Lenovo Converged HX Series Hardware Replacement Guide

Contents

Chapter 1.   Introduction

This document describes the procedures for diagnosing and replacing hardware in the Lenovo Converged HX Series appliances.

Chapter 2 shows how to identify the location of parts in the appliances. Chapter 3 describes the diagnosis and part replacement procedures in detail. Chapter 4 describes software tools you can use to help configure the appliances. Chapter 5 contains details of the configuration procedures that may be required for some of the part replacement procedures.

Maintaining and replacing hardware consists of the following general steps:
- Identification and diagnosis of a problem
- Requesting a replacement part (customer replaceable unit – CRU) from Lenovo
- Shut down of the node unless it is a hot swap part
- Replacement of the part
- Power on of the node unless it is a hot swap part
- Verification that the problem has been solved by the part replacement
- Returning the failed part to Lenovo

Customer replaceable units (CRUs) are parts that can be replaced in the Lenovo Converged HX Series appliances. Note that parts cannot be removed or added.

Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request, you will be charged for the installation. Details of replacing the most important Tier 1 CRUs are listed below:
- Replacing a front HDD/SSD on page 6
- Replacing a power supply on page 7
- Replacing a chassis fan on page 8
- Replacing a network interface card on page 9
- Replacing an host bus adapter (HBA) on page 11
- Replacing a memory DIMM on page 13

You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge. Details of replacing the most important Tier 2 CRUs are listed below:
- Replacing a microprocessor on page 14
- Replacing the system motherboard on page 15

The following CRUs should only be installed by Lenovo, at no additional charge:
- Replacing the M1215 RAID adapter for boot drive on page 16
- Replacing the boot SSD on page 18

Chapter 2. Identification of parts

This chapter is helpful for locating parts for the Lenovo Converged HX Series appliances.

Figure 1 shows the front view of the Lenovo Converged HX3500 appliance.
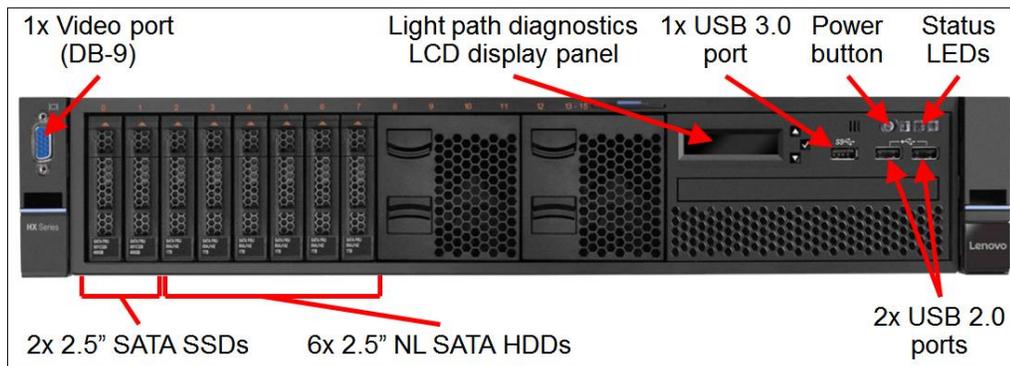
Figure 1. Lenovo Converged HX3500 front view

Figure 2 shows the front view of the Lenovo Converged HX5500 appliance.
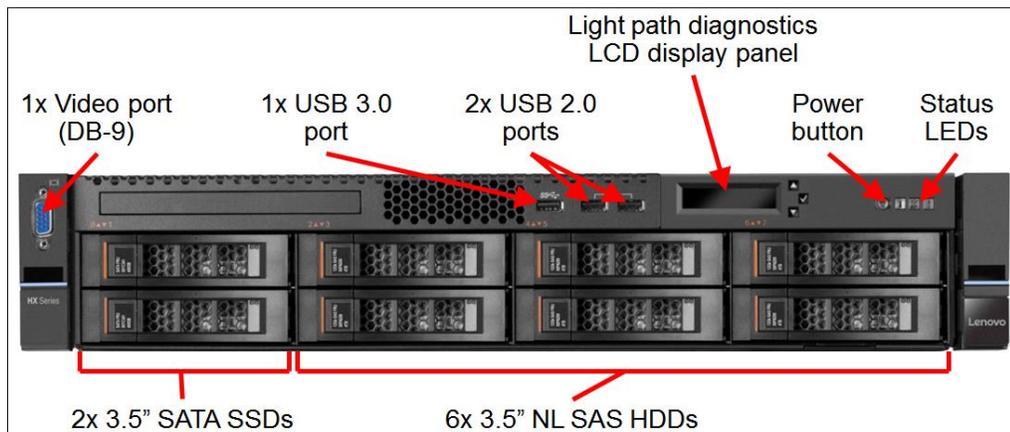
Figure 2. Lenovo Converged HX5500 front view

Figure 3 shows the front view of the Lenovo Converged HX7500 appliance.
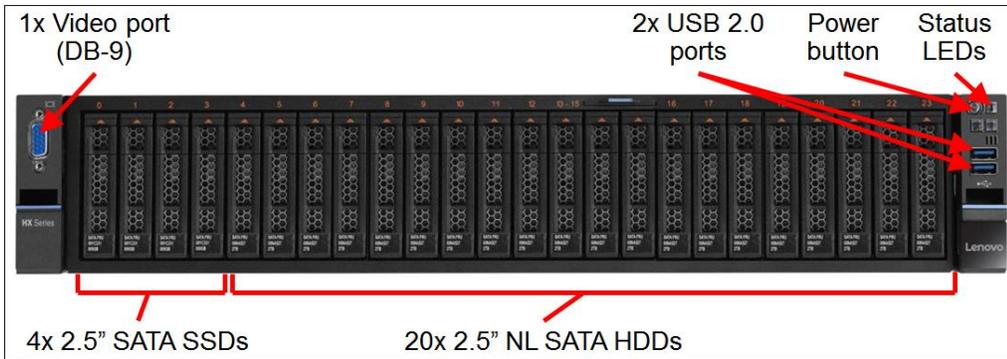
Figure 3. Lenovo Converged HX7500 front view

Figure 4 shows the rear view of the Lenovo Converged HX3500 and Lenovo Converged HX5500 appliances.
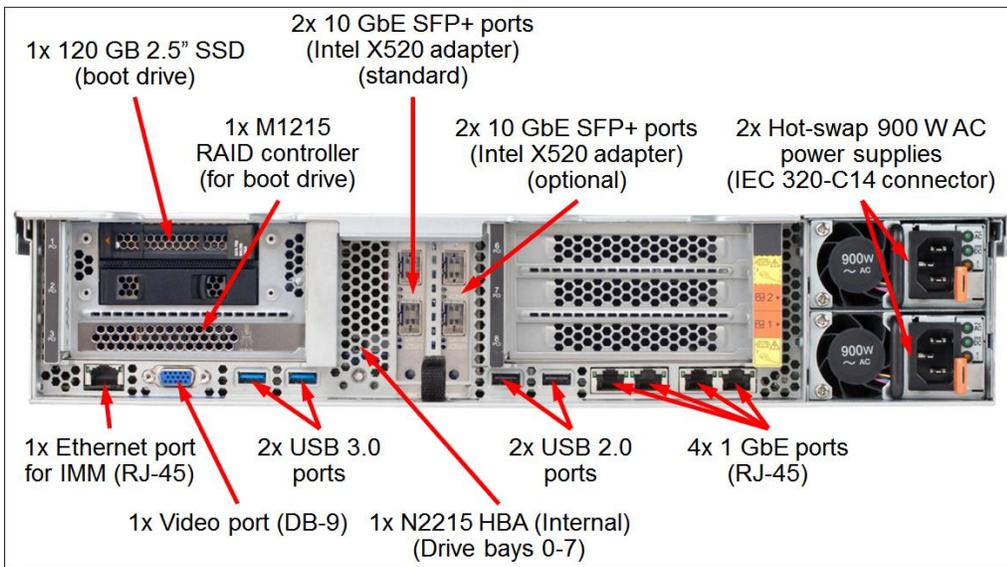

Figure 4. Lenovo Converged HX3500 and Lenovo Converged HX5500 rear view

Figure 5 shows the rear view of the Lenovo Converged HX7500 appliance.
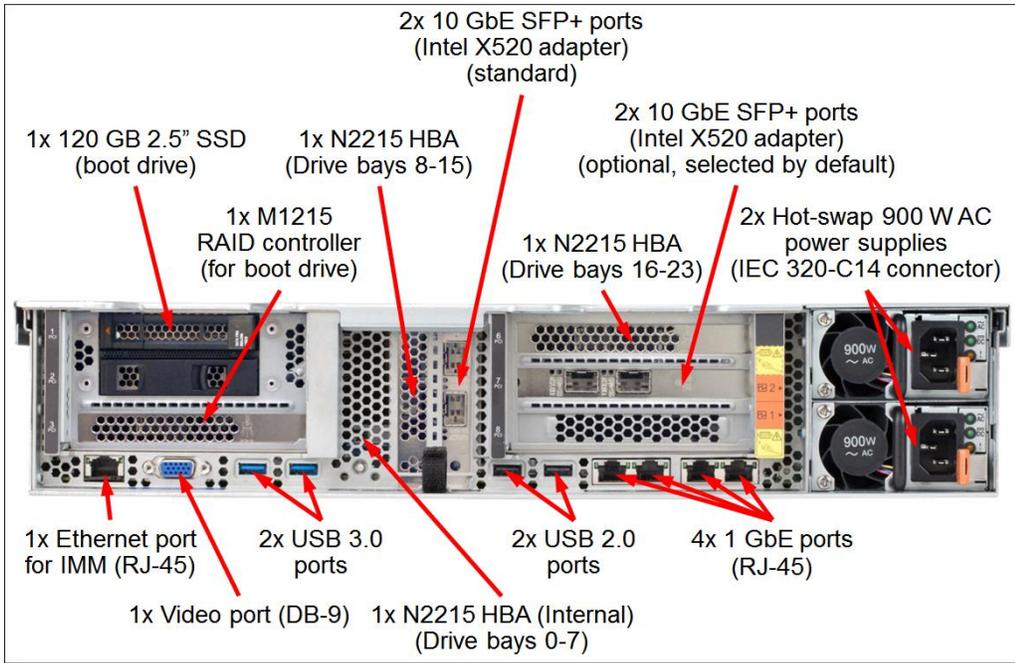
**Figure 5. Lenovo Converged HX7500 rear view**

Figure 6 shows the internal system motherboard and the location of parts.
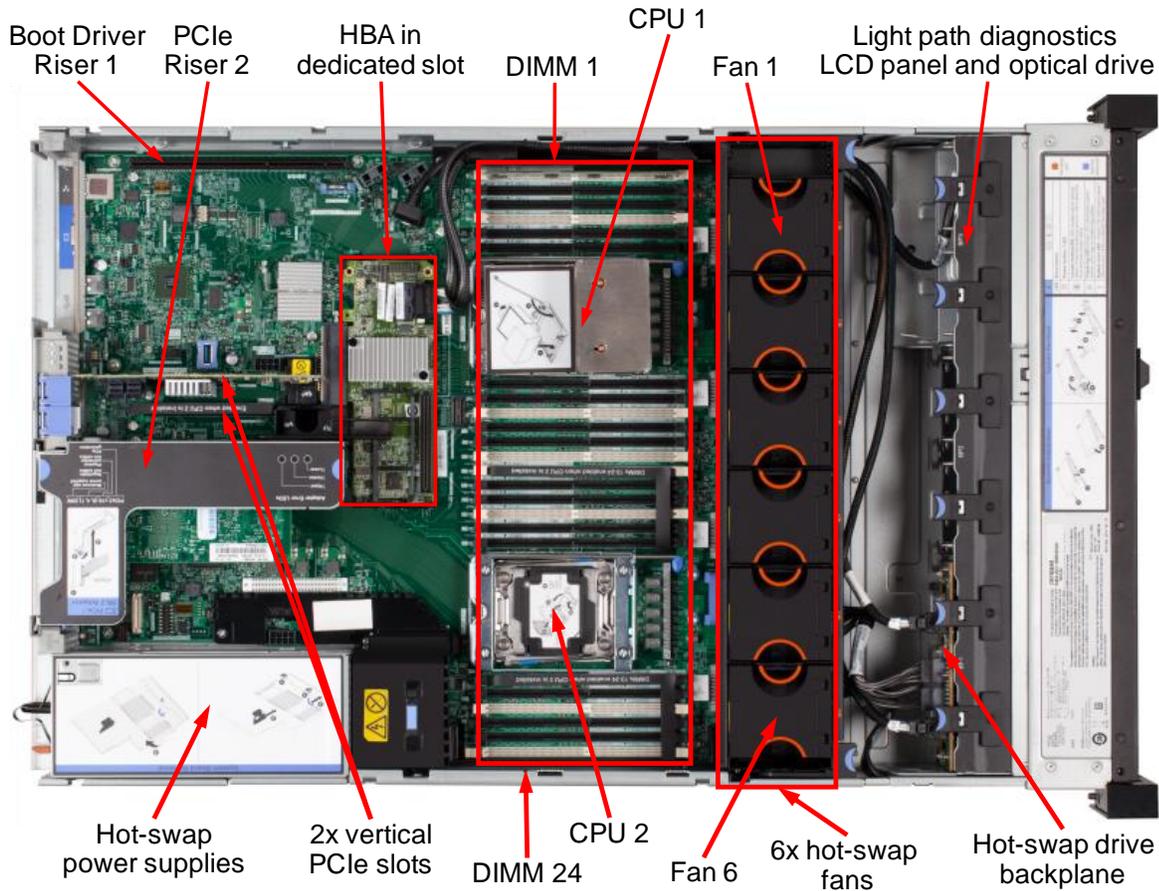
Figure 6. Inside view of the Lenovo Converged HX Series appliance

Chapter 3. Hardware replacement procedures

This chapter contains the detailed procedures for replacing hardware in the Lenovo Converged HX Series appliances. If you are instructed to return a part, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

The types of replaceable parts are:

- Structural parts: Purchase and replacement of structural parts such as chassis assembly, top cover, and bezel is your responsibility. If Lenovo acquires or installs a structural component at your request, you will be charged for the service.
- Tier 1 customer replaceable unit (CRU): Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request, you will be charged for the installation.
- Tier 2 customer replaceable unit (CRU): You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your server.

For information about the terms of the warranty, see the *Warranty Information* document that comes with the server.

For more information about getting service and assistance, see [Getting help and technical assistance](#) in the [Lenovo converged HX Series Quick Started Guide](#).

The remainder of this chapter contains instructions and procedures for removing and replacing the major parts in the Lenovo Converged HX Series appliances, one section per major part.

Replacing a front HDD/SSD

Each Lenovo Converged HX Series appliance contains solid state drives (SSDs) and hard disk drives (HDDs). User data is striped across these drives, so they are referred to as "data drives". While a node might be able to self-correct for a data drive failure, it does lead to system degradation. You should replace failed data drives as soon as possible. The indications of a failed data drive are:

- The Prism web console displays a disk alert.
- The red LED on the front of a drive carrier is illuminated.

The CRUs for the front hot swap drives are as follows:

Solid state drive, 2.5-inch hot-swap, SATA, Enterprise Performance, 400 GB	00YC326
Solid state drive, 2.5-inch hot-swap, SATA, Enterprise Performance, 800 GB	00YC331
Solid state drive, 3.5-inch hot-swap, SATA, Enterprise Performance, 400 GB	00YC341
Solid state drive, 3.5-inch hot-swap, SATA, Enterprise Performance, 800 GB	00YC346
Hard disk drive, 2.5-inch hot-swap, 1 TB, SATA, 7.2 K	00AJ142
Hard disk drive, 2.5-inch hot-swap, 2 TB, Near-Line SATA, 7.2 K	00NA527
Hard disk drive, 3.5-inch hot-swap, 2 TB, SAS, 7.2 K	00FN189
Hard disk drive, 3.5-inch hot-swap, 4 TB, SAS, 7.2 K	00FN209
Hard disk drive, 3.5-inch hot-swap, 6 TB, SAS, 7.2 K	00FN229

Figure 7. S3710 Enterprise performance SATA SSD in a 2.5-inch hot-swap form factor

To replace a SSD or HDD in the front of the appliance, perform the following steps:

1. To identify and prepare for replacing a failed data drive, use the Data Drive Failure procedure in the Nutanix Hardware Replacement Documentation.

2. Replace the hot swap drive as described in the Replacing a hot-swap hard disk drive procedure in the Lenovo Converged HX Series Installation and Service Guide.

3. Bring the data drive online by using the Completing Drive Replacement procedure in the Nutanix Hardware Replacement Documentation.

Replacing a power supply unit (PSU)

The Lenovo Converged HX Series appliances use two power supply units. If you are using 208V input power, the two power supplies are redundant. One power supply can meet the needs of the node. Although losing one of the two power supplies does not impact the operation of a node, you should replace a failed power supply unit as soon as possible to restore redundancy.

The indications of a failed power supply unit are:

- Orange warning LED on node front panel is on.
- Lenovo XClarity Administrator shows a power supply alert.
- Nutanix Prism web console shows a power supply alert.
- If using VMware ESXi, the vSphere client Hardware Status tab shows a power supply alert.

The CRU for the power supply is as follows:

900W High Efficiency Platinum AC Power Supply	94Y8146

Figure 8. 900W AC power supply

To replace a power supply, perform the following steps:

1. The Lenovo Converged HX Series appliances contain two power supplies. Identify the failed power supply by checking in Prism, XClarity Administrator or the indicator lights on the power supply units.

2. Disconnect the power cable for the power supply to be replaced being careful not to dislodge the other power cable.

3. Remove the power supply as described in the Removing a hot-swap ac power supply procedure in the Lenovo Converged HX Series Installation and Service Guide.

4. Replace the power supply as described in the Replacing a hot-swap ac power supply procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Reconnect the power cable.

6. Verify that the power supply has been successfully replaced by checking the following:
   - Orange warning light on the server front panel is extinguished.
   - Verify indicator lights on the power supply (two green LEDs).
   - No error shown in Lenovo XClarity Administrator.
   - No error shown in Prism.

Replacing a chassis fan

Failed or failing chassis fans can cause the system to overheat and shutdown. You should replace a failed chassis fan as soon as possible. The indications of a failed chassis fan include:

- An error in Lenovo XClarity Administrator
- An error in the Prism web console

The CRU for the chassis fan is as follows:

Fan	00KA516

Figure 9. Chassis fan

To replace a chassis fan, perform the following steps:

1. It is possible to replace the chassis fan while the system is powered on providing that the cable management arm is in place by pulling the node chassis out of the rack.

2. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

3. Replace the chassis fan with the error LED on as described in the Replacing a hot-swap fan procedure in the Lenovo Converged HX Series Installation and Service Guide.

4. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Push node chassis back into the rack.

6. Verify that the chassis fan has been successfully replaced by checking the following:
   - Error LED for the replaced fan is off.
   - Orange warning light on the node front panel is extinguished.
   - No error shown in Lenovo XClarity Administrator.
   - No error shown in Prism.

Replacing a network interface card (NIC)

The Lenovo Converged HX Series appliances can support up to eight network ports: two or four 10 GbE ports (up to 2 NICs) and four 1 GbE ports on the motherboard. A node sends all traffic through one 10 GbE port. A second 10 GbE port is set up as standby. A node requires network connectivity to function as part of a cluster. If one network interface is available, the failure of the other network interfaces does not cause service interruption but may cause service degradation.

The indications of a failed NIC include:

- No LED is illuminated for the network interface.
- Guest VM performance degrades.
- Guest VMs, the Nutanix web console, and nCLI are unavailable.
- VM migration fails with an error message such as the following:
  ```
  The migration was cancelled because the amount of changing memory for the VM was
  greater than the available network bandwidth
  ```

The CRU for the NIC is as follows:

Intel x520 Dual Port 10GbE SFP+ Adapter	49Y7962
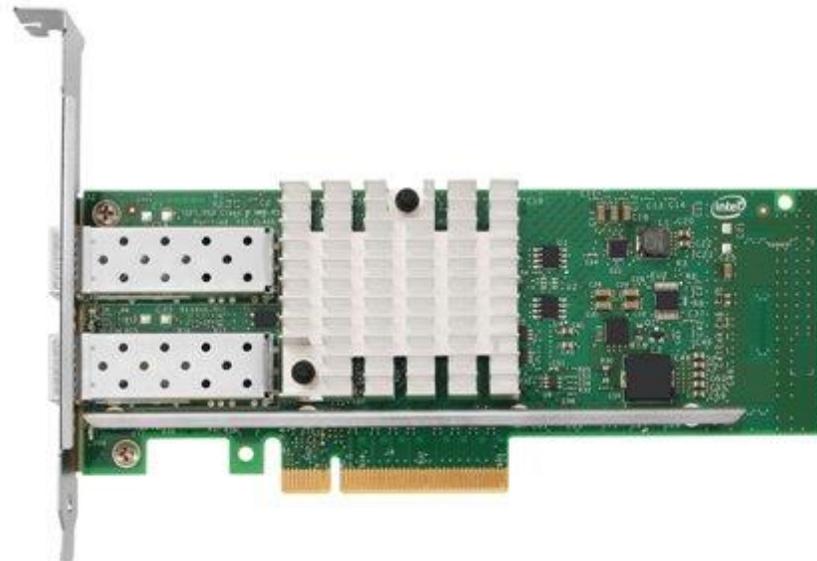
Figure 10. Intel X520 dual port 10GbE SFP+ adapter

To replace a NIC, perform the following steps:

1. The Lenovo Converged HX Series appliances contain one or two NICs. For nodes with two NICs, ensure you verify which one has failed. Identify the failed NIC by either checking in XClarity Administrator or checking the indicator lights on the network ports.

2. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

3. Power off the node and disconnect all the cables if the cable management arm is not in place. Pull the node chassis out of the rack.

4. Remove the top cover as described in the [Removing the top cover](#) procedure in the [Lenovo Converged HX Series Installation and Service Guide](#).

5. Replace the first (and sometimes only) NIC as described in the [Replacing an adapter in PCI expansion slot 4 or slot 5](#) procedure or replace the second NIC as described in the [Replacing an adapter in a riser-card assembly](#) procedure in the [Lenovo Converged HX Series Installation and Service Guide](#).

6. Replace the top cover as described in the [Replacing the top cover](#) procedure in the [Lenovo Converged HX Series Installation and Service Guide](#).

7. Push the node chassis back into the rack and reconnect the cables as necessary. Power on the node.

8. Start the node by following the hypervisor specific [Node Start](#) procedure described in the Nutanix [Hardware Replacement Documentation](#).

9. Verify that the NIC has been successfully replaced by checking the following:
   - Orange warning light on the node front panel is extinguished.
   - All network ports are again fully functional.

Replacing an host bus adapter (HBA)

While a node may be able to self-correct for other adapter card errors, a failed HBA can lead to system degradation and should be addressed as soon as possible.

The indications of a failed HBA card include:

- If using VMware ESXi, vCenter Alarms or Hardware Status shows an alert.
- The Prism web console shows a message similar to LSI HBA card not detected.
- Slow disk performance or slow system performance.
- The hypervisor cannot detect SSDs and HDDs or the red LEDs on the drives are illuminated.
- The CVM won't start because no storage controller resources are detected.
- The hypervisor or BIOS does not detect the HBA card.

The CRU for the HBA is as follows:

N2215 SAS/SATA HBA	47C8676
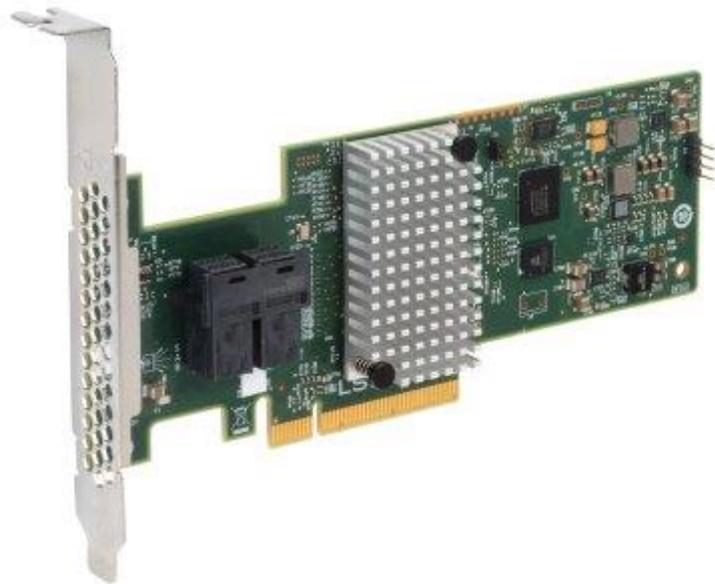
Figure 11. N2215 SAS/SATA HBA

To replace an HBA card, perform the following steps:

1. The HX3500 and HX5500 contain only one HBA adapter. For the HX7500 that has three HBA adapters, identify the failed HBA by either checking in XClarity Administrator or using the IMM web console to browse the post event log. The event log will contain information about the location of the failed HBA adapter.

2. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

3. Power off the node and disconnect all the cables if the cable management arm is not in place. Pull the node chassis out of the rack.

4. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Replace the failed HBA adapter using procedures from the Lenovo Converged HX Series Installation and Service Guide:

    *   For all 3 appliances, the first HBA adapter is installed on the system motherboard. It is replaced using the Replacing the dedicated slotless RAID controller procedure.

    *   The Lenovo Converged HX7500 contains an additional two HBA adapters with one installed in a riser and the other installed vertically in the motherboard. Use one of these two procedures to replace the HBA adapter:

        Replacing an adapter in a riser-card assembly

        Replacing an adapter in PCI expansion slot 4 or slot 5

6. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

7. Push the node chassis back into the rack and reconnect the cables as necessary. Power on the node.

8. It is likely that the CRU shipped to you has an earlier version of the firmware such as 1.04.04 which should not be used in the Lenovo Converged HX Series appliances. You must use XClarity Administrator, or other means, to update the firmware for the N2215 HBA to version 1.09.04 or later.

9. Verify that the HBA has been successfully replaced by checking the following:

    *   Orange warning light on the server is extinguished.

    *   If the controller VM starts and all of the drives are shown as online (8 for the HX3500 and HX5500, and 24 for the HX7500). If the Controller VM does not boot, you can verify if the LSI HBA card is detected using the `lspci` command:

    ```
    root@host lspci | grep –i SAS3008

    sas0000:82:00.0 Mass storage controller: LSI Logic / Symbios Logic SAS3008 PCI-
    Express Fusion-MPT SAS-3
    ```

    If the LSI HBA card is not present, ensure that the card is properly connected. If the card is still not detected, contact Lenovo support.

    If the system fails to boot from the boot drive after replacing the HBA, verify that the option ROM is turned off for the HBA adapter using the procedure in "Disable option ROMs" on page 22.

10. Start the node by following the hypervisor specific Node Start procedure described in the Nutanix Hardware Replacement Documentation.

Replacing a memory DIMM

While a node might be able to self-correct for certain memory errors, failed memory can lead to system degradation. Failed memory should be replaced as soon as possible. The indications of a failed DIMM are:

- A post error on boot
- An error in Lenovo XClarity Administrator
- An error in the Prism web console
- Not all memory is detected. For example, the appliance should have 256 GB per node and the host only shows 240 GB.

The CRUs for 16 GB or 32 GB memory DIMMs are as follows:

| 16 GB dual-rank 1.2 V, DDR4, 2133MHz, RDIMM | 46W0798 |
| 32 GB dual-rank 1.2 V, DDR4, 2133MHz, RDIMM | 95Y4810 |

Here are the steps for replacing a memory DIMM:

1. Identify the failed DIMM by either checking in XClarity Administrator or using the IMM web console to browse the post event log. The event log will contain information about the location of the DIMM fault.

2. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

3. Power off the node and disconnect all the cables if the cable management arm is not in place. Pull the node chassis out of the rack.

4. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Remove the air baffle as described in Removing the air baffle procedure in the Lenovo Converged HX Series Installation and Service Guide.

6. Replace the memory DIMM as described in the Replacing a memory module procedure in the Lenovo Converged HX Series Installation and Service Guide.

7. Replace the air baffle as described in the Replacing the air baffle procedure in the Lenovo Converged HX Series Installation and Service Guide.

8. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

9. Push the node chassis back into the rack and reconnect the cables as necessary. Power on the node.

10. Start the node by following the hypervisor specific Node Start procedure described in the Nutanix Hardware Replacement Documentation.

11. Verify that the DIMM memory failure is resolved by checking the following:
    - No error in the post event log.
    - No error shown in Lenovo XClarity Administrator.
    - No error shown in Prism.

Replacing a microprocessor

The Lenovo Converged HX Series appliances contain two Intel E5-2600v3 ("Haswell") microprocessors. Lenovo support may instruct you that a microprocessor needs to be replaced. This is a level 2 CRU.

The CRUs for the supported microprocessors are as follows:

Intel Xeon E5-2620 v3, 2.4 GHz, 15 MB, 1866 MHz, 85 W (6-core)	00AE690
Intel Xeon E5-2630 v3, 2.4 GHz, 20 MB, 1866 MHz, 85 W (8-core)	00AE689
Intel Xeon E5-2643 v3, 3.4 GHz, 25 MB, 2133 MHz, 135 W (6-core)	00AE695
Intel Xeon E5-2660 v3, 2.6 GHz, 25 MB, 2133 MHz, 105 W (10-core)	00AE685
Intel Xeon E5-2680 v3, 2.5 GHz, 30 MB, 2133 MHz, 120 W (12-core)	00AE683
Intel Xeon E5-2697 v3, 2.6 GHz, 35 MB, 2133 MHz, 145 W (14-core)	00AE680
Intel Xeon E5-2699 v3, 2.3 GHz, 45 MB, 2133 MHz, 145 W (18-core)	00KC789

To replace a microprocessor, perform the following steps:

1. Make sure you know which microprocessor is to be replaced. You can identify the failed microprocessor by either checking in XClarity Administrator or the POST error log on the IMM console.

2. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

3. Power off the node, disconnect all cables, and remove the node from the rack.

4. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Remove the air baffle as described in the Removing the air baffle procedure in the Lenovo Converged HX Series Installation and Service Guide.

6. Replace the microprocessor as described in the Replacing a microprocessor and heat sink procedure in the Lenovo Converged HX Series Installation and Service Guide.

7. Replace the air baffle as described in the Replacing the air baffle procedure in the Lenovo Converged HX Series Installation and Service Guide.

8. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

9. Return the node to the rack, reconnect the cables as necessary and power on the node.

10. Start the node by following the hypervisor specific Node Start procedure described in the Nutanix Hardware Replacement Documentation.

11. Verify that the microprocessor has been successfully replaced by checking the following:
    - Orange warning light on the node front panel is extinguished.
    - Post error log in the IMM

Replacing the system motherboard

Lenovo support may instruct you that the system motherboard needs to be replaced. This is a level 2 CRU.

The CRU for the system motherboard is as follows:

System board	00YJ424

To replace the system motherboard, perform the following steps:

1. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

2. Power off the node, disconnect all cables to the node, and remove the node from the rack as necessary.

3. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

4. Replace the system motherboard as described in the Removing the system board procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Replace the system motherboard as described in the Replacing the system board procedure in the Lenovo Converged HX Series Installation and Service Guide.

6. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

7. Return the node to the rack and reconnect the cables as necessary. Power on the node.

8. Verify that the system motherboard has been successfully replaced by checking the following:
   - Orange warning light on the node front panel is extinguished.
   - System boots successfully with no POST errors or other errors.

9. Stop the startup process at the main IMM menu screen to configure the IMM for the new system motherboard as a Lenovo Converged HX appliance using the following procedures in Chapter 5 of this document:
   - Update the server VPD data
   - Legacy boot mode
   - Disable option ROMs
   - BIOS optimization settings
   - Modify boot options

10. Save the IMM settings and boot into the hypervisor.

11. Start the node by following the hypervisor specific Node Start procedure described in the Nutanix Hardware Replacement Documentation.

Replacing the M1215 RAID adapter for boot drive

Lenovo support may instruct you that the M1215 RAID adapter for the boot drive needs to be replaced. This procedure should be performed by a trained Lenovo field representative.

The CRU for the M1215 RAID adapter is as follows:

ServeRAID M1215 SAS/SATA controller	46C9115

Figure 12. ServeRAID M1215 SAS/SATA controller

Chapter 5To replace the M1215 RAID controller, perform the following steps:

1. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

2. Power off the node and disconnect all the cables if the cable management arm is not in place. Pull the node chassis out of the rack.

3. Remove the top cover as described in the Removing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

4. Replace the M1215 RAID controller as described in the Replacing an adapter in the rear two hard-disk-drive kit procedure in the Lenovo Converged HX Series Installation and Service Guide.

5. Replace the top cover as described in the Replacing the top cover procedure in the Lenovo Converged HX Series Installation and Service Guide.

6. Push the node chassis back into the rack and reconnect the cables as necessary. Power on the node.

7. Verify that the M1215 RAID controller has been successfully replaced by checking the following:
   - Orange warning light on the node front panel is extinguished.
   - System boots successfully with no POST errors or other errors.

8. Stop the startup process at the main IMM menu screen to configure the M1215 RAID controller to recognize the boot drive using the following procedure in Chapter 5 of this document:
   - Import foreign configuration

If the foreign configuration could not be imported correctly, reboot the server and try the import procedure again. If it still fails then you will need to recreate the boot partition and reinstall the hypervisor using the following procedure:

- Configure boot drive virtual drives
- Select virtual drive for booting

9. Use the Phoenix installer to reinstall the hypervisor and CVM by following the "Imaging a Node" procedure in the appendix of the Nutanix Field Installation Guide.

Replacing the boot SSD

Lenovo support may instruct you that the boot SSD needs to be replaced. This should be performed by a trained Lenovo field representative.

The CRU for the boot SSD is as follows:

Solid state drive, 2.5-inch hot-swap, SATA, 120 GB	00AJ396

Figure 13. Location of rear boot SSD

To replace the boot SSD, perform the following steps:

1. Shut down the node by following the hypervisor specific Node Shutdown procedure described in the Nutanix Hardware Replacement Documentation.

2. Replace the boot SSD in the rear boot drive using the following procedure:
   a. Locate the boot drive SSD at the rear of the appliance in the rear boot drive riser.
   b. Slide the latch to unlock the drive handle.
   c. Grasp the handle and slide the drive out of the drive bay.
   d. Make sure that the tray handle is in the open (unlocked) position.
   e. Align the drive with the guide rails in the bay.
   f. Gently push the drive into the bay until the drive stops.
   g. Rotate the tray handle to the closed (locked) position.

3. Power on the node.

4. Verify that the boot drive has been successfully replaced by checking the following:
   - If the yellow status LED of the boot SSD drive is lit continuously, that drive is faulty and must be replaced. If the green activity LED of the boot SSD is flashing, the drive is ok.
   - Orange warning light on the node front panel is extinguished.
   - System boots successfully with no POST errors or other errors.

5. Stop the startup process at the main IMM menu screen to configure the boot SSD for the Lenovo Converged HX Series appliances using the following procedure in Chapter 5 of this document:
   - Configure boot drive virtual drives
   - Select virtual drive for booting

6. Use the Phoenix installer to reinstall the hypervisor and CVM by following the Imaging a Node procedure in the appendix of the Nutanix Field Installation Guide.

Chapter 4.   Software Tools

You may use the following software tools to make it easier to configure the appliance:

- Advanced Settings Utility (ASU)
- StorCLI Utility for Storage Management

Advanced Settings Utility

The ASU tool is a scriptable command line program. You can use the ASU tool on multiple operating-system platforms to perform the following tasks:

- Modify selected basic input/output system (BIOS) CMOS settings without restarting the system to access F1 settings.
- Modify selected baseboard management controller setup settings.
- Modify selected Remote Supervisor Adapter and Remote Supervisor Adapter II setup settings.
- Modify selected settings in the integrated management module.
- Modify a limited number of VPD settings .
- Remote connectivity to support setting all the listed firmware types settings. Remote connection support requires accessing the IMM external port over a LAN.

For more information and to download the ASU program, go to the Advanced Settings Utility (ASU) for Lenovo x86 servers website.

StorCLI Utility for Storage Management

The StorCLI program is a Linux-based scriptable command line program. You can use it an alternative to rebooting the server and accessing the configuration of the M1215 RAID through the BIOS screen by pressing F1.

To use this program you will need to boot the system into a Linux Operating System using the Remote disk facility.

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 website.

Chapter 5.   Configuration procedures

The chapter contains configuration procedures that are used in one or more of the hardware replacement procedures described in Chapter 3.

The remainder of this chapter contains the procedures for configuring the firmware for the Lenovo Converged HX Series appliances.

Update the server VPD data

The VPD string for the Lenovo Converged HX Series appliance is the same as the appliance name.

Appliance Name	VPD String
Lenovo Converged HX3500	Lenovo Converged HX3500
Lenovo Converged HX5500	Lenovo Converged HX5500
Lenovo Converged HX7500	Lenovo Converged HX7500

The VPD data item can be updated using the ASU system tool as follows:

```
>asu64 set SYSTEM_PROD_DATA.SysInfoProdIdentifier "Lenovo Converged HX3500"

>asu64 set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx "Lenovo Converged HX3500:" --force
```

Legacy boot mode

The ASU system tool, or other means, should be used to enable Legacy boot mode if not already enabled.

```
>asu64 set BootModes.SystemBootMode "Legacy Mode"
```

Figure 14 shows where to change the setting using the IMM console.

Figure 14. Legacy Boot Mode

Disable option ROMs

The option ROMs for all N2215 HBAs need to be disabled to ensure that "HARD DISK 0" in the boot order uses SSD boot drive connected to the M1215 RAID adapter.

Use the ASU system tool, or other means, to disable the option ROM(s).

For the Lenovo Converged HX3500 and Lenovo Converged HX5500 appliances:

```
>asu64 set DevicesandIOPorts.Legacy_Slot9 disable
```

For the Lenovo Converged HX7500 appliance:

```
>asu64 set DevicesandIOPorts.Legacy_Slot9 disable
>asu64 set DevicesandIOPorts.Legacy_Slot4 disable
>asu64 set DevicesandIOPorts.Legacy_Slot6 disable
```

Alternatively use the IMM console to disable the option ROMs by using the "System Settings > Devices and IO Ports > Enable / Disable Adapter Option ROM Support" menu. Figure 15 shows where to change the setting for the Lenovo Converged HX7500.
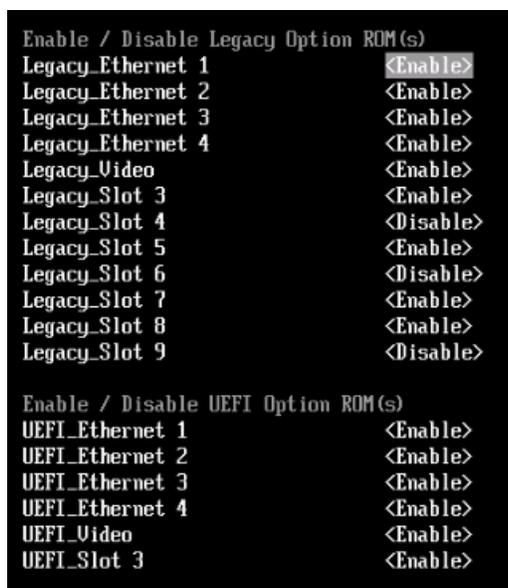

Figure 15. Disable Option ROMs

BIOS optimization settings

Lenovo recommends the following BIOS optimization settings to be used with the Lenovo Converged HX Series appliances.

Direct cache access (DCA)

You should enable DCA mode for the processors to allow the network adapters to place data directly into the CPU cache which reduces cache misses and can improve performance.

Use the ASU system tool, or other means, to enable the DCA processor option:

```
>asu64 set Processors.DCA Enable
```

Figure 16 shows where to change the setting using the IMM console.
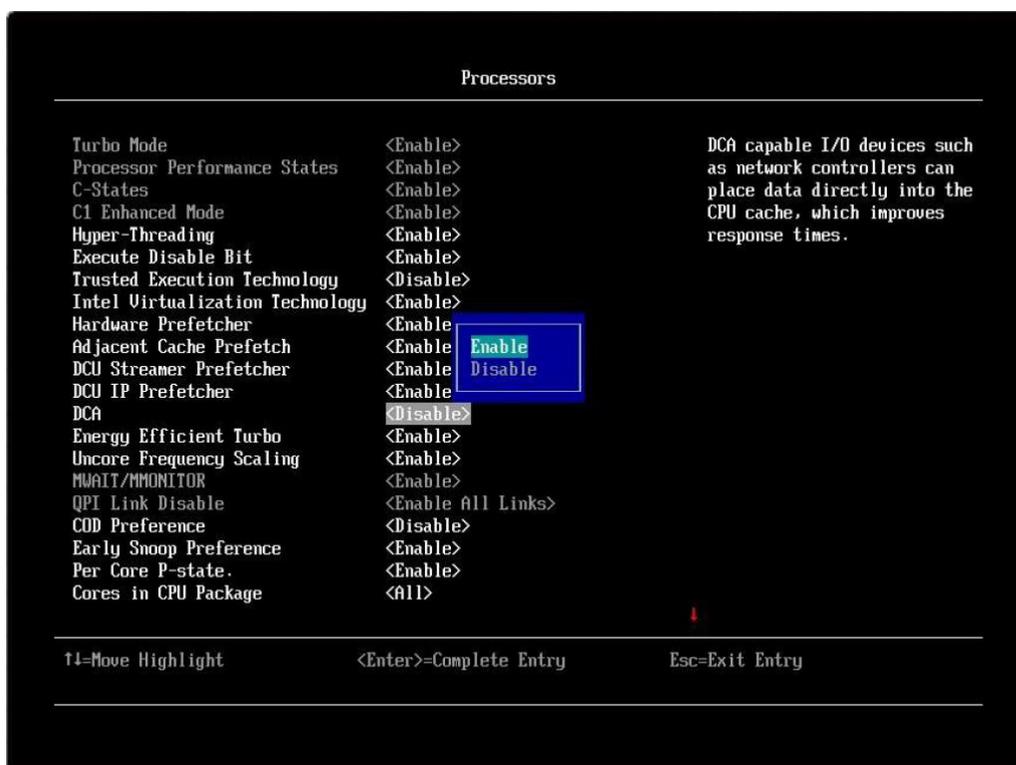
Figure 16. Direct Cache Access (DCA)

Operating mode

You should change the operating mode from the default mode to "Custom Mode". This permits other settings to be changed such as the power performance bias.

Use the ASU system tool, or other means, to set the operating mode:

```
>asu64 set OperatingModes.ChooseOperatingMode Custom
```

Figure 17 shows where to change the setting using the IMM console.

Figure 17. Operating Mode

Power performance bias

This option allows the OS (hypervisor) to control the node power. Many customers prefer this setting as it saves on OPEX.

Use the ASU system tool, or other means, to set the power performance bias to "OS Controlled":

```
>asu64 set Power.PowerPerformanceBias "OS Controlled"
```

Figure 18 shows where to change the setting using the IMM console.
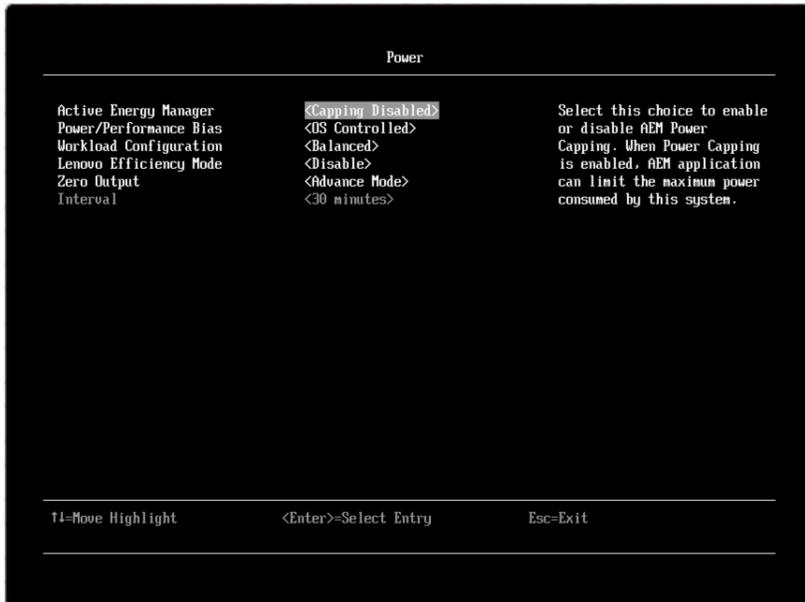
Figure 18. OS Controlled

Modify boot options

Use the ASU system tool, or other means, to configure the boot order as follows:

1. CD/DVD Rom

2. Hard Disk 0

3. PXE Network

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

Figure 19 shows the final boot order in the IMM console.

Figure 19. Boot Order

Import foreign configuration

If you have replaced the M1215 RAID adapter in your appliance but left the boot SSD untouched then you should be able to import the foreign configuration from the SSD using the following procedure.

1. Reboot 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.
   ```

2. Press "Enter" to get to the input field and type a "F" followed by "Enter".

3. 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.
   ```

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

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

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

You should verify the M1215 configuration by allowing the appliance to boot and pressing F1 to enter the IMM. Figure 23 shows the correct configuration for the M1215 RAID controller.

Configure boot drive virtual drives

The boot SSD is configured with two virtual drives where the first 100 GB is used for the Hypervisor and the remaining 10.827 GB is used for the Phoenix installer. Note that if the SSD is in JBOD mode, then the drive must be set to "Unconfigured Good". Note that virtual drive names of HYPERVISOR and PHOENIX must be all capitals and spelled correctly.

Use the storcli utility, or other means, to initialize the boot SSD and configure the virtual drives:
>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

The following detailed steps can be followed using the IMM console to configure the M1215 RAID controller:

1. Select system settings
2. Select storage
3. Select AVAGO MegaRaid controller
4. Select Configure
5. Select Clear Configuration
6. Confirm
7. Select Create Virtual Drive
8. Select "Select Drives"
9. Change media type to SSD
10. Check only drive available

Figure 20. Configuration of virtual drives

11. Apply changes and confirm
12. Set virtual drive name to "**HYPERVISOR**" (hit "return" to edit)
13. Configure drive size to 100 GB

Figure 21. Configuring "HYPERVISOR" virtual drive

14. Save configuration and confirm

15. Escape and select Create Virtual Drive – Advanced

16. Set Select Drives From "Free Capacity"

17. Select "Select Drive Groups"

18. Select only available drive group and apply changes

19. Set virtual drive name to "**PHOENIX**" (hit "return" to edit)

20. Save configuration and confirm

Figure 22. Configuring "PHOENIX" virtual drive

Select virtual drive for booting

For the field installation process, the virtual drive labelled "HYPERVISOR" should be selected as the default boot drive.

Use the storcli utility, or other means, to select the HYPERVISOR virtual drive for booting:
>storcli64 /c0/v0 set bootdrive=on

Figure 23 shows where to change the default boot device using the IMM.

```
                          Controller Management


     BASIC PROPERTIES:                                Selects the primary bootable
     Product Name              ServeRAID M1215         device.
     Serial Number             SV53439099
     Controller Status         <Optimal>
     Select Boot Device        <Virtual Drive 0: HYPERVISOR,
                               RAID0, 100GB, Optimal>
     PCI ID                    0x1000I0x005FI0x1014I0x0456
     PCI Slot Number           1
     Package Version           24.9.0-0026
     Firmware Version          4.290.01-4694
     NVDATA Version            3.1507.01-0009
     Connector Count           [2]
     Drive Count               [1]
     Virtual Drive Count       [2]
   ▶ Advanced Controller Management
   ▶ Advanced Controller Properties




     ↑↓=Move Highlight          <Enter>=Select Entry          Esc=Exit
```

Figure 23. Boot device

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