIC not started

```
root@ecs-fedora28-wjq-test ~]# 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`.

7.11.2 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](#).

7.11.3 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](#).

7.11.4 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`

7.12 ECS Creation

7.12.1 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*.

7.12.2 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 capacity. The value must be smaller than 1024 GB but no less than the system disk capacity in the image.

7.12.3 Can I Specify the System Disk Capacity 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 capacity in the image.

 NOTE

Ensure that your ECS OS supports the system disk capacity you specified.

7.12.4 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.

```
total 0
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
```

NOTE

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/scsi-
SATA_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
```

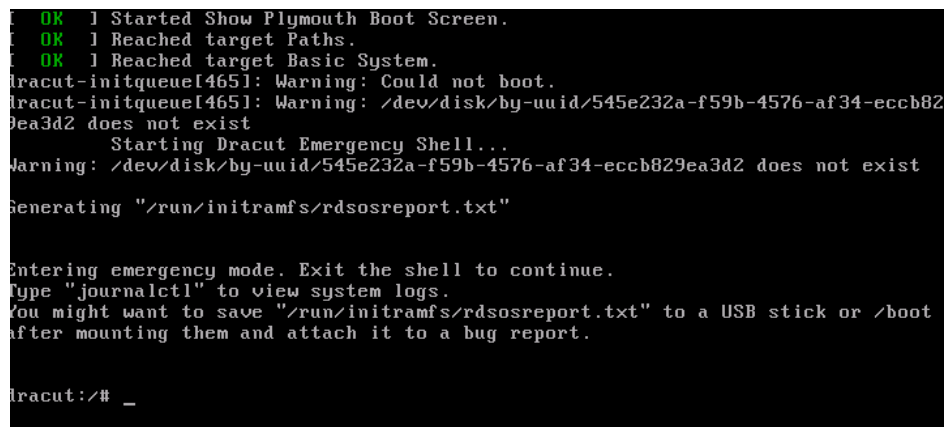
8. Press **Esc**, enter `:wq`, and press **Enter**. The system saves the configuration and exits the vi editor.

7.12.5 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 7-47](#) shows the startup screen after the login to the ECS.

Figure 7-47 Startup screen



```
OK ] Started Show Plymouth Boot Screen.
OK ] Reached target Paths.
OK ] Reached target Basic System.
dracut-initqueue[465]: Warning: Could not boot.
dracut-initqueue[465]: Warning: /dev/disk/by-uuid/545e232a-f59b-4576-af34-eccb829ea3d2 does not exist
Starting Dracut Emergency Shell...
Warning: /dev/disk/by-uuid/545e232a-f59b-4576-af34-eccb829ea3d2 does not exist
Generating "/run/initramfs/rdsosreport.txt"

Entering emergency mode. Exit the shell to continue.
Type "journalctl" to view system logs.
You might want to save "/run/initramfs/rdsosreport.txt" to a USB stick or /boot
after mounting them and attach it to a bug report.

dracut:/# _
```

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 administrator.
 - 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.

NOTE

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 $menuentry_id_option 'gnulinux-3.10.0-229.el7.x86_64-  
advanced-bf3cc825-7638-48d8-8222-cd2f412dd0de' {  
    load_video  
    set gfxpayload=keep  
    insmod gzio  
    insmod part_msdos  
    insmod ext2  
    set root='hd0,msdos1'  
    if [ x$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  
    fi  
    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.

7.12.6 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 VirtIO drivers for a Windows ECS offline, there are some restrictions:

- If the boot mode in the image file is UEFI, the VirtIO drivers 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 VirtIO drivers may fail to be injected offline.

To update VirtIO drivers, you must install UVP VMTools. For how to install UVP VMTools, see [Optimizing a Windows Private Image](#).

7.12.7 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.

7.13 Driver Installation

7.13.1 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 add them to `initrd`.

7.13.2 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 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 administrator.

7.13.3 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.

7.13.4 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](#).

7.13.5 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](#).

7.13.6 How Do I Install 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 native Xen and KVM drivers.

CAUTION

If an ECS has no Xen drivers installed, the network performance of the ECS will be poor, and the security groups and firewall configured for the ECS will not take effect.

If an ECS has no KVM drivers installed, the NICs of the ECS may not be detected and the ECS will be unable to communicate with other resources.

Prerequisites

- The virtualization type of the ECS is Xen.
- The kernel version must be later than 2.6.24.
- Disable your antivirus and intrusion detection software. You can enable them after the driver installation is complete.

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 Xen PV and VirtIO drivers to `add_drivers` (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:

```
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 installed:

```
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`.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 root 50704 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/
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
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
-rwxr--r-- 1 root root 14544 Jul 16 17:53 lib/modules/2.6.32-573.8.1.el6.x86_64/kernel/drivers/
virtio/virtio.ko
-rwxr--r-- 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
-rwxr--r-- 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
```

NOTE

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

NOTE

If you add built-in drivers to the `initrd` or `initramfs` file by mistake, the ECS will not be affected. The drivers cannot be found 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 to add drivers. For details, see [scenario 1](#).

If the OS version is SUSE 12 SP1, modify the `/etc/dracut.conf` file to add 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 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 Xen PV and VirtIO drivers after **INITRD_MODULES=** (the format varies depending on the OS).

```
SIA10000xxxx:~ # 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 processor.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 Xen PVOPS and KVM VirtIO have been installed:

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

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

```
SIA10000xxxx:~ # 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
```

```
SIA10000xxxx:~ # 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, QEMU device shield is enabled by default, and you do not need to configure it.
- g. Run the following commands to check whether Xen drivers exist in `initrd`:

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

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

```
SIA10000xxxx:~ # 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  
  
SIA10000xxxx:~ # 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 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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:
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 installed:
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 Xen PV and VirtIO drivers to **add_drivers** (the format varies depending on the OS).

```
[root@CTU10000xxxx ~]# 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 installed:
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 drivers have been installed:

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
```

7.14 Image Tags

7.14.1 How Many Tags Can I Add to an Image?

An image can have a maximum of 10 tags.

7.14.2 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.
 - 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 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.

7.14.3 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
2024-04-15	This issue is the first official release.