Technical Report

NFSv4.2 Extended attributes

ONTAP 9.12.1

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Abstract

This document guides users through enabling and using NFSv4.2 extended attributes.

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Introduction

Starting from NetApp® ONTAP® 9.12.1, extended attributes (xattrs) for the NFSv4.2 protocol are supported. Xattrs provide the ability to store additional metadata alongside standard file system objects, as defined in RFC 8276. It is important to note that xattrs are not the same as NFSv4 named attributes, which ONTAP does not currently support. Xattrs are user-defined and have no inherent meaning to ONTAP; ONTAP simply stores and retrieves the data as requested by the NFS client. Xattrs are supported on both regular files and directories.

Use cases

Xattrs are implemented in the `user` namespace; they have no inherent meaning to ONTAP. Use cases are defined and controlled strictly by the client-side application. Some examples include:

- Storing the name of an application that created a file.
- Keeping a link to the email message a file was downloaded from.
- Implementing a categorization system for file objects.
- Tagging downloaded files with the URL the file was downloaded from.

How to enable xattrs

ONTAP

To use xattrs in ONTAP, both the NFSv4.1 protocol and the NFSv4.2 xattrs must be enabled. Both are enabled by default, and are scoped to a storage virtual machine (SVM). To confirm NFSv4.1 is enabled (which also enables NFSv4.2), as well as NFSv4.2 xattrs, run the following:

```
nfs show -vserver <svm> -fields v4.1,v4.2-xattrs

vserver  v4.1    v4.2-xattrs
-------- ------- -----------
svm      enabled enabled
```

If either of them shows disabled, run the following:

```
nfs modify -vserver <vserver> -v4.1 enabled -v4.2-xattrs enabled
```

Note: NFSv4.x requires configuring the v4-id-domain for proper user ID (UID)/group ID (GID) translation to take place. See TR-4067 for information on properly configuring NFSv4.x

Linux client

The volume in ONTAP must be mounted using NFSv4.2 to make use of xattrs. By default, Linux clients attempt to mount the highest NFS version supported by both the client and ONTAP. To ensure that the NFS protocol version does not get mounted with something lower than NFSv4.2, specify the `vers=4.2` option.

Example fstab entry

```
server:/junction_path  /local_path    nfs     vers=4.2       0 0
```

Example of a manual mount

```
sudo mount -t nfs -o vers=4.2 server:/junction_path /local_path
```

The NFS client utilizes the `getfattr` and `setfattr` commands to set and retrieve `user.` namespace xattrs. If these are not installed, use the package manager for your Linux distribution to do so.

Red Hat Enterprise Linux

Note: RHEL 8.4 or later is required to use xattrs.

```
sudo dnf install attr
```

Ubuntu

Note: Ubuntu 22.04 or later is required to use xattrs.

```
sudo apt install attr
```

How to set and retrieve xattrs

To set, retrieve, and delete xattrs, use the '`setfattr`' and '`getfattr`' commands.

Example of setting xattrs

```
setfattr -n user.<key> -v <value> <file>
```

Example of retrieving all xattr keys and values for a file

```
getfattr -d <file>
```

Example of retrieving only xattr keys for a file

```
getfattr <file>
```

Example of retrieving a specific xattr

```
getfattr -n user.<key> <file>
```

Note: It is possible that xattrs won't display as expected due to client-side caching. An unmount/remount of the volume, or another mechanism to clear the page cache on the client, should resolve the issue.

Example of deleting a specific xattr

```
setfattr -x user.<key> <file>
```

Mode bits and NFSv4 ACLs

To retrieve xattrs, the 'r' mode bit is required. To set xattrs, the 'w' mode bit is required. For NFSv4 ACEs needed, see below:

Table 1) NFSv4 ACEs required for xattrs.

File type	Retrieve xattrs	Set xattrs
File	`r`	`a,w,T`
Directory	`r`	`T`

Limitations

- 128 xattrs might be set per file or directory
- Xattr keys are limited to 255 bytes
- The combined key or value size is 1729 bytes per xattr

Refer to the Interoperability Matrix Tool (IMT) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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