



# **FlexCache volume creation**

**ONTAP 9**

NetApp  
May 30, 2023

# Table of Contents

- FlexCache volume creation ..... 1
  - FlexCache volume creation workflow. .... 1
  - Add a FlexCache license ..... 2
  - Process to create a FlexCache volume ..... 2

# FlexCache volume creation

## FlexCache volume creation workflow

You must first install the FlexCache license from System Manager. You can then create a FlexCache volume in the same cluster or in a remote cluster by using the CLI.



You must be running ONTAP 9.5 or later.

You can use FlexCache volumes in the same cluster for accelerated performance when accessing hot volumes. You can use FlexCache volumes in different clusters for improving the performance of cross-cluster data distribution.

# Add a FlexCache license

If you are running ONTAP 9.6 or earlier, you must install a FlexCache license, which is a capacity-based and term-based license, by using System Manager.

## About this task

The FlexCache license is a cluster-wide license. The license includes an entitled usage limit that you purchase for using FlexCache volumes in the cluster. The space usage by FlexCache volumes across the cluster must not exceed the capacity of the entitled usage limit. If you need to increase the usage limit of the license, you should contact your sales representative.

Beginning with ONTAP 9.7, the capacity-based license is not required. The FlexCache license is bundled with the ONTAP package.

## Steps

1. Download the NetApp License File for the FlexCache license from the NetApp Support Site.

[NetApp Support](#)

2. Use System Manager to upload the FlexCache license to the cluster:
  - a. Click the **Configurations > Cluster > Licenses** tab.
  - b. In the **Packages** window, click **Add**.
  - c. In the **Add License Packages** dialog box, click **Choose Files** to select the NetApp License File that you downloaded, and then click **Add** to upload the file to the cluster.

# Process to create a FlexCache volume

## Create a FlexCache volume

You can create a FlexCache volume in the same cluster for improving performance when accessing a hot object. If you have data centers in different locations, you can create FlexCache volumes on remote clusters for accelerating data access.

## About this task

The FlexCache volume is always a FlexGroup volume, and not a FlexVol volume.

Beginning with ONTAP 9.7, FlexGroup volumes are also supported at the origin of the FlexCache relationship.

## Steps

1. If the FlexCache volume to be created is in a different cluster, create a cluster peer relationship:
  - a. On the destination cluster, create a peer relationship with the data protection source cluster:

```
cluster peer create -generate-passphrase -offer-expiration MM/DD/YYYY
HH:MM:SS|1...7days|1...168hours -peer-addr peer_LIF_IPs -initial-allowed
-vserver-peers svm_name,...|* -ip-space ip-space_name
```

Beginning with ONTAP 9.6, TLS encryption is enabled by default when creating a cluster peer relationship. TLS encryption is supported for the intercluster communication between the origin and FlexCache volumes. You can also disable TLS encryption for the cluster peer relationship, if required.

```
cluster02::> cluster peer create -generate-passphrase -offer
-expiration 2days -initial-allowed-vserver-peers *
```

Passphrase: UCa+6lRVICXeL/gq1WrK7ShR  
Expiration Time: 6/7/2017 08:16:10 EST  
Initial Allowed Vserver Peers: \*  
Intercluster LIF IP: 192.140.112.101  
Peer Cluster Name: Clus\_7ShR (temporary generated)

Warning: make a note of the passphrase - it cannot be displayed again.

- b. On the source cluster, authenticate the source cluster to the destination cluster:

```
cluster peer create -peer-addr peer_LIF_IPs -ipspace ipspace
```

```
cluster01::> cluster peer create -peer-addr
192.140.112.101,192.140.112.102
```

Notice: Use a generated passphrase or choose a passphrase of 8 or more characters.

To ensure the authenticity of the peering relationship, use a phrase or sequence of characters that would be hard to guess.

Enter the passphrase:  
Confirm the passphrase:

Clusters cluster02 and cluster01 are peered.

2. If the FlexCache volume is in a different SVM than that of the origin volume, create an SVM peer relationship with flexcache as the application:

- a. If the SVM is in a different cluster, create an SVM permission for the peering SVMs:

```
vserver peer permission create -peer-cluster cluster_name -vserver svm-name
-applications flexcache
```

The following example illustrates how to create an SVM peer permission that applies for all of the local SVMs:

```
cluster1::> vsserver peer permission create -peer-cluster cluster2
-vserver "*" -applications flexcache
```

Warning: This Vserver peer permission applies to all local Vservers. After that no explicit "vsserver peer accept" command required for Vserver peer relationship creation request from peer cluster "cluster2" with any of the local Vservers. Do you want to continue? {y|n}: y

b. Create the SVM peer relationship:

```
vsserver peer create -vserver local_SVM -peer-vserver remote_SVM -peer
-cluster cluster_name -applications flexcache
```

3. Create a FlexCache volume:

```
volume flexcache create -vserver cache_svm -volume cache_vol_name -auto
-provision-as flexgroup -size vol_size -origin-vserver origin_svm -origin
-volume origin_vol_name
```

The following example creates a FlexCache volume and automatically selects existing aggregates for provisioning:

```
cluster1::> volume flexcache create -vserver vs_1 -volume fc1 -auto
-provision-as flexgroup -origin-volume vol_1 -size 160MB -origin-vserver
vs_1
[Job 443] Job succeeded: Successful
```

The following example creates a FlexCache volume and sets the junction path:

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

4. Verify the FlexCache relationship from the FlexCache volume and the origin volume.

a. View the FlexCache relationship in the cluster:

```
volume flexcache show
```

```
cluster1::> volume flexcache show
Vserver Volume      Size      Origin-Vserver Origin-Volume Origin-
Cluster
-----
vs_1      fc1        160MB     vs_1          vol_1
cluster1
```

- b. View all of the FlexCache relationships in the origin cluster:

```
volume flexcache origin show-caches
```

```
cluster::> volume flexcache origin show-caches
Origin-Vserver Origin-Volume  Cache-Vserver  Cache-Volume  Cache-
Cluster
-----
vs0             ovol1         vs1            cfg1           clusA
vs0             ovol1         vs2            cfg2           clusB
vs_1            vol_1         vs_1           fc1
cluster1
```

## Result

The FlexCache volume is successfully created. Clients can mount the volume by using the junction path of the FlexCache volume.

## Related information

[Cluster and SVM peering](#)

[ONTAP 9 Commands](#)

## Guidelines for sizing a FlexCache volume

You must be aware of the limits for FlexCache volumes before you start provisioning the volumes.

The size limit of a FlexVol volume is applicable to an origin volume. The size of a FlexCache volume can be less than or equal to the origin volume. The best practice for the size of a FlexCache volume is to be at least 10 percent of the size of the origin volume.

You must also be aware of the following additional limits on FlexCache volumes:

| Limit   | ONTAP 9.5-9.6 | ONTAP 9.7 | ONTAP 9.8 and later |
|---|---------------|-----------|---------------------|
| Maximum number of FlexCache volumes that you can create from an origin volume | 10            | 10        | 100                 |

|   |    |     |     |
|---|----|-----|-----|
| Recommended maximum number of origin volumes per node                               | 10 | 100 | 100 |
| Recommended maximum number of FlexCache volumes per node                            | 10 | 100 | 100 |
| Recommended maximum number of FlexGroup constituents in a FlexCache volume per node | 40 | 800 | 800 |
| Maximum number of constituents per FlexCache volume per node                        | 32 | 32  | 32  |

## Related information

[NetApp Interoperability](#)

## Considerations for auditing FlexCache volumes

Beginning with ONTAP 9.7, you can audit NFS file access events in FlexCache relationships using native ONTAP auditing and file policy management with FPolicy. FPolicy is not supported for FlexCache volumes with SMB. Native auditing and FPolicy are configured and managed with the same CLI commands used for FlexVol volumes. However, there is some different behavior with FlexCache volumes.

### • Native auditing

- You can't use a FlexCache volume as the destination for audit logs.
- If you want to audit read and writes on FlexCache volumes, you must configure auditing on both the cache SVM as well as on the origin SVM.

This is because file system operations are audited where they are processed. That is, reads are audited on the cache SVM and writes are audited on the origin SVM.

- To track the origin of write operations, the SVM UUID and MSID are appended in the audit log to identify the FlexCache volume from which the write originated.
- Although system access control lists (SACLs) can be set on a file using NFSv4 or SMB protocols, FlexCache volumes support only NFSv3. Therefore, SACLs can only be set on the origin volume.

### • FPolicy

- Although writes to a FlexCache volume are committed on the origin volume, FPolicy configurations monitor the writes on the cache volume. This is unlike native auditing, in which the writes are audited on the origin volume.
- While ONTAP does not require the same FPolicy configuration on cache and origin SVMs, it is recommended that you deploy two similar configurations. You can do so by creating a new FPolicy policy for the cache, configured like that of the origin SVM but with the scope of the new policy limited to the cache SVM.



## Copyright information

Copyright © 2023 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.

LIMITED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (b)(3) of the Rights in Technical Data -Noncommercial Items at DFARS 252.227-7013 (FEB 2014) and FAR 52.227-19 (DEC 2007).

Data contained herein pertains to a commercial product and/or commercial service (as defined in FAR 2.101) and is proprietary to NetApp, Inc. All NetApp technical data and computer software provided under this Agreement is commercial in nature and developed solely at private expense. The U.S. Government has a non-exclusive, non-transferrable, nonsublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b) (FEB 2014).

## 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.