



Cloud Storage Services - Scalable File Service



Foreword

- This course provides an overview about Scalable File Service (SFS) in HUAWEI CLOUD.



Objectives

- After completing this course, you will be able to:
 - Know what SFS is.
 - Understand basic concepts, functions, and application scenarios of SFS.
 - Know advantages and the billing standards of SFS.
 - Know SFS FAQs and corresponding answers.



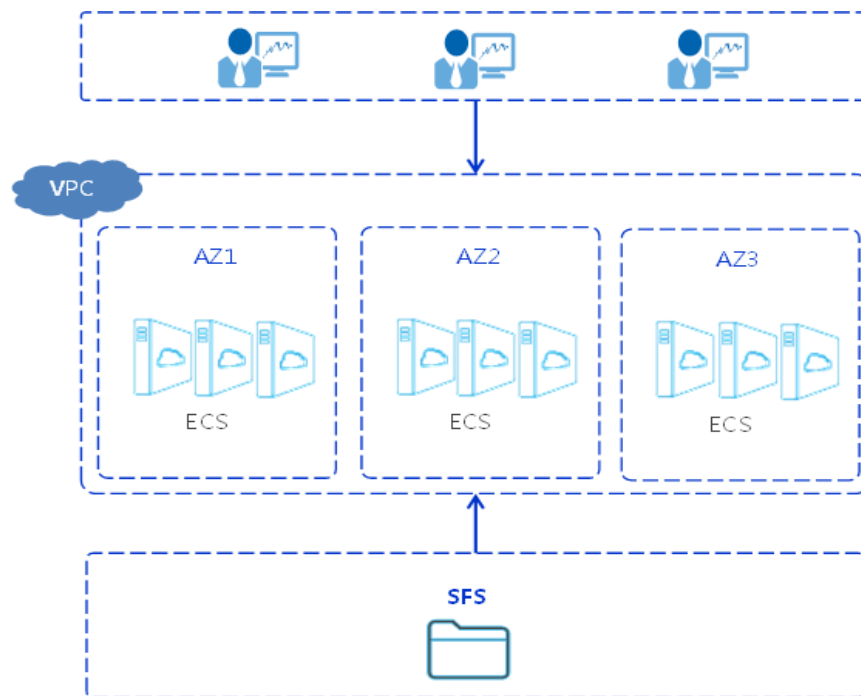
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- 1. SFS Overview**
2. Using and Managing
3. Restrictions and Limitations
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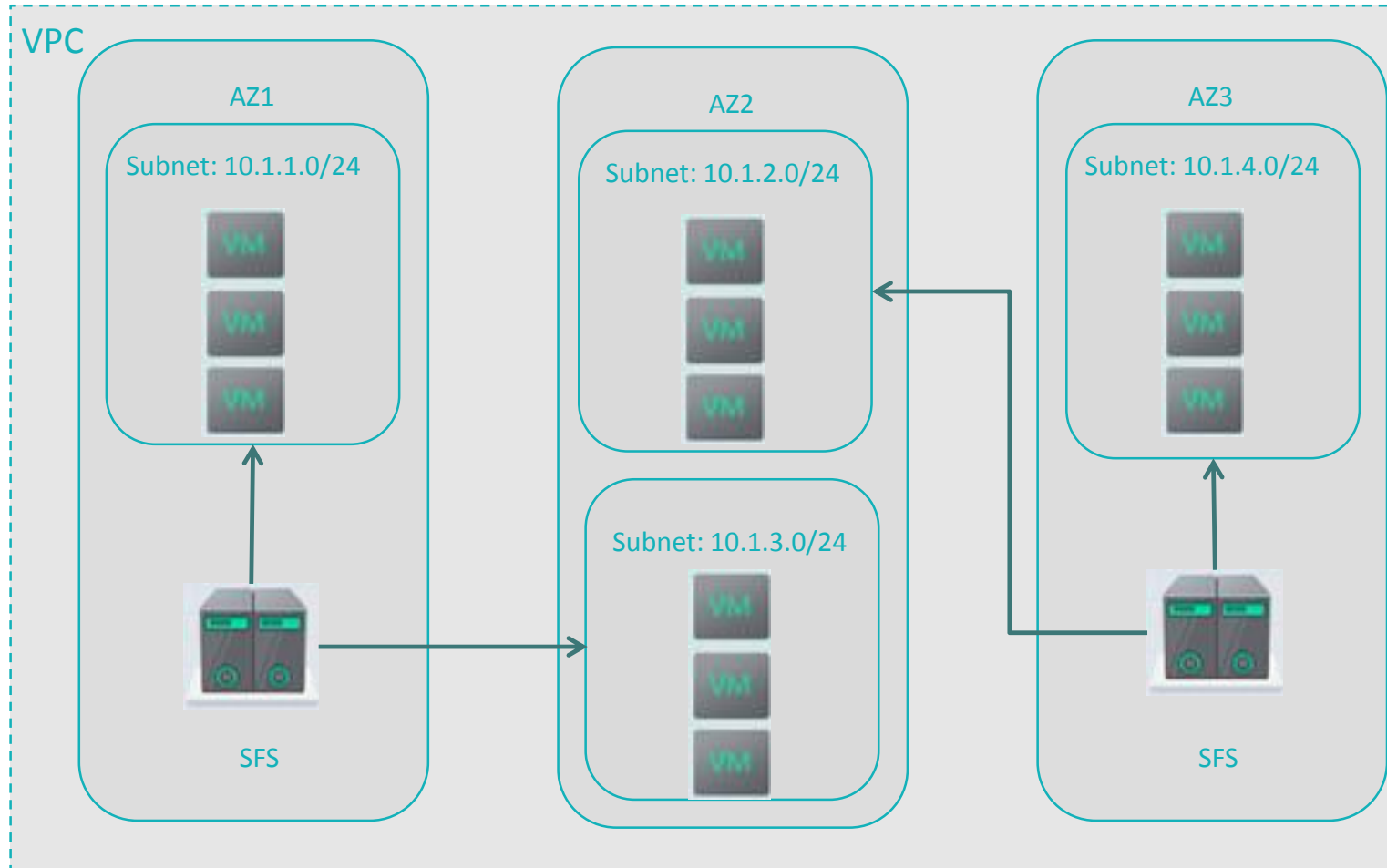
SFS Overview

- Scalable File Service (SFS) provides **high-performance** file storage that is scalable on demand. It can **be shared with multiple Elastic Cloud Servers (ECS)**. Expandable to **petabyte ranges**, SFS provides a fully hosted shared file storage. It features **high availability and durability**, and provides supports for data-intensive and bandwidth-intensive applications.





SFS Product Architecture



- Customers can specify the region, AZ, and VPC with which the file system to be created is associated.
- That is, although ECSs in one VPC resided in different AZs, they can share the same file system. If customer's services have high requirements on latency, cross-AZ access should be avoided.



Advantages of SFS

- File sharing
- Elastic scalability
- Superior performance and reliability
- Seamless integration
- Easy operation and low costs



Typical Scenarios

- High-performance computing (HPC)
- In industries that require HPC, such as simulation experiments, biopharmacy, gene sequencing, image processing, and weather forecast, SFS provides superb computing and storage capabilities, as well as high bandwidth and low latency.
- Media processing
- In such scenarios, a large number of workstations are involved in the whole program production process. Different operating systems may be used by different workstations, requiring high-bandwidth and low-latency file systems to share materials.
- File sharing
- For a company with a large number of employees, documents and data can be shared and accessed using the SFS file systems.
- Content management and web directories
- SFS can be used in various content management systems to store and provide information for websites, home directories, online releases, and archiving.
- Big data and analytic applications
- A file system provides aggregation bandwidth higher than 10 GBit/s and can process ultra-large data files such as satellite images in a timely manner. In addition, the file system has high reliability to prevent system failures from affecting service continuity.



Billing Standards

- SFS is charged by used storage capacity. It provides two billing options: pay-per-use and monthly/yearly subscription.
- By default, SFS is charged on the pay per use basis, that is, by used storage capacity and service duration. There is no minimum fee. Service duration is calculated at the top of every hour. A duration of less than one hour is rounded up to an hour.
- Quota of a resource package is measured by GB or TB. Duration is measured by year or month. Customers are advised to consider the specifications, service duration, and storage capacity of a yearly/monthly resource package before purchase.



Related Services

- A file system can be mounted on different ECSs in the same project for file sharing. SFS uses Identity and Access Management (IAM) to authenticate user identities and control access to cloud resources. Meanwhile, file systems are encrypted by Key Management Service (KMS), and the performance is monitored by Cloud Eye.
- SFS is related to the following services:
 - Elastic Cloud Server (ECS)
 - Virtual Private Cloud (VPC)
 - Identity and Access Management (IAM)
 - Key Management Service (KMS)



Basic Concepts of SFS

- Network File System (NFS)
- NFS is a distributed file system protocol that allows different computers and operating systems to share data over a network.
- CIFS (Common Internet File System)
- CIFS is a protocol used for network file access. It is a public or open version of the Server Message Block (SMB) protocol, which is initiated by Microsoft. CIFS allows applications to access files on computer over the Internet and send requests for file services. Through the CIFS protocol, network files can be shared between hosts running Windows.
- File System
- A file system provides users with shared file storage service through NFS or CIFS. It can be used to access network files remotely. After users create shared directories in the management console, the file system can be mounted to multiple ECSs and is accessible through the standard POSIX interface.
- Availability zone (AZ)
- An availability zone (AZ) is a geographical area with an independent network and an independent power supply. In general, an AZ is an independent physical equipment room, ensuring the independence of the AZ. One region has multiple AZs. If one AZ becomes faulty, the other AZs in the same region can still provide services. AZs in the same region can access each other using the intranet. ECSs can share the same file system across AZs of the same region.
- Region
- Region is a geographical concept. Each region is a different geographical location. Customers can select the regions closest to them to reduce access latencies.

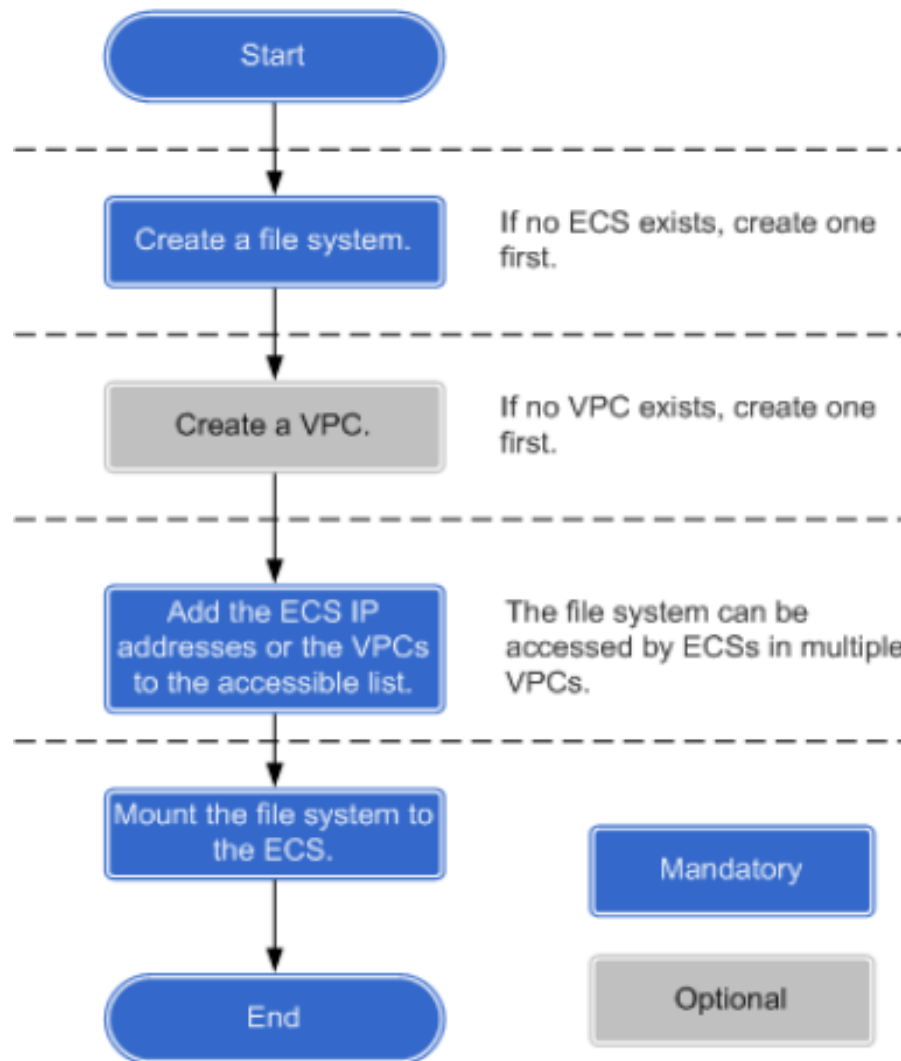


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Process of Accessing SFS





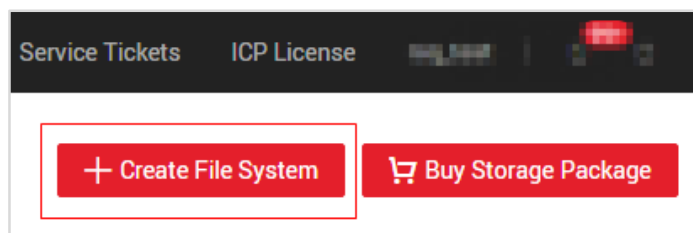
Common Operations

- Creating a File System
- Mounting a File System to an ECS
- Managing VPCs
- Creating a Encrypted File System
- Deleting a File System



Creating a file system

1. Click **Create File System**.



3. Confirm configuration.

Details		
Resource	Configuration	
SFS	Region	AP-Hong Kong
	Name	sfs-5aa8
	AZ	cn-hk1a
	Type	NFS
	VPC	vpc-1864

2. Configure file system parameters.

Create File System [?](#) [Back to File System List](#)

* File System Type [?](#)

☒ SFS ☐ SFS Turbo

Region

AP-Hong Kong

Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region.

Name [?](#)

sfs-5aa8

AZ [?](#)

☒ cn-hk1a

* Type

☒ NFS ☐ CIFS

* VPC [?](#)

vpc-1864 [View VPC](#)

ECSs cannot access file systems that reside on different VPCs. Select the VPCs where ECSs reside.

Total Capacity (GB) [?](#)

-

1

+

Quantity

-

1

+

You can create 7 more SFS file systems. The SFS file systems can use up to 402.34 TB storage space. [Increase quota](#)



- ### 1. Click Remote Login of an ECS.

2. Use the root account and password to log in to the ECS.

3. Run the mount command to mount a file system. After the mounting is successful, you can view the mounted file system.

```

[root@ecs-bef3 /]# mount -l | fgrep -e vers=3,timeout=688,noexec,sfs-nas1.cn-north-1.myhuaweicloud.com:/share-7880c5d8 /local_path
[root@ecs-bef3 /]# mount -l
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
devtmpfs on /dev type devtmpfs (rw,nosuid,size=490880k,ur_inodes=124528,mode=755)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,mode=755)
tmpfs on /sys/fs/cgroup type tmpfs (ro,nosuid,nodev,noexec,mode=755)
cgroup on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,xattr,release_agent=/usr/lib/systemd/systemd-cgroup
ps-agent,namespaces)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
cgroup on /sys/fs/cgroup/freezer type cgroup (rw,nosuid,nodev,noexec,relatime,freezer)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,devices)
cgroup on /sys/fs/cgroup/net_cls,net_prio type cgroup (rw,nosuid,nodev,noexec,relatime,net_prio,net_cls)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime,perf_event)
cgroup on /sys/fs/cgroup/memory type cgroup (rw,nosuid,nodev,noexec,relatime,memory)
cgroup on /sys/fs/cgroup/bklkio type cgroup (rw,nosuid,nodev,noexec,relatime,bklkio)
cgroup on /sys/fs/cgroup/cpus,cpuacct type cgroup (rw,nosuid,nodev,noexec,relatime,cpuacct,cpus)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
cgroup on /sys/fs/cgroup/hugetlb type cgroup (rw,nosuid,nodev,noexec,relatime,hugetlb)
configfs on /sys/kernel/config type configfs (rw,relatime)
/dev/xdm on / type ext3 (rw,relatime,data=ordered)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=28,pgrp=1,timeout=8,minproto=5,maxproto=5,direct,pipe_ino=9665
)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
mqueue on /dev/mqueue type mqueue (rw,relatime)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
nfsd on /proc/fs/nfsd type nfsd (rw,relatime)
tmpfs on /run/user/0 type tmpfs (rw,nosuid,nodev,relatime,size=101500k,mode=700)
sfs-nas1.cn-north-1.myhuaweicloud.com:/share-7880c5d8 on /local_path type nfs (rw,relatime,vers=3,rsz=1048576,usize=1048576,na
mlen=255,hard,noexec,proto=tcp,timeout=688,rettrans=2,sec=sys,mountaddr=100.125.16.91,mountvers=3,mountport=20898,mountproto=adp,loc
al.lockall,addr=100.125.16.91)

```




Common Operations

- Managing VPCs

1. Select the target file system.

<input type="checkbox"/>	Name	AZ	Status	Type
<input type="checkbox"/>	sfs-fa98	AZ1	Available	SFS Capacity-O...
<input type="checkbox"/>	sfs-name-c650	AZ1	Available	SFS Capacity-O...
<input type="checkbox"/>	sfs-name-e4b9	AZ1	Available	SFS Capacity-O...

2. Click **Add Authorized VPC** on the **Authorization** tab page.

Authorizations

Tags

Only ECSs on VPCs can access file systems. If there are no available VPCs, [apply for VPCs](#) first.

Add Authorized VPC

You can add 19 more authorized VPCs and 399 more authorized addresses/segments.

Name
test-vpc-001

3. Add required VPC or VPCs.

Add Authorized VPC

VPC

vpc-b7ef

View VPC

You can add 19 more authorized VPCs.

OK

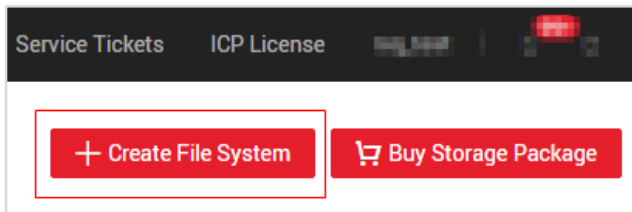
Cancel



Common Operations

- Creating an encrypted file system

1. Click **Create File System**.



2. Select **KMS Encryption** and select an encryption key.

Create File System ? < Back to File System List

* File System Type ? ☒ SFS ☐ SFS Turbo

Region

Regions are geographic areas isolated from each other. Resources are region-specific and cannot be used across regions through internal network connections. For low network latency and quick resource access, select the nearest region.

Name ?

AZ ? ☒ AZ1

* Type ☒ NFS ☐ CIFS

* VPC ? [View VPC](#)

ECSs cannot access file systems that reside on different VPCs. Select the VPCs where ECSs reside.

Quantity

You can create 0 more SFS file systems. [Increase quota](#)

Encryption ☒ KMS encryption

Agency Name ? SFSAccessKMS

KMS key name [View KMS List](#)

KMS key ID 317fb59b-2fb7-4bb7-aabe-b388baaa36e7

3. Confirm configuration.

Details		
Resource	Configuration	
SFS	Region	southchina
	Name	sfs-1643
	AZ	AZ1
	Type	NFS
	VPC	test-vpc-001
	Encryption	Yes



Common Operations

- Deleting a file system

1. Click **Delete** in the **Operation** column of the target file system.

<input type="checkbox"/>	Name	AZ	Status ▾	Type ▾	Share Protocol ▾	Used Capacity (G... ▾	Encrypted ▾	Enterprise Pr...	Share Path	Operation
<input type="checkbox"/>	sfs-fa98	AZ1	Available	SFS Capacity-O...	NFS	0.00	No	default	sfs-nas1.southchina.huaweicloud.com:/share-6872b26b	Resize Delete

2. Confirm the deletion and click **OK**.

Delete File System

!

Are you sure you want to delete the following file systems?

Before deleting file systems, log in to ECSs to unmount these file systems. Deleted file systems cannot be recovered. Exercise caution when performing this operation.

Name	Status	Used Capacity (GB)	Created
sfs-fa98	Available	0.00	Nov 26, 2018 17:23:...

Delete

Enter Delete to confirm deletion

OK

Cancel



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Restrictions and Limitations

- Note the following limitations and constraints when using SFS:
 - SFS Capacity-Oriented supports NFSv3 and CIFS protocols. Currently, SFS Turbo supports only the **NFSv3 protocol**.
 - SFS does not support the replication function.
 - The following table lists the operating systems on which SFS file systems can be mounted.

OS	Version
CentOS	CentOS 5,6,7 for x86
Debian	Debian GNU/Linux 6,7,8,9 for x86
Oracle	Oracle Enterprise Linux 5,6,7 for x86
Red Hat	Red Hat Enterprise Linux 5,6,7 for x86
SUSE	SUSE Linux Enterprise Server 10,11,12 for x86
Ubuntu	Ubuntu 10,11,12,13,14,15 LTS for x86
Euler	Euler OS 2
Fedora	Fedora 24,25
OpenSUSE	OpenSUSE 42
Windows	Windows Server 2008,2008 r2,2012,2012 r2,2016 for x64; Windows 7,8,10



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FAQs (1/3)

- Can a File System Be Mounted to a Windows ECS?
 - Yes.
- What Access Protocols Does SFS Support?
 - SFS Capacity-Oriented supports standard NFSv3 and CIFS protocols. SFS Turbo supports only the standard NFSv3 protocol.
- What Is the Maximum Size of a File That Can Be Stored In a File System?
 - For SFS Capacity-Oriented file systems, the supported maximum size of a file is 240 TB. For SFS Turbo file systems, the supported maximum size of a file is 16 TB.
- How Many File Systems Can Be Created by Each Account?
 - Currently, a maximum of 10 shared file systems can be created for each account, and they can be created at a time.



FAQs (2/3)

- How Is the **Access Permission** for a File System Controlled?
 - An SFS Capacity-oriented file system can be shared by ECSs of multiple VPCs. When the file system is mounted on the ECSs, files can be shared. You can set the IP addresses or address segments authorized by a VPC to control the ECSs in other VPCs to access the file system.
 - An SFS Turbo file system can only be shared by ECSs in the same VPC. After an SFS system is mounted on an ECS, the ECS can access the shared files and prevent ECSs of other VPCs from accessing the shared files.
- How Do I Check Whether a File System on a ECS Running Linux Is Available?
 - Log in to the ECS as the **root** user. Run the following command, and the command output displays all available file systems with the same domain name.
showmount -e *File system domain name*



FAQs (3/3)

- How Can an ECS Access a File System?
 - If your ECS is running Linux, you need to install the NFS client on the ECS and run a command to mount the file system. If your ECS is running on Windows, you need to install the NFS client, modify the NFS transfer protocol, and run a command to mount the file system. Then, you can share the files and directories of the file system.
- Can a File System Be Accessed Across VPCs?
 - Cross-VPC access is supported for a file system of the SFS Capacity-Oriented type.
 - A file system of the SFS Turbo type in a VPC is accessible only to AZs in the VPC.



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Troubleshooting Cases (1/2)

- When executing the **mount** command to mount a file system to an ECS, the ECS system displays a timed out message.
 - Possible cause 1: When the public cloud network is unstable or the customer accesses the service for the first time, the routing times out. Prolong the timeout period or retry the mounting command when this problem occurs.
 - Possible cause 2: The DNS configuration of the ECS is incorrect. As a result, the domain name of the file system cannot be parsed and the mounting fails.
- When executing the **mount** command to mount a file system on an ECS, the ECS system displays an access denied message.
 - Possible cause 1: The file system has been deleted.
 - Possible cause 2: The ECS and the file system do not reside in the same VPC.
 - Possible cause 3: The shared path in the **mount** command is incorrect.
 - Possible cause 4: The virtual IP address is used to access SFS.



Troubleshooting Cases (2/2)

- An ECS fails to access a share. The system displays a message indicating that the access request is denied. All services on the ECS are abnormal.
 - Possible cause 1: The file system is abnormal.
 - Possible cause 2: The ECS belongs to a different VPC from the file system.
 - Possible cause 3: After a forcible unmount operation on the ECS, mounting fails.



Quiz

1. (Multiple-answer) Which of the following are the application scenarios of SFS?
 - A. Media processing
 - B. Log management
 - C. Content management and web directories
 - D. High-performance computing (HPC)



Quiz

1. (Multiple-answer) Which of the following are the application scenarios of SFS?
 - A. Media processing
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 - C. Content management and web directories
 - D. High-performance computing (HPC)



Summary

- Introduces SFS.
- Describes the concepts, creation process, and application scenarios of SFS.
- Introduces the advantages and billing standards of SFS.
- Describes the common problems and faults of SFS.

The background of the image shows silhouettes of several groups of business professionals in a modern office environment. They are standing on a highly reflective floor, and their reflections are clearly visible. The entire scene is overlaid with a semi-transparent blue filter. In the center, the text "Thank You" is written in a large, white, sans-serif font, with the website address "www.huawei.com" in a smaller, white, sans-serif font directly below it.

Thank You

www.huawei.com