Scalable File Service

Getting Started

Issue 02

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Contents

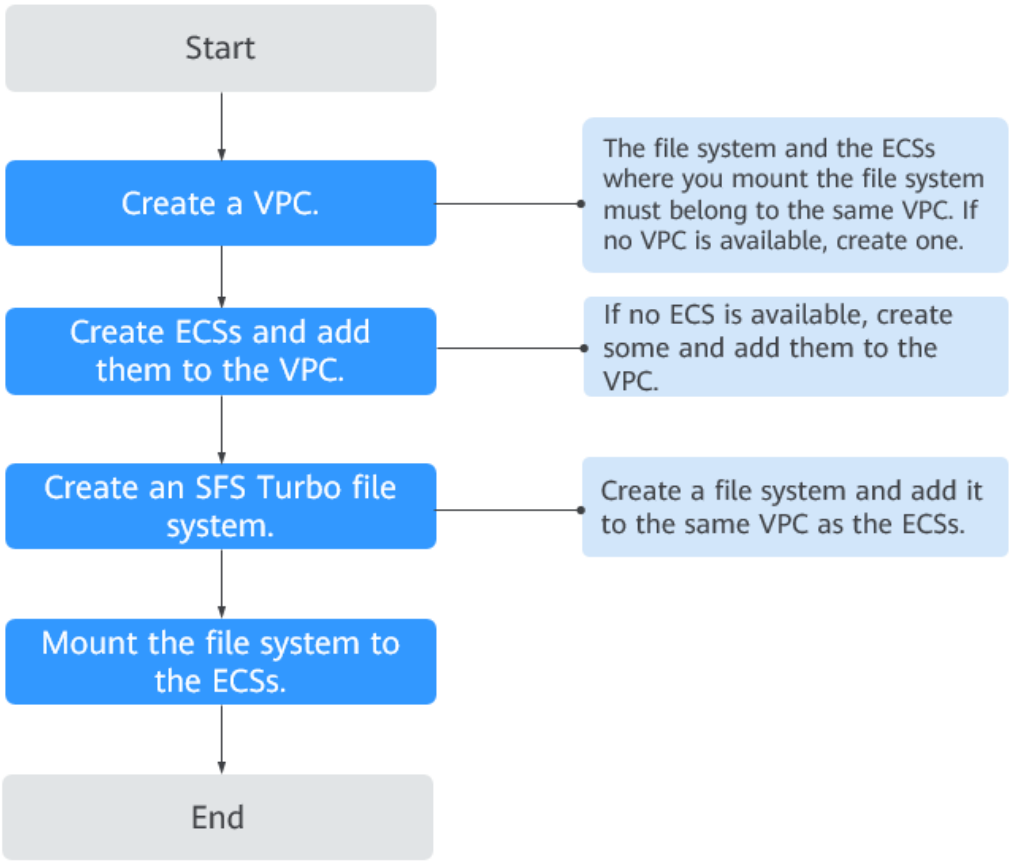
1 Overview

This section describes how to use SFS.

After creating a file system, you cannot directly access the file system. Instead, you need to mount the file system to ECSs.

Figure 1-1 shows the process for creating and mounting an SFS Turbo file system.

Figure 1-1 Process for using SFS Turbo



2 Make Preparations

Before using SFS, you need to make the following preparations:

- **Registering a HUAWEI ID and Enabling Huawei Cloud Services**
- **Creating an IAM User**

Registering a HUAWEI ID and Enabling Huawei Cloud Services

If you already have a Huawei ID, skip this part. If you do not have a Huawei ID, perform the following operations to create one:

1. Visit **www.huaweicloud.com/eu/** and click **Register**.
2. On the displayed **Register** page, register an account as prompted.

   After you have successfully registered, the system automatically redirects you to your personal information page.

Creating an IAM User

If you want to allow multiple users to manage your resources without sharing your password or private key, you can create users using IAM and grant permissions to the users. These users can use specified login links and their own accounts to access the public cloud and help you efficiently manage resources. You can also set account security policies to ensure the security of these accounts and reduce enterprise information security risks.

If you have registered with the public cloud but have not created an IAM user, you can create a user on the IAM console. For example, to create an SFS administrator, perform the following steps:

1. Enter your username and password to log in to the management console.
2. In the upper right corner of the page, hover the mouse over the username and select **Identity and Access Management**.
3. In the navigation pane on the left, choose **Users**.
4. On the **Users** page, click **Create User**.
5. Enter user information on the **Create User** page.
   - **Username**: Enter a username, for example, **sfs_admin**.
   - **Email Address**: Email address of the IAM user. This parameter is mandatory if the access type is specified as **Set by user**.

- (Optional) **Mobile Number**: Mobile number of the IAM user.
- (Optional) **Description**: Enter the description of the user, for example, **SFS administrator**.

6. Select **Management console access** for **Access Type** and **Set now** for **Password**. Enter a password and click **Next**.

   NOTE

   An SFS administrator can log in to the management console and manage users. You are advised to select **Set now** for **Password Type** when you create an SFS administrator for your domain. If you create an SFS administrator for another user, you are advised to select **Set by user** for **Password Type** instead so that the user can set their own password.

7. (Optional) Add the user to the **admin** user group and click **Create**.

   User group **admin** has all the operation permissions. If you want to grant fine-grained permissions to IAM users, see **Creating a User and Granting SFS Permissions**.

   The user is displayed in the user list. You can click the IAM user login link to log in to the console.

3 Create a File System

You can create a file system and mount it to multiple servers. Then the servers can share this file system.

Prerequisites

1. Before creating a file system, ensure that a VPC is available.

   If no VPC is available, create one by referring to section "Creating a VPC" in the *Virtual Private Cloud User Guide*.

2. Before creating a file system, ensure that ECSs are available and reside within the created VPC.

   If no ECS is available, create an ECS by referring to "Creating an ECS" in the *Elastic Cloud Server User Guide*.

Logging In to the Management Console

Step 1 Visit the Huawei Cloud website at **www.huaweicloud.com/eu/**.

Step 2 Register an account.

Before using SFS, you need to register a HUAWEI ID. This account can be used to access all Huawei Cloud services, including SFS. If you already have an account, start from **Step 3**.

1. In the upper right corner of the page, click **Register**.
2. Complete the registration as instructed.

   After you have successfully registered, the system automatically redirects you to your personal information page.

Step 3 Log in to the management console.

1. In the upper right corner of the displayed page, click **Console**.
2. Enter the username and password as prompted, and click **Log In**.

Step 4 After logging in to the management console, select the region where the service is located from the drop-down list in the upper left corner of the page.

Step 5 Choose **Storage** > **Scalable File Service** to go to SFS Console.

Step 6 It is recommended that you top up your account and subscribe to SFS so that the service can be used properly. For details about how to purchase SFS, see **How Do I Purchase SFS?**

----End

Procedure

Step 1 Log in to the management console using a cloud account.

1. Log in to the management console and select a region and a project.
2. Choose **Storage** > **Scalable File Service**.

Step 2 In the upper right corner of the page, click **Create File System**.

Step 3 Set the parameters. **Table 3-1** describes the parameters.

Table 3-1 Parameter description

Parameter	Description	Remarks
Billing Mode	Mandatory	-
Region	Mandatory Region of the tenant. Select the region from the drop-down list in the upper left corner of the page.	You are advised to select the same region as that of the servers.
AZ	Mandatory A geographical area with an independent network and an independent power supply.	You are advised to select the same AZ as that of the servers.
Protocol Type	Mandatory SFS Turbo supports NFS for file system access.	The default value is **NFS**.
Storage Class	Mandatory Includes SFS Turbo Standard and SFS Turbo Performance. For more information, see **File System Types**.	Select **Standard**. **NOTE** Once a file system is created, its storage class cannot be changed. If you want to change the storage class, you need to create another file system. Therefore, you are advised to plan the storage class carefully in advance.

Parameter	Description	Remarks
Capacity	Maximum capacity of a single file system. When the used capacity of a file system reaches this value, no more data can be written to the file system. You need to expand the file system. The capacity of an SFS Turbo file system cannot be decreased. Set an appropriate file system capacity based on your service needs.	Supported scope: • SFS Turbo Standard: 500 GB to 32 TB • SFS Turbo Performance: 500 GB to 32 TB • SFS Turbo Standard - Enhanced and SFS Turbo Performance - Enhanced: 10 TB to 320 TB.
VPC	Mandatory Select a VPC and its subnet. • VPC: A server cannot access file systems in a different VPC. Select the VPC to which the server belongs. • Subnet: A subnet is an IP address range in a VPC. In a VPC, a subnet segment must be unique. A subnet provides dedicated network resources that are logically isolated from other networks, improving network security. **NOTE** Upon creation, only one VPC can be added for each file system. Multi-VPC file sharing can be implemented through VPC peering connection. For details about VPC peering connection, see section "VPC Peering Connection" in *Virtual Private Cloud User Guide*.	-

Parameter	Description	Remarks
Security Group	Mandatory A security group is a virtual firewall that provides secure network access control policies for file systems. You can define different access rules for a security group to protect the file systems that are added to this security group. When creating an SFS Turbo file system, you can select only one security group. You are advised to use an independent security group for an SFS Turbo file system to isolate it from service nodes. The security group rule configuration affects the normal access and use of SFS Turbo. For details about how to configure a security group rule, see section "Adding a Security Group Rule" in the *Virtual Private Cloud User Guide*. After an SFS Turbo file system is created, the system automatically enables the security group port required by the NFS protocol in the SFS Turbo file system. This ensures that the SFS Turbo file system can be accessed by your ECS and prevents file system mounting failures. The inbound ports required by the NFS protocol are ports 111, 445, 2049, 2051, 2052, and 20048. If you need to change the enabled ports, choose **Access Control** > **Security Groups** of the VPC console and locate the target security group.	-
Name	Mandatory User-defined name of the file system.	The value can contain only letters, digits, and hyphens (-). The name of the created file system must contain more than four characters and less than or equal to 64 characters.

Step 4 Click **Create Now**.

Step 5 Confirm the file system information and click **Submit**.

Step 6 Complete the creation and go back to the file system list.

If the status of the created file system is **Available**, the file system is created successfully. If the status is **Creation failed**, contact the administrator.

----End

4 Mount a File System

4.1 Mounting an NFS File System to ECSs (Linux)

After creating a file system, you need to mount the file system to servers so that they can share the file system.

In this section, ECSs are used as example servers. Operations on BMSs are the same as those on ECSs.

To use SFS Turbo as the storage backend for CCE, see **Storage**. Then complete the deployment on the CCE console.

Prerequisites

- You have checked the type of the operating system on each ECS. Different operating systems use different commands to install the NFS client.
- You have created a file system and have obtained the mount point of the file system.
- At least one ECS that belongs to the same VPC as the file system exists.

Procedure

Step 1 Log in to the management console using a cloud account.

1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to go to the ECS console.

Step 2 Log in to the ECS as user **root**.

NOTE

If you log in to the ECS as a non-root user, see **Mounting a File System to a Linux ECS as a Non-root User**.

Step 3 Install the NFS client.

1. Run the following command to check whether the NFS software package is installed.
   - On CentOS, Red Hat, Oracle Enterprise Linux, SUSE, EulerOS, Fedora, or OpenSUSE:

     rpm -qa|grep nfs
   - On Debian or Ubuntu:

     dpkg -l nfs-common

   If nothing is displayed, go to **Step 3.2**.
   - On CentOS, Red Hat, EulerOS, Fedora, or Oracle Enterprise Linux:
     ```
     libnfsidmap
     nfs-utils
     ```
   - On SUSE or OpenSUSE:
     ```
     nfsidmap
     nfs-client
     ```
   - On Debian or Ubuntu:
     ```
     nfs-common
     ```
2. Run the following command to install the NFS software package.

   NOTE

   The following commands require that ECSs be connected to the Internet. Or, the installation will fail.
   - On CentOS, Red Hat, EulerOS, Fedora, or Oracle Enterprise Linux:

     sudo yum -y install nfs-utils
   - On Debian or Ubuntu:

     sudo apt-get install nfs-common
   - On SUSE or OpenSUSE:

     zypper install nfs-client

Step 4 Run the following command to create a local path for mounting the file system:

mkdir *Local path*

NOTE

If there is any resource, such as a disk, already mounted on the local path, create a new path. (NFS clients do not refuse repeated mounts. If there are repeated mounts, information of the last successful mount is displayed.)

Step 5 Run the following command to mount the file system to the ECS that belongs to the same VPC as the file system. Currently, the file system can be mounted to Linux ECSs using NFSv3 only.

Table 4-1 describes the variables.

To mount an SFS Turbo file system, run the following command: **mount -t nfs -o vers=3,timeo=600,noresvport,nolock,tcp** *Mount point Local path*

NOTICE

After an ECS where file systems have been mounted restarts, it loses the file system mount information. You can configure automatic mount in the **fstab** file to ensure that an ECS automatically mounts file systems when it restarts. For details, see **4.3 Mounting a File System Automatically**.

Table 4-1 Parameter description

Parameter	Description
vers	File system version. Only NFSv3 is supported currently, so the value is fixed to **3**.
timeo	Waiting time before the NFS client retransmits a request. The unit is 0.1 second. The recommended value is **600**.
resvport/ noresvport	Whether the confidential source port is used for server connection. By default, **resvport** indicates that the confidential port is used, and **noresvport** indicates that the confidential port is not used. This parameter is supported by Linux kernel 2.6.28 or later. You are advised to set this parameter to **noresvport**, which can tell NFS clients to use a TCP source port when reconnecting to the network, thereby ensuring the continuous availability of the SFS file system in the event of a network failure.
lock/nolock	Whether to lock files on the server using the NLM protocol. If **nolock** is selected, the lock is valid for applications on one host. For applications on another host, the lock is invalid. The recommended value is **nolock**. If this parameter is not specified, **lock** is selected by default. In this case, other servers cannot write data to the file system.
Mount point	The format for an SFS Turbo file system is *File system IP address*:/, for example, **192.168.0.0:/**.
Local path	Local path on the ECS, used to mount the file system, for example, **/local_path**.

For more mounting parameters for performance optimization during file system mounting, see **Table 4-2**. Use commas (,) to separate parameters. The following command is an example:

mount -t nfs -o vers=3,timeo=600,nolock,rsize=1048576,wsize=1048576,hard,retrans=3,noresvport,ro,async,noatime,nodiratime *Mount point Local path*

Table 4-2 Parameters for file system mounting

Parameter	Description
rsize	Maximum number of bytes that can be read from the server each time. The actual data is less than or equal to the value of this parameter. The value of **rsize** must be a positive integer that is a multiple of **1024**. If the entered value is smaller than **1024**, the value is automatically set to **4096**. If the entered value is greater than **1048576**, the value is automatically set to **1048576**. By default, the setting is performed after the negotiation between the server and the client. You are advised to set this parameter to the maximum value **1048576**.
wsize	Maximum number of bytes that can be written to the server each time. The actual data is less than or equal to the value of this parameter. The value of **wsize** must be a positive integer that is a multiple of **1024**. If the entered value is smaller than **1024**, the value is automatically set to **4096**. If the entered value is greater than **1048576**, the value is automatically set to **1048576**. By default, the setting is performed after the negotiation between the server and the client. You are advised to set this parameter to the maximum value **1048576**.
soft/hard	**soft** indicates that a file system is mounted in soft mount mode. In this mode, if an NFS request times out, the client returns an error to the invoking program. **hard** indicates that a file system is mounted in hard mount mode. In this mode, if the NFS request times out, the client continues to request until the request is successful. The default value is **hard**.
retrans	Number of retransmission times before the client returns an error.
ro/rw	• **ro**: indicates that the file system is mounted as read-only. • **rw**: indicates that the file system is mounted as read/write. The default value is **rw**. If this parameter is not specified, the file system will be mounted as read/write.

Parameter	Description
resvport/ noresvport	Whether the confidential source port is used for server connection. By default, **resvport** indicates that the confidential port is used, and **noresvport** indicates that the confidential port is not used. This parameter is supported by Linux kernel 2.6.28 or later. You are advised to set this parameter to **noresvport**, which can tell NFS clients to use a TCP source port when reconnecting to the network, thereby ensuring the continuous availability of the SFS file system in the event of a network failure.
sync/async	**sync** indicates that data is written to the server immediately. **async** indicates that data is first written to the cache before being written to the server. Synchronous write requires that an NFS server returns a success message only after all data is written to the server, which brings long latency. The recommended value is **async**.
noatime	If you do not need to record the file access time, set this parameter. This prevents overheads caused by access time modification during frequent access.
nodiratime	If you do not need to record the directory access time, set this parameter. This prevents overheads caused by access time modification during frequent access.

NOTE

You are advised to use the default values for the parameters without usage recommendations.

Step 6 Run the following command to view the mounted file system:

mount -l

If the command output contains the following information, the file system has been mounted.

Mount point on */local_path* type nfs (rw,vers=3,timeo=600,nolock,addr=)

Step 7 After the file system is mounted successfully, access the file system on the ECSs to read or write data.

If the mounting fails or times out, rectify the fault by referring to **Troubleshooting**.

NOTE

The maximum size of a file that can be written to an SFS Turbo file system is 32 TB, and that for an SFS Turbo Enhanced file system is 320 TB.

----End

4.2 Mounting an NFS File System to ECSs (Windows)

After creating a file system, you need to mount the file system to servers so that they can share the file system.

This section uses Windows Server 2012 as the example OS to describe how to mount an NFS file system. For other versions, perform the steps based on the actual situation.

In this section, ECSs are used as example servers. Operations on BMSs are the same as those on ECSs.

Prerequisites

- You have created a file system and have obtained the mount point of the file system.
- At least one ECS that belongs to the same VPC as the file system exists.

Procedure

Step 1 Log in to the management console using a cloud account.

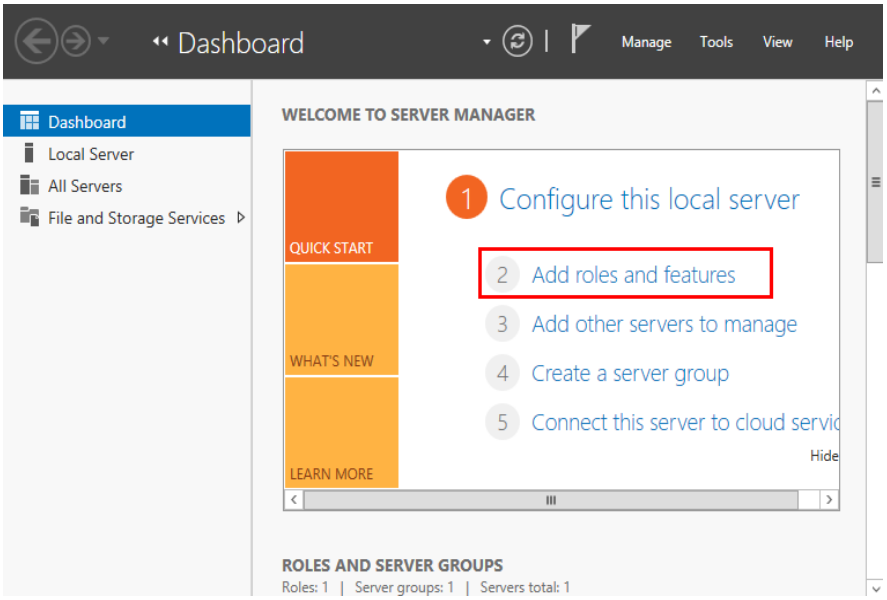
1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to switch to the ECS console.

Step 2 Go to the ECS console and log in to the ECS running Windows Server 2012.

Step 3 Install the NFS client.

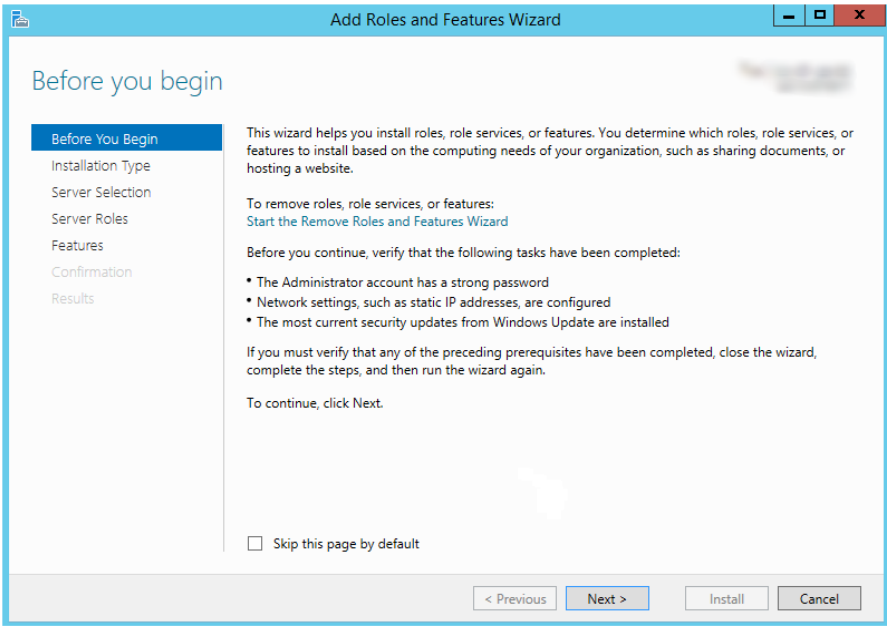
1. Click **Server Manager** in the lower left corner. The **Server Manager** window is displayed, as shown in **Figure 4-1**.

Figure 4-1 Server Manager



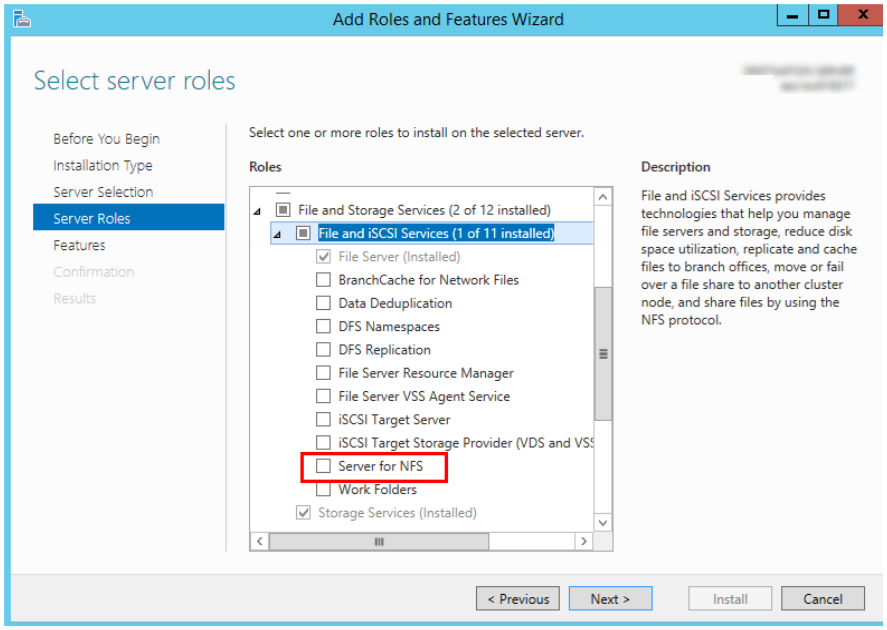
2. Click **Add Roles and Features**. See **Figure 4-2**.

Figure 4-2 Wizard for adding roles and features



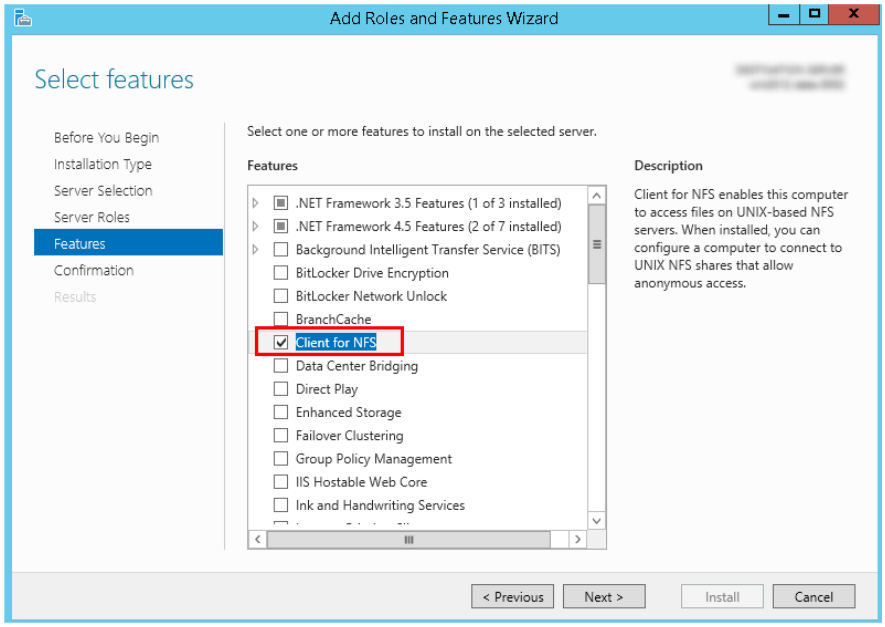
3. Click **Next** as prompted. On the **Server Roles** page, select **Server for NFS**, as shown in **Figure 4-3**.

Figure 4-3 Selecting the server for NFS



4. Click **Next**. In the **Features** page, select **Client for NFS** and click **Next**, as shown in **Figure 4-4**. Confirm the settings and then click **Install**. If you install the NFS client for the first time, after the installation is complete, restart the client and log in to the ECS again as prompted.

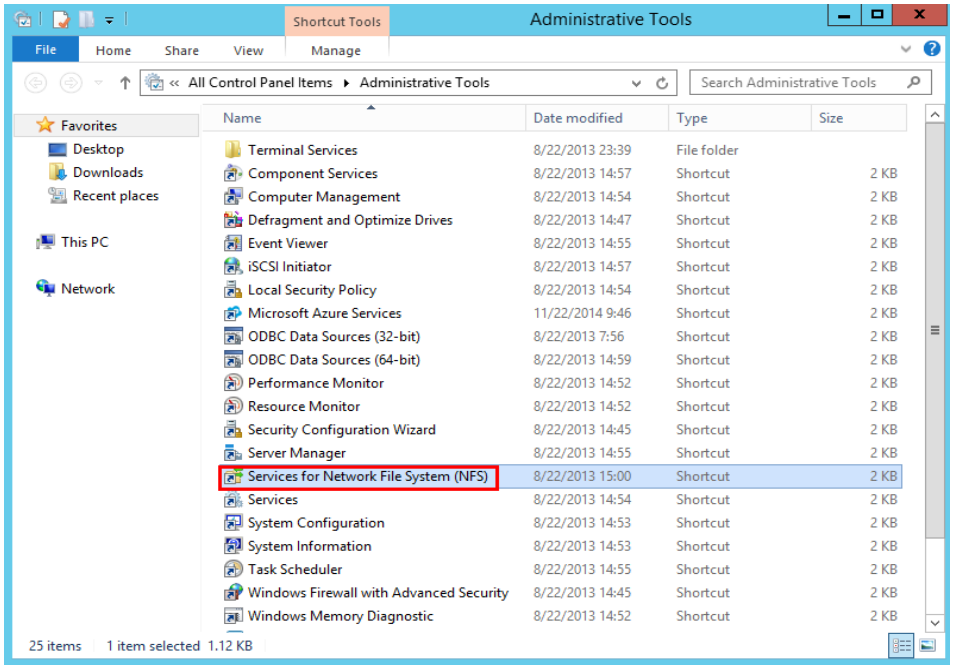
Figure 4-4 Selecting the NFS client



Step 4 Modify the NFS transfer protocol.

1. Choose **Control Panel > System and Security > Administrative Tools > Services for Network File System (NFS)**, as shown in **Figure 4-5**.

Figure 4-5 Administrative tools



2. Right-click **Client for NFS**, choose **Properties**, change the transport protocol to **TCP**, and select **Use hard mounts**, as shown in **Figure 4-6** and **Figure 4-7**.

Figure 4-6 Services for NFS

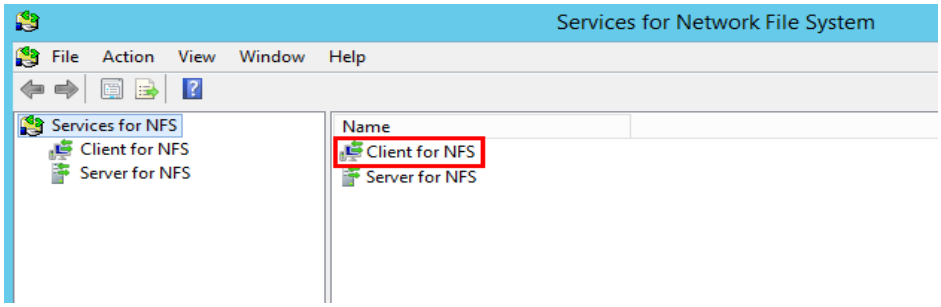
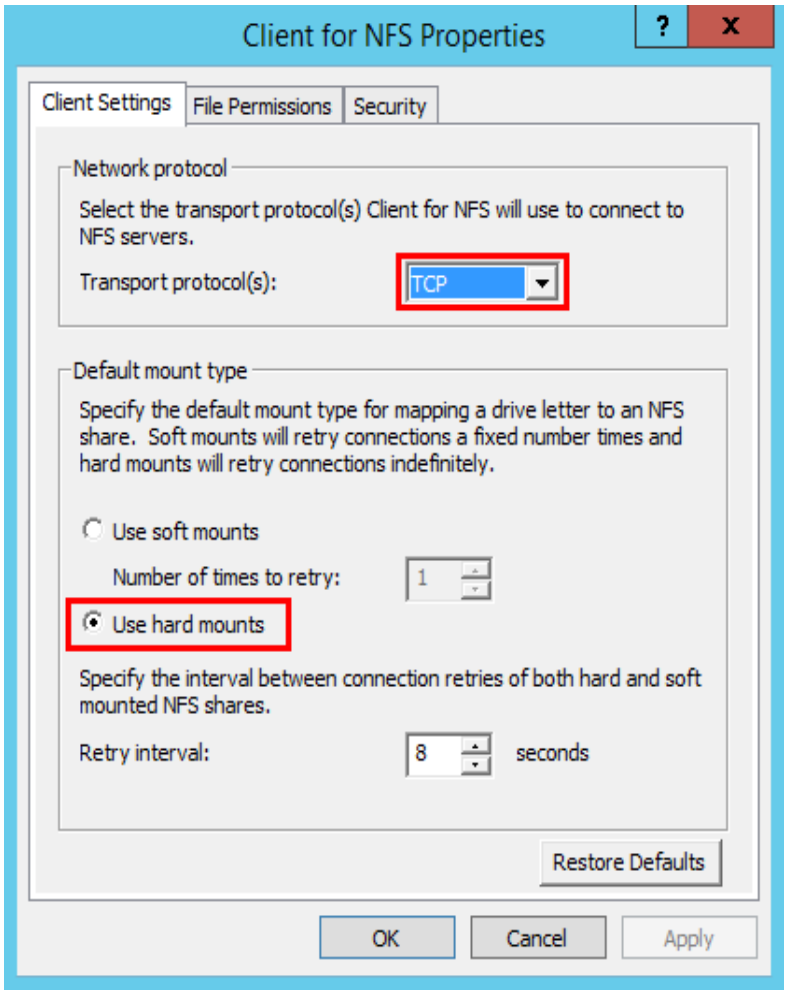


Figure 4-7 Client for NFS properties



Step 5 Run the following command in the Command Prompt of the Windows Server 2012 (**X** is the drive letter of the free disk). Select the ECS that belongs to the same VPC as the file system to mount the file system.

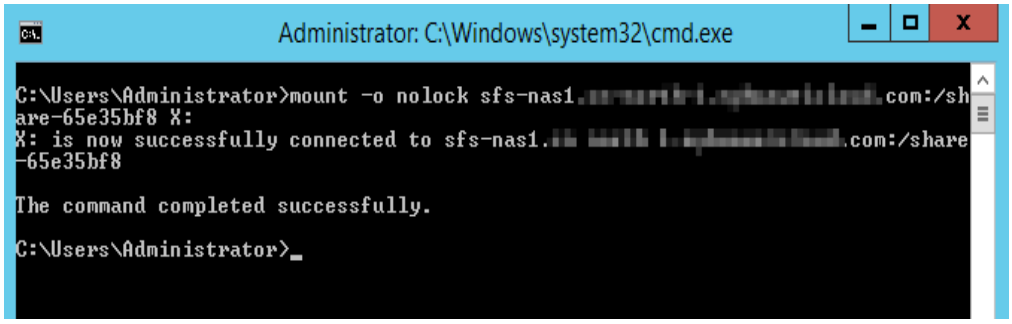
For SFS Turbo file systems: **mount -o nolock -o casesensitive=yes** *IP address*:**/! X:**

NOTE

- Free drive letter of the disk: A drive letter that is not in use, such as driver letter E or X.
- The mount point of an SFS Turbo file system is the root directory. **Ensure that an English exclamation mark (!) is added to the mount point**, for example, **127.0.0.1:/!**.
- **casesensitive=yes** indicates that file names are case sensitive during file search. If this parameter is not added, the performance of creating files in a large directory will deteriorate.

You can move the cursor to the mount point and click next to the mount point to copy the mount point. If the information shown in **Figure 4-8** is displayed, the mounting is successful.

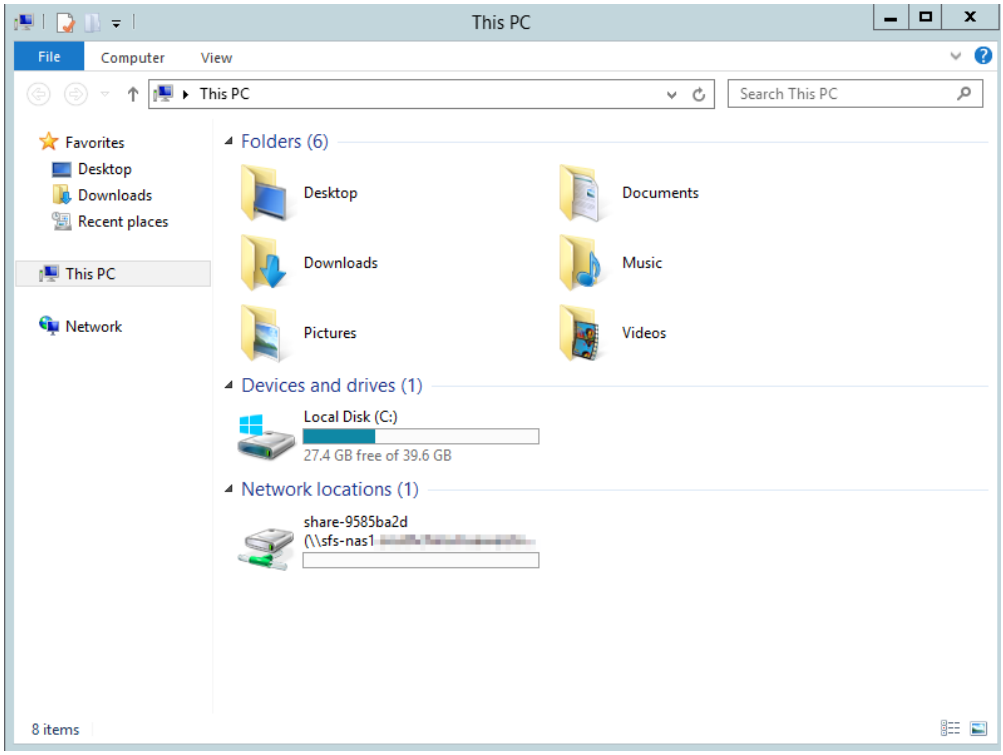
Figure 4-8 Running the command



Step 6 After the file system is mounted successfully, you can view the mounted file system on the **This PC** window, as shown in **Figure 4-9**.

If the mounting fails or times out, rectify the fault by referring to **Troubleshooting**.

Figure 4-9 Successful mounting



NOTE

To distinguish different file systems mounted on an ECS, you can rename file systems by right-clicking a file system and choose **Rename**.

----End

4.3 Mounting a File System Automatically

File system mounting information may be lost after a server is restarted. You can configure automatic mounting for the server to avoid the mounting information loss.

Restrictions

Because the service startup sequences in different operating systems vary, some servers running CentOS may not support the following automatic mounting schemes. In this case, manually mount the file system.

Procedure (Linux)

Step 1 Log in to the management console using a cloud account.

1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to switch to the ECS console.

Step 2 Log in to the ECS as user **root**.

Step 3 Run the **vi /etc/fstab** command to edit the **/etc/fstab** file.

At the end of the file, add the file system information, for example:

```
Mount point /local_path nfs vers=3,timeo=600,nolock 0 0
```

Replace *Mount point* and */local_path* with actual values. You can obtain the mount point from the **Mount Address** column of the file system. Each record in the **/etc/fstab** file corresponds to a mount. Each record has six fields, as described in **Field Description**.

NOTICE

For optimal system performance, configure file system information based on the previous example configuration. If needed, you can customize part of mount parameters. However, the customization may affect system performance.

Step 4 Press **Esc**, input **:wq**, and press **Enter** to save and exit.

After the preceding configurations are complete, the system reads mounting information from the **/etc/fstab** file to automatically mount the file system when the ECS restarts.

Step 5 (Optional) Run the following command to view the updated content of the **/etc/fstab** file:

cat /etc/fstab

Step 6 If the automatic mounting fails due to a network issue, add the **sleep** parameter and a time in front of the mounting command in the **rc.local** file, and mount the file system after the NFS service is started.

```
sleep 10s && sudo mount -t nfs -o vers=3,timeo=600,noresvport,nolock Mount point/local_path
```

----End

Field Description

Table 1 describes the mount fields.

Table 4-3 Field description

Field	Description
Mount point	Mount object, that is, the mount point of the file system to be mounted. Set this parameter to the mount point in the **mount** command that is used in **4.1 Mounting an NFS File System to ECSs (Linux)**.
/local_path	Mount point, that is, the directory created on the ECS for mounting the file system. Set this parameter to the local path in the **mount** command that is used in **4.1 Mounting an NFS File System to ECSs (Linux)**.
nfs	Mount type, that is, file system or partition type. Set it to **nfs**.

Field	Description
vers=3,timeo=600,nolock	Mount options, used to set mount parameters. Use commas (,) to separate between multiple options. • **vers**: file system version. The value **3** indicates NFSv3. • **timeo**: waiting time before the NFS client retransmits a request. The unit is 0.1 second. The recommended value is **600**. • **nolock**: specifies whether to lock files on the server using the NLM protocol.
0	Choose whether to back up file systems using the dump command. • **0**: not to back up file systems • An integer larger than 0: to back up file systems. A file system with a smaller integer is checked earlier than that with a larger integer.
0	Choose whether to check file systems using the fsck command when the ECS is starting and specify the sequence for checking file systems. • **0**: to check file systems • By default, this field is set to **1** for the root directory partition. Other partitions start from **2**, and a partition with a smaller integer is checked earlier than that with a larger integer.

Procedure (Windows)

Ensure that an NFS client has been installed on the target server before mounting. This section uses Windows Server 2012 as an example to describe how to mount a file system.

Step 1 Log in to the management console using a cloud account.

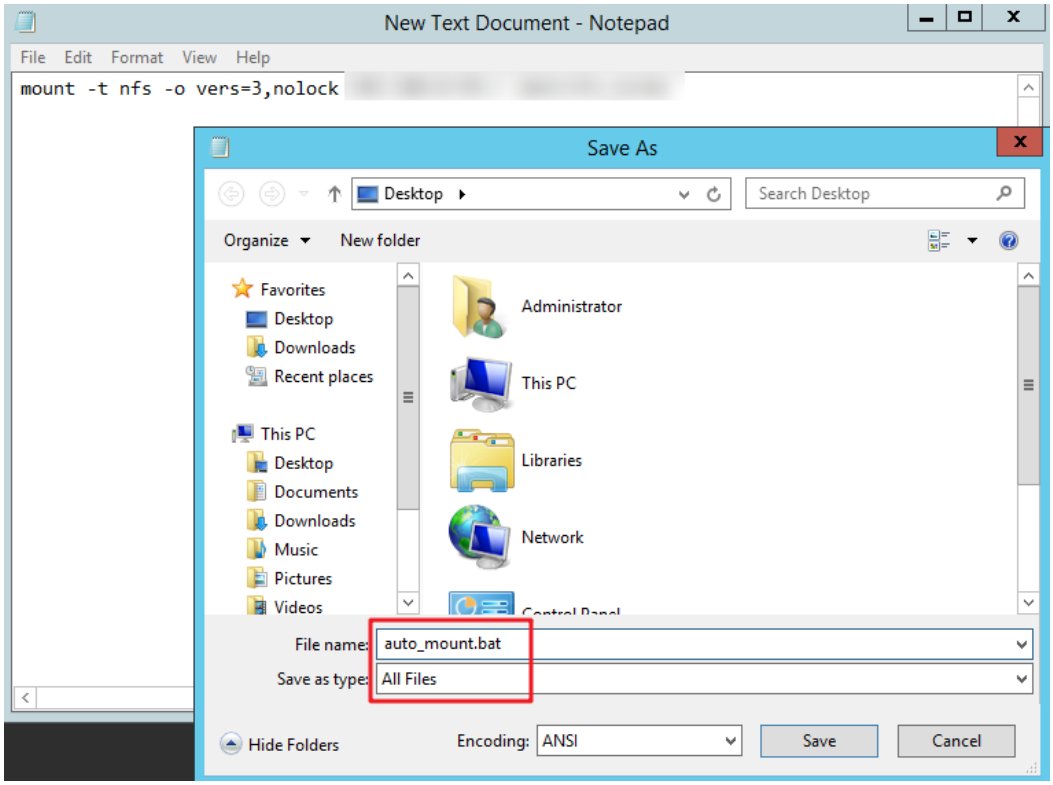
1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to switch to the ECS console.

Step 2 Log in to the ECS.

Step 3 Before mounting the file system, create a script named **auto_mount.bat**, save the script to a local host, and record the save path. The script contains the following content:

```
mount -o nolock mount point corresponding drive letter
```


Figure 4-10 Saving the script



For example, the **auto_mount.bat** script of a file system contains the following content:

For SFS Turbo file systems: **mount -o nolock -o casesensitive=yes** *IP address*:**/! X:**

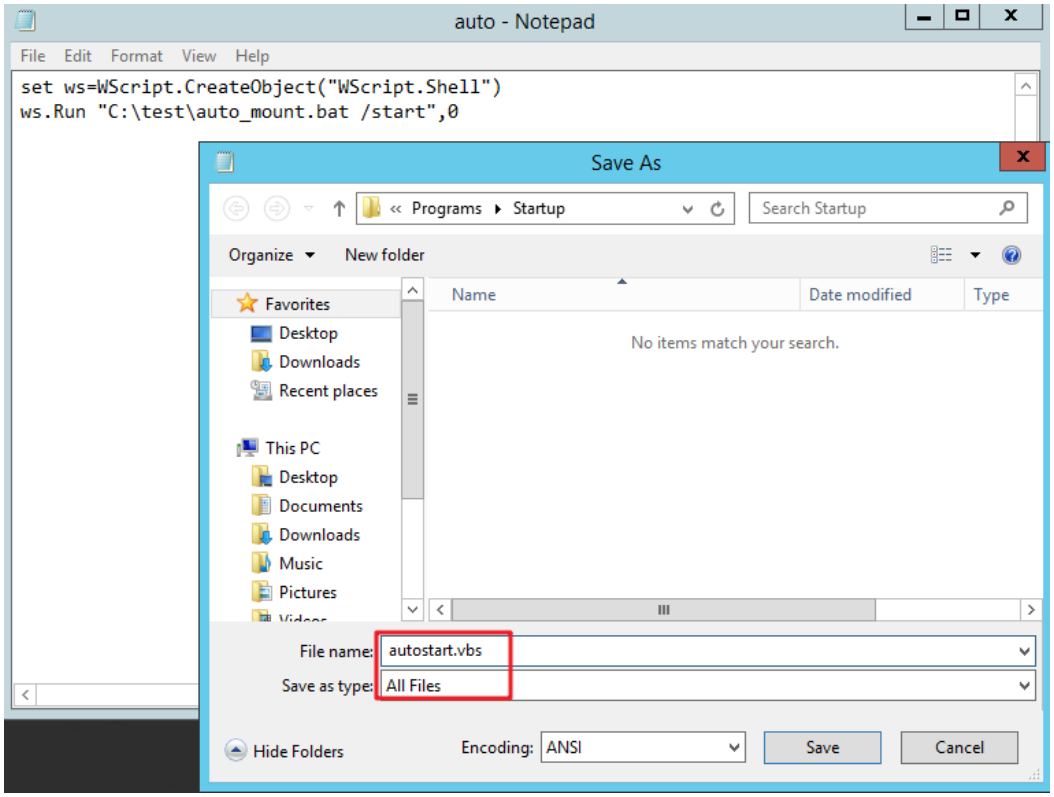
NOTE

- You can copy the mount command of the file system from the console.
- After the script is created, manually run the script in the Command Prompt to ensure that the script can be executed successfully. If you can view the file system in **This PC** after the script execution, the script can be executed properly.
- This .bat script cannot be stored in the same path in **Step 4** that stores the .vbs file. In this example, the .bat script is stored in **C:\test**.

Step 4 Create a .txt file whose name is *XXX*.**vbs** and save the file to the directory **C:\Users\Administrator\AppData\Roaming\Microsoft\Windows\Start Menu\Programs\Startup**. The file contains the following content:

```
set ws=WScript.CreateObject("WScript.Shell")
ws.Run "Local path and script name of the auto_mount.bat script /start", 0
```


Figure 4-11 Creating .vbs file



NOTE

In this example, the local path of the **auto_mount.bat** script is **C:\test**. Therefore, the content in the .vbs file is as follows:

```
set ws=WScript.CreateObject("WScript.Shell")
ws.Run "C:\test\auto_mount.bat /start",0
```

Step 5 After the task is created, you can restart the ECS and check whether the configuration is successful. After the configuration is successful, the file system automatically appears in **This PC**.

----End

5 Unmount a File System

If a file system is no longer used and needs to be deleted, you are advised to unmount the file system and then delete it.

Prerequisites

Before unmounting a file system, stop the process and read/write operations.

Linux OS

Step 1 Log in to the management console using a cloud account.

1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to go to the ECS console.

Step 2 Log in to the ECS.

Step 3 Run the following command:

umount *Local path*

Local path: An ECS local directory where the file system is mounted, for example, **/local_path**.

NOTE

Before running the **umount** command, stop all read and write operations related to the file system and exit from the local path. Or, the unmounting will fail.

----End

Windows OS

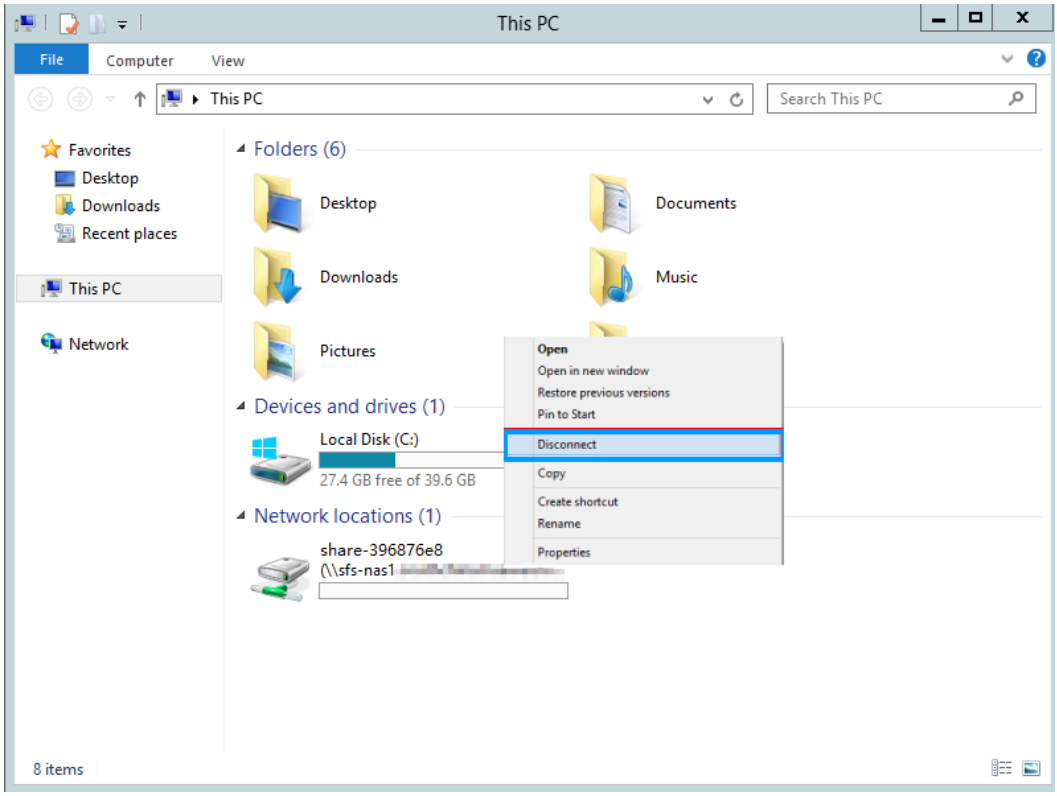
Step 1 Log in to the management console using a cloud account.

1. Log in to the management console and select a region and a project.
2. Under **Computing**, click **Elastic Cloud Server** to go to the ECS console.

Step 2 Log in to the ECS.

Step 3 Right-click the file system to be unmounted and choose **Disconnect**.

Figure 5-1 Unmounting



Step 4 If the file system disappears from the network location, it has been unmounted.

----End

6 Change History

Released On	Description
2023-07-27	This issue is the second official release, which incorporates the following change: Added descriptions about using SFS Turbo as the storage backend of CCE.
2022-09-30	This issue is the first official release.

