



# What to do after an ONTAP upgrade

## ONTAP 9

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# What to do after an ONTAP upgrade

## What to do after an ONTAP upgrade

After you upgrade ONTAP, there are several tasks you should perform to verify your cluster readiness.

1. [Verify your cluster](#).

After you upgrade ONTAP, you should verify your cluster version, cluster health, and storage health. If you are using a MetroCluster FC configuration, you also need to verify that the cluster is enabled for automatic unplanned switchover.

2. [Verify that all LIFs are on home ports](#).

During a reboot, some LIFs might have been migrated to their assigned failover ports. After you upgrade a cluster, you must enable and revert any LIFs that are not on their home ports.

3. Verify [special considerations](#) specific to your cluster.

If certain configurations exist on your cluster, you might need to perform additional steps after you upgrade.

4. [Update the Disk Qualification Package \(DQP\)](#).

The DQP is not updated as part of an ONTAP upgrade.

## Verify your cluster after ONTAP upgrade

After you upgrade ONTAP, you should verify your cluster version, cluster health, and storage health. If your cluster is in a MetroCluster FC configuration, you also need to verify that the cluster is enabled for automatic unplanned switchover.

### Verify cluster version

After all the HA pairs have been upgraded, you must use the version command to verify that all of the nodes are running the target release.

The cluster version is the lowest version of ONTAP running on any node in the cluster. If the cluster version is not the target ONTAP release, you can upgrade your cluster.

1. Verify that the cluster version is the target ONTAP release:

```
version
```

2. If the cluster version is not the target ONTAP release, you should verify the upgrade status of all nodes:

```
system node upgrade-revert show
```

# Verify cluster health

After you upgrade a cluster, you should verify that the nodes are healthy and eligible to participate in the cluster, and that the cluster is in quorum.

- 1. Verify that the nodes in the cluster are online and are eligible to participate in the cluster:

```
cluster show
```

```
cluster1::> cluster show
Node                Health  Eligibility
-----
node0               true   true
node1               true   true
```

If any node is unhealthy or ineligible, check EMS logs for errors and take corrective action.

- 2. Set the privilege level to advanced:

```
set -privilege advanced
```

- 3. Verify the configuration details for each RDB process.

- The relational database epoch and database epochs should match for each node.
- The per-ring quorum master should be the same for all nodes.

Note that each ring might have a different quorum master.

To display this RDB process...	Enter this command...
Management application	cluster ring show -unitname mgmt
Volume location database	cluster ring show -unitname vlddb
Virtual-Interface manager	cluster ring show -unitname vifmgr
SAN management daemon	cluster ring show -unitname bcomd

This example shows the volume location database process:

```
cluster1::*> cluster ring show -unitname vldb
```

Node	UnitName	Epoch	DB Epoch	DB Trnxs	Master	Online
node0	vldb	154	154	14847	node0	master
node1	vldb	154	154	14847	node0	secondary
node2	vldb	154	154	14847	node0	secondary
node3	vldb	154	154	14847	node0	secondary

4 entries were displayed.

4. If you are operating in a SAN environment, verify that each node is in a SAN quorum: `cluster kernel-service show`

```
cluster1::*> cluster kernel-service show
```

Master	Cluster	Quorum	Availability
Operational			
Node	Node	Status	Status
cluster1-01	cluster1-01	in-quorum	true
operational	cluster1-02	in-quorum	true
operational			

2 entries were displayed.

## Related information

[System administration](#)

## Verify automatic unplanned switchover is enabled (MetroCluster FC configurations only)

If your cluster is in a MetroCluster FC configuration, you should verify that automatic unplanned switchover is enabled after you upgrade ONTAP.



### About this task

This procedure is performed only for MetroCluster FC configurations. If you are using a MetroCluster IP configuration, skip this procedure.

## Steps

1. Check whether automatic unplanned switchover is enabled:

```
metrocluster show
```

If automatic unplanned switchover is enabled, the following statement appears in the command output:

```
AUSO Failure Domain  auso-on-cluster-disaster
```

2. If the statement does not appear, enable an automatic unplanned switchover:

```
metrocluster modify -auto-switchover-failure-domain auso-on-cluster-disaster
```

3. Verify that an automatic unplanned switchover has been enabled by repeating Step 1.

#### Related information

[Disk and aggregate management](#)

## Verify all LIFs are on home ports after upgrade

During a reboot, some LIFs might have been migrated to their assigned failover ports. After you upgrade a cluster, you must enable and revert any LIFs that are not on their home ports.

The network interface revert command reverts a LIF that is not currently on its home port back to its home port, provided that the home port is operational. A LIF's home port is specified when the LIF is created; you can determine the home port for a LIF by using the network interface show command.

1. Display the status of all LIFs: `network interface show -fields home-port,curr-port`

This example displays the status of all LIFs for a storage virtual machine (SVM).

```

cluster1::> network interface show -fields home-port,curr-port
vserver                                lif             home-port curr-port
-----
C1_sti96-vsim-ucs539g_1622463615 clus_mgmt e0d          e0d
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539g_cluster_mgmt_inet6
e0d e0d
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539g_mgmt1 e0c e0c
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539g_mgmt1_inet6 e0c e0c
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539h_cluster_mgmt_inet6
e0d e0d
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539h_mgmt1 e0c e0c
C1_sti96-vsim-ucs539g_1622463615 sti96-vsim-ucs539h_mgmt1_inet6 e0c e0c
Cluster                               sti96-vsim-ucs539g_clus1 e0a e0a
Cluster                               sti96-vsim-ucs539g_clus2 e0b e0b
Cluster                               sti96-vsim-ucs539h_clus1 e0a e0a
Cluster                               sti96-vsim-ucs539h_clus2 e0b e0b
vs0                                   sti96-vsim-ucs539g_data1 e0d e0d
vs0                                   sti96-vsim-ucs539g_data1_inet6 e0d e0d
vs0                                   sti96-vsim-ucs539g_data2 e0e e0e
vs0                                   sti96-vsim-ucs539g_data2_inet6 e0e e0e
vs0                                   sti96-vsim-ucs539g_data3 e0f e0f
vs0                                   sti96-vsim-ucs539g_data3_inet6 e0f e0f
vs0                                   sti96-vsim-ucs539g_data4 e0d e0d
vs0                                   sti96-vsim-ucs539g_data4_inet6 e0d e0d
vs0                                   sti96-vsim-ucs539g_data5 e0e e0e
vs0                                   sti96-vsim-ucs539g_data5_inet6 e0e e0e
vs0                                   sti96-vsim-ucs539g_data6 e0f e0f
vs0                                   sti96-vsim-ucs539g_data6_inet6 e0f e0f
vs0                                   sti96-vsim-ucs539h_data1 e0d e0d
vs0                                   sti96-vsim-ucs539h_data1_inet6 e0d e0d
vs0                                   sti96-vsim-ucs539h_data2 e0e e0e
vs0                                   sti96-vsim-ucs539h_data2_inet6 e0e e0e
vs0                                   sti96-vsim-ucs539h_data3 e0f e0f
vs0                                   sti96-vsim-ucs539h_data3_inet6 e0f e0f
vs0                                   sti96-vsim-ucs539h_data4 e0d e0d
vs0                                   sti96-vsim-ucs539h_data4_inet6 e0d e0d
vs0                                   sti96-vsim-ucs539h_data5 e0e e0e
vs0                                   sti96-vsim-ucs539h_data5_inet6 e0e e0e
vs0                                   sti96-vsim-ucs539h_data6 e0f e0f
vs0                                   sti96-vsim-ucs539h_data6_inet6 e0f e0f
35 entries were displayed.

```

If any LIFs appear with a Status Admin status of "down" or with an Is home status of "false", continue with the next step.

2. Enable the data LIFs: `network interface modify {-role data} -status-admin up`

```
cluster1::> network interface modify {-role data} -status-admin up
8 entries were modified.
```

3. Revert LIFs to their home ports: `network interface revert *`

This command reverts all LIFs back to their home ports.

```
cluster1::> network interface revert *
8 entries were acted on.
```

4. Verify that all LIFs are in their home ports: `network interface show`

This example shows that all LIFs for SVM vs0 are on their home ports.

```
cluster1::> network interface show -vserver vs0
```

Vserver	Logical Interface	Status Admin/Oper	Network Address/Mask	Current Node	Current Port	Is Home
vs0						
	data001	up/up	192.0.2.120/24	node0	e0e	true
	data002	up/up	192.0.2.121/24	node0	e0f	true
	data003	up/up	192.0.2.122/24	node0	e2a	true
	data004	up/up	192.0.2.123/24	node0	e2b	true
	data005	up/up	192.0.2.124/24	node1	e0e	true
	data006	up/up	192.0.2.125/24	node1	e0f	true
	data007	up/up	192.0.2.126/24	node1	e2a	true
	data008	up/up	192.0.2.127/24	node1	e2b	true

```
8 entries were displayed.
```

## Special configurations

### Special considerations after an ONTAP upgrade

If your cluster is configured with any of the following features you might need to perform additional steps after you upgrade.



Ask yourself...	If your answer is yes, then do this...
Did I upgrade from ONTAP 9.7 or earlier to ONTAP 9.8 or later?	<a href="#">Verify your network configuration</a>  <a href="#">Remove the EMS LIF service from network service policies that do not provide reachability to the EMS destination</a>
Is my cluster in a MetroCluster configuration?	<a href="#">Verify your networking and storage status</a>
Do I have a SAN configuration?	<a href="#">Verify your SAN configuration</a>
Did I upgrade from ONTAP 9.3 or earlier, and am using NetApp Storage Encryption?	<a href="#">Reconfigure KMIP server connections</a>
Do I have load-sharing mirrors?	<a href="#">Relocate moved load-sharing mirror source volumes</a>
Does my cluster have defined SnapMirror relationships?	<a href="#">Resume SnapMirror operations</a>
Do I have user accounts for Service Processor (SP) access that were created prior to ONTAP 9.9.1?	<a href="#">Verify the change in accounts that can access the Service Processor</a>
Did I upgrade from ONTAP 8.3.0?	<a href="#">Set the desired NT ACL permissions display level for NFS clients</a>

## Verify your networking configuration after an ONTAP upgrade from ONTAP 9.7x or earlier

After you upgrade from ONTAP 9.7x or earlier to ONTAP 9.8 or later, you should verify your network configuration. After the upgrade, ONTAP automatically monitors layer 2 reachability.

### Step

1. Verify each port has reachability to its expected broadcast domain:

```
network port reachability show -detail
```

The command output contains reachability results. Use the following decision tree and table to understand the reachability results (reachability-status) and determine what, if anything, to do next.



reachability-status	Description
---------------------	-------------

ok	<p>The port has layer 2 reachability to its assigned broadcast domain.</p> <p>If the reachability-status is "ok", but there are "unexpected ports", consider merging one or more broadcast domains. For more information, see <a href="#">Merge broadcast domains</a>.</p> <p>If the reachability-status is "ok", but there are "unreachable ports", consider splitting one or more broadcast domains. For more information, see <a href="#">Split broadcast domains</a>.</p> <p>If the reachability-status is "ok", and there are no unexpected or unreachable ports, your configuration is correct.</p>
misconfigured-reachability	<p>The port does not have layer 2 reachability to its assigned broadcast domain; however, the port does have layer 2 reachability to a different broadcast domain.</p> <p>You can repair the port reachability. When you run the following command, the system will assign the port to the broadcast domain to which it has reachability:</p> <pre>network port reachability repair -node -port</pre> <p>For more information, see <a href="#">Repair port reachability</a>.</p>
no-reachability	<p>The port does not have layer 2 reachability to any existing broadcast domain.</p> <p>You can repair the port reachability. When you run the following command, the system will assign the port to a new automatically created broadcast domain in the Default IPspace:</p> <pre>network port reachability repair -node -port</pre> <p>For more information, see <a href="#">Repair port reachability</a>.</p>
multi-domain-reachability	<p>The port has layer 2 reachability to its assigned broadcast domain; however, it also has layer 2 reachability to at least one other broadcast domain.</p> <p>Examine the physical connectivity and switch configuration to determine if it is incorrect or if the port's assigned broadcast domain needs to be merged with one or more broadcast domains.</p> <p>For more information, see <a href="#">Merge broadcast domains</a> or <a href="#">Repair port reachability</a>.</p>
unknown	<p>If the reachability-status is "unknown", then wait a few minutes and try the command again.</p>

After you repair a port, you need to check for and resolve displaced LIFs and VLANs. If the port was part of an interface group, you also need to understand what happened to that interface group. For more information, see [Repair port reachability](#).

## Remove EMS LIF service from network service policies

If you have Event Management System (EMS) messages set up before you upgrade from ONTAP 9.7 or earlier to ONTAP 9.8 or later , after the upgrade, your EMS messages

might not be delivered.

During the upgrade, management-ems, which is the EMS LIF service, is added to all existing service policies. This allows EMS messages to be sent from any of the LIFs associated with any of the service policies. If the selected LIF does not have reachability to the event notification destination, the message is not delivered.

To prevent this, after the upgrade, you should remove the EMS LIF service from the network service policies that do not provide reachability to the destination.

### Steps

1. Identify the LIFs and associated network service policies through which EMS messages can be sent:

```
network interface show -fields service-policy -services management-ems
```

vserver	lif	service-policy
cluster-1	cluster_mgmt	
		default-management
cluster-1	node1-mgmt	
		default-management
cluster-1	node2-mgmt	
		default-management
cluster-1	inter_cluster	
		default-intercluster

4 entries were displayed.

2. Check each LIF for connectivity to the EMS destination:

```
network ping -lif lif_name -vserver svm_name -destination  
destination_address
```

Perform this on each node.

### Examples

```
cluster-1::> network ping -lif node1-mgmt -vserver cluster-1  
-destination 10.10.10.10  
10.10.10.10 is alive  
  
cluster-1::> network ping -lif inter_cluster -vserver cluster-1  
-destination 10.10.10.10  
no answer from 10.10.10.10
```

3. Enter advanced privilege level:

```
set advanced
```

4. For the LIFs that do not have reachability, remove the management-ems LIF service from the corresponding service policies:

```
network interface service-policy remove-service -vserver svm_name  
-policy service_policy_name -service management-ems
```

5. Verify that the management-ems LIF is now only associated with the LIFs that provide reachability to the EMS destination:

```
network interface show -fields service-policy -services management-ems
```

### Related Links

[LIFs and service policies in ONTAP 9.6 and later](#)

## Verify networking and storage status for MetroCluster configurations after an ONTAP upgrade

After you upgrade an ONTAP cluster in a MetroCluster configuration, you should verify the status of the LIFs, aggregates, and volumes for each cluster.

1. Verify the LIF status:

```
network interface show
```

In normal operation, LIFs for source SVMs must have an admin status of up and be located on their home nodes. LIFs for destination SVMs are not required to be up or located on their home nodes. In switchover, all LIFs have an admin status of up, but they do not need to be located on their home nodes.

```

cluster1::> network interface show

```

Current Is	Logical	Status	Network	Current	
Vserver	Interface	Admin/Oper	Address/Mask	Node	Port
Home					
-----	-----	-----	-----	-----	
Cluster					
	cluster1-a1_clus1	up/up	192.0.2.1/24	cluster1-01	e2a
true					
	cluster1-a1_clus2	up/up	192.0.2.2/24	cluster1-01	e2b
true					
cluster1-01					
	clus_mgmt	up/up	198.51.100.1/24	cluster1-01	e3a
true					
	cluster1-a1_inet4_intercluster1	up/up	198.51.100.2/24	cluster1-01	e3c
true					
	...				

27 entries were displayed.

## 2. Verify the state of the aggregates:

```

storage aggregate show -state !online

```

This command displays any aggregates that are *not* online. In normal operation, all aggregates located at the local site must be online. However, if the MetroCluster configuration is in switchover, root aggregates at the disaster recovery site are permitted to be offline.

This example shows a cluster in normal operation:

```

cluster1::> storage aggregate show -state !online
There are no entries matching your query.

```

This example shows a cluster in switchover, in which the root aggregates at the disaster recovery site are

offline:

```
cluster1::> storage aggregate show -state !online
Aggregate      Size Available Used% State   #Vols  Nodes      RAID
Status
-----
aggr0_b1
      0B      0B    0% offline    0 cluster2-01
raid_dp,
mirror
degraded
aggr0_b2
      0B      0B    0% offline    0 cluster2-02
raid_dp,
mirror
degraded
2 entries were displayed.
```

### 3. Verify the state of the volumes:

```
volume show -state !online
```

This command displays any volumes that are *not* online.

If the MetroCluster configuration is in normal operation (it is not in switchover state), the output should show all volumes owned by the cluster's secondary SVMs (those with the SVM name appended with "-mc").

Those volumes come online only in the event of a switchover.

This example shows a cluster in normal operation, in which the volumes at the disaster recovery site are not online.

```
cluster1::> volume show -state !online
(volume show)
Vserver   Volume      Aggregate    State    Type    Size
Available Used%
-----
vs2-mc    vol1        aggr1_b1     -        RW      -
-         -
vs2-mc    root_vs2    aggr0_b1     -        RW      -
-         -
vs2-mc    vol2        aggr1_b1     -        RW      -
-         -
vs2-mc    vol3        aggr1_b1     -        RW      -
-         -
vs2-mc    vol4        aggr1_b1     -        RW      -
-         -
5 entries were displayed.
```

#### 4. Verify that there are no inconsistent volumes:

```
volume show -is-inconsistent true
```

See the Knowledge Base article [Volume Showing WAFL Inconsistent](#) on how to address the inconsistent volumes.

## Verify the SAN configuration after an upgrade

After an ONTAP upgrade, in a SAN environment, you should verify that each initiator that was connected to a LIF before the upgrade has successfully reconnected to the LIF.

#### 1. Verify that each initiator is connected to the correct LIF.

You should compare the list of initiators to the list you made during the upgrade preparation.

For...	Enter...
iSCSI	<code>iscsi initiator show -fields igroup,initiator-name,tpgroup</code>
FC	<code>fcp initiator show -fields igroup,wwpn,lif</code>



## Reconfigure KMIP server connections after an upgrade from ONTAP 9.2 or earlier

After you upgrade from ONTAP 9.2 or earlier to ONTAP 9.3 or later, you need to reconfigure any external key management (KMIP) server connections.

### Steps

1. Configure the key manager connectivity:

```
security key-manager setup
```

2. Add your KMIP servers:

```
security key-manager add -address key_management_server_ip_address
```

3. Verify that KMIP servers are connected:

```
security key-manager show -status
```

4. Query the key servers:

```
security key-manager query
```

5. Create a new authentication key and passphrase:

```
security key-manager create-key -prompt-for-key true
```

The passphrase must have a minimum of 32 characters.

6. Query the new authentication key:

```
security key-manager query
```

7. Assign the new authentication key to your self-encrypting disks (SEDs):

```
storage encryption disk modify -disk disk_ID -data-key-id key_ID
```



Make sure you are using the new authentication key from your query.

8. If needed, assign a FIPS key to the SEDs:

```
storage encryption disk modify -disk disk_id -fips-key-id  
fips_authentication_key_id
```

If your security setup requires you to use different keys for data authentication and FIPS 140-2 authentication, you should create a separate key for each. If that is not the case, you can use the same authentication key for FIPS compliance that you use for data access.

## Relocate moved load-sharing mirror source volumes after an ONTAP upgrade

After you upgrade ONTAP, you need to move load-sharing mirror source volumes back to their pre-upgrade locations.

### Steps

1. Identify the location to which you are moving the load-sharing mirror source volume by using the record you created before moving the load-sharing mirror source volume.
2. Move the load-sharing mirror source volume back to its original location by using the `volume move start` command.

## Resume SnapMirror operations after an ONTAP upgrade

After a non-disruptive ONTAP upgrade, you need to resume any SnapMirror relationships that were suspended.

### Steps

1. Resume transfers for each SnapMirror relationship that was previously quiesced:

```
snapmirror resume *
```

This command resumes the transfers for all quiesced SnapMirror relationships.

2. Verify that the SnapMirror operations have resumed:

```
snapmirror show
```

```
cluster1::> snapmirror show
```

Source	Destination	Mirror	Relationship	Total		
Last						
Path	Type	Path	State	Status	Progress	Healthy
Updated						
-----	----	-----	-----	-----	-----	-----
-----						
cluster1-vs1:dp_src1	DP	cluster1-vs2:dp_dst1	Snapmirrored	Idle	-	true -
cluster1-vs1:xdp_src1	XDP	cluster1-vs2:xdp_dst1	Snapmirrored	Idle	-	true -
cluster1://cluster1-vs1/ls_src1	LS	cluster1://cluster1-vs1/ls_mr1	Snapmirrored	Idle	-	true -
		cluster1://cluster1-vs1/ls_mr2	Snapmirrored	Idle	-	true -

4 entries were displayed.

For each SnapMirror relationship, verify that the Relationship Status is **Idle**. If the status is **Transferring**, wait for the SnapMirror transfer to complete, and then reenter the command to verify that the status has changed to **Idle**.

For each SnapMirror relationship that is configured to run on a schedule, you should verify that the first scheduled SnapMirror transfer completes successfully.

## Change in user accounts that can access the Service Processor

If you created user accounts in ONTAP 9.8 and earlier releases that can access the Service Processor (SP) with a non-admin role and you upgrade to ONTAP 9.9.1 or later, any non-admin value in the `-role` parameter is modified to `admin`.

For more information, see [Accounts that can access the SP](#).

## Update the Disk Qualification Package

Each update of the ONTAP Disk Qualification Package (DQP) adds full support for newly qualified drives.

The DQP contains the proper parameters for ONTAP interaction with all newly qualified drives. If you are

running a version of ONTAP with a DQP that does not contain information for a newly qualified drive, ONTAP will not have the information to properly configure the drive.

A best practice is to also update the DQP every quarter, and at least twice a year. You need to download and install the DQP in the following situations.

- Whenever you upgrade to a new version of ONTAP.

The DQP is not updated as part of an ONTAP upgrade.

- Whenever you add a new drive type or size to the node

For example, if you already have 1-TB drives and add 2-TB drives, you need to check for the latest DQP update.

- Whenever you update the disk firmware
- Whenever newer disk firmware or DQP files are available

#### **Related information**

- [NetApp Downloads: Disk Qualification Package](#)
- [NetApp Downloads: Disk Drive Firmware](#)

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