Hewlett Packard Enterprise

Troubleshooting Guide for HPE ProLiant Gen10 servers

Abstract

This document describes common procedures and solutions for the many levels of troubleshooting servers. This document is intended for the person who installs, administers, and troubleshoots servers, server blades, and HPE Apollo systems. Hewlett Packard Enterprise assumes you are qualified to service computer equipment and are trained in recognizing hazards in products with hazardous energy levels.

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Using this guide

Getting started

> **NOTE:**
>
> For common troubleshooting procedures, the term "server" is used to mean servers and server blades.

This guide provides common procedures and solutions for troubleshooting an HPE ProLiant server—from the most basic connector issues to complex software configuration issues.

To understand the sections of this guide and to identify the best starting point for an issue, review the following descriptions:

- **Troubleshooting preparation** on page 11

  This section provides information on how to prepare to begin troubleshooting the server, including important safety information, tips on how to gather symptom information, how to prepare your server to begin diagnosis, and other pre-diagnostic information.
- **Common issue resolution** on page 17

  Many server issues are caused by loose connections, outdated firmware, and other issues. Use this section to perform basic troubleshooting for common issues.
- **Remote troubleshooting** on page 26

  This section provides a list of the tools and processes to begin troubleshooting a server from a remote location.
- **Diagnostic flowcharts** on page 30

  If a server exhibits symptoms that do not immediately pinpoint the issue, use this section to begin troubleshooting. The section contains a series of flowcharts that provide a common troubleshooting process for HPE ProLiant servers. The flowcharts identify a diagnostic tool or a process to help solve the issue.
- **Hardware issues** on page 63

  If the symptoms point to a specific component, use this section to find solutions for issues with power, general components, system boards, system open circuits and short circuits, and external devices.
- **Software issues** on page 100

  If you have a known, specific software issue, use this section to identify and solve the issue.
- **Software and configuration utilities** on page 107

  Use this section as a reference for software tools and utilities.
- **Reports and logs** on page 119

  Use this section for more information about the reports and logs you can generate during the troubleshooting process or prior to contacting Hewlett Packard Enterprise Support.
- **Resources for troubleshooting** on page 124

  When additional information becomes necessary, use this section to identify websites and supplemental documents that contain troubleshooting information.
- **Support and other resources** on page 131

  When you need to contact Hewlett Packard Enterprise Technical Support, use this section to find the phone number and a list of the information needed prior to making the phone call.

Supported servers

The HPE Gen10 Troubleshooting Guide focuses on troubleshooting procedures for HPE Apollo systems and HPE ProLiant Gen10 ML, DL, BL, and XL servers.

Additional troubleshooting resources

Additional troubleshooting resources are available for HPE Gen10 server products in the following documents:

- *Error Message Guide for HPE ProLiant Gen10 servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.
- *Integrated Management Log Messages and Troubleshooting Guide for HPE ProLiant Gen 10 and HPE Synergy* provides IML messages and associated troubleshooting information to resolve critical and cautionary IML events.

To access the troubleshooting resources, see the Hewlett Packard Enterprise Information Library (**http://www.hpe.com/info/gen10-troubleshooting**).

Troubleshooting preparation

Prerequisites for server troubleshooting

⚠️ **WARNING:**

To avoid potential issues, ALWAYS read the warnings and cautionary information in the product documentation before removing, replacing, reseating, or modifying system components.

ⓘ **IMPORTANT:**

This guide provides information for multiple servers. Some information might not apply to the server you are troubleshooting. See the server documentation for information on procedures, hardware options, software tools, and operating systems supported by the server.

Procedure

1. Review the **important safety information**.
2. Gather and record symptom information.

   For more information, see "**Collecting symptom information** on page 14."
3. Gather all error information, such as the full POST error message displayed and the IML.
4. If it is necessary to contact Hewlett Packard Enterprise, download the Active Health System log and submit a support case through Active Health System Viewer (AHSV).

   For more information, see the AHSV user guide at **http://www.hpe.com/support/ahsv-docs**.
5. Prepare the server for diagnosis. For more information, see **Preparing the server for diagnosis** on page 14.
6. To begin the diagnostic process, see "**Initial diagnosis** on page 30."

Important safety information

Familiarize yourself with the safety information in the following sections before troubleshooting the server.

⚠️ **Important safety information**

Before servicing this product, read the Important Safety Information document provided with the server.

Symbols on equipment

The following symbols might be found on the equipment to indicate the presence of potentially hazardous conditions.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

	This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason. **WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure.
	This symbol on an RJ-45 receptacle indicates a network interface connection. **WARNING:** To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.
	This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists. **WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.
weight in kg weight in lb	This symbol indicates that the component exceeds the recommended weight for one individual to handle safely. **WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.
	These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power. **WARNING:** To reduce the risk of injury from electric shock, remove all power cords to disconnect power from the system completely.
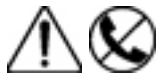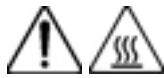
Warnings and cautions

⚠ **WARNING:**
Only authorized technicians trained by Hewlett Packard Enterprise should attempt to repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module-level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or to make modifications to any printed wiring board. Improper repairs can create a safety hazard.

⚠ **WARNING:**
To reduce the risk of personal injury or damage to the equipment, consult the safety information and user documentation provided with the server before attempting the installation.

Some servers contain high energy circuits, high current circuits, moving parts (such as fan blades), or any combination of these hazards, that may be exposed if covers and access panels are removed while the product is connected to a power source. These products are intended to be serviced only by qualified personnel who have been trained to deal with these hazards. Do not remove enclosures or attempt to bypass any interlocks designed to guard against these hazardous conditions.

⚠ WARNING:
To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling feet are extended to the floor.
- The full weight of the rack rests on the leveling feet.
- The stabilizing feet are attached to the rack if it is a single-rack installation.
- The racks are coupled together in multiple-rack installations.
- Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.

⚠ WARNING:
To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

⚠ 👤

weight in kg

weight in lb

⚠ WARNING:
To reduce the risk of personal injury or damage to the equipment:

- Observe local occupation health and safety requirements and guidelines for manual handling.
- Obtain adequate assistance to lift and stabilize the chassis during installation or removal.
- The server is unstable when not fastened to the rails.
- When mounting the server in a rack, remove the power supplies and any other removable module to reduce the overall weight of the product

⚠ CAUTION:
To properly ventilate the system, you must provide at least 7.6 cm (3.0 in) of clearance at the front and back of the server.

⚠ CAUTION:
The server is designed to be electrically grounded (earthed). To ensure proper operation, plug the AC power cord into a properly grounded AC outlet only.

Electrostatic discharge

Be aware of the precautions you must follow when setting up the system or handling components. A discharge of static electricity from a finger or other conductor may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the system or component.

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- ◦ Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- ◦ Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- ◦ Use conductive field service tools.
- ◦ Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized reseller install the part.

For more information on static electricity or assistance with product installation, contact an authorized reseller.

Collecting symptom information

Before troubleshooting a server issue, collect the following symptom information:

- Does the server power on?
- Does the server complete POST?

  - ◦ If not, then what do the server LEDs indicate? Which LEDs are illuminated? Which LEDs are illuminated but not flashing? Which LEDs are flashing and at what rate are they flashing? What color is the LED? Are LEDs flashing in unison?
  - ◦ Is video display available?
  - ◦ If server completes POST and video is available, are there any POST error messages? Record the text of the POST error message as displayed.
- Does the server successfully boot an operating system or hypervisor? If not, does the server display any of the following symptoms and at what point did the following symptom occur?

  - ◦ An uncorrectable machine check exception
  - ◦ Stop error or blue screen (Windows)
  - ◦ Purple diagnostic screen (Linux)
  - ◦ Linux kernel panic
  - ◦ A system "hang"
  - ◦ A system "freeze"
- If the issue occurs after an OS is installed:

  - ◦ Does the issue occur when a new application is loading?
  - ◦ What symptoms did the server display when the server malfunctioned? (For example, did the server reboot? Were there LED codes, health logs, or messages on the screen?)
- Are any indications present that show that the malfunction was reported as a memory error, PCI error, or so forth?

  The processor now contains the memory controller and PCI Express controller, so faults in other areas might be attributed to a processor malfunction.
- When did the issue occur? Record exactly when the issue happens (include the date and time). If it happens more than once, keep a list of all symptoms for each occurrence.
- What events preceded the failure? After which steps does the issue occur?
- What has been changed since the time the server was working?
- Has hardware or software been recently added or removed? If so, were the appropriate settings in the server setup utility changed, if necessary?
- How long has the server exhibited issue symptoms?
- If the issue occurs randomly, what is the duration or frequency?
- What failed based on the iLO Event Log or the IML?

Preparing the server for diagnosis

Procedure

1. Be sure the server is in the proper operating environment with adequate power, air conditioning, and humidity control. For required environmental conditions, see the **Server user guide** on page 125.
2. Record any error messages displayed by the system.
3. Remove all CD-ROMs, DVD-ROMs, USB drive keys, or SD cards that are not bootable devices.
4. Collect all tools and utilities necessary to troubleshoot the issue, such as a Torx screwdriver, loopback adapters, ESD wrist strap, and software utilities.

    • You must have the appropriate support software installed on the server.

      To verify the server configuration, connect to the **System Management Homepage** and select **Version Control Agent**. The VCA provides a list of names and versions of all installed Hewlett Packard Enterprise drivers, Management Agents, and utilities, and whether they are current.

    • Hewlett Packard Enterprise recommends you have access to the **Server documentation** on page 124 for server-specific information.

5. Determine if the server will be diagnosed offline or online:

    • If you will diagnose the server online, complete steps 6 and 8.
    • If you will diagnose the server offline, complete steps 7 and 8.

6. To diagnose the server online, review and collect the following information:

    a. Obtain a record of all current ROM settings by running CONREP from **Scripting Toolkit for Windows and Linux** on page 111.
    b. Review the IML.

       For more information, see the **Integrated Management Log** on page 119.
    c. Review the iLO information on both the **Overview** and the **System Information** page.
    d. Review the **Diagnostics** page.
    e. If the OS is operating and the System Management Homepage is installed, then review the operational status from the System Management Homepage.
    f. **Active Health System Log** on page 108.

       For more information, see the Active Health System Viewer documentation at the following website: **http://www.hpe.com/support/ahsv-docs**
    g. Record survey data.

7. To diagnose the server offline, power down the server and peripheral devices. If possible, always perform an orderly shutdown:

    a. Exit any applications.
    b. Exit the operating system.
    c. Power down the server.

8. Disconnect any peripheral devices not required for testing (any devices not necessary to power up the server).

Processor troubleshooting guidelines

> ⚠ **CAUTION:**
>
> When reducing the server to a minimum configuration for troubleshooting, do not remove additional processors. Processor and heatsinks are not designated for customer self repair. The processor and heatsink must be removed and replaced by an authorized service provider.

Before performing any troubleshooting steps that involve processors, review the following guidelines:

- Be sure that only authorized personnel perform the troubleshooting steps that involve installation, removal, or replacement of a processor.
- Always complete all other troubleshooting procedures before an authorized service provider removes or replaces a processor.

Breaking the server down to the minimum hardware configuration

⚠ **CAUTION:**

When reducing the server to a minimum configuration for troubleshooting, do not remove additional processors. Processor and heatsinks are not designated for customer self repair. The processor and heatsink must be removed and replaced by an authorized service provider.

During the troubleshooting process, you may be asked to break the server down to the minimum hardware configuration. A minimum configuration consists of only the components needed to boot the server and successfully pass POST. When requested to break the server down to the minimum configuration, uninstall the following components, if installed:

- All additional cooling fans, if applicable

  For the minimum fan configuration, see the server user guide or the chassis setup and installation guide.
- All additional power supplies, if applicable (leave one installed)
- All hard drives and solid state drives
- All optical drives (DVD-ROM, CD-ROM, and so forth)
- All optional mezzanine cards
- All expansion boards

Before removing the components, be sure to determine the minimum configuration for each component and follow all guidelines in the server user guide. Always use the recommended minimum configuration above before removing any DIMMs. If you are unable to isolate the issue with the configuration above, you will then remove all but the minimum number of associated DIMMs for each processor as directed by the Hewlett Packard Enterprise Support Center.

Common issue resolution

Resolving loose connections

- Be sure that all power cords are securely connected.
- Be sure that all cables are properly aligned and securely connected for each external and internal component.
- Remove and check all data and power cables for damage. Be sure that no cables have bent pins or damaged connectors.
- If a cable routes through air baffles or other components, be sure the cords and cables connected to the server are routed correctly through the baffle.
- Be sure that each device is properly seated. Avoid bending or flexing circuit boards when reseating components.
- If a device has latches, be sure that they are completely closed and locked.
- Check any interlock or interconnect LEDs that might indicate that a component is not connected properly.
- If issues continue to occur, remove and reinstall each device, checking the connectors and sockets for bent pins or other damage.
- For ProLiant BL c-Class Server Blades, be sure the Onboard Administrator tray is seated properly.

Searching for service notifications

Service notifications are created to provide solutions for known server issues. Check to see if your issue is covered by an existing service notification.

Procedure

1. Go to the Hewlett Packard Enterprise Support Center at **http://www.hpe.com/support/hpesc**.
2. Enter the product name or number, and then click **Go**.
3. Select **Top Issues and Solutions**, and then select **Advisories Bulletins and Notices**.

The complete list of documents is displayed.

Firmware updates

Many common issues can be resolved by updating the firmware. Firmware updates and additional information can be found in the following ways:

- SPP: Update the firmware by downloading SPP from **http://www.hpe.com/servers/spp**. For more information about SPP, see **Service Pack for ProLiant** on page 114.
- Hewlett Packard Enterprise Support Center website: The most recent version of a particular server or option firmware from the **Hewlett Packard Enterprise website**.

  To locate the drivers for a particular server, go to **http://www.hpe.com/support/hpesc**. Under **Select your HPE product**, enter the product name or number, and click **Go**.
- Subscription services: Hewlett Packard Enterprise offers a subscription service that can provide notification of firmware updates. For more information, see "**Subscription services**."

Server updates with an HPE Trusted Platform Module and BitLocker enabled

When a TPM is installed and enabled in UEFI System Utilities, and when the Microsoft Windows BitLocker Drive Encryption feature is enabled, always disable BitLocker before performing any of the following procedures:

- Restarting the computer for maintenance without a PIN or startup key
- Updating firmware when a TPM is installed or the Chipset-TPM feature is enabled

- Upgrading critical early boot components
- Replacing the system board
- Replacing the system board to replace or remove the TPM
- Disabling or clearing the TPM
- Moving a BitLocker-protected drive to another server
- Adding an optional PCI device, such as a storage controller or network adapter
- Installing a TPM 2.0 when Chipset-TPM is enabled in UEFI System Utilities.

For more information about TPM settings in UEFI System Utilities, see the UEFI System Utilities user guide at **http://www.hpe.com/info/uefi/docs**.

DIMM handling guidelines

> **△ CAUTION:**
> Failure to properly handle DIMMs can cause damage to DIMM components and the system board connector.

When handling a DIMM, observe the following guidelines:

- Avoid electrostatic discharge.
- Always hold DIMMs by the side edges only.
- Avoid touching the connectors on the bottom of the DIMM.
- Never wrap your fingers around a DIMM.
- Avoid touching the components on the sides of the DIMM.
- Never bend or flex the DIMM.

When installing a DIMM, observe the following guidelines:

- Before seating the DIMM, open the DIMM slot and align the DIMM with the slot.
- To align and seat the DIMM, use two fingers to hold the DIMM along the side edges.
- To seat the DIMM, use two fingers to apply gentle pressure along the top of the DIMM.

For more information, see the **Hewlett Packard Enterprise website**.

DIMM population information

For specific DIMM population information, see the DIMM population guidelines on the Hewlett Packard Enterprise website (**http://www.hpe.com/docs/memory-population-rules**).

Component LED definitions

Many common issues can be identified by reviewing the component and server LEDs. For more information, see the server and component documentation on the **Hewlett Packard Enterprise website**.

SAS, SATA, and SSD drive guidelines

When adding drives to the server, observe the following general guidelines:

- Drives must be of the same capacity to provide the greatest storage space efficiency when drives are grouped in the same drive array.
- Drives in the same logical volume must be of the same type. HPE SSA does not support mixing SAS, SATA, and SSD drives in the same logical volume.

Hot-plug drive LED definitions
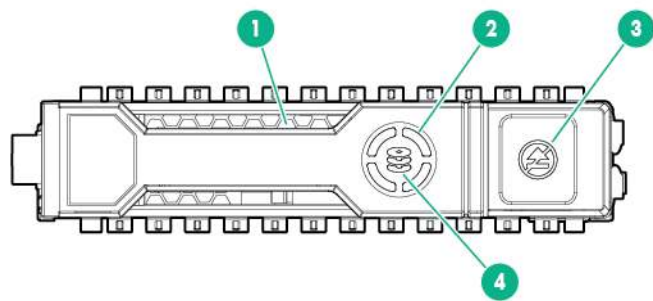
Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity
3	Do not remove	Solid white	Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.
		Off	Removing the drive does not cause a logical drive to fail.
4	Drive status	Solid green	The drive is a member of one or more logical drives.
		Flashing green	The drive is rebuilding or performing a RAID migration, strip size migration, capacity expansion, or logical drive extension, or is erasing.
		Flashing amber/ green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.

LFF drive LED definitions
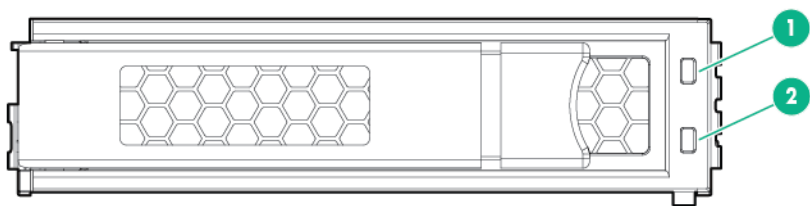
Item	Definition
1	Fault/UID (amber/blue)
2	Online/Activity (green)

Online/Activity LED (green)	Fault/UID LED (amber/blue)	Definition
On, off, or flashing	Alternating amber and blue	One or more of the following conditions exist: • The drive has failed. • A predictive failure alert has been received for this drive. • The drive has been selected by a management application.
On, off, or flashing	Solid blue	One or both of the following conditions exist: • The drive is operating normally. • The drive has been selected by a management application.
On	Flashing amber	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
On	Off	The drive is online but is not currently active.
1 flash per second	Flashing amber	Do not remove the drive. Removing the drive might terminate the current operation and cause data loss. The drive is part of an array that is undergoing capacity expansion or stripe migration, but a predictive failure alert has been received for this drive. To minimize the risk of data loss, do not remove the drive until the expansion or migration is complete.
1 flash per second	Off	Do not remove the drive. Removing the drive might terminate the current operation and cause data loss. The drive is rebuilding, erasing, or is part of an array that is undergoing capacity expansion or stripe migration.
4 flashes per second	Flashing amber	The drive is active but a predictive failure alert has been received for this drive. Replace the drive as soon as possible.
4 flashes per second	Off	The drive is active and is operating normally.
Off	Solid amber	A critical fault condition has been identified for this drive and the controller has placed it offline. Replace the drive as soon as possible.
Off	Flashing amber	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or not configured as part of an array.

NVMe SSD components
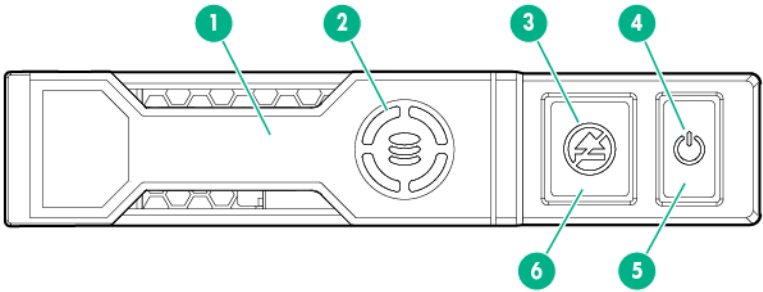
Item	Component	Status	Definition
1	Release lever	—	Ejects the NVMe drive carrier from the cage.
2	Activity ring LED	Rotating green	Drive activity
		Off	No drive activity
3	Do Not Remove LED	Solid white	Drive is powered on and configured in system. Do not remove the drive.
		Flashing white	Ejection request pending. Do not remove the drive.
		Off	Drive removed from the PCIe bus and can be ejected.
4	Power LED	Solid green	Drive is powered on and configured in system. Do not remove the drive.
		Flashing green	Ejection request pending. Do not remove the drive.
		Off	Drive removed from the PCIe bus and can be ejected.
5	Power button	—	Momentary press to request drive removal from PCIe bus and ejection. Drive removal request can be denied by operating system.
6	Do Not Remove button	—	Releases the release lever for removal and insertion.

Upon NVMe SSD insertion, an LED initiation sequence will be visible - lighting each LED in the carrier in sequence from left to right. The sequence will cycle until the drive is recognized by the system. When the

SSD is recognized by the system - the Do Not Remove LED will be solid white and the Power LED will be solid green.

System power LED definitions

The system power LED is located on the Power On/Standby button and each status is defined as follows:

System power LED	Definition
Off (Server)	System has no power.
Off (Server blade)	If the Health Status LED bar is off, then the system has no power.
	If the Health Status LED bar is flashing green, then the Power On/Standby Button service is being initialized.
Solid amber	System is in standby, Power On/Standby Button service is initialized.
Flashing green	System is waiting to power on, Power On/Standby button is pressed.
Solid green	System is powered on.

Health status LED bar definitions (c-Class server blades only)

Server blades have a health status LED bar with the following status definitions:

- Solid Green = Normal
- Flashing Green = Power On/Standby Button service is being initialized.
- Flashing Amber = Degraded condition
- Flashing Red = Critical condition

Front panel LED and buttons

Standard descriptions for most HPE ProLiant Gen10 servers are provided in this section. HPE ProLiant Gen10 server blades have a Health status LED bar instead of the Health LED described in this section. For product-specific LED information, see the **Server user guide** on page 125.

Description	Status
UID LED/button	Solid blue = Activated
	Off = UID is deactivated and iLO Service Port is ready for use.
	Flashing blue:
	• 1 Hz/cycle per sec = Remote management or firmware upgrade in progress • 4 Hz/cycle per sec = iLO manual reboot sequence initiated • 8 Hz/cycle per sec = iLO manual reboot sequence in progress • 1 fast flash and then off for 3 seconds = iLO Service Port status is Complete. • 4 medium flashes and then off for 1 second = iLO Service Port status is Busy. • 8 fast flashes and then off for 1 second - iLO Service Port status is Error.
Power On/Standby button and system power LED	Solid green = System on
	Flashing green (1 Hz/cycle per sec) = Performing power on sequence
	Solid amber = System in standby
	Off = No power present
Health LED	Solid green = Normal
	Flashing green (1 Hz/cycle per sec) = iLO is rebooting.
	Flashing amber = System degraded
	Flashing red (1 Hz/cycle per sec) = System critical
NIC status LED	Solid green = Link to network
	Flashing green (1 Hz/cycle per sec) = Network active
	Off = No network activity

Front panel LED notations

For more information about LED combinations and LED definitions, review the following:

- When all four front panel LEDs flash simultaneously, a power fault has occurred. For more information, see **Front panel LED power fault codes**.
- The server UID also flashes to indicate the current status of the iLO service port. For more information, see the iLO documentation at **http://www.hpe.com/support/iLO-docs**.
- When the system power LED is off, one of the following is true:

  ◦ Facility power is not present.
  ◦ The power cord is not attached.
  ◦ Power supplies are not seated properly.
  ◦ No power supplies are installed.
  ◦ A power supply failure has occurred.
  ◦ The power backplane, if required, is not seated properly.
  ◦ The PDU has issues.
  ◦ The Power On/Standby Button cable is disconnected.
- If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

Using the Server Health Summary

You can use iLO to display the Server Health Summary on an external monitor when the server is powered on or off. This feature is useful for troubleshooting when the server will not start up, and can also be used to view the server IP address and other health information.

Prerequisites

- The server has a UID button.
- An external monitor is connected.

Procedure

1. Press the UID button on the server.

   ⚠ **CAUTION:**

   Press and release the UID button. Holding it down at any time for more than 5 seconds initiates a graceful iLO reboot or a hardware iLO reboot. Data loss or NVRAM corruption might occur during a hardware iLO reboot.

   The Server Health Summary screen is displayed on the external monitor.
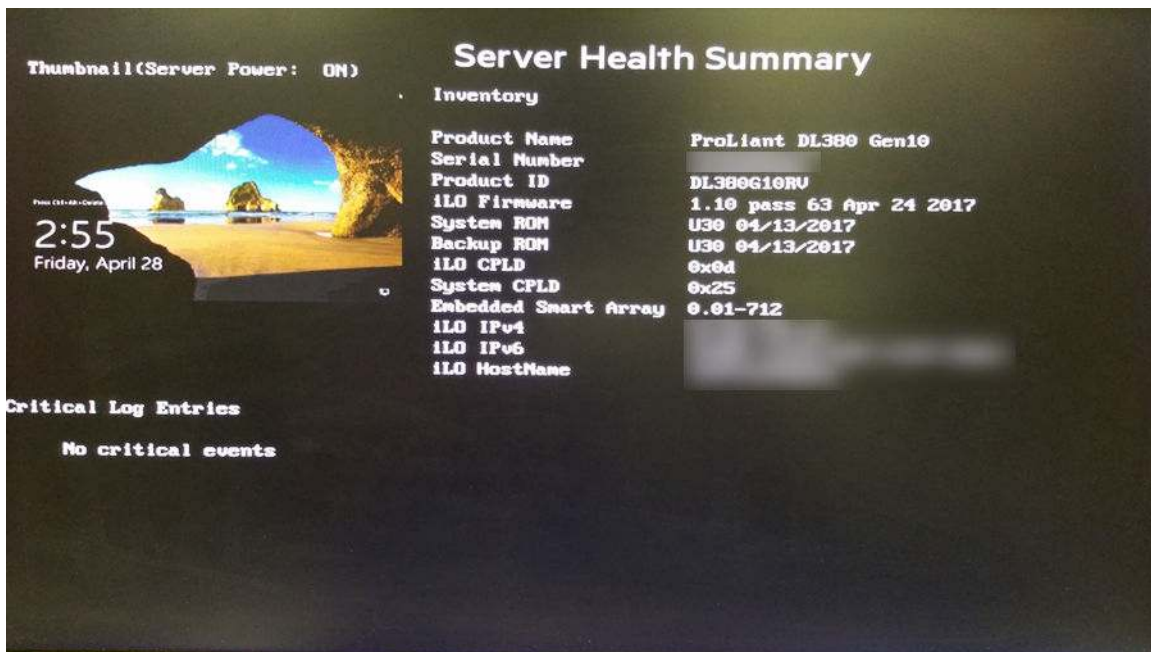
2. Press the UID button again to close the Server Health Summary screen.

Front panel LED power fault codes

When a power fault occurs, the following front panel LEDs flash simultaneously:

- System power LED
- Health LED
- NIC LED
- UID LED

For more information about the LED locations on your server, see the server user guide in the **Hewlett Packard Enterprise Information Library**.

The number of flashes in each sequence corresponds to the subsystem impacted by the power fault. The following table provides a list of power fault codes, and the subsystems that are affected. Not all power faults are used by all servers.

Subsystem	Front panel LED behavior
System board	1 flash
Processor	2 flashes
Memory	3 flashes
Riser board PCIe slots	4 flashes
FlexibleLOM	5 flashes
Removable HPE Flexible Smart Array controller/ Smart SAS HBA controller	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

Remote troubleshooting

Remote troubleshooting tools

Hewlett Packard Enterprise provides several options that help IT administrators troubleshoot a server from remote locations.

- **HPE iLO**

  iLO is available for all HPE ProLiant and HPE Synergy servers. iLO consists of an intelligent processor and firmware that allows for remote server management. The iLO VSP provides bi-directional data flow with a server serial port. Using VSP, you can operate as if a physical serial connection exists on the remote server serial port. From an established iLO connection, the system status can be identified within the first interface presented to the Administrator. When diagnosing server issues, administrators can determine what failed based on the IML or iLO Event Log. For more information about iLO features (which may require a specific iLO license), see the iLO documentation on the **Hewlett Packard Enterprise website**.

- HPE Onboard Administrator (for HPE ProLiant server blades only)

  HPE Onboard Administrator and HPE Onboard Administrator Command Line Interface assist Administrators in remotely troubleshooting server blades in the HPE BladeSystem environment. **Using the OA CLI** on page 28, administrators obtain access to all configuration information on each blade bay and interconnect. A standard SHOW ALL command from the OA CLI provides configuration information on the HPE ProLiant c-Class Blade Enclosures. For more information about using the OA CLI and other BladeSystem documentation, see the **Hewlett Packard Enterprise website**.

  Administrators can also generate an OA SHOW ALL report using the guidelines on the **Hewlett Packard Enterprise website**.

- HPE SIM

  HPE SIM offers remote access for event monitoring, maximizing uptime for your server and storage. SIM provides the ability to remotely monitor fault management and event handling in combination with scripting options for custom configuration of policies. Performance is another key feature of SIM used to analyze environment for performance bottlenecks. For more information about SIM, see the **Hewlett Packard Enterprise website**.

- Virtual Connect (for HPE ProLiant BL c-Class server blades)

  The GUI provides a syslog containing detailed information that may not be reported in VC logs yet. Other access to VC is through the CLI. For more information on how to remotely access the VC manager, see **Remote access to the Virtual Connect Manager** on page 27.

  For more information on capturing Healthreport, SHOW ALL, and SupportDump Files using VCSU, see the **Hewlett Packard Enterprise website**.

- **Active Health System** on page 107

  The HPE Active Health System monitors and records changes in the server hardware and system configuration. The Active Health System assists in diagnosing issues and delivering rapid resolution when server failures occur. The Active Health System log, in conjunction with the system monitoring provided by Agentless Management or SNMP Pass-thru, provides continuous monitoring of hardware and configuration changes, system status, and service alerts for various server components.

  Active Health System Viewer (AHSV) is an online tool used to read, diagnose, and resolve server issues quickly using AHS uploaded data. AHSV provides Hewlett Packard Enterprise recommended repair actions based on experience and best practices.

  If you are you unable to resolve the issues, submit a support case through AHSV. For more information, see the AHSV User Guide at **http://www.hpe.com/support/ahsv-ug-en**.

Remote access to the Virtual Connect Manager

To access the VCM CLI remotely through any SSH session:

1. Using any SSH client application, start an SSH session to the VCM.
2. When prompted, enter the assigned IP address or DNS name of the VCM.
3. Enter a valid user name.
4. Enter a valid password. The CLI command prompt is displayed.
5. Enter commands for the VCM.
6. To terminate the remote access SSH session, close the communication software or enter Exit at the CLI command prompt.

For more information, see the *HPE Virtual Connect Manager Command Line Interface for c-Class BladeSystem User Guide* on the **Hewlett Packard Enterprise website**.

Using iLO for remote troubleshooting of servers and server blades

Procedure

1. Log in to the iLO web interface
2. Review the initial **Overview** screen for status and health.

   Observe the following fields on the Overview screen:

   - System ROM
   - iLO Firmware version
   - System health
   - Server power
   - SD card status

3. To display the Summary tab, click **System Information** in the navigation tree.
   a. Review all installed Subsystems and Devices and verify that all devices show the OK status with a green icon.
   b. If any degraded subsystems or devices exist, then click the degraded subsystems or device to review the current status.
4. From the System Information page, select the **Storage** tab.
   a. Verify that all storage devices show the OK status with a green icon.
   b. If any degraded subsystems or devices exist, then click the degraded subsystems or device to review the status.
5. To review firmware and OS information, click **Firmware & OS Software** in the navigation tree.

   The Firmware tab is displayed.
6. Review the Event Logs and the IML for possible hardware faults on power-on or boot up issues when the server is not booting properly.
   a. To access the logs, click **Information** in the navigation tree.
   b. Click the **iLO Event Log** or the **Integrated Management Log** tab.

   > **NOTE:**
   >
   > Troubleshooting information is available for selected IML events. Supported events are displayed as **Learn More** links in the IML event pane.

7. Click **Information** in the navigation tree, and then select the **Diagnostics** tab.

   From this page, you can do the following:

- Verify the status of the iLO Self-Test results.
- Use the **Reset** button to reset iLO.
- If a memory dump recording is required, use the **Generate NMI to System** button to Initiate NMI for a memory dump recording.

8. Be sure the **Power On** and **Health** status icons in the top right on the iLO web interface pages are green.

Using Onboard Administrator for remote troubleshooting of server blades

1. Review the **Entire Enclosure Status** in the upper left corner of the **System Status** view screen.

   This shows how the entire enclosure is operating. Critical events, such as incorrectly placed components like mezzanine boards and interconnect devices, are displayed.

   For more information on how to review the Onboard Administrator SHOW ALL output for warnings or possible failures, see the *HPE BladeSystem c-Class Enclosure Troubleshooting Guide* on the **Hewlett Packard Enterprise website**.

2. To verify the status and diagnostics for the blade, access **Device bays > Host > Status** tab.

3. Review the **IML** tab for possible server hardware events that require action.

4. Review possible interconnect link state issues on the **Status** tab **> Port Mapping Information**.

   Any Green indicator on a Port indicates that a link is available at the transportation layer. This means that a NIC or a possible SAN connection should be established and that the midplane signals are transferred correctly from the server to the interconnect device.

   The **Table view** tab on this screen displays the Port Status indicator as Green for all connections.

   For any ports that are not green or that are failed ports, review the signal backplane on the server or the midplane for damage.

   For any blade power on issues, review the **iLO** screen on the **Status** tab and the **Event Log** tab on the "iLO – Device bay x" page.

5. If all status indicators are green and no warnings, failed, or degraded components exist, then proceed to the iLO WEB guide (**Status Tab > iLO > Web Administration**).

6. If the blade is not displayed in the Insight Display on the chassis or within the Onboard Administrator GUI, then troubleshoot the issue further using the procedures in the *HPE BladeSystem c-Class Enclosure Troubleshooting Guide* on the **Hewlett Packard Enterprise website**.

Using the OA CLI

Gather and review health and system information using the OA CLI to troubleshoot the system:

- For systems using OA firmware 3.60 or later, run the SHOW HEALTH CLI command and review the health status for the entire chassis. The SHOW HEALTH status output is included within the OA SHOW ALL report as well as the first executed SHOW command.

- Execute the SHOW ALL command from either the OA GUI or the OA CLI as follows:

  ◦ OA GUI > Enclosure Settings > Configuration Scripts > SHOW ALL
  ◦ OA CLI > Execute the following CLI command: SHOW ALL

  This command executes all OA CLI SHOW commands to provide a detailed report of the enclosure configuration, status, and inventory available.

To gather and respond to information obtained by the SHOW ALL command, do the following:

1. For systems using OA firmware 3.60 and earlier, review the `SHOW ENCLOSURE LCD` output of the `SHOW ALL` report. A display status of "Blinking" indicates a warning condition. Review the data or remotely review messages on the Insight Display through the OA GUI.

2. For a status overview of the chassis, review the output of the following commands listed in the `SHOW ALL` report:

   - `SHOW ENCLOSURE STATUS`
   - `SHOW SERVER STATUS ALL`
   - `SHOW INTERCONNECT STATUS ALL`

   If the status of a component is "Degraded," then observe the subcomponents one by one to discover the degraded component. Subcomponents that are faulty can be marked as such.

3. Review the system log (SYSLOG) section of the `SHOW ALL` report to locate information that might be pertinent to the current issue.

   If the time frame of the failure is not available within the system log, then review the extended system log using the following CLI command:

   `SHOW SYSLOG HISTORY 0`

4. To search for support information about the issue (if available), go to the **Hewlett Packard Enterprise website** and do the following:

   a. Enter **HP Onboard Administrator** in the **Enter a product name or number** field.
   b. Select **HP Onboard Administrator** from the results list.
   c. Enter text from the system log or related search words into the **Search HP Onboard Administrator** field.

5. For any low-level (transport layer) SAN or network connectivity errors in an interconnect device or network card connection, review any low-level FRU firmware update information provided by the `SHOW UPDATE` output in the `SHOW ALL` report. Any newer version available in the New Version column must be updated using the `UPDATE DEVICE` command. These errors cause an interruption in I/O connectivity. Update the firmware per module and not simultaneously. For more information about the `UPDATE DEVICE` command, see the *HPE BladeSystem Onboard Administrator Command Line Interface Users Guide* on the **Hewlett Packard Enterprise website**.

6. Capture any entry in the system log file referring to "Saving supportdump" by using the OA CLI command `UPLOAD SUPPORTDUMP`. Send this file to Hewlett Packard Enterprise Support for analysis, if needed. For more information, see the **Hewlett Packard Enterprise website**.

Diagnostic flowcharts

Diagnostic steps

To effectively troubleshoot an issue, Hewlett Packard Enterprise recommends that you start with **Initial diagnosis** on page 30, and follow the appropriate diagnostic path.

If the other flowcharts do not provide a troubleshooting solution, follow the diagnostic steps in **General diagnosis flowchart** on page 60. The General diagnosis flowchart is a generic troubleshooting process to be used when the issue is not server-specific or is not easily categorized into the other flowcharts.

Gather important information before you begin

Before you begin troubleshooting the issue, gather the following information for use during troubleshooting and for use if the issue requires contacting Hewlett Packard Enterprise support:

- Active Health System log — For more information, see **Active Health System Viewer** on page 107.
- Symptom information — For more information, see **Collecting symptom information** on page 14.
- IML — For more information, see **Integrated Management Log** on page 119.
- POST error messages — For more information about error message documentation, see **Troubleshooting resources** on page 124.
- OA SHOW ALL report (for HPE ProLiant BL Server Blades only) — For more information, see **Using the OA CLI** on page 28.
- Other **Reports and logs** on page 119

Troubleshooting flowcharts

Using the Diagnostic flowcharts

Some information provided in the flowcharts can be further explained in conjunction with other sources of information provided on the Hewlett Packard Enterprise website and in other sections of this document. To locate the appropriate information, see the references following the flowchart. Each reference corresponds to the underlined text in the flowchart.

Initial diagnosis

This section helps you decide which flowchart can help you with your issue.

- **Remote diagnosis flowchart** on page 31 — To diagnose the issue from a remote location.
- **Server power-on issues flowchart with ML and DL series servers** on page 32 — An HPE ProLiant ML or DL Gen10 series server does not power on.
- **Server power-on issues flowchart for XL series servers** on page 34 — An HPE ProLiant XL Gen10 series server does not power on.
- **Server blade power-on issues flowchart with BL series server blades** on page 36 — An HPE ProLiant BL Gen10 series server blade does not power on.
- **POST issues flowchart** on page 39 — A server does not complete POST.
- **Intelligent Provisioning issues flowchart** on page 40 — A server does not boot to Intelligent Provisioning.
- **Controller issues flowchart** on page 42 — A controller is not shown during POST or if your controller shows errors.
- **Cache module issues flowchart** on page 44 — A logical drive performance is poor or you are unable to enable write caching in HPE SSA.

- **HPE Smart Storage Battery issues for Smart Array controllers** on page 46 — An HPE Smart Storage battery is not recognized or is not charging.
- **Physical drive issues flowchart** on page 48 — Physical drives are not shown or if errors are displayed during POST.
- **Logical drive issues flowchart** on page 50 — Logical drives are not shown or if errors are displayed during POST.
- **OS boot issues flowchart** on page 51 — A server does not boot to the OS.
- **Server fault indications flowchart for non-blade servers** on page 53 — A nonblade server has Insight Management Agent faults or faults indicated by LEDs.
- **Server blade fault indications flowchart for BL series server blades** on page 55 — An HPE ProLiant BL server blade has Insight Management Agent faults or faults indicated by LEDs.
- **Power profile issues flowchart** on page 56 — A server is having unexplained ASRs, blue screens, purple screens, or hangs.
- **NIC issues flowchart** on page 58 — A NIC is not working.
- **General diagnosis flowchart** on page 60 — All other issues.

Remote diagnosis flowchart

For a generic approach to troubleshoot a server from a remote location, see the remote diagnosis flowchart:

Figure 1: Remote troubleshooting flowchart

For more information about the underlined statements in this flowchart, see the following sections:

- **Using Onboard Administrator for remote troubleshooting of server blades** on page 28
- **Using iLO for remote troubleshooting of servers and server blades** on page 27
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

Power-on issues flowchart

Server power-on issues flowchart with ML and DL series servers

Symptom

- The server does not power on.
- The server does not respond when the power button is pressed.
- The system power LED is off or solid amber.
- The health LED is solid red, flashing red, solid amber, or flashing amber.
- All front panel LEDs flash in unison. For more information, see **Front panel LED power fault codes** on page 24.

Cause

- Improperly seated or faulty power supply
- Loose or faulty power cord
- Power source issue
- Improperly seated component or interlock issue

Action

1. To resolve the issue, follow the steps in the flowchart.

Figure 2: Server power-on issues flowchart for ML and DL series servers

For more information about the underlined statements in this flowchart, see the following sections:

- Check for loose power cables — **Resolving loose connections** on page 17
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- What color is the system power LED? — **System power LED definitions** on page 22
- Is the power source operating properly? — **Power source issues** on page 63
- System health LED — **Front panel LED and buttons** on page 22
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

For the location of server LEDs and information on their statuses, see the server documentation on the **Hewlett Packard Enterprise website**.

Server power-on issues flowchart for XL series servers

Symptom

- The server does not power on.
- The system power LED is off or solid amber.
- The health LED status bar is flashing red or flashing amber.

Cause

- The server is not properly installed in the chassis.
- The server is not configured to automatically power on in HPE iLO.
- The power being supplied is not sufficient for the server installed in the chassis.
- The power cap is not configured properly for the chassis.
- The management module is not properly installed in the chassis.
- A power fault occurred.

Action

1. To resolve the issue, follow the steps in the flowchart.

Start
Power-on issues
(XL series)

Are the other servers in the chassis powered on?

No → Is the power to the chassis connected properly and adequate for the load?

Yes → Remove components in the order below:
1. Servers
2. Fans
3. Management module
4. Power cables
See the chassis and server maintenance and service guides.

→ Wait 30 seconds.

→ Re-install components in the order below:
1. Power cables
2. Management module
3. Fans
4. Servers
See the chassis and server maintenance and service guides.

No → Properly connect power to the chassis. See the chassis setup and installation guide.

Yes → Are all the front panel LEDs on the server flashing at the same rate?

Yes → Review the IML for an entry and see Front panel LED power fault codes. → Replace or troubleshoot internal server components.

No → What color is the server system power LED?

Off → Verify that all cables within the server are connected properly. See the chassis and server documentation. → Remove the tray and check for visible damage to the rear connectors. See the maintenance and service guide. → Is visible damage present?

Yes → Create and submit a support case using the Active Health System Viewer. See the Active Health System Viewer user guide.

No → Reseat the server. See the maintenance and service guide.

Does the condition still exist? No → / Yes →

Amber

Flashing green or Solid green → Press the Power On/Standby button and wait 45 seconds. → Does the condition still exist? Yes → / No → End

Does the condition still exist? Yes → Create and submit... / No → Contact Support.

Does the condition still exist? No → End / Yes → Contact Support.

Wait for 45 seconds.

What color is the health LED? Solid green → End

Red or Amber → Review the IML for an entry. → Replace or troubleshoot internal server components. See the maintenance and service guide. → Does the condition still exist? No → End / Yes →

Figure 3: Server power-on issues flowchart for XL series servers

For more information about the underlined statements in this flowchart, see the following sections:

- Maintenance and service guide — **Server maintenance and service guide** on page 125
- Setup and installation guide — **Setup and installation guide** on page 125
- Front panel LED power fault codes — **Front panel LED power fault codes** on page 24
- Replace or troubleshoot internal server components — **Hardware issues** on page 63
- System power LED? — **System power LED definitions** on page 22
- Server documentation — **Server documentation** on page 124
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Health LED — **Front panel LED and buttons** on page 22
- IML — **Integrated Management Log** on page 119
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

For the location of server LEDs and information on their statuses, see the server documentation on the **Hewlett Packard Enterprise website**.

Server blade power-on issues flowchart with BL series server blades

Symptom

- The server blade does not power on.
- The system power LED is off or solid amber.
- The health status LED bar is flashing red or flashing amber.

Cause

- The server blade is not properly installed in the enclosure.
- The server blade is not configured to automatically power on in HPE iLO.
- The power being supplied is not sufficient for the server blades installed in the enclosure.
- The power cap is not configured properly for the enclosure.
- The Onboard Administrator module is not properly installed in the enclosure.
- A possible communication failure between HPE iLO and the Onboard Administrator is causing the server blade to wait for permission to power on.
- The server blade has a mismatched fabric installed on the mezzanine 1 connector or the mezzanine 2 connector.

Action

1. To resolve the issue, follow the steps in the flowchart.
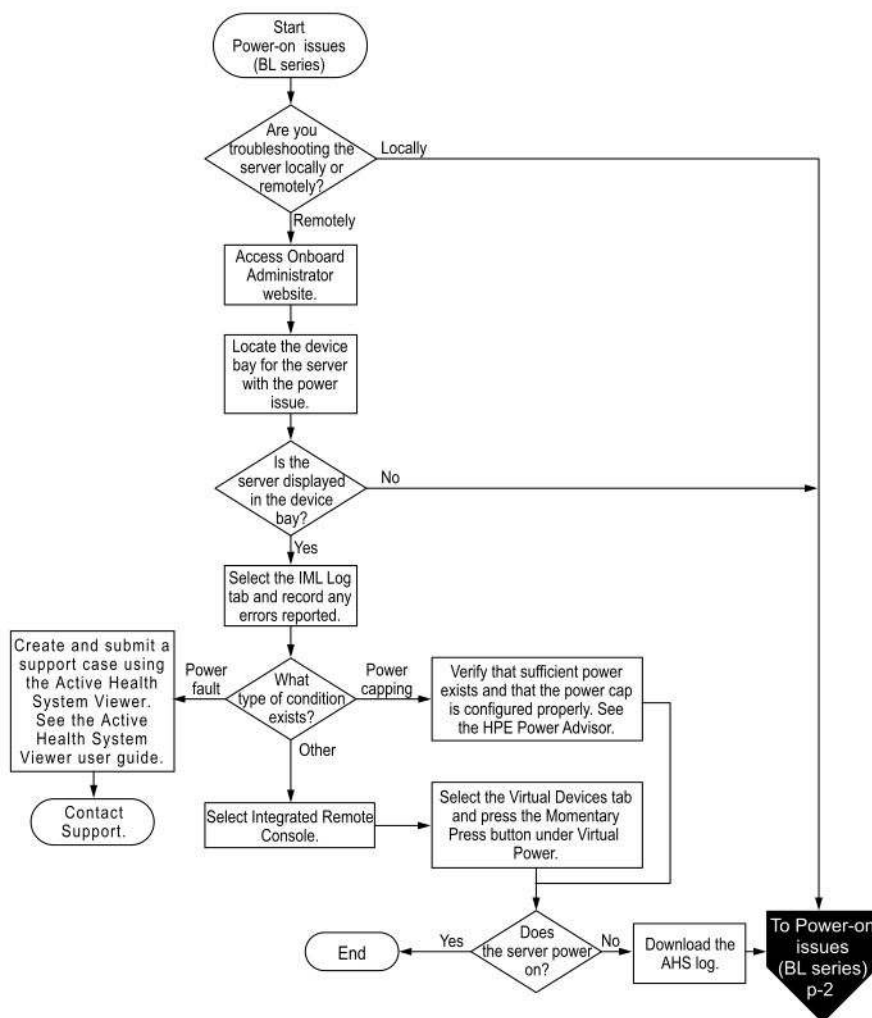
Figure 4: Server power-on issues flowchart for BL series server blades (page 1 — Remote troubleshooting)

For more information about the underlined statements in this flowchart, see the following sections:

- AHS log — **Active Health System Viewer** on page 107
- HPE Power Advisor — **Server maintenance and service guide** on page 125
- Before contacting support, gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131
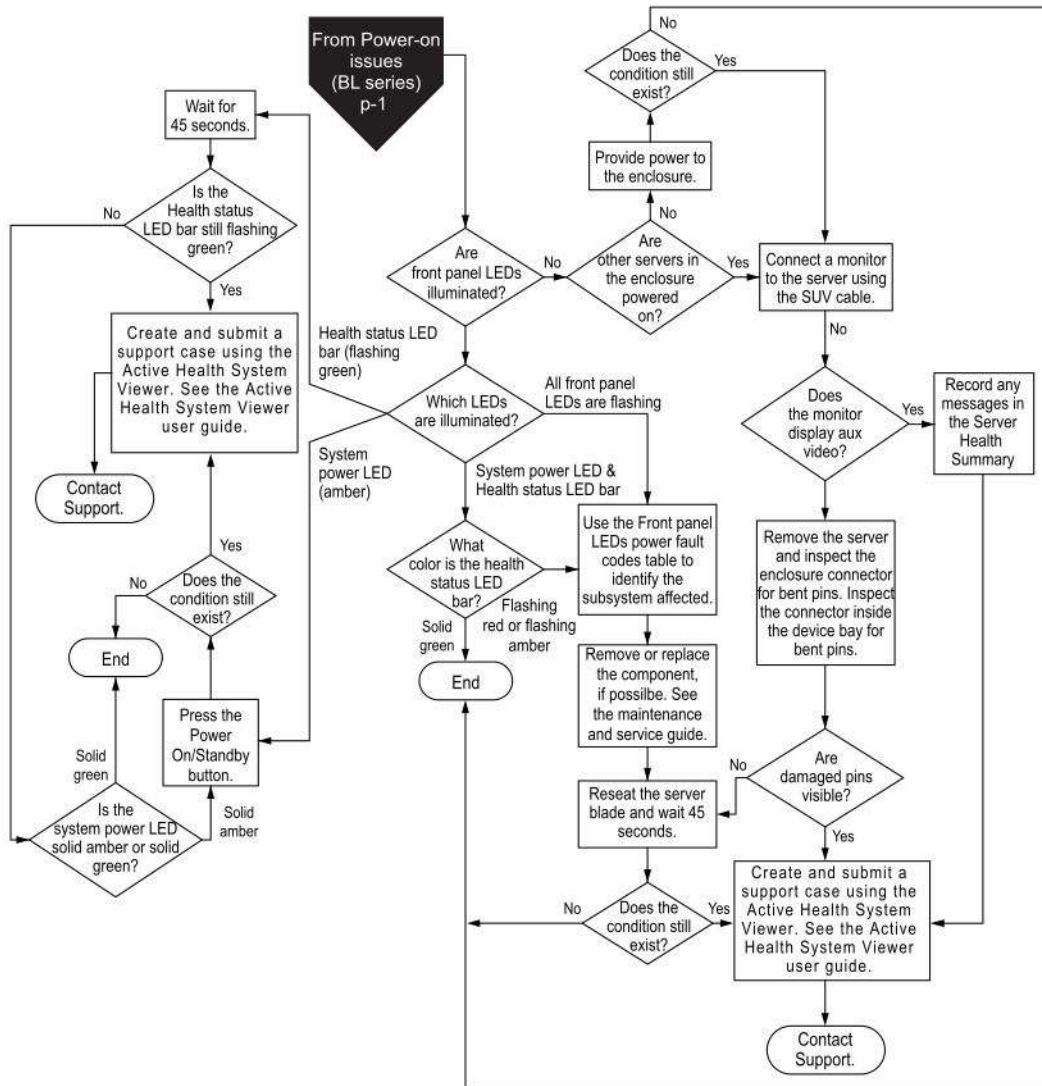
Figure 5: Server power-on issues flowchart for BL series server blades (page 2 — Local troubleshooting)

For more information about the underlined statements in this flowchart, see the following sections:

• Health Status LED bar — **Health status LED bar definitions (c-Class server blades only)** on page 22
• Front panel LEDs power fault code — **Front panel LED power fault codes** on page 24
• Maintenance and service guide — **Server maintenance and service guide** on page 125
• System power LED — **System power LED definitions** on page 22
• See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
• Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

For the location of server LEDs and information on their statuses, see the server documentation on the **Hewlett Packard Enterprise website**.

POST issues flowchart

Symptom

- The server does not complete POST
- The server completes POST with errors

Cause

- Improperly populated memory
- Outdated firmware on adapter options
- Unsupported adapter
- Improperly seated or faulty internal component
- Faulty video device

Action

1. To resolve the issue, follow the steps in the flowchart.

Figure 6: POST issues flowchart (1 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- Power on issues flowchart — **Power-on issues flowchart** on page 32
- System power LED — **System power LED definitions** on page 22
- User guide — **Server user guide** on page 125
- OS boot issues flowchart — **OS boot issues flowchart** on page 51
- Check for loose connections — **Resolving loose connections** on page 17
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- HPE Error Message Guide — **Troubleshooting resources** on page 124
- Update all component firmware to the latest version — **Updating firmware or system ROM** on page 114
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

Figure 7: POST issues flowchart (2 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- User guide — **Server user guide** on page 125
- Loose connections — **Resolving loose connections** on page 17
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

Intelligent Provisioning issues flowchart

Symptom

The server does not boot to Intelligent Provisioning (F10).

Cause

- Corrupted installation of Intelligent Provisioning
- Drive subsystem issue
- Incorrect setting in UEFI System Utilities

Action

1. To resolve the issue, follow the steps in the flowchart.

Figure 8: Intelligent Provisioning issues flowchart
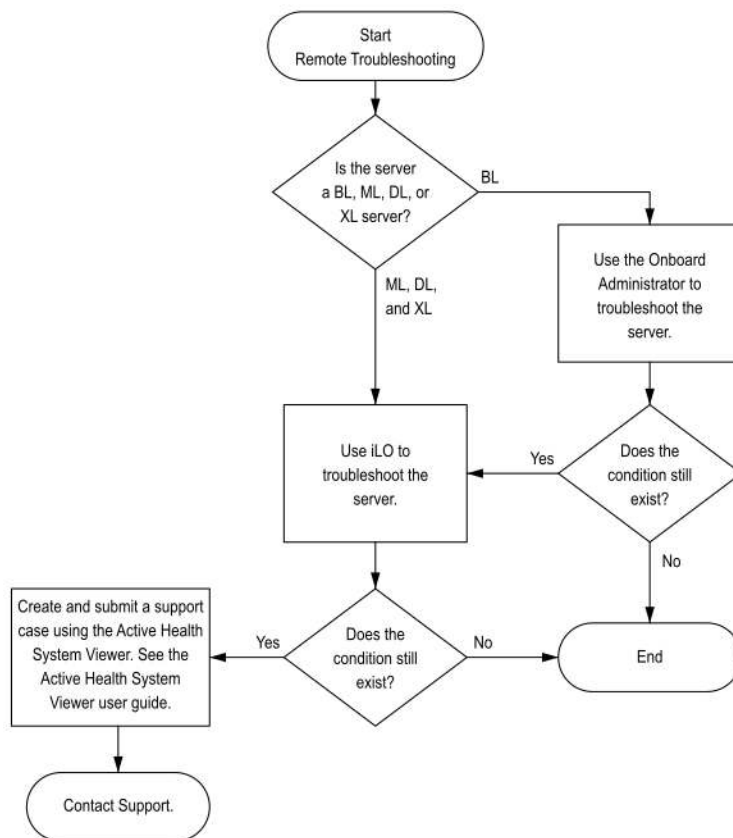
For more information about the underlined statements in this flowchart, see the following sections:

- Intelligent Provisioning User Guide — **Intelligent Provisioning software documentation** on page 126
- Go to POST issues — **POST issues flowchart** on page 39
- UEFI System Utilities user guide — **UEFI System Utilities documentation** on page 125
- Drive issues — **Drive issues (hard drives and solid state drives)** on page 68
- Corrupted system disk — **Hardware issues** on page 63
- Operating system — **Operating system issues and resolutions** on page 100
- Isolate and minimize the memory configuration — **Isolating and minimizing the memory configuration** on page 87
- Break the server down to minimum configuration — **Breaking the server down to the minimum hardware configuration** on page 16

Controller issues flowchart

Symptom

- The array controller is not visible during the POST process.
- The Smart Array controller shows errors during the POST process.

Cause

- The hardware is physically damaged.
- The controller is not supported on the server.
- The controller is faulty.
- The controller is not supported by the PCIe slot.
- The processor is not installed for the PCIe slot where the controller is installed.
- The firmware is outdated.

Action

1. To resolve the issue, follow the steps in the flowchart.
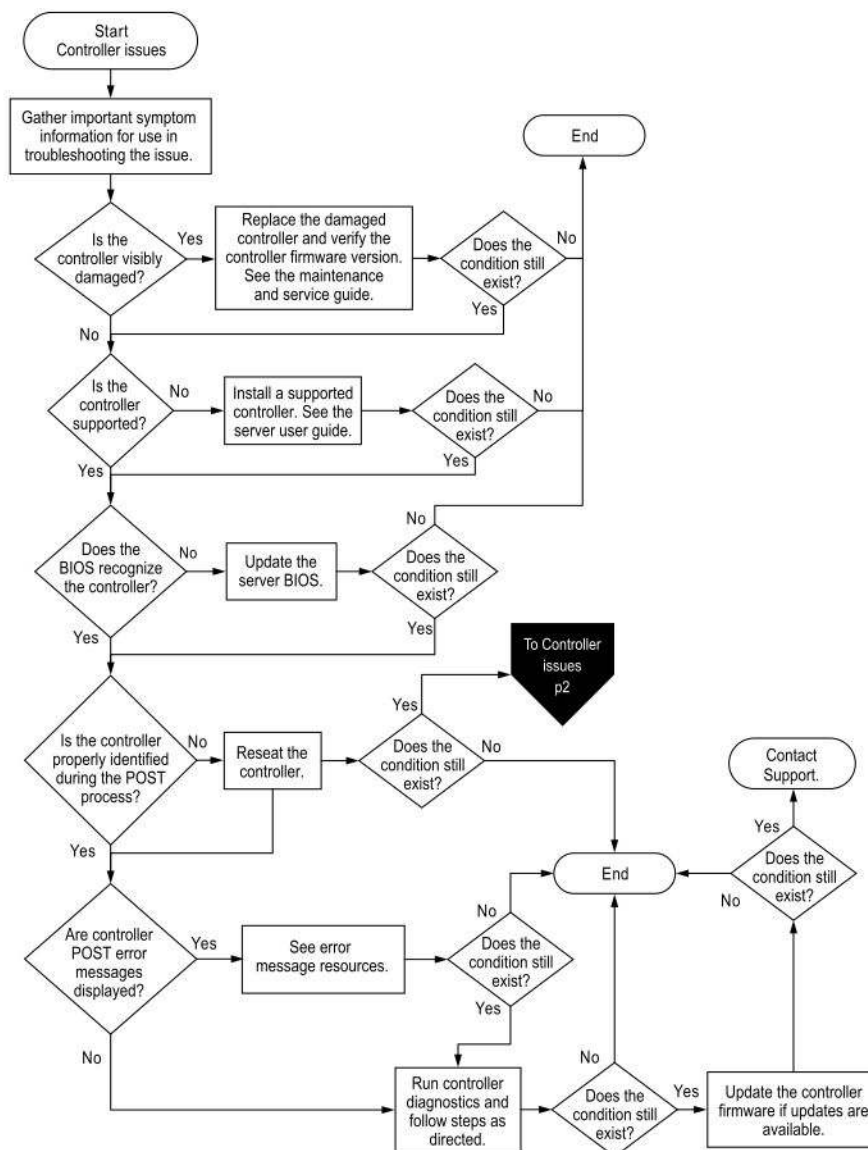
Figure 9: Controller issues flowchart (1 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- Verify the controller firmware version — **Updating firmware or system ROM** on page 114
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- User guide — **Server user guide** on page 125
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131
- See error message resources — **Troubleshooting resources** on page 124
- Update the controller firmware if updates are available — **Updating firmware or system ROM** on page 114
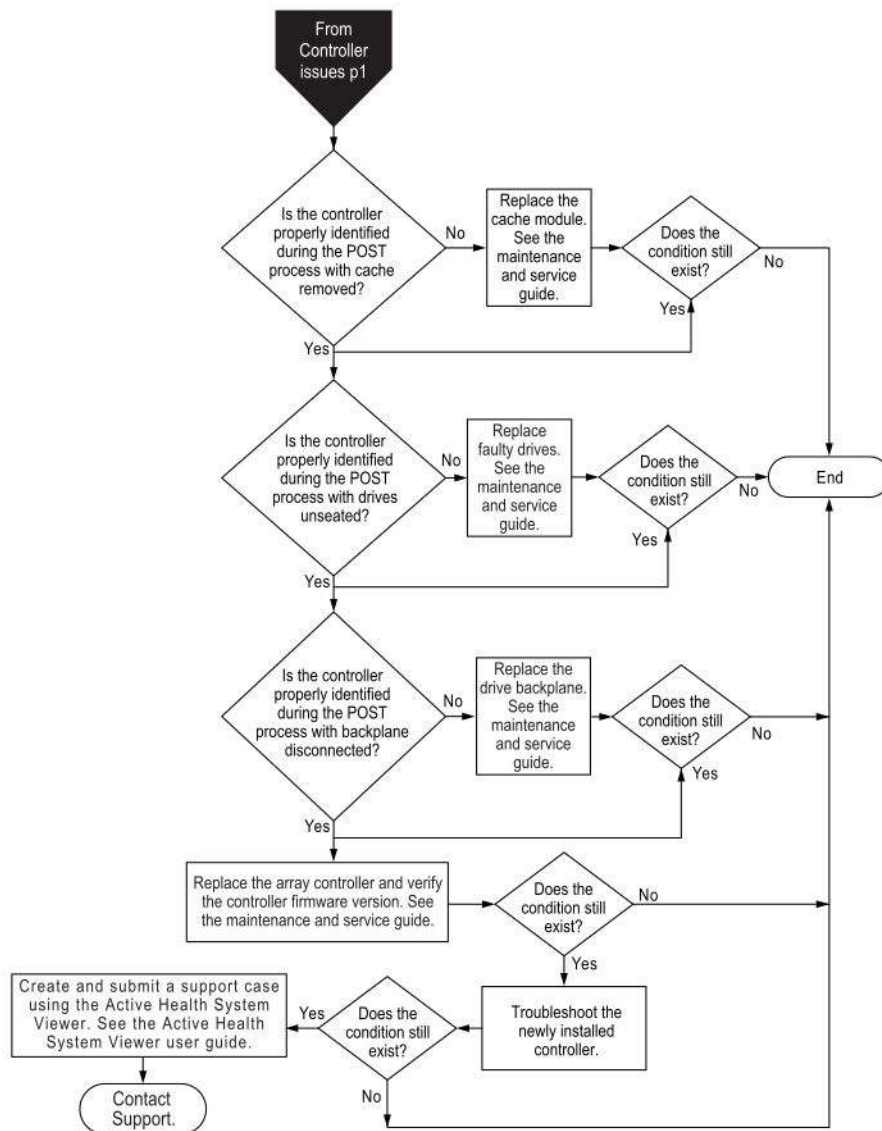
Figure 10: Controller issues flowchart (2 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- Maintenance and service guide — **Server maintenance and service guide** on page 125
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

Cache module issues flowchart

Symptom

- The logical drive performance is poor.
- Write-caching cannot be enabled in HPE SSA.
- The cache module shows errors during the POST process.

Cause

- The cache module is missing or failed.
- The battery is not sufficiently charged.

- The cache module is not supported on the server.
- The cable connecting the cache module on a standup controller to the PCIe riser is damaged or not seated properly.

Action

1. To resolve the issue, follow the steps in the flowchart.

Figure 11: Cache module issues flowchart

For more information about the underlined statements in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- User guide — **Server user guide** on page 125
- Maintenance and service guide — **Server maintenance and service guide** on page 125

HPE Smart Storage Battery issues for Smart Array controllers

Symptom

- The battery is not recognized.
- The battery is not charging.
- The battery or cache module is reported as failed.

Cause

- The battery is unsupported on this server.
- The battery cable connector needs to be reseated.
- The battery is faulty.

Action

1. To resolve the issue, follow the steps in the flowchart.
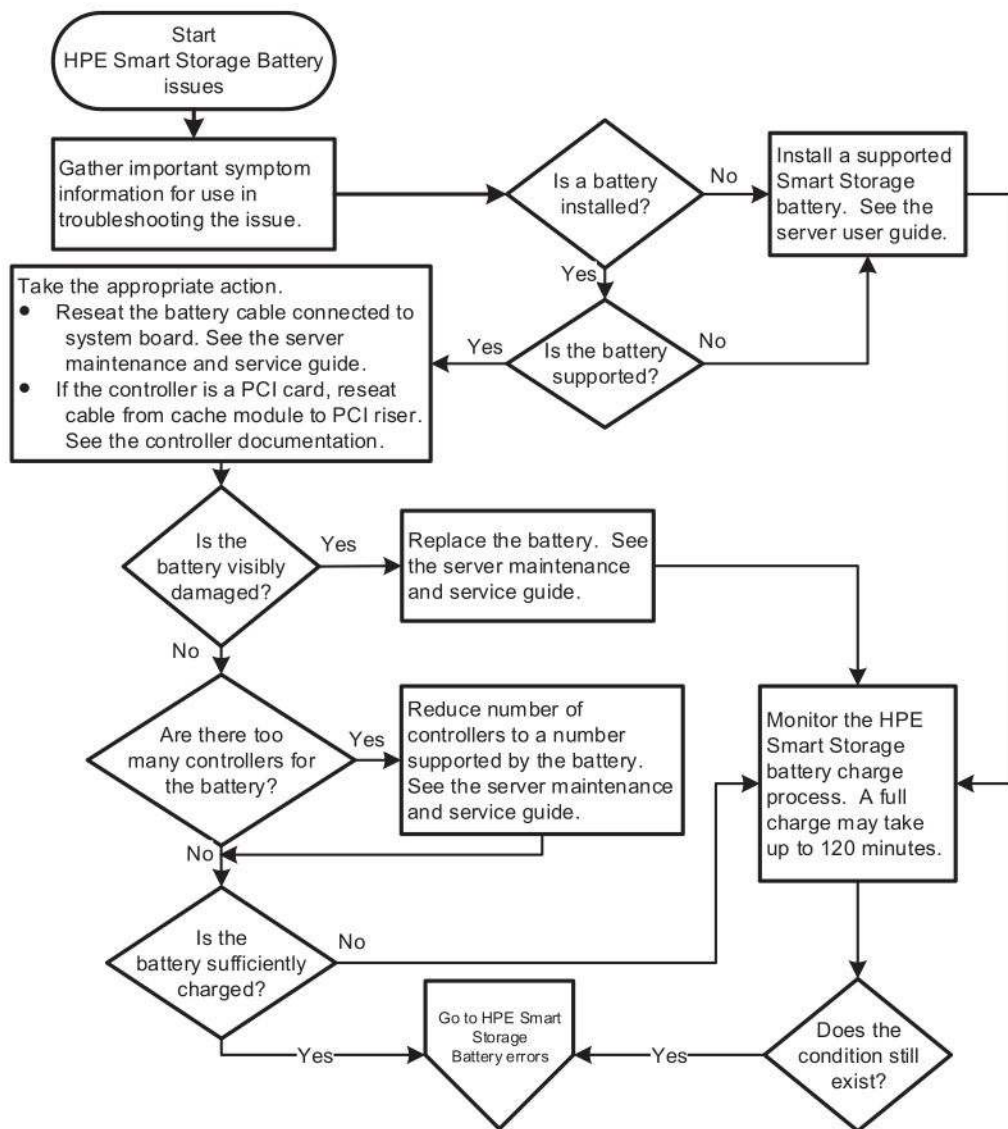
Figure 12: HPE Smart Storage Battery issues flowchart

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- User guide — **Server user guide** on page 125
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- Controller documentation — **HPE Smart Array controller documentation** on page 127
- Cache module issues flowchart — **Cache module issues flowchart** on page 44
- Controller issues flowchart — **Controller issues flowchart** on page 42

2. If the HPE Smart Storage battery issues did not resolve the issue, follow the steps in the following flowchart.
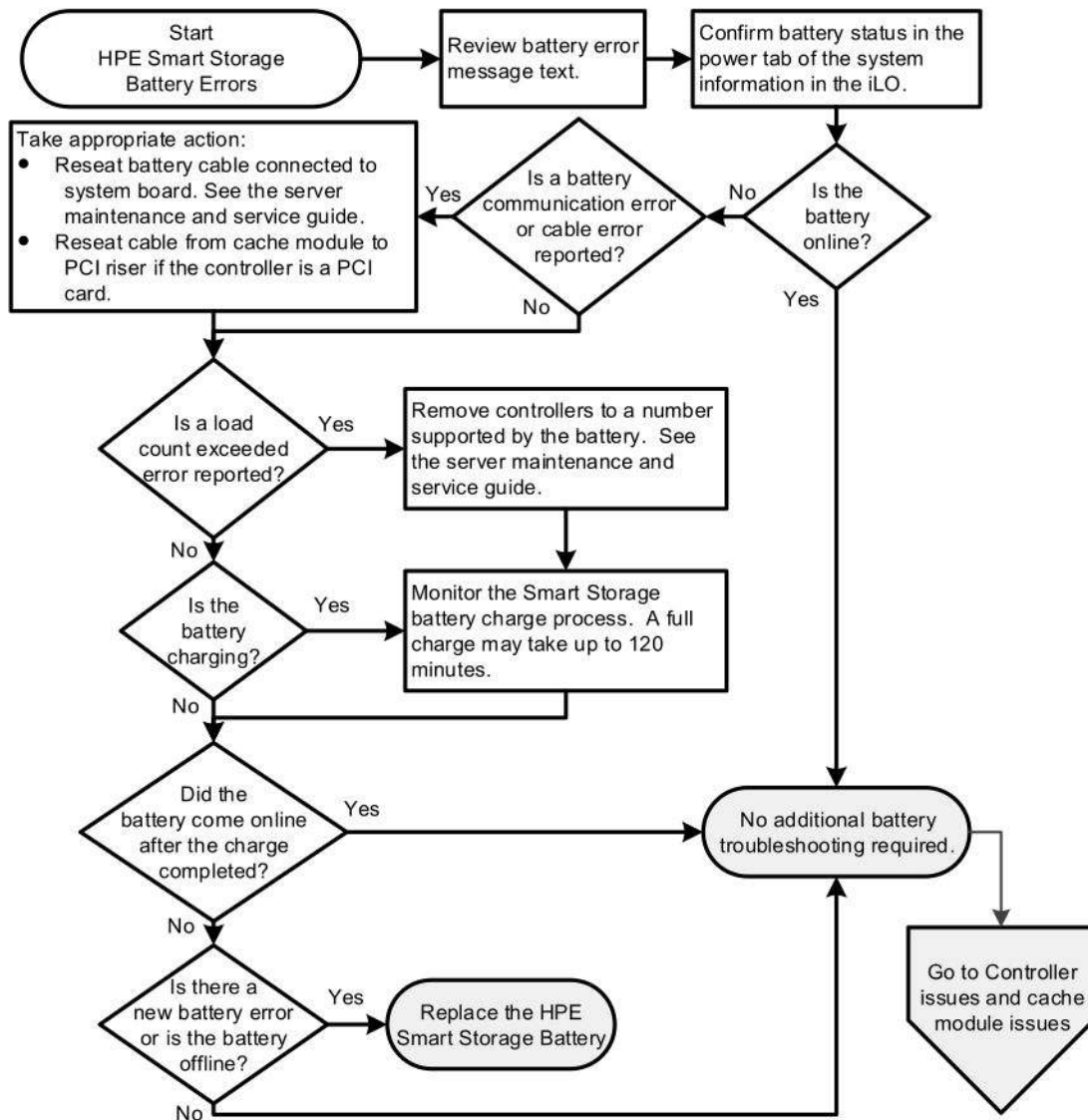
Figure 13: HPE Smart Storage Battery errors flowchart

For more information about references in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- User guide — **Server user guide** on page 125
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- Cache module issues flowchart — **Cache module issues flowchart** on page 44
- Controller issues flowchart — **Controller issues flowchart** on page 42

For additional troubleshooting topics for the HPE Smart Storage Battery, see **HPE Smart Storage Battery issues** on page 97.

Physical drive issues flowchart

Symptom

- A drive is not available.
- Drive errors are displayed during POST in the logs.

Cause

- The drive is faulty.
- The firmware is outdated.
- The drive does not match other drives in the same configuration.
- The controller is not cabled properly.

Action

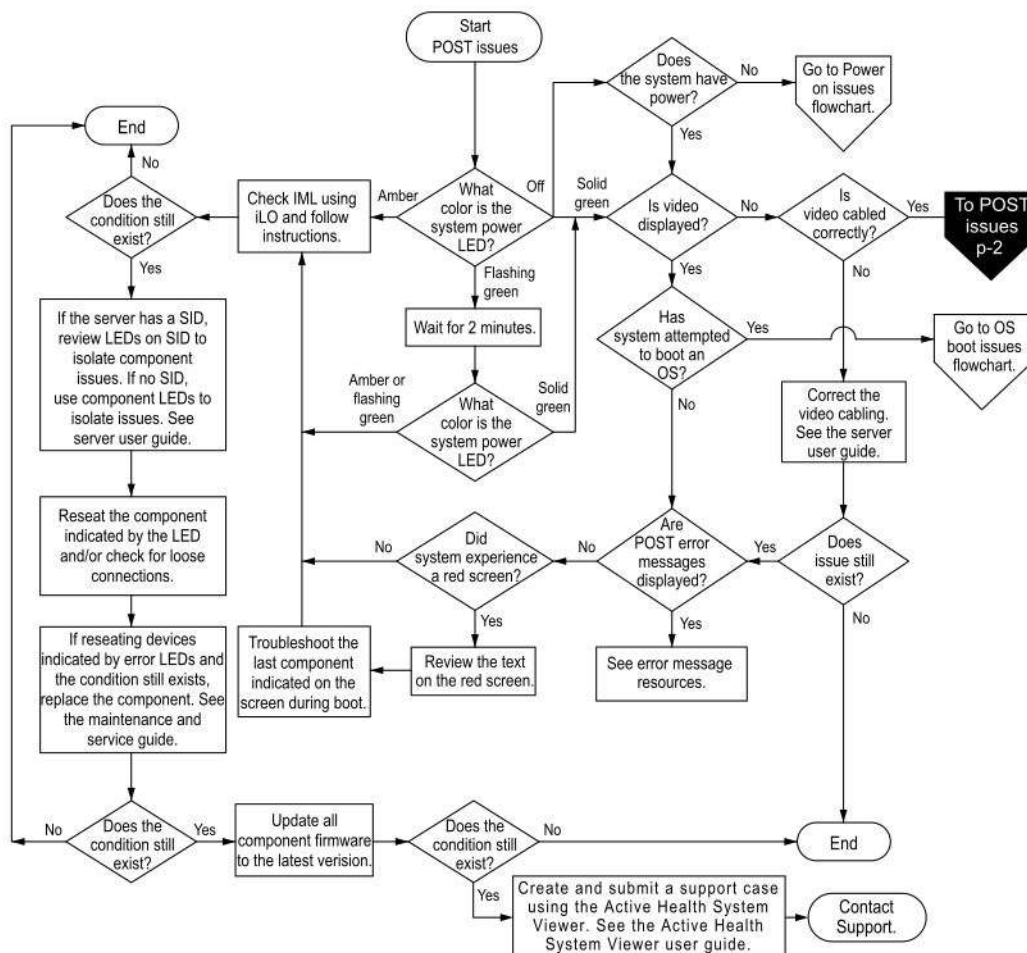1. To resolve the issue, follow the steps in the flowchart.

Figure 14: Physical drive issues flowchart

For more information about the underlined statements in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- User guide — **Server user guide** on page 125
- Update drive firmware — **Updating firmware or system ROM** on page 114
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- HPE Error Message Guide — **Troubleshooting resources** on page 124

- HPE SSA diagnostic tasks — **HPE Smart Storage Administrator Diagnostics Utility CLI** on page 119
- Controller issues flowchart — **Controller issues flowchart** on page 42

Logical drive issues flowchart

Symptom

- Logical drive errors are displayed during POST or in one of the logs.
- The logical drives associated with an array controller are not visible during POST.

Cause

- The controller is not in RAID mode.
- The drives or cables are not seated properly.
- The associated physical drives are not available.
- Logical drives are configured.

Action

1. To resolve the issue, follow the steps in the flowchart.
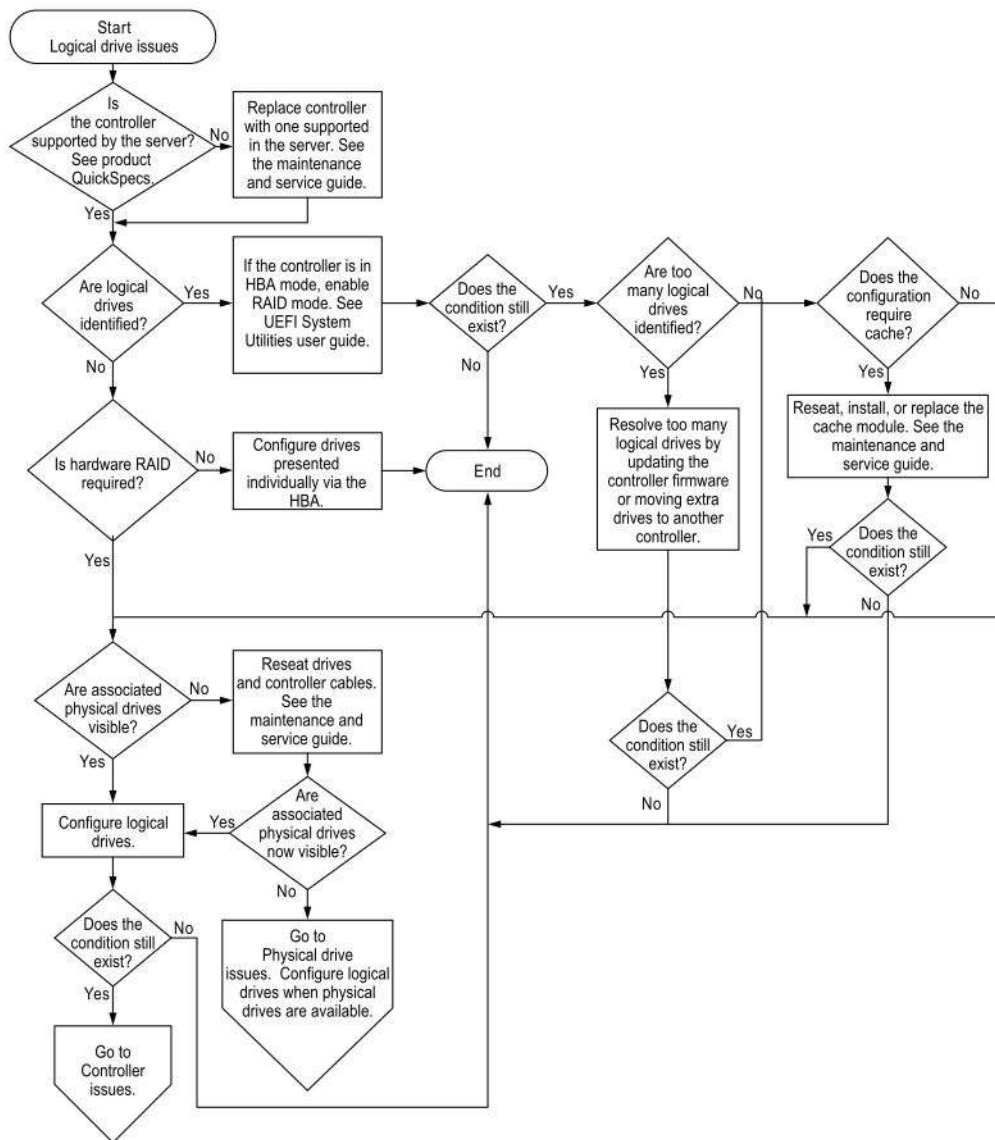
Figure 15: Logical drive issues

For more information about the underlined statements in this flowchart, see the following sections:

- Product QuickSpecs — **Product QuickSpecs** on page 126
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- UEFI System Utilities user guide — **UEFI System Utilities documentation** on page 125
- Physical drive issues — **Physical drive issues flowchart** on page 48
- Controller issues flowchart — **Controller issues flowchart** on page 42

OS boot issues flowchart

Symptom

The server does not boot a previously installed OS.

Cause

- Corrupted OS
- Drive subsystem issue

- Incorrect setting in UEFI System Utilities
- Issue with the boot order
- An item in the boot order failed or was removed
- Set for UEFI boot mode versus Legacy boot mode

Action

1. To resolve the issue, follow the steps in the flowchart.
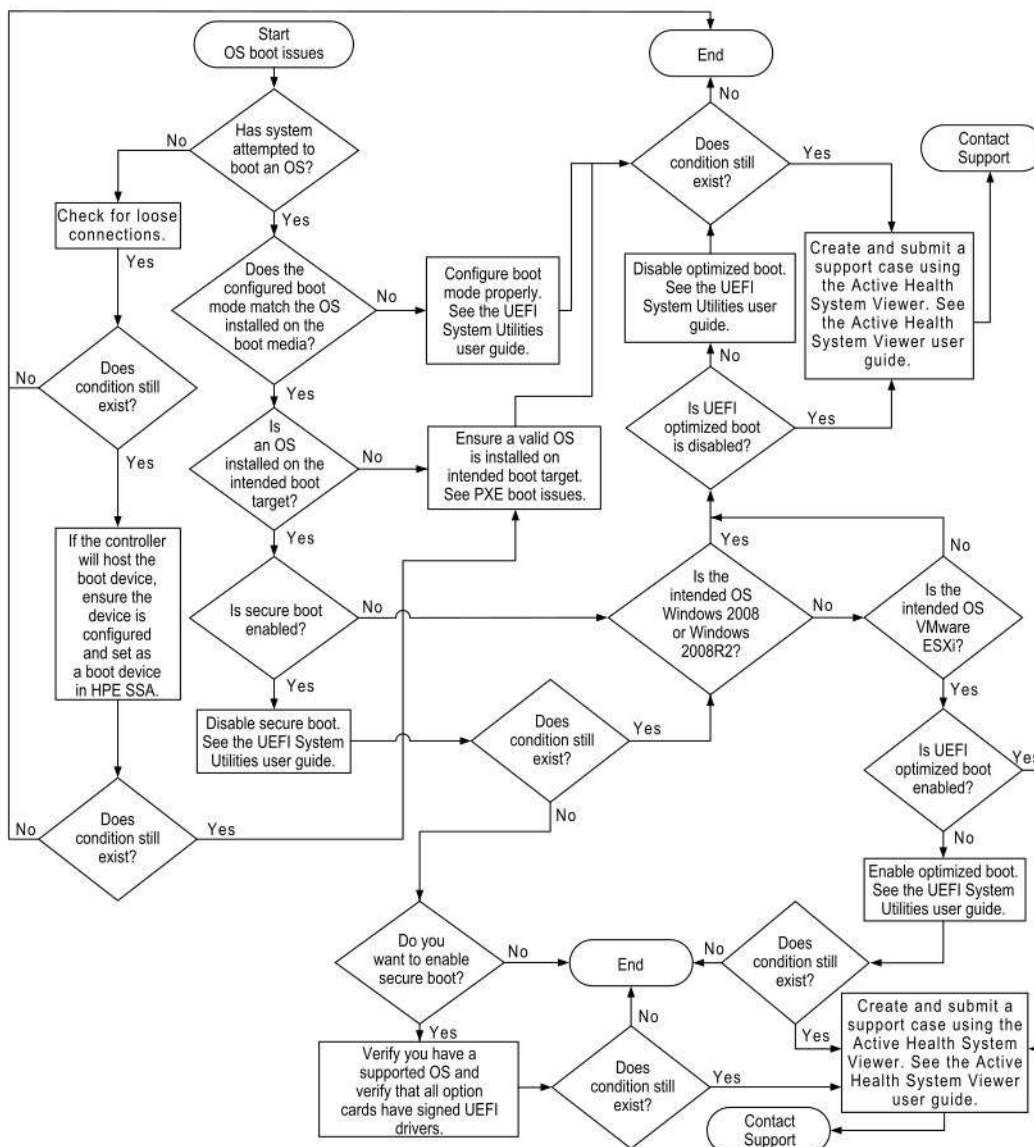
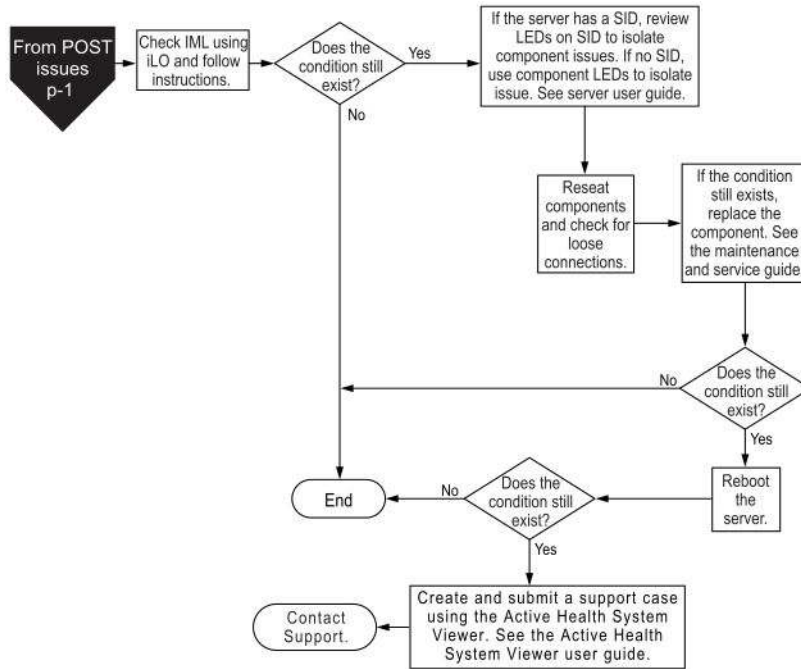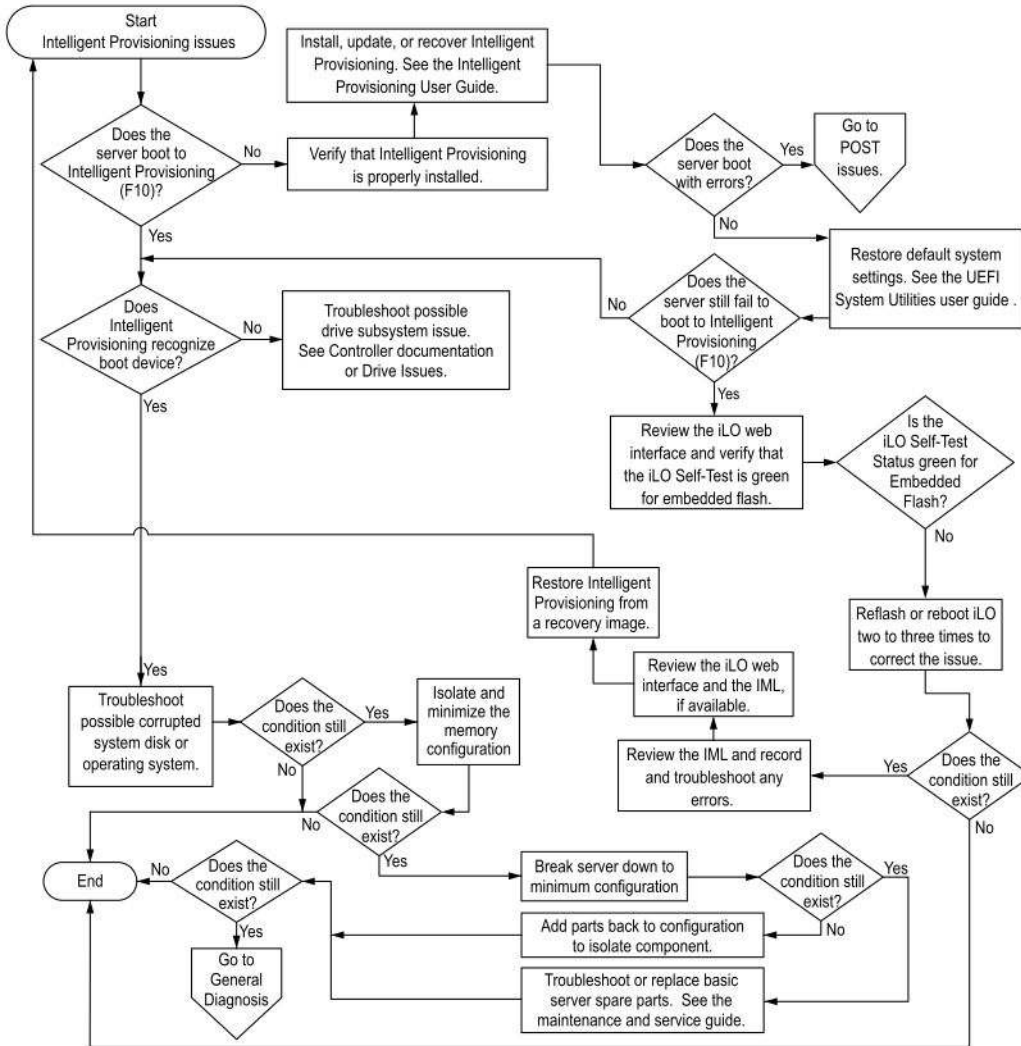**Figure 16: OS boot issues flowchart**

For more information about the underlined statements in this flowchart, see the following sections:

- Check for loose connections — **Resolving loose connections** on page 17
- UEFI System Utilities user guide — **UEFI System Utilities documentation** on page 125
- Before contacting support, gather important symptom information for use in troubleshooting the issue
  — **Gather important information before you begin** on page 30
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131

- PXE boot issues — **Boot issues** on page 105
- Secure boot — **Secure Boot** on page 112

Fault indications flowchart

Server fault indications flowchart for non-blade servers

Symptom

- The server boots, but a fault event is reported by Insight Management Agents.
- The server boots, but the system health LED or component health LED is red or amber.

For the location of server LEDs and information on their statuses, see the server documentation on the **Hewlett Packard Enterprise website**.

Cause

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System over temperature condition

Action

1. To resolve the issue, follow the steps in the flowchart.
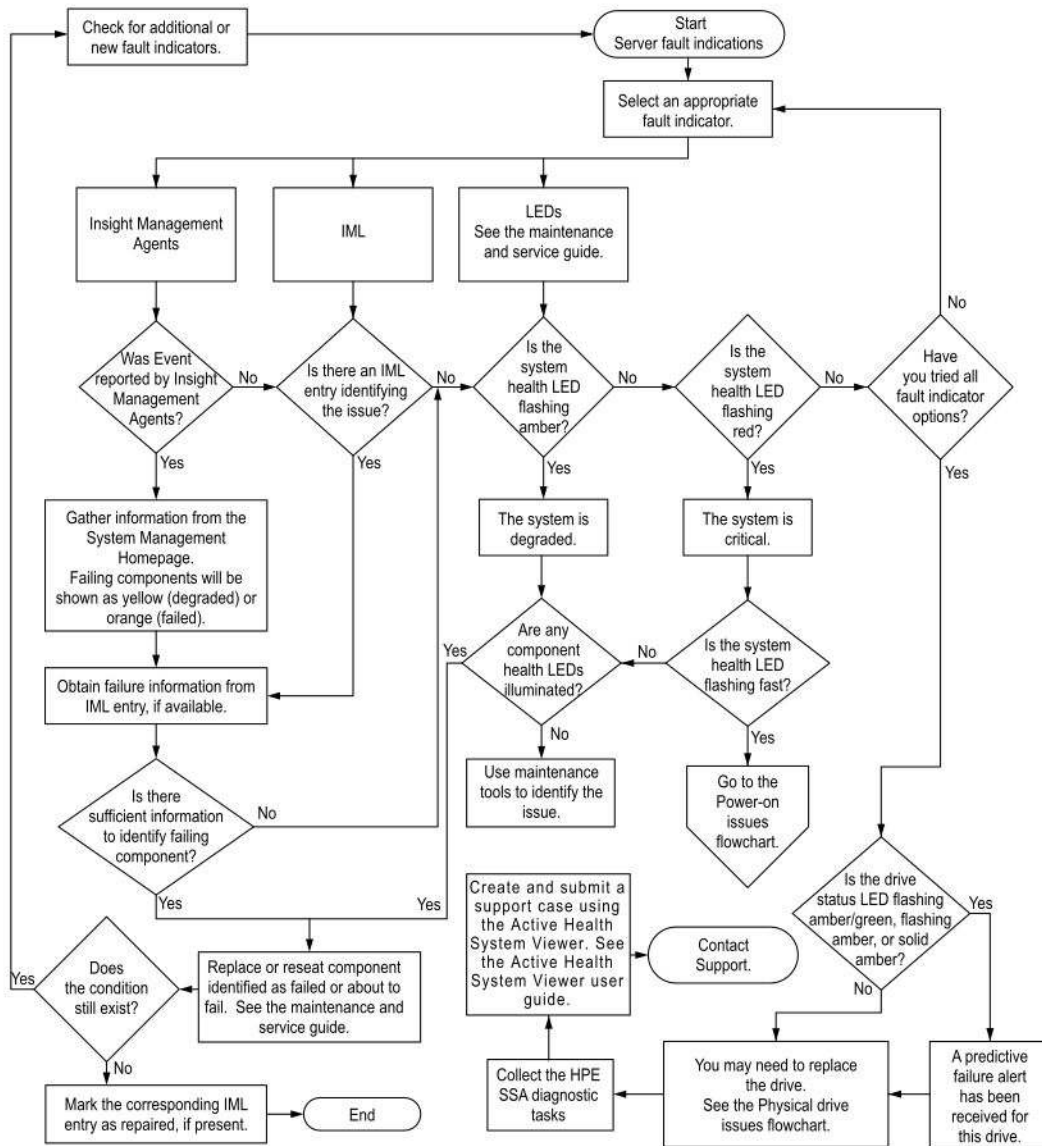
Figure 17: Server fault indications flowchart for non-blade servers

For more information about the underlined statements in this flowchart, see the following sections:

- IML — **Integrated Management Log** on page 119
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- System Management Homepage — **System Management Homepage software documentation** on page 126
- Maintenance tools — **Software and configuration utilities** on page 107
- Go to Power-on issues flowchart — **Power-on issues flowchart** on page 32
- Before contacting support, gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107

- HPE SSA Diagnostic Tasks — **HPE Smart Storage Administrator Diagnostics Utility CLI** on page 119
- **Physical drive issues flowchart** on page 48

Server blade fault indications flowchart for BL series server blades

Symptom

- The server boots, but a fault event is reported by Insight Management Agents.
- The server boots, but the system health LED is red or amber.

For the location of server LEDs and information on their statuses, see the server documentation on the **Hewlett Packard Enterprise website**.

Cause

- Improperly seated or faulty internal or external component
- Unsupported component installed
- Redundancy failure
- System over temperature condition

Action

1. To resolve the issue, follow the steps in the flowchart.
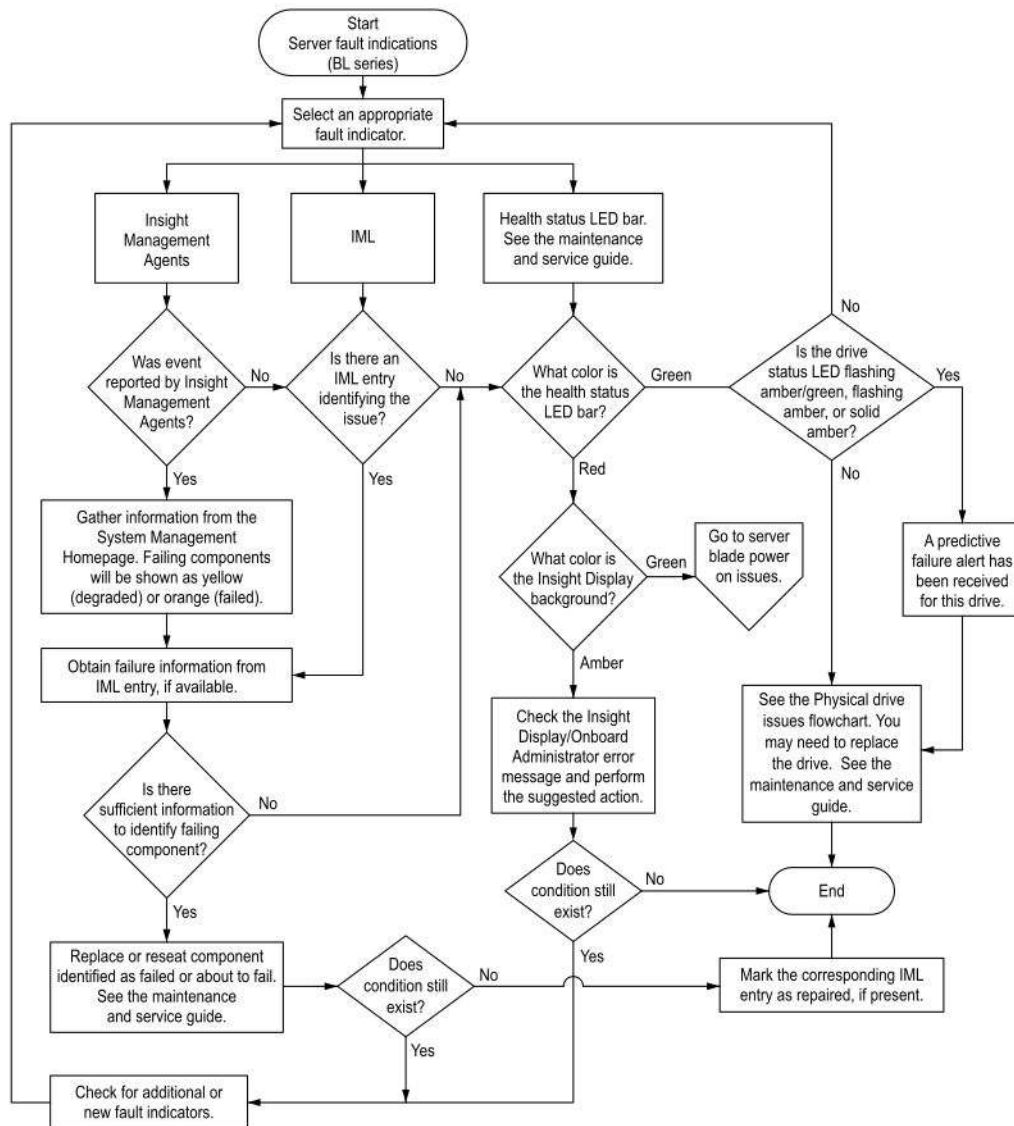
Figure 18: Server blade fault indications flowchart for BL c-Class server blades

For more information about the underlined statements in this flowchart, see the following sections:

- IML — **Integrated Management Log** on page 119
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- System Management Homepage — **System Management Homepage software documentation** on page 126
- Go to server blade power on issues — **Server blade power-on issues flowchart with BL series server blades** on page 36
- **Physical drive issues flowchart** on page 48
- Drive — **Drive issues (hard drives and solid state drives)** on page 68

Power profile issues flowchart

Symptom

- Unexplained ASRs, blue screens, purple screens, or server hangs occur unexpectedly.
- Poor performance exists with some applications.

Cause

- Power profile settings allow the server to get to a state that cannot be exited quickly enough to avoid timeouts.
- The transitions between power states result in poor performance.

For more information on Power Profile settings, see the UEFI System Utilities user guide. For more information, see **UEFI System Utilities documentation** on page 125.

Action

1. To resolve the issue, follow the steps in the flowchart.
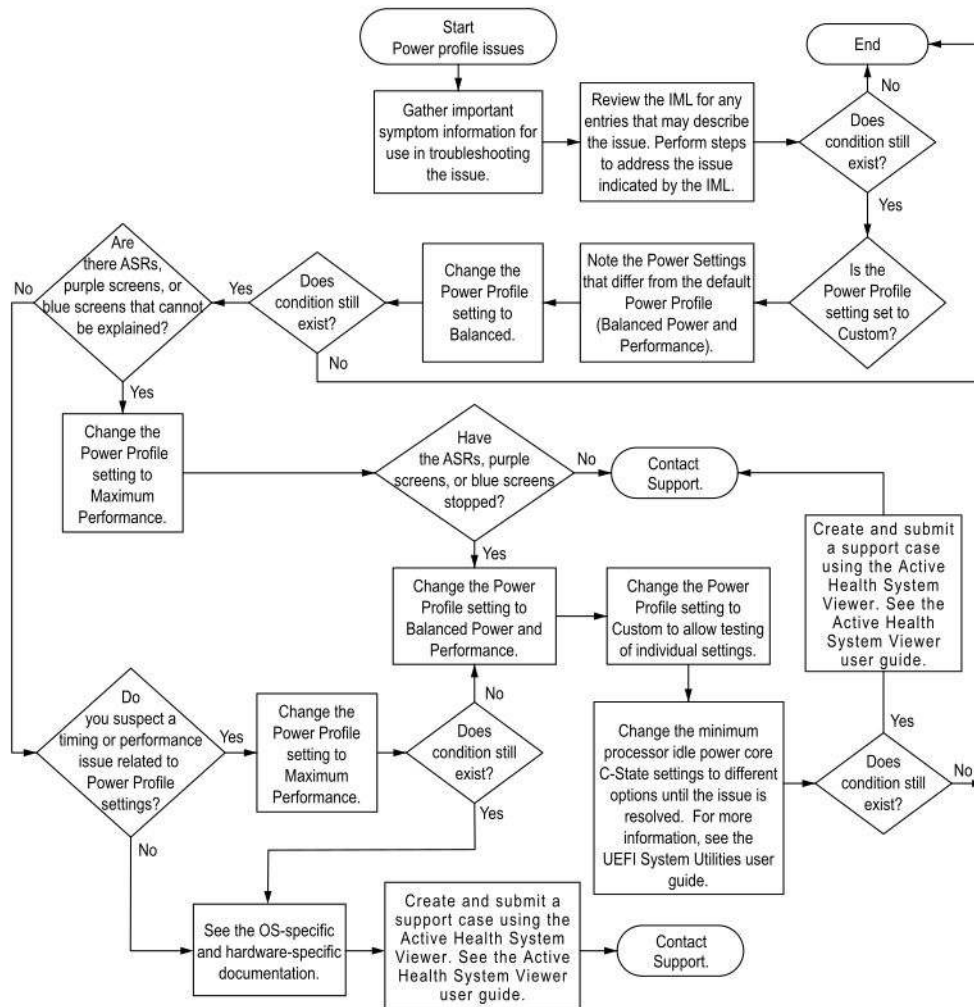
Figure 19: Power profile issues flowchart

For more information about the underlined statements in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- IML — **Integrated Management Log** on page 119
- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107

- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131
- UEFI System Utilities user guide — **UEFI System Utilities documentation** on page 125

NIC issues flowchart

Symptom

- The NIC is not working.
- One or more ports on the NIC is not working.

Cause

- The firmware or drivers are outdated, mismatched, or faulty.
- The NIC or cable is not seated properly.
- The NIC, the cable, or other hardware is faulty.
- The hardware components are not supported in the same configuration.
- The NIC is not supported on the server.

Action

1. To resolve the issue, follow the steps in the flowchart.
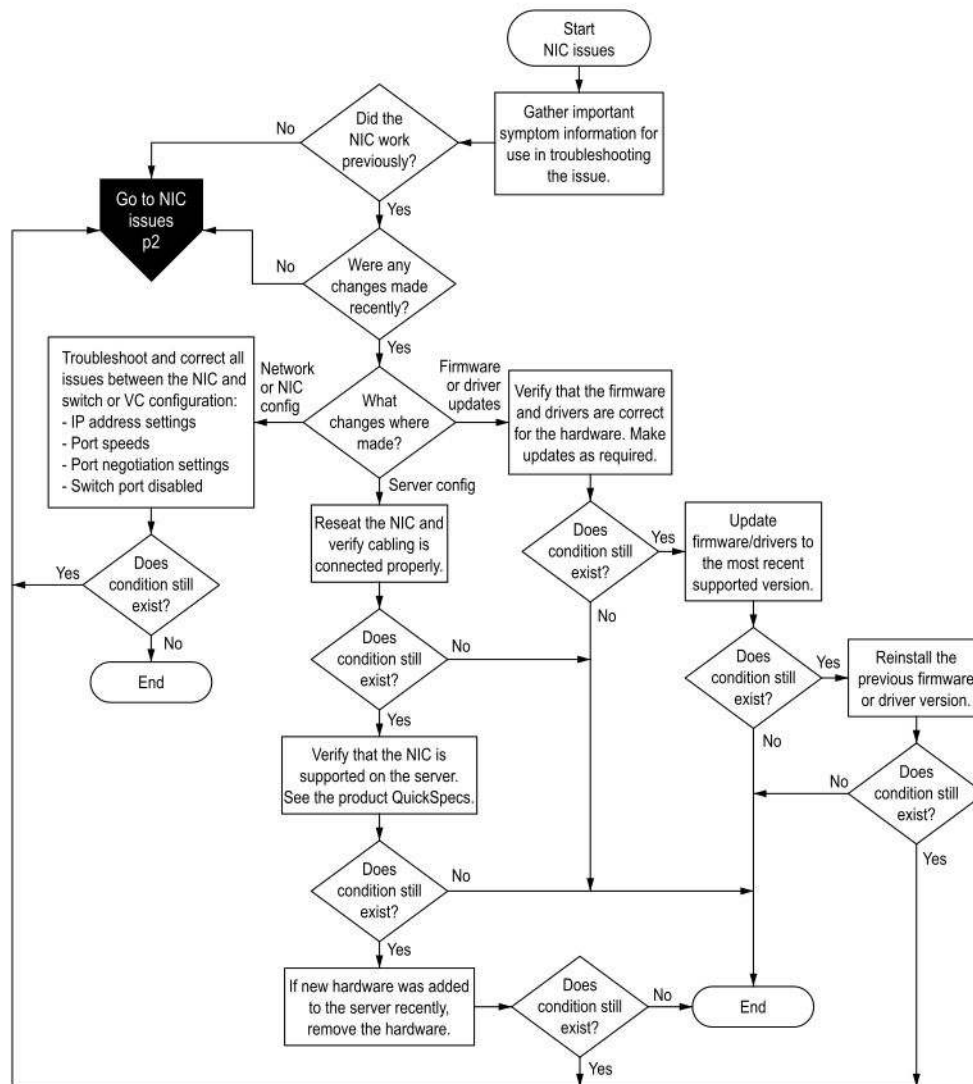
Figure 20: NIC issues flowchart (1 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- Make updates as required — **Updating firmware or system ROM** on page 114
- Update firmware/drivers — **Updating firmware or system ROM** on page 114
- **Product QuickSpecs** on page 126
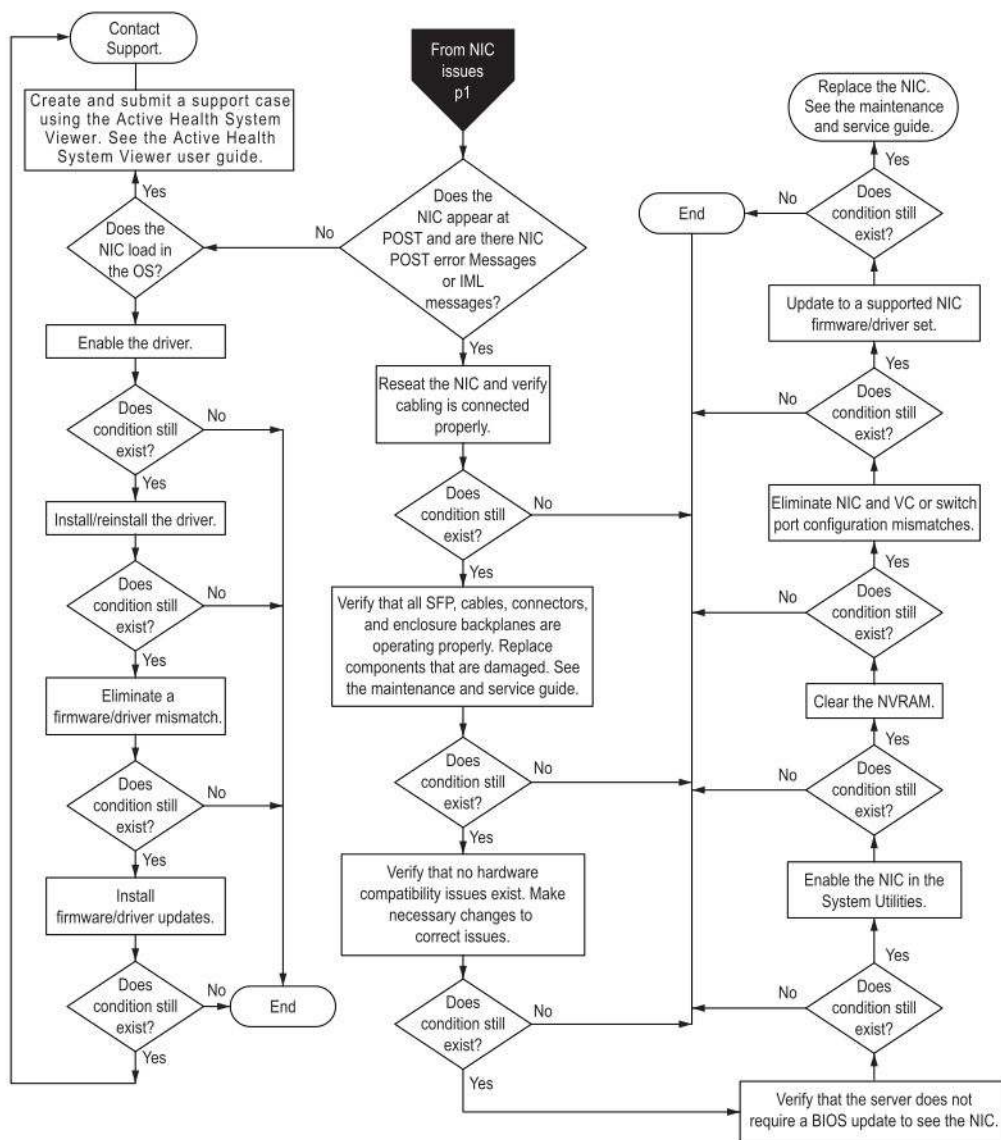
Figure 21: NIC issues flowchart (2 of 2)

For more information about the underlined statements in this flowchart, see the following sections:

- See the Active Health System Viewer user guide — **Active Health System Viewer** on page 107
- Contact Support — **Accessing Hewlett Packard Enterprise Support** on page 131
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- Install firmware/driver updates — **Updating firmware or system ROM** on page 114

General diagnosis flowchart

Symptom

If your symptoms are not clear, use this flowchart.

The General diagnosis flowchart provides a generic approach to troubleshooting. If you are unsure of the issue, or if the other flowcharts do not fix the issue, use the following flowchart.

Cause

The cause is unknown or unclear.

Action

1. To resolve the issue, follow the steps in the flowchart.

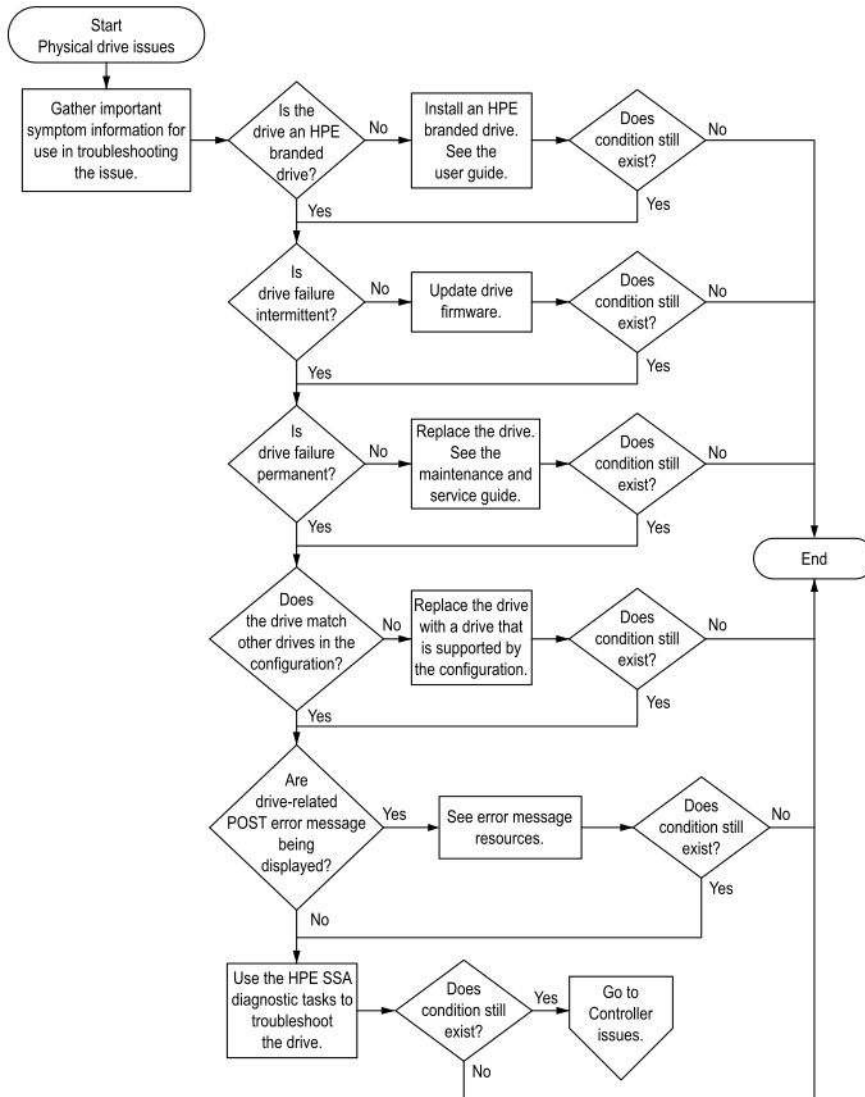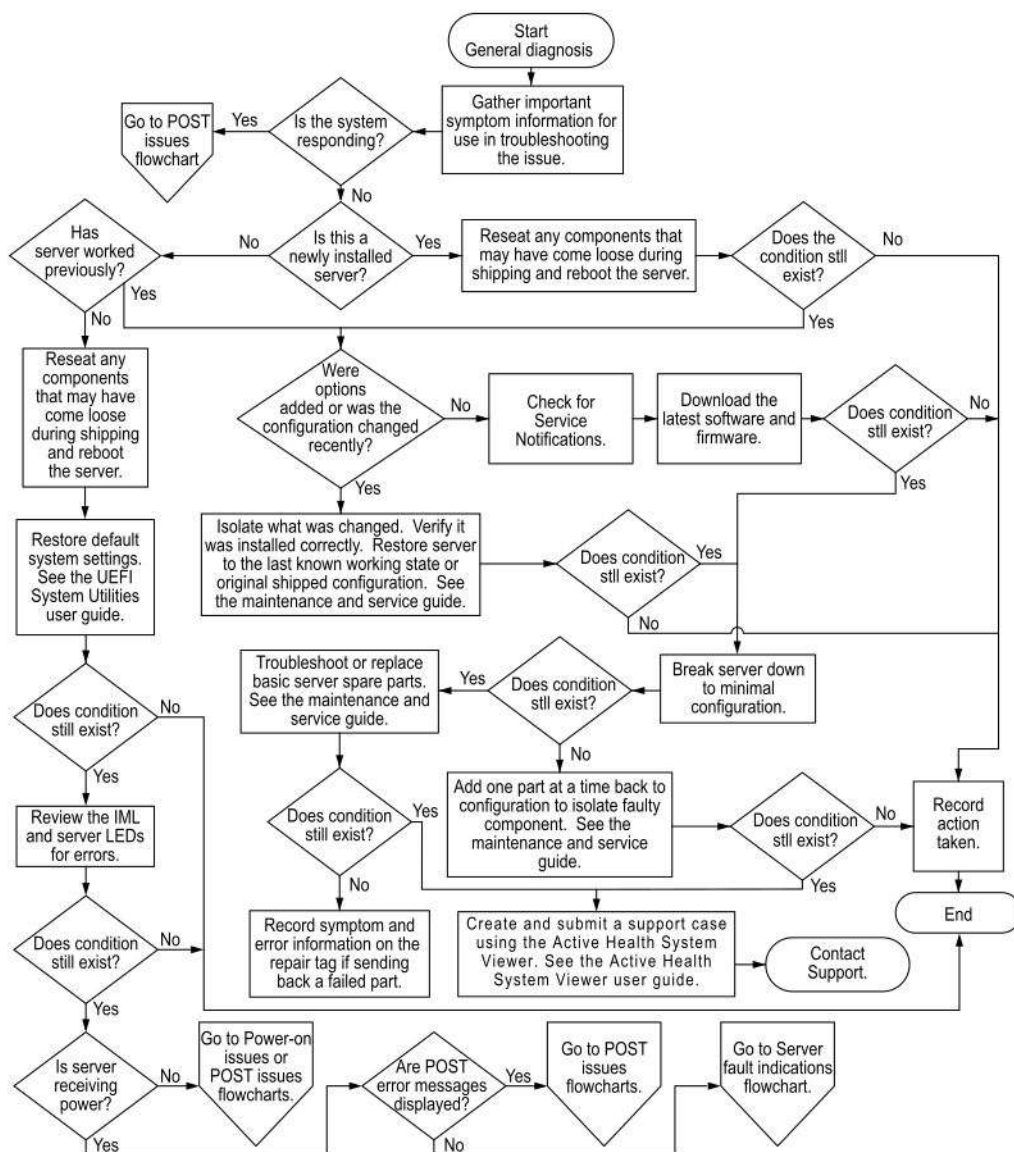**Figure 22: General diagnosis flowchart**

For more information about the underlined statements in this flowchart, see the following sections:

- Go to POST issues flowchart — **POST issues flowchart** on page 39
- Gather important symptom information for use in troubleshooting the issue — **Gather important information before you begin** on page 30
- Reseat any components that may have come loose during shipping — **Resolving loose connections** on page 17
- Service notifications — **Searching for service notifications** on page 17
- UEFI System Utilities user guide — **UEFI System Utilities documentation** on page 125
- Maintenance and service guide — **Server maintenance and service guide** on page 125
- Break the server down to minimum configuration — **Breaking the server down to the minimum hardware configuration** on page 16
- Server LEDs — **Front panel LED and buttons** on page 22

- Record action taken — **Collecting symptom information** on page 14
- Record symptom and error information — **Collecting symptom information** on page 14
- Power-on issues — **Power-on issues flowchart** on page 32
- Go to Server fault indications flowchart — **Fault indications flowchart** on page 53

Hardware issues

Procedures for all ProLiant servers

The procedures in this section are comprehensive and include steps about or references to hardware features that may not be supported by the server you are troubleshooting.

> ⚠ **CAUTION:**
> Before removing or replacing any processors, be sure to follow the guidelines provided in **Processor troubleshooting guidelines**. Failure to follow the recommended guidelines can cause damage to the system board, requiring replacement of the system board.

Power issues

Server does not power on

Symptom

The server does not power on.

Action

1. Review the Server Health Summary. For more information, see **Using the Server Health Summary** on page 24.
2. See the **Power-on issues flowchart** on page 32.

Power source issues

Symptom

The server does not power on.

Cause

- The server is not powered on.
- Components or cables might not be properly connected or seated.
- The grounded power outlet is not working.
- The power cord is not functional.
- The power strip is not functional.
- The circuit breaker is in the off position.
- The line voltage is insufficient for the load.
- Sufficient power is not allocated to support the server.

Action

1. Press the Power On/Standby button to be sure it is on. If the server has a Power On/Standby button that returns to its original position after being pressed, be sure you press the switch firmly.

   For more information about system power LED status, see **System power LED definitions** on page 22.
2. Be sure no loose connections exist.

   For more information, see **Resolving loose connections** on page 17.
3. Verify that the power LEDs are on the power supplies are illuminated.
4. Plug another device into the grounded power outlet to be sure the outlet works. Also, be sure the power source meets applicable standards.

5. Replace the power cord with a known functional power cord to be sure it is not faulty.
6. Replace the power strip with a known functional power strip to be sure it is not faulty.
7. Be sure the proper circuit breaker is in the On position.
8. Have a qualified electrician check the line voltage to be sure it meets the required specifications.
9. If Enclosure Dynamic Power Capping or Enclosure Power Limit is enabled on supported servers, be sure there is sufficient power allocation to support the server.

   For more information, see the following documents:

   • *HPE Power Capping and HPE Dynamic Power Capping for ProLiant servers* technology brief on the **Hewlett Packard Enterprise website**.
   • *HPE BladeSystem Onboard Administrator User Guide* on the **Hewlett Packard Enterprise website**.

Power supply issues

Cause

• The power supply might not be fully seated.
• AC power is unavailable.
• The power supply failed.
• The power supply is in standby mode.
• The power supply has exceeded the current limit.
• The power supply is not supported on the server.
• The power is not sufficient for the hardware installed.
• Redundant power supplies are configured but the power supplies are not compatible.

Action

1. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.
2. If the power supplies have LEDs, be sure they indicate that each power supply is working properly:

   a. If the LEDs indicate an issue with a power supply (red, amber, or off), then check the power source.
   b. If the power source is working properly, then replace the power supply.
3. Be sure the system has enough power, particularly if you recently added hardware, such as drives. Remove the newly added component and if the issue is no longer present, then additional power supplies are required. Check the system information from the IML.

   For product-specific information, see the server documentation on the **Hewlett Packard Enterprise website**.

   For more information, see the HPE Power Advisor on the **Hewlett Packard Enterprise website**.
4. If running a redundant configuration, be sure that all of the power supplies in the system have the same spare part number and are supported by the server. For a list of supported power supplies, see the server documentation on the **Hewlett Packard Enterprise website**.
5. For further troubleshooting, see the **Power-on issues flowchart** on page 32.

For more information, see the server documentation on the **Hewlett Packard Enterprise website**.

Insufficient power supply configuration

Symptom

The power supply configuration for the server is insufficient to meet the power requirements for the server.

Cause

The current power supply configuration is not sufficient to operate the server.

Action

1. Verify that the power supplies support the power requirements for the server configuration. For more information, see the HPE Power Advisor on the **Hewlett Packard Enterprise website**.
2. Verify that all power supplies are supported for this server. For more information, see the **Product QuickSpecs** on page 126.
3. If the power supplies have LEDs, check the LEDs to see if they indicate an issue:

   a. If the LEDs display red, replace the power supply.
   b. If the LEDs display amber, then the power supply is in standby mode.

      Press and hold the Power On/Standby button on the server.
   c. If the LEDs are off, check the power source. Then, power on the server again.
   d. If the power source is working properly, and the LEDs remain off, replace the power supply.
4. Verify that the system has enough power, particularly if you recently added hardware, such as drives.

   To verify that the system has enough power, remove the newly added component. If the issue is no longer present, then additional power supplies are required. Check the system information from the IML.

   For more information, see the server documentation on the **Hewlett Packard Enterprise website**.

UPS issues

UPS is not working properly

Cause

- The UPS switch is not in the ON position.
- The UPS batteries are not charged to the proper level.
- The UPS software is not up-to-date.
- The UPS power cord is not connected.
- The UPS power cord is not the correct type for the UPS and the country in which the server is located.

Action

1. Be sure the UPS batteries are charged to the proper level for operation. For more information, see the UPS documentation.
2. Be sure the UPS power switch is in the ON position. For the location of the switch, see the UPS documentation.
3. Be sure the UPS software is updated to the latest version. Use the Power Management software located on the **Hewlett Packard Enterprise website**.
4. Be sure the power cord is the correct type for the UPS and the country in which the server is located. For specifications, see the UPS reference guide.
5. Be sure the line cord is connected.
6. Be sure each circuit breaker is in the ON position, or replace the fuse if needed. If this occurs repeatedly, contact an authorized service provider.
7. Check the UPS LEDs to be sure a battery or site wiring issue has not occurred. See the UPS documentation.
8. If the UPS sleep mode is initiated, disable sleep mode for proper operation. The UPS sleep mode can be turned off through the configuration mode on the front panel.
9. Change the battery to be sure damage was not caused by excessive heat, particularly if a recent air conditioning outage has occurred.

   NOTE:

   The optimal operating temperature for UPS batteries is 25°C (77°F). For approximately every 8°C to 10°C (16°F to 18°F) average increase in ambient temperature above the optimal temperature, battery life is reduced by 50 percent.

Low battery warning is displayed

Symptom

A low battery warning is displayed on the UPS.

Cause

- The batteries need to be charged.
- The batteries are failing to hold a charge.
- The batteries are faulty.

Action

1. Plug the UPS into an AC grounded outlet for at least 24 hours to charge the batteries.
2. Test the batteries.
3. Replace the batteries if necessary.
4. Be sure the alarm is set appropriately by changing the amount of time given before a low battery warning. For more information, see the UPS documentation.

One or more LEDs on the UPS is red

Symptom

One or more of the UPS LEDs is red.

Action

For product-specific LED information and additional troubleshooting information, see the UPS documentation.

General hardware issues

New hardware issues

Cause

- Unsupported hardware
- Incomplete population of a memory bank
- Connection of the data cable, but not the power cable, of a new device

Action

1. Be sure the hardware being installed is a supported option on the server. For information on supported hardware, see the **Server documentation** on page 124 on the **Hewlett Packard Enterprise website**.

   If necessary, remove unsupported hardware.
2. Be sure the issue is not caused by a change to the hardware release. For more information, see the release notes included with the hardware. If no documentation is available, see the **Hewlett Packard Enterprise website**.
3. Be sure the new hardware is installed properly. To be sure all requirements are met, see the device, server, and OS documentation.
4. Be sure no memory, I/O, or interrupt conflicts exist.
5. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.
6. Be sure all cables are connected to the correct locations and are the correct lengths. For more information, see the server documentation on the **Hewlett Packard Enterprise website**.
7. Be sure other components were not accidentally unseated during the installation of the new hardware component.
8. Be sure all necessary software updates, such as device drivers, ROM updates, and patches, are installed and current, and the correct version for the hardware is installed. For example, if you are using

a Smart Array controller, you need the latest Smart Array Controller device driver. Uninstall any incorrect drivers before installing the correct drivers.

9. After installing or replacing boards or other options, verify that the system recognizes all changes to the hardware in the BIOS/Platform Configuration (RBSU) or in the options setup in UEFI System Utilities. If the new hardware is not configured properly, you may receive a POST error message indicating a configuration error. For more information on the UEFI System Utilities, see the UEFI System Utilities user guide in the **UEFI Information Library**.

10. Be sure all switch settings are set correctly. For more information about required switch settings, see the **Server documentation** on page 124 on the **Hewlett Packard Enterprise website**.

11. Be sure all boards are properly installed in the server.

12. Uninstall the new hardware.

Unknown issue

Action

1. Check the server LEDs to see if any statuses indicate the source of the issue. For LED information, see the **Server documentation** on page 124.

2. Power down and disconnect power to the server. Remove all power sources to the server.

3. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.

4. Following the guidelines and cautionary information in the server documentation, reduce the server to the minimum hardware configuration by removing all cards or devices that are not necessary to power on the server. Keep the monitor connected to view the server power-on process. Before completing this step, see **Breaking the server down to the minimum hardware configuration** on page 16.

5. Reconnect power, and then power on the system.

   - If the video does not work, see **Video issues** on page 93.

   ⚠️ **CAUTION:**
   Only authorized technicians trained by Hewlett Packard Enterprise should attempt to remove the system board. If you believe the system board requires replacement, contact Hewlett Packard Enterprise technical support before proceeding. For more information, see **Accessing Hewlett Packard Enterprise Support** on page 131.

   ⚠️ **CAUTION:**
   Before removing or replacing any processors, be sure to follow the guidelines provided in **Processor troubleshooting guidelines** on page 15. Failure to follow the recommended guidelines can cause damage to the system board, requiring replacement of the system board.

   - If the system fails in this minimum configuration, one of the primary components has failed. If you have already verified that the processor, power supply, and memory are working before getting to this point, replace the system board. If not, be sure each of those components is working.
   - If the system boots and video is working, add each component back to the server one at a time, restarting the server after each component is added to determine if that component is the cause of the issue. When adding each component back to the server, be sure to disconnect power to the server and follow the guidelines and cautionary information in the server documentation.

Third-party device issues

Symptom

- A third-party device is not recognized by the server or the OS.
- A third-party device is not operating as expected.

Cause

- The device is not supported on the server or OS.
- The device is not installed properly.

Action

1. Verify that the server and operating system support the device.

   For more information, see the server QuickSpecs and operating system documentation.
2. Verify that the latest device drivers are installed.
3. Verify that the device is installed properly.

   For more information on which PCIe technology is supported and for the slot PCIe bus width, see the server QuickSpecs at **http://www.hpe.com/info/qs**.

Testing the device

Procedure

1. Uninstall the device.

   If the server works when the device is removed, then one of the following issues exists:

   - An issue exists with the device.
   - The server does not support the device.
   - The device conflicts with another device.
2. If there is only one device on a bus, verify that the bus works by installing a different device on the bus.
3. To determine if the device is working, install the device:
   a. In a PCIe slot on a different bus.
   b. In the same slot in another working server of the same or similar design.

   Restart the server each time the device is reinstalled.

   If the board works in any of these slots, either the original slot is bad or the board was not properly seated. Reinstall the board into the original slot to verify.
4. If you are testing a board (or a device that connects to a board):
   a. Test the board with all other boards removed.
   b. Test the server with only that board removed.
5. Clear the NVRAM.
6. Verify that the PCIe device or graphics controller does not need additional power to operate.

   For more information, see the device documentation.

Internal system issues

Drive issues (hard drives and solid state drives)

Drives are failed

Symptom

The drives are failed.

Action

1. Be sure no loose connections exist.

For more information, see **Resolving loose connections** on page 17.

2. Check to see if an update is available for any of the following:

   - Smart Array Controller firmware
   - Dynamic Smart Array driver
   - Host bus adapter firmware
   - Expander backplane SEP firmware
   - System ROM

3. Be sure the drive or backplane is cabled properly.
4. Be sure the drive data cable is working by replacing it with a known functional cable.
5. Be sure drive blanks are installed properly when the server is operating.

   Drives may overheat and cause sluggish response or drive failure.
6. Run HPE SSA and check the status of the failed drive.

   For more information, see **HPE Smart Storage Administrator** on page 113.
7. Be sure the replacement drives within an array are the same size or larger.
8. Be sure the replacement drives within an array are the same drive type, such as SAS, SATA, or SSD.
9. Power cycle the server.

   If the drive shows up, check to see if the drive firmware needs to be updated.

Drives are not recognized

Symptom

Drives are not recognized.

Action

1. Be sure that no **power issues** exist.
2. Be sure that no loose connections exist.

   For more information, see **Resolving loose connections** on page 17.
3. Check for available updates on any of the following components:

   - Smart Array Controller firmware
   - HPE Smart Array S100i SR Gen10 driver
   - HBA firmware
   - Expander backplane SEP firmware
   - System ROM

4. Be sure that the drive or backplane is cabled properly.
5. Check the drive LEDs to be sure that they indicate normal function. For information on drive LEDs, see **Hot-plug drive LED definitions** on page 19.

   For server-specific drive LED information, see **Server documentation** on page 124.
6. Be sure that the drive is supported.

   To determine drive support, see the **Product QuickSpecs** on page 107.
7. Power cycle the server.

   If the drive appears, check to see if the drive firmware requires an update.
8. Be sure that the drive bay is not defective by installing the hard drive in another bay.
9. When the drive is a replacement drive on an array controller, be sure that the drive is the same type and of the same or larger capacity than the original drive.
10. When using an array controller, be sure that the drive is configured in an array. Run HPE SSA.

    For more information, see **HPE Smart Storage Administrator** on page 113.

11. Be sure that the correct controller drivers are installed and that the controller supports the hard drives being installed.
12. If a storage enclosure is used, be sure that the storage enclosure is powered on.
13. If a SAS switch is used, be sure that disks are zoned to the server using the Virtual SAS Manager.

> ⓘ **IMPORTANT:**
> The HPE Smart Array S100i SR Gen10 and the AHCI do not support SAS drives.

14. If the HPE Smart Array S100i SR Gen10 is installed on the server, be sure that RAID mode is enabled and UEFI boot mode in **UEFI System Utilities** on page 111.

Data is inaccessible

Symptom

The data on the drives is inaccessible.

Cause

- The files are corrupt.
- Viruses exist on the server.
- A TPM is installed but not properly enabled on the server.

Action

1. Be sure the files are not corrupt. Run the repair utility for the operating system.
2. Be sure no viruses exist on the server. Run a current version of a virus scan utility.
3. When a TPM is installed and is being used with BitLocker, be sure the TPM is enabled in **UEFI System Utilities** on page 111. See the TPM replacement recovery procedure in the operating system documentation.
4. When a TPM is installed, be sure that the TPM is configured for a mode that is compatible with the OS running on the server. Verify that the OS supports the version of TPM installed and configured on the server.
5. When a TPM 2.0 is installed, verify that the server is configured for UEFI boot mode.
6. When migrating encrypted data to a new server, be sure to follow the recovery procedures in the operating system documentation.

Server response time is slower than usual

Symptom

The server response time is slower than usual.

Cause

- The drive is full.
- Operating system encryption technology is causing a decrease in performance.
- A recovery operation is pending on the logical drive.

Action

1. Be sure the drive is not full. If needed, increase the amount of free space on the drive. Hewlett Packard Enterprise recommends that drives have a minimum of 15 percent free space.
2. Review information about the operating system encryption technology, which can cause a decrease in server performance. For more information, see the operating system documentation.
3. Use HPE SSA to verify that a recovery operation is not pending on the logical drive. For more information, see **HPE Smart Storage Administrator** on page 113.

HPE SmartDrive icons or LEDs illuminate errors for the wrong drive or an error message is displayed in POST, HPE SSA, or HPE SSADUCLI

Symptom

- HPE SmartDrive icons or LEDs illuminate indicating an error.
- An error message is displayed in POST, HPE SSA, or HPE SADUCLI.

Action

Verify that the cabling from the drive backplane to the system board is correct. For server-specific cabling information, see the **Server user guide** on page 125.

SSD Smart Wear error

Symptom

A POST message or an IML message is received.

Cause

The device is approaching the maximum usage limit for writes to the device.

Action

Replace the device. For more information, see the server maintenance and service guide on the **Hewlett Packard Enterprise website**.

512e Physical drive support

HPE Smart Storage Administrator is able to detect and correct performance issues caused by non-optimal logical drive alignment for 512e physical drives.

The following scenarios indicate drive support is needed:

- Multiple logical drives exist in a single array.
- An array consists of one or more 512e physical drives.
- At least one of the logical drives in the array is not aligned on a native block boundary. For current 512e drives, the native block boundary is 4K.

As a response, HPE SSA will display a warning indicating the logical drive is not optimally aligned and that performance of the logical drive will not be optimal. Additionally, the array will present a "Re-align Logical Drive" button if the following scenario is met:

- There is enough free space in the array to move the logical drive to be aligned to the native 4K boundary.
- The controller is capable of performing the transformation (requires a cache module with a fully-charged battery or capacitor connected).
- The controller does NOT have SmartCache enabled.

Customer Value

Diagnosing array problems
Diagnostic tools

To troubleshoot array problems and generate feedback about arrays, use the following diagnostic tools:

- **Event Notification Service**

  This utility reports array events to the Microsoft Windows system event log and IML. You can obtain the utility from the SmartStart CD or the **Hewlett Packard Enterprise website**. When prompted for product information, enter the server model name.
- **HPE Insight Diagnostics**

Insight Diagnostics is a tool that displays information about the system hardware configuration and performs tests on the system and its components, including drives if they are connected to Smart Array controllers. This utility is available on the **Hewlett Packard Enterprise website**.

- **POST messages**

  Smart Array controllers produce diagnostic error messages (POST messages) at reboot. Many POST messages suggest corrective actions. For more information about POST messages, see the ProLiant Servers Troubleshooting Guide.

- **HPE Smart Storage Administrator**
- **HPE Smart Storage Administrator Diagnostics Utility CLI**

  This standalone diagnostic utility provides configuration and error information about array controllers, storage enclosures, drive cages, logical drives, physical drives, and tape drives. For any supported SSDs, the utility provides current usage level and remaining expected lifetime. For more information, see "**Smart Storage Administrator Diagnostics Utility CLI**."

Drive arrays and fault-tolerance methods
Drive arrays

The capacity and performance of a single physical (hard) drive is adequate for home users. However, business users demand higher storage capacities, higher data transfer rates, and greater protection against data loss when drives fail.

Connecting extra physical drives (Pn in the figure) to a system increases the total storage capacity but has no effect on the efficiency of read/write (R/W) operations. Data can still be transferred to only one physical drive at a time.
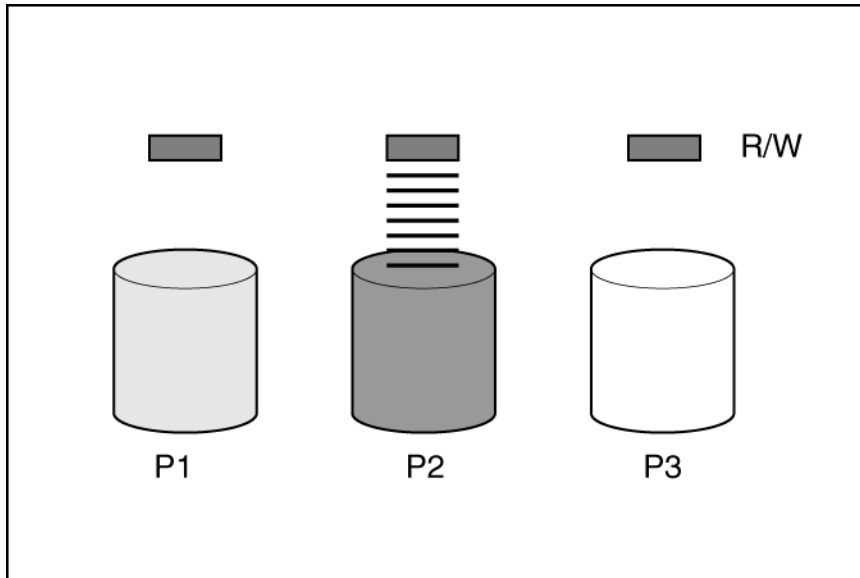
With an array controller installed in the system, the capacity of several physical drives can be combined into one or more virtual units called **logical drives** (also called **logical volumes** and denoted by Ln in the figures in this section). Then, the read/write heads of all the constituent physical drives are active simultaneously, reducing the total time required for data transfer.
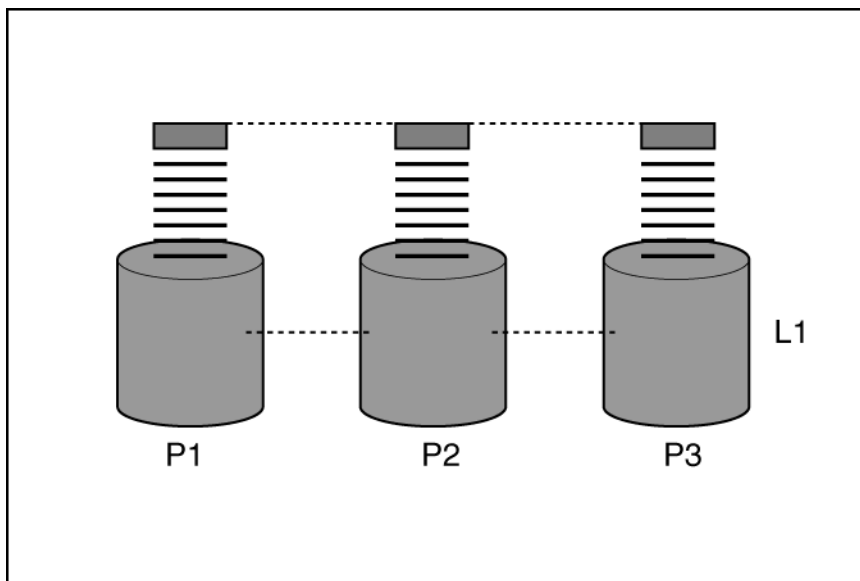
Because the read/write heads are active simultaneously, the same amount of data is written to each drive during any given time interval. Each unit of data is called a **block** (denoted by Bn in the figure), and adjacent blocks form a set of data **stripes** (Sn) across all the physical drives that comprise the logical drive.
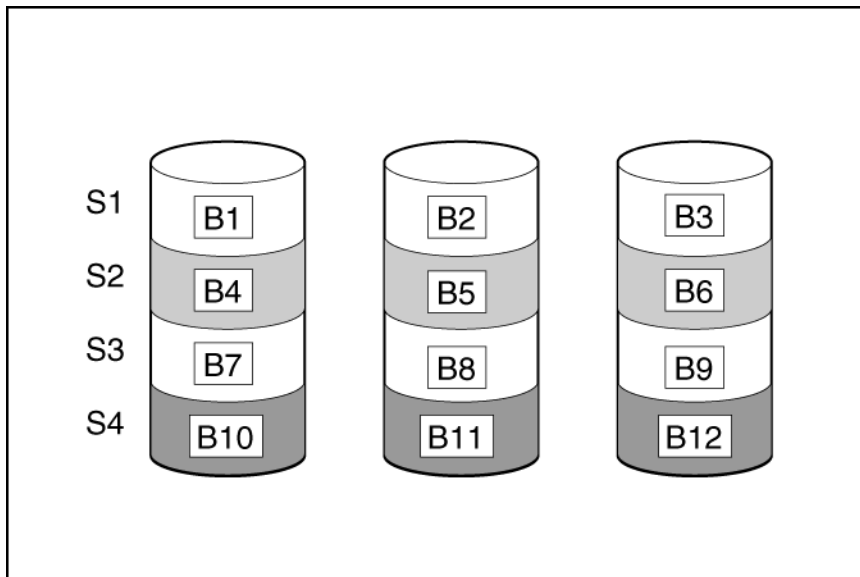
For data in the logical drive to be readable, the data block sequence must be the same in every stripe. This sequencing process is performed by the array controller, which sends the data blocks to the drive write heads in the correct order.

A natural consequence of the striping process is that each physical drive in a given logical drive will contain the same amount of data. If one physical drive has a larger capacity than other physical drives in the same logical drive, the extra capacity is wasted because it cannot be used by the logical drive.

The group of physical drives containing the logical drive is called a **drive array,** or just **array** (denoted by An in the figure). Because all the physical drives in an array are commonly configured into just one logical drive, the term array is often used as a synonym for logical drive. However, an array can contain several logical drives, each of a different size.
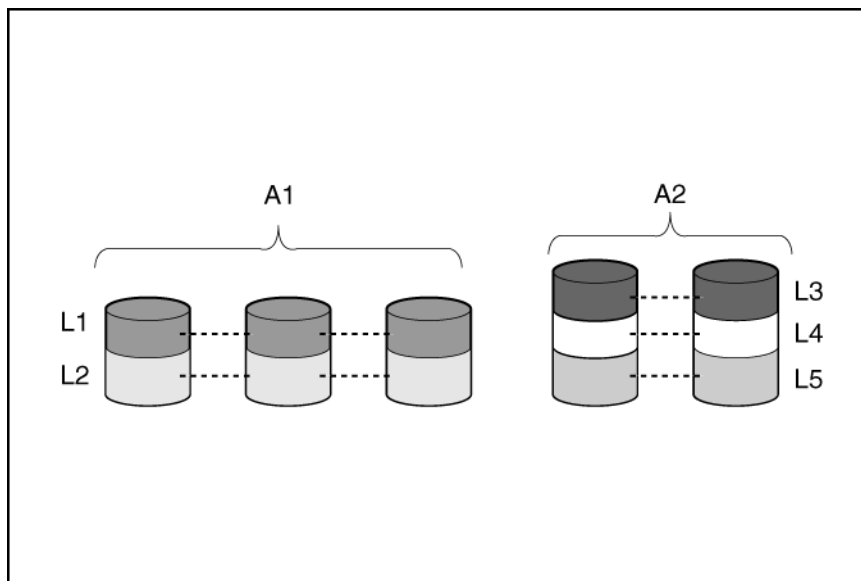
Each logical drive in an array is distributed across all of the physical drives within the array. A logical drive can also extend across more than one port on the same controller, but it cannot extend across more than one controller.

Drive failure, although rare, is potentially catastrophic. For arrays that are configured as shown in the previous figure, failure of any physical drive in the array causes every logical drive in the array to suffer irretrievable data loss. To protect against data loss due to physical drive failure, logical drives are configured with **fault tolerance** .

For any configuration except RAID 0, further protection against data loss can be achieved by assigning a drive as an **online spare** (or **hot spare**). This drive contains no data and is connected to the same controller as the array. When any other physical drive in the array fails, the controller automatically rebuilds information that was originally on the failed drive to the online spare. The system is thus restored to full RAID-level data protection, although it now no longer has an online spare. (However, in the unlikely event that another drive in the array fails while data is being rewritten to the spare, the logical drive will still fail.)

When you configure an online spare, it is automatically assigned to all logical drives in the same array. Additionally, you do not need to assign a separate online spare to each array. Instead, you can configure one hard drive to be the online spare for several arrays if the arrays are all on the same controller.

Effects of a hard drive failure on logical drives

When a drive fails, all logical drives that are in the same array are affected. Each logical drive in an array might be using a different fault-tolerance method, so each logical drive can be affected differently.

- RAID 0 configurations do not tolerate drive failure. If any physical drive in the array fails, all RAID 0 logical drives in the same array also fail.
- RAID 1 tolerates the failure of one drive.
- RAID 10 configurations tolerate multiple drive failures as long as no failed drives are mirrored to another failed drive.
- RAID 5 configurations tolerate one drive failure.
- RAID 50 configurations tolerate one failed drive in each parity group.
- RAID 6 configurations tolerate two failed drives at a given time.
- RAID 60 configurations tolerate two failed drives in each parity group.
- RAID 1 (ADM) and RAID 10 (ADM) configurations tolerate multiple drive failures if no more than two drives, mirrored to one another, fail.

Fault-tolerance methods

Several fault-tolerance methods exist. Those most often used with Smart Array controllers are hardware-based RAID methods.

Two alternative fault-tolerance methods that are sometimes used **are also described**. However, hardware-based RAID methods provide a much more robust and controlled fault-tolerance environment, so these alternative methods are seldom used.

RAID 0

A RAID 0 configuration provides data striping, but there is no protection against data loss when a drive fails. However, it is useful for rapid storage of large amounts of noncritical data (for printing or image editing, for example) or when cost is the most important consideration.
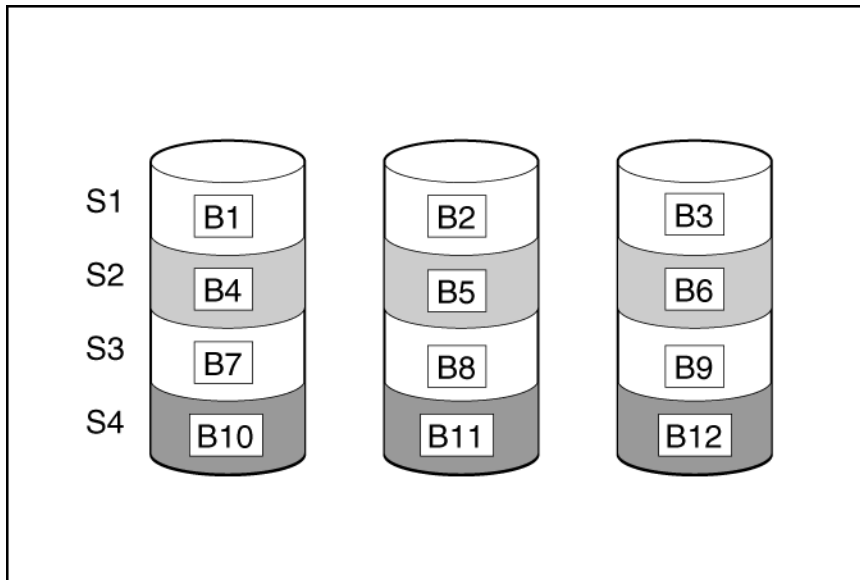
This method has the following benefits:

* Useful when performance and low cost are more important than data protection.
* Has the highest write performance of all RAID methods.
* Has the lowest cost per unit of stored data of all RAID methods.
* All drive capacity is used to store data (none is needed for fault tolerance).

RAID 1 and RAID 1+0 (RAID 10)

In RAID 1 and RAID 1+0 (RAID 10) configurations, data is duplicated to a second drive. The usable capacity is C x (n / 2) where C is the drive capacity with n drives in the array. A minimum of two drives is required.

When the array contains only two physical drives, the fault-tolerance method is known as RAID 1.
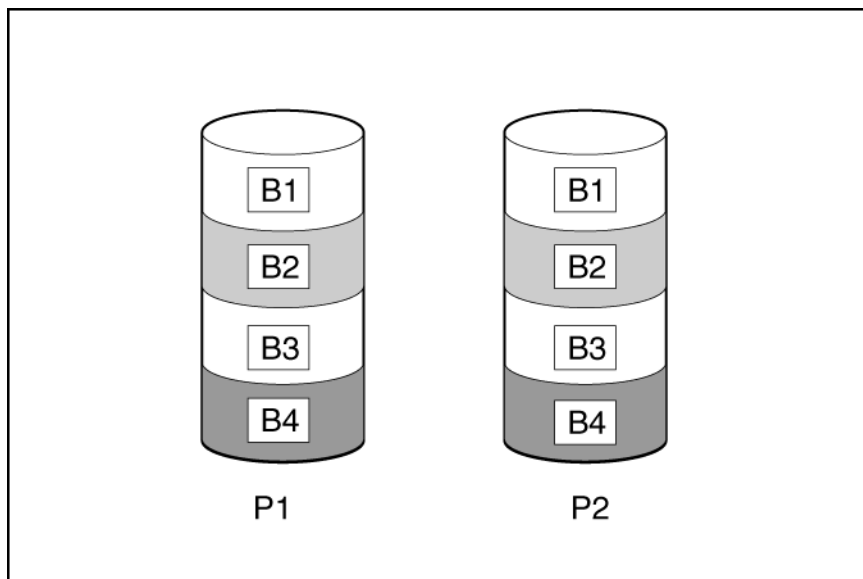
When the array has more than two physical drives, drives are mirrored in pairs, and the fault-tolerance method is known as RAID 1+0 or RAID 10. If a physical drive fails, the remaining drive in the mirrored pair can still provide all the necessary data. Several drives in the array can fail without incurring data loss, as long as no two failed drives belong to the same mirrored pair. The total drive count must increment by 2 drives.
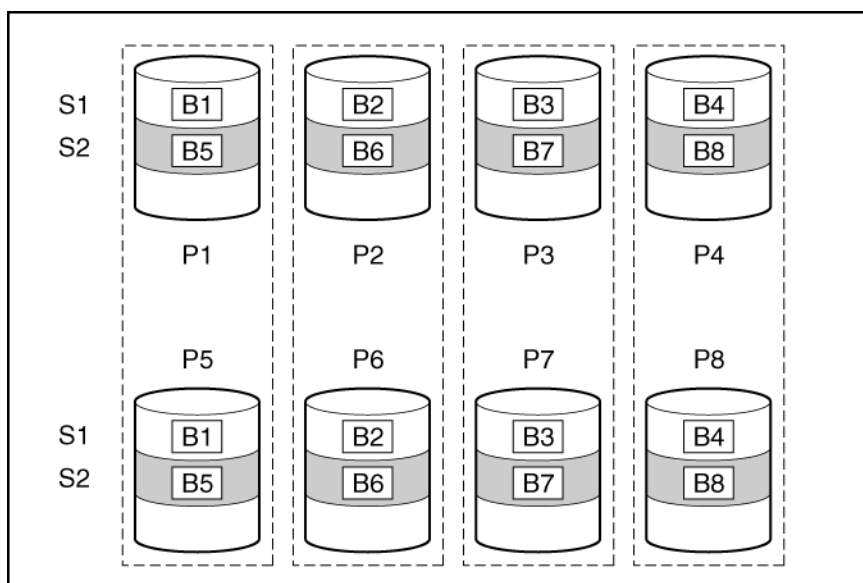
This method has the following benefits:

- It is useful when high performance and data protection are more important than usable capacity.
- This method has the highest write performance of any fault-tolerant configuration.
- No data is lost when a drive fails, as long as no failed drive is mirrored to another failed drive.
- Up to half of the physical drives in the array can fail.

RAID 1 (ADM) and RAID 10 (ADM)

In RAID 1 (ADM) and RAID 10 (ADM) configurations, data is duplicated to two additional drives. The usable capacity is C x (n / 3) where C is the drive capacity with n drives in the array. A minimum of 3 drives is required.

When the array contains only three physical drives, the fault-tolerance method is known as RAID 1 (ADM).
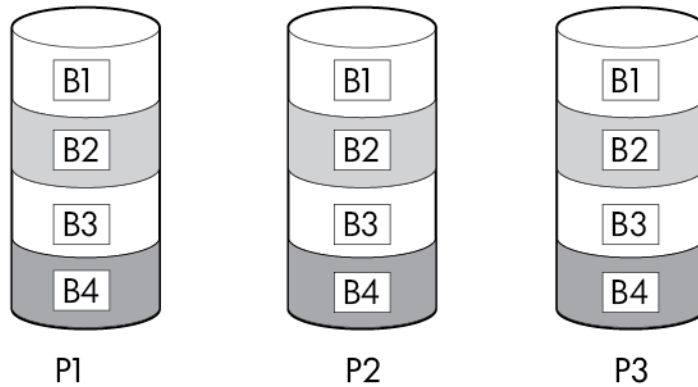
When the array has more than three physical drives, drives are mirrored in trios, and the fault-tolerance method is known as RAID 10 (ADM). If a physical drive fails, the remaining two drives in the mirrored trio can still provide all the necessary data. Several drives in the array can fail without incurring data loss, as long as no three failed drives belong to the same mirrored trio. The total drive count must increment by 3 drives.
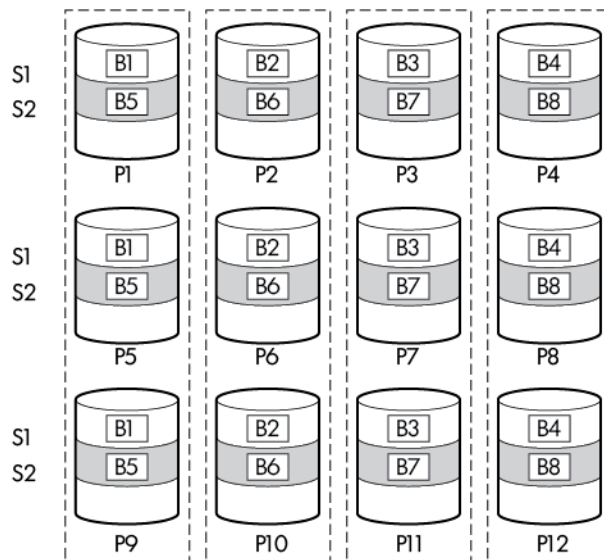
This method has the following benefits:

- It is useful when high performance and data protection are more important than usable capacity.
- This method has the highest read performance of any configuration due to load balancing.
- This method has the highest data protection of any configuration.
- No data is lost when two drives fail, as long as no two failed drives are mirrored to another failed drive.
- Up to two-thirds of the physical drives in the array can fail.

RAID 5

RAID 5 protects data using parity (denoted by Px,y in the figure). Parity data is calculated by summing (XOR) the data from each drive within the stripe. The strips of parity data are distributed evenly over every physical drive within the logical drive. When a physical drive fails, data that was on the failed drive can be recovered from the remaining parity data and user data on the other drives in the array. The usable capacity is C x (n - 1) where C is the drive capacity with n drives in the array. A minimum of three drives is required.
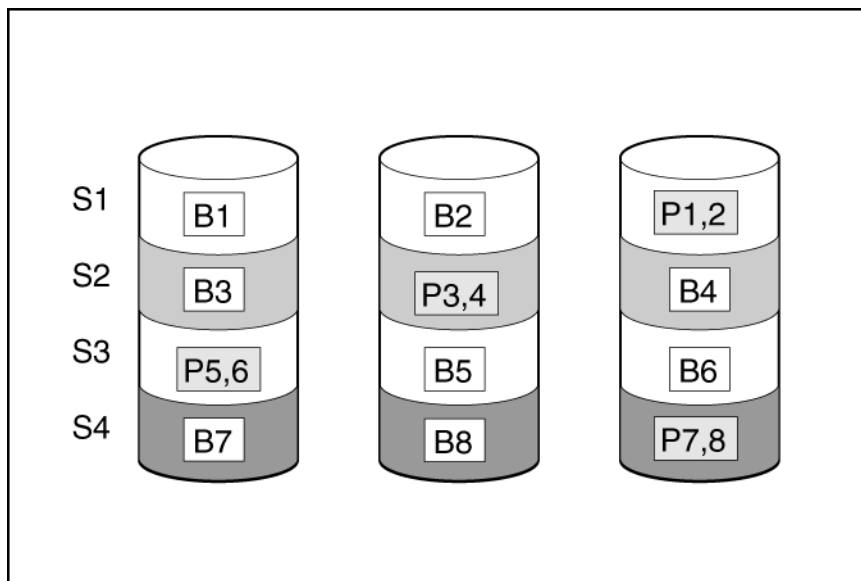
This method has the following benefits:

- It is useful when usable capacity, write performance, and data protection are equally important.
- It has the highest usable capacity of any fault-tolerant configuration.
- Data is not lost if one physical drive fails.

RAID 6

RAID 6 protects data using double parity. With RAID 6, two different sets of parity data are used (denoted by Px,y and Qx,y in the figure), allowing data to still be preserved if two drives fail. Each set of parity data uses a capacity equivalent to that of one of the constituent drives. The usable capacity is C x (n - 2) where C is the drive capacity with n drives in the array. A minimum of 4 drives is required.
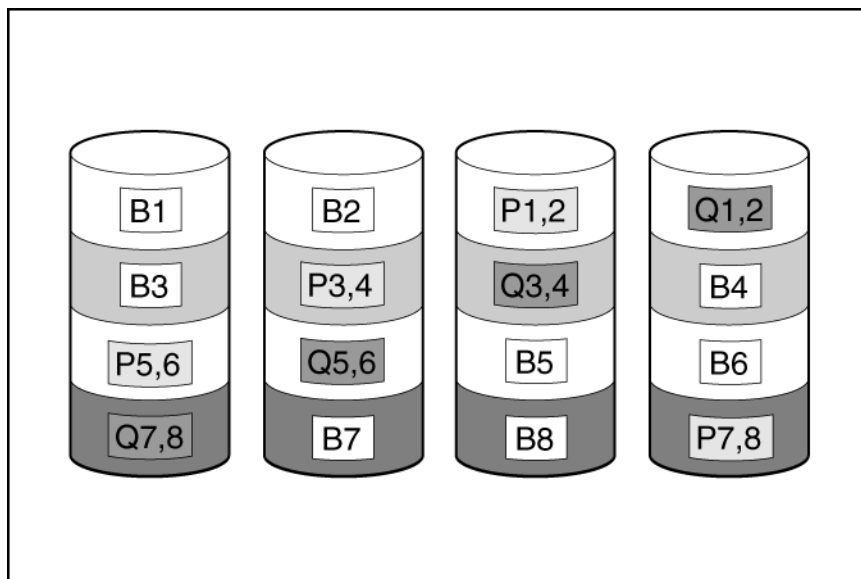
This method is most useful when data loss is unacceptable but cost is also an important factor. The probability that data loss will occur when an array is configured with RAID 6 (ADG) is less than it would be if it were configured with RAID 5.

This method has the following benefits:

- It is useful when data protection and usable capacity are more important than write performance.

- It allows any two drives to fail without loss of data.

RAID 50

RAID 50 is a nested RAID method in which the constituent hard drives are organized into several identical RAID 5 logical drive sets (parity groups). The smallest possible RAID 50 configuration has six drives organized into two parity groups of three drives each.
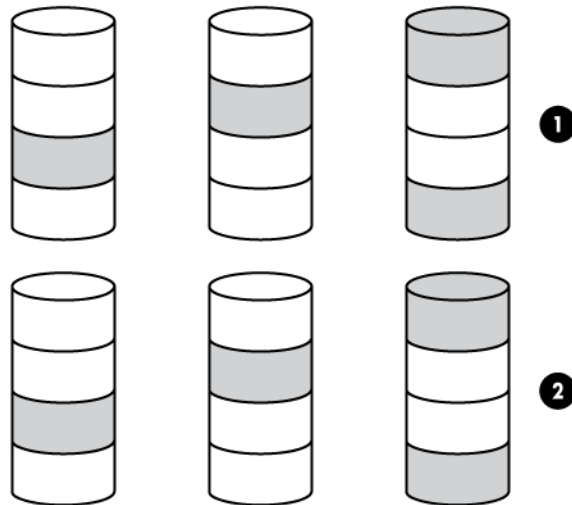
For any given number of hard drives, data loss is least likely to occur when the drives are arranged into the configuration that has the largest possible number of parity groups. For example, four parity groups of three drives are more secure than three parity groups of four drives. However, less data can be stored on the array with the larger number of parity groups.

All data is lost if a second drive fails in the same parity group before data from the first failed drive has finished rebuilding. A greater percentage of array capacity is used to store redundant or parity data than with non-nested RAID methods.

This method has the following benefits:

- Higher performance than for RAID 5, especially during writes.
- Better fault tolerance than either RAID 0 or RAID 5.
- Up to n physical drives can fail (where n is the number of parity groups) without loss of data, as long as the failed drives are in different parity groups.

RAID 60

RAID 60 is a nested RAID method in which the constituent hard drives are organized into several identical RAID 6 logical drive sets (parity groups). The smallest possible RAID 60 configuration has eight drives organized into two parity groups of four drives each.

For any given number of hard drives, data loss is least likely to occur when the drives are arranged into the configuration that has the largest possible number of parity groups. For example, five parity groups of four drives are more secure than four parity groups of five drives. However, less data can be stored on the array with the larger number of parity groups.

The number of physical drives must be exactly divisible by the number of parity groups. Therefore, the number of parity groups that you can specify is restricted by the number of physical drives. The maximum number of parity groups possible for a particular number of physical drives is the total number of drives divided by the minimum number of drives necessary for that RAID level (three for RAID 50, four for RAID 60).

All data is lost if a third drive in a parity group fails before one of the other failed drives in the parity group has finished rebuilding. A greater percentage of array capacity is used to store redundant or parity data than with non-nested RAID methods.

This method has the following benefits:

- Higher performance than for RAID 6, especially during writes.
- Better fault tolerance than either RAID 0 or RAID 6.
- Up to 2n physical drives can fail (where n is the number of parity groups) without loss of data, as long as no more than two failed drives are in the same parity group.

Comparing the hardware-based RAID methods

Not all controllers support all RAID levels.

Item	RAID 0	RAID 1+0	RAID 5	RAID 6 (ADG)	RAID 1(0) (ADM)
Alternative name	Striping (no fault tolerance)	Mirroring	Distributed Data Guarding	Advanced Data Guarding	Advanced Data Mirroring
Formula for number of drives usable for data (n = total number of drives in array)	n	n/2	n-1	n-2	n/3
Percentage of drive space usable[1]	100%	50%	67% to 93%	50% to 96%	33%
Minimum number of physical drives	1	2	3	4	3
Tolerates failure of one physical drive	No	Yes	Yes	Yes	Yes
Tolerates simultaneous failure of more than one physical drive	No	Only if no two failed drives are in the same mirrored pair	No	Yes	Only if no three drives are in the same mirror group [2]
Read performance	High	High	High	High	High
Write performance	High	Medium	Low	Low	Medium
Relative cost	Low	High	Medium	Medium	Very high

[1] Values for the percentage of drive space usable are calculated with these assumptions: (1) all physical drives in the array have the same capacity; (2) online spares are not used; (3) no more than 14 physical drives are used per array for RAID 5; and (4) no more than 56 drives are used with RAID 6 (ADG).

[2] Mirror groups include the physical drives in each mirror.

Selecting a RAID method

Not all controllers support all RAID levels. To determine the RAID capabilities of your controller, see the model-specific information for your controller on the **Hewlett Packard Enterprise website**.

Most important criterion	Also important	Suggested RAID level
Fault tolerance	Cost effectiveness	RAID 6
	I/O performance	RAID 10 (ADM), RAID 1+0, RAID 50, RAID 60
Cost effectiveness	Fault tolerance	RAID 6
	I/O performance	RAID 5 (RAID 0 if fault tolerance is not required)
I/O performance	Cost effectiveness	RAID 5 (RAID 0 if fault tolerance is not required)
	Fault tolerance	RAID 10 (ADM), RAID 1+0, RAID 50, RAID 60

Alternative fault-tolerance methods

Your operating system may also support software-based RAID or controller duplexing.

- **Software-based RAID** resembles hardware-based RAID, except that the operating system works with logical drives as if they were physical drives. To protect against data loss caused by physical drive failure, each logical drive must be in a different array from the others.
- **Controller duplexing** uses two identical controllers with independent, identical sets of drives containing identical data. In the unlikely event of a controller failure, the remaining controller and drives will service all requests.

Neither of these alternative fault-tolerance methods supports online spares or automatic data recovery, nor do they support auto-reliability monitoring or interim data recovery.

If you decide to use one of these alternative methods, configure your arrays with RAID 0 for maximum storage capacity and refer to your operating system documentation for further implementation details.

Storage controller issues

General controller issues

Symptom

- The controller is not visible during the POST process.
- The controller shows errors during the POST process.

Cause

- The hardware is physically damaged.
- The controller is not supported on the server.
- The controller is not seated properly.
- The controller is faulty.
- The firmware is outdated.

Action

1. Verify that the controller is supported for the server.
2. Verify that the controller is not physically damaged.
3. If the controller is recognized by the system BIOS, then reseat the controller.
4. Run controller diagnostics and follow the steps displayed.
5. Update the firmware.
6. Download the Active Health System log and use the AHSV to read, diagnose, and resolve issues.

    For more information, see the AHSV user guide at **http://www.hpe.com/support/ahsv-ug-en**.

7. If you are unable to resolve the issue, submit a case to Hewlett Packard Enterprise technical support through AHSV.

   For more information, see the AHSV user guide at **http://www.hpe.com/support/ahsv-ug-en**.
8. Replace the controller. For more information, see the **Server maintenance and service guide** on page 125.

Controllers are no longer redundant

Symptom

- The controller shows errors during the POST process.
- The cache is disabled.

Cause

- The hardware on one or more controllers is physically damaged.
- One or more controllers are not supported on the server.
- The controllers are not compatible for redundant operation.
- One or more controllers are not installed properly.
- The firmware on one or more controllers is outdated or not compatible.
- The HPE Smart Storage Battery is not installed.
- The HPE Smart Storage Battery is not connected to the system board properly.
- The cache module cable is not connected to the PCIe riser board (for controllers installed on a PCIe riser board).

Action

1. Verify that the controllers are supported for the server.
2. Verify that both controllers are installed or seated properly.
3. Verify that the controllers are compatible controller models.
4. Verify that the controller firmware versions are compatible and current.
5. Verify that the controller cache sizes are compatible.
6. Verify that the HPE Smart Storage Battery is installed and connected properly.
7. Verify that all controller cabling is connected properly.
8. If the issue persists, download the Active Health System log. For more information, see the **Active Health System Log** on page 108.
9. Contact Hewlett Packard Enterprise technical support. For more information, see **Accessing Hewlett Packard Enterprise Support** on page 131.

Data located on drives accessed in RAID mode is not compatible with data accessed from non-RAID mode

Symptom

Data located on drives accessed in RAID mode is not compatible with data accessed from non-RAID mode and data located on drives accessed in non-RAID mode is not compatible with data accessed from RAID mode.

Action

Hewlett Packard Enterprise recommends that you access drive data only when the same RAID or non-RAID mode is enabled. Back up and restore the data on the drives.

The Smart Array controller does not show logical drives after moving drives to a new server or JBOD

Symptom

The Smart Array controller does not show logical drives after moving drives to a new server or JBOD.

Cause

A drive migration issue occurred.

Action

Be sure to follow all drive roaming rules when migrating drives. See "**Drive roaming** on page 83."

Drive roaming

Drive roaming lets you move disk drives and arrays while maintaining data availability. You can move one or more disk drives in a configured logical drive to a different bay position as long as the new bay position is accessible by the same controller. In addition, you can move a complete array from one controller to another, even if controllers are in different servers. The logical drive status must be good before you move physical drives to a new bay position.

Drive roaming is an offline feature. There is no method for removing an array while the server is online and then moving it to a new physical location.

Data failure or disk errors on a server with a 10SFF drive backplane or a 12LFF drive backplane

Symptom

Data failure or disk errors occur on a server with a 10SFF or 12LFF drive backplane.

Cause

The drive backplane is not cabled properly to the controller.

Action

Be sure that the drive backplane ports are connected to only one controller. Only one cable is required to connect the backplane to the controller. The second port on the backplane is cabled to the controller to provide additional bandwidth. For more information on server cabling, see the **Server user guide** on page 125.

HPE Smart Array S100i SR Gen10 drives are not found when RAID mode is disabled

Symptom

The HPE Smart Array S100i SR Gen10 drives are not found when RAID mode is disabled.

Cause

When an HPE Smart Array S100i SR Gen10 is enabled on a server and RAID mode is disabled in the UEFI System Utilities, then the drives are listed as AHCI drives or HPE H220i drives and the RAID controller is not found in POST or device manager. When RAID mode is enabled, the drives appear as HPE Smart Array S100i SR Gen10 drives.

Action

1. To access the UEFI System Utilities, press the **F9** key during the startup process.
2. From the **Systems Utilities** screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **System Options** > **SATA Controller Options** > **Embedded SATA Configuration** > **Enable Dynamic Smart Array RAID Support**.
3. Save your setting.
4. Reboot the server.

HPE Smart Array S100i SR Gen10 drives are not recognized

Symptom

When installing an OS, the OS installation does not recognize the HPE Smart Array S100i SR Gen10 drives.

Action

1. Manually install the HPE Smart Array S100i SR Gen10 drivers.

   For more information, see the controller documentation.

Fan and thermal issues

General fan issues

Symptom

Cause

- The fans are not seated properly.
- The fan configuration does not meet the functional requirements of the server.
- The server is not ventilated properly.
- One or more required fans are not installed.
- Required fan blanks are not installed.
- Error messages are displayed during POST or in the IML.
- One or more fans are not functioning.

Action

1. Be sure the fans are properly seated and working:

   a. Follow the procedures and warnings in the server documentation for removing the access panels and accessing and replacing fans.

   a. Unseat, and then reseat, each fan according to the proper procedures.

   b. Replace the access panels, and then attempt to restart the server.

2. Be sure the fan configuration meets the functional requirements of the server.

   See the **Server user guide** on page 125.

3. Be sure no ventilation issues exist. If the server is operated for an extended period of time with the access panel removed, airflow might be impeded, causing thermal damage to components.

   For further requirements, see the **Server documentation** on page 124.

4. Be sure no POST error messages are displayed while booting the server that indicate temperature violation or fan failure information.

   For the temperature requirements for the server, see the **Server documentation** on page 124.

5. Use iLO or an optional IML viewer to access the IML to see if any event list error messages relating to fans are listed.

   For more information about event list error messages, see **Troubleshooting resources** on page 124.

6. In the iLO web interface, navigate to the **Information** > **System Information** page and verify the following information:

   a. Click the **Fans** tab and verify the fan status and fan speed.

   b. Click the **Temperatures** tab and verify the temperature readings for each location on the Temperatures tab. If a hot spot is located, then check the airflow path for blockage by cables and other material.

A hot spot is not an absolute temperature but is relative to a component specification. Hot spot is defined as temperature on a sensor within 3°C of a Caution threshold listed on the Temperature tab.

7. Replace any required non-functioning fans and restart the server. For specifications on fan requirements, see the **Server documentation** on page 124.
8. Be sure all fan slots have fans or blanks installed. For airflow requirements, see the **Server documentation** on page 124.
9. Verify the fan airflow path is not blocked by cables or other material.
10. For HPE BladeSystem c-Class enclosure fan issues, review the fan section of Onboard Administrator SHOW ALL and the FAN FRU low-level firmware. For more information, see the *HPE BladeSystem c-Class Enclosure Troubleshooting Guide* on the **Hewlett Packard Enterprise website**.

Fans running at a higher than expected speed

Symptom

The fans are running at a higher speed than expected.

Cause

- The system temperature sensor is reading within approximately 10°C of the Caution threshold.
- An air baffle or blank is missing or not installed properly and causing a disruption of the airflow.
- The processor heatsink is not installed as indicated in the server documentation.
- A supported fan is not installed in the server.

Action

1. Update the server to the latest firmware versions, such as iLO firmware, system BIOS, option firmware, etc.
2. Verify the Temperature tab. Fan speeds can be high if a sensor temperature is within approximately 10°C of the Caution threshold.
3. Verify that all air baffles and required blanks, such as drive blanks, processor heatsink blanks, power supply blanks, etc., are installed.
4. Verify that the correct processor heatsink is installed.
5. Verify that the correct fan is installed, if the system supports both standard fans and performance fans.

For more information about updating the firmware, see **Updating firmware or system ROM** on page 114. For server-specific documentation, see **Server documentation** on page 124.

Excessive fan noise (high speeds)

Symptom

Fans are operating at high speeds with excessive noise.

Cause

Fans can generate noise if running at a high speed (as expected) or when at low speed if there is an issue with the fan.

Action

1. In the iLO web interface, navigate to the **Information** > **System Information** page.
2. Click the **Fans** tab.
3. Verify the fan status and fan speed.

   Fan speeds greater than 60% are expected to be loud.
4. If the fan is running at a higher speed than expected, see **Fans running at a higher than expected speed** on page 85.

   For server-specific documentation, see **Server documentation** on page 124.

Excessive fan noise (low speeds)

Symptom

Abnormal/rattling noise observed at low fan speeds might indicate an issue with the fan.

Action

Replace the fan. For server-specific documentation, see **Server documentation** on page 124.

Hot-plug fan issues

Action

1. Check the LEDs to be sure the hot-plug fans are working. For LED information, see the server documentation on the **Hewlett Packard Enterprise website**.

   NOTE:

   For servers with redundant fans, backup fans may spin up periodically to test functionality. This is part of normal redundant fan operation.

2. Verify that there are no POST error messages displayed.

   If a POST error message is displayed, complete the steps needed to resolve the error.

3. Verify that the hot-plug fan meets the requirements for the server. For more information, see the server documentation on the **Hewlett Packard Enterprise website**.

HPE BladeSystem c-Class enclosure fans are operating at a high speed

Symptom

All fans in an HPE BladeSystem c-Class enclosure are operating at a high speed while fans in the other enclosures are operating at normal speed.

Action

If all fan LEDs are solid green but the fans in the chassis are operating at a higher speed than normal, then access the following information from the Onboard Administrator or iLO:

- Review the FAN section in OA SHOW ALL to locate the fan zone that is consuming more FAN speed.
- Verify the virtual FAN value for the affected servers within the FAN zone that indicates which server is consuming a lot of FAN speed.

Possible indicators could be either an outdated ROMBIOS or iLO firmware, or a server repeatedly going through POST or reboot.

If a single fan is operating at approximately 80% and the issue is resolved after resetting the Onboard Administrator, then upgrade to Onboard Administrator firmware 3.60 or later to resolve the issue.

For more information, review the *HPE BladeSystem c-Class Enclosure Troubleshooting Guide* on the **Hewlett Packard Enterprise website**.

Memory issues

General memory issues

Symptom

A DIMM error occurred or a DIMM failed.

Cause

- The memory does not meet server requirements.
- A DIMM has failed.
- Third-party memory is installed on the server.
- The DIMM is not properly seated.

Action

- Isolate and minimize the memory configuration. Use care when handling DIMMs.

  For more information, see **DIMM handling guidelines** on page 18.
- Be sure that the DIMMs meet the server requirements and is installed as required by the server. Some servers might require that memory channels are populated fully or that all memory within a memory channel is of the same size, type, and speed. To determine if the memory is installed properly, see **Server documentation** on page 124.
- Check any server LEDs that correspond to memory slots.
- Remove any third-party memory.
- Update the system ROM to the latest version.

  For more information, see **Updating firmware or system ROM** on page 114.
- Reseat the DIMM.
- Replace the DIMM.

  For more information, see the **Server maintenance and service guide** on page 125.

Isolating and minimizing the memory configuration

When troubleshooting memory issues, sometimes it is necessary to isolate DIMMs in a minimum configuration to determine which DIMM failed.

Prerequisites

Use care when handling DIMMs. For more information, see "**DIMM handling guidelines**."

Procedure

1. If you are unsure which DIMM has failed, test each channel of DIMMs by removing all other DIMMs.
2. Isolate the failed DIMM by switching each DIMM in a channel with a known working DIMM.

Server is out of memory

Symptom

- The server is out of memory.
- A POST error message or an IML message is displayed.

Cause

- The memory is not configured properly.
- An OS error is indicated.

Action

1. Be sure the memory is configured properly. For more information, see the product documentation to determine the memory configuration requirements.
2. Be sure no operating system errors are indicated.
3. Update the system ROM to the latest version. For more information, see **Updating firmware or System ROM**.

DIMM configuration errors

Symptom

A POST error message or an IML message is displayed.

Cause

- The DIMM configuration does not support the Advanced Memory Protection setting configured for the server.
- The memory channel was not populated in the correct order.
- An unsupported DIMM is installed in the server.
- The corresponding processor is not installed.

Action

- Verify that the DIMMs are installed according to the DIMM population guides in the **Server user guide** on page 125.
- Verify that the Advanced Memory Protection settings and DIMMs are installed according to the DIMM population guidelines in the **Server user guide** on page 125.
- Verify that the DIMMs are supported on the server. For a list of supported options, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.
- Be sure that the associated processor is installed for all DIMMs on the server.
- Update the system ROM to the latest version. For more information, see **Updating firmware or system ROM** on page 114.

Server fails to recognize existing memory

Symptom

The server does not recognize existing memory.

Cause

- The server does not support the processor installed in the server.
- The associated processor is not installed for all DIMMs in the server.
- The memory is not configured properly.
- The DIMM is degraded.
- The DIMM is not installed or seated properly.

Action

1. Verify that the server supports associated processor installed for the DIMM.

   For a list of supported options, see the **http://www.hpe.com/info/qs**.
2. Verify that the associated processor is installed for all DIMMs in the server.

   For more information on which DIMM slots are associated to each processor, see the server documentation in the **Hewlett Packard Enterprise Information Library**.
3. Verify that the memory is configured properly.

   For more information, see the **Server documentation** on page 124.
4. Reseat the memory.

   > ⓘ **IMPORTANT:**
   >
   > Use care when handling DIMMs. For more information, see **DIMM handling guidelines** on page 18.

5. Replace all degraded DIMMs. For more information, see the **Server documentation** on page 124.
6. Update the system ROM. For more information, see **Updating firmware or system ROM** on page 114.

Server fails to recognize new memory

Symptom

The server does not recognize new memory installed on the server.

Cause

- The memory is not supported on this server.
- The memory is not installed according to the server requirements.
- The memory limits are exceeded for the server.
- The processor is not supported on the server.
- The memory is not installed or seated properly.

Action

1. Be sure the memory is the correct type for the server.

   For a list of supported options, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.
2. Be sure the memory is installed according to the server requirements.

   For more information, see the **Server documentation** on page 124.
3. Be sure you have not exceeded the memory limits of the server or operating system.

   For more information, see the **Server documentation** on page 124.
4. Be sure the server supports the number of processor cores.

   Some server models support only 32 cores and this might reduce the amount of memory that is visible.
5. Be sure no Event List error messages are displayed in the IML.

   For more information, see **Integrated Management Log** on page 119.
6. Be sure the memory is seated properly.
7. Be sure no conflicts are occurring with existing memory. Run the server setup utility.
8. Test the memory by installing the memory into a known working server.

   Be sure the memory meets the requirements of the new server on which you are testing the memory.
9. Update the system ROM to the latest version.

   For more information, see **Updating firmware or system ROM** on page 114.
10. Replace the memory.

    For more information, see the **Server maintenance and service guide** on page 125.

Uncorrectable memory error

Symptom

- A POST error message or an IML message is displayed.
- Stop error or blue screen (Windows)
- Purple diagnostic screen (Linux)
- Linux kernel panic
- A system "hang"
- A system "freeze"
- ASR
- Server restarts or powers down unexpectedly
- Parity errors occur

Cause

- The DIMM is not installed or seated properly.
- The DIMM has failed.

Action

1. Reseat the DIMM.
2. Update the system ROM to the latest version. For more information, see **Updating firmware or system ROM** on page 114.
3. If the issue still exists, then replace the DIMM.

For more information, see the **Server maintenance and service guide** on page 125.

Correctable memory error threshold exceeded

Symptom

- Performance is degraded.
- The memory LED is amber.
- ECC errors occur with no other symptoms.

Cause

- The DIMM is not installed or seated properly.
- The DIMM has failed.

Action

1. Update the system ROM to the latest version. For more information, see **Updating firmware or system ROM** on page 114.
2. Replace the DIMM. For more information, see the **Server maintenance and service guide** on page 125.

Processor issues

Troubleshooting the processor

Symptom

A POST error message or an IML message is received.

Cause

- One or more processors are not supported by the server.
- The processor configuration is not supported by the server.
- The server ROM is not current.
- A processor is not seated properly.
- A processor has failed.

Action

1. Be sure each processor is supported by the server and is installed as directed in the server documentation. The processor socket requires very specific installation steps and only supported processors should be installed. For processor requirements, see the **Server user guide** on page 125.
2. Be sure the server ROM is current.
3. Be sure you are not mixing processor stepping, core speeds, or cache sizes if this is not supported on the server. For more information, see the **Product QuickSpecs** on page 107.
4. If the server has only one processor installed, reseat the processor. If the issue is resolved after you restart the server, the processor was not installed properly.
5. If the server has only one processor installed, replace it with a known functional processor. If the issue is resolved after you restart the server, the original processor failed.
6. If the server has multiple processors installed, test each processor:

   a. Remove all but one processor from the server. Replace each with a processor terminator board or blank, if applicable to the server.
   b. Replace the remaining processor with a known functional processor. If the issue is resolved after you restart the server, a fault exists with one or more of the original processors. Install each processor one

by one, restarting each time, to find the faulty processor or processors. At each step, be sure the server supports the processor configurations.

Uncorrectable machine check exception

Symptom

A POST error message or an IML message is received indicating an uncorrectable machine check exception.

Action

⚠ **CAUTION:**
Before removing or replacing any processors, be sure to follow the guidelines provided in **Processor troubleshooting guidelines** on page 15. Failure to follow the recommended guidelines can cause damage to the system board, requiring replacement of the system board.

Replace the processor.

Trusted Platform Module issues

TPM fails or is not detected

Symptom

The TPM failed or is no longer detected.

Cause

- The TPM failed.
- The TPM is not configured properly in UEFI System Utilities.
- The boot mode is not configured for the TPM installed on the server.
- Chipset-TPM is disabled in UEFI System Utilities. This might happen if defaults are loaded.

Action

1. When a TPM is installed and is being used with BitLocker, be sure the TPM is enabled in **UEFI System Utilities** on page 111. See the TPM replacement recovery procedure in the operating system documentation.
2. When a TPM is installed, be sure that the TPM is configured for a mode that is compatible with the OS running on the server. Verify that the OS supports the version of TPM installed and configured on the server.
3. When a TPM 2.0 is installed, verify that the server is configured for UEFI boot mode.
4. Leave the TPM installed and request a new system board and TPM from a Hewlett Packard Enterprise authorized service provider. For more information, see **Accessing Hewlett Packard Enterprise Support** on page 131.
5. Verify that Chipset-TPM feature is enabled in Trusted Platform Module options menu in System Utilities.

   For more information, see the UEFI System Utilities user guide at **http://www.hpe.com/info/uefi/docs**.

System battery is low or lost power

Symptom

An error message is received indicating low power or loss of power.

Cause

Real-time clock system battery is running low on power or lost power.

Action

Replace the battery. For more information, see the server maintenance and service guide on the **Hewlett Packard Enterprise website**.

System board and power backplane issues

Symptom

A POST message or an IML message is received indicating an issue with either the system board or the power backplane.

Action

- Review all error messages for possible issues with other components and troubleshoot components identified.
- Verify that no loose connections exist on the system board or power backplane. It is not necessary to reseat processors. For more information, see **Resolving loose connections**.
- Remove any components recently added. For more information on removal and replacement procedures, see the product maintenance and service guide on the **Hewlett Packard Enterprise website**.
- Power down and remove all power from the server. Remove the system battery for 10 minutes. Reinstall the battery and power on the server. To locate the system battery and for server-specific procedures, see the product documentation on the **Hewlett Packard Enterprise website**.
- Reset the NVRAM to default using the BIOS utility (F9). If the system will not boot, then use the System Maintenance Switch, SW6, to reset the NVRAM. For more information, see the label on the server access panel or the **Server user guide** on page 125.
- Use the AHSV to read, diagnose, and resolve server issues using AHS uploaded data. AHSV provides Hewlett Packard Enterprise recommended repair actions based on experience and best practices. If you are you unable to resolve the issues, submit a support case through AHSV. For more information, see the AHSV User Guide at **HTTP://WWW.HPE.COM/SUPPORT/AHSV-UG-EN**.

microSD card issues

The system does not boot from the microSD card

Symptom

The system is not booting from the drive.

Cause

- The drive boot order is not set to boot from the microSD card.
- The microSD card is not detected by iLO.
- The microSD card is not seated properly.

Action

1. Be sure the drive boot order in the UEFI System Utilities is set so that the server boots from the microSD card.
2. Use the iLO web interface to verify that the microSD card is detected by iLO.
3. Remove all power from the server. Reseat the microSD card, and then power on the server.

USB drive key issues

System does not boot from the USB drive key

Symptom

The system does not boot from the USB drive key.

Cause

- The USB drive key is not enabled in the UEFI System Utilities.
- The drive boot order is not set to boot from the USB drive key.
- The USB drive key is not seated properly.

Action

1. Be sure that USB is enabled in the UEFI System Utilities.
   For more information, see **UEFI System Utilities documentation** on page 125.
2. Be sure the drive boot order in the UEFI System Utilities is set so that the server boots from the USB drive key.
3. Reseat the USB drive key.
4. Move the USB drive key to a different USB port, if available.

Graphics and video adapter issues

Troubleshooting general graphics and video adapter issues

Cause

- The graphics or video adapter is not supported on the server.
- Insufficient power to support the graphics or video adapter.
- The graphics or video adapter is not installed or seated properly.

Action

- Use only cards listed as a supported option for the server. For a complete list of supported options, see the **product QuickSpecs**.
- Be sure that the power supplies installed in the server provide adequate power to support the server configuration. Some high-power graphics adapters require specific cabling, fans, or auxiliary power. For more information about adapter power requirements, see the documentation that ships with the graphics option or see the vendor website. For more information about server power capabilities, see the server documentation on the **Hewlett Packard Enterprise website**.
- Be sure the adapter is seated properly.

External device issues

Video issues

The screen is blank for more than 60 seconds after you power up the server

Symptom

The screen is blank for more than 60 seconds after the server powered up.

Cause

- The monitor is not receiving power.
- The monitor is not cabled properly.
- The monitor cables are not connected properly.
- The power is not sufficient for a PCIe device or graphics controller installed on the server.
- A video expansion board is installed, but is not powered or configured properly.
- A video expansion board installed on the server is not supported.
- The video drive is not current.

Action

1. Be sure the monitor power cord is plugged into a working grounded (earthed) AC outlet.
2. Power up the monitor and be sure the monitor light is on, indicating that the monitor is receiving power.
3. Be sure the monitor is cabled to the intended server or KVM connection.
4. Be sure no loose connections exist by verifying the following connections:

   • For rack-mounted servers, check the cables to the KVM switch and be sure the switch is correctly set for the server. You might need to connect the monitor directly to the server to be sure the KVM switch has not failed.
   • For tower model servers, check the cable connection from the monitor to the server, and then from the server to the power outlet.
   • For blades, verify that the SUV cable is connected to the VGA cable on the monitor and to the connector on the front of the blade.

   For more information, see **Resolving loose connections** on page 17.
5. Press any key, or enter the password, and wait for a few moments for the screen to activate to be sure the energy saver feature is not in effect.
6. Verify that a PCIe device or graphics controller does not need additional power to operate. For more information, see the device documentation.
7. Be sure a video expansion board has not been added to replace onboard video, making it seem like the video is not working. Disconnect the video cable from the onboard video, and then reconnect it to the video jack on the expansion board.

   > **NOTE:** All servers automatically bypass onboard video when a video expansion board is present.

8. Press any key, or enter the password, and wait for a few moments for the screen to activate to be sure the power-on password feature is not in effect. You can also tell if the power-on password is enabled if a key symbol is displayed on the screen when POST completes. If you do not have access to the password, you must disable the power-on password by using the Password Disable switch on the system board. See the server documentation on the **Hewlett Packard Enterprise website**.
9. If the video expansion board is installed in a PCI hot-plug slot, be sure the slot has power by checking the power LED on the slot, if applicable. See the server documentation on the **Hewlett Packard Enterprise website**.
10. Be sure the server and the OS support the video expansion board.
11. Be sure the video driver is current. For driver requirements, see the third-party video adapter documentation.

Monitor does not function properly with energy saver features

Symptom

The monitor does not function properly with energy saver features.

Cause

The monitor does not support energy saver features.

Action

Verify that the monitor supports energy saver features. If the monitor does not support energy saver features, disable the features.

Video colors are wrong

Symptom

The video colors are displayed wrong on the monitor.

Cause

- The video cable is not connected securely to the correct port.
- The monitor and KVM switch are not compatible with the video output of the server.
- The video cable is damaged.

Action

- Be sure the 15 pin VGA cable is securely connected to the correct VGA port on the server and to the monitor.
- Be sure the monitor and any KVM switch are compatible with the VGA output of the server.
- Be sure that the VGA cable is not damaged. Replace the cable with a known working cable.

Slow-moving horizontal lines are displayed

Symptom

Slow-moving horizontal lines are displayed on the monitor.

Cause

Magnetic field interference is occurring.

Action

Move the monitor away from other monitors or power transformers.

Mouse and keyboard issues

Action

1. Verify that all cables and cords are securely and properly connected. Check the following:

   - If you are using a KVM switching device, verify that the server is properly connected to the switch.
   - If you have rack-mounted servers, check the cables to the switch box to verify that the switch is correctly set for the server.
   - If you have tower model servers, check the cable connection from the input device to the server.

   For more information, see **Resolving loose connections** on page 17.
2. If you are using a KVM switching device, verify that all cables and connectors are the proper length and are supported by the switch.

   For more information, see the switch documentation.
3. Be sure the current drivers for the operating system are installed.
4. Replace the driver with a known functioning driver to verify that the device driver is not corrupted.
5. Restart the system. Check whether the input device functions correctly after the server restarts.
6. Replace the device with a known working equivalent device (a similar mouse or keyboard):

   - If the issue still occurs with the new mouse or keyboard, the connector port on the system I/O board is defective. Replace the board.
   - If the issue no longer occurs, the original input device is defective. Replace the device.
7. Be sure the keyboard or mouse is connected to the correct port. Determine whether the keyboard lights flash at POST or the NumLock LED illuminates. If not, change port connections.
8. Clean the keyboard or mouse.

Expansion board issues

System requests recovery method during expansion board replacement

Symptom

The system requests a recovery method during expansion board replacement on a BitLocker-encrypted server.

Action

When replacing an expansion board on a BitLocker-encrypted server, always disable BitLocker before replacing the expansion board. If BitLocker is not disabled, the system requests the recovery method selected when BitLocker was configured. Failure to provide the correct recovery password or passwords results in loss of access to all encrypted data.

Be sure to enable BitLocker after the installation is complete.

For information on BitLocker, see BitLocker for Servers on the **Microsoft website**.

Network controller or FlexibleLOM issues

Network controller or FlexibleLOM is installed but not working

Symptom

The network controller or the FlexibleLOM is not working.

Action

1. Check the network controller or FlexibleLOM LEDs to see if any statuses indicate the source of the issue. For LED information, see the network controller documentation or **Server documentation** on page 124.
2. Review the IML for error messages that could indicate the issue.
3. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.
4. Be sure the correct cable type is used for the network speed or that the correct SFP or DAC cable is used. For dual-port 10 GB networking devices, both SFP ports should have the same media (for example, DAC cable or equivalent SFP+ module). Mixing different types of SFP (SR/LR) on a single device is not supported.
5. Be sure the network cable is working by replacing it with a known functional cable.
6. Be sure a software issue has not caused the failure. For more information, see the operating system documentation.
7. Be sure the server and operating system support the controller. For more information, see the operating system documentation or **Server documentation** on page 124.
8. Be sure the controller is enabled in the UEFI System Utilities.
9. Be sure the server ROM is up to date.
10. Be sure the controller drivers are up to date.
11. Be sure a valid IP address is assigned to the controller and that the configuration settings are correct.

Network controller or FlexibleLOM has stopped working

Symptom

The network controller or FlexibleLOM stopped working.

Action

1. Check the network controller or FlexibleLOM LEDs to see if any statuses indicate the source of the issue. For LED information, see the network controller documentation or **Server documentation** on page 124.
2. Be sure the correct network driver is installed for the controller and that the driver file is not corrupted. Reinstall the driver.
3. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.
4. Be sure the network cable is working by replacing it with a known functional cable.
5. Be sure the network controller or FlexibleLOM is not damaged.

Network controller or FlexibleLOM stopped working when an expansion board was added

Symptom

The network controller or FlexibleLOM stopped working when an expansion board was added to the server.

Cause

- The network controller or FlexibleLOM is not seated or connected properly.
- The network controller or FlexibleLOM is not supported by the OS or the server.
- Installation of the network controller or FlexibleLOM changes the server configuration.
- The network controller or FlexibleLOM drivers are out of date.
- The driver parameters do not match the configuration of the network controller.

Action

1. Be sure no loose connections exist. For more information, see **Resolving loose connections** on page 17.
2. Be sure the server and operating system support the controller. For more information, see the operating system documentation or **Server documentation** on page 124.
3. Be sure the new expansion board has not changed the server configuration, requiring reinstallation of the network driver:

   a. Uninstall the network controller driver for the malfunctioning controller in the operating system.
   b. Restart the server and run the appropriate option in the UEFI System Utilities. Be sure the server recognizes the controller and that resources are available for the controller.
   c. Restart the server, and then reinstall the network driver.
4. Be sure the correct drivers are installed. For more information, see the operating system documentation.
5. Be sure that the driver parameters match the configuration of the network controller. For more information, see the operating system documentation.

Network interconnect blade issues

Symptom

The network interconnect blade has issues.

Cause

The network interconnect blade is not properly seated or connected.

Action

Be sure the network interconnect blades are properly seated and connected.

HPE Smart Storage Battery issues

HPE Smart Storage Battery might lose charge when shelved for long periods of time

Symptom

Any server configured with an HPE Smart Storage Battery for HPE Smart Array Controllers might display a POST error message stating that the cache module or the HPE Smart Storage Battery failed.

Cause

The HPE Smart Storage Battery discharged to a threshold where it is permanently disabled and must be replaced.

Action

1. Verify the HPE Smart Storage battery status in iLO.
2. Download the **Active Health System Log** on page 108 using the AHSV.
3. Submit a support case through AHSV. Contact Hewlett Packard Enterprise technical support.

   For more information, see the AHSV User Guide at **http://www.hpe.com/support/ahsv-ug-en**.

HPE Smart Storage Battery configuration error

Symptom

Any HPE ProLiant server configured with an HPE Smart Storage Battery for HPE Smart Array Controllers receive a POST error message or an IML message.

Cause

The number of controllers exceeds the installed HPE Smart Storage Battery capacity.

Action

1. Do one of the following:

   - Ensure that the HPE Smart Storage Battery is fully charged. It may take up to 120 minutes in a powered server or enclosure for the HPE Smart Storage Battery to charge to support the number of controllers in the server or enclosure.
   - If the charge level is insufficient to support the controllers installed in the server, the HPE Smart Storage Battery output might not be enabled while the battery is charging. It might take up to 120 minutes in a powered server or enclosure for the battery to charge fully.
   - Verify the HPE Smart Storage battery status in iLO.
   - Remove some of the devices using the HPE Smart Storage Battery. HPE Smart Array Controllers use the HPE Smart Storage Battery.

   For more information, see the **Server user guide** on page 125.

HPE Smart Storage Battery failure

Symptom

Any HPE ProLiant server configured with an HPE Smart Storage Battery for HPE Smart Array Controllers receives a POST error message or an IML message indicating a cache module failure or an HPE Smart Storage Battery failure.

Cause

- Communication with the HPE Smart Storage Battery failed.
- The HPE Smart Storage Battery output is not enabled.

Action

- Verify that the HPE Smart Storage Battery is installed and cabled properly. For more information, see the *HPE Smart Array Controllers User Guide* at **http://www.hpe.com/info/SmartArrayGen10-docs**.
- Verify the HPE Smart Storage battery status in iLO.
- Update the system ROM.
- If the issue persists, download the Active Health System Log and send it to a support professional to help resolve the issue.

  For more information, see the Active Health System Viewer documentation at the following website: **http://www.hpe.com/support/ahsv-docs**

Cable issues

Drive errors, retries, timeouts, and unwarranted drive failures occur when using an older Mini-SAS cable

Symptom

Errors, retries, timeouts, and unwarranted drive failures occur when using an older Mini-SAS cable.

Cause

The Mini-SAS cable might be reaching its life expectancy.

Action

The Mini-SAS connector life expectancy is 250 connect/disconnect cycles (for external, internal, and cable Mini-SAS connectors). If using an older cable that could be near the life expectancy, replace the Mini-SAS cable.

USB device not recognized, an error message is displayed, or the device does not power on when connected to an SUV cable

Symptom

- The USB device is not recognized when connected to an SUV cable.
- An error message is displayed.
- The device does not power on when connected to an SUV cable.

Cause

The USB connectors on the SUV cable do not support devices that require a power source greater than 500mA.

Action

Remove the USB device and do one of the following:

- Attach a USB device that requires a power source less than 500mA.
- Attach an externally powered USB hub to the SUV cable and connect the USB device to the hub.

Software issues

Operating system issues and resolutions

Operating system issues

Operating system locks up

Symptom

The operating system locks up.

Action

- Scan for viruses with an updated virus scan utility.
- Review the iLO event log.
- Review the IML.
- Gather the NMI Crash Dump information for review, if needed.
- Use the Active Health System Viewer (AHSV) to upload the AHS data and read, diagnose, and resolve your server issues. If you are unable to resolve the issues, submit a case using the Active Health System Viewer. For more information, see the Active Health System Viewer documentation at **http://www.hpe.com/support/ahsv-docs**.

Errors are displayed in the error log

Symptom

Error messages are displayed in the error log.

Action

Follow the information provided in the error log. For more information, see the operating system documentation.

Issues occur after the installation of a service pack

Symptom

Issues occur after the installation of a service pack

Action

1. Update the operating system.

   For more information, see "**Updating the operating system** on page 100."

Updating the operating system

Prerequisites for updating the operating system

Before updating the operating system, read the release notes for each update.

Use care when applying operating system updates (Service Packs, hotfixes, and patches). If you do not require specific fixes from the update, Hewlett Packard Enterprise recommends that you do **not** apply the updates. Some updates overwrite files specific to Hewlett Packard Enterprise.

Updating the operating system

If you decide to apply an operating system update:

Procedure

1. Perform a full system backup.
2. Apply the operating system update, using the instructions provided.
3. Install the current drivers.

If you apply the update and have issues, locate files to correct the issues on the **Hewlett Packard Enterprise website**.

Reconfiguring or reloading software

Prerequisites for reconfiguring or reloading software

If all other options have not resolved the issue, consider reconfiguring the system. Before reconfiguring the system, do the following:

Procedure

1. Weigh the projected downtime of a software reload against the time spent troubleshooting intermittent issues. It might be advantageous to start over by removing and reinstalling the software with issues, or, in some cases, by using the Erase Utility and reinstalling all system software.

   △ **CAUTION:**
   Perform a backup before running the System Erase Utility. The utility sets the system to its original factory state, deletes the current hardware configuration information, including array setup and disk partitioning, and erases all connected hard drives completely. Refer to the instructions for using this utility.

2. Be sure the server has adequate resources (processor speed, hard drive space, and memory) for the software.
3. Be sure the server ROM is current and the configuration is correct.
4. Be sure you have printed records of all troubleshooting information you have collected to this point.
5. Be sure you have two good backups before you start. Test the backups using a backup utility.
6. Check the operating system and application software resources to be sure you have the latest information.
7. If the last-known functioning configuration does not work, try to recover the system with operating system recovery software. For more information, see the operating system documentation.

Restoring a backup version

If you recently upgraded the operating system or software and cannot resolve the issue, try restoring a previously saved version of the system. Before restoring the backup, make a backup of the current system. If restoring the previous system does not correct the issue, you can restore the current set to be sure you do not lose additional functionality.

For more information, see the documentation provided with the backup software.

Linux resources

For troubleshooting information specific to Linux operating systems, see the Linux for ProLiant website at **http://www.hpe.com/info/proliantlinux**.

To assist in possible LINUX installation issues on HPE ProLiant servers, capture either the sosreport or supportconfig before contacting **Hewlett Packard Enterprise technical support**. For more information, see "**sosreport and supportconfig** on page 123."

Application software issues

Software locks up

Symptom

The software locks up.

Cause

- The software might be incompatible with other software on the server.
- Known issues might exist with the software.
- The server configuration might have changed.
- The server might be infected by a virus.

Action

1. Check the application log and operating system log for entries indicating why the software locked up.
2. Check for incompatibility with other software on the server.
3. Check the support website of the software vendor for known issues.
4. Review log files for changes made to the server that might have caused the issue.
5. Scan the server for viruses with an updated virus scan utility.

Errors occur after a software setting is changed

Symptom

The system locks up after settings were changed.

Cause

The new system settings are not supported.

Action

Check the system logs to determine what changes were made, and then change the settings back to the original configuration.

Errors occur after the system software is changed

Symptom

Errors occur after the system software is changed.

Action

Change the settings back to the original configuration. If more than one setting was changed, change the settings one at a time to isolate the cause of the issue.

Errors occur after an application is installed

Symptom

Errors occur after an application is installed on a server.

Action

- Check the application log and operating system log for entries indicating why the software failed.
- Check system settings to determine if they are the cause of the error. You might need to obtain the settings from the server setup utility and manually set the software switches. For more information, see the application documentation, the vendor website, or both.
- Check for overwritten files. To determine which files are added by the application, see the application documentation.

- Reinstall the application.
- Be sure you have the most current drivers.

ROM issues

Remote ROM flash issues

Command-line syntax error

Symptom

If the correct command-line syntax is not used, an error message describing the incorrect syntax is displayed and the program exits.

Cause

Incorrect command-line is used.

Action

1. Correct the command-line syntax.
2. Restart the process.

Access denied on target computer

Symptom

When attempting to access a networked target computer for which administrative privileges are not authorized, an error message is displayed describing the issue, and then the program exits.

Cause

Administrative privileges are not available for the user requesting access.

Action

1. Obtain administrative privileges for the target computer or server.
2. Restart the process.

Be sure the remote registry service is running on a Windows-based system.

Invalid or incorrect command-line parameters

Symptom

If incorrect parameters are passed into command-line options, an error message describing the invalid or incorrect parameter is displayed and the program exits.

Cause

Invalid or incorrect command-line parameters are used.

Action

1. Correct the invalid parameter.
2. Restart the process.

Network connection fails on remote communication

Symptom

An error message describing the broken connection displays and the program exits.

Cause

Because network connectivity cannot be guaranteed, it is possible for the administrative client to become disconnected from the target server during the ROM flash preparation. If any remote connectivity procedure fails during the ROM flash online preparation, the ROM flash does not occur for the target system.

Action

1. Attempt to ascertain and correct the cause of connection failure.
2. Restart the process.

Failure occurs during ROM flash

Symptom

The server will not start.

Cause

The flash cannot be interrupted during a ROM flash, or the ROM image is corrupted and the server does not start. The most likely reason for failure is a loss of power to the system during the flash process.

Action

Initiate ROMPaq disaster recovery procedures.

Target system is not supported

Symptom

If the target system is not listed in the supported servers list, an error message appears and the program exits.

Cause

Only supported systems can be upgraded using the Remote ROM Flash utility.

Action

To determine if the server is supported, see the **Hewlett Packard Enterprise website**.

System requests recovery method during a firmware update

Symptom

System requests recovery method during a firmware update.

Action

1. Always disable BitLocker before updating the firmware.

   If BitLocker is not disabled, the system requests the recovery method selected when BitLocker was configured. Failure to provide the correct recovery password or passwords results in loss of access to all encrypted data.
2. Update the firmware.
   If BitLocker is configured to measure option ROMs, follow the firmware upgrade steps in **Keeping the system current** on page 114. BitLocker can be configured to measure the following option ROMs:

   • NIC
   • Smart Array storage
   • Standup HBAs
3. Enable BitLocker after the firmware updates are complete.

   For information on BitLocker, see BitLocker for servers on the Microsoft website at **http://technet.microsoft.com/en-us/library/cc732774.aspx**.

Updating firmware

Procedure

1. Check the firmware version on the device.
2. Determine the latest firmware version available.

   For more information, see the operating system documentation.
3. If a Trusted Platform Module (TPM) is installed and enabled on the server, disable BitLocker before updating the firmware.

   For more information, see the operating system documentation.
4. Download and update the firmware to the current version supported for the hardware configuration.
5. Verify the firmware update by checking the firmware version.
6. If a TPM is installed and enabled on the server, enable BitLocker after the firmware update is complete.

   For more information, see the operating system documentation.

Boot issues

Server does not boot

Symptom

The server does not boot.

Cause

- The system ROMPaq flash fails.
- The system ROM is corrupt.
- The server fails to boot after a SYSROM update using ROMPaq.
- A logical drive is not configured on the Smart Array RAID controller.
- The controller boot order is not set properly.
- Smart Arrays containing multiple logical drives might require the boot logical drive to be selected within HPE SSA (F5).
- Invalid or corrupted firmware is detected.

Action

- Review the steps in the **OS boot issues flowchart** on page 51.
- Verify the controller boot order.

   For more information, see the UEFI System Utilities user guide at **http://www.hpe.com/info/uefi/docs**.
- Access the redundant ROM using one of the following procedures:

   ◦ **Accessing the redundant ROM (non-blade servers)** on page 105
   ◦ **Accessing the redundant ROM (server blades)** on page 106

Accessing the redundant ROM (non-blade servers)

If the system ROM is corrupted, the system automatically switches to the redundant ROM in most cases. If the system does not automatically switch to the redundant ROM, perform the following steps:

Procedure

1. Power down the server.
2. Remove the server from the rack, if necessary.
3. Remove the access panel.
4. Change positions 1, 5, and 6 of the system maintenance switch to on.

5. Install the access panel.
6. Install the server into the rack.
7. Power up the server.
8. After the system beeps, repeat steps 1 through 3.
9. Change positions 1, 5, and 6 of system maintenance switch to off.
10. Repeat steps 5 and 6.

If both the current and backup versions of the ROM are corrupt, return the system board for a service replacement.

To switch to the backup ROM when the System ROM is not corrupt, use the **UEFI System Utilities** on page 111.

Accessing the redundant ROM (server blades)

If the system ROM is corrupted, the system automatically switches to the redundant ROM in most cases. If the system does not automatically switch to the redundant ROM, perform the following steps:

Procedure

1. Power down the server.
2. Remove the server.
3. Remove the access panel.
4. Change positions 1, 5, and 6 of the system maintenance switch to on.
5. Install the access panel.
6. Install the server in the enclosure and power up the server.
7. After the system beeps, repeat steps 1 through 3.
8. Change positions 1, 5, and 6 of system maintenance switch to off.
9. Repeat steps 5 and 6.

If both the current and backup versions of the ROM are corrupt, return the system board for a service replacement.

To switch to the backup ROM when the System ROM is not corrupt, use the **UEFI System Utilities** on page 111.

PXE boot guidelines for UEFI servers

- When the server is configured for UEFI Boot Mode, PXE servers must be configured with a UEFI boot image. For x64 EFI machines, the DHCP server also needs to be configured to support x64 EFI DHCP boot requests. For more information, see the UEFI documentation at **http://www.hpe.com/info/UEFI/docs**.
- When booting VMware ESX in UEFI Boot Mode, UEFI Optimized Boot must be enabled.
- When the server boots in UEFI Boot Mode, it does not boot media with a legacy OS installation. This includes DOS targets and Windows or Linux systems installed in Legacy BIOS Boot Mode. The reverse is also true for servers that boot in Legacy BIOS Boot Mode.

Software and configuration utilities

Server mode

The software and configuration utilities presented in this section operate in online mode, offline mode, or in both modes.

Software or configuration utility	Server mode
Active Health System on page 107	Online and Offline
HPE iLO 5 on page 108	Online and Offline
HPE Smart Storage Administrator on page 113	Online and Offline
iLO RESTful API on page 109	Online and Offline
Intelligent Provisioning on page 110	Offline
Scripting Toolkit for Windows and Linux on page 111	Online
Service Pack for ProLiant on page 114	Online and Offline
Smart Update Manager on page 114	Online and Offline
UEFI System Utilities on page 111	Offline

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/qs**).

Active Health System Viewer

Active Health System Viewer (AHSV) is an online tool used to read, diagnose, and resolve server issues quickly using AHS uploaded data. AHSV provides Hewlett Packard Enterprise recommended repair actions based on experience and best practices. AHSV provides the ability to:

• Read server configuration information
• View Driver/Firmware inventory
• Review Event Logs
• Respond to Fault Detection Analytics alerts
• Open new and update existing support cases

Active Health System

The Active Health System monitors and records changes in the server hardware and system configuration.

The Active Health System provides:

• Continuous health monitoring of over 1600 system parameters
• Logging of all configuration changes

- Consolidated health and service alerts with precise time stamps
- Agentless monitoring that does not affect application performance

For more information about the Active Health System, see the iLO user guide on the Hewlett Packard Enterprise website.

Active Health System data collection

The Active Health System does not collect information about your operations, finances, customers, employees, or partners.

Examples of information that is collected:

- Server model and serial number
- Processor model and speed
- Storage capacity and speed
- Memory capacity and speed
- Firmware/BIOS and driver versions and settings

The Active Health System does not parse or change OS data from third-party error event log activities (for example, content created or passed through the OS).

Active Health System Log

The data collected by the Active Health System is stored in the Active Health System Log. The data is logged securely, isolated from the operating system, and separate from customer data.

When the Active Health System Log is full, new data overwrites the oldest data in the log.

It takes less than 5 minutes to download the Active Health System Log and send it to a support professional to help you resolve an issue.

When you download and send Active Health System data to Hewlett Packard Enterprise, you agree to have the data used for analysis, technical resolution, and quality improvements. The data that is collected is managed according to the privacy statement, available at **http://www.hpe.com/info/privacy**.

You can also upload the log to the Active Health System Viewer. For more information, see the Active Health System Viewer documentation at the following website: **http://www.hpe.com/support/ahsv-docs**.

HPE iLO 5

iLO 5 is a remote server management processor embedded on the system boards of HPE ProLiant servers and Synergy compute modules. iLO enables the monitoring and controlling of servers from remote locations. iLO management is a powerful tool that provides multiple ways to configure, update, monitor, and repair servers remotely. iLO (Standard) comes preconfigured on Hewlett Packard Enterprise servers without an additional cost or license.

Features that enhance server administrator productivity and additional new security features are licensed. For more information, see the iLO licensing guide at the following website: **http://www.hpe.com/support/ilo-docs**.

For more information about iLO, see the iLO user guide on the Hewlett Packard Enterprise website.

iLO Federation

iLO Federation enables you to manage multiple servers from one system using the iLO web interface.

When configured for iLO Federation, iLO uses multicast discovery and peer-to-peer communication to enable communication between the systems in an iLO Federation group.

When an iLO Federation page loads, a data request is sent from the iLO system running the web interface to its peers, and from those peers to other peers until all data for the selected iLO Federation group is retrieved.

iLO supports the following features:

- Group health status—View server health and model information.
- Group Virtual Media—Connect scripted media for access by the servers in an iLO Federation group.
- Group power control—Manage the power status of the servers in an iLO Federation group.
- Group power capping—Set dynamic power caps for the servers in an iLO Federation group.
- Group firmware update—Update the firmware of the servers in an iLO Federation group.
- Group license installation—Enter a license key to activate iLO licensed features on the servers in an iLO Federation group.
- Group configuration—Add iLO Federation group memberships for multiple iLO systems.

Any user can view information on iLO Federation pages, but a license is required for using the following features: Group Virtual Media, Group power control, Group power capping, Group configuration, and Group firmware update. For more information, see the following website: **http://www.hpe.com/info/ilo/licensing**.

For more information about iLO Federation, see the iLO user guide on the Hewlett Packard Enterprise website.

iLO Service Port

The Service Port is a USB port with the label **iLO** on the front of ProLiant Gen10 servers and Synergy Gen10 compute modules.

When you have physical access to a server, you can use the Service Port to do the following:

- Download the Active Health System Log to a supported USB flash drive.

  When you use this feature, the connected USB flash drive is not accessible by the host operating system.
- Connect a client (such as a laptop) with a supported USB to Ethernet adapter to access the iLO web interface, remote console, CLI, iLO RESTful API, or scripts.

  Hewlett Packard Enterprise recommends the HPE USB to Ethernet Adapter (part number Q7Y55A).

When you use the iLO Service Port:

- Actions are logged in the iLO Event Log.
- The server UID blinks to indicate the Service Port status.

  You can also retrieve the status by using a REST client and the iLO RESTful API.
- You cannot use the Service Port to boot any device within the server, or the server itself.
- You cannot access the server by connecting to the Service Port.
- You cannot access the connected device from the server.

For more information about the iLO Service Port, see the iLO user guide on the Hewlett Packard Enterprise website.

iLO RESTful API

iLO includes the iLO RESTful API, which is Redfish API conformant. The iLO RESTful API is a management interface that server management tools can use to perform configuration, inventory, and monitoring tasks by sending basic HTTPS operations (GET, PUT, POST, DELETE, and PATCH) to the iLO web server.

To learn more about the iLO RESTful API, see the Hewlett Packard Enterprise website (**http://www.hpe.com/info/restfulinterface/docs**).

For specific information about automating tasks using the iLO RESTful API, see libraries and sample code at **http://www.hpe.com/info/redfish**.

RESTful Interface Tool

The RESTful Interface Tool (iLOrest) is a scripting tool that allows you to automate HPE server management tasks. It provides a set of simplified commands that take advantage of the iLO RESTful API. You can install

the tool on your computer for remote use or install it locally on a server with a Windows or Linux Operating System. The RESTful Interface Tool offers an interactive mode, a scriptable mode, and a file-based mode similar to CONREP to help decrease automation times.

For more information, see the following website: **http://www.hpe.com/info/resttool**.

iLO Amplifier Pack

The iLO Amplifier Pack is an advanced server inventory and firmware and driver update solution that enables rapid discovery, detailed inventory reporting, and firmware and driver updates by leveraging iLO advanced functionality. The iLO Amplifier Pack performs rapid server discovery and inventory for thousands of supported servers for the purpose of updating firmware and drivers at scale.

For more information about iLO Amplifier Pack, see the iLO Amplifier Pack user guide at the following website: **http://www.hpe.com/servers/iloamplifierpack**.

Intelligent Provisioning

Intelligent Provisioning is a single-server deployment tool embedded in ProLiant servers, Apollo systems, and HPE Synergy compute modules. Intelligent Provisioning simplifies server setup, providing a reliable and consistent way to deploy servers.

Intelligent Provisioning prepares the system for installing original, licensed vendor media and Hewlett Packard Enterprise-branded versions of OS software. Intelligent Provisioning also prepares the system to integrate optimized server support software from the Service Pack for ProLiant (SPP). SPP is a comprehensive systems software and firmware solution for ProLiant servers, server blades, their enclosures, and HPE Synergy compute modules. These components are preloaded with a basic set of firmware and OS components that are installed along with Intelligent Provisioning.

After the server is running, you can update the firmware to install additional components. You can also update any components that have been outdated since the server was manufactured.

In addition to accessing Intelligent Provisioning by pressing F10 from the POST screen, you can also access Intelligent Provisioning from the iLO web browser user interface using Always On. You can access Always On without having to reboot your server.

Intelligent Provisioning operation

Intelligent Provisioning includes the following components:

- Critical boot drivers
- Active Health System (AHS)
- Erase Utility
- Deployment Settings

ⓘ **IMPORTANT:**

- Although your server is pre-loaded with firmware and drivers, you should update the firmware upon initial setup to ensure you have the latest versions. Also, downloading and updating the latest version of Intelligent Provisioning ensures the latest supported features are available.
- For ProLiant servers, firmware is updated using the Intelligent Provisioning Firmware Update utility.
- Do not update firmware if the version you are currently running is required for compatibility.

NOTE:

Intelligent Provisioning does not function within multihomed configurations. A multihomed host is one that is connected to two or more networks or has two or more IP addresses.

Intelligent Provisioning provides installation help for the following operating systems:

- Microsoft Windows Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware ESXi/vSphere Custom Image

Not all versions of an OS are supported. For information about specific versions of a supported operating system, see the OS Support Matrix on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/ossupport**).

Management Security

HPE ProLiant Gen10 servers are built with some of the industry's most advanced security capabilities, out of the box, with a foundation of secure embedded management applications and firmware. The management security provided by HPE embedded management products enables secure support of modern workloads, protecting your components from unauthorized access and unapproved use. The range of embedded management and optional software and firmware available with the iLO Advanced and iLO Advanced Premium Security Edition licenses provides security features that help ensure protection, detection, and recovery from advanced cyber-attacks. For more information, see the *HPE Gen10 Server Security Reference Guide* on the Hewlett Packard Enterprise Information Library at **http://www.hpe.com/info/EIL**.

For information about the iLO Advanced Premium Security Edition license, see **http://www.hpe.com/servers/ilopremium**.

Scripting Toolkit for Windows and Linux

The STK for Windows and Linux is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The STK is designed to support ProLiant servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these tools to build an automated server deployment process.

The STK provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each deployment, making it possible to scale rapid, high-volume server deployments.

For more information or to download the STK, see the **Hewlett Packard Enterprise website**.

UEFI System Utilities

The UEFI System Utilities is embedded in the system ROM. Its features enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options.
- Enabling and disabling system features.
- Displaying system information.
- Selecting the primary boot controller or partition.
- Configuring memory options.
- Launching other preboot environments.

HPE servers with UEFI can provide:

- Support for boot partitions larger than 2.2 TB. Such configurations could previously only be used for boot drives when using RAID solutions.
- Secure Boot that enables the system firmware, option card firmware, operating systems, and software collaborate to enhance platform security.
- UEFI Graphical User Interface (GUI)
- An Embedded UEFI Shell that provides a preboot environment for running scripts and tools.
- Boot support for option cards that only support a UEFI option ROM.

Selecting the boot mode

This server provides two **Boot Mode** configurations: UEFI Mode and Legacy BIOS Mode. Certain boot options require that you select a specific boot mode. By default, the boot mode is set to **UEFI Mode**. The system must boot in **UEFI Mode** to use certain options, including:

- Secure Boot, UEFI Optimized Boot, Generic USB Boot, IPv6 PXE Boot, iSCSI Boot, and Boot from URL
- Fibre Channel/FCoE Scan Policy

> **NOTE:**
>
> The boot mode you use must match the operating system installation. If not, changing the boot mode can impact the ability of the server to boot to the installed operating system.

Prerequisite

When booting to **UEFI Mode**, leave **UEFI Optimized Boot** enabled.

Procedure

1. From the **System Utilities** screen, select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options** > **Boot Mode**.
2. Select a setting.
   - **UEFI Mode** (default)—Configures the system to boot to a UEFI compatible operating system.
   - **Legacy BIOS Mode**—Configures the system to boot to a traditional operating system in Legacy BIOS compatibility mode.
3. Save your setting.
4. Reboot the server.

Secure Boot

Secure Boot is a server security feature that is implemented in the BIOS and does not require special hardware. Secure Boot ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards
- UEFI drivers loaded from mass storage devices
- Preboot UEFI Shell applications
- OS UEFI boot loaders

When Secure Boot is enabled:

- Firmware components and operating systems with boot loaders must have an appropriate digital signature to execute during the boot process.
- Operating systems must support Secure Boot and have an EFI boot loader signed with one of the authorized keys to boot. For more information about supported operating systems, see **http://www.hpe.com/servers/ossupport**.

You can customize the certificates embedded in the UEFI BIOS by adding or removing your own certificates, either from a management console directly attached to the server, or by remotely connecting to the server using the iLO Remote Console.

You can configure Secure Boot:

- Using the **System Utilities** options described in the following sections.
- Using the `secboot` command in the Embedded UEFI Shell to display Secure Boot databases, keys, and security reports.

Launching the Embedded UEFI Shell

Use the **Embedded UEFI Shell** option to launch the Embedded UEFI Shell. The Embedded UEFI Shell is a pre-boot command-line environment for scripting and running UEFI applications, including UEFI boot loaders. The Shell also provides CLI-based commands you can use to obtain system information, and to configure and update the system BIOS.

Prerequisites

- **Embedded UEFI Shell** is set to enabled.

Procedure

1. From the **System Utilities** screen, select **Embedded Applications** > **Embedded UEFI Shell**.

    The **Embedded UEFI Shell** screen appears.
2. Press any key to acknowledge that you are physically present.

    This step ensures that certain features, such as disabling **Secure Boot** or managing the **Secure Boot** certificates using third-party UEFI tools, are not restricted.
3. If an administrator password is set, enter it at the prompt and press **Enter**.

    The `Shell>` prompt appears.
4. Enter the commands required to complete your task.
5. Enter the `exit` command to exit the Shell.

HPE Smart Storage Administrator

HPE SSA is the main tool for configuring arrays on HPE Smart Array SR controllers. It exists in three interface formats: the HPE SSA GUI, the HPE SSA CLI, and HPE SSA Scripting. All formats provide support for configuration tasks. Some of the advanced tasks are available in only one format.

The diagnostic features in HPE SSA are also available in the standalone software HPE Smart Storage Administrator Diagnostics Utility CLI.

During the initial provisioning of the server or compute module, an array is required to be configured before the operating system can be installed. You can configure the array using SSA.

HPE SSA is accessible both offline (either through HPE Intelligent Provisioning or as a standalone bootable ISO image) and online:

- Accessing HPE SSA in the offline environment

  > ⓘ **IMPORTANT:**
  > If you are updating an existing server in an offline environment, obtain the latest version of HPE SSA through Service Pack for ProLiant before performing configuration procedures.

  Using one of multiple methods, you can run HPE SSA before launching the host operating system. In offline mode, users can configure or maintain detected and supported devices, such as optional Smart Array controllers and integrated Smart Array controllers. Some HPE SSA features are only available in the offline environment, such as setting the boot controller and boot volume.
- Accessing HPE SSA in the online environment

  This method requires an administrator to download the HPE SSA executables and install them. You can run HPE SSA online after launching the host operating system.

For more information, see *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

USB support

Hewlett Packard Enterprise Gen10 servers support all USB operating speeds depending on the device that is connected to the server.

External USB functionality

Hewlett Packard Enterprise provides external USB support to enable local connection of USB devices for server administration, configuration, and diagnostic procedures.

For additional security, external USB functionality can be disabled through USB options in UEFI System Utilities.

Redundant ROM support

The server enables you to upgrade or configure the ROM safely with redundant ROM support. The server has a single ROM that acts as two separate ROM images. In the standard implementation, one side of the ROM contains the current ROM program version, while the other side of the ROM contains a backup version.

> **NOTE:** The server ships with the same version programmed on each side of the ROM.

Safety and security benefits

When you flash the system ROM, the flashing mechanism writes over the backup ROM and saves the current ROM as a backup, enabling you to switch easily to the alternate ROM version if the new ROM becomes corrupted for any reason. This feature protects the existing ROM version, even if you experience a power failure while flashing the ROM.

Keeping the system current

Updating firmware or system ROM

To update firmware or system ROM, use one of the following methods:

- The **Firmware Update** option in the System Utilities. See **Updating firmware from the System Utilities**.
- The `fwupdate` command in the **Embedded UEFI Shell**.
- Service Pack for ProLiant (SPP)
- HPE online flash components

Service Pack for ProLiant

SPP is a systems software and firmware solution delivered as a single ISO file download. This solution uses SUM as the deployment tool and is tested on supported ProLiant servers.

SPP, along with SUM and SUT, provides Smart Update system maintenance tools that systematically update ProLiant servers and BladeSystem infrastructure.

SPP can be used in an online mode on a Windows or Linux hosted operating system, or in an offline mode where the server is booted to an operating system included in the ISO file.

To download the SPP, see the SPP download page at **https://www.hpe.com/servers/spp/download**.

Smart Update Manager

SUM is a tool for firmware, driver, and software maintenance on ProLiant servers, BladeSystem enclosures, Moonshot systems, and other nodes. It provides a browser-based GUI or a command-line scripting interface for flexibility and adaptability.

SUM identifies associated nodes you can update at the same time to avoid interdependency issues.

Key features of SUM include:

- Discovery engine that finds installed versions of hardware, firmware, and software on nodes.
- SUM deploys updates in the correct order and ensures that all dependencies are met before deploying an update.
- Interdependency checking.
- Automatic and step-by-step localhost Guided Update process.
- Web browser-based mode.
- Ability to create custom baselines and ISOs.
- Support for iLO Repository (Gen10 iLO 5 nodes only).
- Simultaneous firmware and software deployment for multiple remote nodes.
- Local offline firmware deployments with SPP deliverables.
- Extensive logging in all modes.

> **NOTE:**
>
> SUM does not support third-party controllers, including flashing hard drives behind the controllers.

Integrated Smart Update Tools

Smart Update Tools is a software utility used with iLO 4 (Gen9 servers), iLO 5 (Gen10 servers), HPE OneView, iLO Amplifier Pack, Service Pack for ProLiant (SPP), and Smart Update Manager (SUM) to stage, install, and activate firmware and driver updates.

> **NOTE:**
>
> HPE OneView and iLO Amplifier Pack manage the iLO while SUT runs on each server and deploys the updates. The same administrator might not manage both applications. Create a process that notifies the administrators when updates are available.

- **Smart Update Tools**: Polls an iLO, HPE OneView, or iLO Amplifier Pack for updates through the management network and orchestrates staging, deploying, and activating updates. You can adjust the polling interval by issuing the appropriate command-line option provided by SUT. Performs inventory on target servers, stages deployment, deploys updates, and then reboots the servers.
- **iLO 5 with integrated Smart Update** (Gen10 servers only): Loads Install Sets to the iLO Repository on iLO 5 nodes. SUT deploys OS-based updates from the iLO Repository.
- **iLO Amplifier Pack**: Displays available updates for servers. Communicates with SUT, or SUT 1.x to initiate updates, reports the status to iLO Amplifier Pack.
- **HPE OneView:** Displays available updates for servers. Communicates with iSUT to initiate updates, reports the status on the **Firmware** section of the **Server Profile** page of HPE OneView. HPE OneView provides automated compliance reporting in the dashboard.
- **SPP**: A comprehensive systems software and firmware update solution, which is delivered as a single ISO image.
- **SUM**: A tool for firmware and driver maintenance for HPE ProLiant servers and associated options.

> **NOTE:**
>
> Do not manage one node with iLO Amplifier Pack and HPE OneView at the same time.

Updating firmware from the System Utilities

Use the **Firmware Updates** option to update firmware components in the system, including the system BIOS, NICs, and storage cards.

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Launch the **System Utilities**, and select **Embedded Applications** > **Firmware Update**.
5. Select a device.

   The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.
6. Select **Select Firmware File**.
7. Select the flash file in the **File Explorer** list.

   The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.
8. Select **Image Description**, and then select a firmware image.

   A device can have multiple firmware images.
9. Select **Start firmware update**.

Updating the firmware from the UEFI Embedded Shell

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center (**http://www.hpe.com/support/hpesc**).
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Boot to the UEFI Embedded Shell.
5. To obtain the assigned file system volume for the USB key, enter `map -r`.
6. Change to the file system that contains the System ROM Flash Binary component for your server. Enter one of the `fsx` file systems available, such as `fs0:` or `fs1:`, and press **Enter**.
7. Use the `cd` command to change from the current directory to the directory that contains the binary file.
8. Flash the system ROM by entering `fwupdate -d BIOS -f` *filename*.
9. Reboot the server. A reboot is required after the firmware update in order for the updates to take effect and for hardware stability to be maintained.

Online Flash components

This component provides updated system firmware that can be installed directly on supported operating systems. Additionally, when used in conjunction with SUM, this Smart Component allows the user to update firmware on remote servers from a central location. This remote deployment capability eliminates the need for the user to be physically present at the server to perform a firmware update.

Drivers

> ⓘ **IMPORTANT:**
> Always perform a backup before installing or updating device drivers.

The server includes new hardware that may not have driver support on all OS installation media.

If you are installing an Intelligent Provisioning-supported OS, use **Intelligent Provisioning** on page 110 and its Configure and Install feature to install the OS and latest supported drivers.

If you do not use Intelligent Provisioning to install an OS, drivers for some of the new hardware are required. These drivers, as well as other option drivers, ROM images, and value-add software can be downloaded as part of an SPP.

If you are installing drivers from SPP, be sure that you are using the latest SPP version that your server supports. To verify that your server is using the latest supported version and for more information about SPP, see the **Hewlett Packard Enterprise website**.

To locate the drivers for a particular server, go to the **Hewlett Packard Enterprise Support Center website**. Under **Select your HPE product**, enter the product name or number and click **Go**.

Software and firmware

Update software and firmware before using the server for the first time, unless any installed software or components require an older version.

For system software and firmware updates, use one of the following sources:

- Download the SPP from the **Hewlett Packard Enterprise website**.
- Download individual drivers, firmware, or other systems software components from the server product page in the **Hewlett Packard Enterprise Support Center website**.

Operating system version support

For information about specific versions of a supported operating system, refer to the **operating system support matrix**.

HPE Pointnext Portfolio

HPE Pointnext delivers confidence, reduces risk, and helps customers realize agility and stability. Hewlett Packard Enterprise helps customers succeed through Hybrid IT by simplifying and enriching the on-premise experience, informed by public cloud qualities and attributes.

Operational Support Services enable you to choose the right service level, length of coverage, and response time to fit your business needs. For more information, see the Hewlett Packard Enterprise website:

https://www.hpe.com/us/en/services/operational.html

Utilize the Advisory and Transformation Services in the following areas:

- Private or hybrid cloud computing
- Big data and mobility requirements
- Improving data center infrastructure
- Better use of server, storage, and networking technology

For more information, see the Hewlett Packard Enterprise website:

http://www.hpe.com/services/consulting

Change control and proactive notification

Hewlett Packard Enterprise offers Change Control and Proactive Notification to notify customers 30 to 60 days in advance of the following:

- Upcoming hardware and software changes
- Bulletins
- Patches

Let Hewlett Packard Enterprise know what HPE commercial products you own and they will send you the latest updates to keep your business running smoothly.

For more information, see the Hewlett Packard Enterprise website:

http://www.hpe.com/info/pcn

Reports and logs

Overview of reports and logs

You might be asked to gather some of the following reports or logs when you contact Hewlett Packard Enterprise:

- Active Health System log — Use the Active Health System Viewer to download the Active Health System Log and submit a case to Hewlett Packard Enterprisesupport. For more information, see the Active Health System Viewer documentation at **http://www.hpe.com/support/ahsv-docs**.
- **Integrated Management Log** on page 119
- **HPE Smart Storage Administrator Diagnostics Utility CLI** on page 119
- **HPS report** on page 123
- **sosreport and supportconfig** on page 123

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with one-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HPE SIM
- From within the UEFI System Utilities
- From within the Embedded UEFI shell
- From within operating system-specific IML viewers:
  - For Windows: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO web interface

HPE Smart Storage Administrator Diagnostics Utility CLI

About the utility

The HPE Smart Storage Administrator Diagnostics Utility CLI collects all possible information about storage devices in the system, detects all problems, and provides a detailed configuration report in .zip format.

After downloading and installing the software, you can run the utility as a CLI in an online environment. The functionality in this utility is mirrored in the diagnostics features of the HPE Smart Storage Administrator, which can be run in an offline environment.

The utility generates two types of reports:

- Array diagnostic report

  This report contains information about all devices, such as array controllers, storage enclosures, drive cages, as well as logical, physical, and tape drives. For supported solid state drives, this report also contains SmartSSD Wear Gauge information.
- SmartSSD Wear Gauge report

  This report contains information about the current usage level and remaining expected lifetime of solid state drives attached to the system.

For more information, see "**Reported information**."

Reported information

The array diagnostic report provides detailed information about devices (array controllers, storage enclosures, drive cages, physical drives, logical drives, and tape drives).

For example, device information on a typical embedded controller might include:

- Software versions
- Errors
- Controller information:

  - Name
  - Attached devices
  - Description
  - PCI bus
  - PCI device
  - PCI function

- Drive information:

  - Interface
  - WWID
  - Drive model
  - Serial number
  - Firmware revision
  - Total blocks

The SmartSSD Wear Gauge report contains information on the current usage level of and expected lifetime remaining for solid state drives attached to the system.

For discovered SSDs, the report summary page provides the following calculated totals:

- Total Solid State Drives with Wearout Status
- Total Smart Array Solid State Drives
- Total Non Smart Array Solid State Drives
- Total Solid State SAS Drives
- Total Solid State SATA Drives
- Total Solid State Drives

In addition to these totals, the summary page also displays the following tables:

- Solid State Drives with Wearout Status
- Solid State Drives with Less Than an Estimated 56 Days of Life Remaining
- Solid State Drives with Less Than 2% Usage Remaining
- Solid State Drives with Less Than 5% Usage Remaining
- Smart Array Controllers
- Non Smart Array Controllers

When the generated report is viewed in a browser, the report page displays the following fields in the SmartSSD Status table.

Field	Description
SSD Wear Status	Indicates the SSD's wear status with one of the following messages: • OK • Not Supported • The SmartSSD Wear Gauge log is full. Wear Gauge parameters are not available. • SSD has less than 5% usage remaining before wearout. • SSD has less than 2% usage remaining before wearout. • SSD has less than an estimated 56 days before it reaches the maximum usage limit for writes (wearout) and should be replaced as soon as possible. • SSD has less than 5% of usage remaining before wearout. It has less than an estimated 56 days before it reaches the maximum usage limit and should be replaced as soon as possible. • SSD has less than 2% of usage remaining before wearout. It has less than an estimated 56 days before it reaches the maximum usage limit and should be replaced as soon as possible. • SSD has reached the maximum rated usage limit for writes (wearout) and should be replaced immediately.
Power Cycles	Indicates the number of times the SSD has powered on from the powered off state
Power On Hours	Indicates the number of hours the SSD has been powered on
Estimated Life Remaining Based On Workload To Date	Indicates an estimate of the number of days the SSD has before SSD Utilization reaches 100%. This field is not displayed when the SSD Utilization is still at 0%.
Usage Remaining	Indicates the percentage of the SSD that has not worn out. Usage remaining is equal to the difference of 100 and the SSD Utilization percentage.
SSD Utilization	Indicates the percentage of the SSD that has worn out

Installing the utility

Procedure

1. Browse to the **HPE Smart Storage Administrator website**.
2. Click **Download software**.
3. Select an OS.
4. Identify the preferred software and version, and then click **Download**.
5. Save, and then run, the executable file.

   By default, the software installs at `C:\Program Files\HP System Tools\`.

Launching the utility in CLI mode

Procedure

1. Click **Start>All Programs>Windows System>Smart Storage Administrator Diagnostics Utility>Read Me**
2. Open a command prompt.
3. Change directory (cd) to the location where `ssaducli.exe` is installed.

   This directory is commonly C:\Program Files\Smart Storage Administrator\ssaducli\bin.
4. Do one of the following:

- Generate a diagnostic report with the following command:`ssaducli -f adu-report.zip`
- Generate a SmartSSD Wear Gauge report with the following command:`ssaducli -ssd -f ssd-report.zip`

For more options, use the following command:

```
ssaducli -help
```

Diagnostic report procedures

Viewing the diagnostic report

Procedure

1. **Launch the utility**.
2. Browse to the .zip file you created using the utility.
3. Open the HTML file to view the report.

Identifying and viewing diagnostic report files

The diagnostic report output archive contains the following files:

- `ADUReport.txt`—Diagnostic report in text format
- `ADUReport.xml`—Diagnostic report in XML format
- `ADUReportViewer.htm`—HTML viewer for XML diagnostic report
- `SlotX.txt (SlotX.old)`—Controller serial output log

  The serial output log file(s) are only available if the Smart Array SAS/SATA Event Notification Service is installed and running.

Procedure

1. Extract `ADUReportViewer.htm` to a directory.
2. Open `ADUReportViewer.htm` in the browser.

SmartSSD Wear Gauge report procedures

Viewing the SmartSSD Wear Gauge report

Procedure

1. **Launch the utility**.
2. Browse to the .zip file you created using the utility.
3. Open the HTML file to view the report.

Identifying and viewing SmartSSD Wear Gauge report files

The SmartSSD Wear Gauge report output archive contains the following files:

- `SmartSSDWearGaugeReport.txt`—SmartSSD wear gauge report in text format
- `SmartSSDWearGaugeReport.json`—SmartSSD wear gauge report in JSON format
- `SmartSSDWearGaugeReport.htm`—HTML viewer for the JSON wear gauge report

Procedure

1. Extract the following files to a single directory:

- `SmartSSDWearGaugeReport.json`
- `SmartSSDWearGaugeReport.htm`

2. Open `SmartSSDWearGaugeReport.htm` in the browser.

HPS report

The HPS reports are used to capture critical operation and configuration information from Windows server environments. The HPS report utility can be downloaded from the **Hewlett Packard Enterprise website**. To start the report, run the executable file and the utility will save a cab file in the C:\WINDOWS\HPSReports \Enhanced\Report directory.

Run this report before contacting **Hewlett Packard Enterprise technical support** and be prepared to send the cab file.

sosreport and supportconfig

To assist in possible LINUX installation issues on HPE ProLiant servers, capture either the sosreport or supportconfig before contacting **Hewlett Packard Enterprise Support**.

Resources for troubleshooting

Online resources

Hewlett Packard Enterprise Support Center website

Troubleshooting tools and information, as well as the latest drivers and flash ROM images, are available on the **Hewlett Packard Enterprise website**.

Hewlett Packard Enterprise Information Library

HPE ProLiant Server documentation is available in the **Hewlett Packard Enterprise Information Library**.

Troubleshooting resources for previous HPE ProLiant server models

The HPE ProLiant Servers Troubleshooting Guide provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, error message interpretation, issue resolution, and software maintenance on ProLiant servers and server blade models prior to Gen8. This guide includes problem-specific flowcharts to help you navigate complex troubleshooting processes. To view the guide, select a language:

- **English**
- **French**
- **Italian**
- **Spanish**
- **German**
- **Dutch**
- **Japanese**

Server blade enclosure troubleshooting resources

The *HPE BladeSystem c-Class Enclosure Troubleshooting Guide* provides procedures and solutions for troubleshooting an HPE BladeSystem c-Class enclosure, from using the Insight Display to more complex component-level troubleshooting. For more information, see the **Hewlett Packard Enterprise website**.

Troubleshooting resources

Troubleshooting resources are available for HPE Gen10 server products in the following documents:

- *Troubleshooting Guide for HPE ProLiant Gen10 servers* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance.
- *Error Message Guide for HPE ProLiant Gen10 servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.
- *Integrated Management Log Messages and Troubleshooting Guide for HPE ProLiant Gen 10 and HPE Synergy* provides IML messages and associated troubleshooting information to resolve critical and cautionary IML events.

To access the troubleshooting resources, see the Hewlett Packard Enterprise Information Library (**http://www.hpe.com/info/gen10-troubleshooting**).

Server documentation

Each server has a number of product-specific documents that include setup, installation, maintenance, service, and cabling information. The server documentation can be accessed from the following locations:

- Product specific information library — See the Start Here document that ships with the server.
- **Hewlett Packard Enterprise Information Library** — Select the product to narrow the list to fewer documents.
- **Hewlett Packard Enterprise Support Center website**

Server user guide

The server user guide provides component and LED identification, server setup, cable routing, software, hardware options installation, and server specification information.

Server documentation can be accessed from the following locations:

- Product specific information library — See the Start Here document that ships with the server.
- **Hewlett Packard Enterprise Information Library** — Select the product to narrow the list to fewer documents.
- **Hewlett Packard Enterprise Support Center website**

Server maintenance and service guide

The server maintenance and service guide provides a list of server spare parts, server spare parts removal and replacement, cable routing, component and LED identification, and server specification information.

Server documentation can be accessed from the following locations:

- Product-specific information library — See the Start Here document that ships with the server.
- **Hewlett Packard Enterprise Information Library** — Select the product to narrow the list to fewer documents.
- **Hewlett Packard Enterprise Support Center website**

Setup and installation guide

The setup and installation guide provides information for planning the installation, component and LED identification, installation, cable routing, and configuration information for a system that normally includes a chassis or enclosure and one or more server.

Product documentation can be accessed from the following locations:

- Product specific information library — See the Start Here document that ships with the server.
- **Hewlett Packard Enterprise Information Library** — Select the product to narrow the list to fewer documents.
- **Hewlett Packard Enterprise Support Center website**

HPE iLO software documentation

For more information about iLO, see the HPE iLO user guide on the **Hewlett Packard Enterprise website**.

UEFI System Utilities documentation

For more information about UEFI System Utilities, see the UEFI System Utilities user guide on the **Hewlett Packard Enterprise website**. This user guide provides information on many topics and includes the following:

- Using the System Configuration menu options
- Using the iLO 4 Configuration utility
- Viewing Smart Array Controller information
- Viewing and configuring NIC and FCoE settings
- Using the One-Time Boot Menu
- Troubleshooting

Intelligent Provisioning software documentation

For more information about Intelligent Provisioning, see the Intelligent Provisioning user guide on the **Hewlett Packard Enterprise website**. This user guide provides information on server configuration and OS installation, performing maintenance tasks, troubleshooting, and other advanced topics.

System Management Homepage software documentation

The SMH is a web-based interface that consolidates and simplifies the management of ProLiant servers running Windows or Linux. For more information about the SMH, see the SMH documentation on the **Hewlett Packard Enterprise website**.

To access the System Management homepage of a server, go to **https://localhost:2381**.

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

White papers

White papers are electronic documentation on complex technical topics. Some white papers contain in-depth details and procedures. Topics include Hewlett Packard Enterprise products, Hewlett Packard Enterprise technology, OS, networking products, and performance. See one of the following websites:

- **Hewlett Packard Enterprise Support Center**
- **Hewlett Packard Enterprise Information Library**

Service notifications, advisories, and notices

To search for service notifications, see the **Hewlett Packard Enterprise Support Center**. Enter the product name or number, and then click **Go**. Select **Top Issues and Solutions**, and then **Advisories Bulletins and Notices**. The complete list of documents is displayed.

Subscription services

Receive support alerts, product support communications, driver updates, software releases, firmware updates, and customer replaceable component information in your email by signing up on the **Hewlett Packard Enterprise website**.

To change options for support alerts you already receive, click the link to sign in on the right.

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- Big data and mobility requirements
- Improving data center infrastructure
- Better use of server, storage, and networking technology

For more information, see the Hewlett Packard Enterprise website:

Product information resources

Additional product information

Refer to product information on the **Hewlett Packard Enterprise Servers website**.

HPE Smart Memory speed information

For more information about memory speed information, see the Hewlett Packard Enterprise website (**https://www.hpe.com/docs/memory-speed-table**).

Registering the server

To experience quicker service and more efficient support, register the product at the **Hewlett Packard Enterprise Product Registration website**.

Overview of server features and installation instructions

For server features, see the Product QuickSpecs on the **Hewlett Packard Enterprise website**.

For installation instructions, see the server user guide available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Key features, option part numbers

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

Server and option specifications, symbols, installation warnings, and notices

See the printed notices, available in the Reference Information pack.

See the server documentation, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

HPE Smart Array controller documentation

For more information about HPE Smart Array controllers, see the documentation on the **Hewlett Packard Enterprise website**.

Spare part numbers

Hewlett Packard Enterprise continually improves and changes product parts. For complete and current supported spare parts information, see the Hewlett Packard Enterprise PartSurfer website:

- Desktop: **http://www.hpe.com/info/partsurfer**
- Mobile: **http://partsurfermobile.ext.hpe.com**

Teardown procedures, part numbers, specifications

See the server maintenance and service guide, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Teardown or removal and replacement procedure videos

For more information about removal and replacement procedures for HPE ProLiant servers, see the **Hewlett Packard Enterprise website**.

Technical topics

White papers are electronic documentation on complex technical topics. Some white papers contain in-depth details and procedures. Topics include Hewlett Packard Enterprise products, Hewlett Packard Enterprise technology, OS, networking products, and performance. See one of the following websites:

- **Hewlett Packard Enterprise Support Center**
- **Hewlett Packard Enterprise Information Library**

Product installation resources

External cabling information

See the cabling information on the **Hewlett Packard Enterprise website**.

Power capacity

For all HPE ProLiant Gen9 servers, see the HPE Power Advisor on the **Hewlett Packard Enterprise website**.

Switch settings, LED functions, drive, memory, expansion board and processor installation instructions, and board layouts

See the access panel labels and the server user guide. The access panel labels are located on the server, and the server user guide is available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Product configuration resources

Device driver information

See the device driver information on the **Hewlett Packard Enterprise website**.

DDR4 memory configuration

Locate the DDR4 Smart Memory Configurator on the **Hewlett Packard Enterprise website**.

Operating System Version Support

For information about specific versions of a supported operating system, refer to the **operating system support matrix**.

Operating system installation and configuration information (for factory-installed operating systems)

Refer to the factory-installed operating system installation documentation that ships with the server.

Server configuration information

See the server user guide or setup and installation guide, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Installation and configuration information for the server setup software

See the server user guide or setup and installation guide, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Software installation and configuration of the server

See the server user guide or setup and installation guide, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

HPE iLO information

For all HPE iLO documentation, see the **Hewlett Packard Enterprise website**.

Management of the server

See the *HPE Systems Insight Manager Help Guide* in the **Hewlett Packard Enterprise Information Library**.

Installation and configuration information for the server management system

See the *HPE Systems Insight Manager Installation and User Guide* on the **Hewlett Packard Enterprise Information Library**.

Fault tolerance, security, care and maintenance, configuration and setup

See the server documentation, available in the following locations:

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center website**

Websites

General websites

Hewlett Packard Enterprise Information Library

www.hpe.com/info/EIL

Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix

www.hpe.com/storage/spock

Storage white papers and analyst reports

www.hpe.com/storage/whitepapers

For additional websites, see **Support and other resources**.

Support and other resources

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  http://www.hpe.com/assistance
- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  http://www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs
- Add-on products or components
- Third-party products or components

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates:

  Hewlett Packard Enterprise Support Center
  > **www.hpe.com/support/hpesc**

  Hewlett Packard Enterprise Support Center: Software downloads
  > **www.hpe.com/support/downloads**

  Software Depot
  > **www.hpe.com/support/softwaredepot**
- To subscribe to eNewsletters and alerts:

  www.hpe.com/support/e-updates
- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  www.hpe.com/support/AccessToSupportMaterials

  (!) **IMPORTANT:**

  Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience.

Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

http://www.hpe.com/support/selfrepair

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which will initiate a fast and accurate resolution based on your product's service level. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

If your product includes additional remote support details, use search to locate that information.

Remote support and Proactive Care information

> **HPE Get Connected**
>> **www.hpe.com/services/getconnected**
> **HPE Proactive Care services**
>> **www.hpe.com/services/proactivecare**
> **HPE Proactive Care service: Supported products list**
>> **www.hpe.com/services/proactivecaresupportedproducts**
> **HPE Proactive Care advanced service: Supported products list**
>> **www.hpe.com/services/proactivecareadvancedsupportedproducts**

Proactive Care customer information

> **Proactive Care central**
>> **www.hpe.com/services/proactivecarecentral**
> **Proactive Care service activation**
>> **www.hpe.com/services/proactivecarecentralgetstarted**

Warranty information

To view the warranty for your product or to view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products* reference document, go to the Enterprise Safety and Compliance website:

www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional warranty information

> **HPE ProLiant and x86 Servers and Options**
>> **www.hpe.com/support/ProLiantServers-Warranties**
> **HPE Enterprise Servers**
>> **www.hpe.com/support/EnterpriseServers-Warranties**
> **HPE Storage Products**
>> **www.hpe.com/support/Storage-Warranties**
> **HPE Networking Products**
>> **www.hpe.com/support/Networking-Warranties**

Regulatory information

To view the regulatory information for your product, view the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products*, available at the Hewlett Packard Enterprise Support Center:

www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

www.hpe.com/info/environment

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (**docsfeedback@hpe.com**). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.