

RAID Configurator

Lenovo ThinkStation P4

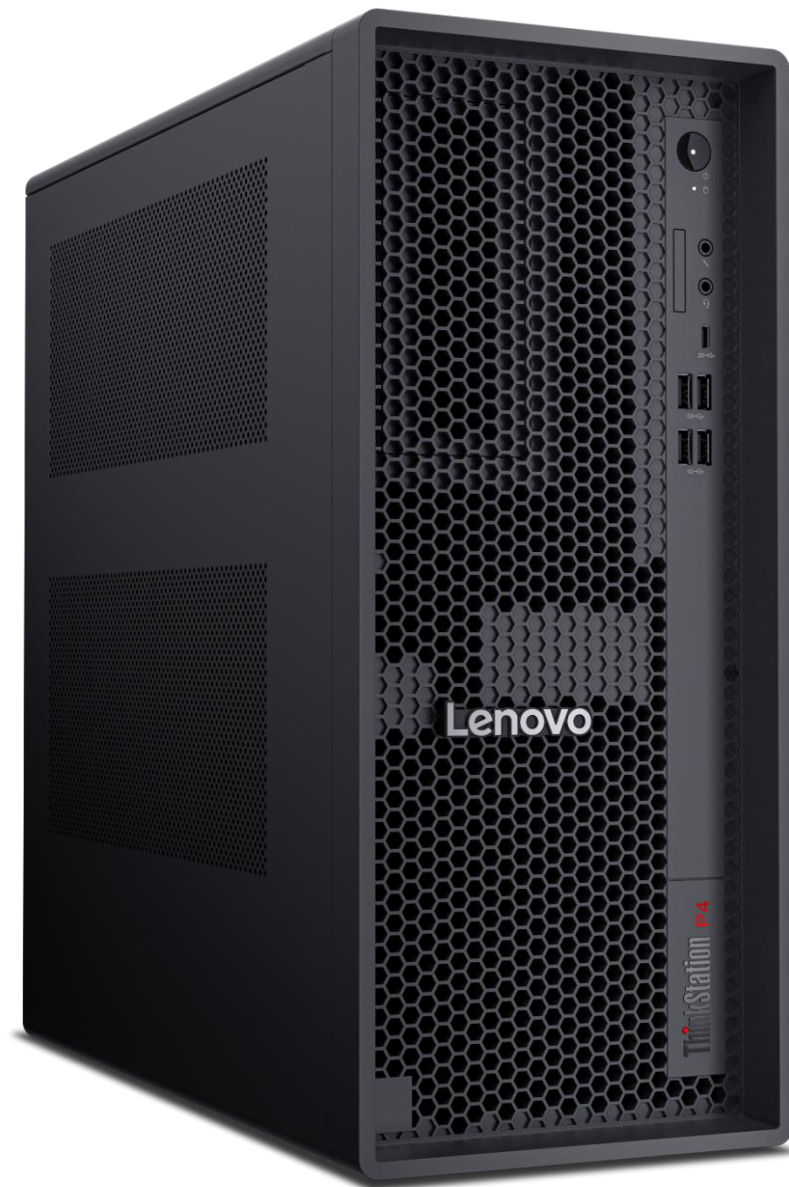


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Overview

The purpose of this document is to provide guidelines for users on how to optimally configure RAID in the ThinkStation P4 platform to ensure proper compatibility and functionality.

Below is a high-level review of the drive type support for P4:

Table 1 – P4 Storage Support

System	M.2 NVMe	SATA
P4	Supported, Max QTY: 3*	Supported, Max QTY: 4*

*Max quantity varies by configuration.

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 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.

More storage information can be found in the ThinkStation P4 Storage Configurator, located on [Lenovo's Support Site](#).

Section 1 – RAID Levels

This section will detail the RAID capabilities P4. The table below shows various supported RAID levels:

Table 2 – P4 RAID Capabilities

System	Max # of RAIDable M.2 NVMe Drives	M.2 NVMe RAID Levels	Max # of RAIDable SATA Drives	SATA RAID Levels
P4	2*	0,1	4	0,1,5,10*

*P4 supports M.2 RAID between the Gen 5 drives. RAID with the Gen 4 Slot 3 is not supported.

**A fourth SATA drive bay will prevent M.2 2280 sized drives from being installed in M.2 Slot 1, reducing max number of RAIDable M.2 NVMe drives to two.

P4 RAID Notes:

- P4 utilizes AMD RAIDXpert2 for configuring RAID.
- At the time of writing there are no add-in RAID controllers certified on this platform.
- At the time of writing P4 does not support mixed M.2 RAID between the onboard Gen 5 and Gen 4 M.2 drive slots.
- The table below lists the supported quantities of SATA drives for the respective RAID levels:

Table 3 – P4 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

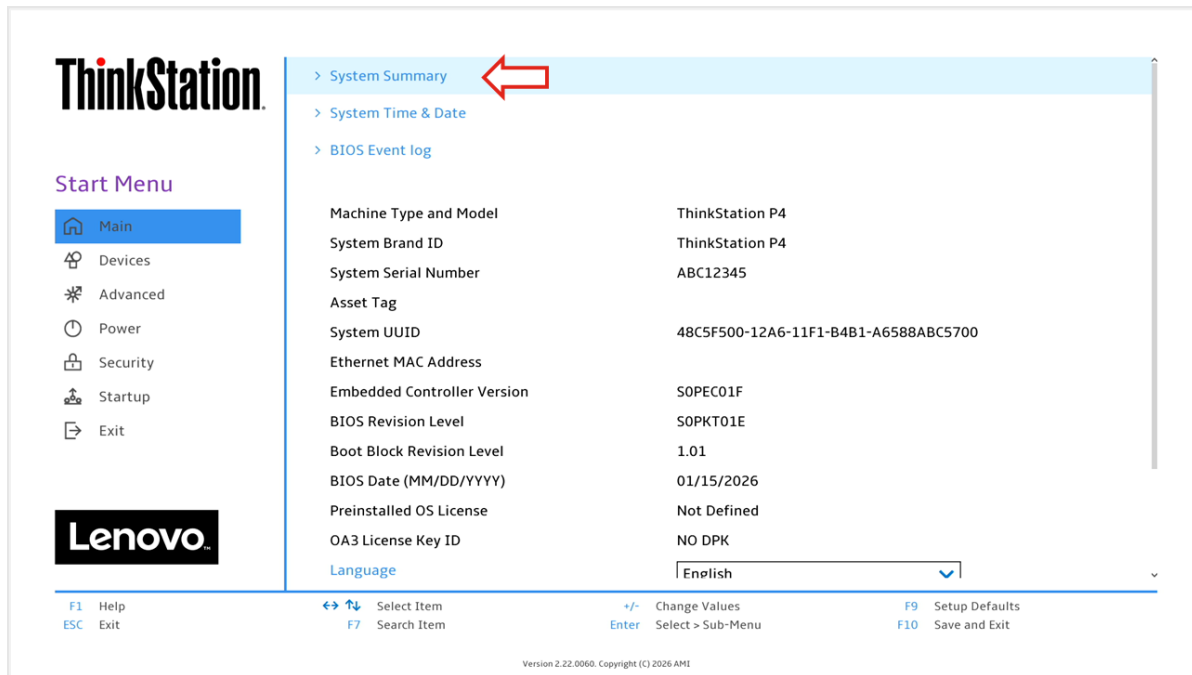
Section 2 – Configuring RAID

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.

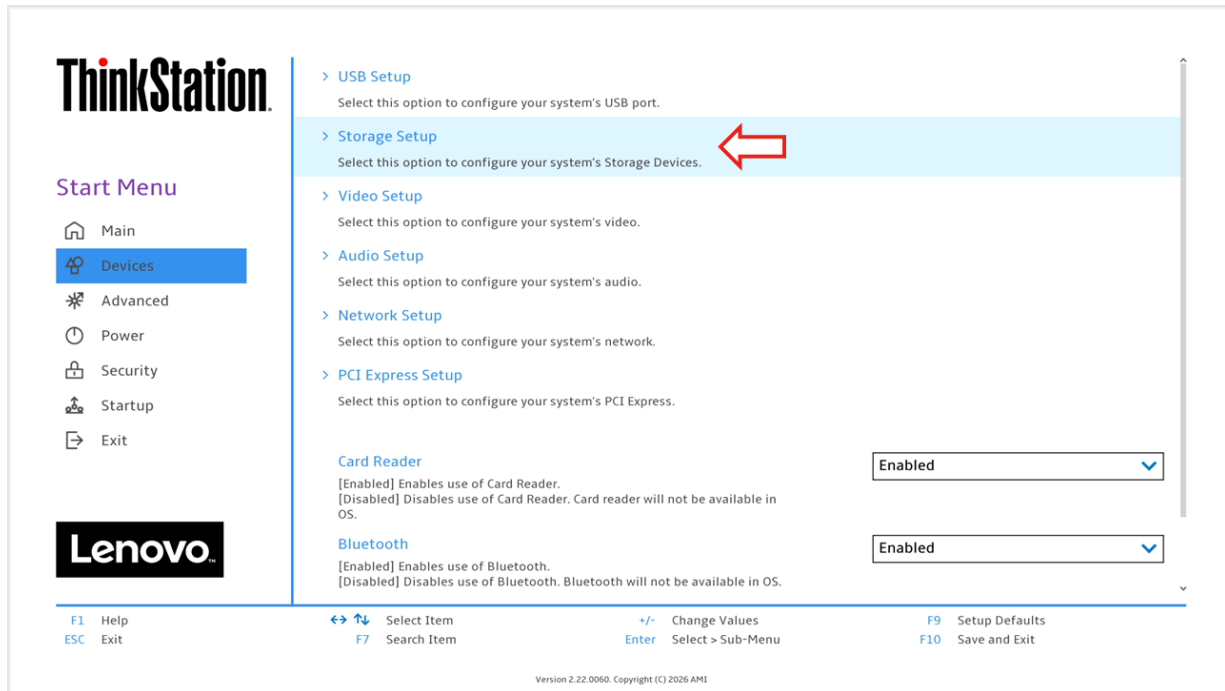


2. Select "System Summary" and scroll down to verify BIOS is recognizing the drives installed in the system.

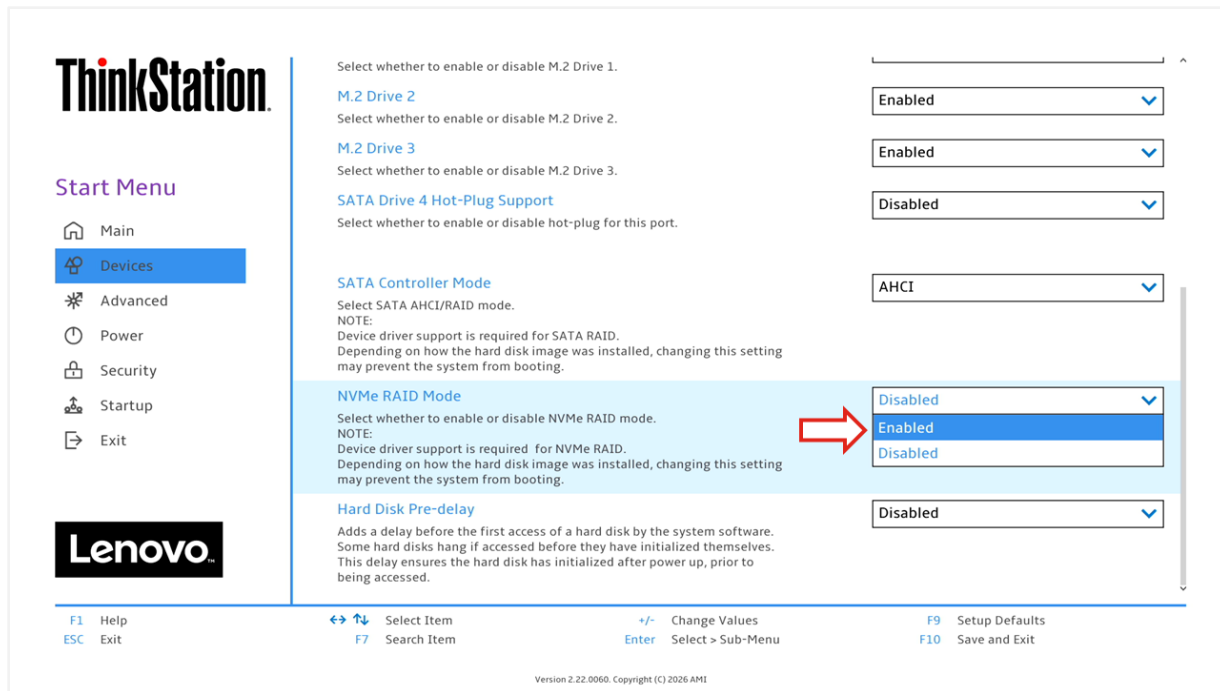


Note: From this point forward, the examples will utilize the M.2 NVMe drives. The process is the same for both drive types.

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

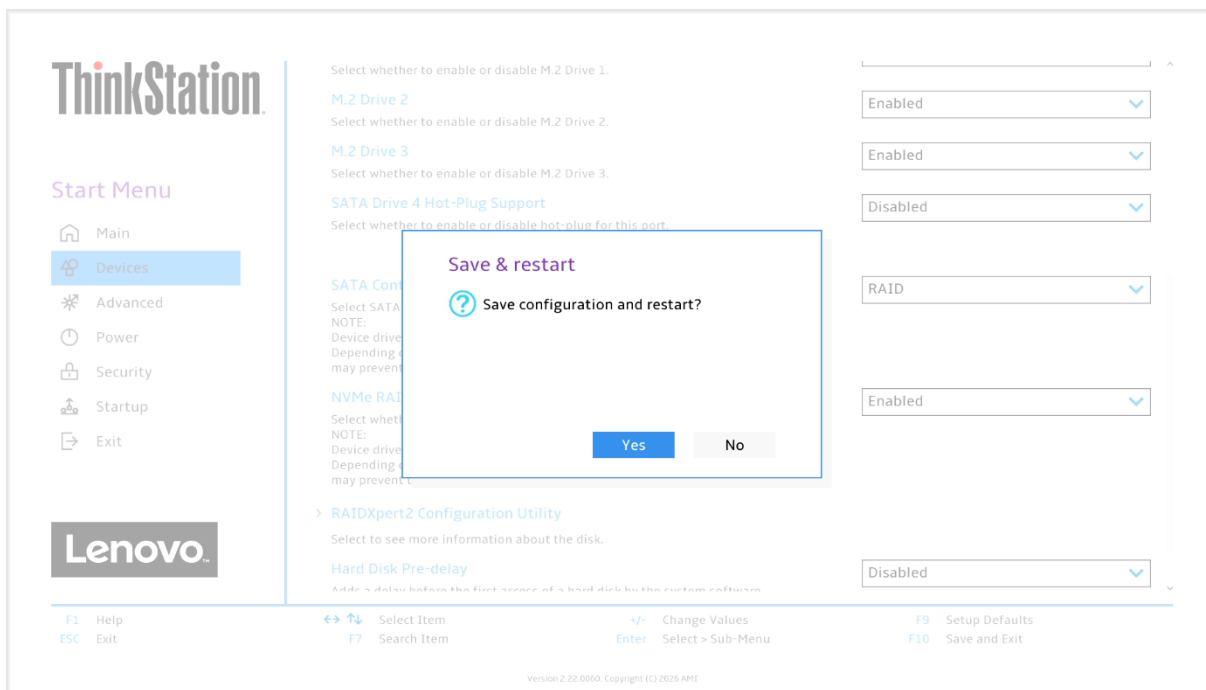


4. In the “Storage Setup” menu, select “NVMe RAID mode” and change or verify the option is set to “enabled”. For SATA RAID, change the “SATA Controller Mode” from “AHCI” to “RAID”.

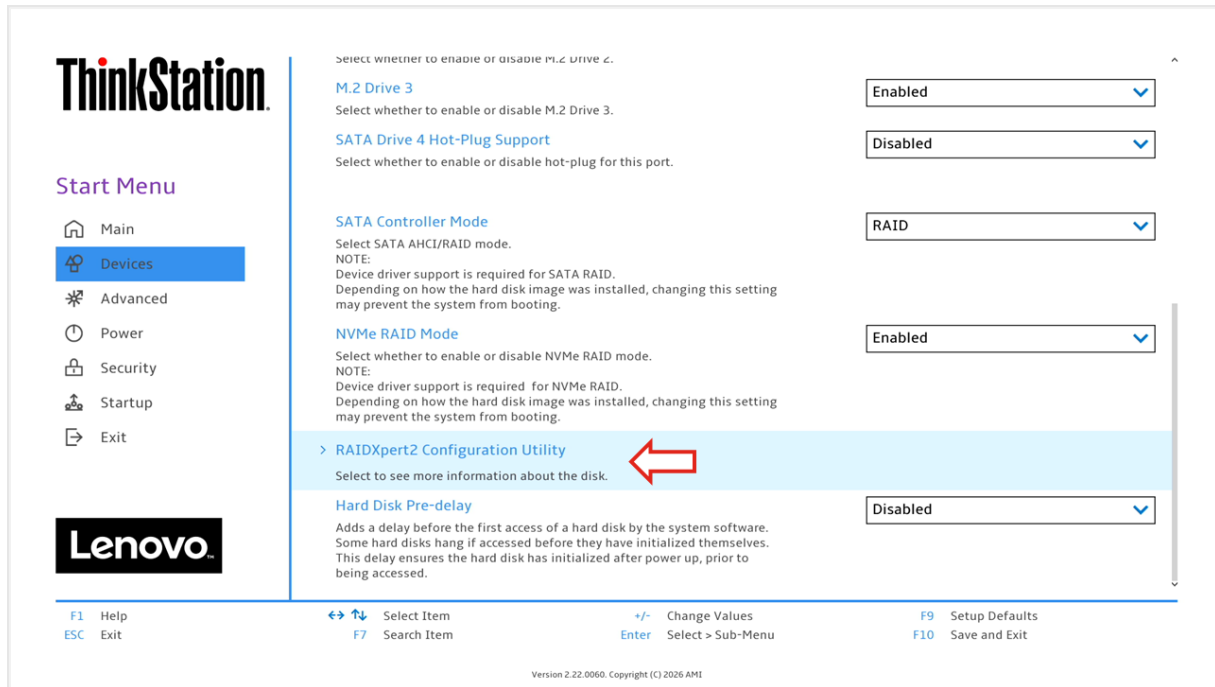


Note: In order to Secure Erase any drives, the storage mode option must not be in RAID mode. Changing storage modes may cause issues with boot OS and data on existing drives.

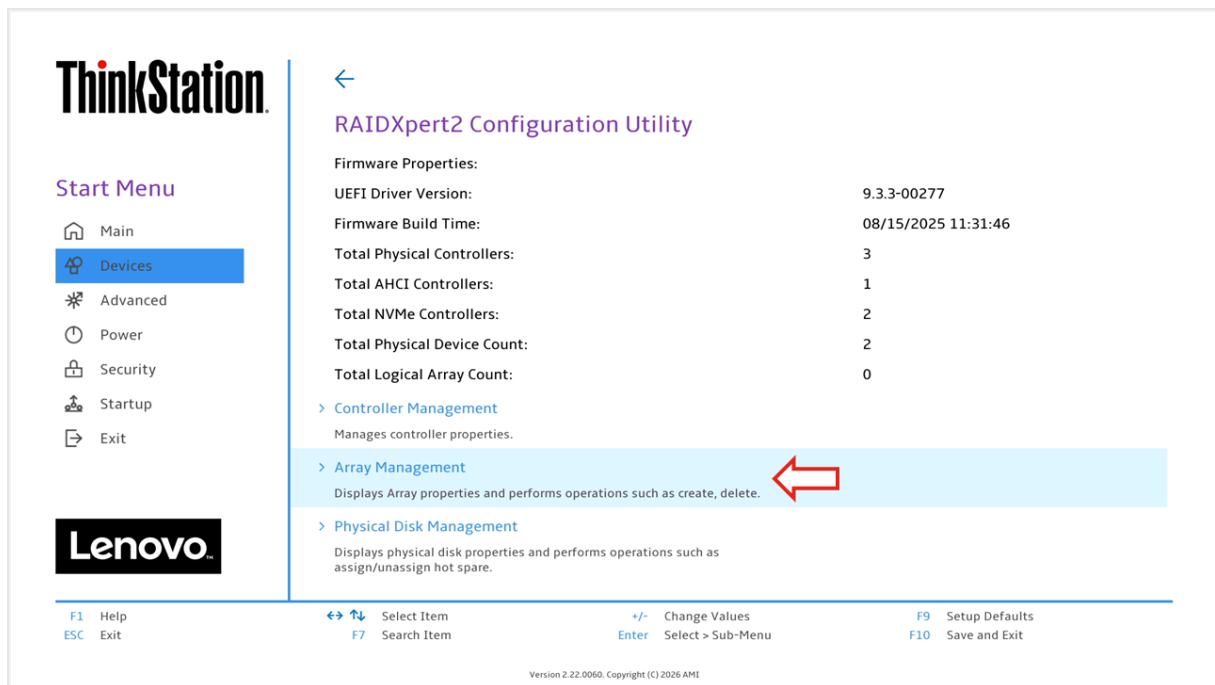
5. Press F10 to save and Exit BIOS setup.



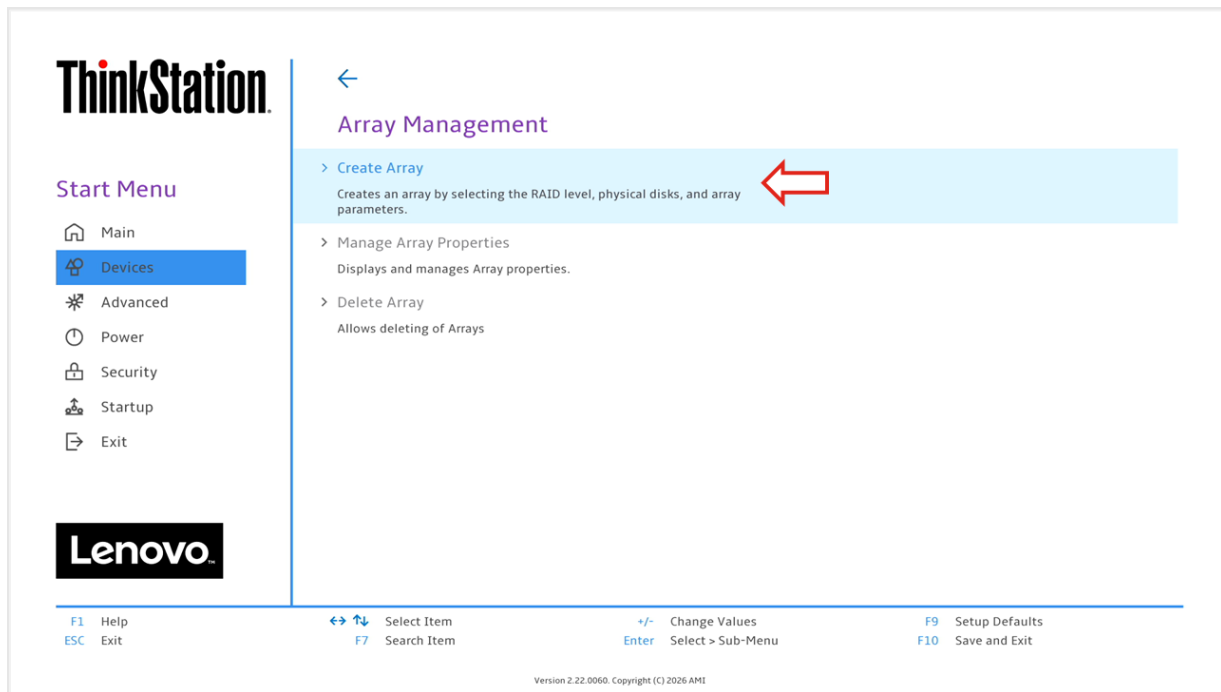
- As the system reboots, press the function F1 key at the Lenovo splash screen to re-enter the BIOS setup. The “RAIDXpert2 Configuration Utility” option will now appear in the Storage menu.



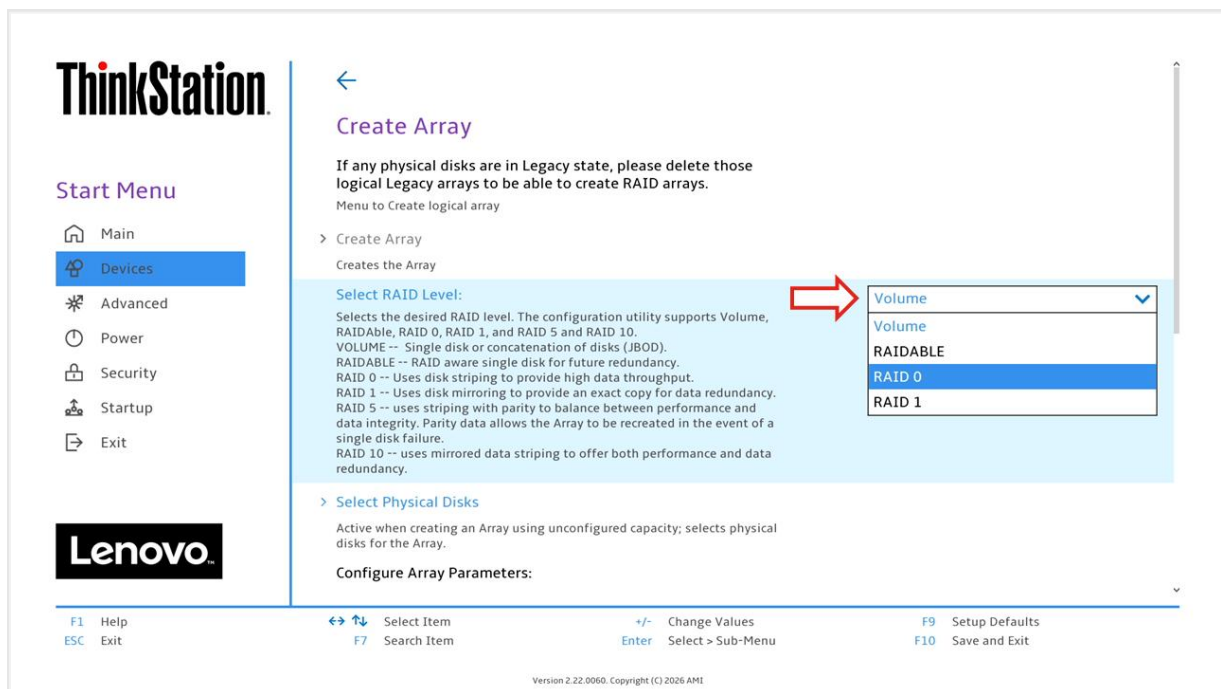
- Enter the utility menu and select “Array Management”.



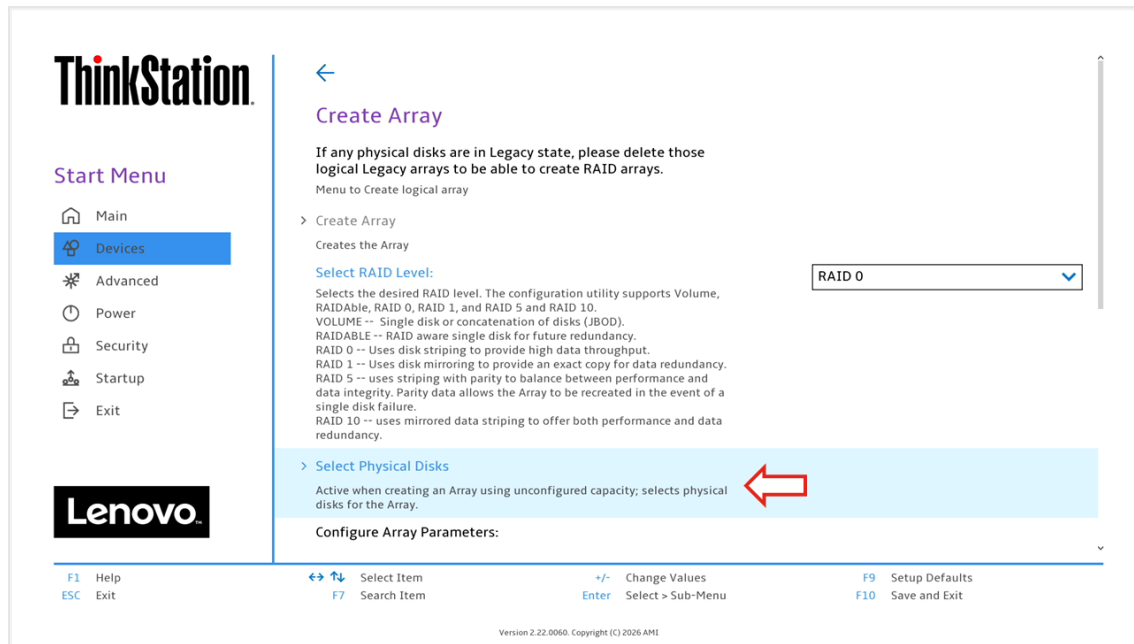
8. Select "Create Array". Check steps 13-16 if this option is not selectable.



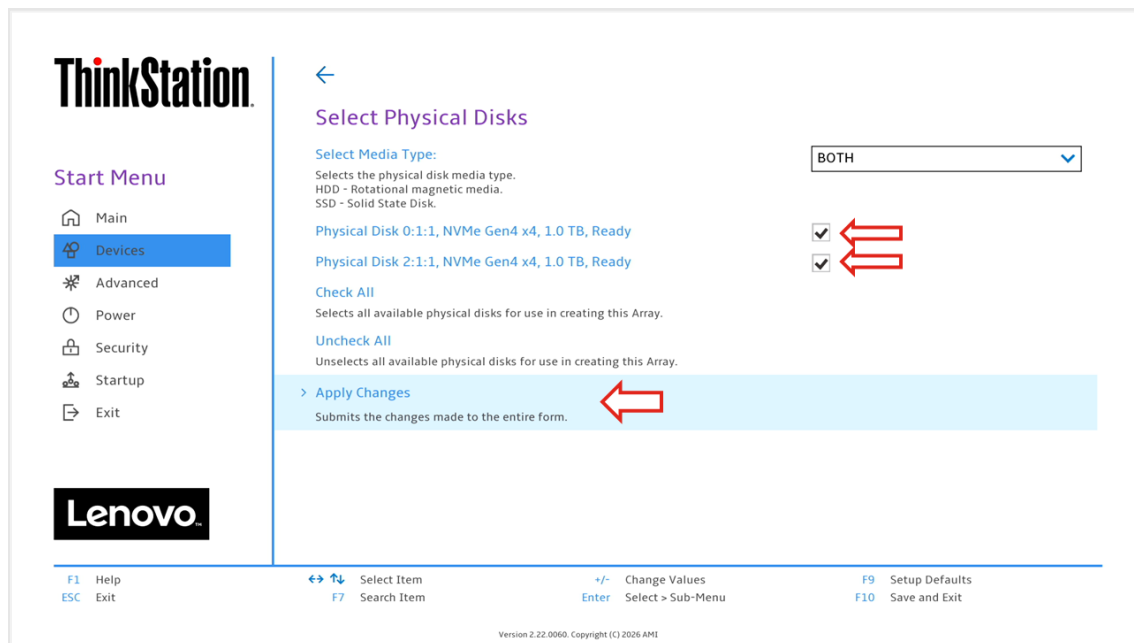
9. Select the drop-down box for "RAID Level" and select the desired RAID level. The RAID level options displayed are based on the type and number of drives available in the system.



10. To choose which drives to include in the array, select “Select Physical Disks”.



11. Check the boxes for each drive to add to the array. Once all the required drives are added, select “Apply Changes”. Unselected drives will appear in an OS like normal.



12. Returning to the previous menu, the user can adjust other array parameters seen below. Once finished, select “Create Array”.

ThinkStation

Start Menu

- Main
- Devices
- Advanced
- Power
- Security
- Startup
- Exit

Lenovo

disks for the Array.

Configure Array Parameters:

Array Size:
Allows the user to specify the size of the Array to be created. A value of 0 will be reset to the maximum supported Array size when a valid configuration has been selected.

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Array Size Unit:
Selects the units in which the Array Size is displayed. 1 MB = 1000 KBs. 1GB = 1000 MBs. 1 TB = 1000 GBs.

MB (MegaBytes)

Select CacheTagSize:
Specifies the Cachetag Size. This is the amount of data per disk in a stripe. Supported sizes are 64KB, 128KB, or 256KB.

256KB

Read Cache Policy:
Selects the desired read policy. The configuration utility supports No Cache and Read Cache.
Read Cache -- Read data will be pre-fetched
No Cache -- Reads will be performed only when requested

Read Cache

Write Cache Policy:
Selects the desired write policy. The configuration utility supports No Cache and Write Back Cache.
No Cache -- Writes are done immediately
Write Back Cache -- Writes are delayed. May result in loss of data in event of system failure!

Write Back Cache

> Create Array
Creates the Array

F1 Help
ESC Exit

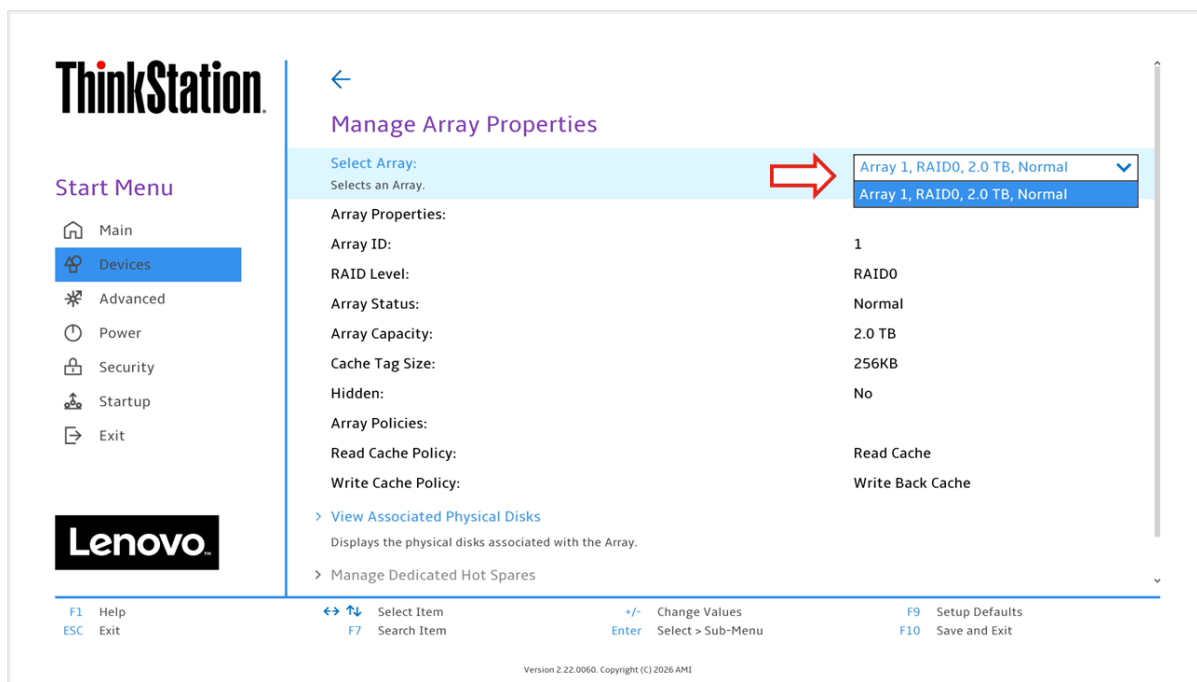
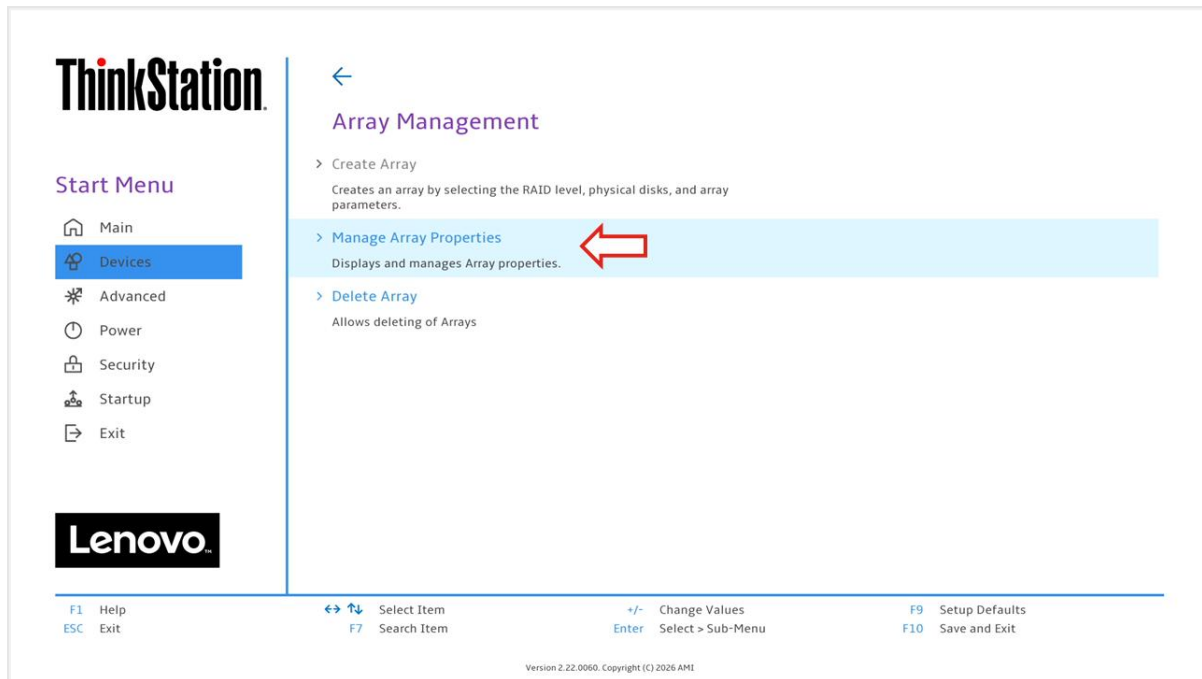
↔ ↑ ↓ Select Item
F7 Search Item

+/- Change Values
Enter Select > Sub-Menu

F9 Setup Defaults
F10 Save and Exit

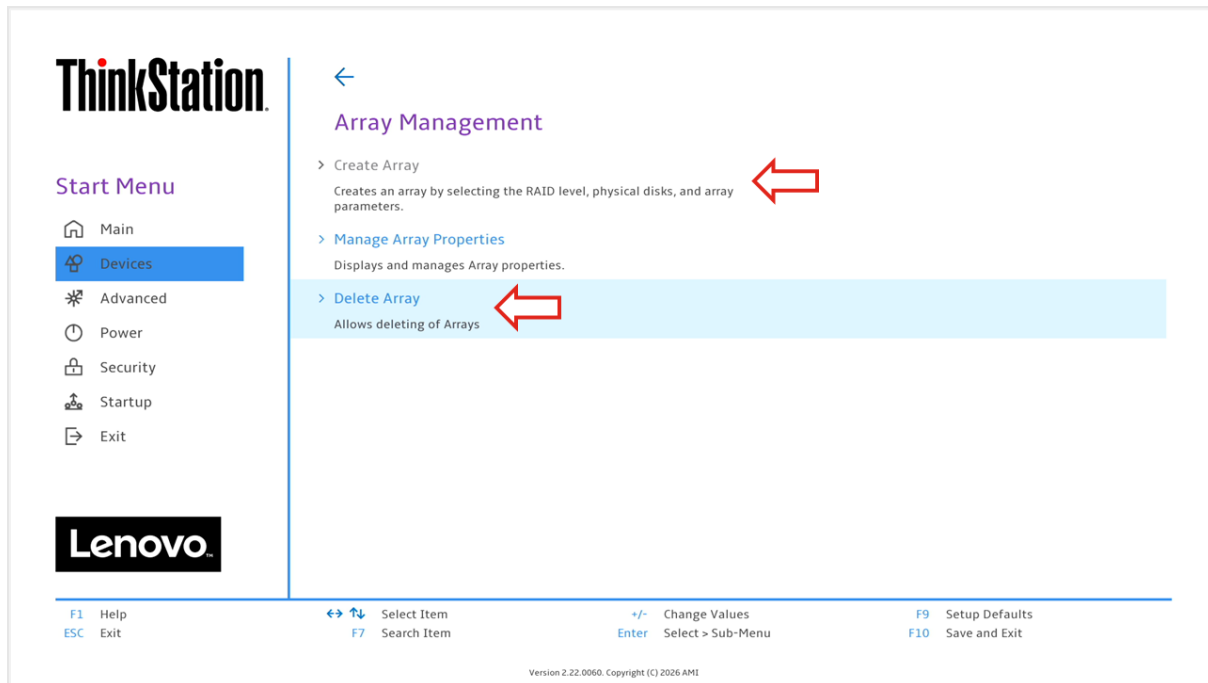
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13. Once created, the array can be viewed and have its properties edited under “Manage Array Properties”.

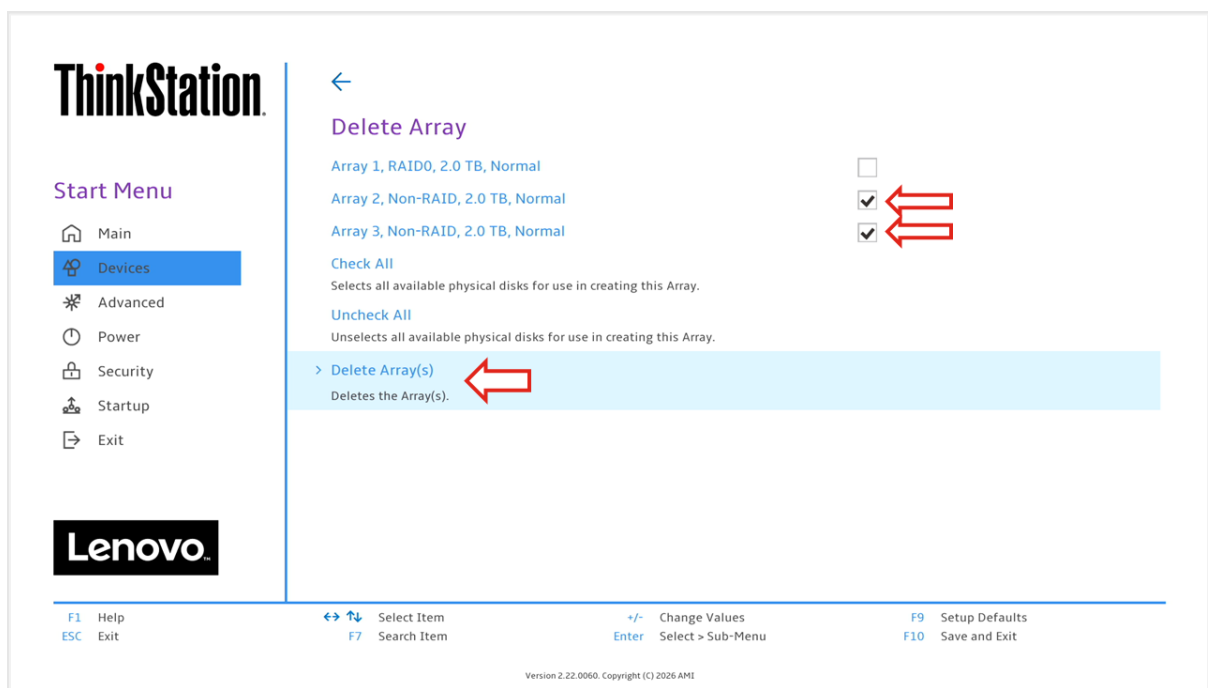


Note: The user may not see the RAID array show up in the BIOS boot sequence until after a bootable operating system has been installed on the array.

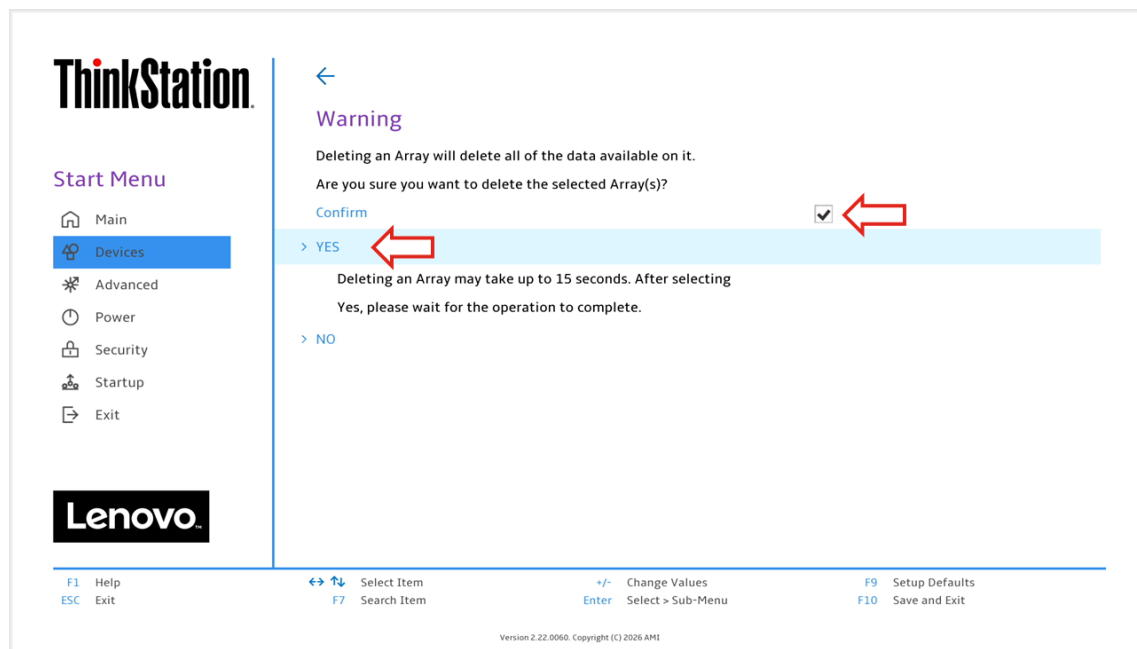
14. If the “Create Array” option is grayed out, it may be necessary to clear any existing data on the drives. If so, select “Delete Array”.



15. Select the Non-RAID drives that will be chosen to be RAIDed. The example below shows two SATA drives added into the system after previous steps.



16. Confirm the deletion of data on the drives and select “YES”. After performing this deletion, the drives will be selectable to new RAID array creation.



Section 3 – Document Revision History

Version	Date	Author	Updates
v1.0	6/30/26	Chris C	Initial Release