SupremRAID™ QuickStart Guide

Graid Technology Inc.

Quick Linux Driver SE Installation Guide

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May 29th, 2024:

Table of Contents

Graid Technology QuickStart Guide

v1.0

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](#)

SuprimeRAID 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.

Installation Of SupremeRAID™ Driver

Installing the Graid Software

The recommended and quickest way to install the graid software is by using the pre-installer scripts and installer (described below).

Using the Pre-installer and Installer Scripts

The graid pre-installer is an executable file that contains the required dependencies and a setup script that installs the NVIDIA driver. The script makes it easy to prepare the environment and install the SupremeRAID™ driver in every supported Linux distribution. Use the following steps to prepare the environment and install the SupremeRAID™ driver using the pre-installer in supported Linux distributions.

download the pre-installer and installer

```
$ open with a browser (chrome,safari etc) https://docs.graidtech.com/release-notes/linux-driver/1.6.0-beta/

# copy the url of the pre-installer and the installer pkg then use wget to download them.

$ wget https://download.graidtech.com/driver/pre-install/graid-sr-pre-installer-1.6.0-107-x86_64.run

$ chmod +x graid-sr-pre-installer-1.6.0-107-x86_64.run

$ wget https://download.graidtech.com/driver/sr/linux/1.6.0/beta/graid-sr-installer-1.6.0-000-188-145.run

$ chmod +x graid-sr-installer-1.6.0-000-188-145.run
```

Fedora Desktop 40 Installation Guide

Requirements pkgs for Fedora Desktop 40

Fedora Desktop necessary packages including DKMS

```
sudo dnf update -y
sudo dnf install -y vim wget make automake gcc gcc-c++ kernel-devel kernel-headers kernel
dkms ipmitool tar mdadm sg3_utils sqlite-libs automake dialog
```

Running the Pre-installer

```
./graid-sr-pre-installer-1.6.0-107-x86_64.run
```

Once the pre-installer is run, reboot the system and runt the nvidia-smi command to verify that the nvidia driver is showing as installed.

Using the -q option, to get additional information about the nvidia card.

```
root@graid-workstation:~# nvidia-smi -q|more
                                        Alacritty
==============NVSMI LOG==============

Timestamp                            : Thu May  9 16:17:19 2024
Driver Version                       : 550.67
CUDA Version                         : 12.4

Attached GPUs                        : 1
GPU 00000000:47:00.0
    Product Name                     : NVIDIA RTX A4000
    Product Brand                    : NVIDIA RTX
    Product Architecture             : Ampere
    Display Mode                     : Disabled
    Display Active                   : Disabled
    Persistence Mode                 : Enabled
    Addressing Mode                  : None
    MIG Mode
        Current                      : N/A
        Pending                      : N/A
    Accounting Mode                  : Disabled
    Accounting Mode Buffer Size      : 4000
    Driver Model
        Current                      : N/A
        Pending                      : N/A
    Serial Number                    : 1714223000620
    GPU UUID                         : GPU-42493182-9df1-bc95-9ad5-8cbfad1b8e0c
    Minor Number                     : 0
    VBIOS Version                    : 94.04.57.00.0B
    MultiGPU Board                   : No
    Board ID                         : 0x4700
    Board Part Number                : 900-5G190-0300-002
    GPU Part Number                  : 24B0-875-A1
    FRU Part Number                  : N/A
    Module ID                        : 1
    Inforom Version
        Image Version                : G190.0510.00.02
        OEM Object                   : 2.0
        ECC Object                   : 6.16
        Power Management Object      : N/A
    Inforom BBX Object Flush
        Latest Timestamp             : N/A
        Latest Duration              : N/A
    GPU Operation Mode
        Current                      : N/A
        Pending                      : N/A
    GPU C2C Mode                     : N/A
    GPU Virtualization Mode
        Virtualization Mode          : None
        Host VGPU Mode               : N/A
        vGPU Heterogeneous Mode      : N/A
    GPU Reset Status
        Reset Required               : No
        Drain and Reset Recommended  : N/A
    GSP Firmware Version             : N/A
    IBMNPU
        Relaxed Ordering Mode        : N/A
    PCI
        Bus                          : 0x47
        Device                       : 0x00
        Domain                       : 0x0000
        Base Classcode               : 0x3
        Sub Classcode                : 0x0
        Device Id                    : 0x24B010DE
        Bus Id                       : 00000000:47:00.0
        Sub System Id                : 0x14AD103C
        GPU Link Info
            PCIe Generation
```

```
root@graid-workstation ~]# nvidia-smi -q|grep -iG5 serial
    Accounting Mode                       : Disabled
    Accounting Mode Buffer Size           : 4000
    Driver Model
        Current                           : N/A
        Pending                           : N/A
    Serial Number                         : 1714223000620
    GPU UUID                              : GPU-42493182-9df1-bc95-9ad5-0cbfad1b8e0c
    Minor Number                          : 0
    VBIOS Version                         : 94.04.57.00.0B
    MultiGPU Board                        : No
    Board ID                              : 0x4700
root@graid-workstation ~]#
```

Running the Installer

Installing the SupremeRAID™ driver requires root privileges and will need to be rebooted after installation.

Installing the SupremeRAID™ driver

```
./graid-sr-installer-1.6.0-000-188-145.run
```

Once rebooted run the version command

```
root@graid-workstation:~# graidctl version
  Graidctl version successfully.
graidctl version:        1.6.0-beta-197.g800bf340.017
graid_server version:    1.6.0-beta-197.g800bf340.017
```

Apply the Graid Technology SupremeRAID license.

```
graidctl apply license xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx
```

Check control status

```
root@graid-workstation:~# graidctl list controller
List controller successfully.

 ID | CONTROLLER MODEL | SERIAL NUMBER | NUMA | STATE  | DG
 0  | Unknown          | 1714223       | 0    | ONLINE | 0

root@graid-workstation:~#
```

As this is still a beta version, the controller is model is not yet recognized under our Fedora 40 Desktop environment.

Ubuntu Desktop 24.04 Installation Guide

Graid Technology, Inc. recommends referring to Supported Operating Systems on page 16 and using the pre- installer to configure the environmental settings.

Disable Ubuntu daily upgrade and auto upgrades.

```
$ sudo sed -i '/Unattended-Upgrade "1"/ s/"1"/"0"/' /etc/apt/apt.conf.d/20auto-
upgrades
$ sudo sed -i '/Update-Package-Lists "1"/ s/"1"/"0"/'
/etc/apt/apt.conf.d/20auto-upgrades
```

Requirements pkgs for Ubuntu Desktop 24.04

Ubuntu Desktop install package dependencies and build for DKMS.

```
$ sudo apt-get update -y
$ sudo apt install -y make automake gcc g++ linux-headers-$(uname -r) dkms ipmitool initramfs-
tools tar mdadm libsgutils2-1.46-2 libudev-dev libpci3 sqlite3 automake dialog
```

Download the Graid Pre-installer.

```
wget https://download.graidtech.com/driver/pre-install/graid-sr-pre-installer-1.6.0-107-
x86_64.run
```

Download the Graid Installer based on the NVIDIA driver version, in this example it's for the SR-1000.

```
wget https://download.graidtech.com/driver/sr/linux/1.6.0/beta/graid-sr-installer-1.6.0-000-188-
145.run
```

Ubunutu nvidia-smi Output

```
============NVSMI LOG==============

Timestamp                                : Fri May 24 14:19:52 2024
Driver Version                           : 550.67
CUDA Version                             : 12.4

Attached GPUs                            : 1
GPU 00000000:01:00.0
    Product Name                         : NVIDIA RTX A2000
    Product Brand                        : NVIDIA RTX
    Product Architecture                 : Ampere
    Display Mode                         : Disabled
    Display Active                       : Disabled
    Persistence Mode                     : Enabled
    Addressing Mode                      : None
    MIG Mode
        Current                          : N/A
        Pending                          : N/A
    Accounting Mode                      : Disabled
    Accounting Mode Buffer Size          : 4000
    Driver Model
        Current                          : N/A
        Pending                          : N/A
    Serial Number                        : 1424921036099
    GPU UUID                             : GPU-0221aa0b-2335-f9fd-8f11-58f8bc7a0e6a
    Minor Number                         : 0
    VBIOS Version                        : 94.06.2C.00.01
    MultiGPU Board                       : No
    Board ID                             : 0x100
    Board Part Number                    : 900-5G192-2200-000
    GPU Part Number                      : 2531-850-A1
    FRU Part Number                      : N/A
    Module ID                            : 1
    Inforom Version
        Image Version                    : G192.0500.00.01
        OEM Object                       : 2.0
        ECC Object                       : 6.16
        Power Management Object          : N/A
    Inforom BBX Object Flush
        Latest Timestamp                 : N/A
        Latest Duration                  : N/A
    GPU Operation Mode
        Current                          : N/A
        Pending                          : N/A
    GPU C2C Mode                         : N/A
    GPU Virtualization Mode
        Virtualization Mode              : Pass-Through
        Host VGPU Mode                   : N/A
        vGPU Heterogeneous Mode          : N/A
    GPU Reset Status
        Reset Required                   : No
        Drain and Reset Recommended      : N/A
    GSP Firmware Version                 : N/A
    IBMNPU
        Relaxed Ordering Mode            : N/A
    PCI
        Bus                              : 0x01
        Device                           : 0x00
        Domain                           : 0x0000
        Base Classcode                   : 0x3
        Sub Classcode                    : 0x0
        Device Id                        : 0x253110DE
        Bus Id                           : 00000000:01:00.0
        Sub System Id                    : 0x151D10DE
        GPU Link Info
            PCIe Generation
                Max                      : 4
                Current                  : 2
--More--
```

Figure 1. NVIDIA Installed

Getting the serial number of the nvidia card to get the Graid Technology SupremeRAID™ license.

```
root@graid-workstation ~]# nvidia-smi -q|grep -iG5 serial
    Accounting Mode                      : Disabled
    Accounting Mode Buffer Size          : 4000
    Driver Model
        Current                          : N/A
        Pending                          : N/A
    Serial Number                        : 1714223000620
    GPU UUID                             : GPU-42493182-9df1-bc95-9ad5-8cbfad1b8e0c
    Minor Number                         : 0
    VBIOS Version                        : 94.04.57.00.0B
    MultiGPU Board                       : No
    Board ID                             : 0x4700
root@graid-workstation ~]#
```

Figure 2. NVIDIA SMI Serial Number

Utilize the New Drive

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 a PD by nqn
  graidctl create physical_drive nqn.2020-05.graid.com.example:nvm-subsys-sn-xxx

# create a PD by device path
  graidctl create physical_drive /dev/nvme1

# create three PDs by device path
  graidctl create physical_drive /dev/nvme1-3

# create two PDs by nqn and device path
  graidctl create physical_drive nqn.2020-05.graid.com.example:nvm-subsys-sn-xxx
/dev/nvme1
```

Create Drive Group

```
#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
```

Format and Mount Virtual Drive

Create mounting point

mkdir /media/graid

Check with fdisk the new available partition

```
root@graid-workstation ~]# fdisk -l|grep -iG5



Disk /dev/gdg0n1: 2.73 TiB, 2998693527552 bytes, 732102912 sectors
Disk model: GRAID-SR
Units: sectors of 1 * 4096 = 4096 bytes
Sector size (logical/physical): 4096 bytes / 4096 bytes
I/O size (minimum/optimal): 12288 bytes / 12288 bytes
```

You will need to create a partition on it:

fdisk to make the partition available

```
root@graid-workstation ~]# fdisk /dev/gdg0n1

Welcome to fdisk (util-linux 2.40).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS (MBR) disklabel with disk identifier 0xd983a5cc.

Command (m for help): p
Disk /dev/gdg0n1: 2.73 TiB, 2998693527552 bytes, 732102912 sectors
Disk model: GRAID-SR
Units: sectors of 1 * 4096 = 4096 bytes
Sector size (logical/physical): 4096 bytes / 4096 bytes
I/O size (minimum/optimal): 12288 bytes / 12288 bytes
Disklabel type: dos
Disk identifier: 0xd983a5cc

Command (m for help): n
Partition type
   p   primary (0 primary, 0 extended, 4 free)
   e   extended (container for logical partitions)
Select (default p):
Disk /dev/gdg0n1: 2.73 TiB, 2998693527552 bytes, 732102912 sectors
```

```
Disk model: GRAID-SR
Units: sectors of 1 * 4096 = 4096 bytes
Sector size (logical/physical): 4096 bytes / 4096 bytes
I/O size (minimum/optimal): 12288 bytes / 12288 bytes
Disklabel type: dos
Disk identifier: 0xd983a5cc


Device      Boot Start     End  Sectors  Size Id Type
/dev/gdg0n1p1      256 732102911 732102656  2.7T 83 Linux
```

And then, you can type "n" to create a new partition. Make it primary and select the defaults. Will be using the full disk.

Execute the "w" command to write the changes

Format VD as ext4

```
mkfs.ext4 /dev/gdg0n1n1
```

Mount the new SupremeRAID Virtal Drive

```
mount -o noatime,nodiratime /dev/gdg0n1n1 /media/graid
```

Automatically remount at reboot

```
$ cp /etc/fstab /tmp/
$ echo "/dev/gdg0n1n1 /media/graid ext4 x-
systemd.requires=graid.service,nofail,noatime,nodiratime 0 0" >> /etc/fstab
```

Document Released on May 29th, 2024

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