SupremRAID™
Windows SE Installation Guide

Graid Technology Inc.

Windows SE Installation Guide

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Version: 1.0

Document Overview

Modifications

This is a pre-release document that is subject to change.

Confidentiality Statement

Main References Information

- Overview of Graid Technology Linux Driver

    Graid Technology Documentation

SupremiRAID™ SE Summary

Physical Drive (PD)

Since NVMe drives are not directly attached to the SupremeRAID™ controller, you must tell the controller which SSDs can be managed. After an SSD is created as a physical drive, the SupremeRAID™ driver unbinds the SSD from the operating system, meaning the device node (/dev/nvmeX) disappears and is no longer accessible. At the same time, the SupremeRAID™ driver creates a corresponding device node (/dev/gpdX). You can check the SSD information, such as SSD model or SMART logs, using this device node. To control and access the SSD using /dev/nvmeXn1, you must first delete the corresponding physical drive. SupremeRAID™ supports 8 physical drives, regardless of whether the physical drives are created from a native NVMe SSD, a drive connected through NVMe-oF, or a SAS/SATA disk.

Drive Group (DG)

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

- Fast Initialization: When all of the physical drives in the drive group (DG) support the de-allocate dataset management command, the SupremeRAID™ driver performs fast initialization by default, which optimizes the drive group state immediately.

- Background Initialization: Performance is slightly affected by the initialization traffic, but you can still create the virtual drive and access the virtual drive during a background initialization. SupremeRAID™ supports eight drive groups, with a maximum of 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 (/dev/gdgXnY) 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. Currently, the SupremeRAID™ driver supports a maximum of 1023 virtual drives in each drive group.

Limitation 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.

Installation Of SupremeRAID™ Driver

This section describes installing the SupremeRAID™ software package for Windows

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

    An available PCIe Gen3 or Gen4 x16 slot

- The SupremeRAID™ card must installed into a PCIe x16 slot
- SSD Drive

BIOS Settings Recommended

- Recommended enable the P-state option or switch it to 'Native Mode' to prevent any performance issues.
- Recommended The UEFI Secure Boot function is disabled in the system BIOS(Usually in BIOS secure page).
- Optional The IOMMU(AMD)/VT-d(intel) function is disabled in the system BIOS(Usually in BIOS Advanced page).

Disable the following OS Setting

- **MUST HAVE**: disable Windows 11 "Sleep Mode", which is enabled by default. However, running the system in "Sleep Mode" might lead to unforeseen errors. To prevent this, it's recommended to manually disable the "Sleep Mode" feature.
- **MUST HAVE**: disable the "Fast Startup" option, as it can cause similar issues related to "Sleep Mode." Ensure that all Intel chip-sets are installed to prevent any undefined devices from appearing in the system.

Installing the Software Driver

To install the SupremeRAID™ driver on Windows systems:

> **Dependency and Utilities**
> NVIDIA Driver 512.15
> Visual C++ Redistributable

Step 1: Download the latest version of the NVIDIA driver and the SupremeRAID™ driver.

Dependency	NNVIDIA Driver for Windows
Driver Package	SR-100 / SR-101 / SR102 Download link Graid Technology Driver
The SupremeRAID™ software package is downloadable from the Graid Technology website.	

ℹ️ Supported Windows version: Windows Server 2019, Windows Server 2022 and Windows 11.

❗ Please use the appropriate installer based on your specific card model:
SR-100 : graid-sr-1.2.3-xx.xxxxxxx.007.x64-WHQL.exe
SR-101 : graid-sr-1.2.3-xx.xxxxxxx.017.x64-WHQL.exe
SR-102 : graid-sr-1.2.3-xx.xxxxxxx.027.x64-WHQL.exe
Ensure that you download and run the installer corresponding to your respective SupremeRAID™ card installation

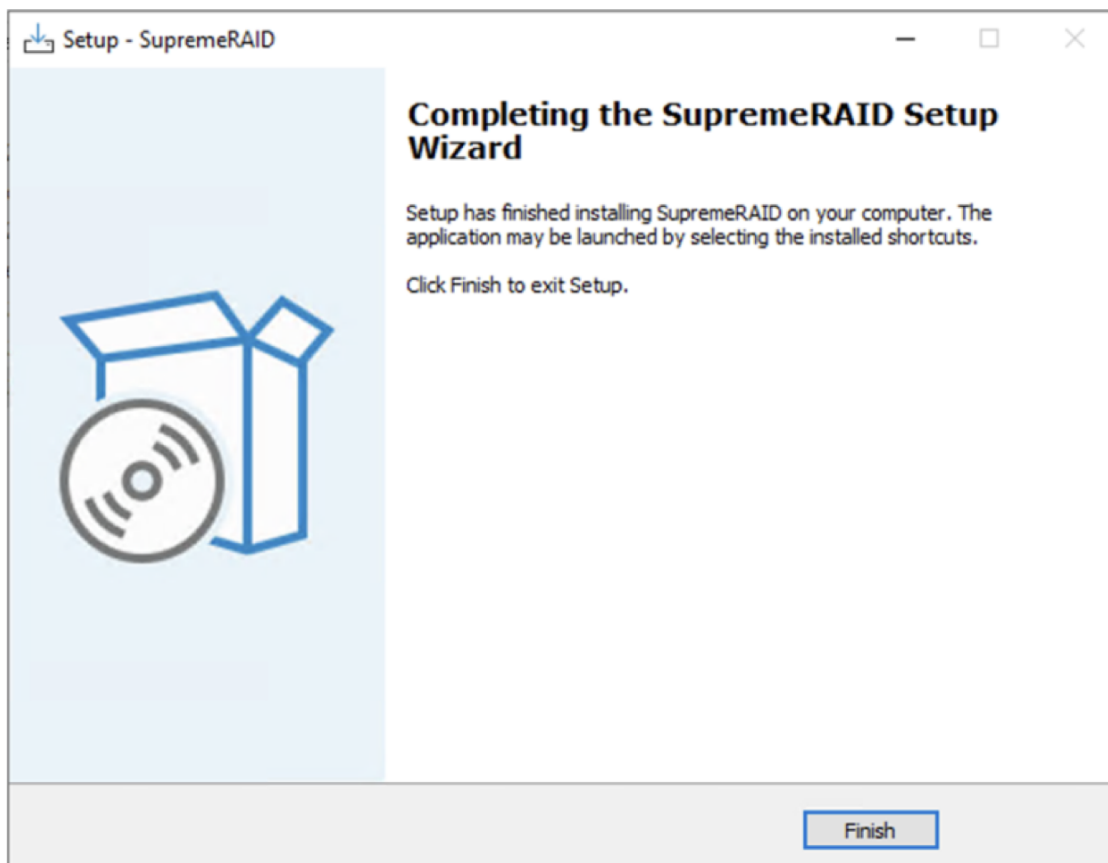*Step 2: Install the NVIDIA driver and follow the instructions.*
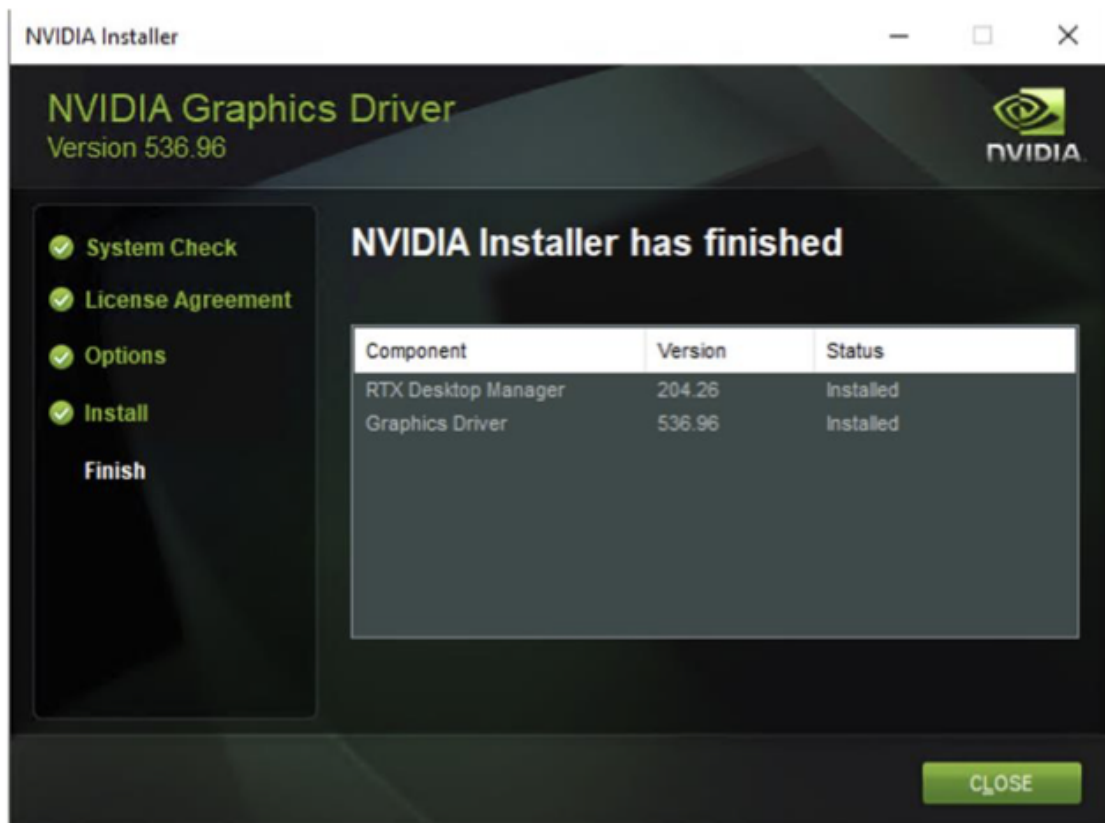
Step 3: Install the SupremeRAID™ driver and follow the instructions.

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.
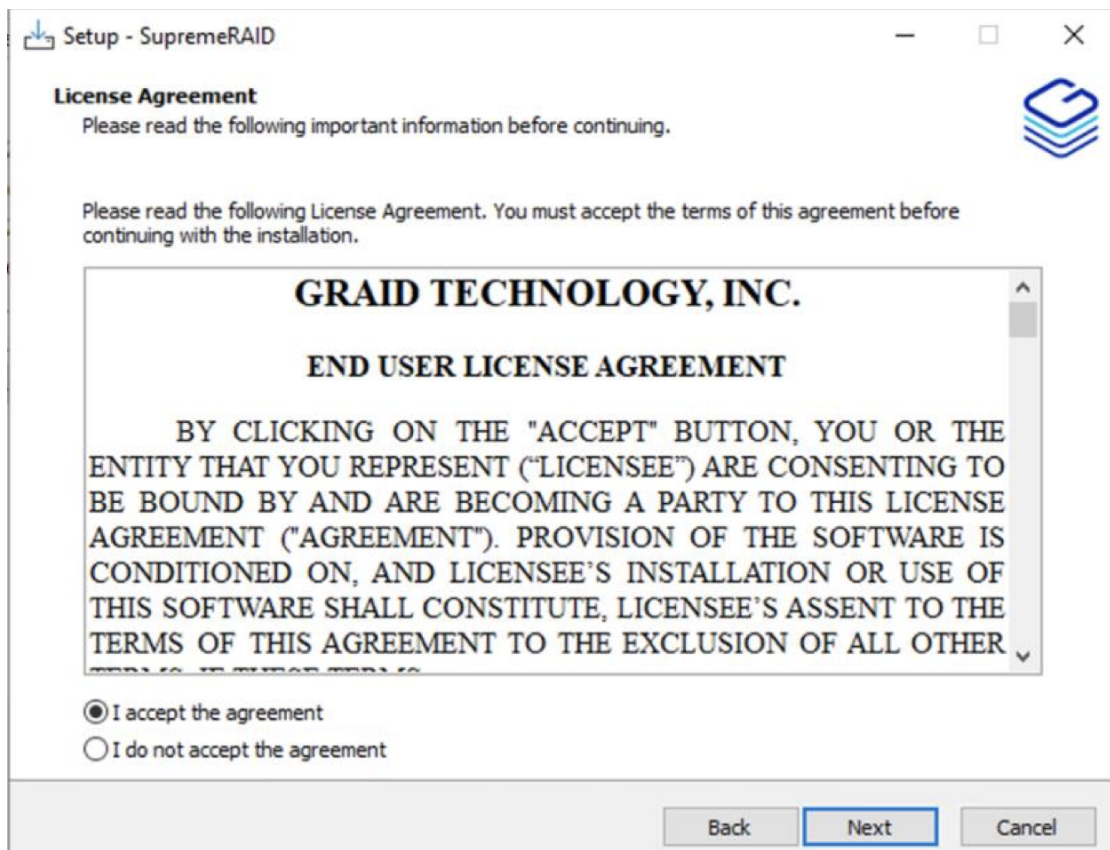
Step 5: Install the SupremeRAID™ driver page.

Managing Licenses

You can apply the license and check license information. To complete the installation, apply the license.

Applying the License

To apply the license and complete the installation, run:

```
> graidctl apply license <LICENSE_KEY>
```

Output example applying invalid license and valid license:

```
C:\Users\Administrator>graidctl apply license 2PE2QH74-UWQXISAH-GHVA48C4-CFBWUSNM
Apply license successfully.
Due to switch GPU to TCC mode, service is inactive now.
Please reboot system to active service.

C:\Users\Administrator>_
```

> ⛔ When applying the license, you might need to provide the serial number of the NVIDIA GPU to Graid Technology Technical Support. To obtain the NVIDIA GPU serial number, run the following command: > nvidia-smi -q | findstr -i serial

> ⚠️ After applying license, would set NVIDIA driver to TCC mode automatically. You need to reboot the system to enable graid driver.

Checking License Information

To obtain the license information, run:

```
> graidctl describe license
```

```
C:\Users\Administrator>graidctl desc license
Describe license successfully.
License State:       APPLIED
License Key:         2PE2QH74-UWQXISAH-GHVA48C4-CFBWUSNM
Expiration Days:     Unlimited
Features:

                     PD Number: 32
                     RAID5: true
                     RAID6: true
                     NVMe-over-Fabric: true
```

Utilize the New Drive

⚠️ Make sure you open the powershell as administrator.
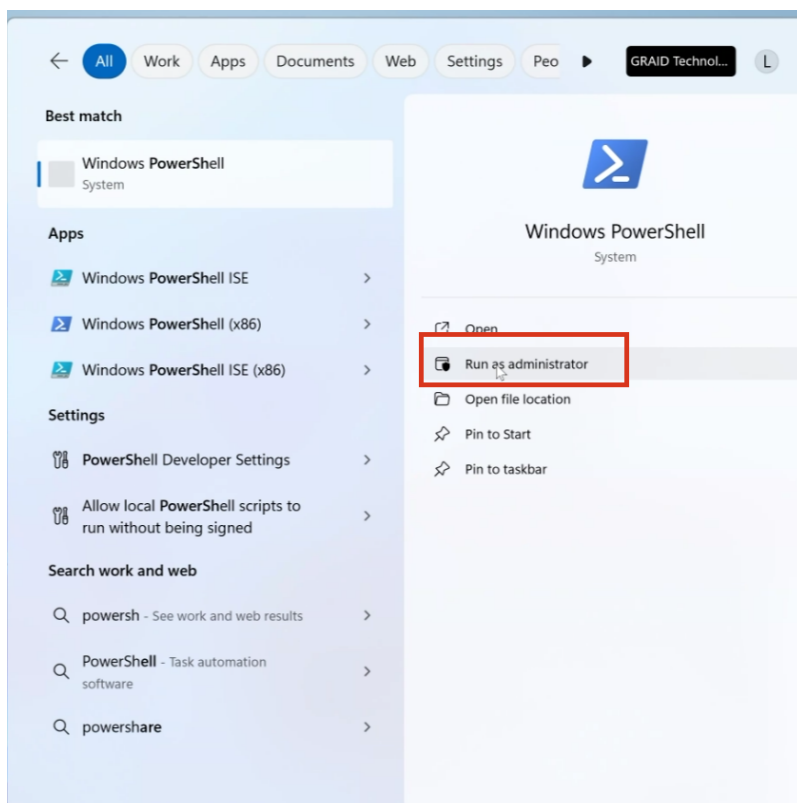
Create Physical Drive

A few examples for PD, DG and VD. Depenging on available NVMe etc. Select one of the options for each PD,DG and VD.

```
Examples:
  # create physical drive
    graidctl icreate physical_drive

  # create a drive group
    graidctl icreate drive_group

  # create a virtual drive
    graidctl icreate virtual_drive
```

Using icreate command, you can create a physical drive sequencial steps below.

```
PS C:\Windows\system32> graidctl icreate physical_drive
? Choose one or more NVMe devices:  [Use arrows to move, space to select, <right> to all, <left> to none, type to filter
]
> [ ]   Device Path:\\?\scsi#disk&ven_nvme&prod_corsair_mp700_pr#5&23d95725&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8
b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:A7GDB340-007B-SS00-0000-000000000000, Model:Corsair MP700 PRO, Capacity:1.0
 TB
  [ ]   Device Path:\\?\scsi#disk&ven_nvme&prod_t-force_tm8ff100#5&89d32a7&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8b
}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:TPBF2309-1100-1040-0409-000000000000, Model:T-FORCE TM8FF1001T, Capacity:1.0
 TB
  [ ]   Device Path:\\?\scsi#disk&ven_nvme&prod_ct1000t700ssd3#5&16744d04&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8}
, NQN/WWID:nqn.2016-08.com.micron:nvme:nvm-subsystem-sn-2339E87A01DC, Model:CT1000T700SSD3, Capacity:1.0 TB
  [ ]   Device Path:\\?\scsi#disk&ven_nvme&prod_sabrent_sb-rkt5-#5&19b34c86&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8
b}, NQN/WWID:nqn.2020-11.org.nvmexpress:uuid:48836385-5002-8300-0000-000000000000, Model:Sabrent SB-RKT5-1TB, Capacity:1
.0 TB
```



```
PS C:\Windows\system32> graidctl icreate physical_drive
? Choose one or more NVMe devices: Device Path:\\?\scsi#disk&ven_nvme&prod_corsair_mp700_pr#5&23d95725&0&000000#{53f5630
7-b6bf-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:A7GDB340-007B-SS00-0000-000000000000, Model:Cor
sair MP700 PRO, Capacity:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_t-force_tm8ff100#5&89d32a7&0&000000#{53f56307-b
6bf-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:TPBF2309-1100-1040-0409-000000000000, Model:T-FORC
E TM8FF1001T, Capacity:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_ct1000t700ssd3#5&16744d04&0&000000#{53f56307-b6bf
-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2016-08.com.micron:nvme:nvm-subsystem-sn-2339E87A01DC, Model:CT1000T700SSD3, Capa
city:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_sabrent_sb-rkt5-#5&19b34c86&0&000000#{53f56307-b6bf-11d0-94f2-00a0c
91efb8b}, NQN/WWID:nqn.2020-11.org.nvmexpress:uuid:48836385-5002-8300-0000-000000000000, Model:Sabrent SB-RKT5-1TB, Capa
city:1.0 TB
? Create new physical drive now? (y/N) _
```



```
PS C:\Windows\system32> graidctl icreate physical_drive
? Choose one or more NVMe devices:  [Use arrows to move, space to select, <right> to all, <left> to none, type to filter
]
  [x]   Device Path:\\?\scsi#disk&ven_nvme&prod_corsair_mp700_pr#5&23d95725&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8
b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:A7GDB340-007B-SS00-0000-000000000000, Model:Corsair MP700 PRO, Capacity:1.0
 TB
  [x]   Device Path:\\?\scsi#disk&ven_nvme&prod_t-force_tm8ff100#5&89d32a7&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8b
}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:TPBF2309-1100-1040-0409-000000000000, Model:T-FORCE TM8FF1001T, Capacity:1.0
 TB
  [x]   Device Path:\\?\scsi#disk&ven_nvme&prod_ct1000t700ssd3#5&16744d04&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8b}
, NQN/WWID:nqn.2016-08.com.micron:nvme:nvm-subsystem-sn-2339E87A01DC, Model:CT1000T700SSD3, Capacity:1.0 TB
> [x]   Device Path:\\?\scsi#disk&ven_nvme&prod_sabrent_sb-rkt5-#5&19b34c86&0&000000#{53f56307-b6bf-11d0-94f2-00a0c91efb8
b}, NQN/WWID:nqn.2020-11.org.nvmexpress:uuid:48836385-5002-8300-0000-000000000000, Model:Sabrent SB-RKT5-1TB, Capacity:1
.0 TB
```



```
PS C:\Windows\system32> graidctl icreate physical_drive
? Choose one or more NVMe devices: Device Path:\\?\scsi#disk&ven_nvme&prod_corsair_mp700_pr#5&23d95725&0&000000#{53f5630
7-b6bf-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:A7GDB340-007B-SS00-0000-000000000000, Model:Cor
sair MP700 PRO, Capacity:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_t-force_tm8ff100#5&89d32a7&0&000000#{53f56307-b
6bf-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2000-11.org.nvmexpress:uuid:TPBF2309-1100-1040-0409-000000000000, Model:T-FORC
E TM8FF1001T, Capacity:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_ct1000t700ssd3#5&16744d04&0&000000#{53f56307-b6bf
-11d0-94f2-00a0c91efb8b}, NQN/WWID:nqn.2016-08.com.micron:nvme:nvm-subsystem-sn-2339E87A01DC, Model:CT1000T700SSD3, Capa
city:1.0 TB, Device Path:\\?\scsi#disk&ven_nvme&prod_sabrent_sb-rkt5-#5&19b34c86&0&000000#{53f56307-b6bf-11d0-94f2-00a0c
91efb8b}, NQN/WWID:nqn.2020-11.org.nvmexpress:uuid:48836385-5002-8300-0000-000000000000, Model:Sabrent SB-RKT5-1TB, Capa
city:1.0 TB
? Create new physical drive now? Yes
Icreate physical drive PD0 (nqn.2000-11.org.nvmexpress:uuid:A7GDB340-007B-SS00-0000-000000000000) successfully.
Icreate physical drive PD1 (nqn.2000-11.org.nvmexpress:uuid:TPBF2309-1100-1040-0000-000000000000) successfully.
Icreate physical drive PD2 (nqn.2016-08.com.micron:nvme:nvm-subsystem-sn-2339E87A01DC) successfully.
Icreate physical drive PD3 (nqn.2020-11.org.nvmexpress:uuid:48836385-5002-8300-0000-000000000000) successfully.
PS C:\Windows\system32>
```
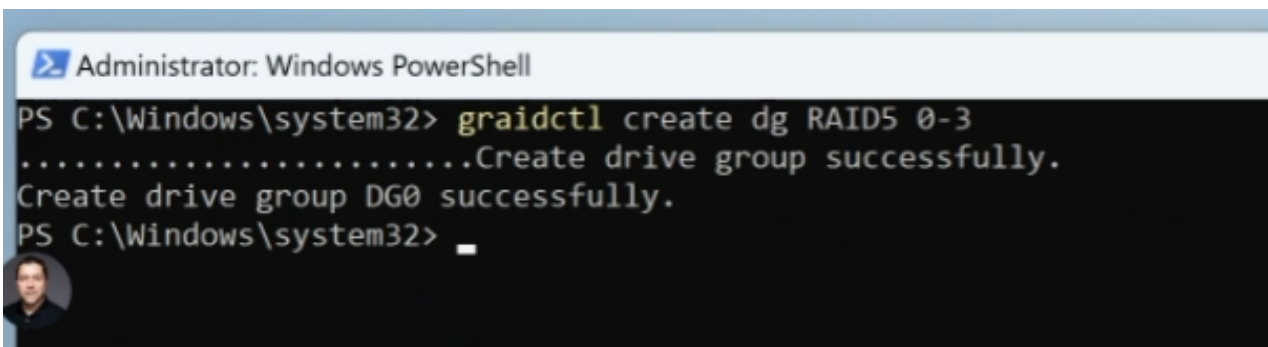
Create Drive Group
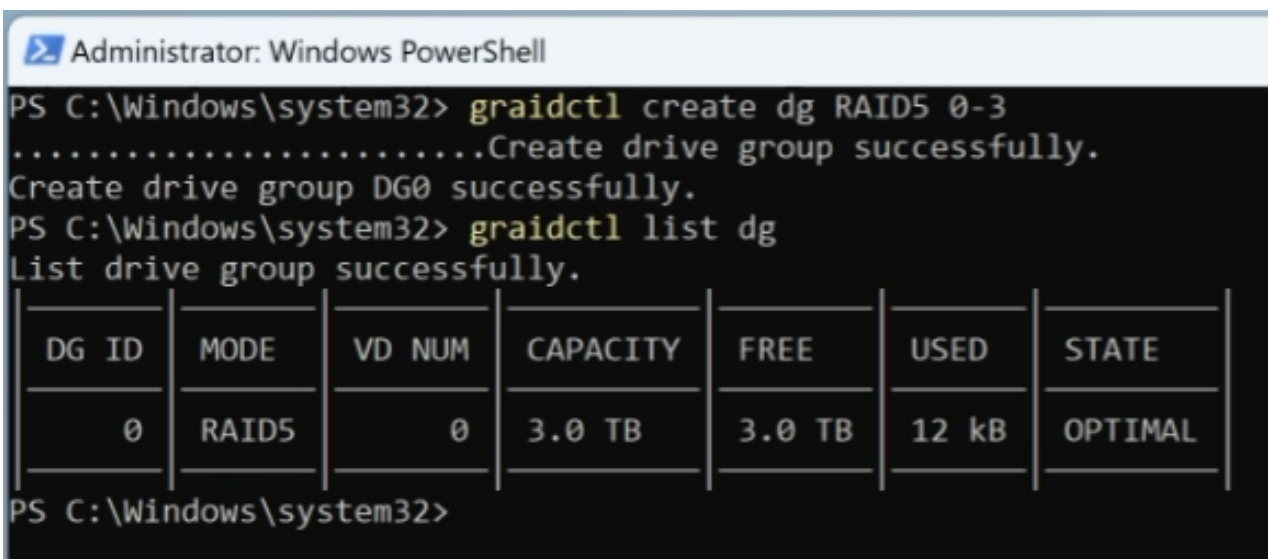
Creating a drive group RAID 5 with 4 Drives.

```
#Examples:
# create a RAID10 DG with PD0 and PD1
  graidctl create drive_group RAID10 0 1

# create a RAID5 DG with PD0, 1, 2 and 5
  graidctl create drive_group RAID5 0 1 2 5
  graidctl create drive_group RAID5 0-2 5
```
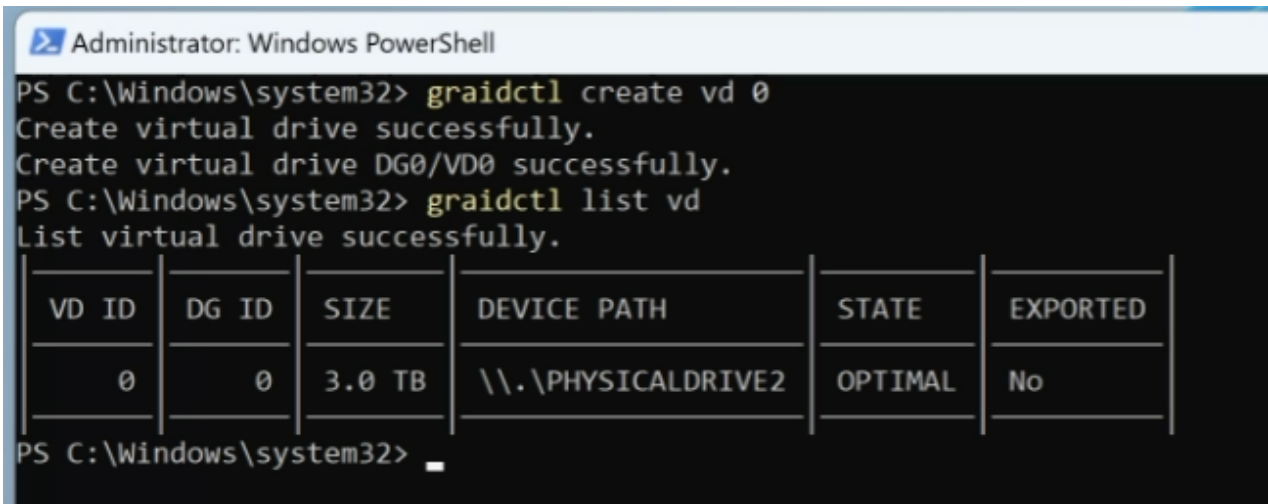
Create Virtual Drive

#Examples:
create a VD with all DG0's free size
  graidctl create virtual_drive 0
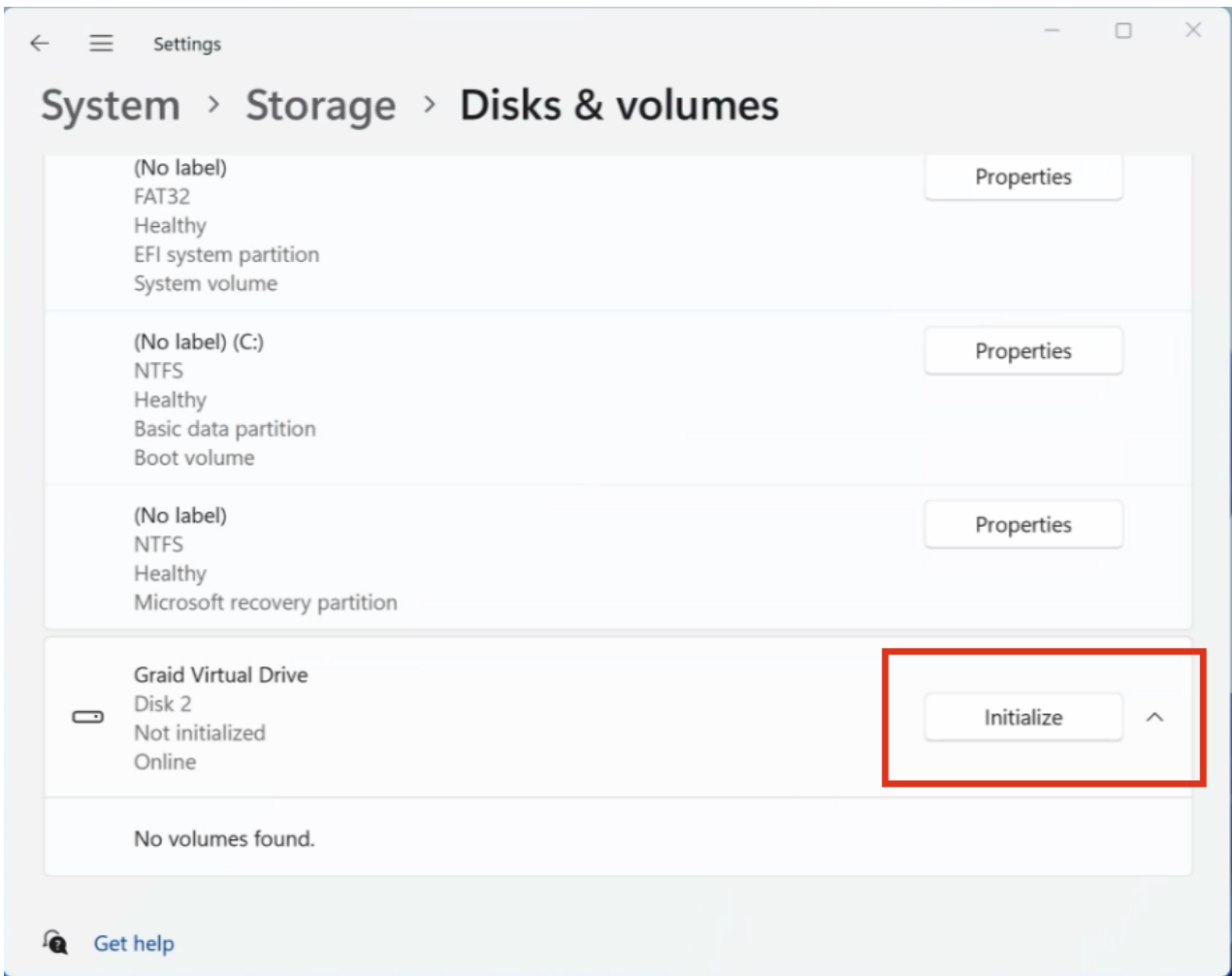
create a 500GB VD on DG0
  graidctl create virtual_drive 0 500GB
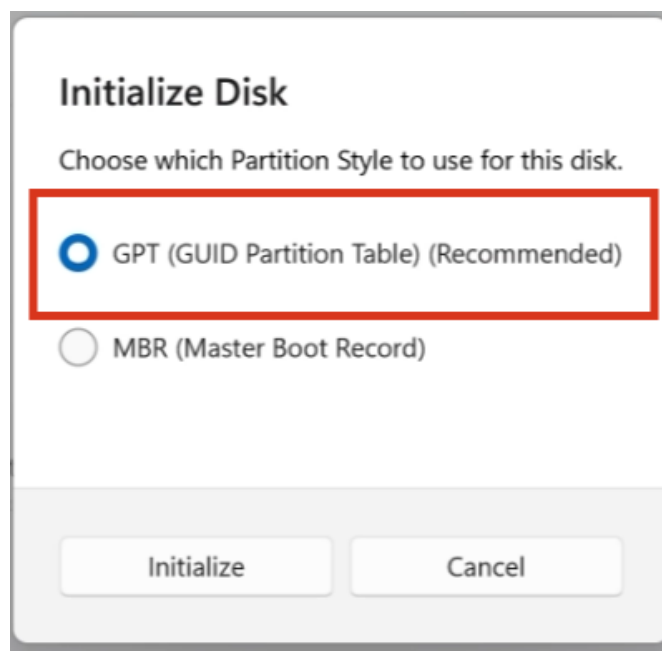
Initialize Virtual Drive

Now using Disk Management, initialize the virtual drive.
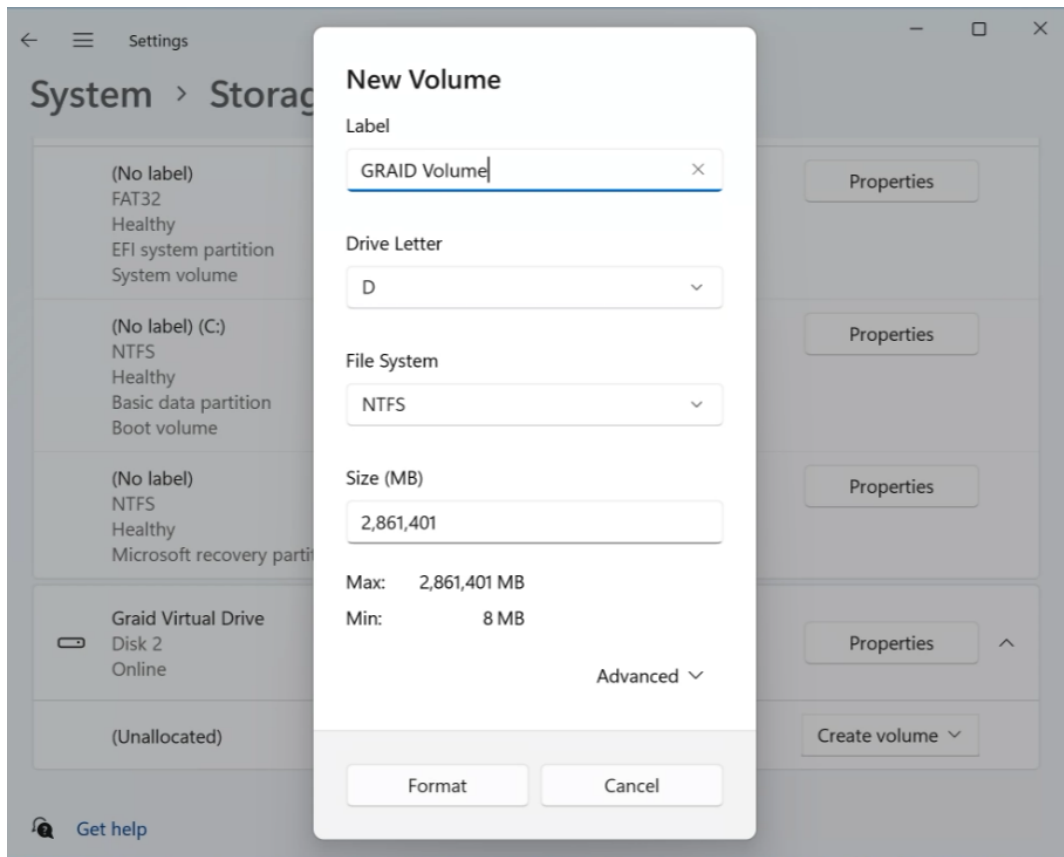

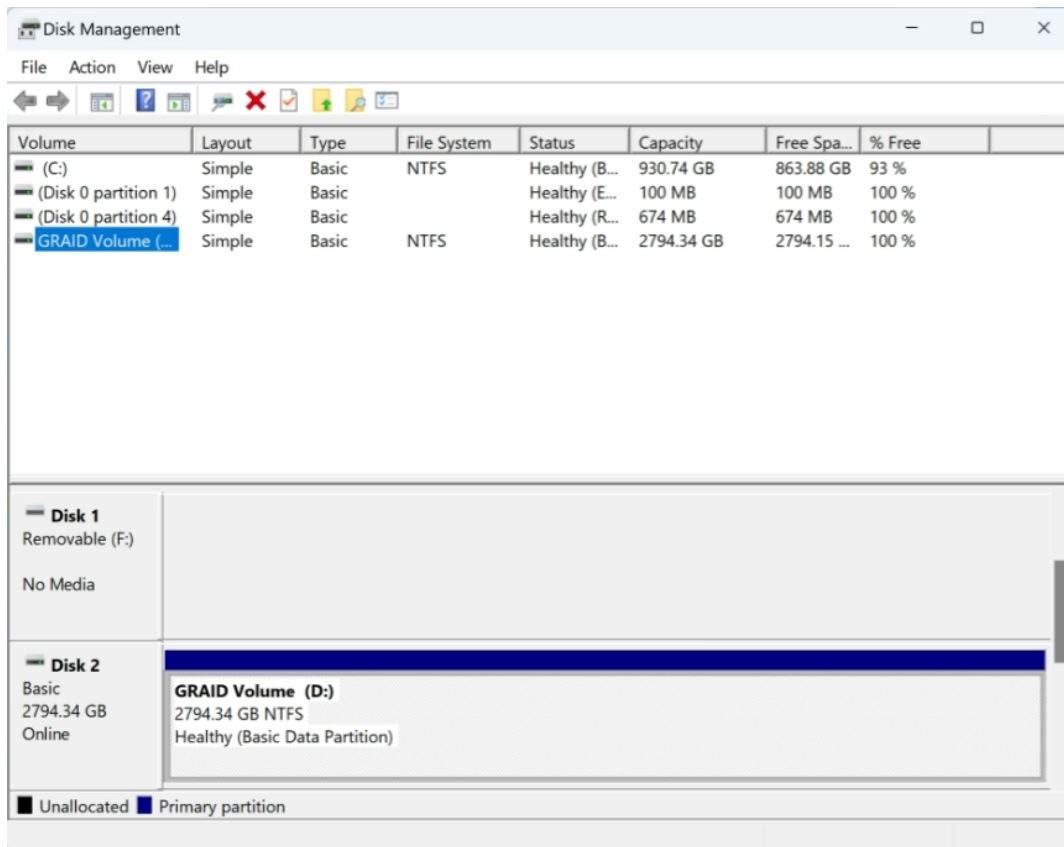Use default options to initialize the virtual drive.

New Volume on Virtual Drive

Now to be able to use the new volume, you need to format it.

Drive now available to use with letter D:

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