



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, verify the cluster version, cluster health, and storage health. For MetroCluster FC configurations, also 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. Change to advanced privilege level:

```
set -privilege advanced
```

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

```
system node image show -version
```

3. 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. 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 vldb
Virtual-Interface manager	cluster ring show -unitname vifmgr
SAN management daemon	cluster ring show -unitname bcomd

Learn more about `cluster ring show` in the [ONTAP command reference](#).

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.
```

3. 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           Status
-----  -----  -----  -----  -----
-----  -----
cluster1-01      cluster1-01      in-quorum      true
operational
                  cluster1-02      in-quorum      true
operational
2 entries were displayed.
```

4. Return the privilege level to admin:

```
set -privilege admin
```

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.

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:

```
metrocluster show
```

Related information

[Disk and aggregate management](#)

Verify all LIFs are on home ports after ONTAP upgrade

During the reboot that occurs as part of the ONTAP upgrade process, some LIFs might be migrated from their home ports to their assigned failover ports. After an upgrade, you need to enable and revert any LIFs that are not on their home ports.

Steps

1. Display the status of all LIFs:

```
network interface show -fields home-port,curr-port
```

If **Status Admin** is "down" or **Is home** is "false" for any LIFs, continue with the next step.

2. Enable the data LIFs:

```
network interface modify {-role data} -status-admin up
```

3. Revert LIFs to their home ports:

```
network interface revert *
```

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
  Logical      Status      Network          Current  Current Is
Vserver  Interface  Admin/Oper Address/Mask  Node     Port    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.
```

Related information

- [network interface](#)

Special configurations

Check for specific ONTAP configurations after an upgrade

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

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?	Verify your network configuration Remove the EMS LIF service from network service policies that do not provide reachability to the EMS destination
Is my cluster in a MetroCluster configuration?	Verify your networking and storage status
Do I have a SAN configuration?	Verify your SAN configuration
Did I upgrade from ONTAP 9.3 or earlier, and am using NetApp Storage Encryption?	Reconfigure KMIP server connections
Do I have load-sharing mirrors?	Relocate moved load-sharing mirror source volumes

Ask yourself...	If your answer is yes, then do this...
Do I have user accounts for Service Processor (SP) access that were created prior to ONTAP 9.9.1?	Verify the change in accounts that can access the Service Processor

Verify your ONTAP networking configuration after an upgrade

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.

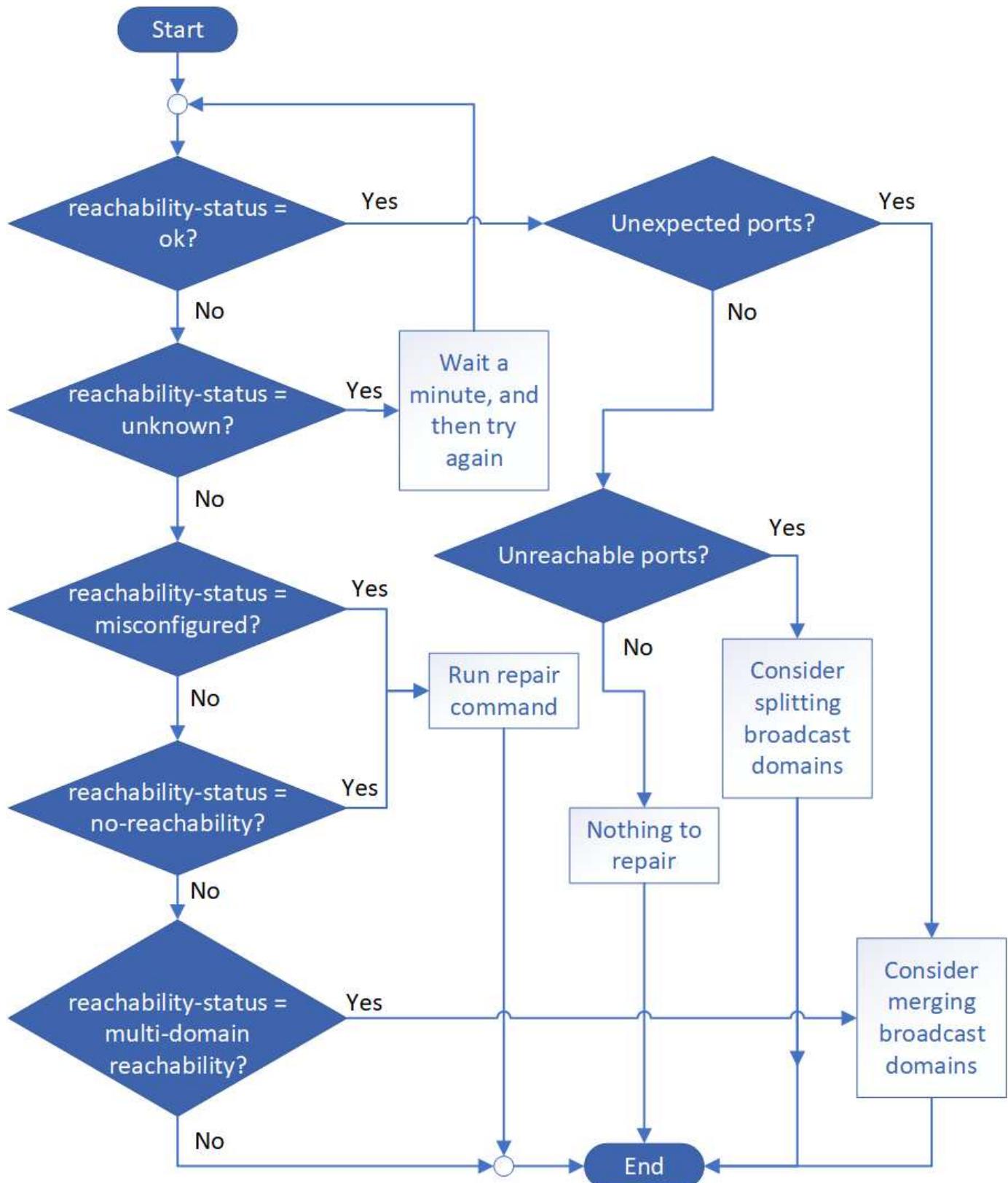
Step

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

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

Learn more about `network port reachability show` in the [ONTAP command reference](#).

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.



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 Merge broadcast domains.</p> <p>If the reachability-status is "ok", but there are "unreachable ports", consider splitting one or more broadcast domains. For more information, see Split broadcast domains.</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 Repair port reachability.</p> <p>Learn more about <code>network port reachability repair</code> in the ONTAP command reference.</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 Repair port reachability.</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 Merge broadcast domains or Repair port reachability.</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 after an ONTAP upgrade

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 in admin SVMs. This allows EMS messages to be sent from any of the LIFs associated with 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.

[Learn more about ONTAP LIFs and service policies.](#)

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>
-policies <service_policy_name> -service management-ems
```

Learn more about `network interface service-policy remove-service` in the [ONTAP command reference](#).

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
```

Verify network 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
      Logical      Status      Network          Current
Current Is
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        agg1_b1      -        RW      -
-
vs2-mc    root_vs2    agg0_b1      -        RW      -
-
vs2-mc    vol2        agg1_b1      -        RW      -
-
vs2-mc    vol3        agg1_b1      -        RW      -
-
vs2-mc    vol4        agg1_b1      -        RW      -
-
5 entries were displayed.
```

4. Verify that there are no inconsistent volumes:

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

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

Verify the SAN configuration after an ONTAP 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. If you are running ONTAP 9.11.1 or later, use System Manager to view the connection status as it gives a much clearer display than CLI.

System Manager

1. In System Manager, click **Hosts > SAN Initiator Groups**.

The page displays a list of initiator groups (igroups). If the list is large, you can view additional pages of the list by clicking the page numbers at the lower right corner of the page.

The columns display various information about the igroups. Beginning with 9.11.1, the connection status of the igroup is also displayed. Hover over status alerts to view details.

CLI

- List iSCSI initiators:

```
iscsi initiator show -fields igrp,initiator-name,tpgroup
```

- List FC initiators:

```
fcp initiator show -fields igrp,wwpn,lif
```

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
```

Set a passphrase with at least 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>
```



Use 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. Otherwise, use the same authentication key for both.

Related information

- [security key-manager setup](#)
- [storage encryption disk modify](#)

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:

```
volume move start
```

Change in user accounts that can access the Service Processor after an ONTAP upgrade

If you created user accounts in ONTAP 9.8 or earlier 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 after an ONTAP upgrade

After you upgrade your ONTAP software, you should download and install the ONTAP Disk Qualification Package (DQP). The DQP is not updated as part of an ONTAP upgrade.

The DQP contains the proper parameters for ONTAP interaction with all newly qualified drives. If your version of the DQP does not contain information for a newly qualified drive, ONTAP will not have the information to properly configure the drive.

It is best practice to update the DQP every quarter. You should also update the DQP for the following reasons:

- Whenever you add a new drive type or size to a node in your cluster

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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