

# Object Storage Service

## Tool Guide (obsfs)

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# 1 Introduction to obsfs

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## NOTE

obsfs has been taken offline since July 1, 2024. After that, OBS will no longer provide maintenance and customer support for obsfs. If you still want to mount an OBS bucket to your local file system in Linux, use [s3fs](#). We apologize for any inconvenience and appreciate your understanding. For any questions, [submit a service ticket](#) for technical support.

obsfs is a file system tool based on Filesystem in Userspace (FUSE). With obsfs, you can mount an OBS parallel file system to Linux, so that you can access the practically infinite storage of OBS as easily as accessing a local file system.

obsfs is a great option if you are used to storing data locally but your data is now stored in OBS.

## Functions

- Lets you mount a parallel file system to your local file system in Linux, so that you can manage objects stored in OBS as if they were stored locally.
- Supports synchronous upload. Any file uploaded to the mount directory can be synchronously uploaded to OBS.
- Synchronizes objects from a parallel file system to its mount directory in the local file system, so that you can copy, modify, rename, or truncate objects locally and they will be automatically updated in OBS.

## Constraints

- The local directory that the parallel file system will be mounted to does not need to be empty, but any files in that directory will become unavailable after the parallel file system is mounted to that directory. However, they will still be there when the parallel file system is unmounted later. To avoid any confusion this might cause, mount your parallel file system to an empty directory.
- obsfs can be used to mount parallel file systems but not OBS buckets.
- After an OBS parallel file system is mounted using obsfs, the newly generated mount directory cannot be used as an FTP directory.
- A parallel file system that is mounted locally cannot provide the same performance and functions as an actual local file system. When using a mounted parallel file system, pay attention to the following points:

- Files or folders in the mount directory do not support hard links.
- There can be no more than 45 directory levels.
- Since there is switching between user mode and kernel mode in FUSE, obsfs is not recommended for high-concurrency scenarios.
- Linux commands (such as **ls** and **stat**) require remote access to the OBS server, which causes poor performance.
- A parallel file system can be mounted to multiple cloud servers, but you need to prevent multiple servers from concurrently writing to the same file.
- If obsfs is used to mount a parallel file system, policies and IAM policies configured for the parallel file system take effect, but those configured for directories do not take effect.

## Applicable Operating Systems

obsfs is compatible with Linux. For details, see [Table 1-1](#).

**Table 1-1** Obtaining obsfs

Method	Description	Compatible Distributions	Operation Guideline
Download	Download and install the official software package and configure the environment (Linux).	Ubuntu 16 and CentOS 7	<a href="#">Downloading and Installing obsfs</a>

# 2 Environment Preparation

## 2.1 Resource Preparation

Before using obsfs, you need to prepare the resources listed in [Table 2-1](#).

**Table 2-1** Resource preparation

Resource	Description	Operation Guideline
HUAWEI ID	You can use an account to access Huawei Cloud and to manage resources (including IAM users, access keys, and OBS parallel file systems) required by obsfs. Before using obsfs, you need a HUAWEI ID that has subscribed to OBS.	<a href="#">Creating a HUAWEI ID and Enabling Huawei Cloud Services</a>
IAM user	Optional. To ensure account and resource security, you are advised not to use a regular account to access OBS directly, and it is safer to create an IAM user and assign permissions to that user specifically for accessing OBS resources. Then use the IAM account to access obsfs. <b>NOTE</b> The IAM user who uses obsfs to mount and access a parallel file system must have the same access permissions for OBS buckets. After an OBS role or policy is granted to an IAM user, the role or policy will apply to both OBS buckets and parallel file systems.	<a href="#">Creating an IAM User</a>

Resource	Description	Operation Guideline
Access keys (AK and SK)	Access keys (AK and SK) are used as credentials for your account and for IAM users. obsfs accesses OBS using access keys that are used to encrypt the signature of a request, ensuring the security and integrity of the request and that identities of the request sender and receiver are correct.	<a href="#">Creating Access Keys (AK and SK)</a>
Parallel file system	A parallel file system is a container for storing data.	<a href="#">Creating a Parallel File System</a>

## Creating a HUAWEI ID and Enabling Huawei Cloud Services

Before using obsfs, you need to create a HUAWEI ID and subscribe to OBS. You can use OBS on a pay-per-use basis or by purchasing resource packages. Make sure that your account balance is sufficient or you have valid resource packages. Then you can access and use OBS. If you already have an account and have subscribed to OBS, skip this part.

**Step 1** Visit the [Huawei Cloud official website](#).

**Step 2** Create a HUAWEI ID.

If you already have one, start from [Step 3](#).

1. On the right of the top navigation bar, click **Register**.
2. Complete the registration as instructed.

After the registration is completed, you will be redirected to your account information page.

**Step 3** On the right of the top navigation menu, click **Log In**, and enter the username and password.

**Step 4** On the right of the top navigation bar, click **Console** to go to the management console.

----End

## Creating an IAM User

To ensure account and resource security, you are advised not to use a regular account to access OBS directly, and it is safer to create an IAM user and assign permissions to that user specifically for accessing OBS resources. Then use the IAM account to access obsfs. If you do not need any IAM users, skip this part.

**Step 1** Visit the [Huawei Cloud official website](#).

**Step 2** Click **Console** in the upper right corner of the page and use the created account to log in to OBS Console.



**Step 3** On the top navigation bar, choose **Service List > Management & Governance > Identity and Access Management**. The IAM console is displayed.

**Step 4** Create a user group.

For details, see [Creating a User Group and Assigning Permissions](#). After the user group is created, locate the row that displays **Global service > OBS** in the **User Group Permissions** area, and click **Configure Policy** in the row to set OBS permissions for the user group. For details about OBS policies, see [IAM Permissions](#).

 **NOTE**

The permissions required for accessing a parallel file system are the same as those required for accessing an OBS bucket. After an OBS role or policy is granted to an IAM user, the role or policy will apply to both OBS buckets and parallel file systems.

**Step 5** Create a user.

For details, see [Creating a User](#). When creating a user, add it to the user group created in [Step 4](#) (with OBS permissions configured).

 **NOTE**

If the user group has not been configured OBS permissions, you can grant full access to the parallel file system to be mounted on OBS Console through a policy or access control list (ACL).

----End

## Creating Access Keys (AK and SK)

Access keys (AK and SK) are used as credentials for your account and for IAM users. obsfs accesses OBS using access keys that are used to encrypt the signature of a request, ensuring the security and integrity of the request and that identities of the request sender and receiver are correct. For details about how to create access keys, see [Access Keys](#). If you already have them, skip this part.

 **NOTE**

Each account or IAM user can create a maximum of two valid access keys.

## Creating a Parallel File System

For details about how to create a parallel file system, see [Creating a Parallel File System](#).

## 2.2 Downloading and Installing obsfs

 **NOTE**

obsfs has been taken offline since July 1, 2024. After that, OBS will no longer provide maintenance and customer support for obsfs. If you still want to mount an OBS bucket to your local file system in Linux, use [s3fs](#). We apologize for any inconvenience and appreciate your understanding. For any questions, [submit a service ticket](#) for technical support.

## Configuring a Runtime Environment

The operating environment of obsfs depends on the software packages such as openssl-devel, fuse, and fuse-devel. Before running obsfs, you need to run commands to configure the dependent environment.

### NOTE

- obsfs supports libfuse 2.9.7, 2.9.8, or 2.9.9. If your system has a different version of libfuse installed, remove it and install the correct version by referring to [libfuse Installation Guide](#).
- You can view the libfuse version by running the system's version query command or run the following command:

```
find / -name libfuse.so*
```
- CentOS 7

```
yum install -y openssl-devel fuse fuse-devel
```
- Ubuntu 16

```
apt-get install -y libfuse-dev libcurl4-openssl-dev
```

## 2.3 Initializing obsfs

Before using obsfs, you need to write the access keys (AK and SK) into the key file, enabling user authentication before using parallel file systems.

This topic describes how to write the access keys to the `/etc/passwd-obsfs` file.

### Prerequisites

You have obtained the access keys (AK and SK). For details, see [Resource Preparation](#).

### Procedure

**Step 1** Open the CLI.

**Step 2** Run the following command to write the access keys into the `/etc/passwd-obsfs` file:

```
echo AK:SK > /etc/passwd-obsfs
```

**Step 3** Run the following command to check whether the key information is successfully configured:

```
cat /etc/passwd-obsfs
```

**Step 4** Run the following command to set the key file to be used only by the current user:

```
chmod 600 /etc/passwd-obsfs
```

### NOTE

To prevent your AK and SK from being leaked, use a temporary AK/SK pair or periodically change the AK/SK pair. Updating AK/SK pairs do not interrupt services. You need to delete unused key files in a timely manner.

----End

# 3 Operation Guide

---

## 3.1 Mounting a Parallel File System

To use obsfs to manage your objects in OBS, you need to mount an OBS parallel file system locally. After the parallel file system is mounted, working on the mount directory is working on the parallel file system. For example, you can upload an object to OBS simply by saving it to the mount directory.

 **NOTE**

Traffic consumed by parallel file systems after they are mounted to ECSs through obsfs is measured as OBS traffic.

### Constraints

- obsfs can be used to mount parallel file systems but not OBS buckets.
- The local directory that the parallel file system will be mounted to does not need to be empty, but any files in that directory will become unavailable after the parallel file system is mounted to that directory. However, they will still be there when the parallel file system is unmounted later. To avoid any confusion this might cause, mount your parallel file system to an empty directory.
- Files or folders in the mount directory do not support hard links.
- There can be no more than 45 directory levels.
- If a parallel file system is manually mounted by running a command, it needs to be mounted again every time the Linux is restarted.
- The actual size and used space of a parallel file system vary with your actual usage.

 **NOTE**

You can configure auto mounting of a parallel file system upon startup. For details, see [Mounting a Parallel File System Automatically upon Startup](#).

- A parallel file system can be mounted to multiple cloud servers, but you need to prevent multiple servers from concurrently writing to the same file.
- If obsfs is used to mount a parallel file system, policies and IAM policies configured for the parallel file system take effect, but those configured for directories do not take effect.

## Prerequisites

- You have obtained obsfs by referring to [Downloading and Installing obsfs](#).
- obsfs has been initialized by referring to [Initializing obsfs](#).
- There is a mount directory in the local file system.

### NOTE

You can run the **mkdir** command to create a directory for mounting a parallel file system. For example, to create a directory named **mountpoint**, the command is:

```
mkdir mountpoint
```

- The system time has been calibrated.

### NOTE

If there is a huge time offset between the system and the storage server, the request authentication will fail.

## Mounting a Parallel File System Manually

**Step 1** Open the CLI.

**Step 2** Run the **cd** command to go to the directory where obsfs is located.

**Step 3** Run the mount command in the following format:

```
./obsfs Parallel file system name Local mount directory -o url=Region endpoint address -o passwd_file=Key file path -o big_writes -o max_write=131072 -o use_ino Mount parameters
```

- *Parallel file system name*: name of the parallel file system you want to mount.

### NOTE

A specific directory in a parallel file system can be mounted locally. If you mount just a directory, you can access only this directory in the parallel file system after entering the local mount directory. The mount command is as follows:

```
./obsfs Parallel file system name:Directory name Local mount directory -o url=Region endpoint address -o passwd_file=Key file path -o big_writes -o max_write=131072 -o use_ino Mount parameters
```

- *Local mount directory*: the absolute or relative path of the directory on which a parallel file system is to be mounted.
- *Region endpoint address*: Obtain the endpoint address according to the region where the mounted parallel file system resides. For details, see [Regions and Endpoints](#).
- *Mount parameters*:

Mount parameters, excepting **passwd\_file** and **use\_ino**, are optional. Select proper parameters according to your actual needs. The format is as follows: **-o Parameter=Value**. If you do not need to specify a parameter value, use only **-o Parameter**. [Table 3-1](#) lists OBS mount parameters and their descriptions.

### NOTE

For details about obsfs mount parameter configurations, run the **./obsfs --help** command to learn more.

**Table 3-1** obsfs mount parameters

Parameter	Value	Description
passwd_file	Type: String Value: Set this parameter to the path of the access key file configured in <a href="#">Initializing obsfs</a> .	The access key file contains the AK and SK information required for accessing obsfs.
use_ino	Required	If this parameter is specified, obsfs allocates the <b>inode</b> number.
big_writes	Not required	After the configuration, the maximum size of the cache can be modified.
max_write	Type: Integer Recommended value: <b>128 KB</b>	This parameter is valid only when <b>big_writes</b> is configured. The default write size is 4 KB. The recommended value is 128 KB.
nonempty	Not required	This parameter allows the mount point to be a non-empty directory.
allow_other	Not required	This parameter allows other users to access the parallel file system.
max_background	Type: Integer Recommended value: <b>100</b>	You can use this parameter to set the maximum number of waiting requests in the background.
use_path_request_style	Not required	Indicates the path-based access (legacy API). If this parameter is configured, you need to use the specified endpoint address to access OBS. <b>NOTE</b> If the value of the URL in the command is an IP address, this parameter must be carried in the mount command. Otherwise, a domain name resolution error is reported.

Parameter	Value	Description
umask	Not required	<p>It controls what permissions are not given to all files in the parallel file system.</p> <p><b>NOTE</b> Below gives an example: <b>-o umask=XXX</b> If <b>umask</b> is set to <b>777</b>, the permissions for all files in the parallel file system is <b>000</b>. If <b>umask</b> is set to <b>000</b>, the permissions for all files in the parallel file system is <b>777</b>. If <b>umask</b> is set to <b>002</b>, the permissions for all files in the parallel file system is <b>775</b>.</p>
obsfslog	Not required	<p>This parameter enables the loading of log configuration parameters from the configuration file, including the log mode and level. You can change the log level without restarting the process when this parameter is enabled.</p> <p><b>NOTE</b> The path of the configuration file is: <b>/etc/obsfsconfig</b>. If you want to use this parameter, you need to manually create the configuration file path on the local host and write the content by referring to the following example and comments.</p> <p>An example of the configuration file content: //Log mode. The value <b>0</b> indicates that the log mode is displayed on the client. If the value is <b>1</b>, the log file is generated in the following path: <b>/var/log/obsfs</b>, which is named after the process ID. If the value is <b>2</b>, the log is written into the system log. dbglogmode=1 //Log level. The value can be <b>dbg</b>, <b>info</b>, <b>warn</b>, <b>err</b>, or <b>crit</b>. If the log level is set to <b>dbg</b> or <b>info</b>, service details, such as the bucket name and file name, will be printed. dbglevel=info</p>

**Step 4** Run the following command to view the result:

```
df -h
```

If the information similar to the following is displayed, the parallel file system is successfully mounted:

```
Filesystem      Size      Used      Avail      Use%      Mounted on
obsfs           256T        0         256T        0%         /path/to/mountpoint
```

 **NOTE**

The actual size and used space of a parallel file system vary with your actual usage.

If the preceding information is not displayed, the parallel file system fails to be mounted. In this case, you can add the following parameters to the command, so

that the mount process and detailed debug logs are displayed in the command output:

```
-d -d -f -o f2 -o curldb
```

Then you can locate the fault based on the error information. For details about troubleshooting of common faults, see [Failures in Mounting a Parallel File System](#).

----End

## Command Example

In this example, the **filesystem001** parallel file system and the access key file path **/etc/passwd-obsfs** in the CN-Hong Kong region are used as examples to describe how to mount an OBS parallel file system.

- Mount the parallel file system **filesystem001** to the mount point **/mnt/mount\_path/** and allow the directory to be non-empty.

```
./obsfs filesystem001 /mnt/mount_path/ -o url=obs.ap-southeast-1.myhuaweicloud.com -o  
passwd_file=/etc/passwd-obsfs -o big_writes -o max_write=131072 -o nonempty -o use_ino
```

- Mount the parallel file system **filesystem001** to the mount point **/mnt/mount\_path/** and set the write cache size.

```
./obsfs filesystem001 /mnt/mount_path/ -o url=obs.ap-southeast-1.myhuaweicloud.com -o  
passwd_file=/etc/passwd-obsfs -o big_writes -o max_write=131072 -o max_background=100 -o  
use_ino
```

- Mount the **filesystem001** parallel file system to the mount point **/mnt/mount\_path/** and allow other users to access the directory.

```
./obsfs filesystem001 /mnt/mount_path/ -o url=obs.ap-southeast-1.myhuaweicloud.com -o  
passwd_file=/etc/passwd-obsfs -o big_writes -o max_write=131072 -o allow_other -o use_ino
```

### NOTE

If the value of the **url** in the command is an IP address, add the **-o use\_path\_request\_style** parameter to the mount command. Otherwise, a domain name resolution error is reported.

## Mounting a Parallel File System Automatically upon Startup

The following uses CentOS 7 as an example to describe how to configure the parallel file system to automount at startup.

**Step 1** Log in to the Linux server as user **root**.

**Step 2** Run the following command to create a **/home/startobsfs.sh** script:

```
vi /home/startobsfs.sh
```

**Step 3** Press **i** to enter the editing mode, and write the following comments and mount commands to the **/home/startobsfs.sh** script.

```
#!/bin/bash  
cd Absolute path of obsfs  
./obsfs Parallel file system name Local mount directory -o url=Region endpoint address -o passwd_file=Key  
file path -o big_writes -o max_write=131072 -o use_ino Mount parameters
```

### NOTE

For details about the mount command parameters, see [Step 3](#) in section "Mounting a Parallel File System Manually."

**Step 4** Press **Esc** and enter **:wq** to save and exit the script.

**Step 5** Run the following command to grant the **root** user the permission to execute the script:

```
chmod +x /home/startobsfs.sh
```

**Step 6** Run the following command to grant the **root** user the permission to execute the **rc.local** file:

```
chmod +x /etc/rc.d/rc.local
```

 **NOTE**

The location of the **rc.local** file varies depending on the OS. In CentOS 7, the file is stored in **/etc/rc.d/rc.local**.

**Step 7** Add the following command to the end of **/etc/rc.d/rc.local**, save the file, and exit:

```
bash /home/startobsfs.sh
```

 **NOTE**

If the **/etc/rc.d/rc.local** file contains an exit command, for example, **exit 0**, add the command prior to the exit command.

**Step 8** Restart the server and verify the mounting.

After the server is restarted, run the following command to check whether the parallel file system is successfully mounted:

```
df -h
```

 **NOTE**

If you no longer want the parallel file system to automount at startup, delete the script from **rc.local**.

----End

## Follow-up Procedure

Before adding, modifying, or deleting any parameters for a mounted parallel file system, you need to unmount the parallel file system and then mount it again. For details about how to unmount a parallel file system, see [Unmounting a Parallel File System](#).

## 3.2 Unmounting a Parallel File System

If you do not need to access a mounted parallel file system or you need to add, modify, or delete parameters it has configured, you can unmount it.

 **NOTE**

Unmounting a parallel file system does not affect data stored in the parallel file system.

## Prerequisites

The parallel file system is currently mounted.



## Procedure

**Step 1** Open the CLI.

**Step 2** Check whether the current directory is the mount point.

- If it is, navigate to a different directory. Then go to [Step 3](#).
- If it is not, go to [Step 3](#).

**Step 3** Run the following command to unmount a parallel file system:

```
umount Local mount point
```

**Step 4** Run the following command to confirm that the parallel file system has been unmounted:

```
df -h
```

**----End**

# 4 FAQs

---

## Can I Mount a Parallel File System to Multiple Clients at the Same Time?

Yes.

## Can Multiple Parallel File Systems Be Mounted to the Same Client?

Yes. Each mounting process is independent.

## Is the Traffic Consumed by Parallel File Systems Measured as ECS Traffic After They Are Mounted to ECSs Through obsfs?

No. It is measured as OBS traffic only.

## How Can Other Users Access a Mounted Parallel File System?

Generally, only the user who mounted the parallel file system has access.

To authorize other users the access to the mount directory, you can specify the **allow\_other** parameter in the mount command, for example:

```
./obsfs filesystem001 /mnt/mount_path/ -o url=obs.ap-southeast-1.myhuaweicloud.com -o  
passwd_file=/etc/passwd-obsfs -o big_writes -o max_write=131072 -o allow_other -o use_ino
```

# 5 Troubleshooting

---

## 5.1 Failures in Mounting a Parallel File System

This section describes some typical reasons a parallel file system may fail to be mounted and what actions you can take to resolve the issue.

### Symptom 1: "The specified bucket does not exist" or Similar Errors Occur

#### Fault Locating

The parallel file system to be mounted does not exist.

#### Solution

Create a parallel file system and mount it again. For details about how to create a parallel file system, see [Creating a Parallel File System](#).

### Symptom 2: "file system not support this request: this bucket not support filesystem" or Similar Errors Occur

#### Fault Locating

The mounted bucket is not a parallel file system.

#### Solution

Create a parallel file system and mount it again. For details about how to create a parallel file system, see [Creating a Parallel File System](#).

### Symptom 3: "The request signature we calculated does not match the signature you provided. Check your key and signing method." or Similar Errors Occur

#### Fault Locating

Authentication failed. The access keys (AK and SK) are incorrect.

#### Solution

Check whether the AK and SK information in the key file is correctly configured. For details about the check method, see [Step 3](#) in the section "Initializing obsfs."

#### **Symptom 4: "specified passwd\_file is not readable" or Similar Errors Occur**

##### **Fault Locating**

The key file path configured in the `passwd_file` file is incorrect.

##### **Solution**

Check whether the key file path configured in the `passwd_file` file is correct. For details about the check method, see [Step 3](#) in the section "Initializing obsfs."

#### **Symptom 5: "Access Denied" or Similar Errors Occur**

##### **Fault Locating**

Authentication failed. The IAM user does not have OBS operation permissions.

##### **Solution**

Authorize the user with required OBS operation permissions. For details, see [Resource Preparation](#).

#### **Symptom 6: "unable to access MOUNTPOINT /obsfs: Transport endpoint is not connected" or Similar Errors Occur**

##### **Fault Locating**

The mount point is occupied by another obsfs mount process.

##### **Solution**

Run the `df` command to query the partitions and points that have been mounted to. Then select an unoccupied mount point and mount the bucket again.

#### **Symptom 7: "unknown option" or Similar Errors Occur**

##### **Fault Locating**

One or more parameters in the mount command are incorrectly set and therefore failed to be identified by obsfs.

##### **Solution**

Check the mount parameters by referring to [Table 3-1](#) in the section "Mounting the Parallel File System".

#### **Symptom 8: "unable to access MOUNTPOINT /mnt/obsfs: No such file or directory" or Similar Errors Occur**

##### **Fault Locating**

The mount directory does not exist.

##### **Solution**

Use the **mkdir** command to create a directory or mount the bucket to an existing directory.

## Symptom 9: "device not found" or Similar Errors Occur

### Fault Locating

1. The fuse component is not started.
2. In Docker container scenarios, parameter **--privileged** is missing.

### Solution

1. Run the **find / -name libfuse.so\*** command to check whether the fuse component is installed. If the component is not installed, install it by referring to the runtime environment configuration in [Downloading and Installing obsfs](#).
2. Add parameter **--privileged** to the **docker run** command.

## Symptom 10: "The difference between the request time and the current time is too large." or Similar Errors Occur

### Fault Locating

There was a huge time offset between the system and the storage server, which made the request authentication fail.

### Solution

Calibrate the system time.

## 5.2 Failure in Unmounting a Parallel File System

This topic describes the possible causes of and solutions to common failures in unmounting parallel file systems.

### Symptom 1: "target is busy" or Similar Errors Occur When Unmounting a Parallel File System

#### Fault locating:

During unmounting, the CLI terminal stays in the mount directory or its subdirectory.

#### Solution:

Exit the mount directory.

# 6 Related Operations

## 6.1 libfuse Installation Guide

This section uses libfuse 2.9.7 as an example target version to describe how to update libfuse on CentOS 7, SUSE 12, and Ubuntu 16.

### Prerequisites

The source code of libfuse has been downloaded and then compiled to generate libfuse.so.2.9.7.

Download address of libfuse: <https://github.com/libfuse/libfuse/releases/tag/fuse-2.9.7>

```
tar -zxvf fuse-2.9.7.tar.gz
cd fuse-2.9.7/ && ./configure && make && make install
echo -e "\n/usr/local/lib" >> /etc/ld.so.conf
ldconfig
```

### Installing libfuse on CentOS 7

libfuse.so.2.9.2 is installed on CentOS 7 by default.

Ensure that you have downloaded the libfuse source code and generated libfuse.so.2.9.7 after compilation as described in [Prerequisites](#). Then perform the following steps.

**Step 1** Run the following command to locate the links of the libfuse.so.2.9.2 library:

```
find / -name libfuse.so*
```

**Step 2** Run the following command to copy libfuse.so.2.9.7 to the directory where the libfuse.so.2.9.2 library resides.

```
cp /usr/local/lib/libfuse.so.2.9.7 /usr/lib64/
```

**Step 3** Run the following command to remove all links of the libfuse.so library of the earlier version:

```
rm -f /usr/lib64/libfuse.so
rm -f /usr/lib64/libfuse.so.2
```

**Step 4** Run the following command to create links of libfuse.so.2.9.7 library similar to the deleted ones of the libfuse.so library of the earlier version:

```
ln -s /usr/lib64/libfuse.so.2.9.7 /usr/lib64/libfuse.so  
ln -s /usr/lib64/libfuse.so.2.9.7 /usr/lib64/libfuse.so.2
```

----End

## Installing libfuse on SUSE 12

libfuse.so.2.9.3 is installed on SUSE 12 by default.

Ensure that you have downloaded the libfuse source code and generated libfuse.so.2.9.7 after compilation as described in [Prerequisites](#). Then perform the following steps.

**Step 1** Run the following command to locate the links of the libfuse.so.2.9.3 library:

```
find / -name libfuse.so*
```

**Step 2** Run the following command to copy libfuse.so.2.9.7 to the directory where the libfuse.so.2.9.3 library resides.

```
cp /usr/local/lib/libfuse.so.2.9.7 /usr/lib64/
```

**Step 3** Run the following command to remove all links of the libfuse.so library of the earlier version:

```
rm -f /usr/lib64/libfuse.so.2  
rm -f /lib64/libfuse.so.2.9.3
```

**Step 4** Run the following command to create links of libfuse.so.2.9.7 library similar to the deleted ones of the libfuse.so library of the earlier version:

```
ln -s /usr/lib64/libfuse.so.2.9.7 /usr/lib64/libfuse.so.2  
ln -s /usr/lib64/libfuse.so.2.9.7 /lib64/libfuse.so.2.9.7
```

----End

## Installing libfuse on Ubuntu 16

libfuse.so.2.9.4 is installed on Ubuntu 16 by default.

Ensure that you have downloaded the libfuse source code and generated libfuse.so.2.9.7 after compilation as described in [Prerequisites](#). Then perform the following steps.

**Step 1** Run the following command to locate the links of the libfuse.so.2.9.4 library:

```
find / -name libfuse.so*
```

**Step 2** Run the following command to copy libfuse.so.2.9.7 to the directory where the libfuse.so.2.9.4 library resides.

```
cp /usr/local/lib/libfuse.so.2.9.7 /lib/x86_64-linux-gnu/
```

**Step 3** Run the following command to remove all links of the libfuse.so library of the earlier version:

```
rm -f /lib/x86_64-linux-gnu/libfuse.so.2
```

**Step 4** Run the following command to create links of libfuse.so.2.9.7 library similar to the deleted ones of the libfuse.so library of the earlier version:

```
ln -s /lib/x86_64-linux-gnu/libfuse.so.2.9.7 /lib/x86_64-linux-gnu/libfuse.so.2
```

----End