Configure Boot from iSCSI with Intel X710T2LG Adapter on UCS C-Series Server

Contents

Introduction

This document describes how to configure boot from iSCSI using an Intel® X710T2LG 2x10 GbE RJ45 OCP 3.0 NIC Adapter and a UCS C225 M6 server.

Prerequisites

Cisco recommends that you have knowledge of these topics:

- Cisco Integrated Management Controller (CIMC)® IP address configured.
- Basic knowledge on Internet Small Computer System Interface (iSCSI) configuration.
- Physical connectivity from the network adapter to the switch.
- Storage configuration parameters:
    - LUN ID
    - Port
    - Initiator IQN
    - Target IQN
    - Initiator IP address
    - Target IP address
    - CHAP authentication information (if required)

Components Used

The information in this document is based on these software and hardware versions:

- Intel® X710T2LG 2x10 GbE RJ45 OCP 3.0 NIC Adapter
- Cisco® UCS C225 M6 server
- Microsoft® Windows® Server 2022 with iSCSI services enabled.
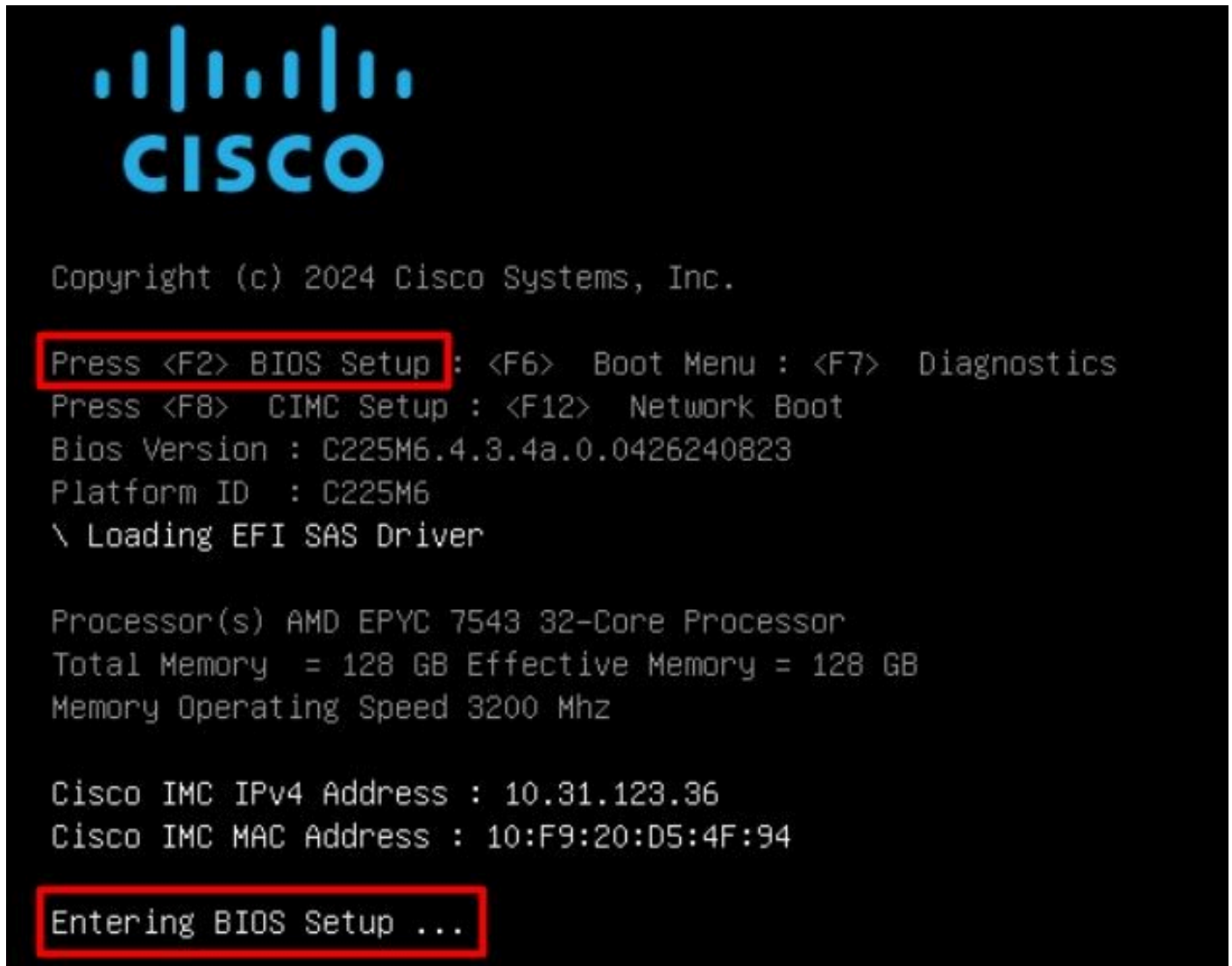- Cisco® Catalyst 3560 switch

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information

Previously, it was required to execute the Intel® Ethernet iSCSI Boot Flash Utility to configure the iSCSI settings. Now, the new Intel® adapters, have iSCSI configuration option available, directly on the server BIOS.

Configuration Steps

Step 1. **Power On**, or reboot the server. During the booting process, press **F2** to access the server BIOS.
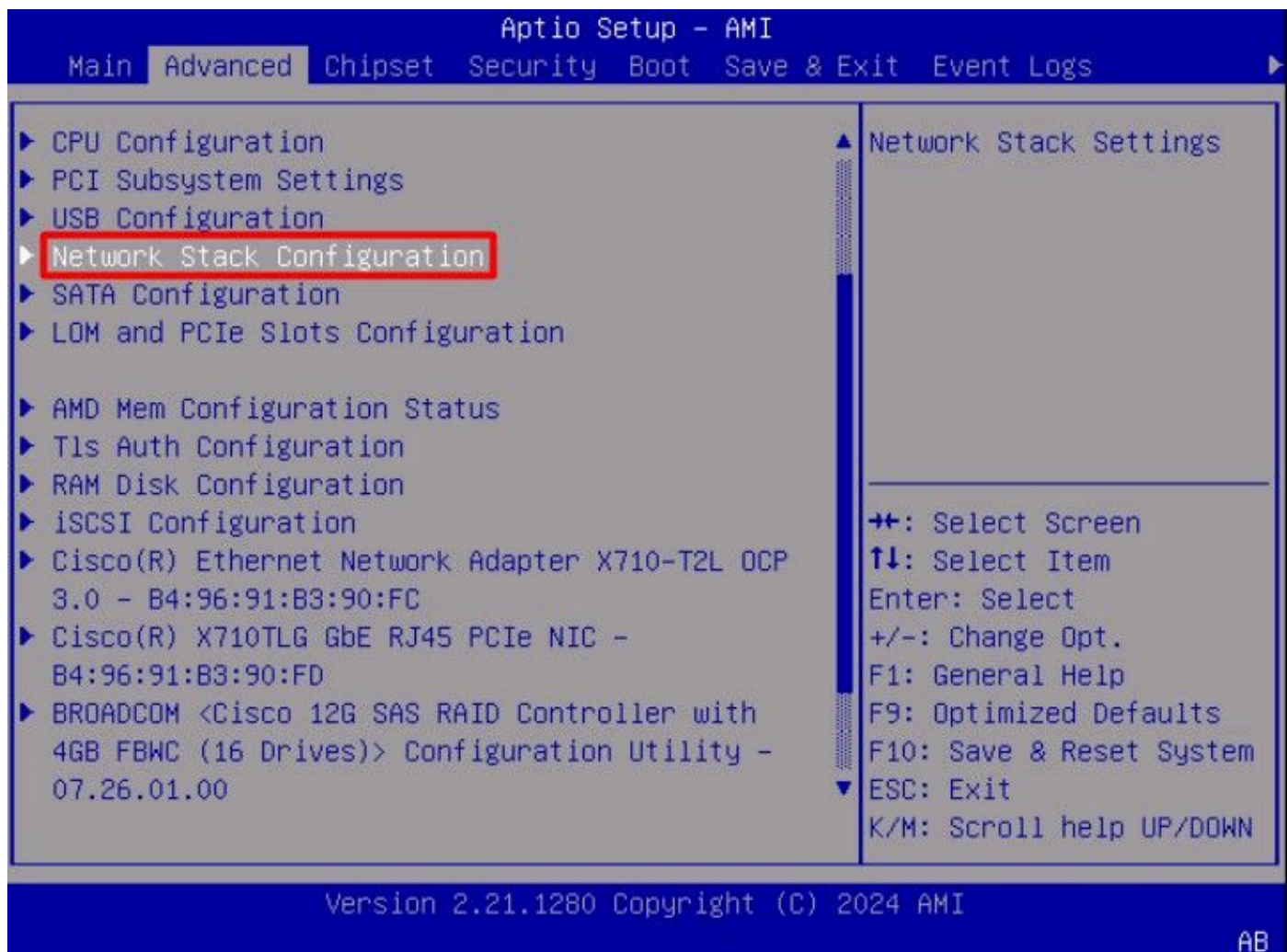

Step 2. In the server BIOS, select the **Network Stack Configuration** option:

```
                      Aptio Setup - AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit  Event Logs         ►

 ▶ CPU Configuration                         ▲  Network Stack Settings
 ▶ PCI Subsystem Settings
 ▶ USB Configuration
 ▶ Network Stack Configuration
 ▶ SATA Configuration
 ▶ LOM and PCIe Slots Configuration

 ▶ AMD Mem Configuration Status
 ▶ Tls Auth Configuration
 ▶ RAM Disk Configuration                       ──────────────────────────
 ▶ iSCSI Configuration                          ➜←: Select Screen
 ▶ Cisco(R) Ethernet Network Adapter X710-T2L OCP  ↑↓: Select Item
   3.0 - B4:96:91:B3:90:FC                      Enter: Select
 ▶ Cisco(R) X710TLG GbE RJ45 PCIe NIC -         +/-: Change Opt.
   B4:96:91:B3:90:FD                            F1: General Help
 ▶ BROADCOM <Cisco 12G SAS RAID Controller with F9: Optimized Defaults
   4GB FBWC (16 Drives)> Configuration Utility - F10: Save & Reset System
   07.26.01.00                               ▼  ESC: Exit
                                                K/M: Scroll help UP/DOWN

               Version 2.21.1280 Copyright (C) 2024 AMI
                                                                    AB
```

Step 3. Select **Enabled**:

```
                          Aptio Setup - AMI
   Advanced

Network Stack          [Enabled]              Enable/Disable UEFI
IPv4 PXE Support       [Disabled]             Network Stack
IPv4 HTTP Support      [Disabled]
IPv6 PXE Support       [Disabled]
IPv6 HTTP Support      [Disabled]

                    ┌─── Network Stack ───┐
                    │  Disabled           │
                    │  Enabled            │
                    └─────────────────────┘  ►◄: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F9: Optimized Defaults
                                             F10: Save & Reset System
                                             ESC: Exit
                                             K/M: Scroll help UP/DOWN

             Version 2.21.1280 Copyright (C) 2024 AMI
                                                                AB
```
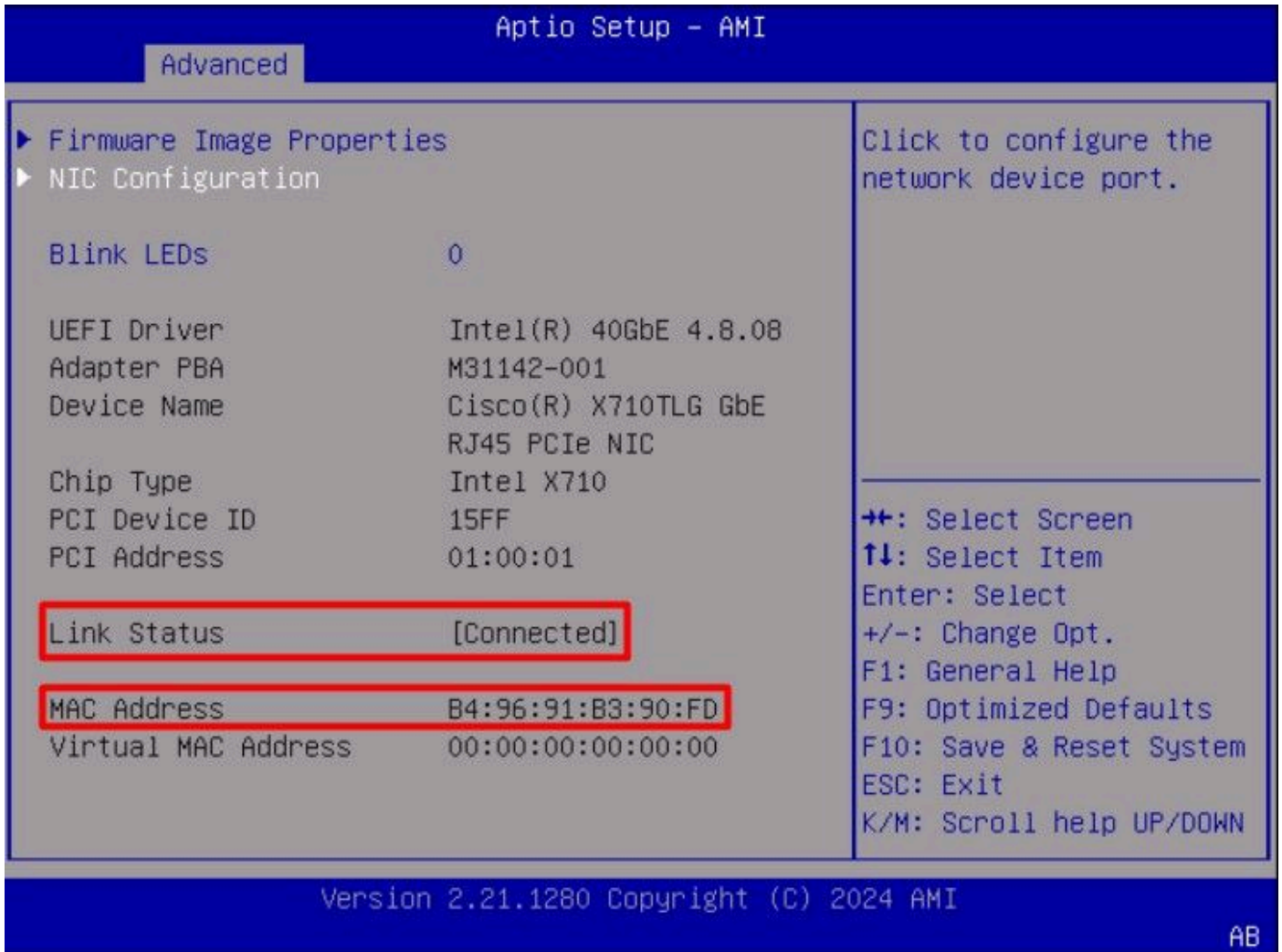
Step 4. Once the network stack is enabled, select the network adapter to use for iSCSI boot.

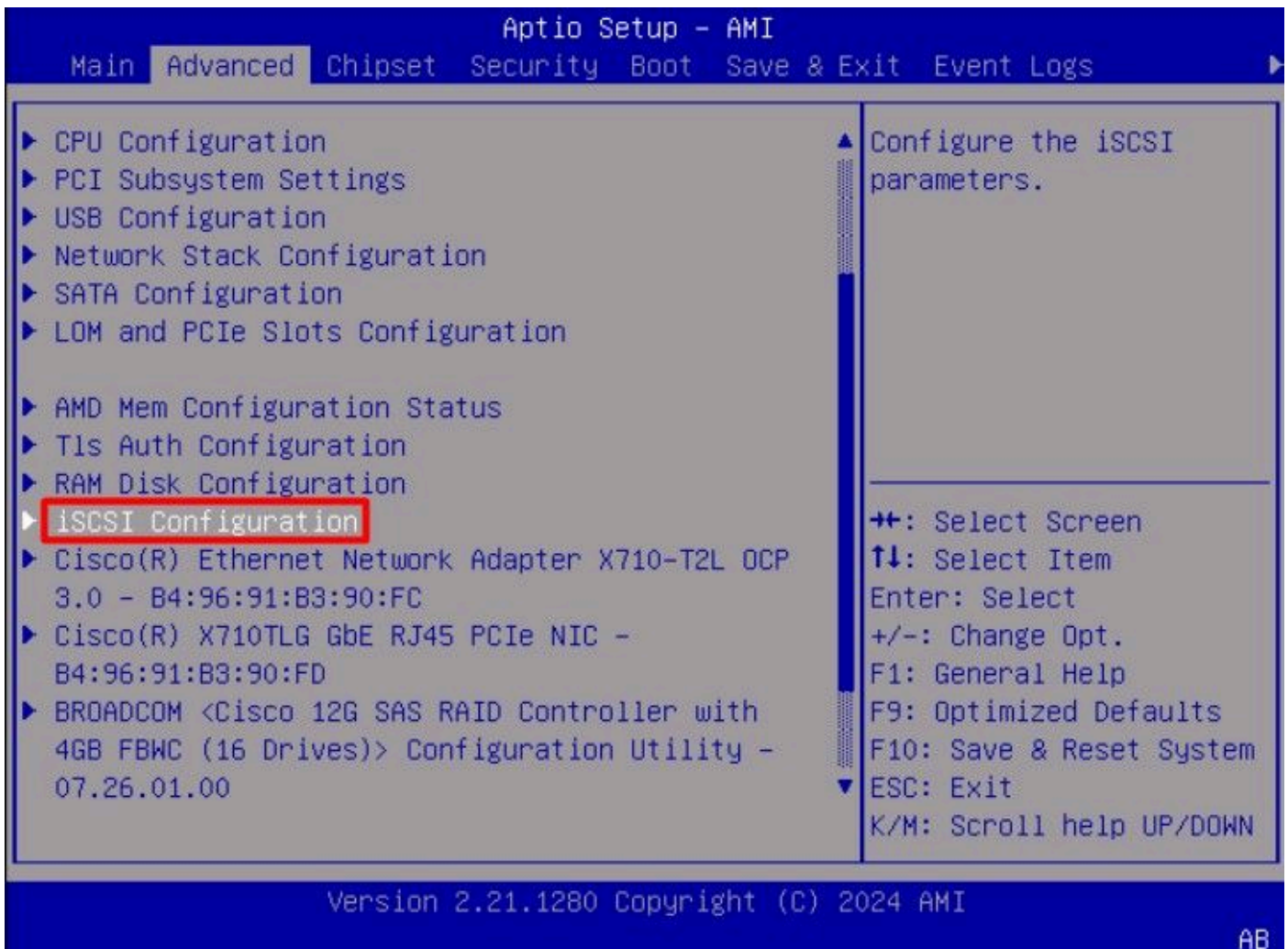In this example, the **Cisco® X710T2LG 2x10 GbE RJ45** Adapter is used:

```
                    Aptio Setup - AMI
   Main  Advanced  Chipset  Security  Boot  Save & Exit  Event Logs        ▶

 ▶ CPU Configuration                          ▲  Configure 10 Gigabit
 ▶ PCI Subsystem Settings                        Ethernet device
 ▶ USB Configuration                             parameters.
 ▶ Network Stack Configuration
 ▶ SATA Configuration
 ▶ LOM and PCIe Slots Configuration

 ▶ AMD Mem Configuration Status
 ▶ Tls Auth Configuration
 ▶ RAM Disk Configuration                      ─────────────────────
 ▶ iSCSI Configuration                         ↔: Select Screen
 ▶ Cisco(R) Ethernet Network Adapter X710-T2L OCP  ↑↓: Select Item
   3.0 - B4:96:91:B3:90:FC                     Enter: Select
 ▶ Cisco(R) X710TLG GbE RJ45 PCIe NIC -        +/-: Change Opt.
   B4:96:91:B3:90:FD                           F1: General Help
 ▶ BROADCOM <Cisco 12G SAS RAID Controller with F9: Optimized Defaults
   4GB FBWC (16 Drives)> Configuration Utility - F10: Save & Reset System
   07.26.01.00                                ▼ ESC: Exit
                                               K/M: Scroll help UP/DOWN

            Version 2.21.1280 Copyright (C) 2024 AMI
                                                                       AB
```

Step 5. Inside the network adapter option, validate the **Link Status** is **Connected**.

✎ **Note**: Take note of the port MAC address, as it is useful for identification purposes.

Aptio Setup – AMI

Advanced

▶ Firmware Image Properties
▶ NIC Configuration

Blink LEDs   0

UEFI Driver   Intel(R) 40GbE 4.8.08
Adapter PBA   M31142-001
Device Name   Cisco(R) X710TLG GbE
                       RJ45 PCIe NIC
Chip Type   Intel X710
PCI Device ID   15FF
PCI Address   01:00:01

Link Status   [Connected]

MAC Address   B4:96:91:B3:90:FD
Virtual MAC Address   00:00:00:00:00:00

Click to configure the
network device port.

↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F9: Optimized Defaults
F10: Save & Reset System
ESC: Exit
K/M: Scroll help UP/DOWN

Version 2.21.1280 Copyright (C) 2024 AMI

AB

Step 6. Go back to the main menu, and select the **iSCSI Configuration** option:

Step 7. Select **Host iSCSI Configuration** option:
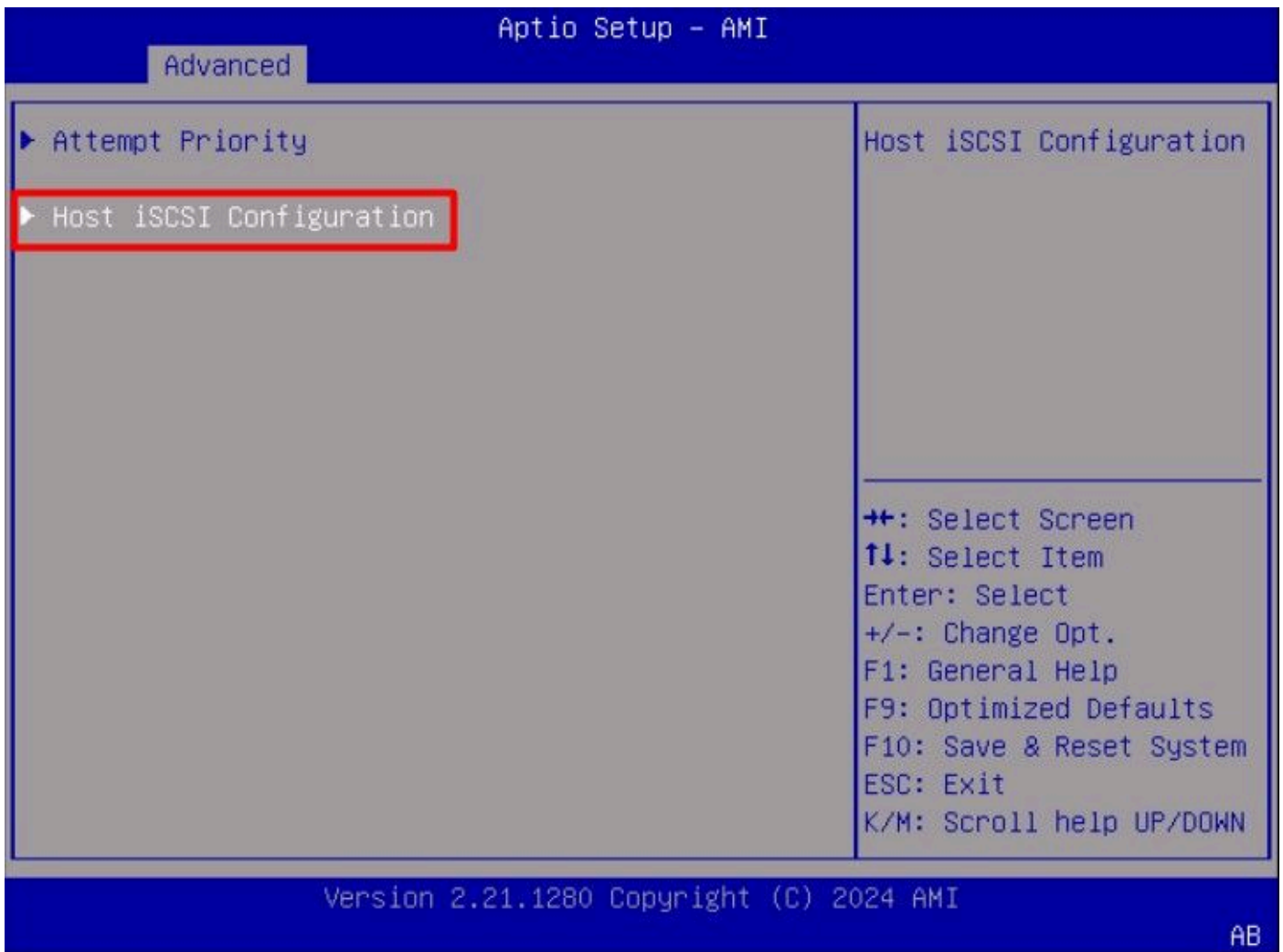
Step 8. Add the ISCSI Qualified Name (IQN), for the initiator.

The iSCSI Qualified Name (IQN) format takes the form **iqn.yyyy-mm.naming-authority:unique** name.
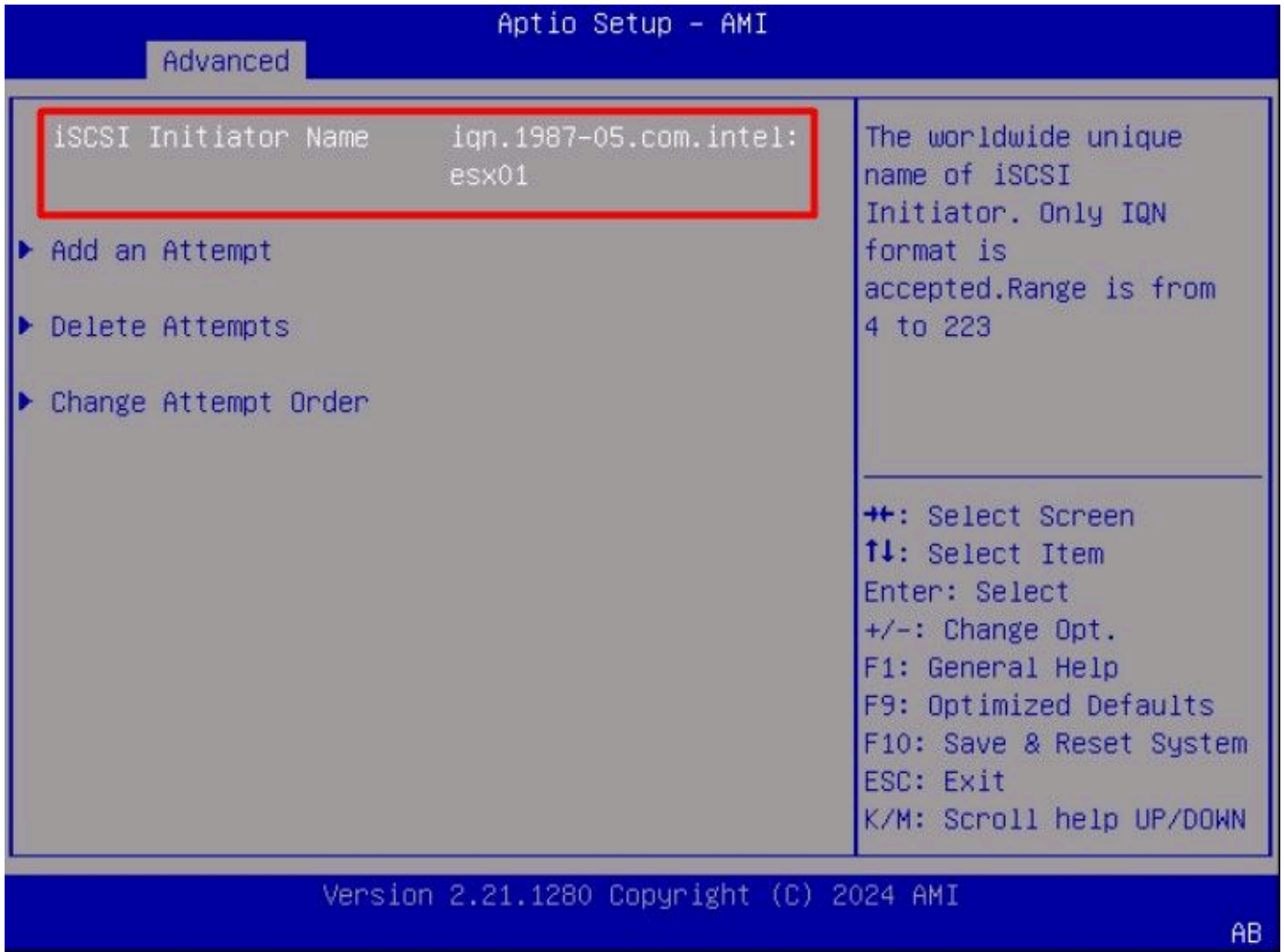
Step 9. Select the **Add an Attempt** option:
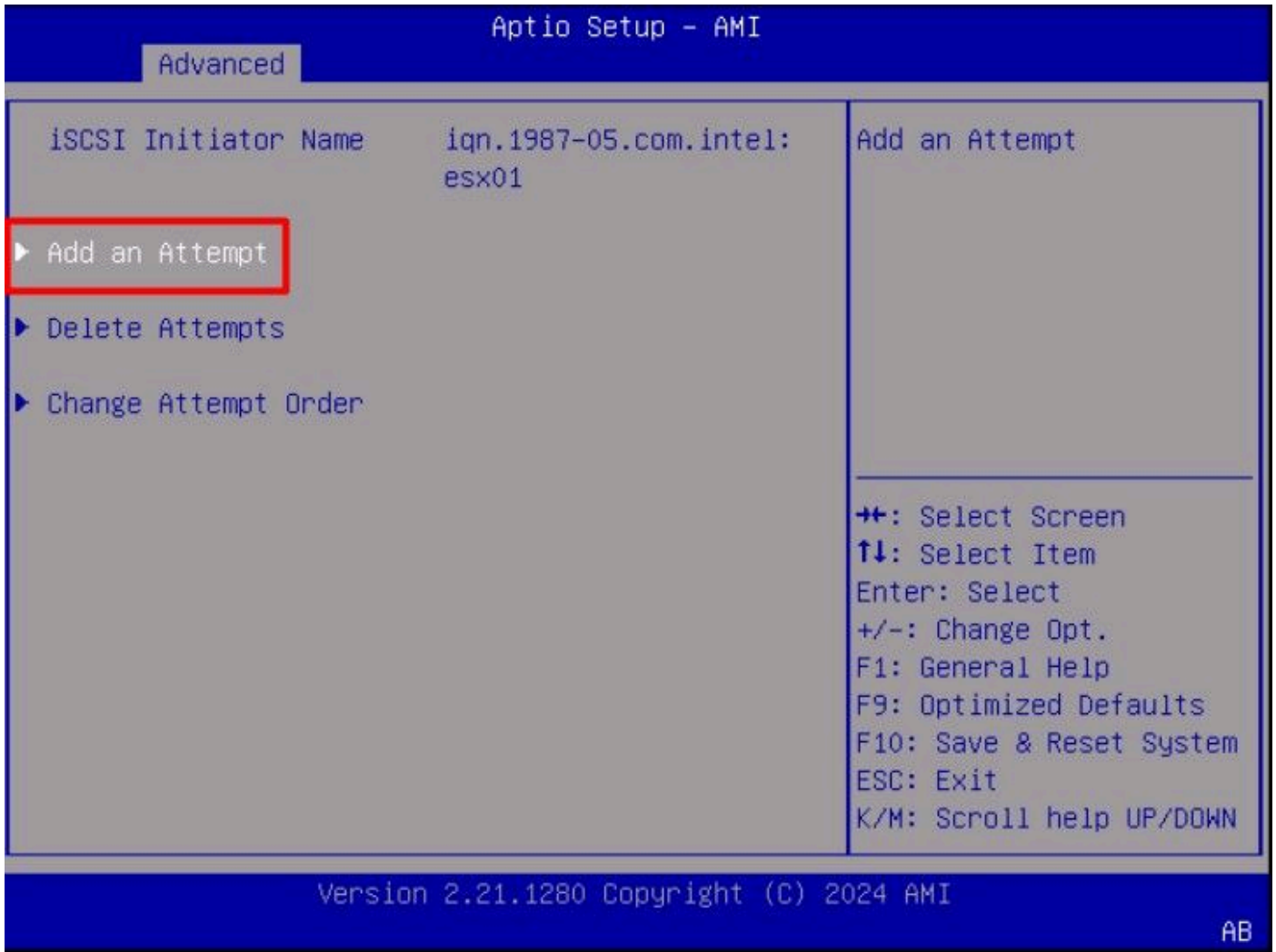
Step 10. Select the correct adapter, to configure the iSCSI settings. You can verify the adapter with the mac address that was registered on **Step 5**:
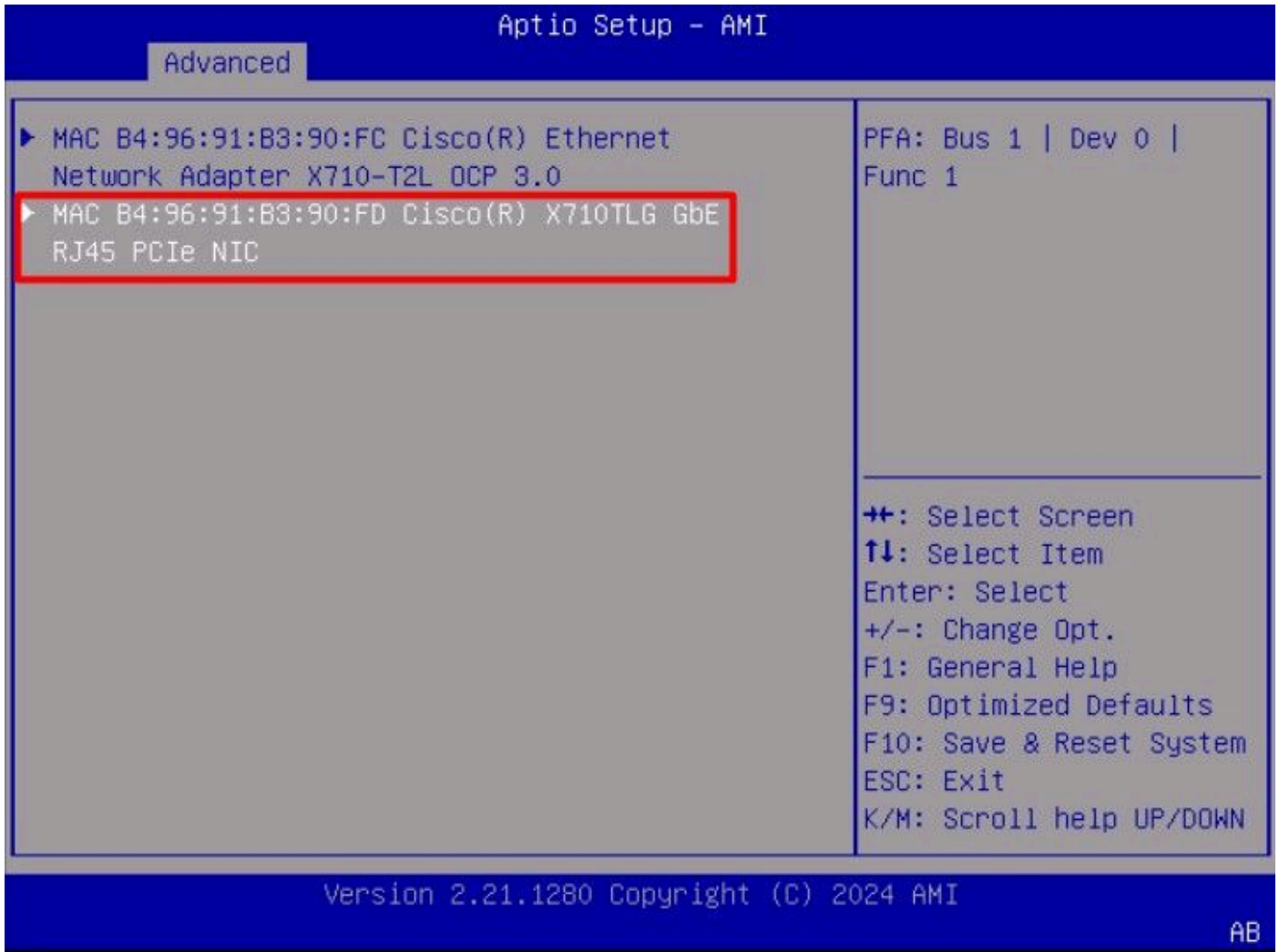
Step 11. Configure the iSCSI settings:
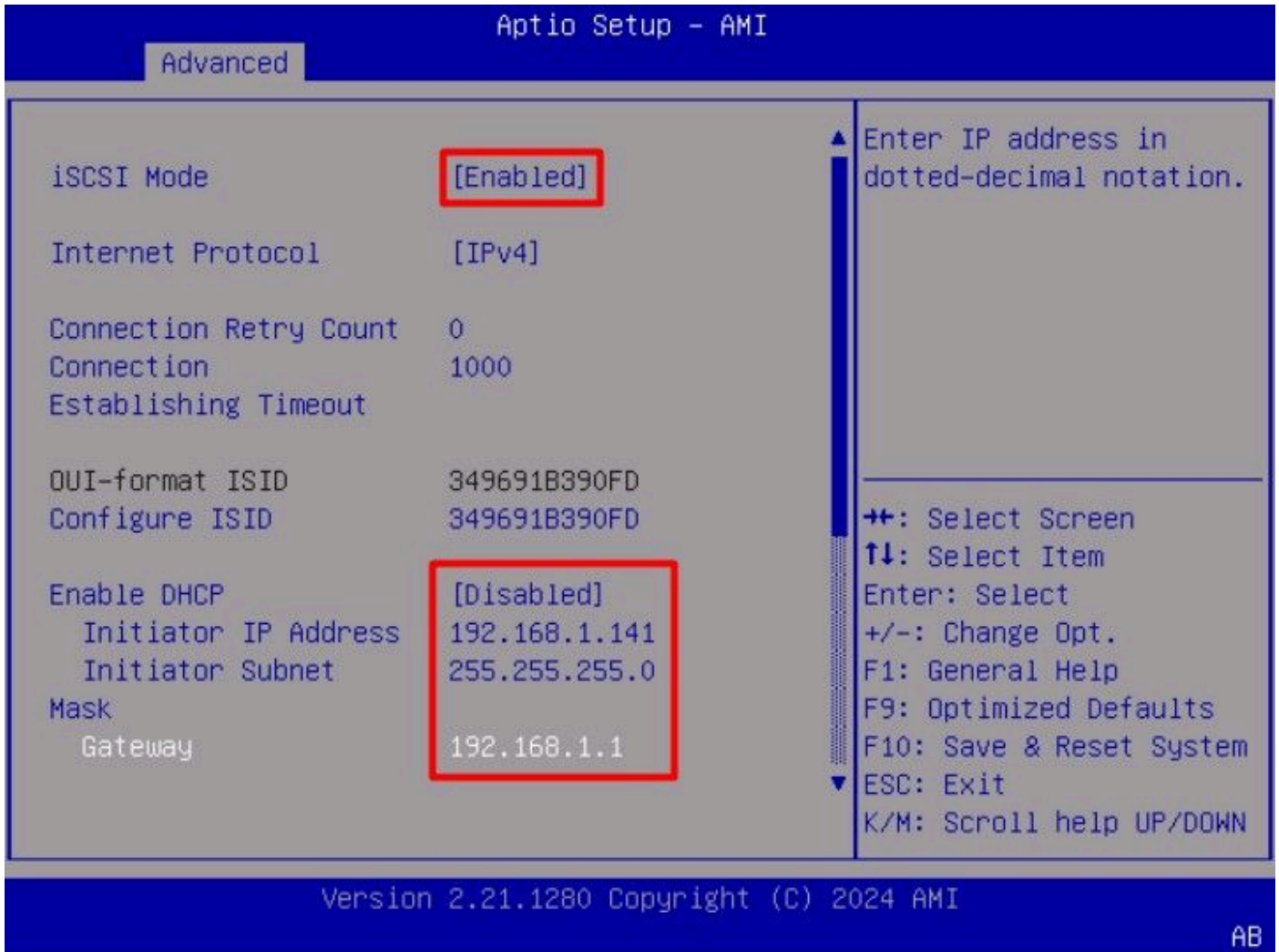
The values for this example are:

- iSCSI Mode: **Enabled**
- Internet Protocol: **IPv4**
- Connection Retry Count: **0** (Default)
- Connection Establishment Timeout: **1000** (milliseconds)
- OUI-Format ISID: **(Default)**
- Configure ISID: **(Default)**
- Enable DHCP: **Disabled**
- Initiator IP Address: **192.168.1.141**
- Initiator Subnet Mask: **255.255.255.0**
- Gateway: **192.168.1.1**

Step 12. Configure the Target information:
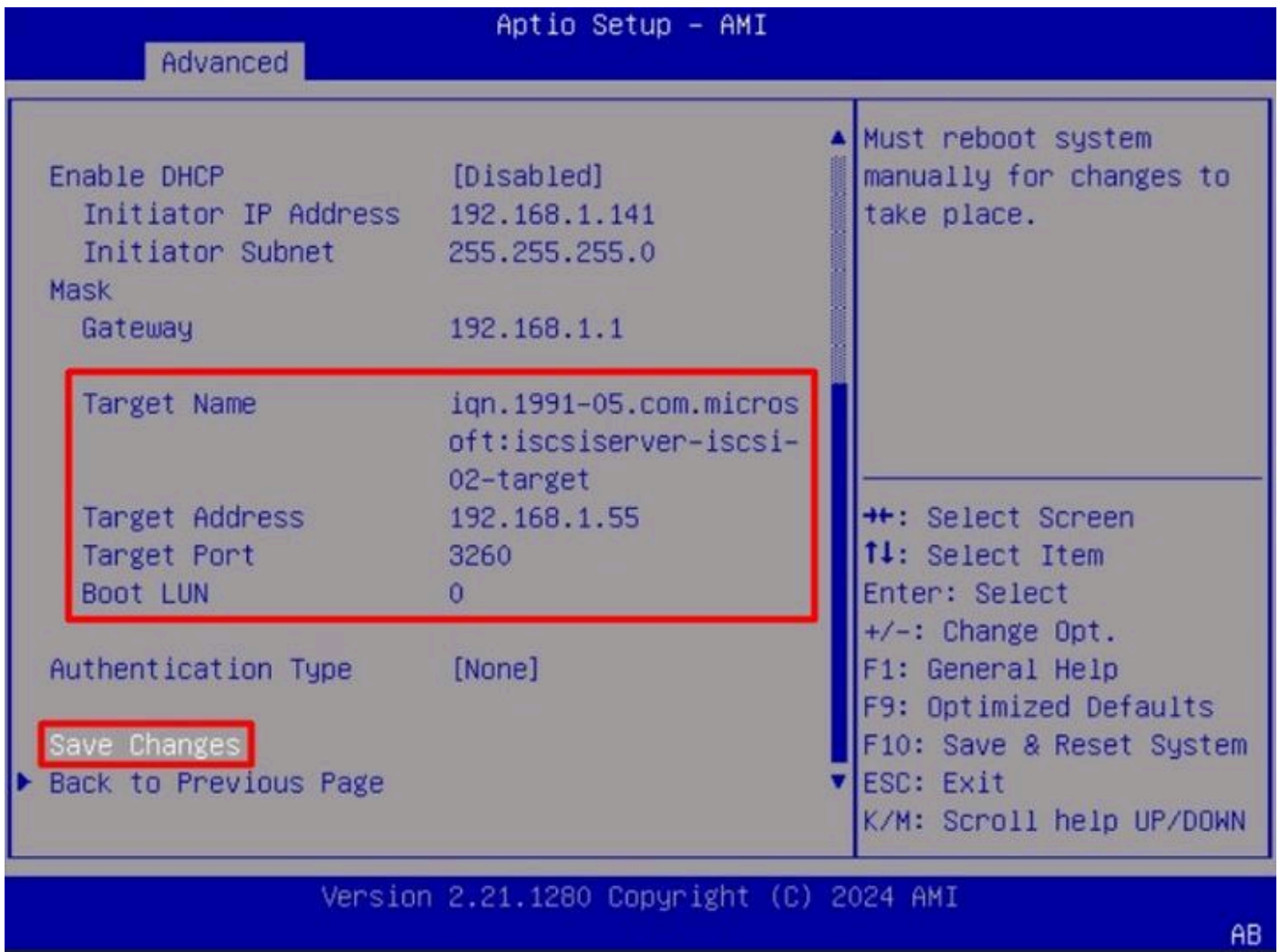
The values for this example are:

- Target Name: **(Target IQN for the storage)**
- Target Address: **192.168.1.55**
- Target Port: **3260** (iSCSI default port)
- Boot Lun: **0**
- Authentication Type: **None**

Select **Save Changes**.

Step 13. Select the **Save & Exit Menu**, then select **Save Changes and Reset**:
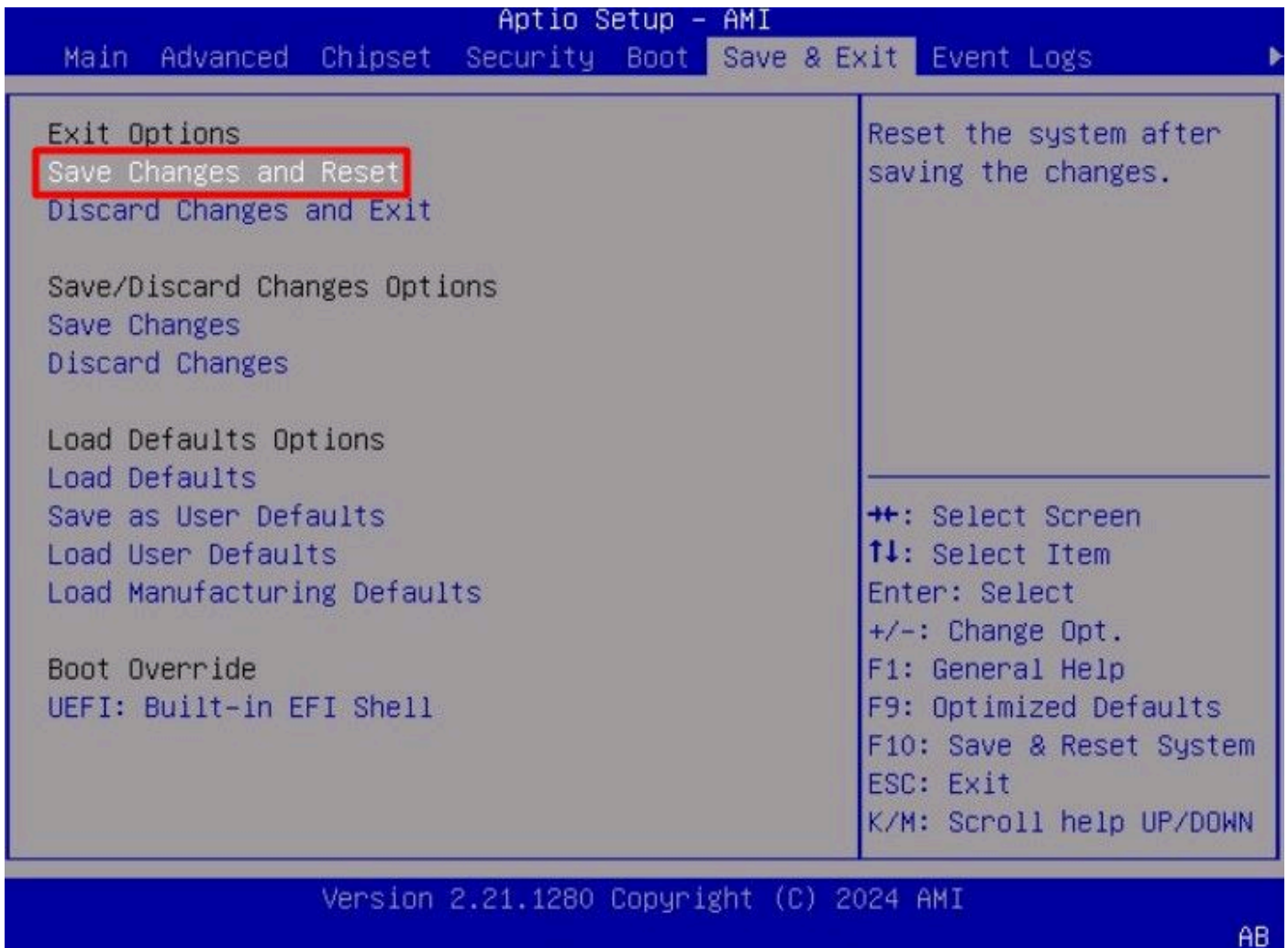
Step 14. Once the server boots, the iSCSI storage information is displayed during the boot process:
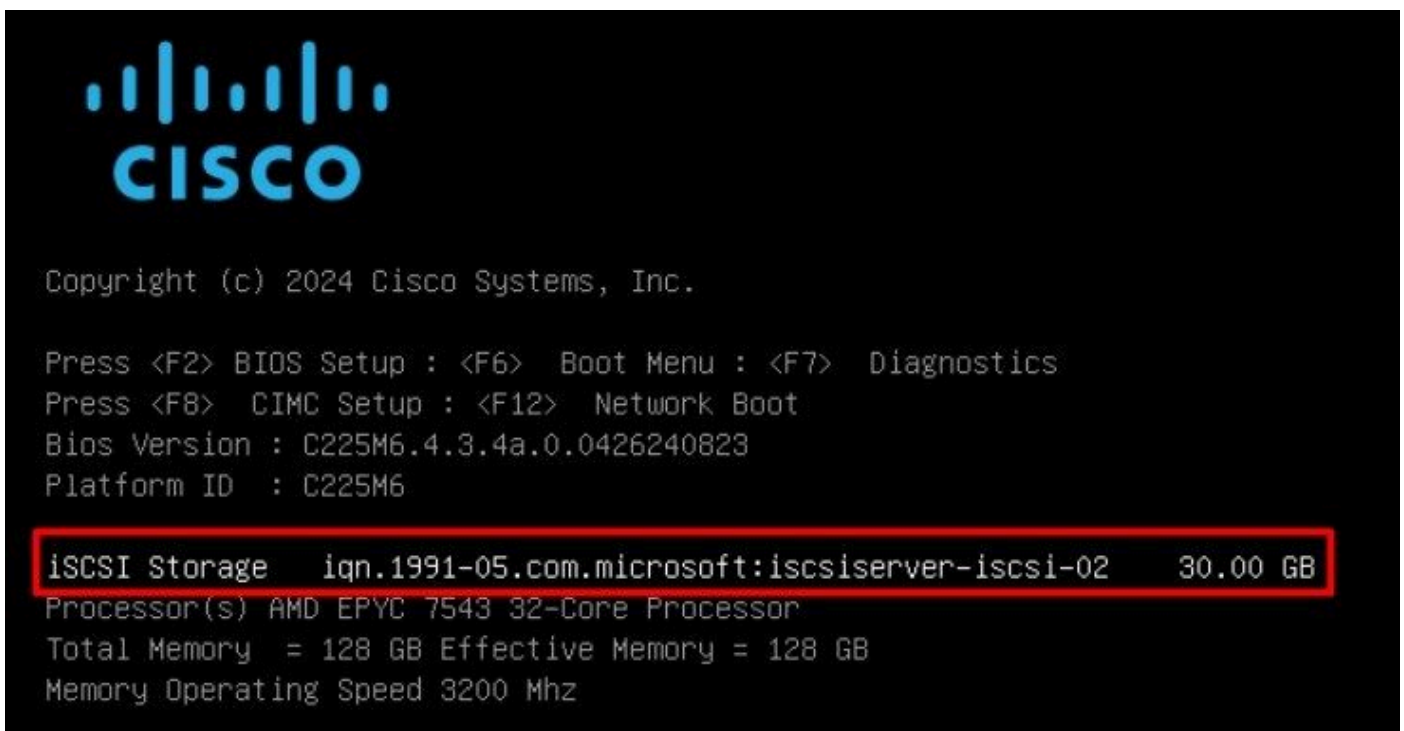

Step 15. Map an OS ISO using the **Virtual Media** > **vKVM-Mapped DVD** option:

cisco **vKVM**

- Console >
- File >
- View >
- Macros >
- Tools >
- Power >
- Boot Device >
- Virtual Media >
  - Create Image
  - **vKVM-Mapped vDVD**
  - vKVM-Mapped vHDD
  - vKVM-Mapped vFDD
  - CIMC-Mapped vDVD
  - CIMC-Mapped vHDD
- Chat
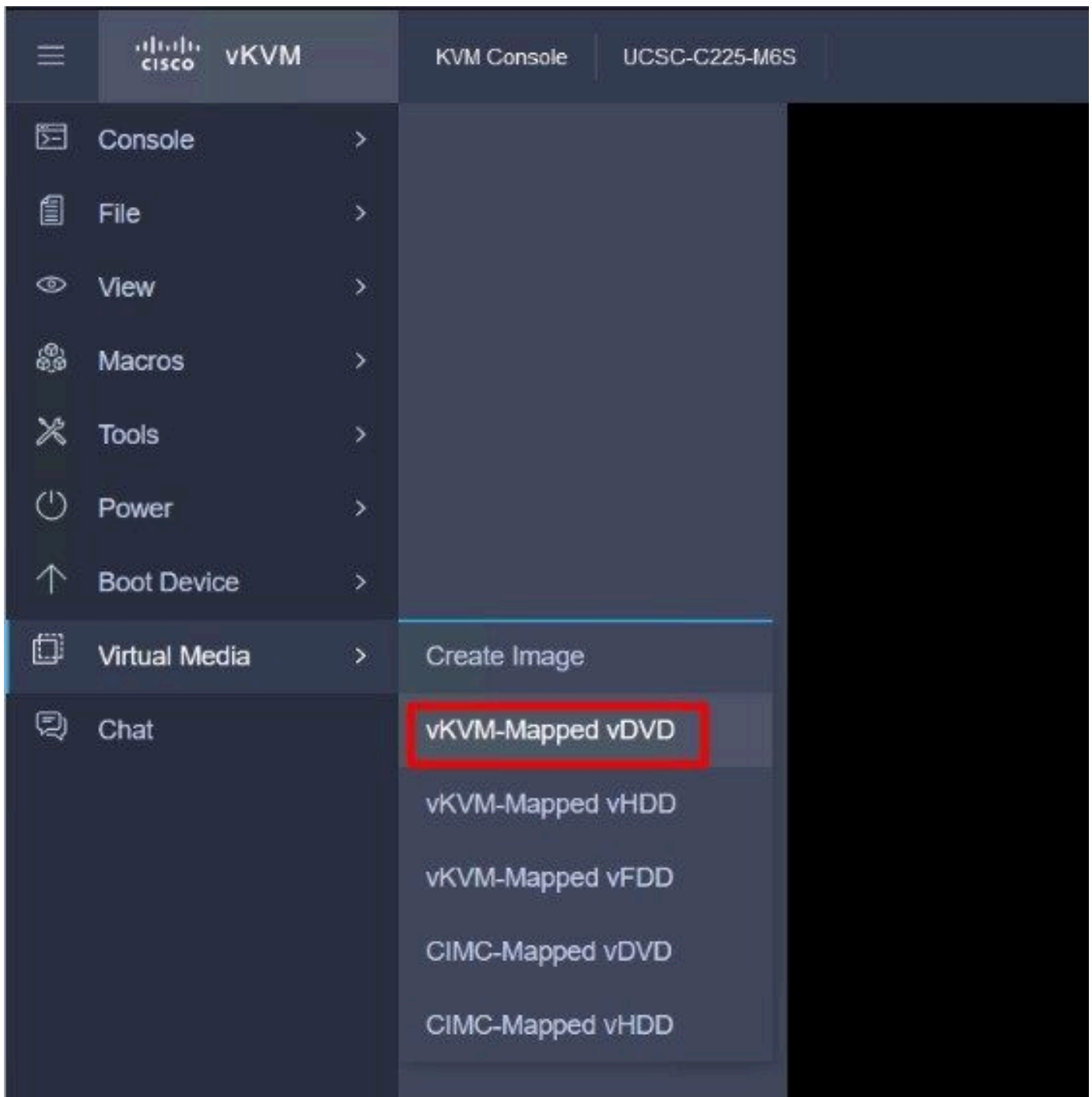
Step 16. Select **Map Drive**:

Step 17. Once the ISO is mapped, boot from it using the F6 Menu. Wait for the installer to load. Once the installer displays the storage options to install, the remote iSCSI storage is visible:
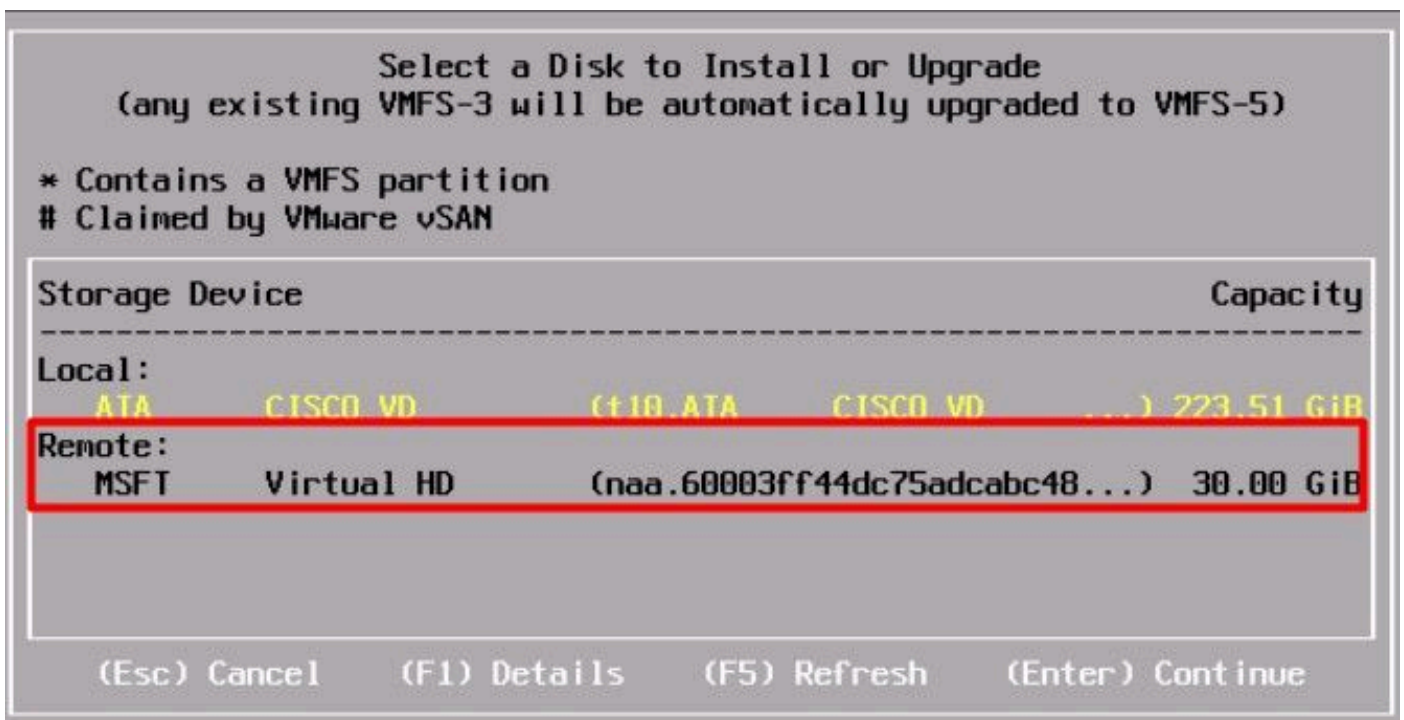
Step 18. Continue the installation process using the remote storage. Once it finishes, reboot the server and press F2 to enter the server BIOS settings. In the BIOS settings, select the **Boot Menu** and move the option **VMware® ESXi** to the **Boot Option # 1**:
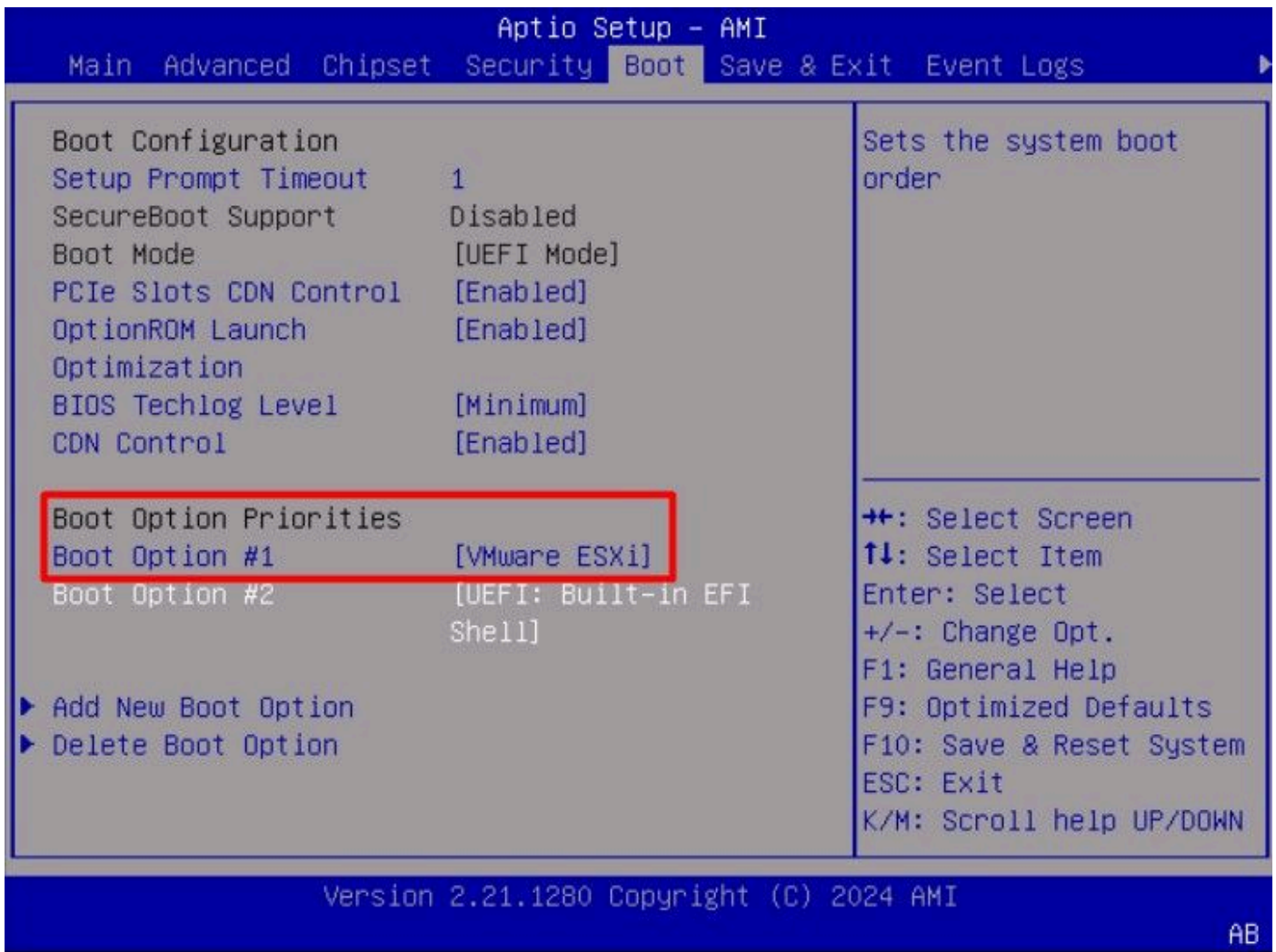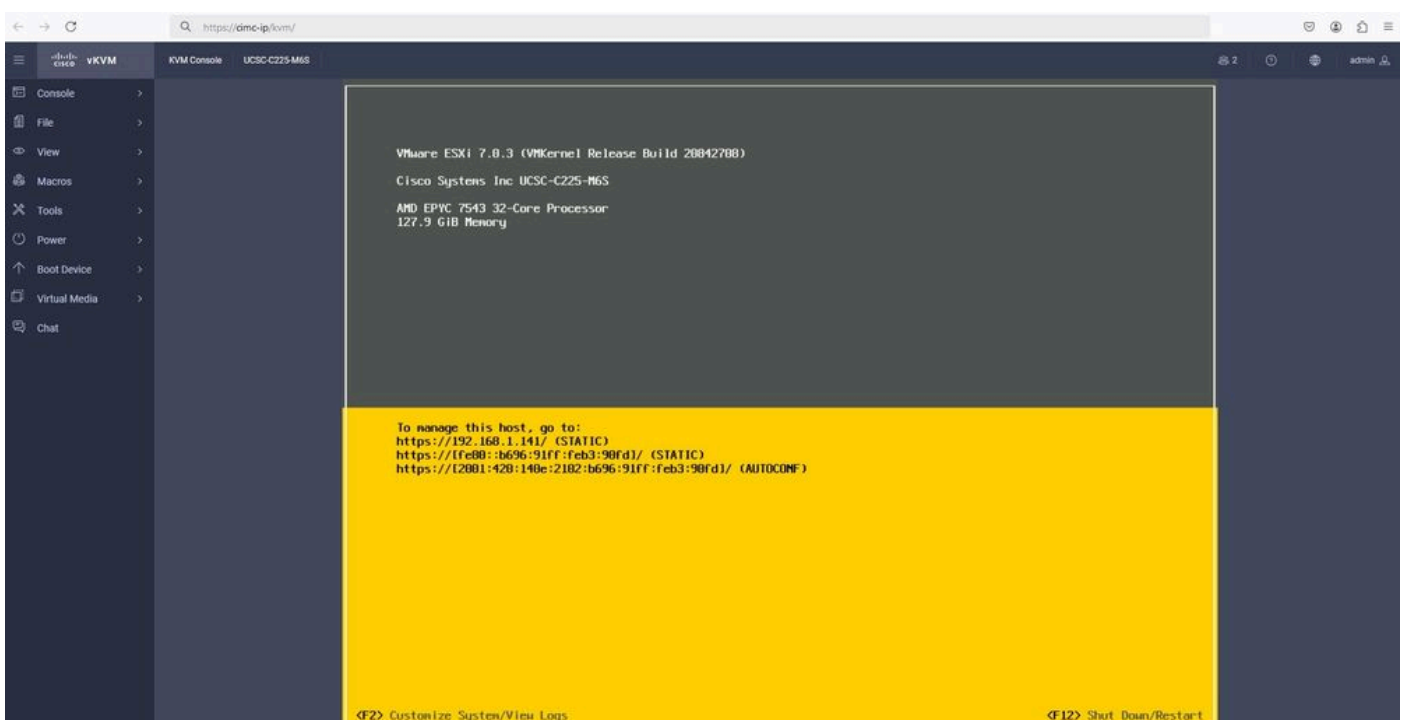
Step 19. Navigate to the **Save & Exit** menu, and select **Save Changes and Reset** option:
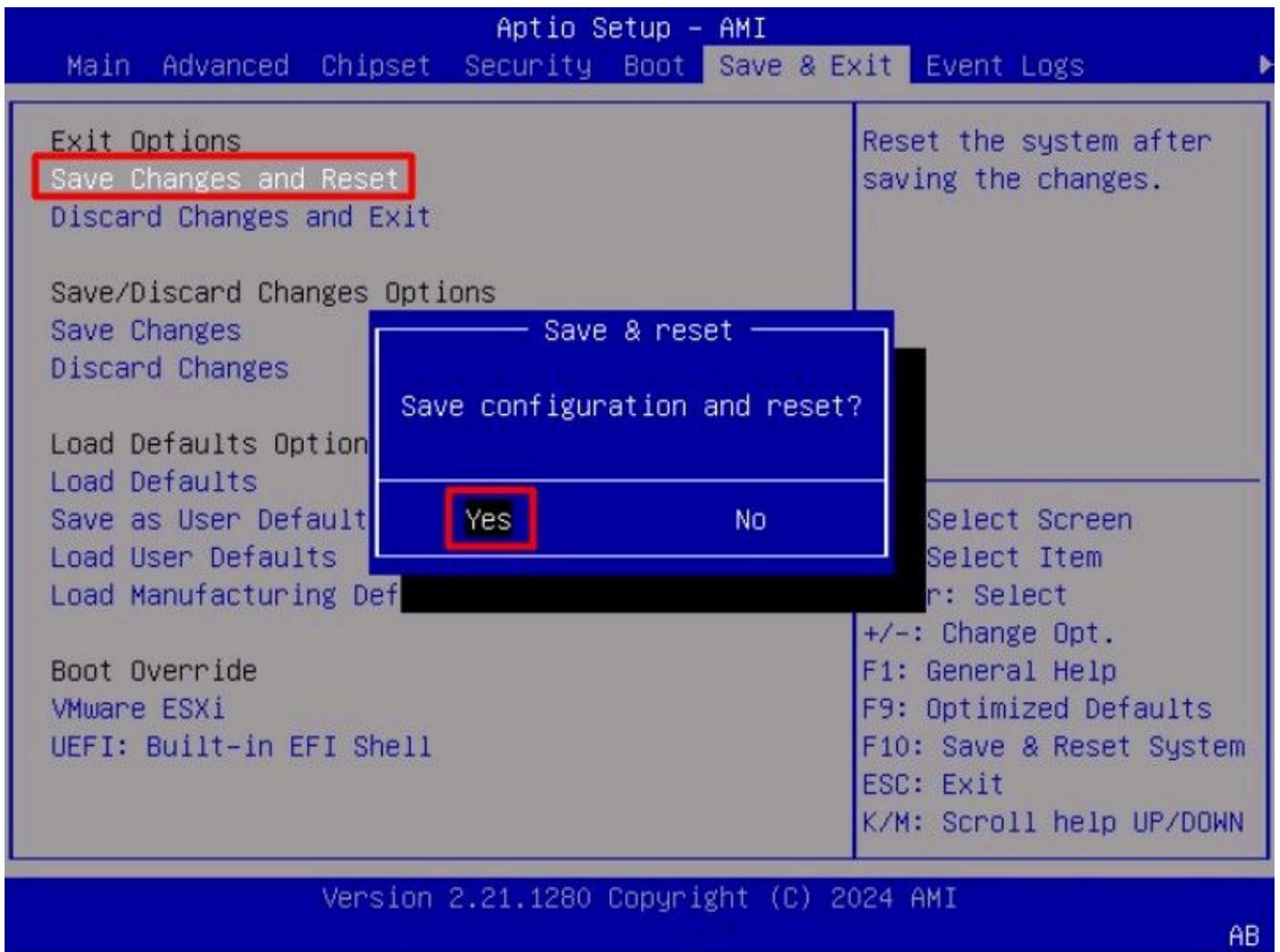
Verify

The server successfully boots to the VMware® ESXi OS:

Troubleshooting

1. Verify the IQN for the Initiator and Target to avoid any misconfiguration.
2. Verify the switch port configuration, as the NIC Adapter does not support any VLAN tagging.
3. Verify the adapter port mac address is learned on the correct port on the switch.

<#root>

```
switch#show mac address-table address b496.91b3.90fd
          Mac Address Table
-------------------------------------------
Vlan  Mac Address  Type    Ports
----  -----------  --------  -----
10
```

b496.91b3.90fd

 DYNAMIC

Te1/0/45

```
Total Mac Addresses for this criterion: 1
```

Verify the iSCSI negotiation with a packet capture leveraging the Embedded Packet Capture (EPC) feature in Cisco IOS® software.

Example:

<#root>

```
switch#monitor capture ISCSI buffer size 100 circular interface TenGigabitEthernet1/0/45 both match any
switch#monitor capture ISCSI start
```

--> This command starts the capture

```
switch# monitor capture ISCSI stop
```

--> Stop the capture, once the server has attempted to boot from the Intel® NIC Adapter.

```
switch#show monitor capture ISCSI buffer brief
```

--> This command shows the capture content

```
Starting the packet display ........ Press Ctrl + Shift + 6 to exit
...
21 0.000285 192.168.1.141 -> 192.168.1.55
```

iSCSI

```
 114 NOP Out
22 0.000299 192.168.1.55 -> 192.168.1.141
```

iSCSI

```
 118 NOP In
```

```
23 0.000313 192.168.1.55 -> 192.168.1.141
```

iSCSI

```
 118 [TCP Retransmission] NOP In
24 0.000327 192.168.1.141 -> 192.168.1.55 TCP 66 57954 > iscsi-target [ACK] Seq=49 Ack=49 Win=514 Len=0
25 0.000341 192.168.1.141 -> 192.168.1.55 TCP 1514 [TCP segment of a reassembled PDU]
26 0.000357 192.168.1.141 -> 192.168.1.55 TCP 1514 [TCP segment of a reassembled PDU]
27 0.000382 192.168.1.141 -> 192.168.1.55 iSCSI 1514 SCSI:
```

Write(10) LUN: 0x00 (LBA: 0x0105f758, Len: 8)SCSI: Data Out LUN: 0x00 (Write(10) Request Data)

```
28 0.000399 192.168.1.141 -> 192.168.1.55 TCP 102 [TCP segment of a reassembled PDU]
29 0.000413 192.168.1.55 -> 192.168.1.141 TCP 70 iscsi-target > 57954 [ACK] Seq=49 Ack=4429 Win=8195 Ler
30 0.000427 192.168.1.141 -> 192.168.1.55 TCP 1514 [TCP segment of a reassembled PDU]
31 0.000448 192.168.1.141 -> 192.168.1.55 TCP 1514 [TCP segment of a reassembled PDU]
32 0.000464 192.168.1.141 -> 192.168.1.55 iSCSI 1078 SCSI:
```

Write(10) LUN: 0x00 (LBA: 0x0105f548, Len: 8)SCSI: Data Out LUN: 0x00 (Write(10) Request Data)

```
33 0.000480 192.168.1.55 -> 192.168.1.141 TCP 70 iscsi-target > 57954 [ACK] Seq=49 Ack=8337 Win=8195 Ler
34 0.000494 192.168.1.55 -> 192.168.1.141 iSCSI 118 SCSI:
```

Response LUN: 0x00 (Write(10)) (Good)

```
35 0.000508 192.168.1.55 -> 192.168.1.141 iSCSI 118 SCSI:
```

Response LUN: 0x00 (Write(10)) (Good)

For RJ45 NIC adapters, it is recommended to use at least a Cat6 UTP cable, and connect to 10 GbE ports.

Related Information

- Windows Server iSCSI Target Server Overview
- Cisco Community - HOW TO - iSCSI boot with Intel i350 adapters on UCS servers
- iSCSI Naming Conventions
- Configure and Capture Embedded Packet on Software