Configure ONTAP Mediator for unplanned automatic switchover

ONTAP MetroCluster

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ONTAP Mediator installation requirements for MetroCluster IP configurations

Your environment must meet certain requirements.

The following requirements apply to one disaster recovery group (DR group). Learn more about DR groups.

- If you plan on updating your Linux version, do so before you install the most current version of ONTAP Mediator.
- The ONTAP Mediator and MetroCluster Tiebreaker software should not both be used with the same MetroCluster configuration.
- ONTAP Mediator must be installed on a Linux host at a separate location from the MetroCluster sites.

  The connectivity between the ONTAP Mediator and each site must be two separate failure domains.

- Automatic unplanned switchover is supported in ONTAP 9.7 and later.
- Beginning with ONTAP 9.18.1 and ONTAP Mediator 1.11, a single ONTAP Mediator instance can manage up to ten MetroCluster configurations simultaneously. In earlier releases, ONTAP Mediator can support up to five MetroCluster configurations simultaneously.
- Beginning with ONTAP 9.18.1, IPv6 is supported for ONTAP Mediator 1.11 or later in a MetroCluster IP configuration.

Network requirements for using ONTAP Mediator in a MetroCluster configuration

To install ONTAP Mediator in a MetroCluster configuration, you must make sure that the configuration meets several network requirements.

- Latency

  Maximum latency of less than 75ms (RTT).

  Jitter must be no more than 5ms.

- MTU

  The MTU size must be at least 1400.

- Packet loss

  For both Internet Control Message Protocol (ICMP) and TCP traffic, packet loss must be less than 0.01%.

- Bandwidth

  The link between ONTAP Mediator and one DR group must have at least 20Mbps of bandwidth.

- Independent connectivity

Independent connectivity between each site and the ONTAP Mediator is required. A failure in one site must not interrupt the IP connectivity between the other two unaffected sites.

Host requirements for ONTAP Mediator in a MetroCluster configuration

You must ensure that the configuration meets several host requirements.

- ONTAP Mediator must be installed at an external site that is physically separated from the two ONTAP clusters.
- ONTAP Mediator does not require more than the host operating system's minimum requirements for CPU and memory (RAM).
- In addition to the host operating system's minimum requirements, at least 30GB of additional usable disk space must be available.
  - Each DR group requires up to 200MB of disk space.

Firewall requirements for ONTAP Mediator

ONTAP Mediator uses a number of ports to communicate with specific services.

If you are using a third-party firewall:

- HTTPS access must be enabled.
- It must be configured to allow access on ports 31784 and 3260.

  When using the default Red Hat or CentOS firewall, the firewall is automatically configured during Mediator installation.

The following table lists the ports that you must allow in your firewall:

- The iSCSI port is only required in a MetroCluster IP configuration.
- The 22/tcp port is not required for normal operation but you can enable it temporarily for maintenance and disable it when the maintenance session has finished.

Port/services	Source	Direction	Destination	Purpose
22/tcp	Management host	Inbound	ONTAP Mediator	SSH / ONTAP Mediator management
31784/tcp	cluster-mgmt and node-mgmt LIFs	Inbound	ONTAP Mediator web server	REST API (HTTPS)
3260/tcp	node-mgmt LIFs	Inbound	ONTAP Mediator iSCSI targets	iSCSI data connection for mailboxes

Guidelines for upgrading ONTAP Mediator in a MetroCluster configuration

If you are upgrading ONTAP Mediator you must meet the Linux version requirements and follow guidelines for the upgrade.

- ONTAP Mediator can be upgraded from version from an immediately prior version to the current version.
- All Mediator versions are supported on MetroCluster IP configurations running ONTAP 9.7 or later.

Install or upgrade ONTAP Mediator

After the upgrade

After the Mediator and operating system upgrade is complete, you should issue the `storage iscsi-initiator show` command to confirm that the Mediator connections are up.

Set up the ONTAP Mediator for a MetroCluster IP configuration

You must configure the ONTAP Mediator on the ONTAP node to use it in a MetroCluster IP configuration.

Before you begin

- ONTAP Mediator must have been successfully installed on a network location that can be reached by both MetroCluster sites.

  Install or upgrade ONTAP Mediator

- You must have the IP address of the host running ONTAP Mediator.
- You must have the username and password for ONTAP Mediator.
- All nodes of the MetroCluster IP configuration must be online.

> Beginning with ONTAP 9.12.1, you can enable the MetroCluster automatic forced switchover feature in a MetroCluster IP configuration. This feature is an extension of the Mediator-assisted unplanned switchover. Before you enable this feature, review the Risks and limitations of using MetroCluster automatic forced switchover.

About this task

- This task enables automatic unplanned switchover by default.
- This task can be performed on the ONTAP interface of any node in the MetroCluster IP configuration.
- Beginning with ONTAP 9.18.1 and ONTAP Mediator 1.11, a single ONTAP Mediator instance can manage up to ten MetroCluster configurations simultaneously. In earlier releases, ONTAP Mediator can support up to five MetroCluster configurations simultaneously.

Steps

1. Add ONTAP Mediator to ONTAP. The steps depend on whether you want to use an IPv4 or IPv6 address.

- You must be running ONTAP 9.18.1 or later and ONTAP Mediator 1.11 or later to use IPv6.
- If you enable IPv6 on a cluster, you cannot disable it later.

Use IPv4

a. Run the following command to add the ONTAP Mediator:

```
metrocluster configuration-settings mediator add -mediator-address
<mediator_host_ip_address>
```

You are prompted for the username and password for the Mediator admin user account.

Use IPv6

a. Run the following command on both clusters:

```
network options ipv6 modify -enabled true
```

b. Configure the node-mgmt IP address with IPv6 addresses on all four nodes.

c. Add the ONTAP Mediator:

```
metrocluster configuration-settings mediator add -mediator-address
<mediator_host_ipv6_ip_address>
```

You are prompted for the username and password for the Mediator admin user account.

2. Verify that the automatic switchover feature is enabled:

```
metrocluster show
```

3. Verify that the Mediator is now running.

   a. Show the Mediator virtual disks:

```
storage disk show -container-type mediator
```

```
 cluster_A::> storage disk show -container-type mediator
                       Usable           Disk    Container
Container
 Disk                  Size Shelf Bay Type    Type        Name
Owner
 ---------------- ---------- ----- --- ------- ----------- ---------
--------
 NET-1.5                  -     -   - VMDISK  mediator    -
node_A_2
 NET-1.6                  -     -   - VMDISK  mediator    -
node_B_1
 NET-1.7                  -     -   - VMDISK  mediator    -
node_B_2
 NET-1.8                  -     -   - VMDISK  mediator    -
node_A_1
```

b. Set the privilege mode to advanced:

```
set advanced
```

```
 cluster_A::> set advanced
```

c. Display the initiators labelled as mediator:

```
storage iscsi-initiator show -label mediator
```

```
 cluster_A::*> storage iscsi-initiator show -label mediator
   (storage iscsi-initiator show)
  +
Status
 Node Type Label    Target Portal      Target Name
Admin/Op
 ---- ---- -------- ------------------
--------------------------------- --------
 node_A_1
      mailbox
           mediator 1.1.1.1       iqn.2012-
05.local:mailbox.target.6616cd3f-9ef1-11e9-aada-
00a098ccf5d8:a05e1ffb-9ef1-11e9-8f68- 00a098cbca9e:1 up/up
 node_A_2
      mailbox
           mediator 1.1.1.1       iqn.2012-
05.local:mailbox.target.6616cd3f-9ef1-11e9-aada-
00a098ccf5d8:a05e1ffb-9ef1-11e9-8f68-00a098cbca9e:1 up/up
```

d. Verify the state of the automatic unplanned switchover (AUSO) failure domain:

`metrocluster show`

> The following example output applies to ONTAP 9.13.1 and later. For ONTAP 9.12.1 and earlier, the AUSO failure domain state should be `auso-on-cluster-disaster`.

```
cluster_A::> metrocluster show
Cluster                   Entry Name          State
------------------------- ------------------- -----------
Local: cluster_A         Configuration state configured
                          Mode                normal
                          AUSO Failure Domain auso-on-dr-group-
disaster
Remote: cluster_B         Configuration state configured
                          Mode                normal
                          AUSO Failure Domain auso-on-dr-group-
disaster
```

4. Optionally, configure MetroCluster automatic forced switchover.

You can only use the following command in advanced privilege level.

> Before using this command, review the Risks and limitations of using MetroCluster automatic forced switchover.

```
metrocluster modify -allow-auto-forced-switchover true
```

Example

```
cluster_A::*> metrocluster modify -allow-auto-forced-switchover true
```

Remove the ONTAP Mediator from a MetroCluster IP configuration

You can unconfigure ONTAP Mediator from the MetroCluster IP configuration.

Before you begin

You must have successfully installed and configured ONTAP Mediator on a network location that can be reached by both MetroCluster sites.

Steps

1. Unconfigure ONTAP Mediator by using the following command:

   ```
   metrocluster configuration-settings mediator remove
   ```

   You are prompted for the user name and password for the ONTAP Mediator admin user account.

   > If the ONTAP Mediator is down, the `metrocluster configuration-settings mediator remove` command still prompts you to enter the user name and password for the ONTAP Mediator admin user account and removes ONTAP Mediator from the MetroCluster configuration.

   a. Check if there are any broken disks by using the following command:

      ```
      disk show -broken
      ```

      Example

      ```
      There are no entries matching your query.
      ```

2. Confirm that ONTAP Mediator has been removed from the MetroCluster configuration by running the following commands on both clusters:

   a. `metrocluster configuration-settings mediator show`

      Example

      ```
      This table is currently empty.
      ```

   b. `storage iscsi-initiator show -label mediator`

      Example

```
There are no entries matching your query.
```

Connect a MetroCluster IP configuration to a different ONTAP Mediator instance

If you want to connect the MetroCluster nodes to a different ONTAP Mediator instance, you must unconfigure and then reconfigure the Mediator connection in the ONTAP software.

Before you begin

You need the username, password, and IP address of the new ONTAP Mediator instance.

About this task

These commands can be issued from any node in the MetroCluster configuration.

Steps

1. Remove the current ONTAP Mediator from the MetroCluster configuration:

   ```
   metrocluster configuration-settings mediator remove
   ```

2. Establish the new ONTAP Mediator connection to the MetroCluster configuration:

   ```
   metrocluster configuration-settings mediator add -mediator-address ip-address-of-mediator-host
   ```

How the ONTAP Mediator supports automatic unplanned switchover in MetroCluster IP configurations

ONTAP Mediator provides mailbox LUNs to store state information about the MetroCluster IP nodes. These LUNs are co-located with ONTAP Mediator, which runs on a Linux host physically separate from the MetroCluster sites. The MetroCluster IP nodes can use the mailbox information to monitor the state of their disaster recovery (DR) partners and implement a Mediator-assisted unplanned switchover (MAUSO) in the case of a disaster.

MAUSO is not supported in MetroCluster FC configurations.

When a node detects a site failure requiring a switchover, it takes steps to confirm that the switchover is appropriate and, if so, performs the switchover. By default, a MAUSO is initiated for the following scenarios:

- Both SyncMirror mirroring and DR mirroring of each node's nonvolatile cache is operating and the caches and mirrors are synchronized at the time of the failure.
- None of the nodes at the surviving site are in takeover state.
- If a site disaster occurs. A site disaster is a failure of *all* nodes at the same site.

A MAUSO is *not* initiated in the following shutdown scenarios:

- You initiate a shutdown. For example, when you:
  - Halt the nodes
  - Reboot the nodes

Learn about the MAUSO features available with each ONTAP 9 release.

Beginning with…	Description
ONTAP 9.13.1	• A MAUSO is initiated if a default scenario occurs and a fan or hardware failure initiates an environmental shutdown. Examples of hardware failures include a high or low temperature, or a power supply unit, NVRAM battery, or Service Processor heartbeat failure. • The default value for the failure domain is set to "auso-on-dr-group" in a MetroCluster IP configuration. For ONTAP 9.12.1 and earlier, the default value is set to "auso-on-cluster-disaster". In an eight-node MetroCluster IP configuration, "auso-on-dr-group" triggers a MAUSO either on failure of the cluster or a HA pair in one DR group. For a HA pair, both nodes must fail at the same time. Optionally, you can change the failure domain setting to the "auso-on-cluster-disaster" domain using the `metrocluster modify -auto-switchover-failure-domain auso-on-cluster-disaster` command to trigger a MAUSO only if there are HA node pair failures in both DR groups. • You can change the behavior to force a MAUSO even if NVRAM is not in sync at the time of the failure.
ONTAP 9.12.1	You can enable the MetroCluster automatic forced switchover feature in a MetroCluster IP configuration by using the `metrocluster modify -allow-auto-forced -switchover true` command. Switchover upon detection of a site failure happens automatically when you enable the MetroCluster automatic forced switchover feature. You can use this feature to supplement the MetroCluster IP automatic switchover capability. **Risks and limitations of using MetroCluster automatic forced switchover** When you allow a MetroCluster IP configuration to operate in automatic forced switchover mode, the following known issue might lead to data loss: • The nonvolatile memory in the storage controllers is not mirrored to the remote DR partner on the partner site. **Caution**: You might encounter scenarios that are not mentioned. NetApp is not responsible for any data corruption, data loss, or other damage that might arise from enabling the MetroCluster automatic forced switchover feature. Do not use the MetroCluster automatic forced switchover feature if the risks and limitations are not acceptable to you.

Manage the ONTAP Mediator with System Manager in MetroCluster IP configurations

Using System Manager, you can perform tasks to manage ONTAP Mediator.

About these tasks

Beginning with ONTAP 9.8, you can use System Manager as a simplified interface for managing a four-node MetroCluster IP configuration, which can include an ONTAP Mediator installed in a third location.

Beginning with ONTAP 9.14.1, you can use System Manager to also perform these operations for an eight-node MetroCluster IP site. Although you can't set up or expand an eight-node system with System Manager, if you have already set up an eight-node MetroCluster IP system, then you can perform these operations.

Perform the following tasks to manage ONTAP Mediator.

To perform this task…	Take these actions…
Configure ONTAP Mediator	Both clusters at the MetroCluster sites should be up and peered. **Steps** 1. In System Manager in ONTAP 9.8, select **Cluster > Settings**. 2. In the **Mediator** section, click the ⚙. 3. On the **Configure Mediator** window, click **Add+**. 4. Enter the configuration details for ONTAP Mediator. You can enter the following details while configuring ONTAP Mediator with System Manager. ◦ The IP address of ONTAP Mediator. ◦ The user name. ◦ The password.
Enable or disable Mediator-assisted Automatic Switchover (MAUSO)	**Steps** 1. In System Manager, click **Dashboard**. 2. Scroll to the MetroCluster section. 3. Click ⋮ next to the MetroCluster site name. 4. Select **Enable** or **Disable**. 5. Enter the administrator user name and password, then click **Enable** or **Disable**. ⓘ You can enable or disable ONTAP Mediator when it can be reached and both sites are in "Normal" mode. ONTAP Mediator is still reachable when MAUSO is enabled or disabled if the MetroCluster system is healthy.

Remove ONTAP Mediator from the MetroCluster configuration	**Steps** 1. In System Manager, click **Dashboard**. 2. Scroll to the MetroCluster section. 3. Click ⋮ next to the MetroCluster site name. 4. Select **Remove Mediator**. 5. Enter the administrator user name and password, then click **Remove**.
Check the health of ONTAP Mediator	Perform the System Manager specific steps in Verify the health of a MetroCluster configuration.
Perform a switchover and a switchback	Perform the steps in Use System Manger to perform switchover and switchback (MetroCluster IP configurations only).

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