

SSD6204 Red Hat 8.3 Installation Guide

Version 1.00

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1 Overview

This guide explains how to install Red Hat to an NVMe SSD or array hosted by the SSD6204 controller.

For Red Hat 8.3

Mirror link: <https://developers.redhat.com/products/rhel/download#>

2 Installing Red Hat 8.3 on SSD6204 controller

Step 1 Prepare Your Hardware for Installation

After installing the NVMe SSDs into the SSD6204 controller, you can configure the SSD's as a RAID array, or use them as separate, single disks.

Before installation, you must temporarily remove all the NVMe SSD, which are not physically attached to SSD6204 controller, from your system. These can be reinstalled after Red Hat is up and running.

Note: Red Hat 8.3 requires UEFI Boot support when used with the SSD6204. If you have other SCSI-class adapters installed, you must make sure the SSD6204 controller UEFI support is loaded first; otherwise the system may be unable to boot. If the SSD6204 is not loading first, try moving it to another PCIe slot.

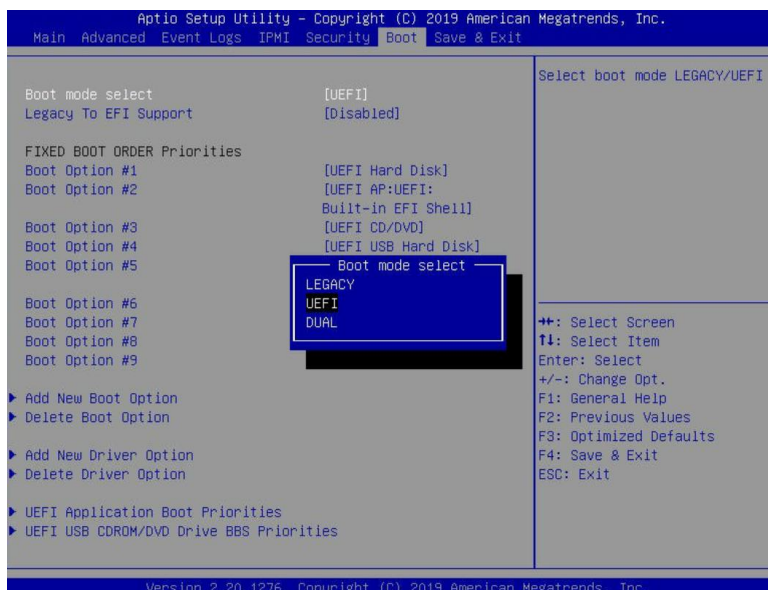
Step 2 Create an Array

If you would like to configure a RAID array using NVMe SSD's hosted by the SSD6204, please select 1 of the following 4 Methods.

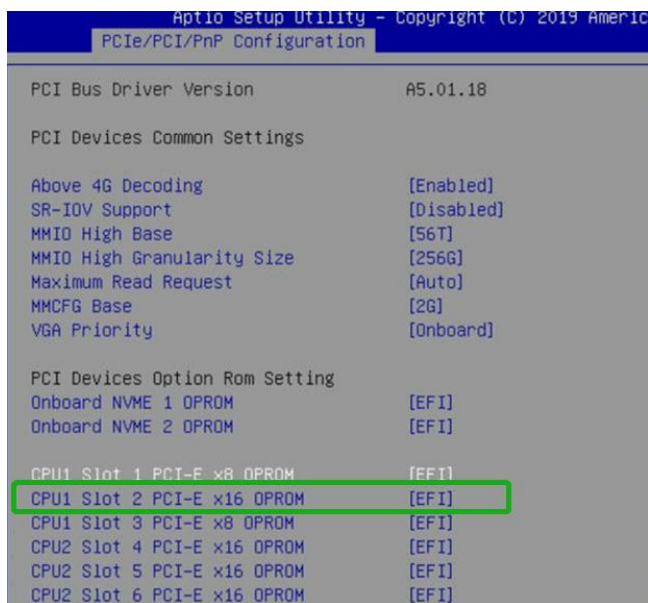
Method 1: Create a RAID array using the Motherboard BIOS

Using the SuperMicro XIIDPi-NT motherboard as an example:

1. Set 'Boot mode select' to 'UEFI'.

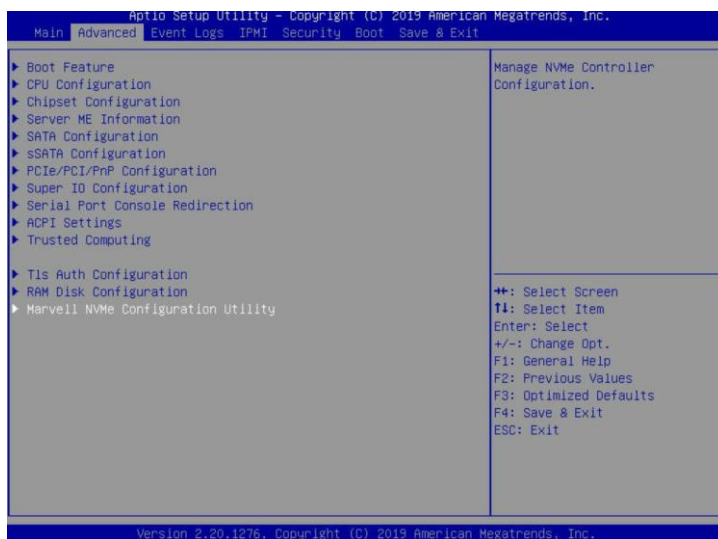


2. Next, under "**Advanced->PCIe/PCI/PnP Configuration**", change "**CPU Slot x PCI-E OPROM**" to "**EFI**". "**x**" refers to the slot number (slot 2 was used when the screenshot was taken). Please consult the motherboard manual for more information.



3. Creating the RAID array:

- a. Select "**Advanced->Marvell NVMe Configuration Utility**";

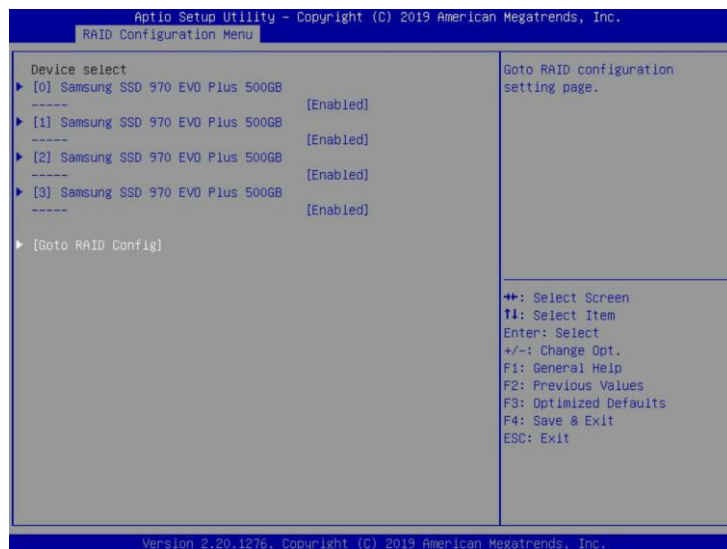


Note: If you cannot find "**Marvell NVMe Configuration Utility**" in the motherboard BIOS under "**advanced**" interface, you will need to create the array using one of the other three methods.

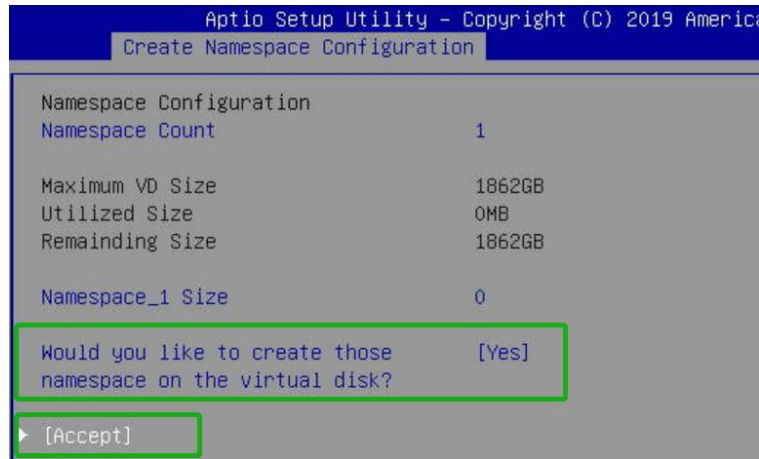
- b. Next, select “**Create RAID Configuration**”. Press “**Enter**” to open the Configuration Utility.



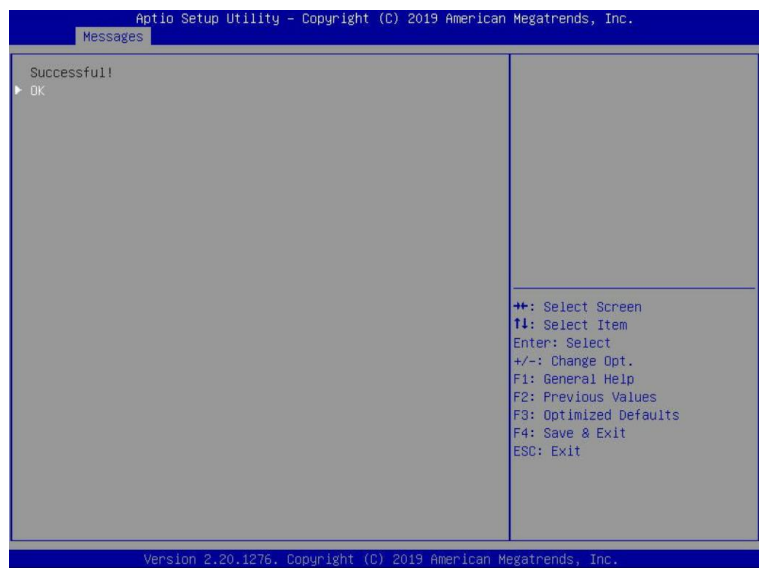
- c. Set “**RAID Configuration Menu**” to “**Enabled**”, and then select “**Goto RAID Config**”.



- d. For “**Would you like to create this virtual disk**” select “**Yes**”, then select “**Accept**” to create the RAID0 array.



- e. When the page displays “Successful!” select **OK**, to exit the menu;

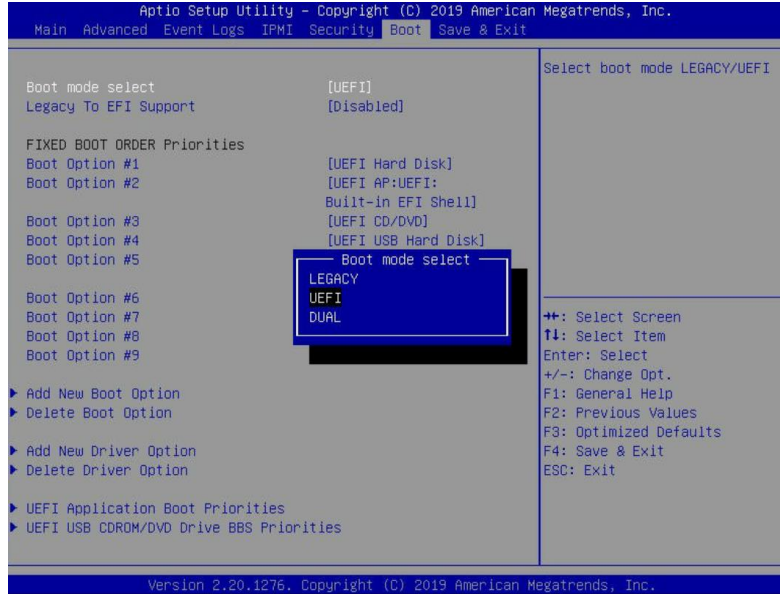


Method 2: Create RAID in UEFI

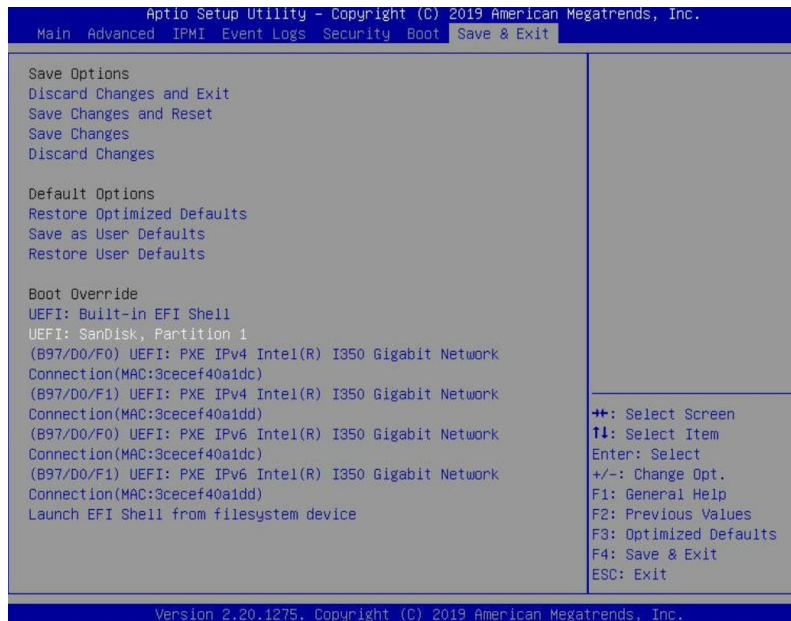
1. First, prepare the UEFI Tool. This file should be copied to the root of a bootable USB flash drive.

Using the SuperMicro XIIDPi-NT motherboard as an example:

2. Set ‘Boot mode select’ to ‘UEFI’;

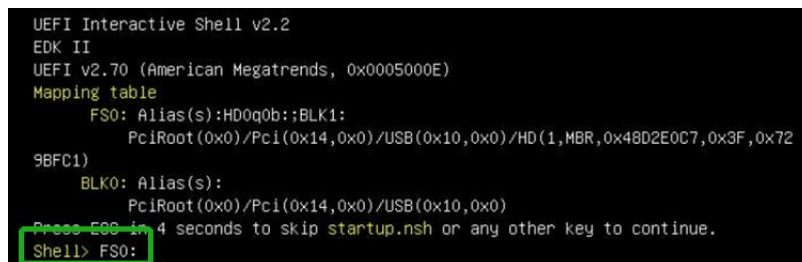


3. Hoose to boot from the USB flash drive (shown as “UEFI: SanDisk, Partition 1” for the example below):



4. After entering the UEFI Shell, select "FS0:" to access the USB flash drive:.

Note: "FS0" is the name of the USB flash drive used for this example



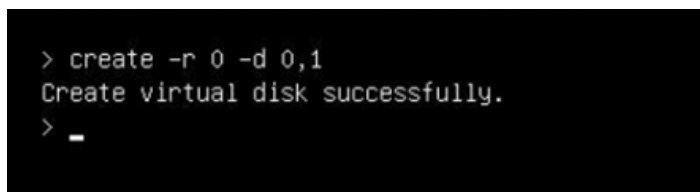
- Next, locate the “**mnv_cli.efi**” program and run it:



Note: if the CLI reports that “No NVMe Controller is found”, please see Appendix – Troubleshooting.

- To create a RAID0 array using two NVMe SSD’s, enter the following command:

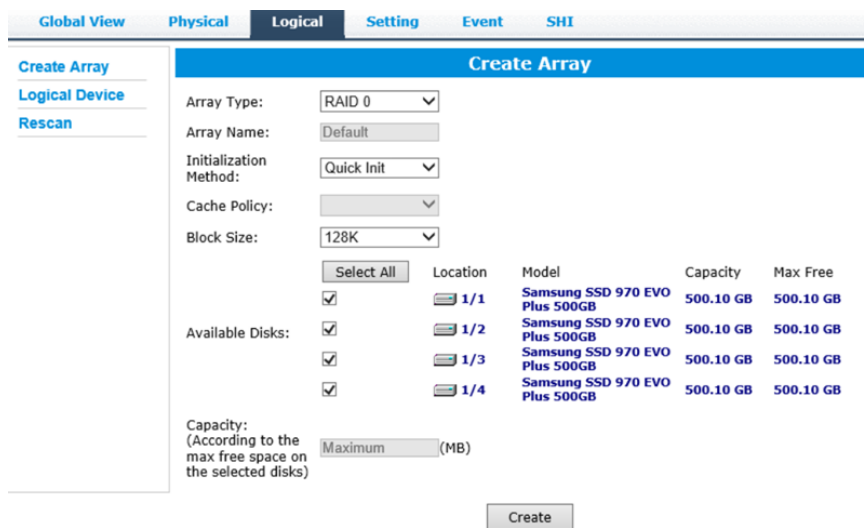
create -r 0 -d 0,1



For more CLI commands, please download the CLI manual from the product page of the official website.

Method 3: Create the RAID array using a Windows operating System, and the WebGUI management software:

- This method assumes you have access to a Windows Server 2019 system and have installed the WebGUI software.
- Open the WebGUI, select the Logical tab. Click “Create Array”, and configure the array as desired using the drop-down menus and selection boxes. Once configured, click the “Create” button to create the array (the example below shows 4 NVMe SSD’s configured as a RAID 0 array).



3. Once the array has been created, it will be displayed under **Logical Device Information**.

Name	Type	Capacity	Blocksize	Sectorsize	OS Name	Status
VD_0	RAID 0	2.00 TB	128k	512B	HighPoint-SSD6204	Normal Maintenance

Location	Model	Capacity	Max Free
1/1	Samsung SSD 970 EVO Plus 500GB	500.10 GB	0.00 GB
1/2	Samsung SSD 970 EVO Plus 500GB	500.10 GB	0.00 GB
1/3	Samsung SSD 970 EVO Plus 500GB	500.10 GB	0.00 GB
1/4	Samsung SSD 970 EVO Plus 500GB	500.10 GB	0.00 GB

Method 4: Create a RAID array in Red Hat 8.3 using the CLI Tool

- This method assumes that you have already prepared a Red Hat system.
- Boot the system, and enter the username and password to start Red Hat.
- Copy the CLI package into the root directory of a USB flash drive. Use the following command to copy the `mnv_cli` package to home directory:

```
cp mnv_cli /home
```

```
[root@localhost mnt]# cp mnv_cli /home/
[root@localhost mnt]# cd /home/
[root@localhost home]# ls
mnv_cli  test
```

- Access the home directory and enter the following command to start the CLI:

```
./mnv_cli
```

```
[root@localhost home]# ./mnv_cli
CLI Version: 1.0.0.1041
Welcome to NVMe Command Line Interface.
```

- To create a RAID0 array using four NVMe SSD's, enter the following command.

```
create -r 0 -d 0,1,2,3
```

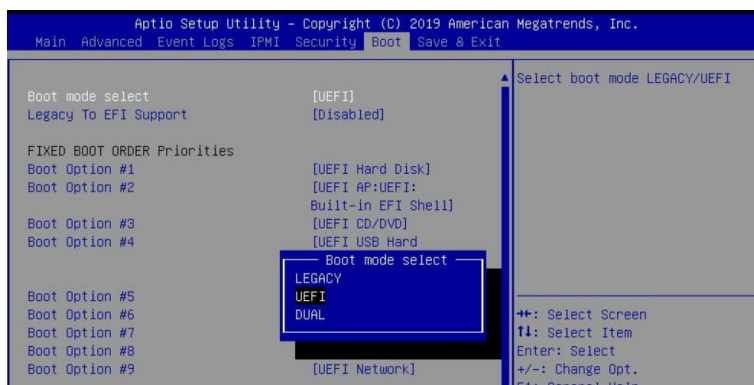
```
> create -r 0 -d 0,1,2,3
Create virtual disk successfully.
>
```

For more CLI commands, please download the CLI manual from the product page of the official website.

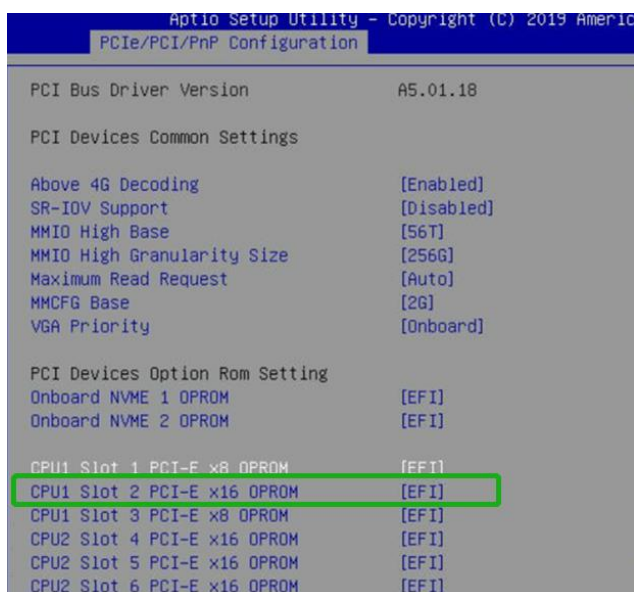
Step 3 Adjust the Motherboard BIOS Settings

Using the Super Micro X11DPi-NT motherboard as an example:

1. In the system BIOS SETUP menu, change 'Boot mode select' to 'UEFI';



2. Under "Advanced→PCIe/PCI/PnP Configuration, change the setting for "CPU Slot x PCI-E OPRM" to "EFI". "x" refers to the slot number (slot 2 was used when the screenshot was taken). Please consult the motherboard manual for more information.

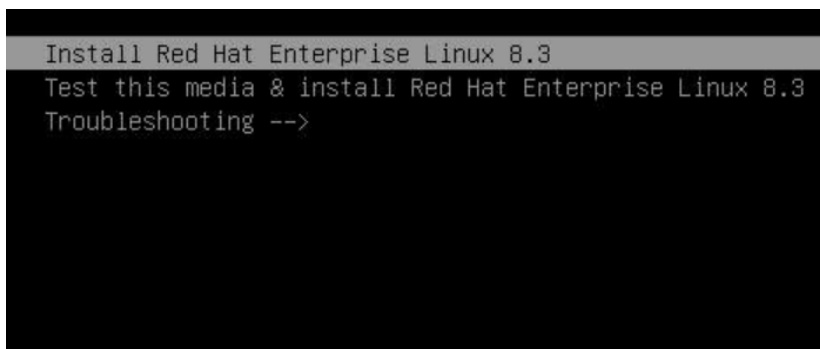


3. Set " Secure Boot " to "Disabled".

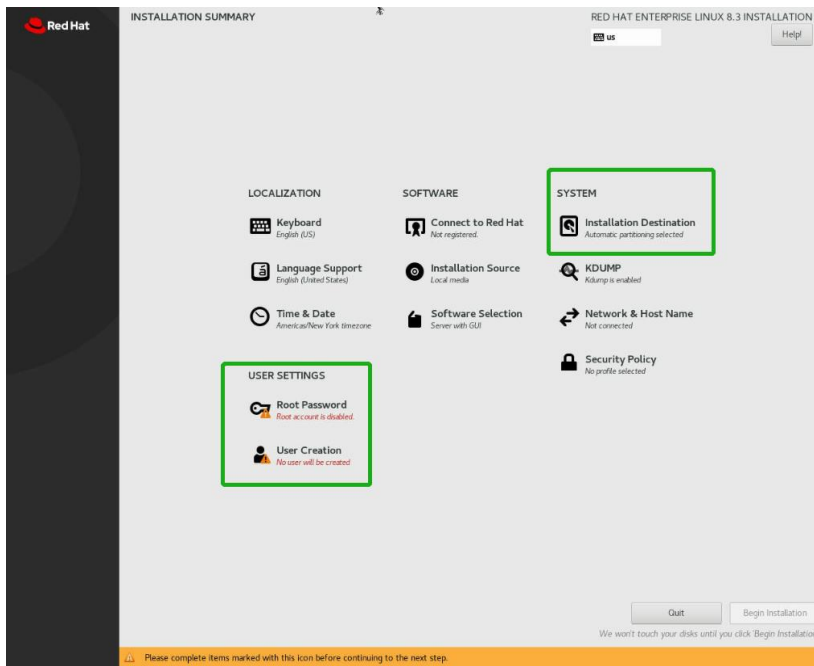


Step 4 Install Red Hat 8.3 to the SSD6204

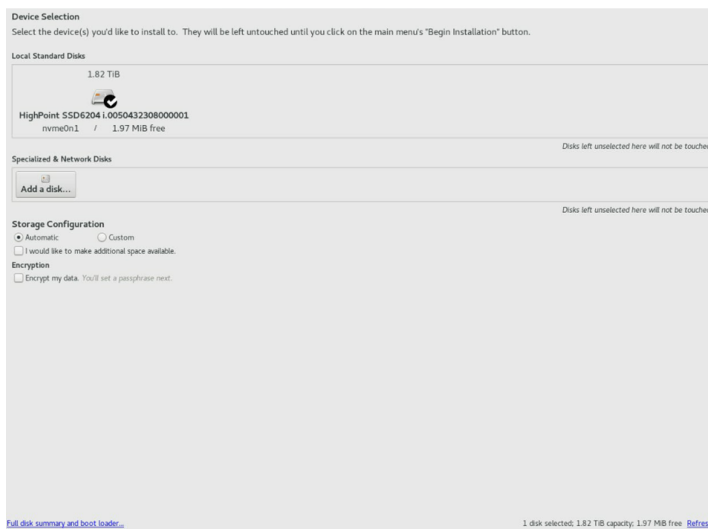
1. Boot from the Red Hat 8.3 Installation DVD (UEFI mode).
2. When the Installation screen appears, please select "**Install Red Hat Enterprise Linux 8.3**" to install Red Hat 8.3.



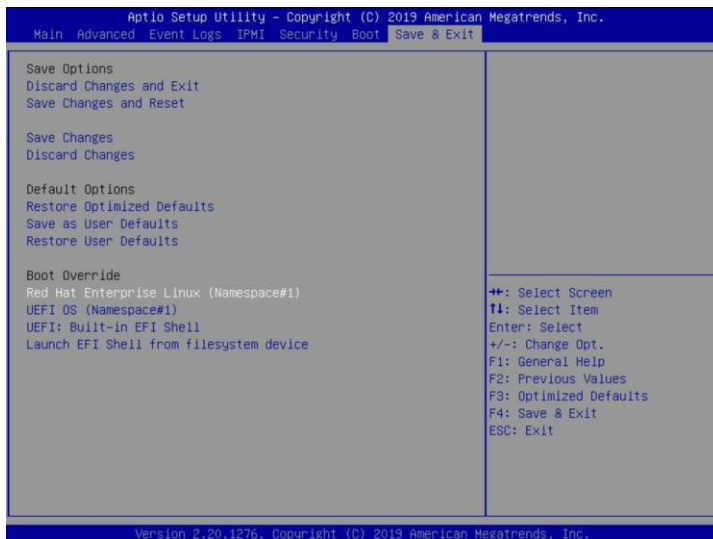
3. When the installation switches to the graphical interface, click "**Root Password**" and "**User Creation**" to set username and password. Next, click "**Installation Destination**" to select the target disk for installation.



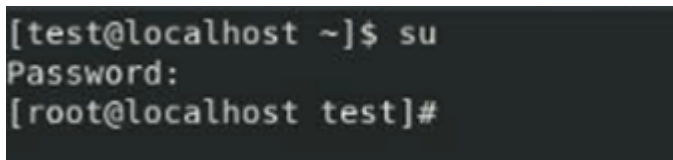
4. Select the RAID array as the target disk to install the Red Hat 8.3. You can then proceed normally - follow the onscreen prompts to install Red Hat 8.3 to the array.



5. After installation is complete, select the appropriate startup item to enter the system.



6. Enter the user name and password to log into Red Hat 8.3.



Appendix

Troubleshooting

1. The CLI reports that “No NVMe Controller is found”

- 1) After starting “`mnv-cli.efi`”, the utility reports “No NVME Controller is found” (as shown below):

```

management CLI\1.0.0.1041_sign\uefi\64\> mnv_cli.efi
No NVMe Controller is found.
CLI Version: 1.0.0.1041
Welcome to NVMe Command Line Interface.

```

- 2) You will need check and make sure the system recognizes the SSD6204. First, enter the following command using the UEFI tool:

pci -b

```

FS0:\> pci -b_

```

- 3) If the interface reports “Vendor 1B4B Device 2241 Prog Interface 2”, the SSD6204 is recognized by the motherboard, but cannot support the UEFI tool. In this case, you will need to create the array using one of the other methods described in this manual (BIOS, CLI or WebGUI).

```

00 D8 00 00 => Mass Storage Controller - Non-volatile memory subsystem
em
Vendor 1B4B Device 2241 Prog Interface 2
FS0:\> FS0:_

```

- 4) If the interface does not display “Vendor 1B4B Device 2241 Prog Interface 2”, then the motherboard does not recognize the SSD6204.
 - a. Power down the system, and make sure the SSD6204 is securely installed into the PCIe slot
 - b. Boot the system and enter the motherboard BIOS utility. Make sure the required BIOS settings are still enabled (refer to page 1)

2. The replacement SSD6204 controller cannot recognize the RAID array

Existing RAID arrays may not be recognized if you simply transfer the NVMe SSD’s from one controller to another.

Diagram before replacing NVMe to the new SSD6204:

```

Boot Override
Windows Boot Manager (Namespace#1)
USB#0:SanDisk
IBA 40G Slot 6000 v1066
UEFI: SanDisk, Partition 1
UEFI: Built-in EFI Shell
Launch EFI Shell from filesystem device
    
```

Diagram after replacing NVMe to the new SSD6204:

```

Boot Override
UEFI: Built-in EFI Shell
UEFI: SanDisk, Partition 1
    
```

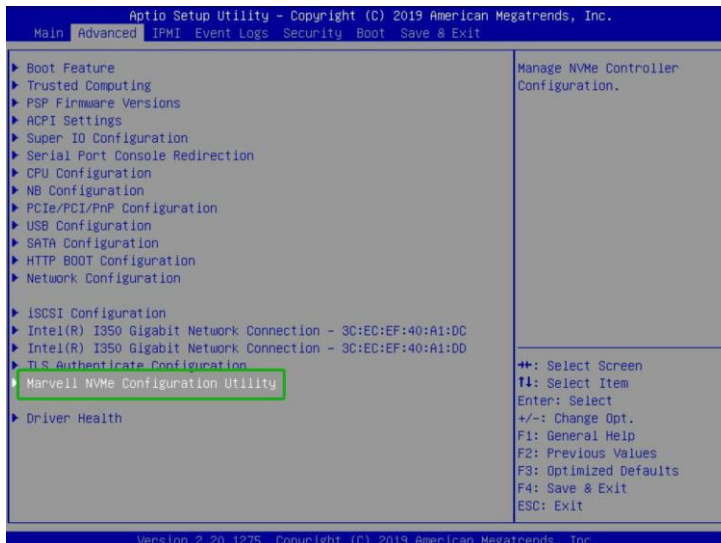
This problem can be resolved by importing the array using the new host controller. There are 3 ways to import an existing RAID configuration. This command is a Simple API feature to import a VD when an importable VD roams from one controller to another. If NVMe Controller supports the RAID mode, this function will import VD.

If VD is created from one controller and the SSD with VD roamed to another controller, the VD needs to be imported first before the firmware reports the VD to the OS.

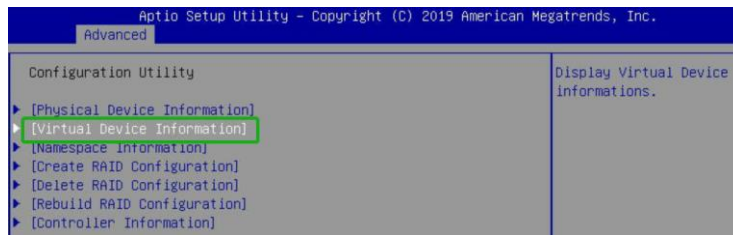
Note: The user can use > info -o VD command to check if the VD status to be imported or not.

Method 1: Import the RAID array using the BIOS Utility

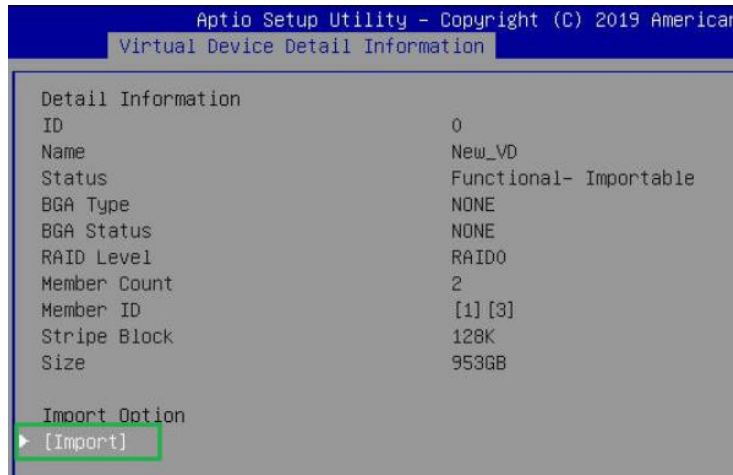
- 1) Set the Slot Storage OPROM of SSD6204 in the motherboard BIOS to **UEFI**.
- 2) Set **'Boot mode select'** to **'UEFI'**.
- 3) From the motherboard BIOS menu, select **"Marvell NVMe Configuration Utility"**:



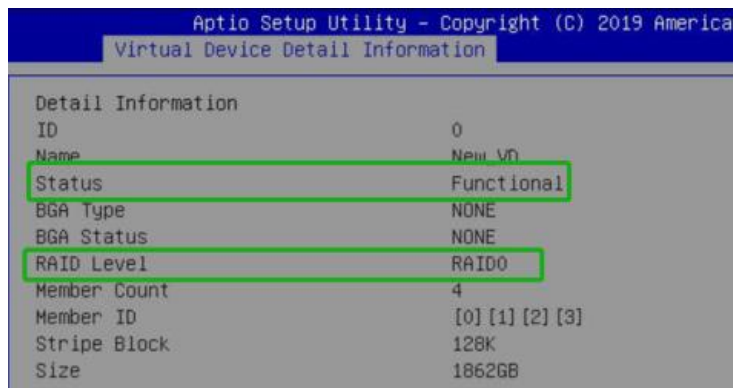
- 4) Next, select **"Virtual Device Information"**:



- 5) Click **“Import”**.



- 6) After restarting the system, you can recognized the RAID0 and can see that the status of the RAID has changed by entering **“Virtual device information→[0]-New_VD”**



Method 2: Import the RAID array using the UEFI Utility

- 1) Copy `mnv_cli` to the root directory of a bootable USB flash drive.
- 2) Boot to the flash drive and enter the following command:

import -l 0

```
FS0:\> mnv_cli.efi
CLI Version: 1.0.0.1041
Welcome to NVMe Command Line Interface.

> info -o vd

VD ID:          0
Name:           New_VD
Status:         Functional
Importable:     Yes
RAID Mode:      RAID0
size:           953 GB
PD Count:       2
PDs:            1 3
Stripe Block Size: 128K
Sector Size:    512 bytes

Total # of VD:  1

> import -l 0
VD 0 import successfully.
```

- 3) After restarting the system, you can recognize the RAID0 and can see that the status of the RAID has changed by entering the command:

Info -o vd

```
> info -o vd

VD ID:          0
Name:           VD 0
Status:         Functional
Importable:     No
RAID Mode:      RAID0
size:           1862 GB
PD Count:       4
PDs:            0 1 2 3
Stripe Block Size: 128K
Sector Size:    512 bytes

Total # of VD:  1
```

Method 3: Import the RAID array using the CLI tool:

- 1) Run `mnv_cli.exe` using the following command:

./mnv_cli

```
[root@DESKTOP-7FT8SGF:/opt/marvell/nvme] ./mnv_cli
CLI Version: 1.0.0.1039
Welcome to NVMe Command Line Interface.

>
```

- 2) Entering the command:

import -l 0

```
CLI Version: 1.0.0.1041
Welcome to NVMe Command Line Interface.
> import -l 0
VD 0 import successfully. Please shutdown and power on the system.
>
```

- 3) After restarting the system, you can recognize the RAID0 and can see that the status of the RAID has changed by entering the command:

Info -o vd

```
> info -o vd
VD ID:          0
Name:           VD_0
Status:         Functional
Importable:     No
RAID Mode:      RAID0
size:           1862 GB
PD Count:      4
PDs:           0 1 2 3
Stripe Block Size: 128K
Sector Size:    512 bytes

Total # of VD: 1
```