



# **volume flexcache commands**

ONTAP 9.9.1 commands

NetApp  
September 27, 2022

# Table of Contents

- volume flexcache commands ..... 1
  - volume flexcache config-refresh ..... 1
  - volume flexcache create ..... 2
  - volume flexcache delete ..... 4
  - volume flexcache prepare-to-downgrade ..... 5
  - volume flexcache show ..... 6
  - volume flexcache sync-properties ..... 8
  - volume flexcache origin show-caches ..... 9
  - volume flexcache origin config modify ..... 11
  - volume flexcache origin config show ..... 12
  - volume flexcache prepopulate start ..... 13

# volume flexcache commands

## volume flexcache config-refresh

Refresh FlexCache configuration for a peer volume

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The ``volume flexcache config-refresh`` command is used to refresh the FlexCache configuration. It can be used to update the configuration on either the FlexCache or origin of a FlexCache cluster. This command only needs to be run if the automatic refresh failed and the corresponding EMS was generated.



This command must be run on the peer cluster. For example, refresh of origin of a FlexCache volume must be run from the FlexCache cluster. Refresh a FlexCache volume must be run from the of an origin of a FlexCache cluster.

### Parameters

**-peer-vserver <vserver name> - Peer Vserver**

Name of the Vserver for which the configuration is being refreshed.

**-peer-volume <volume name> - Peer Volume**

Name of the volume for which the configuration is being refreshed.

**-peer-endpoint-type {cache|origin} - Origin/Cache Volume**

The peer-endpoint-type specifies the FlexCache endpoint type of the peer volume. Possible values are *cache* for FlexCache volumes and *origin* for origin of a FlexCache volumes.

### Examples

The following example triggers config-refresh on origin of a FlexCache volume "origin1".

```
cluster1::> flexcache config-refresh -peer-vserver vs34 -peer-volume  
origin1 -peer-endpoint-type origin  
          (volume flexcache config-refresh)
```

The following example triggers config-refresh on FlexCache volume "fc1".

```
cluster1::> flexcache config-refresh -peer-vserver vs34 -peer-volume fc1
-peer-endpoint-type cache
          (volume flexcache config-refresh)
```

The following example triggers config-refresh on FlexCache volume "fc1" with an incorrect peer-endpoint-type.

```
cluster1::> flexcache config-refresh -peer-vserver vs34 -peer-volume fc1
-peer-endpoint-type origin
          (volume flexcache config-refresh)
Error: command failed: Failed to store the configuration for peer volume
"fc1"
          in Vserver "vs34" on cluster "cluster1". Check the
FlexCache
          configuration on the local cluster and retry the
operation.
```

## volume flexcache create

Create a new cache relationship

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *admin* privilege level.

### Description

The `volume flexcache create` command is used to create a FlexCache volume. It also creates the relationship between the FlexCache volume and the specified origin volume.



If the `vserver` and `origin-vserver` are different, the Vservers must be in a peer relationship.

### Parameters

**-vserver <Vserver Name> - Vserver Name**

This specifies the Vserver on which the FlexCache volume is to be created.

**-volume <volume name> - Cache Volume Name**

This specifies the name of the FlexCache volume that is to be created.

**{ [-aggr-list <aggregate name>,...] - List of Aggregates for FlexGroup Constituents**

Specifies an array of names of aggregates to be used for creating the FlexCache volume.

### **[-aggr-list-multiplier <integer>] - Aggregate List Repeat Count**

Specifies the number of times to iterate over the aggregates listed with the `-aggr-list` parameter when creating a FlexGroup. The aggregate list will be repeated the specified number of times. Example:

```
-aggr-list aggr1,aggr2 -aggr-list-multiplier 2
```

will cause four constituents to be created in the order `aggr1`, `aggr2`, `aggr1`, `aggr2`.

+

The default value is 4.

### **[-auto-provision-as <FlexGroup>] - Automatically Provision as Volume of Type**

Use this parameter to automatically select existing aggregates for provisioning the FlexCache volume.

### **[-use-tiered-aggregate {true|false}] - Automatically Provision FlexGroup on FabricPool }**

This parameter specifies whether or not FabricPool-enabled aggregates are selected when provisioning a FlexCache volume using the `auto-provision-as` parameter. Only FabricPool-enabled aggregates are used if this parameter is set to `true` and only non-FabricPool-enabled aggregates are used if this parameter is set to `false`. The default value is `false`. Tiering-policy is always `none` for FlexCache.

This parameter only applies to FlexCaches created using the `-auto-provision-as` parameter.

### **[-size {<integer>[KB|MB|GB|TB|PB]}] - Volume Size**

This optionally specifies the size of the FlexCache volume. The size is specified as a number followed by a unit designation: k (kilobytes), m (megabytes), g (gigabytes), or t (terabytes). If the unit designation is not specified, bytes are used as the unit, and the specified number is rounded up to the nearest 4 KB. If the size parameter is not specified, it defaults to 10% of the origin volume size.

### **[-origin-vserver <vserver name>] - Origin Vserver Name**

This specifies the name of the Vserver where the origin volume is located.

### **-origin-volume <volume name> - Origin Volume Name**

This specifies the name of the origin volume.

### **[-junction-path <junction path>] - Cache Junction Path**

This optionally specifies the FlexCache volume's junction path. The junction path name is case insensitive and must be unique within a Vserver's namespace.

### **[-foreground {true|false}] - Foreground Process**

This specifies whether the operation runs in the foreground. The default setting is `true` (the operation runs in the foreground). When set to `true`, the command will not return until the operation completes.

### **[-s, -space-guarantee {none|volume}] - Space Guarantee Style**

This optionally specifies the space guarantee style for the volume. A value of `volume` reserves space on the aggregates for the entire volume. A value of `none` reserves no space on the aggregates, meaning that writes can fail if an aggregate runs out of space. The default setting for the FlexCache volumes is `none`.

## Examples

The following example triggers FlexCache volume create:

```
cluster1::> flexcache create -vserver vs34 -volume fc1 -aggr-list
aggr34,aggr43 -origin-volume origin1 -size 400m
(volume flexcache create)
[Job 894] Job succeeded: Successful
```

```
cluster1::> flexcache create -vserver vs34 -volume fc3 -auto-provision-as
flexgroup -origin-volume origin1 -size 400m
(volume flexcache create)
[Job 898] Job succeeded: Successful
```

```
cluster1::> flexcache create -vserver vs34 -volume fc4 -aggr-list
aggr34,aggr43 -origin-volume origin1 -size 400m -junction-path /fc4
(volume flexcache create)
[Job 903] Job succeeded: Successful
```

## volume flexcache delete

Delete a cache relationship

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *admin* privilege level.

### Description

The `volume flexcache delete` command deletes the specified FlexCache volumes and their relationships.

NOTE:

- FlexCache volumes must be offline (see [volume offline](#)) to be deleted.

### Parameters

**-vserver <Vserver Name> - Vserver Name**

This specifies the name of the Vserver from which the FlexCache volume is to be deleted.

**-volume <volume name> - Cache Volume Name**

This specifies the name of the FlexCache volume that is to be deleted.

**[-foreground {true|false}] - Foreground Process**

This specifies whether the operation runs in the foreground. The default setting is *true* (the operation runs in the foreground). When set to true, the command will not return until the operation completes.

## Examples

The following example deletes FlexCache volume "fc1":

```
cluster1::> flexcache delete -volume fc1 -vserver vs34
(volume flexcache delete)
```

```
Error: command failed: Volume fc1 in Vserver vs34 must be offline to be
deleted. Use "volume offline -vserver vs34 -volume fc1" command to
offline the volume
```

```
cluster1::> volume offline -vserver vs34 -volume fc1
Volume "vs34:fc1" is now offline.
```

```
cluster1::> flexcache delete -volume fc1 -vserver vs34
(volume flexcache delete)
[Job 891] Job succeeded: Successful
```

```
cluster1::> flexcache delete -volume fc1 -vserver vs34 -foreground false
(volume flexcache delete)
```

## Related Links

- [volume offline](#)

## volume flexcache prepare-to-downgrade

Disables flexcache version features

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

## Description

This command disables the FlexCache feature enabled for a version.

## Parameters

**[*-disable-feature-set* <ClusterVersion>] - Cluster Version**

This specifies the version for which we are running this command.

## Examples

The following example disables FlexCache features for cluster "cluster1":

```
cluster1::> flexcache prepare-to-downgrade -disable-feature-set 9.8.0
FlexCache features introduced in 9.8 are successfully disabled.
```

## volume flexcache show

Display cache relationships

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *admin* privilege level.

### Description

The `volume flexcache show` command displays information about FlexCache volumes. The command output depends on the parameter or parameters specified with the command. If no parameters are specified, the command displays the following information about all FlexCache volumes:

- Vserver name
- Volume name
- Size
- Space guarantee
- Origin Vserver
- Origin volume
- Origin cluster

To display detailed information about all FlexCache volumes, run the command with the `-instance` parameter.

### Parameters

**{ [-fields <fieldname>,...]**

This specifies the fields that need to be displayed.

**| [-instance ] }**

If this parameter is specified, the command displays information about all values.

**[-vserver <Vserver Name>] - Vserver Name**

If this parameter and the `-volume` parameter are specified, the command displays detailed information about the specified volume. If this parameter is specified by itself, the command displays information about FlexCache volumes on the specified Vserver.

**[-volume <volume name>] - Cache Volume Name**

If this parameter is specified, the command displays detailed information about the specified FlexCache volume.

**[-aggr-list <aggregate name>,...] - List of Aggregates for FlexGroup Constituents**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that are located on the specified list of storage aggregates.



**[-size {<integer>[KB|MB|GB|TB|PB] }] - Volume Size**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have the specified size. Size is the maximum amount of space a volume can consume from its associated aggregate(s), including user data, metadata, Snapshot copies, and Snapshot reserve. Note that for volumes without a `-space-guarantee` of *volume*, the ability to fill the volume to this maximum size depends on the space available in the associated aggregate or aggregates.

**[-flexgroup-msid <integer>] - Cache Flexgroup MSID**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have the specified FlexGroup master data-set ID.

**[-origin-vserver <vserver name>] - Origin Vserver Name**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes which have a relationship with the specified origin-vserver.

**[-origin-vserver-uuid <UUID>] - Origin Vserver UUID**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes which have a relationship with the origin-vserver UUID.

**[-origin-volume <volume name>] - Origin Volume Name**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have a relationship with the specified origin-volume.

**[-origin-volume-msid <integer>] - Origin Volume MSID**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have a relationship with the specified origin master data set ID.

**[-origin-cluster <Cluster name>] - Origin Cluster Name**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have a relationship with the specified origin-cluster.

**[-junction-path <junction path>] - Cache Junction Path**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have the specified junction path.

**[-create-time <Date>] - FlexCache Create Time**

If you specify this parameter, the command displays information only about the FlexCache volume or volumes for which the `create-time` option matches the specified input.

**[-s, -space-guarantee {none|volume}] - Space Guarantee Style**

If this parameter is specified, the command displays information only about the FlexCache volume or volumes that have the specified space guarantee style.

**[-relationship-type {Intravserver|Intervserver|Intercluster}] - Relationship Type**

If this parameter is specified, the command displays the FlexCache volumes matching the relationship type.

## Examples

The following example displays information about all FlexCache volumes on the Vserver named "vs34":

```

cluster1::> flexcache show -vserver vs34
          (volume flexcache show)
          Vserver Volume      Size      Origin-Vserver Origin-Volume
Origin-Cluster
-----
vs34     fc1          800MB     vs34          origin1
cluster-2
vs34     fc2          800MB     vs34          origin1
cluster-2
2 entries were displayed.

```

The following example displays detailed information about a FlexCache volume named fc1 on an SVM named vs34:

```

cluster1::> flexcache show -vserver vs34 -volume fc1 -instance
          (volume flexcache show)
Vserver: vs34
          Cache Volume Name: fc1
List of Aggregates for FlexGroup Constituents: aggr34
          Volume Size: 800MB
          Cache Flexgroup MSID: 2155934574
          Origin Vserver Name: vs34
          Origin Vserver UUID: a8717aeb-2826-11e8-bf56-
00505695f37a
          Origin Volume Name: origin1
          Origin Volume MSID: 2155934545
          Origin Cluster Name: cluster-2
          Cache Junction Path: -
          FlexCache Create Time: Thu Aug 23 04:36:19 2018
          Relationship Type: inter-vserver

```

## volume flexcache sync-properties

### Sync volume properties

**Availability:** This command is available to *cluster* administrators at the *advanced* privilege level.

### Description

The `volume flexcache sync-properties` command is used to sync a FlexCache volume's properties with its origin volume or to update FlexCache origin volume name in FlexCache relationship during a origin volume rename operation in disconnected mode.



This command should be used when there is a failure to sync properties from the origin of a FlexCache volume to the FlexCache volume or to update the FlexCache origin volume name in the FlexCache relationship in the case of a volume rename from the origin in disconnected mode.

## Parameters

### **-vserver <vserver name> - Vserver Name**

Specifies the SVM on which the volume is located.

### **-volume <volume name> - Volume Name**

Specifies the volume name whose properties need to be synced. If the volume is a FlexCache volume, its properties are synced with its origin volume. If the volume is a FlexCache origin volume, the origin volume name is updated in the FlexCache relationship where the origin volume is renamed in disconnected mode.

## Examples

```
cluster1::> flexcache sync-properties -volume fc1 -vserver vs34
(volume flexcache sync-properties)
```

## volume flexcache origin show-caches

Display all the caches connected to origin

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *admin* privilege level.

## Description

The `volume flexcache origin show-caches` command displays FlexCache relationships for origin of a FlexCache volumes on the origin cluster.

## Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>`, ... parameter, the command output also includes the specified field or fields. You can use `'-fields ?'` to display the fields to specify.

**| [-instance ] }**

If you specify the `-instance` parameter, the command displays detailed information about all fields.

**[-origin-vserver <Vserver Name>] - Vserver Name**

If this parameter and the `origin-volume` parameter are specified, the command displays the FlexCache relationship for the specified origin of a FlexCache volume. If this parameter is specified by itself, the command displays all the FlexCache relationships for all origin of a FlexCache volumes in the specified Vserver.

**[-origin-volume <volume name>] - Origin Volume**

If this parameter is specified, the command displays all the FlexCache relationships for the specified origin of a FlexCache volume.

**[-cache-vserver <vserver name>] - Cache Vserver**

If this parameter is specified then the command displays FlexCache relationships for the specified Vserver hosting FlexCache volumes.

**[-cache-volume <volume name>] - Cache Volume**

If this parameter is specified then the command displays FlexCache relationships for the specified FlexCache volume.

**[-cache-cluster <Cluster name>] - Cache Cluster**

If this parameter is specified then the command displays FlexCache relationships for the specified cluster hosting FlexCache volumes.

**[-cache-volume-msid <integer>] - Cache Volume MSID**

If this parameter is specified then the command displays FlexCache relationships for the specified FlexCache volume's FlexGroup master data-set ID.

**[-relationship-create-time <Date>] - Relationship Create Time**

If you specify this parameter, the command displays FlexCache relationships for which the relationship-create-time option matches the specified input.

**[-relationship-type {Intravserver|Intervserver|Intercluster}] - Relationship Type**

If this parameter is specified, the command displays the origin of a FlexCache volume matching the relationship type

**[-preserve-msid {true|false}] - Preserve Origin MSID on the Cache**

If this parameter is specified, the command displays the origin of a FlexCache volume whose Msid is preserved

## Examples

The following example displays information about all origin of a FlexCache volumes on the Vserver named vs34:

```

cluster1::> flexcache origin show-caches -origin-vserver vs34
(volume flexcache origin show-caches)
Origin-Vserver Origin-Volume Cache-Vserver Cache-Volume Cache-Cluster
-----
vs34            origin1       vs56         fc1_c3_origin1
                                     cluster-3
vs34            origin1       vs34         fc1           cluster-2
vs34            origin1       vs34         fc2           cluster-2
vs34            origin2_new  vs56         fc1_c3_origin2
                                     cluster-3

4 entries were displayed.

```

```

cluster1::> flexcache origin show-caches -origin-vserver vs56 -instance
(volume flexcache origin show-caches)
Vserver: vs56
    Origin Volume: origin
    Cache Vserver: vs56
    Cache Volume: fc1
    Cache Cluster: cluster-3
    Cache Volume MSID: 2156002002
Relationship Create Time: Thu Aug 23 04:36:24 2018
Relationship Type: intra-vserver

```

## volume flexcache origin config modify

### Modify FlexCache Origin Configuration

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *advanced* privilege level.

### Description

The `volume flexcache origin config modify` command modifies volume specific options of an origin of a FlexCache volume.

### Parameters

**-origin-vserver <Vserver Name> - Vserver Name**

This specifies the Vserver in which the origin of a FlexCache volume is located.

**-origin-volume <volume name> - Origin Volume Name**

This specifies the origin of a FlexCache volume.

**[-is-bli-enabled {true|false}] - Is BLI Enabled**

This parameter specifies whether data invalidation at block level is enabled or not. By default, `-is-bli-enabled` is *false*.

## Examples

The following example modifies the `is-bli-enabled` field value to true:

```
cluster1::> flexcache origin config modify -origin-volume origin_flexgroup
-origin-vserver vs3_c2 -is-bli-enabled true
(volume flexcache origin config show)
```

```
cluster1::> flexcache origin config show -origin-volume origin_flexgroup
-origin-vserver vs3_c2
(volume flexcache origin config show)
Vserver: vs3_c2
Origin Volume Name: origin_flexgroup
Is BLI Enabled: true
```

## volume flexcache origin config show

### Show FlexCache Origin Configuration

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *advanced* privilege level.

### Description

The `volume flexcache origin config show` command displays volume specific options of an origin of a FlexCache volume.

### Parameters

**{ [-fields <fieldname>,...]**

If you specify the `-fields <fieldname>, ...` parameter, the command output also includes the specified field or fields. You can use `'-fields ?'` to display the fields to specify.

**| [-instance ] }**

If you specify the `-instance` parameter, the command displays detailed information about all fields.

**[-origin-vserver <Vserver Name>] - Vserver Name**

If this parameter and the `-origin-volume` parameter are specified, the command displays options for the specified origin of a FlexCache volume. If this parameter is specified by itself, the command displays options for all origin of a FlexCache volumes in the specified Vserver.

**[-origin-volume <volume name>] - Origin Volume Name**

If this parameter is specified, the command displays options for the specified origin of a FlexCache volume.

**[-is-bli-enabled {true|false}] - Is BLI Enabled**

If this parameter is specified, the command displays the origin of a FlexCache volume matching the specified value. Possible values are:

- *false* - Block level invalidation is not set
- *true* - Block level invalidation is set

### **[*-is-global-file-locking-enabled* {*true|false*}] - Is Global File Locking Enabled**

If this parameter is specified, the command displays the origin configurations matching the specified value. Global file locking mode is a mode where protocol read locking semantics are enforced across all FlexCaches and origins of a FlexCache volume. To completely disable/enable global file locking mode, kindly delete all the FlexCache relationship (s) and recreate FlexCache relationship (s) with global file locking mode set to true/false depending upon the requirement. Possible values are:

- *false* - Global file locking mode is not set
- *true* - Global file locking mode is set

## **Examples**

The following example displays FlexCache origin options:

```
cluster1::> volume flexcache origin config show
(volume flexcache origin config show)
Origin-Vserver      Origin-Volume      Is-BLI-Enabled      Is-Global-File-Locking-
Enabled
-----
vs34                origin1             true                 true
vs34                origin2_new         false                false
2 entries were displayed.
```

## **volume flexcache prepopulate start**

Prepopulate flexcache volume

**Availability:** This command is available to *cluster* and *Vserver* administrators at the *advanced* privilege level.

### **Description**

The ``volume flexcache prepopulate start`` command is used to prepopulate a FlexCache volume with the data of given directory path(s) from the origin volume.



The FlexCache prepopulate job fails when the directories listed with the `-path-list` have one or more non-existing paths.

## Parameters

### **-cache-vserver <vserver name> - Cache Vserver Name**

This specifies the Vserver that has the FlexCache volume to be prepopulated.

### **-cache-volume <volume name> - Cache Volume Name**

This specifies the FlexCache volume which needs to be prepopulated.

### **-path-list <text>,... - List of Paths**

This specifies an array of directory names that need to be prepopulated in the FlexCache volume.

### **[-isRecursion {true|false}] - Recursively populate**

This specifies that the directories listed with the `-path-list` need to be recursively prepopulated in the `-cache-volume` FlexCache volume.

The default value is true.

### **[-exclude-path-list <text>,...] - Exclude List of Paths**

This specifies an array of directory names that need not be populated.



The path provided should be absolute path. If same path provided is for include and exclude path list then include-path will take the preference

## Examples

The following example triggers FlexCache volume prepopulate:

```
cluster1::> flexcache prepopulate start -cache-volume
vol_cache2_vs3_c2_vol_origin1_vs1_c1 -cache-vserver vs3_c2 -path-list
/dir1 -isRecursion false
(volume flexcache prepopulate start)
[JobId 164]: FlexCache prepopulate job queued.
```

```
cluster1::> flexcache prepopulate start -cache-volume
vol_cache2_vs3_c2_vol_origin1_vs1_c1 -cache-vserver vs3_c2 -path-list
/dir1
(volume flexcache prepopulate start)
[JobId 188]: FlexCache prepopulate job queued.
```



```
cluster1::> flexcache prepopulate start -cache-volume  
vol_cache2_vs3_c2_vol_origin1_vs1_c1 -cache-vserver vs3_c2 -path-list  
/dir1, dir5, dir6  
  (volume flexcache prepopulate start)
```

```
Error: command failed: Path(s) "dir5, dir6" does not exist in origin  
volume
```

```
  "vol_origin1_vs1_c1" in Vserver "vs1_c1".
```

## Copyright Information

Copyright © 2022 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

## Trademark Information

NETAPP, the NETAPP logo, and the marks listed at <http://www.netapp.com/TM> are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.