



Maintenance configuration procedures

StorageGRID

NetApp
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Table of Contents

Maintenance configuration procedures	1
Upgrade SANtricity OS on storage controllers	1
Upgrade SANtricity OS on storage controllers using Grid Manager	1
Upgrade SANtricity OS on storage controllers using maintenance mode	6
Upgrade drive firmware using SANtricity System Manager	8
Upgrade SG6000 drive firmware using SANtricity System Manager using the online method	8
Upgrade SG6000 drive firmware using SANtricity System Manager using the offline method	11
Troubleshoot drive firmware upgrade errors	15
Turn controller identify LED on and off	16
Locate controller in data center	17
Power controller on and off	18
Shut down SG6000-CN controller	18
Power on SG6000-CN controller and verify operation	20
Change link configuration of SG6000-CN controller	23

Maintenance configuration procedures

Upgrade SANtricity OS on storage controllers

To ensure optimal functioning of the storage controller, you must upgrade to the latest maintenance release of the SANtricity OS that is qualified for your StorageGRID appliance.

Consult the [NetApp Interoperability Matrix Tool \(IMT\)](#) to determine which version you should be using.

Download the new SANtricity OS Software file from [NetApp Downloads: StorageGRID Appliance](#).

Use one of the following procedures based on the version of SANtricity OS currently installed:

- If the storage controller is using SANtricity OS 08.42.20.00 (11.42) or newer, use the Grid Manager to perform the upgrade.

[Upgrade SANtricity OS on storage controllers using Grid Manager](#)

- If the storage controller is using a SANtricity OS version older than 08.42.20.00 (11.42), use maintenance mode to perform the upgrade.

[Upgrade SANtricity OS on storage controllers using maintenance mode](#)



When upgrading the SANtricity OS for your storage appliance, you must follow the instructions in the StorageGRID documentation. If you use any other instructions, your appliance could become inoperable.

Upgrade SANtricity OS on storage controllers using Grid Manager

For storage controllers currently using SANtricity OS 08.42.20.00 (11.42) or newer, you must use the Grid Manager to apply an upgrade.

Before you begin

- You have consulted the [NetApp Interoperability Matrix Tool \(IMT\)](#) to confirm that the SANtricity OS version you are using for the upgrade is compatible with your appliance.
- You have the [Maintenance or Root access](#) permission.
- You are signed in to the Grid Manager using a [supported web browser](#).
- You have the provisioning passphrase.
- You have access to [NetApp Downloads: StorageGRID Appliance](#).

About this task

You can't perform other software updates (StorageGRID software upgrade or a hotfix) until you have completed the SANtricity OS upgrade process. If you attempt to start a hotfix or a StorageGRID software upgrade before the SANtricity OS upgrade process has finished, you are redirected to the SANtricity OS upgrade page.

The procedure will not be complete until the SANtricity OS upgrade has been successfully applied to all applicable nodes that have been selected for the upgrade. It might take more than 30 minutes to load the

SANtricity OS on each node (sequentially) and up to 90 minutes to reboot each StorageGRID storage appliance. Any nodes in your grid that don't use SANtricity OS will not be affected by this procedure.



The following steps are only applicable when you are using the Grid Manager to perform the upgrade. The storage controllers in the appliance can't be upgraded using the Grid Manager when the controllers are using SANtricity OS older than 08.42.20.00 (11.42).



This procedure will automatically upgrade the NVSRAM to the most recent version associated with the SANtricity OS upgrade. You don't need to apply a separate NVSRAM upgrade file.



Be sure to apply the latest StorageGRID hotfix before you begin this procedure. See [StorageGRID hotfix procedure](#) for details.

Steps

1. Download the new SANtricity OS Software file from [NetApp Downloads: StorageGRID Appliance](#).

Be sure to choose the SANtricity OS version for your storage controllers.

2. Select **MAINTENANCE > System > Software update**.

Software update

You can upgrade StorageGRID software, apply a hotfix, or upgrade the SANtricity OS software on StorageGRID storage appliances. NetApp recommends you apply the latest hotfix before and after each software upgrade. Some hotfixes are required to prevent data loss.

StorageGRID upgrade Upgrade to the next StorageGRID version and apply the latest hotfix for that version. Upgrade →	StorageGRID hotfix Apply a hotfix to your current StorageGRID software version. Apply hotfix →	SANtricity OS update Update the SANtricity OS software on your StorageGRID storage appliances. Update →
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3. In the SANtricity OS update section, select **Update**.

The SANtricity OS upgrade page appears and lists the details for each appliance node including:

- Node name
- Site
- Appliance model
- SANtricity OS version
- Status
- Last upgrade status

4. Review the information in the table for all of your upgradable appliances. Confirm that all storage

controllers have **Nominal** status. If the status for any controller is **Unknown**, go to **Nodes > appliance node > Hardware** to investigate and resolve the issue.

5. Select the SANtricity OS upgrade file you downloaded from the NetApp Support Site.

- a. Select **Browse**.
- b. Locate and select the file.
- c. Select **Open**.

The file is uploaded and validated. When the validation process is done, the file name is shown with a green check mark next to the **Browse** button. Don't change the file name because it is part of the verification process.

6. Enter the provisioning passphrase and select **Continue**.

A warning box appears stating that your browser's connection might be lost temporarily as services on nodes that are upgraded are restarted.

7. Select **Yes** to stage the SANtricity OS upgrade file to the primary Admin Node.

When the SANtricity OS upgrade starts:

- a. The health check is run. This process checks that no nodes have the status of **Needs Attention**.



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

- b. The SANtricity OS Upgrade Progress table appears. This table shows all Storage Nodes in your grid and the current stage of the upgrade for each node.



The table shows all appliance Storage Nodes. Software-based Storage Nodes aren't displayed. Select **Approve** for all nodes that require the upgrade.

SANtricity OS

Upload files — 2 Upgrade

Approved nodes are added to a queue and upgraded sequentially. Each node can take up to 30 minutes, which includes updating NVSRAM. When the upgrade is complete, the node is rebooted.

Select **Approve all** or approve nodes one at a time. To remove nodes from the queue, select **Remove all** or remove nodes one at a time. If the uploaded file doesn't apply to an approved node, the upgrade process skips that node and moves to the next node in the queue.

Optionally, select **Skip nodes and finish** to end the upgrade and skip any unapproved nodes.

SANtricity OS upgrade file: RCB_11.70.3_280x_6283a64d.dlp

0 out of 3 completed

Node name	Current version	Progress	Stage	Details	Status	Actions
10-224-2-24-S1 ?	08.40.60.01	<div style="width: 20%;"></div>	Waiting for you to approve		Nominal	Approve
lab-37-sgws-quanta-10 ?	08.73.00.00	<div style="width: 20%;"></div>	Waiting for you to approve		Nominal	Approve
storage-7 ?	98.72.09.00	<div style="width: 20%;"></div>	Waiting for you to approve		Nominal	Approve

[Skip nodes and finish](#)

8. Optionally, sort the list of nodes in ascending or descending order by:

- Node name
- Current version
- Progress
- Stage
- Status

You can also enter a term in the Search box to search for specific nodes.

9. Approve the grid nodes you are ready to add to the upgrade queue. Approved nodes are upgraded one at a time.



Don't approve the SANtricity OS upgrade for an appliance Storage Node unless you are sure the node is ready to be stopped and rebooted. When the SANtricity OS upgrade is approved on a node, the services on that node are stopped and the upgrade process begins. Later, when the node is finished upgrading, the appliance node is rebooted. These operations might cause service interruptions for clients that are communicating with the node.

- Select the **Approve All** button to add all Storage Nodes to the SANtricity OS upgrade queue.



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.

- Select one or more **Approve** buttons to add one or more nodes to the SANtricity OS upgrade queue. The **Approve** button is disabled if the Status is not Nominal.

After you select **Approve**, the upgrade process determines if the node can be upgraded. If a node can be upgraded, it is added to the upgrade queue.

For some nodes, the selected upgrade file is intentionally not applied and you can complete the upgrade process without upgrading these specific nodes. Nodes intentionally not upgraded show a stage of Complete (upgrade attempted) and list the reason the node was not upgraded in the Details column.

10. If you need to remove a node or all nodes from the SANtricity OS upgrade queue, select **Remove** or **Remove All**.

When the stage progresses beyond Queued, the **Remove** button is hidden and you can no longer remove the node from the SANtricity OS upgrade process.

11. Wait while the SANtricity OS upgrade is applied to each approved grid node.

- If any node shows a stage of Error while the SANtricity OS upgrade is applied, the upgrade has failed for the node. With the assistance of technical support, you might need to place the appliance in maintenance mode to recover it.
- If the firmware on the node is too old to be upgraded with the Grid Manager, the node shows a stage of Error with the details that you must use maintenance mode to upgrade SANtricity OS on the node. To resolve the error, do the following:
 - a. Use maintenance mode to upgrade SANtricity OS on the node that shows a stage of Error.
 - b. Use the Grid Manager to restart and complete the SANtricity OS upgrade.

When the SANtricity OS upgrade is complete on all approved nodes, the SANtricity OS Upgrade Progress table closes and a green banner shows the number of nodes upgraded, and the date and time the upgrade completed.

12. If a node can't be upgraded, note the reason shown in the Details column and take the appropriate action.



The SANtricity OS upgrade process will not be complete until you approve the SANtricity OS upgrade on all the listed Storage Nodes.

Reason	Recommended action
Storage Node was already upgraded.	No further action required.
SANtricity OS upgrade is not applicable to this node.	The node does not have a storage controller that can be managed by the StorageGRID system. Complete the upgrade process without upgrading the node displaying this message.

Reason	Recommended action
SANtricity OS file is not compatible with this node.	The node requires a SANtricity OS file different than the one you selected. After completing the current upgrade, download the correct SANtricity OS file for the node and repeat the upgrade process.

13. If you want to end approving nodes and return to the SANtricity OS page to allow for an upload of a new SANtricity OS file, do the following:

- Select **Skip Nodes and Finish**.

A warning appears asking if you are sure you want to finish the upgrade process without upgrading all applicable nodes.

- Select **OK** to return to the **SANtricity OS** page.
- When you are ready to continue approving nodes, [download the SANtricity OS](#) to restart the upgrade process.



Nodes already approved and upgraded without errors remain upgraded.

14. Repeat this upgrade procedure for any nodes with a stage of Complete that require a different SANtricity OS upgrade file.



For any nodes with a status of Needs Attention, use maintenance mode to perform the upgrade.

Related information

[NetApp Interoperability Matrix Tool](#)

[Upgrade SANtricity OS on storage controllers using maintenance mode](#)

Upgrade SANtricity OS on storage controllers using maintenance mode

For storage controllers currently using SANtricity OS older than 08.42.20.00 (11.42), you must use the maintenance mode procedure to apply an upgrade.

Before you begin

- You have consulted the [NetApp Interoperability Matrix Tool \(IMT\)](#) to confirm that the SANtricity OS version you are using for the upgrade is compatible with your appliance.
- If the StorageGRID appliance is running in a StorageGRID system, you have placed the SG6000-CN controller into [maintenance mode](#).



Maintenance mode interrupts the connection to the storage controller.

About this task

Don't upgrade the SANtricity OS or NVSRAM in the E-Series controller on more than one StorageGRID appliance at a time.



Upgrading more than one StorageGRID appliance at a time might cause data unavailability, depending on your deployment model and ILM policies.

Steps

1. Confirm that the appliance is in [maintenance mode](#).
2. From a service laptop, access SANtricity System Manager and sign in.
3. Download the new SANtricity OS Software file and NVSRAM file to the management client.



The NVSRAM is specific to the StorageGRID appliance. Don't use the standard NVSRAM download.

4. Follow the instructions in the *Upgrading SANtricity OS* guide or the SANtricity System Manager online help to upgrade the firmware and NVSRAM.



Activate the upgrade files immediately. Don't defer activation.

5. If this procedure completed successfully and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced > Reboot Controller**, and then select one of these options:
 - Select **Reboot into StorageGRID**
 - Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The Nodes page should display a normal status (green check mark icon  to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

Related information

[NetApp Interoperability Matrix Tool](#)

[Upgrade SANtricity OS on storage controllers using Grid Manager](#)

Upgrade drive firmware using SANtricity System Manager

Upgrade SG6000 drive firmware using SANtricity System Manager using the online method

Use the SANtricity System Manager online method to upgrade the firmware on the drives in your appliance to make sure you have all the latest features and bug fixes.

Before you begin

- The storage appliance has an Optimal status.
- All drives have an Optimal status.



Don't upgrade the drive firmware on more than one StorageGRID appliance at a time. Doing so might cause data unavailability, depending on your deployment model and ILM policy.

About this task

The drives are upgraded one at a time while the appliance is performing I/O. This method does not require you to place the appliance in maintenance mode. However, system performance might be impacted and the upgrade might take several hours longer than the offline method.



Drives belonging to volumes that don't have redundancy must be updated using the [offline method](#). The offline method should be used for any drive associated with flash read cache (for example, SSD drives in the SG6060), or any pool or volume group that is currently degraded. There are two types of drives: SSD and HDD. You must use the [offline method](#) to upgrade the firmware on the SSDs (for example, SSD drives in the SG6060). You can use either the online or offline method to upgrade the firmware on HDDs.

Steps

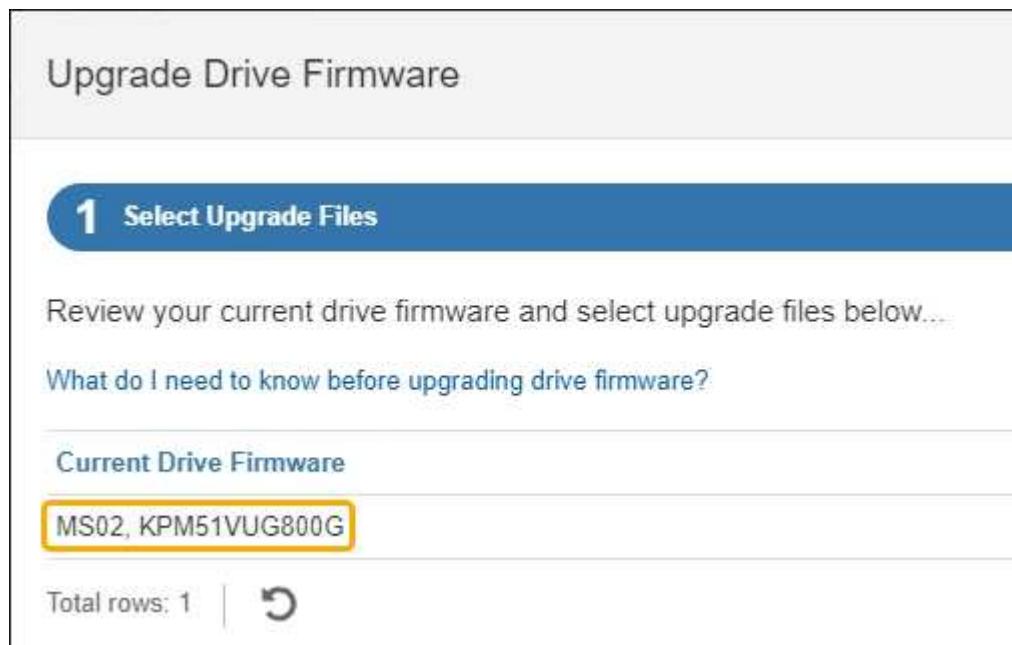
1. Access SANtricity System Manager using one of these methods:
 - Use the StorageGRID Appliance Installer and select **Advanced > SANtricity System Manager**
 - Use the Grid Manager and select **NODES > Storage Node > SANtricity System Manager**
 - Use SANtricity System Manager by browsing to the storage controller IP:

`https://Storage_Controller_IP`

2. Enter the SANtricity System Manager administrator username and password, if required.
3. Verify the drive firmware version currently installed in the storage appliance:
 - a. From SANtricity System Manager, select **SUPPORT > Upgrade Center**.
 - b. Under Drive Firmware upgrade, select **Begin Upgrade**.

The Upgrade Drive Firmware page displays the drive firmware files currently installed.

- c. Note the current drive firmware revisions and drive identifiers in the Current Drive Firmware column.



Current Drive Firmware
MS02, KPM51VUG800G

In this example:

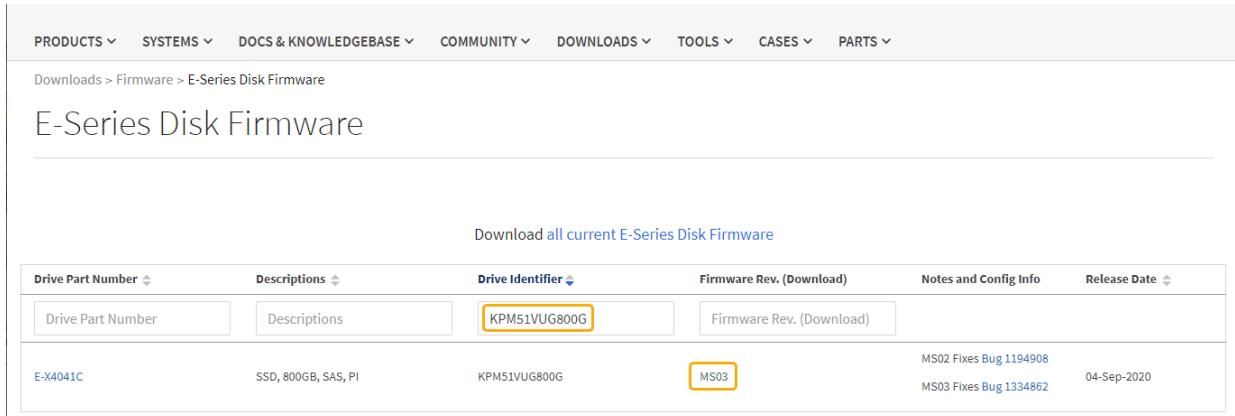
- The drive firmware revision is **MS02**.
- The drive identifier is **KPM51VUG800G**.

- d. Select **View drives** in the Associated Drives column to display where these drives are installed in your storage appliance.
- e. Close the Upgrade Drive Firmware window.

4. Download and prepare the available drive firmware upgrade:
 - a. Under Drive Firmware upgrade, select **NetApp Support**.
 - b. On the NetApp Support Site, select the **Downloads** tab, and then select **E-Series Disk Drive Firmware**.

The E-Series Disk Firmware page displays.

- c. Search for each **Drive Identifier** installed in your storage appliance and verify that each drive identifier has the latest firmware revision.
 - If the firmware revision is not a link, this drive identifier has the latest firmware revision.
 - If one or more drive part numbers are listed for a drive identifier, a firmware upgrade is available for these drives. You can select any link to download the firmware file.



The screenshot shows the 'E-Series Disk Firmware' page with a table of drive identifiers. The table has columns for Drive Part Number, Descriptions, Drive Identifier, Firmware Rev. (Download), Notes and Config Info, and Release Date. The 'Drive Identifier' column is highlighted with a yellow box around 'KPM51VUG800G'. The 'Firmware Rev. (Download)' column for this row is also highlighted with a yellow box around 'MS03'. The 'Notes and Config Info' column for this row contains links: 'MS02 Fixes Bug 1194908' and 'MS03 Fixes Bug 1334862'. The 'Release Date' column shows '04-Sep-2020'.

Drive Part Number	Descriptions	Drive Identifier	Firmware Rev. (Download)	Notes and Config Info	Release Date
E-X4041C	SSD, 800GB, SAS, PI	KPM51VUG800G	MS03	MS02 Fixes Bug 1194908 MS03 Fixes Bug 1334862	04-Sep-2020

- d. If a later firmware revision is listed, select the link in the Firmware Rev. (Download) column to download a .zip archive containing the firmware file.
- e. Extract (unzip) the drive firmware archive files you downloaded from the Support site.

5. Install the drive firmware upgrade:

- a. From SANtricity System Manager, under Drive Firmware upgrade, select **Begin Upgrade**.
- b. Select **Browse**, and select the new drive firmware files that you downloaded from the Support site.

Drive firmware files have a filename similar to

D_HUC101212CSS600_30602291_MS01_2800_0002.dlp.

You can select up to four drive firmware files, one at a time. If more than one drive firmware file is compatible with the same drive, you get a file conflict error. Decide which drive firmware file you want to use for the upgrade and remove the other one.

- c. Select **Next**.

Select Drives lists the drives that you can upgrade with the selected firmware files.

Only drives that are compatible appear.

The selected firmware for the drive appears in the **Proposed Firmware** column. If you must change this firmware, select **Back**.

- d. Select **Upgrade all drives online** — Upgrades the drives that can support a firmware download while the storage array is processing I/O. You don't have to stop I/O to the associated volumes using these drives when you select this upgrade method.



An online upgrade can take several hours longer than an offline upgrade.

You must use the [offline method](#) to upgrade the firmware on SSDs.

e. In the first column of the table, select the drive or drives you want to upgrade.

The best practice is to upgrade all drives of the same model to the same firmware revision.

f. Select **Start** and confirm that you want to perform the upgrade.

If you need to stop the upgrade, select **Stop**. Any firmware downloads currently in progress complete. Any firmware downloads that have not started are canceled.



Stopping the drive firmware upgrade might result in data loss or unavailable drives.

g. (Optional) To see a list of what was upgraded, select **Save Log**.

The log file is saved in the downloads folder for your browser with the name `latest-upgrade-log-timestamp.txt`.

[If required, troubleshoot driver firmware upgrade errors.](#)

Upgrade SG6000 drive firmware using SANtricity System Manager using the offline method

Use the SANtricity System Manager offline method to upgrade the firmware on the drives in your appliance to make sure you have all the latest features and bug fixes.

Before you begin

- The storage appliance has an Optimal status.
- All drives have an Optimal status.
- You have [placed the StorageGRID appliance into maintenance mode](#).



While the appliance is in maintenance mode, I/O (input/output) activity to the storage controller is stopped to make disruptive storage operations safe.



Don't upgrade the drive firmware on more than one StorageGRID appliance at a time. Doing so might cause data unavailability, depending on your deployment model and ILM policy.

About this task

The drives are upgraded in parallel while the appliance is in maintenance mode. If the pool or volume group does not support redundancy or is degraded, you must use the offline method to upgrade the drive firmware. You should also use the offline method for any drive associated with flash read cache, or any pool or volume group that is currently degraded. The offline method upgrades firmware only while all I/O activity is stopped on the drives to be upgraded. To stop I/O activity, place the node into maintenance mode.

The offline method is faster than the online method and will be significantly faster when many drives in a single appliance need upgrades. However, it requires that nodes be taken out of service, which might require scheduling a maintenance window and monitoring progress. Choose the method that is the best fit for your operational procedures and the number of drives that need to be upgraded.



There are two types of drives: SSD and HDD. You must use the offline method to upgrade the firmware on the SSDs (for example, SSD drives in the SG6060). You can use either the online or offline method to upgrade the firmware on HDDs.

Steps

1. Confirm that the appliance is in [maintenance mode](#).



If you are upgrading the firmware in SSD drives that are part of a cache group, you must ensure that no I/O is sent to any cached volumes while the upgrade is in progress. When the appliance is in maintenance mode, no I/O is sent to any volumes while the upgrade is in progress.

2. Access SANtricity System Manager using one of these methods:

- Use the StorageGRID Appliance Installer and select **Advanced > SANtricity System Manager**
- Use the Grid Manager and select **NODES > Storage Node > SANtricity System Manager**
- Use SANtricity System Manager by browsing to the storage controller IP:

`https://Storage_Controller_IP`

3. Enter the SANtricity System Manager administrator username and password, if required.

4. Verify the drive firmware version currently installed in the storage appliance:

- a. From SANtricity System Manager, select **SUPPORT > Upgrade Center**.
- b. Under Drive Firmware upgrade, select **Begin Upgrade**.

The Upgrade Drive Firmware page displays the drive firmware files currently installed.

- c. Note the current drive firmware revisions and drive identifiers in the Current Drive Firmware column.

Current Drive Firmware
MS02, KPM51VUG800G

Total rows: 1

In this example:

- The drive firmware revision is **MS02**.

- The drive identifier is **KPM51VUG800G**.

- Select **View drives** in the Associated Drives column to display where these drives are installed in your storage appliance.
- Close the Upgrade Drive Firmware window.

- Download and prepare the available drive firmware upgrade:
 - Under Drive Firmware upgrade, select **NetApp Support**.
 - On the NetApp Support Site, select the **Downloads** tab, and then select **E-Series Disk Drive Firmware**.

The E-Series Disk Firmware page displays.

- Search for each **Drive Identifier** installed in your storage appliance and verify that each drive identifier has the latest firmware revision.
 - If the firmware revision is not a link, this drive identifier has the latest firmware revision.
 - If one or more drive part numbers are listed for a drive identifier, a firmware upgrade is available for these drives. You can select any link to download the firmware file.

Drive Part Number	Descriptions	Drive Identifier	Firmware Rev. (Download)	Notes and Config Info	Release Date
Drive Part Number	Descriptions	KPM51VUG800G	Firmware Rev. (Download)		
E-X4041C	SSD, 800GB, SAS, PI	KPM51VUG800G	MS03	MS02 Fixes Bug 1194908 MS03 Fixes Bug 1334862	04-Sep-2020

- If a later firmware revision is listed, select the link in the Firmware Rev. (Download) column to download a .zip archive containing the firmware file.
- Extract (unzip) the drive firmware archive files you downloaded from the Support site.

- Install the drive firmware upgrade:
 - From SANtricity System Manager, under Drive Firmware upgrade, select **Begin Upgrade**.
 - Select **Browse**, and select the new drive firmware files that you downloaded from the Support site.

Drive firmware files have a filename similar to

D_HUC101212CSS600_30602291_MS01_2800_0002.dlp.

You can select up to four drive firmware files, one at a time. If more than one drive firmware file is compatible with the same drive, you get a file conflict error. Decide which drive firmware file you want to use for the upgrade and remove the other one.

- Select **Next**.

Select Drives lists the drives that you can upgrade with the selected firmware files.

Only drives that are compatible appear.

The selected firmware for the drive appears in the **Proposed Firmware** column. If you must change this firmware, select **Back**.

d. Select **Upgrade all drives offline (parallel)** — Upgrades the drives that can support a firmware download only while all I/O activity is stopped on any volumes that use the drives.



You must place the appliance into maintenance mode before using this method. You should use the **Offline** method to upgrade the drive firmware.



If you want to use the Offline (parallel) upgrade, don't proceed unless you are certain that the appliance is in maintenance mode. Failure to place the appliance into maintenance mode before initiating an offline drive firmware update might cause data loss.

e. In the first column of the table, select the drive or drives you want to upgrade.

The best practice is to upgrade all drives of the same model to the same firmware revision.

f. Select **Start** and confirm that you want to perform the upgrade.

If you need to stop the upgrade, select **Stop**. Any firmware downloads currently in progress complete. Any firmware downloads that have not started are canceled.



Stopping the drive firmware upgrade might result in data loss or unavailable drives.

g. (Optional) To see a list of what was upgraded, select **Save Log**.

The log file is saved in the downloads folder for your browser with the name `latest-upgrade-log-timestamp.txt`.

[If required, troubleshoot driver firmware upgrade errors.](#)

7. After the procedure completes successfully, perform any additional maintenance procedures while the node is in maintenance mode. When you are done, or if you experienced any failures and want to start over, go to the StorageGRID Appliance Installer and select **Advanced > Reboot Controller**. Then select one of these options:

- **Reboot into StorageGRID.**

- **Reboot into Maintenance Mode.** Reboot the controller and keep the node in maintenance mode. Select this option if there were any failures during the procedure and you want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.

It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The Nodes page should display a normal status (green check mark icon to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

Name	Type	Object data used	Object metadata used	CPU usage
StorageGRID Deployment	Grid	0%	0%	--
Data Center 1	Site	0%	0%	--
DC1-ADM1	Primary Admin Node	--	--	21%
DC1-ARC1	Archive Node	--	--	8%
DC1-G1	Gateway Node	--	--	10%
DC1-S1	Storage Node	0%	0%	29%

Troubleshoot drive firmware upgrade errors

Troubleshoot errors that can occur when using SANtricity System Manager to upgrade the firmware on the drives in your appliance.

- **Failed assigned drives**

- One reason for the failure might be that the drive does not have the appropriate signature. Make sure that the affected drive is an authorized drive. Contact technical support for more information.
- When replacing a drive, make sure that the replacement drive has a capacity equal to or greater than the failed drive you are replacing.
- You can replace the failed drive while the storage array is receiving I/O.

- **Check storage array**

- Make sure that an IP address has been assigned to each controller.
- Make sure that all cables connected to the controller aren't damaged.
- Make sure that all cables are tightly connected.

- **Integrated hot spare drives**

This error condition must be corrected before you can upgrade the firmware.

- **Incomplete volume groups**

If one or more volume groups or disk pools are incomplete, you must correct this error condition before you can upgrade the firmware.

- **Exclusive operations (other than background media/parity scan) currently running on any volume groups**

If one or more exclusive operations are in progress, the operations must complete before the firmware can be upgraded. Use System Manager to monitor the progress of the operations.

- **Missing volumes**

You must correct the missing volume condition before the firmware can be upgraded.

- **Either controller in a state other than Optimal**

One of the storage array controllers needs attention. This condition must be corrected before the firmware can be upgraded.

- **Mismatched Storage Partition information between Controller Object Graphs**

An error occurred while validating the data on the controllers. Contact technical support to resolve this issue.

- **SPM Verify Database Controller check fails**

A storage partitions mapping database error occurred on a controller. Contact technical support to resolve this issue.

- **Configuration Database Validation (If supported by the storage array's controller version)**

A configuration database error occurred on a controller. Contact technical support to resolve this issue.

- **MEL Related Checks**

Contact technical support to resolve this issue.

- **More than 10 DDE Informational or Critical MEL events were reported in the last 7 days**

Contact technical support to resolve this issue.

- **More than 2 Page 2C Critical MEL Events were reported in the last 7 days**

Contact technical support to resolve this issue.

- **More than 2 Degraded Drive Channel Critical MEL events were reported in the last 7 days**

Contact technical support to resolve this issue.

- **More than 4 critical MEL entries in the last 7 days**

Contact technical support to resolve this issue.

Turn controller identify LED on and off

The blue identify LED on the front and back of the controller can be turned on to help locate the appliance in a data center.

Before you begin

You have the BMC IP address of the controller you want to identify.

Steps

1. Access the controller BMC interface.

2. Select **Server Identify**.

The current status of the identify LED is selected.

3. Select **ON** or **OFF**, and then select **Perform Action**.

When you select **ON**, the blue identify LEDs light on the front (shown) and rear of the appliance.



If a bezel is installed on the controller, it might be difficult to see the front identify LED.

4. Turn the LED on and off as needed.

Related information

[Verify Fibre Channel HBA to replace](#)

[Locate controller in data center](#)

[Access BMC interface](#)

Locate controller in data center

Locate the controller so that you can perform hardware maintenance or upgrades.

Before you begin

- You have determined which controller requires maintenance.

(Optional) To help locate the controller in your data center, turn on the blue identify LED.

[Turn controller identify LED on and off](#)

Steps

1. Find the controller requiring maintenance in the data center.

- Look for a lit blue identify LED on the front or rear of the controller.

The front identify LED is behind the controller front bezel and might be difficult to see if the bezel is installed.



- Check the tags attached to the front of each controller for a matching part number.

2. Remove the controller front bezel, if one is installed, to access the front panel controls and indicators.
3. Optional: Turn off the blue identify LED if you used it to locate the controller.
 - Press the identify LED switch on the controller front panel.
 - Use the controller BMC interface.

[Turn controller identify LED on and off](#)

Related information

[Remove Fibre Channel HBA](#)

[Remove SG6000-CN controller from cabinet or rack](#)

[Shut down SG6000-CN controller](#)

Power controller on and off

Shut down SG6000-CN controller

Shut down the SG6000-CN controller to perform hardware maintenance.

Before you begin

- You have physically located the SG6000-CN controller requiring maintenance in the data center. See [Locate controller in data center](#).

About this task

To prevent service interruptions, confirm that all other Storage Nodes are connected to the grid before shutting down the controller or shut down the controller during a scheduled maintenance window when periods of service disruption are acceptable. See the information about [monitoring node connection states](#).

 If you have ever used an ILM rule that creates only one copy of an object, you must shut down the controller during a scheduled maintenance window. Otherwise, you might temporarily lose access to those objects during this procedure.

See information about managing objects with information lifecycle management.

Steps

1. Shut down the SG6000-CN controller.



You must perform a controlled shut down of the appliance by entering the commands specified below. It is a best practice to perform a controlled shutdown when possible to avoid unnecessary alerts, ensure full logs are available, and avoid service disruptions.

a. If you have not already logged into the grid node, log in using PuTTY or another ssh client:

- i. Enter the following command: `ssh admin@grid_node_IP`
- ii. Enter the password listed in the `Passwords.txt` file.
- iii. Enter the following command to switch to root: `su -`
- iv. Enter the password listed in the `Passwords.txt` file.

When you are logged in as root, the prompt changes from `$` to `#`.

b. Shut down the SG6000-CN controller:

`shutdown -h now`

This command might take up to 10 minutes to complete.

2. Use one of the following methods to verify that the SG6000-CN controller is powered off:

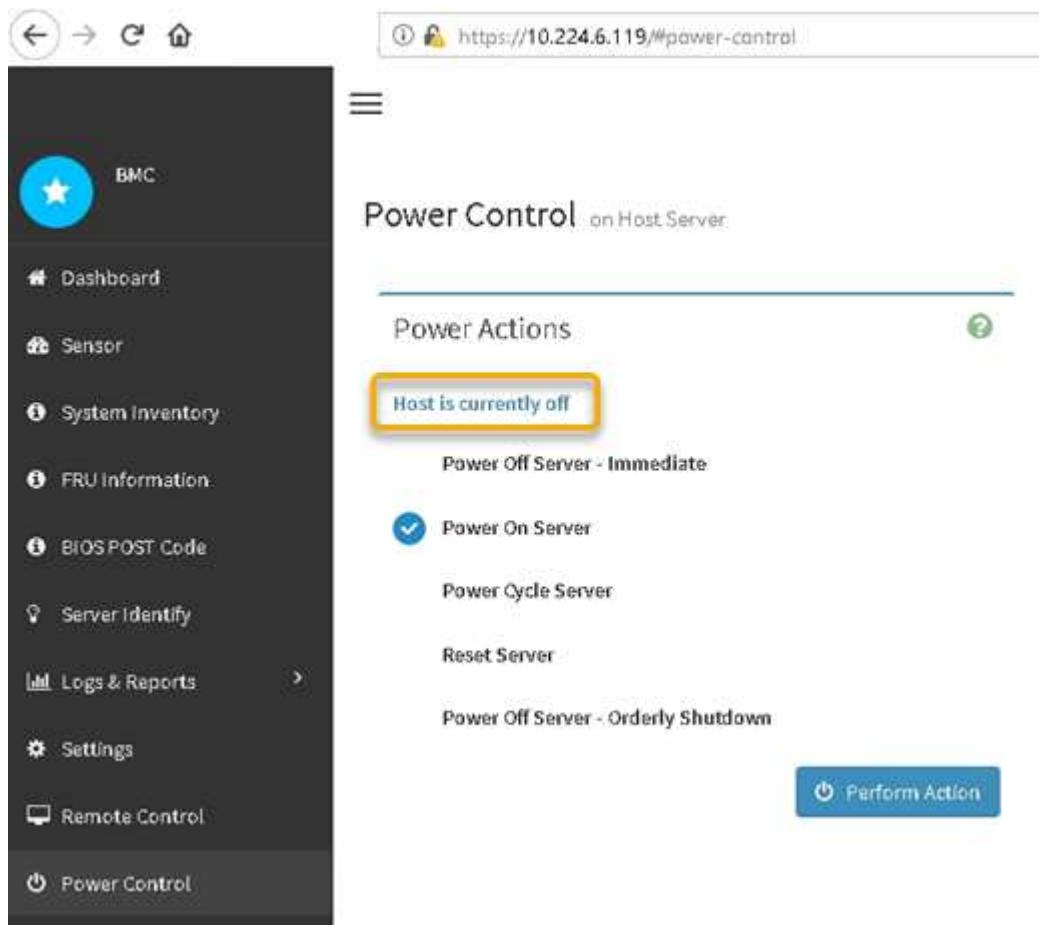
- Look at the blue power LED on the front of the controller and confirm that it is off.



- Look at the green LEDs on both power supplies in the rear of the controller and confirm that they blink at a regular rate (approximately one blink per second).



- Use the controller BMC interface:
 - i. Access the controller BMC interface.
[Access BMC interface](#)
 - ii. Select **Power Control**.
 - iii. Verify that the Power Actions indicates that the host is currently off.



The screenshot shows the BMC interface on a web browser. The URL is https://10.224.6.119/#power-control. The left sidebar has a 'BMC' icon and links to Dashboard, Sensor, System Inventory, FRU Information, BIOS POST Code, Server Identify, Logs & Reports, Settings, Remote Control, and Power Control. The main content area is titled 'Power Control' on Host Server. It shows a 'Power Actions' section with the status 'Host is currently off' (highlighted with a yellow box). Below it are five options: 'Power Off Server - Immediate', 'Power On Server' (selected, indicated by a blue checkmark), 'Power Cycle Server', 'Reset Server', and 'Power Off Server - Orderly Shutdown'. A blue 'Perform Action' button is at the bottom right.

Related information

[Remove SG6000-CN controller from cabinet or rack](#)

Power on SG6000-CN controller and verify operation

Power on the controller after completing maintenance.

Before you begin

- You have installed the controller in a cabinet or rack and connected the data and power cables.

[Reinstall SG6000-CN controller into cabinet or rack](#)

- You have physically located the controller in the data center.

[Locate controller in data center](#)

Steps

1. Power on the SG6000-CN controller and monitor the controller LEDs and boot-up codes using one of the following methods:
 - Press the power switch on the front of the controller.



- Use the controller BMC interface:
 - i. Access the controller BMC interface.

[Access BMC interface](#)

- ii. Select **Power Control**.
- iii. Select **Power On Server** and then select **Perform Action**.

A screenshot of the NetApp BMC interface. The top navigation bar shows the URL https://10.224.6.119/#power-control. The left sidebar has a 'BMC' icon and links to 'Dashboard', 'Sensor', 'System Inventory', 'FRU Information', 'BIOS POST Code', 'Server Identify', 'Logs & Reports', 'Settings', 'Remote Control', and 'Power Control'. The main content area is titled 'Power Control' on Host Server. It shows 'Power Actions' with a note 'Host is currently off'. Under 'Power Off Server - Immediate', the 'Power On Server' button is selected and highlighted with a yellow box and a circled '1'. Under 'Power Off Server - Orderly Shutdown', the 'Perform Action' button is highlighted with a yellow box and a circled '2'.

Use the BMC interface to monitor start-up status.

2. Confirm that the appliance controller displays in the Grid Manager and with no alerts.

It might take up to 20 minutes for the controller to display in the Grid Manager.

3. Confirm that the new SG6000-CN controller is fully operational:

- a. Log in to the grid node using PuTTY or another ssh client:

- i. Enter the following command: `ssh admin@grid_node_IP`
- ii. Enter the password listed in the `Passwords.txt` file.
- iii. Enter the following command to switch to root: `su -`
- iv. Enter the password listed in the `Passwords.txt` file.

When you are logged in as root, the prompt changes from \$ to #.

- b. Enter the following command and verify that it returns the expected output:

```
cat /sys/class/fc_host/*/port_state
```

Expected output:

```
Online
Online
Online
Online
```

If the expected output is not returned, contact technical support.

- c. Enter the following command and verify that it returns the expected output:

```
cat /sys/class/fc_host/*/speed
```

Expected output:

```
16 Gbit
16 Gbit
16 Gbit
16 Gbit
```

If the expected output is not returned, contact technical support.

- d. From the Nodes page in Grid Manager, make sure that the appliance node is connected to the grid and does not have any alerts.



Don't take another appliance node offline unless this appliance has a green icon.

4. Optional: Install the front bezel, if one was removed.

Related information

Change link configuration of SG6000-CN controller

You can change the Ethernet link configuration of the SG6000-CN controller. You can change the port bond mode, the network bond mode, and the link speed.

Before you begin

The appliance has been [placed maintenance mode](#).

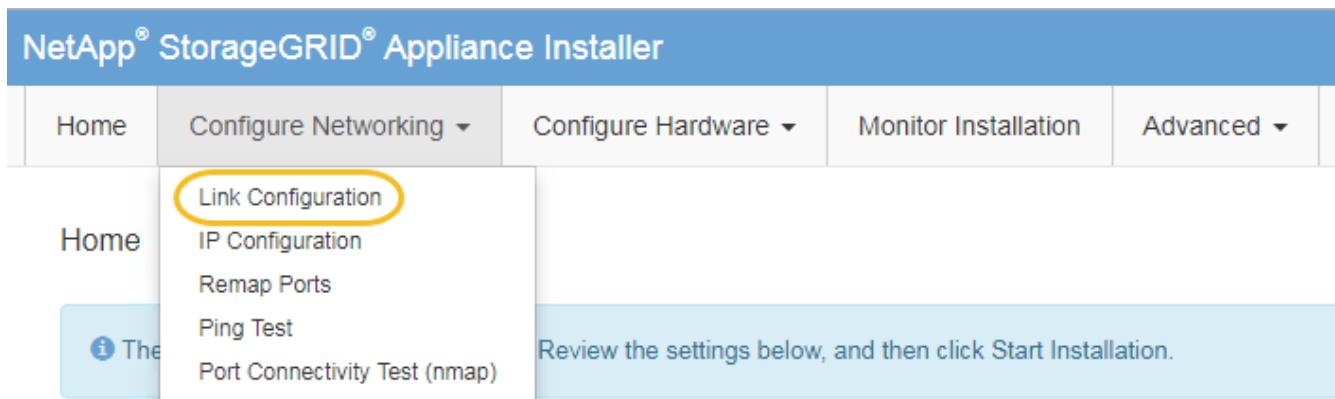
About this task

Options for changing the Ethernet link configuration of the SG6000-CN controller include:

- Changing **Port bond mode** from Fixed to Aggregate, or from Aggregate to Fixed
- Changing **Network bond mode** from Active-Backup to LACP, or from LACP to Active-Backup
- Enabling or disabling VLAN tagging, or changing the value of a VLAN tag
- Changing the link speed.

Steps

1. From the StorageGRID Appliance Installer, select **Configure Networking > Link Configuration**.



2. Make the desired changes to the link configuration.

For more information about the options, see [Configure network links](#).

3. When you are satisfied with your selections, click **Save**.



You might lose your connection if you made changes to the network or link you are connected through. If you aren't reconnected within 1 minute, re-enter the URL for the StorageGRID Appliance Installer using one of the other IP addresses assigned to the appliance:

`https://Appliance_Controller_IP:8443`

If you made changes to the VLAN settings, the subnet for the appliance might have changed. If you need to change the IP addresses for the appliance, follow the [Configure IP addresses](#) instructions.

[Configure StorageGRID IP addresses](#)

4. Select **Configure Networking > Ping Test** from the menu.
5. Use the Ping Test tool to check connectivity to IP addresses on any networks that might have been affected by the link configuration changes you made in the [link configuration changes](#) step.

In addition to any other tests you choose to perform, confirm that you can ping the Grid Network IP address of the primary Admin Node, and the Grid Network IP address of at least one other Storage Node. If necessary, return to the [link configuration changes](#) step and correct any link configuration issues.

6. When you are satisfied that your link configuration changes are working and you have additional procedures to perform while the node is in maintenance mode, perform them now. When you are done, or if you experienced any failures and want to start over, select **Advanced > Reboot Controller**, and then select one of these options:

- Select **Reboot into StorageGRID**
- Select **Reboot into Maintenance Mode** to reboot the controller with the node remaining in maintenance mode. Select this option if you experienced any failures during the procedure and want to start over. After the node finishes rebooting into maintenance mode, restart from the appropriate step in the procedure that failed.



It can take up to 20 minutes for the appliance to reboot and rejoin the grid. To confirm that the reboot is complete and that the node has rejoined the grid, go back to the Grid Manager. The **NODES** page should display a normal status (green check mark icon  to the left of the node name) for the appliance node, indicating that no alerts are active and the node is connected to the grid.

DASHBOARD

ALERTS ✓

Current

Resolved

Silences

Rules

Email setup

NODES

TENANTS

ILM

CONFIGURATION

MAINTENANCE

SUPPORT

Nodes

View the list and status of sites and grid nodes.

Search... 🔍 Total node count: 14

Name	Type	Object data used	Object metadata used	CPU usage
StorageGRID Deployment	Grid	0%	0%	—
▲ Data Center 1	Site	0%	0%	—
✓ DC1-ADM1	Primary Admin Node	—	—	21%
✓ DC1-ARC1	Archive Node	—	—	8%
✓ DC1-G1	Gateway Node	—	—	10%
✓ DC1-S1	Storage Node	0%	0%	29%

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