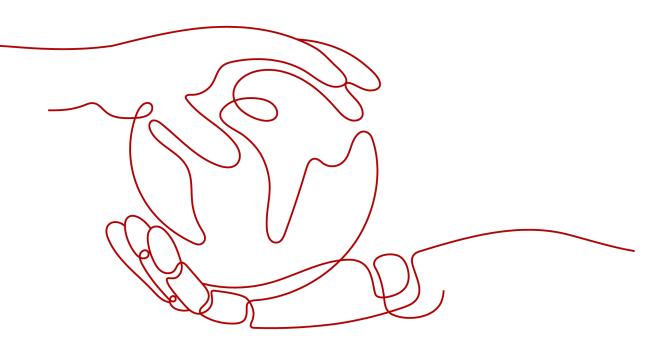
Elastic Cloud Server

Best Practices

 Issue
 01

 Date
 2024-11-04





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This section describes common application scenarios of Elastic Cloud Server (ECS) and provides solution details and an operation guide for each scenario, so you can easily deploy services using ECS.

Best Practices for Using ECSs

Table 1-1 Best	Practices for	Using ECSs

Category	Scenario	Reference	Description
Environmen t setup	Setting up an LNMP environme nt	Manually Deploying LNMP (CentOS 7.2)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up an LNMP environment.
		Manually Deploying LNMP (CentOS 8.0)	An ECS running CentOS 8.0 64-bit is used as an example to describe how to set up an LNMP environment.
		Manually Deploying LNMP (Ubuntu 20.04)	An ECS running Ubuntu 20.04 64-bit is used as an example to describe how to set up an LNMP environment.
	Setting up an LAMP environme nt	Manually Deploying LAMP (CentOS 7.8 PHP 7.0)	An ECS running CentOS 7.8 64-bit is used as an example to describe how to set up an LAMP environment.

Category	Scenario	Reference	Description
Setting up a Java web environme nt		Setting Up Tomcat- based Java Web Environment (CentOS 7.4)	An ECS running CentOS 7.4 64-bit is used as an example to describe how to set up a Java Web environment.
	Setting up a Node.js environme nt	Manually Deploying Node.js	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up a Node.js environment.
Website setup	Setting up a WordPress website	Setting Up a WordPress Website (Linux)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up a WordPress website.
	Setting up a Discuz forum	Setting Up a Discuz Forum	An ECS running CentOS is used as an example to describe how to set up a Discuz forum.
	Setting up a Magento e- commerce website	Manually Setting Up a Magento E-Commerce Website (Linux)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up a Magento e- commerce website.
	Deploying a Ghost blog	Manually Deploying a Ghost Blog (Ubuntu 20.04)	An ECS running Ubuntu 20.04 64-bit is used as an example to describe how to deploy a Ghost blog.
Application setup	Setting up an FTP site	Setting Up an FTP Site (Windows 2012)	An ECS running Windows Server 2012 Datacenter 64-bit is used as an example to describe how to set up an FTP site.
		Setting Up an FTP Site (Windows 2019)	An ECS running Windows Server 2019 Datacenter 64-bit is used as an example to describe how to set up an FTP site.
		Setting Up an FTP Site (Linux)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up an FTP website.

Category	Scenario	Reference	Description
	Building Microsoft SharePoint Server	Building Microsoft SharePoint Server 2016	An ECS running Windows Server 2012 Datacenter 64-bit is used as an example to describe how to build Microsoft SharePoint Server 2016.
	Deploying Docker	Manually Deploying Docker (CentOS 7.5)	An ECS running CentOS 7.5 64-bit is used as an example to describe how to deploy Docker.
	Deploying an ECS as an official WeChat account server	Deploying an ECS for Handling Text Messages from an Official WeChat Account	An ECS running CentOS 7.4 64-bit is used as an example to describe how to deploy an ECS as an official WeChat account server.
	Installing the BT panel	Manually Installing a BT Panel (CentOS 7.2)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to install the BT panel.
	Deploying GitLab	Manually Deploying GitLab (CentOS 7.2)	An ECS running CentOS 7.2 64-bit is used as an example to describe how to deploy GitLab.
	Deploying RabbitMQ	Manually Deploying RabbitMQ (CentOS 7.4)	An ECS running CentOS 7.4 64-bit is used as an example to describe how to deploy RabbitMQ.
	Setting up a ThinkPHP framework	Setting Up a ThinkPHP Framework	An ECS running CentOS 7.2 64-bit is used as an example to describe how to set up a ThinkPHP framework.
	Setting up master- slave replication on PostgreSQ L	Setting Up Master- Slave Replication on PostgreSQL	An ECS running CentOS 7.6 64-bit is used as an example to describe how to set up master-slave replication on PostgreSQL.
	Deploying Jenkins	Installing and Deploying Jenkins on an ECS	An ECS running CentOS 7.6 64-bit is used as an example to describe how to deploy Jenkins.

Category	Scenario	Reference	Description
	Configurin g auditd	Using auditd to Record File Changes (Linux)	An ECS running CentOS 7.4 64-bit is used as an example to describe how to install and configure auditd.
	Restoring data using Extundelet e quickly	Restoring Accidentally Deleted Data Using Extundelete (Linux)	An ECS running CentOS 7.5 64-bit is used as an example to describe how to use the open-source tool Extundelete to quickly restore accidentally deleted data.
ECS security	Enhancing security for SSH logins to Linux ECSs	Enhancing Security for SSH Logins to Linux ECSs	An ECS running CentOS 7.6 64-bit is used as an example to describe how to enhance security for SSH logins.
Cloud server migration	Migrating servers to the cloud	Migrating Servers to the Cloud	It describes how to use Server Migration Service (SMS) and image import to migrate applications and data from your existing servers to Huawei Cloud.
Other	Accessing OBS from an ECS over an	Accessing OBS over Intranet by Using OBS Browser+ on a Windows ECS	It describes how to use OBS Browser+ to access OBS over intranet on a Windows ECS.
	intranet	Accessing OBS over Intranet by Using obsutil on a Linux ECS	It describes how to use obsutil to access OBS over intranet on a Linux ECS.
	Using VNC Viewer to access a Linux ECS	Using VNC Viewer to Access a Linux ECS	Ubuntu 20.04 OS is used as an example to describe how to install VNC Server on a Linux ECS and how to use VNC Viewer to access the ECS.

2 Setting Up Websites on ECSs

Overview

This section provides guidance on how to set up frequently used websites by using Huawei Cloud services. In addition, this section provides links to desired operation guides and images, facilitating your website setup.

Summary

 Table 2-1
 Summary on website setups

Website Setup Solution	How to Set Up	OS	Image and Resources	Description
Setting Up a Discuz Forum	Manual setup	Linux	Public image	Discuz! is a common community forum software system. Its basic architecture is based on the popular web programming combination of PHP +MySQL.
Setting Up an FTP Site (Windows 2012)	Manual setup	Windo ws	Public image	Use FTP delivered with Windows to set up an FTP site.
Setting Up an FTP Site (Linux)	Manual setup	Linux	Public image	Use the very secure FTP daemon (vsftpd) software to set up an FTP site. vsftpd is an FTP server software that is widely used in Linux releases.

Website Setup Solution	How to Set Up	OS	Image and Resources	Description
Setting Up Tomcat- based Java Web Environme nt	Manual setup	Linux	Public image Tomcat 8.5.31 JDK 8u171 	Tomcat is a commonly used open source web application that is free of charge. It can be used to host common Java web applications.
Manually Setting Up a Magento E- Commerce Website (Linux)	Manual setup	Linux	Public imageMySQL 5.7PHP 7.0Magento 2.1	Magento is an open source e-commerce system that features flexible design, modular architecture, and rich functions. It is suitable for building medium- and large- sized sites.
Building Microsoft SharePoint Server 2016	Manual setup	Windo ws	 Public image Microsoft SQL Server 2014 SharePoint Server 2016 	Microsoft SharePoint Server is a portal that enables enterprises to develop intelligent portal websites. These sites are seamlessly accessible to users, teams, and knowledge libraries.
Manually Deploying LNMP (CentOS 7.2)	Manual setup	Linux	Public imageNginx 1.14.0MySQL 5.7PHP 7.0.31	LNMP indicates the Nginx+MySQL+PHP website server architecture in Linux. Nginx is compact, efficient web server software in Linux.
Setting Up a WordPress Website (Linux)	Manual setup	Linux	 Public image Nginx 1.14.0 MySQL 5.7 PHP 7.0.31 WordPress 4.9.8 	A Linux ECS is used to manually set up an LNMP website and deploy WordPress on it. WordPress (WP for short) is initially a blog system and gradually evolved to a free CMS or website setup system.

Website Setup Solution	How to Set Up	OS	Image and Resources	Description
Manually Deploying Docker (CentOS 7.5)	Manual setup	Linux	Public image	Docker is deployed on a Linux ECS. Additionally, common Docker operations and the process of creating a Docker image are provided.
Deploying an ECS for Handling Text Messages from an Official WeChat Account	Manual setup	Linux	Public image	An ECS is deployed as an official WeChat account server so that it receives text messages from the WeChat server and sends processing results to end users. On this ECS, Python is used to compile the logic code for processing WeChat messages.
Manually Deploying GitLab (CentOS 7.2)	Manual setup	Linux	Public image	A Linux ECS is used for manually deploying GitLab. GitLab is an open source version management system that uses Git as the code management tool.

Website Setup Solution	How to Set Up	OS	Image and Resources	Description
Manually Deploying RabbitMQ (CentOS 7.4)	Manual setup	Linux	Public imageErlang 8.3RabbitMQ 3.6.9	A Linux ECS is used for deploying RabbitMQ. RabbitMQ is a message middleware that uses the Erlang programming language for the Advanced Message Queuing Protocol (AMQP). It originates from the financial system and is used to store and forward messages in the distributed system. Featuring high reliability, scalability, availability, and rich functions, RabbitMQ is widely used.
Manually Deploying a Ghost Blog (Ubuntu 20.04)	Manual setup	Linux	Public imageNginx 1.14.0MySQL 5.7	Ghost is an open source blog platform based on Node.js and makes writing and release more convenient. This section walks you through the deployment of a Ghost blog on an ECS running Ubuntu 20.04.

Website Setup Solution	How to Set Up	OS	Image and Resources	Description
Manually Deploying Node.js (CentOS 7.2)	Manual setup	Linux	Public image	A Linux ECS is used for deploying Node.js. Node.js is a JavaScript runtime environment based on the Google Chrome V8 engine. It enables simple deployment of network applications that feature fast response and easy-to-expand. Based on the event- driven and non- blocking I/O model, Node.js is lightweight and efficient. It is ideal for running data- intensive real-time applications on distributed devices.

3 Configuring an ECS

To use ECSs more securely, reliably, flexibly, and efficiently, follow the best practices for ECS.

Access and Connection

We recommend that you use the Virtual Network Computing (VNC) when logging in to your ECS for the first time and check that the ECS is running properly.

For details, see:

• Login Using VNC

The next time you log in, you can choose a proper login method based on your local environment and whether your ECS has an EIP bound. For details, see **Logging In to an ECS**.

System Updates

• Linux image source updates

To obtain the latest system updates and software installation dependencies, update the image source before using an ECS.

• Windows patches and drivers updates

To improve the fault rectification capability and performance of ECSs, periodically update Windows patches and drivers.

You can enable Windows automatic updates to detect the latest patches and driver versions.

Data Storage

• Storage security

To ensure data storage security, use the system disk to store OS data and use data disks to store application data. This ensures data security and prevents data loss caused by system faults. As service demand changes, you can expand storage capacity by:

- Expanding disk capacity: You can expand both system disks and data disks. For details, see **Expanding Capacity for an In-use EVS Disk**.

- Adding data disks: You can add only data disks. After **adding disks**, you need to **attach** and **initialize** them before they can be used.
- Data encryption

To further protect data security, both the system and data disks can be encrypted. For details, see **Managing Encrypted EVS Disks**.

Security Management

• Identity authentication

To securely control access to resources and centrally manage permissions, use IAM users and Enterprise Management for identity authentication, permissions management, and resource group management. For details, see Assigning Permissions to O&M Personnel and Multi-project Management Cases.

Access control

To control inbound and outbound access to ECSs and improve security, set access control policies based on:

- ECSs: **Configure security group rules** to control access to ECSs.
- Subnets: Configure network ACLs to control access to all ECSs in a given subnet.
- Server security

In addition to the basic edition of Host Security Service (HSS), use advanced editions to enhance the security of your ECSs. For details about HSS editions, see **Edition details** and **HSS**.

Backup and Restore

• Data backup and restore

To quickly restore data in case of virus intrusion, mis-deletion, and hardware or software faults, back up data periodically. For details, see **Cloud Backup** and **Recovery (CBR)**.

After the backup is successful, you can **restore data using a cloud server backup** or **use a backup to create an image**.

• Service disaster recovery (DR)

For high service DR capabilities, deploy ECSs in the same region in different AZs. For details about AZs, see **Region and AZ** and **Step 1: Configure Basic Settings**.

Resource Management

• Monitoring

Use **Cloud Eye** to keep informed of ECS performance metrics and statuses in real time, and receive alarms if any exceptions occur.

• Tracing

Use **Cloud Trace Service (CTS)** to record operations on your ECSs for later query, auditing, and backtracking.

• Logging

Use **Log Tank Service (LTS)** to collect ECS logs for centralized management. With LTS, you can analyze large volumes of logs efficiently, securely, and in

real time and gain insights into improving availability and performance of applications.

4 Setting Up an Environment

4.1 Setting Up an LNMP Environment

4.1.1 Manually Deploying LNMP (CentOS 7.2)

Overview

LNMP (Linux, Nginx, MySQL, and PHP) is one of the mainstream website server architectures. It is used for running large-sized and high-concurrency website applications, such as e-commerce websites, social networks, and content management systems. This section describes how to use a CentOS 7.2 64bit Linux ECS to set up an LNMP environment on Huawei Cloud.

The process is as follows:

- 1. Install Nginx.
- 2. Install MySQL.
- 3. Install PHP.
- 4. Test the LNMP deployment.

Prerequisites

- 1. The ECS has an EIP bound.
- 2. The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Table 4-1	Security	group rule
-----------	----------	------------

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

Resource Planning

Table 4-2 lists the resource configuration and software versions used in this practice. The commands and parameters may vary according to the hardware specifications or software versions you would use.

Table 4-2	Resources	and	costs
-----------	-----------	-----	-------

Resource	Description	Cost
ECS	 Billing mode: pay-per-use AZ: AZ1 Flavor: s6.large.4 Image: CentOS 7.2 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes.
Nginx	A high-performance HTTP and reverse proxy server. Download URL: http://nginx.org/packages/ centos/7/noarch/RPMS/ nginx-release- centos-7-0.el7.ngx.noarch.rp m	Free
MySQL	An open-source relational database software. Download URL: https://dev.mysql.com/get/ mysql80-community- release-el7-11.noarch.rpm	Free
РНР	An open-source software used for web development. Download URL: https:// mirrors.huaweicloud.com/ remi/enterprise/remi- release-7.rpm	Free

Procedure

Step 1 Install Nginx.

- 1. Log in to the ECS.
- Run the following command to download the Nginx package: wget http://nginx.org/packages/centos/7/noarch/RPMS/nginx-releasecentos-7-0.el7.ngx.noarch.rpm
- 3. Run the following command to create the Nginx yum repository:

rpm -ivh nginx-release-centos-7-0.el7.ngx.noarch.rpm

4. Run the following command to install Nginx:

yum -y install nginx

5. Run the following command to check the Nginx version:

nginx -v

Information similar to the following is displayed: nginx version: nginx/1.26.1

6. Run the following commands to start Nginx and enable it to start automatically upon ECS startup:

systemctl start nginx

systemctl enable nginx

7. Check the startup status.

systemctl status nginx.service

8. Enter **http://***IP* address of the Nginx server in the address bar to access Nginx. If the following page is displayed, Nginx has been installed.

Figure 4-1 Accessing Nginx

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to <u>nginx.org</u>. Commercial support is available at <u>nginx.com</u>.

Thank you for using nginx.

Step 2 Install MySQL.

1. Run the following commands in sequence to install MySQL:

rpm -Uvh https://dev.mysql.com/get/mysql80-community-releaseel7-11.noarch.rpm

yum -y install mysql-community-server

2. Run the following command to check the MySQL version:

mysql -V

Information similar to the following is displayed: mysql Ver 8.0.39 for Linux on x86_64 (MySQL Community Server - GPL)

3. Run the following commands in sequence to start MySQL and enable it to start automatically upon ECS startup:

systemctl start mysqld

systemctl enable mysqld

4. Run the following command to check the MySQL status:

systemctl status mysqld.service

Information similar to the following is displayed.

[root0 ~]# systemctl status mysqld.service
🛛 mysgld.service – MySQL Server
Loaded: loaded (/usr/lib/systemd/system/mysqld.service; enabled; vendor preset: disabled)
Active: active (running) since Wed 2024-08-14 17:01:17 CST; 19s ago
Docs: man:musgld(8)
http://dev.mysgl.com/doc/refman/en/using-systemd.html
Main PID: 8482 (mysqld)
Status: "Server is operational"
CGroup: /system.slice/mysqld.service
-8482 /usr/sbin/mysqld
Aug 14 17:01:11 systemd[1]: Starting MySQL Server
Aug 14 17:01:17 systemd[1]: Started MuSQL Server.

5. Run the following command to obtain the **root** user's password that is automatically set during MySQL installation:

grep 'temporary password' /var/log/mysqld.log

Information similar to the following is displayed: 2018-08-29T07:27:37.541944Z 1 [Note] A temporary password is generated for root@localhost: 2YY? 3uHUA?Ys

6. Run the following command and follow the prompts to harden MySQL:

mysql_secure_installation

Securing the MySQL server deployment.

Enter password for user root: #Enter the obtained password of user **root**. The existing password for the user account root has expired. Please set a new password.

New password: #Enter a new password of user root.

Re-enter new password: #Enter the new password again. The 'validate_password' plugin is installed on the server. The subsequent steps will run with the existing configuration of the plugin. Using existing password for root.

Estimated strength of the password: 100 Change the password for root ? ((Press y|Y for Yes, any other key for No) : N #Press **N**.

... skipping.

By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Press Y to remove anonymous users. Success.

Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Press Y to disallow remote logins of user **root**.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Press Y to delete the test database and remove access to it. - Dropping test database... Success. - Removing privileges on test database... Success.

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Press Y to reload privilege tables. Success.

All done!

Step 3 Install PHP.

1. Run the following commands to install the EPEL and REMI repositories:

yum install -y epel-release rpm -Uvh https://mirrors.huaweicloud.com/remi/enterprise/remirelease-7.rpm

- Run the following command to install the Yum repository management tool: yum -y install yum-utils
- Run the following command to enable the PHP 8.0 repository: yum-config-manager --enable remi-php80
- 4. Run the following commands to install PHP:

yum install -y php php-cli php-fpm php-mysqlnd php-zip php-devel phpgd php-mcrypt php-mbstring php-curl php-xml php-pear php-bcmath php-json

5. Run the following command to check the version of the installed PHP:

php -v

If information similar to the following is displayed, PHP has been installed:

[rootQ	~1# php	-v			
PHP 8.0.30 (cli)	(built: Jun	4 2024	15:19:49)	(NTS gcc	: x86_64)
Copyright (c) The	e PHP Group				
Zend Engine v4.0	.30. Copurial	ht (c) Z	end Technol	logies	

6. Run the following commands to start PHP and enable it to start automatically upon ECS startup:

systemctl start php-fpm

systemctl enable php-fpm

- 7. Modify the Nginx configuration file to support PHP.
 - a. Run the following command to open the **/etc/nginx/nginx.conf** file: **vim /etc/nginx/nginx.conf**

Figure 4-2 nginx.conf

iser nginx; worker_processes auto;	
error_log /var/log/nginx/error.log notice; pid /var/run/nginx.pid;	
events { worker_connections 1024; }	
<pre>http { include /etc/nginx/mime.types; default_type application/octet-stream; log_format main '\$remote_addr - \$remote_user [\$time_local] "\$request" ' '\$status \$body_bytes_sent "\$http_referer" ' '"\$http user agent" "Shttp x forwarded for"'; } }</pre>	
access_log /var/log/nginx/access.log main; sendfile on; #tcp_nopush on;	
keepalive_timeout 65; #gzip on;	
include /etc/nginx/conf.d/*.conf;	

According to the nginx.conf, the configuration file is directed to **/etc/nginx/conf.d/*.conf**.

- b. Enter :quit to exit nginx.conf.
- c. Run the following command to open the **/etc/nginx/conf.d/default.conf** file:

vim /etc/nginx/conf.d/default.conf

- d. Press **i** to enter insert mode.
- e. Modify the **default.conf** file.

Find the **server** paragraph and configure it as follows:

```
server {
   listen
             80:
   server_name localhost;
   #access_log /var/log/nginx/host.access.log main;
 location / {
    root /usr/share/nginx/html;
   index index.html index.htm index.php;
 }
 location ~ \.php$ {
   root
              /usr/share/nginx/html;
    fastcgi_pass 127.0.0.1:9000;
   fastcgi_index index.php;
   fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
    include
               fastcgi_params;
 }
}
```

Figure 4-3 shows the configuration after modification.



```
listen
             80;
             localhost;
server_name
#access_log /var/log/nginx/host.access.log main;
location ∕ {
    root /usr/share/nginx/html;
    index index.html index.htm
                                  index.php
}
location ~
           N.php$ {
    root
                   /usr/share/nginx/html;
   fastcgi_pass
fastcgi_index
                   127.0.0.1:9000;
                   index.php;
    fastcgi_param_SCRIPT_FILENAME_$document_root$fastcgi_script_name;
    include
                   fastcgi_params;
}
#error_page 404
                               /404.html;
# redirect server error pages to the static page /50x.html
#
             500 502 503 504 /50x.html;
error_page
location = /50 \times .html {
          /usr/share/nginx/html;
    root
```

- f. Press **Esc** to exit the editing mode. Then, enter **:wq** to save the settings and exit the file.
- 8. Run the following command to reload the Nginx configuration file: **service nginx reload**
- **Step 4** Test the LNMP deployment.
 - 1. Create the info.php test file in /usr/share/nginx/html/.
 - a. Run the following command to create and open the **info.php** test file: vim /usr/share/nginx/html/info.php
 - b. Press **i** to enter insert mode.

 - d. Press **Esc** to exit the editing mode. Then, enter **:wq** to save the settings and exit the file.
 - 2. Enter **http://***Server IP address***/info.php** in the address bar. If the following page is displayed, the LNMP environment has been set up.

PHP Version 8.0.30	php
System	Linux 🔳 💷 3.10.0-1160.53.1.el7.x86_64 #1 SMP Fri Jan 14 13:59:45 UTC 2022 x86_64
Build Date	Jun 4 2024 15:19:49
Build System	Red Hat Enterprise Linux Server release 7.9 (Maipo)
Build Provider	Remi's RPM repository <https: rpms.remirepo.net=""></https:> #StandWithUkraine
Compiler	gcc (GCC) 8.3.1 20190311 (Red Hat 8.3.1-3)
Architecture	x86_64
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php.ini
Scan this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/20-bcmath.ini, /etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, /etc/php.d/20-tp.ini, /etc/php.d/20-dom.ini, /etc/php.d/20-exitini, /etc/php.d/20-fileinfo.ini, /etc/php.d/20-fip.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-pha.ini, /etc/php.d/20-pha.ini, /etc/php.d/20-sodium.ini, /etc/php.d/20-sintesi.ini, /etc/php.d/20-symmsgini, /etc/php.d/20-sockets.ini, /etc/php.d/20-sodium.ini, /etc/php.d/20-sintesi.ini, /etc/php.d/20-symmsgini, /etc/php.d/20-system.ini, /etc/php.d/20-system.ini, /etc/php.d/20-sintesi.ini, /etc/php.d/20-symmsgini, /etc/php.d/20-system.ini, /etc/php.d/20-system.ini, /etc/php.d/20-tokenize.ini, /etc/php.d/20-symlosi, /etc/php.d/20-system.ini, /etc/php.d/30-pd_sqitte.ini, /etc/php.d/30-mcrystlini, /etc/php.d/30-mysqli.ini, /etc/php.d/30-pdo_gut.ini,
PHP API	20200930
PHP Extension	20200930
Zend Extension	420200930
Zend Extension Build	API420200930,NTS
PHP Extension Build	API20200930,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	provided by mbstring
IPv6 Support	enabled
DTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, compress.bzip2, phar, zip
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, sslv3, tls, tlsv1.0, tlsv1.1, tlsv1.2
Registered Stream Filters	zlib.*, string.tot13, string.toupper, string.tolower, convert.*, consumed, dechunk, bzip2.*, convert.iconv.*, mcrypt.*, mdecrypt.*

----End

4.1.2 Manually Deploying LNMP (CentOS 8.0)

Overview

LNMP (Linux, Nginx, MySQL, and PHP) is one of the mainstream website server architectures. It is used for running large-sized and high-concurrency website applications, such as e-commerce websites, social networks, and content management systems. This section describes how to use a CentOS 8.0 64bit Linux ECS to set up the LNMP environment on Huaei Cloud.

The process is as follows:

- 1. Install Nginx.
- 2. Install MySQL.
- 3. Install PHP.
- 4. Test the LNMP deployment.

Prerequisites

- 1. The ECS has an EIP bound.
- 2. The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

Table 4-3 Security group rules

Resource Planning

Table 4-4 lists the resource configuration and software versions used in this practice. The commands and parameters may vary according to the hardware specifications or software versions you would use.

 Table 4-4 Resources and costs

Resource	Description	Cost
ECS	 Billing mode: pay-per-use AZ: AZ1 Flavor: s6.large.4 Image: CentOS 8.0 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes.
Nginx	A high-performance HTTP and reverse proxy server. Example: Nginx 1.20.1	Free
MySQL	An open-source relational database software Example: MySQL 8.0.26	Free
РНР	An open-source software used for web development Example: PHP 7.4.19	Free

Procedure

Step 1 Install Nginx.

- 1. Log in to the ECS.
- 2. Run the following command to install Nginx:
 - sudo dnf -y install https://nginx.org/packages/centos/8/x86_64/RPMS/ nginx-1.20.1-1.el8.ngx.x86_64.rpm

3. Run the following command to check the Nginx version:

nginx -v

Information similar to the following is displayed: nginx version: nginx/1.20.1

4. Run the following commands to start Nginx and enable it to start automatically upon ECS startup:

systemctl start nginx

systemctl enable nginx

5. Run the following command to check the startup status:

systemctl status nginx.service

Information similar to the following is displayed.

[root]) "]# systemctl status nginx.service
• nginx.service - nginx - high performance web server
Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; vendor preset: disabled)
Active: active (running) since Wed 2024-08-14 10:47:48 CST; 25s ago
Docs: http://nginx.org/en/docs/
Main PID: 1793 (nginx)
Tasks: 3 (limit: 49517)
Memory: 3.0M
CGroup: /system.slice/nginx.service
⊢1793 nginx: master process /usr/sbin/nginx -c /etc/nginx/nginx.conf
-1794 nginx: worker process
-1795 nginx: worker process
1.50 igrine. worker process
Aug 14 18:47:48 systemd[1]: Starting nginx - high performance web server
Aug 14 10:47:48 Sustematil Started nginx - high performance web server
Huy 14 10:47:40 Systematill. Startea nyinx - niyn performance web server.

6. Enter **http://***IP* address of the Nginx server in the address bar to access Nginx. If the following page is displayed, Nginx has been installed.

Figure 4-4 Accessing Nginx

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to <u>nginx.org</u>. Commercial support is available at <u>nginx.com</u>.

Thank you for using nginx.

Step 2 Install MySQL.

1. Run the following command to install MySQL:

sudo dnf -y install @mysql

2. Run the following command to check the MySQL version:

mysql -V

Information similar to the following is displayed: mysql Ver 8.0.26 for Linux on x86_64 (Source distribution)

3. Run the following commands in sequence to start MySQL and enable it to start automatically upon ECS startup:

systemctl start mysqld systemctl enable mysqld

4. Check the MySQL status.

systemctl status mysqld.service

Information similar to the following is displayed.

[root0 ~
Loaded: loaded (/usr/lib/system/mysqld.service; enabled; vendor preset: disabled) Active: active (running) since Wed 2024-08-14 10:55:34 CST; 21s ago
Main PID: 2088 (mysqld)
Status: "Server is operational" Tasks: 38 (limit: 49517)
Memory: 527.8M CGroup: /system.slice/musgld.service
-2088 /usr/libexec/mysqldbasedir=/usr
Aug 14 10:55:28 systemd[1]: Starting MySQL 8.0 database server Aug 14 10:55:28 mysql-prepare-db-dir[2004]: Initializing MySQL database Aug 14 10:55:34 systemd[1]: Started MySQL 8.0 database server.

5. Run the following command and follow the prompts to harden MySQL:

mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD COMPONENT can be used to test passwords and improve security. It checks the strength of password and allows the users to set only those passwords which are secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: Y #Press Y to set the password validation policy.

There are three levels of password validation policy:

LOW Length >= 8 MEDIUM Length >= 8, numeric, mixed case, and special characters STRONG Length >= 8, numeric, mixed case, special characters and dictionary file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 2 #Enter 2 to select the password validation policy. Please set the password for root here.

New password: #Enter a new password of user root.

Re-enter new password: #Enter the new password again.

Estimated strength of the password: 100 Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : Y #Press Y to confirm the new password. By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Press Y to remove anonymous users. Success.

Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Press Y to disallow remote logins of user **root**. Success.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing,

and should be removed before moving into a production environment. Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Press Y to delete the **test** database and remove access to it. - Dropping test database... Success. - Removing privileges on test database... Success. Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Press Y to reload privilege tables. Success.

All done!

Step 3 Install PHP.

1. Run the following commands to add and update the EPEL repository:

sudo dnf -y install epel-release

sudo dnf -y update epel-release

2. Run the following commands to delete unnecessary software packages from the cache and update the software repository:

sudo dnf clean all

sudo dnf makecache

3. Run the following command to start the PHP 7.4 module:

dnf module enable php:7.4

4. Run the following command to install the required PHP module:

sudo dnf -y install php php-curl php-dom php-exif php-fileinfo php-fpm php-gd php-hash php-json php-mbstring php-mysqli php-openssl phppcre php-xml libsodium

5. Run the following command to check the version of the installed PHP:

php -v

Information similar to the following is displayed.

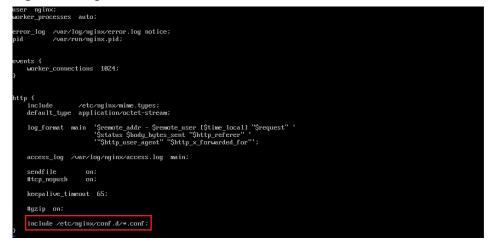
6. Run the following commands to start PHP and enable it to start automatically upon ECS startup:

systemctl start php-fpm

systemctl enable php-fpm

- 7. Modify the Nginx configuration file to support PHP.
 - a. Run the following command to open the **/etc/nginx/nginx.conf** file: **vim /etc/nginx/nginx.conf**

Figure 4-5 nginx.conf



According to the nginx.conf, the configuration file is directed to **/etc/nginx/conf.d/*.conf**.

- b. Enter :quit to exit nginx.conf.
- Run the following command to open the /etc/nginx/conf.d/default.conf file:

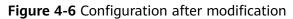
vim /etc/nginx/conf.d/default.conf

- d. Press **i** to enter the editing mode.
- e. Modify the **default.conf** file.

Find the server paragraph and configure it as follows:

```
server {
   listen
             80;
   server_name localhost;
   #access_log /var/log/nginx/host.access.log main;
 location / {
    root /usr/share/nginx/html;
    index index.html index.htm index.php;
 }
 location ~ \.php$ {
              /usr/share/nginx/html;
    root
    fastcgi_pass unix:/run/php-fpm/www.sock;
   fastcgi_index index.php;
    fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
   include
               fastcgi_params;
 }
}
```

Figure 4-6 shows the configuration after modification.



```
listen
              80;
              localhost;
server_name
#access_log /var/log/nginx/host.access.log main;
location / {
    root /usr/share/nginx/html;
index index.html index.htm
                                    index.php
location ~ \.php$ {
    root
                      /usr/share/nginx/html;
    fastcgi_pass
                    unix:/run/php-fpm/www.sock;
    fastcgi_index index.php; fastcgi_param SCRIPT_FILENAME $document_root$fastcgi_script_name;
                     fastcgi_params;
    include
#error_page 404
                                 /404.html;
# redirect server error pages to the static page /50x.html
Ħ
              500 502 503 504 /50x.html;
error_page
location = /50x.html {
          /usr/share/nginx/html;
    \mathbf{root}
3
# proxy the PHP scripts to Apache listening on 127.0.0.1:80
#
#location ~ \.php$ {
#
     proxy_pass http://127.0.0.1;
#}
```

- f. Press **Esc** to exit the editing mode. Then, enter **:wq** to save the settings and exit the file.
- 8. Run the following command to reload the Nginx configuration file:

service nginx reload

- **Step 4** Test the LNMP deployment.
 - 1. Create the **info.php** test file in /usr/share/nginx/html/.
 - a. Run the following command to create and open the **info.php** test file: **vim /usr/share/nginx/html/info.php**
 - b. Press i to enter the editing mode.

 - d. Press **Esc** to exit the editing mode. Then, enter **:wq** to save the settings and exit the file.
 - 2. Enter **http://***Server IP address***/info.php** in the address bar. If the following page is displayed, the environment has been set up.

4.18.0-348.7.1.el8_5x86_64 #1 SMP Wed Dec 22 13:25:12 UTC 2021 ache.ini, /etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, ini, /etc/php.d/20-gh.ini, /etc/php.d/20-exit.ini, /etc/php.d/20-fileinfo.ini, ini, /etc/php.d/20-gh.ini, /etc/php.d/20-exit.ini, /etc/php.d/20-indeini, ini, /etc/php.d/20-gh.ini, /etc/php.d/20-sysIntex.ini, /etc/php.d/20-sqlite3.ini, ini, /etc/php.d/20-sinilini, /etc/php.d/20-ssqlite3.ini, /etc/php.d/20-sqlite3.ini, ini, /etc/php.d/20-sqliti, /etc/php.d/20-ssqlite3.ini, /etc/php.d/20-sqlite3.ini, ini, /etc/php.d/20-sqliti, /etc/php.d/20-ssqlite3.ini, /etc/php.d/20-sqlite3.ini, glitini, /etc/php.d/30-pdo_mysql.ini, /etc/php.d/30-pdo_sqlite3.ini, /etc/php.d/30-			
ache.ini, /etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, ini, /etc/php.d/20-gd.ini, /etc/php.d/20-exit.ini, /etc/php.d/20-fileinfo.ini, i.ni, /etc/php.d/20-gd.ini, /etc/php.d/20-gt.ini, /etc/php.d/20-ionv.ini, i.ni, /etc/php.d/20-simplexml.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-solini, i.nize.ini, /etc/php.d/20-simplexml.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-sslini, inize.ini, /etc/php.d/20-sslini, /etc/php.d/20-sslini,			
ini, /etc/php.d/20-dom.ini, /etc/php.d/20-exitini, /etc/php.d/20-fileinfo.ini, ini, /etc/php.d/20-gd.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-gdoini, inini, /etc/php.d/20-simplexml.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-silnit estimizerini, /etc/php.d/20-simi(inite:ini, /etc/php.d/20-silnit), /etc/php.d/20-silnit, /etc/php.d/20-silnit);			
ini, /etc/php.d/20-dom.ini, /etc/php.d/20-exitini, /etc/php.d/20-fileinfo.ini, ini, /etc/php.d/20-gd.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-gdo.ini, inini, /etc/php.d/20-simplexml.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-solini inizetini, /etc/php.d/20-simi, intci-php.d/20-sockets.ini, /etc/php.d/20-solini			
ini, /etc/php.d/20-domini, /etc/php.d/20-exifini, /etc/php.d/20-fileinfo.ini, ni, /etc/php.d/20-gd.ini, /etc/php.d/20-gettextini, /etc/php.d/20-iconvini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-gd.ini, inii, /etc/php.d/20-simplexml.ini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sel.ini, iniezcini, /etc/php.d/20-simil, /etc/php.d/20-seckets.ini, /etc/php.d/20-sel.ini, iniezcini, /etc/php.d/20-simil.y. {etc/php.d/20-sel.ini,			
ini, /etc/php.d/20-domini, /etc/php.d/20-exifini, /etc/php.d/20-fileinfo.ini, ni, /etc/php.d/20-gd.ini, /etc/php.d/20-gettextini, /etc/php.d/20-iconvini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-gd.ini, inii, /etc/php.d/20-simplexml.ini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sel.ini, iniezcini, /etc/php.d/20-simil, /etc/php.d/20-seckets.ini, /etc/php.d/20-sel.ini, iniezcini, /etc/php.d/20-simil.y. {etc/php.d/20-sel.ini,			
ini, /etc/php.d/20-domini, /etc/php.d/20-exitini, /etc/php.d/20-fileinfo.ini, ni, /etc/php.d/20-gd.ini, /etc/php.d/20-gettextini, /etc/php.d/20-iconvini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-pdoini, inii, /etc/php.d/20-simplexml.ini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini, iniercini, /etc/php.d/20-wini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini, iniercini, /etc/php.d/20-wini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini,			
ini, /etc/php.d/20-domini, /etc/php.d/20-exitini, /etc/php.d/20-fileinfo.ini, ni, /etc/php.d/20-gd.ini, /etc/php.d/20-gettextini, /etc/php.d/20-iconvini, ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-pdoini, inii, /etc/php.d/20-simplexml.ini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini, iniercini, /etc/php.d/20-wini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini, iniercini, /etc/php.d/20-wini, /etc/php.d/20-seckets.ini, /etc/php.d/20-sal.ini,			
ing			
available, disabled			
https, ftps, compress.zlib, php, file, glob, data, http, ftp, compress.bzip2, phar			
ssl, tls, tlsv1.0, tlsv1.1, tlsv1.2, tlsv1.3			
zlib.*, string.rot13, string.toupper, string.tolower, string.strip_tags, convert.*, consumed, dechunk, bzip2.*, convert.conv.*			

----End

4.1.3 Manually Deploying LNMP (Ubuntu 20.04)

Overview

The best practices for Huawei Cloud ECS guide you through the deployment of LNMP on a Linux ECS. This section uses the Ubuntu 20.04 64bit as an example.

The process is as follows:

- 1. Install Nginx.
- 2. Install MySQL.
- 3. Install PHP.
- 4. Test the LNMP deployment.

Prerequisites

- 1. The ECS has an EIP bound.
- 2. The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

 Table 4-5
 Security group rule

Resource Planning

Table 4-6 lists the resource configuration and software versions used in this practice. The commands and parameters may vary according to the hardware specifications or software versions you would use.

Table 4-6 Resources and cost	S
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Resource	Description	Cost
ECS	 Billing mode: pay-per-use AZ: AZ1 Flavor: s6.large.2 Image: Ubuntu 20.04 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	 The following resources generate costs: ECSs EVS disks EIPs For billing details, see Billing Modes.
Nginx	A high-performance HTTP and reverse proxy server.	Free
MySQL	An open-source relational database software.	Free
РНР	An open-source software used for web development.	Free

Procedure

Step 1 Install Nginx.

- 1. Log in to the ECS.
- 2. Run the following commands to install Nginx:

sudo apt-get update

sudo apt-get install nginx

If **Do you want to continue? [Y/n]** is displayed, enter **y** or **Y** to continue the installation.

3. (Optional) Configure the firewall.

Uncomplicated Firewall (UFW) is an iptables interface that simplifies the firewall configuration. By default, Ubuntu has UFW installed. Run the following command to check the firewall status:

sudo ufw status

If you do not want to enable the firewall, skip this step. If you want to enable the firewall, run the following command:

sudo ufw enable

Verify that the firewall is enabled.

Before testing Nginx, you need to reconfigure the firewall to allow access to Nginx. Run the following command to automatically register Nginx with UFW:

sudo ufw app list

Information similar to the following is displayed:

Available applications: Nginx Full Nginx HTTP Nginx HTTPS

- **Nginx Full**: Port 80 is enabled to distribute normal and unencrypted web traffic, and port 443 to distribute TLS/SSL-encrypted traffic.
- Nginx HTTP: Port 80 is enabled to distribute normal and unencrypted web traffic.
- **Nginx HTTPS**: Port 443 is enabled to distribute TLS/SSL-encrypted traffic.

Run the following command to ensure that the firewall allows HTTP and HTTPS connections:

sudo ufw allow 'Nginx Full'

4. Verify that Nginx can work properly.

Use the domain name or IP address to access Nginx. The **Welcome to nginx** page is displayed if Nginx is started normally.

Enter **http://***IP* address of the Nginx server in the address bar to access Nginx. If the following page is displayed, Nginx has been installed.

Figure 4-7 Accessing Nginx

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to <u>nginx.org</u>. Commercial support is available at <u>nginx.com</u>.

Thank you for using nginx.

Step 2 Install MySQL.

1. Run the following command to install MySQL:

sudo apt -y install mysql-server

2. Check the MySQL status.

sudo systemctl status mysql

```
    mysql.service - MySQL Community Server
Loaded: loaded (/lib/system//system/mysql.service; enabled; vendor preset: enabled)
Active: active (running) since Wed 2023-07-26 15:57:29 CST; 22min ago
Main PID: 10770 (mysqld)
Status: "Server is operational"
Tasks: 37 (limit: 4217)
Memory: 364.9M
CGroup: /system.slice/mysqld.service
10770 /usr/sbin/mysqld
```

Jul 26 15:57:29 ecs-ubuntu systemd[1]: Starting MySQL Community Server... Jul 26 15:57:29 ecs-ubuntu systemd[1]: Started MySQL Community Server.

3. Run the following command to access MySQL:

sudo mysql

4. Run the following command to set the password for user **root**:

ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password by 'xxxxx';

In the preceding command, *xxxxx* indicates the password you set for user **root**.

5. Run the following command to exit MySQL:

exit;

6. Run the following command and follow the prompts to harden MySQL:

mysql_secure_installation

Securing the MySQL server deployment.

Enter password for user root: #Enter the password of user **root** set in step 4.

VALIDATE PASSWORD COMPONENT can be used to test passwords and improve security. It checks the strength of password and allows the users to set only those passwords which are secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: Y #Press Y to set the password validation policy.

There are three levels of password validation policy:

LOW Length >= 8 MEDIUM Length >= 8, numeric, mixed case, and special characters STRONG Length >= 8, numeric, mixed case, special characters and dictionary file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 2 #Enter 2 to select the password validation policy. Using existing password for root.

Estimated strength of the password: 25 Change the password for root ? ((Press y|Y for Yes, any other key for No) : Y #Press Y to change the password of user **root**.

New password: #Enter a new password of user **root**.

Re-enter new password: #Enter the new password again.

Estimated strength of the password: 100 Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : Y #Press Y to confirm the new password. By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Press Y to remove anonymous users. Success.

Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Press Y to disallow remote logins of user **root**. Success.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Press Y to delete the **test** database and remove access to it. - Dropping test database... Success.

- Removing privileges on test database... Success.

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Press Y to reload privilege tables. Success.

All done!

Step 3 Install PHP.

1. Run the following commands to install PHP:

sudo apt update

sudo apt install php-fpm

2. Run the following command to check the version of the installed PHP:

php -v

Information similar to the following is displayed:

PHP 7.4.3-4ubuntu2.19 (cli) (built: Jun 27 2023 15:49:59) (NTS) Copyright (c) The PHP Group Zend Engine v3.4.0, Copyright (c) Zend Technologies with Zend OPcache v7.4.3-4ubuntu2.19, Copyright (c), by Zend Technologies

3. Run the following command to check the runtime status of PHP:

systemctl status php7.4-fpm

Information similar to the following is displayed:

 php7.4-fpm.service - The PHP 7.4 FastCGI Process Manager Loaded: loaded (/lib/systemd/system/php7.4-fpm.service; enabled; vendor preset: enabled) Active: active (running) since Mon 2023-07-31 17:33:35 CST; 3min 50s ago Docs: man:php-fpm7.4(8)

NOTE

If lines 1-16/16 (end) is displayed in the command output, press q to exit.

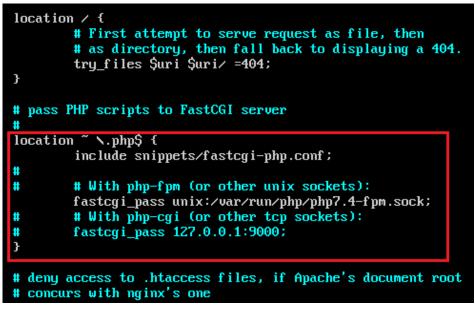
- Modify the Nginx configuration file to support PHP. 4.
 - Run the following command to open the default Nginx configuration file: a. sudo vim /etc/nginx/sites-enabled/default
 - b. Press i to enter insert mode.

Ħ

- Modify the opened Nginx configuration file. C.
 - In server{}, find the line starting with index and add index.php to this line.

```
Default server configuration
server {
        listen 80 default_server;
       listen [::]:80 default_server;
       # SSL configuration
       # listen 443 ssl default_server;
       # listen [::]:443 ssl default_server;
       #
       # Note: You should disable gzip for SSL traffic.
       # See: https://bugs.debian.org/773332
       #
       # Read up on ssl_ciphers to ensure a secure configuration.
       # See: https://bugs.debian.org/765782
       #
       # Self signed certs generated by the ssl-cert package
       # Don't use them in a production server!
       #
       # include snippets/snakeoil.conf;
       root /var/www/html;
       # Add index.php to the list if you are using PHP
       index.php index.html index.htm index.nginx-debian.html;
       server_name _;
       location / {
               # First attempt to serve request as file, then
```

Find location ~ \.php\$ {} in server{} and delete the comments from the lines in the following red box:



- d. Press **Esc** to exit insert mode. Then, enter **:wq** to save the settings and exit.
- 5. Run the following command to reload the Nginx configuration file: sudo systemctl restart nginx
- **Step 4** Test the LNMP deployment.
 - In the root directory of the Nginx website, create the phpinfo.php file.
 sudo vim /var/www/html/phpinfo.php
 - 2. Press **i** to enter insert mode.
 - 3. Modify the **phpinfo.php** file and add the following to the file: <?php echo phpinfo(); ?>
 - 4. Press **Esc** to exit insert mode. Then, enter :wq to save the settings and exit.
 - 5. Enter **http://***IP* address of the Nginx server/**phpinfo.php** in the address bar. If the following page is displayed, the LNMP environment has been deployed.

PHP Version 7.4.3-4ubuntu2.19	php
System	Linux ecs-Inmp 5.4.0-153-generic #170-Ubuntu SMP Fri Jun 16 13:43:31 UTC 2023 x86_64
Build Date	Jun 27 2023 15:49:59
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/7.4/fpm
Loaded Configuration File	/etc/php/7.4/fpm/php.ini
Scan this dir for additional .ini files	/etc/php/7.4/fpm/conf.d
Additional .ini files parsed	/etc/php/7.4/fpm/conf.d/10-opcache.ini, /etc/php/7.4/fpm/conf.d/10-pdo.ini, /etc/php/7.4/fpm/conf.d/20-ackini, /etc/php/7.4/fpm/conf.d/20-ctype.ini, /etc/php/7.4/fpm/conf.d/20-ackini, /etc/php/7.4/fpm/conf.d/20-gettext.ini, /etc/php/7.4/fpm/conf.d/20-itcini, /etc/php/7.4/fpm/conf.d/20-gettext.ini, /etc/php/7.4/fpm/conf.d/20-itcini, /etc/php/7.4/fpm/conf.d/20-gettext.ini, /etc/php/7.4/fpm/conf.d/20-posixini, /etc/php/7.4/fpm/conf.d/20-sockets.ini, /etc/php/7.4/fpm/conf.d/20-syswini, /etc/php/7.4/fpm/conf.d/20-sockets.ini, /etc/php/7.4/fpm/conf.d/20-syswsfam.ini, /etc/php/7.4/fpm/conf.d/20-syswem.ini, /etc/php/7.4/fpm/conf.d/20-syswsfam.ini, /etc/php/7.4/fpm/conf.d/20-syswem.ini
PHP API	20190902
PHP Extension	20190902
Zend Extension	320190902
Zend Extension Build	API320190902,NTS
PHP Extension Build	API20190902,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, phar
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, tls, tlsv1.0, tlsv1.1, tlsv1.2, tlsv1.3
Registered Stream Filters	zlib.", string.rot13, string.toupper, string.tolower, string.strip_tags, convert.", consumed, dechunk, convert.iconv."

----End

4.2 Setting Up an LAMP Environment

4.2.1 Manually Deploying LAMP (CentOS 7.8 PHP 7.0)

Overview

LAMP is a web application platform consisting of Linux, Apache, MySQL, and PHP.

The best practices for Huawei Cloud ECS guide you through the deployment of LAMP on a Linux ECS. The CentOS 7.8 64bit OS is used as an example in this section.

Prerequisites

- 1. The ECS has an EIP bound.
- 2. The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

 Table 4-7 Security group rule

Resource Planning

Table 4-8 lists the resource configuration and software versions used in this practice. The commands and parameters may vary according to the hardware specifications or software versions you would use.

Table 4-8	Resources	and	costs
-----------	-----------	-----	-------

Resource	Description	Cost
ECS	 Billing mode: pay-per-use AZ: AZ1 Flavor: c7.large.2 Image: CentOS 7.8 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes.
Apache	An open-source web server	Free
MySQL	An open-source relational database software Download URL: http://dev.mysql.com/get/ mysql57-community- release-el7-10.noarch.rpm	Free
РНР	An open-source software used for web development Download URL: https:// mirror.webtatic.com/yum/el 7/epel-release.rpm https:// mirror.webtatic.com/yum/el 7/webtatic-release.rpm	Free

Procedure

Step 1 Install Apache.

- 1. Log in to the ECS.
- 2. Run the following commands as user **root** to update the software package and install Apache:

yum -y update

yum -y install httpd

3. Run the following command to check the version of the installed Apache: httpd -v

Information similar to the following is displayed:

Server version: Apache/2.4.6 (CentOS) Server built: May 30 2023 14:01:11

4. Run the following commands in sequence to start Apache and enable it to start automatically upon ECS startup:

systemctl start httpd

systemctl enable httpd

5. Enter **http://***Server IP address* in the address bar of the browser to access Apache. If the following page is displayed, Apache has been installed.



This page is used to test the proper operation of the Apache HTTP server after it has been installed. If you can read this page it means that this site is working properly. This server is powered by CentOS.

Just visiting?

The website you just visited is either experiencing problems or is undergoing routine maintenance.

If you would like to let the administrators of this website know that you've seen this page instead of the page you expected, you should send them e-mail. In general, mail sent to the name "webmaster" and directed to the website's domain should reach the appropriate person.

For example, if you experienced problems while visiting www.example.com, you should send e-mail to "webmaster@example.com".

Are you the Administrator?

You should add your website content to the directory /var/www/html/. To prevent this page from ever being used, follow the instructions in the file /etc/httpd/conf. d/welcome.conf.

Promoting Apache and CentOS

You are free to use the images below on Apache and CentOS Linux powered HTTP servers. Thanks for using Apache and CentOSI $\ensuremath{\mathsf{E}}$



Important note:

The CentOS Project has nothing to do with this website or its content, it just provides the software that makes the website run

The CentOS Project

The CentOS Linux distribution is a stable, predictable, manageable and reproduceable platform derived from the sources of Red Hat Enterprise Linux (RHEL).

Step 2 Install MySQL.

1. Run the following commands in sequence to install MySQL:

wget -i -c http://dev.mysql.com/get/mysql57-community-releaseel7-10.noarch.rpm

yum -y install mysql57-community-release-el7-10.noarch.rpm

yum -y install mysql-community-server --nogpgcheck

2. Run the following command to check the version of the installed MySQL: mysql -V

Information similar to the following is displayed: mysql Ver 14.14 Distrib 5.7.44, for Linux (x86_64) using EditLine wrapper

3. Run the following commands in sequence to start MySQL and enable it to start automatically upon ECS startup:

systemctl start mysqld

systemctl enable mysqld

4. Run the following command to check the MySQL status:

systemctl status mysqld.service

[root@ecs-adc3 ~]# systemctl status mysqld.service

- mysqld.service MySQL Server
 - Loaded: loaded (/usr/lib/systemd/system/mysqld.service; enabled; vendor preset: disabled) Active: active (running) since Tue 2023-10-31 19:33:40 CST; 36s ago
- Docs: man:mysqld(8)

http://dev.mysql.com/doc/refman/en/using-systemd.html

Main PID: 7916 (mysqld)

CGroup: /system.slice/mysqld.service

7916 /usr/sbin/mysqld --daemonize --pid-file=/var/run/mysqld/mysqld.pid

Aug 16 19:33:35 ecs-adc3 systemd[1]: Starting MySQL Server... Aug 16 19:33:40 ecs-adc3 systemd[1]: Started MySQL Server.

5. Run the following commands to obtain the **root** user's password that is automatically set during MySQL installation:

grep 'temporary password' /var/log/mysqld.log

Information similar to the following is displayed: 2023-10-31T11:53:08.691748Z 1 [Note] A temporary password is generated for root@localhost: 2YY? 3uHUA?Ys

6. Run the following command and follow the prompts to harden MySQL:

mysql_secure_installation

Securing the MySQL server deployment.

Enter password for user root: #Enter the obtained password of user **root**. The existing password for the user account root has expired. Please set a new password.

New password: #Enter a new password of user root.

Re-enter new password: #Enter the new password again. The 'validate_password' plugin is installed on the server. The subsequent steps will run with the existing configuration of the plugin. Using existing password for root.

Estimated strength of the password: 100 Change the password for root ? ((Press y|Y for Yes, any other key for No) : N #Press \mathbf{N} .

... skipping.

By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Press Y to remove anonymous users. Success. Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Press Y to disallow remote logins of user **root**. Success.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Press Y to delete the **test** database and remove access to it. - Dropping test database...

Success.

- Removing privileges on test database... Success.

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Press Y to reload privilege tables. Success.

All done!

Step 3 Install PHP.

1. Run the following commands to install PHP 7 and required PHP extensions:

rpm -Uvh https://mirror.webtatic.com/yum/el7/epel-release.rpm

rpm -Uvh https://mirror.webtatic.com/yum/el7/webtatic-release.rpm

yum -y install php70w-devel php70w.x86_64 php70w-cli.x86_64 php70wcommon.x86_64 php70w-gd.x86_64 php70w-ldap.x86_64 php70wmbstring.x86_64 php70w-mcrypt.x86_64 php70w-pdo.x86_64 php70wmysqlnd php70w-fpm php70w-opcache php70w-pecl-redis php70w-peclmongodb

2. Run the following command to check the version of the installed PHP:

php -v

Information similar to the following is displayed:

PHP 7.0.33 (cli) (built: Dec 6 2018 22:30:44) (NTS) Copyright (c) 1997-2017 The PHP Group Zend Engine v3.0.0, Copyright (c) 1998-2017 Zend Technologies

3. Run the following commands to start PHP and enable it to start automatically upon ECS startup:

systemctl start php-fpm systemctl enable php-fpm

Step 4 Test the LAMP deployment.

2>

- 1. Create the **info.php** test file in **/var/www/html**/.
 - a. Run the following command to create and open the **info.php** test file: **vim /var/www/html/info.php**
 - b. Press i to enter insert mode.
 - c. Modify the **info.php** file and add the following to the file: <?php phpinfo();

- d. Press **Esc** to exit insert mode. Then, enter **:wq** to save the settings and exit.
- 2. Run the following command to restart Apache:

systemctl restart httpd

3. Enter **http://***Server IP address***/info.php** in the address bar. If the following page is displayed, the LAMP environment has been set up.

PHP Version 7.0.33	php
System	Linux ecs-maxiaorui-wx1058652-20231103 3.10.0-1160.92.1.el7.x86_64 #1 SMP Tue Jun 20 11:48:01 UTC 2023 x86_64
Build Date	Dec 6 2018 22:31:47
Server API	Apache 2.0 Handler
/irtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
oaded Configuration File	/etc/php.ini
can this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/bz2.ini, /etc/php.d/calendar.ini, /etc/php.d/ctype.ini, /etc/php.d/curl.ini, /etc/php.d/dom.ini, /etc/php.d/gmp.ini, /etc/php.d/fileinfo.ini, /etc/php.d/ftp.ini, /etc/php.d/gd.ini, /etc/php.d/gettextini, /etc/php.d/gmp.ini, /etc/php.d/icomi, /etc/php.d/igbinary.ini, /etc/php.d/gd.ini, /etc/php.d/gettextini, /etc/php.d/mstring.ini, /etc/php.d/mcryptini, /etc/php.d/pd.ini, /etc/php.d/pd.ini, /etc/php.d/pd. /etc/php.d/mstring.ini, /etc/php.d/pcache.ini, /etc/php.d/pd.ini, /etc/php.d/pdo_mysqlnd.ini, /etc/php.d/gdo_sqlite.ini, /etc/php.d/spcache.ini, /etc/php.d/pdo.ini, /etc/php.d/pdo_mysqlnd.ini, /etc/php.d/shorop.ini, /etc/php.d/simplexml.ini, /etc/php.d/spcixte.ini, /etc/php.d/sqlite3.ini, /etc/php.d/syswmg.ini, /etc/php.d/sysvsem.ini, /etc/php.d/sysvshm.ini, /etc/php.d/tokenizer.ini, /etc/php.d/skl.ini, /etc/php.d/sini_wdc.ini, /etc/php.d/sysvshm.ini, /etc/php.d/tokenizer.ini, /etc/php.d/sl.ini, /etc/php.d/sini_
РНР АРІ	20151012
PHP Extension	20151012
Zend Extension	320151012
Zend Extension Build	API320151012,NTS
PHP Extension Build	API20151012,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	disabled
end Memory Manager	enabled
end Multibyte Support	provided by mbstring
Pv6 Support	enabled
OTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, compress.bzip2, phar, zip
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, sslv3, tls, tlsv1.0, tlsv1.1, tlsv1.2
Registered Stream Filters	zlib.", string.rot13, string.toupper, string.tolower, string.strip_tags, convert.", consumed, dechunk, bzip2.", convert.iconv.", mcrypt.", mdecrypt."

----End

4.3 Setting Up a Java Web Environment

4.3.1 Setting Up Tomcat-based Java Web Environment (CentOS 7.4)

Application Scenarios

Tomcat is a widely used Java Web application server. This section describes how to set up Java Web environment on an ECS. To do so, you need to download the Java Web installation packages, upload the packages to the ECS, and set security rules for the ECS. After installing Java Web, you need to configure related software. The ECS in this chapter uses CentOS 7.4 64bit as OS.

Architecture

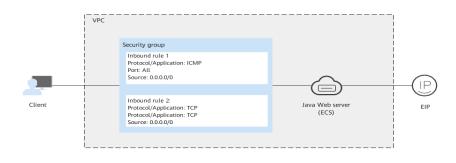


Figure 4-8 Setting up Tomcat-based Java web environment

Resource and Cost Planning

Table 4-9 Resources and costs

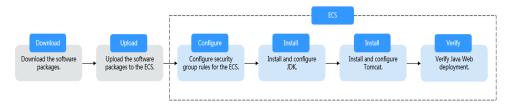
Resource	Description	Cost
VPC	VPC CIDR block: 192.168.0.0/16	Free
Subnet	AZ: AZ1CIDR block: 192.168.0.0/24	Free
Security group	 Inbound rule 1: Priority: Set it to 1. Action: Select Allow. Type: Select IPv4. Protocol & Port: Set it to ICMP: All. Source: Set it to 0.0.0.0/0. Inbound rule 2: Priority: Set it to 1. Action: Select Allow. Type: Select IPv4. Protocol & Port: Set it to TCP: 8080. Source: Set it to 0.0.0.0/0. 	Free
	• Source : Set it to 0.0.0/0 .	

Resource	Description	Cost
ECS	 Billing mode: Yearly/ Monthly AZ: AZ1 Flavor: c7.large.2 Image: CentOS 7.4 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes .
jdk	A Java development tool software. You can download it from: http://www.oracle.com/ technetwork/java/javase/ downloads	Free
tomcat	An open-source web application server. You can download it from: http://tomcat.apache.org/ download-80.cgi	Free
PuTTY	A cross-platform remote access tool, which is used to access various nodes from a Windows OS during software installation. You can download it from: https:// www.chiark.greenend.org.u k/~sgtatham/putty/ latest.html	Free
WinSCP	A file transfer across platform, which is used for transferring files between Windows and Linux systems. You can download it from: http://winscp.net/	Free

Table 4-9 lists the official paths to download JDK and Tomcat installation packages. You can also obtain the packages from open-source image paths.

Process

Figure 4-9 Deployment Process



Procedure

Preparations

- An ECS is created and has an EIP bound.
- The **jdk** and **tomcat** directories have been created on the ECS using the following commands:

cd /home/

mkdir webDemo

cd webDemo/

mkdir jdk

mkdir tomcat

- The installation packages have been downloaded to the local PC and uploaded to the ECS through the file transfer tool. Alternatively, you can run the wget command to download the installation packages to the ECS. The details of both methods are described as follows:
 - Method 1: Upload the installation packages to the ECS using the file transfer tool.
 - Use WinSCP to upload the JDK software package to the jdk directory.
 - Use WinSCP to upload the Tomcat software package to the tomcat directory.
 - Method 2: Run the **wget** command to download the installation packages to the ECS.
 - i. Run the following command to go to the **jdk** directory:

cd /home/webDemo/jdk

ii. Run the following command to download the JDK installation package:

wget JDK package download address

Download the JDK installation package from the path listed in **Table 4-9** or from other open-source image paths.

For example, to check the available versions of the **jdk17** software package (**jdk-17_linux-x64_bin.tar.gz** used as an example), run the following command:

wget https://download.oracle.com/java/17/latest/jdk-17_linux-x64_bin.tar.gz

iii. Run the following command to go to the **tomcat** directory:

cd /home/webDemo/tomcat

iv. Run the following command to download the Tomcat installation package:

Download the Tomcat installation package from the path listed in **Table 4-9** or from other open-source image paths.

wget http://mirrors.tuna.tsinghua.edu.cn/apache/tomcat/tomcatx/vx.x.xx/bin/apache-tomcat-x.x.xx.tar.gz

Find the required version from **the open-source image path**. The Tomcat installation package of version 8.5.xx is used as an example. Run the following commands to download the package:

wget https://mirrors.tuna.tsinghua.edu.cn/apache/tomcat/ tomcat-8/v8.5.xx/bin/apache-tomcat-8.5.xx.tar.gz --no-checkcertificate

Configuring Security Group Rules for the ECS

- 1. Click the ECS name to switch to the ECS details page and click **Security Groups**.
- 2. In the upper right corner of the security group rule list, click **Modify Security Group Rule**.
- 3. On the displayed page showing security group details, click Add Rule.
- 4. In the **Add Inbound Rule** dialog box, add a security group rule as prompted. To deploy the Java Web environment, you need to add two security group rules for the ECS.
 - a. Set **Protocol** to **ICMP**.

If ICMP traffic to an ECS is disabled by default, pinging the ECS EIP will time out. Add a rule to allow ICMP traffic to the ECS first.

Figure 4-10 Adding a rule to allow ICMP traffic

Add Inboun	Add Inbound Rule Learn more about security group configuration.						
1 Inbound ru	ules allow incoming	traffic to instances associated v	vith the security gro	up.			
Security Group d	efault ultiple rules in a bat	ch.					
Priority ⑦	Action	Protocol & Port ③	Туре	Source ⑦	Description	Operation	
1	Allow •	ICMP	IPv4 v	IP address ▼ 0.0.0.0/0		Operation 👻	
			🕀 Add Rule				
			ОК	Cancel			

b. Set an appropriate port. Port **8080** is used as an example here.

Figure 4-11 Adding port 8080

Add Inboun	d Rule Learn	more about security group	o configuration.			
1 Inbound ru	ules allow incoming	traffic to instances associated v	vith the security gro	up.		
Security Group d	efault ultiple rules in a bat	ch.				
Priority 🕐	Action	Protocol & Port ②	Туре	Source	Description	Operation
1	Allow •	TCP •	IPv4 v	IP address 0.0.0.0/0	•	Operation 🗸
			🕀 Add Rule			
			ОК	Cancel		

Installing JDK

- Run the following command to go to the jdk directory: cd /home/webDemo/jdk
- 2. Run the following command to decompress the JDK installation package to the **jdk** directory:

tar -xvf jdk-17_linux-x64_bin.tar.gz -C /home/webDemo/jdk/

3. Run the following command to configure environment variables:

vim /etc/profile

```
    Add the following content to the end of the file:
#set java environment
JAVA_HOME=/home/webDemo/jdk/jdk-17.0.x
JRE_HOME=$JAVA_HOME
PATH=$JAVA_HOME/bin:$PATH
CLASSPATH=::$JAVA_HOME/lib/dt.jar:$JRE_HOME/lib/tools.jar
export JAVA_HOME JRE_HOME PATH CLASSPATH
```

NOTE

In the preceding command, *jdk-17.0.x* indicates the version of the JDK installation package that is obtained from the command output in 2. Example value: jdk-17.0.9

5. Run the following command to save the settings and exit:

:wq

6. Run the following command to make the **/etc/profile** configurations take effect:

source /etc/profile

7. Run the following command to verify the installation.

java -version

If the following information is displayed, JDK is installed.

```
[root@ecs-c525-web ~]# java -version
java version "17.0.9" 2023-10-17 LTS
Java(TM) SE Runtime Environment (build 17.0.9+11-LTS-201)
Java HotSpot(TM) 64-Bit Server VM (build 17.0.9+11-LTS-201, mixed mode, sharing)
```

Installing Tomcat

1. Run the following command to go to the **tomcat** directory:

cd /home/webDemo/tomcat

2. Run the following command to decompress the Tomcat installation package to the **tomcat** directory:

tar -xvf apache-tomcat-x.x.xx.tar.gz -C /home/webDemo/tomcat/

For example, to decompress the Tomcat installation package of version 8.5.*xx*, run the following commands:

tar -xvf apache-tomcat-8.5.xx.tar.gz -C /home/webDemo/tomcat/

3. Run the following commands to install Tomcat:

cd /home/webDemo/tomcat/apache-tomcat-x.x.xx/

cd bin/

For example, to install the Tomcat installation package of version 8.5.*xx*, run the following commands:

cd /home/webDemo/tomcat/apache-tomcat-8.5.xx/

cd bin/

4. Run the following command to edit the **setclasspath.sh** script:

vi setclasspath.sh

Add the following content to the end of the **setclasspath.sh** script:

```
Use the java version in Resource and Cost Planning to replace the JDK version in the following script:
export JAVA_HOME=/home/webDemo/jdk/jdk-17.0.9
export JRE_HOME=$JAVA_HOME
```

5. Run the following command to save the settings and exit:

:wq

6. Run the following command to start Tomcat:

./startup.sh

7. Run the following command to check the Tomcat process:

ps -ef | grep tomcat

If the following information is displayed, Tomcat is started successfully.

Figure 4-12 Checking the Tomcat process

[root@ecs] 671 116 14:33 tty1 08:00:22 /nome/webDemo/jdk/jdk-17.0.9/bin/java -Djava.util.logging.config.file=/home/webD emo/iomezi/apache-tomcat-8.5.95/conf/logging.properties -Djava.util.logging.manager=org.apache.juli.ClassLoaderLogManager -Djdk. tls.ephemeralDHKeySize=2040 -Djava.protocol.handler.pkgs=org.apache.catalina.webresources -Dorg.apache.catalina.security.Securit ulistener./UMSSE0227-Dignore.endorsed.dirs= -classpath /home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bootstrap.jar/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/tomcat-juli.jar -Dcatalina.base=/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bootstrap.jar/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bin/jar/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bin/jar/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bin/jar/home/webDemo/tomcat/apache-tomcat-8.5.95/bin/bin/jar/home/webDemo/bin/jar/hom

Verifying Java Web Deployment

Enter the following URL in the address bar of the browser:

http://EIP bound to the ECS:8080

If the Tomcat page is displayed, Java Web has been set up. Port 8080 can be accessed over the public network.

Figure 4-13 Accessing port 8080

Home Documentat	tion Configuration	Examples Wiki	Mailing Lists			Find Help
pache Tomca	at/8.5.95				🖉 АРАСН	E SOFTWARE FOUNDAT http://www.apache.c
	If you're seeing this	, you've succes	sfully installe	d Tomcat	. Congratulations!	
	Recommended Re Security Considerati Manager Application Clustering/Session F	ons How-To How-To	2			Server Status Manager App Host Manager
Developer Quick S Tomcat Setup First Web Application	tart <u>Realms & AA</u> JDBC DataS		<u>Examples</u>		<u>Servlet Specificat</u> <u>Tomcat Versions</u>	ions
Managing Tomca For security, access to the restricted. Users are def \$cATALINA_HOME/conf/tomer in Tomcat 8.5 access to application is split betwee Read more Release Notes Changelog Migration Guide Security.Notices	ne <u>manager webapp</u> is ined in: xt=users.xml the manager	Documentation Tomcat 8.5 Docu Tomcat 8.5 Com Tomcat 8.5 Com Tomcat Wiki Find additional impu information in: SCATALINA_HOME/RUMPU Developers may be Tomcat 8.5 Bug Datait Tomcat 8.5 Git Repos	umentation figuration ortant configuration CRG, txt : interested in: base		Getting Help <u>FAQ</u> and <u>Mailing Lists</u> The following mailing lists <u>Inneat-announce</u> Important announcements, vulnerability notifications. I <u>Inneat-users</u> User support and discussion <u>Inneat-dev</u> Development mailing list, incl messages	are available: releases, security Low volume). for <u>Apache Taglibs</u>
Other Downloads Tomcal Connectors Tomcal Native Taglibs Deployer	Other Documentation Tomcal Connectors mod Jk Documentation Tomcat Native Deployer	n Get Involv <u>Overview</u> <u>Source Rep</u> <u>Mailing Lists</u> <u>Wiki</u>	ositories	Miscellane <u>Contact</u> Legal Sponsorship Thanks	Founda Who We	Are Home

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4.4 Manually Deploying Node.js (CentOS 7.2)

Overview

The best practices for Huawei Cloud ECS guide you through the manual deployment of Node.js on a Linux ECS.

Node.js is a JavaScript runtime environment based on the Google Chrome V8 engine for building fast and scalable network applications. Based on the eventdriven and non-blocking I/O model, Node.js is lightweight and efficient. It is ideal for running data-intensive real-time applications on distributed devices.

For more information about Node.js, see https://nodejs.org.

This section uses CentOS 7.2 64bit (40 GB) and Node.js installation packages **node-v10.14.1-linux-x64.tar** and **node-v10.14.2-linux-x64.tar** as an example to describe how to deploy Node.js.

Prerequisites

- An ECS has been created. For details, see Purchasing an ECS.
- The target ECS has an EIP bound. For instructions about how to bind an EIP to an ECS, see **Assigning an EIP**.

• A tool (for example, **PuTTY**) for accessing the Linux ECS has been installed on the local computer.

Procedure

Step 1 Install the Node.js software packages.

- Using the binary file
 - a. Log in to the ECS.
 - b. Run the following command to download the **Node.js installation package**:

wget https://nodejs.org/dist/v10.14.1/node-v10.14.1-linux-x64.tar.xz

c. Run the following command to decompress the file:

```
tar xvJf node-v10.14.1-linux-x64.tar.xz
```

d. Run the following commands in any directory to set up a soft connection for node and NPM, respectively:

ln -s /root/node-v10.14.1-linux-x64/bin/node /usr/local/bin/node

```
ln -s /root/node-v10.14.1-linux-x64/bin/npm /usr/local/bin/npm
```

e. Run the following commands to check the node and NPM versions: **node -v**

npm -v

- Using the NVM version manager
 - a. Log in to the ECS.
 - b. Run the following command to install git:

yum install git

c. Run the following command to copy the source code to the local **~/.nvm** directory using git and check the version:

```
git clone https://github.com/cnpm/nvm.git ~/.nvm && cd ~/.nvm && git checkout `git describe --abbrev=0 --tags`
```

d. Run the following command to activate NVM and add it to the **profile** file:

echo ". ~/.nvm/nvm.sh" >> /etc/profile

- e. Run the following command for the environment variables to take effect: **source /etc/profile**
- f. Run the following command to list available Node.js versions: **nvm ls-remote**
- g. Run the following command to install multiple Node.js versions:
 nvm install v10.14.1
 nvm install v10.14.2
- h. Run the following command to check the installed versions: **nvm ls**
- i. Run the following command to switch the Node.js version to V10.14.2: **nvm use v10.14.2**

D NOTE

- Run the nvm alias default v10.14.2 command to set the default version to 10.14.2.
- Run the **nvm help** command to obtain more information about NVM.
- Step 2 Verify the deployment.
 - 1. Run the following command to go to the home directory:

cd

- 2. Run the following command to create a **test.js** project file: **touch test.js**
- 3. Use VIM to edit the **test.js** file.
 - a. Run the following command to open the **test.js** file: **vim test.js**
 - b. Press **i** to enter insert mode.

```
Modify the file as follows:
const http = require('http');
const hostname = '0.0.0.0';
const port = 3000;
const server = http.createServer((req, res) => {
    res.statusCode = 200;
    res.setHeader('Content-Type', 'text/plain');
    res.end('Hello World\n');
});
server.listen(port, hostname, () => {
    console.log(`Server running at http://${hostname}:${port}/`);
});
```

- The port number can be customized.
- c. Press **Esc** to exit insert mode. Then, enter **:wq** to save the settings and exit.
- 4. Run the following command to view enabled port:

netstat -lntp

If the port is unavailable, log in to the ECS console and change the security group rule. For details, see **Adding a Security Group Rule**.

- 5. Add exception ports in the firewall configuration.
 - a. For example, to add port 3000, run the following command:

firewall-cmd --zone=public --add-port=3000/tcp --permanent

If the following information is displayed, the firewall is disabled. Then, go to step **Step 2.6**.

[root@ecs-centos7 ~]# firewall-cmd --zone=public --add-port=3000/tcp --permanent FirewallD is not running

If the following information is displayed, the firewall is enabled, and the exception port has been added:

[root@ecs-centos7 ~]# firewall-cmd --zone=public --add-port=3000/tcp --permanent success

- b. Reload the policy configuration for the new configuration to take effect. **firewall-cmd --reload**
- c. Run the following command to view all enabled ports:

firewall-cmd --list-ports

[root@ecs-centos7 ~]# firewall-cmd --list-ports 3000/tcp

6. Run the following command to run the project:

node ~/test.js

7. Enter **http://***EIP***.3000** in the address bar to access Node.js. If the following page is displayed, Node.js has been deployed.

Figure 4-14 Deployment and testing



----End

5 Setting Up a Website

5.1 Setting Up a WordPress Website

5.1.1 Setting Up a WordPress Website (Linux)

Application Scenarios

WordPress (WP for short) is initially a blog system and gradually evolved to a free CMS or website setup system. The best practices for ECS guide you through the setup of LNMP on a Linux ECS running the CentOS 7.2 64bit OS and deploy WordPress on the website.

Architecture

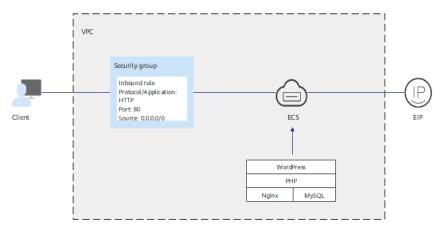


Figure 5-1 Setting up a WordPress website (Linux)

Advantages

- A website with a simple networking architecture can be quickly set up.
- The website is secure and easy to use.

Resources and Costs

Table 5-1	Resources	and cos	sts
-----------	-----------	---------	-----

Resource	Description	Cost
VPC	VPC CIDR block: 192.168.0.0/16	Free
VPC subnet	AZ: AZ1CIDR block: 192.168.0.0/24	Free
Security group	 Inbound rule: Priority: Set it to 1. Action: Select Allow. Type: Select IPv4. Protocol & Port: Set it to TCP: 80. Source: Set it to 0.0.0/0. 	Free
ECS	 Billing mode: Yearly/ Monthly AZ: AZ1 Flavor: s6.large.4 Image: CentOS 7.2 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes .
Nginx	A high-performance HTTP and reverse proxy server. Download URL: http://nginx.org/packages/ centos/7/noarch/RPMS/ nginx-release- centos-7-0.el7.ngx.noarch.rp m	Free
MySQL	An open-source relational database software Download URL: https://dev.mysql.com/get/ mysql80-community- release-el7-11.noarch.rpm	Free

Resource	Description	Cost
РНР	An open-source software used for web development Download URL: https:// mirrors.huaweicloud.com/ remi/enterprise/remi- release-7.rpm	Free
WordPress	An open-source blogging software. Download URL: https://wordpress.org/ download/releases/	Free
Domain name	Used to access the created website.	The price of a domain name is subject to that provided by the domain name registrar. For details, see the help document of the domain name registrar.

Process

The process of manually setting up a WordPress website on a Linux ECS is as follows:

- 1. Set up the LNMP environment.
- 2. Create a database.
- 3. Install WordPress.
- 4. Purchase a domain name.
- 5. Configure DNS records.

Procedure

Preparations

- A VPC and an EIP are available.
- A domain name is available if you plan to configure a domain name for the website.
- The rule listed in **Table 5-2** has been added to the security group which the target ECS belongs to. For details, see **Configuring Security Group Rules**.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

Table 5-2 Security group rules

Procedure

- **Step 1** Log in to the ECS.
- Step 2 Set up the LNMP environment. For details, see Manually Deploying LNMP (CentOS 7.2).
- **Step 3** Create a database.
 - 1. Run the following command and enter the **root** user password of MySQL as prompted to log in to the MySQL CLI:

mysql -u root -p

2. Run the following command to create a database:

CREATE DATABASE *wordpress*,

In the preceding command, *wordpress* is the database name, which can be customized.

3. Run the following command to create a user:

CREATE USER 'user'@'localhost' IDENTIFIED BY 'xxxx';

In the preceding command, *user* is the name of the database user, and *xxxxx* is the configurable user password.

4. Run the following command to grant all permissions on the WordPress database to the user:

GRANT ALL PRIVILEGES ON wordpress.* TO 'user'@'localhost';

- Run the following command to make all configurations take effect: FLUSH PRIVILEGES;
- Run the following command to exit the MySQL CLI: exit
- 7. (Optional) Run the following commands to verify the creation of the database and user and then exit the MySQL CLI:

mysql -u user -p

SHOW DATABASES;

exit

In the preceding command, *user* is the created username for logging in to the database.

Step 4 Install WordPress.

1. Run the following commands to go to the root directory of the Nginx website and download the WordPress package:

cd /usr/share/nginx/html

wget https://cn.wordpress.org/wordpress-6.6.1-zh_CN.tar.gz

2. Run the following command to decompress the WordPress software package: tar zxvf wordpress-6.6.1-zh_CN.tar.gz

After the decompression, the folder **wordpress** is obtained.

3. Run the following commands to go to the WordPress installation directory, copy the **wp-config-sample.php** file to the **wp-config.php** file, and retain the original sample configuration file as a backup:

cd /usr/share/nginx/html/wordpress

cp wp-config-sample.php wp-config.php

- 4. Run the following command to open and edit the created configuration file: **vim wp-config.php**
- 5. Press **i** to enter insert mode. Find MySQL configurations in the file and modify them to information in **Step 3**.

. / ** 🛛 🗖 ** // /** WordPress • • • • • define('DB_NAME', 'wordpress'); '** I I I I I */ define('DB_USER', 'user'); define('DB_PASSWORD', ' /** */ define('DB_HOST', 'localhost'); define('DB_CHARSET', 'utf8'); def ine('DB_COLLATE', '');

Figure 5-2 Modifying MySQL configurations

- 6. Press **Esc** to exit the editing mode. Then, enter **:wq** to save the settings and exit the file.
- 7. Enter **http://***Server IP address***/wordpress** in the address bar of the browser to access the installation wizard.
- 8. Set the site title, administrator username, password, and email address. Then, click **Install WordPress**.

 Table 5-3 Configuration parameters

Parameter	Description
Site title	Name of the WordPress website.
Username	Name of the WordPress administrator.

Parameter	Description
Password	Default or user-defined password.
	Do not reuse an existing password and keep your password secure.
Email address	Email address for receiving notifications.

- 9. Check that the installation is successful.
- 10. Click **Log In**. Alternatively, enter **http://***Server IP address*/**wordpress/wp-login.php** in the address bar of the browser, enter the username or email address and password, and click **Log In**.
- **Step 5** Purchase a domain name.

Configure a unique domain name for website access. You need to obtain an authorized domain name from the domain name registrar first.

Step 6 Configure DNS records.

Your website can be visited using the registered domain name only after DNS records are configured. For details, see **Routing Internet Traffic to a Website**.

For example, if the domain name is www.example.com, enter **http://www.***example.***com** in the address bar of the browser to access the website.

----End

5.2 Setting Up a Discuz Forum

5.2.1 Overview

Application Scenarios

This guide describes how you can build a website using HUAWEI CLOUD.

Small websites are often deployed on a single server, which handles requests from users, stores static and dynamic content, and processes data. As the number of website users increase, database access drastically increases, and a single server fails to meet the service requirements. In this case, two or more servers are required to run the website, and a load balancing service is also required to balance their loads.

To build a website (a forum is used as an example in this guide), the following requirements must be met:

- Database nodes and service nodes are deployed on different servers.
- The number of servers is dynamically adjusted as incoming traffic changes over time.
- Traffic is automatically distributed across multiple servers.
- The website must be licensed.

According to China's regulations, Internet Content Provider (ICP) licensing is required if the servers used to deploy the website are located in the Chinese mainland. A domain name that is not licensed cannot be used to access the website.

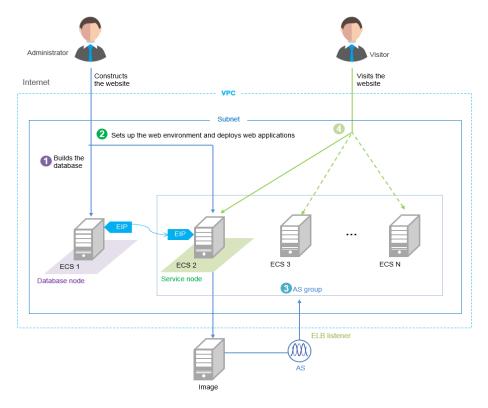
Solution

You can use the following solution to build a website.

Table	5-4	Solution	details
-------	-----	----------	---------

Requirement	Solution	Service
Database nodes and service nodes are deployed on different servers.	 Building the website Buy two Elastic Cloud Servers (ECSs) to replace the physical server. One ECS works as the database node, and the other as the service node. Create a Virtual Private Cloud (VPC) to provide network resources for the two ECSs. Buy an Elastic Volume Service (EVS) disk for each ECS and attach it to each ECS as the data disk if required. 	ECS VPC (Optional) EVS
The number of servers is dynamically adjusted as incoming traffic changes over time.	Configuring features : Configure Auto Scaling (AS) policies based on service requirements. AS dynamically adds and removes ECSs created from the image of the service node as required to ensure stable and efficient service running.	AS
Traffic is automatically distributed across multiple servers.	Configuring features : Configure Elastic Load Balance (ELB) to automatically distribute the traffic across multiple servers, achieving better fault tolerance and expanding service capabilities for applications.	ELB

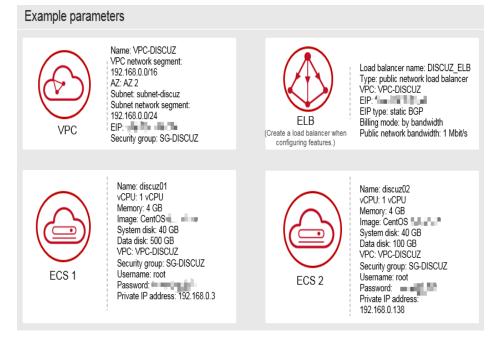
Logical Architecture



- 1. Bind an elastic IP address (EIP) to ECS 1 and build the database.
- 2. Unbind the EIP from ECS 1, bind it to ECS 2, set up the web environment, and deploy web applications.
- 3. As the traffic increases, AS adds ECSs created from the image of ECS 2 to the AS group.
- 4. Visitors access the website using the EIP of the load balancer, which automatically distributes traffic across multiple ECSs.

5.2.2 Requesting Cloud Resources

Required Cloud Resources



NOTE

Retain default settings for parameters not highlighted in the figures when creating or purchasing cloud resources and configuring features.

Applying for a VPC

1. On the displayed page, click **Apply for VPC**.

Figure 5-3 Applying for a VPC

	👋 HUAWEI 💿	Console Ser	vice List ▼ Favorites
	Hello Account Balan \$5113.25		View Quota
	Computing ~ Elastic Cloud Server Auto Scaling Image Management Service	Volume Backup	Network Virtual Private Cloud Service Elastic Load Balance Service WPN
3	A Virtual Private Cloud (VPC) is a + Apply for VPC	a secure, isolated, log	ical network environment.

2. Configure the parameters and click **Create Now**.

Figure 5-4 Configuring parameters

Apply for VPC @	
Basic Inform	ation
Regio	To change the region, use the region selector in the upper left corner of this page.
Name:	VPC-DISCUZ Enter the VPC name.
CIDR Block:	192.168.0 . / 16
Tag:	To comply with best practices, it is recommended that you use the predefined tag function provided by TMS to add tags to your resources. View Predefined Tag
	Enter a tag key. Enter a tag value You can add 9 more tags.
	rou can aud 9 more tags.
Subnet Settin	ngs
AZ: Subnet Name	Subnet-discuz
CIDR:	192.168.0.1 / 24
Gateway:	192.168.0 .1
DNS Server A	Address 1: 100.125.1 .250
DNS Server A	Address 2: 114.114.114.114
	6
	I have read and agreed to the Huawei Virtual Private Cloud Service Agreement

Buying an EIP

	Elastic IP Address 6	9				Buy EIP
Network Console	You can create 5 more	e EIPs.	All	• EIP •		Q Search by Tag ≠ C
Dashboard Virtual Private Cloud	EIP/ID Status	Bound Private Type	Bandwidth Sh	Bandwidth Siz	Billing Mode	Operation
Security Group						
Network ACL						
Elastic IP Bandwidth						
VPC Peering						
VPN						
Direct Connect						
Apply for EIP @						
Specify E	Details		Confirm Order			Pay
1			2			3
Basic Information	on					
Region:	To chan	ge the region, use the re	gion selector in t	he upper left corne	r of this page.	
Type:	Oynamic BG	P Static BGP	(?) Solo	ct the billing mod	0.	
Billing Mode:	Yearly/Month	ly On-demand	• Mo	nthly/Yearly -demand	с.	
Tag:		est practices, it is recom /iew Predefined Tag	mended that you	use the predefined	I tag function p	rovided by TMS to add tags to
	Enter a tag key.	Enter a tag	y value.			
	You can add 9 m	ore tags.				

Bandwidth Settings	5
Select Bandwidth:	Allocate new Use existing
Bandwidth Name:	discuz_ip
Sharing Type:	Exclusive Shared
	The sharing type cannot be changed after being specified.
Charged By:	Traffic
	After specified, this parameter value cannot be changed.
Bandwidth Size (Mbit/s):	1Mbit/s
(4)	1 100 200 300
Quantity	
Quantity:	- 1 + You can create 2 more EIPs.To apply for a higher EIP quota, click Apply for Higher Quota
EIP Price \$0.01/hou	ur (5)
Public Network Traffic Pric	
The estimated price is for i	reference only and may vary from the final price in your bill Price Details
	01/hour Public Network Traffic Price \$0.15/GB
	for reference only and may vary from the final price in your bill. Price Details
	6
	■ I have read and agreed to the Huawei VPC Service Announcement
	Back Submit Order

Creating a Security Group and Adding Rules

\bigcirc	Security Group @		(2) + Create	Security Group
Network Console	You can create 97 more security groups a	nd 4984 more security group	rules. N	QC
Virtual Private Cloud	Security Groups Name/ID	Description	Operation	
Security Group				
Network ACL		Create Sec	curity Group	×
Elastic IP Address		3		
Bandwidth		* Name:	SG-DISCUZ	
VPC Peering		Description:		
Direct Connect				
		4	OK Cancel	41

Ø	Security Group @			+ Create Security	Group
Network Console	You can create 97 more security groups a	nd 4984 more security group r	ules. N	•	QC
Dashboard					
Virtual Private Cloud	Security Groups Name/ID	Description	Operation		
Security Group	SG-DISCUZ 233e23a0-07a3-4539-9b4d-92850		Fast Add Rule	Add Rule More -	
Network ACL			×		
Elastic IP Address	Add Rule				
Bandwidth		nbound Outbound	<u>ן</u>		
VPC Peering					
VPN	* Protocol: U	· ·		fter an access rule is add ecurity group, ECSs in the	
Direct Connect	* Port Range: 80		g	roup are protected by the	rule.
Select TCP for Range to 80.	Protocol and set Port	P Address Security G	roup		
	SG-	DISCUZ(233e			
	8 ок	Cancel			

NOTE

Default security group rules cannot be deleted. Otherwise, two servers cannot communicate with each other.

Purchasing ECSs

1. Under **Computing**, click **Elastic Cloud Server**. On the page that is displayed, click **Buy ECS**.

₩ HUAWEI 📀	Console Se	rvice List ▼ Favorites
Hello Account Bala \$5113.2		View Quota
Computing ~	Storage ~	Network ~
2 Elastic Cloud Server	Elastic Volume	Service 🕑 Virtual Private Cloud
Auto Scaling	Volume Backup	Service 📣 Elastic Load Balance
Mage Management Service	e 💮 Object Storage	Service VPN
An Elastic Cloud Server (ECS isolated environment.) is a virtual server t	hat runs in a secure and

2. Configure the parameters and submit your request.

CentOS CentoS	Image:	Public Image Private Image	Shared Image	Select ar	n image for the ECS.
System Disk Common I/O		CentOS - CentOS	bit(40GB) 👻 C	;	
System Disk Data Disk Data Disk Common I/O •	Disk:			ch an EVS disk for t	the ECS as a data disk.
Select the greated VBC and ecquitive group		Common I/O - Ø	Common I/O	• 0	Data Disk You can attach 22 more disks
VPC (0): VPC-DISCUZ View VPC (C)		VPC-DISCUZ -	-	ed VPC and securit	y group.

Figure 5-5 Basic configuration

Figure 5-6 Network configuration

System Disk Data Disk Data Disk Common I/O • • - 40 + GB 100-1,000 IOPS - 500 + GB 100-1,000 IOPS + Select the created VPC and security group.		CentOS - CentOS 6.3 64bi	it(40GB) - C			
System Disk Common I/O - • • - 40 + GB 100-1,000 IOPS Select the created VPC and security group.	Disk:	Attach an EVS disk for the ECS as a data disk.				
		System Disk Common I/O - Ø	Common I/O - @	Data Disk You can attach 22 more disks. —		
VPC @: VPC-DISCUZ + View VPC G) VPC 😧 :	VPC-DISCUZ -	Select the created VPC and se	curity group.		

	EIP :	If you need to access the Internet from your ECSs, make a plan for the elastic IP addresses you need. Click here to view Elastic IP Addresses. Specify EIP Do Not Use Select the EIP you have obtained.				
		ECSs cannot be created in batches if an elastic IP address is specified.				
		Current EIP Specifications: Static BGP Bandwidth: 1Mbil/s Charging Mode: By bandwidth				
	Login Mode:	Password Key pair To reset the ECS password, you must install a plug-in on the ECS after it is created Learn more about how to install the plug-in.				
(11	Username: Password:	root Security Level: Low Keep your password secure. The system cannot detect your password.				
	Confirm Password:					
	ECS Name:	discuz01				
(12)		If you buy ECSs in batches, the system automatically adds a suffix to the ECS names, for example, my_ECS-0001.				
	Purchase Quantity:	- 1 + You can only create one ECS at a time if an EIP or a static NIC IP address is specified.				

Figure 5-7 Advanced settings

Figure 5-8 Confirming the configurations

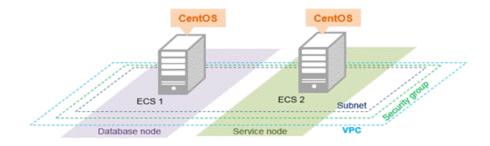
Price \$0.03/Hour	13 Buy Now
The estimated price is for reference only and may vary from the final price in your bill Price	ce Details
I have read and agreed to the Huawei	Elastic Cloud Server Agreement and Huawei Image Management Service Agreement Previous 15

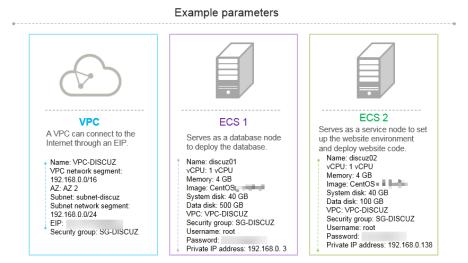
NOTE

You need to buy two ECSs. For details about their configuration, see "Example parameters".

5.2.3 Building the Website

Requested Cloud Resources





Building Process



Obtaining the Software

1. WinSCP

WinSCP is a free and open-source SFTP, FTP, WebDAV and SCP client for Microsoft Windows. It is mainly used to transfer files between a local and a remote computer in a secure manner. **Download the required version of WinSCP**.

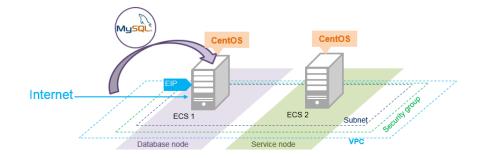
2. Discuz X3.5 (UTF-8)

Discuz X3.5 (UTF-8) is used to deploy website applications. Download the software package of the required version from the official website.

NOTE

- The recommended English version of Discuz X3.5 (UTF-8) is not free of charge. Refer to the provided page for payment details.
- The software packages are only used to construct the forum. To deploy a commercial website, download the applications as needed.

Building the Database



Install MySQL.

CentOS 7.2 is used as an example to describe how to install MySQL.

- 1. Log in to ECS **discuz01** remotely and enter the username and password.
- 2. Install MySQL.

wget -i -c http://dev.mysql.com/get/mysql57-community-releaseel7-10.noarch.rpm

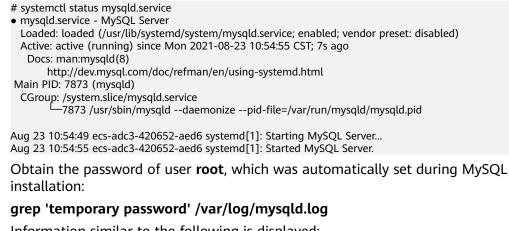
yum -y install mysql57-community-release-el7-10.noarch.rpm yum -y install mysql-community-server --nogpgcheck

Configure MySQL.

- 1. Start and enable MySQL.
 - systemctl start mysqld
 - systemctl enable mysqld
- 2. Query the running status of MySQL.

systemctl status mysqld.service

Information similar to the following is displayed:



Information similar to the following is displayed: 2021-08-16T11:33:37.790533Z 1 [Note] A temporary password is generated for root@localhost: ;8nPd29lhs,k

4. Harden MySQL.

3.

mysql_secure_installation

Securing the MySQL server deployment.

Enter password for user root: #Enter the obtained password of user **root**. The existing password for the user account root has expired. Please set a new password.

New password: #Enter the new password.

Re-enter new password: #Enter the new password again. The 'validate_password' plugin is installed on the server. The subsequent steps will run with the existing configuration of the plugin. Using existing password for root.

Estimated strength of the password: 100 Change the password for root ? ((Press y|Y for Yes, any other key for No) : N #Asks you whether to change the password of user **root**. Press **N**.

... skipping.

By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Asks you whether to remove anonymous users. Press Y. Success.

Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Asks you whether to forbid remote login of user **root**. Press **Y**. Success.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Asks you whether to delete the test database and cancel access permissions to it. Press Y. - Dropping test database... Success.

- Removing privileges on test database... Success.

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Asks you whether to reload privilege tables. Press Y. Success

All done!

5. Enter the password of user **root** to log in to the database.

mysql -u root -p

6. Set the MySQL database as the default database.

use mysql;

7. Query the user list.

select host, user from user;

NOTE

This command and the following database commands must end with a semicolon (;).

- 8. Refresh the user list and allow all IP addresses to access the database. update user set host='%' where user='root' LIMIT 1;
- 9. Forcibly update the permissions to allow ECSs in the same subnet to access the MySQL database using private IP addresses.

flush privileges;

- 10. Exit the database. quit
- 11. Restart MySQL.

systemctl restart mysqld

12. Enable MySQL to automatically start upon system boot.

systemctl enable mysqld

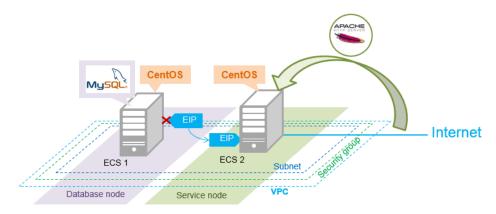
13. Disable the firewall.

systemctl stop firewalld.service

14. Check the firewall status.

systemctl status firewalld

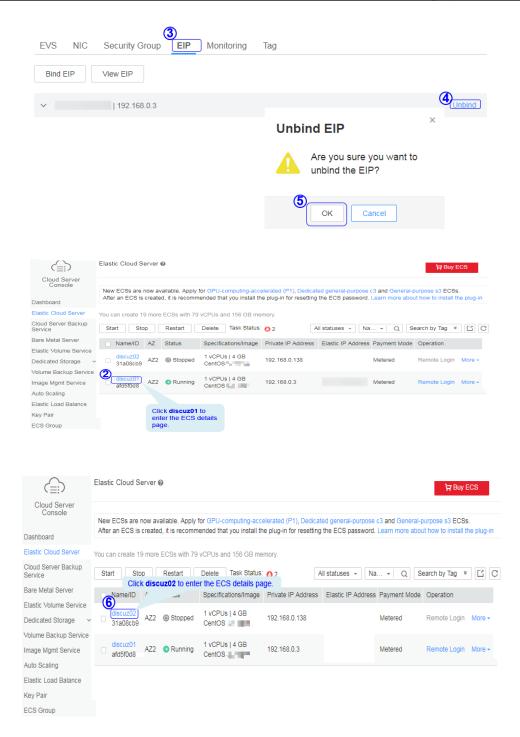
Setting Up the Web Environment



Install the web environment.

1. Unbind the EIP from ECS **discuz01** and bind it to ECS **discuz02**.

Start Stop	Restart	Delete	All statuses 👻	Name 👻	Q Search by Tag *
Task Status: 🚺 🤉					
Name/ID AZ	Status	Specifications/Image	Private IP Address	Elastic IP Address	Payment Mode Operation
discuz01 afd5f0d8 AZ2	Running	1 vCPUs 4 GB CentOS	192.168.0.3	-	Metered Remote Login More -
		Enter the username root, press Enter, and enter the password. CentOS release Kernel 2.6.32-27			√ inal) .x86_64 on an x86_64
			discuz01 login: _		



- 2. Log in to ECS discuz02 remotely and enter the username and password.
- 3. Install MySQL.

wget -i -c http://dev.mysql.com/get/mysql57-community-releaseel7-10.noarch.rpm

yum -y install mysql57-community-release-el7-10.noarch.rpm yum -y install mysql-community-server --nogpgcheck

4. Install the Apache HTTP Server (httpd), PHP FastCGI Process Manager (phpfpm), MySQL client (mysql), and MySQL server (mysql-server).

yum install -y httpd php php-fpm mysql mysql-server php-mysql

If the following information is displayed, the installation is successful. Complete!

5. Reinstall the Apache HTTP Server (httpd), PHP FastCGI Process Manager (php-fpm), MySQL client (mysql), and MySQL server (mysql-server).

```
yum reinstall -y httpd php php-fpm mysql mysql-server php-mysql
```

If the following information is displayed, the installation is successful. Complete!

Configure the web environment.

- 1. Start httpd. service httpd start
- 2. Enable httpd to automatically start upon system boot. chkconfig httpd on
- 3. Start php-fpm.

service php-fpm start

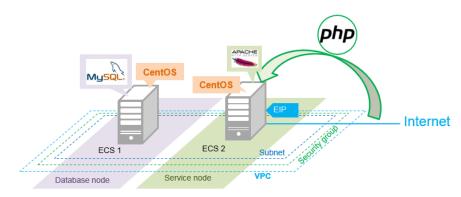
- Enable php-fpm to automatically start upon system boot.
 chkconfig php-fpm on
- Disable the firewall.
 systemctl stop firewalld.service
- Check the firewall status again.
 systemctl status firewalld
- 7. Start MySQL.

systemctl start mysqld

- 8. Enable MySQL to automatically start upon system boot. systemctl enable mysqld.service
- 9. Enter **http://***EIP* in a browser to query the default page of the ECS.



Deploying the Website Code



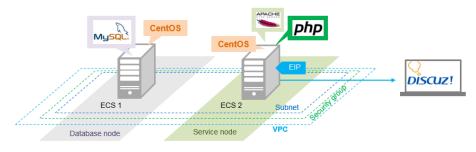
- 1. Decompress the Discuz_X3.5_SC_UTF8_20231001.zip package to the Discuz_X3.5_SC_UTF8_20231001 folder.
- Use WinSCP to upload the upload file in the Discuz_X3.5_SC_UTF8_20231001 folder to the /var/www/html directory on ECS discuz02. For details, see WinSCP documents.
- 3. Log in to **discuz02** and run the following command to grant the write permission to other users:

chmod -R 777 /var/www/html

- 4. Enter **http://***Elastic IP address* in the address bar of a browser. Follow the installation wizard to install Discuz.
 - The database address if the private IP address of **discuz01**.
 - The database password is the password of the database administrator's root account configured on **discuz01**.

Verifying the Website

In the browser address bar, enter **http://***Elastic IP address*/**forum.php**. If the forum homepage is displayed, the website is successfully built.



5.2.4 Configuring Features

Unbinding the EIP

By default, you can use only one EIP. You can apply for more as needed. If you create a load balancer on a public network, the system will automatically bind an EIP to the load balancer. To ensure that an EIP can be bound to the load balancer, unbind the EIP bound to the ECS before you create the load balancer if you have only one EIP.

\bigcirc	Elastic IP Addre	SS 🛛					Apply for EIP	þ
Network Console Dashboard	You can create 18 r	nore EIPs.			All + EIP	Ŧ	Q	C
Virtual Private Cloud Security Group	EIP/ID	Status	Bound Private IP Address	Туре	Bandwidth Size (Mbi	t/s) Billing Mode	Operation	
Network ACL Elastic IP Address	9488617f-6a28-4	Bound	192.168.0.138	Static BGP		1 On-demand	Bind Unbind Re	elease
Bandwidth VPC Peering								
VPN Direct Connect								

Creating a Load Balancer

1. On the displayed page, click **Create Load Balancer**.

👋 HUAWEI 💿	Console Se	ervice List 🔻 Favorites
Hello Account Balar ¥5113.25		View Quota My Packages
Computing ~	Storage 🗸	Network 🗸
Elastic Cloud Server	Elastic Volume	Service 🕜 Virtual Private Cloud
🙆 Cloud Server Backup Servi	ce 📴 Volume Backup	Servi Elastic Load Balance
Cloud Container Engine	💮 Object Storage	Service 🥜 Direct Connect
Load Balancer 🛛	5	+ Create Load Balancer

2. Specify the parameters and submit the application.

Create Load Balancer ⊚	
Specify Details	Confirm Specifications Finish
Basic Information Region: Asia Pacific-HongKong Name: DISCUZ_ELB	To change the region, use the region selector in the upper left corner of this page.
VPC: VPC-DISCUZ If no desired VPC is available	Select the VPC to which the load balancer belongs.
8	View Subnet C ual sting EIP View EIP C Use an existing EIP.
The estimated price is for reference only and may vary f	rom the final price in your bill. Price Details: I have read and agreed to the Huawel Elastic Load Balance Agreement Back Submit

Configuring the Load Balancer

		Load Balancer 🖲	9					+ Create Load E	Balancer
	Cloud Server Console	Load Balancer			balancer nam	e DISCUZ_E	LB to view t	he	
	Dashboard Elastic Cloud Server	You can create 9 mo		tails.			N •		QC
	Elastic Volume Service	Name/ID	Statue Public	: IP Address	Service IP Ad	dress ervice	Subnet	Operation	
	Volume Backup Service	DISCUZ_ELB 826fa0df8a92	Running				subnet-discu:	z Delete	
1	Auto Scaling 3	Add Listener Yo	u can add 10 more li:	steners.					
2		Name/ID	Status	LB Protoco	ol/Port	ECS Protoco	l/Port		

Add Listener		(TCP) and la	ayer 7 (HTTP) load balanc		balancing services (layer 4 ICP for Protocol, and set the
Name:	discuz-listener		ol/Port: specifies the prot		that ECSs use to provide
LB Protocol/Port:	TCP - 80 The value ranges from 1 to 65		P is selected for Protoco	I, and port 80	is used.
ECS Protocol/Port:	TCP - 80				
	The value ranges from 1 to 65	535.	Health Check Configurat	tion	
LB Mode 🔞 :	Round robin 👻		Check Mode:	TCP 👻	80
Sticky Session:	\bigcirc	G	y	The value ra	nges from 1 to 65535.
Stickiness Duration (min):	1 The value range	s from 1 to 60.	Interval (s) 🔞 :	2	The value ranges from 1 to 5.
Description:			Timeout (s) 👩 :	5	The value ranges from 1 to 50.
		0/128	Healthy Threshold @:	3	The value ranges from 1 to 10.
 Interval (s): specifies the interval or value is 2. Timeout (s): specifies the maximum recommended value is 5. Healthy Threshold: specifies the r 	n timeout duration for one health	check. The	Linhealthy Threshold @:	3	The value ranges from 1 to 10.
 Heating Intesticit, specifies the f checks necessary for an ECS to be is 3. Unhealthy Threshold: specifies th necessary for an ECS to be consid Success response time: 15 second Failure Response Time: 11 second 	e considered healthy. The recomme e number of consecutive failed he red unhealthy. The recommende (2 × 3 = 6)	ealth checks	6	ок с	ancel

Creating Images

1. Under **Computing**, click **Elastic Cloud Server**. On the page that is displayed, locate and stop the ECS.

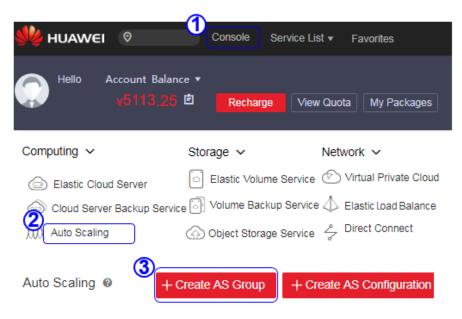
👋 HUAWEI 🛛 🔍	Console Se	ervice List 🔻 Favorites
Hello Account Bal		View Quota My Packages
Computing ~	Storage 🗸	Network 🗸
Elastic Cloud Server	Elastic Volume	Service 🕑 Virtual Private Cloud
Cloud Server Backup Se	ervice 🔄 Volume Backup	Service 📣 Elastic Load Balance
Cloud Container Engine	Object Storage	Service 🥜 Direct Connect
	Stop the ECS bef	ore creating an image.
Start Stop Rest	art Delete Task	: Status: 🙆 2
Name/ID AZ S	tatus Payment M	ode Operation
3 discuz02 AZ2 € 31a08cb9	Running Metered	Remote Login More -
afd5f0d8 AZ2	Stopped Metered	Remote Login More -

2. Configure the parameters and submit your request.

Name	/ID AZ	Status	Specifications/Image	Private IP Address	Payment Mode	Operation	
Siscut 31a0	AL	1 Stopped	1 vCPUs 4 GB CentOS	192.168.0.138	Metered	Remote Login More -	Modify Specifications
afd5f	A71	Stopped	1 vCPUs 4 GB CentOS	192.168.0.3	Metered	Remote Login More -	Make Image 6 Reset Password
							Reinstall OS
* Source:	ECS	Image F	ile				Change OS
							Start
* ECS:	discuz	02		Select			Stop
							Restart
	Name OS: C	Details: e: discuz02 DentOS					Delete
Encryption:	Unencry	pted 🔞	(10 I have read and age	reed to the Huawei Ela	astic Cloud Server Agreement	and System Image Disclain
* Name:	discuz_	centOS				Previous	Submit Application
			(Apply Now		(1)	

Configuring AS

1. Under **Computing**, click **Auto Scaling**. Create an AS group and AS configuration.



AS Group Name:	as-group-discuz	Specify Min. Instances, Expected Instances, and Max. Instances
(5) Min. Instances	0	J for the AS group. An AS group can have 0 to 50 ECSs. Expected Instances can be set to 2.
* Expected Instances	2	Select the VPC, subnet, and security group. Choose whether to
* Max. Instances	10	use ELB for health check and then select the load balancer if ELB is used for health check. Specify Health Check Method, Health Check Interval, and Instance Removal Policy.
Cooling Duration (s):	900	 ELB checks the health of ECSs in the selected security group every five minutes. The health check configuration has been set when the listener is
* AZ:	AZ2 × •	added for the selected load balancer. C © • Instances created and configured earlier are removed first.
OVPC:	VPC-DISCUZ(192.168.0.0/16) -	View VPC
* Subnet:	subnet-discuz(192.168.0.0/ × •	CO
* Security Group:	SG-DISCUZ (Inbound: - Outboun • Inbound: - Outbound: -	C Manage Security Group Learn more about how to configure a security group
* Load Balancing:	O Do not use O Use ULB View ULB (C 10
	Load Balancer: DISCUZ_E +	Listener: discuz-liste 👻
* Health Check Method:	ELB health check	- Ø
* Health Check Interval:	5 minutes	Y
* Instance Removal Policy:	Oldest instance created based on th	•
* Release EIP on Instance Removal:	C @ 8	
O Use Existing AS C		
You can select an exis Basic Informa		s c ^o nfiguration. You can also change the AS configuration of an existing AS group.
* Configuration Name:	as-config-discuz	
* Configuration Template:	Create a new specifications tem	plate Use specifications of an existing ECS
Specifications		
* ECS Type:	General-purpose Memory	optimized Disk-intensive GPU-acceleration
	First generation Second g	eneration Third generation
*vCPU:	1vCPUs 2vCPUs 4	CPUs 8vCPUs 16vCPUs 32vCPUs
* Memory:	1GB 2GB 4GB	
	Selected Specifications: s1.medium 1	I vCPUs 4 GB
Image Public Image		ect the private image I have created.
*Image:	discuz_centOS (40G) - C	

Elastic IP Address:	Do Not Use	Automatically Ass	sign 🕜		
	Automatically assigns insufficient, apply for a		hat exclusively uses bandwid	th. If you select this option,	check the EIP quota. If the quota is
Specifications:	Dynamic BGP	Static BGP	BGP(Discontinued)		
Charging Mode:	By bandwidth	By traffic			
1	Mbit/s				
Bandwidth:	· · · · ·				1 Mbit/s
	1		50	100	
.ogin	(12)				
Login Mode:	Key Pair	Account Password			
Username:	root				
Account Password:		Security Level	Keep your p	assword secure. The system	n cannot retrieve your password. 🥥
Confirm Password:			14_		
	13			I have read and agreed i	to the Huawei Autoscaling Service Agre
	Next A	pply Now	_		

2. Configure AS policies.

Name	Status	AS Configuration	Current Insta	Expected Instan	Min. Instances	Max. Instances Operation	
as-group-discuz	Enabled	as-config-discuz	0	1	1	10 View AS Po	Disable More -
Monitoring Ins	2 tance AS Pol	icy Notification	Tag Lifecycle Ho	юk			
Add AS Policy	You can add 1	0 more policies.					

	Add Policy	×
	* Policy Name:	as-policy-discuz-cpu
	* Policy Type:	Alarm Scheduled Periodic CPU alarm policy: When the CPU usage exceeds 70% for three
	* Alarm:	Create Alarm Rule
	* Alarm Name:	as-alarm-cpu
6	* Trigger Condition:	CPU Us ▼ Max. ▼ > ▼ 70 %
	* Monitoring Interval:	5 minutes 👻
	* Consecutive Occurrences:	3
	Scaling Action:	Add 👻 1 instan 👻
	Cooling Duration (s):	900
		OK Cancel

Add Policy

Policy Type	Alarm	Sch	eduled		Perio	dic	
k Alarm	Create Alarm	Rule	٠				
Alarm Name	as-alarm-cpu-	02					
Trigger Condition	ODUUT	-					10
 Trigger Condition 	CPU Usage To check wheth Outcoming Rate different OSs, se	e, or Inba	and Inco	oming	Rate ar	e sup	portec
Monitoring Interval	To check wheth Outcoming Rate	e, or Inba	toring n and Inco	oming	Memo Rate ar	e sup	age, In portec
	To check wheth Outcoming Rate different OSs, se	e, or Inba	toring n and Inco astic C	oming	Memo Rate ar	e sup	age, In portec
Monitoring Interval	To check wheth Outcoming Rate different OSs, so 5 minutes	e, or Inba	toring n and Inco astic C	oming I loud Se	Memo Rate ar	e sup	age, In porte

3. Add AS instances.

				Start ECS				
				Are you s	sure you want to start	the fol	llowing ECSs?	
	Cloud Server Console			Name	Status	Expire	At	
				discuz02	Stopped			
0	Dashboard				•			
			adding them to the	(OK Cance	ł	Dashboard	
3	AS group.						Elastic Cloud Server	
	Start Stop Restart	Delete	Task Status: ዕ 2				Cloud Server Backup Service	э
	Name/ID	AZ	Status				Bare Metal Server	
0	discuz02						Elastic Volume Service	
	31a08cb9-f2fc-4727-8a5	AZ2	Stopped				Dedicated Storage	~
	discuz01	170					Volume Backup Service	
	afd5f0d8-d933-4395-a27	AZ2	Stopped			a	Image Mgmt Service	
						(5	Auto Scaling	

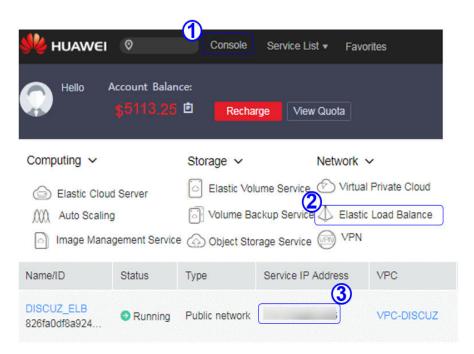
Name	Status	AS Configuration	Current Insta	Expected Instan	Min. Instances	Max. Instances	Operation	
as-group-discuz	Enabled	as-config-discuz	0	1	1	6	View AS Policy Disable	More •
Monitoring Ins 8 Add Remo	AS P AS P Remo		Tag Lifecy More∙ Ø	cle Hook				
Add						×		
Max. Instanc	es in a Batch: 10							
Available Inst	tances: En	ter a name.	Q C Selec	ted Instances:				
9 Nan	ne	ID	Nar	ne	ID	Opera		
disc	uz02	31a08cb9-f2fc-472	7-8a5 disc	uz02	31a08cb9-f2fc-472	Delete		
		10						
		Ĭ	OK Can	cel				

4. Modify AS policies.

*)	ccount Bala x5113.2		Recharge	e View Quot	a My Packag	es				
mputing 🗸		Storage	e 🗸	Netv	vork 🗸					
Elastic Cloud	Server	-		ne Service 🖄	Virtual Private C	loud				
		vice 🔄 Vol	ume Back	up Service 📣	Elastic Load Bala	nce				
) Auto Scaling		💮 Obj	ect Storag	ge Service 💪	Direct Connect					
e Sta	atus	AS Config	uration	Current Instance	es Expected I	Instances	Min. Instances	Max. In	stances	Operation
oup-discuz 🥑	Enabled	as-config-	discuz		0	2	1		10	View AS Policy Disable M
										iew Details elete
Modify ★ AS Group		oup	as	-group-discuz						
-	Name:	oup	as 1	-group-discuz]	Set Min Ins	tances to	D	elete
* AS Group	Name:	oup		-group-discuz			Set Min. Ins not be remov		Di 1 to ens	elete
* AS Group) Name: inces: Instances:	oup	1						Di 1 to ens	elete
* AS Group Min. Insta * Expected * Max. Insta) Name: inces: Instances:	bup	1						Di 1 to ens	elete
* AS Group * Min. Insta * Expected * Max. Insta Cooling D	Name: Inces: Instances: ances:		1 2 10 90						Di 1 to ens	elete
* AS Group (5) * Min. Insta * Expected * Max. Insta Cooling D * Health Ch	Name: Inces: Instances: ances: Juration (s):	:	1 2 10 90 EL	0					Di 1 to ens	elete
* AS Group (5) * Min. Insta * Expected * Max. Insta Cooling D * Health Ch) Name: Instances: ances: Juration (s): neck Method		1 2 10 90 EL 5 r	0 B health check	*				Di 1 to ens	elete
* AS Group * Min. Insta * Expected * Max. Insta Cooling D * Health Ch * Health Ch) Name: Inces: Instances: Juration (s): Juration (s): neck Method neck Interval Removal Pol		1 2 10 90 EL 5 1	0 B health check minutes	*				Di 1 to ens	elete
* AS Group * Min. Insta * Expected * Max. Insta Cooling D * Health Ch * Health Ch * Instance F	o Name: Inces: Instances: ances: Juration (s): neck Method neck Interval Removal Pol Mode:	: : licy:	1 2 10 90 EL 51 01 01 85	0 B health check minutes dest instance cre	*				Di 1 to ens	elete

Verifying the Configuration

1. Obtain the EIP of the load balancer.



2. In the browser address box, enter **http://***EIP of the load balancer*/**forum.php** to access the website, for example, **http://114.115.138.223/forum.php**.

5.2.5 Visiting the Website

Filing the Website

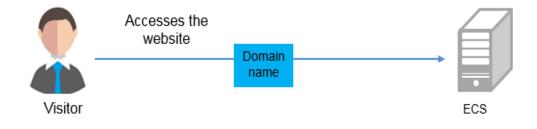
According to national regulations, if the servers used to deploy the website are located in the Chinese mainland, Internet Content Provider (ICP) licensing is required. The domain name that is not licensed cannot be used to access the website.

The prerequisites for ICP licensing are as follows:

- The domain name has been registered.
- Ensure that the IP address is possessed by Huawei.
- The website is a non-operating one.

Accessing the Website

Visitors can access the Internet using the domain name.



5.3 Setting Up a Magento E-Commerce Website

5.3.1 Manually Setting Up a Magento E-Commerce Website (Linux)

Overview

The section guides you through the manual setup of a Magento e-commerce website on a Linux ECS. Magento is an open source e-commerce system that features flexible design, modular architecture, and rich functions. It is suitable for building medium- and large-sized sites. Magento is written in PHP and employs the MySQL database management system for data storage.

Prerequisites

- You have purchased an ECS and bound an EIP to it.
- The rules listed in the following table have been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 22	IP address of the client that is allowed to remotely connect to Linux ECSs using SSH. If the source IP is set to 0.0.0.0/0 , access from all IP addresses is allowed. For security purposes, 0.0.0.0/0 is not recommended.
Inboun d	1	Allow	IPv4	TCP: 80	IP address of the client that is allowed to access Magento. If the source IP is set to 0.0.0/0 , access from all IP addresses is allowed.

Table 5-5 Security group rules

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP : 3306	IP address of the client that is allowed to remotely access MySQL databases. If the source IP is set to 0.0.0/0 , access from all IP addresses is allowed. For security purposes, 0.0.0.0/0 is not recommended.

Resource Planning

Table 5-6 lists the resource configuration and software versions used in this practice. The commands and parameters may vary according to the hardware specifications or software versions you would use.

Table	5-6	Resource	plannin	g

Resource	Туре	Specification/Version
ECS configuration	Flavor	c6s.large.2
	vCPUs	2 vCPUs
	Memory	4 GiB
	OS	CentOS 7.2
Software resources	Apache	2.4.6
	MySQL	5.7
		Download URL:
		http:// dev.mysql.com/get/ mysql57-community- release- el7-8.noarch.rpm
	РНР	7.0.33
		Download URL:
		https:// mirror.webtatic.com/yu m/el7/webtatic- release.rpm

Resource	Туре	Specification/Version
	Composer	1.10.19 Download URL: https:// getcomposer.org/ installer
	Magento	2.1.0 Download URL: https://github.com/ magento/magento2.git

NOTE

To make sure that the website works properly, use an ECS whose memory is 2 GiB or higher.

Step 1: Install and Configure Apache

- **Step 1** Remotely log in to the ECS by referring to Logging In to a Linux ECS.
- **Step 2** Run the following commands as user **root** to update the software package and install Apache:

yum -y update yum -y install httpd

NOTE

If an error message is displayed, indicating that the domain name cannot be resolved, add a DNS server to the **/etc/resolv.conf** file.

Step 3 Open the Apache configuration file.

vim /etc/httpd/conf/httpd.conf

NOTE

If vim is not installed, run the **yum install -y vim*** command to install it.

Step 4 Press i to enter insert mode and modify the file as follows:

• Change AllowOverride None to AllowOverride all.

Options Indexes FollowSymLinks	
<pre># # AllowOverride controls what directives may be placed in .htaccess file # It can be "All", "None", or any combination of the keywords: # Options FileInfo AuthConfig Limit # AllowOverride None</pre>	<i>w</i> .

• Add the following parameters to the end of the configuration file: LoadModule rewrite_module modules/mod_rewrite.so

Load config files in the "/etc/httpd/conf.d" directory, if any. IncludeOptional conf.d/*.conf

LoadModule rewrite_module modules/mod_rewrite.so

- Step 5 Press Esc to exit insert mode. Then, enter :wq to save the settings and exit.
- **Step 6** Run the following commands in sequence to start Apache and enable it to start automatically upon ECS startup: systemctl start httpd systemctl enable httpd

----End

Step 2: Install and Configure MySQL

- **Step 1** Run the following command as the **root** user to add a yum repository: rpm -Uvh http://dev.mysql.com/get/mysql57-community-release-el7-8.noarch.rpm
- **Step 2** Run the following command to Install MySQL: yum -y install mysql-community-server --nogpgcheck
- Step 3 Run the following commands in sequence to start MySQL and enable it to start automatically upon ECS startup: systemctl start mysqld systemctl enable mysqld
- **Step 4** Run the following command to obtain the **root** user's password that is automatically set during MySQL installation: grep 'temporary password' /var/log/mysqld.log

Information similar to the following is displayed, in which **(n?K7jP#cirM** is the temporary password. 2019-05-09T11:29:42.365419Z 1 [Note] A temporary password is generated for root@localhost: **(n? K7jP#cirM**

Step 5 Run the following command to harden MySQL:

mysql_secure_installation

Perform operations as prompted.

Securing the MySQL server deployment.

Enter password for user root: #Enter the obtained password of user **root**. The existing password for the user account root has expired. Please set a new password.

New password: #Set a new password for user root.

Re-enter new password: #Enter the new password again. The 'validate_password' plugin is installed on the server. The subsequent steps will run with the existing configuration of the plugin. Using existing password for root.

Estimated strength of the password: 100 Change the password for root ? ((Press y|Y for Yes, any other key for No) : Y #Press Y to change the password of user **root**.

New password: #Enter a new password that consists of 8 to 30 characters, including letters, digits, and special characters (`~!@#\$%^&*-+=|(){[:;'<>,.?/). Re-enter new password: #Enter the new password again. Estimated strength of the password: 100 Do you wish to continue with the password provided?(Press y|Y for Yes, any other key for No) : Y **#Press Y.** By default, a MySQL installation has an anonymous user, allowing anyone to log into MySQL without having to have a user account created for them. This is intended only for testing, and to make the installation go a bit smoother. You should remove them before moving into a production environment.

Remove anonymous users? (Press y|Y for Yes, any other key for No) : Y #Press Y to remove anonymous users. Success. Normally, root should only be allowed to connect from 'localhost'. This ensures that someone cannot guess at the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for No) : Y #Press Y to disallow remote logins of user **root**. Success.

By default, MySQL comes with a database named 'test' that anyone can access. This is also intended only for testing, and should be removed before moving into a production environment.

Remove test database and access to it? (Press y|Y for Yes, any other key for No) : Y #Press Y to delete the **test** database and remove access to it. - Dropping test database...

Success.

- Removing privileges on test database... Success.

Reloading the privilege tables will ensure that all changes made so far will take effect immediately.

Reload privilege tables now? (Press y|Y for Yes, any other key for No) : Y #Press Y to reload privilege tables. Success.

All done!

- **Step 6** Log in to the MySQL database as the **root** user. mysql -u root -p
- **Step 7** Run the following command to create a database named **magento**. CREATE DATABASE *magento*;
- **Step 8** Run the following command to create a user for the database and assign full permissions to the user:

GRANT ALL ON magento.* TO magentouser@localhost IDENTIFIED BY 'xxxxx';

In this command, **magento** is the name of the database created in the previous step, **magentouser** is the name of the database user, and **xxxxx** is the password of the database user.

- **Step 9** Run the following command to exit the MySQL CLI: exit
- **Step 10** (Optional) Perform the following operations to check whether the database and account have been created and then exit the MySQL CLI:
 - Run the following command to log in to the MySQL CLI as user magentouser: mysql -u magentouser -p
 - 2. Run the following command to view the created database: SHOW DATABASES;

In the displayed information, magento is the newly created database.

```
| Database |
+-----+
| information_schema |
| magento |
+-----+
2 rows in set (0.00 sec)
```

т

3. Run the following command to exit the MySQL CLI:

----End

Step 3: Install and Configure PHP

Step 1 Run the following command to add the IUS and EPEL repositories:

yum install \ https://repo.ius.io/ius-release-el7.rpm \ https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm

- **Step 2** Run the following command to add a webtatic repository: rpm -Uvh https://mirror.webtatic.com/yum/el7/webtatic-release.rpm
- **Step 3** Run the following command to install PHP7 and required PHP extensions for Magento:

yum -y install php70w php70w-pdo php70w-mysqlnd php70w-opcache php70w-xml php70w-gd php70w-mcrypt php70w-devel php70w-intl php70w-mbstring php70w-bcmath php70w-json php70w-iconv

Step 4 Run the following command to check the version of the installed PHP:

Information similar to the following is displayed:

PHP 7.0.33 (cli) (built: Dec 6 2018 22:30:44) (NTS) Copyright (c) 1997-2017 The PHP Group Zend Engine v3.0.0, Copyright (c) 1998-2017 Zend Technologies with Zend OPcache v7.0.33, Copyright (c) 1999-2017, by Zend Technologies

- **Step 5** Run the following command to open the PHP configuration file **php.ini**: vim /etc/php.ini
- **Step 6** Press **i** to enter insert mode and modify the file as follows:
 - Set memory_limit to a proper value.

; Maximum amount of memory a script may consume (128MB) ; http://php.net/memory-limit memory_limit = 256M

• Uncomment and set date.timezone.

[Date] ; Defines the default timezone used by the date functions ; http://php.net/date.timezone date.timezone = Asia/Shanghai

Step 7 Press Esc to exit insert mode. Then, enter :wq to save the settings and exit.

Step 8 Run the following command to restart the web service process: systemctl restart httpd

----End

Step 4: Install Composer

Composer is a package manager for the PHP programming language that provides a standard format for managing dependencies of PHP software and required libraries.

Step 1 Install composer 1.*x* for the dependency of Magento 2.

Run the following commands to install the Composer of the specified version and set the installation path to **/usr/bin/** for global use: php -r "copy('https://getcomposer.org/installer', 'composer-setup.php');" php composer-setup.php --install-dir=**/usr/bin/** --filename=composer --**version=1.10.19** The command output is as follows:

All settings correct for using Composer Downloading...

Composer (version 1.10.19) successfully installed to: /usr/bin/composer Use it: php /usr/bin/composer

Step 2 Run the following command to check whether the Composer is successfully installed:

composer -v

The command output is as follows:



Composer version 1.10.19 2020-12-04 09:14:16

----End

Step 5: Install Magento

When installing Magento, you can determine whether to install sample data. If Magento is only used for testing, it is optional for you to install sample data. If Magento is used in production environments, you are advised to perform initial configuration instead of installing sample data.

- **Step 1** Run the following command to install git: yum -y install git
- **Step 2** Run the following commands to go to the default root directory /var/www/html/ of the web server and use git to download Magento: cd /var/www/html/ git clone https://github.com/magento/magento2.git
- **Step 3** Switch Magento to a stable version.

By default, Magento of the latest version is installed. In the production environment, you are advised to switch to a stable version.

cd magento2 && git checkout tags/2.1.0 -b 2.1.0

The command output is as follows:

Switched to a new branch '2.1.0'

Step 4 Run the following command to move the installation file to the root directory /var/www/html/ of the web server. /var/www/html/magento2/ is the directory where Magento is installed.

shopt -s dotglob nullglob && mv /var/www/html/magento2/* /var/www/html/ && cd ...

Then, you can access the Magento site from http://magento server IP address. If you do not move the installation file to the root directory, you can access the Magento site only from http://magento server IP address/magento2.

Step 5 Run the following commands to set file permissions for Magento: chown -R apache:apache /var/www/html find /var/www/html -type f -print0 | xargs -r0 chmod 640

find /var/www/html -type d -print0 | xargs -r0 chmod 750 chmod -R g+w /var/www/html/{pub,var} chmod -R g+w /var/www/html/{app/etc,vendor} chmod 750 /var/www/html/bin/magento

- **Step 6** Run the following command to install unzip and zip. yum install -y unzip zip
- Step 7 Run the following commands to go to the default root directory /var/www/html/ of the web server and use Composer to install Magento: cd /var/www/html/ composer install
- **Step 8** After the installation is complete, enter **http://magento server IP address** in the address bar of a browser to visit Magento. If the following page is displayed, Magento is installed successfully.



Version 2.1.0

Welcome to Magento Admin, your online store headquarters. Click 'Agree and Set Up Magento' or read Getting Started to learn more.

Terms & Agreement

Agree and Setup Magento

----End

Step 6: Configure Magento

- **Step 1** Visit **http://magento server IP address** and click **Agree and Setup Magento** to start the configuration.
- **Step 2** Click **Start Readiness Check** to check the environment. After the check is passed, click **Next**.

Û						
O Readiness Check	2 Add a Database	3 Web Configuration	4 Customize Your Store	5 Create Admin Account	6 Install	Back
Step 1: Readiness Check						
Let's check your environment for the correct PHP version, PHP extensions, file permissions and compatibility.						

|--|

Step 3 Enter the MySQL database user magentouser, the password of the database user, and the database magento created in Step 2: Install and Configure MySQL, and click Next.

Step 2: Add a Database

Database Server Host 🖈	localhost
Database Server Username 🔺	magentouser
Database Server Password	•••••
Database Name 🔸	magento
Table prefix	(optional)

Step 4 Set the website access address and background management address, and click **Next**.

Step 3: Web Configuration			
Your Store Address	http://124.		
Magento Admin Address ★	http://124.	admin_1pj83g	

NOTE

The background management address can be customized.

Step 5 Set the time zone and language, and click **Next**.

Step 4: Customize Your Store

Store Default Time Zone *	GMT (UTC)	•
Store Default Currency 🔸	Chinese Yuan (CNY)	•
Store Default Language *	Chinese (China)	•

Step 6 Set the admin account and click **Next**.

Step 5: Create Admin Account

Create a new Admin account to manage your store.

New Username 🔸	admin
New Email 🔸	endedearop-peartais
New Password 🔸	•••••
Confirm Password	•••••

Step 7 Click **Install Now** and wait until the installation is complete.

If the following information is displayed, the installation is successful.



Please keep this information for your records:

admin
80.000 (million from

http://124.
http://124.

Be sure to bookmark your unique URL and record it offline.

Encryption Key:

property of the second s

Database Info:

Database Name:	magento
Username:	magentouser

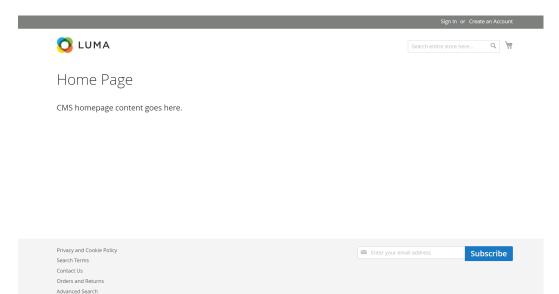
- **Step 8** Log in to the Magento server and set up cron jobs. crontab -u apache -e
- **Step 9** Press **i** to enter insert mode and add the following content:

*/10 * * * * php -c /etc /var/www/html/bin/magento cron:run
*/10 * * * * php -c /etc /var/www/html/update/cron.php
*/10 * * * * php -c /etc /var/www/html/bin/magento setup:cron:run

Press **Esc** to exit insert mode. Then, enter :wq to save the settings and exit.

For more information about running Magento cron jobs, see **Magento Documentation**.

Step 10 Enter **http://magento server IP address** in the address bar of a browser. The following page is displayed by default.



Step 11 Enter **http://magento background management address** in the address bar of a browser and use the admin account to log in. After the login is successful, the following page is displayed.

Ŵ	Dashboard			Q	🌲 💄 admi	n 🔻
dashboard	Store View: All Store Views -				Reload Data	a
SALES PRODUCTS	Lifetime Sales CN¥0.00	Chart is disable	ed. To enable the chart, click	here.	Quantity	
CUSTOMERS	Average Order CN¥0.00	CN¥0.00		CN¥0.00	0	
	Last Orders We couldn't find any records.	Bestsellers	Most Viewed Products	New Customers	Customers	
CONTENT REPORTS	Last Search Terms We couldn't find any records.	We couldn't find	any records.			

NOTE

If the message "One or more indexers are invalid. Make sure your Magento cron job is running" is displayed, run the **php bin/magento indexer:reindex** command in Magento root directory **/var/www/html**.

For more information about Magento configuration, see **Magento Documentation**.

----End

Step 7: Other Operations

Step 1 Purchase a domain name.

Configure a unique domain name for website access. You need to obtain an authorized domain name from the domain name registrar first.

Step 2 Configure DNS records.

Your website can be visited using the registered domain name only after DNS records are configured. For details, see **Routing Internet Traffic to a Website**.

For example, if the domain name is www.example.com, enter **http:// www.***example***.com** in the address bar of the browser to access the website.

----End

5.4 Manually Deploying a Ghost Blog (Ubuntu 20.04)

Ghost is an open-source blog platform based on Node.js and makes writing and release more convenient. This section walks you through the deployment of a Ghost blog on an ECS running Ubuntu 20.04.

Creating a User

Performing operations as user **root** is not recommended by Ghost. You need to create a user and grant permissions to it.

1. Run the following command to create a user: The following uses **user** as an example.

adduser user

The following information is displayed:

```
Adding user `user' ...
Adding new group `user' (1000) ...
Adding new user 'user' (1000) with group 'user' ...
Creating home directory `/home/user' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for user
Enter the new value, or press ENTER for the default
     Full Name []:
     Room Number []:
     Work Phone []:
     Home Phone []:
     Other []:
Is the information correct? [Y/n] Y
```

- a. In the **New password:** and **Retype new password:** lines, enter and confirm the user password (not displayed by default) as prompted, and press **Enter**.
- b. In the **Enter the new value, or press ENTER for the default** line, press **Enter** to retain the default settings. You can also specify the information as needed.
- c. In the **Is the information correct? [Y/n]** line, press **Y** to confirm the information and press **Enter** to complete the settings.
- Run the following command to add the newly created user to the user group: usermod -aG sudo user
- 3. Run the following command to switch to user:

su - user

Installing Nginx

Before deploying the Ghost blog, you need to install Nginx and use it as an HTTP server. The following uses Nginx 1.18.0 as an example.

1. Run the following commands to update the Linux OS and software package:

sudo apt-get update

sudo apt-get upgrade -y

2. Run the following command to install Nginx:

sudo apt-get install -y nginx

3. Run the following command to check the Nginx version:

nginx -v

The following information is displayed: nginx version: nginx/1.18.0 (Ubuntu)

4. (Optional) Configure the firewall.

Uncomplicated Firewall (UFW) is an iptables interface that simplifies the firewall configuration. By default, Ubuntu has UFW installed. Run the following command to check the firewall status:

sudo ufw status

If you do not want to enable the firewall, skip this step. If you want to enable the firewall, run the following command:

sudo ufw enable

Verify that the firewall is enabled.

Before testing Nginx, you need to reconfigure the firewall to allow access to Nginx. Run the following command to automatically register Nginx with UFW:

sudo ufw app list

The following information is displayed:

```
Available applications:
Nginx Full
Nginx HTTP
Nginx HTTPS
```

- Nginx Full: Port 80 is enabled to distribute normal and unencrypted web traffic, and port 443 to distribute TLS/SSL-encrypted traffic.
- Nginx HTTP: Port 80 is enabled to distribute normal and unencrypted web traffic.
- Nginx HTTPS: Port 443 is enabled to distribute TLS/SSL-encrypted traffic.

Run the following command to ensure that the firewall allows HTTP and HTTPS connections:

sudo ufw allow 'Nginx Full'

5. Verify that Nginx can work properly.

Use the domain name or IP address to access Nginx. The **Welcome to nginx** page is displayed if Nginx is started normally.

Enter **http://***IP* address of the Nginx server in the address bar to access Nginx. If the following page is displayed, Nginx has been installed.

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to <u>nginx.org</u>. Commercial support is available at <u>nginx.com</u>.

Thank you for using nginx.

Installing MySQL

MySQL is an open-source database management system, which is usually installed as a part of the popular LAMP (Linux, Apache, MySQL, and PHP/Python/Perl) stack. MySQL uses relational databases and the structured query language (SQL) to manage data.

1. Run the following command to install MySQL:

sudo apt-get install -y mysql-server

2. Run the following command to check the MySQL version:

mysql -V

The following information is displayed: mysql Ver 8.0.37-0ubuntu0.20.04.3 for Linux on x86_64 ((Ubuntu))

3. Run the following command to access MySQL:

sudo mysql

- Create a database for Ghost. The following uses ghost_data as an example.
 CREATE DATABASE ghost_data;
- 5. Run the following commands to set the password for user **root**:

ALTER USER 'root'@'localhost' IDENTIFIED WITH mysql_native_password BY 'xxxxx';

In the preceding command, *xxxxx* indicates the password you set for user **root**.

6. Run the following command to reload the privilege tables of MySQL to check that the change takes effect:

FLUSH PRIVILEGES;

 Run the following command to exit MySQL: exit

Installing Node.js

- Run the following commands to install Node.js: sudo curl -sL https://deb.nodesource.com/setup_18.x | sudo -E bash sudo apt-get install -y nodejs
- 2. Run the following commands to view the versions of Node.js and Node Package Manager (npm), respectively:

node -v

npm -v

The following information is displayed: root@ecs-c47c:~# node -v v18.20.3 root@ecs-c47c:~# npm -v 10.7.0

Installing and Configuring Ghost

Ghost-CLI has been added to Ghost v1.0.0 and later versions. You can directly install and configure Ghost-CLI.

1. Run the following command to install Ghost-CLI:

sudo npm install ghost-cli@latest -g

 Create a folder named ghost under /var/www/. sudo mkdir -p /var/www/ghost

NOTE

If **ghost** is created under **/root**, Ghost cannot work properly.

 Run the following command to grant user permissions to ghost: sudo chown user:user /var/www/ghost sudo chmod 775 /var/www/ghost

NOTE

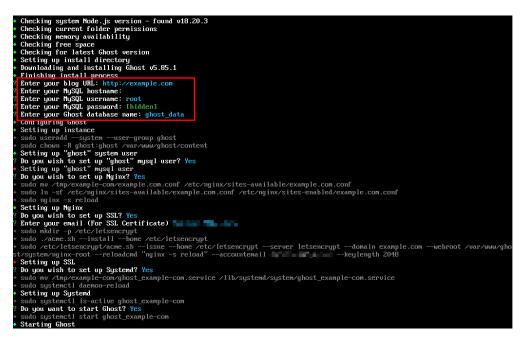
user is created in step 1.

- Run the following command to switch to the created folder: cd /var/www/ghost
- 5. Run the following command to install Ghost using Ghost-CLI: **ghost install**

If a message is displayed indicating that the node version does not match, obtain the required version on the official website of Node.js and reinstall Ghost. https://nodejs.org/en/download/

6. Configure Ghost.

If **ghost install** is successfully executed in **/var/www/ghost/**, follow the prompts to configure related parameters.



- Enter your blog URL: Enter a resolved domain name, for example, http:// example.com.
- Enter your MySQL hostname: Enter the database connection address. In this example, the MySQL database and Ghost are deployed on the same ECS. Press Enter to retain the default settings.
- **Enter your MySQL username**: Enter the database username **root** and press **Enter**.
- Enter your MySQL password: Enter the database password set in step 5 and press Enter.
- **Enter your Ghost database name**: Enter the name of the database used by Ghost. Enter **ghost_data** and press **Enter**.

To modify the configuration, run the following command:

vi config.production.json

The following example is for your reference.

```
url":
server
  tabase":
  client":
   onnection
    host":
    user
    password
   "database
  il":
  transport": "D
 ogging": (
   ransports":
        .
process
paths": (
  contentPath":
bootstrap-socket":
```

Verifying Blog Access

If Ghost is successfully installed, you can access the Ghost blog using the domain name.

6 Setting Up an Application

6.1 Setting Up an FTP Site

6.1.1 Setting Up an FTP Site (Windows 2012)

Overview

The best practices for ECS guide you through the setup of an FTP site on a Windows ECS. The Windows Server 2012 R2 OS is used as an example in this section.

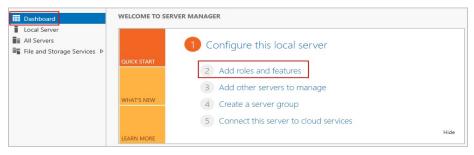
The process is as follows:

- 1. Add IIS and FTP service roles.
- 2. Create a username and password.
- 3. Assign permissions to shared files.
- 4. Add and set the FTP site.
- 5. (Optional) Configure the FTP firewall.
- 6. Set the security group and firewall.
- 7. Verify the configuration on the client.

Procedure

Step 1 Add IIS and FTP service roles.

- 1. Log in to the ECS.
- 2. Choose **Start** > **Server Manager**.
- 3. Click Add roles and features.



- 4. In the **Before you begin** dialog box, click **Next**.
- 5. Select **Role-based or feature-based installation** and click **Next**.

B	Add Roles and Features Wizard
Select installatio	n type destination server ecs-7306
Before You Begin	Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).
Installation Type Server Selection	Role-based or feature-based installation Configure a single server by adding roles, role services, and features.
Server Roles Features Confirmation Results	 Remote Desktop Services installation Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.
	< Previous Next > Install Cancel

6. Select the ECS where FTP is to be deployed and click **Next**.

a	Add Roles and Features Wizard				
Select destination	DD SERVER ect-7306				
Before You Begin Installation Type Server Selection	Select a server or a virtual hard disk on which to install roles and features. Select a server from the server pool Select a virtual hard disk				
Server Roles	Server Pool				
Features					
Confirmation	Filter				
Results	Name IP Address Operating System				
	ecs-7306 Microsoft Windows Server 2012 R2 Standard				
	1 Computer(s) found This page shows servers that are running Windows Server 2012, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.				
	< Previous Next > Install Cancel				

7. Select **Web Server (IIS)**. In the displayed dialog box, click **Add Features** and then **Next**.

P	Add Roles and Features Wizard	_ _ ×
Select server roles Before You Begin Installation Type Server Selection Server Roles Features Web Server Role (IIS) Role Services Confirmation Results	Select one or more roles to install on the selected server. Roles Application Server DHCP Server SAX Server Fax Server Fax Server Fat Server File and Storage Services (1 of 12 installed) Hyper-V Network Policy and Access Services Print and Document Services Remote Access Remote Access Remote Desktop Services Volume Activation Services Windows Deployment Services Windows Server Essentials Experience	DESTINATION SERVER ecs-7306 Description Meb Server (IIS) provides a reliable, mangeable, and scalable Web application infrastructure.
Add	Windows Server Update Services Previous Roles and Features Wizard	Vext > Install Cancel
The following tools at have to be installed of Web Server (IIS) A Management		

- 8. Click **Next** until the **Role Service** page is displayed.
- 9. Select FTP Server and IIS Management Console. Then, click Next.

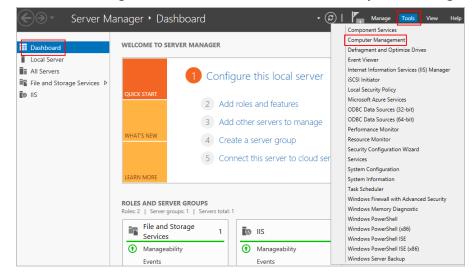
Select role servi	ces	DESTINATION SERVER ecs-7306
Before You Begin Installation Type Server Selection Server Roles Features Web Server Role (IIS) Role Services Confirmation Results	Select the role services to install for Web Server (IIS) Role services Digest Authentication Digest Authentication Disect Authorization Disect Authorization Disect Authonication Disect Authonicati	Description FTP Extensibility enables support for FTP extensibility features such as custom providers, ASP.NET users or IIS Manager users.

- 10. Click Install to assign the service roles.
- 11. After the installation is complete, click **Close**.

Step 2 Create a username and password.

The Windows username and password are used for FTP. If you allow anonymous users to access FTP, you do not need to create an FTP username and password.

1. In Server Manager, choose Dashboard > Tools > Computer Management.



2. Choose **System Tools** > **Local Users and Groups** > **Users**, right-click the blank area on the right, and choose **New User** from the shortcut menu.

£			Com	nputer Management
File Action View Help				
🗢 🔿 🙍 🖬 🖉				
Computer Management (Local	Name	Full Name		Description
⊿	Mathematical Administrator			Built-in account for administering
Task Scheduler	💭 cloudbase-init	cloudbase-init		
Event Viewer	👧 Guest			Built-in account for guest access t
Shared Folders				
Local Users and Groups Users	Ne	ew User		
Groups	Refresh			
Performance Bevice Manager	Exp	port List	_	
⊿ 📇 Storage		View +		
Windows Server Backup Disk Management	Ar	range lcons 🔹 🕨		
Services and Applications	Lir	ne up Icons		
	He	elp		

3. Set **User name (ftpadmin** is used as an example) and **Password**.

New User ? X
User name: [tpadmin
Full name:
Description:
Password:
Confirm password:
User must change password at next logon
User cannot change password
Password never expires
Account is disabled
Help Create Close

Step 3 Assign permissions to shared files.

Set access and edit permissions for the files shared to users on the FTP site.

1. Create a folder for FTP on the ECS, right-click the folder, and choose **Properties** from the shortcut menu.

The **work01** folder is used as an example and it contains the **test.txt** file to be shared.

2. On the **Security** tab, select **Everyone** and click **Edit**.

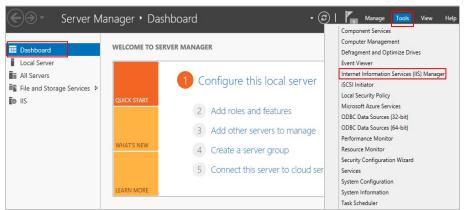
If **Everyone** is unavailable, add it. For details, see **FAQs**.

👃 work01 Properties 🗙
General Sharing Security Previous Versions Customize
Object name: C:\work01
Group or user names:
See Everyone
CREATOR OWNER
& SYSTEM
To change permissions, click Edit. Edit
Permissions for Everyone Allow Deny
Full control
Modify
Read & execute 🗸 🗉
List folder contents 🗸
Read 🗸
VVILE
For special permissions or advanced settings, Advanced click Advanced.
OK Cancel Apply

3. Select **Everyone**, assign permissions as needed, and click **OK**. In this example, all permissions are allowed.

Permissions	for work01	X			
Security					
Object name: C:\work01					
Group or user names:					
Everyone CREATOR OWNER					
SYSTEM .					
Administrators (ECS-7306\Ad & Users (ECS-7306\Users)	ministrators)				
	Add	Remove			
Permissions for Everyone	Allow	Deny			
Full control					
Modify Read & execute					
List folder contents					
Read	✓				
ОК	Cancel	Apply			

- **Step 4** Add and set the FTP site.
 - 1. In Server Manager, choose Dashboard > Tools > Internet Information Services (IIS) Manager.



2. Right-click **Sites** and choose **Add FTP Site** from the shortcut menu.

File View Help				
Connections	Sites			
Start Page ▲ · • ECS-7306 (ECS-7306\Adminis	Filter:	- 1	🌾 Go 🕞 🙀 Show All	Ţ
Application Pools	Name 🔺	ID	Status	Bind
> Sites	😔 Default Web Site	1	Started (ht	*:80
Add Website				
😰 Refresh				
G Add FTP Site				
Switch to Conte	nt View			

3. In the displayed dialog box, set the FTP site name and the physical path in which the shared folder is stored. Then, click **Next**.

Site name **FTPSERVER** is used as an example.

Add FTP Site	?	x
Site Information		
FTP site name: FTPSERVER Content Directory Physical path: C:\work01 		
Previous Next Finish C	ancel	

- 4. Enter the private IP address and port number of the ECS, set SSL, and click **Next**.
 - Port 21 is used by default. You can set it as required.
 - You can also set SSL as required.
 - **No SSL**: SSL encryption is not required.
 - Allow SSL: Non-SSL and SSL connections between the FTP server and the client are allowed.
 - Require SSL: SSL encryption is required for the communication between the FTP server and the client.

NOTE

When **Allow SSL** and **Require SSL** are selected, select an existing SSL certificate or create one. For details, see **3**.

Binding and SSL Settings Binding IP Address: IP Address: <td< th=""><th></th><th>Add FTP Site</th><th>? X</th></td<>		Add FTP Site	? X
IP Address: Port: 21 C Enable Virtual Host Names: Virtual Host (example: ftp.contoso.com): Start FTP site automatically SSL ○ No SSL ③ Allow SSL ③ Allow SSL SSL Certificate: View	Binding and SSL Settings		
Z1 Enable Virtual Host Names: Virtual Host (example: ftp.contoso.com): Start FTP site automatically SL No SSL Allow SSL Require SSL SL SL Certificate: View	Binding		
Virtual Host (example: ftp.contoso.com): Start FTP site automatically SSL No SSL Allow SSL Require SSL SSL Certificate: SSL Certificate: Select View			
SSL No SSL Allow SSL Require SSL SSL Certificate: Select View			
 ○ No SSL ● Allow SSL ○ Require SSL SSL Certificate: ✓ Select View 	✓ Start FTP site automatically		
 ● Allow SSL ○ Require SSL SSL Certificate: ✓ Select View 			
 ○ Require SSL SSL Certificate: ✓ Select View 			
SSL Certificate:			
Select View			
Previous Next Finish Cancel		✓ Select View	1
Previous Next Finish Cancel	V		-
		Previous Next Finish	Cancel

- 5. Configure authentication and authorization and click **Finish**.
 - Authentication
 - Anonymous: allows any user with username anonymous or ftp to access.
 - Basic: allows only users with authorized usernames and passwords to access. However, the passwords transmitted over the network are not encrypted. You are advised to use this authentication method after confirming that the network connection between the client and the FTP server is secure.
 - Authorization
 - Allow access to:
 - **All users**: All users are allowed.
 - **Anonymous users**: Anonymous users are allowed.
 - Specified roles or user groups: Only specified roles or user group members are allowed. If you select this option, you are required to enter the specified roles or user groups in the text box.
 - **Specified users**: Only specified users are allowed. If you select this option, you are required to enter the specified users in the text box.
 - Permissions: specifies permissions for the authorized users.

Add FTP Site	? X
Authentication and Authorization Information	
Authentication Anonymous Basic	
Authorization Allow access to: Not Selected	
Permissions Read Write	
Previous Next	Finish Cancel

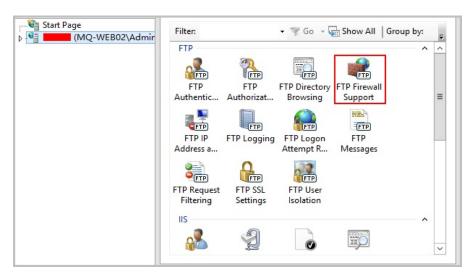
6. Add the private IP address of the ECS to the FTP site.

Choose **Sites**, select the FTP site, and click **Bindings**. In the **Site Bindings** dialog box, click **Add**. Then, add the private IP address of the ECS in the displayed dialog box and click **OK**.

	Application Pools	Name ID Default Web Site 1 FTPSERVER 2	Started (ht *:80 (http) Started (ftp)	Path %SystemDrive C:\work01	Add FTP Site Set FTP Site Def Edit Site Bindings
	Type Host Name ftp	Site Port IP Address 21 139.159.147.1 Add Site Binding		? X Add Edit	 Basic Settings Explore Edit Permission Remove Rename
<	ftp V Host name:	dress:	Port:	Remove Browse	View Applicatio View Virtual Dirv Manage FTP Site Restart Start Stop
Ready		[OK Cancel	Close	

Step 5 (Optional) Configure the FTP firewall.

- To enable the passive mode on the FTP server, the FTP firewall must be configured.
- If Huawei Cloud servers use public IP addresses to access the FTP site that is set up on a Huawei Cloud ECS, the passive mode must be enabled on the FTP server.
- 1. Double-click FTP Firewall Support.



- 2. Set parameters and click **Apply**.
 - Data Channel Port Range: specifies the range of ports used for passive connections. The port range is 1025-65535. Configure this parameter based on site requirements.
 - External IP Address of Firewall: specifies the public IP address of the ECS.

	Alerts
FTP Firewall Support The settings on this page let you configure your FTP server to accept passive connections from an external firewall. Data Channel Port Range: 5000-6000 Example: 5000-6000 External IP Address of Firewall: External IP Address of Firewall: Example: 10.0.0.1	Alerts ▲ To accept passive connections when you are using FTP over SSL (FTPS) or when your firewall does not filter packets, configure the external IPv4 address of your firewall. Actions Actions Cancel ② Help
The Features View 📴 Content View	

3. Restart the ECS for the firewall configuration to take effect.

Step 6 Set the security group and firewall.

After setting up the FTP site, add a rule in the inbound direction of the security group to allow packets to pass through the FTP port. For details, see **Configuring Security Group Rules**. For details about which ports are allowed, see **Table 6-1**.

If **FTP Firewall Support** is configured, enable the ports used by the FTP site and the data channel ports used by the FTP firewall in the security group.

By default, the firewall allows packets to pass through TCP port 21 for FTP. If another port is used, add an inbound rule that allows packets to pass through the port on the firewall.

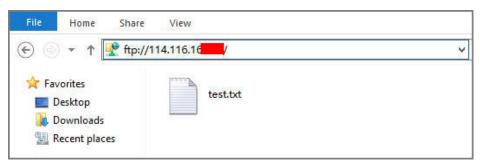
Dir ecti on	Priori ty	Acti on	Туре	Protocol & Port	Source Address
Inb oun d	1	Allo w	IPv4	Protocols/TCP (Custom): 20-21	0.0.0.0/0
Inb oun d	1	Allo w	IPv4	Protocols/TCP (Custom): 1024-65535 (for example, 5000-6000)	0.0.0/0

 Table 6-1 Security group rules

Step 7 Verify the configuration on the client.

On the computer with the client installed, enter **ftp://***IP* address of the FTP server.FTP port number in the Internet Explorer address bar. If you do not specify the port number, port 21 is used by default. If a dialog box is displayed for you to enter the username and password, the configuration is correct. After entering the username and password, you can perform operations on the FTP folder with assigned permissions.

If **FTP Firewall Support** is not configured, configure the Internet Explorer browser. Otherwise, the FTP folder cannot be accessed. To configure the Internet Explorer browser, choose **Tools > Internet Options > Advanced**, select **Enable FTP folder view**, and deselect **Use Passive FTP**.



----End

FAQs

- 1. For more information about setting up an FTP site on a Windows ECS, see Microsoft official documents.
- 2. When configuring the properties of a folder, if **Everyone** is unavailable, perform the following operations to add it:
 - a. On the **Security** tab, click **Edit**.

👃 work01 Properties 💌
General Sharing Security Previous Versions Customize
Object name: C:\work01
Group or user names:
& CREATOR OWNER
SYSTEM .
Administrators (ECS-7306\Administrators)
& Users (ECS-7306\Users)
To change permissions, click Edit.
Permissions for CREATOR
OWNER Allow Deny
Full control
Modify
Read & execute
List folder contents
Read
Write 🗸
For special permissions or advanced settings, Advanced click Advanced.
OK Cancel Apply

b. In the displayed dialog box, click **Add**.

Permissions	for work01	X
Security		
Object name: C:\work01		
Group or user names:		
CREATOR OWNER		
& Administrators (ECS-7306\Ac & Users (ECS-7306\Users)	dministrators)	
Permissions for CREATOR OWNER	Add	Remove
Full control		
Modify		
Modily		
Read & execute		
Read & execute List folder contents		
Read & execute		
Read & execute List folder contents		

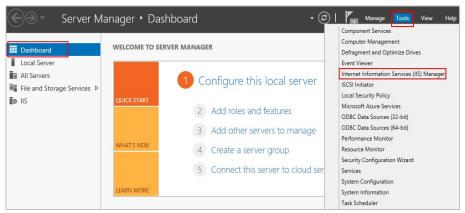
c. In the displayed dialog box, click **Advanced**.

Select Users or Groups	X
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
ECS-7306	Locations
Enter the object names to select (<u>examples</u>):	
	Check Names
Advanced OK	Cancel

d. In the displayed dialog box, click **Find Now**, select **Everyone** in search results, and click **OK**.

	Select Users or Groups		x			
Select this object type:						
Users, Groups, or Built-in security principals Object Types						
From this location:						
ECS-7306		Locat	tions			
Common Queries						
Name: Starts with V			Columns			
Description: Starts with V			Find Now			
Disabled accounts			Stop			
Non expiring password						
Days since last logon:	~		,			
Search results:		ОК	Cancel			
Name In Folder			^			
Bistributed C ECS-7306						
Event Log Re ECS-7306						
tpadmin ECS-7306			_			
Guest ECS-7306			=			
Guests ECS-7306						
Hyper-V Admi ECS-7306						
IIS_IUSRS ECS-7306						
KINTERACTIVE						
			~			

- e. Click **OK** to return to the permissions page.
- f. Click OK.
- 3. Create a server certificate.
 - a. In Server Manager, choose Dashboard > Tools > Internet Information Services (IIS) Manager.



b. In the left list, click the server. Under **IIS** area, double-click **Server Certificates**. The **Server Certificates** page is displayed.



c. Click Create Self-Signed Certificate.

6 3	Interr	et Information Services (I	IIS) Manager	_ _ ×
ECS-SMQ01	•			😨 🔤 🟠 🔞 -
File View Help				70-
Connections		r Certificates		Actions
🔍 • 🔜 🛯 🖄 🛛 😣	Serve	r Certificates	Import	
A Start Page ▲ Start Page ECS- Application Pools	du Use this feature to use with websites	o request and manage certificate configured for SSL.	Create Certificate Request Complete Certificate Request	
>- Sites	Filter:	🕶 🐨 Go 👒 🙀 Shor	Create Domain Certificate	
	Name 🔷	Issued To	w All Group by: Issued By	Create Self-Signed Certificate
				Enable Automatic Rebind of Renewed Certificate
				🔞 Help

d. Specify a certificate name, select a certificate storage type, and click OK.

	Create Self-Signed Certificate	?	x
Ţ	Specify Friendly Name		
signing:	file name for the certificate request. This information can be sent to a certificate authority for		
Specify a SSL-FTP	friendly name for the certificate:		
Select a c	ertificate store for the new certificate:		
Personal	v		
	ОКС	ancel	
			_

The created certificate is displayed on the **Server Certificates** page.

Connections		C	
🔍 • 🔚 🖄 🕵	Serve	r Certificates	
Start Page		request and manage certifi configured for SSL.	cates that the Web server can
→ 💣 Application Pools	Filter:	🕶 🛒 Go 👒 🕁 S	Show All Group by: 💡
	Name 📤	Issued To	Issued By
	SSL-FTP		

6.1.2 Setting Up an FTP Site (Windows 2019)

Overview

The best practices for ECS guide you through the setup of an FTP site on a Windows ECS. The Windows Server 2019 OS is used as an example in this section.

The process is as follows:

- 1. Add IIS and FTP service roles.
- 2. Create a username and password.
- 3. Assign permissions to shared files.
- 4. Add and set the FTP site.
- 5. (Optional) Configure the FTP firewall.
- 6. Set the security group and firewall.
- 7. Verify the configuration on the client.

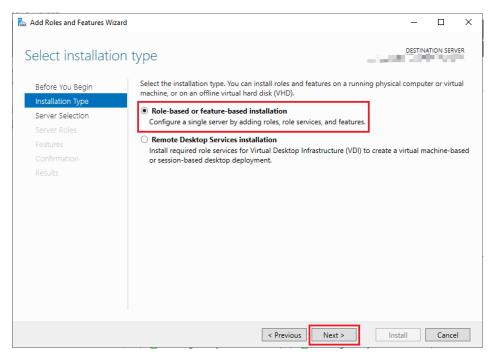
Procedure

Step 1 Add IIS and FTP service roles.

- 1. Log in to the ECS.
- 2. Choose Start > Server Manager.
- 3. Click Add roles and features.

🚡 Server Manager						- 0	×
Server M	anager • Dashl	poard	• @ 🏲	Manage	Tools	View	Help
🔛 Dashboard	WELCOME TO SERVI	ER MANAGER					^
Local Server All Servers File and Storage Services		1 Configure this local serv	ver				
	QUICK START	2 Add roles and features					
		3 Add other servers to mana	age				
	WHAT'S NEW	4 Create a server group					
		5 Connect this server to clou	ud services				
	LEARN MORE					Hide	

- 4. In the **Before you begin** dialog box, click **Next**.
- 5. Select Role-based or feature-based installation and click Next.



6. Select the ECS where FTP is to be deployed and click Next.

🛓 Add Roles and Features Wi	zard			-		×
Select destinati	on server			DESTIN	ATION SER	/ER
Before You Begin Installation Type Server Selection		from the server pool	to install roles and features.			
Server Roles Features Confirmation	Server Pool					
	Name	IP Address	Operating System Microsoft Windows Server 201	10 Standard		
		ervers that are running Wir	ndows Server 2012 or a newer rele Servers command in Server Mana			
		ers from which data collect	ion is still incomplete are not show		Cance	

7. Select **Web Server (IIS)**. In the displayed dialog box, click **Add Features** and then **Next**.

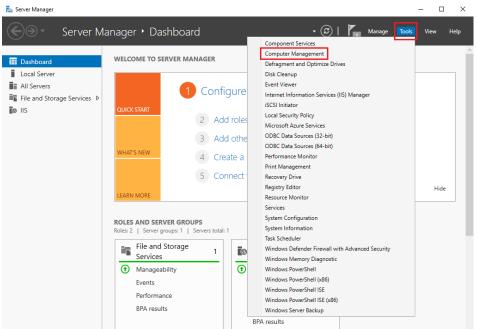
	Select one or more roles to install on the selected server.		
	Roles	Description	
Server Selection Server Roles Features Confirmation Results	Active Directory Certifica Active Directory Referati Active Directory Lightwe Active Directory Rightwe Active Directory Rightwe Active Directory Rightwe Active Directory Rightwe Active Directory Rightwe DHCP Server DHCP Server DH	ver (IIS)?	Lerovides a reliable, manageable, a

- 8. Click **Next** until the **Role Services** page is displayed.
- 9. Select FTP Server and IIS Management Console. Then, click Next.

📥 Add Roles and Features Wizard		- 🗆 X
Add Roles and Features Wizard Select role service Before You Begin Installation Type Server Selection Server Roles Features Web Server Role (IIS) Role Services Confirmation Results	S Select the role services to install for Web Server (IIS) Role services	- C X
	FIP Service FiP Extensibility Management Tools IIS Management Console IIS 6 Management Compatibility IIS Management Scripts and Tools Management Service X	
	< Previous Next >	> Install Cancel

- 10. Click **Install** to assign the service roles.
- 11. After the installation is complete, click **Close**.
- **Step 2** Create a username and password.

The Windows username and password are used for FTP. If you allow anonymous users to access FTP, you do not need to create an FTP username and password.



1. In Server Manager, choose Dashboard > Tools > Computer Management.

2. Choose **System Tools** > **Local Users and Groups** > **Users**, right-click the blank area on the right, and choose **New User** from the shortcut menu.

😓 Computer Management File Action View Help				-		×
Computer Management (Local System Tools Computer Meanagement (Local System Tools Computer Meanagement Computer Viewer Computer Viewer C	Name F Administrator Cloudbase-init o DefaultAcco Guest WDAGUtility	Full Name cloudbase-init cloudbase-init Refresh Export List View Arrange Ico Line up Icor Help	> ns >	Actions Users More Act	ions	-

3. Set User name (ftpadmin is used as an example) and Password.

New User					?	×
User name:	ftpadmin					
Full name:						
Description:						
Password:	•••	••••				
Confirm password:	•••	••••				
User must cha	nge passwo	ord at n	ext logo	n		
User cannot ch	nange pass	word				
Password neve	er expires					
Account is disa	abled					
Help				Create	0	Close

4. Click Create.

Step 3 Assign permissions to shared files.

Set access and edit permissions for the files shared to users on the FTP site.

 Create a folder for FTP on the ECS, right-click the folder, and choose Properties from the shortcut menu.

The **work01** folder is used as an example and it contains the **test.txt** file to be shared.

2. On the **Security** tab, select **Everyone** and click **Edit**.

If **Everyone** is unavailable, add it. For details, see **FAQs**.

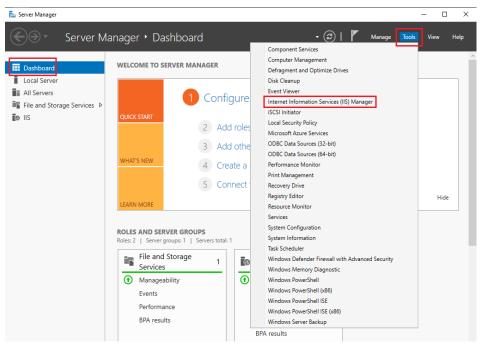
work01 Properties	×
General Sharing Security Previous Versions Customize	
Object name: C:\work01	
Group or user names:	
Severyone	•
SYSTEM	
Administratore (ECS.MAXIAORI II.W/\ Administratore)	1
< >	
To change permissions, click Edit. Edit	
Permissions for Everyone Allow Deny	
Full control	1 1
Modify	
Read & execute 🗸	
List folder contents	
Read 🗸	
Write	/
For special permissions or advanced settings, Advanced click Advanced.	
OK Cancel Apply	

3. Select **Everyone**, assign permissions as needed, and click **OK**. In this example, all permissions are allowed.

Permissions for work01			×	<
Security				
Object name: C:\work01				
Group or user names:				
Everyone				
🧟 Administrators (Administra	ators)	
🤽 Users (Users)			
	Ad	d	Remove	
Permissions for Everyone		Allow	Deny	
Full control			□ ^	
Modify				
Read & execute List folder contents				
Read				
	-			
ОК		Cancel	Apply	

Step 4 Add and set the FTP site.

1. In Server Manager, choose Dashboard > Tools > Internet Information Services (IIS) Manager.



2. Right-click **Sites** and choose **Add FTP Site** from the shortcut menu.

Internet Information Services (IIS) M	anager	- 🗆 X
← →	📴 🖂 🕼 🗸	
File View Help		
Connections		Actions
Contraction of the second seco	Filter:	Manage Server Restart Start Stop View Application Pools
Refresh	TP FTP FTP Directory entic Authorizat Browsing	View Sites Get New Web Platform Components
Add Website	FTP FTP irewall FTP IP FTP Logging port Address a	Help
Stop		
G Add FTP Site	FTP FTP CFTP	
Rename	npt R Messages Filtering	
Switch to Content View		
< >> Ready	📰 Features View 💦 Content View	•1.:

3. In the displayed dialog box, set the FTP site name and the physical path in which the shared folder is stored. Then, click **Next**.

Site name **FTPSERVER** is used as an example.

Add FTP Site	?	Х
Site Information		
FTP site name: FTPSERVER		
Content Directory		
Physical path: C:\work01		
Previous Next Finish	Cancel	

- 4. Enter the private IP address and port number of the ECS, set SSL, and click **Next**.
 - Port 21 is used by default. You can set it as required.
 - You can also set SSL as required.

- **No SSL**: SSL encryption is not required.
- Allow SSL: Non-SSL and SSL connections between the FTP server and the client are allowed.
- **Require SSL**: SSL encryption is required for the communication between the FTP server and the client.

NOTE

When **Allow SSL** and **Require SSL** are selected, you can select an existing SSL certificate or create one. For details, see **3**.

Add FTP Site	? >
Binding and SSL Settings	
Binding	7
IP Address: Port:	
Enable Virtual Host Names: Virtual Host (example: ftp.contoso.com):	
☑ Start FTP site automatically	
SSL O No SSL	
Allow SSL	
O Require SSL	
O Require SSL SSL Certificate:	

- 5. Configure authentication and authorization and click **Finish**.
 - Authentication
 - Anonymous: allows any user with username anonymous or ftp to access.
 - Basic: allows only users with authorized usernames and passwords to access. However, the passwords transmitted over the network are not encrypted. You are advised to use this authentication method after confirming that the network connection between the client and the FTP server is secure.
 - Authorization
 - Allow access to:
 - All users: All users are allowed.
 - **Anonymous users**: Anonymous users are allowed.

- **Specified roles or user groups**: Only specified roles or user group members are allowed. If you select this option, you are required to enter the specified roles or user groups in the text box.
- **Specified users**: Only specified users are allowed. If you select this option, you are required to enter the specified users in the text box.
- **Permissions**: specifies permissions for the authorized users.

Add FTP Site	?	×
Authentication and Authorization Information		
Authentication		
Anonymous		
Basic		
Authorization		
Allow access to:		
Not Selected V		
Permissions		
Read Write		
Previous Next Finish	Cancel	

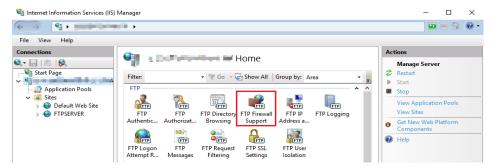
6. Add the private IP address of the ECS to the FTP site.

Choose **Sites**, select the FTP site, and click **Bindings**. In the **Site Bindings** dialog box, click **Add**. Then, add the private IP address of the ECS in the displayed dialog box and click **OK**.

📬 Internet Information Services	(IIS) Manager	- 🗆 ×
↔	Sites >	😰 🛛 🏠 🔞 🗸
File View Help		
Connections	Sites Filter: • • • • • • • • • • • • • • • • • • •	Actions Add Website Set Website Defaults Add FTP Site Set FTP Site Defaults Edit Site Bindings. 2
	ype Host Name Port IP Address Binding Informa	dd rmissions e dit e pplications
	-	rtual Directories P Site Construction Construction P Site Construction Constructio
۲ د د د د د د د د د د د د د د د د د د د	c	llose

Step 5 (Optional) Configure the FTP firewall.

- To enable the passive mode on the FTP server, the FTP firewall must be configured.
- If Huawei Cloud servers use public IP addresses to access the FTP site that is set up on a Huawei Cloud ECS, the passive mode must be enabled on the FTP server.
- 1. Double-click FTP Firewall Support.



- 2. Set parameters and click **Apply**.
 - **Data Channel Port Range**: specifies the range of ports used for passive connections. The port range is 1025-65535. Configure this parameter based on site requirements.
 - External IP Address of Firewall: specifies the public IP address of the ECS.



3. Restart the ECS for the firewall configuration to take effect.

Step 6 Set the security group and firewall.

After setting up the FTP site, add a rule in the inbound direction of the security group to allow packets to pass through the FTP port. For details, see **Configuring Security Group Rules**. For details about which ports are allowed, see **Table 6-2**.

If **FTP Firewall Support** is configured, enable the ports used by the FTP site and the data channel ports used by the FTP firewall in the security group.

By default, the firewall allows packets to pass through TCP port 21 for FTP. If another port is used, add an inbound rule that allows packets to pass through the port on the firewall.

Priori ty	Acti on	Туре	Protocol & Port	Source Address
1	Allo w	IPv4	Protocols/TCP (Custom): 20-21	0.0.0.0/0
1	Allo w	IPv4	Protocols/TCP (Custom): 1024-65535 (for example, 5000-6000)	0.0.0.0/0

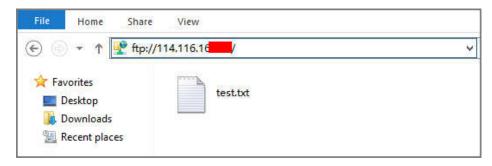
Table 6-2 Security group rules

Step 7 Verify the configuration on the client.

On the computer with the client installed, enter **ftp://***Public IP address of the FTP server.FTP port number* in the Internet Explorer address bar. If you do not specify the port number, port 21 is used by default. If a dialog box is displayed for you to enter the username and password, the configuration is correct. After entering the username and password, you can perform operations on the FTP folder with assigned permissions.

NOTE

If **FTP Firewall Support** is not configured, configure the Internet Explorer browser. Otherwise, the FTP folder cannot be accessed. To configure the Internet Explorer browser, choose **Tools** > **Internet Options** > **Advanced**, select **Enable FTP folder view**, and deselect **Use Passive FTP**.





FAQs

- 1. For more information about setting up an FTP site on a Windows ECS, see Microsoft official documents.
- 2. When configuring the properties of a folder, if **Everyone** is unavailable, perform the following operations to add it:
 - a. On the **Security** tab, click **Edit**.

work01 Properties ×
General Sharing Security Previous Versions Customize
Object name: C:\work01
Group or user names:
CREATOR OWNER
SYSTEM Administrators (
St Users (VUsers)
To change permissions, click Edit.
Permissions for CREATOR
OWNER Allow Deny
Full control
14 M
Modify
Read & execute
Read & execute
Read & execute List folder contents
Read & execute List folder contents Read
Read & execute List folder contents Read Write
Read & execute List folder contents Read Write

b. In the displayed dialog box, click **Add**.

Permissions for work01		×
Security		
Object name: C:\work01		
Group or user names:		
CREATOR OWNER		
SYSTEM		
🚨 Administrators (/\Administrate	ors)
🤽 Users (\Users)	
	Add	Remove
Permissions for CREATOR OWNER	Allow	Deny
Full control		
Modify		
Read & execute		
List folder contents		
Read		
L		
ОК	Cancel	Apply

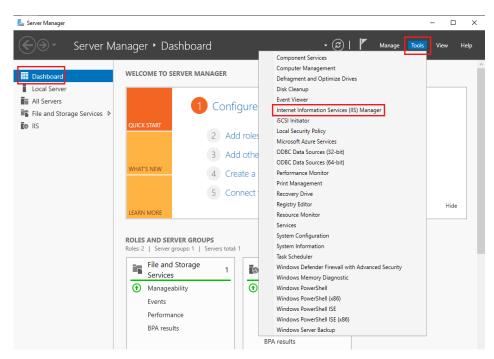
c. In the displayed dialog box, click **Advanced**.

Select Users or Groups	×
Select this object type:	
Users, Groups, or Built-in security principals	Object Types
From this location:	
	Locations
Enter the object names to select (<u>examples</u>):	
I	Check Names
Advanced OK	Cancel

d. In the displayed dialog box, click **Find Now**, select **Everyone** in search results, and click **OK**.

Select Users or Gr	oups			×
Select this object ty				
Users, Groups, or	Built-in security pr	incipals	 Object 7	Types
From this location:				
	•		Locati	ons
Common Queries				
Name: S	Starts with \sim			Columns
Description:	Starts with \sim			Find Now
Disabled acc	counts			Stop
Non expiring	password			
Days since last	logon:	\sim		<i>9</i> 7
Search results:			ОК	Cancel
Name	In Folder			^
🌡 DefaultAccount	Contraction of the			
Device Owners	Constant of	L.		
DIALUP				
Bistributed C	1000			
Everyone				
5 ftpadmin	1000			
Guest				
Guests	10100			
Hyper-V Admi	(addition)			~

- e. Click **OK** to return to the permissions page.
- f. Click **OK**.
- 3. Create a server certificate.
 - a. In Server Manager, choose Dashboard > Tools > Internet Information Services (IIS) Manager.



b. In the left list, click the server. Under **IIS** area, double-click **Server Certificates**. The **Server Certificates** page is displayed.

💐 Internet Information Services (IIS) Manager	- 🗆 ×
		😐 🗠 😭 🕡 🗸
File View Help		
Connections		Actions
🔍 - 🔜 🖄 🥵	Home	Open Feature
Start Page	Filter: • 🐨 Go - 🥁 Show All Group by: Area •	Manage Server
	FTP ^ ^	Restart Start
		Stop
	FTP FTP FTP Directory FTP Firewall FTP IP FTP Logging	View Application Pools
	Authentic Authorizat Browsing Support Address a	View Sites
		Get New Web Platform Components
	FTP Logon FTP FTP Request FTP SSL FTP User Attempt R Messages Filtering Settings Isolation	Help
	IIS •	
	Authentic Compression Default Directory Error Pages Handler Document Browsing Mappings	
	👚 🔲 🏂 🛋	
	HTTP Logging MIME Types Modules Output Request Respon Caching Filtering	
	Server Worker Certificates Processes	
	Management 💦 🔪 🗸	
< >	Features View 💦 Content View	
Ready		€ <u>1</u> .:

c. Click Create Self-Signed Certificate.

💐 Internet Information Services (IIS) N	Manager			- 🗆 ×
← →	₩ +			🔯 🖂 🟠 🔞 -
File View Help				
Connections	Server Certifica	tos		Actions
Q				Import
Start Page	Use this feature to request and manage certificates that the Web server can use with websites configured for SSL.			Create Certificate Request Complete Certificate Request
Application Pools	Application Pools websites configured for SSL.			
> - 🔞 Sites	Filter: • 🐨	Go 👻 🙀 Show All Group by:	No Grouping •	Create Domain Certificate
	Name	Issued To	Issued By	Create Self-Signed Certificate.
				Enable Automatic Rebind of Renewed Certificate
				😢 Help

d. Specify a certificate name, select a certificate storage type, and click OK.

Create Self-Signed Certificate	?	Х
Specify Friendly Name		
Specify a file name for the certificate request. This information can be sent to a certificate authority for signing:		
Specify a friendly name for the certificate:		
SSL-FTP		
Select a certificate store for the new certificate:		
Personal V		
ОК	Cancel	

The created certificate is displayed on the **Server Certificates** page.

Internet Information Services (IIS)	Manager				– 🗆 ×
< → <	V •				🔛 🖂 🟠 🔞 •
File View Help					
Connections		ertificates		Ac	tions
😂 🗸 🔚 🖄 😪	Server Ce	entificates			Import
 Start Page Application Pools 	Use this feature to requ websites configured for	est and manage certificates that the We r SSL.	b server can use with		Create Certificate Request Complete Certificate Request
> log Sites	Filter:	🗸 🖙 Go 👒 🥁 Show All 🛛 Group	by: No Grouping -		Create Domain Certificate
	Name	Issued To	Issued By		Create Self-Signed Certificate.
	SSL-FTP	with some of the straightfull			View
					Export
				\sim	Remove
					Enable Automatic Rebind of Renewed Certificate
					Help

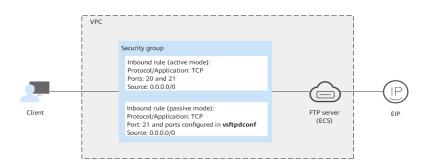
6.1.3 Setting Up an FTP Site (Linux)

Application Scenarios

The best practices for Huawei Cloud ECS guide you through the setup of an FTP site on a Linux ECS using very secure FTP daemon (vsftpd). vsftpd is an FTP server software that is widely used in Linux releases. The CentOS 7.2 64bit OS is used as an example in this section.

Architecture

Figure 6-1 Setting up an FTP site (Linux)



Advantages

- A website with a simple networking architecture can be quickly set up.
- The website is secure and easy to use.

Resource and Cost Planning

Table 6-3 Resources and costs

Resource	Description	Cost
VPC	VPC CIDR block: 192.168.0.0/16	Free
Subnet	 AZ: AZ1 CIDR block: 192.168.0.0/24 	Free

Resource	Description	Cost
Security group	 Inbound rule (active mode): Priority: Set it to 1. Action: Select Allow. Type: Select IPv4. Protocol & Port: Set it to TCP: 20-21. Source: Set it to 0.0.0/0. Inbound rule (passive mode): Priority: Set it to 1. Action: Select Allow. Type: Select IPv4. Protocol & Port: Set it to TCP: 21 and ports configured in vsftpdconf Source: Set it to 0.0.0/0. 	Free
ECS	 Billing mode: Yearly/ Monthly AZ: AZ1 Flavor: s6.large.2 Image: CentOS 7.2 64bit System disk: 40 GiB EIP: Auto assign EIP type: Dynamic BGP Billed by: Traffic Bandwidth: 5 Mbit/s 	The following resources generate costs: • ECSs • EVS disks • EIPs For billing details, see Billing Modes .
vsftpd	A free, open-source FTP software.	Free

Process

The process of manually setting up an FTP website on a Linux ECS is as follows:

- 1. Install vsftpd.
- 2. Configure vsftpd.

- 3. Configure a security group.
- 4. Verify the configuration on the client.

Procedure

Step 1 Install vsftpd.

- 1. Log in to the ECS.
- 2. Run the following command to install vsftpd:

yum install -y vsftpd

If information similar to the following is displayed, vsftpd has been installed.

Dependencies Resolu	ved			
Package	Arch	Version	Repository	Size
Installing: vsftpd	x86_64	3.0.2-22.e17	base	169 k
Transaction Summary				
Install 1 Package				
Total download size Installed size: 348	l k			
Downloading package vsftpd-3.0.2-22.e17	2.×86_64.rpm		i 169 kB	00:00:00
Running transaction Running transaction Transaction test su	ı test			
Running transaction Installing : vsft				1/1 1/1
Installed: vsftpd.x86_64 0:3	8.0.2-22.e17			

3. Run the following command to configure automatic FTP enabling upon ECS startup:

systemctl enable vsftpd.service

4. Run the following command to start FTP:

systemctl start vsftpd.service

5. Run the following command to obtain the port running FTP:

netstat -antup | grep ftp

Information similar to the following is displayed.

tcp6	0	0 :::21	:::*	LISTEN	11836/vsftpd
------	---	---------	------	--------	--------------

Step 2 Configure vsftpd.

After vsftpd is installed, anonymous FTP is enabled by default, allowing you to log in to the FTP server without requiring the login username and password. However, you are not allowed to modify or upload files. If you attempt to log in to the FTP server using the Linux OS account, your request will be rejected by vsftpd, but you are allowed to configure the username and password in vsftpd for logging in to the FTP server. To do so, perform the following operations:

1. Create a user.

For example, to create user **ftpadmin**, run the following command:

useradd ftpadmin

- 2. Run the following command to configure the password of user **ftpadmin**: **passwd ftpadmin**
- 3. Run the following command to create a file directory for the FTP server, **/var/ftp/work01** is used as an example:

mkdir /var/ftp/work01

4. Run the following command to change the owner of the created file directory to the local user for logging in to the FTP server:

chown -R ftpadmin:ftpadmin /var/ftp/work01

- 5. Modify the **vsftpd.conf** configuration file.
 - a. Run the following command to open the file:

vi /etc/vsftpd/vsftpd.conf

- b. Press i to enter insert mode.
- c. Modify the **vsftpd.conf** file.

Set FTP to active or passive mode based on site requirements. If other Huawei Cloud ECSs are required to use public IP addresses to access the FTP site that is set up on a Huawei Cloud ECS, set FTP to passive mode.

Parameters to be conf	figured for the active FTP mode:
, <u>,</u>	E FTP server is allowed. Local users are allowed to log in to
the FTP server with their loca	
anonymous_enable=NO	#No anonymous login to the FTP server is allowed.
local_enable=YES	#Local users are allowed to log in to the FTP server.
local_root=/ var/ftp/work01	#Specifies the file directory used by a local FTP user.
#The following parameter al	llows login users to visit their own home directories:
chroot local user=YES	#The directory access rule applies to all users.
chroot list enable=YES	#The directory access rule does not apply to
exclusive users	

chroot_list_file=/etc/vsftpd/chroot_list #Specifies exclusive users. allow writeable chroot=YES

 Apart from the parameters configured in active FTP mode, the following parameters are also required for passive FTP mode: #The public IP address of the FTP server and the range of accessible ports must also be

configured. listen=YES listen_ipv6=NO pasv_address= <i>xx.xx.xx.xx</i>	#Public IP address of the FTP server
pasv_min_port= 3000	#Minimum port number in passive FTP mode
pasv_max_port= 3100	#Maximum port number in passive FTP mode

- d. Press **Esc** to exit insert mode. Then, enter **:wq** to save the settings and exit.
- e. Create the **chroot_list** file in **/etc/vsftpd/**.

touch chroot_list

The **chroot_list** file contains exclusive users to whom the home directory access rules do not apply. To allow a user to access non-home directories, add the username to this file. If there is no exclusive user, the **chroot_list** file can be left blank, but the file must be available.

6. Run the following command to restart vsftpd for the configuration to take effect:

systemctl restart vsftpd.service

Step 3 Configure a security group.

After setting up the FTP site, add a rule in the inbound direction of the security group to allow packets to pass through the FTP port. For details, see **Adding a Security Group Rule**.

Priori ty	Acti on	Туре	Protocol & Port	Source Address
1	Allo w	IPv4	Protocols/TCP (Custom): 20-21	0.0.0.0/0
1	Allo w	IPv4	Protocols/TCP (Custom): 1024-65535 (for example, 5000-6000)	0.0.0/0

 Table 6-4 Security group rules

Step 4 Verify the configuration on the client.

On the computer with the client installed, enter **ftp://***IP* address of the FTP server.FTP port number in the Internet Explorer address bar. If you do not specify the port number, port 21 is used by default. If a dialog box is displayed for you to enter the username and password, the configuration is correct. After entering the username and password, you can perform operations on the FTP folder with assigned permissions.

- If active FTP mode is selected, use this method to configure the Internet Explorer browser. Otherwise, the FTP folder will be inaccessible. To configure the Internet Explorer browser, choose Tools > Internet Options > Advanced, select Enable FTP folder view, and deselect Use Passive FTP.
- If an error occurs when you use a browser to access the FTP server, clear the browser caches and try again.

----End

6.2 Building Microsoft SharePoint Server 2016

6.2.1 Purchasing and Logging In to an ECS

Purchase an ECS on Huawei Cloud with specified specifications and OS.

- 1. Log in to the management console.
- 2. Click 💿 in the upper left corner and select the desired region and project.
- 3. Under Compute, click Elastic Cloud Server.
- 4. Click **Buy ECS**.

The **Buy ECS** page is displayed.

Configure ECS parameters.
 For details, see Purchasing an ECS.

Figure 6-2 Setting ECS specifications

Instance Selection	By Type By Scenario						
CPU Architecture	x86 Kunpeng	D					
Specifications	Latest generation 💌	vCPUs -Select vCPUs-	Memory -Select Memo	ry- + Flavor Name	•	Q Hide sold-out specificati	ons
	General computing-plus	General computing Memory-	optimized Large-memory	/ Disk-intensive	Ultra-high I/O GPU-a	Al-accelerated Al-accelerated	General computing-basic
	Select All \$7 Collapse Help ^	s6 s3					
	General computing ECSs provide a	balance of compute, memory, and network	resources with a baseline level of v	/CPU performance and the ability to	o deliver occasional bursts of extra	compute above this baseline.	
	EC\$ Type	Flavor Name	vCPUs ≑	Memory 💠	CPU \$	Assured / Maximum ⑦ Bandwidth	Packets Per Second (?) 🖨
	 General computing s6 	s6.small.1	1 vCPU	1 GiB	Intel Cascade Lake 2.6GHz	0.1 / 0.8 Gbit/s	100,000 PPS
	General computing s6	s6.medium.2	1 vCPU	2 GIB	Intel Cascade Lake 2.6GHz	0.1 / 0.8 Gbit/s	100,000 PPS
	General computing s6	s6.medium.4	1 vCPU	4 GIB	Intel Cascade Lake 2.6GHz	0.1 / 0.8 Gbit/s	100,000 PPS
	 General computing s6 	s6.large.2	2 vCPUs	4 GiB	Intel Cascade Lake 2.6GHz	0.2 / 1.5 Gbit/s	150,000 PPS
	General computing s6	ső.large.4	2 vCPUs	8 GiB	Intel Cascade Lake 2.6GHz	0.2 / 1.5 Gbit/s	150,000 PPS
	General computing s6	s6.xlarge.2	4 vCPUs	8 GIB	Intel Cascade Lake 2.6GHz	0.35 / 2 Gbit/s	250,000 PPS
	General computing s6	s6.xlarge.4	4 vCPUs	16 GIB	Intel Cascade Lake 2.6GHz	0.35 / 2 Gbit/s	250,000 PPS
	Selected specifications Ge	neral computing s6.large.2 2 vCPUs	4 GiB				

Figure 6-3 Setting the network

Network	vpc-f00373897(192.168.0.0/16) Create VPC	* C	subnet-f0037389	¥7-01(192.168.0.0/24) ▼	C Automatically assign IP as	ddress	ivate IP addresses: 249
Extension NIC	Add NIC NICs you can still add: 1						
Source/Destination Che	eck 🚺						
Security Group	Sys-WebServer(13e7c18e99c464ee7 Similar to a frewall a security group opcou- Ensure that the selected security group allo Security Group Rules Inbound Rules Outbound Rules	ly controls n ws access t	network access.	C Create Security Group d Linux login), 3389 (Window). Configure Security Group Rules	
	Security Group Name	Priority		Action	Protocol & Port ⑦	Туре	Source (?)
		1		Permit	TCP: 111	IPv4	0.0.0/0
		1		Permit	UDP: 111	IPv4	0.0.0/0
		1		Permit	TCP: 2049	IPv4	0.0.0/0
		1		Permit	TCP: 2052	IPv4	0.0.0/0
	Sue MahSanuer	1		Permit	TCP: 2051	IPv4	0.0.0.0/0
EIP	Auto assign Use existing C	Not requir	ed				
EIP Type	Dynamic BGP	Stat	tic BGP				
Billed By	 Greater than or equal to 99.95% service Bandwidth de For heavy/stable traffic Billed based on usage duration and bandwidth 	Traffic For light/s	rate harply fluctuating tra	ffic Shared bar For staggere			

ECS Name	ecs-3fbc Allow duplicate name
	If you are creating multiple ECSs at the same time, automatic naming and customizable naming are available for you to select.
Description	
	0/85
Login Mode	Password Key pair
Username	Administrator
Password	Keep the password secure. If you forget the password, you can log in to the ECS console and change it.
	······ @
Confirm Password	······ @
Cloud Backup and	To use CBR, you need to purchase a backup vault. A vault is a container that stores backups for servers.
Recovery	
	Create new Use existing Not required ?
	CBR backups can help you restore data in case anything happens to your ECS. To ensure data security, you are advised to use CBR.
ECS Group (Optional)	Anti-affinity (?)
	-Select ECS group-
	Create ECS Group

Figure 6-4 Setting the login mode and ECS name

- 6. Confirm the ECS configuration, and read and agree to the agreement.
- 7. Click **Submit** and wait for the ECS creation to complete.
- 8. In the ECS list, locate the ECS you created and click **Remote Login** in the **Operation** column.
- 9. Enter the password of the ECS to log in.

6.2.2 Adding AD, DHCP, DNS, and IIS Services

1. Choose Server Manager > Local Server and set IE Enhanced Security Configuration to Off.

🔏 In	ternet Explorer Enhanced Security Configuration
expos Intern	et Explorer Enhanced Security Configuration (IE ESC) reduces the ure of your server to potential attacks from Web-based content. et Explorer Enhanced Security Configuration is enabled by It for Administrators and Users groups.
Admin	istrators:
۲	○ On (Recommended)
۲	● off
Users:	
۲	○ On (Recommended)
8	● off
More a	about Internet Explorer Enhanced Security Configuration
	OK Cancel

Figure 6-5 Internet Explorer Enhanced Security Configuration

- 2. Choose Server Manager > Dashboard.
- 3. Click **Add roles and features** to add roles and functions for the server, including DNS, DHCP, IIS, and Net Framework 3.5.

Figure 6-6 Add roles and features

<u>à</u>		Ser	ver Manager			_ 0	x
Server Ma	anager 🕨 Dashb	oard		• 🕲 I 🧗	Manage Tools	View He	яþ
Dashboard Local Server All Servers File and Storage Services	QUICK START		gure this local se	rver			
	WHAT'S NEW	4 Cre	d other servers to ma eate a server group nnect this server to clo	5			
	LEARN MORE					Hide	≡
	ROLES AND SERVER (Roles: 1 Server groups: File and Store Services	1 Servers total	1 Local Server	1			
	Manageability		 Manageability 				
	Events		Events				
	Performance BPA results		3 Services Performance				
	DEATESUIS		BPA results				
			6	/28/2018 9:08			
						9:1	×
	1				- 🕼	12 R 6/28/	

4. On the Server Roles page, select Active Directory Domain Services, DHCP Server, DNS Server, and Web Server (IIS).

Figure 6-7 Server role 1

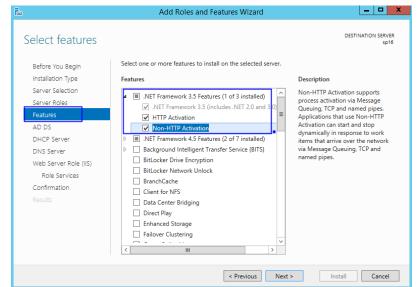
te de la companya de	Add Roles and Features Wizard				
Select server role	S	DESTINATION SERVER sp16			
Before You Begin Installation Type Server Selection Server Roles Peatures AD DS DHCP Server DNS Server Web Server Role (IIS) Role Services Confirmation Results	Select one or more roles to install on the selected server. Roles Active Directory Certificate Services Active Directory Domain Services Active Directory rederation Services Active Directory Rights Management Services Application Server Directory Roles Services (1 of 12 installed) Hyper-V Network Policy and Access Services Print and Document Services Remote Access Remote Desktop Services V	Description Web Server (IIS) provides a reliable, manageable, and scalable Web application infrastructure.			
	< Previous Next	> Install Cancel			

Figure 6-8 Server role 2

b	- - X	
Select server roles Before You Begin	Select one or more roles to install on the selected server.	DESTINATION SERVER sp16
Installation Type Server Roles Features AD DS DHCP Server DNS Server Web Server Role (IIS) Role Services Confirmation Results	Roles Application Server DHCP Server Fax Server Fax Server III File and Storage Services (1 of 12 installed) Hyper-V Network Policy and Access Services Print and Document Services Remote Access Remote Desktop Services Volume Activation Services Windows Deployment Services Windows Server Essentials Experience Windows Server Update Services	
	< Previous Ne	ext > Install Cancel

- 5. Click **Next**.
- 6. On the Features page, select .NET Framework 3.5 Features.

Figure 6-9 Features



- 7. Click **Next** until the configuration is complete.
- 8. On the Confirmation page, select Restart the destination server automatically if required.

Figure 6-10 Confirm installation selections

2	Add Roles and Features Wizard	X
Confirm installatio		DESTINATION SERVER sp16
Before You Begin	To install the following roles, role services, or features on selected server, click	Install.
Installation Type	Restart the destination server automatically if required	
Server Selection Server Roles Features	Optional features (such as administration tools) might be displayed on this pay been selected automatically. If you do not want to install these optional featur their check boxes.	
AD DS	.NET Framework 3.5 Features	^
DHCP Server	HTTP Activation Non-HTTP Activation	=
DNS Server Web Server Role (IIS)	.NET Framework 4.5 Features ASP.NET 4.5	
Role Services Confirmation	Active Directory Domain Services DHCP Server	
Results	DNS Server	
	Group Policy Management Remote Server Administration Tools	~
	Export configuration settings Specify an alternate source path	
	< Previous Next >	Install Cancel

- 9. Click Install to start installation.
- 10. After the installation is complete, click **Promote this server to a domain** controller to configure the AD service.

Figure 6-11 AD configuration

	View installation progress	
	 Feature installation 	
	Configuration required. Installation succeeded on ecs-sharepoint.	
	Active Directory Domain Services	-
	Additional steps are required to make this machine a domain controller.	
	Promote this server to a domain controller	
	DHCP Server Launch the DHCP post-install wizard	
	Complete DHCP configuration	
	.NET Framework 3.5 Features	
	HTTP Activation	
Results	Non-HTTP Activation	
	.NET Framework 4.5 Features	

11. Choose Add a new forest. Set Root domain name to sp160.com.cn.

Figure 6-12 Add a new forest

b	Active Directory Domain Services Configuration Wizard	_ D X
Deployment Configuration Domain Controller Options Additional Options Paths Review Options Prerequisites Check Installation Results		TARGET SERVER
	More about deployment configurations	Cancel

- 12. Click Next.
- 13. Set the password, which is used to back up and restore the domain controller.

Figure 6-13 Password setting

🚡 Active Directory Domain Services Configuration Wizard 📃 🗖 🗙					
Domain Controller	r Options		TARGET SERVER		
Deployment Configuration Domain Controller Options DNS Options Additional Options Paths Review Options Prerequisites Check Installation Results	Select functional level of the new forest Forest functional level: Domain functional level: Specify domain controller capabilities Ormain Name System (DNS) server Global Catalog (GC) Read only domain controller (RODC)	Windows Server 2012 R2 Windows Server 2012 R2	_		
	Type the Directory Services Restore Mod Password: Confirm password: More about domain controller options	•••••••			
< Previous Next > Install Cancel					

- 14. Click **Next** until the installation is complete.
- 15. Click **Complete DHCP configuration** to configure the DHCP function.

Figure 6-14 DHCP configuration 1

à		Server Manager	_ 0 ×
Server M	anager • Dashboard	🛛 🕑 🍢 Manage Tools	View Help
Dashboard Local Server All Servers	WELCOME TO SERVER MANAG	Post-deployment Configura TAXS V X Configuration required for DHCP Server at ECS- SHAREPOINT Complete DHCP configuration	
副 AD DS 弾 DHCP の DNS	QUICK START	Task Details "Add roles and reatures	
File and Storage Services ▷ 【● IIS	3 WHAT'S NEW 4	Add other servers to manage Create a server group	
	5	Connect this server to cloud services	

16. Retain the default settings and click Next.

Figure 6-15 DHCP configuration 2

a	DHCP Post-Install configuration wizard	_ D X
Authorization Description Authorization Summary	DHCP Post-Install configuration wizard Specify the credentials to be used to authorize this DHCP server in AD DS. Use the following user's credentials User Name: Specify Specify	_ D X
	Skip AD authorization < Previous Next > Commit	Cancel

- 17. Click Commit.
- 18. After the configuration is complete, click **Close**.

6.2.3 Installing SQL Server

1. Double-click **Setup.exe** to open the SQL Server installation center.

Figure 6-16 SQL Server installation center

1	SQL Server Installation Center	×
Planning	Hardware and Software Requirements	^
Installation	View the hardware and software requirements.	
Maintenance	Security Documentation	
Tools	View the security documentation.	
Resources	1 Online Release Notes	=
Advanced	View the latest information about the release.	
Options	How to Get SQL Server Data Tools	
	SQL Server Data Tools provides an integrated environment for database developers to carry out all their database design work for any SQL Server platform.	
	System Configuration Checker	
	Launch a tool to check for conditions that prevent a successful SQL Server installation.	
	Install Upgrade Advisor	
	Upgrade Advisor analyzes any SQL Server 2012, SQL Server 2008 R2, SQL Server 2008 or SQL Server 2005 components that are installed and identifies issues to fix either before or after you upgrade to SQL Server 2014.	
	Conline Installation Help	
	Launch the online installation documentation.	
	How to Get Started with SQL Server 2014 Failover Clustering	
	Read instructions on how to get started with SQL Server 2014 failover clustering.	
	How to Get Started with a PowerPivot for SharePoint Standalone Server Installation	
Microsoft SQL Server 2014	Read instructions on how to install PowerPivot for SharePoint in the fewest possible steps on a new SharePoint 2010 server.	
		~

2. On the **Installation** page, click the first option.

5	SQL Server Installation Center
Planning Installation Maintenance Tools Resources Advanced Options	SQL Server installation Center Image: SQL Server stand-alone installation or add features to an existing installation Launch a wizard to install SQL Server 2014 in a non-clustered environment or to add features to an existing SQL Server 2014 inistance. Image: SQL Server failover cluster installation Launch a wizard to install a single-node SQL Server 2014 failover cluster. Image: SQL Server failover cluster Launch a wizard to add a node to an existing SQL Server 2014 failover cluster. Image: SQL Server failover cluster Launch a wizard to add a node to an existing SQL Server 2014 failover cluster. Image: SQL Server failover cluster Launch a wizard to add a node to an existing SQL Server 2008 R2 or SQL Server 2012 Launch a wizard to upgrade SQL Server 2005, SQL Server 2008, SQL Server 2008 R2 or SQL Server 2012 to SQL Server 2014.
Microsoft SQL Server 2014	

Figure 6-17 SQL Server installation options

3. Select **Specify a free edition** to install SQL Server with a free image.

To set up an official SharePoint environment, you need to enter a key to install a full edition of SQL Server.

Figure 6-18 SQL Server free edition

1	SQL Server 2014 Setup	x
Product Key Specify the edition of SQL Se	erver 2014 to install.	
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Rules Setup Role Feature Selection Feature Configuration Rules Ready to Install Installation Progress Complete	Validate this instance of SQL Server 2014 by entering the 25-character key from the Microsoft certificate of authenticity or product packaging. You can also specify a free edition of SQL Server, suc as Evaluation or Express. Evaluation has the largest set of SQL Server features, as documented in SQL Server Books Online, and is activated with a 180-day expiration. To upgrade from one edition to another, run the Edition Upgrade Wizard. © Specify a free edition: Evaluation C Enter the product key: NQGJR-63HC8-XCRQH-MYVCH-333QR	
	< Back Next > Can	cel

4. Select I accept the license terms and click Next.

Figure 6-19 SQL Server license option

15	SQL Server 2014 Setup	
License Terms To install SQL Server 2014, yo	u must accept the Microsoft Software License Terms.	
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Rules Setup Role Feature Selection	MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SQL SERVER 2014 EVALUATION These license terms are an agreement between Microsoft Corporation live, one of its affiliates) and you. Please read them. They apply to the named above, which includes the media on which you received it, if an any Microsoft • updates,	evaluation software
Feature Rules Feature Configuration Rules Ready to Install Installation Progress Complete	Complement I accept the license terms. Turn on Customer Experience Improvement Program ("CEIP") and Error R quality, reliability and performance of Microsoft SQL Server 2014. See the Microsoft SQL Server 2014 Privacy Statement for more information. * Microsoft SQL Server 2014 also includes a Visual Studio component that w off by default. If Visual Studio is installed, this component will use the CEIP s	ill have CEIP settings turned
	< Back	Next > Cancel

- 5. Click **Next** to install **Microsoft Updates**, **Install Rules**, and **Setup Role** using the default settings.
- 6. Click **Select All** to select all features and click **Next**.

Figure 6-20 SQL Server Feature Selection

5	SQL Server 2014 Setup	
Feature Selection	o install.	
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Rules Setup Role Feature Selection	Features: Instance Features Database Engine Services SQL Server Replication Interplied Content of Seat Analysis Services Reporting Services - Native Shared Features Reporting Services - SharePoint	Feature description: The configuration and operation of each instance feature of a SQL Server instances is isolated from other SQL Server instances. SQL Server instances can operate side-by-side on Prerequisites for selected features: Already installed: Windows PowerShell 2.0 Microsoft.NFT Framework 3.5 III >>
Feature Rules Instance Configuration Server Configuration Database Engine Configuration Analysis Services Configuration	Reporting Services Add-in for SharePoint Proc Data Quality Client Client Tools Connectivity Integration Services III Select All Inselect All	Disk Space Requirements Drive C: 6028 MB required, 14583 MB available
Reporting Services Configuration Distributed Replay Controller Distributed Replay Client Feature Configuration Rules Ready to Install	Instance root directory: C:\Program Files\A Shared feature directory: C:\Program Files\A	Aicrosoft SQL Server\

7. Select **Default instance**.

Figure 6-21 SQL Server instance

1	SQL Se	erver 2014 S	etup		_ D X		
Instance Configuration Specify the name and instance ID for the instance of SQL Server. Instance ID becomes part of the installation path.							
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files	Default instance Named instance:	MSSQLSERVE	R				
	Instance ID:	MSSQLSERVE	R				
Install Rules Setup Role Feature Selection	SQL Server directory: Analysis Services directory:	-		QL Server\MSSQL12.MS QL Server\MSAS12.MSS			
Feature Rules Instance Configuration Server Configuration	Reporting Services directory: Installed instances:	C:\Program F	iles\Microsoft S	QL Server\MSRS12.MSS0	2LSERVER		
Database Engine Configuration Analysis Services Configuration Reporting Services Configuration Distributed Replay Controller Distributed Replay Client Feature Configuration Rules Ready to Install	Instance Name Instan	nce ID	Features	Edition	Version		
			< Back	Next > Can	cel Help		

- 8. Set SQL Server configurations.
 - Change the account name of SQL Server Database Engine to NT AUTHORITY\NETWORK SERVICE.
 - Set the account and password of SQL Server Analysis Services to those configured in steps 11 to 13 in Adding AD, DHCP, DNS, and IIS Services.

Figure 6-22 SQL Server service accounts

3	SQL Server 201	4 Setup			
Server Configuration					
Specify the service accounts and	collation configuration.				
Product Key	Service Accounts Collation				
License Terms Global Rules	Microsoft recommends that you use	a separate account for each	SQL Server servic	e.	
Microsoft Update	Service	Account Name	Password	Startup Type	
Product Updates	SQL Server Agent	NT Service\SQLSERVERA		Manual	~
Install Setup Files	SQL Server Database Engine	NT AUTHORITY\NETW		Automatic	~
Install Rules	SQL Server Analysis Services	sp160\Administrator	•••••	Automatic	~
Setup Role	SQL Server Reporting Services	NT Service\ReportServer		Automatic	~
Feature Selection	SQL Server Integration Services 12.0	NT Service\MsDtsServer		Automatic	~
Feature Rules	SQL Server Distributed Replay Client	NT Service\SQL Server D		Manual	~
Instance Configuration	SQL Server Distributed Replay Con	NT Service\SQL Server D		Manual	~
Server Configuration	SQL Full-text Filter Daemon Launc	NT Service\MSSQLFDLa		Manual	
Database Engine Configuration	SQL Server Browser	NT AUTHORITY\LOCAL		Disabled	~
Analysis Services Configuration					
Reporting Services Configuration					
Distributed Replay Controller					
Distributed Replay Client					
Feature Configuration Rules					

9. Click **Add Current User** to set the current account as the SQL Server administrator account, and click **Next**.

Figure 6-23	SQL Server administrator account 1	SQL Server	
*	SOL Server 2014 Setun		

1	SQL Server 2014 Setup	
Database Engine Config Specify Database Engine auther	guration tication security mode, administrators and data directories.	
Product Key License Terms Global Rules Microsoft Update Product Updates Install Setup Files Install Rules Setup Role Feature Selection Feature Rules Instance Configuration Server Configuration Database Engine Configuration Analysis Services Configuration Reporting Services Configuration Distributed Replay Controller Distributed Replay Controller Distributed Replay Client Feature Configuration Rules Ready to Install	have unrest	administrators tricted access base Engine.
	< Back Next > Cancel	Help

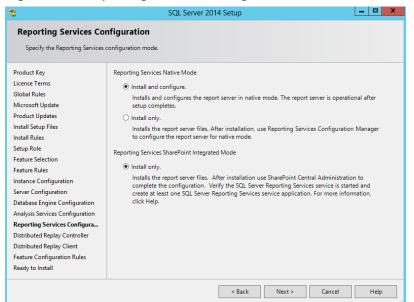
10. Click **Add Current User** to grant Analysis Services administrator permissions to the current account, and click **Next**.

Figure 6-24 SQL Server administrator account 2

	SQL Server 2014 Setup	
Analysis Services Confi	guration	
Specify Analysis Services server	modes, administrators, and data directories.	
Product Key	Server Configuration Data Directories	
License Terms	Server Mode:	
Global Rules	Multidimensional and Data Mining Mode	
Microsoft Update	Multidimensional and Data Mining Mode Tabular Mode	
Product Updates		
Install Setup Files	Specify which users have administrative permissions for Analysis Services.	
Install Rules	SP160\Administrator (Administrator)	Analysis Services
Setup Role		administrators have unrestricted access to
Feature Selection		Analysis Services.
Feature Rules		
Instance Configuration		
Server Configuration		
Database Engine Configuration		
Analysis Services Configuration		
Reporting Services Configuration		
Distributed Replay Controller		
Distributed Replay Client		
Feature Configuration Rules	Add Current User Add Remove	

11. Retain the default setting in **Reporting Services Configuration** and click **Next**.

Figure 6-25 Reporting Services Configuration



12. Click **Add Current User** to grant Distribution Replay Controller service permissions to the current account, and click **Next**.

Figure 6-26 Distribution Replay Controller service

5	SQL Server 2014 Setup	
Distributed Replay Co	ntroller	
Specify Distributed Replay Con	troller service access permissions.	
Product Key	Specify which users have permissions for the Distributed Replay Controller se	nvice.
License Terms	SP160\Administrator (Administrator)	Users that have been
Global Rules		granted permission will have
Microsoft Update		unlimited access to the
Product Updates		Distributed Replay Controller service.
Install Setup Files		
Install Rules		
Setup Role		
Feature Selection		
Feature Rules		
Instance Configuration		
Server Configuration		
Database Engine Configuration		
Analysis Services Configuration		
Reporting Services Configuration		
Distributed Replay Controller		
Distributed Replay Client		
Feature Configuration Rules		
Ready to Install	Add Current User Add Remove	
	< Back Next >	Cancel Help

13. Confirm SQL Server configurations and click Install.

5	SQL Server 2014 Setup	
Ready to Install		
Verify the SQL Server 2014 fea	tures to be installed.	
Product Key	Ready to install SQL Server 2014:	
License Terms	- Summary	
Global Rules	- Edition: Evaluation	1
Microsoft Update	Action: Install (Product Update)	
Product Updates	Prerequisites	- 1
Install Setup Files	Already installed: Windows PowerShell 2.0	
Install Rules		
Setup Role	Microsoft .NET Framework 4.0	
Feature Selection	□ To be installed from media:	
Feature Bules	Microsoft Visual Studio 2010 Redistributables	
Instance Configuration	Microsoft Visual Studio 2010 Shell	
-	Microsoft Visual Studio Tools for Applications 3.0	
Server Configuration	General Configuration	
Database Engine Configuration	Database Engine Services	
Analysis Services Configuration		
Reporting Services Configuration	Full-Text and Semantic Extractions for Search	-
Distributed Replay Controller	C Data Quality Servicer	>
Distributed Replay Client	Configuration file path:	
Feature Configuration Rules		
	C:\Program Files\Microsoft SQL Server\120\Setup Bootstrap\Log\20180703_202844\ConfigurationFile	ini

Figure 6-27 SQL Server installation

14. Click **Close**. The SQL Server installation is complete.

Figure 6-28 Finish SQL Server installation

6	SQL Server 2014 Setu	p 📃 🗖 🗴
Complete Your SOL Server 2014 installati	ion completed successfully with product updates.	
	, ,	
Product Key	Information about the Setup operation or possil	ple next steps:
License Terms	Feature	Status
Global Rules	Management Tools - Complete	Succeeded
Microsoft Update	Client Tools Connectivity	Succeeded –
Product Updates	Client Tools SDK	Succeeded
Install Setup Files	Client Tools Backwards Compatibility	Succeeded
Install Rules	Management Tools - Basic	Succeeded
Setup Role	Reporting Services - Native	Succeeded
Feature Selection		
Feature Rules	Details:	
	Details:	
Instance Configuration	Viewing Product Documentation for SQ	Server ^
Server Configuration	Only the components that you use to view of	and manage the documentation for SQL Server have
Database Engine Configuration		component uses the online library. After installing
Analysis Services Configuration	SQL Server, you can use the Help Library N	lanager component to download documentation to
Reporting Services Configuration		see Use Microsoft Books Online for SQL Server
Distributed Replay Controller	(<http: ?linkid="29</td" fwlink="" go.microsoft.com=""><td><u>9578></u>).</td></http:>	<u>9578></u>).
Distributed Replay Client	Summary log file has been saved to the followin	g location:
Feature Configuration Rules	C:\Program Files\Microsoft SQL Server\120\Setu	- un Bootstran) og\ 20180703_202844
Ready to Install	\Summary sp16_20180703_202844.txt	19 0003009/20100103 202044
includy to instan		
		Close Help

6.2.4 Installing Microsoft SharePoint Server 2016

1. Open the image file and double-click the executable file of the preparation tool to install SharePoint 2016 preparation tool.

inguit 0 25	ShareFoint prepar				
🖾 l 💽 🔝 = l	Application Tools	DVD Drive (D:) 16.	0.4351.1000	_ _ ×	
File Home Share	View Manage			^	?
Copy Paste X Cut Copy Paste Paste sho	Move Conv Delete Rename	New item *	Properties	Select all Select none	1
Clipboard	Organize	New	Open	Select	
🔄 💿 🝷 🕇 🔛 🕨 Tł	nis PC DVD Drive (D:) 16.0.4351.1000	~	C Search DVD Drive	e (D:) 16.0.435 🔎	
🛠 Favorites	Name	Date modified	Туре	Size	^
Desktop	🗟 api-ms-win-crt-locale-l1-1-0.dll	7/30/2015 5:30	Application extens	19 KB	
Downloads	🗟 api-ms-win-crt-math-I1-1-0.dll	7/30/2015 5:30	Application extens	28 KB	
Recent places	🗟 api-ms-win-crt-runtime-I1-1-0.dll	7/30/2015 5:30	Application extens	23 KB	
	🗟 api-ms-win-crt-stdio-l1-1-0.dll	7/30/2015 5:30	Application extens	25 KB	
🌉 This PC	🚳 api-ms-win-crt-string-l1-1-0.dll	7/30/2015 5:30	Application extens	25 KB	
膧 Desktop	🖾 autorun	5/29/2015 3:05	ICO File	2 KB	L
Documents	autorun	5/29/2015 3:05	Setup Information	1 KB	
🐌 Downloads	🖻 default	11/24/2015 17:22	HTA File	14 KB	
🜗 Music	prerequisiteinstaller	2/11/2016 2:13	Application	973 KB	
📔 Pictures	🖃 readme	9/24/2015 5:28	HTM File	1 KB	
Videos	🚳 setup	5/29/2015 3:05	Windows Comma	1 KB	=
🊢 Local Disk (C:)	🚳 setup.dll	11/26/2015 0:29	Application extens	763 KB	
💹 DVD Drive (D:) 16.0.4		7/31/2015 22:05	Application	257 KB	
	splash	7/30/2015 14:27	HTA File	3 KB	
👊 Network	🚳 svrsetup.dll	2/11/2016 2:13	Application extens	12,959 KB	
	🚳 ucrtbase.dll	7/30/2015 5:30	Application extens	960 KB	
	🚳 vcruntime140.dll	7/30/2015 5:30	Application extens	87 KB	~
27 items 1 item selected	972 KB			8== 8	-

Figure 6-29 SharePoint preparation tool

- 2. Open the installation wizard of the SharePoint preparation tool and click **Next**.
 - Figure 6-30 SharePoint preparation tool installation wizard

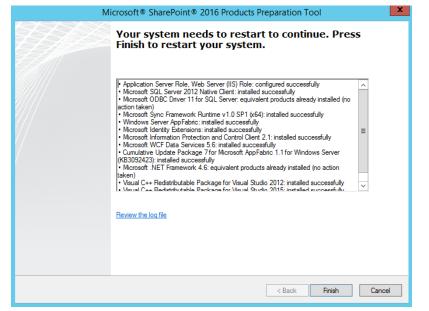


3. Select I accept the terms of the License Agreement(s) and click Next.

Microsoft® SharePoir	nt® 2016 Products Preparation Tool
cense Terms for software products. This solution requires that you install each of the follo review the license terms.	owing software modules and agree to their license terms. Please
MICROSOFT SOFTWARE LICENSE TERM	MS
Below are two sets of Licen	se Terms that cover twelve different
Microsoft products. The products	ducts covered by these license terms
are:	
LICENSE 1	
Microsoft Windows Management Fr	ramework 3.0
LICENSE 2	
	<u> </u>
Be sure to carefully read and understand all of the rigit the EULA before the products can be downloaded ar	hts and restrictions described in the EULA. You must accept the terms of nd installed on your computer.
I have used surdensheed and save discharge of a	الم
I have read, understood, and agreed to the terms of t terms of the License Agreement(s)" and using these p	the End User License Agreement(s) and so signify by clicking "I accept the products.
▼ I accept the terms of the License Agreement(s)	1
I accept the terms of the License Agreement(s)	

- CULUR TOULS CONTOUR
- 4. After the preparation tool is installed, click **Finish** to restart the system.

Figure 6-32 Successful preparation tool installation



5. Double-click the installation file to install SharePoint.

Figure 6-33 Installing SharePoint

I 🕞 🔝 🖛 I		Application Tools		DVD Drive (D:) 16.	0.4351.1000	_ □	x
File Home Sha	are View	Manage					^ (
Copy Paste	Mov	Copy to *		New item *	Properties	Select all Select none Invert select	-
Clipboard		Organize		New	Open	Select	
• 🖻 🔹 🕈 💽	This PC + DVD	D Drive (D:) 16.0.4351	1.1000	~	C Search DVD Driv	e (D:) 16.0.435	Q,
Favorites	Name	*		Date modified	Туре	Size	F
Desktop	🚳 api-ms-	win-crt-locale-I1-1-	-0.dll	7/30/2015 5:30	Application extens	19 KB	
Downloads	🗟 api-ms	win-crt-math-I1-1-	0.dll	7/30/2015 5:30	Application extens	28 KB	
📃 Recent places	🚳 api-ms-	win-crt-runtime-I1-	-1-0.dll	7/30/2015 5:30	Application extens	23 KB	
	🚳 api-ms-	win-crt-stdio-I1-1-0	0.dll	7/30/2015 5:30	Application extens	25 KB	
🌉 This PC	🗟 api-ms-	win-crt-string-I1-1-	-0.dll	7/30/2015 5:30	Application extens	25 KB	
📜 Desktop 🛛 🗉	autorur 🔝	1		5/29/2015 3:05	ICO File	2 KB	
Documents	autorur 🗿	n		5/29/2015 3:05	Setup Information	1 KB	
🐌 Downloads	📄 default			11/24/2015 17:22	HTA File	14 KB	
Music	🚡 prerequ	iisiteinstaller		2/11/2016 2:13	Application	973 KB	
📔 Pictures	📄 readme			9/24/2015 5:28	HTM File	1 KB	
📔 Videos	🚳 setup			5/29/2015 3:05	Windows Comma	1 KB	
🊢 Local Disk (C:) 📃	🔊 setup.d			11/26/2015 0:29	Application extens	763 KB	
DVD Drive (D:) 1	🚺 setup			7/31/2015 22:05	Application	257 KB	
퉬 catalog	🖻 splash			7/30/2015 14:27	HTA File	3 KB	
퉬 files	🚳 svrsetu			2/11/2016 2:13	Application extens	12,959 KB	
鷆 global	🗟 ucrtbas			7/30/2015 5:30	Application extens	960 KB	
퉬 prerequisitein 🗸	🗸 🚳 vcruntii	me140.dll		7/30/2015 5:30	Application extens	87 KB	_ [
27 items 1 item select	ted 256 KB					8	

6. Enter the key of the SharePoint product. The key of the 180-day trial edition is **NQGJR-63HC8-XCRQH-MYVCH-3J3QR**.

Figure 6-34 SharePoint product key

\$	Microsoft SharePoint Server 2016 Trial	x
7	Enter your Product Key	0
	Need to find your Product Key? Your Product Key is 25 characters and is typically found in your product packaging. If you cannot find your Product Key, click the "Learn more about Product Keys and see examples" link. Learn more about Product Keys and see examples	
	NQGJR-63HC8-XCRQH-MYVCH-3J3QR	

7. Accept the license and click **Continue**.

Microsoft SharePoint Server 2016 Trial Read the Microsoft Software License Terms To continue you must accept the terms of this agreement. If you do not want to accept the Microsoft Software License Terms, close this window to cancel the installation. This installation contains the following software, the license terms of each of which are included below, respectively: 1. Microsoft Project Server 2016 2. Microsoft Project Server 2016 Scroll down to read these license terms. #1 MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SHAREPOINT SERVER 2016 Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to you. Your product key will determine which terms apply to you. If you have	
To continue you must accept the terms of this agreement. If you do not want to accept the Microsoft Software License Terms, close this window to cancel the installation. This installation contains the following software, the license terms of each of which are included below, respectively: 1. Microsoft SharePoint Server 2016 Scroll down to read these license terms. #1 MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SHAREPOINT SERVER 2016 Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to	
the Microsoft Software License Terms, close this window to cancel the installation. This installation contains the following software, the license terms of each of which are included below, respectively: 1. Microsoft SharePoint Server 2016 2. Microsoft Project Server 2016 Scroll down to read these license terms. #1 MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SHAREPOINT SERVER 2016 Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to	0
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#1 MICROSOFT EVALUATION SOFTWARE LICENSE TERMS MICROSOFT SHAREPOINT SERVER 2016 Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to	
MICROSOFT SHAREPOINT SERVER 2016 Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to	
Below are two separate sets of terms for Microsoft SharePoint Server 2016. Only one set of the Microsoft SharePoint Server 2016 terms applies to	
you. Your product key will determine which terms apply to you. If you have	
a Trial product key, then the Trial Terms below apply to you. If you do not have a Trial Product key, then the following Notice applies to you:	
NOTICE Your use of this software is subject to the terms and conditions of the license agreement by which you acquire this software. For instance, if you	
are:	
a volume license customer, use of this software is subject to your volume license agreement.	
A SDN customer use of this software is subject to the MSDN	

Figure 6-35 SharePoint license terms

8. Retain the default installation paths.

Figure 6-3	36 SharePoint	installation paths
------------	---------------	--------------------

5		Microsoft SharePoint Server 2016 Trial	X
	<u>F</u> ile Locatio	n	
		Choose a file location	0
		Microsoft SharePoint Server 2016 will be installed on your computer. To install this product in a different location, click Browse, and then select the location.	
		C:\Program Files\Microsoft Office Servers <u>B</u> rowse	
		If you intend to use this computer as a search server, the search index files will be stored on the local hard drive. These files can be very large, so ensure that there is sufficient free space on the selected drive. To change where Microsoft SharePoint Server 2016 will store its search index files, click Browse, and then select the location.	
		C:\Program Files\Microsoft Office Servers\16.0\Data	
		insta	I Now

- 9. Click Install Now.
- 10. After **SharePoint** is installed, select **Run the SharePoint Products Configuration Wizard now.** to run the SharePoint configuration wizard.

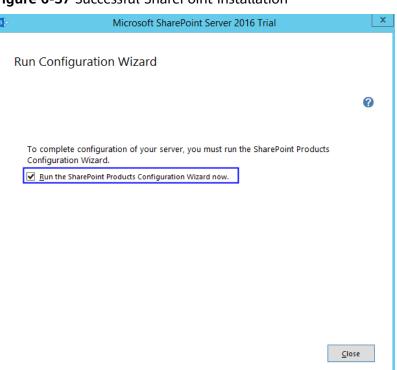
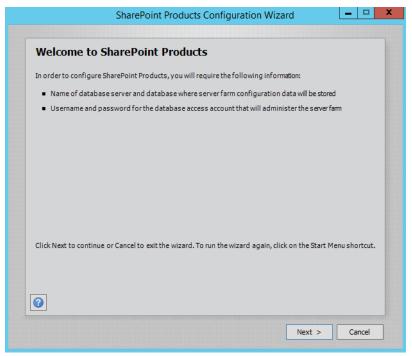


Figure 6-37 Successful SharePoint installation

6.2.5 Configuring Microsoft SharePoint Server 2016

1. In the SharePoint products configuration wizard, click Next.

Figure 6-38 SharePoint Products	Configuration Wizard
---------------------------------	-----------------------------



2. Click Yes to allow service restart during the configuration.

	e to SharePoint Products	
	database server and database where server farm configuration data will be stored	
 Upperson 	SharePoint Products Configuration Wizard	
d Click N	The following services may have to be started or reset during configuration: Internet Information Services SharePoint Administration Service SharePoint Timer Service Choose yes to restart the services if required and continue with the configuration wizard or no to exit the configuration wizard.	tcut.
0	Yes No	

Figure 6-39 Service restart prompt

3. Select Create a new server farm.

Figure 6-40 Creating a new server farm

Connect to	a server farn	ı			
A server farm is a co connect to an existi	ollection of two or mo ing server farm?	ore computers that share	e configuration	data. Do you wa	antto
	to an existing server new server farm	farm			

4. Specify configuration database settings. The SharePoint database is on the local host, so you need to enter the local database and account. Then, click **Next**.

SharePoint	Products Configuration Wizard
Specify Configuration Da	ntabase Settings
name. If the database does not exist, it v	configuration database. Type the database server and database will be created. To reuse an existing database, the database must be ding database server security configuration and network access
Database server:	
Database name:	SharePoint_Config
Specify Database Access Acco	unt
Select an existing Windows account that	this machine will always use to connect to the configuration
database. If your configuration databas	e is hosted on another server, you must specify a domain account.
· · ·	e is hosted on another server, you must specify a domain account.
Type the username in the form DOMAIN	e is hosted on another server, you must specify a domain account. User_Name and password for the account.
Type the username in the form DOMAIN Username:	e is hosted on another server, you must specify a domain account. User_Name and password for the account.
Type the username in the form DOMAIN Username:	e is hosted on another server, you must specify a domain account. User_Name and password for the account.
Type the username in the form DOMAIN	e is hosted on another server, you must specify a domain account. User_Name and password for the account.
Type the username in the form DOMAIN	e is hosted on another server, you must specify a domain account. User_Name and password for the account.
Type the username in the form DOMAIN Username: Password:	e is hosted on another server, you must specify a domain account. User_Name and password for the account.

Figure 6-41 Configuring the SharePoint database

5. Enter the password of the server farm and click **Next**.

Figure 6-42 Setting the password for the SharePoint server farm

ins the farm. The passphr	
•••••	
••••	

6. Select **Front-end** to specify the server role and click **Next**.

	int Products Configuration Wizard
Specify Server Role	
Select the role for this server in the se more about server farm topology.	erver farm. The role determines which services run on this server. <u>Lea</u>
Multiple-Server Farm	Server Role Description
Front-end	Service applications, services, and components that serve user requests belong on front-end web servers. These
O Application	servers are optimized for fast performance.
O Distributed Cadhe	
○ Search	
○ Custom	
- Single-Server Farm	
O Single-Server Farm	

7. Set the port number of SharePoint Central Administration Web Application to **10000**.

Figure 6-44 Port number of SharePoint Central Administration Web Application

	SharePoint P	roducts Config	uration Wizard	
Configure S	SharePoint Cen	tral Adminis	stration Web Ap	plication
farm. The first serveb application h	er added to a server far	m must host this we heck the box below	ou to manage configurati b application. To specify and type a number betwe n.	a port number for the
🖌 Specify	port number: 10000			
Configure Sec	urity Settings			
requires special c	nfiguration by the dom	ain administrator. N	th Integrated Windows a TLM authentication will w n. <u>Show me more informat</u>	ork with any
Choose an authen	ication provider for this	Web Application.		
NTLM				
🔿 Negoti	ate (Kerberos)			
0				
			< Back Next	> Cancel

8. Check and confirm the SharePoint configurations.

SharePoint Products Confi	guration Wizard	
Completing the SharePoint Products	Configuration Wizar	ď
he following configuration settings will be applied:		
Configuration Database Server	SP16	
Configuration Database Name	SharePoint_Config	=
 Host the Central Administration Web Application 	yes	
Central Administration URL	http://sp16:10000/	
Authentication provider	NTLM	
Local Server Role	Front-end	
ick Next to apply configuration settings.		
Advanced Settings		
2	<back next=""></back>	Cancel

Figure 6-45 SharePoint configurations

9. Click **Next** to start configuring SharePoint.

Figure 6-46 Configuration progress

Configuring SharePoint Products	
Please wait while SharePoint Products are configured.	
Performing configuration task 3 of 10	
Creating the configuration database	
0	
<u></u>	

10. After SharePoint is configured successfully, click **Finish**.

	tion Wizard 📃 💻
Configuration Successful	
he following configuration settings were successfully applied:	
Configuration Database Server	SP 16
 Configuration Database Name 	SharePoint_Config
 Host the Central Administration Web Application 	yes
Central Administration URL	http://sp16:10000/
Authentication provider	NTLM
Local Server Role	Front-end
lick Finish to close this wizard and launch the SharePoint Central Ac onfiguring your SharePoint installation. The users may be prompte the form DOMAIN\User_Name and password to access the site. A ou used to logon to this computer. Add this site to the list of truste	ed by their web browser for the usernam At that prompt, enter the credentials tha

c٠ Fi c **-** • · . •

6.2.6 Verifying Microsoft SharePoint Server 2016

1. Open the SharePoint central administration.

Share F	Help Make SharePoint Better Do you want to help make SharePoint better? You can help make SharePoint better by signing up for the Customer Experience Improvement Program and automatically sending error reports to Microsoft. More Information	Sign up for the Customer Experience Improvement Program and automatically upload error reports to Microsoft O ves, I am willing to participate (Recommended). O No, I don't wish to participate.	SHARE	[1]
Applica Manage System Monito Backup Security Upgrad		ox	Wizard	
General Setting: Apps Office 365 Configura	5 stion Wizards			

Figure 6-48 SharePoint central administration

2. Select the method to configure the SharePoint farm. Click **Cancel**. To configure the SharePoint farm through the wizard, click **Start the Wizard**.

Figure 6-49 SharePoint farm configuration 10 × ⇒ Is http://sp16:10000/_admin/admin 𝒫 マ 𝔅 Is Initial Farm Configuration × SharePoint ø? System Account 🗘 SHARE 🛛 🔲 s> Welcome 🗉 Central Administration How do you want to configure your SharePoint farm? Application Management Yes, walk me through the configuration of my farm using this wizard. Start the Wizard This wizard will help with the initial configuration of your SharePoint farm. You can select the services to use in this farm and create your first site. System Settings Monitoring Backup and Restore You can launch this wizard again from the Configuration Wizards page in the Central Administration site. No, I will configure everything myself. Cancel Security Upgrade and Migration General Application Settings Apps Office 365 Configuration Wizards

3. In the SharePoint central administration, click Create site collections to create a SharePoint site.

Figure 6-50 Creating a SharePoint site

SharePoint			System Account
BROWSE PAGE			🗘 SHARE
s >			
Central Administration	Application	System Settings	Resources
Application Management	Management Manage web	Manage servers in this farm	There are currently no favorite links to display. To add a new link, click
System Settings	applications	Manage services in	"Add new link".
Monitoring	Create site collections Manage service	this farm Manage farm features	
Backup and Restore	applications	Configure alternate access mappings	+ Add new link
Security	Manage content databases	access mappings	
Upgrade and Migration		Backup and Restore	
General Application Settings	Monitoring Review problems and	Restore from a	
Apps	solutions Check job status	backup Perform a site	
Office 365	encergoo status	collection backup	
Configuration Wizards	Security Manage the farm	Upgrade and	
5	administrators group Configure service	Migration Convert farm license	

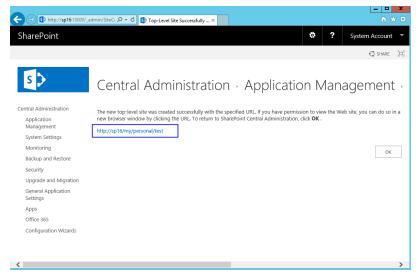
4. Set SharePoint site parameters.

narePoint		🔅 ? System A	Accou
) shaf
Management			7 31 90
System Settings	Web Application	Web Application: http://sp16/ •	
Monitoring	Select a web application.		
Backup and Restore	To create a new web application go to New Web Application page.		
Security			
Upgrade and Migration	Title and Description	Title:	
General Application Settings	Type a title and description for your new site. The title will be displayed on each page in the site.	test	
Apps		Description:	
Office 365		example	
Configuration Wizards			
	Web Site Address Specify the URL name and URL path to create a new site, or choose to create a site at a specific path.	URL: http://sp16[/my/personal/	
	To add a new URL Path go to the Define Managed Paths page.		

Figure 6-51 Setting SharePoint site parameters

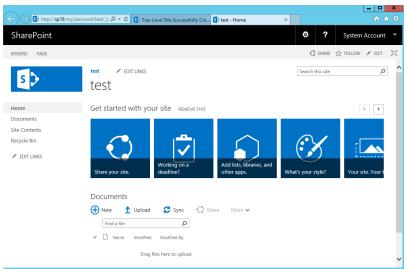
5. The SharePoint top-level site is created successfully. Click the link to open the page.

Figure 6-52 SharePoint top-level site created successfully



6. Open the SharePoint site, where you can design your web pages.

Figure 6-53 SharePoint verification



6.3 Deploying Docker

6.3.1 Manually Deploying Docker (CentOS 7.5)

Overview

The best practices for Huawei Cloud ECS guide you through the manual deployment of Docker on a Linux ECS. Additionally, common Docker operations and the process of creating a Docker image are provided.

Term	Description					
Docker	Docker is a platform for developers and system administrators to develop, deploy, and run applications using containers.					
Docker image	Docker image is a special file system, which provides the programs, libraries, resources, and configuration files required for running containers. A Docker image also contains configuration parameters, for example, for anonymous disks, environment variables, and users. A Docker image does not contain any dynamic data, and its content remains unchanged after being built.					
Container	Images become containers at runtime, that is, containers are created from images. A container can be created, started, stopped, deleted, and suspended.					

Table	6-5	Docker	termino	loaies
	•••	Docker		i gies

For more information about Docker, image, and container, see **Docker Documentation**.

Docker requires 64bit OSs with a kernel version being 3.10 or later. This section uses CentOS 7.5 64bit (40 GiB) as an example.

Prerequisites

- The target ECS has an EIP bound. For instructions about how to bind an EIP to an ECS, see **Assigning an EIP**.
- The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Table 6-6	Security	group rule
-----------	----------	------------

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0.0/0

Deploying Docker

- 1. Log in to the ECS.
- Add a yum repository.
 yum install epel-release -y
 yum clean all
- 3. Install yum-utils. yum install -y yum-utils device-mapper-persistent-data lvm2
- 4. Configure the yum repository for Docker.

yum-config-manager --add-repo https://download.docker.com/linux/ centos/docker-ce.repo

5. Install and run Docker.

yum -y install docker-ce systemctl enable docker systemctl start docker

6. Check the installation.

docker --version

If the information similar to the following is displayed, Docker has been installed:

Docker version 26.1.4, build 5650f9b

Basic Operations on Docker

- 1. Managing Docker processes
 - Start Docker.
 - systemctl start docker
 - Stop Docker.
 - systemctl stop docker

- Restart Docker.

systemctl restart docker

- 2. Managing Docker images
 - a. Pull docker images, taking official Apache and CentOS images as an example.

docker pull httpd

docker pull centos

b. View existing images.

docker images

[root@ecs-b67a-doc	ker ~]# docker images	1		
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
docker.io/httpd	latest	55a118e2a010	2 weeks ago	132 MB
docker.io/centos	latest	75835a67d134	5 weeks ago	200 MB
[root@ecs-b67a-doc	ker ~]#			

c. Forcibly delete an image.

docker rmi centos

- 3. Managing containers
 - a. Create a container and run it.

docker run -it -d -p *80:80* --name *datahttpd* -v /*data/:/var/www/httpd/* httpd

The parameters are as follows:

- -i: runs the container in interactive mode, which is usually used with
 -t.
- -t: reallocates a pseudo input terminal to the container. This parameter is usually used with -i.
- **-d**: runs the container at the backend and returns the container ID.
- -p: port mapping, in the format of "Host port:Container port".
- --name: specifies a name for the container.
- -v: mounts an absolute directory on the host to the image, in the format of "Directory on the host:Mount path in the image".

D NOTE

In the preceding parameters, the host is the target ECS.

For example, use image **httpd** to start a container in interactive mode, map port 80 on the container to port 80 on the host, and map **/data** on the host to **/var/www/httpd** on the container, and have the container ID returned. Then, run the following command:

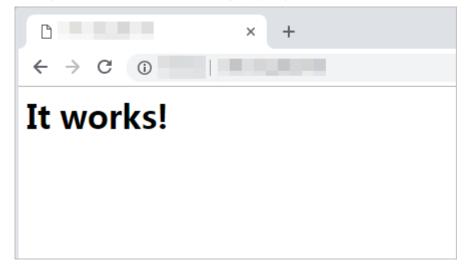
[root@ecs-b67a-docker ~]# docker run -it -d -p 80:80 --name datahttpd -v /data/:/var/www/httpd/ httpd 6a514dea52a9465c1f6863c0f17ff41debda231ccff8bf66e3c0dbcc5f33cb20 [root@ecs-b67a-docker ~]#

b. Check whether the container has been started.

docker ps -a

[root@ecs-b67a-do	ocker ~]# docke	er ps -a				
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS	NAMES
6a514dea52a9	httpd	"httpd-foreground"	4 minutes ago	Up 4 minutes	0.0.0.0:80->80/tcp	datahttpd
[root@ecs-b67a-do	ocker ~]#					

c. In the address bar of the browser, enter the EIP bound to the ECS and check the running status of the container. If the following information is displayed, the container is running properly.



Creating an Image

Use **Dockerfile** to customize a simple Nginx image.

Create a file named Dockerfile.
 mkdir mynginx

cd mynginx

touch Dockerfile

2. Edit the file.

vim Dockerfile

Add the following data to **Dockerfile**:

FROM nginx

RUN echo '<h1>Hello, Docker!</h1>' > /usr/share/nginx/html/index.html

Simple **Dockerfile** commands are as follows (for more information, log in at **https://docs.docker.com**):

- FROM statement (mandatory): must be the first instruction in
 Dockerfile, indicating that the Nginx image is used as a basic image.
- RUN statement: indicates that the echo command is executed with the message "Hello, Docker!" displayed on the screen.
- 3. Build the image.

docker build -t nginx:v3.

- **-t nginx:v3**: specifies the image name and version.
- .: specifies the context path. After the image-built command is executed, all data in the path will be packed to the Docker engine to build the image.
- 4. Check the created Nginx image, the version of which is v3.

docker images

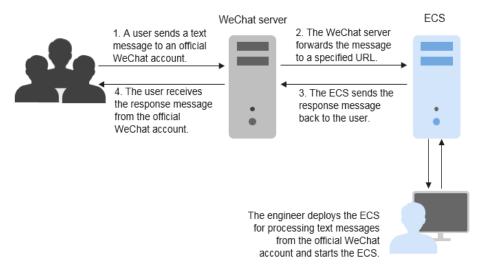
REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
nginx	v3	09422e465d96	10 seconds ago	109 MB

6.4 Deploying an ECS for Handling Text Messages from an Official WeChat Account

Overview

The best practices for Huawei Cloud ECS guide you through the deployment of an ECS as an official WeChat account server so that the ECS receives text messages from the WeChat server and sends processing results to end users. On this ECS, Python is used to compile the logic code for processing WeChat messages. Figure 6-54 shows the service flow.

Figure 6-54 Flowchart for processing text messages



Before performing the operations described in this section, you are required to have basic knowledge on the CentOS (Linux), Python language, Web.py framework, and HTTP/XML protocol.

Preparations

Apply for an official WeChat account.

URL: https://mp.weixin.qq.com/

This section uses the Service Infographics WeChat account as an example.

• Purchase an ECS.

If you do not have an account, **register a HUAWEI ID and enable Huawei Cloud services**.

This section uses an ECS running CentOS 7.4 as an example.

Figure 6-55 Public images

os									
Image (?)									
Public Image	Private image	Shared image	cooGallery image						
C Huawei Cloud EulerOS	(i) CentOS	SUSE	(C) Ubuntu	© EulerOS	(O Debian	OpenSUSE	ళ్ళిత AlmaLinux	OS Rocky Linux	OS CentOS Stream
CoreOS	openEuler	OS SUSESAP	Windows						
CentOS 7.4 64bit(10) GiB)		~ Q						

• Purchase an EIP.

Purchase an EIP with your ECS. The EIP will be configured in the official WeChat account.

Figure 6-56 EIP

Public Network A	ccess								
EIP									
Auto assign	Use existing	Not required							
EIP Type 💿									
Dynamic BGP	Static BGP								
Greater than or ed	qual to 99.95% service	e availability rate							
Billed By 💿									
E Bandwidt	th 🍁 stable traffic		~	Traffic For light/sl	harply fluctuating	traffic	L.	Shared bandwid For staggered peak	
Billed based on usage	e duration and bandw	idth size.							
Bandwidth Size									
1 2	5	10	100	200	Custom				
Anti-DDoS protection	⑦ Free								

Installing Basic Software

This section uses Python and Web.py to develop the official WeChat account. You are required to install or upgrade Python, pip, Web.py framework, and WinSCP software.

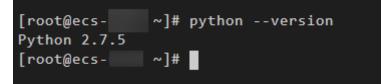
Upgrade the default Python version.

The Python version delivered with CentOS 7.4 is too old to use. You are advised to upgrade it to Python 3.

1. Run the following command to view the Python version:

python --version

Figure 6-57 Viewing the Python version



Download the Python installation package, for example, Python 3.6.0.
 wget https://www.python.org/ftp/python/3.6.0/Python-3.6.0a1.tar.xz

Figure 6-58 Downloading the Python installation package

[root@ecs- ~]# wget https://www.python.org/ftp/python/3.6 2020-12-28 09:25:56 https://www.python.org/ftp/python/3. Resolving www.python.org (www.python.org) Connecting to www.python.org (www.python.org) HTTP request sent, awaiting response 200 OK Length: 15328032 (15M) [application/octet-stream] Saving to: 'Python-3.6.0a1.tar.xz'	
100%[
2020-12-28 09:25:57 (12.7 MB/s) - 'Python-3.6.0a1.tar.xz' sav	ed [15328032/15328032]
[root@ecs- ~]#	

- 3. Run the following command to decompress the installation package: tar xvf Python-3.6.0a1.tar.xz
- 4. Run the following commands to configure Python:

cd Python-3.6.0a1

./configure

 If information similar to the following is displayed, the command has been successfully executed.

Figure 6-59 Successful execution

```
configure: creating ./config.status
config.status: creating Makefile.pre
config.status: creating Modules/Setup.config
config.status: creating Misc/python.pc
config.status: creating Misc/python-config.sh
config.status: creating Modules/ld_so_aix
config.status: creating pyconfig.h
creating Modules/Setup
creating Modules/Setup.local
creating Makefile
```

 If the message "configure: error: no acceptable C compiler found in \$PATH" is displayed, no proper compiler has been installed.
 Solution:

Run the following command to install or upgrade GCC and its dependent packages:

sudo yum install gcc-c++

Enter **y** and press **Enter** as prompted. If information shown in **Figure 6-60** is displayed, the dependency packages have been installed.

Figure 6-60 Successful installation

```
Installed:
  gcc-c++.x86_64 0:4.8.5-44.el7
Dependency Installed:
  libstdc++-devel.x86_64 0:4.8.5-44.el7
Dependency Updated:
  cpp.x86_64 0:4.8.5-44.el7 gcc.x86_64 0:4.8.5-44.el7
```

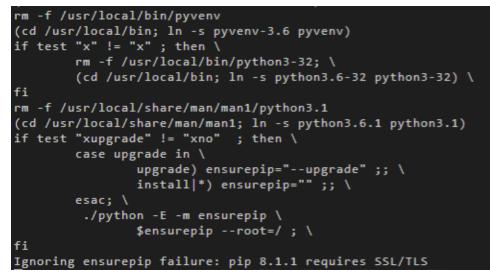
Run the ./configure command again.

5. Run the following command to install Python:

make && make install

If the system displays a pip error after the command execution, the openssldevel package is unavailable. Ignore the error.

Figure 6-61 Successful execution



Run the following command to view the Python 3 version:
 python3 --version

Figure 6-62 Viewing the Python 3 version

[root@ecs-	Python-3.6.0a1]#	python3	version
Python 3.6.0a1			

7. Run the following command to verify the Python 3 installation:

python3

If information shown in the following figure is displayed, Python 3 has been installed.

Figure 6-63 Successful installation

```
[root@ecs- Python-3.6.0a1]# python3
Python 3.6.0a1 (default, Dec 18 2020, 15:45:57)
[GCC 4.8.5 20150623 (Red Hat 4.8.5-44)] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

NOTE

Before performing subsequent operations, exit the Python CLI by running any of the following commands and press **Enter**:

- Ctrl+Z
- exit()
- quit()

Upgrade the default pip version.

pip is a common Python package management tool, which allows you to search for, download, install, and uninstall Python packages. pip3 is delivered with Python 3, but the version is too old to use. Upgrade pip to the latest version. During Python 3 installation, the error message "Ignoring ensurepip failure: pip 8.1.1 requires SSL/TLS" indicates a pip installation failure, so pip must be reinstalled.

1. Run the following command to install the openssl-devel package:

yum install openssl-devel -y

Figure 6-64 Installing the openssl-devel package

2. Run the following command to install pip:

make && make install

If information shown in the following figure is displayed, pip has been installed.

Figure 6-65 Successful installation

Collecting	setuptools
Collecting	pip
Installing	collected packages: setuptools, pip
Successful	y installed pip-8.1.1 setuptools-20.10.1

3. Run the following command to upgrade pip3:

pip3 install --upgrade pip

If information shown in the following figure is displayed, pip has been upgraded to the latest version.

Figure 6-66 Successful upgrade

<pre>[root@ecs- Python-3.6.0a1]# pip3 installupgrade pip</pre>
Collecting pip
Downloading https://files.pythonhosted.org/packages/54/eb/4a36
100% 1.5 MB 32kB/s
Installing collected packages: pip
Found existing installation: pip 8.1.1
Uninstalling pip-8.1.1:
Successfully uninstalled pip-8.1.1
Successfully installed pip-20.3.3

Install the Web.py framework.

To obtain the official Web.py installation tutorial, log in at **http://webpy.org/**. Run the following command to install Web.py:

pip3 install web.py==0.40.dev0

```
Figure 6-67 Installing Web.py
```

```
[root@ecs-c438 Python-3.6.0a1]# pip3 install web.py==0.40.dev0
Collecting web.py==0.40.dev0
Downloading web.py-0.40.dev0.tar.gz (116 kB)
Using legacy 'setup.py install' for web.py, since package 'wheel'
Installing collected packages: web.py
Running setup.py install for web.py ... done
Successfully installed web.py-0.40.dev0
```

Install WinSCP.

Code is generally edited on a local Windows OS and uploaded to the CentOS ECS. WinSCP is an SSH-based open source SFTP client for Windows and supports SCP. Its main function is file transfer between a local and a remote computer. Additionally, WinSCP offers scripting and basic file manager functionality.

Download WinSCP from https://winscp.net/eng/index.php.

Uploading Code

```
Create the main.py file and copy the following data:
1.
     # -*- coding: utf-8 -*-
     # filename: main.py
     import web
     from handle import Handle
     urls = (
        '/wx', 'Handle',
     )
     if __name__ == '__main__':
        app = web.application(urls, globals())
        app.run()
     Create the handle.py file and copy the following data:
2.
     # -*- coding: utf-8 -*-
     # filename: handle.py
     import hashlib
     import web
     import receive
     import time
     import os
     class Handle(object):
        def __init__(self):
           self.app_root = os.path.dirname(__file__)
           self.templates_root = os.path.join(self.app_root, 'templates')
           self.render = web.template.render(self.templates_root)
        def GET(self):
           try:
             data = web.input()
             if len(data) == 0:
                return "hello, this is handle view"
             signature = data.signature
             timestamp = data.timestamp
             nonce = data.nonce
             echostr = data.echostr
             token = "Use the taken value obtained in the basic configuration of the official WeChat
```

```
account."
             list = [token, timestamp, nonce]
             list.sort()
             s = list[0] + list[1] + list[2]
             hashcode = hashlib.sha1(s.encode('utf-8')).hexdigest()
             print( "handle/GET func: hashcode, signature: ", hashcode, signature)
             if hashcode == signature:
                return echostr
             else:
                return echostr
           except (Exception) as Argument:
             return Argument
        def POST(self):
           try:
             webData = web.data()
             print("Handle Post webdata is:\n", webData)
             #Print message body logs.
             recMsg = receive.parse_xml(webData)
             if isinstance(recMsg, receive.Msg) and recMsg.MsgType == 'text':
                toUser = recMsg.FromUserName
                fromUser = recMsg.ToUserName
                content = "Welcome to Service Infographics." + str(recMsg.Content)
                print('Reply message info:\n')
                print('toUser =', toUser)
                print('fromUser = ', fromUser)
                print('content = ', content)
                return self.render.reply_text(toUser, fromUser, int(time.time()), content)
             else:
                print("Message types not supported:",recMsg.MsgType)
                return "success"
           except (Exception) as Argment:
             return Argment
3.
     Create the receive.py file and copy the following data:
     # -*- coding: utf-8 -*-
     # filename: receive.py
     import xml.etree.ElementTree as ET
     def parse_xml(web_data):
        if len(web_data) == 0:
           return None
        xmlData = ET.fromstring(web_data)
        msg_type = xmlData.find('MsgType').text
        if msg_type == 'text':
          return TextMsg(xmlData)
        elif msg_type == 'image':
           return ImageMsg(xmlData)
        elif msg_type == 'location':
           return LocationMsg(xmlData)
        elif msg type == 'event':
           return EventMsg(xmlData)
     class Event(object):
        def __init__(self, xmlData):
           self.ToUserName = xmlData.find('ToUserName').text
           self.FromUserName = xmlData.find('FromUserName').text
           self.CreateTime = xmlData.find('CreateTime').text
           self.MsgType = xmlData.find('MsgType').text
           self.Eventkey = xmlData.find('EventKey').text
     class Msg(object):
        def __init__(self, xmlData):
           self.ToUserName = xmlData.find('ToUserName').text
           self.FromUserName = xmlData.find('FromUserName').text
           self.CreateTime = xmlData.find('CreateTime').text
           self.MsgType = xmlData.find('MsgType').text
           self.MsgId = xmlData.find('MsgId').text
```

```
class TextMsg(Msg):
  def __init__(self, xmlData):
     Msg.__init__(self, xmlData)
     self.Content = xmlData.find('Content').text
class ImageMsg(Msg):
  def __init__(self, xmlData):
     Msg.__init__(self, xmlData)
     self.PicUrl = xmlData.find('PicUrl').text
     self.MediaId = xmlData.find('MediaId').text
class LocationMsg(Msg):
  def __init__(self, xmlData):
     Msg.__init__(self, xmlData)
     self.Location_X = xmlData.find('Location_X').text
     self.Location_Y = xmlData.find('Location_Y').text
class EventMsg(Msg):
  def __init__(self, xmlData):
```

Event.__init__(self, xmlData) self.Event = xmlData.find('Event').text

4. Create the **templates** folder and the **reply_text.xml** file in the folder. Then,

```
copy the following data:

$def with (toUser,fromUser,createTime,content)

<ml>

<ToUserName><![CDATA[$toUser]]></ToUserName>

<FromUserName><![CDATA[$fromUser]]></FromUserName>

<CreateTime>$createTime</CreateTime>

<MsgType><![CDATA[text]]></MsgType>

<Content><![CDATA[$content]]></Content>

</xml>
```

5. Obtain the local file.

Figure 6	-68	Local	file
----------	-----	-------	------

2018/04/21	14:31	<dir></dir>		
2018/04/21	14:31	<dir></dir>		
2018/04/20	13:42		2,077	handle.py
2018/04/11	23:13		211	main.py
2018/04/19	23:46		2,008	receive.py
2018/04/20	13:41	<dir></dir>		templates
D:\workspa 2018/04/20	13:41	xtProcess <dir></dir>	\templa	tes
				tes reply_text.xm

6. Use WinSCP to upload the preceding files and folder to the specified directory on the ECS.

Figure 6-69 Uploading files

.:								
total 16								
-rw-rr	1	root	root	2077	Apr	20	13:42	handle.py
-rw-rr	1	root	root	211	Apr	11	23:13	main.py
-rw-rr	1	root	root	2008	Apr	19	23:46	receive.py
drwxr-xr-x	2	root	root	4096	May	7	22:40	
./template:	5:							
total 4								
-rw-rr	1	root	root	275	Apr :	20	13:14	reply text.xml

Starting the Service

Run the following command to start the service:

python3 main.py 80

If the command output shown in **Figure 6-70** is displayed, the service has been started.

Figure 6-70 Successful service startup



Enabling the Developer Mode

- 1. Log in to official WeChat platform, choose **Develop** > **Basic Configuration**, and click **Modify Configuration**.
- 2. Specify the following basic configurations and click Submit.
 - **URL**: https://*EIP bound to the ECS*/wx. Port 80 is not required.
 - **Token**: the same as the token value in the **handle.py** file.
 - EncodingAESKey: generated randomly.
 - **Message encryption and decryption**: plaintext in this example.
- 3. Authenticate the token and click **Enable**.

D NOTE

If authenticating the token failed, check whether the token configuration is the same as that in the code for processing GET messages in the **handle.py** file.

Verifying Service Deployment

Send a text message to the official WeChat account. If the response is properly received, the service has been successfully deployed.

6.5 Manually Deploying GitLab (CentOS 7.2)

Overview

The best practices for Huawei Cloud ECS guide you through the manual deployment of GitLab on a Linux ECS. GitLab is an open-source version

management system that uses Git as the code management tool. The CentOS 7.2 64bit OS is used as an example in this section.

Prerequisites

- The memory of the target ECS is greater than or equal to 4 GB.
- The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Table 6-7 Security	group rule
--------------------	------------

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 80	0.0.0/0

Procedure

Step 1 Install the dependency package.

- 1. Log in to the ECS.
- 2. Run the following command to install the dependency packages:
 - sudo yum install -y curl policycoreutils-python openssh-server
- 3. Run the following commands to configure automatic SSH enabling upon ECS startup and start SSH:

sudo systemctl enable sshd

sudo systemctl start sshd

- **Step 2** Install Postfix to send emails.
 - Run the following command to install Postfix: sudo yum install postfix
 - 2. Run the following commands to configure automatic Postfix enabling upon ECS startup and start Postfix:

sudo systemctl enable postfix

sudo systemctl start postfix

- **Step 3** Add the GitLab repository and install the software package.
 - 1. Run the following command to add the GitLab repository:

curl https://packages.gitlab.com/install/repositories/gitlab/gitlab-ee/ script.rpm.sh | sudo bash

2. Run the following command to install GitLab:

sudo EXTERNAL_URL="http://*gitlab.example.com*" **yum install -y gitlab-ee** Set **EXTERNAL_URL** to the IP address of the GitLab server, which can be the public IP address of the server or the domain name.

- After the command is executed, you can view the software download speed and the estimated download completion time in the command output.

If information similar to the following is displayed, GitLab has been installed:

Running handlers: Running handlers complete Chef Client finished, 452/672 resources updated in 01 minutes 38 seconds gitlab Reconfigured!

*.	*.
***	***
*****	*****
*****	******
*******	******
**	//////// :**** ///////// ** //////// ** /////// **
//_//_	Ī.J.Ī J.I J.I. I`I\ 'II J.I.I.I I IJI

Thank you for installing GitLab!

Step 4 Test the GitLab deployment.

1. Enter **http://***Server IP address* in the address bar. If the following page is displayed, GitLab has been set up.

Please create a password for your new account.	
GitLab Enterprise Edition	Change your password
Open source software to collaborate on code	New password
Manage Git repositories with fine-grained access controls that keep your code secure. Perform code reviews and enhance collaboration with merge requests. Each project can also have an issue tracker and a wiki.	Confirm new password
	Change your password
	Didn't receive a confirmation email? Request a new one Already have login and password? Sign in

2. Change the password upon your first login. Then, enter the new password to log in.

----End

6.6 Manually Deploying RabbitMQ (CentOS 7.4)

Overview

The best practices for Huawei Cloud ECS guide you through the manual deployment of RabbitMQ on a Linux ECS. RabbitMQ is a message middleware that uses the Erlang programming language for the Advanced Message Queuing Protocol (AMQP). It originates from the financial system and is used to store and forward messages in the distributed system. Featuring high reliability, scalability, availability, and rich functions, RabbitMQ is widely used.

Prerequisites

The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see **Adding a Security Group Rule**.

Directio n	Priori ty	Action	Туре	Protocol & Port	Source Address
Inbound	1	Allow	IPv4	TCP: 5672	0.0.0/0
Inbound	1	Allow	IPv4	TCP: 15672	0.0.0/0

Table 6-8 Security group rule

Procedure

Step 1 Install the dependency package and perl.

- 1. Log in to the target ECS.
- Run the following command to install the dependency packages: yum -y install make gcc gcc-c++ m4 ncurses-devel openssl-devel unixODBC-devel
- 3. Run the following command to install perl: yum install perl

Step 2 Install Erlang.

For details, see Erlang Packages Download.

1. Run the following commands to add **Erlang Solutions repository** to your system:

wget https://packages.erlang-solutions.com/erlangsolutions-2.0-1.noarch.rpm

rpm -Uvh erlang-solutions-2.0-1.noarch.rpm

Alternatively, add the repository entry manually.

rpm --import https://packages.erlang-solutions.com/rpm/ erlang_solutions.asc 2. In the **/etc/yum.repos.d/** directory, create a file named **rabbitmq-erlang.repo**, and add the following to the file:

cd /etc/yum.repos.d/

vi rabbitmq-erlang.repo [erlang-solutions] name=CentOS \$releasever - \$basearch - Erlang Solutions baseurl=https://packages.erlang-solutions.com/rpm/centos/\$releasever/\$basearch gpgcheck=1 gpgkey=https://packages.erlang-solutions.com/rpm/erlang_solutions.asc enabled=1

- Press **Esc** to exit insert mode. Then, enter **:wq** to save the settings and exit.
- 3. Run the following command to install Erlang:

sudo yum install erlang

Run the following command to install esl-erlang:

sudo yum install esl-erlang

4. Run the following command to check the installation result:

erl -version

If information similar to the following is displayed, Erlang has been installed: [root@ecs-rabbitmq ~]# erl -version Erlang (SMP,ASYNC_THREADS,HIPE) (BEAM) emulator version 11.1.7

Step 3 Install RabbitMQ.

- Run the following command to go to the home directory: cd
- 2. Perform the following steps to download the RabbitMQ installation package:
 - a. Open RabbitMQ.
 - b. Click Get Started.

Figure 6-71 Get Started

■ RabbitMQ_	Features Get Started Support Community Docs Blog	
Quorum queues A webinar on high availability and data safety in messaging Learn more		

c. Click **Download+Installation**.

Figure 6-72 Download+Installation

	Get Started	
Download + Installation		RabbitMQ Tutorials
Servers and clients for popular operating systems and languages		Hands-on examples to get you started with RabbitMQ

d. Select a download address based on the ECS OS. Here, the CentOS 7.x is used as an example.

Figure 6-73 Selecting a download address

Downloads <u>on GitHub</u>

- <u>Windows installer</u>
- Debian, Ubuntu
- RHEL/CentOS 8.x | RHEL/CentOS 7.x | RHEL/CentOS 6.x | OpenSUSE | SLES 11.x | Erlang RPM
- Generic UNIX binary
- <u>Windows binary</u>
- e. Run the following command to download the RabbitMQ installation package.

For example, the download address in **Step 3.2.d** is as follows:

https://github.com/rabbitmq/rabbitmq-server/releases/download/ v3.8.12/rabbitmq-server-3.8.12-1.el7.noarch.rpm

Run the following command:

wget https://github.com/rabbitmq/rabbitmq-server/releases/ download/v3.8.12/rabbitmq-server-3.8.12-1.el7.noarch.rpm

If the message **Unable to establish SSL connection.** is displayed during the download,

you can add **--no-check-certificate** to the end of the wget command and repeat it for several times for download.

For example:

wget https://github.com/rabbitmq/rabbitmq-server/releases/ download/v3.8.12/rabbitmq-server-3.8.12-1.el7.noarch.rpm --nocheck-certificate

- f. Run the following command to install the RabbitMQ installation package: yum install rabbitmq-server-3.8.12-1.el7.noarch.rpm
- 3. Start the RabbitMQ after it is installed.
- service rabbitmq-server start
- 4. Check the RabbitMQ status.

service rabbitmq-server status

Step 4 Run the following command to enable the RabbitMQ management web page:

rabbitmq-plugins enable rabbitmq_management

Information similar to the following is displayed:

```
[root@ecs-rabbitmq ~]# rabbitmq-plugins enable rabbitmq_management
Enabling plugins on node rabbit@ecs-rabbitmq:
rabbitmq_management
The following plugins have been configured:
rabbitmq_management
rabbitmq_management_agent
rabbitmq_web_dispatch
Applying plugin configuration to rabbit@ecs-2b36...
The following plugins have been enabled:
rabbitmq_management
rabbitmq_management
rabbitmq_management_agent
```

rabbitmq_web_dispatch

started 3 plugins.

Step 5 Run the following command to create a user:

rabbitmqctl add_user Username password

For example, run the following command:

rabbitmqctl add_user root 123456

Step 6 Run the following command to set the user as the administrator:

rabbitmqctl set_user_tags Username administrator

For example, run the following command:

rabbitmqctl set_user_tags root administrator

Step 7 Run the following command to assign all permissions to the user:

rabbitmqctl set_permissions -p / Username '.*' '.*'

For example, run the following command:

rabbitmqctl set_permissions -p / root '.*' '.*'

Step 8 Run the following command to start RabbitMQ on the backend:

rabbitmq-server -detached

Step 9 Enter **http://***EIP***.15672** in the address bar to access RabbitMQ. If the following page is displayed, RabbitMQ has been installed.

	RabbitMQ	
	Login failed	
Username:] :
Password:] :
	Login	

Step 10 Enter the username and password of the account created in **Step 5** to go to the RabbitMQ management page.

B RabbitMQ.							User: root Cluster: rabbit@rabbit1 (<u>change</u>) RabbitMQ 3.6.9, <u>Erlang 19.3</u>
Overview Connections Chann	els Exchanges	Queues A	dmin				
Overview							
▼ Totals							
Queued messages (chart: last minute) (?)							
Currently idle							
Message rates (chart: last minute) (?)							
Currently idle							
Global counts (?)							
Connections: 0 Channels: 0	Exchange	es: 8	Queues: 0	Consumers	s: 0		
▼ Node							
Node: rabbit@rabbit1 (More about this no	de)						
File descriptors (?) Socket descriptors (?)	Erlang processes	Memory	Disk space	Rates mode	Info	Reset stats DB	+/-
22 0 1024 available 829 available	324 1048576 available	56MB 735MB high waterm	35GB ar48MB low waterman	basic k	Disc 1	Reset	
Reset stats on all nodes							
Resources on an nodes							

----End

6.7 Setting Up Master-Slave Replication on PostgreSQL

What Is PostgreSQL?

PostgreSQL is an open source object-relational DBMS (ORDBMS) with an emphasis on extensibility and standards compliance. It applies to businessoriented online transaction processing (OLTP) scenarios and supports NoSQL (JSON, XML, or hstore) and geographic information system (GIS) data types. It has won a good reputation in reliability and data integrity, and applies widely to Internet websites, location-based applications, and complex data object processing.

This section helps you use Huawei Cloud ECSs to set up PostgreSQL.

Preparations

- Create two ECSs.
- Configure a security group rule for the ECSs to allow port 5432.

D NOTE

The CentOS 7.6 64bit is used as an example. The PostgreSQL 11.2 version is used as an example.

Configuring the Master Node

1. Run the following commands to install **PostgreSQL** on the master node:

yum update -y

yum install https://download.postgresql.org/pub/repos/yum/reporpms/ EL-7-x86_64/pgdg-redhat-repo-latest.noarch.rpm

- # yum install postgresql11-server
- # yum install postgresql11
- # /usr/pgsql-11/bin/postgresql-11-setup initdb
- # systemctl enable postgresql-11
- # systemctl start postgresql-11

- Run the following command to switch to the default user **postgres**:
 # su postgres
- 3. Run the following command to enter the database:

psql

4. Run the following command to create an account and assign permissions to it:

create role Username login replication encrypted password 'Password'

NOTE

The password in the preceding command must be enclosed in single quotation marks. Assume the username is **dbar** and the password is *xxxxx*. Run the following command:

create role dbar login replication encrypted password 'xxxxx';

5. Run the following command to open configuration file **/var/lib/pgsql/11/ data/pg_hba.conf**:

vim /var/lib/pgsql/11/data/pg_hba.conf

Add the following content to the file: host all all 192.168.1.0/24 md5 #Allows for MD5 password authentication connection in the VPC network segment. host replication *dbar IP address of the slave database*/24 md5 #Allows for data replication from the master database to the slave database.

6. Run the following command to open file /var/lib/pgsql/11/data/ postgresql.conf:

vim postgresql.conf

Add the following content to the file:

```
wal_level = hot_standby
max_wal_senders= 6
wal_sender_timeout = 60s
max_connections = 512 #The max_connections value of the slave database must be greater than that
of the master database.
archive_command= 'cp %p /var/lib/pgsql/11/data/archivelog/%f'
wal_keep_segments=10240
archive_mode = on
listen_addresses= xxx.xx.xx.xx
```

7. Run the following command to restart PostgreSQL:

systemctl restart postgresql-11

Configuring the Slave Node

- 1. Run the following commands to install PostgreSQL on the slave node:
 - # yum update -y

yum install https://download.postgresql.org/pub/repos/yum/reporpms/ EL-7-x86_64/pgdg-redhat-repo-latest.noarch.rpm

yum install postgresql11-server

yum install postgresql11

2. Run the following commands to copy the configuration file from the master node:

pg_basebackup -h /P address of the master node -U dbar -D /var/lib/ pgsql/11/data -X stream -P # cp /usr/pgsql-11/share/recovery.conf.sample /var/lib/pgsql/11/data/ recovery.conf

<pre>[root@ecs-22f5-0002 ~]# pg_basebackup -D /var/lib/pgsql/11/data -h</pre>	-p 5432 -U test -X s
tream -P	
Password:	
24508/24508 kB (100%), 1/1 tablespace	
[root@ecs-22f5-0002 ~]#	

3. Run the following command to modify the **recovery.conf** file:

vim recovery.conf

standby_mode = on # This node is used as the slave database.
primary_conninfo = 'host=*IP address of the master node* port=5432 user=*dbar* password=*xxxxx* (Do
not enclose the password in single quotation marks.)
trigger_file = '/var/lib/pgsql/11/data/trigger.kenyon' #Trigger file for master/slave switchover
recovery_target_timeline = 'latest'
restore_command = 'cp /var/lib/pgsql/11/data/archivelog/%f %p'
archive_cleanup_command = 'pg_archivecleanup /var/lib/pgsql/11/data/archivelog %r' #Clear
outdated archives.

4. Run the following command to modify the **postgresql.conf** file:

chown -R postgres.postgres /var/lib/pgsql/11/data

5. Add the following content to the /var/lib/pgsql/11/data/postgresql.conf file.

listen_addresses= xxx.xx.xx.xx

max_connections = 600

6. Run the following commands to start PostgreSQL and enable it to start automatically upon ECS startup:

#systemctl enable postgresql-11

#systemctl start postgresql-11

Verifying Master-Slave Replication

1. Run the following command to check whether process **sender** runs on the master node:

ps aux |grep sender

[root@ecs-22f5-0001 ~]# ps aux |grep sender postgres 14406 0.0 0.3 397240 3620 7 Ss 20:19 0:00 postgres: walsender test (53052) streaming 0/3000140

2. Run the following command to check whether process **receiver** runs on the slave node:

ps aux | grep receiver
[root@ecs-22f5-0002 ~]# ps aux |grep receiver
postgres 4390 0.0 0.3 403500 3632 ? Ss 20:19 0:00 postgres: walreceiver streaming 0/3000140

3. Run the following commands to check whether the status of the slave database can be viewed from the master database:

su - postgres

-bash-4.2# psql

replication=# select * from pg_stat_replication;

pid	usesysid 1	usename a	at_replicatio pplication_na replay_lsn	ne client				backend_start y sync_state	backend_>	xmin	state	se
	16384 1 0/3000140		alreceiver 0/3000140	1	1			2019-03-26 20:19:18.693053+4 0 async	1 86		streaming	1 0/

4. Create a database from the master database and check whether the newly created database is synchronized to the slave database.

a. Run the following commands to create a database from the master database:

postgres=# create database testdb;
postgres=# \l

But the following command to check whether the newly created database is synchronized to the slave database.
 postgres=# \l

6.8 Manually Installing a BT Panel (CentOS 7.2)

Application Scenarios

The best practices for Huawei Cloud ECS guide you through the manual installation of a BT panel on Linux ECSs. BT panel is an easy-to-use, powerful, and free-of-charge server management software that supports Linux and Windows. It allows you to configure LAMP, LNMP, websites, databases, FTP, and SSL with few clicks and easily manage ECSs through a web client. This section uses CentOS 7.2 64bit as an example to describe how to install BT panel 6.9.

Advantages

- A management project can be quickly created.
- You can view your server resource usage.
- The software installation and source code deployment is easy.

Constraints

- ECS OS and specifications:
 - A minimum of 512 MB memory is required, but 768 MB or above is recommended. A BT panel occupies about 60 MB of the total.
 - A minimum of 100 MB disk space is required. A BT panel occupies about 20 MB of the total.
 - BT panel Linux 6.0 was developed based on CentOS 7, so CentOS 7.x is recommended.
 - The OS has no Apache, Nginx, PHP, or MySQL installed.
- The rule listed in **Table 6-9** has been added to the security group which the target ECS belongs to. For details, see **Adding a Security Group Rule**.

NOTE

The BT panel usually uses port 8888, but it may vary according to the installation environment, so the port used by the panel installed in **Step 1.2** or the port set in the system is recommended.

Directi on	Priori ty	Action	Туре	Protocol & Port	Source Address
Inboun d	1	Allow	IPv4	TCP: 8888	0.0.0.0/0

Table 6-9 Security group rule

Process of Installing a BP Panel

To manually install a BT panel on the Linux ECS, perform the following steps:

- 1. Install the BT panel.
- 2. Log in to the BT panel.

Procedure

Step 1 Install the BT panel.

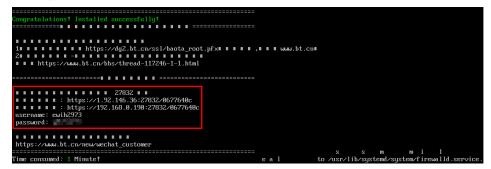
- 1. Log in to the target ECS.
- 2. Run the following command to download and install the BT panel:

yum install -y wget && wget -O install.sh http://download.bt.cn/install/ install_6.0.sh && sh install.sh

When information similar to the following is displayed, enter y:

Do you want to install Bt-Panel to the /www directory now?(y/n): y

After the installation is complete, information similar to the following is displayed:



NOTE

Record the address information in the red box as well as the **username** and **password** in the command output.

Step 2 Log in to the BT panel.

- 1. In the address bar of the browser, enter the recorded address, for example, https://1.92.xxx.xx:27832/0677640c. In this example, port 27832 is used, and you need to add it to the security group, or the message "The webpage cannot be found" is displayed.
- 2. Enter the username and password you recorded.
- 3. Select I have read and agreed to *Service Agreement* and click Enter Panel.

- 4. Bind the BT panel account.
- 5. Install desired suites and deploy websites using the BT panel based on service requirements.

----End

6.9 Installing and Deploying Jenkins on an ECS

Preparations

- Before installing Jenkins, purchase an ECS (recommended configuration: 4 GB + memory and 40 GB+ disk size) running CentOS 7.6. Bind an EIP to the ECS.
- After the ECS is purchased, add the inbound rule listed in the following table to the security group which the ECS belongs to. For details, see Adding a Security Group Rule.

Direction	Priorit y	Action	Туре	Protocol & Port	Source Address
Inbound	1	Allow	IPv4	TCP: 8080	0.0.0/0

Procedure

Step 1 Install JDK.

NOTE

To ensure compatibility with Jenkins, install OpenJDK 11 (view supported Java versions).

- 1. Remotely log in to the purchased ECS.
- 2. Run the following command to view the current JDK version:

java -version

If JDK exists and its version is earlier than 11, uninstall the JDK.

rpm -qa | grep java | xargs rpm -e --nodeps

- 3. Install JDK 11.
 - yum install -y java-11-openjdk
- 4. Restart the ECS.
- 5. Check whether the installation is successful.

java -version

[root@ecs-jenkins ~]# java -version
openjdk version "11.0.16" 2022-07-19 LTS
OpenJDK Runtime Environment (Red_Hat-11.0.16.0.8-1.el7_9) (build 11.0.16+8-LTS)
OpenJDK 64-Bit Server VM (Red_Hat-11.0.16.0.8-1.el7_9) (build 11.0.16+8-LTS, mixed mode, sharing)

- Step 2 Install Jenkins.
 - 1. Run the following commands one at a time:

sudo wget -O /etc/yum.repos.d/jenkins.repo https://pkg.jenkins.io/redhatstable/jenkins.repo

sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io.key

yum install -y jenkins --nogpgcheck

2. Edit the **Jenkins** file.

vim /etc/sysconfig/Jenkins

#Port
JENKINS_PORT="8080"
#Modify the user
\$JENKINS_USER="root"
#Modify directory permissions
chown -R root:root /var/lib/jenkins
chown -R root:root /var/cache/jenkins
chown -R root:root /var/log/Jenkins

3. Start Jenkins and check its status.

systemctl start jenkins

systemctl status jenkins

[root@ecs-jenkins ~]# systemct1 start jenkins
[root@ecs-jenkins ~]# systemctl status jenkins
🛛 jenkins.service – Jenkins Continuous Integration Server
Loaded: loaded (/usr/lib/systemd/system/jenkins.service; disabled; vendor preset: disabled)
Active: active (running) since Thu 2022-12-22 10:30:57 CST; 1min 34s ago
Main PID: 8236 (java)
CGroup: /system.slice/jenkins.service
└─8236 /usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.warwebroot=xC/jenkins/war
-8236 ∕usr/bin/java -Djava.awt.headless=true -jar /usr/share/java/jenkins.warwebroot=%C/jenkins/war

Step 3 Unlock Jenkins.

1. In the address bar of your local browser, enter **http:***EIP bound to the ECS hosting Jenkins*.8080. The unlocking page is displayed.



- 2. Log in to the ECS.
- 3. Obtain the activation password.

cat /var/lib/jenkins/secrets/initialAdminPassword

```
[root@ecs-jenkins ~]# cat /var/lib/jenkins/secrets/initialAdminPassword
f4360f0t
```

- 4. On the **Unlock Jenkins** page, paste this password into the **Administrator password** field and click **Continue**.
- 5. Install suggested plugins. After the installation is complete, use the admin account to go to the next step.

Getting	Started		×
	Customize Je	nkins	
	Plugins extend Jenkins with addi needs.	itional features to support many different	
	Install suggested	Select plugins to	
	plugins	install	
	Install plugins the Jenkins community finds most useful.	Select and install plugins most suitable for your needs.	

6. Save the settings and complete the installation. The Jenkins page is displayed.

	RL+K) ⑦
ashboard >	
+ New Item	
RE People Welcome to Jenkins!	
Councer Instance This page is where your lenkins jobs will be displayed. To get start Manage Jenkins distributed builds or start building a software project.	ted, you can set up
My Views Start building your software project	
ild Queue 🗸 Create a job	\rightarrow
Iild Executor Status V Set up a distributed build	
Idle Set up an agent	\rightarrow
die Configure a cloud	\rightarrow
Learn more about distributed builds	Θ



Verification

Single Job

- 1. Choose New item, select Freestyle Project, click OK.
- 2. In **Build Steps**, select **Execute shell**, enter **echo hello world; exit**, and click **OK**.

Build Steps

≡ Execute shell ?
Command
See the list of available environment variables
echo hello world exit
Advanced

- 3. Click **Build Now**.
- 4. Wait until the execution of build task in the lower left corner is complete. Click Console Output, you can see the job is finished and **hello world** is displayed.

Console Output				
Started by user 001				
Running as SYSTEM				
[EnvInject] - Loading node environment variables.				
Building in workspace /var/lib/jenkins/workspace/Demo				
[Demo] \$ /bin/sh -xe /tmp/jenkins14186913887102109696.sh				
+ echo hello world				
hello world				
+ exit				
Finished: SUCCESS				

Multiple Jobs

1. On the plug-in management page, search for the MultiJob plug-in and install it.

NOTE

• After the plug-in is installed, you need to restart Jenkins for the plug-in to take effect. Select **Download now and install after restart**.

Dashboard > Manage Jenkins > Plugin Manage		
(실) Updates	Plugins	
Available plugins	Q MultiJob	\overline{I}
Advanced settings	Install Name ↓	Released
Download progress	Multijob 623.v03401733c9a_9 Miscellaneous Enabling full hierarchy of Jenkins jobs	
	This plugin is deprecated. In general, this means that it is eilonger work. Learn more.	ther obsolete, no longer being developed, or may no
	Install without restart Download now and install after restart	Update information obtained: 1 hr 3 min ago Check now

• After Jenkins is restarted, check whether the MultiJob plug-in takes effect on the installed plug-ins page.

Dashboard > Manage Jenkins > Plugin Manage	r		
ပ်) Updates	Plugins		
Available plugins Installed plugins	Q MultiJob		
 Advanced settings 	Name i		Enabled
	Multijob plugin 623v03401733c9a_9 Enabling full hierarchy of Jenkins jobs Report an issue with this plugin This plugin is deprecated. In general, this means that it is either obsolete, no longer being developed, or the second seco	or may no longer work. <u>Learn</u>	Ø
	more.		

2. Click New item, select MultiJob Project, and click OK.



MultiJob Project

MultiJob Project, suitable for running other jobs

Before creating a MultiJob project, you need to create three jobs.

3. In **Build Steps**, select **MultiJob Phase**.

Build Steps

Add build step 🔺	
Filter	
	•
Execute shell	
Inject environment va	ariables
Invoke Ant	
Invoke Gradle script	
Invoke top-level Mave	en targets
MultiJob Phase	

4. Add three jobs as follows:

Build Steps

E MultiJob Phase	×
hase name 👔	
excuteJobSequentialy	
hase jobs	
Job Job name 🔋	×
Demo1	
Advanced	
≡ Job	×
Job name 👔	
Demo2	
Advanced	
dot = Job	×
Demo3	
Dauco -	

Job execution type ?

Running phase jobs sequentially

5. Save the settings. The jobs are added.

MultiJob Project multijobDemo

6. Click **Build Now**. The three jobs are successfully built in sequence.

					Add description Disable Project
S W Job	Last Success	Last Failure	Last Duration	Console	Built On
⊘ ⁽ Q) multijobDemo	28 sec #2	N/A	7.5 sec	Console output	Display="block-style="block-sty
⊘ IQ̂I Demo1	28 sec #2	N/A	8 ms	Console output	Jenkins
⊘ XÔX Demo2	25 sec #5	N/A	9 ms	Console output	Jenkins
⊘ XỘX Demo3	23 sec #4	N/A	9 ms	Console output	Jenkins
con: S M L kan keyind 🖏 Atom feed for failures 🚿 Atom feed for failures 🚿 Atom feed for					
on: S M L			Icon legend 🔊 A	Atom feed for all 💦 Atom feed for failures	🕅 Atom feed for just latest build
Conc S M L Workspace Recent Changes Downstream Projects			icon legend 🛼 i	Atom feed for all 💦 Atom feed for failures	沢 Atom feed for just letest build

6.10 Using auditd to Record File Changes (Linux)

The auditd is a user-space component of the Linux audit system. It records operation logs, including file read/write and invoking records, in the OS, which can be used for audit if a fault occurs. This section uses CentOS 7.4 64bit as an example to describe how to install and configure auditd.

auditd-related Tool Commands and Configuration Files

Tool commands:

- **auditctl**: controls the audit daemon in real time, such as adding rules.
- **aureport**: checks and generates audit reports.
- **ausearch**: searches for audit events.
- **auditspd**: forwards event notifications to other applications instead of writing them to audit logs.
- **autrace**: traces processes.

Configuration files:

- /etc/audit/auditd.conf: specifies configuration file of auditd.
- /etc/audit/rules.d/audit.rules: contains audit rules.
- /etc/audit/audit.rules: records audit rules.

Procedure

Installing auditd

1. Run the following command to install auditd:

yum install -y auditd*

NOTE

After auditd is installed for the first time, there are no audit rules by default. You can run the **sudo auditctl -l** command to query the audit rules.

2. Run the following command to check the runtime status of auditd:

service auditd status

Figure 6-74 Runtime status

[root@ecs ~]# service auditd status
Redirecting to /bin/systemctl status auditd.service
auditd.service - Security Auditing Service
Loaded: loaded (/usr/lib/systemd/system/auditd.service; enabled; vendor preset: enabled)
Active: active (running) since Mon 2023-08-28 10:46:20 CST; 45min ago
Docs: man:auditd(8)
https://github.com/linux-audit/audit-documentation
Main PID: 400 (auditd)
CGroup: /system.slice/auditd.service
└400 /sbin/auditd
Aug 28 10:46:20 localhost.localdomain augenrules[404]: lost 0
Aug 28 10:46:20 localhost.localdomain augenrules[404]: backlog 0
Aug 28 10:46:20 localhost.localdomain augenrules[404]: enabled 1
Aug 28 10:46:20 localhost.localdomain augenrules[404]: failure 1
Aug 28 10:46:20 localhost.localdomain augenrules[404]: pid 400
Aug 28 10:46:20 localhost.localdomain augenrules[404]: rate_limit 0
Aug 28 10:46:20 localhost.localdomain augenrules[404]: backlog_limit 8192
Aug 28 10:46:20 localhost.localdomain augenrules[404]: lost 0
Aug 28 10:46:20 localhost.localdomain augenrules[404]: backlog 0
Aug 28 10:46:20 localhost.localdomain systemd[1]: Started Security Auditing Service.

Configuring audit rules

1. Run the following command to configure the monitoring file and change the directory:

```
auditctl -w /etc/passwd -p rwxa
```

where:

- **-w**: specifies the file path to be monitored. The preceding command specifies the monitored file path **/etc/passwd**.
- **-p**: specifies the access permission of the file or directory that triggers the audit.
- rwxa: specifies trigger conditions. r indicates the read permission, w the write permission, x the execution permission, and a the attribute.
- 2. Run the following commands to audit all accesses to /production:

mkdir production

auditctl -w /production/

3. Run the following command to check configured rules:

```
auditctl -l
-w /etc/passwd -p rwxa
-w /production -p rwxa
```

4. After rules are added, run the following command to check the audit log:

ausearch -f /etc/passwd

Figure 6-75 Checking the audit log



Figure 6-75 shows that the file is not modified. The parameters are described as follows:

- time: audit time
- name: audit object
- cwd: current path
- **syscall**: related system calls
- auid: ID of the audited user
- **uid** and **gid**: user ID and user group ID for accessing a file
- comm: command for a user to access a file
- exe: file path where the preceding command can be executed
- 5. Run the following command to add a user **test** to the monitoring file: **useradd test**
- Run the following command to check the audit log again: ausearch -f /etc/passwd

Figure 6-76 Checking the audit log again

time->Non fug 28 15:35:52 2023 type=PROCTITLE msg=audit(1693208152.845:203): proctitle=7375646F006175736561726568082D66002F6574632F706173737764 type=PATH msg=audit(1693208152.845:203): item=0 name="/etc/passud" inode=1315990 dev=7d:81 mode=8180644 ouid=0 ogid=0 rdev=00:00 tojtyp=PNORTML cap_fp=00000000000000000 cap_fi=80000000000000000 cap_fc=0 cap_fver=0 type=CAUD msg=audit(1693208152.845:203): cack="/root" type=SYSCALL msg=audit(1693208152.845:203): cack="/root" type=

Figure 6-76 shows that **/etc/passwd** is modified by user **root** (uid=0, gid=0) in the **/root** directory at a specified time. The **/etc/passwd** file is accessed from **/usr/bin/sudo**.

7. Run the following command to check whether the audit log contains any content:

ausearch -f /production

[root@ecs ______ ~]# ausearch -f /production <no matches>

8. Run the following commands to change the directory permissions as user **root** and check the audit log again:

chmod -R 777 /test/ ausearch -f /test/

9. Run the following command to view the audit report:

aureport

Figure 6-77 Viewing the audit report

```
[root@ecs _____~]# aureport
Summary Report
Range of time in logs: 01/01/1970 08:00:00.000 - 08/28/2023 18:11:02.564
Selected time for report: 01/01/1970 08:00:00 - 08/28/2023 18:11:02.564
Number of changes in configuration: 4
Number of changes to accounts, groups, or roles: 1
Number of logins: 4
Number of failed logins: 0
Number of authentications: 1
Number of failed authentications: 0
Number of users: 2
Number of terminals: 4
Number of host names: 3
Number of executables: 7
Number of commands: 3
Number of files: 0
Number of AVC's: 0
Number of MAC events: 0
Number of failed syscalls: 0
Number of anomaly events: 0
Number of responses to anomaly events: Ø
Number of crypto events: 12
Number of integrity events: 0
Number of virt events: 0
Number of keys: 0
Number of process IDs: 15
Number of events: 140
```

10. Run the following command to view the authorization failure details: **aureport -au**

Figure 6-78 Viewing authorization failure details

11. Run the following command to view all events related to account modifications:

aureport -m

Figure 6-79 Viewing account modification events



12. (Optional) Run the following commands to clear the defined rules:

auditctl -D auditctl -l

Figure 6-80 Clearing defined rules

[root@ecs-	~]#	auditctl	-D
No rules			
[root@ecs-	~]#	auditctl	-1
No rules			

6.11 Restoring Accidentally Deleted Data Using Extundelete (Linux)

Application Scenarios

You can use Extundelete to restore accidentally deleted files. Extundelete is a utility that can restore deleted files from an ext3 or ext4 partition.

NOTICE

Whether deleted files can be restored are determined by the following factors:

- Whether data in the files is overwritten after being deleted
- Whether metadata is stored in journal

If the accidentally deleted files were stored in the system disk and data was continuously written into the files after deletion, the files cannot be restored using Extundelete.

To improve data security, you are advised to periodically back up data. For details, see **Creating a Snapshot**, **Creating a Private Image**, and **Creating a Cloud Disk Backup**.

The following uses an ECS running CentOS 7.5 as an example to describe how to use the open-source tool Extundelete to quickly restore accidentally deleted data.

Prerequisites

Before restoring data, complete the following preparations:

- Back up data by referring to Creating a Snapshot and Creating a Private Image to ensure that data can be restored to its original state if an error occurs during data restoration.
- Stop writing data to the file system. If you want to restore a data disk, unmount it first.

Procedure

Step 1 Install Extundelete.

- 1. Log in to the ECS.
- 2. Run the following commands in sequence to install Extundelete dependencies and libraries:

yum install libcom_err e2fsprogs-devel

yum install gcc gcc-c++

- 3. Type **y** when the following information is displayed: Installed size: 25 M Is this OK [y/d/N]: **y**
- 4. Run the following command to **download** the Extundelete source code:

wget https://github.com/curu/extundelete/archive/refs/tags/v1.0.tar.gz

5. Run the following command to decompress v1.0.tar.gz:

tar xf v1.0.tar.gz

6. Run the following commands in sequence to compile and install Extundelete: **cd extundelete-1.0**

./configure

make

7. Run the following command to go to the **src** directory and view the compiled Extundelete file:

cd ./src

Step 2 Run the following command to restore data:

./extundelete --restore-all /dev/partition

The data is restored in **RECOVERED_FILES** in the same directory.

----End

6.12 Setting Up a ThinkPHP Framework

Overview

ThinkPHP, a free, open-source, fast, and simple object-oriented lightweight PHP development framework, is released under the Apache2 open source protocol and is designed for developing agile web applications and simple enterprise applications. The section guides you through the setup of ThinkPHP using an ECS running CentOS 7.2 on Huawei Cloud.

Prerequisites

- You have purchased an ECS and bound an EIP to it.
- The rule listed in the following table has been added to the security group which the target ECS belongs to. For details, see Adding a Security Group Rule.

Directio n	Priority	Acti on	Туре	Protocol & Port	Source Address
Inbound	1	Allo w	IPv4	TCP: 22	0.0.0.0/0
Inbound	1	Allo w	IPv4	TCP: 443	0.0.0.0/0
Inbound	1	Allo w	IPv4	TCP: 8000	0.0.0.0/0

Table 6-10 Security group rules

Procedure

- 1. Install PHP.
 - a. Run the following commands to install the EPEL and REMI repositories: **sudo yum install -y epel-release**

sudo yum install -y https://rpms.remirepo.net/enterprise/remirelease-7.rpm

b. Run the following commands to enable the PHP 8.0 repository:

sudo yum -y install yum-utils

sudo yum-config-manager --enable remi-php80

c. Run the following commands to install PHP:

sudo yum install -y php php-cli php-fpm php-mysqlnd php-zip phpdevel php-gd php-mcrypt php-mbstring php-curl php-xml php-pear php-bcmath php-json

d. Run the following command to check the version of the installed PHP:

php -v

Information similar to the following is displayed:

PHP 8.0.30 (cli) (built: Jun 4 2024 15:19:49) (NTS gcc x86_64) Copyright (c) The PHP Group Zend Engine v4.0.30, Copyright (c) Zend Technologies

2. Install Composer.

Composer is a package manager for the PHP programming language that provides a standard format for managing dependencies of PHP software and required libraries.

a. Run the following command to install the dependencies required by Composer:

sudo yum install -y unzip git

b. Run the following commands to install Composer:

curl -sS https://getcomposer.org/installer | php

sudo mv composer.phar /usr/local/bin/composer

c. Run the following command to check the version of the installed Composer:

composer --version

Information similar to the following is displayed: Composer version 2.7.7 2024-06-10 22:11:12 PHP version 8.0.30 (/usr/bin/php)

- 3. Install ThinkPHP.
 - a. Use Composer to create a new ThinkPHP application.

Run the following command to create **my-thinkphp-app** in the current directory and download the core files and dependencies of ThinkPHP:

composer create-project topthink/think my-thinkphp-app

b. Run the following commands to switch to the created directory and start the ThinkPHP built-in server for development:

cd my-thinkphp-app

php think run

If information similar to the following is displayed, ThinkPHP has been started:



c. After the installation is complete, enter http://ECS EIP.8000 in the address bar of the browser. If the following page is displayed, ThinkPHP has been installed.

7 Securing an ECS

7.1 Enhancing Security for SSH Logins to Linux ECSs

Linux ECSs are generally logged in using SSH. How can I ensure login security for password-authenticated Linux ECSs? This section uses CentOS 7.6 as an example to describe how to enhance security for SSH logins.

Parameter	Example Value
Name	ecs-f5a2
OS	CentOS 7.6 64bit
EIP	119.3. <i>xxx.x</i>
Login mode	Password

 Table 7-1 ECS configurations

Changing the Default Login Port

- 1. Remotely log in to the ECS using its password through SSH. For details, see Login Using an SSH Password.
- 2. Run the following command to change the default port for SSH logins, for example, to **5000**:

vim /etc/ssh/sshd_config

Press **i** to enter insert mode. In line 17, delete the comment character (#) and change the port number to **5000**.

Figure 7-1 Before the change

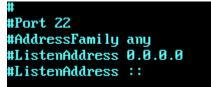


Figure 7-2 After the change



3. Press **Esc** and enter :wq to save the changes and exit.

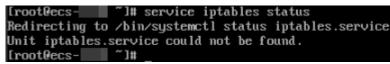
Adding a Firewall Rule to Open a Specified Port

CentOS 7 series use the **fireware** firewall rather than **iptables** by default. Perform the operations described in this section only if Iptables has been installed on your ECS to open port 5000 for SSH logins.

1. Run the following command to check whether Iptables has been installed:

service iptables status

 If information similar to the following is displayed, Iptables has not been installed. In such a case, skip this section and proceed with Adding a Security Group Rule.



 If information similar to the following is displayed, Iptables has been installed, and it is in **active** state. Then, go to step 2.

Redirecting to /bin/sys iptables.service - IP Loaded: loaded (/usr Active: active (exit Process: 23744 ExeCSt	ice iptables status temctl status iptables.service vf firewall with iptables /lib/systemd/system/iptables.service; disabled; vendor preset: disabled) ed) since Tue 2019-04-16 10:42:53 CST; 3s ago art=/usr/libexec/iptables/iptables.init start (code=exited, status=0/SUCCESS) exited, status=0/SUCCESS)
Apr 16 10:42:53 ecs-	systemd[1]: Starting IPv4 firewall with iptables
Apr 16 10:42:53 ecs-	iptables.init[23744]: iptables: Applying firewall rules: [OK]
Apr 16 10:42:53 ecs-	systemd[1]: Started IPv4 firewall with iptables.

2. Run the following command to add an Iptables rule to open port 5000:

iptables -A INPUT -p tcp -m state --state NEW -m tcp --dport 5000 -j ACCEPT

3. Run the following command to check whether port 5000 is contained in the existing Iptables rules:

iptables -L -n

Chain INP	UT (po	licy	ACCEPT)	Value Neuro				
target	prot	opt	source	destination				
ACCEPT	tcp		0.0.0.0/0	0.0.0.0/0	state	NEW	tcp	dpt:5000
ACCEPT	tcp		0.0.0.0/0	0.0.0.0/0	state	NEW	tcp	dpt:5000

Adding a Security Group Rule

By default, port 22 is enabled in the inbound direction of a security group. After changing the SSH login port on your ECS to port 5000, add a rule for port 5000 to the security group.

- 1. Log in to the management console.
- 2. Under **Compute**, click **Elastic Cloud Server**. The ECS console is displayed.

- 3. Click the ECS name **ecs-f5a2** to go to the page providing details about the ECS.
- 4. Click the **Security Groups** tab and then \cong to show details about the security group rules. Click **Modify Security Group Rule** in the upper right corner of the table for the security group rules.
- 5. Add an inbound rule, as shown in **Figure 7-3**.

Figure 7-3 Security group rules

Add Rule Fast-A	Add Rule Delete A	llow Common Ports Inbound	Rules: 3 View Security Group Configuratio	on Examples 🕐	
 Select a property or enter 	er a keyword.				
Priority	Action	Туре	Protocol & Port	Source	Description
1	Allow	IPv4	TCP: 5000	0.0.0.0/0 ⑦	-
1	Allow	IPv4	TCP : 22	0.0.0.0/0 ⑦	Used to remotely connect t
□ 1	Allow	IPv4	TCP : 443	0.0.0.0/0 ⑦	Used to access websites o

Changing Password Authentication to Key-Pair Authentication

Create a key pair on the management console, bind the key pair to your ECS to change the ECS login mode.

- 1. Log in to the management console.
- 2. Under **Computing**, click **Elastic Cloud Server** to switch to the ECS console.
- 3. Create a key pair by following the instructions provided in **Creating a Key Pair**, and keep the private key file secure.
- 4. Choose Service List > Security & Compliance > Data Encryption Workshop. In the left navigation pane, click Key Pair Service.
- Click the ECS List tab, locate the row containing ecs-f5a2, and click Bind in the Operation column. Set parameters according to Figure 7-5, and click OK. To disable password authentication, select Disable the password login mode on the Bind Key Pair page, or edit the sshd_config configuration file.

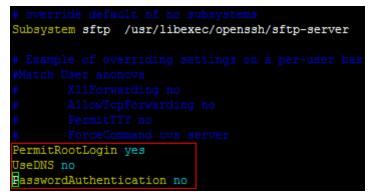
Figure 7-4 Bind Key Pair

key to log in	will configure the key pair for the server. After this operation, you can use the to the server. To ensure security, it is recommended that you disable the pin mode of the server and use only the key to log in to the server.
ECS Name	ecs-a51c-
IP Address	
Status	8 Running
New Key Pair	KeyPair-
Boot Password	

6. Log in to the ECS, and edit the **sshd_config** file to disable password authentication.

vim /etc/ssh/sshd_config

Press **i** to enter insert mode, and configure the data in last several lines according to the following figure.



Parameter description:

- PermitRootLogin: specifies whether to allow the root user to log in to the ECS. Set this parameter to yes.
- UseDNS: specifies whether DNS resolution is allowed. Set this parameter to no.
- PasswordAuthentication: specifies whether a login is authenticated using a password. Set this parameter to no.

NOTE

During key pair binding in step 5, you have selected "Disable the password login mode". The **PasswordAuthentication** value should be **no**. You only need to verify it.

Press **Esc** and enter :wq to save the changes and exit.

7. Run the following command to restart sshd:

systemctl restart sshd

8. Attempt to log in to the ECS using Xshell or an SSH client. If password input is unavailable, as shown in **Figure 7-5**, the configuration is successful.

	Figure 7-5	Logging	in t	to the	ECS	using	Xshell
--	------------	---------	------	--------	-----	-------	--------

SSH User Authen	tication		?	x
Remote Host: Login Name: Server Type:	119.3. :5000 root SSH2, OpenSSH_7	.4	2	
	r user authenticati vide necessary info			thods
Pass <u>w</u> ord:				
User <u>K</u> ey: Passp <u>h</u> rase:		•	Browse	···· •
C Keyboard Int Use keyboard	eractive d input for user authen	tication,		
Remember Pass	sword	ОК	Canc	el

Editing hosts.allow and hosts.deny

The **/etc/hosts.allow** and **/etc/hosts.deny** files control remote access. You can configure these files to allow or deny the access from certain IP addresses or IP address ranges to a process running on the Linux ECS.

For example, if SSH is available only to the administrator, you can only allow access from the IP address ranges used by the administrator.

The ECS may be logged in anywhere. You are advised to allow accesses from all IP addresses in **/etc/hosts.allow**.

vim /etc/hosts.allow

Add **sshd:ALL** in the last line.

#	either use the tcp_wrappers library or that have been
#	started through a tcp_wrappers-enabled xinetd.
#	
#	See 'man 5 hosts_options' and 'man 5 hosts_access'
#	for information on rule syntax.
#	See 'man tcpd' for information on tcp_wrappers
sshd : ALL	

Identify ECS security risks using certain methods, for example, checking the SSH status, to detect risky IP addresses, and add them to **/etc/hosts.deny** to deny the access from these IP addresses.

8 Migrating an ECS

8.1 Migrating Servers to the Cloud

Background

As the public cloud is agile, flexible, reliable, easy to use, and cost-effective, more and more enterprises choose to migrate their IT applications and loads to the public cloud. An easy and quick migration method is of great significance for the enterprises. Huawei Cloud allows you to quickly and easily migrate workloads from x86 physical servers or VMs on private clouds or other public cloud platforms to Huawei Cloud ECSs.

Two migration methods are available for you.

- Server Migration Service (Recommended)
- Image import

This section describes how to use the preceding methods to migrate applications and data from your existing servers to Huawei Cloud.

Server Migration Service (Recommended)

Service Overview

Server Migration Service (SMS) provides P2V and V2V migration services to help you migrate applications and data from on-premises x86 physical servers or VMs on private or public clouds to Huawei Cloud Elastic Cloud Servers (ECSs).

SMS supports a wide range of OS types. For details, see **Supported OSs**.

Before using SMS, you need to know constraints on source servers.

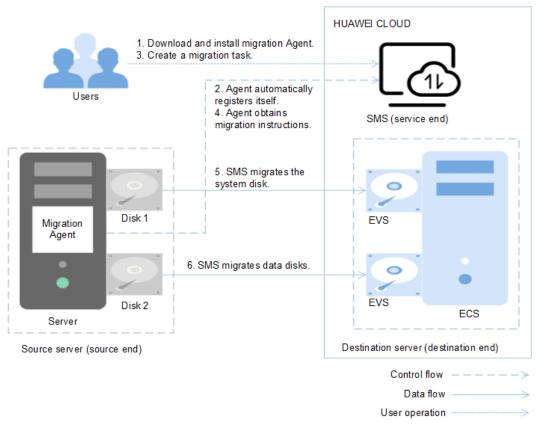


Figure 8-1 SMS working principle

SMS automatically performs the migration, and you only need to perform steps 1 and 3.

- 1. Install the migration Agent on the source server. For details, see **How Do I Download and Install the Agent on Source Servers?**
- 2. The migration Agent installed on the source server registers its connection status with SMS and reports the information about the source server to SMS. Then, SMS completes the migration feasibility check.
- 3. After the migration feasibility check is passed, you can create a migration task. For details, see **Creating a Migration Task**.
- 4. The migration Agent obtains and executes the migration instruction sent by SMS.
- 5. SMS starts to migrate system disk of the source server.
- 6. SMS starts to migrate data disks of the source server.

NOTE

- Source end: indicates the source server in a migration task.
- **Destination end**: indicates the destination server in a migration task.
- Service end: indicates the SMS service.

Service entry

SMS procedure: Creating a Migration Task.

SMS introduction: Server Migration Service.

Image Import

- 1. Create an image. For example, you can use QEMU to create an image. See **details**.
- 2. Create a private image. See **details**.
- 3. For details about how to create an ECS using a private image, see **Purchasing an ECS**.

9 Accessing OBS from an ECS over the Intranet

9.1 Overview

Scenario Introduction

An enterprise runs basic services on Elastic Cloud Servers (ECSs), but storage capacity of hard disks becomes insufficient for storing a large number of images and videos. After learning that HUAWEI CLOUD provides OBS, an elastic cloud storage service for massive amounts of data, the enterprise determined to use OBS as the data storage resource pool to reduce the burden on local servers.

From ECSs, you can access OBS over the internet or HUAWEI CLOUD intranet. However, for access over the internet, the network response speed is subject to the network conditions, and you need to pay for data access over the internet. To maximize performance and reduce costs, enterprise administrators want to access OBS over the intranet.

NOTE

When accessing OBS over the intranet, ensure that the OBS resources to be accessed are in the region where the ECS resides. If the OBS resources reside in a different region, access is supported only over the Internet.

Solution

Configure intranet DNS on the established ECS. The intranet DNS resolves the OBS domain name so that the ECS can access OBS through the intranet. Figure 9-1 shows the access process.

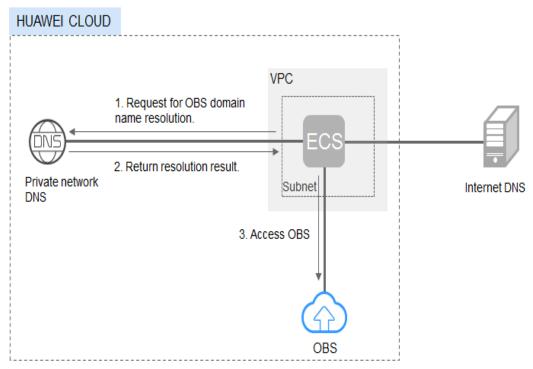


Figure 9-1 Accessing OBS through the intranet

Table 9-1 describes the services in the figure.

Table 9-1	Service	description
-----------	---------	-------------

Service	Description
Virtual Private Cloud (VPC)	VPC enables users to create an isolated virtual network environment defined and managed by themselves, improving security of resources in the cloud and simplifying network deployment.
	A subnet is a network that provides IP address management and DNS services for the ECS in a VPC. IP addresses of an ECS must be in the same subnet of the ECS.
Domain Name Service (DNS)	Intranet DNS is provided for resolving intranet domain names and OBS domain names. This simplifies the domain name resolution process and saves costs.

• For Windows ECSs, you are advised to use OBS Browser+ to access OBS over intranet. For details, see:

Accessing OBS over Intranet by Using OBS Browser+ on a Windows ECS

• For Linux ECSs, you are advised to use obsutil to access OBS over intranet. For details, see:

Accessing OBS over Intranet by Using obsutil on a Linux ECS

When accessing OBS through the intranet from your ECSs, you can read, back up, and archive data without affecting the internet bandwidth.

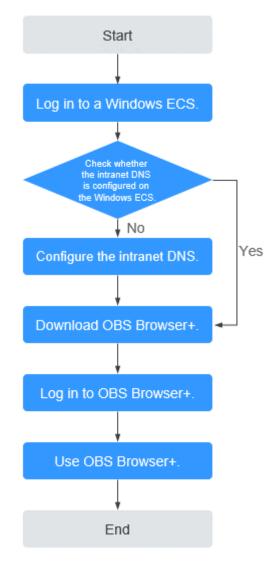
9.2 Accessing OBS over Intranet by Using OBS Browser+ on a Windows ECS

OBS Browser+ is a graphical interface tool applicable to object-based storage services. You can configure the intranet DNS server address to access OBS over intranet on a Huawei Cloud Windows ECS. The process and procedure are described as follows.

You need to download OBS Browser+ over the Internet. Alternatively, you can download OBS Browser+ from a cloud server that can access the Internet and then transfer the downloaded OBS Browser+ to the current cloud server for installation.

Process

Figure 9-2 The process of accessing OBS over intranet by using OBS Browser+ on a Windows ECS



Procedure

Step 1 Log In to the Windows ECS.

- 1. Log in to the Huawei Cloud official website and click Console.
- 2. On the home page of the console, choose **Compute** > **Elastic Cloud Server**.
- 3. Select an ECS and log in to it.

A Windows ECS can be logged in using either VNC or MSTSC. For details, see **Logging In to an ECS**.

Step 2 Check whether the intranet DNS is configured on the Windows ECS.

On the Windows ECS, you can view the current DNS configuration by using the graphical user interface (GUI) or command line interface (CLI). This section uses the CLI as an example to describe how to view the DNS configuration.

- 1. After logging in to the ECS, open the CLI.
- 2. Run the **ipconfig /all** command to check whether DNS server is at the intranet DNS address of the region where the current ECS resides.

Huawei Cloud provides different private DNS server addresses for different regions. For details, see What Are the Private DNS Server Addresses Provided by Huawei Cloud?

- If no, go to Step 3.
- If yes, go to Step 5.

Step 3 Configure the Intranet DNS.

Change the DNS server address of the ECS to the intranet DNS provided by Huawei Cloud. You can change the DNS address of the VPC subnet or modify the local DNS configuration to achieve this.

Methods 1: Changing the DNS server address of the VPC subnet

Locate the VPC where the ECS resides and change the DNS server address of the VPC subnet to the intranet DNS address. In this manner, ECSs in the VPC can use the intranet DNS for resolution and thereby you can access OBS on Huawei Cloud intranet. For details, see **Modifying a Subnet**.

NOTE

The intranet DNS server address must be selected based on the region where the ECS resides. For details, see **What Are the Private DNS Server Addresses Provided by Huawei Cloud?**

• Method 2: Modifying the local DNS configuration

The intranet DNS configured in this method becomes invalid once the ECS is restarted. You need to reconfigure the intranet DNS after each restart of the ECS. This section uses configuration through CLI as an example to describe how to modify the DNS configuration locally.

- 1. Open the CLI.
- 2. Run the following command to configure the IP address of the primary DNS server:

netsh interface ip set dns name="Local connection" source=static addr=Intranet DNS server address register=primary

NOTE

- Local connection: NIC name. You need to modify the name according to the actual NIC.
- Intranet DNS server address: Select the intranet DNS server address based on the region where the ECS resides. For details, see What Are the Private DNS Server Addresses Provided by Huawei Cloud?
- (Optional) Run the following command to configure the IP address of the backup DNS server: netsh interface ip add dns name="Local connection" addr= Alternative DNS server address index=2

- *Local connection*: a NIC name. Use the actual NIC name when configuring the local DNS.
- Alternative DNS server address: The DNS server is used when the primary DNS server is faulty, unavailable, or cannot resolve the requested domain name. You can set this parameter to the IP address of the Huawei Cloud intranet DNS server. (You need to select the intranet DNS server address based on the region where the ECS resides. For details, see What Are the Private DNS Server Addresses Provided by Huawei Cloud?) You can also set this parameter to the IP address of a public DNS server.
- **Step 4** Check whether OBS is accessed over the intranet.

For details, see **How Do I Determine Whether OBS Is Being Accessed from an Intranet Connection**?

The global domain name of an OBS bucket is in the *Bucket name*.obs.mykualalumpur-1.alphaedge.tmone.com.my format.

Step 5 Download OBS Browser+.

For details, see Downloading OBS Browser+.

Step 6 Log in to OBS Browser+.

OBS Browser+ accesses OBS over a public network by default. When you log in to OBS Browser+ and add an account, set **Service** and **Server Address** as follows:

• Server Address: Enter the OBS domain name in the region where your ECS resides and the port number. The HTTPS port number is **443** and the HTTP port number is **80**. The HTTPS server is used by default. If you want to use the

HTTP server, click in the upper right corner of OBS Browser+ and click **System Configuration**. In the **System Configuration** dialog box that is displayed, deselect **Enable HTTPS**.

Example: obs.eu-west-101.myhuaweicloud.eu:443

NOTE

Step 7 Start to use OBS Browser+.

After logging in to OBS Browser+, you can access OBS over the intranet from the Windows ECS to perform basic data access operations and other advanced settings.

For details, see **OBS Browser+ Tool Guide**.

----End

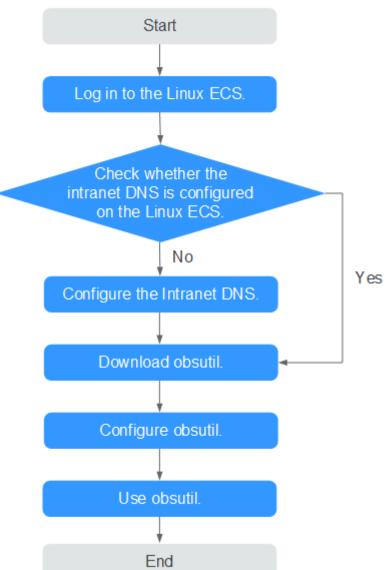
9.3 Accessing OBS over Intranet by Using obsutil on a Linux ECS

obsutil is a command line tool that can run Windows, macOS, and Linux operating systems. This section describes how to configure an intranet DNS server for a Huawei Cloud Linux ECS to access OBS over the intranet.

You need to download obsutil over the Internet. Alternatively, you can download obsutil from a cloud server that can access the Internet and then transfer the downloaded obsutil to the current cloud server for installation.

Process

Figure 9-3 The process of accessing OBS over intranet by using obsutil on a Linux ECS



Procedure

Step 1 Log In to the Linux ECS.

- 1. Log in to the Huawei Cloud official website and click Console.
- 2. On the home page of the console, choose **Compute** > **Elastic Cloud Server**.

3. Select an ECS and log in to it.

The login mode is set during the Linux ECS creation.

For details about how to log in to the ECS, see Logging In to an ECS.

- **Step 2** Check whether the intranet DNS is configured on the Linux ECS.
 - 1. Log in to the Linux ECS and open the CLI.
 - 2. Run the **cat /etc/resolv.conf** command to check whether the IP address after **nameserver** in the first line is the intranet DNS address of the region where the current ECS resides.

NOTE

Huawei Cloud provides different private DNS server addresses for different regions. For details, see What Are the Private DNS Server Addresses Provided by Huawei Cloud?

- If no, go to Step 3.
- If yes, go to Step 5.
- **Step 3** Configure the Intranet DNS.

Change the DNS server address of the ECS to the intranet DNS provided by Huawei CloudDNS. To do this, you can change the DNS address of the VPC subnet or change the local DNS configuration.

• Methods 1: Changing the DNS server address of the VPC subnet

Locate the VPC where the ECS resides and change the DNS server address of the VPC subnet to the intranet DNS address. In this manner, ECSs in the VPC can use the intranet DNS for resolution and thereby you can access OBS on Huawei Cloud intranet. For details, see **Modifying a Subnet**.

NOTE

The intranet DNS server address must be selected based on the region where the ECS resides. For details, see **What Are the Private DNS Server Addresses Provided by Huawei Cloud?**

• Method 2: Modifying the local DNS configuration

The following uses an ECS running CentOS 6.x 64bit as an example to describe how to modify the local DNS configuration.

- a. Open the CLI.
- b. Run the following command to open the **/etc/resolv.conf** file: vi /etc/resolv.conf
- c. Press i to enter insert mode. In the /etc/resolv.conf file, add the intranet DNS server address before the existing DNS server address in the following format: nameserver Intranet DNS server address

D NOTE

- The intranet DNS server address must be selected based on the region where the ECS resides. For details, see What Are the Private DNS Server Addresses Provided by Huawei Cloud?
- The IP address of the new DNS server must be placed before all existing DNS IP addresses.
- DNS servers are selected in the sequence of nameserver. A new DNS server is selected only when the previous DNS server is faulty, unavailable, or cannot resolve the requested domain name. If you want to switch to the public network access mode, you need to change the first line of the DNS address to a public DNS server address or add a public DNS server address before the existing DNS server address.
- d. Press **Esc** and enter :wq! to save the settings and close the file.

NOTE

The modified DNS server address takes effect immediately after you save the modification to the **/etc/resolv.conf** file.

Step 4 Check whether OBS is accessed over the intranet.

For details, see **How Do I Determine Whether OBS Is Being Accessed from an Intranet Connection**?

Step 5 Download obsutil.

For details about the latest version of obsutil and download link, see **Downloading obsutil**.

Step 6 Configure obsutil.

Before using obsutil, you need to configure the interconnection between obsutil and OBS. Parameters include OBS endpoints and access keys (AK and SK).

For details, see Initializing Configurations in the tool guide of obsutil.

NOTE

The OBS endpoint needs to be entered according to the region where the ECS resides.

Step 7 Use obsutil.

After obsutil is successfully configured, you can access OBS over Huawei Cloud intranet on the Linux ECS to perform basic data access operations and other advanced settings.

For details, see the following topics:

- Uploading an Object
- Downloading an Object

For details, see **OBS Tools Guide (obsutil)**.

----End

10 Using VNC Viewer to Access a Linux ECS

Linux ECSs are generally accessed through SSH, allowing you to securely log in to your ECSs using key pairs. However, SSH connections use a character-based user interface, which does not support complex operations that are supported on the GUI. This section uses the Ubuntu 20.04 OS as an example to describe how to install VNC Server on a Linux ECS and how to use VNC Viewer to access the ECS.

Preparations

• An ECS running Ubuntu 20.04 has been created, and an EIP has been bound to it for internet access.

For details, see Purchasing an ECS and Assigning an EIP.

• The VNC Viewer client has been installed on a local PC.

NOTE

Log in at https://www.realvnc.com/en/connect/download/viewer/ to download VNC Viewer.

Installing VNC Server

Ubuntu 20.04 has no GUI or VNC Server installed by default. In this example, Xfce, a compact lightweight desktop is used. Xfce is more compact and user-friendly than Gnome and KDE. It applies to remote ECS access.

1. Remotely log in to the ECS.

The username is **root**, and the password is the one you set during ECS creation.

- 2. Run the following command to update the software package list:
 - sudo apt update
- 3. Install Xfce.

sudo apt install xfce4 xfce4-goodies

4. Install the TightVNC server.

sudo apt install tightvncserver

5. Run the **vncserver** command to configure the TightVNC server.

After the first running of the **vncserver** command, the system automatically creates a default startup script. Then, configure parameters as prompted.

rootlecs-9240- : # Uncserver
You will require a password to access your desktops.
Password:
Verify:
Would you like to enter a view-only password (y/n)? n
xauth: file /root/.Xauthority does not exist
New 'X' desktop is ecs-9240- :1
Creating default startup script /root/.vnc/xstartup
Starting applications specified in /root/.vnc/xstartup
Log file is /root/.vnc/ecs-9240- :1.log
root@ecs-9240- :~#

- Password: consists of 6 to 8 characters. When the number of characters reaches the upper limit (8), no more characters can be entered. Securely keep the password, which will be used by VNC Viewer to access an ECS.
- **Verify**: Enter the password again.
- Would you like to enter a view-only password: If you select y, you are not allowed to use the mouse or keyboard to control your ECS. Press n.

Configuring VNC Server

1. Stop the first virtual desktop.

vncserver -kill :1

root@ecs-9240-	:~#	vncserver -kill	:1
Killing Xtightvnc prod	cess	ID 2738	
root@ecs-9240-	:~#		

2. Modify the **xstartup** file.

vim ~/.vnc/xstartup

Press i to enter insert mode and add the following to the file:

```
#!/bin/sh
xrdb $HOME/.Xresources
startxfce4 &
```

In the preceding terminal display:

- The first command xrdb \$HOME/.Xresources is used to have the VNC GUI framework read the .Xresources file of VNC Server. You can modify GUI settings in the .Xresources file, such as the color display, cursor theme, and font rendering.
- The second command **startxfce4 &** have VNC Server start Xfce.

#!/bin/sh
xrdb \$HOME/.Xresources
xsetroot -solid grey
<pre>#x-terminal-emulator -geometry 80x24+10+10 -ls -title "\$UNCDESKTOP Desktop" &</pre>
#x-window-manager &
Fix to make GNOME work
export XKL_XMODMAP_DISABLE=1
/etc/X11/Xsession
startxfce4 &

3. Assign executable permissions to the file to ensure proper VNC running.

sudo chmod +x ~/.vnc/xstartup

4. Restart VNC Server.

vncserver

After the second running of the **vncserver** command, the system automatically creates a log file.

root@ecs-9240- :~# vncserver					
New 'X' desktop is ecs-9240- :1					
Starting applications specified in /root/.vnc/xstartup Log file is /root/.vnc/ecs-9240- :1.log					
root@ecs-9240- :~#					

The information similar to "Log file is /root/.vnc/xxx:1.log" is displayed. **1** indicates that the current user is allocated with the first VNC desktop.

Configuring the ECS on the Management Console

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- 1. Log in to the management console.
- 2. Click the name of your ECS to switch to the page providing details about the ECS.
- 3. On the **Security Groups** tab page, click **Modify Security Group Rule** to permit port 5901.

Figure 10-1 Modifying security group rules

			more				
d Rule Fast-	-Add Rule Delete	Allow Common Ports Inboun	d Rules: 6 Learn more about security grou	p configuration.			
Specify filter criteria.							
Priority ⑦	Action ③	Туре	Protocol & Port (2)	Source ⑦	Description	Last Modified	Operation
] 1	Allow	IPv4	TCP : 5901		-	Apr 17, 2024 15:14:17 GMT+08:00	Modify Replicate Dele
1	Allow	IPv6	Al		$(g^{\mu}(p, q), d_{\mu\nu}) \in \mathrm{Sub}(M, Q)$	Jun 27, 2023 14:54:20 GMT+08:00	Modify Replicate Dele
1	Allow	IPv4	ICMP : All		ga 100 00 00 - 100 00	Jun 27, 2023 14:54:20 GMT+08:00	Modify Replicate Dele
) 1	Allow	IPv4	TCP : 80	7 ()	Advanta Miller States	Jun 27, 2023 14:54:20 GMT+08:00	Modify Replicate Dele

Using VNC Viewer to Access an ECS

1. Start the VNC Viewer client on the local computer, enter **EIP:1**, set the name, and click **OK**.

The port number is determined by the log file name displayed in the command output of step **4**. If the log file name is **xxx:1.log**, enter **1**.

November 2010 Properties	_		\times			
General Options Expert						
			^			
VNC Server:						
Name: ubuntu						
Labels						
To nest labels, separate names with a forward s	lash (/)					
Enter a label name, or press Down to apply exis	sting lab	els				
Security						
Encryption: Let VNC Server choose		\sim				
Authenticate using single sign-on (SSO) if possible						
Authenticate using a smartcard or certificate store if possible						
Privacy			~			
	Ж	Cano	cel			

2. In the displayed dialog box, click **Continue**.

V2 Encryption					
Unencrypted connection					
The connection to this VNC Server will not be encrypted.					
VNC Server: (TCP)					
Your authentication credentials will be transmitted securely, but all subsequent data exchanged while the connection is in progress may be susceptible to interception by third parties.					
Don't warn me about this again on this computer.					
Continue Cancel					

3. Enter the password set in step **5** and click **OK**.

Nuthentica	ation		×	
Authenticate to VNC Server				
Enter VNC Server credentials (Hint: NOT your RealVNC account details)				
Username:				
Password:	•••••		Ø	
Remember password		Fo	rgot password?	
		ОК	Cancel	

4. Verify the GUI of the Ubuntu 20.04 OS.

