



How ONTAP handles NFS client authentication

ONTAP 9

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How ONTAP handles NFS client authentication

How ONTAP handles NFS client authentication overview

NFS clients must be properly authenticated before they can access data on the SVM. ONTAP authenticates the clients by checking their UNIX credentials against the name services that you configure.

When an NFS client connects to the SVM, ONTAP obtains the UNIX credentials for the user by checking different name services, depending on the name services configuration of the SVM. ONTAP can check credentials for local UNIX accounts, NIS domains, and LDAP domains. At least one of them must be configured so that ONTAP can successfully authenticate the user. You can specify multiple name services and the order in which ONTAP searches them.

In a pure NFS environment with UNIX volume security styles, this configuration is sufficient to authenticate and provide the proper file access for a user connecting from an NFS client.

If you are using mixed, NTFS, or unified volume security styles, ONTAP must obtain a CIFS user name for the UNIX user for authentication with a Windows domain controller. This can happen either by mapping individual users using local UNIX accounts or LDAP domains, or by using a default CIFS user instead. You can specify which name services ONTAP searches in which order, or specify a default CIFS user.

How ONTAP uses name services

ONTAP uses name services to obtain information about users and clients. ONTAP uses this information to authenticate users accessing data on or administering the storage system, and to map user credentials in a mixed environment.

When you configure the storage system, you must specify what name services you want ONTAP to use for obtaining user credentials for authentication. ONTAP supports the following name services:

- Local users (file)
- External NIS domains (NIS)
- External LDAP domains (LDAP)

You use the `vserver services name-service ns-switch` command family to configure SVMs with the sources to search for network information and the order in which to search them. These commands provide the equivalent functionality of the `/etc/nsswitch.conf` file on UNIX systems.

When an NFS client connects to the SVM, ONTAP checks the specified name services to obtain the UNIX credentials for the user. If name services are configured correctly and ONTAP can obtain the UNIX credentials, ONTAP successfully authenticates the user.

In an environment with mixed security styles, ONTAP might have to map user credentials. You must configure name services appropriately for your environment to allow ONTAP to properly map user credentials.

ONTAP also uses name services for authenticating SVM administrator accounts. You must keep this in mind when configuring or modifying the name service switch to avoid accidentally disabling authentication for SVM administrator accounts. For more information about SVM administration users, see [xref:./nfs-admin/./authentication/index.html](#) [Administrator authentication and RBAC].

How ONTAP grants SMB file access from NFS clients

ONTAP uses Windows NT File System (NTFS) security semantics to determine whether a UNIX user, on an NFS client, has access to a file with NTFS permissions.

ONTAP does this by converting the user's UNIX User ID (UID) into a SMB credential, and then using the SMB credential to verify that the user has access rights to the file. A SMB credential consists of a primary Security Identifier (SID), usually the user's Windows user name, and one or more group SIDs that correspond to Windows groups of which the user is a member.

The time ONTAP takes converting the UNIX UID into a SMB credential can be from tens of milliseconds to hundreds of milliseconds because the process involves contacting a domain controller. ONTAP maps the UID to the SMB credential and enters the mapping in a credential cache to reduce the verification time caused by the conversion.

How the NFS credential cache works

When an NFS user requests access to NFS exports on the storage system, ONTAP must retrieve the user credentials either from external name servers or from local files to authenticate the user. ONTAP then stores these credentials in an internal credential cache for later reference. Understanding how the NFS credential caches works enables you to handle potential performance and access issues.

Without the credential cache, ONTAP would have to query name services every time an NFS user requested access. On a busy storage system that is accessed by many users, this can quickly lead to serious performance problems, causing unwanted delays or even denials to NFS client access.

With the credential cache, ONTAP retrieves the user credentials and then stores them for a predetermined amount of time for quick and easy access should the NFS client send another request. This method offers the following advantages:

- It eases the load on the storage system by handling fewer requests to external name servers (such as NIS or LDAP).
- It eases the load on external name servers by sending fewer requests to them.
- It speeds up user access by eliminating the wait time for obtaining credentials from external sources before the user can be authenticated.

ONTAP stores both positive and negative credentials in the credential cache. Positive credentials means that the user was authenticated and granted access. Negative credentials means that the user was not authenticated and was denied access.

By default, ONTAP stores positive credentials for 24 hours; that is, after initially authenticating a user, ONTAP uses the cached credentials for any access requests by that user for 24 hours. If the user requests access after 24 hours, the cycle starts over: ONTAP discards the cached credentials and obtains the credentials again from the appropriate name service source. If the credentials changed on the name server during the previous 24 hours, ONTAP caches the updated credentials for use for the next 24 hours.

By default, ONTAP stores negative credentials for two hours; that is, after initially denying access to a user, ONTAP continues to deny any access requests by that user for two hours. If the user requests access after 2 hours, the cycle starts over: ONTAP obtains the credentials again from the appropriate name service source. If the credentials changed on the name server during the previous two hours, ONTAP caches the updated

credentials for use for the next two hours.

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