

# Alibaba Cloud Network Attached Storage

## Product Introduction

Issue: 20190215

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## Generic conventions

Table -1: Style conventions

Style	Description	Example
	This warning information indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	 <b>Danger:</b> Resetting will result in the loss of user configuration data.
	This warning information indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	 <b>Warning:</b> Restarting will cause business interruption. About 10 minutes are required to restore business.
	This indicates warning information, supplementary instructions, and other content that the user must understand.	 <b>Notice:</b> Take the necessary precautions to save exported data containing sensitive information.
	This indicates supplemental instructions, best practices, tips, and other content that is good to know for the user.	 <b>Note:</b> You can use Ctrl + A to select all files.
>	Multi-level menu cascade.	Settings > Network > Set network type
<b>Bold</b>	It is used for buttons, menus, page names, and other UI elements.	Click OK.
Courier font	It is used for commands.	Run the <code>cd /d C:/windows</code> command to enter the Windows system folder.
<i>Italics</i>	It is used for parameters and variables.	<code>bae log list --instanceid Instance_ID</code>
[ ] or [a b]	It indicates that it is an optional value, and only one item can be selected.	<code>ipconfig [-all -t]</code>

Style	Description	Example
<code>{}</code> or <code>{a b}</code>	It indicates that it is a required value, and only one item can be selected.	<code>swich {stand   slave}</code>



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# 1 Scenarios

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To identify the target scenarios of Alibaba Cloud Network Attached Storage (NAS) more precisely, the application scenarios of NAS can be classified into the following five types:

## Enterprise applications

With high scalability, elasticity, availability, and persistence, NAS can be used to store the files of enterprise applications and the applications delivered as services. NAS provides standard file system interfaces and semantics. Therefore, you can easily construct new applications or migrate your enterprise applications to Alibaba Cloud.

## Media and entertainment workflows

Shared storage is used to process large files in media workflows, such as video editing, audio and video production, broadcast processing, and sound design and rendering. With the powerful data consistency model, high throughput, and shared file access, NAS can reduce the time required to complete the work flows and merge multiple local file repositories into a single repository that can be accessed by all users.

## Big data analysis

NAS can provide the scale, performance, and features required by big data applications, for example, high throughput of computing nodes, post-write read consistency, and file operations with low latency. Many analysis workloads use file interfaces for data interactions and depend on file system semantics such as the file lock. In addition, the workloads also require to write a part of a file. NAS supports the required file system semantics and can provide scalable capacity and performance.

## Content management and Web services

As a file system with high throughput and persistence, NAS can be used in content management systems and Web service applications to store and provide information for websites and online publishing and archiving applications. NAS follows the expected file system semantics, file naming conventions, and the privileges that Web developers are used to applying. Therefore, you can easily integrate NAS with Web applications and use it in websites and online publishing and archiving applications.


## Container storage

Containers are ideal for microservices construction thanks to such features as fast presetting, portability, and process isolation. For the containers that access raw data at every start, a shared file system is required to allow these containers to access the file system no matter which instance they run on. NAS is ideal for container storage because it provides persistent shared access to file data.

## 2 Terms

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The following table lists some terms used in NAS.

Term	Description
Mount point	<p>A mount point is the access address of the file system in a VPC or classic network. Each mount point is mapped to a domain name. When using the <code>mount</code> command, you can specify the domain name of the mount point to mount the corresponding NAS file system to a local destination.</p>
Permission group	<p>A permission group acts as a whitelist in NAS. You can add rules to a permission group to specify access permissions for an IP address or an IP segment.</p> <div> <b>Note:</b> Each mount point must be assigned with a permission group.</div>
Authorized object	<p>An authorized object is an attribute of a permission group rule. It represents the target to which a permission group rule is applied.</p> <p>In a VPC, an authorized object can be a single IP address or an IP segment.</p> <p>In a classic network, an authorized object can only be a single IP address (generally the intranet IP address of an ECS instance).</p>

## 3 Storage type

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### 3.1 Storage types

NAS provides two storage types: NAS normal and Cloud Paralled File System (CPFS).

- *NAS normal* applies to distributed file storage scenarios and provides two product types: capacity type and SSD performance type.
- CPFS is a parallel file system. It is now in the beta testing phase.

The following table describes the advantages and application scenarios of each storage type:

Storage type	Advantage	Application scenario
Capacity type	Large capacity and low cost	Highly scalable and cost-sensitive workloads, such as big data analysis, file sharing, and data backup
SSD performance type	Low latency and high IOPS	Random I/O intensive and latency-sensitive workloads, such as enterprise applications, website containers, and searching tasks
CPFS	Low latency, high throughput, and parallel I/O	Highly parallel applications and workloads with high I/O and throughput, such as high-performance computing

### 3.2 NAS normal

NAS normal is the most common storage type in NAS. NAS normal can be easily used without a local client and can meet the file storage requirements in daily business.

#### Introduction

NAS normal provides two product types: capacity type and SSD performance type.

The two types use different storage media and are different in performance, protocol

compatibility, and billing. The differences between the two types are described as follows:

- The NAS SSD performance type focuses on performance and aims to provide storage with higher throughput (four times that of the capacity type), higher IOPS, and lower latency (two to four times lower than the capacity type) for workloads.
- The NAS capacity type focuses on the cost and aims to provide efficient and reliable storage with a lower cost for workloads.

#### Application scenarios

NAS normal can meet the file storage requirements of daily business in various file storage scenarios:

- File sharing in business systems
- Log storage and analysis in business systems
- Development and test data storage in business systems
- Enterprise database backup and storage
- Back-end file storage in Office Automation (OA) systems
- Website data storage and distribution

You can select NAS capacity type or NAS SSD performance type based on your application scenarios.

- In scenarios where high throughput or low latency is required, for example, scenarios where file operations are frequently performed or file modifications must take effect immediately, you can use the NAS SSD performance type to ensure storage performance.
- In scenarios where large storage capacity is required without high performance requirements, for example, the static backup of a large number of files, you can use the NAS capacity type to reduce storage costs.

#### Specification comparison

The following table compares the performance indicators, supported protocols, and billing methods of the NAS capacity type and NAS SSD performance type. You can use this table as a reference when selecting the product types.

Item	NAS SSD performance type	NAS capacity type
Storage medium	SSD	SSD + SATA HDD

Item	NAS SSD performance type	NAS capacity type
Maximum throughput (MB/s)	0.58 MB/s x File system storage capacity (GB) + 600 MB/s (20 GB/s in maximum )	0.14 MB/s x File system storage capacity (GB) + 150 MB/s (10 GB/s in maximum )
Maximum IOPS	50,000	15,000
Supported protocols	NFS (v3.0/v4.0), SMB (v2.0/v2.1/v3.0)	NFS (v3.0/v4.0), SMB (v2.0/v2.1/v3.0)
Billing method	Pay-As-You-Go and storage packages are supported. You can choose whether to bind a storage package when creating a file system .	You must bind a storage package to use the NAS capacity type. If the actual storage capacity exceeds the package capacity, the exceeded part is billed using Pay-As-You-Go.

#### Billing method

For detailed billing methods for NAS, see [NAS pricing](#).

## 4 NFS protocol limits

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Network Attached Storage (NAS) supports the NFSv3 and NFSv4 protocols. However, you must pay attention to the following limits:

- Attributes not supported by NFSv4.0 include: `FATTR4_MIMETYPE`, `FATTR4_QUOTA_AVAIL_HARD`, `FATTR4_QUOTA_AVAIL_SOFT`, `FATTR4_QUOTA_USED`, `FATTR4_TIME_BACKUP`, and `FATTR4_TIME_CREATE`. If these attributes are attempted, an `NFS4ERR_ATTRNOTSUPP` error is returned to the client.
- Attributes not supported by NFSv4.1 include: `FATTR4_DIR_NOTIF_DELAY`, `FATTR4_DIRENT_NOTIF_DELAY`, `FATTR4_DACL`, `FATTR4_SACL`, `FATTR4_CHANGE_POLICY`, `FATTR4_FS_STATUS`, `FATTR4_LAYOUT_HINT`, `FATTR4_LAYOUT_TYPES`, `FATTR4_LAYOUT_ALIGNMENT`, `FATTR4_FS_LOCATIONS_INFO`, `FATTR4_MDSTHRESHOLD`, `FATTR4_RETENTION_GET`, `FATTR4_RETENTION_SET`, `FATTR4_RETENT EVT_GET`, `FATTR4_RETENT EVT_SET`, `FATTR4_RETENTION_HOLD`, `FATTR4_MODE_SET_MASKED`, and `FATTR4_FS_CHARSET_CAP`. If these attributes are attempted, an `NFS4ERR_ATTRNOTSUPP` error is returned to the client.
- OPs not supported by NFSv4.1 include: `OP_DELEGPURGE`, `OP_DELEGRETURN`, and `NFS4_OP_OPENATTR`. If these OPs are attempted, an `NFS4ERR_NOTSUPP` error is returned to the client.
- NFSv4 currently does not support Delegation.
- Issues concerning UID and GID
  - For the NFSv3 protocol, if the file's UID or GID exists in a Linux local account, then the corresponding user name or group name is displayed based on the mapping relations of the local UID and GID; if the file's UID or GID does not exist in the local account, then the UID or GID is displayed directly.
  - For the NFSv4 protocol, if the version of the local Linux kernel is earlier than 3.0, the UID and GID of all files is displayed as nobody; if the version is later than 3.0, then the display rule is the same as that of NFSv3 protocol.



### Note:

If you use NFSv4 protocol to mount a file system, and the version of your Linux kernel is earlier than 3.0, we recommend that you do not change owner or

group of the file or directory. Otherwise, the UID and GID of the file or directory is changed to nobody.

- A single file system can be simultaneously mounted and accessed by up to 10,000 computing nodes.



## 5 SMB protocol limits

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NAS supports the SMB protocol. However, you must pay attention to some limits.

### Introduction

Server Message Block (SMB), also known as Common Internet File System (CIFS), usually refers to SMB protocols earlier than SMB2. SMB is an application-layer communication protocol used to access files, printers, and other shared resources on networks. The SMB mentioned in NAS documentations refers to SMB 2.0 and later versions, which are supported by Alibaba Cloud NAS.

Compared to NFS, the SMB protocol is more suitable for Windows clients. Many versions of Windows provide excellent support for the SMB protocol, and most Windows applications can access Alibaba Cloud NAS through the SMB protocol without modification. We recommend that you use SMB as the file system on your Windows clients.

### Features

SMB provides the following functions:

- It supports SMB 2.0 and later versions, with corresponding support for Windows Vista, Windows Server 2008, and all later versions of Windows, but does not support Windows XP, Windows Server 2003, and earlier versions. The main reason is that SMB 1.0, in comparison to SMB 2.0 and later versions, has major design differences and serious defects in performance and functions, and Microsoft no longer provides support for earlier versions of Windows and Windows that only supports SMB 1.0.
- The file system capacity and performance can be linearly scaled in a single namespace. The maximum capacity for a single file system is petabyte-sized data with up to one billion of files.
- SMB supports secure access control in VPCs and classic networks to protect the privacy of user data. SMB provides mount point permission groups and supports RAM for console access (RAM APIs).
- Access method: Each mount point provides only one share, all named *myshare*. You can use `\\mount_point\myshare` to access this SMB share. Your multiple virtual

hosts in an Alibaba Cloud classic or VPC network can simultaneously access the same SMB file system.

- The same as the NFS, SMB is based on the same distributed and highly-available underlying file system, so it provides the same SLA. The restrictions on file quantities and lengths are also the same as those in NFS.

## Limits

Public cloud environments and traditional enterprise environments are different, especially in diversity and complexity of clients. A few SMB functions are not supported. These unsupported functions have no effect on the operation of most applications. The following functions are unsupported:

- Access by Linux clients
- Access to the same file system from both NFS and SMB, or direct access to an SMB file system over a WAN
- File and directory ACLs (file system ACLs are supported)
- File extended attributes and Oplocks and Lease-based client caching
- Sparse files, file compression, NIC status queries, reparse points, and other IOCTL/FSCTL operations
- Alternate data streams
- SMB Direct, SMB Multichannel, SMB Directory Leasing, Persistent File Handle, and other protocol functions provided by SMB 3.0 and later versions