DHCS Deployment Guide

release v1.0.0

1. Installation Requirements

DHCS supports the following four deployment scenarios:

- One-click script installation on Ubuntu
- Containerized deployment via Podman
- VMware Workstation virtual machine import
- VMware ESXi virtual machine import

1.1. Hardware Resource Requirements

The minimum hardware resources required for server, Podman, or virtual machine operation are as follows:

Item	Requirements	Remarks
Processor	4 Cores 8 Threads, frequency > 2.8 GHz	X86 Platform
Memory	>= 8 GB	Adjustable based on the scale of managed devices
Disk Storage	>= 500 GB	Adjustable based on the scale of managed devices
Network Card	Gigabit Ethernet Card (Fiber or Copper)	1000 Mbps port or higher
Bandwidth	≥ 3 Mbps	For internet communication

▲ Table 1: Hardware Resources

1.2. Software Resources

The required versions for the operating system and VMware Virtual Machine are as follows:

Item	Requirements	Remarks
OS	Ubuntu 20.04.6 LTS Ubuntu 22.04.5 LTS Ubuntu 24.04.3 LTS	Server edition, Kernel ≥ 4.14 (Check with `uname -r`)
Virtualization Software	VMware Workstation 15.1.0	
Virtualization Software	VMware ESXi 8.0	

▲ Table 2: Software Resources

2. Installation Media

2.1. Operating System Images

- Ubuntu 20.04.6 LTS
  https://releases.ubuntu.com/20.04.6/ubuntu-20.04.6-live-server-amd64.iso

- Ubuntu 22.04.5 LTS
  https://releases.ubuntu.com/22.04.5/ubuntu-22.04.5-live-server-amd64.iso
- Ubuntu 24.04.3 LTS
  https://releases.ubuntu.com/24.04.3/ubuntu-24.04.3-live-server-amd64.iso

2.2. DHCS Installation Packages

You can download the DHCS deployment installation files from the following links:

- **DHCS for Ubuntu**
- http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/dhcs-V1.0.0-ubuntu20.tar.gz

  http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/dhcs-V1.0.0-ubuntu22.tar.gz

  http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/dhcs-V1.0.0-ubuntu24.tar.gz
- **DHCS for VM/ESXi**
  http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/dhcs-vm-ubuntu24.zip
- **DHCS for Podman**
  http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/dhcs-V1.0.0-podman.tar.xz

3. Open Ports

Ensure the following ports on the DHCS server are open in the firewall and accessible via the network:

No.	Service	Port	Description
1	HTTP	80/tcp	Web Management Interface
2	HTTPS	443/tcp	Encrypted Web Management Interface
3	MQTT	883/tcp	Device Communication
4	FRP	7000/tcp	Intranet Penetration Service
5	FRP Proxy	6000-6100/tcp	Device Proxy Port Range

▲ Table 3: Open Ports

4. Installing DHCS

This guide describes four installation methods for DHCS:

- Binary File Installation
- Podman Image Deployment
- VMware Workstation Deployment
- VMware ESXi Deployment

4.1. Binary File Installation

4.1.1. Install Ubuntu Operating System

The DHCS binary installation package requires one of the following Ubuntu versions:

- Ubuntu 20.04.6 LTS
- Ubuntu 22.04.5 LTS
- Ubuntu 24.04.3 LTS

Please download the corresponding Ubuntu image from Chapter 2 Installation Media, complete the system installation, configure the network, and record the root account password.

4.1.2. Install OpenSSH (Optional)

To facilitate remote management, you can install and enable the SSH service:

1. Update the package list (to ensure the latest version can be downloaded) and install the SSH server:

   ```
   # Update package list
   sudo apt update

   # Install SSH server
   sudo apt install openssh-server -y

   # Start SSH service
   sudo systemctl start ssh

   # Enable auto-start on boot
   sudo systemctl enable ssh

   # Verify SSH service status
   sudo systemctl status ssh
   ```

   If the system firewall (UFW) is enabled, open the SSH port:

   ```
   # Allow SSH connections (default port 22)
   sudo ufw allow ssh

   # Check firewall status
   sudo ufw status
   ```

4.1.3. Upload Installation Package

- **SCP Method**

  First, download the appropriate installation package locally, then use the `scp` command to upload it to a specified directory on the server.

  `scp` (Secure Copy) is a secure copy command based on SSH, available on almost all systems with SSH installed (Linux, macOS, Windows 10/11).

```
# Command format: scp <local_file_path> <username>@<server_ip>:<target_path>
scp dhcs-v1.0.2-ubuntu24.tar dhcs@172.16.121.201:/home/dhcs/
```

- **wget Download (Direct Server Download)**

  If the server has internet access, you can download the installation package directly on the server:

  ```
  # Navigate to target directory

  # Download installation package (replace with actual URL)
  wget http://www.hohunet.com/download/dhcs/ubuntu/dhcs-v1.0.2-ubuntu24.tar
  ```

- **SSH Client Tool Upload**

  1. Establish an SSH connection: Use a tool to connect to the target server.
  2. Open the file transfer interface:
     - Usually via a toolbar icon or right-click menu to open an SFTP/SCP transfer window.
     - Some tools support dragging and dropping files directly onto the terminal interface for automatic upload.
  3. Perform the upload operation:
     - Select the local installation package file in the file transfer interface.
     - Specify the server target directory (e.g., `/home/dhcs/`).
     - Execute the upload.

  Note: The specific interface varies slightly between tools, but generally follows the common process: "Connect → Open Transfer Interface → Select File → Upload".

4.1.4. Install DHCS

Step 1: Set System Timezone

```
timedatectl status | grep "Time zone"

sudo timedatectl set-timezone Asia/Shanghai

echo "Asia/Shanghai" | sudo tee /etc/timezone
```

Step 2: Extract and Execute the Installation Script

Navigate to the directory containing the downloaded installation package and execute the following commands to extract it:

```
# Extract the installation package
sudo tar -xvf dhcs-xxxx.tgz

# Enter the extracted directory
cd dhcs-ubuntu24

# Grant execute permission to the installation script
sudo chmod +x dhcs-install.sh

# Execute the installation script
sudo ./dhcs-install.sh
```

Step 3: Verify Installation Result

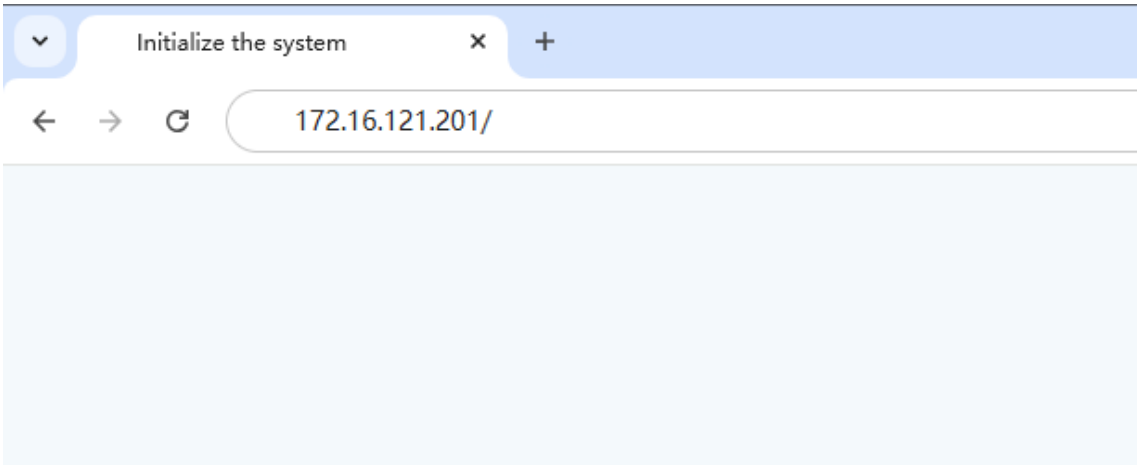
After installation completes, the following prompt information will be displayed:

```
Start the AUTH service...
Start the DHCS service...
service installation is complete!
The AUTH/DHCS service can be managed using the following commands.:
start: systemctl start auth/dhcs
stop: systemctl stop auth/dhcs
restart: systemctl restart auth/dhcs
status: systemctl status auth/dhcs
[Thu Nov 27 12:08:09 PM UTC 2025] The execution of install-portal was successful.
DHCS installation completed
HTTP: http://IP|domain
HTTPS: https://IP|domain, Default self-signed certificate, certificate directory:
\etc\nginx\ssl\site
test@ubuntu:~/dhcs-ubuntu24$
```

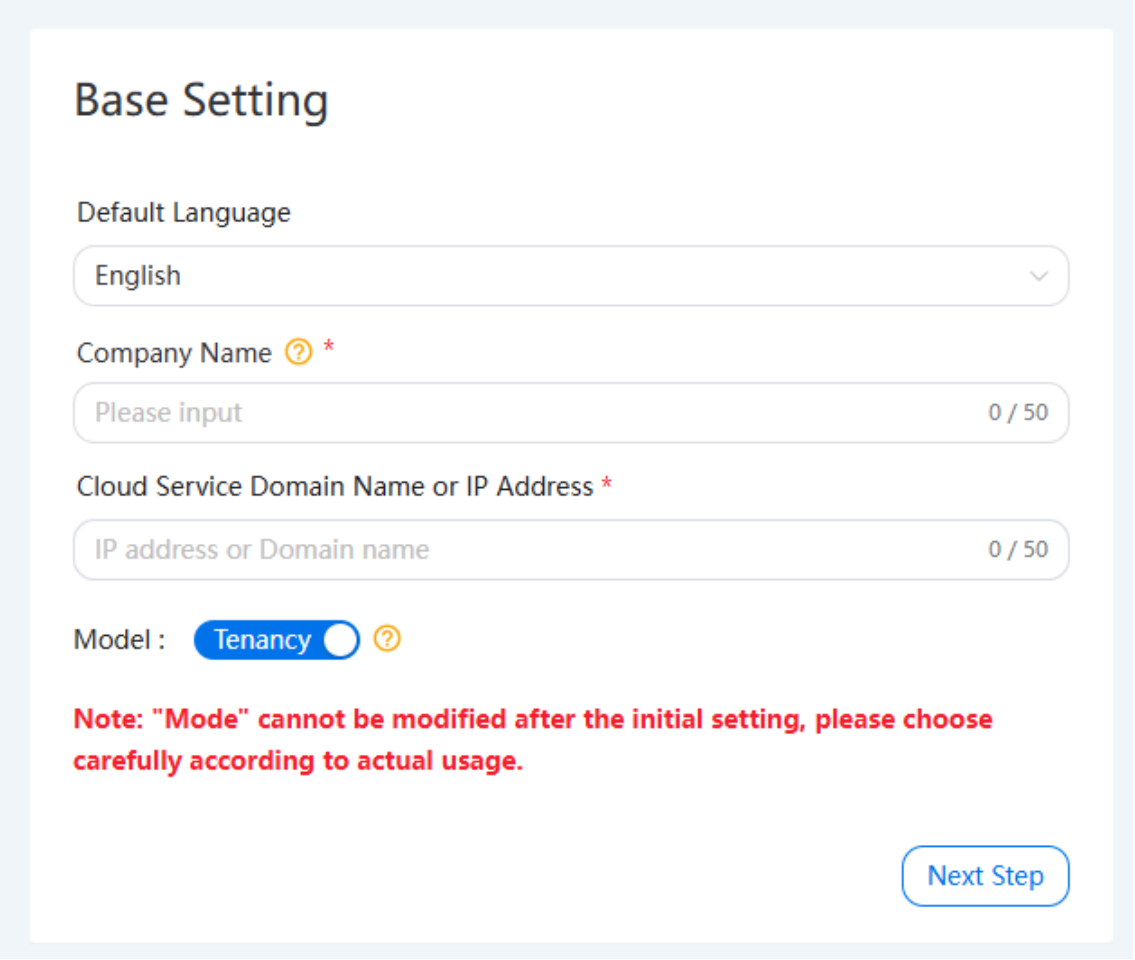
4.1.5. Initialization Wizard

After DHCS installation is complete, system initialization must be performed via the web page.

1. **Access the Initialization Page**
   Open a browser and enter `http://<server_ip>` to access the initialization interface.

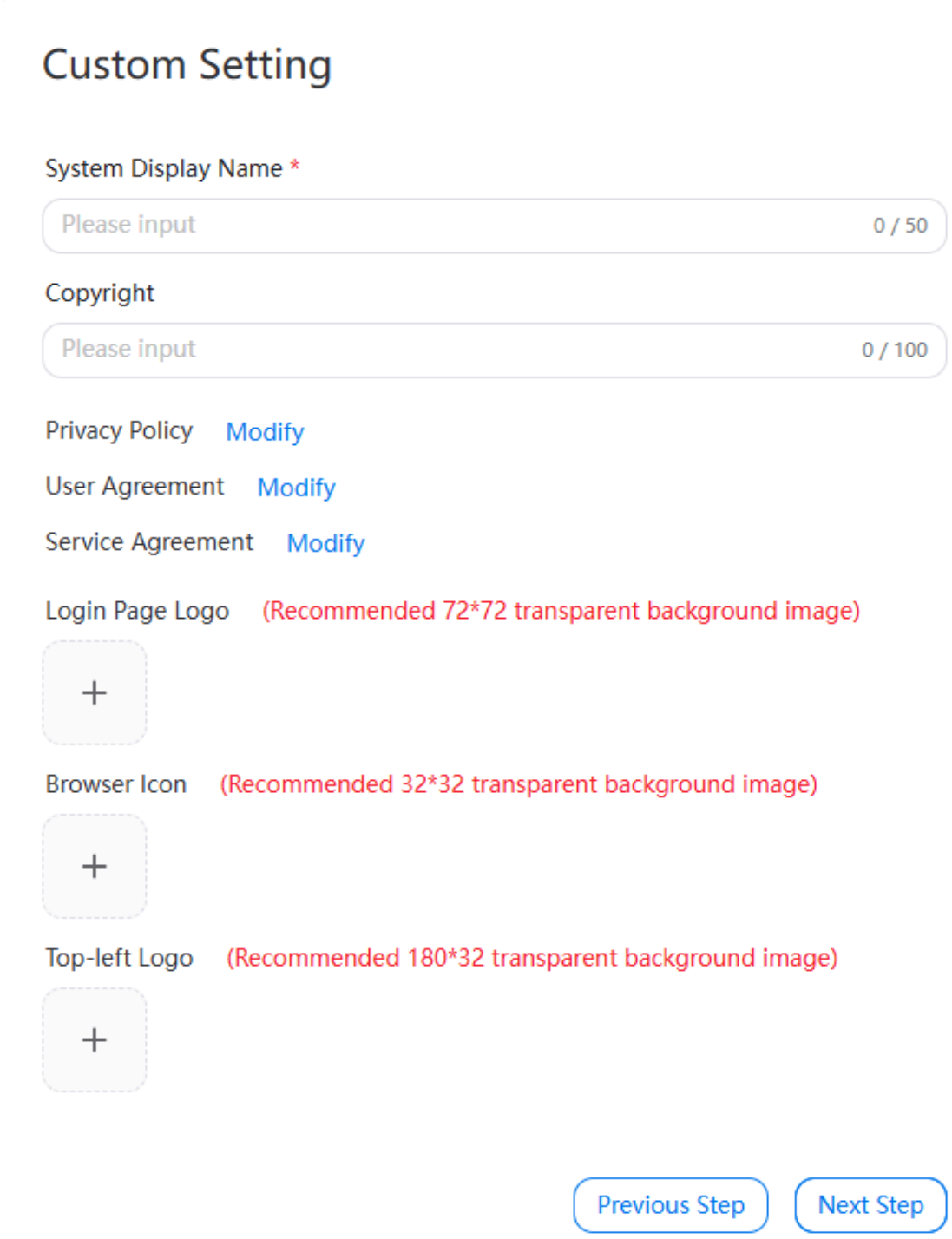


2. **Set Basic Information**
   Configure platform owner, cloud service domain/IP, system language, business mode (tenant/private), etc.

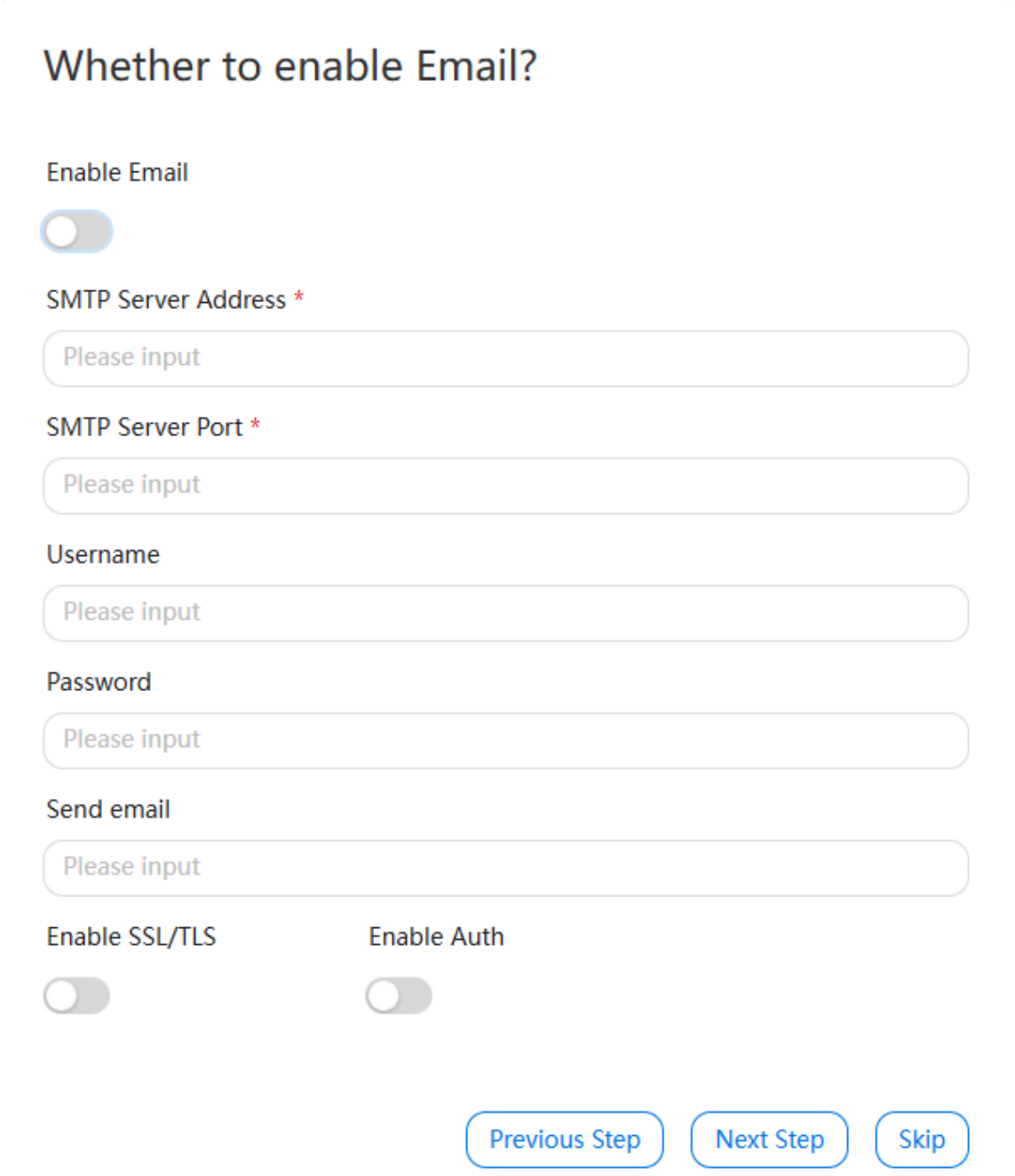


- **Default Language:** Specifies the language in which the user interface is displayed.
- **Company Name:** The owner of the DHCS platform assets, can be displayed to users where necessary.
- **Cloud Service Address:** Used for communication with network devices, e.g., device reporting, establishing management tunnels, etc.
- **Business Mode:** Tenant mode or Private mode. Can only be set for the first time after installation and cannot be modified later.

3. **Set Customization Information**
   Configure platform display name, corporate copyright information, logo, user agreement, etc.

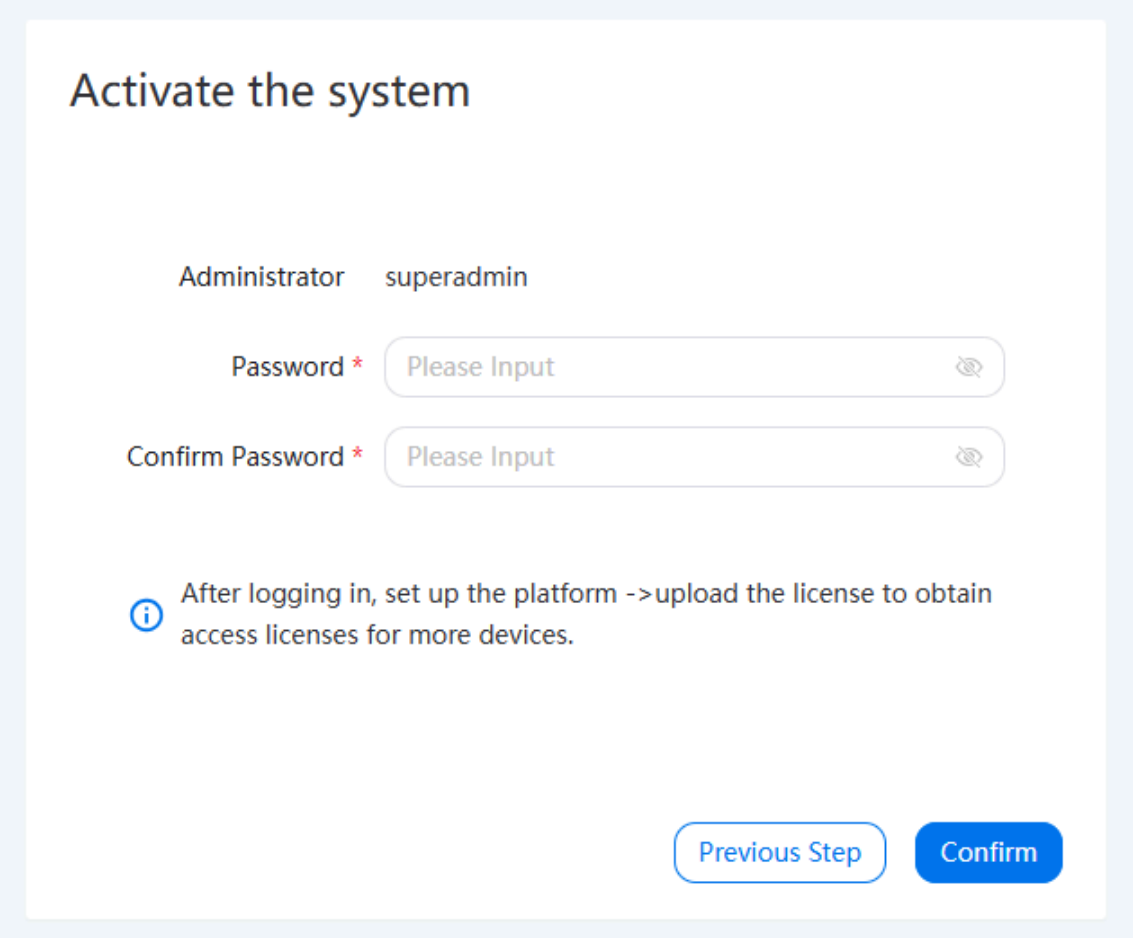


4. **Set Up Email Service**
   Configure SMTP server information for system notifications, password reset, and other functions.



> ⚠ **Warning**
> Email notifications require the associated Email Templates to be enabled for use simultaneously.

5. **Activate System**
   Set the superadmin password to complete system activation.



4.2. Podman Image Deployment

4.2.1. Environment Preparation

Podman deployment requires one of the following Ubuntu versions:

- ✨ Ubuntu 20.04.6
- ✨ Ubuntu 22.04.5
- ✨ Ubuntu 24.04.3

4.2.2. Install Podman

Execute the corresponding installation script based on the system version:

```
#!/bin/bash

# Get current Ubuntu version
UBUNTU_VERSION=$(lsb_release -rs)

# Install Podman based on different Ubuntu versions
case $UBUNTU_VERSION in
    "20.04"|"22.04")
        echo "Detected Ubuntu $UBUNTU_VERSION"
        # Add Podman PPA
        . /etc/os-release
```

```
        sudo sh -c "echo 'deb
https://download.opensuse.org/repositories/devel:/kubic:/libcontainers:/stable/xU
buntu_${VERSION_ID}/ /' >
/etc/apt/sources.list.d/devel:kubic:libcontainers:stable.list"
        wget -qO -
https://download.opensuse.org/repositories/devel:/kubic:/libcontainers:/stable/xU
buntu_${VERSION_ID}/Release.key | gpg --dearmor | sudo tee
/etc/apt/trusted.gpg.d/devel_kubic_libcontainers_stable.gpg > /dev/null
        sudo apt-get update -qq
        sudo apt-get install -y podman
        ;;
    "24.04")
        echo "Detected Ubuntu $UBUNTU_VERSION"
        # Install Podman using default repositories
        sudo apt-get update -qq
        sudo apt-get install -y podman
        ;;
    *)
        echo "Unsupported Ubuntu version: $UBUNTU_VERSION"
        exit 1
        ;;
esac

# Verify installation
podman --version
```

4.2.3. Upload Image Package

Refer to 4.1.3. Upload Installation Package to upload the appropriate installation package to the server.

4.2.4. Installation Process

In the directory containing the software package, execute the following commands to install:

```
# Extract the image package
sudo tar -xzvf dhcs-1.0.1-podman.tgz

# Enter the extracted directory
cd dhcs-container/

# Grant execute permission to the installation script
sudo chmod +x dhcs-install-pod.sh

# Execute the installation script
sudo ./dhcs-install-pod.sh
```

Upon completion, the following information will be displayed:

```
dhcs-emqx.jarConfiguration successful
dhcs-portal.jarConfiguration successful
Start the dhcs-broker service
Start the dhcs-proxy service
Start the dhcs-portal service
DHCS installation completed
HTTP: http://IP|domain
HTTPS: https://IP|domain, Default self-signed certificate, certificate directory:
data\etc\nginx\ssl\site
```

4.2.5. Initialization

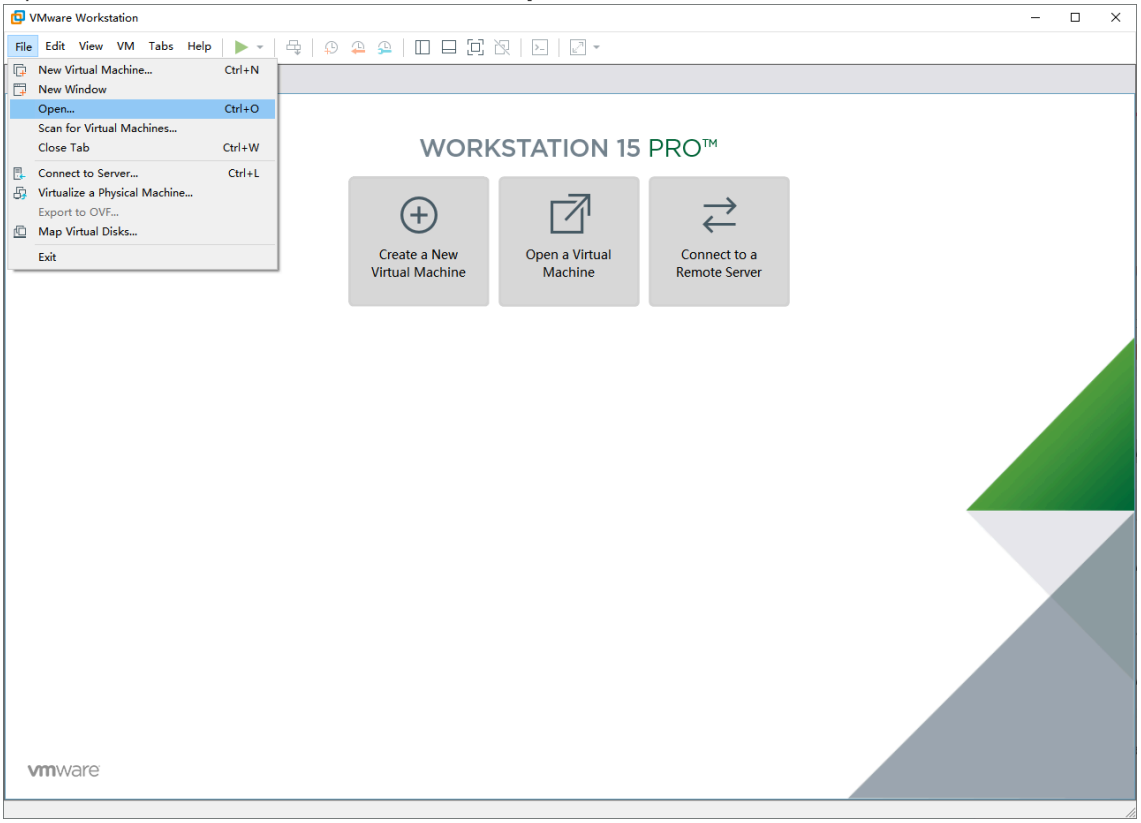
After installation, please refer to 4.1.5 Initialization Wizard to complete system initialization configuration.

4.3. VMware Workstation Deployment

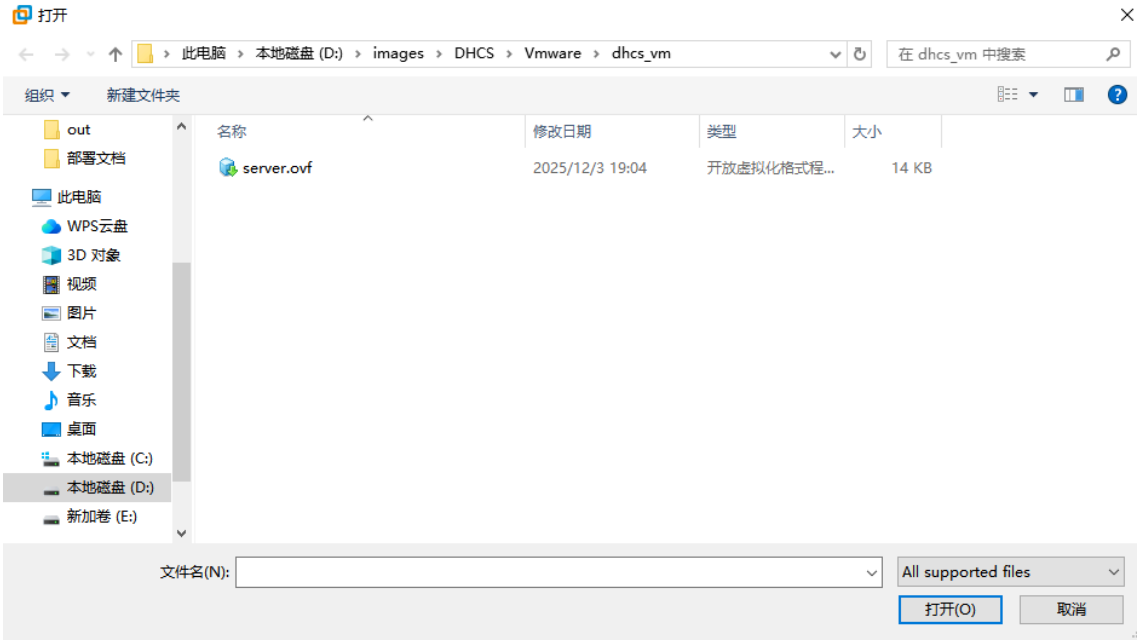
4.3.1. Import Virtual Machine

Currently supports importing DHCS VM images into VMware Workstation 15.1.0. Procedure:

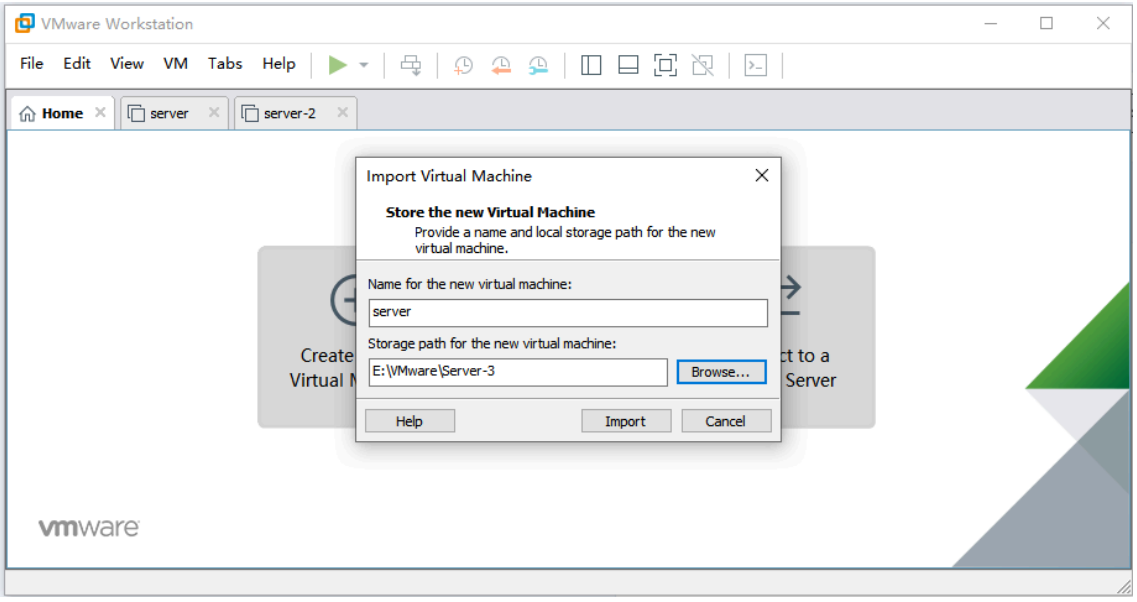
1. Upload and extract the VM image package to the virtual machine server.
   Download the required DHCS for VM version from Installation Media, and save the downloaded `dhcs_vm.zip` locally.
2. Open VMware Workstation, select **File** → **Open**.



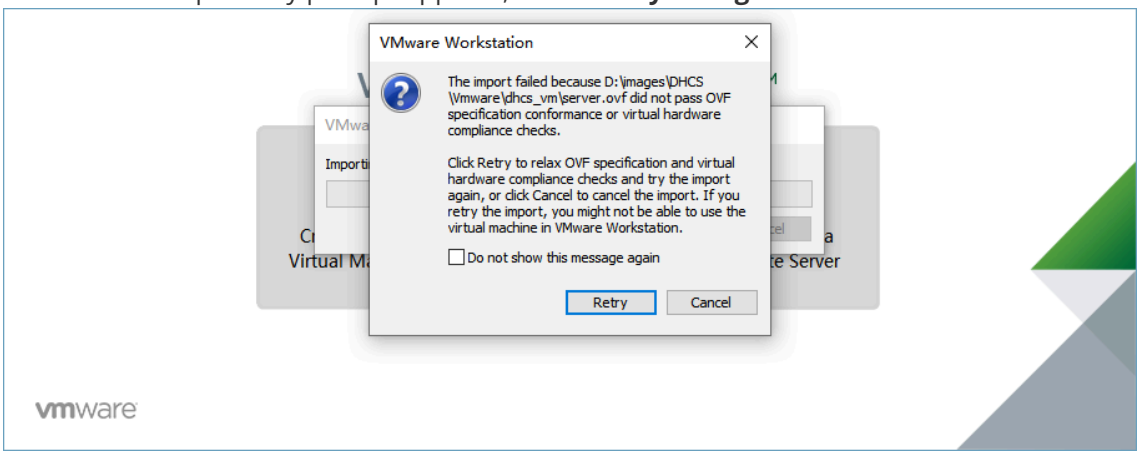
3. Browse to the extraction directory, select the `server.ovf` file, and click **Open**.



4. Set the virtual machine name and storage path, then click **Import**.

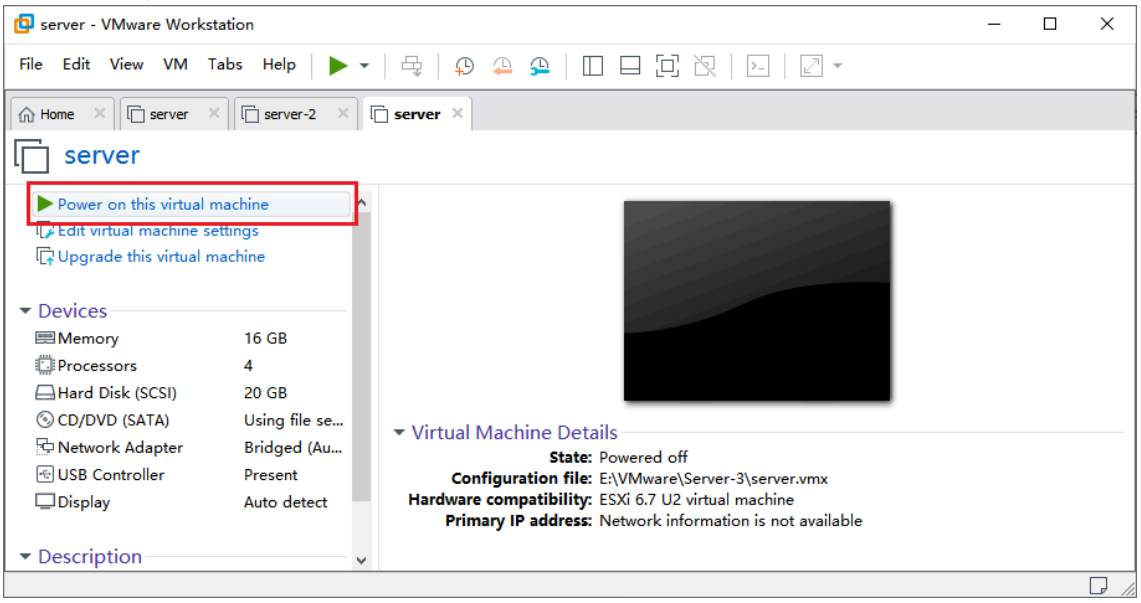


5. If a version compatibility prompt appears, select **Retry and Ignore** to continue.



4.3.2. Start and Setup

1. Start the imported virtual machine.



2. Follow the on-screen prompts to complete initial configuration such as network and timezone.
3. The system will automatically install and start the DHCS service.

4.3.3. Initial Configuration

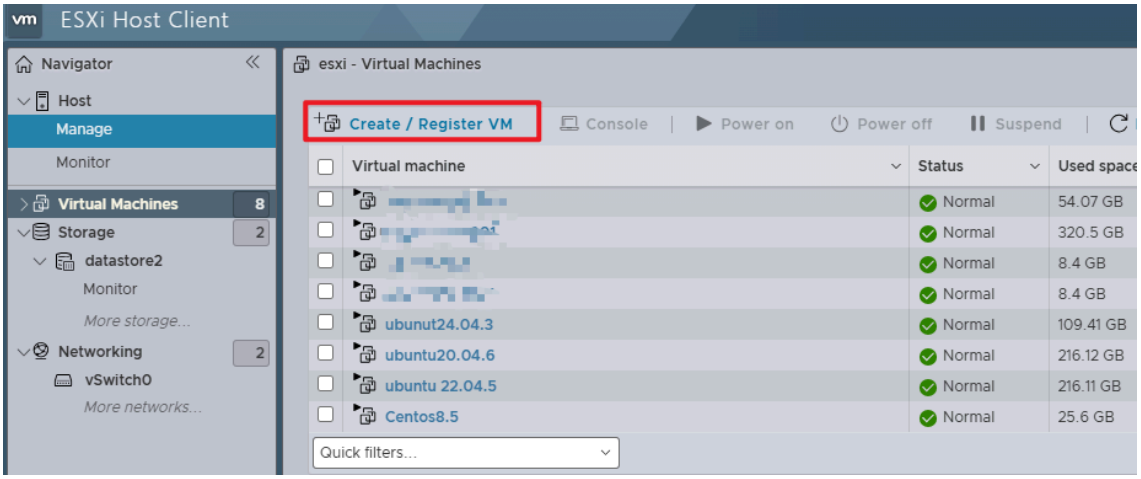
After installation, please refer to Virtual Machine Initialization to complete system initialization configuration.

4.4. VMware ESXi Deployment

Currently supports importing DHCS VM images into VMware ESXi 8.0. Procedure:

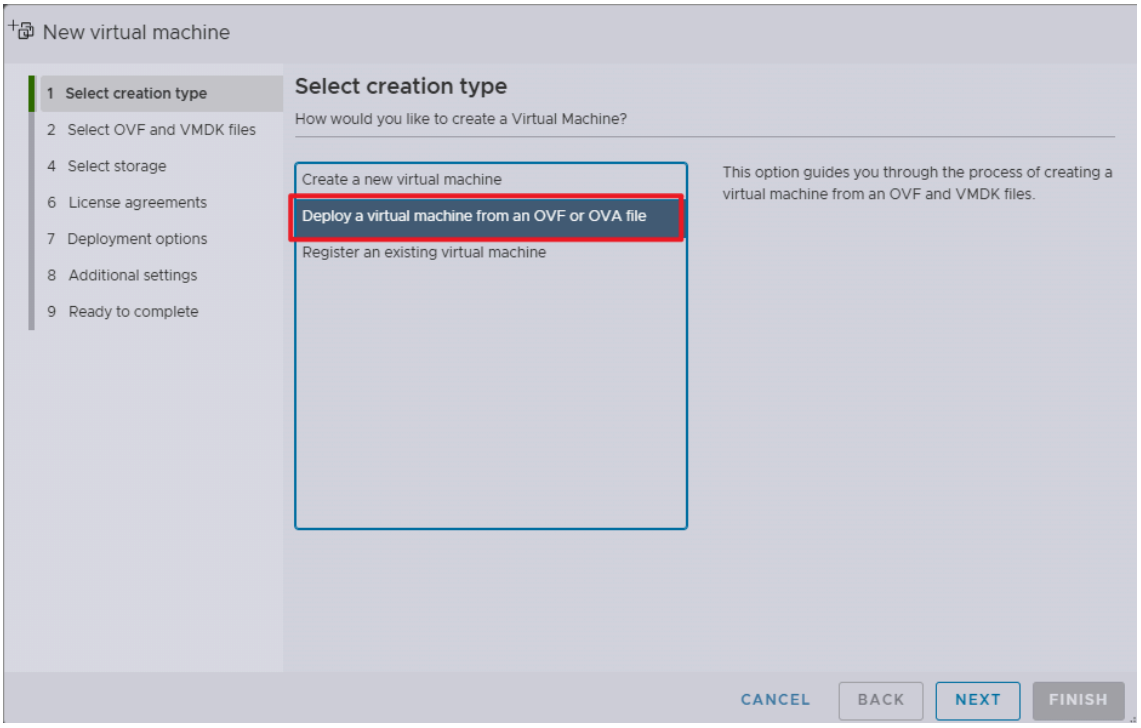
4.4.1. Create Virtual Machine

1. Log in to the ESXi management interface, go to **Virtual Machines**, click **Create / Register VM**.



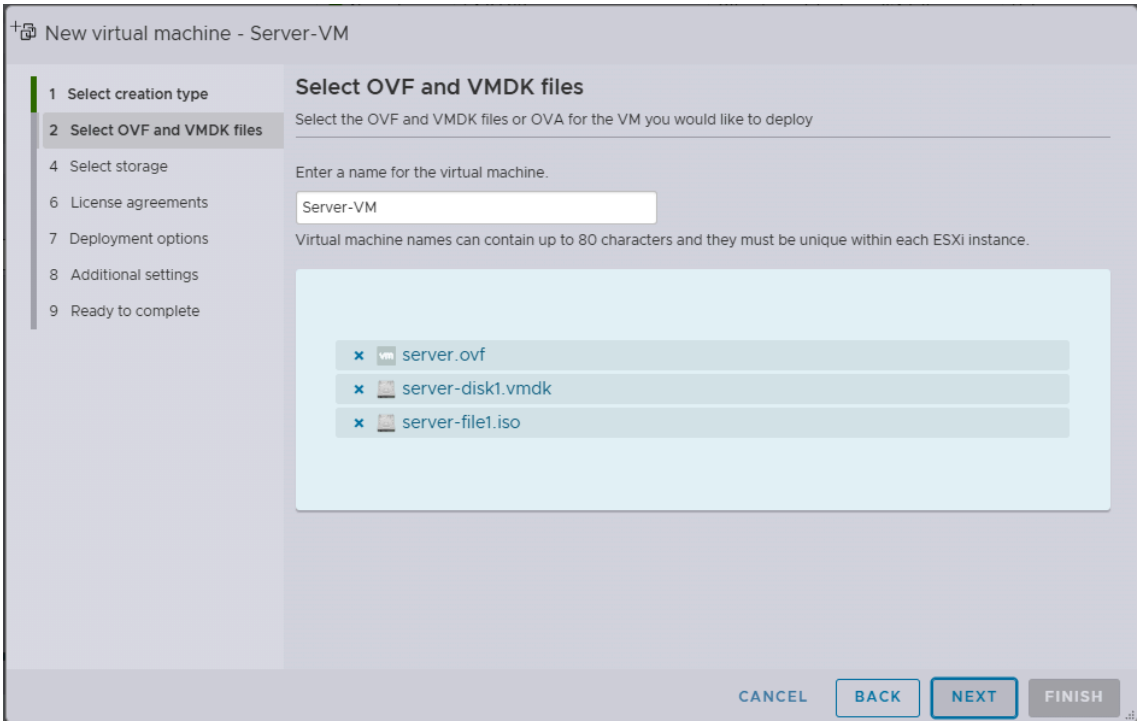
2. **Select creation type**

   Select the type of virtual machine to create. For DHCS, create from an OVF or OVA file as shown:



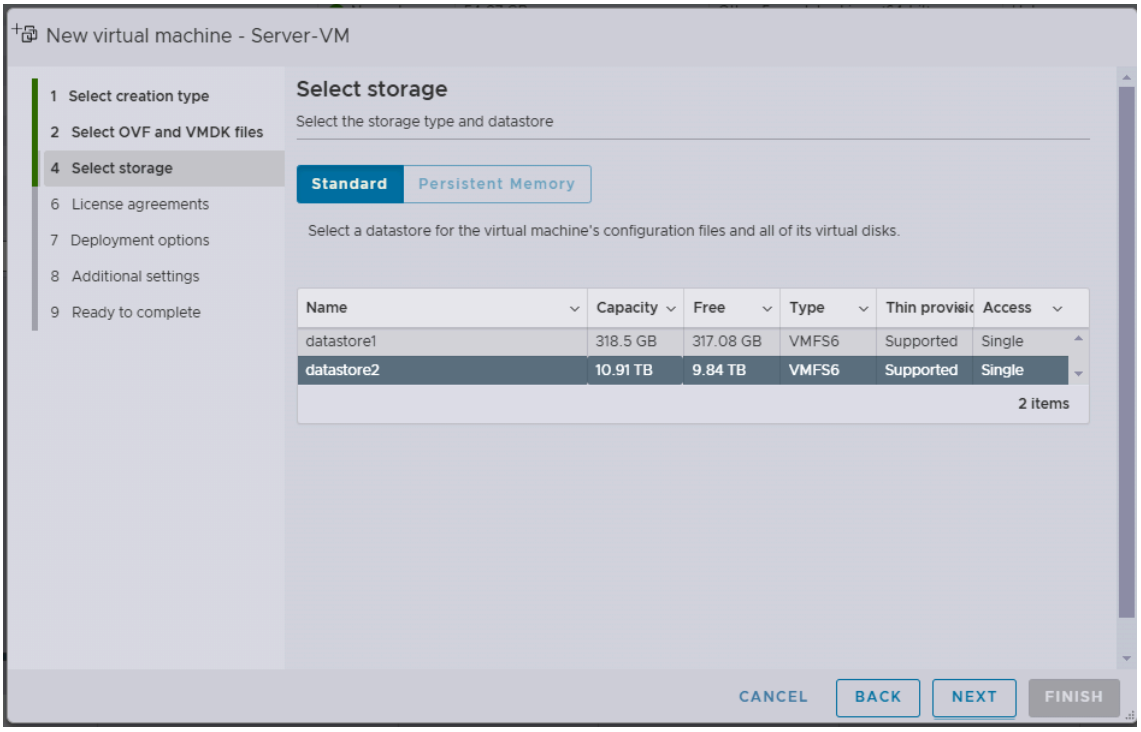
3. **Select OVF and VMDK files**

   Enter a name for the virtual machine and upload the virtual machine file downloaded from the installation media.

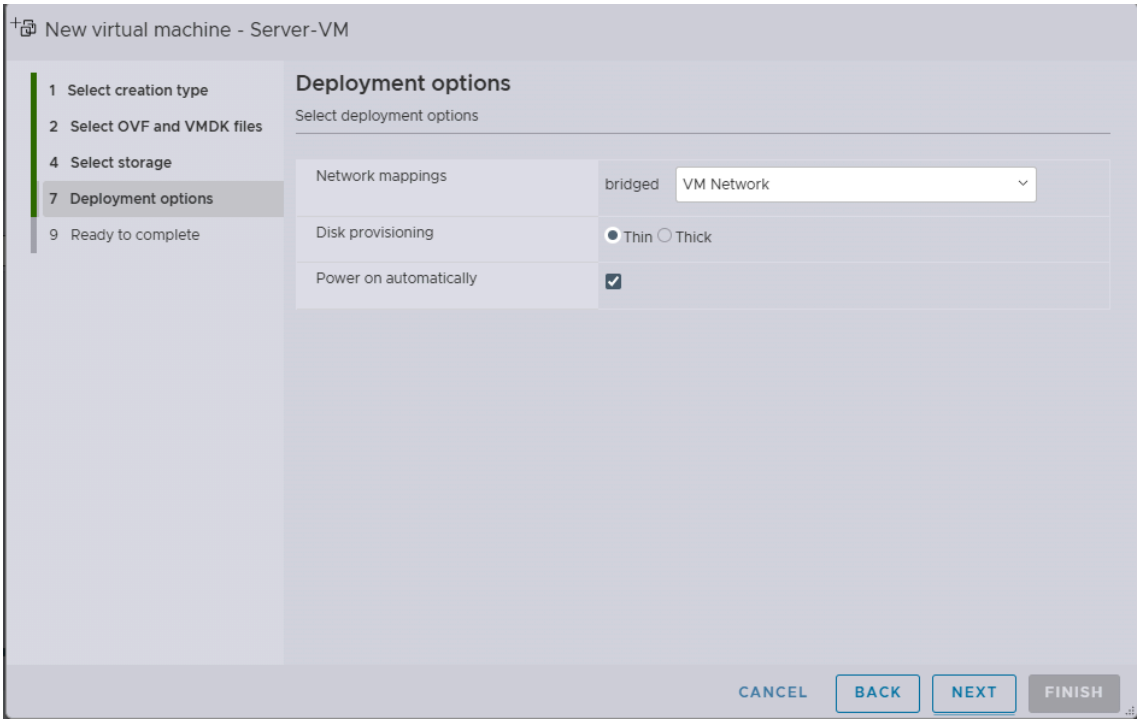


4. **Select storage**

   Select a storage system for the virtual machine.

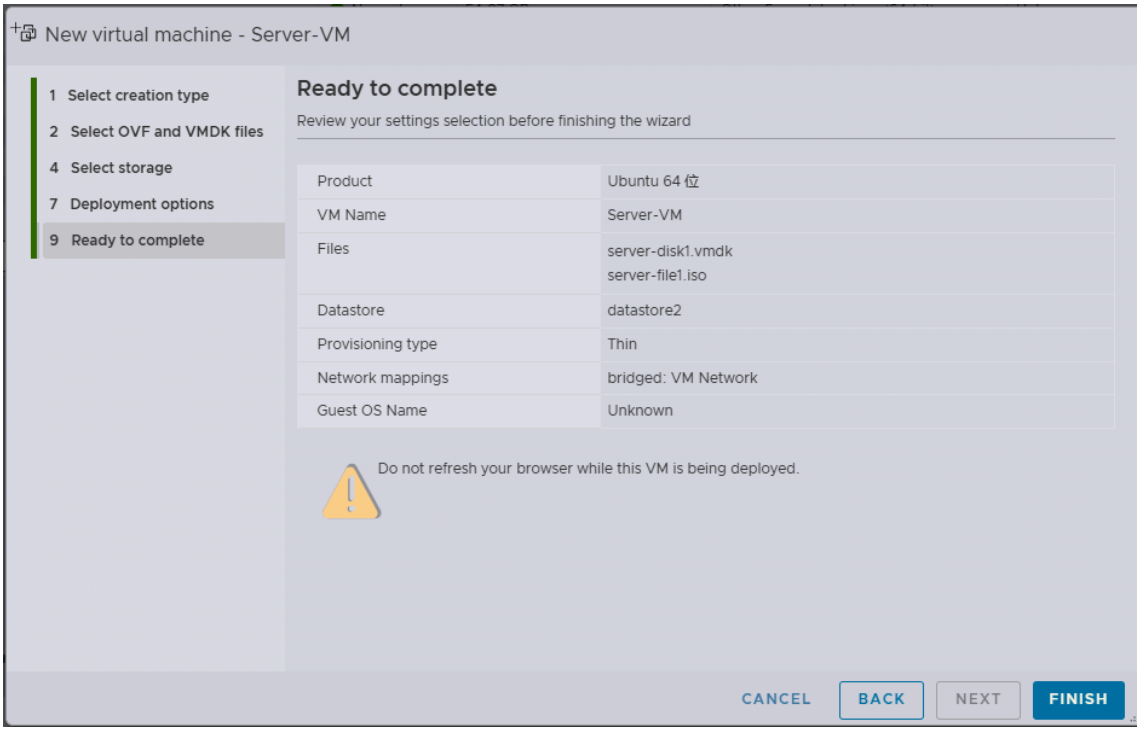


5. **Select deployment options**



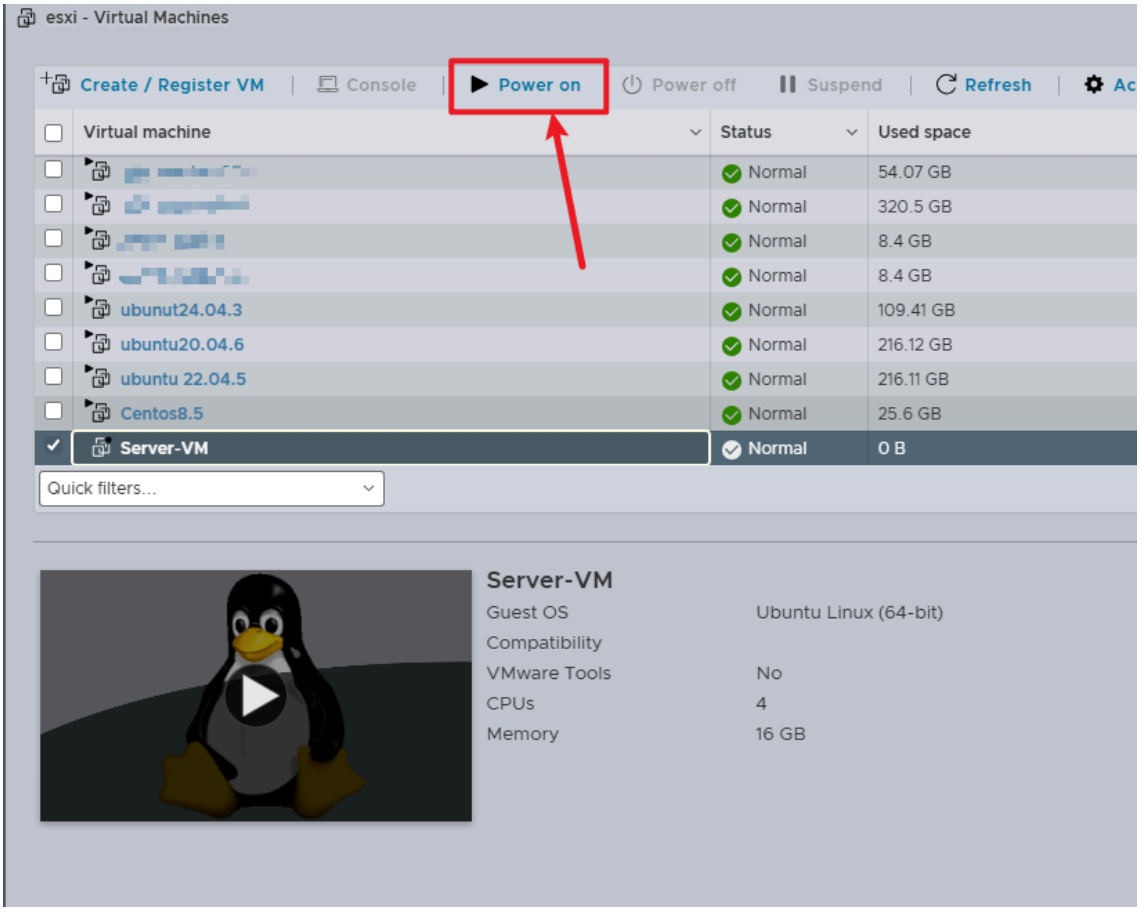
6. **Ready to complete**

   After confirming the configuration information is correct, click the **Finish** button.



7. **Power on the virtual machine**

   Select the virtual machine to start and click the **Power on** button.

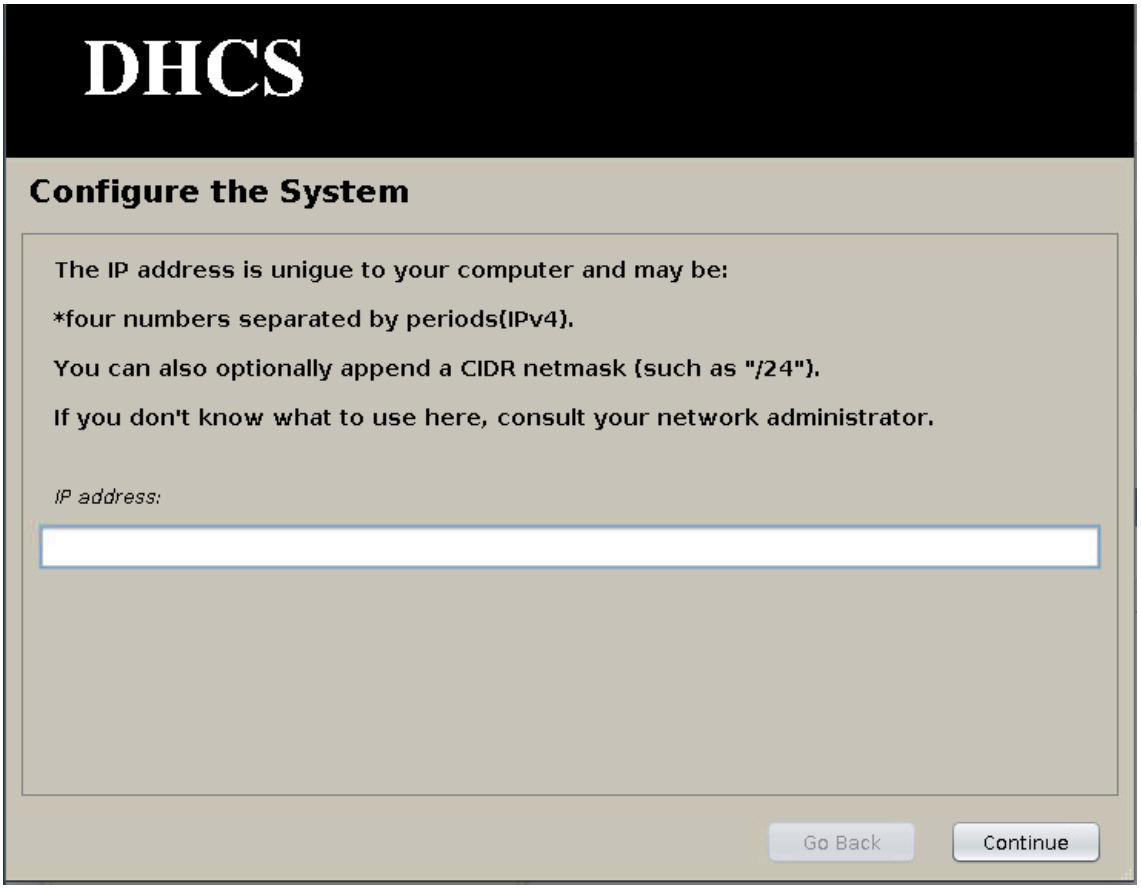


   After the virtual machine starts, access its console to enter the setup interface.

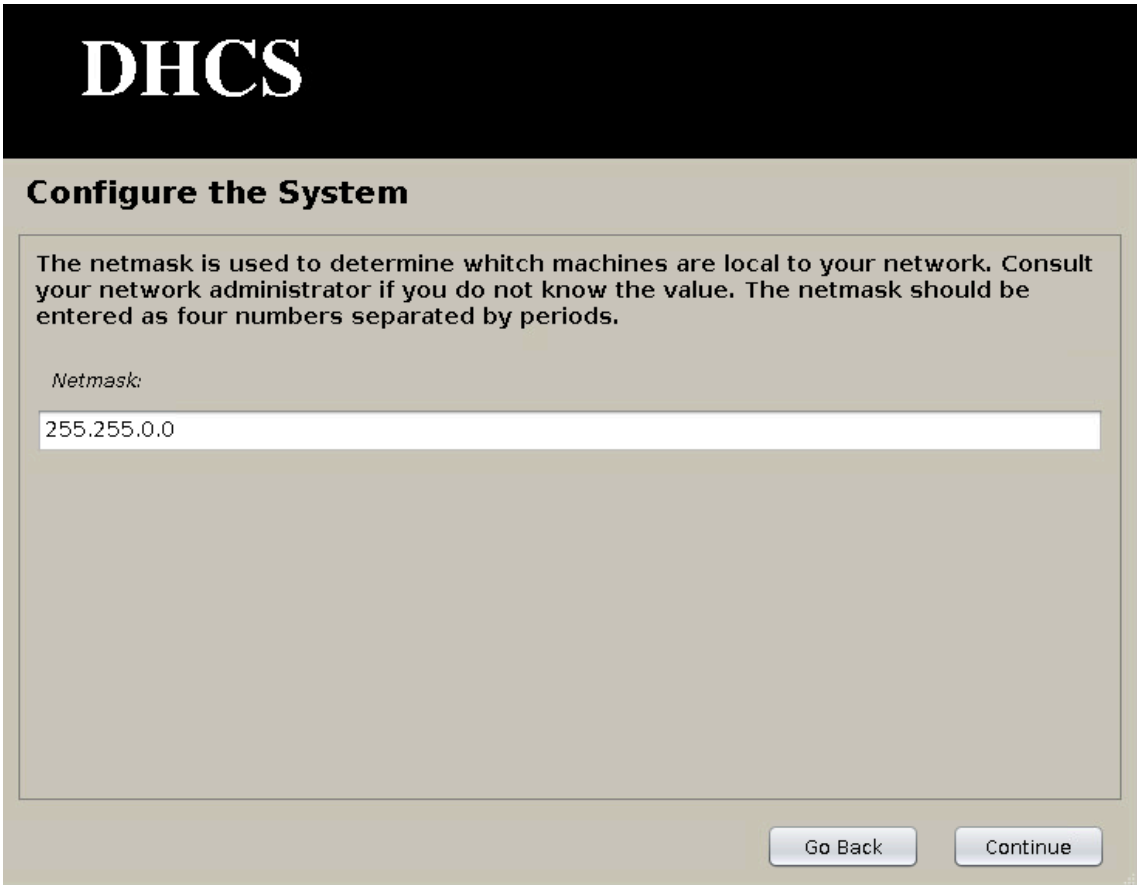
4.4.2. Initial Configuration

After the virtual machine starts, configure the following information in sequence:

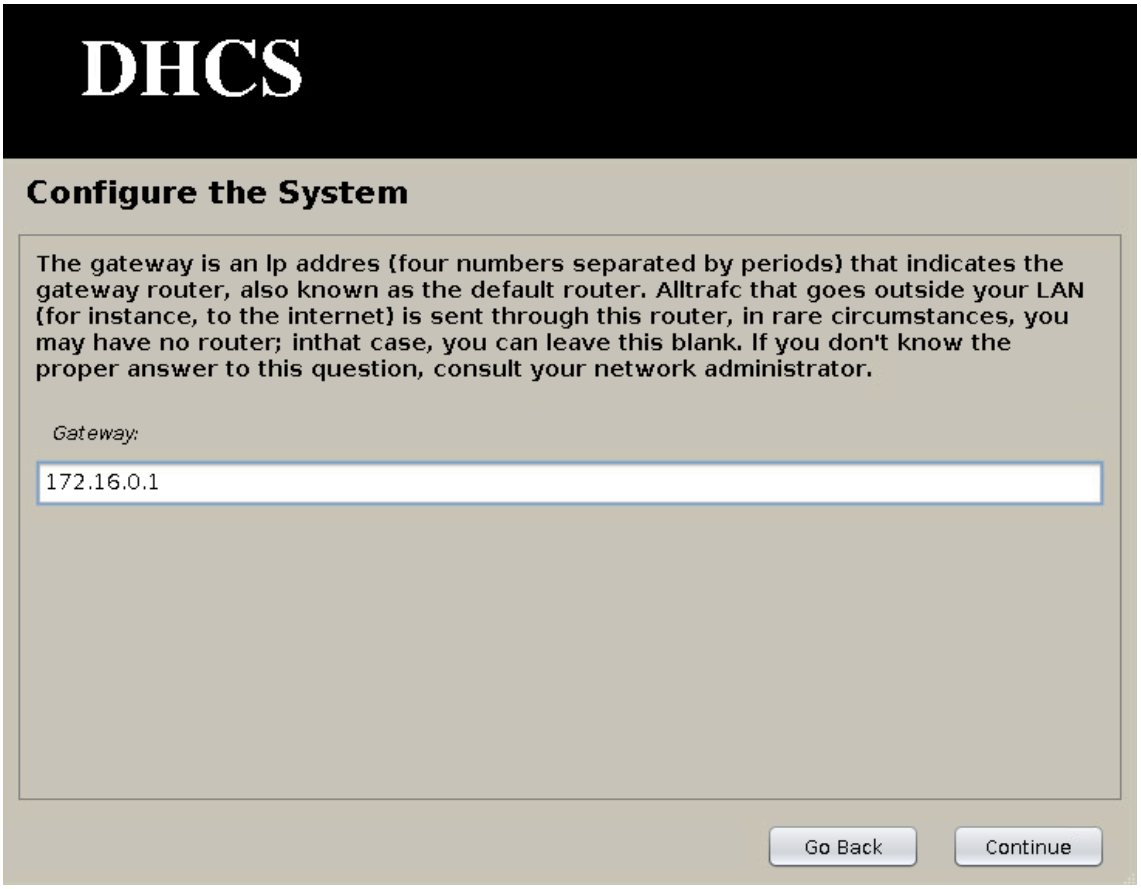
- Configure DHCS IP



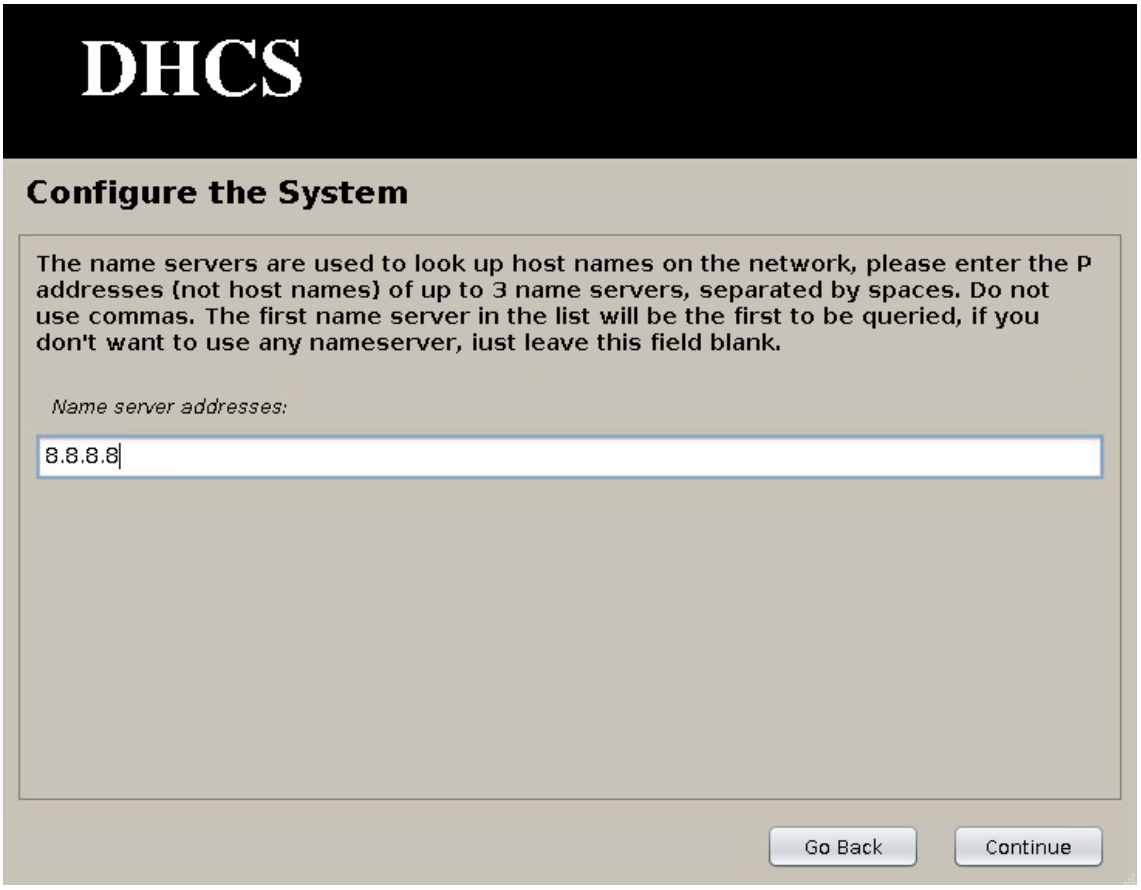
- Subnet Mask



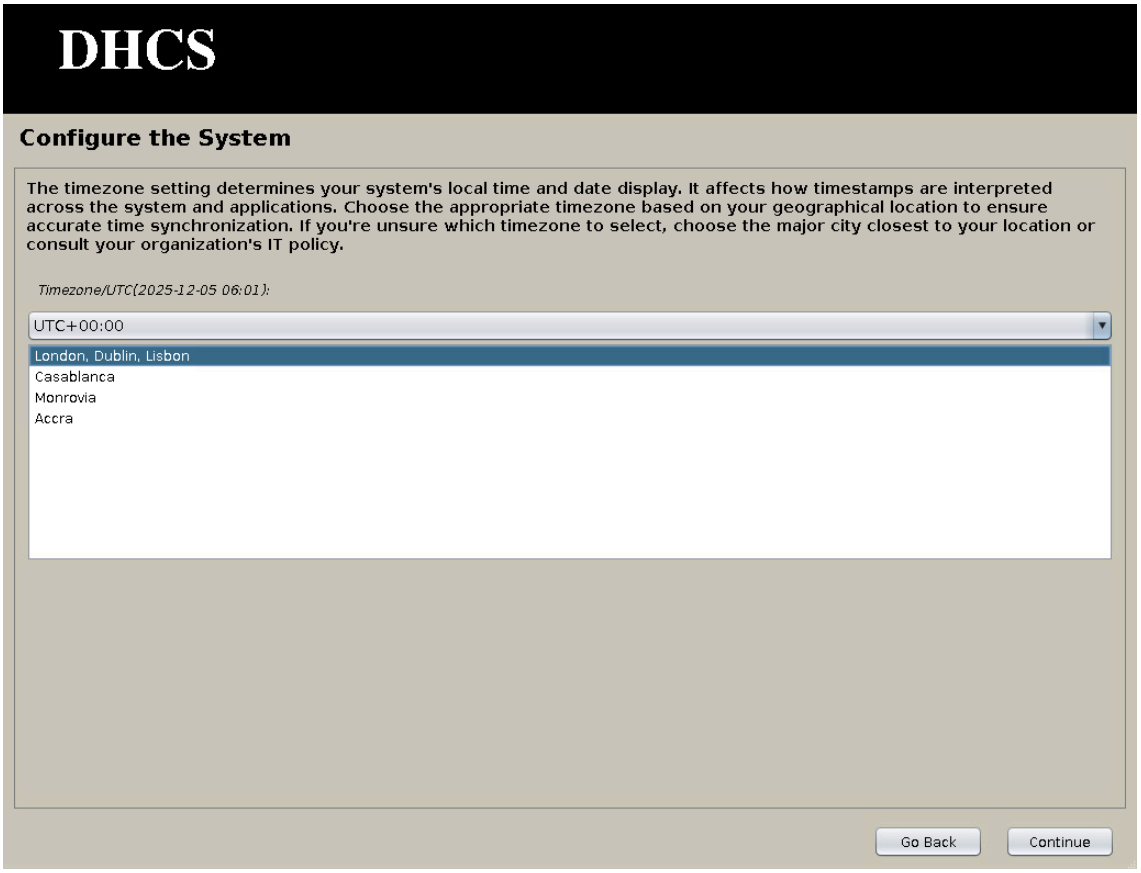
- Default Gateway



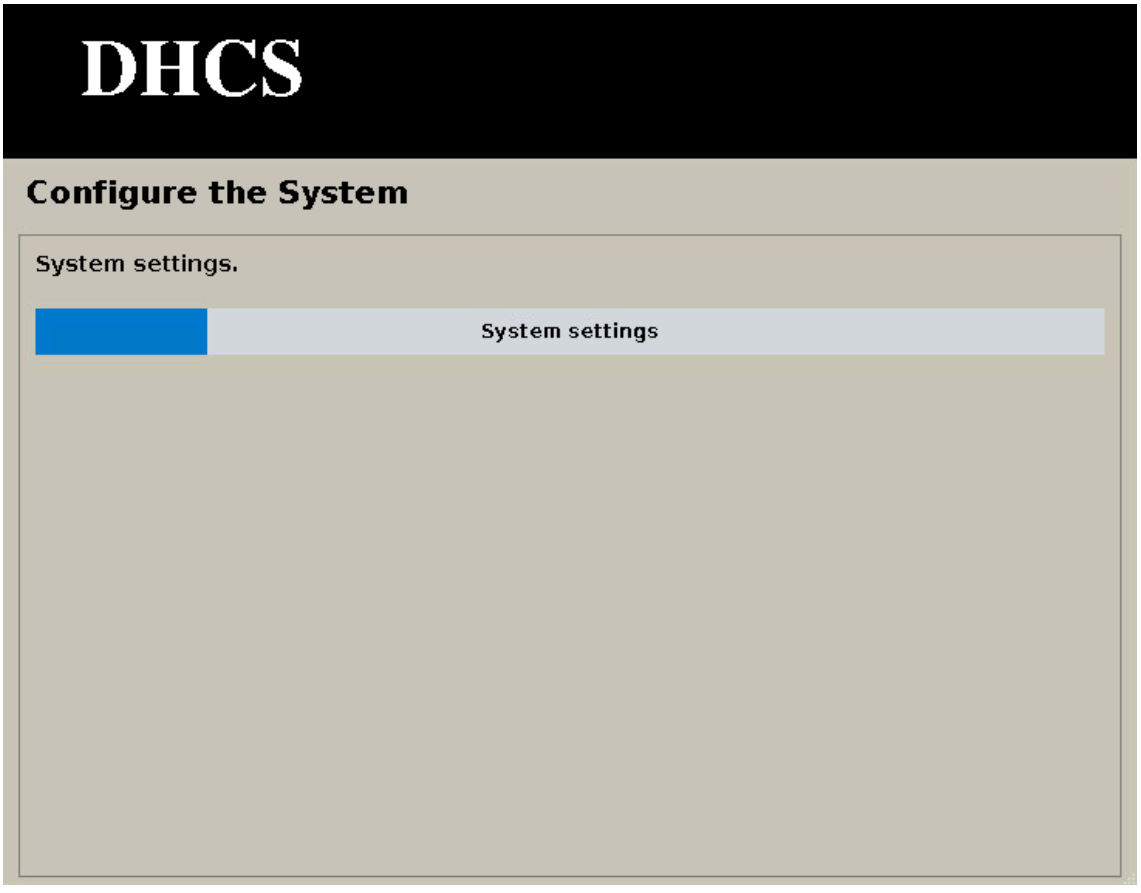
- DNS Server



- System Timezone



- After configuration is complete, the system will automatically complete service deployment and restart.



4.4.3. Login Information

Service	Username	Password
SSH	dhcs	admin123
Web	superadmin	Set during installation

Table 4: System Default Accounts

5. System Login

5.1. Login Methods

Type	Address
http	http://<ip_or_domain>
https	https://<ip_or_domain>

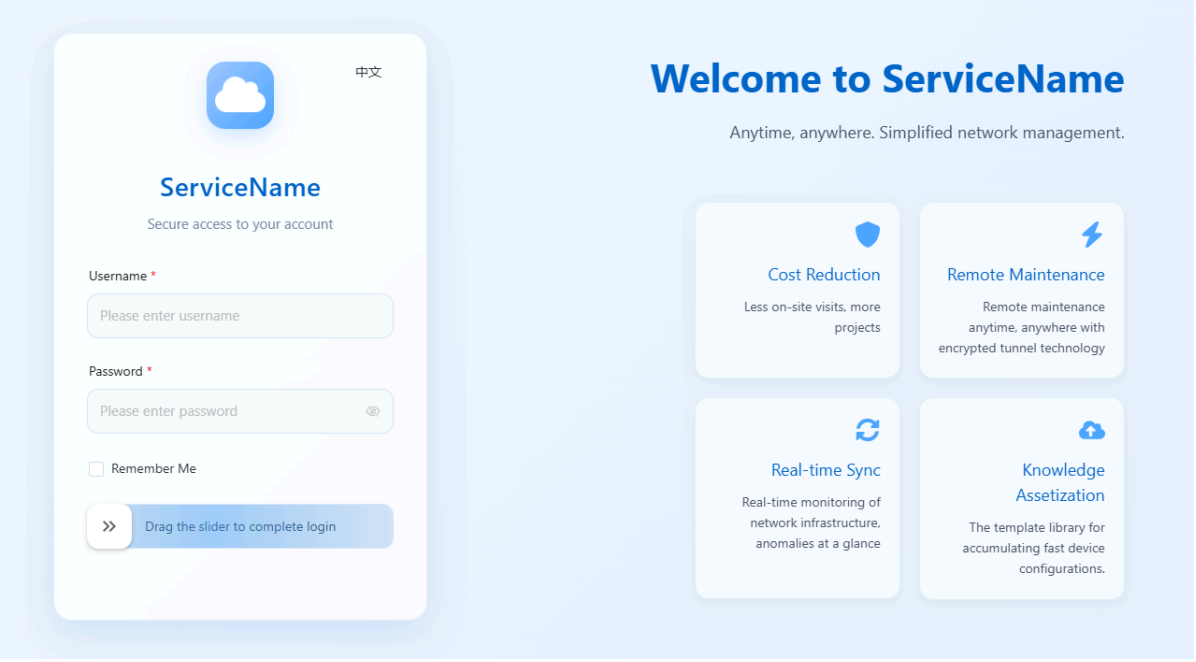
Table 5: Management Interface Access Addresses

5.2. Login Account

Username: `superadmin`

Password: The super administrator password set during the installation process.

5.3. Login Page



6. Troubleshooting

6.1. Check Services

```
# Check related service status
systemctl status emqx
systemctl status dhcs
systemctl status redis
systemctl status mysql
systemctl status influxd
```

6.2. Check Processes

```
# Check each service process
ps aux | grep emqx
ps aux | grep dhcs
ps aux | grep redis
ps aux | grep mysql
ps aux | grep influxd
```

6.3. Check Ports

```
# Verify key port listening status
ss -na | grep :80
ss -na | grep :443
ss -na | grep :883
ss -na | grep :7000
ss -na | grep :6000
```

6.4. Common Issues

Physical machine/virtual machine installations can be fully diagnosed using the commands in this guide.

> **Note**
> The troubleshooting approach for container deployments is the same, with the only difference being the specific commands. Use `systemctl status container-dhcs-xxx`, where the exact service name depends on the container package creation.

Issue 1: Web Management Interface Unreachable
Troubleshooting Steps:

1. Check DHCS Service Status

```
systemctl status dhcs
```

```
root@iZbp16ashh6h628o3tr2niZ:/data/dhcs# systemctl status dhcs
● dhcs.service - dhcs
     Loaded: loaded (/usr/lib/systemd/system/dhcs.service; enabled; preset: enabled)
     Active: active (running) since Sat 2025-12-27 14:27:56 CST; 1h 18min ago
    Process: 3383512 ExecStart=/bin/bash -c nohup /bin/java -jar dhcs-portal.jar -Xmx1g -Xms512m > /dev/null
   Main PID: 3383515 (java)
      Tasks: 164 (limit: 8650)
     Memory: 1.2G (peak: 1.2G)
        CPU: 10min 36.488s
     CGroup: /system.slice/dhcs.service
             └─3383515 /bin/java -jar dhcs-portal.jar -Xmx1g -Xms512m
```

2. Check Nginx Proxy Service

```
systemctl status nginx
```

```
root@iZbp16ashh6h628o3tr2niZ:/data/dhcs# systemctl status nginx
● nginx.service - OpenResty Server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: enabled)
     Active: active (running) since Sat 2025-12-20 18:49:35 CST; 6 days ago
    Process: 3334042 ExecReload=/usr/share/openresty/nginx/sbin/nginx -c /etc/nginx/nginx.conf -s reload (code=exited,
   Main PID: 26494 (nginx)
      Tasks: 7 (limit: 8650)
     Memory: 94.2M (peak: 279.7M)
        CPU: 3min 40.494s
     CGroup: /system.slice/nginx.service
             ├─ 26494 "nginx: master process /usr/share/openresty/nginx/sbin/nginx -c /etc/nginx/nginx.conf"
             ├─2254375 "nginx: worker process is shutting down"
             ├─2849036 "nginx: worker process is shutting down"
             ├─3334044 "nginx: worker process"
             ├─3334045 "nginx: worker process"
             └─3334046 "nginx: worker process"
```

3. View DHCS Logs

```
tail -f /data/dhcs/logs/sys-info.log
tail -f /data/dhcs/logs/sys-error.log
```

```
dhcs@dhcs:~/dhcs-ubuntu24$ tail -f /data/dhcs/logs/sys-info.log
09:22:08.394 [main] INFO  org.jboss.threads - [<clinit>,55] - JBoss Threads version 3.5.0.Final
09:22:08.533 [main] INFO  o.s.b.w.e.u.UndertowWebServer - [start,121] - Undertow started on port 8020 (http) with context path '/dhcs'
09:22:08.536 [main] INFO  o.s.s.q.SchedulerFactoryBean - [startScheduler,729] - Starting Quartz Scheduler now
09:22:08.537 [main] INFO  o.q.c.QuartzScheduler - [start,547] - Scheduler quartzScheduler_$_NON_CLUSTERED started.
09:22:08.576 [main] INFO  c.h.DHCSApplication - [logStarted,56] - Started DHCSApplication in 28.929 seconds (process running for 22.915)
09:44:38.399 [XNIO-1 task-3] INFO  io.undertow.servlet - [log,372] - Initializing Spring DispatcherServlet 'dispatcherServlet'
09:44:38.400 [XNIO-1 task-3] INFO  o.s.w.s.DispatcherServlet - [initServletBean,532] - Initializing Servlet 'dispatcherServlet'
09:44:38.407 [XNIO-1 task-3] INFO  o.s.w.s.DispatcherServlet - [initServletBean,554] - Completed initialization in 7 ms
09:46:02.569 [schedule-pool-9] INFO  sys-user - [run,52] - [172.16.121.1][superadmin][Success][登录成功]
09:47:35.768 [schedule-pool-28] INFO  sys-user - [run,52] - [172.16.121.1][superadmin][Success][登录成功]
```

4. View Nginx Error Logs

```
tail -f /var/log/nginx/error.log
```

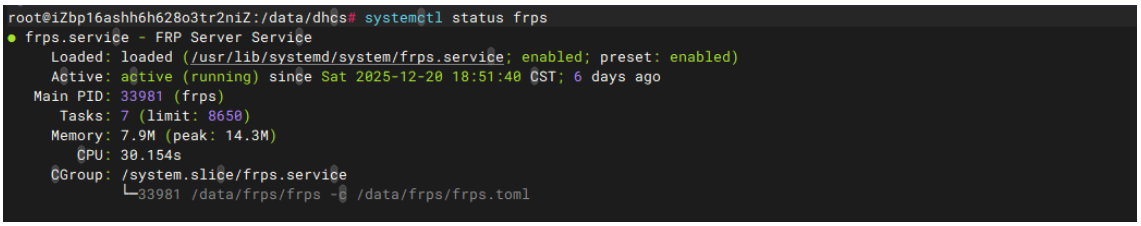
```
dhcs@dhcs:~/dhcs-ubuntu24$ tail -f /var/log/nginx/error.log
2026/01/05 09:21:54 [info] 26313#26313: *3 client 127.0.0.1:53428 connected to 0.0.0.0:1883
2026/01/05 09:21:54 [info] 26313#26313: *3 proxy 127.0.0.1:55070 connected to 127.0.0.1:1886
2026/01/05 09:22:08 [info] 26313#26313: *5 client 127.0.0.1:40546 connected to 0.0.0.0:1883
2026/01/05 09:22:08 [info] 26313#26313: *5 proxy 127.0.0.1:40038 connected to 127.0.0.1:1886
2026/01/05 09:22:08 [info] 26313#26313: *7 client 127.0.0.1:40548 connected to 0.0.0.0:1883
2026/01/05 09:22:08 [info] 26313#26313: *7 proxy 127.0.0.1:40052 connected to 127.0.0.1:1886
2026/01/05 09:22:09 [info] 26313#26313: *9 client 127.0.0.1:40552 connected to 0.0.0.0:1883
2026/01/05 09:22:09 [info] 26313#26313: *9 proxy 127.0.0.1:40054 connected to 127.0.0.1:1886
2026/01/05 09:22:09 [info] 26315#26315: *11 client 127.0.0.1:40566 connected to 0.0.0.0:1883
2026/01/05 09:22:09 [info] 26315#26315: *11 proxy 127.0.0.1:40064 connected to 127.0.0.1:1886
```

Issue 2: Remote Tunnel Unable to Connect

Troubleshooting Steps:

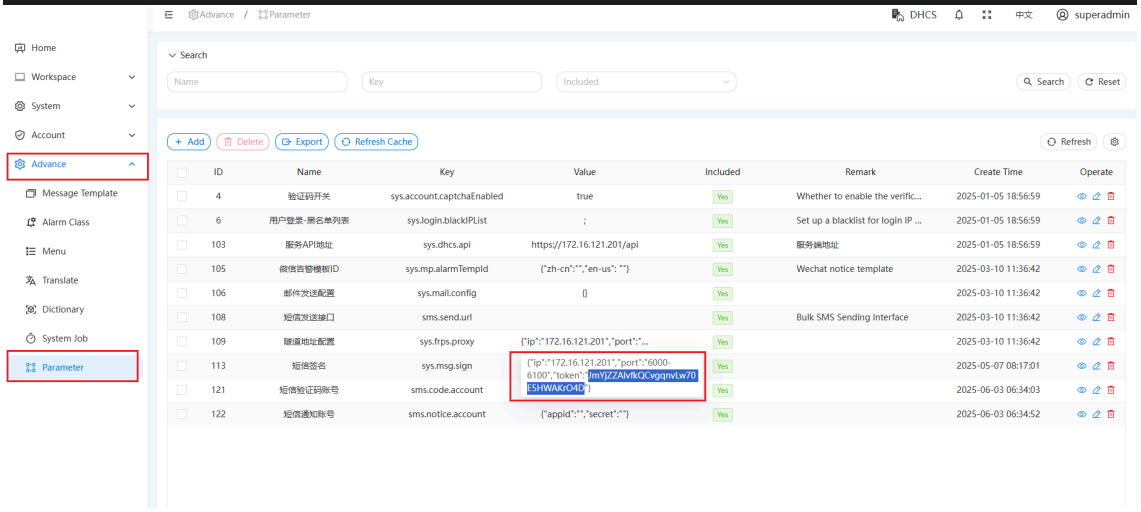
1. Check FRP Service Status

```
systemctl status frps
```



2. Check if FRP Authentication Tokens Match

```
# View token
cat /data/frps/frps.toml
```



Ensure the authentication token in the `frps.toml` configuration matches the token in the DHCS platform under **System Settings → Advanced Settings → Parameter Configuration → Tunnel Address Configuration**. Also, verify that the IP or domain configured is accessible from the devices.

Refer to Enabling Advanced Settings

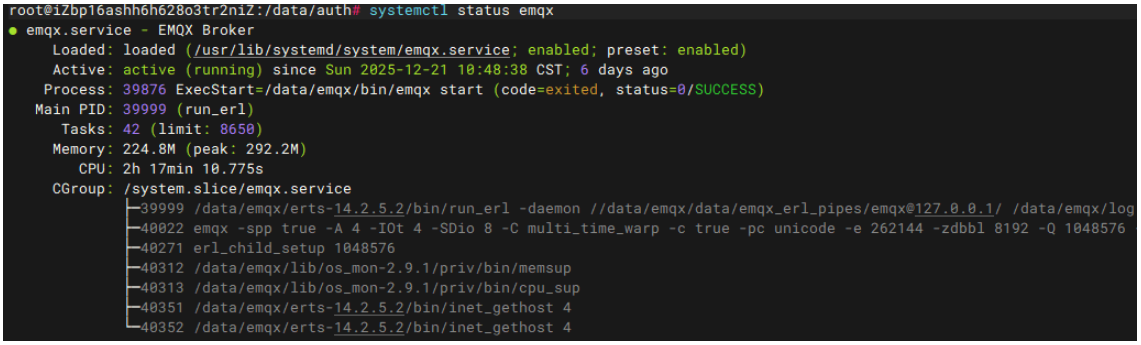
Issue 3: Device Unable to Connect to Platform

Troubleshooting Steps:

1. Check EMQX Service Status

```
systemctl status emqx
```

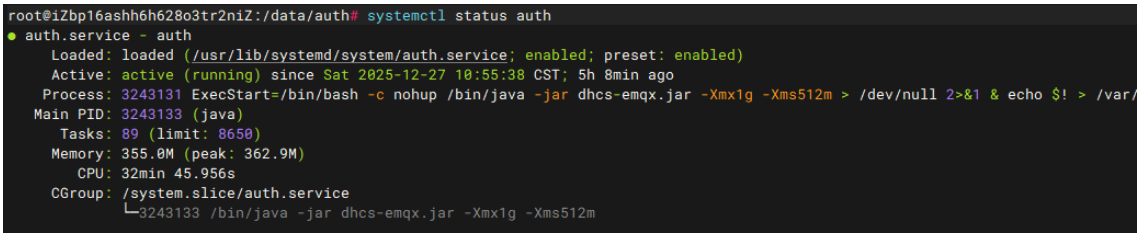
Normal status as shown below:



2. Check Device Authentication Service

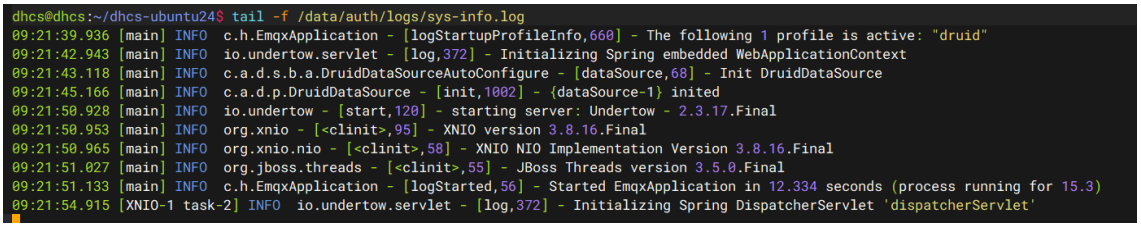
```
systemctl status auth
```

Normal status as shown below:



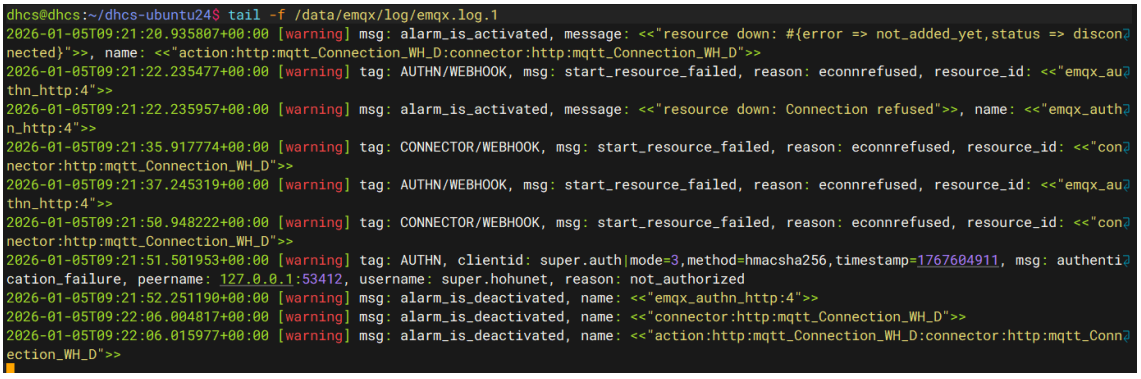
3. View Authentication Service Logs

```
tail -f /data/auth/logs/sys-info.log
tail -f /data/auth/logs/sys-error.log
```



4. View EMQX Service Logs

```
tail -f /data/emqx/logs/emqx.log.1
```



Container Deployment Notes

If deployed via Podman, use the following commands to check container service status:

```
# View container running status
podman ps

# View container logs
podman logs <container_name>
```

7. Advanced Maintenance Mode

7.1 Advanced Maintenance Mode

Use the `dhcs-mode` tool when you need to reset the superadmin password or adjust the system operation mode.

```
dhcs@dhcs:~$ dhcs-mode

Please select an operation:
1) Reset the superadmin password
2) Advanced Model (The advanced mode allows for the maintenance of system
settings information after logging in as a superuser)
3) Standard Model (This mode is adopted during the regular operation)
4) Exit
Please entry option(1-4): 1
The password for the superadmin account has been reset to the default password
'admin@123'. Please login to the system immediately to change the password.
```

- Option 1: Resets the superadmin password to admin@123. Change it immediately after login.
- Option 2: Enables Advanced Mode, opening the system advanced settings page.
- Option 3: Switches back to Standard Operation Mode.

8. offline Podman install

8.1. offline Podman installation packages

ubuntu 20.04.6 LTS
http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/podman-offline-ubuntu20.04.tar.gz

ubuntu 22.04.5 LTS

http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/podman-offline-ubuntu22.04.tar.gz

ubuntu 24.04.3 LTS
http://hohunet.oss-cn-shenzhen.aliyuncs.com/DHCS/podman-offline-ubuntu24.04.tar.gz

Download the offline installation package for the corresponding system and upload it to the server:

```
# Unzip the offline installation package
tar -xvf podman-offline-ubuntu24.04.tar.gz
# Go to the offline installation package directory
cd podman-offline-ubuntu24.04
# Install the required deb
sudo dpkg -i *.deb
# Verify the Podman installation
podman --version
```