

RAID Configurator

Lenovo ThinkStation P3 Tower Gen 2, P3 Ultra SFF Gen 2, and P3 Tiny Gen 2

Lenovo



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Overview

The purpose of this document is to provide guidelines for users on how to optimally configure RAID in the ThinkStation P3 Gen 2 series platforms to ensure proper compatibility and functionality.

Below is a high-level review of the drive type support of each system in the P3 Gen 2 series:

Table 1 - P3 Series Gen 2 Storage Support

System	M.2 NVMe	SATA	Notes
P3 Tower Gen 2	Supported, Max QTY: 4*	Supported, Max QTY: 4*	3.5" SATA or 2.5" SATA with adapter
P3 Ultra SFF Gen 2	Supported, Max QTY: 4*	Supported, Max QTY: 1*	3.5" SATA or 2.5" SATA with adapter
P3 Tiny Gen 2	Supported, Max QTY: 3	Not Supported	

*Max quantity varies by configuration.

More storage information can be found in the ThinkStation P3 Gen 2 Storage Configurator, located on [Lenovo's Support Site](#).

Section 1 – RAID Levels

This section will detail the RAID capabilities of each system in the P3 Gen 2 family. The table below shows various RAID levels supported on each platform:

Table 2 - P3 Gen 2 Series RAID Capabilities

System	Max # of RAIDable M.2 NVMe Drives	M.2 NVMe RAID Levels	Max # of RAIDable SATA Drives	SATA RAID Levels
P3 Tower Gen 2	3*	0,1,5	4*	0,1,5,10
P3 Ultra SFF Gen 2	3*	0,1,5	0	N/A
P3 Tiny Gen 2	3	0,1,5	0	N/A

*RAID across onboard and the PCIe M.2 Add-In Card is not supported. RAID only supported across onboard drives.

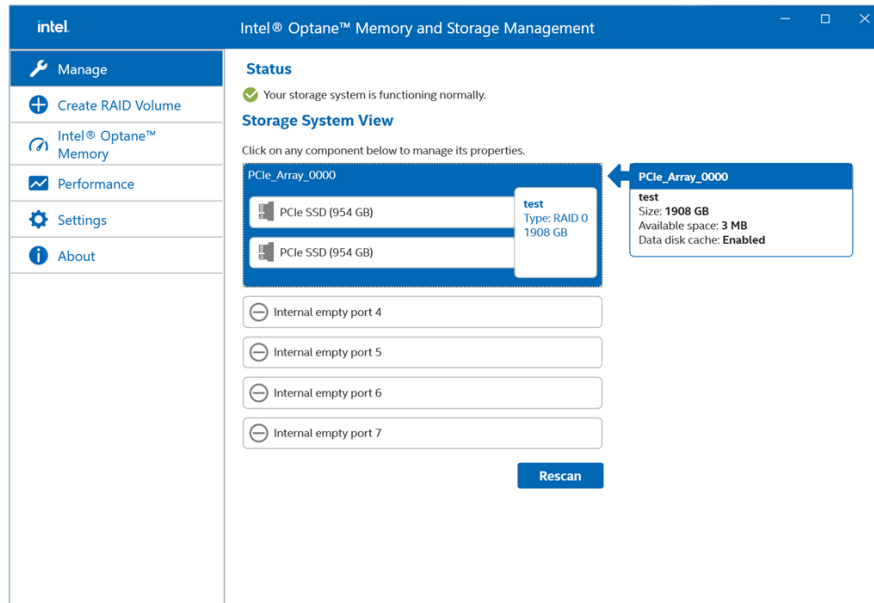
**A fourth SATA drive bay will prevent M.2 2280 sized drives from being installed in the two onboard Gen 4 M.2 slots, reducing max number of RAIDable M.2 NVMe drives to one (Gen 5 onboard Slot 1).

General RAID Notes:

- Before creating or altering a RAID config, always backup important data to an external location to prevent accidental data loss.
- A given array should not mix drive types or logical sizes. It is recommended to only use drives officially supported by Lenovo for the given platform.
- Each RAID level requires a certain minimum and or maximum number of drives. If altering the system storage devices after purchase or a previous configuration, it will be necessary to verify the proper types and number of devices for a desired RAID configuration have been installed. Altering or creating an array may require any existing OS to be reinstalled.
- P3 Tower Gen 2, Ultra SFF Gen 2, and Tiny Gen 2 utilize Intel Rapid Storage Technology (RST) for configuring RAID.

- RAID arrays can be monitored in Windows using the Intel Optane Memory and Storage Management tool. At the time of this writing, it can be downloaded from the Microsoft Store or installed using the Hardware Support Application (HSA) software package, available from [Lenovo Support](#), for either P3 Tower Gen 2, Ultra SFF Gen 2, or Tiny Gen 2.

Figure 1 – Intel Optane Memory and Storage Management application



P3 Tower Gen 2 RAID Notes:

- At the time of writing there are no add-in RAID controllers certified on this platform.
- RAID configurations utilizing both onboard and AIC M.2 drives are not supported.
- P3 Tower Gen 2 supports mixed M.2 RAID between the onboard Gen 5 and Gen 4 M.2 slots (Levels 0,1,5) or just between the two Gen 4 M.2 slots (Levels 0,1).
- The table below lists the supported quantities of SATA drives for the respective RAID levels:

Table 3 - P3 Gen 2 Series SATA RAID Capabilities

RAID Level (SATA)	Possible QTY of SATA Drives Supported
RAID 0	2,3,4*
RAID 1	2
RAID 5	3,4*
RAID 10	4*

*4th SATA support is configuration dependent

P3 Ultra SFF Gen 2 RAID Notes:

- RAID configurations utilizing both onboard and an AIC M.2 drive are not supported.
- P3 Ultra SFF Gen 2 supports mixed M.2 RAID between the onboard Gen 5 and Gen 4 M.2 slots (Levels 0,1,5) or just between the two Gen 4 M.2 slots (Levels 0,1).
- Ubuntu OS not supported on RAID.

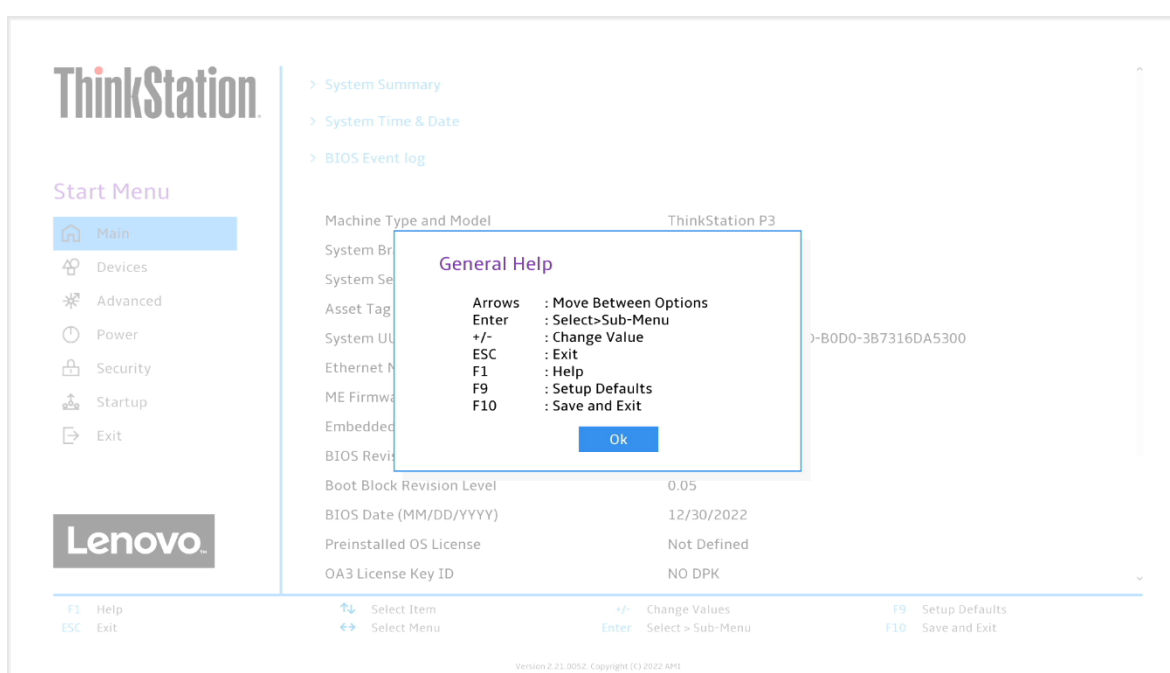
P3 Tiny Gen 2 RAID Notes:

- P3 Tiny Gen 2 supports mixed M.2 RAID between the onboard Gen 5 and Gen 4 M.2 slots (Levels 0,1,5) or just between the two Gen 4 M.2 slots (Levels 0,1).
 - Drive capacity over 1TB recommended for RAID 0 & 5.
- Ubuntu OS not supported on RAID.

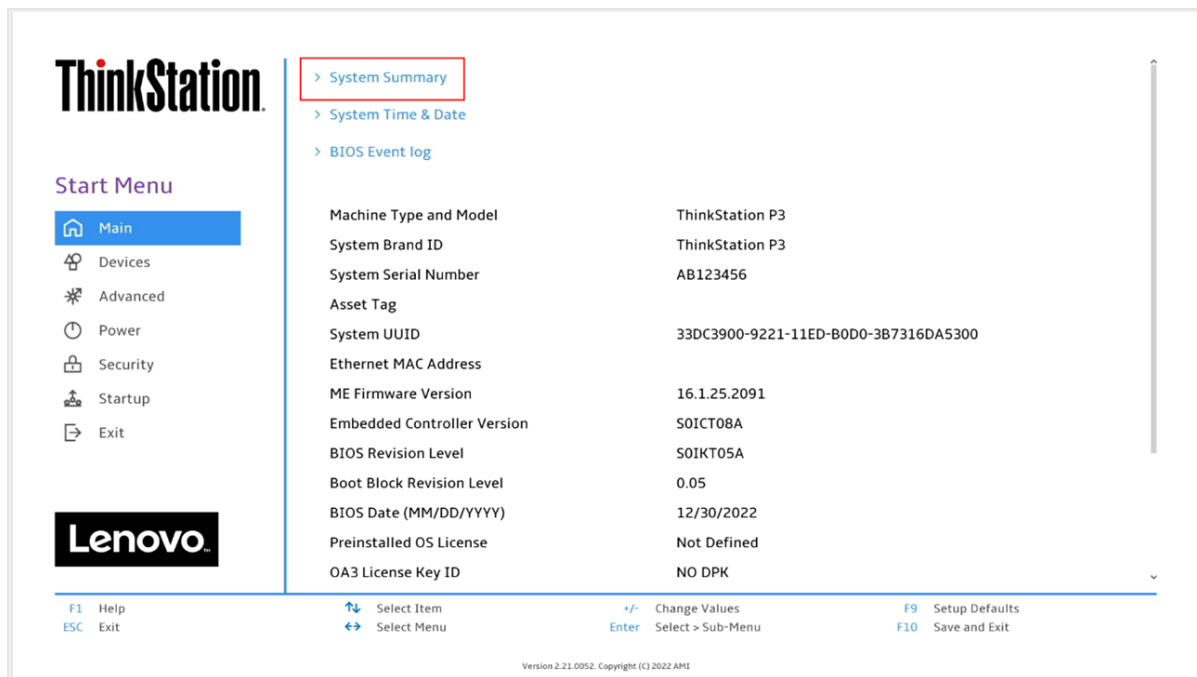
Section 2 – Configuring RAID

Please refer to the following steps to configure RAID for both NVMe and SATA drives. Examples may show configurations that are not possible on all systems. **Backup any important data before editing RAID configurations!**

1. Boot into the BIOS by pressing the function F1 key at the “Lenovo” splash screen.

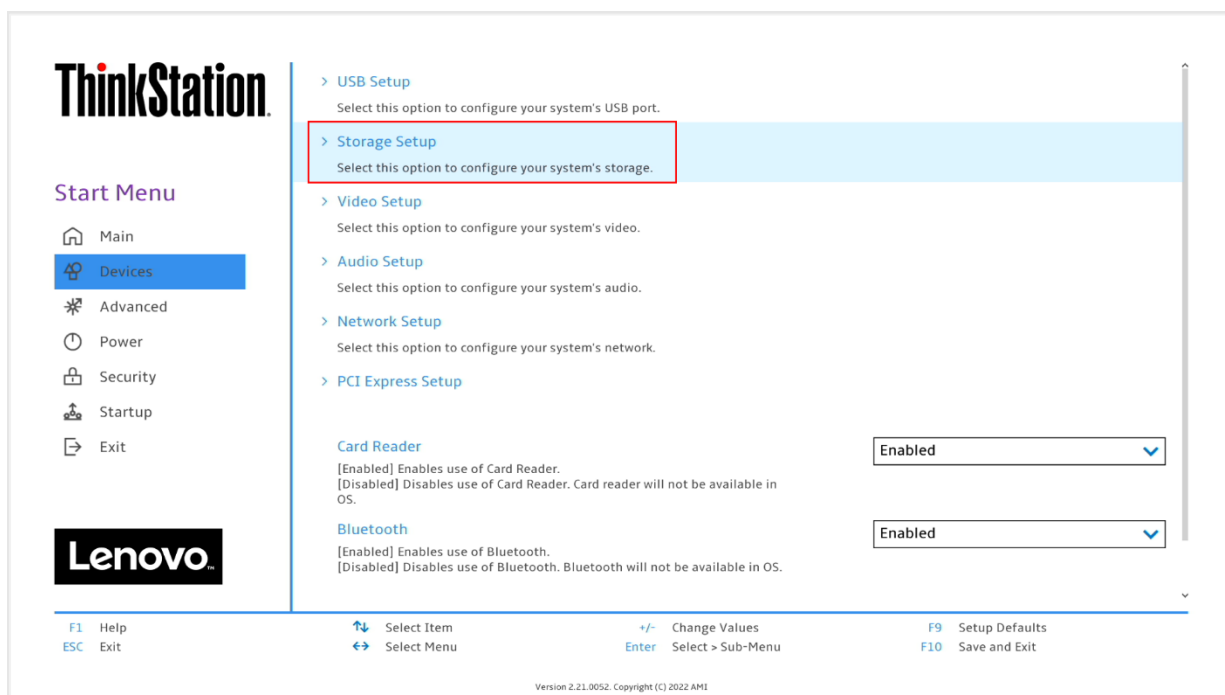


2. Select “System Summary” and scroll down to verify BIOS is recognizing all the drives installed in the system.

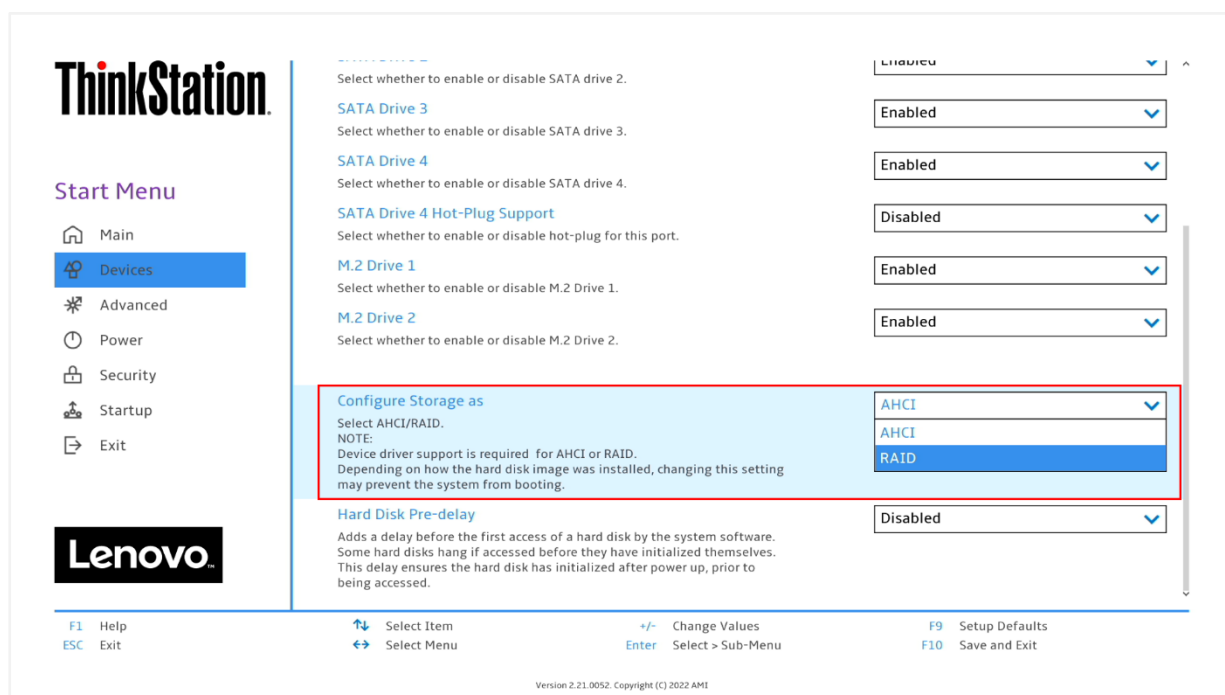


Note: From this point forward, the examples will utilize the M.2 NVMe drives. The process is the same for both drive types.

3. Select the “Devices” menu at the BIOS main screen setup utility and then select “Storage Setup”.

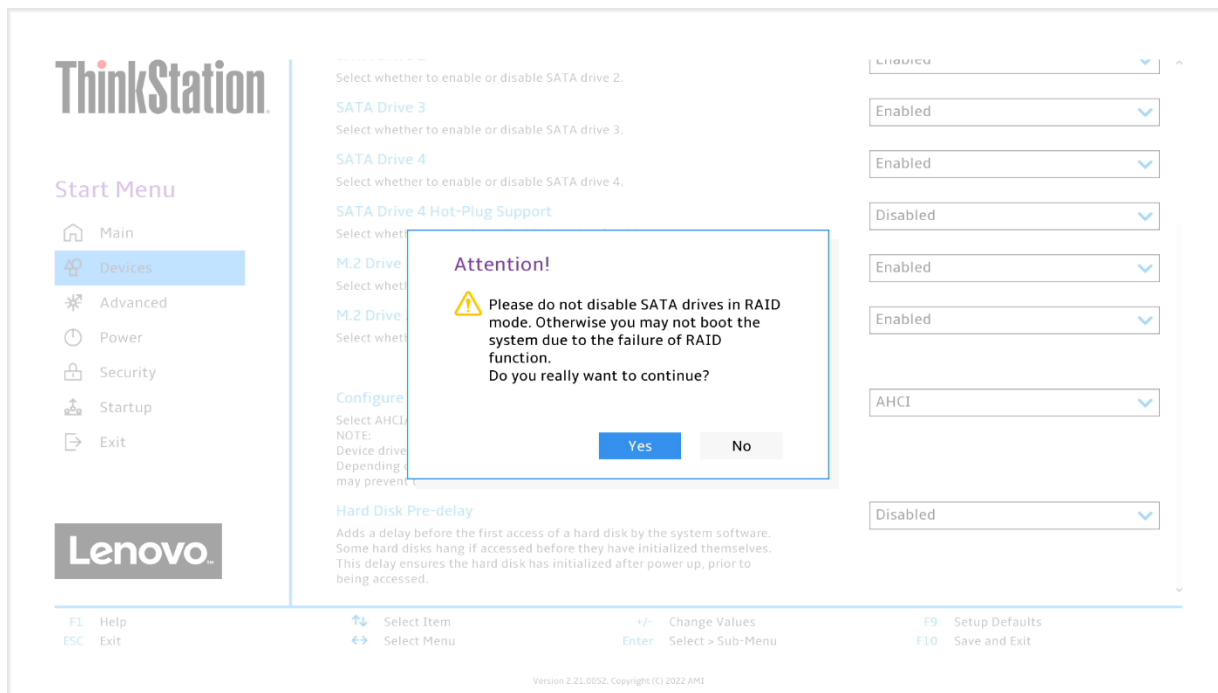


4. In the “Storage Setup” menu, select “Configure Storage as” and change or verify the option is set to “RAID”.

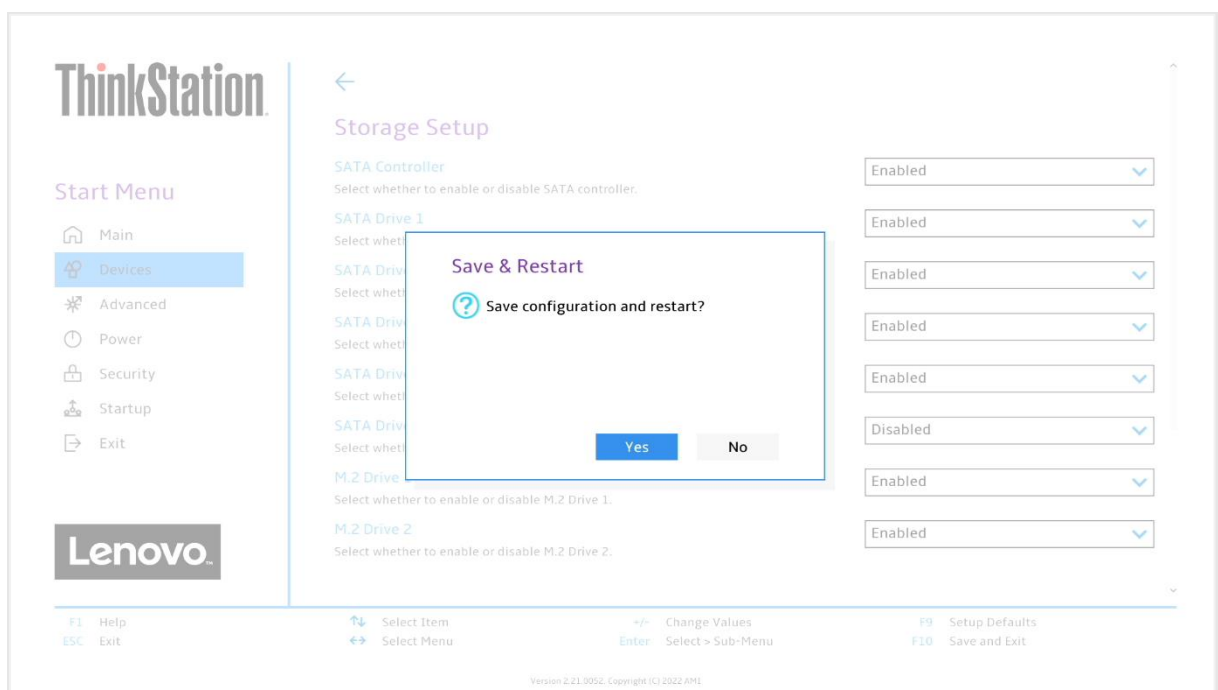


Notes: In order to Secure Erase any drives, the ‘Configure Storage as’ option must be set to ‘AHCI’ mode. Changing storage modes may cause issues with boot OS and data on existing drives.

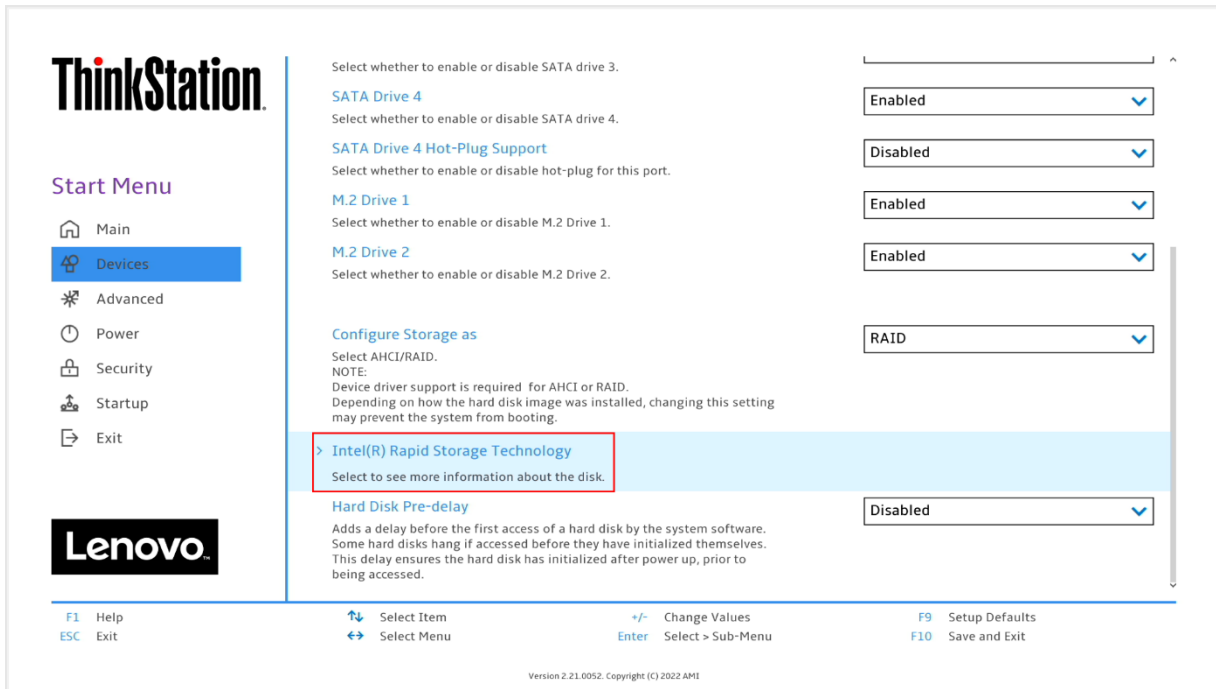
- When selecting to enable RAID the system will prompt a warning that changing the setting may result in the failure of the system to boot. Select "Yes" to continue.



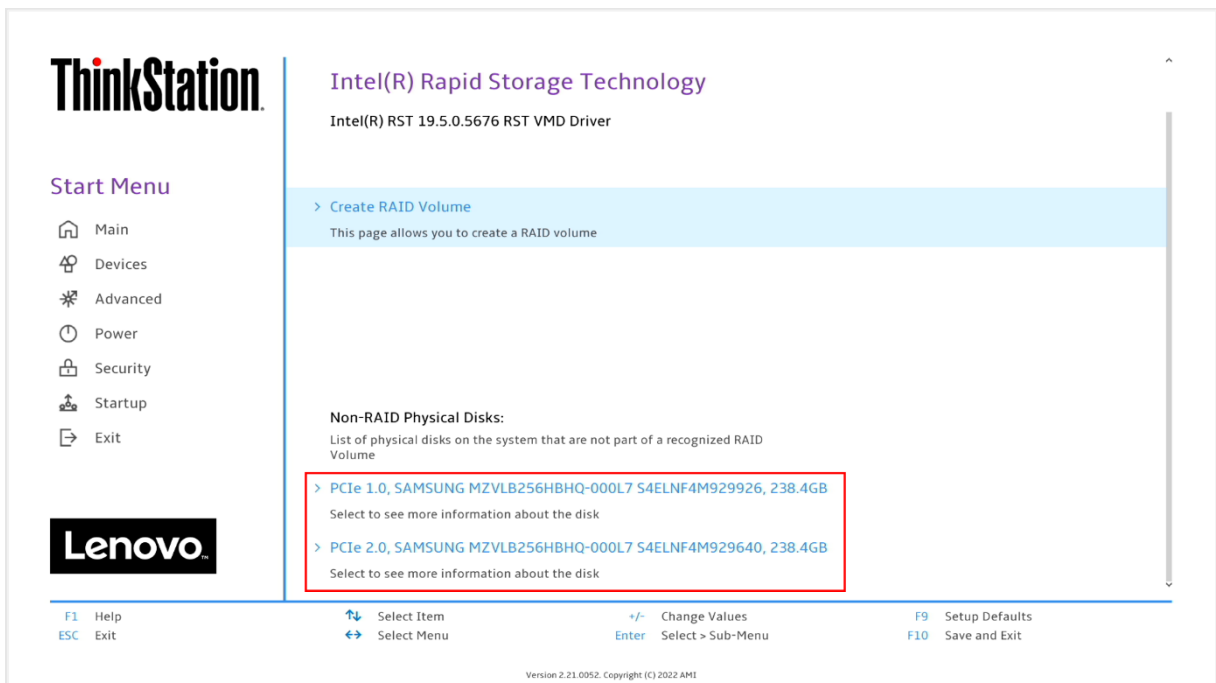
- Press F10 to save and Exit BIOS setup.



- As the system reboots, press the function F1 key at the Lenovo splash screen to enter the BIOS setup. Select the “Devices” menu at the BIOS main screen setup utility and then “Intel(R) Rapid Storage Technology”.

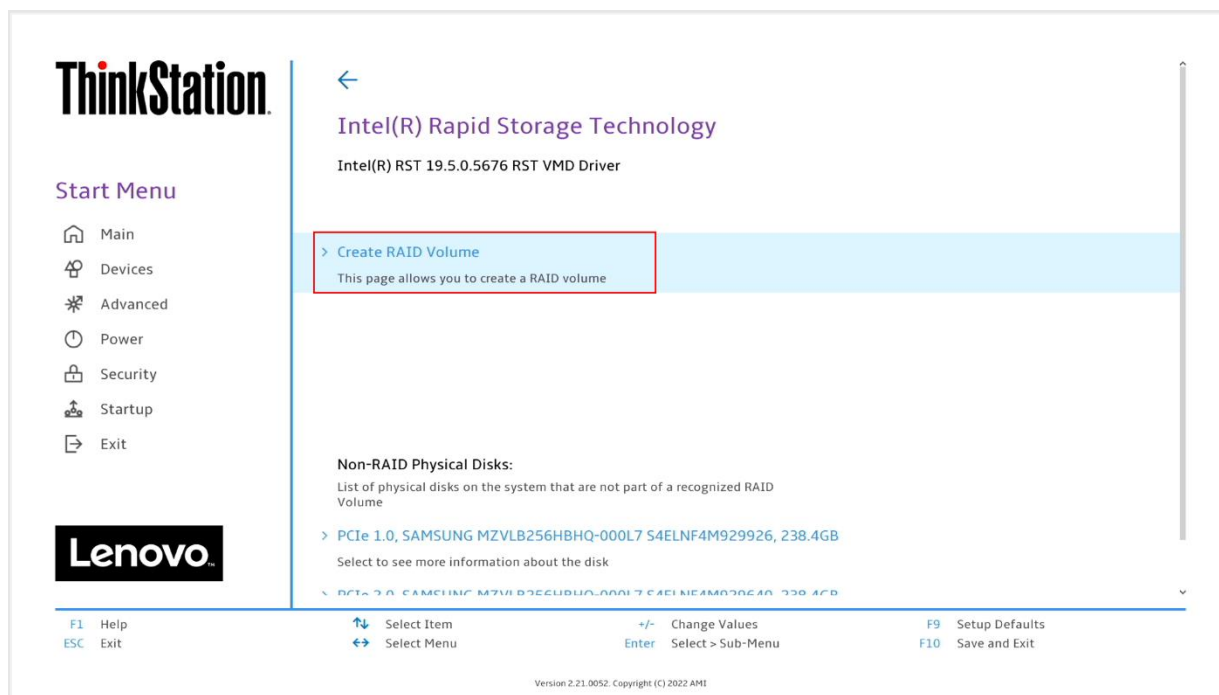


- Verify all the desired drives are available.

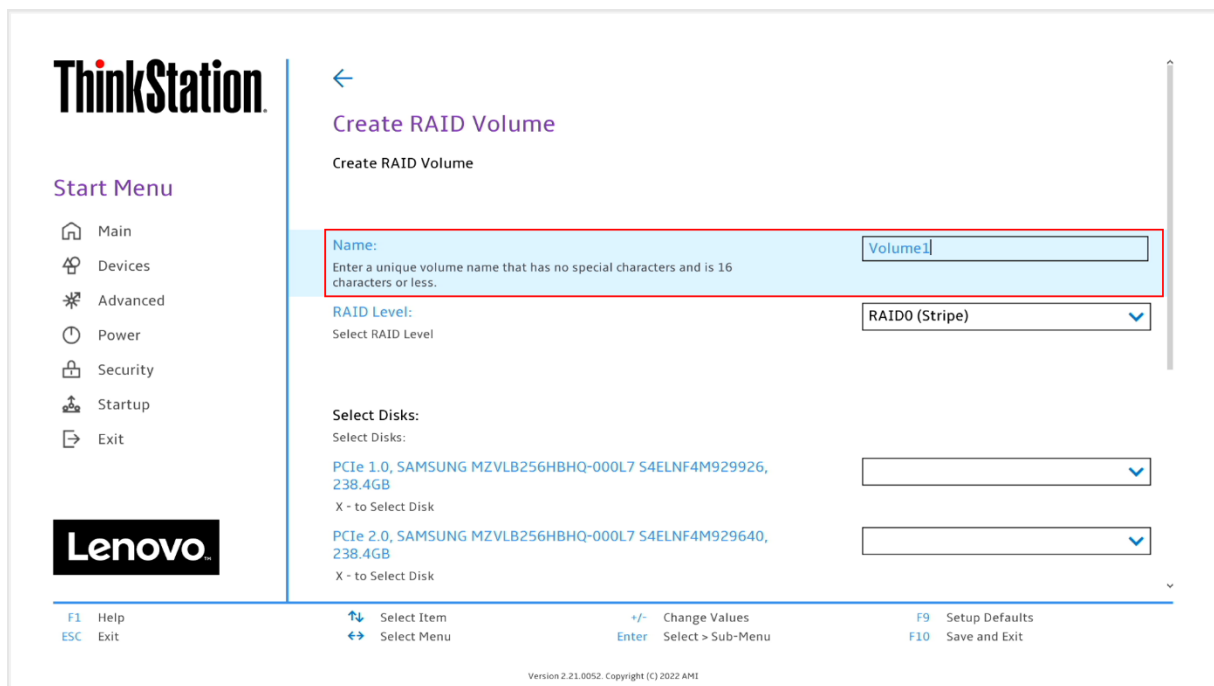


9. If all the disks installed are not shown as available, it may be necessary to clear any previous data from the disks. If no arrays have been created previously but there is an existing volume shown, it will be necessary to delete any previous arrays. Advance to step 15 to complete the process to delete any arrays. Return and proceed to step 10 once the desired drives are available.

10. Select "Create RAID Volume".



11. Choose a name for the volume.



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Create RAID Volume

Create RAID Volume

Name:
Enter a unique volume name that has no special characters and is 16 characters or less.

Volume1

RAID Level:
Select RAID Level

RAID0 (Stripe)

Select Disks:
Select Disks:

PCIe 1.0, SAMSUNG MZVLB256HBHQ-000L7 S4ELNF4M929926, 238.4GB

X - to Select Disk

PCIe 2.0, SAMSUNG MZVLB256HBHQ-000L7 S4ELNF4M929640, 238.4GB

X - to Select Disk

F1 Help
ESC Exit

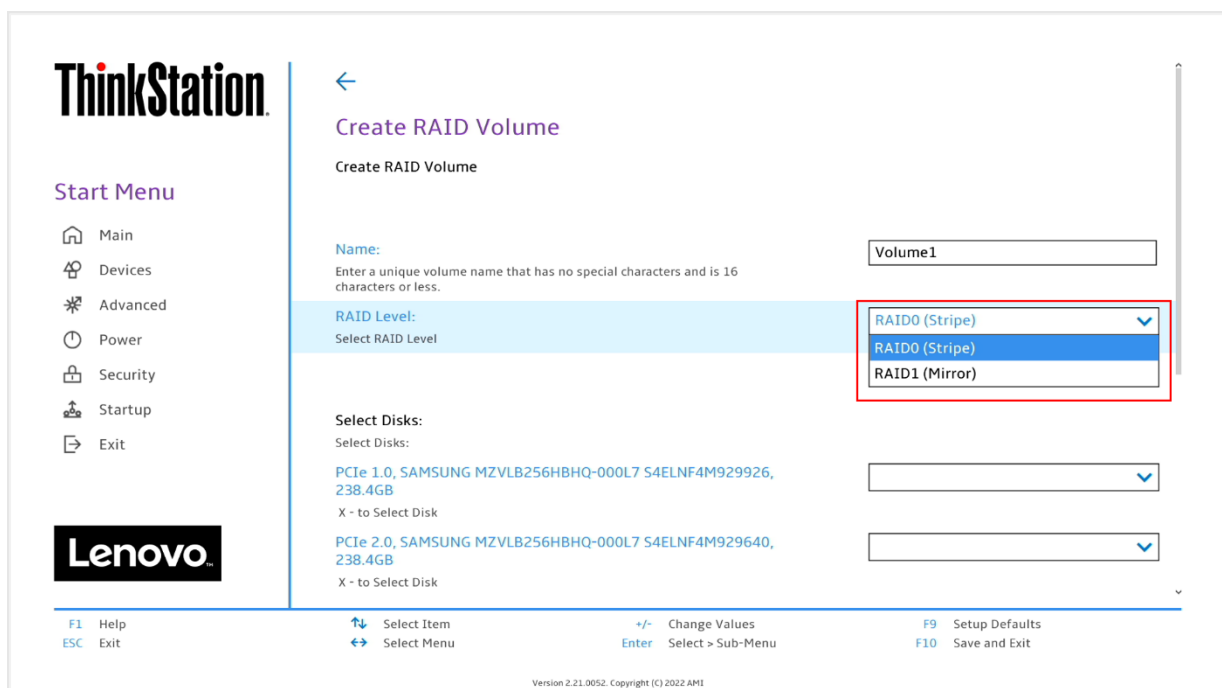
Select Item
Select Menu

+/- Change Values
Enter Select > Sub-Menu

F9 Setup Defaults
F10 Save and Exit

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12. Select the drop-down box for "RAID Level" and select the desired RAID level. The RAID level options displayed are based on the type and number of drives available in the system.



ThinkStation

Create RAID Volume

Create RAID Volume

Name:
Enter a unique volume name that has no special characters and is 16 characters or less.

Volume1

RAID Level:
Select RAID Level

RAID0 (Stripe)
RAID0 (Stripe)
RAID1 (Mirror)

Select Disks:
Select Disks:

PCIe 1.0, SAMSUNG MZVLB256HBHQ-000L7 S4ELNF4M929926, 238.4GB

X - to Select Disk

PCIe 2.0, SAMSUNG MZVLB256HBHQ-000L7 S4ELNF4M929640, 238.4GB

X - to Select Disk

F1 Help
ESC Exit

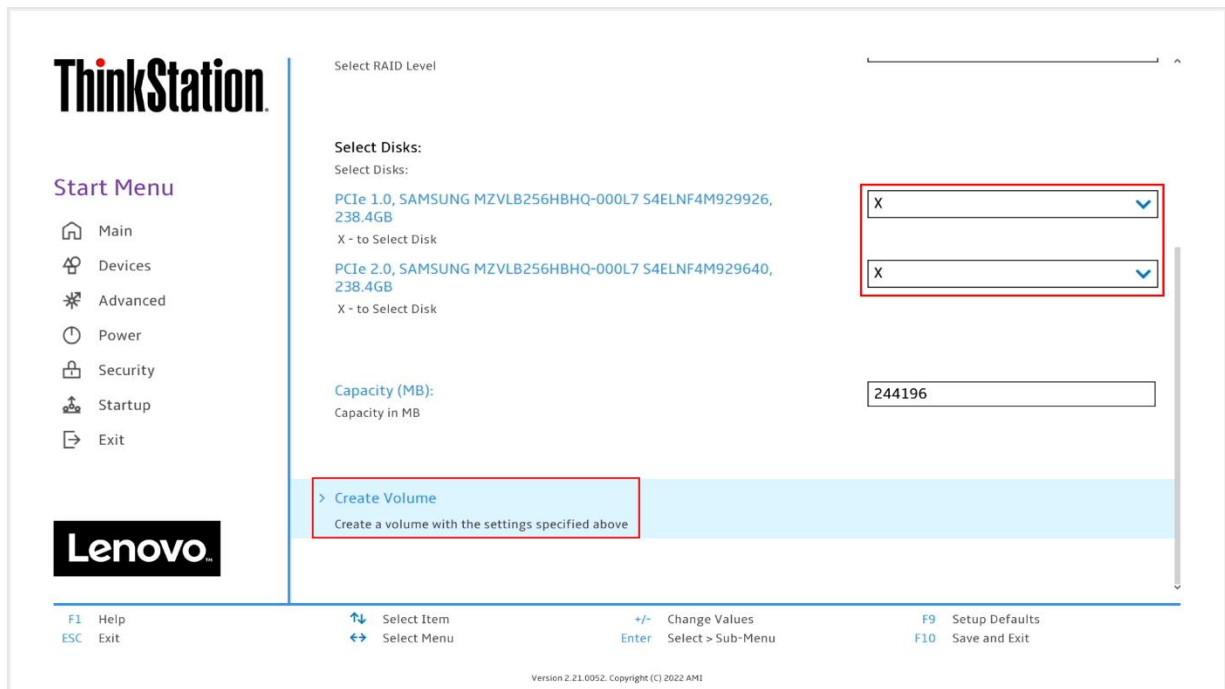
Select Item
Select Menu

+/- Change Values
Enter Select > Sub-Menu

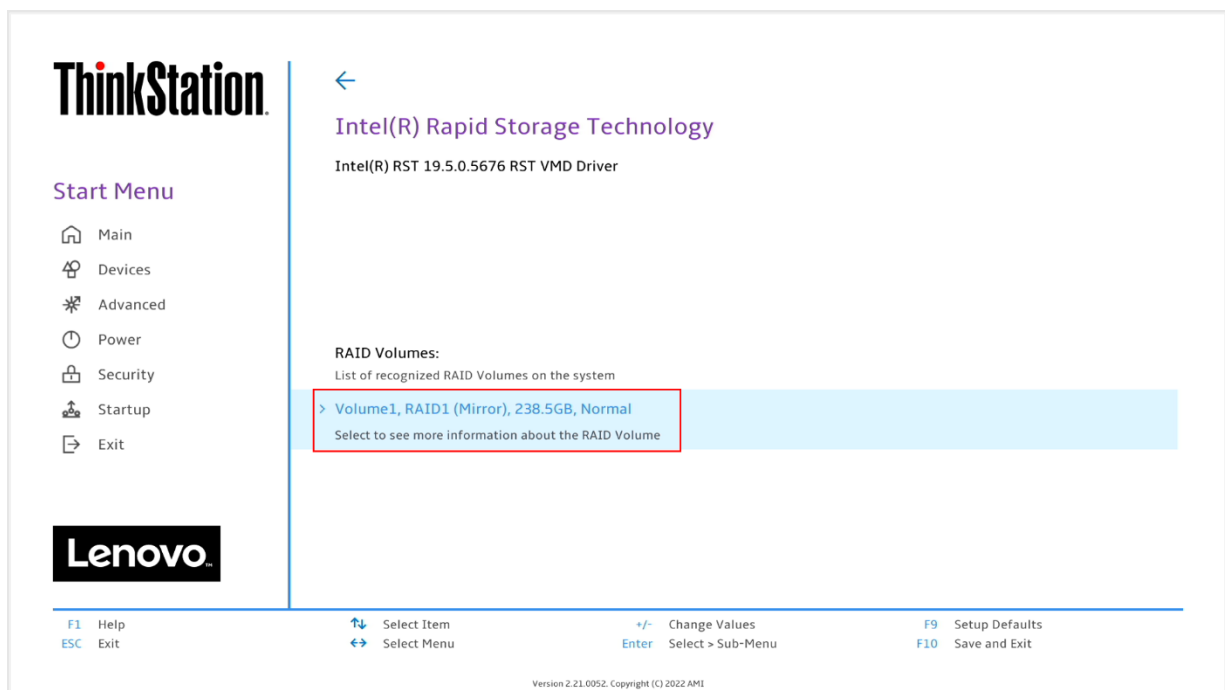
F9 Setup Defaults
F10 Save and Exit

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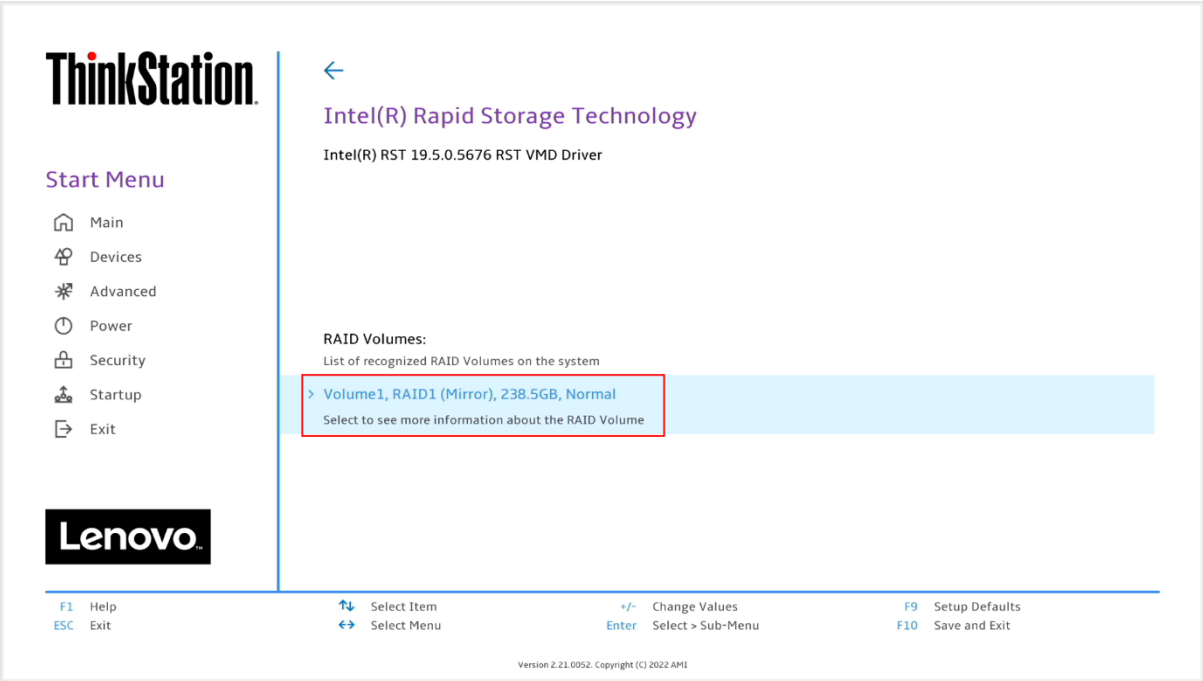
- On the same page, select the drop-down box for each drive and select “X” to add the drive to the array. Once all the required drives are added, select “Create Volume”. Unselected drives will appear in an OS like normal.



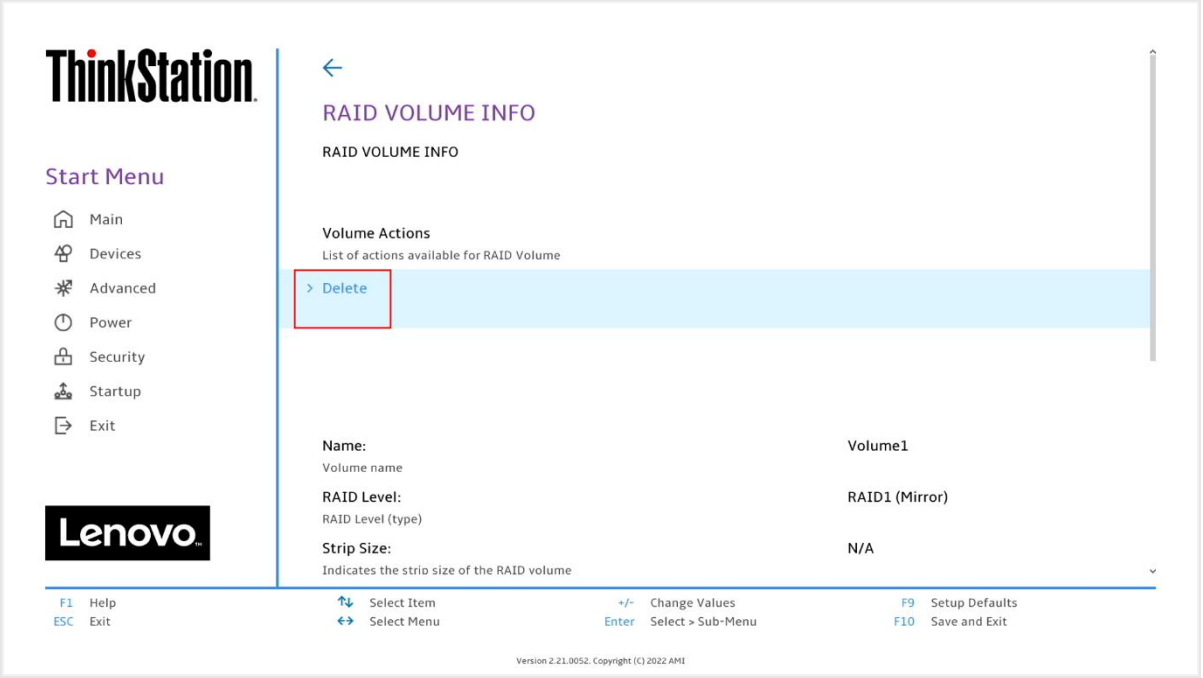
- From the opening page of the “Intel(R) Rapid Storage Technology”, verify the volume was created properly.



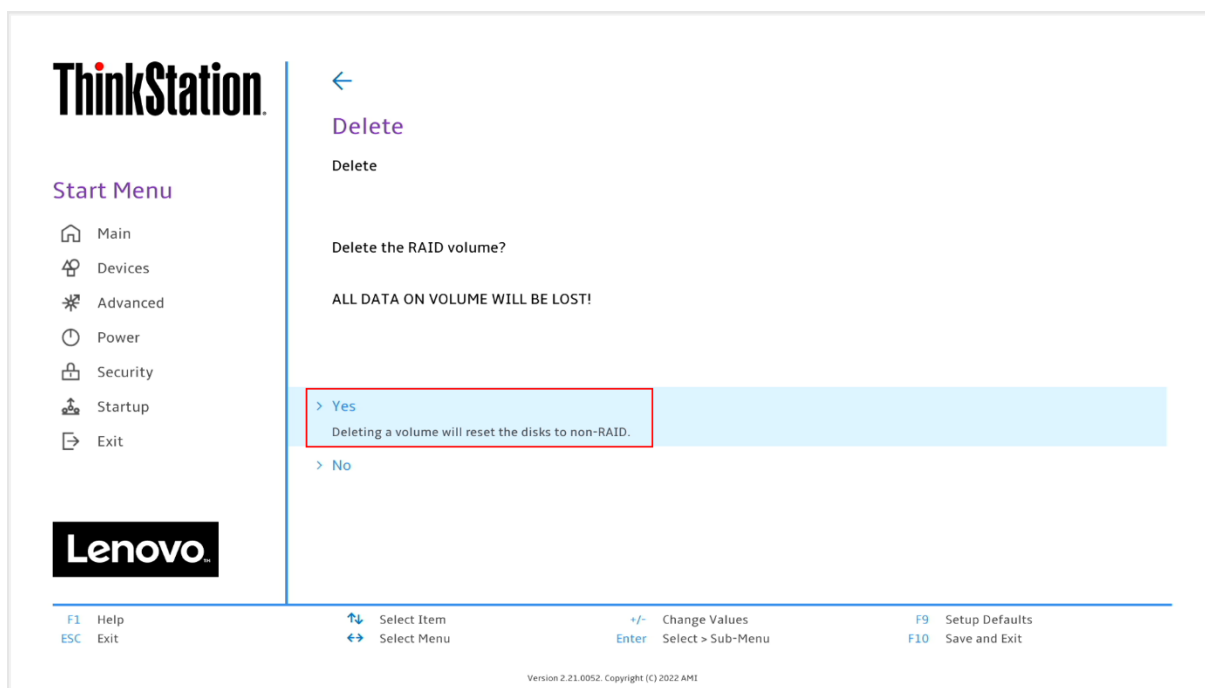
15. To delete an array, select a displayed volume to view information about it.



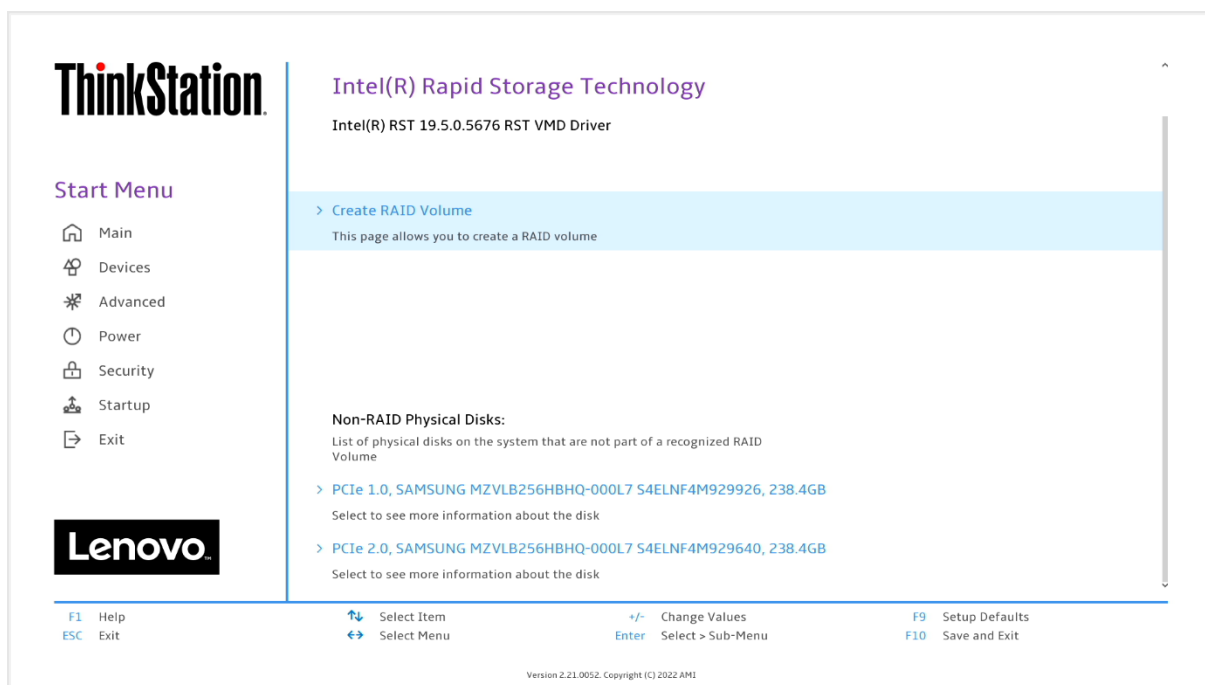
16. Select the “Delete” option.



17. Select “Yes” to confirm the deletion of the volume.



18. To verify the array was deleted, return the opening page of the “Intel(R) Rapid Storage Technology” and verify the drives are once again seen as available for the creation of a new array.



Note: The user may not see the RAID array show up in the BIOS boot sequence until after a bootable operating system has been installed on the array.



Section 3 – Document Revision History

Version	Date	Author	Updates
v1.0	6/23/25	Chris C	Initial Release