



# **How quotas work with users and groups**

## **ONTAP 9**

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# How quotas work with users and groups

## How quotas work with users and groups overview

When you specify a user or group as the target of a quota, the limits imposed by that quota are applied to that user or group. However, some special groups and users are handled differently. There are different ways to specify IDs for users, depending on your environment.

## How you specify UNIX users for quotas

You can specify a UNIX user for a quota using one of three formats: the user name, the UID, or a file or directory owned by the user.

To specify a UNIX user for a quota, you can use one of the following formats:

- The user name, such as jsmith.



You cannot use a UNIX user name to specify a quota if that name includes a backslash (\) or an @ sign. This is because ONTAP treats names containing these characters as Windows names.

- The UID, such as 20.
- The path of a file or directory owned by that user, so that the file's UID matches the user.



If you specify a file or directory name, you must select a file or directory that will last as long as the user account remains on the system.

Specifying a file or directory name for the UID does not cause ONTAP to apply a quota to that file or directory.

## How you specify Windows users for quotas

You can specify a Windows user for a quota using one of three formats: the Windows name in pre-Windows 2000 format, the SID, or a file or directory owned by the SID of the user.

To specify a Windows user for a quota, you can use one of the following formats:

- The Windows name in pre-Windows 2000 format.
- The security ID (SID), as displayed by Windows in text form, such as S-1-5-32-544.
- The name of a file or directory that has an ACL owned by that user's SID.

If you specify a file or directory name, you must select a file or directory that will last as long as the user account remains on the system.

For ONTAP to obtain the SID from the ACL, the ACL must be valid.



If the file or directory exists in a UNIX-style qtree, or if the storage system uses UNIX mode for user authentication, ONTAP applies the user quota to the user whose **UID**, not **SID**, matches that of the file or directory.

Specifying a file or directory name to identify a user for a quota does not cause ONTAP to apply a quota to that file or directory.

## How default user and group quotas create derived quotas

When you create default user or group quotas, corresponding derived user or group quotas are automatically created for every user or group that owns files at the same level.

Derived user and group quotas are created in the following ways:

- A default user quota on a FlexVol volume creates derived user quotas for every user that owns a file anywhere on the volume.
- A default user quota on a qtree creates derived user quotas for every user that owns a file in the qtree.
- A default group quota on a FlexVol volume creates derived group quotas for every group that owns a file anywhere on the volume.
- A default group quota on a qtree creates derived group quotas for every group that owns a file in the qtree.

If a user or group does not own files at the level of a default user or group quota, derived quotas are not created for the user or group. For example, if a default user quota is created for qtree proj1 and the user jsmith owns files on a different qtree, no derived user quota is created for jsmith.

The derived quotas have the same settings as the default quotas, including limits and user mapping. For example, if a default user quota has a 50-MB disk limit and has user mapping turned on, any resulting derived quotas also have a 50-MB disk limit and user mapping turned on.

However, no limits exist in derived quotas for three special users and groups. If the following users and groups own files at the level of a default user or group quota, a derived quota is created with the same user-mapping setting as the default user or group quota, but it is only a tracking quota (with no limits):

- UNIX root user (UID 0)
- UNIX root group (GID 0)
- Windows BUILTIN\Administrators group

Since quotas for Windows groups are tracked as user quotas, a derived quota for this group is a user quota that is derived from a default user quota, not a default group quota.

### Example of derived user quotas

If you have volume where three users—root, jsmith, and bob—own files, and you create a default user quota on the volume, ONTAP automatically creates three derived user quotas. Therefore, after you reinitialize quotas on the volume, four new quotas appear in the quota report:

```
cluster1::> volume quota report
```

```
Vserver: vs1
```

Volume Specifier	Tree	Type	ID	----Disk----		----Files-----		Quota
				Used	Limit	Used	Limit	
-----	-----	-----	-----	-----	-----	-----	-----	
-----								
vol1		user	*	0B	50MB	0	-	*
vol1		user	root	5B	-	1	-	
vol1		user	jsmith	30B	50MB	10	-	*
vol1		user	bob	40B	50MB	15	-	*

4 entries were displayed.

The first new line is the default user quota that you created, which is identifiable by the asterisk (\*) as the ID. The other new lines are the derived user quotas. The derived quotas for jsmith and bob have the same 50-MB disk limit as the default quota. The derived quota for the root user is a tracking quota without limits.

## How quotas are applied to the root user

The root user (UID=0) on UNIX clients is subject to tree quotas, but not user quotas or group quotas. This allows the root user to take actions on behalf of other users that would otherwise be prevented by a quota.

When root carries out a file or directory ownership change or other operation (such as the UNIX `chown` command) on behalf of a user with less privileges, ONTAP checks the quotas based on the new owner but does not report errors or stop the operation, even if the hard quota restrictions of the new owner are exceeded. This can be useful when an administrative action, such as recovering lost data, results in temporarily exceeding quotas.



After the ownership transfer is carried out, however, a client system will report a disk space error if the user attempts to allocate more disk space while the quota is still exceeded.

## How quotas work with special Windows groups

Quotas are applied to the Everyone group and the BUILTIN\Administrators group differently than to other Windows groups.

The following list describes what happens if the quota target is a special Windows group ID:

- If the quota target is the Everyone group, a file whose ACL shows that the owner is Everyone is counted under the SID for Everyone.
- If the quota target is BUILTIN\Administrators, the entry is considered a user quota, for tracking only.

You cannot impose restrictions on BUILTIN\Administrators.

If a member of BUILTIN\Administrators creates a file, the file is owned by BUILTIN\Administrators and is counted under the SID for BUILTIN\Administrators, not the user's personal SID.



ONTAP does not support group quotas based on Windows group IDs. If you specify a Windows group ID as the quota target, the quota is considered to be a user quota.

## How quotas are applied to users with multiple IDs

A user can be represented by multiple IDs. You can set up a single user quota for such a user by specifying a list of IDs as the quota target. A file owned by any of these IDs is subject to the restriction of the user quota.

Suppose a user has the UNIX UID 20 and the Windows IDs corp\john\_smith and engineering\jsmith. For this user, you can specify a quota where the quota target is a list of the UID and Windows IDs. When this user writes to the storage system, the specified quota applies, regardless of whether the write originates from UID 20, corp\john\_smith, or engineering\jsmith.



Separate quota file entries are considered separate targets, even if the IDs belong to the same user. For example, for the same user you can specify one quota that limits UID 20 to 1 GB of disk space and another quota that limits corp\john\_smith to 2 GB of disk space, even though both IDs represent the same user. ONTAP applies quotas to UID 20 and corp\john\_smith separately.

In this case, no limits are applied to engineering\jsmith, even though limits are applied to the other IDs used by the same user.

## How ONTAP determines user IDs in a mixed environment

If you have users accessing your ONTAP storage from both Windows and UNIX clients, then both Windows and UNIX security are used to determine file ownership. Several factors determine whether ONTAP uses a UNIX or Windows ID when applying user quotas.

If the security style of the qtree or FlexVol volume that contains the file is only NTFS or only UNIX, then the security style determines the type of ID used when applying user quotas. For qtrees with the mixed security style, the type of ID used is determined by whether the file has an ACL.

The following table summarizes what type of ID is used:

Security Style	ACL	No ACL
UNIX	UNIX ID	UNIX ID
Mixed	Windows ID	UNIX ID
NTFS	Windows ID	Windows ID

## How quotas with multiple users work

When you put multiple users in the same quota target, the quota limits defined by that quota are not applied to each individual user; in this case, the quota limits are shared

among all users listed in the quota target.

Unlike with commands for managing objects, such as volumes and qtrees, you cannot rename a quota target, including a multi-user quota. This means that after a multi-user quota is defined, you cannot modify the users in the quota target, and you cannot add users to a target or remove users from a target. If you want to add or remove a user from a multi-user quota, then the quota containing that user must be deleted and a new quota rule with the set of users in the target defined.



If you combine separate user quotas into one multi-user quota, you can activate the change by resizing quotas. However, if you want to remove users from a quota target with multiple users, or add users to a target that already has multiple users, you must reinitialize quotas before the change takes effect.

#### Example of more than one user in a quotas file entry

In the following example, there are two users listed in the quota entry. The two users can use up to 80 MB of space combined. If one uses 75 MB, then the other one can use only 5 MB.

```
#Quota      target type      disk files thold sdisk sfile
#-----
jsmith,chen  user@/vol/vol1 80M
```

## How you link UNIX and Windows names for quotas

In a mixed environment, users can log in as either Windows users or UNIX users. You can configure quotas to recognize that a user's UNIX id and Windows ID represent the same user.

Quotas for Windows user name are mapped to a UNIX user name, or vice versa, when both of the following conditions are met:

- The `user-mapping` parameter is set to "on" in the quota rule for the user.
- The user names have been mapped with the `vserver name-mapping` commands.

When a UNIX and Windows name are mapped together, they are treated as the same person for determining quota usage.

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