What to do after an ONTAP upgrade

ONTAP 9

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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. 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 vldb`
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        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.

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.
```

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 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 polices that do not provide reachabiity to the EMS destination
Is my cluster in a 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
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 networking configuration after an ONTAP upgrade from ONTAP 9.7x or earlier

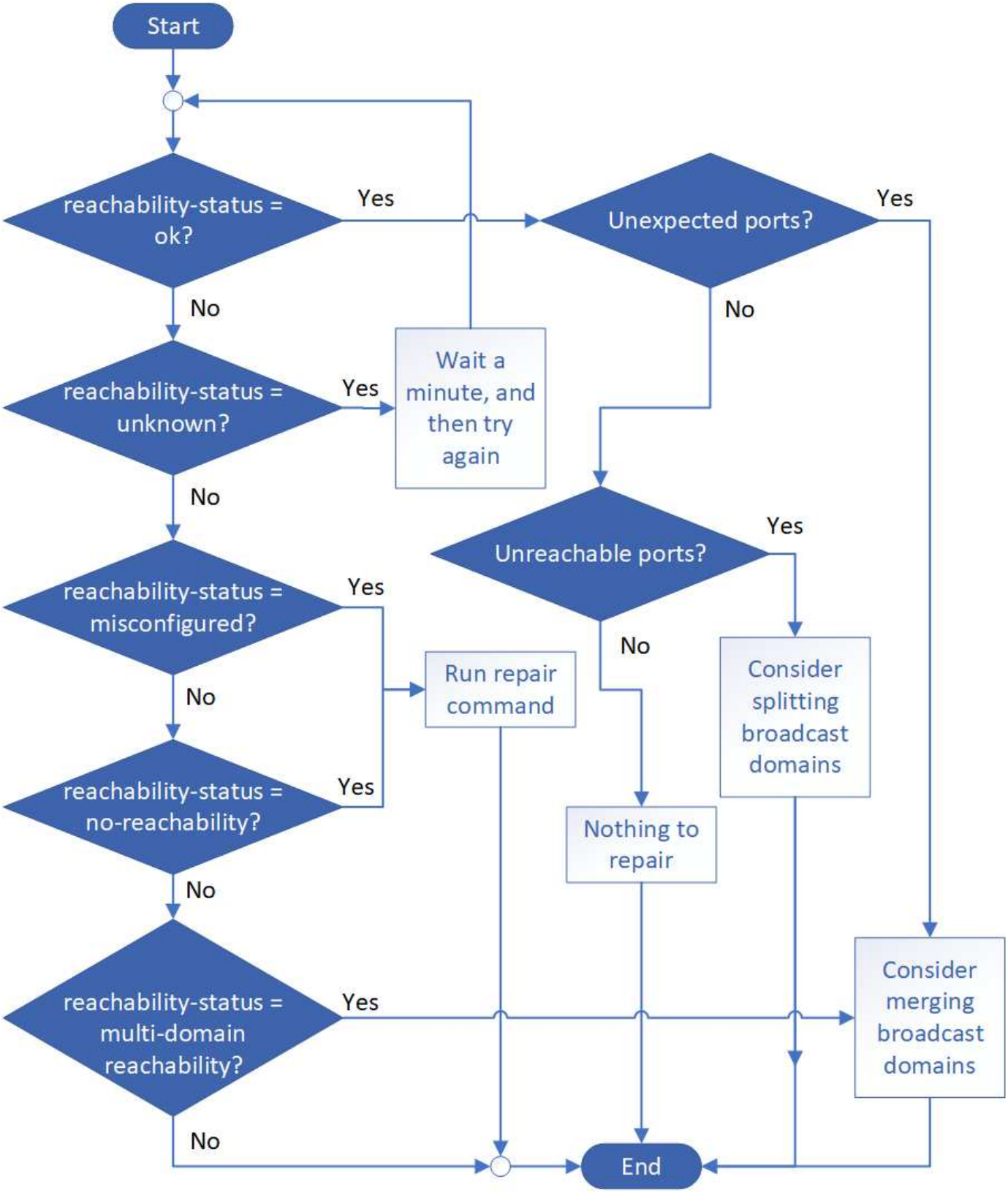
After you upgrade from ONTAP 9.7x or earlier to ONTAP 9.8 or later, you should verify your network configuration. After the upgrade, ONTAP automatically monitors layer 2 reachability.

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	The port has layer 2 reachability to its assigned broadcast domain. 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. 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. If the reachability-status is "ok", and there are no unexpected or unreachable ports, your configuration is correct.
misconfigured-reachability	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. 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: `network port reachability repair -node -port` For more information, see Repair port reachability.
no-reachability	The port does not have layer 2 reachability to any existing broadcast domain. 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: `network port reachability repair -node -port` For more information, see Repair port reachability.
multi-domain-reachability	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. 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. For more information, see Merge broadcast domains or Repair port reachability.
unknown	If the reachability-status is "unknown", then wait a few minutes and try the command again.

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 polices. This allows EMS messages to be sent from any of the LIFs associated with any of the service polices. 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 polices that do not provide reachability to the destination.

Steps

1. Identify the LIFs and associated network service polices 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 polices:

```
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 polices 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
            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         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	`iscsi initiator show -fields igroup,initiator-name,tpgroup`
FC	`fcp initiator show -fields igroup,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
```

   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:

```
volume move start
```

Change in user accounts that can access the Service Processor

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 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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