Oracle® ZFS Storage Appliance Cabling Guide

For ZS5-x, ZS4-4, ZS3-x, 7x20 Controllers, and DEx-24, Sun Disk Shelves, Release OS8.7.0

Part No: E78911-02
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Oracle ZFS Storage Appliance Cabling Guide

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Contents

Getting Started with Cabling

Appliance cabling comprises connections to the controller service processor (SP) network cabling, cabling between disk shelves and controllers, and cabling for cluster configuration. To access initial setup and configuration, you make a network or serial connection to Oracle Integrated Lights Out Manager (ILOM), located in the SP. All disk shelf and controller cabling must be completed before you can begin power-on and initial configuration.

The cabling configuration for your appliance depends on the number and type of controllers and disk shelves, as well as the number of host bus adapters (HBAs) in your system. Disk shelves attach to other disk shelves with daisy-chained serial attached SCSI (SAS) cables. Controllers attach to each disk shelf chain with a longer SAS cable connected via HBAs located in specified PCIe slots of the controllers. The cabling methodology designed for the appliance includes bottom-to-top cabling for easier growth with optimum safety, strategic slot placement for optimum load distribution and performance, and interface redundancy for clustered controllers, ensuring no single point of failure (NSPF).

Disk shelves can be added to established standalone or clustered configurations without powering down the appliance or loss of service to clients. For more information, see "Adding a New Disk Shelf" in *Oracle ZFS Storage Appliance Customer Service Manual*. After connecting the disk shelves, verify that you have redundant paths to each disk shelf.

To get started with cabling, use the following sections:

Caution - Improper orientation of mini-SAS HD cables during installation can damage the HBA connector and cause the HBA to malfunction. These cables are used with 4X4 port SAS-2 HBAs and 4X4 port SAS-3 HBAs. Position the blue release tab downward for horizontally mounted HBAs or to the right for vertically mounted HBAs. For detailed information, see "Cabling Disk Shelves Together" on page 27 and "Cabling Controllers to Disk Shelves in a Base Cabinet" on page 36.

To view cabling diagrams for standalone and clustered controllers, use the following sections:

Oracle DE3-24 Disk Shelves to 4X4 Port SAS-3 HBAs

Oracle DE2-24 Disk Shelves to 4X4 Port SAS-2 HBAs

Oracle DE2-24 Disk Shelves to 2X4 Port SAS-2 HBAs

Sun Disk Shelves

Mixed DE3-24 and DE2-24 Disk Shelves

Cabinet and Cabling Guidelines

This section contains guidelines for properly placing and connecting the disk shelves.

Cabinet Configuration

- For safety reasons, mount the heaviest equipment, typically disk shelves, at the bottom of the cabinet. Refer to the appropriate Oracle Safety and Compliance Guide for rack-mounting guidelines.
- To best prepare for cabling controllers to disk shelves, now and in the future, mount controllers in the middle of the cabinet. This also allows for optimal air circulation, whether in a floor- or ceiling-cooled environment.
- Do not remove cabinet panels to run cables between cabinets.

Load Distribution

- Balance the number of disk shelves across the disk chains in your system.
- Balance the number of disk chains across the number of HBAs in your system. For example, attaching two chains to two separate HBAs will have better performance than attaching two chains to a single HBA.
- Do not mix disks with different capacities or rotation speeds within a single disk shelf.
- To maximize performance, use the maximum number of disk chains supported by the controller's SAS HBAs. For example, four SAS HBAs with eight chains and eight disk shelves will have better performance than two SAS HBAs with four chains and eight disk shelves.
- To maximize performance, do not attach more than four DE2-24C, DE2-24P, or DE3-24C disk shelves to a single chain, and do not attach more than three DE3-24P disk shelves to a single chain. This only applies to systems that are performance critical. The maximum of six disk shelves per chain is available for cases where capacity is preferred over performance.

HBA Support for Disk Shelves

Disk shelves may require adding or replacing HBAs in your configuration. For HBA maintenance procedures for each controller, see *Oracle ZFS Storage Appliance Customer Service Manual*.

- A SAS-2 HBA always operates at SAS-2 interface speeds, whether it is directly attached to DE2-24 or DE3-24 disk shelves, or whether the disk chain includes all DE2-24, all DE3-24, or an intermix of DE2-24 and DE3-24 disk shelves.
- A SAS-3 HBA always operates at SAS-2 interface speeds if directly attached to a DE2-24 disk shelf.
- A SAS-3 HBA always operates at SAS-3 interface speeds if directly attached to a DE3-24 disk shelf, or when the disk chain comprises all DE3-24 disk shelves.
- Aggregate bandwidth should be based on SAS-2 interface speeds when mixing DE2-24 and DE3-24 disk shelves in a disk chain connected to a SAS-3 HBA.

Cable Lengths

- The maximum cable length between DE3-24 disk shelves is three meters.
- The maximum cable length is six meters between DE3-24 disk shelves in a single chain that spans two adjacent cabinets.
- The maximum cable length between DE2-24 disk shelves is three meters.
- The maximum cable length between Sun Disk Shelves is three meters.
- The maximum cable length between a controller and disk shelves is six meters.

All-Flash Disk Shelves

Oracle ZFS Storage Appliance all-flash disk shelves contain only SSDs, and utilize all-flash pools (AFP). To maximize performance, observe the following guidelines:

- Connect all-flash disk shelves to an exclusive SAS-3 HBA. Do not attach all-flash and non-all-flash disk shelves to the same SAS-3 HBA.
- Connect a maximum of two all-flash disk shelves in a single chain.
- Spread disk chains across as many SAS-3 HBAs as allowed by the system.
- Segregate all-flash disk chains from non-all-flash disk chains. For example, do not mix all-flash DE3-24P disk shelves in a chain with DE3-24C disk shelves.
- Only connect all-flash disk shelves to a SAS-3 HBA in the controller, and use SAS-3 qualified cabling (do not use SAS-2 cabling).

Disk Shelf Installation and Upgrade Considerations

- **Installing a new system** - To maximize performance, avoid intermixing DE3-24 and DE2-24 disk shelves when installing a new system. Exclusively use a SAS-3 HBA, DE3-24 disk shelves, and associated SAS-3 cabling to take advantage of the high performance SAS-3 fabric.
- **Upgrading a system** - When upgrading a system, choose the mixture of disk shelves according to your storage needs:
  - **Upgrading an obsolete component** - Replace the obsolete component and its associated components, which could be the SAS HBA, or disk shelf, and respective cabling. When possible for your system, add SAS-3 fabric components.
  - **Segregating the upgrade for increased performance** - If a controller has empty HBA slots, add SAS-3 HBAs (if supported by the controller model), DE3-24 disk shelves, and associated cabling.
  - **Maximizing performance** - Upgrade all components, possibly including controllers, to support an all DE3-24 disk shelf configuration with SAS-3 HBAs in the controller, and appropriate cabling.

Maximizing Performance with Intermixed DEx-24 Disk Shelves

To maximize performance when mixing DE3-24 and DE2-24 disk shelves, observe the following guidelines:

- A disk chain should ideally contain only DE3-24 or DE2-24 disk shelves.
- Attach SAS-3 HBAs to DE3-24 disk shelves, and attach SAS-2 HBAs to DE2-24 disk shelves.

Cabling for Intermixed DEx-24 Disk Shelves

- **Disk Chain Cables** - The DE2-24 and DE3-24 disk shelves require different cable connectors. Select the correct cables according to the disk shelves being connected:
  - DE2-24 to DE2-24 disk shelf: SFF-8088 connectors on both cable ends
  - DE3-24 to DE3-24 disk shelf: SFF-8644 connectors on both cable ends
  - DE2-24 to DE3-24 disk shelf: SFF-8088 connector on DE2-24 cable end, SFF-8644 connector on DE3-24 cable end
- **HBA Cables** - The different disk shelf types require different cables for connecting to a SAS-3 or SAS-2 HBA. Select the correct cables according to the disk shelves being connected:
  - SAS-3/SAS-2 HBA to DE3-24 disk shelf: SFF-8644 connectors on both cable ends
  - SAS-3/SAS-2 HBA to DE2-24 disk shelf: SFF-8644 connectors on HBA cable end, and SFF-8088 connector on disk shelf end

Intermixing DE2-24 and Sun Disk Shelves

- For controllers that support using DE2-24 and Sun Disk Shelves together, the controller must use 4X4 port SAS-2 HBAs, which are supported as of software release 2013.1.0.
- Do not use DE2-24 and Sun Disk Shelves in the same disk chain.

Supported Disk Shelf Combinations and HBAs

Disk shelves are supported by specific HBAs in the controller, and can be combined in certain configurations within a system. Use the following table to determine the HBA type required by each disk shelf model.

TABLE 1 Required HBA per Disk Shelf Model

Disk Shelf Model	Required HBA
DE3-24P All-Flash	SAS-3 4x4 port HBA
DE3-24 Disk Shelf	SAS-3 4x4 port HBA or SAS-2 4x4 port HBA
DE2-24 Disk Shelf	SAS-3 4x4 port HBA, SAS-2 4x4 port HBA or SAS-2 2x4 port HBA
Sun Disk Shelf	SAS-2 4x4 port HBA or SAS-2 2x4 port HBA
DE2-24 and Sun Disk Shelf together	SAS-2 4x4 port HBA

Disk Shelf Model	Required HBA
	SAS-2 2x4 port HBA for only Sun ZFS Storage 7120

The following table describes the disk shelf models that can be used together for each controller configuration, as of software release OS8.7.0. See “Cabinet and Cabling Guidelines” on page 15 for disk shelf intermixing guidelines and all-flash disk shelf usage. To understand which controllers support which HBA types, see “Maximum Disk Shelves per Controller Configuration” on page 20.

Note - Do not attach all-flash and non-all-flash disk shelves to the same SAS-3 HBA.

TABLE 2 Supported Disk Shelves per Controller Configuration

Controller Configuration	DE3-24P All-Flash	All DE3 Disk Shelves (except All-Flash)	All DE2 Disk Shelves	DE3 and DE2 Disk Shelves	DE2 and Sun Disk Shelves
ZS5-4 with SAS-3 4x4 port HBAs	Yes	Yes	Yes	Yes	No
ZS5-4 with SAS-2 4x4 port HBAs	No	Yes	Yes	Yes	No
ZS5-2 with SAS-3 4x4 port HBAs	Yes	Yes	Yes	Yes	No
ZS5-2 with SAS-2 4x4 port HBAs	No	Yes	Yes	Yes	No
ZS4-4 with SAS-3 4x4 port HBAs	Yes	Yes	Yes	Yes	No
ZS4-4 with SAS-2 4x4 port HBAs	No	Yes	Yes	Yes	No
ZS3-4 with SAS-2 4x4 port HBAs	No	Yes	Yes	Yes	Yes
ZS3-2 with SAS-3 4x4 port HBAs	No	Yes	Yes	Yes	No
ZS3-2 with SAS-2 4x4 port HBAs	No	Yes	Yes	Yes	Yes
7420 with SAS-2 4x4 port HBAs	No	No	Yes	No	Yes

Controller Configuration	DE3-24P All-Flash	All DE3 Disk Shelves (except All-Flash)	All DE2 Disk Shelves	DE3 and DE2 Disk Shelves	DE2 and Sun Disk Shelves
7420 with SAS-2 2x4 port HBAs	No	No	Yes	No	No
7320 with SAS-2 4x4 port HBAs	No	No	Yes	No	Yes
7320 with SAS-2 2x4 port HBAs	No	No	Yes	No	No
7120 with SAS-2 2x4 port HBAs	No	No	Yes	No	Yes

Maximum Disk Shelves per Controller Configuration

When determining how many disk shelves a controller configuration supports, it is important to remember that each disk shelf chain can support up to six disk shelves, and some controller configurations are limited to a specific number of total disk shelves. The following table details the number of supported disk shelf chains per HBA type.

TABLE 3 Supported Disk Shelf Chains per HBA

HBA Type	Number of Disk Shelf Chains per HBA
SAS-3 4x4 port	2
SAS-2 4x4 port	2
SAS-2 2x4 port	1

As of software release OS8.7.0, 4x4 port SAS-3 HBAs and 4x4 port SAS-2 HBAs can be used together in the same system. Controllers cannot simultaneously use 2x4 port SAS-2 HBAs and 4x4 port SAS-2 HBAs. Sun Disk Shelves are not supported in any system that includes a SAS-3 HBA, or a combination of SAS-3 and SAS-2 HBAs.

The following table shows the maximum number of HBAs per controller, and the maximum number of disk shelves supported per controller configuration. Both standalone and clustered controllers support the same maximum number of disk shelves. For information on disk compatibility, see the Oracle Systems Handbook.

TABLE 4 Maximum Number of Disk Shelves per Controller Configuration

Controller	Max. Shelves	Max. 2X4 Port SAS-2 HBA	Max. 4X4 Port SAS-2 HBA	Max. 4X4 Port SAS-3 HBA
ZS5-4	48	NA	4	4
ZS5-2	16	NA	2	2

Controller	Max. Shelves	Max. 2X4 Port SAS-2 HBA	Max. 4X4 Port SAS-2 HBA	Max. 4X4 Port SAS-3 HBA
ZS4-4	36	NA	4	4
ZS3-4	36	NA	4	NA
ZS3-2	16	NA	2	2
7420	36	6	6	NA
7320	6	1	1	NA
7120	2	1	NA	NA

New Appliance Cabling Workflow

When installing a new appliance, this is the installation, cabling, and powering on sequence. To further configure the disk shelves, see "Configuring Storage" in *Oracle ZFS Storage Appliance Administration Guide, Release OS8.7.0*.

▼ Installing, Cabling, and Powering On a New Appliance

1. **Plan for disk shelf and controller placement as described in "Cabinet and Cabling Guidelines" on page 15.**
2. **Install disk shelves into the rack as described in "Installation Overview" in *Oracle ZFS Storage Appliance Installation Guide*. Do not apply power.**
3. **Install controllers into the rack as described in "Installation Overview" in *Oracle ZFS Storage Appliance Installation Guide*. Do not apply power.**
4. **Connect the system cables as described in "Connecting System Cables" on page 22.**
5. **If clustered controllers, connect the cluster cables as described in "Connecting Cluster Cables" on page 23.**
6. **Cable disk shelves to controllers as described in this guide. Locate your controller and disk shelf types, as well as the number of controller HBAs, in "Getting Started with Cabling" on page 13.**
7. **Apply power to disk shelves and controllers, configure the system, and perform the initial configuration as described in "Powering On the Appliance" in *Oracle***

ZFS Storage Appliance Installation Guide **and "Configuring the Appliance for the First Time" in** ***Oracle ZFS Storage Appliance Installation Guide*****.**

Connecting System Cables

Use the following procedure to make a physical serial or network connection to Oracle ILOM.

Use a serial SP connection for system configuration and initial configuration, which enables you to monitor progress, especially during system reboots. Afterward remove the serial connection if you do not need it for CLI access. Instead, make a network SP connection, which allows for better collection of platform data.

Caution - Failure to configure Oracle ILOM connectivity after initial setup may lead to longer than necessary hardware fault diagnosis and resolution times. For more information about Oracle ILOM, see "Changing the Cabling for Oracle ILOM" on page 46.

Before You Begin

Ensure the storage controllers and disk shelves are installed, but not cabled together.

If making a serial connection to the SP (recommended), ensure that you have configured the administrative client as described in "Configuring the System" in *Oracle ZFS Storage Appliance Installation Guide*.

To make a network connection to the SP, your network must have a DHCP server.

Caution - Do not connect the power cables until instructed to do so in "Powering On the Appliance" in *Oracle ZFS Storage Appliance Installation Guide*.

1. **To prepare for system configuration, perform one of the following SP connections:**

   - For a serial SP connection (recommended), attach a serial cable from the SER MGT port on the rear panel of the controller to the serial port on the administrative client. Use a DB9 to RJ45 adapter if necessary.
   - For a network SP connection, attach an Ethernet cable from the NET MGT port on the rear panel of the controller to your Ethernet switch.

   If clustered controllers, repeat for the second controller.

2. **Connect an Ethernet cable from the NET-0 port on the rear panel of the controller to your Ethernet switch.**

   If clustered controllers, repeat for the second controller.

Connecting Cluster Cables

The cluster interface card provides three redundant links that enable two controllers to communicate with each other. The cluster I/O ports consist of two serial links (0,1) and an Ethernet link. (See “Controller Cluster I/O Ports” on page 25) Cluster cabling must be done before powering on either controller, and all three links must be established before configuration can proceed.

Before You Begin

Gather the three Ethernet cables that were supplied for connecting clustered controllers. The ZS5-x cluster cables are 2.5-meters in length. Cluster cables or other controllers are 1-meter in length. If supplying your own Ethernet cables, ensure they are straight-through, Category 5 or better, and the correct length.

1. **Connect the cluster serial ports of each controller to form a crossover pattern:**

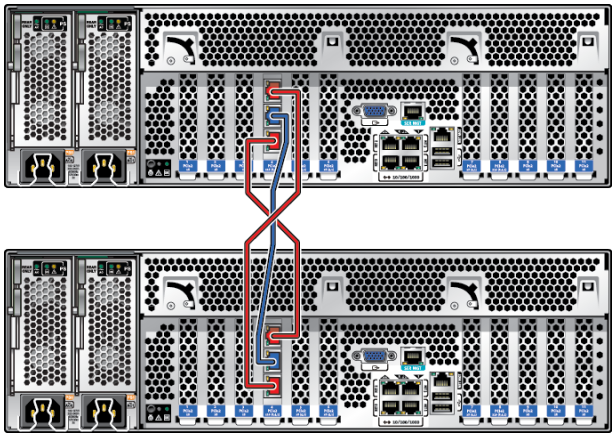
   a. **Connect one Ethernet cable between serial port 0 of one controller and serial port 1 of the other controller.**

   b. **Connect another Ethernet cable between serial port 1 of one controller and serial port 0 of the other controller.**

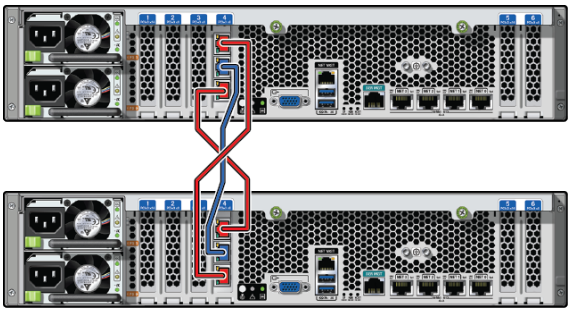
      The cables between the serial ports form a crossover pattern, as shown in the following illustrations.

2. **Connect one Ethernet cable between the Ethernet ports of each controller.**

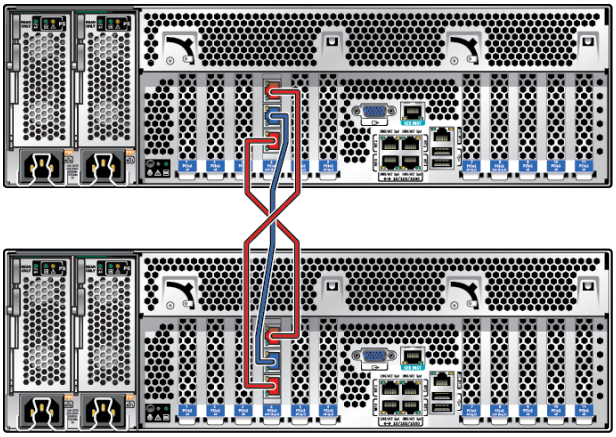
   The following figure shows cluster cabling between two ZS5-4 controllers.



The following figure shows cluster cabling between two ZS5-2 controllers.

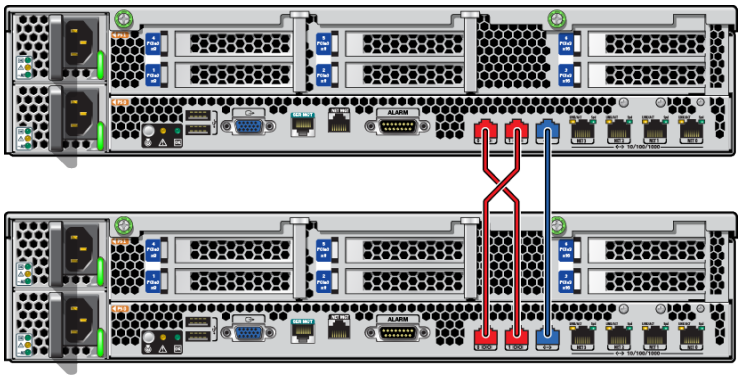


The following figure shows cluster cabling between two ZS4-4 controllers.



Note - The cluster card for ZS3-4 and 7420 is installed in the Cluster slot, as described in the hardware overview for each controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

The following figure shows cluster cabling between two ZS3-2 controllers.



Controller Cluster I/O Ports

The controllers provide three redundant cluster links: two serial links and an Ethernet link. For the location of these cluster ports, see the hardware overview for the appropriate controller.

The following diagram illustrates the cluster serial and Ethernet ports for ZS5-4, ZS5-2, ZS4-4, ZS3-4, and 7x20 controllers.

FIGURE 1 ZS5-4, ZS5-2, ZS4-4, ZS3-4, and 7x20 Controller Cluster I/O Ports

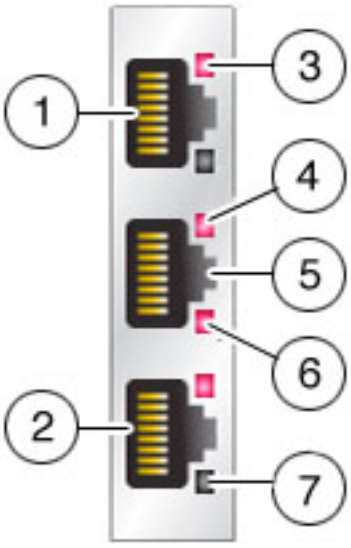


Figure Legend			
1 Serial 1	2 Serial 0	3 Serial Activity LED	4 Ethernet Activity LED
5 Ethernet	6 Ethernet Status LED	7 Serial Status LED	

The following diagram illustrates the cluster serial and Ethernet ports for ZS3-2 controllers.

FIGURE 2 ZS3-2 Controller Cluster I/O Ports

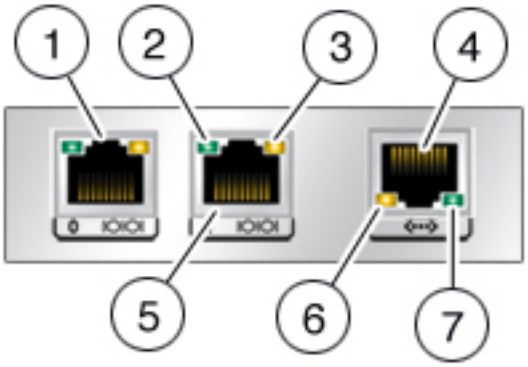


Figure Legend			
1 Serial 0	2 Serial Activity LED	3 Serial Status LED	4 Ethernet
5 Serial 1	6 Ethernet Status LED	7 Ethernet Activity LED	

▼ Cabling Disk Shelves Together

Use the following procedure to cable disk shelves together in a rack. For DEx-24P disk shelves, use one-meter (3.28-foot) cables; and for DEx-24C and Sun Disk Shelves, use two-meter (6.56-foot) cables. The maximum allowable cable length between disk shelves is three meters (9.84 feet).

1. **Locate the appropriate cabling diagram for your system in "Getting Started with Cabling" on page 13.**

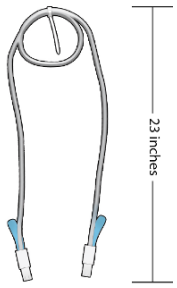
2. **Starting in the middle of a disk shelf cable, make the appropriate number of loose 12.7-centimeter (5-inch) diameter loops, and attach a cable tie to secure them as shown in the following illustration.**

   Use these guidelines for creating the loops:

   - 1-meter cable length - 2 loops

- 2-meter cable length - 3 loops
- 3-meter cable length - 4 loops

The length between the cable tie and the cable ends should be approximately 0.58 meters (23 inches).



3. **Facing the rear of the rack and starting with the uppermost disk shelf, hold the cable loops to the side of the rack, choosing the side closest to the disk shelf cabling ports.**

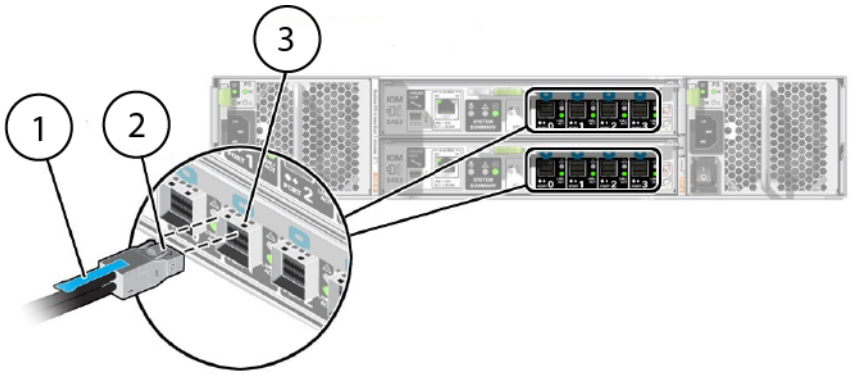
   The cable tie should face the rear of the rack to maximize the cable length.

4. **Extend the upper end of the cable to the rack rail above the uppermost disk shelf, and ensure that the cable leaves enough clearance to remove the power supply.**

5. **Connect that cable end to the appropriate port in the uppermost disk shelf.**

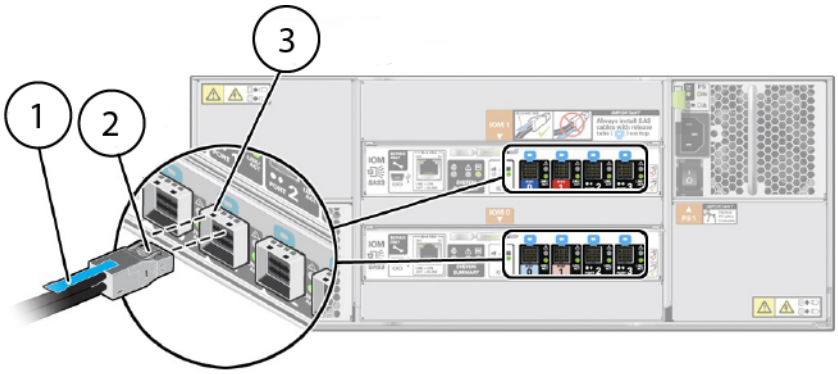
   Refer to the appropriate cabling diagram to identify the disk shelf port. When attaching a cable to a DEx-24 disk shelf, position the blue release tab correctly for the disk shelf type and I/O Module, and ensure that the cable connector latches engage in the port.

Attaching a Mini-SAS HD Cable to a DE3-24P Disk Shelf



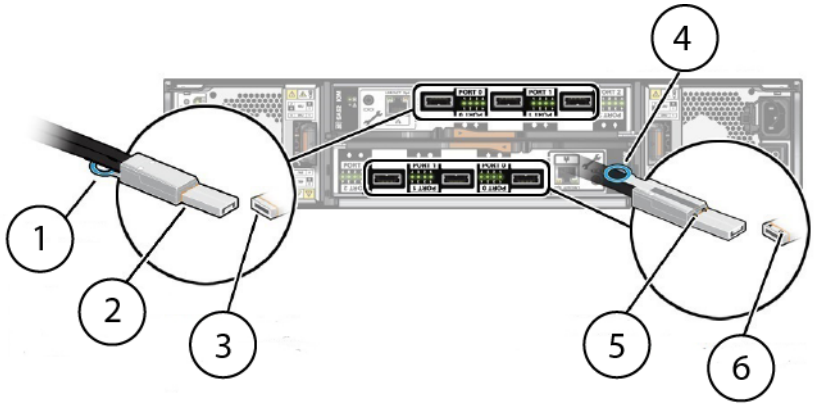
Callout	Description
1	Blue release tab
2	Cable connector latches
3	IOM 0/IOM 1 port latch receiver holes

Attaching a Mini-SAS HD Cable to a DE3-24C Disk Shelf



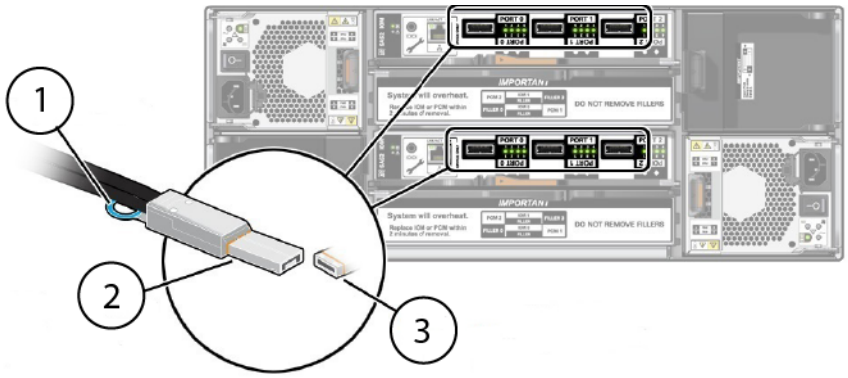
Callout	Description
1	Blue release tab
2	Cable connector latches
3	IOM 0/IOM 1 port latch receiver holes

Attaching a Mini-SAS Cable to a DE2-24P Disk Shelf



Callout	Description
1	Blue release tab
2	Cable connector latches (underneath)
3	IOM 1 port latch receiver holes (underneath)
4	Blue release tab
5	Cable connector latches
6	IOM 0 port latch receiver holes

Attaching a Mini-SAS Cable to a DE2-24C Disk Shelf



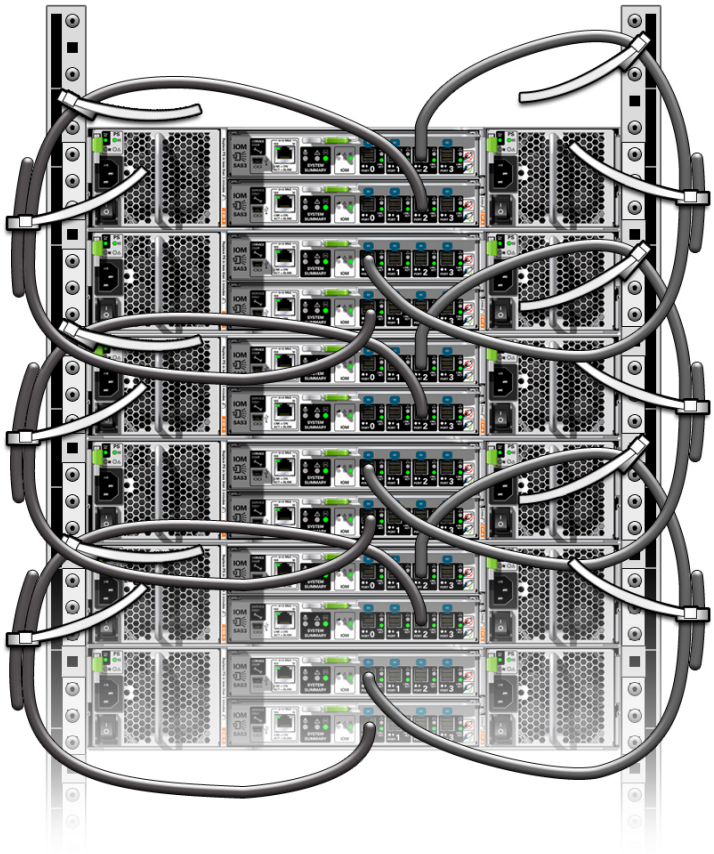
Callout	Description
1	Blue release tab
2	Cable connector latches (underneath)
3	IOM 0/IOM 1 port latch receiver holes (underneath)

6. **Slide the coiled cable between the vertical rack rail and the rack side panel, ensuring that the cable tie is still facing the rear of the rack.**

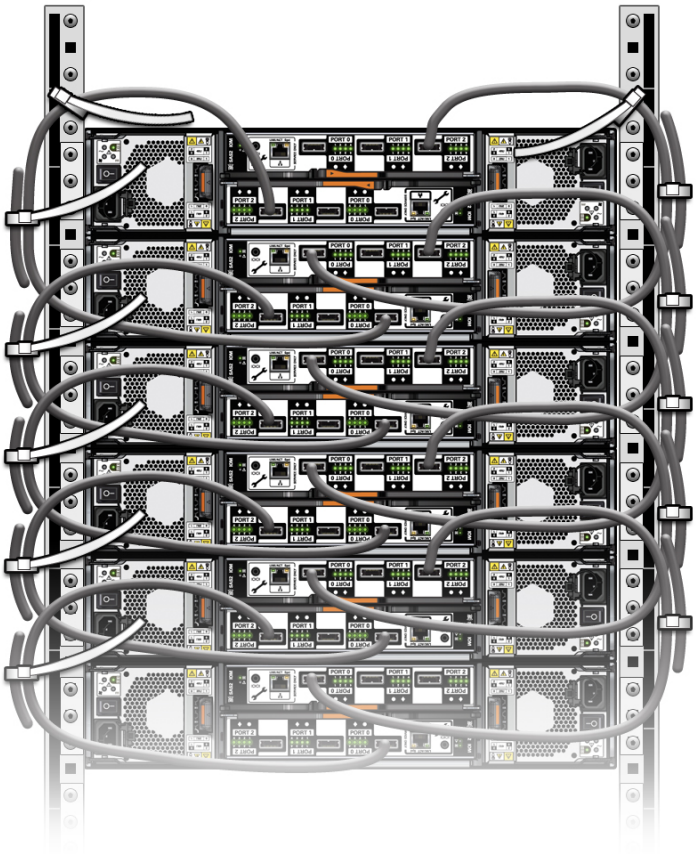
7. **Verify clearance for power supply removal, and then connect the other end of the cable to the appropriate port in the appropriate disk shelf.**

8. **Use another cable tie to secure the upper end of the cable to a rack rail mounting hole that is slightly above the uppermost disk shelf.**

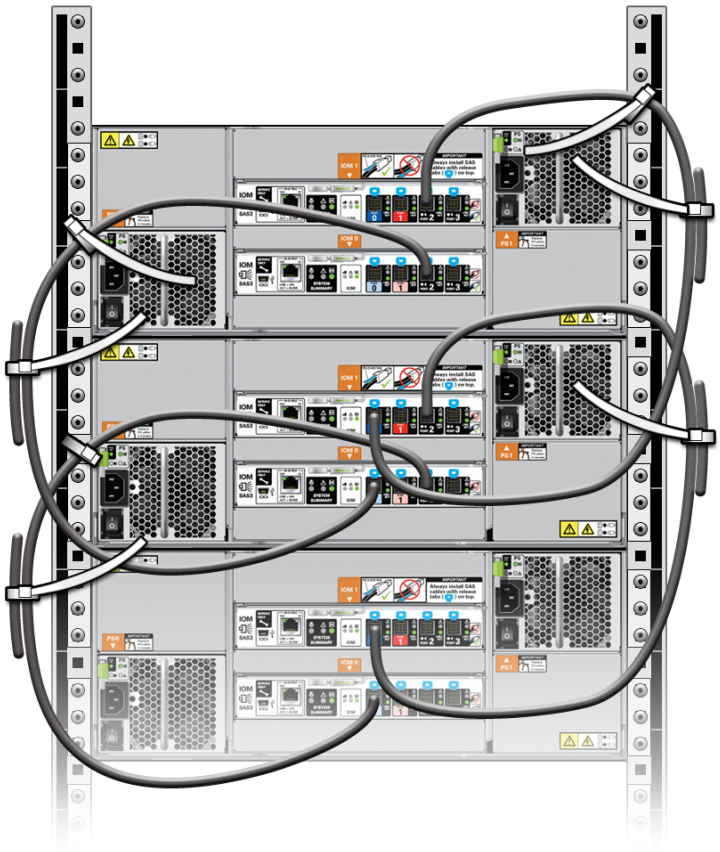
Cabling 2U Disk Shelves Together (DE3-24P shown)



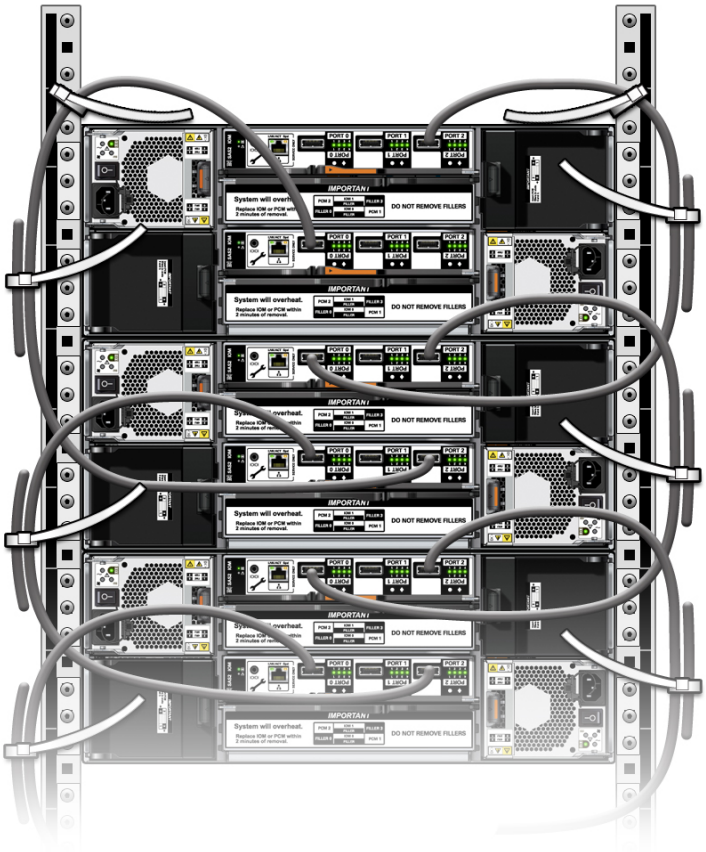
Cabling 2U Disk Shelves Together (DE2-24P shown)



Cabling 4U Disk Shelves Together (DE3-24C shown)



Cabling 4U Disk Shelves Together (DE2-24C shown)



9. **Repeat this process for the remaining disk shelves in the chain, substituting the correct disk shelves.**

   Keep approximately 20.32 centimeters (8 inches) between cable tie-offs on a side.

10. **(Optional) Trim the cable tie excess.**

11. **Repeat this procedure for any additional disk shelf chains.**

12. **To connect the controllers to the disk shelf chains, see the appropriate procedure:**

    - “Cabling Controllers to Disk Shelves in a Base Cabinet” on page 36
    - “Cabling Controllers in a Base Cabinet to Disk Shelves in an Expansion Cabinet” on page 43

▼ Cabling Controllers to Disk Shelves in a Base Cabinet

Use the following procedure to cable controllers to disk shelves in a base cabinet. There can be multiple disk shelf chains within the base cabinet, and they can be located both above and below the controllers. After cabling together the disk shelves to form chains, each chain has a top and bottom end that is attached to different HBAs in the controller(s). While your configuration may vary, the following procedure details connecting a single controller to multiple disk chains.

1. **Locate the appropriate cabling diagram for your system in “Getting Started with Cabling” on page 13.**

2. **Loosely loop the cable that will connect the controller to the disk shelf chain.**

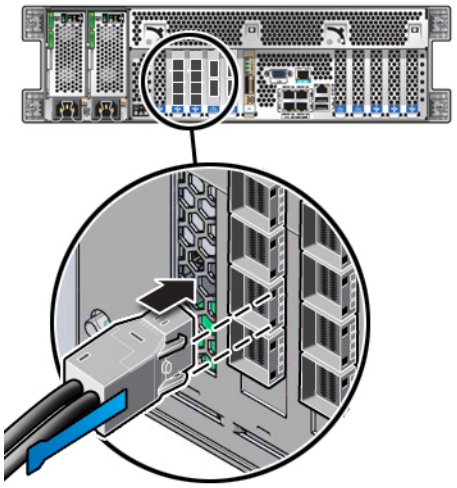
   The maximum cable length between a controller and a disk shelf is six meters (19.69 feet).

3. **Facing the rear of the rack, hold the cable loops to the side of the rack, choosing the side closest to the appropriate controller HBA port.**

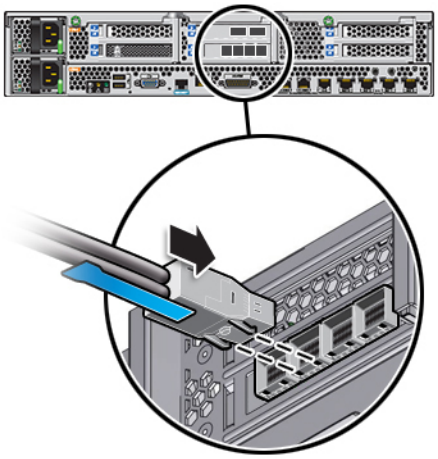
4. **Connect one end of the cable to the appropriate controller HBA port.**

   Ensure the cable is connected to the correct HBA port. Controller models can differ in regard to vertically or horizontally oriented HBAs, which affects the port order, as well as the orientation of the cable's blue release tab. Position the release tab to the right for vertical HBAs, and downward for horizontal HBAs. Also ensure that the cable connector latches engage in the port.

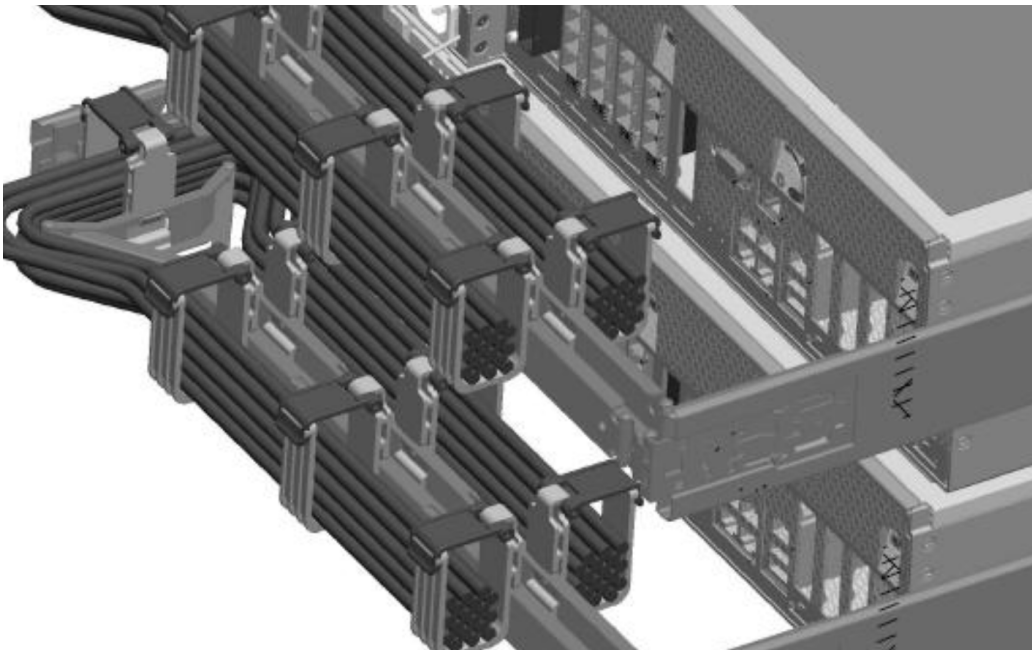
Attaching a Mini-SAS Cable to a Vertically Oriented HBA



Attaching a Mini-SAS Cable to a Horizontally Oriented HBA



5. **(Optional) If the controller has a Cable Management Arm (CMA), route the cable through the CMA, ensuring that there is ample slack for servicing the controller as shown in the following illustration with clustered controllers.**



Note - Do not route more than 12 SAS cables through the CMA.

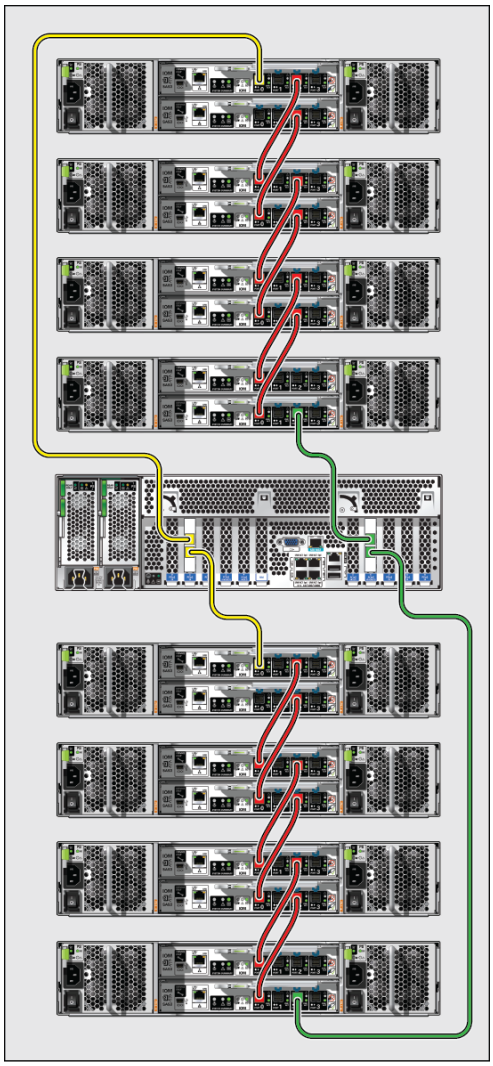
6. **Hold the other end of the cable near the disk shelf port to which it will connect.**

7. **Allowing ample slack for servicing components and for placing excessive cable to the side of the controller, create a 12.7-centimeter (5-inch) diameter coil with any excess cable. Secure the coil with a cable tie. If there is not excessive cable, use a cable tie to secure the cable to the side of the rack, still allowing ample slack for servicing components.**

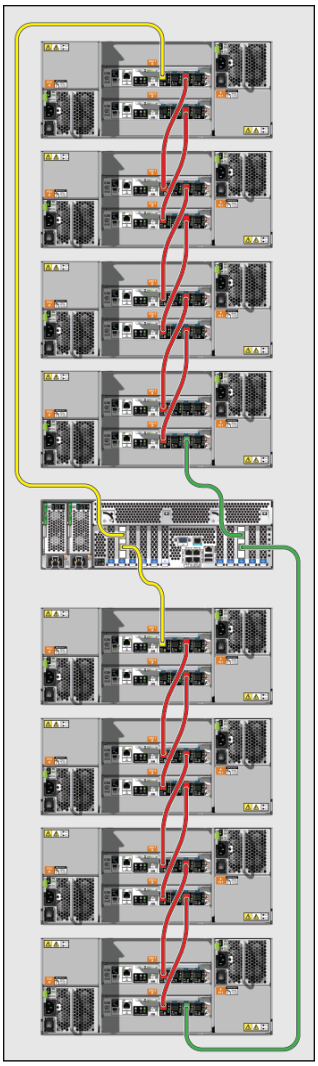
8. **Verify clearance for component removal, and then connect the other end of the cable into the appropriate port in the appropriate disk shelf.**

   Ensure the cable is connected to the correct disk shelf port. Some I/O Modules are oriented upside down in some disk shelf models, which affects the port order.

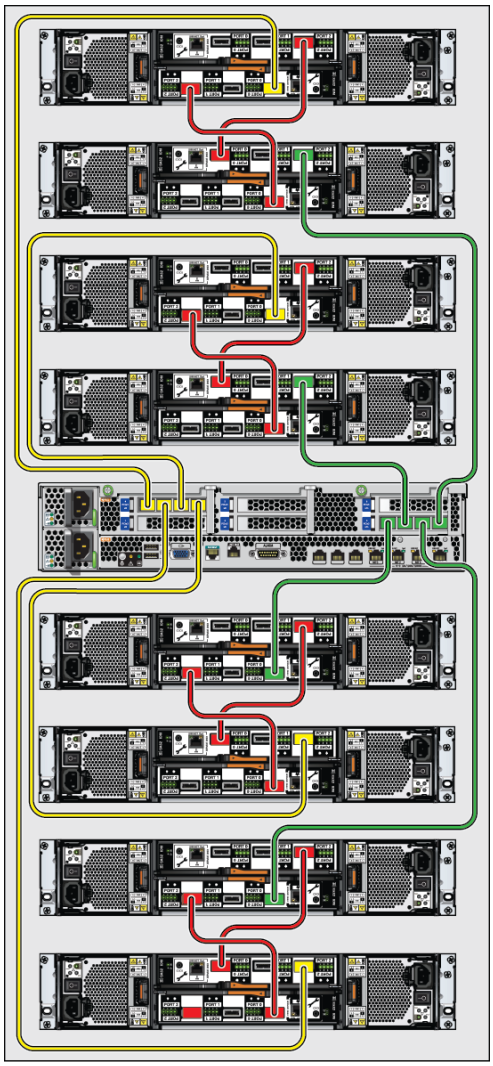
Cabling Controllers to Disk Shelves in a Base Cabinet (ZS5-4 to DE3-24P shown)



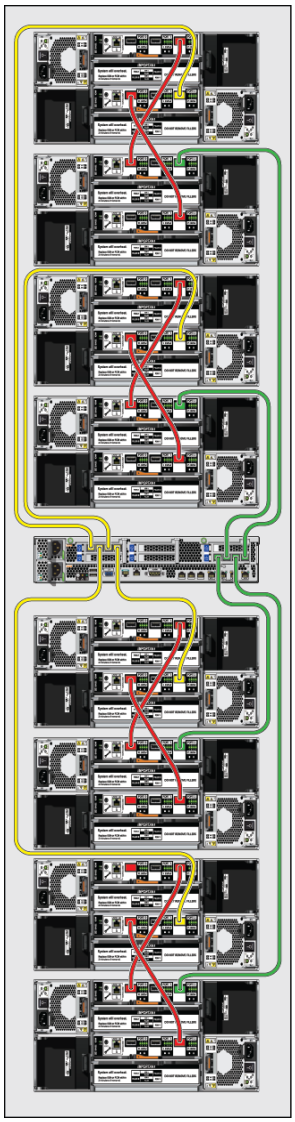
Cabling Controllers to Disk Shelves in a Base Cabinet (ZS5-4 to DE3-24C shown)



Cabling Controllers to Disk Shelves in a Base Cabinet (ZS3-2 to DE2-24P shown)



Cabling Controllers to Disk Shelves in a Base Cabinet (ZS3-2 to DE2-24C shown)



9. **If there is a cable coil, slide the coil between the vertical rack rail and the rack side panel, ensuring that the cable tie is facing the rear of the rack. Using the cable tie, secure the coil to the rack rail.**

10. **Repeat steps 2 through 9 to connect the second cable for the disk chain.**

11. **(Optional) Trim the cable tie excess.**

12. **Repeat this procedure for any remaining disk shelf chains.**

    Keep approximately 20.32 centimeters (8 inches) between cable tie-offs on a side.

▼ Cabling Controllers in a Base Cabinet to Disk Shelves in an Expansion Cabinet

Use the following procedure to connect controllers in a base cabinet to disk shelves in an expansion cabinet with a 6-meter cable.

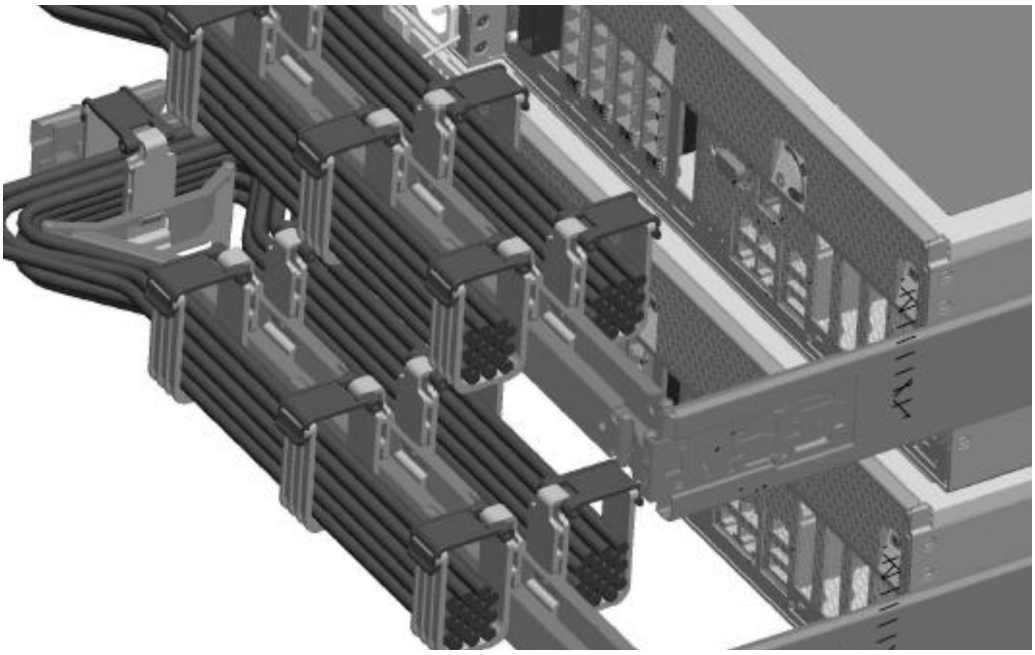
1. **Locate the appropriate cabling diagram for your system in "Getting Started with Cabling" on page 13.**

2. **In the base cabinet, connect one end of the cable into the appropriate HBA port in the appropriate controller.**

   Ensure the cable is connected to the correct HBA port. Controller models can differ in regard to vertically oriented or horizontally oriented HBAs, which affects the port order.

3. **(Optional) If the controller has a Cable Management Arm (CMA), route the cable through the CMA, ensuring that there is ample slack for servicing the controller as shown in the following illustration with clustered controllers. If not using a**

CMA, secure the cable to the rack rail with a cable tie, allowing ample slack for servicing the controller, and so the cable is not bent near its connector.



Note - Do not route more than 12 SAS cables through the CMA. Do not route 6-meter cables through the CMA.

4. **Route the remaining cable so it exits either the top or bottom of the base cabinet and into the corresponding top or bottom entrance of the expansion cabinet.**

    a. **Determine the rack exit port (top or bottom). Use a cable tie to attach the cable to the rack hole closest to the rack exit.**

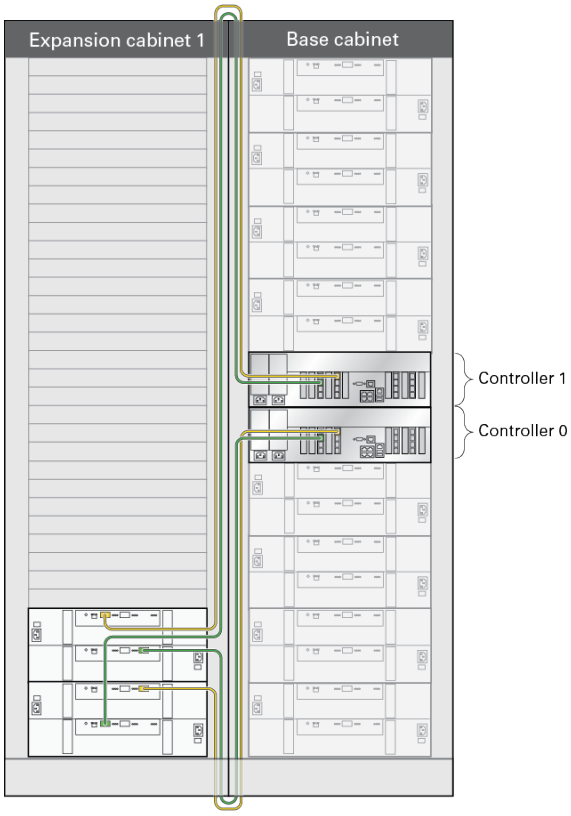
    b. **Route the cable into the expansion rack through the appropriate rack cut out. Using a cabling tie, attach the cable to the closest rack hole.**

5. **Routing the cable vertically along the rack rail, use another cable tie to secure the cable close to the disk shelf to which it will be attached.**

6. **Verify clearance for power supply removal, and then connect the other end of the cable, now in the expansion cabinet, to the appropriate port in the appropriate disk shelf.**

   Ensure the cable is connected to the correct disk shelf port. Some I/O Modules are oriented upside down in some disk shelf models, which affects the port order.

   Cabling Controllers in a Base Cabinet to Disk Shelves in an Expansion Cabinet (ZS4-4 to DE2-24C shown)



Note - The illustration above only shows the 6-meter cables connecting from the base cabinet to the expansion cabinet. To cable the rest of the disk shelves, locate the appropriate cabling diagram in the "Getting Started with Cabling" on page 13.

7. **If there is excessive cable, secure it to the rack rail.**

a. **Create a 12.7-centimeter (5-inch) diameter coil with the excess, allowing ample slack for servicing components and for placing the coil to the side of the disk shelf.**

b. **Secure the coil with a cable tie.**

c. **Slide the coil between the vertical rack rail and the rack side panel, ensuring that the cable tie is facing the rear of the rack.**

d. **Using the cable tie, secure the coil to the rack rail.**

8. **(Optional) Trim the cable tie excess.**

9. **Repeat steps 2 through 8 to connect the second cable for the disk chain.**

10. **Repeat this process for any remaining disk shelf chains.**

    Keep approximately 20.32 centimeters (8 inches) between cable tie-offs on a side.

11. **Repeat the entire procedure for any additional expansion cabinets.**

Changing the Cabling for Oracle ILOM

After configuring the system and performing initial configuration, retain a connection to Oracle Integrated Lights Out Manager (ILOM), located in the controller service processor (SP), for troubleshooting problems that do not otherwise appear in the appliance software.

The following procedure describes how to remove the serial SP connection used for initial configuration and make a network SP connection, which allows for better collection of platform data. Do not remove the serial SP connection if you need it for CLI access.

Caution - Failure to configure Oracle ILOM connectivity after initial setup may lead to longer than necessary hardware fault diagnosis and resolution times.

1. Remove the serial cable attached to the SER MGT port on the rear panel of the controller and to the administrative client.
2. Attach an Ethernet cable from the NET MGT port on the rear panel of the controller to your Ethernet switch.

   If clustered controllers, repeat for the second controller.

Related Topics

- "Identifying the Oracle ILOM Firmware Version (BUI)" in *Oracle ZFS Storage Appliance Customer Service Manual*.
- "Identifying the Oracle ILOM Firmware Version (CLI)" in *Oracle ZFS Storage Appliance Customer Service Manual*.
- "Logging in to Oracle ILOM Using a Local Serial Connection" in *Oracle ZFS Storage Appliance Customer Service Manual*.
- "Logging in to Oracle ILOM Remotely Using a Web Interface" in *Oracle ZFS Storage Appliance Customer Service Manual*.
- "Logging in to Oracle ILOM Remotely Using a Command Line Interface" in *Oracle ZFS Storage Appliance Customer Service Manual*.
- "Viewing and Clearing CPU Faults from Oracle ILOM" in *Oracle ZFS Storage Appliance Customer Service Manual*.

Cabling DE3-24 Disk Shelves to 4X4 Port SAS-3 HBAs

This section contains guidelines for properly cabling standalone and clustered ZS5-4 and ZS5-2 controllers to 4X4 port SAS-3 HBAs.

To review these guidelines, see the following topics:

- "Cabling DE3-24 Disk Shelves to ZS5-4 Controllers" on page 49
- "Cabling DE3-24 Disk Shelves to ZS5-2 Controllers" on page 75
- "Cabling DE3-24 Disk Shelves to ZS4-4 Controllers" on page 88
- "Cabling DE3-24 Disk Shelves to ZS3-2 Controllers" on page 106

Cabling DE3-24 Disk Shelves to ZS5-4 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS5-4 controllers to DE3-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "ZS5-4 Standalone to DE3-24 Disk Shelves (2 HBAs)" on page 50
- "ZS5-4 Standalone to DE3-24 Disk Shelves (3 HBAs)" on page 53
- "ZS5-4 Standalone to DE3-24 Disk Shelves (4 HBAs)" on page 56
- "ZS5-4 Clustered to DE3-24 Disk Shelves (2 HBAs)" on page 61
- "ZS5-4 Clustered to DE3-24 Disk Shelves (3 HBAs)" on page 66
- "ZS5-4 Clustered to DE3-24 Disk Shelves (4 HBAs)" on page 70

ZS5-4 Standalone to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 3 Standalone ZS5-4 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

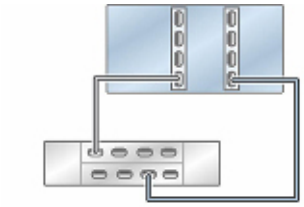


FIGURE 4 Standalone ZS5-4 controller with two HBAs connected to two DE3-24 disk shelves in two chains

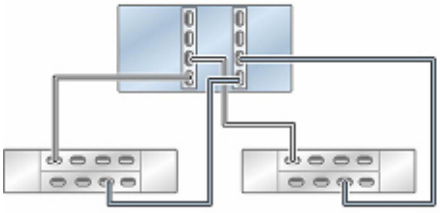


FIGURE 5 Standalone ZS5-4 controller with two HBAs connected to three DE3-24 disk shelves in three chains

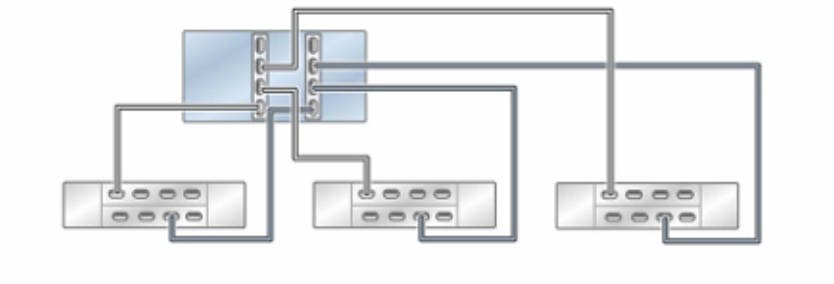


FIGURE 6 Standalone ZS5-4 controller with two HBAs connected to four DE3-24 disk shelves in four chains

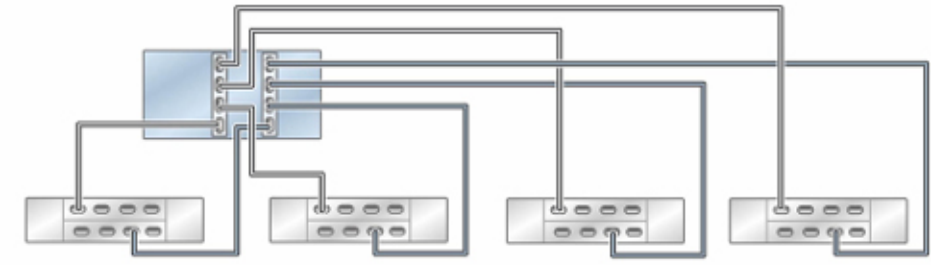


FIGURE 7 Standalone ZS5-4 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

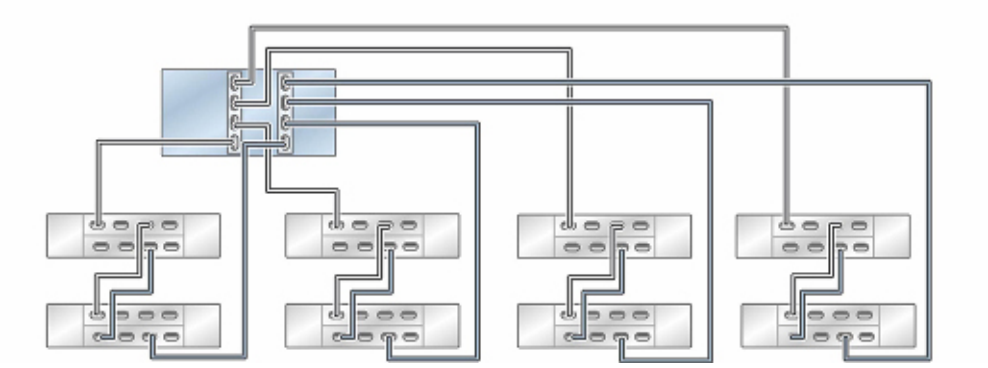


FIGURE 8 Multiple disk shelves in a single chain

ZS5-4 Standalone to DE3-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 9 Standalone ZS5-4 controller with three HBAs connected to two DE3-24 disk shelves in two chains

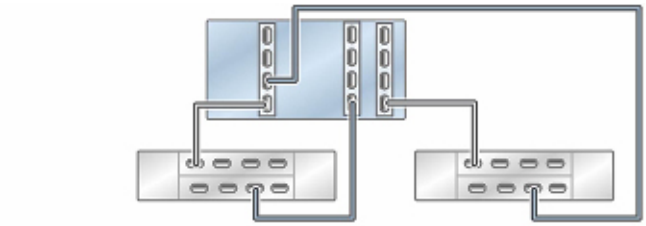


FIGURE 10 Standalone ZS5-4 controller with three HBAs connected to three DE3-24 disk shelves in three chains

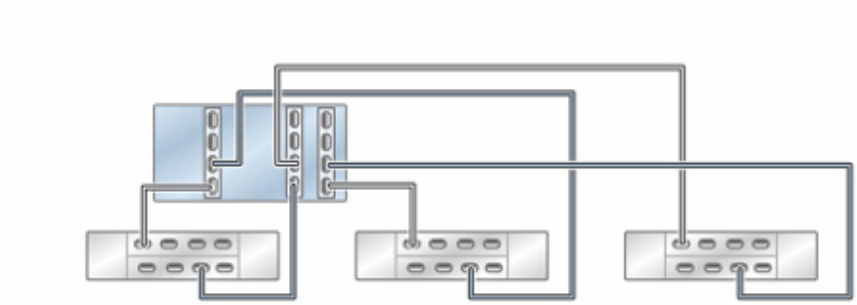


FIGURE 11 Standalone ZS5-4 controller with three HBAs connected to four DE3-24 disk shelves in four chains

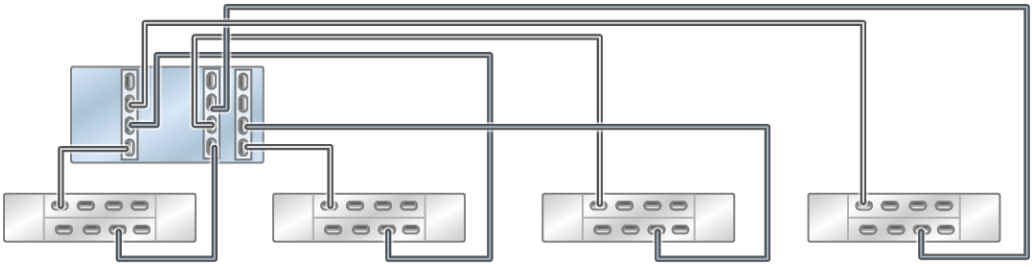


FIGURE 12 Standalone ZS5-4 controller with three HBAs connected to five DE3-24 disk shelves in five chains

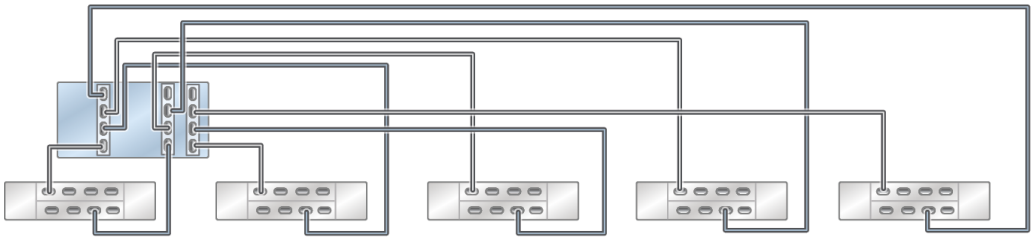


FIGURE 13 Standalone ZS5-4 controller with three HBAs connected to six DE3-24 disk shelves in six chains

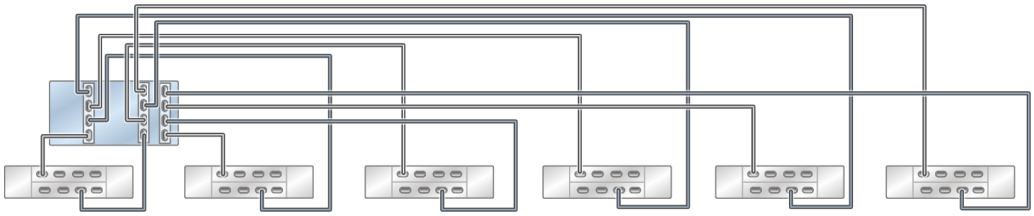
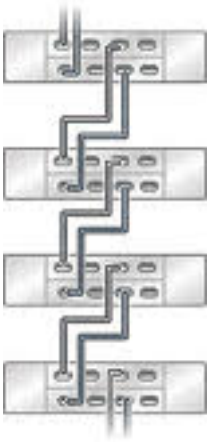


FIGURE 14 Multiple disk shelves in a single chain



ZS5-4 Standalone to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 15 Standalone ZS5-4 controller with four HBAs connected to two DE3-24 disk shelves in two chains

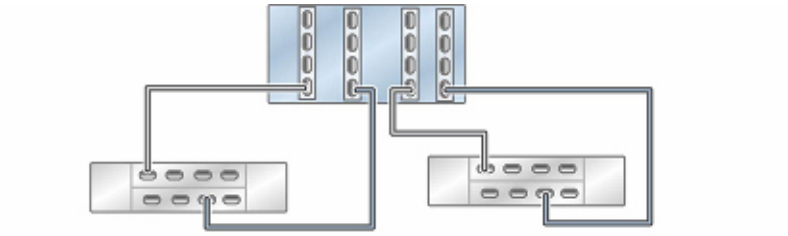


FIGURE 16 Standalone ZS5-4 controller with four HBAs connected to three DE3-24 disk shelves in three chains

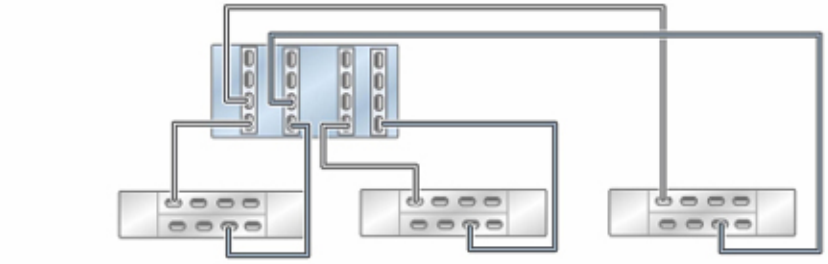


FIGURE 17 Standalone ZS5-4 controller with four HBAs connected to four DE3-24 disk shelves in four chains

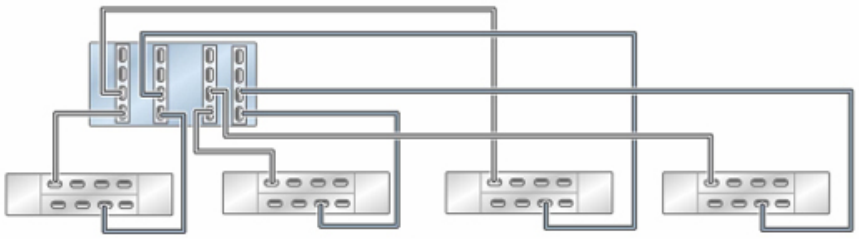


FIGURE 18 Standalone ZS5-4 controller with four HBAs connected to five DE3-24 disk shelves in five chains

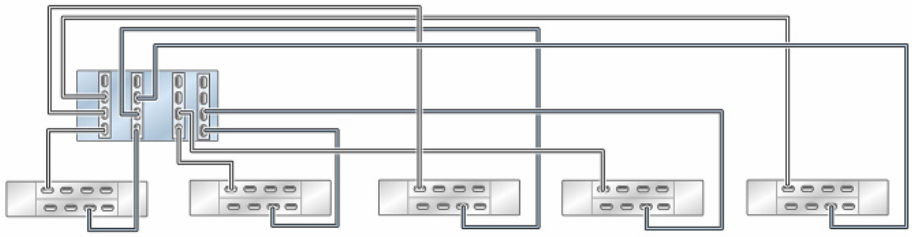


FIGURE 19 Standalone ZS5-4 controller with four HBAs connected to six DE3-24 disk shelves in six chains

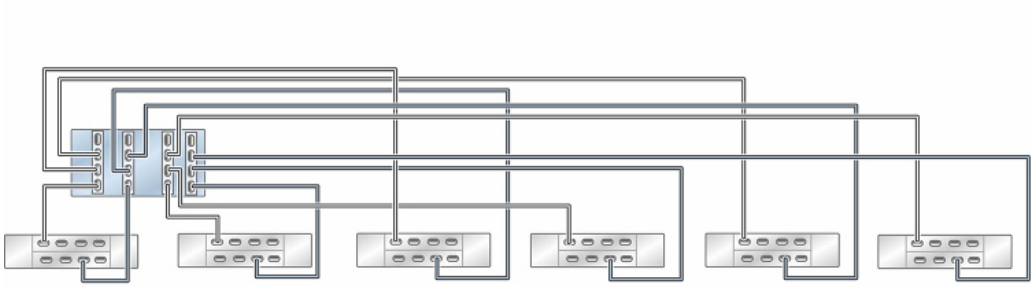


FIGURE 20 Standalone ZS5-4 controller with four HBAs connected to seven DE3-24 disk shelves in seven chains

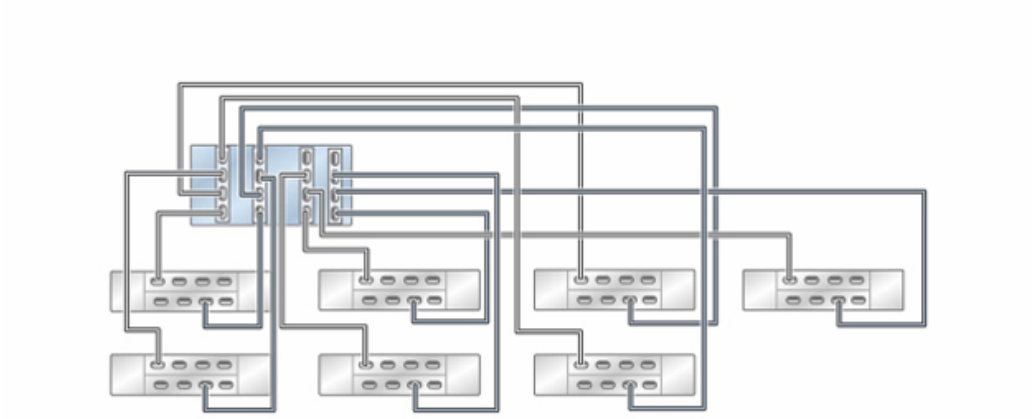


FIGURE 21 Standalone ZS5-4 controller with four HBAs connected to eight DE3-24 disk shelves in eight chains

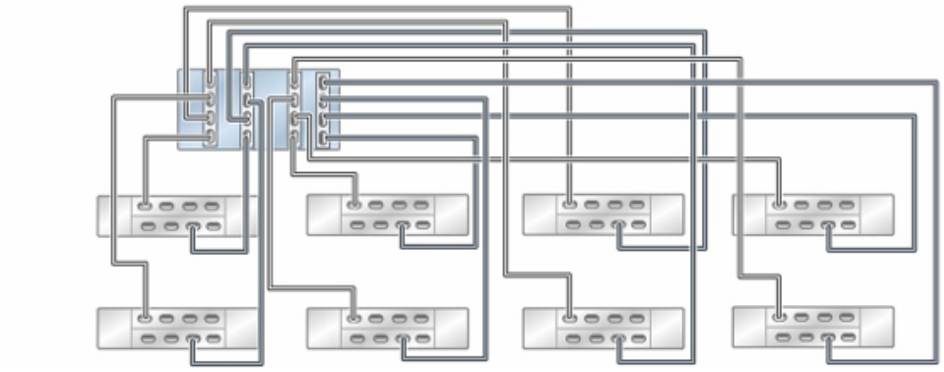


FIGURE 22 Multiple disk shelves in a single chain

ZS5-4 Clustered to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 23 Clustered ZS5-4 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

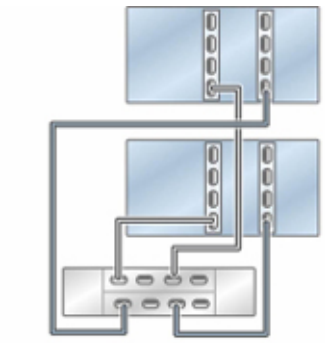


FIGURE 24 Clustered ZS5-4 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

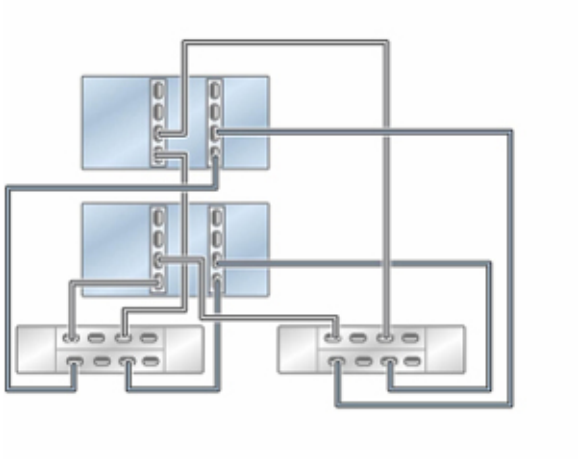


FIGURE 25 Clustered ZS5-4 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

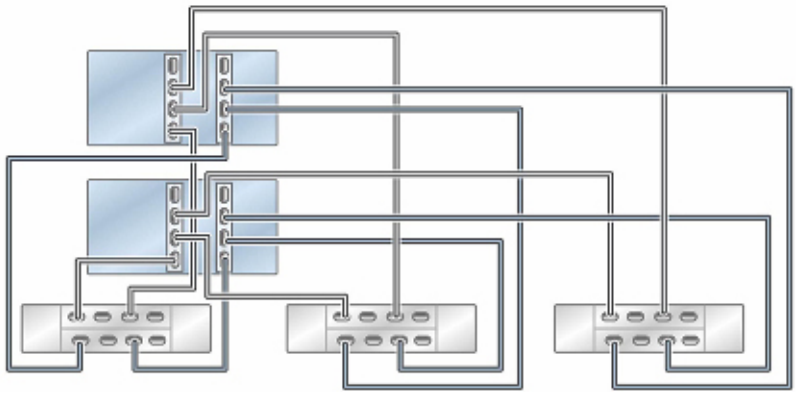


FIGURE 26 Clustered ZS5-4 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

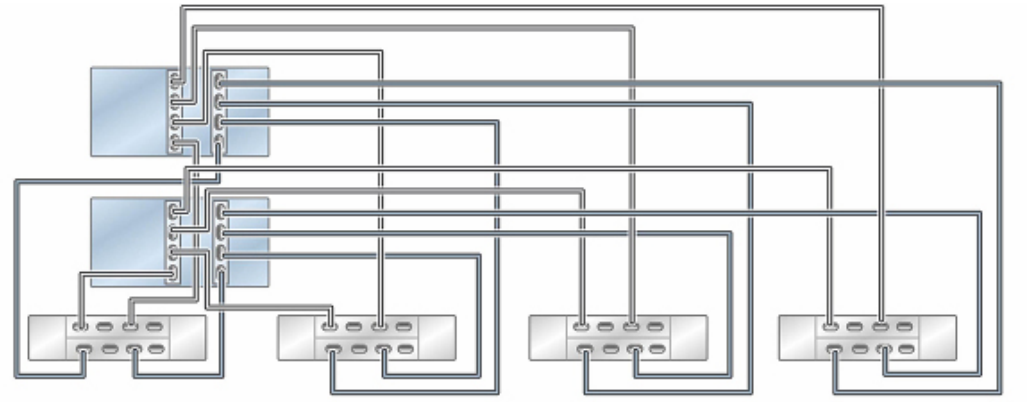


FIGURE 27 Clustered ZS5-4 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

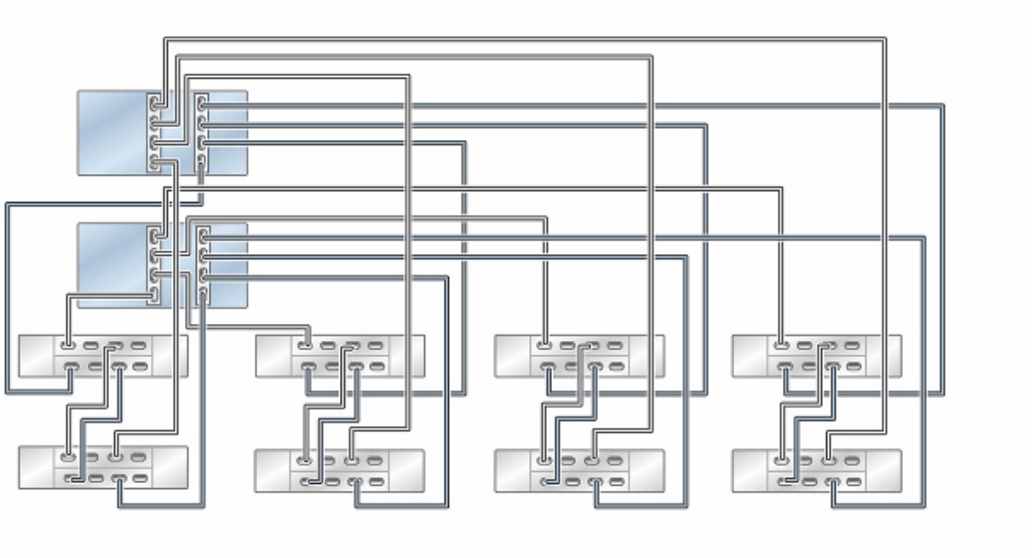


FIGURE 28 Clustered ZS5-4 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains

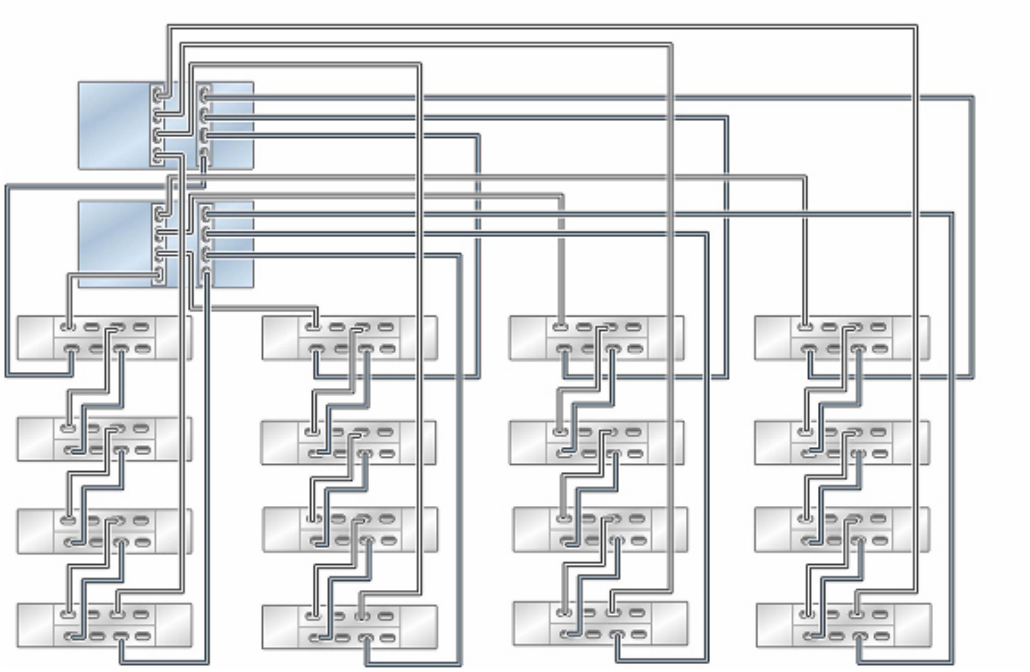
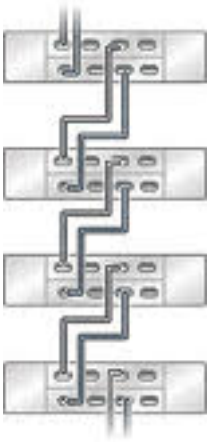


FIGURE 29 Multiple disk shelves in a single chain



ZS5-4 Clustered to DE3-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 30 Clustered ZS5-4 controllers with three HBAs connected to two DE3-24 disk shelves in two chains

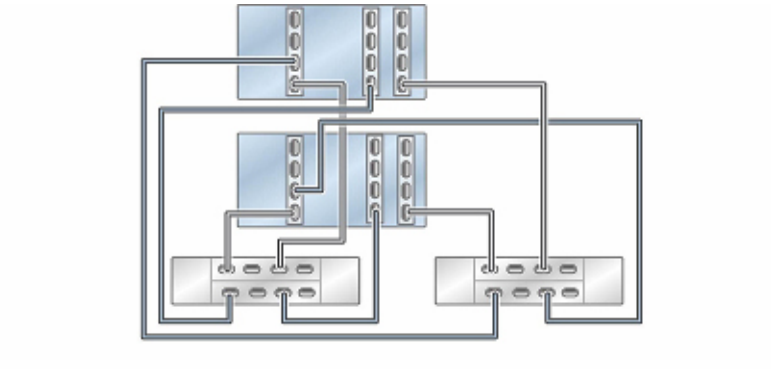


FIGURE 31 Clustered ZS5-4 controllers with three HBAs connected to three DE3-24 disk shelves in three chains

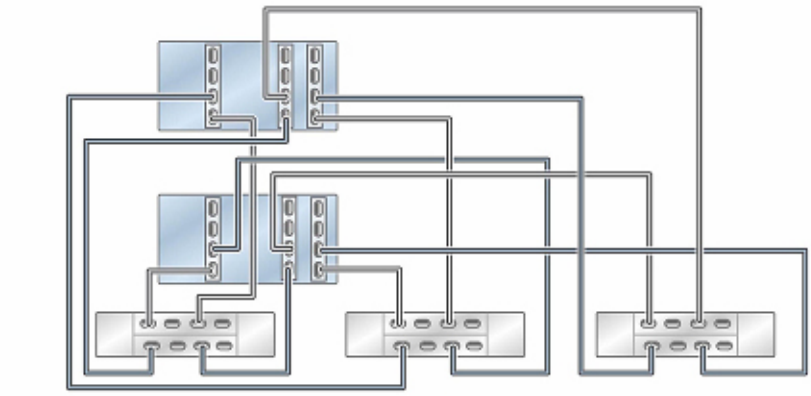


FIGURE 32 Clustered ZS5-4 controllers with three HBAs connected to four DE3-24 disk shelves in four chains

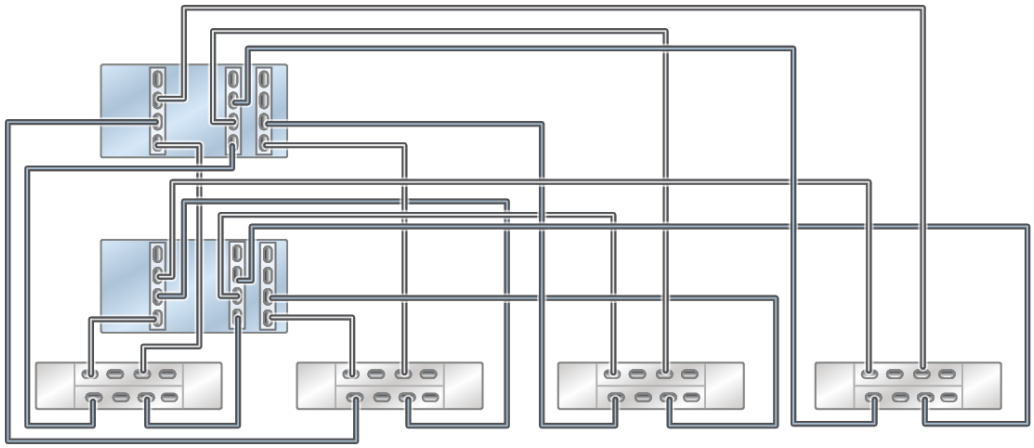


FIGURE 33 Clustered ZS5-4 controllers with three HBAs connected to five DE3-24 disk shelves in five chains

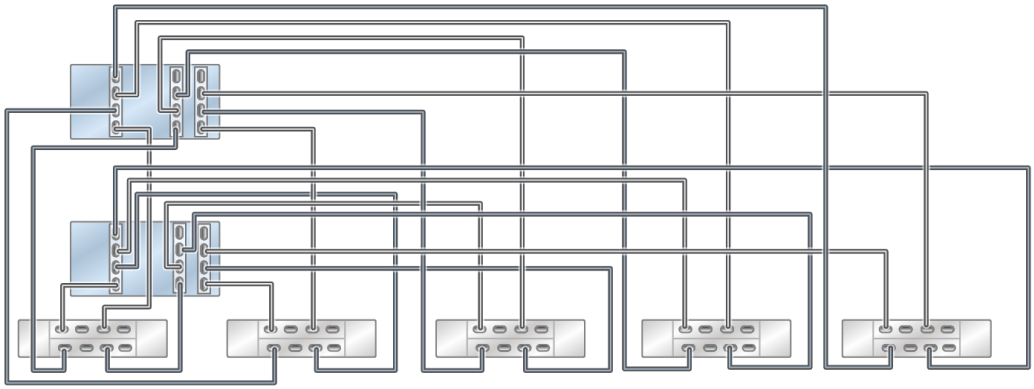


FIGURE 34 Clustered ZS5-4 controllers with three HBAs connected to six DE3-24 disk shelves in six chains

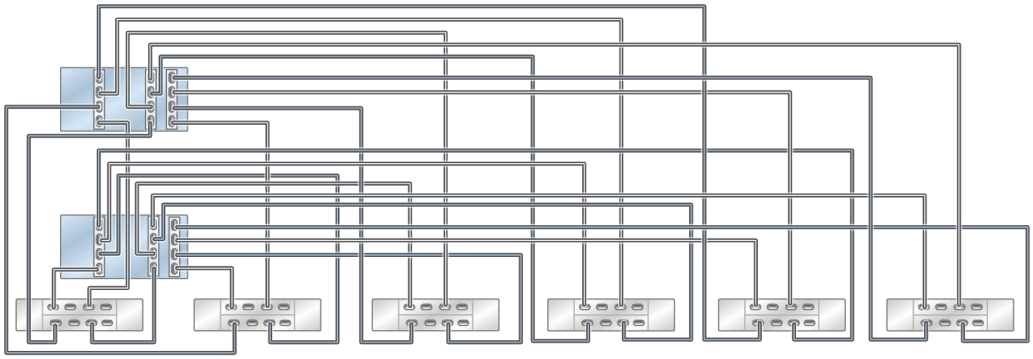
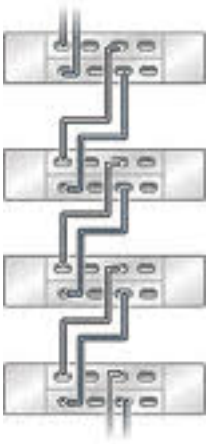


FIGURE 35 Multiple disk shelves in a single chain



ZS5-4 Clustered to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 36 Clustered ZS5-4 controllers with four HBAs connected to two DE3-24 disk shelves in two chains

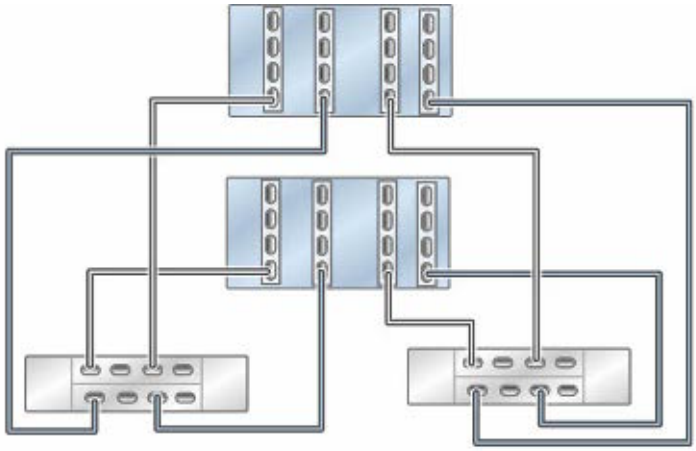


FIGURE 37 Clustered ZS5-4 controllers with four HBAs connected to three DE3-24 disk shelves in three chains

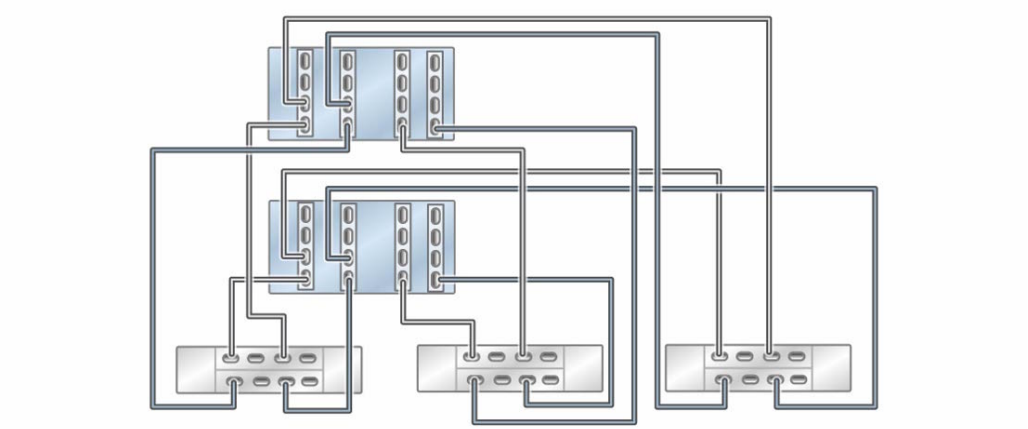


FIGURE 38 Clustered ZS5-4 controllers with four HBAs connected to four DE3-24 disk shelves in four chains

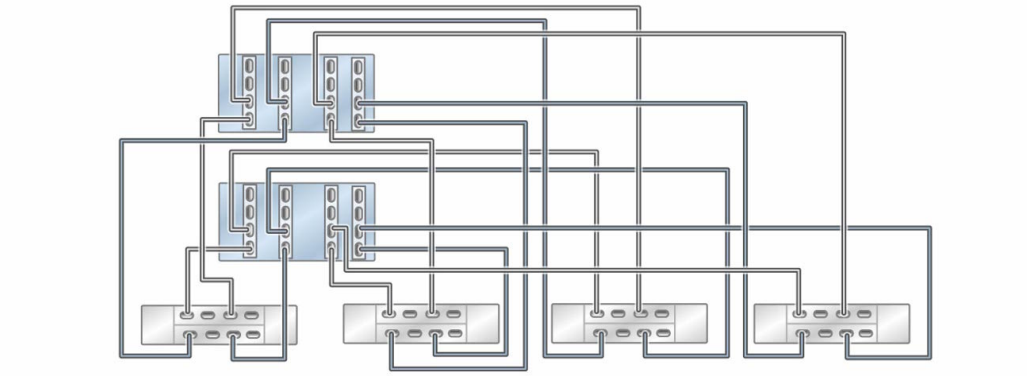


FIGURE 39 Clustered ZS5-4 controllers with four HBAs connected to five DE3-24 disk shelves in five chains

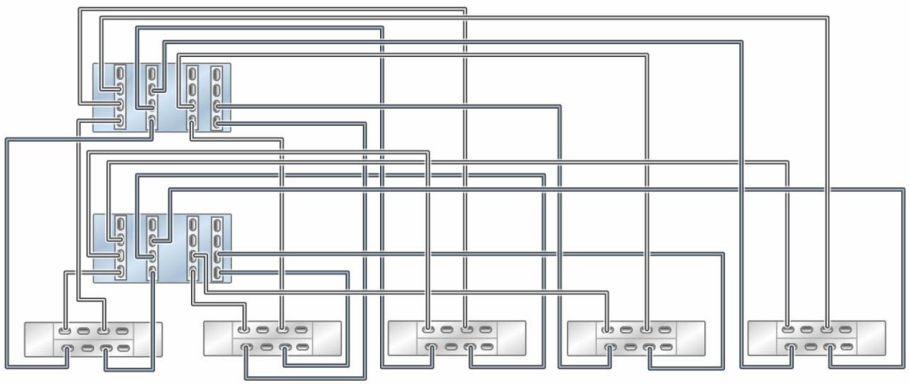


FIGURE 40 Clustered ZS5-4 controllers with four HBAs connected to six DE3-24 disk shelves in six chains

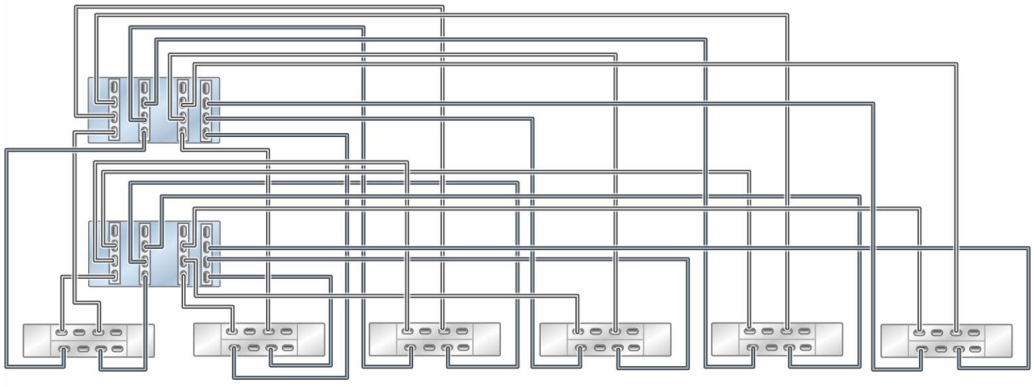


FIGURE 41 Clustered ZS5-4 controllers with four HBAs connected to seven DE3-24 disk shelves in seven chains

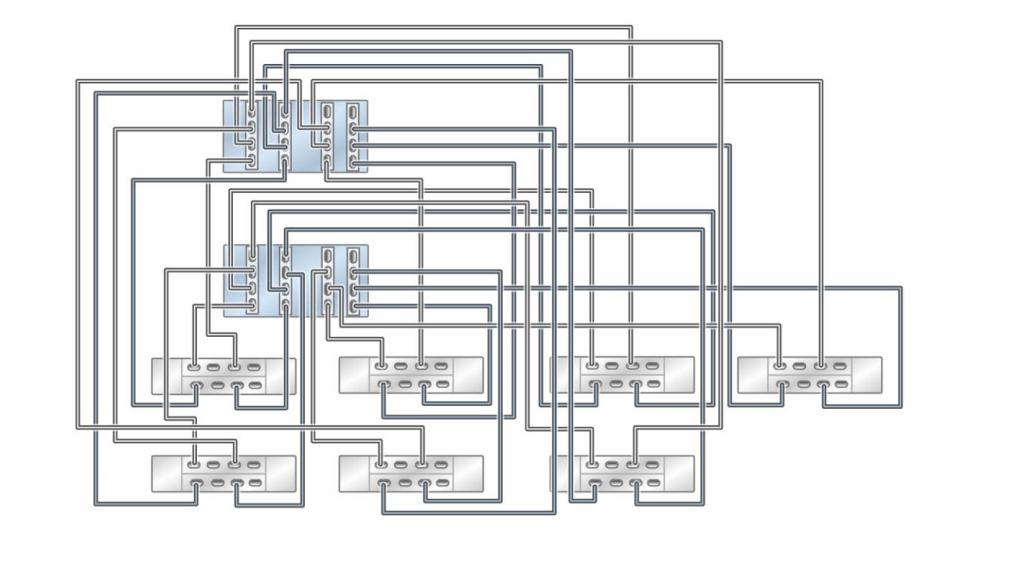


FIGURE 42 Clustered ZS5-4 controllers with four HBAs connected to eight DE3-24 disk shelves in eight chains

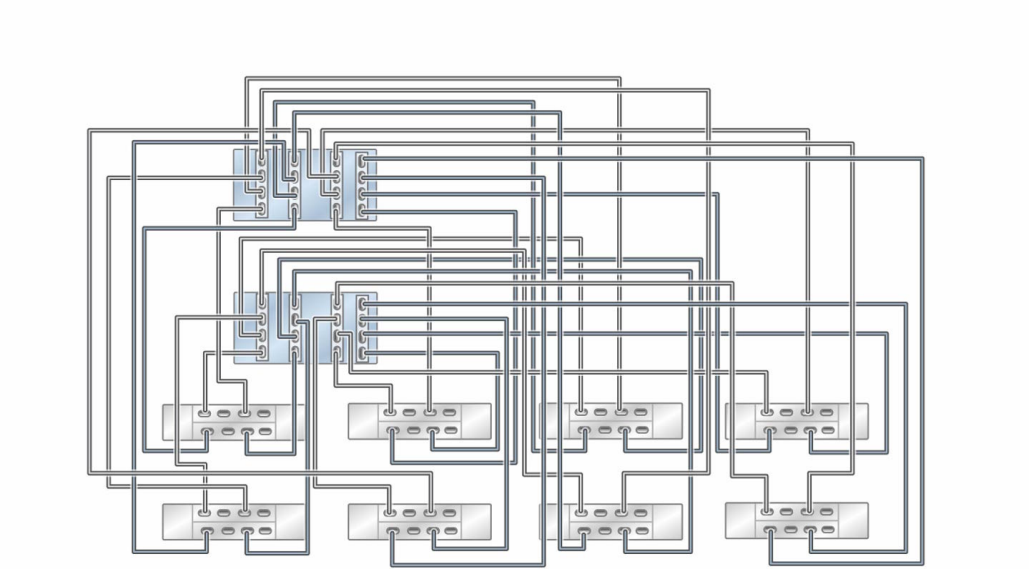
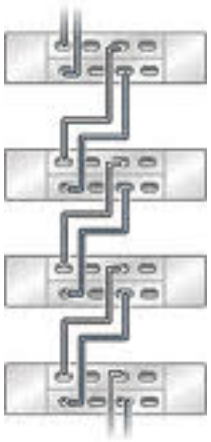


FIGURE 43 Multiple disk shelves in a single chain



Cabling DE3-24 Disk Shelves to ZS5-2 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS5-2 controllers to DE3-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “ZS5-2 Standalone to DE3-24 Disk Shelves (1 HBA)” on page 75
- “ZS5-2 Standalone to DE3-24 Disk Shelves (2 HBAs)” on page 78
- “ZS5-2 Clustered to DE3-24 Disk Shelves (1 HBA)” on page 81
- “ZS5-2 Clustered to DE3-24 Disk Shelves (2 HBAs)” on page 83

ZS5-2 Standalone to DE3-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 standalone controllers with one HBA. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 44 Standalone ZS5-2 controller with one HBA connected to one DE3-24 disk shelf in a single chain

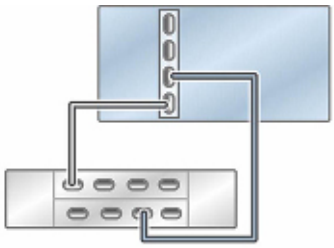


FIGURE 45 Standalone ZS5-2 controller with one HBA connected to two DE3-24 disk shelves in two chains

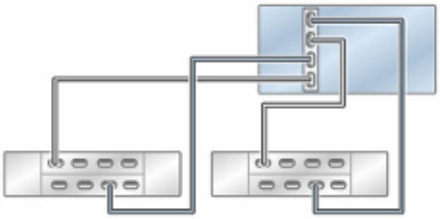


FIGURE 46 Standalone ZS5-2 controller with one HBA connected to four DE3-24 disk shelves in two chains

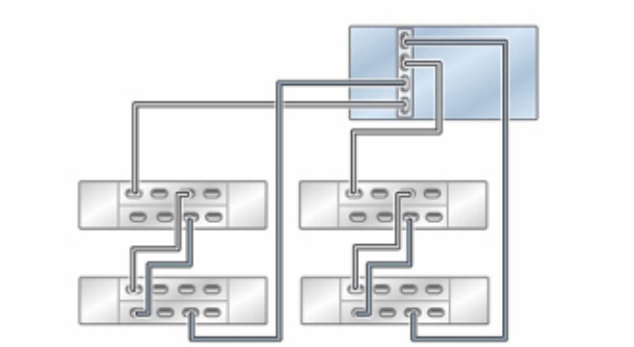
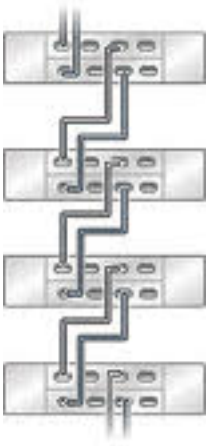


FIGURE 47 Multiple disk shelves in a single chain



ZS5-2 Standalone to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 48 Standalone ZS5-2 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

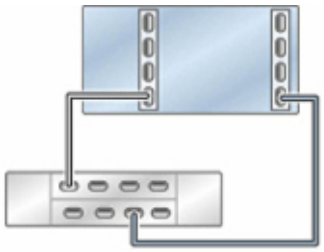


FIGURE 49 Standalone ZS5-2 controller with two HBAs connected to two DE3-24 disk shelves in two chains

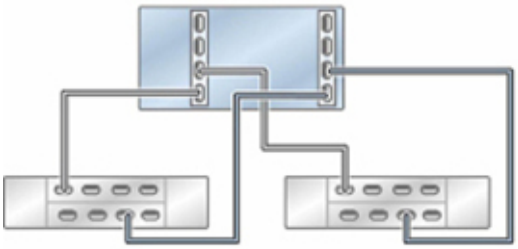


FIGURE 50 Standalone ZS5-2 controller with two HBAs connected to three DE3-24 disk shelves in three chains

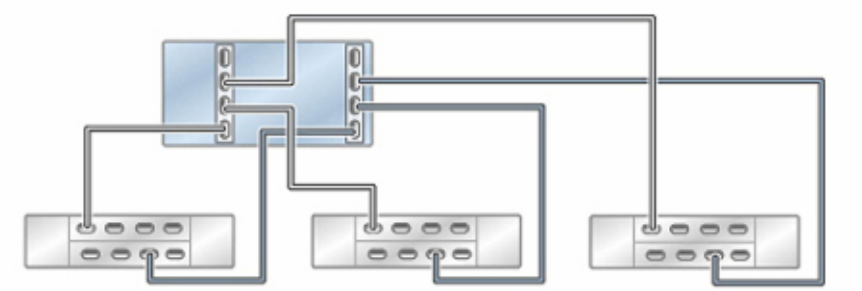


FIGURE 51 Standalone ZS5-2 controller with two HBAs connected to four DE3-24 disk shelves in four chains

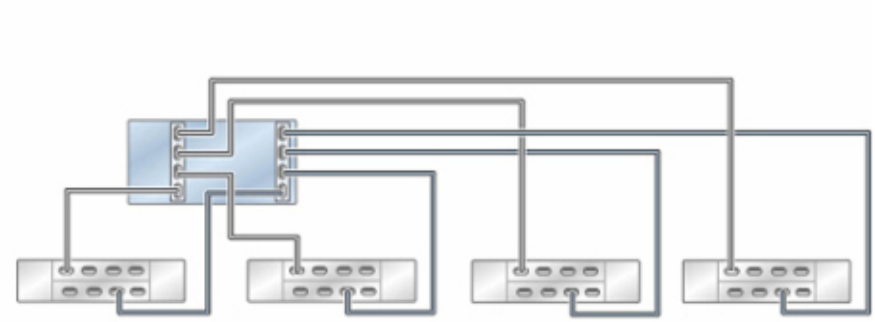


FIGURE 52 Standalone ZS5-2 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

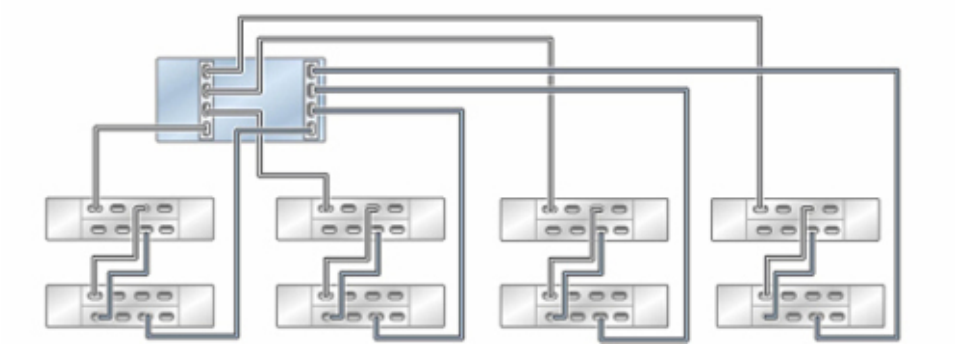


FIGURE 53 Multiple disk shelves in a single chain

ZS5-2 Clustered to DE3-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 54 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 disk shelf in a single chain

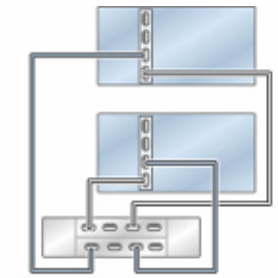


FIGURE 55 Clustered ZS5-2 controllers with one HBA connected to two DE3-24 disk shelves in two chains

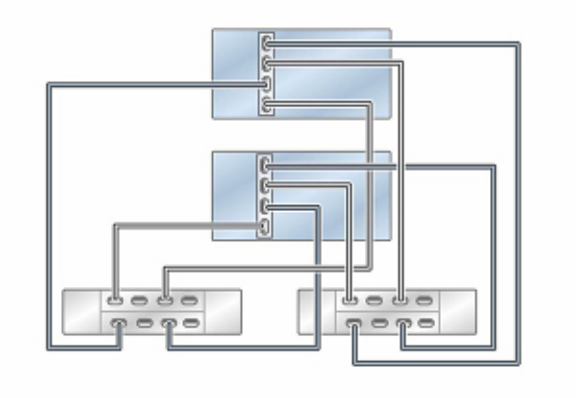


FIGURE 56 Clustered ZS5-2 controllers with one HBA connected to four DE3-24 disk shelves in two chains

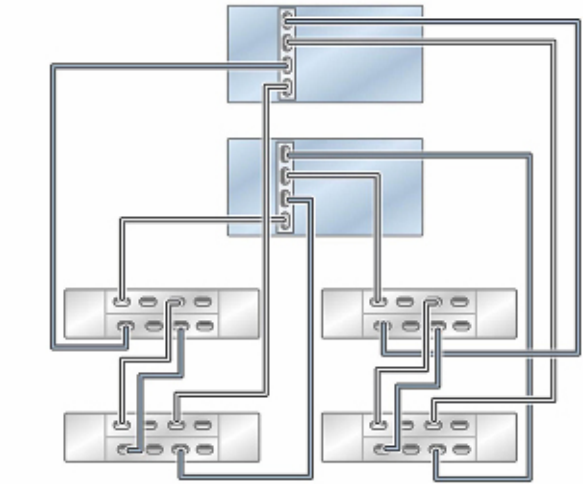
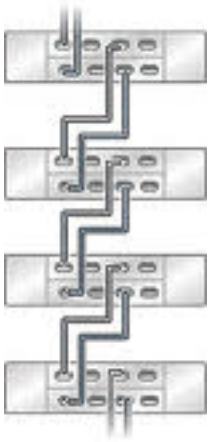


FIGURE 57 Multiple disk shelves in a single chain



ZS5-2 Clustered to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 58 Clustered ZS5-2 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

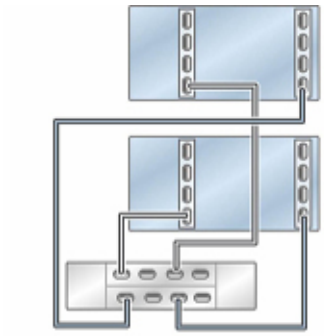


FIGURE 59 Clustered ZS5-2 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

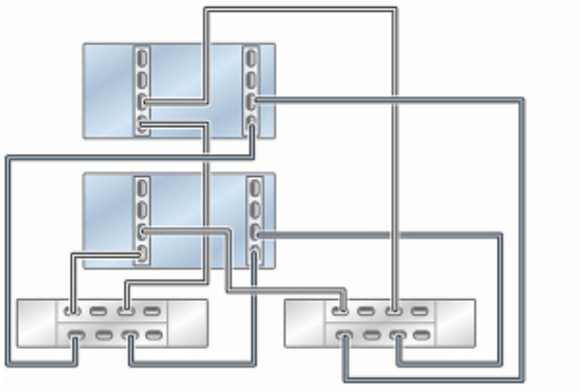


FIGURE 60 Clustered ZS5-2 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

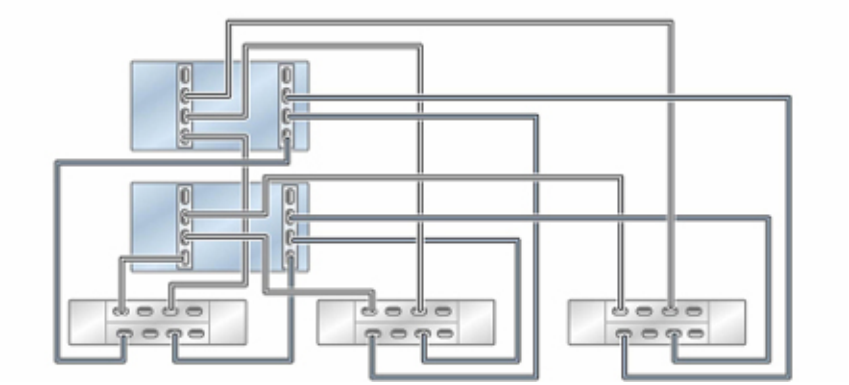


FIGURE 61 Clustered ZS5-2 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

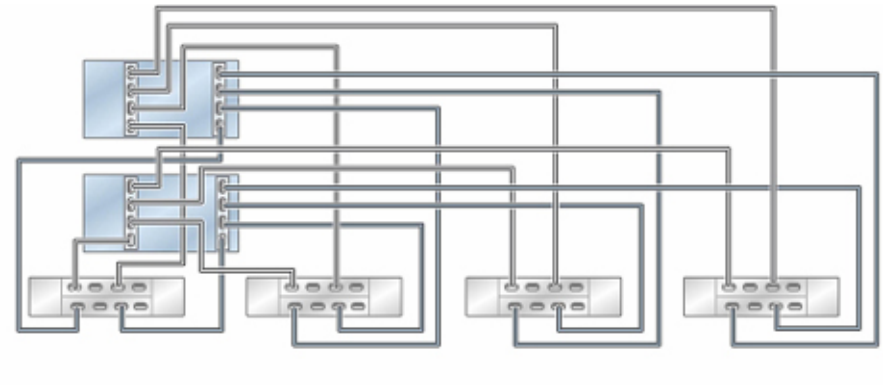


FIGURE 62 Clustered ZS5-2 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

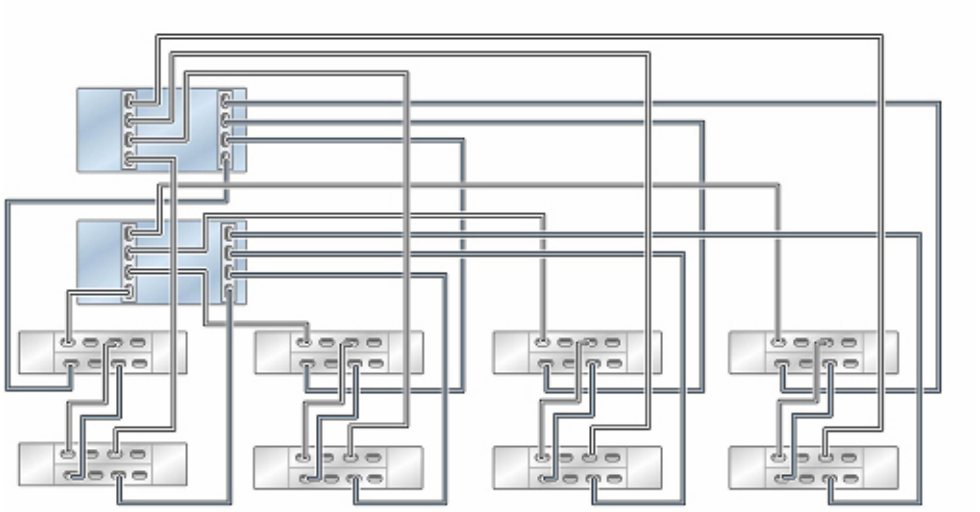


FIGURE 63 Clustered ZS5-2 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains

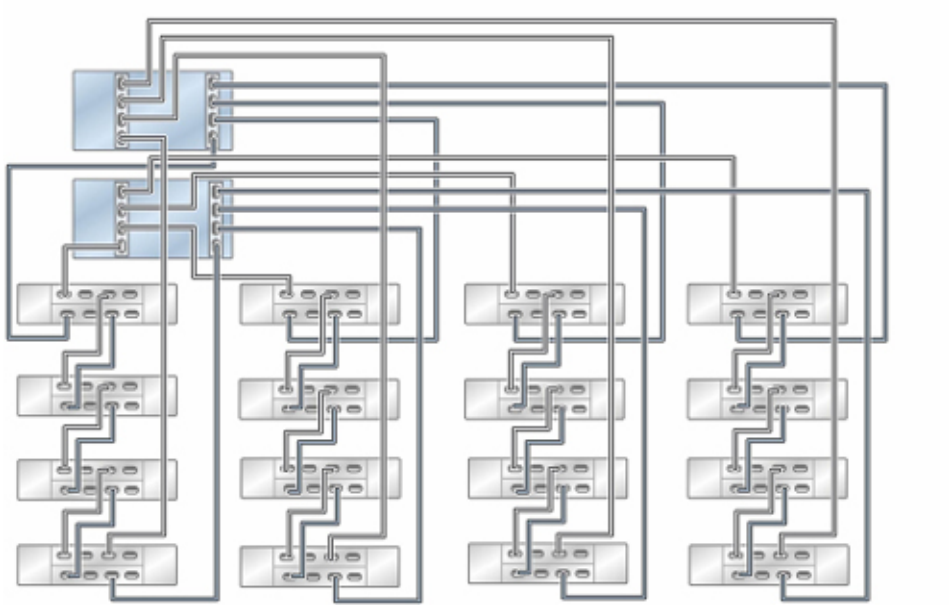
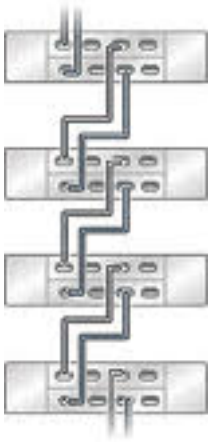


FIGURE 64 Multiple disk shelves in a single chain



Cabling DE3-24 Disk Shelves to ZS4-4 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS4-4 controllers to DE3-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "ZS4-4 Standalone to DE3-24 Disk Shelves (2 HBAs)" on page 89
- "ZS4-4 Standalone to DE3-24 Disk Shelves (3 HBAs)" on page 90
- "ZS4-4 Standalone to DE3-24 Disk Shelves (4 HBAs)" on page 93
- "ZS4-4 Clustered to DE3-24 Disk Shelves (2 HBAs)" on page 96
- "ZS4-4 Clustered to DE3-24 Disk Shelves (3 HBAs)" on page 99
- "ZS4-4 Clustered to DE3-24 Disk Shelves (4 HBAs)" on page 101

ZS4-4 Standalone to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 65 Standalone ZS4-4 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

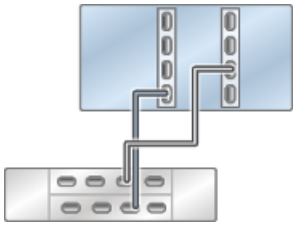


FIGURE 66 Standalone ZS4-4 controller with two HBAs connected to two DE3-24 disk shelves in two chains

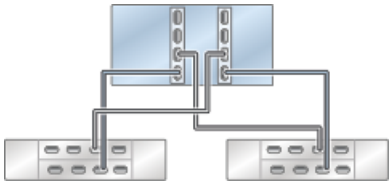


FIGURE 67 Standalone ZS4-4 controller with two HBAs connected to three DE3-24 disk shelves in three chains

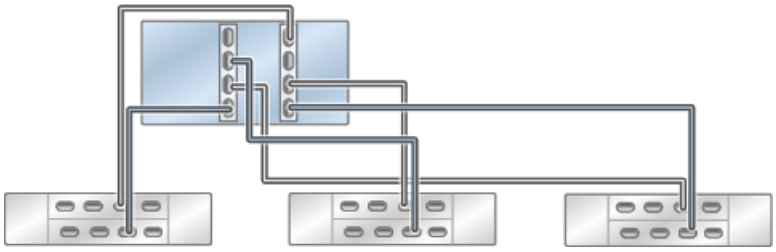
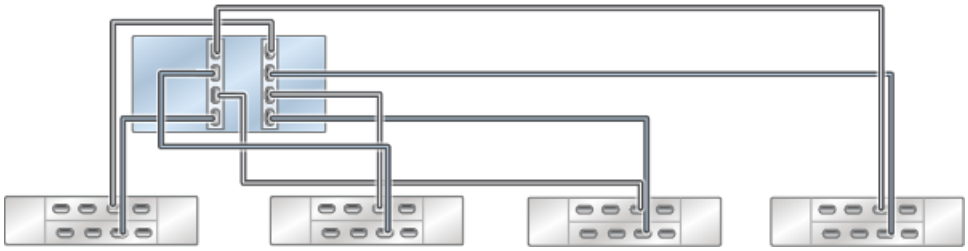


FIGURE 68 Standalone ZS4-4 controller with two HBAs connected to four DE3-24 disk shelves in four chains



ZS4-4 Standalone to DE3-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 69 Standalone ZS4-4 controller with three HBAs connected to one DE3-24 disk shelf in a single chain

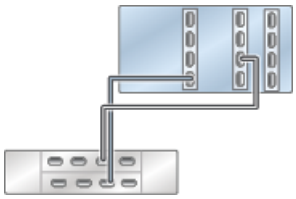


FIGURE 70 Standalone ZS4-4 controller with three HBAs connected to two DE3-24 disk shelves in two chains

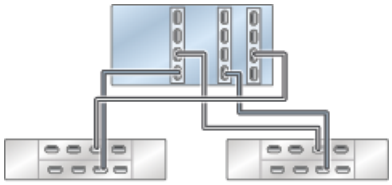


FIGURE 71 Standalone ZS4-4 controller with three HBAs connected to three DE3-24 disk shelves in three chains

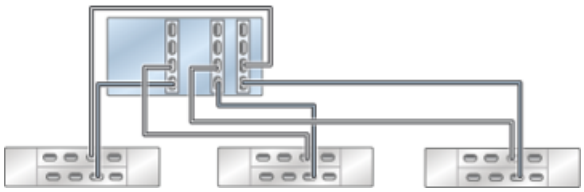
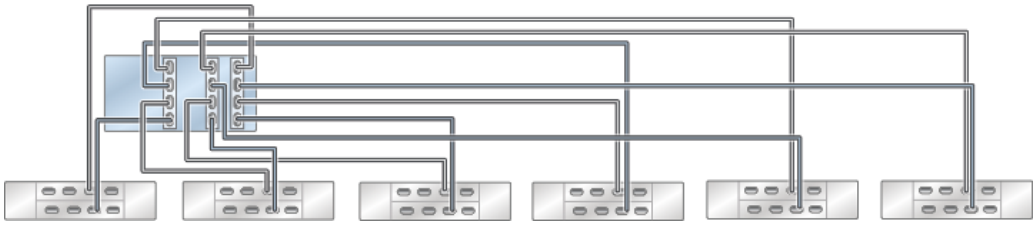


FIGURE 72 Standalone ZS4-4 controller with three HBAs connected to four DE3-24 disk shelves in four chains

FIGURE 73 Standalone ZS4-4 controller with three HBAs connected to five DE3-24 disk shelves in five chains

FIGURE 74 Standalone ZS4-4 controller with three HBAs connected to six DE3-24 disk shelves in six chains



ZS4-4 Standalone to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 75 Standalone ZS5-4 controller with four HBAs connected to one DE3-24 disk shelf in a single chain

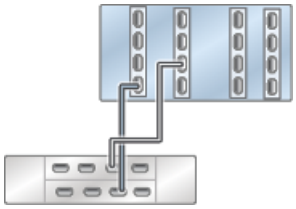


FIGURE 76 Standalone ZS4-4 controller with four HBAs connected to two DE3-24 disk shelves in two chains

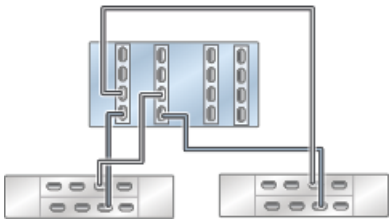


FIGURE 77 Standalone ZS4-4 controller with four HBAs connected to three DE3-24 disk shelves in three chains

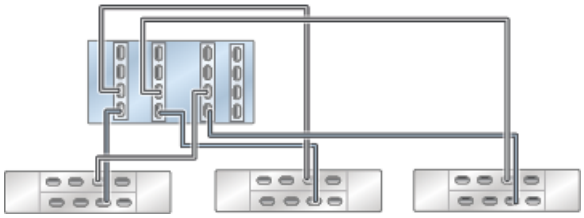


FIGURE 78 Standalone ZS4-4 controller with four HBAs connected to four DE3-24 disk shelves in four chains

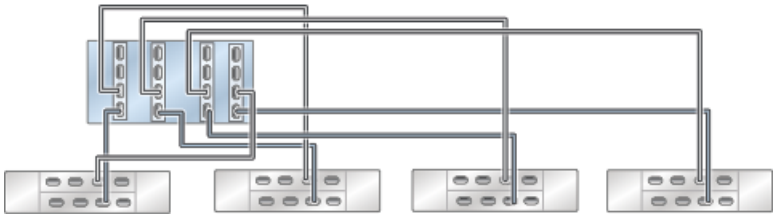


FIGURE 79 Standalone ZS4-4 controller with four HBAs connected to five DE3-24 disk shelves in five chains

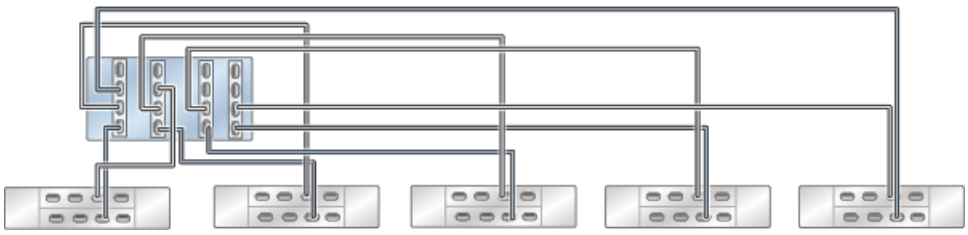


FIGURE 80 Standalone ZS4-4 controller with four HBAs connected to six DE3-24 disk shelves in six chains

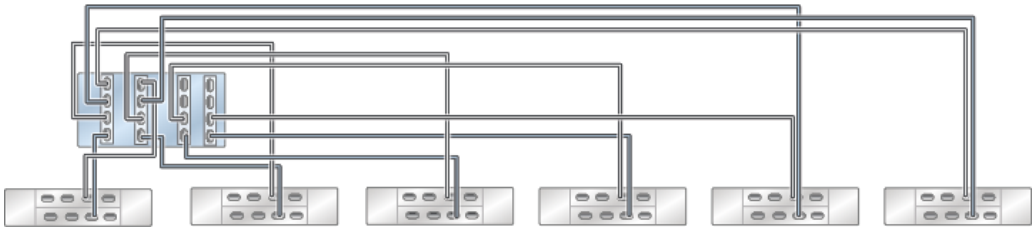


FIGURE 81 Standalone ZS4-4 controller with four HBAs connected to seven DE3-24 disk shelves in seven chains

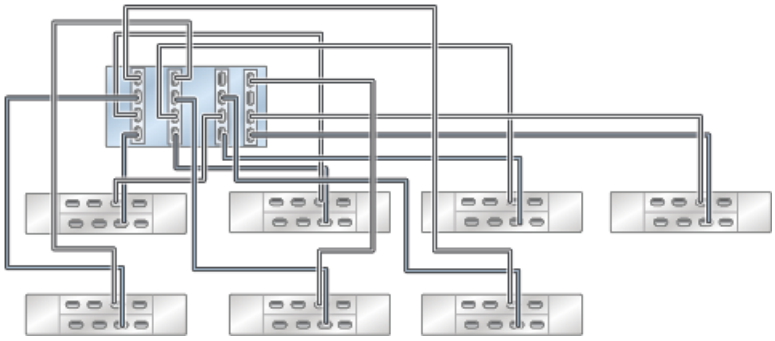
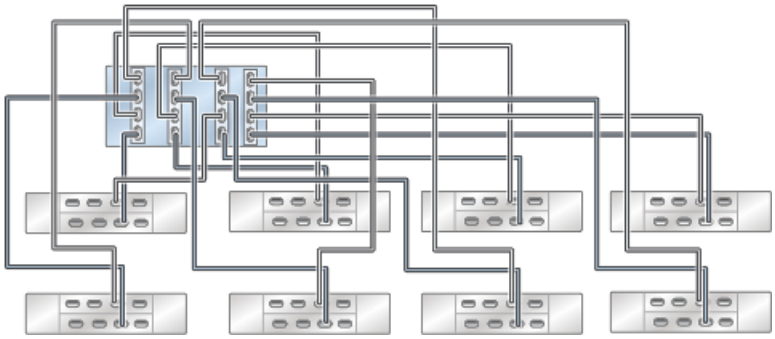


FIGURE 82 Standalone ZS4-4 controller with four HBAs connected to eight DE3-24 disk shelves in eight chains



ZS4-4 Clustered to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 83 Clustered ZS4-4 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

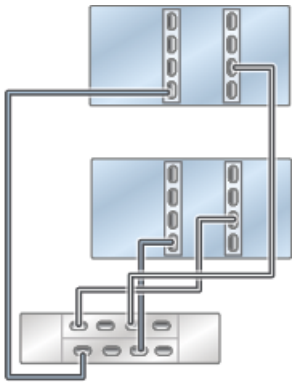


FIGURE 84 Clustered ZS4-4 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

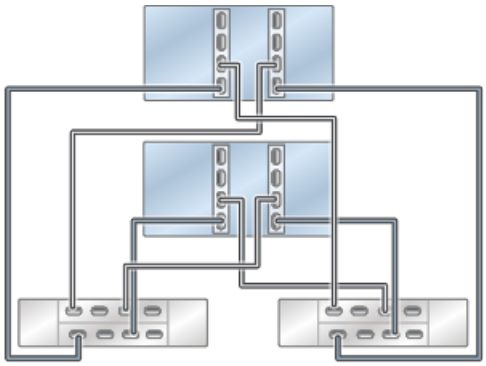


FIGURE 85 Clustered ZS4-4 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

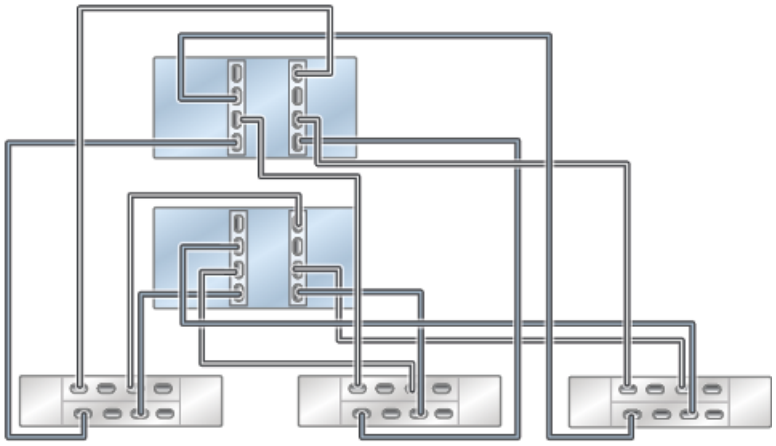
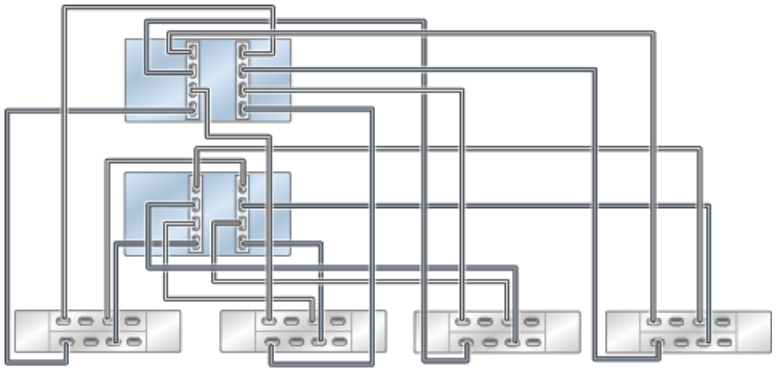


FIGURE 86 Clustered ZS4-4 controllers with two HBAs connected to four DE3-24 disk shelves in four chains



ZS4-4 Clustered to DE3-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 87 Clustered ZS4-4 controllers with three HBAs connected to one DE3-24 disk shelf in a single chain

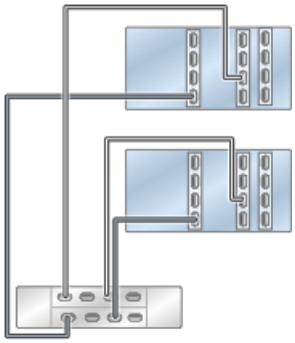


FIGURE 88 Clustered ZS4-4 controllers with three HBAs connected to two DE3-24 disk shelves in two chains

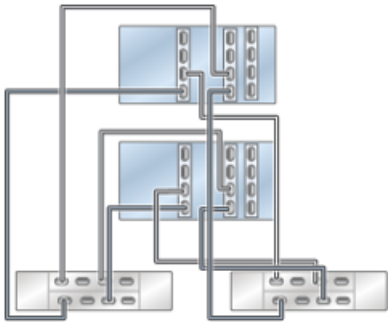


FIGURE 89 Clustered ZS4-4 controllers with three HBAs connected to three DE3-24 disk shelves in three chains

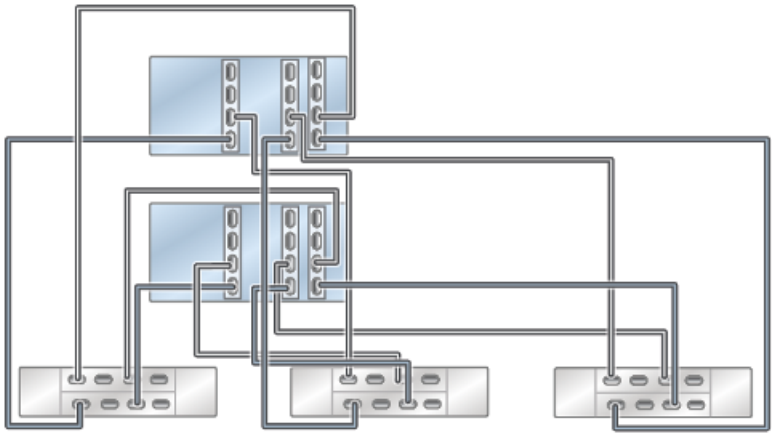


FIGURE 90 Clustered ZS4-4 controllers with three HBAs connected to four DE3-24 disk shelves in four chains

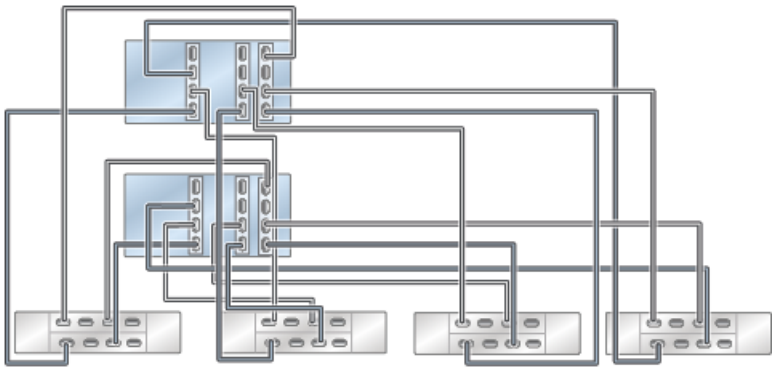


FIGURE 91 Clustered ZS4-4 controllers with three HBAs connected to five DE3-24 disk shelves in five chains

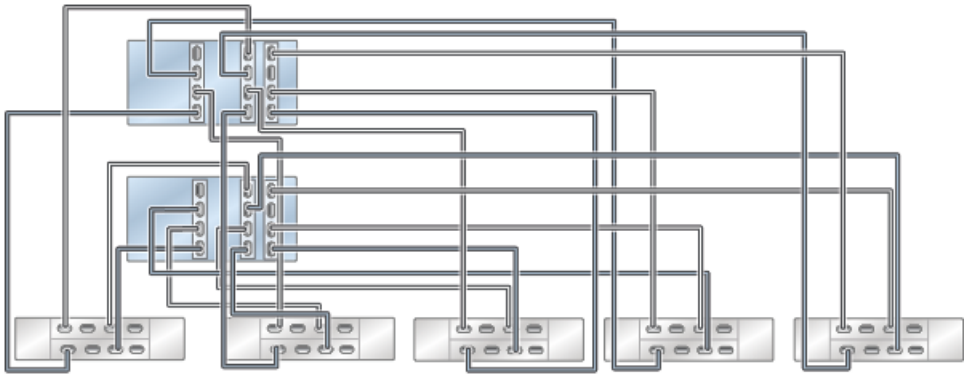
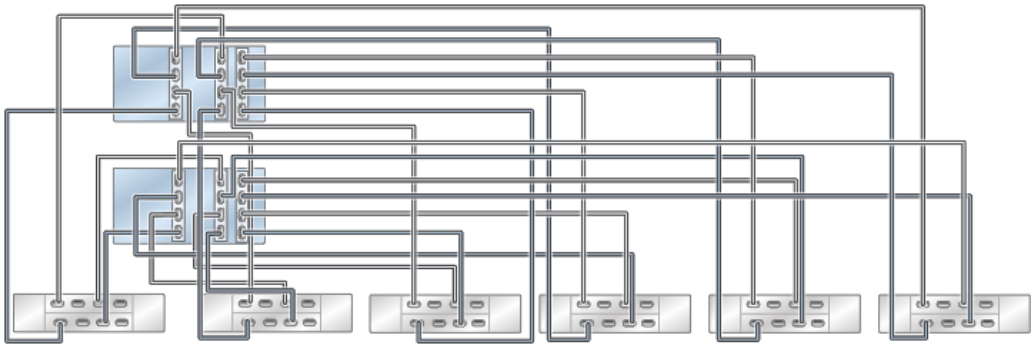


FIGURE 92 Clustered ZS4-4 controllers with three HBAs connected to six DE3-24 disk shelves in six chains



ZS4-4 Clustered to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 93 Clustered ZS4-4 controllers with four HBAs connected to one DE3-24 disk shelf in a single chain

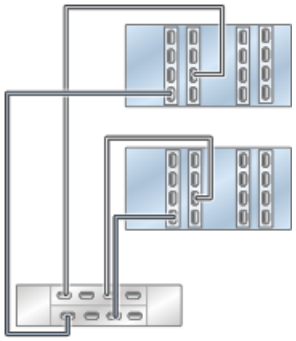


FIGURE 94 Clustered ZS4-4 controllers with four HBAs connected to two DE3-24 disk shelves in two chains

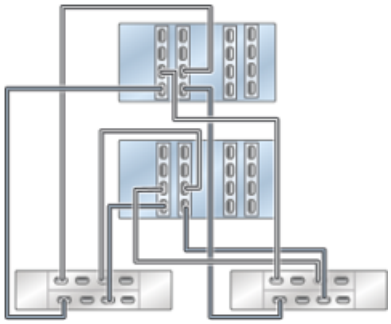


FIGURE 95 Clustered ZS4-4 controllers with four HBAs connected to three DE3-24 disk shelves in three chains

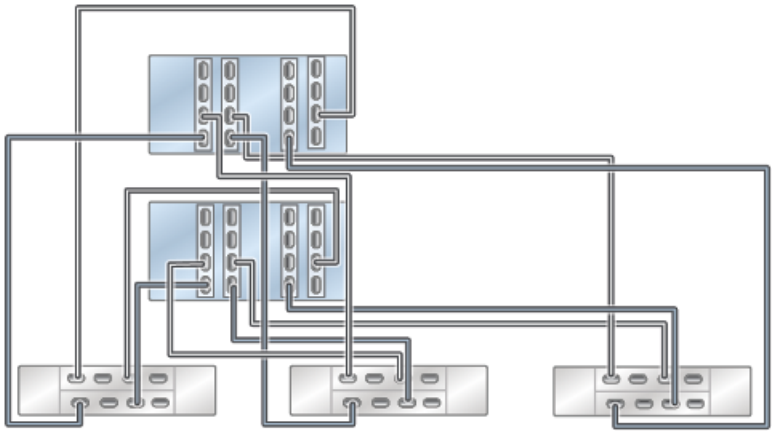


FIGURE 96 Clustered ZS4-4 controllers with four HBAs connected to four DE3-24 disk shelves in four chains

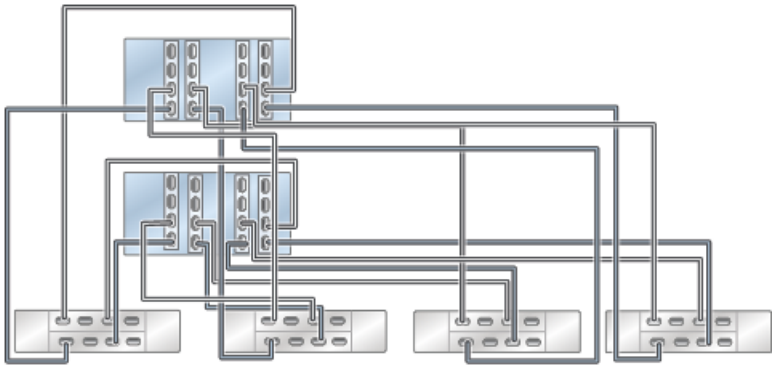


FIGURE 97 Clustered ZS4-4 controllers with four HBAs connected to five DE3-24 disk shelves in five chains

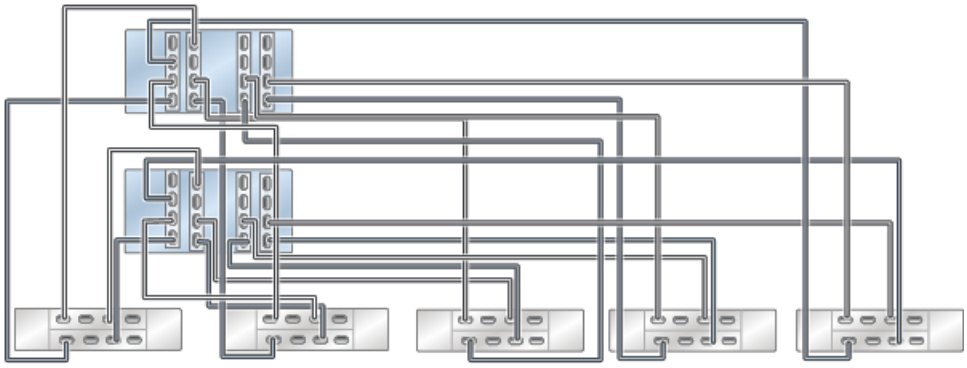


FIGURE 98 Clustered ZS4-4 controllers with four HBAs connected to six DE3-24 disk shelves in six chains

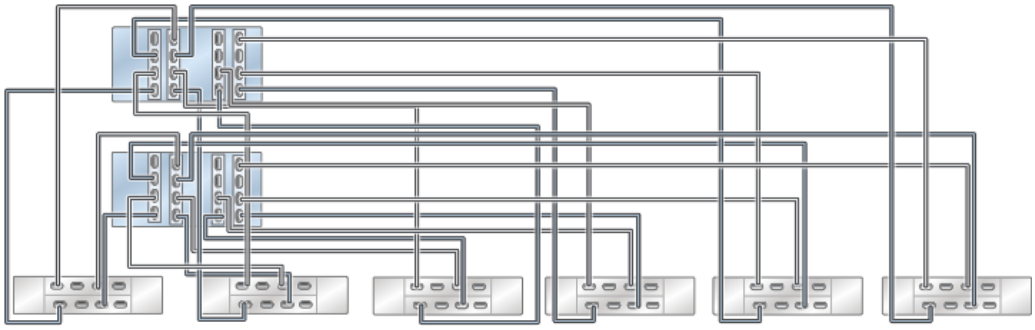


FIGURE 99 Clustered ZS4-4 controllers with four HBAs connected to seven DE3-24 disk shelves in seven chains

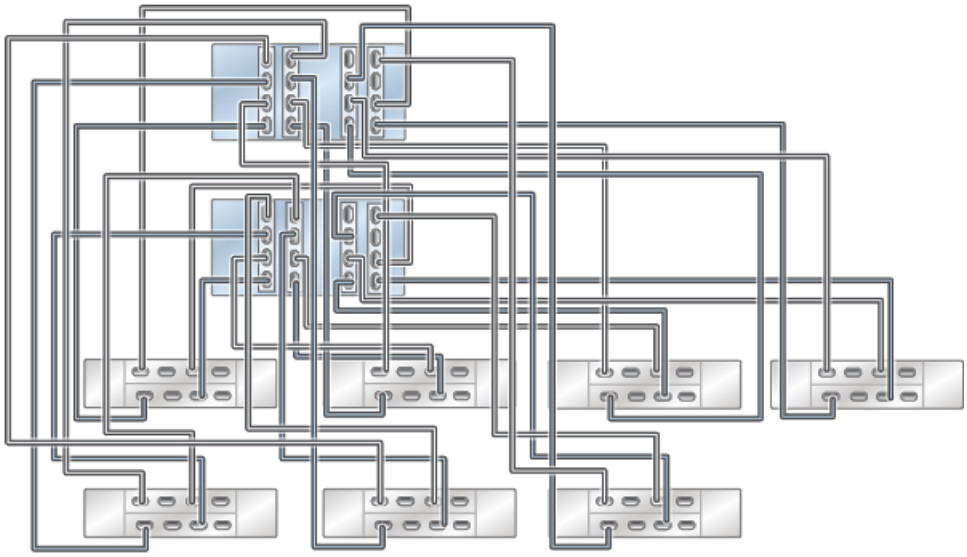
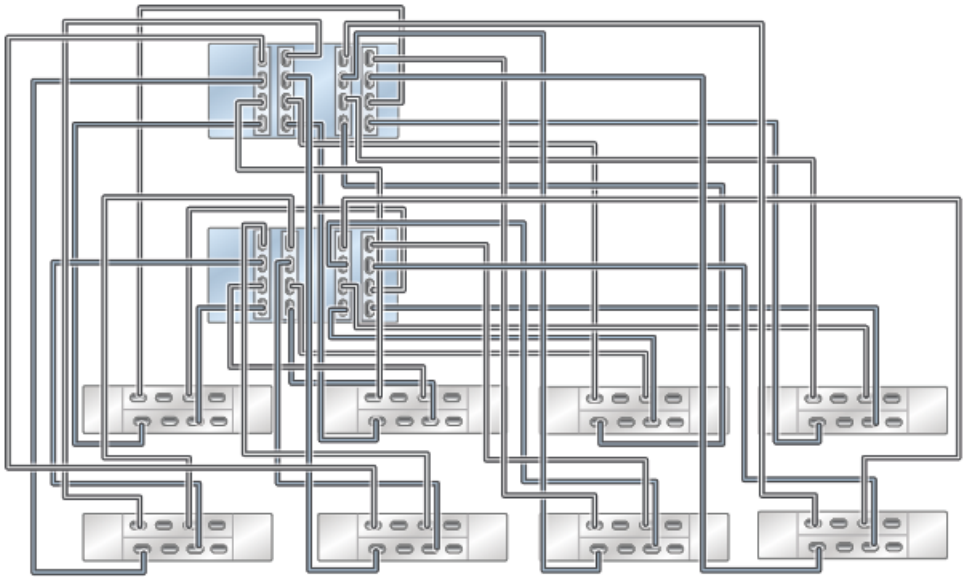


FIGURE 100 Clustered ZS4-4 controllers with four HBAs connected to eight DE3-24 disk shelves in eight chains



Cabling DE3-24 Disk Shelves to ZS3-2 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS3-2 controllers to DE3-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "ZS3-2 Standalone to DE3-24 Disk Shelves (1 HBA)" on page 107
- "ZS3-2 Standalone to DE3-24 Disk Shelves (2 HBAs)" on page 108
- "ZS3-2 Clustered to DE3-24 Disk Shelves (1 HBA)" on page 110
- "ZS3-2 Clustered to DE3-24 Disk Shelves (2 HBAs)" on page 112

ZS3-2 Standalone to DE3-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 101 Standalone ZS3-2 controller with one HBA connected to one DE3-24 disk shelf in a single chain

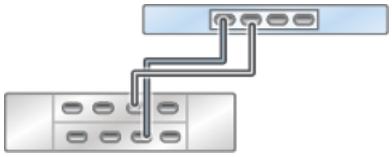


FIGURE 102 Standalone ZS3-2 controller with one HBA connected to two DE3-24 disk shelves in two chains

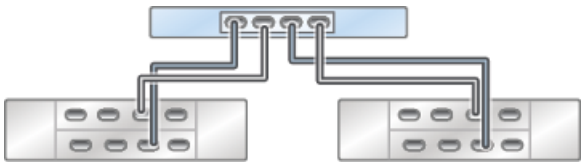
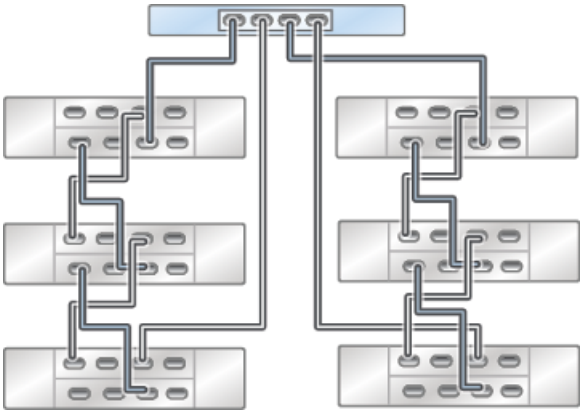


FIGURE 103 Standalone ZS3-2 controller with one HBA connected to six DE3-24 disk shelves in two chains



ZS3-2 Standalone to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 104 Standalone ZS3-2 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

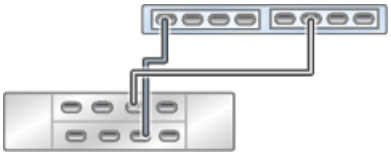


FIGURE 105 Standalone ZS3-2 controller with two HBAs connected to two DE3-24 disk shelves in two chains

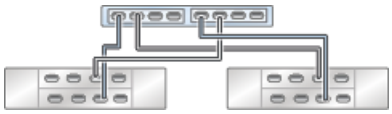


FIGURE 106 Standalone ZS3-2 controller with two HBAs connected to three DE3-24 disk shelves in three chains

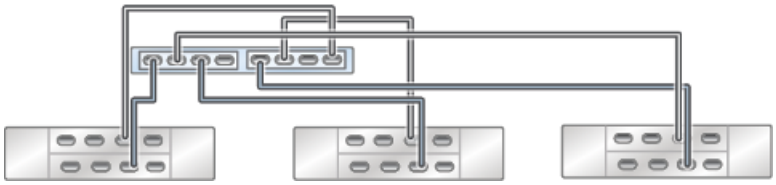


FIGURE 107 Standalone ZS3-2 controller with two HBAs connected to four DE3-24 disk shelves in four chains

FIGURE 108 Standalone ZS3-2 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

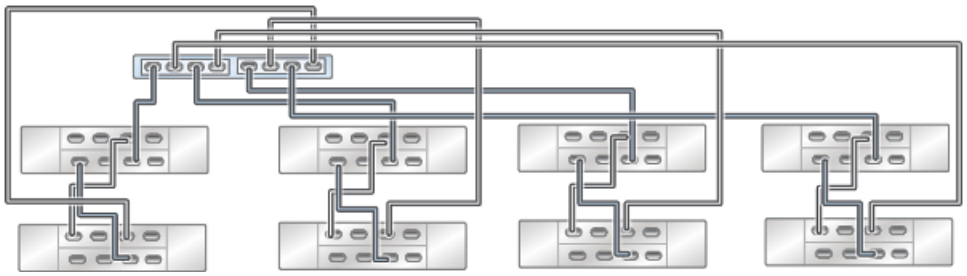
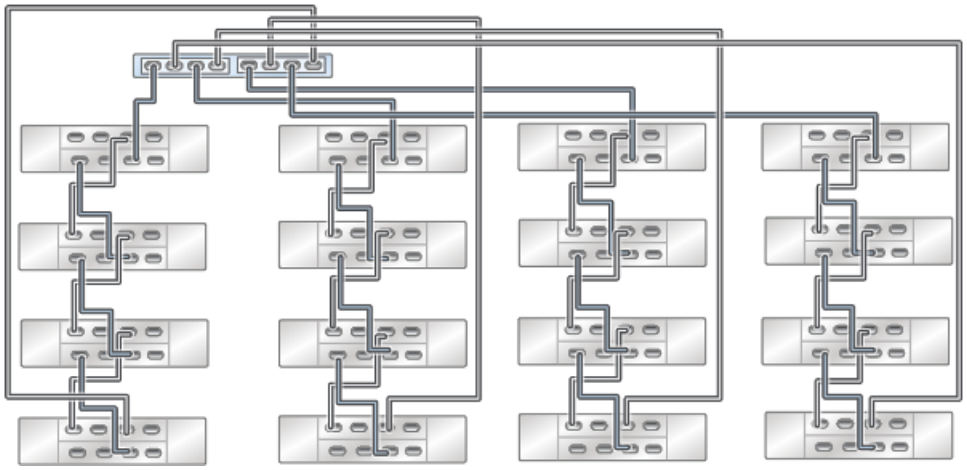


FIGURE 109 Standalone ZS3-2 controller with two HBAs connected to sixteen DE3-24 disk shelves in four chains



ZS3-2 Clustered to DE3-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 110 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 disk shelf in a single chain

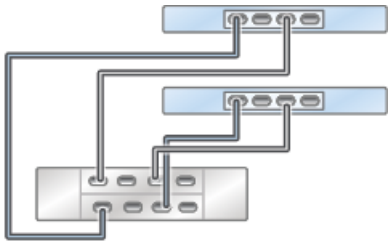


FIGURE 111 Clustered ZS3-2 controllers with one HBA connected to two DE3-24 disk shelves in two chains

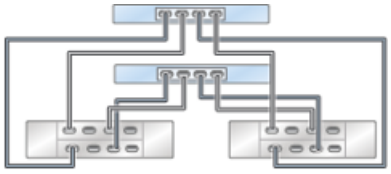
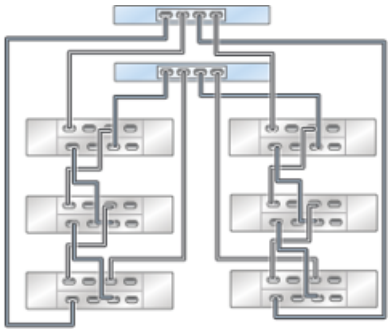


FIGURE 112 Clustered ZS3-2 controllers with one HBA connected to six DE3-24 disk shelves in two chains



ZS3-2 Clustered to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 113 Clustered ZS3-2 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

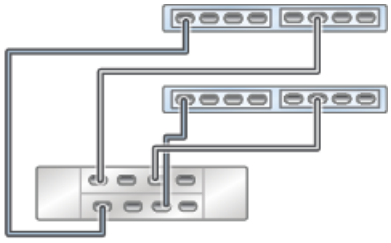


FIGURE 114 Clustered ZS3-2 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

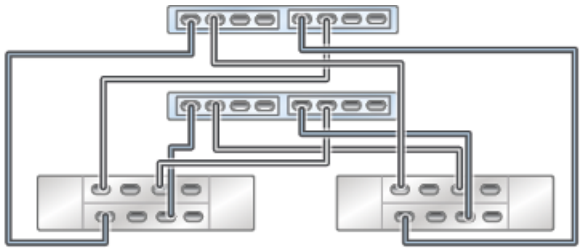


FIGURE 115 Clustered ZS3-2 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

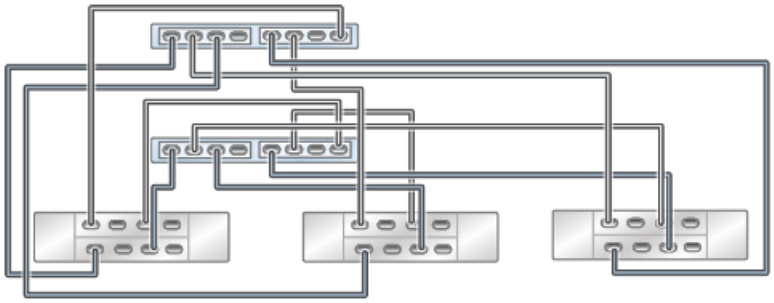


FIGURE 116 Clustered ZS3-2 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

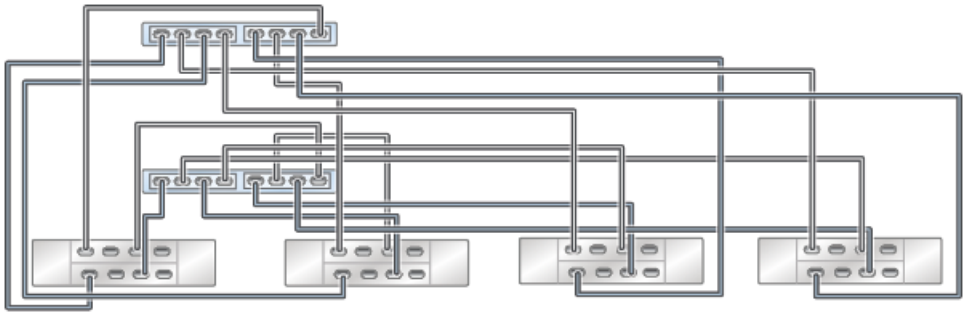


FIGURE 117 Clustered ZS3-2 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

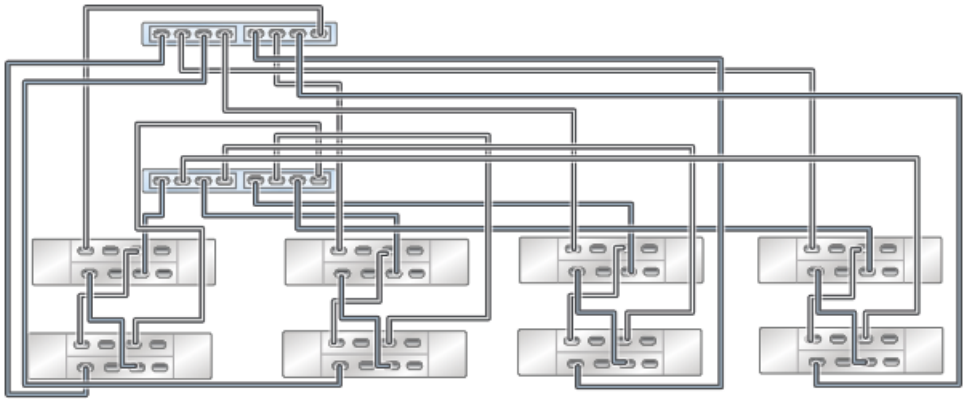
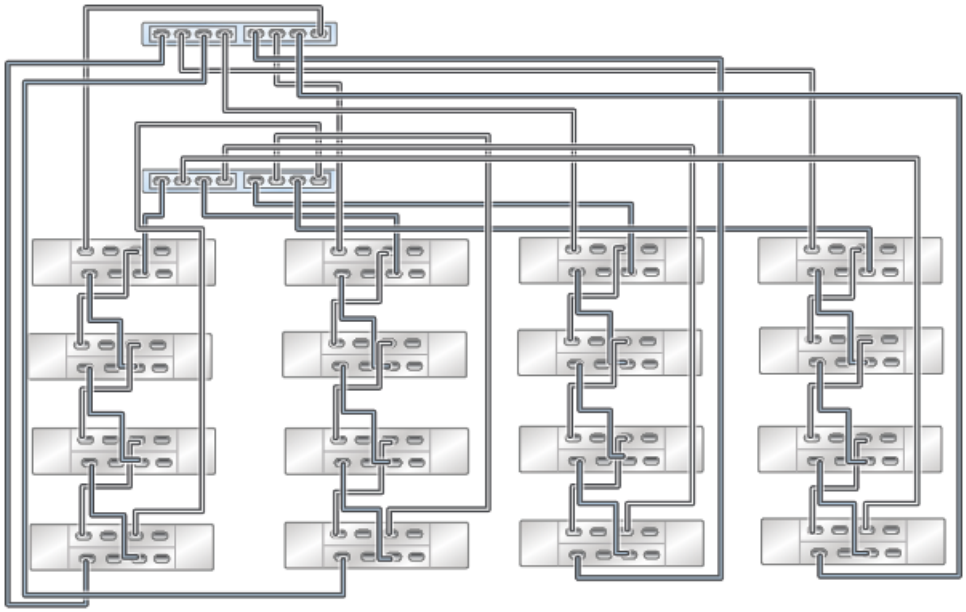


FIGURE 118 Clustered ZS3-2 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains



Cabling DE2-24 Disk Shelves to 4X4 Port SAS-2 HBAs

This section contains guidelines for properly cabling standalone and clustered ZS5-4, ZS5-2, ZS4-4, ZS3-4, ZS3-2, 7420, and 7320 controllers to 4X4 port SAS-2 HBAs.

To review these guidelines, see the following topics:

Cabling DE2-24 Disk Shelves to ZS5-4 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS5-4 controllers to DE2-24 disk shelves. Use the diagrams in this section to connect to one or more disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

ZS5-4 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 119 Standalone ZS5-4 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

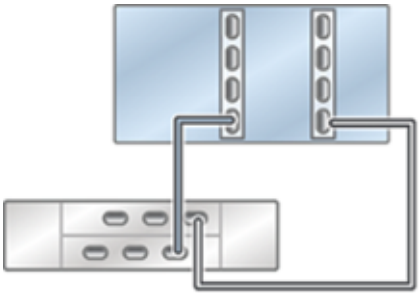


FIGURE 120 Standalone ZS5-4 controller with two HBAs connected to two DE2-24 disk shelves in two chains

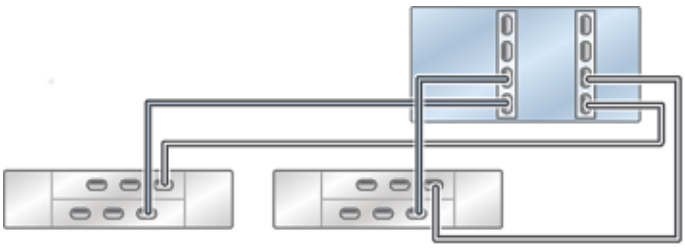


FIGURE 121 Standalone ZS5-4 controller with two HBAs connected to three DE2-24 disk shelves in three chains

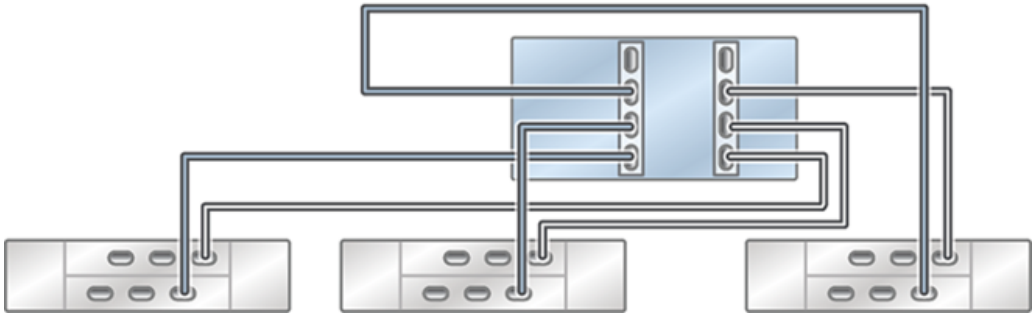


FIGURE 122 Standalone ZS5-4 controller with two HBAs connected to four DE2-24 disk shelves in four chains

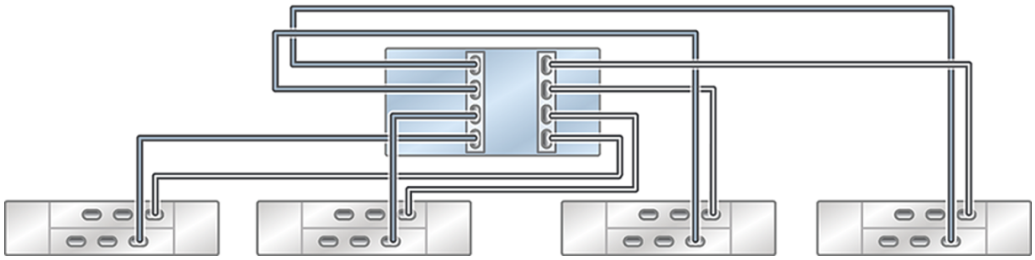


FIGURE 123 Standalone ZS5-4 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

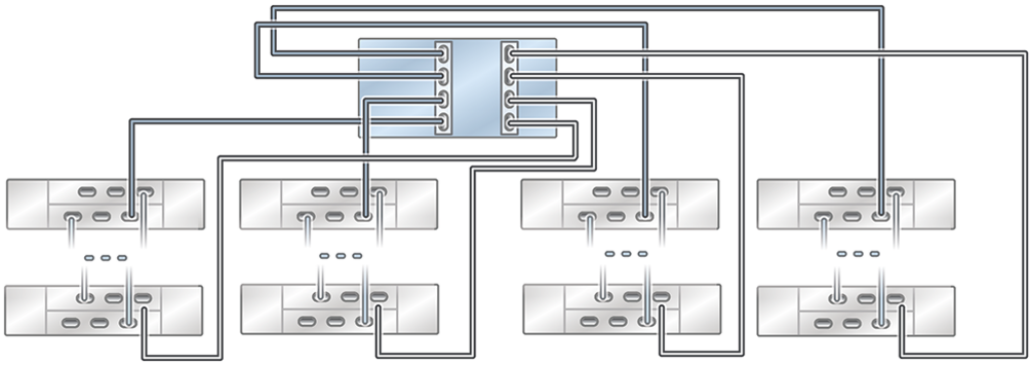
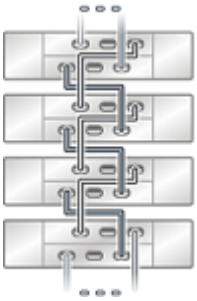


FIGURE 124 Multiple disk shelves in a single chain



ZS5-4 Standalone to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with three HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 125 Standalone ZS5-4 controller with three HBAs connected to two DE2-24 disk shelves in two chains

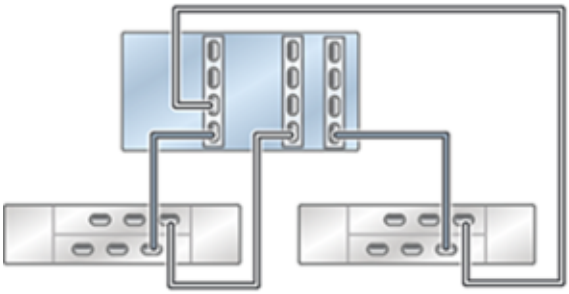


FIGURE 126 Standalone ZS5-4 controller with three HBAs connected to three DE2-24 disk shelves in three chains

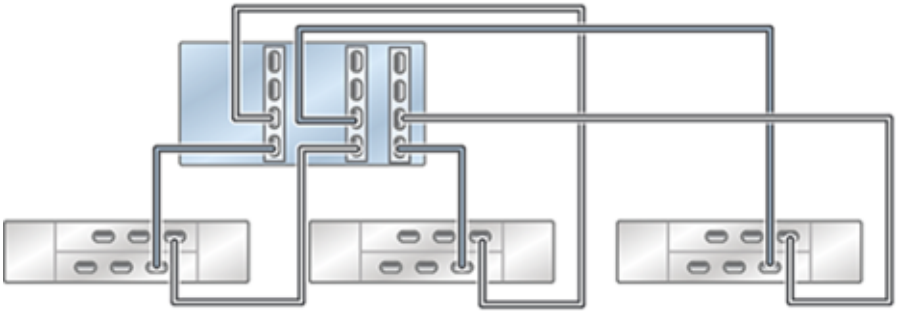


FIGURE 127 Standalone ZS5-4 controller with three HBAs connected to four DE2-24 disk shelves in four chains

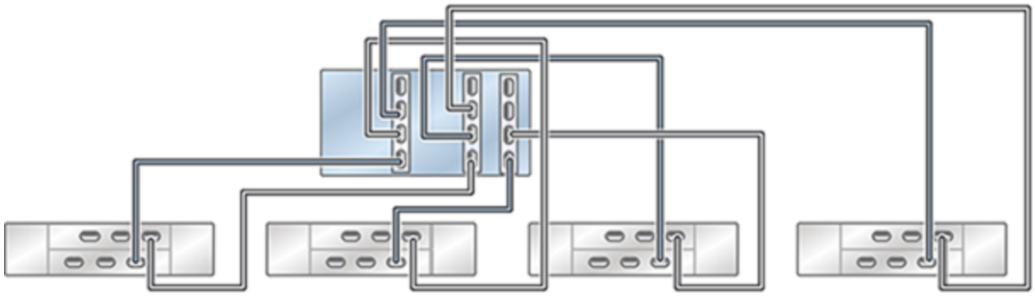


FIGURE 128 Standalone ZS5-4 controller with three HBAs connected to five DE2-24 disk shelves in five chains

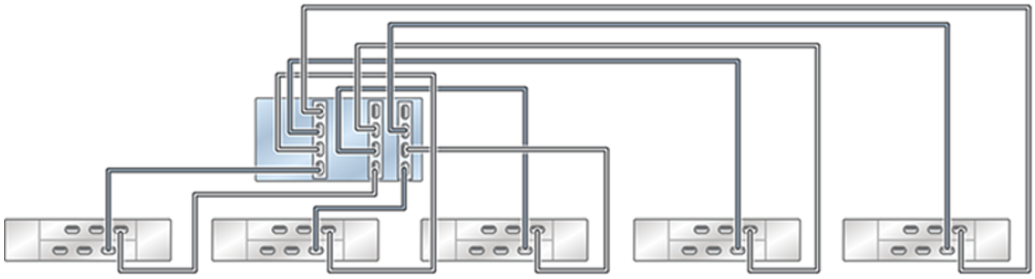


FIGURE 129 Standalone ZS5-4 controller with three HBAs connected to six DE2-24 disk shelves in six chains

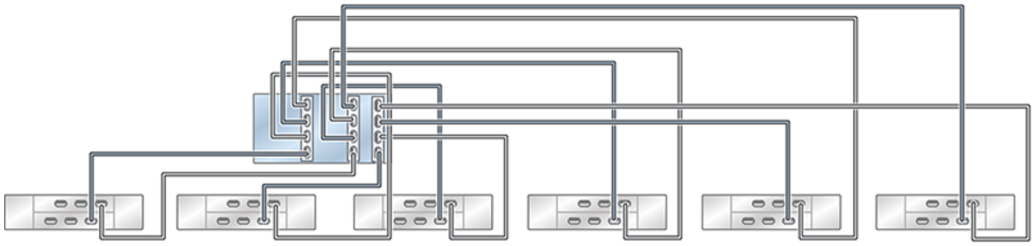
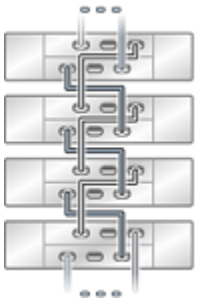


FIGURE 130 Multiple disk shelves in a single chain



ZS5-4 Standalone to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 131 Standalone ZS5-4 controller with four HBAs connected to two DE2-24 disk shelves in two chains

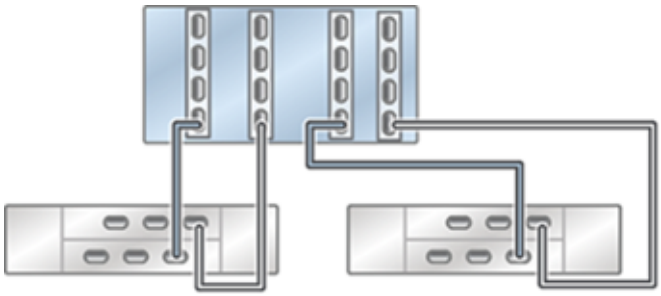


FIGURE 132 Standalone ZS5-4 controller with four HBAs connected to three DE2-24 disk shelves in three chains

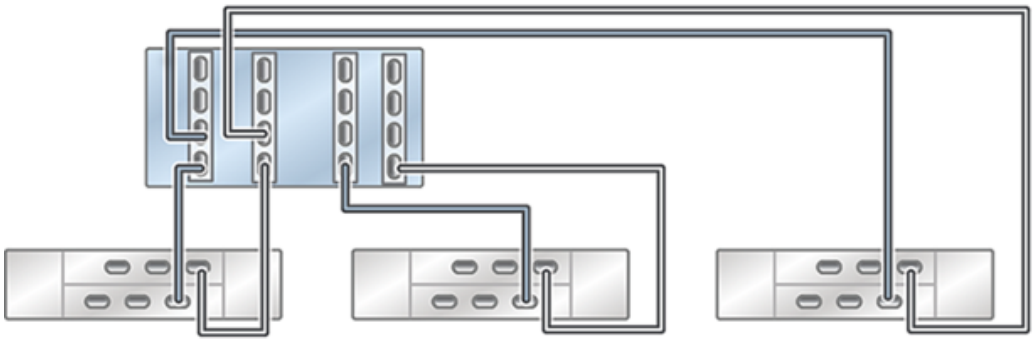


FIGURE 133 Standalone ZS5-4 controller with four HBAs connected to four DE2-24 disk shelves in four chains

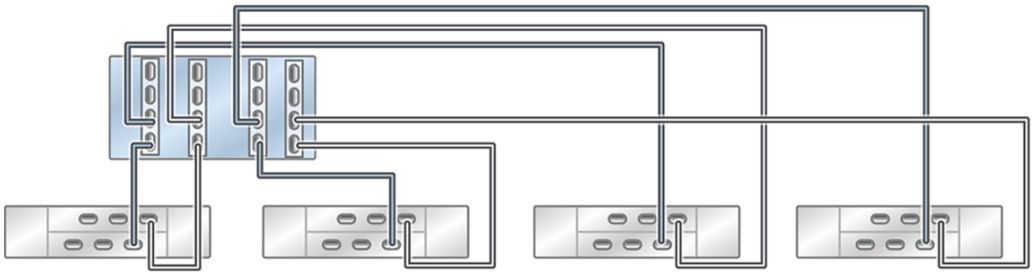


FIGURE 134 Standalone ZS5-4 controller with four HBAs connected to five DE2-24 disk shelves in five chains

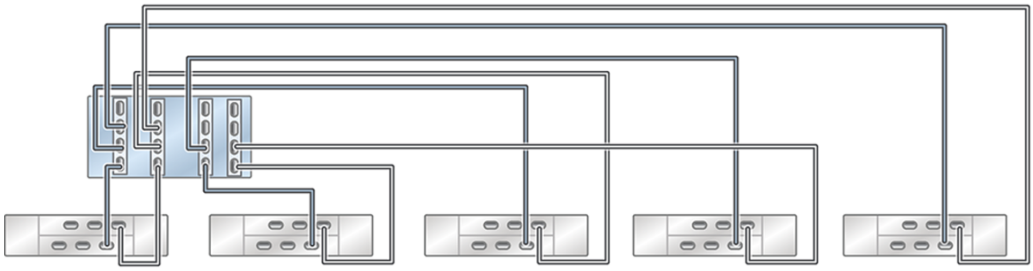


FIGURE 135 Standalone ZS5-4 controller with four HBAs connected to six DE2-24 disk shelves in six chains

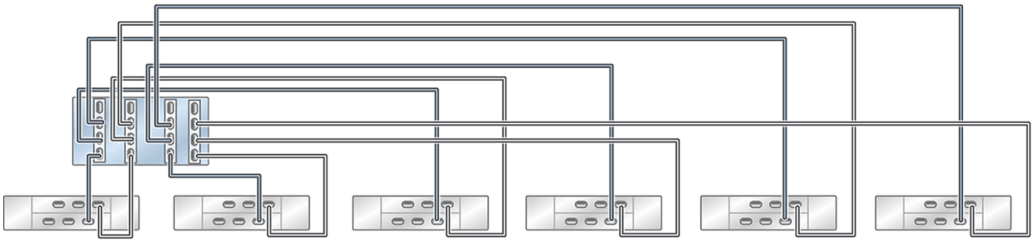


FIGURE 136 Standalone ZS5-4 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

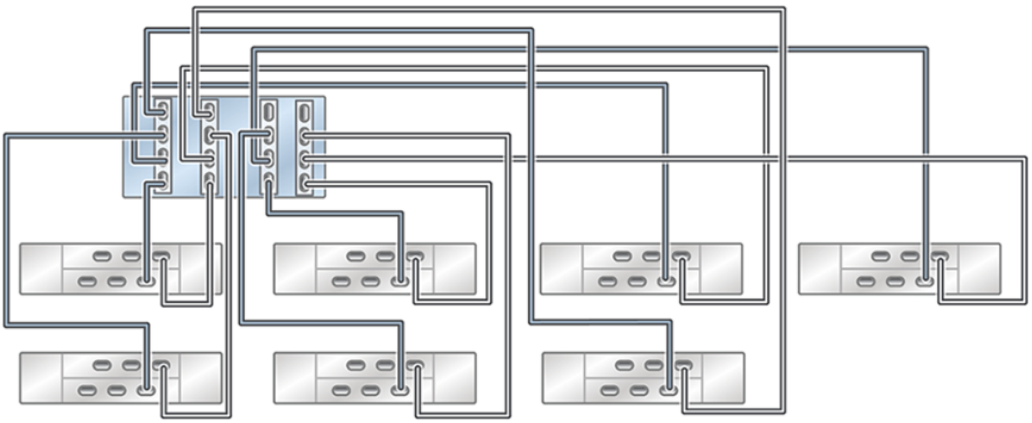


FIGURE 137 Standalone ZS5-4 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

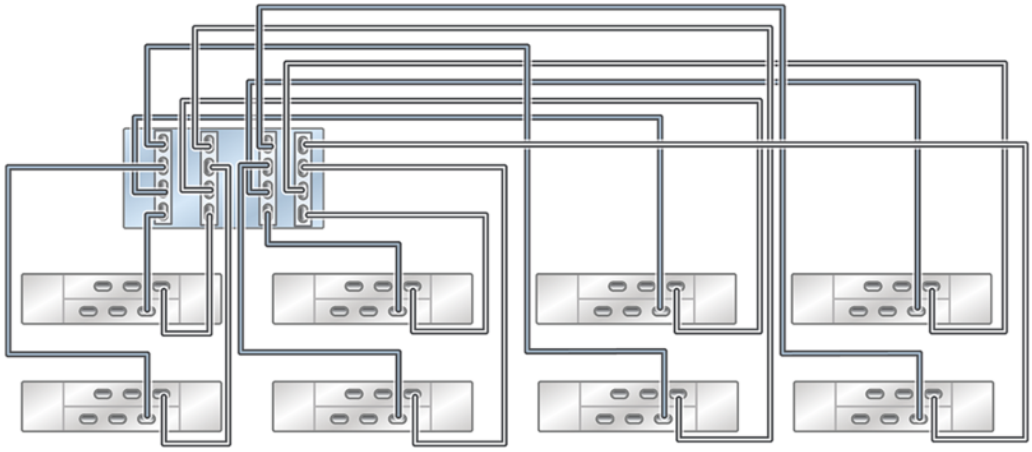
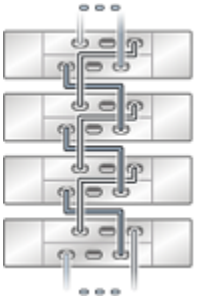


FIGURE 138 Multiple disk shelves in a single chain



ZS5-4 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 139 Clustered ZS5-4 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

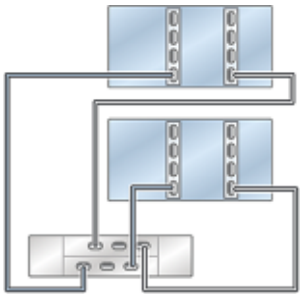


FIGURE 140 Clustered ZS5-4 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

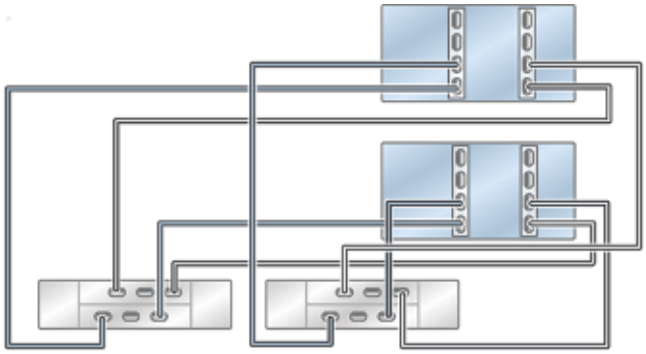


FIGURE 141 Clustered ZS5-4 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

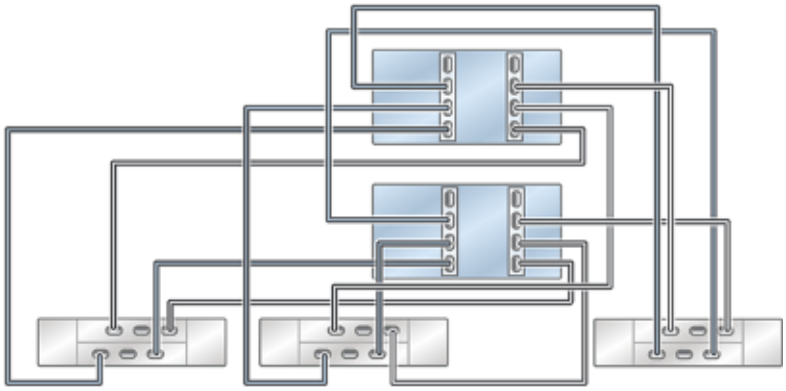


FIGURE 142 Clustered ZS5-4 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

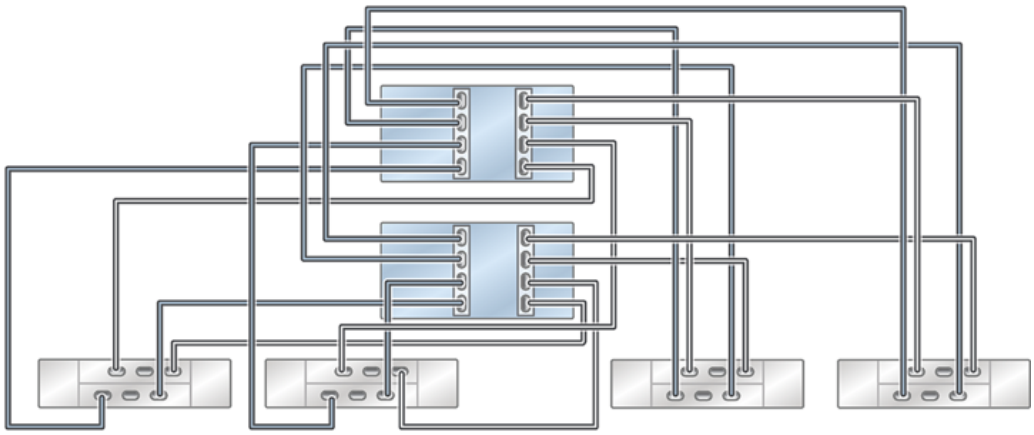


FIGURE 143 Clustered ZS5-4 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

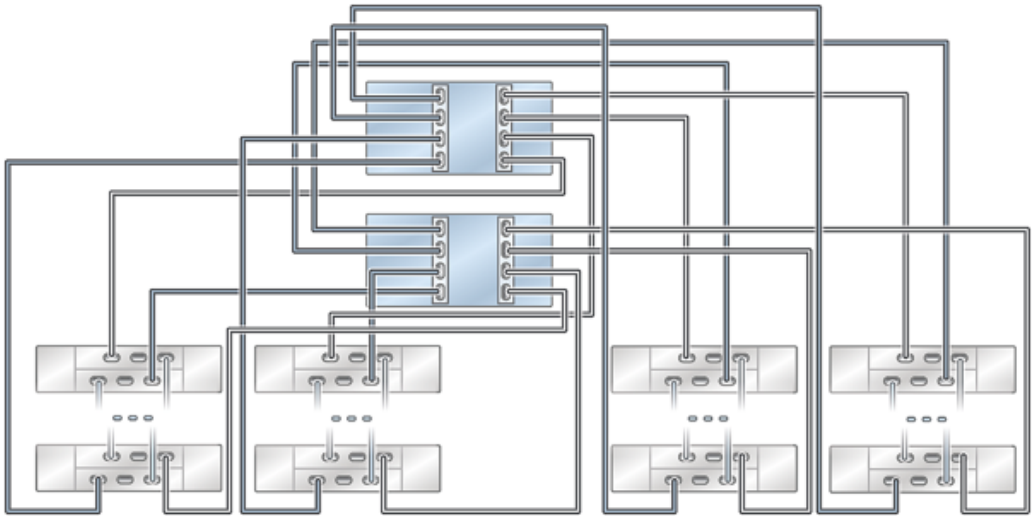
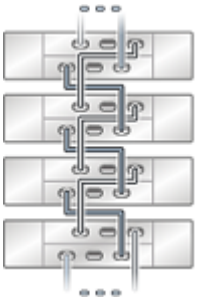


FIGURE 144 Multiple disk shelves in a single chain



ZS5-4 Clustered to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 145 Clustered ZS5-4 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

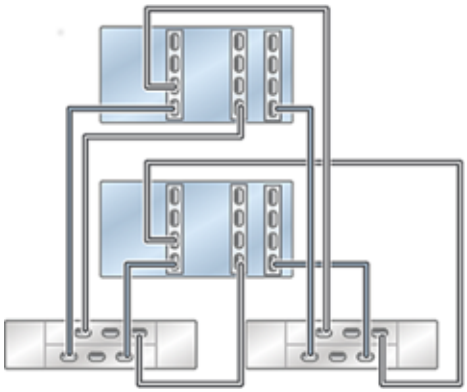


FIGURE 146 Clustered ZS5-4 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

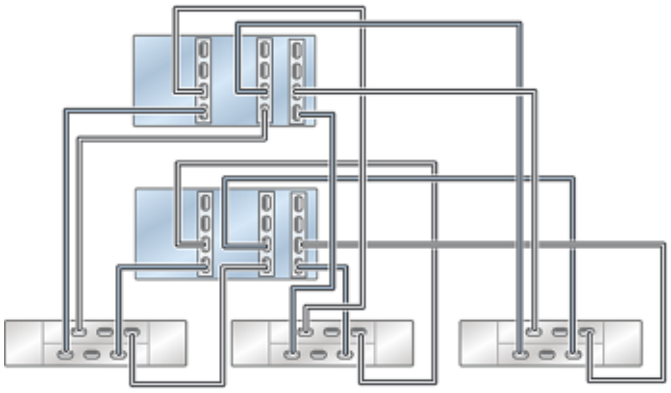


FIGURE 147 Clustered ZS5-4 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

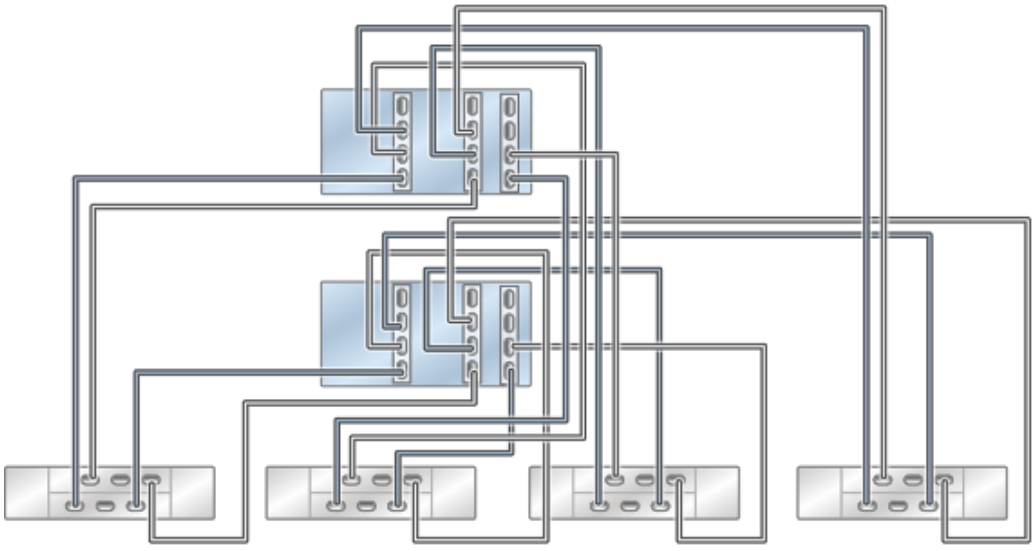


FIGURE 148 Clustered ZS5-4 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

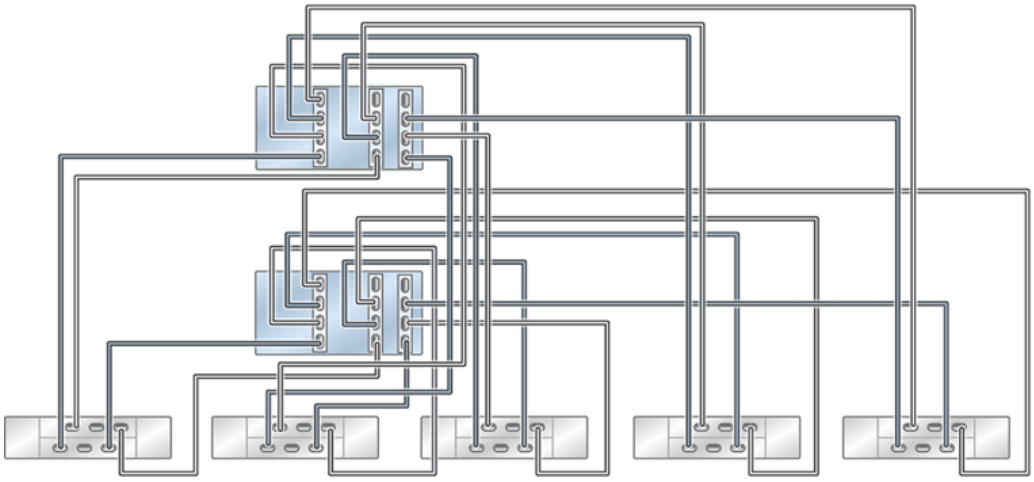


FIGURE 149 Clustered ZS5-4 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

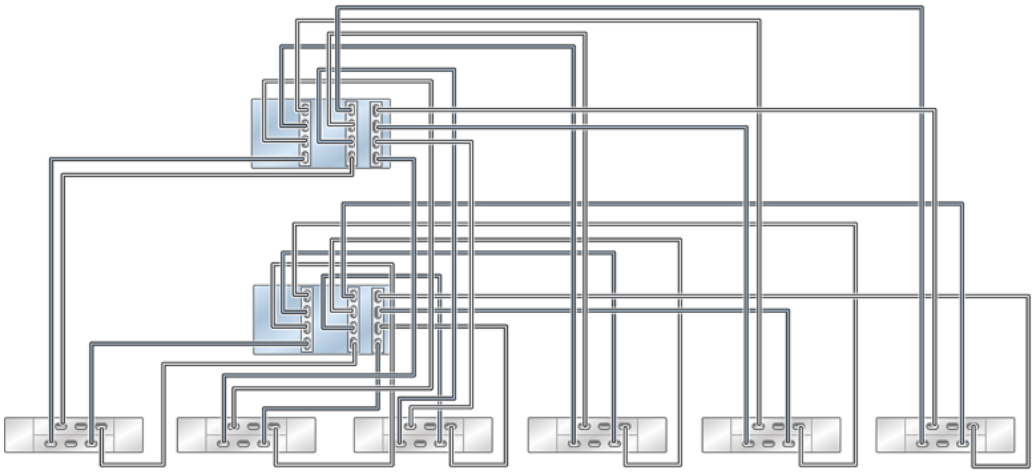
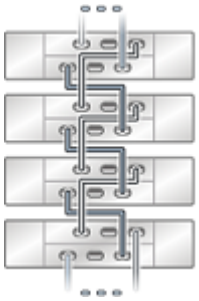


FIGURE 150 Multiple disk shelves in a single chain



ZS5-4 Clustered to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-4 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-4 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 151 Clustered ZS5-4 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

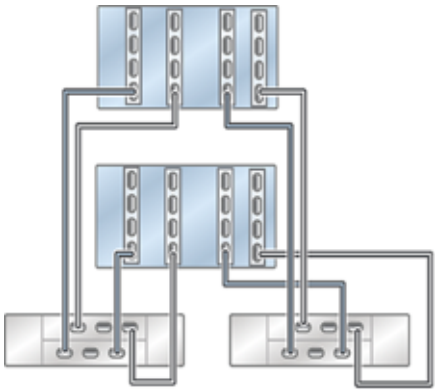


FIGURE 152 Clustered ZS5-4 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

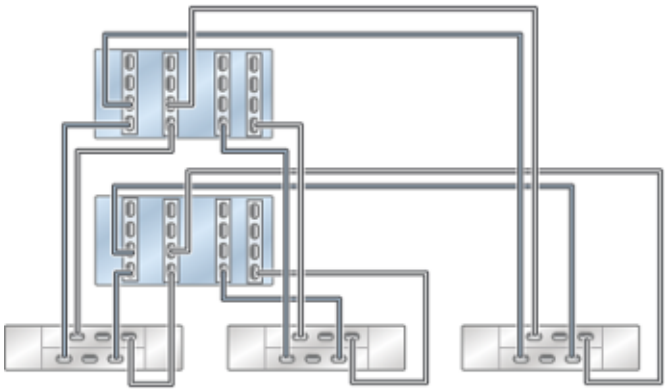


FIGURE 153 Clustered ZS5-4 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

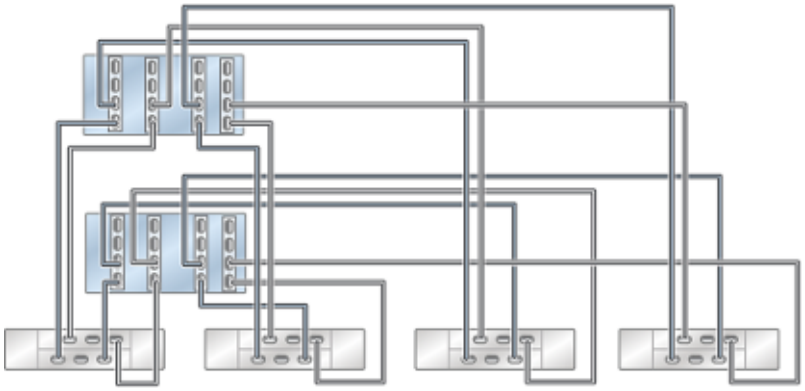


FIGURE 154 Clustered ZS5-4 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

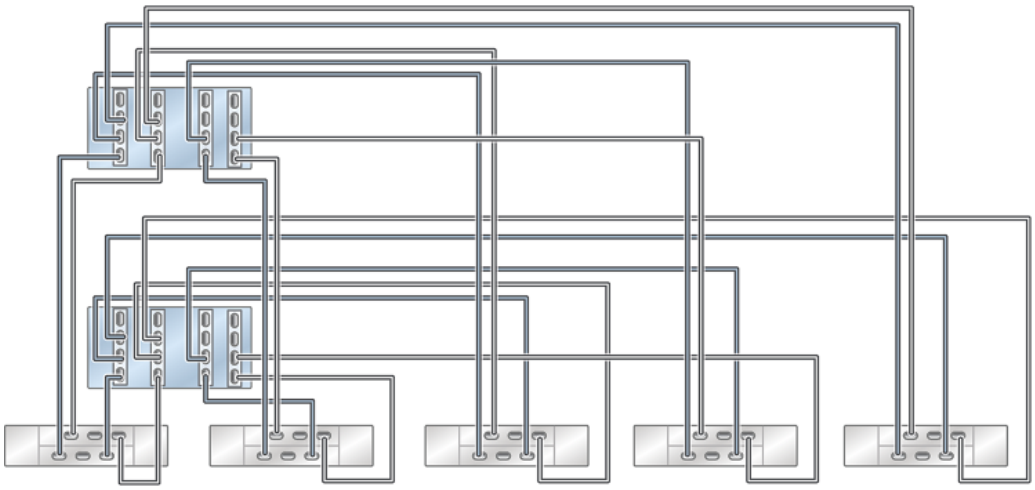


FIGURE 155 Clustered ZS5-4 controllers with four HBAs connected to six DE2-24 disk shelves in six chains

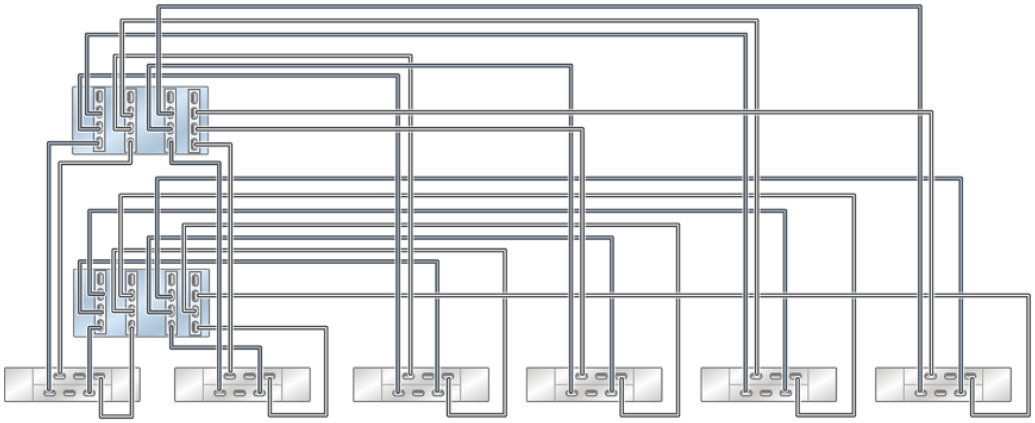


FIGURE 156 Clustered ZS5-4 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

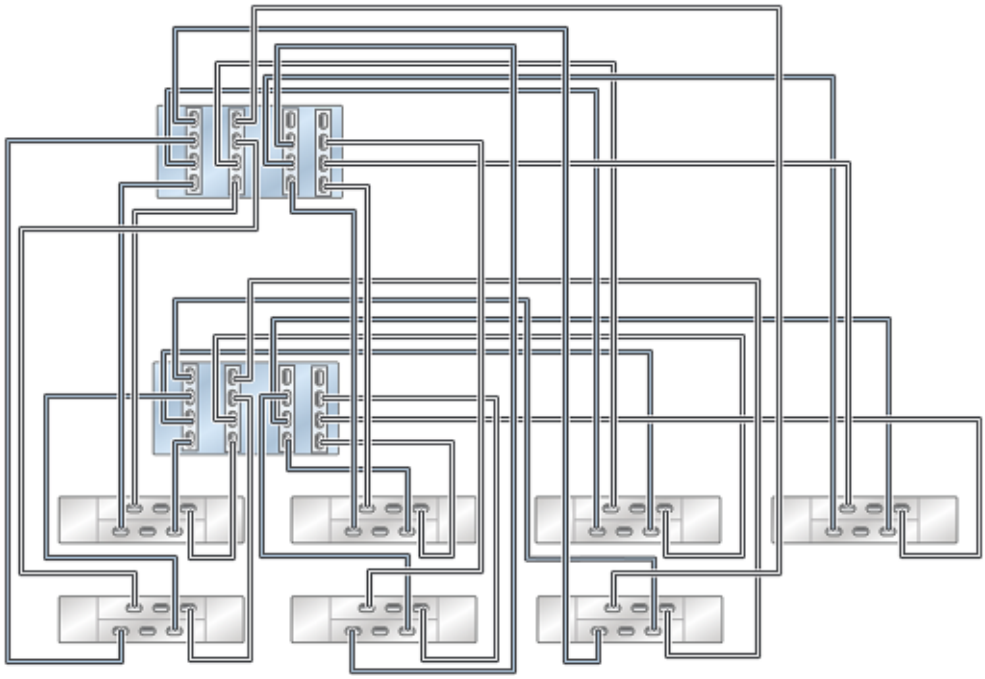


FIGURE 157 Clustered ZS5-4 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

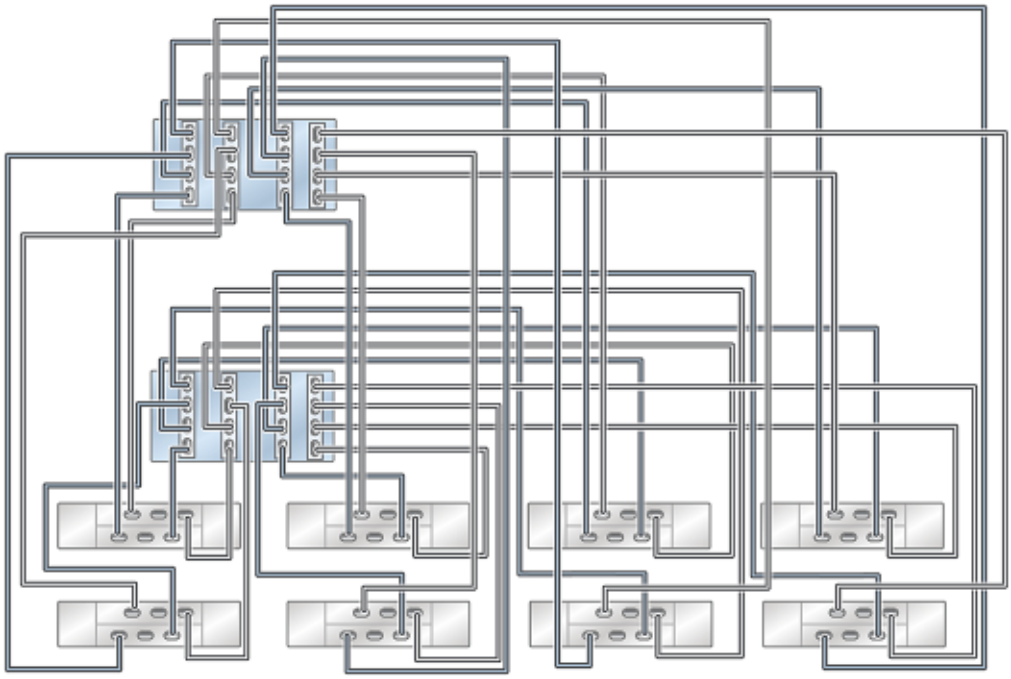
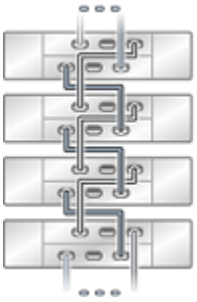


FIGURE 158 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to ZS5-2 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS5-2 controllers to DE2-24 disk shelves. Use the diagrams in this section to connect to one or more disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

ZS5-2 Standalone to DE2-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-2 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 159 Standalone ZS5-2 controller with one HBA connected to one DE2-24 disk shelf in a single chain

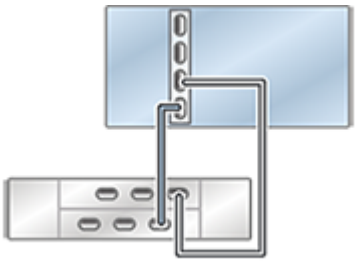


FIGURE 160 Standalone ZS5-2 controller with one HBA connected to two DE2-24 disk shelves in two chains

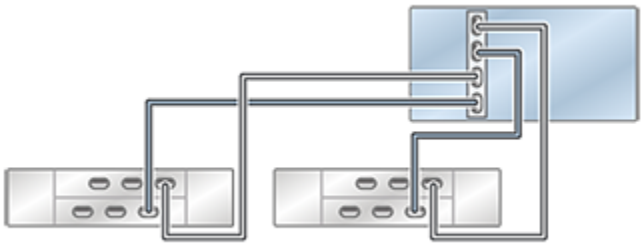


FIGURE 161 Standalone ZS5-2 controller with one HBA connected to four DE2-24 disk shelves in two chains

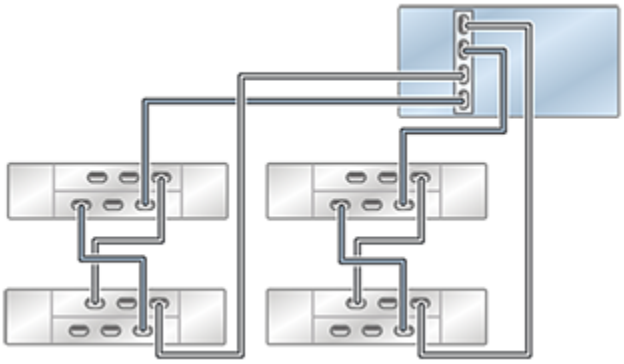
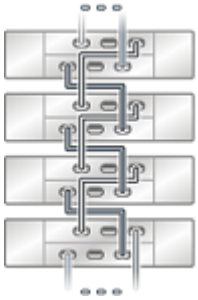


FIGURE 162 Multiple disk shelves in a single chain



ZS5-2 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-2 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 163 Standalone ZS5-2 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

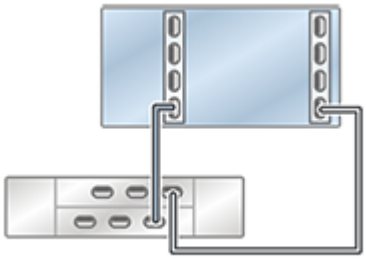


FIGURE 164 Standalone ZS5-2 controller with two HBAs connected to two DE2-24 disk shelves in two chains

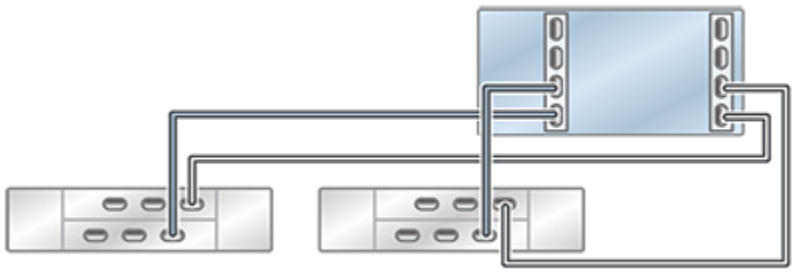


FIGURE 165 Standalone ZS5-2 controller with two HBAs connected to three DE2-24 disk shelves in three chains

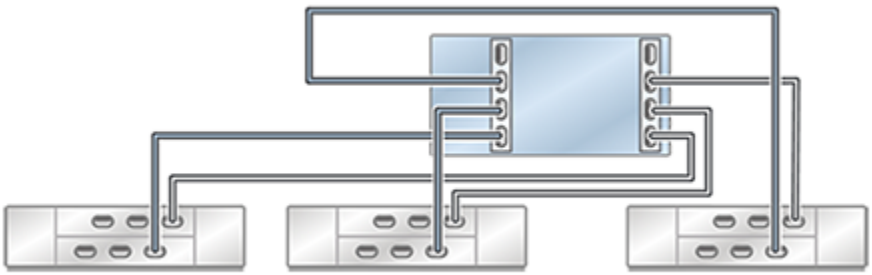


FIGURE 166 Standalone ZS5-2 controller with two HBAs connected to four DE2-24 disk shelves in four chains

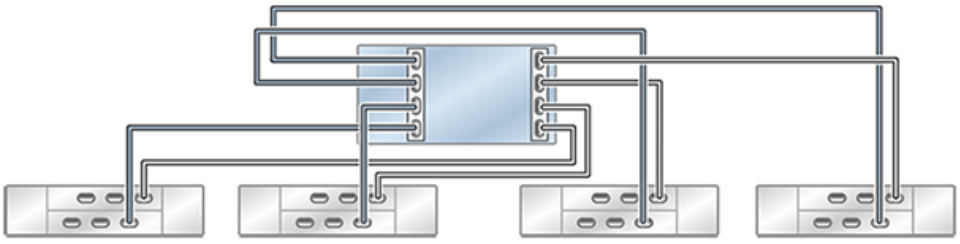


FIGURE 167 Standalone ZS5-2 controller with two HBAs connected to eight DE2-24 disk shelves in four chains

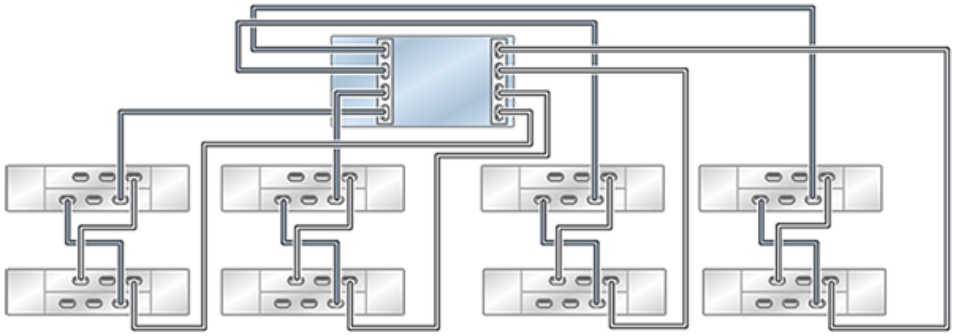
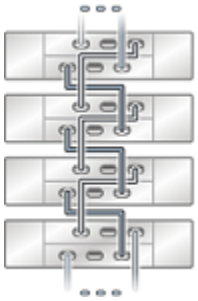


FIGURE 168 Multiple disk shelves in a single chain



ZS5-2 Clustered to DE2-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-2 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 169 Clustered ZS5-2 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

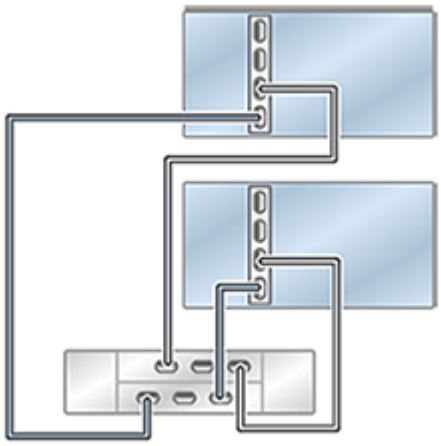


FIGURE 170 Clustered ZS5-2 controllers with one HBA connected to two DE2-24 disk shelves in two chains

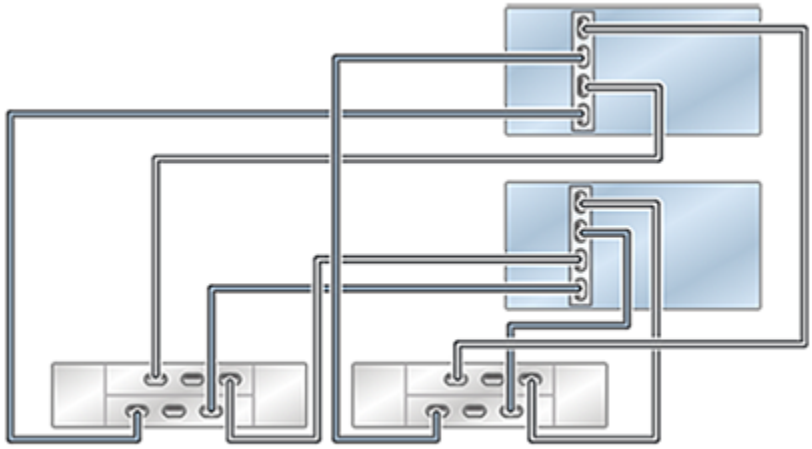


FIGURE 171 Clustered ZS5-2 controllers with one HBA connected to four DE2-24 disk shelves in two chains

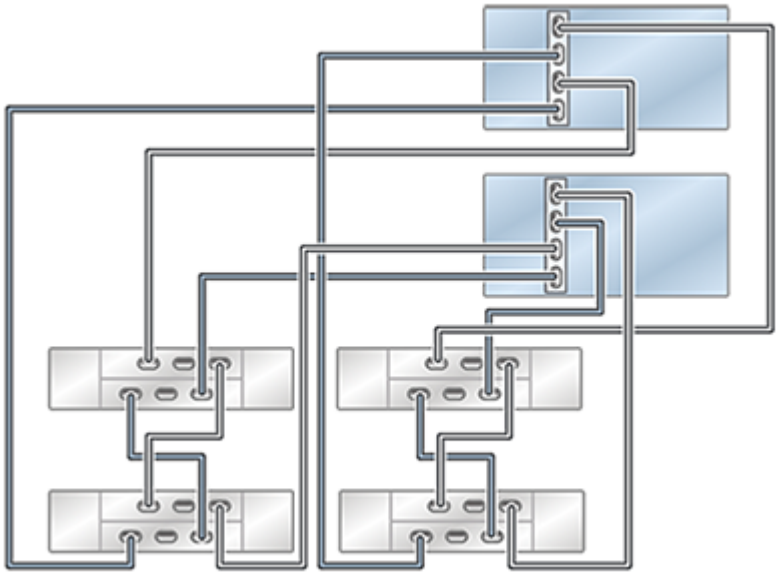
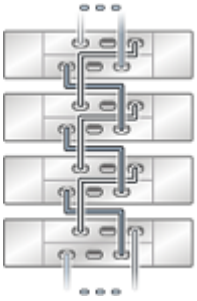


FIGURE 172 Multiple disk shelves in a single chain



ZS5-2 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS5-2 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For HBA port locations, see the hardware overview section for the ZS5-2 controller in *Oracle ZFS Storage Appliance Customer Service Manual*.

FIGURE 173 Clustered ZS5-2 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

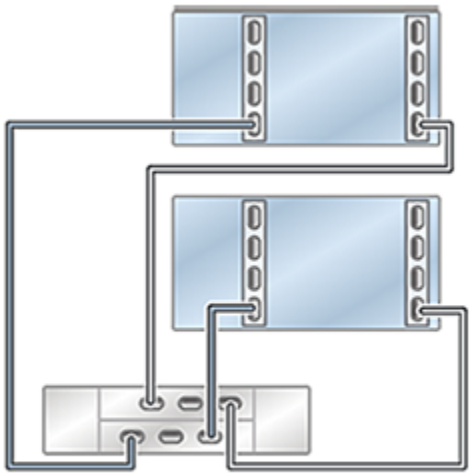


FIGURE 174 Clustered ZS5-2 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

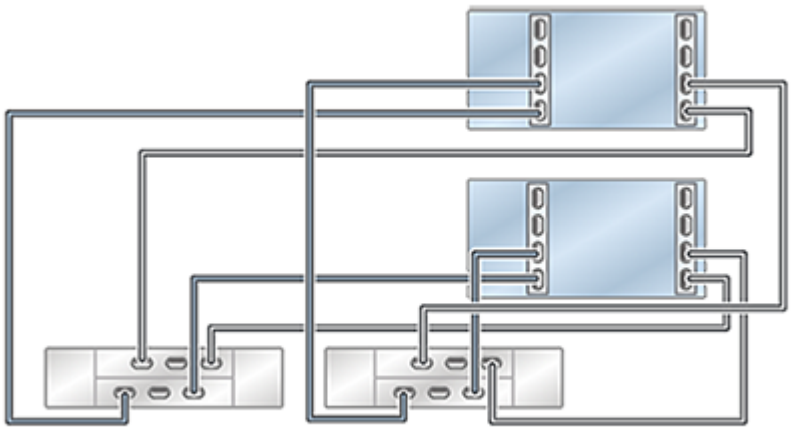


FIGURE 175 Clustered ZS5-2 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

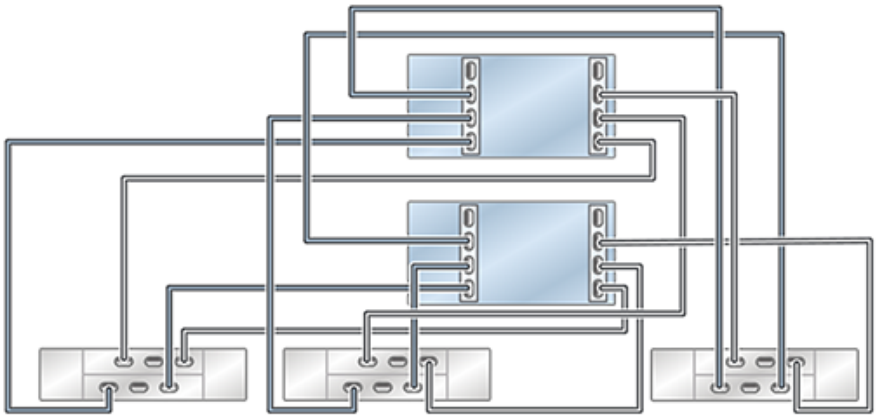


FIGURE 176 Clustered ZS5-2 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

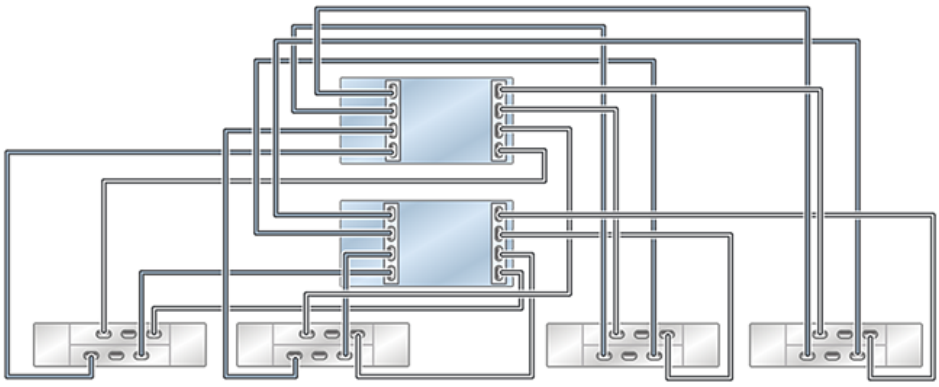


FIGURE 177 Clustered ZS5-2 controllers with two HBAs connected to eight DE2-24 disk shelves in four chains

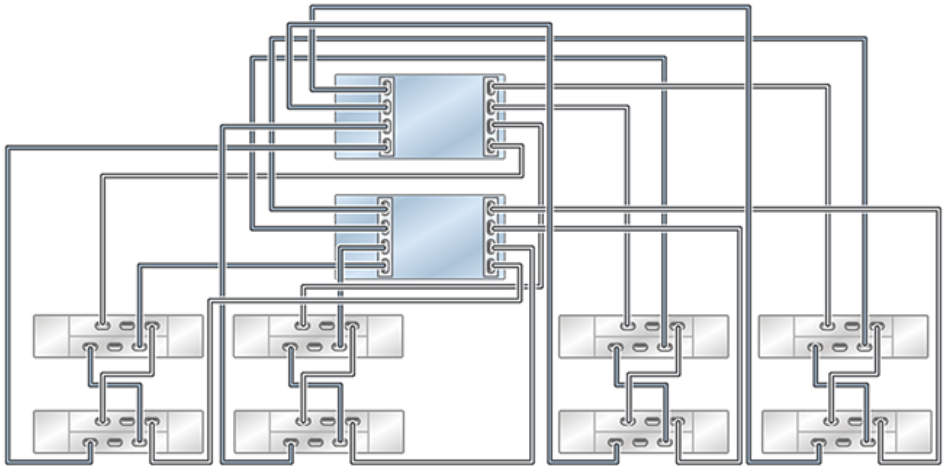
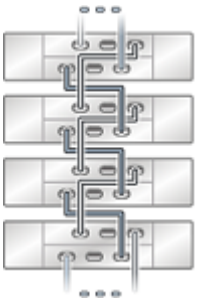


FIGURE 178 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to ZS4-4/ZS3-4 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS4-4/ZS3-4 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 179 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

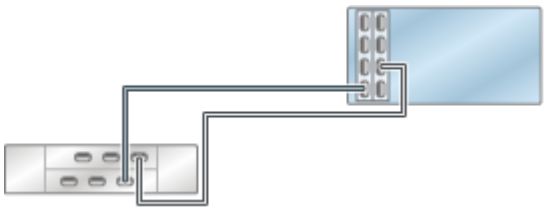


FIGURE 180 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to two DE2-24 disk shelves in two chains

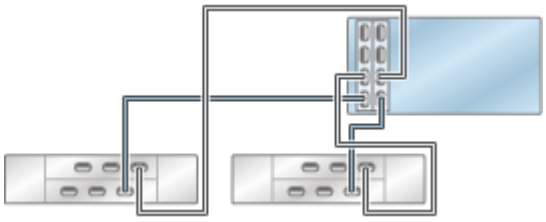


FIGURE 181 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to three DE2-24 disk shelves in three chains

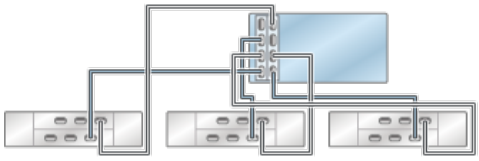


FIGURE 182 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to four DE2-24 disk shelves in four chains

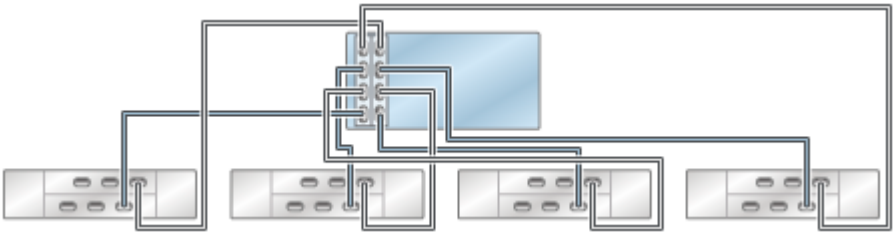


FIGURE 183 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

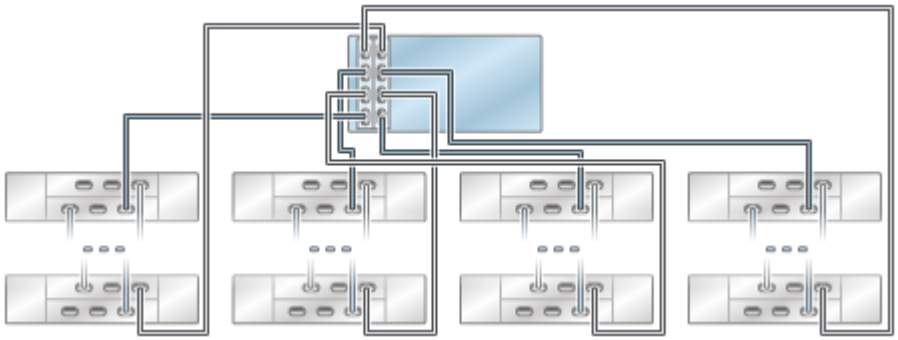
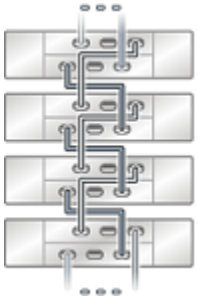


FIGURE 184 Multiple disk shelves in a single chain



ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 standalone controllers with three HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 185 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 186 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to two DE2-24 disk shelves in two chains

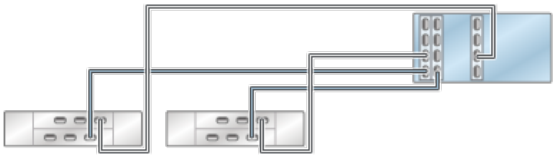


FIGURE 187 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to three DE2-24 disk shelves in three chains

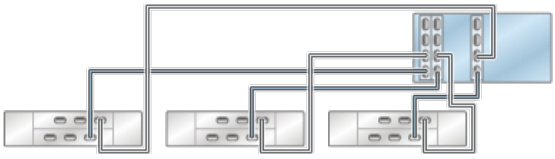


FIGURE 188 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to four DE2-24 disk shelves in four chains

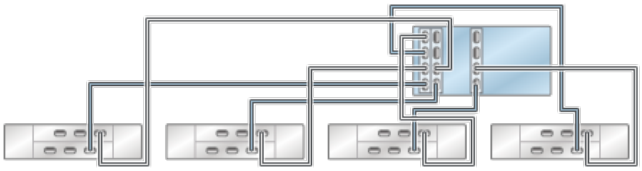


FIGURE 189 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to five DE2-24 disk shelves in five chains

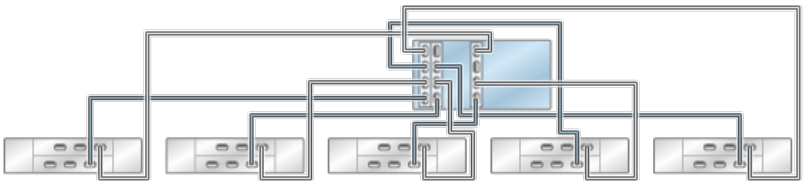


FIGURE 190 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to six DE2-24 disk shelves in six chains

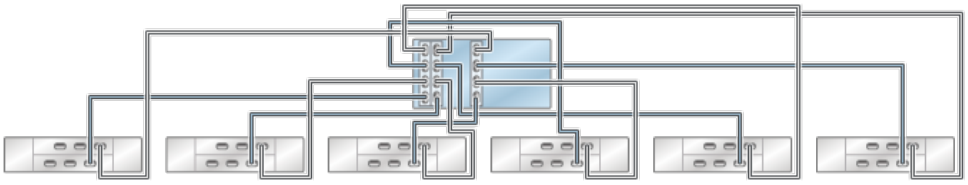


FIGURE 191 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to multiple DE2-24 disk shelves in six chains

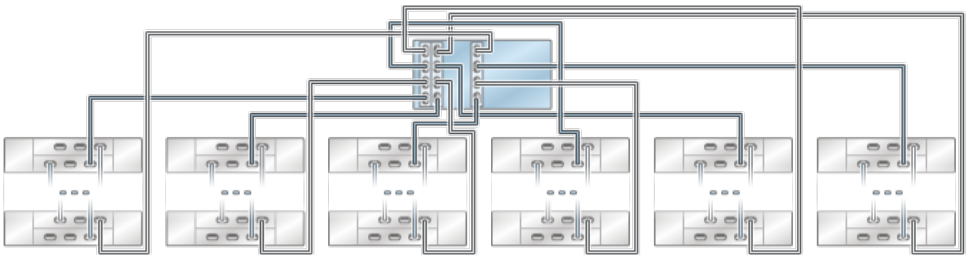
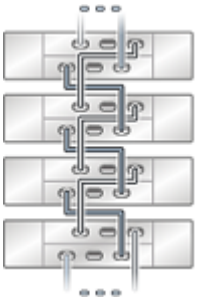


FIGURE 192 Multiple disk shelves in a single chain



ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 standalone controllers with four HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 193 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

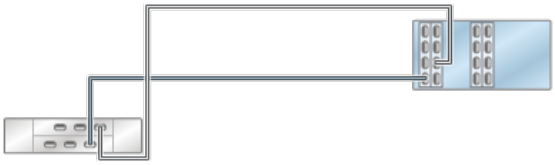


FIGURE 194 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to two DE2-24 disk shelves in two chains

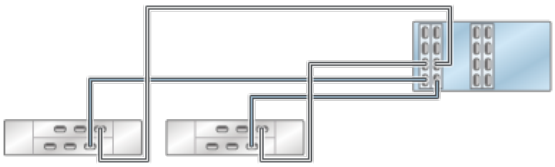


FIGURE 195 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to three DE2-24 disk shelves in three chains

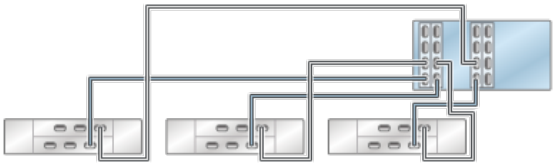


FIGURE 196 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to four DE2-24 disk shelves in four chains

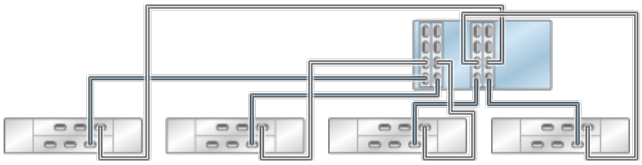


FIGURE 197 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to five DE2-24 disk shelves in five chains

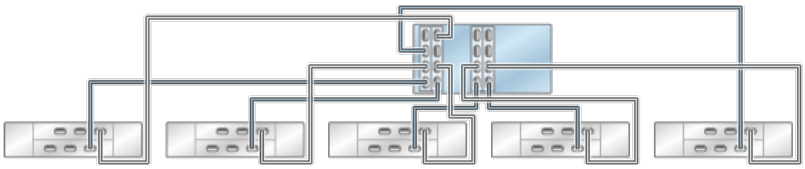


FIGURE 198 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to six DE2-24 disk shelves in six chains

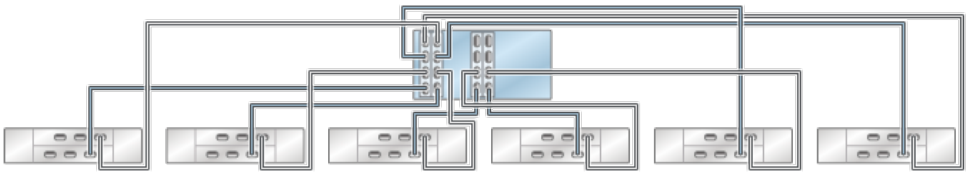


FIGURE 199 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

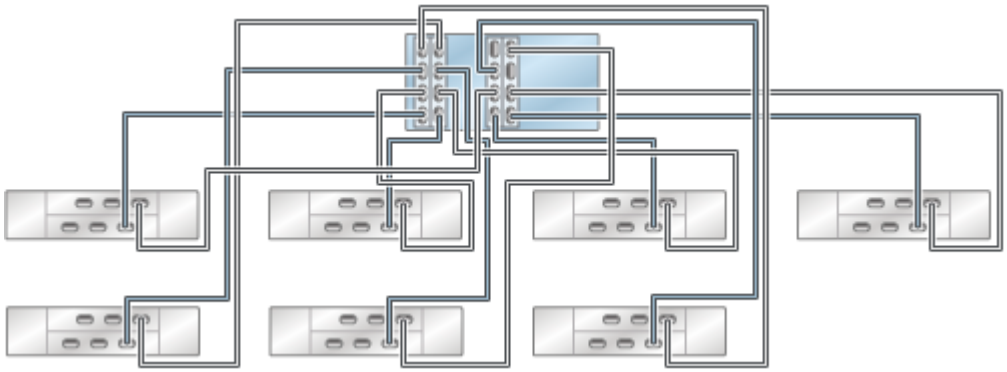


FIGURE 200 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

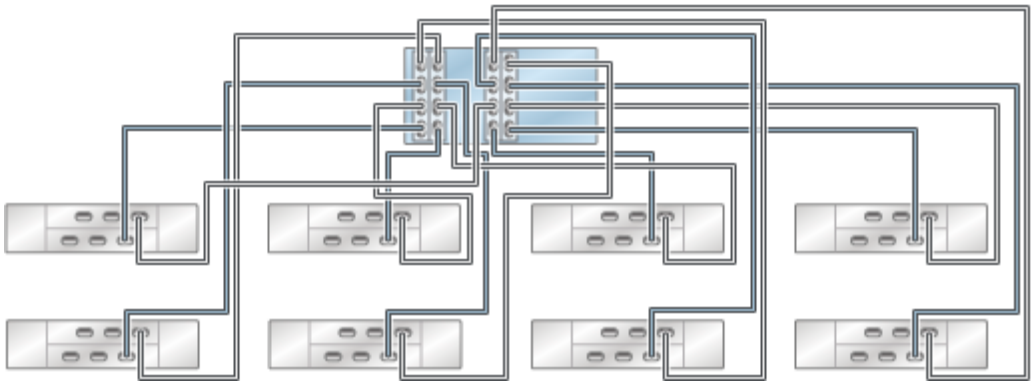


FIGURE 201 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to multiple DE2-24 disk shelves in eight chains

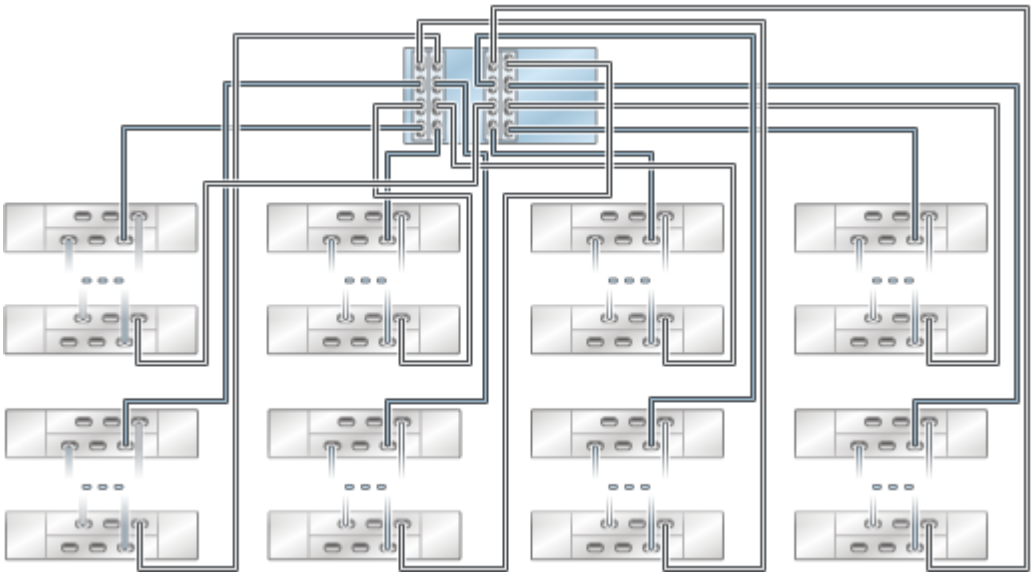
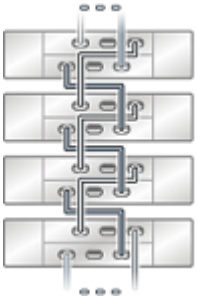


FIGURE 202 Multiple disk shelves in a single chain



ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 clustered controllers with two HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 203 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

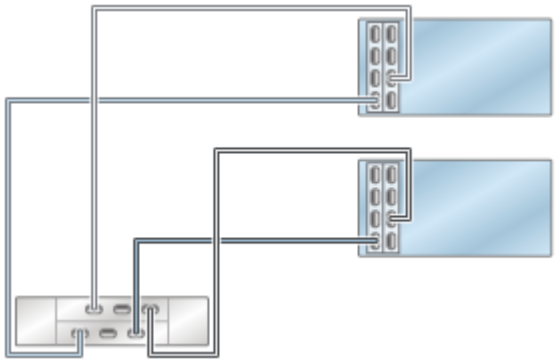


FIGURE 204 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

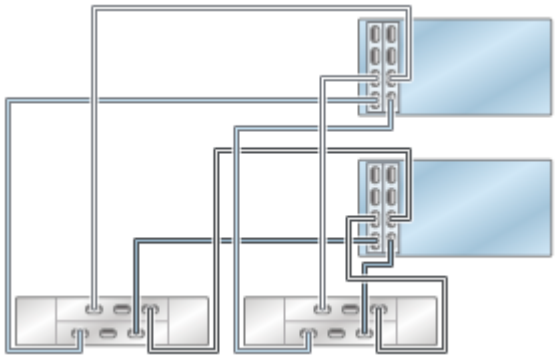


FIGURE 205 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

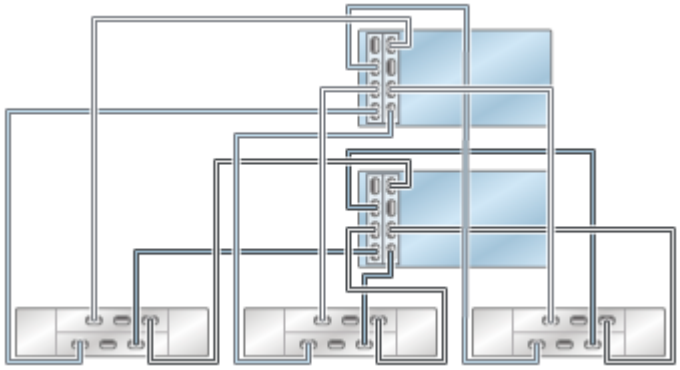


FIGURE 206 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

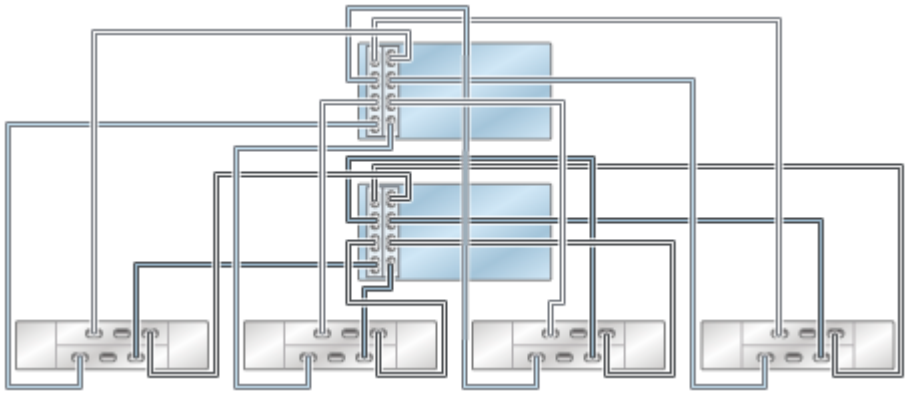


FIGURE 207 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

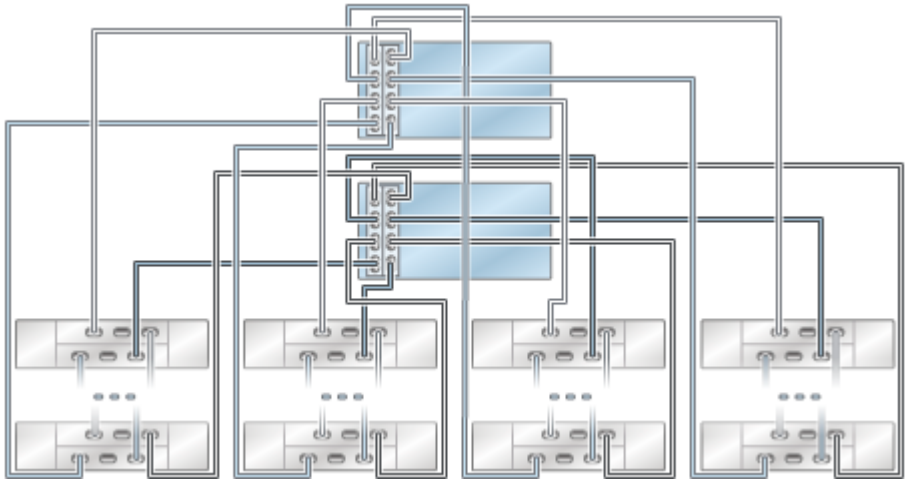
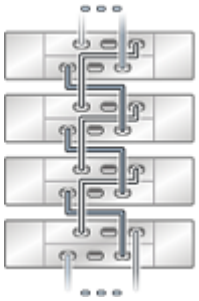


FIGURE 208 Multiple disk shelves in a single chain



ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 209 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 210 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

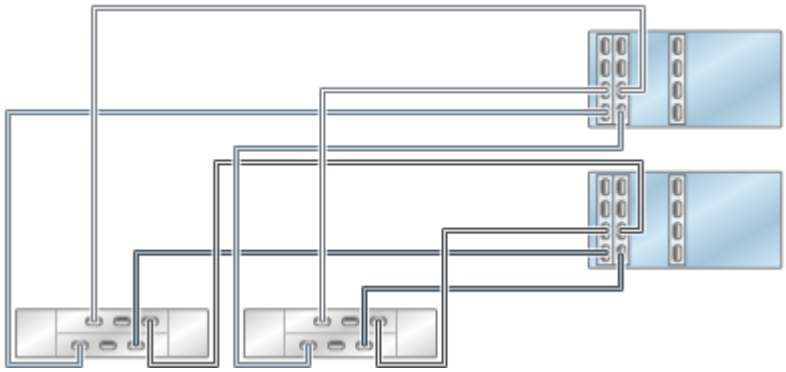


FIGURE 211 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

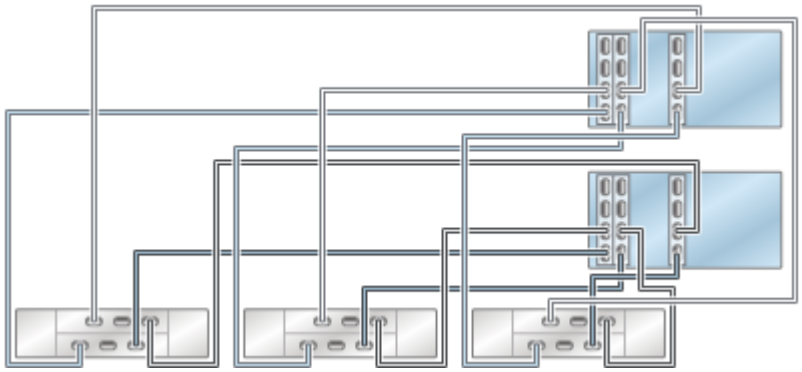


FIGURE 212 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

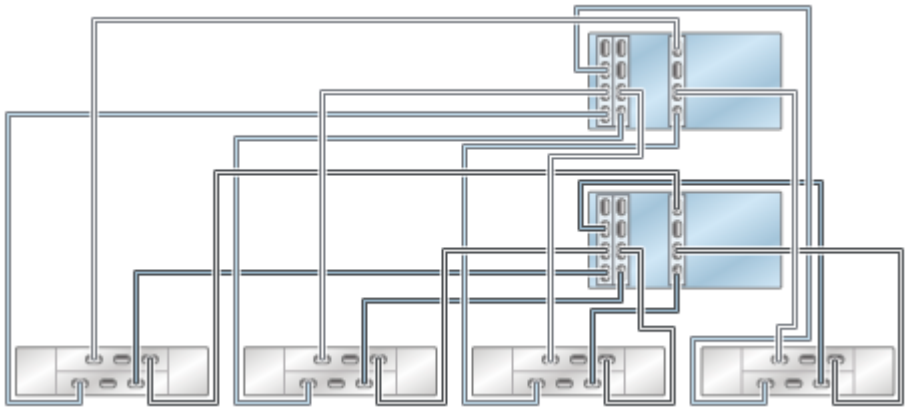


FIGURE 213 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

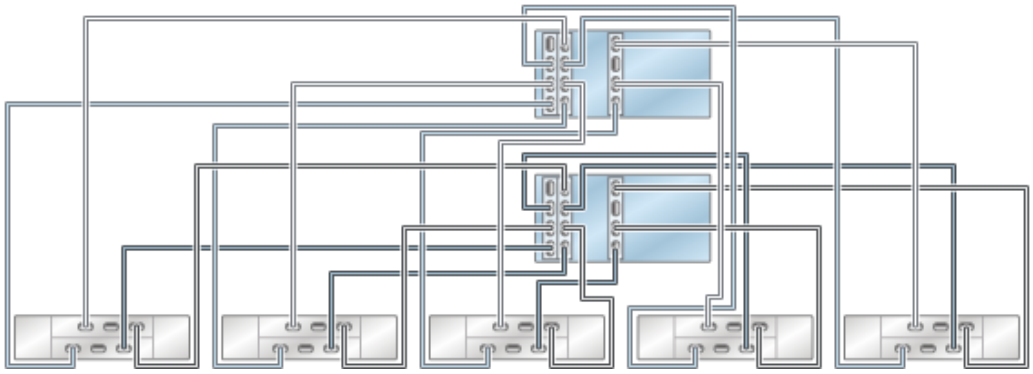


FIGURE 214 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

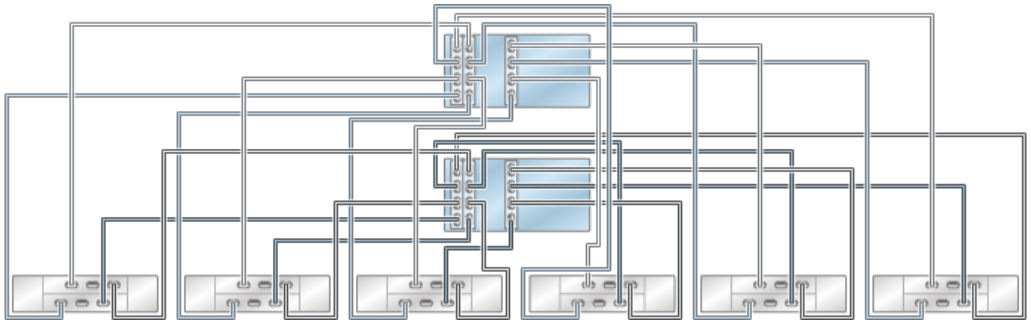


FIGURE 215 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to multiple DE2-24 disk shelves in six chains

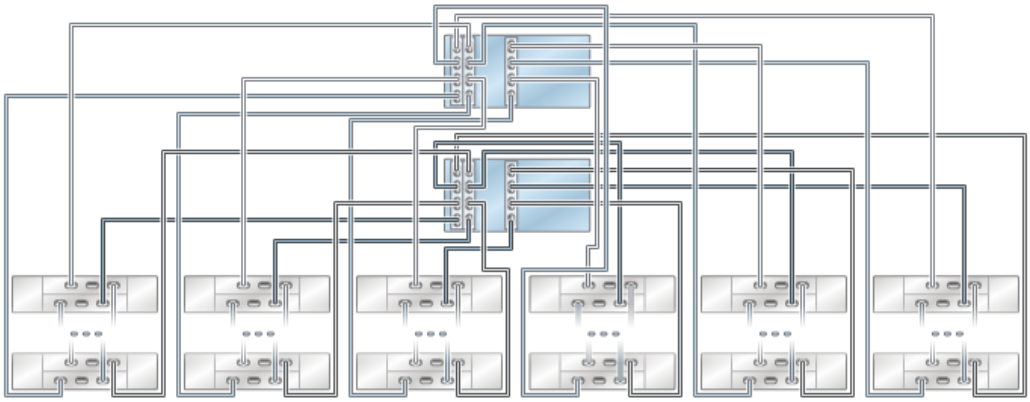
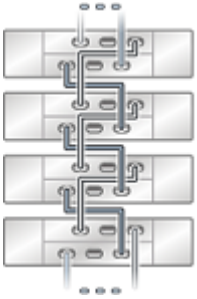


FIGURE 216 Multiple disk shelves in a single chain



ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4/ZS3-4 clustered controllers with four HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 217 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to one DE2-24 disk shelf in a single chain

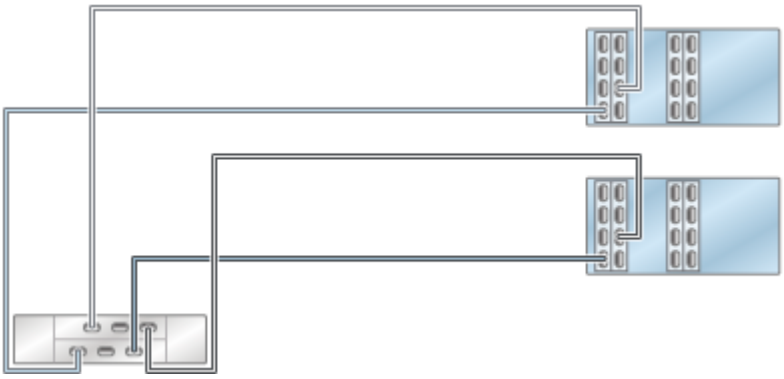


FIGURE 218 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

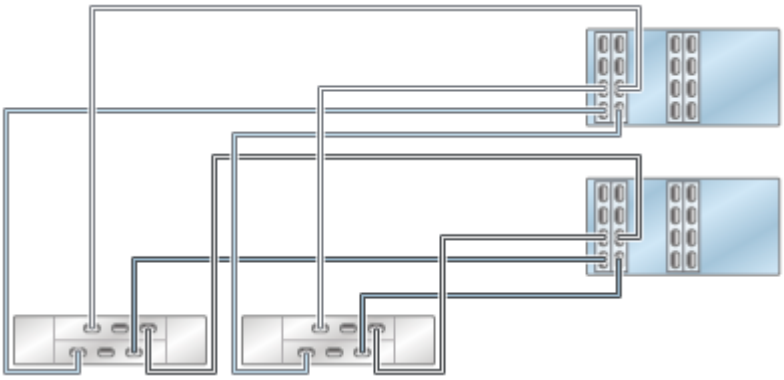


FIGURE 219 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

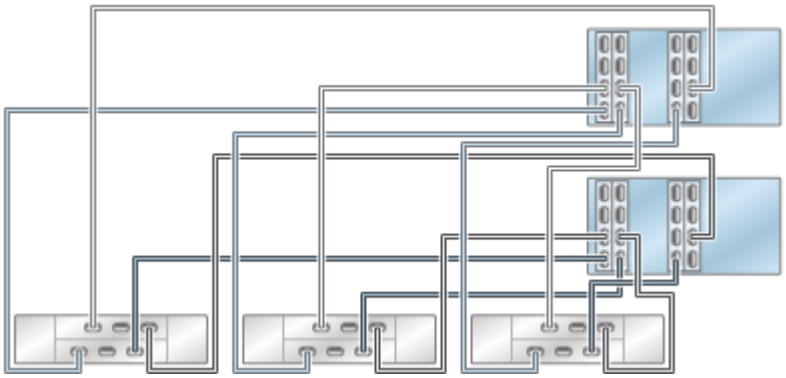


FIGURE 220 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

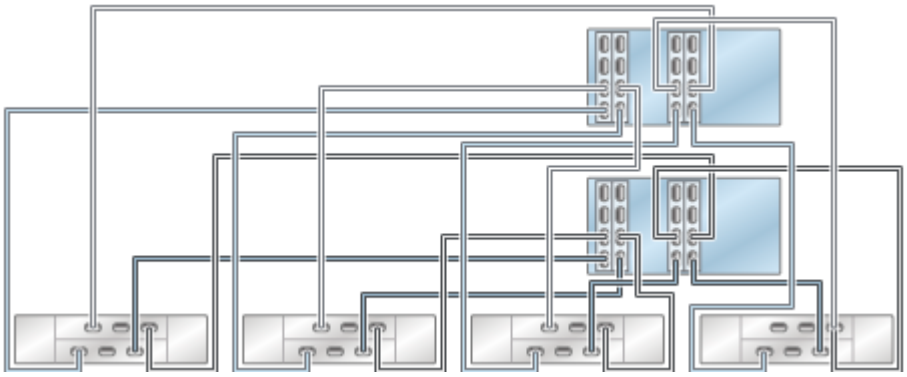


FIGURE 221 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

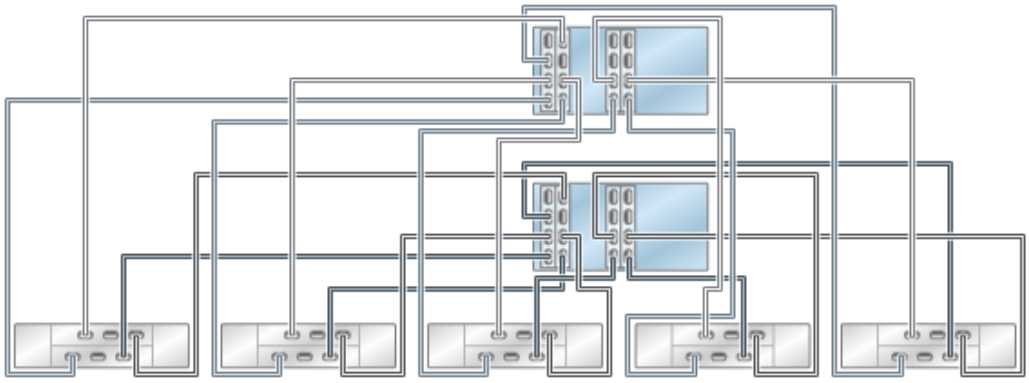


FIGURE 222 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected six DE2-24 disk shelves in six chains

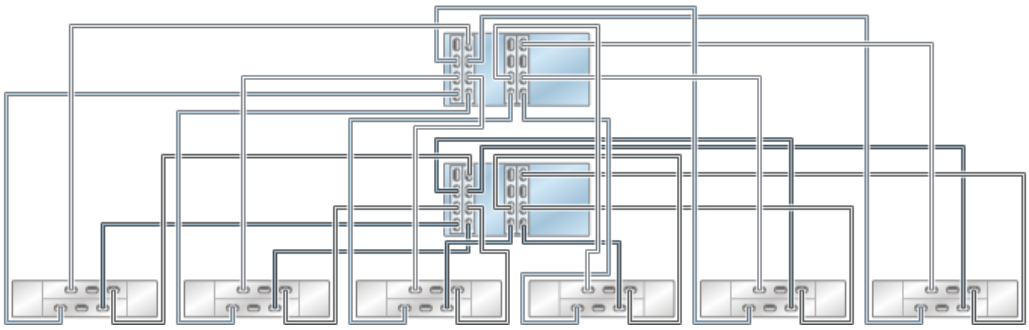


FIGURE 223 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

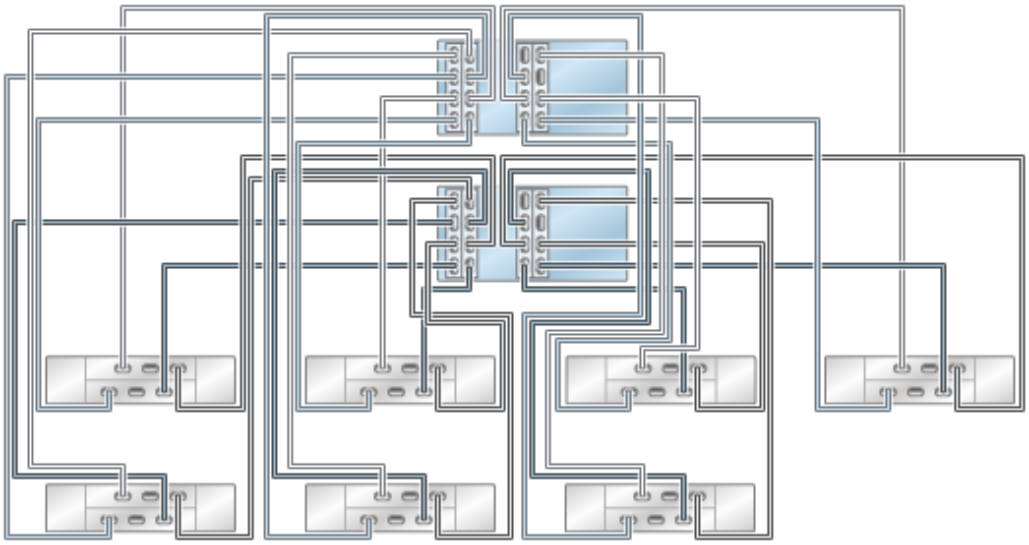


FIGURE 224 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

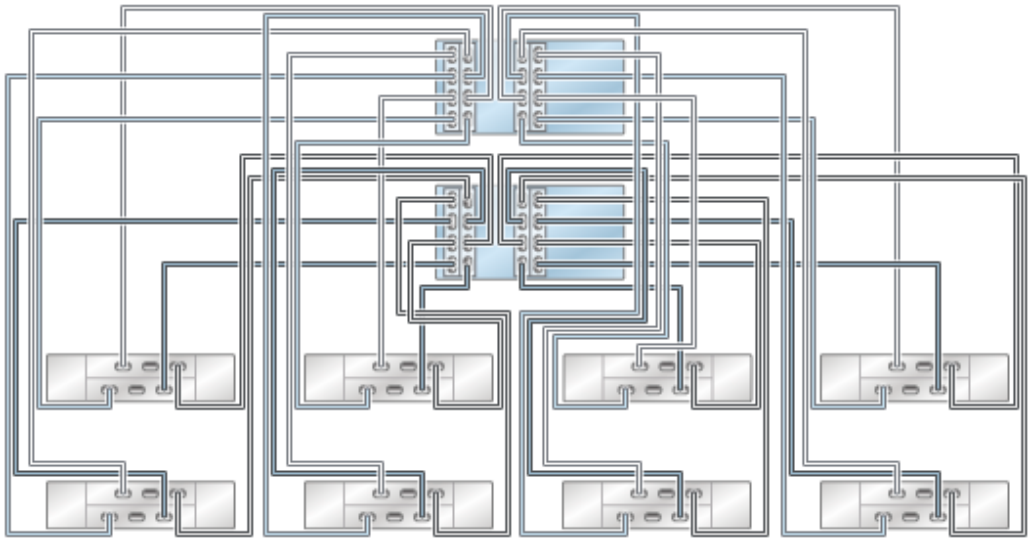


FIGURE 225 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to multiple DE2-24 disk shelves in eight chains

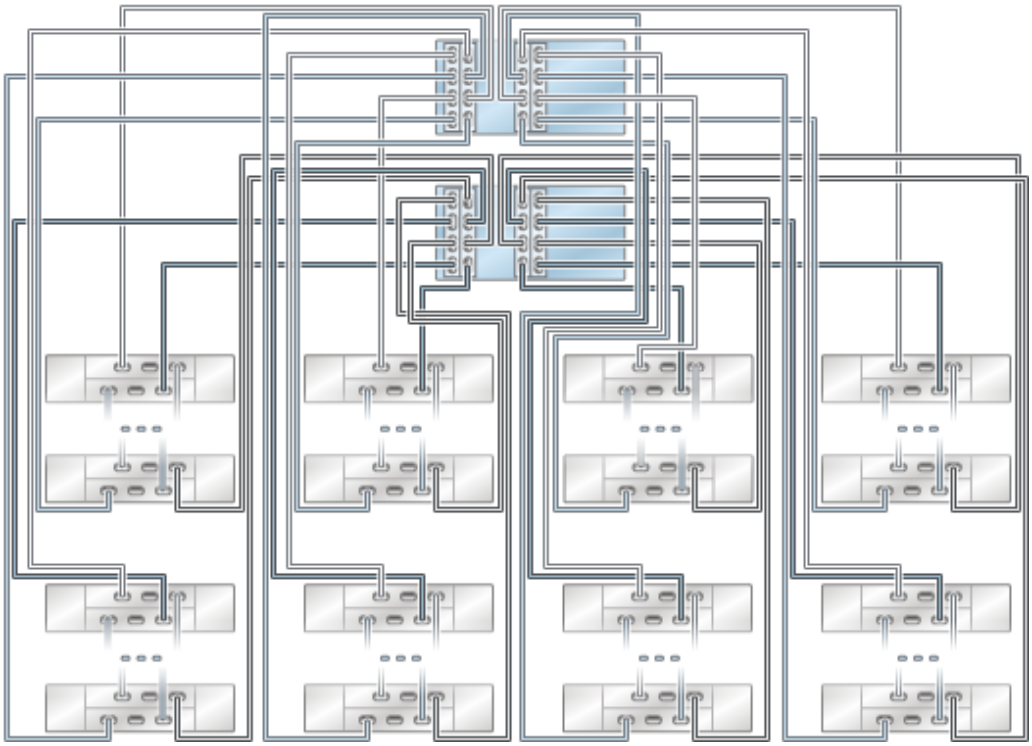
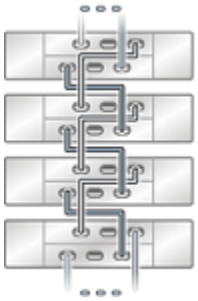


FIGURE 226 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to ZS3-2 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS3-2 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “ZS3-2 Standalone to DE2-24 Disk Shelves (1 HBA)” on page 177
- “ZS3-2 Standalone to DE2-24 Disk Shelves (2 HBAs)” on page 179
- “ZS3-2 Clustered to DE2-24 Disk Shelves (1 HBA)” on page 182
- “ZS3-2 Clustered to DE2-24 Disk Shelves (2 HBAs)” on page 184

ZS3-2 Standalone to DE2-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with one HBA. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 227 Standalone ZS3-2 controller with one HBA connected to one DE2-24 disk shelf in a single chain

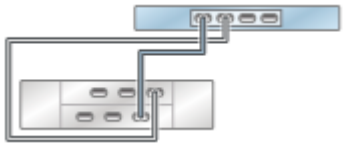


FIGURE 228 Standalone ZS3-2 controller with one HBA connected to two DE2-24 disk shelves in two chains

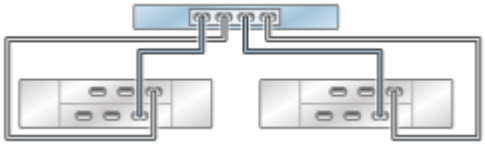


FIGURE 229 Standalone ZS3-2 controller with one HBA connected to six DE2-24 disk shelves in two chains

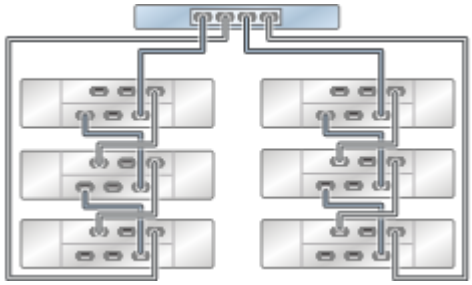
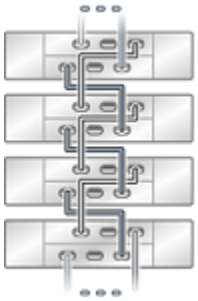


FIGURE 230 Multiple disk shelves in a single chain



ZS3-2 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 231 Standalone ZS3-2 controller with two HBAs connected to one DE2-24 disk shelf in one chain

FIGURE 232 Standalone ZS3-2 controller with two HBAs connected to two DE2-24 disk shelves in two chains

FIGURE 233 Standalone ZS3-2 controller with two HBAs connected to three DE2-24 disk shelves in three chains

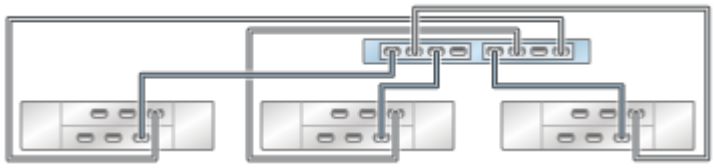


FIGURE 234 Standalone ZS3-2 controller with two HBAs connected to four DE2-24 disk shelves in four chains

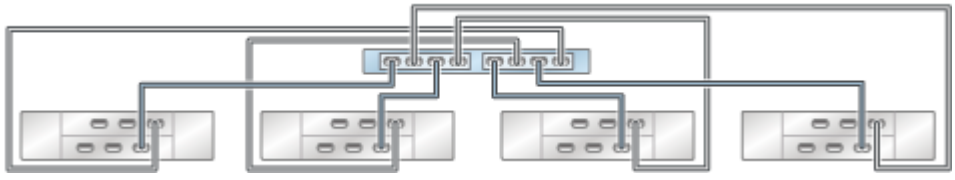


FIGURE 235 Standalone ZS3-2 controller with two HBAs connected to eight DE2-24 disk shelves in four chains

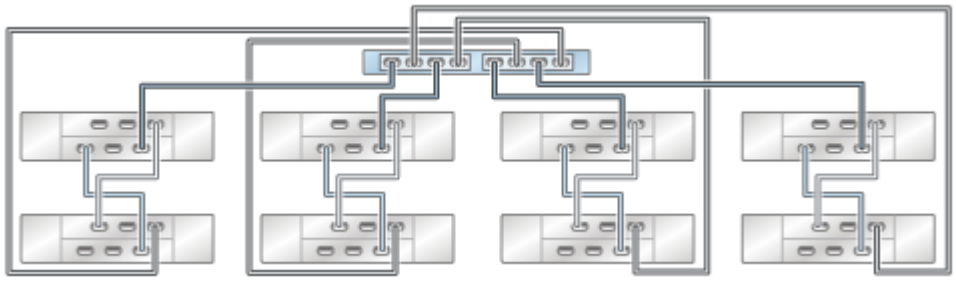


FIGURE 236 Standalone ZS3-2 controller with two HBAs connected to sixteen DE2-24 disk shelves in four chains

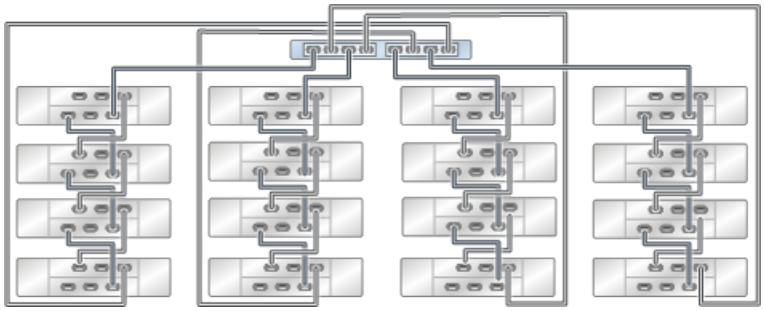
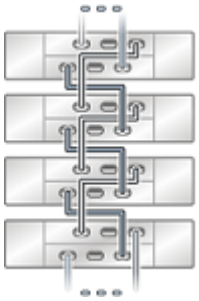


FIGURE 237 Multiple disk shelves in a single chain



ZS3-2 Clustered to DE2-24 Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 238 Clustered ZS3-2 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

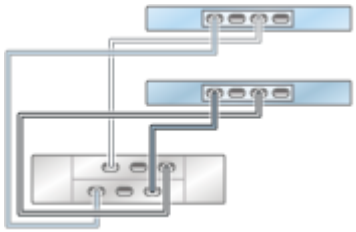


FIGURE 239 Clustered ZS3-2 controllers with one HBA connected to two DE2-24 disk shelves in two chains

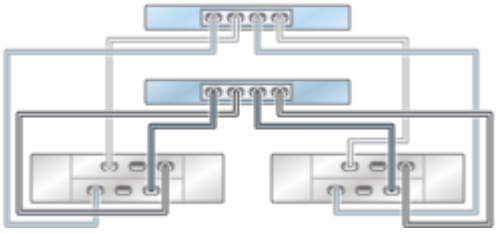


FIGURE 240 Clustered ZS3-2 controllers with one HBA connected to six DE2-24 disk shelves in two chains

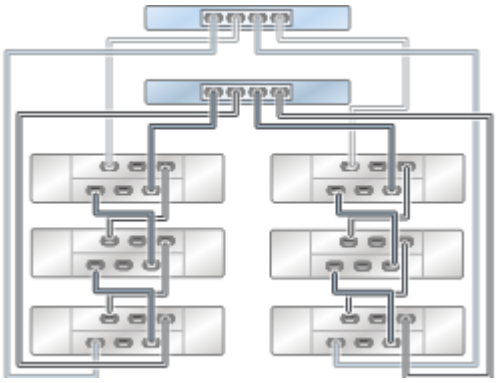
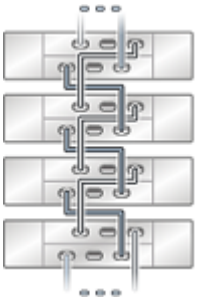


FIGURE 241 Multiple disk shelves in a single chain



ZS3-2 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 242 Clustered ZS3-2 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

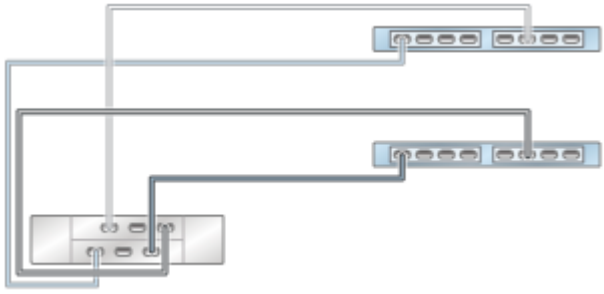


FIGURE 243 Clustered ZS3-2 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

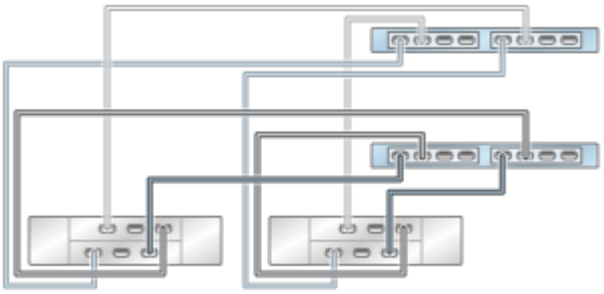


FIGURE 244 Clustered ZS3-2 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

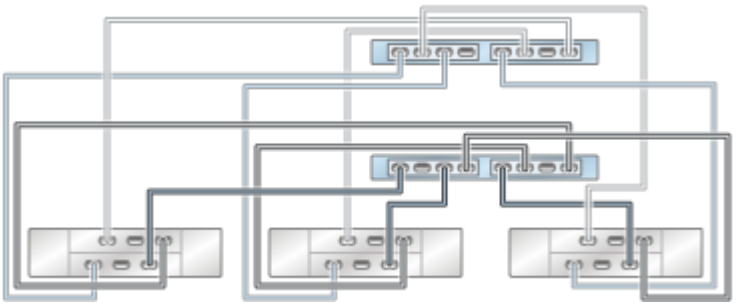


FIGURE 245 Clustered ZS3-2 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

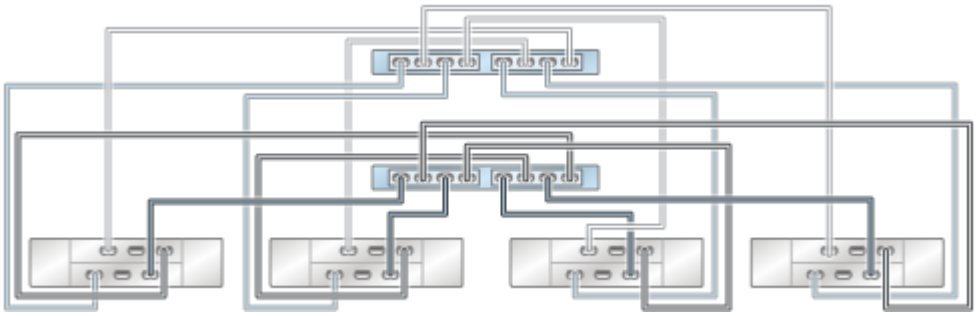


FIGURE 246 Clustered ZS3-2 controllers with two HBAs connected to eight DE2-24 disk shelves in four chains

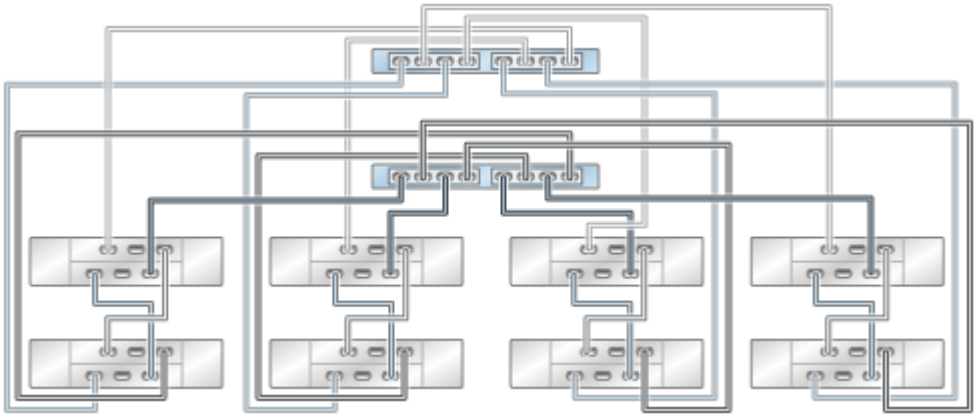


FIGURE 247 Clustered ZS3-2 controllers with two HBAs connected to sixteen DE2-24 disk shelves in four chains

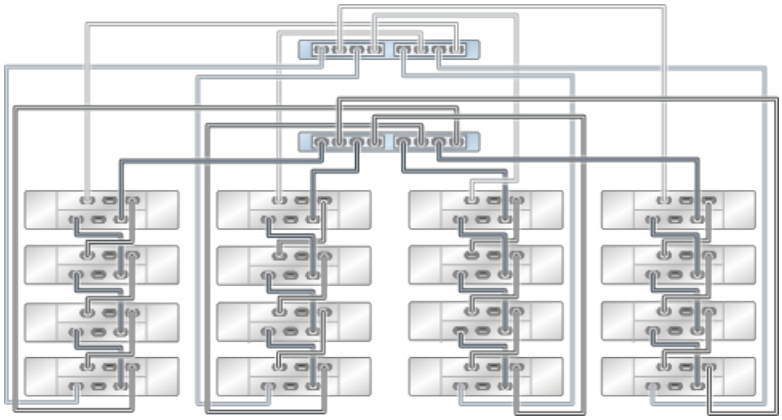
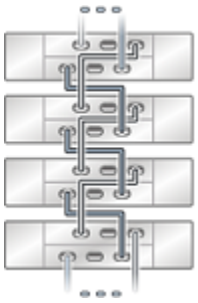


FIGURE 248 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to 7420 Controllers

This section contains guidelines for properly cabling standalone and clustered 7420 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

7420 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with two HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 249 Standalone 7420 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

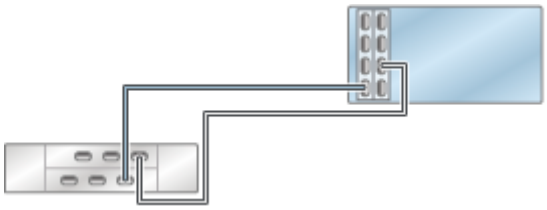


FIGURE 250 Standalone 7420 controller with two HBAs connected to two DE2-24 disk shelves in two chains

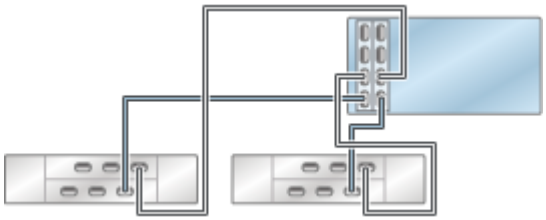


FIGURE 251 Standalone 7420 controller with two HBAs connected to three DE2-24 disk shelves in three chains

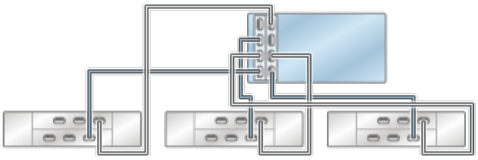


FIGURE 252 Standalone 7420 controller with two HBAs connected to four DE2-24 disk shelves in four chains

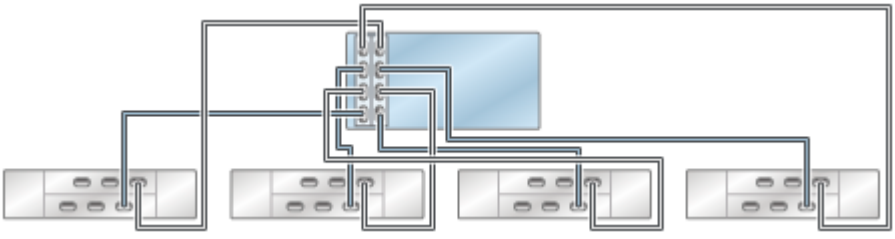


FIGURE 253 Standalone 7420 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

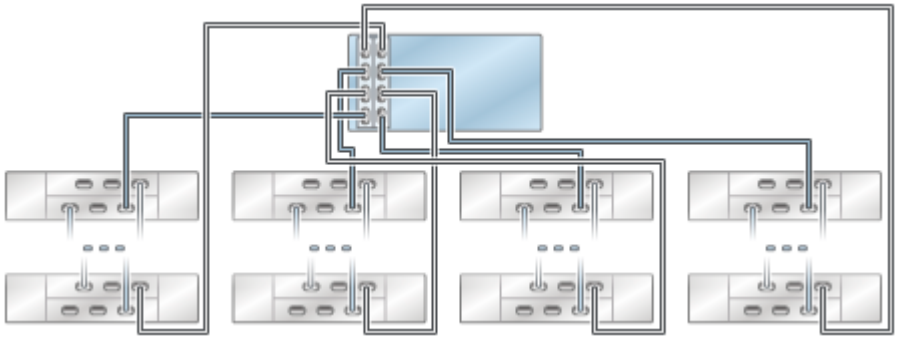
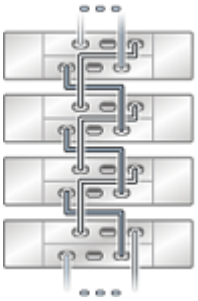


FIGURE 254 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 255 Standalone 7420 controller with three HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 256 Standalone 7420 controller with three HBAs connected to two DE2-24 disk shelves in two chains

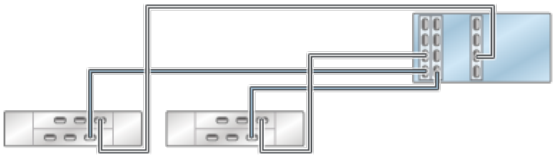


FIGURE 257 Standalone 7420 controller with three HBAs connected to three DE2-24 disk shelves in three chains

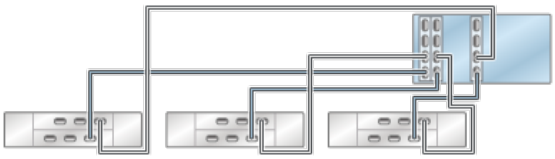


FIGURE 258 Standalone 7420 controller with three HBAs connected to four DE2-24 disk shelves in four chains

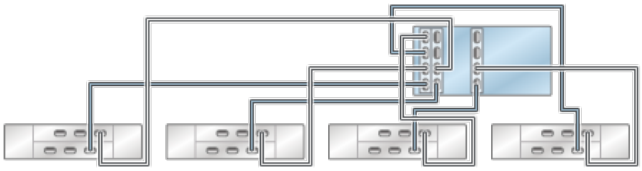


FIGURE 259 Standalone 7420 controller with three HBAs connected to five DE2-24 disk shelves in five chains

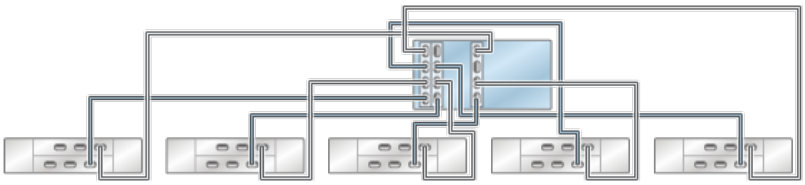


FIGURE 260 Standalone 7420 controller with three HBAs connected to six DE2-24 disk shelves in six chains

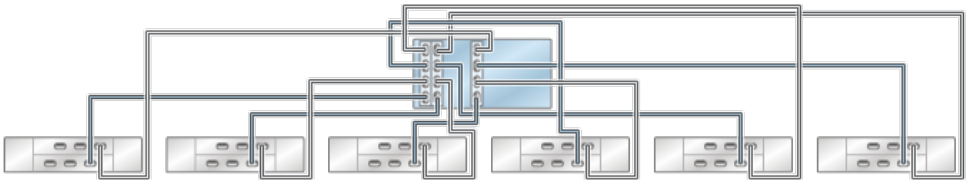


FIGURE 261 Standalone 7420 controller with three HBAs connected to multiple DE2-24 disk shelves in six chains

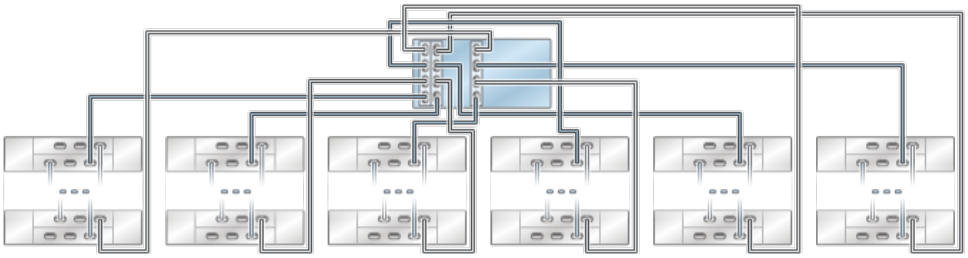
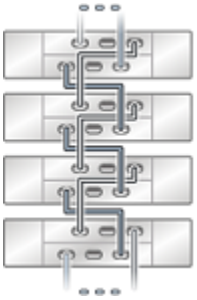


FIGURE 262 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 263 Standalone 7420 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

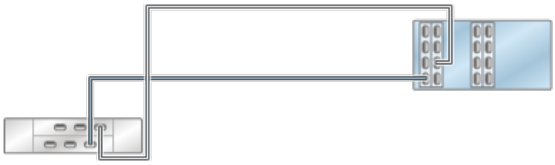


FIGURE 264 Standalone 7420 controller with four HBAs connected to two DE2-24 disk shelves in two chains

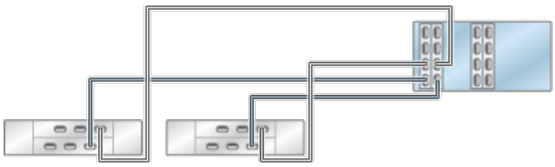


FIGURE 265 Standalone 7420 controller with four HBAs connected to three DE2-24 disk shelves in three chains

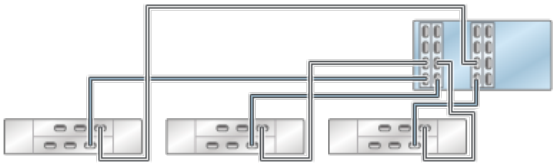


FIGURE 266 Standalone 7420 controller with four HBAs connected to four DE2-24 disk shelves in four chains

FIGURE 267 Standalone 7420 controller with four HBAs connected to five DE2-24 disk shelves in five chains

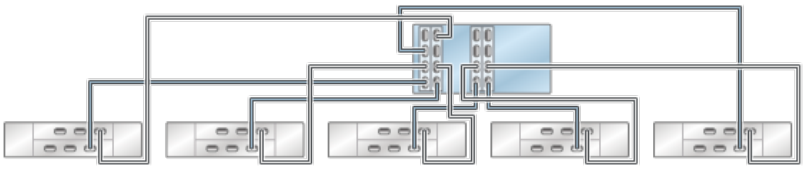


FIGURE 268 Standalone 7420 controller with four HBAs connected to six DE2-24 disk shelves in six chains

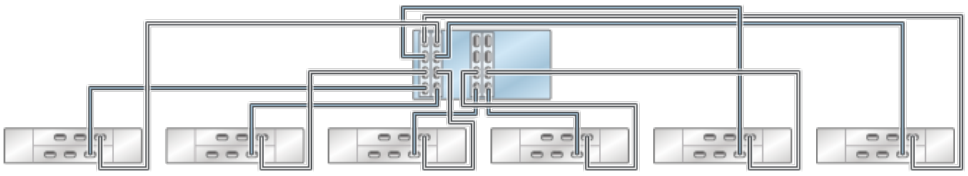


FIGURE 269 Standalone 7420 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

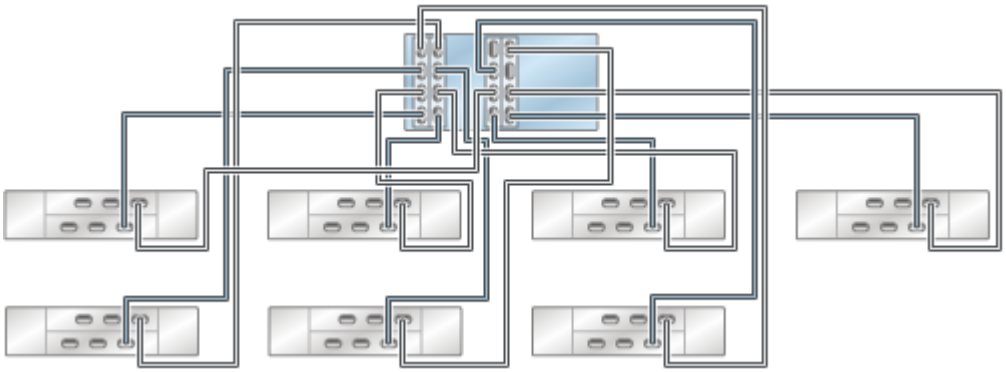


FIGURE 270 Standalone 7420 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

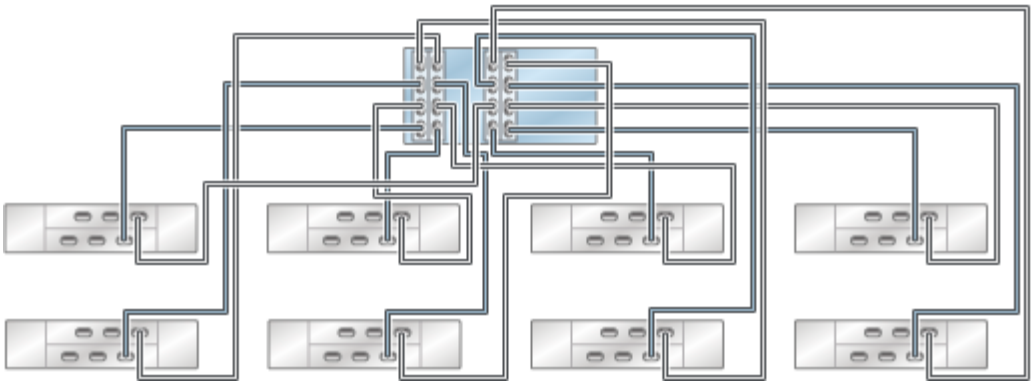


FIGURE 271 Standalone 7420 controller with four HBAs connected to multiple DE2-24 disk shelves in eight chains

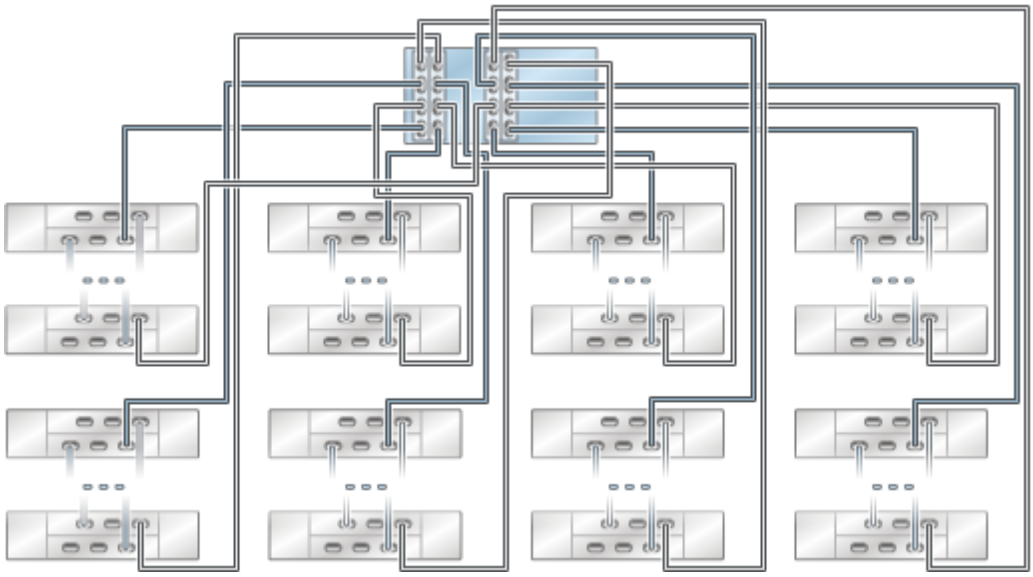
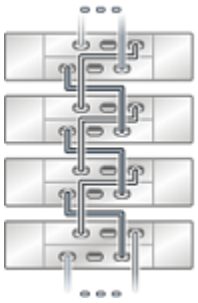


FIGURE 272 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 273 Clustered 7420 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

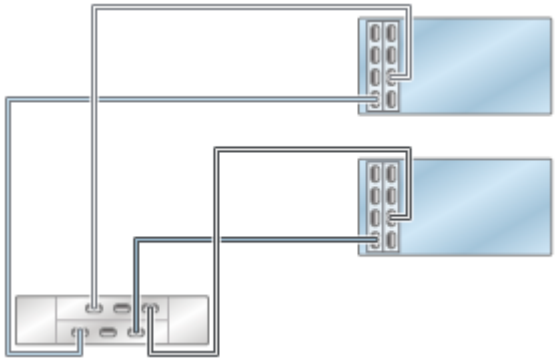


FIGURE 274 Clustered 7420 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

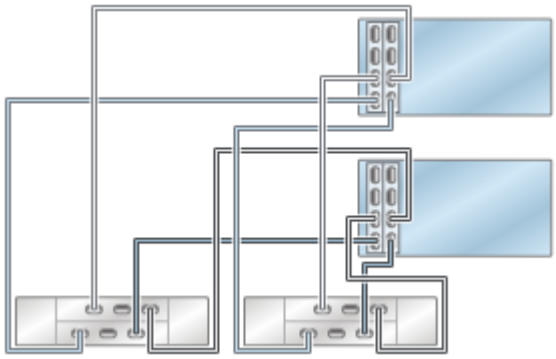


FIGURE 275 Clustered 7420 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

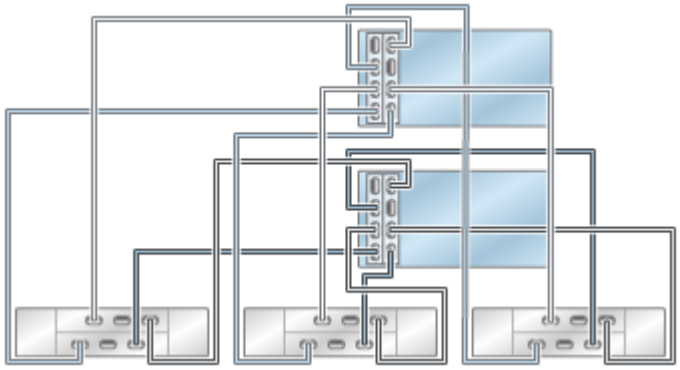


FIGURE 276 Clustered 7420 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

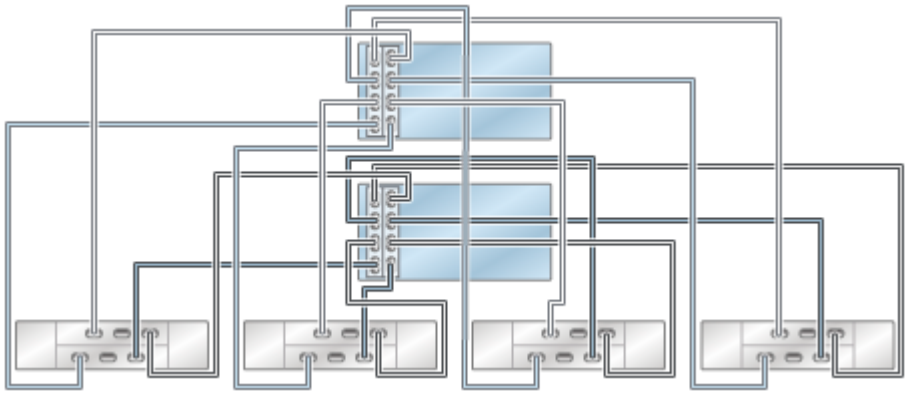


FIGURE 277 Clustered 7420 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

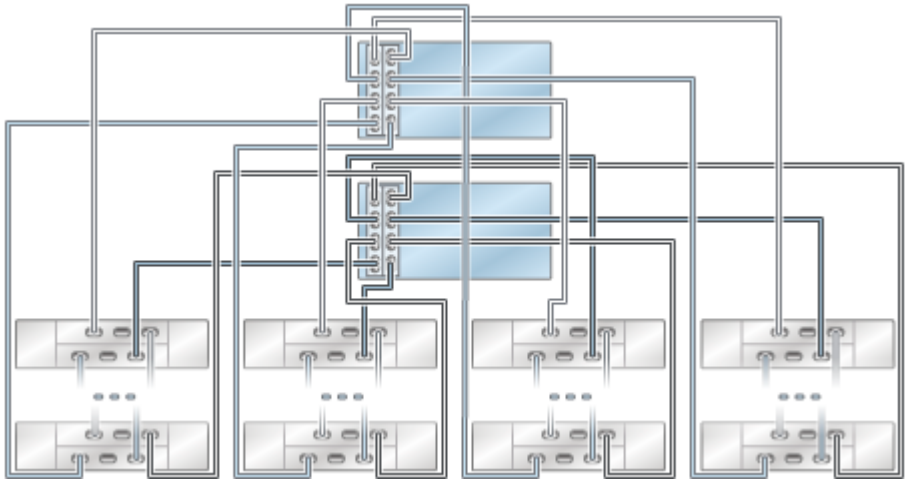
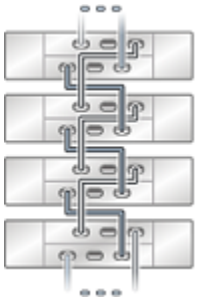


FIGURE 278 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 279 Clustered 7420 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 280 Clustered 7420 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

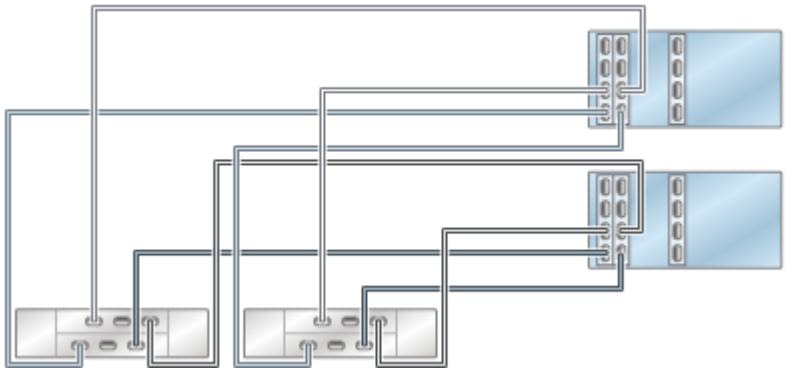


FIGURE 281 Clustered 7420 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

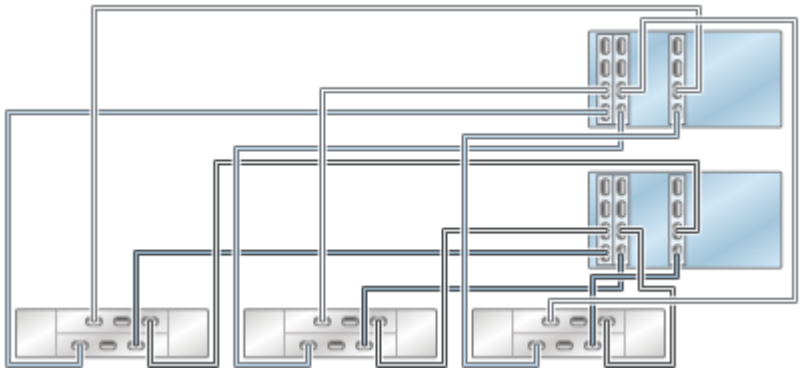


FIGURE 282 Clustered 7420 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

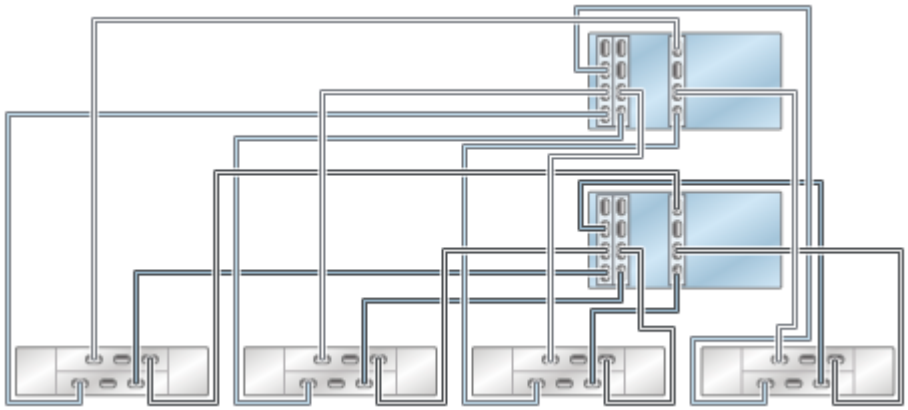


FIGURE 283 Clustered 7420 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

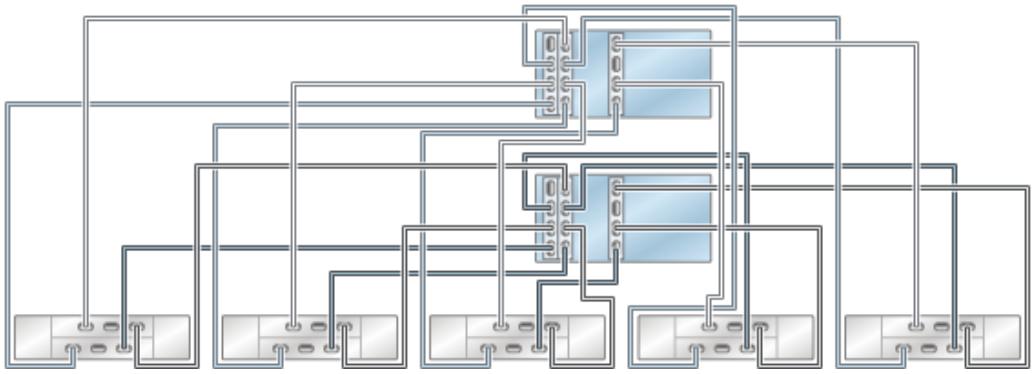


FIGURE 284 Clustered 7420 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

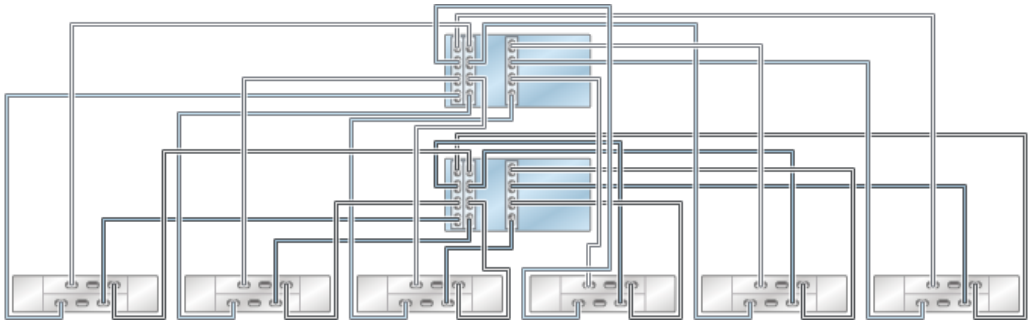


FIGURE 285 Clustered 7420 controllers with three HBAs connected to multiple DE2-24 disk shelves in six chains

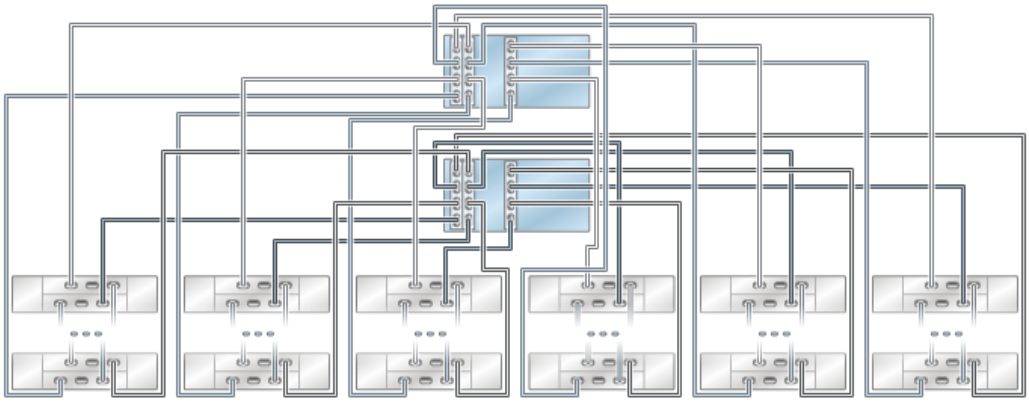
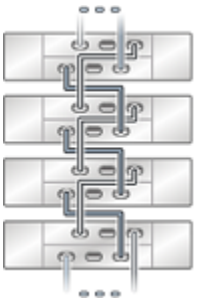


FIGURE 286 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with four HBAs. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 287 Clustered 7420 controllers with four HBAs connected to one DE2-24 disk shelf in a single chain

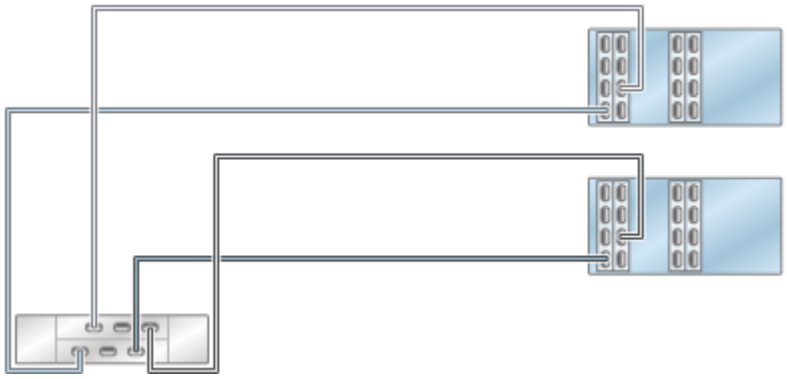


FIGURE 288 Clustered 7420 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

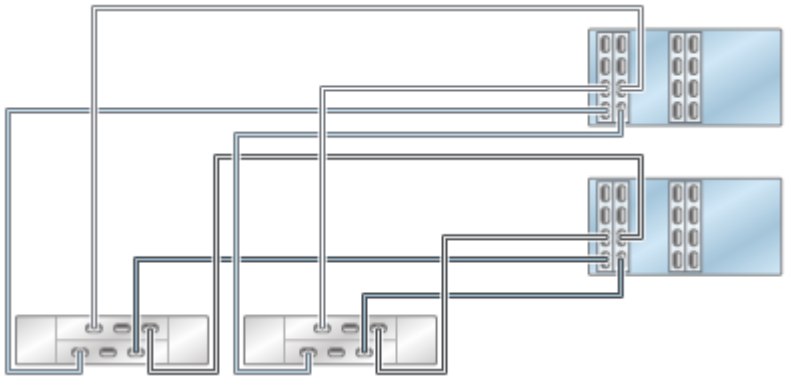


FIGURE 289 Clustered 7420 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

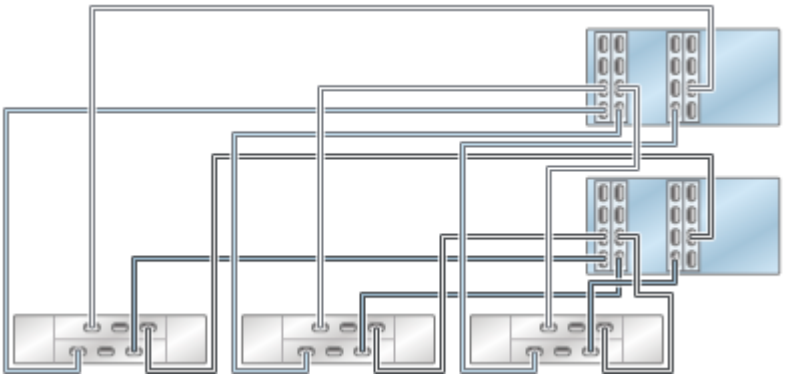


FIGURE 290 Clustered 7420 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

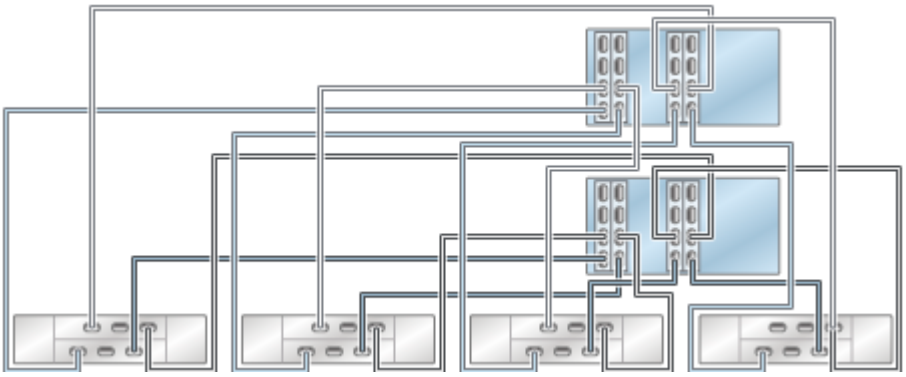


FIGURE 291 Clustered 7420 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

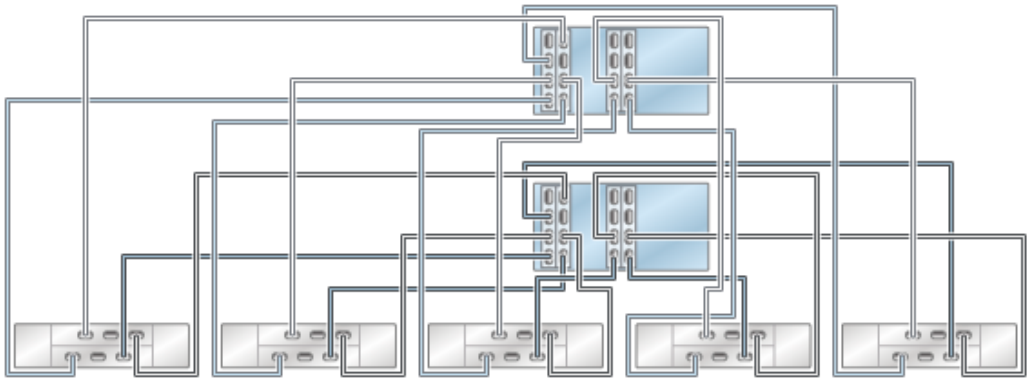


FIGURE 292 Clustered 7420 controllers with four HBAs connected to six DE2-24 disk shelves in six chains

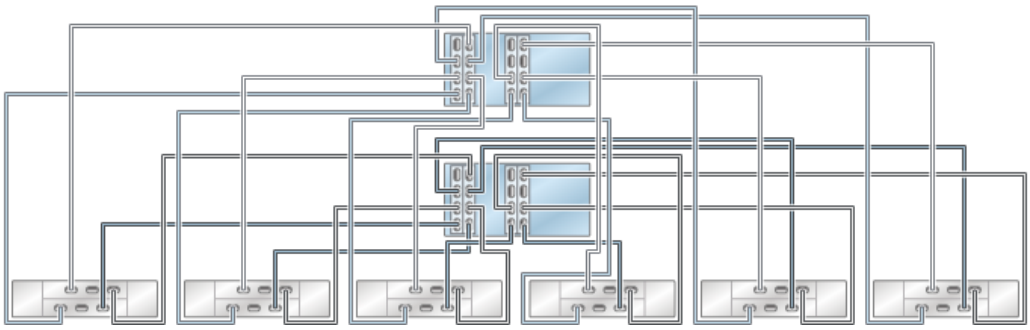


FIGURE 293 Clustered 7420 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

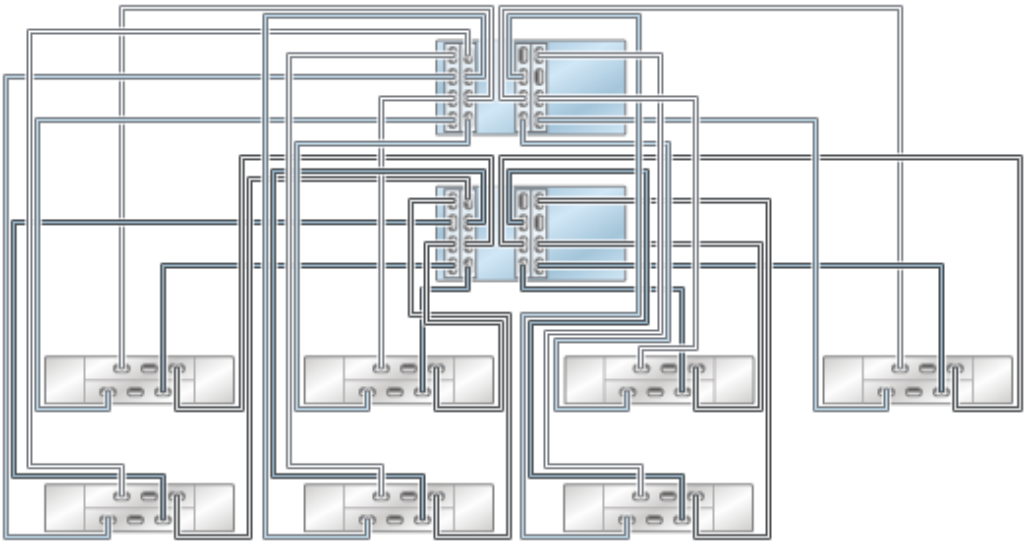


FIGURE 294 Clustered 7420 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

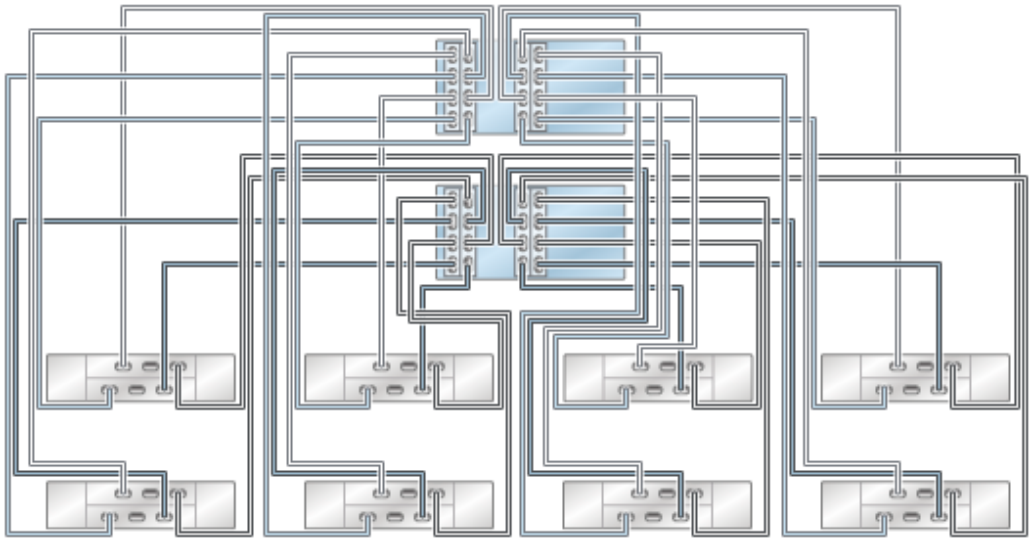


FIGURE 295 Clustered 7420 controllers with four HBAs connected to multiple DE2-24 disk shelves in eight chains

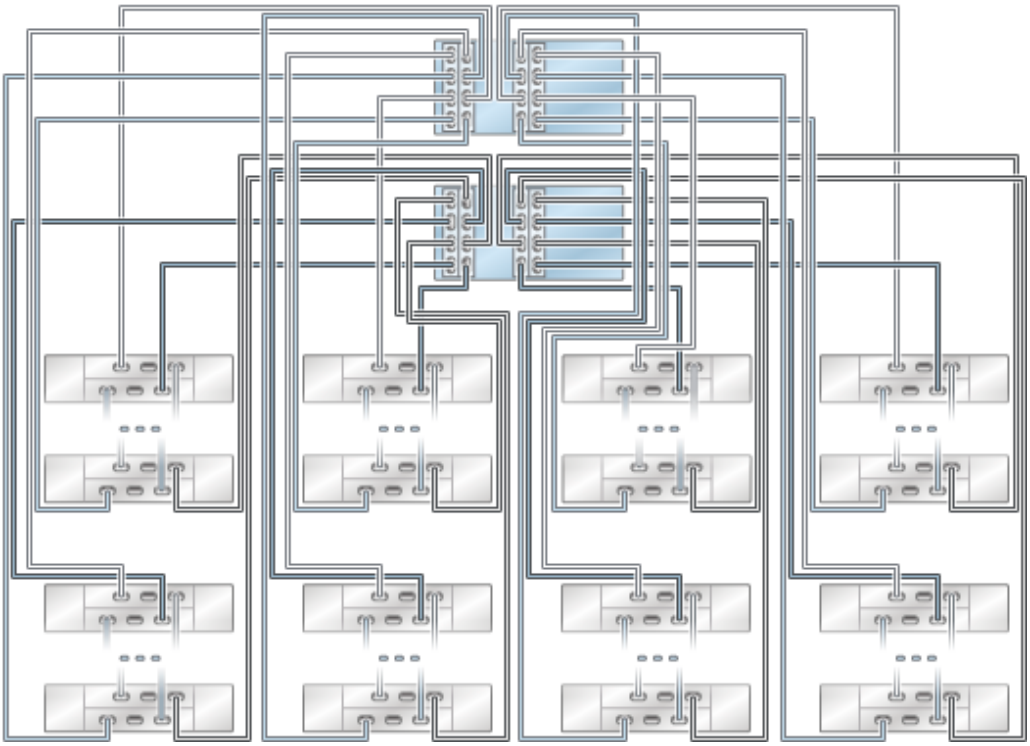
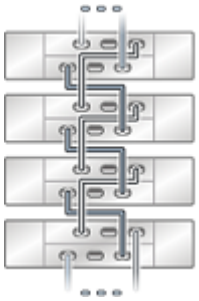


FIGURE 296 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to 7320 Controllers

This section contains guidelines for properly cabling standalone and clustered 7320 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "7320 Standalone to DE2-24 Disk Shelves" on page 212
- "7320 Clustered to DE2-24 Disk Shelves" on page 214

7320 Standalone to DE2-24 Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 standalone controllers with one HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 297 Standalone 7320 controller with one HBA connected to one DE2-24 disk shelf in a single chain

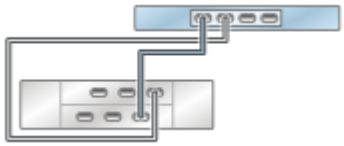


FIGURE 298 Standalone 7320 controller with one HBA connected to two DE2-24 disk shelves in two chains

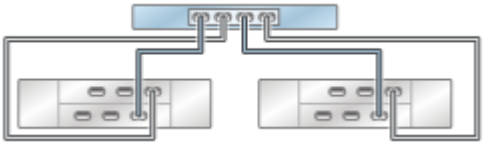


FIGURE 299 Standalone 7320 controller with one HBA connected to six DE2-24 disk shelves in two chains

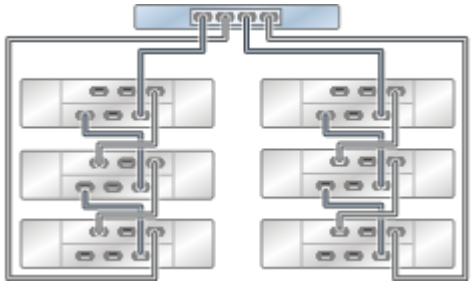
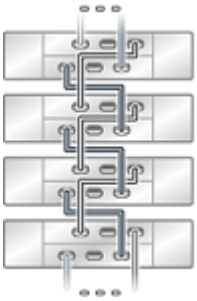


FIGURE 300 Multiple disk shelves in a single chain



7320 Clustered to DE2-24 Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 301 Clustered 7320 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

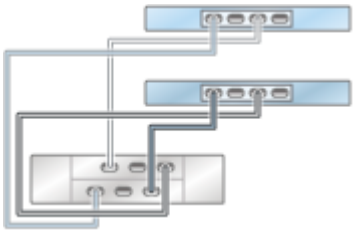


FIGURE 302 Clustered 7320 controllers with one HBA connected to two DE2-24 disk shelves in two chains

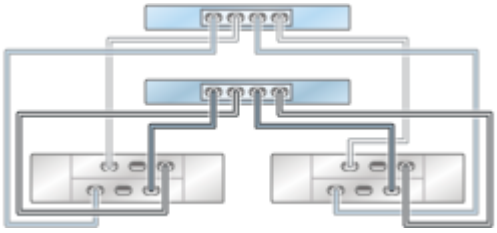


FIGURE 303 Clustered 7320 controllers with one HBA connected to six DE2-24 disk shelves in two chains

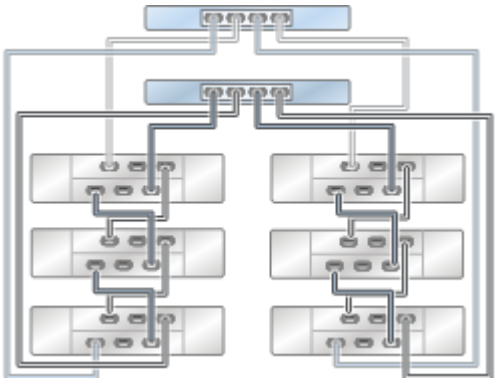
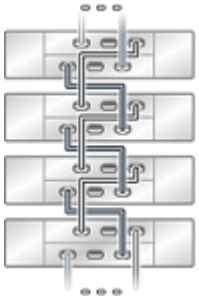


FIGURE 304 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to 2X4 Port SAS-2 HBAs

This section contains guidelines for properly cabling standalone and clustered 7420, 7320, and standalone 7120 controllers to 2X4 port SAS-2 HBAs.

To review these guidelines, see the following topics:

- "Cabling DE2-24 Disk Shelves to 7420 Controllers" on page 217
- "Cabling DE2-24 Disk Shelves to 7320 Controllers" on page 251
- "Cabling DE2-24 Disk Shelves to 7120 Controllers" on page 256

Cabling DE2-24 Disk Shelves to 7420 Controllers

This section contains guidelines for properly cabling standalone and clustered 7420 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "7420 Standalone to DE2-24 Disk Shelves (2 HBAs)" on page 218
- "7420 Standalone to DE2-24 Disk Shelves (3 HBAs)" on page 220
- "7420 Standalone to DE2-24 Disk Shelves (4 HBAs)" on page 223
- "7420 Standalone to DE2-24 Disk Shelves (5 HBAs)" on page 226
- "7420 Standalone to DE2-24 Disk Shelves (6 HBAs)" on page 229
- "7420 Clustered to DE2-24 Disk Shelves (2 HBAs)" on page 233
- "7420 Clustered to DE2-24 Disk Shelves (3 HBAs)" on page 236
- "7420 Clustered to DE2-24 Disk Shelves (4 HBAs)" on page 240
- "7420 Clustered to DE2-24 Disk Shelves (5 HBAs)" on page 244
- "7420 Clustered to DE2-24 Disk Shelves (6 HBAs)" on page 248

7420 Standalone to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 305 Standalone 7420 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

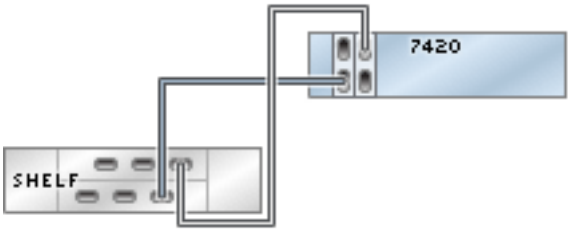


FIGURE 306 Standalone 7420 controller with two HBAs connected to two DE2-24 disk shelves in two chains

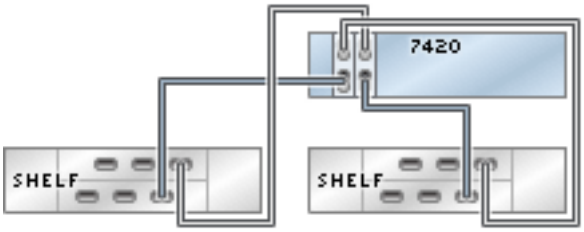


FIGURE 307 Standalone 7420 controller with two HBAs connected to four DE2-24 disk shelves in two chains

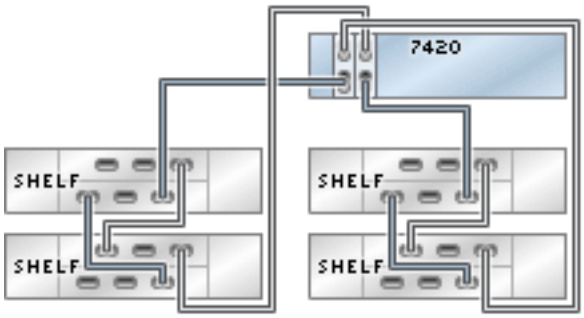


FIGURE 308 Standalone 7420 controller with two HBAs connected to 12 DE2-24 disk shelves in two chains

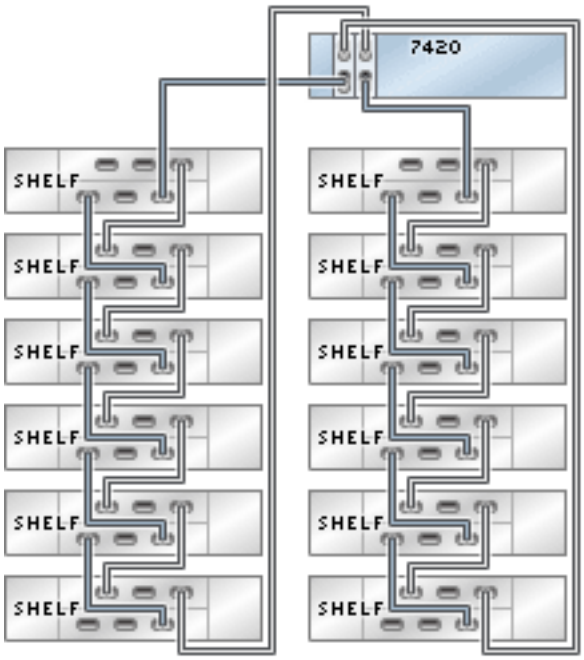
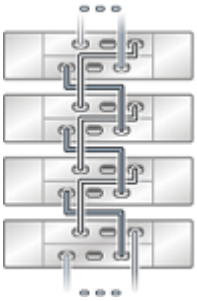


FIGURE 309 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 310 Standalone 7420 controller with three HBAs connected to one DE2-24 disk shelf in a single chain

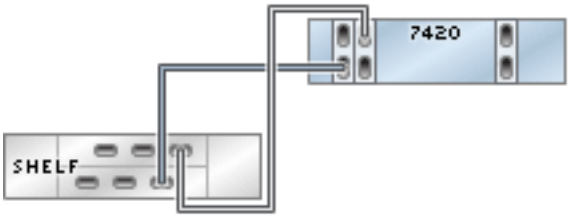


FIGURE 311 Standalone 7420 controller with three HBAs connected to two DE2-24 disk shelves in two chains

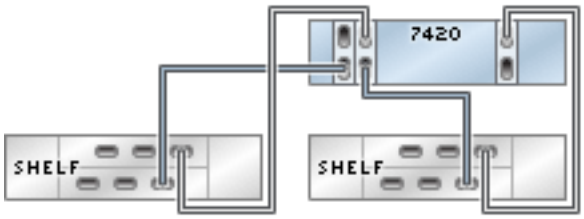


FIGURE 312 Standalone 7420 controller with three HBAs connected to three DE2-24 disk shelves in three chains

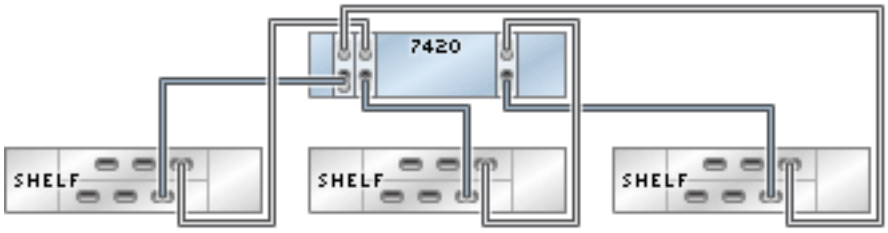


FIGURE 313 Standalone 7420 controller with three HBAs connected to six DE2-24 disk shelves in three chains

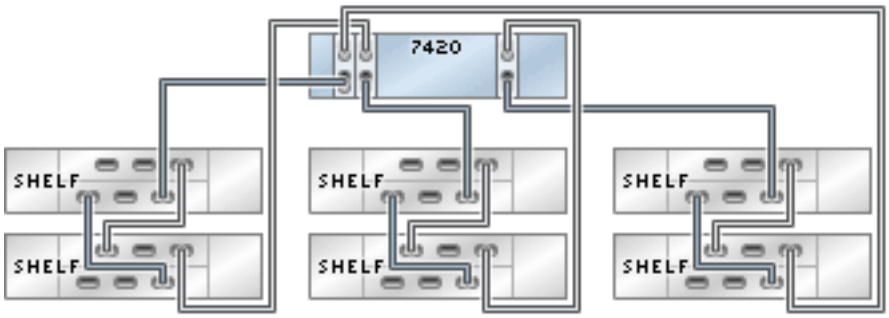


FIGURE 314 Standalone 7420 controller with three HBAs connected to 18 DE2-24 disk shelves in three chains

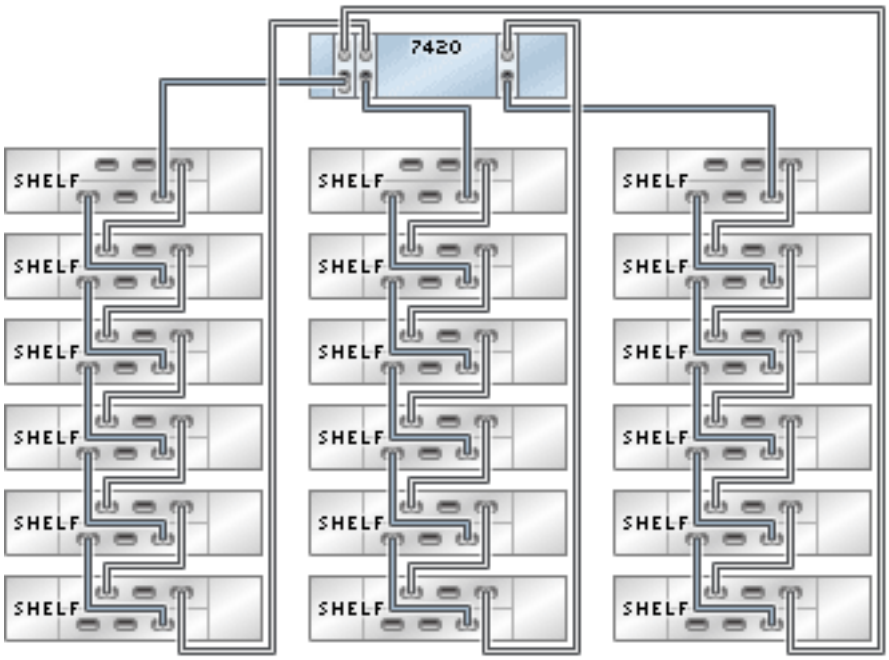
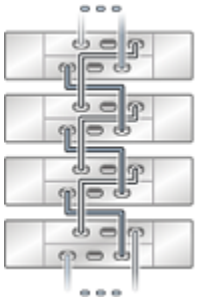


FIGURE 315 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 316 Standalone 7420 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 317 Standalone 7420 controller with four HBAs connected to two DE2-24 disk shelves in two chains

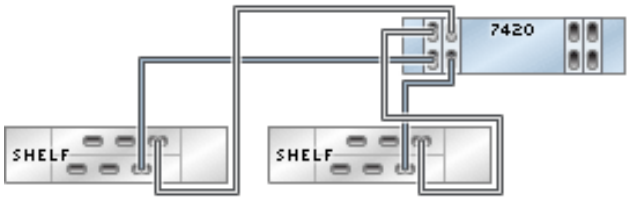


FIGURE 318 Standalone 7420 controller with four HBAs connected to three DE2-24 disk shelves in three chains

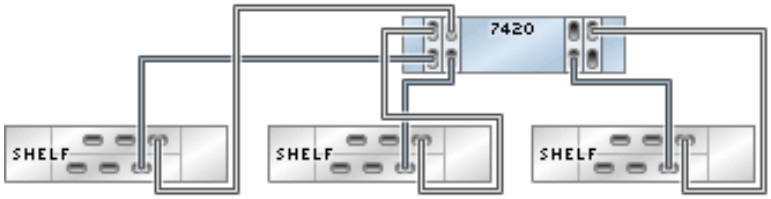


FIGURE 319 Standalone 7420 controller with four HBAs connected to four DE2-24 disk shelves in four chains

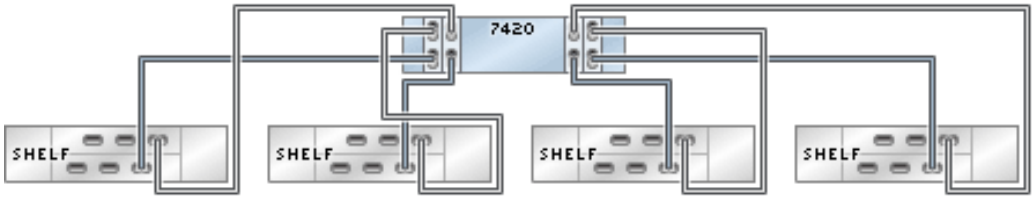


FIGURE 320 Standalone 7420 controller with four HBAs connected to eight DE2-24 disk shelves in four chains

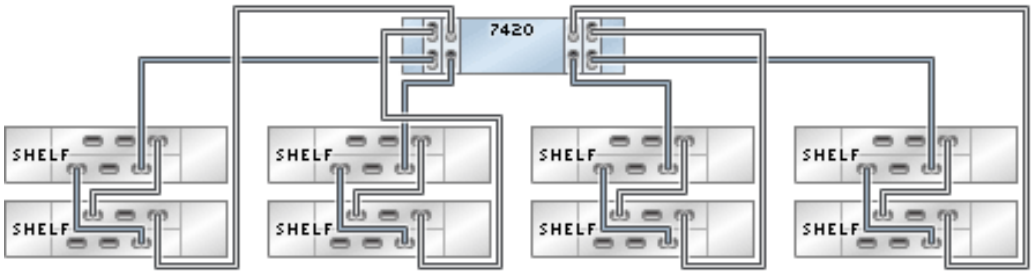


FIGURE 321 Standalone 7420 controller with four HBAs connected to 24 DE2-24 disk shelves in four chains

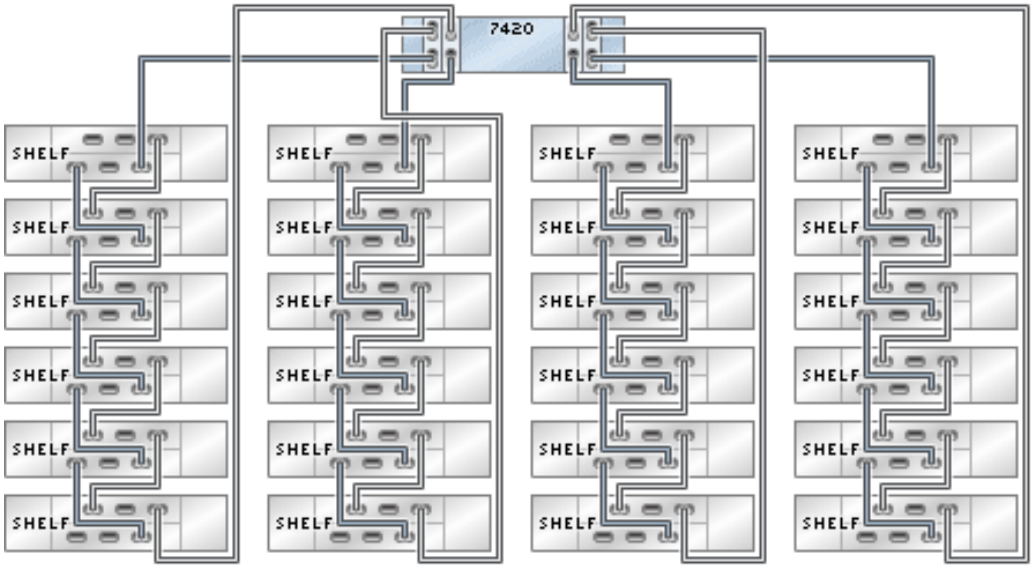
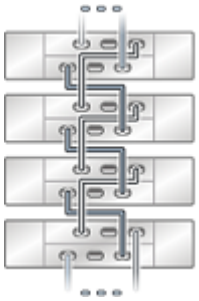


FIGURE 322 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (5 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with five HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 323 Standalone 7420 controller with five HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 324 Standalone 7420 controller with five HBAs connected to two DE2-24 disk shelves in two chains

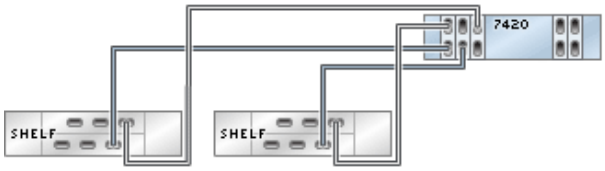


FIGURE 325 Standalone 7420 controller with five HBAs connected to three DE2-24 disk shelves in three chains

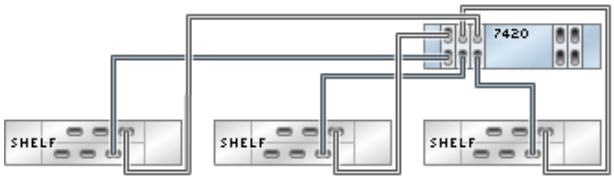


FIGURE 326 Standalone 7420 controller with five HBAs connected to four DE2-24 disk shelves in four chains

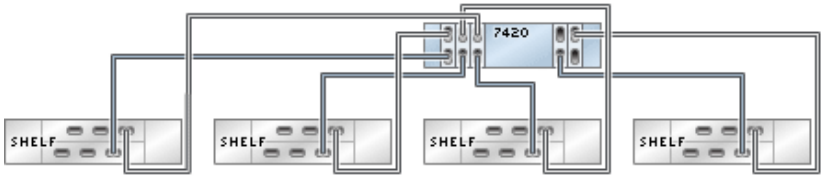


FIGURE 327 Standalone 7420 controller with five HBAs connected to five DE2-24 disk shelves in five chains

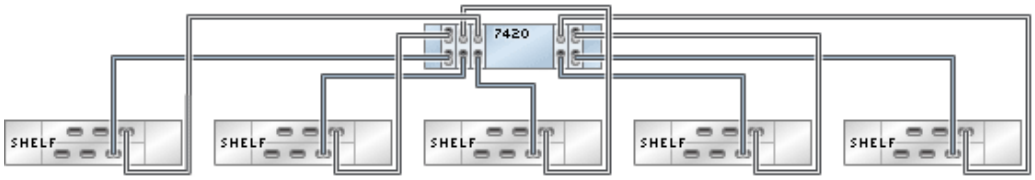


FIGURE 328 Standalone 7420 controller with five HBAs connected to ten DE2-24 disk shelves in five chains

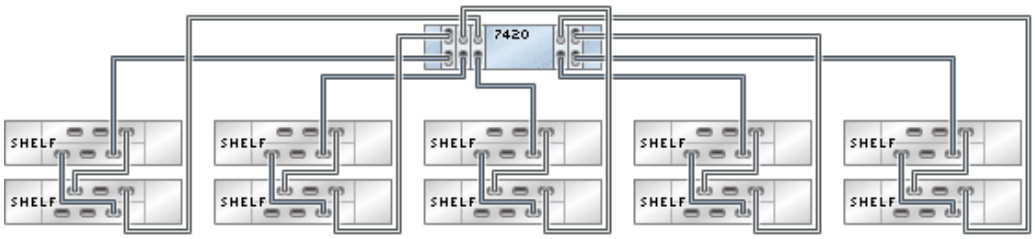


FIGURE 329 Standalone 7420 controller with five HBAs connected to 30 DE2-24 disk shelves in five chains

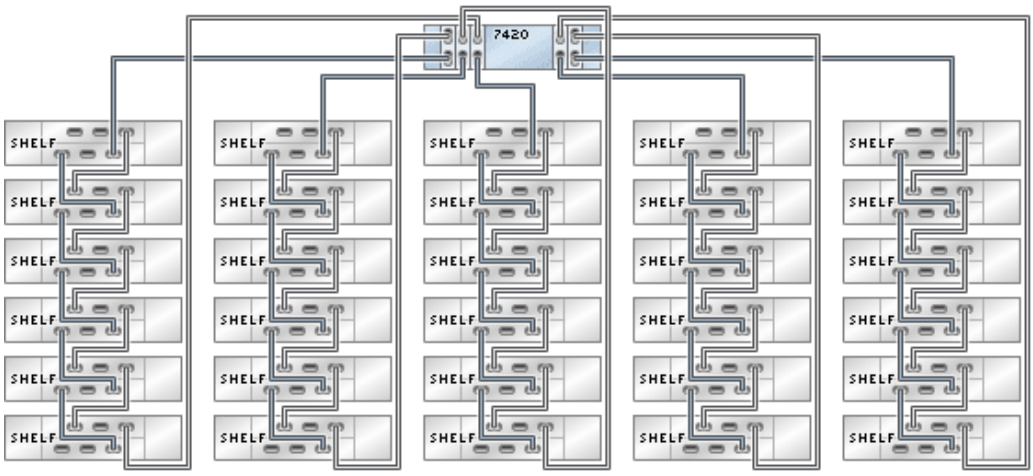
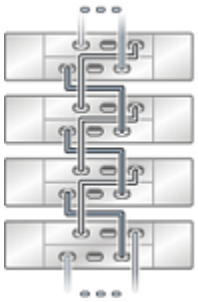


FIGURE 330 Multiple disk shelves in a single chain



7420 Standalone to DE2-24 Disk Shelves (6 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with six HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 331 Standalone 7420 controller with six HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 332 Standalone 7420 controller with six HBAs connected to two DE2-24 disk shelves in two chains

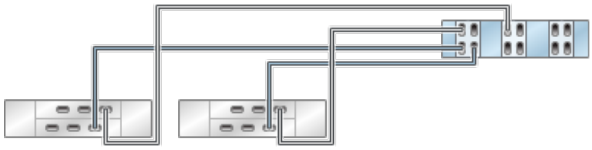


FIGURE 333 Standalone 7420 controller with six HBAs connected to three DE2-24 disk shelves in three chains

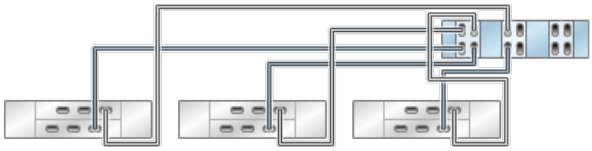


FIGURE 334 Standalone 7420 controller with six HBAs connected to four DE2-24 disk shelves in four chains

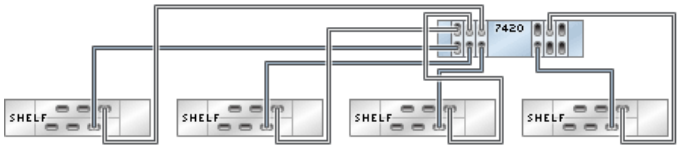


FIGURE 335 Standalone 7420 controller with six HBAs connected to five DE2-24 disk shelves in five chains

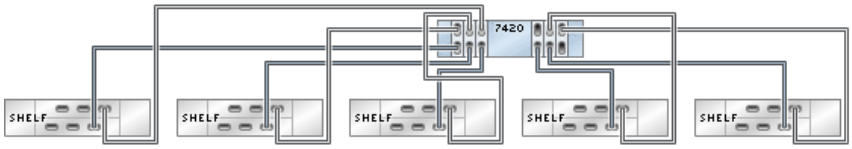


FIGURE 336 Standalone 7420 controller with six HBAs connected to six DE2-24 disk shelves in six chains

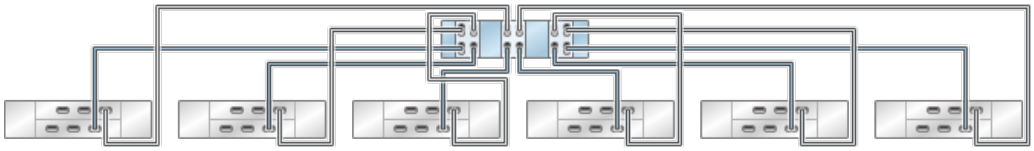


FIGURE 337 Standalone 7420 controller with six HBAs connected to 12 DE2-24 disk shelves in six chains

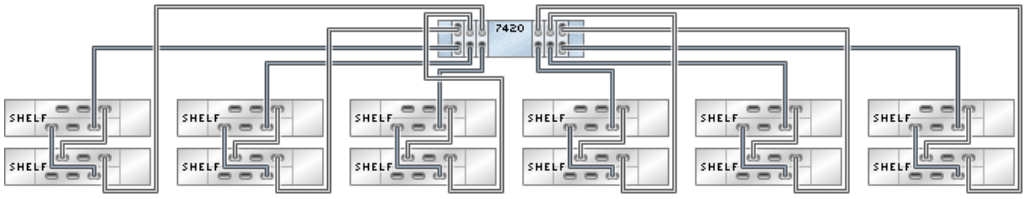


FIGURE 338 Standalone 7420 controller with six HBAs connected to 36 DE2-24 disk shelves in six chains

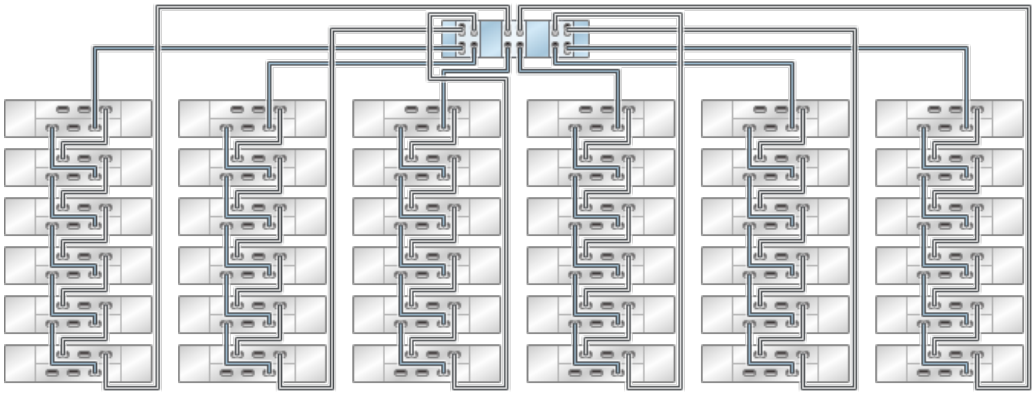
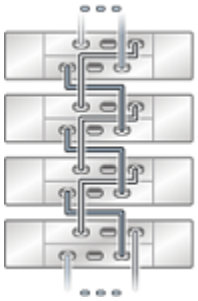


FIGURE 339 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 340 Clustered 7420 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

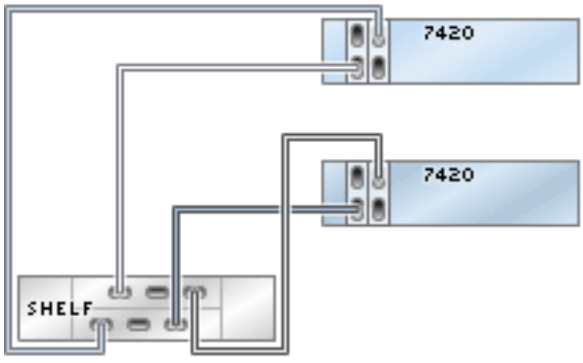


FIGURE 341 Clustered 7420 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

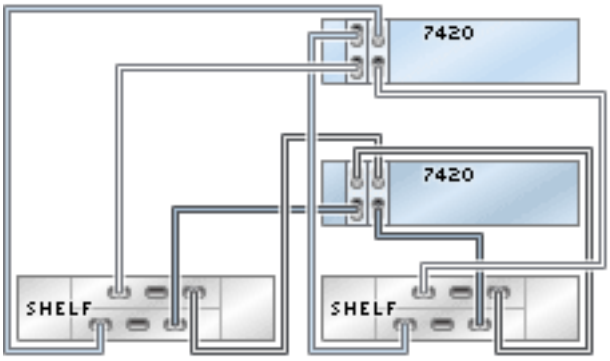


FIGURE 342 Clustered 7420 controllers with two HBAs connected to four DE2-24 disk shelves in two chains

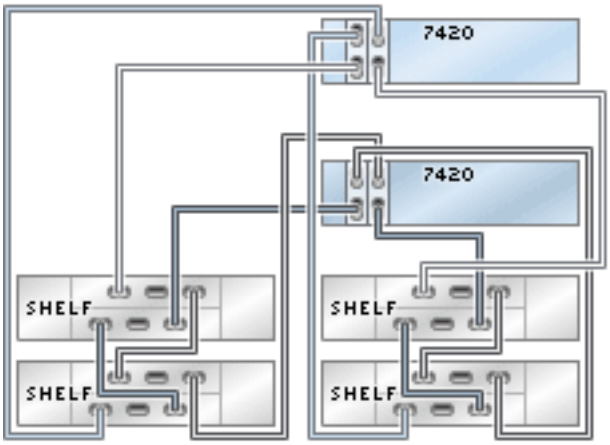


FIGURE 343 Clustered 7420 controllers with two HBAs connected to 12 DE2-24 disk shelves in two chains

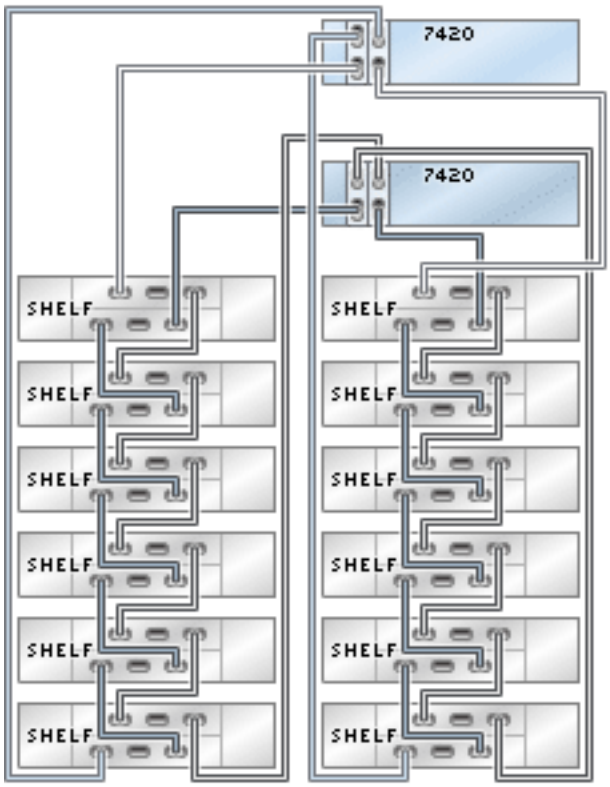
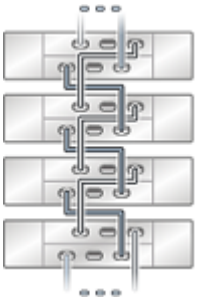


FIGURE 344 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 345 Clustered 7420 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain

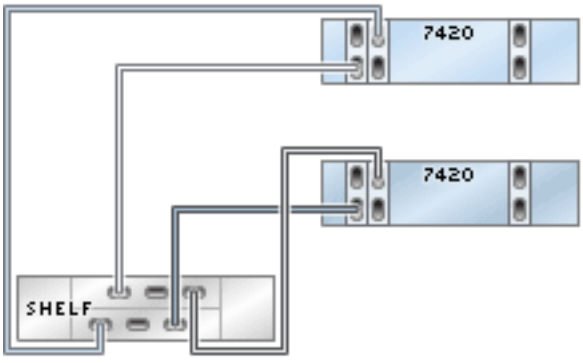


FIGURE 346 Clustered 7420 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

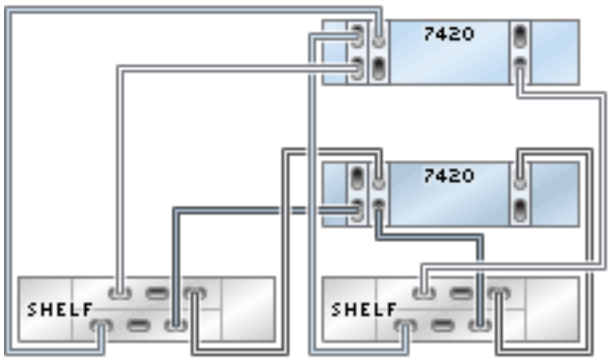


FIGURE 347 Clustered 7420 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

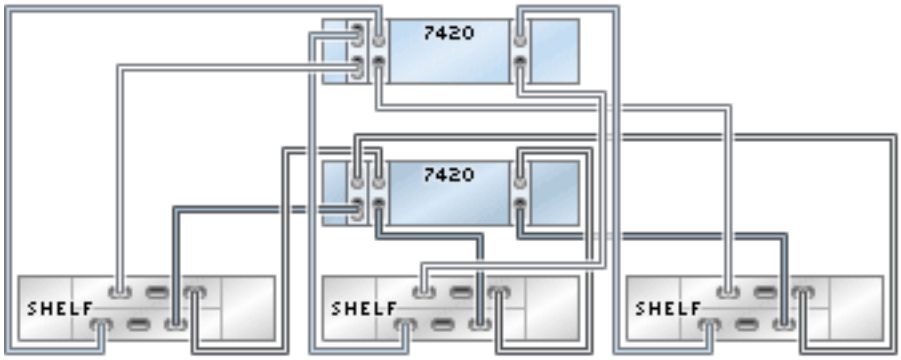


FIGURE 348 Clustered 7420 controllers with three HBAs connected to six DE2-24 disk shelves in three chains

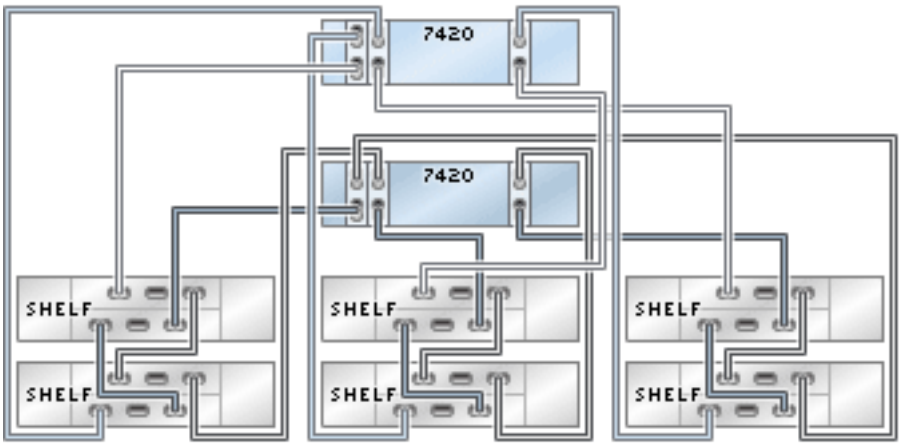


FIGURE 349 Clustered 7420 controllers with three HBAs connected to 18 DE2-24 disk shelves in three chains

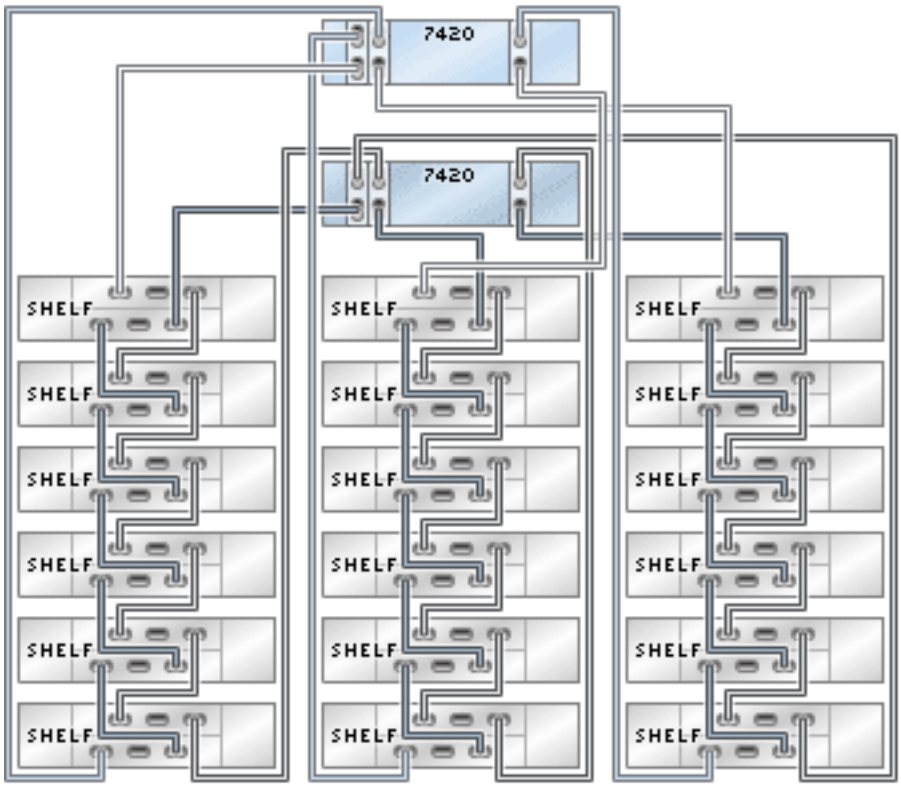
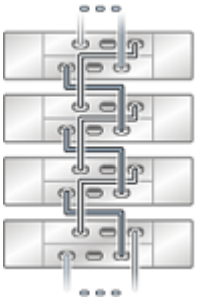


FIGURE 350 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 351 Clustered 7420 controllers with four HBAs connected to one DE2-24 disk shelf in a single chain

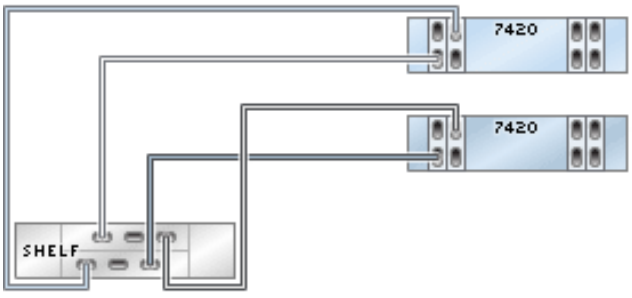


FIGURE 352 Clustered 7420 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

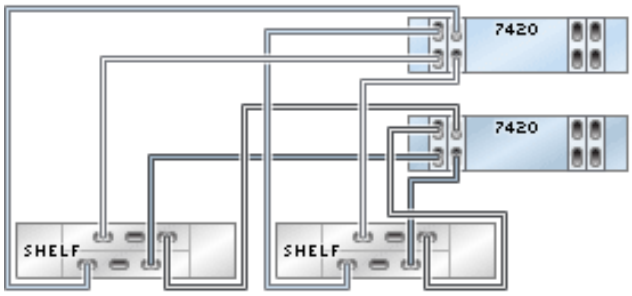


FIGURE 353 Clustered 7420 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

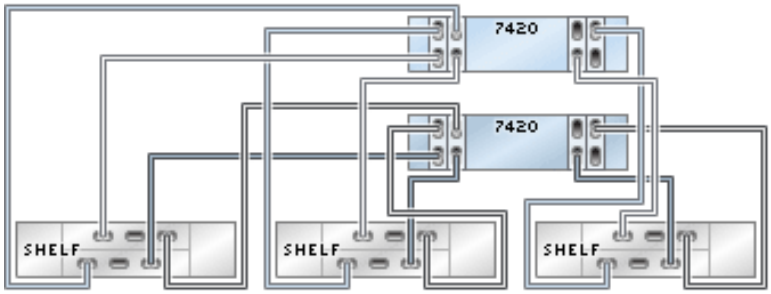


FIGURE 354 Clustered 7420 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

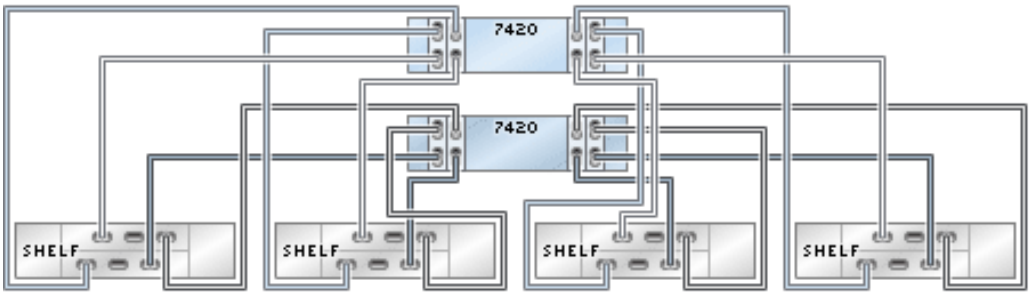


FIGURE 355 Clustered 7420 controllers with four HBAs connected to eight DE2-24 disk shelves in four chains

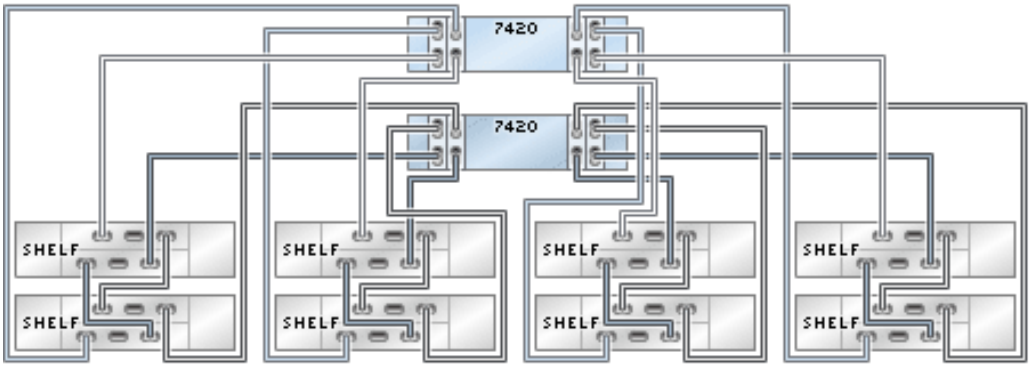


FIGURE 356 Clustered 7420 controllers with four HBAs connected to 24 DE2-24 disk shelves in four chains

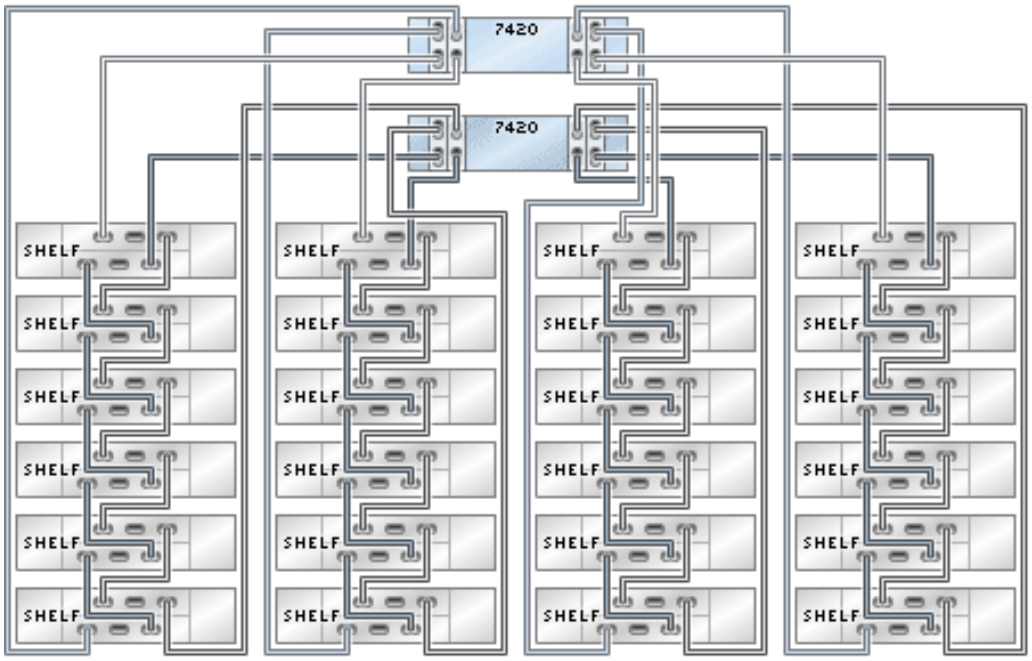
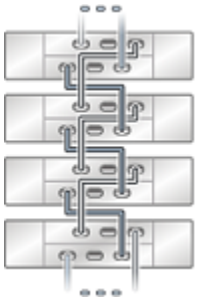


FIGURE 357 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (5 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with five HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 358 Clustered 7420 controllers with five HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 359 Clustered 7420 controllers with five HBAs connected to two DE2-24 disk shelves in two chains

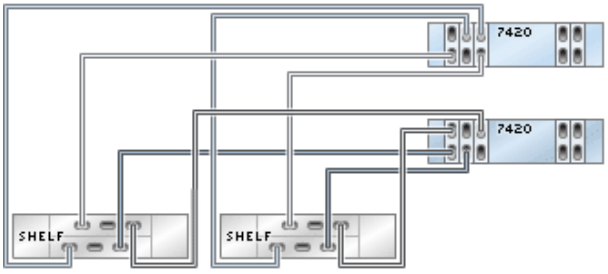


FIGURE 360 Clustered 7420 controllers with five HBAs connected to three DE2-24 disk shelves in three chains

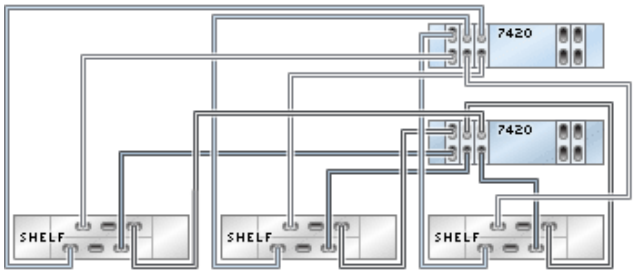


FIGURE 361 Clustered 7420 controllers with five HBAs connected to four DE2-24 disk shelves in four chains

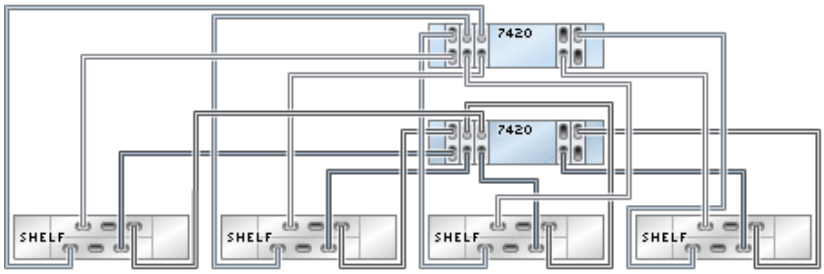


FIGURE 362 Clustered 7420 controllers with five HBAs connected to ten DE2-24 disk shelves in five chains

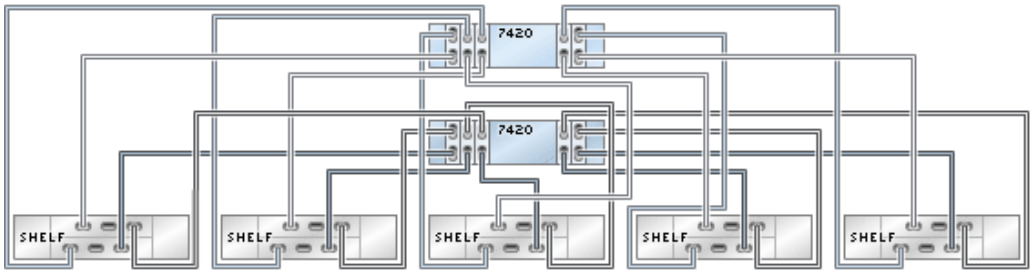


FIGURE 363 Clustered 7420 controllers with five HBAs connected to ten DE2-24 disk shelves in five chains

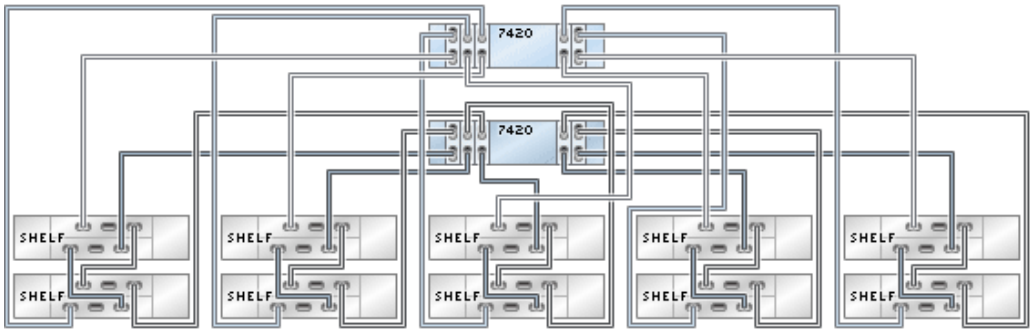


FIGURE 364 Clustered 7420 controllers with five HBAs connected to 30 DE2-24 disk shelves in five chains

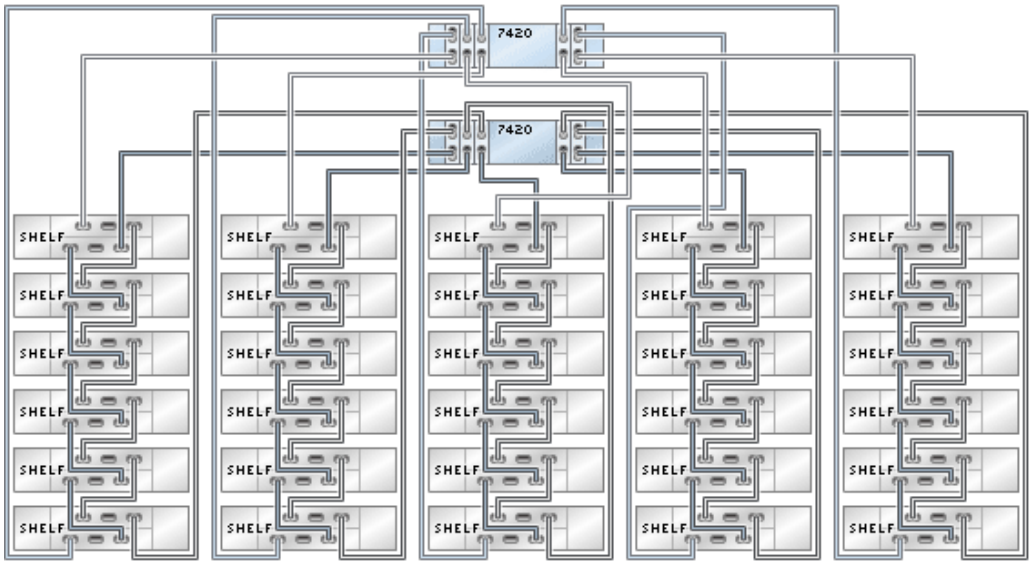
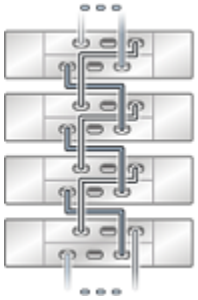


FIGURE 365 Multiple disk shelves in a single chain



7420 Clustered to DE2-24 Disk Shelves (6 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with six HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 366 Clustered 7420 controllers with six HBAs connected to one DE2-24 disk shelf in a single chain

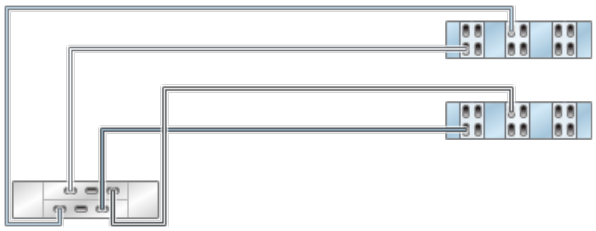


FIGURE 367 Clustered 7420 controllers with six HBAs connected to two DE2-24 disk shelves in two chains

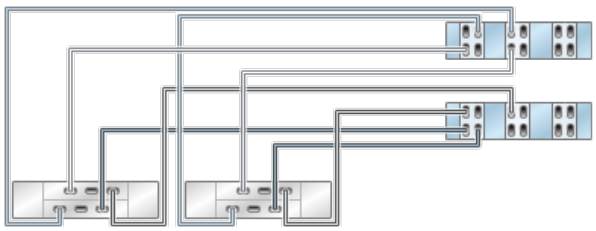


FIGURE 368 Clustered 7420 controllers with six HBAs connected to three DE2-24 disk shelves in three chains

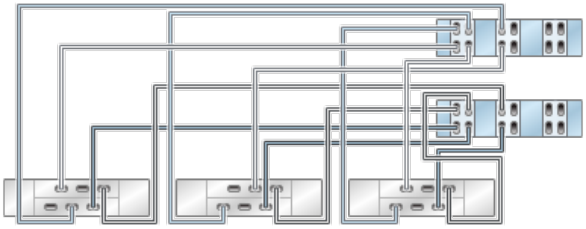


FIGURE 369 Clustered 7420 controllers with six HBAs connected to four DE2-24 disk shelves in four chains

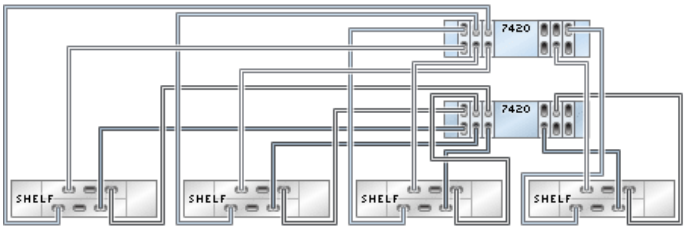


FIGURE 370 Clustered 7420 controllers with six HBAs connected to five DE2-24 disk shelves in five chains

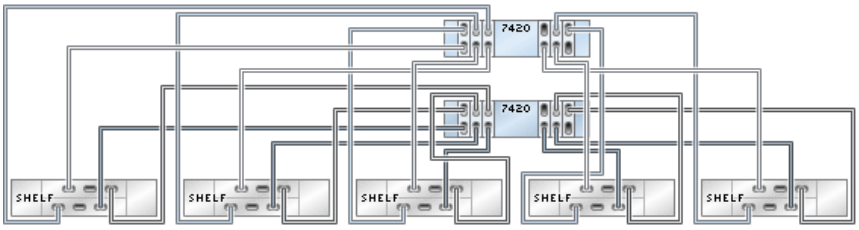


FIGURE 371 Clustered 7420 controllers with six HBAs connected to six DE2-24 disk shelves in six chains

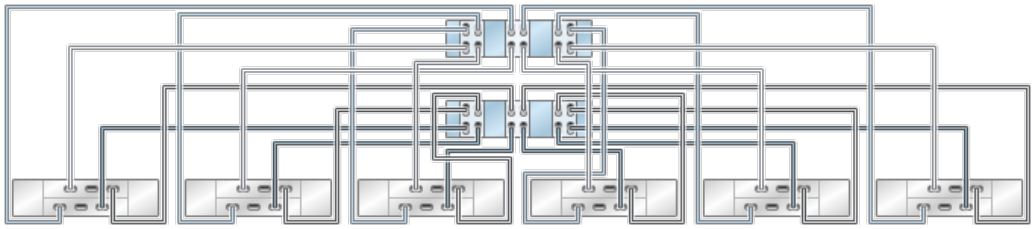


FIGURE 372 Clustered 7420 controllers with six HBAs connected to 12 DE2-24 disk shelves in six chains

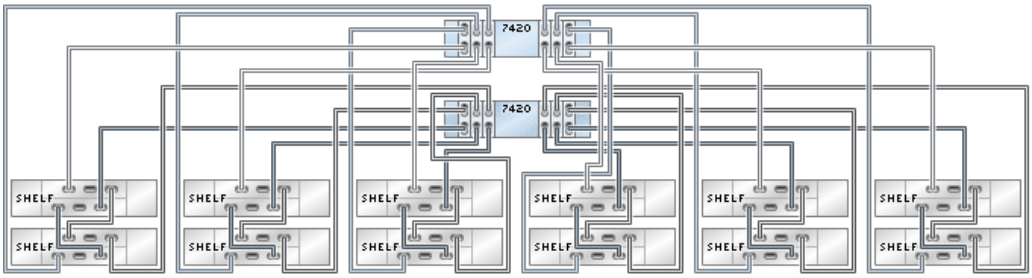


FIGURE 373 Clustered 7420 controllers with six HBAs connected to 36 DE2-24 disk shelves in six chains

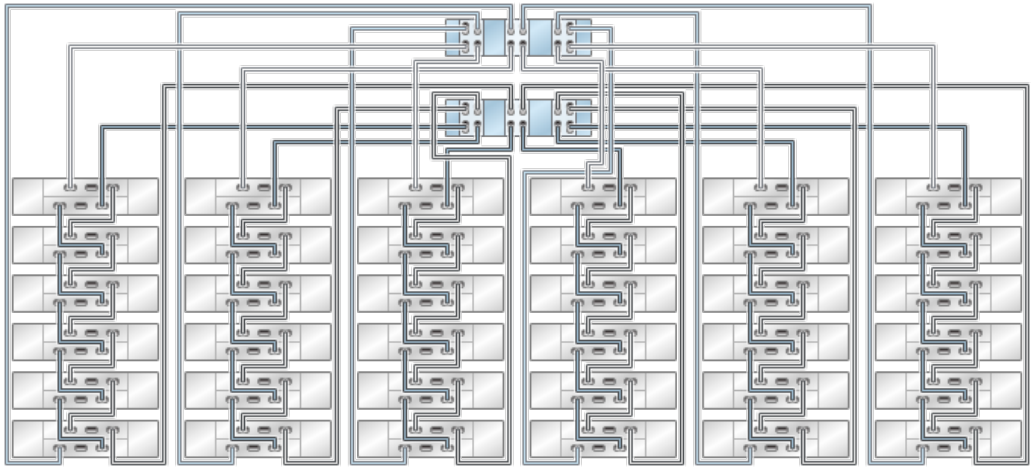
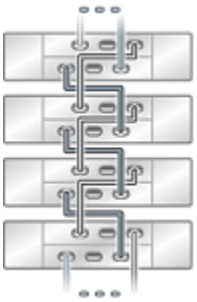


FIGURE 374 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to 7320 Controllers

This section contains guidelines for properly cabling standalone and clustered 7320 controllers to DE2-24 disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- "7320 Standalone to DE2-24 Disk Shelves" on page 252
- "7320 Clustered to DE2-24 Disk Shelves" on page 254

7320 Standalone to DE2-24 Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 375 Standalone 7320 controller with one HBA connected to one DE2-24 disk shelf in a single chain

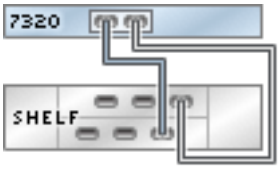


FIGURE 376 Standalone 7320 controller with one HBA connected to two DE2-24 disk shelves in a single chain

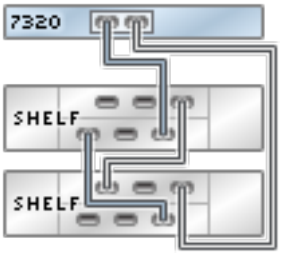


FIGURE 377 Standalone 7320 controller with one HBA connected to six DE2-24 disk shelves in a single chain

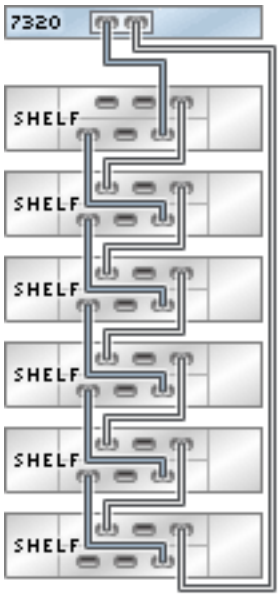
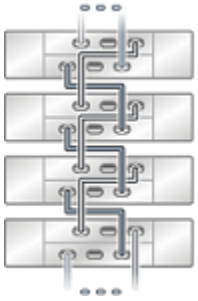


FIGURE 378 Multiple disk shelves in a single chain



7320 Clustered to DE2-24 Disk Shelves

The following figures show a subset of the supported configurations for the Oracle ZFS Storage 7320 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 379 Clustered 7320 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

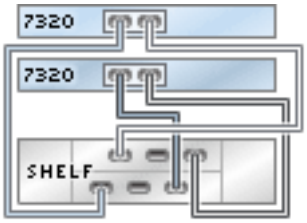


FIGURE 380 Clustered 7320 controllers with one HBA connected to two DE2-24 disk shelves in a single chain

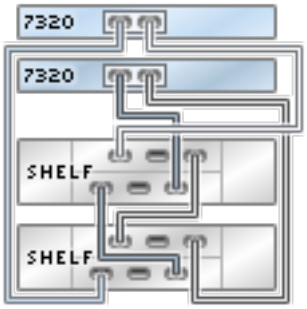


FIGURE 381 Clustered 7320 controllers with one HBA connected to six DE2-24 disk shelves in a single chain

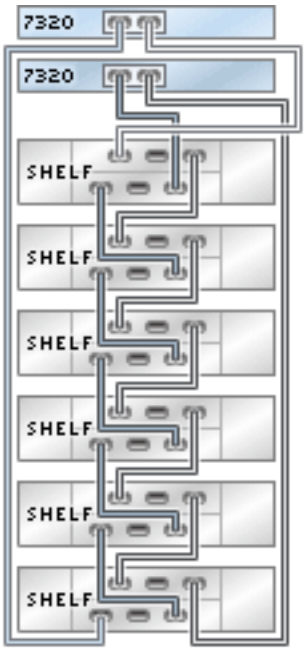
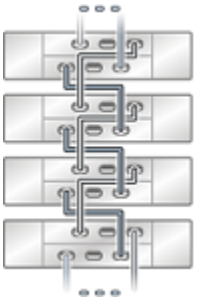


FIGURE 382 Multiple disk shelves in a single chain



Cabling DE2-24 Disk Shelves to 7120 Controllers

This section contains guidelines for properly cabling standalone 7120 controllers to DE2-24 disk shelves. Use the diagrams in this section to connect to one or more disk shelves.

7120 Standalone to DE2-24 Disk Shelves

The following figures show the supported configurations for the Oracle ZFS Storage 7120 standalone controller. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For hardware port locations, see the PCIe Options section in the Hardware Maintenance Overview for your controller model.

FIGURE 383 Standalone 7120 controller with one HBA connected to one DE2-24 disk shelf in a single chain

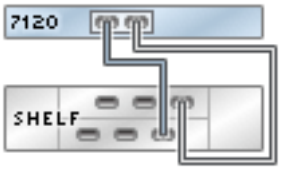
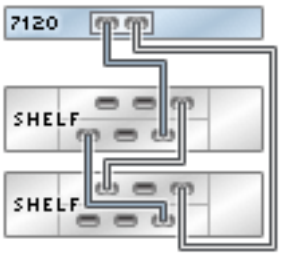


FIGURE 384 Standalone 7120 controller with one HBA connected to two DE2-24 disk shelves in a single chain



Cabling Sun Disk Shelves

This section contains guidelines for properly cabling standalone and clustered 7420, 7320, and standalone 7120 controllers to Sun Disk Shelves.

To review these guidelines, see the following topics:

Cabling Sun Disk Shelves to 7420 Controllers

This section contains guidelines for properly cabling standalone and clustered 7420 controllers to Sun Disk Shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

7420 Standalone to Sun Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 385 Standalone 7420 controller with two HBAs connected to one Sun Disk Shelf in a single chain

FIGURE 386 Standalone 7420 controller with two HBAs connected to two Sun Disk Shelves in two chains

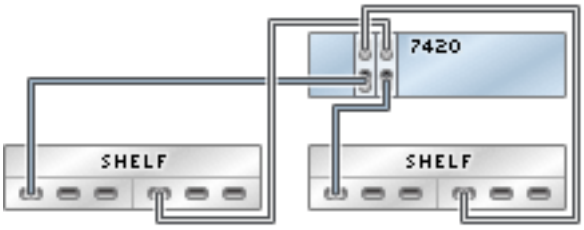


FIGURE 387 Standalone 7420 controller with two HBAs connected to four Sun Disk Shelves in two chains

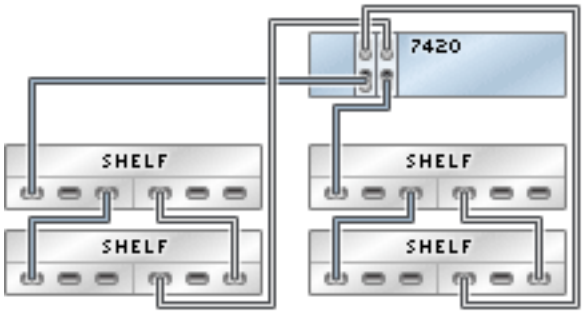
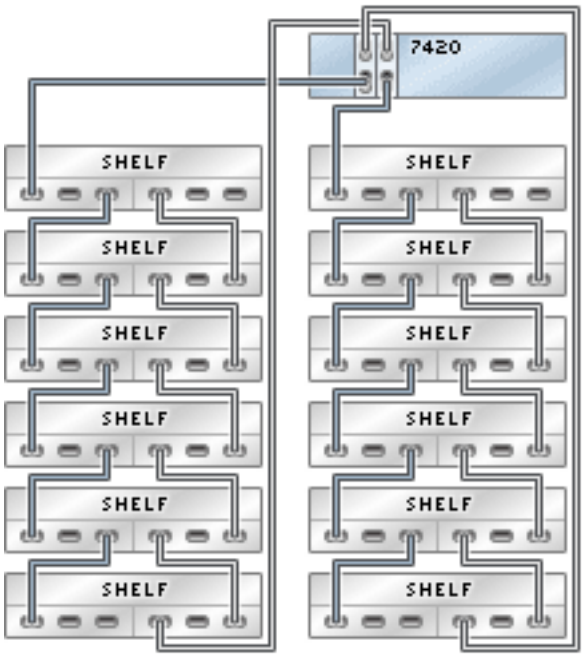


FIGURE 388 Standalone 7420 controller with two HBAs connected to 12 Sun Disk Shelves in two chains



7420 Standalone to Sun Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 389 Standalone 7420 controller with three HBAs connected to one Sun Disk Shelf in a single chain

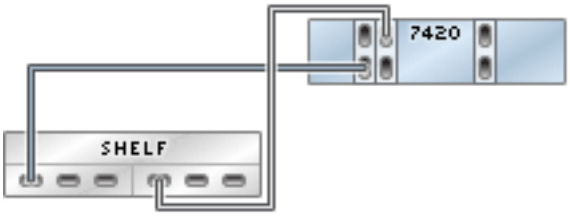


FIGURE 390 Standalone 7420 controller with three HBAs connected to two Sun Disk Shelves in two chains

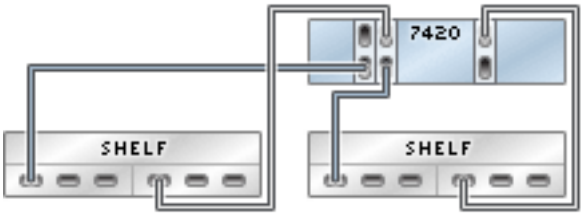


FIGURE 391 Standalone 7420 controller with three HBAs connected to three Sun Disk Shelves in three chains

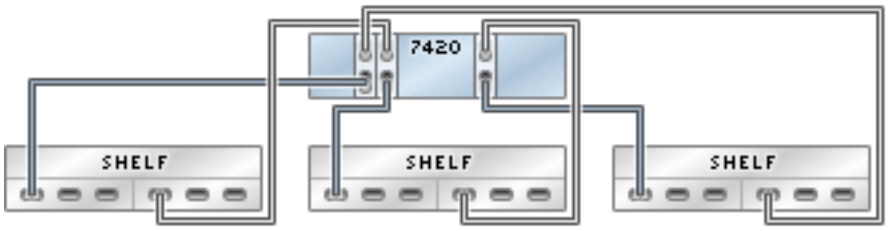


FIGURE 392 Standalone 7420 controller with three HBAs connected to six Sun Disk Shelves in three chains

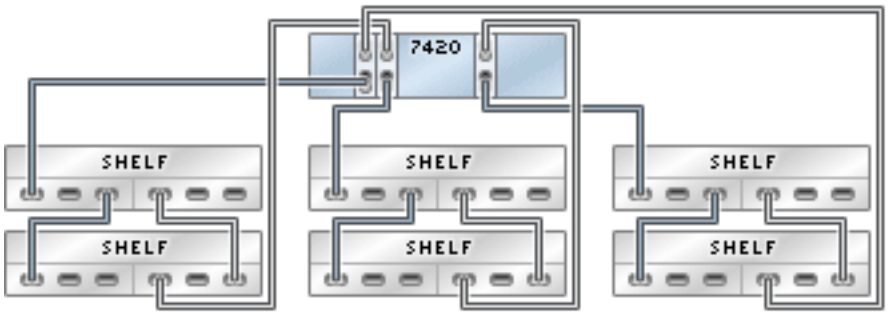
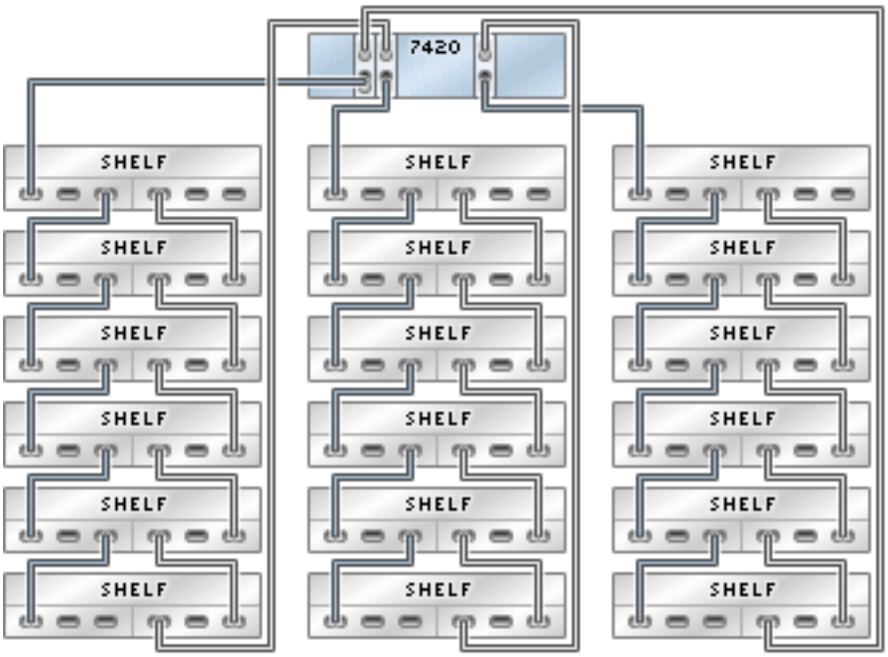


FIGURE 393 Standalone 7420 controller with three HBAs connected to 18 Sun Disk Shelves in three chains



7420 Standalone to Sun Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 394 Standalone 7420 controller with four HBAs connected to one Sun Disk Shelf in a single chain

FIGURE 395 Standalone 7420 controller with four HBAs connected to two Sun Disk Shelves in two chains

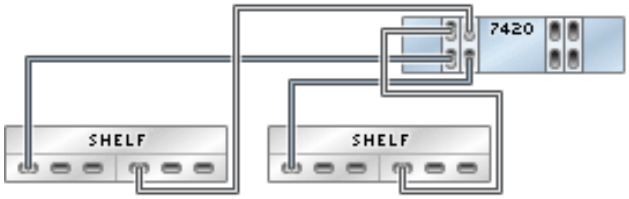


FIGURE 396 Standalone 7420 controller with four HBAs connected to three Sun Disk Shelves in three chains

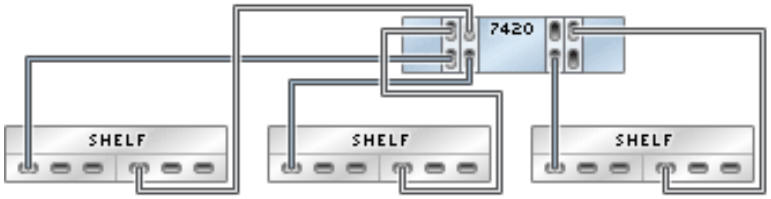


FIGURE 397 Standalone 7420 controller with four HBAs connected to four Sun Disk Shelves in four chains

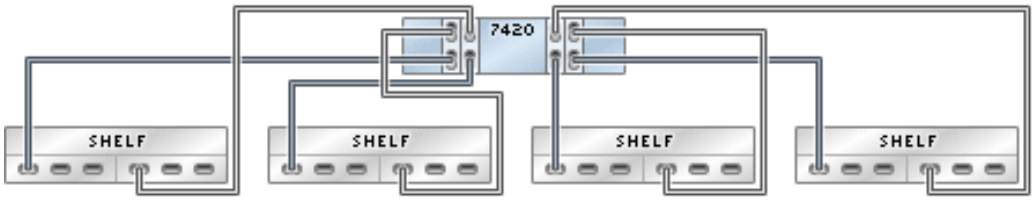


FIGURE 398 Standalone 7420 controller with four HBAs connected to eight Sun Disk Shelves in four chains

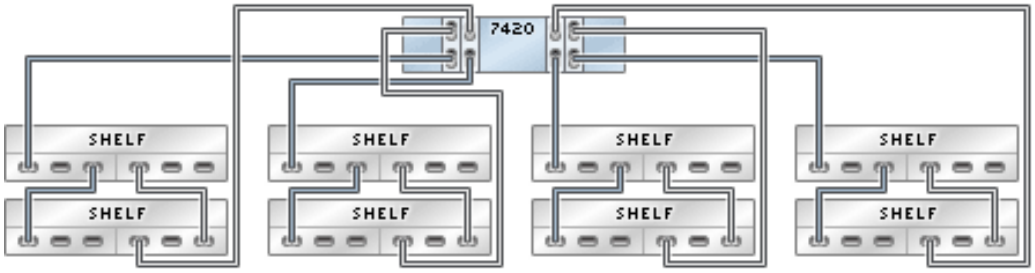
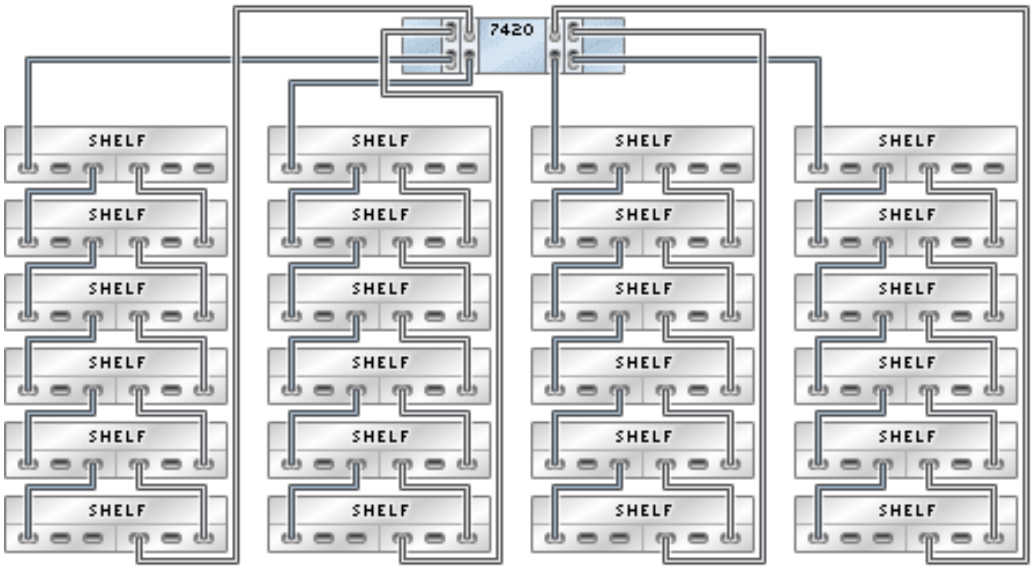


FIGURE 399 Standalone 7420 controller with four HBAs connected to 24 Sun Disk Shelves in four chains



7420 Standalone to Sun Disk Shelves (5 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with five HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 400 Standalone 7420 controller with five HBAs connected to one Sun Disk Shelf in a single chain

FIGURE 401 Standalone 7420 controller with five HBAs connected to two Sun Disk Shelves in two chains

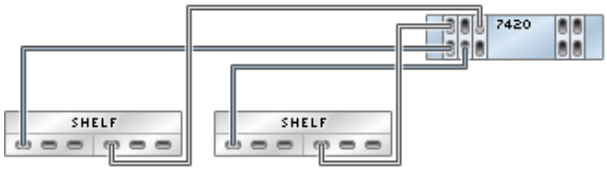


FIGURE 402 Standalone 7420 controller with five HBAs connected to three Sun Disk Shelves in three chains

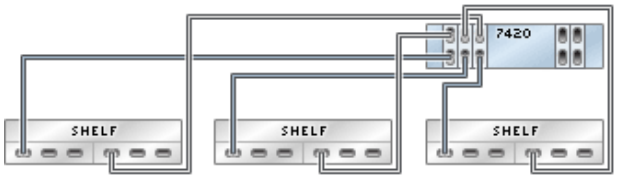


FIGURE 403 Standalone 7420 controller with five HBAs connected to four Sun Disk Shelves in four chains

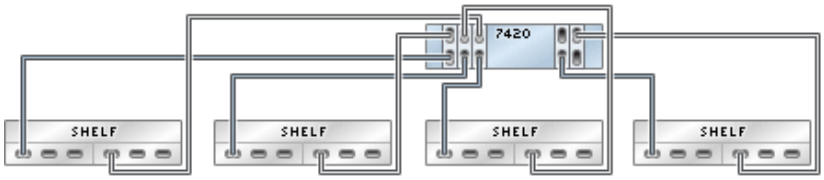


FIGURE 404 Standalone 7420 controller with five HBAs connected to five Sun Disk Shelves in five chains

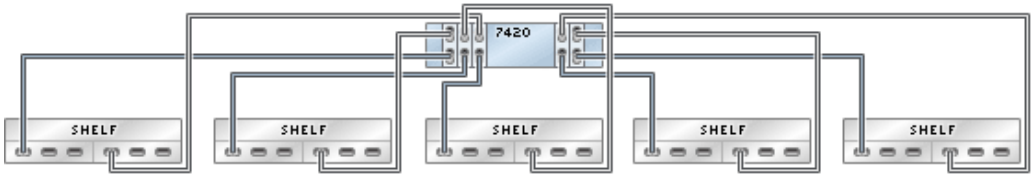


FIGURE 405 Standalone 7420 controller with five HBAs connected to ten Sun Disk Shelves in five chains

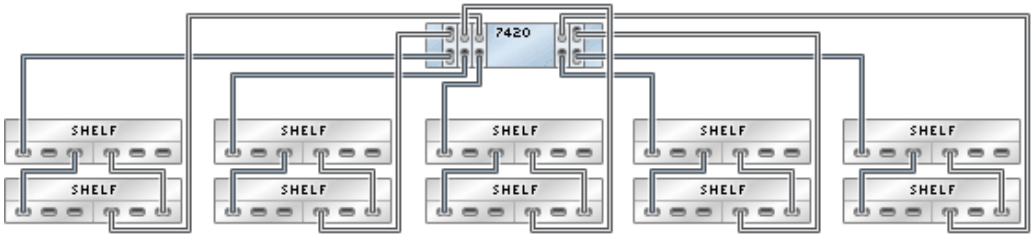
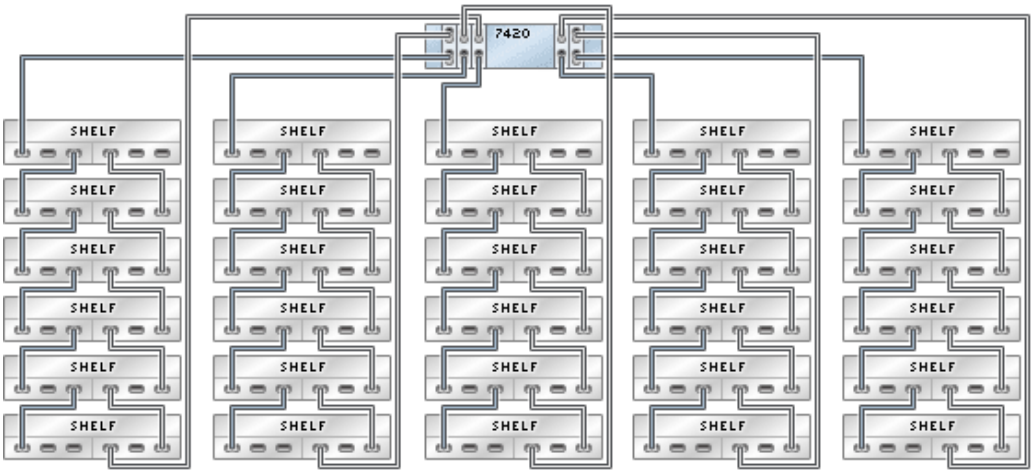


FIGURE 406 Standalone 7420 controller with five HBAs connected to 30 Sun Disk Shelves in five chains



7420 Standalone to Sun Disk Shelves (6 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with six HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 407 Standalone 7420 controller with six HBAs connected to one Sun Disk Shelf in a single chain

FIGURE 408 Standalone 7420 controller with six HBAs connected to two Sun Disk Shelves in two chains

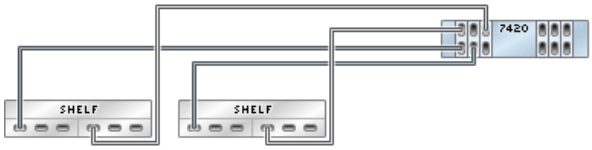


FIGURE 409 Standalone 7420 controller with six HBAs connected to three Sun Disk Shelves in three chains

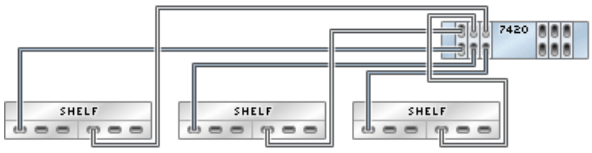


FIGURE 410 Standalone 7420 controller with six HBAs connected to four Sun Disk Shelves in four chains

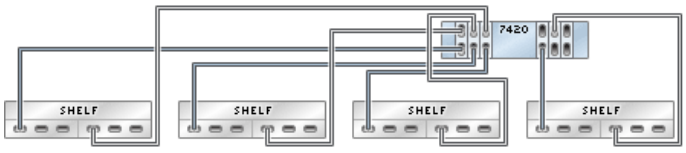


FIGURE 411 Standalone 7420 controller with six HBAs connected to five Sun Disk Shelves in five chains

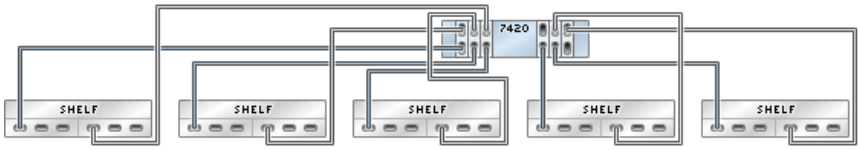


FIGURE 412 Standalone 7420 controller with six HBAs connected to six Sun Disk Shelves in six chains

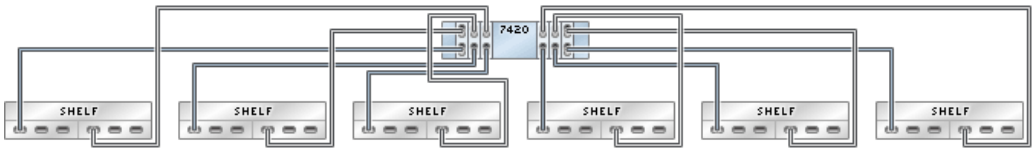


FIGURE 413 Standalone 7420 controller with six HBAs connected to 12 Sun Disk Shelves in six chains

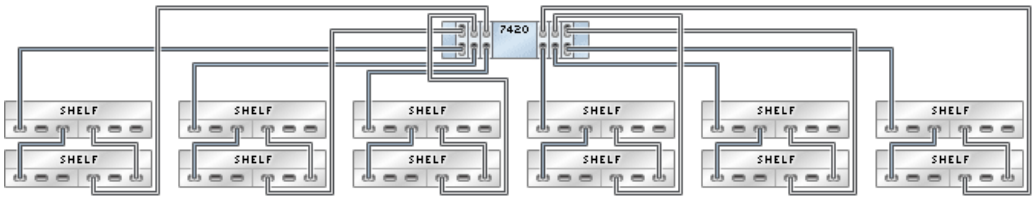
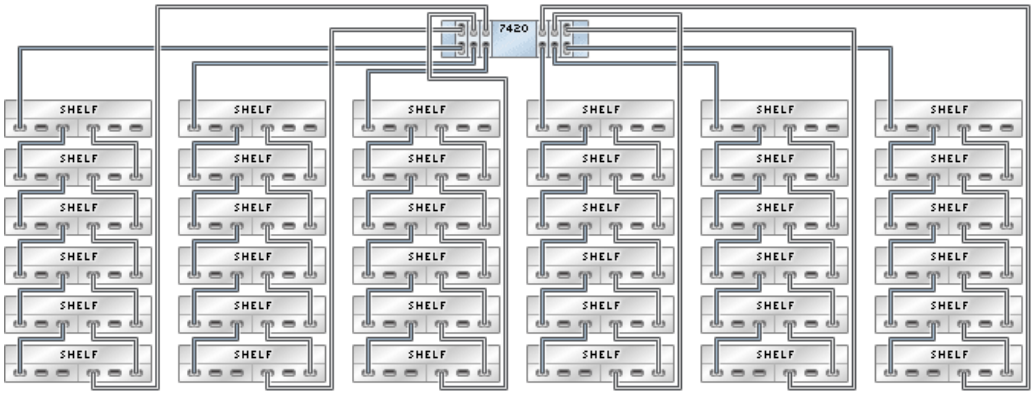


FIGURE 414 Standalone 7420 controller with six HBAs connected to 36 Sun Disk Shelves in six chains



7420 Clustered to Sun Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 415 Clustered 7420 controllers with two HBAs connected to one Sun Disk Shelf in a single chain

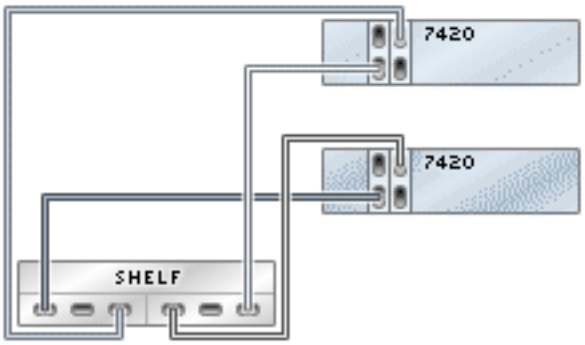


FIGURE 416 Clustered 7420 controllers with two HBAs connected to two Sun Disk Shelves in two chains

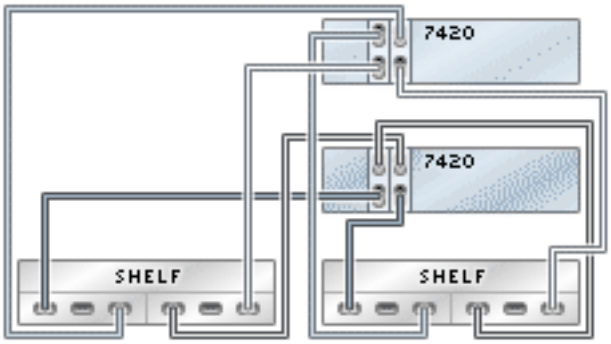


FIGURE 417 Clustered 7420 controllers with two HBAs connected to four Sun Disk Shelves in two chains

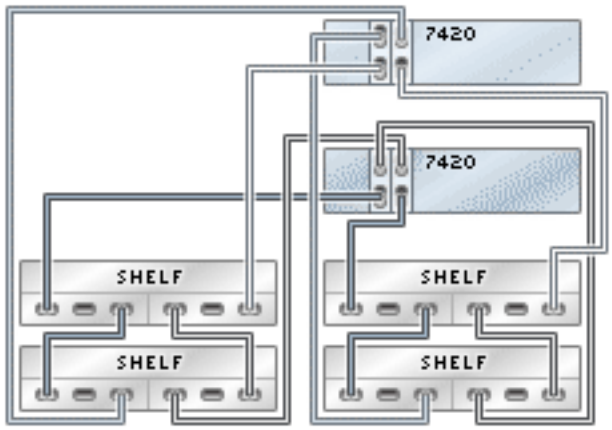
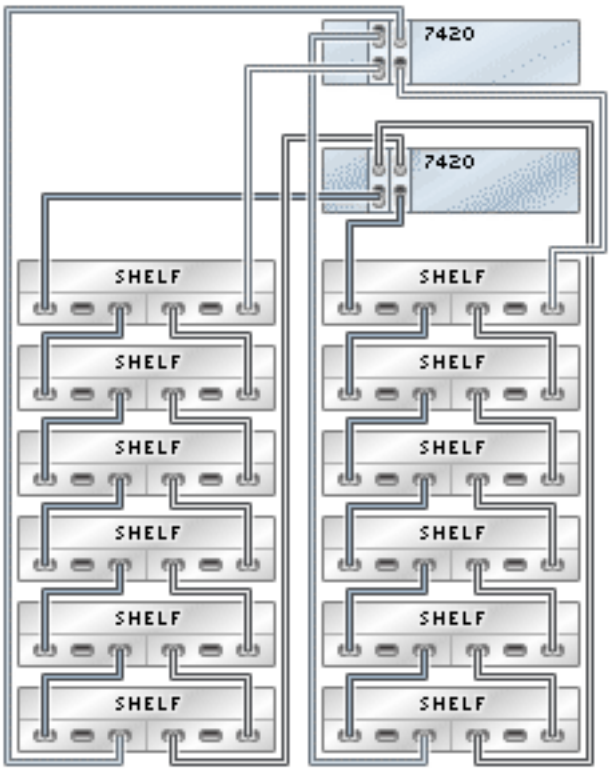


FIGURE 418 Clustered 7420 controllers with two HBAs connected to 12 Sun Disk Shelves in two chains



7420 Clustered to Sun Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 419 Clustered 7420 controllers with three HBAs connected to one Sun Disk Shelf in a single chain

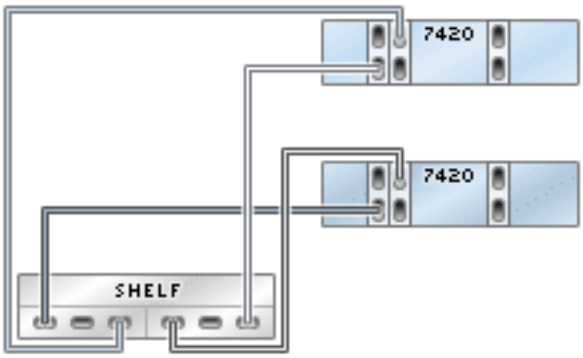


FIGURE 420 Clustered 7420 controllers with three HBAs connected to two Sun Disk Shelves in two chains

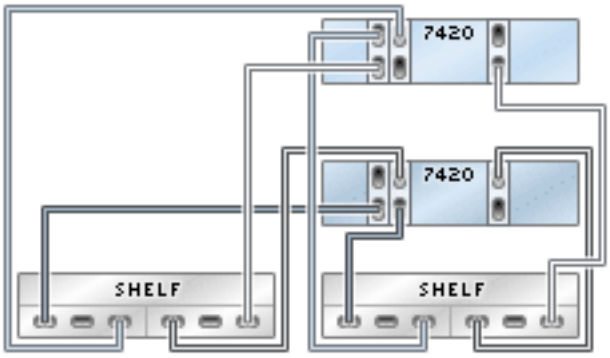


FIGURE 421 Clustered 7420 controllers with three HBAs connected to three Sun Disk Shelves in three chains

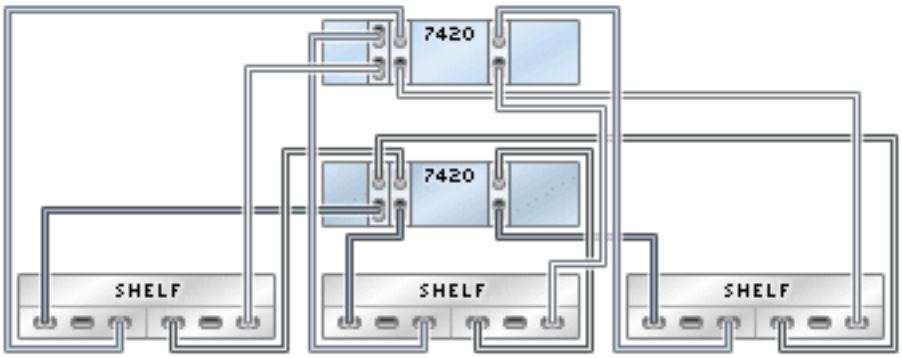


FIGURE 422 Clustered 7420 controllers with three HBAs connected to six Sun Disk Shelves in three chains

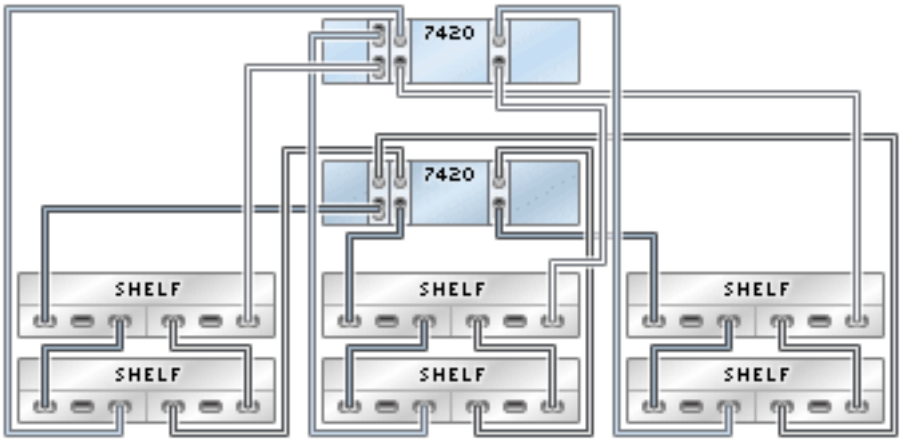
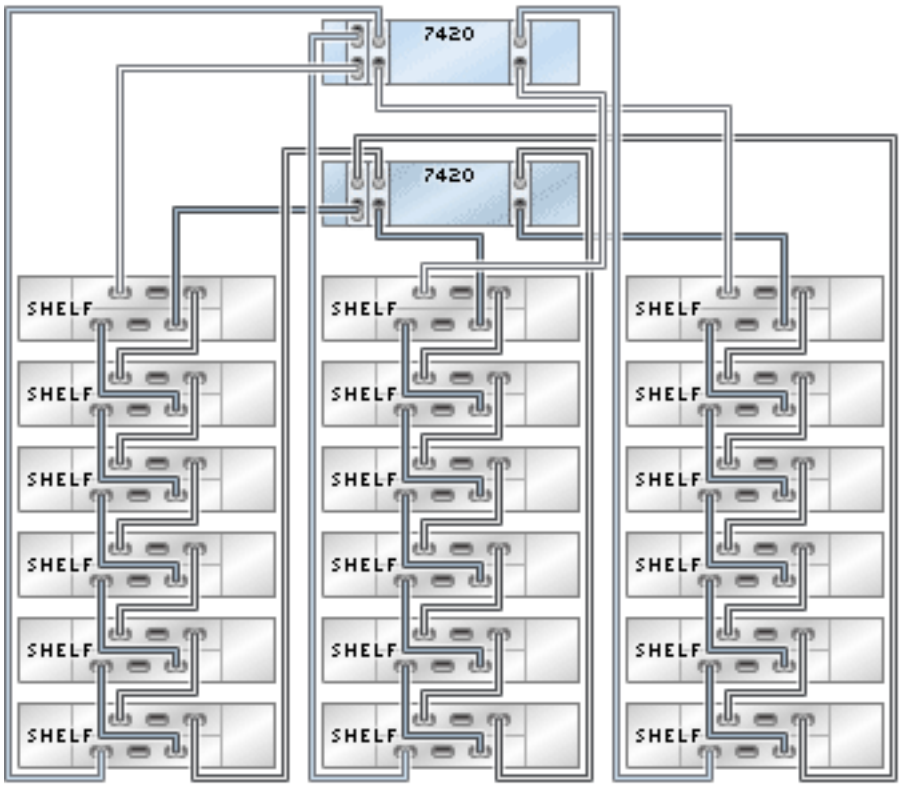


FIGURE 423 Clustered 7420 controllers with three HBAs connected to 18 Sun Disk Shelves in three chains



7420 Clustered to Sun Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 424 Clustered 7420 controllers with four HBAs connected to one Sun Disk Shelf in a single chain

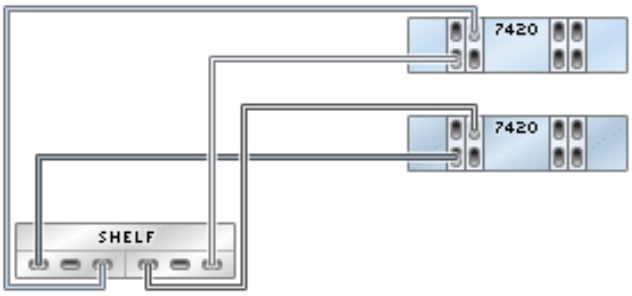


FIGURE 425 Clustered 7420 controllers with four HBAs connected to two Sun Disk Shelves in two chains

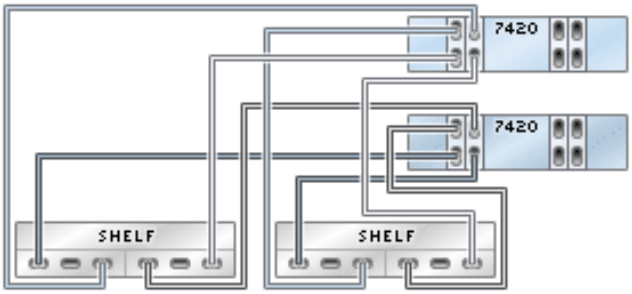


FIGURE 426 Clustered 7420 controllers with four HBAs connected to three Sun Disk Shelves in three chains

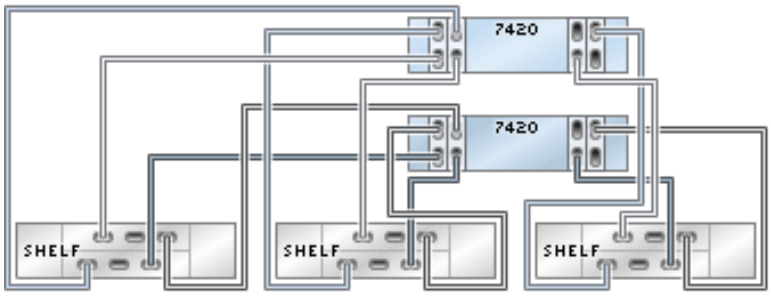


FIGURE 427 Clustered 7420 controllers with four HBAs connected to four Sun Disk Shelves in four chains

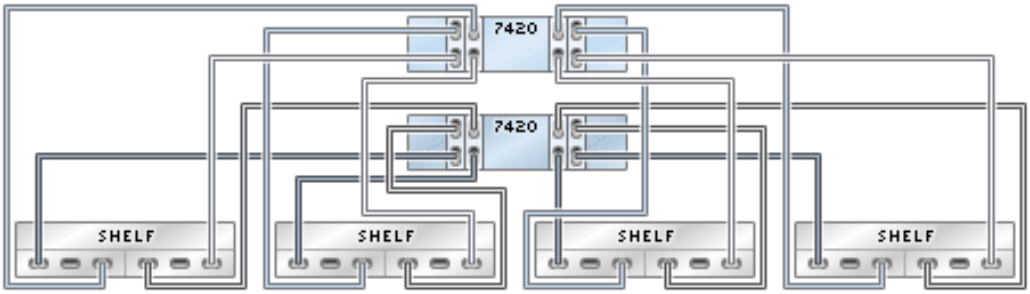


FIGURE 428 Clustered 7420 controllers with four HBAs connected to eight Sun Disk Shelves in four chains

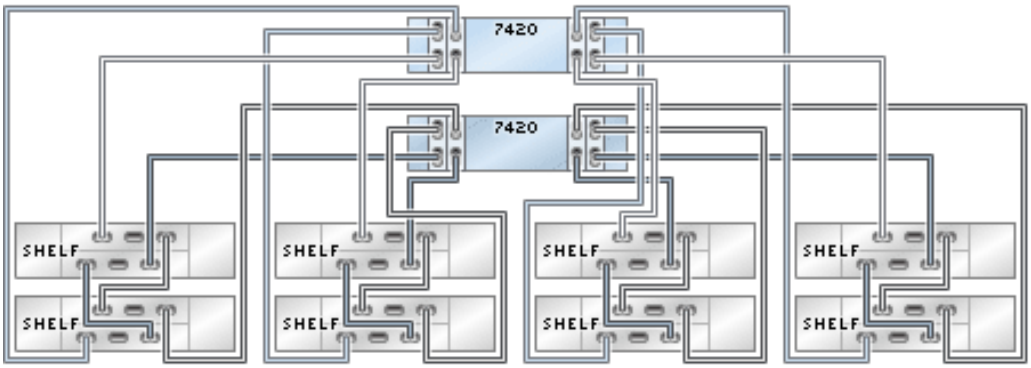
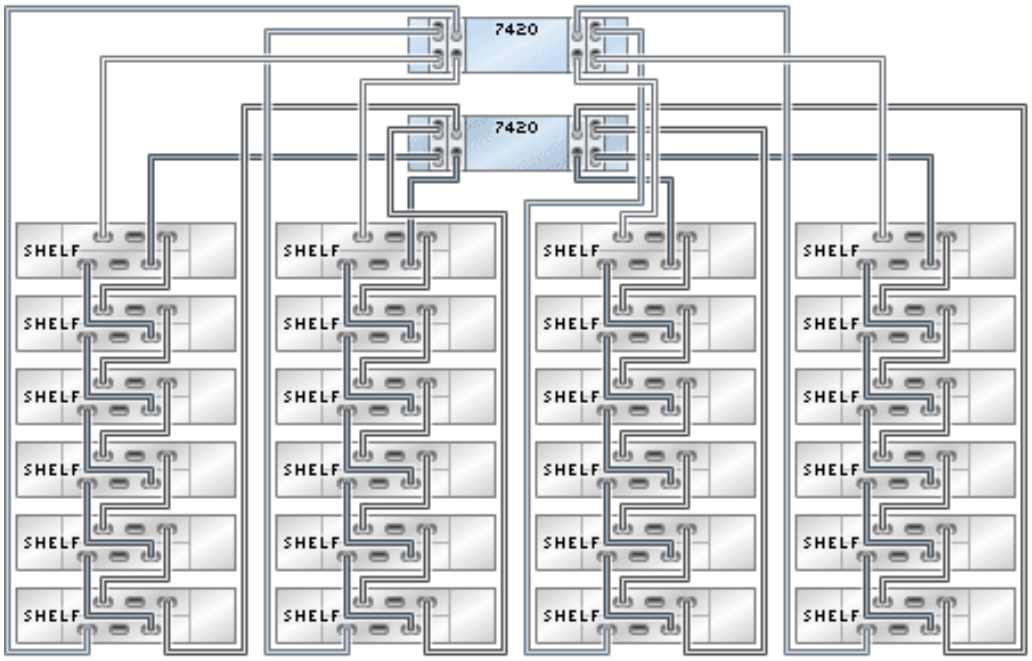


FIGURE 429 Clustered 7420 controllers with four HBAs connected to 24 Sun Disk Shelves in four chains



7420 Clustered to Sun Disk Shelves (5 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with five HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 430 Clustered 7420 controllers with five HBAs connected to one Sun Disk Shelf in a single chain

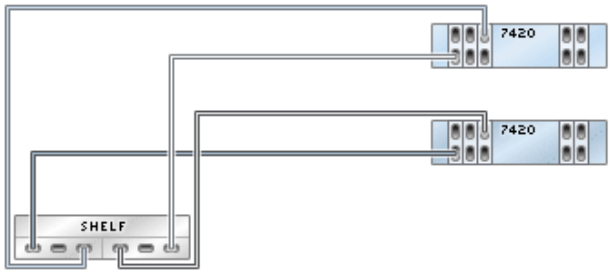


FIGURE 431 Clustered 7420 controllers with five HBAs connected to two Sun Disk Shelves in two chains

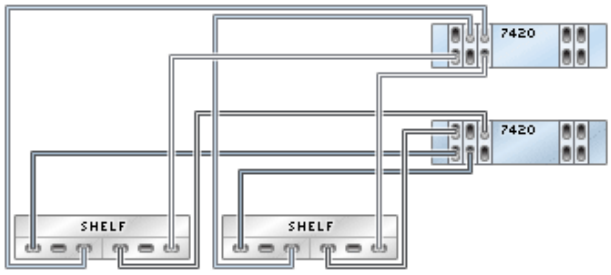


FIGURE 432 Clustered 7420 controllers with five HBAs connected to three Sun Disk Shelves in three chains

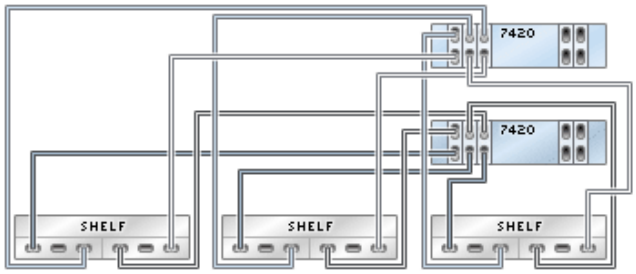


FIGURE 433 Clustered 7420 controllers with five HBAs connected to four Sun Disk Shelves in four chains

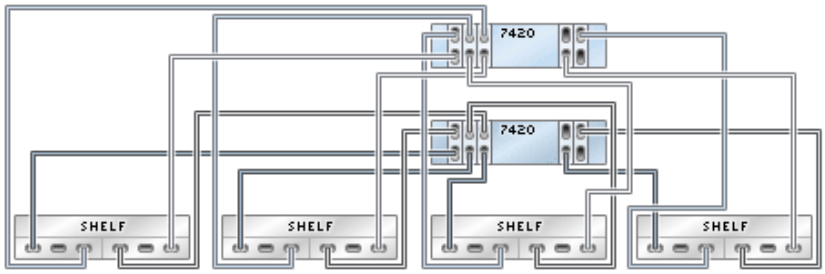


FIGURE 434 Clustered 7420 controllers with five HBAs connected to five Sun Disk Shelves in five chains

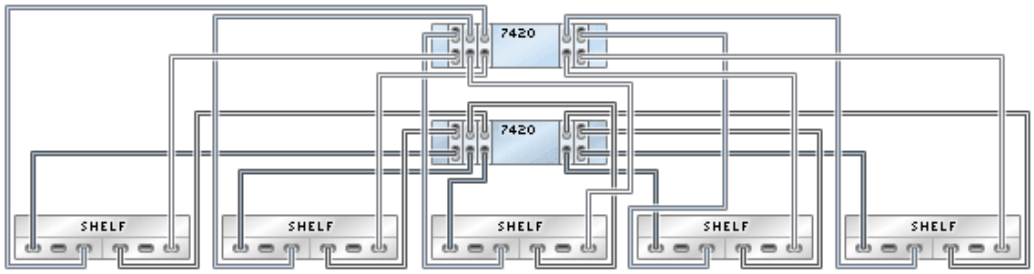


FIGURE 435 Clustered 7420 controllers with five HBAs connected to ten Sun Disk Shelves in five chains

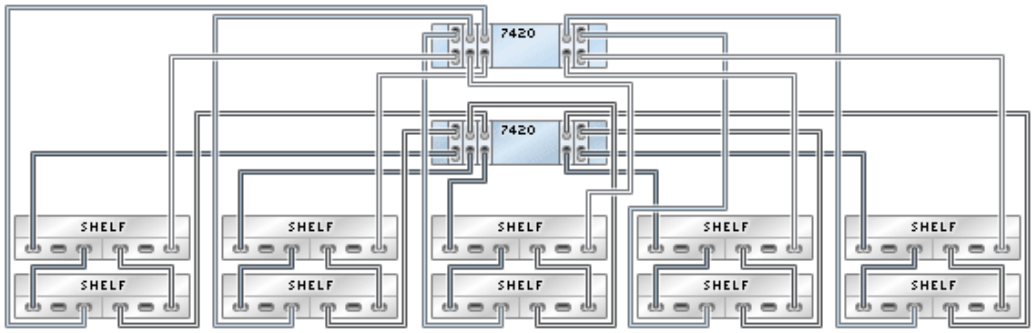
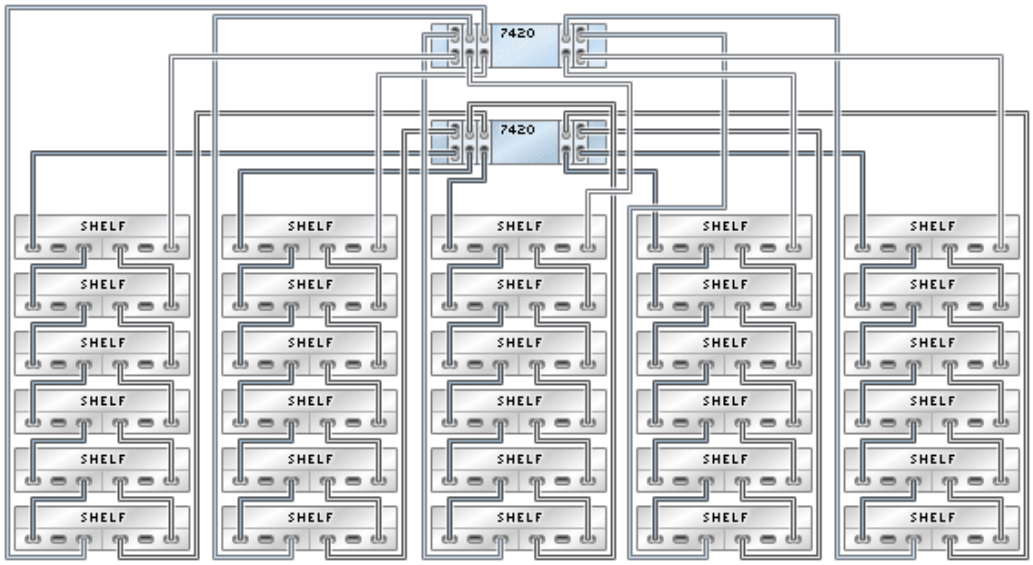


FIGURE 436 Clustered 7420 controllers with five HBAs connected to 30 Sun Disk Shelves in five chains



7420 Clustered to Sun Disk Shelves (6 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with six HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 437 Clustered 7420 controllers with six HBAs connected to one Sun Disk Shelf in a single chain

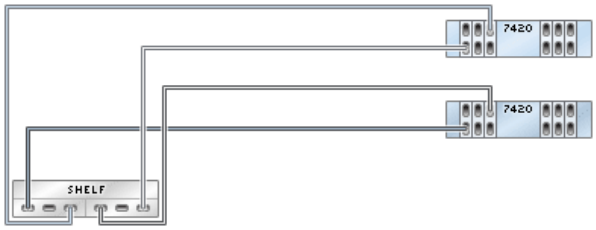


FIGURE 438 Clustered 7420 controllers with six HBAs connected to two Sun Disk Shelves in two chains

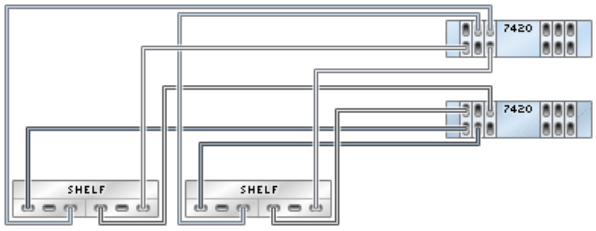


FIGURE 439 Clustered 7420 controllers with six HBAs connected to three Sun Disk Shelves in three chains

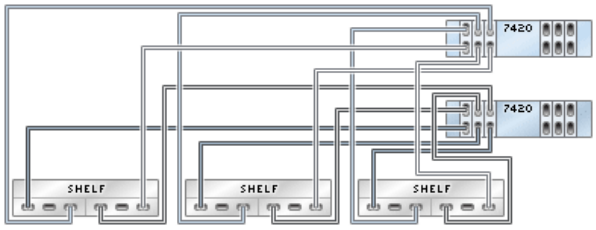


FIGURE 440 Clustered 7420 controllers with six HBAs connected to four Sun Disk Shelves in four chains

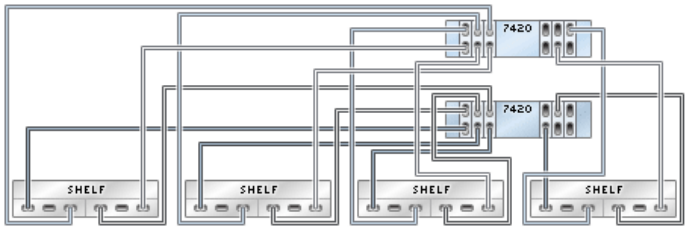


FIGURE 441 Clustered 7420 controllers with six HBAs connected to five Sun Disk Shelves in five chains

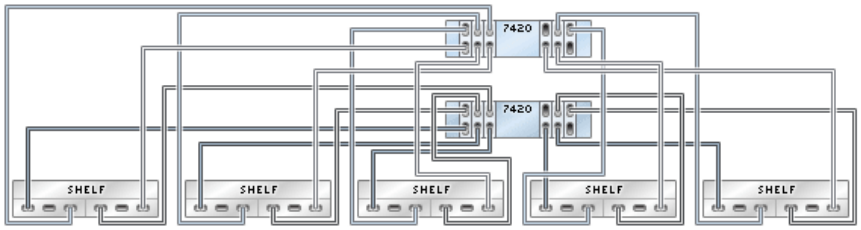


FIGURE 442 Clustered 7420 controllers with six HBAs connected to six Sun Disk Shelves in six chains

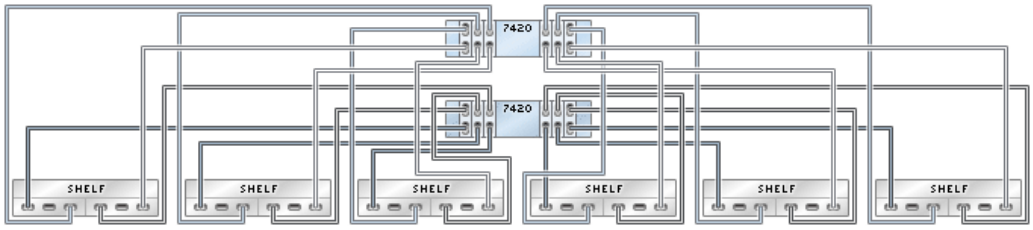


FIGURE 443 Clustered 7420 controllers with six HBAs connected to 12 Sun Disk Shelves in six chains

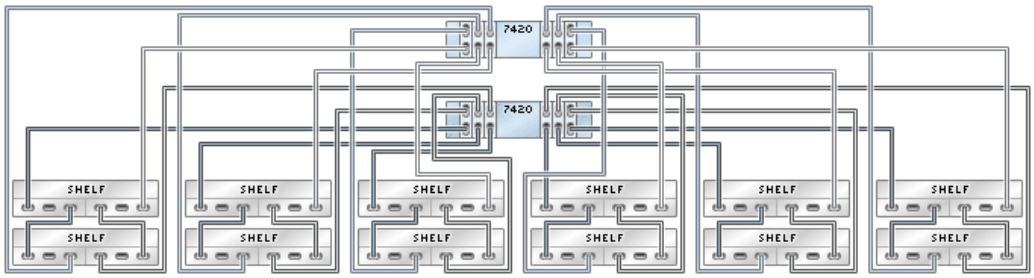
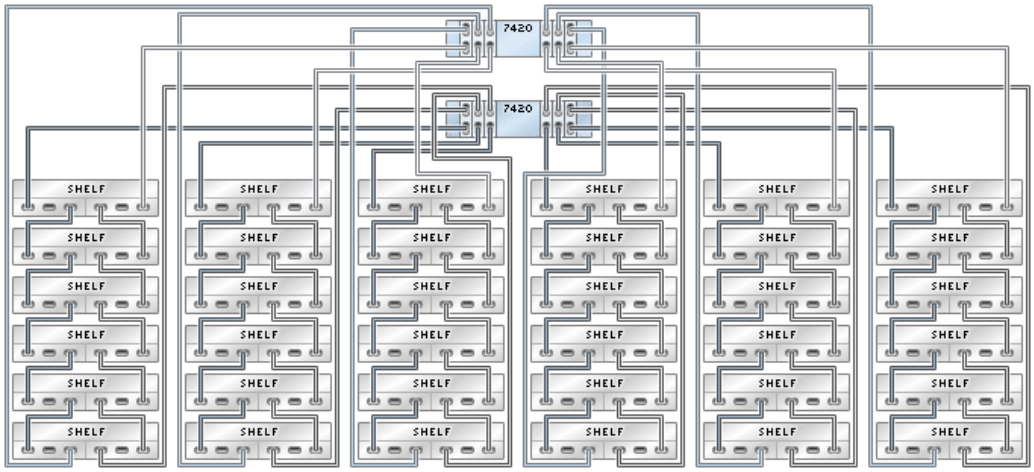


FIGURE 444 Clustered 7420 controllers with six HBAs connected to 36 Sun Disk Shelves in six chains



Cabling Sun Disk Shelves to 7320 Controllers

This section contains guidelines for properly cabling standalone and clustered 7320 controllers to Sun Disk Shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “7320 Standalone to Sun Disk Shelves” on page 289
- “7320 Clustered to Sun Disk Shelves” on page 290

7320 Standalone to Sun Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 standalone controllers with one HBA. To cable the controller to the disk shelves, see “Getting Started with Cabling” on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 445 Standalone 7320 controller with one HBA connected to one Sun Disk Shelf in a single chain

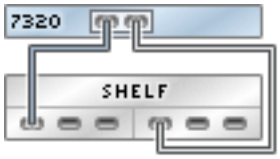


FIGURE 446 Standalone 7320 controller with one HBA connected to two Sun Disk Shelves in a single chain

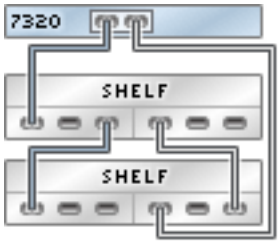
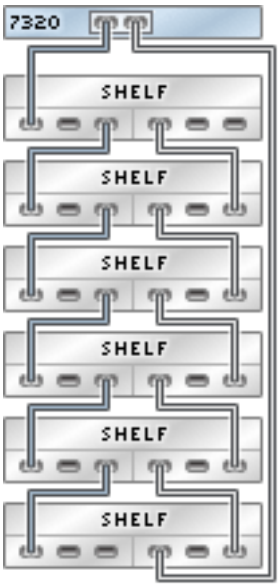


FIGURE 447 Standalone 7320 controller with one HBA connected to six Sun Disk Shelves in a single chain



7320 Clustered to Sun Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*.

FIGURE 448 Clustered 7320 controllers with one HBA connected to one Sun Disk Shelf in a single chain

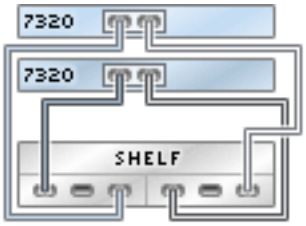


FIGURE 449 Clustered 7320 controllers with one HBA connected to two Sun Disk Shelves in a single chain

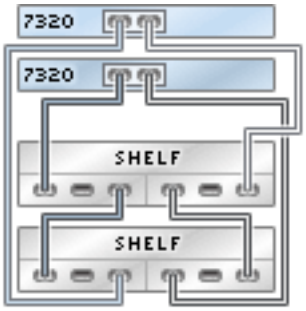
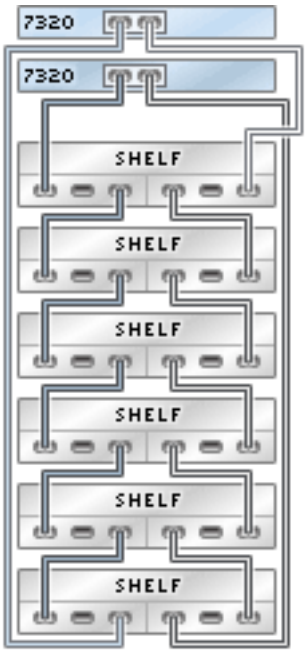


FIGURE 450 Clustered 7320 controllers with one HBA connected to six Sun Disk Shelves in a single chain



Cabling Sun Disk Shelves to 7120 Controllers

This section contains guidelines for properly cabling standalone 7120 controllers to Sun Disk Shelves. Use the diagrams in this section to connect to one or more disk shelves.

7120 Standalone to Sun Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7120 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Note - For hardware port locations, see the PCIe Options section in the Hardware Maintenance Overview for your controller model.

FIGURE 451 Standalone 7120 controller with one HBA connected to one Sun Disk Shelf in a single chain

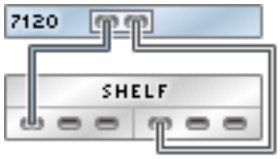
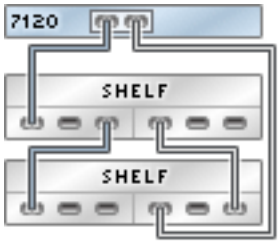


FIGURE 452 Standalone 7120 controller with one HBA connected to two Sun Disk Shelves in a single chain



Cabling Mixed DE3-24 and DE2-24 Disk Shelves

This section contains guidelines for properly cabling ZS5-4, ZS5-2, ZS4-4, and ZS3-2 controllers to DE3-24 and DE2-24 disk shelves.

To review these guidelines, see the following topics:

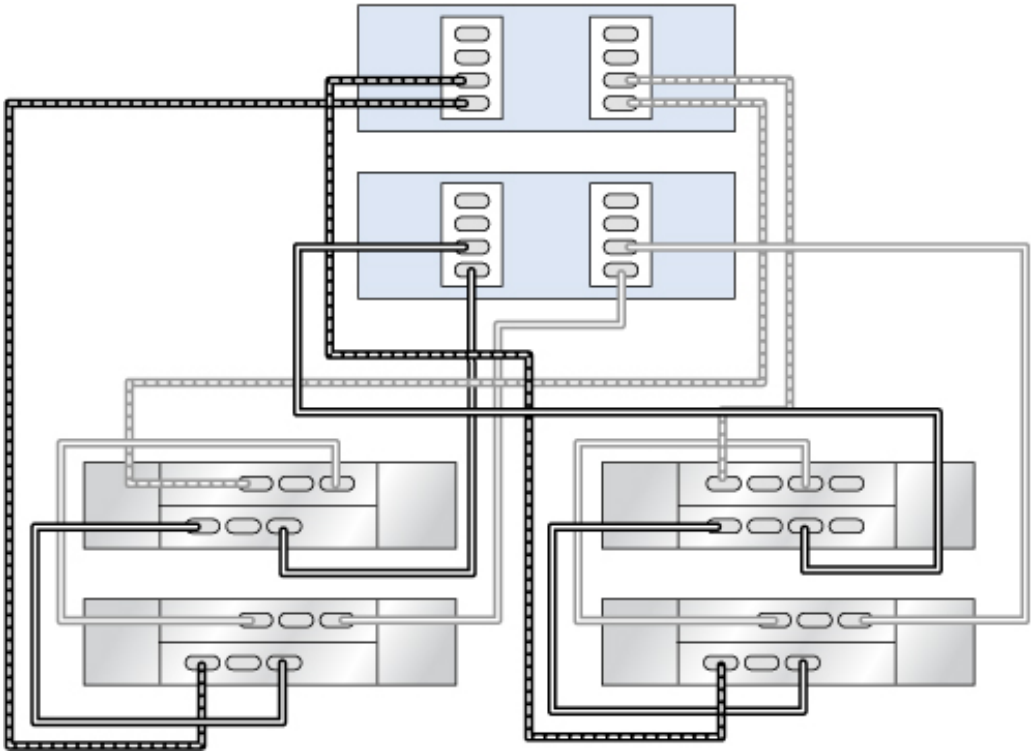
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-4 Controllers

Refer to the diagrams in this section to upgrade a system with DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports. See "Cabinet and Cabling Guidelines" on page 15 for disk shelf intermixing guidelines.

Note - Adding DE3-24 disk shelves uses SAS-3 cabling, but retains the SAS-2 legacy cabling methodology. Replacing SAS-2 HBAs with SAS-3 HBAs does not affect cabling interconnect.

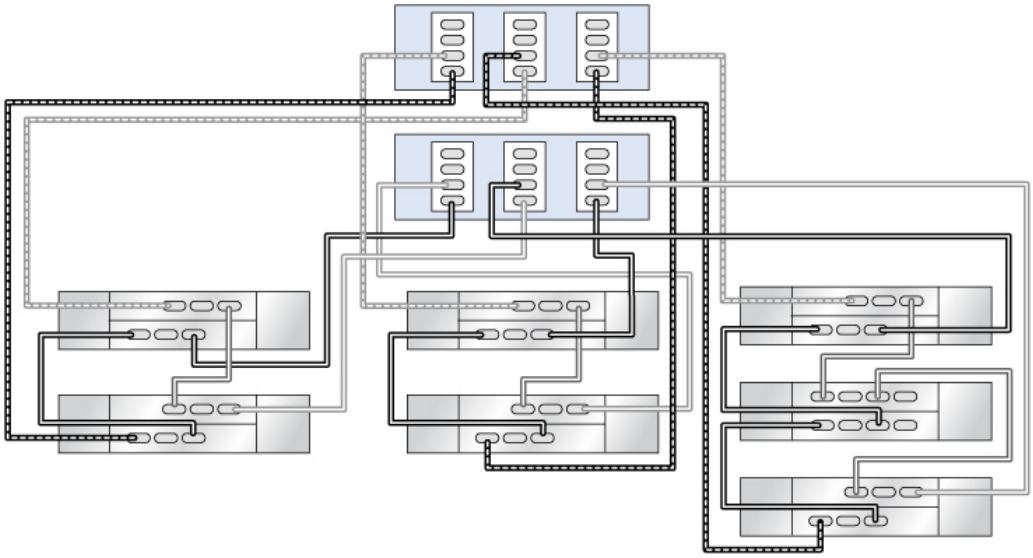
Upgrade - Replace DE2-24 with DE3-24 at Disk Chain End

FIGURE 453 Clustered ZS5-4 controllers with two HBAs connected to one DE3-24 and three DE2-24 in two chains



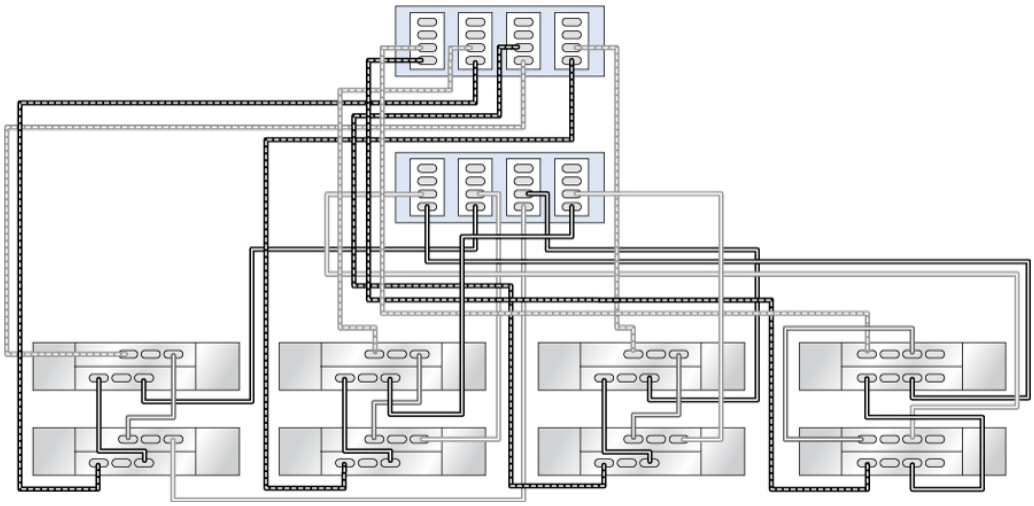
Upgrade - Replace DE2-24 with DE3-24 in Disk Chain Middle

FIGURE 454 Clustered ZS5-4 controllers with three HBAs connected to one DE3-24 and six DE2-24 in three chains



Upgrade - Add Exclusive DE3-24 Disk Chain

FIGURE 455 Clustered ZS5-4 controllers with four HBAs connected to two DE3-24 and six DE2-24 in four chains



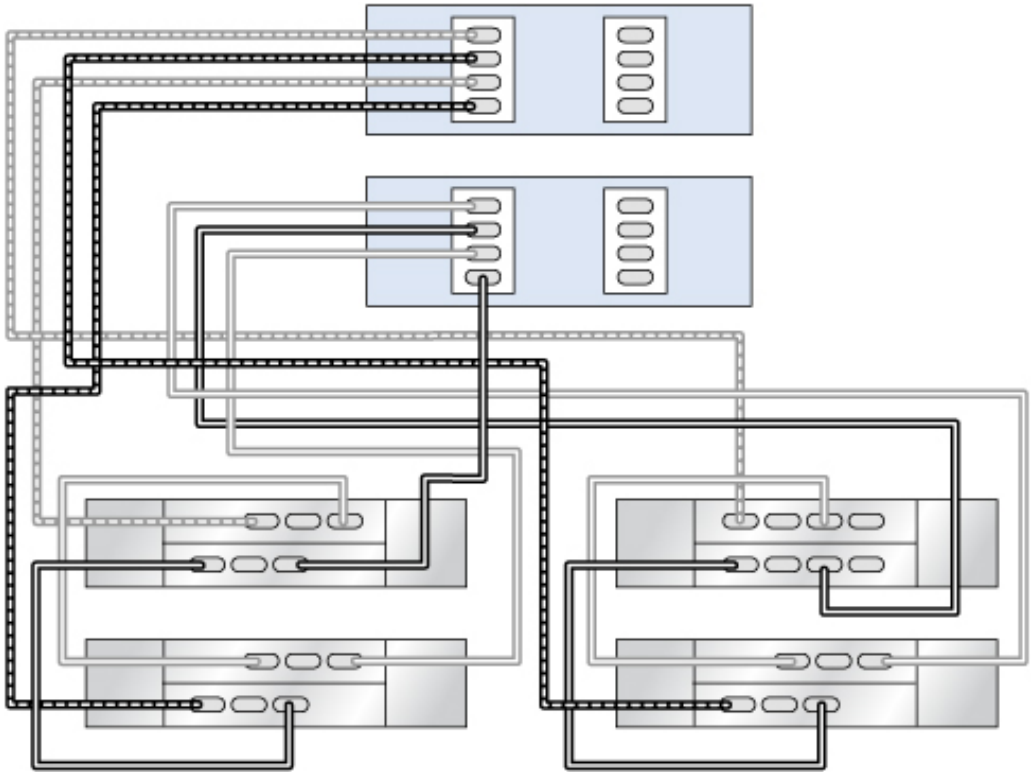
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-2 Controllers

Refer to the diagrams in this section to upgrade a system DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports. See “Cabinet and Cabling Guidelines” on page 15 for disk shelf intermixing guidelines.

Note - Adding DE3-24 disk shelves uses SAS-3 cabling, but retains the SAS-2 legacy cabling methodology. Replacing SAS-2 HBAs with SAS-3 HBAs does not affect cabling interconnect.

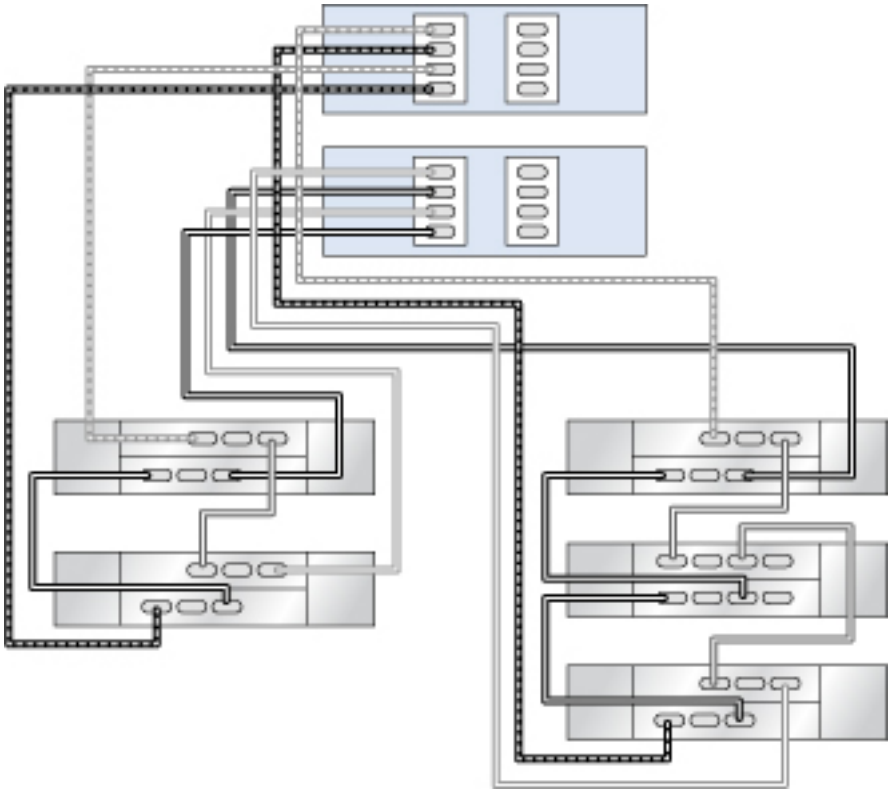
Upgrade - Replace DE2-24 with DE3-24 at Disk Chain End

FIGURE 456 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 and three DE2-24 in two chains



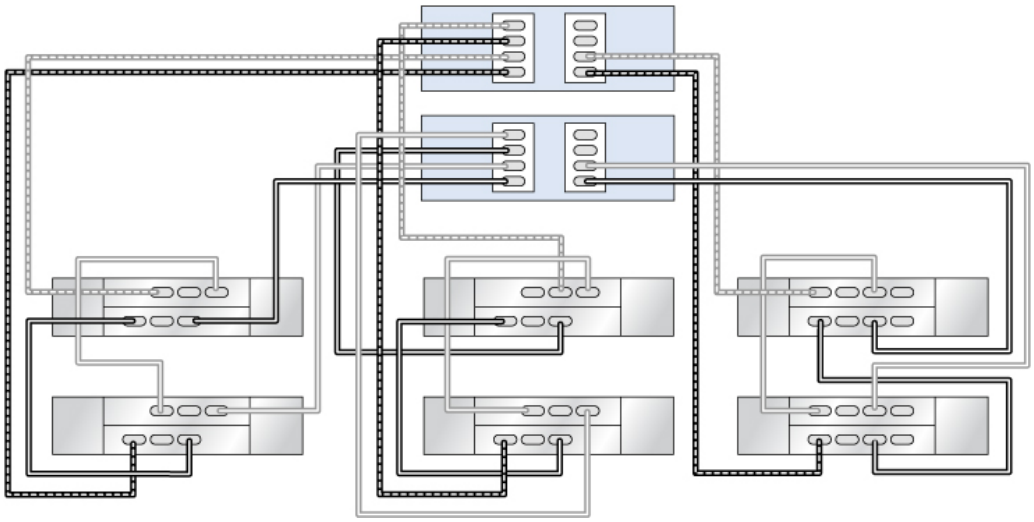
Upgrade - Replace DE2-24 with DE3-24 in Disk Chain Middle

FIGURE 457 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 and four DE2-24 in two chains



Upgrade - Add Exclusive DE3-24 Disk Chain

FIGURE 458 Clustered ZS5-2 controllers with two HBAs connected to two DE3-24 and four DE2-24 in three chains



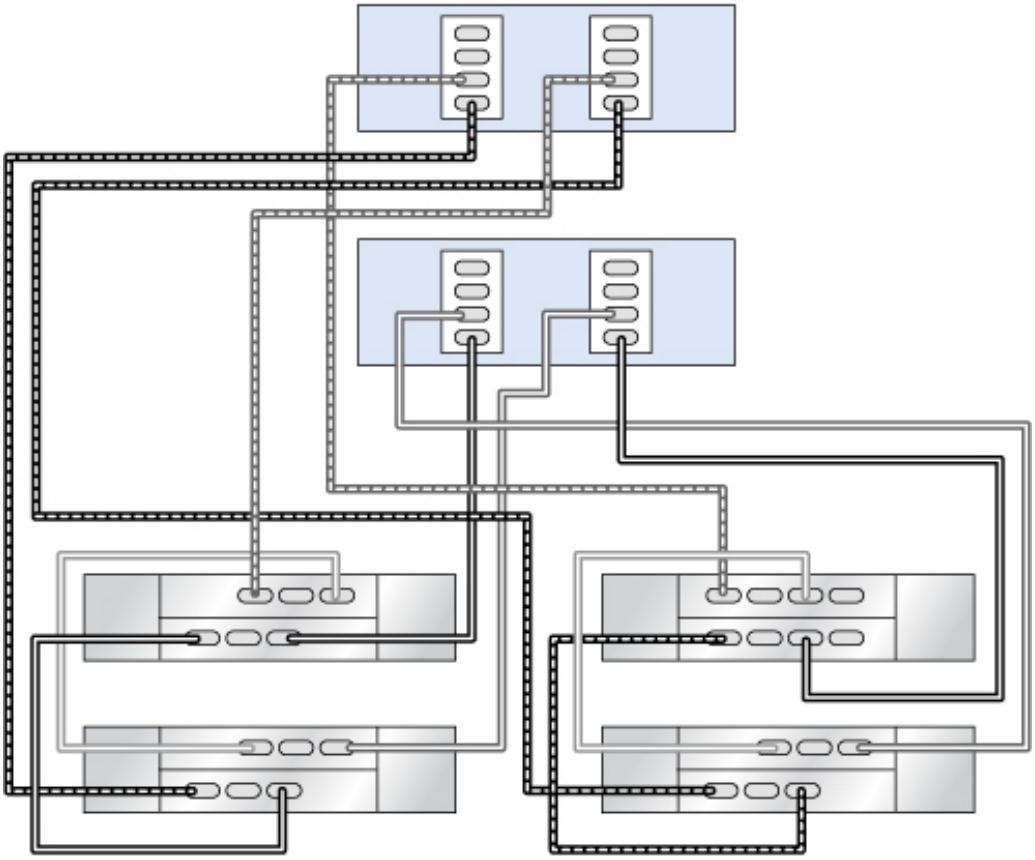
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS4-4 Controllers

Refer to the diagrams in this section to upgrade a system DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports. See “Cabinet and Cabling Guidelines” on page 15 for disk shelf intermixing guidelines.

Note - Adding DE3-24 disk shelves uses SAS-3 cabling, but retains the SAS-2 legacy cabling methodology. Replacing SAS-2 HBAs with SAS-3 HBAs does not affect cabling interconnect.

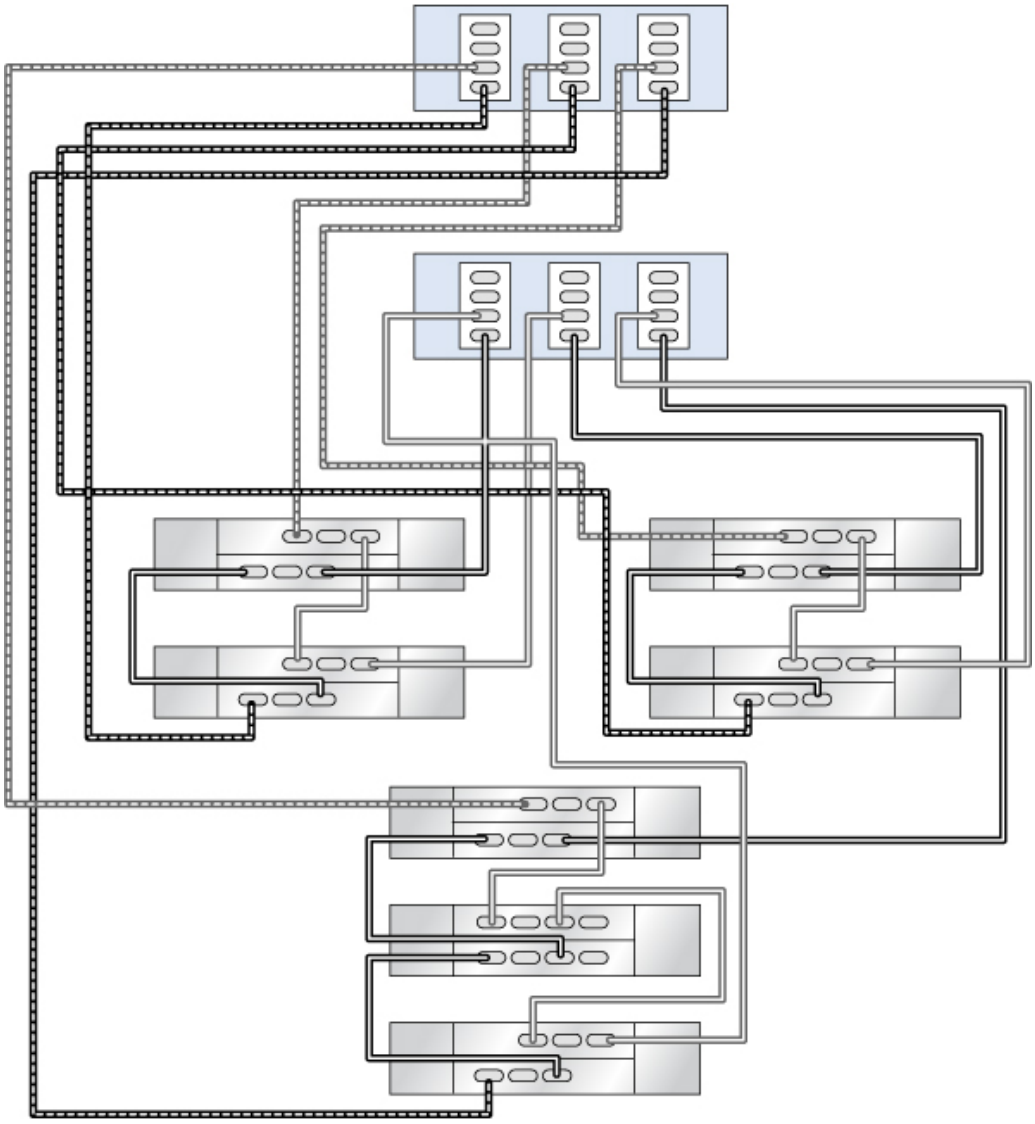
Upgrade - Replace DE2-24 with DE3-24 at Disk Chain End

FIGURE 459 Clustered ZS4-4 controllers with two HBAs connected to one DE3-24 and three DE2-24 in two chains



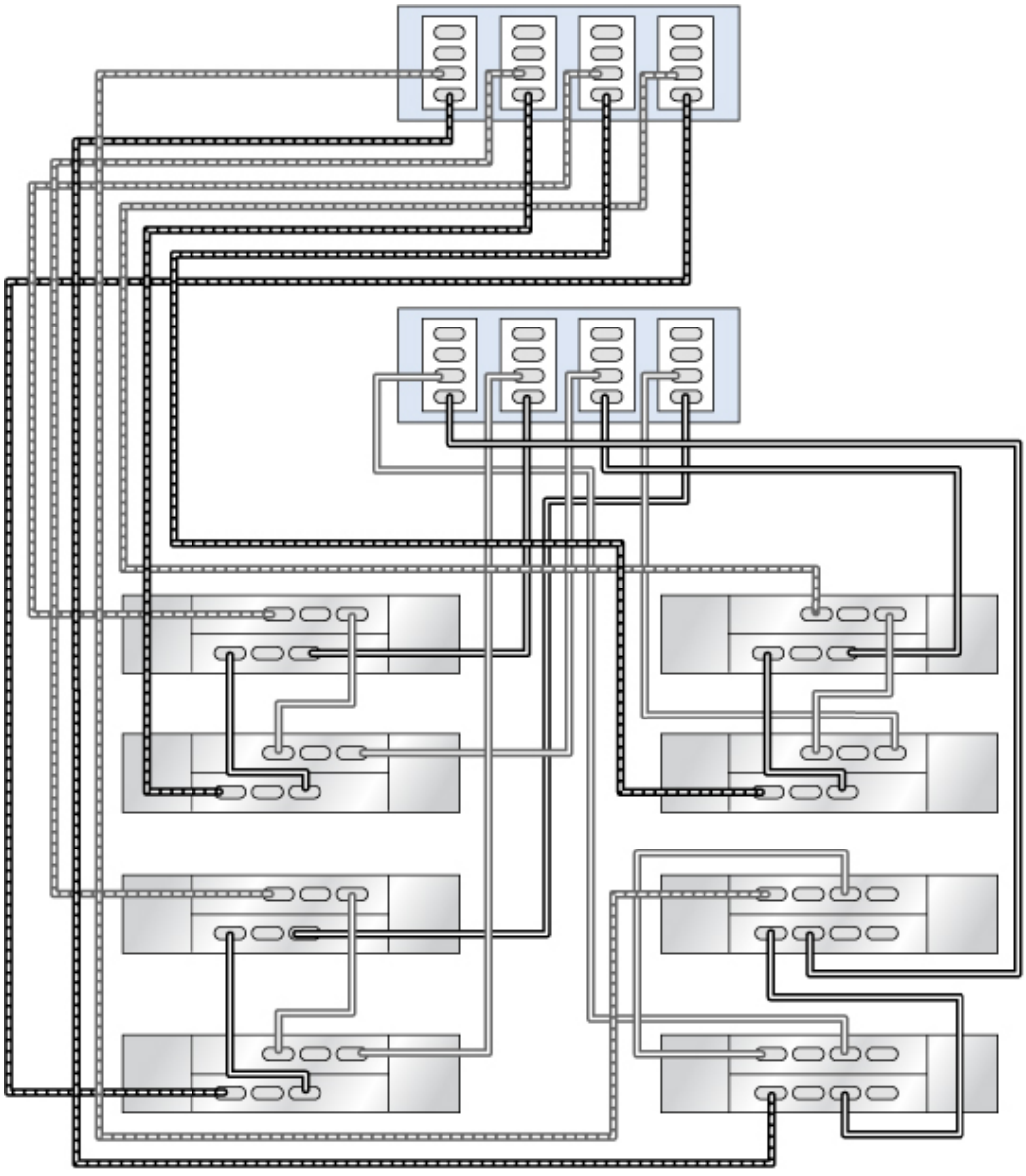
Upgrade - Replace DE2-24 with DE3-24 in Disk Chain Middle

FIGURE 460 Clustered ZS4-4 controllers with three HBAs connected to one DE3-24 and six DE2-24 in three chains



Upgrade - Add Exclusive DE3-24 Disk Chain

FIGURE 461 Clustered ZS4-4 controllers with four HBAs connected to two DE3-24 and six DE2-24 in four chains



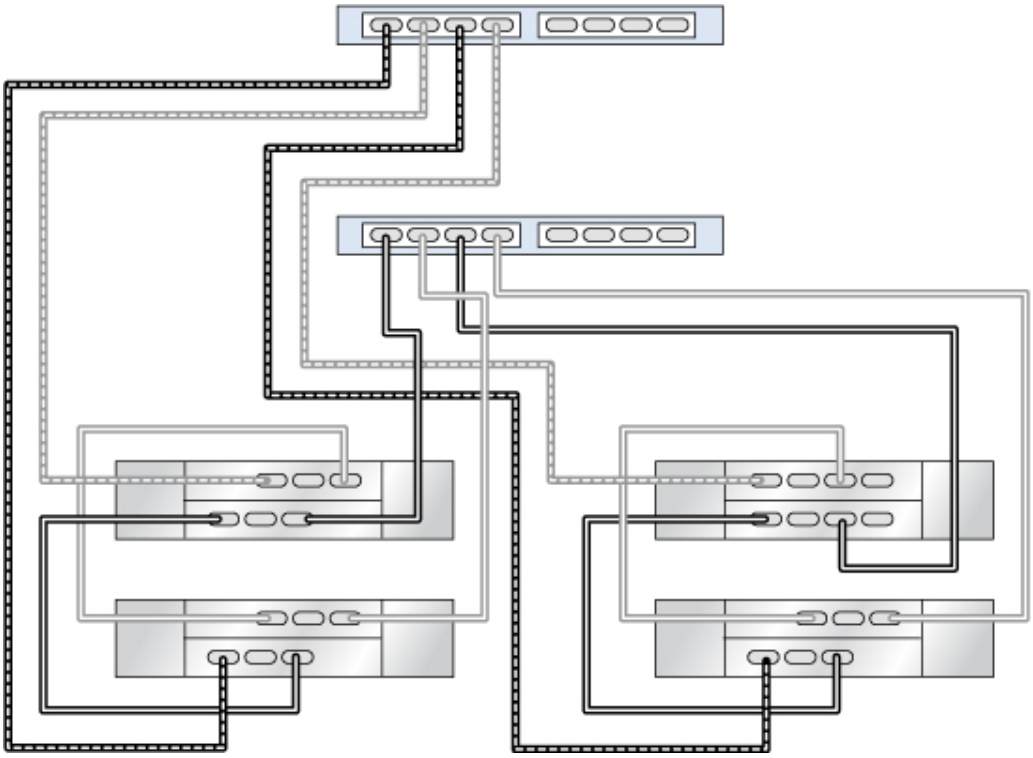
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS3-2 Controllers

Refer to the diagrams in this section to upgrade a system DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports. See “Cabinet and Cabling Guidelines” on page 15 for disk shelf intermixing guidelines.

Note - Adding DE3-24 disk shelves uses SAS-3 cabling, but retains the SAS-2 legacy cabling methodology. Replacing SAS-2 HBAs with SAS-3 HBAs does not affect cabling interconnect.

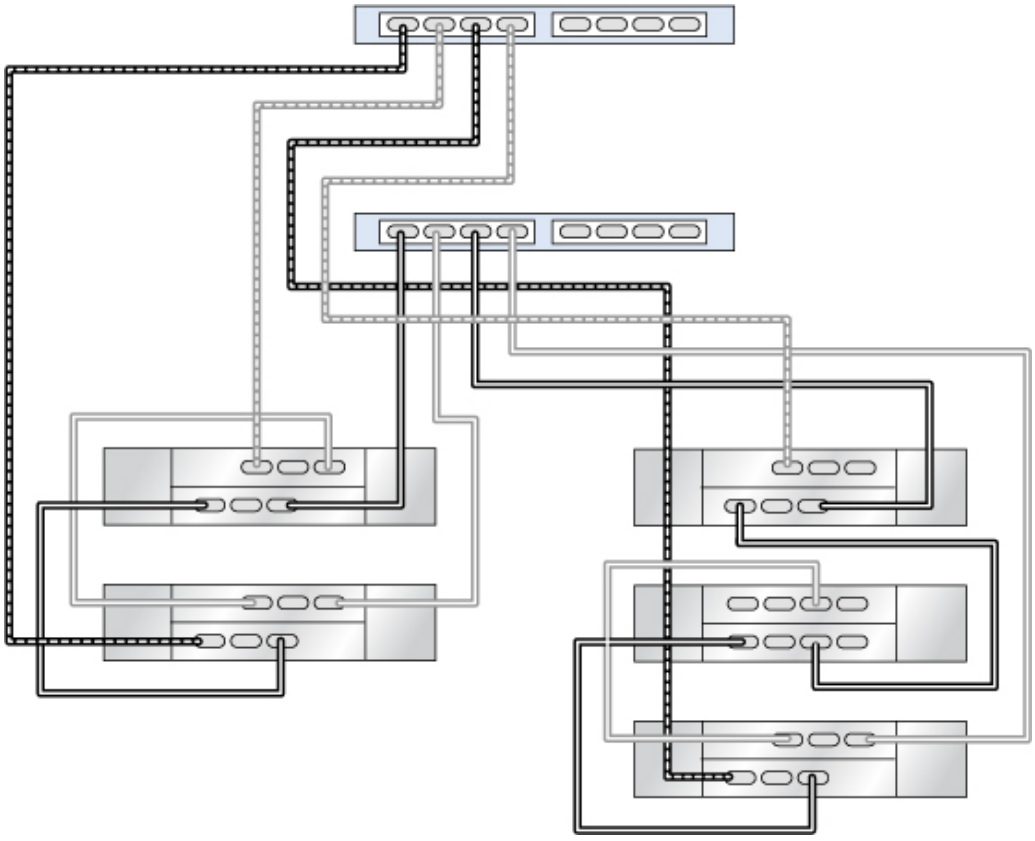
Upgrade - Replace DE2-24 with DE3-24 at Disk Chain End

FIGURE 462 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 and three DE2-24 in two chains



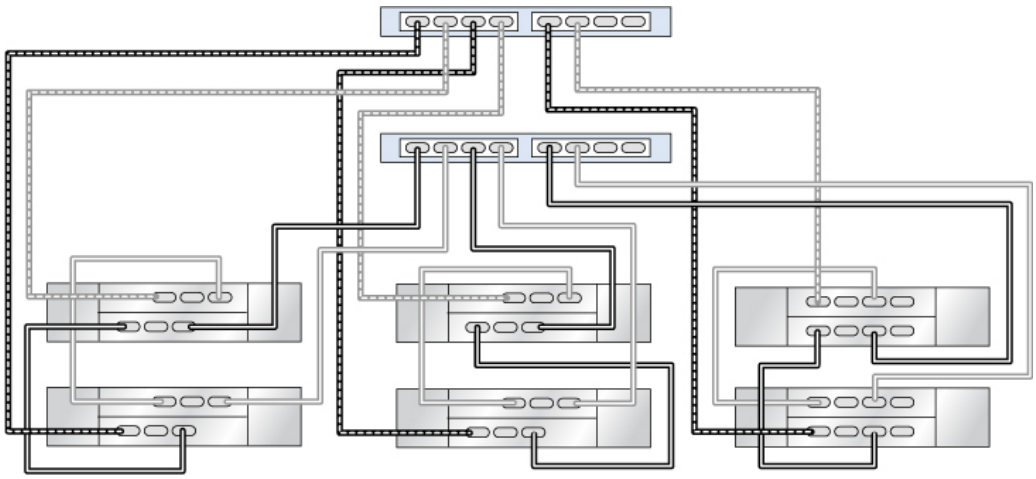
Upgrade - Replace DE2-24 with DE3-24 in Disk Chain Middle

FIGURE 463 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 and four DE2-24 in two chains



Upgrade - Add Exclusive DE3-24 Disk Chain

FIGURE 464 Clustered ZS3-2 controllers with two HBAs connected to two DE3-24 and four DE2-24 in three chains



Cabling Mixed DE2-24 and Sun Disk Shelves

This section contains guidelines for properly cabling standalone and clustered ZS3-4, ZS3-2, 7420, 7320, and 7120 controllers to DE2-24 and Sun Disk Shelves.

To review these guidelines, see the following topics:

Cabling DE2-24 and Sun Disk Shelves to ZS3-4 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS3-4 controllers to DE2-24 and Sun Disk Shelves. You can attach mixed disk shelf types behind the same controllers, but each chain must contain only the same disk shelf type. Directly connecting different disk shelf types is not supported.

To connect to one or more disk shelves, use the diagrams in the following topics:

ZS3-4 Standalone to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 465 Standalone ZS3-4 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

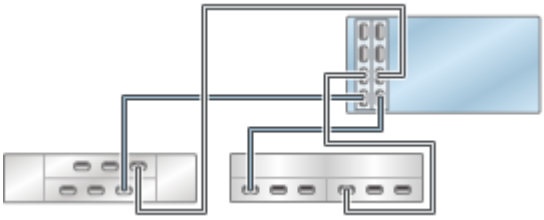


FIGURE 466 Standalone ZS3-4 controllers with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

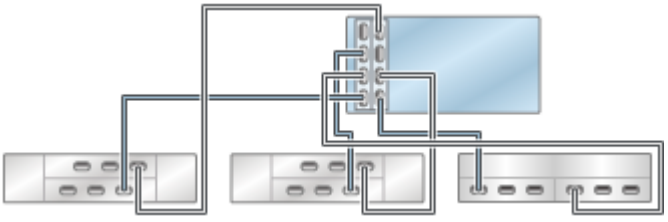


FIGURE 467 Standalone ZS3-4 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

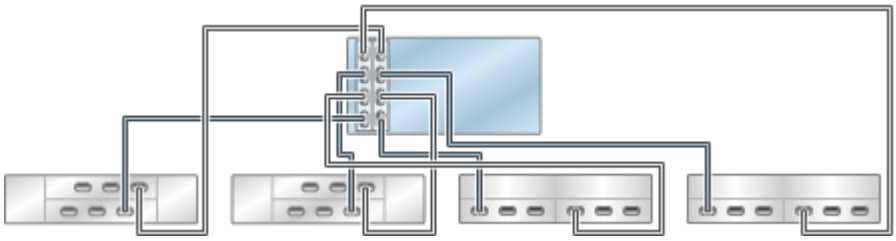


FIGURE 468 Standalone ZS3-4 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

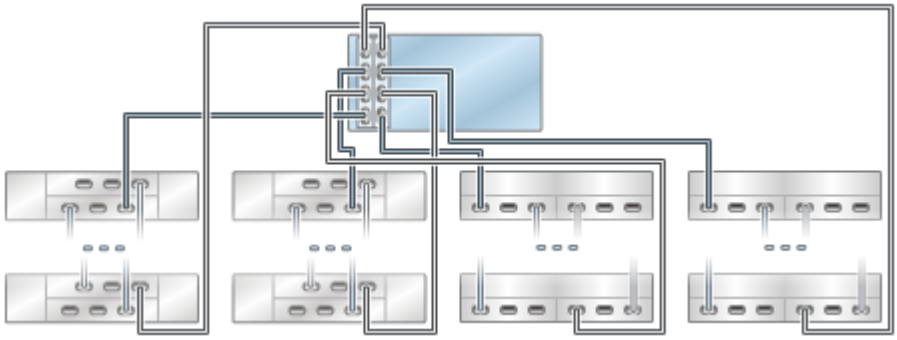


FIGURE 469 Multiple DE2-24 disk shelves in a single chain

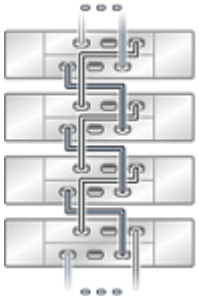
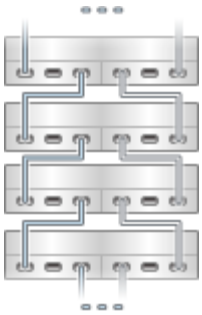


FIGURE 470 Multiple Sun Disk Shelves in a single chain



ZS3-4 Standalone to Mixed Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 471 Standalone ZS3-4 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

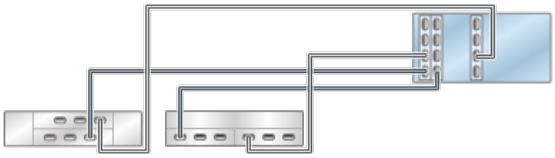


FIGURE 472 Standalone ZS3-4 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

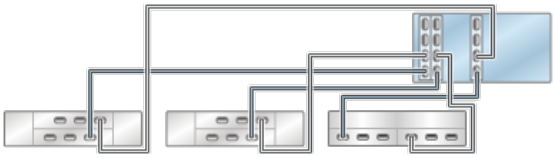


FIGURE 473 Standalone ZS3-4 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

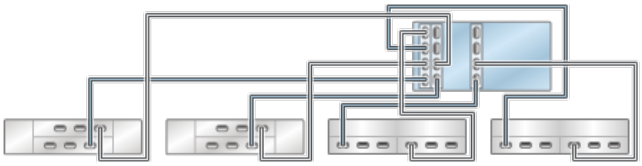


FIGURE 474 Standalone ZS3-4 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

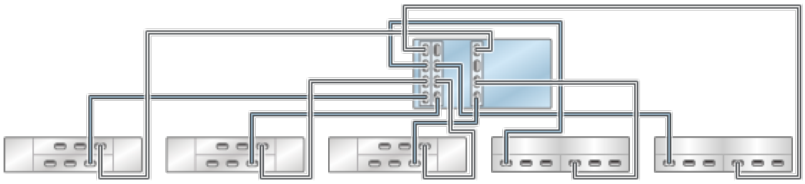


FIGURE 475 Standalone ZS3-4 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

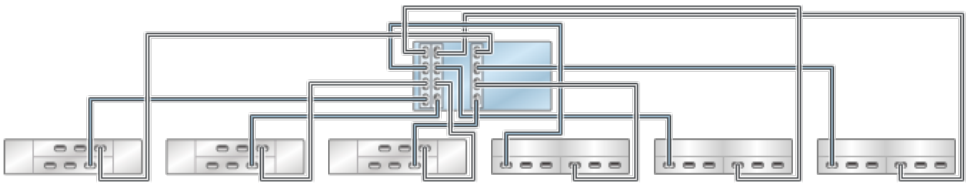


FIGURE 476 Standalone ZS3-4 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

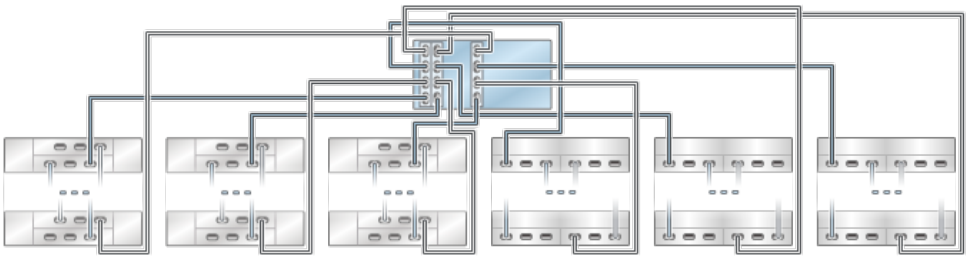


FIGURE 477 Multiple DE2-24 disk shelves in a single chain

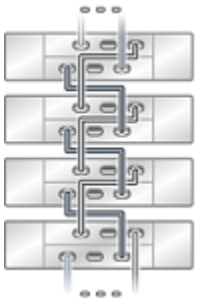
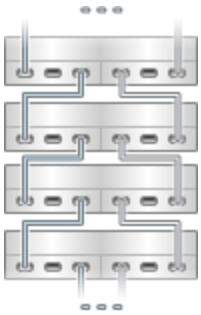


FIGURE 478 Multiple Sun Disk Shelves in a single chain



ZS3-4 Standalone to Mixed Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 479 Standalone ZS3-4 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

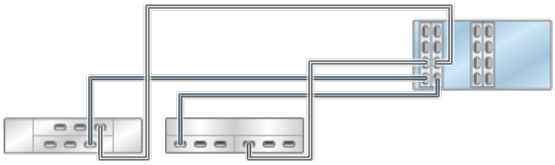


FIGURE 480 Standalone ZS3-4 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

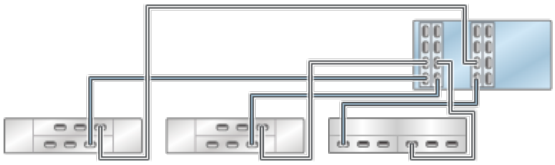


FIGURE 481 Standalone ZS3-4 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

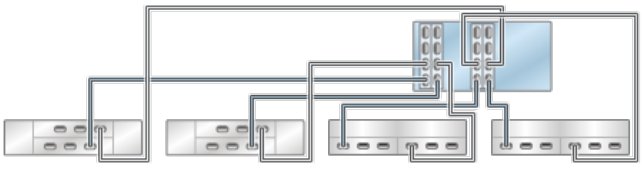


FIGURE 482 Standalone ZS3-4 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

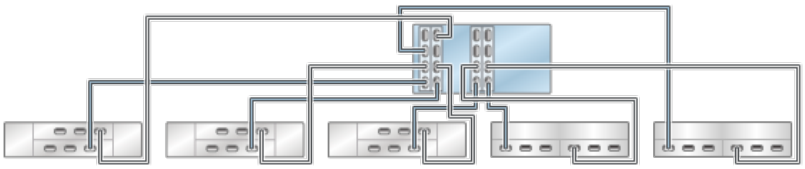


FIGURE 483 Standalone ZS3-4 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

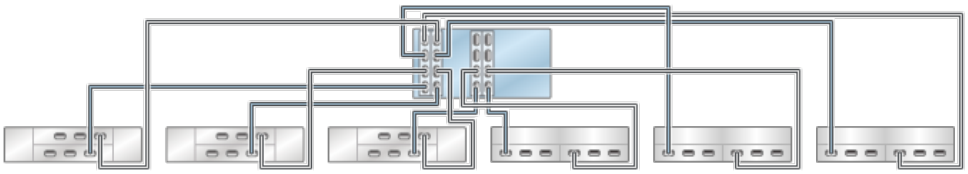


FIGURE 484 Standalone ZS3-4 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

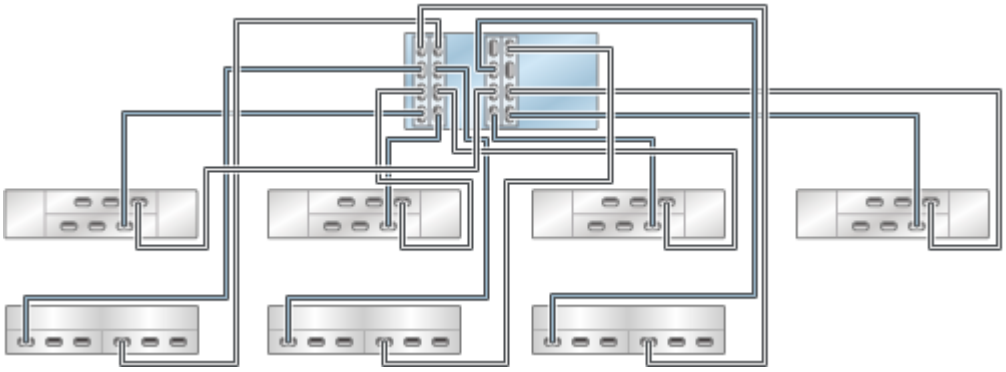


FIGURE 485 Standalone ZS3-4 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

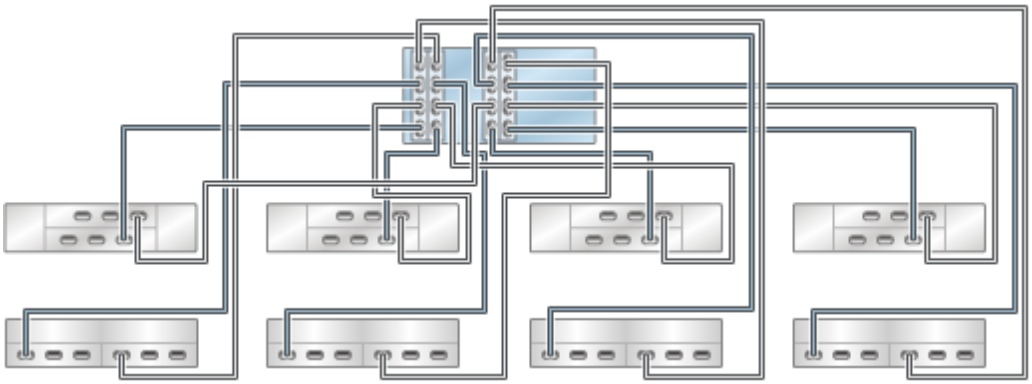


FIGURE 486 Standalone ZS3-4 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

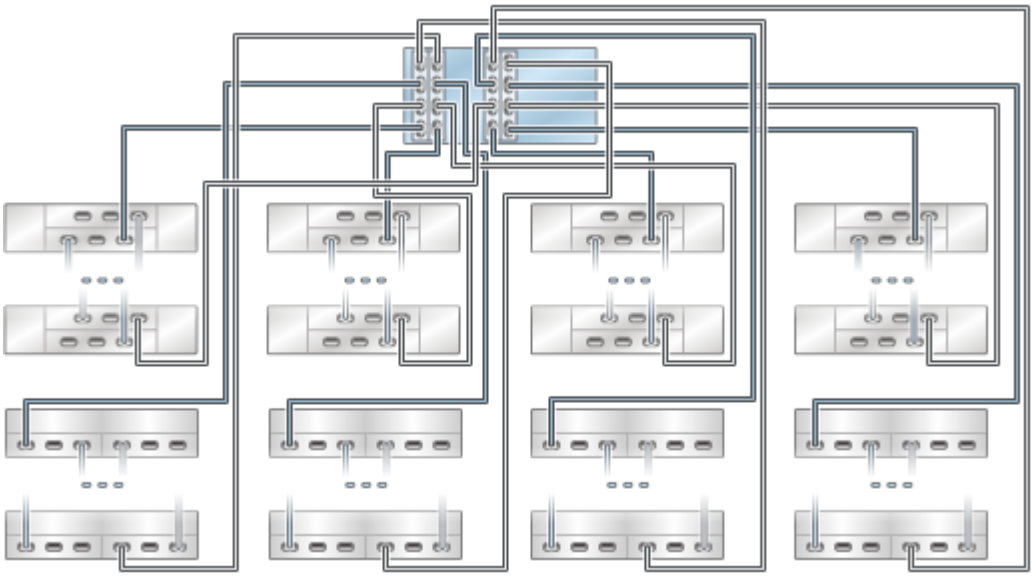


FIGURE 487 Multiple DE2-24 disk shelves in a single chain

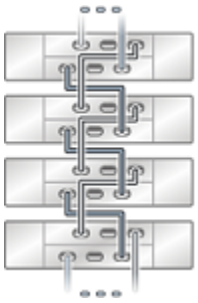
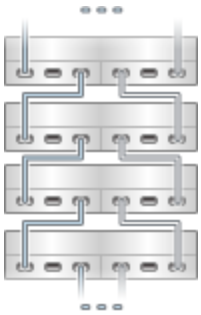


FIGURE 488 Multiple Sun Disk Shelves in a single chain



ZS3-4 Clustered to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 489 Clustered ZS3-4 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

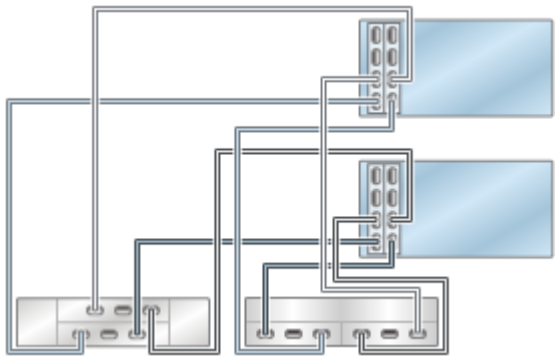


FIGURE 490 Clustered ZS3-4 controllers with two HBAs connected to three mixed disk shelves in two chains (DE2-24 shown on the left)

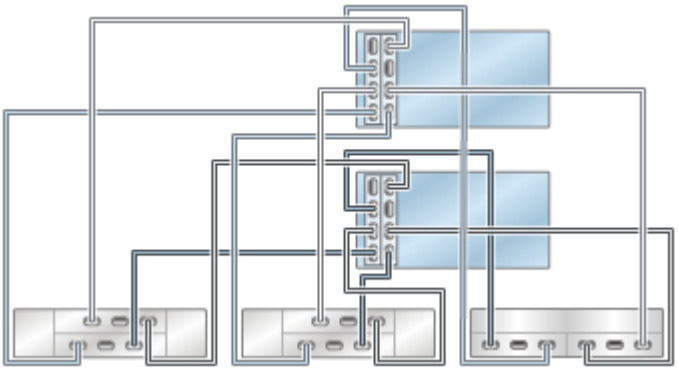


FIGURE 491 Clustered ZS3-4 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

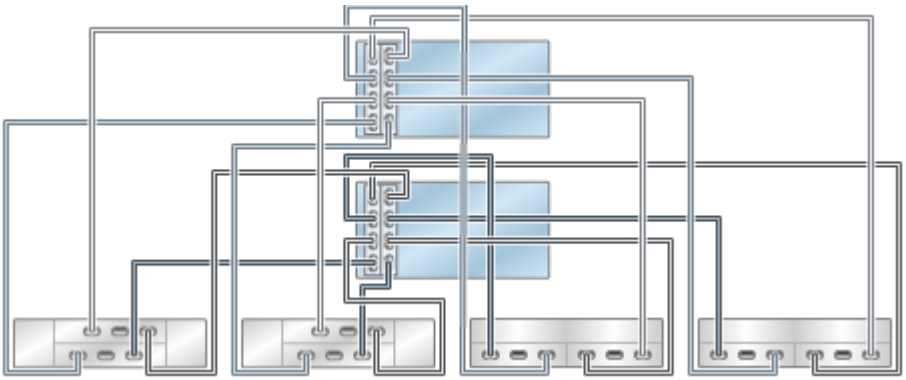


FIGURE 492 Clustered ZS3-4 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

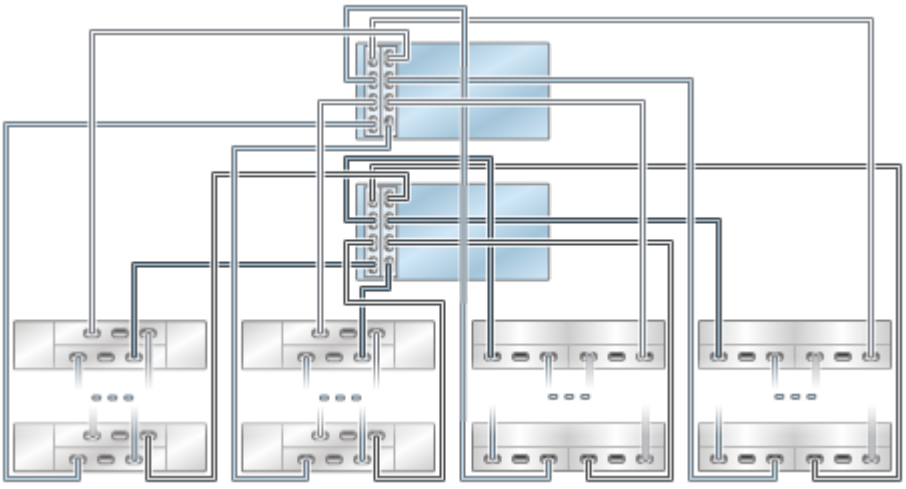


FIGURE 493 Multiple DE2-24 disk shelves in a single chain

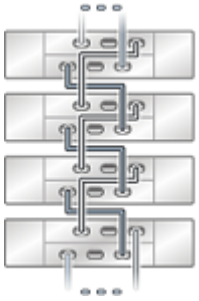
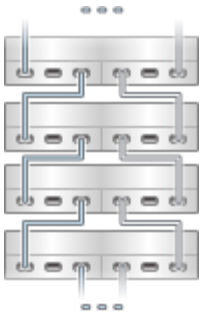


FIGURE 494 Multiple Sun Disk Shelves in a single chain



ZS3-4 Clustered to Mixed Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 495 Clustered ZS3-4 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

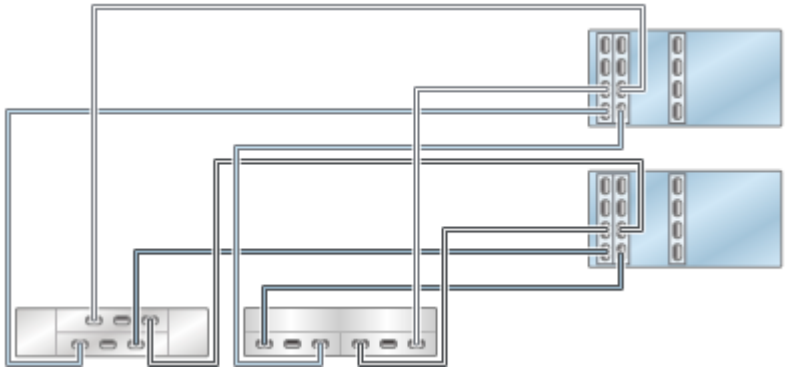


FIGURE 496 Clustered ZS3-4 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

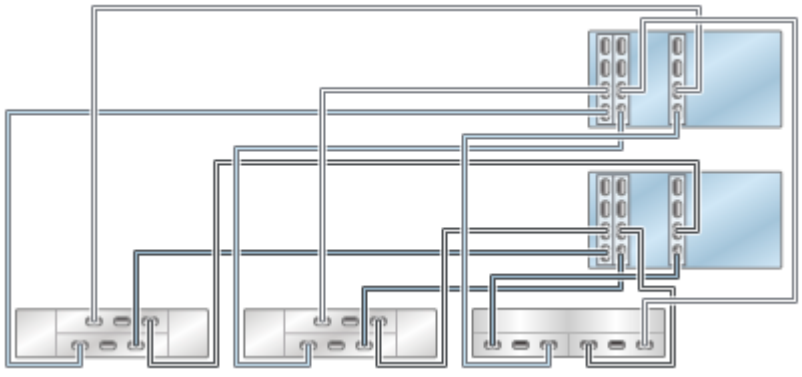


FIGURE 497 Clustered ZS3-4 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

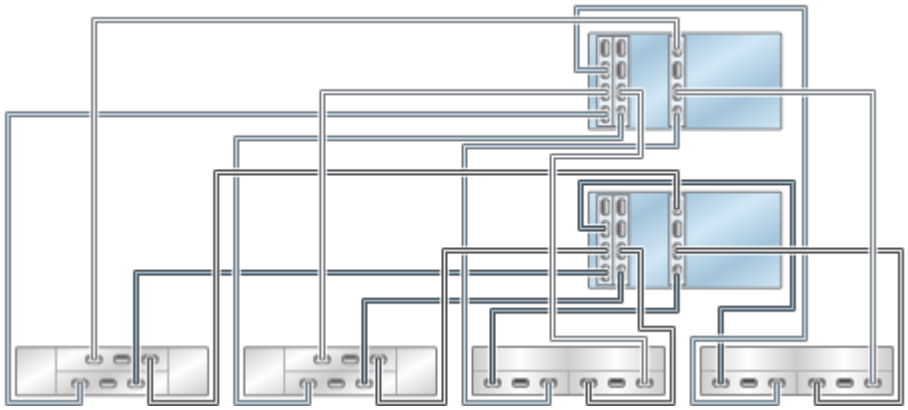


FIGURE 498 Clustered ZS3-4 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

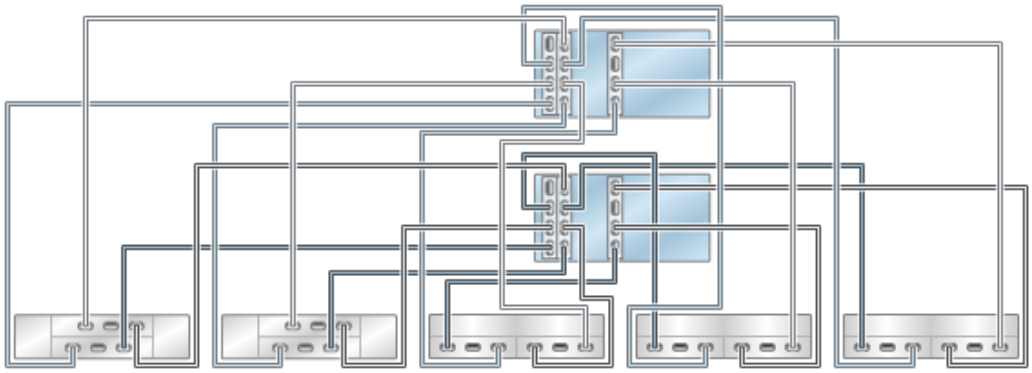


FIGURE 499 Clustered ZS3-4 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

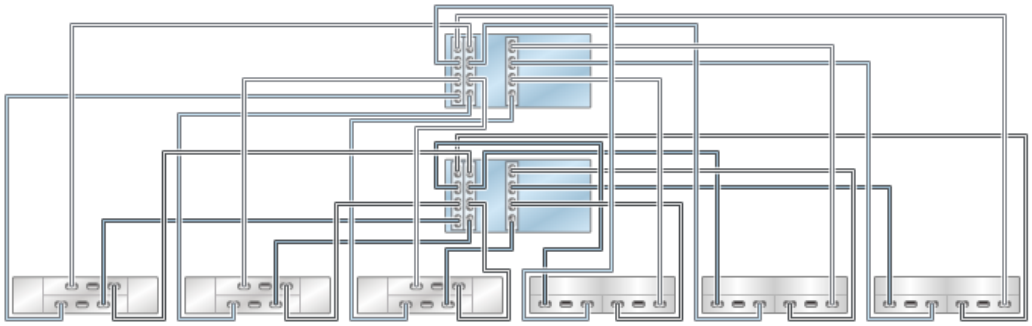


FIGURE 500 Clustered ZS3-4 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

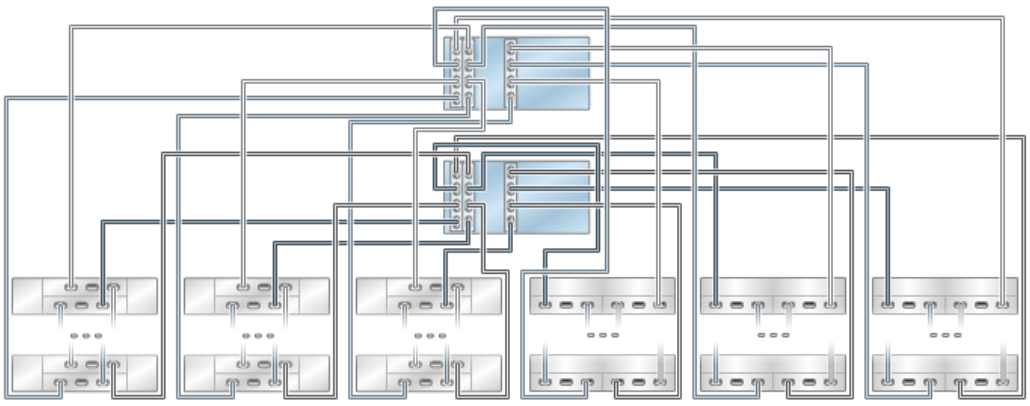


FIGURE 501 Multiple DE2-24 disk shelves in a single chain

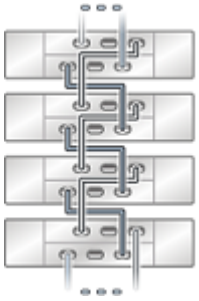
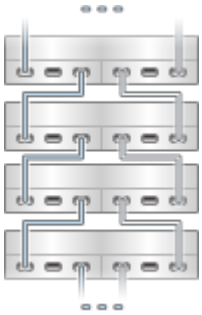


FIGURE 502 Multiple Sun Disk Shelves in a single chain



ZS3-4 Clustered to Mixed Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-4 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 503 Clustered ZS3-4 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

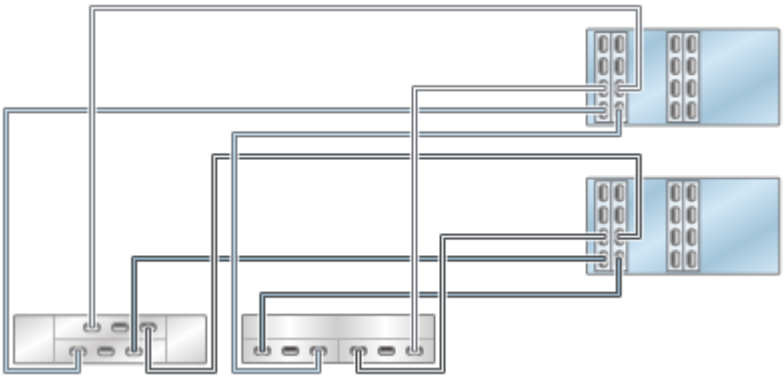


FIGURE 504 Clustered ZS3-4 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

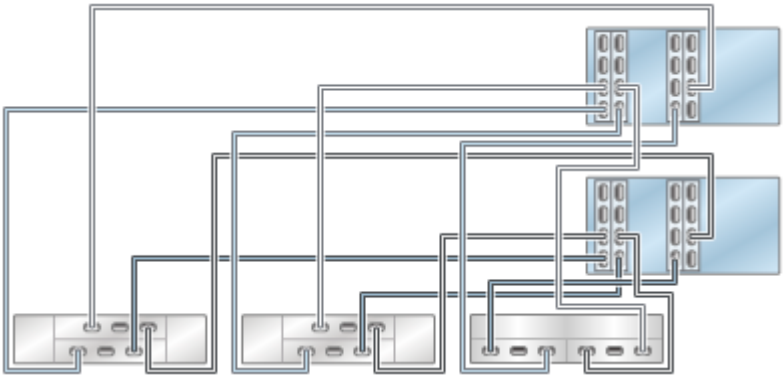


FIGURE 505 Clustered ZS3-4 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

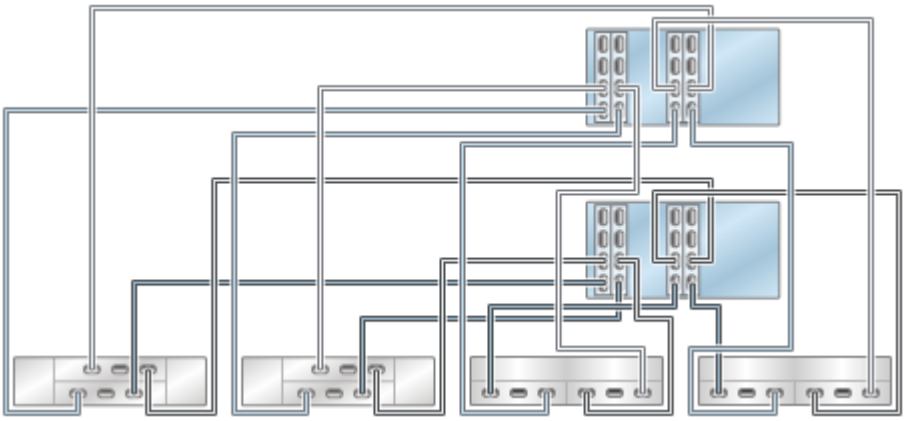


FIGURE 506 Clustered ZS3-4 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

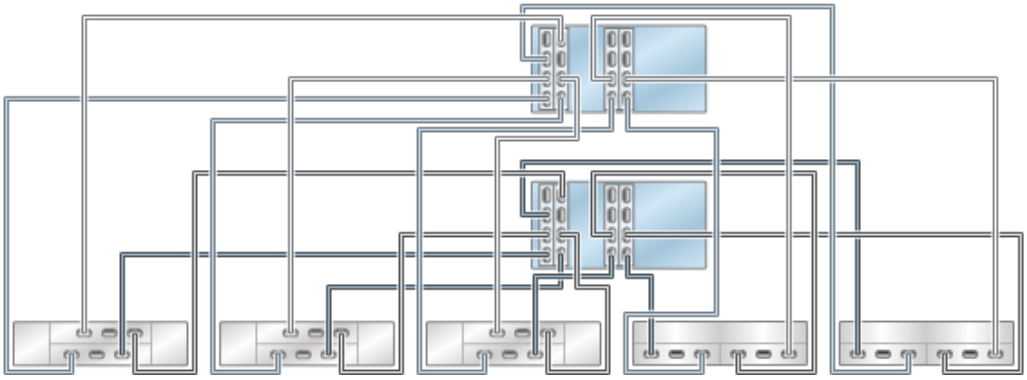


FIGURE 507 Clustered ZS3-4 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

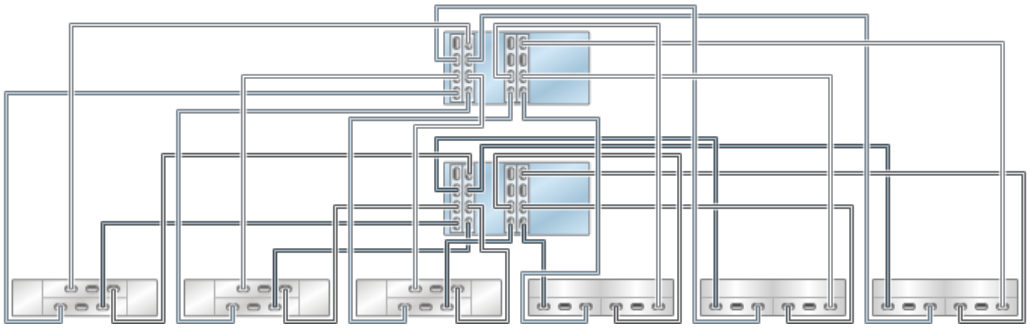


FIGURE 508 Clustered ZS3-4 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

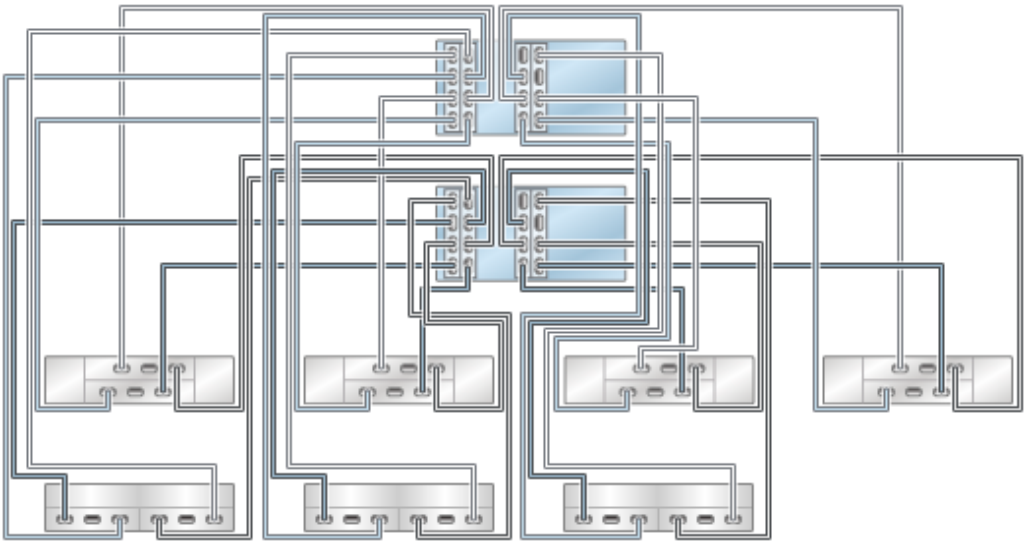


FIGURE 509 Clustered ZS3-4 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

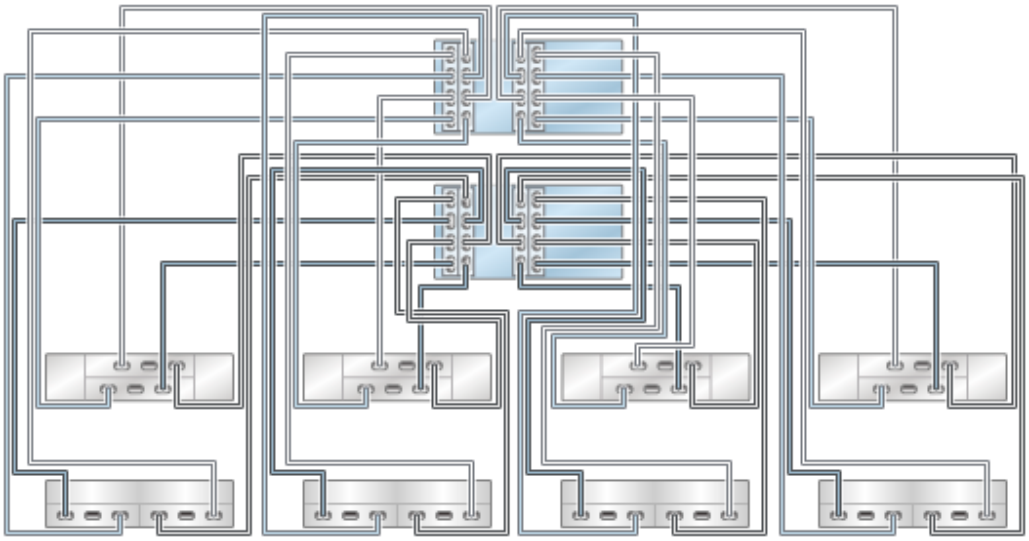


FIGURE 510 Clustered ZS3-4 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

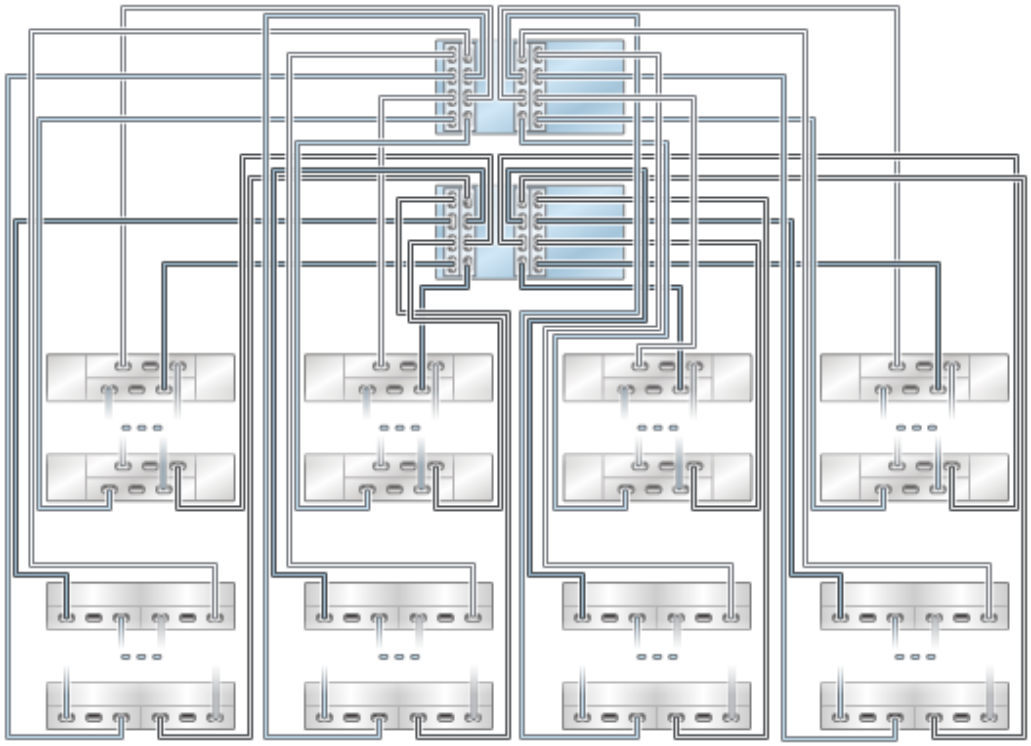


FIGURE 511 Multiple DE2-24 disk shelves in a single chain

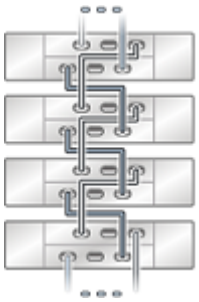
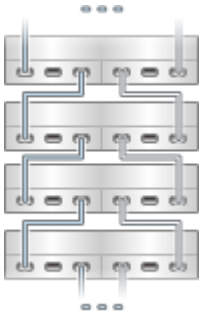


FIGURE 512 Multiple Sun Disk Shelves in a single chain



Cabling DE2-24 and Sun Disk Shelves to ZS3-2 Controllers

This section contains guidelines for properly cabling standalone and clustered ZS3-2 controllers to DE2-24 and Sun Disk Shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “ZS3-2 Standalone to Mixed Disk Shelves (1 HBA)” on page 333
- “ZS3-2 Standalone to Mixed Disk Shelves (2 HBAs)” on page 334
- “ZS3-2 Clustered to Mixed Disk Shelves (1 HBA)” on page 337

- "ZS3-2 Clustered to Mixed Disk Shelves (2 HBAs)" on page 339

ZS3-2 Standalone to Mixed Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 513 Standalone ZS3-2 controller with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

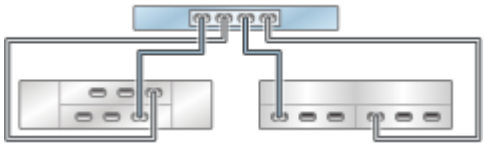


FIGURE 514 Standalone ZS3-2 controller with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

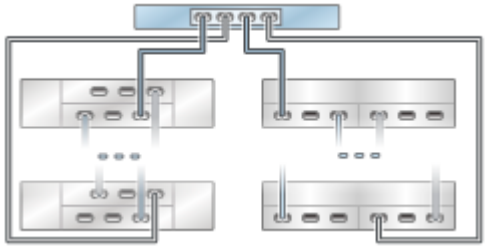


FIGURE 515 Multiple DE2-24 disk shelves in a single chain

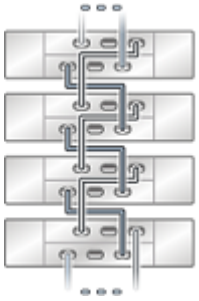
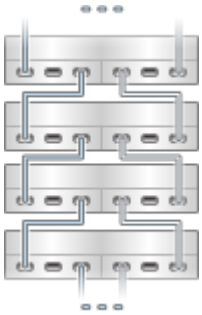


FIGURE 516 Multiple Sun Disk Shelves in a single chain



ZS3-2 Standalone to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 517 Standalone ZS3-2 controller with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

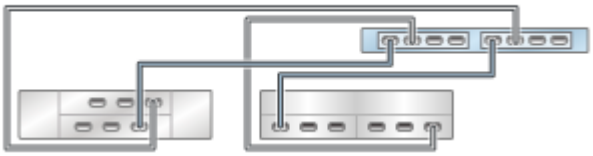


FIGURE 518 Standalone ZS3-2 controller with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

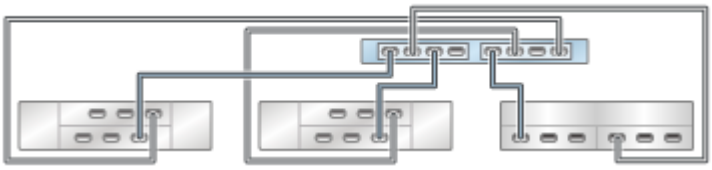


FIGURE 519 Standalone ZS3-2 controller with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

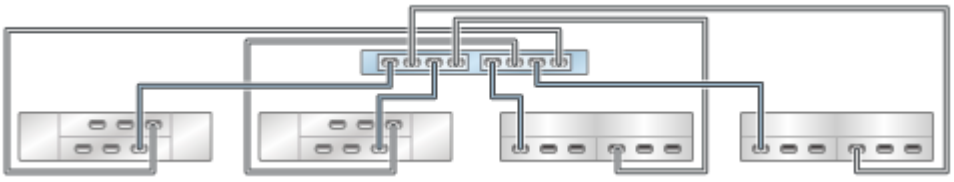


FIGURE 520 Standalone ZS3-2 controller with two HBAs connected to eight mixed disk shelves in four chains (DE2-24 shown on the left)

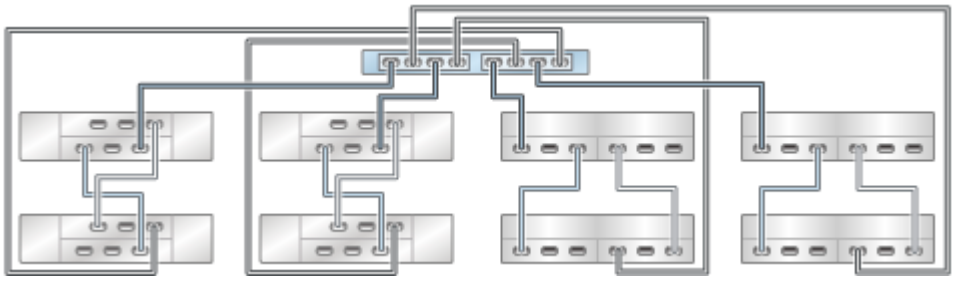


FIGURE 521 Multiple DE2-24 disk shelves in a single chain

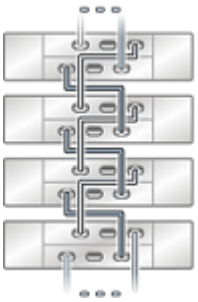
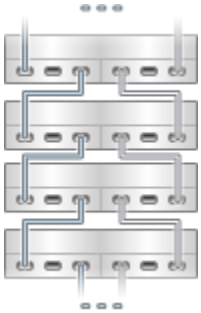


FIGURE 522 Multiple Sun Disk Shelves in a single chain



ZS3-2 Clustered to Mixed Disk Shelves (1 HBA)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 523 Clustered ZS3-2 controllers with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

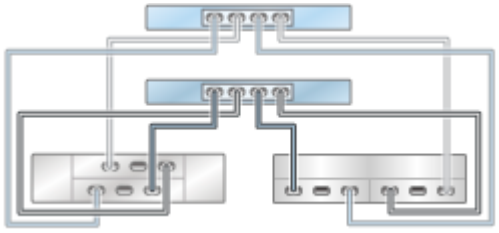


FIGURE 524 Clustered ZS3-2 controllers with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

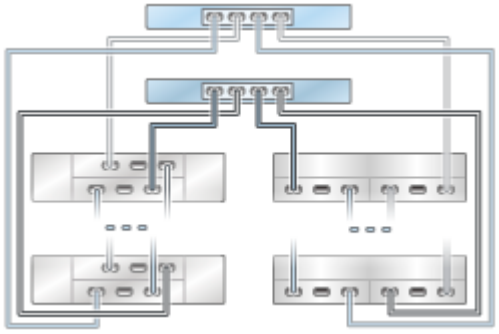


FIGURE 525 Multiple DE2-24 disk shelves in a single chain

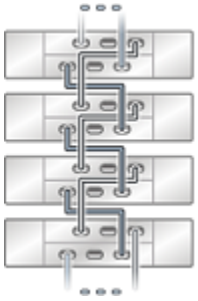
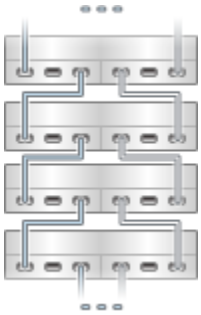


FIGURE 526 Multiple Sun Disk Shelves in a single chain



ZS3-2 Clustered to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS3-2 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 527 Clustered ZS3-2 controller with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

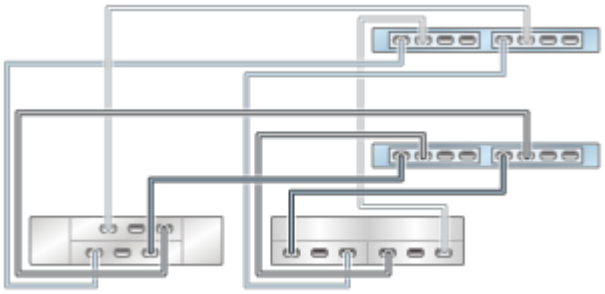


FIGURE 528 Clustered ZS3-2 controller with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

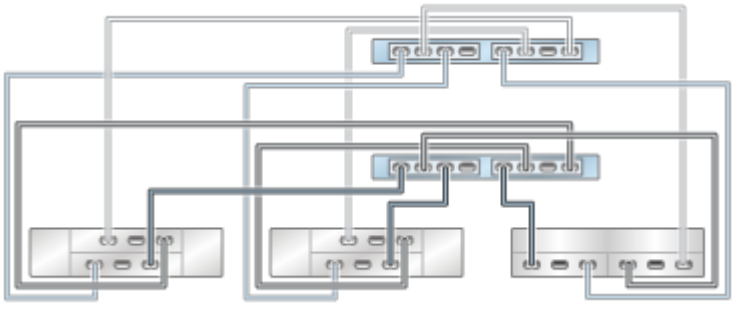


FIGURE 529 Clustered ZS3-2 controller with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

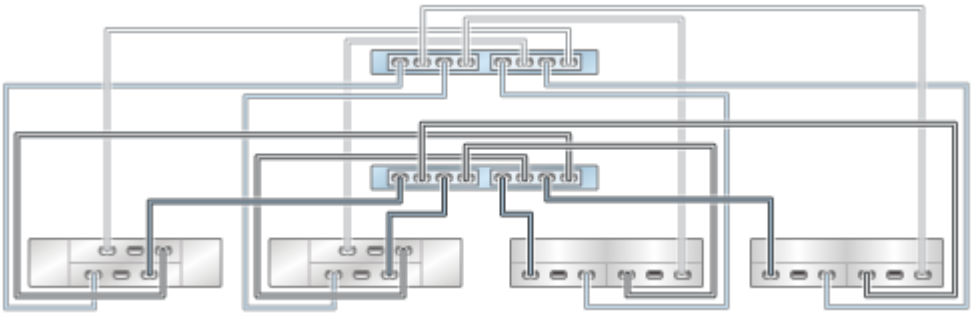


FIGURE 530 Clustered ZS3-2 controller with two HBAs connected to eight mixed disk shelves in four chains (DE2-24 shown on the left)

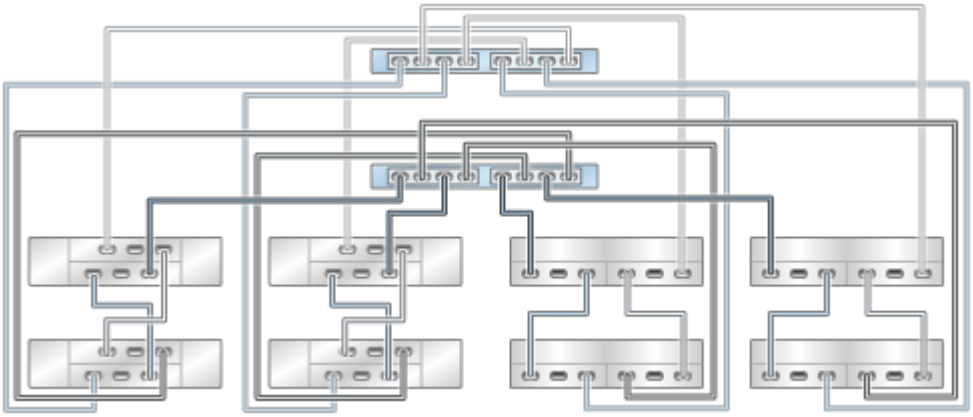


FIGURE 531 Multiple DE2-24 disk shelves in a single chain

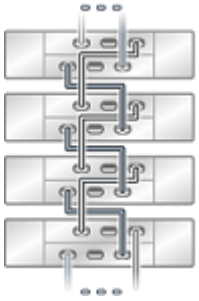
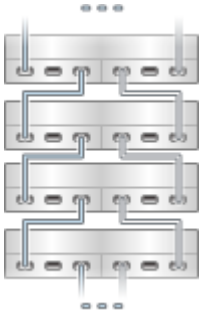


FIGURE 532 Multiple Sun Disk Shelves in a single chain



Cabling DE2-24 and Sun Disk Shelves to 7420 Controllers

This section contains guidelines for properly cabling standalone and clustered 7420 controllers to DE2-24 and Sun Disk Shelves. Use the diagrams in this section to connect to one or more disk shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “7420 Standalone to Mixed Disk Shelves (2 HBAs)” on page 343

7420 Standalone to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 533 Standalone 7420 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

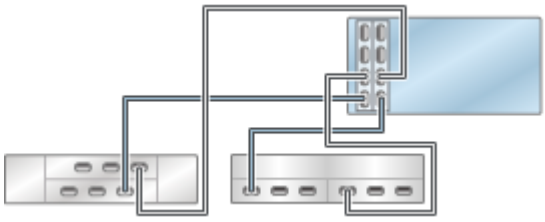


FIGURE 534 Standalone 7420 controllers with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

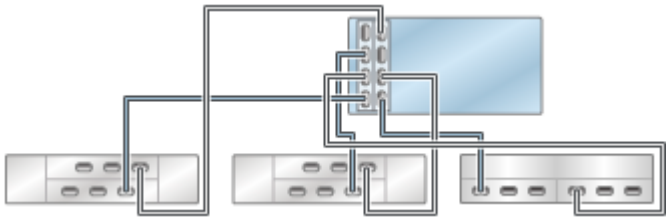


FIGURE 535 Standalone 7420 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

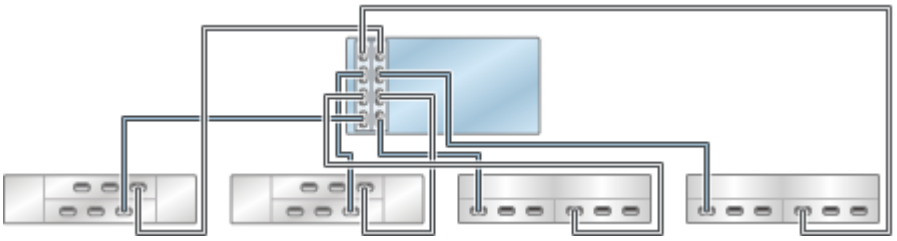


FIGURE 536 Standalone 7420 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

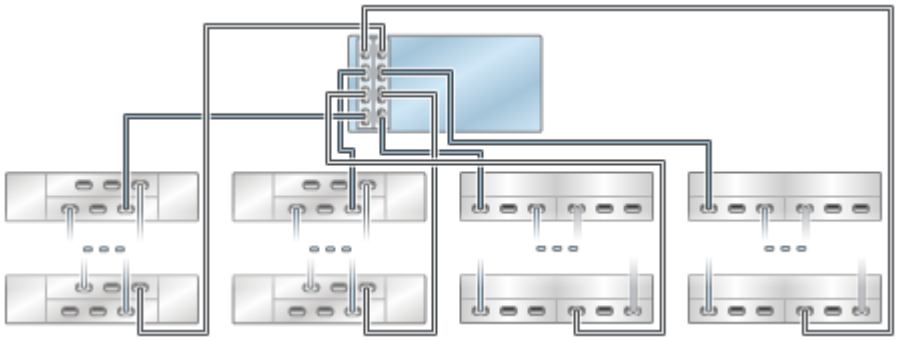


FIGURE 537 Multiple DE2-24 disk shelves in a single chain

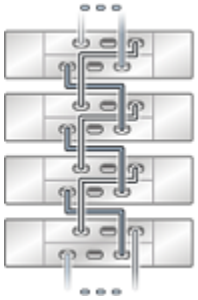
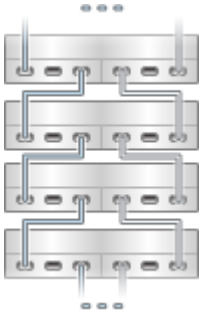


FIGURE 538 Multiple Sun Disk Shelves in a single chain



7420 Standalone to Mixed Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 539 Standalone 7420 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

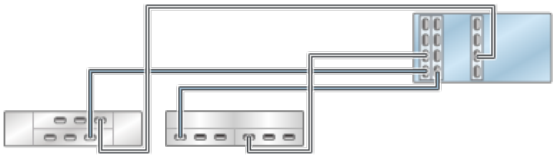


FIGURE 540 Standalone 7420 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

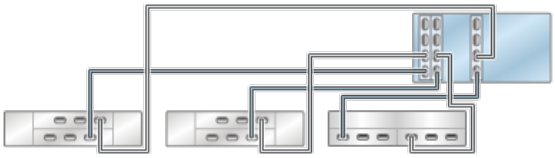


FIGURE 541 Standalone 7420 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

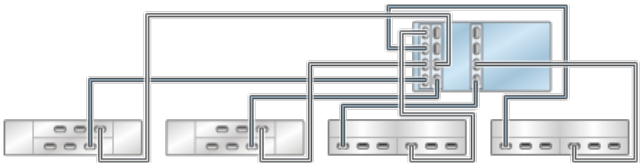


FIGURE 542 Standalone 7420 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

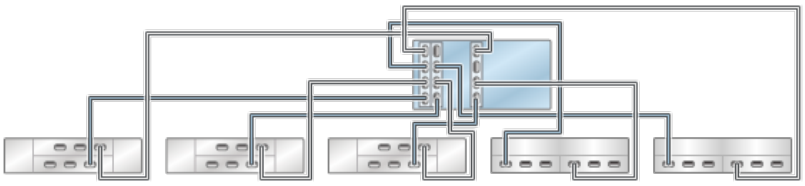


FIGURE 543 Standalone 7420 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

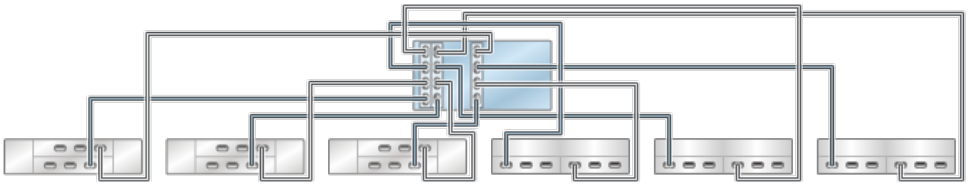


FIGURE 544 Standalone 7420 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

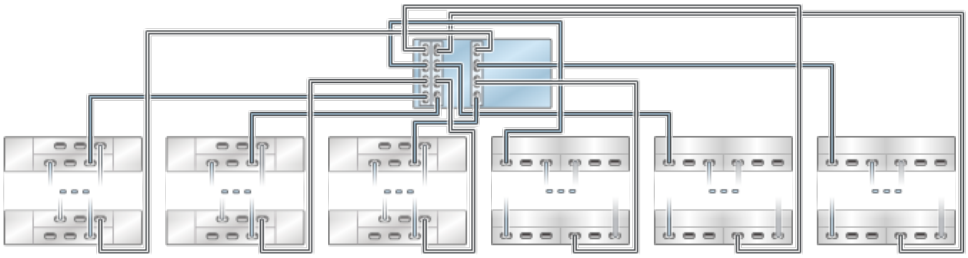


FIGURE 545 Multiple DE2-24 disk shelves in a single chain

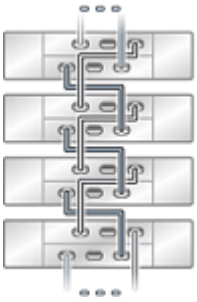
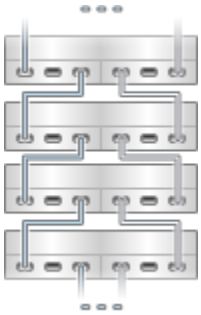


FIGURE 546 Multiple Sun Disk Shelves in a single chain



7420 Standalone to Mixed Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 standalone controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 547 Standalone 7420 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

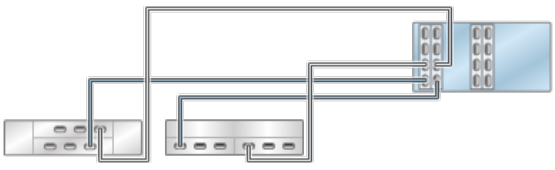


FIGURE 548 Standalone 7420 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

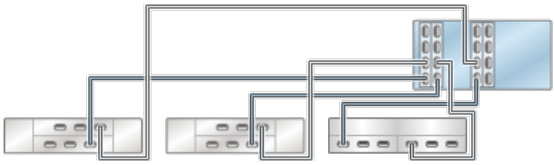


FIGURE 549 Standalone 7420 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

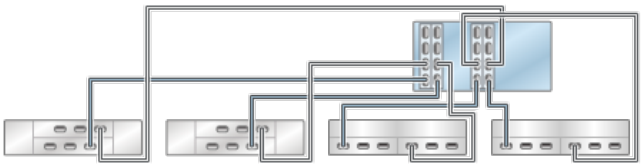


FIGURE 550 Standalone 7420 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

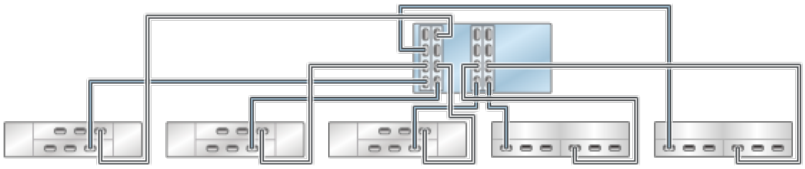


FIGURE 551 Standalone 7420 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

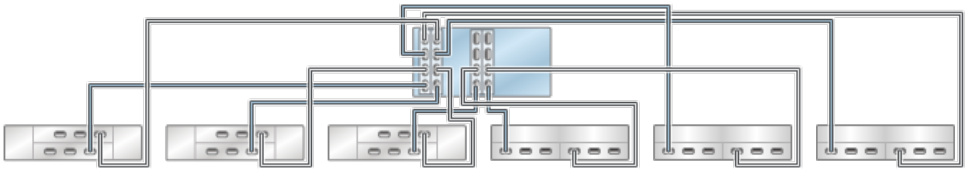


FIGURE 552 Standalone 7420 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

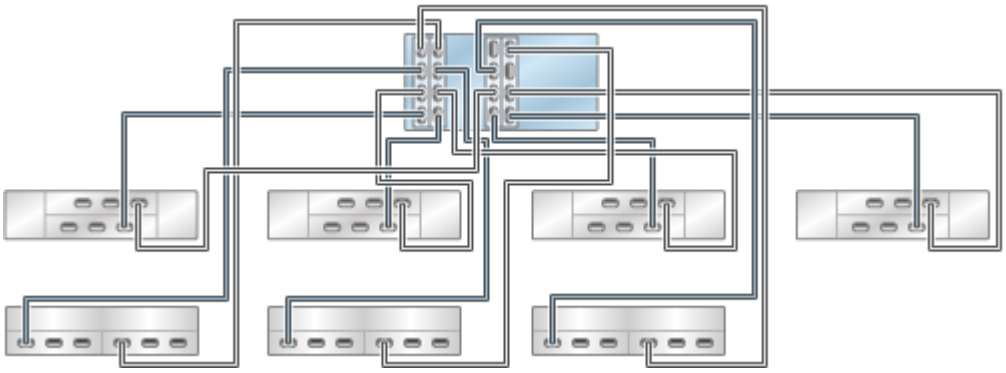


FIGURE 553 Standalone 7420 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

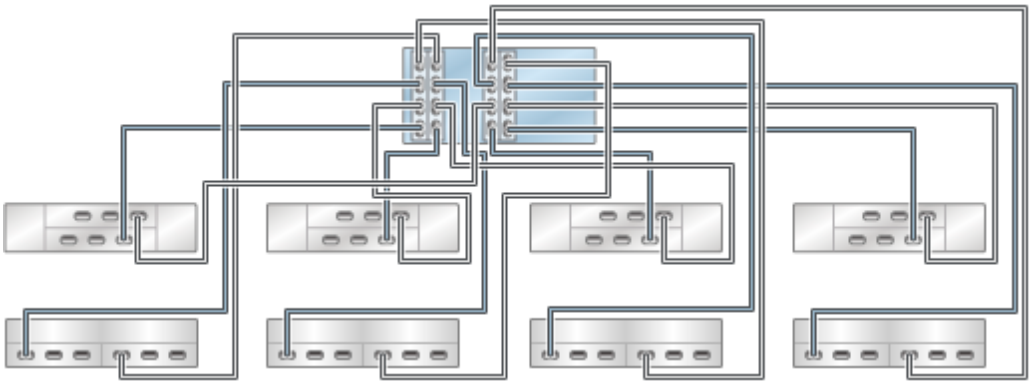


FIGURE 554 Standalone 7420 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

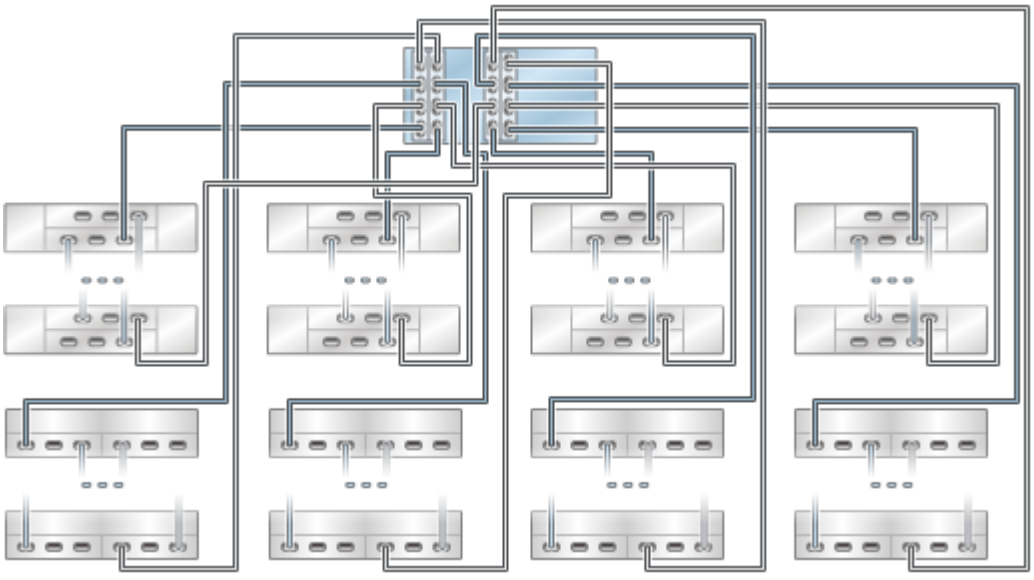


FIGURE 555 Multiple DE2-24 disk shelves in a single chain

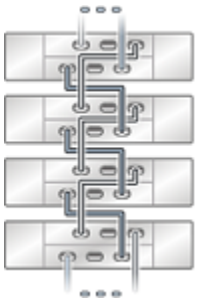
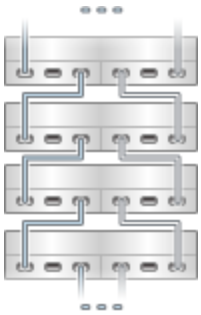


FIGURE 556 Multiple Sun Disk Shelves in a single chain



7420 Clustered to Mixed Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with two HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 557 Clustered 7420 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

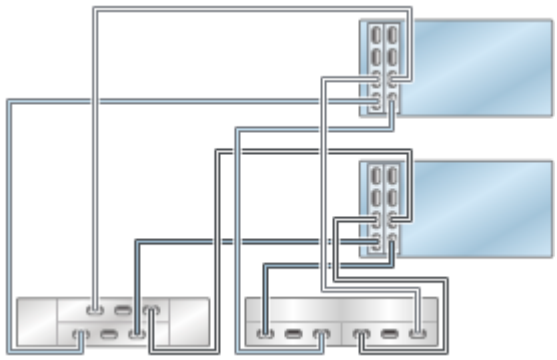


FIGURE 558 Clustered 7420 controllers with two HBAs connected to three mixed disk shelves in two chains (DE2-24 shown on the left)

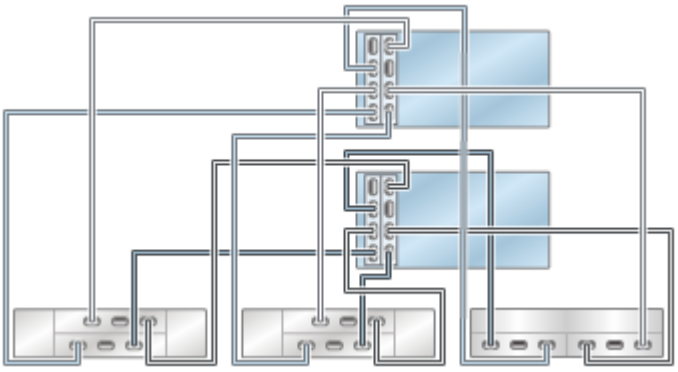


FIGURE 559 Clustered 7420 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

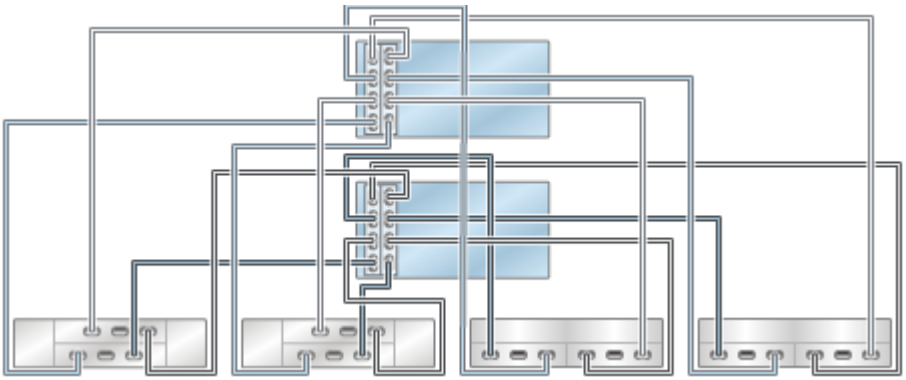


FIGURE 560 Clustered 7420 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

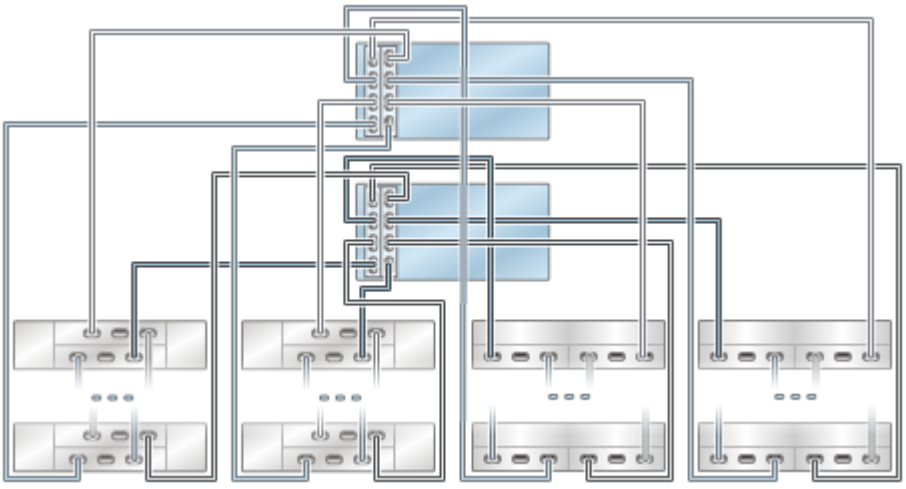


FIGURE 561 Multiple DE2-24 disk shelves in a single chain

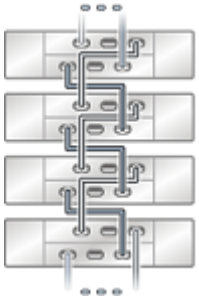
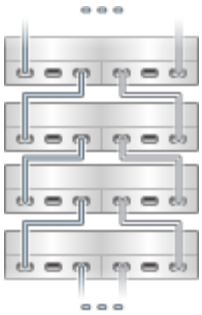


FIGURE 562 Multiple Sun Disk Shelves in a single chain



7420 Clustered to Mixed Disk Shelves (3 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with three HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs

- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 563 Clustered 7420 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

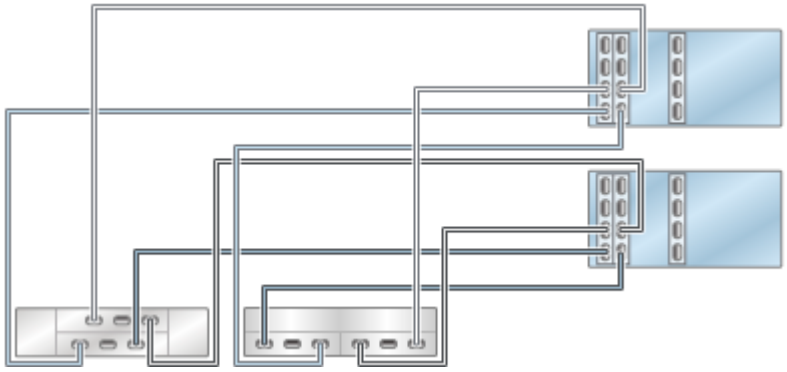


FIGURE 564 Clustered 7420 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

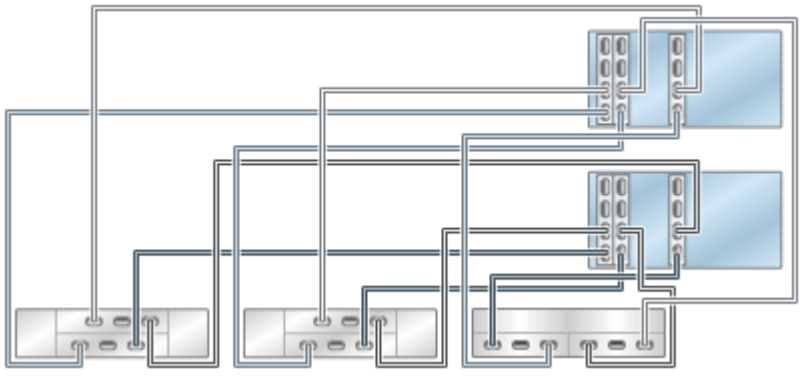


FIGURE 565 Clustered 7420 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

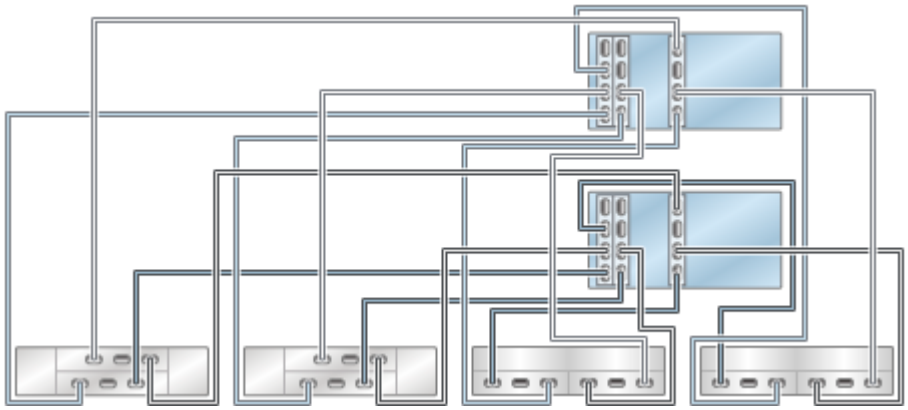


FIGURE 566 Clustered 7420 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

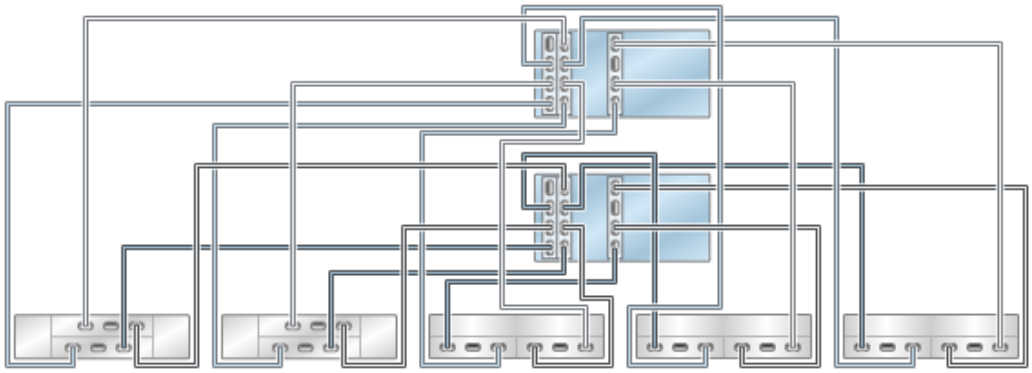


FIGURE 567 Clustered 7420 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

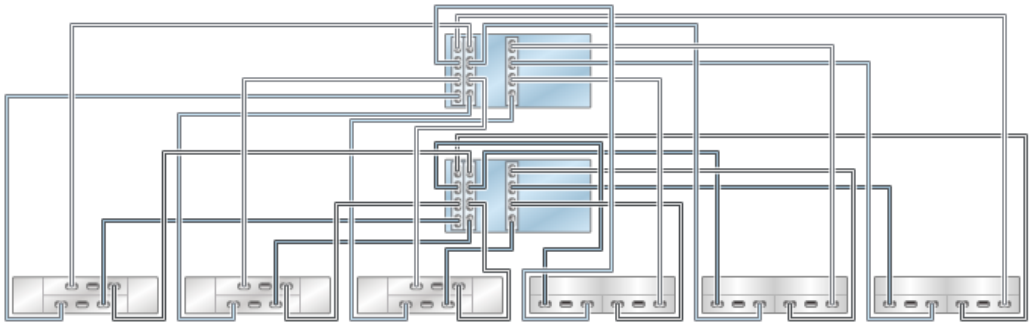


FIGURE 568 Clustered 7420 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

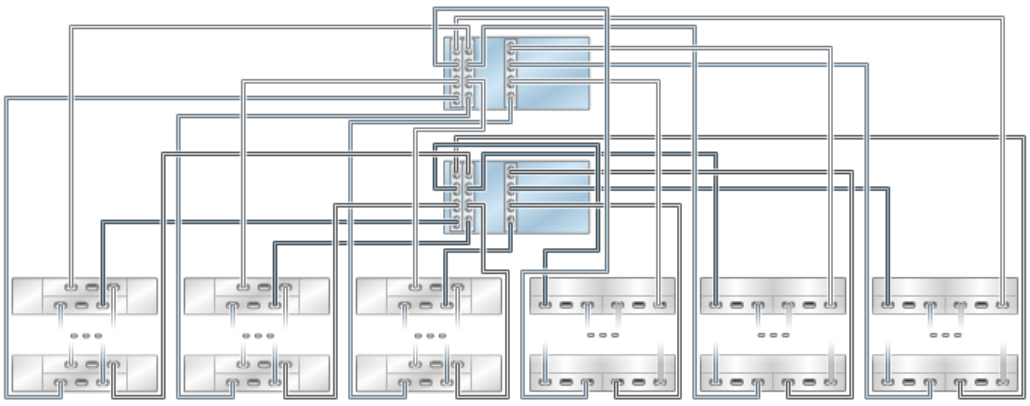


FIGURE 569 Multiple DE2-24 disk shelves in a single chain

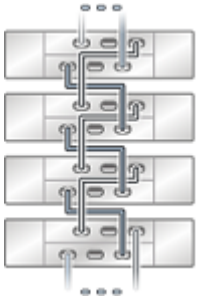
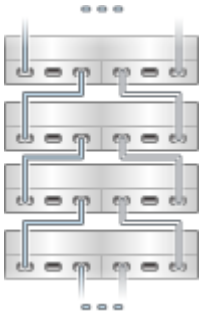


FIGURE 570 Multiple Sun Disk Shelves in a single chain



7420 Clustered to Mixed Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7420 clustered controllers with four HBAs. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 571 Clustered 7420 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

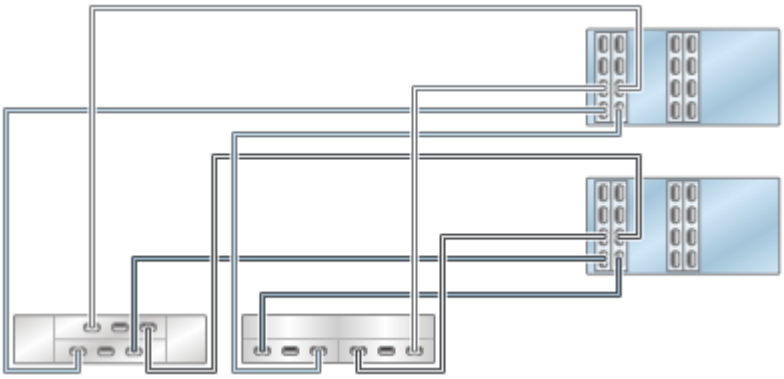


FIGURE 572 Clustered 7420 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

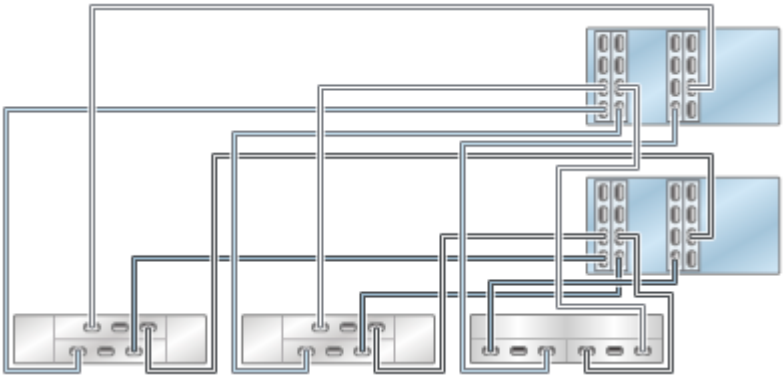


FIGURE 573 Clustered 7420 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

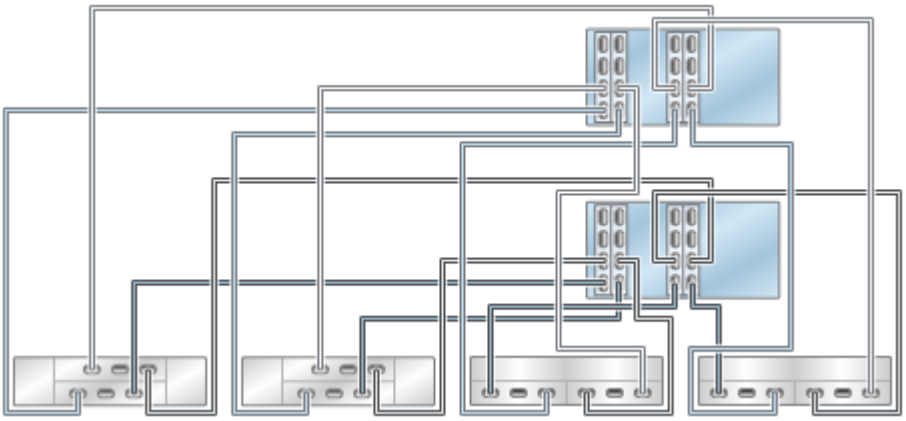


FIGURE 574 Clustered 7420 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

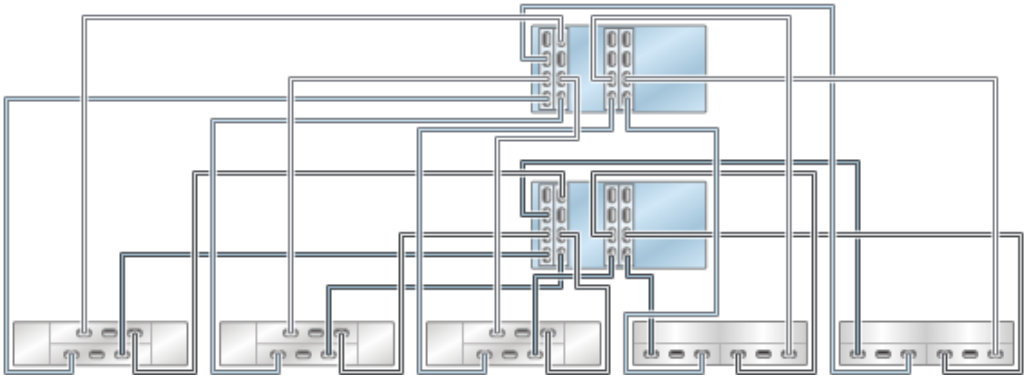


FIGURE 575 Clustered 7420 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

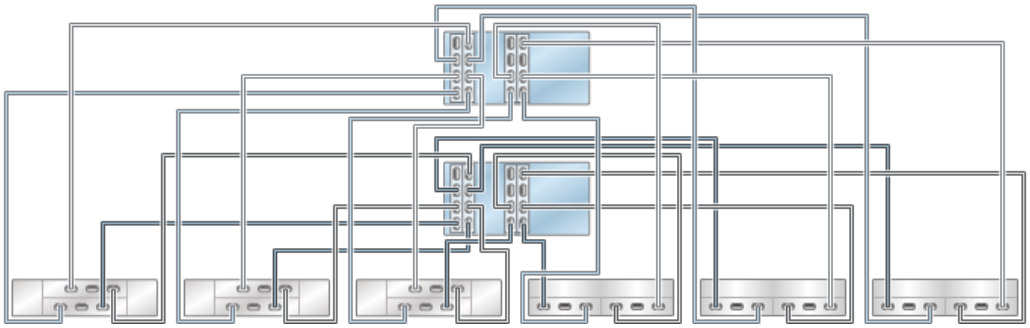


FIGURE 576 Clustered 7420 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

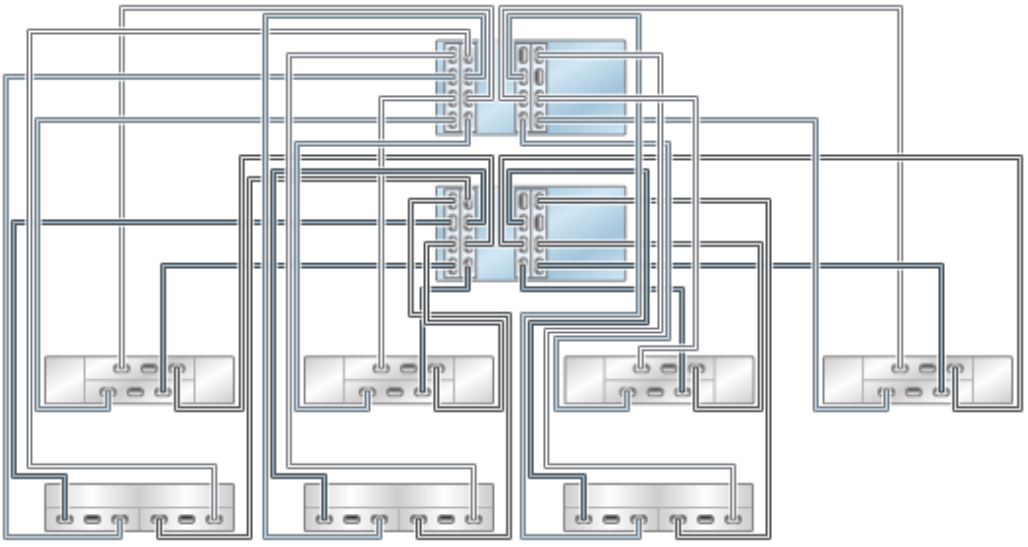


FIGURE 577 Clustered 7420 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

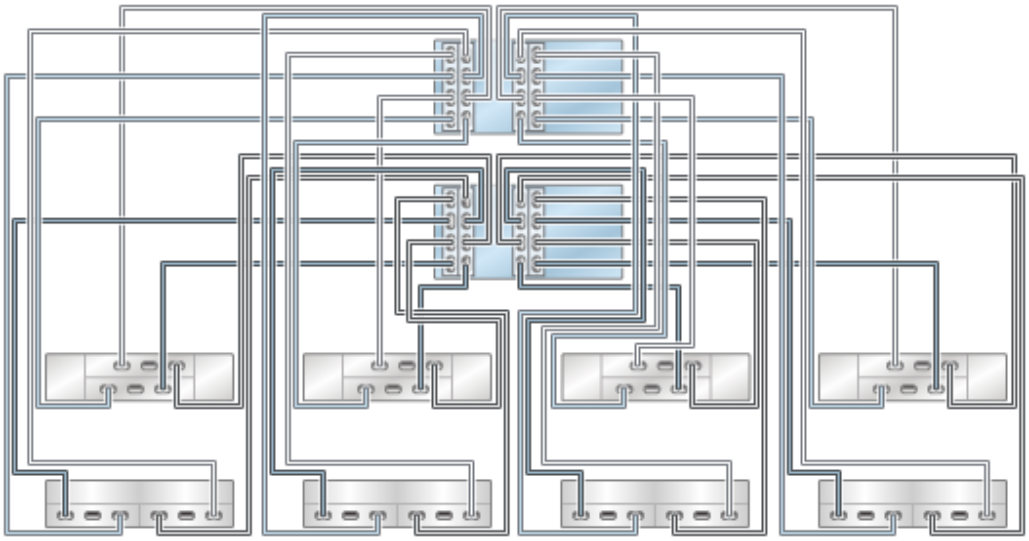


FIGURE 578 Clustered 7420 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

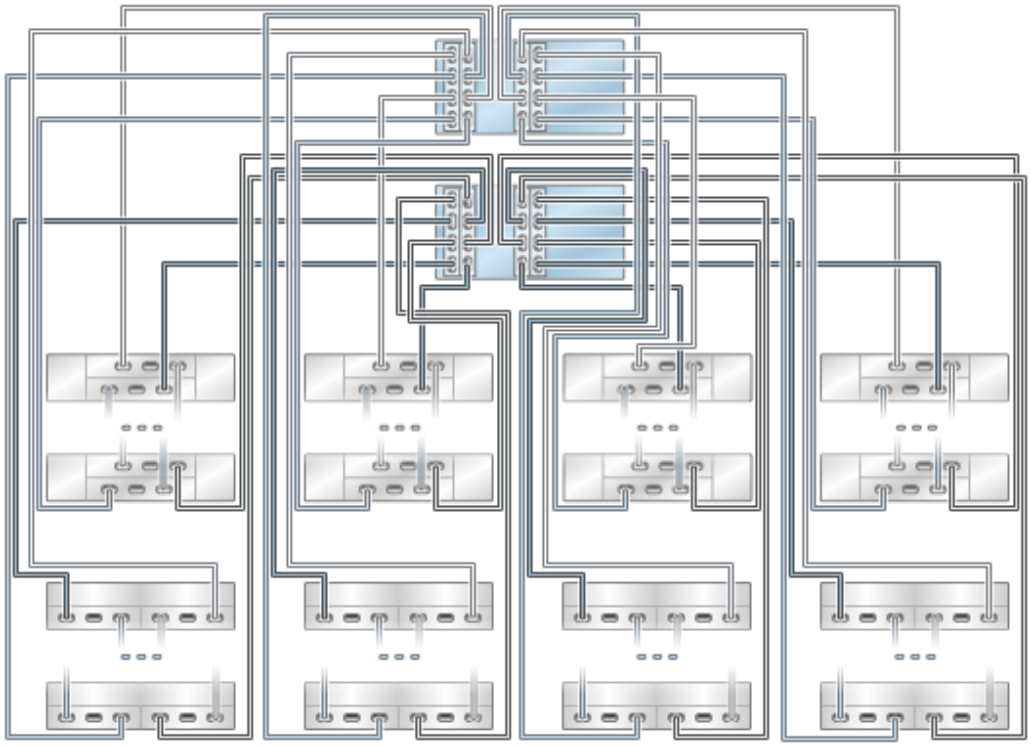


FIGURE 579 Multiple DE2-24 disk shelves in a single chain

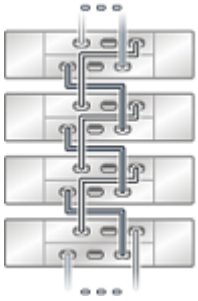
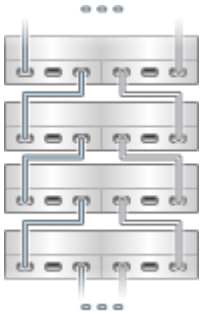


FIGURE 580 Multiple Sun Disk Shelves in a single chain



Cabling DE2-24 and Sun Disk Shelves to 7320 Controllers

This section contains guidelines for properly cabling standalone and clustered 7320 controllers to DE2-24 and Sun Disk Shelves.

To connect to one or more disk shelves, use the diagrams in the following topics:

- “7320 Standalone to Mixed Disk Shelves” on page 367
- “7320 Clustered to Mixed Disk Shelves” on page 368

7320 Standalone to Mixed Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 581 Standalone 7320 controller with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

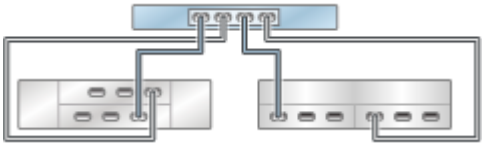


FIGURE 582 Standalone 7320 controller with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

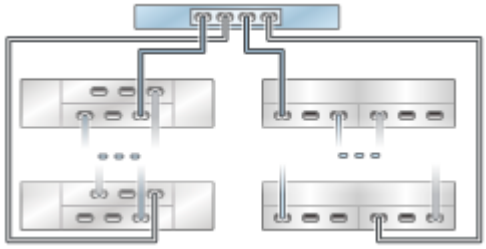


FIGURE 583 Multiple DE2-24 disk shelves in a single chain

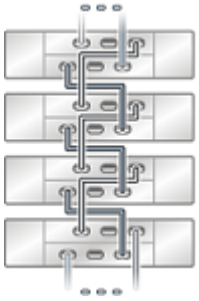
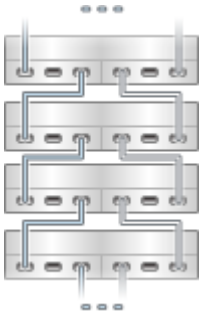


FIGURE 584 Multiple Sun Disk Shelves in a single chain



7320 Clustered to Mixed Disk Shelves

The following figures show a subset of the supported configurations for Oracle ZFS Storage 7320 clustered controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a controller, requires the following:

- The controller must use only 4X4 port SAS-2 HBAs
- Do not use mixed disk shelves in the same chain

Note - For port locations, see the hardware overview section for the corresponding controller in *Oracle ZFS Storage Appliance Installation Guide*. 4X4 port SAS-2 HBAs are only supported with release AK 2013.1.0 and later.

FIGURE 585 Clustered 7320 controllers with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

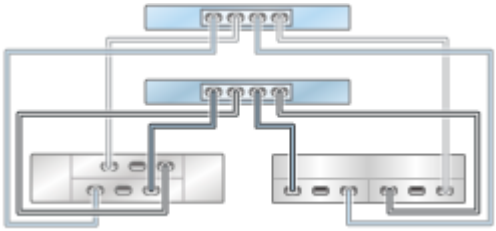


FIGURE 586 Clustered 7320 controllers with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

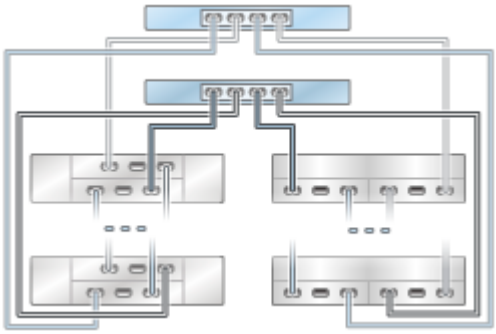


FIGURE 587 Multiple DE2-24 disk shelves in a single chain

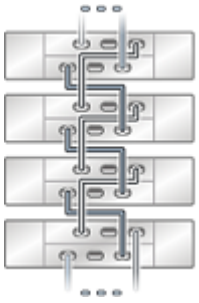
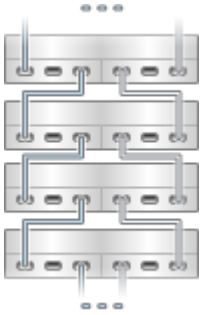


FIGURE 588 Multiple Sun Disk Shelves in a single chain



Cabling DE2-24 and Sun Disk Shelves to 7120 Controllers

This section contains guidelines for properly cabling a standalone 7120 controller to DE2-24 and Sun Disk Shelves. Use the diagram in this section to connect to one or more disk shelves.

7120 Standalone to Mixed Disk Shelves

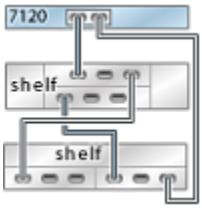
The following figure shows a subset of the supported configurations for Oracle ZFS Storage 7120 standalone controllers with one HBA. To cable the controller to the disk shelves, see "Getting Started with Cabling" on page 13.

Using mixed disk shelves on a 7120 controller requires the following:

- The controller must use only 2X4 port SAS-2 HBAs
- Mixed disk shelves in the same chain must not exceed a chain depth of two

Note - For hardware port locations, see the PCIe Options section in the Hardware Maintenance Overview for your controller model.

FIGURE 589 Standalone 7120 controller with one HBA connected to two mixed disk shelves in a single chain (DE2-24 shown on top)



Oracle ZFS Storage Appliance Racked System ZS5-4 All Flash

This section contains an overview of Oracle ZFS Storage Appliance Racked System ZS5-4 All Flash and its supported configurations.

For more information, see the following topics:

Overview of Oracle ZFS Storage Appliance Racked System ZS5-4 All Flash

Oracle ZFS Storage Appliance Racked System ZS5-4 All Flash is a pre-racked and pre-cabled system with various storage options.

TABLE 5 Storage Options Supported on ZS5-4 Racked System All Flash

Disk Shelf	Device Type
Oracle Storage Drive Enclosure DE3-24P All-Flash	All SSDs (no SSD read cache devices allowed)
Oracle Storage Drive Enclosure DE3-24P	HDD data drives and SSD read cache and/or log devices
Oracle Storage Drive Enclosure DE3-24C	HDD data drives and SSD read cache and/or log devices

ZS5-4 Racked System All Flash Configuration Guidelines

This section describes guidelines for configuring the ZS5-4 Racked System All Flash.

- The DE3-24P disk shelf is only supported in the base cabinet.
- The expansion cabinet only supports DE3-24C disk shelves.
- The DE3-24P disk shelf can include 3.2 TB SSDs in 24-SSD or 20-SSD configurations. Slots 20, 21, 22 and 23 can be installed with 200 GB SSD log devices, but no SSD read cache devices are allowed in the DE3-24P All-Flash disk shelf.
- The DE3-24P disk shelf can include 1.2 TB HDDs in 24-HDD or 20-HDD configurations. Slots 20, 21, 22, and 23 can be installed with 200 GB SSD log devices and/or 3.2 TB SSD read cache devices.
- The DE3-24C disk shelf can include 8 TB HDDs in 24-HDD or 20-HDD configurations. Slots 20, 21, 22, and 23 can be installed with 200 GB SSD log devices and/or 3.2 TB SSD read cache devices.
- DE3-24 disk shelves can only be added in pairs by type: either two DE3-24P disk shelves or two DE3-24C disk shelves.
- ZS5-4 Racked System All Flash supports five base cabinet options and a total of 24 different system configurations. Expansion cabinet options are limited, depending on each system configuration.
- Each expansion cabinet can contain 2, 4, 5 (half-rack), 6, 8, or 10 DE3-24C disk shelves. ZS5-4 Racked System All Flash can have up to three expansion cabinets.

Load Priority of DE3-24 Disk Shelves

The following are allowable configurations for additional disk shelf pairs:

- 20 SSD or HDD data drives and up to 4 SSD log or read cache devices
- 20 SSD or HDD data drives and 2 SSD log or read cache devices
- 24 SSD or HDD data drives

The placement of DE3-24 disk shelves follows this priority:

1. DE3-24 disk shelves with SSD log devices
2. DE3-24 disk shelves with SSD read cache devices
3. DE3-24 disk shelves without SSD log or read cache devices

In all cases, the placement of SSD log devices takes precedence over SSD read cache devices, and the placement is always in disk shelf pairs. The only exception where pairs are not installed is for an expansion “half-rack” such that only one disk shelf is added to the expansion cabinet, for a total of five disk shelves. SSD log and read cache devices can be installed into DE3-24 disk shelves in slots 20, 21, 22, and 23 in that order of priority.

FIGURE 590 DE3-24P Drive Locations (Front View)

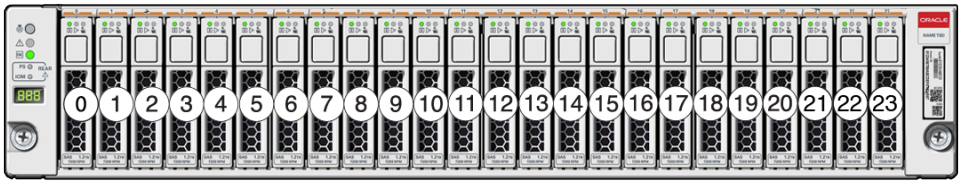
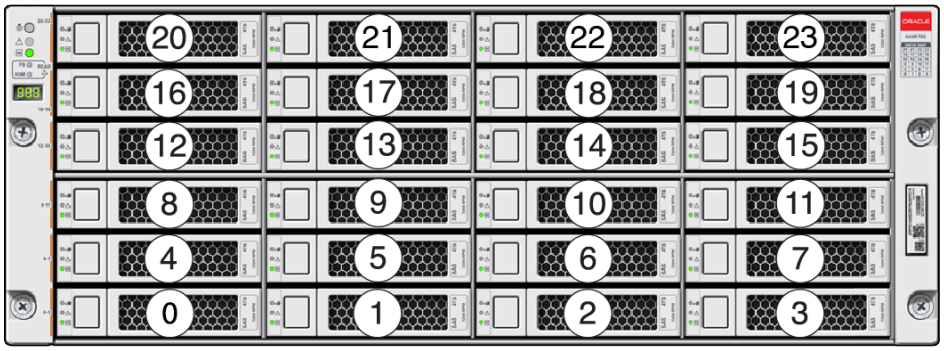


FIGURE 591 DE3-24C Drive Locations (Front View)



Base Cabinet Configurations

ZS5-4 Racked System All Flash maximum performance configurations require four SAS-3 HBA cards; therefore, it provides a maximum of 16 ports of SAS-3 HBA connectivity.

The SAS-3 HBA port numbering order is ascending, from bottom (Port 0) to top (Port 3). Both SAS-3 HBA cards and DE3-24 disk shelves use the SFF 8644 connectors.

FIGURE 592 ZS5-4 HBA Slot Numbers (Back View)

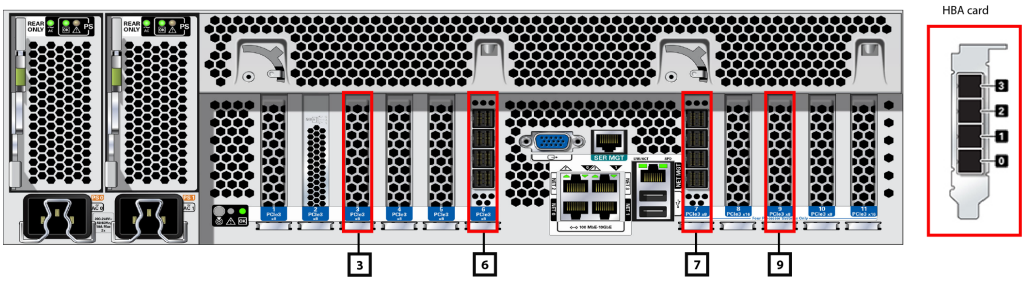


FIGURE 593 DE3-24P HBA Connections (Back View)

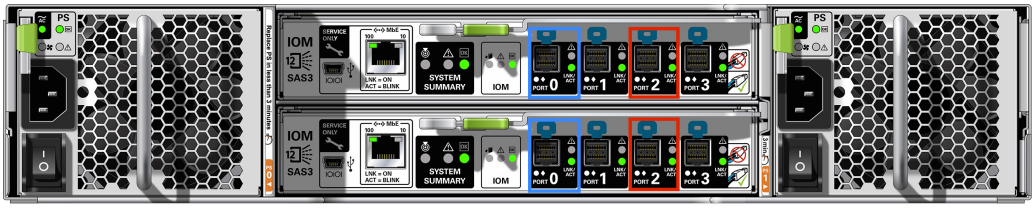
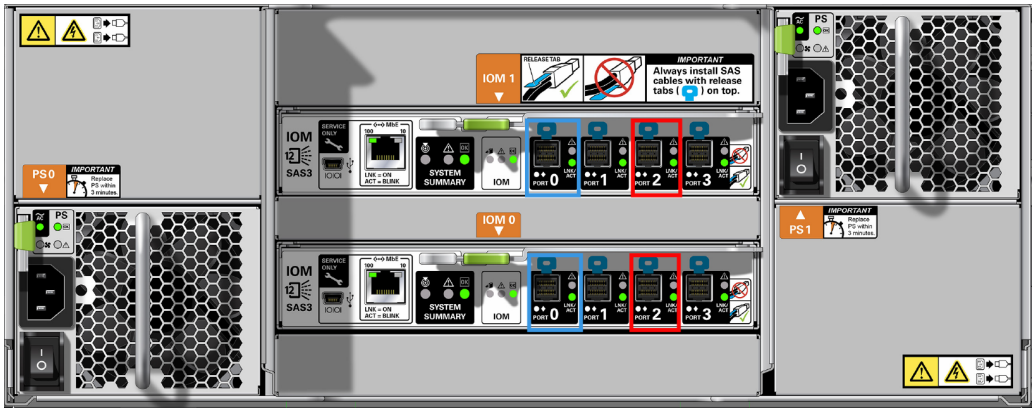


FIGURE 594 DE3-24C HBA Connections (Back View)



The ZS5-4 Racked System All Flash cabling configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). It provides a more practical implementation for SSD log device and read cache device matching, allows for limited multi-cabinet expansion, and can be structured for maximum or optimal performance.

Any upgrades that change the number of SAS-3 HBA cards, or include more than one cabinet that is not an original ZS5-4 Racked System All Flash system or not compatible with ZS5-4 Racked System All Flash have to be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to ZS5-4 with 4x4 port SAS-3 HBAs, see “Cabling DE3-24 Disk Shelves to ZS5-4 Controllers” on page 49. For SAS cable length guidelines, see “Cabinet and Cabling Guidelines” on page 15.

The base cabinet is self-contained and pre-cabled following the required cabling methodology. The following diagrams describe how the five base cabinet options are cabled.

FIGURE 595 ZS5-4 Racked System All Flash with eight DE3-24P disk shelves in eight chains

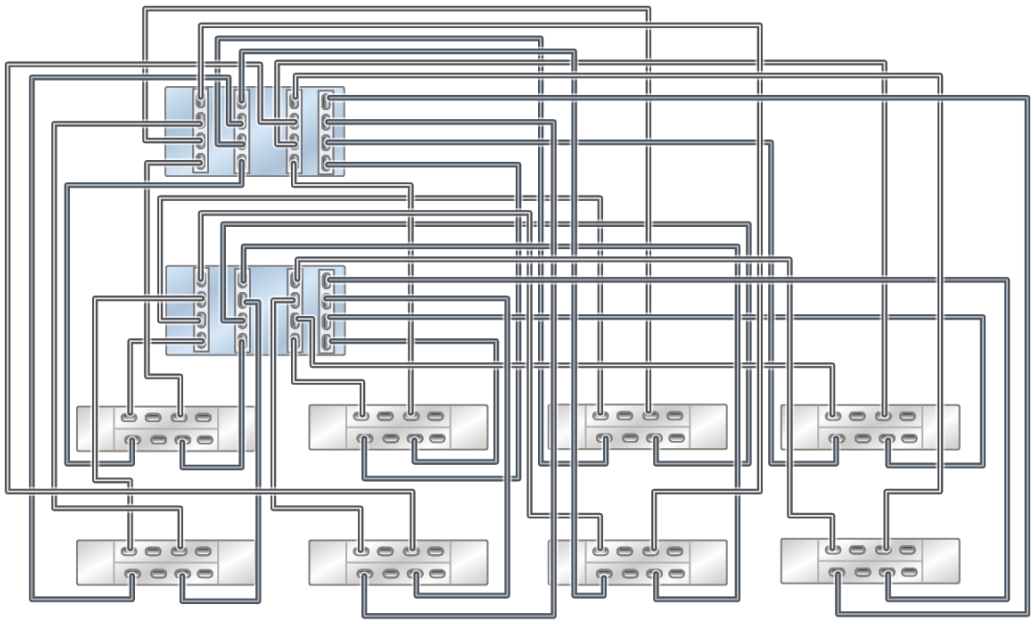


FIGURE 596 ZS5-4 Racked System All Flash with 16 DE3-24P disk shelves in eight chains

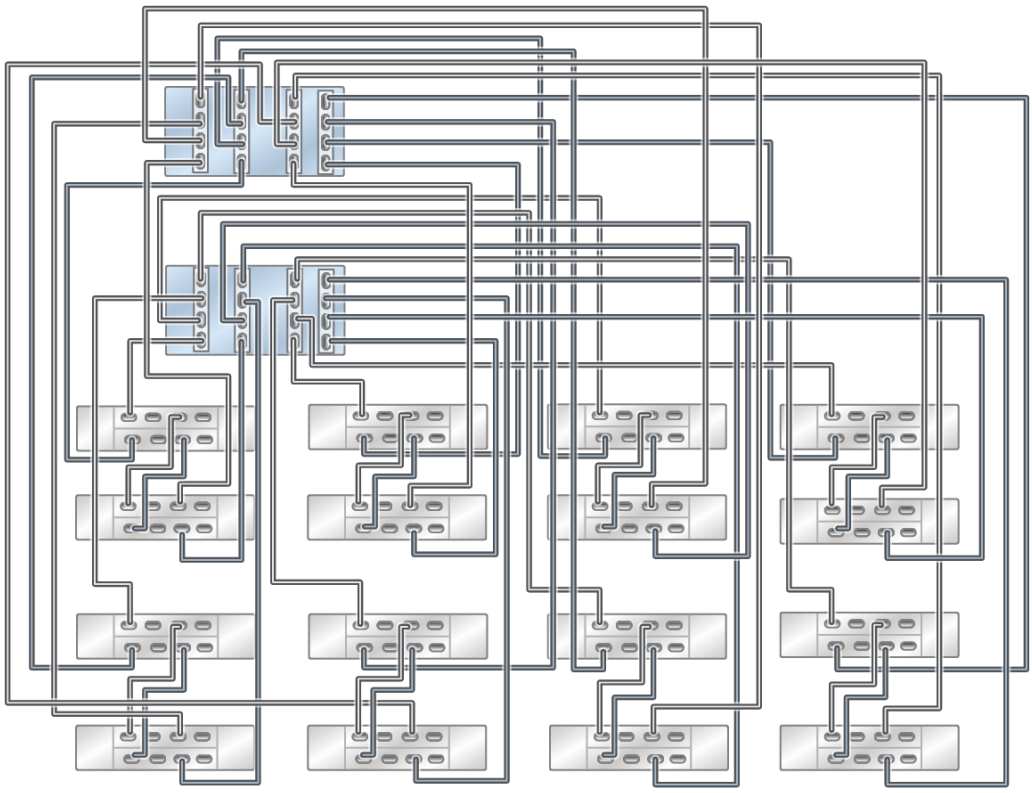


FIGURE 597 ZS5-4 Racked System All Flash with two DE3-24C (bottom left) and 12 DE3-24P disk shelves in seven chains

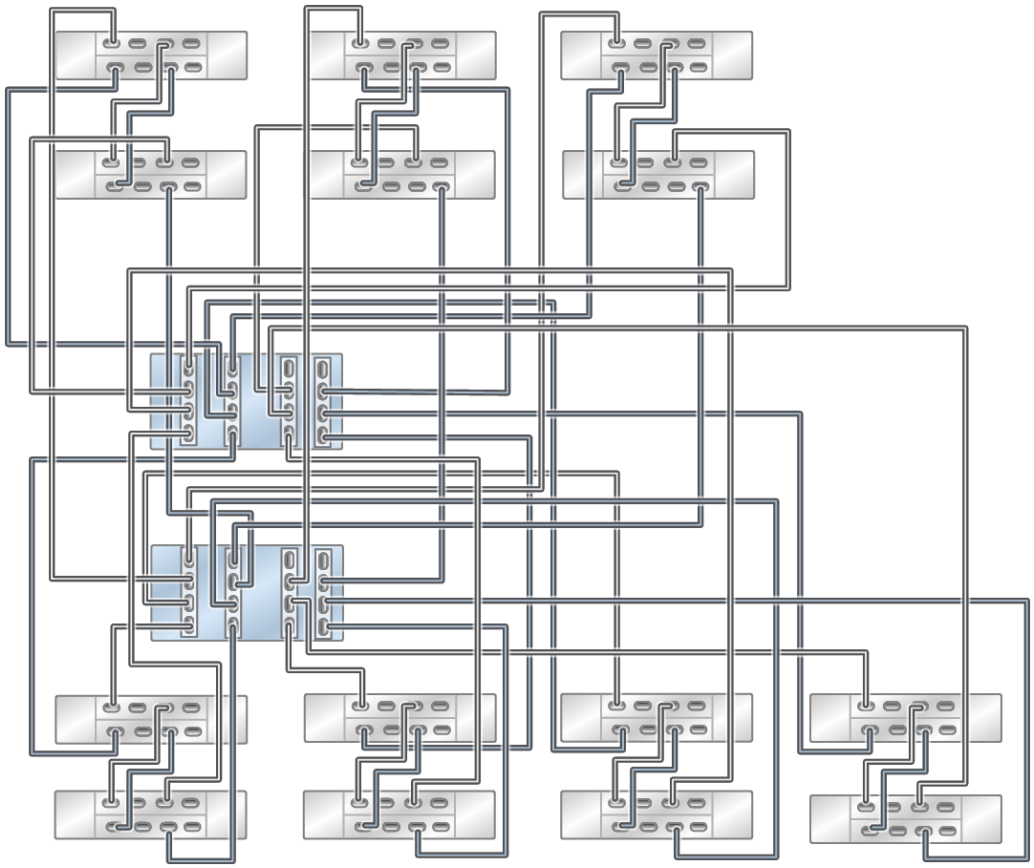


FIGURE 598 ZS5-4 Racked System All Flash with four DE3-24C (bottom left) and eight DE3-24P disk shelves in five chains

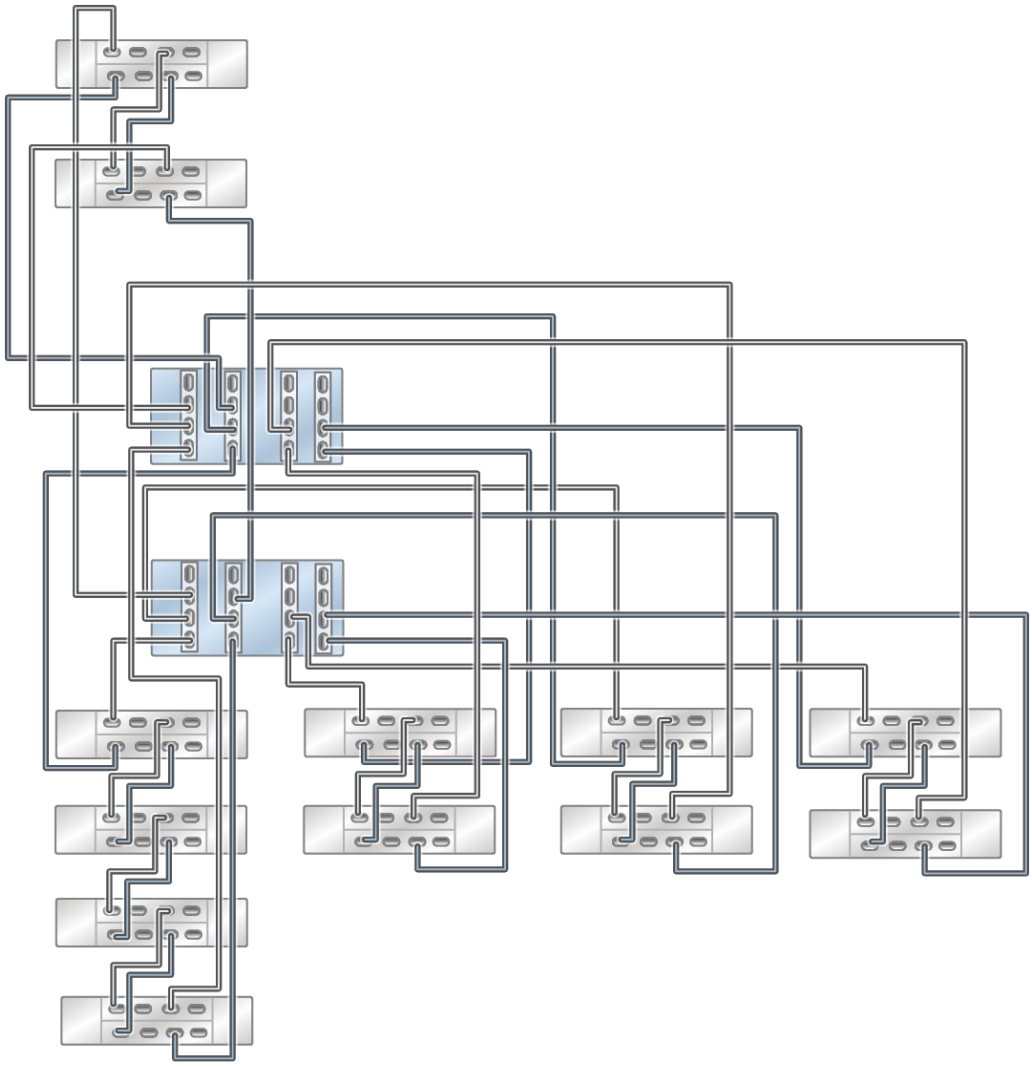
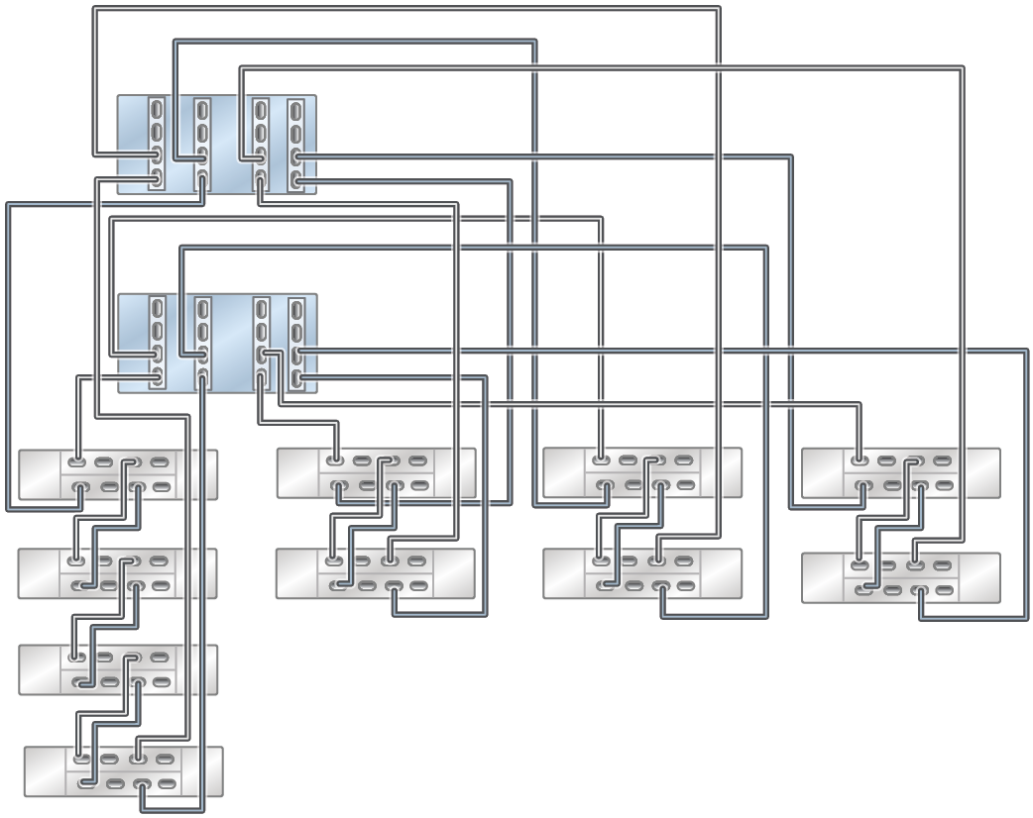


FIGURE 599 ZS5-4 Racked System All Flash with six DE3-24C (first two chains from the left) and four DE3-24P disk shelves in four chains



Expansion Cabinet Configurations

ZS5-4 Racked System All Flash supports multi-cabinet configurations that allow for expansion of up to 30 additional disk shelves. Each expansion cabinet accommodates a maximum of ten DE3-24C disk shelves and is also offered in a “half-rack” option.

Note - Not all base cabinet configurations support expansion cabinets.

The expansion cabinet installation follows a balanced chain installation where the chain on the bottom of the cabinet takes the first disk shelf pair, and the second chain on the top half takes the second pair. The alternating manner of a balanced chain installation distributes SSDs and follows the load priority methodology.

The number of expansion cabinets supported is dependent on the number of chains remaining in the ZS5-4 Racked System All Flash base cabinet. Each ZS5-4 Racked System All Flash expansion cabinet requires two chains to support a full expansion cabinet. Also, a total of four SAS-3 HBA ports (two HBA ports for each chain) are required for each expansion cabinet.

The following diagrams describe the cabling of ZS5-4 Racked System All Flash expansion cabinet configurations.

Note - The base cabinet can contain all DE3-24P disk shelves or a mix of DE3-24C and DE3-24P disk shelves, as described in "Base Cabinet Configurations" on page 375.

FIGURE 600 ZS5-4 Racked System All Flash with one expansion cabinet (two DE3-24C disk shelves)

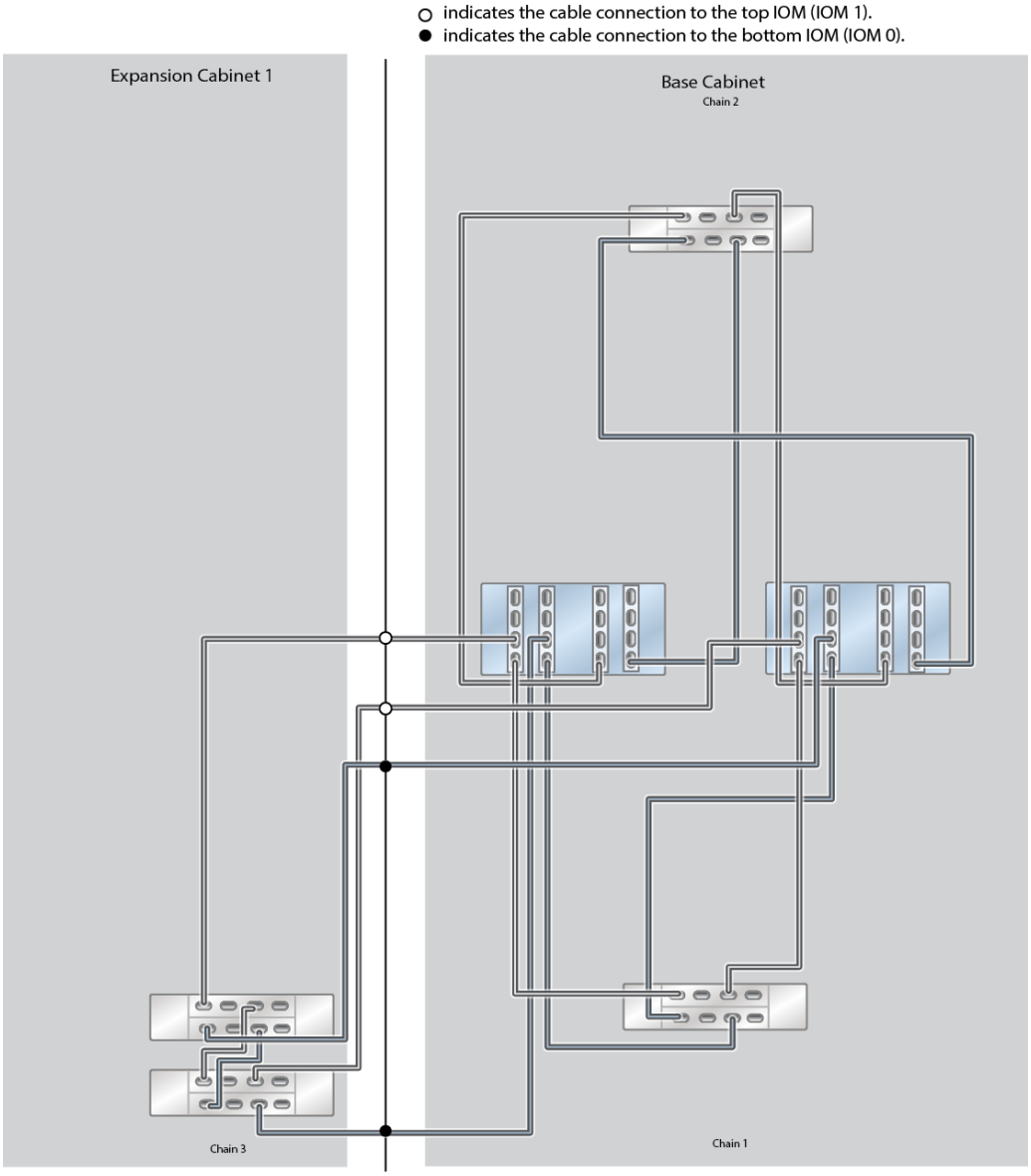


FIGURE 601 ZS5-4 Racked System All Flash with one expansion cabinet (four DE3-24C disk shelves)

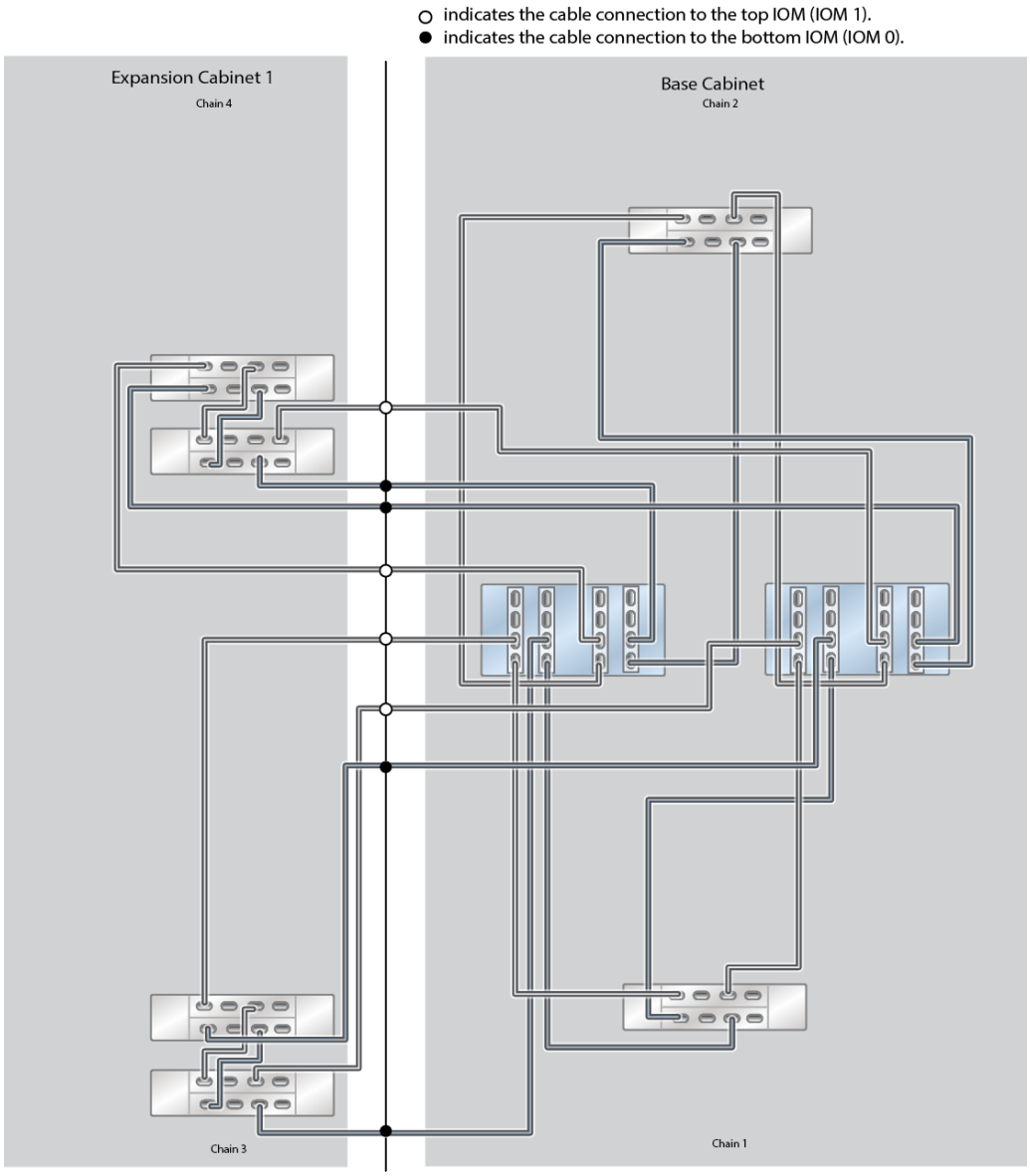


FIGURE 602 ZS5-4 Racked System All Flash with one expansion cabinet (five DE3-24C disk shelves)

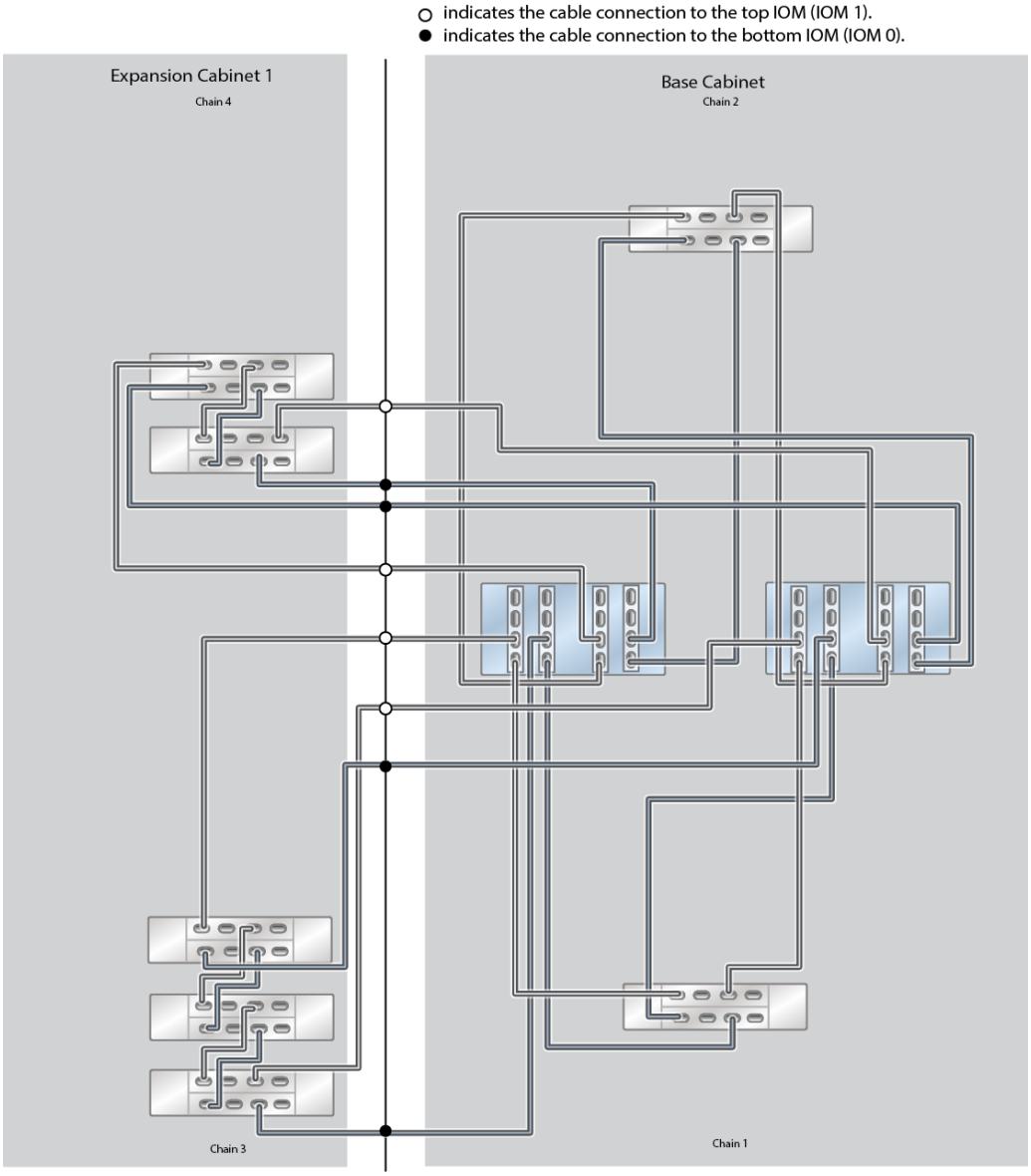


FIGURE 603 ZS5-4 Racked System All Flash with one expansion cabinet (six DE3-24C disk shelves)

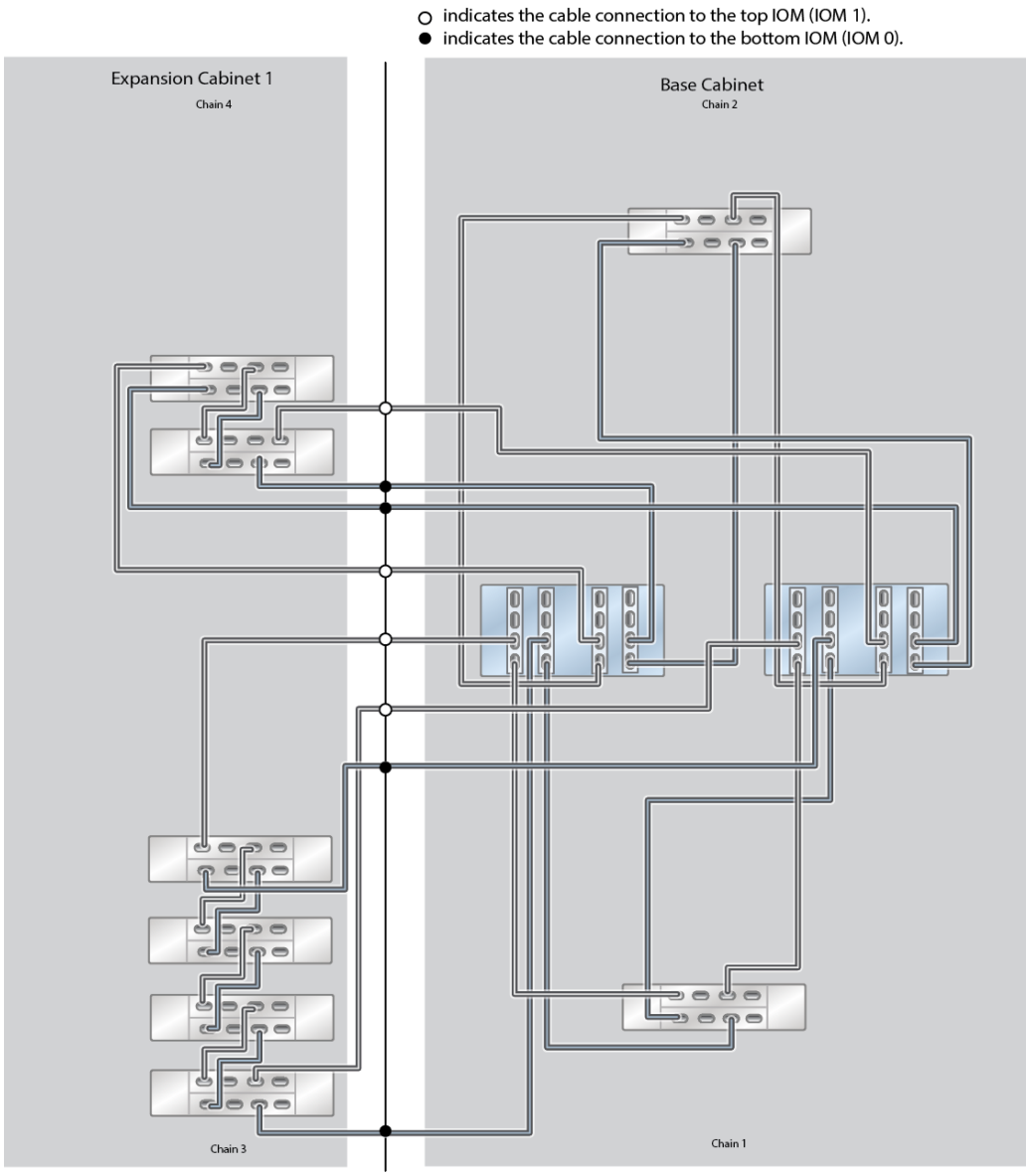


FIGURE 604 ZS5-4 Racked System All Flash with one expansion cabinet (eight DE3-24C disk shelves)

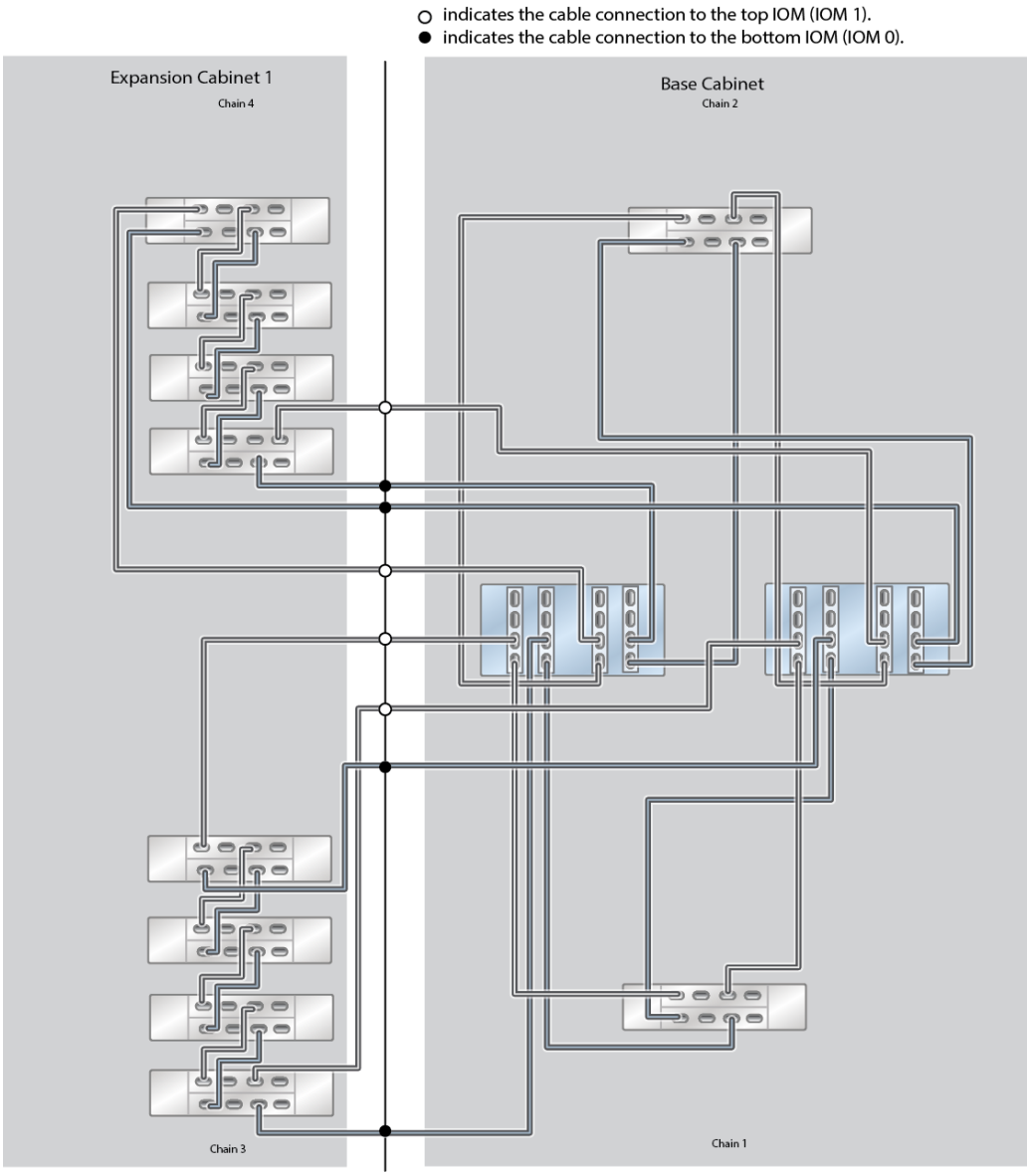


FIGURE 605 ZS5-4 Racked System All Flash with one expansion cabinet (ten DE3-24C disk shelves)

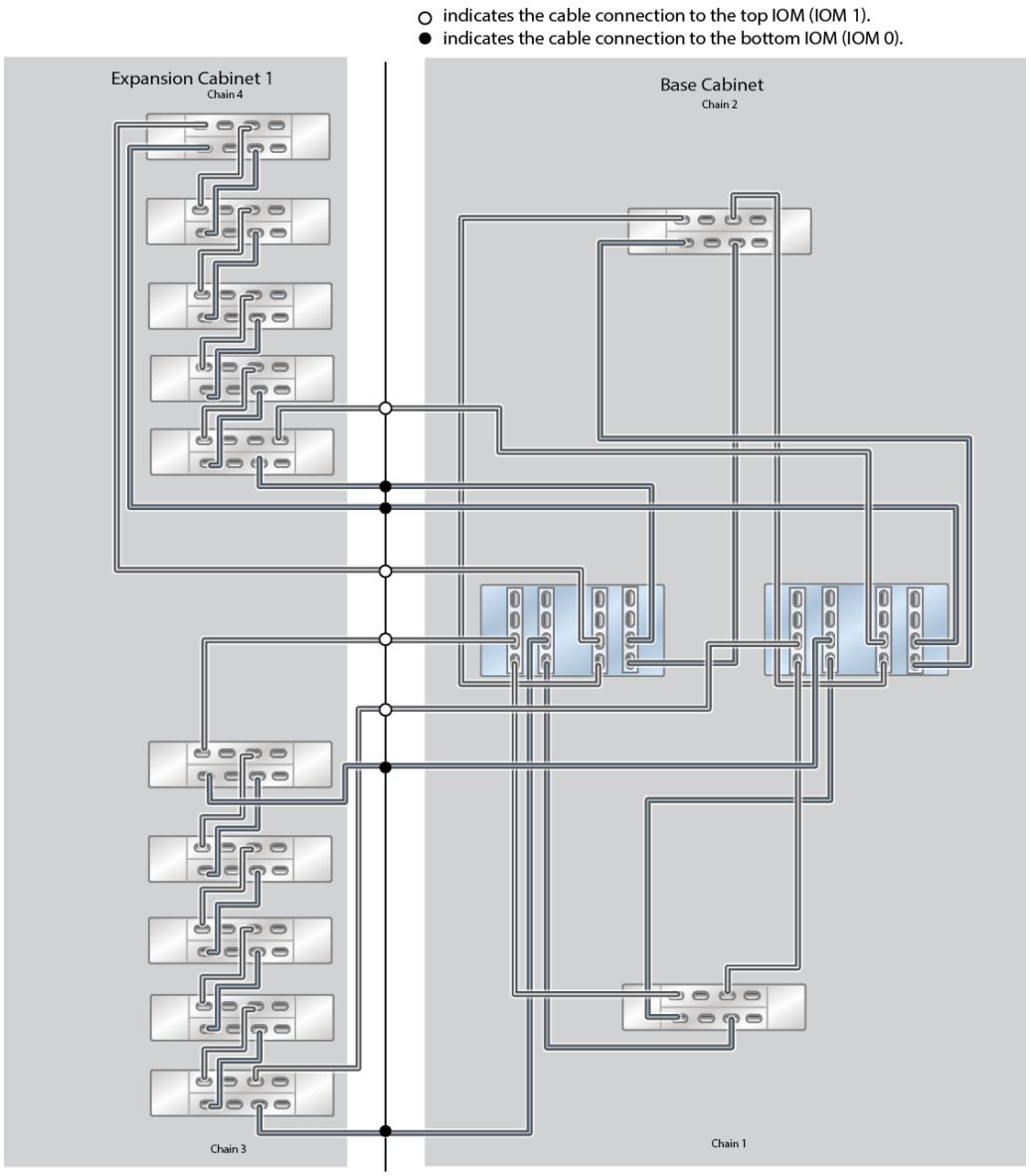


FIGURE 606 ZS5-4 Racked System All Flash with two expansion cabinets (20 DE3-24C disk shelves)

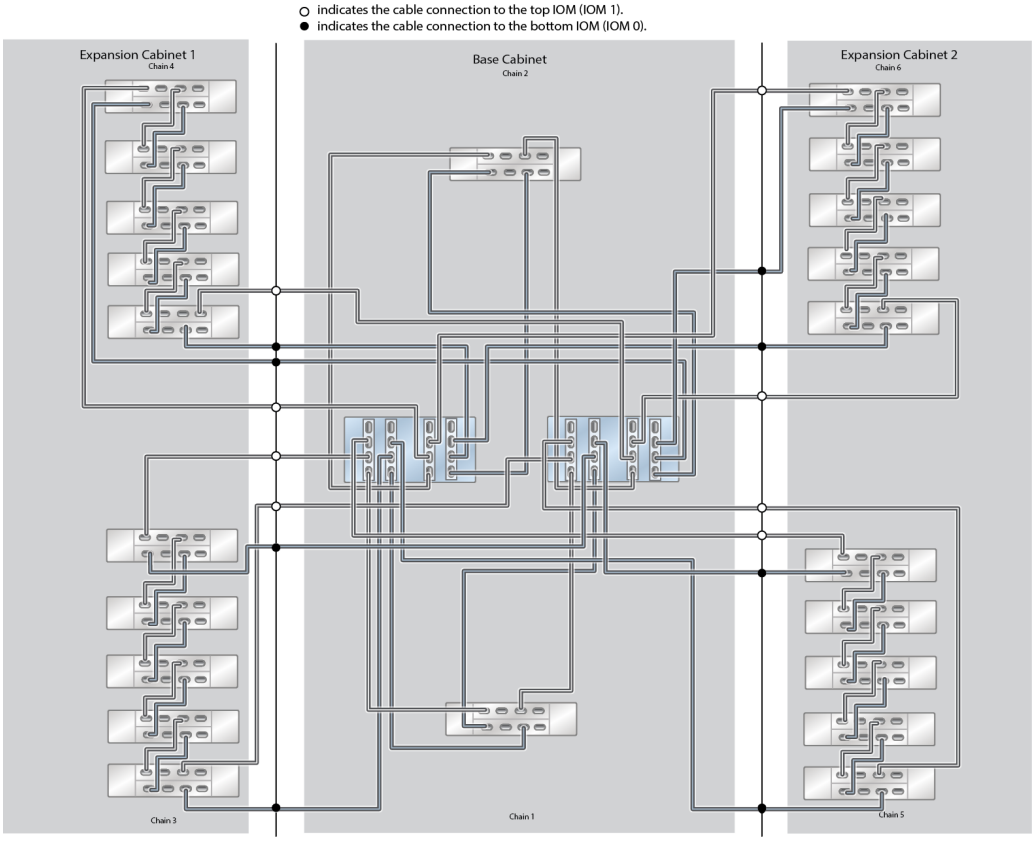
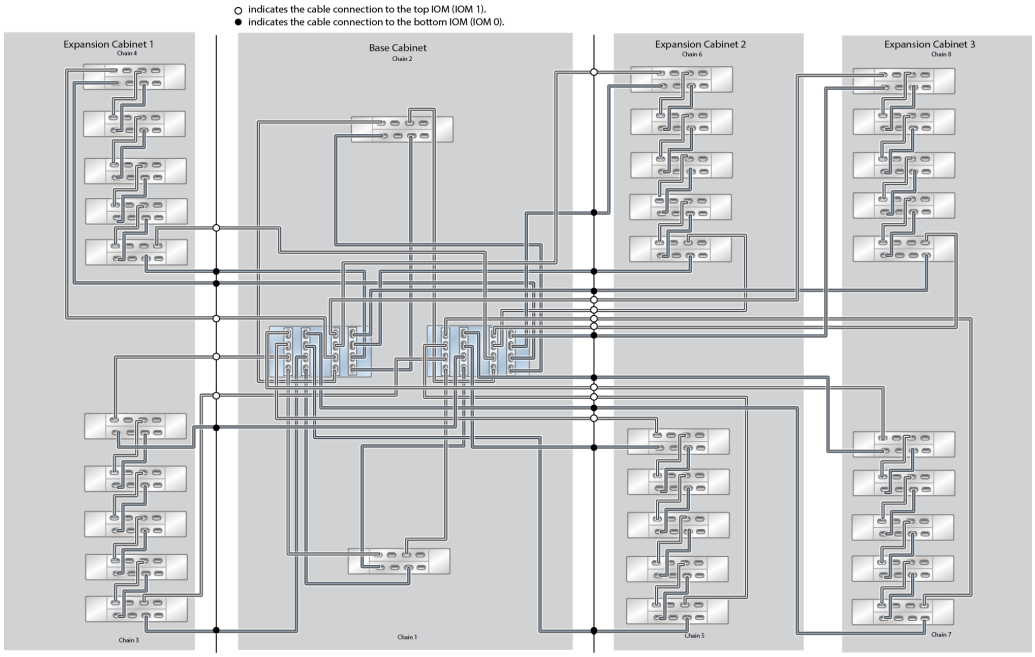


FIGURE 607 ZS5-4 Racked System All Flash with three expansion cabinets (30 DE3-24C disk shelves)



Oracle ZFS Storage Appliance Racked System ZS5-2 All Flash

This section contains an overview of Oracle ZFS Storage Appliance Racked System ZS5-2 All Flash and its supported configurations.

For more information, see the following topics:

Overview of Oracle ZFS Storage Appliance Racked System ZS5-2 All Flash

Oracle ZFS Storage Appliance Racked System ZS5-2 All Flash is a pre-racked and pre-cabled system with various storage options.

TABLE 6 Storage Options Supported on ZS5-2 Racked System All Flash

Disk Shelf	Device Type
Oracle Storage Drive Enclosure DE3-24P All-Flash	All SSDs (no SSD read cache devices allowed)
Oracle Storage Drive Enclosure DE3-24P	HDD data drives and SSD read cache and/or log devices
Oracle Storage Drive Enclosure DE3-24C	HDD data drives and SSD read cache and/or log devices

ZS5-2 Racked System All Flash Configuration Guidelines

This section describes guidelines for configuring the ZS5-2 Racked System All Flash.

- The DE3-24P disk shelf can include 3.2 TB SSDs in 24-SSD or 20-SSD configurations. Slots 20, 21, 22 and 23 can be installed with 200 GB SSD log devices, but no SSD read cache devices are allowed in the DE3-24P All-Flash disk shelf.
- The DE3-24P disk shelf can include 1.2 TB HDDs in 24-HDD or 20-HDD configurations. Slots 20, 21, 22, and 23 can be installed with 200 GB SSD log devices and/or 3.2 TB SSD read cache devices.
- The DE3-24C disk shelf can include 8 TB HDDs in 24-HDD or 20-HDD configurations. Slots 20, 21, 22, and 23 can be installed with 200 GB SSD log devices and/or 3.2 TB SSD read cache devices.
- DE3-24 disk shelves can only be added in pairs by type: either two DE3-24P disk shelves or two DE3-24C disk shelves.
- ZS5-2 Racked System All Flash supports five base cabinet options and a total of 22 different system configurations.

Load Priority of DE3-24 Disk Shelves

The following are allowable configurations for additional disk shelf pairs:

- 20 SSD or HDD data drives and up to 4 SSD log or read cache devices
- 20 SSD or HDD data drives and 2 SSD log or read cache devices
- 24 SSD or HDD data drives

The placement of DE3-24 disk shelves follows this priority:

1. DE3-24 disk shelves with SSD log devices
2. DE3-24 disk shelves with SSD read cache devices
3. DE3-24 disk shelves without SSD log or read cache devices

In all cases, the placement of SSD log devices takes precedence over SSD read cache devices, and the placement is always in disk shelf pairs. SSD log and read cache devices can be installed into DE3-24 disk shelves in slots 20, 21, 22, and 23 in that order of priority.

FIGURE 608 DE3-24P Drive Locations (Front View)

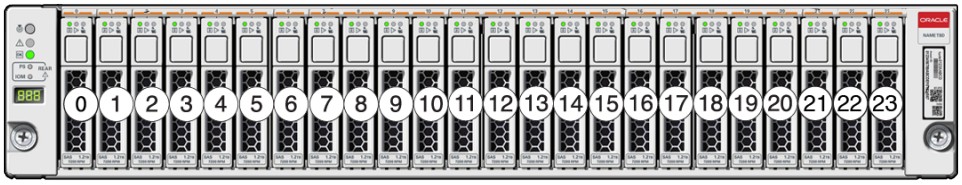
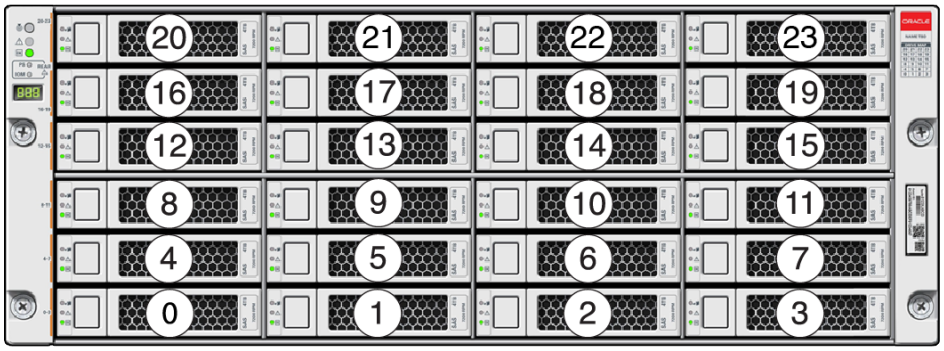


FIGURE 609 DE3-24C Drive Locations (Front View)



Base Cabinet Configurations

ZS5-2 Racked System All Flash maximum performance configurations require two SAS-3 HBA cards; therefore, it provides a maximum of eight ports of SAS-3 HBA connectivity.

The SAS-3 HBA port numbering order is ascending, from bottom (Port 0) to top (Port 3). Both SAS-3 HBA cards and DE3-24 disk shelves use the SFF 8644 connectors.

FIGURE 610 ZS5-2 HBA Slot Numbers (Back View)

FIGURE 611 DE3-24P HBA Connections (Back View)

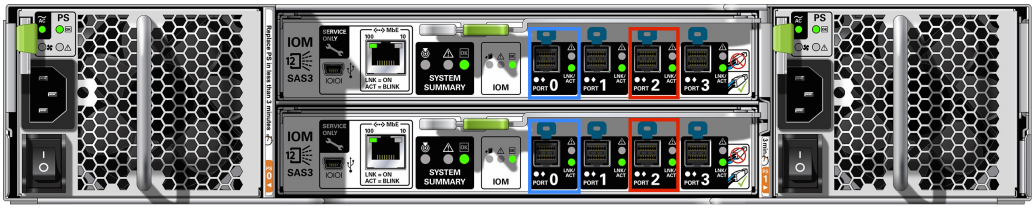
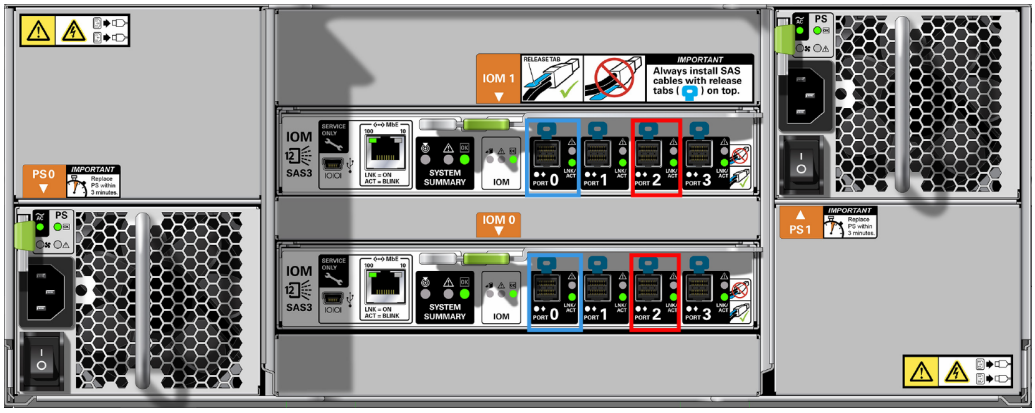


FIGURE 612 DE3-24C HBA Connections (Back View)



The ZS5-2 Racked System All Flash cabling configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). It provides a more practical implementation for SSD log device and read cache device matching, and can be structured for maximum or optimal performance.

Any upgrades that change the number of SAS-3 HBA cards, or include more than one cabinet that is not an original ZS5-2 Racked System All Flash system or not compatible with ZS5-2 Racked System All Flash have to be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to ZS5-2 with 4x4 port SAS-3 HBAs, see “Cabling DE3-24 Disk Shelves to ZS5-2 Controllers” on page 75. For SAS cable length guidelines, see “Cabinet and Cabling Guidelines” on page 15.

The base cabinet is self-contained and pre-cabled following the required cabling methodology. The following diagrams describe how the five base cabinet options are cabled.

FIGURE 613 ZS5-2 Racked System All Flash with four DE3-24P disk shelves in four chains

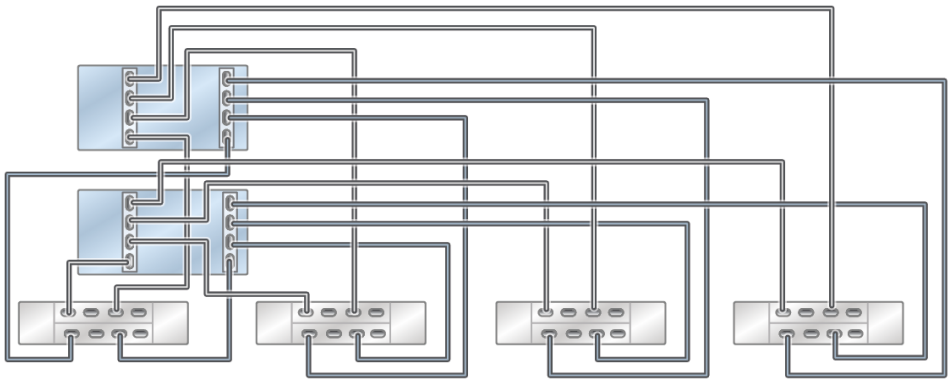


FIGURE 614 ZS5-2 Racked System All Flash with 16 DE3-24P disk shelves in four chains

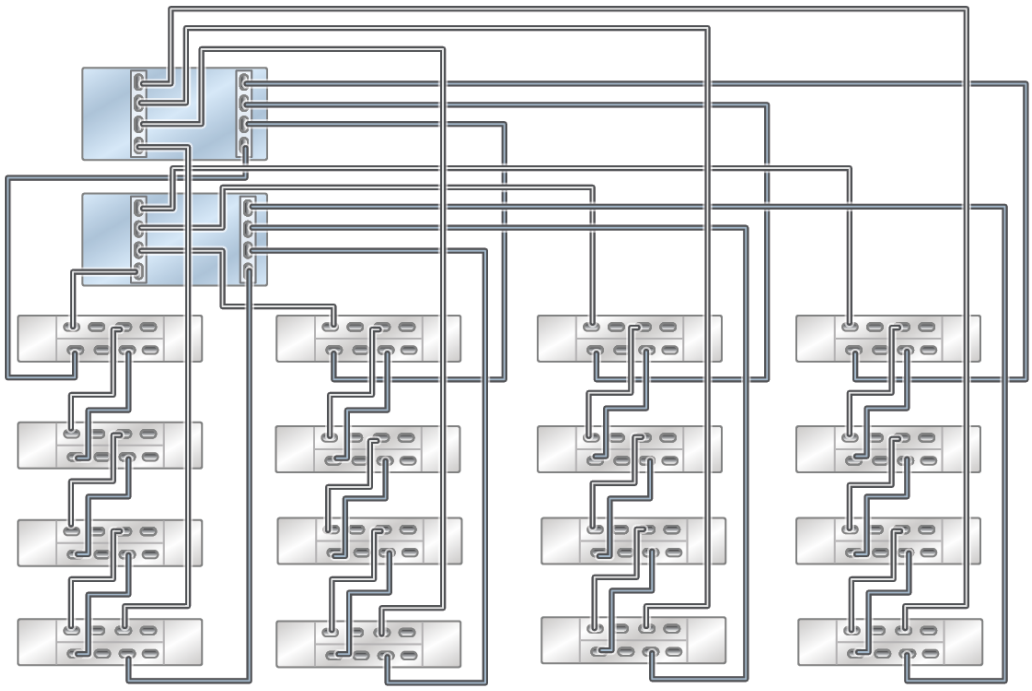


FIGURE 615 ZS5-2 Racked System All Flash with two DE3-24C (bottom left) and 12 DE3-24P disk shelves in four chains

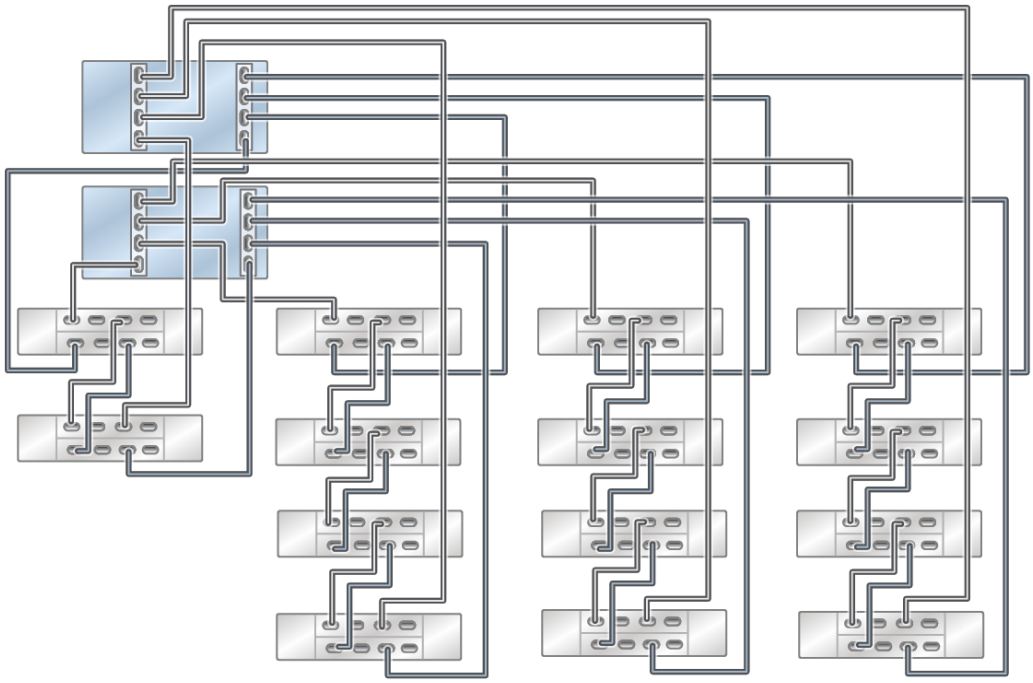


FIGURE 616 ZS5-2 Racked System All Flash with four DE3-24C (bottom left) and eight DE3-24P disk shelves in four chains

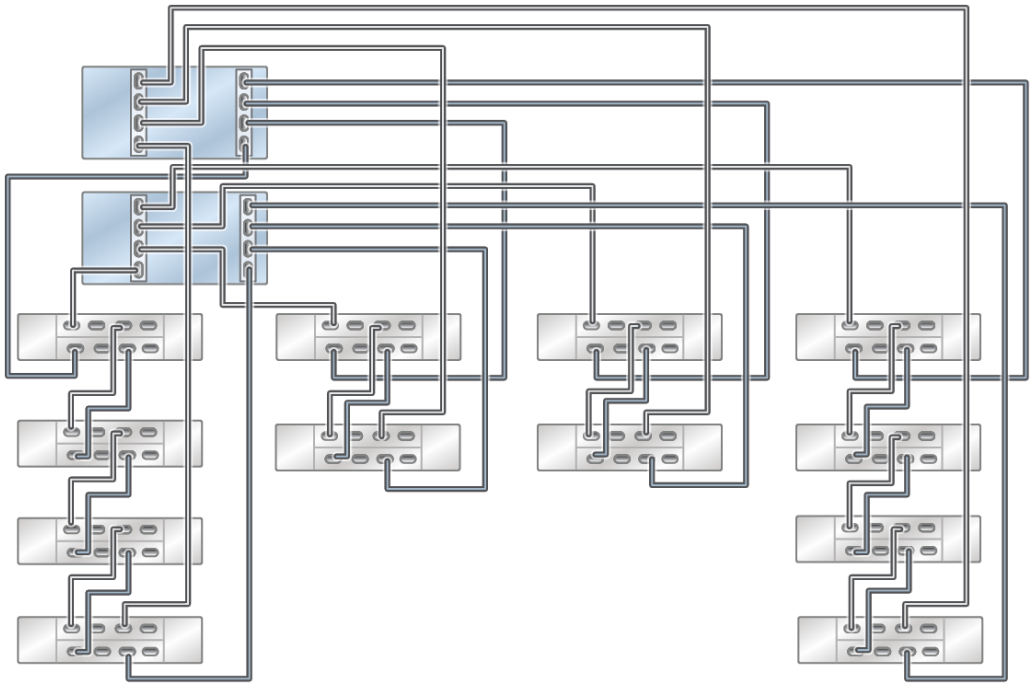
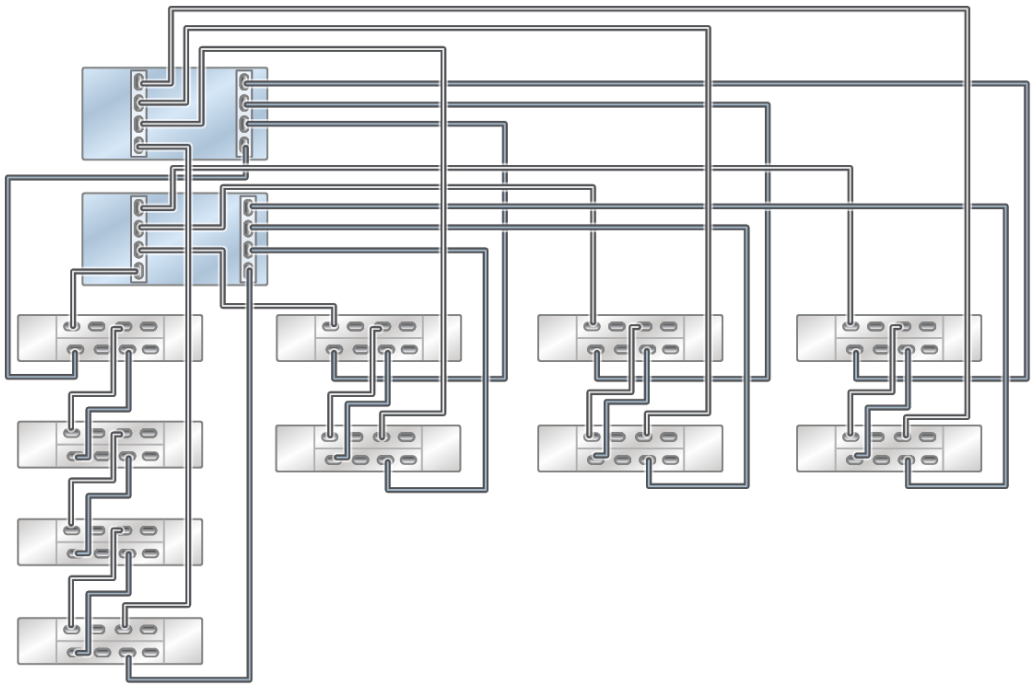


FIGURE 617 ZS5-2 Racked System All Flash with six DE3-24C (first two chains from the left) and four DE3-24P disk shelves in four chains



Oracle DE3-24C Disk Shelf to ZFS Storage Appliance Racked System ZS5-4

This section contains an overview of the ZS5-4 Racked System and its supported configurations.

For more information, see the following topics:

Overview of Oracle ZFS Storage Appliance Racked System ZS5-4

The Oracle ZFS Storage Appliance Racked System ZS5-4 is a pre-racked and pre-cabled system comprising two clustered ZS5-4 controllers and up to eight DE3-24C disk shelves in the base cabinet. Up to three expansion cabinets with up to ten DE3-24C disk shelves each can be connected to the base cabinet, for a total of 38 disk shelves.

Configurations are offered in multiples of two disk shelves, as well as half-rack expansion: 2 disk shelves (minimum), 4, 6, 8, 10, 12, 13 (half rack), 14, 16, 18, 20, 22, 23 (half rack), 24, 26, 28, 30, 32, 33 (half rack), 34, 36, and 38 (maximum). Each ZS5-4 controller supports two, three, or four SAS HBA cards. However, four SAS HBA cards must be installed in each ZS5-4 controller to support disk shelves in the expansion cabinet(s).

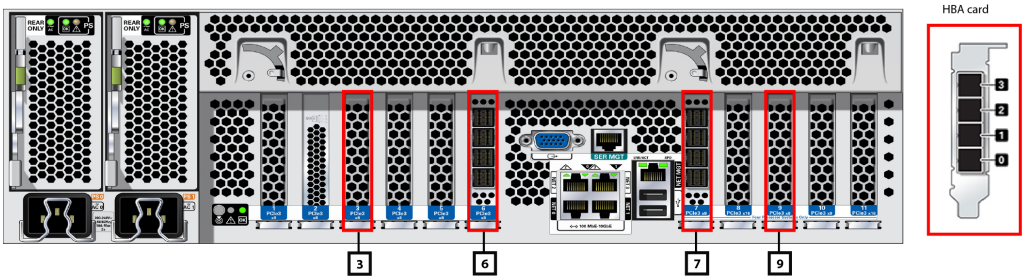
If the clustered ZS5-4 controllers contain four SAS HBAs each, they support a high-availability configuration of:

- Two chains of four disk shelves per disk chain in the base cabinet for a total of eight disk shelves, and
- One to three expansion cabinets, each cabinet supporting two chains with a maximum of five disk shelves per disk chain, for a total of 10 disk shelves for one expansion cabinet, 20 disk shelves for two expansion cabinets, or 30 disk shelves for three expansion cabinets.

The base cabinet is self-contained and pre-cabled following the required cabling methodology. The section "Cabling Tables and Diagrams" describes how pre-racked systems are cabled, as well as how to expand your system in the future.

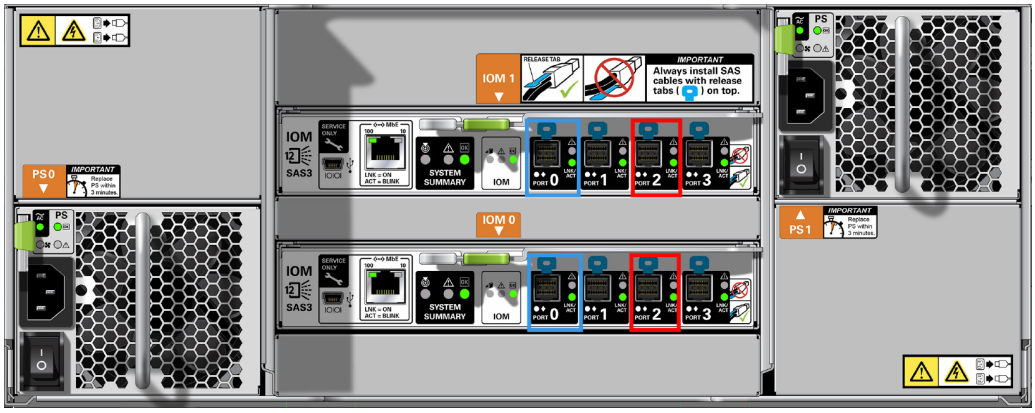
Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS5-4 controller occupies three rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet, and the bottom controller is Controller 0 in RU17. The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 618 ZS5-4 HBA Slot Numbers (Back View)



Each DE3-24C disk shelf occupies four rack units, and disk shelves are normally installed from the bottom of the cabinet to the top for stability. To provide higher performance capabilities, disk chains are alternated from the bottom to the top of the base cabinet, with four disk shelves per chain and gaps between components. Therefore, the first disk shelf is in RU01, the second in RU05, the third in RU23, the fourth in RU27, the fifth in RU09, and so on in an alternating manner. As shown in the following figure, the DE3-24C disk shelf has two I/O Modules (IOMs) with four ports each. In all cabling configurations, Port 1 and Port 3 are never used.

FIGURE 619 DE3-24C HBA Connections (Back View)



Cabling Tables and Diagrams

The following table describes the locations and port connections for two controllers and eight disk shelves in the base cabinet, using 3-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs).

TABLE 7 Base Cabinet: Controller to Disk Shelf (3-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 0	1	1	IOM 1, Port 2
17	0	Slot 6, Port 0	1	1	IOM 0, Port 2
20	1	Slot 7, Port 0	23	3	IOM 1, Port 2
17	0	Slot 9, Port 0	23	3	IOM 0, Port 2
17	0	Slot 3, Port 0	5, 13	2, 6	IOM 1, Port 0
20	1	Slot 6, Port 0	5, 13	2, 6	IOM 0, Port 0
17	0	Slot 7, Port 0	27, 35	4, 8	IOM 1, Port 0
20	1	Slot 9, Port 0	27, 35	4, 8	IOM 0, Port 0

The following table describes the locations and port connections for ten disk shelves in Expansion Cabinet 1, using 6-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs). Expansion Cabinet 1 supports disk shelves 9 through 18.

TABLE 8 Expansion Cabinet 1: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 1	1	9	IOM 1, Port 2
17	0	Slot 6, Port 1	1	9	IOM 0, Port 2
20	1	Slot 7, Port 1	21	11	IOM 1, Port 2
17	0	Slot 9, Port 1	21	11	IOM 0, Port 2
17	0	Slot 3, Port 1	5, 9, 13, 17	10, 13, 14, 17	IOM 1, Port 0
20	1	Slot 6, Port 1	5, 9, 13, 17	10, 13, 14, 17	IOM 0, Port 0
17	0	Slot 7, Port 1	25, 33, 37	12, 16, 18	IOM 1, Port 0
20	1	Slot 9, Port 1	25, 33, 37	12, 16, 18	IOM 0, Port 0

The following table describes the locations and port connections for ten disk shelves in Expansion Cabinet 2, using 6-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs). Expansion Cabinet 2 supports disk shelves 19 through 28.

TABLE 9 Expansion Cabinet 2: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 2	1	19	IOM 1, Port 2
17	0	Slot 6, Port 2	1	19	IOM 0, Port 2
20	1	Slot 7, Port 2	21	21	IOM 1, Port 2
17	0	Slot 9, Port 2	21	21	IOM 0, Port 2
17	0	Slot 3, Port 2	5, 9, 13, 17	20, 23, 24, 27	IOM 1, Port 0
20	1	Slot 6, Port 2	5, 9, 13, 17	20, 23, 24, 27	IOM 0, Port 0
17	0	Slot 7, Port 2	25, 33, 37	22, 26, 28	IOM 1, Port 0
20	1	Slot 9, Port 2	25, 33, 37	22, 26, 28	IOM 0, Port 0

The following table describes the locations and port connections for ten disk shelves in Expansion Cabinet 3, using 6-meter SAS cables. The first disk shelf is located in RU01, and

each disk shelf has two I/O Modules (IOMs). Expansion Cabinet 2 supports disk shelves 29 through 38.

TABLE 10 Expansion Cabinet 3: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 3	1	29	IOM 1, Port 2
17	0	Slot 6, Port 3	1	29	IOM 0, Port 2
20	1	Slot 7, Port 3	21	31	IOM 1, Port 2
17	0	Slot 9, Port 3	21	31	IOM 0, Port 2
17	0	Slot 3, Port 3	5, 9, 13, 17	30, 33, 34, 37	IOM 1, Port 0
20	1	Slot 6, Port 3	5, 9, 13, 17	30, 33, 34, 37	IOM 0, Port 0
17	0	Slot 7, Port 3	25, 33, 37	32, 36, 38	IOM 1, Port 0
20	1	Slot 9, Port 3	25, 33, 37	32, 36, 38	IOM 0, Port 0

The following diagrams describe how pre-racked systems are cabled, as well as how to expand your system in the future.

FIGURE 620 ZFS Storage Appliance Racked System ZS5-4: 10 DE3-24C Disk Shelves

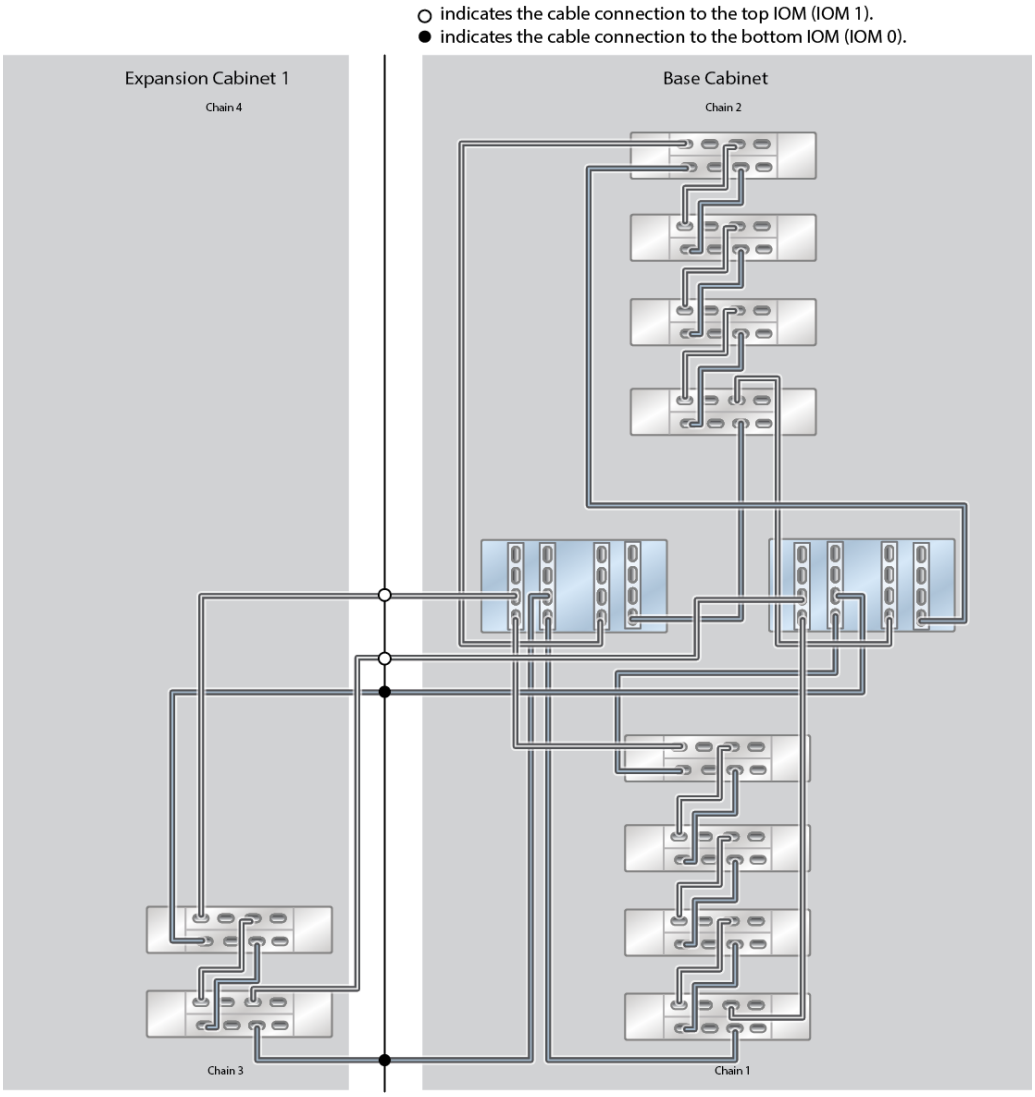


FIGURE 621 ZFS Storage Appliance Racked System ZS5-4: 12 DE3-24C Disk Shelves

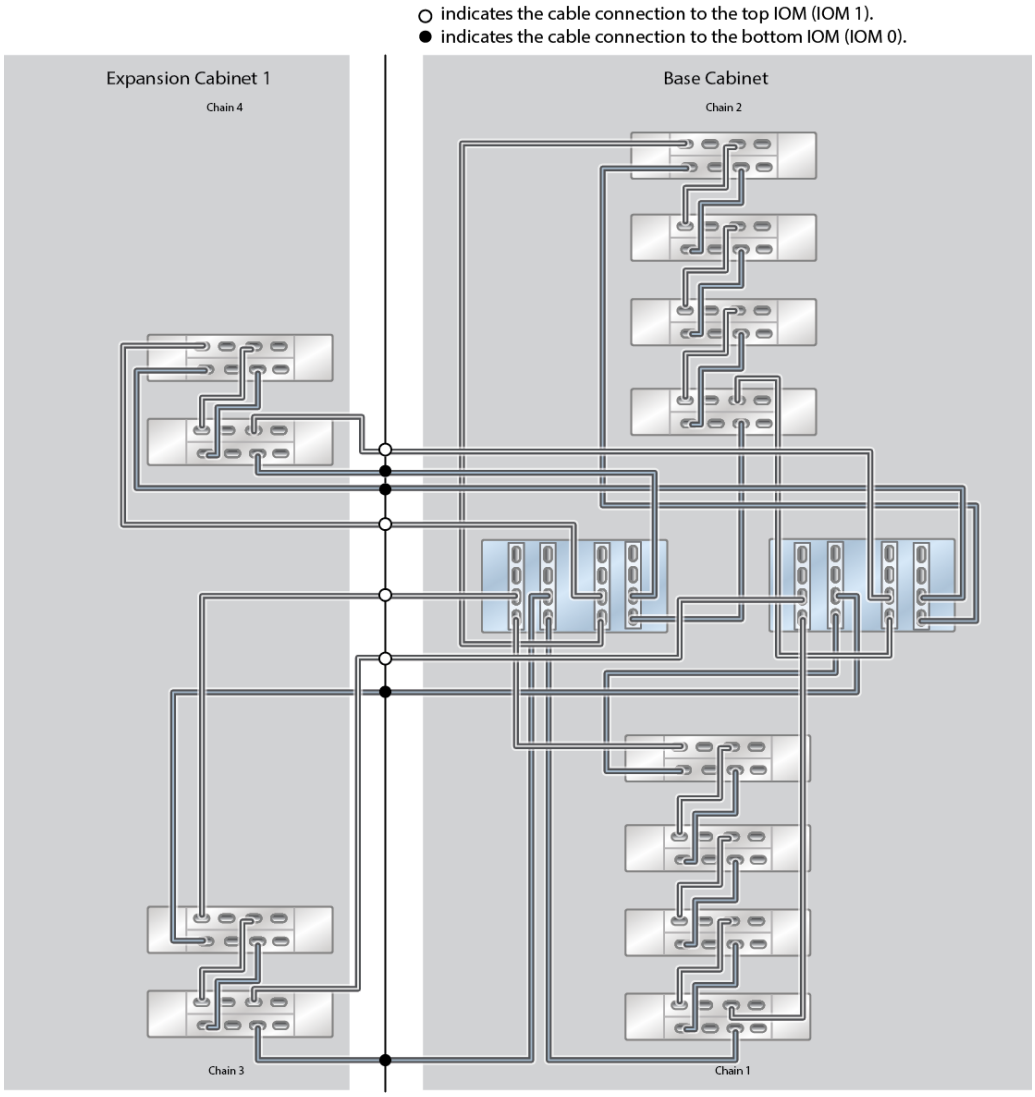


FIGURE 622 ZFS Storage Appliance Racked System ZS5-4: 13 DE3-24C Disk Shelves (Half Rack)

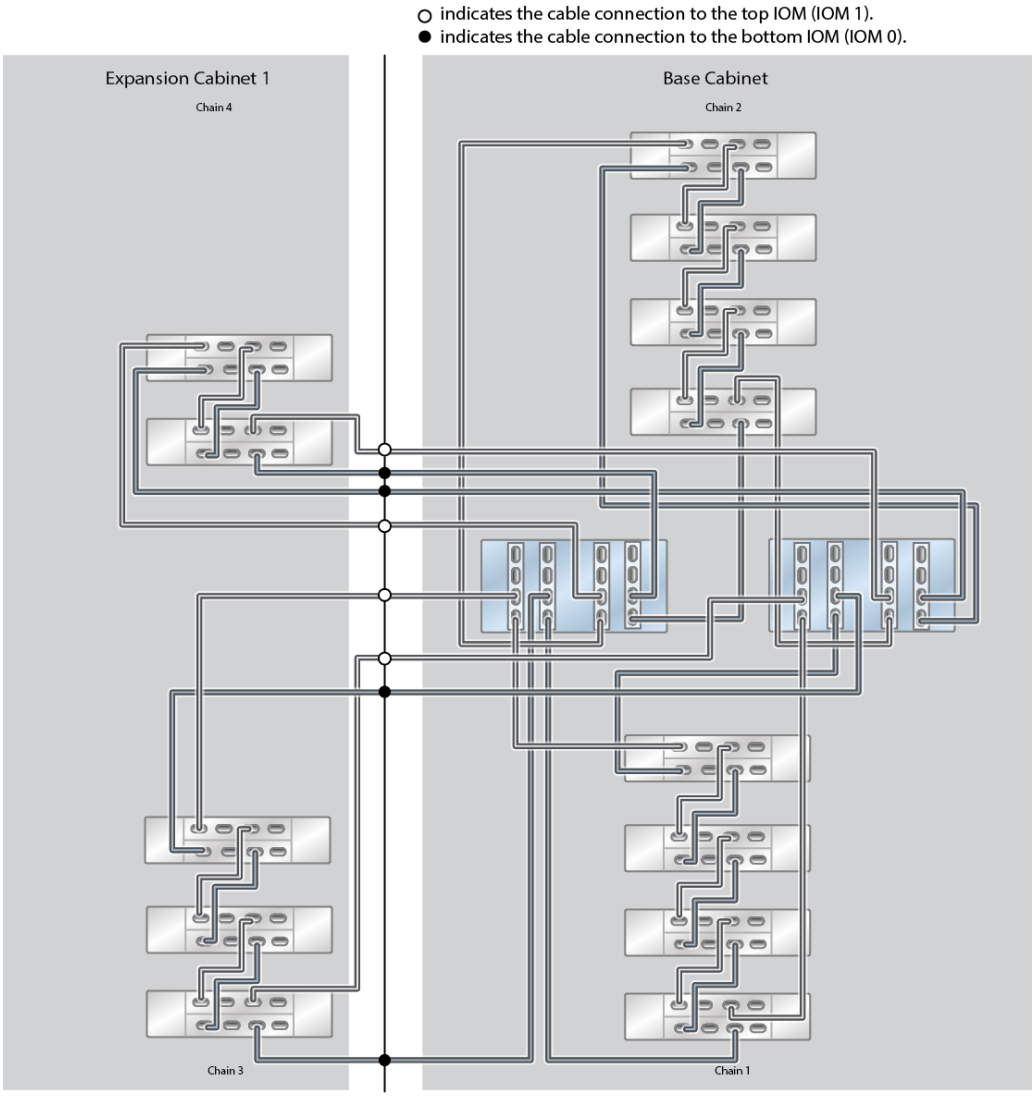


FIGURE 623 ZFS Storage Appliance Racked System ZS5-4: 14 DE3-24C Disk Shelves

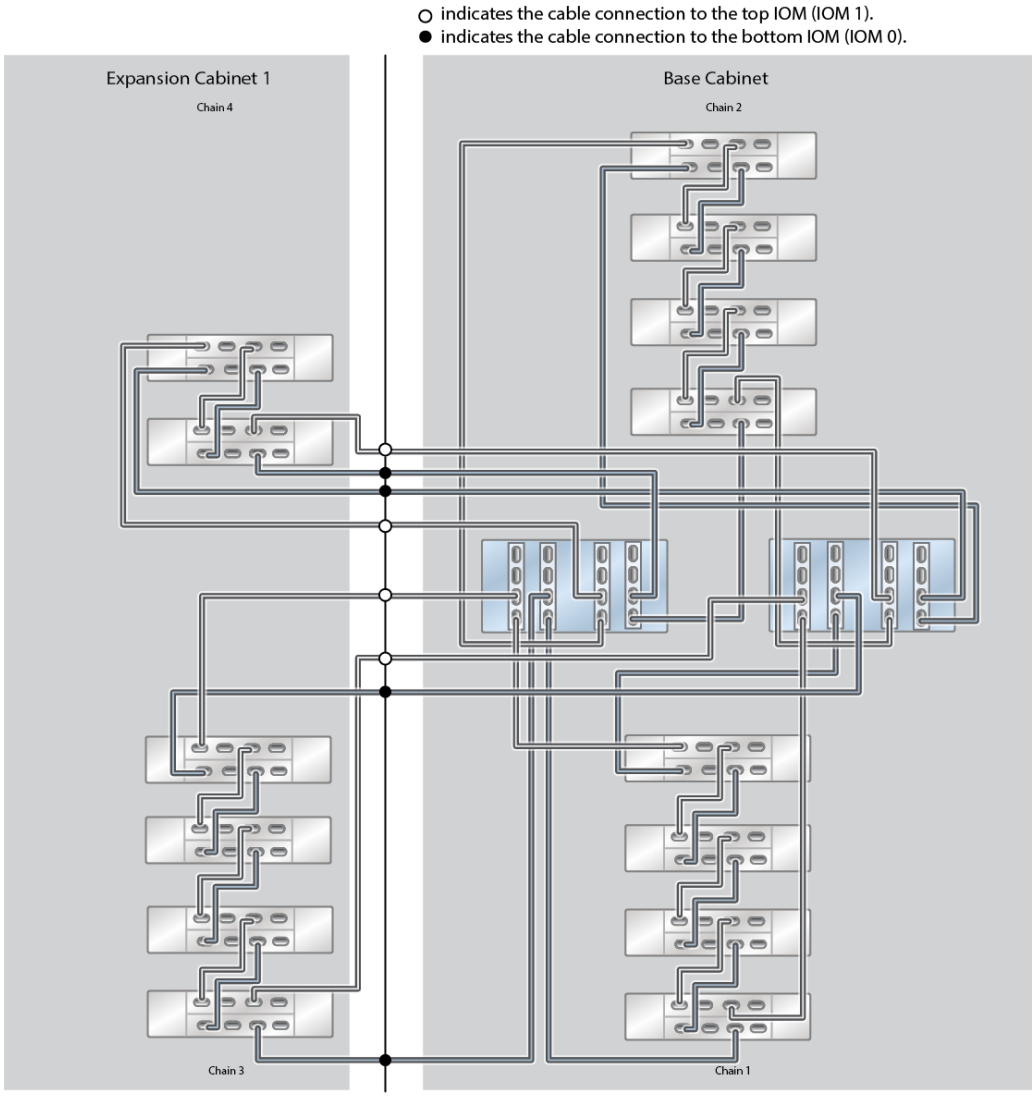


FIGURE 624 ZFS Storage Appliance Racked System ZS5-4: 16 DE3-24C Disk Shelves

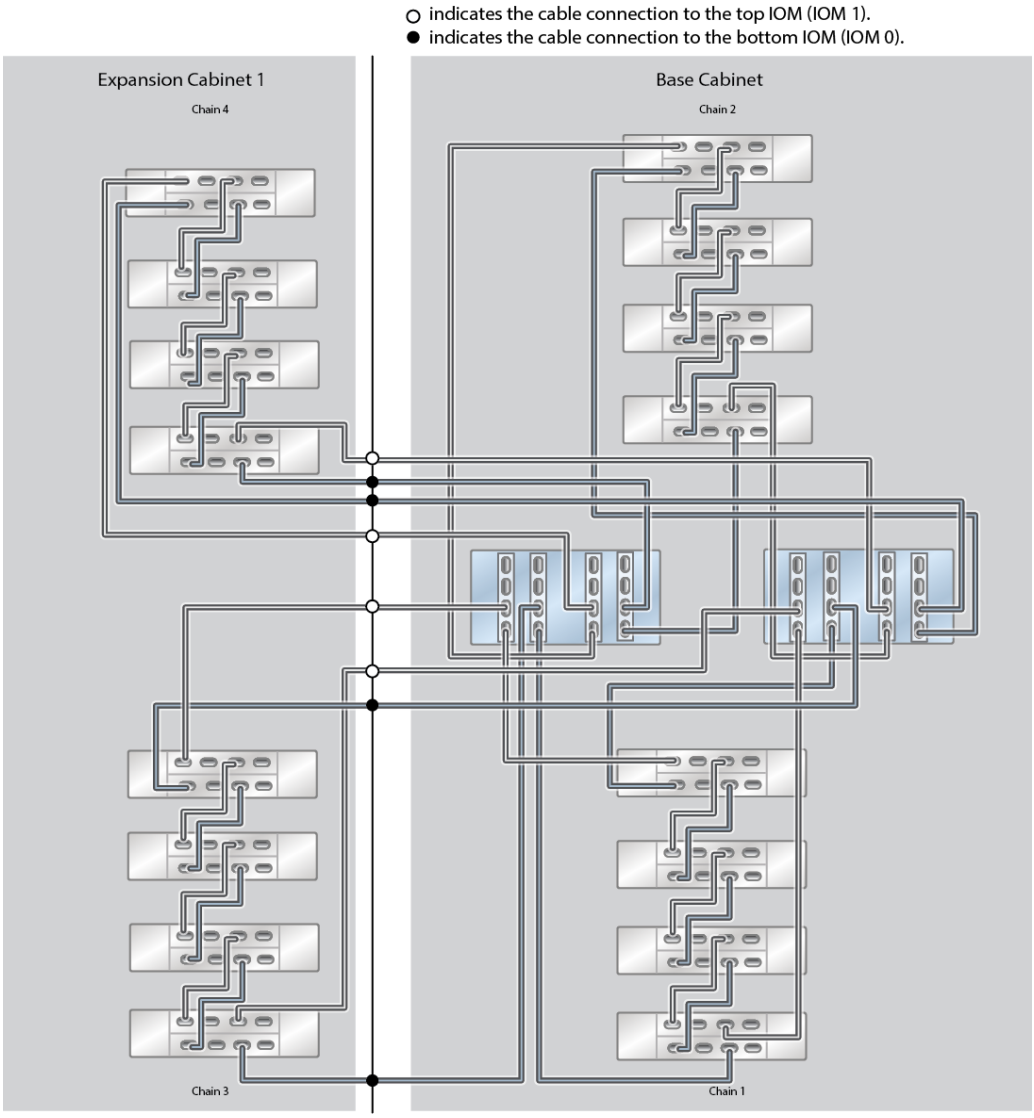


FIGURE 625 ZFS Storage Appliance Racked System ZS5-4: 18 DE3-24C Disk Shelves

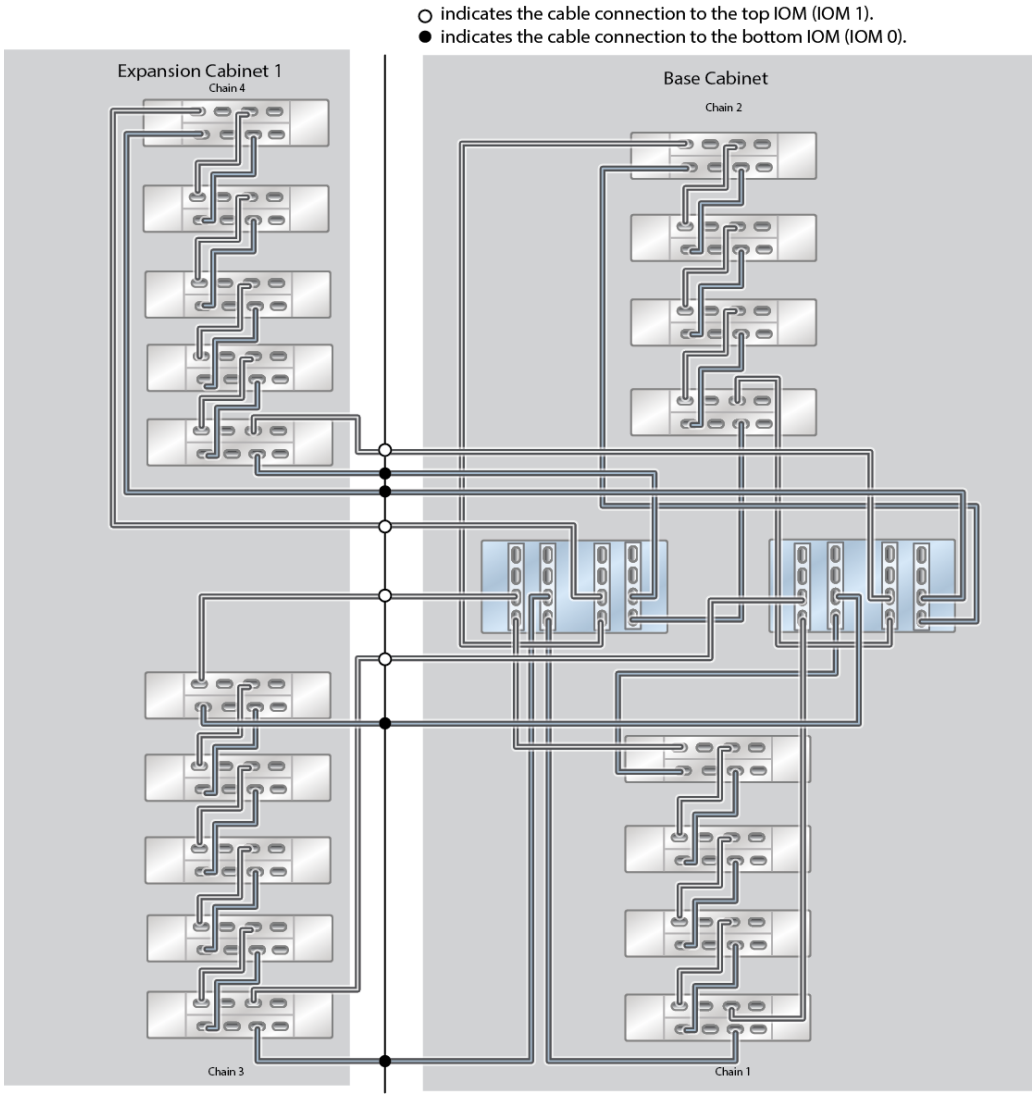


FIGURE 626 ZFS Storage Appliance Racked System ZS5-4: 20 DE3-24C Disk Shelves

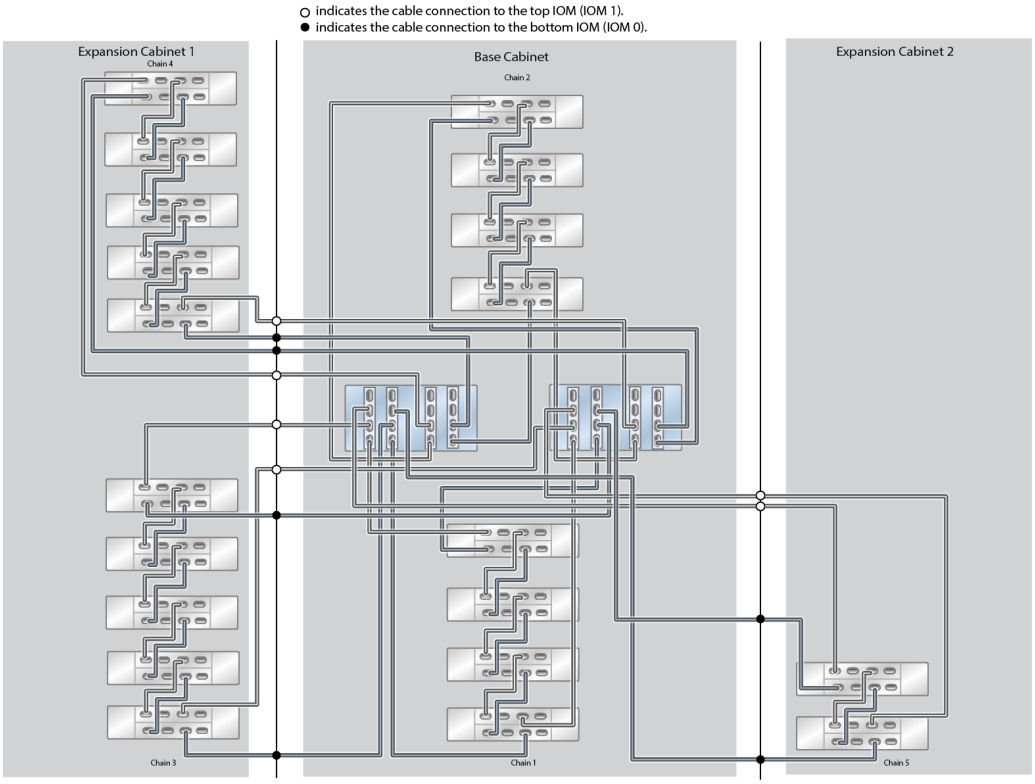


FIGURE 627 ZFS Storage Appliance Racked System ZS5-4: 22 DE3-24C Disk Shelves

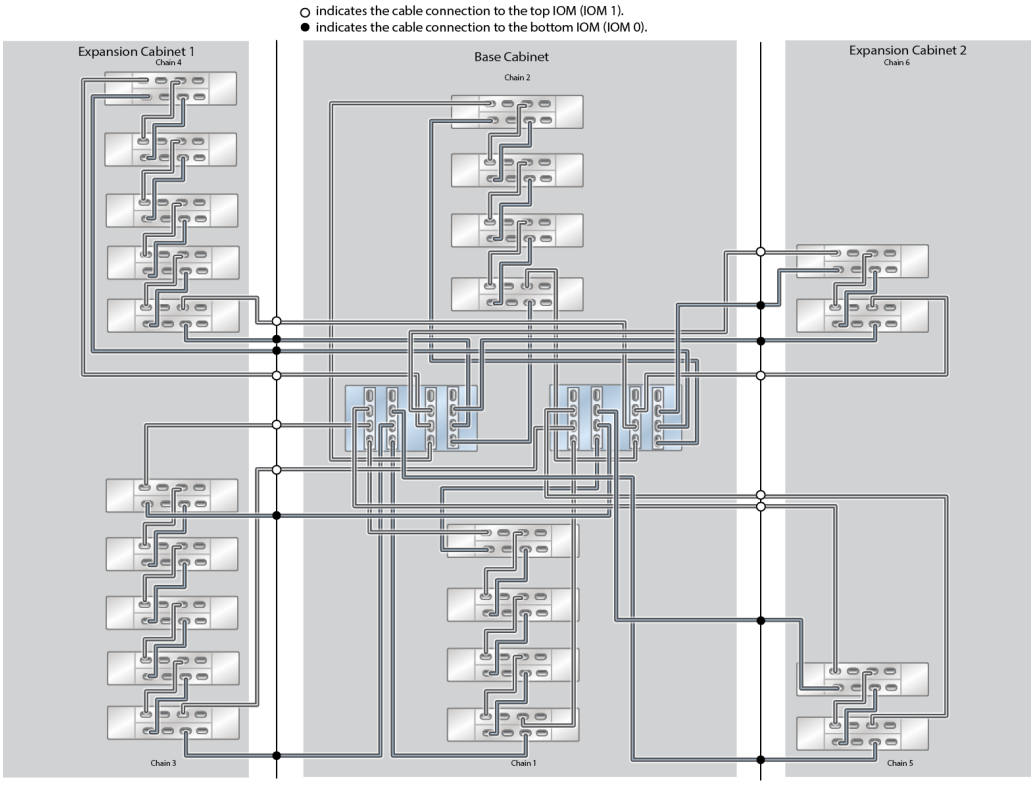


FIGURE 628 ZFS Storage Appliance Racked System ZS5-4: 23 DE3-24C Disk Shelves (Half Rack)

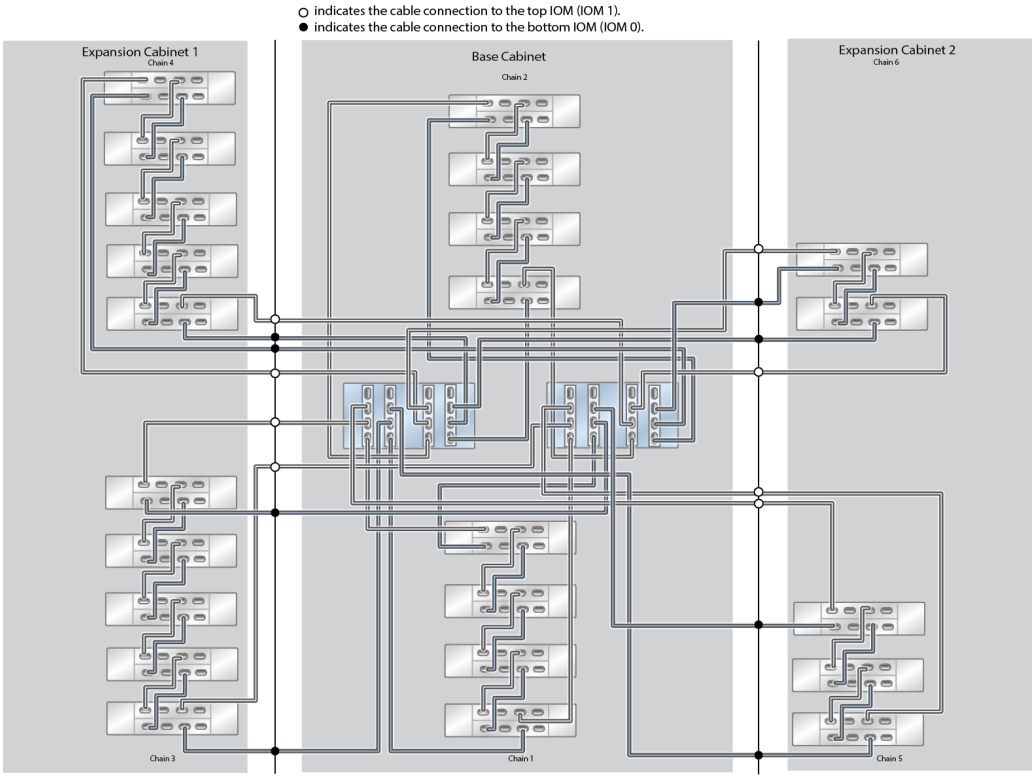


FIGURE 629 ZFS Storage Appliance Racked System ZS5-4: 24 DE3-24C Disk Shelves

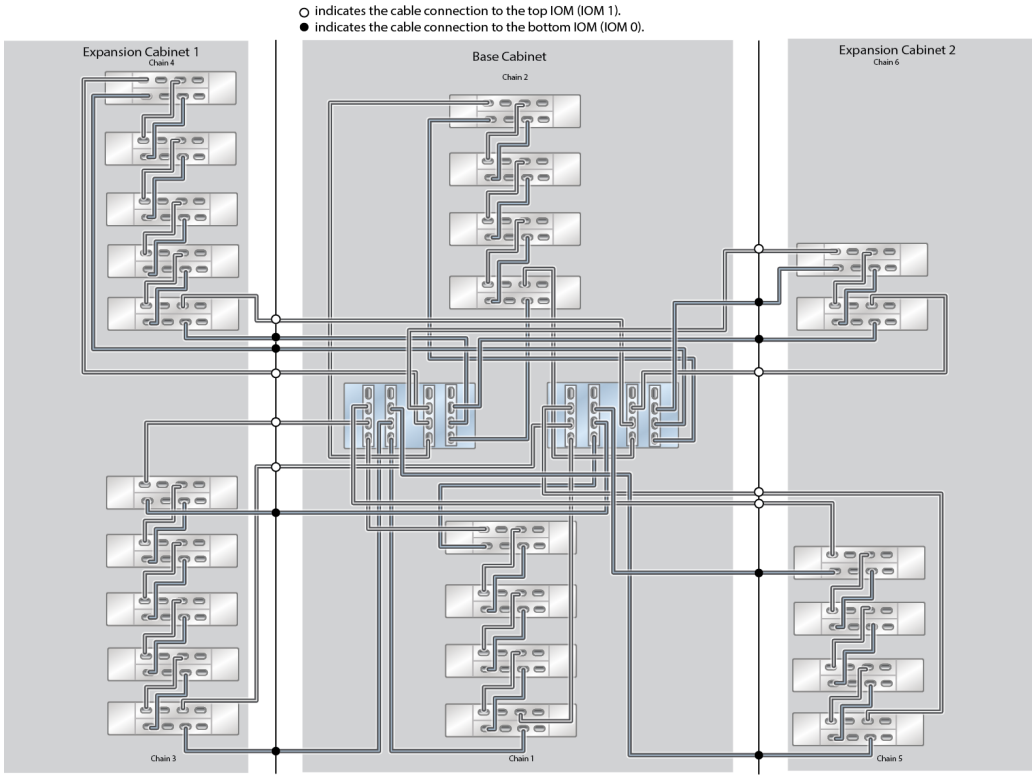


FIGURE 630 ZFS Storage Appliance Racked System ZS5-4: 26 DE3-24C Disk Shelves

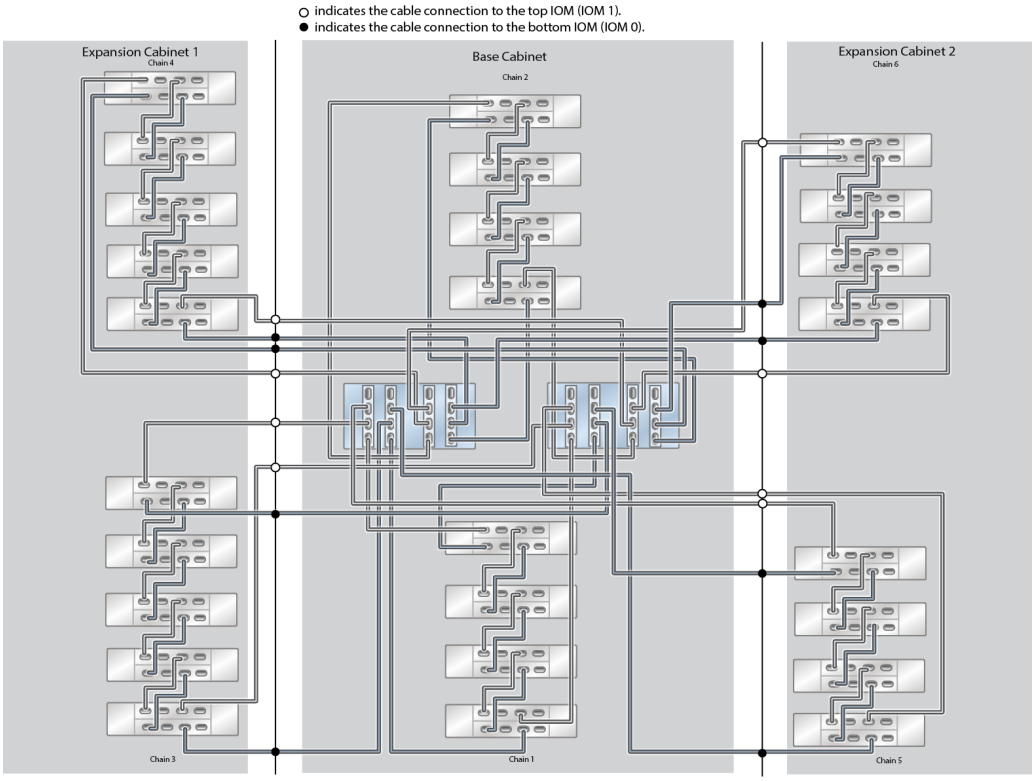


FIGURE 631 ZFS Storage Appliance Racked System ZS5-4: 28 DE3-24C Disk Shelves

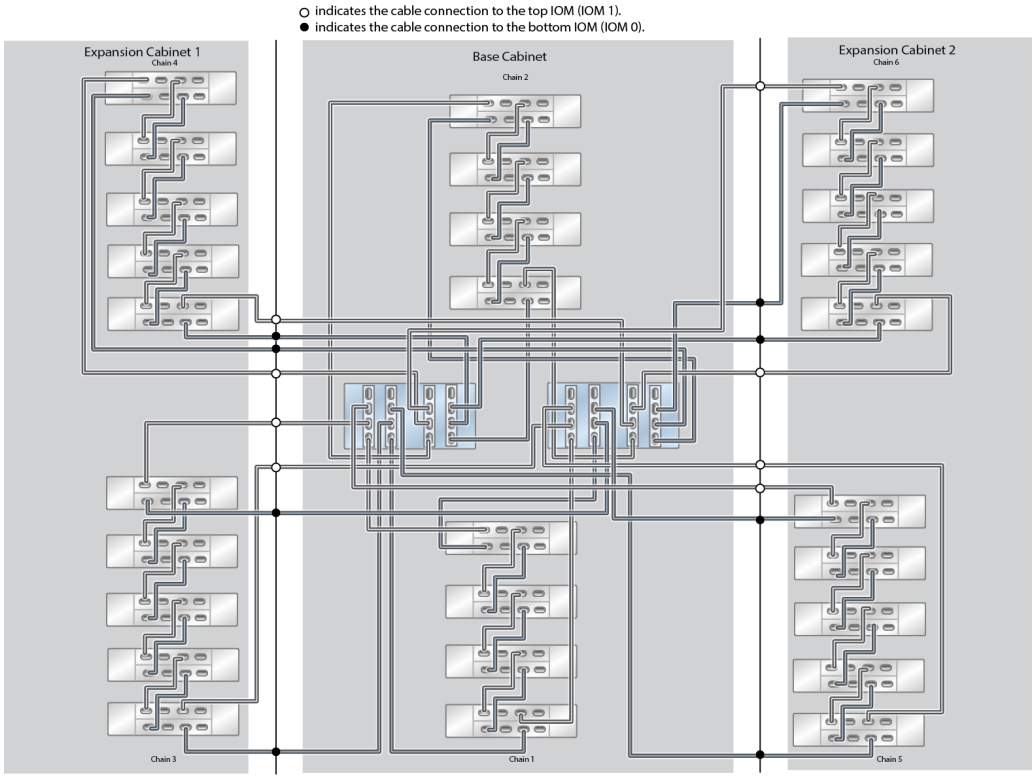


FIGURE 632 ZFS Storage Appliance Racked System ZS5-4: 30 DE3-24C Disk Shelves

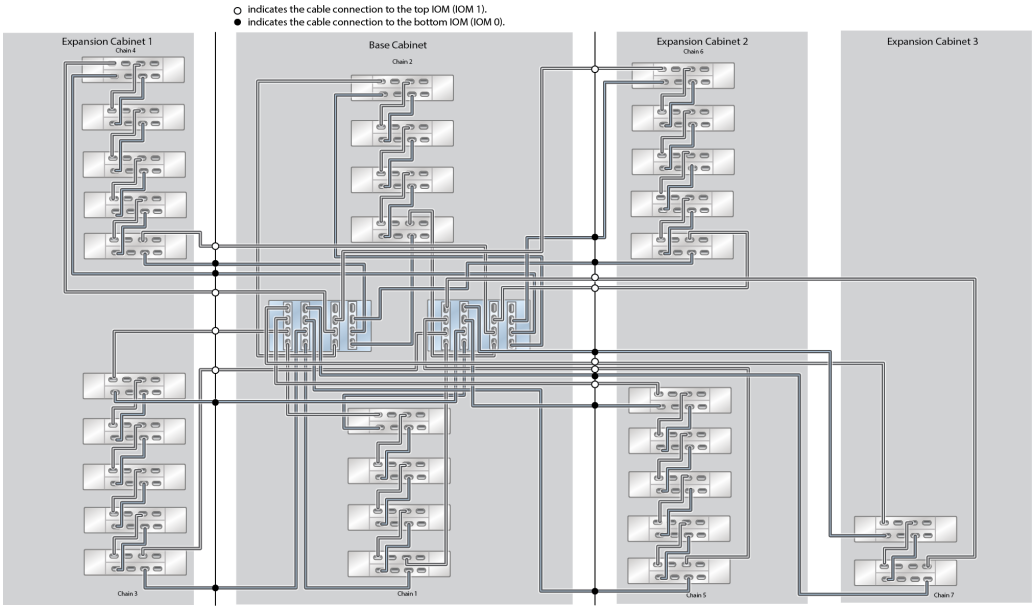


FIGURE 633 ZFS Storage Appliance Racked System ZS5-4: 32 DE3-24C Disk Shelves

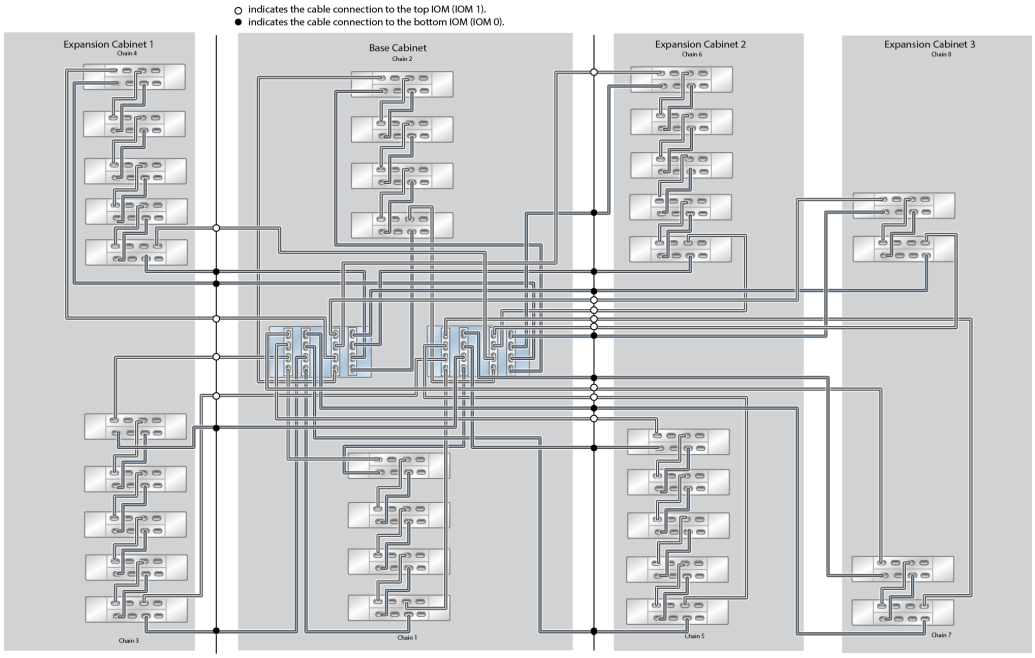


FIGURE 634 ZFS Storage Appliance Racked System ZS5-4: 33 DE3-24C Disk Shelves (Half Rack)

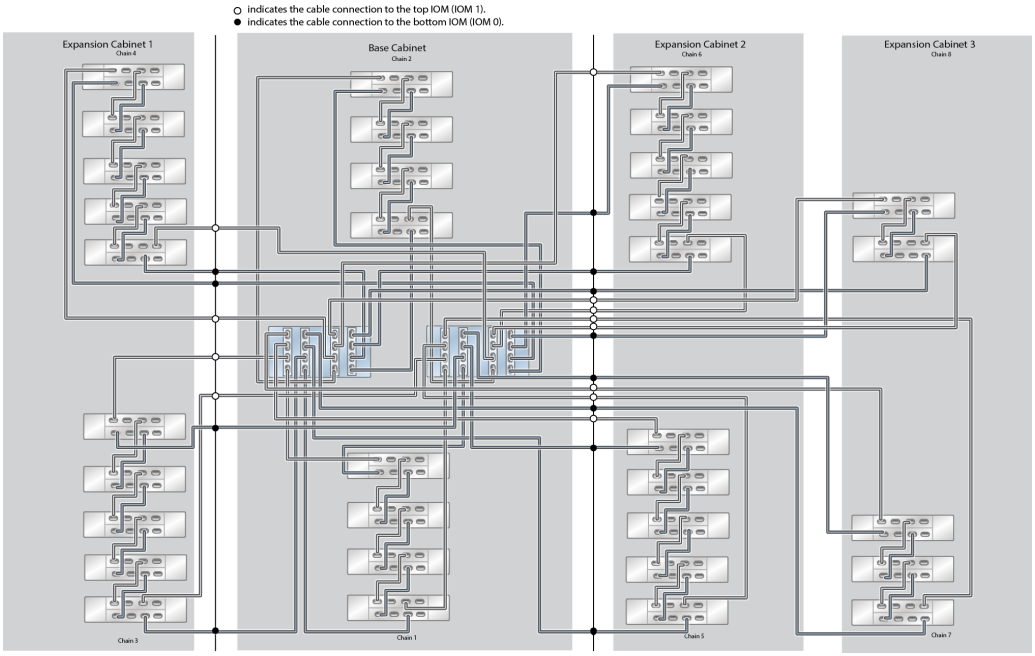


FIGURE 635 ZFS Storage Appliance Racked System ZS5-4: 34 DE3-24C Disk Shelves

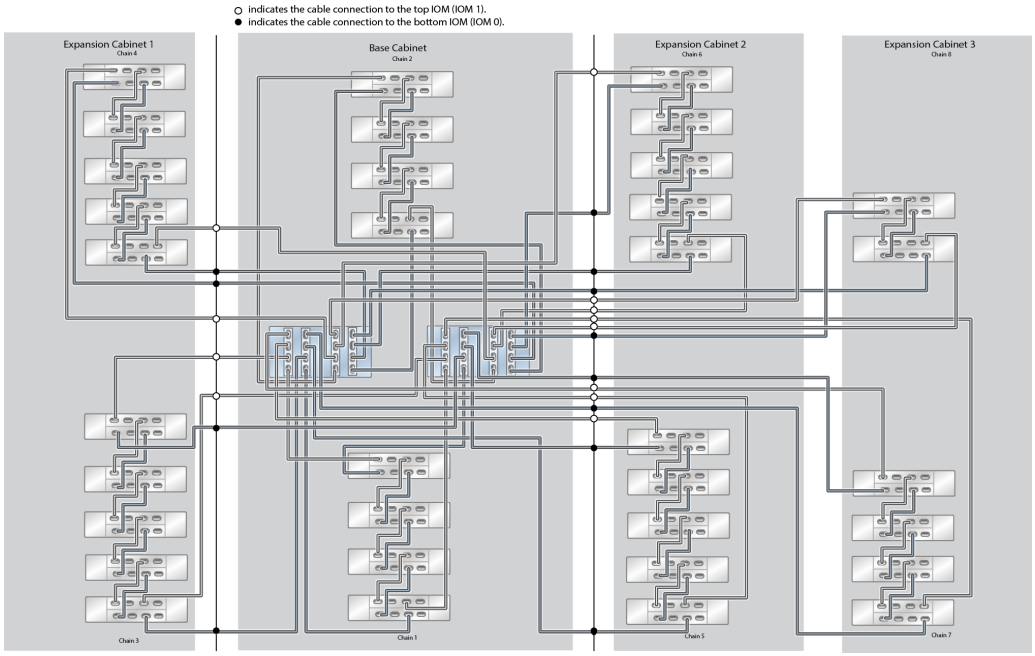


FIGURE 636 ZFS Storage Appliance Racked System ZS5-4: 36 DE3-24C Disk Shelves

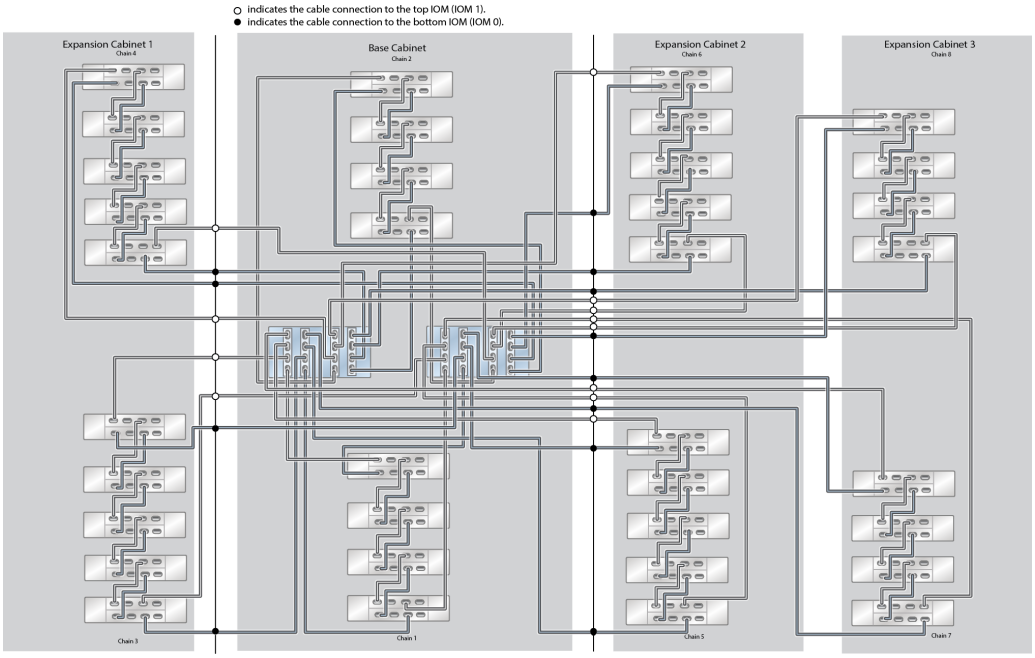
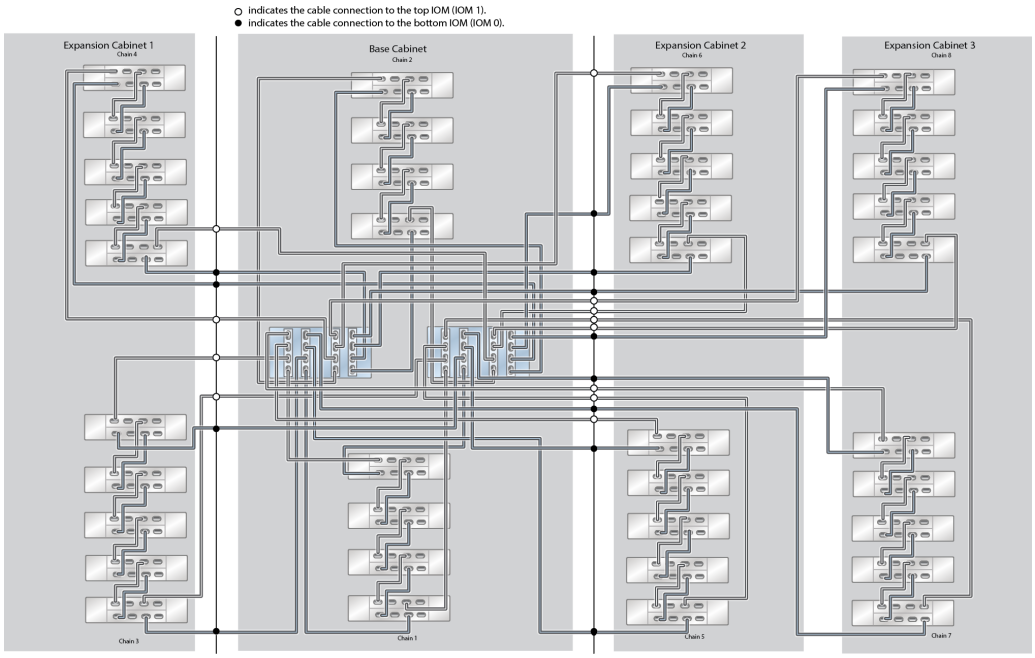


FIGURE 637 ZFS Storage Appliance Racked System ZS5-4: 38 DE3-24C Disk Shelves



Oracle DE3-24C Disk Shelf to ZFS Storage Appliance Racked System ZS5-2

This section contains an overview of the ZS5-2 Racked System and its supported configurations.

For more information, see the following topics:

- "Overview of Oracle ZFS Storage Appliance Racked System ZS5-2" on page 427
- "Cabling Tables and Diagrams" on page 429

Overview of Oracle ZFS Storage Appliance Racked System ZS5-2

The Oracle ZFS Storage Appliance Racked System ZS5-2 is a pre-racked and pre-cabled system comprising two clustered ZS5-2 controllers and up to eight DE3-24C disk shelves in the base cabinet. One expansion cabinet with up to eight DE3-24C disk shelves can be connected to the base cabinet, for a total of 16 disk shelves.

Configurations are offered in multiples of two disk shelves, as well as half-rack expansion: 1 disk shelf (minimum), 2, 4, 6, 8, 10, 12, 13 (half rack), 14, and 16 (maximum). Each ZS5-2 controller supports one or two SAS HBA cards. However, two SAS HBA cards must be installed in each ZS5-2 controller to support disk shelves in the expansion cabinet.

If the clustered ZS5-2 controllers contain two SAS HBAs each, they support a high-availability configuration of:

- Two chains of four disk shelves per disk chain in the base cabinet for a total of eight disk shelves, and
- One expansion cabinet that supports two chains with a maximum of four disk shelves per disk chain, for a total of eight disk shelves.

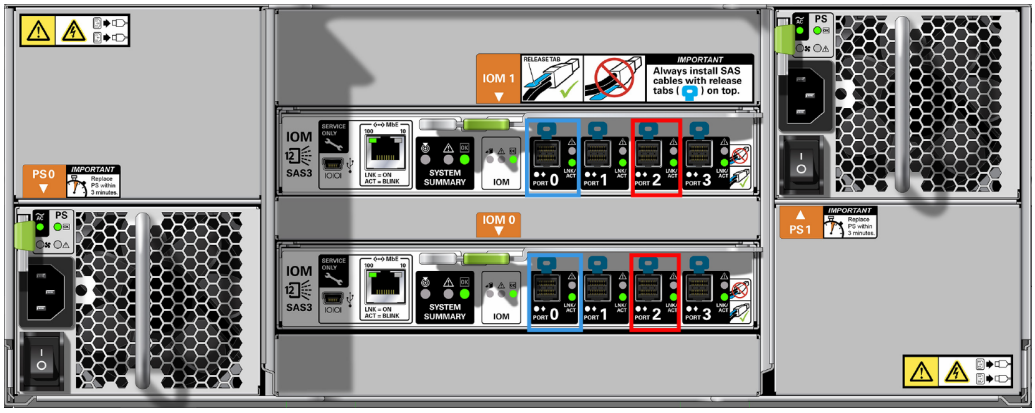
The base cabinet is self-contained and pre-cabled following the required cabling methodology. The section "Cabling Tables and Diagrams" describes how pre-racked systems are cabled, as well as how to expand your system in the future.

Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS5-2 controller occupies two rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet, and the bottom controller is Controller 0 in RU17. Since the ZS5-2 controller occupies two rack units, the base cabinet contains a filler panel above each controller so the cabinet layout is similar to those of other Oracle racked systems with three-rack-unit controllers. The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 638 ZS5-2 HBA Slot Numbers (Back View)

Each DE3-24C disk shelf occupies four rack units, and disk shelves are normally installed from the bottom of the cabinet to the top for stability. To provide higher performance capabilities, disk chains are alternated from the bottom to the top of the base cabinet, with four disk shelves per chain and gaps between components. Therefore, the first disk shelf is in RU01, the second in RU05, the third in RU23, the fourth in RU27, the fifth in RU09, and so on in an alternating manner. As shown in the following figure, the DE3-24C disk shelf has two I/O Modules (IOMs) with four ports each. In all cabling configurations, Port 1 and Port 3 are never used.

FIGURE 639 DE3-24C HBA Connections (Back View)



Cabling Tables and Diagrams

The following table describes the locations and port connections for two controllers and eight disk shelves in the base cabinet, using 3-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs).

TABLE 11 Base Cabinet: Controller to Disk Shelf (3-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 2, Port 0	1	1	IOM 1, Port 2
17	0	Slot 6, Port 0	1	1	IOM 0 Port 2
20	1	Slot 2, Port 1	23	3	IOM 1, Port 2
17	0	Slot 6, Port 1	23	3	IOM 0 Port 2
17	0	Slot 2, Port 0	1, 5, 13	1, 2, 6	IOM 1, Port 0
20	1	Slot 6, Port 0	1, 5, 13	1, 2, 6	IOM 0, Port 0
17	0	Slot 2, Port 1	27, 35	4, 8	IOM 1, Port 0
20	1	Slot 6, Port 1	27, 35	4, 8	IOM 0, Port 0

The following table describes the locations and port connections for eight disk shelves in an expansion cabinet, using 6-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs). The expansion Cabinet supports disk shelves 9 through 16.

TABLE 12 Expansion Cabinet: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 2, Port 2	1	9	IOM 1, Port 2
17	0	Slot 6, Port 2	1	9	IOM 0, Port 2
20	1	Slot 2, Port 3	21	11	IOM 1, Port 2
17	0	Slot 6, Port 3	21	11	IOM 0, Port 2
17	0	Slot 2, Port 2	5, 9, 13	10, 13, 14	IOM 1, Port 0
20	1	Slot 6, Port 2	5, 9, 13	10, 13, 14	IOM 0, Port 0
17	0	Slot 2, Port 3	25, 33	12, 16	IOM 1, Port 0
20	1	Slot 6, Port 3	25, 33	12, 16	IOM 0, Port 0

The following diagrams describe how pre-racked systems are cabled, as well as how to expand your system in the future.

FIGURE 640 ZFS Storage Appliance Racked System ZS5-2: 10 DE3-24C Disk Shelves

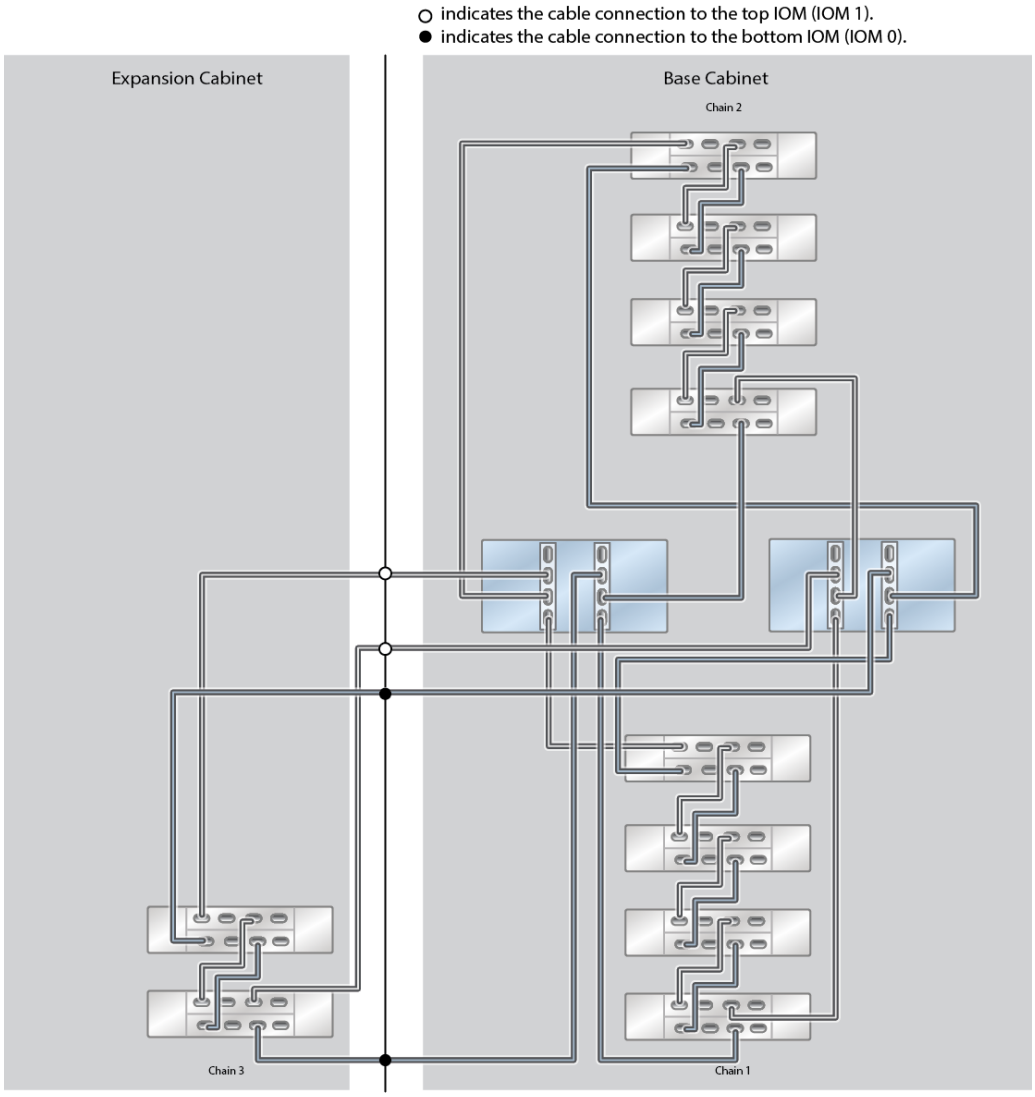


FIGURE 641 ZFS Storage Appliance Racked System ZS5-2: 12 DE3-24C Disk Shelves

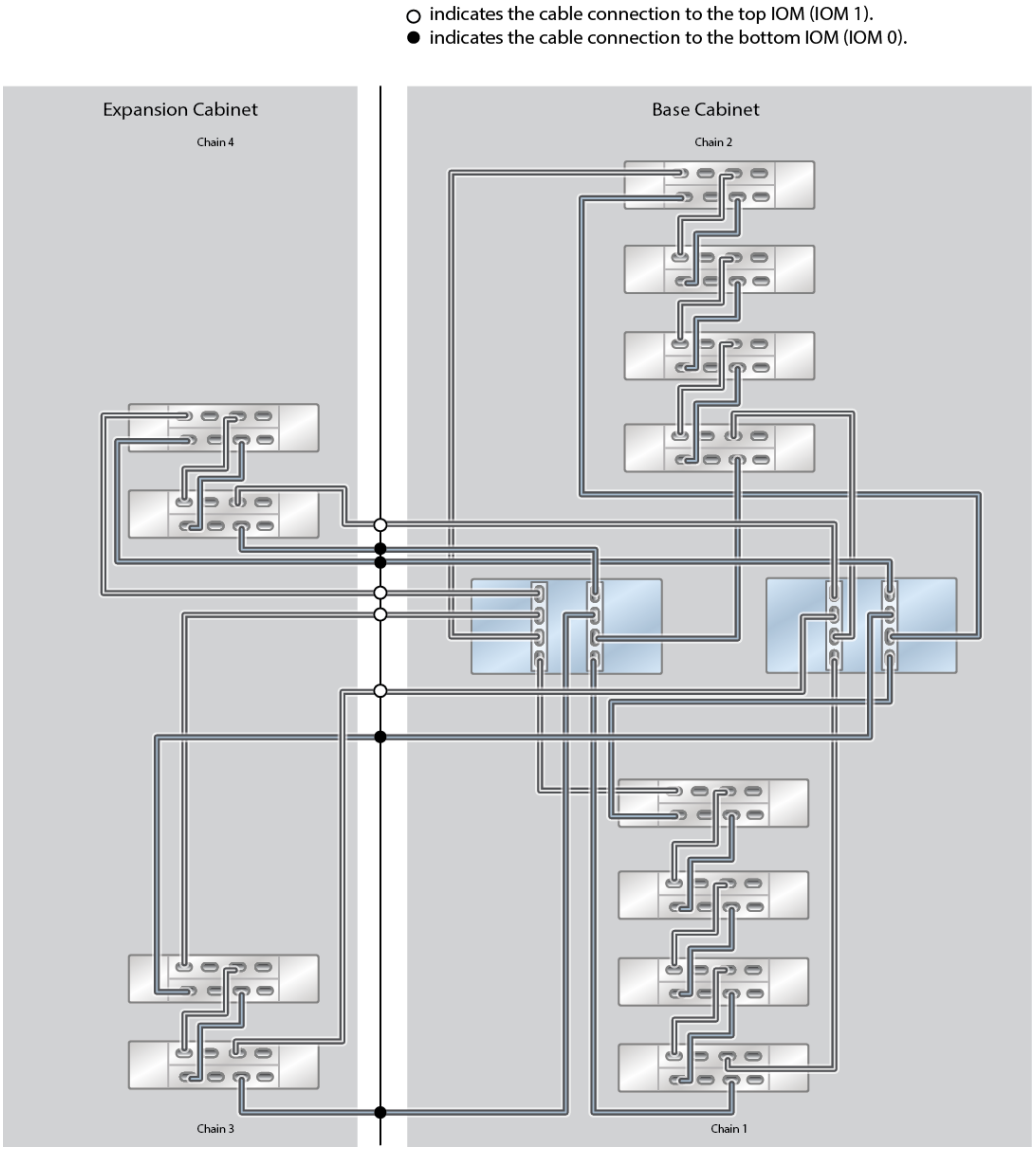


FIGURE 642 ZFS Storage Appliance Racked System ZS5-2: 13 DE3-24C Disk Shelves (Half Rack)

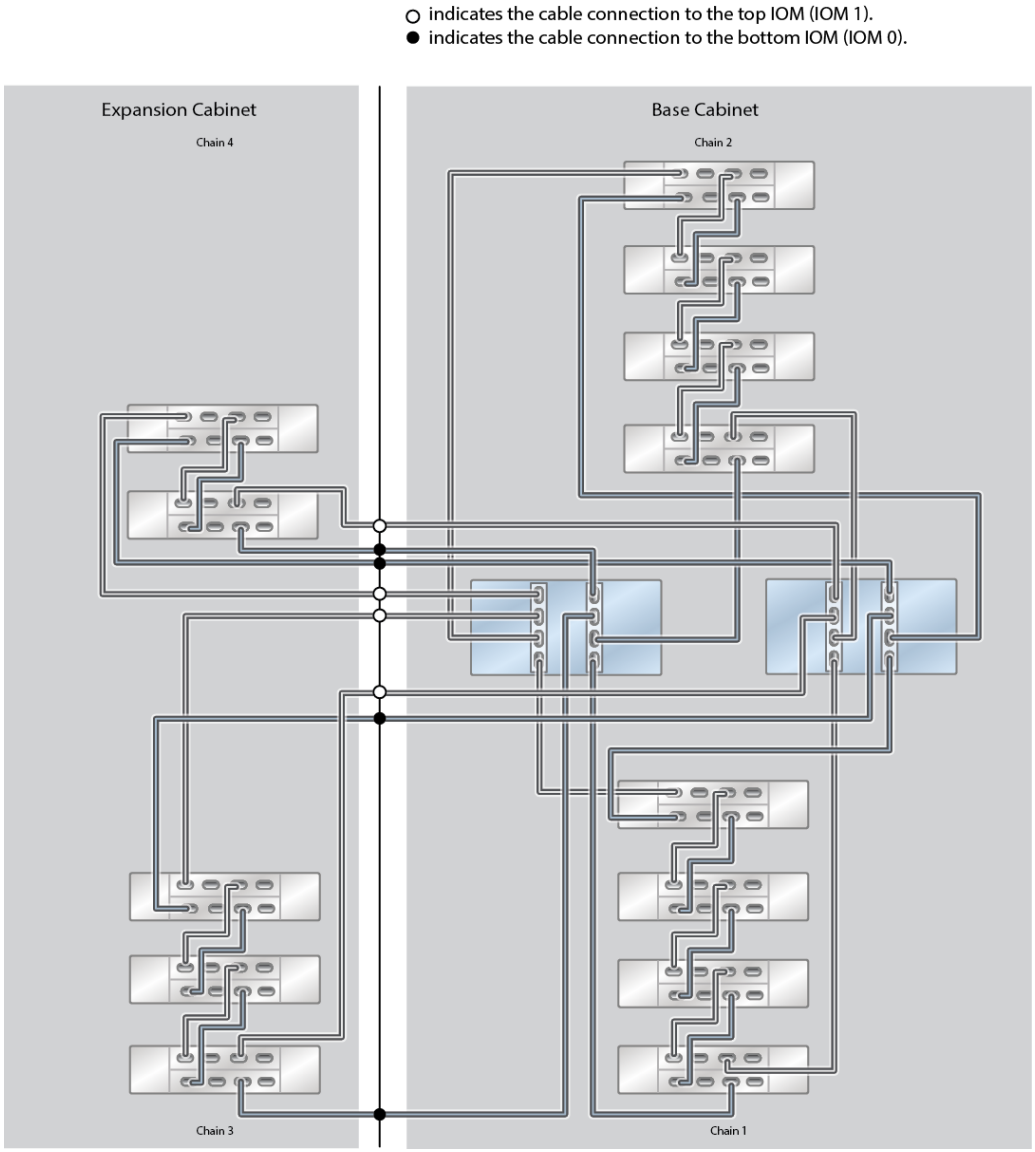


FIGURE 643 ZFS Storage Appliance Racked System ZS5-2: 14 DE3-24C Disk Shelves

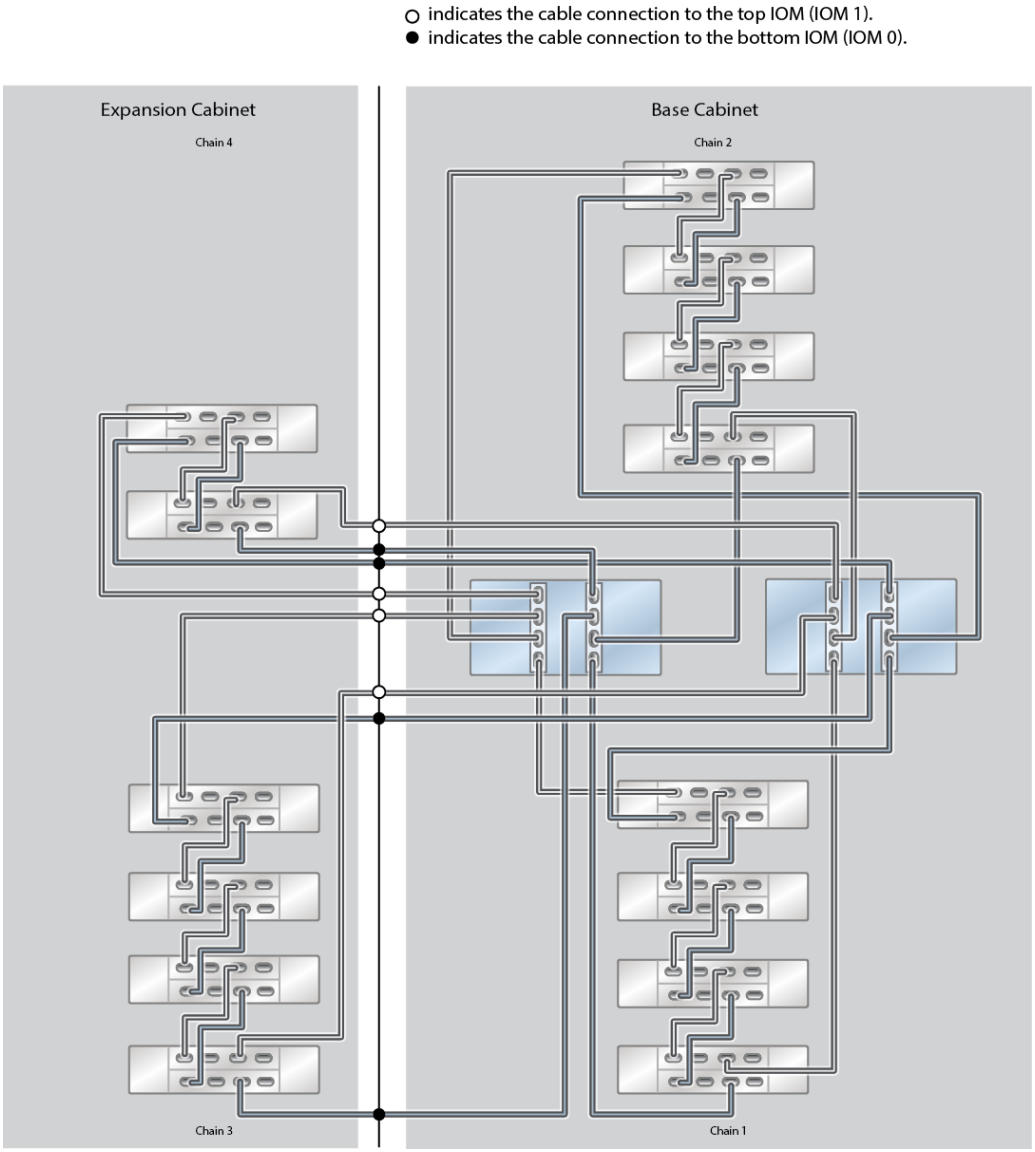
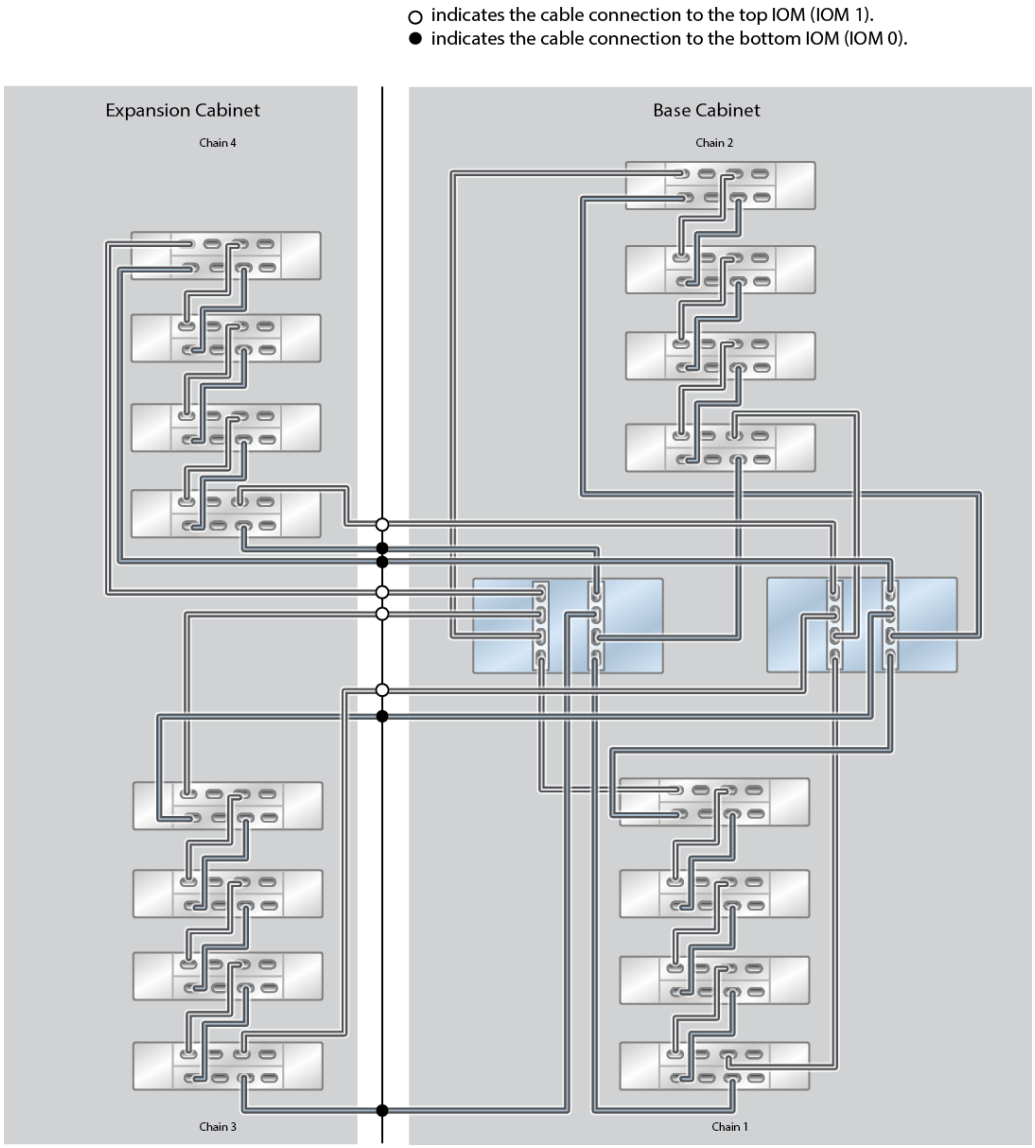


FIGURE 644 ZFS Storage Appliance Racked System ZS5-2: 16 DE3-24C Disk Shelves



Oracle DE2-24C Disk Shelf to ZFS Storage Appliance Racked System ZS4-4

This section contains an overview of the ZS4-4 Racked System and its supported configurations.

For more information, see the following topics:

Overview of Oracle ZFS Storage Appliance Racked System ZS4-4

The Oracle ZFS Storage Appliance Racked System ZS4-4 is a pre-racked and pre-cabled system comprising two clustered ZS4-4 controllers and up to eight DE2-24C disk shelves in the base cabinet. Up to two expansion cabinets with up to 10 DE2-24C disk shelves each can be connected to the base cabinet, for a total of 28 disk shelves.

Configurations are offered in multiples of two disk shelves, as well as half-rack expansion: 2 disk shelves (minimum), 4, 6, 8, 10, 12, 13 (half rack), 14, 16, 18, 20, 22, 23 (half rack), 24, 26, and 28 (maximum). Each ZS4-4 controller supports two, three, or four SAS HBA cards. However, four SAS HBA cards must be installed in each ZS4-4 controller to support disk shelves in the expansion cabinet(s).

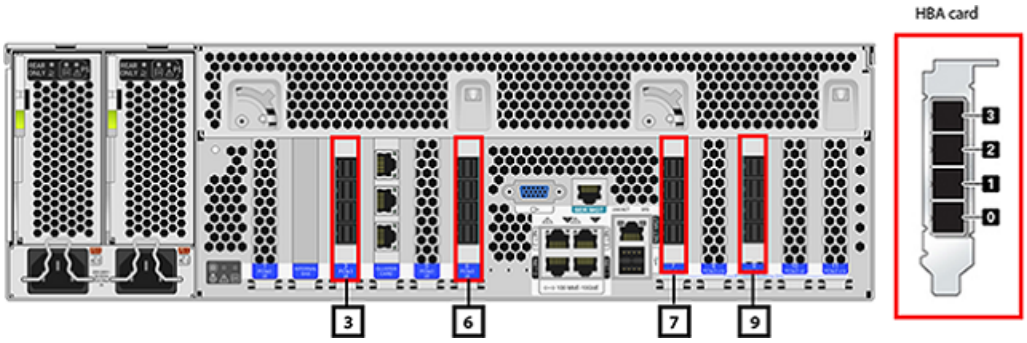
If the clustered ZS4-4 controllers contain four SAS HBAs each, they support a high-availability configuration of:

- Four chains of two disk shelves per disk chain in the base cabinet for a total of eight disk shelves, and
- One to two expansion cabinets, each cabinet supporting two chains with a maximum of five disk shelves per disk chain, for a total of 10 disk shelves for one expansion cabinet or 20 disk shelves for two expansion cabinets.

The base cabinet is self-contained and pre-cabled following the required cabling methodology. The section "Cabling Tables and Diagrams" describes how pre-racked systems are cabled, as well as how to expand your system in the future.

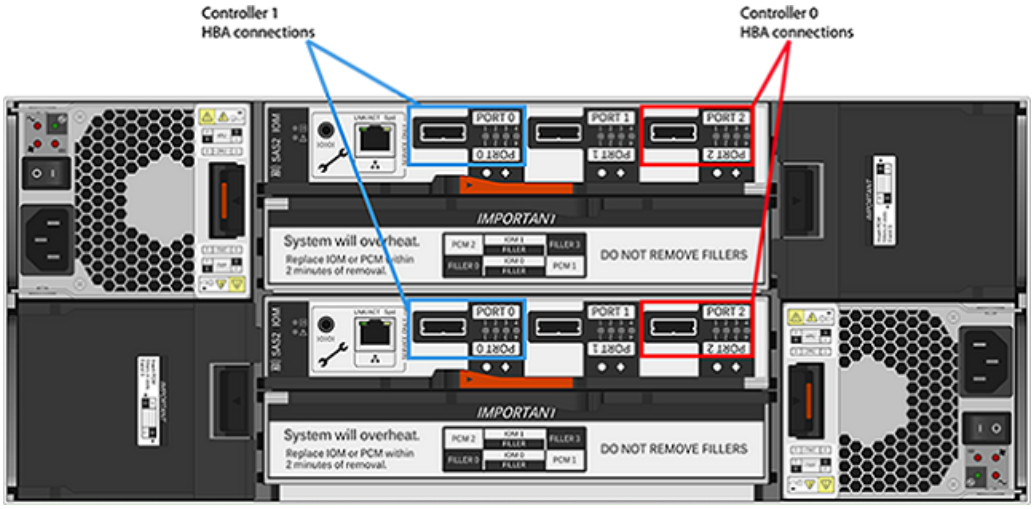
Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS4-4 controller occupies three rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet, and the bottom controller is Controller 0 in RU17. The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 645 ZS4-4 HBA Slot Numbers (Back View)



Each DE2-24C disk shelf occupies four rack units, and disk shelves are racked from the bottom of the cabinet to the top for stability. Therefore, the first disk shelf is in RU01, the second in RU05, and so on. As shown in the following figure, the DE2-24C disk shelf has two I/O Modules (IOMs) with three ports each. Controller 1 uses Port 0, and Controller 0 uses Port 2. In all cabling configurations, Port 1 is never used.

FIGURE 646 DE2-24C HBA Connections (Back View)



Cabling Tables and Diagrams

The following table describes the locations and port connections for two controllers and eight disk shelves in the base cabinet, using 3-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs).

TABLE 13 Base Cabinet: Controller to Disk Shelf (3-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 0	1	1	IOM 0, Port 0
17	0	Slot 6, Port 1	1	1	IOM 1, Port 2
20	1	Slot 6, Port 0	9	3	IOM 0, Port 0
17	0	Slot 7, Port 1	9	3	IOM 1, Port 2
20	1	Slot 7, Port 0	23	5	IOM 0, Port 0
17	0	Slot 9, Port 1	23	5	IOM 1, Port 2
20	1	Slot 9, Port 0	31	7	IOM 0, Port 0

FROM			TO		
17	0	Slot 3, Port 1	31	7	IOM 1, Port 2
17	0	Slot 3, Port 0	5	2	IOM 0, Port 2
20	1	Slot 6, Port 1	5	2	IOM 1, Port 0
17	0	Slot 6, Port 0	13	4	IOM 0, Port 2
20	1	Slot 7, Port 1	13	4	IOM 1, Port 0
17	0	Slot 7, Port 0	27	6	IOM 0, Port 2
20	1	Slot 9, Port 1	27	6	IOM 1, Port 0
17	0	Slot 9, Port 0	35	8	IOM 0, Port 2
20	1	Slot 3, Port 1	35	8	IOM 1, Port 0

The following table describes the locations and port connections for ten disk shelves in Expansion Cabinet 1, using 6-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs). Expansion Cabinet 1 supports disk shelves 9 through 18.

TABLE 14 Expansion Cabinet 1: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**
20	1	Slot 3, Port 2	1	9	IOM 0, Port 0
17	0	Slot 6, Port 3	1	9	IOM 1, Port 2
20	1	Slot 6, Port 2	21	11	IOM 0, Port 0
17	0	Slot 7, Port 3	21	11	IOM 1, Port 2
17	0	Slot 3, Port 2	5, 9, 13, 18	10, 13, 14, 17	IOM 0, Port 2
20	1	Slot 6, Port 3	5, 9, 13, 18	10, 13, 14, 17	IOM 1, Port 0
17	0	Slot 6, Port 2	25, 29, 33, 37	12, 15, 16, 18	IOM 0, Port 2
20	1	Slot 7, Port 3	25, 29, 33, 37	12, 15, 16, 18	IOM 1, Port 0

The following table describes the locations and port connections for ten disk shelves in Expansion Cabinet 2, using 6-meter SAS cables. The first disk shelf is located in RU01, and each disk shelf has two I/O Modules (IOMs). Expansion Cabinet 2 supports disk shelves 19 through 28.

TABLE 15 Expansion Cabinet 2: Controller to Disk Shelf (6-meter Cables)

FROM			TO		
RU	**CONTROLLER**	**HBA PORT**	**RU**	**DISK SHELF**	**DISK SHELF PORT**

FROM			TO		
20	1	Slot 7, Port 2	1	19	IOM 0, Port 0
17	0	Slot 9, Port 3	1	19	IOM 1, Port 2
20	1	Slot 9, Port 2	21	21	IOM 0, Port 0
17	0	Slot 3, Port 3	21	21	IOM 1, Port 2
17	0	Slot 7, Port 2	5, 9, 13, 18	20, 23, 24, 27	IOM 0, Port 2
20	1	Slot 9, Port 3	5, 9, 13, 18	20, 23, 24, 27	IOM 1, Port 0
17	0	Slot 9, Port 2	25, 29, 33, 37	22, 25, 26, 28	IOM 0, Port 2
20	1	Slot 3, Port 3	25, 29, 33, 37	22, 25, 26, 28	IOM 1, Port 0

The following diagrams describe how pre-racked systems are cabled, as well as how to expand your system in the future.

FIGURE 647 ZFS Storage Appliance Racked System ZS4-4: 10 DE2-24C Disk Shelves

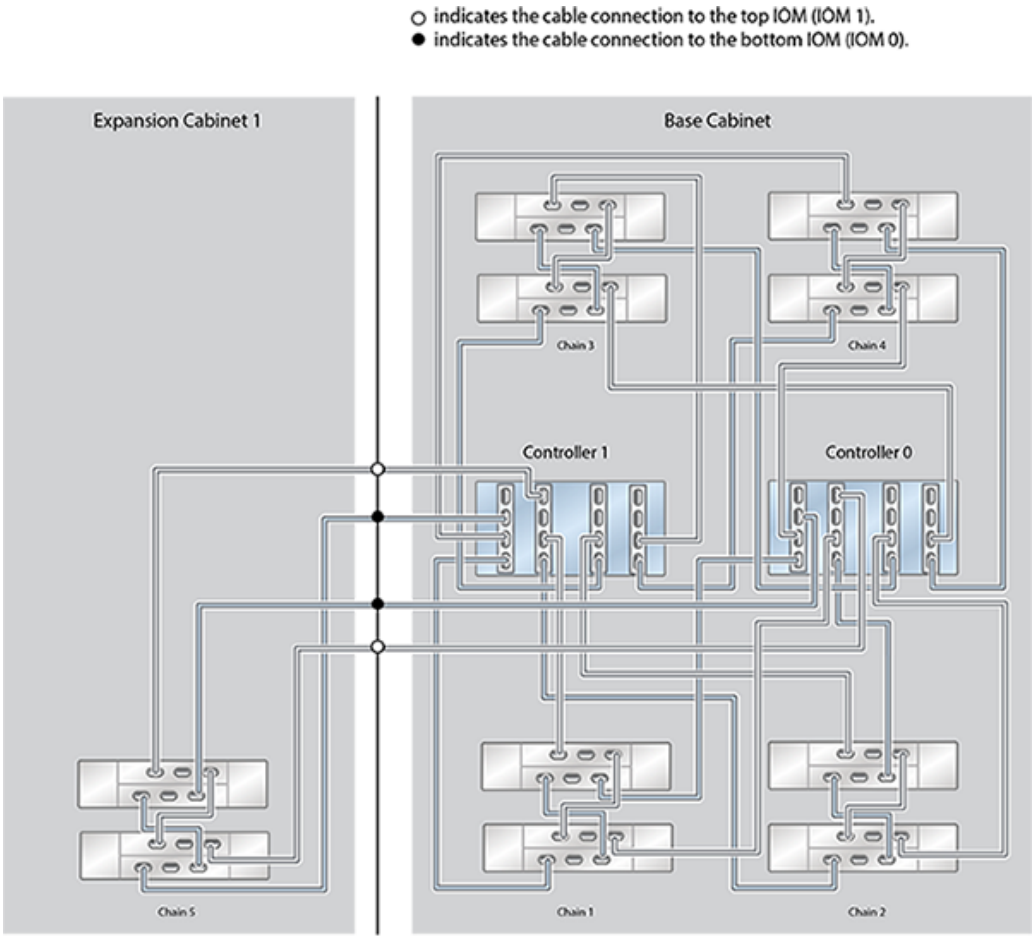


FIGURE 648 ZFS Storage Appliance Racked System ZS4-4: 12 DE2-24C Disk Shelves

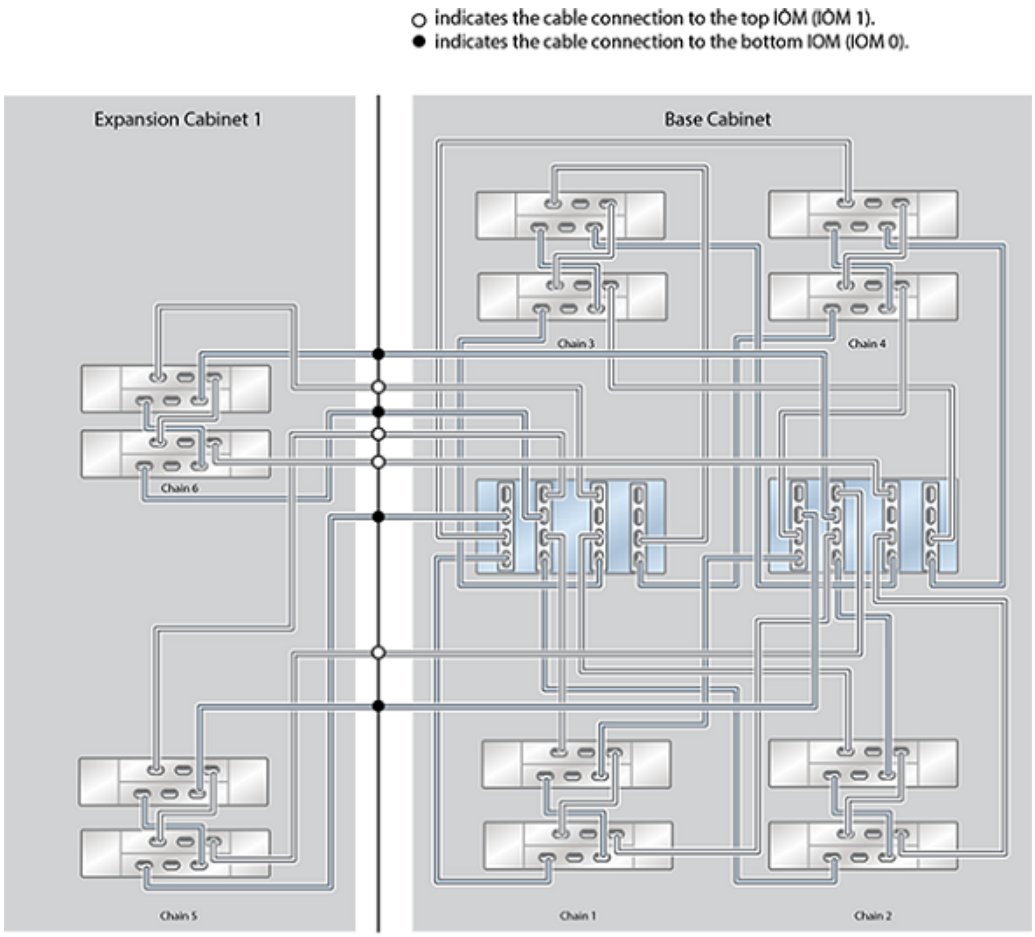


FIGURE 649 ZFS Storage Appliance Racked System ZS4-4: 13 DE2-24C Disk Shelves (Half Rack)

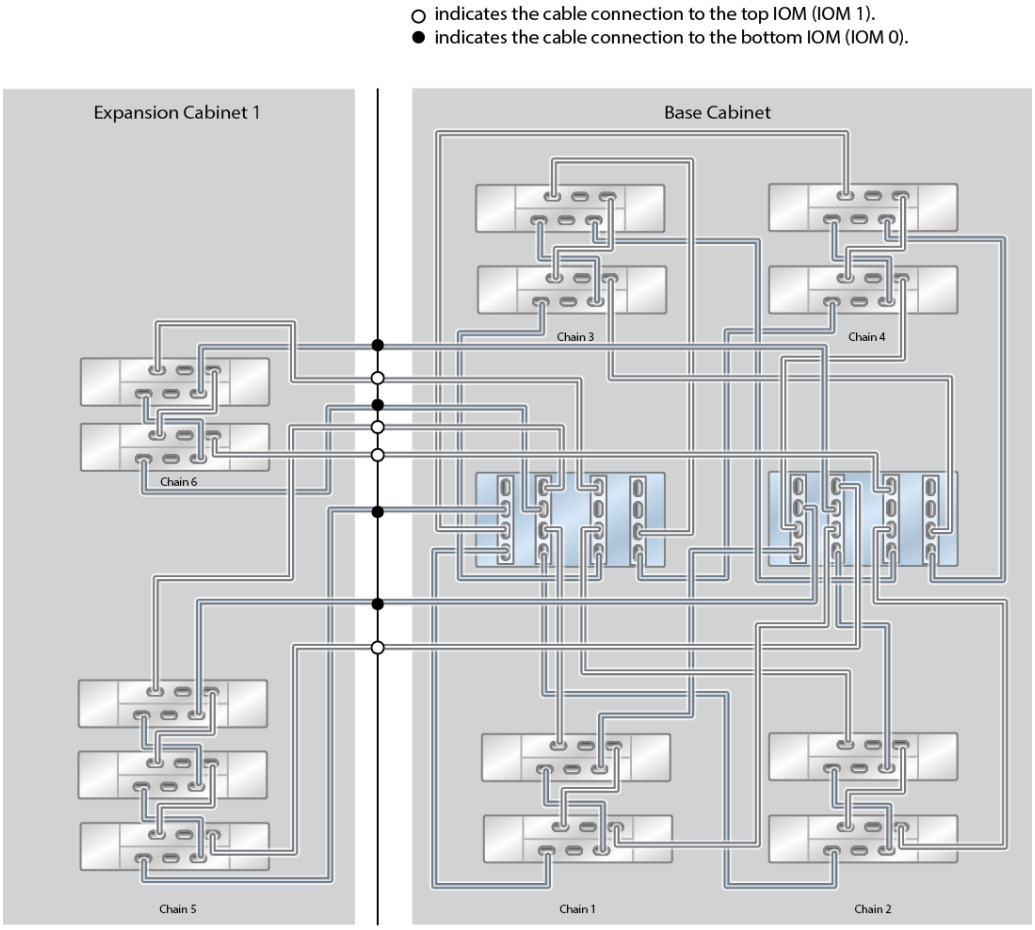


FIGURE 650 ZFS Storage Appliance Racked System ZS4-4: 14 DE2-24C Disk Shelves

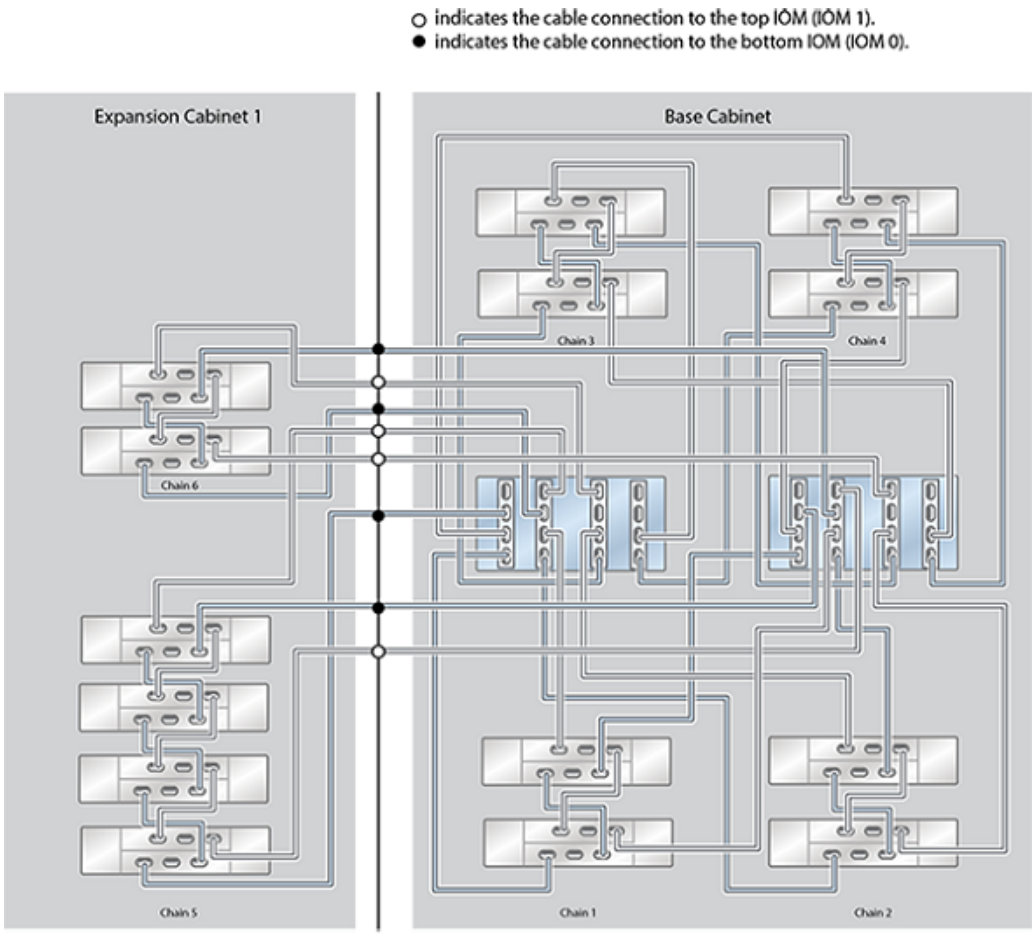


FIGURE 651 ZFS Storage Appliance Racked System ZS4-4: 16 DE2-24C Disk Shelves

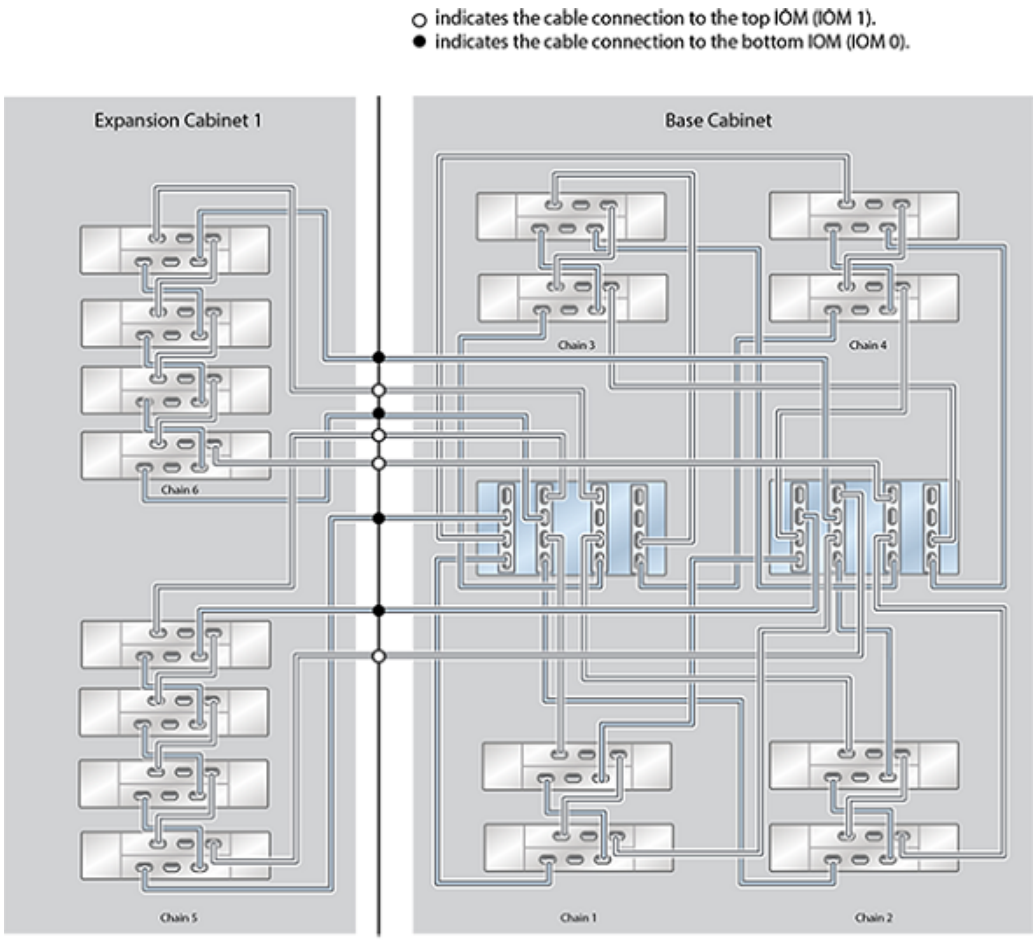


FIGURE 652 ZFS Storage Appliance Racked System ZS4-4: 18 DE2-24C Disk Shelves

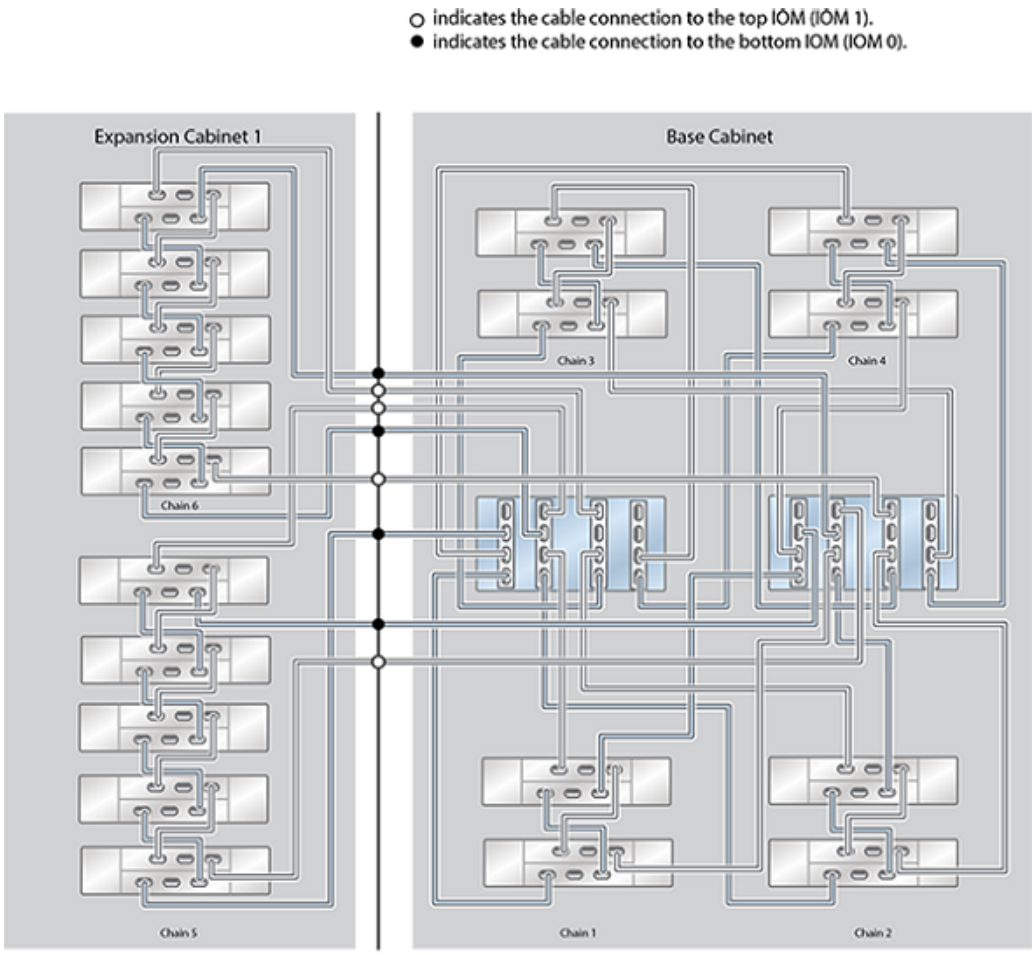


FIGURE 653 ZFS Storage Appliance Racked System ZS4-4: 20 DE2-24C Disk Shelves

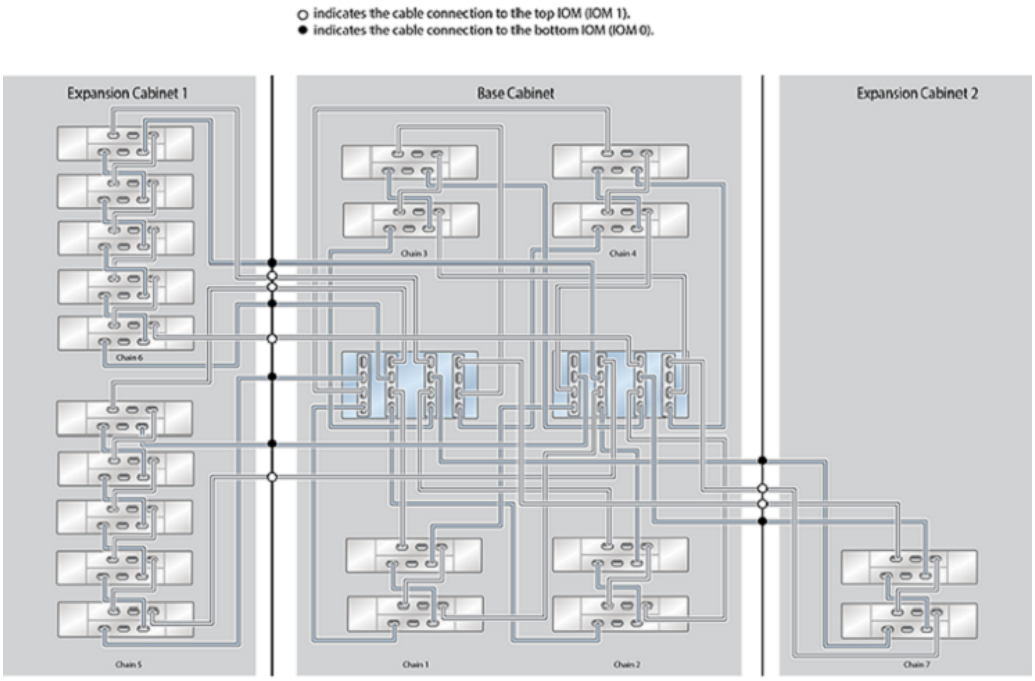


FIGURE 654 ZFS Storage Appliance Racked System ZS4-4: 22 DE2-24C Disk Shelves

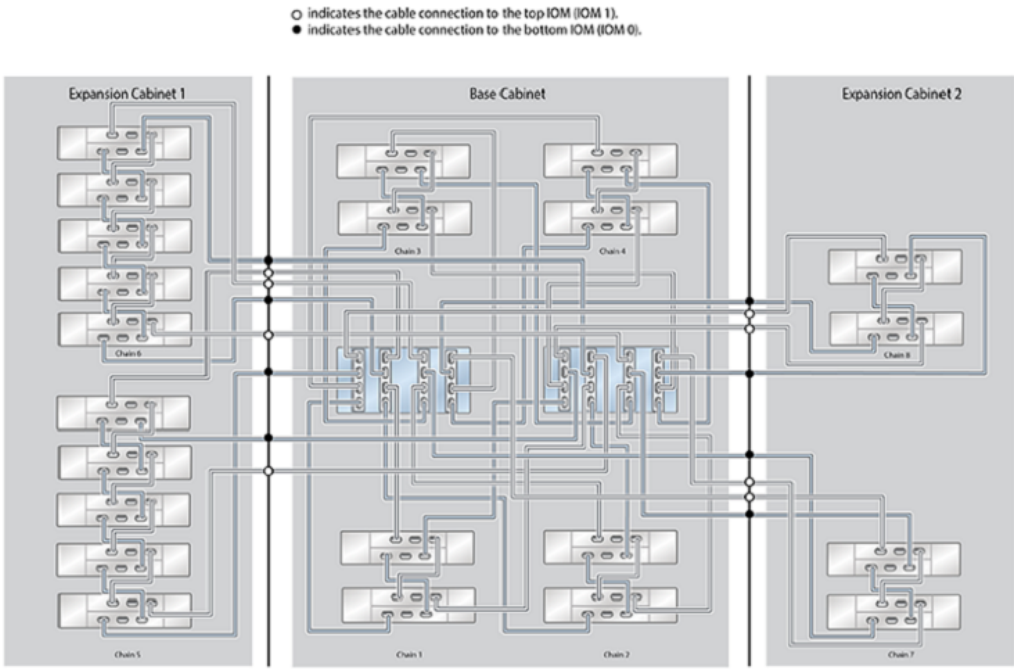


FIGURE 655 ZFS Storage Appliance Racked System ZS4-4: 23 DE2-24C Disk Shelves (Half Rack)

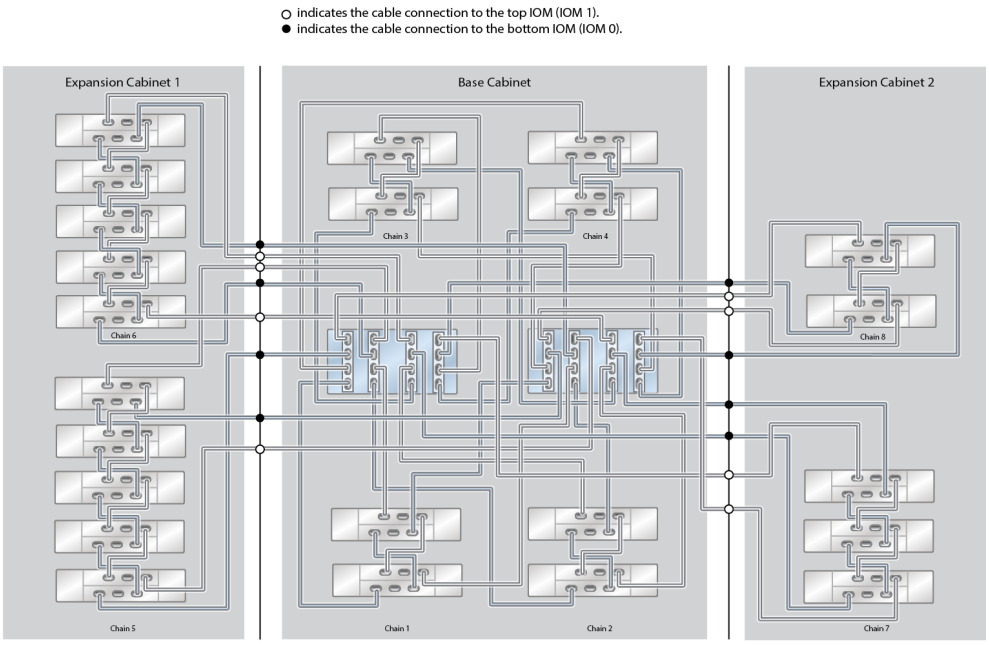


FIGURE 656 ZFS Storage Appliance Racked System ZS4-4: 24 DE2-24C Disk Shelves

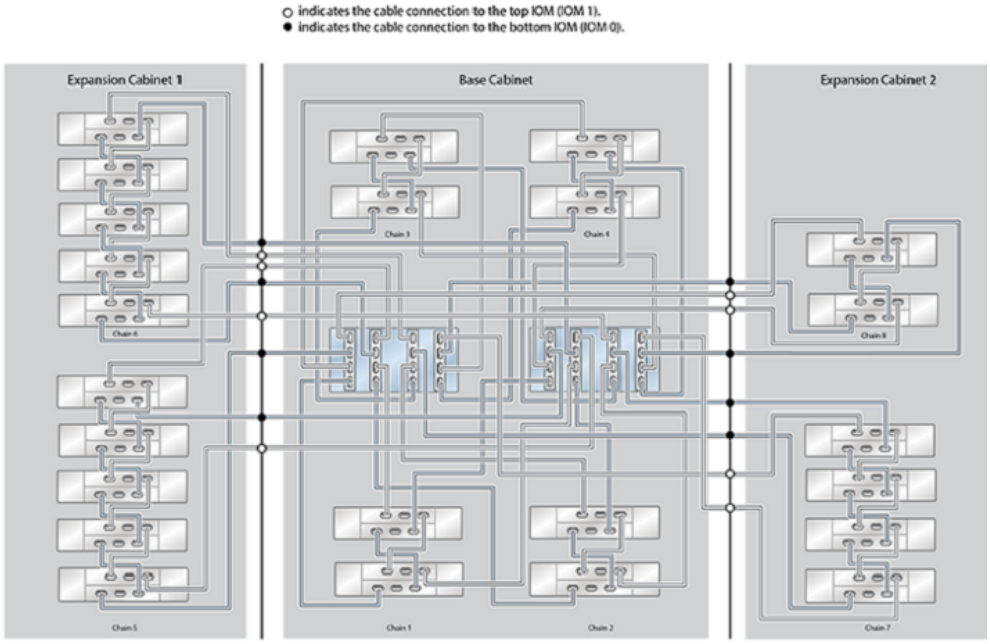


FIGURE 657 ZFS Storage Appliance Racked System ZS4-4: 26 DE2-24C Disk Shelves

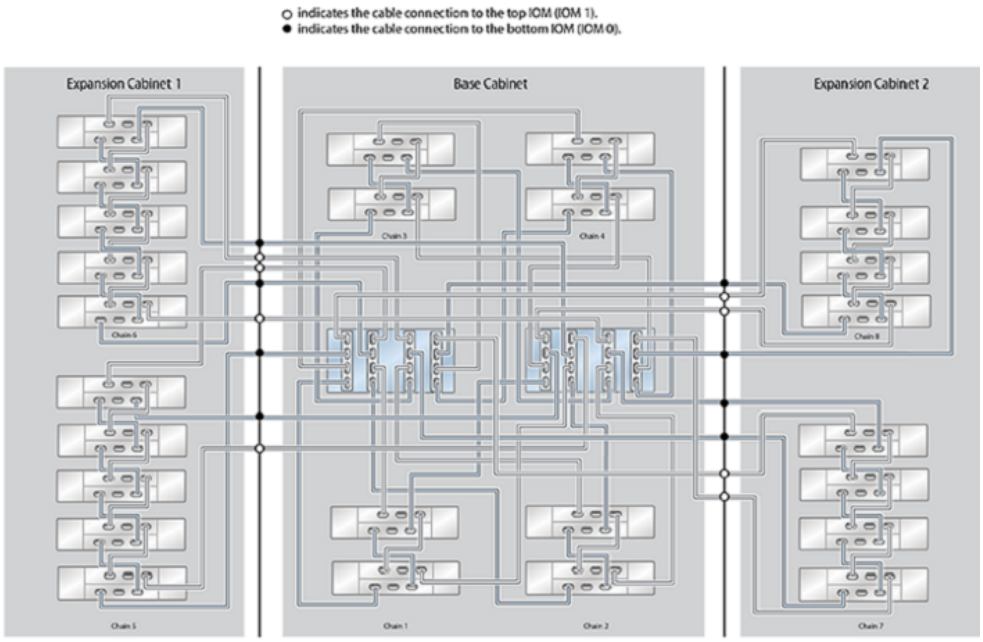


FIGURE 658 ZFS Storage Appliance Racked System ZS4-4: 28 DE2-24C Disk Shelves