Qumulo-Certified Hardware Guide Document History

The following table lists changes to the Qumulo-Certified Hardware Guide.

Date	Documentation Update
May 26, 2022	Created the Qumulo-Certified Hardware Guide and added guides for the following platforms: • HPE Apollo 4200 Gen9 • HPE Apollo 4200 Gen10 • HPE ProLiant DL325 Gen10 Plus

Getting Started with Qumulo on HPE Apollo 4200 Gen9

Summary: This section explains how to prepare HPE Apollo 4200 Gen9 nodes for creating a Qumulo Core cluster.

This section explains how to prepare HPE Apollo 4200 Gen9 nodes for creating a Qumulo Core cluster. This guide is for system administrators, professional service providers, and colleagues in your organization who are responsible for installing and configuring server hardware. For more information, see HPE Apollo 4200 Gen9 - Server Document List .

Prerequisites

Qumulo Core USB Drive Installer

Step 1: Verify Your Node

1. Shut down your node and connect a display, a keyboard, and a mouse to it.
2. Plug the Qumulo Core USB Drive Installer into an available USB port on the node and then press the power button.

3. On the **HPE ProLiant** boot screen, do one of the following:
    - If the **Boot Mode: Legacy BIOS** message appears, skip the rest of this section and continue to boot by using the Qumulo Core USB Drive Installer (page 3).
    - If the **Boot Mode: Legacy BIOS** message doesn't appear, press **F9**.
4. On the **System Utilities** page, click **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options**.
5. On the **Boot Options** page, set **Boot Mode** to **Legacy BIOS Mode** and then press **F10**.
6. Press **Esc** until you return to the main page.
7. Click **Reboot the System**.

Step 2: Boot by Using the Qumulo Core USB Drive Installer

> **Caution**
> If your node contains any live data, *don't* run the FVT.

1. On the **HPE ProLiant** boot screen, press **F11**.

   > **Note**
   > The **Boot Menu** page might take a few minutes to appear.

2. On the **Boot Menu** page, to boot into the **Legacy BIOS One-Time Boot Menu**, press **Enter**.
3. In the blue dialog box, to confirm, press **Enter**.
4. From the **Default Boot Override Options** menu, select **2) One Time Boot to USB DriveKey**.

   Wait for Qumulo Installer to load.

5. Select **[1] Factory reset (DESTROYS ALL DATA)** and when prompted type `DESTROY ALL DATA`.

   The platform name and SmartArray mode appear.

6. Configure the encryption on your node.

   - If the SmartArray mode is **Secure**, **RAID**, or **Encrypted**, select **2) no, continue install in Non-Secure mode**.
   - If the SmartArray mode is **Not Secure**, **HBA**, or **Unencrypted**, do the following:

     a. Select **1) SET ENCRYPTION, set SmartArrays in RAID mode, destroy all data, reboot node**.

     b. After the node reboots, select **1) CONFIGURE ENCRYPTION, Set up encryption, input new keys**.

     The rules for the cryptographic login password and master key appear.

     > **Caution**
     > To avoid data loss, save your credentials.

Step 3: Run the Field Verification Tool (FVT)

1. Select **1) FVT, Enter FVT sub menu**.

2. To update the node components to required versions, choose **1) FLASH, Flash components to required versions**.
3. Do one of the following:
    - If the FVT verification passes, select **2) no, return to menu, run FVT to continue install**.
    - If the FVT flashes firmware, select **1) REBOOT, reboot node in 5 seconds** and the continue from step 2.

Step 4: Install Qumulo Core by Using the USB Drive Installer

Perform the following steps on every node in your cluster.

1. In the FVT, select **2) no, continue install**.

   When the installation is complete, the node shuts down automatically.
2. Remove the USB drive and power on the node.

Step 5: Create and Configure Your Cluster

1. Review the **End User Agreement**, click **I agree to the End User Agreement**, and then click **Submit**.
2. Name your cluster.
3. On the **1. Set up cluster** page, select the nodes to add to your cluster.

   As you select nodes, the installer updates the total capacity of your cluster at the bottom of the page.

   > **Note**
   > If any nodes are missing, confirm that they are powered on and connected to the same network.

4. On the **2. Confirm cluster protection level** page, Qumulo Core selects the recommended 2- or 3-drive protection level based on your cluster size and node type.
5. If the **Customize Protection Level** option appears, you can increase your system resilience by selecting 3-drive protection.

   > **Important**
   > - The option for selecting the drive protection level is available only at cluster

creation time. You can't change it later.

- Using 3-drive protection reduces the total capacity of your cluster.

6. Enter a password for the administrative account and click **Create Cluster**.
7. To access the Qumulo Core Web UI, connect to any node by entering its IP address into a web browser. For more information, see Qumulo Core Web UI Browser Compatibility in Qumulo Care.

For more information about configuring your cluster configuration and getting started with Qumulo Core, see Qumulo Installation FAQ in Qumulo Care.

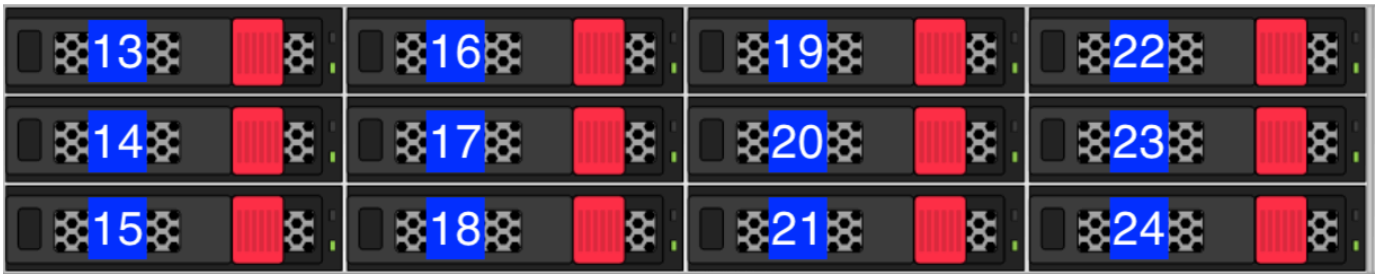
Front and Rear Drive Locations on HPE Apollo 4200 Gen9 Nodes

Summary: This section explains the front and rear drive locations in your HPE Apollo 4200 Gen9 node.

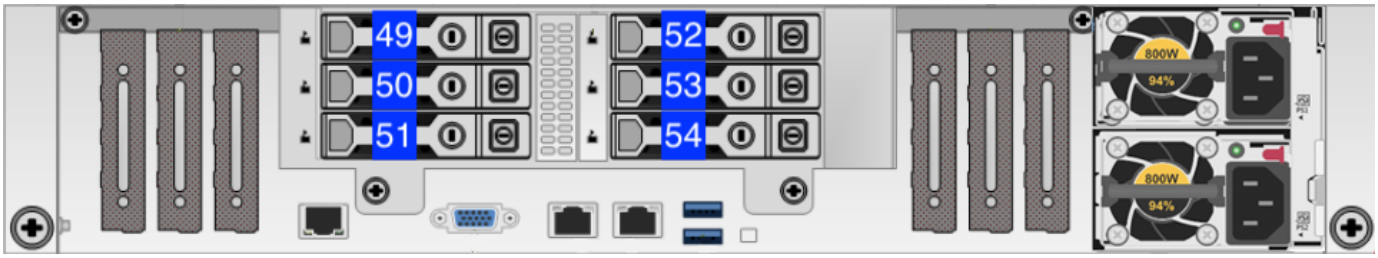
This section shows the front large form factor (LFF) and rear small form factor (SFF) drive locations in your HPE Apollo 4200 Gen9 node. For more information, see HPE Apollo 4200 Gen9 Server - Document List .

Front LFF Drive Row

Second LFF Drive Row



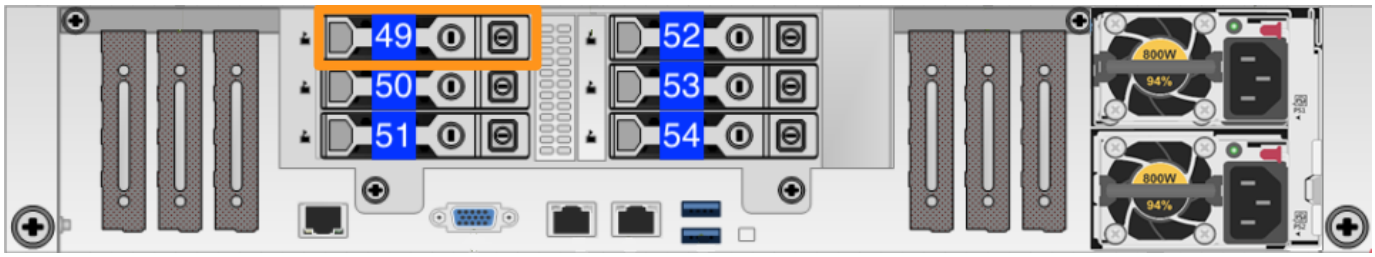
Rear SFF Hot-Plug Drives



Boot Drive

> **⚠ Important**
> Before you remove the boot drive, contact the Qumulo Care Team for additional instructions.

The following diagram shows the boot drive in 90T, 180T, and 288T nodes.



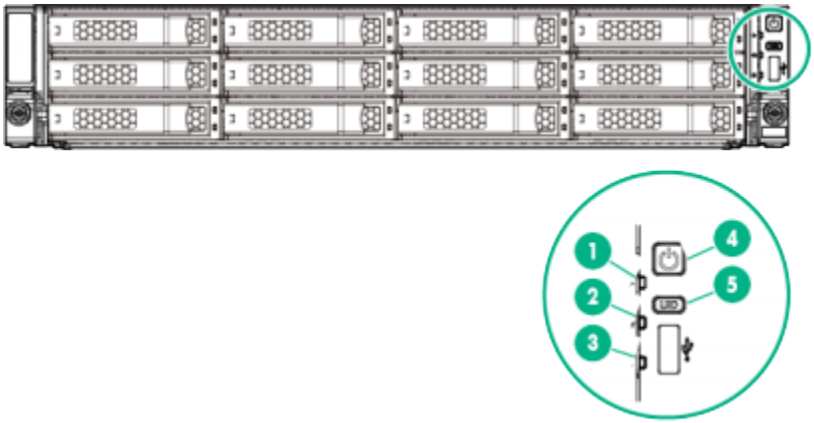
Panel LEDs on HPE Apollo 4200 Gen9 Nodes

Summary: This section explains the LEDs of your HPE Apollo 4200 Gen9 node.

This section explains the LEDs of your HPE Apollo 4200 Gen9 node, including front panel LEDs and buttons, power fault LEDs, and rear panel LEDs. You can use these LEDs to diagnose hardware health issues. For more information, see HPE Apollo 4200 Gen9 Server - Document List .

Front Panel LEDs and Buttons

To locate the front panel LEDs, use the following diagram.



1. Health LED
    - 🟢 **Solid Green:** Normal
    - 🟢 **Flashing Green:** (1 flash per second) iLO is rebooting
    - 🟠 **Flashing Amber:** System degraded
    - 🔴 **Flashing Red:** (1 flash per second) System critical

    > **Note**
    > If the Health LED indicates a degraded or critical state, review the system integrated management log (IML) or use iLO to review the system health status.

2. NIC Status LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** (1 flash per second) Network active
    - **Off:** No network activity
3. Front Drive Health or Thermal LED

- 🟢 **Solid Green:** Drives which the SAS expander supports are functional. This applies to all front drives and the rear drives connected to the front drive cage 2 backplane.
- 🟠 **Solid Amber:** Failure or predictive failure of one or more drives that the SAS expander supports. This applies to all front drives and to the rear drives connected to the front drive cage 2 backplane.
- 🟠 **Flashing Amber:** (1 flash per second) The temperature sensor in one or more front drives is about to reach the thermal threshold. You must immediately slide the front drive cages back into the chassis and keep them there until the LED turns green.

  > ℹ Note
  > This LED behavior depends on the iLO 08-HD Max sensor reading.

- **Off:** No power present

4. Power On or Standby Button and System Power LED
   - 🟢 **Solid Green:** System on
   - 🟢 **Flashing Green:** (1 flash per second) Performing power-on sequence
   - 🟠 **Solid Amber:** System in standby mode
   - **Off:** No power present
5. UID Button and LED
   - 🔵 **Solid Blue:** Activated
   - 🔵 **Flashing Blue:**
     - 1 flash per second: Remote management or firmware upgrade in progress
     - 4 flashes per second: iLO manual reboot sequence initiated
     - 8 flashes per second: iLO manual reboot sequence in progress
   - **Off:** Deactivated

> ℹ Note
> If the (3) Front Drive Health or Thermal LED, or the (4) Power On or Standby Button and System Power LED is off, one of the following conditions is possible:
>
> - Facility power not present
> - Power cord detached

- No power supplies installed
- Power supply failure
- Front I/O cable disconnected

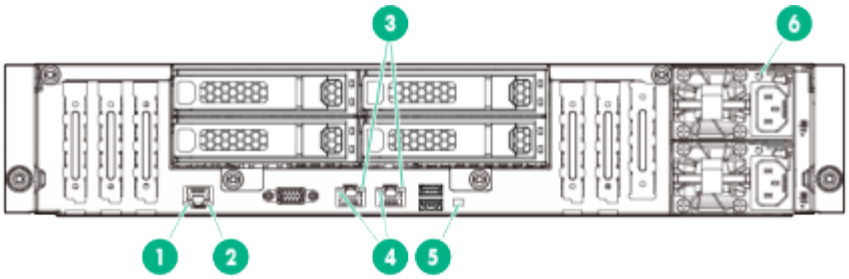
Power Fault LEDs

If the (1) Health LED, (2) NIC status LED, (4) Power On and Standby button, and (4) System Power LED, and the (5) UID Button and LED (5) flash simultaneously, a power fault has occurred. The following table lists the LED behavior corresponding to affected subsystems.

Number of LED Flashes	Affected Subsystem
1	System board
2	Processor
3	Memory
4	Riser board PCIe slots
5	FlexibleLOM
6	Removable HPE Flexible Smart Array controller or Smart SAS HBA controller
7	System board PCIe slots
8	Power backplane or storage backplane
9	Power supply

Rear Panel LEDs

To locate the rear panel LEDs, use the following diagram.



1. Dedicated iLO Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
2. Dedicated iLO Link LED
    - 🟢 **Green:** Network link
    - **Off:** No network link
3. NIC Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
4. NIC Link LED
    - 🟢 **Green:** Network link
    - **Off:** No network link
5. UID LED
    - 🔵 **Solid Blue:** Activated
    - 🔵 **Flashing Blue:**
        - 1 flash per second: Remote management or firmware upgrade in progress
        - 4 flashes per second: iLO manual reboot sequence initiated
        - 8 flashes per second: iLO manual reboot sequence in progress
    - **Off:** Deactivated
6. Power Supply LED
    - 🟢 **Solid Green:** Normal
    - **Off:** One or more of the following conditions exist:

- Power unavailable
- Power supply failed
- Power supply in standby mode
- Power supply error

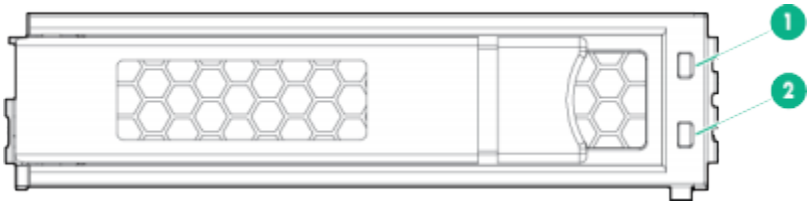
Drive LEDs on HPE Apollo 4200 Gen9 Nodes

Summary: This section explains the drive LEDs in HPE Apollo 4200 Gen9 nodes.

This section explains the LEDs of large form factor (LFF) and small form factor (SFF) drives in your HPE Apollo 4200 Gen9 node. For more information, see HPE Apollo 4200 Gen9 Server - Document List .

Large Form Factor (LFF) Drive LEDs

To locate the LFF drive LEDs, use the following diagram.



You can determine the current state of an LFF drive by reviewing the status of the following LEDs:

1. Fault or UID LED
   - 🟠 Amber
   - 🔵 Blue
2. Online or Activity LED
   - 🟢 Green

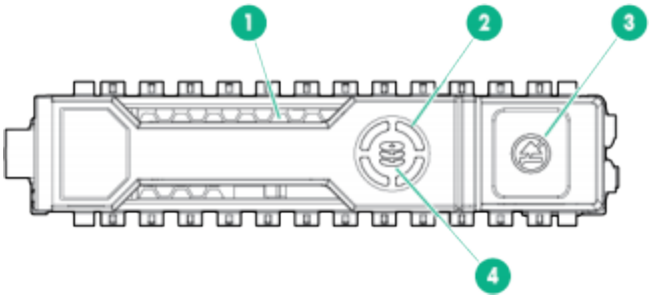
The following table explains the various combinations of the two LFF LEDs.

Online or Activity LED	Fault or UID LED	Description
On, off, or flashing	Alternating amber and blue	One or more of the following conditions exist: • The drive has failed. • This system received a predictive failure alert about the drive. • A management application has selected the drive.

Online or Activity LED	Fault or UID LED	Description
On, off, or flashing	Solid blue	One or more of the following conditions exist: • The drive is operating normally. • A management application has selected the drive.
On	Flashing amber	This system received a predictive failure alert about the drive. Replace the drive as soon as possible.
On	Off	The drive is online but isn't active currently.
1 flash per second	Flashing amber	Don't 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. However, the system received a predictive failure alert about the drive. To minimize the risk of data loss, don't remove the drive until the expansion or migration is complete.
1 flash per second	Off	Don't 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 it received a predictive failure alert. Replace the drive as soon as possible.
4 flashes per second	Off	The drive is active and is operating normally.
Off	Solid amber	The drive has a critical fault condition and the controller has placed it offline. Replace the drive as soon as possible.
Off	Flashing amber	This system received a predictive failure alert about the drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or isn't configured as part of an array.

Small Form Factor (SFF) Drive LEDs

To locate the SFF drive LEDs, use the following diagram.



1. Locate LED
    - 🔵 **Solid Blue:** A host application is identifying the drive.
    - 🔵 **Flashing Blue:** The drive carrier firmware is updating or requires an update.

    > **Note**
    > The Locate LED is behind the release lever. When it is illuminated, it is visible.

2. Activity Ring LED
    - 🟢 **Rotating Green:** Drive activity
    - **Off:** No drive activity
3. Do Not Remove LED
    - ⚬ **Solid White:** Don't remove the drive. Removing the drive causes one or more of the logical drives to fail.
    - **Off:** Removing the drive doesn't cause a logical drive to fail.
4. Drive Status LED
    - 🟢 **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 and Green:** The drive is a member of one or more logical drives and predicts drive failure.
    - 🟠 **Flashing Amber:** The drive isn't configured and predicts drive failure.
    - 🟠 **Solid Amber:** The drive has failed.
    - **Off:** A RAID controller hasn't configured the drive.

Configuring and Using Integrated Lights Out (iLO) on HPE Apollo 4200 Gen9 Nodes

Summary: This section explains how to configure and use Integrated Lights Out (iLO) on HPE Apollo 4200 Gen9 nodes.

This section explains how to configure and use Integrated Lights Out (iLO) on HPE Apollo 4200 Gen9 nodes.

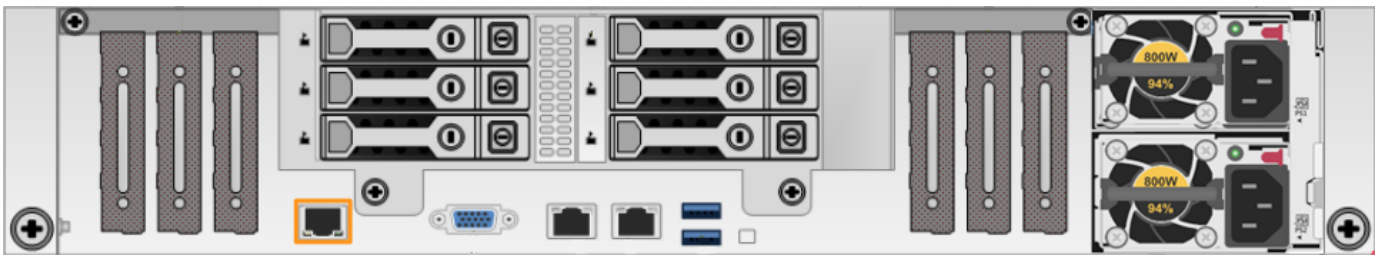
> ⚠ Important
> Access to the iLO port on a public LAN can have serious security implications because it can grant anyone with credentials direct access to your server's hardware and console. Follow security best practices when implementing iLO access.

Prerequisites

To configure the iLO port, you must have root access to the client-facing network through SSH. For example, you can use the `sudo -s` command.

How the iLO Port Works

HPE Apollo 4200 Gen9 nodes provide iLO support for out-of-band maintenance access even when the node is plugged in but powered off. The following diagram shows the location of the iLO port.



Your nodes receive DHCP address assignments by default. When you configure a node's iLO port, you can access the node by using the IP address (that the DHCP server assigns to the node) and a web browser that supports HTML5, Java, and .NET

> ⚠ Important
> We strongly recommend separating your iLO access network from your client-facing network

To access iLO configuration from the BIOS System Utilities menu, press **F9**. The default iLO username is `Administrator`. The password is printed on top of your node chassis.

> **Note**
> The IMPI username and password are unrelated to your Qumulo administrative credentials.

iLO Configuration Commands

Use the following commands to configure the iLO port on your nodes.

To Verify iLO LAN Configuration

```
# ipmitool lan print 2
```

To Configure iLO LAN by Using Static IP Addresses

1. Set the iLO Ethernet interface to a static IP address.

   ```
   # ipmitool lan set 2 ipsrc static
   ```

2. Set the interface IP address. For example:

   ```
   # ipmitool lan set 2 ipaddr 203.0.113.0
   ```

3. Set the interface subnet mask. For example:

   ```
   # ipmitool lan set 2 netmask 255.0.0.1
   ```

4. Set the default gateway IP address. For example:

   ```
   # ipmitool lan set 2 defgw ipaddr 192.168.0.1
   ```

5. (Optional) Enable baseboard management controller (BMC) Address Resolution Protocol (ARP) responses.

```
# ipmitool lan set 2 arp respond on
```

To List Current Users

```
# ipmitool user list 2
ID Name Callin Link Auth IPMI Msg Channel Priv Limit
1 false false true ADMINISTRATOR
2 root false true true ADMINISTRATOR
```

To Change the Default Administrator Password

```
# ipmitool user set password 2
Password for user 2:
Password for user 2:
```

To Create a New User

In the following example, we create the administrative user `netadmin` in user slot `4`.

```
# ipmitool user set name 4 netadmin
# ipmitool user set password 4
Password for user 4:
Password for user 4:
```

To Configure User Access

```
# ipmitool channel setaccess 2 4 link=on ipmi=on callin=on privilege=4
# ipmitool user enable 4
```

To Verify User Access Level

```
# ipmitool channel getaccess 2 4
Maximum User IDs : 10
Enabled User IDs : 4

User ID : 4
User Name : ADMIN
Fixed Name : No
Access Available : call-in / callback
Link Authentication : disabled
IPMI Messaging : enabled
Privilege Level : ADMINISTRATOR
```

To Reset the Baseboard Management Controller

If you can’t connect to the iLO management console and your network configuration is correct, reset the BMC through an SSH or KVM Console session for the affected node.

```
# ipmitool bmc reset cold
```

Networking Your HPE Apollo 4200 Gen9 Cluster

Summary: This section explains how to network your HPE Apollo 4200 Gen9 cluster.

This section explains how to network your HPE Apollo 4200 Gen9 cluster.

Prerequisites

- A network switch with the following criteria:
  - 40 Gbps Ethernet connection
  - Fully non-blocking architecture
  - IPv6 compatibility
- Compatible network cables
- A sufficient number of ports for connecting all nodes to the same switch fabric
- One static IP per node, per defined VLAN

> **⚠ Important**
> Before you connect any Qumulo-supported equipment to your network, we strongly recommend consulting with your network engineering team.

Recommended Configuration

- Two redundant switches
- One physical connection to each redundant switch, per node
- One Link Aggregation Control Protocol (LACP) port-channel per node with the following configuration:
  - Active mode
  - Slow transmit rate
  - Trunk port with a native VLAN
  - Enabled IEEE 802.3x flow control (full-duplex mode)
- DNS servers
- Network Time Protocol (NTP) server
- Firewall protocol or ports configured for Qumulo Care Proactive Monitoring

- Where N is the number of nodes, up to 10 N-1 floating IP addresses per node, per client-facing VLAN

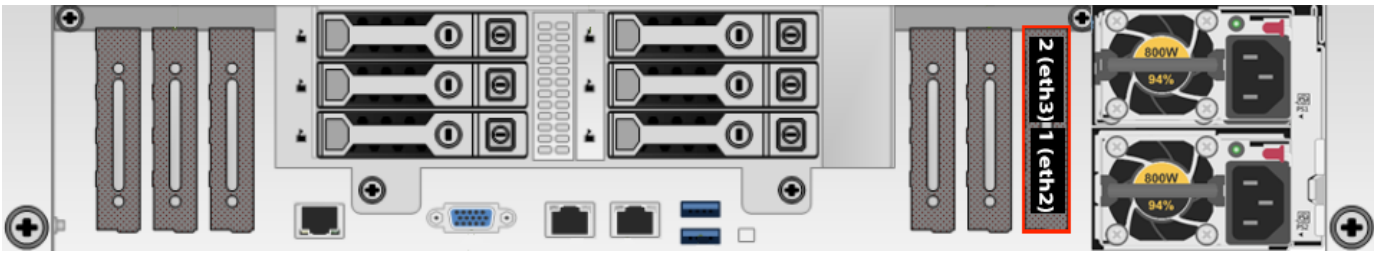
  > **Note**
  > The number of floating IP addresses depends on your workflow and on the clients that connect to the cluster, with a minimum of two floating IP addresses per node, per client-facing VLAN, but with no more than ten floating IP addresses per node, per client-facing VLAN—or 70 floating IP addresses per namespace.

- Nodes connected at their maximum Ethernet speed (this ensures advertised performance). To avoid network bottlenecks, Qumulo validates system performance with this configuration by using clients connected at the same link speed and to the same switch as the nodes.

Node NICs and Ports

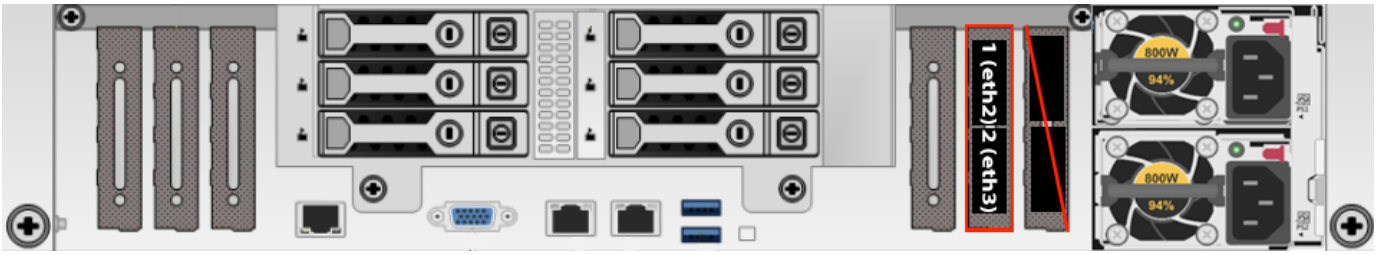
The following diagrams show the NICs and ports on HPE Apollo 4200 Gen9 nodes.

90T NIC1 Ports

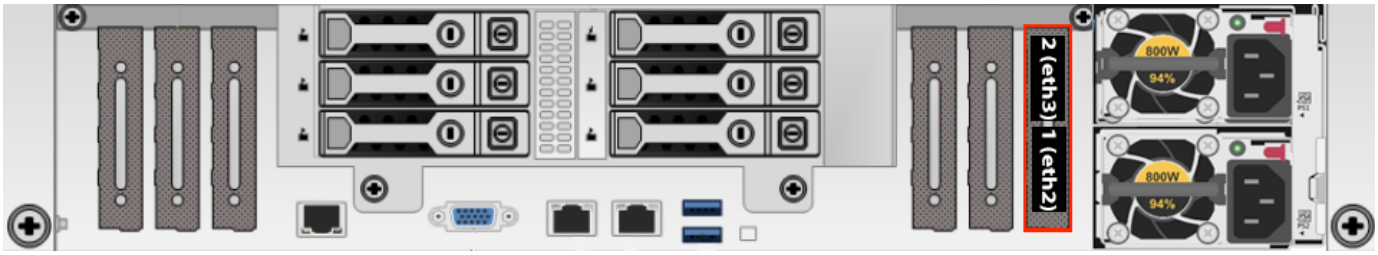


180T NIC1 Ports

> **Note**
> Currently, NIC2 on this model is unused.

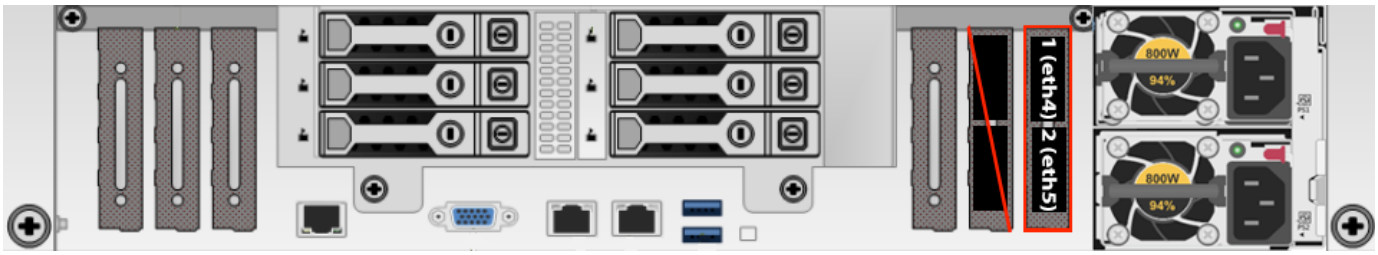


288T NIC1 Ports (Single)



288T NIC1 Ports (Dual)

> **Note**
> Currently, NIC2 on this model is unused.



Connecting to Redundant Switches

This section explains how to connect a four-node HPE cluster to dual switches for redundancy. We recommend this configuration for HPE hardware. If either switch becomes inoperative, the cluster remains accessible through the remaining switch.

- Connect the two 40 Gbps ports on the nodes to separate switches.
- Use at least one port on both switches as an uplink to the client network. To ensure an acceptable level of physical network redundancy and to meet the necessary client access throughput rates, use an appropriate combination of 10 Gbps, 25 Gbps, 40 Gbps, or 100 Gbps network uplinks.
- Use at least one peer link between the switches.

Connecting to a Single Switch

This section explains how to connect a four-node HPE cluster to a single switch.

> **Note**
> If the switch becomes inoperative, the cluster becomes inaccessible.

- Connect two 40 Gbps ports to the switch.
- Connect any uplink ports to the client network.

Getting Started with Qumulo on HPE Apollo 4200 Gen10

Summary: This section explains how to prepare HPE Apollo 4200 Gen10 nodes for creating a Qumulo Core cluster.

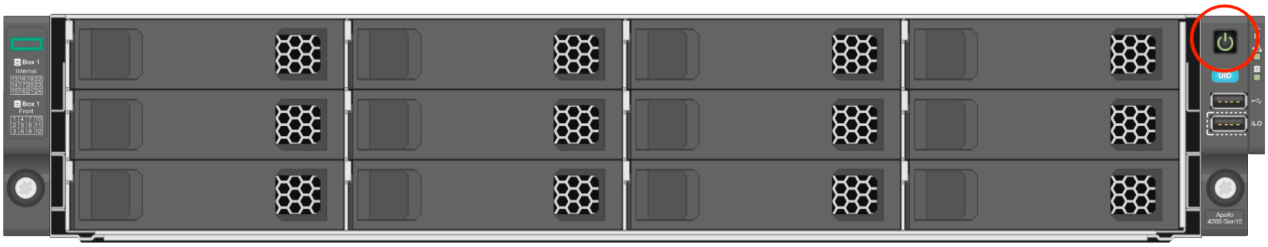
This section explains how to prepare HPE Apollo 4200 Gen10 nodes for creating a Qumulo Core cluster. This guide is for system administrators, professional service providers, and colleagues in your organization who are responsible for installing and configuring server hardware. For more information, see HPE Apollo 4200 Gen10 Server - Document List .

Prerequisites

Qumulo Core USB Drive Installer

Step 1: Verify Your Node

1. Shut down your node and connect a display, a keyboard, and a mouse to it.
2. Plug the Qumulo Core USB Drive Installer into an available USB port on the node and then press the power button.



3. On the **HPE ProLiant** boot screen, do one of the following:
   - If the **Boot Mode: Legacy BIOS** message appears, skip the rest of this section and continue to boot by using the Qumulo Core USB Drive Installer (page 25).
   - If the **Boot Mode: Legacy BIOS** message doesn't appear, press **F9**.
4. On the **System Utilities** page, click **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options**.
5. On the **Boot Options** page, set **Boot Mode** to **Legacy BIOS Mode** and then press **F10**.
6. Press **Esc** until you return to the main page.
7. Click **Reboot the System**.

Step 2: Boot by Using the Qumulo Core USB Drive Installer

1. On the **HPE ProLiant** boot screen, press **F11**.

   > **Note**
   > The **Boot Menu** page might take a few minutes to appear.

2. On the **Boot Menu** page, to boot into the **Legacy BIOS One-Time Boot Menu**, press **Enter**.
3. In the blue dialog box, to confirm, press **Enter**.
4. From the **Default Boot Override Options** menu, select **2) One Time Boot to USB DriveKey**.

Step 3: Run the Field Verification Tool (FVT)

After the node reboots, the Field Verification Tool runs automatically.

Select **[1] Factory reset (DESTROYS ALL DATA)** and then enter `DESTROY ALL DATA`.

Fixable Issues During Installation

If the FVT finds fixable issues, it prompts you to auto-correct any detected issues, depending on your installation scenario. Issues that the FVT can auto-correct include the following:

- BIOS Configuration
- Drive firmware
- Drive controller firmware
- NIC mode for CX5
- Boot order

1. To attempt auto-correction, select **[1] Run FVT Flash. This will try to fix issues then reboot.**

   If the fixes are successful, the FVT reboots the node automatically.

2. To re-attempt verification, boot by using the Qumulo Core USB Drive Installer (page 25) and then continue the installation.

Non-Fixable Issues

If the FVT is unable to auto-correct any issues, the message **Not fixable issues were detected.** appears, providing reasons for failure.

For help with troubleshooting your node, contact Qumulo Care .

Step 4: Install Qumulo Core by Using the USB Drive Installer

> **Caution**
> Store your master key in a secure location. If you lose your master key, you might not be able to recover your data from certain hardware failures.

Perform the following steps on every node in your cluster.

1. Do one of the following:
    - Choose **[1] Install Qumulo Core without HPE Hardware encryption**
    - Choose **[2] Install Qumulo Core with HPE Hardware encryption**.
2. If you install Qumulo Core with encryption, enter your cryptographic login password and master encryption key.

    > **Note**
    > - Your login password must be 8-16 characters long and must contain at least:
    >   - One uppercase character
    >   - One lowercase character
    >   - One numeric character
    >   - One symbol (such as # or $)
    > - Your encryption master key must be 10-32 characters long.
    > - Both your login password and encryption master key:
    >   - Can use uppercase and lowercase letters, numbers, and symbols
    >   - Must use only ASCII characters
    >   - Must not use spaces, semicolons (;), or quotation marks (")
    > - Store your master key in a secure location for the lifetime of the cluster.

Step 5: Create and Configure Your Cluster

1. Review the **End User Agreement**, click **I agree to the End User Agreement**, and then click **Submit**.
2. Name your cluster.

3. On the **1. Set up cluster** page, select the nodes to add to your cluster.

   As you select nodes, the installer updates the total capacity of your cluster at the bottom of the page.

   > **Note**
   > If any nodes are missing, confirm that they are powered on and connected to the same network.

4. On the **2. Confirm cluster protection level** page, Qumulo Core selects the recommended 2- or 3-drive protection level based on your cluster size and node type.
5. If the **Customize Protection Level** option appears, you can increase your system resilience by selecting 3-drive protection.

   > **Important**
   >
   > - The option for selecting the drive protection level is available only at cluster creation time. You can't change it later.
   > - Using 3-drive protection reduces the total capacity of your cluster.

6. Enter a password for the administrative account and click **Create Cluster**.
7. To access the Qumulo Core Web UI, connect to any node by entering its IP address into a web browser. For more information, see Qumulo Core Web UI Browser Compatibility in Qumulo Care.

For more information about configuring your cluster configuration and getting started with Qumulo Core, see Qumulo Installation FAQ in Qumulo Care.

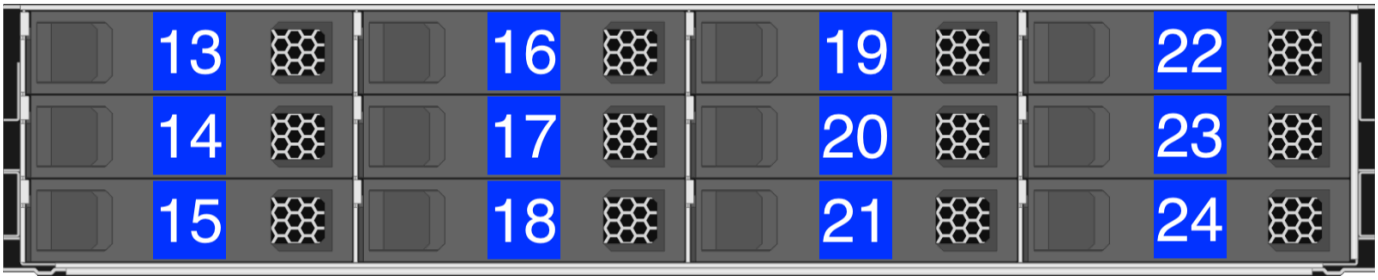
Front and Rear Drive Locations on HPE Apollo 4200 Gen10 Nodes

Summary: This section explains the front and rear drive locations in your HPE Apollo 4200 Gen10 node.

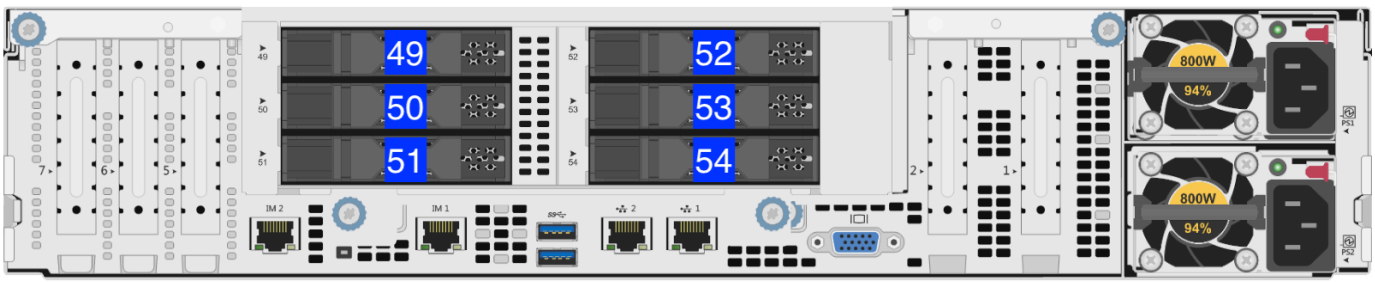
This section shows the front large form factor (LFF) and rear small form factor (SFF) drive locations in your HPE Apollo 4200 Gen10 node. For more information, see HPE Apollo 4200 Gen10 Server - Document List .

Front LFF Drive Row

Second LFF Drive Row



Rear SFF Hot-Plug Drives

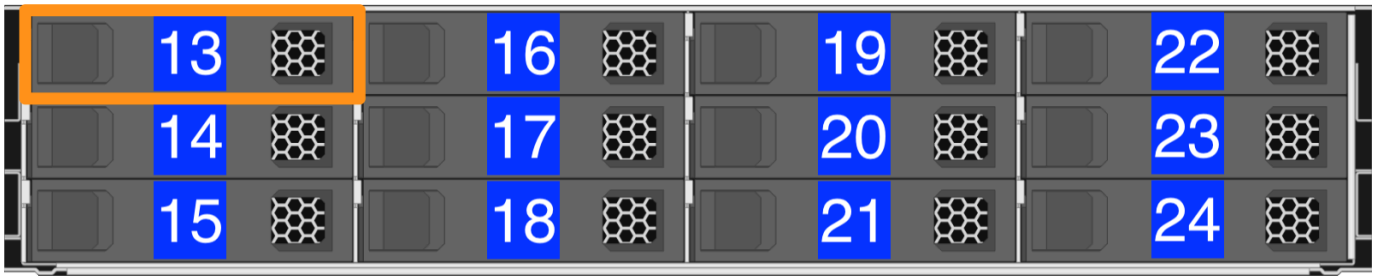


Boot Drive

> **⚠ Important**
> Before you remove the boot drive, contact the Qumulo Care Team for additional instructions.

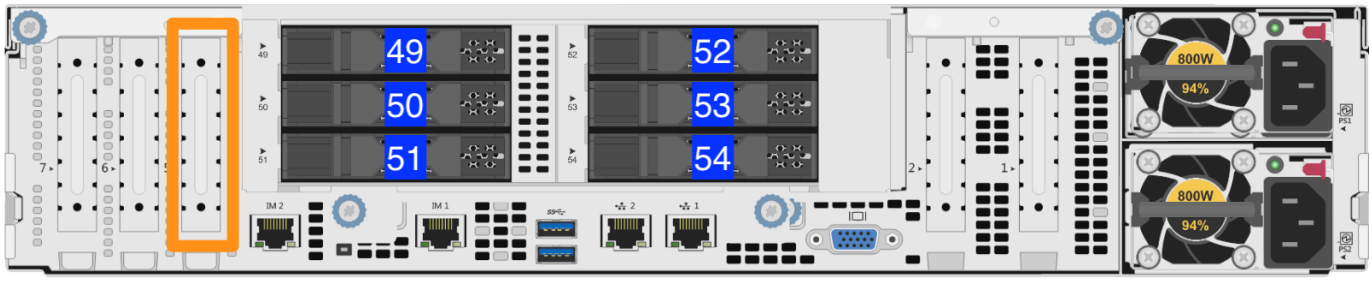
36T and 90T Nodes

In 36T and 90T nodes, the boot drive is located in the second LFF drive row.



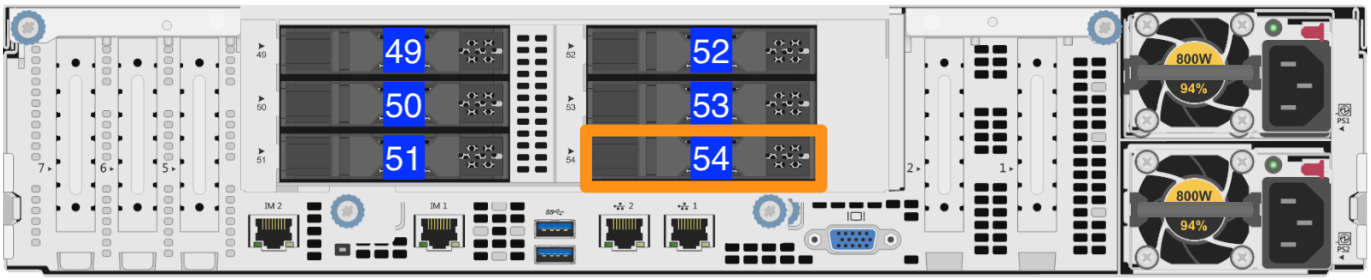
192T Nodes

In 192T nodes, the boot drive is a BOSS PCIe riser card.



336T Nodes

In 336T nodes, the boot drive is located with the rear SFF hot-plug drives.



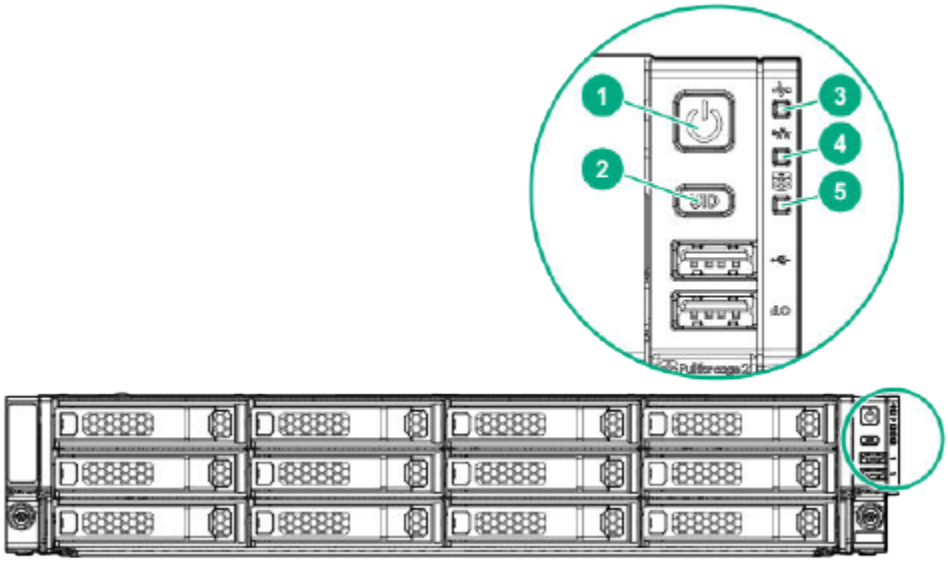
Panel LEDs on HPE Apollo 4200 Gen10 Nodes

Summary: This section explains the LEDs of your HPE Apollo 4200 Gen10 node.

This section explains the LEDs of your HPE Apollo 4200 Gen10 node, including front panel LEDs and buttons, power fault LEDs, and rear panel LEDs. You can use these LEDs to diagnose hardware health issues. For more information, see HPE Apollo 4200 Gen10 Server - Document List
.

Front Panel LEDs and Buttons

To locate the front panel LEDs, use the following diagram.



1. Power On or Standby Button and System Power LED
    - 🟢 **Solid Green:** System on
    - 🟢 **Flashing Green:** (1 flash per second) Performing power-on sequence
    - 🟠 **Solid Amber:** System in standby
    - **Off:** No power present
2. UID Button and LED
    - 🔵 **Solid Blue:** Activated
    - 🔵 **Flashing Blue:**
        - 1 flash per second: Remote management or firmware upgrade in progress
        - 4 flashes per second: iLO manual reboot sequence initiated

        - 8 flashes per second: iLO manual reboot sequence in progress
    - **Off:** Deactivated
3. Health LED
    - 🟢 **Solid Green:** Normal
    - 🟢 **Flashing Green:** (1 flash per second) iLO is rebooting
    - 🟠 **Flashing Amber:** System degraded
    - 🔴 **Flashing Red:** (1 flash per second) System critical

    > **Note**
    > If the Health LED indicates a degraded or critical state, review the system integrated management log (IML) or use iLO to review the system health status.

4. NIC Status LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** (1 flash per second) Network active
    - **Off:** No network activity
5. Front Drive Health or Thermal LED
    - 🟢 **Solid Green:** Drives which the SAS expander supports are functional. This applies to all front drives and the rear drives connected to the front drive cage 2 backplane.
    - 🟠 **Solid Amber:** Failure or predictive failure of one or more drives that the SAS expander supports. This applies to all front drives and to the rear drives connected to the front drive cage 2 backplane.
    - 🟠 **Flashing Amber:** (1 flash per second) The temperature sensor in one or more front drives is about to reach the thermal threshold. You must immediately slide the front drive cages back into the chassis and keep them there until the LED turns green.

      > **Note**
      > This LED behavior depends on the iLO 08-HD Max sensor reading.

    - **Off:** No power present

> **Note**

If the (5) Front Drive Health or Thermal LED, or the (1) Power On or Standby Button and System Power LED are off, one of the following conditions is possible:

- Facility power not present
- Power cord detached
- No power supplies installed
- Power supply failure
- Front I/O cable disconnected

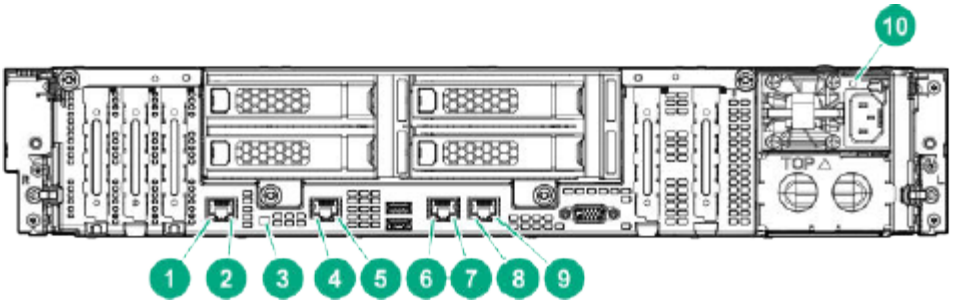
Power Fault LEDs

If the (1) Power On or Standby Button and System Power LED, (2) UID Button and LED, (3) Health LED, and (4) NIC Status LED flash simultaneously, a power fault has occurred. The following table lists the LED behavior corresponding to affected subsystems.

Number of LED Flashes	Affected Subsystem
1	System board
2	Processor
3	Memory
4	Riser board PCIe slots
5	FlexibleLOM
6	Removable HPE Flexible Smart Array controller or Smart SAS HBA controller
7	System board PCIe slots
8	Power backplane or storage backplane
9	Power supply

Rear Panel LEDs

To locate the rear panel LEDs, use the following diagram.



1. Dedicated iLO Port 1 Link LED
    - 🟢 **Green:** Network link
    - **Off:** No network link
2. Dedicated iLO Port 1 Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
3. UID LED
    - 🔵 **Solid Blue:** Activated
    - 🔵 **Flashing Blue:**
        - 1 flash per second: Remote management or firmware upgrade in progress
        - 4 flashes per second: iLO manual reboot sequence initiated
        - 8 flashes per second: iLO manual reboot sequence in progress
    - **Off:** Deactivated
4. Dedicated iLO Port 2 Link LED
    - 🟢 **Green:** Network link
    - **Off:** No network link
5. Dedicated iLO Port 2 Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
6. NIC Port 1 Link LED
    - 🟢 **Green:** Network link

- **Off:** No network link

7. NIC Port 1 Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
8. NIC Port 2 Link LED
    - 🟢 **Green:** Network link
    - **Off:** No network link
9. NIC Port 2 Activity LED
    - 🟢 **Solid Green:** Link to network
    - 🟢 **Flashing Green:** Network active
    - **Off:** No network activity
10. Power Supply LED
    - 🟢 **Solid Green:** Normal
    - **Off:** One or more of the following conditions exist:
        - Power unavailable
        - Power supply failed
        - Power supply in standby mode
        - Power supply error

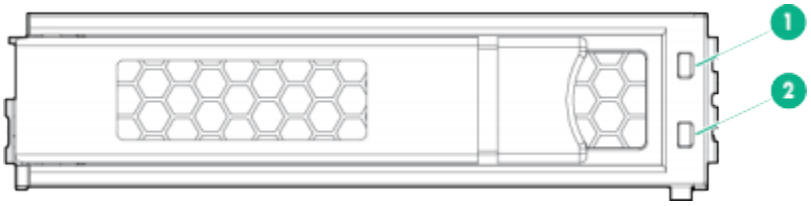
Drive LEDs on HPE Apollo 4200 Gen10 Nodes

Summary: This section explains the drive LEDs in HPE Apollo 4200 Gen9 nodes.

This section explains the LEDs of large form factor (LFF) and small form factor (SFF) drives in your HPE Apollo 4200 Gen10 node. For more information, see HPE Apollo 4200 Gen10 Server - Document List .

Large Form Factor (LFF) Drive LEDs

To locate the LFF drive LEDs, use the following diagram.



You can determine the current state of an LFF drive by reviewing the status of the following LEDs:

1. Fault or UID LED
    - 🟠 Amber
    - 🔵 Blue
2. Online or Activity LED
    - 🟢 Green

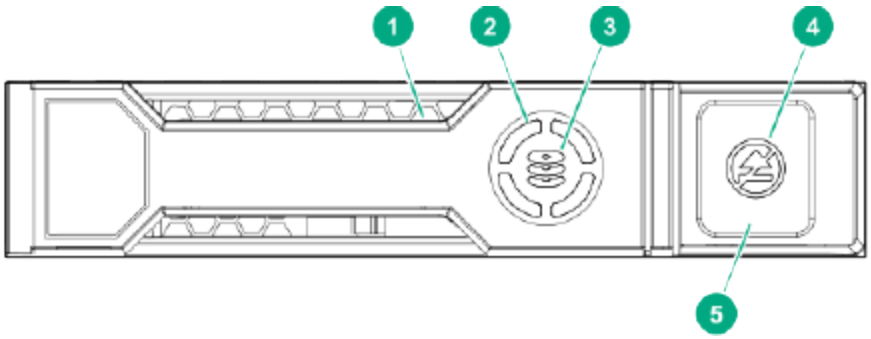
The following table explains the various combinations of the two LFF LEDs.

Online or Activity LED	Fault or UID LED	Description
On, off, or flashing	Alternating amber and blue	One or more of the following conditions exist: • The drive has failed. • This system received a predictive failure alert about the drive. • A management application has selected the drive.

Online or Activity LED	Fault or UID LED	Description
On, off, or flashing	Solid blue	One or more of the following conditions exist: • The drive is operating normally. • A management application has selected the drive.
On	Flashing amber	This system received a predictive failure alert about the drive. Replace the drive as soon as possible.
On	Off	The drive is online but isn't active currently.
1 flash per second	Flashing amber	Don't 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. However, the system received a predictive failure alert about the drive. To minimize the risk of data loss, don't remove the drive until the expansion or migration is complete.
1 flash per second	Off	Don't 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 it received a predictive failure alert. Replace the drive as soon as possible.
4 flashes per second	Off	The drive is active and is operating normally.
Off	Solid amber	The drive has a critical fault condition and the controller has placed it offline. Replace the drive as soon as possible.
Off	Flashing amber	This system received a predictive failure alert about the drive. Replace the drive as soon as possible.
Off	Off	The drive is offline, a spare, or isn't configured as part of an array.

Small Form Factor (SFF) Drive LEDs

To locate the SFF drive LEDs, use the following diagram.



1. Locate LED
    - 🔵 **Solid Blue:** A host application is identifying the drive.
    - 🔵 **Flashing Blue:** The drive carrier firmware is updating or requires an update.

    > **Note**
    > The Locate LED is behind the release lever. When it is illuminated, it is visible.

2. Activity Ring LED
    - 🟢 **Rotating Green:** Drive activity
    - **Off:** No drive activity
3. Drive Status LED
    - 🟢 **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 and Green:** The drive is a member of one or more logical drives and predicts drive failure.
    - 🟠 **Flashing Amber:** The drive isn't configured and predicts drive failure.
    - 🟠 **Solid Amber:** The drive has failed.
    - **Off:** A RAID controller hasn't configured the drive.
4. Do Not Remove LED
    - ⚪ **Solid White:** Don't remove the drive. Removing the drive causes one or more of the logical drives to fail.

- **Off:** Removing the drive doesn't cause a logical drive to fail.

5. Do Not Remove Button

   To open the carrier, press the release lever.

Configuring and Using Integrated Lights Out (iLO) on HPE Apollo 4200 Gen10 Nodes

Summary: This section explains how to configure and use Integrated Lights Out (iLO) on HPE Apollo 4200 Gen10 nodes.

This section explains how to configure and use Integrated Lights Out (iLO) on HPE Apollo 4200 Gen10 nodes.

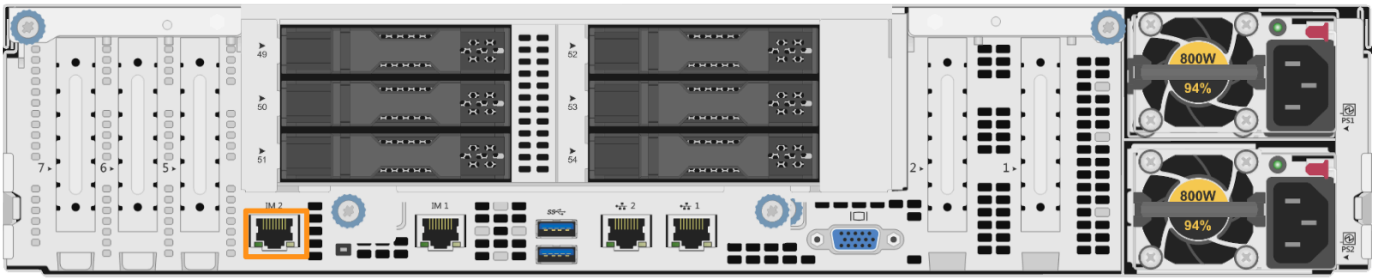
> ⚠ Important
> Access to the iLO port on a public LAN can have serious security implications because it can grant anyone with credentials direct access to your server's hardware and console. Follow security best practices when implementing iLO access.

Prerequisites

To configure the iLO port, you must have root access to the client-facing network through SSH. For example, you can use the `sudo -s` command.

How the iLO Port Works

HPE Apollo 4200 Gen10 nodes provide iLO support for out-of-band maintenance access even when the node is plugged in but powered off. The following diagram shows the location of the iLO port.



Your nodes receive DHCP address assignments by default. When you configure a node's iLO port, you can access the node by using the IP address (that the DHCP server assigns to the node) and a web browser that supports HTML5, Java, and .NET

> ⚠ Important
> We strongly recommend separating your iLO access network from your client-facing network

To access iLO configuration from the BIOS System Utilities menu, press **F9**. The default iLO username is `Administrator`. The password is printed on top of your node chassis.

> **Note**
> The IMPI username and password are unrelated to your Qumulo administrative credentials.

iLO Configuration Commands

Use the following commands to configure the iLO port on your nodes.

To Verify iLO LAN Configuration

```
# ipmitool lan print 1
```

To Configure iLO LAN by Using Static IP Addresses

1. Set the iLO Ethernet interface to a static IP address.

   ```
   # ipmitool lan set 1 ipsrc static
   ```

2. Set the interface IP address. For example:

   ```
   # ipmitool lan set 1 ipaddr 203.0.113.0
   ```

3. Set the interface subnet mask. For example:

   ```
   # ipmitool lan set 1 netmask 255.0.0.1
   ```

4. Set the default gateway IP address. For example:

   ```
   # ipmitool lan set 1 defgw ipaddr 192.168.0.1
   ```

5. (Optional) Enable baseboard management controller (BMC) Address Resolution Protocol (ARP) responses.

```
# ipmitool lan set 1 arp respond on
```

To List Current Users

```
# ipmitool user list 1
ID Name Callin Link Auth IPMI Msg Channel Priv Limit
1 false false true ADMINISTRATOR
2 root false true true ADMINISTRATOR
```

To Change the Default Administrator Password

```
# ipmitool user set password 2
Password for user 2:
Password for user 2:
```

To Create a New User

In the following example, we create the administrative user `netadmin` in user slot `4`.

```
# ipmitool user set name 4 netadmin
# ipmitool user set password 4
Password for user 4:
Password for user 4:
```

To Configure User Access

```
# ipmitool channel setaccess 1 4 link=on ipmi=on callin=on privilege=4
# ipmitool user enable 4
```

To Verify User Access Level

```
# ipmitool channel getaccess 1 4
Maximum User IDs : 10
Enabled User IDs : 4

User ID : 4
User Name : ADMIN
Fixed Name : No
Access Available : call-in / callback
Link Authentication : disabled
IPMI Messaging : enabled
Privilege Level : ADMINISTRATOR
```

To Reset the Baseboard Management Controller

If you can't connect to the iLO management console and your network configuration is correct, reset the BMC through an SSH or KVM Console session for the affected node.

```
# ipmitool bmc reset cold
```

Networking Your HPE Apollo 4200 Gen10 Cluster

Summary: This section explains how to network your HPE Apollo 4200 Gen10 cluster.

This section explains how to network your HPE Apollo 4200 Gen10 cluster.

Prerequisites

- A network switch with the following criteria:
  - Ethernet connection
    - 36T and 90T: 25, 40, or 100 Gbps
    - 192T: 100 Gbps
    - 336T: 25 Gbps or 40 Gbps
  - Fully non-blocking architecture
  - IPv6 compatibility
- Compatible network cables
- A sufficient number of ports for connecting all nodes to the same switch fabric
- One static IP per node, per defined VLAN

> ⚠ Important
> Before you connect any Qumulo-supported equipment to your network, we strongly recommend consulting with your network engineering team.

Recommended Configuration

- Two redundant switches
- One physical connection to each redundant switch, per node
- One Link Aggregation Control Protocol (LACP) port-channel per node with the following configuration:
  - Active mode
  - Slow transmit rate
  - Trunk port with a native VLAN

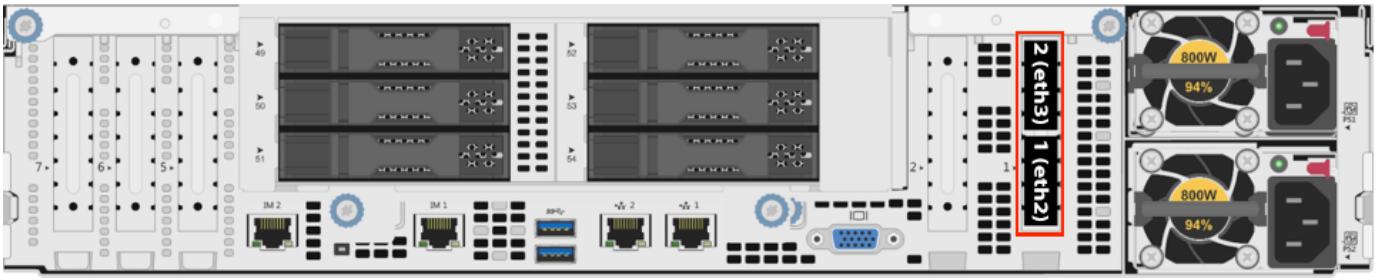
    - Enabled IEEE 802.3x flow control (full-duplex mode)
- DNS servers
- Network Time Protocol (NTP) server
- Firewall protocol or ports configured for Qumulo Care Proactive Monitoring
- Where N is the number of nodes, up to 10 N-1 floating IP addresses per node, per client-facing VLAN

  > **Note**
  > The number of floating IP addresses depends on your workflow and on the clients that connect to the cluster, with a minimum of two floating IP addresses per node, per client-facing VLAN, but with no more than ten floating IP addresses per node, per client-facing VLAN—or 70 floating IP addresses per namespace.

- Nodes connected at their maximum Ethernet speed (this ensures advertised performance). To avoid network bottlenecks, Qumulo validates system performance with this configuration by using clients connected at the same link speed and to the same switch as the nodes.

Node NICs and Ports

The following diagrams show the NICs and ports on HPE Apollo 4200 Gen10 nodes.



Connecting to Redundant Switches

This section explains how to connect a four-node HPE cluster to dual switches for redundancy. We recommend this configuration for HPE hardware. If either switch becomes inoperative, the cluster remains accessible through the remaining switch.

- Connect the two 25 Gbps, 40 Gbps, or 100 Gbps ports on the nodes to separate switches.
- Use at least one port on both switches as an uplink to the client network. To ensure an acceptable level of physical network redundancy and to meet the necessary client access throughput rates, use an appropriate combination of 10 Gbps, 25 Gbps, 40 Gbps, or 100 Gbps network uplinks.

- Use at least one peer link between the switches.

Connecting to a Single Switch

This section explains how to connect a four-node HPE cluster to a single switch.

> **Note**
> If the switch becomes inoperative, the cluster becomes inaccessible.

- Connect two 25 Gbps, 40 Gbps, or 100 Gbps ports to the switch.
- Connect any uplink ports to the client network.

HPE Apollo 4200 Gen10 Technical Specifications

Summary: This section provides technical specifications for HPE Apollo 4200 Gen10 nodes.

This section provides technical specifications for HPE Apollo 4200 Gen10 nodes.

	HPE Apollo 36 TB Hybrid SSD and Disk	HPE Apollo 90 TB Hybrid SSD and Disk	HPE Apollo 192 TB Hybrid SSD and Disk	HPE Apollo 336 TB Active Archive
Raw Capacity	36 TB	90 TB	192 TB	336 TB
HDDs	9 × 4 TB	9 × 10 TB	24 × 8 TB	24 × 14 TB
Logical Flash Cache Capacity	1.44 TB	2.88 TB	5.76 TB	7.68 TB
Connectivity Ports	2 × 25 GbE or 2 × 100 GbE		2 × 100 GbE (25 GbE minimum link speed)	2 × 25 GbE
Management Ports	2 × iLO 1 GbE baseT (RJ45)			
Connectivity Ports	1 × Intel Xeon Silver 4210 2.2 GHz 10 cores		2 × Intel Xeon Silver 4210 2.2 GHz 10 cores	1 × Intel Xeon Silver 4210 2.2 GHz 10-cores
Physical Dimensions	3.44" (8.75 cm) × 17.63" (44.8 cm) × 32" (81.28 cm)			

Getting Started with Qumulo on HPE ProLiant DL325 Gen10 Plus

Summary: This section explains how to prepare HPE ProLiant DL325 Gen10 Plus nodes for creating a Qumulo Core cluster.

This section explains how to prepare HPE ProLiant DL325 Gen10 Plus nodes for creating a Qumulo Core cluster. This guide is for system administrators, professional service providers, and colleagues in your organization who are responsible for installing and configuring server hardware. For more information, see HPE ProLiant DL325 Gen10 Plus Server - Document List .

Prerequisites

Qumulo Core USB Drive Installer

Step 1: Verify Your Node

1. Shut down your node and connect a display, a keyboard, and a mouse to it.
2. Plug the Qumulo Core USB Drive Installer into an available USB port on the node and then press the power button.

3. On the **HPE ProLiant** boot screen, do one of the following:
   - If the **Boot Mode: Legacy BIOS** message appears, skip the rest of this section and continue to boot by using the Qumulo Core USB Drive Installer (page 47).
   - If the **Boot Mode: Legacy BIOS** message doesn't appear, press **F9**.
4. On the **System Utilities** page, click **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Boot Options**.
5. On the **Boot Options** page, set **Boot Mode** to **UEFI Mode** and then press **F10**.
6. Press **Esc** until you return to the main page.
7. Click **Reboot the System**.

Step 2: Boot by Using the Qumulo Core USB Drive Installer

1. On the **HPE ProLiant** boot screen, press **F11**.

> **Note**
> The **Boot Menu** page might take a few minutes to appear.

2. On the **Boot Menu** page, to perform a one-time boot, click **Generic USB Boot**.

Step 3: Run the Field Verification Tool (FVT)

After the node reboots, the Qumulo Installer runs automatically.

1. Choose **[1] Factory reset (DESTROYS ALL DATA)**.
2. To perform a clean installation of Qumulo Core on your node, type `DESTROY ALL DATA` (case-sensitive).
3. Review the verification results and consider the following before proceeding with the installation.
   - If the **FVT Passed!** message appears, select **[1] Install Qumulo Core**.
   - If **FAIL** messages appear, use one of the following resolutions.
4. When the FVT passes all checks, select **[1] Install Qumulo Core**.

Fixable Issues During Installation

If the FVT finds fixable issues, it prompts you to auto-correct any detected issues, depending on your installation scenario. Issues that the FVT can auto-correct include the following:

- BIOS Configuration
- Drive firmware
- NVMe sector size
- NIC mode
- NIC firmware
- Boot order

1. To attempt auto-correction, select **[1] Run FVT Flash. This will try to fix issues then reboot.**

   If the fixes are successful, the FVT reboots the node automatically.
2. To re-attempt verification, boot by using the Qumulo Core USB Drive Installer (page 47) and then continue the installation.

Non-Fixable Issues

If the FVT is unable to auto-correct any issues, the message **Not fixable issues were detected.** appears, providing reasons for failure.

For help with troubleshooting your node, contact Qumulo Care .

Step 4: Create and Configure Your Cluster

1. Review the **End User Agreement**, click **I agree to the End User Agreement**, and then click **Submit**.
2. Name your cluster.
3. On the **1. Set up cluster** page, select the nodes to add to your cluster.

   As you select nodes, the installer updates the total capacity of your cluster at the bottom of the page.

   > **Note**
   > If any nodes are missing, confirm that they are powered on and connected to the same network.

4. On the **2. Confirm cluster protection level** page, Qumulo Core selects the recommended 2- or 3-drive protection level based on your cluster size and node type.
5. If the **Customize Protection Level** option appears, you can increase your system resilience by selecting 3-drive protection.

   > **Important**
   >
   > - The option for selecting the drive protection level is available only at cluster creation time. You can't change it later.
   > - Using 3-drive protection reduces the total capacity of your cluster.

6. Enter a password for the administrative account and click **Create Cluster**.
7. To access the Qumulo Core Web UI, connect to any node by entering its IP address into a web browser. For more information, see Qumulo Core Web UI Browser Compatibility in Qumulo Care.

For more information about configuring your cluster configuration and getting started with Qumulo Core, see Qumulo Installation FAQ in Qumulo Care.

Front and Rear Drive Locations on HPE ProLiant DL325 Gen10 Plus Nodes

Summary: This section explains the front and rear drive locations in your HPE ProLiant DL325 Gen10 Plus node.

This section explains the front and rear drive locations in your HPE ProLiant DL325 Gen10 Plus node. On this platform, the drives in a node are arranged into *rows* and groups called *boxes*.

Front Drive Row

The following diagram shows the front drive row. In the diagram, box 1 holds bays 1-8 (indicated in green) and box 2 holds bays 1-2 (indicated in orange).

Second Drive Row

The second drive row flips up behind the first drive row in the node.

For the second row, box 3 holds bays 1-8 and box 4 holds bays 1-2.

Boot Drive

The boot drive is in box 1, bay 1.

> **⚠ Important**
> Before you remove the boot drive, contact the Qumulo Care Team for additional instructions.

Networking Your HPE ProLiant DL325 Gen10 Plus Cluster

Summary: This section explains how to network your HPE ProLiant DL325 Gen10 Plus cluster.

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Prerequisites

- A network switch with the following criteria:
  - 100 Gbps Ethernet connection
  - Fully non-blocking architecture
  - IPv6 compatibility
- Compatible network cables
- A sufficient number of ports for connecting all nodes to the same switch fabric
- One static IP per node, per defined VLAN

> ⚠ Important
> Before you connect any Qumulo-supported equipment to your network, we strongly recommend consulting with your network engineering team.

Recommended Configuration

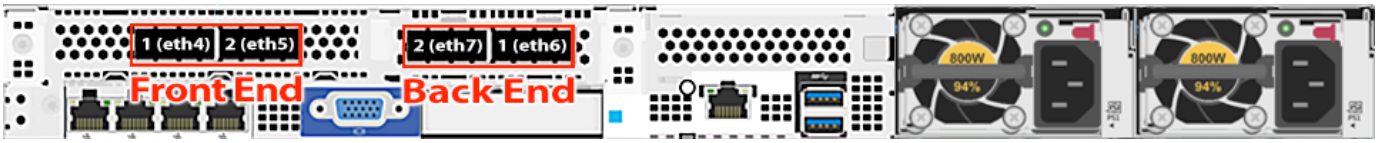
- One set of redundant switches for the front-end network, with an MTU that matches that of the clients that use the storage cluster. Typically, we recommend 1,500 MTU but in some instances 9,000 MTU is the optimal setting.
- One set of redundant switches for the back-end network (9,000 MTU minimum)
- One physical connection to each redundant switch, per node
- One Link Aggregation Control Protocol (LACP) port-channel per network (front-end and back-end) on each node with the following configuration:
  - Active mode
  - Slow transmit rate
  - Trunk port with a native VLAN

- DNS servers
- Network Time Protocol (NTP) server
- Firewall protocol or ports configured for Qumulo Care Proactive Monitoring
- Where N is the number of nodes, up to 10 N-1 floating IP addresses per node, per client-facing VLAN
- Nodes connected at their maximum Ethernet speed (this ensures advertised performance). To avoid network bottlenecks, Qumulo validates system performance with this configuration by using clients connected at the same link speed and to the same switch as the nodes.

Node NICs and Ports

The following diagram shows the NICs and ports on HPE DL325 Gen10 Plus nodes. On this platform, there are two sets of NICs, one for the front end and one for the back end.

> ⚠ Important
> For your node to work correctly, you must connect at least one port in each NIC.



Connecting to Redundant Switches

This section explains how to connect a four-node HPE cluster to dual switches for redundancy. We recommend this configuration for HPE hardware. If either switch becomes inoperative, the cluster remains accessible through the remaining switch.

- Front End
  - Connect the two front-end 100 Gbps ports on your nodes to separate switches.
  - The uplinks to the client network must equal the bandwidth from the cluster to the switch.
  - The two ports form an LACP port channel by using a multi-chassis link aggregation group.
- Back End
  - Connect the two back-end 100 Gbps NIC ports on your nodes to separate switches.
  - Use an appropriate inter-switch link or virtual port channel.

- MTU
    - For all connection speeds, the default behavior is that of an LACP with 1,500 MTU for the front-end and 9,000 MTU for the back-end.

Connecting to a Single Switch

This section explains how to connect a four-node HPE cluster to a single switch.

- Front End
    - Each node has two front-end 100 Gbps NIC ports connected to a single switch.
    - The uplinks to the client network must equal the bandwidth from the cluster to the switch.
    - The two ports form an LACP port channel.
- Back End
    - Each node has two back-end 100 Gbps ports connected to a single switch.
- MTU
    - For all connection speeds, the default behavior is that of an LACP with 1,500 MTU for the front-end and 9,000 MTU for the back-end.

HPE ProLiant DL325 Gen10 Plus Technical Specifications

Summary: This section provides technical specifications for HPE ProLiant DL325 Gen10 Plus nodes.

This section provides technical specifications for HPE ProLiant DL325 Gen10 Plus nodes.

	34T	145T	291T
Form Factor	1U	1U	1U
Raw Storage Capacity	34 TB	145 TB	291 TB
SSD or NVM3	9 × 3.84 TB NVMe	19 × 7.68 TB NVMe	19 × 15.36 TB NVMe
Networking	4 × 100 GbE	4 × 100 GbE	4 × 100 GbE
CPU	24 cores 2.8 GHz	24 cores 2.8 GHz	24 cores 2.8 GHz
Memory	128 GB	128 GB	128 GB