



## Plan

### ONTAP 9

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# Plan

## Prerequisites

When planning your SnapMirror active sync deployment, ensure you have met the various hardware, software, and system configuration requirements.

### Hardware

- Only two-node HA clusters are supported
- Both clusters must be either AFF (including AFF C-Series) or All-Flash SAN Array (ASA; including C-Series). Mixing is not supported.

### Software

- ONTAP 9.9.1 or later
- ONTAP Mediator 1.2 or later
- A Linux server or virtual machine for the ONTAP Mediator running one of the following:

ONTAP Mediator version	Supported Linux versions
1.7	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 8.5, 8.6, 8.7, 8.8, 8.9, 9.0, 9.1, 9.2, and 9.3</li><li>• Rocky Linux 8 and 9</li></ul>
1.6	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 8.4, 8.5, 8.6, 8.7, 8.8, 9.0, 9.1, 9.2</li><li>• Rocky Linux 8 and 9</li></ul>
1.5	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3, 8.4, 8.5</li><li>• CentOS: 7.6, 7.7, 7.8, 7.9</li></ul>
1.4	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3, 8.4, 8.5</li><li>• CentOS: 7.6, 7.7, 7.8, 7.9</li></ul>
1.3	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 7.9, 8.1, 8.2, 8.3</li><li>• CentOS: 7.6, 7.7, 7.8, 7.9</li></ul>
1.2	<ul style="list-style-type: none"><li>• Red Hat Enterprise Linux: 7.6, 7.7, 7.8, 8.1</li><li>• CentOS: 7.6, 7.7, 7.8</li></ul>

### Licensing

- SnapMirror synchronous license must be applied on both clusters.
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If your ONTAP storage systems were purchased before June 2019, see [NetApp ONTAP Master License Keys](#) to get the required SnapMirror synchronous license.

## Networking environment

- Inter-cluster latency round trip time (RTT) must be less than 10 milliseconds.
- Beginning with ONTAP 9.14.1, [SCSI-3 persistent reservations](#) are supported with SnapMirror active sync.

## Supported protocols

- Only SAN protocols are supported (not NFS/SMB).
- Only Fibre Channel and iSCSI protocols are supported.
- The default IPspace is required by SnapMirror active sync for cluster peer relationships. Custom IPspace is not supported.

## NTFS Security Style

NTFS security style is **not** supported on SnapMirror active sync volumes.

## ONTAP Mediator

- The ONTAP Mediator must be provisioned externally and attached to ONTAP for transparent application failover.
- To be fully functional and to enable automatic unplanned failover, the external ONTAP mediator should be provisioned and configured with ONTAP clusters.
- The ONTAP Mediator must be installed in a third failure domain, separate from the two ONTAP clusters.
- When installing the ONTAP Mediator, you should replace the self-signed certificate with a valid certificate signed by a mainstream reliable CA.
- For more information about the ONTAP Mediator, see [Prepare to install the ONTAP Mediator service](#).

## Read-write destination volumes

- SnapMirror active sync relationships are not supported on read-write destination volumes. Before you can use a read-write volume, you must convert it to a DP volume by creating a volume-level SnapMirror relationship and then deleting the relationship. For details, see [Convert an existing SnapMirror relationships to SnapMirror active sync](#).

## Further information

- [Hardware Universe](#)
- [ONTAP Mediator overview](#)

## SnapMirror active sync interoperability

SnapMirror active sync is compatible with numerous operating systems, application hosts, and other features in ONTAP.

## Application hosts

SnapMirror active sync support applications hosts including Hyper-V, Red Hat Enterprise Linux (RHEL), VMware, VMware vSphere Metro Storage Cluster (vMSC), Windows Server, and, beginning with ONTAP 9.14.1, Windows Server Failover Cluster.

## Operating systems

SnapMirror active sync is supported with numerous operating systems, including:

- AIX (beginning ONTAP 9.11.1)
- HP-UX (beginning ONTAP 9.10.1)
- Solaris 11.4 (beginning ONTAP 9.10.1)

### AIX

Beginning with ONTAP 9.11.1, AIX is supported with SnapMirror active sync. With an AIX configuration, the primary cluster is the "active" cluster.

In an AIX configuration, failovers are disruptive. With each failover, you will need to perform a re-scan on the host for I/O operations to resume.

To configure for AIX host with SnapMirror active syn, refer to the Knowledge Base article [How to configure an AIX host for SnapMirror active sync](#).

### HP-UX

Beginning in ONTAP 9.10.1, SnapMirror active sync for HP-UX is supported.

#### Automatic unplanned failover with HP-UX

An automatic unplanned failover (AUFO) event on the isolated master cluster may be caused by dual event failure when the connection between the primary and the secondary cluster is lost and the connection between the primary cluster and the mediator is also lost. This is considered a rare event, unlike other AUFO events.

- In this scenario, it might take more than 120 seconds for I/O to resume on the HP-UX host. Depending on the applications that are running, this might not lead to any I/O disruption or error messages.
- To remediate, you must restart applications on the HP-UX host that have a disruption tolerance of less than 120 seconds.

### Solaris

Beginning with ONTAP 9.10.1, SnapMirror active sync supports Solaris 11.4.

To ensure the Solaris client applications are non-disruptive when an unplanned site failover switchover occurs in an SnapMirror active sync environment, modify the default Solaris OS settings. To configure Solaris with the recommended settings, see the Knowledge Base article [Solaris Host support recommended settings in SnapMirror active sync](#).

## ONTAP interoperability

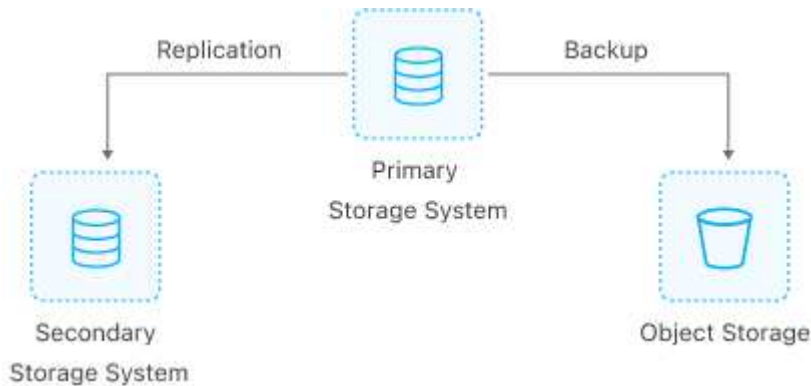
SnapMirror active sync integrates with components of ONTAP to extends its data protection capabilities.

## FabricPool

SnapMirror active sync supports source and destination volumes on FabricPool aggregates with tiering policies of None, Snapshot or Auto. SnapMirror active sync does not support FabricPool aggregates using a tiering policy of All.

## Fan-out configurations

In [fan-out configurations](#), your source volume can be mirrored to a SnapMirror active sync destination endpoint and to one or more SnapMirror asynchronous relationships.



SnapMirror active sync supports [fan-out configurations](#) with the `MirrorAllSnapshots` policy and, beginning in ONTAP 9.11.1, the `MirrorAndVault` policy. Fan-out configurations are not supported in SnapMirror active sync with the `XDPDefault` policy.

Beginning with ONTAP 9.15.1, SnapMirror active sync supports automatic reconfiguration in the fan-out leg after a failover event. If the failover from the primary to the secondary site has succeeded, the tertiary site is automatically reconfigured to treat the secondary site as the source. Reconfiguration is triggered by either a planned or unplanned failover. Reconfiguration also occurs upon failback to the primary site.

For information about managing your fan-out configuration in earlier releases of ONTAP, see [resume protection in the fan-out configuration](#).

## NDMP restore

Beginning in ONTAP 9.13.1, you can use [NDMP to copy and restore data](#) with SnapMirror active sync. Using NDMP allows you to move data onto the SnapMirror active sync source to complete a restore without pausing protection. This is particularly useful in fan-out configurations.

## SnapCenter

SnapMirror active sync is supported with SnapCenter beginning with [SnapCenter 5.0](#). SnapCenter enables the creation of Snapshots that can be used to protect and recover applications and virtual machines, enabling always available storage solutions with application-level granularity.

## SnapRestore

SnapMirror active sync supports partial and single file SnapRestore.

### Single file SnapRestore

Beginning with ONTAP 9.11.1, [single-file SnapRestore](#) is supported for SnapMirror active sync volumes. You can restore a single file from a Snapshot copy replicated from the SnapMirror active sync source to the

destination. Because volumes can contain one or more LUNs, this feature helps you implement a less disruptive restore operation, granularly restoring a single LUN without disrupting the other LUNs. Single File SnapRestore has two options: in-place and out-of-place.

### Partial file SnapRestore

Beginning in ONTAP 9.12.1, [partial LUN restore](#) is supported for SnapMirror active sync volumes. You can restore a data from application-created Snapshot copies that have been replicated between the SnapMirror active sync source (volume) and the destination (Snapshot copy) volumes. Partial LUN or file restore may be necessary if you need to restore a database on a host that stores multiple databases on the same LUN. Using this functionality requires you to know the starting byte offset of the data and byte count.

### Large LUNs and large volumes

Support for large LUNs and large volumes (greater than 100 TB) depends on the version of ONTAP you are using and your platform.

#### ONTAP 9.12.1P2 and later

- For ONTAP 9.12.1 P2 and later, SnapMirror active sync supports Large LUNs and large volumes greater than 100TB on ASA and AFF (including C-Series).



For ONTAP Releases 9.12.1P2 and later, you must ensure that both the primary and secondary clusters are either All-Flash SAN Arrays (ASA) or All Flash Array (AFF), and that they both have ONTAP 9.12.1 P2 or later installed. If the secondary cluster is running a version earlier than ONTAP 9.12.1P2 or if the array type is not the same as primary cluster, the synchronous relationship can go out of sync if the primary volume grows larger than 100 TB.

#### ONTAP 9.9.1 - 9.12.1P1

- For ONTAP releases between ONTAP 9.9.1 and 9.12.1 P1 (inclusive), Large LUNs and large volumes greater than 100TB are supported only on All-Flash SAN Arrays.



For ONTAP releases between ONTAP 9.9.1 and 9.12.1 P2, you must ensure that both the primary and secondary clusters are All-Flash SAN Arrays, and that they both have ONTAP 9.9.1 or later installed. If the secondary cluster is running a version earlier than ONTAP 9.9.1 or if it is not an All-Flash SAN Array, the synchronous relationship can go out of sync if the primary volume grows larger than 100 TB.

## Object limits for SnapMirror active sync

When preparing to use SnapMirror active sync, be aware of the following object limits.

### Consistency groups in a cluster

Consistency group limits for a cluster with SnapMirror active sync are calculated based on relationships and depend on the version of ONTAP used. Limits are platform-independent.

ONTAP version	Maximum number of relationships
ONTAP 9.11.1 and later	50

ONTAP version	Maximum number of relationships
ONTAP 9.10.1	20
ONTAP 9.9.1	5

## Volumes per consistency group

The maximum number of volumes per consistency group with SnapMirror active sync is platform independent.

ONTAP version	Maximum number of volumes supported in a consistency group relationship
ONTAP 9.15.1 and later	80
ONTAP 9.10.1-9.14.1	16
ONTAP 9.9.1	12

## Volumes

Volume limits in SnapMirror active sync are calculated based on the number of endpoints, not the number of relationships. A consistency group with 12 volumes contributes 12 endpoints on both the primary and secondary cluster. Both SnapMirror active sync and SnapMirror Synchronous relationships contribute to the total number of endpoints.

The maximum endpoints per platform are included in the following table.

S. No	Platform	Endpoints per HA for SnapMirror active sync			Overall sync and SnapMirror active sync endpoints per HA		
		ONTAP 9.11.1 and later	ONTAP 9.10.1	ONTAP 9.9.1	ONTAP 9.11.1 and later	ONTAP 9.10.1	ONTAP 9.9.1
1	AFF	400	200	60	400	200	80
2	ASA	400	200	60	400	200	80

## SAN object limits

SAN object limits are included in the following table. The limits apply regardless of the platform.

Object in an SnapMirror active sync relationship	Count
LUNs per volume	256
LUN maps per node	<ul style="list-style-type: none"> <li>• 4096 (ONTAP 9.10 and later)</li> <li>• 2048 (ONTAP 9.9.1 and earlier)</li> </ul>
LUN maps per cluster	<ul style="list-style-type: none"> <li>• 8192 (ONTAP 9.10 and later)</li> <li>• 4096 (ONTAP 9.9.1 and earlier)</li> </ul>



Object in an SnapMirror active sync relationship	Count
LIFs per SVM (with at least one volume in an SnapMirror active sync relationship)	256
Inter-cluster LIFs per node	4
Inter-cluster LIFs per cluster	8

#### Related information

- [Hardware Universe](#)
- [Consistency group limits](#)

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