# Upgrade StorageGRID software

StorageGRID

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# Upgrade StorageGRID software

## Upgrade StorageGRID software: Overview

Use these instructions to upgrade a StorageGRID system to a new release.

### About these instructions

These instructions describe what's new in StorageGRID 11.6 and provide step-by-step instructions for upgrading all nodes in your StorageGRID system to the new release.

### Before you begin

Review these topics to learn about the new features and enhancements in StorageGRID 11.6, determine whether any features have been deprecated or removed, and find out about changes to StorageGRID APIs.

- What's new in StorageGRID 11.6
- Removed or deprecated features
- Changes to the Grid Management API
- Changes to the Tenant Management API

## What's new in StorageGRID 11.6

This release of StorageGRID introduces the following features.

### Usability enhancements

The Grid Manager user interface was substantially redesigned to improve the user experience.

- A new sidebar replaces the pull-down menus in the old user interface.
- Several menus were reorganized to keep related options together. For example, the **CONFIGURATION** menu includes a new **Security** section for the Certificates, Key management server, Proxy settings, and Untrusted Client Networks options.
- A **Search** field in the header bar allows you to quickly navigate to Grid Manager pages.
- The summary table on the **Nodes** page provides high-level information for all sites and nodes, such as object data used and object metadata used, and includes a new search field. Alert icons are displayed next to any nodes with active alerts.
- New wizards guide you through more complex configurations, such as the workflows for admin groups, admin users, tenants, load balancer endpoints, and high availability (HA) groups.
- All UI pages were restyled with updated fonts, button styles, and table formats.

> Unless there was a functional change, the screenshots in the StorageGRID 11.6 Doc Site were not updated to reflect the new Grid Manager page styling.

See the following:

- Administer StorageGRID
- Monitor and troubleshoot

## Multiple VLAN interfaces

You can now create virtual LAN (VLAN) interfaces for Admin Nodes and Gateway Nodes. You can use VLAN interfaces in HA groups and load balancer endpoints to isolate and partition client traffic for security, flexibility, and performance.

- The new **Create a VLAN interface** wizard guides you through the process of entering a VLAN ID and choosing a parent interface on one or more nodes. A parent interface can be the Grid Network, the Client Network, or an additional trunk interface for the VM or bare-metal host. See Configure VLAN interfaces.
- You can now add extra trunk or access interfaces to a node. If you add a trunk interface, you must configure a VLAN interface. If you add an access interface, you can add the interface directly to an HA group; you do not need to configure a VLAN interface. See the following:
  - **Linux (before installing the node)**: Installation enhancements
  - **Linux (after installing the node)**: Linux: Add trunk or access interfaces to a node
  - **VMware (after installing the node)**: Collect information about your deployment environment

## Can use Azure AD for identity federation

You can now select Azure Active Directory (Azure AD) as the identity source when configuring identity federation for the Grid Manager or the Tenant Manager. See Use identity federation.

## Can use Azure AD and PingFederate for SSO

You can now select Azure AD or PingFederate as the SSO type when configuring single sign-on (SSO) for your grid. You can then use sandbox mode to configure and test the Azure AD enterprise applications or PingFederate service provider (SP) connections to each StorageGRID Admin Node. See Configure single sign-on.

## Centralized certificate management

- The new Certificates page (**CONFIGURATION** > **Security** > **Certificates**) consolidates information about all StorageGRID security certificates to a single location. You can manage StorageGRID global, grid CA, and client certificates from the new page or view information about other certificates, such as those used for load balancer endpoints, tenants, and identity federation. See About security certificates.
- As part of this change, the following global certificates were renamed:
  - The **Management Interface Server Certificate** is now the **Management interface certificate**.
  - The **Object Storage API Service Endpoints Server Certificate** (also called the Storage API Server Certificate) is now the **S3 and Swift API certificate**.
  - The **Internal CA Certificate**, **System CA Certificate**, **CA Certificate**, and **Default CA certificate** are now consistently referred to as the **Grid CA certificate**.

## Other Grid Manager enhancements

- **Updates to high availability (HA) groups**. A wizard now guides you through the process of creating an HA group. See Configure high availability groups.

- In addition to selecting interfaces on the Grid Network (eth0) or Client Network (eth2), you can now select VLAN interfaces or any access interfaces you have added to the node.
- You can now specify a priority order for the interfaces. You can choose the primary interface and rank each backup interface in order.
- If any S3, Swift, administrative, or tenant clients will access the VIP addresses for the HA group from a different subnet, you can now provide the IP address for the gateway.

- **Updates to load balancer endpoints**. A new wizard guides you through the process of creating a load balancer endpoint. See Configure load balancer endpoints.
  - You now select the client type (S3 or Swift) when you first create the endpoint, instead of adding this detail after the endpoint is created.
  - You can now use the global **StorageGRID S3 and Swift certificate** for a load balancer endpoint instead of uploading or generating a separate certificate.

> This global certificate was previously used for connections to the deprecated CLB service and to Storage Nodes. If you want to use the global certificate for a load balancer endpoint, you must upload a custom certificate on the S3 and Swift API certificate page.

## New Tenant Manager features

- **New Experimental S3 Console**. Available as a link from the Buckets page in Tenant Manager, the new experimental S3 Console lets S3 tenant users view and manage the objects in their buckets. See Use Experimental S3 Console.

> The experimental S3 Console has not been fully tested and is not intended for bulk management of objects or for use in a production environment. Tenants should only use S3 Console when performing functions for a small number of objects or when using proof-of-concept or non-production grids.

- **Can delete multiple S3 buckets**. Tenant users can now delete more than one S3 bucket at a time. Each bucket that you want to delete must be empty. See Delete S3 bucket.
- **Updates to Tenant accounts permission**. Admin users who belong to a group with the Tenant accounts permission can now view existing traffic classification policies. Previously, users were required to have Root access permission to view these metrics.

## New upgrade and hotfix process

- The **StorageGRID Upgrade** page was redesigned (**MAINTENANCE** > **System** > **Software update** > **StorageGRID upgrade**).
- After the upgrade to StorageGRID 11.6 completes, you can use the Grid Manager to upgrade to a future release and apply a hotfix for that release at the same time. The StorageGRID upgrade page will show the recommended upgrade path and will link directly to the correct download pages.
- A new **Check for software updates** check box on the AutoSupport page (**SUPPORT** > **Tools** > **AutoSupport**) lets you control this functionality. You can disable the check for available software updates if your system does not have WAN access. See Configure AutoSupport > Disable checks for software updates.

> For the upgrade to StorageGRID 11.6, you can optionally use a script to upgrade and apply a hotfix at the same time. See NetApp Knowledge Base: How to run combined major upgrade and hotfix script for StorageGRID.

- You can now pause a SANtricity OS upgrade and skip upgrading some nodes if you need to finish the upgrade later. See the instructions for your storage appliance:
  - Upgrade SANtricity OS on storage controllers using the Grid Manager (SG5600)
  - Upgrade SANtricity OS on storage controllers using the Grid Manager (SG5700)
  - Upgrade SANtricity OS on storage controllers using the Grid Manager (SG6000)

## External syslog server support

- You can now configure an external syslog server if you want to save and manage audit messages and a subset of StorageGRID logs remotely (**CONFIGURATION** > **Monitoring** > **Audit and syslog server**). After an external syslog server is configured, you can save audit messages and certain log files locally, remotely, or both. By configuring the destinations of your audit information, you can reduce network traffic on your Admin Nodes. See Configure audit messages and log destinations.
- Related to this functionality, new check boxes on the Logs page (**SUPPORT** > **Tools** > **Logs**) allow you to specify which types of logs you want to collect, such as certain application logs, audit logs, logs used for network debugging, and Prometheus database logs. See Collect log files and system data.

## S3 Select

You can now optionally allow S3 tenants to issue SelectObjectContent requests to individual objects. S3 Select provides an efficient way to search through large amounts of data without having to deploy a database and associated resources to enable searches. It also reduces the cost and latency of retrieving data. See Manage S3 Select for tenant accounts and Use S3 Select.

Grafana charts for S3 Select operations were also added. See Review support metrics.

## S3 Object Lock default bucket retention period

When using S3 Object Lock, you can now specify a default retention period for the bucket. The default retention period applies to any objects added to the bucket that do not have their own retention settings. See Use S3 Object Lock.

## Google Cloud Platform support

You can now use the Google Cloud Platform (GCP) as an endpoint for Cloud Storage Pools and the CloudMirror platform service. See Specify the URN for a platform services endpoint and Create a Cloud Storage Pool.

## AWS C2S support

You can now use AWS Commercial Cloud Services (C2S) endpoints for CloudMirror replication. See Create platform services endpoint.

## Other S3 changes

- **GET Object and HEAD Object support for multipart objects**. Previously, StorageGRID did not support the `partNumber` request parameter in GET Object or HEAD Object requests. You can now issue GET and

HEAD requests to retrieve a specific part of a multipart object. GET and HEAD Object also support the `x-amz-mp-parts-count` response element to indicate how many parts an object has.

- **Changes to "Available" consistency control**. The “Available” consistency control now behaves the same as the “read-after-new-write” consistency level, but provides eventual consistency for HEAD and GET operations. The “Available” consistency control offers higher availability for HEAD and GET operations than “read-after-new-write” if Storage Nodes are unavailable. Differs from Amazon S3 consistency guarantees for HEAD and GET operations.

  Use S3

## Performance enhancements

- **Storage Nodes can support 2 billion objects**. The underlying directory structure on Storage Nodes was optimized for better scalability and performance. Storage Nodes now use additional subdirectories to store up to two billion replicated objects and to maximize performance. Node subdirectories are modified when you upgrade to StorageGRID 11.6, but existing objects are not redistributed to the new directories.
- **ILM-driven delete performance increased for high-performance appliances**. The resources and throughput used to perform ILM delete operations now adapt to the size and capability of each StorageGRID appliance node. For SG5600 appliances, the throughput is the same as for StorageGRID 11.5. For SG5700 appliances, small improvements were made to ILM delete performance. For SG6000 appliances, which have more RAM and more CPUs, ILM deletes are now processed much more quickly. The improvements are especially noticeable on all-flash SGF6024 appliances.
- **Storage volume watermarks optimized**. In previous releases, the settings of the three Storage Volume Watermarks applied to every storage volume on every Storage Node. StorageGRID can now optimize these watermarks for each storage volume, based on the size of the Storage Node and the relative capacity of the volume. See What are storage volume watermarks.

  Optimized watermarks are automatically applied to all new and most upgraded StorageGRID 11.6 systems. The optimized watermarks will be larger than the previous default settings.

  If you use custom watermarks, the **Low read-only watermark override** alert might be triggered after you upgrade. This alert lets you know if your custom watermark settings are too small. See Troubleshoot Low read-only watermark override alerts.

  As part of this change, two Prometheus metrics were added:

  - `storagegrid_storage_volume_minimum_optimized_soft_readonly_watermark`
  - `storagegrid_storage_volume_maximum_optimized_soft_readonly_watermark`
- **Maximum allowed metadata space increased**. The maximum allowed metadata space for Storage Nodes was increased to 3.96 TB (from 2.64 TB) for higher-capacity nodes, which are nodes with an actual reserved space for metadata of more than 4 TB. This new value allows more object metadata to be stored on certain Storage Nodes and can increase StorageGRID metadata capacity by up to 50%.

  > If you have not already done so, and if your Storage Nodes have enough RAM and sufficient space on volume 0, you can manually increase the Metadata Reserved Space setting up to 8 TB after you install or upgrade.

  - Manage object metadata storage > Allowed metadata space
  - Increase Metadata Reserved Space setting

## Enhancements to maintenance procedures and support tools

- **Can change node console passwords**. You now can use the Grid Manager to change node console passwords (**CONFIGURATION** > **Access control** > **Grid passwords**). These passwords are used to log in to a node as “admin” using SSH, or to the root user on a VM/physical console connection. See Change node console passwords.
- **New Object existence check wizard**. You can now verify object integrity with an easy-to-use Object existence check wizard (**MAINTENANCE** > **Tasks** > **Object existence check**), which replaces the foreground verification procedure. The new procedure takes one third of the time or less to complete and can verify multiple nodes at the same time. See Verify object integrity.
- **"Estimated time to completion" chart for EC rebalance and EC repair jobs**. You can now view the estimated time to completion and the completion percentage for a current EC rebalance or EC repair job.
- **Estimated percent complete for replicated data repairs**. You can now add the `show-replicated-repair-status` option to the `repair-data` command to see an estimated percent completion for a replicated repair.

  > The `show-replicated-repair-status` option is available for technical preview in StorageGRID 11.6. This feature is under development, and the value returned might be incorrect or delayed. To determine if a repair is complete, continue to use **Awaiting - All**, **Repairs Attempted (XRPA)**, and **Scan Period — Estimated (XSCM)** as described in the recovery procedures.

- The results on the Diagnostics page (**SUPPORT** > **Tools** > **Diagnostics**) are now sorted by severity and then alphabetically.
- Prometheus and Grafana were updated to newer versions with modified interfaces and charts. As part of this change, the labels in some metrics were changed.
  - If you have custom queries that used the labels from `node_network_up`, you should now use the labels from `node_network_info` instead.
  - If you also used the label name `interface` from any of the `node_network` metrics, you should now use the the `device` label instead.
- Previously, Prometheus metrics were stored on Admin Nodes for 31 days. Now, metrics are stored until the space reserved for Prometheus data is full, which can significantly increase how long historical metrics are available.

  When the `/var/local/mysql_ibdata/` volume reaches capacity, the oldest metrics are deleted first.

## Installation enhancements

- You now have the option to use Podman as a container during the installation of Red Hat Enterprise Linux. Previously, StorageGRID only supported a Docker container.
- The API schemas for StorageGRID are now included in the installation archives for the RedHat Enterprise Linux/CentOS, Ubuntu/Debian, and VMware platforms. After extracting the archive, you can find the schemas in the `/extras/api-schemas` folder.
- The `BLOCK_DEVICE_RANGEDB` key in the node configuration file for bare-metal deployments should now contain three digits instead of two. That is, instead of `BLOCK_DEVICE_RANGEDB_nn`, you should specify `BLOCK_DEVICE_RANGEDB_nnn`.

  For compatibility with existing deployments, two-digit keys are still supported for upgraded nodes.

- You can optionally add one or more instances of the new `INTERFACES_TARGET_nnnn` key to the node configuration file for bare-metal deployments. Each key provides the name and description of a physical interface on the bare-metal host, which will be displayed on the VLAN interfaces page and the HA groups page.
  - Create node configuration files for Red Hat Enterprise Linux or CentOS deployments
  - Create node configuration files for Ubuntu or Debian deployments

## New alerts

The following new alerts were added for StorageGRID 11.6:

- Audit logs are being added to the in-memory queue
- Cassandra table corruption
- EC rebalance failure
- EC repair failure
- EC repair stalled
- Expiration of global server certificate for S3 and Swift API
- External syslog CA certificate expiration
- External syslog client certificate expiration
- External syslog server certificate expiration
- External syslog server forwarding error
- Identity federation synchronization failure for a tenant
- Legacy CLB load balancer activity detected
- Logs are being added to the on-disk queue
- Low read-only watermark override
- Low tmp directory free space
- Object existence check failed
- Object existence check stalled
- S3 PUT Object size too large

See the Alerts reference.

## Changes to audit messages

- A new **BUID** field was added to the ORLM: Object Rules Met audit message. The **BUID** field shows the bucket ID, which is used for internal operations. The new field appears only if the message status is PRGD.
- A new **SGRP** field was added to the following audit messages. The **SGRP** field is present only if an object was deleted at a different site than where it was ingested.
  - IDEL: ILM Initiated Delete
  - OVWR: Object Overwrite
  - SDEL: S3 DELETE
  - WDEL: Swift DELETE

See Review audit logs.

### StorageGRID documentation changes

The look and feel of the StorageGRID 11.6 documentation site has been modified and now uses GitHub as the underlying platform.

NetApp appreciates feedback on content and encourages users to take advantage of the new “Request doc changes” function available on every page of the product documentation. The documentation platform also offers an embedded content contribution function for GitHub users.

Take a look and contribute to this documentation. You can edit, request a change, or simply send feedback.

## Removed or deprecated features

Some features were removed or deprecated in this release. Review these items to understand whether you need to update client applications or modify your configuration before you upgrade.

### Alarm system and alarm-based APIs deprecated

As of the StorageGRID 11.6 release, the legacy alarm system is deprecated. The user interface and APIs for the legacy alarm system will be removed in a future release.

> If you are still using legacy alarms, plan to fully transition to the alert system after upgrading to StorageGRID 11.6. See Manage alerts and alarms: Overview to learn more about alerts.

The 11.6 release deprecates all alarm-based APIs. The following APIs are affected by this change:

- `GET /grid/alarms`: Fully deprecated
- `GET /grid/health/topology`: Fully deprecated
- `GET /grid/health`: The `alarm-counts` section of the response is deprecated

### Future releases will not support 5 TiB maximum object size for PUT Object

In future StorageGRID releases, the maximum size for a single PUT Object operation will be 5 GiB, instead of 5 TiB. You can use multipart upload for objects that are larger than 5 GiB, up to a maximum of 5 TiB (5,497,558,138,880 bytes).

To help you transition clients to using smaller object sizes in PUT Object, the **S3 PUT Object size too large** alert will be triggered in StorageGRID 11.6 if an S3 client attempts to upload an object that exceeds 5 GiB.

### NAS Bridge feature deprecated

The NAS Bridge feature previously entered limited access with the StorageGRID 11.4 release. The NAS Bridge feature remains at limited access and is deprecated as of StorageGRID 11.6.

NAS Bridge 11.4 remains the final release and will continue to be compatible with StorageGRID 11.6. Review the NetApp Interoperability Matrix Tool for continued compatibility between NAS Bridge 11.4 and StorageGRID versions.

Review the NetApp Support site for the support schedule for NAS Bridge.

# Changes to the Grid Management API

StorageGRID 11.6 uses version 3 of the Grid Management API. Version 3 deprecates version 2; however, version 1 and version 2 are still supported.

> You can continue to use version 1 and version 2 of the management API with StorageGRID 11.6; however, support for these versions of the API will be removed in a future release of StorageGRID. After upgrading to StorageGRID 11.6, the deprecated v1 and v2 APIs can be deactivated using the `PUT /grid/config/management` API.

To learn more, go to Use the Grid Management API.

## Can access Swagger docs for private API operations

You can now access the Swagger docs for the private API from the Grid Manager. To see the available operations, select the Grid Manager help icon and select **API Documentation**. Then, select **Go to private API documentation** from the StorageGRID Management API page.

StorageGRID private APIs are subject to change without notice. StorageGRID private endpoints also ignore the API version of the request.

## Alarm-based APIs deprecated

The 11.6 release deprecates all alarm-based APIs. The following APIs are affected by this change:

- `GET /grid/alarms`: Fully deprecated
- `GET /grid/health/topology`: Fully deprecated
- `GET /grid/health`: The `alarm-counts` section of the response is deprecated

## Can import S3 access keys

You can now use the Grid Management API to import S3 access keys for tenant users. For example, you can migrate access keys from another S3 provider to StorageGRID or use this feature to keep user credentials the same between grids.

> When this feature is enabled, any Grid Manager user with the Change tenant root password permission has full access to tenant data. Disable this feature immediately after use to protect tenant data.

## New account operations

Three new `grid/account` API operations have been added:

- `POST /grid/account-enable-s3-key-import`: This request enables the Import S3 Credentials feature. You must have the Root access permission to enable this feature.
- `POST /grid/accounts/{id}/users/{user_id}/s3-access-keys`: This request imports S3 credentials for a given user in a tenant account. You must have the Root access or Change tenant root

password permission, and you must know the user ID and the tenant account ID.

- `POST /grid/account-disable-s3-key-import`: This request disables the Import S3 Credentials feature. You must have the Root access permission to disable this feature.

### PATCH method deprecated

The PATCH method has now been deprecated and will be removed in a future release. As required, perform a PUT operation to replace a resource instead of using a PATCH operation to modify the resource.

### Additions to `grid/logs/collect` endpoint

Four boolean values have been added to the `grid/logs/collect` endpoint:

- `applicationLogs`: Application-specific logs that technical support uses most frequently for troubleshooting. The logs collected are a subset of the available application logs. The default is `true`.
- `auditLogs`: Logs containing the audit messages generated during normal system operation. The default is `true`.
- `networkTrace`: Logs used for network debugging. The default is `false`.
- `prometheusDatabase`: Time series metrics from the services on all nodes. The default is `false`.

### New `node-details /grid/service-ids` endpoint

The new `/grid/service-ids` endpoint provides a mapping of node UUIDs to the associated node names, service IDs, and service types.

### Can retrieve grid node console passwords

You can now use `POST /grid/node-console-passwords` to retrieve the list of grid nodes and their associated console passwords.

## Changes to the Tenant Management API

StorageGRID 11.6 uses version 3 of the Tenant Management API. Version 3 deprecates version 2; however, version 1 and version 2 are still supported.

> You can continue to use version 1 and version 2 of the management API with StorageGRID 11.6; however, support for these versions of the API will be removed in a future release of StorageGRID. After upgrading to StorageGRID 11.6, the deprecated v1 and v2 APIs can be deactivated using the `PUT /grid/config/management` API.

To learn more, go to Understand the Tenant Management API.

### PATCH method deprecated

The PATCH method has now been deprecated and will be removed in a future release. As required, perform a PUT operation to replace a resource instead of using a PATCH operation to modify the resource.

# Plan and prepare for upgrade

## Estimate the time to complete an upgrade

When planning an upgrade to StorageGRID 11.6, you must consider when to upgrade, based on how long the upgrade might take. You must also be aware of which operations you can and cannot perform during each stage of the upgrade.

### About this task

The time required to complete a StorageGRID upgrade depends on a variety of factors such as client load and hardware performance.

The table summarizes the main upgrade tasks and lists the approximate time required for each task. The steps after the table provide instructions you can use to estimate the upgrade time for your system.

| Upgrade task | Description | Approximate time required | During this task |
|---|---|---|---|
| Start Upgrade Service | Upgrade prechecks are run, the software file is distributed, and the upgrade service is started. | 3 minutes per grid node, unless validation errors are reported | As required, you can run the upgrade prechecks manually before the scheduled upgrade maintenance window. |
| Upgrade Grid Nodes (primary Admin Node) | The primary Admin Node is stopped, upgraded, and restarted. | 30 minutes to 1 hour, with SG100 and SG1000 appliance nodes requiring the most time. | You cannot access the primary Admin Node. Connection errors are reported, which you can ignore. |
| Upgrade Grid Nodes (all other nodes) | The software on all other grid nodes is upgraded, in the order in which you approve the nodes. Every node in your system will be brought down one at a time for several minutes each. | 15 minutes to 1 hour per node, with appliance nodes requiring the most time<br><br>**Note:** For appliance nodes, the StorageGRID Appliance Installer is automatically updated to the latest release. | • Do not change the grid configuration.<br>• Do not change the audit level configuration.<br>• Do not update the ILM configuration.<br>• You are prevented from performing other maintenance procedures, such as hotfix, decommission, or expansion.<br><br>**Note:** If you need to perform a recovery, contact technical support. |

| Upgrade task | Description | Approximate time required | During this task |
|---|---|---|---|
| Enable Features | The new features for the new version are enabled. | Less than 5 minutes | • Do not change the grid configuration.<br>• Do not change the audit level configuration.<br>• Do not update the ILM configuration.<br>• You cannot perform another maintenance procedure. |
| Upgrade Database | The upgrade process checks each node to verify that the Cassandra database does not need to be updated. | 10 seconds per node or a few minutes for the entire grid | The upgrade from StorageGRID 11.5 to 11.6 does not require a Cassandra database upgrade; however, the Cassandra service will be stopped and restarted on each Storage Node.<br><br>For future StorageGRID feature releases, the Cassandra database update step might take several days to complete. |
| Final Upgrade Steps | Temporary files are removed and the upgrade to the new release completes. | 5 minutes | When the **Final Upgrade Steps** task completes, you can perform all maintenance procedures. |

**Steps**

1. Estimate the time required to upgrade all grid nodes.
   a. Multiply the number of nodes in your StorageGRID system by 1 hour/node.

      As a general rule, appliance nodes take longer to upgrade than software-based nodes.

   b. Add 1 hour to this time to account for the time required to download the `.upgrade` file, run precheck validations, and complete the final upgrade steps.
2. If you have Linux nodes, add 15 minutes for each node to account for the time required to download and install the RPM or DEB package.
3. Calculate the total estimated time for the upgrade by adding the results of steps 1 and 2.

**Example: Estimated time to upgrade to StorageGRID 11.6**

Suppose your system has 14 grid nodes, of which 8 are Linux nodes.

1. Multiply 14 by 1 hour/node.
2. Add 1 hour to account for the download, precheck, and final steps.

   The estimated time to upgrade all nodes is 15 hours.

3. Multiply 8 by 15 minutes/node to account for the time to install the RPM or DEB package on the Linux nodes.

   The estimated time for this step is 2 hours.

4. Add the values together.

   You should allow up to 17 hours to complete the upgrade of your system to StorageGRID 11.6.0.

## How your system is affected during the upgrade

You must understand how your StorageGRID system will be affected during the upgrade.

### StorageGRID upgrades are non-disruptive

The StorageGRID system can ingest and retrieve data from client applications throughout the upgrade process. Grid nodes are brought down one at a time during the upgrade, so there is not a time when all grid nodes are unavailable.

To allow for continued availability, you must ensure that objects are stored redundantly using the appropriate ILM policies. You must also ensure that all external S3 or Swift clients are configured to send requests to one of the following:

- A StorageGRID endpoint configured as a high availability (HA) group
- A high availability third-party load balancer
- Multiple Gateway Nodes for each client
- Multiple Storage Nodes for each client

### Appliance firmware is upgraded

During the StorageGRID 11.6 upgrade:

- All StorageGRID appliance nodes are automatically upgraded to StorageGRID Appliance Installer firmware version 3.6.
- SG6060 and SGF6024 appliances are automatically upgraded to BIOS firmware version 3B07.EX and BMC firmware version BMC 3.93.07.
- SG100 and SG1000 appliances are automatically upgraded to BIOS firmware version 3B12.EC and BMC firmware version 4.67.07.

### Alerts might be triggered

Alerts might be triggered when services start and stop and when the StorageGRID system is operating as a mixed-version environment (some grid nodes running an earlier version, while others have been upgraded to a later version). Other alerts might be triggered after the upgrade completes.

For example, you might see the **Unable to communicate with node** alert when services are stopped, or you

might see the **Cassandra communication error** alert when some nodes have been upgraded to StorageGRID 11.6 but other nodes are still running StorageGRID 11.5. In general, these alerts will clear when the upgrade completes.

The **ILM placement unachievable** alert might be triggered when Storage Nodes are stopped during the upgrade to StorageGRID 11.6. This alert might persist for 1 day after the upgrade completes.

If you use custom values for the storage volume watermarks, the **Low read-only watermark override** alert might be triggered after the upgrade is complete. See Troubleshoot Low read-only watermark override alerts for details.

After the upgrade completes, you can review any upgrade-related alerts by selecting **Recently resolved alerts** or **Current alerts** from the Grid Manager Dashboard.

#### Many SNMP notifications are generated

Be aware that a large number of SNMP notifications might be generated when grid nodes are stopped and restarted during the upgrade. To avoid excessive notifications, unselect the **Enable SNMP Agent Notifications** check box (**CONFIGURATION** > **Monitoring** > **SNMP agent**) to disable SNMP notifications before you start the upgrade. Then, re-enable notifications after the upgrade is complete.

#### Configuration changes are restricted

> The list of restricted configuration changes can change from release to release. When upgrading to another StorageGRID release, refer to the list in the appropriate upgrade instructions.

Until the **Enable New Feature** task completes:

- Do not make any grid configuration changes.
- Do not change the audit level configuration or configure an external syslog server.
- Do not enable or disable any new features.
- Do not update the ILM configuration. Otherwise, you might experience inconsistent and unexpected ILM behavior.
- Do not apply a hotfix or recover a grid node.
- You cannot manage HA groups, VLAN interfaces, or load balancer endpoints while you are upgrading to StorageGRID 11.6.

Until the **Final Upgrade Steps** task completes:

- Do not perform an expansion procedure.
- Do not perform a decommission procedure.

#### You cannot view bucket details or manage buckets from the Tenant Manager

During the upgrade to StorageGRID 11.6 (that is, while the system is operating as a mixed-version environment), you cannot view bucket details or manage buckets using the Tenant Manager. One of the following errors appears on the Buckets page in Tenant Manager:

- “You cannot use this API while you are upgrading to 11.6.”
- “You cannot view bucket versioning details in the Tenant Manager while you are upgrading to 11.6.”

This error will resolve after the upgrade to 11.6 is complete.

#### Workaround

While the 11.6 upgrade is in progress, use the following tools to view bucket details or manage buckets, instead of using the Tenant Manager:

- To perform standard S3 operations on a bucket, use either the S3 REST API or the Tenant Management API.
- To perform StorageGRID custom operations on a bucket (for example, viewing and modifying the bucket consistency level, enabling or disabling last access time updates, or configuring search integration), use the Tenant Management API.

See Understand Tenant Management API and Use S3 for instructions.

## Impact of an upgrade on groups and user accounts

You must understand the impact of the StorageGRID upgrade, so that you can update groups and user accounts appropriately after the upgrade is complete.

#### Changes to group permissions and options

After upgrading to StorageGRID 11.6, optionally select the following updated or new permissions and options (**CONFIGURATION** > **Access control** > **Admin groups**).

| Permission or option | Description |
|---|---|
| Tenant accounts | In addition to allowing users to create, edit, and remove tenant accounts, this permission now allows admin users to view existing traffic classification policies (**CONFIGURATION** > **Network** > **Traffic classification**). |

See Manage admin groups.

## Verify the installed version of StorageGRID

Before starting the upgrade, you must verify that the previous version of StorageGRID is currently installed with the latest available hotfix applied.

#### About this task

Before you upgrade to StorageGRID 11.6, your grid must have StorageGRID 11.5 installed. If you are currently using a previous version of StorageGRID, you must install all previous upgrade files along with their latest hotfixes (strongly recommended) until your grid's current version is StorageGRID 11.5.*x.y*.

One possible upgrade path is shown in the example.

> NetApp strongly recommends that you apply the latest hotfix for each StorageGRID version before upgrading to the next version and that you also apply the latest hotfix for each new version you install. In some cases, you must apply a hotfix to avoid the risk of data loss. See NetApp Downloads: StorageGRID and the release notes for each hotfix to learn more.

Note that you can run a script to update from 11.3.0.13+ to 11.4.0.*y* in one step and from 11.4.0.7+ to 11.5.0.*y*

in one step. See NetApp Knowledge Base: How to run combined major upgrade and hotfix script for StorageGRID.

**Steps**

1. Sign in to the Grid Manager using a supported web browser.
2. From the top of the Grid Manager, select **Help** > **About**.
3. Verify that **Version** is 11.5.*x.y*.

   In the StorageGRID 11.5.*x.y* version number:

   - The **major release** has an *x* value of 0 (11.5.0).
   - A **hotfix**, if one has been applied, has a *y* value (for example, 11.5.0.1).
4. If **Version** is not 11.5.*x.y*, go to NetApp Downloads: StorageGRID to download the files for each previous release, including the latest hotfix for each release.
5. Obtain the the upgrade instructions for each release you downloaded. Then, perform the software upgrade procedure for that release, and apply the latest hotfix for that release (strongly recommended).

   See the StorageGRID hotfix procedure.

**Example: Upgrade to StorageGRID 11.5 from version 11.3.0.8**

The following example shows the steps to upgrade from StorageGRID version 11.3.0.8 to version 11.5 in preparation for a StorageGRID 11.6 upgrade.

> Optionally, you can run a script to combine steps 2 and 3 (update from 11.3.0.13+ to 11.4.0.*y*) and to combine steps 4 and 5 (update from 11.4.0.7+ to 11.5.0.*y*). See NetApp Knowledge Base: How to run combined major upgrade and hotfix script for StorageGRID.

Download and install software in the following sequence to prepare your system for upgrade:

1. Apply the latest StorageGRID 11.3.0.*y* hotfix.
2. Upgrade to the StorageGRID 11.4.0 major release.
3. Apply the latest StorageGRID 11.4.0.*y* hotfix.
4. Upgrade to the StorageGRID 11.5.0 major release.
5. Apply the latest StorageGRID 11.5.0.*y* hotfix.

## Obtain the required materials for a software upgrade

Before you begin the software upgrade, you must obtain all required materials so you can complete the upgrade successfully.

| Item | Notes |
|---|---|
| StorageGRID upgrade files | Download the StorageGRID upgrade files to your service laptop. |

| Item | Notes |
| --- | --- |
| Service laptop | The service laptop must have:<br>• Network port<br>• SSH client (for example, PuTTY) |
| Supported web browser | Browser support typically changes for each StorageGRID release. Make sure your browser is compatible with the new StorageGRID version. |
| Recovery Package (`.zip`) file | Download the Recovery Package before upgrading, and save the file in a safe location. The Recovery Package file allows you to restore the system if a failure occurs. |
| `Passwords.txt` file | This file is included in the SAID package, which is part of the Recovery Package `.zip` file. You must obtain the latest version of the Recovery Package. |
| Provisioning passphrase | The passphrase is created and documented when the StorageGRID system is first installed. The provisioning passphrase is not listed in the `Passwords.txt` file. |
| Related documentation | • Release notes for StorageGRID 11.6. Be sure to read these carefully before starting the upgrade.<br>• Instructions for administering StorageGRID.<br>• If you are upgrading a Linux deployment, the StorageGRID installation instructions for your Linux platform:<br>◦ Install Red Hat Enterprise Linux or CentOS<br>◦ Install Ubuntu or Debian<br>• Other StorageGRID documentation, as required. |

### Download the StorageGRID upgrade files

You must download one or more files, depending on where your nodes are installed.

- **All platforms**: `.upgrade` file

If any nodes are deployed on Linux hosts, you must also download an RPM or DEB archive, which you will install before you start the upgrade:

- **Red Hat Enterprise Linux or CentOS**: An additional RPM file (`.zip` or `.tgz`)
- **Ubuntu or Debian**: An additional DEB file (`.zip` or `.tgz`)

#### Steps

1. Go to NetApp Downloads: StorageGRID.
2. Select the button for downloading the latest release, or select another version from the drop-down menu and select **Go**.

StorageGRID software versions have this format: 11.*x.y*. StorageGRID hotfixes have this format: 11.*x.y.z*.

3. Sign in with the username and password for your NetApp account.
4. If a Caution/MustRead statement appears, read it and select the check box.

   This statement appears if there is a required hotfix for the release.

5. Read the End User License Agreement, select the check box, and then select **Accept & Continue**.

   The downloads page for the version you selected appears. The page contains three columns:

   - Install StorageGRID
   - Upgrade StorageGRID
   - Support files for StorageGRID Appliances

6. In the **Upgrade StorageGRID** column, select and download the `.upgrade` archive.

   Every platform requires the `.upgrade` archive.

7. If any nodes are deployed on Linux hosts, also download the RPM or DEB archive in either `.tgz` or `.zip` format. Select the `.zip` file if you are running Windows on the service laptop.

   - Red Hat Enterprise Linux or CentOS
     `StorageGRID-Webscale-`*`version`*`-RPM-`*`uniqueID`*`.zip`
     `StorageGRID-Webscale-`*`version`*`-RPM-`*`uniqueID`*`.tgz`
   - Ubuntu or Debian
     `StorageGRID-Webscale-`*`version`*`-DEB-`*`uniqueID`*`.zip`
     `StorageGRID-Webscale-`*`version`*`-DEB-`*`uniqueID`*`.tgz`

     No additional files are required for the SG100 or SG1000.

### Download the Recovery Package

The Recovery Package file allows you to restore the StorageGRID system if a failure occurs. Download the current Recovery Package file before making grid topology changes to the StorageGRID system or before upgrading software. Then, download a new copy of the Recovery Package after making grid topology changes or after upgrading software.

#### What you'll need

- You must be signed in to the Grid Manager using a supported web browser.
- You must have the provisioning passphrase.
- You must have specific access permissions.

#### Steps

1. Select **Maintenance** > **System** > **Recovery Package**.
2. Enter the provisioning passphrase, and select **Start Download**.

   The download starts immediately.

3. When the download completes:

a. Open the `.zip` file.

b. Confirm it includes a `gpt-backup` directory and an inner `.zip` file.

c. Extract the inner `.zip` file.

d. Confirm you can open the `Passwords.txt` file.

4. Copy the downloaded Recovery Package file (`.zip`) to two safe, secure, and separate locations.

> The Recovery Package file must be secured because it contains encryption keys and passwords that can be used to obtain data from the StorageGRID system.

### Check the system's condition

Before upgrading a StorageGRID system, you must verify the system is ready to accommodate the upgrade. You must ensure that the system is running normally and that all grid nodes are operational.

**Steps**

1. Sign in to the Grid Manager using a supported web browser.
2. Check for and resolve any active alerts.

   For information about specific alerts, see the Alerts reference.

3. Confirm that no conflicting grid tasks are active or pending.

   a. Select **SUPPORT** > **Tools** > **Grid topology**.

   b. Select ***site*** > ***primary Admin Node*** > **CMN** > **Grid Tasks** > **Configuration**.

      Information lifecycle management evaluation (ILME) tasks are the only grid tasks that can run concurrently with the software upgrade.

   c. If any other grid tasks are active or pending, wait for them to finish or release their lock.

      > Contact technical support if a task does not finish or release its lock.

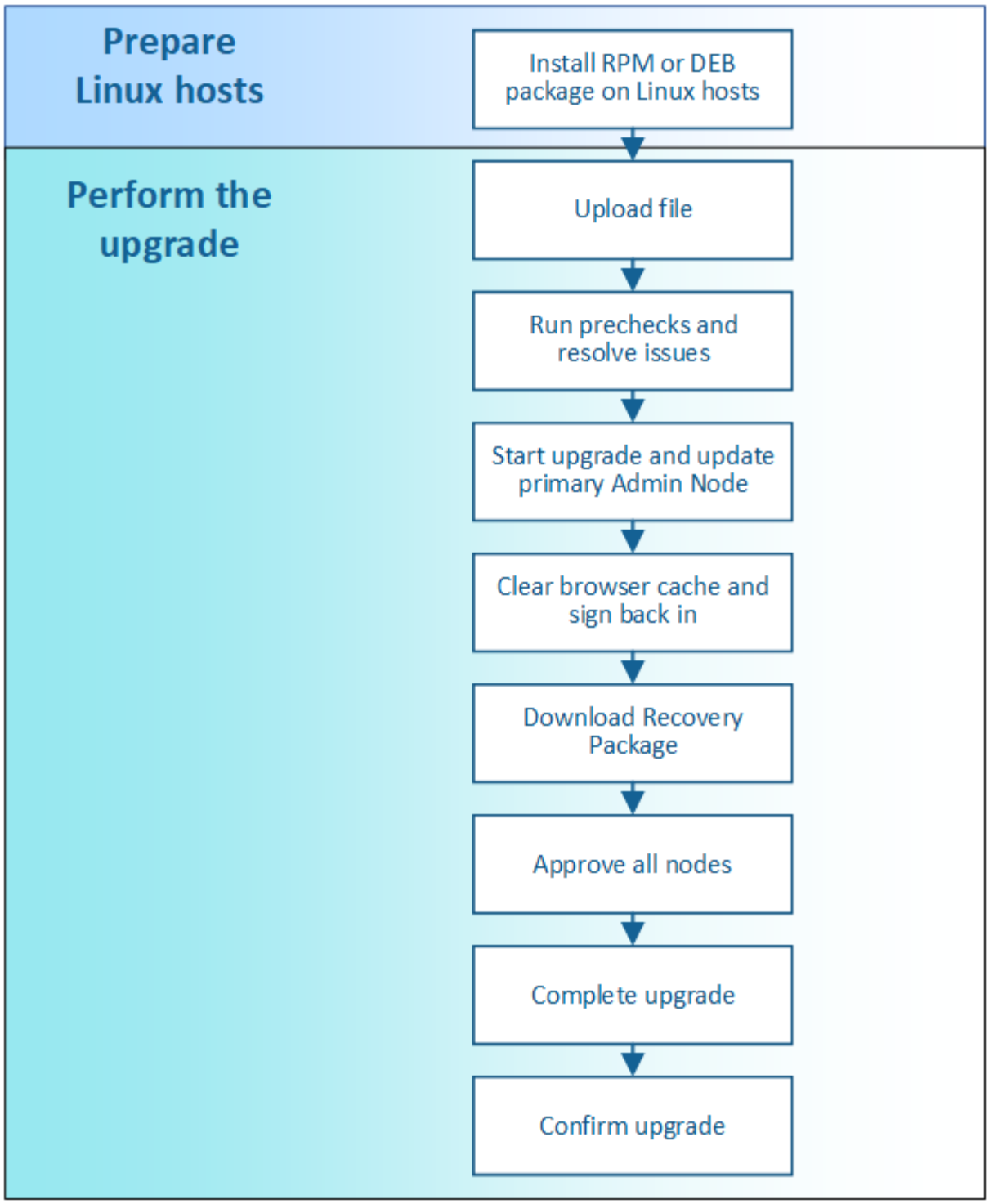
4. Refer to Internal grid node communications and External communications to ensure that all required ports for StorageGRID 11.6 are opened before you upgrade.

   > If you have opened any custom firewall ports, you are notified during the upgrade precheck. You must contact technical support before proceeding with the upgrade.

## Upgrade StorageGRID software

### Upgrade workflow

Before starting the upgrade, review the general workflow. The StorageGRID Upgrade page guides you through each upgrade step.




1. If any StorageGRID nodes are deployed on Linux hosts, install the RPM or DEB package on each host before you start the upgrade.
2. From the primary Admin Node, access the StorageGRID Upgrade page and upload the upgrade file.
3. Optionally run upgrade prechecks to detect and resolve any issues before you start the actual upgrade.
4. Start the upgrade, which runs prechecks and upgrades the primary Admin Node automatically. You cannot access the Grid Manager while the primary Admin Node is being upgraded. Audit logs will also be unavailable. This upgrade can take up to 30 minutes.
5. After the primary Admin Node has been upgraded, clear your web browser's cache, sign back in, and return to the StorageGRID Upgrade page.

6. Download a new Recovery Package.
7. Approve the grid nodes. You can approve individual grid nodes, groups of grid nodes, or all grid nodes.

> Do not approve the upgrade for a grid node unless you are sure that node is ready to be stopped and rebooted.

8. Resume operations. When all grid nodes have been upgraded, new features are enabled and you can resume operations. You must wait to perform a decommission or expansion procedure until the background **Upgrade Database** task and the **Final Upgrade Steps** task have completed.
9. When the upgrade is complete, confirm the software version and apply any hotfixes.

**Related information**

Estimate the time to complete an upgrade

## Linux: Install the RPM or DEB package on all hosts

If any StorageGRID nodes are deployed on Linux hosts, you must install an additional RPM or DEB package on each of these hosts before you start the upgrade.

**What you'll need**

You must have downloaded one of the following `.tgz` or `.zip` files from the NetApp Downloads page for StorageGRID.

> Use the `.zip` file if you are running Windows on the service laptop.

| Linux platform | Additional file (choose one) |
|---|---|
| Red Hat Enterprise Linux or CentOS | • `StorageGRID-Webscale-`*`version`*`-RPM-`*`uniqueID`*`.zip`<br>• `StorageGRID-Webscale-`*`version`*`-RPM-`*`uniqueID`*`.tgz` |
| Ubuntu or Debian | • `StorageGRID-Webscale-`*`version`*`-DEB-`*`uniqueID`*`.zip`<br>• `StorageGRID-Webscale-`*`version`*`-DEB-`*`uniqueID`*`.tgz` |

**Steps**

1. Extract the RPM or DEB packages from the installation file.
2. Install the RPM or DEB packages on all Linux hosts.

   See the steps for installing StorageGRID host services in the installation instructions for your Linux platform.

   - Install Red Hat Enterprise Linux or CentOS
   - Install Ubuntu or Debian

   The new packages are installed as additional packages. Do not remove the existing packages.

## Perform the upgrade

When you are ready to perform the upgrade, you select the `.upgrade` archive and enter the provisioning passphrase. As an option, you can run the upgrade prechecks before performing the actual upgrade.

### What you'll need

You have reviewed all of the considerations and completed all of the planning and preparation steps.

### Upload the upgrade file

1. Sign in to the Grid Manager using a supported web browser.
2. Select **Maintenance** > **System** > **Software Update**.

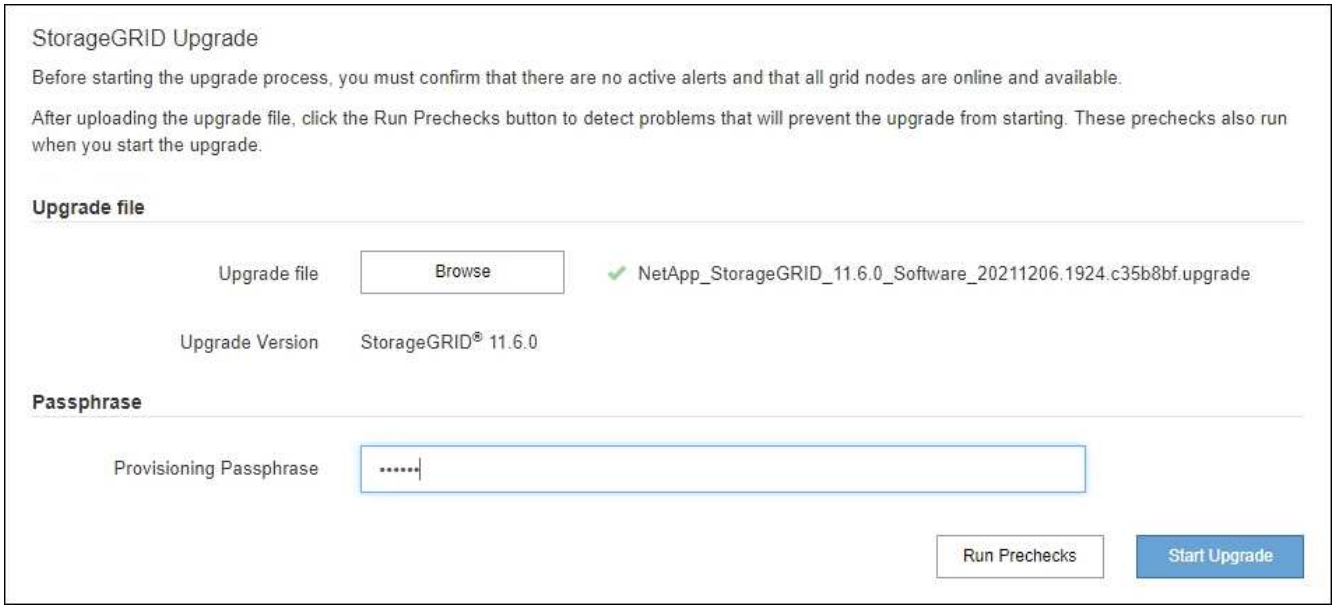
   The Software Update page appears.

3. Select **StorageGRID Upgrade**.
4. On the StorageGRID Upgrade page, select the `.upgrade` archive.
   a. Select **Browse**.
   b. Locate and select the file: `NetApp_StorageGRID_11.6.0_Software_uniqueID.upgrade`
   c. Select **Open**.

      The file is uploaded and validated. When the validation process is done, a green checkmark appears next to the upgrade file name.

5. Enter the provisioning passphrase in the text box.

   The **Run Prechecks** and **Start Upgrade** buttons become enabled.




### Run prechecks

Optionally, you can validate the condition of your system before you start the actual upgrade. Selecting **Run**

**Prechecks** allows you to detect and resolve issues before starting the upgrade. The same prechecks are performed when you start the upgrade. Precheck failures will stop the upgrade process and some might require technical support involvement to resolve.

1. Select **Run Prechecks**.
2. Wait for the prechecks to complete.
3. Follow the instructions to resolve any precheck errors that are reported.

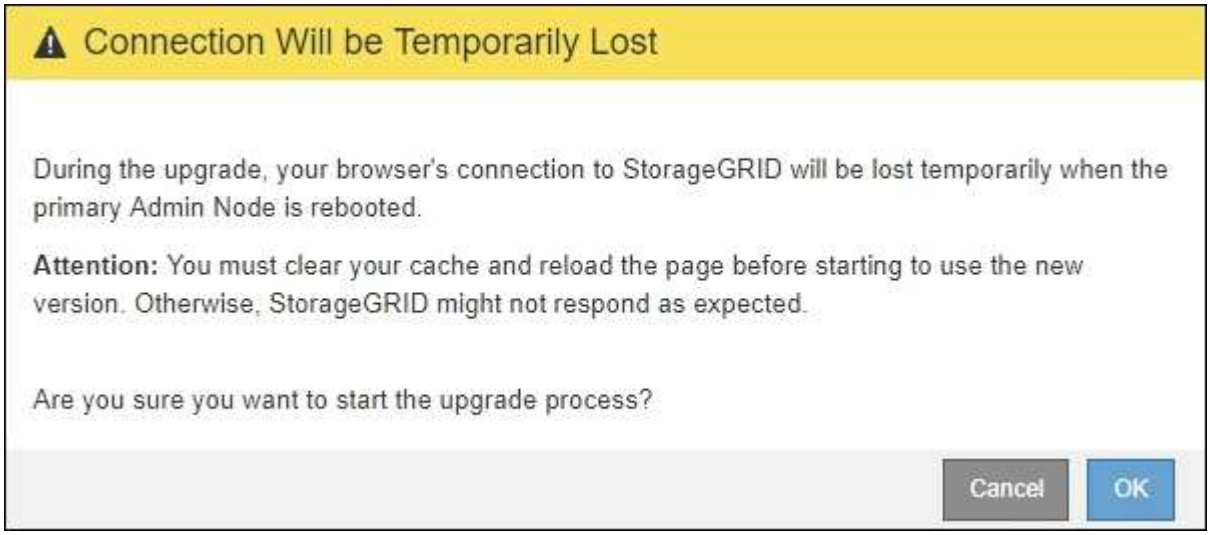
> If you have opened any custom firewall ports, you are notified during the precheck validation. You must contact technical support before proceeding with the upgrade.

### Start upgrade and update primary Admin Node

When the upgrade starts, upgrade prechecks are performed, and the primary Admin Node is upgraded, which includes stopping services, upgrading the software, and restarting services. You cannot access the Grid Manager while the primary Admin Node is being upgraded. Audit logs will also be unavailable. This upgrade can take up to 30 minutes.

1. When you are ready to perform the upgrade, select **Start Upgrade**.

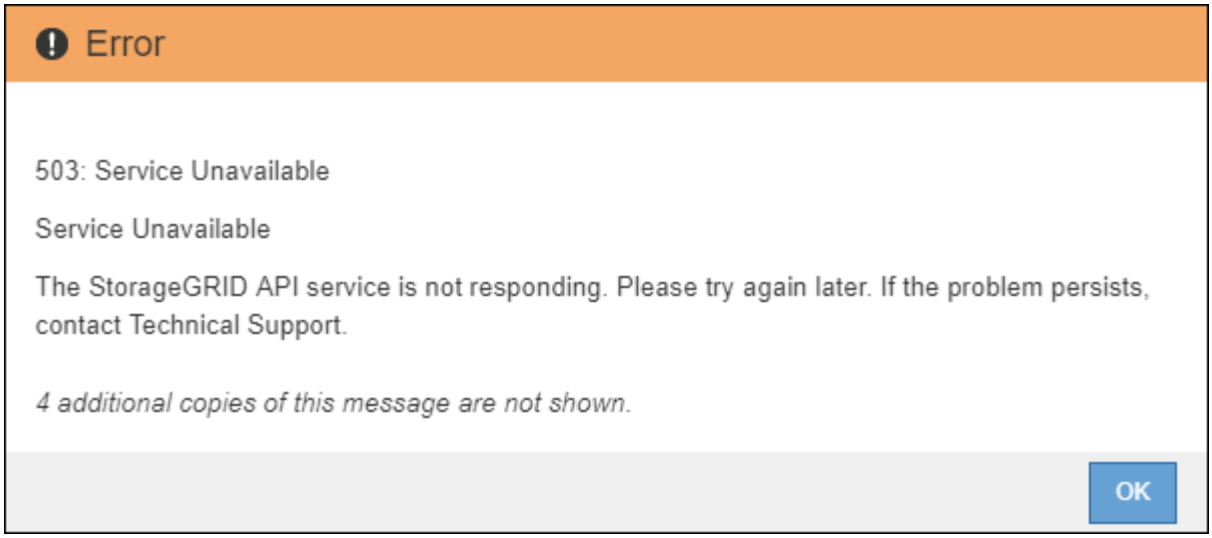
   A warning appears to remind you that your browser's connection will be lost when the primary Admin Node is rebooted.




2. Select **OK** to acknowledge the warning and start the upgrade process.
3. Wait for the upgrade prechecks to be performed and for the primary Admin Node to be upgraded.

   > If any precheck errors are reported, resolve them and select **Start Upgrade** again.

   While the primary Admin Node is being upgraded, multiple **503: Service Unavailable** and **Problem connecting to the server** messages appear, which you can ignore.



4. When you see the **400: Bad Request** message, go to the next step. The Admin Node upgrade is complete.

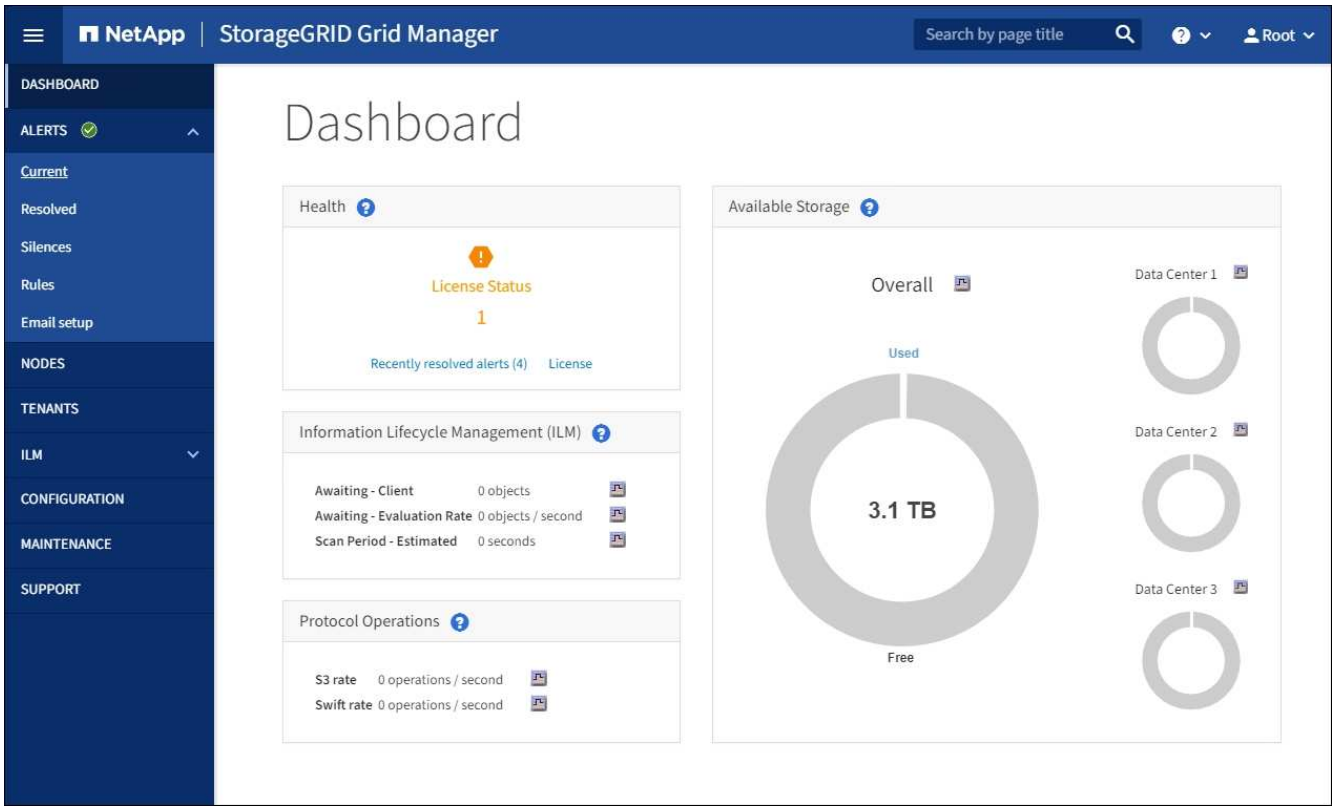
**Clear browser cache and sign back in**

1. After the primary Admin Node has been upgraded, clear your web browser’s cache and sign back in.

   For instructions, see the documentation for your web browser.

> You must clear the web browser's cache to remove outdated resources used by the previous version of the software.

The redesigned Grid Manager interface appears, which indicates that the primary Admin Node has been upgraded.




2. From the sidebar, select **MAINTENANCE** to open the Maintenance menu.
3. In the **System** section, select **Software update**.
4. In the **StorageGRID Upgrade** section, select **Upgrade**.
5. Review the Upgrade Progress section on the StorageGRID Upgrade page, which provides information about each major upgrade task.
   a. **Start Upgrade Service** is the first upgrade task. During this task, the software file is distributed to the grid nodes, and the upgrade service is started.
   b. When the **Start Upgrade Service** task is complete, the **Upgrade Grid Nodes** task starts.
   c. While the **Upgrade Grid Nodes** task is in progress, the Grid Node Status table appears and shows the upgrade stage for each grid node in your system.

### Download Recovery Package and upgrade all grid nodes

1. After the grid nodes appear in the Grid Node Status table, but before approving any grid nodes, download a new copy of the Recovery Package.

> You must download a new copy of the Recovery Package file after you upgrade the software version on the primary Admin Node. The Recovery Package file allows you to restore the system if a failure occurs.

2. Review the information in the Grid Node Status table. Grid nodes are arranged in sections by type: Admin Nodes, API Gateway Nodes, Storage Nodes, and Archive Nodes.

## Upgrade Progress

| | |
|---|---|
| Start Upgrade Service | Completed |
| Upgrade Grid Nodes | In Progress |

### Grid Node Status

You must approve all grid nodes to complete an upgrade, but you can update grid nodes in any order.

During the upgrade of a node, the services on that node are stopped. Later, the node is rebooted. Do not click Approve for a node unless you are sure the node is ready to be stopped and rebooted.

When you are ready to add grid nodes to the upgrade queue, click one or more Approve buttons to add individual nodes to the queue, click the Approve All button at the top of the nodes table to add all nodes of the same type, or click the top-level Approve All button to add all nodes in the grid.

If necessary, you can remove nodes from the upgrade queue before node services are stopped by clicking Remove or Remove All.

Approve All  Remove All

Admin Nodes

API Gateway Nodes

Approve All  Remove All

Storage Nodes

Approve All  Remove All

Search

| Site | Name | Progress | Stage | Error | Action |
|---|---|---|---|---|---|
| ALT-ADM1-177 | ALT-S1-175 | | Waiting for you to approve | | Approve |
| ALT-ADM1-177 | ALT-S2-174 | | Waiting for you to approve | | Approve |
| ALT-ADM1-177 | ALT-S3-173 | | Waiting for you to approve | | Approve |

Archive Nodes

A grid node can be in one of these stages when this page first appears:

- Done (primary Admin Node only)
- Preparing upgrade
- Software download queued
- Downloading
- Waiting for you to approve

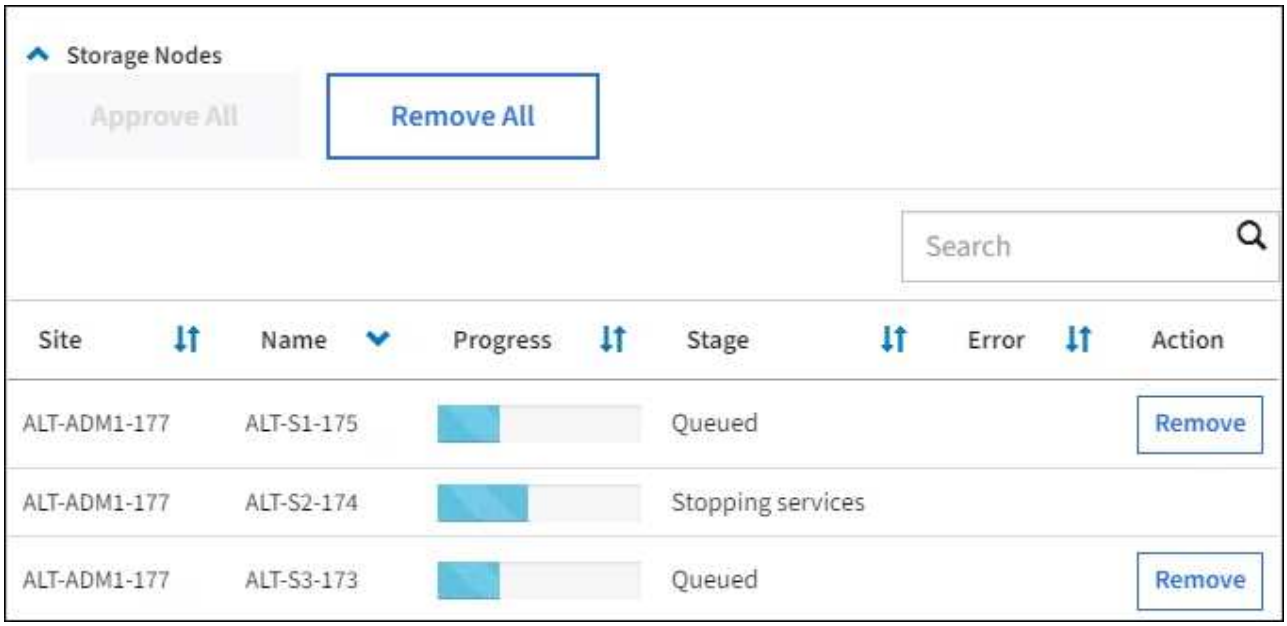
3. Approve the grid nodes you are ready to add to the upgrade queue.

> When the upgrade starts on a grid node, the services on that node are stopped. Later, the grid node is rebooted. To avoid service interruptions for client applications that are communicating with the node, do not approve the upgrade for a node unless you are sure that node is ready to be stopped and rebooted. As required, schedule a maintenance window or notify customers.

You must upgrade all grid nodes in your StorageGRID system, but you can customize the upgrade sequence. You can approve individual grid nodes, groups of grid nodes, or all grid nodes.

If the order in which nodes are upgraded is important, approve nodes or groups of nodes one at a time and wait until the upgrade is complete on each node before approving the next node or group of nodes.

- Select one or more **Approve** buttons to add one or more individual nodes to the upgrade queue. If you approve more than one node of the same type, the nodes will be upgraded one at a time.
- Select the **Approve All** button within each section to add all nodes of the same type to the upgrade queue.
- Select the top-level **Approve All** button to add all nodes in the grid to the upgrade queue.
- Select **Remove** or **Remove All** to remove a node or all nodes from the upgrade queue. You cannot remove a node when its Stage reaches **Stopping services**. The **Remove** button is hidden.




4. Wait for each node to proceed through the upgrade stages, which include Queued, Stopping services, Stopping container, Cleaning up Docker images, Upgrading base OS packages, Rebooting, Performing steps after reboot, Starting services, and Done.

> When an appliance node reaches the Upgrading base OS packages stage, the StorageGRID Appliance Installer software on the appliance is updated. This automated process ensures that the StorageGRID Appliance Installer version remains in sync with the StorageGRID software version.

### Complete upgrade

When all grid nodes have completed the upgrade stages, the **Upgrade Grid Nodes** task is shown as Completed. The remaining upgrade tasks are performed automatically and in the background.

1. As soon as the **Enable Features** task is complete (which occurs quickly), optionally start using the new features in the upgraded StorageGRID version.
2. During the **Upgrade Database** task, the upgrade process checks each node to verify that the Cassandra database does not need to be updated.

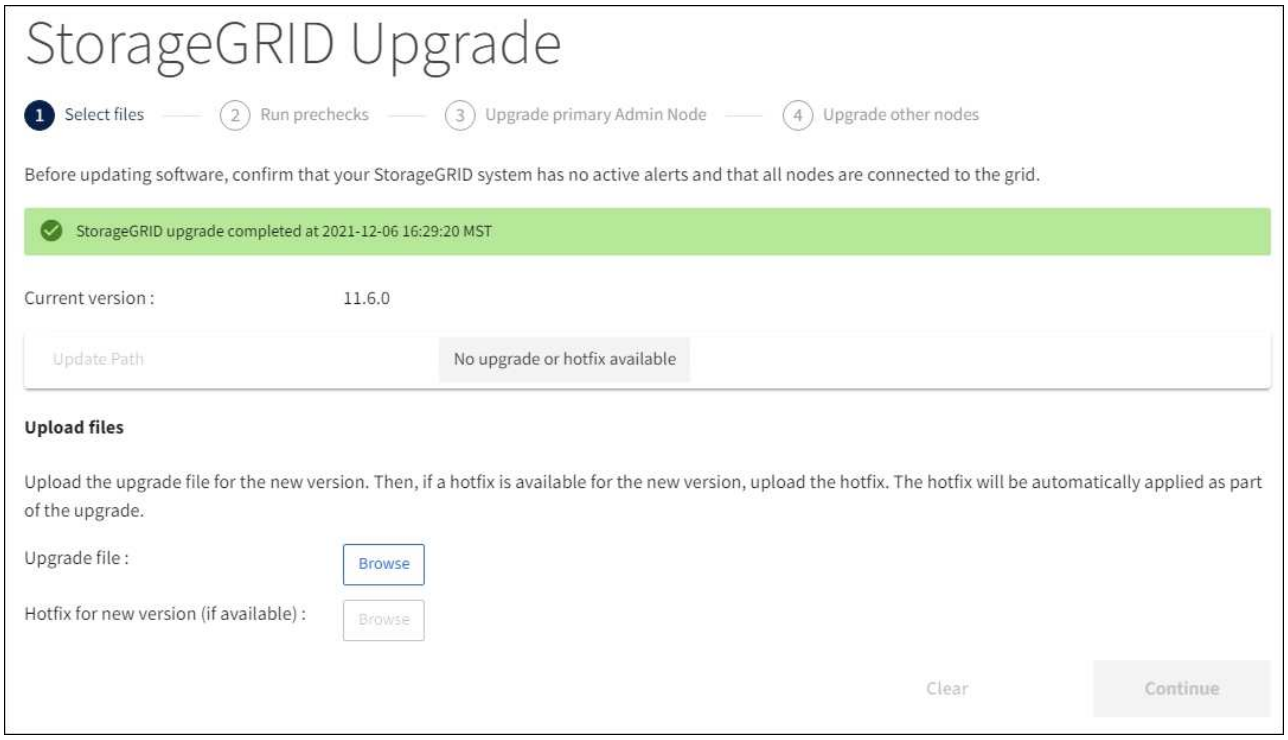
   > The upgrade from StorageGRID 11.5 to 11.6 does not require a Cassandra database upgrade; however, the Cassandra service will be stopped and restarted on each Storage Node. For future StorageGRID feature releases, the Cassandra database update step might take several days to complete.

3. When the **Upgrade Database** task has completed, wait a few minutes for the **Final Upgrade Steps** task to complete.

   When the Final Upgrade Steps task has completed, the upgrade is done.

### Confirm upgrade

1. Confirm that the upgrade completed successfully.
   a. From the top of the Grid Manager, select the help icon and select **About**.
   b. Confirm that the displayed version is what you would expect.
   c. Select **MAINTENANCE** > **System** > **Software update**.
   d. In the **StorageGRID upgrade** section, select **Upgrade**.
   e. Confirm that the green banner shows that the software upgrade was completed on the date and time you expect.




2. From the StorageGRID Upgrade page, determine if any hotfixes are available for the current StorageGRID version.

> If no Update Path is shown, your browser might not be able to reach the NetApp Support Site. Or, the **Check for software updates** check box on the AutoSupport page (**SUPPORT** > **Tools** > **AutoSupport**) might be disabled.

3. If a hotfix is available, download the file. Then, use the StorageGRID hotfix procedure to apply the hotfix.
4. Verify that grid operations have returned to normal:
   a. Check that the services are operating normally and that there are no unexpected alerts.
   b. Confirm that client connections to the StorageGRID system are operating as expected.

# Troubleshoot upgrade issues

## Upgrade does not complete

If the upgrade does not complete successfully, you might able to resolve the issue yourself. If you cannot resolve an issue, you should gather the required information before contacting technical support.

The following sections describe how to recover from situations where the upgrade has partially failed. Contact technical support if you cannot resolve an upgrade issue.

### Upgrade precheck errors

To detect and resolve issues, you can manually run the upgrade prechecks before starting the actual upgrade. Most precheck errors provide information about how to resolve the issue. If you need help, contact technical support.

#### Provisioning failures

If the automatic provisioning process fails, contact technical support.

#### Grid node crashes or fails to start

If a grid node crashes during the upgrade process or fails to start successfully after the upgrade finishes, contact technical support to investigate and to correct any underlying issues.

#### Ingest or data retrieval is interrupted

If data ingest or retrieval is unexpectedly interrupted when you are not upgrading a grid node, contact technical support.

#### Database upgrade errors

If the database upgrade fails with an error, retry the upgrade. If it fails again, contact technical support.

#### Related information

Checking the system's condition before upgrading software

## Troubleshoot user interface issues

You might see issues with the Grid Manager or the Tenant Manager after upgrading to a new version of StorageGRID software.

#### Web interface does not respond as expected

The Grid Manager or the Tenant Manager might not respond as expected after StorageGRID software is upgraded.

If you experience issues with the web interface:

- Make sure you are using a supported web browser.

  Browser support typically changes for each StorageGRID release.

- Clear your web browser cache.

  Clearing the cache removes outdated resources used by the previous version of StorageGRID software, and permits the user interface to operate correctly again. For instructions, see the documentation for your web browser.

## "Docker image availability check" error messages

When attempting to start the upgrade process, you might receive an error message that states "The following issues were identified by the Docker image availability check validation suite." All issues must be resolved before you can complete the upgrade.

Contact technical support if you are unsure of the changes required to resolve the identified issues.

| Message | Cause | Solution |
| --- | --- | --- |
| Unable to determine upgrade version. Upgrade version info file `{file_path}` did not match the expected format. | The upgrade package is corrupt. | Re-upload the upgrade package, and try again. If the problem persists, contact technical support. |
| Upgrade version info file `{file_path}` was not found. Unable to determine upgrade version. | The upgrade package is corrupt. | Re-upload the upgrade package, and try again. If the problem persists, contact technical support. |
| Unable to determine currently installed release version on `{node_name}`. | A critical file on the node is corrupt. | Contact technical support. |
| Connection error while attempting to list versions on `{node_name}` | The node is offline or the connection was interrupted. | Check to make sure that all nodes are online and reachable from the primary Admin Node, and try again. |
| The host for node `{node_name}` does not have StorageGRID `{upgrade_version}` image loaded. Images and services must be installed on the host before the upgrade can proceed. | The RPM or DEB packages for the upgrade have not been installed on the host where the node is running, or the images are still in the process of being imported.<br><br>**Note:** This error only applies to nodes that are running as containers on Linux. | Check to make sure that the RPM or DEB packages have been installed on all Linux hosts where nodes are running. Make sure the version is correct for both the service and the images file. Wait a few minutes, and try again.<br><br>See Linux: Install RPM or DEB package on all hosts. |
| Error while checking node `{node_name}` | An unexpected error occurred. | Wait a few minutes, and try again. |
| Uncaught error while running prechecks. `{error_string}` | An unexpected error occurred. | Wait a few minutes, and try again. |

# Increase Metadata Reserved Space setting

After you upgrade to StorageGRID 11.6, you might be able to increase the Metadata Reserved Space system setting if your Storage Nodes meet specific requirements for RAM and available space.

**What you'll need**

- You must be signed in to the Grid Manager using a supported web browser.
- You must have the Root Access permission or the Grid Topology Page Configuration and Other Grid Configuration permissions.
- You have completed the StorageGRID 11.6 upgrade.

### About this task

You might be able to manually increase the system-wide Metadata Reserved Space setting up to 8 TB after upgrading to StorageGRID 11.6. Reserving additional metadata space after the 11.6 upgrade will simplify future hardware and software upgrades.

You can only increase the value of the system-wide Metadata Reserved Space setting if both of these statements are true:

- The Storage Nodes at any site in your system each have 128 GB or more RAM.
- The Storage Nodes at any site in your system each have sufficient available space on storage volume 0.

Be aware that if you increase this setting, you will simultaneously reduce the space available for object storage on storage volume 0 of all Storage Nodes. For this reason, you might prefer to set the Metadata Reserved Space to a value smaller than 8 TB, based on your expected object metadata requirements.

> In general, it is better to use a higher value instead of a lower value. If the Metadata Reserved Space setting is too large, you can decrease it later. In contrast, if you increase the value later, the system might need to move object data to free up space.

For a detailed explanation of how the Metadata Reserved Space setting affects the allowed space for object metadata storage on a particular Storage Node, go to Manage object metadata storage.

### Steps

1. Sign in to the Grid Manager using a supported web browser.
2. Determine the current Metadata Reserved Space setting.
   a. Select **CONFIGURATION** > **System** > **Storage options**.
   b. In the Storage Watermarks section, note the value of **Metadata Reserved Space**.
3. Ensure you have enough available space on storage volume 0 of each Storage Node to increase this value.
   a. Select **NODES**.
   b. Select the first Storage Node in the grid.
   c. Select the Storage tab.
   d. In the Volumes section, locate the **/var/local/rangedb/0** entry.
   e. Confirm that the Available value is equal to or greater than difference between the new value you want to use and the current Metadata Reserved Space value.

      For example, if the Metadata Reserved Space setting is currently 4 TB and you want to increase it to 6 TB, the Available value must be 2 TB or greater.

   f. Repeat these steps for all Storage Nodes.
      - If one or more Storage Nodes do not have enough available space, the Metadata Reserved Space value cannot be increased. Do not continue with this procedure.
      - If each Storage Node has enough available space on volume 0, go to the next step.
4. Ensure you have at least 128 GB of RAM on each Storage Node.
   a. Select **NODES**.
   b. Select the first Storage Node in the grid.

c. Select the **Hardware** tab.

d. Hover your cursor over the Memory Usage chart. Ensure that **Total Memory** is at least 128 GB.

e. Repeat these steps for all Storage Nodes.

- If one or more Storage Nodes do not have enough available total memory, the Metadata Reserved Space value cannot be increased. Do not continue with this procedure.
- If each Storage Node has at least 128 GB of total memory, go to the next step.

5. Update the Metadata Reserved Space setting.

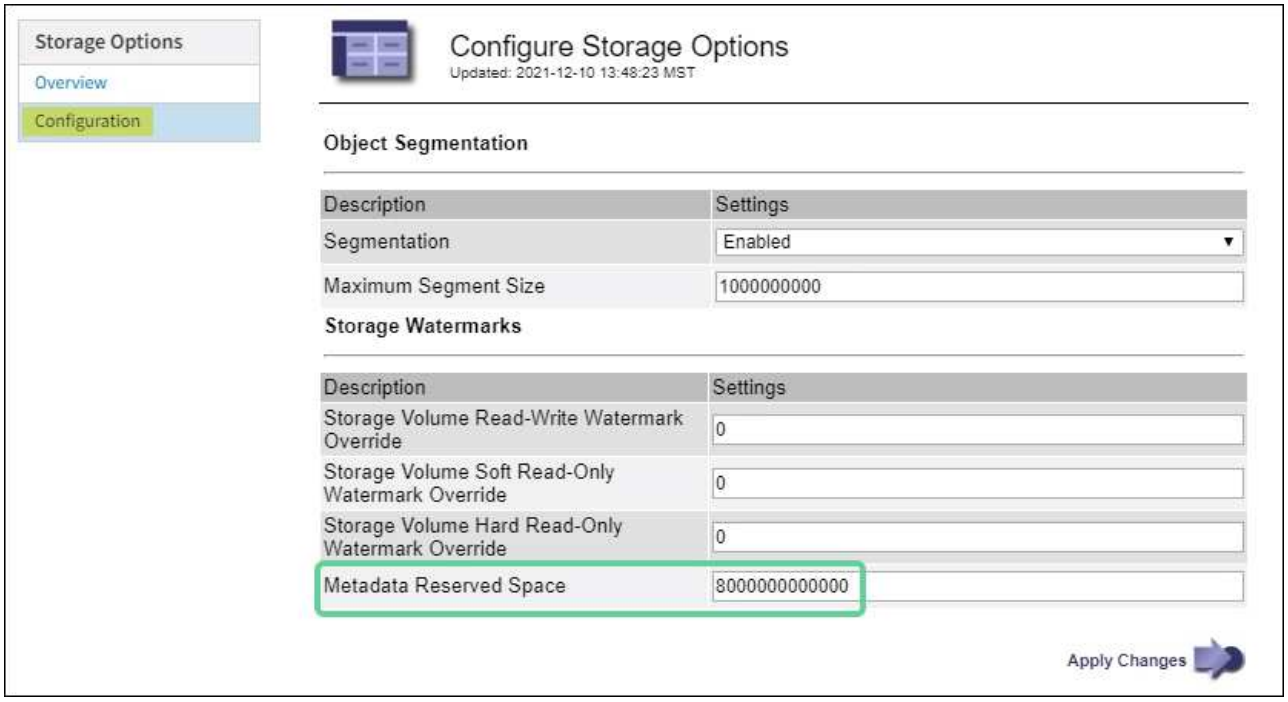
a. Select **CONFIGURATION** > **System** > **Storage options**.

b. Select the Configuration tab.

c. In the Storage Watermarks section, select **Metadata Reserved Space**.

d. Enter the new value.

For example, to enter 8 TB, which is the maximum supported value, enter **8000000000000** (8, followed by 12 zeros)




e. Select **Apply Changes**.

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