

Problem determination and troubleshooting

Hardware failures, CVM warning messages, AHV boot warnings, and TMM/IMM2/LXCC Web-user interface

The Lenovo logo is a red rectangular block with the word "Lenovo" written vertically in white, sans-serif font.

Lenovo

Problem determination and troubleshooting overview

When starting a troubleshoot process on the Lenovo ThinkAgile HX Series, perform the following actions:

- Inquire about the event that occurred before the suspected system problem. If possible, return the system to the previous state.
- Confirm the supported firmware levels on the current system.
- Record the symptoms including poor performance and error messages.
- Determine whether the problem is repeatable.

Data collection

Data collection is the primary step in determining the correct service action to perform to resolve a client's issue. Whether the data collected is verbal from the client (“...the front panel LED is flashing...”) or a diagnostic data file from a specialized application, all information that is collected is useful toward identifying one of the four available service actions that you can perform. The four actions are:

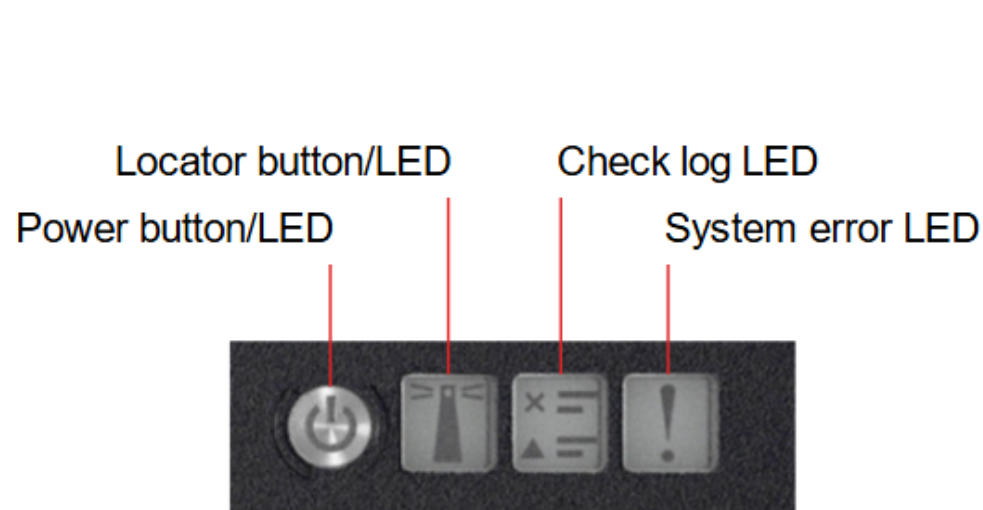
- Update (firmware, microcode, device drivers, and software)
- Reconfigure (parameter values, cabling, component reseats, and system reboots)
- Replace hardware
- Escalate to the next service level

Users can inspect seven error report areas to collect objective information for the Lenovo ThinkAgile HX Series appliance:

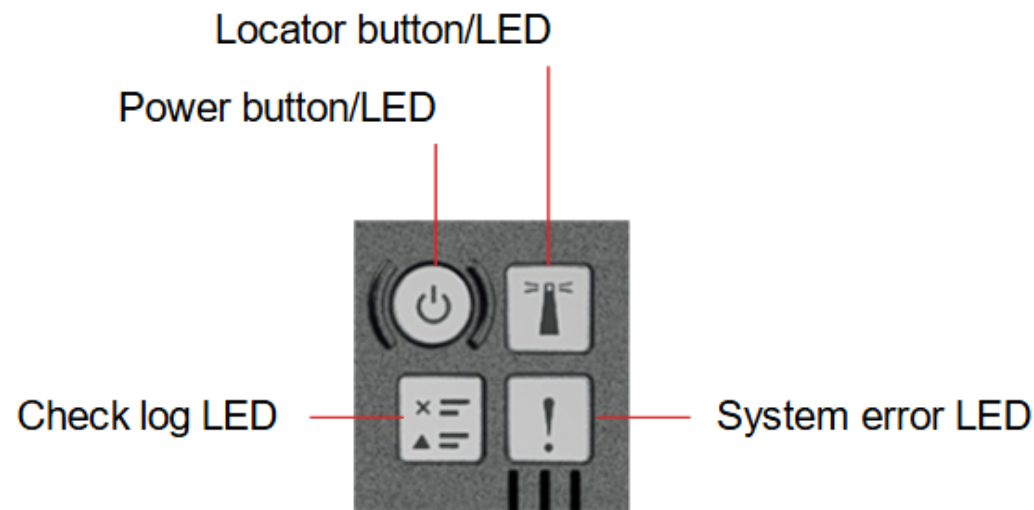
- Status LEDs on the server chassis
- LCD system information display panel on the front bezel
- Internal LEDs inside the server
- TMM, IMM2, or LXCC event log
- DSA preboot or LXPM diagnostics tool
- System Event Log in UEFI and LXPM
- XClarity Administrator
- Prism Web Console

Status LEDs for non-Intel Xeon Scalable CPU servers

There are two types of status LEDs for the non-Intel Xeon Scalable CPU server chassis:



LEDs for HX1310, HX2310, HX2710, HX3310, HX3510, HX3710, and HX5510

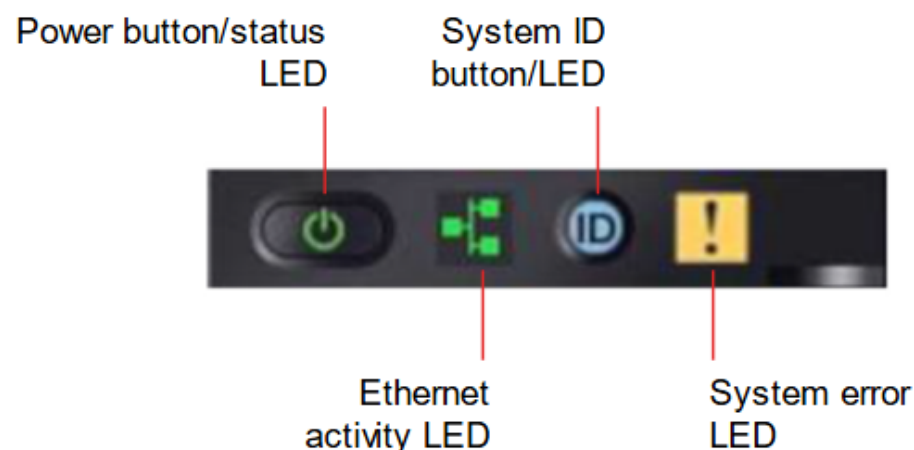


LEDs for HX7510

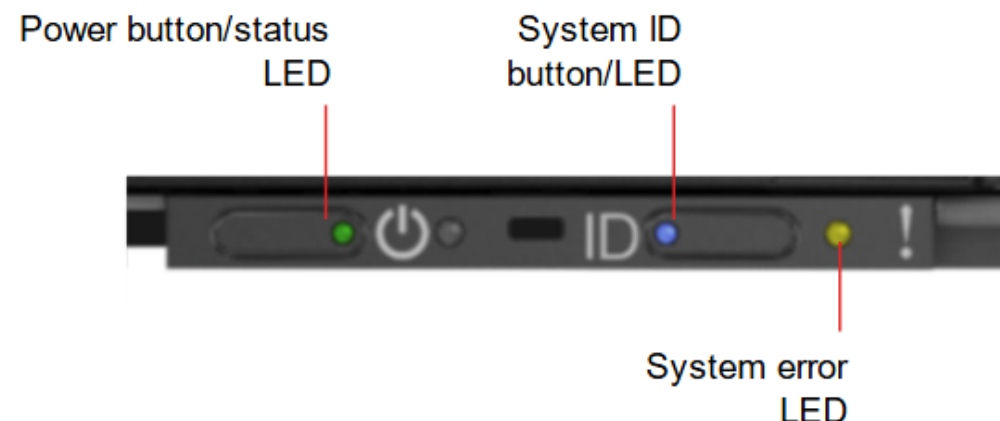
Move cursor over LED to show status description.

Status LEDs for Intel Xeon Scalable CPU servers

The status LEDs for single node server HX1320, HX1321, HX1520-R, HX1521-R, HX2320-E, HX3320, HX3321, HX3520-G, HX3521-G, HX5520, HX5521, HX5520-C, HX5521-C, HX7520, HX7521, HX7820, and HX7821 are on the front chassis. The status LEDs for multiple node server HX2720-E, HX3720, and HX3721 are on the node and not the chassis.



LEDs for HX1320, HX1321, HX3320, HX3321, HX5520, HX5521, HX5520-C, HX5521-C, HX7820, and HX7821



LEDs for HX2720-E, HX3720, and HX3721

Move cursor over LED to show status description.

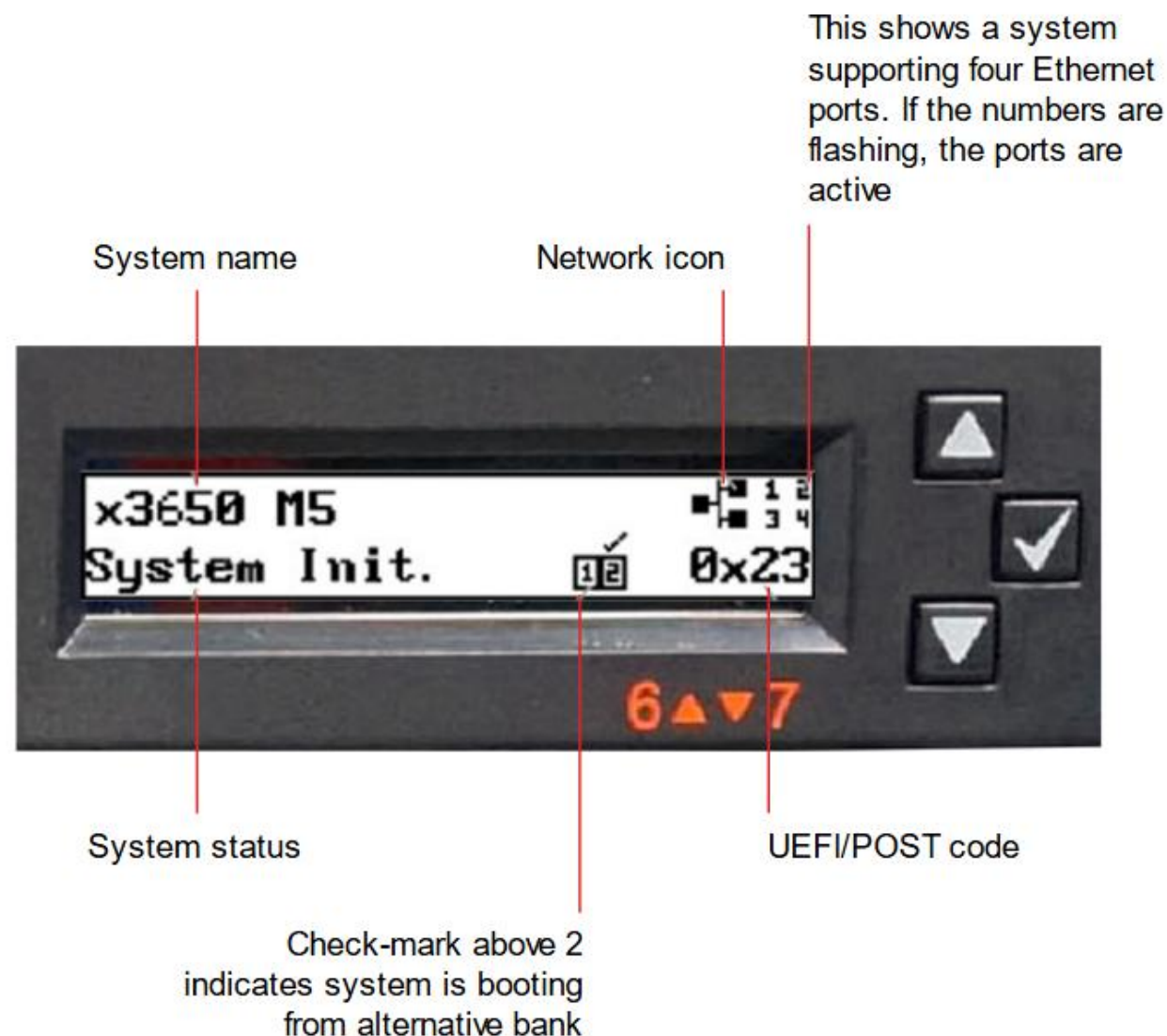
LCD system information display panel

Many of the appliance support the LCD system information panel. The LCD panel is attached to the front bezel of the server. This panel enables users to have quick access to system status, firmware, network, and health information.

When users navigate through the hierarchy of the menu options on the LCD system information operating panel assembly, the display panel shows the information for that option and the up and down arrows appear on the side of the display panel.

When users get to the bottom of the hierarchy of the menu options, only the up arrow is available. When users are at the top of the hierarchy of the menu options, only the down arrow is available.

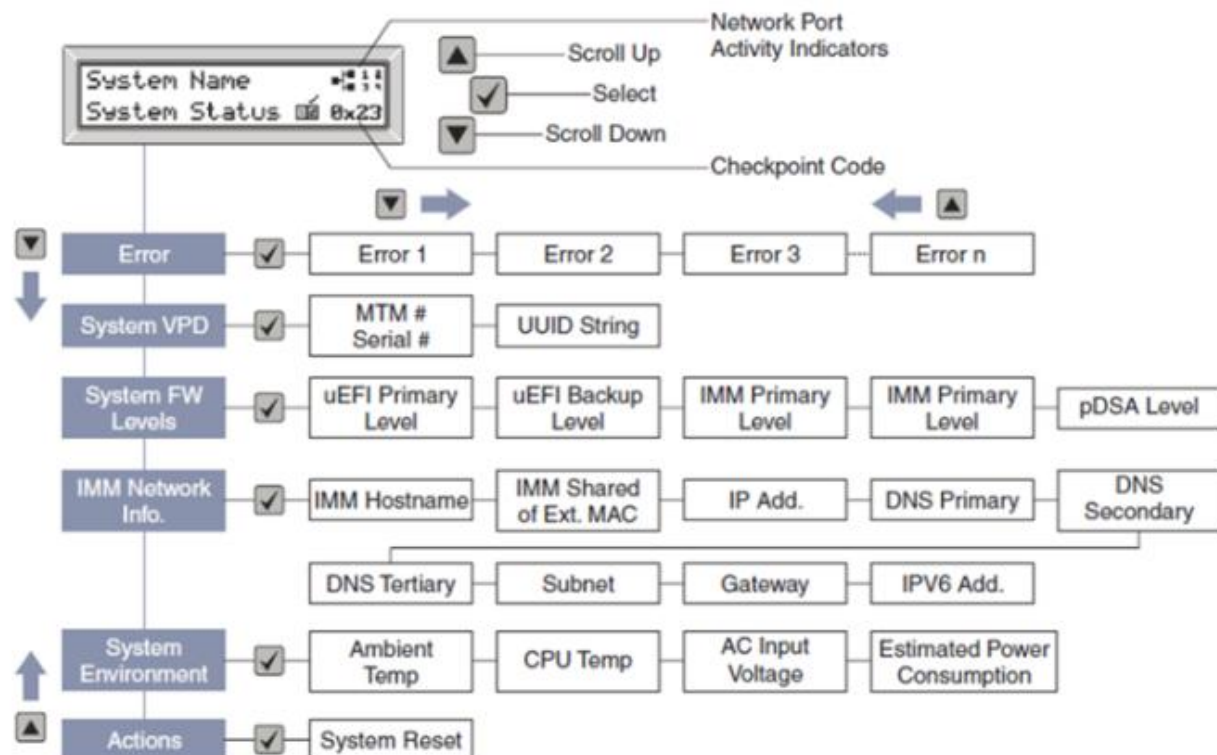
Show panel menu
options flow



LCD system information display panel

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When users navigate through the hierarchy of the menu options on the LCD system information operating panel assembly, the display panel shows the information for that option and the up and down arrows appear on the side of the display panel. When users get to the bottom of the hierarchy of the menu options, only the up arrow is available. When users are at the top of the hierarchy of the menu options, only the down arrow is available.



If only one error occurs, the LCD display panel displays that error in the error submenu set. If more than one error occurs, the LCD display panel displays the number of errors that have occurred. If no errors occur, the no error menu is available for navigation.

To see the system error log (SEL) and get the complete list of errors, go to the TMM/IMM Web page.

Show panel layout

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system. Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

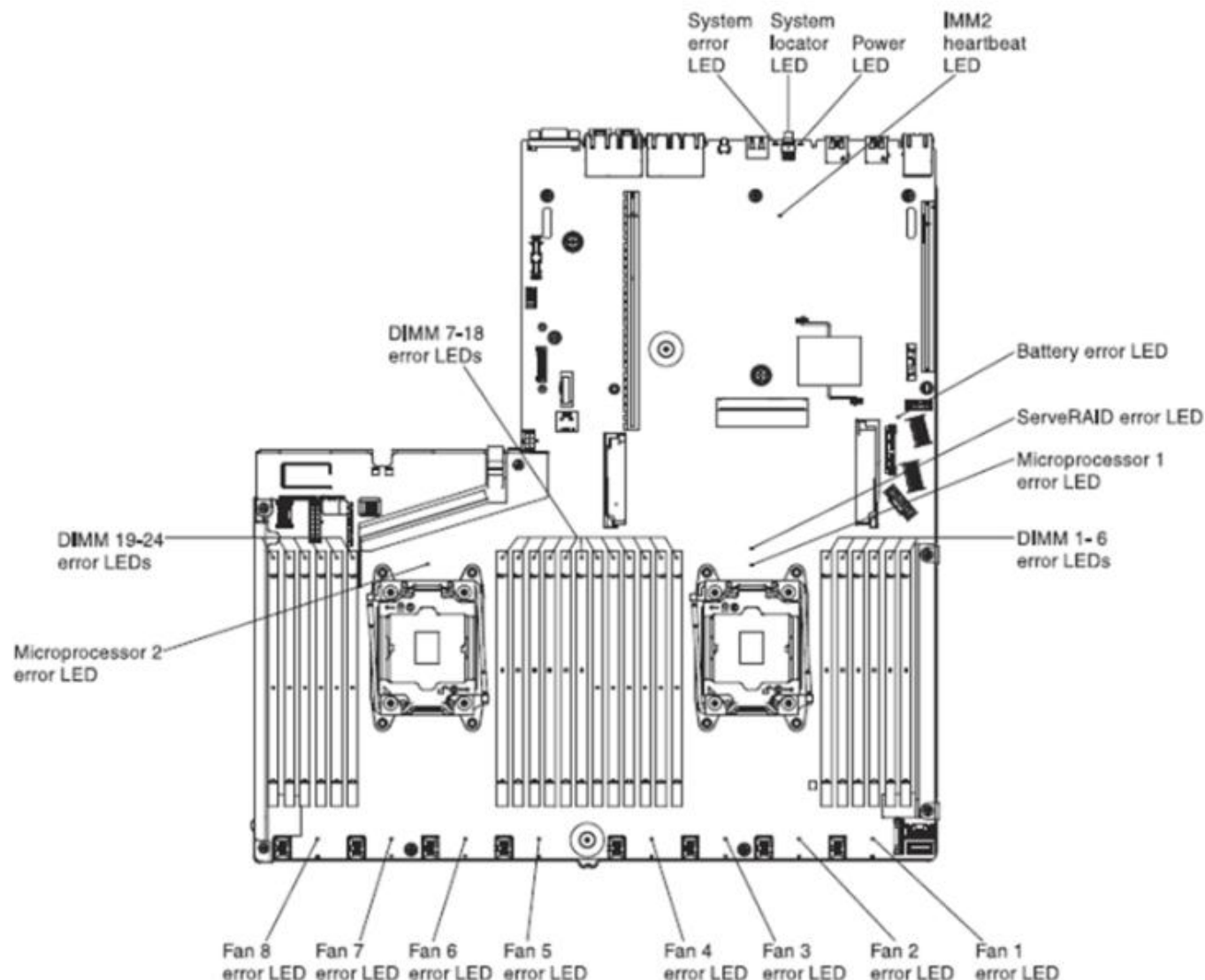
sd350/n400

SD530

SR630

SR650

SR950



x3550 M5

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

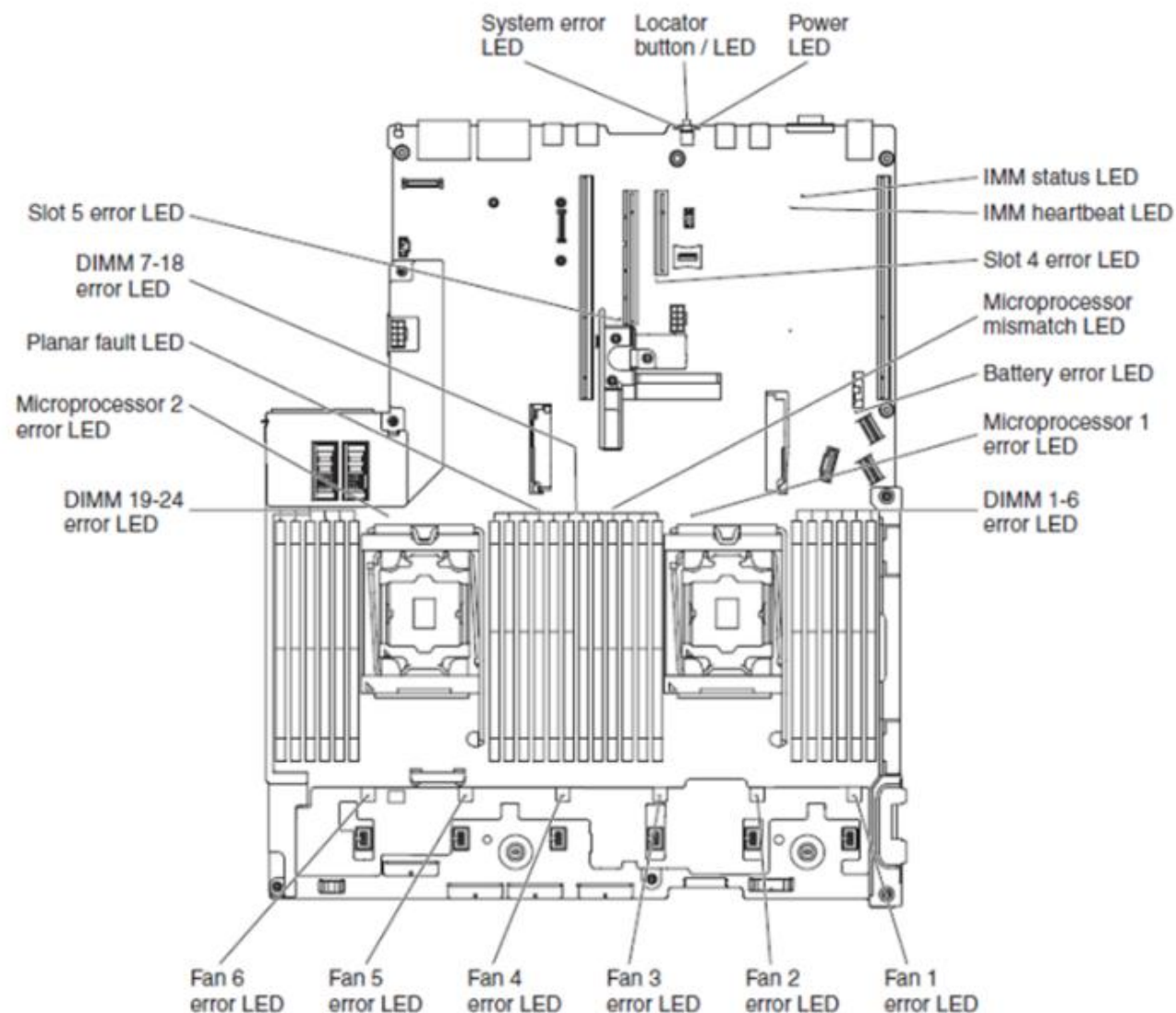
sd350/n400

SD530

SR630

SR650

SR950



x3650 M5

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

sd350/n400

SD530

SR630

SR650

SR950

The sd350 node does not have internal LEDs

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

sd350/n400

SD530

SR630

SR650

SR950

The SD530 node does not have internal LEDs

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

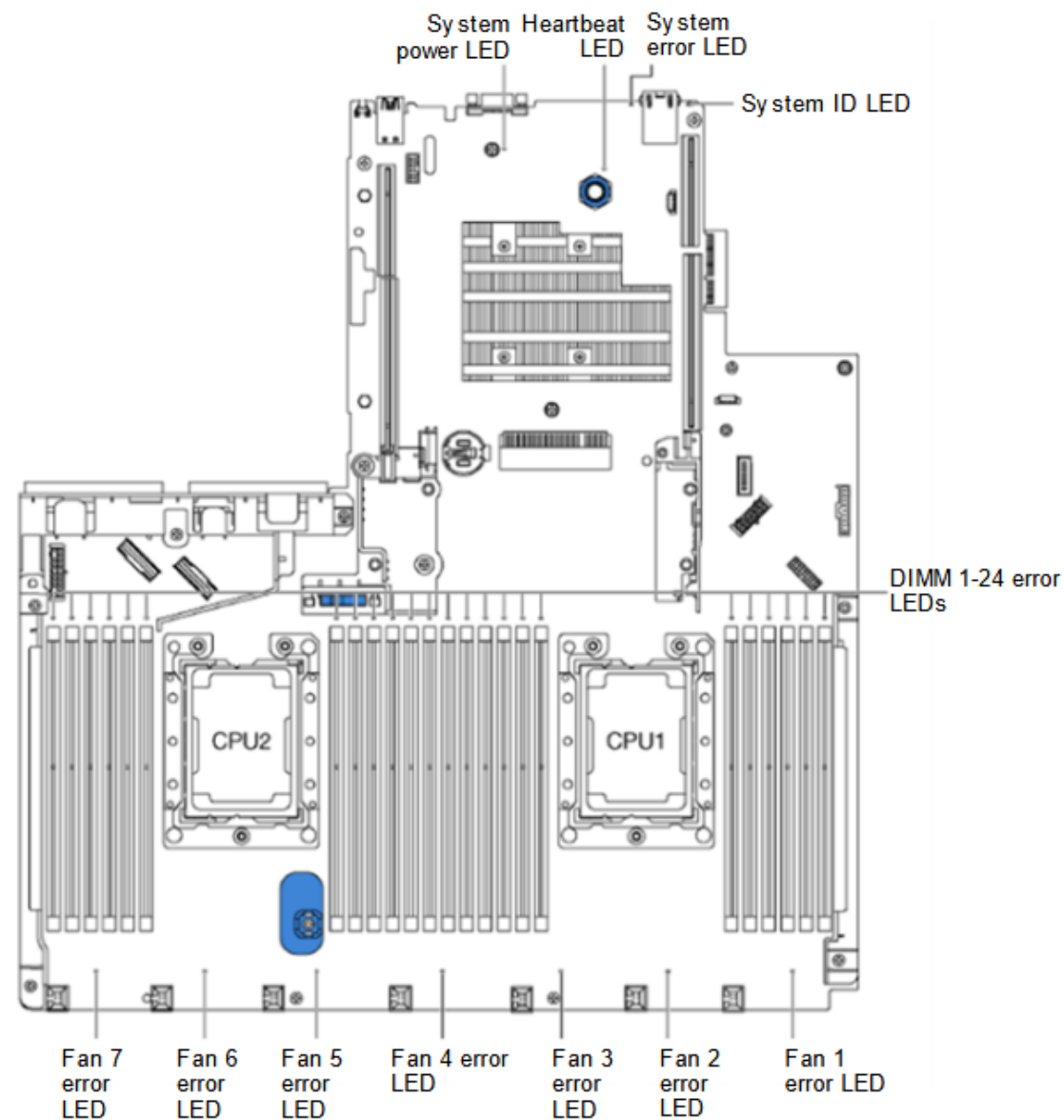
sd350/n400

SD530

SR630

SR650

SR950



SR630

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

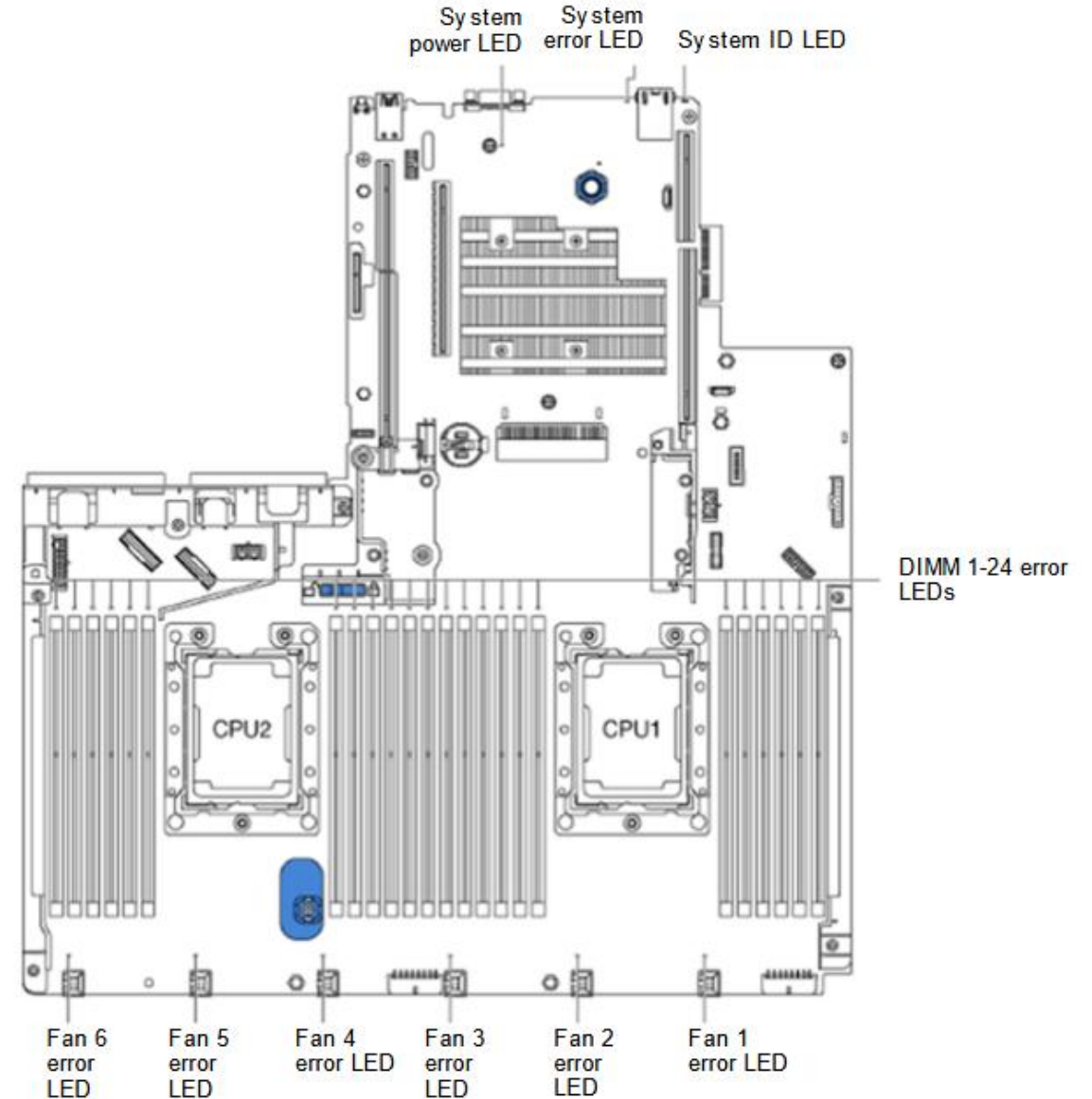
sd350/n400

SD530

SR630

SR650

SR950



SR650

Internal LEDs

Users can check the internal LEDs to locate the source of the error in the system.
Click the reference platform to see system board LED locations and descriptions:

x3550 M5

x3650 M5

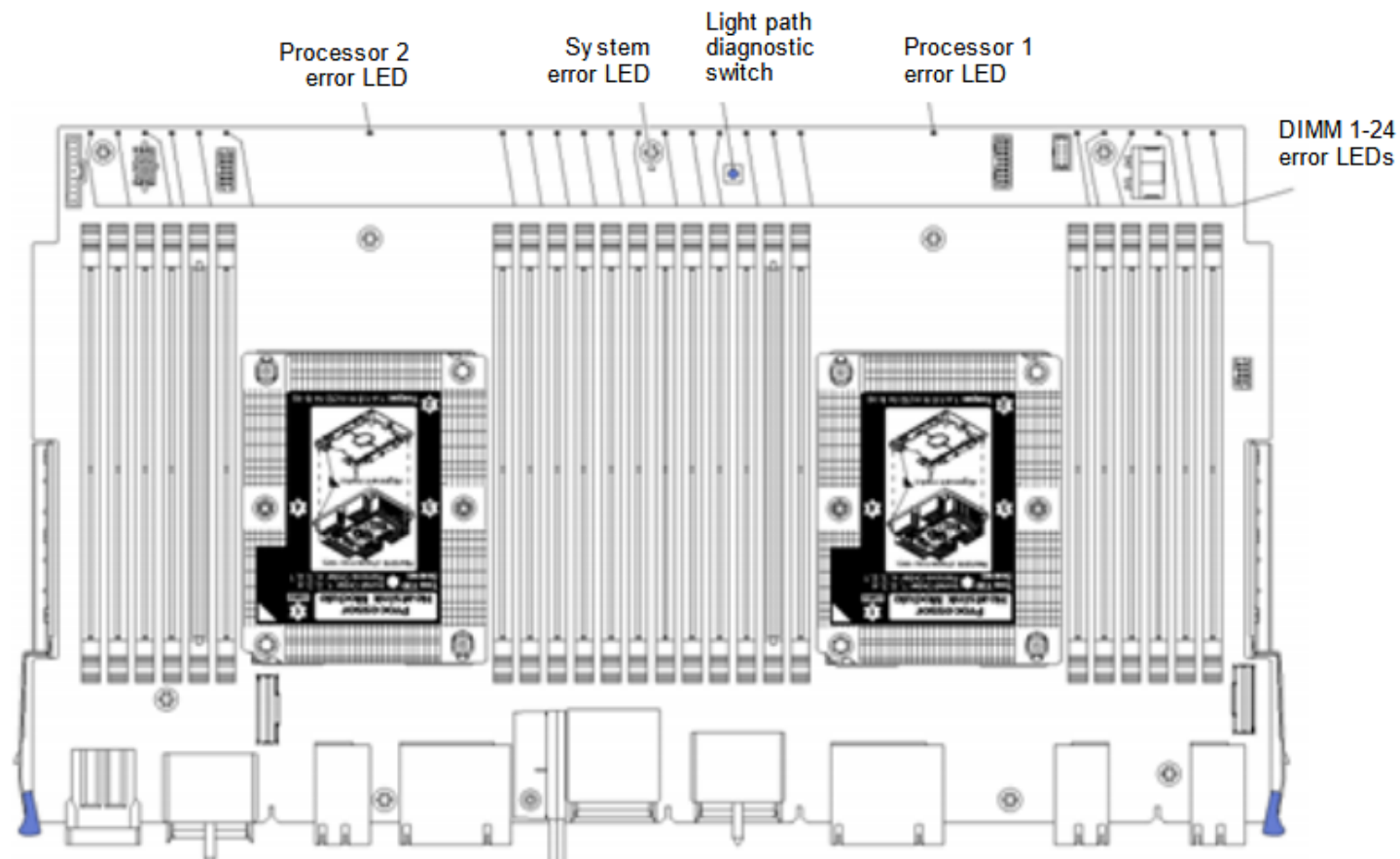
sd350/n400

SD530

SR630

SR650

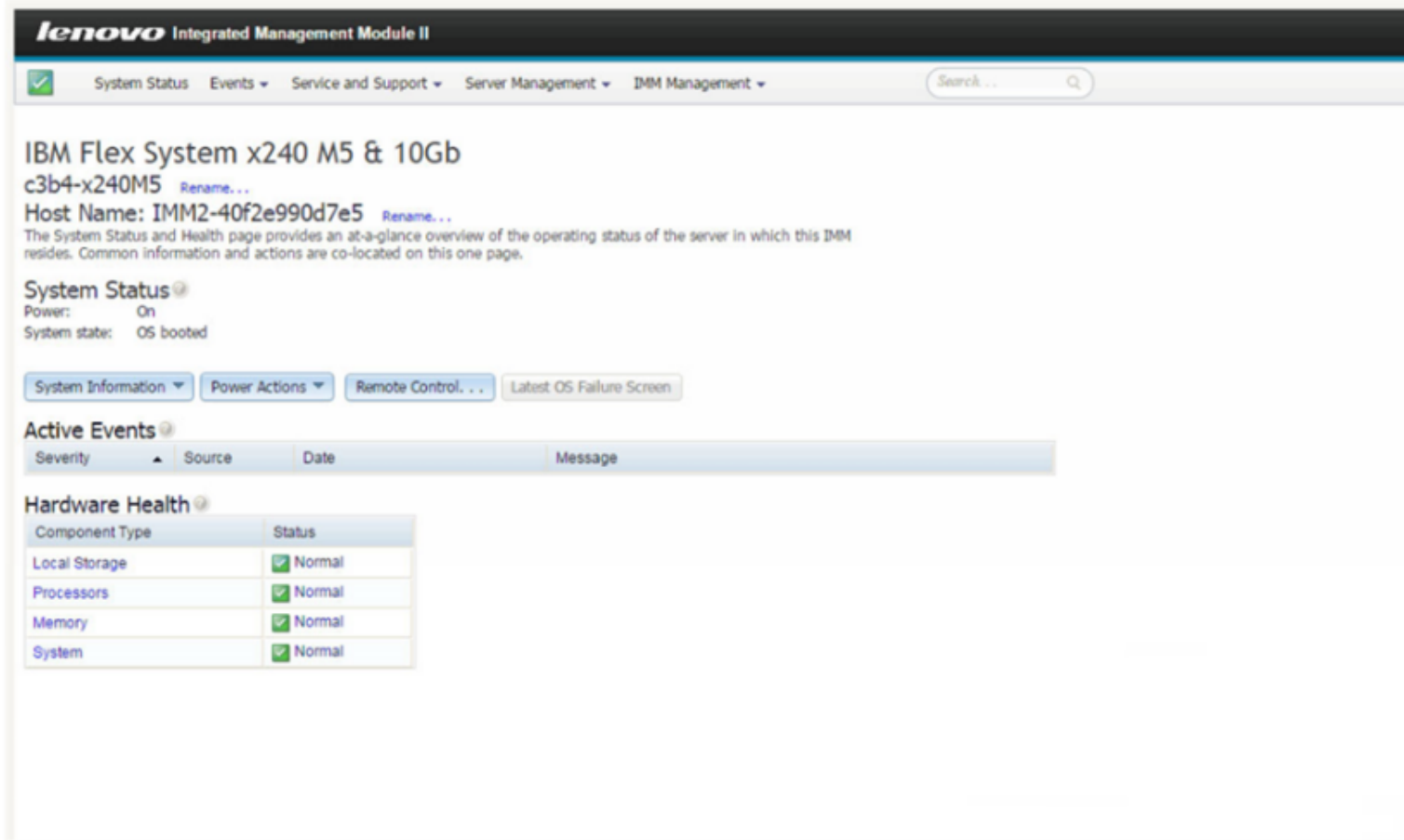
SR950



SR950

IMM2 Web-user interface – Overview

IMM2 is the management controller for the non-Intel Xeon Scalable CPU appliances (not including HX3710). The IMM2 Web-user interface is a convenient tool for users to manage their systems, including viewing error status messages for problem determination and troubleshooting purposes.



The screenshot displays the IMM2 Web-user interface for an IBM Flex System x240 M5 & 10Gb. The interface includes a navigation bar with tabs for System Status, Events, Service and Support, Server Management, and IMM Management. A search bar is located on the right. The main content area shows the system name, host name, and a brief description of the System Status and Health page. Below this, there are buttons for System Information, Power Actions, Remote Control, and Latest OS Failure Screen. The Active Events section is currently empty. The Hardware Health section shows a table with the following data:

Component Type	Status
Local Storage	Normal
Processors	Normal
Memory	Normal
System	Normal

IMM2 Web-user interface – System Status page

The System Status page is displayed after the user logs into the IMM2 Web-user interface or when the user clicks the System Status tab. From the System Status page, users can view the system status, active system events, and hardware health information.

In the sample graphic, the System Status page indicates that power supply 1 is in critical status and has failed.

The screenshot displays the Lenovo Integrated Management Module II (IMM2) System Status page. The page header includes the Lenovo logo and the title 'Integrated Management Module II'. Below the header, there are navigation tabs: System Status, Events, Service and Support, Server Management, and IMM Management. A search bar is located on the right side of the header.

The main content area shows the system information for an IBM System x3550 M5. It includes the Host Name: IMM2-40f2e9b81325 and a description of the System Status and Health page. The System Status section indicates that the Power is On and the System state is Booting OS or in unsupported OS.

Below the System Status section, there are four buttons: System Information, Power Actions, Remote Control, and Latest OS Failure Screen. The Active Events section is highlighted with a red arrow and the text 'Indicate that there are two critical event'. It shows a table of active events with columns for Severity, Source, Date, and Message.

The Hardware Health section is also highlighted with a red arrow and the text 'Check hardware health status'. It shows a table of hardware health with columns for Component Type and Status.

Severity	Source	Date	Message
Error	Power	11 Jan 2016, 06:19:29.863 PM	Power Supply 1 has Failed.
Error	Power	11 Jan 2016, 06:19:34.221 PM	Sensor PS1 12Vaux Fault has transitioned to non-recoverable.

Component Type	Status
Cooling Devices	Normal
Power Modules	Critical
Local Storage	Normal
Processors	Normal
Memory	Normal
System	Normal

IMM2 Web-user interface – Event Log page

Select **Event Log** below the Events tab to display the Event Log page. The Event Log page shows the severity for the events that are reported by the IMM2, and information about all remote access attempts and configuration changes. All events in the log are time stamped, using the IMM2 date and time settings. Users can sort and filter events in the event log.

If an environmental condition exceeds a threshold or if a system component fails, the IMM lights LEDs to help diagnose the problem, records the error in the IMM event log, and alerts the user of the problem.

Lenovo Integrated Management Module II

System Status | **Events** | Service and Support | Server Management | IMM Management

Event Log (Full log history of all events) | **Event Recipients** (Add and modify E-Mail and SysLog notifications)

IBM System x3550

This page displays the contents of the IMM event log, and allows you to sort and filter the log. By default, the log entries are displayed in reverse chronological order (most recent log entry first). For each log entry, the severity of the event is displayed along with a timestamp, source and a text mess. . . [more...](#)

Last Collected Time: Tues, 23 Feb 2016 01:51:33

Filter: [Icons] Time: All Date Search Events... Go

Severity	Source	Date	Event ID	Message
Informational	System	4 Feb 2016, 07:01:25.380 PM	0x806072b220109ff	A successful software or firmware change was detected on system SN# FKD0000.
Informational	System	4 Feb 2016, 07:01:23.279 PM	0x810301120601fff	Sensor SMM Mode has deasserted.
Informational	System	4 Feb 2016, 07:00:35.820 PM	0x800301120601fff	Sensor SMM Mode has asserted.
Informational	System	27 Jan 2016, 03:03:37.162 AM	0x806072b210107ff	A successful software or firmware change was detected on system SN# FKD0000.
Informational	System	26 Jan 2016, 07:50:51.833 AM	0x8107020d258204ff	Sensor RAID Vol State has transitioned to a less severe state from critical. (Volume Degraded, RAID Controller 4)
Informational	Disks	26 Jan 2016, 07:04:18.711 AM	0x816050d0400ffff	Critical Array IBM System x3550 M5 has deasserted.
Error	Disks	21 Jan 2016, 07:51:03.420 AM	0x806050d0400ffff	Array IBM System x3550 M5 is in critical condition.
Informational	Disks	21 Jan 2016, 07:49:09.427 AM	0x816050d0400ffff	Critical Array IBM System x3550 M5 has deasserted.
Error	Disks	21 Jan 2016, 06:50:33.160 AM	0x806050d0400ffff	Array IBM System x3550 M5 is in critical condition.
Informational	Disks	21 Jan 2016, 06:48:38.851 AM	0x816050d0400ffff	Critical Array IBM System x3550 M5 has deasserted.
Error	Disks	21 Jan 2016, 06:45:44.248 AM	0x806050d0400ffff	Array IBM System x3550 M5 is in critical condition.
Informational	Disks	21 Jan 2016, 06:43:40.457 AM	0x816050d0400ffff	Critical Array IBM System x3550 M5 has deasserted.

87 of 250 items filtered. 0 items selected. Clear Filter Applied filters: Events: [Error Information]

1 - 25 of 87 items 25 | 50 | 100

TMM Web user interface

ThinkServer Management Module (TMM) is the management controller for the HX3710, HX3710-F, and HX2710-E appliances. TMM offers the same functions as IMM2 but with a different user interface.

ThinkServer Management Module

Dashboard Chassis Information FRU Information Server Health Configuration Remote Control Auto Video Recording Maintenance Firmware Update

Dashboard 19 new events occurred

Dashboard gives the overall information about the status of the device and remote server.

Device Information

Firmware Build Time: Feb 15 2016 12:00:21 CST
Firmware Revision: 1.32
BIOS Revision: SD350330

Component Information

CPU ID: 1
CPU Status: Present
CPU Vendor: Intel(R)
CPU Family: Xeon(R)
CPU Model: CPU E5-2640 v4 @ 2.40GHz

Sensor Monitoring

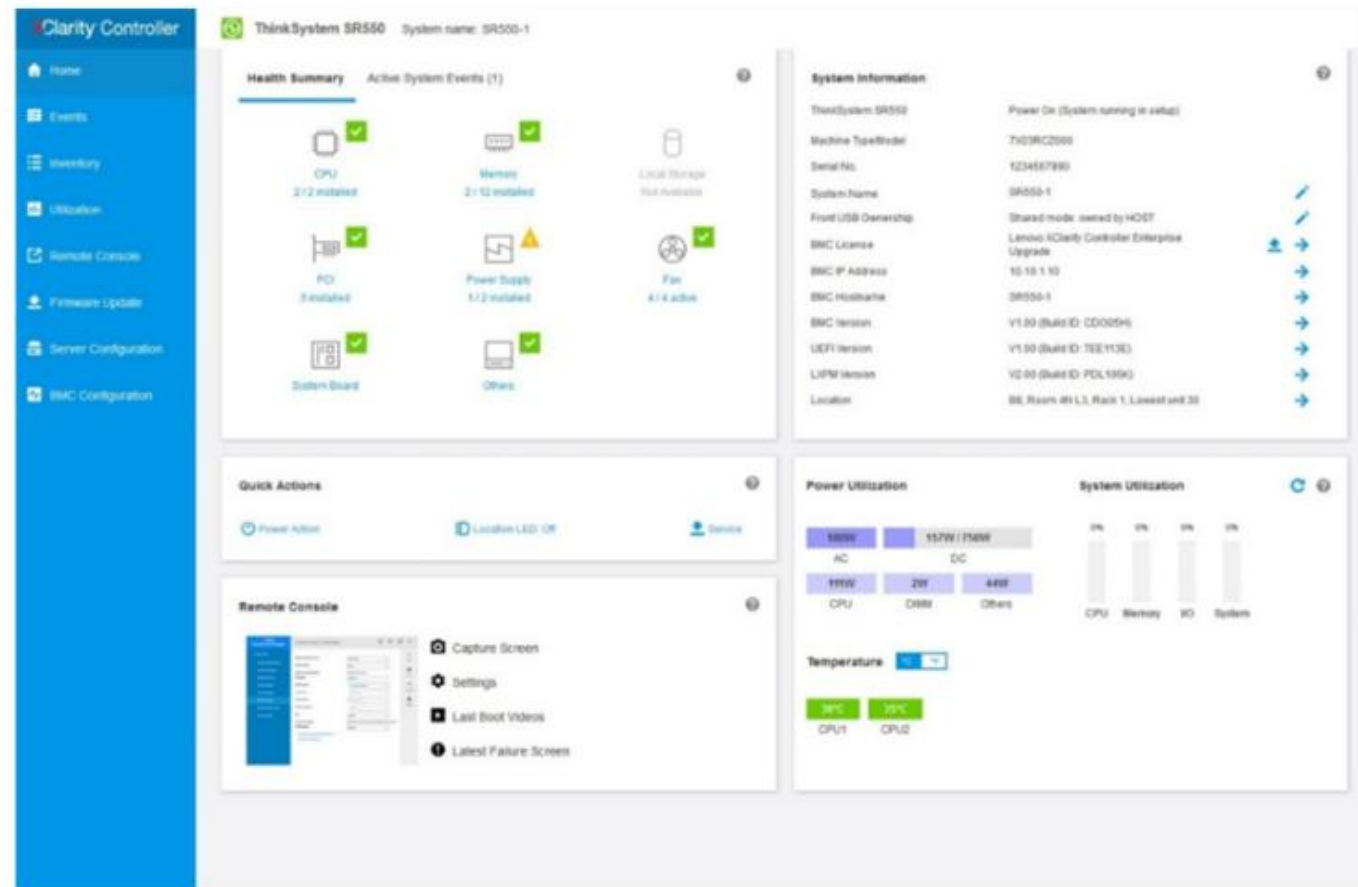
Status	Sensor	Reading
●	Fan1_Speed	5400 RPM
●	Fan2_Speed	5400 RPM
●	Fan3_Speed	5000 RPM
●	Fan4_Speed	5400 RPM
●	Fan5_Speed	5400 RPM

Menu bar

Note: For more information about TMM and how to access it, refer to the [*ES71538C Servicing the Lenovo ThinkServer sd350 Compute Node \(5493\) and n400 Enclosure \(5495\)*](#) course.

LXCC Web-user interface – Overview

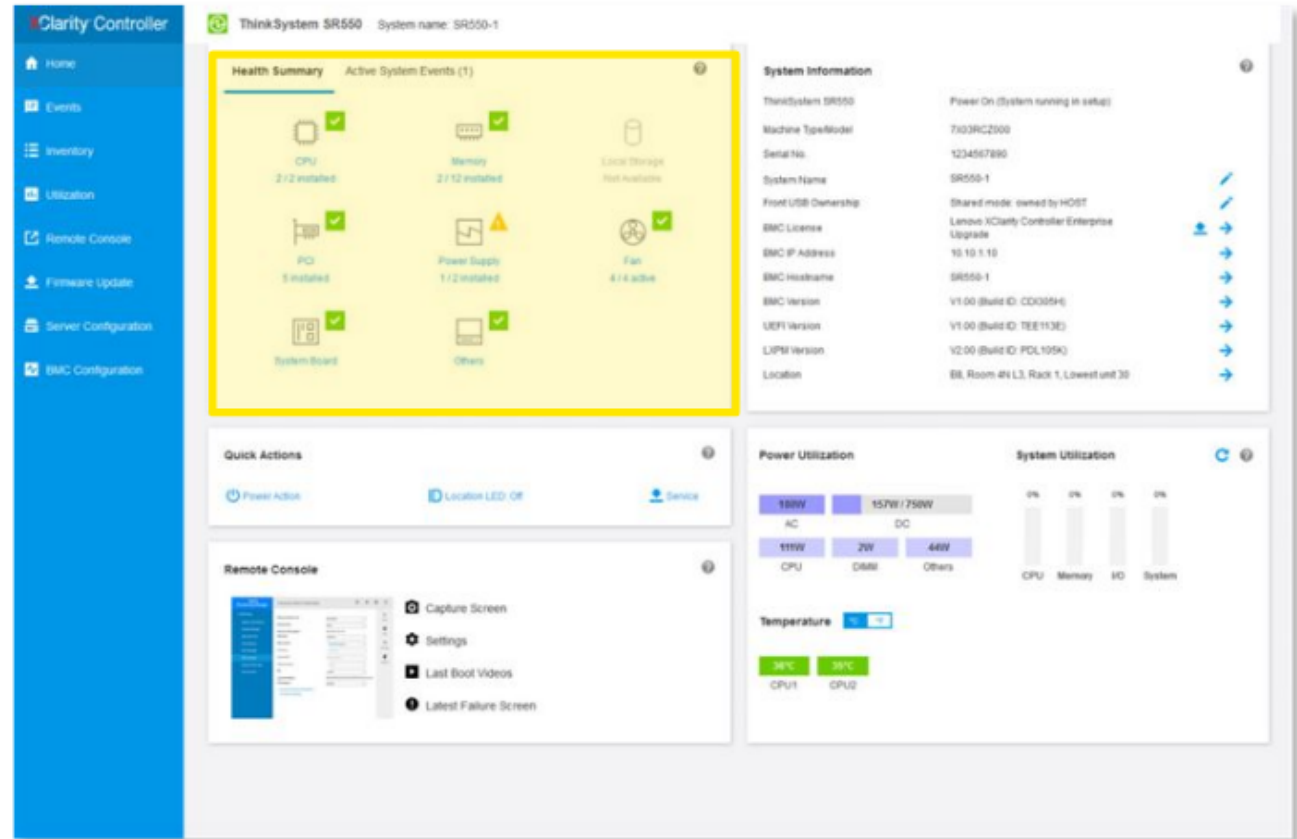
LXCC is the management controller for the Intel Xeon Scalable CPU appliances, replacing the TMM and IMM2. LXCC has all of IMM's management capabilities, but in a different graphical interface.



LXCC Web-user interface – Home page

The Home page is the first page that appears when opening a LXCC session. The Home page displays the hardware health information and the latest warning or error events associated with the server components.

Click the highlighted area to see more information.

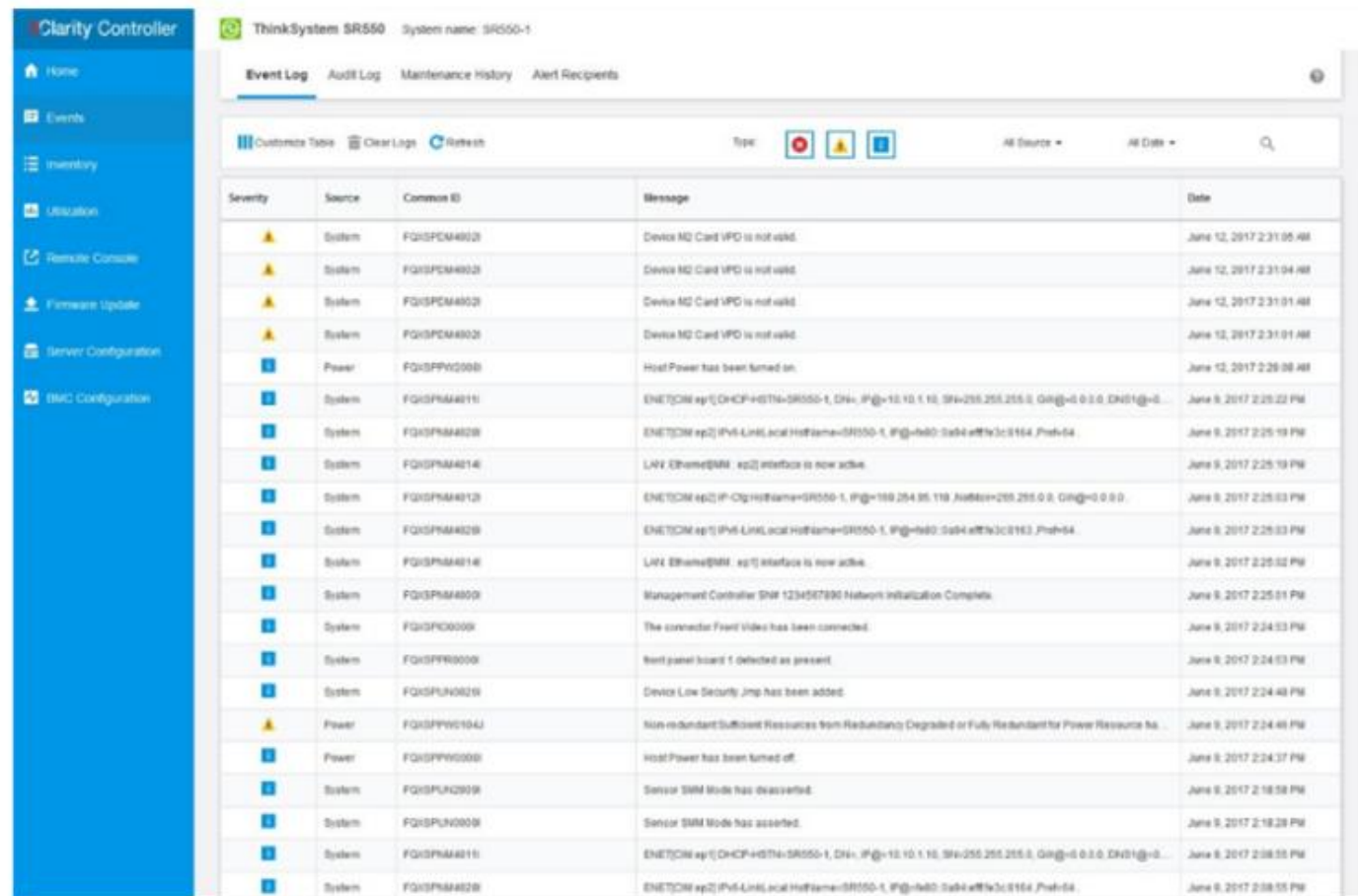


LXCC Web-user interface – Events page

The Events page includes all of the event and audit logs, maintenance history, and set up of recipient notifications when system events occur.

The section tabs and their features are:

- Event Log
 - Provides a historical list of all hardware and management events.
- Audit Log
 - Provides a historical record of user actions, such as login history, creating a new user, and password changes.
- Maintenance History
 - Displays all the firmware updates, configurations, and hardware replacement history.
- Alert Recipients
 - Manages who will be notified of system events.



Clarity Controller ThinkSystem SR550 System name: SR550-1

Event Log Audit Log Maintenance History Alert Recipients

Customize Table Clear Logs Refresh

Type: [Icons] All Source All Date

Severity	Source	Common ID	Message	Date
Warning	System	FQISPCM4002	Device M2 Card VPD is not valid	June 12, 2017 2:31:05 AM
Warning	System	FQISPCM4002	Device M2 Card VPD is not valid	June 12, 2017 2:31:04 AM
Warning	System	FQISPCM4002	Device M2 Card VPD is not valid	June 12, 2017 2:31:01 AM
Warning	System	FQISPCM4002	Device M2 Card VPD is not valid	June 12, 2017 2:31:01 AM
Information	Power	FQISPPV0000	Host Power has been turned on	June 12, 2017 2:28:08 AM
Information	System	FQISPM4011	ENET[CM:ap1] DHCP HostName=SR550-1, IP@=10.10.1.10, SN=255.255.255.0, GW@=0.0.0.0, EN01@=0...	June 9, 2017 2:25:22 PM
Information	System	FQISPM4028	ENET[CM:ap2] IPv4 Link Local HostName=SR550-1, IP@=fe80::3a94:a7f6:3c:8164_Pref=64	June 9, 2017 2:25:19 PM
Information	System	FQISPM4014	LVN1 Ethernet@SM - ap2 interface is now active	June 9, 2017 2:25:19 PM
Information	System	FQISPM4012	ENET[CM:ap2] IP-Cfg HostName=SR550-1, IP@=10.10.1.10, SubNet=255.255.0.0, GW@=0.0.0.0	June 9, 2017 2:25:03 PM
Information	System	FQISPM4028	ENET[CM:ap1] IPv4 Link Local HostName=SR550-1, IP@=fe80::3a94:a7f6:3c:8164_Pref=64	June 9, 2017 2:25:03 PM
Information	System	FQISPM4014	LVN1 Ethernet@SM - ap1 interface is now active	June 9, 2017 2:25:02 PM
Information	System	FQISPM4009	Management Controller SM 1234567890 Network Initialization Complete	June 9, 2017 2:25:01 PM
Information	System	FQISPCM0008	The connector Front Video has been connected	June 9, 2017 2:24:53 PM
Information	System	FQISPPR0000	Front panel board 1 detected as present	June 9, 2017 2:24:53 PM
Information	System	FQISPM4029	Device Low Security Jump has been added	June 9, 2017 2:24:48 PM
Warning	Power	FQISPPV004J	Non-redundant Sufficient Resources from Redundancy Degraded or Fully Redundant for Power Resource ha...	June 9, 2017 2:24:46 PM
Information	Power	FQISPPV0000	Host Power has been turned off	June 9, 2017 2:24:37 PM
Information	System	FQISPM4009	Sensor SMM Mode has deactivated	June 9, 2017 2:18:58 PM
Information	System	FQISPM4009	Sensor SMM Mode has asserted	June 9, 2017 2:18:28 PM
Information	System	FQISPM4011	ENET[CM:ap1] DHCP HostName=SR550-1, IP@=10.10.1.10, SN=255.255.255.0, GW@=0.0.0.0, EN01@=0...	June 9, 2017 2:08:55 PM
Information	System	FQISPM4028	ENET[CM:ap2] IPv4 Link Local HostName=SR550-1, IP@=fe80::3a94:a7f6:3c:8164_Pref=64	June 9, 2017 2:08:55 PM

Preboot DSA

The non-Intel Xeon Scalable CPU HX Series (not including HX3710) can use preboot DSA to collect and analyze system information to aid in diagnosing server problems. DSA Preboot collects the following information about the server:

- Drive health information
- IMM2 configuration information
- IMM2 environmental information
- Event logs for ServeRAID controllers and service processors
- Installed hardware, including PCI and USB information
- LCD system information display panel status
- Microprocessor, input/output hub, and UEFI error logs
- Network interfaces and settings
- Option card driver and firmware information
- RAID controller configuration
- Service processor (integrated management module) status and configuration
- System configuration
- Vital product data, firmware, and UEFI configuration

[Click here to see the procedure used to run the DSA Preboot diagnostic program.](#)

Preboot DSA

CLOSE ✕

If the server is running, turn off the server and all attached devices.



Preboot DSA

CLOSE ✕

Turn on all attached devices, and then turn on the server.



Preboot DSA

CLOSE ✕

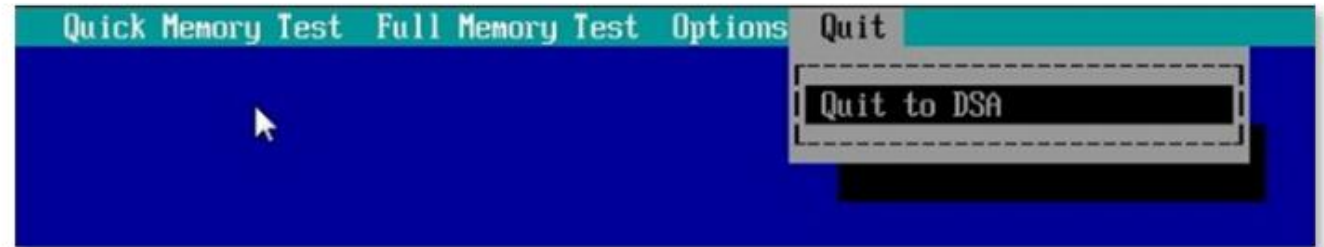
When the prompt <F2> Diagnostics displays, press F2.



Preboot DSA

CLOSE ✕

Optionally, select Quit to DSA to exit from the stand-alone memory diagnostic program.



Preboot DSA

CLOSE ✕

Type **cmd** at the DSA prompt to display the DSA interactive menu.

```
Loading Customized Media....

Starting DSA Preboot v9.03 ...
Extracting...

Commands:
  gui - Enter Graphical User Interface (GUI) screen for diagnostic tests and DSA functionality.
  cmd - Enter Command Line Interface (CLI) for diagnostic tests and DSA functionality.
  exit - Quit program.
        Note: This will eject the CD (if booted from CD) and reboot the system.
  help - Display this help message.
```

Step

1

2

3

4

5

6

7

Preboot DSA

CLOSE ✕

Select **1** to run the data collection

```
Configuring Network Controllers, this may take a minute...
Logging level set to Status
Copying Schema...
IBM DSA Interactive.

1 - Data Collection.
2 - Diagnostics.
3 - Feature on Demand (FoD).
Q - Quit and back to main menu.

Enter Number:
```



Preboot DSA

CLOSE ✕

Once the collection is complete, select **3** to copy the collected system information to the destination device. The destination device should now contain the XML.GZ file that can be parsed or submit back to support for review.

```
DSA capture completed successfully.  
  
Data Collection:  
  
1 - Collect System Information.  
2 - View Collected Results.  
   (Note: To exit the viewer, either type ZZ or :q and then press enter.)  
3 - Copy Collected System Information to Local Media.  
4 - Send Collected System Information to IBM Server or Customized FTP server.  
Q - Quit to previous menu.  
  
Enter Number: _
```

Step

1

2

3

4

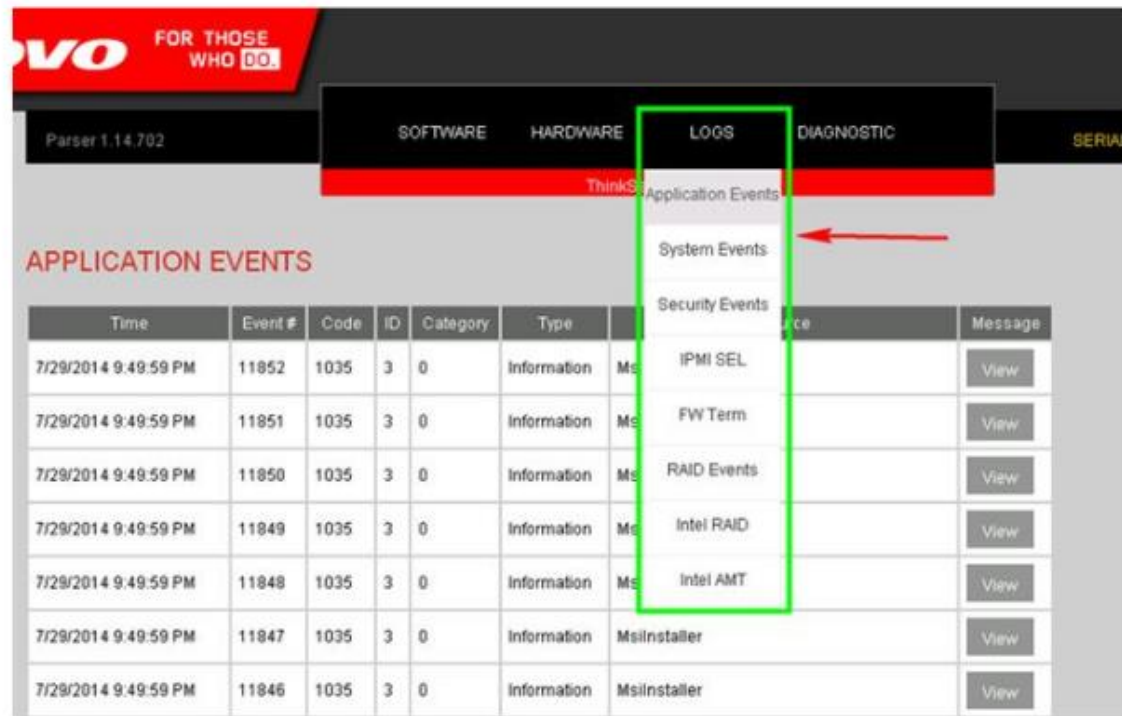
5

6

7

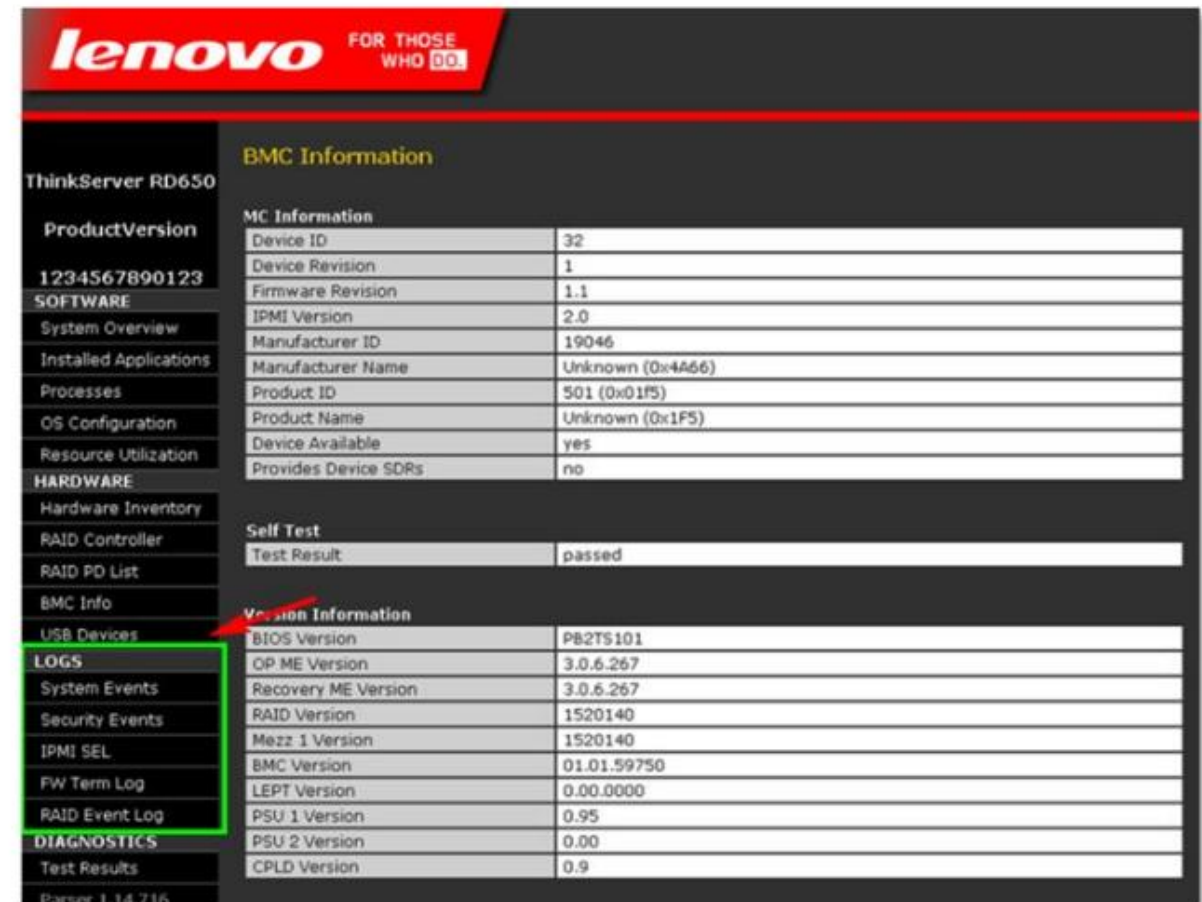
Lenovo ThinkServer Diagnostics tool

The Lenovo ThinkServer Diagnostics tool is a standalone tool that can be used to collect system hardware or software event logs for the HX3710, HX3710-F, and HX2710-E appliances. The tool can be downloaded from the [Lenovo support Website](#).



The screenshot shows the 'LOGS' tab selected in the top navigation bar. A green box highlights the 'LOGS' tab and the 'APPLICATION EVENTS' section. A red arrow points to the 'System Events' link within the 'LOGS' tab. Below the navigation bar, the 'APPLICATION EVENTS' section displays a table of events.

Time	Event #	Code	ID	Category	Type	Message	View
7/29/2014 9:49:59 PM	11852	1035	3	0	Information	IPMI SEL	View
7/29/2014 9:49:59 PM	11851	1035	3	0	Information	FW Term	View
7/29/2014 9:49:59 PM	11850	1035	3	0	Information	RAID Events	View
7/29/2014 9:49:59 PM	11849	1035	3	0	Information	Intel RAID	View
7/29/2014 9:49:59 PM	11848	1035	3	0	Information	Intel AMT	View
7/29/2014 9:49:59 PM	11847	1035	3	0	Information	MsiInstaller	View
7/29/2014 9:49:59 PM	11846	1035	3	0	Information	MsiInstaller	View



The screenshot shows the 'BMC Information' and 'Version Information' sections. The 'BMC Information' section includes fields for Device ID, Device Revision, Firmware Revision, IPMI Version, Manufacturer ID, Manufacturer Name, Product ID, Product Name, Device Available, and Provides Device SDRs. The 'Version Information' section includes fields for BIOS Version, OP ME Version, Recovery ME Version, RAID Version, Mezz 1 Version, BMC Version, LEPT Version, PSU 1 Version, PSU 2 Version, and CPLD Version. A green box highlights the 'LOGS' tab and the 'Version Information' section. A red arrow points to the 'Version Information' link within the 'LOGS' tab.


BMC Information	
Device ID	32
Device Revision	1
Firmware Revision	1.1
IPMI Version	2.0
Manufacturer ID	19046
Manufacturer Name	Unknown (0x4A66)
Product ID	501 (0x01F5)
Product Name	Unknown (0x1F5)
Device Available	yes
Provides Device SDRs	no

Version Information	
BIOS Version	P82TS101
OP ME Version	3.0.6.267
Recovery ME Version	3.0.6.267
RAID Version	1520140
Mezz 1 Version	1520140
BMC Version	01.01.59750
LEPT Version	0.00.0000
PSU 1 Version	0.95
PSU 2 Version	0.00
CPLD Version	0.9

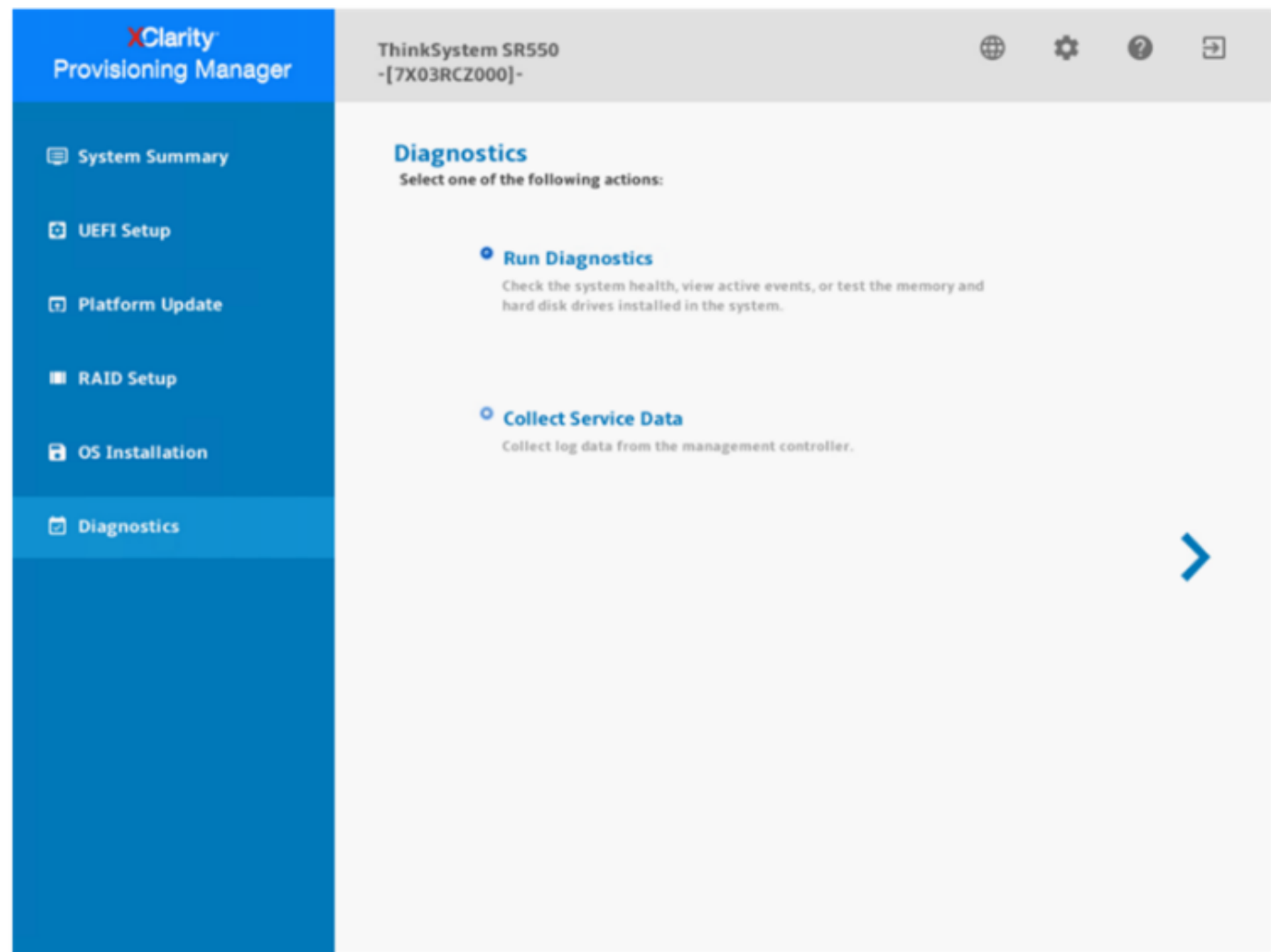
LXPM Diagnostics page

For Intel Xeon Scalable CPU appliances, the preboot DSA is replaced with LXPM. Below LXPM, there is a dedicated Diagnostics page that allows the user to monitor hardware health status as well as collect service data that can be sent to support representatives to aid with troubleshooting.

Selecting **Run Diagnostics** and clicking the blue arrow displays the dashboard, memory test, and HDD test options. Selecting **Collect Service Data** and clicking the blue arrow displays the service data collection options.

To return to the main LXPM page from the diagnostics section, click the  icon in the toolbar menu and select **Exit**.

Note: For more information about LXPM, refer to the [ES51757 Introducing ThinkSystem tools](#) course.



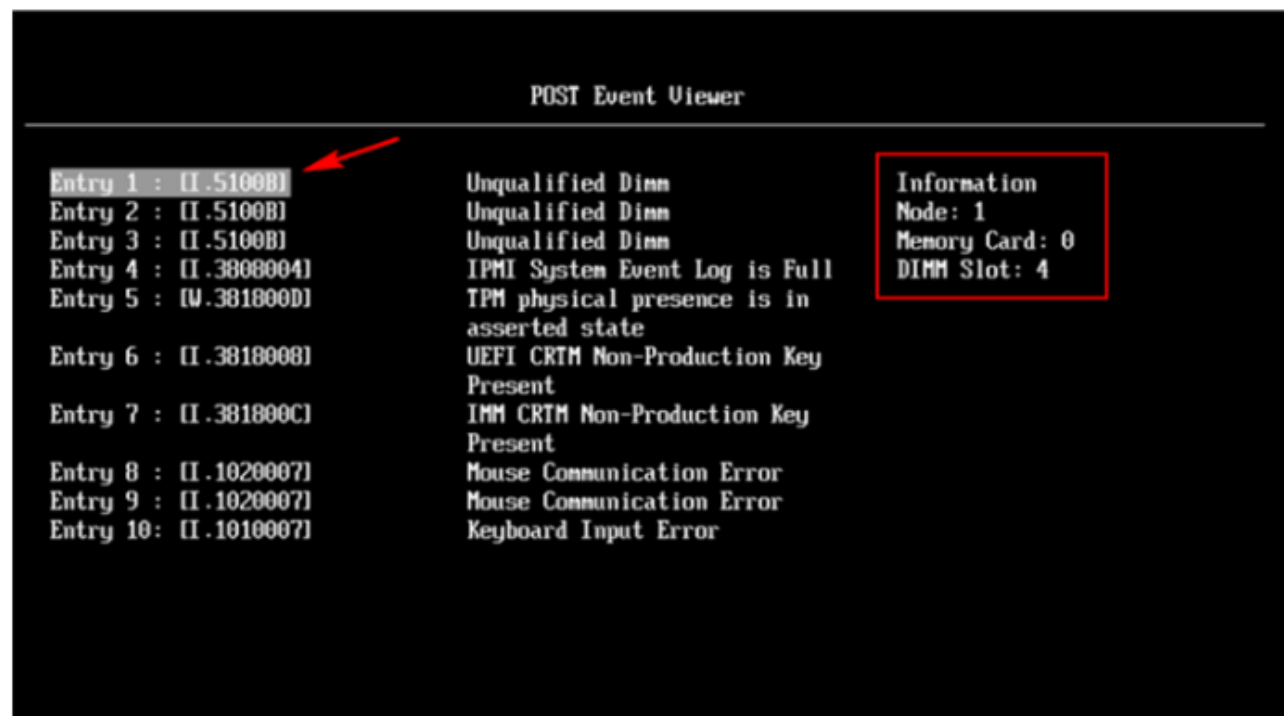
System event logs in UEFI

For non-Intel Xeon Scalable CPU appliances, the system event logs in UEFI contain two types of logs from which to choose:

POST Event Viewer

System Event Log

For Intel Xeon Scalable CPU appliances, refer to “LXCC Web-user interface – Events” section for information about how to access event logs.



This log contains the most recent error codes and messages that were generated during POST. This example shows the POST event log. The Entry 1 information in the sample indicates that the server is installed with unqualified DIMM in DIMM slot 4.

System event logs in UEFI

For non-Intel Xeon Scalable CPU appliances, the system event logs in UEFI contain two types of logs from which to choose:

POST Event Viewer

System Event Log

For Intel Xeon Scalable CPU appliances, refer to “LXCC Web-user interface – Events” section for information about how to access event logs.



This log contains POST and system management interrupt (SMI) events and all events that are generated by the baseboard management controller that is embedded in the integrated management module (IMM). Users can view the contents of the system event log using the UEFI Setup utility, and through the DSA

System event logs in UEFI

For non-Intel Xeon Scalable CPU appliances, the system event logs in UEFI contain two types of logs from which to choose:

POST Event Viewer

System Event Log

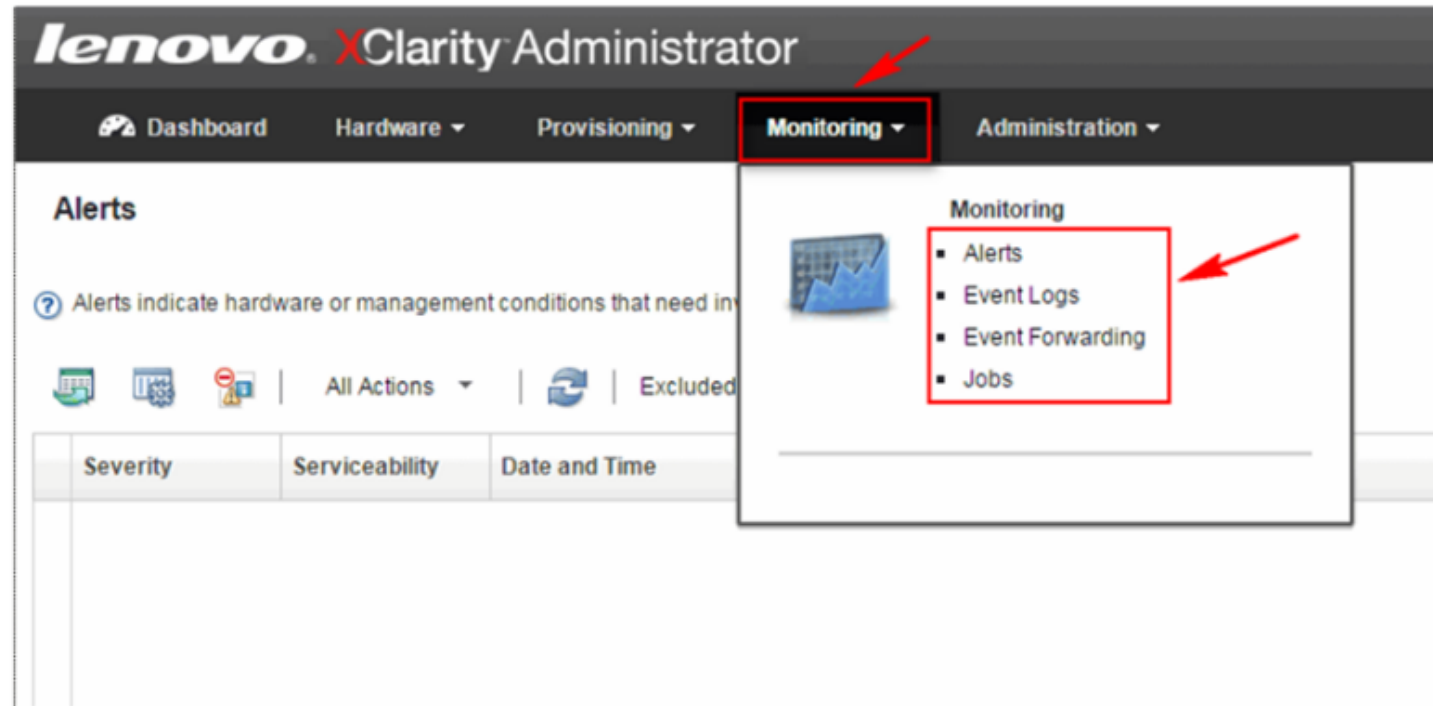
For Intel Xeon Scalable CPU appliances, refer to “LXCC Web-user interface – Events” section for information about how to access event logs.



The system-event log is limited in size. When it is full, new entries will not overwrite existing entries; therefore, Users must periodically clear the system-event log through the UEFI Setup utility. When users are troubleshooting an error, users might have to save and then clear the system-event log to make the most recent events available for analysis.

Lenovo XClarity Administrator

Certain hardware alerts such as memory DIMM errors or high CPU temperature may not appear in the Prism Web console. Lenovo recommends that Lenovo XClarity Administrator be configured to monitor the hardware in a cluster and send alert e-mail for these problems.



Prism Web console

The Prism Web console provides a wide range of health checks on the cluster including VMs, performance, events, and alerts. It should be the primary user interface for monitoring a cluster of the Lenovo ThinkAgile HX Series appliances. To use Prism, refer to the following chapters in the Prism Web Console Guide:

- Alert and event monitoring
- Health management
- Performance monitoring
- Virtual machine management
- Refer to [Nutanix documentation](#) to obtain the Prism Web Console Guide for more details.

AHV boot warnings

When starting AHV the following warnings may be appear in the console. Users can safely ignore the messages as they refer to debug registers not accessible to the CVM.

```
kvm [3371]: vcpu0 unhandled wrmsr: 0x1a6 data 0
```

```
kvm [3371]: vcpu0 unhandled wrmsr: 0x1a7 data 0
```

```
kvm [3371]: vcpu0 unhandled wrmsr: 0x3f6 data 0
```

```
kvm [3371]: vcpu0 unhandled wrmsr: 0x345 data 0
```

These warnings can be suppressed using the following command:

```
echo 1 > /sys/module/kvm/parameters/ignore_msrs
```

CVM warning messages

When starting CVM the following error message may be appear in the console. Users can safely ignore the message because it refers to function not yet implemented.

```
chmod: cannot operate on dangling symlink `home/nutanix/minerva`
```

Hardware failures – boot drive

Lenovo ThinkAgile HX Series use M.2, SATADOM, or rear drive kit as the boot drive. When a boot drive fails, refer to the specific section to replace the type of drive that has failed:

- Hardware failures – rear SSD boot drive
- Hardware failures – M.2 module

After replacing the drive, it is recommended that the user contacts Nutanix directly for assistance to rebuild the node.

Hardware failures – data drive

Each Lenovo ThinkAgile HX Series contains a mixture of SSDs and HDDs, or all SSDs. User data is across these drives and they are referred to as “data drives”.

Error symptoms:

When data drive failures occur, the following will occur:

- The Error LED on the front of drive cage lights.
- The Check log LED on the front bezel lights.
- The System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- The red LED on the front of the drive carrier lights.
- The Prism Web console displays a disk alert.

Fix procedures:

To replace the data drive, follow 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](#) or [ThinkSystem Information Center](#).
3. Refer to the “Completing Drive Replacement” procedure in the [Nutanix Hardware Replacement Documentation](#) for more details on bringing the data drive online after the failed drive has been replaced.

Hardware failures – rear SSD boot drive

The failure of the 120 GB SSD used for booting requires a reinstallation of Phoenix and the hypervisor. If the boot drive fails, replace the physical drive as a normal drive replacement event. After replacing the physical drive, the user can visit the [Nutanix Portal](#) to find information on how to rebuild the node (reinstall Phoenix and the hypervisor) or contact Nutanix directly to assist with rebuilding the node.

Error symptoms:

When boot drive failures occur, the following will occur:

- The Error LED on the front of drive cage lights.
- The Check log LED on the front bezel lights.
- The System-error LED on the front bezel lights.
- The System error information on the LCD system information operating panel displays, if available.
- The Prism Web console displays a disk alert.
- The disk failure event will be logged in LXCA and IMM2 or LXCC.

Fix procedures:

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 which is installed in the rear 2.5-inch hot-swap HDD kit. Refer to the “Replacing a hot-swap hard disk drive” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#).
3. Power on the node.
4. Verify that the boot drive was successfully replaced by checking the following:
 - a. If the yellow status LED of the boot SSD drive is lit

Hardware failures – rear SSD boot drive

The failure of the 120 GB SSD used for booting requires a reinstallation of Phoenix and the hypervisor. If the boot drive fails, replace the physical drive as a normal drive replacement event. After replacing the physical drive, the user can visit the [Nutanix Portal](#) to find information on how to rebuild the node (reinstall Phoenix and the hypervisor) or contact Nutanix directly to assist with rebuilding the node.

Error symptoms:

When boot drive failures occur, the following will occur:

- The Error LED on the front of drive cage lights.
 - The Check log LED on the front bezel lights.
 - The System-error LED on the front bezel lights.
 - The System error information on the LCD system information operating panel displays, if available.
 - The Prism Web console displays a disk alert.
 - The disk failure event will be logged in LXCA and IMM2 or LXCC.
- a. 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 boot SSD is flashing, the drive is healthy.
 - b. Orange warning light on the node front panel is extinguished.
 - c. System boots successfully with no POST errors or other errors.
5. Stop the startup process at the main UEFI menu screen to configure the boot SSD for the Lenovo ThinkAgile HX Series appliances using the following procedure describe in this document:
 - a. Configure boot drive virtual drives
 - b. Selecting virtual drive for booting

Hardware failures – M.2 module

An assembled M.2 backplane and M.2 drive is also known as M.2 module. Lenovo support may instruct you that the M.2 module or M.2 backplane and M.2 drive needs to be replaced. This procedure should be performed by a trained Lenovo field representative.

Error symptoms:

When boot drive failures occur, the following scenarios will be shown:

- Hypervisor cannot load when boot.
- The Prism Web console displays a disk alert.
- The disk failure event will be logged in LXCA and LXCC.

Fix procedures:

To replace the M.2 backplane and M.2 drive, 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 [ThinkSystem Information Center](#).
4. Replace the M.2 backplane and M.2 drive as described in the M.2 backplane and M.2 drive replacement procedure in the [ThinkSystem Information Center](#).

Hardware failures – M.2 module

An assembled M.2 backplane and M.2 drive is also known as M.2 module. Lenovo support may instruct you that the M.2 module or M.2 backplane and M.2 drive needs to be replaced. This procedure should be performed by a trained Lenovo field representative.

Error symptoms:

When boot drive failures occur, the following scenarios will be shown:

- Hypervisor cannot load when boot.
- The Prism Web console displays a disk alert.
- The disk failure event will be logged in LXCA and LXCC.

4. Replace the M.2 backplane and M.2 drive as described in the M.2 backplane and M.2 drive replacement procedure in the [ThinkSystem Information Center](#).
5. Replace the top cover as described in the Replacing the top cover procedure in the [ThinkSystem Information Center](#).
6. Push the node chassis back into the rack and reconnect the cables as necessary. Power on the node.
7. Verify that the M.2 adapter 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.

Hardware failures – hot-swap fan

Failed or failing hot-swap fans can cause the system to overheat and shut down.

Error symptoms:

When hot-swap fan failures occur, the following will occur:

- The Check log LED on the front bezel lights.
- The System-error LED on the front bezel lights.
- The System error information on the LCD system information operating panel displays, if available.
- The hot-swap fan error LED on the hot-swap fan lights.
- The fan speed will increase to maintain sufficient cooling for the server, which results in louder fan noises.
- The fan failure event will be logged in XClarity Administrator and TMM, IMM2, or LXCC.
- The Prism Web console displays a fan alert.
- <http://thinksystem.lenovofiles.com/help/index.jsp>

Fix procedures:

Refer to the “Replacing a hot-swap fan” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) or [ThinkSystem Information Center](#) for more details on replacing the hot-swap fan.



Hardware failures – hot-swap AC power supply

The Lenovo ThinkAgile HX Series uses two power supply units. The two power supplies are redundant when connected to 208 V input power. One power supply alone is sufficient for the node. Although losing one of the two power supplies does not impact the operation of a node, replacing the failed power supply unit as soon as possible is recommended to maintain redundancy.

Error symptoms:

The indications of a failed power supply unit are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- Power supply error LED on the AC power supply lights.
- If all of the LEDs on the power supply are off, check the power cords and power distribution unit (PDU) connected to the power supply to ensure they are in good condition.
- Lenovo XClarity Administrator shows a power supply alert.
- LXCC 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.

Fix procedures:

Refer to the “Replacing a hot-swap fan” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) or [ThinkSystem Information Center](#) for more details on replacing the hot-swap fan.



900 W AC power supply

Hardware failures – microprocessor

The Lenovo ThinkAgile HX series contain Intel E5-2600v3, E5-2600 v4, or Xeon Scalable CPU microprocessors. When a microprocessor failure occurs, determine which microprocessor needs to be replaced. Check XClarity Administrator or the POST error log on the TMM, IMM, or LXCC console to help identify it.

Error symptoms:

The indications of a failed microprocessor are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.
- An error in the Prism Web console.

Fix procedures:

To replace a microprocessor, 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, and pull out the node from the rack.
3. Refer to the “Replacing a microprocessor” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) or [ThinkSystem Information Center](#) for more details on replacing the microprocessor.
4. After replacing the microprocessor, return the node to the rack. Reconnect the cables as necessary and power on the node.

Hardware failures – microprocessor

The Lenovo ThinkAgile HX series contain Intel E5-2600v3, E5-2600 v4, or Xeon Scalable CPU microprocessors. When a microprocessor failure occurs, determine which microprocessor needs to be replaced. Check XClarity Administrator or the POST error log on the TMM, IMM, or LXCC console to help identify it.

Error symptoms:

The indications of a failed microprocessor are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.
- An error in the Prism Web console.

the rack. Reconnect the cables as necessary and power on the node.

5. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).
6. Verify that the microprocessor has been successfully replaced by:
 - a. Ensuring that the check log LED on the front bezel is extinguished.
 - b. Ensuring that the system-error LED on the front bezel is extinguished.
 - c. Making sure that no more microprocessor errors are shown in Lenovo XClarity Administrator and TMM, IMM2, or LXCC.

Hardware failures – memory module

While a node might be able to self-correct for certain memory errors, failed memory module can lead to system degradation. Failed memory module should be replaced as soon as possible.

Error symptoms:

The indications of a failed memory module are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- System may reboot unexpectedly.
- A POST error on boot.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.
- 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.

Fix procedures:

When a DIMM failure occurs and needs to be replaced, perform the following steps:

1. Identify the failed memory module by either checking in XClarity Administrator or using the TMM, IMM2, or LXCC 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. Refer to the “Replacing a memory module” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) or [ThinkSystem Information Center](#) for more details on replacing the memory module.
4. Start the node by following the hypervisor-specific

Hardware failures – memory module

While a node might be able to self-correct for certain memory errors, failed memory module can lead to system degradation. Failed memory module should be replaced as soon as possible.

Error symptoms:

The indications of a failed memory module are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- System may reboot unexpectedly.
- A POST error on boot.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.
- 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.

4. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).
5. Verify that the DIMM memory failure is resolved by ensuring that:
 - a. The check log LED on the front bezel is extinguished
 - b. The system-error LED on the front bezel is extinguished
 - c. The system boots successfully with no POST errors or other errors.
 - d. That there are no errors in the post event log.
 - e. That no errors appear in Lenovo XClarity Administrator.
 - f. That no errors appear in Prism.

Hardware failures – system board

Error symptoms:

The indications of a failed system board are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- System may reboot unexpectedly.
- System may hang during operation.
- System may shut down and cannot resume to normal state.
- System may boot up with blank screen or cannot boot up.
- System cannot pass the test of embedded F2 diagnostics tool.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.

Fix procedures:

When a system board failure occurs and must be replaced, 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. Refer to the “Replacing a system board” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) or [ThinkSystem Information Center](#) for more details on replacing the system board.
3. Verify that the system board has been successfully replaced by checking the following:
 - a. Check log LED on the front bezel is extinguished
 - b. System-error LED on the front bezel is extinguished
 - c. System boots successfully with no POST errors or other errors.

Hardware failures – system board

Error symptoms:

The indications of a failed system board are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- System may reboot unexpectedly.
- System may hang during operation.
- System may shut down and cannot resume to normal state.
- System may boot up with blank screen or cannot boot up.
- System cannot pass the test of embedded F2 diagnostics tool.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.

4. Stop the startup process at the main UEFI menu screen to configure the UEFI for the new system board as a Lenovo ThinkAgile HX Series appliances using the following procedure described in this document:
 - a. Update the server VPD data (refer to the “Update the server VPD data” section for more details).
 - b. Change the **System Boot Mode** setting to **Legacy Boot Mode** in the UEFI Setup Menu (refer to the “Legacy boot mode” for more details).
 - c. Disable **Option ROMs** in UEFI (refer to section “Disable option ROMs” for more details).
 - d. BIOS optimization the settings (refer to section “BIOS optimization settings” for more details).
 - e. Modify the Boot Options for the customer (refer to section “Configuring the boot order” for more details).
5. Save the UEFI settings and boot into the hypervisor.

Hardware failures – system board

Error symptoms:

The indications of a failed system board are:

- Check log LED on the front bezel lights.
- System-error LED on the front bezel lights.
- System error information on the LCD system information operating panel displays, if available.
- System may reboot unexpectedly.
- System may hang during operation.
- System may shut down and cannot resume to normal state.
- System may boot up with blank screen or cannot boot up.
- System cannot pass the test of embedded F2 diagnostics tool.
- An error in Lenovo XClarity Administrator and TMM, IMM2, or LXCC system health or logs.

- a. Update the server VPD data (refer to the “Update the server VPD data” section for more details).
 - b. Change the **System Boot Mode** setting to **Legacy Boot Mode** in the UEFI Setup Menu (refer to the “Legacy boot mode” for more details).
 - c. Disable **Option ROMs** in UEFI (refer to section “Disable option ROMs” for more details).
 - d. BIOS optimization the settings (refer to section “BIOS optimization settings” for more details).
 - e. Modify the Boot Options for the customer (refer to section “Configuring the boot order” for more details).
5. Save the UEFI settings and boot into the hypervisor.
 6. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).

Hardware failures – network interface card (NIC)

The Lenovo ThinkAgile HX Series can support up to eight network ports: two or four 10 GbE ports (up to two NICs) and four 1 GbE ports on the system board. 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.

Error symptoms:

The indications of a failed NIC include:

- Check log LED on the front bezel will light.
- System-error LED on the front bezel will light.
- System error information on the LCD system information operating panel displays, if available.
- No LED lights for the network interface.
- System cannot detect the NIC
- Guest VM performance degrades.
- Guest VMs, the Nutanix Web console, and Nutanix Command-Line interface (nCLI) are unavailable.
- VM migration fails with an error message such as the

Fix procedures:

To replace a NIC, perform the following steps:

1. The Lenovo ThinkAgile HX Series appliances contain one or two NICs. For nodes with two NICs, identify the failed NIC by either checking in XClarity Administrator or checking the indicator lights on the network ports to determine which one has failed.
2. Shut down the node by following the hypervisor-specific “Node Shutdown” procedure described in the [Nutanix Hardware Replacement Documentation](#).
3. Refer to the “Replacing an adapter in PCI expansion slot4 or slot 5” procedure in the [Lenovo Converged](#)

Hardware failures – network interface card (NIC)

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- System error LED on the front bezel will light.
- System error information on the LCD system information operating panel displays, if available.
- No LED lights for the network interface.
- System cannot detect the NIC
- Guest VM performance degrades.
- Guest VMs, the Nutanix Web console, and Nutanix Command-Line interface (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

[HX Series Installation and Service Guide](#) for more details on replacing the first NIC.

4. Refer to the “Replacing an adapter in a riser-card assembly” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) for more details on replacing the second NIC if in the configuration.
5. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).
6. Verify that the NIC was successfully replaced by checking the following:
 - a. Check log LED on the front bezel is extinguished.

Hardware failures – network interface card (NIC)

The Lenovo ThinkAgile HX Series can support up to eight network ports: two or four 10 GbE ports (up to two NICs) and four 1 GbE ports on the system board. 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.

- System-error LED on the front bezel will light.
- System error information on the LCD system information operating panel displays, if available.
- No LED lights for the network interface.
- System cannot detect the NIC
- Guest VM performance degrades.
- Guest VMs, the Nutanix Web console, and Nutanix Command-Line interface (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

[Series Installation and Service Guide](#) for more details on replacing the second NIC if in the configuration.

5. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).
6. Verify that the NIC was successfully replaced by checking the following:
 - a. Check log LED on the front bezel is extinguished.
 - b. System-error LED on the front bezel is extinguished.
 - c. All network ports are again fully functional.

Hardware failures – 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.

Error symptoms:

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 will not start because no storage controller resources are detected.
- The hypervisor or BIOS does not detect the HBA card.

Fix procedures:

To replace an HBA card, perform the following steps:

1. 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. Refer to the “Replacing an adapter in PCI expansion slot4 or slot 5” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) for more details on replacing the first NIC.
4. Replace the failed HBA adapter using procedures from the [Lenovo Converged HX Series Installation](#)

Hardware failures – host bus adapter (HBA)

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Error symptoms:

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 will not start because no storage controller resources are detected.
- The hypervisor or BIOS does not detect the HBA card.

- a. For all three appliances, the first HBA adapter is installed on the system board. It is replaced using the “Replacing the dedicated slotless RAID controller” procedure.
 - b. Use the following procedures to replace the HBA adapter if a riser-card is used:
“Replacing an adapter in a riser-card assembly”
5. It may be necessary to upgrade the adapter firmware to the supported level. The Lenovo XClarity Administrator can be used to update the firmware.
 6. Verify that the HBA has been successfully replaced by checking the following:
 - a. Orange warning light on the server is extinguished.
 - b. If the controller VM starts and all of the drives are shown as online. If the Controller VM does not boot, users can verify if the LSI HBA card is

Hardware failures – host bus adapter (HBA)

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- 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 will not start because no storage controller resources are detected.
- The hypervisor or BIOS does not detect the HBA card.

- b. If the controller VM starts and all of the drives are shown as online. If the Controller VM does not boot, users can verify if the LSI HBA card is detected using the `lspci` command:

For non-Xeon Scalable CPU appliances:

```
root@host lspci | grep -i SAS3008
sas0000:82:00.0 Mass storage controller:
LSI Logic / Symbios Logic SAS3008 PCI-
Express Fusion-MPT SAS-3
```

For Xeon Scalable CPU appliances:

```
root@host lspci | grep -i SAS3408
00:05.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS3408 Fusion-
MPT Tri-Mode I/O Controller Chip (IOC)
(rev 01)
```

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

Hardware failures – 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.

Error symptoms:

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 will not start because no storage controller resources are detected.
- The hypervisor or BIOS does not detect the HBA card.

For Xeon Scalable CPU appliances:

```
root@host lspci | grep -i SAS3408
00:05.0 Serial Attached SCSI controller:
LSI Logic / Symbios Logic SAS3408 Fusion-
MPT Tri-Mode I/O Controller Chip (IOC)
(rev 01)
```

7. 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.
8. 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 section “Disable option ROMs.”
9. Start the node by following the hypervisor-specific “Node Start” procedure described in the [Nutanix Hardware Replacement Documentation](#).

Hardware failures – ServerRAID M1215 SAS/SATA controller

If the M1215 RAID adapter fails and has been replaced, then the foreign configuration from the 120 GB boot drive must be imported into the RAID adapter and the correct virtual drive chosen for default boot.

In addition, it may be necessary to upgrade the adapter firmware to the supported level.

Error symptoms:

When ServerRAID controller failures occur:

- The check log LED on the front bezel lights.
- The system-error LED on the front bezel lights.
- The system error information on the LCD system information operating panel displays, if available.
- A POST error on boot may occur.
- The ServerRAID controller cannot be detected by the system.
- The Prism Web console displays a disk alert due to 120 GB boot SSD cannot be detected while the ServerRAID controller fails.
- The disk failure event will be logged in XClarity Administrator and IMM2 due to 120 GB boot SSD

Fix procedures:

To 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. Refer to the “Replacing an adapter in the rear two hard-disk-drive kit” procedure in the [Lenovo Converged HX Series Installation and Service Guide](#) for more details on replacing the M1215 RAID controller.
3. Power on the node and verify that the M1215 RAID controller was successfully replaced by making sure that:

Hardware failures – ServerRAID M1215 SAS/SATA controller

If the M1215 RAID adapter fails and has been replaced, then the foreign configuration from the 120 GB boot drive must be imported into the RAID adapter and the correct virtual drive chosen for default boot.

In addition, it may be necessary to upgrade the adapter firmware to the supported level.

- The check log LED on the front bezel lights.
 - The system-error LED on the front bezel lights.
 - The system error information on the LCD system information operating panel displays, if available.
 - A POST error on boot may occur.
 - The ServerRAID controller cannot be detected by the system.
 - The Prism Web console displays a disk alert due to 120 GB boot SSD cannot be detected while the ServerRAID controller fails.
 - The disk failure event will be logged in XClarity Administrator and IMM2 due to 120 GB boot SSD cannot be detected while the ServerRAID controller fails.
- a. The check log LED on the front bezel is extinguished.
 - b. The system-error LED on the front bezel is extinguished.
 - c. The system boots successfully with no POST errors or other errors.
4. Stop the startup process and go into the UEFI setup menu to configure the M1215 RAID controller to recognize the boot drive using the “Import foreign configuration” procedure in this document.
 5. If the foreign configuration could not be imported correctly, restart the server and try the import procedure again. Using the following procedure to recreate the boot partition and reinstall the hypervisor if it still fails:

Hardware failures – ServerRAID M1215 SAS/SATA controller

If the M1215 RAID adapter fails and has been replaced, then the foreign configuration from the 120 GB boot drive must be imported into the RAID adapter and the correct virtual drive chosen for default boot.

In addition, it may be necessary to upgrade the adapter firmware to the supported level.

- The check log LED on the front bezel lights.
 - The system-error LED on the front bezel lights.
 - The system error information on the LCD system information operating panel displays, if available.
 - A POST error on boot may occur.
 - The ServerRAID controller cannot be detected by the system.
 - The Prism Web console displays a disk alert due to 120 GB boot SSD cannot be detected while the ServerRAID controller fails.
 - The disk failure event will be logged in XClarity Administrator and IMM2 due to 120 GB boot SSD cannot be detected while the ServerRAID controller fails.
4. Stop the startup process and go into the UEFI setup menu to configure the M1215 RAID controller to recognize the boot drive using the “Import foreign configuration” procedure in this document.
 5. If the foreign configuration could not be imported correctly, restart the server and try the import procedure again. Using the following procedure to recreate the boot partition and reinstall the hypervisor if it still fails:
 - a. Configure boot drive virtual drives
 - b. 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 – Foundation 3.8](#) for more details.

Hardware failures – EIOM card

The Lenovo ThinkAgile 2U4N appliances offer connectivity to the LOM of each node through ports on the EIOM card located at the rear of the chassis. The top PHY maps to port one of the system LOM and the bottom PHY maps to port two of the system LOM.



Fix procedures:

1. Shut down the node by following the hypervisor-specific “Node Shutdown” procedure described in the Nutanix [Hardware Replacement Documentation](#).
2. Follow the instructions to “Remove the EIOM card” as described in the [ThinkSystem Information Center](#) to remove the defective part.
3. Next, follow the instructions to “Install the EIOM card” as described in the [ThinkSystem Information Center](#) to install the replacement part.
4. Start the node by following the hypervisor-specific “Node Start” procedure described in the Nutanix [Hardware Replacement Documentation](#).
5. Verify that the EIOM has been successfully replaced by checking the following:
 - a. Amber warning light on the node front panel is extinguished.
 - b. All network ports are fully functional again.

Hardware failures – GPU

The GPU card errors can be identified through the same methods used for detecting PCIe device errors. When error occurred, either the card will not be recognized by the system at all or an NMI will be logged in the system logs against the slot that the GPU is installed in. Another symptom would include the driver not installing properly.



Hardware failures – NVMe drive

There are two possible failure scenarios for NVMe drives:

- A drive fails completely
- A drive experiences recoverable errors and warnings that indicate potential failure

In either case, Nutanix recommends that users should replace the drive as soon as possible. For more information on the procedure used to replace a failed NVMe drive, refer the [Nutanix Hardware Replacement Documentation](#). Removing a failed NVMe drive without following the replacement procedure will cause the hypervisor to crash.

Reference links

- Lenovo support Web site (Data Center Support):
<https://datacentersupport.lenovo.com>
- *Lenovo Converged HX Series Installation and Services Guide*:
https://download.lenovo.com/servers_pdf/lenovo_converged_hx_series_isg.pdf
- *Lenovo Converged HX Series Hardware Replacement Guide*:
https://download.lenovo.com/servers_pdf/lenovo_converged_hx_series_hardware_replacement_guide.pdf
- Nutanix support documents portal (login credentials required):
<https://my.nutanix.com/#/page/docs>
- Nutanix *Field Installation Guide Foundation 3.8*:
<https://portal.nutanix.com/#/page/docs/details?targetId=Field-Installation-Guide-v3-8:Field-Installation-Guide-v3-8>
- The Nutanix customer Web site also includes product documentation, licenses, software, patches, a knowledge base, search capabilities, and other helpful information (login credentials required):
<http://portal.nutanix.com>

Summary

This course enabled you to:

- Provide an overview of Lenovo ThinkAgile HX Series appliances and certified nodes
- Describe the features and specifications of Lenovo ThinkAgile HX Series appliances and certified nodes
- Identify the differences between Lenovo ThinkAgile HX Series appliances and certified nodes
- Identify the different system configurations and diagrams
- Describe the support flow for Lenovo ThinkAgile HX Series and how to open a case to Nutanix
- Describe the problem determination steps and explain how to troubleshoot issues with Lenovo ThinkAgile HX Series systems