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Apsara File Storage NAS

Limits

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Document conventions

Style	Description	Example
Danger	A danger notice indicates a situation that will cause major system changes, faults, physical injuries, and other adverse results.	**Danger:** Resetting will result in the loss of user configuration data.
Warning	A warning notice indicates a situation that may cause major system changes, faults, physical injuries, and other adverse results.	**Warning:** Restarting will cause business interruption. About 10 minutes are required to restart an instance.
Notice	A caution notice indicates warning information, supplementary instructions, and other content that the user must understand.	**Notice:** If the weight is set to 0, the server no longer receives new requests.
Note	A note indicates supplemental instructions, best practices, tips, and other content.	**Note:** You can use Ctrl + A to select all files.
>	Closing angle brackets are used to indicate a multi-level menu cascade.	Click **Settings**> **Network**> **Set network type**.
Bold	Bold formatting is used for buttons , menus, page names, and other UI elements.	Click **OK**.
`Courier font`	Courier font is used for commands	Run the `cd /d C:/window` command to enter the Windows system folder.
Italic	Italic formatting is used for parameters and variables.	`bae log list --instanceid` *Instance_ID*
[] or [a|b]	This format is used for an optional value, where only one item can be selected.	`ipconfig [-all|-t]`
{} or {a|b}	This format is used for a required value, where only one item can be selected.	`switch {active|stand}`

Table of Contents

1.Limits of product specifications

This topic describes the limits of resources, clients, and features in Apsara File Storage NAS.

Limits of resources

The following table lists limits of NAS resources.

Resource	Description
Maximum number of file systems for each account in a region	20
Maximum number of mount targets for each file system	2

Limits of NFS clients

The following limits apply to Network File System (NFS) clients:

- You can open a maximum of 32,768 files at a time on an NFS client. Files in the list folder and its subfolders are not counted.
- Each mount on an NFS client can acquire up to 8,192 locks across a maximum of 256 files or processes. For example, a single process can acquire one or more locks on 256 separate files, or 8 processes can each acquire one or more locks on 32 files.
- We recommend that you do not use an NFS client in a Windows host to access an NFS file system.

Limits of SMB clients

Each file or directory can be opened a maximum of 8,192 times at a time. This limit applies across all compute nodes that have the file system mounted and all users that share access to the file system. This indicates a maximum of 8,192 active file handles for each file or directory. A maximum of 65,536 active file handles can exist on a file system.

Limits of file systems

The following limits apply to NAS file systems:

- Maximum number of files in each file system: 1 billion.
- Maximum length of a file system name: 255 bytes.
- Maximum directory depth: 1,000 levels.
- Maximum capacity of each file system: 10 PB for NAS Capacity and 1 PB for NAS Performance.
- Maximum number of compute nodes on which a file system is mounted: 1,000.
- Maximum size of each file: 32 TB.
- Each file supports up to 511 hard links.
- In Linux, mappings between user IDs (UIDs) and usernames and mappings between group IDs (GIDs) and group names are defined in configuration files. For NFSv3 file systems, if the mapping between an ID and a name is defined in a configuration file, the name is displayed. If no mapping is defined for an ID, the ID is displayed.
- For NFSv4 file systems, the usernames and group names of all files are displayed as nobody if the version of the Linux kernel is earlier than 3.0. If the kernel version is later than 3.0, the rule that is used

by NFSv3 file systems applies.

- If the Linux kernel version is earlier than 3.0, we recommend that you do not run the chown or chgrp command for files or directories that are stored on a mounted NFSv4 file system. Otherwise, the UID and GID of the file or directory will be displayed as nobody.
- NAS supports the SMB 2.1 protocol and later versions. NAS also supports operating systems including Windows 7, Windows Server 2008 R2, and later versions. However, NAS does not support Windows Vista, Windows Server 2008, or earlier versions. Compared with SMB 2.1 and later versions, SMB 1.0 provides lower performance and fewer features. Furthermore, Windows products that support only SMB 1.0 have reached end of support.

Unsupported NFS features

This section lists the NFS features that NAS does not support.

- NFSv4.0 does not support the following attributes: FATTR4_MIMETYPE, FATTR4_QUOTA_AVAIL_HARD, FATTR4_QUOTA_AVAIL_SOFT, FATTR4_QUOTA_USED, FATTR4_TIME_BACKUP, and FATTR4_TIME_CREATE. If one of the preceding attributes is used, an NFS4ERR_ATTRNOTSUPP error is recorded in the /var/log/messages file.
- NFSv4.1 does not support the following attributes: 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_RETENTEVT_GET, FATTR4_RETENTEVT_SET, FATTR4_RETENTION_HOLD, FATTR4_MODE_SET_MASKED, and FATTR4_FS_CHARSET_CAP. If one of the preceding attributes is used, an NFS4ERR_ATTRNOTSUPP error is recorded in the /var/log/messages file.
- NFSv4 does not support the following operations: OP_DELEGPURGE, OP_DELEGRETURN, and NFS4_OP_OPENATTR. If one of the preceding operations is performed, an NFS4ERR_ATTRNOTSUPP error is recorded in the /var/log/messages file.
- NFSv4 does not support delegations.

Unsupported SMB features

NAS does not support the following SMB features:

- Extended file attributes, and client-side caching based on leases.
- Input/output control (IOCTL) or file system control (FSCTL) operations, such as creating sparse files, compressing files, inspecting the network interface card (NIC) status, and creating reparse points.
- Alternate data streams.
- Identity authentication that is provided by Active Directory (AD) or Lightweight Directory Access Protocol (LDAP).
- Several features that are provided by SMB 3.0 or later, such as SMB Direct, SMB Multichannel, SMB Directory Leasing, and Persistent File Handle.
- Access control lists (ACLs) on files or directories.

2.Recommended kernel images

This topic lists the recommended kernel images for Apsara File Storage NAS clients.

Recommended kernel images for NFS clients

- Linux

Type	Version
CentOS	○ CentOS 6.9: 2.6.32-696.16.1.el6.x86_64 and later ○ CentOS 6.10: 2.6.32-754.17.1.el6.x86_64 and later ○ CentOS 7.2: 3.10.0-514.26.2.el7.x86_64 and later ○ CentOS 7.3: 3.10.0-514.26.2.el7.x86_64 and later ○ CentOS 7.4: 3.10.0-693.2.2.el7.x86_64 and later ○ CentOS 7.5: 3.10.0-862.14.4.el7.x86_64 and later ○ CentOS 7.6: 3.10.0-957.21.3.el7.x86_64 and later ○ CentOS 7.7: 3.10.0-1062.18.1.el7.x86_64 and later ○ CentOS 8.x: 4.18.0-147.5.1.el8 _1.x86_64 and later
Aliyun Linux	Aliyun Linux 2.1903: 4.19.43-13.2.al7.x86_64 and later
Debian	○ Debian 9.6: 4.9.0-8-amd64 and later ○ Debian 9.8: 4.9.0-8-amd64 and later ○ Debian 9.10: 4.9.0-9-amd64 and later
Ubuntu	○ Ubuntu 14.04: 4.4.0-93-generic and later ○ Ubuntu 16.04: 4.4.0-151-generic and later ○ Ubuntu 18.04: 4.15.0-52-generic and later ○ Ubuntu 20.04: 5.4.0-31-generic and later
OpenSuse	openSUSE 42.3: 4.4.90-28-default and later
Suse	○ SUSE Linux Enterprise Server 12 SP2: 4.4.74-92.35-default and later ○ SUSE Linux Enterprise Server 12 SP4: 4.12.14-95.16-default and later
CoreOS	○ CoreOS 1745.7.0: 4.19.56-coreos-r1 and later ○ CoreOS 2023.4.0: 4.19.56-coreos-r1 and later

- Windows

Type	Version
Windows Server 2012	○ Windows Server 2012 R2 Datacenter edition 64-bit (Chinese) ○ Windows Server 2012 R2 Datacenter edition 64-bit (English)

Type	Version
Windows Server 2016	○ Windows Server 2016 Datacenter edition 64-bit (Chinese) ○ Windows Server 2016 Datacenter edition 64-bit (English)
Windows Server 2019	○ Windows Server 2019 Datacenter edition 64-bit (Chinese) ○ Windows Server 2019 Datacenter edition 64-bit (English)

Recommended kernel images for SMB clients

- Windows

Type	Version
Windows Server 2012	○ Windows Server 2012 R2 Datacenter edition 64-bit (Chinese) ○ Windows Server 2012 R2 Datacenter edition 64-bit (English)
Windows Server 2016	○ Windows Server 2016 Datacenter Edition 64-bit (Chinese) ○ Windows Server 2016 Datacenter edition 64-bit (English)
Windows Server 2019	○ Windows Server 2019 Datacenter edition 64-bit (Chinese) ○ Windows Server 2019 Datacenter edition 64-bit (English)

- Linux

Type	Version
CentOS	CentOS 7.6: 3.10.0-957.21.3.el7.x86_64 and later
Aliyun Linux	Aliyun Linux 2.1903: 4.19.43-13.2.al7.x86_64 and later
Debian	Debian 9.10: 4.9.0-9-amd64 and later
Ubuntu	Ubuntu 18.04: 4.15.0-52-generic and later
OpenSuse	openSUSE 42.3: 4.4.90-28-default and later
SUSE Linux	SUSE Linux Enterprise Server 12 SP2: 4.4.74-92.35-default and later
CoreOS	CoreOS 2079.4.0: 4.19.43-coreos and later

3.Known issues on NFS clients

A Network File System (NFS) client is part of a kernel. After you install an NFS client, errors may occur due to pre-existing bugs in the kernel. To ensure the stability of NFS clients, we recommend that you use the kernel versions that are verified by Alibaba Cloud.

Recommended Linux versions

To ensure system stability, we recommend that you use Alibaba Cloud official images whose kernel versions are strictly tested and verified. For more information, see Recommended kernel images.

NFS response failures due to a kernel bug in network stacks (priority: high)

An NFS response failure that is caused by a network stack error occurs if an NFS server fails to process a request that is repeatedly sent from a kernel. This issue may occur in the following kernel versions: 2.6.32-296 to 2.6.32-696.10.1, except for 2.6.32-696.10.1.

If the "operation failed" message appears, we recommend that you restart the Elastic Cloud Service (ECS) instance on which the client resides. For more information, see RHEL6.9:NFSv4 TCP transport stuck in FIN_WAIT_2 forever.

NFS response failures due to a kernel bug (priority: high)

- An NFS response failure occurs if an NFS server failover occurs after you start a connected NFS client or read data from or write data to a file system by using the NFS client. The failover results in a deadlock. This issue may occur in the following kernel versions:
  - RHEL 6 or CentOS 6 2.6.32-696.3.1.el6
  - RHEL 7 or CentOS 7 3.10.0-229.11.1.el7 and earlier versions
  - Ubuntu 15.10: Linux 4.2.0-18-generic

  If the "operation failed" message appears, we recommend that you restart the ECS instance on which the client resides. For more information, see RHEL7:NFSv4 client loops with WRITE/NFS4ERR_STALE_STATEID - if NFS server restarts multiple times within the grace period.
- An NFS response failure occurs if network partition or network jitter occurs or if the NFS client fails to provide appropriate solutions to the returned error codes. Network partition or network jitter results in repeated network connections. If this issue occurs, the "bad sequence-id" error message repeatedly appears in system logs. This issue may occur in the following kernel versions:
  - RHEL 6 or CentOS 6 2.6.32-696.16.1.el6 and earlier
  - RHEL 7 or CentOS 7 3.10.0-693.el7 and earlier

  If the "operation failed" message appears, we recommend that you restart the ECS instance on which the client resides. For more information, see RHEL6/RHEL7:NFS4 client receiving NFS4ERR_BAD_SEQID drops nfs4 stateowner resulting in infinite loop of READ/WRITE+NFS4ERR_BAD_STATEID.
- An NFS response delay or failure occurs when you run the **ls** command, commands with the `*` or `?` wildcard, or other commands that require directory traversal. This issue occurs in the CentOS and RedHat 5.11.x kernel versions.

  To fix the issue, we recommend that you upgrade the kernel to the latest version.

Unsupported chown command and system API calls (priority: low)

If the kernel version is 2.6.32, the **chown** command and system API calls are not supported on an NFS client.

ls command in an infinite loop (priority: low)

- If the kernel version is 2.6.32-696.1.1.el6 or earlier, the **ls** command runs in an infinite loop. This issue occurs if you create or delete files or subdirectories when the ls command is running.

  To fix the issue, we recommend that you upgrade the kernel to the latest version.
- If the kernel version of your Linux is 4.18.0-305.12.1, commands (such as ls) that require directory traversal run in an infinite loop. To fix this issue, we recommend that you upgrade the kernel to 4.18.0-305.19.1. For more information, see kernel-4.18.0-305.19.1.el8_4.x86_64.