Special considerations

ONTAP 9

NetApp
June 22, 2022

This PDF was generated from https://docs.netapp.com/us-en/ontap/upgrade/concept_pre_upgrade_checks.html on June 22, 2022. Always check docs.netapp.com for the latest.

Table of Contents

Special considerations

Pre-upgrade checks

Depending on your environment, you need to consider certain factors before you start your upgrade. Get started by reviewing the table below to see what special considerations you need to consider.

Ask yourself…	If your answer is yes, then do this…
Do I have a mixed version cluster?	Check mixed version requirements
Do I have a SAN configuration?	Verify the SAN configuration
Do I have a MetroCluster configuration?	• Review specific upgrade requirements for MetroCluster configurations • Verify networking and storage status
Are nodes on my cluster using root-data partitioning and root-data-data-partitioning?	Examine upgrade considerations for root-data and root-data-data partitioning
Do I have deduplicated volumes and aggregates?	Verify you have enough free space for your deduplicated volumes and aggregates
Is my cluster running SnapMirror?	• Review upgrade requirements for SnapMirror • Prepare your SnapMirror relationships for upgrade
Is my cluster running SnapLock?	Review upgrade considerations for SnapLock
Am I upgrading from ONTAP 8.3 and have load-sharing mirrors?	Prepare all load-sharing mirrors for upgrade
Am I using NetApp Storage Encryption with external key management servers?	Delete any existing key management server connections
Do I have netgroups loaded into SVMs?	Vefiry that the netgroup file is present on each node
Do I have LDAP clients using SSLv3?	Configure LDAP clients to use TLS
Am I using session-oriented protocols?	Review considerations for session-oriented protocols
Is SSL FIPS mode enabled on a cluster where administrator accounts authenticate with an SSH public key?	Review requirements for SSH public keys

Mixed version requirements

Beginning with ONTAP 9.3, by default, you cannot join new nodes to the cluster that are running a version of ONTAP that is different from the version running on the existing nodes.

If you plan to add new nodes to your cluster that are running a version of ONTAP that is later than the nodes in

your existing cluster, you should upgrade the nodes in your cluster to the later version first, then add the new nodes.

Mixed version clusters are not recommended, but in certain cases you might need to temporarily enter a mixed version state. For example, you need to enter a mixed version state if you are upgrading to a later version of ONTAP that is not supported on certain nodes in your existing cluster. In this case, you should upgrade the nodes that do support the later version of ONTAP, then unjoin the nodes that do not support the version of ONTAP you are upgrading to using the advanced privilege `cluster unjoin -skip-lastlow-version -node check` command.

You might also need to enter a mixed version state for a technical refresh or an interrupted upgrade. In such cases you can override ONTAP default behavior and join nodes of a different version using the following advanced privilege commands:

- `cluster join -allow-mixed-version-join`
- `cluster add-node -allow-mixed-version-join`

When you have to enter a mixed version state, you should complete the upgrade as quickly as possible. An HA pair must not run an ONTAP version from a release that is different from other HA pairs in the cluster for more than seven days. For correct cluster operation, the period the cluster is in a mixed version state should be as short as possible.

When the cluster is in a mixed version state, you should not enter any commands that alter the cluster operation or configuration except as necessary to satisfy the upgrade requirements.

Verifying the SAN configuration

Upgrading in a SAN environment changes which paths are direct. Therefore, before performing an upgrade, you should verify that each host is configured with the correct number of direct and indirect paths, and that each host is connected to the correct LIFs.

1. On each host, verify that a sufficient number of direct and indirect paths are configured, and that each path is active.

   Each host must have a path to each node in the cluster.

2. Verify that each host is connected to a LIF on each node.

   You should record the list of initiators for comparison after the upgrade.

For…	Enter…
iSCSI	`iscsi initiator show -fields igroup,initiator-name,tpgroup`
FC	`fcp initiator show -fields igroup,wwpn,lif`

MetroCluster configurations

Upgrade requirements for MetroCluster configurations

If you have to upgrade a MetroCluster configuration, you should be aware of some important requirements.

Required methods for performing major and minor upgrades of MetroCluster configurations

Patch upgrades to MetroCluster configurations can be performed with automatic non-disruptive upgrade (NDU) procedure.

Beginning with ONTAP 9.3, major upgrades to MetroCluster configurations can be performed with automatic non-disruptive upgrade (NDU) procedure. On systems running ONTAP 9.2 or earlier, major upgrades to MetroCluster configurations must be performed with the NDU procedure that is specific to MetroCluster configurations.

General requirements

- Both clusters must be running the same version of ONTAP.

  You can verify the ONTAP version by using the version command.

- The MetroCluster configuration must be in either normal or switchover mode.

  Upgrade in switchover mode is only supported in minor patch upgrades.

- For all configurations except two-node clusters, you can nondisruptively upgrade both clusters at the same time.

  For nondisruptive upgrade in two-node clusters, the clusters must be upgraded one node at a time.

- The aggregates in both clusters must not be in resyncing RAID status.

  During MetroCluster healing, the mirrored aggregates are resynchronized. You can verify if the MetroCluster configuration is in this state by using the `storage aggregate plex show -in -progress true` command. If any aggregates are being synchronized, you should not perform an upgrade until the resynchronization is complete.

- Negotiated switchover operations will fail while the upgrade is in progress.

  To avoid issues with upgrade or revert operations, do not attempt an unplanned switchover during an upgrade or revert operation unless all nodes on both clusters are running the same version of ONTAP.

Configuration requirements for normal operation

- The source SVM LIFs must be up and located on their home nodes.

  Data LIFs for the destination SVMs are not required to be up or to be on their home nodes.

- All aggregates at the local site must be online.
- All root and data volumes owned by the local cluster's SVMs must be online.

Configuration requirements for switchover

- All LIFs must be up and located on their home nodes.
- All aggregates must be online, except for the root aggregates at the DR site.

  Root aggregates at the DR site are offline during certain phases of switchover.

- All volumes must be online.

Related information

Verifying networking and storage status for MetroCluster configurations

Verify networking and storage status for MetroCluster configurations

Before performing an upgrade 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`

   If any inconsistent volumes are returned, you must contact NetApp Support before you precede with the upgrade.

Related information

Upgrade requirements for MetroCluster configurations

Upgrade considerations for root-data partitioning and root-data-data partitioning

Root-data partitioning and root-data-data-partitioning is supported for some platform models and configurations. This partitioning capability is enabled during system initialization; it cannot be applied to existing aggregates.

For information about migrating your data to a node that is configured for root-data partitioning or root-data-data partitioning, contact your account team or partner organization.

Related information

ONTAP concepts

Verify that deduplicated volumes and aggregates contain sufficient free space

Before upgrading ONTAP, you must verify that any deduplicated volumes and the aggregates that contain them have sufficient free space for the deduplication metadata. If there is insufficient free space, deduplication will be disabled when the ONTAP upgrade is

completed.

Each deduplicated volume must contain at least 4% free space. Each aggregate that contains a deduplicated volume must contain at least 3% free space.

1. Determine which volumes are deduplicated: `volume efficiency show`
2. Determine the free space available on each volume that you identified: `vol show -vserver Vserver_name -volume volume_name -fields volume, size, used, available, percent-used, junction-path`

   Each deduplicated volume must not contain more than 96% used capacity. If necessary, you can increase the sizes of any volumes that exceed this capacity.

   Logical storage management

   In this example, the percent-used field displays the percentage of used space on the deduplicated volume.:

   ```
   vserver    volume size    junction-path available used   percent-used
   ---------- ------ ------- -------------
   cluster1-01 vol0   22.99GB -             14.11GB      7.73GB 35%
   cluster1-02 vol0   22.99GB -             12.97GB      8.87GB    40%
   2 entries were displayed.
   ```

3. Identify the free space available on each aggregate that contains a deduplicated volume: `aggr show -aggregate aggregate_name -fields aggregate, size, usedsize, availsize, percent-used`

   Each aggregate must not contain more than 97% used capacity. If necessary, you can increase the sizes of any aggregates that exceed this capacity.

   Disk and aggregate management

   In this example, the percent-used field displays the percentage of used space on the aggregate containing the deduplicated volume (aggr_2):

   ```
   aggr show -aggregate aggregate_name -fields
   aggregate,size,usedsize,availsize,percent-used
   aggregate         availsize percent-used size    usedsize
   ----------------- --------- ------------    ------- --------
   aggr0_cluster1_01    1.11GB    95%          24.30GB 23.19GB
   aggr0_cluster1_02 1022MB    96%          24.30GB    23.30GB
   2 entries were displayed.
   ```

SnapMirror

Upgrade requirements for SnapMirror

You must perform certain tasks to successfully upgrade a cluster that is running SnapMirror.

- If you are upgrading clusters with DP SnapMirror relationships, you must upgrade the destination cluster/nodes before you upgrade the source cluster/nodes.
- Before upgrading a cluster that is running SnapMirror, SnapMirror operations must be quiesced for each node that contains destination volumes, and each peered SVM must have a unique name across the clusters.

  To prevent SnapMirror transfers from failing, you must suspend SnapMirror operations and, in some cases, upgrade destination nodes before upgrading source nodes. The following table describes the two options for suspending SnapMirror operations.

Option	Description	Upgrade destination nodes before source nodes?
Suspend SnapMirror operations for the duration of the NDU (nondisruptive upgrade).	The simplest method for upgrading in a SnapMirror environment is to suspend all SnapMirror operations, perform the upgrade, and then resume the SnapMirror operations. However, no SnapMirror transfers will occur during the entire NDU. You must use this method if your cluster contains nodes that are mirroring volumes to each other.	No, the nodes can be upgraded in any order.
Suspend SnapMirror operations one destination volume at a time.	You can suspend SnapMirror transfers for a particular destination volume, upgrade the node (or HA pair) that contains the destination volume, upgrade the node (or HA pair) that contains the source volume, and then resume the SnapMirror transfers for the destination volume. By using this method, SnapMirror transfers for all other destination volumes can continue while the nodes that contain the original destination and source volumes are upgraded.	Yes.

SVM peering requires SVM names to be unique across clusters. It is best practice to name SVMs with a unique fully qualified domain name (FQDN), for example, “dataVerser.HQ” or “mirrorVserver.Offsite”. Using the FQDN naming style makes it much easier to make sure of uniqueness.

Related information

ONTAP concepts

Prepare SnapMirror relationships for a nondisruptive upgrade

It is recommended that you quiesce your SnapMirror operations before performing a nondisruptive upgrade of ONTAP.

1. Use the snapmirror show command to determine the destination path for each SnapMirror relationship.
2. For each destination volume, suspend future SnapMirror transfers: `snapmirror quiesce -destination-path destination`

   If there are no active transfers for the SnapMirror relationship, this command sets its status to Quiesced. If the relationship has active transfers, the status is set to Quiescing until the transfer is completed, and then the status becomes Quiesced.

   This example quiesces transfers involving the destination volume vol1 from SVMvs0.example.com:

   ```
   cluster1::> snapmirror quiesce -destination-path vs0.example.com:vol1
   ```

3. Verify that all SnapMirror relationships are quiesced: `snapmirror show -status !Quiesced`

   This command displays any SnapMirror relationships that are *not* quiesced.

   This example shows that all SnapMirror relationships are quiesced:

   ```
   cluster1::> snapmirror show -status !Quiesced
   There are no entries matching your query.
   ```

4. If any SnapMirror relationships are currently being transferred, do one of the following options:

Option	Description
Wait for the transfers to finish before performing the ONTAP upgrade.	After each transfer finishes, the relationship changes to Quiesced status.
Stop the transfers: `snapmirror abort -destination-path destination -h` **Note:** You must use the -foreground true parameter if you are aborting load-sharing mirror transfers.	This command stops the SnapMirror transfer and restores the destination volume to the last Snapshot copy that was successfully transferred. The relationship is set to Quiesced status.

Related information

Upgrade requirements for SnapMirror

Upgrade considerations for SnapLock

SnapLock does not allow the download of certain kernel versions if these are qualified as bad SnapLock releases or if SnapLock is disabled in those releases. These download restrictions only apply if the node has SnapLock data.

Prepare all load-sharing mirrors for a major upgrade

Before performing a major upgrade from ONTAP 8.3, you should move all of the load-sharing mirror source volumes to an aggregate on the node that you will upgrade last. This ensures that load-sharing mirror destination volumes are the same or later versions of ONTAP.

1. Record the locations of all load-sharing mirror source volumes.

   Knowing where the load-sharing mirror source volumes came from helps facilitate returning them to their original locations after the major upgrade.

2. Determine the node and aggregate to which you will move the load-sharing mirror source volumes.
3. Move the load-sharing mirror source volumes to the node and aggregate by using the volume move start command.

Delete existing external key management server connections before upgrading

If you are using NetApp Storage Encryption (NSE) on ONTAP 9.2 or earlier and upgrading to ONTAP 9.3 or later, you must use the command line interface (CLI) to delete any existing external key management (KMIP) server connections before performing the upgrade.

1. Verify that the NSE drives are unlocked, open, and set to the default manufacture secure ID 0x0:

   `storage encryption disk show -disk*`

2. Enter the advanced privilege mode:

   `set -privilege advanced`

3. Use the default manufacture secure ID 0x0 to assign the FIPS key to the self-encrypting disks (SEDs): `storage encryption disk modify -fips-key-id 0x0 -disk *`
4. Verify that assigning the FIPS key to all disks is complete: `storage encryption disk show-status`
5. Verify that the **mode** for all disks is set to data: `storage encryption disk show`
6. View the configured KMIP servers: `security key-manager show`
7. Delete the configured KMIP servers: `security key-manager delete -address kmip_ip_address`
8. Delete the external key manager configuration:`security key-manager delete-kmip-config`

   This step does not remove the NSE certificates.

After the upgrade is complete, you must reconfigure the KMIP server connections.

Related information

Reconfiguring KMIP server connections after upgrading to ONTAP 9.3 or later

Verifying that the netgroup file is present on all nodes

If you have loaded netgroups into storage virtual machines (SVMs), before you upgrade or revert, you must verify that the netgroup file is present on each node. A missing netgroup file on a node can cause an upgrade or revert to fail.

NFS management contains more information about netgroups and loading them from a URI.

1. Set the privilege level to advanced: `set -privilege advanced`
2. Display the netgroup status for each SVM: `vserver services netgroup status`
3. Verify that for each SVM, each node shows the same netgroup file hash value: `vserver services name-service netgroup status`

   If this is the case, you can skip the next step and proceed with the upgrade or revert. Otherwise, proceed to the next step.

4. On any one node of the cluster, manually load the netgroup file: `vserver services netgroup load -vserver vserver_name -source uri`

   This command downloads the netgroup file on all nodes. If a netgroup file already exists on a node, it is overwritten.

Configure LDAP clients to use TLS for highest security

Before upgrading to the target ONTAP release, you must configure LDAP clients using SSLv3 for secure communications with LDAP servers to use TLS. SSL will not be available after the upgrade.

By default, LDAP communications between client and server applications are not encrypted. You must disallow the use of SSL and enforce the use of TLS.

1. Verify that the LDAP servers in your environment support TLS.

   If they do not, do not proceed. You should upgrade your LDAP servers to a version that supports TLS.

2. Check which ONTAP LDAP client configurations have LDAP over SSL/TLS enabled: `vserver services name-service ldap client show`

   If there are none, you can skip the remaining steps. However, you should consider using LDAP over TLS for better security.

3. For each LDAP client configuration, disallow SSL to enforce the use of TLS: `vserver services name-service ldap client modify -vserver vserver_name -client-config ldap_client_config_name -allow-ssl false`
4. Verify that the use of SSL is no longer allowed for any LDAP clients: `vserver services name-service ldap client show`

Related information

Considerations for session-oriented protocols

Clusters and session-oriented protocols might cause adverse effects on clients and applications in certain areas during upgrades.

If you are using session-oriented protocols, consider the following:

- SMB

  If you serve continuously available (CA) shares with SMBv3, you can use the automated nondisruptive upgrade method (with System Manager or the CLI), and no disruption is experienced by the client.

  If you are serving shares with SMBv1 or SMBv2, or non-CA shares with SMBv3, client sessions are disrupted during upgrade takeover and reboot operations. You should direct users to end their sessions before you upgrade.

  For more information, see TR-4100: Nondisruptive Operations with SMB File Shares ONTAP 9.x.

  Hyper-V and SQL Server over SMB support nondisruptive operations (NDOs). If you configured a Hyper-V or SQL Server over SMB solution, the application servers and the contained virtual machines or databases remain online and provide continuous availability during the ONTAP upgrade.

- NFSv4.x

  NFSv4.x clients will automatically recover from connection losses experienced during the upgrade using normal NFSv4.x recovery procedures. Applications might experience a temporary I/O delay during this process.

- NDMP

  State is lost and the client user must retry the operation.

- Backups and restores

  State is lost and the client user must retry the operation.

  > Do not initiate a backup or restore during or immediately before an upgrade. Doing so might result in data loss.

- Applications (for example, Oracle or Exchange)

  Effects depend on the applications. For timeout-based applications, you might be able to change the timeout setting to longer than the ONTAP reboot time to minimize adverse effects.

Copyright Information

Copyright © 2022 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system- without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark Information

NETAPP, the NETAPP logo, and the marks listed at http://www.netapp.com/TM are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.