NetApp

Use BranchCache to cache SMB share content at a branch office

ONTAP 9

NetApp
January 23, 2026

Table of Contents

Use BranchCache to cache SMB share content at a branch office

Learn about using BranchCache to cache ONTAP SMB share content at a branch office

BranchCache was developed by Microsoft to enable caching of content on computers local to requesting clients. ONTAP implementation of BranchCache can reduce wide-area network (WAN) utilization and provide improved access response time when users in a branch office access content stored on storage virtual machines (SVMs) using SMB.

If you configure BranchCache, Windows BranchCache clients first retrieve content from the SVM and then cache the content on a computer within the branch office. If another BranchCache-enabled client in the branch office requests the same content, the SVM first authenticates and authorizes the requesting user. The SVM then determines whether the cached content is still up-to-date and, if it is, sends the client metadata about the cached content. The client then uses the metadata to retrieve content directly from the locally based cache.

Related information

Learn about using offline files to allow caching of files for offline use

Requirements and guidelines

Learn about ONTAP SMB BranchCache version support

You should be aware of which BranchCache versions ONTAP supports.

ONTAP supports BranchCache 1 and the enhanced BranchCache 2:

- When you configure BranchCache on the SMB server for the storage virtual machine (SVM), you can enable BranchCache 1, BranchCache 2, or all versions.

  By default, all versions are enabled.

- If you enable only BranchCache 2, the remote office Windows client machines must support BranchCache 2.

  Only SMB 3.0 or later clients support BranchCache 2.

For more information about BranchCache versions, see the Microsoft TechNet Library.

Related information

Microsoft TechNet Library: technet.microsoft.com/en-us/library/

Learn about ONTAP SMB network protocol support requirements

You must be aware of the network protocol requirements for implementing ONTAP BranchCache.

You can implement the ONTAP BranchCache feature over IPv4 and IPv6 networks using SMB 2.1 or later.

All CIFS servers and branch office machines participating in the BranchCache implementation must have the SMB 2.1 or later protocol enabled. SMB 2.1 has protocol extensions that allow a client to participate in a BranchCache environment. This is the minimum SMB protocol version that offers BranchCache support. SMB 2.1 supports version BranchCache version 1.

If you want to use BranchCache version 2, SMB 3.0 is the minimum supported version. All CIFS servers and branch office machines participating in a BranchCache 2 implementation must have SMB 3.0 or later enabled.

If you have remote offices where some of the clients support only SMB 2.1 and some of the clients support SMB 3.0, you can implement a BranchCache configuration on the CIFS server that provides caching support over both BranchCache 1 and BranchCache 2.

> (i) Even though the Microsoft BranchCache feature supports using both the HTTP/HTTPS and SMB protocols as file access protocols, ONTAP BranchCache only supports the use of SMB.

Learn about ONTAP SMB and Windows hosts version requirements

ONTAP and branch office Windows hosts must meet certain version requirements before you can configure BranchCache.

Before configuring BranchCache, you must ensure that the version of ONTAP on the cluster and participating branch office clients support SMB 2.1 or later and support the BranchCache feature. If you configure Hosted Cache mode, you must also ensure that you use a supported host for the cache server.

BranchCache 1 is supported on the following ONTAP versions and Windows hosts:

- Content server: storage virtual machine (SVM) with ONTAP
- Cache server: Windows Server 2008 R2 or Windows Server 2012 or later
- Peer or client: Windows 7 Enterprise, Windows 7 Ultimate, Windows 8, Windows Server 2008 R2 or Windows Server 2012 or later

BranchCache 2 is supported on the following ONTAP versions and Windows hosts:

- Content server: SVM with ONTAP
- Cache server: Windows Server 2012 or later
- Peer or client: Windows 8 or Windows Server 2012 or later

Learn about the reasons ONTAP SMB invalidates BranchCache hashes

Understanding the reasons why ONTAP invalidates hashes can be helpful as you plan your BranchCache configuration. It can help you decide which operating mode you should configure and can help you choose on which shares to enable BranchCache.

ONTAP must manage BranchCache hashes to ensure that hashes are valid. If a hash is not valid, ONTAP invalidates the hash and computes a new hash the next time that content is requested, assuming that BranchCache is still enabled.

ONTAP invalidates hashes for the following reasons:

- The server key is modified.

  If the server key is modified, ONTAP invalidates all hashes in the hash store.

- A hash is flushed from the cache because the BranchCache hash store maximum size has been reached.

  This is a tunable parameter and can be modified to meet your business requirements.

- A file is modified either through SMB or NFS access.

- A file for which there are computed hashes is restored using the `snap restore` command.

- A volume that contains SMB shares that are BranchCache-enabled is restored using the `snap restore` command.

Learn about choosing the ONTAP SMB hash store location

When configuring BranchCache, you choose where to store hashes and what size the hash store should be. Understanding the guidelines when choosing the hash store location and size can help you plan your BranchCache configuration on a CIFS-enabled SVM.

- You should locate the hash store on a volume where atime updates are permitted.

  The access time on a hash file is used to keep frequently accessed files in the hash store. If atime updates are disabled, the creation time is used for this purpose. It is preferable to use atime to track frequently used files.

- You cannot store hashes on read-only file systems such as SnapMirror destinations and SnapLock volumes.

- If the maximum size of the hash store is reached, older hashes are flushed to make room for new hashes.

  You can increase the maximum size of the hash store to reduce the amount of hashes that are flushed from the cache.

- If the volume on which you store hashes is unavailable or full, or if there is an issue with intra-cluster communication where the BranchCache service cannot retrieve hash information, BranchCache services are not available.

  The volume might be unavailable because it is offline or because the storage administrator specified a new location for the hash store.

  This does not cause issues with file access. If access to the hash store is impeded, ONTAP returns a Microsoft-defined error to the client, which causes the client to request the file using the normal SMB read request.

Related information

- Configure BranchCache on servers
- Modify BranchCache configurations on shares

Learn about ONTAP SMB BranchCache recommendations

Before you configure BranchCache, there are certain recommendations you should keep

in mind when deciding on which SMB shares you want to enable BranchCache caching.

You should keep the following recommendations in mind when deciding on which operating mode to use and on which SMB shares to enable BranchCache:

- The benefits of BranchCache are reduced when the data to be remotely cached changes frequently.
- BranchCache services are beneficial for shares containing file content that is reused by multiple remote office clients or by file content that is repeatedly accessed by a single remote user.
- Consider enabling caching for read-only content such as data in snapshots and SnapMirror destinations.

Configure BranchCache

Learn about ONTAP SMB BranchCache configuration

You configure BranchCache on your SMB server using ONTAP commands. To implement BranchCache, you must also configure your clients, and optionally your hosted cache servers at the branch offices where you want to cache content.

If you configure BranchCache to enable caching on a share-by-share basis, you must enable BranchCache on the SMB shares for which you want to provide BranchCache caching services.

Requirements for configuring ONTAP SMB BranchCache

After meeting some prerequisites, you can set up BranchCache.

The following requirements must be met before configuring BranchCache on the CIFS server for your SVM:

- ONTAP must be installed on all nodes in the cluster.
- CIFS must be licensed and a SMB server must be configured. The SMB license is included with ONTAP One. If you don't have ONTAP One and the license is not installed, contact your sales representative.
- IPv4 or IPv6 network connectivity must be configured.
- For BranchCache 1, SMB 2.1 or later must be enabled.
- For BranchCache 2, SMB 3.0 must be enabled and the remote Windows clients must support BranchCache 2.

Configure BranchCache on ONTAP SMB servers

You can configure BranchCache to provide BranchCache services on a per-share basis. Alternatively, you can configure BranchCache to automatically enable caching on all SMB shares.

About this task

You can configure BranchCache on SVMs.

- You can create an all-shares BranchCache configuration if want to offer caching services for all content contained within all SMB shares on the CIFS server.
- You can create a per-share BranchCache configuration if you want to offer caching services for content contained within selected SMB shares on the CIFS server.

You must specify the following parameters when configuring BranchCache:

Required parameters	Description
SVM name	BranchCache is configured on a per SVM basis. You must specify on which CIFS-enabled SVM you want to configure the BranchCache service.
Path to hash store	BranchCache hashes are stored in regular files on the SVM volume. You must specify the path to an existing directory where you want ONTAP to store the hash data.The BranchCache hash path must be read-writable. Read-only paths, such as snapshot directories are not allowed. You can store hash data in a volume that contains other data or you can create a separate volume to store hash data.

If the SVM is an SVM disaster recovery source, the hash path cannot be on the root volume. This is because the root volume is not replicated to the disaster recovery destination.

The hash path can contain blanks and any valid file name characters. |

You can optionally specify the following parameters:

Optional parameters	Description
Supported Versions	ONTAP support BranchCache 1 and 2. You can enable version 1, version 2, or both versions. The default is to enable both versions.
Maximum size of hash store	You can specify the size to use for the hash data store. If the hash data exceeds this value, ONTAP deletes older hashes to make room for newer hashes. The default size for the hash store is 1 GB. BranchCache performs more efficiently if hashes are not discarded in an overly aggressive manner. If you determine that hashes are discarded frequently because the hash store is full, you can increase the hash store size by modifying the BranchCache configuration.

Optional parameters	Description
Server key	You can specify a server key that the BranchCache service uses to prevent clients from impersonating the BranchCache server. If you do not specify a server key, one is randomly generated when you create the BranchCache configuration. You can set the server key to a specific value so that if multiple servers are providing BranchCache data for the same files, clients can use hashes from any server using that same server key. If the server key contains any spaces, you must enclose the server key in quotation marks.
Operating mode	The default is to enable BranchCache on a per-share basis. • To create a BranchCache configuration where you enable BranchCache on a per-share basis, you can either not specify this optional parameter or you can specify `per-share`. • To automatically enable BranchCache on all shares, you must set the operating mode to `all-shares`.

Steps

1. Enable SMB 2.1 and 3.0 as needed:

   a. Set the privilege level to advanced: `set -privilege advanced`

   b. Check the configured SVM SMB settings to determine whether all needed versions of SMB are enabled: `vserver cifs options show -vserver` *vserver_name*

   c. If necessary, enable SMB 2.1: `vserver cifs options modify -vserver` *vserver_name* `-smb2-enabled true`

   The command enables both SMB 2.0 and SMB 2.1.

   d. If necessary, enable SMB 3.0: `vserver cifs options modify -vserver` *vserver_name* `-smb3-enabled true`

   e. Return to the admin privilege level: `set -privilege admin`

2. Configure BranchCache: `vserver cifs branchcache create -vserver` *vserver_name* `-hash -store-path path [-hash-store-max-size {integer[KB|MB|GB|TB|PB]}] [-versions {v1-enable|v2-enable|enable-all] [-server-key text] -operating-mode {per-share|all-shares}`

   The specified hash storage path must exist and must reside on a volume managed by the SVM. The path must also be located on a read-writable volume. The command fails if the path is read-only or does not exist.

   If you want to use the same server key for additional SVM BranchCache configurations, record the value you enter for the server key. The server key does not appear when you display information about the BranchCache configuration.

3. Verify that the BranchCache configuration is correct: `vserver cifs branchcache show -vserver`
   vserver_name

Examples

The following commands verify that both SMB 2.1 and 3.0 are enabled and configure BranchCache to automatically enable caching on all SMB shares on SVM vs1:

```
cluster1::> set -privilege advanced
Warning: These advanced commands are potentially dangerous; use them
only when directed to do so by technical support personnel.
Do you wish to continue? (y or n): y

cluster1::*> vserver cifs options show -vserver vs1 -fields smb2-
enabled,smb3-enabled
vserver smb2-enabled smb3-enabled
------- ------------ ------------
vs1     true         true


cluster1::*> set -privilege admin

cluster1::> vserver cifs branchcache create -vserver vs1 -hash-store-path
/hash_data -hash-store-max-size 20GB -versions enable-all -server-key "my
server key" -operating-mode all-shares

cluster1::> vserver cifs branchcache show -vserver vs1

                              Vserver: vs1
          Supported BranchCache Versions: enable_all
                    Path to Hash Store: /hash_data
          Maximum Size of the Hash Store: 20GB
Encryption Key Used to Secure the Hashes: -
        CIFS BranchCache Operating Modes: all_shares
```

The following commands verify that both SMB 2.1 and 3.0 are enabled, configure BranchCache to enable caching on a per-share basis on SVM vs1, and verify the BranchCache configuration:

```
cluster1::> set -privilege advanced
Warning: These advanced commands are potentially dangerous; use them
only when directed to do so by technical support personnel.
Do you wish to continue? (y or n): y

cluster1::*> vserver cifs options show -vserver vs1 -fields smb2-
enabled,smb3-enabled
vserver smb2-enabled smb3-enabled
------- ------------ ------------
vs1     true         true

cluster1::*> set -privilege admin

cluster1::> vserver cifs branchcache create -vserver vs1 -hash-store-path
/hash_data -hash-store-max-size 20GB -versions enable-all -server-key "my
server key"

cluster1::> vserver cifs branchcache show -vserver vs1

                             Vserver: vs1
          Supported BranchCache Versions: enable_all
                    Path to Hash Store: /hash_data
          Maximum Size of the Hash Store: 20GB
Encryption Key Used to Secure the Hashes: -
       CIFS BranchCache Operating Modes: per_share
```

Related information

- Learn about BranchCache version support
- Learn about configuring BranchCache at the remote office
- Create a BranchCache-enabled SMB share
- Enable BranchCache on existing shares
- Modify BranchCache configurations on shares
- Learn about disabling BranchCache on shares
- Delete the BranchCache configuration on shares

Learn about configuring BranchCache at the remote office in ONTAP SMB

After configuring BranchCache on the SMB server, you must install and configure
BranchCache on client computers and, optionally, on caching servers at your remote
office. Microsoft provides instructions for configuring BranchCache at the remote office.

Instructions for configuring branch office clients and, optionally, caching servers to use BranchCache are on
the Microsoft BranchCache web site.

Microsoft BranchCache Docs: What's New

Configure BranchCache-enabled SMB shares

Learn about configuring BranchCache-enabled ONTAP SMB shares

After you configure BranchCache on the SMB server and at the branch office, you can enable BranchCache on SMB shares that contain content that you want to allow clients at branch offices to cache.

BranchCache caching can be enabled on all SMB shares on the SMB server or on a share-by-share basis.

- If you enable BranchCache on a share-by-share basis, you can enable BranchCache as you create the share or by modifying existing shares.

  If you enable caching on an existing SMB share, ONTAP begins computing hashes and sending metadata to clients requesting content as soon as you enable BranchCache on that share.

- Any clients that have an existing SMB connection to a share do not get BranchCache support if BranchCache is subsequently enabled on that share.

  ONTAP advertises BranchCache support for a share at the time the SMB session is set up. Clients that already have established sessions when BranchCache is enabled need to disconnect and reconnect to use cached content for this share.

> (i) If BranchCache on a SMB share is subsequently disabled, ONTAP stops sending metadata to the requesting client. A client that needs data retrieves it directly from the content server (SMB server).

Create BranchCache-enabled ONTAP SMB shares

You can enable BranchCache on an SMB share when you create the share by setting the `branchcache` share property.

About this task

- If BranchCache is enabled on the SMB share, the share must have the offline files configuration set to manual caching.

  This is the default setting when you create a share.

- You can also specify additional optional share parameters when you create the BranchCache-enabled share.

- You can set the `branchcache` property on a share even if BranchCache is not configured and enabled on the storage virtual machine (SVM).

  However, if you want the share to offer cached content, you must configure and enable BranchCache on the SVM.

- Since there are no default share properties applied to the share when you use the `-share-properties` parameter, you must specify all other share properties that you want applied to the share in addition to the `branchcache` share property by using a comma-delimited list.

- Learn more about `vserver cifs share create` in the ONTAP command reference.

Step

1. Create a BranchCache-enabled SMB share:

   `vserver cifs share create -vserver` *`vserver_name`* `-share-name` *`share_name`* `-path` *`path`* `-share-properties branchcache[,…]`

2. Verify that the BranchCache share property is set on the SMB share by using the `vserver cifs share show` command.

Example

The following command creates a BranchCache-enabled SMB share named "data" with a path of `/data` on SVM vs1. By default, the offline files setting is set to `manual`:

```
cluster1::> vserver cifs share create -vserver vs1 -share-name data -path
/data -share-properties branchcache,oplocks,browsable,changenotify

cluster1::> vserver cifs share show -vserver vs1 -share-name data
                      Vserver: vs1
                        Share: data
      CIFS Server NetBIOS Name: VS1
                         Path: /data
             Share Properties: branchcache
                               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: data
                Offline Files: manual
 Vscan File-Operations Profile: standard
```

Related information

[Disable BranchCache on a single share](#)

Enable BranchCache on existing ONTAP SMB shares

You can enable BranchCache on an existing SMB share by adding the `branchcache` share property to the existing list of share properties.

About this task

- If BranchCache is enabled on the SMB share, the share must have the offline files configuration set to manual caching.

  If the existing share's offline files setting is not set to manual caching, you must configure it by modifying

the share.

- You can set the `branchcache` property on a share even if BranchCache is not configured and enabled on the storage virtual machine (SVM).

  However, if you want the share to offer cached content, you must configure and enable BranchCache on the SVM.

- When you add the `branchcache` share property to the share, existing share settings and share properties are preserved.

  The BranchCache share property is added to the existing list of share properties. Learn more about `vserver cifs share properties add` in the ONTAP command reference.

Steps

1. If necessary, configure the offline files share setting for manual caching:

   a. Determine what the offline files share setting is by using the `vserver cifs share show` command.

   b. If the offline files share setting is not set to manual, change it to the required value: `vserver cifs share modify -vserver vserver_name -share-name share_name -offline-files manual`

2. Enable BranchCache on an existing SMB share: `vserver cifs share properties add -vserver vserver_name -share-name share_name -share-properties branchcache`

3. Verify that the BranchCache share property is set on the SMB share: `vserver cifs share show -vserver vserver_name -share-name share_name`

Example

The following command enables BranchCache on an existing SMB share named "data2" with a path of `/data2` on SVM vs1:

```
cluster1::> vserver cifs share show -vserver vs1 -share-name data2

                      Vserver: vs1
                        Share: data2
      CIFS Server NetBIOS Name: VS1
                         Path: /data2
             Share Properties: oplocks
                               browsable
                               changenotify
                               showsnapshot
           Symlink Properties: -
      File Mode Creation Mask: -
 Directory Mode Creation Mask: -
                Share Comment: -
                    Share ACL: Everyone / Full Control
File Attribute Cache Lifetime: 10s
                  Volume Name: -
                Offline Files: manual
Vscan File-Operations Profile: standard

cluster1::> vserver cifs share properties add  -vserver vs1 -share-name
data2 -share-properties branchcache

cluster1::> vserver cifs share show -vserver vs1 -share-name data2

                      Vserver: vs1
                        Share: data2
      CIFS Server NetBIOS Name: VS1
                         Path: /data2
             Share Properties: oplocks
                               browsable
                               showsnapshot
                               changenotify
                               branchcache
           Symlink Properties: -
      File Mode Creation Mask: -
 Directory Mode Creation Mask: -
                Share Comment: -
                    Share ACL: Everyone / Full Control
File Attribute Cache Lifetime: 10s
                  Volume Name: -
                Offline Files: manual
Vscan File-Operations Profile: standard
```

Related information

Manage and monitor the BranchCache configuration

Modify BranchCache configurations on ONTAP SMB shares

You can modify the configuration of the BranchCache service on SVMs, including changing the hash store directory path, the hash store maximum directory size, the operating mode, and which BranchCache versions are supported. You can also increase the size of the volume that contains the hash store.

Steps

1. Perform the appropriate action:

If you want to…	Enter the following…
Modify the hash store directory size	`vserver cifs branchcache modify -vserver vserver_name -hash-store-max -size {integer[KB|MB|GB|TB|PB]}`
Increase the size of the volume that contains the hash store	`volume size -vserver vserver_name -volume volume_name -new-size new_size[k|m|g|t]` If the volume containing the hash store fills up, you might be able to increase the size of the volume. You can specify the new volume size as a number followed by a unit designation. Learn more about [managing FlexVol volumes](#)

If you want to…	Enter the following…
Modify the hash store directory path	`vserver cifs branchcache modify -vserver vserver_name -hash-store-path path -flush-hashes {true|false}` If the SVM is an SVM disaster recovery source, the hash path cannot be on the root volume. This is because the root volume is not replicated to the disaster recovery destination. The BranchCache hash path can contain blanks and any valid file name characters. If you modify the hash path, `-flush-hashes` is a required parameter that specifies whether you want ONTAP to flush the hashes from the original hash store location. You can set the following values for the `-flush-hashes` parameter: • If you specify `true`, ONTAP deletes the hashes in the original location and creates new hashes in the new location as new requests are made by BranchCache-enabled clients. • If you specify `false`, the hashes are not flushed. In this case, you can choose to reuse the existing hashes later by changing the hash store path back to the original location.
Change the operating mode	`vserver cifs branchcache modify -vserver vserver_name -operating-mode {per-share|all-shares|disable}` You should be aware of the following when modifying the operating mode: • ONTAP advertises BranchCache support for a share when the SMB session is set up. • Clients that already have established sessions when BranchCache is enabled need to disconnect and reconnect to use cached content for this share.
Change the BranchCache version support	`vserver cifs branchcache modify -vserver vserver_name -versions {v1-enable|v2-enable|enable-all}`

2. Verify the configuration changes by using the `vserver cifs branchcache show` command.

Display information about BranchCache configurations on ONTAP SMB shares

You can display information about BranchCache configurations on storage virtual machines (SVMs), which can be used when verifying a configuration or when determining current settings before modifying a configuration.

Step

1. Perform one of the following actions:

If you want to display…	Enter this command…
Summary information about BranchCache configurations on all SVMs	`vserver cifs branchcache show`
Detailed information about the configuration on a specific SVM	`vserver cifs branchcache show -vserver vserver_name`

Example

The following example displays information about the BranchCache configuration on SVM vs1:

```
cluster1::> vserver cifs branchcache show -vserver vs1

                                   Vserver: vs1
           Supported BranchCache Versions: enable_all
                        Path to Hash Store: /hash_data
            Maximum Size of the Hash Store: 20GB
  Encryption Key Used to Secure the Hashes: -
            CIFS BranchCache Operating Modes: per_share
```

Change the ONTAP SMB BranchCache server key

You can change the BranchCache server key by modifying the BranchCache configuration on the storage virtual machine (SVM) and specifying a different server key.

About this task

You can set the server key to a specific value so that if multiple servers are providing BranchCache data for the same files, clients can use hashes from any server using that same server key.

When you change the server key, you must also flush the hash cache. After flushing the hashes, ONTAP creates new hashes as new requests are made by BranchCache-enabled clients.

Steps

1. Change the server key by using the following command: `vserver cifs branchcache modify -vserver vserver_name -server-key text -flush-hashes true`

   When configuring a new server key, you must also specify `-flush-hashes` and set the value to `true`.

2. Verify that the BranchCache configuration is correct by using the `vserver cifs branchcache show` command.

Example

The following example sets a new server key that contains spaces and flushes the hash cache on SVM vs1:

```
cluster1::> vserver cifs branchcache modify -vserver vs1 -server-key "new
vserver secret" -flush-hashes true

cluster1::> vserver cifs branchcache show -vserver vs1

                                Vserver: vs1
         Supported BranchCache Versions: enable_all
                     Path to Hash Store: /hash_data
         Maximum Size of the Hash Store: 20GB
Encryption Key Used to Secure the Hashes: -
         CIFS BranchCache Operating Modes: per_share
```

Related information

Learn about the reasons ONTAP invalidates BranchCache hashes

Pre-compute BranchCache hashes on specified ONTAP SMB paths

You can configure the BranchCache service to pre-compute hashes for a single file, for a directory, or for all files in a directory structure. This can be helpful if you want to compute hashes on data in a BranchCache-enabled share during off, non-peak hours.

About this task

If you want to collect a data sample before you display hash statistics, you must use the `statistics start` and optional `statistics stop` commands.

- You must specify the storage virtual machine (SVM) and path on which you want to pre-compute hashes.

- You must also specify whether you want hashes computed recursively.

- If you want hashes computed recursively, the BranchCache service traverses the entire directory tree under the specified path, and computes hashes for each eligible object.

  Learn more about `statistics start` and `statistics stop` in the ONTAP command reference.

Steps

1. Pre-compute hashes as desired:

If you want to pre-compute hashes on…	Enter the command…
A single file or directory	`vserver cifs branchcache hash-create -vserver vserver_name -path path -recurse false`

If you want to pre-compute hashes on…	Enter the command…
Recursively on all files in a directory structure	`vserver cifs branchcache hash-create -vserver vserver_name -path absolute_path -recurse true`

2. Verify that hashes are being computed by using the `statistics` command:

   a. Display statistics for the `hashd` object on the desired SVM instance: `statistics show -object hashd -instance vserver_name`

   b. Verify that the number of hashes created is increasing by repeating the command.

   Learn more about `statistics show` in the ONTAP command reference.

Examples

The following example creates hashes on the path `/data` and on all contained files and subdirectories on SVM vs1:

```
cluster1::> vserver cifs branchcache hash-create -vserver vs1 -path /data
-recurse true

cluster1::> statistics show -object hashd -instance vs1
Object: hashd
Instance: vs1
Start-time: 9/6/2012 19:09:54
End-time: 9/6/2012 19:11:15
Cluster: cluster1

    Counter                                               Value
    ------------------------------- -------------------------------
    branchcache_hash_created                                 85
    branchcache_hash_files_replaced                           0
    branchcache_hash_rejected                                 0
    branchcache_hash_store_bytes                              0
    branchcache_hash_store_size                               0
    instance_name                                           vs1
    node_name                                             node1
    node_uuid
                              11111111-1111-1111-1111-111111111111
    process_name                                              -

cluster1::> statistics show -object hashd -instance vs1
Object: hashd
Instance: vs1
Start-time: 9/6/2012 19:09:54
End-time: 9/6/2012 19:11:15
Cluster: cluster1

    Counter                                               Value
    ------------------------------- -------------------------------
    branchcache_hash_created                                 92
    branchcache_hash_files_replaced                           0
    branchcache_hash_rejected                                 0
    branchcache_hash_store_bytes                              0
    branchcache_hash_store_size                               0
    instance_name                                           vs1
    node_name                                             node1
    node_uuid
                              11111111-1111-1111-1111-111111111111
    process_name                                              -
```

Related information

• Performance monitoring setup

Flush hashes from the ONTAP SMB SVM BranchCache hash store

You can flush all cached hashes from the BranchCache hash store on the storage virtual machine (SVM). This can be useful if you have changed the branch office BranchCache configuration. For example, if you recently reconfigured the caching mode from distributed caching to hosted caching mode, you would want to flush the hash store.

About this task

After flushing the hashes, ONTAP creates new hashes as new requests are made by BranchCache-enabled clients.

Step

1. Flush the hashes from the BranchCache hash store: `vserver cifs branchcache hash-flush -vserver vserver_name`

   ```
   vserver cifs branchcache hash-flush -vserver vs1
   ```

Display ONTAP SMB BranchCache statistics

You can display BranchCache statistics to, among other things, identify how well caching is performing, determine whether your configuration is providing cached content to clients, and determine whether hash files were deleted to make room for more recent hash data.

About this task

The `hashd` statistic object contains counters that provide statistical information about BranchCache hashes. The `cifs` statistic object contains counters that provide statistical information about BranchCache-related activity. You can collect and display information about these objects at the advanced-privilege level.

Steps

1. Set the privilege level to advanced: `set -privilege advanced`

   ```
   cluster1::> set -privilege advanced

   Warning: These advanced commands are potentially dangerous; use them
   only when directed to do so by support personnel.
   Do you want to continue? {y|n}: y
   ```

2. Display the BranchCache-related counters by using the `statistics catalog counter show` command.

   ```
   cluster1::*> statistics catalog counter show -object hashd

   Object: hashd
       Counter                         Description
       ---------------------------
   ```

```
--------------------------------------------
    branchcache_hash_created    Number of times a request to generate
                                BranchCache hash for a file succeeded.
    branchcache_hash_files_replaced
                                Number of times a BranchCache hash file
was
                                deleted to make room for more recent
hash
                                data. This happens if the hash store
size is
                                exceeded.
    branchcache_hash_rejected    Number of times a request to generate
                                BranchCache hash data failed.
    branchcache_hash_store_bytes
                                Total number of bytes used to store hash
data.
    branchcache_hash_store_size Total space used to store BranchCache
hash
                                data for the Vserver.
    instance_name               Instance Name
    instance_uuid               Instance UUID
    node_name                   System node name
    node_uuid                   System node id
9 entries were displayed.

cluster1::*> statistics catalog counter show -object cifs

Object: cifs
    Counter                     Description
    --------------------------
--------------------------------------------
    active_searches             Number of active searches over SMB and
SMB2
    auth_reject_too_many        Authentication refused after too many
                                requests were made in rapid succession
    avg_directory_depth         Average number of directories crossed by
SMB
                                and SMB2 path-based commands
    avg_junction_depth          Average number of junctions crossed by
SMB
                                and SMB2 path-based commands
    branchcache_hash_fetch_fail Total number of times a request to fetch
hash
                                data failed. These are failures when
                                attempting to read existing hash data.
It
```

```
                                    does not include attempts to fetch hash
  data
                                    that has not yet been generated.
    branchcache_hash_fetch_ok   Total number of times a request to fetch
  hash
                                    data succeeded.
    branchcache_hash_sent_bytes Total number of bytes sent to clients
                                    requesting hashes.
    branchcache_missing_hash_bytes
                                    Total number of bytes of data that had
  to be
                                    read by the client because the hash for
  that
                                    content was not available on the server.
  ....Output truncated....
```

Learn more about `statistics catalog counter show` in the .

3. Collect BranchCache-related statistics by using the `statistics start` and `statistics stop` commands.

```
cluster1::*> statistics start -object cifs -vserver vs1 -sample-id 11
Statistics collection is being started for Sample-id: 11

cluster1::*> statistics stop -sample-id 11
Statistics collection is being stopped for Sample-id: 11
```

Learn more about `statistics start` and `statistics stop` in the .

4. Display the collected BranchCache statistics by using the `statistics show` command.

```
cluster1::*> statistics show -object cifs -counter
branchcache_hash_sent_bytes -sample-id 11

Object: cifs
Instance: vs1
Start-time: 12/26/2012 19:50:24
End-time: 12/26/2012 19:51:01
Cluster: cluster1

    Counter                                                       Value
    ------------------------------- -------------------------------
    branchcache_hash_sent_bytes                                       0
    branchcache_hash_sent_bytes                                       0
    branchcache_hash_sent_bytes                                       0
    branchcache_hash_sent_bytes                                       0

cluster1::*> statistics show -object cifs -counter
branchcache_missing_hash_bytes -sample-id 11

Object: cifs
Instance: vs1
Start-time: 12/26/2012 19:50:24
End-time: 12/26/2012 19:51:01
Cluster: cluster1

    Counter                                                       Value
    ------------------------------- -------------------------------
    branchcache_missing_hash_bytes                                    0
    branchcache_missing_hash_bytes                                    0
    branchcache_missing_hash_bytes                                    0
    branchcache_missing_hash_bytes                                    0
```

Learn more about `statistics show` in the ONTAP command reference.

5. Return to the admin privilege level: `set -privilege admin`

```
cluster1::*> set -privilege admin
```

Related information

- Display statistics
- Performance monitoring setup
- statistics start
- statistics stop

Learn about ONTAP SMB support for BranchCache Group Policy Objects

ONTAP BranchCache provides support for BranchCache Group Policy Objects (GPOs), which allow centralized management for certain BranchCache configuration parameters. There are two GPOs used for BranchCache, the Hash Publication for BranchCache GPO and the Hash Version Support for BranchCache GPO.

- **Hash Publication for BranchCache GPO**

  The Hash Publication for BranchCache GPO corresponds to the `-operating-mode` parameter. When GPO updates occur, this value is applied to storage virtual machine (SVM) objects contained within the organizational unit (OU) to which the group policy applies.

- **Hash Version Support for BranchCache GPO**

  The Hash Version Support for BranchCache GPO corresponds to the `-versions` parameter. When GPO updates occur, this value is applied to SVM objects contained within the organizational unit to which the group policy applies.

Related information

Learn about applying Group Policy Objects to SMB servers

Display information about ONTAP SMB BranchCache Group Policy Objects

You can display information about the CIFS server's Group Policy Object (GPO) configuration to determine whether BranchCache GPOs are defined for the domain to which the CIFS server belongs and, if so, what the allowed settings are. You can also determine whether BranchCache GPO settings are applied to the CIFS server.

About this task

Even though a GPO setting is defined within the domain to which the CIFS server belongs, it is not necessarily applied to the organizational unit (OU) containing the CIFS-enabled storage virtual machine (SVM). Applied GPO setting are the subset of all defined GPOs that are applied to the CIFS-enabled SVM. BranchCache settings applied through GPOs override settings applied through the CLI.

Steps

1. Display the defined BranchCache GPO setting for the Active Directory domain by using the `vserver cifs group-policy show-defined` command.

   > (i) This example does not display all of the available output fields for the command. Output is truncated.

```
cluster1::> vserver cifs group-policy show-defined -vserver vs1

Vserver: vs1
-----------------------------
        GPO Name: Default Domain Policy
        Level: Domain
       Status: enabled
  Advanced Audit Settings:
      Object Access:
          Central Access Policy Staging: failure
  Registry Settings:
      Refresh Time Interval: 22
      Refresh Random Offset: 8
      Hash Publication Mode for BranchCache: per-share
      Hash Version Support for BranchCache: version1
  [...]

   GPO Name: Resultant Set of Policy
       Status: enabled
  Advanced Audit Settings:
      Object Access:
          Central Access Policy Staging: failure
  Registry Settings:
      Refresh Time Interval: 22
      Refresh Random Offset: 8
      Hash Publication for Mode BranchCache: per-share
      Hash Version Support for BranchCache: version1
  [...]
```

2. Display the BranchCache GPO setting applied to the CIFS server by using the `vserver cifs group-policy show-applied` command. ``

   (i) This example does not display all of the available output fields for the command. Output is truncated.

```
cluster1::> vserver cifs group-policy show-applied -vserver vs1

Vserver: vs1
-----------------------------
     GPO Name: Default Domain Policy
        Level: Domain
       Status: enabled
  Advanced Audit Settings:
      Object Access:
           Central Access Policy Staging: failure
  Registry Settings:
      Refresh Time Interval: 22
      Refresh Random Offset: 8
      Hash Publication Mode for BranchCache: per-share
      Hash Version Support for BranchCache: version1
  [...]

   GPO Name: Resultant Set of Policy
        Level: RSOP
  Advanced Audit Settings:
      Object Access:
           Central Access Policy Staging: failure
  Registry Settings:
      Refresh Time Interval: 22
      Refresh Random Offset: 8
      Hash Publication Mode for BranchCache: per-share
      Hash Version Support for BranchCache: version1
  [...]
```

Related information

- Enable or disable GPO support on servers
- vserver cifs group-policy show-defined
- vserver cifs group-policy show-applied

Disable BranchCache on SMB shares

Learn about disabling BranchCache on ONTAP SMB shares

If you do not want to provide BranchCache caching services on certain SMB shares but you might want to provide caching services on those shares later, you can disable BranchCache on a share-by-share basis. If you have BranchCache configured to offer caching on all shares but you want to temporarily disable all caching services, you can modify the BranchCache configuration to stop automatic caching on all shares.

If BranchCache on an SMB share is subsequently disabled after first being enabled, ONTAP stops sending metadata to the requesting client. A client that needs data retrieves it directly from the content server (CIFS server on the storage virtual machine (SVM)).

Related information

Learn about configuring BranchCache-enabled shares

Disable BranchCache on a single ONTAP SMB share

If you do not want to offer caching services on certain shares that previously offered cached content, you can disable BranchCache on an existing SMB share.

Step

1. Enter the following command: `vserver cifs share properties remove -vserver vserver_name -share-name share_name -share-properties branchcache`

   The BranchCache share property is removed. Other applied share properties remain in effect.

Example

The following command disables BranchCache on an existing SMB share named "data2":

```
cluster1::> vserver cifs share show -vserver vs1 -share-name data2

                      Vserver: vs1
                        Share: data2
      CIFS Server NetBIOS Name: VS1
                         Path: /data2
             Share Properties: oplocks
                               browsable
                               changenotify
                               attributecache
                               branchcache
            Symlink Properties: -
      File Mode Creation Mask: -
 Directory Mode Creation Mask: -
                Share Comment: -
                    Share ACL: Everyone / Full Control
 File Attribute Cache Lifetime: 10s
                  Volume Name: -
                Offline Files: manual
 Vscan File-Operations Profile: standard


cluster1::> vserver cifs share properties remove -vserver vs1 -share-name
data2 -share-properties branchcache

cluster1::> vserver cifs share show -vserver vs1 -share-name data2

                      Vserver: vs1
                        Share: data2
      CIFS Server NetBIOS Name: VS1
                         Path: /data2
             Share Properties: oplocks
                               browsable
                               changenotify
                               attributecache
            Symlink Properties: -
      File Mode Creation Mask: -
 Directory Mode Creation Mask: -
                Share Comment: -
                    Share ACL: Everyone / Full Control
 File Attribute Cache Lifetime: 10s
                  Volume Name: -
                Offline Files: manual
 Vscan File-Operations Profile: standard
```

Stop automatic caching on all ONTAP SMB shares

If your BranchCache configuration automatically enables caching on all SMB shares on each storage virtual machine (SVM), you can modify the BranchCache configuration to stop automatically caching content for all SMB shares.

About this task

To stop automatic caching on all SMB shares, you change the BranchCache operating mode to per-share caching.

Steps

1. Configure BranchCache to stop automatic caching on all SMB shares: `vserver cifs branchcache modify -vserver vserver_name -operating-mode per-share`

2. Verify that the BranchCache configuration is correct: `vserver cifs branchcache show -vserver vserver_name`

Example

The following command changes the BranchCache configuration on storage virtual machine (SVM, formerly known as Vserver) vs1 to stop automatic caching on all SMB shares:

```
cluster1::> vserver cifs branchcache modify -vserver vs1 -operating-mode
per-share

cluster1::> vserver cifs branchcache show -vserver vs1

                              Vserver: vs1
        Supported BranchCache Versions: enable_all
                    Path to Hash Store: /hash_data
        Maximum Size of the Hash Store: 20GB
Encryption Key Used to Secure the Hashes: -
        CIFS BranchCache Operating Modes: per_share
```

Disable or enable BranchCache on the SVM

Learn what happens when you disable or reenable BranchCache on ONTAP SMB servers

If you previously configured BranchCache but do not want the branch office clients to use cached content, you can disable caching on the CIFS server. You must be aware of what happens when you disable BranchCache.

When you disable BranchCache, ONTAP no longer computes hashes or sends the metadata to the requesting client. However, there is no interruption to file access. Thereafter, when BranchCache-enabled clients request metadata information for content they want to access, ONTAP responds with a Microsoft-defined error, which causes the client to send a second request, requesting the actual content. In response to the request for content, the CIFS server sends the actual content that is stored on the storage virtual machine (SVM).

After BranchCache is disabled on the CIFS server, SMB shares do not advertise BranchCache capabilities. To access data on new SMB connections, clients make normal read SMB requests.

You can reenable BranchCache on the CIFS server at any time.

- Because the hash store is not deleted when you disable BranchCache, ONTAP can use the stored hashes when replying to hash requests after you reenable BranchCache, provided that the requested hash is still valid.

- Any clients that have made SMB connections to BranchCache-enabled shares during the time when BranchCache was disabled do not get BranchCache support if BranchCache is subsequently reenabled.

  This is because ONTAP advertises BranchCache support for a share at the time the SMB session is set up. Clients that established sessions to BranchCache-enabled shares while BranchCache was disabled need to disconnect and reconnect to use cached content for this share.

> ⓘ If you do not want to save the hash store after you disable BranchCache on a CIFS server, you can manually delete it. If you reenable BranchCache, you must ensure that the hash store directory exists. After BranchCache is reenabled, BranchCache-enabled shares advertise BranchCache capabilities. ONTAP creates new hashes as new requests are made by BranchCache-enabled clients.

Disable or enable BranchCache on ONTAP SMB shares

You can disable BranchCache on the storage virtual machine (SVM) by changing the BranchCache operating mode to `disabled`. You can enable BranchCache at any time by changing the operating mode to either offer BranchCache services per-share or automatically for all shares.

Steps

1. Run the appropriate command:

If you want to…	Then enter the following…
Disable BranchCache	`vserver cifs branchcache modify -vserver vserver_name -operating-mode disable`
Enable BranchCache per share	`vserver cifs branchcache modify -vserver vserver_name -operating-mode per-share`
Enable BranchCache for all shares	`vserver cifs branchcache modify -vserver vserver_name -operating-mode all-shares`

2. Verify that the BranchCache operating mode is configured with the desired setting: `vserver cifs branchcache show -vserver vserver_name`

Example

The following example disables BranchCache on SVM vs1:

```
cluster1::> vserver cifs branchcache modify -vserver vs1 -operating-mode
disable

cluster1::> vserver cifs branchcache show -vserver vs1

                              Vserver: vs1
          Supported BranchCache Versions: enable_all
                     Path to Hash Store: /hash_data
          Maximum Size of the Hash Store: 20GB
Encryption Key Used to Secure the Hashes: -
        CIFS BranchCache Operating Modes: disable
```

Delete the BranchCache configuration on SVMs

Learn what happens when you delete the BranchCache configuration on ONTAP SMB shares

If you previously configured BranchCache but do not want the storage virtual machine (SVM) to continue providing cached content, you can delete the BranchCache configuration on the CIFS server. You must be aware of what happens when you delete the configuration.

When you delete the configuration, ONTAP removes the configuration information for that SVM from the cluster and stops the BranchCache service. You can choose whether ONTAP should delete the hash store on the SVM.

Deleting the BranchCache configuration does not disrupt access by BranchCache-enabled clients. Thereafter, when BranchCache-enabled clients request metadata information on existing SMB connections for content that is already cached, ONTAP responds with a Microsoft defined error, which causes the client to send a second request, requesting the actual content. In response to the request for content, the CIFS server sends the actual content that is stored on the SVM

After the BranchCache configuration is deleted, SMB shares do not advertise BranchCache capabilities. To access content that has not previously been cached using new SMB connections, clients make normal read SMB requests.

Delete the BranchCache configuration on ONTAP SMB shares

The command you use for deleting the BranchCache service on your storage virtual machine (SVM) differs depending on whether you want to delete or keep existing hashes.

Step
1. Run the appropriate command:

If you want to…	Then enter the following…
Delete the BranchCache configuration and delete existing hashes	`vserver cifs branchcache delete -vserver vserver_name -flush-hashes true`
Delete the BranchCache configuration but keep existing hashes	`vserver cifs branchcache delete -vserver vserver_name -flush-hashes false`

Example

The following example deletes the BranchCache configuration on SVM vs1 and deletes all existing hashes:

```
cluster1::> vserver cifs branchcache delete -vserver vs1 -flush-hashes
true
```

Learn what happens to ONTAP SMB BranchCache when reverting

It is important to understand what happens when you revert ONTAP to a release that does not support BranchCache.

- When you revert to a version of ONTAP that does not support BranchCache, the SMB shares do not advertise BranchCache capabilities to BranchCache-enabled clients; therefore, the clients do not request hash information.

  Instead, they request the actual content using normal SMB read requests. In response to the request for content, the SMB server sends the actual content that is stored on the storage virtual machine (SVM).

- When a node hosting a hash store is reverted to a release that does not support BranchCache, the storage administrator needs to manually revert the BranchCache configuration using a command that is printed out during the revert.

  This command deletes the BranchCache configuration and hashes.

  After the revert completes, the storage administrator can manually delete the directory that contained the hash store if desired.

Related information

[Delete the BranchCache configuration on shares](#)