



# Administration

## ONTAP 9

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# Administration

## Create a common Snapshot copy

In addition to the regularly scheduled Snapshot copy operations, you can manually create a common Snapshot copy between the volumes in the primary SnapMirror consistency group and the volumes in the secondary SnapMirror consistency group.

In ONTAP 9.8, the scheduled snapshot creation interval is one hour. Beginning with ONTAP 9.9.1, that interval is 12 hours.

### Before you begin

The SnapMirror group relationship must be in sync.

### Steps

1. Create a common Snapshot copy:

```
destination::>snapmirror update -destination-path vs1_dst:/cg/cg_dst
```

2. Monitor the progress of the update:

```
destination::>snapmirror show -fields -newest-snapshot
```

## Perform a planned failover

You can perform a planned failover to test your disaster recovery configuration or to perform maintenance on the primary cluster.

### Before you begin

- The relationship must be in sync
- Nondisruptive operations must not be running
- The ONTAP Mediator must be configured, connected, and in quorum

### About this task

A planned failover is initiated by the administrator of the secondary cluster. The operation requires switching the primary and secondary roles so that the secondary cluster takes over from the primary. The new primary cluster can then begin processing input and output requests locally without disrupting client operations.

### Steps

1. Start the failover operation:

```
destination::>snapmirror failover start -destination-path vs1_dst:/cg/cg_dst
```

2. Monitor the progress of the failover:

```
destination::>snapmirror failover show
```

3. When the failover operation is complete, you can monitor the Synchronous SnapMirror protection relationship status from the destination:

```
destination::>snapmirror show
```

## Automatic unplanned failover operations

An automatic unplanned failover (AUFO) operation occurs when the primary cluster is down or isolated. When this occurs, the secondary cluster is converted to the primary and begins serving clients. This operation is performed only with assistance from the ONTAP Mediator.



After the automatic unplanned failover, it is important to rescan the host LUN I/O paths so that there is no loss of I/O paths.

You can monitor the status of the automatic unplanned failover by using the `snapmirror failover show` command.

## Basic monitoring

There are several SM-BC components and operations you can monitor.

### ONTAP mediator

During normal operation, the Mediator state should be connected. If it is in any other state, this might indicate an error condition. You can review the Event Management System (EMS) messages to determine the error and appropriate corrective actions.

EMS Name	Description
sm.mediator.added	Mediator is added successfully
sm.mediator.removed	Mediator is removed successfully
sm.mediator.unusable	Mediator is unusable due to a corrupted Mediator server
sm.mediator.misconfigured	Mediator is repurposed or the Mediator package is no longer installed on the Mediator server
sm.mediator.unreachable	Mediator is unreachable
sm.mediator.removed.force	Mediator is removed from the cluster using the "force" option
sm.mediator.cacert.expiring	Mediator certificate authority (CA) certificate is due to expire in 30 days or less
sm.mediator.serverc.expiring	Mediator server certificate is due to expire in 30 days or less
sm.mediator.clientc.expiring	Mediator client certificate is due to expire in 30 days or less
sm.mediator.cacert.expired	Mediator certificate authority (CA) certificate has expired

EMS Name	Description
sm.mediator.serverc.expired	Mediator server certificate has expired
sm.mediator.clientc.expired	Mediator client certificate has expired
sm.mediator.in.quorum	All the SM-BC records are resynchronized with Mediator

## Planned failover operations

You can monitor status and progress of a planned failover operation using the `snapmirror failover show` command. For example:

```
ClusterB::> snapmirror failover start -destination-path vs1:/cg/dcg1
```

Once the failover operation is complete, you can monitor the Synchronous SnapMirror protection status from the new destination cluster. For example:

```
ClusterA::> snapmirror show
```

You can also review the following messages to determine if there is an error and take the appropriate corrective actions.

EMS Name	Description
smbc.pfo.failed	SMBC planned failover operation failed. Destination path:
smbc.pfo.start. Destination path:	SMBC planned failover operation started

## Automatic unplanned failover operations

During an unplanned automatic failover, you can monitor the status of the operation using the `snapmirror failover show` command. For example:

```
ClusterB::> snapmirror failover show -instance
Start Time: 9/23/2020 22:03:29
      Source Path: vs1:/cg/scg3
Destination Path: vs3:/cg/dcg3
Failover Status: completed
      Error Reason:
      End Time: 9/23/2020 22:03:30
Primary Data Cluster: cluster-2
Last Progress Update: -
      Failover Type: unplanned
Error Reason codes: -
```

You can also review the following messages to determine if there is an error and take the appropriate corrective actions.

EMS Name	Description
smbc.aufo.failed	SnapMirror automatic planned failover operation failed. Destination path:
smbc.aufo.start	SMBC planned failover operation started. Destination path:
smbc.aufo.completed:	SnapMirror automatic planned failover operation completed. Destination path:
smbc.aufo.failover.incapable	block.giveback.during.aufo

## SM-BC availability

You can check the availability of the SM-BC relationship using a series of commands, either on the primary cluster, the secondary cluster, or both.

Commands you use include the `snapmirror mediator show` command on both the primary and secondary cluster to check the connection and quorum status, the `snapmirror show` command, and the `volume show` command. For example:

```

SMBC_A::*> snapmirror mediator show
Mediator Address Peer Cluster      Connection Status Quorum Status
-----
10.236.172.86    SMBC_B      connected      true

SMBC_B::*> snapmirror mediator show
Mediator Address Peer Cluster      Connection Status Quorum Status
-----
10.236.172.86    SMBC_A      connected      true

SMBC_B::*> snapmirror show -expand

Progress
Source          Destination Mirror Relationship Total
Last
Path            Type Path            State Status Progress Healthy
Updated
-----
-----
vs0:/cg/cg1 XDP vs1:/cg/cg1_dp Snapmirrored InSync - true -
vs0:vol1 XDP vs1:vol1_dp Snapmirrored InSync - true -
2 entries were displayed.

SMBC_A::*> volume show -fields is-smbc-master,smbc-consensus,is-smbc-
failover-capable -volume vol1
vserver volume is-smbc-master is-smbc-failover-capable smbc-consensus
-----
vs0 vol1 true false Consensus

SMBC_B::*> volume show -fields is-smbc-master,smbc-consensus,is-smbc-
failover-capable -volume vol1_dp
vserver volume is-smbc-master is-smbc-failover-capable smbc-consensus
-----
vs1 vol1_dp false true No-consensus

```

## Add and remove volumes in a consistency group

If you want to change the composition of the consistency group by adding or removing a volume, you must first delete the original relationship and then create the consistency group again with the new composition.



This workflow applies to ONTAP 9.8 and 9.9.1. Beginning with ONTAP 9.10.1, it is recommended that you manage [consistency groups](#) through System Manager or with the ONTAP REST API.

Beginning in ONTAP 9.12.1, you can add or remove volumes to a consistency group using System Manager or the ONTAP REST API. You will have to break the SM-BC relationship before you can modify the consistency group and then restore SM-BC protection. For more information about this process, refer to [Modify a consistency group](#).

### About this task

- The composition change is not allowed when the consistency group is in the “InSync” state.
- The destination volume should be of type DP.



The new volume you add to expand the consistency group must have a pair of common Snapshot copies between the source and destination volumes.

### Steps

This procedure assumes that there are two volume mappings: vol\_src1 ↔ vol\_dst1 and vol\_src2 ↔ vol\_dst2, in a consistency group relationship between the end points vs1\_src:/cg/cg\_src and vs1\_dst:/cg/cg\_dst.

1. Verify that a common Snapshot copy exists between the source and destination volumes on both the source and destination cluster:

```
source::>snapshot show -vserver vs1_src -volume vol_src3 -snapshot snapmirror*
```

```
destination::>snapshot show -vserver vs1_dst -volume vol_dst3 -snapshot  
snapmirror*
```

2. If no common Snapshot copy exists, create and initialize a FlexVol SnapMirror relationship:

```
destination::>snapmirror initialize -source-path vs1_src:vol_src3 -destination  
-path vs1_dst:vol_dst3
```

3. Delete the zero RTO consistency group relationship:

```
destination::>snapmirror delete -destination-path vs1_dst:vol_dst3
```

4. Release the source SnapMirror relationship and retain the common Snapshot copies:

```
source::>snapmirror release -relationship-info-only true -destination-path  
vs1_dst:vol_dst3
```

5. Unmap the LUNs and delete the existing consistency group relationship:

```
destination::>lun mapping delete -vserver vs1_dst -path <lun_path> -igroup  
<igroup_name>
```



The destination LUNs are unmapped, while the LUNs on the primary copy continue to serve the host I/O.

```
destination::>snapmirror delete -destination-path vs1_dst:/cg/cg_dst
```



```
source::>snapmirror release -destination-path vs1_dst:/cg/cg_dst -relationship
-info-only true
```

6. **If you are using ONTAP 9.10.1 or later**, delete and recreate the consistency group on the source with the correct composition. Follow the steps in [Delete a consistency group](#) and then [Configure a single consistency group](#). In ONTAP 9.10.1 and later, you must perform the delete and create operations in System Manager or with the ONTAP REST API; there is no CLI procedure.

**If you are using ONTAP 9.8, 9.0, or 9.9.1, skip to the next step.**

7. Create the new consistency group on the destination with the new composition:

```
destination::>snapmirror create -source-path vs1_src:/cg/cg_src -destination
-path vs1_dst:/cg/cg_dst -cg-item-mappings vol_src1:@vol_dst1,
vol_src2:@vol_dst2, vol_src3:@vol_dst3
```

8. Resynchronize the zero RTO consistency group relationship to ensure it is in sync:

```
destination::>snapmirror resync -destination-path vs1_dst:/cg/cg_dst
```

9. Remap the LUNs that you unmapped in Step 5:

```
destination::> lun map -vserver vs1_dst -path <lun_path> -igroup <igroup_name>
```

10. Rescan host LUN I/O paths to restore all paths to the LUNs.

## Resume protection in a fan-out configuration with SM-BC

SM-BC supports [fan-out configurations](#). Your source volume can be mirrored to an SM-BC destination endpoint and to one or more asynchronous SnapMirror relationships.

Fan-out configurations are supported with the `MirrorAllSnapshots` policy, and, beginning with ONTAP 9.11.1, the `MirrorAndVault` policy. Beginning in ONTAP 9.11.1, fan-out configurations in SM-BC are not supported with the `XDPDefault` policy.

If you experience a failover on the SM-BC destination, the asynchronous SnapMirror destination will become unhealthy, and you must manually restore protection by deleting and recreating the relationship with the asynchronous SnapMirror endpoint.

### Resume protection in a fan-out configuration

1. Verify the failover has completed successfully:  

```
snapmirror failover show
```
2. On the asynchronous Snapmirror endpoint, delete the fan-out endpoint:  

```
snapmirror delete -destination-path destination_path
```
3. On the third site, create an asynchronous SnapMirror relationships between the new SM-BC primary volume and the async fan-out destination volume:  

```
snapmirror create -source-path source_path -destination-path destination_path
-policy MirrorAllSnapshots -schedule schedule
```
4. Resynchronize the relationship:  

```
SnapMirror resync -destination-path destination_path
```

5. Verify the relationship status and health:

```
snapmirror show
```

## Convert existing relationships to SM-BC relationships

You can convert an existing zero recovery point protection (zero RPO) Synchronous SnapMirror relationship to an SM-BC zero RTO Synchronous SnapMirror consistency group relationship.

### Before you begin

- A zero RPO Synchronous SnapMirror relationship exists between the primary and secondary.
- All LUNs on the destination volume are unmapped before the zero RTO SnapMirror relationship is created.
- SM-BC only supports SAN protocols (not NFS/CIFS). Ensure no constituent of the consistency group is mounted for NAS access.

### About this task

- You must be a cluster and SVM administrator on the source and destination.
- You cannot convert zero RPO to zero RTO sync by changing the SnapMirror policy.
- If existing LUNs on the secondary volume are mapped, `snapmirror create` with AutomatedFailover policy triggers an error.  
You must ensure the LUNs are unmapped before issuing the `snapmirror create` command.

### Steps

1. Perform a SnapMirror update operation on the existing relationship:

```
destination::>snapmirror update -destination-path vs1_dst:vol1
```

2. Verify that the SnapMirror update completed successfully:

```
destination::>snapmirror show
```

3. Quiesce each of the zero RPO synchronous relationships:

```
destination::>snapmirror quiesce -destination-path vs1_dst:vol1
```

```
destination::>snapmirror quiesce -destination-path vs1_dst:vol2
```

4. Delete each of the zero RPO synchronous relationships:

```
destination::>snapmirror delete -destination-path vs1_dst:vol1
```

```
destination::>snapmirror delete -destination-path vs1_dst:vol2
```

5. Release the source SnapMirror relationship but retain the common Snapshot copies:

```
source::>snapmirror release -relationship-info-only true -destination-path  
vs1_dst:vol1
```

```
source::>snapmirror release -relationship-info-only true -destination-path  
vs1_dst:vol2
```

6. Create a group zero RTO Synchronous Snapmirror relationship:

```
destination::> snapmirror create -source-path vs1_src:/cg/cg_src -destination  
-path vs1_dst:/cg/cg_dst -cg-item-mappings vol1:@vol1,vol2:@vol2 -policy  
AutomatedFailover
```

7. Resynchronize the zero RTO consistency group:

```
destination::> snapmirror resync -destination-path vs1_dst:/cg/cg_dst
```

8. Rescan host LUN I/O paths to restore all paths to the LUNs.

## SM-BC upgrade and revert considerations

You should be aware of the requirements for upgrading and reverting an SM-BC configuration.

### Upgrade

Before you can configure and use SM-BC, you must upgrade all nodes on the source and destination clusters to ONTAP 9.8 or later.

xref:./smbc/[Upgrading software on ONTAP clusters](#)



SM-BC is not supported with mixed ONTAP 9.7 and ONTAP 9.8 clusters.

Upgrading clusters from 9.8 or 9.9.1 to 9.10.1 creates new consistency groups on both source and destination for SM-BC relationships.

### Reverting to ONTAP 9.9.1 from ONTAP 9.10.1

To revert relationships from 9.10.1 to 9.9.1, SM-BC relationships must be deleted, followed by the 9.10.1 consistency group instance. Consistency groups cannot be deleted with an active SMBC relationship. Any FlexVol volumes that were upgraded to 9.10.1 previously associated with another Smart Container or Enterprise App in 9.9.1 or earlier will no longer be associated on revert. Deleting consistency groups does not delete the constituent volumes or volume granular snapshots. Refer to [Delete a consistency group](#) for more information on this task.

### Reverting to ONTAP 9.7 from ONTAP 9.8

When you revert from ONTAP 9.8 to ONTAP 9.7, you must be aware of the following:

- If the cluster is hosting an SM-BC destination, reverting to ONTAP 9.7 is not allowed until the relationship is broken and deleted.
- If the cluster is hosting an SM-BC source, reverting to ONTAP 9.7 is not allowed until the relationship is released.
- All user-created custom SM-BC SnapMirror policies must be deleted before reverting to ONTAP 9.7.

### Steps

1. Perform a revert check from one of the clusters in the SM-BC relationship:

```
cluster::*> system node revert-to -version 9.7 -check-only
```

Example:

```
cluster::*> system node revert-to -version 9.7 -check-only
Error: command failed: The revert check phase failed. The following
issues must be resolved before revert can be completed. Bring the data
LIFs down on running vservers. Command to list the running vservers:
vserver show -admin-state running Command to list the data LIFs that are
up: network interface show -role data -status-admin up Command to bring
all data LIFs down: network interface modify {-role data} -status-admin
down
Disable snapshot policies.
    Command to list snapshot policies: "snapshot policy show".
    Command to disable snapshot policies: "snapshot policy modify
-vserver
    * -enabled false"

    Break off the initialized online data-protection (DP) volumes and
delete
    Uninitialized online data-protection (DP) volumes present on the
local
    node.
    Command to list all online data-protection volumes on the local
node:
    volume show -type DP -state online -node <local-node-name>
    Before breaking off the initialized online data-protection volumes,
quiesce and abort transfers on associated SnapMirror relationships
and
    wait for the Relationship Status to be Quiesced.
    Command to quiesce a SnapMirror relationship: snapmirror quiesce
    Command to abort transfers on a SnapMirror relationship: snapmirror
abort
    Command to see if the Relationship Status of a SnapMirror
relationship
    is Quiesced: snapmirror show
    Command to break off a data-protection volume: snapmirror break
    Command to break off a data-protection volume which is the
destination
    of a SnapMirror relationship with a policy of type "vault":
snapmirror
    break -delete-snapshots
    Uninitialized data-protection volumes are reported by the
"snapmirror
break" command when applied on a DP volume.
    Command to delete volume: volume delete

    Delete current version snapshots in advanced privilege level.
```

```

Command to list snapshots: "snapshot show -fs-version 9.8"
Command to delete snapshots: "snapshot prepare-for-revert -node
<nodename>"

Delete all user-created policies of the type active-strict-sync-
mirror
and active-sync-mirror.
The command to see all active-strict-sync-mirror and active-sync-
mirror
type policies is:
snapmirror policy show -type
active-strict-sync-mirror,active-sync-mirror
The command to delete a policy is :
snapmirror policy delete -vserver <SVM-name> -policy <policy-name>

```

For information on reverting clusters, see [Revert ONTAP](#).

## Remove an SM-BC configuration

You can remove zero RTO Synchronous SnapMirror protection and delete the SM-BC relationship configuration.

### About this task

Before you delete the SM-BC relationship, all LUNs in the destination cluster must be unmapped. After the LUNs are unmapped and the host is rescanned, the SCSI target notifies the hosts that the LUN inventory has changed. The existing LUNs on the zero RTO secondary volumes change to reflect a new identity after the zero RTO relationship is deleted. Hosts discover the secondary volume LUNs as new LUNs that have no relationship to the source volume LUNs.

The secondary volumes remain DP volumes after the relationship is deleted. You can issue the `snapmirror break` command to convert them to read/write.

Deleting the relationship is not allowed in the failed-over state when the relationship is not reversed.

### Steps

1. Delete the SM-BC consistency group relationship between the source endpoint and destination endpoint:

```
Destination::>snapmirror delete -destination-path vs1_dst:/cg/cg_dst
```

2. From the source cluster, release the consistency group relationship and the Snapshot copies created for the relationship:

```
Source::>snapmirror release -destination-path vs1_dst:/cg/cg_dst
```

3. Perform a host rescan to update the LUN inventory.
4. Beginning with ONTAP 9.10.1, deleting the SnapMirror relationship does not delete the consistency group. If you want to delete the consistency group, you must use System Manager or the ONTAP REST API. See [Delete a consistency group](#) for more information.

# Remove ONTAP Mediator

If you want to remove an existing ONTAP Mediator configuration from your ONTAP clusters, you can do so by using the `snapmirror mediator remove` command.

## Steps

1. Remove ONTAP Mediator:

```
snapmirror mediator remove -mediator-address 12.345.678.90 -peer-cluster  
cluster_xyz
```

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