Inspur Server
3008 Series RAID Controller Card
Configuration Manual

Document Version: V1.4
Release Date: January 25, 2022

Environmental Protection

Please dispose of product packaging by recycling at a local recycling center for a greener planet.

Trademarks

Inspur and Inspur Logo are registered trademarks of Inspur.

All the other trademarks or registered trademarks mentioned herein are the property of their respective holders.

Disclaimer

The purchased products, services and features shall be bound by the contract made between Inspur and the customer. All or part of the products, services and features described herein may not be within your purchase or usage scope. Unless otherwise agreed in the contract, Inspur makes no express or implied statement or warranty on the contents herein. Images provided herein are for reference only and may contain information or features that do not apply to your purchased model. This manual is only used as a guide. Inspur shall not be liable for any damage, including but not limited to loss of profits, loss of information, interruption of business, personal injury, or any consequential damage incurred before, during, or after the use of our products. Inspur assumes you have sufficient knowledge of servers and are well trained in protecting yourself from personal injury or product damages during operation and maintenance. The information in this manual is subject to change without notice. Inspur shall not be liable for technical or editorial errors or omissions contained in this manual.

Technical Support

Global Service Hotline:	1-844-860-0011/1-760-769-1847
Address:	No. 1036 Langchao Road, Jinan, PRC Inspur Electronic Information Industry Co., Ltd
Postal Code:	250101
Email:	serversupport@inspur.com

Foreword

Abstract

This document describes the appearance and features of 12 G SAS RAID controller Inspur 3008IR/IT series, and provides instructions on how to configure RAID arrays and install drivers. These methods are also applicable to Broadcom 9300 and 9305 series.

Inspur assumes you have sufficient knowledge of servers and are well trained in protecting yourself from personal injury or product damages during service.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 DANGER	A potential for serious injury, or even death if not properly handled
 WARNING	A potential for minor or moderate injury if not properly handled
 CAUTION	A potential loss of data or damage to equipment if not properly handled
 IMPORTANT	Operations or information that requires special attention to ensure successful installation or configuration
 NOTE	Supplementary description of important information

Revision History

Version	Date	Change
V1.4	2022/01/25	Optimized the contents and format
V1.3	2021/07/19	Updated names of figures and tables
V1.2	2021/07/05	Added recommended configurations for RAID controller cards
V1.1	2021/06/24	Optimized content and format
V1.0	2021/01/08	Initial release

Table of Contents

1 RAID Introduction

This chapter introduces the basic concepts and features of RAID.

1.1 RAID Functions

RAID is the abbreviation of “Redundant Array of Independent Disk”. Simply put, RAID is a technology that combines multiple independent hard disks (physical hard disks) in different ways to form a group of hard disks (logical hard disks), thus providing higher storage performance than a single hard disk and providing data backup. Depending on the different combinations of disk displays, RAID can be classified into different RAID levels. With data backup, users can restore corrupted data from the backup to ensure data security. In addition, users can manage the drive group just like a single drive, and can also partition or format it. In brief, operations on a RAID array are the same as those on a single drive. The only difference lies in that a RAID array delivers a higher storage speed and enables automatic data redundancy backup.

RAID supports:

- Automatic detection of failed drives
- Rebuilding of data in bad sectors
- Drive backup
- Hot-swap drives
- Drive capacity expansion

1.2 RAID Levels

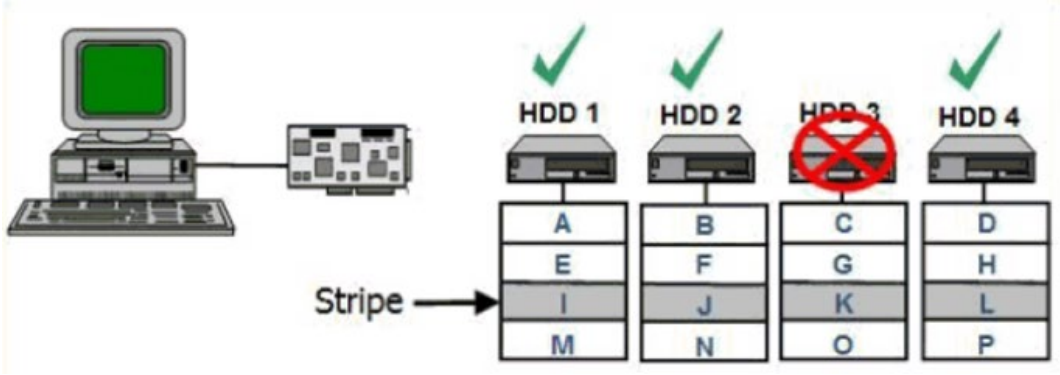
Various RAID levels are available to provide different data access speeds, security levels, and cost performances. Users can select appropriate RAID levels based on their actual needs in terms of availabilities, performances, and capacities of storage systems. The commonly used RAID levels include RAID 0, RAID 1, RAID 5, RAID 6, RAID 10, RAID 1E, RAID 50, and RAID 60.

1.2.1 RAID 0

Also known as striping, RAID 0 divides data into multiple data blocks with the same size and writes them into different drives in the array. With data distributed across multiple drives, data read/write is performed concurrently on these drives. Therefore, the capacity and data transfer rate of RAID 0 is theoretically N times of

those of a single drive (“N” represents the total number of drives composing RAID 0). However, RAID 0 cannot ensure data security since it does not support data redundancy, and therefore is applicable only to scenarios that require high I/O but low data security.

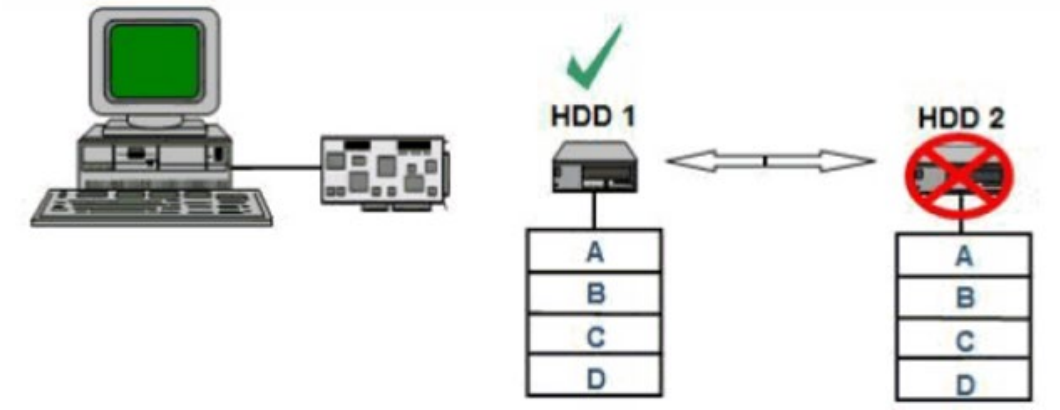
Figure 1-1 RAID 0



1.2.2 RAID 1

RAID 1 is also referred to as mirroring. In a RAID 1 array, each data drive has a mirrored drive. Data is written to both data and mirrored drives simultaneously, and is read only from the data drive. If a data drive fails, data will be read from its mirrored drive. After the failed drive is replaced, data can be rebuilt from the mirrored drive. RAID 1 features high reliability but its effective capacity is half of the total drive capacity. It applies to scenarios where high fault tolerance is required, such as finance, banking, etc.

Figure 1-2 RAID 1

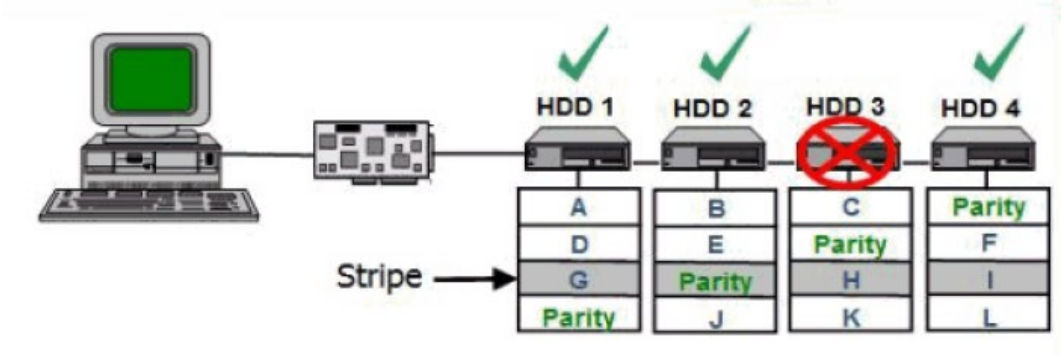


1.2.3 RAID 5

RAID 5 consists of rotating parity and independent access. The parity information is

evenly distributed to all drives in the array by certain rules instead of being written to a fixed drive. Therefore, each drive contains both data information and parity information. If any drive fails, data on the failed drive can be rebuilt from the parity bit data on other drives in the array. RAID 5 requires at least 3 drives. The advantages are better utilization of the capacity of all redundant drives configured in the array and excellent read/write performance. Note that drive failures will affect the throughput rate. This means a longer time is required to rebuild data than it takes in RAID 1 configuration.

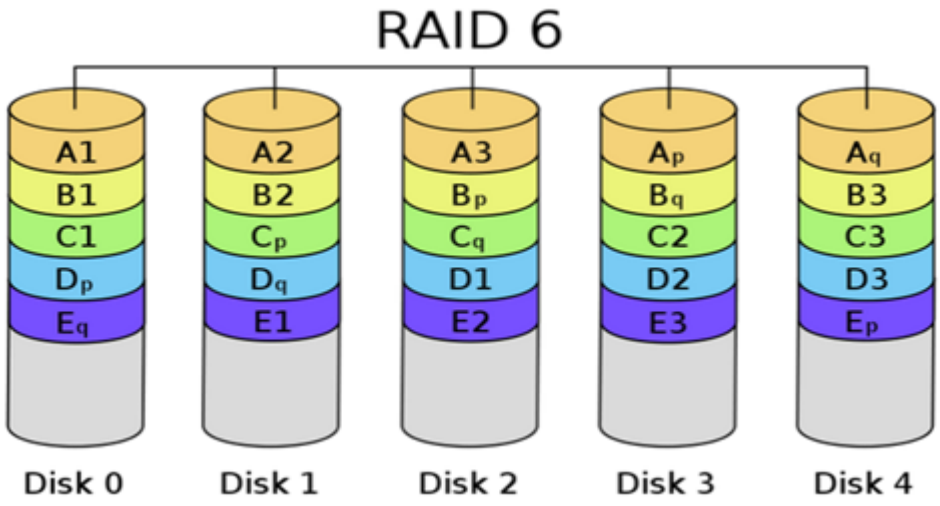
Figure 1-3 RAID 5



1.2.4 RAID 6

Compared with RAID 5, RAID 6 adds a second independent parity block for double parity. The two independent parity systems use different algorithms to ensure high data reliability. Data processing is not affected even if 2 drives fail at the same time. However, RAID 6 requires larger drive space for storing parity information and has a higher “write penalty” compared with RAID 5. Therefore, RAID 6 provides lower write performance than RAID 5.

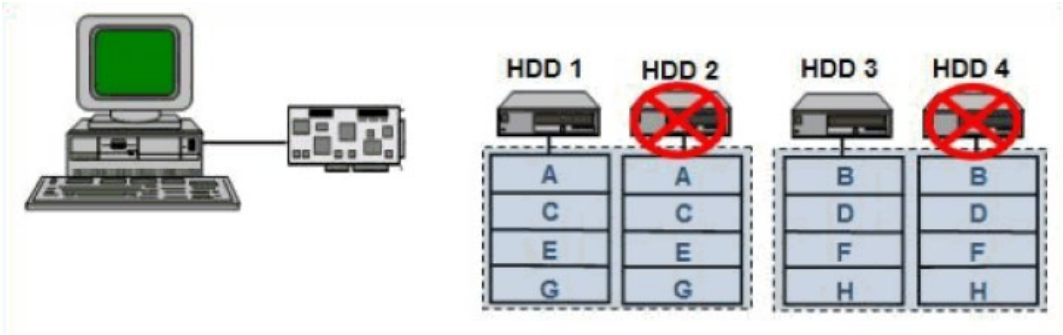
Figure 1-4 RAID 6



1.2.5 RAID 10

RAID 10 is a combination of RAID 1 and RAID 0. RAID 10 requires at least 4 drives. It delivers the best performance, protection, and capacity among all RAID levels. In RAID 10, mirrored drives are in pairs, and their data is stripped on the entire array. In most cases, RAID 10 can resist failures of multiple drives at the same time, and is able to better ensure stable running of the system. Data loss is least likely to happen in RAID 10. RAID 10 is a perfect choice for data protection because of the same redundancy feature as RAID 1 (mirroring).

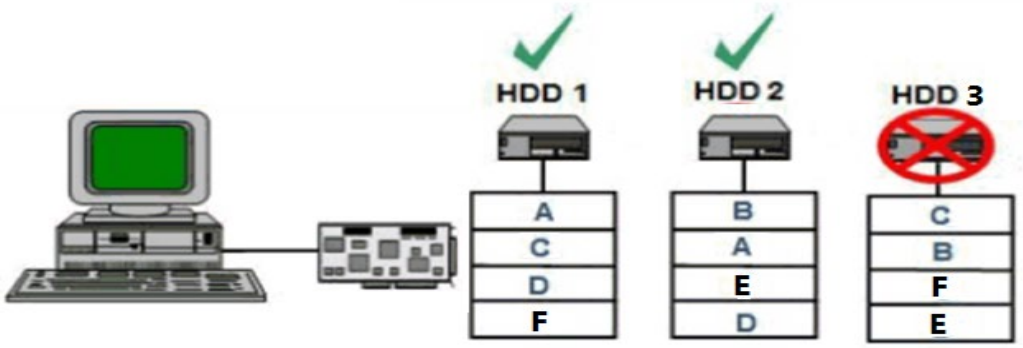
Figure 1-5 RAID 10



1.2.6 RAID 1E

RAID 1E is the enhanced version of RAID 1, which integrates data striping and mirroring to enhance the data recovery capability. However, since all data gets written at least twice, the load is increased in the RAID processor, thereby lowering read/write speed of drives. Like RAID 1, RAID 1E data is mirrored, so the logical drive capacity is half the total capacity of all member drives. RAID 1E requires at least 3 drives.

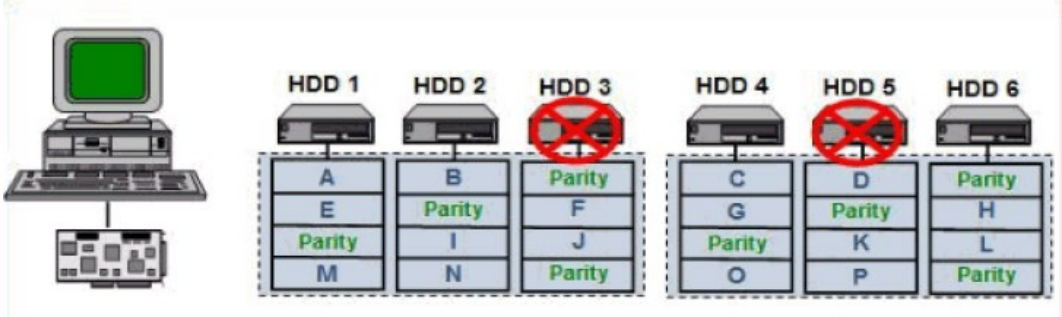
Figure 1-6 RAID 1E



1.2.7 RAID 50

RAID 50 or RAID 5+0 is a combination of RAID 5 (distributed parity) and RAID 0 (striping). RAID 0 allows data to be striped and written to multiple drives simultaneously, and RAID 5 ensures data security by using parity bits evenly distributed on drives. Therefore, RAID 50 delivers higher data security than RAID 0 and better read/write performance than RAID 5.

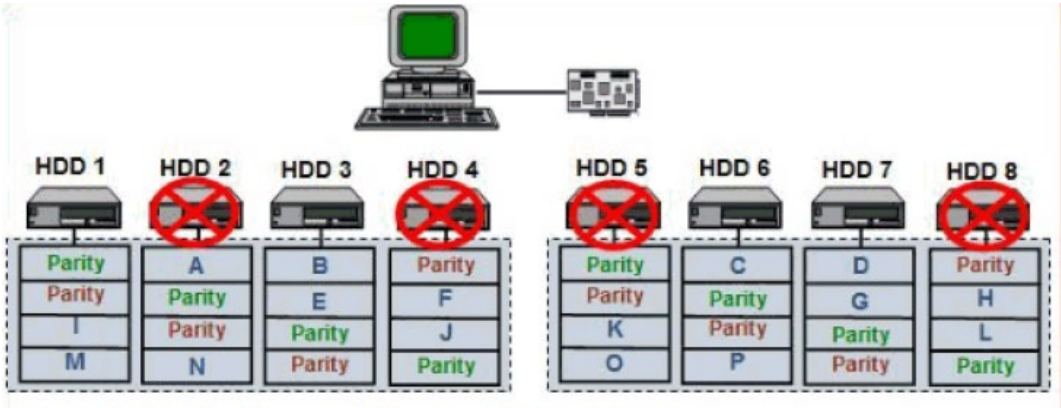
Figure 1-7 RAID 50



1.2.8 RAID 60

RAID 60 or RAID 6+0 is a combination of RAID 6 and RAID 0. RAID 0 allows data to be striped and written to multiple drives simultaneously. RAID 6 ensures data security by using 2 parity blocks distributed evenly on drives.

Figure 1-8 RAID 60



1.3 SAS RAID Controller Card Parameters

This section describes the general technical parameters and environmental parameters of SAS RAID controller cards.

The following table lists the performance and drive space utilization of different RAID levels supported by the RAID controller.

Table 1-1 Performance and Drive Space Utilization of Different RAID Levels

RAID Level	Reliability	Read Performance	Write Performance	Drive Space Utilization
RAID 0	Low	High	High	100%
RAID 1	High	Low	Low	50%
RAID 5	Relatively high	High	Medium	(N - 1)/N
RAID 6	Relatively high	High	Medium	(N - 2)/N
RAID 10	High	Medium	Medium	50%
RAID 1E	High	Medium	Medium	(N + 1)/2N
RAID 50	High	High	Relatively high	(N - M)/N
RAID 60	High	High	Relatively high	(N - M × 2)/N
Note: "N" is the total number of drives in a RAID array and "M" is the number of sub-arrays in the RAID array.				

1.4 Recommended RAID Configurations

NOTE

- The following policy settings apply to Broadcom and Microsemi RAID controller cards. Recommended configurations for HDDs and SSDs are provided respectively with performance or data security prioritized.
- The configurations are for reference only. You can adjust them according to your actual application.

The detailed configurations are described below.

1.4.1 With a Super-Capacitor

1 Optimal Performance Settings for HDDs

- Broadcom RAID controller card:
  - Read Policy = Read Ahead

- Write Policy = Write Back
- IO Policy = Direct
- Disk Cache = Enable

- Microsemi RAID controller card:
  - Read Caching/Write Caching = Controller Cache
  - Drive Write Cache = Enable

2 Optimal Performance Settings for SSDs

RAID levels without parity (RAID 0/RAID 1/RAID 10)

- Broadcom RAID controller card:
  - Read Policy = Normal (No Read Ahead)
  - Write Policy = Write Through
  - IO Policy = Direct
  - Disk Cache = Unchanged (not changeable)
- Microsemi RAID controller card:
  - Read Caching/Write Caching = SSD IO bypass
  - Drive Write Cache = Enable

RAID levels with parity (RAID 5/RAID 6/RAID 50/RAID 60)

1. Small block random read and write:

- Broadcom RAID controller card:
  - Read Policy = Normal (No Read Ahead)
  - Write Policy = Write Through
  - IO Policy = Direct
  - Disk Cache = Unchanged (not changeable)
- Microsemi RAID controller card:
  - Read Caching/Write Caching = SSD IO bypass
  - Drive Write Cache = Enable

2. Large block sequential read and write:

- Broadcom RAID controller card:

- Read Policy = Normal (No Read Ahead)
- Write Policy = Write Back
- IO Policy = Direct
- Disk Cache = Unchanged (not changeable)

- Microsemi RAID controller card:
  - Read Caching/Write Caching = SSD IO bypass
  - Drive Write Cache = Enable

3 Recommended Data Security Settings

Security Settings for HDDs:

- Broadcom RAID controller card:
  - Read Policy = Read Ahead
  - Write Policy = Write Back
  - IO Policy = Direct
  - Disk Cache = Disable
- Microsemi RAID controller card:
  - Use the default settings.

Security Settings for SSDs:

- Same as the performance settings for SSDs.

1.4.2 Without a Super-Capacitor

NOTE

If no super capacitor module is used, we assume that data security is not considered and the optimal performance settings are provided by default.

1 Optimal Performance Settings for HDDs

- Broadcom RAID controller card:
  - Read Policy = Read Ahead
  - Write Policy = Always Write Back

- IO Policy = Direct
- Disk Cache = Enable

- Microsemi RAID controller card:
  - Use the default settings.

2 Optimal Performance Settings for SSDs

Same as the optimal performance settings for SSD with a super-capacitor.

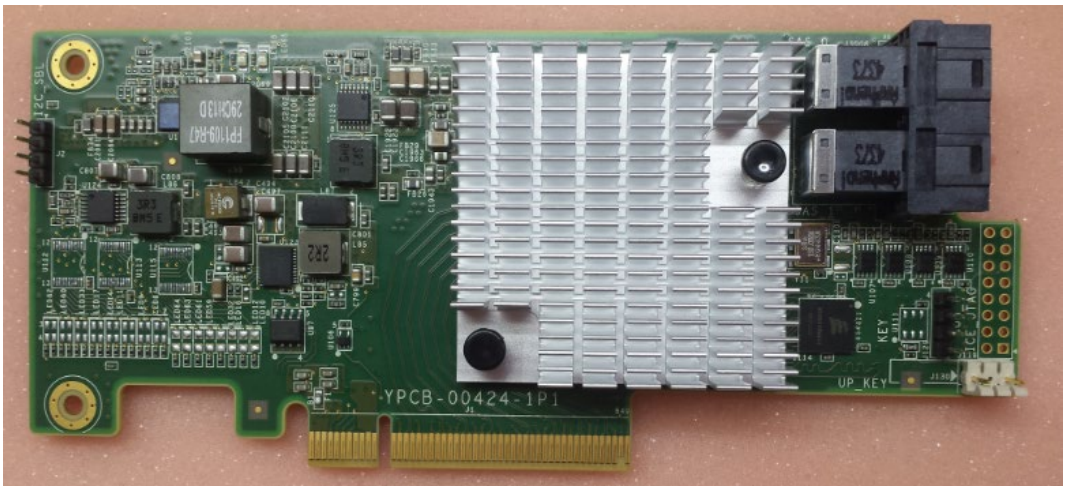
2 Introduction

This chapter describes the appearance, features, and functions of Inspur 12 G SAS RAID controller cards. For information about 9300/9305 series, refer to the datasheet on Broadcom website.

2.1 About Inspur SAS3008IR/IT

Inspur SAS3008 SAS controller card is a cost-effective SAS solution designed specifically to provide external disk storage and JBOD expansion capabilities for servers. Refer to the figure below for its appearance.

Figure 2-1 SAS3008 SAS Controller Card



Inspur SAS3008 is an 8-port 12 G SAS controller based on Fusion-MPT™ (Message Passing Technology) architecture with PCIe x8 interfaces and a powerful I/O storage engine. It can transparently execute all data verification and recovery tasks.

Moreover, Inspur SAS3008IT/IR SAS controller card supports SAS data transfer at 3 Gbit/s, 6 Gbit/s and 12 Gbit/s, and each port supports SSP, SMP, STP, and other protocols.

Inspur SAS3008IT/IR SAS controller card features:

- None of the RAID levels (Inspur SAS3008IT)
- RAID 0, 1, 1E, and 10 (Inspur SAS3008IR)
- PCIe 3.0 x8 interfaces to deliver a bandwidth rate up to 8 Gbit/s

- Eight SAS/SATA ports for disk storage
- Connection to a maximum of 256 extended devices
- Support for SAS/SATA disks and SSDs
- Support for hot-swap drives
- Drive sleep mode

2.2 Technical Limitations of SAS3008IR

The technical limitations on Inspur 3008IR:

1. Limitation of RAID arrays on drive number:
    - RAID 1: A maximum of 2 disks are allowed to create a RAID 1 array, and a maximum of 2 global hot spare (HS) disks can be configured.
    - RAID 1E/RAID 10: 3 - 10 disks are required, and a maximum of 2 global HS disks can be configured.
    - RAID 0: 2 - 10 disks are allowed for RAID 10 creation, but no global HS disk can be configured.
2. Limitation on creating RAID arrays:
    - A single SAS controller card allows configuration of 2 global HS disks at most.
    - A single SAS controller card allows creation of a maximum of 2 RAID arrays with no more than 14 disks (including HS drives).

    (For example, to create 2 RAID 1 arrays, you need 4 disks and cannot create other RAID arrays.)

    - While creating a RAID array, you cannot manually partition RAID or define parameters such as Stripe Size. (For example, if RAID 0 is created with two 2 T drives, the partition size can only be 4 T).
    - Linux OS with disk partitions in Ext3, Ext2 and other formats cannot be installed when the capacity of a single disk or RAID array is greater than 2 T.
    - When you install Linux OS for drives connected directly to SAS3008IR, the drive letter (Sda, Sdb...) under the OS may not correspond to the physical slot ID on the drive backplane.
    - RAID arrays cannot be created by mixed use of drives such as SAS+SATA, SSD+SATA/SAS, or 4 K+512 e.

3. The order of RAID array creation:

   - To create 2 RAID arrays, start from the disk with a larger slot ID, so as not to reverse the order after creating 2 RAID arrays in sequence.

   (For example, a SAS controller card connects 6 drives, namely drives in Slot 0, 1, 2, 3, 4, and 5. It is planned to create a RAID 1 array with drives in Slot 0 and 1 and a RAID 10 array with drives in Slot 2, 3, 4, and 5. Specifically, select drives in Slot 2, 3, 4, and 5 to create the RAID 10 array first, and then select drives Slot 0 and 1 to create the RAID 1 array. Thus, Slot 0 and 1 precede Slot 2, 3, 4, and 5.)

2.3 Environmental Parameters of SAS RAID Controller Cards

This section describes the environmental parameters of SAS RAID controller cards.

The environmental parameters of Inspur SAS RAID controller are shown below.

Table 2-1 Environmental Parameters

Specification	12 G SAS
MTBF	> 2,000,000 hours
Operating Voltage	+12 V ± 8%; 3.3 V ± 8%
Operating Temperature	0℃ - 55℃ (32℉ - 131℉)
Storage Temperature	-45℃ - 105℃ (-49℉ - 221℉)
Relative Humidity	5% - 90% (non-condensing)
Form Factor	Low Profile (2.6” × 6.6”)

3 Configuring Inspur SAS3008IT/IR

3.1 Initial Configuration (Legacy Mode)

This section describes how to configure Inspur SAS3008IT/IR, which is also applicable to Broadcom 9300 series.

3.1.1 Logging in to the CU Screen

This section demonstrates with Inspur SAS3008IR to introduce how to log in to the CU configuration screen and the key functions on the CU screen.

3.1.2 Creating RAID Arrays

Introduces how to create RAID arrays on Inspur SAS3008IR.

3.1.3 Configuring RAID Arrays

Introduces how to configure Inspur SAS3008IR.

IMPORTANT

- The operating procedures described in this section are also applicable to Inspur SAS3008IT.
- The main difference between SAS3008IT and SAS3008IR is that the former cannot be configured to any RAID level.

3.1.1 Logging in to the CU Screen

This section details how to log in to the Configuration Utility (CU) screen of Inspur SAS3008IR and the key functions on the CU screen.

Scenario:

Inspur SAS3008IR MPT3BIOS CU is a tool for configuring and managing the Inspur SAS3008IR controller. The CU is embedded in the controller MPT3BIOS and runs independently of the operating system, making it simple and easy for RAID configuration and management.

This section guides installation and debugging engineers on how to log in to the CU screen of Inspur SAS3008IR controller.

IMPORTANT

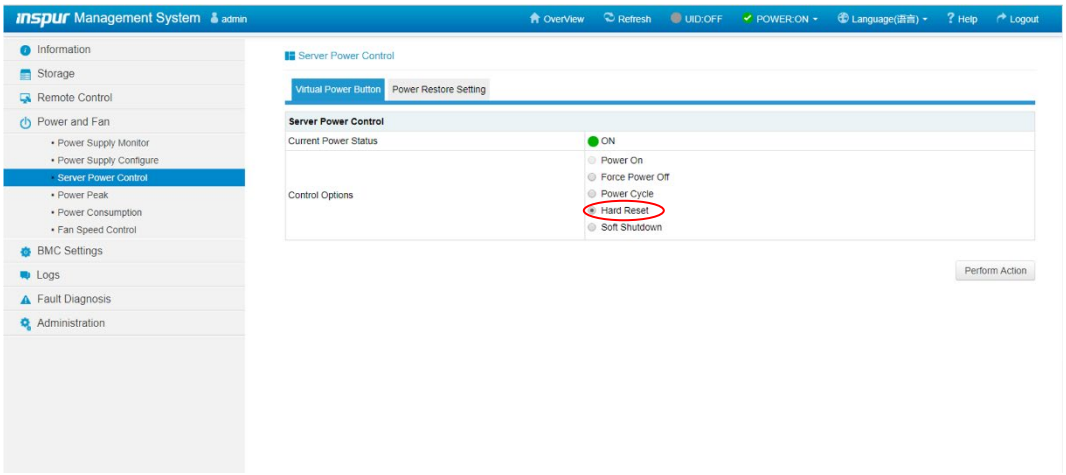
Logging in to the CU screen requires a server restart, which will cause system service interruption.

Procedures:

1. Hard reset the server

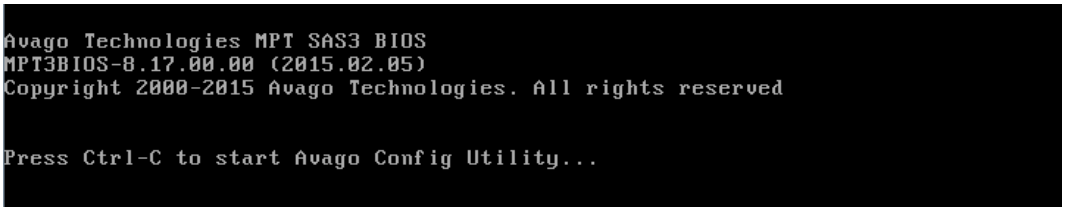
Log in to the target server remotely via BMC and click **Hard Reset** in the remote console, as shown below.

Figure 3-1 Hard Resetting the Server



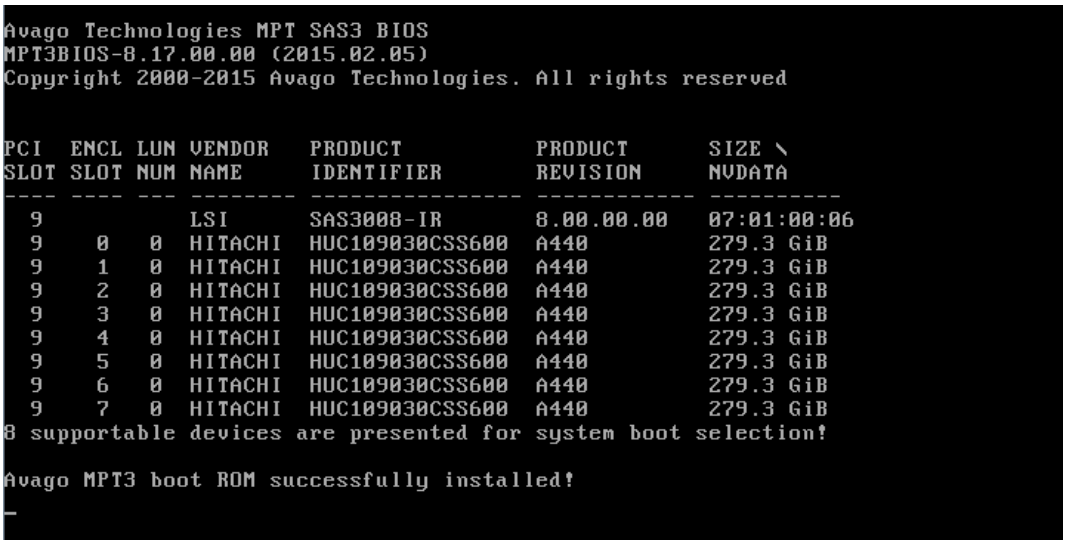
2. During POST, when the prompt **Press <Ctrl><C> to Start AVAGO Config Utility** appears, press <Ctrl> and <C> to enter the **SAS3008IR MPT3BIOS Config Utility** screen, as shown below.

Figure 3-2 Prompt on How to Start Config Utility



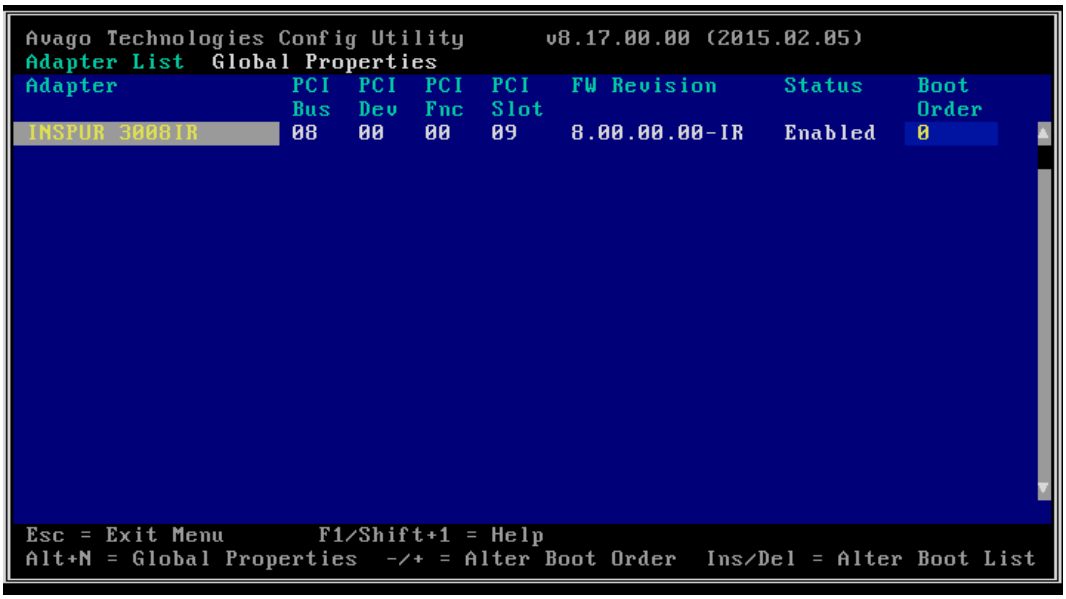
The Inspur SAS3008IR POST screen is shown below.

Figure 3-3 SAS3008IR POST Screen



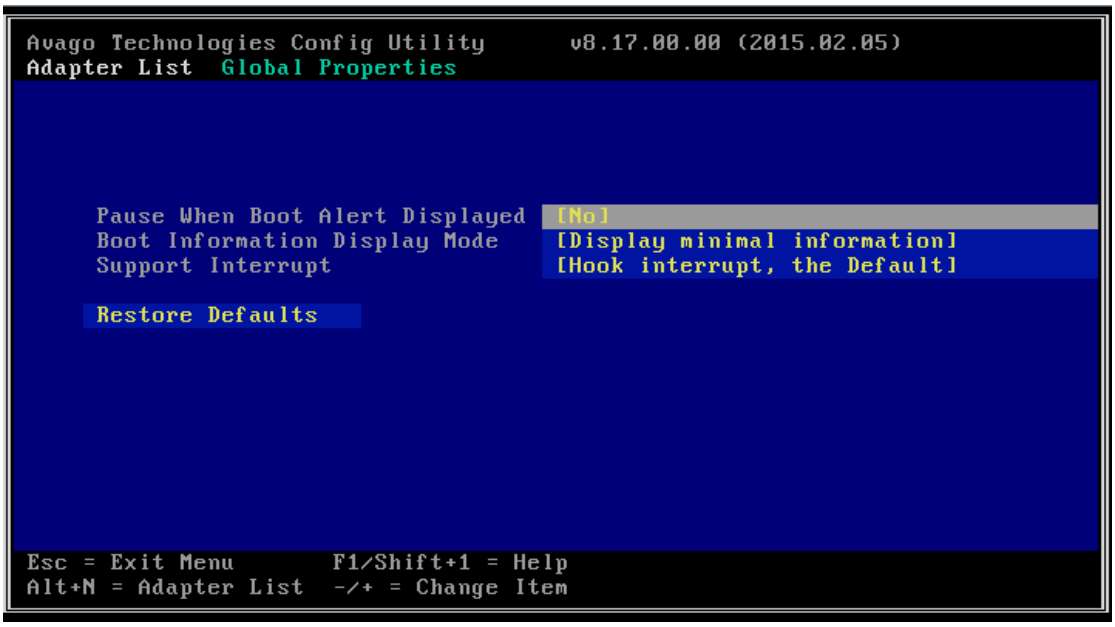
Enter the CU screen of SAS3008IR, which is shown below:

Figure 3-4 CU Screen



Press <Alt> and <N> under the screen to view the global properties of the existing RAID controller card. The screen is shown below:

Figure 3-5 Global Properties



3.1.2 Creating RAID Arrays

This section describes how to create RAID arrays after entering the CU screen of Inspur SAS3008IR.

IMPORTANT

- To create a RAID array, the drives in the same RAID array shall be of the same type and specifications.
- Inspur SAS3008IT cannot be configured to any RAID level.

1 Creating RAID 0

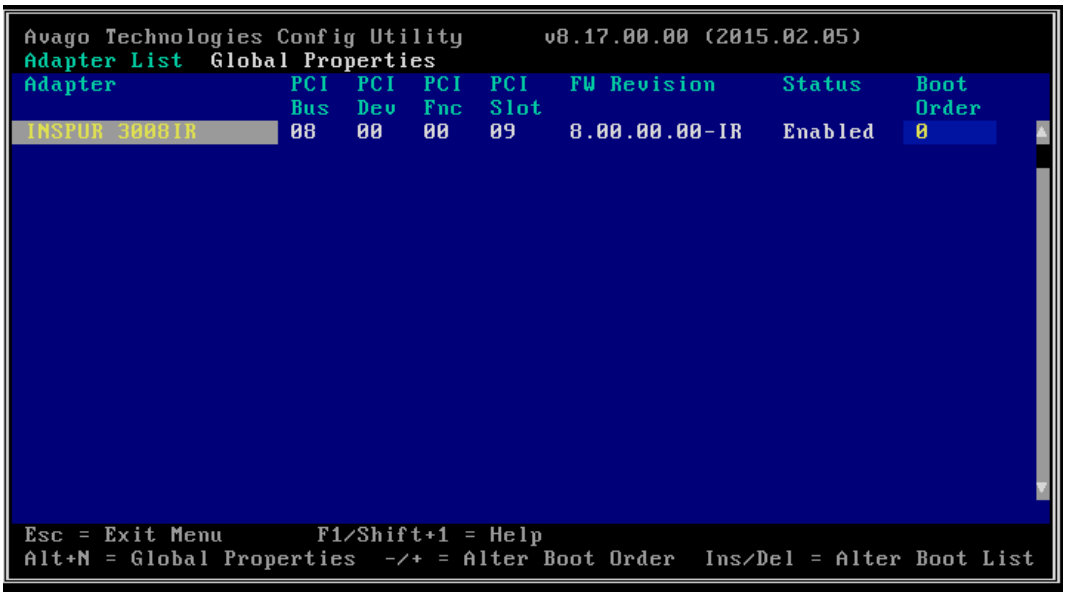
Scenario:

This section guides installation and debugging engineers on how to create RAID 0 arrays with Inspur SAS3008IR controller.

Procedures:

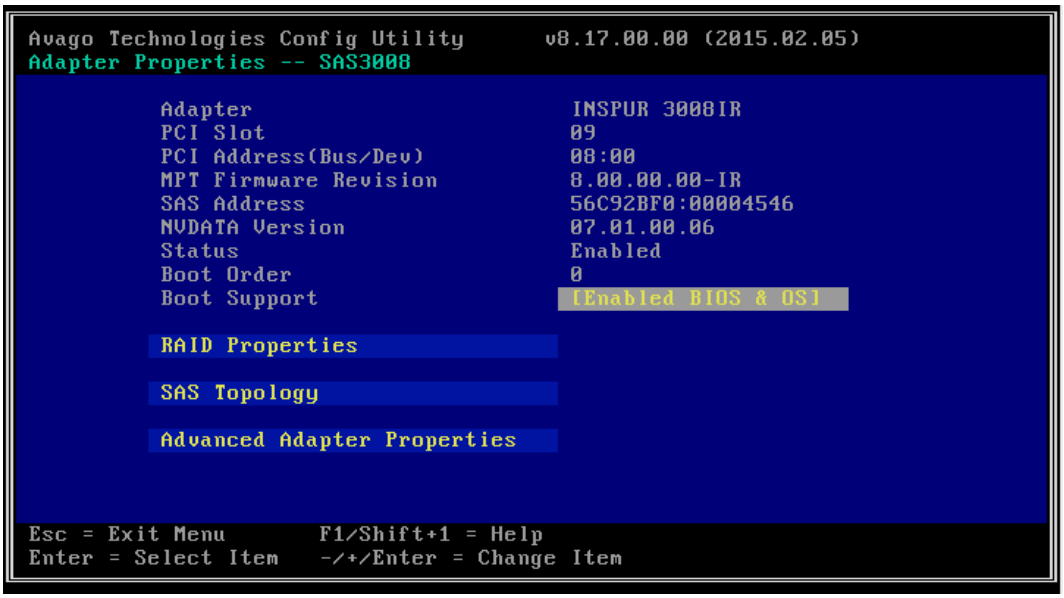
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-6 CU Screen



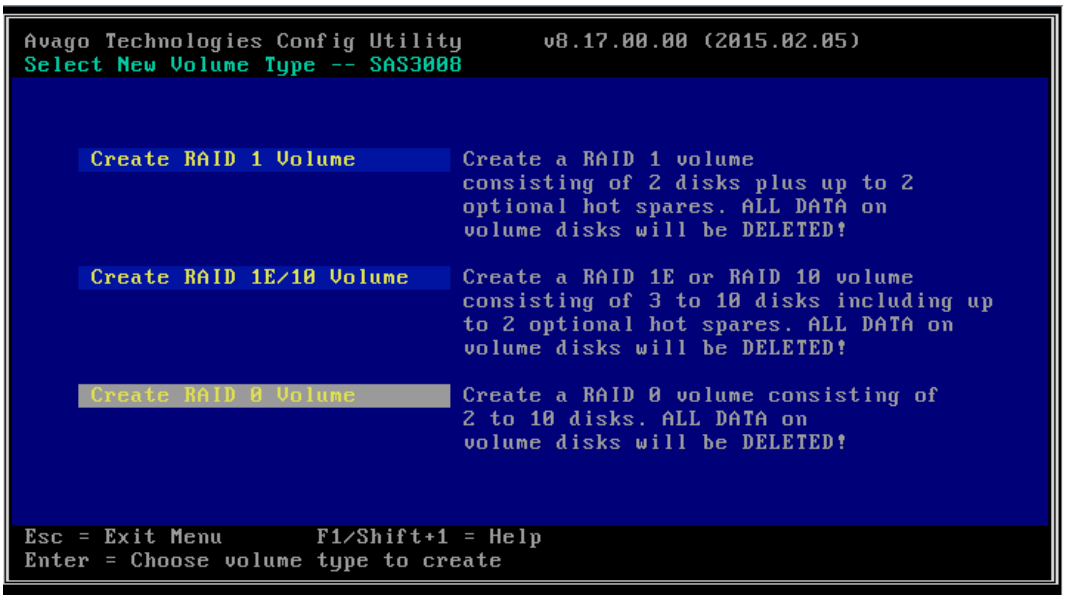
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-7 Adapter Properties Screen



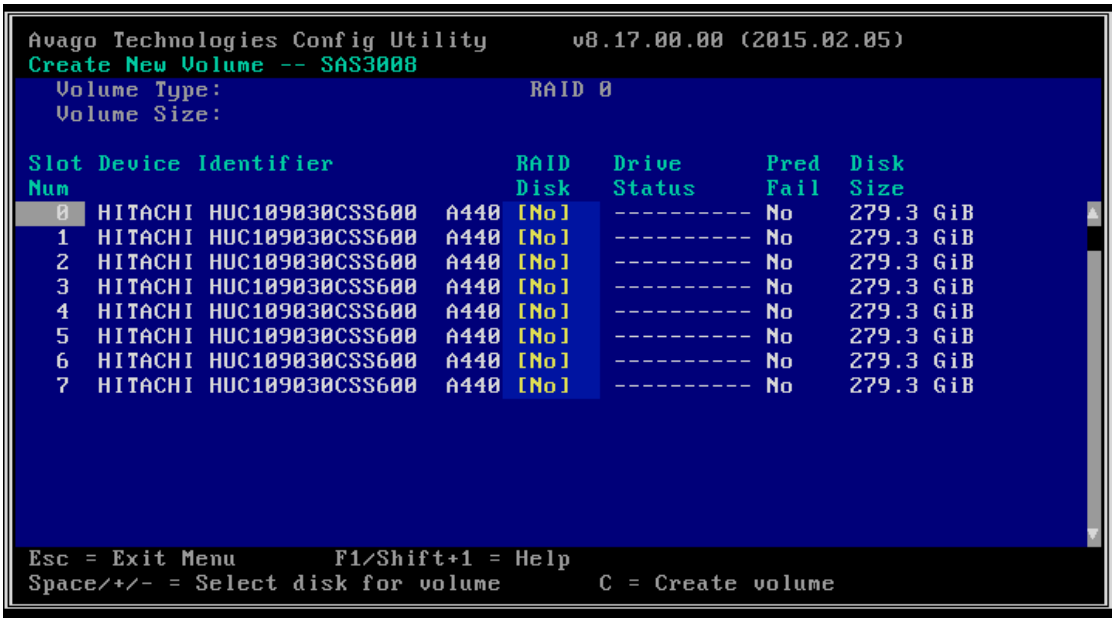
3. Select **RAID Properties** and press <Enter> to enter the **Select New Volume Type** screen, as shown below.

Figure 3-8 Select New Volume Type Screen



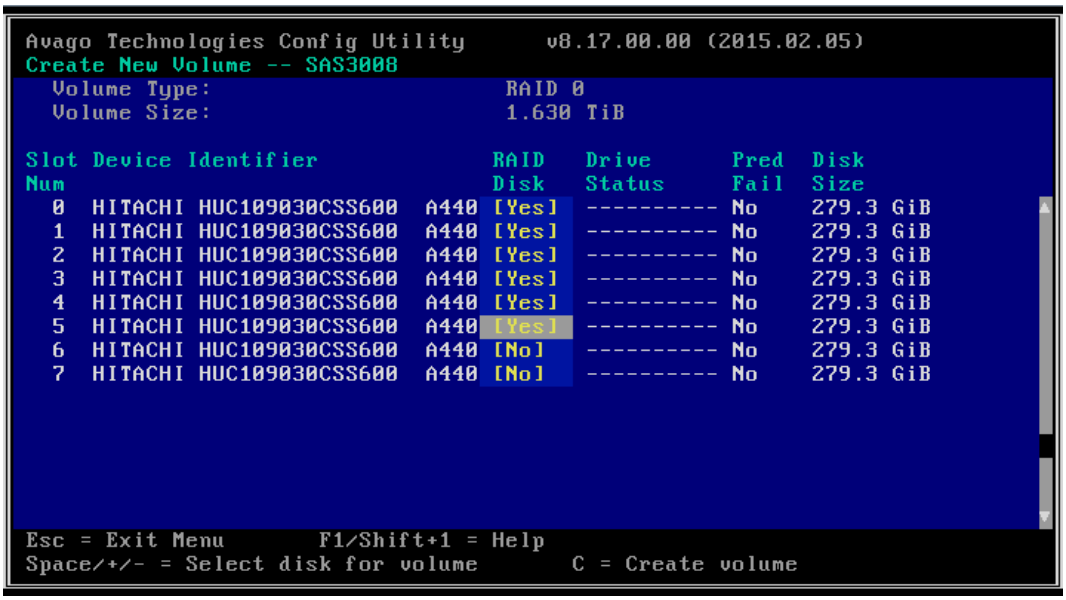
4. Select **Create RAID 0 Volume** and press <Enter> to enter the **Create New Volume** screen which lists all the disks that can be added to the new RAID array, as shown below.

Figure 3-9 Create New Volume Screen



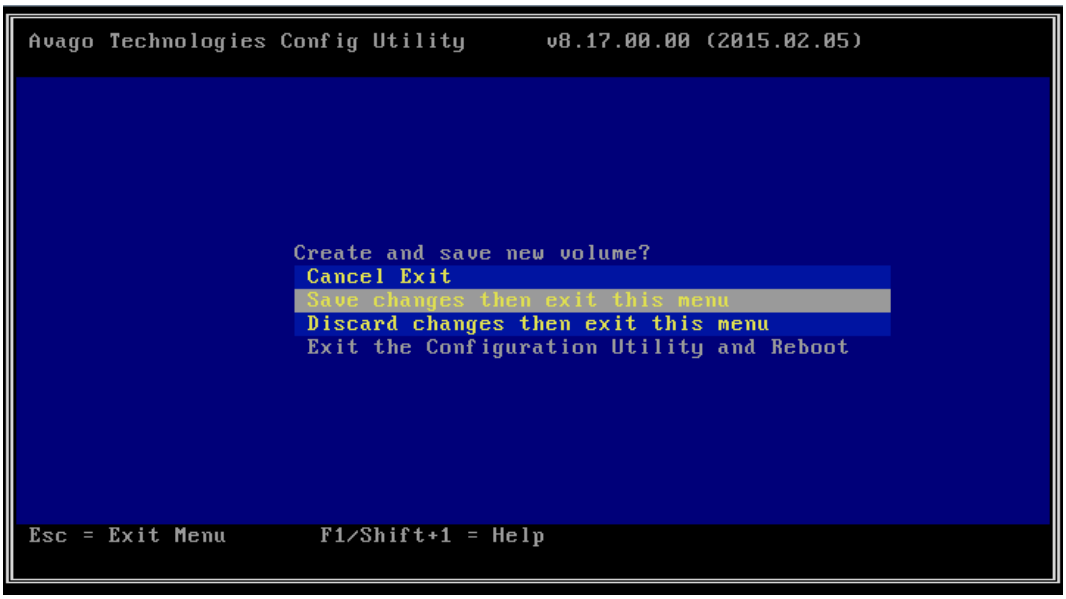
5. To add a disk to the RAID array, press <->, <+> or the space key in the **RAID Disk** column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. **RAID Disk** will be marked as **Yes** or **No**, indicating whether the disk has been added to the existing RAID array, as shown below.

Figure 3-10 Adding a Drive



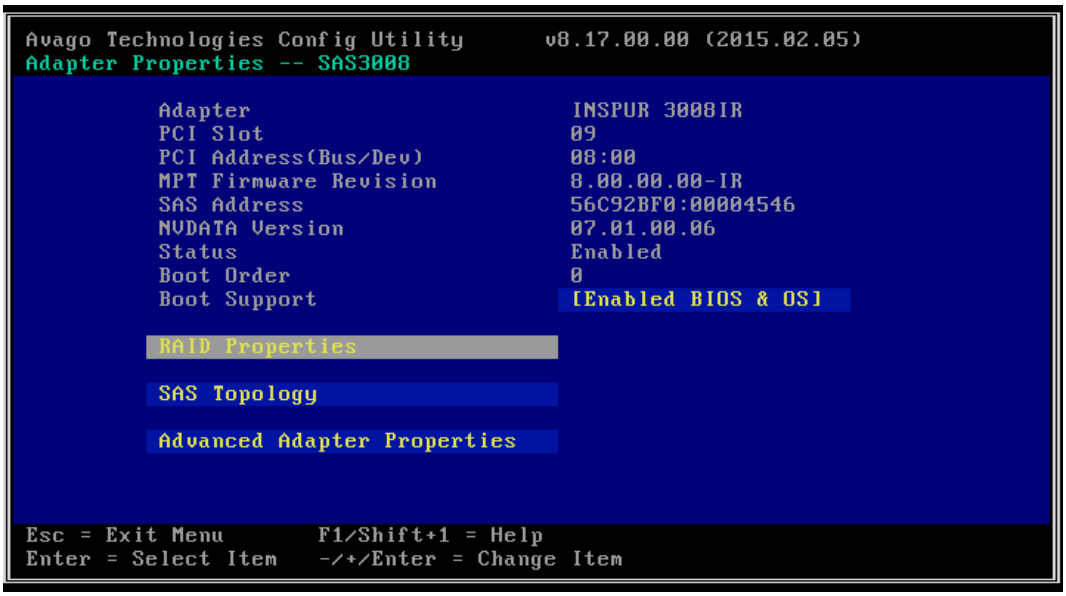
6. Press <C> to enter the RAID array creation confirmation screen, select **Save changes then exit this menu**, and press <Enter> to save the changes, as shown below.

Figure 3-11 Saving Changes



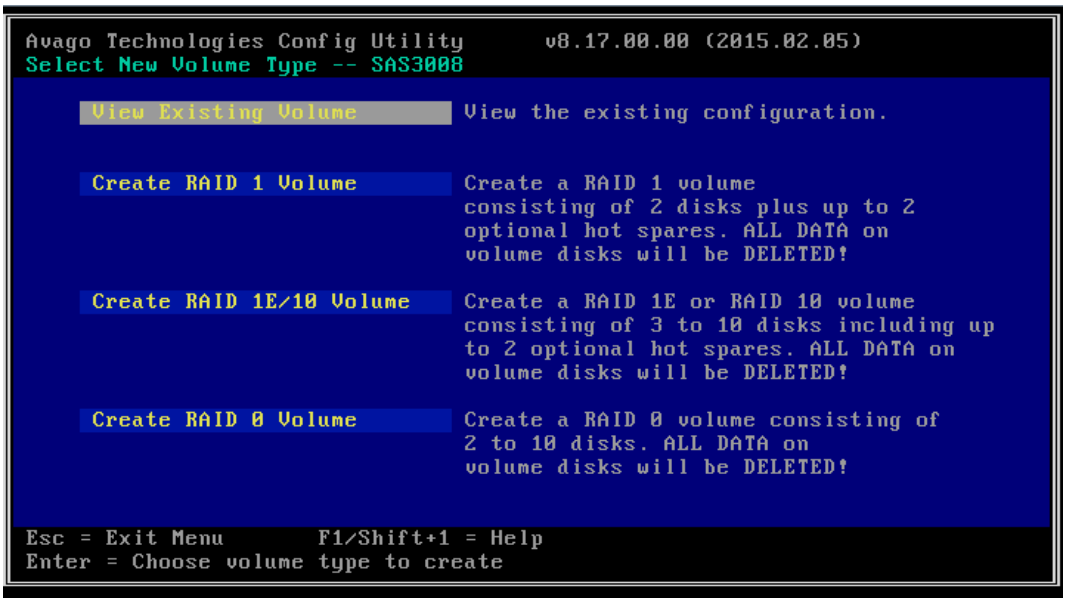
7. After the setting is completed, you will be automatically redirected back to the **Adapter Properties** screen, as shown below.

Figure 3-12 Adapter Properties Screen



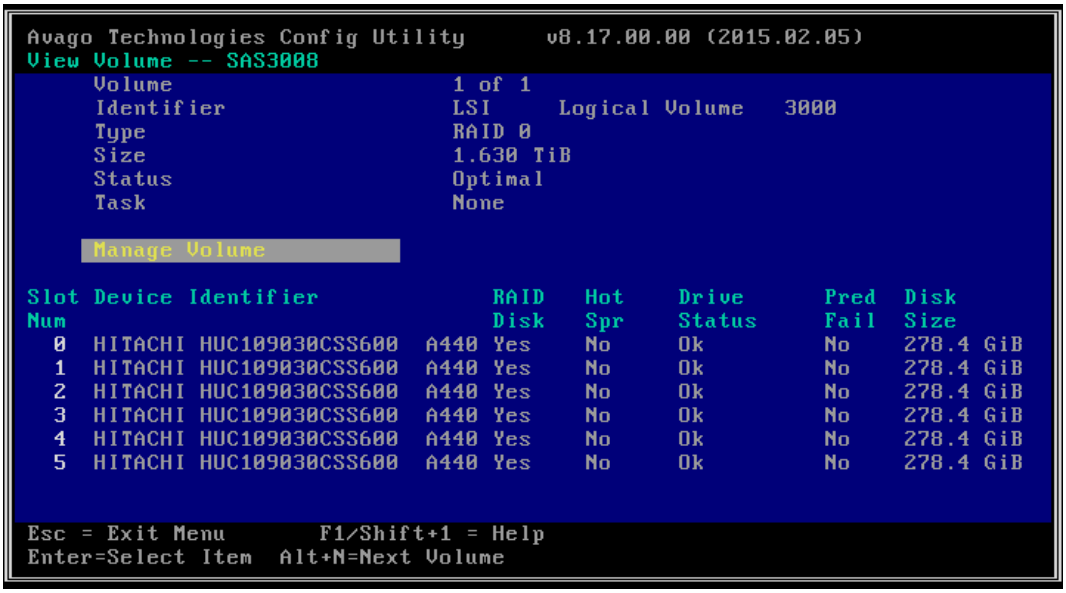
8. To view the RAID array created, select **RAID Properties**, press <Enter> to enter **Select New Volume Type** screen, and **View Existing Volume** will appear at the top, as shown below.

Figure 3-13 RAID Properties Menu



9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

Figure 3-14 RAID Array Screen



10. RAID 0 array creation has been completed. Press <Esc> to exit.

2 Creating RAID 1

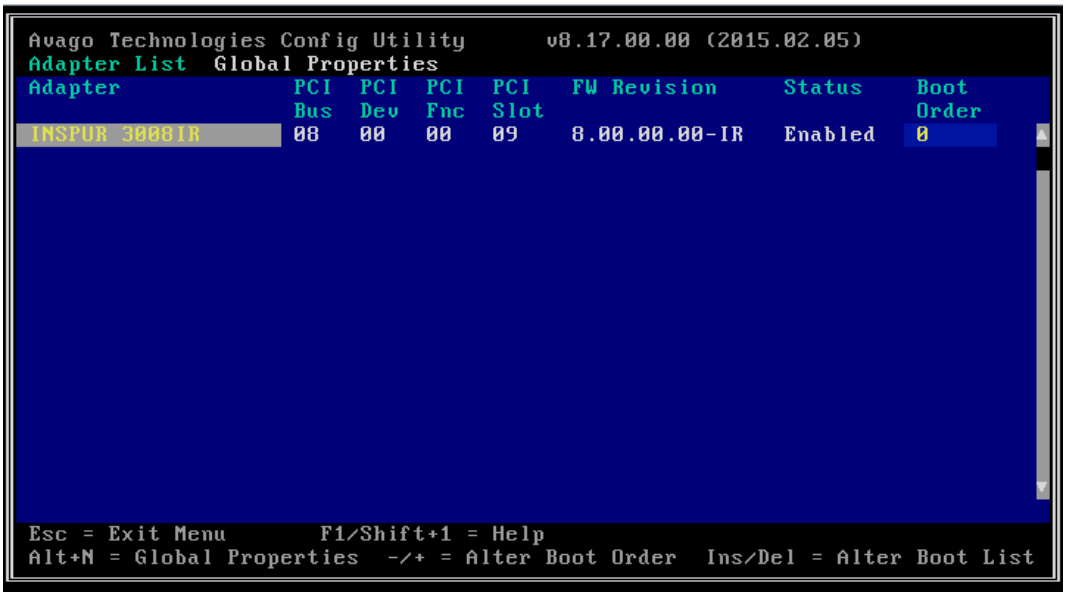
Scenario:

This section guides installation and debugging engineers on how to create RAID 1 arrays with Inspur SAS3008IR controller.

Procedures:

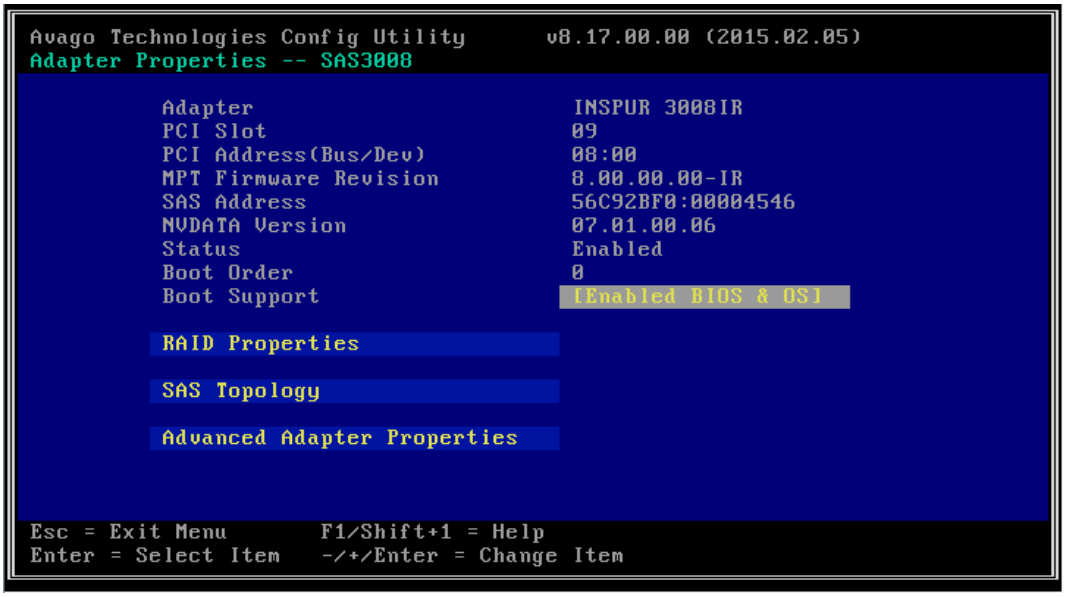
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-15 CU Screen



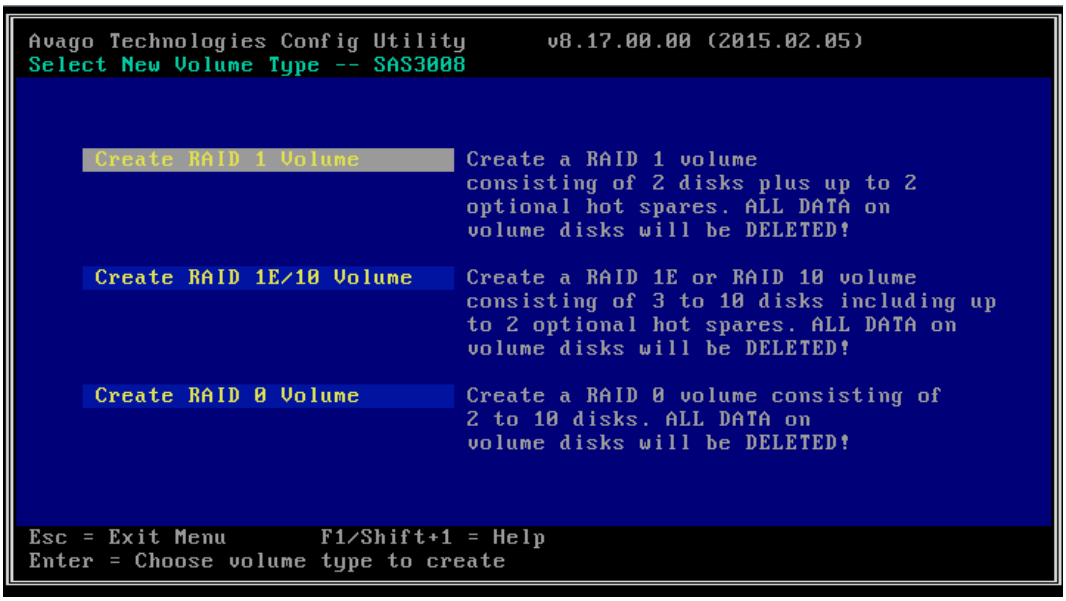
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-16 Adapter Properties Screen



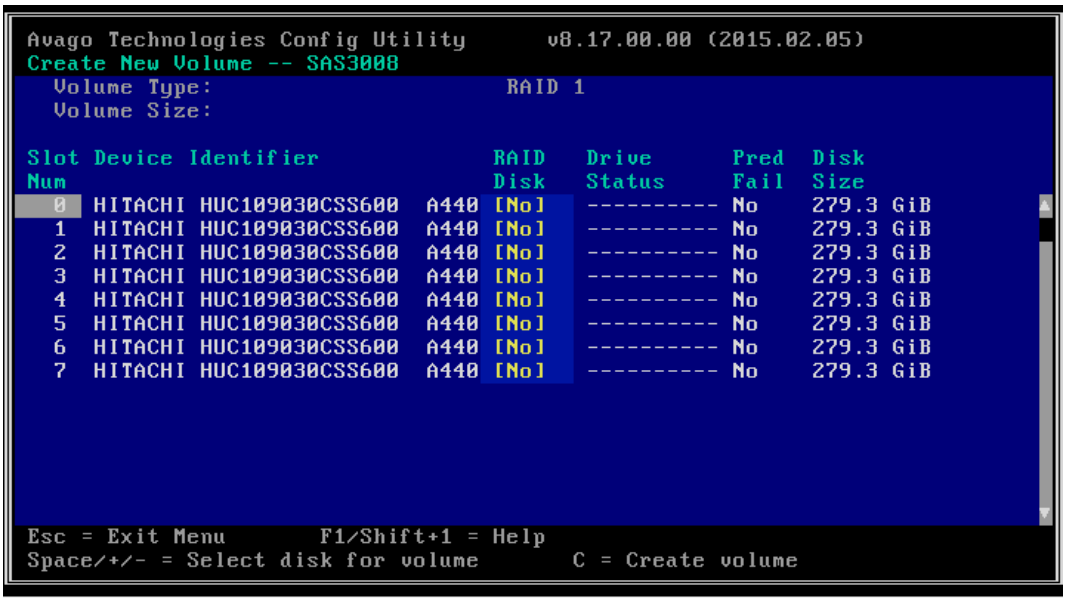
3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-17 Select New Volume Type Screen



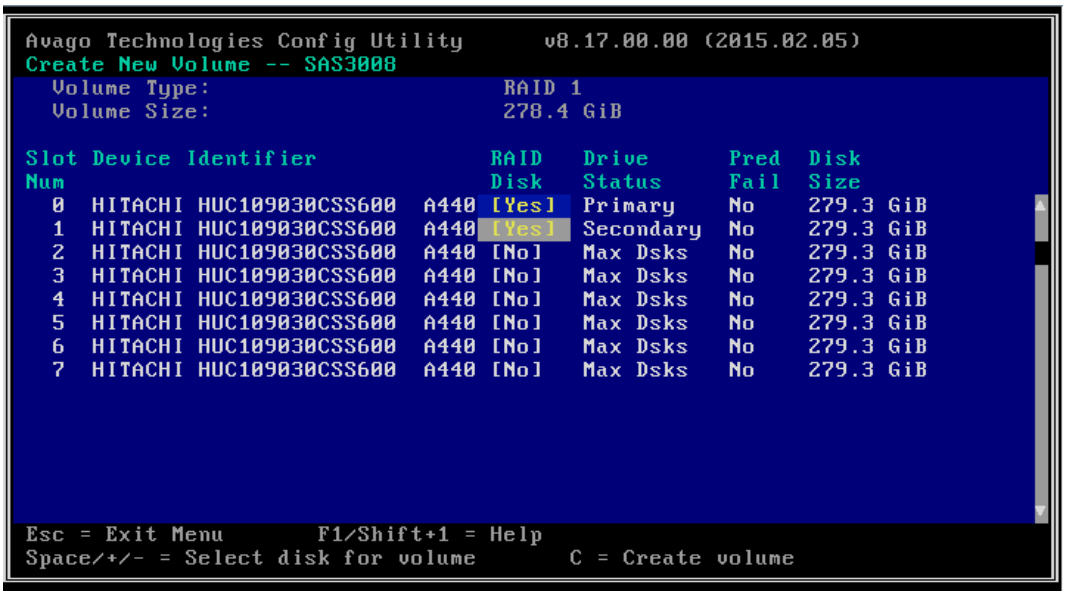
4. Select **Create RAID 1 Volume** and press <Enter> to enter **Create New Volume** screen which lists all the disks that can be added to the new RAID array, as shown below.

Figure 3-18 Create New Volume Screen



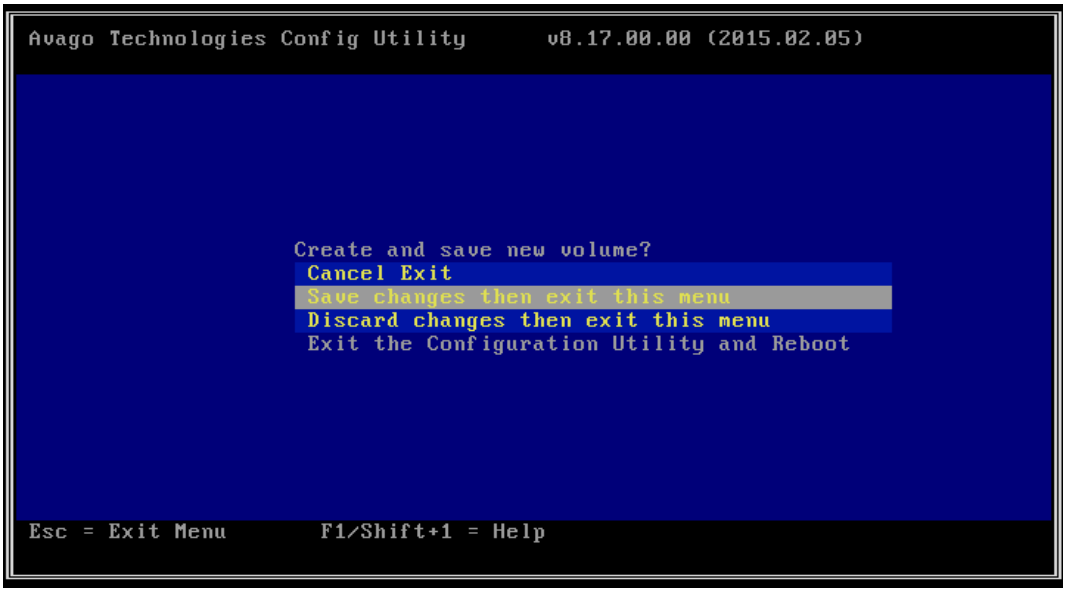
5. To add a disk to the RAID array, press <->, <+> or the space key in the **RAID Disk** column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. **RAID Disk** will be marked as **Yes** or **No**, indicating whether the disk has been added to the existing RAID array. The disk added first is the master drive, and the disks added later are the slave drives. Slave disks will synchronize the contents of the master drive, as shown below.

Figure 3-19 Adding a Drive



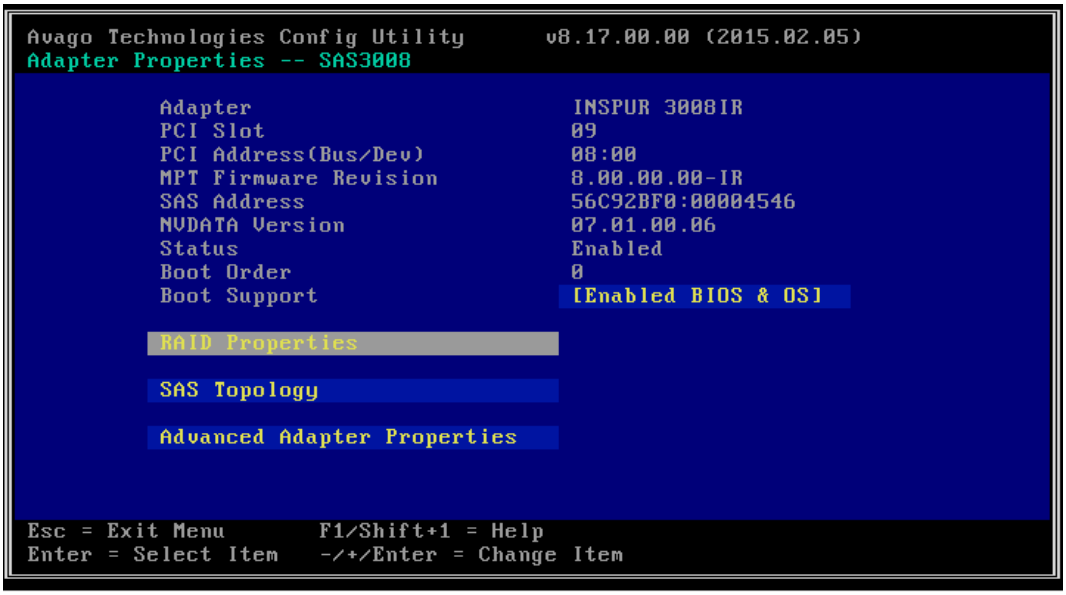
6. Press <C> to enter the RAID array creation confirmation screen, select **Save changes then exit this menu**, and press <Enter> to save the changes, as shown below.

Figure 3-20 Saving Changes



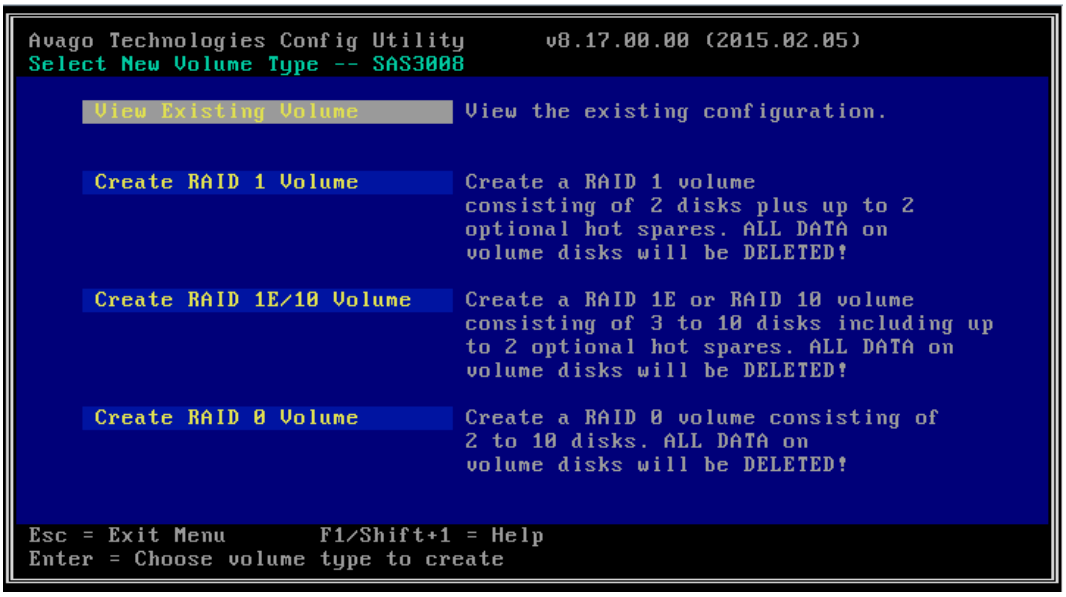
7. After the setting is completed, you will be automatically redirected back to the **Adapter Properties** screen, as shown below.

Figure 3-21 Adapter Properties Screen



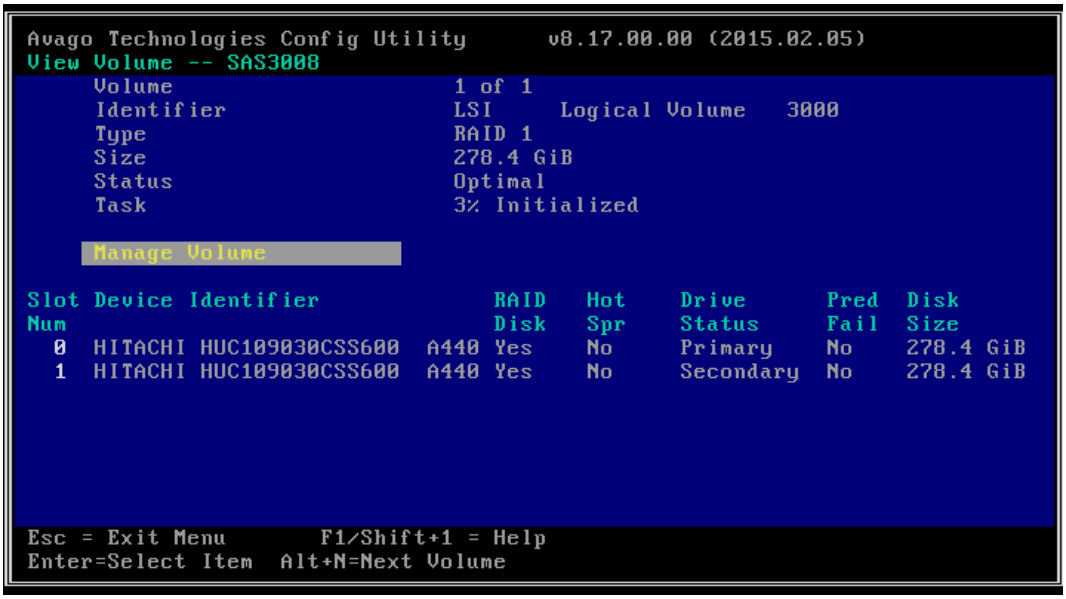
8. To view the RAID array created, select **RAID Properties**, press <Enter> to enter **Select New Volume Type** screen, and **View Existing Volume** will appear at the top, as shown below.

Figure 3-22 RAID Properties Menu



9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

Figure 3-23 RAID Array Screen



10. RAID 1 array creation has been completed. Press <Esc> to exit.

3 Creating RAID 10/1E

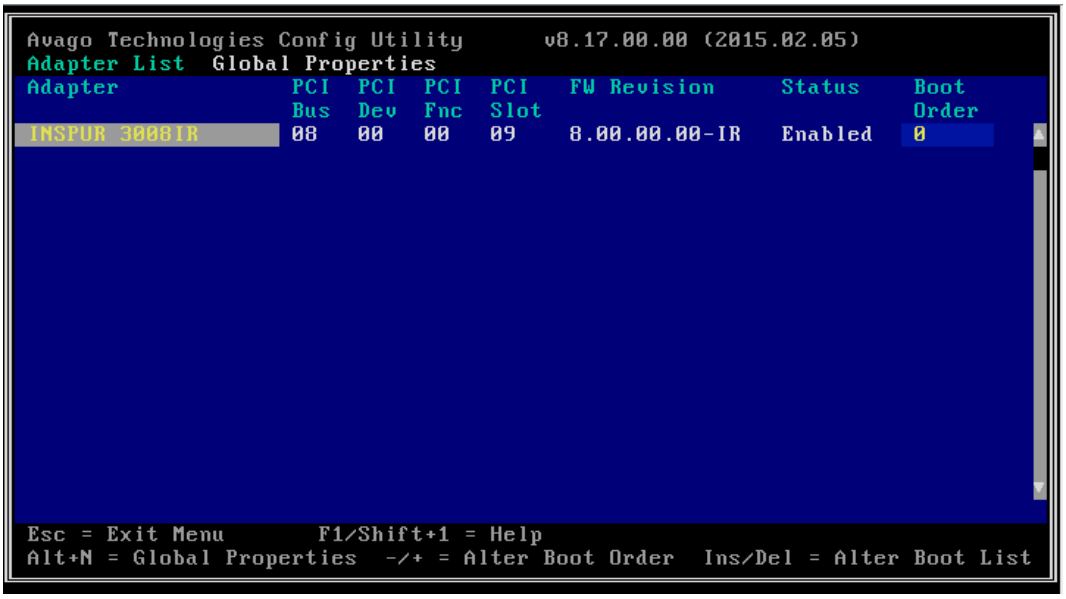
Scenario:

This section guides installation and debugging engineers on how to create RAID 10/1E arrays with Inspur SAS3008IR controller.

Procedures:

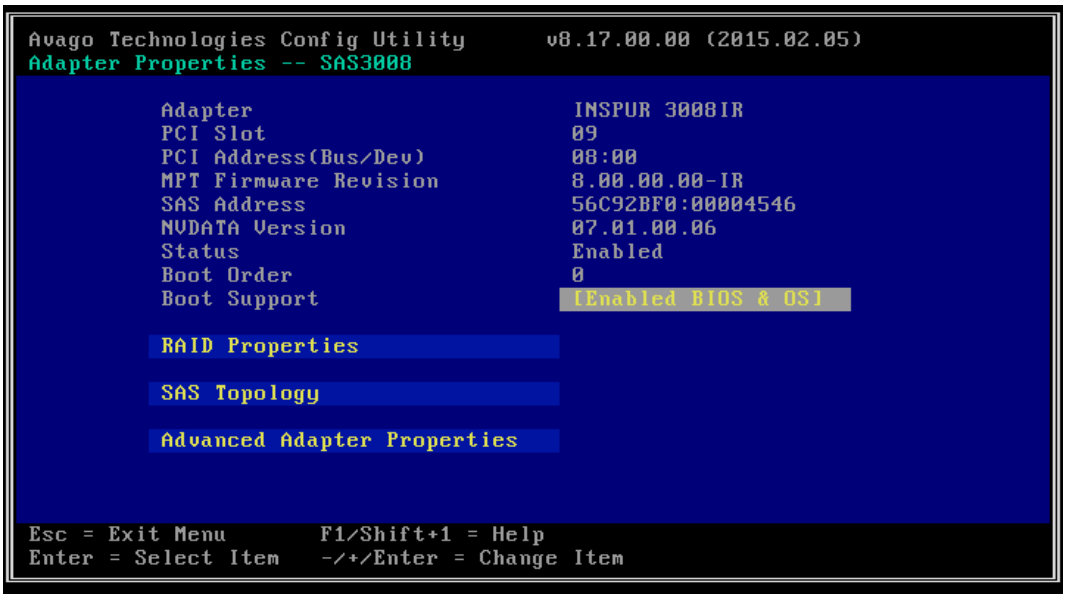
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-24 CU Screen



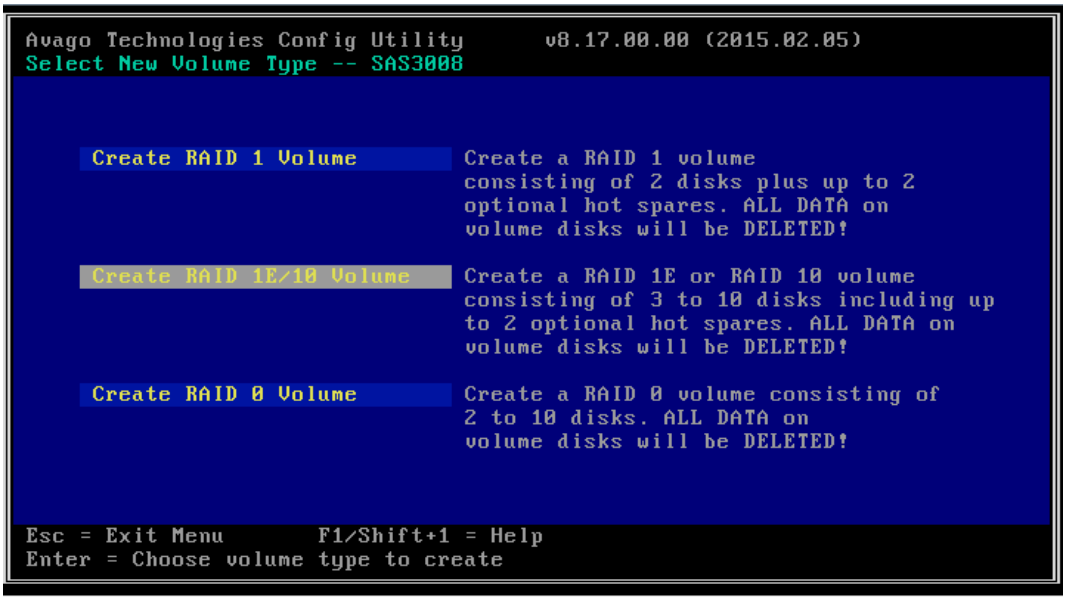
2. Select the Inspur 3008IR on the main screen of CU, and press <Enter> to enter Adapter Properties screen, as shown below.

Figure 3-25 Adapter Properties Screen



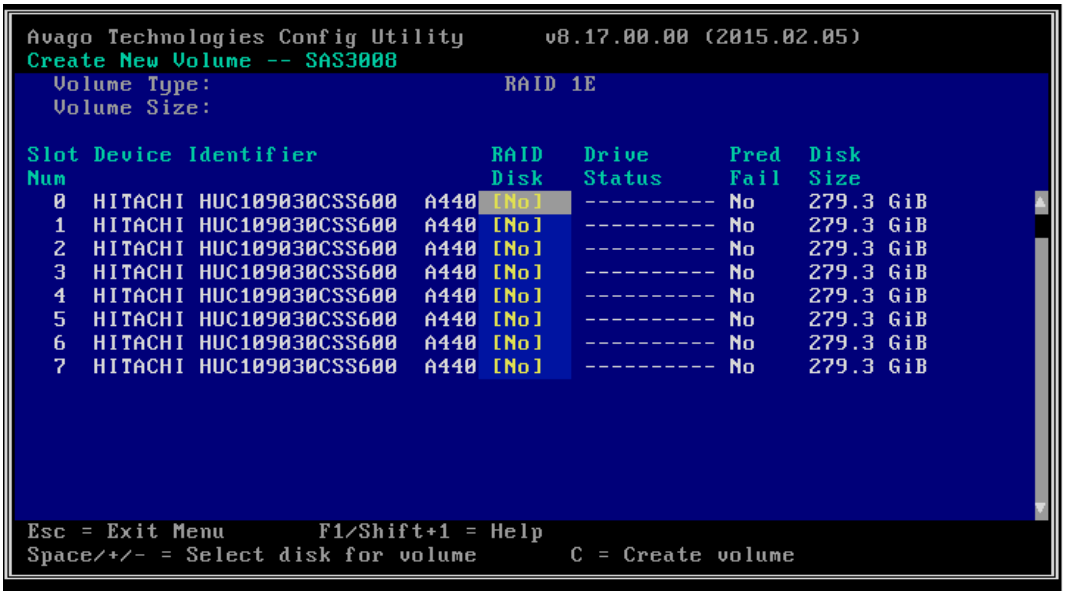
3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-26 Select New Volume Type Screen



4. Select **Create RAID 1E/10 Volume** and press <Enter> to enter **Create New Volume** screen which lists all the disks that can be added to the new RAID array, as shown below.

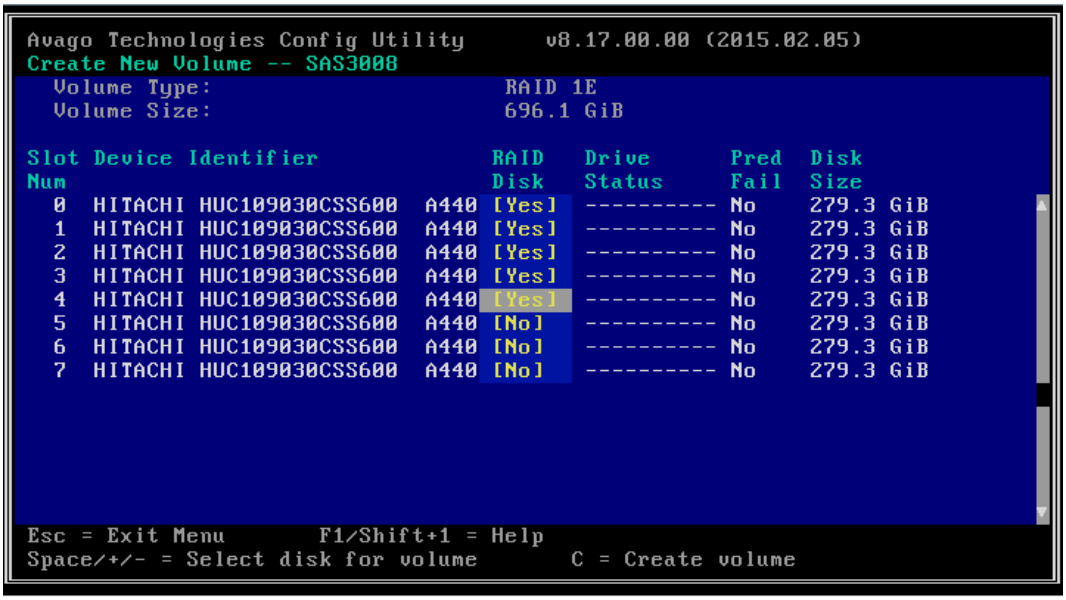
Figure 3-27 Create New Volume Screen



5. To add a disk to the RAID array, press <->, <+> or the space key in the **RAID Disk** column to mark whether the disk needs to be added to the existing RAID array. It will be prompted that the data on the disk to be added to the RAID array will be lost, if any. Press <C> to continue adding the disk to the RAID array. **RAID Disk** will be marked as **Yes** or **No**, indicating whether the disk has been added to the existing RAID array, as shown below.

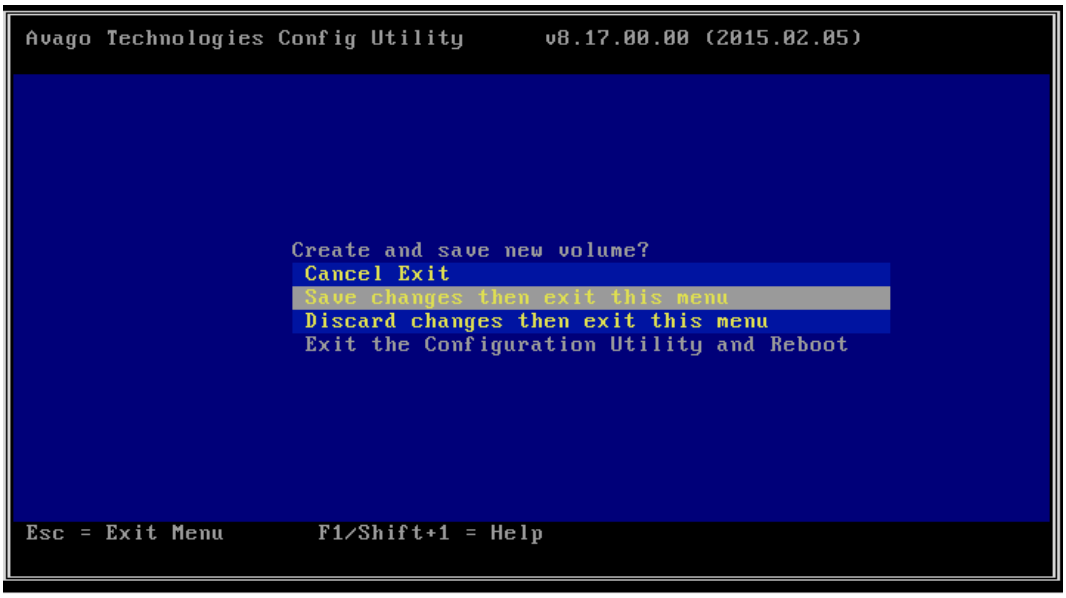
   Note: RAID 1E arrays can be created with an odd number (> 2) of disks and RAID 10 arrays with an even number (> 3) of disks.

Figure 3-28 Adding a Drive



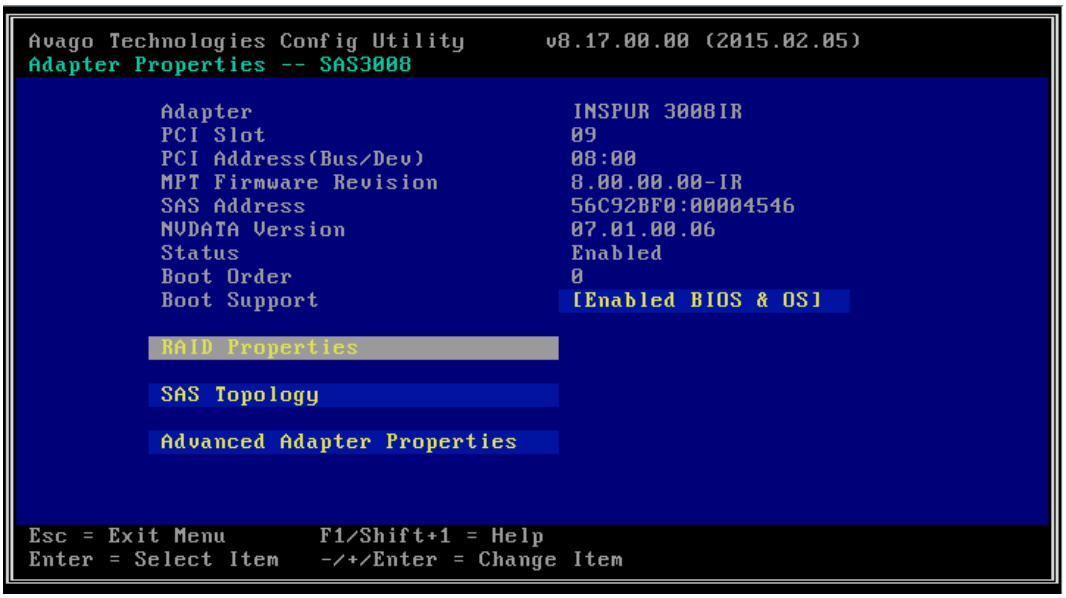
6. Press <C> to enter the RAID array creation confirmation screen, select **Save changes then exit this menu**, and press <Enter> to save the changes, as shown below.

Figure 3-29 Saving Changes



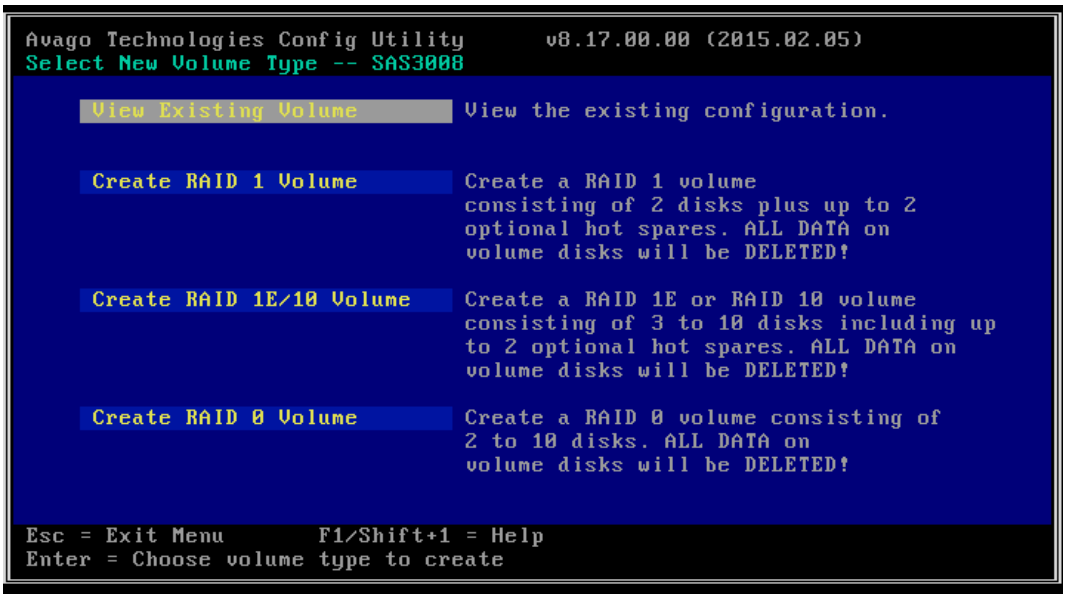
7. After the setting is completed, you will be automatically redirected back to the Adapter Properties screen, as shown below.

Figure 3-30 Adapter Properties Screen



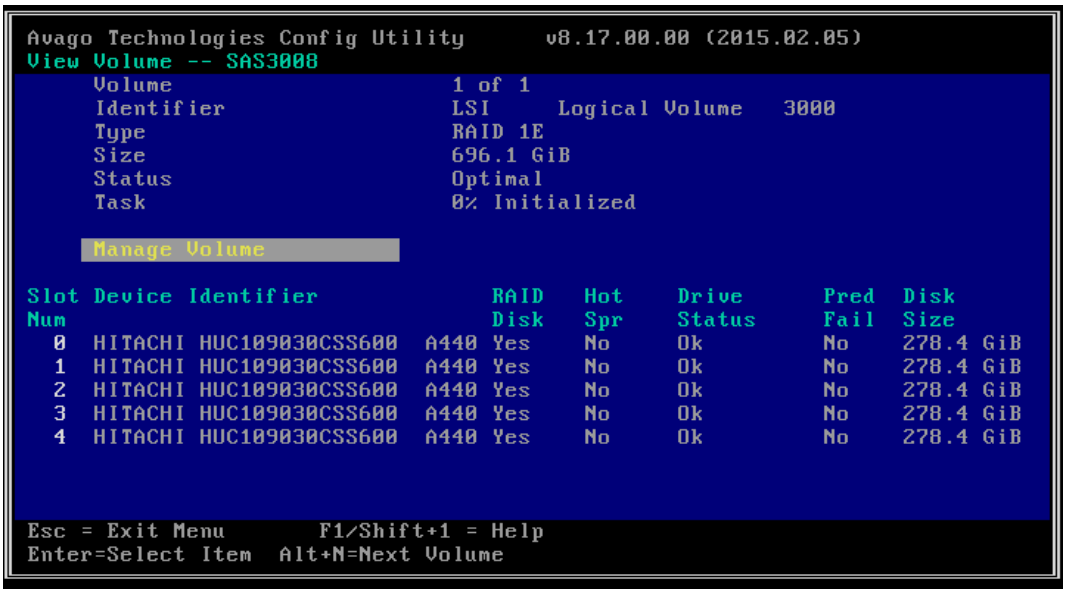
8. To view the RAID array created, select **RAID Properties**, press <Enter> to enter **Select New Volume Type** screen, and **View Existing Volume** will appear at the top, as shown below.

Figure 3-31 RAID Properties Menu



9. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

Figure 3-32 RAID Array Screen



10. RAID 10/1E array creation has been completed. Press <Esc> to exit.

3.1.3 Configuring RAID Arrays

This section introduces how to configure Inspur SAS3008IR.

1 Configuring Global HS Drives

A maximum of 2 global HS disks can be created for higher data security after creation of RAID 1/1E/10 arrays on Inspur SAS3008IR. Taking RAID 1 as an example, this section guides installation and debugging engineers on how to configure global HS drives.

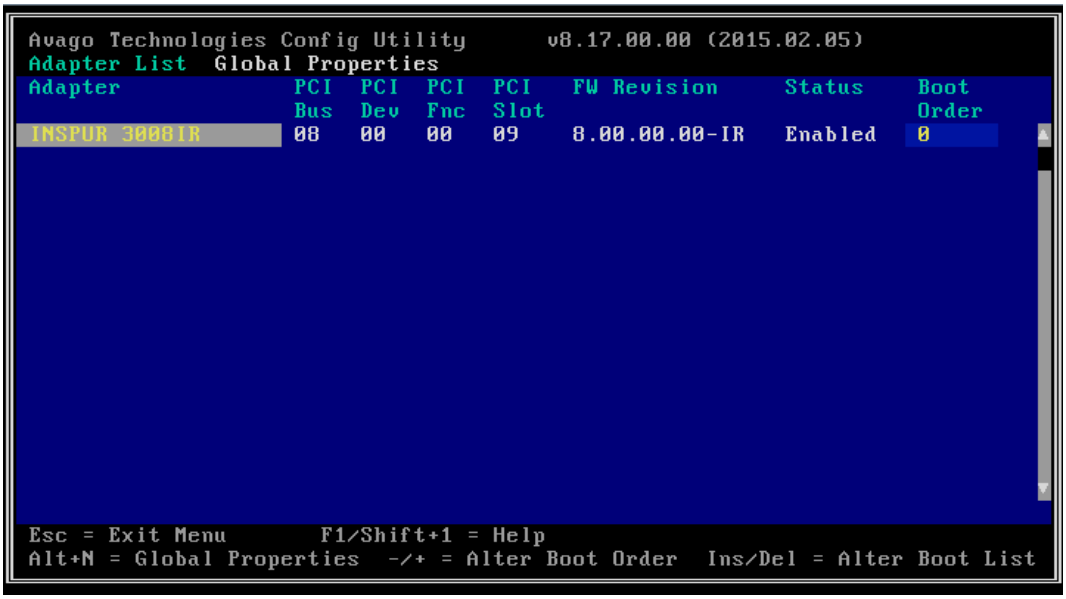
IMPORTANT

- The server must have unconfigured drives, and drives already added to a RAID array cannot be configured as HS drives.
- An HS drive must be a SATA or SAS drive with its capacity not smaller than the maximum capacity of a drive in any RAID array.
- RAID arrays (RAID 0, 1, 1E, and 10) support HS drives except RAID 0.

Procedures:

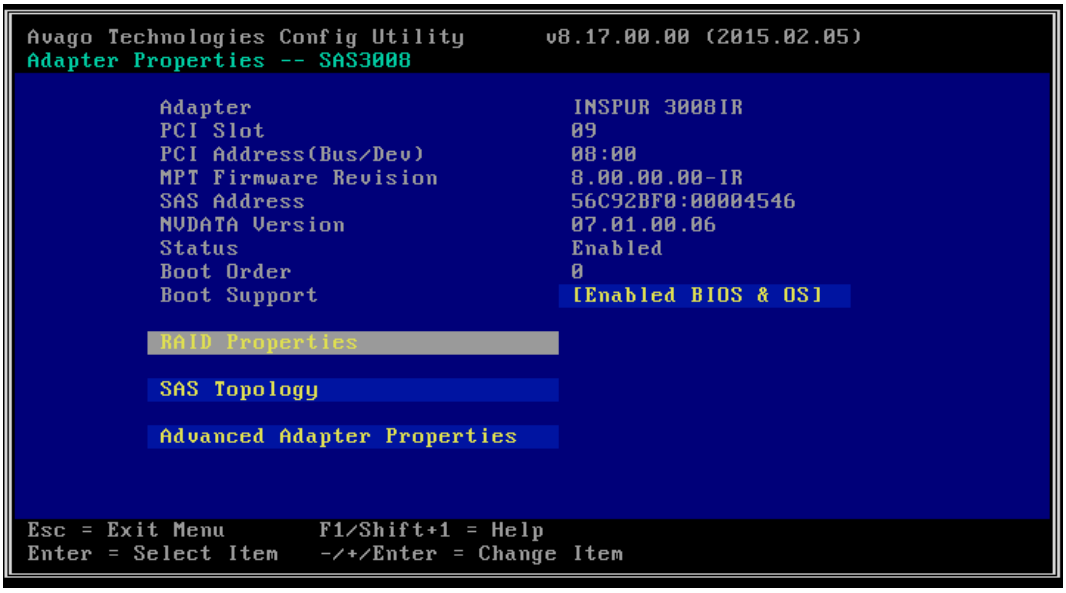
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-33 CU Screen



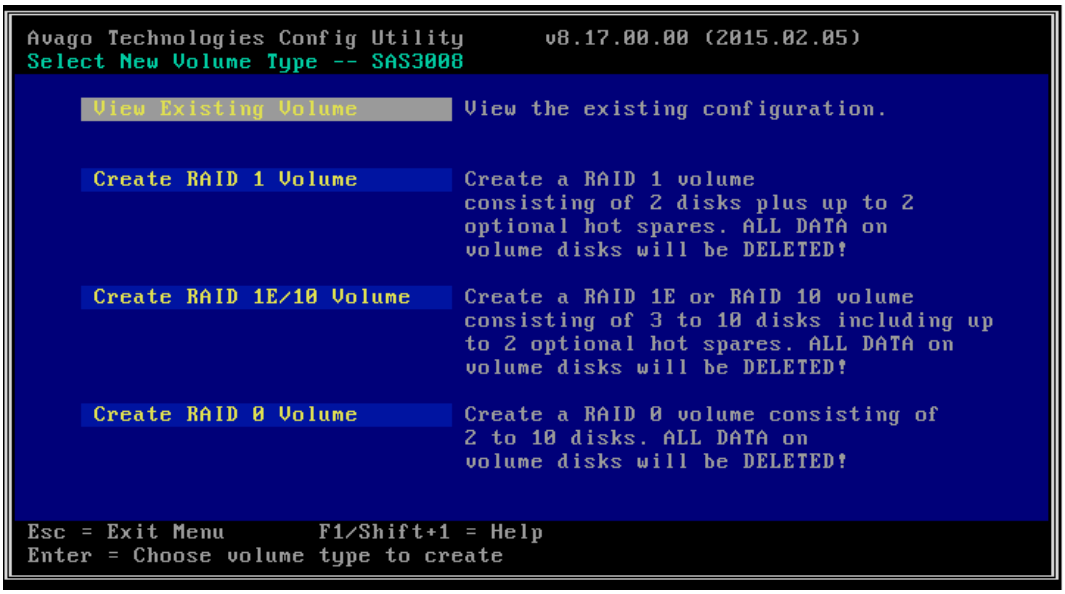
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter the **Adapter Properties** screen, as shown below.

Figure 3-34 Adapter Properties Screen



3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-35 Select New Volume Type Screen

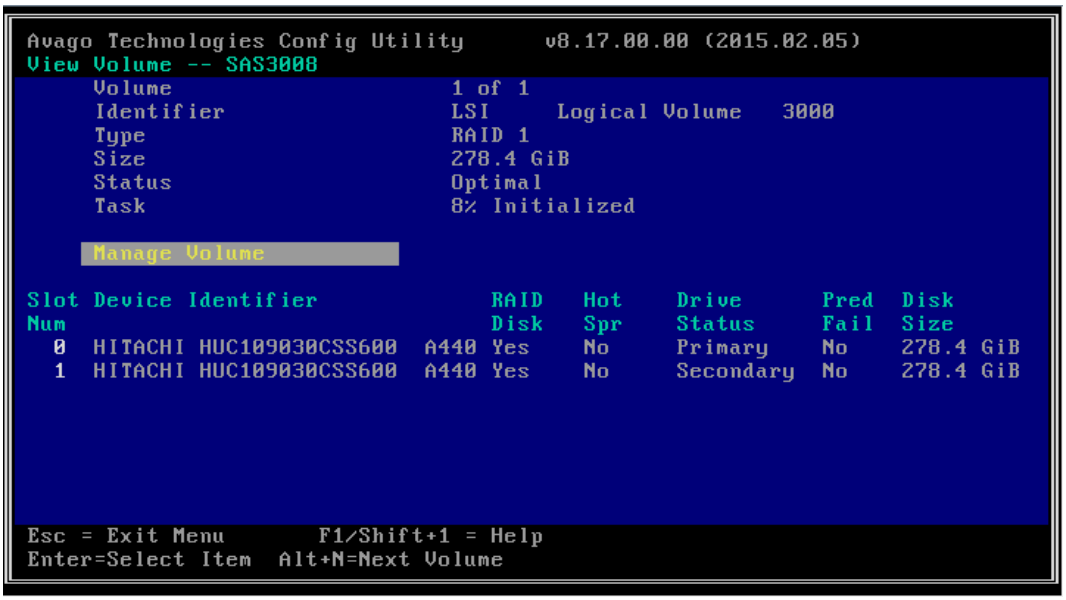


4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, and you can view the detailed information of the RAID array, as shown below.

IMPORTANT

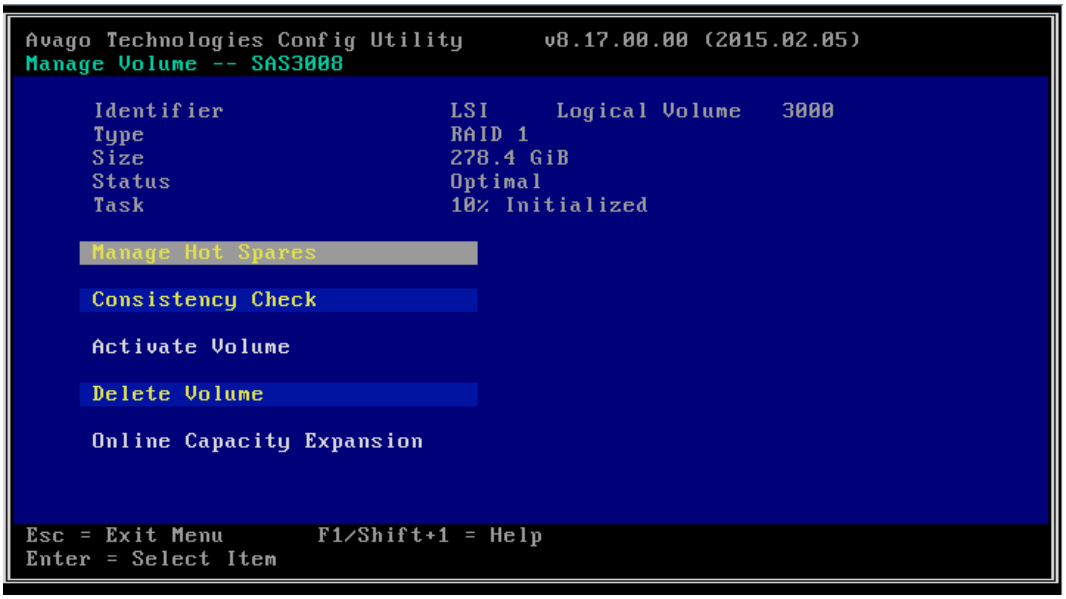
- On this screen, move the cursor to **Volume** and press <Enter> to turn on the LED of RAID member drive.
- For multiple RAID arrays, press <Alt> and <N> to switch among them.

Figure 3-36 RAID Array Screen



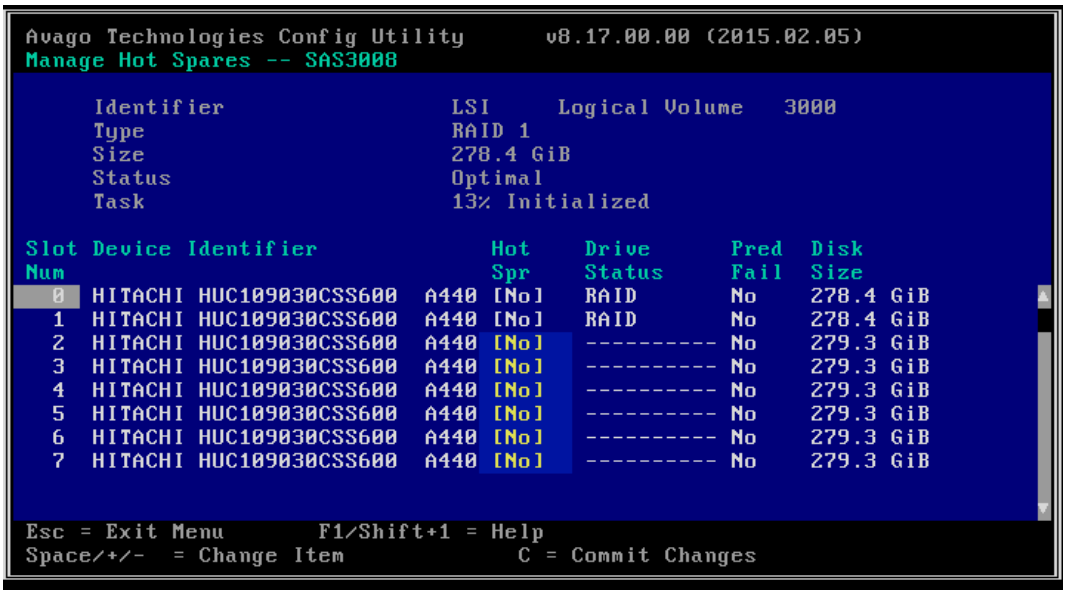
5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-37 Manage Volume Screen



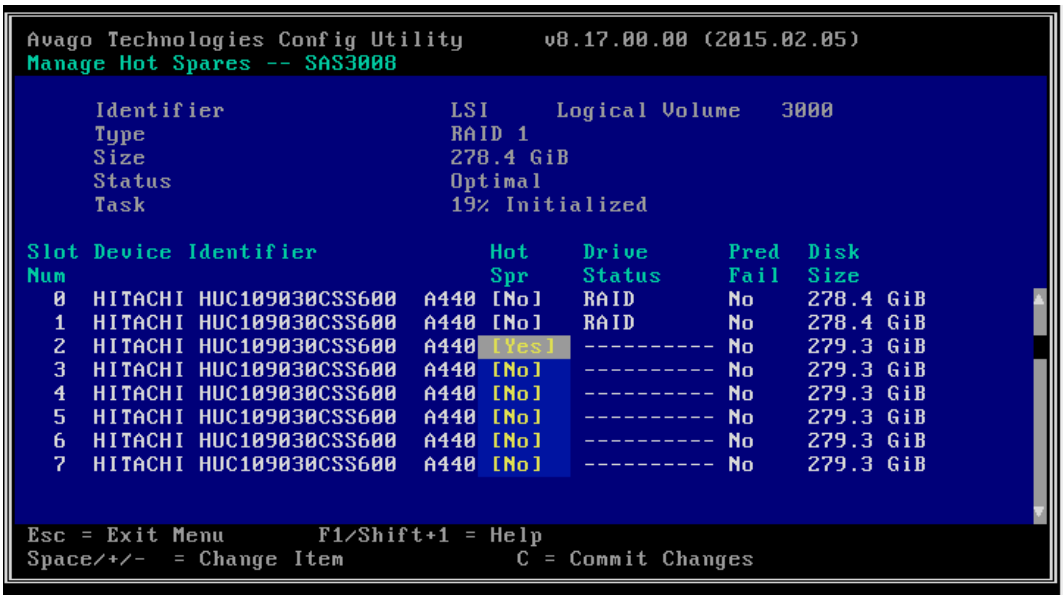
6. Select **Manage Hot Spares** and press <Enter> to enter the **Manage Hot Spares** screen, as shown below.

Figure 3-38 Manage Hot Spares Screen



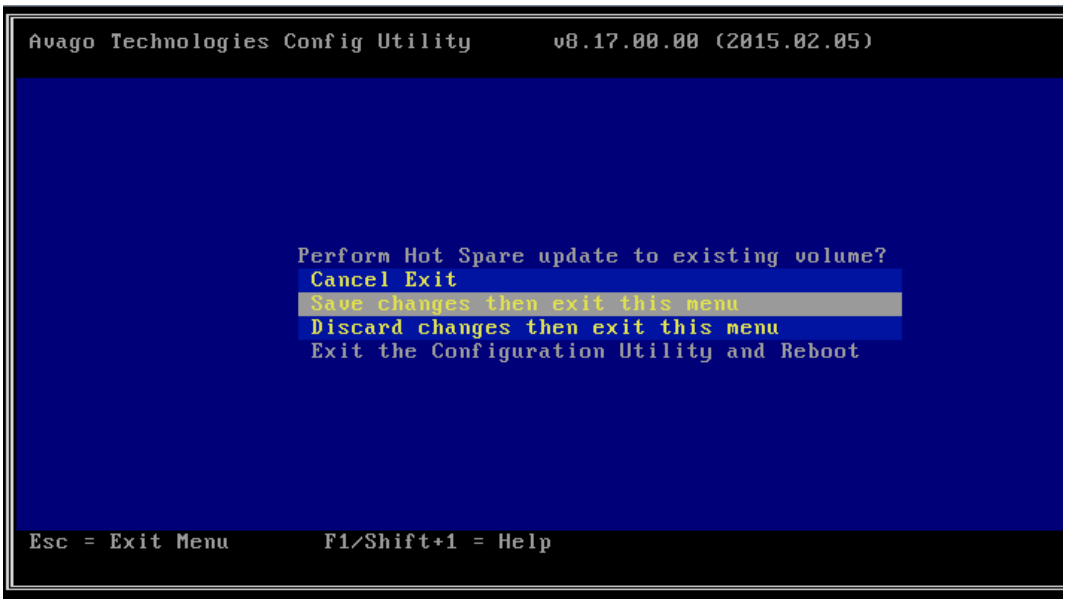
7. Press <->, <+>, or the space key in the **Hot SPR** column to mark the HS drive. If **Hot Spr** is marked as **Yes**, the disk has been configured as an HS drive; if **No**, the disk has not been configured as an HS drive, as shown below.

Figure 3-39 Marking Hot Spares



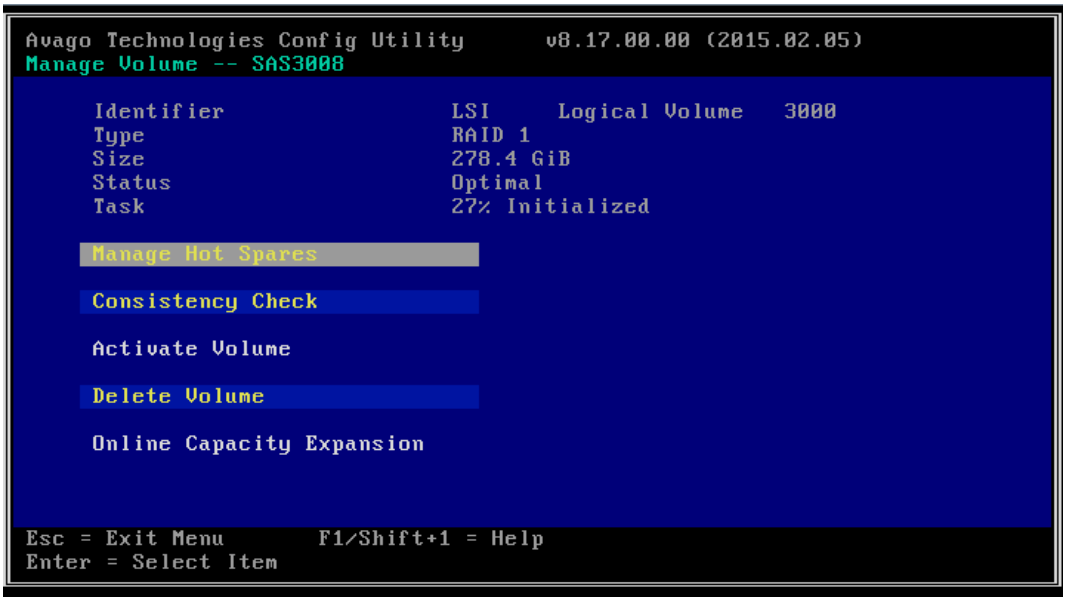
8. Press <C> to enter the configuration confirmation screen, select **Save changes then exit this menu**, and press <Enter> to save the changes, as shown below.

Figure 3-40 Saving Changes



9. After the setting is completed, you will be automatically redirected back to **Manage Volume** screen, as shown below.

Figure 3-41 Manage Volume Screen



10. The setting is completed.

2 Importing a Foreign Configuration

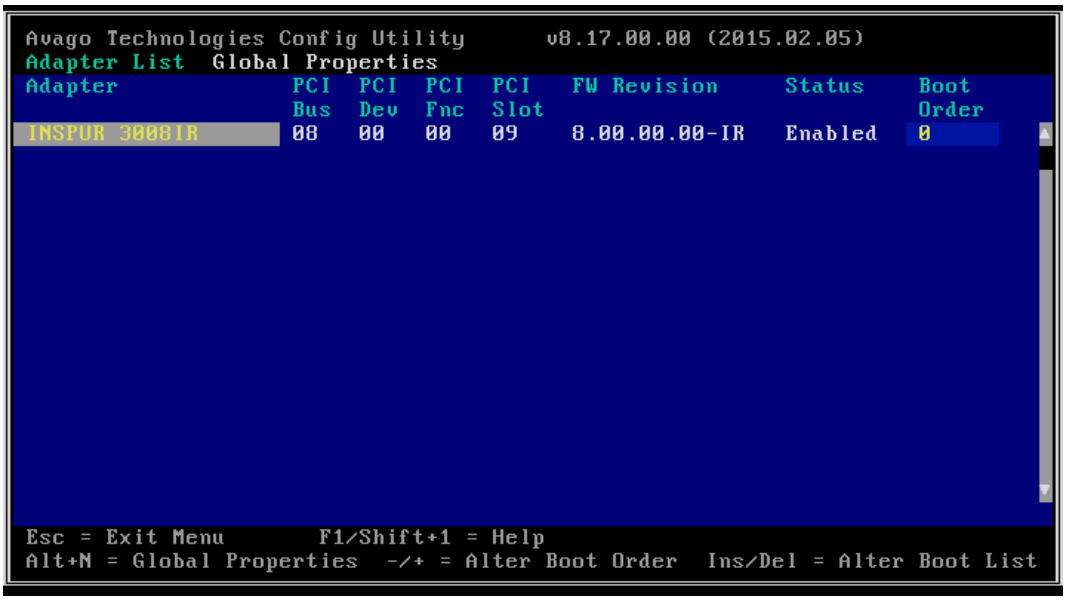
Scenario:

A RAID may have been configured for a physical disk newly installed in the server. Import this foreign configuration for it to become effective in the existing controller card. This section guides installation and debugging engineers on how to import a foreign configuration.

Procedures:

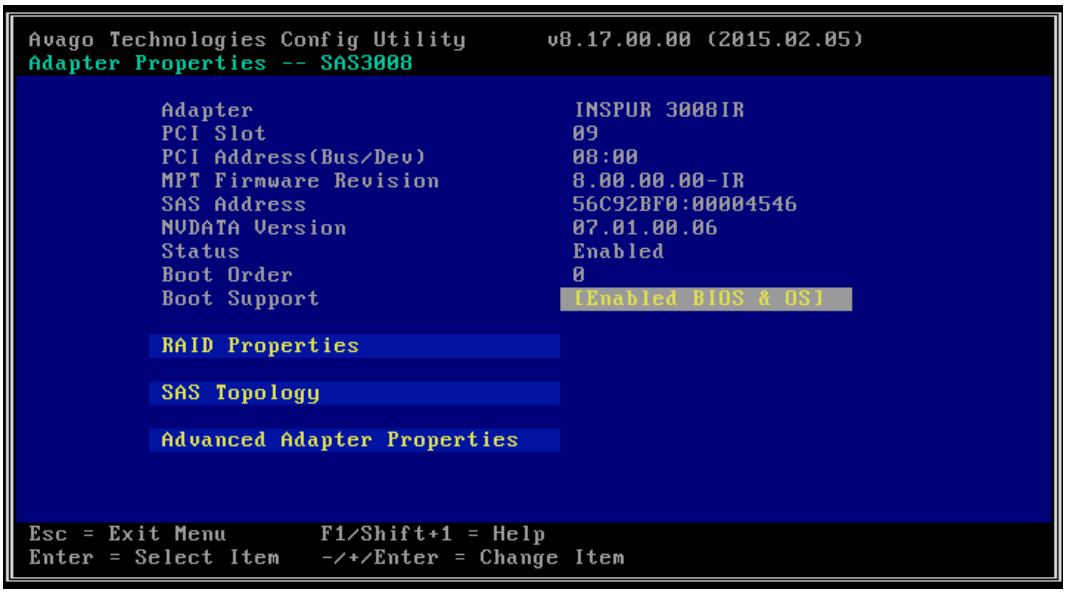
1. During POST, press <Ctrl> and <C> to log in to CU screen of Inspur SAS3008IR, as shown below.

Figure 3-42 CU Screen



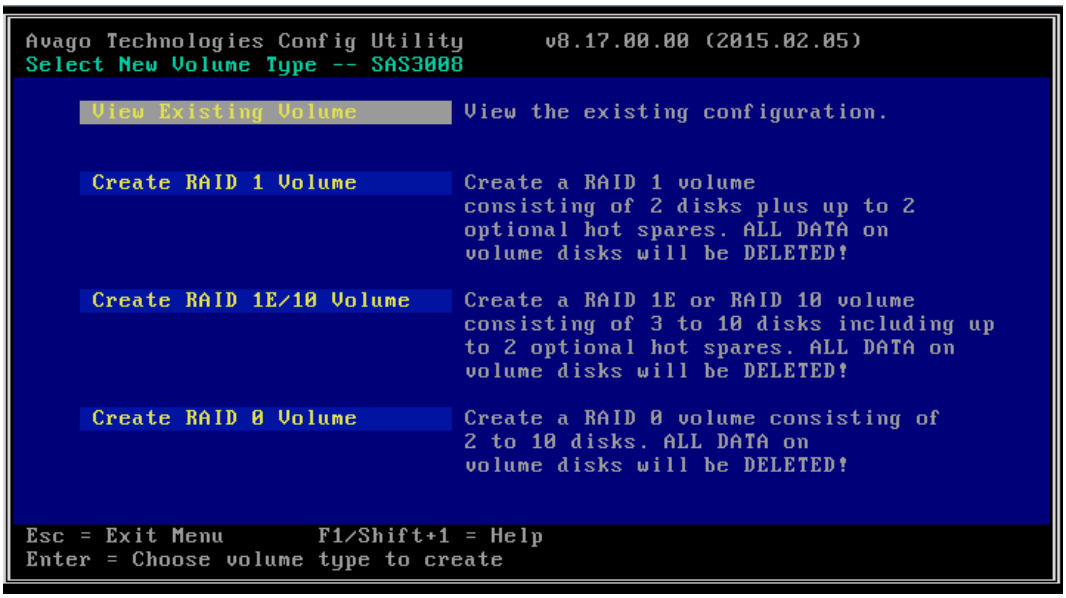
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-43 Adapter Properties Screen



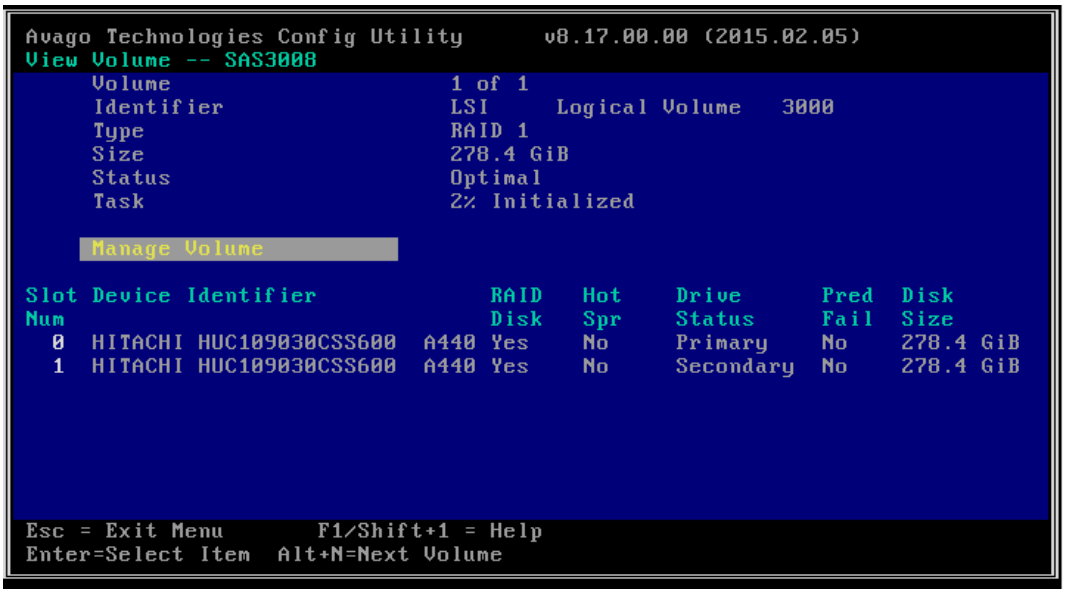
3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-44 Select New Volume Type Screen



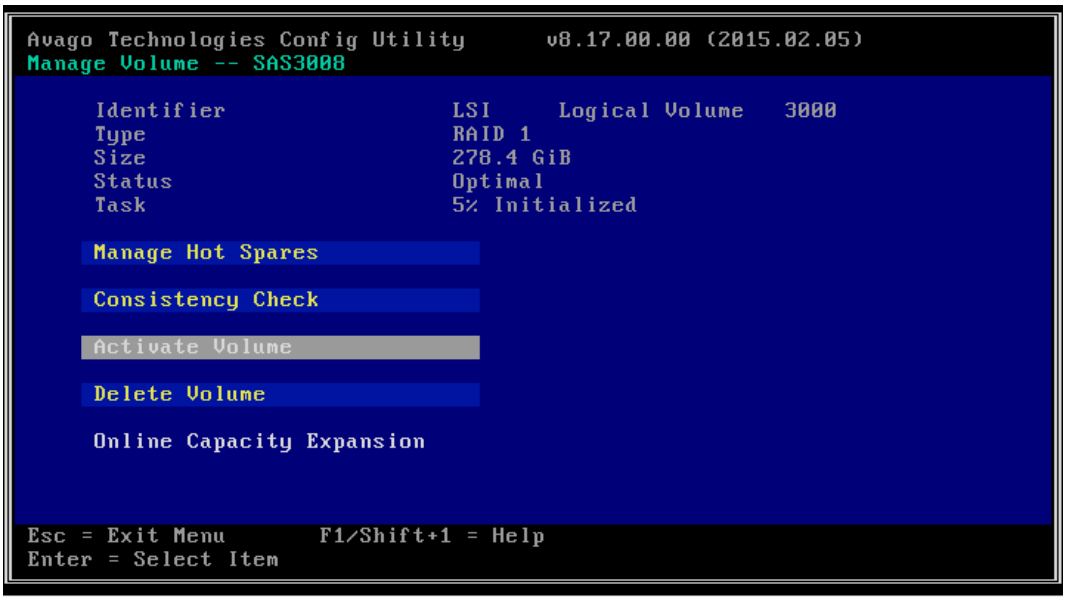
4. Select **View Existing Volume** and press <Enter> to display the RAID array screen.

Figure 3-45 RAID Array Screen



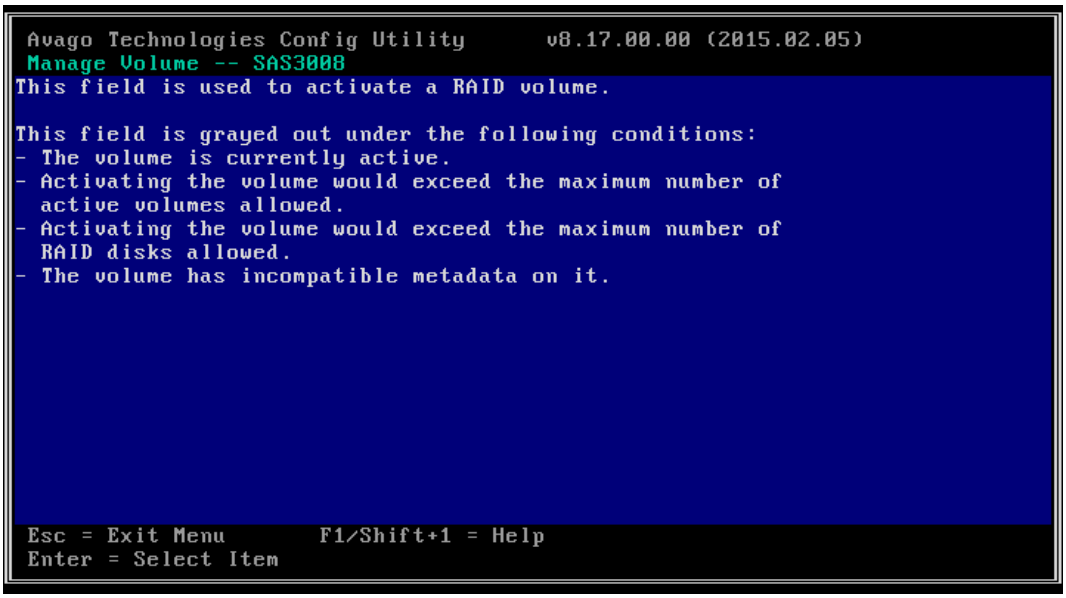
5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-46 Manage Volume Screen



6. Select **Activate Volume** and press <Enter> to enter the RAID activation confirmation screen. Press <Y> to confirm the activation and <Esc> to exit the configuration screen. The **Activate Volume** screen is shown as follows.

Figure 3-47 RAID Activation Confirmation Screen



3 Deleting a RAID Array

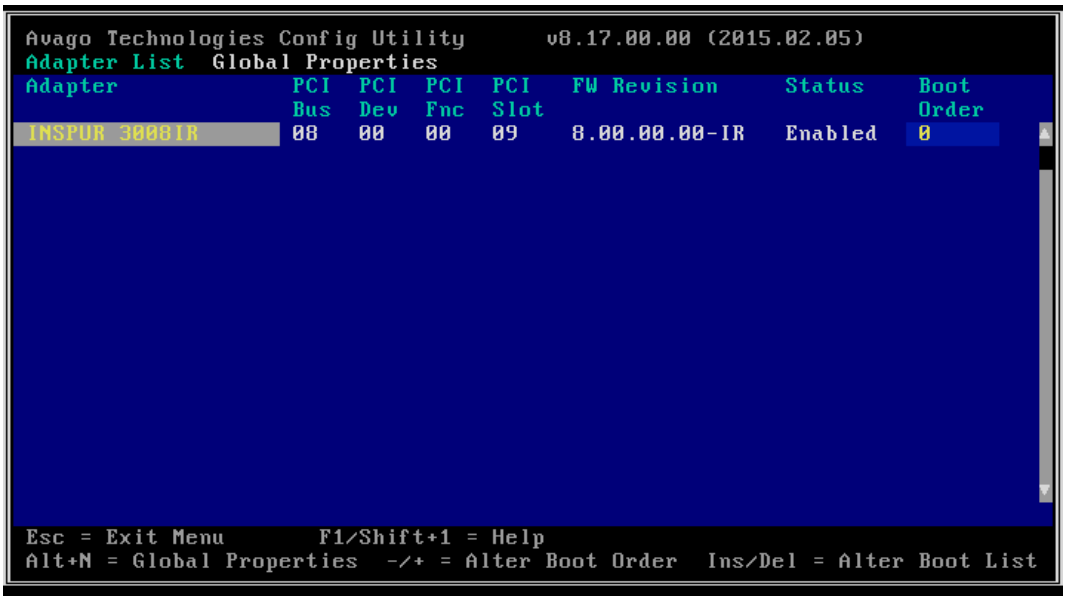
Scenario:

When the server does not require a RAID array, delete the RAID array to free up the disk space. This section guides installation and debugging engineers on how to delete a RAID array.

Procedures:

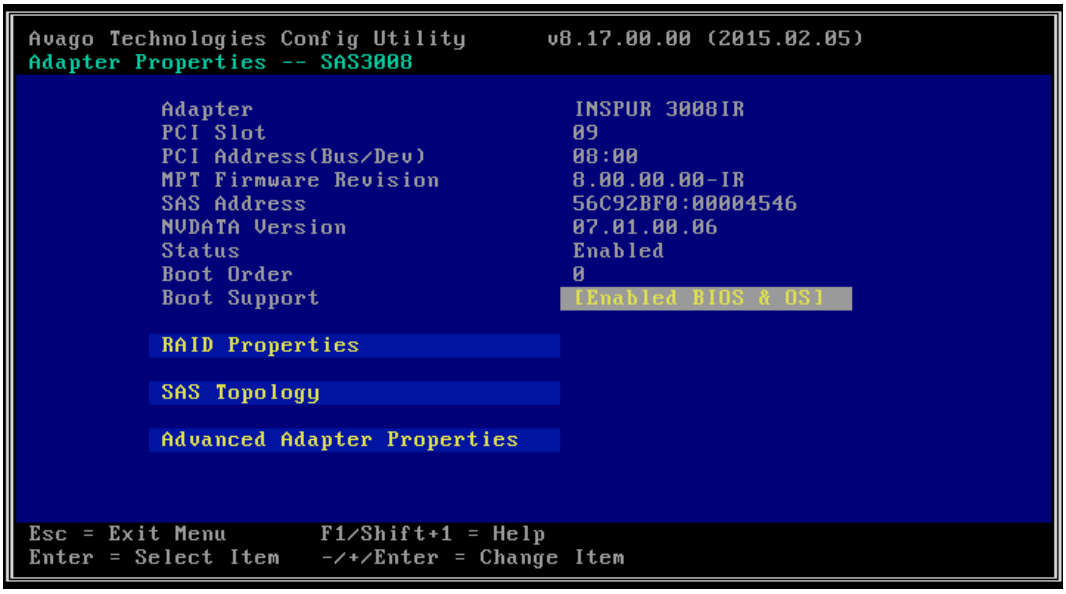
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-48 CU Screen



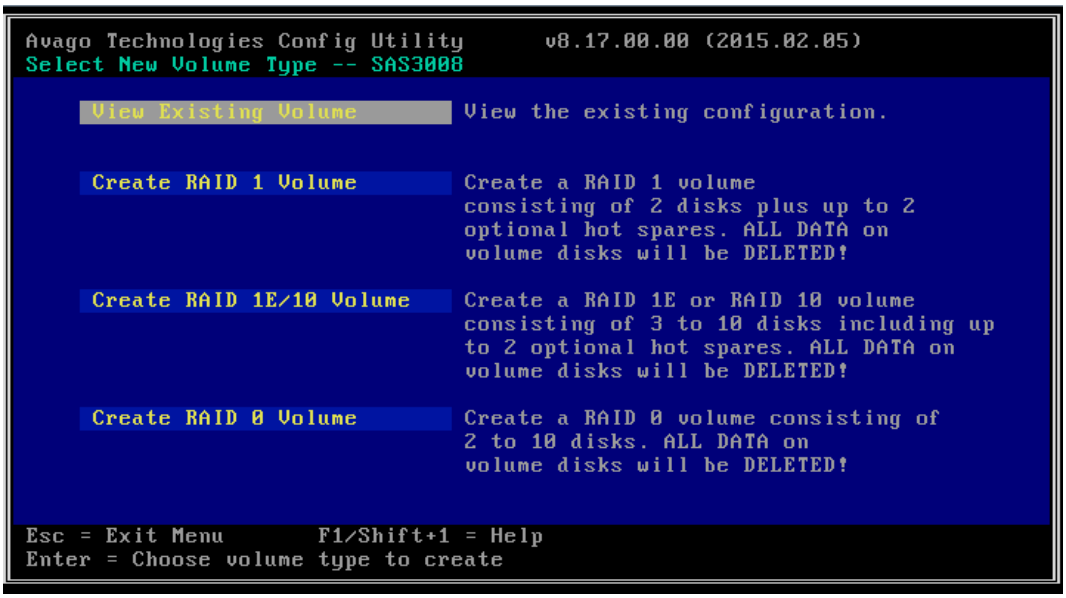
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-49 Adapter Properties Screen



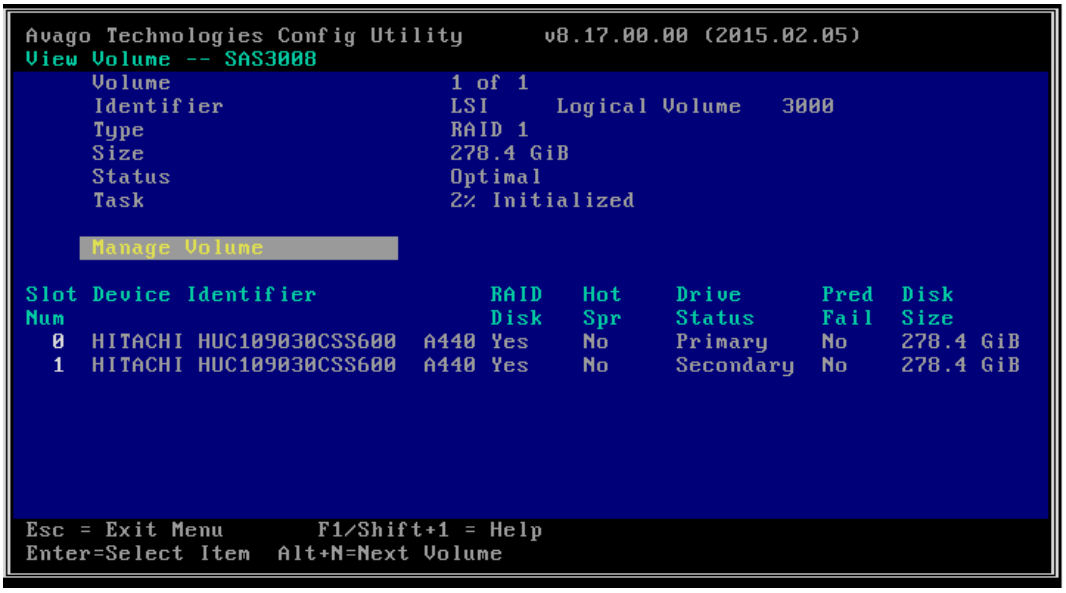
3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-50 Select New Volume Type Screen



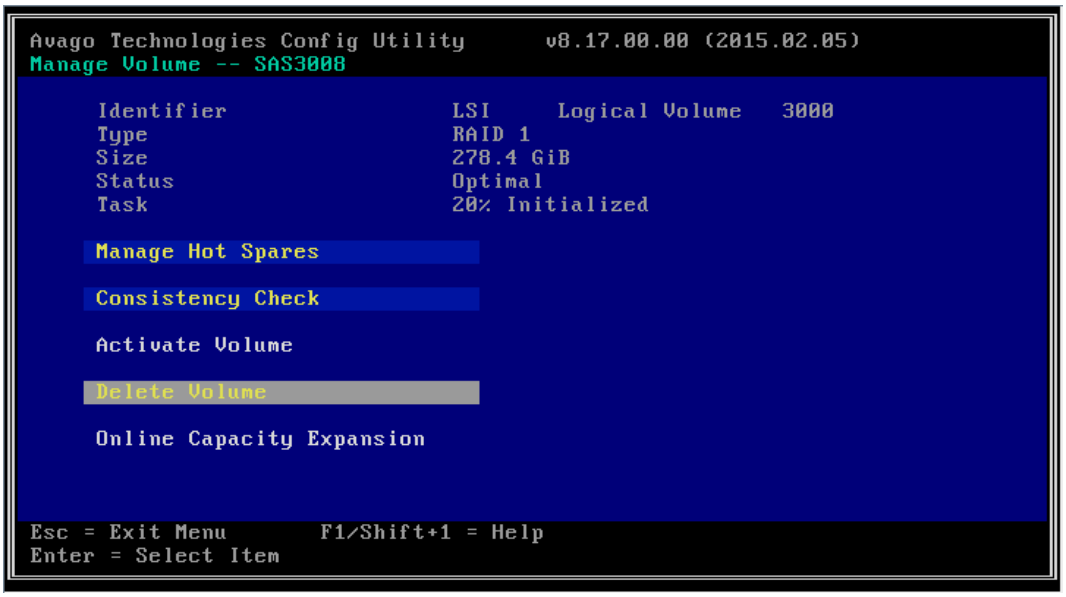
4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, as shown below.

Figure 3-51 RAID Array Screen



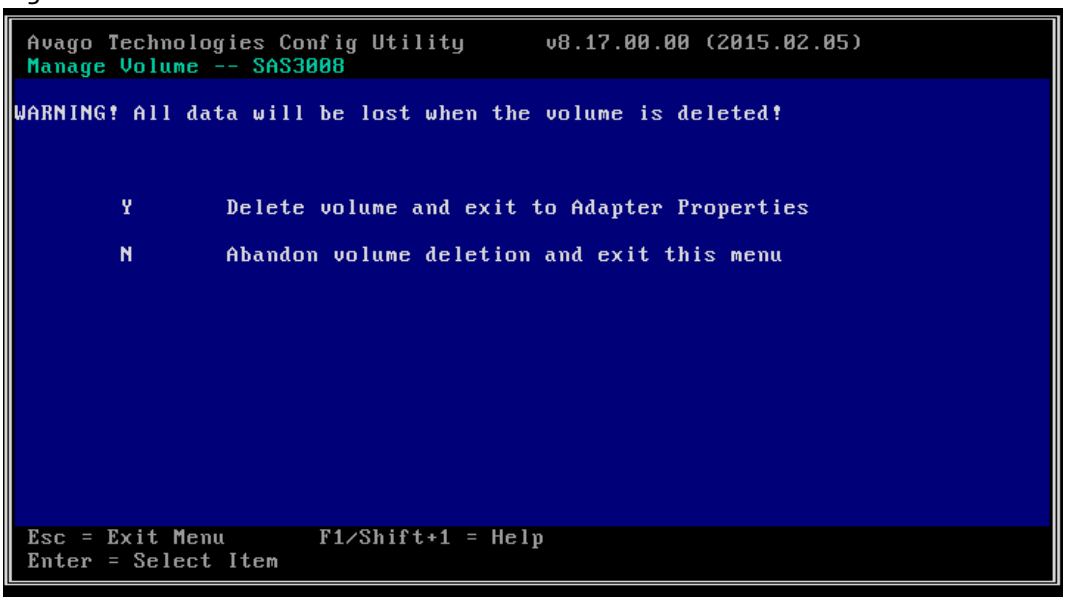
5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-52 Manage Volume Screen



6. Select **Delete Volume**, press <Enter> to enter the deletion confirmation screen, and press <Y> to confirm the deletion. The previous data will be deleted together with the array, as shown below.

Figure 3-53 Deletion Confirmation Screen



4 Consistency Check

Scenario:

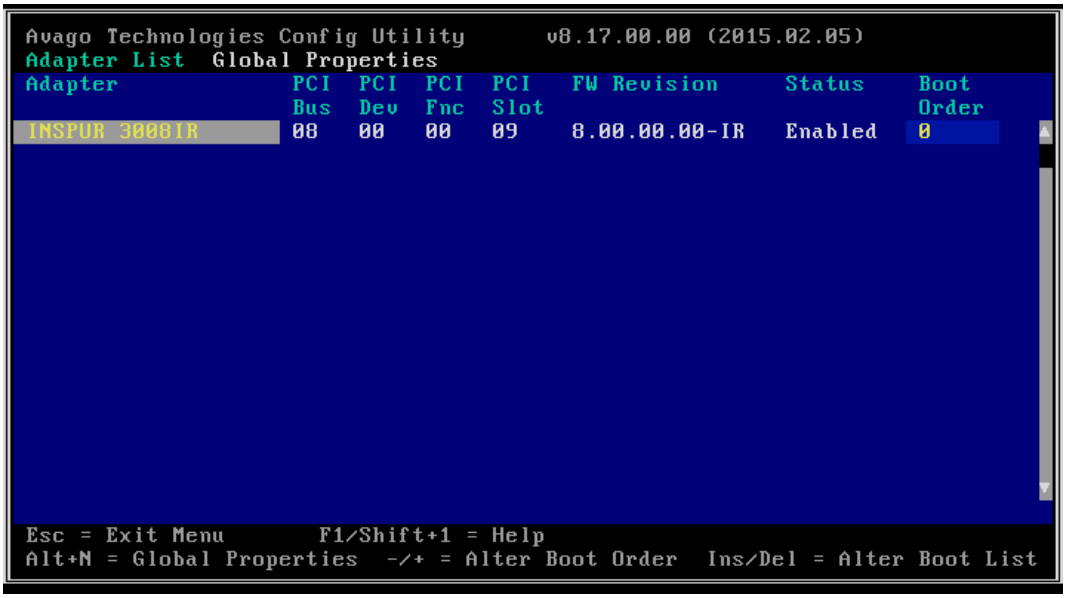
For a fault-tolerant virtual drive, regular consistency checks are required. A

consistency check aims to inspect the correctness and validity of the redundant data in RAID 1/10/1E arrays. This section guides installation and debugging engineers on how to perform a consistency check.

Procedures:

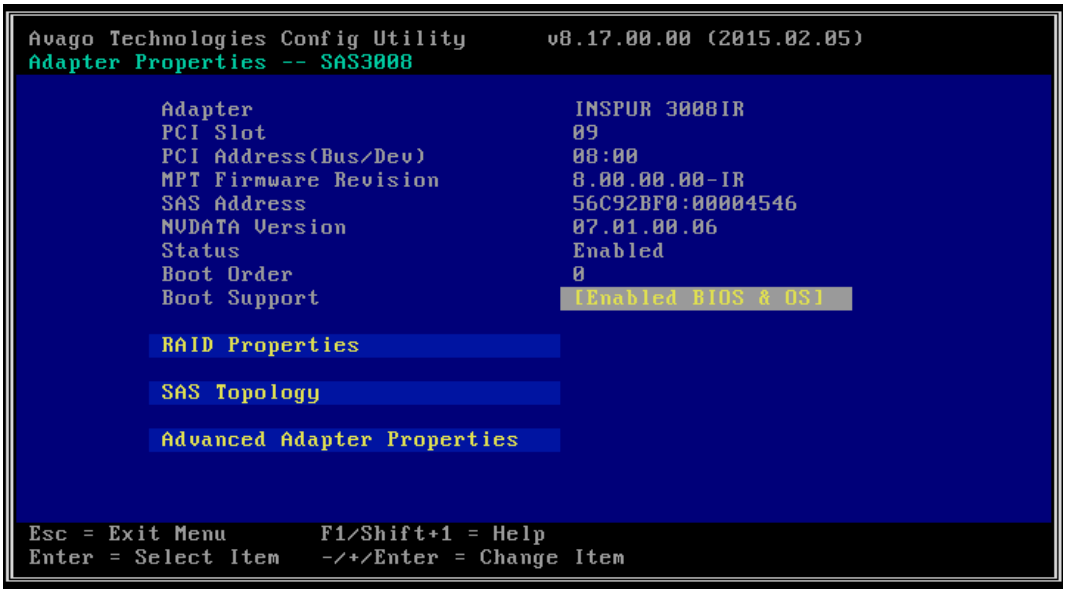
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-54 CU Screen



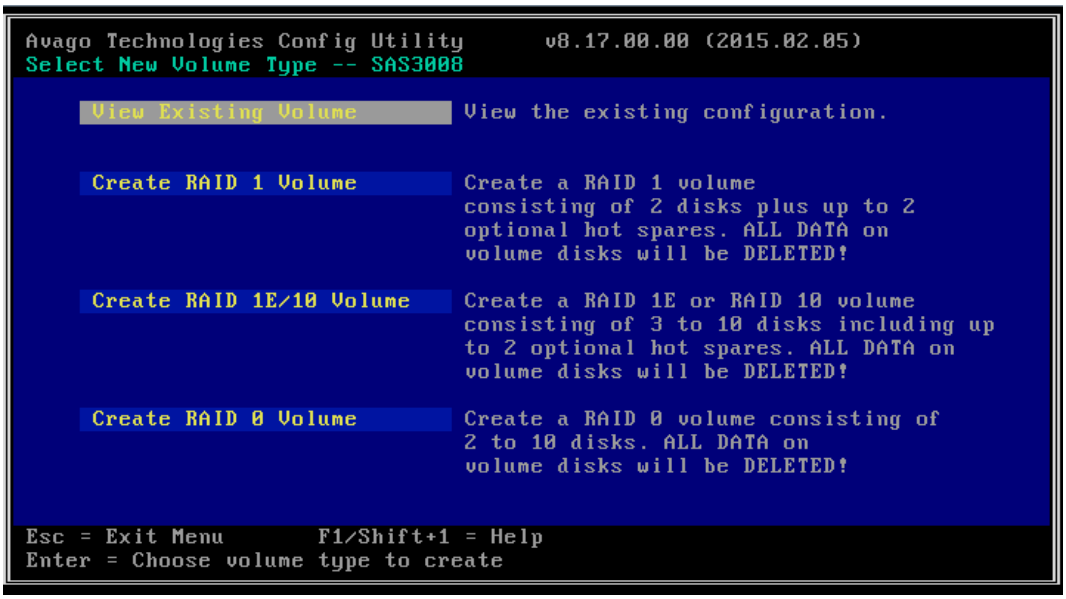
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-55 Adapter Properties Screen



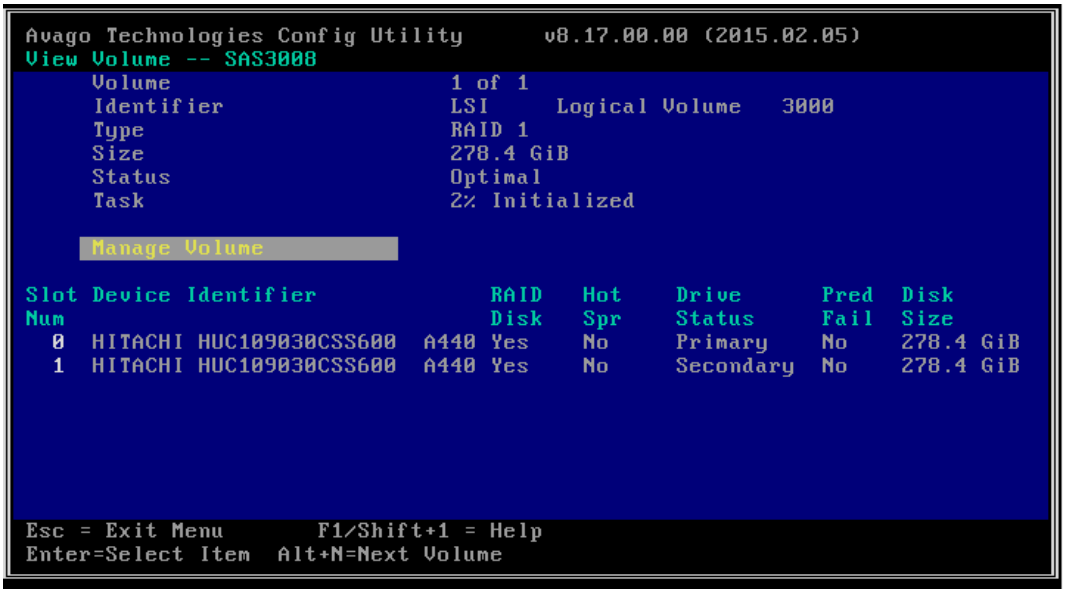
3. Select **RAID Properties** and press <Enter> to enter **Select New Volume Type** screen, as shown below.

Figure 3-56 Select New Volume Type Screen



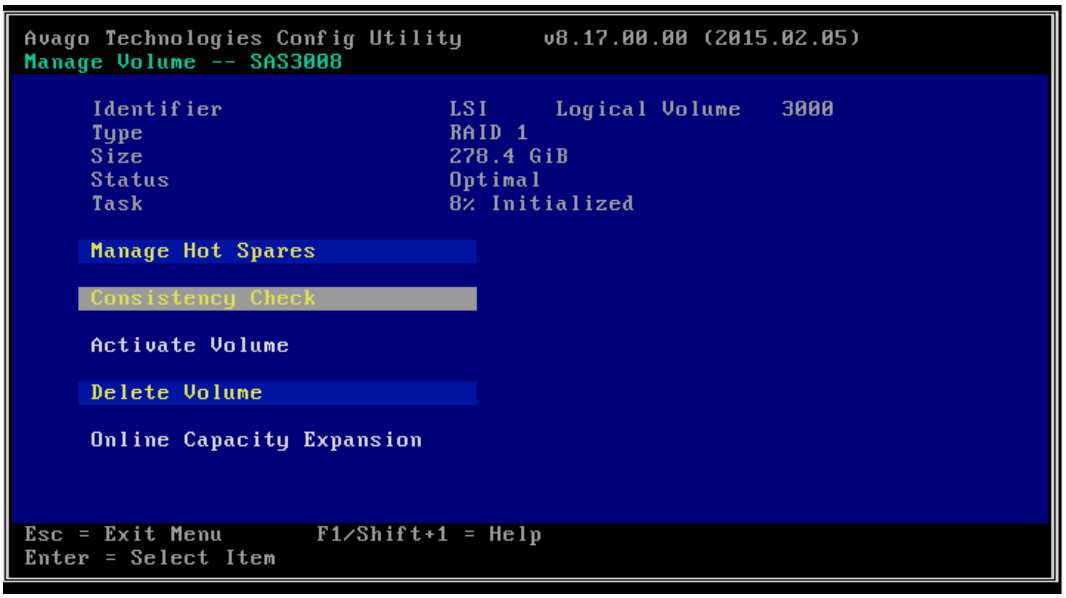
4. Select **View Existing Volume** and press <Enter> to display the RAID array screen, as shown below.

Figure 3-57 RAID Array Screen



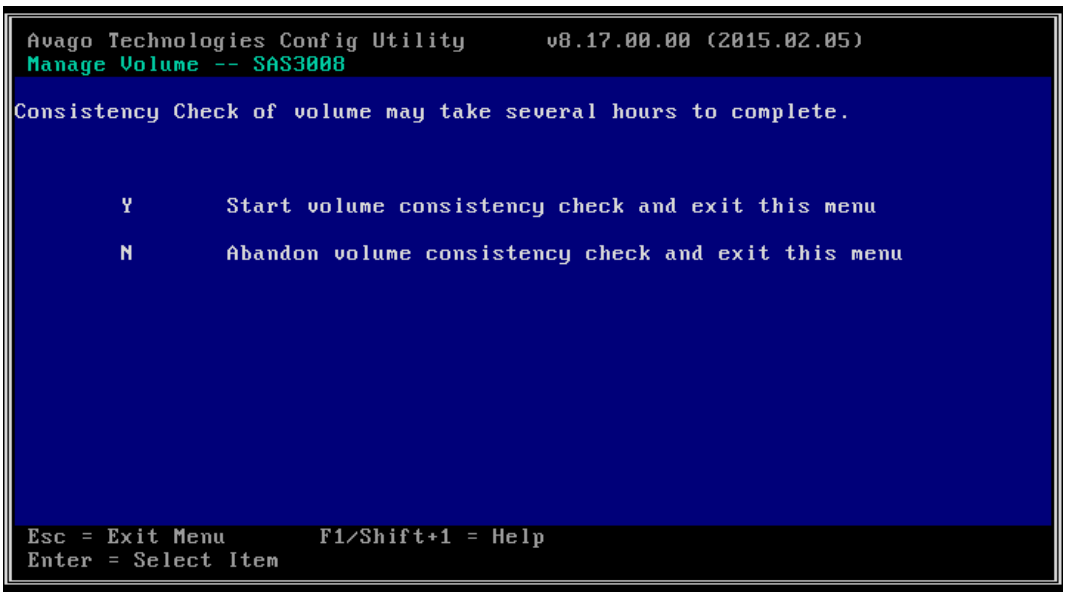
5. Select **Manage Volume** and press <Enter> to enter **Manage Volume** screen, as shown below.

Figure 3-58 Manage Volume Screen



6. Select **Consistency Check**, press <Enter> to enter the consistency check confirmation screen, and press <Y> to start checking. After the check is completed, you will be automatically redirected back to **Manage Volume** screen, as shown below.

Figure 3-59 Consistency Check Confirmation Screen



5 Viewing a Topology

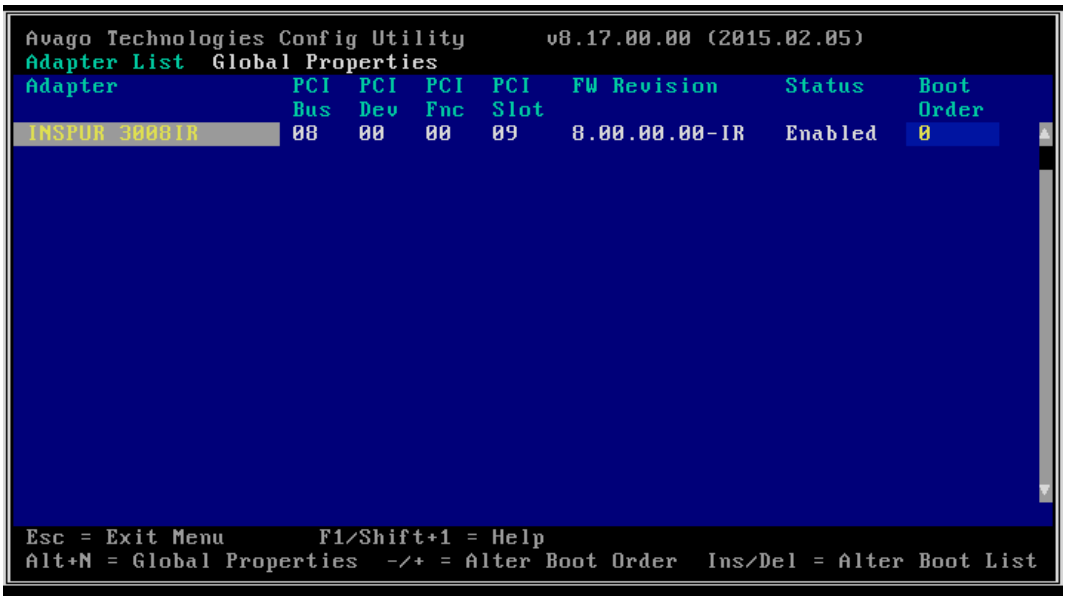
Scenario:

This section guides installation and debugging engineers on how to view the topology of disks controlled by Inspur SAS3008IR controller.

Procedures:

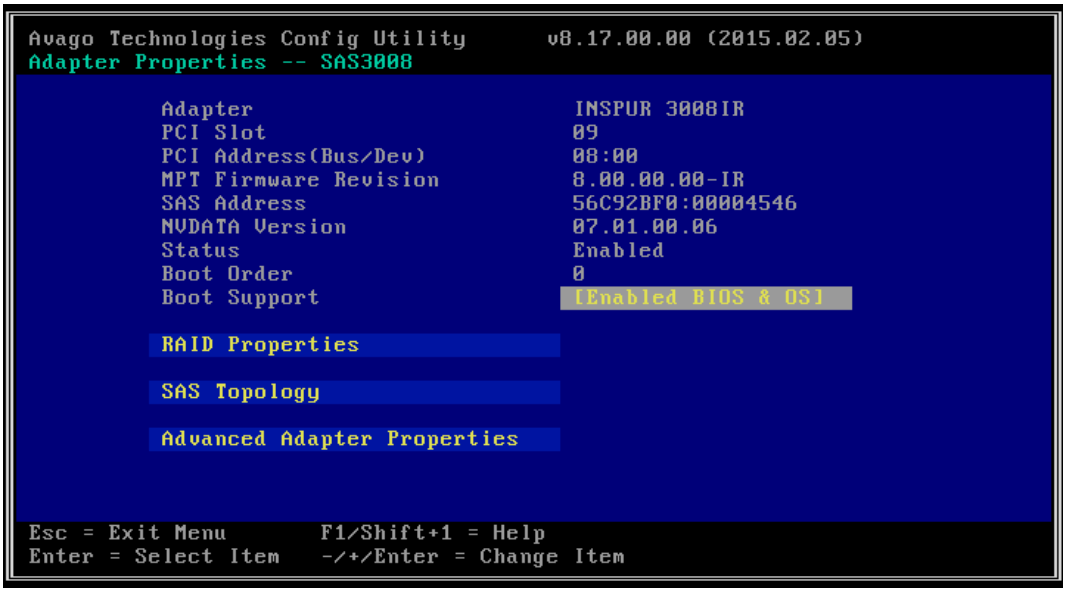
1. During POST, press <Ctrl> and <C> to log in to the CU screen of Inspur SAS3008IR, as shown below.

Figure 3-60 CU Screen



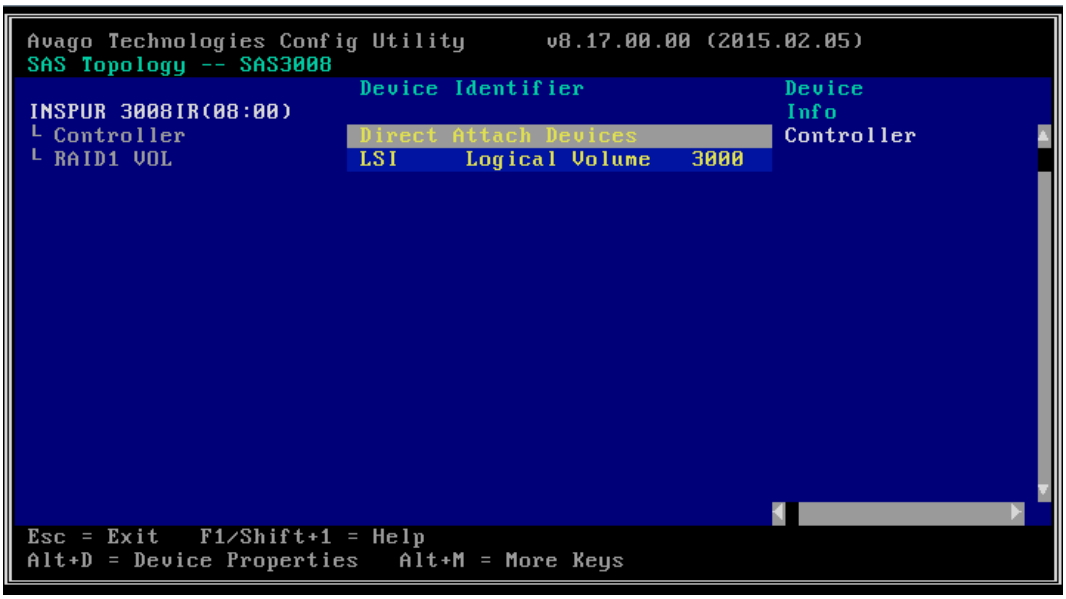
2. Select **Inspur 3008IR** on the main screen of CU, and press <Enter> to enter **Adapter Properties** screen, as shown below.

Figure 3-61 Adapter Properties Screen



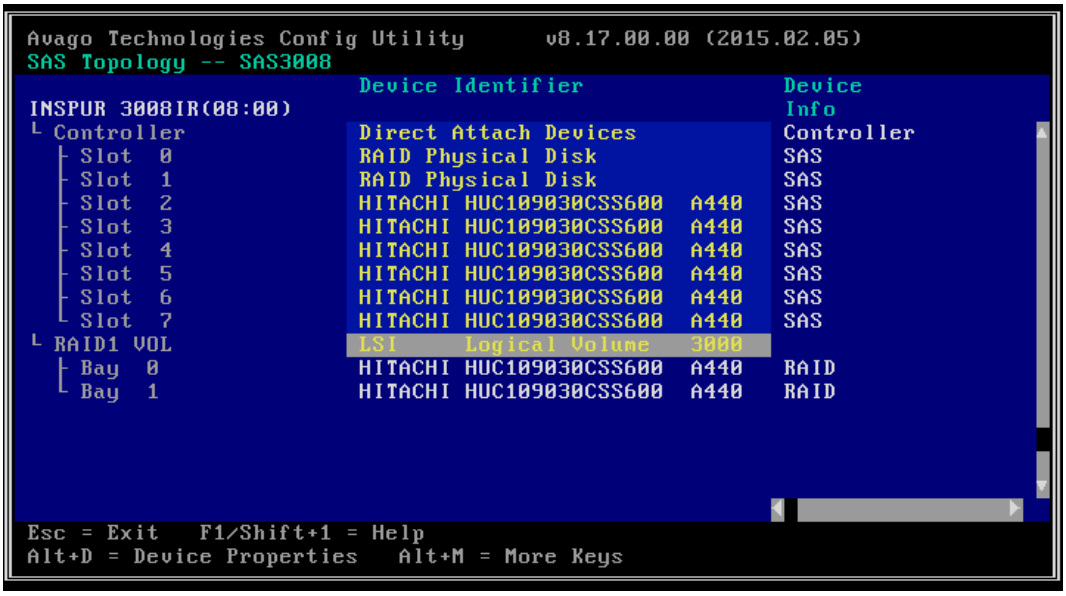
3. Select **SAS Topology** and press <Enter> to enter **SAS Topology** screen, as shown below.

Figure 3-62 SAS Topology Screen



4. Select the item to be viewed and press <Enter> to view the topology of disks on the screen controlled by LSI SAS3008 controller, as shown below.

Figure 3-63 Topology of Drives



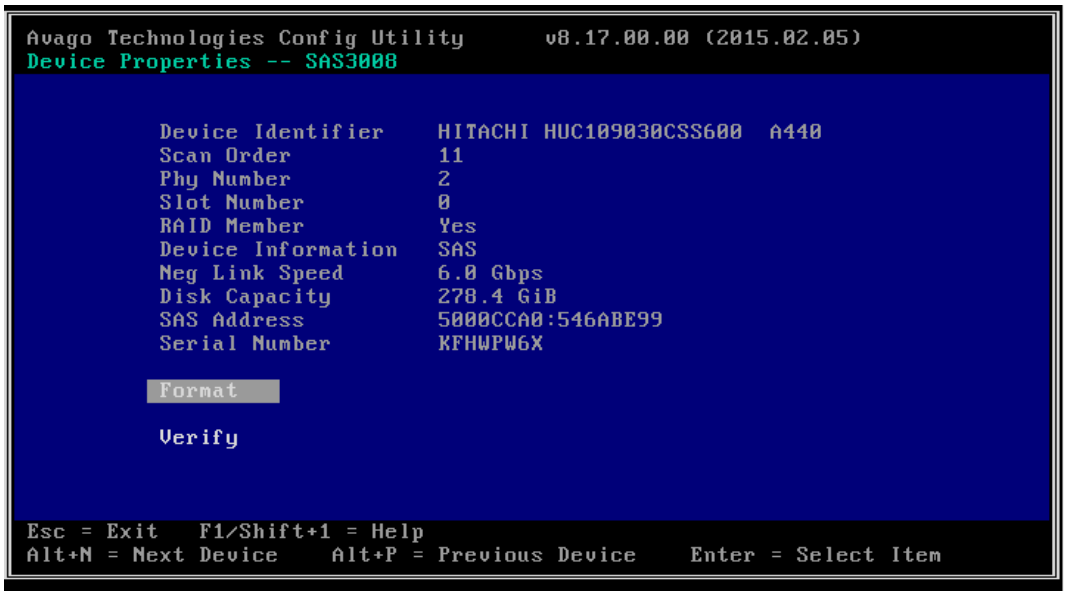
5. Select a single disk or RAID array and perform the following operations:

a. Press <ALT> and <D> to view the properties of the selected device and provide an interface for disk formatting and verification, as shown below.

Format: Format the drive.

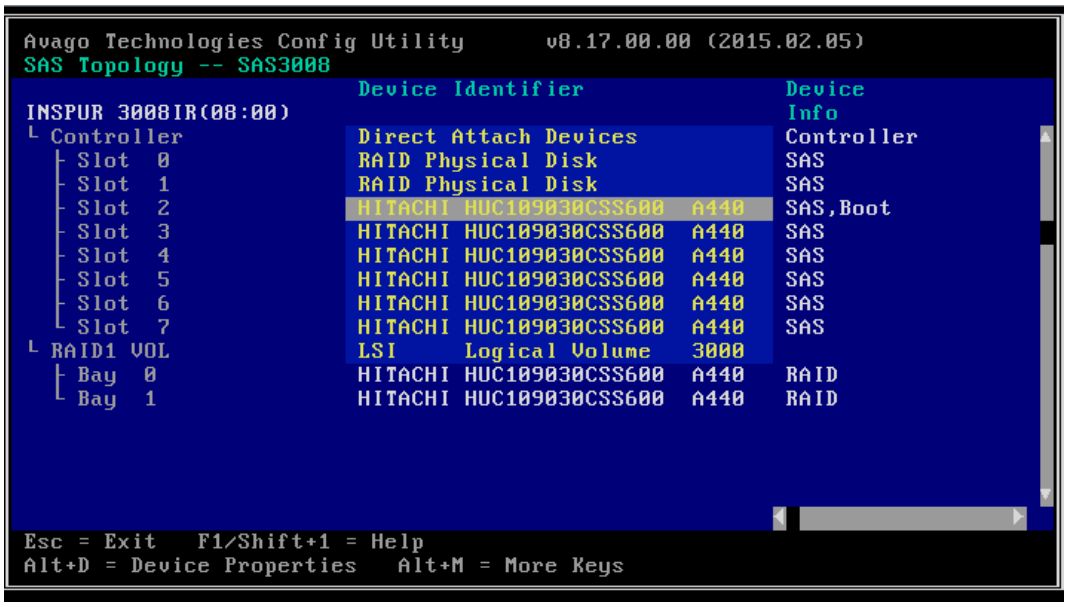
Verify: Check and verify the drive.

Figure 3-64 Device Properties Screen



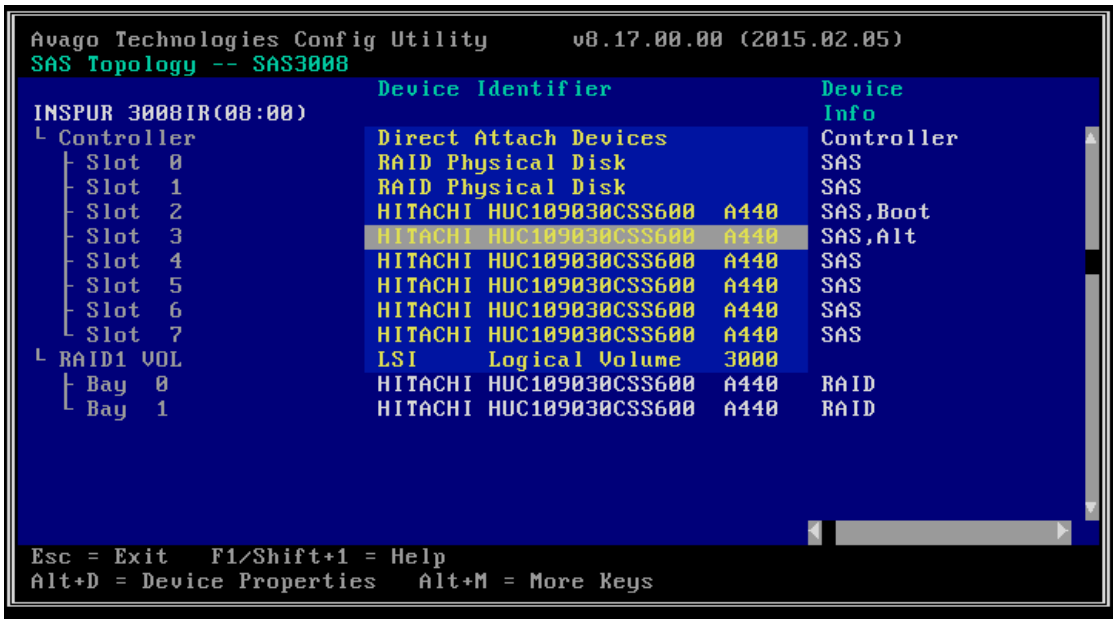
b. Press <ALT> and <B> to set the selected device as the first boot device. After the setting is completed, **Boot** will be shown in **Device Info**, as shown below.

Figure 3-65 Setting as the First Boot Device



c. Press <ALT> and <A> to set the selected device as the second boot device. After the setting is completed, **Alt** will be shown in **Device Info**, as shown below.

Figure 3-66 Setting as the Second Boot Device



d. Press <Enter> to turn on the locate LED (s) of the corresponding RAID array disks or a single drive. After viewing, press <Esc> consecutively to exit the query screen.

3.2 Initial Configuration (UEFI Mode)

This section introduces how to configure Inspur SAS3008IT/IR in the UEFI mode.

IMPORTANT

- The operating steps described in this chapter are also applicable to Inspur SAS3008IT.
- The main difference between SAS3008IT and SAS3008IR is that the former cannot be configured to any RAID level.

3.2.1 Logging in to the Configuration Screen

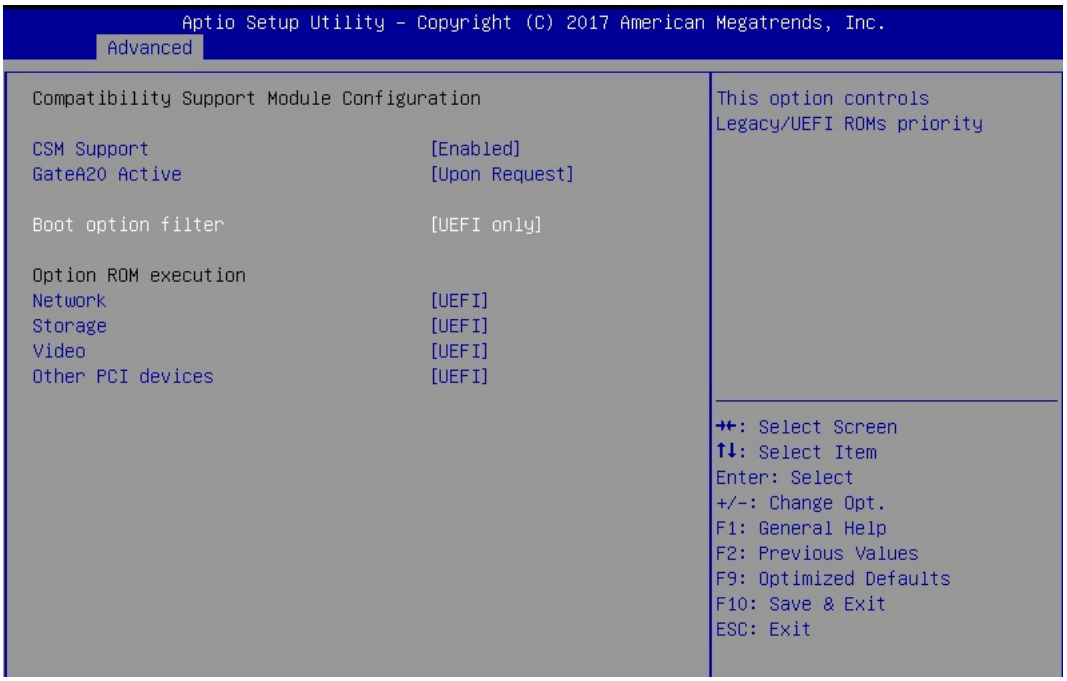
Procedures:

1. Log in to the real-time server desktop via the remote virtual console.
2. Restart the server to enter BIOS configuration screen. The shortcut keys for entering different BIOS may vary. Please follow the prompt on the screen. When the blue progress bar appears as shown below, press <Delete> as prompted to enter BIOS main screen.

Figure 3-67 Prompt

3. Go to **BIOS** > **Advanced**, select **CSM Configuration**, and press <Enter> as shown below. The BIOS screen may vary. Set **Boot option filter** to **UEFI only** in the BIOS.

Figure 3-68 Setting Boot option filter to UEFI Only



4. Press <F10>. In the popup confirmation dialog box, select **Yes** and press <Enter> to save the settings and exit the BIOS configuration screen. The server restarts and logs you on the LSI SAS3008 management screen.

3.2.2 Creating RAID Arrays

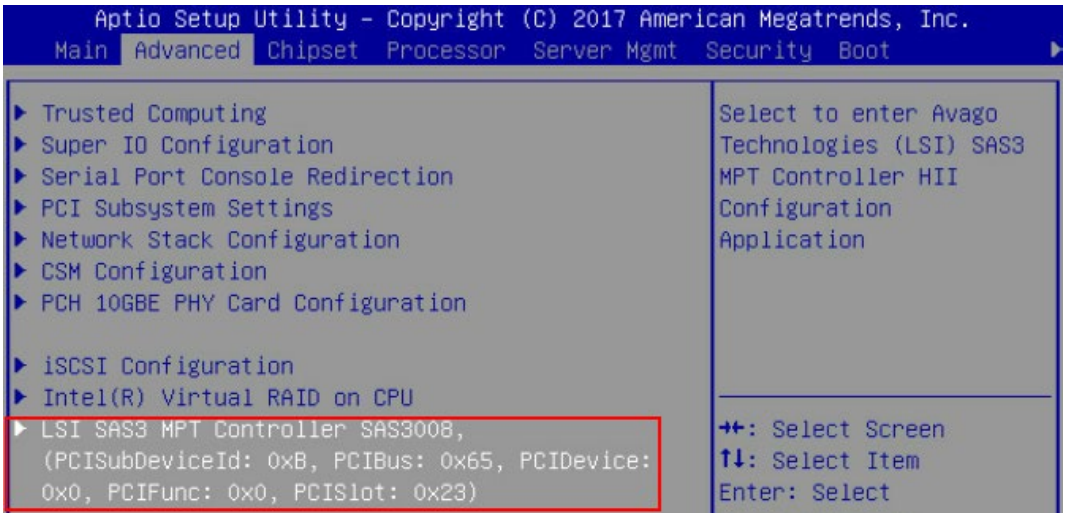
IMPORTANT

- To create a RAID array, the disks in the same RAID array shall be of the same type and specifications.
- Inspur SAS3008IT cannot be configured to any RAID level.

1 Creating a RAID 0 Array in UEFI Mode

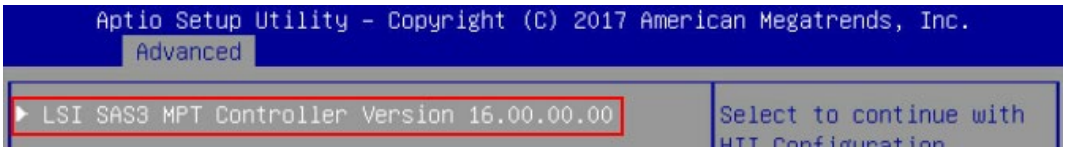
1. Re-enter the BIOS configuration screen, switch to the **Advanced** tab, select the LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-69 Selecting LSI SAS3008 Controller under Advanced Tab



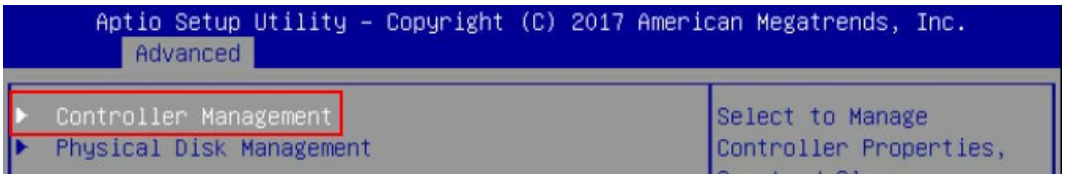
2. On the popup screen, select **LSI SAS3 MPT Controller Version 16.00.00.00** and press <Enter>.

Figure 3-70 Selecting LSI SAS3 MPT Controller Version 16.00.00.00



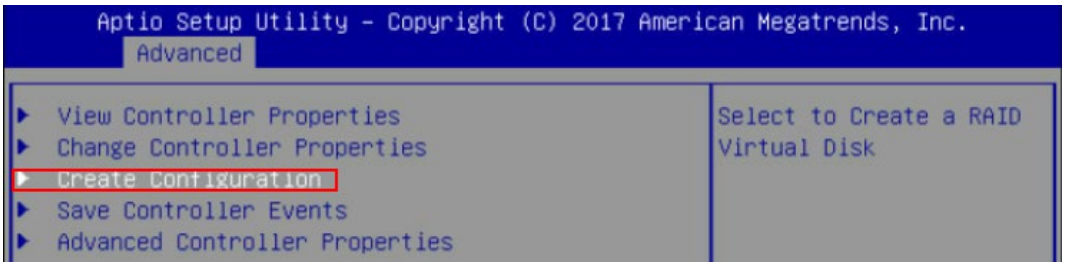
3. On the popup screen, select **Controller Management** and press <Enter>.

Figure 3-71 Selecting Controller Management



4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-72 Selecting Create Configuration



5. On the popup screen, select **RAID 0** in **Select RAID Level** menu. Note: Select **Select Physical Disks** to select 2 disks and press <Enter> to create RAID 0.

Figure 3-73 Creating RAID 0

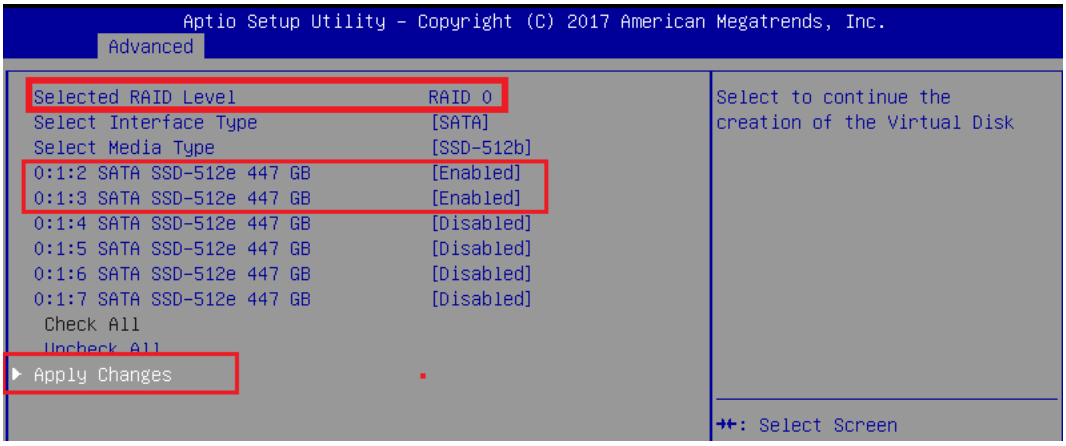
6. On the popup screen, configure the following settings:

   a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for RAID array creation have SATA interfaces.

   b. Set the disk status for RAID array creation to **Enabled**.

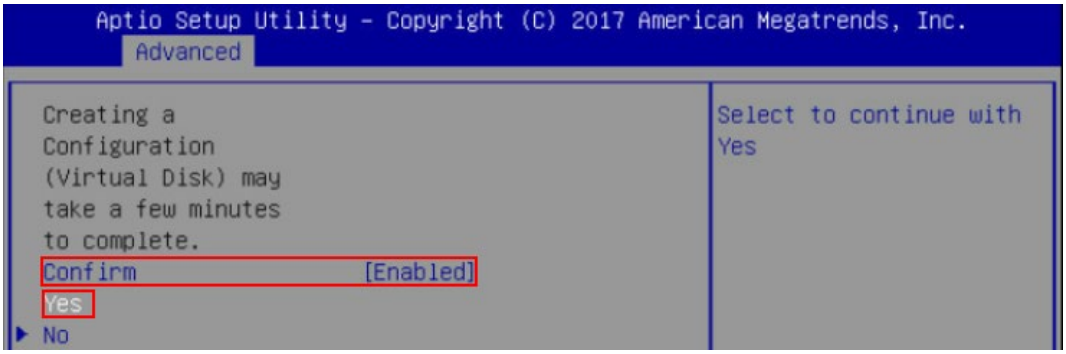
   c. Select **Apply Changes** and press <Enter>.

Figure 3-74 Related Settings



7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-75 Setting Confirm to Enabled

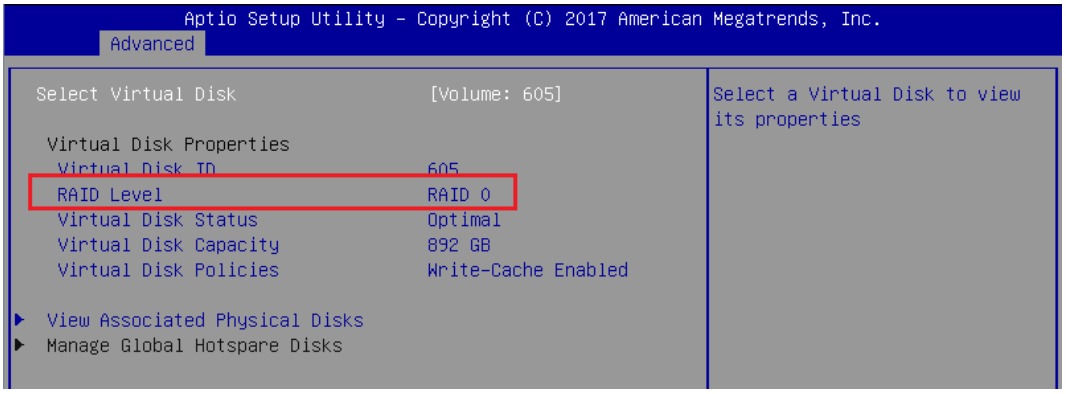


8. On the popup screen, select **OK** and press <Enter>.

Figure 3-76 Selecting OK

9. To view the RAID array, go to **LSI SAS3 MPT Controller Version 16.00.00.00** > **Virtual Disk Management** > **Manage Virtual Disk Properties**. You can view details on the popup screen and switch among multiple RAID arrays via **Select Virtual Disk**.

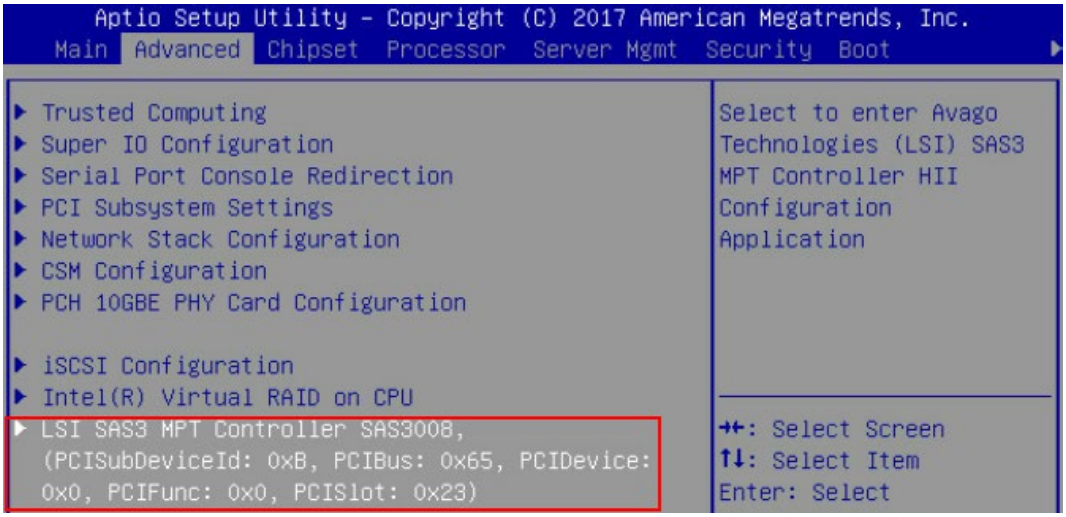
Figure 3-77 RAID Information



2 Creating a RAID 1 Array in UEFI Mode

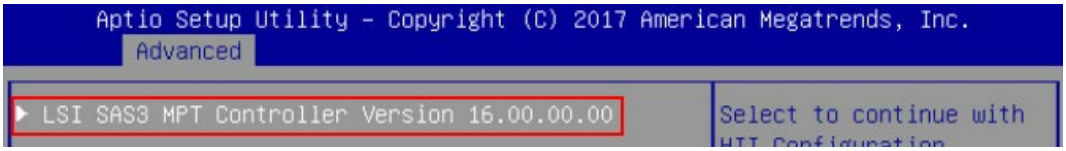
1. Re-enter the BIOS configuration screen, switch to the **Advanced** tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-78 Selecting LSI SAS3008 Controller under Advanced Tab



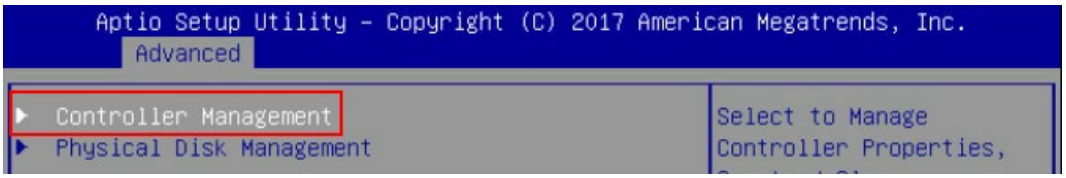
2. On the popup screen, select **LSI SAS3 MPT Controller Version 16.00.00.00** and press <Enter>.

Figure 3-79 Selecting LSI SAS3 MPT Controller Version 16.00.00.00



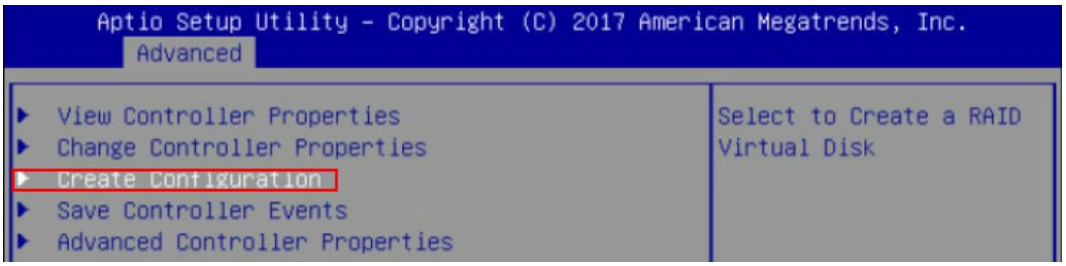
3. On the popup screen, select Controller Management and press <Enter>.

Figure 3-80 Selecting Controller Management



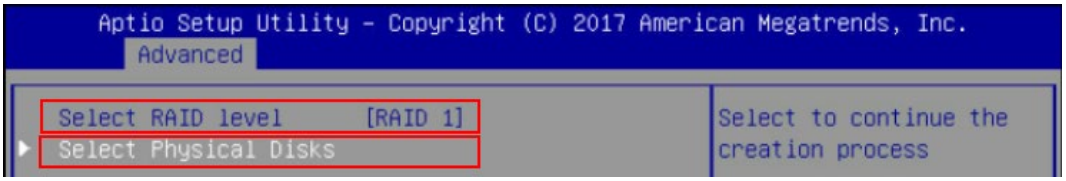
4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-81 Selecting Create Configuration



5. On the popup screen, select an appropriate option in **Select RAID Level** menu. Note: Select **Select Physical Disks** to select 2 disks and press <Enter> to create RAID 1

Figure 3-82 Selecting Select Physical Disks



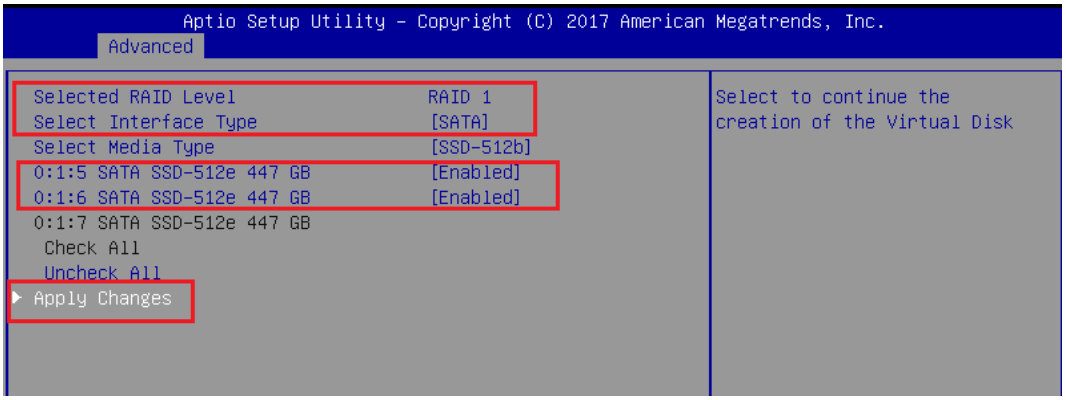
6. On the popup screen, configure the following settings:

   a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for RAID array creation have SATA interfaces.

   b. Set the disk status for RAID array creation to **Enabled**.

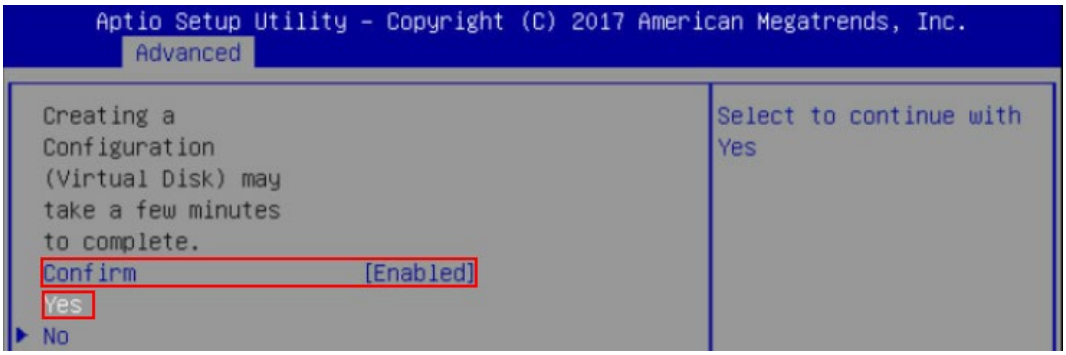
   c. Select **Apply Changes** and press <Enter>.

Figure 3-83 Related Settings



7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-84 Setting Confirm to Enabled

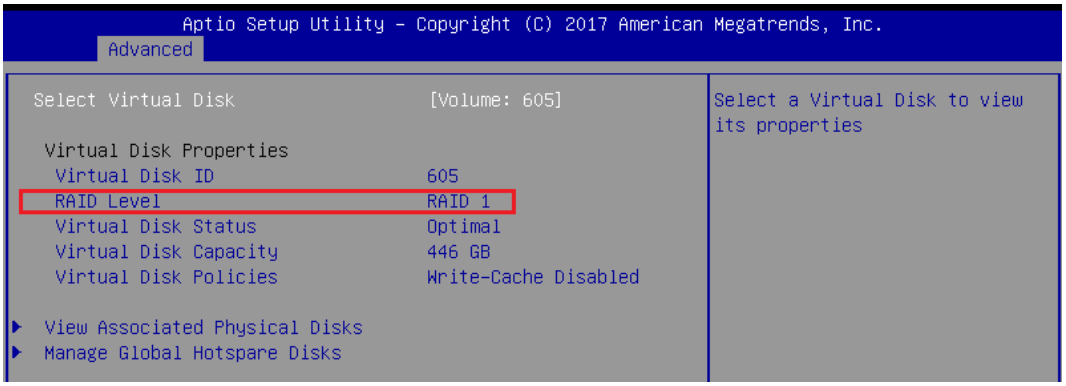


8. On the popup screen, select **OK** and press <Enter>.

Figure 3-85 Selecting OK

9. To view the RAID array, go to **LSI SAS3 MPT Controller Version 16.00.00.00** > **Virtual Disk Management** > **Manage Virtual Disk Properties**. You can view details on the popup screen and switch among multiple RAID arrays via **Select Virtual Disk**.

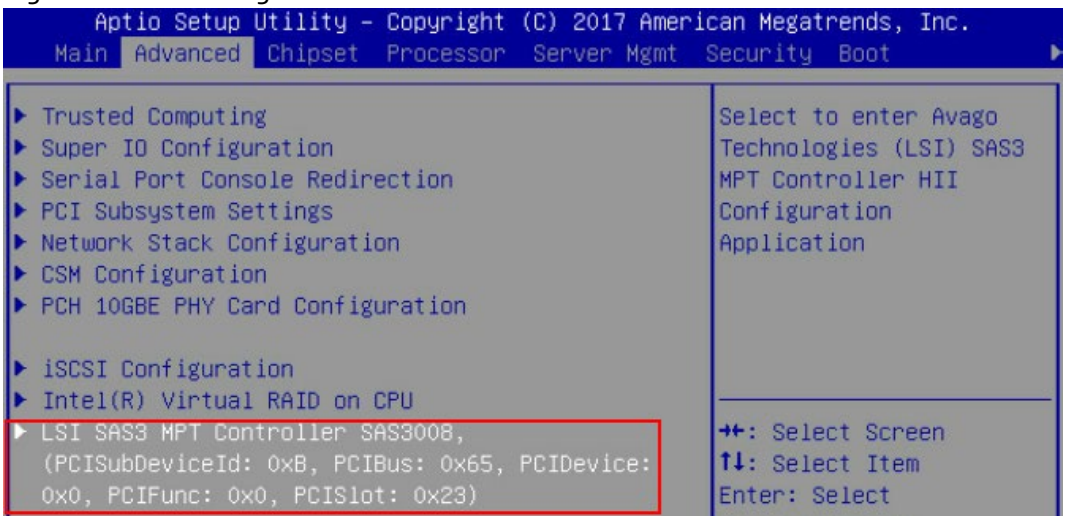
Figure 3-86 RAID Information



3 Creating a RAID 1E Array in UEFI Mode

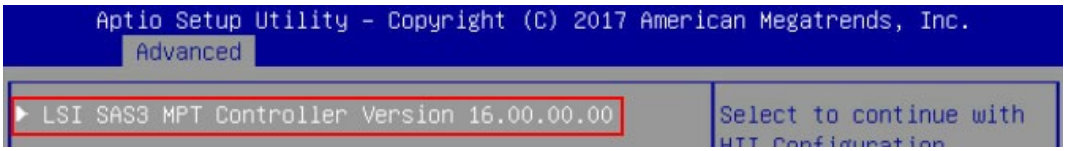
1. Re-enter the BIOS configuration screen, switch to the **Advanced** tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-87 Selecting LSI SAS3008 Controller under Advanced Tab



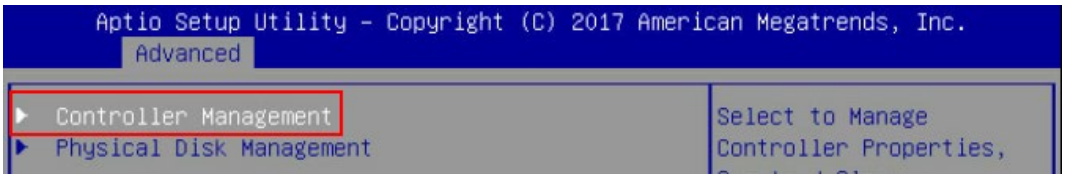
2. On the popup screen, select **LSI SAS3 MPT Controller Version 16.00.00.00** and press <Enter>.

Figure 3-88 Selecting LSI SAS3 MPT Controller Version 16.00.00.00



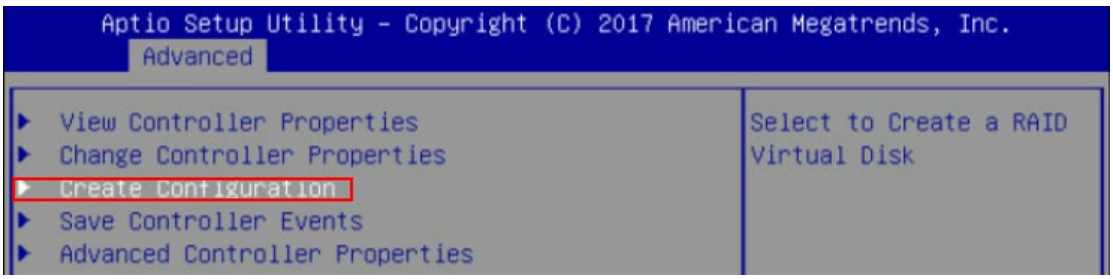
3. On the popup screen, select **Controller Management** and press <Enter>.

Figure 3-89 Selecting Controller Management



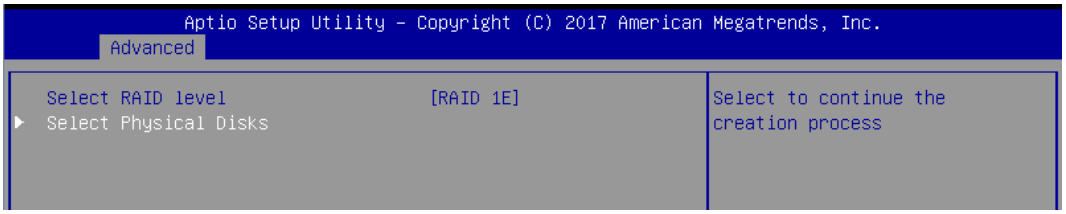
4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-90 Selecting Create Configuration



5. On the popup screen, select an appropriate option in **Select RAID level** menu. Note: Select **Select Physical Disks** to select 3 disks and press <Enter> to create RAID 1E.

Figure 3-91 Selecting Select Physical Disks



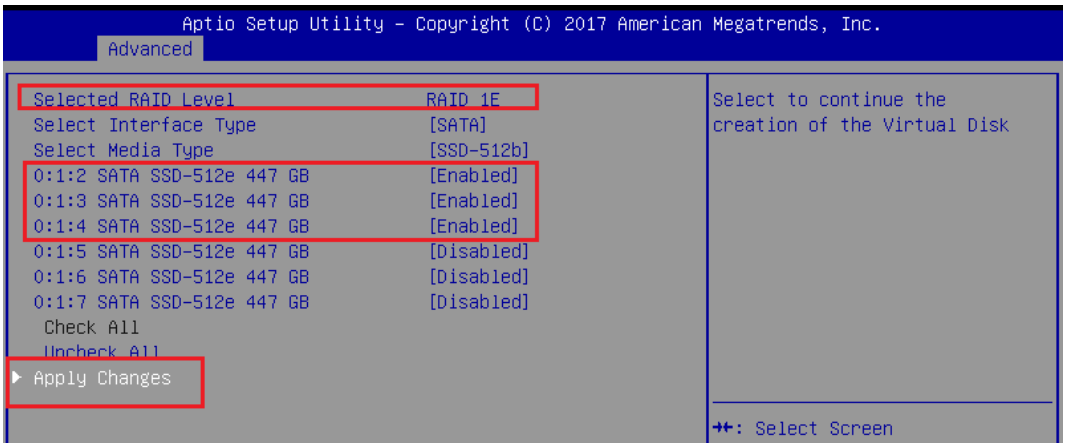
6. On the popup screen, configure as follows:

   a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for the RAID array creation have SATA interfaces.

   b. Set the disk status for RAID array creation to **Enabled.**

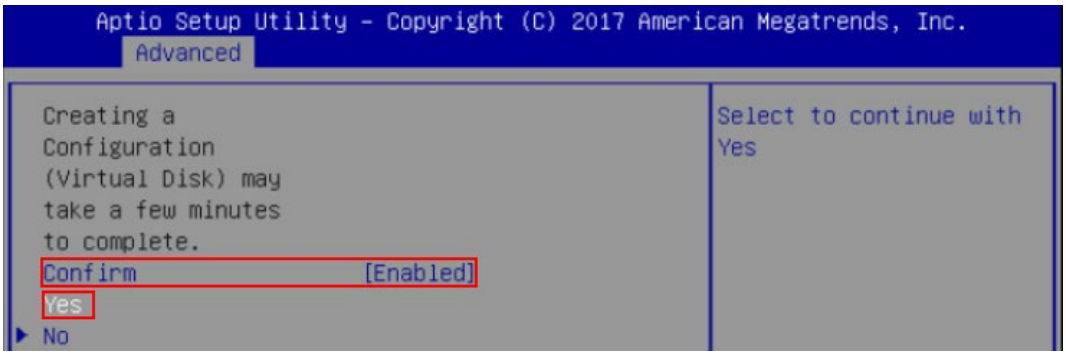
   c. Select **Apply Changes** and press <Enter>.

Figure 3-92 Related Settings



7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-93 Setting Confirm to Enabled

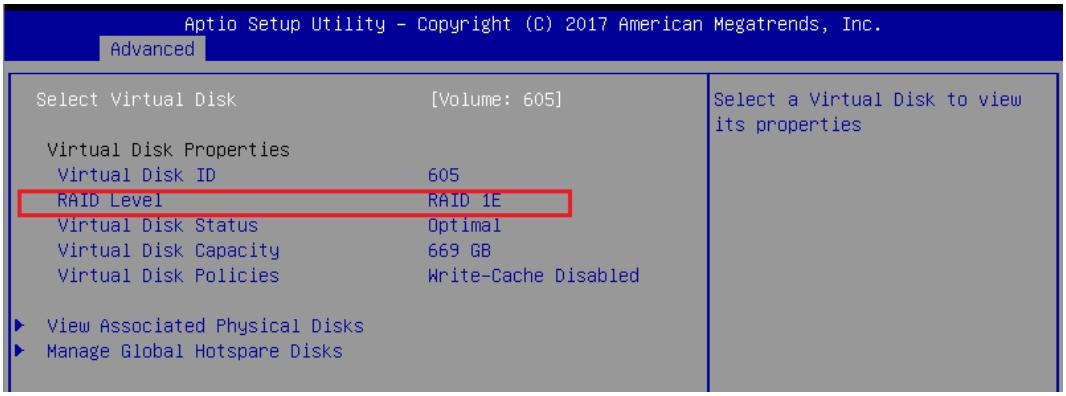


8. On the popup screen, select **OK** and press <Enter>.

Figure 3-94 Selecting OK

9. To view the RAID array, go to **LSI SAS3 MPT Controller Version 16.00.00.00** > **Virtual Disk Management** > **Manage Virtual Disk Properties**. You can view details on the popup screen and switch among multiple RAID arrays via **Select Virtual Disk**.

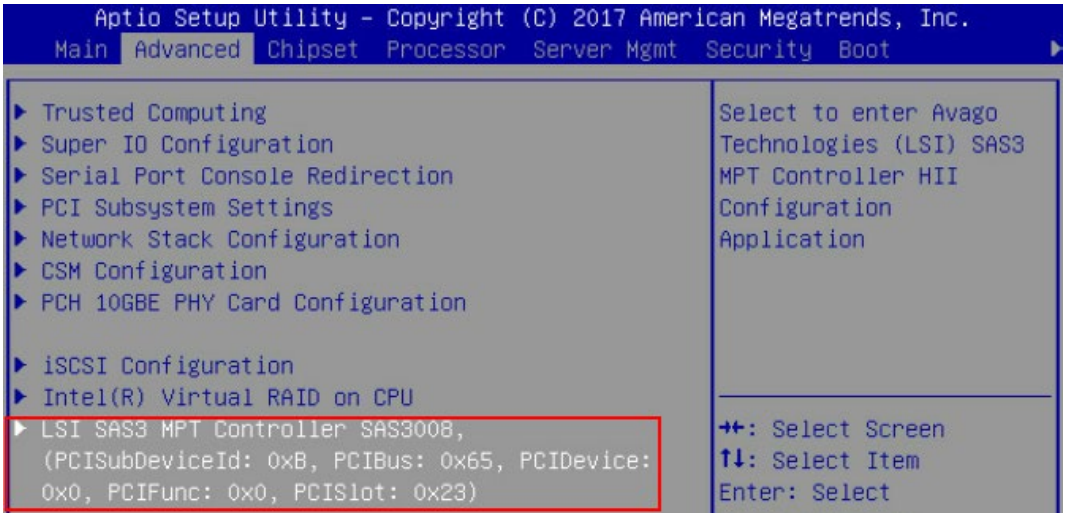
Figure 3-95 RAID information



4 Creating a RAID 10 Array in UEFI Mode

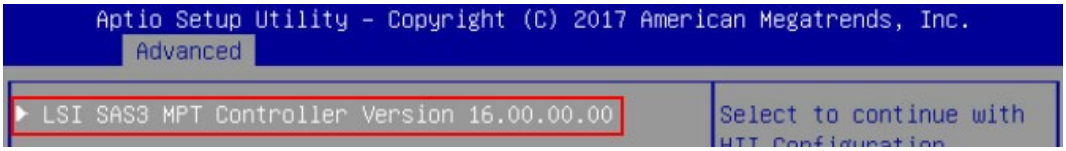
1. Re-enter the BIOS configuration screen, switch to the **Advanced** tab, select LSI SAS3008 controller from the existing RAID controller card list, and then press <Enter>.

Figure 3-96 Selecting LSI SAS3008 Controller under Advanced Tab



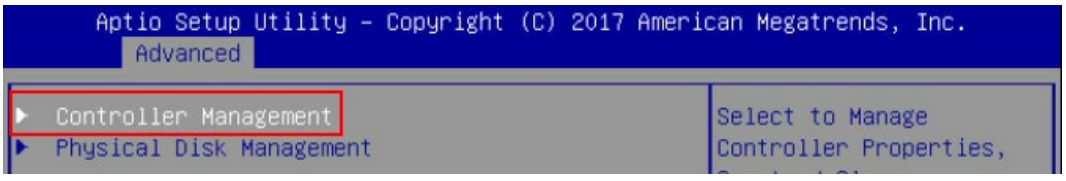
2. On the popup screen, select **LSI SAS3 MPT Controller Version 16.00.00.00** and press <Enter>.

Figure 3-97 Selecting LSI SAS3 MPT Controller Version 16.00.00.00



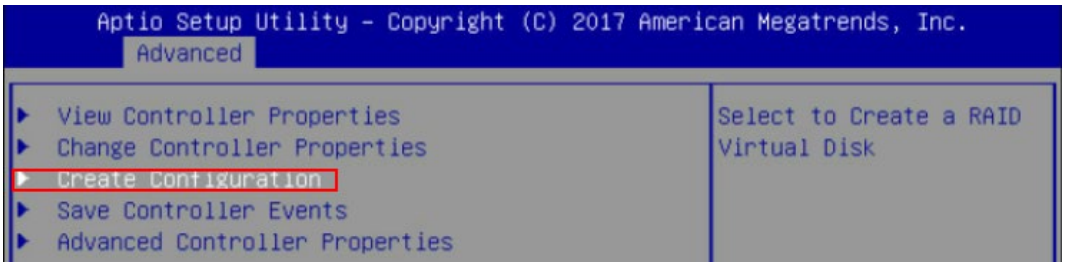
3. On the popup screen, select **Controller Management** and press <Enter>.

Figure 3-98 Selecting Controller Management



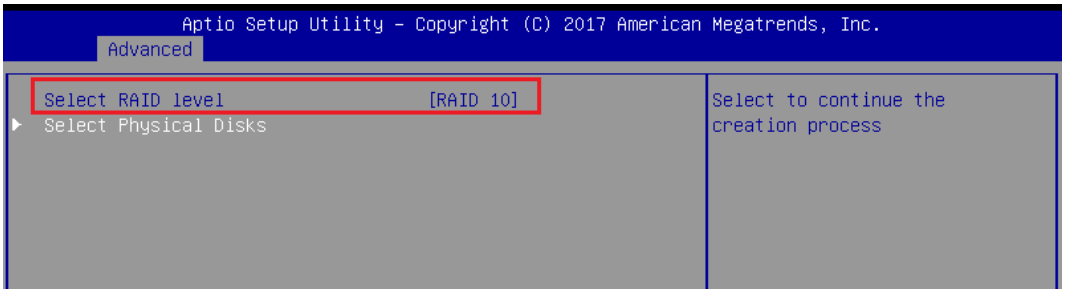
4. On the popup screen, select **Create Configuration** and press <Enter>.

Figure 3-99 Selecting Create Configuration



5. On the popup screen, select appropriate settings in **Select RAID Level** menu. Note: Select **Select Physical Disks** to select 4 disks and press <Enter> to create RAID 10.

Figure 3-100 Selecting Select Physical Disks



6. On the popup screen, configure the following settings:

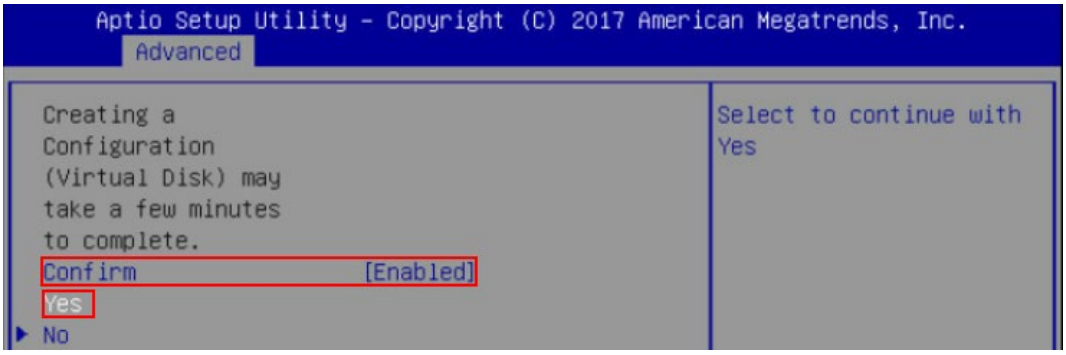
    a. Select the disk type to be set in **Select Interface Type**. Note: SATA shall be selected, as the disks for the RAID array creation have SATA interfaces.

    b. Set the disk status for RAID array creation to **Enabled**.

    c. Select **Apply Changes** and press <Enter>.

7. On the popup screen, set **Confirm** to **Enabled**, select **Yes**, and press <Enter>.

Figure 3-101 Setting Confirm to Enabled

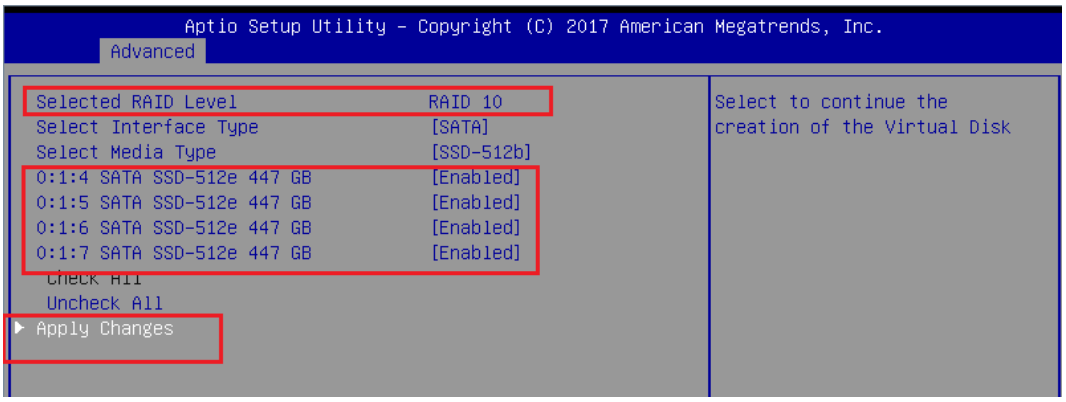


8. On the popup screen, select **OK** and press <Enter>.

Figure 3-102 Selecting OK

9. To view the RAID array, go to **LSI SAS3 MPT Controller Version 16.00.00.00** > **Virtual Disk Management** > **Manage Virtual Disk Properties**. You can view details on the popup screen and switch among multiple RAID arrays via **Select Virtual Disk**.

Figure 3-103 RAID Information



3.2.3 Configuring RAID Arrays

1 Configuring HS Drives

A maximum of 2 global HS disks can be created for higher data security after creation of RAID 10/1E arrays on LSI SAS3008 controller. No dedicated HS drives can be created on LSI SAS3008.

Impact on the system:

The data on the disk to be added to the RAID array will be lost. Please back up the disk data in advance.

IMPORTANT

- The server must have unconfigured drives, and disks already added to a RAID array cannot be configured as HS drives.

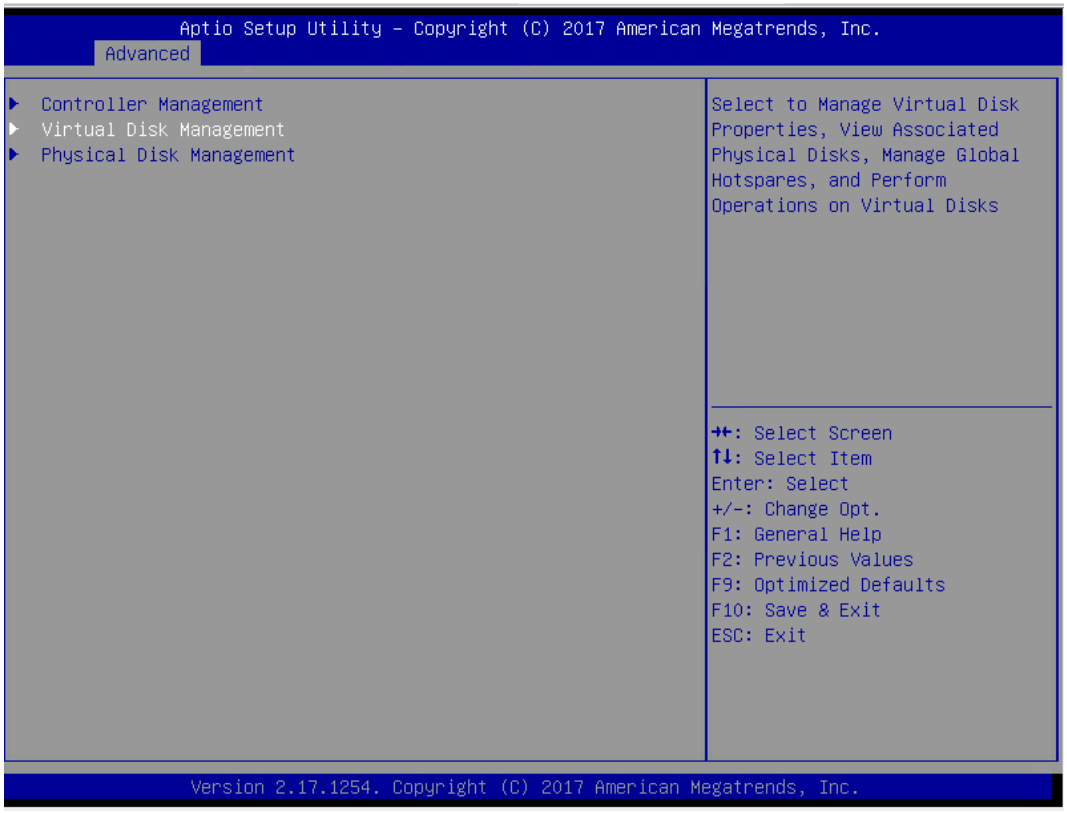
- An HS disk must be a SATA or SAS disk with its capacity not smaller than the maximum capacity of a disk in any RAID array.
- RAID 1, RAID 1E and RAID 10 support HS disks, but RAID 0 does not.

Data preparation is not required for the following operation.

Procedures:

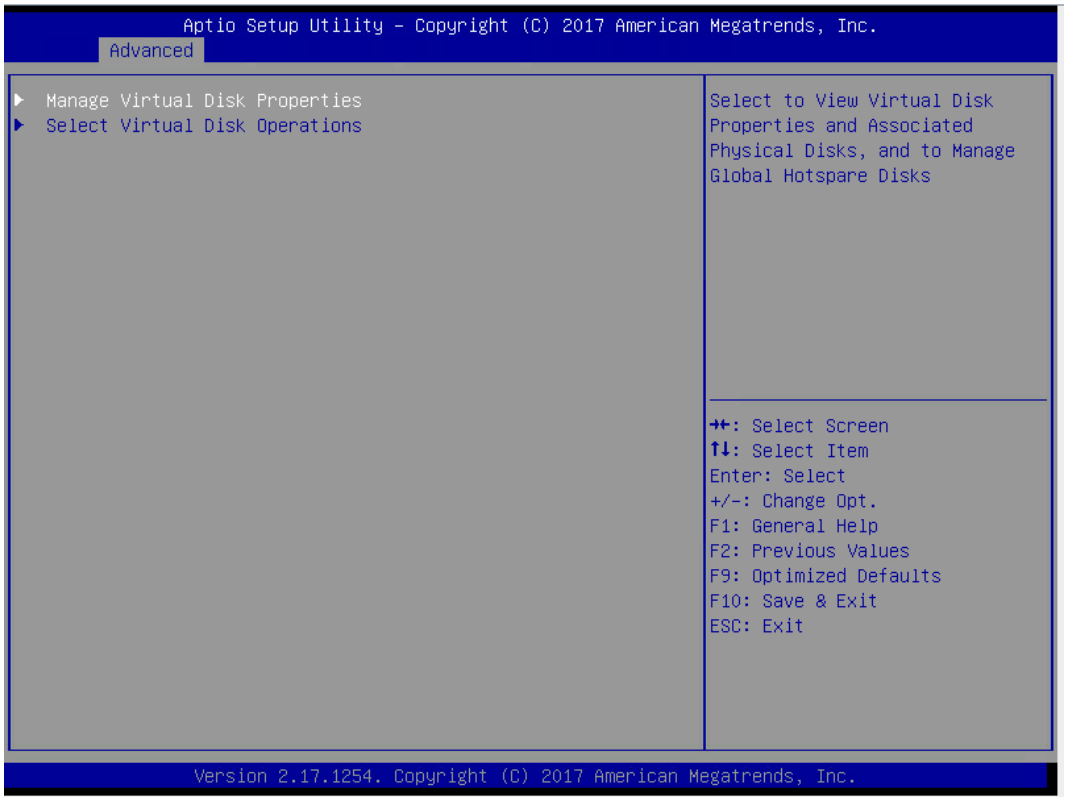
1. Log in to the management screen.
2. Enter the Virtual Disk Management screen.
   a. Select **Virtual Disk Management** on the main screen and press <Enter>.

Figure 3-104 Selecting Virtual Disk Management



   b. Select **Manage Virtual Disk Properties** and press <Enter> to enter the screen for management of virtual disk properties.

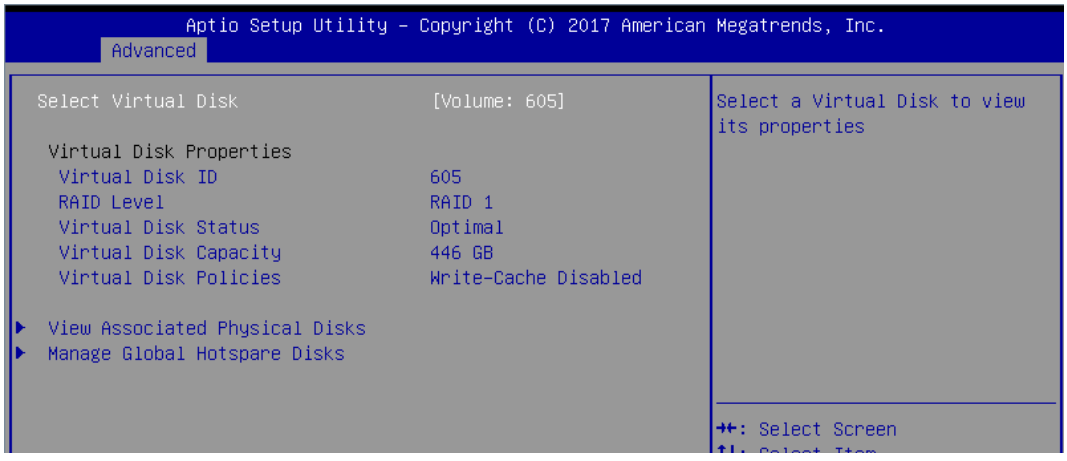
Figure 3-105 Selecting Manage Virtual Disk Properties



3. Configure HS drives.

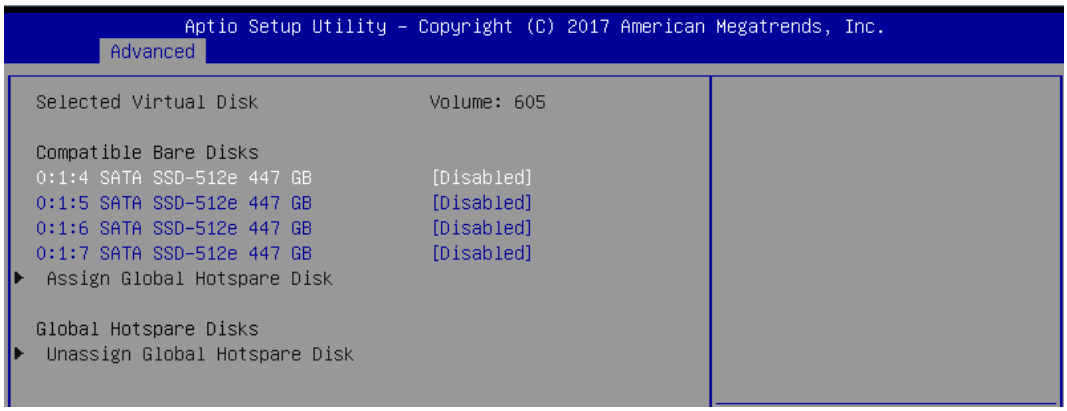
   a. Select **Manage Global Hotspare Disks** and press <Enter> to enter the screen for HS disk configuration.

Figure 3-106 Selecting Manage Global Hotspare Disks



   b. Press <↑> or <↓> to select the disk to be configured and press <Enter>.

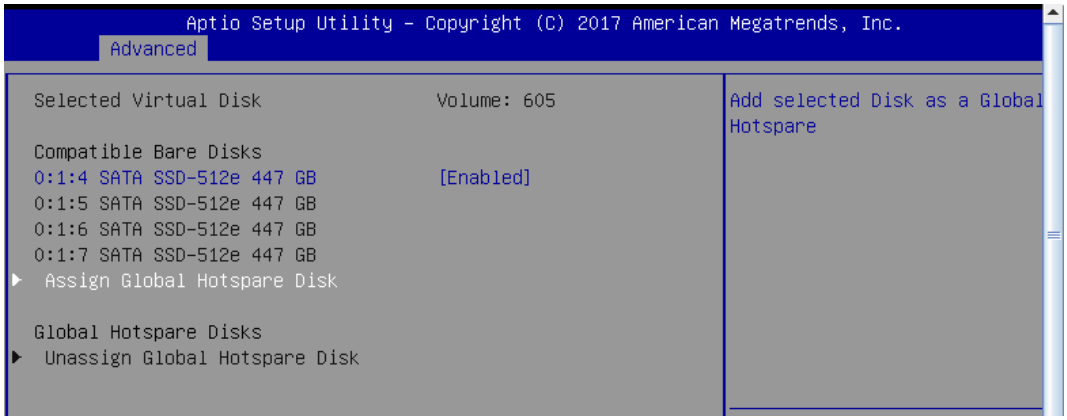
Figure 3-107 Selecting the Drive to be Configured



c. Select **Enabled** in the popup list and press <Enter>.

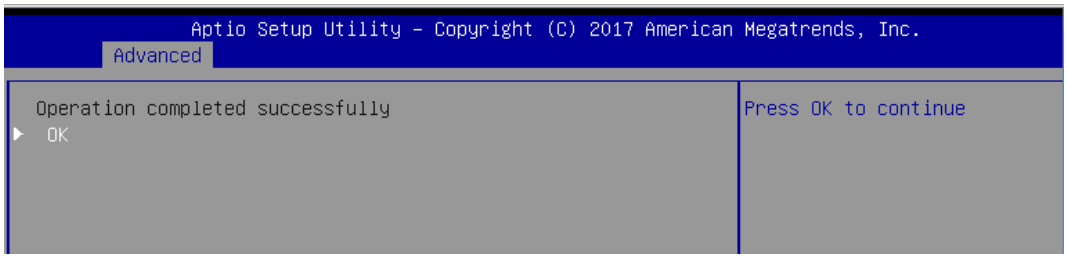
d. Select **Assign Global Hotspare Disk** by pressing <↑> or <↓> and press <Enter>.

Figure 3-108 Selecting Assign Global Hotspare Disk



e. On the popup screen, **Operation completed successfully** appears. Select **OK** and press <Enter>.

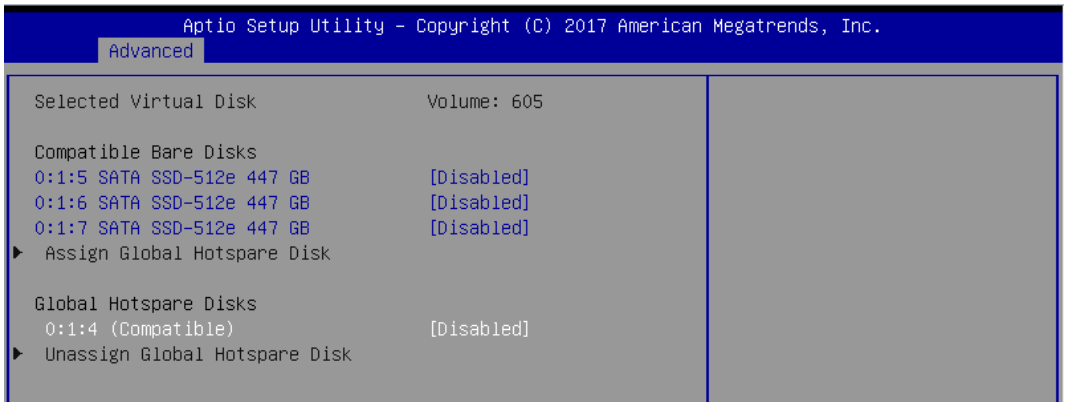
Figure 3-109 Selecting OK



f. Select **Virtual Disk Management** on the main screen and press <Enter>.

g. Select **Manage Virtual Disk Properties** and press <Enter> to enter the **Manage Virtual Disk Properties** screen and check that the HS disk is configured successfully.

Figure 3-110 Manage Virtual Disk Properties Screen



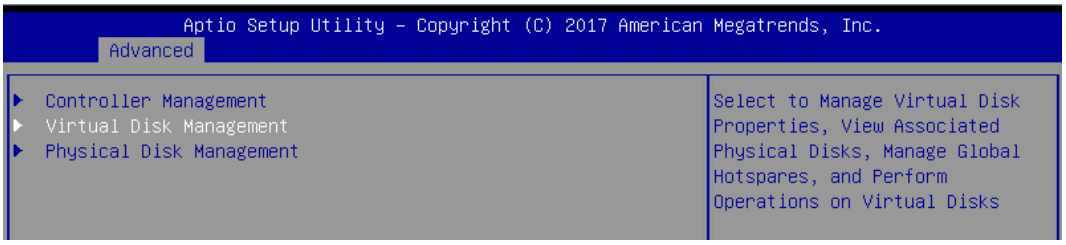
h. The configuration is completed.

2 Deleting HS Drives

Procedures:

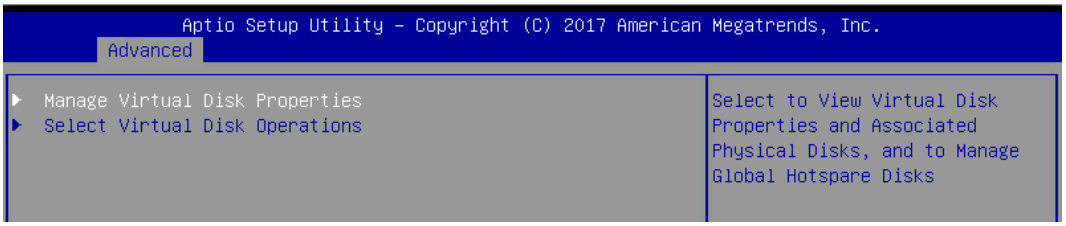
1. Select **Virtual Disk Management** on the main screen and press <Enter>.

Figure 3-111 Selecting Virtual Disk Management



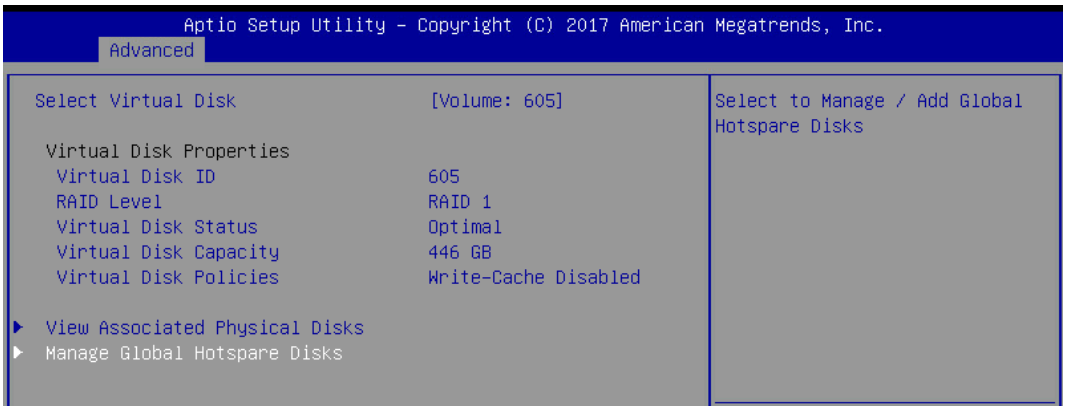
2. Select **Manage Virtual Disk Properties** and press <Enter>.

Figure 3-112 Selecting Manage Virtual Disk Properties



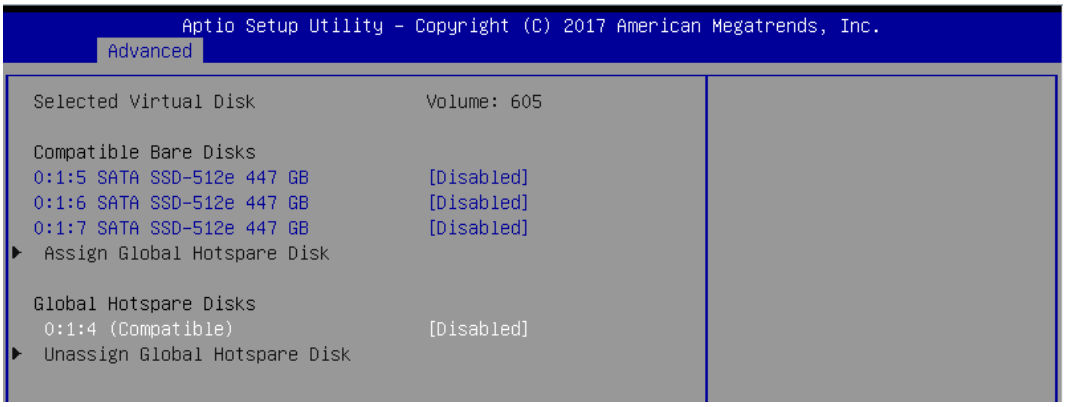
3. Select **Manage Global Hotspare Disks** and press <Enter> to enter the screen for HS disk configuration.

Figure 3-113 Selecting Manage Global Hotspare Disks



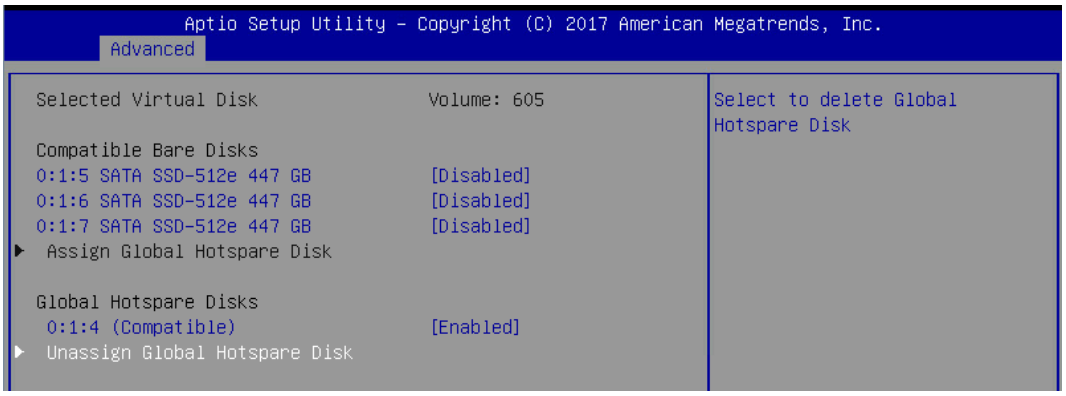
4. Press <↑> or <↓> to select the HS disk to be deleted and press <Enter>.

Figure 3-114 Selecting the HS Drive to Be Deleted



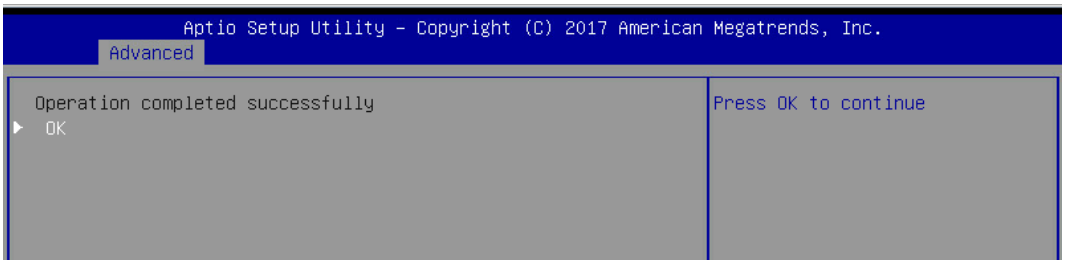
5. Select **Enabled** in the popup list and press <Enter>.
6. Select **Unassign Global Hotspare Disk** by pressing <↑> or <↓> and press <Enter>.

Figure 3-115 Selecting Unassign Global Hotspare Disk



7. After **Operation completed successfully** appears, select **OK** in the popup list and press <Enter>.

Figure 3-116 Selecting OK



8. The configuration is completed.

3 Importing a Foreign Configuration

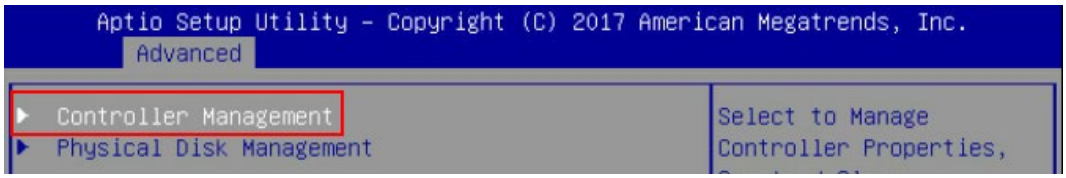
Scenario:

Storage may have been configured for physical disks newly installed in the server. Such foreign configurations can be imported to the current RAID controller card through Web BIOS. After replacing the server RAID controller card, users can import the original configuration into the new RAID controller card.

Procedures:

1. Log in to the management screen.
2. Enter the **Manage Foreign Configuration** screen.
    a. Select **Controller Management** on the main screen and press <Enter>.

Figure 3-117 Selecting Controller Management



b. Select **Manage Foreign Configuration** and press <Enter>.

3. Enter the Manage Foreign Configuration screen to import foreign configuration.

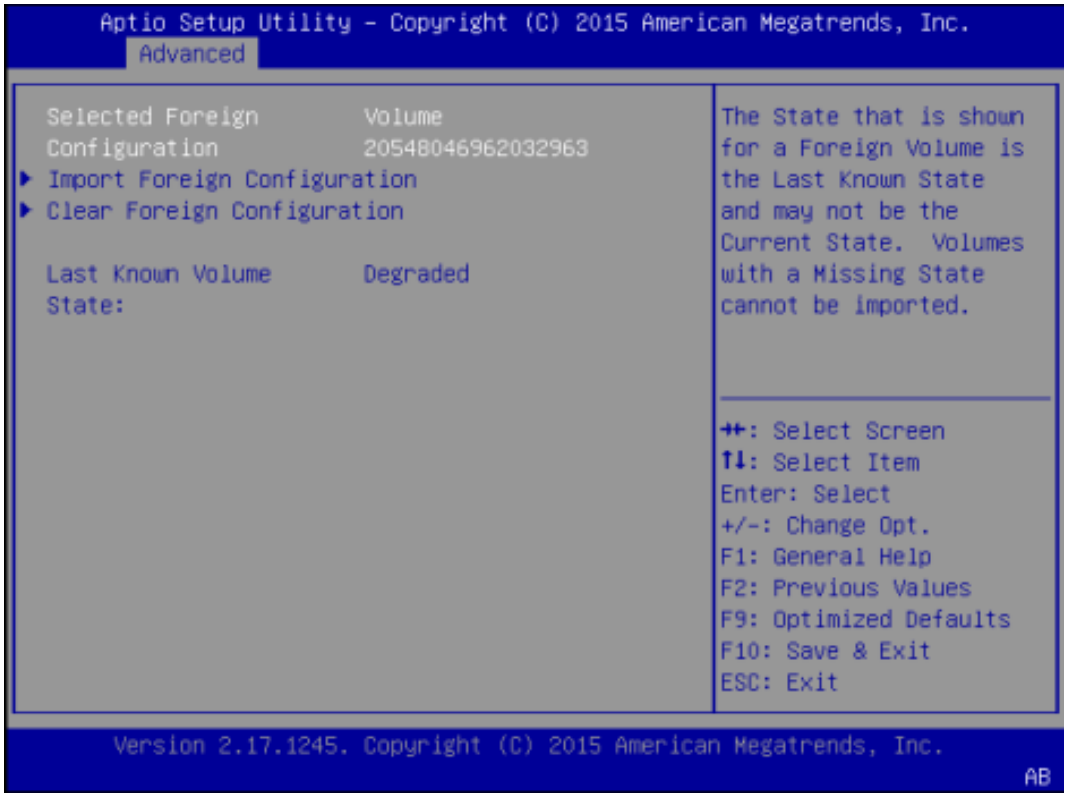
   a. Select Select Foreign Configuration and press <Enter>.

   b. Select the foreign configuration to be imported from the list and press <Enter>.

   c. Select **View Foreign Configuration** and press <Enter>.

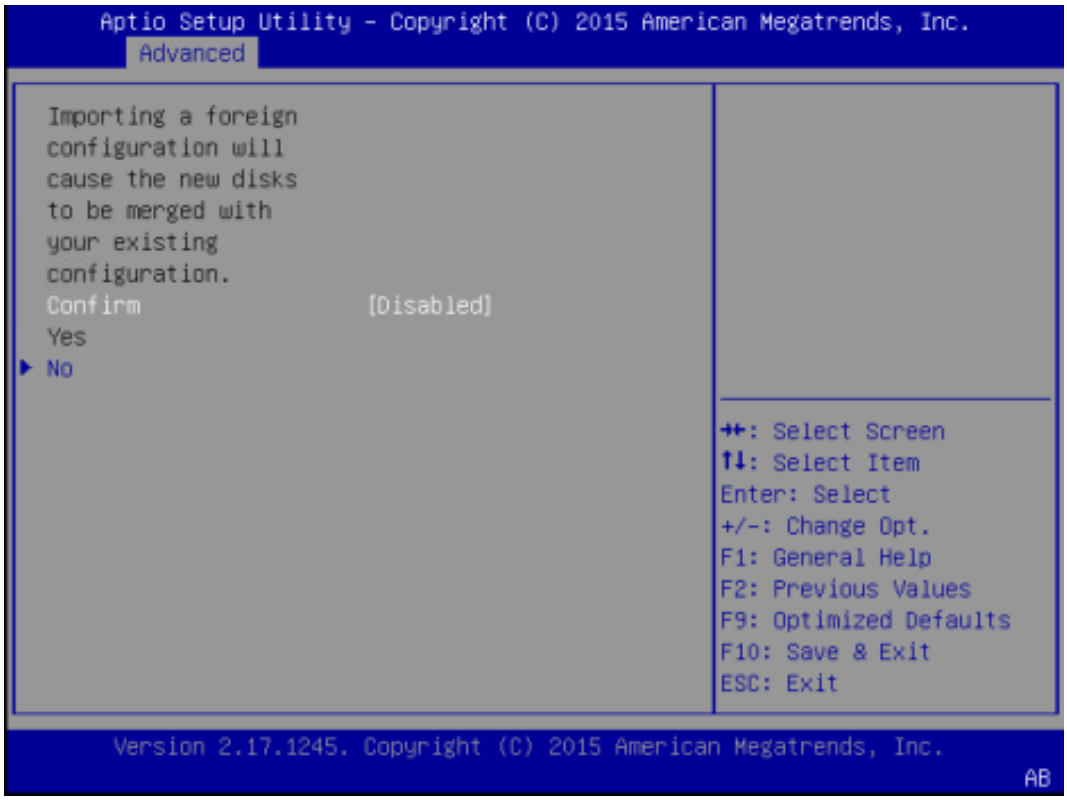
   d. Select **Import Foreign Configuration** and press <Enter>.

Figure 3-118 View Foreign Configuration Screen



e. Enter the operation confirmation screen.

Figure 3-119 Operation Confirmation Screen



f. Press <Enter>, and a confirmation screen will pop up.

g. Select **Enabled** and press <Enter>.

h. Select **Yes** by pressing <↑> or <↓> and press <Enter>. **Operation completed successfully** appears.

i. Press <Enter>.

j. The configuration is completed.

4 Deleting a RAID Array

Scenario:

When the server does not require a RAID array, delete the RAID array to free up the disk space.

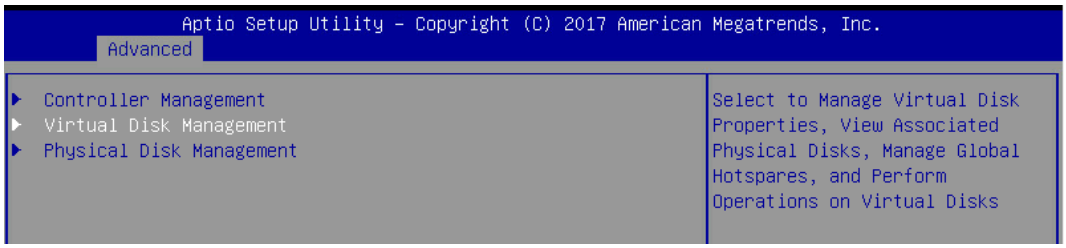
IMPORTANT

The RAID array cannot be restored after being deleted. Please proceed with caution.

Procedures:

1. Log in to the management screen.
2. Enter **Select Virtual Disk Operations** screen.
   a. Select **Virtual Disk Management** on the main screen and press <Enter>.

Figure 3-120 Selecting Virtual Disk Management

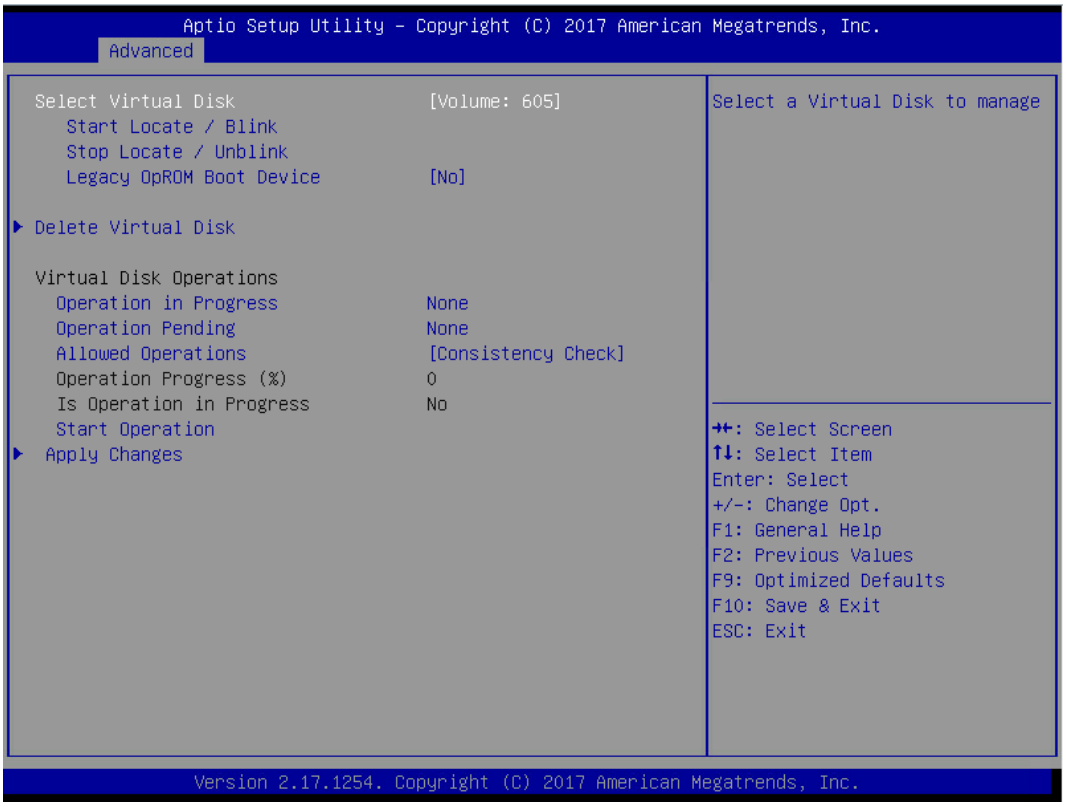


   b. Select **Select Virtual Disk Operations** and press <Enter>.

Figure 3-121 Selecting Select Virtual Disk Operations

3. Delete the specified RAID array.

Figure 3-122 Deleting the Specified RAID Array



a. Select **Select Virtual Disk** and press <Enter>.

b. Select the RAID array to be deleted in the list and press <Enter>.

c. Select **Delete Virtual Disk** by pressing <↑> or <↓> and press <Enter>.

d. Enter the operation confirmation screen.

e. Select **Confirm** by pressing <↑> and <↓> and press <Enter>.

f. Select **Yes** by pressing <↑> or <↓> and press <Enter>.

g. After **Operation completed successfully** appears, select **OK** and press <Enter>.

h. The configuration is completed.

4 How to Install Inspur SAS RAID Controller Card Driver

This chapter guides you on how to load Inspur SAS RAID controller card drivers during Windows, Red Hat Linux and SUSE Linux installation. The method is also applicable to Broadcom 9300 and 9305 series.

4.1 Loading Driver during Windows Installation

This section demonstrates with Windows Server 2008 R2 OS to guide you on how to load the driver during Windows OS installation.

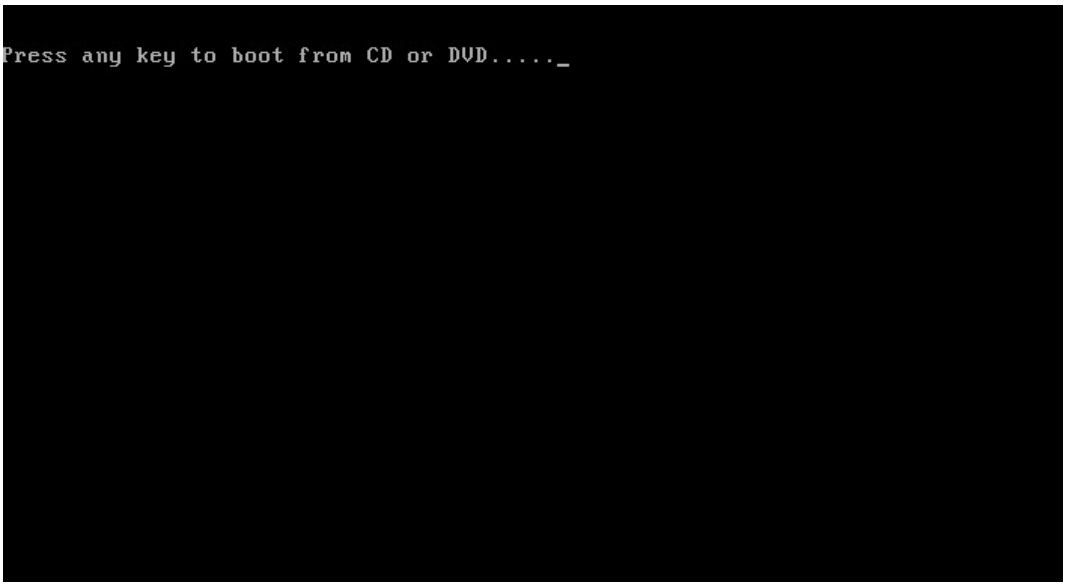
Scenario:

The driver needs to be loaded during Windows OS installation.

Procedures:

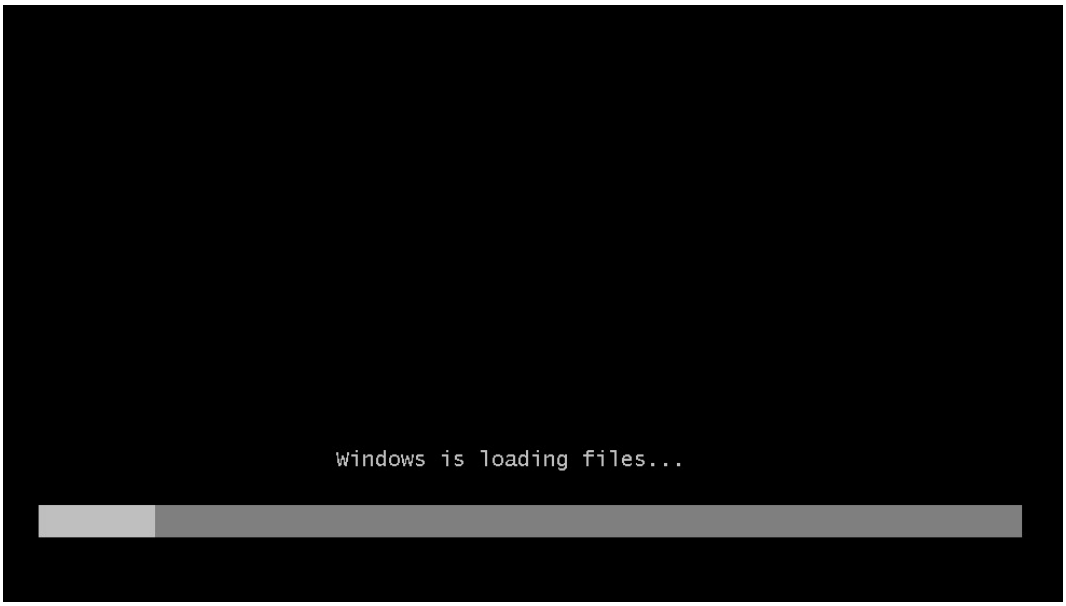
1. Copy the RAID controller driver from the driver disk to a USB flash drive.
2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.
3. When **Press any key to boot from CD or DVD...** appears on the screen, press any key to continue, as shown below.

Figure 4-1 Pressing Any Key to Boot from CD or DVD



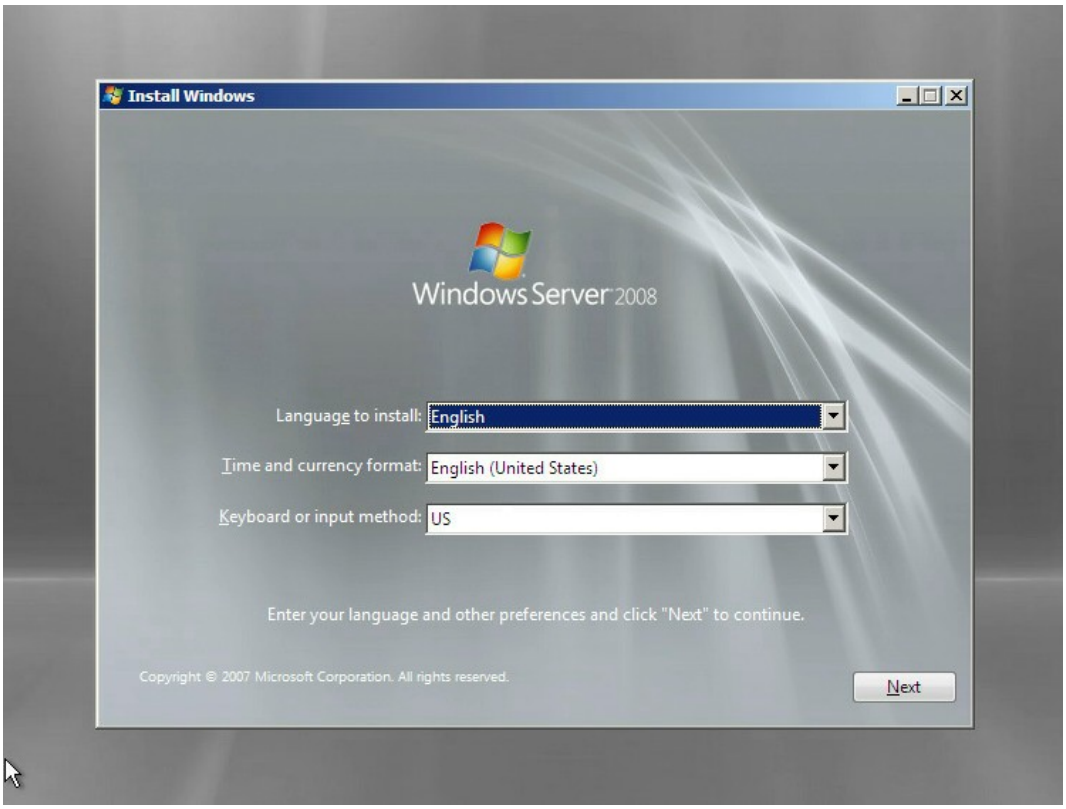
4. The prompt **Windows is loading files...** indicates the system files are being loaded, as shown below.

Figure 4-2 Loading Files



5. When **Install Windows** screen appears, configure **Language to install**, **Time and currency format** and **Keyboard or input method**, and click **Next**, as shown below.

Figure 4-3 Install Windows Screen

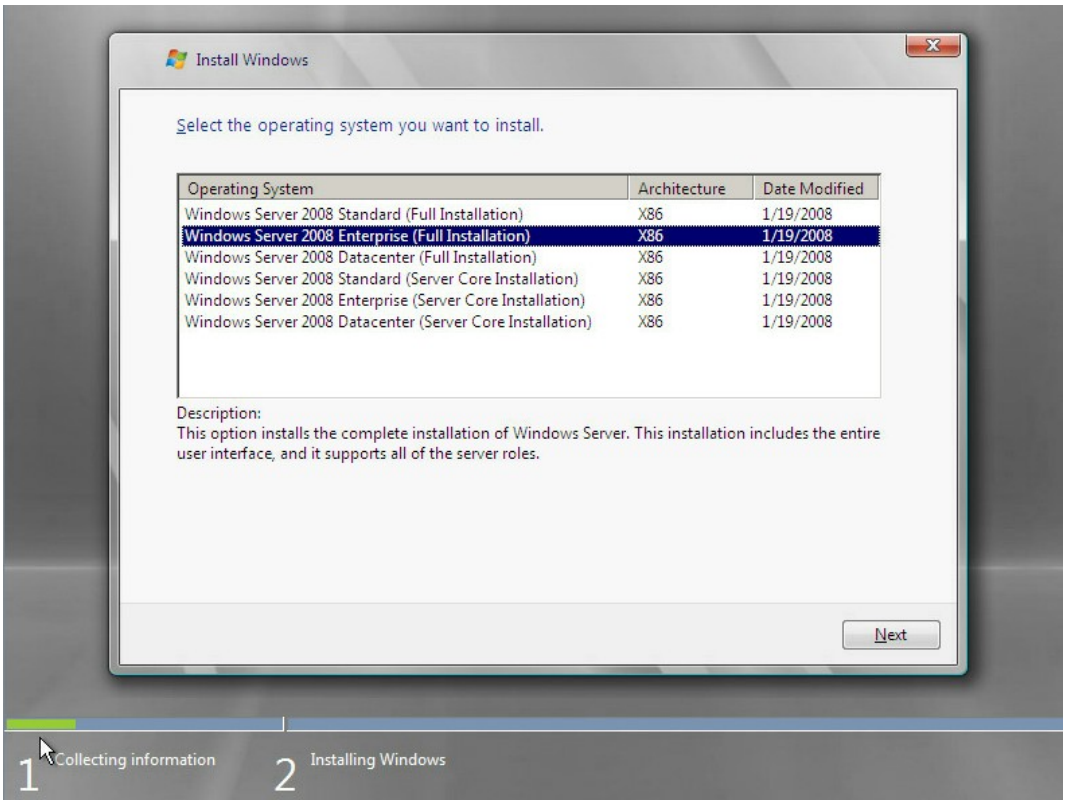


6. Click **Install now** to install immediately, as shown below.

Figure 4-4 Clicking Install Now

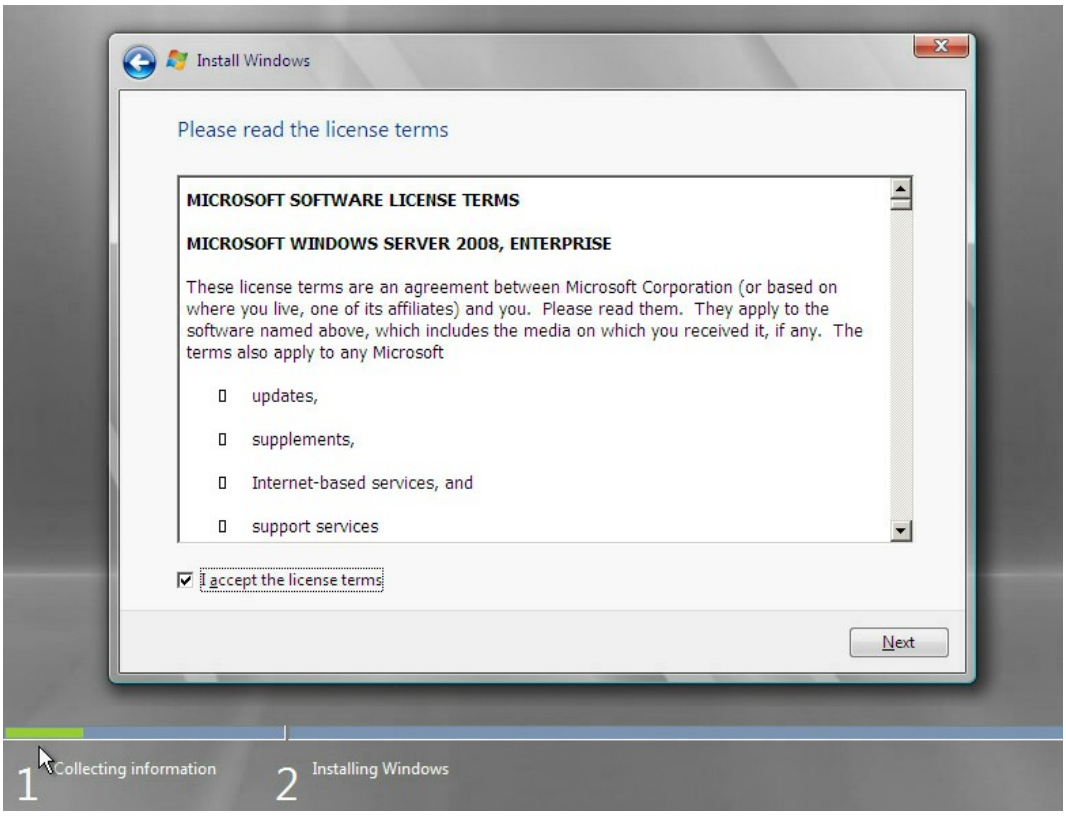
7. Select the OS version to be installed. This section demonstrates with Windows Server 2008 Enterprise (Full Installation), as shown below.

Figure 4-5 Selecting the Operating System Version



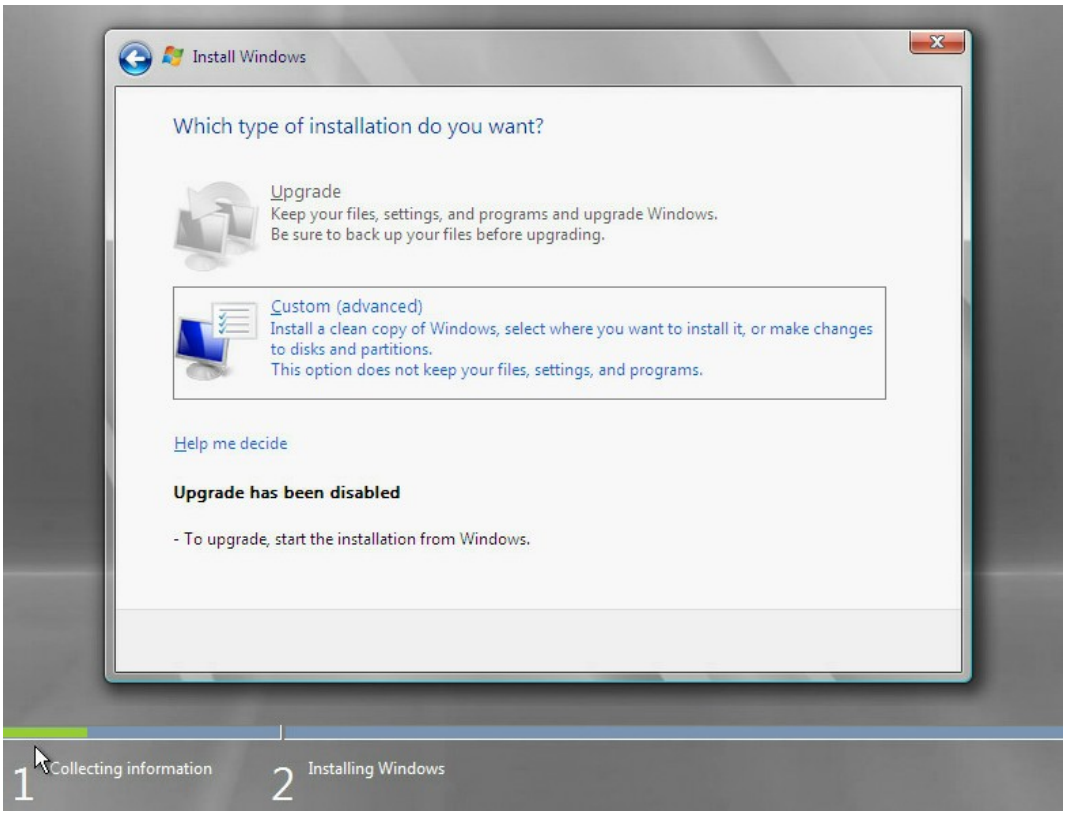
8. Check **I accept the license terms** and click **Next**, as shown below.

Figure 4-6 Checking I Accept the License Terms



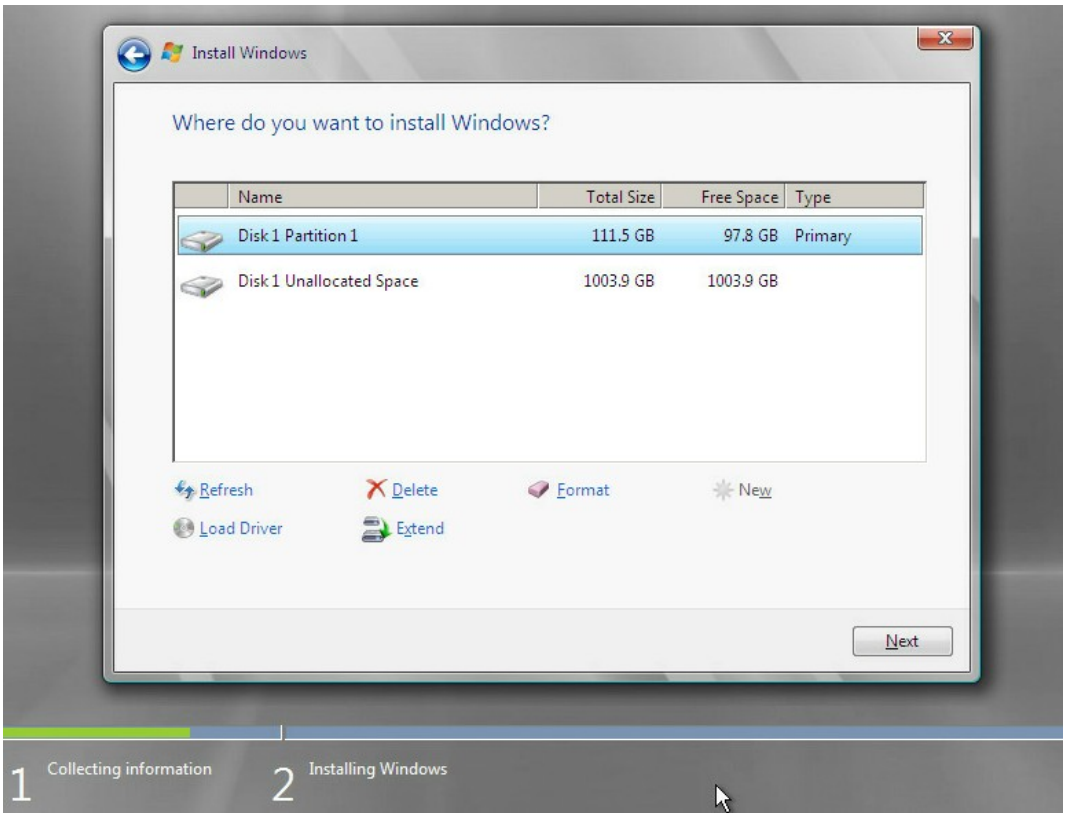
9. Select **Custom (advanced)** and press <Enter>, as shown below.

Figure 4-7 Selecting Custom (advanced)



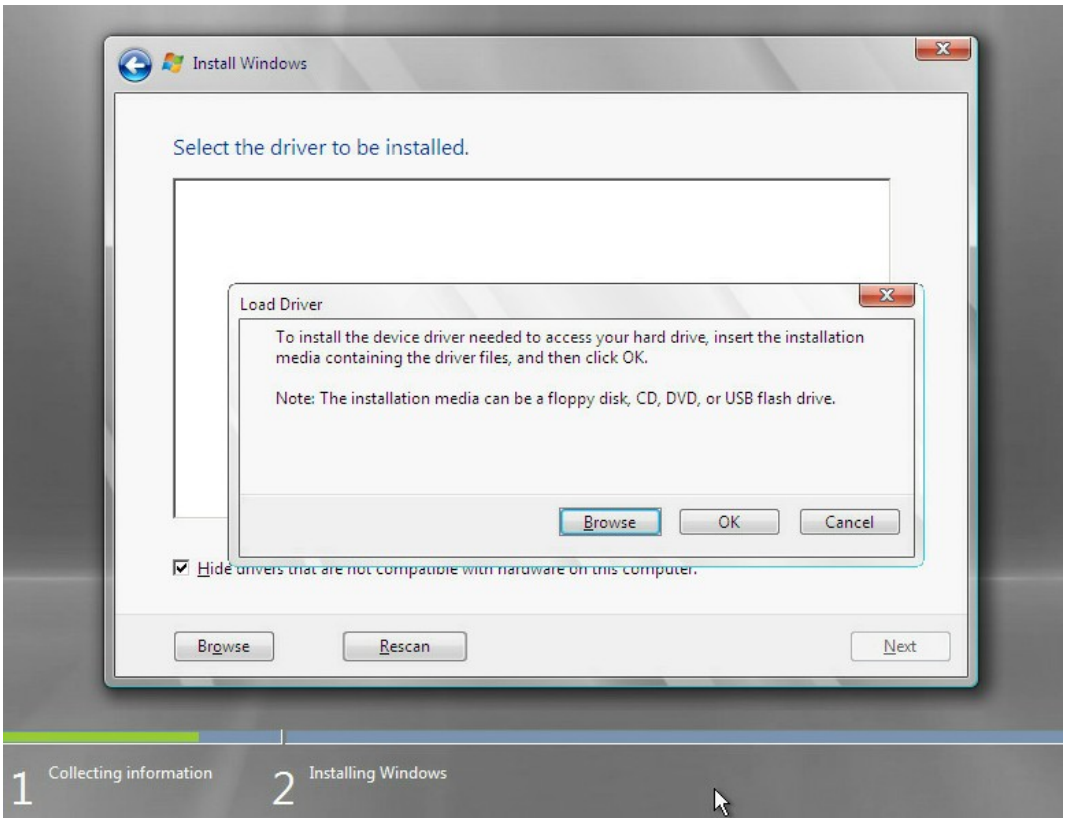
10. On the screen shown, select **Load Driver** and press <Enter>.

Figure 4-8 Selecting Load Driver



11. On the screen shown, click **Browse** and press <Enter>.

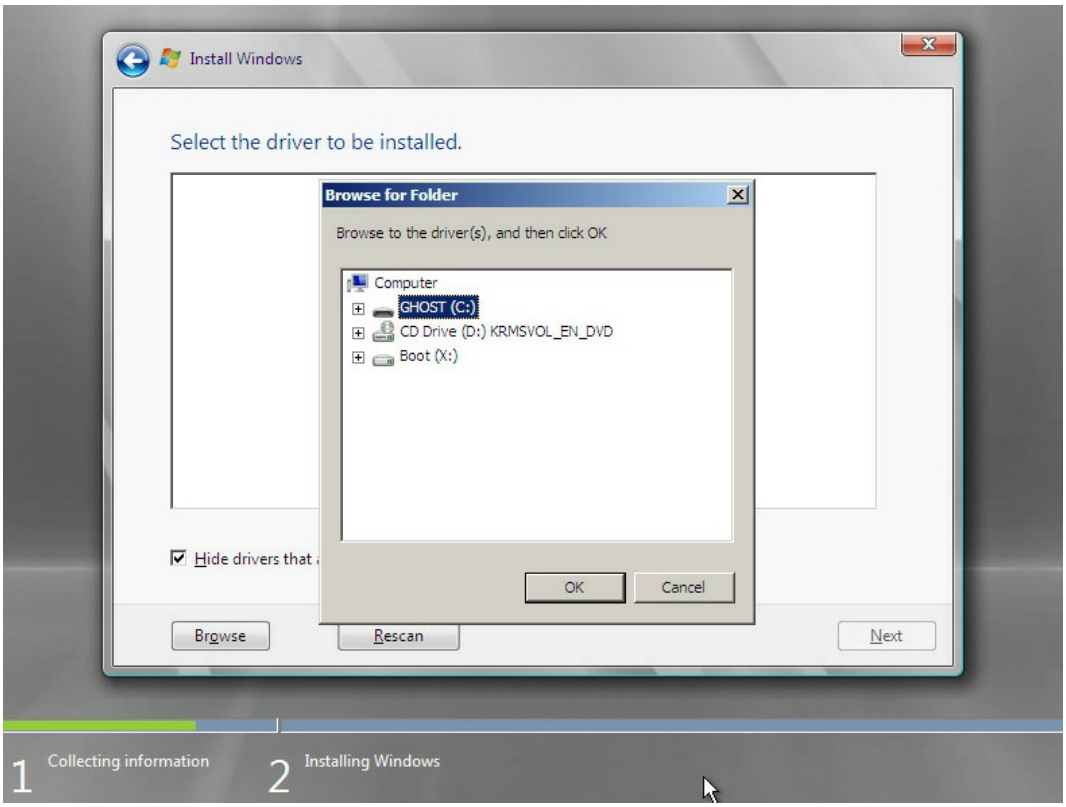
Figure 4-9 Clicking Browse



To install the driver:

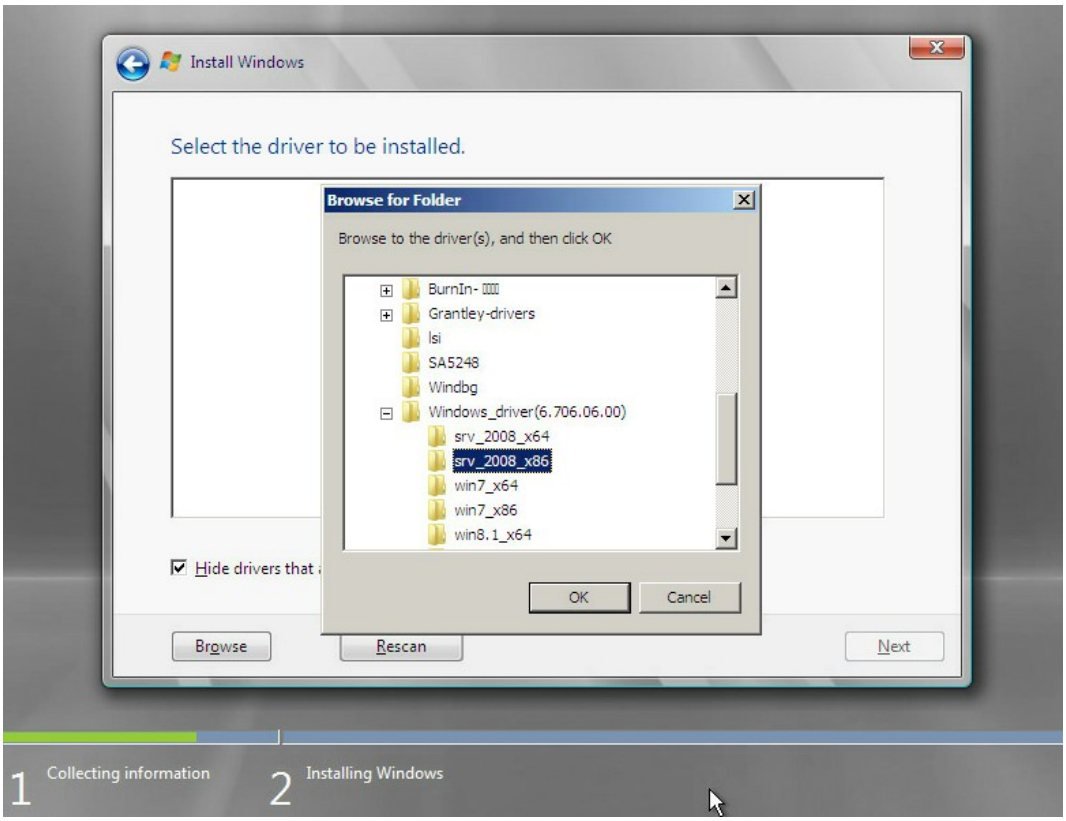
1. Select **GHOST (C:)**, as shown below.

Figure 4-10 Selecting GHOST (C:)



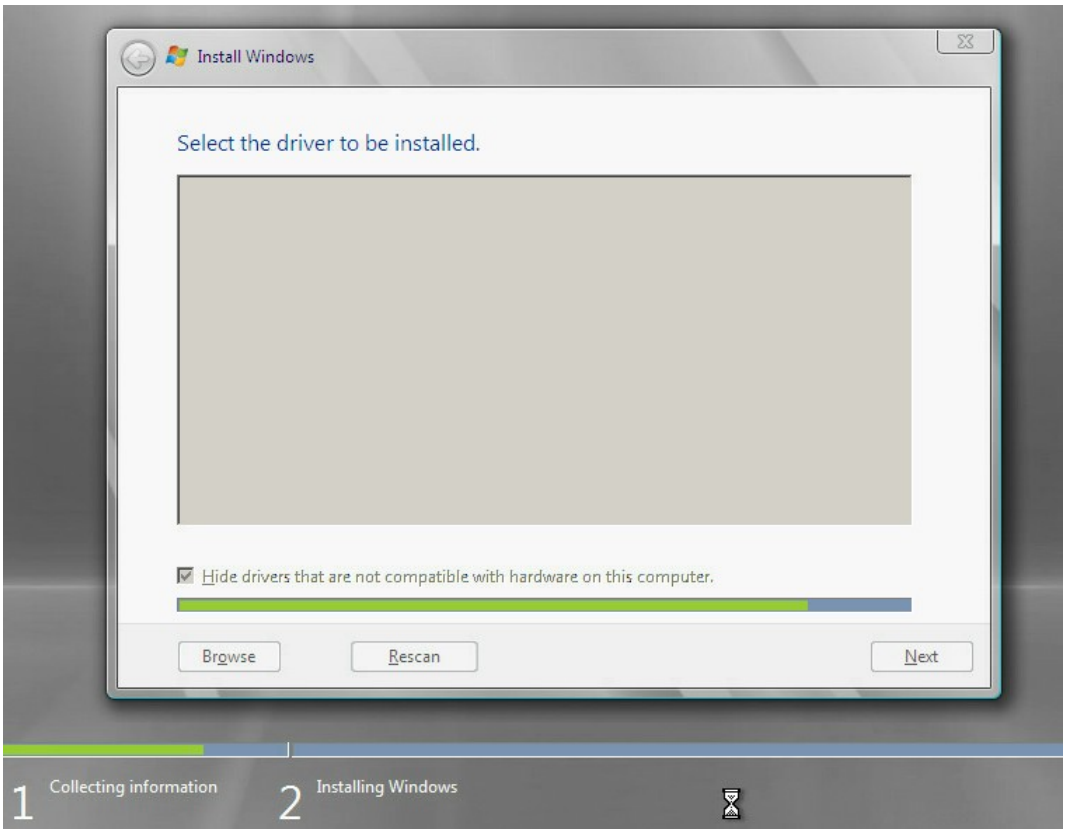
2. Scroll down to find the folder **srv_2008_x86** and click **OK** to load the RAID controller driver, as shown below.

Figure 4-11 Selecting the Driver



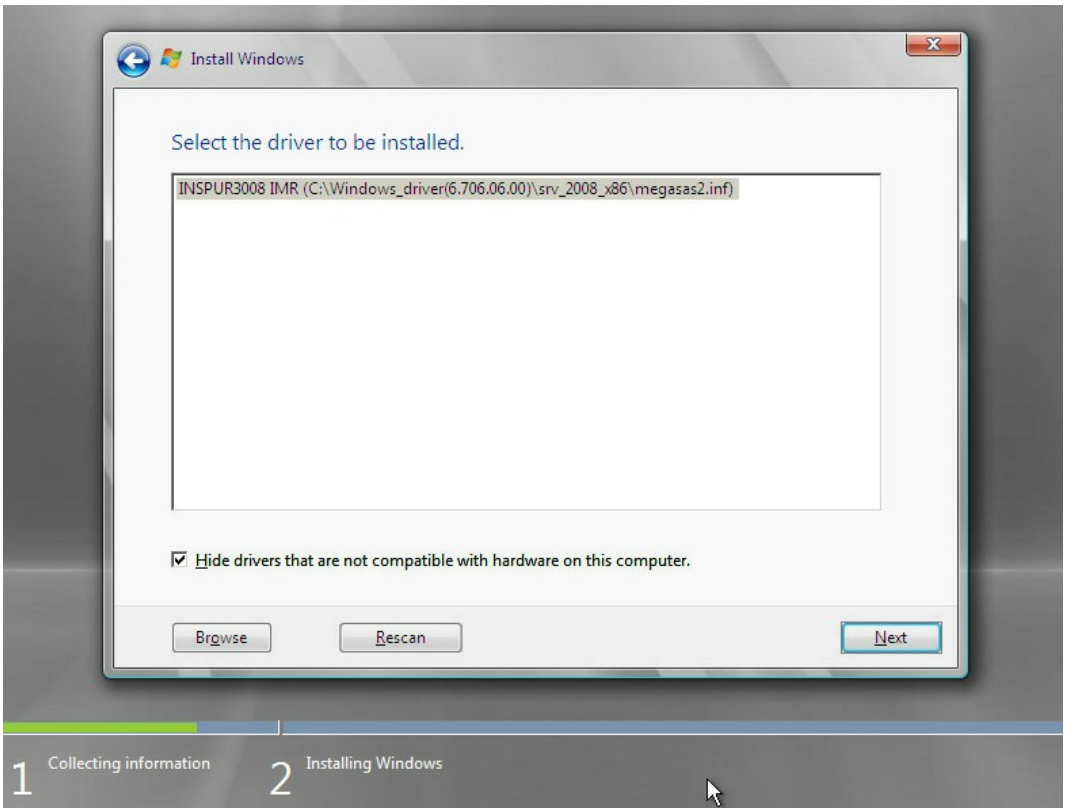
3. The system starts loading the driver, as shown below. Please wait patiently.

Figure 4-12 Loading the Driver



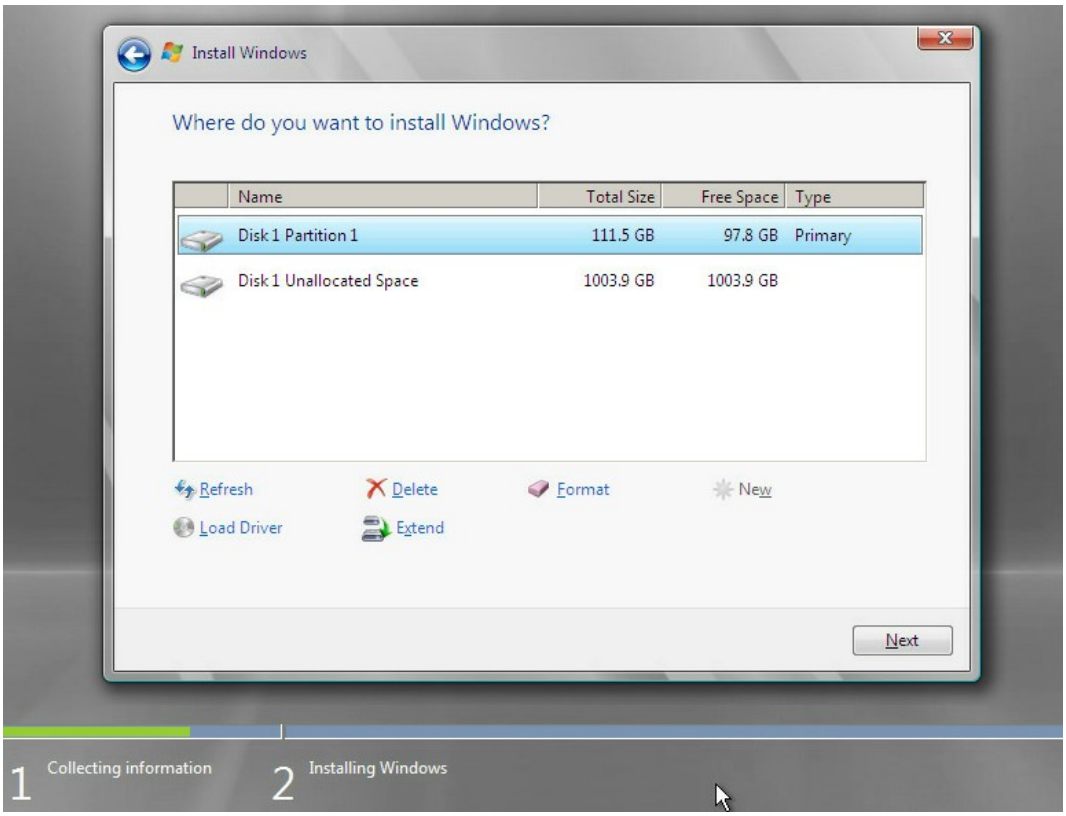
4. On the screen shown, click **Next**.

Figure 4-13 Clicking Next



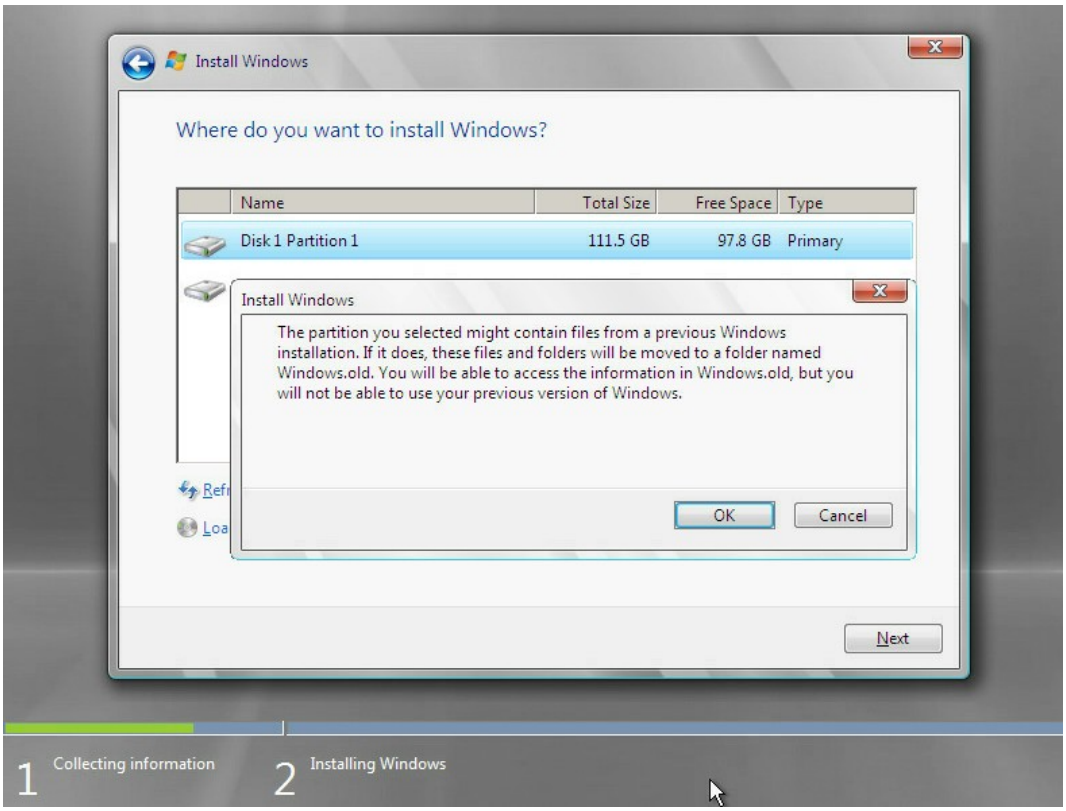
5. After the driver is loaded, the system returns to the screen below. Select a system partition and click **Next**. If there is no partition, click **New** to create one.

Figure 4-14 Selecting a System Partition



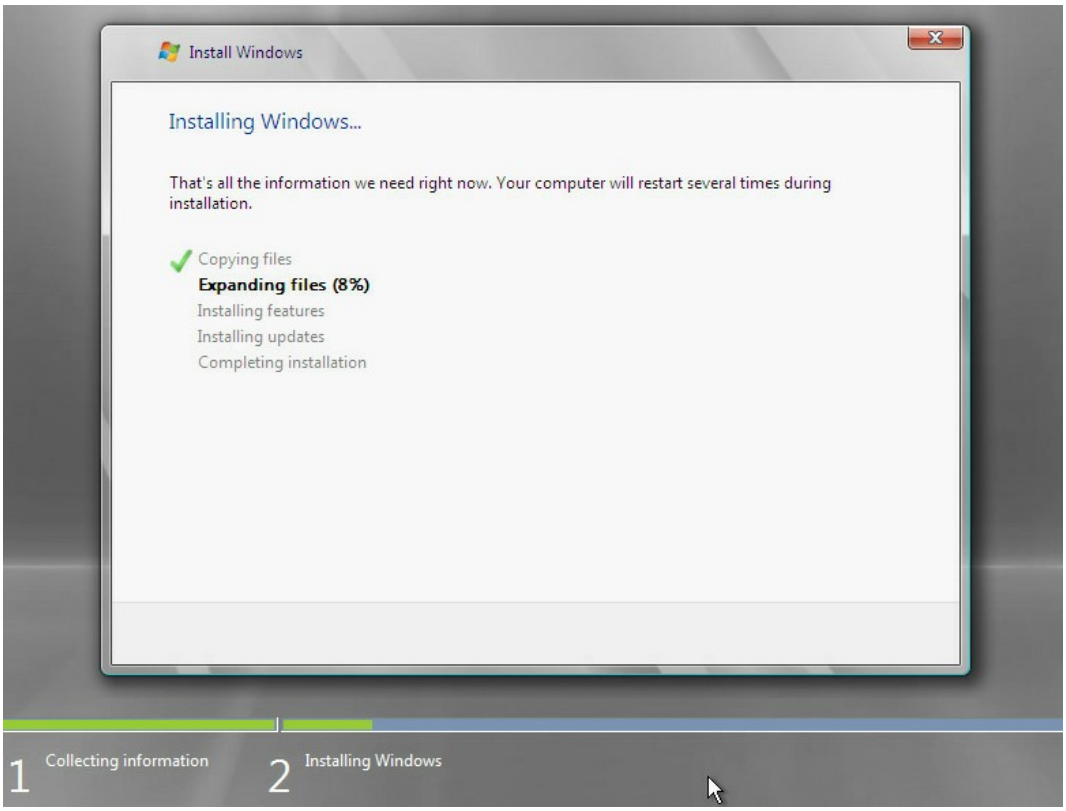
6. Click **OK** to enter the OS installation screen, as shown below.

Figure 4-15 Clicking OK



7. As shown below, the screen prompts **Installing Windows**. Your computer will restart several times during installation. Please do not perform any operation until the installation is completed.

Figure 4-16 Installing Windows

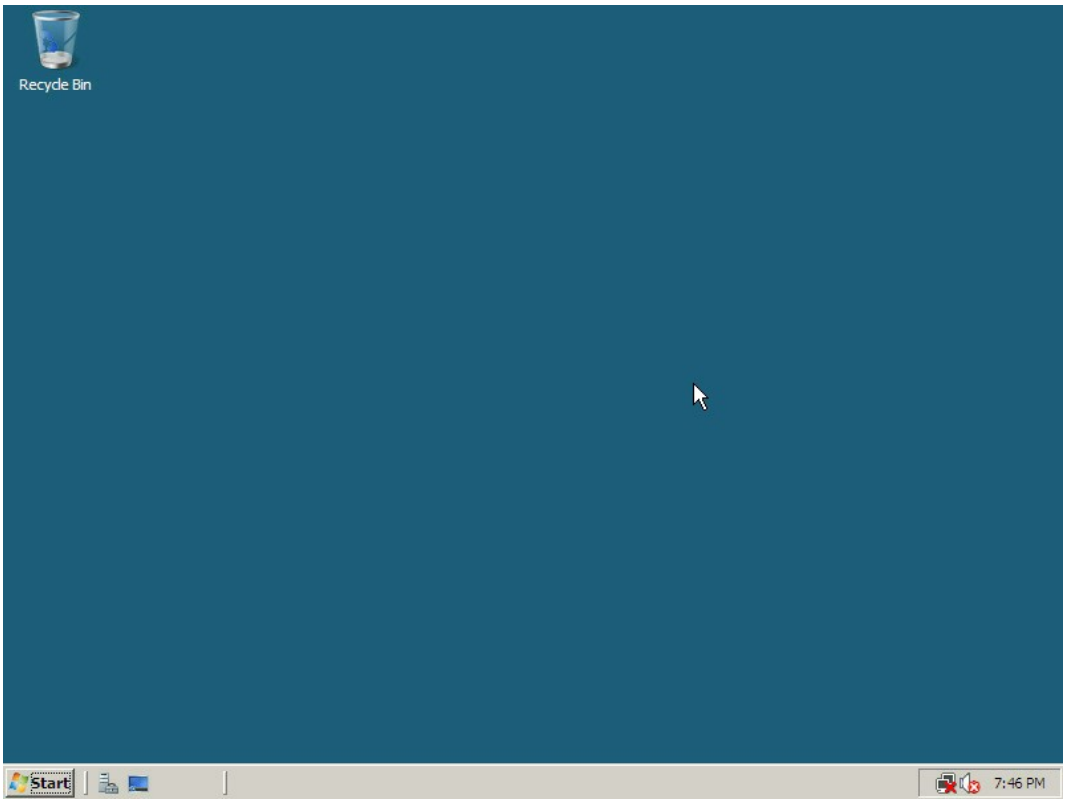


8. Create an administrator password and press <Enter> to enter the OS.

Figure 4-17 Creating an Administrator Password

9. When the Windows Server 2008 desktop appears, Windows installation is completed.

Figure 4-18 Desktop



4.2 Loading Driver during Red Hat Linux Installation

This section demonstrates with Red Hat 6.2 OS to guide you on how to load the driver during Red Hat OS installation.

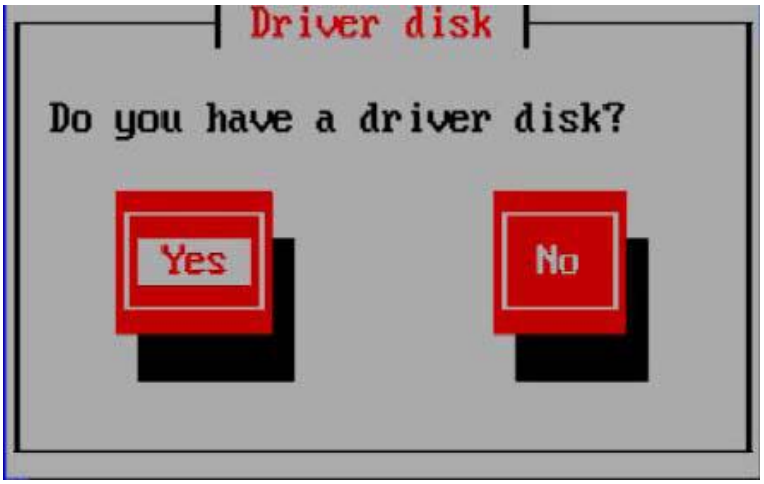
Scenario:

The driver needs to be loaded during Red Hat OS installation.

Procedures:

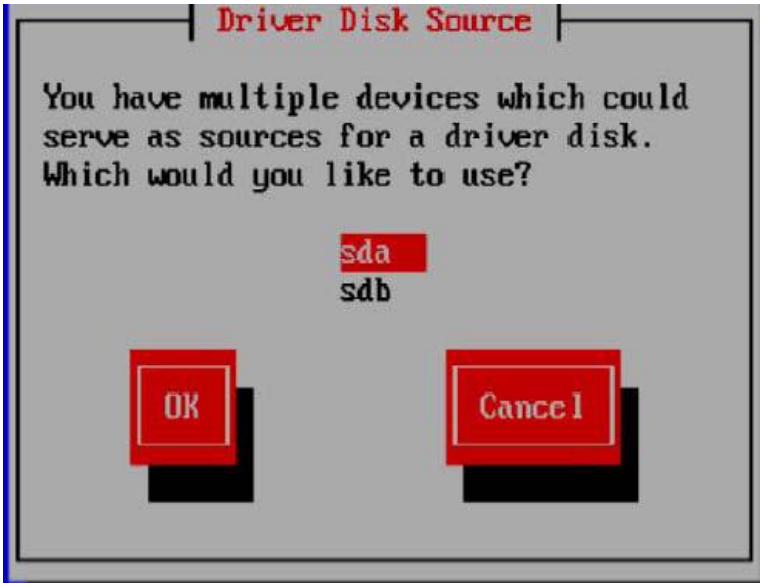
1. Copy the RAID controller driver to be loaded from the driver disk to the common partition of a USB flash drive.
2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.
3. When **boot:** appears, type **linux dd** and press <Enter> to load the driver.
4. When the screen prompts **Do you have a driver disk?**, select **Yes** and press <Enter> to continue the loading.

Figure 4-19 Driver Disk Availability Confirmation



5. The system prompts you to select a driver disk source. Select **sda** and then **OK**.

Figure 4-20 Selecting a Driver Disk Source



6. In the popup window, select **/dev/sda1** and then **OK**.

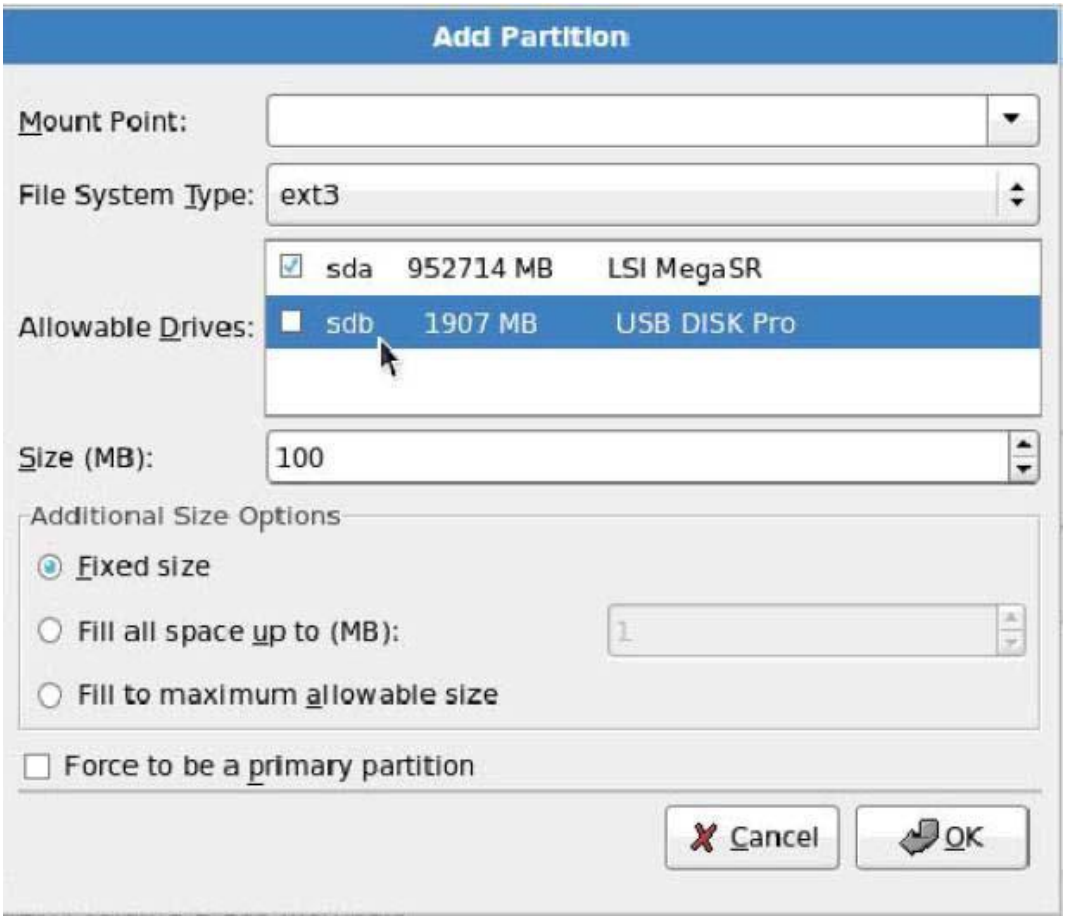
Figure 4-21 Selecting a Partition

7. If there are multiple files in the USB flash drive, a driver selection screen will pop up. Select the desired driver file and then **OK**. Press <Enter> to load the driver. After loading, the following window will pop up, prompting **Do you wish to load any more driver disks?**.

Figure 4-22 Prompt on to Load More Driver Disks

8. If you want to load more drivers, select **Yes** and follow the procedures above. Otherwise, select **No**, and follow the prompts to install Red Hat Linux OS. In the figure below, **sdb 1907MB USB DISK Pro** refers to the USB flash drive, which needs to be unchecked when you create a driver partition.

Figure 4-23 Creating a Partition



9. During partition creation for Red Hat Linux 6.x (x indicates 1, 2, 3, 4, 5, 6), the USB flash drive will be detected automatically. Uncheck the box in front of the USB flash drive so as not to create partitions on it.

4.3 Loading Driver during SUSE Linux Installation

This section demonstrates with SUSE 11.2 OS to guide you on how to load the driver during SUSE Linux installation.

Scenario:

The driver needs to be loaded during SUSE OS installation.

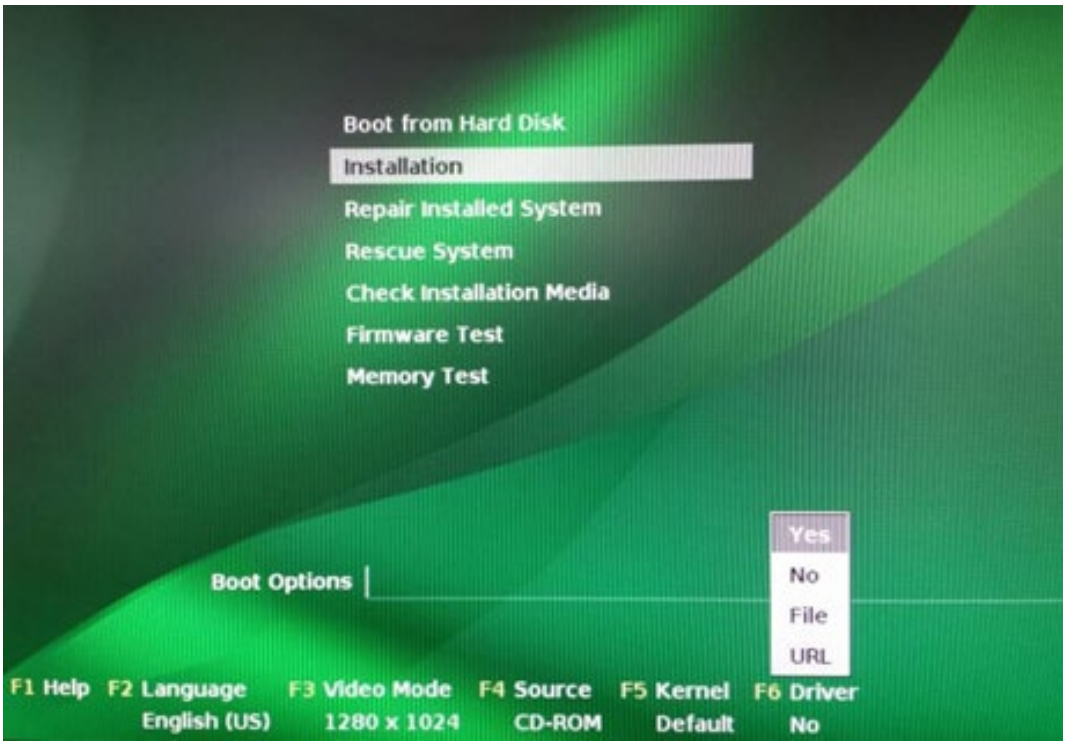
Procedures:

1. Copy the RAID controller driver to be loaded from the driver disk to the common partition of a USB flash drive.

2. Connect the USB flash drive to the USB port of the server, power on the server, and put the OS setup CD into the DVD/CD-ROM drive. Go to BIOS for setup to boot the system from the CD.

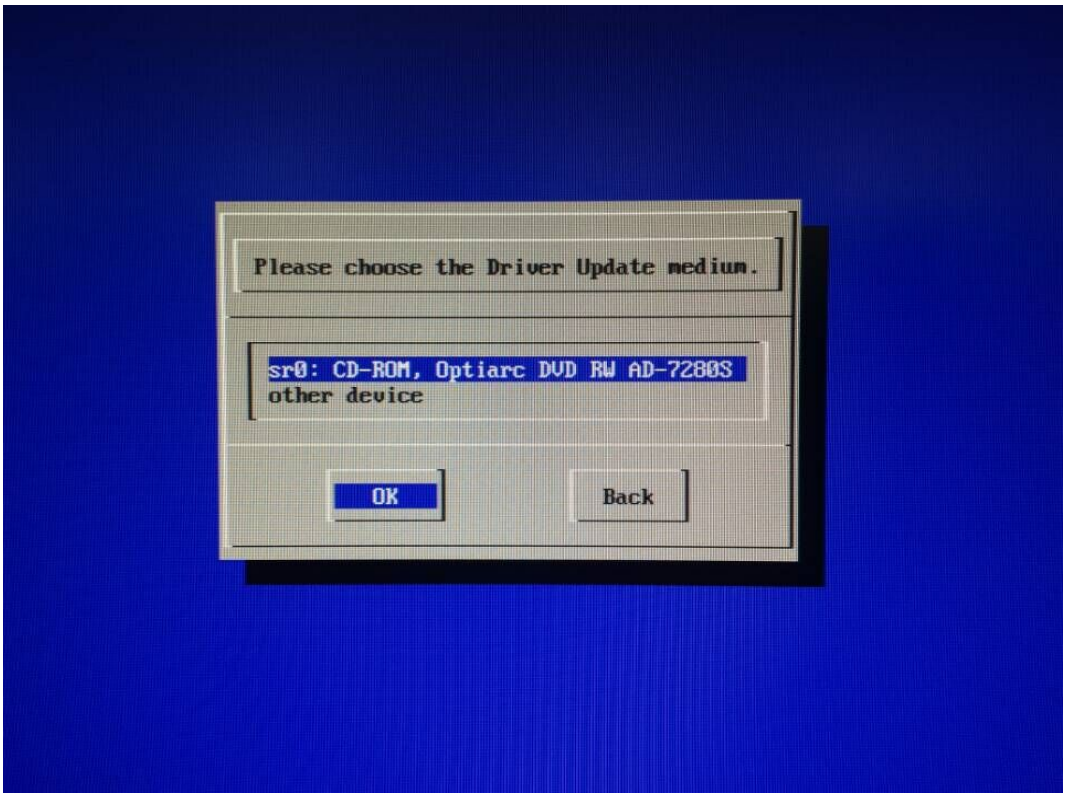
3. On the **Boot Options** screen, press <F6>. A window will pop up. Select **Yes** and press <Enter>. Select **Installation** and press <Enter> to load the driver. This may take a few minutes.

Figure 4-24 Selecting Installation



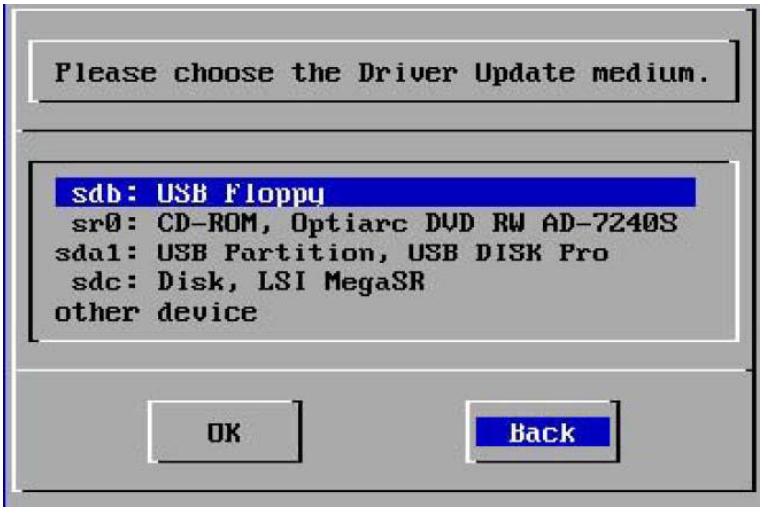
4. The driver loading screen appears, as shown below.

Figure 4-25 Driver Loading Screen



5. After the driver is loaded, the name of the loaded driver will be displayed. Select **OK** to continue.
6. The following screen is displayed.

Figure 4-26 Selecting the Driver Update Medium



7. Since the driver has been loaded automatically, select **Back** to continue.

8. Follow the prompts to install SUSE Linux OS.

IMPORTANT

During custom partitioning, distinguish between a hard disk and a USB flash drive. Do not partition, delete or format a USB flash drive.

4.4 Loading Driver during VMware Installation

Use a tool to merge the driver file (.vib) with the image file to generate a new installation image, and install the OS with the new image.

Note that you can directly install VMware 7 OS that already come with Inbox drivers.

5 How to Obtain Help

If a tough or critical problem persists in troubleshooting or routine maintenance, contact Inspur for technical support.

5.1 Preparations Before Contacting Inspur

To better solve the problem, we suggest you collect troubleshooting information and make debugging preparations before contacting Inspur.

5.1.1 Collecting Troubleshooting Information

You need to collect necessary information before troubleshooting, including:

- Name and address of the customer
- Contact person and telephone number
- Time when the fault occurred
- Fault description
- Device type and software version
- Measures taken after the fault occurred and the related results
- Troubleshooting level and required solution deadline

5.1.2 Making Preparations for Debugging

When you contact Inspur for help, our technical support engineer might assist you to do certain operations to collect information about the fault or rectify the fault directly.

Before contacting Inspur for help, you need to prepare the boards, port modules, screwdrivers, screws, cables for serial ports, network cables, and other required materials.

5.2 How to Use Documents

Inspur provides comprehensive guidance documents shipped with the devices to assist users in solving common problems encountered in troubleshooting or routine maintenance.

To better solve the problems, use the documents before you contact Inspur for technical support.

5.3 How to Contact Us

Go to Inspur official website https://en.inspur.com/, click **Support** > **Support Center** > **Warranty & Configuration** to learn about the product warranty service policy, including service offering, warranty period, service type, response time and disclaimer. You can also call Inspur at 1-844-860-0011/1-760-769-1847 to consult by providing product model or product serial number.

6 Appendix

6.1 Appendix A: Glossary

B

Backplane	A circuit board that connects devices in parallel with each other. It provides connectors for slots to support power distribution, management, and auxiliary signal connection. The slot ports are connected by high-speed twisted pairs.
BIOS	Basic input/output system

H

HDD	Hard disk drive
Hot-swap	In a running system, inserting or removing a board does not affect normal running of the system.

I

IOPS	Input/output operations per second (IOPS) refers to the maximum number of I/O operations the system can perform per second, which is the most important performance measurement to characterize the storage system.

P

PCIe	Short for PCI Express. It is a new bus standard adopting peer-to-peer and bidirectional interconnection technology to replace PCI and AGP interface specifications. It supports serial data transmission rather than parallel data transmission of PCI or AGP. With PCIe, the data transmission speed between devices can be improved greatly.

R

RAID	A technology that combines multiple independent hard

	disks (physical hard disks) in different ways to form a group of hard disks (logical hard disks), thus providing higher storage performance than a single hard disk and providing data backup.
Redundancy	The ability of a system to keep functioning normally in the event of a device failure, by automatically having a backup device replace the faulty one.

S

SAS	Short for Serial Attached SCSI. It is a computer bus technology for data transmission between various devices, such as hard disks and DVD/CD-ROM drives.
SATA	Serial advanced technology attachment
SSD	A solid state disk (SSD) is a hard disk made with a solid-state electronic storage chip array, and is composed of a control unit and storage unit (FLASH chip). The specifications and definitions, functions and usage of the interface of the solid state disk are exactly the same as those of the hard disk drive.