Hardware configuration procedures

Software tools, OneCLI, StorCLI, configuring appliance boot drives, configuring boot order, updating VPD, BIOS optimizations, and more

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Software tools

The following software tools can be used to make it easier to configure the appliance:

- Lenovo XClarity Essentials OneCLI (formerly known as ToolsCenter Suite CLI)
- StorCLI Utility for Storage Management (E5-2400 v3 appliances)

The replacement of faulty hardware is either done by customer, a trained Lenovo field service representative or partner. They can use OneCLI or StorCLI to help with reconfiguring the hardware.

OneCLI

OneCLI is a command-line utility that is intended to replace several of the existing command-line utilities currently used by both support personnel and users.
OneCLI replaces:

- Dynamic System Analysis (DSA) – DSA collects and analyzes system information to aid in diagnosing system problems.
- Advanced Setting Utility (ASU) – ASU allows the user to modify firmware settings from the command line under an installed operating system.
- UpdateXpress System Pack Installer (UXSPI) – UXSPI is used to inventory, install, and update system firmware and device drivers.
- For more information and to download the OneCLI program, go to the Lenovo XClarity Essentials OneCLI Web site.

Storage Command-Line tool (StorCLI)

The Storage Command-Line tool (StorCLI) is Linux-based scriptable command-line management software designed for the MegaRAID® product line. This tool is used for the HX Series appliances with the E5-2400 v3 processor to create the correct partitions for the boot drive.

For more information and to download the StorCLI program, go to the StorCLI (Command Line) Utility for Storage Management v1.14.12 for Linux - Lenovo Systems Web site.

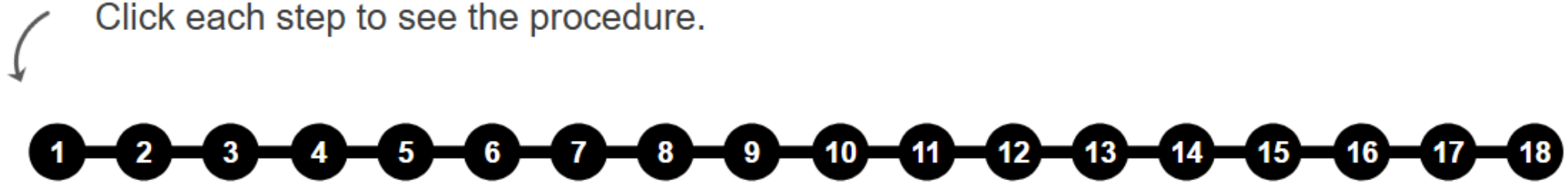
Configuring E5-2600 v3 appliance boot drive virtual drives

Replacing the hypervisor boot drive components is a complex task and is best performed by a Lenovo professional service technician.

The StorCLI utility can be used to initialize the boot SSD for E5-2600 v3 appliances and configure the virtual drives with the following commands:

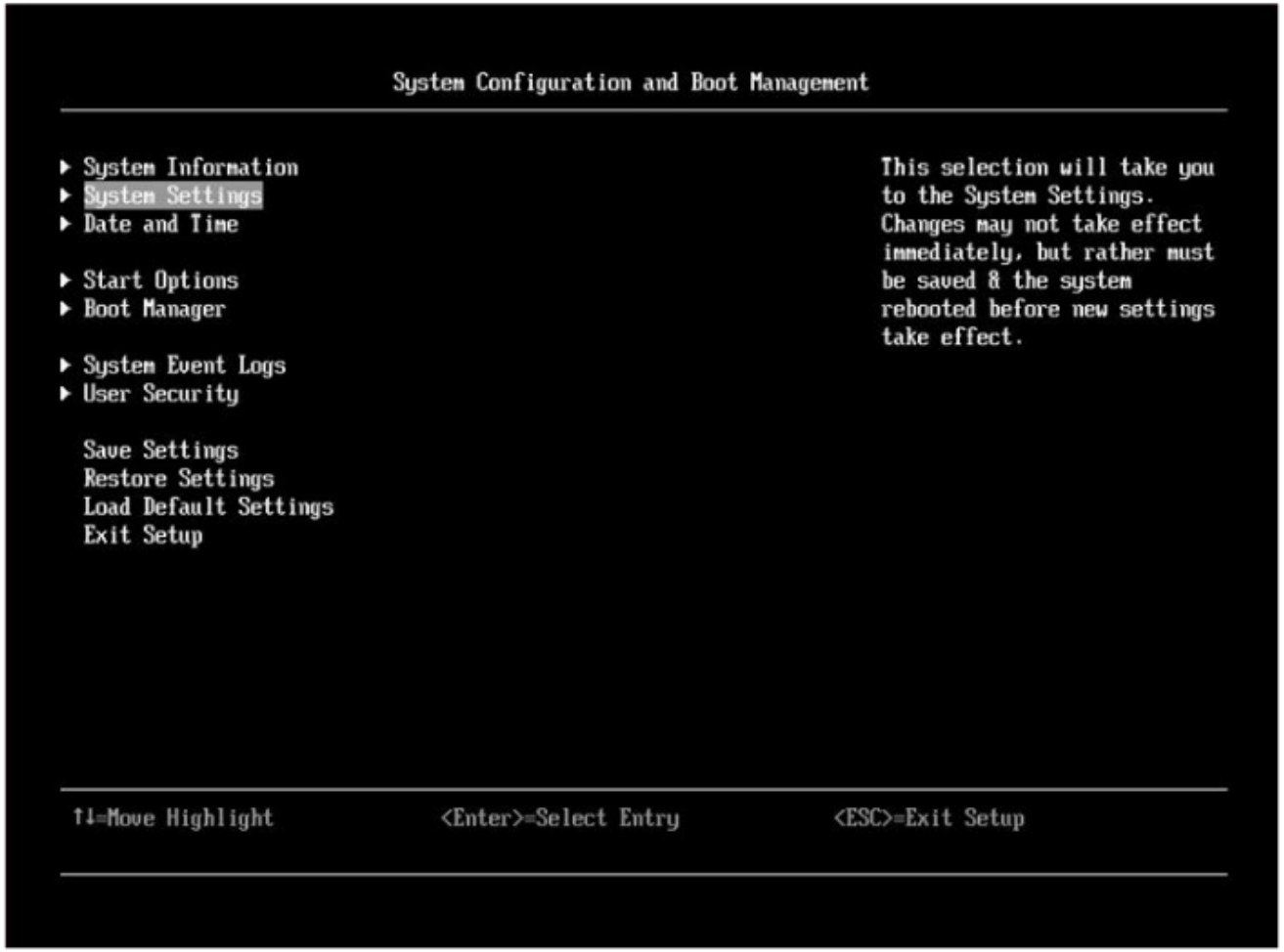
```
>storcli64 /c0 /e62 /s28 set good force
>storcli64 /c0 add vd r0 Size=100GB name=HYPERVISOR drives=62:28 PDperArray=1
>storcli64 /c0 add vd r0 name=PHOENIX drives=62:28 PDperArray=1 Aftervd=0
```

Follow the steps in the UEFI setup menu to configure the M1215 RAID controller:



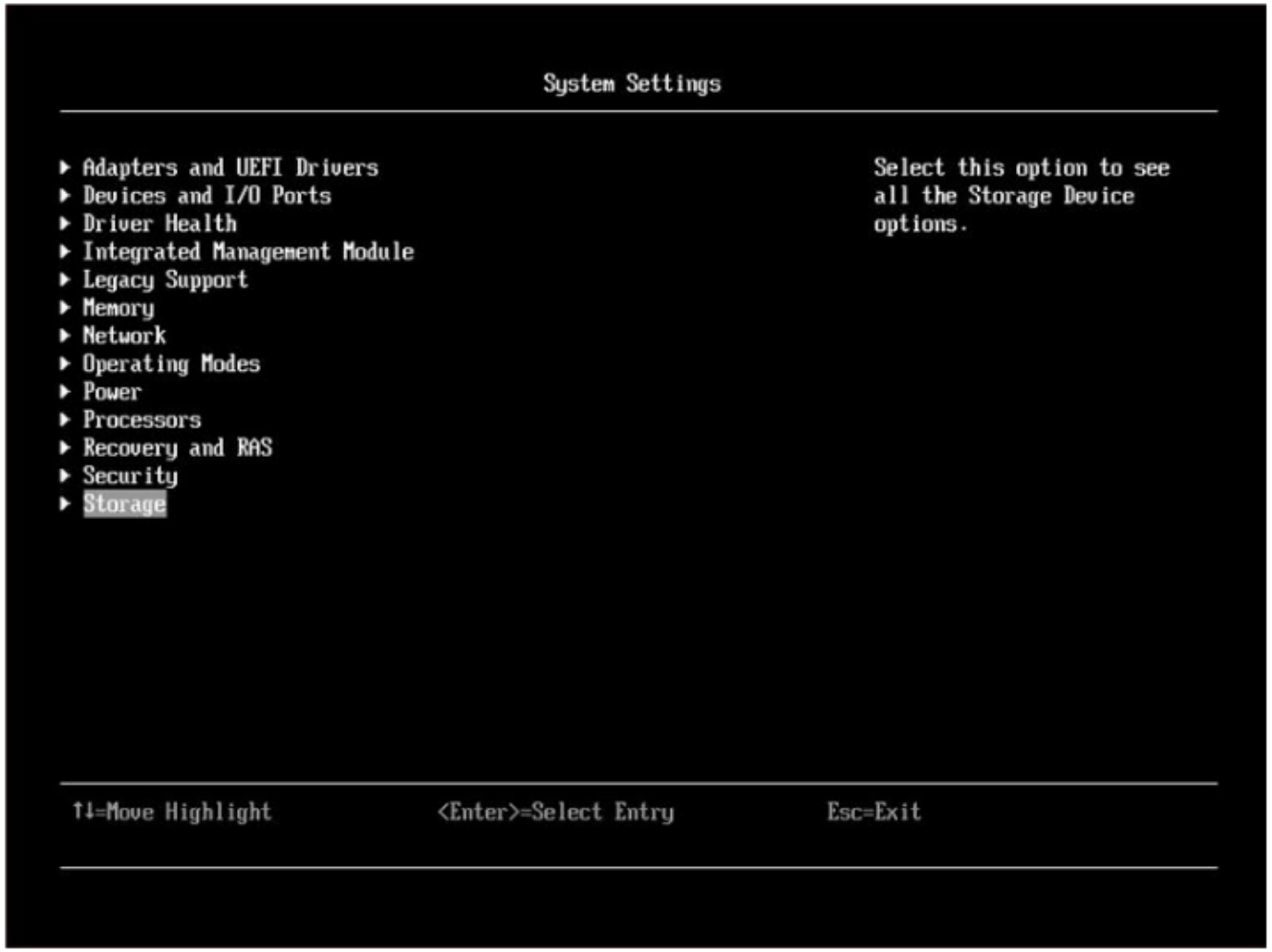
Configuring E5-2600 v3 appliance boot drive virtual drives

Select **System Settings**.



Configuring E5-2600 v3 appliance boot drive virtual drives

Select **Storage**.



Configuring E5-2600 v3 appliance boot drive virtual drives

Select **AVAGO MegaRAID controller**.

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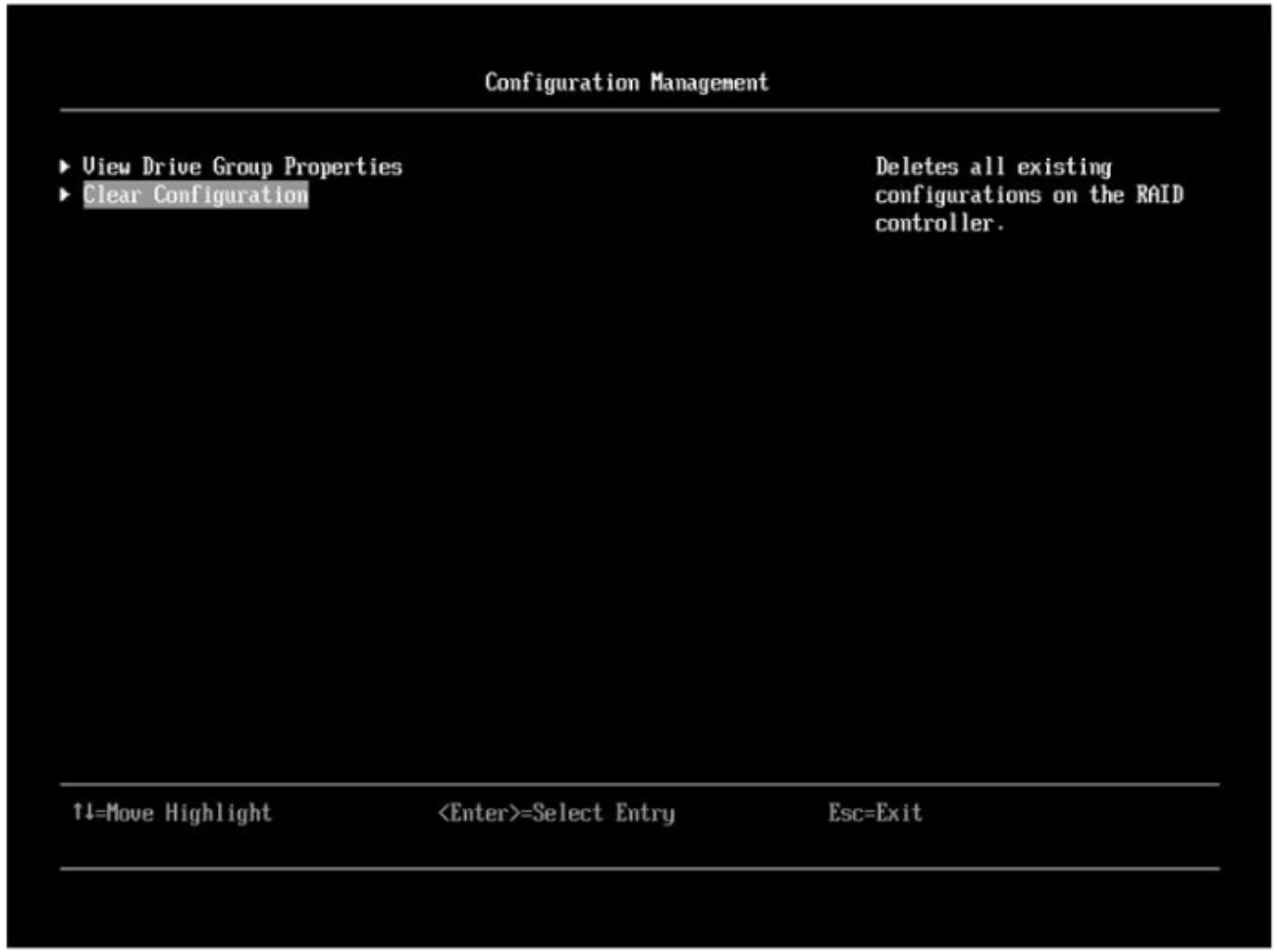
Configuring E5-2600 v3 appliance boot drive virtual drives

Select **Configure**.

Configuring E5-2600 v3 appliance boot drive virtual drives

Select **Clear Configuration** and confirm.



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Configuring E5-2600 v3 appliance boot drive virtual drives

Select **Create Virtual Drive**.

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Configuring E5-2600 v3 appliance boot drive virtual drives

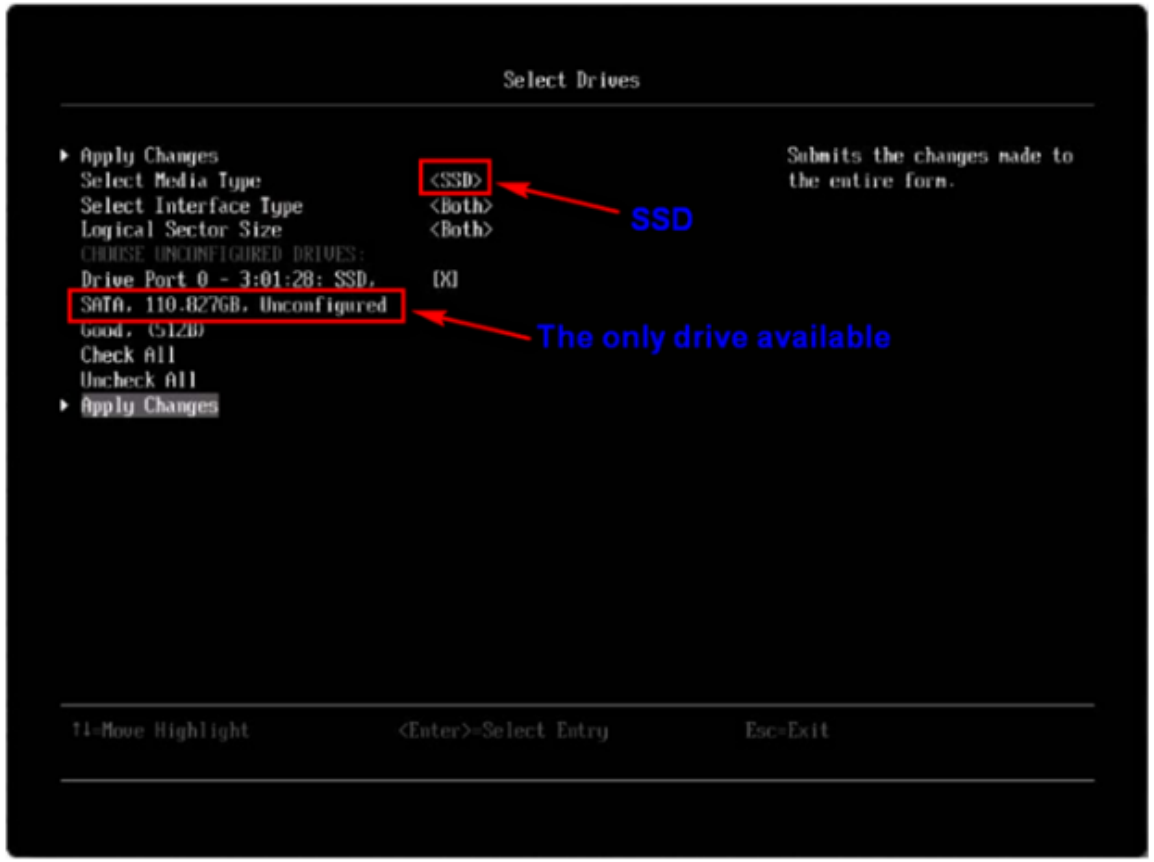
Select **Select Drives**.

Configuring E5-2600 v3 appliance boot drive virtual drives

Change the media type to SSD.

Configuring E5-2600 v3 appliance boot drive virtual drives

Check the only drive that is available.

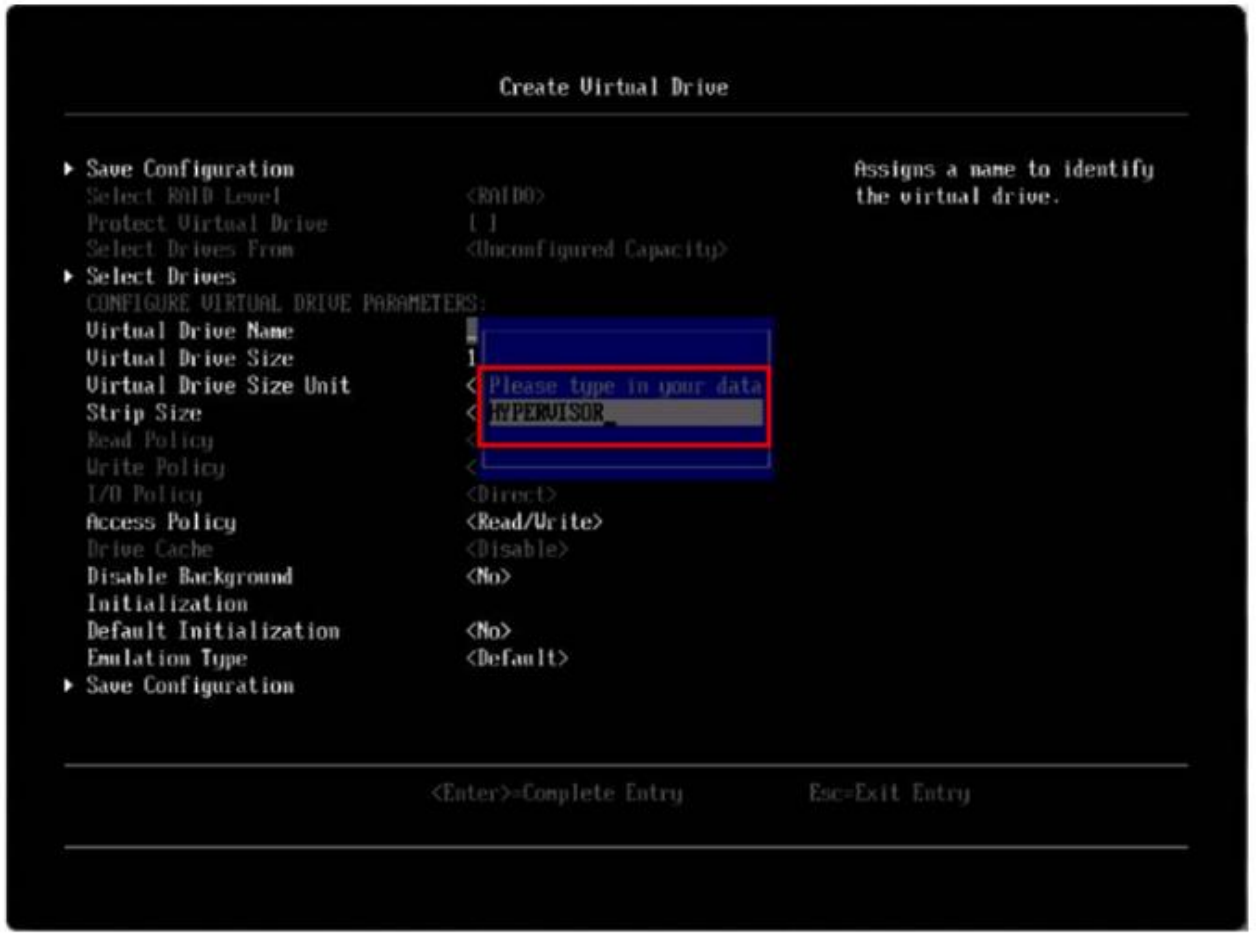


Configuring E5-2600 v3 appliance boot drive virtual drives

Apply the changes and confirm the changes.

Configuring E5-2600 v3 appliance boot drive virtual drives

Set the virtual drive name to HYPERVISOR.



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Configuring E5-2600 v3 appliance boot drive virtual drives

Configure the drive size to 100 GB.

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Configuring E5-2600 v3 appliance boot drive virtual drives

Save the configuration and confirm it.

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Configuring E5-2600 v3 appliance boot drive virtual drives

Press **Escape** and select **Create Virtual Drive – Advanced**.

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Configuring E5-2600 v3 appliance boot drive virtual drives

Set **Select Drives From** free capacity.

Configuring E5-2600 v3 appliance boot drive virtual drives

Select **Select Drive Groups**. Select the only available drive group and apply the changes.

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Configuring E5-2600 v3 appliance boot drive virtual drives

Set the virtual drive name to PHOENIX (press **return** to edit).

Lenovo

Configuring E5-2600 v3 appliance boot drive virtual drives

Save the configuration and confirm it.

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Configuring the boot order

The configured boot order for factory preload is:
1. Phoenix PXE boot
2. Remote image load (System x only)
3. Boot drive (M.2, SATADOM, SSD)

After preload installation is complete, the boot order is changed to:
1. CD/DVD ROM
2. Hard Disk 0
3. PXE Network

The boot order can be changed using UEFI or LXPM, depending on the appliance.

The StorCLI utility can also be used to select the virtual drive for booting by using the command:

```
>storcli64 /c0v0 set bootdrive=on
```

The ASU system tool can also configure the boot order by using the command:

```
asu64 set BootOrder.BootOrder="Legacy Only=CD/DVD Rom=Hard Disk 0=PXE Network"
```

Boot order in UEFI setup screen

ThinkAgile HX Series appliances update server VPD data

Depending on the ThinkAgile HX Series appliances model, the server VPD data must be updated when the system board is replaced.
The VPD string for the ThinkAgile HX Series appliances is the same as the appliance name. The VPD strings are:

Lenovo Converged HX3500
Lenovo Converged HX5500
Lenovo Converged HX7500
Lenovo Converged HX3310
Lenovo Converged HX5510
Lenovo Converged HX7510

Lenovo ThinkAgile HX1320 Appliance
Lenovo ThinkAgile HX1520-R Appliance
Lenovo ThinkAgile HX2320-E Appliance
Lenovo ThinkAgile HX2720-E Appliance
Lenovo ThinkAgile HX3320 Appliance
Lenovo ThinkAgile HX3520-G Appliance

Lenovo ThinkAgile HX3720 Appliance
Lenovo ThinkAgile HX5520 Appliance
Lenovo ThinkAgile HX7520 Appliance
Lenovo ThinkAgile HX7820 Appliance

The VPD string can be updated using the OneCLI system tool with the following command:

```
>onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier "Lenovo ThinkAgile HX2320-E Appliance"
>onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx "Lenovo ThinkAgile HX2320-E Appliance:" -override
```

For appliances with E2600 v4 and Intel Xeon Scalable processors, the VPD data must be updated with the machine type / model (MTM), serial number, and the appliance description string.
The MTM can be updated using the OneCLI system tool with the following command usage example:

```
>onecli config set SYSTEM_PROD_DATA.SysInfoProdName 8693AC2
```

Note: For more information on how to use OneCLI, go to the Lenovo XClarity Essentials OneCLI Web site.

ThinkAgile HX Series certified nodes update the server VPD data

Depending on the ThinkAgile HX Series certified nodes model, the server VPD data must be updated when the system board is replaced.
The VPD string for the ThinkAgile HX Series certified nodes is the same as the appliance name. The VPD strings are:

Lenovo ThinkAgile HX1321 Appliance	Lenovo ThinkAgile HX3721 Appliance
Lenovo ThinkAgile HX1521-R Appliance	Lenovo ThinkAgile HX5521 Appliance
Lenovo ThinkAgile HX3321 Appliance	Lenovo ThinkAgile HX5521-C Appliance
Lenovo ThinkAgile HX3521-G Appliance	Lenovo ThinkAgile HX7521 Appliance

The VPD string can be updated using the OneCLI system tool with the following command:

```
>onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier "Lenovo ThinkAgile HX1321 Appliance"
>onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx "Lenovo ThinkAgile HX1321 Appliance:" -override
```

For appliances with Intel Xeon Scalable processors, the VPD data must be updated with the machine type / model (MTM), serial number, and the description string.
The MTM can be updated using the OneCLI system tool with the following command usage example:

```
>onecli config set SYSTEM_PROD_DATA.SysInfoProdName 8693AC2
```

Note: For more information on how to use OneCLI, go to the Lenovo XClarity Essentials OneCLI Web site.

Legacy Boot Mode

The System Boot Mode setting in UEFI or LXPM should be set to Legacy Mode. In UEFI, the boot mode settings can be found under Boot Manager → Boot Modes. In LXPM, the boot mode settings can be found on the Getting Started page.
The OneCLI system tool also can be used to enable Legacy boot mode if not already enabled.

```
>onecli config set
BootModes.SystemBootMode "Legacy
Mode"
```

View LXPM

Legacy Boot Mode

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```
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BootModes.SystemBootMode "Legacy
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```
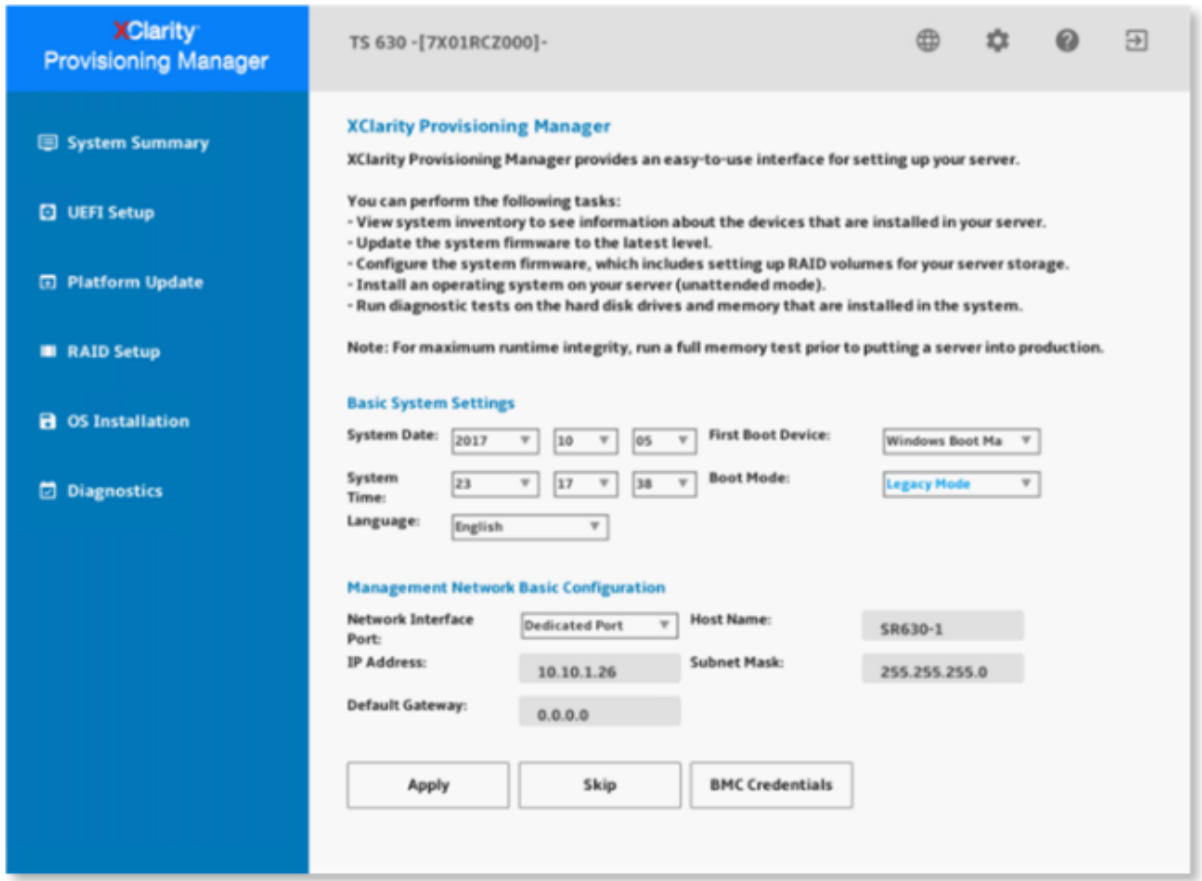

View UEFI



Disable option ROMs (for HX3500, HX5500, and HX7500)

By default, all of the option ROMs are enabled. The option ROMs for all N2215 HBAs must be disabled to ensure that HARD DISK 0 in the boot order uses the M1215 RAID adapter. This is a workaround to a problem whereby multiple option ROMs cannot load in Legacy boot mode without errors.
Select **System Settings > Devices and IO Ports > Enable / Disable Adapter Option ROM Support** in the UEFI setup menu to disable the option ROMs.
The OneCLI system tools also can be used to disable option ROMs.

For the HX3500 and HX5500, use the following command:

```
>onecli config set DevicesandIOPorts.Legacy_Slot9 disable
```

For the HX7500, use the following commands:

```
>onecli config set DevicesandIOPorts.Legacy_Slot9 disable
>onecli config set DevicesandIOPorts.Legacy_Slot4 disable
>onecli config set DevicesandIOPorts.Legacy_Slot6 disable
```

Note: Make sure that the slot 4 option ROM is not disabled for the HX3500 and HX5500 because that slot contains the first NIC adapter.

BIOS optimization settings – Direct cache access (DCA) mode

Enable DCA mode in the UEFI setup menu or LXPM for the processors to allow the network adapters to place data directly into the CPU cache which reduces cache misses and can improve performance.

The OneCLI utility also can be used to enable the DCA processor option:

```
>onecli config set Processors.DCA Enable
```

View LXPM

BIOS optimization settings – Direct cache access (DCA) mode

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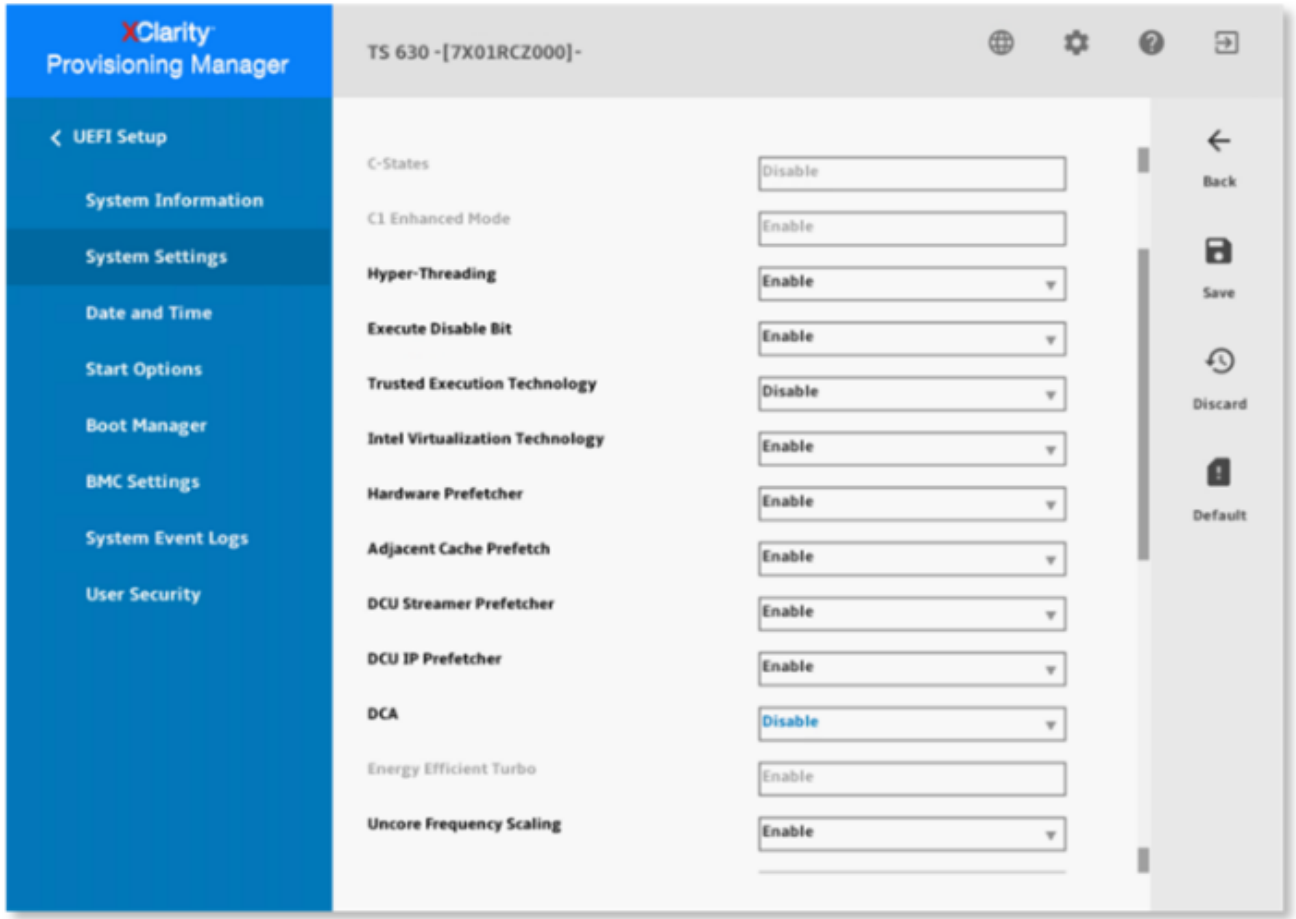
The OneCLI utility also can be used to enable the DCA processor option:

```
>onecli config set Processors.DCA
Enable
```

View UEFI



BIOS optimization settings – Operating mode

The server needs to be configured so that the hypervisor has control over power. Many customers prefer this as it saves on operating expenses (OPEX).
The operating mode needs to be changed from the default mode to Custom Mode. This permits other settings to be changed such as the power performance bias.
The OneCLI utility also can be used to set the operating mode:

```
>onecli config set
OperatingModes.ChooseOperatingMode
"Custom Mode"
```

View LXPM

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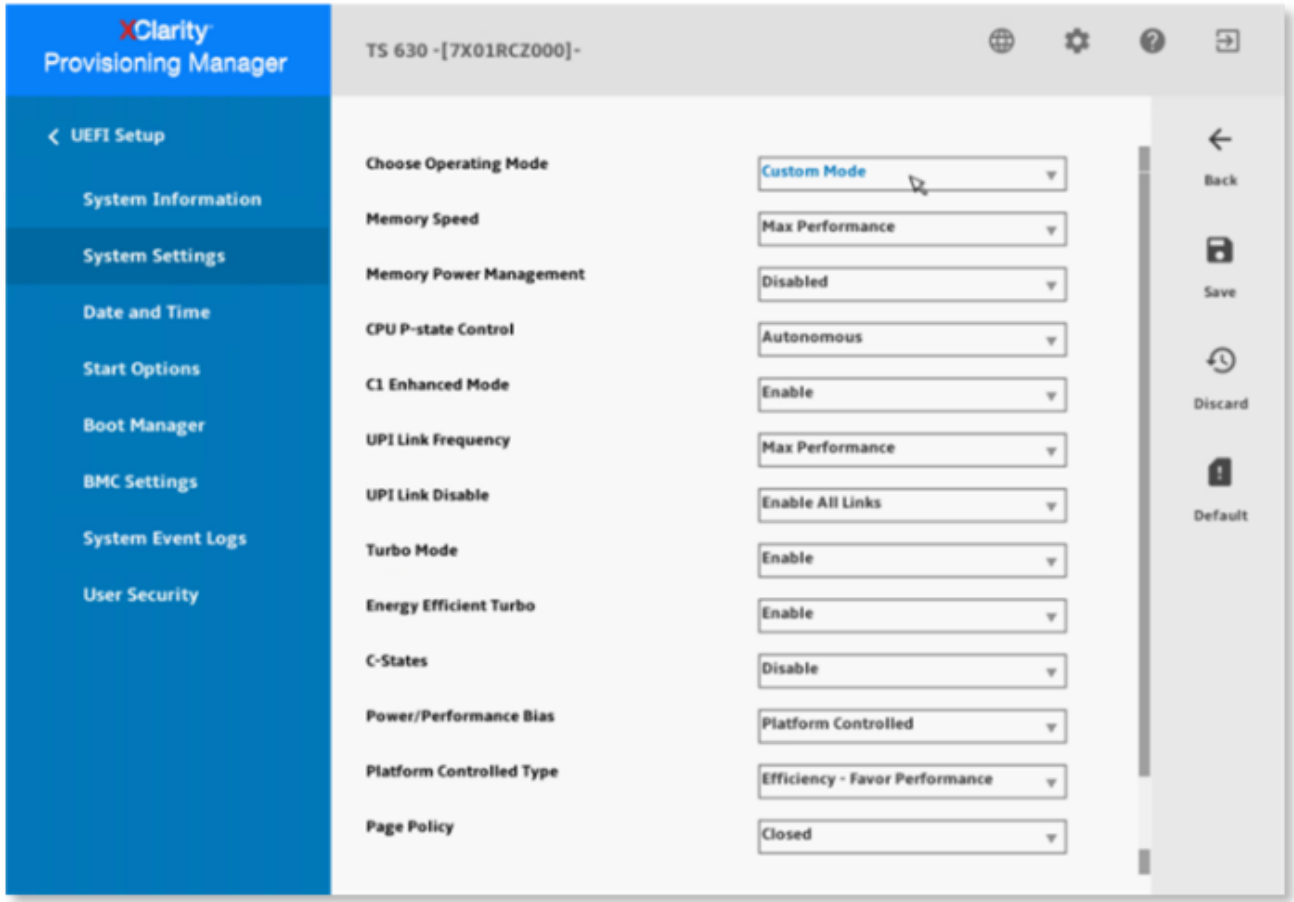
View UEFI

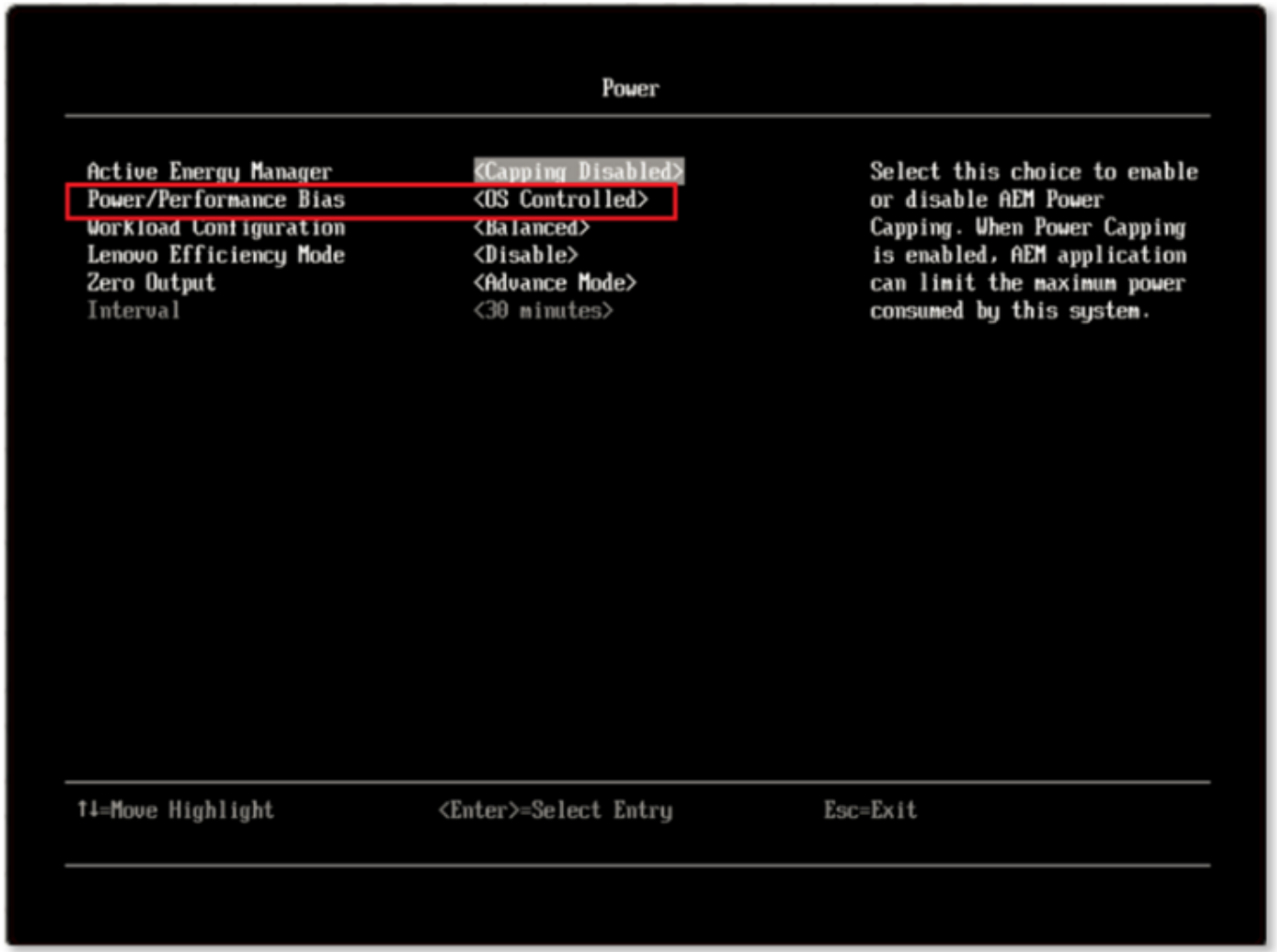


BIOS optimization settings – Power performance bias

This option must be changed to allow the OS (hypervisor) to control the node power. As a prerequisite, the Operating Mode must be changed to Custom mode first.
The OneCLI utility also can be used to set the power performance bias to OS Controlled:

```
>onecli config set
Power.PowerPerformanceBias "OS
Controlled"
```

View LXPM



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```
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Controlled"
```
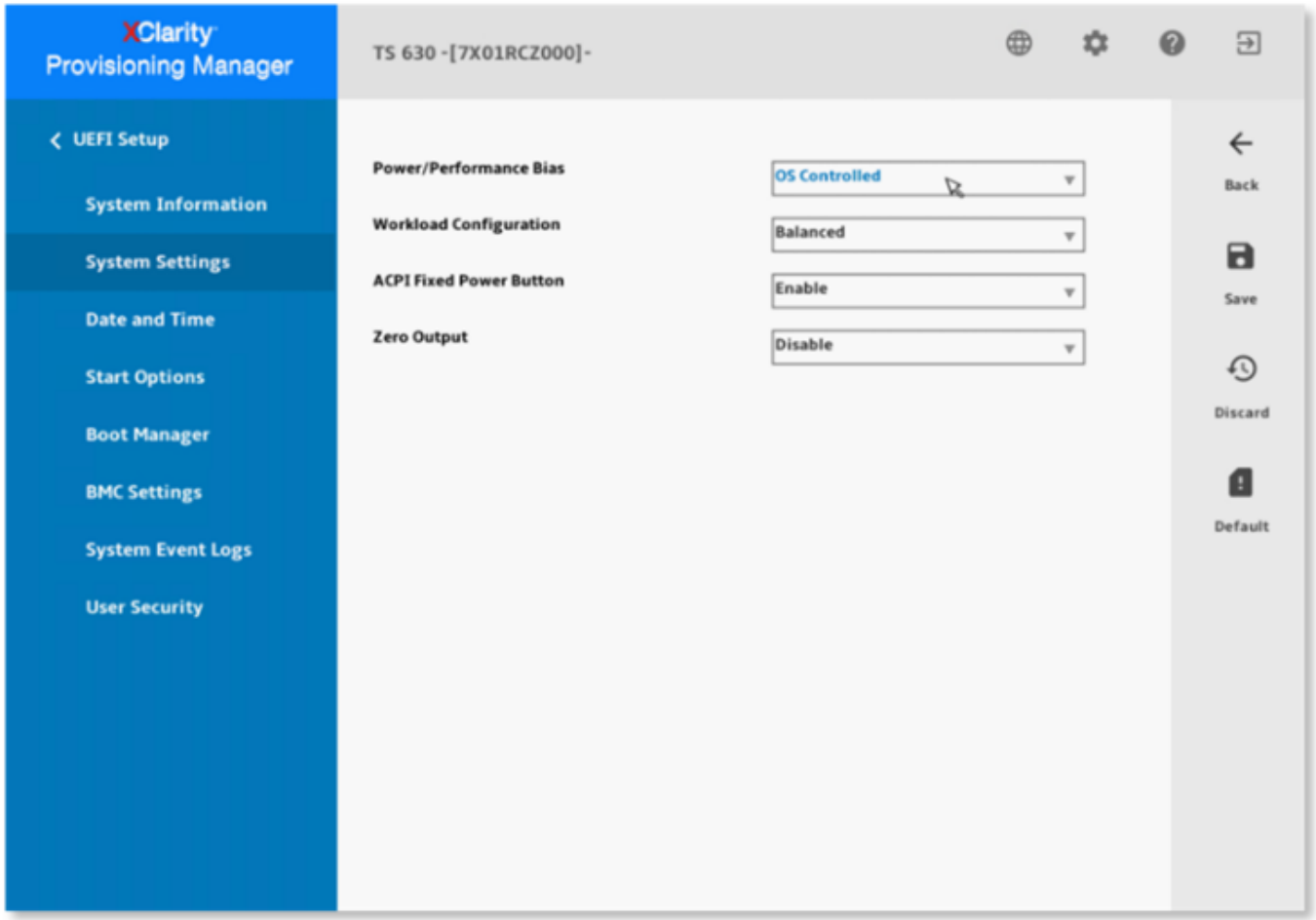
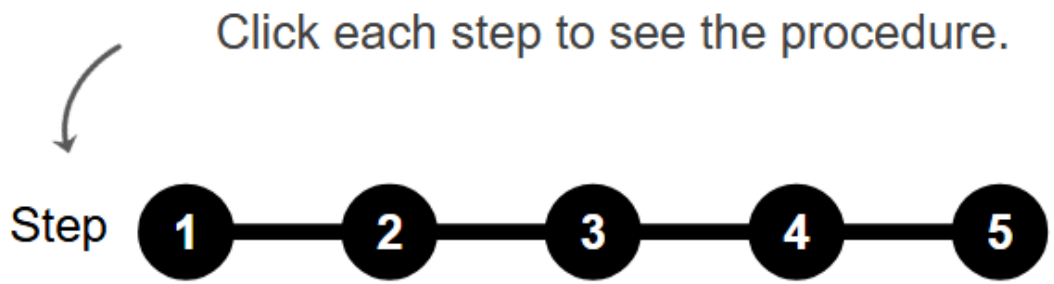

View UEFI



Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

A foreign configuration is a storage configuration that exists on a set of drives that a RAID controller sees for the first time. It is foreign to the RAID controller, and different to the factory default or existing configuration stored on the RAID controller. In addition, if one or more drives are removed from a configuration, by a cable pull or drive removal, for example, the configuration on those drives is considered a foreign configuration by the RAID controller.
If the M1215 RAID adapter has been replaced and the boot SSD was left untouched, then the foreign configuration can be imported from the SSD using the following procedure:



Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

Restart the server and look for the foreign configuration message:

```
Foreign configuration(s) found on adapter.
Press any key to continue or 'C' load the configuration utility,
or 'F' to import foreign configuration(s) and continue.
```


Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

Press **Enter** to get to the input field and type an **F** followed by **Enter**.

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Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

Look for the following message:

```
All of the disks from your previous configuration are gone. If this is an
unexpected message, then please power of your system and check your cables to
ensure all disks are present. Press any key to continue, or 'C' to load the
configuration utility.
```


Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

Press **Enter** to get to the input field and type any key except a **C** followed by **Enter**.

Import foreign configuration (HX3500, HX5500, and HX7500 appliances)

The following message indicates that the foreign configuration has been successfully imported:

```
2 Virtual Drive(s) found on host adapter.
```

The M1215 configuration can be verified by enable the appliance to boot and pressing F1 to enter the UEFI.

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Configure M.2 mirroring for Intel Xeon Scalable CPU appliances

The M.2 adapter used by the boot drive needs to be configured with a RAID 1 mirrored virtual drive in order for the hypervisor to be installed for booting. In the LXPM text mode, go to **System Settings** → **Storage** → **M.2 + Mirroring Kit Configuration Utility** → **Configuration Management**. Set the RAID options, and make sure that **RAID1** is selected as the RAID level. Select **Create** to create the RAID configuration.

The LXPM GUI mode can also be used to set up M.2 mirroring. Refer to the *ES51780B Servicing the ThinkSystem storage controllers* course for more information.