ONTAP® 9

Upgrade Express Guide

■ NetApp®

Contents

Deciding whether to use the Upgrade Express Guide

This guide describes how to upgrade an ONTAP cluster with the automated upgrade feature using ONTAP System Manager.

You can also perform an automated upgrade using the command line interface (CLI); however, using ONTAP System Manager is preferred.

Beginning with ONTAP 9.3, automated upgrades can be performed for all ONTAP upgrades including MetroCluster configurations. However, automated upgrades for MetroCluster configurations are only supported by ONTAP System Manager for clusters with four nodes. If you need to upgrade a MetroCluster configuration for a cluster with a number of nodes other than four, you should use the CLI procedures in the *ONTAP Upgrade and Revert/Downgrade Guide*.

You should use this guide if you want to use ONTAP System Manager to:

- Perform an automated upgrade from ONTAP 9 or later for all non-MetroCluster configurations with two or more nodes.
  If you want to perform a manual upgrade and you have less than eight nodes in your cluster, you should use the procedures in the *ONTAP Upgrade and Revert/Downgrade Guide*. Manual upgrades are not recommended for clusters with eight or more nodes.

- Perform an automated upgrade for single-node clusters running ONTAP 9.4 or later.
  Beginning with ONTAP 9.4, you can perform an automated upgrade on a single-node cluster. If you want to upgrade a single-node cluster running ONTAP 9.3 or earlier, you should use the CLI procedures in the *ONTAP Upgrade and Revert/Downgrade Guide*.
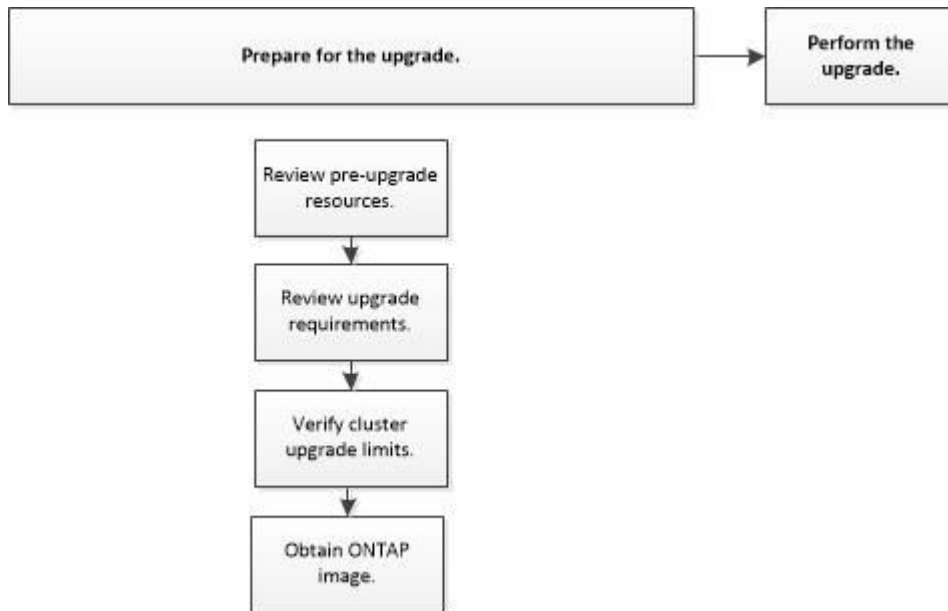
Related concepts

Cluster update requirements on page 7

Related information

Upgrade, revert, or downgrade

Cluster software update workflow

You can use the cluster software update workflow to perform the entire process.

Performing manual checks before an automated cluster upgrade

Before performing an upgrade or downgrade you must manually check that the cluster is ready, make any required configuration changes, and obtain and install the target ONTAP images.

Steps

1. Reviewing pre-update resources on page 6
   Before updating the ONTAP software, you should review resources to understand issues you must resolve, understand new system behavior in the target release, and confirm hardware support.

2. Reviewing cluster upgrade requirements on page 7
   Before updating the ONTAP software, you must verify that your cluster meets the general requirements. Some configurations and features also have requirements that you should understand.

3. Verifying cluster upgrade limits on page 9
   Before upgrading the ONTAP software, you must verify that your cluster does not exceed the platform system limits. SAN also has limits that you should verify in addition to the platform system limits.

4. Preparing to upgrade nodes using NetApp Storage Encryption with external key management servers on page 9
   If you are using NetApp Storage Encryption (NSE) and upgrading to ONTAP 9.3 or later, you must delete any existing external key management (KMIP) server connections before performing the upgrade.

5. Obtaining ONTAP software images on page 10
   For ONTAP 9.4 and later, you can copy the ONTAP software image from the NetApp Support Site to a local folder. For upgrades from ONTAP 9.3 or earlier, you must copy the ONTAP software image to an HTTP server or FTP server on your network.

Reviewing pre-update resources

Before updating the ONTAP software, you should review resources to understand issues you must resolve, understand new system behavior in the target release, and confirm hardware support.

Steps

1. Review the *Release Notes* for the target release.

   ONTAP 9 Release Notes

   The "Important cautions" section describes potential issues that you should be aware of before upgrading to the new release. The "New and changed features" and "Known problems and limitations" sections describe new system behavior after upgrading to the new release.

2. Confirm that your hardware platform is supported in the target release.

   NetApp Hardware Universe

3. Confirm that your cluster and management switches are supported in the target release.

   Your NX-OS (cluster network switches), IOS (management network switches), and reference configuration file (RCF) software versions must be compatible with the version of ONTAP to which you are upgrading.

NetApp Interoperability Matrix Tool

4. If your cluster and management switches do not have the minimum software versions for the target ONTAP release, upgrade to supported software versions.

   NetApp Downloads: Cisco Ethernet Switch

   NetApp Downloads: NetApp Ethernet Switch

5. If your cluster is configured for SAN, confirm that the SAN configuration is fully supported.

   All SAN components—including the target ONTAP software version, host OS and patches, required Host Utilities software, multipathing software, and adapter drivers and firmware— should be supported.

   NetApp Interoperability Matrix Tool

Reviewing cluster upgrade requirements

Before updating the ONTAP software, you must verify that your cluster meets the general requirements. Some configurations and features also have requirements that you should understand.

Cluster update requirements

There are release and configuration requirements that your cluster should meet before you perform an update. Additionally, there are mixed version requirements that you should be aware of while you are performing the update.

Release requirements

The version of ONTAP that you can upgrade or downgrade to varies based on the version of ONTAP currently running on your nodes. You can determine the current version of ONTAP running on each node by using the `system image show` command.

> **Note:** If you are running a release earlier than Data ONTAP 8.3.x, you cannot upgrade directly to ONTAP 9 or 9.1. You must upgrade to Data ONTAP 8.3.x first, then upgrade to ONTAP 9 or 9.1.

You can upgrade from...	To...
ONTAP 9.6	ONTAP 9.7
ONTAP 9.5	ONTAP 9.6 or 9.7
ONTAP 9.4	ONTAP 9.5
ONTAP 9.3	ONTAP 9.4, 9.5 or 9.7 **Note:** If you are upgrading from ONTAP 9.3 directly to 9.7, you must download the software image for ONTAP 9.5 and 9.7. The automated upgrade process uses the 9.5 image in the background to complete the update to 9.7. You should expect multiple reboots during the process.
ONTAP 9.2	ONTAP 9.3
ONTAP 9.1	ONTAP 9.2 or 9.3
ONTAP 9	ONTAP 9.1
Data ONTAP 8.3.x	ONTAP 9 or 9.1

You can upgrade from...	To...
Data ONTAP 8.2.x	Data ONTAP 8.3.x

You can downgrade from...	To...
ONTAP 9.1	ONTAP 9 **Note:** Downgrade of a two-node MetroCluster configuration from ONTAP 9.1 to 9 is disruptive.

You must perform a revert from...	To...
ONTAP 9.7	ONTAP 9.6
ONTAP 9.6	ONTAP 9.5
ONTAP 9.5	ONTAP 9.4
ONTAP 9.4	ONTAP 9.3
ONTAP 9.3	ONTAP 9.2
ONTAP 9.2	ONTAP 9.1
ONTAP 9.1 or ONTAP 9	Data ONTAP 8.3.x

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 advance 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 the ONTAP 9.3 default behavior and join nodes of a different version using the following advance 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.

Guidelines for estimating the duration of the upgrade process

You should plan for at least 30 minutes to complete preparatory steps, at least 30 minutes to upgrade the cluster (depending on the number of nodes), and at least 30 minutes to complete post-upgrade steps.

The upgrade duration guidelines are based on typical configurations and workloads. You can use these guidelines to estimate the time it will take to perform a nondisruptive upgrade in your environment. However, the actual duration of your upgrade process will depend on your individual environment and the number of nodes.

Verifying cluster upgrade limits

Before upgrading the ONTAP software, you must verify that your cluster does not exceed the platform system limits. SAN also has limits that you should verify in addition to the platform system limits.

Steps

1. Verify that the cluster does not exceed the system limits for your platform.

   [NetApp Hardware Universe](#)

2. If your cluster is configured for SAN, verify that it does not exceed the configuration limits for FC, FCoE, and iSCSI.

   [SAN configuration](#)

3. Determine the CPU and disk utilization:

   node run -node *node_name* -command sysstat -c 10 -x 3

   You should monitor CPU and disk utilization for 30 seconds. The values in the CPU and Disk Util columns should not exceed 50% for all 10 measurements reported. No additional load should be added to the cluster until the upgrade is complete.

Preparing to upgrade nodes using NetApp Storage Encryption with external key management servers

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

Steps

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
```

> **Note:** This step does not remove the NSE certificates.

After you finish

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

Obtaining ONTAP software images

For ONTAP 9.4 and later, you can copy the ONTAP software image from the NetApp Support Site to a local folder. For upgrades from ONTAP 9.3 or earlier, you must copy the ONTAP software image to an HTTP server or FTP server on your network.

About this task

To upgrade, revert, or downgrade the cluster to the target release of ONTAP, you require access to software images. Software images, firmware version information, and the latest firmware for your platform model are available on the NetApp Support Site. You should note the following important information:

- Software images are specific to platform models.
  You must obtain the correct image for your cluster.

- Software images include the latest version of system firmware that was available when a given version of ONTAP was released.

- If you are upgrading a system with NetApp Volume Encryption to ONTAP 9.5 or later, you must download the ONTAP software image for non-restricted countries, which includes NetApp Volume Encryption.
  If you use the ONTAP software image for restricted countries to upgrade a system with NetApp Volume Encryption, the system panics and you lose access to your volumes.

- If you are upgrading from ONTAP 9.3 to 9.7, you must copy the software image for ONTAP 9.5 and 9.7.

Steps

1. Locate the target ONTAP software in the **Software Downloads** area of the NetApp Support Site.

2. Copy the software image.

   - For ONTAP 9.3 or earlier, copy the software image (for example, `93_q_image.tgz`) from the NetApp Support Site to the directory on the HTTP server or FTP server from which the image will be served

- For ONTAP 9.4 or later, copy the software image (for example, `97_q_image.tgz`) from the NetApp Support Site to the directory on the HTTP server or FTP server from which the image will be served or to a local folder.

Related information

[*NetApp Downloads: Software*](#)

Upgrading an ONTAP cluster using the automated method

The automated upgrade method validates the cluster components to verify that the cluster can be upgraded, installs the target ONTAP image on each node, and then executes the upgrade in the background. Automated upgrades of multi-node clusters are non-disruptive. Automated upgrades of single-node clusters are disruptive because single-node clusters lack redundancy.

Automatically updating a cluster using ONTAP System Manager

You can use ONTAP System Manager to update a cluster or individual nodes in HA pairs that are running ONTAP 8.3.1 or later to a specific version of ONTAP software without disrupting access to client data. You can also use ONTAP System Manager to automatically perform updates for single-node clusters running ONTAP 9.4 or later. Single-node cluster updates are disruptive.

Before you begin

- Single-node clusters must be running ONTAP 9.4 and ONTAP System Manager 9.4 or later.

- All of the nodes must be healthy.
  The status of your nodes is indicated on the System Manager Dashboard under **Alerts and Notification** and under **Nodes**.

- You must have copied the software image from the NetApp Support Site so that the nodes can access the image.
  Obtaining ONTAP software images on page 10

About this task

If you try to perform other tasks from ONTAP System Manager while updating the node that hosts the cluster management LIF, an error message might be displayed. You must wait for the update to finish before performing any operations.

Steps

1. Depending on the System Manager version that you are running, perform one of the following steps:

   - ONTAP 9.4 or earlier: Click **Configuration > Cluster Update**.

   - ONTAP 9.5 or later: Click **Configuration > Cluster > Update**.

2. In the **Cluster Update** tab, add a new image or select an available image.

If you want to…	Then…
Add a new software image from the local client **Note:** You should have already downloaded the image to the local client. *Obtaining ONTAP software images* on page 10	**a.** Under Available Software Images, click **Add from Local**. **b.** Browse to the location you saved the software image, select the image, and then click **Open**. The software image uploads after you click **Open**.
Add a new software image from the NetApp Support Site	**a.** Click **Add from Server**. **b.** In the Add a New Software Image dialog box, enter the URL of the HTTP server or FTP server on which you have saved the image that was downloaded from the NetApp Support Site. For anonymous FTP, you must specify the URL in the `ftp://anonymous@ftpserver` format. **c.** Click **Add**.
Select an available image	Choose one of the listed images.

3. Click **Validate** to run the pre-update validation checks to verify whether the cluster is ready for an update.

   The validation operation checks the cluster components to validate that the update can be completed nondisruptively, and then displays any errors or warnings. It also displays any required remedial action that you must perform before updating the software.

   Important: You must perform all of the required remedial actions for the errors before proceeding with the update. Although you can ignore the remedial actions for the warnings, the best practice is to perform all of the remedial actions before proceeding with the update.

4. Click **Next**.

5. Click **Update**.

   Validation is performed again.

   - When the validation is complete, a table displays any errors and warnings, along with any required remedial actions to be taken before proceeding.

   - If the validation is completed with warnings, you can choose to select the **Continue update with warnings** checkbox, and then click **Continue**.

   When the validation is complete and the update is in progress, the update might be paused because of errors. You can click the error message to view the details, and then perform the remedial actions before resuming the update.

   After the update is completed successfully, the node reboots, and you are redirected to the ONTAP System Manager login page. If the node takes a long time to reboot, you must refresh your browser.

6. Log in to ONTAP System Manager.

7. Depending on the System Manager version that you are running, perform one of the following steps to view the details and verify that the cluster is successfully updated to the selected version

   - ONTAP 9.4 or earlier: Click **Configuration > Cluster Update > Update History**.

   - ONTAP 9.5 or later: Click **Configuration > Cluster > Update > Update History**.

Viewing issues encountered during automated upgrades using ONTAP System Manager

If issues are encountered during your automated upgrade, you can view EMS messages and details in ONTAP System Manager.

Step

1. Click **Events & Jobs > Events**.

Resuming an upgrade after an error in the automated upgrade process

If an automated upgrade pauses because of an error, you can resolve the error and resume the automated upgrade, or you can cancel the automated upgrade and complete the process manually. If you choose to continue the automated upgrade, do not perform any of the upgrade steps manually.

Steps

1. Depending on the System Manager version that you are running, perform one of the following steps:

    *   ONTAP 9.4 or earlier: Click **Configuration > Cluster Update**.

    *   ONTAP 9.5 or later: Click **Configuration > Cluster > Update**.

2. Continue the automated update or cancel it and continue manually.

If you want to...	Then...
Resume the automated updated	Click **Resume**.
Cancel the automated updated and continue manually	Click **Cancel**.

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