# Huawei Cloud EulerOS

# FAQs

**Issue** 01

**Date** 2024-09-20

**HUAWEI CLOUD COMPUTING TECHNOLOGIES CO., LTD.**

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# Contents



# 1 What Do I Do If CentOS Linux Is No Longer Maintained?

CentOS has planned to stop maintaining CentOS Linux. Huawei Cloud will stop providing CentOS Linux public images. This section describes the impacts and tells you how to address the situation.

## Background

On December 8, 2020, CentOS announced its plan to stop maintaining CentOS Linux and launched CentOS Stream. For more information, see **CentOS Project shifts focus to CentOS Stream**.

CentOS Linux 8 ended on December 31, 2021, and CentOS Linux 7 will end on June 30, 2024. CentOS Linux 9 and later versions will not be released, and patches will no longer be updated.

## Impacts

CenterOS Linux users will be affected as follows:

- After December 31, 2021, CentOS Linux 8 users will not be able to obtain any maintenance or support services, including problem fixing and function updates.
- After June 30, 2024, CentOS Linux 7 users will not be able to obtain any maintenance or support services, including problem fixing and function updates.

Huawei Cloud users will be affected as follows:

- CentOS Linux 8 public images will continue for a certain time. ECSs created from CentOS Linux 8 images will not be affected, but the images will no longer be updated.
- Huawei Cloud will synchronize with CentOS for the support of CentOS Linux. After December 31, 2021, support services will no longer be available for CentOS 8. The support for CentOS 7 will continue until June 30, 2024.

## Solution

You can change or migrate the OS so that the services originally running in CentOS Linux can continue to run in other OSs.

For details about how to change to Debian or Ubuntu, see **Changing the OS**.

- Change CentOS Linux to one of those listed in **Table 1-2**.

  If you want to change the ECS OS and the software is loosely coupled with the OS, change it. This does not affect the ECS configurations (such as NICs, disks, and VPNs).

  - For details about how to change to Huawei Cloud EulerOS, see **Changing an OS to Huawei Cloud EulerOS**.
  - For details about how to change to Debian or Ubuntu, see **Changing the OS**.

- Migrate CentOS Linux to Huawei Cloud EulerOS.

  If you want to change the OS but retain OS parameter settings, migrate the OS to Huawei Cloud EulerOS. This does not affect the ECS configurations (such as NICs, disks, and VPNs).

  For details, see **Migrating an OS to Huawei Cloud EulerOS**.

The following table describes the differences between the two methods.

**Table 1-1** Differences between OS change and OS migration

| Item | Changing the OS | Migrating the OS |
| --- | --- | --- |
| Data backup | • Data in all partitions of the system disk will be cleared, so you are advised to back up the system disk data prior to an OS change.<br>• Data in data disks remains unchanged. | • System disk data is not cleared, but you are still advised to back up the system disk data to prevent any exception in system software.<br>• Data in data disks remains unchanged. |
| Custom settings | After the OS is changed, custom settings such as DNS and hostname will be reset and need to be reconfigured. | After the OS is migrated, custom settings such as DNS and hostname do not need to be reconfigured. |

**Table 1-2** Available OSs

| OS | Description | Intended User |
| --- | --- | --- |
| Huawei Cloud EulerOS | Huawei Cloud EulerOS (HCE) is an openEuler-based cloud operating system.<br>HCE offers cloud native, high-performing, secure, and easy-to-migrate capabilities. This accelerates service migration to the cloud and promotes application innovation. You can use it to replace operating systems such as CentOS and EulerOS. | Individuals or enterprises that want to continue to use free images in an open source community |
| Debian and Ubuntu | They are Linux distributions that differ in use and compatibilities. | Individuals or enterprises that can afford the OS change costs |

# 2 Does Huawei Cloud Have a Migration Solution for CentOS?

## Background

CentOS Linux 8 ended on December 31, 2021, and CentOS Linux 7 ended on June 30, 2024. CentOS will no longer support new software and patch updates. CentOS services may be exposed to risks or even become unavailable. What's worse, they cannot be restored in a timely manner.

HCE can be a perfect alternative to CentOS. You can use our migration tool to easily migrate OSs such as CentOS or EulerOS to HCE. Additionally, you can benefit from professional services in cloud native hybrid deployment, security hardening, fast migration, efficient O&M, and professional certification.

## Compatibility Evaluation

Technologically, HCE can replace CentOS. HCE is fully independent and controllable, and continuously evolves with astute contributions from the openEuler open-source community. Huawei Cloud EulerOS can work with 400 types of boards in the southbound direction, including mainstream compute products. In the northbound direction, Huawei Cloud EulerOS is 100% compatible with applications in mainstream application scenarios, such as cloud native, storage, database, big data, and web. More than 5,000 types of applications have passed the compatibility certification on Huawei Cloud EulerOS and can be alternatives to those running on CentOS.

To ensure the seamless migration from CentOS to HCE, you can use the compatibility evaluation tool to quickly scan the software to determine whether they are compatible with HCE.

For compatible software, the software configuration is not modified during the migration and does not need to be reconfigured after the migration. For incompatible software, the evaluation report provides workarounds for adaptation after the migration.

## Migration Feasibility

Huawei Cloud has mature migration guides for the following types of applications:

- Distributed clustered applications, such as big data and distributed storage. CentOS migration does not interrupt services, thanks to distributed software scaling.
- Active/standby applications, such as databases. CentOS-to-EulerOS migration does not interrupt services. The standby application will be first migrated, followed by the active application. The active-to-standby synchronization allows for seamless migration.
- Standalone applications: Services need to be interrupted during CentOS migration. This migration solution is mature and proven. It works like re-deploying the application on Huawei Cloud EulerOS.

## Contact Us

Professional Huawei Cloud engineers are available 24/7 to provide the help and support you need in the event that you experience an issue. If you encounter any issue while using Huawei Cloud, you can **submit a service ticket**.

# 3 How Do I Install the MLNX Driver?

Install the MLNX driver on HCE 2.0 (including x86 and Arm).

## Constraints

- The kernel of HCE 2.0 is Linux 5.10 or later.
- The CX6 NIC driver version is 23.10-1.1.9.0-LTS or later.

## Prerequisites

HCE 2.0 with kernel 5.10 or later has been installed.

## Installing the MLNX Driver for the x86 Architecture

1. Download the CX6 NIC driver installation package **MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-x86_64.tgz**.
2. Decompress the package and go to the working directory.

   **tar -xf MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-x86_64.tgz**

   **cd MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-x86_64**
3. Install the CX6 NIC driver.

   **./mlnxofedinstall --basic --without-depcheck --distro OPENEULER22.03 --force --kernel 5.10.0-60.18.0.50.oe2203.x86_64 --kernel-sources /lib/modules/$(uname -r)/build**

   NOTE

   **5.10.0-60.18.0.50.oe2203.x86_64** is the kernel version when the official MLNX_OFED package is compiled.
4. Create a link.

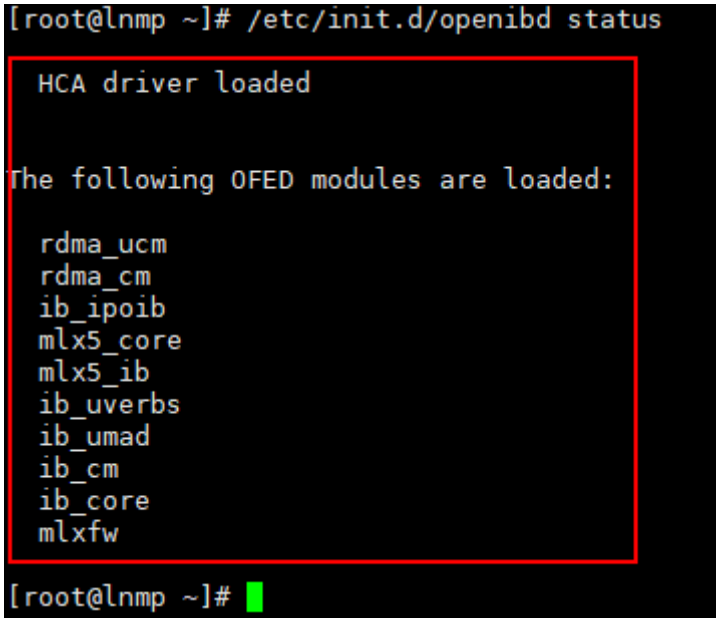
   **ln -s /lib/modules/5.10.0-60.18.0.50.oe2203.x86_64/extra/mlnx-ofa_kernel /lib/modules/$(uname -r)/weak-updates/**

   **ln -s /lib/modules/5.10.0-60.18.0.50.oe2203.x86_64/extra/kernel-mft /lib/modules/$(uname -r)/weak-updates/**

   **depmod -a**
5. Run **reboot** to restart the OS.
6. Run the **/etc/init.d/openibd status** command to check the driver installation result.

If the following information is displayed, the driver is installed:




## Installing the MLNX Driver for the Arm Architecture

1. Download the CX6 NIC driver installation package MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-aarch64.tgz.
2. Decompress the package and go to the working directory.

   **tar -xf MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-aarch64.tgz**

   **cd MLNX_OFED_LINUX-23.10-1.1.9.0-openeuler22.03-aarch64**
3. Install the CX6 NIC driver.

   **./mlnxofedinstall --basic --without-depcheck --distro OPENEULER22.03 --force --kernel 5.10.0-60.18.0.50.oe2203.aarch64 --kernel-sources /lib/modules/$(uname -r)/build**

   NOTE

   **5.10.0-60.18.0.50.oe2203.aarch64** is the kernel version when the official MLNX_OFED package is compiled.
4. Create a link.

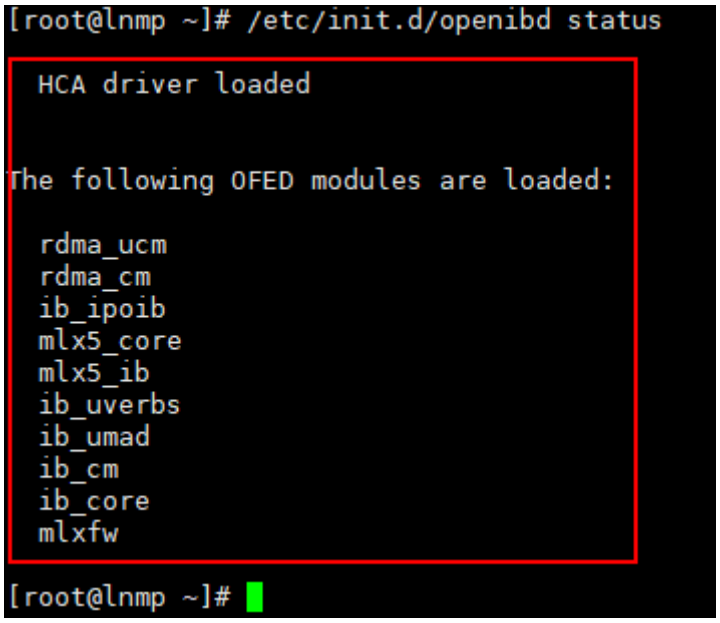
   **ln -s /lib/modules/5.10.0-60.18.0.50.oe2203.aarch64/extra/mlnx-ofa_kernel /lib/modules/$(uname -r)/weak-updates/**

   **ln -s /lib/modules/5.10.0-60.18.0.50.oe2203.aarch64/extra/kernel-mft /lib/modules/$(uname -r)/weak-updates/**

   **depmod -a**
5. Run **reboot** to restart the OS.
6. Run the **/etc/init.d/openibd status** command to check the driver installation result.

   If the following information is displayed, the driver is installed:



# 4 How Do I Enable SELinux on an ECS Running HCE?

By default, SELinux is disabled on HCE. You can enable SELinux as needed.

**CAUTION**

Do not run the **/etc/selinux/config** command to enable SELinux. If you enable SELinux by running this command, login may fail.

## Procedure

1. Open the configuration file **/boot/grub2/grub.cfg** and delete **selinux=0**.
2. Run the **touch /.autorelabel** command.

   The **/.autorelabel** file triggers the OS to relabel all files on the disk during startup. This process may take several minutes. After the relabel operation is complete, the OS automatically restarts for the operation to take effect and deletes the **/.autorelabel** file to ensure that the relabel operation will not be performed again.
3. Open the configuration file **/etc/selinux/config**, set **SELINUX** to **permissive**, and run the **reboot** command to restart the OS.

   ```
   # This file controls the state of SELinux on the system.
   # SELINUX= can take one of these three values:
   #     enforcing - SELinux security policy is enforced.
   #     permissive - SELinux prints warnings instead of enforcing.
   #     disabled - No SELinux policy is loaded.
   SELINUX=permissive
   # SELINUXTYPE= can take one of three values:
   #     targeted - Targeted processes are protected,
   #     minimum - Modification of targeted policy. Only selected processes are protected.
   #     mls - Multi Level Security protection.
   SELINUXTYPE=targeted
   ```
4. Open the configuration file **/etc/selinux/config**, set **SELINUX** to **enforcing**, and run the **reboot** command to restart the OS.

```
# This file controls the state of SELinux on the system.
# SELINUX= can take one of these three values:
#     enforcing - SELinux security policy is enforced.
#     permissive - SELinux prints warnings instead of enforcing.
#     disabled - No SELinux policy is loaded.
SELINUX=enforcing
# SELINUXTYPE= can take one of three values:
#     targeted - Targeted processes are protected,
#     minimum - Modification of targeted policy. Only selected processes are protected.
#     mls - Multi Level Security protection.
SELINUXTYPE=targeted
```

5. Run the **getenforce** command to check the SELinux status.

   If **Enforcing** is displayed, SELinux is enabled.

```
[root@localhost ~]#
[root@localhost ~]# getenforce
Enforcing
```

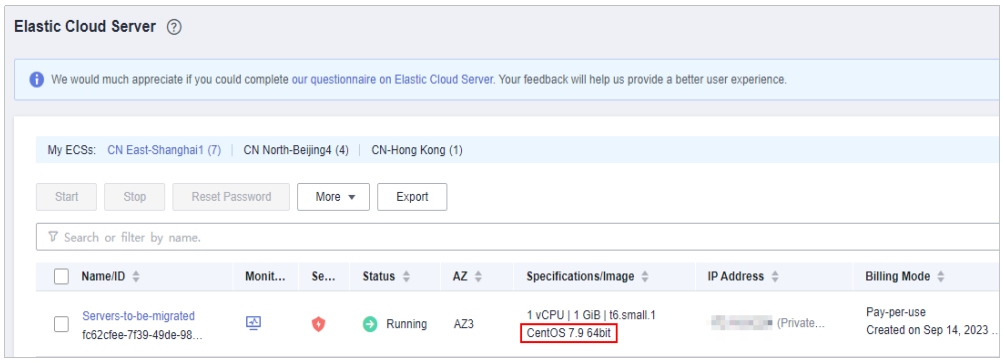
  

# 5 How Do I Change the OS Name on the Console After the OS Is Migrated?

## Background

After the original OS (for example, CentOS 7.9) is migrated to Huawei Cloud EulerOS, the existing OS name CentOS 7.9 rather than Huawei Cloud EulerOS is displayed on the console.

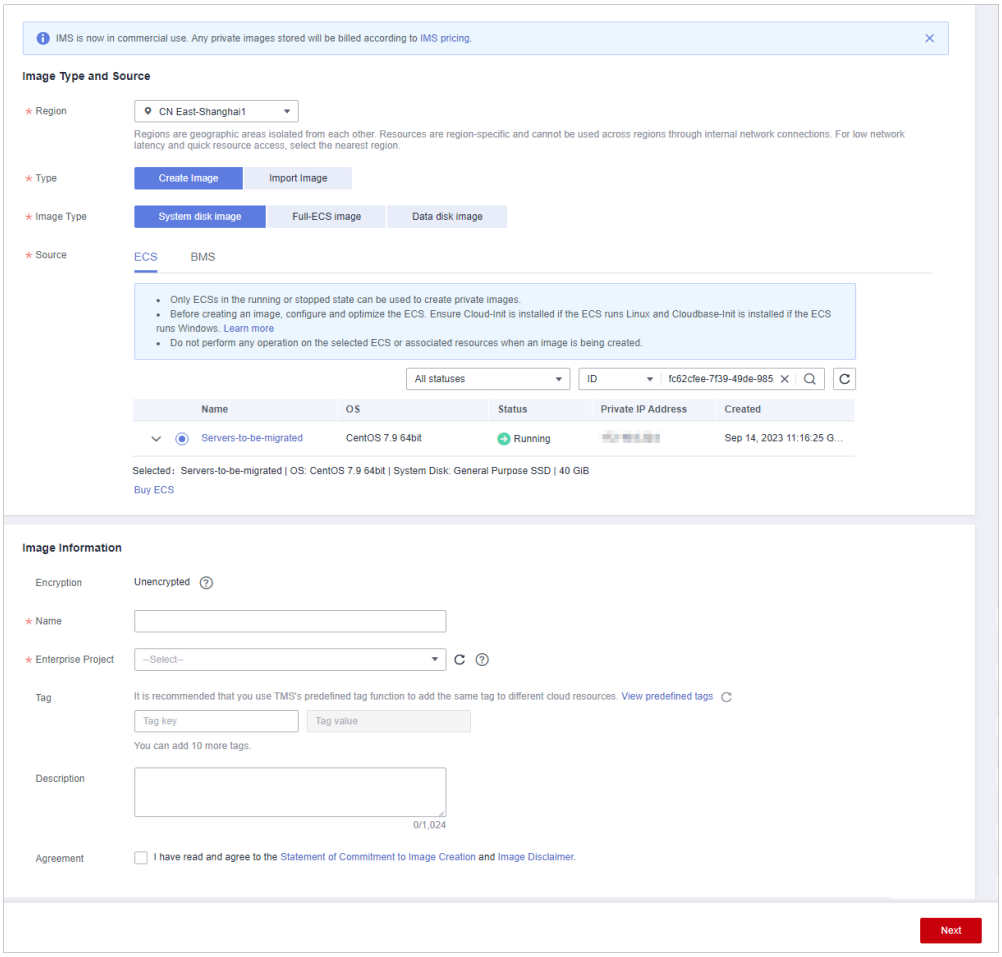
You can create a private image and then switch to the created private image to change the OS name to Huawei Cloud EulerOS.




## Procedure

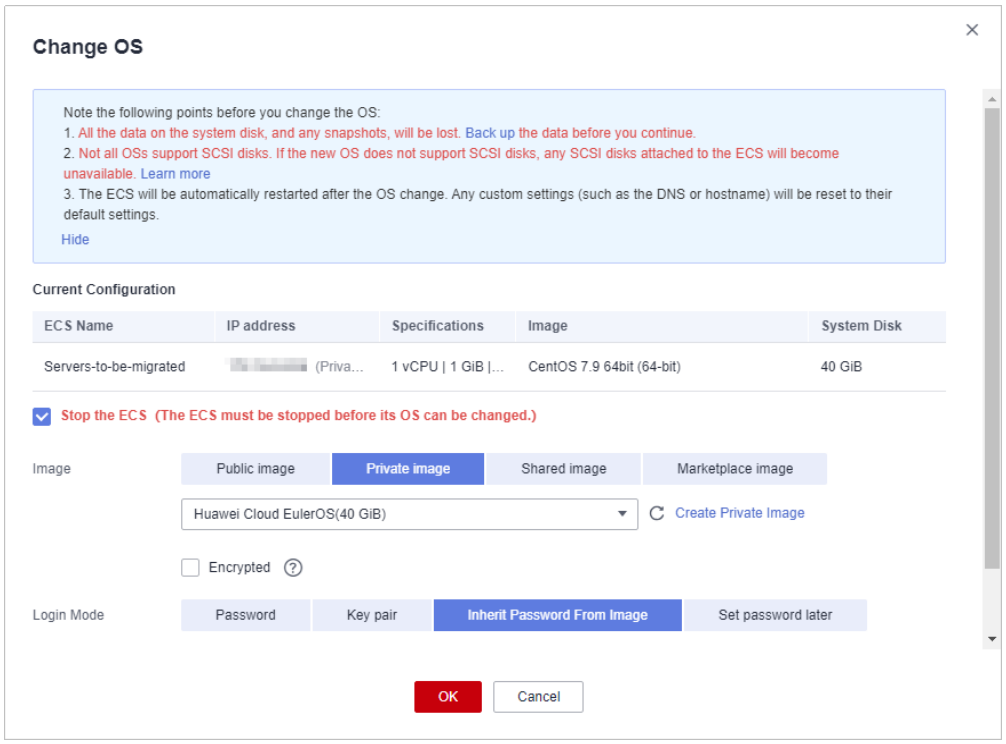
1. Log in to the **ECS console**.
2. Locate the ECS whose OS is to be migrated and choose **More** > **Manage Image** > **Create Image** in the **Operation** column.
3. On the **Create Image** page, configure the following parameters:
   - **Region**: Retain the default value.
   - **Type**: Retain the default value.
   - **Image Type**: Retain the default value.
   - **Source**: Retain the default value.
   - **Name**: Enter an image name that is easy to identify.
   - **Agreement**: Read the agreements and select the **Agreement** option.




4. Click **Next**.
5. Confirm the image information and click **Submit**.
6. Switch back to the ECS console, locate the ECS whose OS is to be changed, and choose **More** > **Manage Image** > **Change OS** in the **Operation** column.
7. In the **Change OS** dialog, configure the following parameters:
   - Select **Stop the ECS**.
   - **Image**: Select **Private image**.
   - **Login Mode**: Select **Password**.




8. Click **OK** and complete the verification as prompted.
9. Read and select the statement, and click **OK**.

   After the switchover, the OS name on the console is changed to Huawei Cloud EulerOS.

# 6 How Are Huawei Cloud EulerOS, EulerOS, and openEuler Different from One Another?

Huawei Cloud EulerOS, EulerOS, and openEuler are developed by Huawei. **Table 6-1** describes the differences between them.

**Table 6-1** Differences between Huawei Cloud EulerOS, EulerOS, and openEuler

| OS | Description |
| --- | --- |
| Huawei Cloud EulerOS (HCE) | Huawei Cloud EulerOS (HCE) is a commercial Linux distribution developed based on openEuler. It can replace CentOS and EulerOS and provides professional maintenance and assurance. Currently, images are free of charge.<br>**NOTE**<br>Huawei Cloud EulerOS 2.0 is a cloud operating system developed based on openEuler 22.03 LTS. |
| openEuler | openEuler is a free, open-source operating system that does not provide commercial maintenance and assurance. openEuler was initially developed by Huawei and officially donated to the OpenAtom Foundation on November 9, 2021. Since then, the community has been providing technical support for openEuler. |
| EulerOS | EulerOS is an enterprise-class Linux distribution that offers high security, scalability, and performance, making it an ideal choice for customers seeking reliable IT infrastructure and cloud computing services.<br>**NOTE**<br>EulerOS is developed based on openEuler and is a Huawei internal operating system. |

# 7 How Do I Enable WireGuard in Kernel and Install wireguard-tools?

NOTE

wireguard-tools comes from the community. If you encounter any problems when using the tool, visit **https://github.com/WireGuard/wireguard-tools/pulls**.

## Enabling WireGuard in Kernel

You can run the **modprobe wireguard** command to enable WireGuard.

## Installing wireguard-tools

**Step 1** Run the following command to install the dependency package:

**dnf install gcc make**

**Step 2** Run the following command to download the wireguard-tools source code package:

**wget https://git.zx2c4.com/wireguard-tools/snapshot/wireguard-tools-1.0.20210914.tar.xz**

**Step 3** Run the following command to decompress the obtained source code package:

**tar -xf wireguard-tools-1.0.20210914.tar.xz**

**Step 4** Go to the **wireguard-tools-1.0.20210914/src** directory and run the following commands in sequence to compile and install the tool:

**make**

**make install**

**Step 5** Check whether the tool is successfully installed.

You can run the **wg -h** and **wg-quick -h** commands to check whether the installation is successful.

```
[root@localhost ~]# wg -h
Usage: wg <cmd> [<args>]

Available subcommands:
  show: Shows the current configuration and device information
  showconf: Shows the current configuration of a given WireGuard interface, for use with `setconf'
  set: Change the current configuration, add peers, remove peers, or change peers
  setconf: Applies a configuration file to a WireGuard interface
  addconf: Appends a configuration file to a WireGuard interface
  syncconf: Synchronizes a configuration file to a WireGuard interface
  genkey: Generates a new private key and writes it to stdout
  genpsk: Generates a new preshared key and writes it to stdout
  pubkey: Reads a private key from stdin and writes a public key to stdout
You may pass `--help' to any of these subcommands to view usage.
[root@localhost ~]# wg-quick -h
Usage: wg-quick [ up | down | save | strip ] [ CONFIG_FILE | INTERFACE ]

  CONFIG_FILE is a configuration file, whose filename is the interface name
  followed by `.conf'. Otherwise, INTERFACE is an interface name, with
  configuration found at /etc/wireguard/INTERFACE.conf. It is to be readable
  by wg(8)'s `setconf' sub-command, with the exception of the following additions
  to the [Interface] section, which are handled by wg-quick:

  - Address: may be specified one or more times and contains one or more
    IP addresses (with an optional CIDR mask) to be set for the interface.
  - DNS: an optional DNS server to use while the device is up.
  - MTU: an optional MTU for the interface; if unspecified, auto-calculated.
  - Table: an optional routing table to which routes will be added; if
    unspecified or `auto', the default table is used. If `off', no routes
    are added.
  - PreUp, PostUp, PreDown, PostDown: script snippets which will be executed
    by bash(1) at the corresponding phases of the link, most commonly used
    to configure DNS. The string `%i' is expanded to INTERFACE.
  - SaveConfig: if set to `true', the configuration is saved from the current
    state of the interface upon shutdown.

See wg-quick(8) for more info and examples.
[root@localhost ~]#
```

**----End**

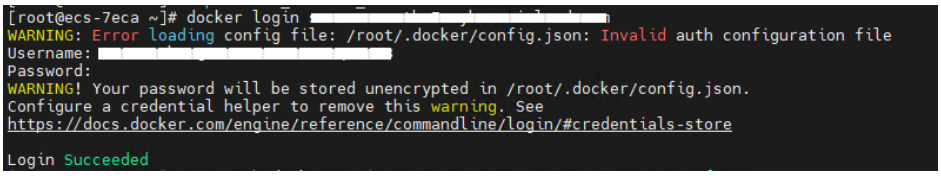
  

# 8 How Do I Save the User Credential Information for Logging In to Docker Like What Docker CE Does?

## Background

When you run the **docker login** command to log in to Docker Community Edition (CE), data such as the username and password is saved in the user configuration file in Base64 format, which poses security risks. To ensure security, Docker included in HCE 2.0 encrypts the data by default. However, some Docker CE tools do not support this feature. You need to manually change the saving mode of Docker in HCE 2.0 like what Docker CE does.

## Procedure

1. Configure the required environment variable.
   ```
   export USE_DECRYPT_AUTH=true
   ```
2. Run the **docker login** command to log in to Docker again.
   ```
   docker login
   ```
   
   
3. Verify the data saving mode. It is recommended that you save the environment variable setting in a persistent file (such as **~/.bash_profile** or **/etc/profile**) so the setting will be applied upon system reboot.
   ```
   echo "export USE_DECRYPT_AUTH=true" >> ~/.bash_profile
   ```

# 9 What Is OOM? Why Does OOM Occur?

## OOM Concepts

Out of Memory (OOM) occurs when all available memory is exhausted and the system is unable to allocate memory for processes, which will trigger a kernel panic or OOM killer.

On Linux, OOM killer is a process that prevents other processes from collectively exhausting the host's memory. When the system is critically low on memory, the processes that use more memory than available will be killed to ensure the overall availability of the system.

## OOM Parameters

**Table 9-1** OOM parameters

| Parameter | Description | Value | How to Change |
| --- | --- | --- | --- |
| panic_on_oom | Controls how the system reacts when OOM occurs. When OOM occurs, the system has two options:<br>• Triggers a kernel panic, during which the system may break down frequently.<br>• Selects one or more processes and triggers OOM killer to end the selected processes and to release the memory so that the system can be used normally. | You can run either of the following commands to view the parameter value:<br>**cat /proc/sys/vm/panic_on_oom**<br>**sysctl -a \| grep panic_on_oom**<br>• If the value is set to **0**, OOM killer is triggered when the memory is insufficient.<br>• If the value is set to **1**, either OOM killer or kernel panic will be triggered.<br>• If the value is set to **2**, a kernel panic will be forcibly triggered. As a result, the system restarts.<br>**NOTE**<br>The default value of this parameter in Huawei Cloud EulerOS is **1**. | For example, to set the value to **0**, use either of the following methods:<br>• Temporary configuration: The configuration takes effect immediately. However, after the system is restarted, the value changes to the default one.<br>**sysctl -w vm.panic_on_oom=0**<br>• Persistence configuration: The configuration still takes effect after the system is restarted.<br>Run **vim /etc/sysctl.conf**, add **vm.panic_on_oom =0** to the configuration file, and then run **sysctl –p** or restart the system for the configuration to take effect. |

| Parameter | Description | Value | How to Change |
| --- | --- | --- | --- |
| oom_kill_allocating_task | Determines which processes are selected when the system triggers OOM killer and attempts to end some processes. The options are as follows:<br>• Process that triggers OOM<br>• Process with the highest **oom_score** value | You can run either of the following commands to view the parameter value:<br>**cat /proc/sys/vm/oom_kill_allocating_task**<br>**sysctl -a \| grep oom_kill_allocating_task**<br>• If the value is set to **0**, the process with the highest **oom_score** value is selected.<br>• If the value is a non-zero value, the process that triggers OOM is selected.<br>**NOTE**<br>The default value of this parameter in Huawei Cloud EulerOS is **0**. | For example, to set the value to **1**, use either of the following methods:<br>• Temporary configuration: The configuration takes effect immediately. However, after the system is restarted, the value changes to the default one.<br>**sysctl -w vm.oom_kill_allocating_task=1**<br>• Persistence configuration: The configuration still takes effect after the system is restarted.<br>Run **vim /etc/sysctl.conf**, add **vm.oom_kill_allocating_task=1** to the configuration file, and then run **sysctl –p** or restart the system for the configuration to take effect. |

| Parameter | Description | Value | How to Change |
| --- | --- | --- | --- |
| oom_score | Indicates the score of a process, which consists of two parts:<br>• System score: The system automatically calculates the score based on the memory usage of the process.<br>• User score: This is the **oom_score_adj** score, which can be customized. | You can adjust the value of **oom_score_adj** to adjust the final score of a process. You can run the following command to view the parameter value:<br>**cat /proc/***Process ID***/oom_score_adj**<br>• If the value is set to **0**, the **oom_score** value is not adjusted.<br>• If the value is negative, the probability of the process getting picked and terminated by OOM killer is reduced.<br>• If the value is positive, the probability of the process getting picked and terminated by OOM killer is increased.<br>**NOTE**<br>The value of **oom_score_adj** ranges from **-1000** to **1000**.<br>If this parameter is set to **OOM_SCORE_ADJ_MIN** or **-1000**, OOM killer is not allowed to end the process. | For example, to set **oom_score_adj** to **1000** for the process whose ID is **2939**, run the following command:<br>**echo 1000 > /proc/2939/oom_score_adj** |

| Parameter | Description | Value | How to Change |
| --- | --- | --- | --- |
| oom_dump_tasks | Specifies whether to record the system process information and OOM killer information when OOM occurs, for example, dump information about all processes in the system like the process ID, memory used by the process, and page table information of the process. Such information helps you understand the cause of OOM. | You can run either of the following commands to view the parameter value:<br>**cat /proc/sys/vm/oom_dump_tasks**<br>**sysctl -a \| grep oom_dump_tasks**<br>• If the value is set to **0**, related information is not printed when OOM occurs.<br>• If the value is not 0, a system-wide task dump is produced to print the memory usage of all tasks in the system in the following scenarios:<br>– A kernel panic is triggered due to OOM.<br>– The process to be terminated is not found.<br>– The process is found and terminated.<br>**NOTE**<br>The default value of this parameter in Huawei Cloud EulerOS is **1**. | For example, to set the value to **0**, use either of the following methods:<br>• Temporary configuration: The configuration takes effect immediately. However, after the system is restarted, the value changes to the default one.<br>**sysctl –w vm.oom_dump_tasks=0**<br>• Persistence configuration: The configuration still takes effect after the system is restarted.<br>Run **vim /etc/sysctl.conf**, add **vm.oom_dump_tasks=0** to the configuration file, and then run **sysctl –p** or restart the system for the configuration to take effect. |

## Example of OOM Killer

1. Set Huawei Cloud EulerOS system parameters by referring to **Table 9-1**. The following is an example configuration:

```
[root@localhost ~]# cat /proc/sys/vm/panic_on_oom
0
[root@localhost ~]# cat /proc/sys/vm/oom_kill_allocating_task
0
```

```
[root@localhost ~]# cat /proc/sys/vm/oom_dump_tasks
1
```

- **panic_on_oom=0** indicates that OOM killer is triggered when OOM occurs.
- **oom_kill_allocating_task=0** indicates that the process with the highest **oom_score** value is preferentially terminated when OOM killer is triggered.
- **oom_dump_tasks=1** indicates that the process and OOM killer information is recorded when OOM occurs.

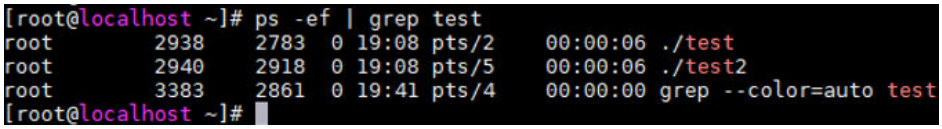
2. Start the process.

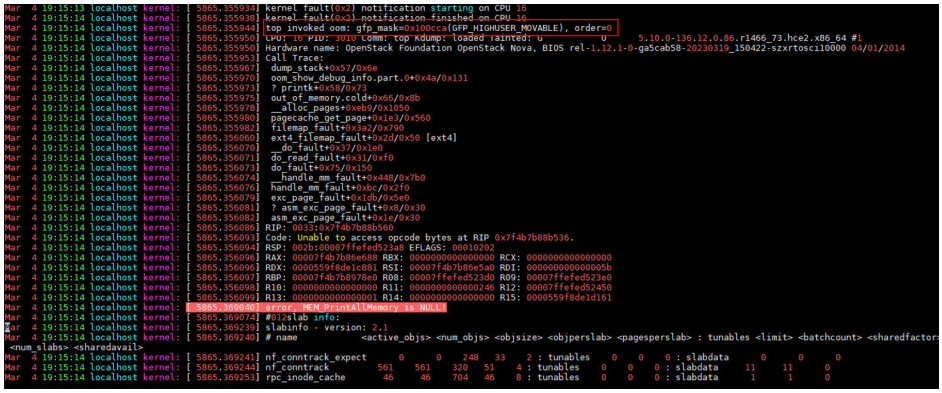
   Start three same test processes (test, test1, and test2) in the system at the same time, continuously request new memory for the three processes, and set **oom_score_adj** of process **test1** to **1000** (indicating that OOM killer will terminate this process first), until the memory is used up and OOM occurs.

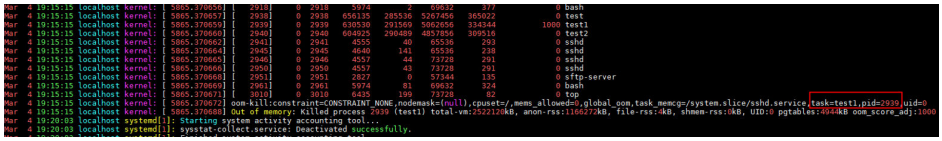
```
[root@localhost ~]# ps -ef | grep test
root       2938    2783  0 19:08 pts/2    00:00:00 ./test
root       2939    2822  0 19:08 pts/3    00:00:00 ./test1
root       2940    2918  0 19:08 pts/5    00:00:00 ./test2
[root@localhost ~]# echo 1000 > /proc/2939/oom_score_adj
[root@localhost ~]# cat /proc/2939/oom_score_adj
1000
```

3. View the OOM information.

   After a period of time, OOM occurs in the system, and OOM killer is triggered. At the same time, the memory information of all processes in the system is printed in **/var/log/messages**, and process **test1** is terminated.





## Possible Causes

- The cgroup memory is insufficient.

  The memory exceeds the value of **memory.limit_in_bytes** in cgroup. Suppose **memory.limit_in_bytes** is set to 80 MB and 100 MB of memory is allocated to memhog. As shown in the logs (stored in the **/var/log/messages**

directory), the memhog process (PID: 2021820) uses 81,920 KB of memory, which exceeds the memory specified by **memory.limit_in_bytes** and triggers OOM.

```
warning|kernel[-]|[2919920.414131] memhog invoked oom-killer: gfp_mask=0xcc0(GFP_KERNEL), order=0, oom_score_adj=0
info|kernel[-]|[2919920.414220] memory: usage 81920kB, limit 81920kB, failcnt 30
err|kernel[-]|[2919920.414272] Memory cgroup out of memory: Killed process 2021820 (memhog) total-vm:105048kB, anon-rss:81884kB, file-rss:1544kB, shmem-rss:0kB, UID:0 pgtables:208kB oom_score_adj:0
```

- The parent cgroup memory is insufficient.

  The memory of child cgroups is sufficient, but the memory of the parent cgroup is insufficient and exceeds the memory limit. In the following example, **memory.limit_in_bytes** is set to 80 MB for the parent cgroup and to 50 MB for the two child cgroups, respectively. A program is used to cyclically allocate memory in the two child cgroups to trigger OOM. Some logs in **/var/log/messages** are as follows:

  ```
  warning|kernel[-]|[2925796.529231] main invoked oom-killer: gfp_mask=0xcc0(GFP_KERNEL), order=0, oom_score_adj=0
  info|kernel[-]|[2925796.529315] memory: usage 81920kB, limit 81920kB, failcnt 199
  err|kernel[-]|[2925796.529366] Memory cgroup out of memory: Killed process 3238866 (main) total-vm:46792kB, anon-rss:44148kB, file-rss:1264kB, shmem-rss:0kB, UID:0 pgtables:124kB oom_score_adj:0
  ```

- The system memory is insufficient.

  The free memory of the OS is insufficient, and some programs keep requesting memory. Even some memory can be reclaimed, the memory is still insufficient, and OOM is triggered. In the following example, a program is used to cyclically allocate memory in the OS to trigger OOM. The logs in **/var/log/messages** show that the free memory of Node 0 is lower than the minimum memory (the value of **low**), triggering OOM.

  ```
  kernel: [ 1475.869152] main invoked oom: gfp_mask=0x100dca(GFP_HIGHUSER_MOVABLE|__GFP_ZERO), order=0
  kernel: [ 1477.959960] Node 0 DMA32 free:22324kB min:44676kB low:55844kB high:67012kB reserved_highatomic:0KB active_anon:174212kB inactive_anon:1539340kB active_file:0kB inactive_file:64kB unevictable:0kB writepending:0kB present:2080636kB managed:1840628kB mlocked:0kB pagetables:7536kB bounce:0kB free_pcp:0kB local_pcp:0kB free_cma:0kB
  kernel: [ 1477.960064] oom-kill:constraint=CONSTRAINT_NONE,nodemask=(null),cpuset=/,mems_allowed=0,global_oom,task_memcg=/system.slice/sshd.service,task=main,pid=1822,uid=0
  kernel: [ 1477.960084] Out of memory: Killed process 1822 (main) total-vm:742748kB, anon-rss:397884kB, file-rss:4kB, shmem-rss:0kB, UID:0 pgtables:1492kB oom_score_adj:1000
  ```

- The memory of the memory nodes is insufficient.

  In a NUMA system, an OS has multiple memory nodes. If a program uses up the memory of a specific memory node, OOM may be triggered even when the OS memory is sufficient. In the following example, there are two memory nodes, and a program is used to cyclically allocate memory on Node 1. As a result, the memory of Node 1 is insufficient, but the OS memory is sufficient. Some logs in **/var/log/messages** are as follows:

  ```
  kernel: [  465.863160] main invoked oom: gfp_mask=0x100dca(GFP_HIGHUSER_MOVABLE|__GFP_ZERO), order=0
  kernel: [  465.878286] active_anon:218 inactive_anon:202527 isolated_anon:0#012 active_file:5979 inactive_file:5231 isolated_file:0#012 unevictable:0 dirty:0 writeback:0#012 slab_reclaimable:6164 slab_unreclaimable:9671#012 mapped:4663 shmem:2556 pagetables:846 bounce:0#012 free:226231 free_pcp:36 free_cma:0
  kernel: [  465.878292] Node 1 DMA32 free:34068kB min:32016kB low:40020kB high:48024kB reserved_highatomic:0KB active_anon:188kB inactive_anon:778076kB active_file:20kB inactive_file:40kB unevictable:0kB writepending:0kB present:1048444kB managed:866920kB mlocked:0kB pagetables:2752kB bounce:0kB free_pcp:144kB local_pcp:0kB free_cma:0kB
  kernel: [  933.264779] oom-kill:constraint=CONSTRAINT_MEMORY_POLICY,nodemask=1,cpuset=/,mems_allowed=0-1,global_oom,
  ```

```
task_memcg=/system.slice/sshd.service,task=main,pid=1733,uid=0
kernel: [  465.878438] Out of memory: Killed process 1734 (main) total-vm:239028kB, anon-rss:236300kB, file-rss:200kB, shmem-rss:0kB, UID:0 pgtables:504kB oom_score_adj:1000
```

- Other possible cause

  During memory allocation, if the memory of the buddy system is insufficient, OOM killer is triggered to release the memory to the buddy system.

## Solutions

- Check if there is memory leak, which causes OOM.
- Check whether the **cgroup limit_in_bytes** configuration matches the memory plan. If any modification is required, run the following command:
  ```
  echo <value> > /sys/fs/cgroup/memory/<cgroup_name>/memory.limit_in_bytes
  ```
- If more memory is required, upgrade the ECS flavors.

# 10 How Do I Handle IPVS Errors?

## Background

An IP virtual server (IPVS) is used for load balancing and network forwarding. If you configure an IPVS but do not set up a real server in the system, error logs will be generated after you log in to the ECS using VNC.

## Symptoms

If an IPVS is configured but no real server is set up, when a network request is sent to the virtual server address, an error log similar to the following is displayed in the CLI after you log in to the ECS using VNC.

```
[32264.645949][T268365] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
[32265.234919][T268366] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
[32265.954662][T268367] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
[32266.557032][T268368] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
[32267.166530][T268369] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
[32267.725920][T268370] IPVS: wlc: TCP 192.168.1.1:5000 - no destination available
```

## Solution

1. Install ipvsadm.
2. Run the **ipvsadm -Ln** command to query the configuration of the current virtual server. Find the entry corresponding to the virtual server for which an error is reported.

   **Figure 10-1** No real server configured

   ```
   IP Virtual Server version 1.2.1 (size=4096)
   Prot LocalAddress:Port[:Subnet] Scheduler Established(Sec.) Flags
     -> RemoteAddress:Port[:Oif]          Forward Weight ActiveConn InActConn VtepAddr:vtepport VniId Mac
   TCP  192.168.1.1:5000  wlc
   ```

   If no real server is configured, the configuration is incomplete, and an error is generated. Check your service process.

   **Figure 10-2** Real server configured

   ```
   IP Virtual Server version 1.2.1 (size=4096)
   Prot LocalAddress:Port[:Subnet] Scheduler Established(Sec.) Flags
     -> RemoteAddress:Port[:Oif]          Forward Weight ActiveConn InActConn VtepAddr:vtepport VniId Mac
   TCP  192.168.1.1:5000  wlc
     -> 192.168.1.2:5000            Masq        1      0          0
   ```

As shown in the figure, a real server is configured.

3. To eliminate the interference of the IPVS error log on the VNC, perform either of the following operations:
   - Disable network requests sent by the service. The specific operations are determined by the service requirements.
   - Run the following command to adjust the print level of the kernel printk:

     **echo 3 4 1 7 > /proc/sys/kernel/printk**

     NOTE

     If the system configuration is modified temporarily, restore the system configuration at a proper time.
   - Log in to the ECS using CloudShell.

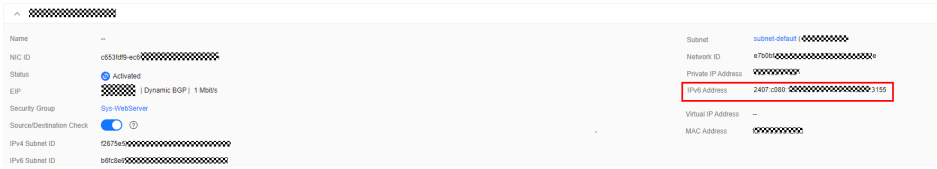
# 11 Why Can't HCE Obtain an IPv6 Address After IPv6 Is Enabled for an ECS?

## Background

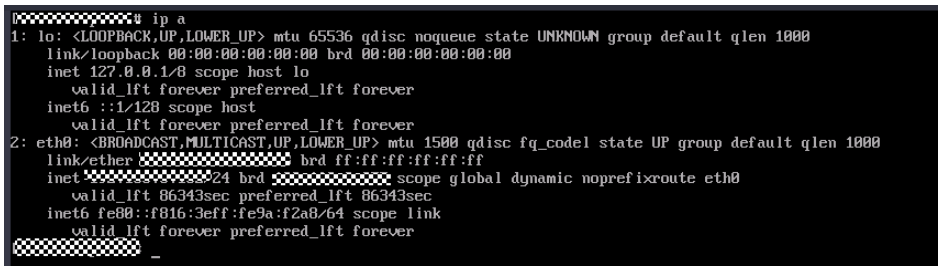
After IPv6 is enabled for the ECS NIC on the ECS console, HCE cannot obtain an IPv6 address because DHCP is not correctly configured for the OS.

## Symptoms

IPv6 has been enabled on the ECS console, and an IPv6 address is displayed on the ECS details page.




However, the OS cannot obtain an IPv6 address.




## Solution

1. Configure DHCP to automatically obtain IPv6 addresses. Add the following content to the NIC configuration file **/etc/sysconfig/network-scripts/ifcfg-ethx**:

   IPV6INIT="yes"

   DHCPV6C="yes"

```
[root@ecs-xxxx ~]# cat /etc/sysconfig/network-scripts/ifcfg-eth0
DEVICE="eth0"
BOOTPROTO="dhcp"
ONBOOT="yes"
TYPE="Ethernet"
PERSISTENT_DHCLIENT="yes"
IPV6INIT="yes"
DHCPV6C="yes"
[root@ecs-xxxx ~]#
```

2. Run the following command to restart NetworkManager to obtain an IPv6 address:

   **systemctl restart NetworkManager**

```
[root@ecs-xxxx ~]# systemctl restart NetworkManager
[root@ecs-xxxx ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether xx:xx:xx:xx:xx:xx brd ff:ff:ff:ff:ff:ff
    inet xxx.xxx.xxx.x4 brd xxx.xxx.xxx.xxx scope global dynamic noprefixroute eth0
       valid_lft 86394sec preferred_lft 86394sec
    inet6 2407:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:3155/128 scope global dynamic noprefixroute
       valid_lft 7195sec preferred_lft 7195sec
    inet6 fe80::f816:3eff:fe9a:f2a8/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
[root@ecs-xxxx ~]# _
```

# 12 How Do I Set Auto Log Using TMOUT?

## Scenarios

To ensure system security and reduce resource waste, users must log out they are not actively using the system. This can be achieved by setting an automatic logout timer using *TMOUT*.

*TMOUT* is an environment variable in Linux shell that defines number of seconds a shell session can be idle before it is automatically logged out. When this variable is set, shell will terminate session if there is no input activity for set time. If this variable is not set or is set to **0**, automatic logout is disabled, and users are not disconnected due to long-time inactivity.

## Procedure

1. Check the automatic logout time (the value of *TMOUT*):
   ```
   echo $TMOUT
   ```
   If no value is returned, *TMOUT* is not configured.
2. Configure the automatic logout time for the current session. To define a long-term automatic logout time, go to **3**.
   ```
   export TMOUT=seconds
   ```
3. Use this variable to set a long-time automatic logout time.

   **Method 1**

   Run the following command to modify the **/etc/profile** file. If the modification does not take effect, modify the **/etc/bashrc** file. The modification steps are the same. In this way, the automatic logout time will be configured for all users who use the configuration file.

   ```
   vim /etc/profile
   ```

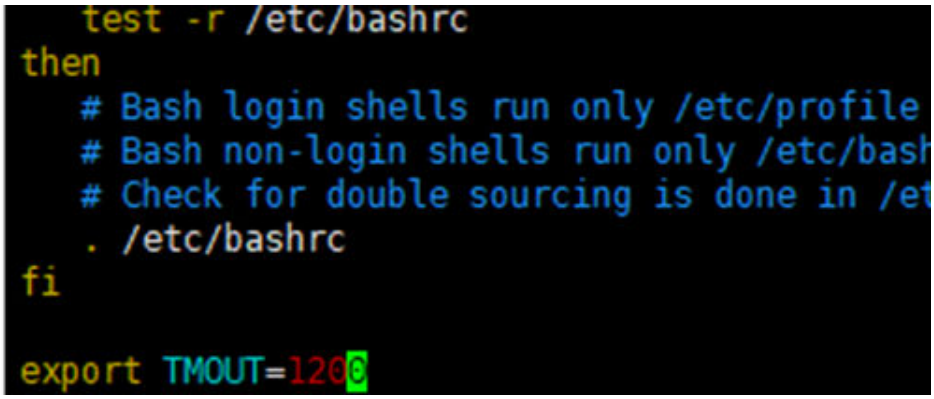
   Or

   ```
   vim /etc/bashrc
   ```

   Add the following command to the end of the file: For example, you can set the automatic logout time to 1,200 seconds. If the value is set to **0**, the automatic logout is disabled.

   ```
   export TMOUT=1200
   ```




Save and then refresh the file.

```
source /etc/profile
```

**Method 2**

Run the following commands in sequence to change the automatic logout time:

```
sed -i '$a\export TMOUT=1200' /etc/profile
source /etc/profile
```

4. Check the automatic logout time:

```
echo $TMOUT
```

If the defined value is displayed, the automatic logout is configured successfully.