Spectra BlackPearl HotPair

Installation & Configuration Guide

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Revision History

Revision	Date	Description
A	May 2018	Initial release.
B	September 2019	Added 96-drive and 107-drive disk solution instructions. Added IPMI instructions.
C	November 2020	Added additional information for configuring VHIDs.

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HotPair Setup and Configuration

This document describes the initial setup and configuration steps for a HotPair configuration for a BlackPearl NAS solution (formerly called a Verde array) or BlackPearl Converged Storage system, referred to as the *system* in this guide.

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BEFORE YOU BEGIN

Make sure that HBAs (host bus adaptors) are installed in the master node and the system is rack mounted in accordance with the *Spectra Verde Array Installation Guide* or the *BlackPearl Rack Mounting Guide.*

Install all data drives in the **expansion nodes**, as described in "Installing a New Data Drive" in the *Spectra BlackPearl NAS User Guide* or the *BlackPearl Drive Installation Guide*.

Important Do not install any data drives into the primary or secondary master nodes. Installing a drive in either master node disables the HotPair configuration.

Important Do not power on any of the modules until instructed.

PRIMARY AND SECONDARY MASTER NODES

The HotPair configuration features two master nodes, designated as the **primary master node** and **secondary master node**.

During normal operation, one master node is designated the **active node**, and the other is the **standby node**. The active node handles all data traffic, while the standby node monitors the status of the active node. If the active node experiences a failure, the standby node becomes the active node. When replaced, the failed master node assumes the standby node role.

During the configuration process, the **primary master node** is the **active node** and the **secondary master node** is the **standby node**.

Before you continue, choose one master node to be the primary master node.

CONNECT CABLES

Use the instructions in this section and Figure 1 to connect network cables, install the null modem serial cable, cable the primary and secondary master nodes to the expansion nodes, connect Fibre Channel and SAS cables, if applicable, and connect power cables.

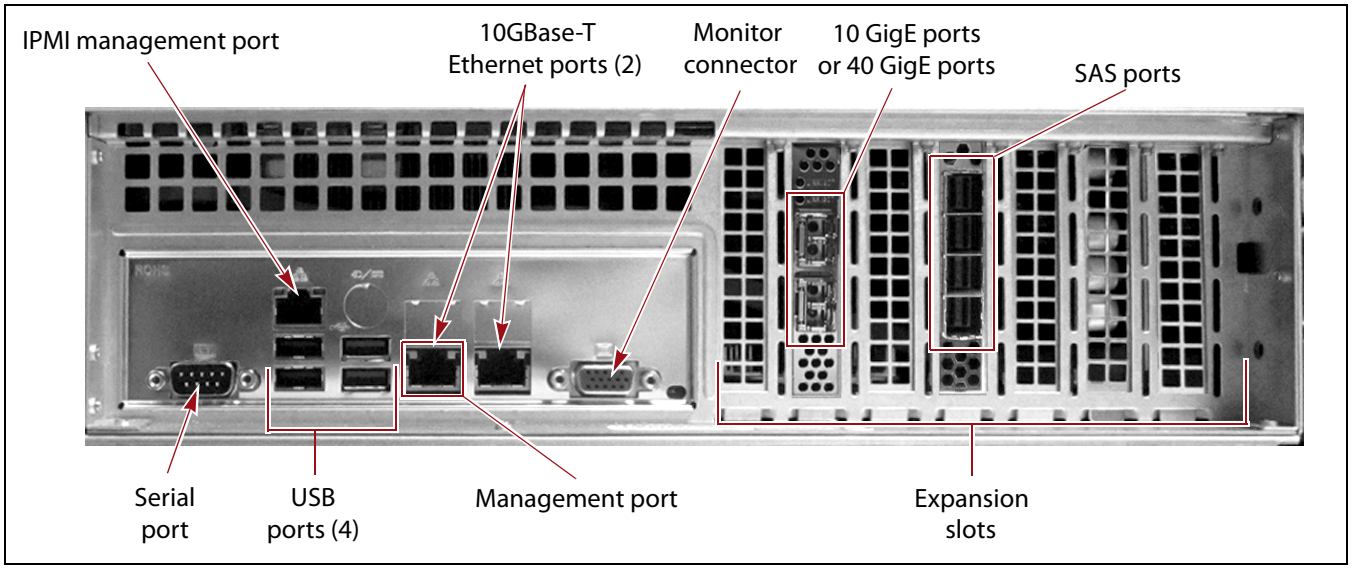

Figure 1 The rear panel components of the master nodes.

Connect Ethernet Cables

Use the instructions in this section to connect Ethernet cables to the master nodes. See Figure 1 for port location.

Connect the Management Port Cables

Note: You can only use the management port to access the user interface. You cannot use this port for data transfer.

1. Connect an Ethernet cable from your network to the management port on the **primary master node**.
2. Connect another Ethernet cable from your network to the management port on the **secondary master node**.

Connect the Data Port Cables

The data connections to each master node must be identical, the same ports connected in the same way to the same network, on both the primary and secondary master node. See Figure 1 on page 10 for port location.

1. Determine how you want to configure one or more data connections for the system and connect the data port cables accordingly.

   Notes:
   - You can configure link aggregation for better performance.
   - While different types of Ethernet network interface cards can be installed in the same system, only one type of port can be used in each link aggregation configuration.

   For example, if you plan to use both 10 GigE ports in a link aggregation connection, you must cable both data ports on both the primary and secondary master node to the same network.

2. Connect the appropriate cables from your network to the **primary master node**.
3. Connect additional appropriate cables in the same configuration to the **secondary master node**.

Install the Null Modem Serial Cable

The null modem serial cable allows the primary and secondary master nodes to communicate with one another. Use the instructions in this section to install the serial cable.

1. Locate the serial port on the back of the **primary master node**. See Figure 1 on page 10.
2. Connect one end of the cable to the serial port in the **primary master node**, and using your fingers, secure the cable to the chassis.
3. Connect the other end of the cable to the serial port in the **secondary master node**, and using your fingers, secure the cable to the chassis.

Cable the Master Nodes to the Expansion Nodes

The master nodes must be cabled to the expansion nodes in order to access the drives installed in the expansion nodes. The method used to connect expansion nodes to master nodes differs depending on what type of expansion node(s) are included in your HotPair configuration.

Use the instructions in the below section(s) to cable the master nodes to an expansion node(s).

- Connect a BlackPearl Expansion Node on page 12
- Connect a 96-Drive Disk Solution on page 13
- Connect a 107-Drive Disk Solution on page 14

Connect a BlackPearl Expansion Node

1. Locate the SAS ports on the back of the **primary master node** (see Figure 1 on page 10). If you have more than two expansion nodes or tape libraries with SAS drives, additional SAS cards are installed in the master node.
2. Connect two SAS cables to any SAS ports on the **primary master node**.

   Note: The master node and expansion node SAS ports use a different connector. It is not possible to reverse the cable.
3. Connect one of the cables to the **Front Pri** port on the first expansion node.

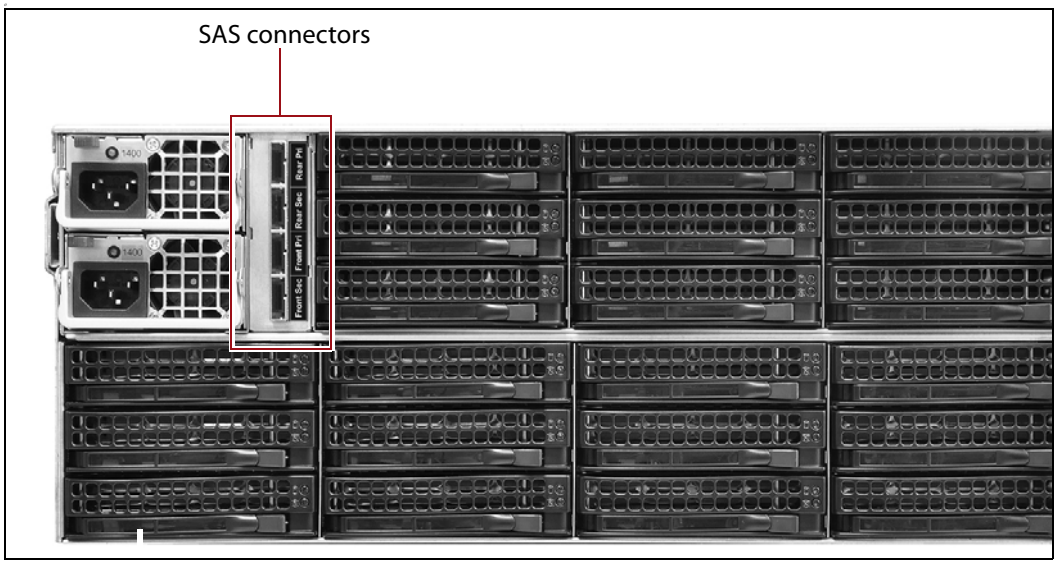

Figure 2 The SAS connectors on a expansion node.

4. Connect the second cable to the **Rear Pri** port on the first expansion node.

Important Make sure that you connect the cables from the **primary master node** to the **Front Pri** and **Rear Pri** ports on each expansion node. Connecting to any other ports causes the HotPair configuration to fail.

5. Locate the SAS ports on the back of the **secondary master node** (see Figure 1 on page 10). If you have more than two expansion nodes, additional SAS cards are installed in the master node.
6. Connect two SAS cables to any SAS ports on the **secondary master node.**

   Note: The master node and expansion node use a different SAS port connector. It is not possible to reverse the cable.
7. Connect one of the cables to the **Front Sec** port on the first expansion node (see Figure 2 on page 12).

8. Connect the second cable to the **Rear Sec** port on the first expansion node.

Important Make sure that you connect the cables from the **secondary master node** to the **Front Sec** and **Rear Sec** ports on each expansion node. Connecting to any other ports causes the HotPair configuration to fail.

9. Repeat for each additional BlackPearl expansion node.

Connect a 96-Drive Disk Solution

1. Locate the SAS ports on the back of the **primary master node** (see Figure 1 on page 10). If you have more than two expansion nodes or tape libraries with SAS drives, additional SAS cards are installed in the master node.
2. Connect one SAS cable to any SAS port on the **primary master node**.
3. Connect the cable to the **HOST** port on the 96-drive disk solution.

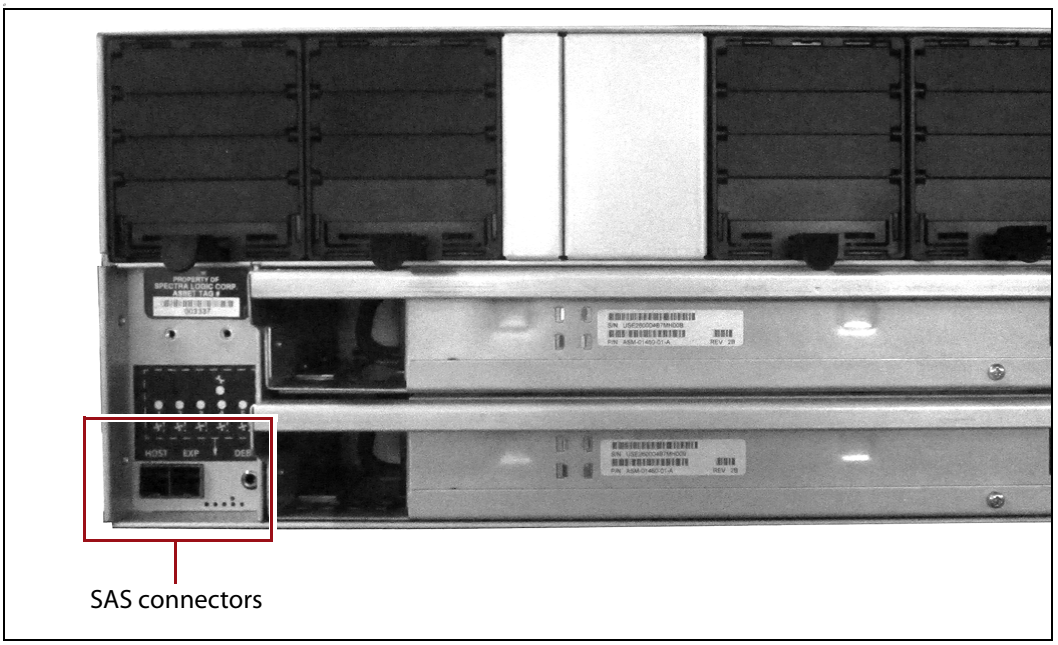

Figure 3 The rear view of the 96-drive disk solution.

4. Locate the SAS ports on the back of the **secondary master node** (see Figure 1 on page 10). If you have more than two expansion nodes, additional SAS cards are installed in the master node.
5. Connect one SAS cable to any SAS port on the **secondary master node**.
6. Connect the cable to the **EXP** port on the 96-drive disk solution (see Figure 3).
7. Repeat for each additional 96-drive disk solution.

Connect a 107-Drive Disk Solution

1. Locate the SAS ports on the back of the **primary master node** (see Figure 1 on page 10). If you have more than two expansion nodes or tape libraries with SAS drives, additional SAS cards are installed in the master node.
2. Connect one SAS cable to any SAS port on the **primary master node**.
3. Connect the cable to one of the SAS ports on the 107-drive disk solution.

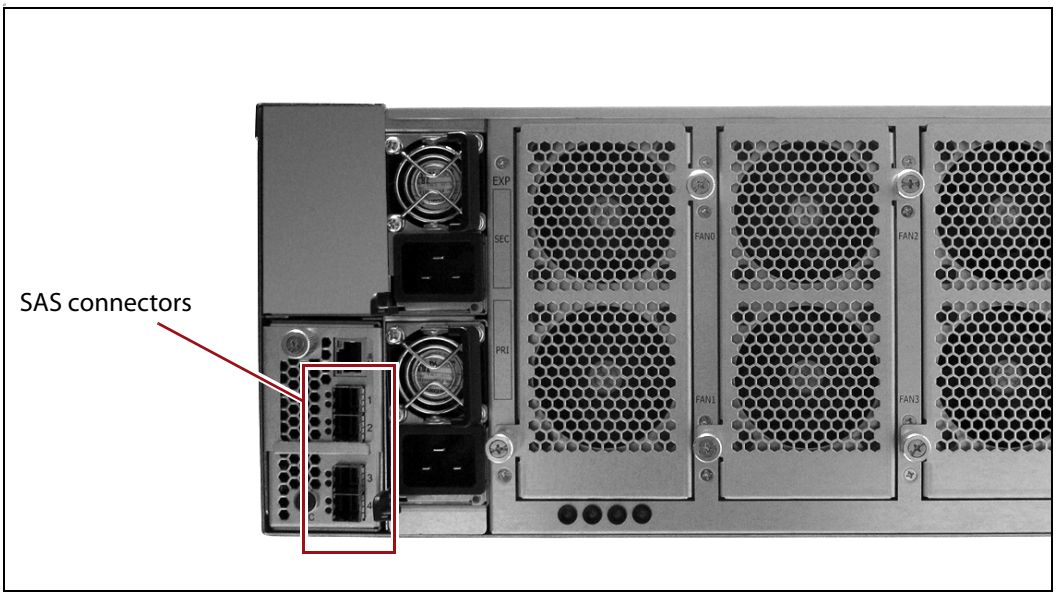

Figure 4 The SAS connectors on a 107-drive disk solution.

4. Locate the SAS ports on the back of the **secondary master node** (see Figure 1 on page 10). If you have more than two expansion nodes, additional SAS cards are installed in the master node.
5. Connect one SAS cable to any SAS port on the **secondary master node**.
6. Connect the cable to one of the SAS ports on the 107-drive disk solution (see Figure 4).
7. Repeat for each additional 107-drive disk solution.

Connect Fibre Channel and SAS Cables (BlackPearl Converged Storage Systems Only)

For BlackPearl configurations with tape libraries, use the appropriate cables to connect the tape drives in the library to both the **primary** and **secondary** master nodes. See Figure 1 on page 10 for port locations.

Fibre Channel If necessary, remove the port cap from the Fibre Channel port on the tape drive, and then connect a Fibre cable from the SAN or BlackPearl Fibre Channel HBA to the port on the tape drive.

SAS Connect the single end of the fanout SAS cable to the BlackPearl SAS HBA. Insert one of the other ends of the cable into each tape drive.

Connect Power Cords

Use the following steps to connect the power cords to all master nodes and BlackPearl expansion nodes in the system. See Figure 1 on page 10 for AC power connector locations.

Important Do not connect power cables to the 96-drive disk solution at this time.

1. Connect a power cord to each of the power supply connectors.
2. Plug the other end of each cord into an AC power outlet.

Important Do not power on any of the modules until instructed.

POWER ON THE EXPANSION NODE(S) AND PRIMARY MASTER NODE

Power on all BlackPearl expansion nodes by removing the front bezel and then gently pressing the power button on the front panel. The power LED illuminates indicating that power is on. Replace the front bezel.

If your HotPair configuration includes one or more 96-drive disk solution(s) connect the power cables at the rear of the chassis to power on the solution.

If your HotPair configuration includes one or more 107-drive disk solution(s), remove the right side bezel cover and press the power button accessible through the cutout on the right side of the bezel. Replace the bezel side cover.

If necessary, power on all attached tape libraries. See the *User Guide* for your library for instructions.

Wait while all expansion nodes and any attached tape libraries complete their initialization. Expansion nodes take approximately five minutes to initialize. Tape library initialization is complete when the login screen displays on the front panel.

Important **Do not** power on the **primary master node** until the expansion nodes have completed initialization.

Power on the **primary master node** by removing the front bezel and then gently pressing the power button on the front panel. The power LED illuminates indicating that power is on. Replace the front bezel.

Important **Do not** power on the **secondary master node** at this time. Powering on the **secondary master node** before instructed causes the HotPair configuration to fail.

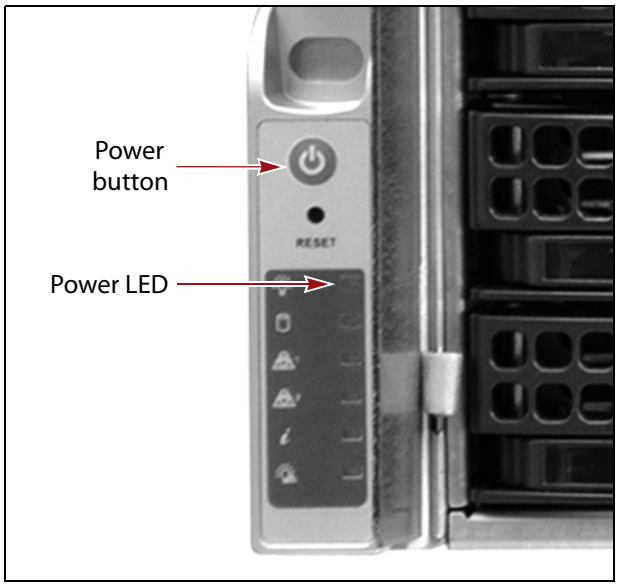

Figure 5 Press the power button.

Wait while the **primary master node** completes its power-on sequence which takes approximately five minutes, depending on the configuration. During the power-on sequence, the system initializes all of its installed components and starts the web server.

Note: Do not use the system's front panel power button to power it off.

CONFIGURE HOTPAIR NETWORK CONNECTIONS

The HotPair network configuration has both **public** and **private** network connections.

The **public** connections are the primary methods for accessing the HotPair system. These connections automatically redirect traffic flow to the active node, without user intervention. With public connections, the IP addresses used to connect to the system remain the same after a HotPair failover.

The **private** connections are for accessing either the primary or secondary master node individually.

- Private management port connections allow you to see the status of each individual master node.
- Private data connections are not used for data transfer, but are configured as an IP address target for the public data connection.

All network connections in a HotPair configuration must use a static IP address.

To fully configure the network settings for the HotPair solution, you must configure all of the following. It may be helpful to obtain all IP address and VHID settings before proceeding.

- One public management IP address
- Two private management IP addresses
- One public data IP address
- Two private data IP addresses

Note: All public IP addresses require a unique VHID. The data connection and management connection **cannot** share the same VHID.

Configure your network connections as described in the following sections.

Configure the Primary Master Node Private Management Port

The first network connection you must configure is the private management port on the **primary master node**. This connection is configured using the console interface. Once this connection is configured, configure all remaining connections via the user interface.

The default address of the management port is **10.0.0.2** with a netmask of **255.255.255.0**. If your network is already using this IP address, or you want to configure a different IP address for the management port, use the master node console to configure the private management port IP address.

If you do not want to change the default private management port IP address, skip to Log Into the User Interface on page 20.

Important You must connect Ethernet cables as described in Connect Ethernet Cables on page 10 before either proceeding with the steps below or skipping this section and accepting the default IP address for the management port.

Use the following steps to configure the Primary Master Node Private Management Port.

1. Connect a monitor and USB keyboard to the **primary master node**. See Figure 1 on page 10 to locate the monitor and USB connectors. The Console screen displays. Verify the Console screen indicates that it is the active node.

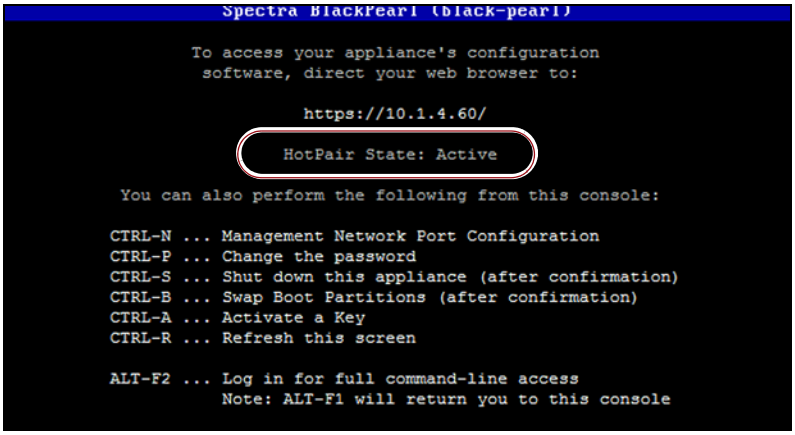

Figure 6 The Console screen active node indicator.

2. Press **CTRL-N**. The Configure Management Network Interface screen displays.

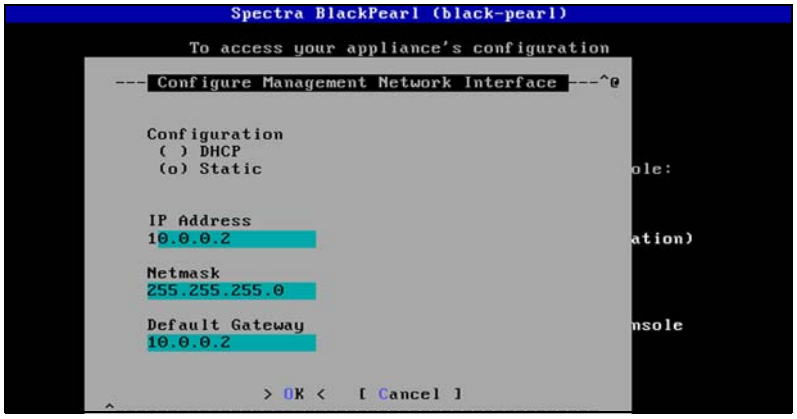

Figure 7 The Configure Management Network Interface screen.

3. Select **Static** as the addressing method and enter the following information:
   - **IP Address** — Enter a valid IPv4 address.
   - **Netmask** — Enter the subnet mask.
   - **Default Gateway** — Enter the default gateway.
4. Select **OK**. The console screen displays showing the new IP address.

   Note: If a new IP address does not display, you may need to manually refresh the console screen by pressing **CTRL-R**.
5. Disconnect the monitor and USB keyboard from the **primary master node**.

Log Into the User Interface

1. Open a web browser on a computer on an active network that has access to the system.
2. Enter the IP address of the private management port of the **primary master node** in the browser address bar using either the default address of **10.0.0.2**, or the IP address of the management port you configured in Configure the Primary Master Node Private Management Port on page 18.

   Note: The user interface uses a secure connection.
3. If necessary, resolve the security certificate warning for the user interface. The system does not ship with a security certificate.

   The BlackPearl system ships with non-signed SSL certificates for both the data and management ports on the system. When using the shipped certificates, you must pass a security check every time you attempt to access the management port to view the BlackPearl user interface, or when you attempt to transfer data using the data port.

   Notes:
   - The absence of the certificate does not affect functionality.
   - If desired, you can install signed, trusted SSL certificates for your data and management ports so that you no longer need to pass the security check when accessing these ports. See your *User Guide* for instructions.
4. Enter the login username and password. The default username is **Administrator**. The default password is **spectra**. The fields are case sensitive.

   Note: Spectra Logic recommends that you change the default password for the primary administrator (see your *User Guide* for instructions).

Figure 8 The Login screen (BlackPearl user interface shown).

5. Click ⋯ to log in.

Important The remainder of this document assumes you are logged into the **active node**. During the initial configuration, the **primary master node** is also the **active node**.

Verify the Expansion Node Cabling

Use the following instructions to verify that the **active node** correctly detects the disks in the expansion node(s).

1. From the menu bar, select **Status** ⋯⁘ **Hardware** or click the Hardware pane on the Dashboard, or click the Hardware link on the status bar. The Hardware screen displays.

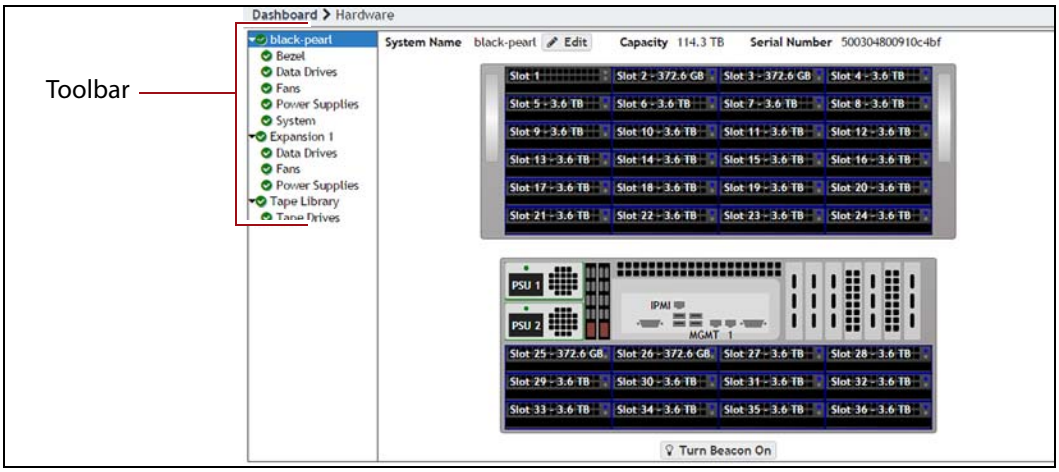

Figure 9 The Hardware screen.

2. Verify that the correct number of expansion nodes displays.
3. In the left toolbar, under Expansion 1, click **Data Drives**. Verify that the user interface displays the correct number of drives in the expansion node.
4. Repeat Step 3 for each additional expansion node.

Automatically Import Activation Keys

Activation keys enable features on the HotPair system. They are tied to the serial number of the system for which they are issued, and cannot be used on another system. Renewals of expired activation keys are obtained by contacting Spectra Logic Technical Support (see Contacting Spectra Logic on page 7).

Note: Activation keys are only needed for the **active node**. Do not install activation keys on the **secondary node**.

The USB device in the documentation kit contains the activation keys for the options that you purchased. If your documentation kit does not contain a USB device, see "Manually Enter Activation Keys" in your *User Guide* for instructions for manually entering the activation keys.

Follow these steps to import the keys.

1. Insert the USB device into a USB port on the back of the system. When the system detects the USB device it automatically imports the activation keys and power cycles the system.

Important Do not remove the USB device until after the system power cycles and the user interface displays a message that it is safe to remove the USB device.

2. Wait while the system performs its power-on sequence and then log into the user interface using the instructions in Log Into the User Interface on page 20.

   Note: The first time that you log in after importing activation keys, an informational message displays indicating that you can now safely remove the USB device. Use the following steps to close the message:

   a. Remove the USB device.

   b. On the menu bar, select **Status ···⁘ Messages**. The messages screen displays.

   c. Select the message about safely removing the USB device, and then select **Action ···⁘ Mark as read**. The informational message closes.

Configure the Data Connections

This section describes using the user interface to configure one or more data connections for the system. The configuration steps are the same for all port types. Data connection configuration for both the primary and secondary master node are configured through the **active node** user interface.

Notes:
- You can create one or more data connections to the system.
- You can configure link aggregation for better performance.
- While different types of Ethernet network interface cards can be installed in the same system, only one type port can be used in each link aggregation configuration.
- You can only use the management port to access the user interface. You cannot use this port for data transfer.

Configure an Aggregate Port Data Connection

Link aggregation uses multiple Ethernet ports, configured with a single MAC address, to improve data transfer speeds. See “Link Aggregation Notes” in your *User Guide* for more information.

Use the following instructions to configure an aggregate port data connection.

1. From the menu bar, select **Configuration ···⁘ Network**, or select the Network pane from the Dashboard screen. The Network screen displays with information about the network connections of the system.

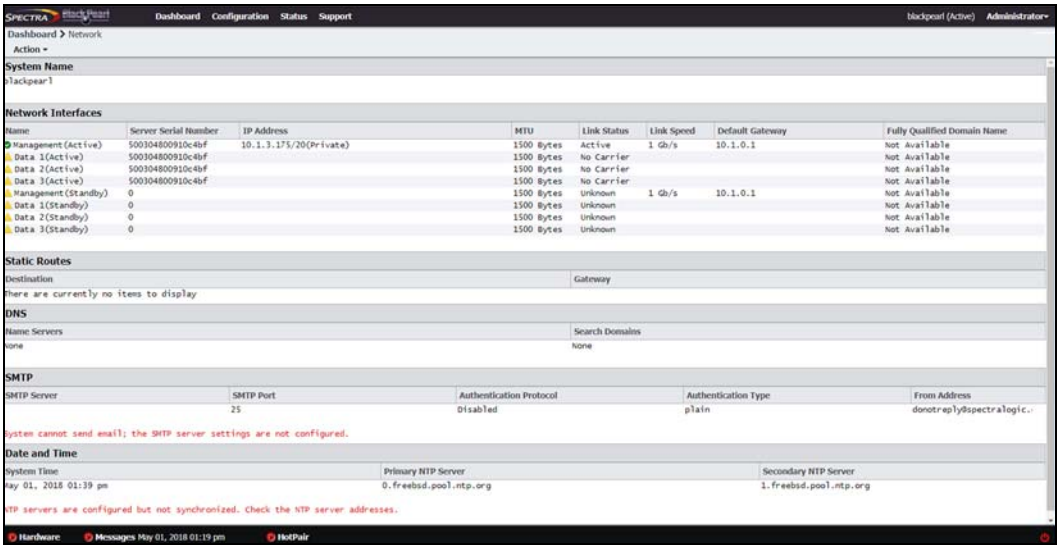

Figure 10 The Network screen.

2. From the menu bar, select **Action ···⁘ New Aggregate Interface**. The New Aggregate Interface dialog box displays.

   Note: Depending on your hardware configuration, the New Aggregate Interface dialog box may look different than what is shown below.

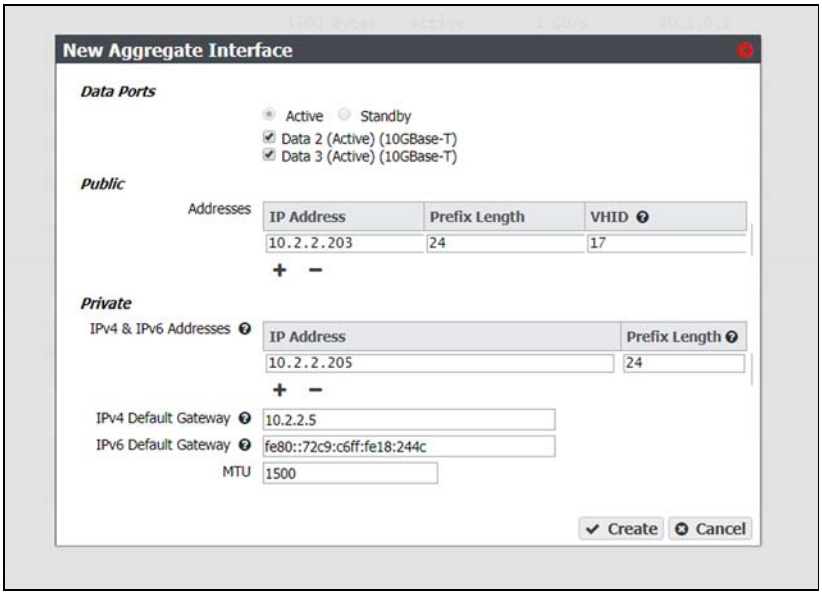

Figure 11 The New Aggregate Interface - Active dialog box.

3. If necessary, select **Active**.

4. Select the **Data Port(s**) you want to configure into an aggregate data interface. Only one type of port can be used in an aggregation. For example, you cannot use both 10 GigE and 40 GigE ports in the same link aggregation.
5. Click the **+** button and enter the following information for the **Public** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.
   - **VHID** - Enter a Virtual Host ID. Acceptable values are 1-25.

Important The VHID entered **must be unique** across all devices in your company's network. The BlackPearl data port connection and management connection **cannot use the same VHID.**

Note: If desired, you can enter **Aliases**, multiple IP addresses, prefix lengths, and VHIDs assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

6. Click the **+** button and enter the following information for the **Private** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.

   Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.
7. Enter the **IPv4 Default Gateway** and **IPv6 Default Gateway**.

   Note: The IPv4 and IPv6 gateway entered for the last configured connection sets the default gateways for the system.
8. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.
9. Click **Create**.
10. From the menu bar, select **Action ⋯⁘ New Aggregate Interface**. The New Aggregate Interface dialog box displays.

11. If necessary, select **Standby**.

    Note: Depending on your hardware configuration, the New Aggregate Interface dialog box may look different than what is shown below.

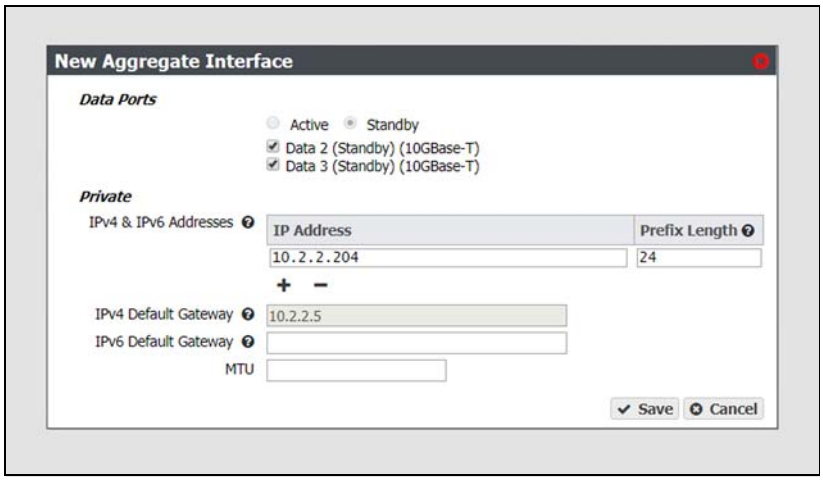

Figure 12 The New Aggregate Interface - Standby dialog box.

12. Select the same **Data Port(s**) you selected when configuring the **active data connection** (see Step 4 on page 24).

13. Click the **+** button and enter the following information for the **Private** addressing on the **standby node**:

    - **IP Address** — Enter a valid IPv4 or IPv6 address.
    - **Prefix Length** — Enter the subnet mask.

    Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths, assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

14. If desired, enter the **IPv6 Default Gateway**.

    Note: The IPv4 Default Gateway is configured when creating the active data aggregate interface and cannot be changed.

15. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.

16. Click **Create**.

Configure a Single Port Data Connection

Use the following instructions to configure a single port data connection.

1. From the menu bar, select **Configuration ⋯ Network**, or select the Network pane from the Dashboard screen. The Network screen displays. See Figure 10 on page 23.

2. Double-click the Data # (Active) row in the Network Interfaces pane for the port you want to configure, or select the Data # (Active) row and select **Action ⋯⁘ Edit** from the menu bar. The Edit Data # (Active) dialog box displays.

   Note: Depending on your hardware configuration, the Edit Data # (Active) dialog box may look different than what is shown below.

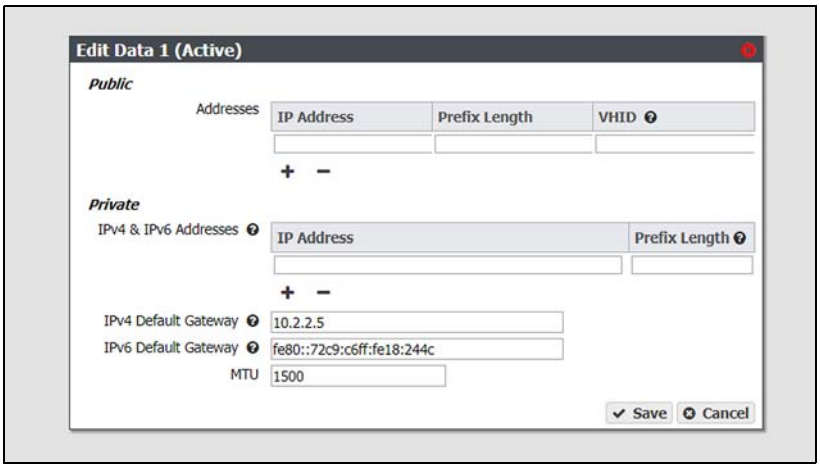

Figure 13 The Edit Data # (Active) dialog box.

3. Click the **+** button and enter the following information to configure the **Public** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.
   - **VHID** - Enter a Virtual Host ID. Acceptable values are 1-25.

Important The VHID entered **must be unique** across all devices in your company's network. The BlackPearl data port connection and management connection **cannot use the same VHID.**

   Note: If desired, you can enter **Aliases**, multiple IP addresses, prefix lengths, and VHIDs assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

4. Click the **+** button and enter the following information for the **Private** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.

   Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

5. Enter the **IPv4 Default Gateway** and **IPv6 Default Gateway**.

   Note: The IPv4 and IPv6 gateway entered for the last configured connection sets the default gateways for the system.

6. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.

7. Click **Save**.

8. Double-click the Data # (Standby) row in the Network Interfaces pane for the same port you just configured on the **active node**, or select the Data # (Standby) row and select **Action ⋯ Edit** from the menu bar. The Edit Data # (Standby) dialog box displays.

   Note: Depending on your hardware configuration, the Edit Data # (Standby) dialog box may look different than what is shown below.

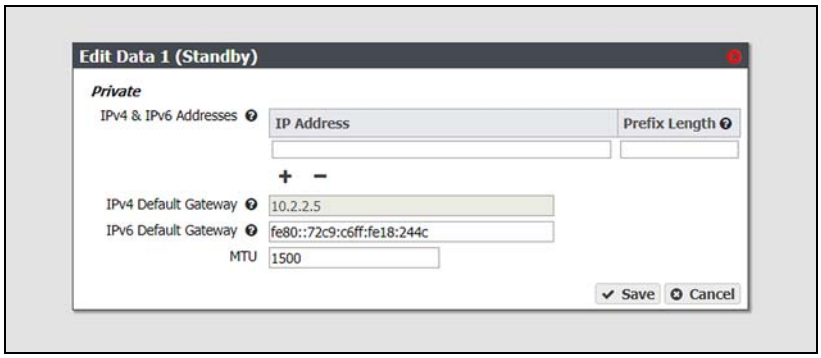

Figure 14 The Edit Data # (Standby) dialog box.

9. Click the **+** button and enter the following information for the **Private** addressing:

   - **IPv4 and IPv6 Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.

   Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

10. If desired, enter the **IPv6 Default Gateway**.

    Note: The IPv4 Default Gateway is configured when creating the active data interface and cannot be changed.

11. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.

12. Click **Save**.

Configure a Static Route

The system only supports communication with one default gateway. When configuring a system with multiple data connections, each connection communicates via the gateway entered when the connection was configured. The gateway entered for the last configured connection sets the default gateway for the system.

When configuring a system with multiple data connections, if each data connection only communicates with its own network, a static route is not required. When an additional network or external network is only available from one, but not all, of the data connections configured on the system, a static route is required in order for the system to communicate to the additional network.

For example, if one data connection is on the 10.2.2.x network and another connection is on the 10.2.4.x network, when the 10.2.3.x network is connected externally to the 10.2.4.x network, a static route must be configured on the system to route communication with the 10.2.3.x network through the data connection on the 10.2.4.x network.

After creating the static route to the isolated network, you must create additional static routes to each specific host computer on the isolated network. If the system receives a request from an IP address that is not configured to a static route, then the request is sent to the default gateway. If the default gateway is not connected to the IP address for isolation reasons, the request fails.

Use the instructions in this section to configure a static route.

1. From the menu bar, select **Configuration ⋯⁘ Network**, or select the Network pane from the Dashboard screen. The Network screen displays (see Figure 10 on page 23).
2. From the menu bar, select **Action ⋯⁘ New Static Route**. The Static Route dialog box displays.

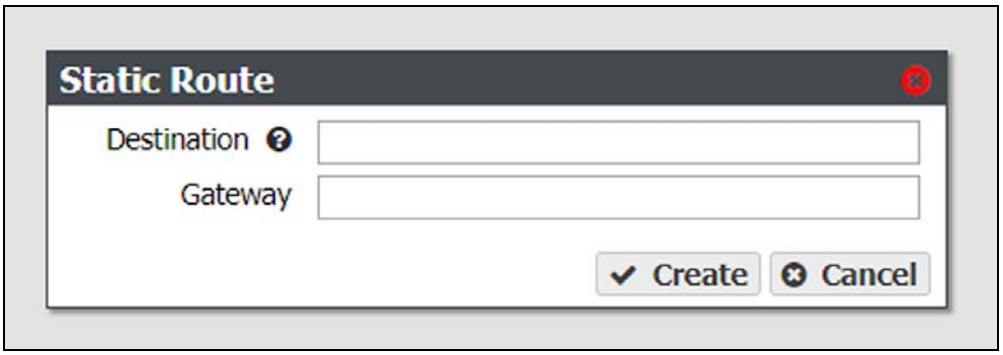

Figure 15 The Static Route dialog box.

3. In the **Destination** field, enter either an IPv4 host address or network address that you want to access through the data connection.
4. Enter the **Gateway** of the data connection used to communicate with the isolated network.

5. Click **Create**.
6. Repeat Step 2 through Step 5 for each host computer on the isolated network.

Configure the Public Management Port

1. From the menu bar, select **Configuration ···⁘ Network**, or click the Network pane on the Dashboard screen. The Network screen displays. See Figure 10 on page 23.
2. In the Network Interfaces pane, select the Management (Active) row, and then select **Action ···⁘ Edit**. The Edit Management (Active) dialog box displays.

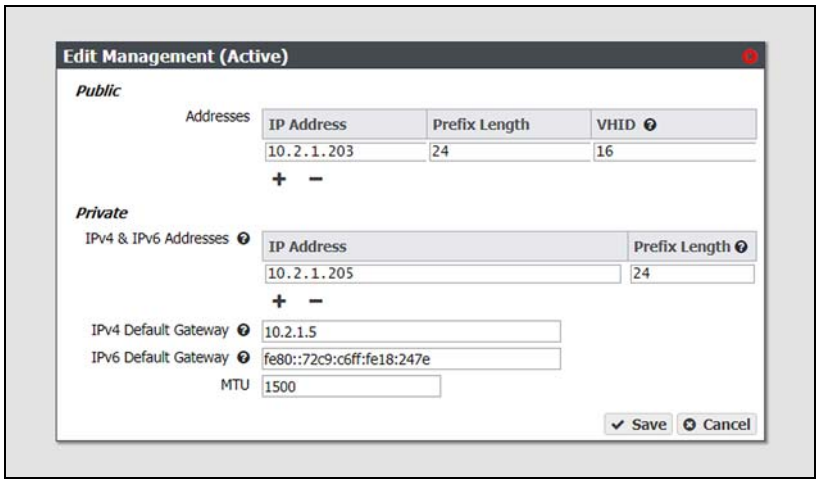

Figure 16 The Edit Management (Active) dialog box.

3. Click the **+** button and enter the following information to configure the **Public** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.
   - **VHID** — Enter a Virtual Host ID. Acceptable values are 1-25.

Important The VHID entered **must be unique** across all devices in your company's network. The BlackPearl data port connection and management connection **cannot use the same VHID.**

Note: If desired, you can enter **Aliases**, multiple IP addresses, prefix lengths, and VHIDs assigned to the **public** management port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.

4. Click the **+** button and enter the following information for the **Private** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.

   Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.
5. Enter the **IPv4 Default Gateway** and **IPv6 Default Gateway**.

   Note: The gateway entered for the last configured connection sets the default gateway for the system.
6. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.
7. Click **Save**.

Configure the Private Management Port for the Standby Node

This section configures the private management port for the **standby node**. The configuration is done through the **active node** user interface.

1. From the menu bar, select **Configuration ⋯⁘ Network**, or click the Network pane on the Dashboard screen. The Network screen displays. See Figure 10 on page 23.
2. In the Network Interfaces pane, select the Management (Standby) row, and then select **Action ⋯⁘ Edit**. The Edit Management (Standby) dialog box displays.

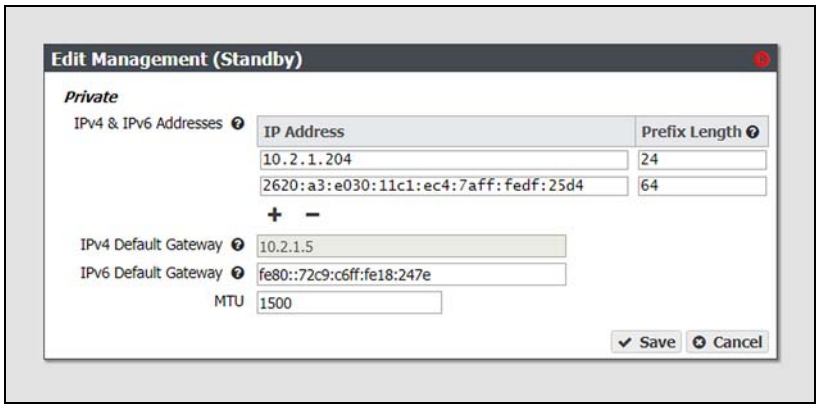

Figure 17 The Edit Private Management (Standby) dialog box.

3. Click the **+** button and enter the following information for the **Private** addressing:
   - **IP Address** — Enter a valid IPv4 or IPv6 address.
   - **Prefix Length** — Enter the subnet mask.

   Note: If desired, you can enter **Aliases**, multiple IP addresses and prefix lengths assigned to the data port. Use the **+** button to add a row for each alias. You can configure a maximum of 16 aliases.
4. If desired, enter the **IPv6 Default Gateway**.

   Note: The IPv4 Default Gateway is configured when creating the active data interface and cannot be changed.
5. Change the **MTU** (Maximum Transmission Unit) value, if desired. If you set the MTU value to something other than 1500, ensure that your switch configuration supports larger MTU settings, as well as all the hosts on the network.
6. Click **Save**.

CONFIGURE OTHER SYSTEM OPTIONS

Use your *User Guide* to configure all other system features including date and time, DNS, one or more storage pool(s), volumes, shares, and Advanced Bucket Management, if applicable. Then return to this document to complete the HotPair setup.

COMPLETE THE HOTPAIR SETUP

After configuring all system features including at least one storage pool, complete the HotPair setup by initiating an RSC backup and powering on the **secondary master node.**

Important It is important to create an RSC backup before powering on the **secondary master node**. The **secondary master node** will not initialize correctly if an up to date RSC backup is not available when the **secondary master node** is powered on.

Initiate an RSC Backup

The replicated system configuration (RSC) backup stores the current configuration of all settings for the system on a storage pool present in the system.

Use the instructions in this section to manually backup the system configuration.

1. From the menu bar, select **Support ···⁘ Tools ···⁘ Data Integrity Verification.** The Data Integrity Verification screen displays.

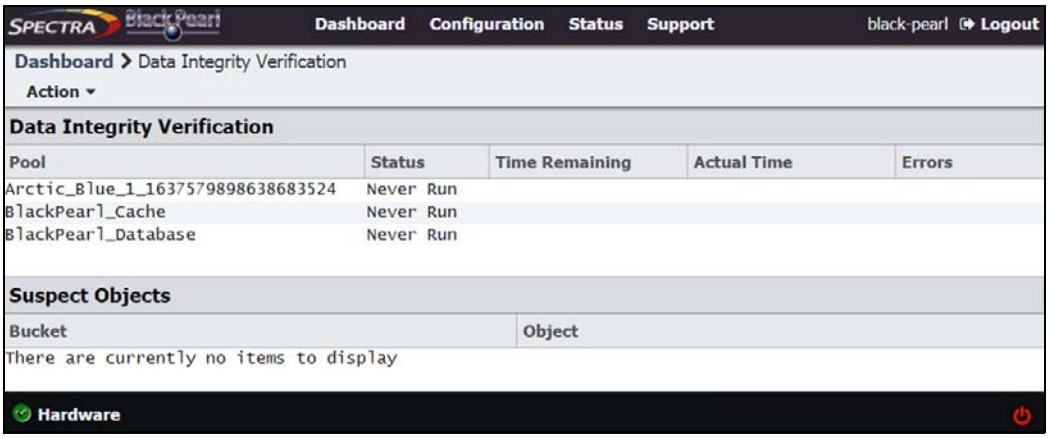

Figure 18 The Data Integrity Verification screen.

2. Select **Action ···⁘ Initiate RSC Backup.** A confirmation screen displays.
3. Click **Initiate RSC Backup** to manually backup the current system configuration.

Power on the Secondary Master Node

Remove the front bezel on the **secondary master node**, and then gently press the power button on the front panel (see Figure 5 on page 17). The power LED illuminates indicating that power is on.

Wait while the system completes its power-on sequence, which takes approximately five minutes.

VERIFY THE HOTPAIR CONFIGURATION

After powering-on the **secondary master node**, use the steps in this section to confirm that the HotPair configuration works as expected.

1. Open a web browser on a computer on an active network that has access to the system.
2. Enter the IP address of the **public management port** in the browser address bar using the IP address of the public management port you configured in Configure the Public Management Port on page 29.
3. Log into the user interface using the instructions in Log Into the User Interface on page 20.

4. On the status bar at the bottom of the Dashboard, confirm that the HotPair configuration shows good status.

Figure 19 HotPair status on the Dashboard.

5. If the HotPair configuration shows an error, contact Spectra Logic Technical Support (see Contacting Spectra Logic on page 7).
6. If desired, you can force a failover to further test the HotPair configuration. See Force a Failover on page 34.

FAILOVER

If the **active node** fails, the **standby node** automatically detects the failure, restores the configuration contained in the RSC backup, reboots, and takes over as the **active node**. There is no manual intervention required.

When the **original active node** is repaired and powered on, it becomes the **standby node** until another failover.

Important When connected to a BlackPearl expansion node, the secondary master node always displays failures for the expansion node fans. This is because the fan status is not reported over the **Front Sec** and **Rear Sec** ports. Ignore the critical status or, when the **primary master node** is again available, force a failover so that it becomes the **active node**.

Force a Failover

1. Power off the **active node** without first powering off the **standby node** (see Shutdown the Active Node on page 36).

   Wait while the **standby node** automatically detects the failure, restores the configuration contained in the RSC backup, reboots, and takes over as the **active node**, approximately 5 minutes.

2. Power on the **original active node** by removing the front bezel and then gently pressing the power button on the front panel (see Figure 5 on page 17).

Verify the Failover

If desired, use the following steps to verify that a failover was successful.

1. Enter the IP address of the public management port in the browser address bar using the IP address of the public management port you configured in Configure the Public Management Port on page 29.
2. Enter the login username and password.

   The default username is **Administrator**. The default password is **spectra**. The fields are case sensitive.

3. Click ⋯ to log in.
4. From the menu bar, select **Configuration ⋯ Network**, or select the Network pane from the Dashboard screen. The Network screen displays (Figure 10 on page 23).
5. Determine whether the **primary master node** or the **secondary master node** is now the **active node** and verify that the correct IP addresses display in the Management (Active) row and the Management (Standby) row.
6. From the menu bar, select **Status ⋯ Hardware** or click the Hardware pane on the Dashboard, or click the Hardware link on the status bar. The Hardware screen displays (seeFigure 9 on page 21). Verify the following:

   - The correct number of expansion modules displays.
   - Each expansion module displays the correct number of drives.

ADDITIONAL CHANGES

If you make subsequent configuration changes to the **active node**, you should manually perform an RSC backup (see Complete the HotPair Setup on page 31) to ensure the changes are propagated to the **standby node** in the event of a failure. An RSC backup is automatically created once per week and after creating a new storage pool. An RSC backup is not created when editing a storage pool.

Important It is important to create an RSC backup after making any configuration changes that do not automatically create an RSC backup. The HotPair failover will fail if the RSC backup is not up to date when the **active node** fails.

POWER OFF THE HOTPAIR SYSTEM

Use the following instructions to shutdown a HotPair configuration using the user interface.

1. From the menu bar, select **Configuration ⋯ Network**, or select the Network pane from the Dashboard screen. The Network screen displays with information about the network connections of the system (Figure 10 on page 23).
2. Note the Management (Standby) private IP address and the Management (Active) private IP address.

Shutdown the Standby Node

1. Open a web browser on a computer on an active network that has access to the system.
2. Enter the Management (Standby) private IP address in the browser address bar.
3. Enter the login username and password.

   The default username is **Administrator**. The default password is **spectra**. The fields are case sensitive.
4. Click ⋯ to log in.
5. Click the power icon in the lower right-hand corner of any screen in the user interface. The Power screen displays.

Figure 20 The Power icon (BlackPearl user interface shown).

6. Click **Shutdown**.

7. A confirmation screen appears. Confirm the selection to perform the shutdown.

Shutdown the Active Node

1. If necessary, log into the user interface using the Management (Active) private IP address. See Log Into the User Interface on page 20.
2. Click the power icon in the lower right-hand corner of any screen in the user interface (See Figure 20). The Power screen displays.
3. Click **Shutdown**.
4. A confirmation screen appears. Confirm the selection to perform the shutdown.

Shutdown the Expansion Nodes

Power off BlackPearl expansion nodes by removing the front bezel and then gently pressing the power button on the front panel (see Figure 5 on page 17). Replace the front bezel.

Power off 96-drive disk solution(s) by unplugging the power cords at the rear of the chassis.

Power off 107-drive disk solution(s) by removing the right side bezel cover and pressing the power button accessible through the cutout on the right side of the bezel. Replace the bezel side cover

Note: To power on the HotPair solution, use the instructions in Power On the Expansion Node(s) and Primary Master Node.

IPMI Configuration

This appendix provides instructions for configuring IPMI for the BlackPearl system using the system BIOS.

Caution **DO NOT** make any changes in the BIOS other than changing the IPMI settings as described below. Changing any other setting is not supported by Spectra Logic and may cause adverse system performance.

1. If the BlackPearl system is currently powered on, shut down the system as described in the *User Guide* for your system.
2. Connect a monitor and USB keyboard to the rear of the master node. See Figure 1 on page 10 to locate the monitor and USB connectors.
3. Power on the system as described in Power On the Expansion Node(s) and Primary Master Node on page 16.
4. When prompted by the system, press **DEL** to enter the system BIOS.

   Note: The system only displays this prompt for a few seconds. If you do not press **DEL** in time to enter the BIOS, let the system complete it's boot process, then reboot the system and repeat Step 4.

5. Using the keyboard, navigate to the **IPMI** tab and then select **BMC Network Configuration**. The current settings of the BMC configuration display.

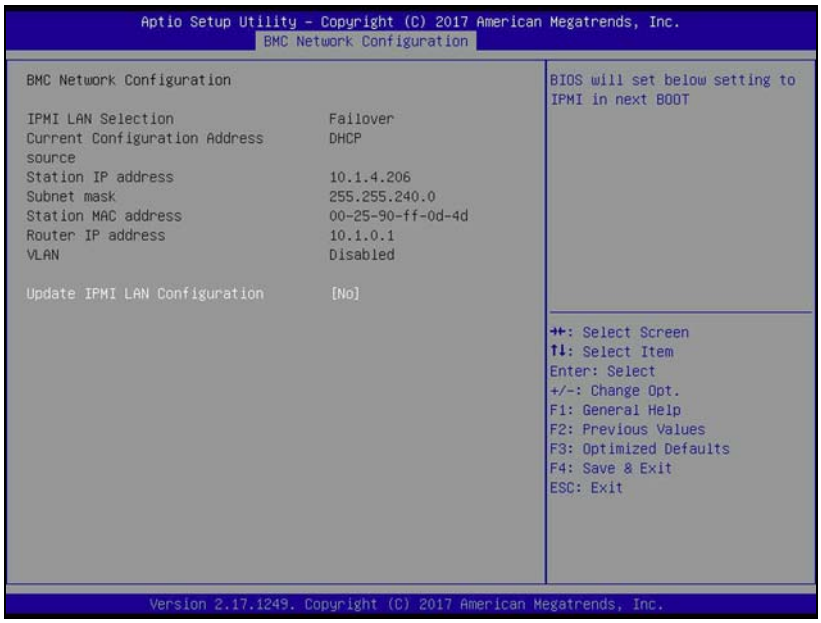

Figure 21 The BMC Configuration screen.

6. Using the keyboard, select **Update IMPI LAN Configuration**. A confirmation window displays. Select **YES** to continue. The current IPMI settings display.

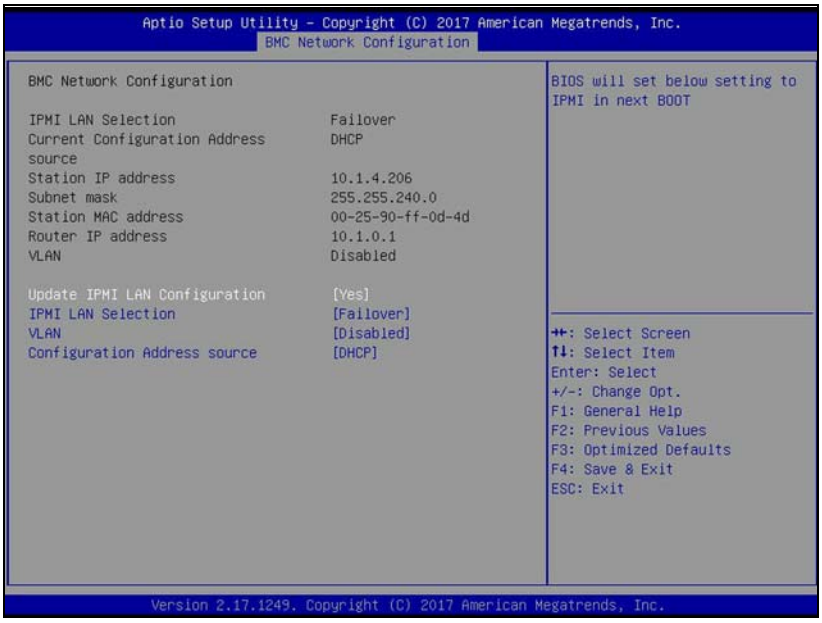

Figure 22 Current IPMI settings.

7. If desired, select **IPMI LAN Selection**. Change the configured setting as needed.
   - **Dedicated** - Always uses the dedicated IPMI port for IPMI traffic.
   - **Shared** - Always uses the LAN1 port for IPMI traffic.
   - **Failover** - On system startup, detect if the dedicated IPMI port is connected. If not, the system uses the LAN1 port for IPMI traffic.
8. If desired, select **VLAN** to enable or disable VLAN as needed.
9. To change the IPMI address settings, select **Configuration Address source**. The current address source information displays.
10. Select **Static** or **DHCP** addressing.
    - If you select **DHCP**, skip to Step 12.
    - If you select **Static**, IP addressing fields display.

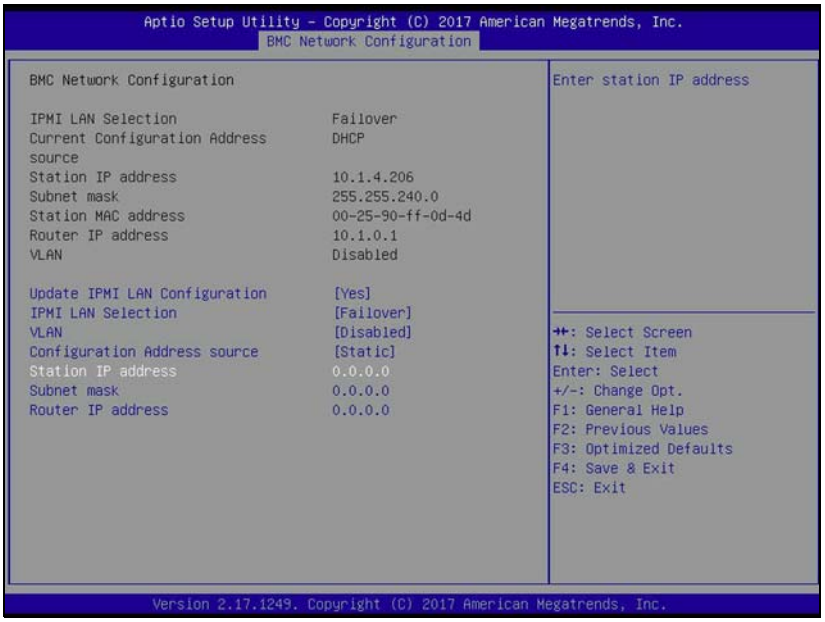

Figure 23 Enter Static IP information.

11. Configure the **Station IP address**, **Subnet mask**, and **Router IP address** with the desired address values.

    Note: Only IPv4 addresses are valid.
12. Press **F4** to exit the BIOS and save the entered settings. The BlackPearl system reboots.