# SSD6204 VMware vSphere Hypervisor (ESXi) 7.0b Installation Guide

Version 1.00

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# 1. Overview

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

For VMware vSphere (ESXi) 7.0b Mirror link: https://my.vmware.com/en/web/vmware/downloads/#all\_products

# 2. Installing VMware vSphere Hypervisor (ESXi) 7.0b to the 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 VMware is up and running.

**Note: VMware7.0b only supports UEFI Boot 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 X11DPi-NT motherboard as an example:

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

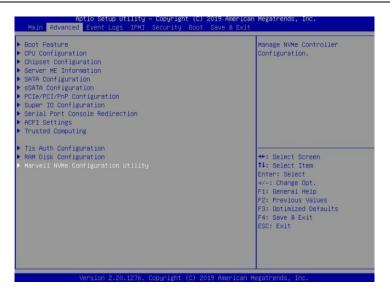
#### SSD6204 VMware vSphere Hypervisor (ESXi) 7.0b Installation Guide

Main Huvanceu Event Lugs	IPMI Security Boot Save & Ex	
		Select boot mode LEGACY/UEF:
Legacy To EFI Support	[Disabled]	
FIXED BOOT ORDER Priorities		
Boot Option #1	[UEFI Hard Disk]	
Boot Option #2	[UEFI AP:UEFI:	
	Built-in EFI Shell]	
Boot Option #3	[UEFI CD/DVD]	
Boot Option #4	[UEFI USB Hard Disk]	
Boot Option #5	Boot mode select	
	LEGACY	
Boot Option #6	UEFI	
Boot Option #7	DUAL	++: Select Screen
Boot Option #8		t↓: Select Item
Boot Option #9		Enter: Select
		+/-: Change Opt.
Add New Boot Option		F1: General Help
Delete Boot Option		F2: Previous Values
berete boot option		F3: Optimized Defaults
Add New Driver Option		F4: Save & Exit
Delete Driver Option		ESC: Exit
boloto brater option		
UEFI Application Boot Priori	ies	
UEFI USB CDROM/DVD Drive BBS		
001 1 000 00M0H/040 01 140 000	11 10/ 10100	

 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.

Aptio Setup Utility PCIe/PCI/PnP Configuration	– Copyright (C) 2019 Americ
PCI Bus Driver Version	A5.01.18
PCI Devices Common Settings	
Above 4G Decoding SR-IOV Support MMID High Base MMID High Granularity Size Maximum Read Request MMCFG Base VGA Priority	[Enabled] [Disabled] [S6T] [256G] [Auto] [2G] [Onboard]
PCI Devices Option Rom Setting Onboard NVME 1 OPROM Onboard NVME 2 OPROM CPU1 Slot 1 PCI-E ×8 OPROM CPU1 Slot 2 PCI-E ×16 OPROM CPU1 Slot 3 PCI-E ×8 OPROM	(EF I) (EF I) (EF I) (EF I)
CPU2 Slot 4 PCI-E ×16 OPROM CPU2 Slot 5 PCI-E ×16 OPROM CPU2 Slot 6 PCI-E ×16 OPROM	[EFI] [EFI] [EFI]

- 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.

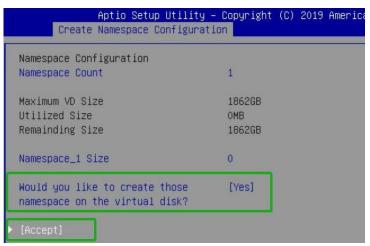
b. Next, select "Create RAID Configuration". Press "Enter" to open the Configuration Utility.



c. Set "RAID Configuration Menu" to "Enabled", and then select "Goto RAID Config".

Device select • [0] Samsung SSD 970 EV0 Plus 500GB • [1] Samsung SSD 970 EV0 Plus 500GB	[Enabled]	Goto RAID configuration setting page.
[2] Samsung SSD 970 EVD Plus 500GB	[Enabled] [Enabled]	
[3] Samsung SSD 970 EVO Plus 5006B  [Goto RAID Config]	[Enabled]	
		++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

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;

Messag	Aptio Setup Utility - es	- Copyright (C)	) 2019 American	Megatrends,	Inc.
Successful!				++: Select : T4: Select : Enter: Select +/-: Change F1: General F2: Previous F3: Optimize F4: Save S ESC: Exit	ltem St Opt. Help S Values ad Defaults xit
	Version 2.20.1276. 0	Copyright (C) 2	2019 American Me	egatrends, In	10.

#### Method 2: Create RAID in UEFI

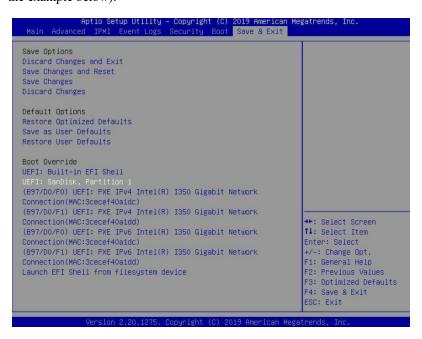
1. First, prepare the UEFI Tool. This file should be copied to the root of a bootable USB flash drive.

# Using the SuperMicro X11DPi-NT motherboard as an example:

2. Set 'Boot mode select' to 'UEFI';

	<mark>ility – Copyright (C) 2019 American</mark> IPMI Security <mark>Boot</mark> Save & Exit	Megatrends, Inc.
Boot mode select Legacy To EFI Support FIXED BOOT ORDER Priorities	[UEFI] [Disabled]	Select boot mode LEGACY/UEFI
Boot Option #1 Boot Option #2	[UEFI Hard Disk] [UEFI AP:UEFI: Built-in EFI Shell]	
Boot Option #3 Boot Option #4 Boot Option #5	[UEFI CD/DVD] [UEFI USB Hard Disk] Boot mode select	
Boot Option #6 Boot Option #7 Boot Option #8 Boot Option #9	UEFI DUAL	
Add New Boot Option Delete Boot Option		+/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
Add New Driver Option Delete Driver Option		F4: Save & Exit ESC: Exit
UEFI Application Boot Priorit UEFI USB CDROM/DVD Drive BBS		

 Choose 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

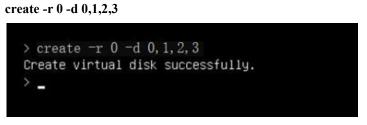


5. Next, locate the "mnv\_cli.efi" program and run it:



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

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



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:

- 1. 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).

Create Array	Create Array						
Logical Device Rescan	Array Type:	RAID 0	~				
	Array Name: Initialization Method:	Default Quick Init	~				
	Cache Policy:		$\sim$				
	Block Size:	128K	~				
		Select All	Location	Model	Capacity	Max Free	
		$\checkmark$	<b>I/1</b>	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GB	
	Available Disks:	$\checkmark$	<b>1/2</b>	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GB	
		$\checkmark$	<b>1/3</b>	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GB	
		$\checkmark$	<b>1/4</b>	Samsung SSD 970 EVO Plus 500GB	500.10 GB	500.10 GB	
	Capacity: (According to the	Maximum	(MB)				
	max free space on the selected disks)						

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

							Technologies, I
Global View	Physical	Logical	Setting	Event	SHI		
Create Array	1		Logic	al Device	Information		
Logical Device	Name Ty			Sectorsize	US Name	Status	
Rescan	VD_0 RA	ID 0 2.00 TE	3 128k	512B	HighPoint-SSD6204	Normal	Maintenance
			Physi	cal Device	Information		
	Location	Model				acity	Max Free
	Location		SSD 970 EVO	Plus 500GB	Cap	acity .10 GB	Max Free 0.00 GB
		Samsung	SSD 970 EVO SSD 970 EVO		Cap 500		
	<b>1/1</b>	Samsung Samsung		Plus 500G8	Cap 500 500	.10 GB	0.00 GB

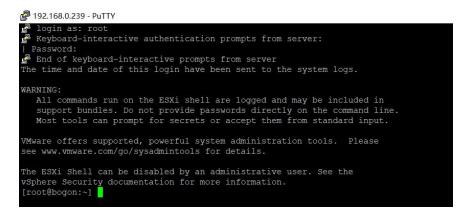
Method 4: Create a RAID array using VMware vSphere (ESXi) 7.0b via CLI

- a. This method requires you to prepare the VMware vSPhere system and download the SSD6200 VMware CLI software package from the HighPoint official website.
- b. Boot the system, and enter the username and password to start VMware.
- c. Please download the file transfer tool and upload the SSD6200 VMware CLI to the tmp directory under VMware;

Take FileZilla as an example, output the IP address and password of the virtual machine, and upload the file to the tmp directory of the virtual machine.

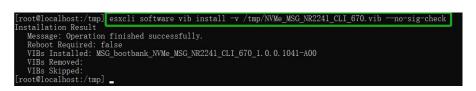
E sftp://root@192.168.0.153 - FileZilla	
Eile Edit View Iransfer Server Bookmarks Help	
Host: sftp://192.168.0.15 Username: root Password: ••••••	Port: Quickconnect 💌
Status: Listing directory /tmp   Status: Directory listing of */tmp* successful   Status: Disconnected from server	
Not connected 🗰 sftp://root@192.168.0.153 🗶	
Local site: SSD62xx_VM_CLI_v1.0.0.1041_2020_06_19\vm\64\ESXi_6.7.0\ ∨ DingDing Download DaBaiCai_d3_v6.0_2101_Online SSD62xx_VM_CLI_v1.0.0.1041_2020_06_19 G4 ESXi_6.5.0 ESXi_6.7.0 V	Remote site: /tmp -? tardisks -? tardisks.noauto tmp ymware-root -? usr -? var -? vmfs Filename
Filename	NVMe_MSG_NR2241_CLI_670.vib

d. Open VMware vSphere (ESXi) 7.0b Shell (Alt+F1) locally or log in via SSH.



e. Install SSD6200 series CLI software package using the following command: Take NVMe\_MSG\_NR2241\_CLI\_670 as an example.

esxcli software vib install -v /tmp/NVMe\_MSG\_NR2241\_CLI\_670.vib--no-sig-check



f. Restart the system and use the following command to verify that NVMe\_MSG\_NR2241\_CLI\_670 was installed (as shown below): esxcli software vib list

[root@localhost:/tmp] esxcli Name	software vib list Version	Vendor	Acceptance Level	Install Date
NVMe_MSG_NR2241_CLI_670	1. 0. 0. 1041-A00	MSG	PartnerSupported	2021-07-22
atlantic	1. U. 3. U-8vmw. 702. U. U. 17867351	VMW	VMwareCertified	2021-07-22
bnxtnet	216. 0. 50. 0-34vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
bnxtroce	216. 0. 58. 0-19vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
brcmfcoe	12. 0. 1500. 1-2vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
brcmnvmefc	12. 8. 298. 1-1vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
elxiscsi	12. 0. 1200. 0-8vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
elxnet	12. 0. 1250. 0-5vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
i40enu	1. 8. 1. 136-1vmw, 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
iavmd	2. 0. 0. 1152-1vmw, 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
icen	1. 0. 0. 10-1vmw, 702, 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
igbn	1. 4. 11. 2-1vmw, 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22
irdman	1. 3. 1. 19-1vmw. 702. 0. 0. 17867351	VMW	VMwareCertified	2021-07-22

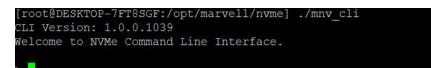
g. Next, enter the following command to check whether the SSSD6204 is recognized. If it displays the phrase "Marvell Technology Group Ltd", the SSD6204 is recognized by VMware. esxcfgscsidevs -a



h. Enter the/opt/marvell/nvme directory.



i. enter the following command to run cli: ./mnv\_cli



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

vd -a create -r 0 -d 0,1,2,3 >vd -a create -r 0 -d 0, 1, 2, 3 cmd success

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

# Step 3 Adjust System's UEFI BIOS Settings

Using the SuperMicro X11DPi-NT motherboard as an example:

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

	ility – Copyright (C) 2019 Amer IPMI Security Boot Save & E	
		Select boot mode LEGACY/UEFI
Legacy To EFI Support	[Disabled]	
FIXED BOOT ORDER Priorities		
Boot Option #1	[UEFI Hard Disk]	
Boot Option #2	[UEFI AP:UEFI:	
	Built-in EFI Shell]	
Boot Option #3	[UEFI CD/DVD]	
Boot Option #4	[UEFI USB Hard	
	Boot mode select	
	LEGACY	
Boot Option #5	UEFI	
Boot Option #6	DUAL	++: Select Screen
Boot Option #7		↑↓: Select Item
Boot Option #8		Enter: Select
Boot Option #9	[UEFI Network]	+/-: Change Opt. F1: General Help

2. Next, under "Advanced->PCIe/PCI/PnP Configuration", change "CPUx Slot 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.

Aptio Setup Utility - PCIe/PCI/PnP Configuration	Copyright (C) 2019 Americ
PCI Bus Driver Version	A5.01.18
PCI Devices Common Settings	
Above 4G Decoding SR-IOV Support MMIO High Base MMIO High Granularity Size Maximum Read Request MMCFG Base	[Enabled] [Disabled] [567] [2566] [Auto] [26]
VGA Priority	(Onboard)
PCI Devices Option Rom Setting Onboard NVME 1 OPROM Onboard NVME 2 OPROM	[EFI] [EFI]
CPU1 Slot 1 PCI-E x8 OPROM CPU1 Slot 2 PCI-E x16 OPROM CPU1 Slot 3 PCI-E x8 OPROM CPU2 Slot 4 PCI-E x16 OPROM CPU2 Slot 5 PCI-E x16 OPROM	[EFI] [EFI] [EFI] [EFI] [EFI]
CPU2 Slot 6 PCI-E x16 OPROM	[EFI]

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

Aptio Setup Ut	ility – Copyright (C) 2019 American Secure Boot
System Mode	Setup
Secure Boot	[Disabled] Not Active
Secure Boot Mode CSM Support ▶ Restore Factory Keys ▶ Reset To Setup Mode	[Custom] [Enabled]
▶ Key Management	

# Step 4 Install VMware vSphere Hypervisor (ESXi) 7.0b to the SSD6204

- a. Boot from the installation DVD (UEFI mode).
- b. When the Installation screen appears, please press "Enter" to start installation:



c. When the installation process switches to graphical mode, press "F11".

	End User License Agreement (EULA)
VMWARE END U	ISER LICENSE AGREEMENT
AGREEMENT SH	THAT THE TERMS OF THIS END USER LICENSE IALL GOVERN YOUR USE OF THE SOFTMARE, REGARDLESS THAT MAY APPEAR DURING THE INSTALLATION OF THE
USING THE SO AGREE TO BE AGREEMENT (" THIS EULA, Y SOFTWARE, AN TO THE VENDO	AD CAREFULLY: BY DOWNLOADING, INSTALLING, OR IFTMARE, YOU (THE INDIVIDUAL OR LEGAL ENTITY) BOUND BY THE TERMS OF THIS END USER LICENSE TEULA"). IF YOU DO NOT AGREE TO THE TERMS OF YOU MUST NOT DOWNLOAD, INSTALL, OR USE THE ID YOU MUST DELETE OR RETURN THE UNUSED SOFTWARE IN FROM WHICH YOU ACQUIRED IT WITHIN THIRTY (30) JUEST A REFUND OF THE LICENSE FEE, IF ANY, THAT
Use	the аггом keys to scroll the EULA text
(ESC) D	o not Accept (F11) Accept and Continue

d. When the graphical interface returns, select the previously created RAID0 as the target disk:

Select a Disk to Install or Upgrade (any existing VMFS-3 will be automatically upgraded to VMFS-5) * Contains a VMFS partition # Claimed by VMware vSAM						
Storage [	)evice					Capacity
Local: NVMe Renote: (none)	SSD62(					
			Details			Continue

e. After installation is complete, select the appropriate startup item to boot the system:



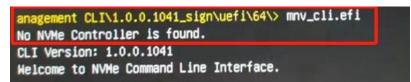
f. Enter the user name and password, to log into VMware vSphere Hypervisor (ESXi) 7.0b.

2 x AMD EPYC 7282 16-Care Processor 31.8 GiB Menory	
Authentication Required	
Enter an authorized login name and password for localhost	
Configured Keyboard (US Default) To nanage this host, go to Login Name: E root	1
https://192.168.0.244/ (DH Password: [ *********	
https://lfe88:3eec.effff Center> 0K	ncel
https://[fe80::3eec:efff:f	ncel

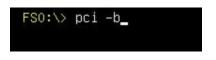
# Appendix

# 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):



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



- 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

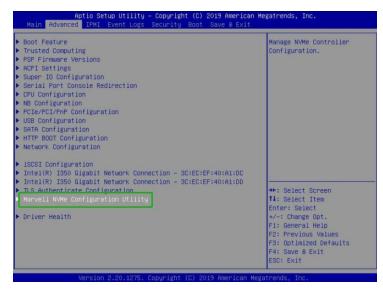
This problem can be resolved by importing the array using the new host controller. There are 3 ways to import an existing RAID configuration. This command is a Simple API feature to import a VD when an importable VD roams from one controller to another. If NVMe Controller supports the RAID mode, this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

onfiguration Utility	Display Virtual Devic informations.
Physical Device Information]	
Virtual Device Information]	
Namespace Information]	
Create RAID Configuration]	

5) Click "Import".

Detail Information	
ID	0
Name	New_VD
Status	Functional- Importable
3GA Type	NONE
3GA Status	NONE
RAID Level	RAIDO
1ember Count	2
1ember ID	[1] [3]
Stripe Block	128K
Size	953GB

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"

Aptio Setup Virtual Device Deta	Utility – Copyright (C) 2019 American all Information
Detail Information	
ID	0
Name	New VD
Status	Functional
BGA Type	NONE
BGA Status	NONE
RAID Level	RAIDO
Member Count	4
Member ID	[0] [1] [2] [3]
Stripe Block	128K
Size	1862GB

## 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

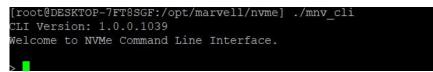
FSO:\> mnv_cli.efi CLI Version: 1.0.0.	1041
	mand Line Interface.
> info -o vd	
VD ID:	0
Name:	New_VD
Status:	Functional
Importable:	Yes
RAID Mode:	RAIDO
size:	953 GB
PD Count:	2
PDs:	1 3
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1
> import -1 0	
VD 0 import success	fully.

After restarting the system, you can recognized the RAID0 and can see that the status of the RAID has changed by entering the command: info -o vd

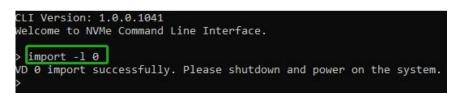
VD ID:	0
Name:	VD_0
Status:	Functional
Importable:	No
RAID Mode:	RAIDO
size:	1862 GB
PD Count:	4
PDs:	0123
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1

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

 Run mnv\_cli.exe using the following command: ./mnv\_cli



2) Entering the command: import -l 0



After restarting the system, you can recognized the RAID0 and can see that the status of the RAID has changed by entering the command: info -o vd

VD ID:	0
Name:	VD_0
Status:	Functional
Importable:	No
RAID Mode:	RAIDO
size:	1862 GB
PD Count:	4
PDs:	0123
Stripe Block Size:	128K
Sector Size:	512 bytes
Total # of VD:	1