



# Configure

## ONTAP 9

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# Configure

## Configure the ONTAP Mediator and clusters for SnapMirror active sync

SnapMirror active sync utilizes peered clusters to ensure your data is available in the event of a failover scenario. The ONTAP Mediator is a key resource ensuring business continuity, monitoring the health of each cluster. To configure SnapMirror active sync, you must first install the ONTAP Mediator and ensure you primary and secondary clusters are configured properly.

Once you have installed the ONTAP Mediator and configured your clusters, you must [Initialize the ONTAP mediator for SnapMirror active sync](#) the ONTAP Mediator for use with SnapMirror active sync. You must then [create, initialize, and map the consistency group for SnapMirror active sync](#).

### ONTAP Mediator

The ONTAP Mediator establishes a quorum for the ONTAP clusters in an SnapMirror active sync relationship. It coordinates automated failover when a failure is detected, determining which cluster acts as the primary and ensuring data is served to and from the correct destination.

#### Prerequisites for the ONTAP Mediator

- The ONTAP Mediator includes its own set of prerequisites. You must meet these prerequisites before installing the mediator.

For more information, see [Prepare to install the ONTAP Mediator service](#).

- By default, the ONTAP Mediator provides service through TCP port 31784. You should make sure that port 31784 is open and available between the ONTAP clusters and the mediator.

### Install the ONTAP Mediator and confirm cluster configuration

Proceed through each of the following steps. For each step, you should confirm that the specific configuration has been performed. Use the link included after each step to get more information as needed.

#### Steps

1. Install the ONTAP Mediator service before you ensure that your source and destination clusters are configured properly.

[Prepare to install or upgrade the ONTAP Mediator service](#)

2. Confirm that a cluster peering relationship exists between the clusters.



The default IPspace is required by SnapMirror active sync for cluster peer relationships. A custom IPspace is not supported.

[Configure peer relationships](#)

3. Confirm that the Storage VMs are created on each cluster.

### [Creating an SVM](#)

4. Confirm that a peer relationship exists between the Storage VMs on each cluster.

### [Creating an SVM peering relationship](#)

5. Confirm that the volumes exist for your LUNs.

### [Creating a volume](#)

6. Confirm that at least one SAN LIF is created on each node in the cluster.

### [Considerations for LIFs in a cluster SAN environment](#)

### [Creating a LIF](#)

7. Confirm that the necessary LUNs are created and mapped to an igroup, which is used to map LUNs to the initiator on the application host.

### [Create LUNs and map igroups](#)

8. Rescan the application host to discover any new LUNs.

## **Initialize the ONTAP mediator for SnapMirror active sync**

Once you have installed the ONTAP Mediator and confirmed your cluster configuration, you must initialize the ONTAP Mediator for cluster monitoring. You can initialize the ONTAP Mediator using System Manager or the ONTAP CLI.

## System Manager

With System Manager, you can configure the ONTAP Mediator server for automated failover. You can also replace the self-signed SSL and CA with the third party validated SSL Certificate and CA if you have not already done so.



From ONTAP 9.8 through 9.14.1, SnapMirror active sync is referred to as SnapMirror Business Continuity (SM-BC).

### Steps

1. Navigate to **Protection > Overview > Mediator > Configure**.
2. Select **Add**, and enter the following ONTAP Mediator server information:
  - IPv4 address
  - Username
  - Password
  - Certificate

### CLI

You can initialize the ONTAP Mediator from either the primary or secondary cluster using the ONTAP CLI. When you issue the `mediator add` command on one cluster, the ONTAP Mediator is automatically added on the other cluster.

### Steps

1. Initialize Mediator on one of the clusters:

```
snapmirror mediator add -mediator-address IP_Address -peer-cluster  
cluster_name -username user_name
```

### Example

```
cluster1::> snapmirror mediator add -mediator-address 192.168.10.1  
-peer-cluster cluster2 -username mediatoradmin  
Notice: Enter the mediator password.
```

```
Enter the password: *****
```

```
Enter the password again: *****
```

2. Check the status of the Mediator configuration:

```
snapmirror mediator show
```

Mediator Address	Peer Cluster	Connection Status	Quorum Status
192.168.10.1	cluster-2	connected	true

Quorum Status indicates whether the SnapMirror consistency group relationships are synchronized

with the mediator; a status of `true` indicates successful synchronization.

## Protect with SnapMirror active sync

SnapMirror active sync offers asymmetric protection and, beginning with ONTAP 9.15.1, symmetric active/active protection.

### Configure asymmetric protection

Configuring asymmetric protection using SnapMirror active sync involves selecting LUNs on the ONTAP source cluster and adding them to a consistency group.

#### Before you begin

- You must have a SnapMirror synchronous license.
- You must be a cluster or storage VM administrator.
- All constituent volumes in a consistency group must be in a single storage VM (SVM).
  - LUNs can reside on different volumes.
- The source and destination cluster cannot be the same.
- You cannot establish SnapMirror active sync consistency group relationships across ASA clusters and non-ASA clusters.
- The default IPspace is required by SnapMirror active sync for cluster peer relationships. Custom IPspace is not supported.
- The name of the consistency group must be unique.
- The volumes on the secondary (destination) cluster must be type DP.
- The primary and the secondary SVMs must be in a peered relationship.

#### Steps

You can configure a consistency group using the ONTAP CLI or System Manager.

Beginning in ONTAP 9.10.1, ONTAP offers a consistency group endpoint and menu in System Manager, offering additional management utilities. If you are using ONTAP 9.10.1 or later, see [Configure a consistency group](#) then [configure protection](#) to create an SnapMirror active sync relationship.



From ONTAP 9.8 through 9.14.1, SnapMirror active sync is referred to as SnapMirror Business Continuity (SM-BC).

## System Manager

1. On the primary cluster, navigate to **Protection > Overview > Protect for Business Continuity > Protect LUNs**.
2. Select the LUNs you want to protect and add them to a protection group.
3. Select the destination cluster and SVM.
4. **Initialize relationship** is selected by default. Click **Save** to begin protection.
5. Go to **Dashboard > Performance** to verify IOPS activity for the LUNs.
6. On the destination cluster, use System Manager to verify that the protection for business continuity relationship is in sync: **Protection > Relationships**.

## CLI

1. Create a consistency group relationship from the destination cluster.

```
destination::> snapmirror create -source-path source-path -destination-path destination-path -cg-item-mappings volume-paths -policy policy-name
```

You can map up to 12 constituent volumes using the `cg-item-mappings` parameter on the `snapmirror create` command.

The following example creates two consistency groups: `cg_src_` on the source with `vol1` and `vol2` and a mirrored destination consistency group, `cg_dst`.

```
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 -policy AutomatedFailOver
```

2. From the destination cluster, initialize the consistency group.

```
destination::> snapmirror initialize -destination-path destination-  
consistency-group
```

3. Confirm that the initialization operation completed successfully. The status should be `InSync`.

```
snapmirror show
```

4. On each cluster, create an igroup so you can map LUNs to the initiator on the application host.

```
lun igroup create -igroup name -protocol fcp|iscsi -ostype os -initiator  
initiator_name
```

5. On each cluster, map LUNs to the igroup:

```
lun map -path path_name -igroup igroup_name
```

6. Verify the LUN mapping completed successfully with the `lun map` command. Then, you can discover the new LUNs on the application host.

## Configure symmetric active/active protection

You can establish symmetric protection using System Manager or the ONTAP CLI. In both interfaces, there are different steps for [uniform and non-uniform configurations](#).

### Before you begin

- Both clusters must be running ONTAP 9.15.1 or later.
- Symmetric active/active configurations require the `AutomatedFailoverDuplex` protection policy. Alternately, you can [create a custom SnapMirror policy](#) provided the `-type` is `automated-failover-duplex`.



## Example 1. Steps

### System Manager

#### Steps for a uniform configuration

1. On the primary site, [create a consistency group using new LUNs](#).
  - a. When creating the consistency group, specify host initiators to create igroups.
  - b. Select the checkbox to **Enable SnapMirror** then choose the `AutomatedFailoverDuplex` policy.
  - c. In the dialog box that appears, select the **Replicate initiator groups** checkbox to replicate igroups. In **Edit proximal settings**, set proximal SVMs for your hosts.
  - d. Select **Save**.

#### Steps for a non-uniform configuration

1. On the primary site, [create a consistency group using new LUNs](#).
  - a. When creating the consistency group, specify host initiators to create igroups.
  - b. Select the checkbox to **Enable SnapMirror** then choose the `AutomatedFailoverDuplex` policy.
  - c. Select **Save** to create the LUNs, consistency group, igroup, SnapMirror relationship, and igroup mapping.
2. On the secondary site, create an igroup and map the LUNs.
  - a. Navigate to **Hosts > SAN Initiator Groups**.
  - b. Select **+Add** to create a new igroup.
  - c. Provide a **Name**, select the **Host Operating System**, then choose **Initiator Group Members**.
  - d. Select **Save**.
3. Map the new igroup to the destination LUNs.
  - a. Navigate to **Storage > LUNs**.
  - b. Select all the LUNs to map to the igroup.
  - c. Select **More** then **Map to Initiator Groups**.

### CLI

#### Steps for a uniform configuration

1. Create a new SnapMirror relationship grouping all the volumes in the application. Ensure you designate the `AutomatedFailOverDuplex` policy to establish bidirectional sync replication.

```
snapmirror create -source-path source_path -destination-path  
destination_path -cg-item-mappings source_volume:@destination_volume  
-policy AutomatedFailOverDuplex
```

2. Confirm the operation has succeeded by waiting for the `Mirrored State` to show as `SnapMirrored` and the `Relationship Status` as `Insync`.

```
snapmirror show -destination-path destination_path
```

3. On your host, configure host connectivity with access to each cluster according to your needs.

4. Establish the igroup configuration. Set the preferred paths for initiators on the local cluster. Specify the option to replicate the configuration to the peer cluster inverse affinity.

```
SiteA::> igroup create -vserver svm_name -igroup igroup_name -replication
-peer peer_svm_name -initiators host -proximal-vserver local
```

```
SiteA::> igroup add -vserver svm_name -igroup igroup_name -initiators host
-proximal-vserver peer_svm
```

5. From the host, discover the paths and verify the hosts have an active/optimized path to the storage LUN from the preferred cluster.
6. Deploy the application and distribute the VM workloads across clusters to achieve the required load balancing.

### Steps for a non-uniform configuration

1. Create a new SnapMirror relationship grouping all the volumes in the application. Ensure you designate the 'AutomatedFailOverDuplex'" policy to establish bidirectional sync replication.

```
snapmirror create -source-path source_path -destination-path
destination_path -cg-item-mappings source_volume:@destination_volume
-policy AutomatedFailOverDuplex
```

2. Confirm the operation has succeeded by waiting for the Mirrored State to show as SnapMirrored and the Relationship Status as Insync.

```
snapmirror show -destination-path destination_path
```

3. On your host, configure host connectivity with access to each cluster according to your needs.
4. Establish the igroup configurations on both the source and destination clusters.

```
# primary site
SiteA::> igroup create -vserver svm_name -igroup igroup_name -initiators
host_1_name

# secondary site
SiteB::> igroup create -vserver svm_name -igroup igroup_name -initiators
host_2_name
```

5. From the host, discover the paths and verify the hosts have an active/optimized path to the storage LUN from the preferred cluster.
6. Deploy the application and distribute the VM workloads across clusters to achieve the required load balancing.

## Convert an existing SnapMirror relationship to SnapMirror active sync relationship

If you've configured SnapMirror protection, you can convert the relationship to SnapMirror active sync. Beginning with ONTAP 9.15.1, you can convert the relationship to use symmetric active/active protection.

## Convert an existing SnapMirror relationship to an asymmetric SnapMirror active sync relationship

If you have an existing SnapMirror synchronous relationship between a source and destination cluster, you can convert it to an asymmetric SnapMirror active sync relationship. This allows you to associate the mirrored volumes with a consistency group, ensuring zero RPO across a multi-volume workload. Additionally, you can retain existing SnapMirror snapshots if you need to revert to a point in time prior to establishing the SnapMirror active sync relationship.

### About this task

- You must be a cluster and SVM administrator on the primary and secondary clusters.
- You cannot convert zero RPO to zero RTO sync by changing the SnapMirror policy.
- You must ensure the LUNs are unmapped before issuing the `snapmirror create` command.

If existing LUNs on the secondary volume are mapped and the `AutomatedFailover` policy is configured, the `snapmirror create` command triggers an error.

### Before you begin

- A zero RPO SnapMirror synchronous relationship must exist between the primary and secondary cluster.
- All LUNs on the destination volume must be unmapped before the zero RTO SnapMirror relationship can be created.
- SnapMirror active sync only supports SAN protocols (not NFS/CIFS). Ensure no constituent of the consistency group is mounted for NAS access.

### Steps

1. From the secondary cluster, perform a SnapMirror update on the existing relationship:

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

2. Verify that the SnapMirror update completed successfully:

```
SiteB::>snapmirror show
```

3. Pause each of the zero RPO synchronous relationships:

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

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

4. Delete each of the zero RPO synchronous relationships:

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

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

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

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

```
SiteA::>snapmirror release -relationship-info-only true -destination-path
```

```
vs1_dst:vol2
```

6. Create a zero RTO Snapmirror synchronous relationship:

```
SiteB::> 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 consistency group:

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

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

## Convert an existing SnapMirror relationship to symmetric active/active

Beginning with ONTAP 9.15.1, you can convert an existing SnapMirror relationship to a SnapMirror active sync symmetric active/active relationship.

### Before you begin

- You must be running ONTAP 9.15.1 or later.
- A zero RPO SnapMirror synchronuous relationship must exist between the primary and secondary cluster.
- All LUNs on the destination volume must be unmapped before the zero RTO SnapMirror relationship can be created.
- SnapMirror active sync only supports SAN protocols (not NFS/CIFS). Ensure no constituent of the consistency group is mounted for NAS access.

### Steps

1. From the secondary cluster, perform a SnapMirror update on the existing relationship:

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

2. Verify that the SnapMirror update completed successfully:

```
SiteB::>snapmirror show
```

3. Pause each of the zero RPO synchronous relationships:

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

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

4. Delete each of the zero RPO synchronous relationships:

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

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

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

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

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

6. Create a zero RTO Snapmirror synchronous relationship with the AutomatedFailoverDuplex policy:

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

7. If the existing hosts are local the primary cluster, add the host to the secondary cluster and establish connectivity with respective access to each cluster.
8. On the secondary site, delete the LUN maps on the igroups associated with remote hosts.



Ensure the igroup does not contain maps for non-replicated LUNs.

```
SiteB::> lun mapping delete -vserver svm_name -igroup igroup -path <>
```

9. On the primary site, modify the initiator configuration for existing hosts to set the proximal path for initiators on the local cluster.

```
SiteA::> igroup initiator add-proximal-vserver -vserver svm_name -initiator  
host -proximal-vserver server
```

10. Add a new igroup and initiator for the new hosts and set the host proximity for host affinity to its local site. Enable igroup replication to replicate the configuration and invert the host locality on the remote cluster.

```
SiteA::> igroup modify -vserver vsA -igroup ig1 -replication-peer vsB  
SiteA::> igroup initiator add-proximal-vserver -vserver vsA -initiator host2  
-proximal-vserver vsB
```

11. Discover the paths on the hosts and verify the hosts have an Active/Optimized path to the storage LUN from the preferred cluster
12. Deploy the application and distribute the VM workloads across clusters.
13. Resynchronize the consistency group:

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

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

## Convert SnapMirror active sync relationship type

Beginning with ONTAP 9.15.1, you can convert between types of SnapMirror active sync protection: from asymmetric to symmetric active/active and vice versa.

### Convert to a symmetric active/active relationship

You can convert a SnapMirror active sync relationship with asynchronous protection to use symmetric active/active.

### Before you begin

- Both clusters must be running ONTAP 9.15.1 or later.
- Symmetric active/active configurations require the AutomatedFailoverDuplex protection policy. Alternately, you can [create a custom SnapMirror policy](#) provided the `-type` is `automated-failover-duplex`.

## System Manager

### Steps for a uniform configuration

1. Remove the destination igroup:
  - a. On the destination cluster, navigate to **Hosts > SAN Initiator Groups**.
  - b. Select the igroup with the SnapMirror relationship, then **Delete**.
  - c. In the dialog box, select the **Unmap the associated LUNs** box then **Delete**.
2. Edit the SnapMirror active sync relationship.
  - a. Navigate to **Protection > Relationships**.
  - b. Select the kabob menu next to the relationship you want to modify then **Edit**.
  - c. Modify the **Protection Policy** to AutomatedFailoverDuplex.
  - d. Selecting AutoMatedFailoverDuplex prompts a dialog box to modify host proximity settings. For the initiators, select the appropriate option for **Initiator proximal to** then **Save**.
  - e. Select **Save**.
3. In the **Protection** menu, confirm the operation succeeded when the relationship displays as InSync.

### Steps for a non-uniform configuration

1. Remove the destination igroup:
  - a. On the secondary site, navigate to **Hosts > SAN Initiator Groups**.
  - b. Select the igroup with the SnapMirror relationship, then **Delete**.
  - c. In the dialog box, select the **Unmap the associated LUNs** box then **Delete**.
2. Create a new igroup:
  - a. In the **SAN Initiator Groups** menu on the destination site, select **Add**.
  - b. Provide a **Name**, select the **Host Operating System**, then choose **Initiator Group Members**.
  - c. Select **Save**.
3. Map the new igroup to the destination LUNs.
  - a. Navigate to **Storage > LUNs**.
  - b. Select all the LUNs to map to the igroup.
  - c. Select **More** then **Map to Initiator Groups**.
4. Edit the SnapMirror active sync relationship.
  - a. Navigate to **Protection > Relationships**.
  - b. Select the kabob menu next to the relationship you want to modify then **Edit**.
  - c. Modify the **Protection Policy** to AutomatedFailoverDuplex.
  - d. Selecting AutoMatedFailoverDuplex initiates the option to modify host proximity settings. For the initiators, select the appropriate option for **Initiator proximal to** then **Save**.
  - e. Select **Save**.
5. In the **Protection** menu, confirm the operation succeeded when the relationship displays as InSync.

## CLI

### Steps for a uniform configuration

1. Modify the SnapMirror policy from AutomatedFailover to AutomatedFailoverDuplex:

```
snapmirror modify -destination-path destination_path -policy  
AutomatedFailoverDuplex
```

2. Modifying the policy triggers a resync. Wait for the resync to complete and confirm the relationship is Insync:

```
snapmirror show -destination-path destination_path
```

3. If the existing hosts are local the primary cluster, add the host to the second cluster and establish connectivity with respective access to each cluster.
4. On the secondary site, delete the LUN maps on the igroups associated with remote hosts.



Ensure the igroup does not contain maps for non-replicated LUNs.

```
SiteB::> lun mapping delete -vserver svm_name -igroup igroup -path <>
```

5. On the primary site, modify the initiator configuration for existing hosts to set the proximal path for initiators on the local cluster.

```
SiteA::> igroup initiator add-proximal-vserver -vserver svm_name -initiator  
host -proximal-vserver server
```

6. Add a new igroup and initiator for the new hosts and set the host proximity for host affinity to its local site. Enable igroup replication to replicate the configuration and invert the host locality on the remote cluster.

```
SiteA::> igroup modify -vserver vsA -igroup ig1 -replication-peer vsB  
SiteA::> igroup initiator add-proximal-vserver -vserver vsA -initiator  
host2 -proximal-vserver vsB
```

7. Discover the paths on the hosts and verify the hosts have an Active/Optimized path to the storage LUN from the preferred cluster
8. Deploy the application and distribute the VM workloads across clusters.

### Steps for a non-uniform configuration

1. Modify the SnapMirror policy from AutomatedFailover to AutomatedFailoverDuplex:

```
snapmirror modify -destination-path destination_path -policy  
AutomatedFailoverDuplex
```

2. Modifying the policy triggers a resync. Wait for the resync to complete and confirm the relationship is Insync:

```
snapmirror show -destination-path destination_path
```

3. If the existing hosts are local to the primary cluster, add the host to the second cluster and establish connectivity with respective access to each cluster.



4. On the secondary site, delete the LUN maps on the igroups associated with remote hosts.



Ensure the igroup does not contain maps for non-replicated LUNs.

```
SiteB::> lun mapping delete -vserver svm_name -igroup igroup -path <>
```

5. On the primary site, modify the initiator configuration for existing hosts to set the proximal path for initiators on the local cluster.

```
SiteA::> igroup initiator add-proximal-vserver -vserver Svm_name -initiator  
host -proximal-vserver server
```

6. On the secondary site, add a new igroup and initiator for the new hosts and set the host proximity for host affinity to its local site. Map the LUNs to the igroup.

```
SiteB::> igroup create -vserver svm_name -igroup igroup_name  
SiteB::> igroup add -vserver svm_name -igroup igroup_name -initiator  
host_name  
SiteB::> lun mapping create -igroup igroup_name -path path_name
```

7. Discover the paths on the hosts and verify the hosts have an Active/Optimized path to the storage LUN from the preferred cluster
8. Deploy the application and distribute the VM workloads across clusters.

## Convert from symmetric active/active to an asymmetric relationship

If you've configured symmetric active/active protection, you can convert the relationship to asymmetric protection using the ONTAP CLI.

### Steps

1. Move all the VM workloads to the host local to the source cluster.
2. Remove the igroup configuration for the hosts that are not managing the VM instances and modify the igroup configuration to terminate igroup replication.

code

3. On the secondary site, unmap the LUNs.

```
SiteB::> lun mapping delete -vserver svm_name -igroup igroup_name -path <>
```

4. On the secondary site, delete the symmetric active/active relationship.

```
SiteB::> snapmirror delete -destination-path destination_path
```

5. On the primary site, release the symmetric active/active relationship.

```
SiteA::> snapmirror release -destination-path destination_path -relationship  
-info-only true
```

6. From the secondary site, create a relationship to the same set of volumes with the AutomatedFailover

policy the resynchronize the relationship.

```
SiteB::> snapmirror create -source-path source_path -destination-path  
destination_path -cg-item-mappings source:@destination -policy  
AutomatedFailover  
SiteB::> snapmirror resync -destination-path vs1:/cg/cg1_dst
```



The consistency group on the secondary site needs **to be deleted** before recreating the relationship. The destination volumes **must be converted to type DP**.

7. Confirm the relationship Mirror State is Snapmirrored the Relationship Status is Insync.

```
snapmirror show -destination-path destination_path
```

8. Re-discover the paths from the host.

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