



# About SMTape engine for FlexVol volumes

## ONTAP 9

NetApp  
December 12, 2022

This PDF was generated from <https://docs.netapp.com/us-en/ontap/tape-backup/smtape-engine-concept.html> on December 12, 2022. Always check docs.netapp.com for the latest.

# Table of Contents

- About SMTape engine for FlexVol volumes . . . . . 1
  - About SMTape engine for FlexVol volumes . . . . . 1
  - Use Snapshot copies during SMTape backup . . . . . 1
  - SMTape capabilities . . . . . 2
  - Features not supported in SMTape . . . . . 3
  - Scalability limits for SMTape backup and restore sessions . . . . . 3
  - What tape seeding is . . . . . 3
  - How SMTape works with storage failover and ARL operations . . . . . 4
  - How SMTape works with volume move . . . . . 4
  - How SMTape works with volume rehost operations. . . . . 4
  - How NDMP backup policy are affected during ADB . . . . . 5
  - How SMTape backup and restore operations are affected in MetroCluster configurations . . . . . 5

# About SMTape engine for FlexVol volumes

## About SMTape engine for FlexVol volumes

SMTape is a disaster recovery solution from ONTAP that backs up blocks of data to tape. You can use SMTape to perform volume backups to tapes. However, you cannot perform a backup at the qtree or subtree level. SMTape supports baseline, differential, and incremental backups. SMTape does not require a license.

You can perform an SMTape backup and restore operation by using an NDMP-compliant backup application. You can choose SMTape to perform backup and restore operations only in the storage virtual machine (SVM) scoped NDMP mode.



Reversion process is not supported when an SMTape backup or restore session is in progress. You must wait until the session finishes or you must abort the NDMP session.

Using SMTape, you can back up 255 Snapshot copies. For subsequent baseline, incremental, or differential backups, you must delete older backed-up Snapshot copies.

Before performing a baseline restore, the volume to which data is being restored must be of type `DP` and this volume must be in the restricted state. After a successful restore, this volume is automatically online. You can perform subsequent incremental or differential restores on this volume in the order in which the backups were performed.

## Use Snapshot copies during SMTape backup

You should understand how Snapshot copies are used during an SMTape baseline backup and an incremental backup. There are also considerations to keep in mind while performing a backup using SMTape.

### Baseline backup

While performing a baseline backup, you can specify the name of the Snapshot copy to be backed up to tape. If no Snapshot copy is specified, then depending on the access type of the volume (read/write or read-only), either a Snapshot copy is created automatically or existing Snapshot copies are used. When you specify a Snapshot copy for the backup, all the Snapshot copies older than the specified Snapshot copy are also backed up to tape.

If you do not specify a Snapshot copy for the backup, the following occurs:

- For a read/write volume, a Snapshot copy is created automatically.

The newly created Snapshot copy and all the older Snapshot copies are backed up to tape.

- For a read-only volume, all the Snapshot copies, including the latest Snapshot copy, are backed up to tape.

Any new Snapshot copies created after the backup is started are not backed up.

## Incremental backup

For SMTape incremental or differential backup operations, the NDMP-compliant backup applications create and manage the Snapshot copies.

You must always specify a Snapshot copy while performing an incremental backup operation. For a successful incremental backup operation, the Snapshot copy backed up during the previous backup operation (baseline or incremental) must be on the volume from which the backup is performed. To ensure that you use this backed-up Snapshot copy, you must consider the Snapshot policy assigned on this volume while configuring the backup policy.

## Considerations on SMTape backups on SnapMirror destinations

- A data protection mirror relationship creates temporary Snapshot copies on the destination volume for replication.

You should not use these Snapshot copies for SMTape backup.

- If a SnapMirror update occurs on a destination volume in a data protection mirror relationship during an SMTape backup operation on the same volume, then the Snapshot copy that is backed up by SMTape must not be deleted on the source volume.

During the backup operation, SMTape locks the Snapshot copy on the destination volume and if the corresponding Snapshot copy is deleted on the source volume, then the subsequent SnapMirror update operation fails.

- You should not use these Snapshot copies during incremental backup.

## SMTape capabilities

SMTape capabilities such as backup of Snapshot copies, incremental and differential backups, preservation of deduplication and compression features on restored volumes, and tape seeding help you optimize your tape backup and restore operations.

SMTape provides the following capabilities:

- Provides a disaster recovery solution
- Enables incremental and differential backups
- Backs up Snapshot copies
- Enables backup and restore of deduplicated volumes and preserves deduplication on the restored volumes
- Backs up compressed volumes and preserves compression on the restored volumes
- Enables tape seeding

SMTape supports the blocking factor in multiples of 4 KB, in the range of 4 KB through 256 KB.



You can restore data to volumes created across up to two major consecutive ONTAP releases only.

## Features not supported in SMTape

SMTape does not support restartable backups and verification of backed-up files.

## Scalability limits for SMTape backup and restore sessions

While performing SMTape backup and restore operations through NDMP or CLI (tape seeding), you must be aware of the maximum number of SMTape backup and restore sessions that can be performed simultaneously on storage systems with different system memory capacities. This maximum number depends on the system memory of a storage system.



SMTape backup and restore sessions scalability limits are different from NDMP session limits and dump session limits.

System memory of the storage system	Total number of SMTape backup and restore sessions
Less than 16 GB	6
Greater than or equal to 16 GB but less than 24 GB	16
Greater than or equal to 24 GB	32

You can obtain the system memory of your storage system by using the `sysconfig -a` command (available through the nodeshell). For more information about using this command, see the man pages.

### Related information

[Scalability limits for NDMP sessions](#)

[Scalability limits for dump backup and restore sessions](#)

## What tape seeding is

Tape seeding is an SMTape functionality that helps you initialize a destination FlexVol volume in a data protection mirror relationship.

Tape seeding enables you to establish a data protection mirror relationship between a source system and a destination system over a low-bandwidth connection.

Incremental mirroring of Snapshot copies from the source to the destination is feasible over a low bandwidth connection. However, an initial mirroring of the base Snapshot copy takes a long time over a low-bandwidth connection. In such cases, you can perform an SMTape backup of the source volume to a tape and use the tape to transfer the initial base Snapshot copy to the destination. You can then set up incremental SnapMirror updates to the destination system using the low-bandwidth connection.

### Related information

[ONTAP concepts](#)

# How SMTape works with storage failover and ARL operations

Before you perform SMTape backup or restore operations, you should understand how these operations work with storage failover (takeover and giveback) or aggregate relocation (ARL) operation. The `-override-vetoes` option determines the behavior of SMTape engine during a storage failover or ARL operation.

When an SMTape backup or restore operation is running and the `-override-vetoes` option is set to `false`, a user-initiated storage failover or ARL operation is stopped and the backup or restore operation complete. If the backup application supports CAB extension, then you can continue performing incremental SMTape backup and restore operations without reconfiguring backup policies. However, if the `-override-vetoes` option is set to `true`, then the storage failover or ARL operation is continued and the SMTape backup or restore operation is aborted.

## Related information

[Network management](#)

[High Availability](#)

# How SMTape works with volume move

SMTape backup operations and volume move operations can run in parallel until the storage system attempts the final cutover phase. After this phase, new SMTape backup operations cannot run on the volume that is being moved. However, the current operations continue to run until completion.

Before the cutover phase for a volume is started, the volume move operation checks for active SMTape backup operations on the same volume. If there are active SMTape backup operations, then the volume move operation moves into a cutover deferred state and allows the SMTape backup operations to complete. After these backup operations are completed, you must manually restart the volume move operation.

If the backup application supports CAB extension, you can continue performing incremental tape backup and restore operations on read/write and read-only volumes without reconfiguring backup policies.

Baseline restore and volume move operations cannot be performed simultaneously; however, incremental restore can run in parallel with volume move operations, with the behavior similar to that of SMTape backup operations during volume move operations.

## Related information

[ONTAP concepts](#)

# How SMTape works with volume rehost operations

SMTape operations cannot commence when a volume rehost operation is in progress on a volume. When a volume is involved in a volume rehost operation, SMTape sessions should not be started on that volume.

If any volume rehost operation is in progress, then SMTape backup or restore fails. If an SMTape backup or

restore is in progress, then volume rehost operations fail with an appropriate error message. This condition applies to both NDMP-based and CLI-based backup or restore operations.

## How NDMP backup policy are affected during ADB

When the automatic data balancer (ADB) is enabled, the balancer analyzes the usage statistics of aggregates to identify the aggregate that has exceeded the configured high-threshold usage percentage.

After identifying the aggregate that has exceeded the threshold, the balancer identifies a volume that can be moved to aggregates residing in another node in the cluster and attempts to move that volume. This situation affects the backup policy configured for this volume because if the data management application (DMA) is not CAB aware, then the user has to reconfigure the backup policy and run the baseline backup operation.



If the DMA is CAB aware and the backup policy has been configured using specific interface, then the ADB is not affected.

## How SMTape backup and restore operations are affected in MetroCluster configurations

Before you perform SMTape backup and restore operations in a MetroCluster configuration, you must understand how SMTape operations are affected when a switchover or switchback operation occurs.

### SMTape backup or restore operation followed by switchover

Consider two clusters: cluster 1 and cluster 2. During an SMTape backup or restore operation on cluster 1, if a switchover is initiated from cluster 1 to cluster 2, then the following occurs:

- If the value of the `-override-vetoes` option is `false`, then the switchover process is aborted and the backup or restore operation continues.
- If the value of the option is `true`, then the SMTape backup or restore operation is aborted and the switchover process continues.

### SMTape backup or restore operation followed by switchback

A switchover is performed from cluster 1 to cluster 2 and an SMTape backup or restore operation is initiated on cluster 2. The SMTape operation backs up or restores a volume that is located on cluster 2. At this point, if a switchback is initiated from cluster 2 to cluster 1, then the following occurs:

- If the value of the `-override-vetoes` option is `false`, then the switchback process is aborted and the backup or restore operation continues.
- If the value of the option is `true`, then the backup or restore operation is aborted and the switchback process continues.

### SMTape backup or restore operation initiated during a switchover or switchback

During a switchover process from cluster 1 to cluster 2, if an SMTape backup or restore operation is initiated on cluster 1, then the backup or restore operation fails and the switchover continues.

During a switchback process from cluster 2 to cluster 1, if an SMTape backup or restore operation is initiated from cluster 2, then the backup or restore operation fails and the switchback continues.



## 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.

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.