



# **Configure SMB client access to UNIX symbolic links**

**ONTAP 9**

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# Configure SMB client access to UNIX symbolic links

## How ONTAP enables you to provide SMB client access to UNIX symbolic links

A symbolic link is a file that is created in a UNIX environment that contains a reference to another file or directory. If a client accesses a symbolic link, the client is redirected to the target file or directory to which the symbolic link refers. ONTAP supports relative and absolute symbolic links, including widelinks (absolute links with targets outside the local file system).

ONTAP provides SMB clients the ability to follow UNIX symbolic links that are configured on the SVM. This feature is optional, and you can configure it on a per-share basis, using the `-symlink-properties` option of the `vserver cifs share create` command, with one of the following settings:

- Enabled with read/write access
- Enabled with read-only access
- Disabled by hiding symbolic links from SMB clients
- Disabled with no access to symbolic links from SMB clients

If you enable symbolic links on a share, relative symbolic links work without further configuration.

If you enable symbolic links on a share, absolute symbolic links do not work right away. You must first create a mapping between the UNIX path of the symbolic link to the destination SMB path. When creating absolute symbolic link mappings, you can specify whether it is a local link or a *widelink*; widelinks can be links to file systems on other storage devices or links to file systems hosted in separate SVMs on the same ONTAP system. When you create a widelink, it must include the information for the client to follow; that is, you create a reparse point for the client to discover the directory junction point. If you create an absolute symbolic link to a file or directory outside of the local share but set the locality to local, ONTAP disallows access to the target.



If a client attempts to delete a local symbolic link (absolute or relative), only the symbolic link is deleted, not the target file or directory. However, if a client attempts to delete a widelink, it might delete the actual target file or directory to which the widelink refers. ONTAP does not have control over this because the client can explicitly open the target file or directory outside the SVM and delete it.

### • Reparse points and ONTAP file system services

A *reparse point* is an NTFS file system object that can be optionally stored on volumes along with a file. Reparse points provide SMB clients the ability to receive enhanced or extended file system services when working with NTFS style volumes. Reparse points consist of standard tags that identify the type of reparse point, and the content of the reparse point that can be retrieved by SMB clients for further processing by the client. Of the object types available for extended file system functionality, ONTAP implements support for NTFS symbolic links and directory junction points using reparse point tags. SMB clients that cannot understand the contents of a reparse point simply ignore it and don't provide the extended file system service that the reparse point might enable.

### • Directory junction points and ONTAP support for symbolic links

Directory junction points are locations within a file system directory structure that can refer to alternate locations where files are stored, either on a different path (symbolic links) or a separate storage device (widelinks). ONTAP SMB servers expose directory junction points to Windows clients as reparse points, allowing capable clients to obtain reparse point contents from ONTAP when a directory junction point is traversed. They can thereby navigate and connect to different paths or storage devices as though they were part of the same file system.

- **Enabling widelink support using reparse point options**


The `-is-use-junctions-as-reparse-points-enabled` option is enabled by default in ONTAP 9. Not all SMB clients support widelinks, so the option to enable the information is configurable on a per-protocol version basis, allowing administrators to accommodate both supported and non-supported SMB clients. In ONTAP 9.2 and later releases, you must enable the option `-widelink-as-reparse-point-versions` for each client protocol that accesses the share using widelinks; the default is SMB1. In earlier releases, only widelinks accessed using the default SMB1 were reported, and systems using SMB2 or SMB3 were unable to access the widelinks.

#### Related information

- [Windows backup applications and Unix-style symlinks](#)
- [Microsoft Documentation: Reparse Points](#)

## Limits when configuring UNIX symbolic links for SMB access

You need to be aware of certain limits when configuring UNIX symbolic links for SMB access.

Limit	Description
45	<div>Maximum length of the CIFS server name that you can specify when using an FQDN for the CIFS server name.</div> <div> You can alternatively specify the CIFS server name as a NetBIOS name, which is limited to 15 characters.</div>
80	Maximum length of the share name.
256	Maximum length of the UNIX path that you can specify when creating a symbolic link or when modifying an existing symbolic link's UNIX path. The UNIX path must start with a "/" (slash) and end with a "/". Both the beginning and ending slashes count as part of the 256-character limit.

Limit	Description
256	Maximum length of the CIFS path that you can specify when creating a symbolic link or when modifying an existing symbolic link's CIFS path. The CIFS path must start with a "/" (slash) and end with a "/". Both the beginning and ending slashes count as part of the 256-character limit.

#### Related information

[Creating symbolic link mappings for SMB shares](#)

## Control automatic DFS advertisements in ONTAP with a CIFS server option

A CIFS server option controls how DFS capabilities are advertised to SMB clients when connecting to shares. Because ONTAP uses DFS referrals when clients access symbolic links over SMB, you should be aware of what the impact is when disabling or enabling this option.

A CIFS server option determines whether the CIFS servers automatically advertise that they are DFS capable to SMB clients. By default, this option is enabled and the CIFS server always advertises that it is DFS capable to SMB clients (even when connecting to shares where access to symbolic links is disabled). If you want the CIFS server to advertise that it is DFS capable to clients only when they are connecting to shares where access to symbolic links is enabled, you can disable this option.

You should be aware of what happens when this option is disabled:

- The share configurations for symbolic links is unchanged.
- If the share parameter is set to allow symbolic link access (either read-write access or read-only access), the CIFS server advertises DFS capabilities to clients connecting to that share.

Client connections and access to symbolic links continue without interruption.

- If the share parameter is set to not allow symbolic link access (either by disabling access or if the value for the share parameter is null), the CIFS server does not advertise DFS capabilities to clients connecting to that share.

Because clients have cached information that the CIFS server is DFS capable and it is no longer advertising that it is, clients that are connected to shares where symbolic link access is disabled might not be able to access these shares after the CIFS server option is disabled. After the option is disabled, you might need to reboot clients that are connected to these shares, thus clearing the cached information.

These changes do not apply to SMB 1.0 connections.

## Configure UNIX symbolic link support on SMB shares

You can configure UNIX symbolic link support on SMB shares by specifying a symbolic link share-property setting when you create SMB shares or at any time by modifying

existing SMB shares. UNIX symbolic link support is enabled by default. You can also disable UNIX symbolic link support on a share.

#### About this task

When configuring UNIX symbolic link support for SMB shares, you can choose one of the following settings:

Setting	Description
<code>enable</code> (DEPRECATED*)	Specifies that symbolic links are enabled for read-write access.
<code>read_only</code> (DEPRECATED*)	Specifies that symlinks are enabled for read-only access. This setting does not apply to widelinks. Widelink access is always read-write.
<code>hide</code> (DEPRECATED*)	Specifies that SMB clients are prevented from seeing symlinks.
<code>no-strict-security</code>	Specifies that clients follow symlinks outside of share boundaries.
<code>symlinks</code>	Specifies that symlinks are enabled locally for read-write access. The DFS advertisements are not generated even if the CIFS option <code>is-advertise-dfs-enabled</code> is set to <code>true</code> . This is the default setting.
<code>symlinks-and-widelinks</code>	Specifies that both local symlinks and widelinks for read-write access. The DFS advertisements are generated for both local symlink and widelinks even if the CIFS option <code>is-advertise-dfs-enabled</code> is set to <code>false</code> .
<code>disable</code>	Specifies that symlinks and widelinks are disabled. The DFS advertisements are not generated even if the CIFS option <code>is-advertise-dfs-enabled</code> is set to <code>true</code> .
<code>""</code> (null, not set)	Disables symbolic links on the share.
<code>-</code> (not set)	Disables symbolic links on the share.



\*The *enable*, *hide*, and *read-only* parameters are deprecated and may be removed in a future release of ONTAP.

#### Steps

1. Configure or disable symbolic link support:

If it is...	Enter...
A new SMB share	<code>vserver cifs share create -vserver vserver_name -share-name share_name -path path -symlink-properties {enable hide read-only ""   symlinks symlinks-and- widelinks disable},...]</code>
An existing SMB share	<code>vserver cifs share modify -vserver vserver_name -share-name share_name -symlink-properties {enable hide read- only ""   symlinks symlinks-and- widelinks disable},...]</code>

2. Verify that the SMB share configuration is correct: `vserver cifs share show -vserver  
vserver_name -share-name share_name -instance`

### Example

The following command creates an SMB share named “data1” with the UNIX symbolic link configuration set to enable:

```
cluster1::> vserver cifs share create -vserver vs1 -share-name data1 -path  
/data1 -symlink-properties enable  
  
cluster1::> vserver cifs share show -vserver vs1 -share-name data1  
-instance  
  
Vserver: vs1  
Share: data1  
CIFS Server NetBIOS Name: VS1  
Path: /data1  
Share Properties: oplocks  
browsable  
changenotify  
Symlink Properties: enable  
File Mode Creation Mask: -  
Directory Mode Creation Mask: -  
Share Comment: -  
Share ACL: Everyone / Full Control  
File Attribute Cache Lifetime: -  
Volume Name: -  
Offline Files: manual  
Vscan File-Operations Profile: standard  
Maximum Tree Connections on Share: 4294967295  
UNIX Group for File Create: -
```

## Related information

[Creating symbolic link mappings for SMB shares](#)

# Create symbolic link mappings for SMB shares

You can create mappings of UNIX symbolic links for SMB shares. You can either create a relative symbolic link, which refers to the file or folder relative to its parent folder, or you can create an absolute symbolic link, which refers to the file or folder using an absolute path.

## About this task

Widelinks are not accessible from Mac OS X clients if you use SMB 2.x. When a user attempts to connect to a share using widelinks from a Mac OS X client, the attempt fails. However, you can use widelinks with Mac OS X clients if you use SMB 1.

## Steps

1. To create symbolic link mappings for SMB shares: `vserver cifs symlink create -vserver virtual_server_name -unix-path path -share-name share_name -cifs-path path [-cifs-server server_name] [-locality {local|free|widelink}] [-home-directory {true|false}]`

`-vserver virtual_server_name` specifies the storage virtual machine (SVM) name.

`-unix-path path` specifies the UNIX path. The UNIX path must begin with a slash (/) and must end with a slash (/).

`-share-name share_name` specifies the name of the SMB share to map.

`-cifs-path path` specifies the CIFS path. The CIFS path must begin with a slash (/) and must end with a slash (/).

`-cifs-server server_name` specifies the CIFS server name. The CIFS server name can be specified as a DNS name (for example, mynetwork.cifs.server.com), IP address, or NetBIOS name. The NetBIOS name can be determined by using the `vserver cifs show` command. If this optional parameter is not specified, the default value is the NetBIOS name of the local CIFS server.

`-locality {local|free|widelink}` specifies whether to create a local link, a free link or a wide symbolic link. A local symbolic link maps to the local SMB share. A free symbolic link can map anywhere on the local SMB server. A wide symbolic link maps to any SMB share on the network. If you do not specify this optional parameter, the default value is `local`.

`-home-directory {true|false}` specifies whether the target share is a home directory. Even though this parameter is optional, you must set this parameter to `true` when the target share is configured as a home directory. The default is `false`.

## Example

The following command creates a symbolic link mapping on the SVM named `vs1`. It has the UNIX path `/src/`, the SMB share name "SOURCE", the CIFS path `/mycompany/source/`, and the CIFS server IP address `123.123.123.123`, and it is a widelink.



```
cluster1::> vserver cifs symlink create -vserver vs1 -unix-path /src/
-share-name SOURCE -cifs-path "/mycompany/source/" -cifs-server
123.123.123.123 -locality widelink
```

## Related information

[Configuring UNIX symbolic link support on SMB shares](#)

# Commands for managing symbolic link mappings

There are specific ONTAP commands for managing symbolic link mappings.

If you want to...	Use this command...
Create a symbolic link mapping	<code>vserver cifs symlink create</code>
Display information about symbolic link mappings	<code>vserver cifs symlink show</code>
Modify a symbolic link mapping	<code>vserver cifs symlink modify</code>
Delete a symbolic link mapping	<code>vserver cifs symlink delete</code>

See the man page for each command for more information.

## Windows backup applications and Unix-style symlinks

When a backup application running on Windows encounters a Unix-style symbolic link (symlink), the link is followed and the data is backed up. Beginning with ONTAP 9.15.1, you have the option of backing up the symlinks instead of the data. This feature is fully supported with ONTAP FlexGroups and FlexVols.

### Overview

Before you change how ONTAP handles symlinks during a Windows backup operation, you should be familiar with the benefits, key concepts, and configuration options.

### Benefits

When this feature is disabled or unavailable, each symlink is traversed and the data it links to is backed up. Because of this, unnecessary data can sometimes be backed up and in certain situations the application might end up in a loop. Backing up the symlinks instead avoids these issues. And because the symlink files are very small compared to the data in most cases, the backups take less time to complete. The overall performance of the cluster can also improve because of the reduced IO operations.

### Windows server environment

This feature is supported for backup applications running on Windows. You should understand the relevant technical aspects of the environment before using it.

## Extended attributes

Windows supports extended attributes (EA) which collectively form additional metadata optionally associated with the files. These attributes are used by various applications, such as the Windows Subsystem for Linux as described at [File Permissions for WSL](#). Applications can request extended attributes for each file when reading data from ONTAP.

The symlinks are returned in the extended attributes when the feature is enabled. Therefore a backup application must provide standard EA support which is used to store the metadata. Some Windows utilities support and preserve the extended attributes. However, if the backup software does not support backing up and restoring the extended attributes, it will not preserve the metadata associated with each file and fail to process the symlinks properly.

## Windows configuration

Backup applications running on a Microsoft Windows server can be granted a special privilege allowing them to bypass normal file security. This is typically done by adding the applications to the Backup Operators group. The apps can then back up and restore files as needed as well as perform other related system operations. There are subtle changes to the SMB protocol used by the backup applications which can be detected by ONTAP as the data is read and written.

## Requirements

The symlink backup feature has several requirements including:

- Your cluster is running ONTAP 9.15.1 or later.
- A Windows backup application that has been granted special backup privileges.
- The backup application must also support extended attributes and request them during the backup operations.
- The ONTAP symlink backup feature is enabled for the applicable data SVM.

## Configuration options

In addition to the ONTAP CLI, you can also manage this feature using the REST API. See [What's new with the ONTAP REST API and automation](#) for more information. The configuration determining how ONTAP processes the Unix-style symlinks must be performed separately for each SVM.

## Enable the symlink backup feature in ONTAP

A configuration option has been introduced to an existing CLI command with ONTAP 9.15.1. You can use this option to enable or disable Unix-style symlink processing.

### Before you begin

Review the basic [Requirements](#). In addition:

- Be able to elevate your CLI privilege to the advanced level.
- Determine the data SVM you want to modify. The SVM `vs1` is used in the example command.

### Steps

1. Set the advanced privilege level.

```
set privilege advanced
```

2. Enable symlink file backup.

```
vserver cifs options modify -vserver vs1 -is-backup-symlink-enabled true
```

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