Scalable File Service Turbo

Service Overview

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Contents

1 What Is SFS Turbo?

Overview

Scalable File Service Turbo (SFS Turbo) provides scalable, high-performance (NAS) file storage. With SFS Turbo, you can enjoy shared file access spanning multiple Elastic Cloud Server (ECSs), Bare Metal Servers (BMSs), and containers created on Cloud Container Engine (CCE), as shown in **Figure 1-1**.

Figure 1-1 Accessing SFS Turbo
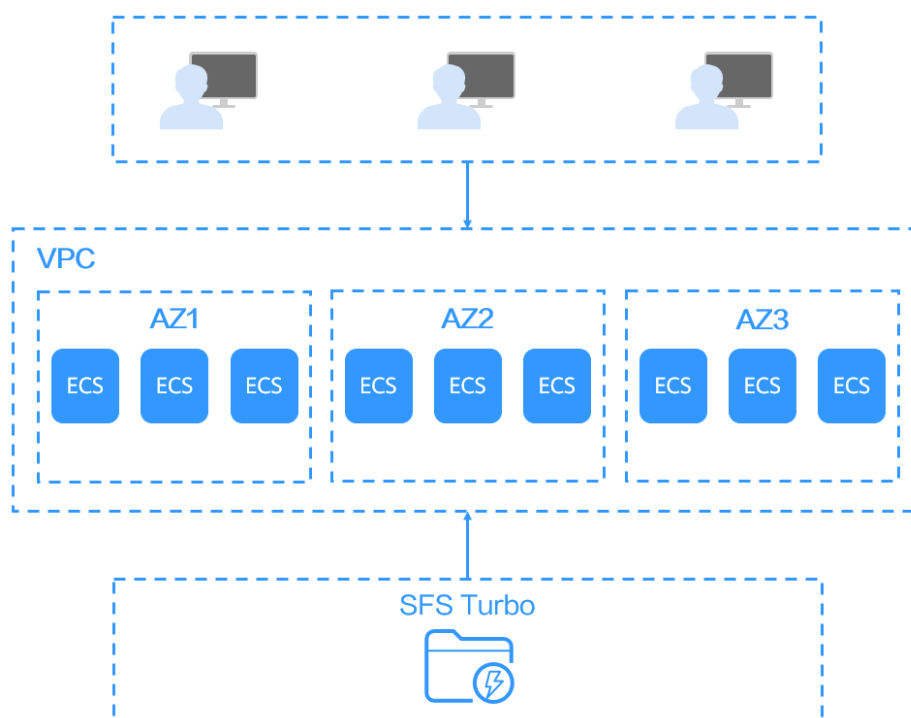
Compared with traditional file storage, SFS Turbo has the following advantages:

- File sharing

  Cloud servers in multiple availability zones (AZs) of the same region can access the same file system concurrently and share files.

- Elastic scaling

The file system storage can be scaled up on demand to dynamically adapt to service changes without interrupting applications. You can complete resizing with a few clicks.

- Superior performance and reliability

  File system performance increases as capacity grows, and file systems deliver a high data durability to support rapid service growth.

  The background system supports both HDD and SSD storage media. It adopts a distributed architecture and uses full redundant design for modules, which eliminate single-node faults.

- Seamless integration

  SFS Turbo supports Network File System (NFS), through which a broad range of applications can read data from and write data into file systems.

- Easy operation and low costs

  On an intuitive graphical user interface (GUI), you can create and manage file systems with ease. SFS Turbo slashes the cost as it is billed on a pay-per-use basis.

Accessing SFS Turbo

You can access SFS Turbo on the console or through HTTPS-based API calls.

- APIs

  Use APIs if you need to integrate SFS Turbo into a third-party system for secondary development. For detailed operations, see "Scalable File Service Turbo API Reference".

- Console

  Use the console if you prefer a web-based UI to perform operations.

2 Dedicated SFS Turbo

Overview

Dedicated SFS Turbo provides shared file storage for enterprises, governments, and finance institutions based on dedicated compute and storage resource pools. Dedicated resource pools are physically isolated from public pools. The reliable, efficient cloud experience dedicated pools offer can help you meet specific performance, application, and compliance needs.

Figure 2-1 Architecture of Dedicated SFS Turbo
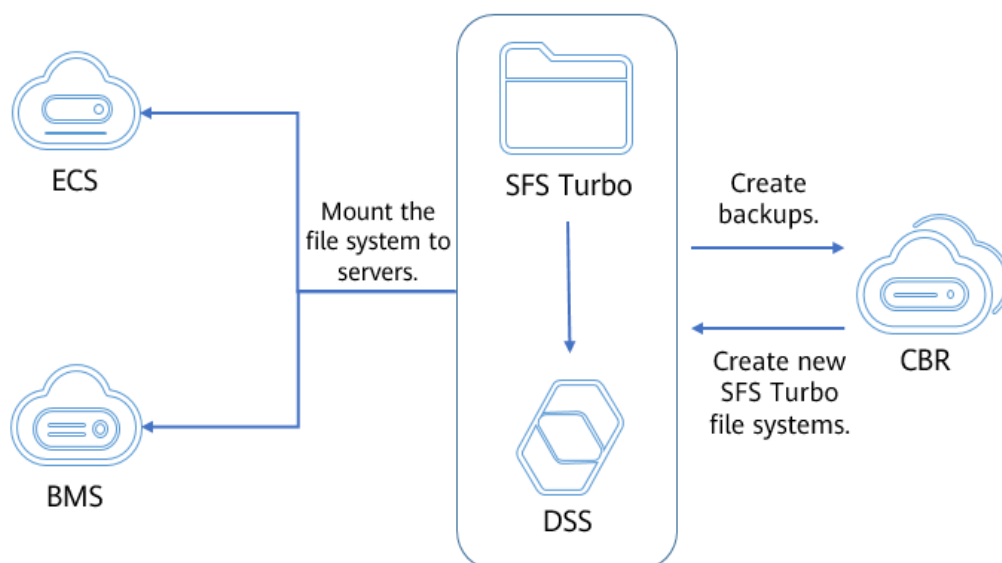
Functions

- A variety of specifications

  Various file system types, including Standard and Performance, are available for different application workloads.

- Elastic scaling

  File system capacity can be increased on demand, and file system performance improves linearly.

- Reliable and secure

  Three-copy redundancy ensures 99.9999999% durability.

  Storage pool data encryption protects your data security.

  VPC isolation guarantees 100% isolation between tenants.

  Physically isolated storage pools provide exclusive resources for tenants.

- Backup and restore

  Dedicated SFS Turbo file systems can be backed up using CBR. You can use backups to restore file system data.

- Monitoring

  Dedicated SFS Turbo can be interconnected with Cloud Eye, which allows you to view file system metrics including bandwidth, IOPS, and capacity.

- Auditing

  Dedicated SFS Turbo can be audited using CTS. You can view, audit, and backtrack file system operations.

Performance

Table 2-1 Performance

Specifications	Dependent Underlying Resources	Performance
SFS Turbo Standard (Dedicated)	DCC: C7, C7n, C6, C6s, C7, C6s, C7t, C7n, C6nl instances DSS: High I/O storage pool	Bandwidth = Min. (1 GB/s, Available bandwidth of the DSS storage pool) IOPS = Min. (15,000, Available IOPS of the DSS storage pool)
SFS Turbo Performance (Dedicated)	DCC: C7, C7n, C6, C6s, C7, C6s, C7t, C7n, C6nl instances DSS: Ultra-high I/O storage pool	Bandwidth = Min. (2 GB/s, Available bandwidth of the DSS storage pool) IOPS = Min. (20,000, Available IOPS of the DSS storage pool)

☐ **NOTE**

The available bandwidth and IOPS of a storage pool are in direct proportion to the storage capacity. When purchasing Dedicate SFS Turbo and planning DSS resources, reserve enough Dedicated SFS Turbo storage space and performance to prevent affecting the file system performance.

In the **Performance** column of the preceding table, the bandwidth or IOPS value is the smallest value in ().

3 Application Scenarios

Expandable to 320 TB, SFS Turbo provides fully hosted shared file storage. It features high availability and durability to support massive small files and applications requiring low latency and high IOPS. SFS Turbo is recommended for various scenarios, including high-performance websites, log storage, compression and decompression, DevOps, enterprise OA, and containerized applications.

- High-performance websites

  For I/O-intensive website services, SFS Turbo can provide shared website source code directories for multiple web servers, enabling low-latency and high-IOPS concurrent share access.

- Log storage

  SFS Turbo can provide multiple service nodes for shared log output directories, facilitating log collection and management of distributed applications.

- DevOps

  The development directory can be shared to multiple VMs or containers, simplifying the configuration process and improving R&D experience.

- Enterprise OA

  Office documents of enterprises or organizations can be saved in an SFS Turbo file system for high-performance shared access.

4 Functions

Table 4-1 lists common SFS Turbo functions.

Before using SFS Turbo, you are advised to learn basic concepts such as NFS and CIFS in **SFS Turbo Basic Concepts** to better understand the functions provided by SFS Turbo.

Table 4-1 Common SFS Turbo functions

Function	Description	Region Availability
NFS	Network File System (NFS) is a distributed file system protocol that allows different computers and OSs to share data over a network. After the NFS client is installed on each ECS, you can mount the file system to implement file sharing between ECSs. NFS is recommended for Linux clients.	All
File system management	File systems are containers that store files in SFS Turbo. You can create, view, and delete SFS Turbo file systems.	All
Permissions	SFS Turbo uses Identify and Access Management (IAM) for permissions management. You can control the read and write permissions of file systems by granting IAM users fine-grained SFS Turbo permissions using IAM custom policies.	All

Function	Description	Region Availability
SFS Turbo file system backup	A backup is a complete copy of a file system at a specific time and it records all configuration data and service data at that time. If your file system is faulty or a logical error occurs in the data in the file system, you can use the backup data to restore the data quickly.	All
SFS Turbo file system encryption	You can encrypt data on the newly created file systems if needed.	All
SFS Turbo file system capacity expansion	You can expand the capacity of a file system if needed.	All
SFS Turbo file system monitoring using Cloud Eye	Cloud Eye is a multi-dimensional resource monitoring service. With Cloud Eye, you can view the file system usage and service running status, and respond to exceptions in a timely manner.	All
SFS Turbo file system auditing using CTS	Cloud Trace Service (CTS) records operations performed on SFS Turbo file systems, facilitating query, audit, and backtracking.	All
Enterprise project	An enterprise project manages multiple resource instances by category. Resources and projects in different cloud service regions can be classified into one enterprise project. An enterprise allows you to classify resources based on departments or project groups and put relevant resources into the same enterprise project for management. Resources can be migrated between enterprise projects.	All
File system tagging	You can use tags to classify and identify file systems. If you add tags to a file system, service detail records (SDRs) generated for it will be labeled with these tags. You can classify SDRs by tag for cost analysis.	All

5 File System Types

This section describes the features, highlights, and application scenarios of different types of SFS Turbo file systems.

Table 5-1 SFS Turbo file systems

Parameter	20 MB/s/TiB	40 MB/s/TiB	125 MB/s/TiB	250 MB/s/TiB	500 MB/s/TiB	1,000 MB/s/TiB
Max. bandwidth	8 GB/s	8 GB/s	20 GB/s	20 GB/s	80 GB/s	80 GB/s
Max. IOPS	250,000	250,000	1 million	1 million	1 million	1 million
Single-queue, 4 KiB latency	2–5 ms	2–5 ms	1–3 ms	1–3 ms	1–3 ms	1–3 ms
Capacity	3.6 TB to 1 PB	1.2 TB to 1 PB	1.2 TB to 1 PB	1.2 TB to 1 PB	1.2 TB to 1 PB	1.2 TB to 1 PB
Medium Type	HDD	HDD	SSD	SSD	ESSD	ESSD
Highlights	Large capacity and low cost	Large capacity and low cost	Low latency and cost effectiveness	Low latency and cost effectiveness	High IOPS and high-density performance	High IOPS and high-density performance

| Typical scenarios | Log storage, file sharing, content management, and websites | Log storage, file sharing, content management, and websites | AI training, autonomous driving, EDA simulation, rendering, enterprise NAS, and HPC web applications | AI training, autonomous driving, EDA simulation, rendering, enterprise NAS, and HPC web applications | Large-scale AI training, AI models, and AI generated content | Large-scale AI training, AI models, and AI generated content |

Table 5-2 Previous-generation SFS Turbo file systems

Parameter	Standard	Standard-Enhanced (Discontinued)	Performance	Performance-Enhanced (Discontinued)
Max. bandwidth	150 MB/s	1 GB/s	350 MB/s	2 GB/s
Max. IOPS	5,000	15,000	20,000	100,000
Single-queue, 4 KiB latency	2–5 ms	2–5 ms	1–3 ms	1–3 ms
Capacity	500 GB to 32 TB	10 TB to 320 TB	500 GB to 32 TB	10 TB to 320 TB
Medium Type	HDD	HDD	SSD	SSD
Highlights	Large capacity and low cost		Low latency and high IOPS	
Typical scenarios	Code storage, log storage, file sharing, and enterprise OA		High-performance website, file sharing, content management, image rendering, AI training, and enterprise OA	

◻ NOTE

- In the table, the maximum IOPS and maximum bandwidth all include both the read and write operations. So, maximum IOPS = read IOPS + write IOPS.
- The minimum expansion increment of SFS Turbo Standard-Enhanced (discontinued), Standard, Performance-Enhanced (discontinued), and Performance file systems is 100 GB. The minimum expansion increment of 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, or 1,000 MB/s/TiB file systems is 1.2 TB, and the new capacity must be an integral multiple of 1.2.

6 File System Encryption

You can encrypt data on the newly created file systems if needed.

Keys used by encrypted file systems are provided by the Key Management Service (KMS), which is secure and convenient. You do not need to establish and maintain the key management infrastructure. If you want to use your own key material, use the key import function on the KMS console to create a custom key whose key material is empty and import the key material to the custom key. For details, see **Importing Key Materials** in the *Data Encryption Workshop User Guide*.

You can directly use the encryption function when creating SFS Turbo file systems. No authorization is required.

Encryption Key

An SFS Turbo file system does not have a default key. You can use your existing key or create a new key. For details, see **Creating a Custom Key** in the *Data Encryption Workshop User Guide*.

7 Security

7.1 Shared Responsibilities

Huawei guarantees that its commitment to cyber security will never be outweighed by the consideration of commercial interests. To cope with emerging cloud security challenges and pervasive cloud security threats and attacks, Huawei Cloud builds a comprehensive cloud service security assurance system for different regions and industries based on Huawei's unique software and hardware advantages, laws, regulations, industry standards, and security ecosystem.

Figure 7-1 illustrates the responsibilities shared by Huawei Cloud and users.

- **Huawei Cloud**: Ensure the security of cloud services and provide secure clouds. Huawei Cloud's security responsibilities include ensuring the security of our IaaS, PaaS, and SaaS services, as well as the physical environments of the Huawei Cloud data centers where our IaaS, PaaS, and SaaS services operate. Huawei Cloud is responsible for not only the security functions and performance of our infrastructure, cloud services, and technologies, but also for the overall cloud O&M security and, in the broader sense, the security and compliance of our infrastructure and services.

- **Tenant**: Use the cloud securely. Tenants of Huawei Cloud are responsible for the secure and effective management of the tenant-customized configurations of cloud services including IaaS, PaaS, and SaaS. This includes but is not limited to virtual networks, the OS of virtual machine hosts and guests, virtual firewalls, API Gateway, advanced security services, all types of cloud services, tenant data, identity accounts, and key management.

Huawei Cloud Security White Paper elaborates on the ideas and measures for building Huawei Cloud security, including cloud security strategies, the shared responsibility model, compliance and privacy, security organizations and personnel, infrastructure security, tenant service and security, engineering security, O&M security, and ecosystem security.

Figure 7-1 Huawei Cloud shared security responsibility model
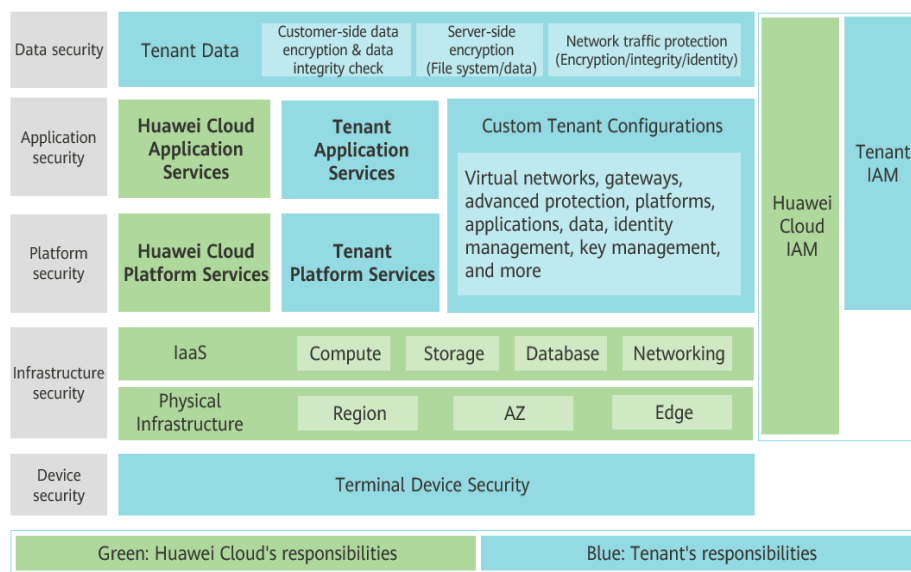
7.2 Identity Authentication and Access Control

7.2.1 Access Control for SFS Turbo

SFS Turbo is interconnected with IAM, so you can assign different permissions to employees to access your SFS Turbo resources for fine-grained permissions management. For details, see **SFS Turbo Permissions**.

You can use IAM to securely control access to your SFS Turbo resources.

Table 7-1 SFS Turbo access control

Method		Description	Reference
Permissions control	IAM permissions	IAM permissions define which actions on your cloud resources are allowed or denied. After creating an IAM user, the administrator needs to add it to a user group and grant the permissions required by SFS Turbo to the user group. Then, all users in this group automatically inherit the granted permissions.	**Permissions**

7.3 Data Protection

Encryption

SFS Turbo supports server-side encryption, which allows you to encrypt the data stored in SFS Turbo file systems. When data is accessed, SFS Turbo automatically decrypts the data and returns it to you.

To use the encryption function, see **File System Encryption**.

Backup

A backup is a complete copy of an SFS Turbo file system at a specific time. It records all configuration data and service data at that time. If a file system is faulty or encounters a logical error (such as an accidental deletion, a hacker attack, or virus infection), you can use data backups to quickly restore data.

To use the backup function, see **Backup**.

7.4 Auditing

Cloud Trace Service (CTS) records operations on the cloud resources in your account. You can use the logs generated by CTS to perform security analysis, track resource changes, audit compliance, and locate faults.

After you enable CTS and configure a tracker, CTS can record management and data traces of SFS Turbo for auditing.

For details about how to enable and configure CTS, see **CTS Getting Started**.

For the SFS Turbo management and data traces supported by CTS, see **Auditing**.

7.5 Risk Monitoring

SFS Turbo uses Cloud Eye to perform monitoring over resources, helping you monitor your file system usages and receive alarms and notifications in real time. You can monitor the number of client connections, bandwidth, IOPS, and capacity of SFS Turbo file systems in real time.
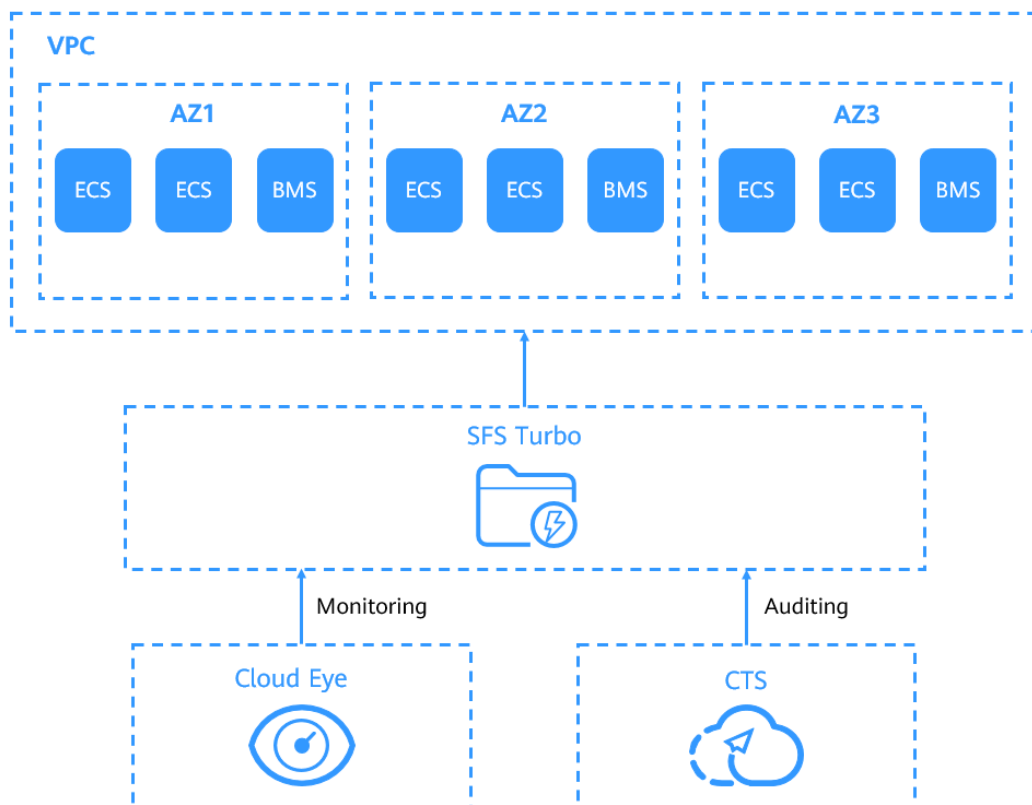
For details about supported SFS Turbo metrics and how to create alarm rules, see **Monitoring**.

8 SFS Turbo and Other Services

Figure 8-1 describes how SFS Turbo works with other cloud services.

Figure 8-1 Relationships between SFS Turbo and other services

Relationships Between SFS Turbo and Other Services

Table 8-1 Related services

Function	Related Service	Reference
A file system and the ECSs must belong to the same project. File systems are mounted to shared paths for data sharing.	Elastic Cloud Server (ECS)	**Mounting an NFS File System to ECSs (Linux)**
CCE is a highly scalable, enterprise-class hosted Kubernetes service for you to run containers and applications. With CCE, you can easily deploy, manage, and scale containerized applications in the cloud. You can use SFS Turbo file systems as persistent storage for containers and mount the file systems to containers when creating workloads.	Cloud Container Engine (CCE)	**Mounting an NFS File System to ECSs (Linux)**
VPC provisions an isolated virtual network environment defined and managed by yourself, improving the security of cloud resources and simplifying network deployment. An ECS cannot access file systems in a different VPC. Before using SFS Turbo, ensure that the file system and ECSs are in the same VPC.	Virtual Private Cloud (VPC)	**Creating a File System**
IAM is an enterprise-level self-service cloud resource management system. It provides user identity management and access control functions. When employees in your enterprise need to use SFS Turbo, the enterprise administrator can use IAM to create users and control these users' permissions on enterprise resources.	Identity and Access Management (IAM)	**Permissions**
Once you have subscribed to SFS Turbo, you can monitor its performance without installing any plug-ins and view monitored metrics, such as the read bandwidth, write bandwidth, and read and write bandwidth on Cloud Eye.	Cloud Eye	**Monitoring**

Function	Related Service	Reference
CTS allows you to collect, store, and query cloud resource operation records and use these records for security analysis, compliance auditing, resource tracking, and fault locating. With CTS, you can record operations associated with SFS Turbo for later query, audit, and backtrack operations.	Cloud Trace Service (CTS)	**Auditing**
You can use tags to classify and identify file systems.	Tag Management Service (TMS)	**Tag**

9 Basic Concepts

9.1 SFS Turbo Basic Concepts

Before you start, understand the following concepts.

File System

A file system provides users with shared file storage through NFS. It is used for accessing network files remotely. After you create a file system on the console, you can mount the file system on multiple servers and access the file system from the servers through the standard POSIX.

POSIX

Portable Operating System Interface (POSIX) is a set of interrelated standards specified by Institute of Electrical and Electronics Engineers (IEEE) to define the application programming interface (API) for software compatible with the UNIX operating system (OS). POSIX is intended to achieve software portability at the source code level so that a program written for a POSIX compatible OS can be compiled and executed on any other POSIX OS.

NFS

Network File System (NFS) is a distributed file system protocol that allows different computers and OSs to share data over a network.

You are advised to use NFS file systems with Linux servers.

SMB

Server Message Block (SMB) is a protocol used for network file access. Using SMB, network files can be shared between Windows hosts. SMB enables Windows clients to identify and access shared resources provided by the file system. Through SMB, clients can quickly read, write, and create files in the file system the same way as on local PCs.

SMB file systems cannot be mounted to Linux servers.

You are advised to use SMB file systems with Windows servers.

9.2 Project and Enterprise Project

Project

A project is used to group and isolate OpenStack resources, such as compute, storage, and network resources. A project can be a department or a project team. Multiple projects can be created for one account.

Enterprise Project

An enterprise project manages multiple resource instances by category. Resources and projects in different cloud service regions can be classified into one enterprise project. An enterprise allows you to classify resources based on departments or project groups and put relevant resources into the same enterprise project for management.

9.3 Region and AZ

What Are Region and AZ?

A region and an availability zone (AZ) identify the location of a data center. You can create resources in a specific region and AZ.

- Regions are divided based on geographical location and network latency. Public services, such as Elastic Cloud Server (ECS), Elastic Volume Service (EVS), Object Storage Service (OBS), Virtual Private Cloud (VPC), Elastic IP (EIP), and Image Management Service (IMS), are shared within the same region. Regions are either universal or dedicated. A universal region provides universal cloud services for common tenants, while a dedicated region provides services of the same type only or for specific tenants.

- An AZ contains one or more physical data centers. Each AZ has independent cooling, fire extinguishing, moisture-proof, and electricity facilities. Within an AZ, compute, network, storage, and other resources are logically divided into multiple clusters. AZs within a region are interconnected using high-speed optical fibers, to support cross-AZ high-availability systems.

Figure 9-1 shows the relationship between regions and AZs.

Figure 9-1 Regions and AZs
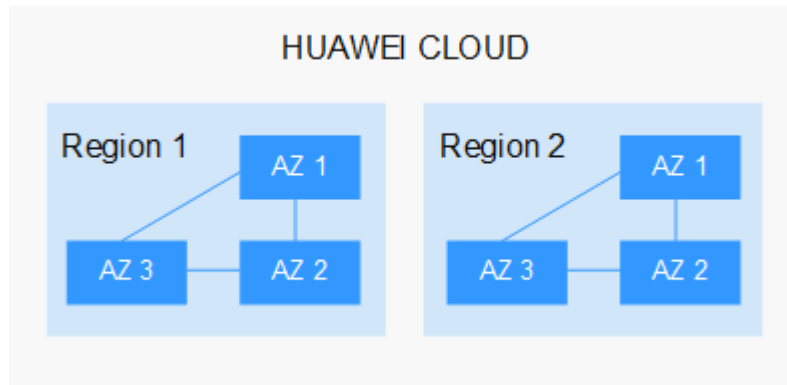
Huawei Cloud provides services in many regions around the world. You can select a region and an AZ based on requirements. For more information, see **Huawei Cloud Global Regions**.

Selecting a Region

When selecting a region, consider the following factors:

- Geographical location

  Select a region closest to your target users for lower network latency and quick access.

  – If your target users are in Asia Pacific (excluding the Chinese mainland), select the **CN-Hong Kong**, **AP-Bangkok**, or **AP-Singapore** region.

  – If your target users are in Africa, select the **AF-Johannesburg** region.

  – If your target users are in Latin America, select the **LA-Santiago** region.

    ☐ NOTE

    The **LA-Santiago** region is located in Chile.

- Resource price

  Resource prices may vary in different regions. For details, see **Product Pricing Details**.

Selecting an AZ

When deploying resources, consider your applications' requirements on network latency.

For lower network latency, deploy resources in the same AZ.

Regions and Endpoints

Before you call an API to use a resource, specify its region and endpoint. For more information, see **Regions and Endpoints**.

10 Notes and Constraints

Naming

Table 10-1 Naming

Item	Description
SFS Turbo file system name	A file system name can contain only letters, digits, underscores (_), and hyphens (-). It must start with a letter and can contain 4 to 64 characters.
Tag key	A tag key can contain a maximum of 128 characters and can contain letters, digits, spaces, and special characters (_.:=+-@), but cannot start or end with a space or start with _sys_.
Tag value	A tag value can contain a maximum of 255 characters and can contain letters, digits, spaces, and special characters (_.:/=+-@), but cannot start or end with a space.

Specifications

Table 10-2 Specifications

Item	Description
Max. size of a single file	- Standard, Standard-Enhanced (discontinued), Performance, and Performance-Enhanced (discontinued): 16 TB 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 320 TB

Item	Description
Max. number of files or subdirectories in a file system	• Standard, Standard-Enhanced (discontinued), Performance, and Performance-Enhanced (discontinued): 1 billion **NOTE** The number of files or subdirectories allowed in a single file system is calculated by dividing the total capacity (KB) by 16. If the calculated value is greater than 1 billion, the 1 billion cap is used. • 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 2 billion **NOTE** The number of files or subdirectories allowed in a single file system is calculated by multiplying the total capacity (GB) with 25,000. If the calculated value is greater than 2 billion, the 2 billion cap is used.
Max. number of files or subdirectories in a single directory	20 million **NOTE** If you need to execute the **ls**, **du**, **cp**, **chmod**, or **chown** command on a directory, you are advised to place no more than 500,000 files or subdirectories in that directory. Otherwise, requests may queue for a long time as the NFS protocol needs to send a large number of requests to traverse files in the directory.
Max. directory depth	100
Max. path length	• Standard, Standard-Enhanced (discontinued), Performance, and Performance-Enhanced (discontinued): 1,024 bytes • 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 4,096 bytes
Max. soft link length	1,024 bytes
Max. hard link length	255 bytes
Max. number of file systems	32 by default. You can **submit a service ticket** to increase the quota.

Operations

Table 10-3 Operations

Operation	Item	Description
Creating an SFS Turbo file system	Supported protocols	NFSv3 only

Operation	Item	Description
	Max. capacity of a file system	- Standard and Performance: 32 TB - Standard-Enhanced (discontinued) and Performance-Enhanced (discontinued): 320 TB - 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 1 PB
	Max. number of SFS Turbo file systems allowed	An account can create a maximum of 20 file systems in a region.
	SFS Turbo file system creation from backups	- Standard, Standard-Enhanced (discontinued), Performance, Performance-Enhanced (discontinued), 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: supported
	File locking with Flock	Not supported
	Cache acceleration	- Standard, Standard-Enhanced (discontinued), Performance, and Performance-Enhanced (discontinued): not supported - 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: supported. (Only eventual consistency is supported. If you need to disable the function, **submit a service ticket**.) **NOTE** When multiple clients access the same file system, access requests of a client may be routed to different backends. Eventual consistency means that if a request hits a backend's local cache, it will fail to obtain the modifications made by other clients. Cache is normally valid for 3 to 30 seconds.
	Max. number of authorized VPCs that can be added for a file system	20

Operation	Item	Description
Mounting an SFS Turbo file system	Max. number of clients that a file system allows	- Standard, Standard-Enhanced (discontinued), Performance, and Performance-Enhanced (discontinued): 500 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 3,000
Accessing an SFS Turbo file system	Access methods	VPN, Direct Connect, and Cloud Connect
Expanding and reducing the capacity of an SFS Turbo file system	Capacity expansion	Supported
	Capacity reduction	Not supported
	New capacity value range	- Standard–Enhanced (discontinued), Standard, Performance–Enhanced (discontinued), and Performance: The expansion increment is 100 GB. A Standard or Performance file system can be expanded to up to 32 TB, and a Standard-Enhanced or Performance-Enhanced file system can be expanded to up to 320 TB. 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB,500 MB/s/TiB, and 1,000 MB/s/TiB: The expansion increment is 1.2 TB, and the new capacity must be an integer multiple of 1.2 TB and no more than 1 PB.
Backing up an SFS Turbo file system	File system backup	Standard, Standard-Enhanced (discontinued), Performance, Performance-Enhanced (discontinued), 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: supported
	Billing mode	If you create an SFS Turbo file system from a backup, you can only choose pay-per-use billing.
Unmounting an SFS Turbo file system	Unmount prerequisites	Processes and read and write operations are stopped.

Operation	Item	Description
Deleting an SFS Turbo file system	Deletion prerequisites	The desired file system is unmounted.
	Prerequisites of deleting a pay-per-use SFS Turbo file system	The status of the desired file system is **Available** or **Unavailable**.
	Prerequisites of unsubscribing from a yearly/monthly SFS Turbo file system	The status of the desired file system is **Available** or **Unavailable**.
Adding a tag	File system tagging	Supported
	Number of tags	You can add a maximum of 20 tags to an SFS Turbo file system.
	Tag key	● When you add a tag, the tag key is mandatory and cannot be left blank. ● Tag keys of an SFS Turbo file system must be unique.
	Tag editing after file system creation	Supported

Performance

Table 10-4 Performance

Item	Description
Max. bandwidth	● Standard: 150 MB/s ● Standard-Enhanced (discontinued): 1 GB/s ● Performance: 350 MB/s ● Performance-Enhanced (discontinued): 2 GB/s ● 20 MB/s/TiB and 40 MB/s/TiB: 8 GB/s (You can **submit a service ticket** to get up to 20 GB/s of throughput.) ● 125 MB/s/TiB and 250 MB/s/TiB: 20 GB/s (You can **submit a service ticket** to get up to 100 GB/s of throughput.) ● 500 MB/s/TiB and 1,000 MB/s/TiB: 80 GB/s (You can **submit a service ticket** to get up to 200 GB/s of throughput.) **NOTE** The read/write speed is affected by the number of clients that mount the file system. For details, see **How Do I Make the Most Out of My SFS Turbo File System?**

Item	Description
Max. IOPS	- Standard: 5,000 - Standard-Enhanced (discontinued): 15,000 - Performance: 20,000 - Performance-Enhanced (discontinued): 100,000 20 MB/s/TiB and 40 MB/s/TiB: 250,000 125 MB/s/TiB and 250 MB/s/TiB: 1 million 500 MB/s/TiB and 1,000 MB/s/TiB: 4 million (You can **submit a service ticket** to get up to 10 million of IOPS.)
Min. latency	Standard, Standard-Enhanced (discontinued), Performance, Performance-Enhanced (discontinued), 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB: 1–2 ms

11 Billing

Billing Items

Pay-per-use billing is preset by default. You are billed based on the storage capacity that you select (instead of the used capacity) and the amount of time that you use the file system. Usage period is calculated at the top of every hour. Any usage period of less than an hour is rounded up to an hour. For details, see **Table 11-1**.

Table 11-1 SFS Turbo billing model

Billing Item	Billing Factor
Standard, Standard-Enhanced (discontinued), Performance, Performance-Enhanced (discontinued), 20 MB/s/TiB, 40 MB/s/TiB, 125 MB/s/TiB, 250 MB/s/TiB, 500 MB/s/TiB, and 1,000 MB/s/TiB	Storage space

Billing Modes

SFS Turbo supports the following billing modes: pay-per-use and yearly/monthly.

For details about the billing, see the "SFS Turbo" content on **Product Pricing Details**.

In addition, you can use the SFS Turbo **Price Calculator** to calculate an estimated price for the resources that you select.

Changing Billing Mode

- Yearly/monthly is a prepaid billing mode. You will be billed based on the subscription duration you specify. This mode provides a favorable price and is ideal when the resource use duration is predictable.

- Pay-per-use is a postpaid billing mode. You will be billed based on the billing items of specific file systems and can purchase or delete file systems at any time. Expenditures are deducted from the account balance.

In some regions, you can change your pay-per-use SFS Turbo file systems to yearly/monthly billing. Changing from yearly/monthly billing to pay-per-use is currently not supported.

Renewal

For more information about renewal, including auto-renewal, exporting the renewal list, and changing subscriptions, see **Renewal Management**.

Expiration

After a yearly/monthly SFS Turbo file system expires, the system will not automatically change it to pay-per-use billing, but processes it based on the rules specified in **Resource Suspension and Release**. If the file system is not renewed before the retention period expires, it will be deleted.

Overdue Payment

Possible causes of overdue payment:

You have created a pay-per-use SFS Turbo file system and your account balance is not enough to pay for the generated pay-per-use charges.

Service status and operation restrictions when an account is in arrears:

Your SFS Turbo file systems are retained after your account is in arrears and the file systems enter the retention period, but you cannot use the file systems. For details about how to repay arrears, see **Topping Up an Account**. If the outstanding payment is not cleared before the retention period ends, data stored in the file systems will be deleted and cannot be recovered.

For details about the retention period, see **Service Suspension and Resource Release**.

12 Permissions

If you need to assign different permissions to employees in your enterprise to access your SFS Turbo resources on Huawei Cloud, Identity and Access Management (IAM) is a good choice for fine-grained permissions management. IAM provides identity authentication, permissions management, and access control, helping you to securely access your Huawei Cloud resources.

With IAM, you can use your Huawei Cloud account to create IAM users, and assign permissions to the users to control their access to specific resources. For example, some software developers in your enterprise need to use SFS Turbo resources but should not be allowed to delete the resources or perform any other high-risk operations. In this scenario, you can create IAM users for the software developers and grant them only the permissions required for using SFS Turbo resources.

If your Huawei Cloud account does not require individual IAM users for permissions management, skip this section.

IAM is a free service. You only pay for the resources in your account. For more information about IAM, see **IAM Service Overview**.

SFS Turbo Permissions

New IAM users do not have any permissions assigned by default. You need to first add them to one or more groups and then attach policies or roles to these groups. The users then inherit permissions from the groups and can perform specified operations on cloud services based on the permissions they have been assigned.

You can grant permissions by using roles and policies.

- Roles: A coarse-grained authorization strategy that defines permissions by job responsibility. Only a limited number of service-level roles are available for authorization. When using roles to grant permissions, you need to also assign other roles on which the permissions depend to take effect. However, roles are not ideal for fine-grained authorization and least privilege access.

- Policies: A fine-grained authorization strategy that defines permissions required to perform operations on specific cloud resources under certain conditions. This type of authorization is more flexible and is ideal for least privilege access. For example, you can grant users only permission to manage a certain type of ECSs. Most policies define permissions based on APIs. For the API actions supported by SFS Turbo, see section "Permissions Policies and Supported Actions" in the *Scalable File Service API Reference*.

Table 12-1 lists all the system-defined permissions for SFS Turbo.

Table 12-1 System-defined permissions for SFS Turbo

Policy/Role Name	Description	Type	Dependencies
SFS Turbo FullAccess	Administrator permissions for SFS Turbo. Users with these permissions can perform any operation on all SFS Turbo resources under the account.	System-defined policy	None
SFS Turbo ReadOnlyAccess	Read-only permissions for SFS Turbo. Users with these permissions can only view SFS Turbo data.	System-defined policy	None

Table 12-2 lists the common operations supported by system-defined policies for SFS Turbo.

Table 12-2 Common operations supported by each system-defined policy of SFS Turbo

Operation	SFS Turbo FullAccess	SFS Turbo ReadOnlyAccess
Querying the AD domain configuration	Supported	Supported
Obtaining SFS Turbo specifications	Supported	Supported
Querying a specific permissions rule of a file system	Supported	Supported
Querying details of a file system	Supported	Supported
Obtaining details about a file system asynchronous task	Supported	Supported

Operation	SFS Turbo FullAccess	SFS Turbo ReadOnlyAccess
Querying task status details	Supported	Supported
Querying NIC details of an SFS Turbo file system	Supported	Supported
Querying details of a storage backend	Supported	Supported
Querying details about an import or export task	Supported	Supported
Listing NICs of an SFS Turbo file system	Supported	Supported
Querying SFS Turbo quotas	Supported	Supported
Querying the LDAP configuration	Supported	Supported
Querying details of all file systems	Supported	Supported
Querying the resource usage of a directory	Supported	Supported
Querying quota limits of a directory	Supported	Supported
Checking whether a directory exists	Supported	Supported
Querying tags of a file system	Supported	Supported
Obtaining the AZ information	Supported	Supported
Modifying the LDAP configuration	Supported	Not supported
Joining an AD domain	Supported	Not supported
Deleting a directory from a file system	Supported	Not supported
Deleting tags from a file system	Supported	Not supported
Changing the billing mode of a file system from pay-per-use to yearly/monthly	Supported	Not supported

Operation	SFS Turbo FullAccess	SFS Turbo ReadOnlyAccess
Deleting a permissions rule	Supported	Not supported
Deleting file systems	Supported	Not supported
Creating file systems	Supported	Not supported
Canceling and deleting an interworking task	Supported	Not supported
Modifying a permissions rule	Supported	Not supported
Configuring auto synchronization for an OBS backend	Supported	Not supported
Canceling or deleting an asynchronous task of a file system	Supported	Not supported
Removing quota limits from a directory	Supported	Not supported
Updating quota limits of a directory	Supported	Not supported
Creating quota limits for a directory	Supported	Not supported
Adding a storage backend	Supported	Not supported
Creating a permissions rule	Supported	Not supported
Adding a tag to a file system	Supported	Not supported
Adding NICs	Supported	Not supported
Updating a file system	Supported	Not supported
Creating directories	Supported	Not supported
Expanding the capacity or changing the security group of a file system	Supported	Not supported
Creating an asynchronous task for a file system	Supported	Not supported
Checking the name of a file system	Supported	Not supported

Operation	SFS Turbo FullAccess	SFS Turbo ReadOnlyAccess
Batch adding tags to a file system	Supported	Not supported
Removing a storage backend	Supported	Not supported
Creating an import or export task	Supported	Not supported
Modifying the AD domain configuration	Supported	Not supported
Creating and binding the LDAP configuration	Supported	Not supported
Deleting the LDAP configuration	Supported	Not supported
Leaving an AD domain	Supported	Not supported
Removing NICs	Supported	Not supported
Querying the permissions rules of a file system	Supported	Supported
Listing storage backends	Supported	Supported
Listing the asynchronous tasks of a file system	Supported	Supported
Listing import and export tasks	Supported	Supported
Querying tags of all file systems of a tenant	Supported	Supported

Role/Policy Dependencies of the SFS Turbo Console

Table 12-3 Role/Policy dependencies of the SFS Turbo console

Console Function	Dependent Services	Role/Policy Required
Creating a file system	VPC Billing Center DSS ECS	• 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.
Querying file system details	VPC	• The permissions of the **SFS Turbo ReadOnlyAccess** policy already include the permissions of **VPC ReadOnlyAccess**, which are required for querying file system details. An IAM user assigned the **SFS Turbo ReadOnlyAccess** policy does not need to have the **VPC ReadOnlyAccess** policy assigned explicitly.
Adding an OBS backend	OBS	• To add OBS buckets as storage backends, the **OBS Administrator** policy is required.

Helpful Links

- **IAM Service Overview**
- **Creating a User and Granting SFS Turbo Permissions**

13 Supported OSs

Table 13-1 lists the OSs that have passed the compatibility test.

Table 13-1 Supported OSs

Type	Version
CentOS	CentOS 5, 6, and 7 for x86
Debian	Debian GNU/Linux 6, 7, 8, and 9 for x86
Oracle	Oracle Enterprise Linux 5, 6, and 7 for x86
Red Hat	Red Hat Enterprise Linux 5, 6, and 7 for x86
SUSE	SUSE Linux Enterprise Server 10, 11, and 12 for x86
Ubuntu	Ubuntu 14.04 and later
EulerOS	EulerOS 2
Fedora	Fedora 24 and 25
OpenSUSE	OpenSUSE 42