Scalable File Service

Getting Started

Issue 01

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Contents

1 Make Preparations

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

- **Registering a HUAWEI ID and Enabling Huawei Cloud Services**
- **Topping Up Your Account**
- **Creating an IAM User**

Registering a HUAWEI ID and Enabling Huawei Cloud Services

If you already have a HUAWEI ID, skip this part. To create a HUAWEI ID, do as follows:

1. Visit **www.huaweicloud.com/intl/en-us/** and click **Sign Up**.
2. On the displayed page, register an account as prompted.

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

Topping Up Your Account

Ensure that your account has sufficient balance.

For details about the SFS price, see **Price Details**.

For details about how to top up an account, see **Topping Up an Account**.

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.

2 Configure a VPC Endpoint

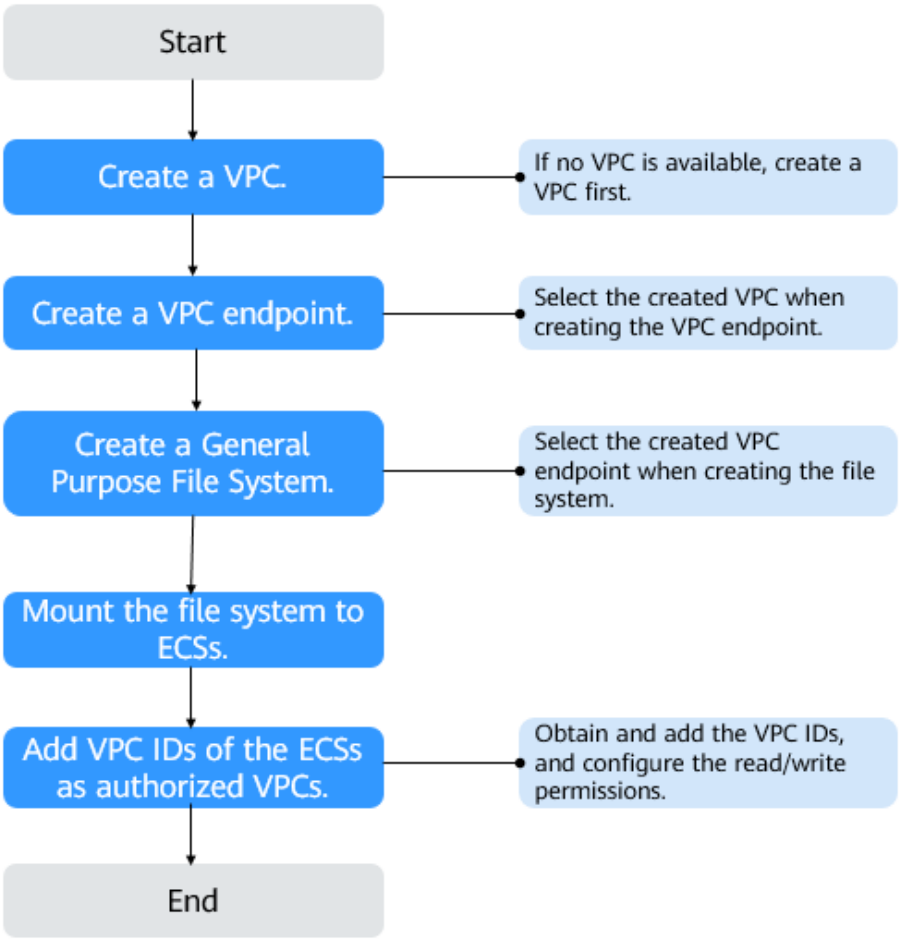
Context

VPC Endpoint (VPCEP) provides reliable channels to connect VPCs to general purpose file systems. By configuring VPC endpoints, compute resources in VPCs can access general purpose file systems. **What Is VPC Endpoint?**

Before mounting a general purpose file system to a compute resource, you need to create a VPC endpoint in the region where the compute resource belongs. VPC endpoints can be created for General Purpose File System in the following regions: CN North-Beijing4, CN East-Shanghai1, CN-Hong Kong, and CN South-Guangzhou. In the regions beside those ones, SFS Capacity-Oriented and SFS Turbo are recommended.

VPC endpoints are not required for SFS Capacity-Oriented and SFS Turbo file systems.

Figure 2-1 Configuration process



Prerequisites

1. Before creating a general purpose file system, ensure that a VPC is available.
   If no VPC is available, create one by referring to **Creating a VPC** in the *Virtual Private Cloud User Guide*.
2. Before creating a general purpose file system, ensure that ECSs are available and in the created VPC.
   If no ECSs are available, buy ECSs by referring to **Purchasing an ECS** and **Logging In to an ECS**.

Procedure

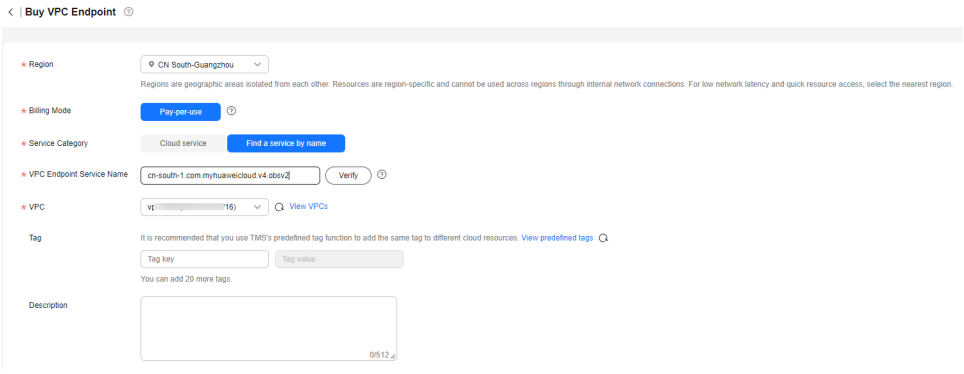
Step 1 Log in to the Huawei Cloud console.

1. Log in to the management console.
2. Click in the upper left corner and select your desired region and project.
3. Choose **Networking** > **VPC Endpoint** > **VPC Endpoints**.

Step 2 On the **VPC Endpoints** page, click **Buy VPC Endpoint**.

The **Buy VPC Endpoint** page is displayed.

Figure 2-2 Buy VPC Endpoint



Step 3 Set the parameters as prompted.

Table 2-1 Parameters for purchasing an endpoint

Parameter	Description
Region	Region where the VPC endpoint is located. Ensure that this region is the same as the one where the planned general purpose file system resides. VPC Endpoint supports General Purpose File System only in the CN North-Beijing4, CN East-Shanghai1, CN-Hong Kong, and CN South-Guangzhou regions.
Billing Mode	**Pay-per-use** is preselected by default, but you will not be billed for the endpoint purchased for general purpose file systems.

Parameter	Description
Service Category	Select **Find a service by name**. Enter a VPC endpoint service name based on the region selected. • If the CN North-Beijing4 region is selected, enter **cn-north-4.com.myhuaweicloud.v4.storage.lz13**. • If the CN South-Guangzhou region (AZ1) is selected, enter **cn-south-1.com.myhuaweicloud.v4.obsv2**. **NOTE** General purpose file systems created in AZ1 of the CN South-Guangzhou region cannot be mounted to containers. • If the CN South-Guangzhou region (AZ6) is selected, enter **cn-south-1.com.myhuaweicloud.v4.obsv2.storage.lz06**. • If the CN East-Shanghai1 region is selected, enter **cn-east-3.com.myhuaweicloud.v4.storage.lz07**. • If the CN-Hong Kong region is selected, enter **ap-southeast-1.com.myhuaweicloud.v4.obsv2.storage.lz005**. After entering the service name, click **Verify**. If **Service name found** is displayed, proceed with subsequent steps. If **Service name not found** is displayed, check whether the entered service name is correct. If the problem persists, **submit a service ticket**.
VPC	VPC where the planned general purpose file system and ECSs reside.
Tag	Optional VPC endpoint tags. Each tag consists of a key and a value. You can add a maximum of 10 tags to a VPC endpoint. Tag keys and values must meet the requirements listed in **Table 2-2**. **NOTE** • If a predefined tag has been created in TMS, you can select the corresponding tag key and value. For details about predefined tags, see **Predefined Tag Overview**.

Table 2-2 describes the tag parameters.

Table 2-2 Tag parameter description

Parameter	Description	Example Value
Tag key	Each tag has a unique key. You can customize the key or select the key of an existing tag created in TMS. A tag key: ● Can contain 1 to 36 Unicode characters. ● Can contain only letters, digits, hyphens (-), and underscores (_).	Key_0001
Tag value	A tag value can be repetitive or left blank. A tag value: ● Can contain 0 to 43 Unicode characters. ● Can contain only letters, digits, hyphens (-), and underscores (_).	Value_0001

Step 4 Click **Next**.

- If you do not need to modify the specifications, click **Submit**.
- If you need to modify the specifications, click **Previous**, modify the configuration as needed, and then click **Submit**.

Step 5 Go back to the VPC endpoint list and check whether the status of the VPC endpoint changes to **Accepted**. If so, the VPC endpoint has been connected to the VPC endpoint service.

----End

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. You can create three types of file systems: SFS Capacity-Oriented, SFS Turbo, and General Purpose File System.

Prerequisites

1. A VPC is available.

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

2. ECSs are available and are in the available VPC.

   If no ECSs are available, buy ECSs by referring to **Purchasing an ECS** and **Logging In to an ECS**.

3. Creating SFS Turbo file systems depends on the following services: VPC, Billing Center, DSS, and ECS. Ensure that required roles or policies have been configured.
   - The permissions of the **SFS Turbo FullAccess** policy already include the permissions of **VPC FullAccess**, which are required for creating file systems. An IAM user assigned the **SFS Turbo Full Access** policy does not need to have the **VPC FullAccess** policy assigned explicitly.
   - To create yearly/monthly file systems, the **BSS Administrator** policy is required.
   - To create file systems in dedicated projects, the **DSS FullAccess** and **ECS FullAccess** policies are required.

Logging In to the Management Console

Step 1 Visit the **Huawei Cloud website**.

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 **Sign Up**.
2. Complete the registration as instructed.

After the registration is complete, you will be redirected 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 **Sign In**.

Step 4 In the upper left corner of the page, select the region where the service is located from the drop-down list.

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

Step 6 (Recommended) Top up your account and subscribe to SFS, so that the service can be used properly. To purchase SFS, see **How Do I Purchase SFS?**

----End

Creating an SFS Capacity-Oriented File System

Step 1 In the upper right corner of the page, click **Create File System**.

Step 2 Set the parameters described in **Table 3-1**, as shown in **Figure 3-1**.

Figure 3-1 Creating a file system

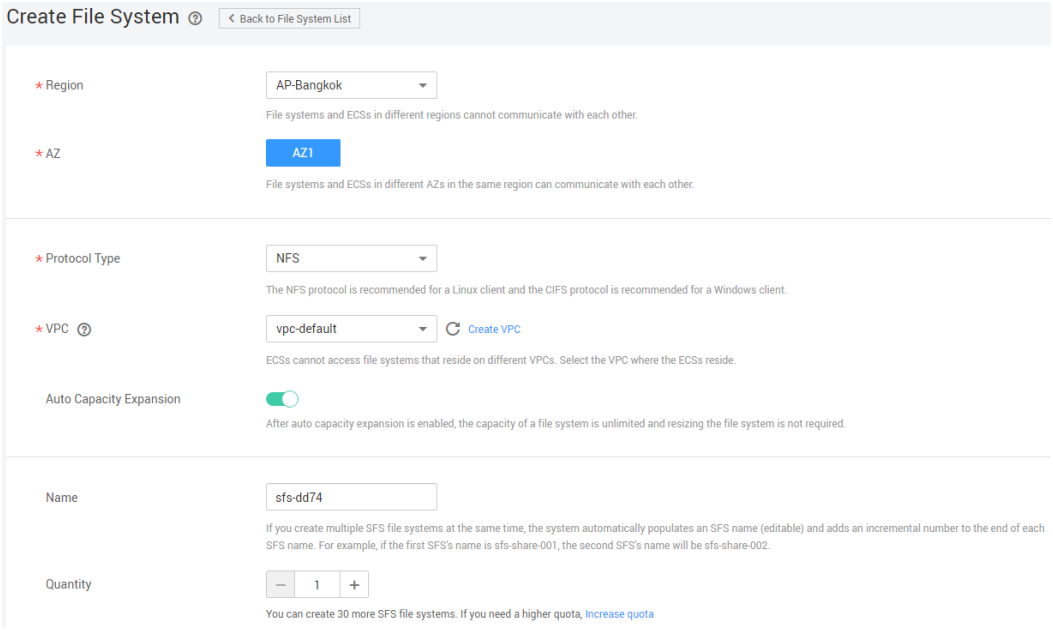


Table 3-1 Parameter description

Parameter	Description	Remarks
File System Type	Select **SFS Capacity-Oriented** or **SFS Turbo**.	Select **SFS Capacity-Oriented**.

Parameter	Description	Remarks
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 region where the ECSs reside.
AZ	A geographical area with an independent network and an independent power supply.	You are advised to select the AZ where the ECSs reside.
Protocol Type	The supported protocols include NFS (NFSv3 only) and CIFS. NFS is suitable for Linux ECSs, and CIFS is suitable for Windows ECSs.	Select **NFS** or **CIFS** based on your need.
VPC	An ECS cannot access file systems in a different VPC. Select the VPC to which the ECS belongs. **NOTE** • By default, all ECSs in a VPC have the same permissions. You can modify the VPC in the future. • Only one VPC can be added when a file system is created. After a file system is created, you can add multiple authorized VPCs for the file system by referring to **Configuring Multi-VPC Access**.	Click **View VPC** to view existing VPCs or create a new one.
Maximum Capacity	Maximum capacity allowed for 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 value ranges from **1 GB** to **512,000 GB**.

Parameter	Description	Remarks
Encryption	Optional Specifies whether a file system is encrypted. You can create an encrypted or non-encrypted file system, but you cannot change the encryption settings of an existing file system. If **Encryption** is selected, the following parameters will be displayed: • **Create Agency** If the KMS access rights are not granted to SFS Capacity-Oriented, this button will be displayed. Otherwise, this button will not be displayed. Click **Create Agency** to grant SFS Capacity-Oriented the permissions to access KMS. The system automatically creates an agency and names it **SFSAccessKMS**. When **SFSAccessKMS** is displayed for **Agency Name**, the KMS access rights have been granted to SFS Capacity-Oriented, and SFS Capacity-Oriented can obtain KMS keys for encrypting or decrypting the file system. After the rights are granted, follow-up operations do not need granting rights again. • **Agency Name** – Agency: An agency is a trust relationship between two tenants or services. A tenant can create an agency to grant resource access rights to another tenant or service. – SFSAccessKMS: If **Agency Name** is **SFSAccessKMS**, SFS Capacity-Oriented is granted the KMS access rights to use custom keys to encrypt or decrypt file systems. • **KMS key name** **NOTE** **KMS key name** is displayed only after the agency named **SFSAccessKMS** has been created. For details, see **Create Agency** above. **KMS key name** is the identifier of the key, and you can use **KMS key name** to specify the KMS key that is	-

Parameter	Description	Remarks
	to be used for encryption. You can select one of the following keys: – **Default key**: After the KMS access rights have been granted to SFS Capacity-Oriented, the system automatically creates a default key and names it **sfs/default**. – **Custom key**: Existing or newly created custom keys. For details, see **Creating a Custom Key** in the *Data Encryption Workshop User Guide*. **NOTE** Before you use the encryption function, the KMS access rights must be granted to SFS Capacity-Oriented. If you have the right to grant the permission, grant SFS the permissions to access KMS directly. Otherwise, you need to contact the system administrator to obtain the "Security Administrator" rights first. For details, see **File System Encryption**.	
Name	User-defined name of the file system. If you create more than one file system at a time, a name suffix is added to each file system name automatically. For example, if you set the name to **sfs-name** for two new file systems, the two file system names will be **sfs-name-001** and **sfs-name-002**.	The name can contain only letters, digits, underscores (_), and hyphens (-). When creating one file system, enter a maximum of 255 characters. When creating multiple file systems, enter 1 to 251 characters.

Parameter	Description	Remarks
Quantity	Number of file systems to be created	Each cloud account can have a total of 512,000 GB for its file systems and a maximum of 10 file systems created, one by one or in a batch. If the quantity or total capacity of the file systems you are creating exceeds the upper limit, click **Increase quota** to apply for a higher quota.

Step 3 Click **Create Now**.

Step 4 Confirm the file system information and click **Submit**.

Step 5 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

Creating a General Purpose File System

Step 1 In the upper right corner of the page, click **Create File System**.

Step 2 Set the parameters as shown in **Figure 3-2**. **Table 3-2** describes the parameters.

Figure 3-2 Creating a file system

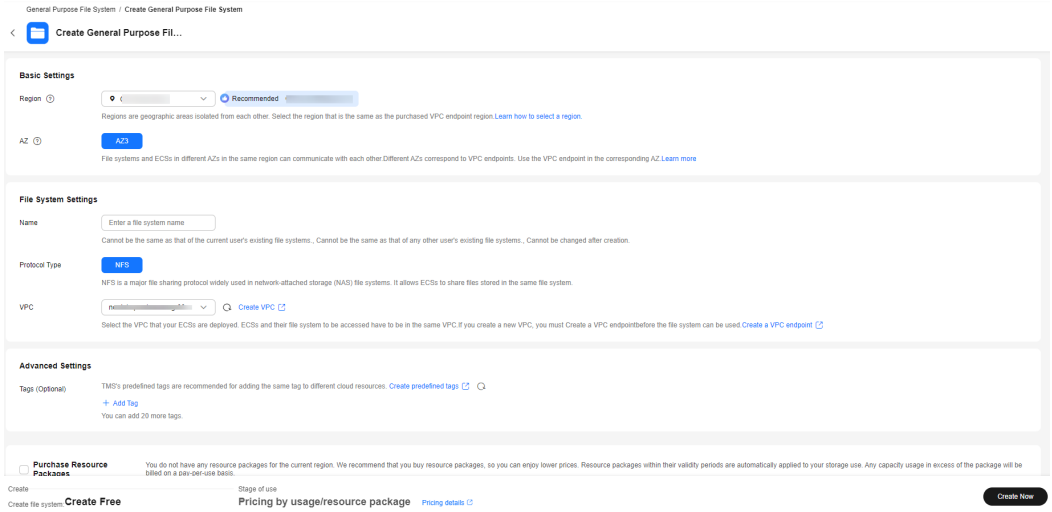


Table 3-2 Parameter description

Parameter	Description	Remarks
Region	Mandatory Region of the tenant. Select the region from the drop-down list in the upper left corner of the page.	Select the region where the ECSs and VPC endpoint reside.
AZ	A geographical area with an independent network and an independent power supply.	You are advised to select the AZ where the ECSs reside.
Name	User-defined name of the file system. Must be globally unique. It cannot be the same as the name of any existing general purpose file system, including one created by the current user or any other user. And it cannot be changed after the file system is created. If a general purpose file system is deleted, you can only create a general purpose file system with the same name as the deleted one 30 minutes after that file system has been deleted.	The name can contain only letters, digits, underscores (_), and hyphens (-). When creating one file system, enter a maximum of 255 characters. When creating multiple file systems, enter 1 to 251 characters.
Protocol Type	Only NFSv3 is supported currently.	-
VPC	Select the IAM project to which the target VPC belongs and then select the target VPC. **What Is an IAM Project?** Select the VPC where the ECSs and VPC endpoint reside. An ECS cannot access a file system belonged to a different VPC. Select the VPC where your ECSs reside. You can add authorized VPCs later on the file system details page.	-

Parameter	Description	Remarks
Tag	Optional When creating a file system, you can add tags to it. Tags help you identify file systems, and you can classify and search for file systems by tag. Tags are composed of key-value pairs. • Key: mandatory. A tag key can contain a maximum of 128 characters. It can contain letters, digits, and spaces representable in UTF-8 and special characters (_.:=+-@). It cannot start or end with a space and cannot be left empty. Tag keys starting with **_sys_** are system tags, and you cannot start a tag key with **_sys_**. • Value: optional. A tag value can contain a maximum of 255 characters. It can contain letters, digits, and spaces representable in UTF-8 and special characters (_.:=+-@) and can be left empty. It cannot start or end with a space.	• You can add a maximum of 20 tags to a file system. • The tag keys of the same file system must be unique. • Except for tagging the file system during file system creation, you can also add, modify, or delete tags for existing file systems.
Purchase Resource Packages	Optional You can select this parameter and then a desired resource package. The resource package takes effect immediately after payment. For details about resource packages, see **Resource Packages**.	A resource package can only be used to pay for the storage capacity used by general purpose file systems in the same region. Any usage in excess of the package quota will be billed in the pay-per-use mode. Only available in the CN-Hong Kong region.

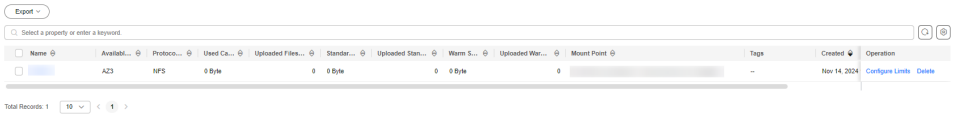
Step 3 Click **Create Now**.

Step 4 Confirm the file system information and click **Submit**.

Step 5 Go back to the file system list.

If the file system is displayed in the list, it is successfully created. If the file system status is **Creation failed**, **submit a service ticket**.

Figure 3-3 General purpose file system created



----End

Creating an SFS Turbo File System

Step 1 In the navigation pane on the left, choose **SFS Turbo**. In the upper right corner of the page, click **Create File System**.

Step 2 Set the parameters, as shown in **Figure 3-4**. **Table 3-3** describes the parameters.

Figure 3-4 Creating an SFS Turbo file system

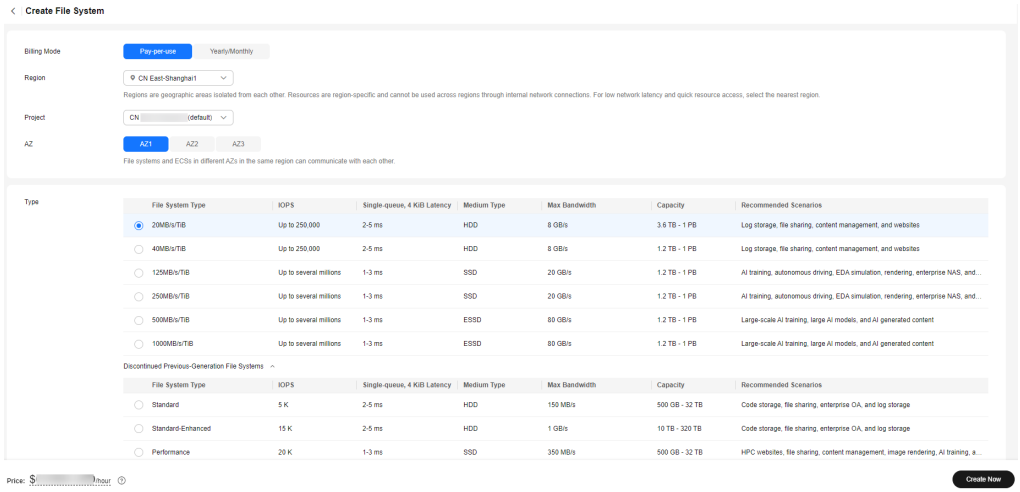


Table 3-3 Parameter description

Parameter	Description	Remarks
Billing Mode	Mandatory Select a billing mode, **Yearly/ Monthly** or **Pay per use**. For details about the billing standards, see **Price Details**.	-
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 region where the servers reside.

Parameter	Description	Remarks
AZ	Mandatory A geographical area with an independent network and an independent power supply.	There is certain performance loss when a file system is accessed from a different AZ. You are advised to select the AZ where your servers reside.
Type	Mandatory Includes SFS Turbo Standard and SFS Turbo Performance. For more information, see **File System Types**.	Select **Standard**. **NOTE** After a file system is created, its flavor cannot be changed. If you want to change the flavor, you need to create another file system. Plan the file system flavor in advance.
Capacity	Maximum capacity allowed for 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 range: • SFS Turbo Standard: 500 GB to 32 TB • SFS Turbo Performance: 500 GB to 32 TB
Protocol Type	Mandatory SFS Turbo supports NFS for file system access.	The default value is **NFS**.

Parameter	Description	Remarks
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 a unique IP address range in a VPC. A subnet provides dedicated network resources that are logically isolated from other networks for network security. **NOTE** To achieve the optimal network performance, select the VPC where your cloud servers reside. You can also use VPC peering connections to connect two or more VPCs to share files between VPCs. When a file system is accessed across VPCs, the latency as well as the bandwidth and IOPS loss may be high. Therefore, intra-VPC access is recommended. For details about VPC peering connections, see **VPC Peering Connection**.	-

Parameter	Description	Remarks
Security Group	Mandatory A security group functions as a virtual firewall and provides secure network access control policies for file systems. You can define access rules for a security group to protect the file systems in 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 normal access and use of an SFS Turbo file system are affected by the rules configured for its security group. For details about how to configure a security group rule, see **Adding a Security Group Rule**. After an SFS Turbo file system is created, the system automatically enables the security group ports required by the NFS protocol. This ensures that the SFS Turbo file system can be successfully mounted to your servers. The inbound ports required by the NFS protocol are ports 111, 2049, 2051, 2052, and 20048. If you need to change the enabled ports, go to the VPC console, choose **Access Control** > **Security Groups**, locate the target security group, and change the ports.	-

Parameter	Description	Remarks
Encryption	Optional Specifies whether a file system is encrypted. You can create an encrypted or non-encrypted file system, but you cannot change the encryption settings of an existing file system. If **Encryption** is selected, the following parameters will be displayed: • **KMS key name** **KMS key name** is the identifier of the key, and you can use **KMS key name** to specify the KMS key that is to be used for encryption. Select an existing key from the drop-down list, or click **View KMS List** to create a new key. For details, see **Creating a CMK** in the *Data Encryption Workshop User Guide*. • **KMS key ID** After you select a key name, the system automatically generates a key ID.	-

Parameter	Description	Remarks
Tag	Optional When creating a file system, you can add tags to it. Tags help you identify file systems, and you can classify and search for file systems by tag. Tags are composed of key-value pairs. ● Key: Mandatory if the file system is going to be tagged. A tag key can contain a maximum of 36 characters. It cannot start or end with spaces or start with _**sys**_. It can contain letters, digits, spaces, and the following characters: _.:=+-@ ● Value: Optional if the file system is going to be tagged. It can be an empty character string. A tag value can contain a maximum of 43 characters. It cannot start or end with spaces. It can contain letters, digits, spaces, and the following characters: _.:/=+-@ **NOTE** – You can add a maximum of 20 tags to a file system. – The tag keys of the same file system must be unique. – Except for tagging the file system during file system creation, you can also add, modify, or delete tags for existing file systems. – If your organization has enabled the tag policy type for SFS and has a tag policy attached, you must comply with the tag policy rules when creating file systems, otherwise file systems may fail to be created. Contact the organization administrator to learn more about tag policies.	-

Parameter	Description	Remarks
Automatic Backup	Cloud Backup and Recovery (CBR) provides backup protection for SFS Turbo and allows you to use backup data to create SFS Turbo file systems. After you configure backup, the system will associate the SFS Turbo file system with the backup vault and apply the selected policy to the vault to periodically back up the file system. The following options are available, among which the default value is **Do not use**: ● **Buy new**: 1. Enter a vault name, which can contain a maximum of 64 characters, including letters, digits, underscores (_), and hyphens (-), for example, **vault-f61e**. The default naming rule is **vault**_*xxxx*. 2. Enter a vault capacity, which is required for backing up SFS Turbo file systems. The vault capacity cannot be less than the size of file systems, so enter a value ranging from the total size of the associated file systems to 10,485,760 in the unit of GB. 3. Select a backup policy from the drop-down list, or log in to the CBR console and configure a desired one. ● **Use existing**: 1. Select an existing backup vault from the drop-down list. 2. Select a backup policy from the drop-down list, or log in to the CBR console and configure a desired one. ● **Do not use**: Skip this configuration if backup is not required. If you need backup	-

Parameter	Description	Remarks
	protection after a file system has been purchased, log in to the CBR console, locate the desired vault, and associate the file system with the vault.	
Name	Mandatory User-defined name of the file system.	The name can contain only letters, digits, and hyphens (-). It must contain more than four characters but no more than 64 characters.

Step 3 Click **Create Now**.

Step 4 Confirm the file system information and click **Submit**.

Step 5 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 it to ECSs so that they can share the file system.

CIFS file systems cannot be mounted to Linux ECSs.

An SFS Capacity-Oriented file system can use either the NFS or CIFS protocol. It cannot use both protocols.

In this section, ECSs are used as example servers. Operations on BMSs and containers (CCE) are the same as those on ECSs.

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

General purpose file systems cannot be mounted to 32-bit Linux servers.

Prerequisites

- You have checked the type of the OS on each ECS. Different OSs use different commands to install the NFS client.
- You have created a file system and have obtained its mount point.
- At least one ECS that is in the same VPC as the file system is available.
- The IP address of the DNS server for resolving the file system domain name has been configured on the ECSs. SFS Turbo file systems do not require domain name resolution.
- If you are mounting a general purpose file system, ensure that a VPC endpoint has been created according to **Configure a VPC Endpoint**.

Notes and Constraints

NOTE

This constraint only applies to local paths (mount points) and does not affect other files or directories.

Metadata of the local paths (mount points) cannot be modified. Specifically, the following operations cannot be performed on the local paths' metadata:

- **touch**: Update file access time and modification time.
- **rm**: Delete files or directories.
- **cp**: Replicate files or directories.
- **mv**: Move files or directories.
- **rename**: Rename files or directories.
- **chmod**: Modify permissions on files or directories.
- **chown**: Change the owners of files or directories.
- **chgrp**: Change the group of a file or directory.
- **ln**: Create hard links.
- **link**: Create hard links.
- **unlink**: Delete hard links.

The **atime**, **ctime**, and **mtime** attributes of a local path (root directory of the mount point) are the current time. So each time the root directory attribute is queried, the current time of the server is returned.

Procedure

Step 1 Log in to the ECS as user **root**.

Step 2 Install the NFS client.

1. **Install the NFS client.**
   a. Check whether the NFS software package is installed.
      - On CentOS, Red Hat, Oracle Enterprise Linux, SUSE, EulerOS, Fedora, or OpenSUSE, run the following command:

        rpm -qa|grep nfs
      - On Debian or Ubuntu, run the following command:

        dpkg -l nfs-common

      If a command output similar to the following is displayed, the NFS software package has been installed and you can go to **Step 3**. If no such command output is displayed, go to **Step 2.1.b**.

      - On CentOS, Red Hat, EulerOS, Fedora, or Oracle Enterprise Linux, the command output is as follows:
        ```
        libnfsidmap
        nfs-utils
        ```
      - On SUSE or OpenSUSE, the command output is as follows:
        ```
        nfsidmap
        nfs-client
        ```
      - On Debian or Ubuntu, the command output is as follows:
        ```
        nfs-common
        ```


b. 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, run the following command:

  sudo yum -y install nfs-utils

- On Debian or Ubuntu, run the following command:

  sudo apt-get install nfs-common

- On SUSE or OpenSUSE, run the following command:

  zypper install nfs-client

Step 3 Check whether the domain name in the file system mount point can be resolved. SFS Turbo file systems do not require domain name resolution. Skip this step and directly mount the file system.

nslookup *File system domain name*

NOTE

- A file system domain name (for example, **sfs-nas1.***xxxx***.com**) is just part of its mount point. Enter the domain name here, not the entire mount point.
- If the **nslookup** command cannot be used, install the **bind-utils** software package by running the **yum install bind-utils** command.

- If the domain name can be resolved, go to **Step 4**.
- If the domain name cannot be resolved, configure the DNS server IP address and then mount the file system. For details, see **Configuring DNS**.

Step 4 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 Mount the file system to the ECS that belongs to the same VPC as the file system. You can now mount the file system to Linux ECSs using NFSv3 only.

Table 4-1 describes the variables.

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

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*

To mount a general purpose file system, run the following command: **mount -t nfs -o vers=3,timeo=600,noresvport,nolock,proto=tcp** *Mount point Local path*

NOTICE

After a mounted ECS is restarted, it loses the file system mount information. You can configure auto mount in the **fstab** file to ensure that an ECS automatically mounts the file system when it restarts. For details, see **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**.
noresvport	Whether the NFS client uses a new TCP port when it re-establishes a network connection to the NFS server. It is strongly recommended that you use the **noresvport** option, which ensures that your file system remains uninterrupted after a network reconnection or recovery.
lock/nolock	Whether to use the NLM protocol to lock files on the server. If **nolock** is specified, the lock is valid only for applications on the same host. It is invalid for applications on any other hosts. The recommended value is **nolock**. If this parameter is not specified, **lock** is used by default. In this case, other servers cannot write data to the file system. SFS Turbo and General Purpose File System do not support operations of non-local locks. If a client uses a non-local lock, it will experience slow writes due to the failure to obtain the lock. In this case, the **nolock** option needs to be specified to avoid such issues.
proto	Protocol used by NFS clients to send requests to the server. Both UDP and TCP protocols can be used. General Purpose File System does not support UDP. Therefore, you need to set **proto** to **tcp** for general purpose file systems.

Parameter	Description
Mount point	For an SFS Capacity-Oriented file system, the format is *File system domain name*:/*Path*, for example, **example.com:/share-***xxx*. For an SFS Turbo file system, the format is *File system IP address*:/, for example, **192.168.0.0:/**. For a general purpose file system, the format is *File system domain name*:/*File system name*, for example, **example.com:/***xxx*. See **Figure 4-1**. **NOTE** • Variable *x* is a digit or letter. • If the mount point is too long to display completely, adjust the column width. • Hover the mouse over the mount point to display the complete **mount** command.
Local path	Local path on the ECS used to mount the file system, for example, **/local_path**.

Figure 4-1 Mount point

For more performance optimization mount options, 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,tcp,noresvport,ro,async,noatime,nodiratime *Mount point Local path*

Table 4-2 Mount options for performance optimization

Parameter	Description
rsize	Maximum number of bytes in each read request that the client can receive when reading data from a file on the server. The actual data size is less than or equal to this parameter setting. The value of **rsize** must be a positive integral multiple of **1024**. Specified values less than **1024** are automatically replaced with **4096**, and values greater than **1048576** are automatically replaced with **1048576**. By default, this parameter is set through a negotiation between the server and the client. You are advised to set this parameter to the maximum value **1048576**.

Parameter	Description
wsize	Maximum number of bytes in each write request that the client can send when writing data to a file on the server. The actual data size is less than or equal to this parameter setting. The value of **wsize** must be a positive integral multiple of **1024**. Specified values less than **1024** are automatically replaced with **4096**, and values greater than **1048576** are automatically replaced with **1048576**. By default, this parameter is set through a negotiation between the server and the client. You are advised to set this parameter to the maximum value **1048576**.
soft/hard	Value **soft** indicates soft mounts. With **soft** specified, if an NFS request times out, the client returns an error to the calling program. Value **hard** indicates hard mounts. With **hard** specified, if an 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. Recommended value: **1**
tcp/udp	If **mountproto** is not specified, the client will mount the file system using UDP first. If the UDP network is not connected, the client will mount the file system using TCP after freezing for several seconds. The UDP port used for mounting is currently not enabled in the inbound rule of the security group, so you need to specify **tcp** when mounting the file system.
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.
noresvport	Whether the NFS client uses a new TCP port when it re-establishes a network connection to the NFS server. It is strongly recommended that you use the **noresvport** option, which ensures that your file system remains uninterrupted after a network reconnection or recovery.
sync/async	Value **sync** indicates that data is written to the server immediately. Value **async** indicates that data is first written to the cache and then to the server. Value **async** is recommended. Synchronous writes require that an NFS server returns a success message after all data is written to the server, which brings long latency.

Parameter	Description
noatime	If you do not need to record the file access time, set this parameter. This prevents overheads caused by frequent access to modify the time.
nodiratime	If you do not need to record the directory access time, set this parameter. This prevents overheads caused by frequent access to modify the time.

NOTE

You are advised to use the default values for the parameters with no usage recommendations provided.

Step 6 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 mount 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 Capacity-Oriented file system is 240 TB.

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 it to ECSs 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.

An SFS Capacity-Oriented file system can use either the NFS or CIFS protocol. It cannot use both protocols.

In this section, ECSs are used as example servers. Operations on BMSs and containers (CCE) are the same as those on ECSs.

Prerequisites

- You have created a file system and have obtained its mount point.
- At least one ECS that is in the same VPC as the file system is available.
- The IP address of the DNS server for resolving the file system domain name has been configured on the ECSs. For details, see **Configuring DNS**.

Notes and Constraints

You are advised to use CIFS file systems in Windows OS.

SFS Turbo file systems cannot be mounted to Windows ECSs.

General purpose file systems cannot be mounted to Windows ECSs.

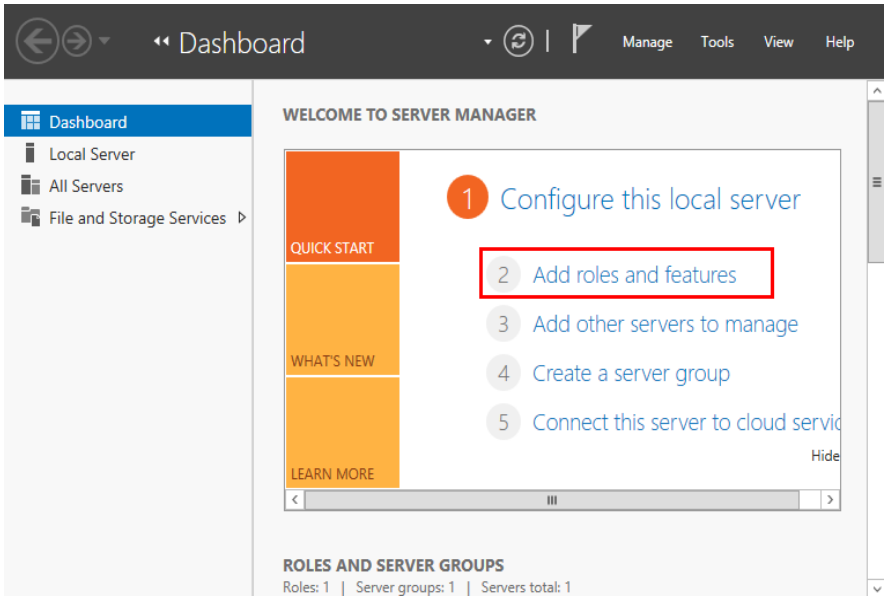
Procedure

Step 1 Go to the ECS console and log in to the ECS running Windows Server 2012.

Step 2 Install the NFS client.

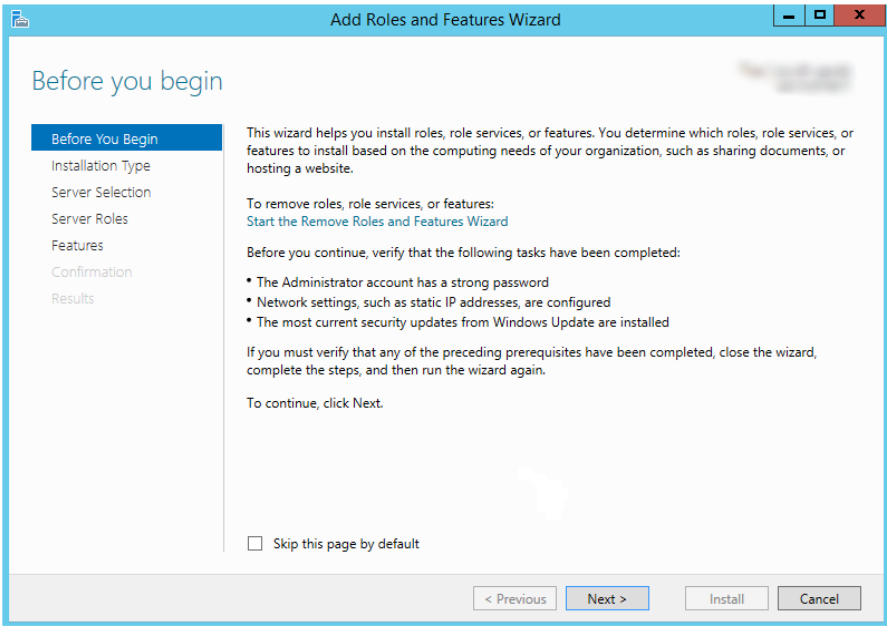
1. Click **Server Manager** in the lower left corner to open **Server Manager**, as shown in **Figure 4-2**.

   Figure 4-2 Server Manager

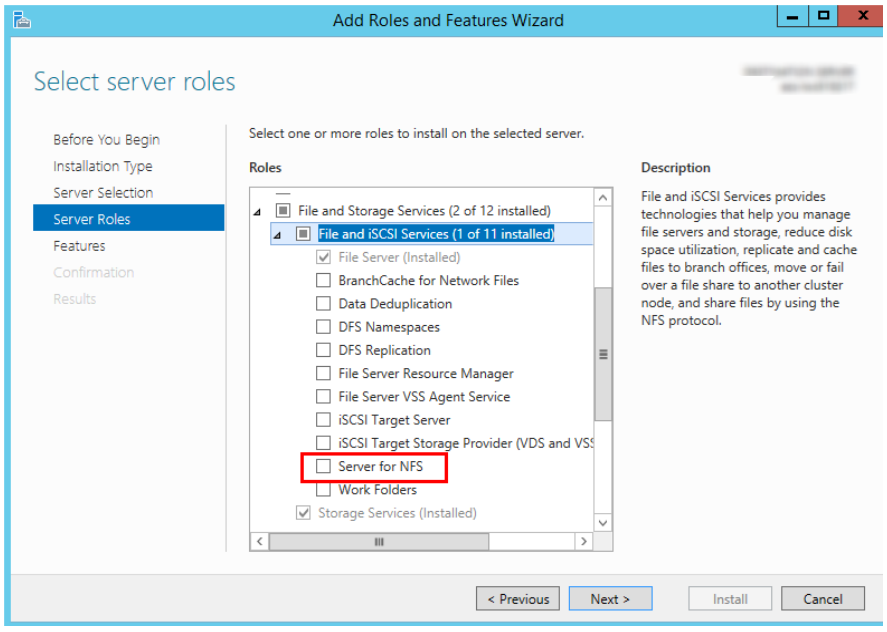
2. Click **Add roles and features**.

Figure 4-3 Wizard for adding roles and features



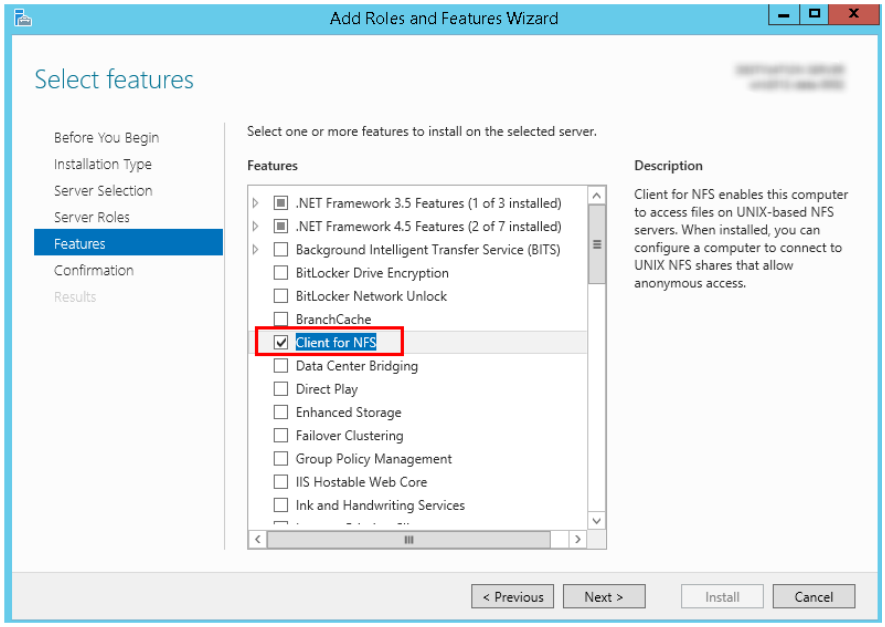
3. Click **Next** as prompted. On the **Server Roles** page, select **Server for NFS**.

Figure 4-4 Selecting Server for NFS



4. Click **Next**. On the **Features** page, select **Client for NFS** and click **Next**. 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.

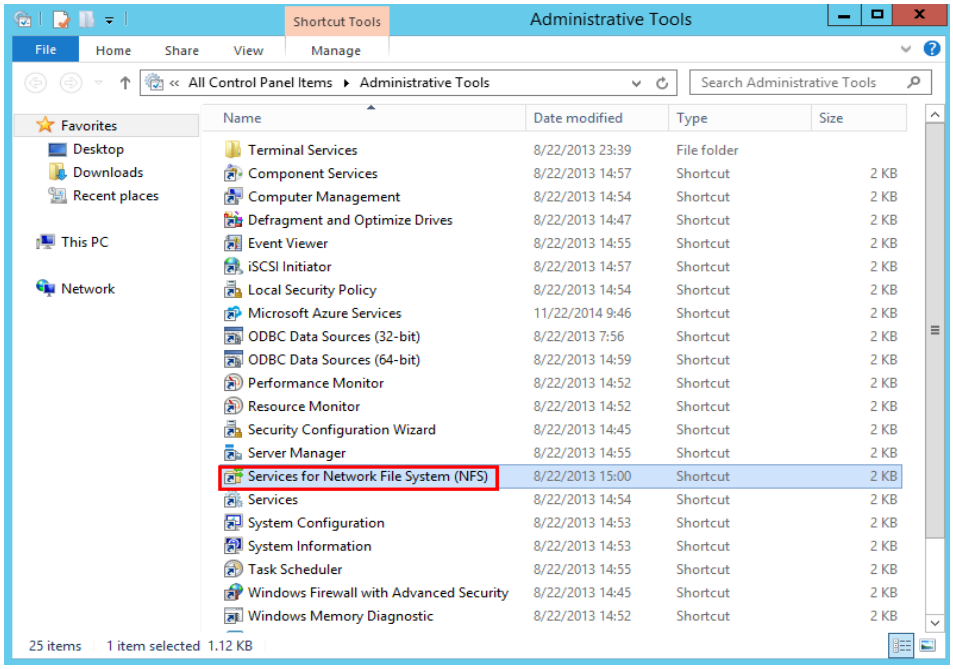
Figure 4-5 Selecting Client for NFS



Step 3 Modify the NFS transport protocol.

1. Choose **Control Panel** > **System and Security** > **Administrative Tools** > **Services for Network File System (NFS)**.

Figure 4-6 Administrative tools



2. Right-click **Client for NFS**, choose **Properties**, change the transport protocol to **TCP**, and select **Use hard mounts**.

Figure 4-7 Services for NFS

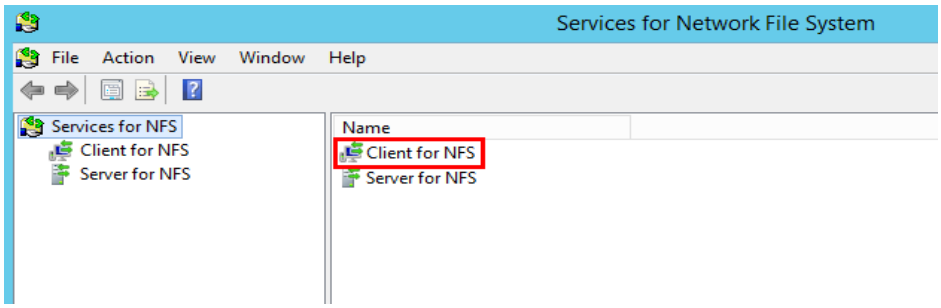
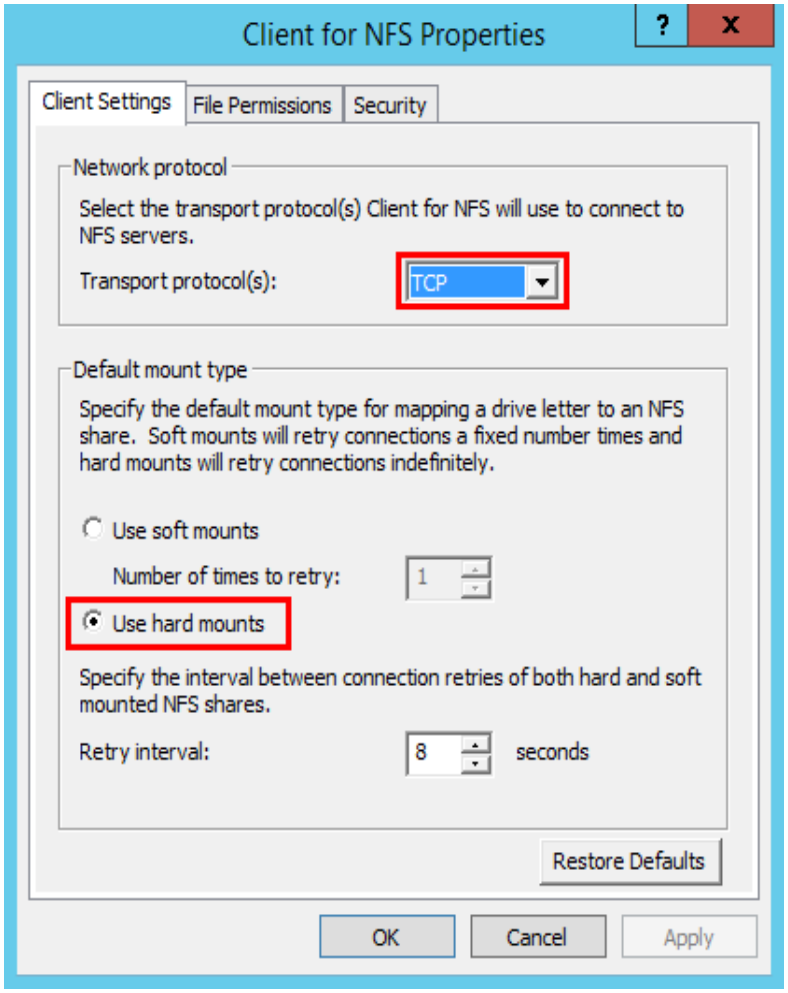


Figure 4-8 Client for NFS properties



Step 4 Check that the IP address of the DNS server for resolving the file system domain name has been configured on the ECS before mounting the file system. For details, see **Configuring DNS**. SFS Turbo file systems do not require domain name resolution.

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

For SFS Capacity-Oriented file systems: **mount -o nolock** *Mount point* **X:**

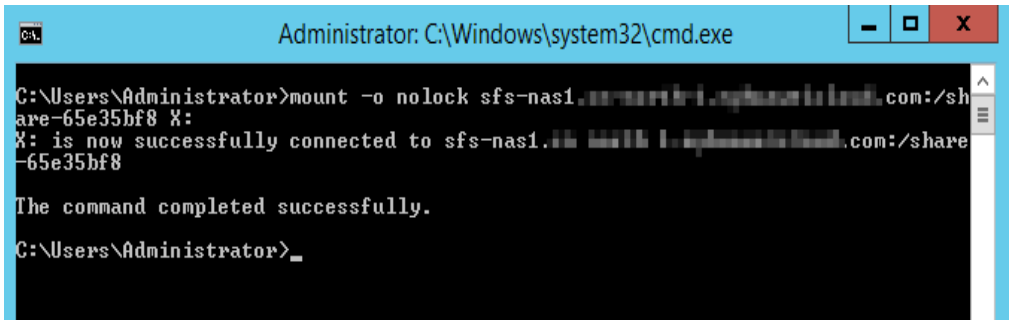
NOTE

- A free drive letter is one that is not in use, such as drive letter E or X.

You can move the cursor to the mount point and click next to it to copy the mount point. For details, see **Figure 4-9**. If the information shown in **Figure 4-10** is displayed, the mount is successful.

Figure 4-9 Mount point

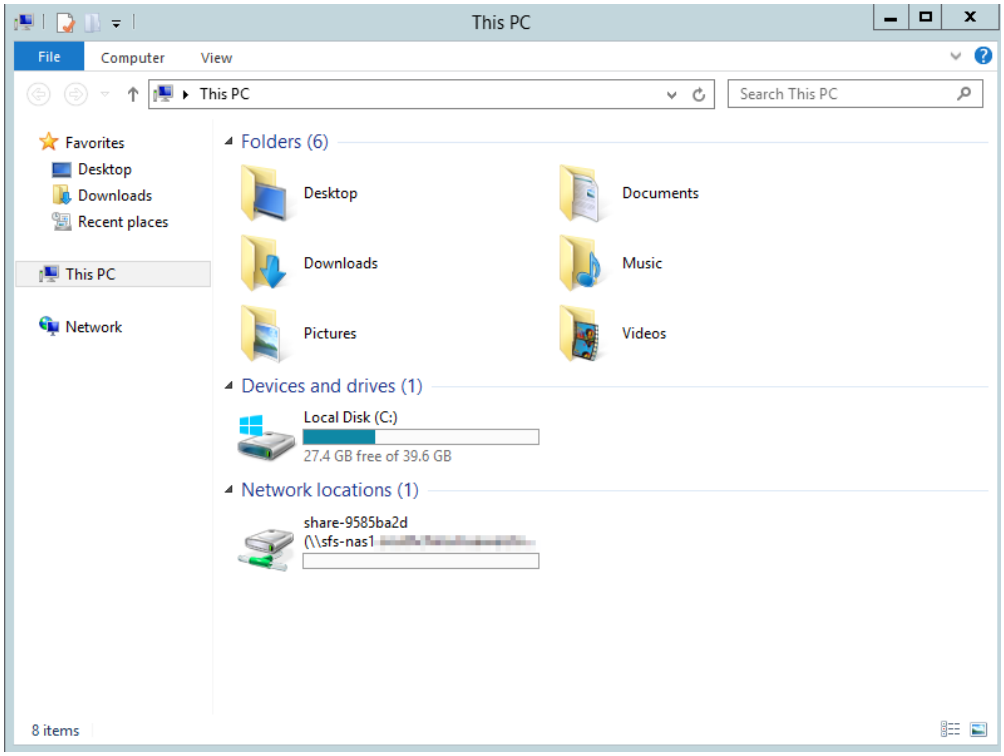
Figure 4-10 Running the command



Step 6 After the file system is mounted successfully, view the mounted file system in the **This PC** window.

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

Figure 4-11 Successful mount



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

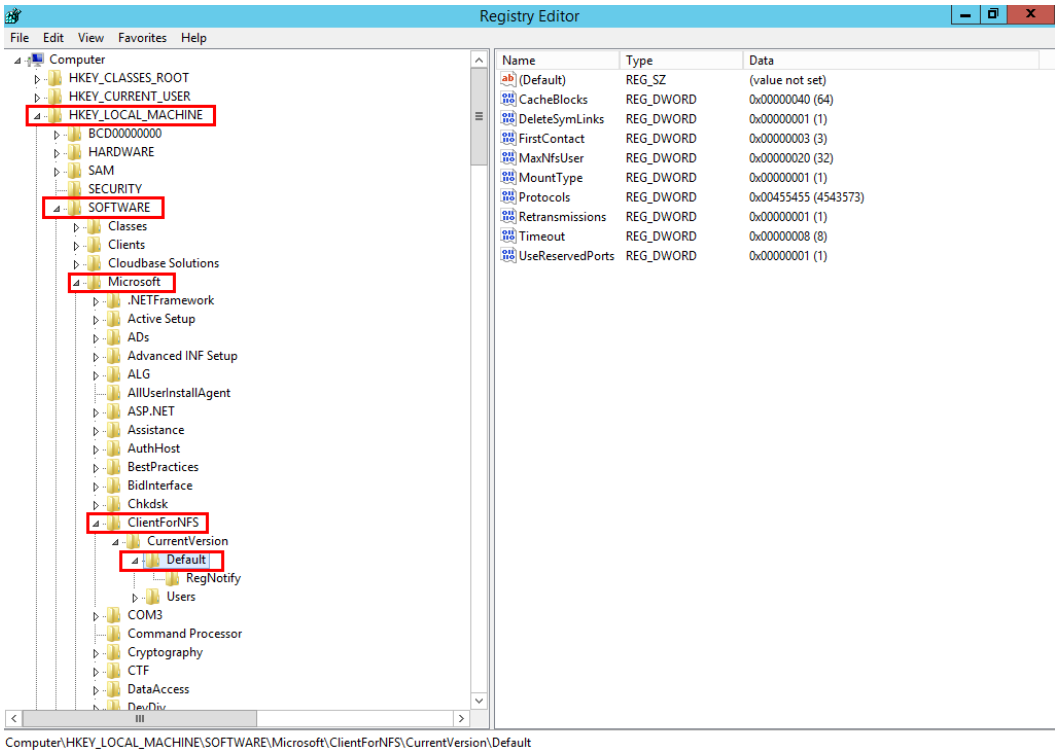
Troubleshooting

If a file system is mounted to a Linux ECS and a Windows ECS, on the Windows ECS, you cannot write data to the files created by the Linux ECS. To address this problem, modify the registry to change both UID and GID values to **0** for NFS accesses from Windows. This section uses Windows Server 2012 as an example. Do as follows:

Step 1 Choose **Start** > **Run** and enter **regedit** to open the registry.

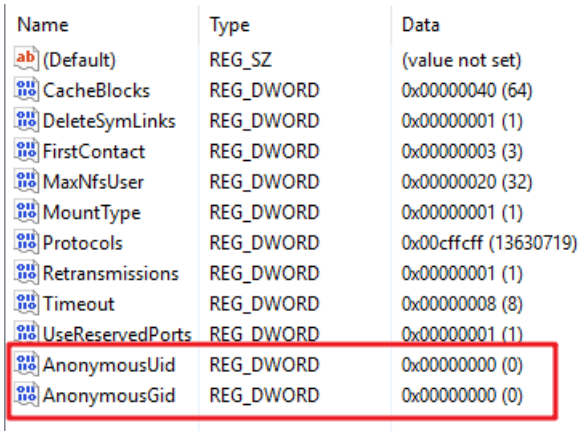
Step 2 Enter the **HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\ClientForNFS\CurrentVersion\Default** directory.

Figure 4-12 Entering the directory



Step 3 Right-click the blank area and choose **New** > **DWORD Value** from the shortcut menu. Set **AnonymousUid** and **AnonymousGid** to **0**. Figure 4-13 shows a successful operation.

Figure 4-13 Adding values



Step 4 After the registry is modified, restart the server for the modification to take effect.

----End

4.3 Mounting a CIFS File System to ECSs (Windows)

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

This section uses Windows Server 2012 as an example to describe how to mount a CIFS file system.

An SFS Capacity-Oriented file system can use either NFS or CIFS. It cannot use both protocols.

Prerequisites

- You have created a file system and have obtained its mount point.
- At least one ECS that is in the same VPC as the file system is available.
- The IP address of the DNS server for resolving the file system domain name has been configured on the ECSs. For details, see **Configuring DNS**.
- You need to mount the file system as user **Administrator**. You cannot switch to another user to mount the file system.

Notes and Constraints

CIFS file systems cannot be mounted to Linux ECSs.

SFS Capacity-Oriented file systems are now sold out. Use this type of mount carefully.

Procedure

Step 1 Go to the ECS console and log in to the ECS running Windows Server 2012.

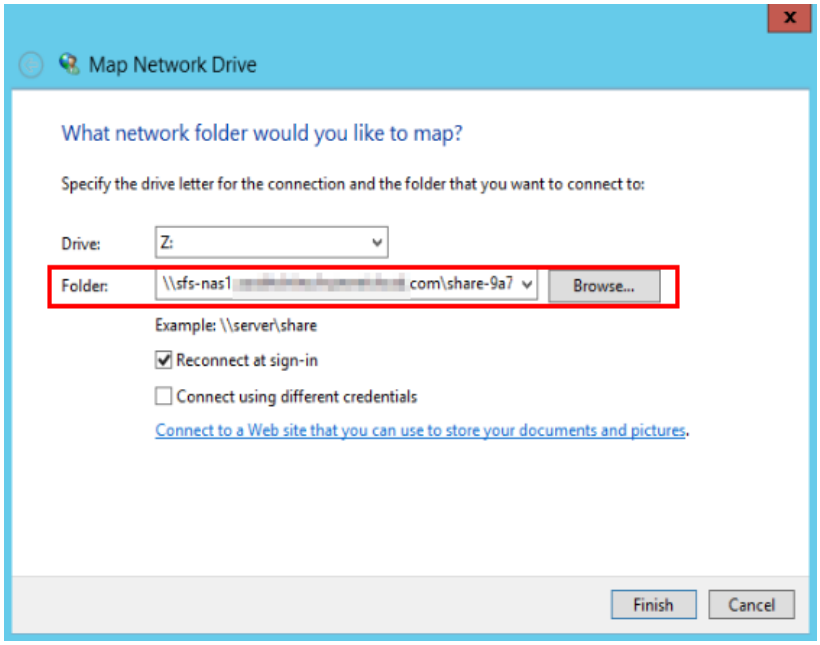
Step 2 Click **Start**, right-click **Computer**, and choose **Map network drive**.

Step 3 In the dialog box that is displayed, enter the mount point of the file system, specifically, *File system domain name**Path*, as shown in **Figure 4-14**.

Table 4-3 Variable description

Variable	Description
File system domain name	Obtain the file system domain name from the file system mount point. For details, see **Viewing a File System**.
Path	The format is **share-***xxxxxxxx*, where *x* is a digit or letter.

Figure 4-14 Entering the mount point



Step 4 Click **Finish**.

Step 5 After the file system is mounted successfully, view the mounted file system in the **This PC** window.

If the mount fails or times out, it may be that guest access to CIFS file systems is blocked or disabled by Windows. Rectify the fault by referring to **Troubleshooting**.

----End

4.4 Mounting a File System Automatically

File system mounting information may be lost after a server is restarted. You can configure auto mount on the server to avoid losing the mounting information.

Restrictions

Because the service startup sequences in different OSs vary, some servers running CentOS may not support the following auto mount plans. In this case, manually mount the file system.

Procedure (Linux)

Step 1 Log in to the ECS as user **root**.

Step 2 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 mount example provided. If needed, you can customize certain mount options, but the customization may affect system performance.

Step 3 Press **Esc**, enter **:wq**, and press **Enter** to save and exit.

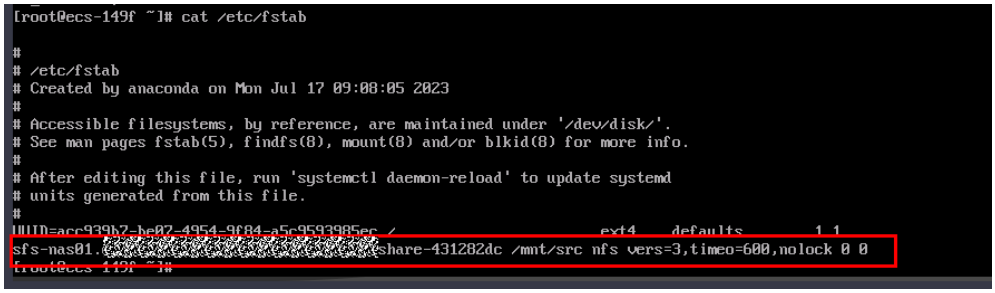
After the preceding configurations are complete, the system reads the mount information from the **/etc/fstab** file to automatically mount the file system when the ECS restarts.

Step 4 (Optional) View the updated content of the **/etc/fstab** file.

cat /etc/fstab

Figure 4-15 shows the updated file content.

Figure 4-15 Updated file content



Step 5 If auto mount fails due to a network issue, add the **sleep** option and a time in front of the mount 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,tcp *Mount point*/*local_path*

----End

Field Description

Table 1 describes the mount fields.

Table 4-4 Field description

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

Field	Description
vers=3,timeo=600,nolock	Mount options. Use commas (,) to separate multiple options. • **vers**: The file system version. Value **3** indicates the NFSv3 protocol. • **timeo**: The 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**: Backup is not used. • An integer larger than 0 means that the file system is backed up. A smaller value has a higher check priority.
0	Choose whether to check file systems using the fsck program when the ECS starts and specify the sequence for checking file systems. • **0**: File systems are not checked. • By default, this field is set to **1** for the root directory. The values for other directories start from **2**, and one with a smaller integer is checked earlier than that with a larger integer.

Procedure (Windows)

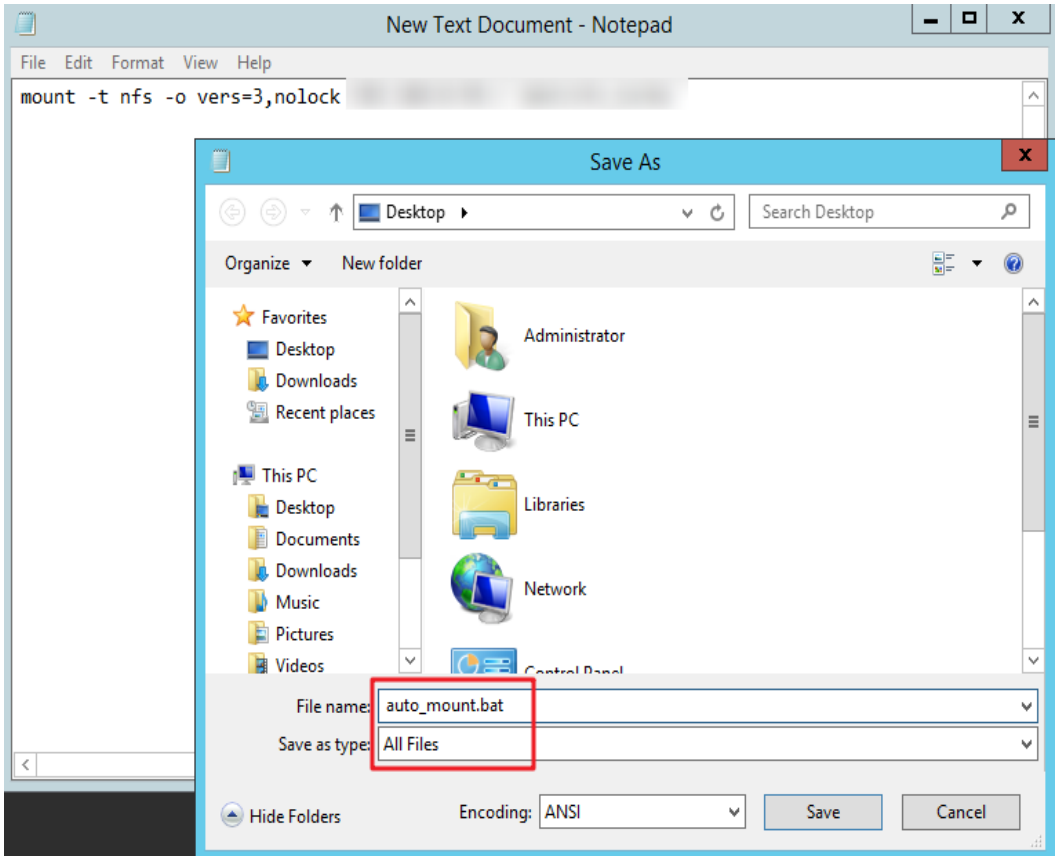
Ensure that an NFS client has been installed on the target server before mounting. This section uses Windows Server 2012 as an example to describe how to mount a file system.

Step 1 Log in to ECS.

Step 2 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 4-16 Saving the script



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

For SFS Capacity-Oriented file systems: **mount -o nolock** *mount point* **X:**

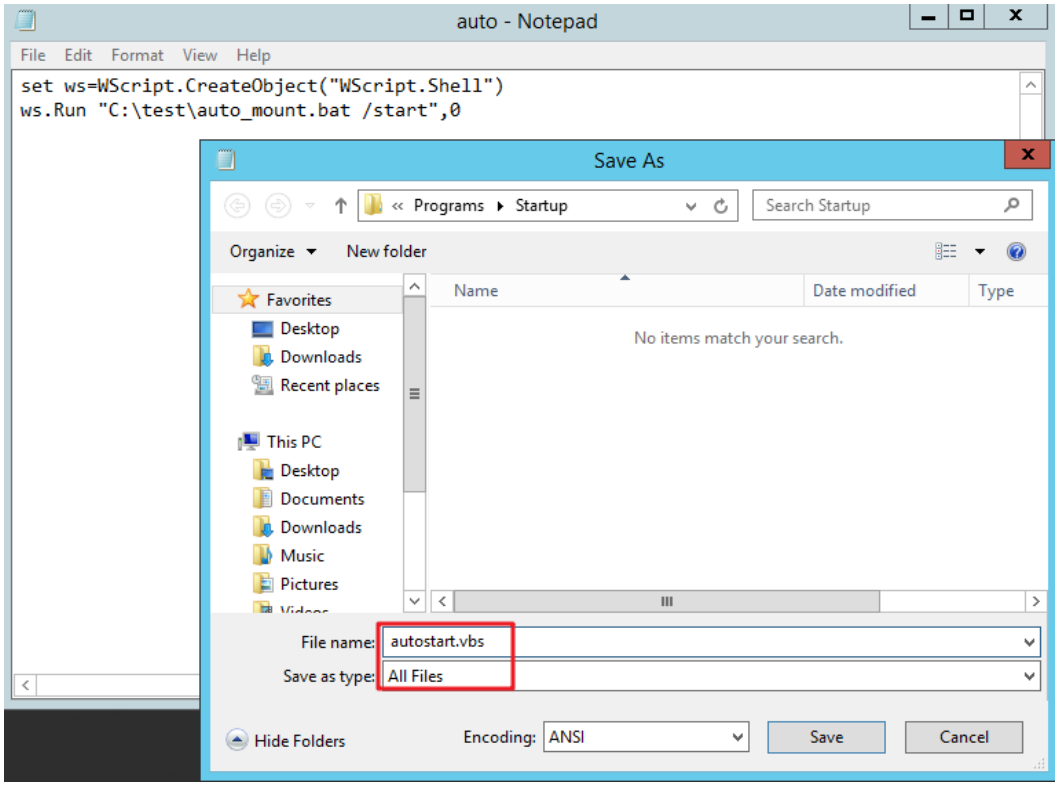
NOTE

- 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 3** that stores the .vbs file. In this example, the .bat script is stored in **C:\test**.

Step 3 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 4-17 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 4 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 ECS.

Step 2 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

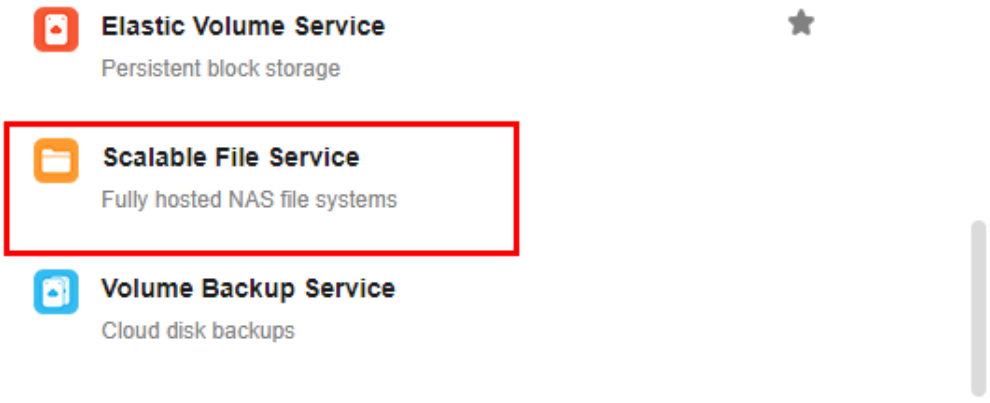
6 Example: Mounting an NFS File System to ECSs

- You can create a file system and mount it to multiple servers for shared access.
- Before creating a file system, make that a VPC and ECSs are available, and the ECSs are in this VPC. For an SFS Turbo file system, if the ECSs are not in the same VPC, you can establish communication between SFS Turbo and the ECSs using VPC peering connections.
- This guide describes how to set up shared file storage for a company using SFS.

Step 1: Log In to the Console

Step 1 Log in to the **Huawei Cloud console**. In the service list, choose **Storage** > **Scalable File Service**.

Figure 6-1 Logging in to the SFS console



Step 2 Select the region where the ECSs are deployed. A file system can be mounted to an ECS only when they are in the same region and VPC. In this example, select **CN-Hong Kong**.

----End

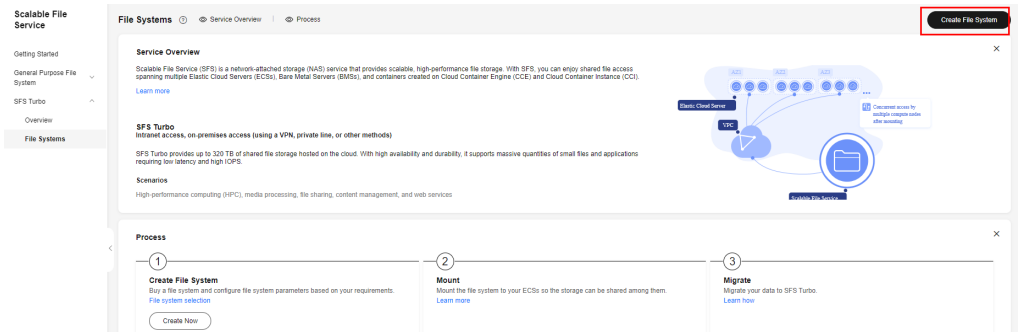
NOTE

1. This company has purchased ECSs in the **CN-Hong Kong** region.
2. All the company's ECSs are in the **vpc-3114** VPC.
3. For the detailed creation procedure, see **Create a File System**.

Step 2: Create a File System

Step 1 Click **Create File System**.

Figure 6-2 Creating a file system



Step 2 On the displayed page, configure file system parameters and click **Create Now**.

----End

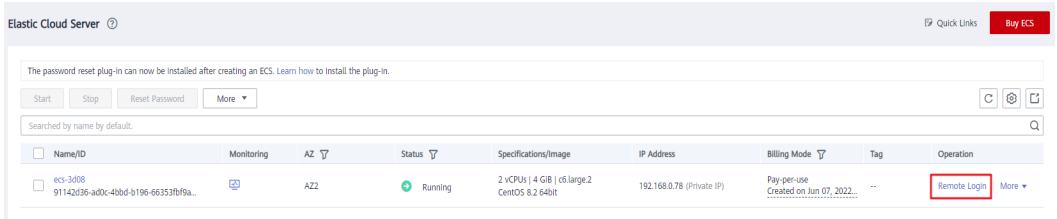
NOTE

1. You are advised to select the same AZ as the ECSs.
2. You can view existing VPCs or create a new VPC.
3. For the detailed creation procedure, see **Create a File System**.

Step 3: Mount the File System

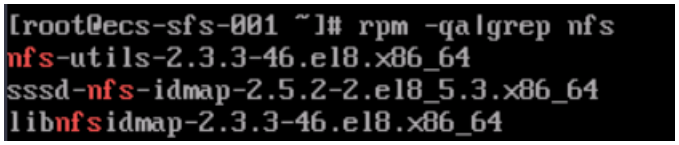
Step 1 Log in to an ECS. You can log in to an ECS using the console or a remote access tool (such as PuTTY).

Figure 6-3 Logging in to an ECS



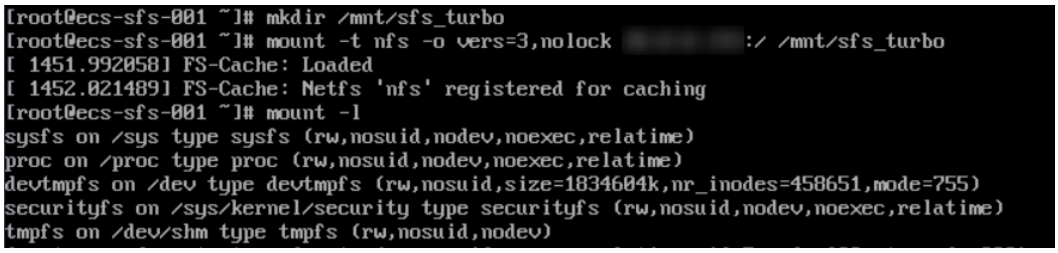
Step 2 Run **rpm -qa|grep nfs** to check whether the NFS client is installed on the ECS.

Figure 6-4 Checking whether the NFS client is installed



Step 3 Run **mkdir** *Local path* to create a local path. Then run **mount -t nfs -o vers=3,timeo=600,noresvport,nolock,tcp** *Mount point Local path* to mount the file system. Run **mount -l** to check whether the file system is successfully mounted.

Figure 6-5 Mounting the file system



----End

NOTE

1. You can copy the mount point from the file system details page on the console.
2. If information similar to "*IP address* on /local_path type nfs (rw,vers=3,timeo=600,nolock,addr=)" is returned, the file system is mounted successfully.
3. For details about the creation procedure, see **Mounting an NFS File System to ECSs (Linux)**.

