SupremeRAID™ SE User Guide for Windows

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INTRODUCTION

SupremeRAID™ SE is the most powerful, high-speed data protection solution specially designed for NVMe SSDs. SupremeRAID™ SE installs a virtual NVMe controller onto the operating system and integrates a high-performance, AI processor equipped PCIe RAID card into the system to manage the RAID operations of the virtual NVMe controller.

This document explains how to install the SupremeRAID™ SE software package for Windows and how to manage the RAID components using the Graphical Management Console.

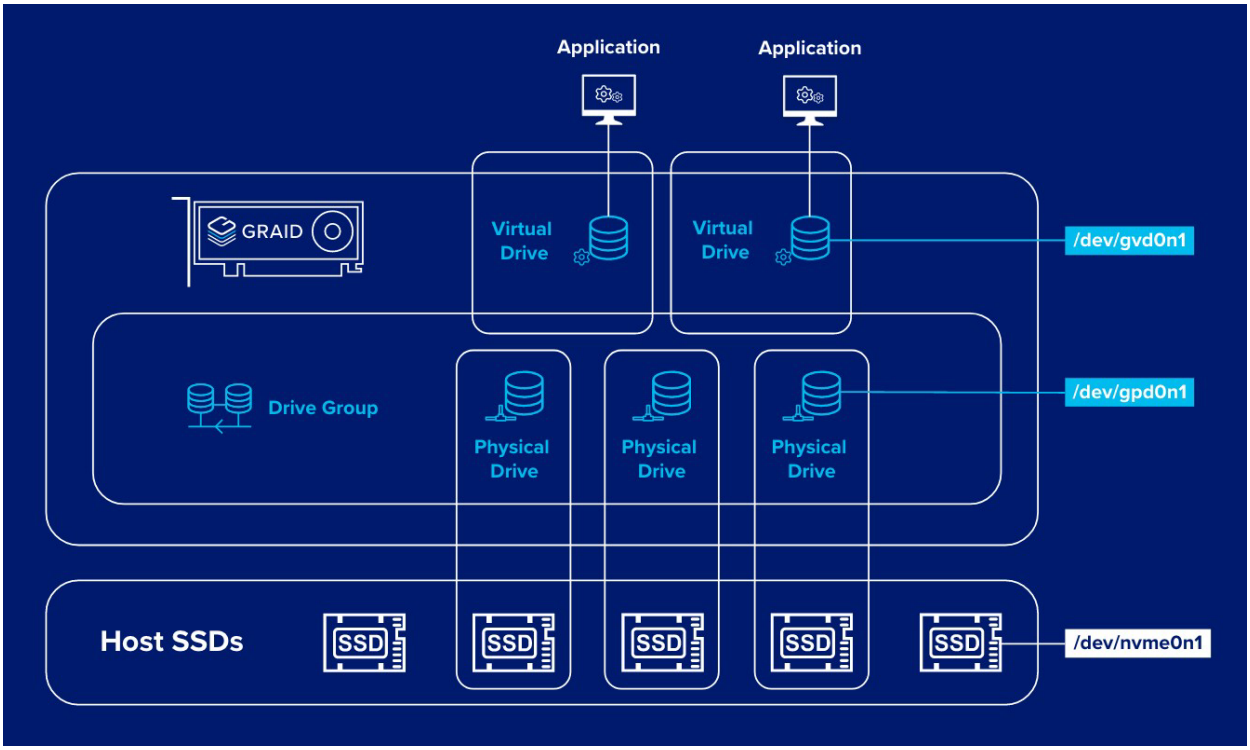
SUPREMERAID™ SE SPECIFICATIONS

SupremeRAID™ Driver Specifications	
Supported Models	SE-TU, SE-AM, SE-AD
Supported RAID levels	RAID 0, 1, 5, 10,
Supported OS	Windows Server 2019 Windows Server 2022 Windows Server 2025 Windows 11
Supported GPU models	Turing, Ampere, Ada Lovelace Series
Recommended minimum drive number for each RAID level	RAID 0: at least one drive RAID 1: at least two drives RAID 5: at least three drives RAID 10: at least two drives
Maximum number of physical drives	8
Maximum number of drive groups	4
Maximum number of virtual drives per drive group	8
Maximum size of the drive group	Defined by the physical drive sizes

RAID Components

There are three major RAID logical components in SupremeRAID™ SE:

- Physical Drive (PD)
- Drive Group (DG)
- Virtual Drive (VD)



Physical Drive (PD)

Since NVMe drives are not directly attached to the SupremeRAID™ SE controller, you must tell the controller which SSDs can be managed. Once an SSD has been created as a physical drive, the SupremeRAID™ SE driver unbinds the SSD from the operating system, meaning the device node (.\PHYSICALDRIVEx) will disappear and is no longer accessible. At the same time, a corresponding device node is created by the SupremeRAID™ SE driver. You can check the SSD information, such as the SSD model or SMART logs, using this device node. To control and access the SSD using nvmeXn1, you must first delete the corresponding physical drive.

SupremeRAID™ SE supports a maximum 8 physical drives in one Drive Group.

Drive Group (DG)

The main component of RAID logic is a RAID group. When the drive group is created, the SupremeRAID™ SE driver initializes the physical drives with the corresponding RAID mode to ensure that the data and the parity are synchronized. There are two types of initialization processes.

- Fast Initialization: When all the physical drives in the drive group (DG) support the deallocate dataset management command, the SupremeRAID™ SE driver performs fast initialization by default, meaning the drive group state is optimized immediately.
- Background Initialization: Performance will be slightly affected by the initialization traffic, but you can still create the virtual drive and access the virtual drive during a background initialization.

SupremeRAID™ SE supports a maximum of 4 Drive Groups with up to 8 Physical Drives in one Drive Group.

Virtual Drive (VD)

The virtual drive is equivalent to the RAID volume. You can create multiple virtual drives in the same drive group for multiple applications. The corresponding device node (\.\PHYSICALDRIVEx) appears on the operating system when you create a virtual drive, and you can make the file system or running application directly on this device node.

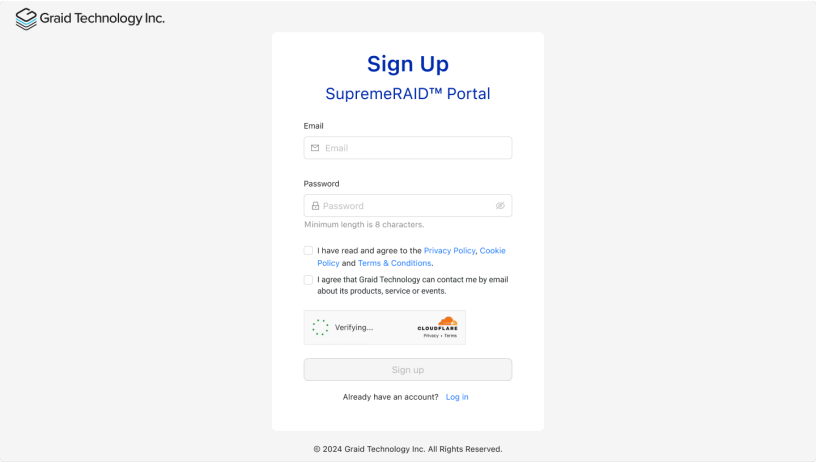
SupremeRAID™ SE supports a maximum of 8 Virtual Drives in each Drive Group.

Limitations of SupremeRAID™ SE

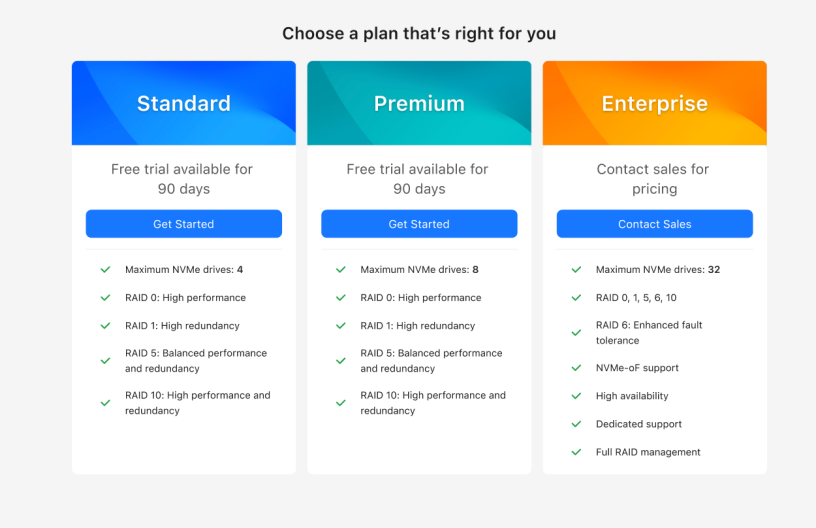
- System suspension and hibernation are currently unsupported due to a limitation in the NVIDIA driver.
- SAS/SATA/NVMe-oF drives are not supported in the Windows driver.
- If you have previously installed other SupremeRAID™ products, executing the SupremeRAID™ SE installation will prevent the restoration of previous product settings.
- After your SupremeRAID™ SE subscription expires, you will still be able to access and read your data, but the data cannot be written.

SIGN UP FOR THE SUPREMERAID™ SE

Step 1 You can sign up for the SupremeRAID™ SE through our official website. Please create an account on the SupremeRAID™ SE Portal.



Step 2 Choose a subscription plan that is right for you.



Step 3 Upon successful subscription, please follow the steps in the next section to proceed with the installation.

INSTALLATION

This section describes how to install the SupremeRAID™ SE software package for Windows operating systems.

Prerequisites

Before installing the software package, ensure that the system meets the following requirements:

- Minimum system requirements:
  - CPU: 2 GHz or faster with at least 8 cores
  - RAM: 16 GB
  - Supported operating system: see Supported Operating Systems section on our website.
  - An available PCIe Gen3 or Gen4 x16 slot
- The GPU card must be installed into a PCIe x16 slot.
- Make sure a SupremeRAID™ SE compatible SSD drive is being used. SupremeRAID™ SE supports all form factors of NVMe drives, including M.2, U.2, U.3, EDSFF, and AIC.

BIOS Setting

- It is recommended to enable the P-state option or switch it to 'Native Mode' to prevent any performance issues.
- Optional to disable the IOMMU (AMD) / VT-d (intel) function in the system BIOS (Usually in BIOS Advanced page).

Operating System Setting

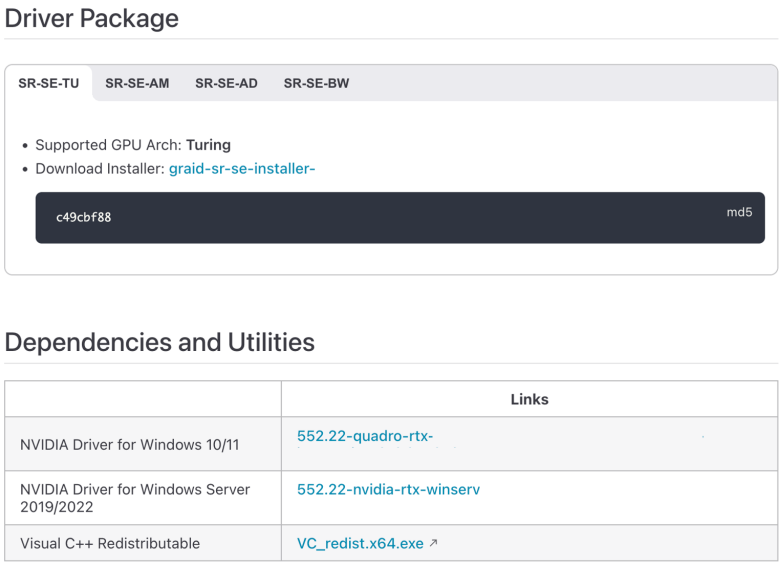
- Must Have: Make sure to prevent your system from entering "Sleep/Hibernation/Standby" modes. If the system enters any of these states, it might lead to unforeseen errors.
- Must Have: Disabling the “Fast Startup” option, as it can cause similar issues related to “Sleep/Hibernation/Standby” modes. Ensure that all Intel chipsets are installed to prevent any undefined devices from appearing in the system.

Installing the Software Driver

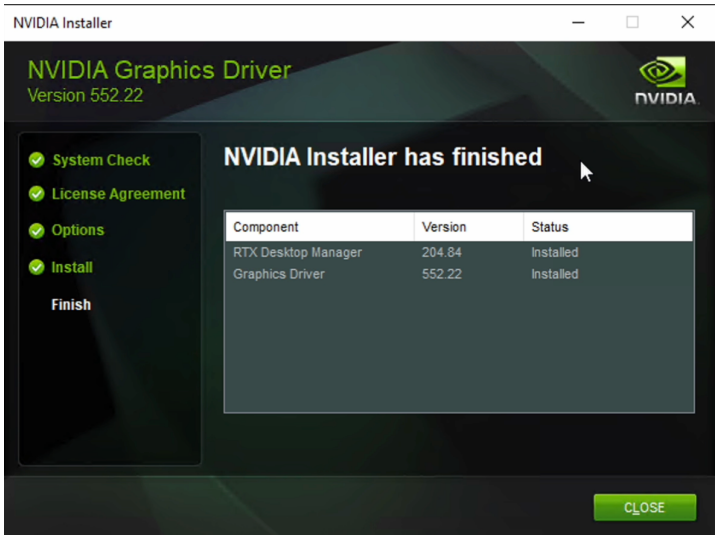
Note: You must install the NVIDIA driver before installing the SupremeRAID™ SE driver for Windows.

To install the SupremeRAID™ SE driver on Windows systems:

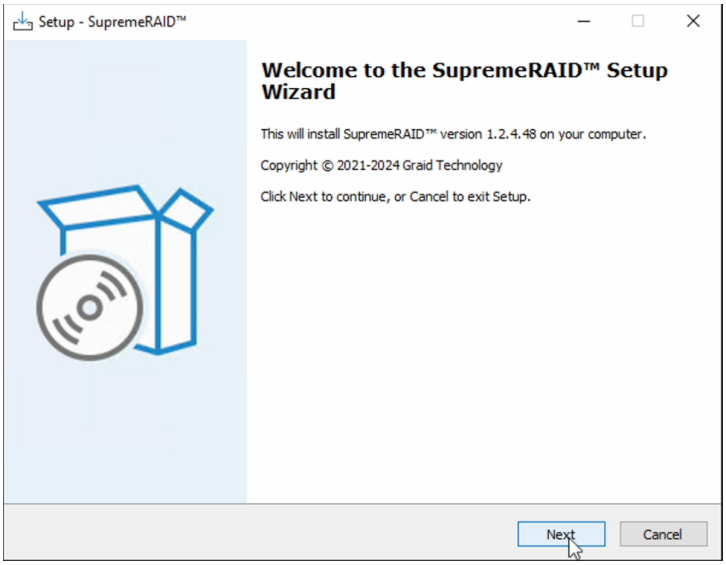
Step 1 Download the latest version of the NVIDIA driver and the SupremeRAID™ SE driver on our website, see Driver Package. Please ensure to download and run the installer corresponding to your respective SupremeRAID™ SE.



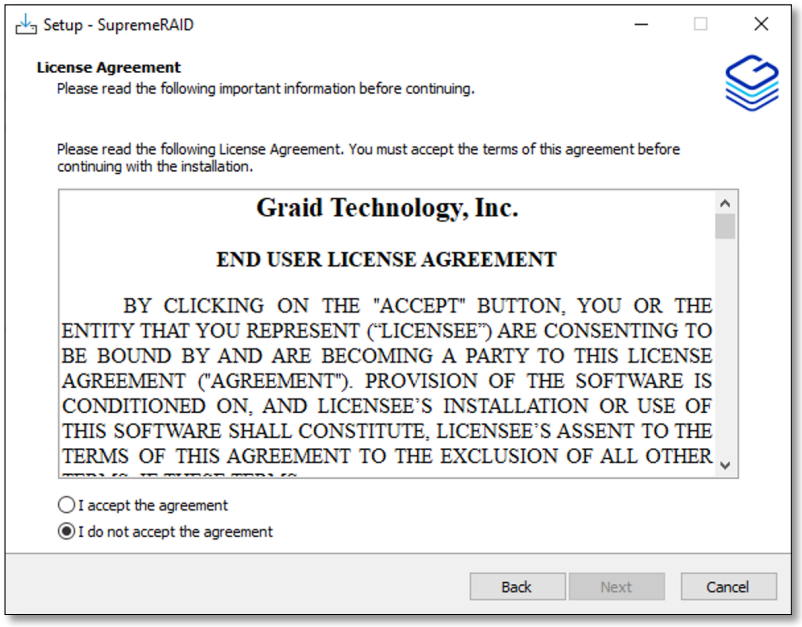
Step 2 Install the NVIDIA driver and follow the instructions.



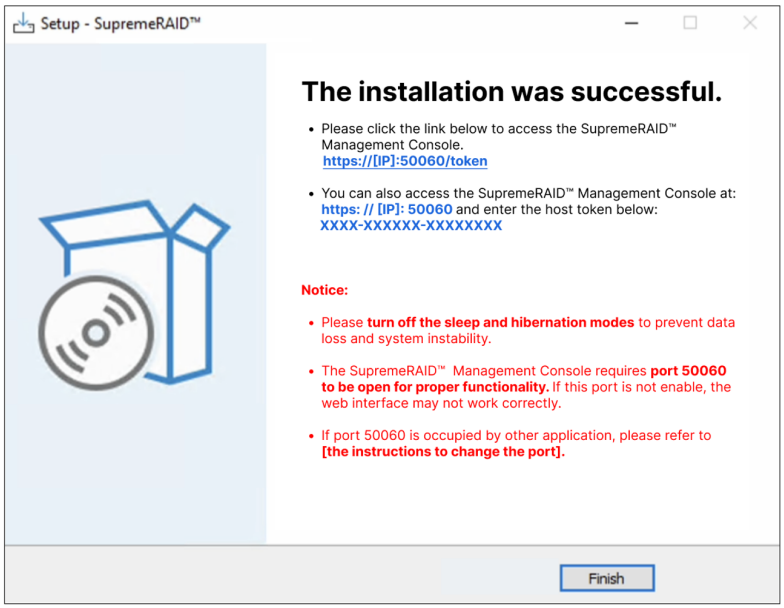
Step 3 Install the SupremeRAID™ SE driver and follow the instructions.



Step 4 In the end-user license agreement page, you can scroll down the license content. After you review the license, accept the agreement, and click Next to proceed.



Step 5 After the installation is completed, please click the link and enter the host token to access the SupremeRAID™ SE Management Console.



Note: Please turn off the sleep and hibernation modes to prevent data loss and system instability.

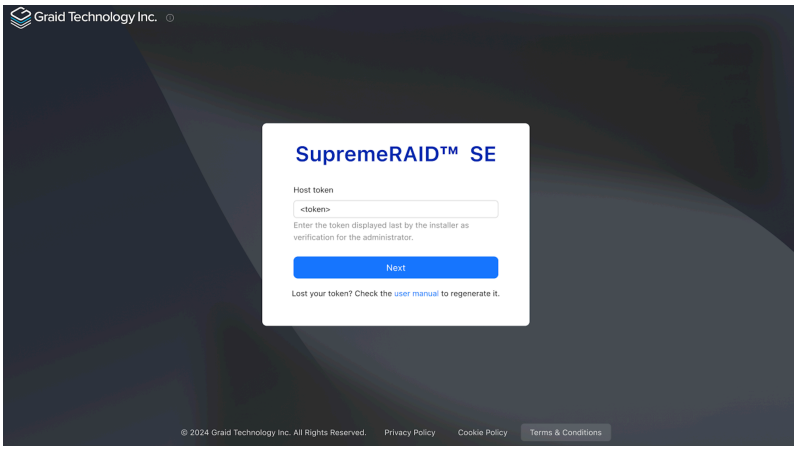
The SupremeRAID™ SE Management Console requires port 50060 to be open for proper functionality. If this port is not enabled, the web interface may not work correctly.

If port 50060 is occupied by another application, to set up your own port and IP, please edit the configuration file **C:\Program Files\SupremeRAID Management Console\conf\service.conf.**

For example, if you want to set the port and IP to 8888 and 123.456.7.889 respectively, it would be as follows:

```
[common]
web_port=8888
web_addr=123.456.7.889
```

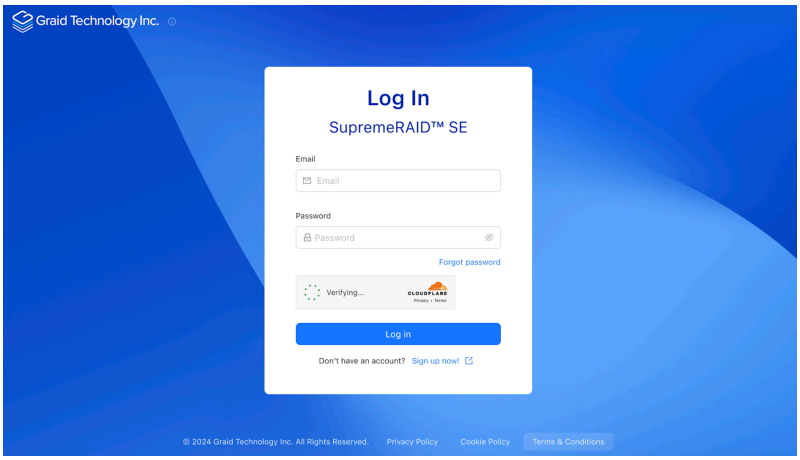
Step 4 Enter the token and log in to the SupremeRAID™ SE Management Console.



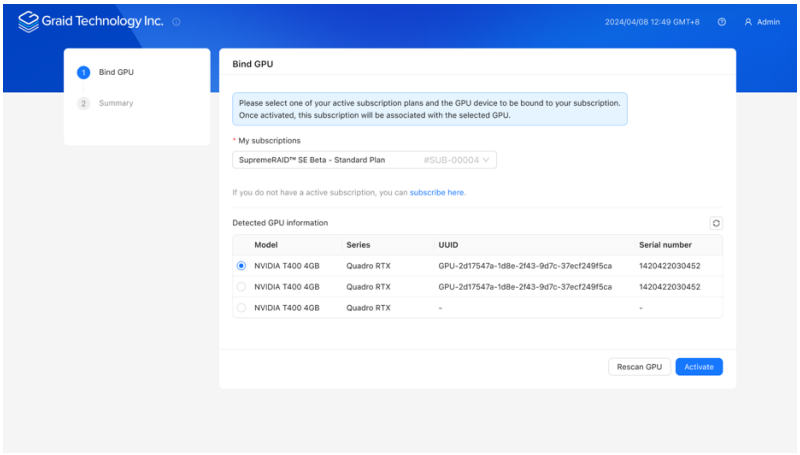
If you have lost the token, please use the following command to retrieve the host token.

```
Stop-Service graidmgr
graid-mgr host_token gen
Start-Service graidmgr
```

Log in to the SupremeRAID™ SE Management Console using the email and password you signed up with.



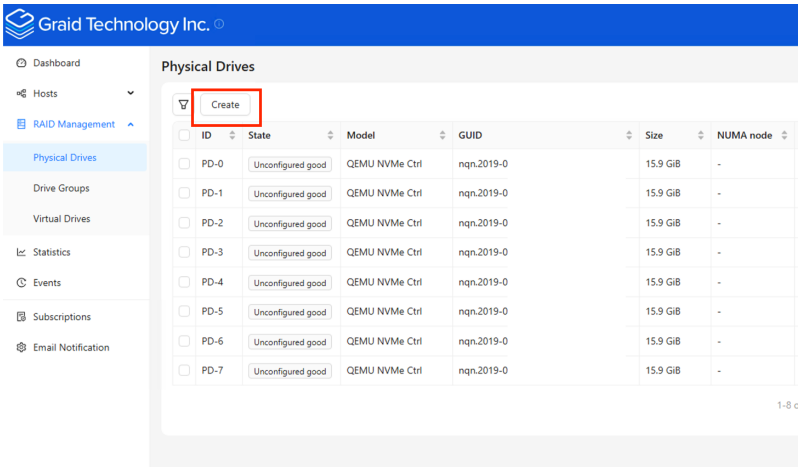
Step 5 Bind your GPU and start the RAID setup.



Managing Physical Drives

Creating a Physical Drive

To create physical drives, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Physical Drives section in the sidebar menu and click the “Create” button.

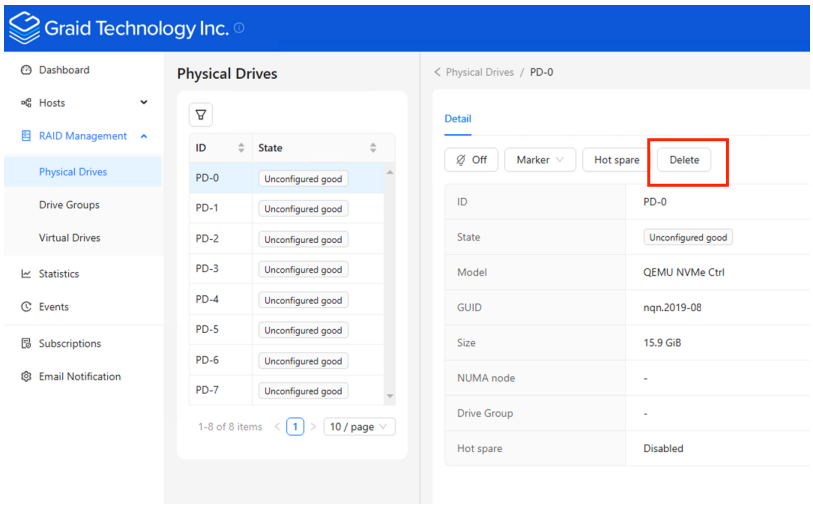


Physical Drive State:

State	Description
ONLINE	Physical drive was added to a drive group and is ready to work.
HOTSPARE	Physical drive is configured as a hot spare drive.
FAILED	Physical drive is detected, but it is not operating normally.
OFFLINE	Physical drive is marked as offline.
REBUILD	Physical drive is being rebuilt.
MISSING	Physical drive cannot be detected.
UNCONFIGURED_GOOD	Physical drive did not join a drive group.
UNCONFIGURED_BAD	Physical drive did not join any drive group and is not operating normally.

Deleting a Physical Drives

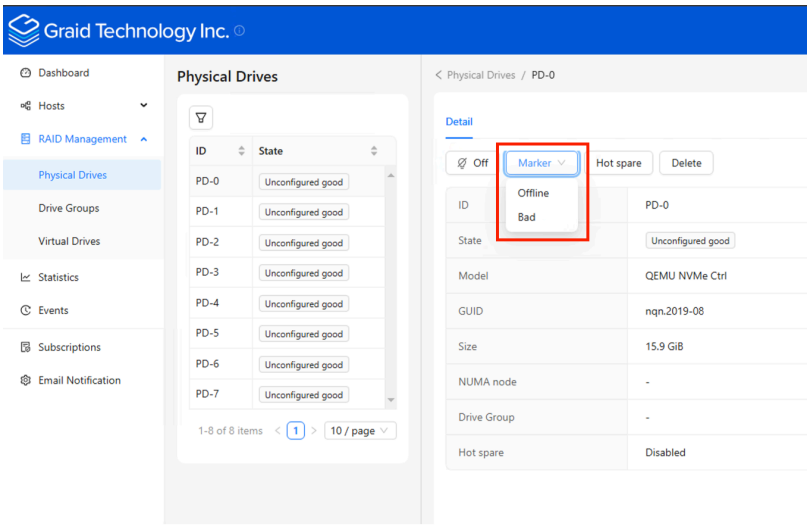
To delete physical drives, please select the physical drives you want to delete and click the “Delete” button.



Note:	You cannot delete a physical drive which is used by drive group.

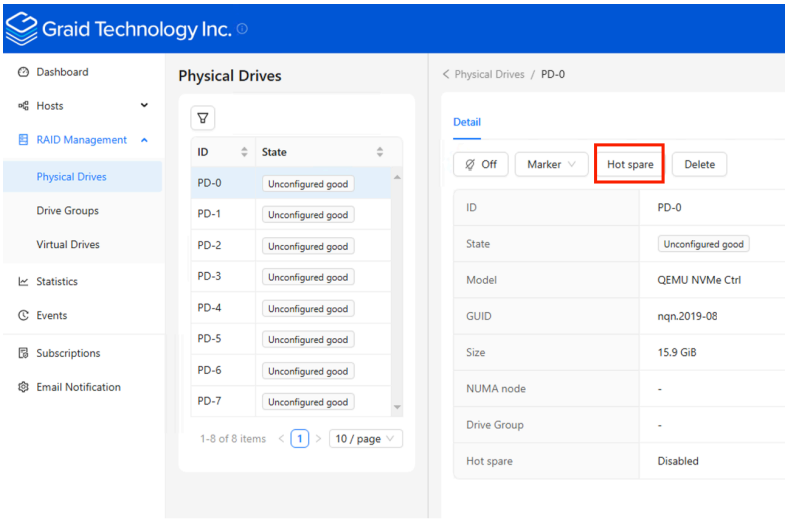
Marking a Physical Drive Online/Offline/Good/Bad

To mark a physical drive as online/offline/Good/Bad, please select the physical drives you want to change and click the “Mark” button.



Assigning a Hot Spare Drive

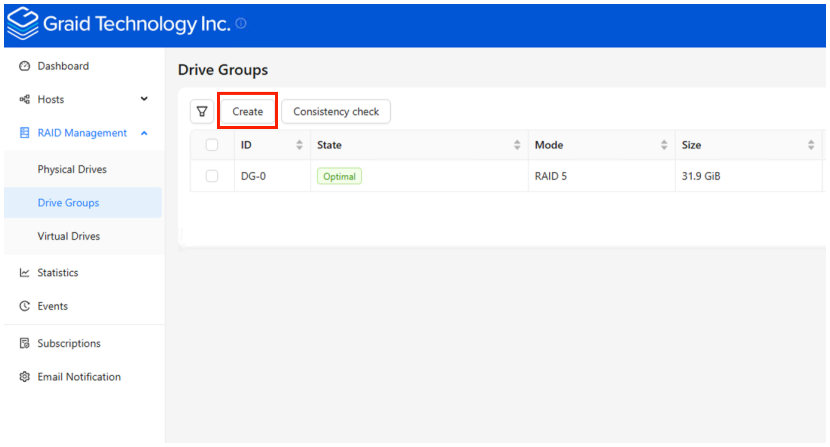
To assign a physical drive as a hot spare, please select the physical drives you want assign and click the “Hot spare” button.



Managing Drive Groups

Creating a Drive Group

To create a drive group, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Drive Group section in the sidebar menu and click the “Create” button.



Note: Wait for the drive group initialization to complete. DO NOT power-off or reboot the system when the drive_group state is INIT/RESYNC/RECOVERY.

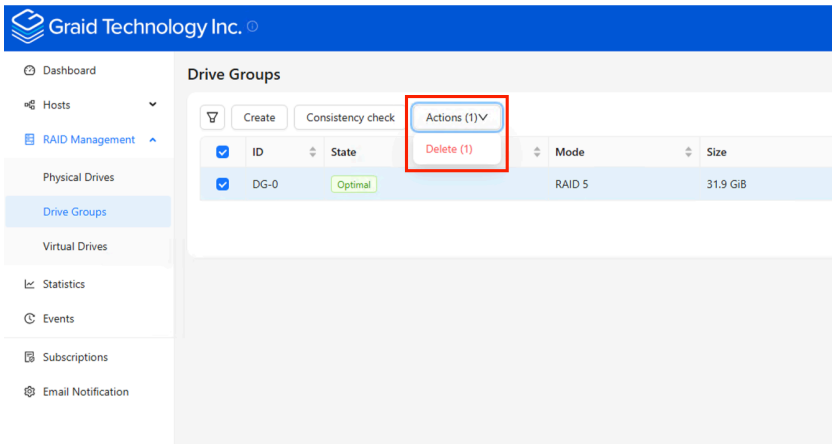
Drive Group State:

STATE	Description
OFFLINE	The drive group does not function normally. This condition is usually caused when the number of damaged physical drives exceeds the limit.
OPTIMAL	The drive group is in optimal state.
DEGRADED	The drive group is available and ready, but the number of missing or failed physical drives has reached the limit.
PARTIALLY_DEGRADED	The drive group is available and ready for use, but some physical drives are missing or failed.
RECOVERY	The drive group is recovering.

STATE	Description
FAILED	The drive group does not function normally.
INIT	The drive group is initializing.
RESYNC	The drive group is re-synchronizing. This condition usually occurs when the system encounters an abnormal crash. Do not replace the physical drive in this state until the resynchronization process is complete.
RESCUE	The drive group is in rescue mode.

Deleting a Drive Group

To delete a drive group, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Drive Group section in the sidebar menu. Select the drive group you want to delete and click the “Delete” button.



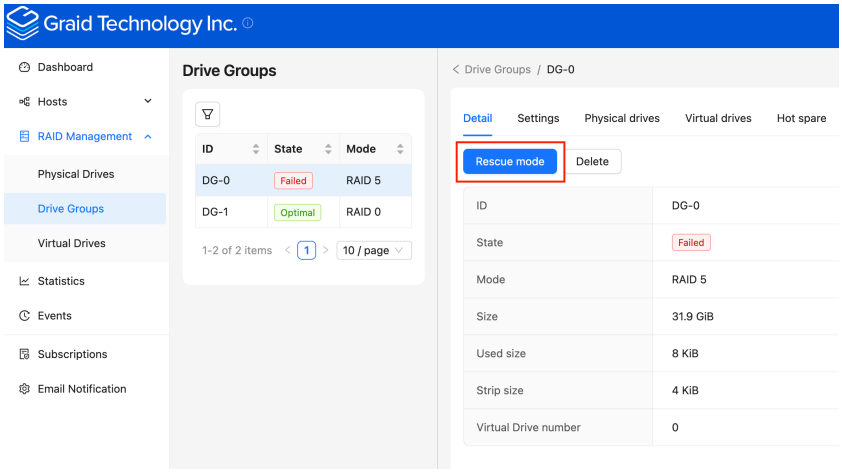
Note: You cannot delete a drive group that contains a virtual drive.

Degradation and Recovery

When multiple drive groups require simultaneous recovery, the drive groups recover individually. When multiple physical drives in the same drive group require rebuilding, the physical drives are rebuilt simultaneously

Rescue Mode

When a damaged drive group is initialized, or when a recovering drive group encounters an abnormal system crash, the data integrity of the drive group is affected. In this event, the drive group is forced offline to prevent data from being written to the drive group. To read the data from the drive group, force the drive group to go online using Rescue mode.

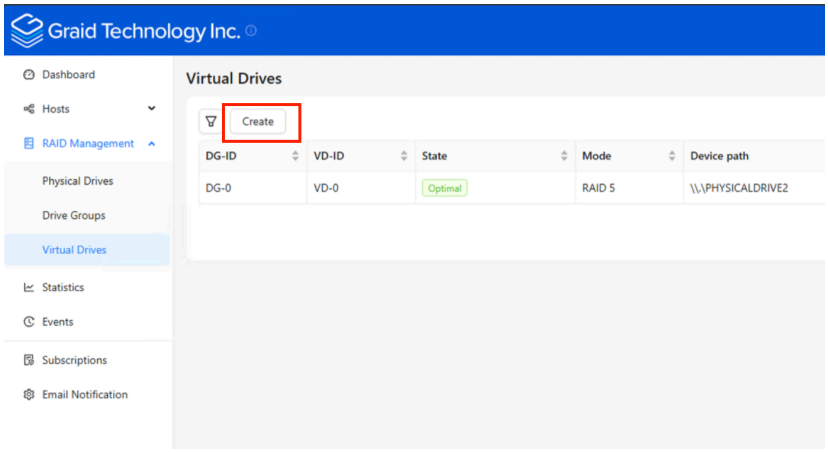


Note: A drive group in Rescue mode is read-only. Rescue mode cannot be disabled.

Managing Virtual Drives

Creating a Virtual Drive

To create virtual drives, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Virtual Drives section in the sidebar menu. Please click the “Create” button to select which the drive group you want to create virtual drives.



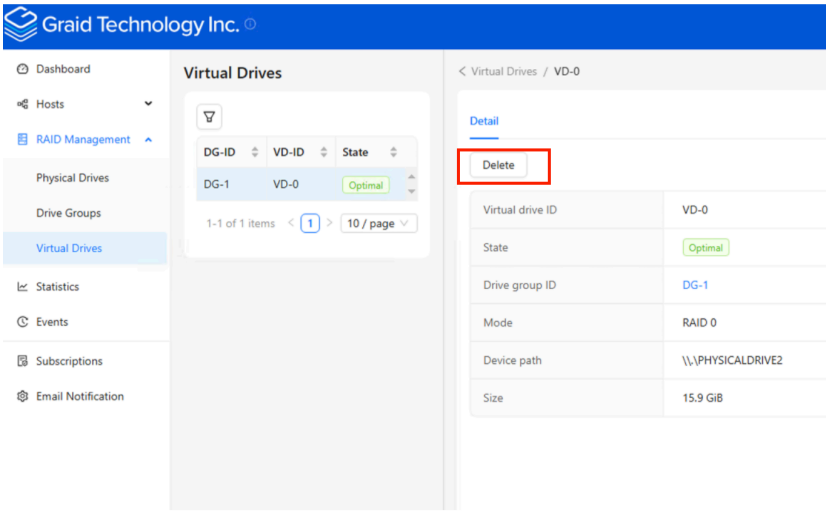
Virtual Drive STATE: Identical to the drive group state.

OFFLINE	The drive group does not function normally. This condition is usually caused when the number of damaged physical drives exceeds the limit.
OPTIMAL	The drive group is in optimal state.
DEGRADED	The drive group is available and ready, but the number of missing or failed physical drives has reached the limit.
PARTIALLY_DEGRADED	The drive group is available and ready for use, but some physical drives are missing or failed.
RECOVERY	The drive group is recovering.
FAILED	The drive group does not function normally.
INIT	The drive group is initializing.

RESYNC	The drive group is re-synchronizing. This condition usually occurs when the system encounters an abnormal crash. Do not replace the physical drive in this state until the re-synchronization process is complete.
RESCUE	The drive group is in rescue mode.

Deleting Virtual Drives

To delete a virtual drive, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Virtual Drives section in the sidebar menu. Please select the virtual drive you want to delete and click the “Delete” button.

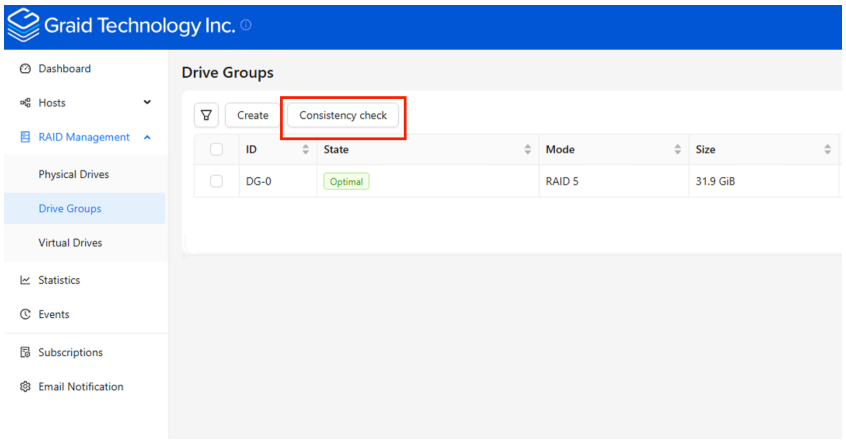


Features Overview

Consistency Checks

The consistency check operation verifies that the data is correct in Drive Groups that use RAID levels 1, 5, and 10. In a system with parity, for example, checking consistency calculates the data on one drive and compares the results to the contents of the parity drive.

To start the consistency check, please log in to the SupremeRAID™ SE Management Console, then navigate to the RAID management / Drive Group section in the sidebar menu. Please select the drive group you want to perform the Consistency Check on and click the “Consistency Check” button.



Attachments

Events for SupremeRAID™ SE

Category	Severity	Description
Physical Drive	Warning	Physical Drive <PD_ID> state has transitioned from <STATE_OLD> to unconfigured bad.
	Critical	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to failed.
	Warning	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to offline.
	Critical	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to missing.
	Info	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to online.
	Info	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to rebuild.
	Info	Physical Drive <PD_ID> state has transitioned from <OLD_STATE> to unconfigured good.
	Info	Physical Drive <PD_ID> has been successfully created.
	Info	Physical Drive <PD_ID> has been deleted.
	Info	Physical Drive <PD_ID> has been hot-plugged.
	Warning	Physical Drive <PD_ID> has been hot-removed.
	Warning	The temperature of Physical Drive <PD_ID> is currently <CURRENT_TEMP> degrees, which exceeds the Warning threshold of <THRESHOLD_TEMP> degrees. Critical Warning error code: ERROR_CODE.
	Critical	The temperature of Physical Drive <PD_ID> is currently <CURRENT_TEMP> degrees, which exceeds the Critical threshold of <THRESHOLD_TEMP> degrees. Critical Warning error code: ERROR_CODE.
	Critical	The available spare capacity <AVAIL_SPARE> of Physical Drive <PD_ID> has fallen below the threshold <SPARE_THRESHOLD>. Critical Warning error code: <ERROR_CODE>.
	Critical	The NVM subsystem reliability of Physical Drive <PD_ID> has been degraded due to significant media related errors or any internal error that degrades NVM subsystem reliability. Critical Warning error code: <ERROR_CODE>.

	Critical	All of the media of Physical Drive <PD_ID> has been placed in read only mode. Critical Warning error code: <ERROR_CODE>.
	Critical	The volatile memory backup device of Physical Drive <PD_ID> has failed. Critical Warning error code: <ERROR_CODE>.
	Critical	The Persistent Memory Region of Physical Drive <PD_ID> has become read-only or unreliable. Critical Warning error code: <ERROR_CODE>.
	Warning	Physical Drive <PD_ID> is currently experiencing a wearout level of WEAROUT, surpassing the Warning threshold of <THRESHOLD_WEAROUT>.
	Critical	Physical Drive <PD_ID> is currently experiencing a wearout level of WEAROUT, surpassing the Critical threshold of <THRESHOLD_WEAROUT>.
Drive Group	Fatal	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to failed.
	Critical	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to offline.
	Critical	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to degraded.
	Warning	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to rescue.
	Warning	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to partially degraded.
	Info	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to optimal.
	Info	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to recovery.
	Info	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to init.
	Info	Drive Group <DG_ID> state has transitioned from <OLD_STATE> to resync.
	Info	Drive Group <DG_ID> has been successfully created.
	Info	Drive Group <DG_ID> has been deleted.
	Info	Consistency Check for Drive Group <DG_ID> has been manually aborted.
	Info	Consistency Check for Drive Group <DG_ID> has been aborted due to the deletion of the Drive Group.
	Info	Consistency Check for Drive Group <DG_ID> was aborted due to the Drive Group migrating from Controller <CX_OLD> to <CX_NEW>.
	Info	Consistency Check for Drive Group <DG_ID> has been aborted due to the Drive Group's state transitioning to <DG_STATE>.

	Info	Manual Consistency Check for Drive Group <DG_ID> has been completed.
	Info	Scheduled Consistency Check for Drive Group <DG_ID> has completed.
	Info	Manual Consistency Check for Drive Group <DG_ID> has started.
	Info	Scheduled Consistency Check for Drive Group <DG_ID> has started.
	Info	Inconsistency in Drive Group <DG_ID> has been fixed at: Drive Group block range: <DG_INTERS>.
	Critical	Inconsistency detected in Drive Group <DG_ID> at: Drive Group block range: <DG_INTERS>.
	Critical	Consistency Check for Drive Group <DG_ID> has been aborted due to the 'stop_on_error' policy.
	Critical	Consistency Check for Drive Group <DG_ID> has been aborted due to numerous inconsistencies found and fixed.
	Info	Journal Replay for Drive Group <DG_ID> has started.
	Info	Journal Replay for Drive Group <DG_ID> has been completed. Entry replayed <REPLAYNR>.
	Critical	Journal Replay for Drive Group <DG_ID> has been waiting Physical Drive <PD_ID> to be active.
	Critical	Journal Replay for Drive Group <DG_ID> has been aborted due to inconsistency detected on journal.
Virtual Drive	Info	Inconsistency for Virtual Drive <VD_ID> within Drive Group <DG_ID> has been fixed at: Virtual Drive block range: <VD_OFFSETS>.
	Critical	Inconsistency found in Virtual Drive VD_ID of Drive Group <DG_ID> at: Virtual Drive block range: <VD_OFFSETS>.
	Info	Virtual Drive VD_ID for Drive Group <DG_ID> has been created successfully.
	Info	Virtual Drive VD_ID for Drive Group <DG_ID> has been deleted.
	Info	Stripe cache for Virtual Drive <VD_ID> on Drive Group <DG_ID> has been deleted.
	Info	Stripe cache for Virtual Drive <VD_ID> on Drive Group <DG_ID> has been created successfully.