

Oracle® ZFS Storage Appliance Cabling Guide

For ZS7-x, ZS5-x, ZS4-4, ZS3-x, 7x20 Controllers, and DEx-24,
Sun Disk Shelves, Release OS8.8.0

ORACLE®

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Contents

Getting Started with Cabling	11
Cabinet and Cabling Guidelines	13
Supported Disk Shelf Combinations and HBAs	17
Maximum Disk Shelves per Controller Configuration	18
New Appliance Cabling Workflow	21
▼ Installing, Cabling, and Powering On a New Appliance	21
▼ Connecting System Cables	21
▼ Connecting Cluster Cables	22
Controller Cluster I/O Ports	26
▼ Cabling Disk Shelves Together	27
▼ Cabling Controllers to Disk Shelves in a Base Cabinet	36
▼ Cabling Controllers in a Base Cabinet to Disk Shelves in an Expansion Cabinet	43
Changing the Cabling for Oracle ILOM	46
Cabling DE3-24 Disk Shelves to 4X4 Port SAS-3 HBAs	49
Cabling DE3-24 Disk Shelves to ZS7-2 Controllers	49
Cabling DE3-24 Disk Shelves to ZS7-2 High-end (HE) Controllers	49
Cabling DE3-24 Disk Shelves to ZS7-2 Mid-range (MR) Controllers	60
Cabling DE3-24 Disk Shelves to ZS5-4 Controllers	68
ZS5-4 Standalone to DE3-24 Disk Shelves (2 HBAs)	69
ZS5-4 Standalone to DE3-24 Disk Shelves (3 HBAs)	72
ZS5-4 Standalone to DE3-24 Disk Shelves (4 HBAs)	75
ZS5-4 Clustered to DE3-24 Disk Shelves (2 HBAs)	80
ZS5-4 Clustered to DE3-24 Disk Shelves (3 HBAs)	85
ZS5-4 Clustered to DE3-24 Disk Shelves (4 HBAs)	89
Cabling DE3-24 Disk Shelves to ZS5-2 Controllers	95
ZS5-2 Standalone to DE3-24 Disk Shelves (1 HBA)	95
ZS5-2 Standalone to DE3-24 Disk Shelves (2 HBAs)	98

ZS5-2 Clustered to DE3-24 Disk Shelves (1 HBA)	101
ZS5-2 Clustered to DE3-24 Disk Shelves (2 HBAs)	103
Cabling DE3-24 Disk Shelves to ZS4-4 Controllers	108
ZS4-4 Standalone to DE3-24 Disk Shelves (2 HBAs)	109
ZS4-4 Standalone to DE3-24 Disk Shelves (3 HBAs)	110
ZS4-4 Standalone to DE3-24 Disk Shelves (4 HBAs)	113
ZS4-4 Clustered to DE3-24 Disk Shelves (2 HBAs)	116
ZS4-4 Clustered to DE3-24 Disk Shelves (3 HBAs)	119
ZS4-4 Clustered to DE3-24 Disk Shelves (4 HBAs)	121
Cabling DE3-24 Disk Shelves to ZS3-2 Controllers	126
ZS3-2 Standalone to DE3-24 Disk Shelves (1 HBA)	127
ZS3-2 Standalone to DE3-24 Disk Shelves (2 HBAs)	128
ZS3-2 Clustered to DE3-24 Disk Shelves (1 HBA)	130
ZS3-2 Clustered to DE3-24 Disk Shelves (2 HBAs)	132
Cabling DE2-24 Disk Shelves to 4X4 Port SAS-2 HBAs	137
Cabling DE2-24 Disk Shelves to ZS5-4 Controllers	137
ZS5-4 Standalone to DE2-24 Disk Shelves (2 HBAs)	138
ZS5-4 Standalone to DE2-24 Disk Shelves (3 HBAs)	140
ZS5-4 Standalone to DE2-24 Disk Shelves (4 HBAs)	143
ZS5-4 Clustered to DE2-24 Disk Shelves (2 HBAs)	147
ZS5-4 Clustered to DE2-24 Disk Shelves (3 HBAs)	151
ZS5-4 Clustered to DE2-24 Disk Shelves (4 HBAs)	154
Cabling DE2-24 Disk Shelves to ZS5-2 Controllers	160
ZS5-2 Standalone to DE2-24 Disk Shelves (1 HBA)	160
ZS5-2 Standalone to DE2-24 Disk Shelves (2 HBAs)	162
ZS5-2 Clustered to DE2-24 Disk Shelves (1 HBA)	165
ZS5-2 Clustered to DE2-24 Disk Shelves (2 HBAs)	169
Cabling DE2-24 Disk Shelves to ZS4-4/ZS3-4 Controllers	173
ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (2 HBAs)	173
ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (3 HBAs)	175
ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (4 HBAs)	178
ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (2 HBAs)	183
ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (3 HBAs)	186
ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (4 HBAs)	190
Cabling DE2-24 Disk Shelves to ZS3-2 Controllers	197
ZS3-2 Standalone to DE2-24 Disk Shelves (1 HBA)	197

ZS3-2 Standalone to DE2-24 Disk Shelves (2 HBAs)	199
ZS3-2 Clustered to DE2-24 Disk Shelves (1 HBA)	202
ZS3-2 Clustered to DE2-24 Disk Shelves (2 HBAs)	204
Cabling DE2-24 Disk Shelves to 7420 Controllers	207
7420 Standalone to DE2-24 Disk Shelves (2 HBAs)	208
7420 Standalone to DE2-24 Disk Shelves (3 HBAs)	210
7420 Standalone to DE2-24 Disk Shelves (4 HBAs)	213
7420 Clustered to DE2-24 Disk Shelves (2 HBAs)	218
7420 Clustered to DE2-24 Disk Shelves (3 HBAs)	221
7420 Clustered to DE2-24 Disk Shelves (4 HBAs)	225
Cabling DE2-24 Disk Shelves to 7320 Controllers	232
7320 Standalone to DE2-24 Disk Shelves	232
7320 Clustered to DE2-24 Disk Shelves	234
Cabling DE2-24 Disk Shelves to 2X4 Port SAS-2 HBAs	237
Cabling DE2-24 Disk Shelves to 7420 Controllers	237
7420 Standalone to DE2-24 Disk Shelves (2 HBAs)	238
7420 Standalone to DE2-24 Disk Shelves (3 HBAs)	240
7420 Standalone to DE2-24 Disk Shelves (4 HBAs)	243
7420 Standalone to DE2-24 Disk Shelves (5 HBAs)	246
7420 Standalone to DE2-24 Disk Shelves (6 HBAs)	249
7420 Clustered to DE2-24 Disk Shelves (2 HBAs)	253
7420 Clustered to DE2-24 Disk Shelves (3 HBAs)	256
7420 Clustered to DE2-24 Disk Shelves (4 HBAs)	260
7420 Clustered to DE2-24 Disk Shelves (5 HBAs)	264
7420 Clustered to DE2-24 Disk Shelves (6 HBAs)	268
Cabling DE2-24 Disk Shelves to 7320 Controllers	271
7320 Standalone to DE2-24 Disk Shelves	272
7320 Clustered to DE2-24 Disk Shelves	274
Cabling DE2-24 Disk Shelves to 7120 Controllers	276
7120 Standalone to DE2-24 Disk Shelves	276
Cabling Sun Disk Shelves	277
Cabling Sun Disk Shelves to 7420 Controllers	277
7420 Standalone to Sun Disk Shelves (2 HBAs)	278
7420 Standalone to Sun Disk Shelves (3 HBAs)	280
7420 Standalone to Sun Disk Shelves (4 HBAs)	282

7420 Standalone to Sun Disk Shelves (5 HBAs)	285
7420 Standalone to Sun Disk Shelves (6 HBAs)	288
7420 Clustered to Sun Disk Shelves (2 HBAs)	291
7420 Clustered to Sun Disk Shelves (3 HBAs)	294
7420 Clustered to Sun Disk Shelves (4 HBAs)	297
7420 Clustered to Sun Disk Shelves (5 HBAs)	301
7420 Clustered to Sun Disk Shelves (6 HBAs)	305
Cabling Sun Disk Shelves to 7320 Controllers	308
7320 Standalone to Sun Disk Shelves	309
7320 Clustered to Sun Disk Shelves	310
Cabling Sun Disk Shelves to 7120 Controllers	312
7120 Standalone to Sun Disk Shelves	312
Cabling Mixed DE3-24 and DE2-24 Disk Shelves	315
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-4 Controllers	315
Add a DE3-24 to DE2-24 Disk Shelves at Chain End	315
Add/Replace DE3-24 to/from DE2-24 Disk Shelves at Chain Middle	316
Add Exclusive DE3-24 Disk Shelves Chain	317
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-2 Controllers	318
Add a DE3-24 to DE2-24 Disk Shelves at Chain End	319
Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle	320
Add Exclusive DE3-24 Disk Shelves Chain	321
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS4-4 Controllers	321
Add a DE3-24 to DE2-24 Disk Shelves at Chain End	322
Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle	323
Add Exclusive DE3-24 Disk Shelves Chain	325
Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS3-2 Controllers	327
Add a DE3-24 to DE2-24 Disk Shelves at Chain End	327
Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle	328
Add Exclusive DE3-24 Disk Shelves Chain	329
Cabling Mixed DE2-24 and Sun Disk Shelves	331
Cabling DE2-24 and Sun Disk Shelves to ZS3-4 Controllers	331
ZS3-4 Standalone to Mixed Disk Shelves (2 HBAs)	332
ZS3-4 Standalone to Mixed Disk Shelves (3 HBAs)	334
ZS3-4 Standalone to Mixed Disk Shelves (4 HBAs)	337
ZS3-4 Clustered to Mixed Disk Shelves (2 HBAs)	341

ZS3-4 Clustered to Mixed Disk Shelves (3 HBAs)	344
ZS3-4 Clustered to Mixed Disk Shelves (4 HBAs)	348
Cabling DE2-24 and Sun Disk Shelves to ZS3-2 Controllers	354
ZS3-2 Standalone to Mixed Disk Shelves (1 HBA)	355
ZS3-2 Standalone to Mixed Disk Shelves (2 HBAs)	356
ZS3-2 Clustered to Mixed Disk Shelves (1 HBA)	359
ZS3-2 Clustered to Mixed Disk Shelves (2 HBAs)	361
Cabling DE2-24 and Sun Disk Shelves to 7420 Controllers	364
7420 Standalone to Mixed Disk Shelves (2 HBAs)	365
7420 Standalone to Mixed Disk Shelves (3 HBAs)	368
7420 Standalone to Mixed Disk Shelves (4 HBAs)	371
7420 Clustered to Mixed Disk Shelves (2 HBAs)	375
7420 Clustered to Mixed Disk Shelves (3 HBAs)	378
7420 Clustered to Mixed Disk Shelves (4 HBAs)	382
Cabling DE2-24 and Sun Disk Shelves to 7320 Controllers	388
7320 Standalone to Mixed Disk Shelves	389
7320 Clustered to Mixed Disk Shelves	390
Cabling DE2-24 and Sun Disk Shelves to 7120 Controllers	392
7120 Standalone to Mixed Disk Shelves	393
Oracle ZFS Storage Appliance Racked System ZS7-2	395
ZS7-2 High-end (HE) Racked System Configurations	395
Capacity Configurations for ZS7-2 HE Racked Systems	395
All-Flash/Mixed Configurations for ZS7-2 HE Racked Systems	418
ZS7-2 Mid-range (MR) Racked System Configurations	437
Capacity Configurations for ZS7-2 MR Racked Systems	438
All-Flash/Mixed Configurations for ZS7-2 MR Racked Systems	447
Oracle ZFS Storage Appliance Racked System ZS5-4	457
Capacity Configurations for ZS5-4 Racked System	457
Overview of ZS5-4 Racked System Capacity Configurations	457
Cabling Tables and Diagrams for ZS5-4 Racked System Capacity Configurations	460
Performance Configurations for ZS5-4 Racked System	480
Overview of ZS5-4 Racked System Performance Configurations	481
Base Cabinet Configurations for ZS5-4 Racked System Performance Configurations	483

Expansion Cabinet Configurations for ZS5-4 Racked System Performance Configurations	490
Oracle ZFS Storage Appliance Racked System ZS5-2	499
Capacity Configurations for ZS5-2 Racked System	499
Overview of ZS5-2 Racked System Capacity Configurations	499
Cabling Tables and Diagrams for ZS5-2 Racked System Capacity Configurations	502
Performance Configurations for ZS5-2 Racked System	509
Overview of ZS5-2 Racked System Performance Configurations	509
Base Cabinet Configurations for ZS5-2 Racked System Performance Configurations	511
Oracle ZFS Storage Appliance Racked System ZS4-4	519
Overview of ZS4-4 Racked System Capacity Configurations	519
Cabling Tables and Diagrams for ZS4-4 Racked System Capacity Configurations	521

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:

- [“Cabinet and Cabling Guidelines” on page 13](#)
- [“New Appliance Cabling Workflow” on page 21](#)
- [“Connecting System Cables” on page 21](#)
- [“Connecting Cluster Cables” on page 22](#)
- [“Controller Cluster I/O Ports” on page 26](#)
- [“Cabling Disk Shelves Together” on page 27](#)
- [“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](#)
- [“Changing the Cabling for Oracle ILOM” on page 46](#)



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 release tab downward for horizontally mounted HBAs or to the right for vertically mounted HBAs. Mini-SAS HD active optical cables (AOCs) should be oriented similarly to copper cables. 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

- [“Cabling DE3-24 Disk Shelves to ZS7-2 Controllers” on page 49](#)
- [“Cabling DE3-24 Disk Shelves to ZS5-4 Controllers” on page 68](#)
- [“Cabling DE3-24 Disk Shelves to ZS5-2 Controllers” on page 95](#)
- [“Cabling DE3-24 Disk Shelves to ZS4-4 Controllers” on page 108](#)
- [“Cabling DE3-24 Disk Shelves to ZS3-2 Controllers” on page 126](#)

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

- [“Cabling DE2-24 Disk Shelves to ZS5-4 Controllers” on page 137](#)
- [“Cabling DE2-24 Disk Shelves to ZS5-2 Controllers” on page 160](#)
- [“Cabling DE2-24 Disk Shelves to ZS4-4/ZS3-4 Controllers” on page 173](#)
- [“Cabling DE2-24 Disk Shelves to ZS3-2 Controllers” on page 197](#)
- [“Cabling DE2-24 Disk Shelves to 7420 Controllers” on page 207](#)
- [“Cabling DE2-24 Disk Shelves to 7320 Controllers” on page 232](#)

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

- [“Cabling DE2-24 Disk Shelves to 7420 Controllers” on page 237](#)
- [“Cabling DE2-24 Disk Shelves to 7320 Controllers” on page 271](#)
- [“Cabling DE2-24 Disk Shelves to 7120 Controllers” on page 276](#)

Sun Disk Shelves

- [“Cabling Sun Disk Shelves to 7420 Controllers” on page 277](#)
- [“Cabling Sun Disk Shelves to 7320 Controllers” on page 308](#)
- [“Cabling Sun Disk Shelves to 7120 Controllers” on page 312](#)

Mixed DE3-24 and DE2-24 Disk Shelves

- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-4 Controllers” on page 315](#)
- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-2 Controllers” on page 318](#)
- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS4-4 Controllers” on page 321](#)

- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS3-2 Controllers” on page 327](#)

Mixed DE2-24 and Sun Disk Shelves

- [“Cabling DE2-24 and Sun Disk Shelves to ZS3-4 Controllers” on page 331](#)
- [“Cabling DE2-24 and Sun Disk Shelves to ZS3-2 Controllers” on page 354](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7420 Controllers” on page 364](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7320 Controllers” on page 388](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7120 Controllers” on page 392](#)

Oracle ZFS Storage Appliance Racked System ZS7-2

- [“ZS7-2 High-end \(HE\) Racked System Configurations” on page 395](#)
- [“ZS7-2 Mid-range \(MR\) Racked System Configurations” on page 437](#)

Oracle ZFS Storage Appliance Racked System ZS5-4

- [“Capacity Configurations for ZS5-4 Racked System” on page 457](#)
- [“Performance Configurations for ZS5-4 Racked System” on page 480](#)

Oracle ZFS Storage Appliance Racked System ZS5-2

- [“Capacity Configurations for ZS5-2 Racked System” on page 499](#)
- [“Performance Configurations for ZS5-2 Racked System” on page 509](#)

Oracle ZFS Storage Appliance Racked System ZS4-4

- [“Overview of ZS4-4 Racked System Capacity Configurations” on page 519](#)
- [“Cabling Tables and Diagrams for ZS4-4 Racked System Capacity Configurations” on page 521](#)

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

- Active optical cables (AOCs) are required for attaching ZS7-2 controllers to DE3-24 disk shelves. Other controllers and/or disk shelves in the future may adapt AOC cabling. AOCs are available in the following lengths: 3 meters, 6 meters, and 20 meters. The maximum AOC length between a controller and disk shelves that span further than two adjacent cabinets is 20 meters.
- The maximum copper cable length between a controller and disk shelves is 6 meters.
- The maximum copper or AOC cable length between DE3-24 disk shelves in a single chain that spans two adjacent cabinets is 6 meters copper, 6 meters AOC, or 20 meters AOC; only one pair of 6-meter or 20-meter cables is allowed per chain.

- The maximum copper cable length between DE3-24 disk shelves that span across adjacent cabinets is 3 meters.
- The maximum copper cable length between DE2-24 disk shelves that span across adjacent cabinets is 3 meters.
- The maximum copper cable length between Sun Disk Shelves that span across adjacent cabinets is 3 meters.

For further guidelines for cabling together disk shelves, see [“Cabling Disk Shelves Together” on page 27](#).

Cable Bend Radius

Do not bend SAS cables less than the following minimum radius:

SAS Cable Type	SAS Cable Length	Minimum Bend Radius
Copper	1 meter	26 mm
Copper	3 meters	28 mm
Copper	6 meters	35 mm
Active Optic Cable	All lengths	25 mm

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 DE_x-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 DE_x-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 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, starting with software release OS8.7.0. See [“Cabinet and Cabling Guidelines” on page 13](#) 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 18](#).

Note - For optimal performance, 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
ZS7-2 with SAS-3 4x4 port HBAs	Yes	Yes	No	No	No
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

Maximum 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
ZS5-2 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
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

HBA Type	Number of Disk Shelf Chains per HBA
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 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	Guidelines
ZS7-2 high-end model	48	NA	NA	4	Disk shelves can include 24x HDD/SSD, or combine 20x HDD/SSD plus 4x write-optimized and/or read-optimized flash accelerators (SSDs). Total number of chains is eight. Any combination of disk-only and write- or read-optimized shelves may be combined within the chain in any order.
ZS7-2 mid-range model	16	NA	NA	2	Disk shelves can include 24x HDD/SSD, or combine 20x HDD/SSD plus 4x write-optimized and/or read-optimized flash accelerators (SSDs). Total number of chains is four. Any combination of disk-only and write- or read-optimized shelves may be combined within the chain in any order.
ZS5-4	48	NA	4	4	Disk shelves can include 24x HDD/SSD, or combine 20x HDD/SSD plus 4x write-optimized and/or read-optimized flash accelerators (SSDs). Total number of chains is eight. Any combination of disk-only and write- or read-optimized shelves may be combined within the chain in any order.
ZS5-2	16	NA	2	2	Disk shelves can include 24x HDD/SSD, or combine 20x HDD/SSD plus 4x write-optimized and/or read-optimized flash accelerators (SSDs). Total number of chains is four. Any combination of disk-only and write- or read-optimized shelves may be combined within the chain in any order.
ZS4-4	36	NA	4	4	Disk shelves can include 24x HDD/SSD, or combine 20x HDD/SSD plus 4x write-optimized and/or read-optimized flash accelerators (SSDs). Total number of chains is eight. Any combination of disk-only and write-

Maximum 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	Guidelines
					optimized shelves can be combined within the chain in any order.
ZS3-4	36	NA	4	NA	Disk shelves can include 24x HDD, or combine 20x HDD plus 4x write-optimized flash accelerators (SSDs). Total number of chains is eight. Any combination of disk-only and write-optimized shelves can be combined within the chain in any order. You can also connect mixed disk shelf types (DE2 and legacy Sun Disk Shelves) to the same controllers, but each chain must contain only the same disk shelf type. Directly connecting different disk shelf types is not supported.
ZS3-2	16	NA	2	2	Disk shelves can include 24x HDD, or combine 20x HDD plus 4x write-optimized flash accelerators (SSDs). Total number of chains is four. Any combination of disk-only and write-optimized shelves can be combined within the chain in any order. You can also connect mixed disk shelf types (DE2 and legacy Sun Disk Shelves) to the same controllers, but each chain must contain only the same disk shelf type. Directly connecting different disk shelf types is not supported.
7420	36	6	6	NA	Disk shelves can include 24x HDD, or combine 20x HDD plus 4x write-optimized flash accelerators (SSDs). Total number of chains is six with 2X4 port SAS-2 HBAs, and 12 with 4X4 port SAS-2 HBAs. Any combination of disk-only and write-optimized shelves can be combined within the chain in any order. You can also connect mixed disk shelf types (DE2 and legacy Sun Disk Shelves) to the same controllers, but each chain must contain only the same disk shelf type. Directly connecting different disk shelf types is not supported.
7320	6	1	1	NA	Any combination of disk-only and write-optimized shelves may be combined within the chain in any order. The cabling configurations are unchanged. You can also connect mixed disk shelf types (DE2 and legacy Sun Disk Shelves) to the same controllers, but each chain must contain only the same disk shelf type. Directly connecting different disk shelf types is not supported.
7120	2	1	NA	NA	Write-optimized SSDs are not supported in the expansion storage for the 7120. The disk shelves must be fully populated with 24 HDDs. You can also connect mixed disk shelf types (DE2 and legacy Sun Disk Shelves) to the same controllers.

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 OS8.8.0.](#)

▼ 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 13.](#)
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 21.](#)
5. If clustered controllers, connect the cluster cables as described in [“Connecting Cluster Cables” on page 22.](#)
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 11.](#)
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 26](#)) 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 ZS7-2 and 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.

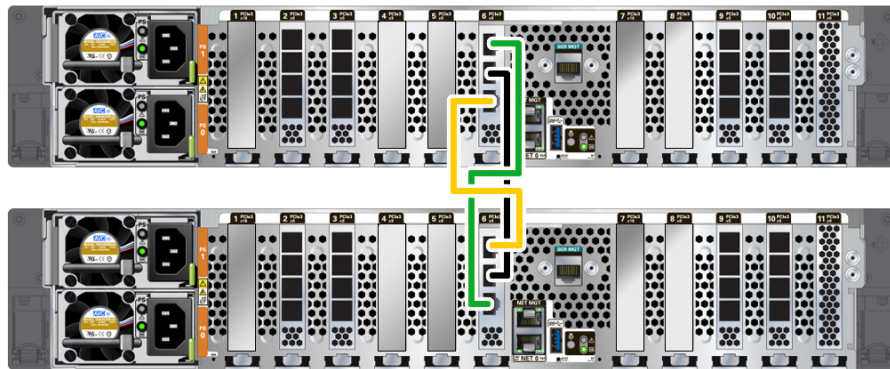
1. **Connect the cluster serial ports of each controller to form a crossover pattern:**
 - a. **Connect one Ethernet cable between serial port 0 of one controller and serial port 1 of the other controller.**
 - b. **Connect another Ethernet cable between serial port 1 of one controller and serial port 0 of the other controller.**

The cables between the serial ports form a crossover pattern, as shown in the following illustrations. For ZS7-2 controllers, use the supplied yellow and green Ethernet cables. Use one cable for step 1a and the other for step 1b; it does not matter which cable you use.

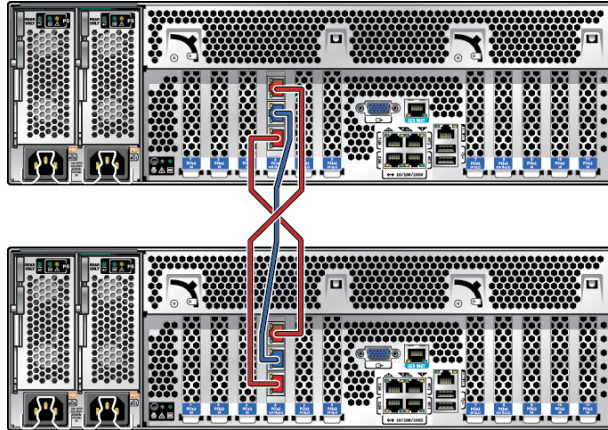
2. **Connect one Ethernet cable between the Ethernet ports of each controller.**

The following figure shows cluster cabling between two ZS7-2 controllers (high-end model shown). Use the supplied black Ethernet cable.

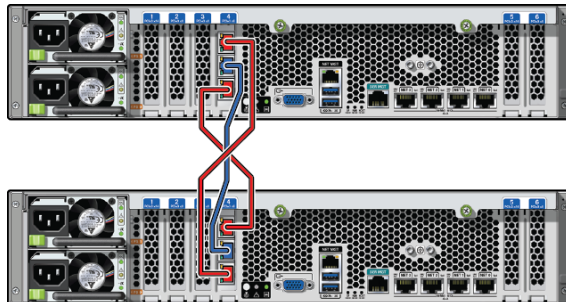
ZS7-2 Cluster Cabling



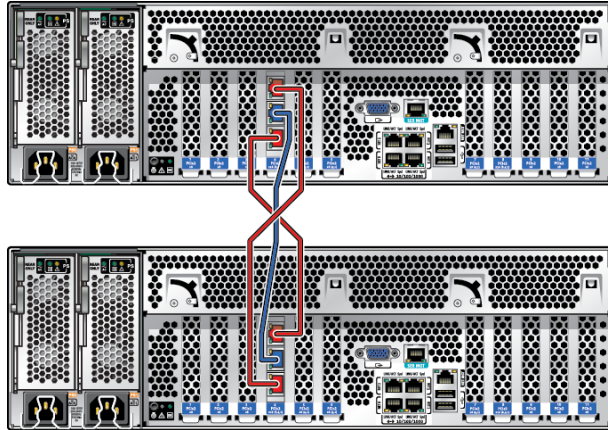
The following figure shows cluster cabling between two ZS5-4 controllers.



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

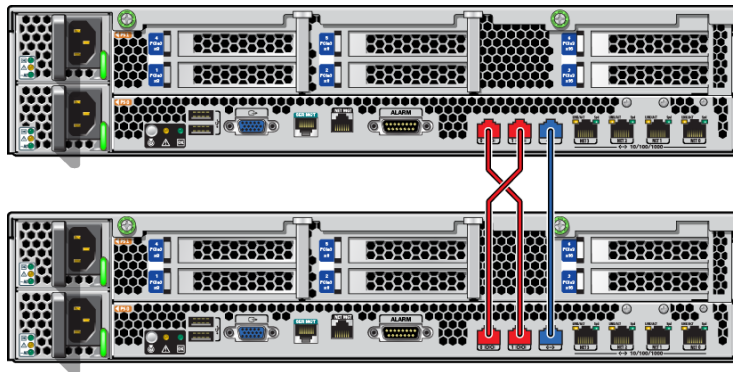


The following figure shows cluster cabling between two ZS4-4 controllers.



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 ZS7-2, ZS5-4, ZS5-2, ZS4-4, ZS3-4, and 7x20 controllers.

FIGURE 1 ZS7-2, ZS5-4, ZS5-2, ZS4-4, ZS3-4, and 7x20 Controller Cluster I/O Ports

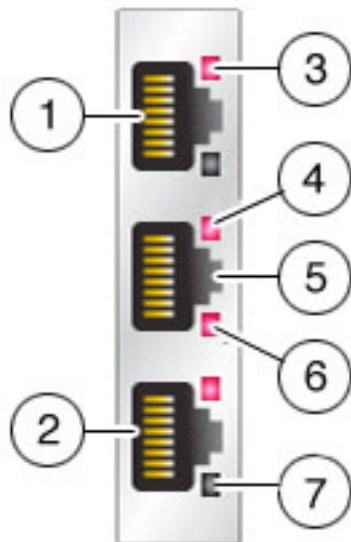
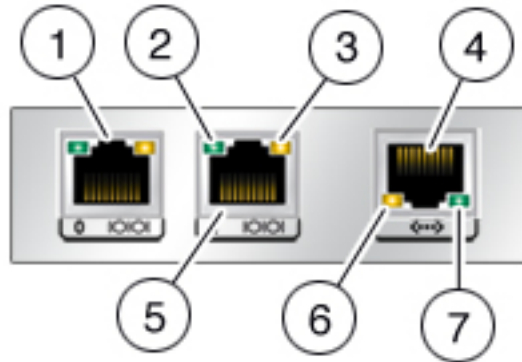


Figure Legend			
1 Serial 1	2 Serial 0	3 Serial Activity LED	4 Ethernet Activity LED
5 Ethernet	6 Ethernet Status LED	7 Serial Status LED	

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 using copper SAS cables. Active optical cables (AOCs) are allowed for DE3-24 disk shelves in special circumstances as indicated here.

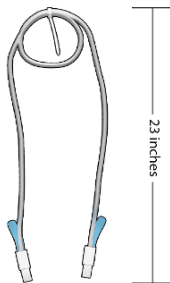
- For DE3-24 disk shelves within the same cabinet, use 1-meter (3.28-foot) SAS-3 cables; for DE2-24 and Sun Disk Shelves within the same cabinet use 2-meter (6.56-foot) SAS-2 cables.
- For DE3-24 disk shelf cabling extending between adjacent cabinets, use 3-meter (9.84-foot) SAS-3 cables.
- For DE3-24 disk shelf cabling extending between two adjacent cabinets, use 6-meter (19.68-foot) copper, or 6-meter AOC, or 20-meter (65.62-foot) AOC SAS-3 cables; only one pair of 6-meter or 20-meter SAS-3 cables is allowed per chain.
- For DE2-24 and Sun Disk Shelf cabling extending between adjacent cabinets, use 3-meter (9.84-foot) SAS-2 cables.

1. **Locate the appropriate cabling diagram for your system in “Getting Started with Cabling” on page 11.**
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.**

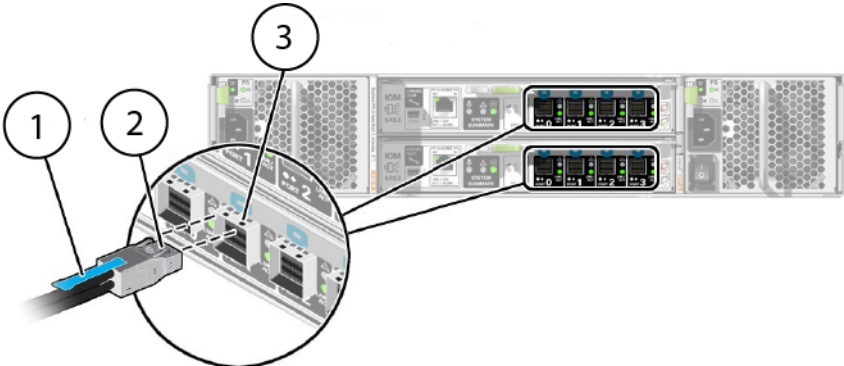
The cable tie should face the rear of the rack to maximize the cable length.

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.**

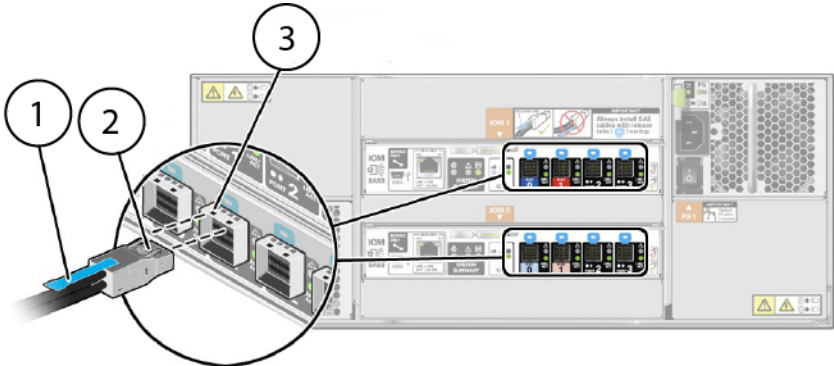
Refer to the appropriate cabling diagram to identify the disk shelf port. When attaching a cable to a DEx-24 disk shelf, position the blue release tab correctly for the disk shelf type and I/O Module, and ensure that the cable connector latches engage in the port.

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



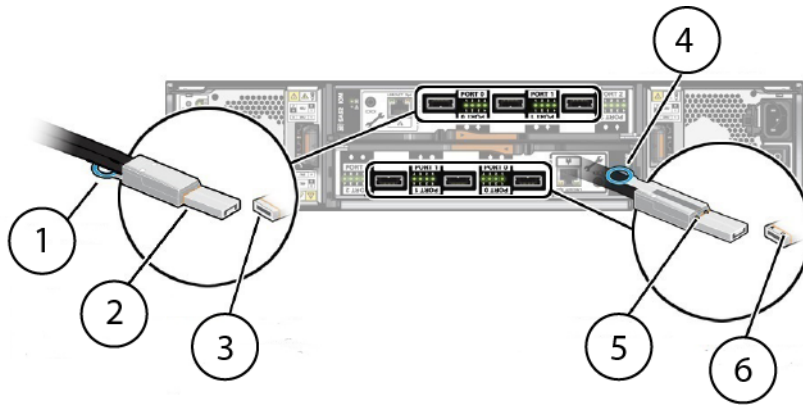
Callout	Description
1	Blue release tab
2	Cable connector latches
3	IOM 0/IOM 1 port latch receiver holes

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



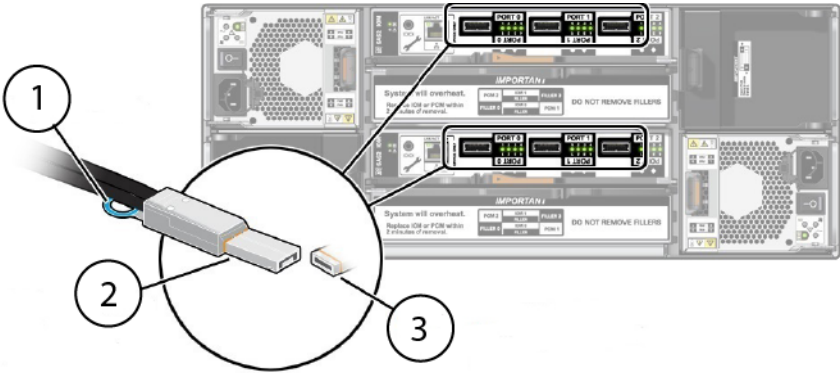
Callout	Description
1	Blue release tab
2	Cable connector latches
3	IOM 0/IOM 1 port latch receiver holes

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

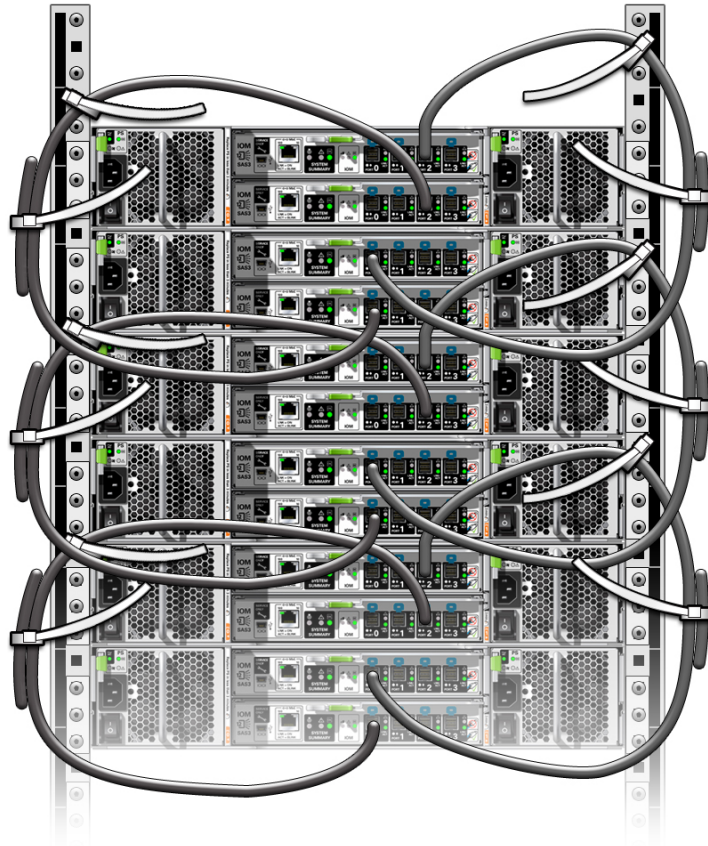
Attaching a Mini-SAS Cable to a DE2-24C Disk Shelf



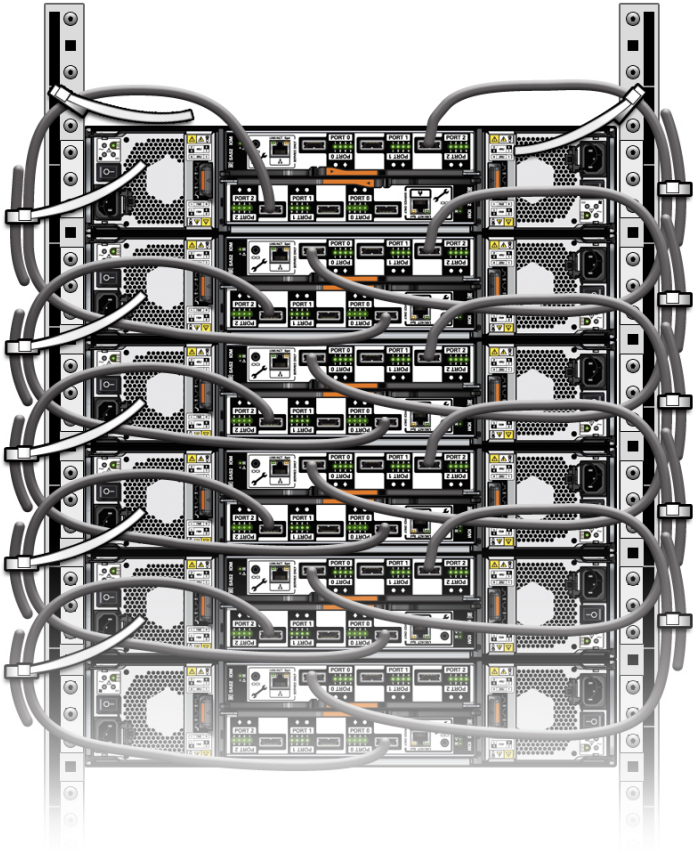
Callout	Description
1	Blue release tab
2	Cable connector latches (underneath)
3	IOM 0/IOM 1 port latch receiver holes (underneath)

- 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.

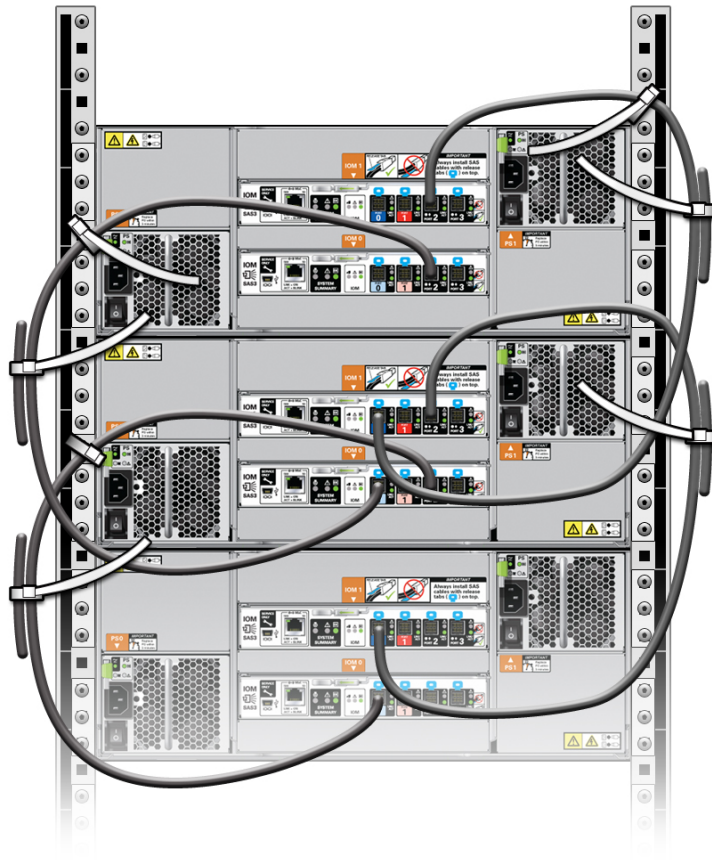
Cabling 2U Disk Shelves Together (DE3-24P shown)

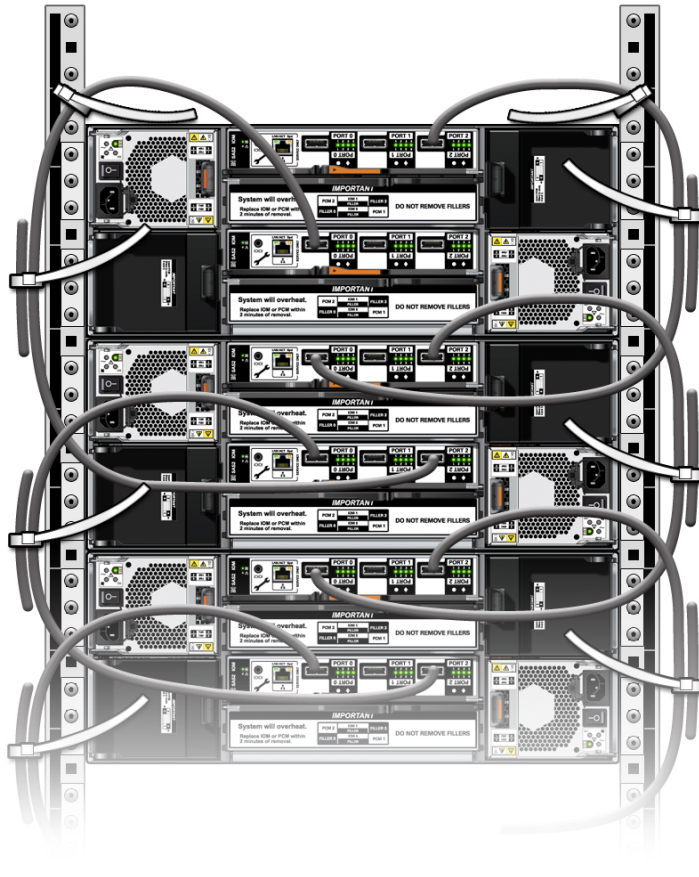


Cabling 2U Disk Shelves Together (DE2-24P shown)



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.

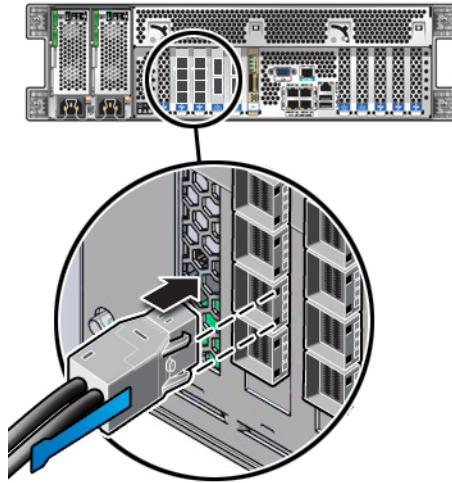
Note - Use active optical cables (AOCs) with the Oracle ZFS Storage ZS7-2 controller.

1. **Locate the appropriate cabling diagram for your system in [“Getting Started with Cabling” on page 11](#).**
2. **Loosely loop the cable that will connect the controller to the disk shelf chain.**

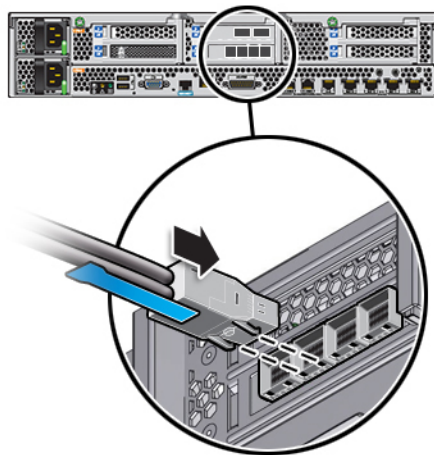
The maximum cable length between a controller and a disk shelf is six meters (19.69 feet).
3. **Facing the rear of the rack, hold the cable loops to the side of the rack, choosing the side closest to the appropriate controller HBA port.**
4. **Connect one end of the cable to the appropriate controller 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.

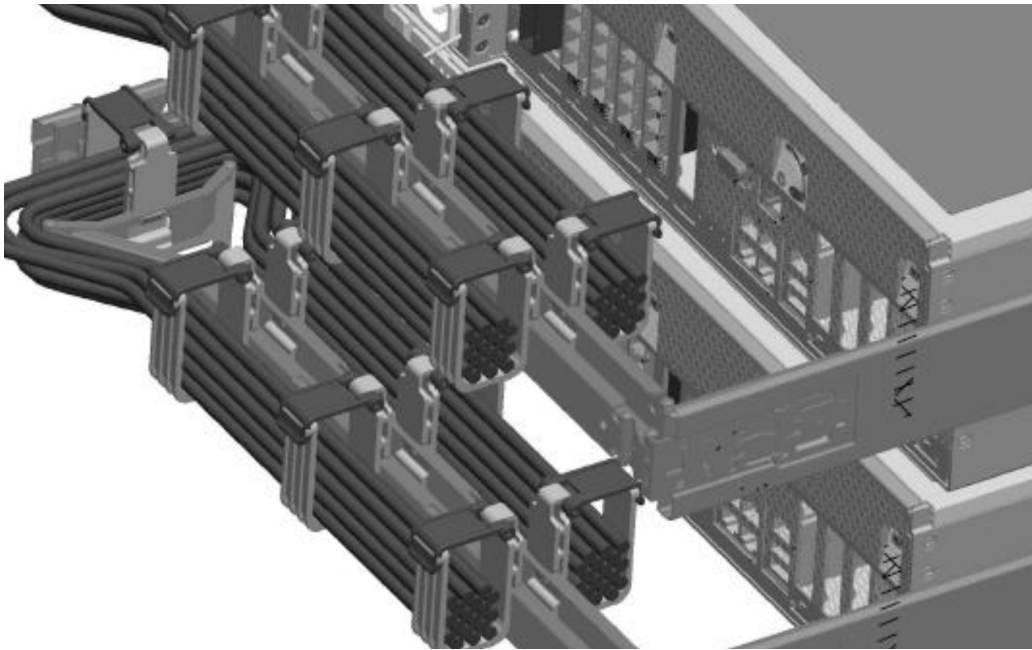
Attaching a Mini-SAS Cable to a Vertically Oriented HBA



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.**

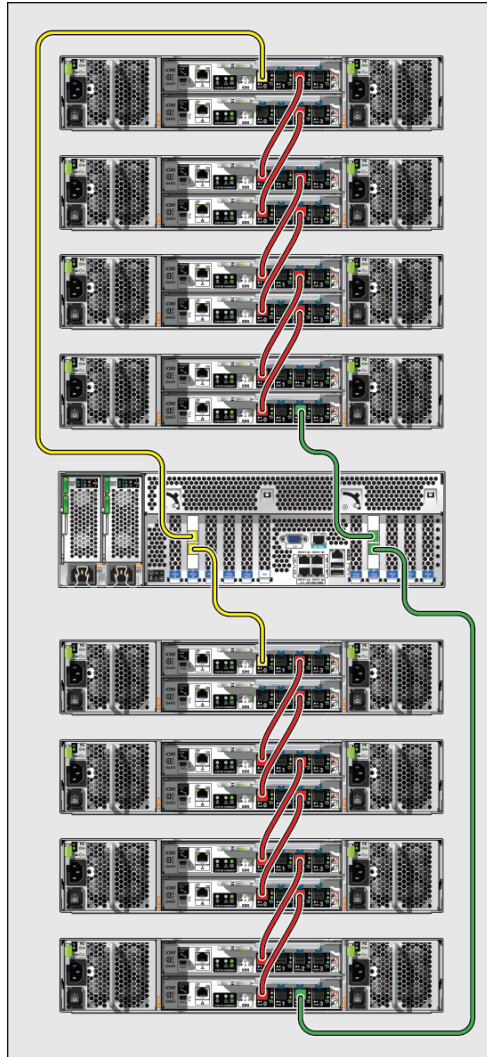


Note - Do not route more than 12 copper SAS cables through the CMA. Newer CMAs for the ZS7-2 and ZS5-4 controllers, generally from 2018 or later, can route a maximum of 16 SAS cables. All active optical cables (AOCs) must be routed through the CMA.

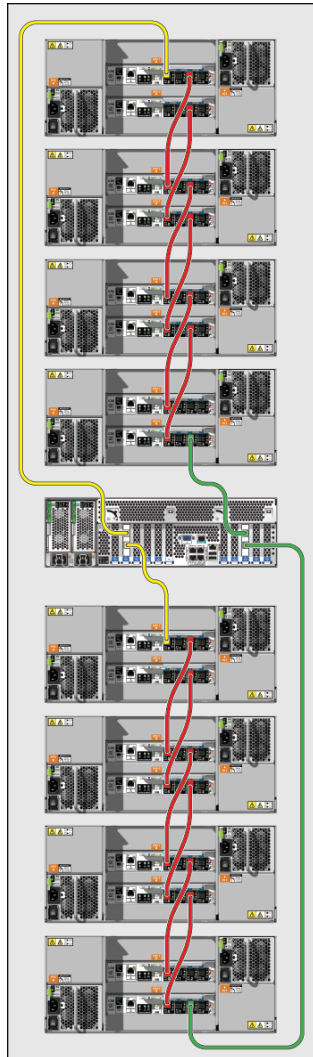
6. **Hold the other end of the cable near the disk shelf port to which it will connect.**
7. **Allowing ample slack for servicing components and for placing excessive cable to the side of the controller, create a 12.7-centimeter (5-inch) diameter coil with any excess cable. Secure the coil with a cable 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.

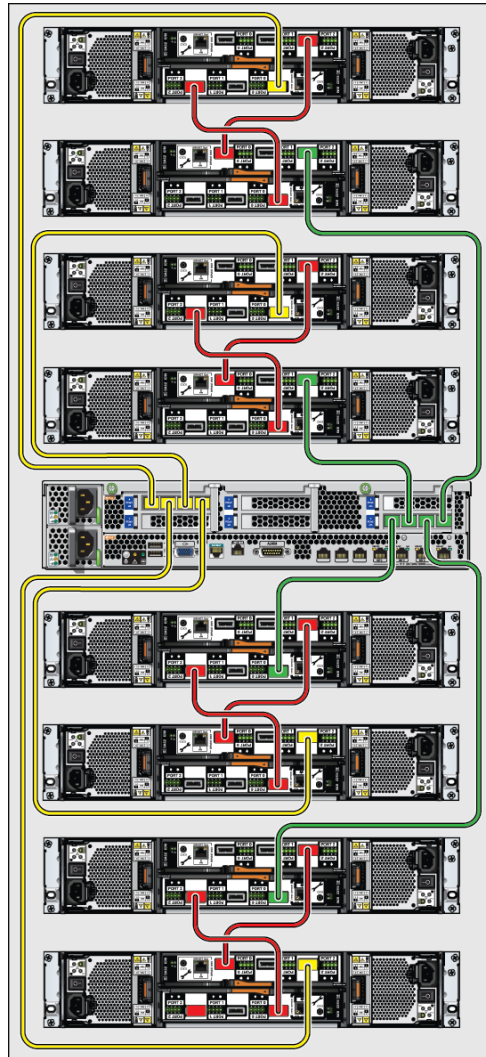
Cabling Controllers to Disk Shelves in a Base Cabinet (ZS5-4 to DE3-24P shown)



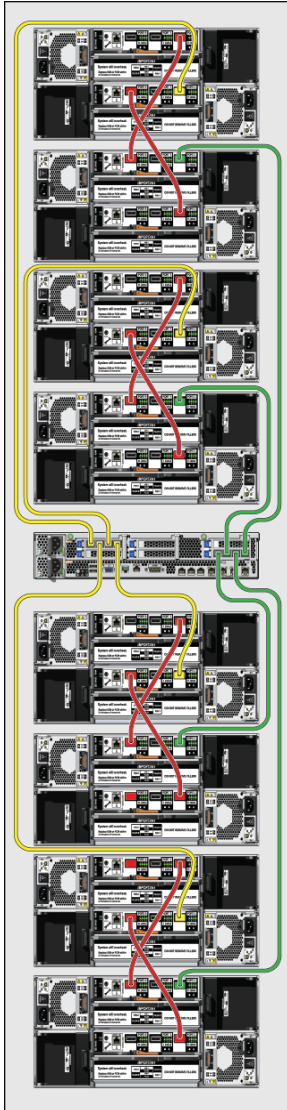
Cabling Controllers to Disk Shelves in a Base Cabinet (ZS5-4 to DE3-24C shown)



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)



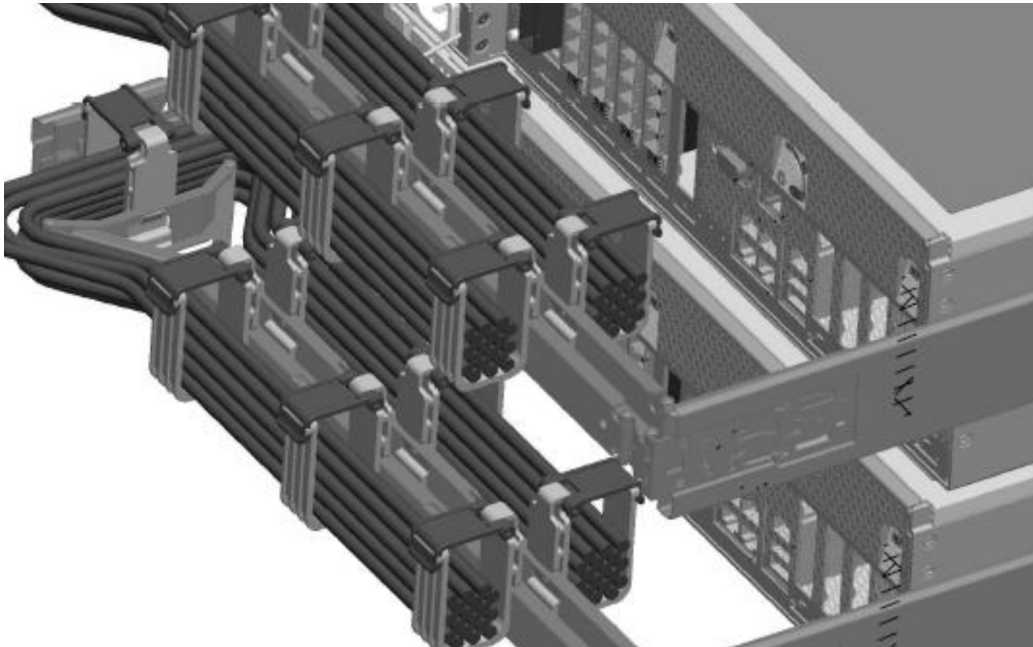
9. **If there is a cable coil, slide the coil between the vertical rack rail and the rack side panel, ensuring that the cable tie is facing the rear of the rack. Using the cable tie, secure the coil to the rack rail.**
10. **Repeat steps 2 through 9 to connect the second cable for the disk chain.**
11. **(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 11](#).**
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.



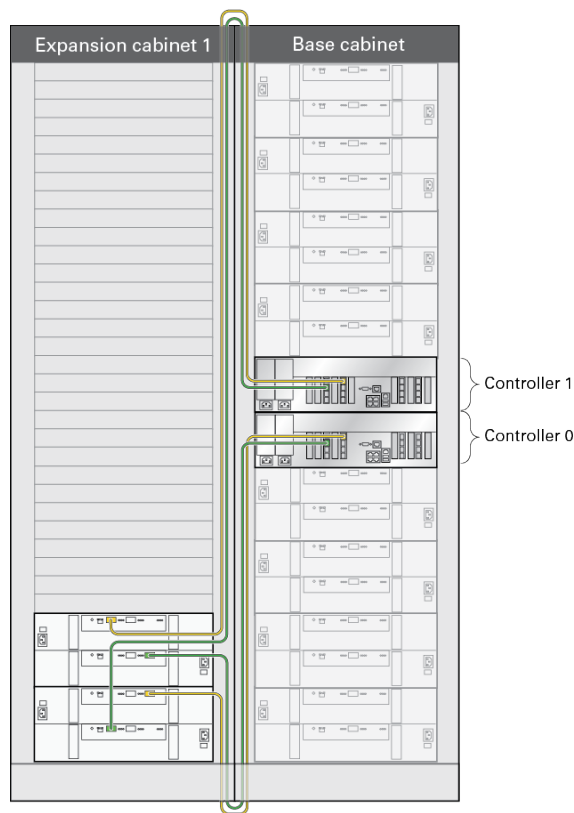
Note - Do not route more than 12 copper SAS cables through the CMA. Newer CMAs for the ZS7-2 and ZS5-4 controllers, generally from 2018 or later, can route a maximum of 16 SAS cables. All active optical cables (AOCs) must be routed through the CMA.

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 11](#).

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 controllers to 4X4 port SAS-3 HBAs.

To review these guidelines, see the following topics:

- [“Cabling DE3-24 Disk Shelves to ZS7-2 Controllers” on page 49](#)
- [“Cabling DE3-24 Disk Shelves to ZS5-4 Controllers” on page 68](#)
- [“Cabling DE3-24 Disk Shelves to ZS5-2 Controllers” on page 95](#)
- [“Cabling DE3-24 Disk Shelves to ZS4-4 Controllers” on page 108](#)
- [“Cabling DE3-24 Disk Shelves to ZS3-2 Controllers” on page 126](#)

Cabling DE3-24 Disk Shelves to ZS7-2 Controllers

This section contains guidelines for properly cabling ZS7-2 controllers to DE3-24 disk shelves.

- [“Cabling DE3-24 Disk Shelves to ZS7-2 High-end \(HE\) Controllers” on page 49](#)
- [“Cabling DE3-24 Disk Shelves to ZS7-2 Mid-range \(MR\) Controllers” on page 60](#)

Cabling DE3-24 Disk Shelves to ZS7-2 High-end (HE) Controllers

This section contains guidelines for properly cabling standalone and clustered ZS7-2 HE controllers to DE3-24 disk shelves.

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

- [“ZS7-2 HE Standalone to DE3-24 Disk Shelves \(4 HBAs\)” on page 50](#)

- [“ZS7-2 HE Clustered to DE3-24 Disk Shelves \(4 HBAs\)” on page 54](#)

ZS7-2 HE Standalone to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS7-2 HE standalone controllers with four HBAs. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 3 Standalone ZS7-2 HE controller with four HBAs connected to two DE3-24 disk shelves in two chains

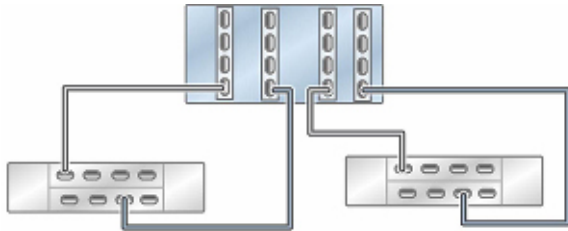


FIGURE 4 Standalone ZS7-2 HE controller with four HBAs connected to three DE3-24 disk shelves in three chains

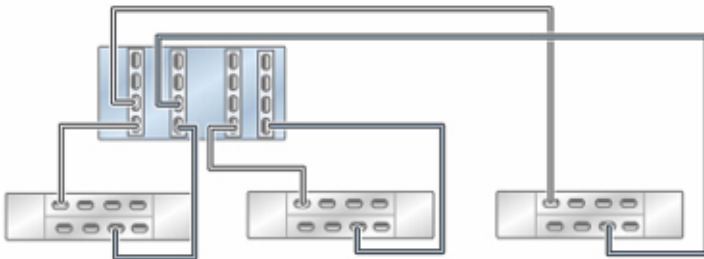


FIGURE 5 Standalone ZS7-2 HE controller with four HBAs connected to four DE3-24 disk shelves in four chains

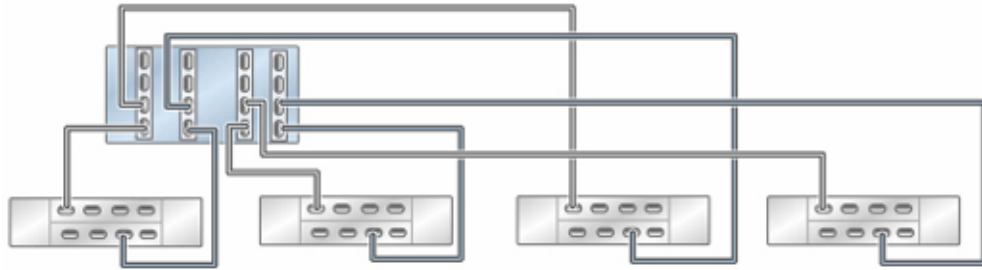


FIGURE 6 Standalone ZS7-2 HE controller with four HBAs connected to five DE3-24 disk shelves in five chains

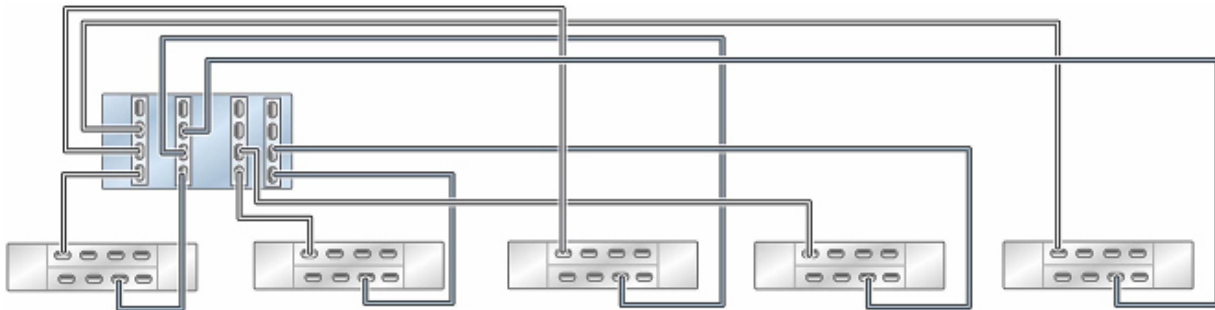


FIGURE 7 Standalone ZS7-2 HE controller with four HBAs connected to six DE3-24 disk shelves in six chains

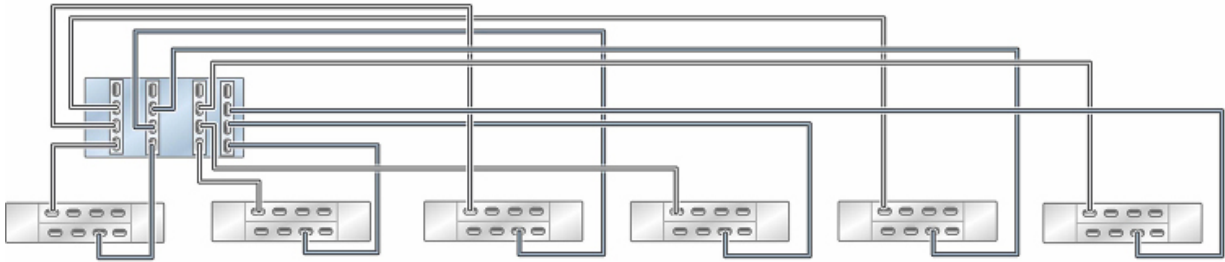


FIGURE 8 Standalone ZS7-2 HE controller with four HBAs connected to seven DE3-24 disk shelves in seven chains

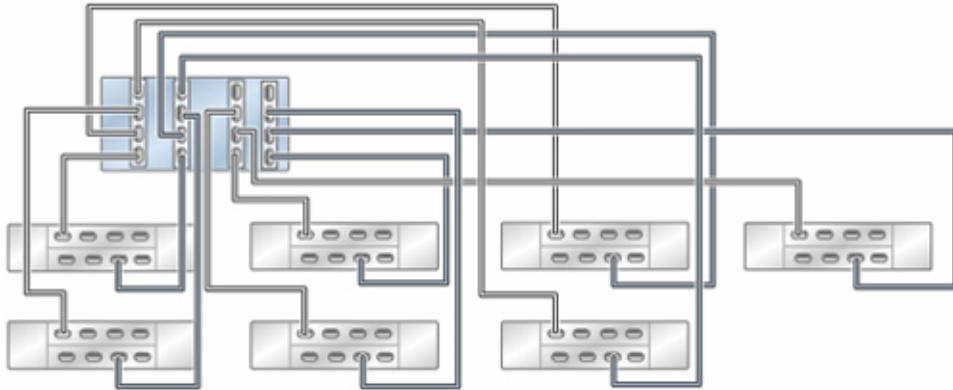


FIGURE 9 Standalone ZS7-2 HE controller with four HBAs connected to eight DE3-24 disk shelves in eight chains

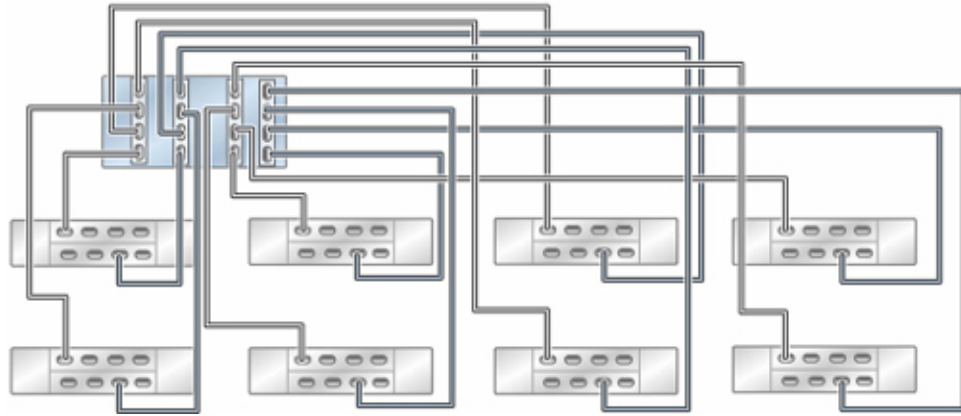
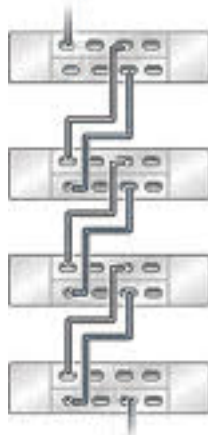


FIGURE 10 Multiple disk shelves in a single chain



ZS7-2 HE Clustered to DE3-24 Disk Shelves (4 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS7-2 HE clustered controllers with four HBAs. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 11 Clustered ZS7-2 HE controllers with four HBAs connected to two DE3-24 disk shelves in two chains

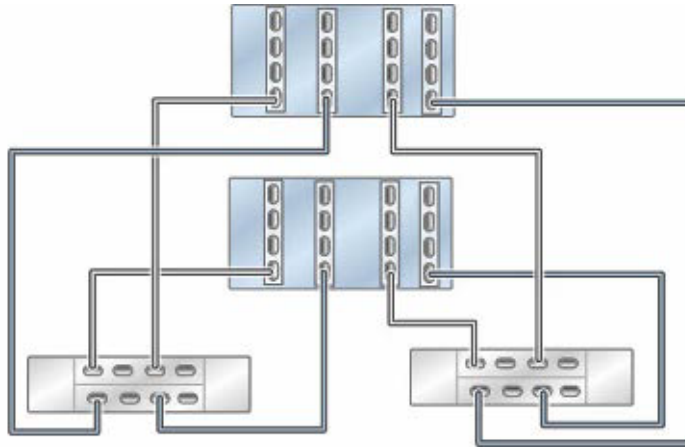


FIGURE 12 Clustered ZS7-2 HE controllers with four HBAs connected to three DE3-24 disk shelves in three chains

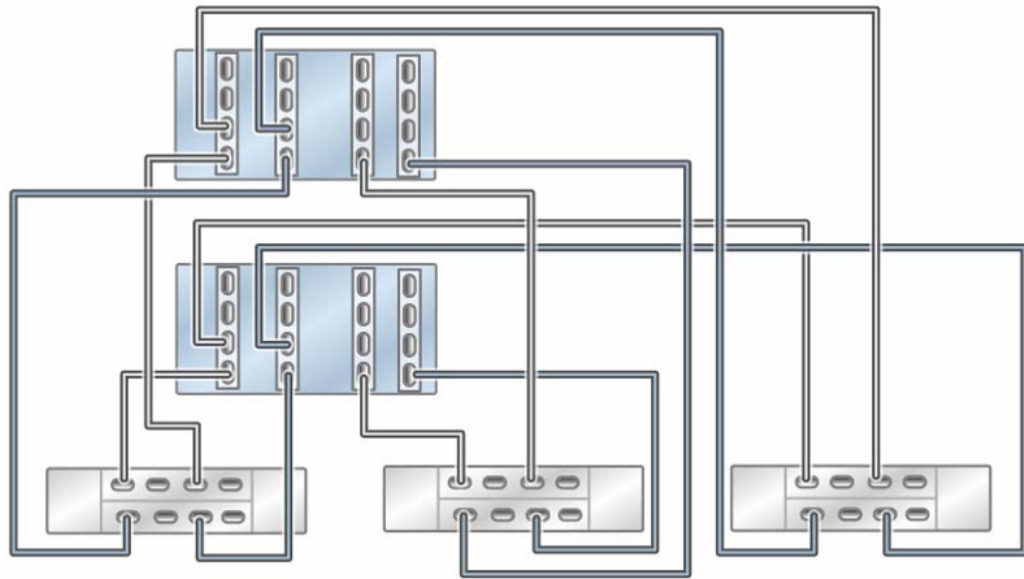


FIGURE 13 Clustered ZS7-2 HE controllers with four HBAs connected to four DE3-24 disk shelves in four chains

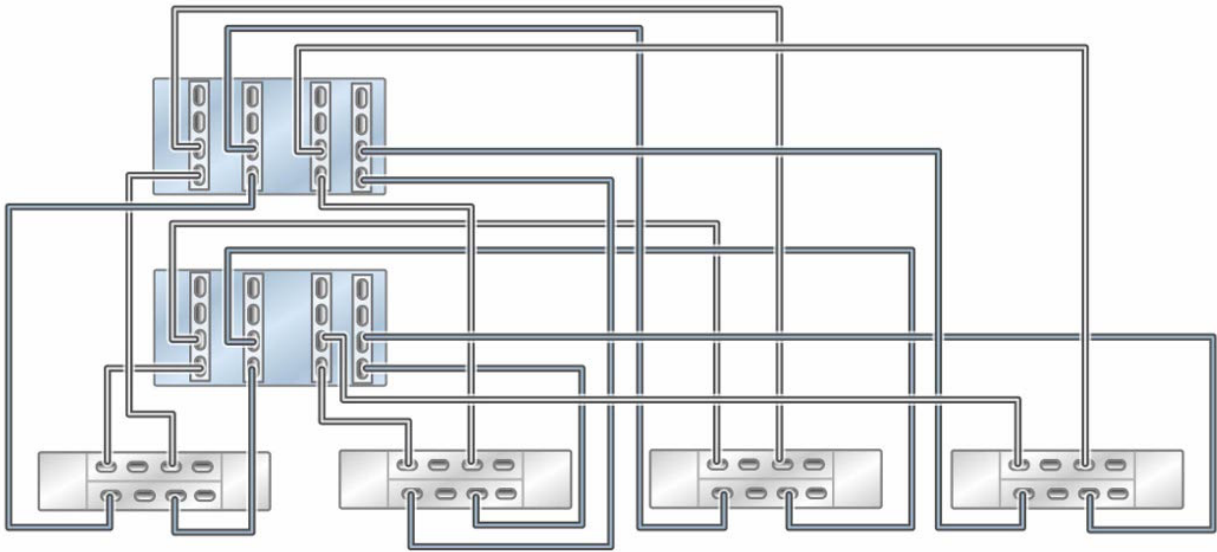


FIGURE 14 Clustered ZS7-2 HE controllers with four HBAs connected to five DE3-24 disk shelves in five chains

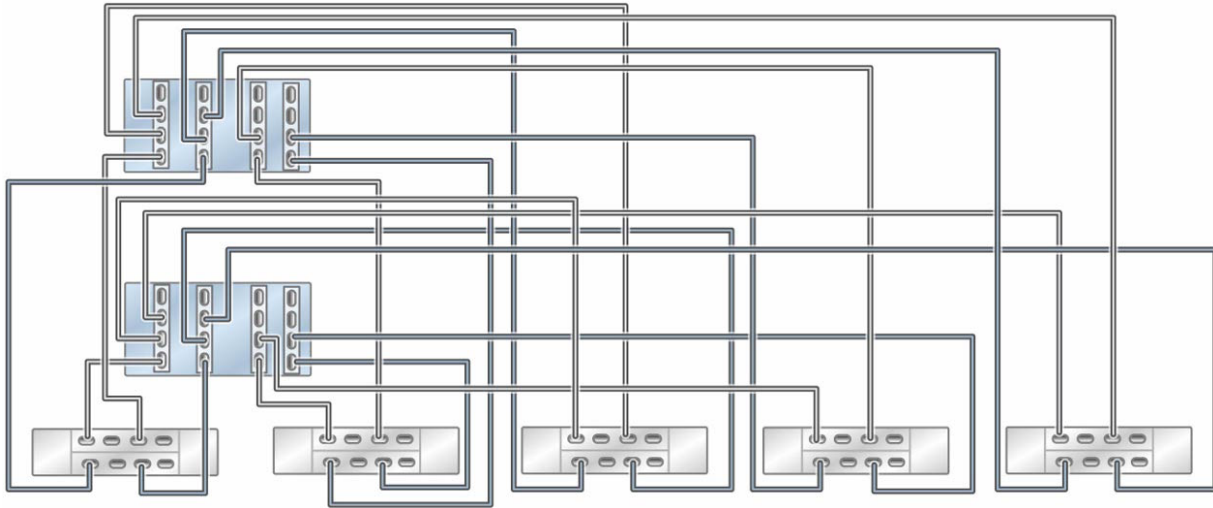


FIGURE 15 Clustered ZS7-2 HE controllers with four HBAs connected to six DE3-24 disk shelves in six chains

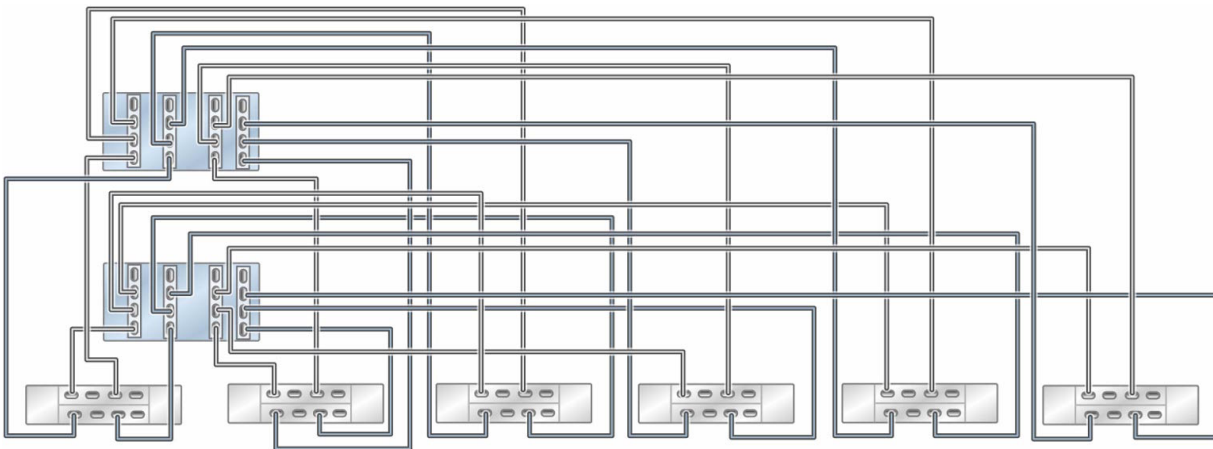


FIGURE 16 Clustered ZS7-2 HE controllers with four HBAs connected to seven DE3-24 disk shelves in seven chains

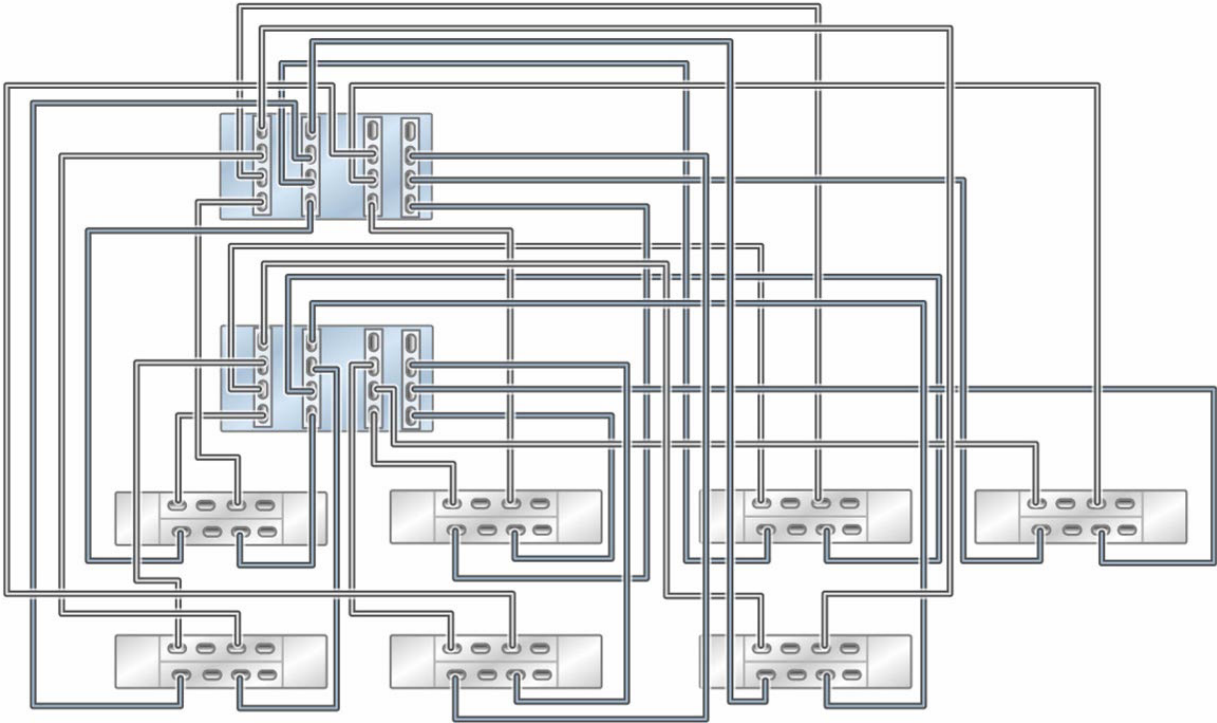


FIGURE 17 Clustered ZS7-2 HE controllers with four HBAs connected to eight DE3-24 disk shelves in eight chains

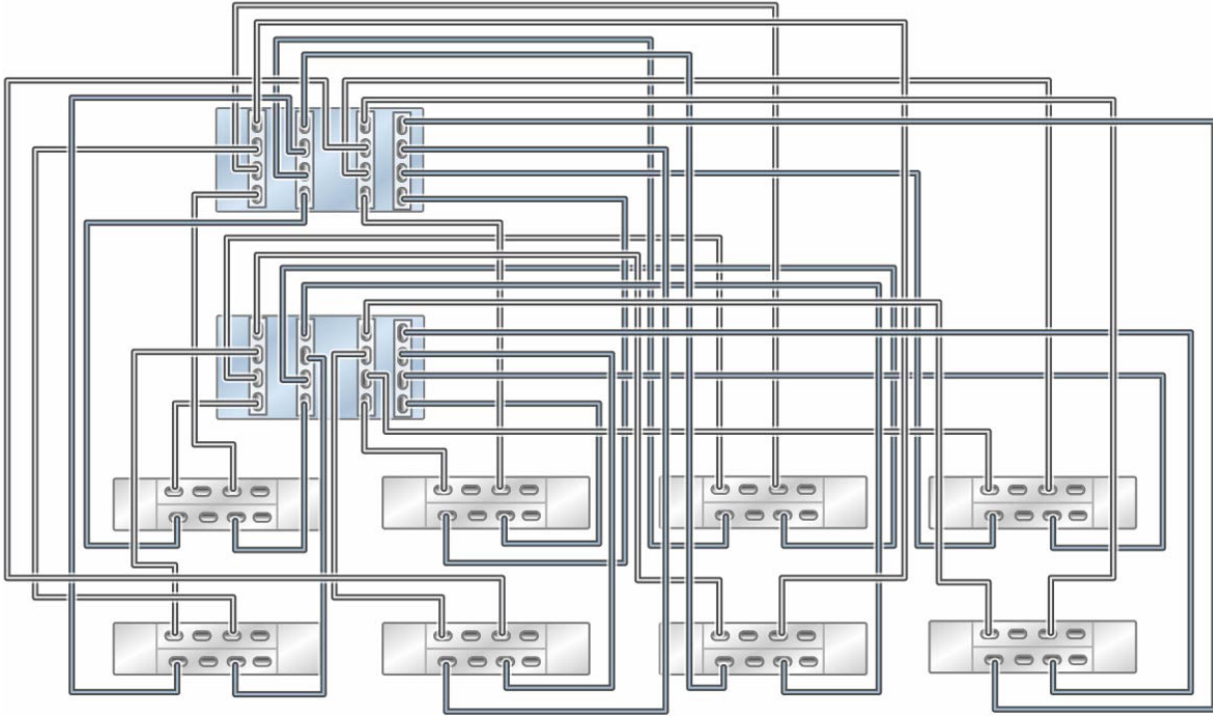


FIGURE 18 Multiple disk shelves in a single chain



Cabling DE3-24 Disk Shelves to ZS7-2 Mid-range (MR) Controllers

This section contains guidelines for properly cabling standalone and clustered ZS7-2 MR controllers to DE3-24 disk shelves.

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

- [“ZS7-2 MR Standalone to DE3-24 Disk Shelves \(2 HBAs\)” on page 60](#)
- [“ZS7-2 MR Clustered to DE3-24 Disk Shelves \(2 HBAs\)” on page 64](#)

ZS7-2 MR Standalone to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS7-2 MR standalone controllers with two HBAs. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 19 Standalone ZS7-2 MR controller with two HBAs connected to one DE3-24 disk shelf in a single chain

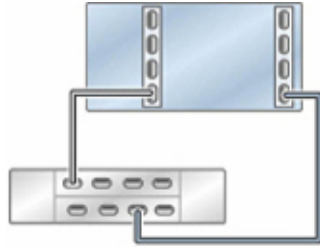


FIGURE 20 Standalone ZS7-2 MR controller with two HBAs connected to two DE3-24 disk shelves in two chains

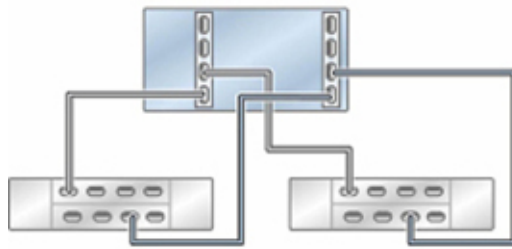


FIGURE 21 Standalone ZS7-2 MR controller with two HBAs connected to three DE3-24 disk shelves in three chains

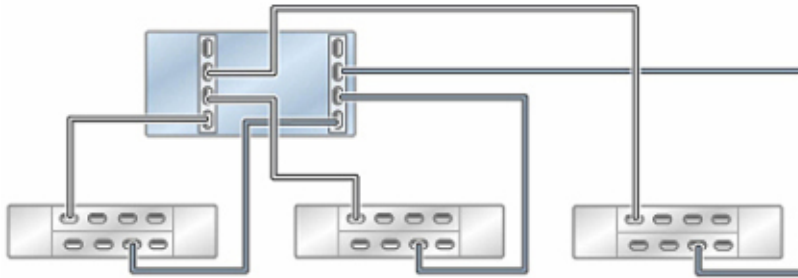


FIGURE 22 Standalone ZS7-2 MR controller with two HBAs connected to four DE3-24 disk shelves in four chains



FIGURE 23 Standalone ZS7-2 MR controller with two HBAs connected to eight DE3-24 disk shelves in four chains

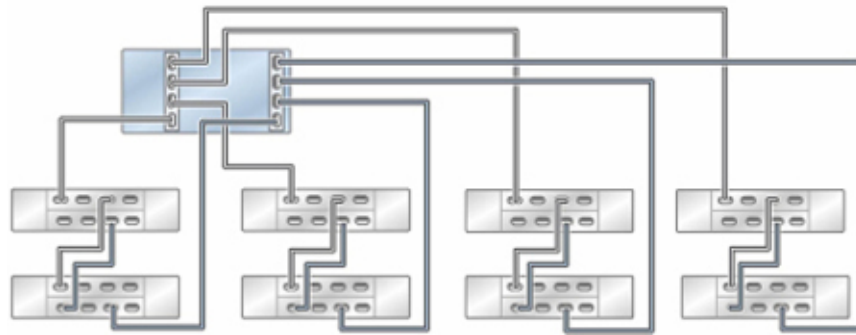
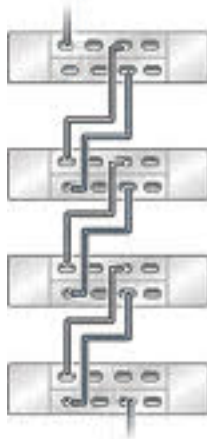


FIGURE 24 Multiple disk shelves in a single chain



ZS7-2 MR Clustered to DE3-24 Disk Shelves (2 HBAs)

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS7-2 MR clustered controllers with two HBAs. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 25 Clustered ZS7-2 MR controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

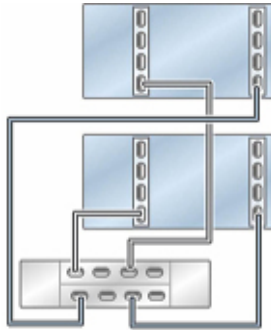


FIGURE 26 Clustered ZS7-2 MR controllers with two HBAs connected to two DE3-24 disk shelves in two chains

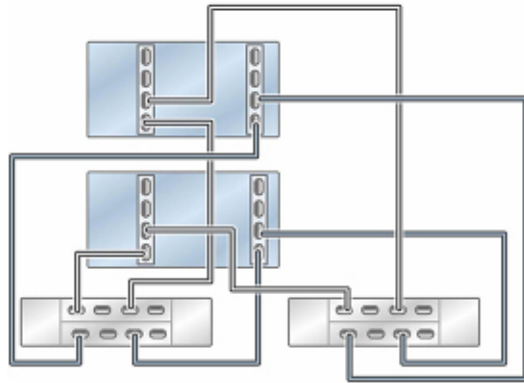


FIGURE 27 Clustered ZS7-2 MR controllers with two HBAs connected to three DE3-24 disk shelves in three chains

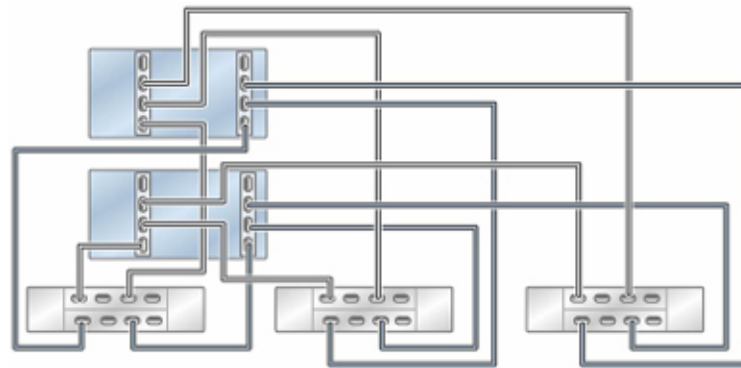


FIGURE 28 Clustered ZS7-2 MR controllers with two HBAs connected to four DE3-24 disk shelves in four chains

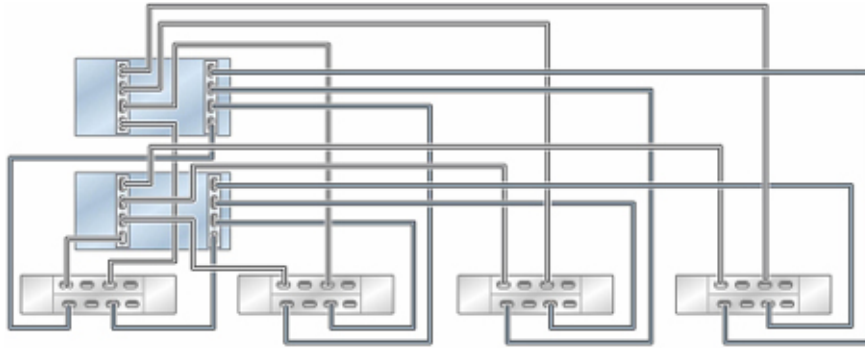


FIGURE 29 Clustered ZS7-2 MR controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

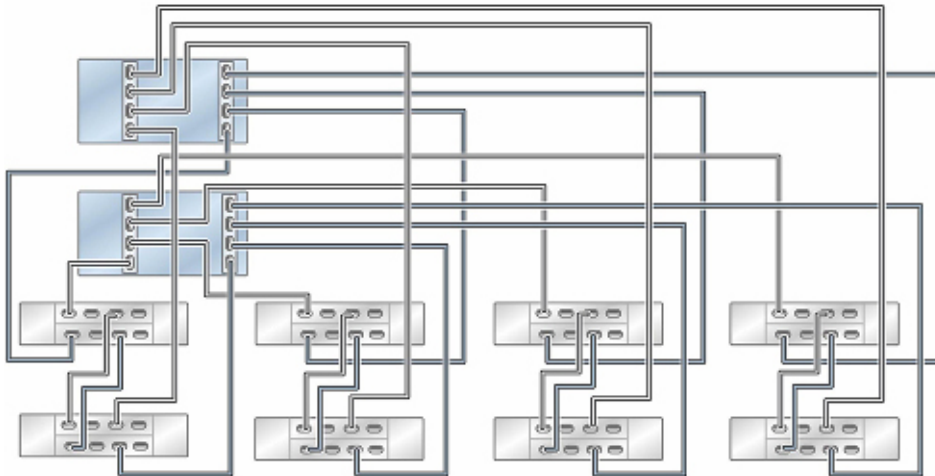


FIGURE 30 Clustered ZS7-2 MR controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains

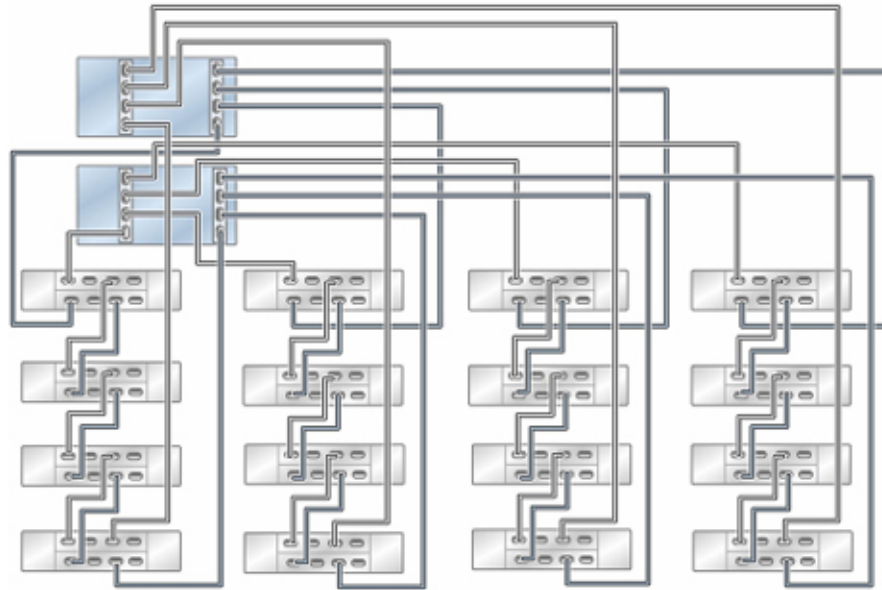


FIGURE 31 Multiple disk shelves in a single chain



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 69](#)
- [“ZS5-4 Standalone to DE3-24 Disk Shelves \(3 HBAs\)” on page 72](#)
- [“ZS5-4 Standalone to DE3-24 Disk Shelves \(4 HBAs\)” on page 75](#)
- [“ZS5-4 Clustered to DE3-24 Disk Shelves \(2 HBAs\)” on page 80](#)
- [“ZS5-4 Clustered to DE3-24 Disk Shelves \(3 HBAs\)” on page 85](#)
- [“ZS5-4 Clustered to DE3-24 Disk Shelves \(4 HBAs\)” on page 89](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 32 Standalone ZS5-4 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

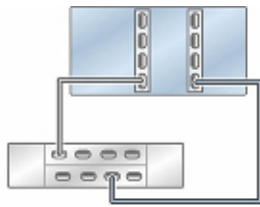


FIGURE 33 Standalone ZS5-4 controller with two HBAs connected to two DE3-24 disk shelves in two chains

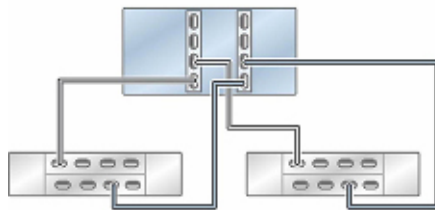


FIGURE 34 Standalone ZS5-4 controller with two HBAs connected to three DE3-24 disk shelves in three chains

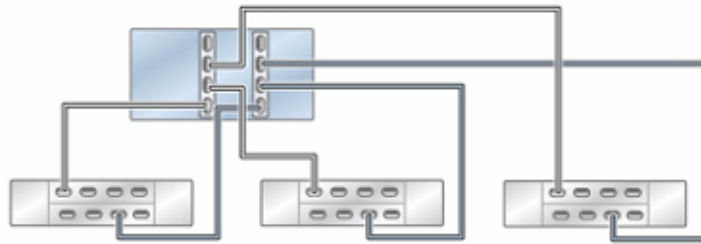


FIGURE 35 Standalone ZS5-4 controller with two HBAs connected to four DE3-24 disk shelves in four chains



FIGURE 36 Standalone ZS5-4 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

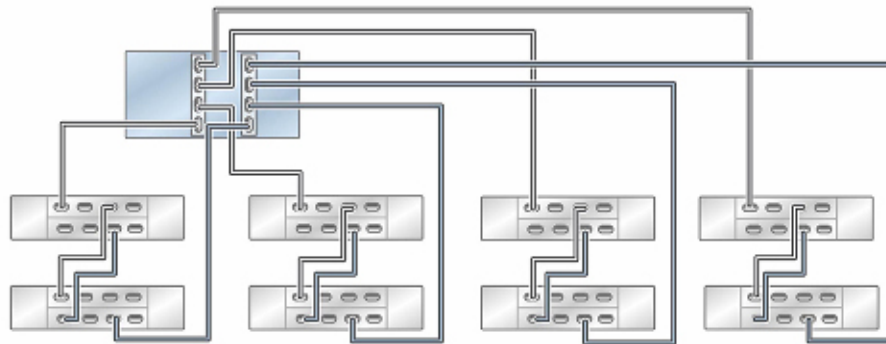
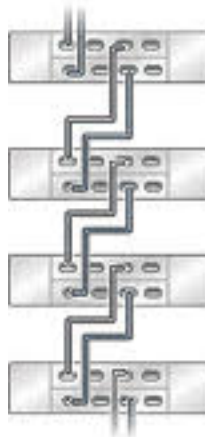


FIGURE 37 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 38 Standalone ZS5-4 controller with three HBAs connected to two DE3-24 disk shelves in two chains

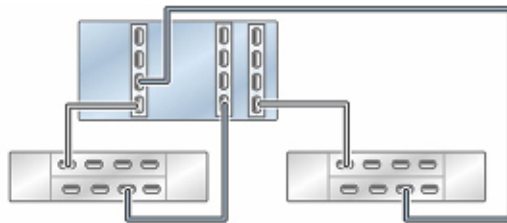


FIGURE 39 Standalone ZS5-4 controller with three HBAs connected to three DE3-24 disk shelves in three chains

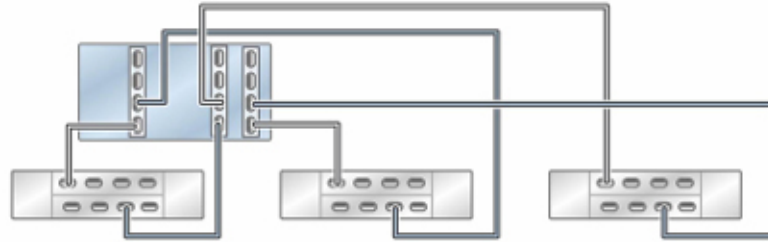


FIGURE 40 Standalone ZS5-4 controller with three HBAs connected to four DE3-24 disk shelves in four chains

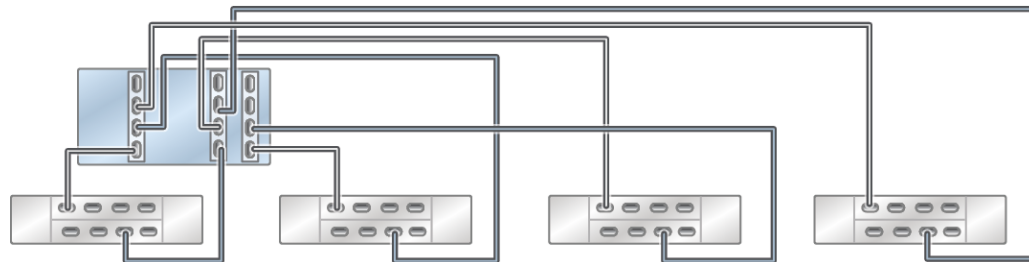


FIGURE 41 Standalone ZS5-4 controller with three HBAs connected to five DE3-24 disk shelves in five chains

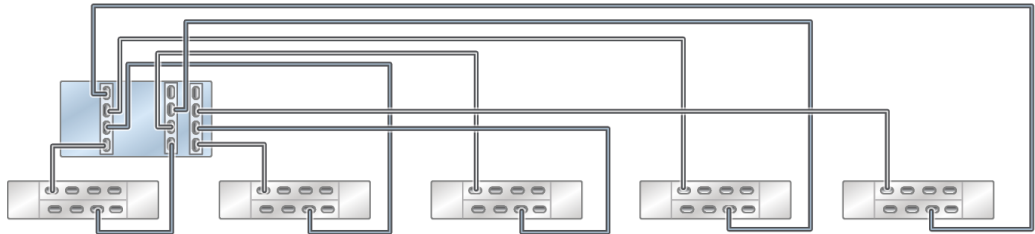


FIGURE 42 Standalone ZS5-4 controller with three HBAs connected to six DE3-24 disk shelves in six chains

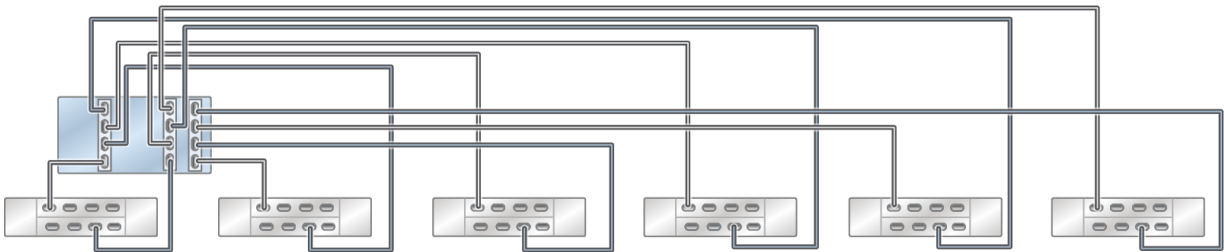
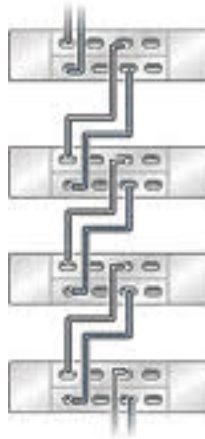


FIGURE 43 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 44 Standalone ZS5-4 controller with four HBAs connected to two DE3-24 disk shelves in two chains

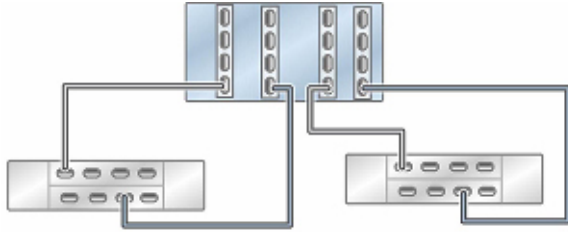


FIGURE 45 Standalone ZS5-4 controller with four HBAs connected to three DE3-24 disk shelves in three chains

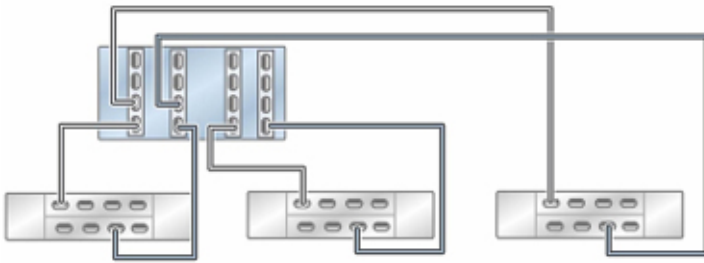


FIGURE 46 Standalone ZS5-4 controller with four HBAs connected to four DE3-24 disk shelves in four chains

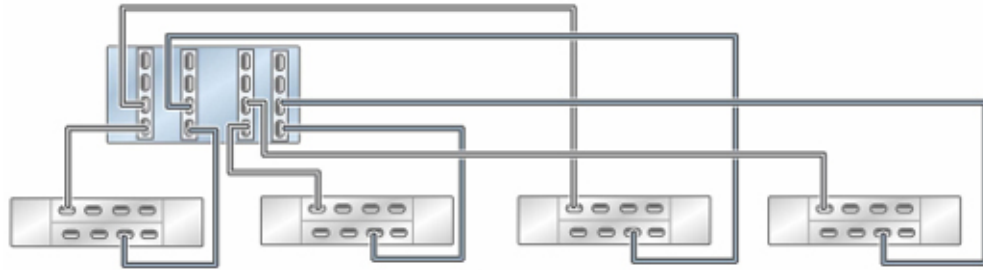


FIGURE 47 Standalone ZS5-4 controller with four HBAs connected to five DE3-24 disk shelves in five chains

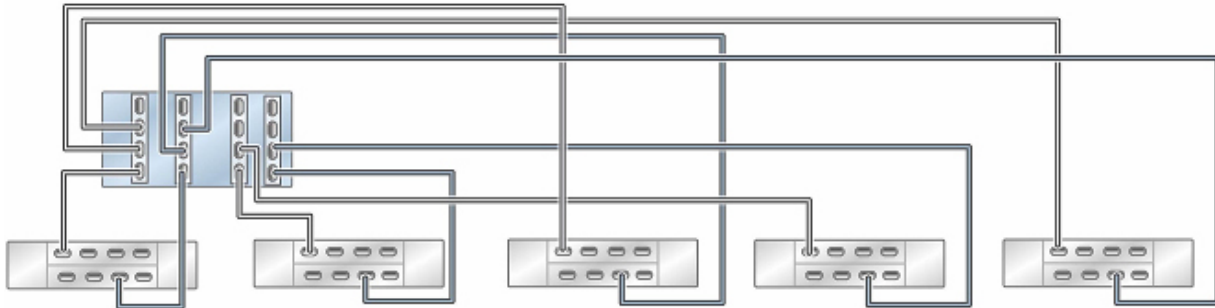


FIGURE 48 Standalone ZS5-4 controller with four HBAs connected to six DE3-24 disk shelves in six chains

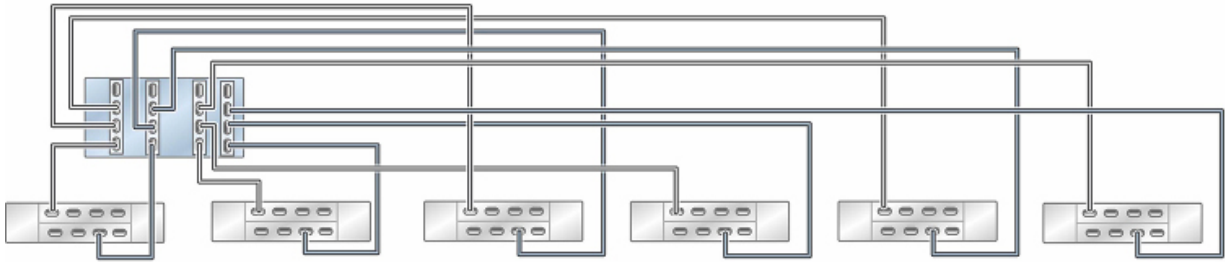


FIGURE 49 Standalone ZS5-4 controller with four HBAs connected to seven DE3-24 disk shelves in seven chains

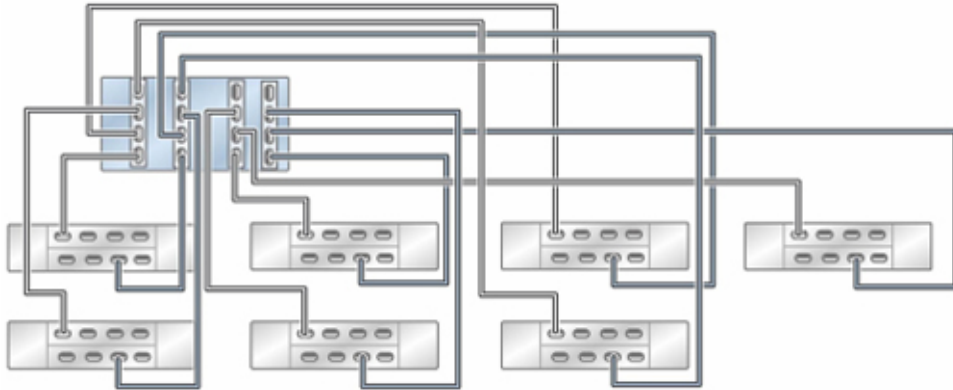


FIGURE 50 Standalone ZS5-4 controller with four HBAs connected to eight DE3-24 disk shelves in eight chains

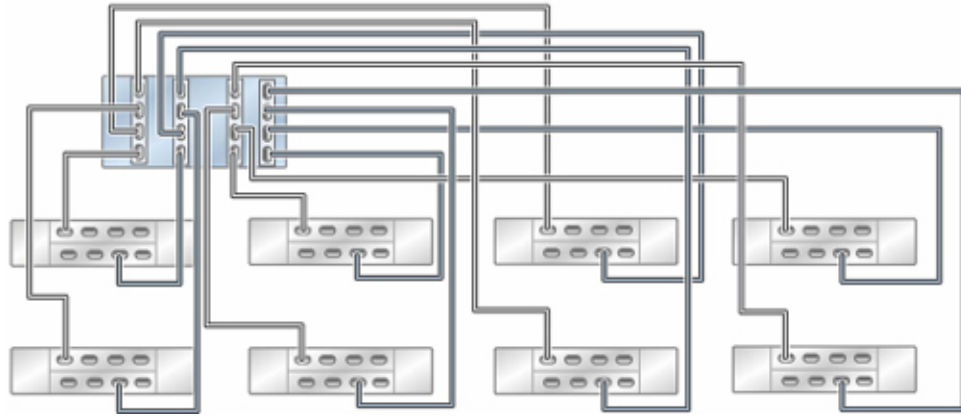
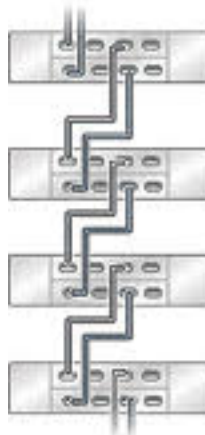


FIGURE 51 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 52 Clustered ZS5-4 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

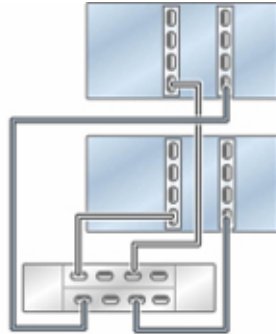


FIGURE 53 Clustered ZS5-4 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

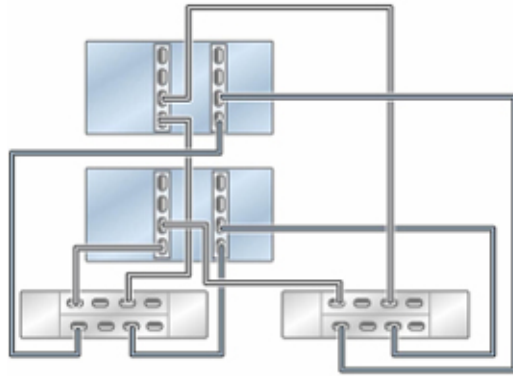


FIGURE 54 Clustered ZS5-4 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

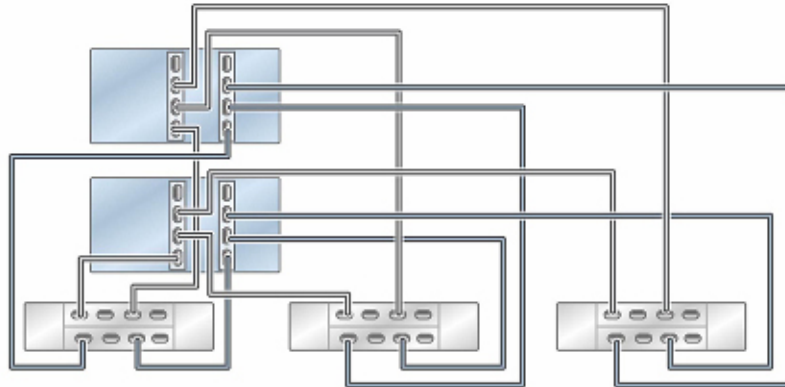


FIGURE 55 Clustered ZS5-4 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

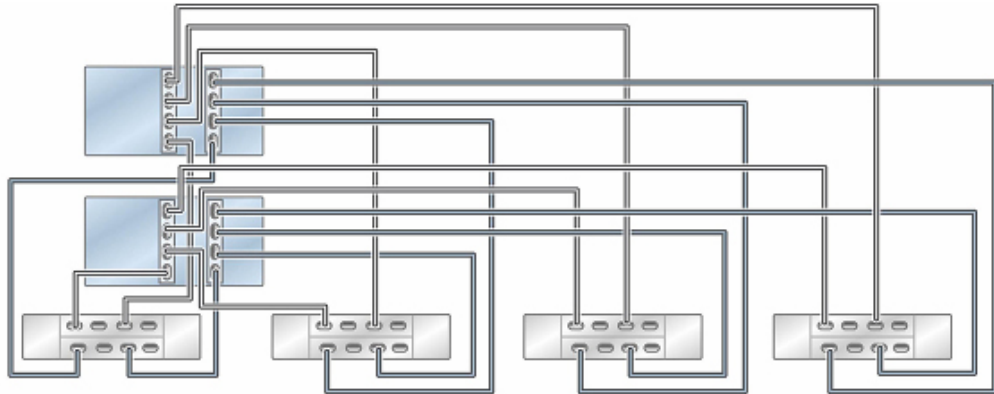


FIGURE 56 Clustered ZS5-4 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

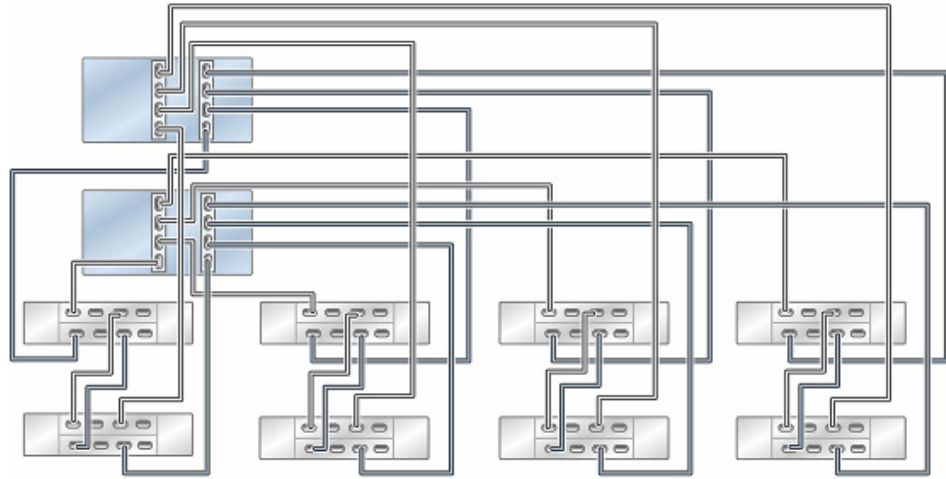


FIGURE 57 Clustered ZS5-4 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains

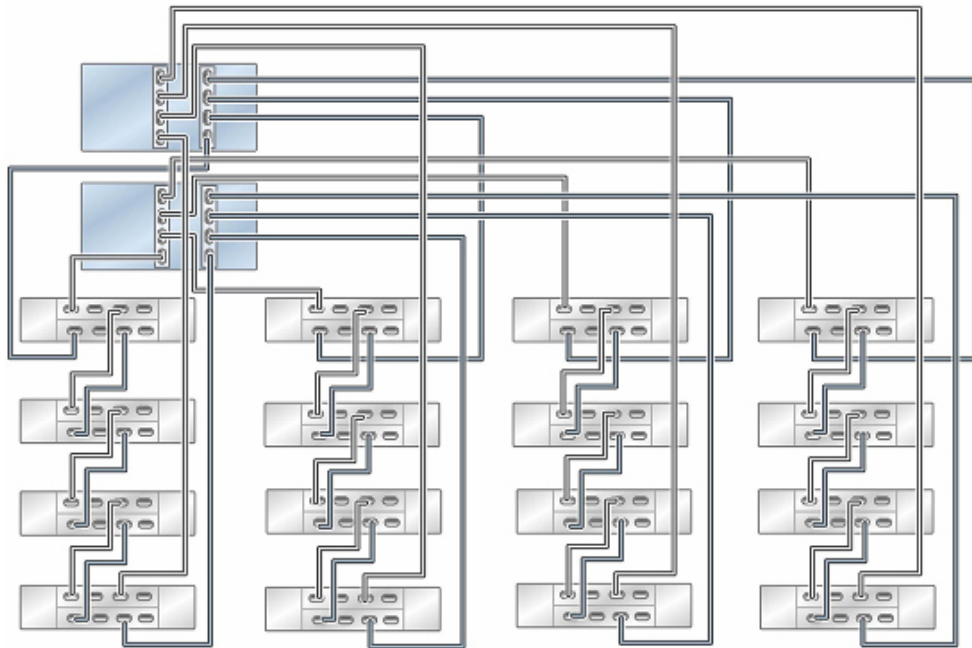
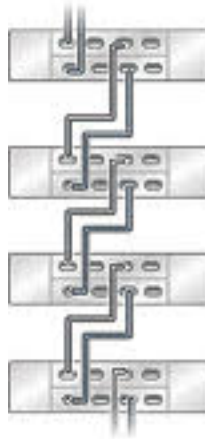


FIGURE 58 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 59 Clustered ZS5-4 controllers with three HBAs connected to two DE3-24 disk shelves in two chains

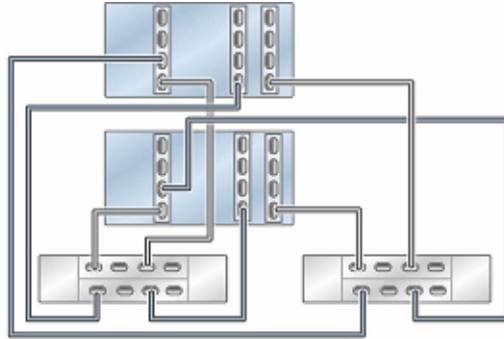


FIGURE 60 Clustered ZS5-4 controllers with three HBAs connected to three DE3-24 disk shelves in three chains

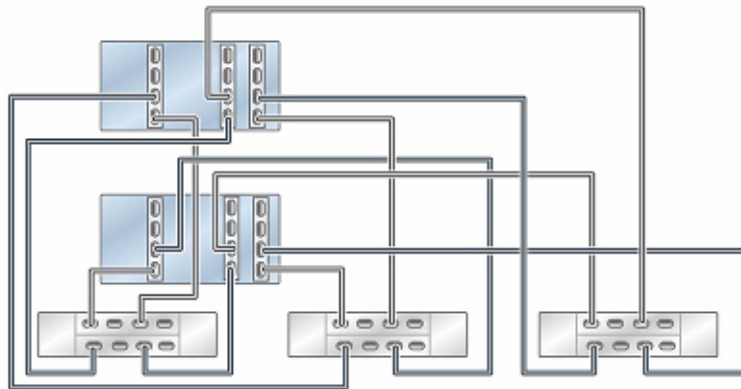


FIGURE 61 Clustered ZS5-4 controllers with three HBAs connected to four DE3-24 disk shelves in four chains

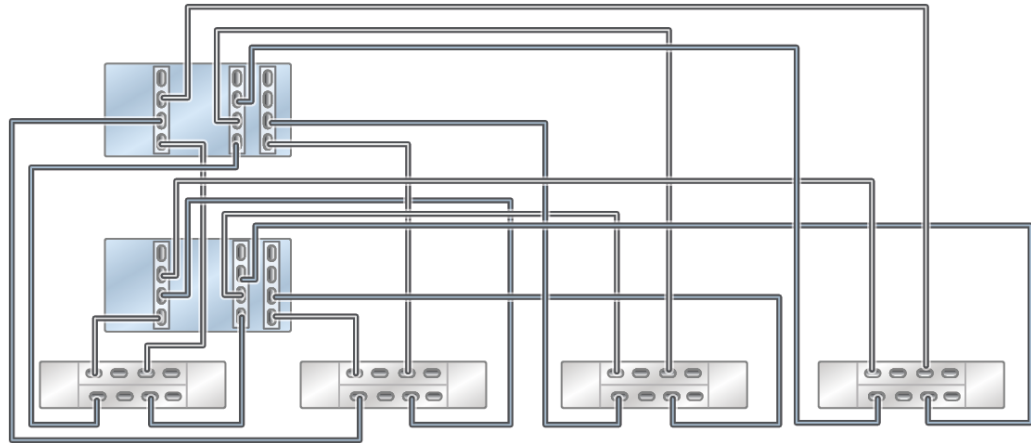


FIGURE 62 Clustered ZS5-4 controllers with three HBAs connected to five DE3-24 disk shelves in five chains

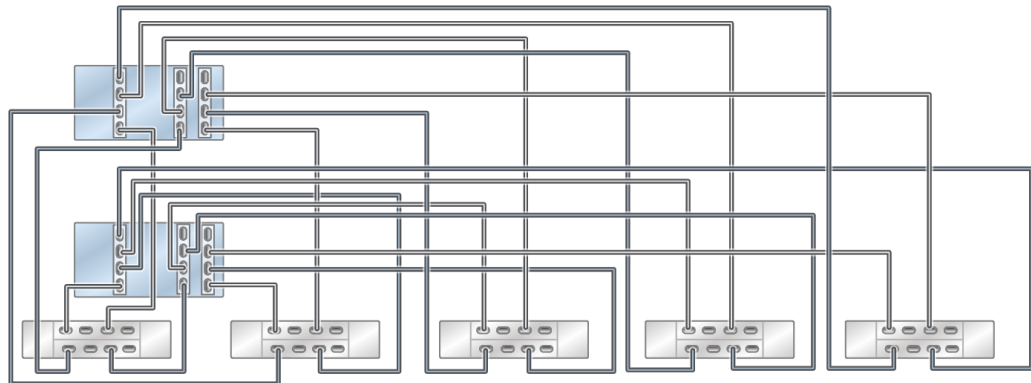


FIGURE 63 Clustered ZS5-4 controllers with three HBAs connected to six DE3-24 disk shelves in six chains

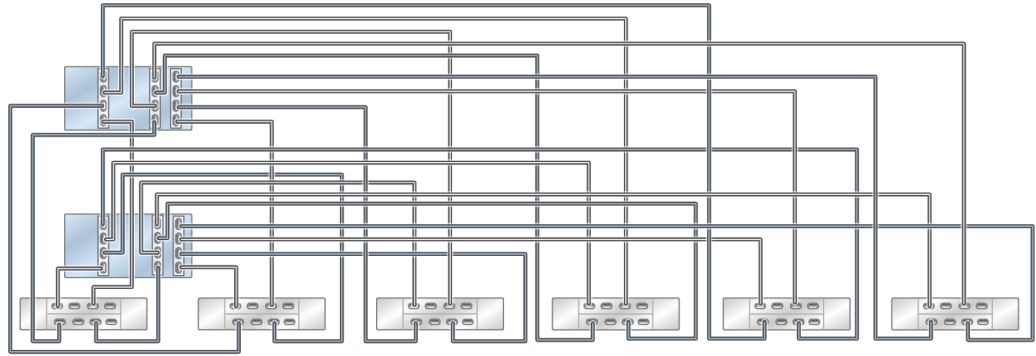
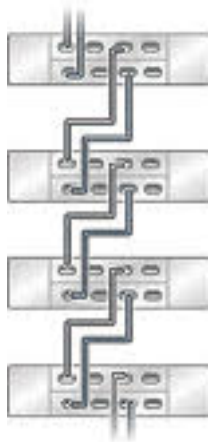


FIGURE 64 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 65 Clustered ZS5-4 controllers with four HBAs connected to two DE3-24 disk shelves in two chains

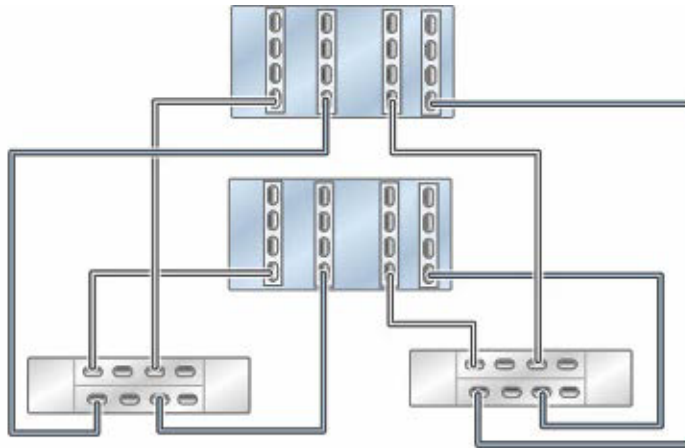


FIGURE 66 Clustered ZS5-4 controllers with four HBAs connected to three DE3-24 disk shelves in three chains

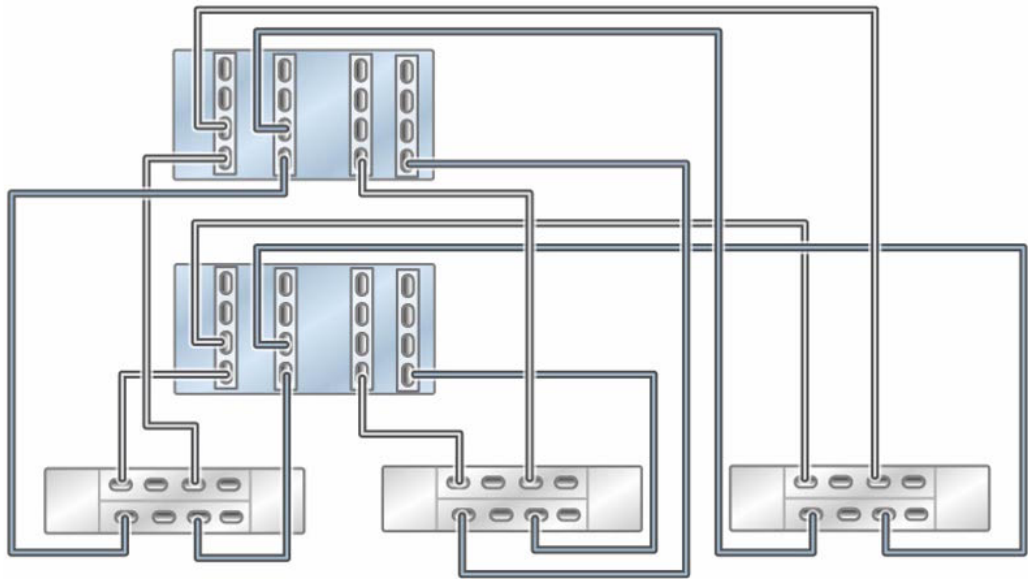


FIGURE 67 Clustered ZS5-4 controllers with four HBAs connected to four DE3-24 disk shelves in four chains

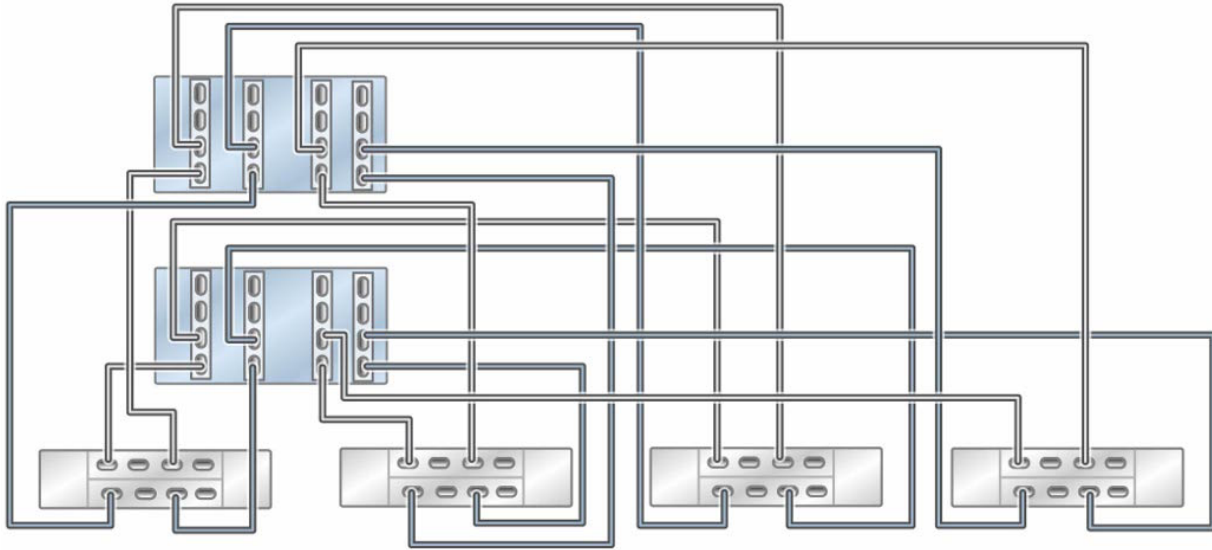


FIGURE 68 Clustered ZS5-4 controllers with four HBAs connected to five DE3-24 disk shelves in five chains

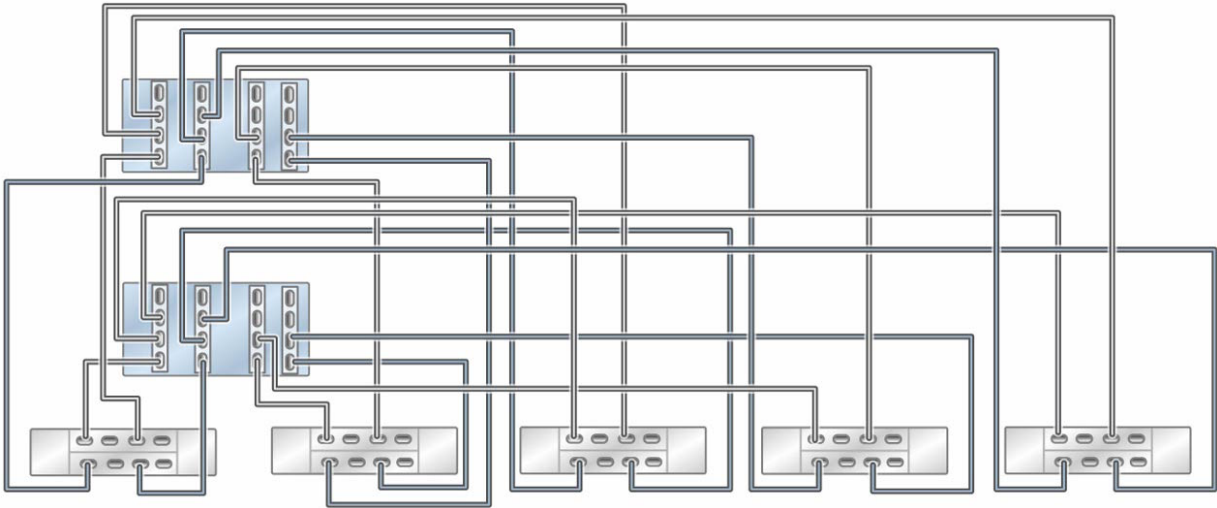


FIGURE 69 Clustered ZS5-4 controllers with four HBAs connected to six DE3-24 disk shelves in six chains

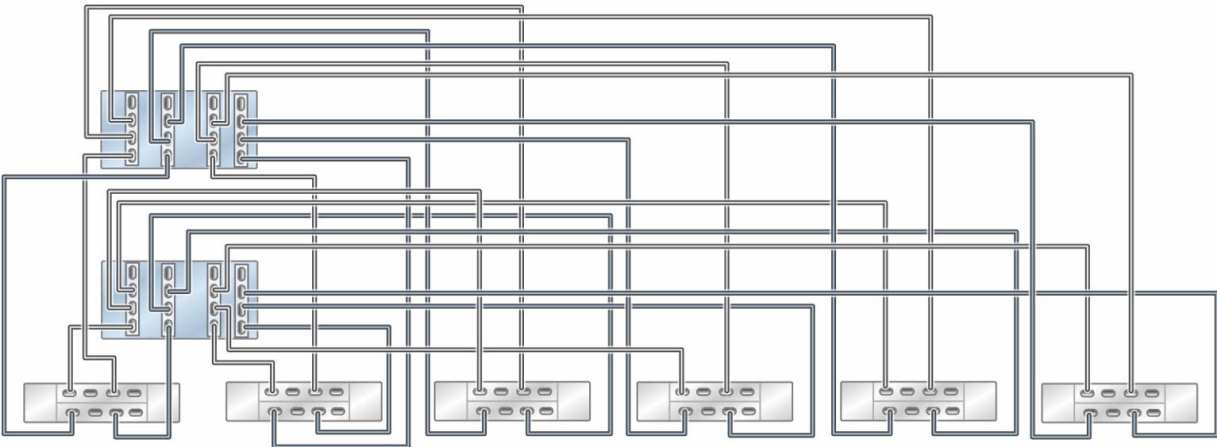


FIGURE 70 Clustered ZS5-4 controllers with four HBAs connected to seven DE3-24 disk shelves in seven chains

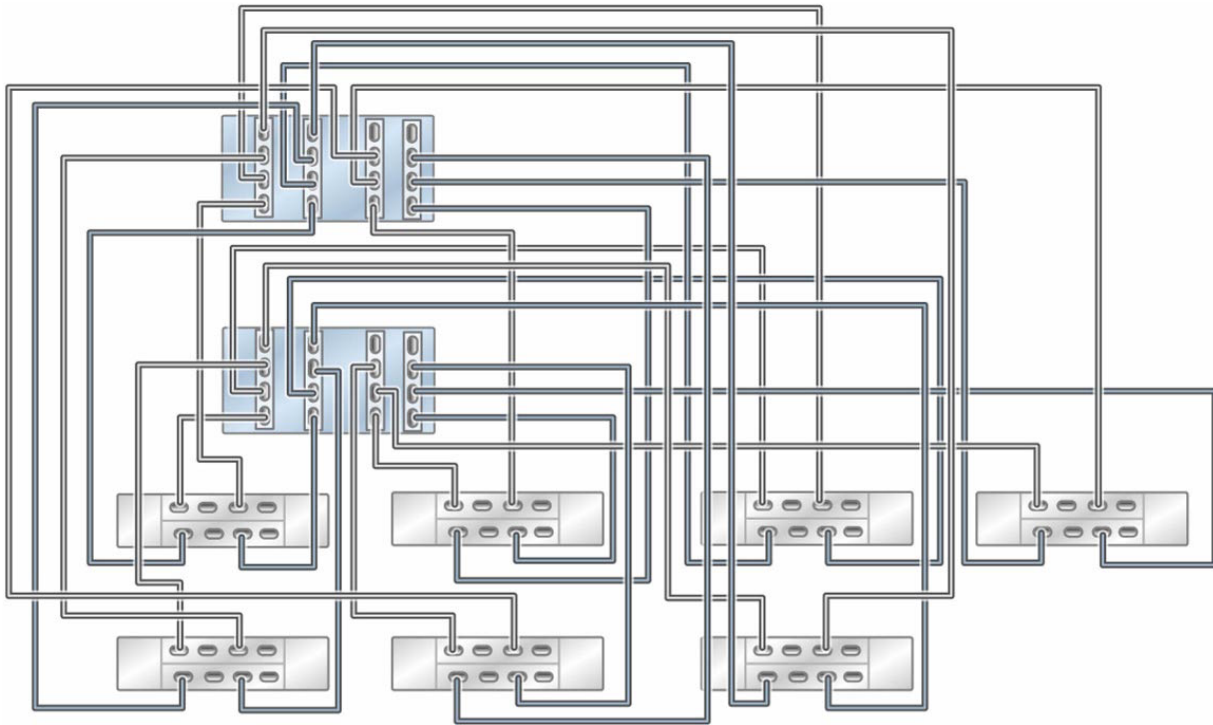


FIGURE 71 Clustered ZS5-4 controllers with four HBAs connected to eight DE3-24 disk shelves in eight chains

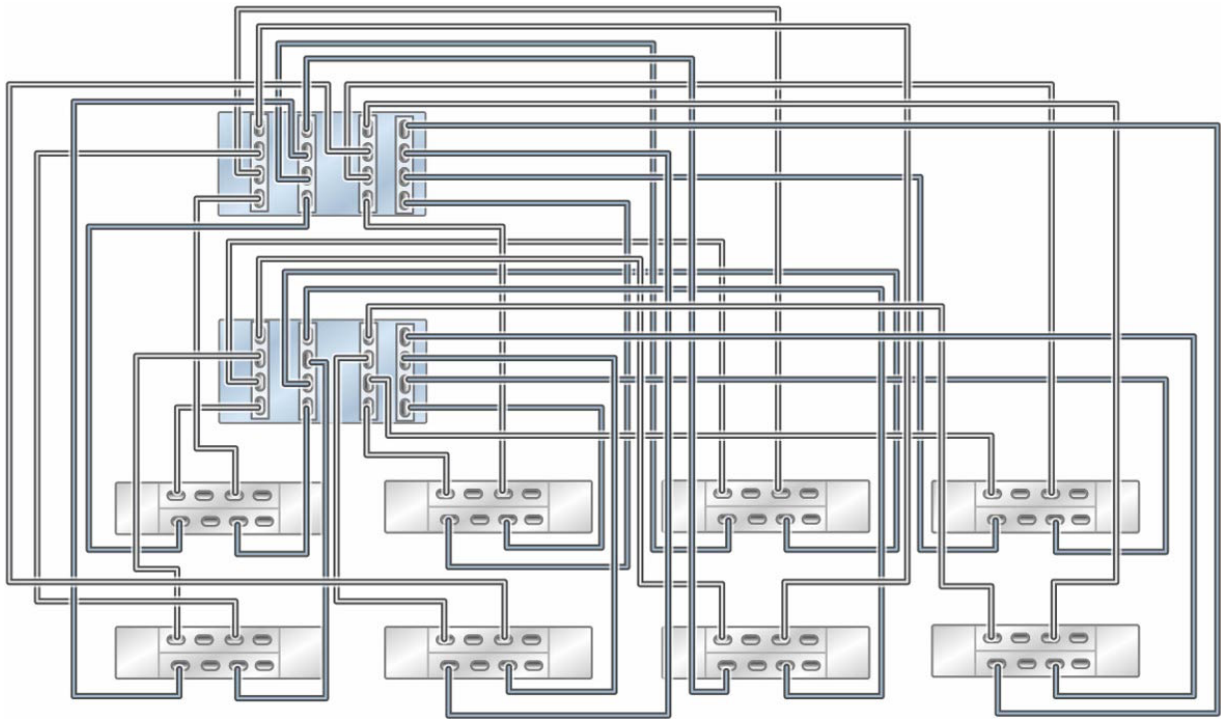


FIGURE 72 Multiple disk shelves in a single chain

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 95](#)
- [“ZS5-2 Standalone to DE3-24 Disk Shelves \(2 HBAs\)” on page 98](#)
- [“ZS5-2 Clustered to DE3-24 Disk Shelves \(1 HBA\)” on page 101](#)
- [“ZS5-2 Clustered to DE3-24 Disk Shelves \(2 HBAs\)” on page 103](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 73 Standalone ZS5-2 controller with one HBA connected to one DE3-24 disk shelf in a single chain

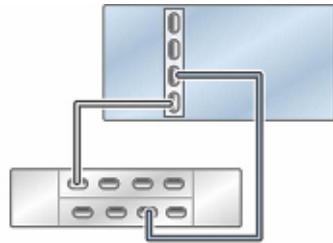


FIGURE 74 Standalone ZS5-2 controller with one HBA connected to two DE3-24 disk shelves in two chains

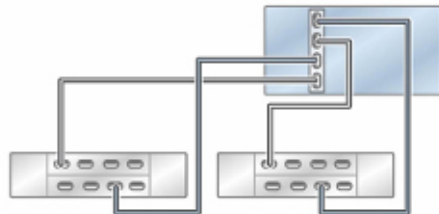


FIGURE 75 Standalone ZS5-2 controller with one HBA connected to four DE3-24 disk shelves in two chains

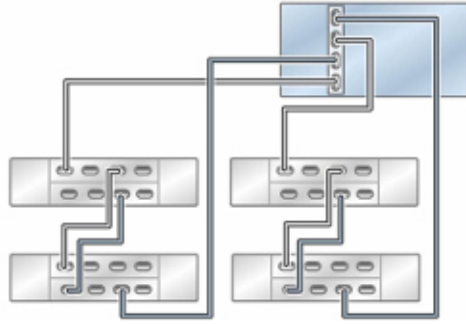
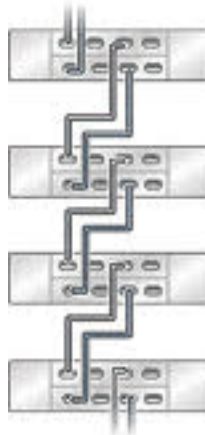


FIGURE 76 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 77 Standalone ZS5-2 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

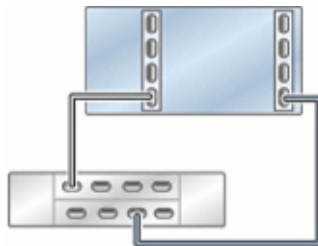


FIGURE 78 Standalone ZS5-2 controller with two HBAs connected to two DE3-24 disk shelves in two chains

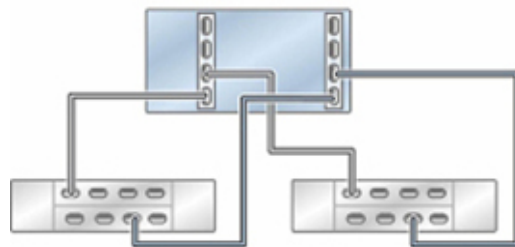


FIGURE 79 Standalone ZS5-2 controller with two HBAs connected to three DE3-24 disk shelves in three chains

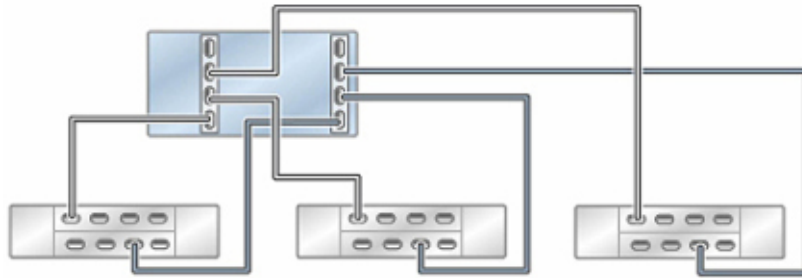


FIGURE 80 Standalone ZS5-2 controller with two HBAs connected to four DE3-24 disk shelves in four chains

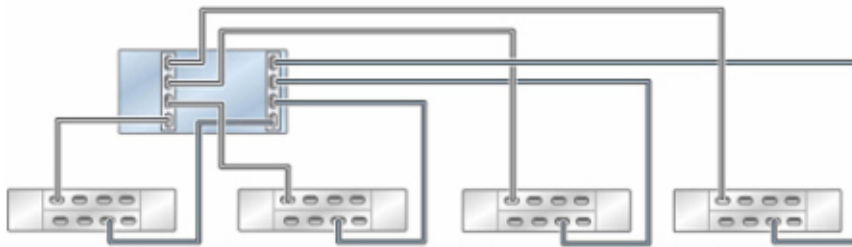


FIGURE 81 Standalone ZS5-2 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

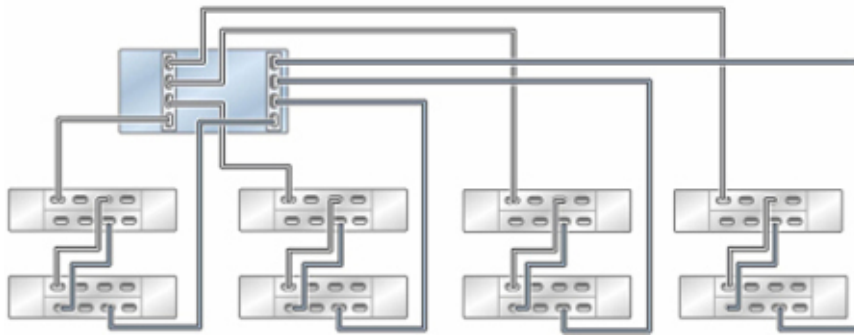
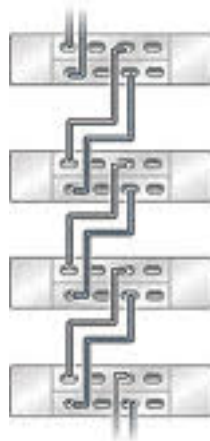


FIGURE 82 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 83 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 disk shelf in a single chain

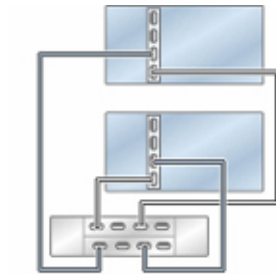


FIGURE 84 Clustered ZS5-2 controllers with one HBA connected to two DE3-24 disk shelves in two chains

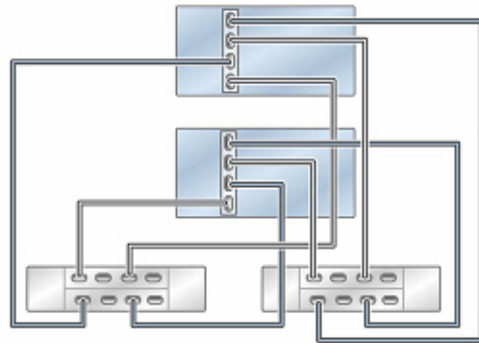


FIGURE 85 Clustered ZS5-2 controllers with one HBA connected to four DE3-24 disk shelves in two chains

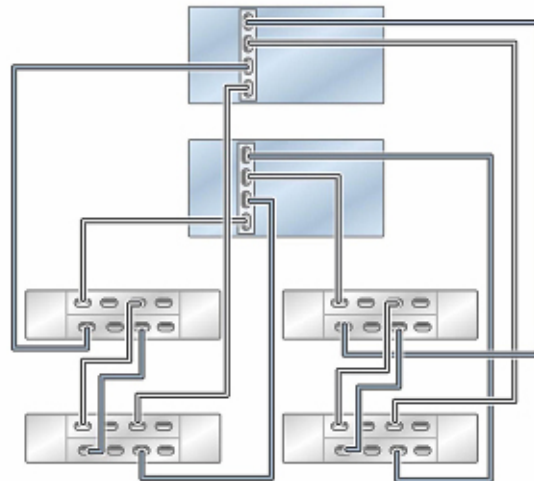
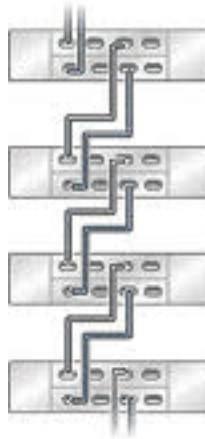


FIGURE 86 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 87 Clustered ZS5-2 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

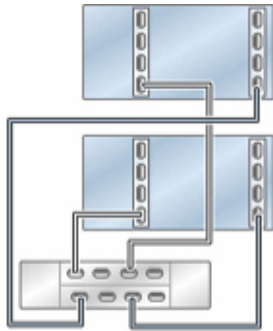


FIGURE 88 Clustered ZS5-2 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

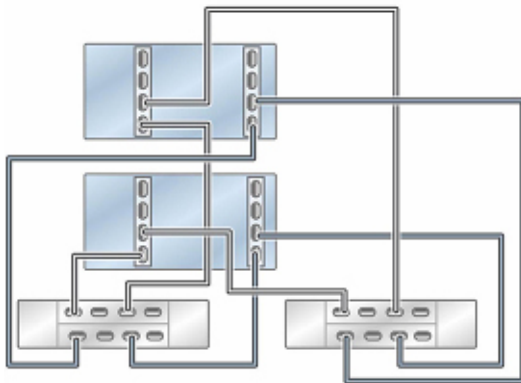


FIGURE 89 Clustered ZS5-2 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

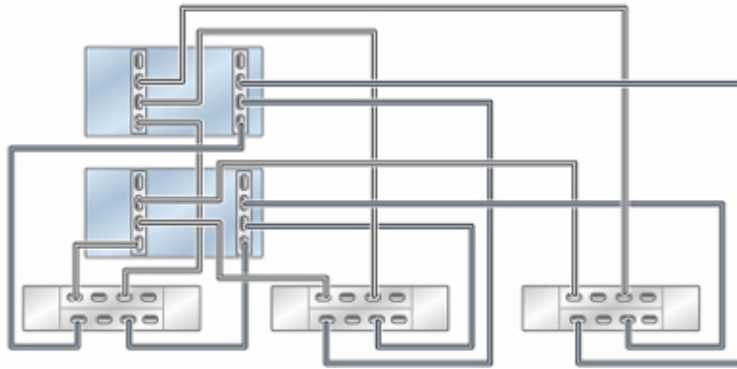


FIGURE 90 Clustered ZS5-2 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

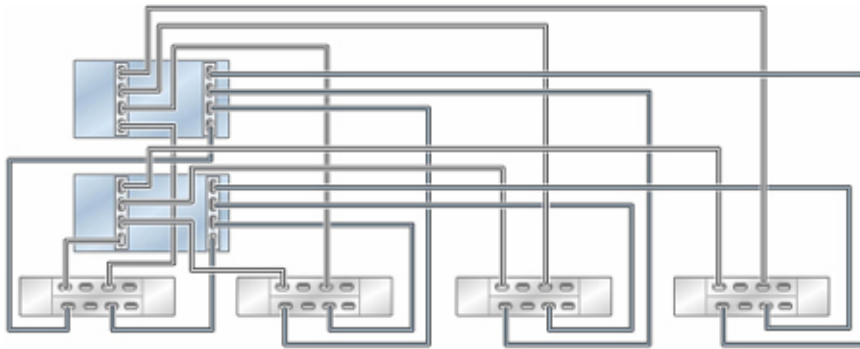


FIGURE 91 Clustered ZS5-2 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

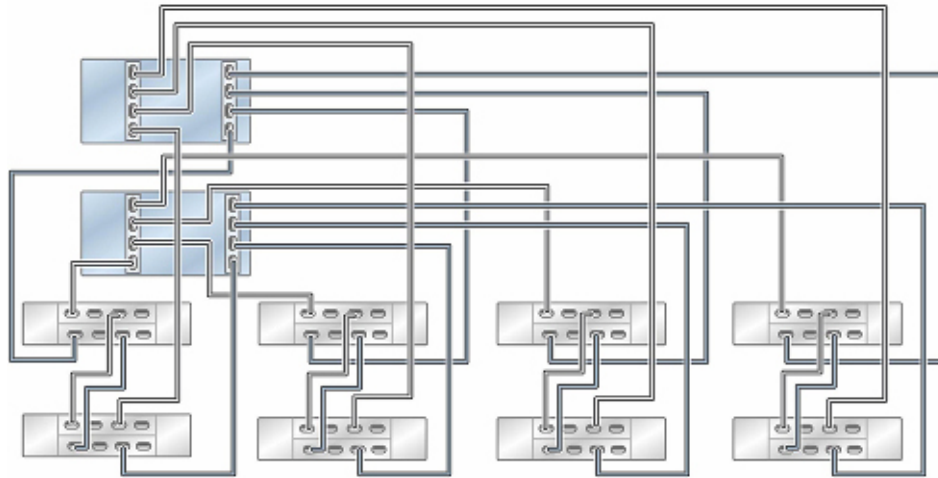


FIGURE 92 Clustered ZS5-2 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains

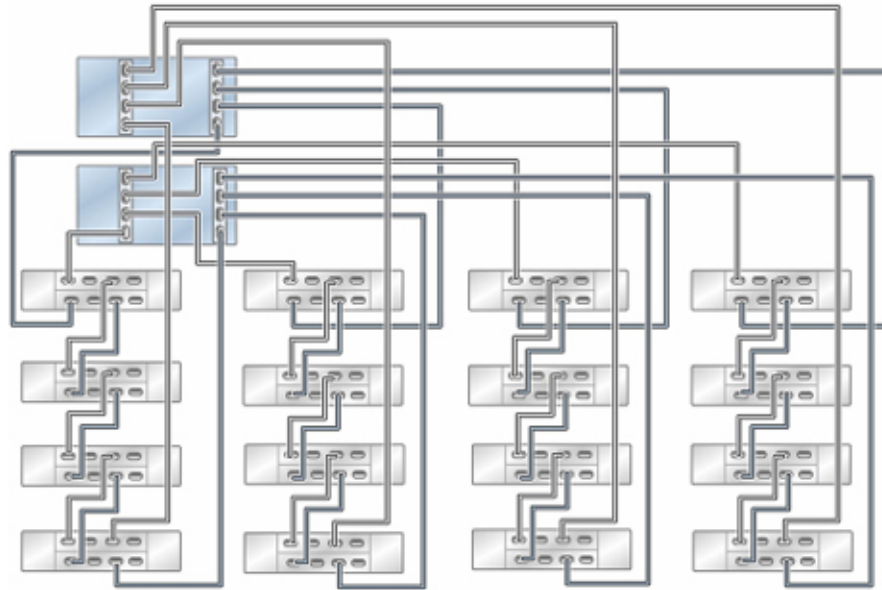


FIGURE 93 Multiple disk shelves in a single chain



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 109](#)
- [“ZS4-4 Standalone to DE3-24 Disk Shelves \(3 HBAs\)” on page 110](#)
- [“ZS4-4 Standalone to DE3-24 Disk Shelves \(4 HBAs\)” on page 113](#)
- [“ZS4-4 Clustered to DE3-24 Disk Shelves \(2 HBAs\)” on page 116](#)
- [“ZS4-4 Clustered to DE3-24 Disk Shelves \(3 HBAs\)” on page 119](#)
- [“ZS4-4 Clustered to DE3-24 Disk Shelves \(4 HBAs\)” on page 121](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 94 Standalone ZS4-4 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

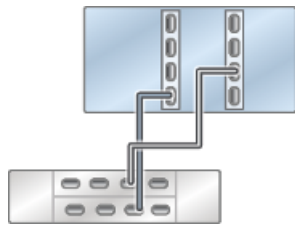


FIGURE 95 Standalone ZS4-4 controller with two HBAs connected to two DE3-24 disk shelves in two chains

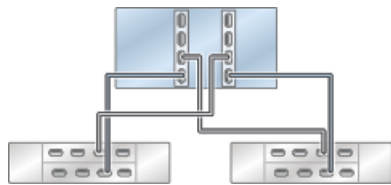


FIGURE 96 Standalone ZS4-4 controller with two HBAs connected to three DE3-24 disk shelves in three chains

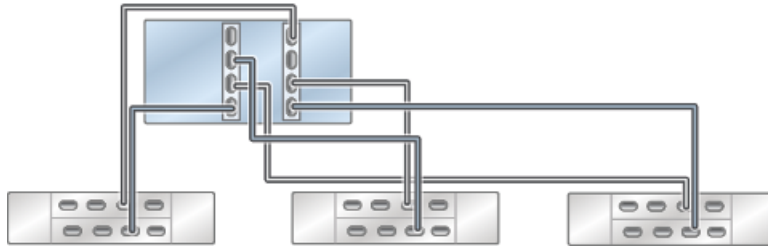


FIGURE 97 Standalone ZS4-4 controller with two HBAs connected to four DE3-24 disk shelves in four chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 98 Standalone ZS4-4 controller with three HBAs connected to one DE3-24 disk shelf in a single chain

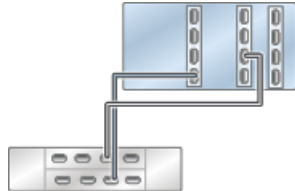


FIGURE 99 Standalone ZS4-4 controller with three HBAs connected to two DE3-24 disk shelves in two chains

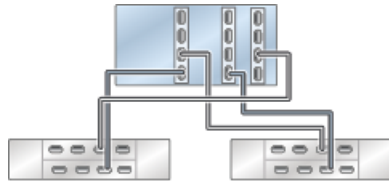


FIGURE 100 Standalone ZS4-4 controller with three HBAs connected to three DE3-24 disk shelves in three chains

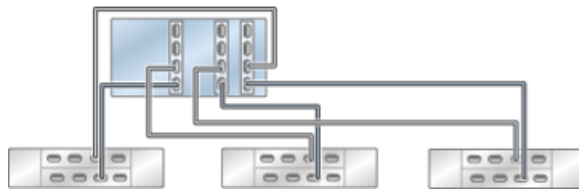


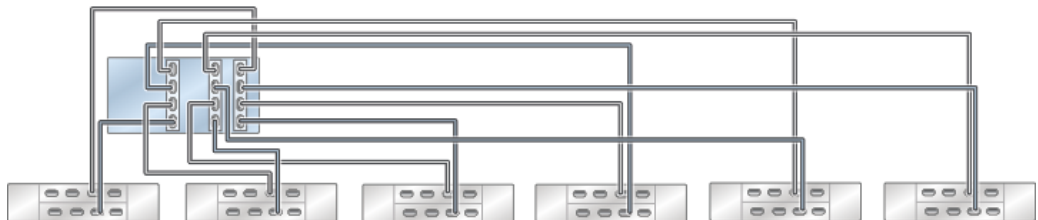
FIGURE 101 Standalone ZS4-4 controller with three HBAs connected to four DE3-24 disk shelves in four chains



FIGURE 102 Standalone ZS4-4 controller with three HBAs connected to five DE3-24 disk shelves in five chains



FIGURE 103 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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 104 Standalone ZS5-4 controller with four HBAs connected to one DE3-24 disk shelf in a single chain

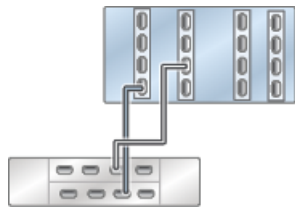


FIGURE 105 Standalone ZS4-4 controller with four HBAs connected to two DE3-24 disk shelves in two chains

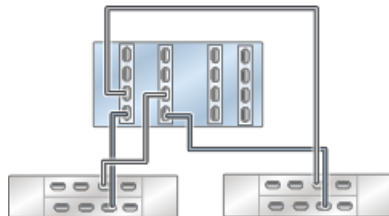


FIGURE 106 Standalone ZS4-4 controller with four HBAs connected to three DE3-24 disk shelves in three chains

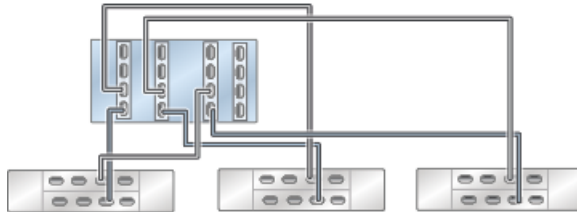


FIGURE 107 Standalone ZS4-4 controller with four HBAs connected to four DE3-24 disk shelves in four chains

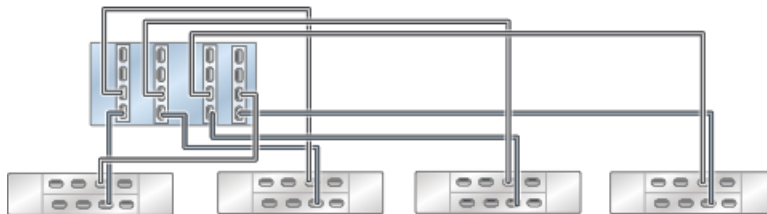


FIGURE 108 Standalone ZS4-4 controller with four HBAs connected to five DE3-24 disk shelves in five chains

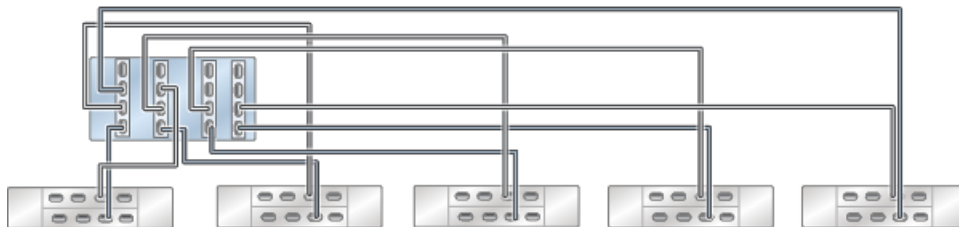


FIGURE 109 Standalone ZS4-4 controller with four HBAs connected to six DE3-24 disk shelves in six chains

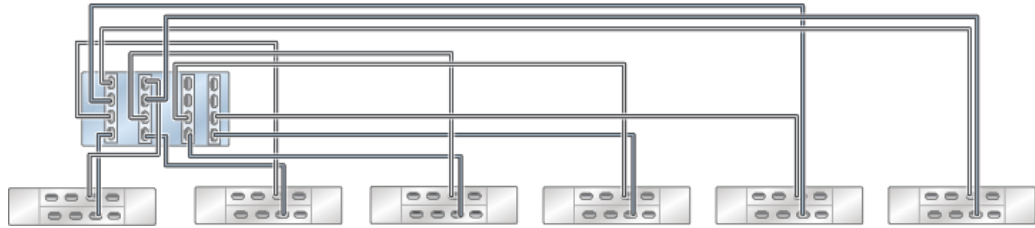


FIGURE 110 Standalone ZS4-4 controller with four HBAs connected to seven DE3-24 disk shelves in seven chains

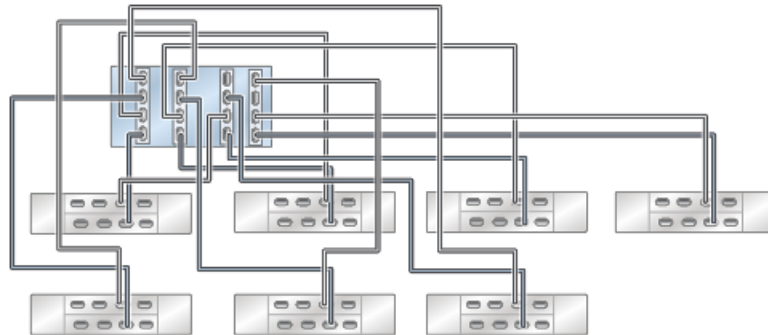
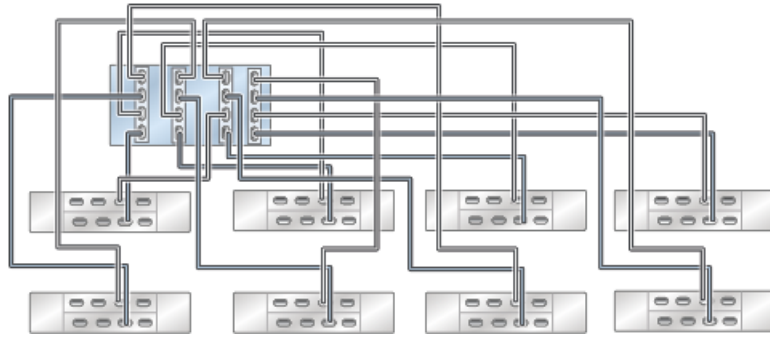


FIGURE 111 Standalone ZS4-4 controller with four HBAs connected to eight DE3-24 disk shelves in eight chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 112 Clustered ZS4-4 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

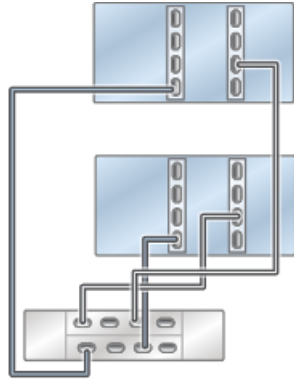


FIGURE 113 Clustered ZS4-4 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

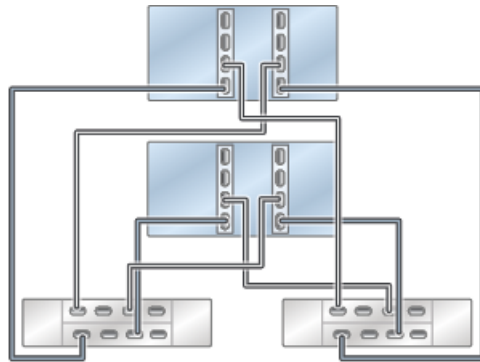


FIGURE 114 Clustered ZS4-4 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

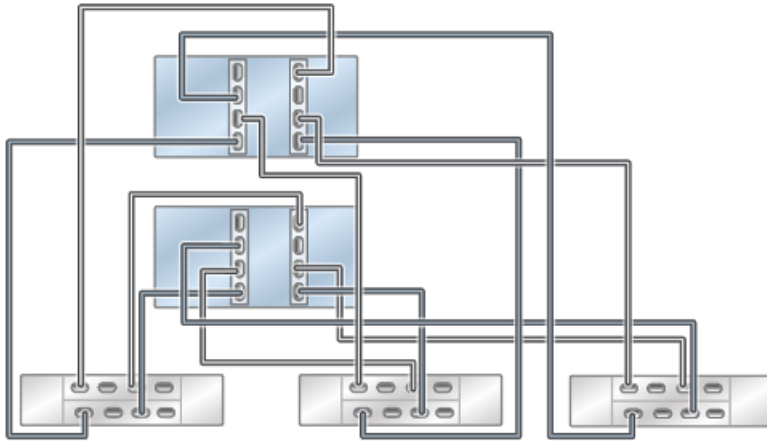
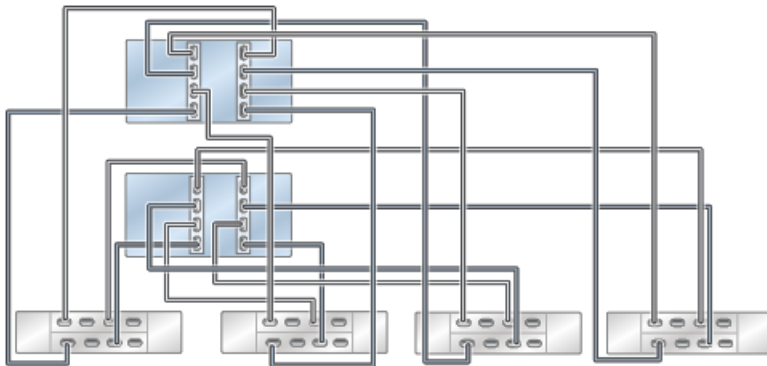


FIGURE 115 Clustered ZS4-4 controllers with two HBAs connected to four DE3-24 disk shelves in four chains



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

The following figures show a subset of the supported configurations for Oracle ZFS Storage ZS4-4 clustered controllers with three HBAs. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 116 Clustered ZS4-4 controllers with three HBAs connected to one DE3-24 disk shelf in a single chain

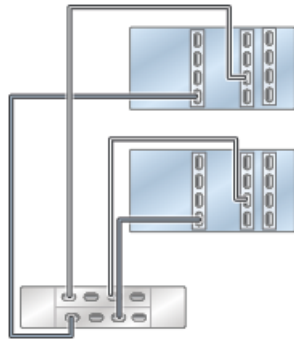


FIGURE 117 Clustered ZS4-4 controllers with three HBAs connected to two DE3-24 disk shelves in two chains

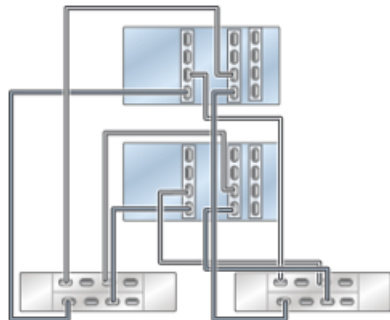


FIGURE 118 Clustered ZS4-4 controllers with three HBAs connected to three DE3-24 disk shelves in three chains

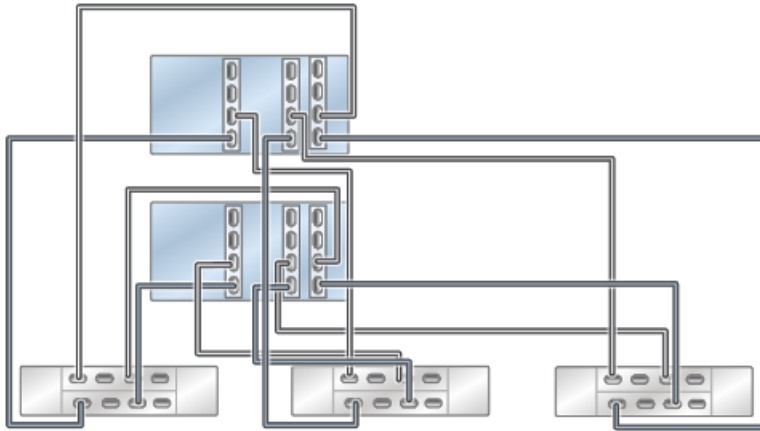


FIGURE 119 Clustered ZS4-4 controllers with three HBAs connected to four DE3-24 disk shelves in four chains

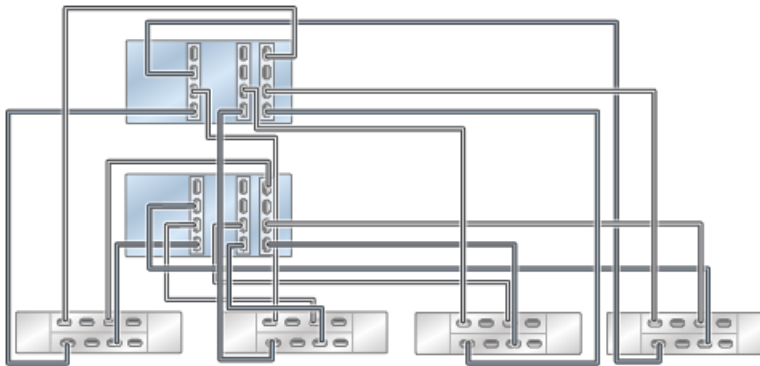


FIGURE 120 Clustered ZS4-4 controllers with three HBAs connected to five DE3-24 disk shelves in five chains

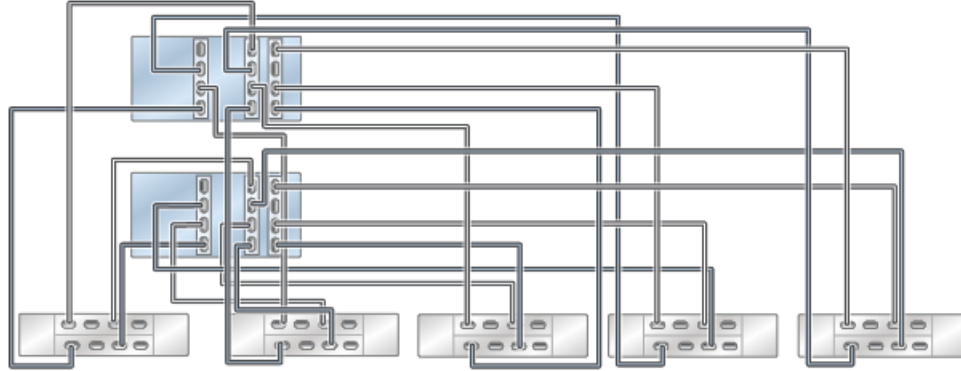
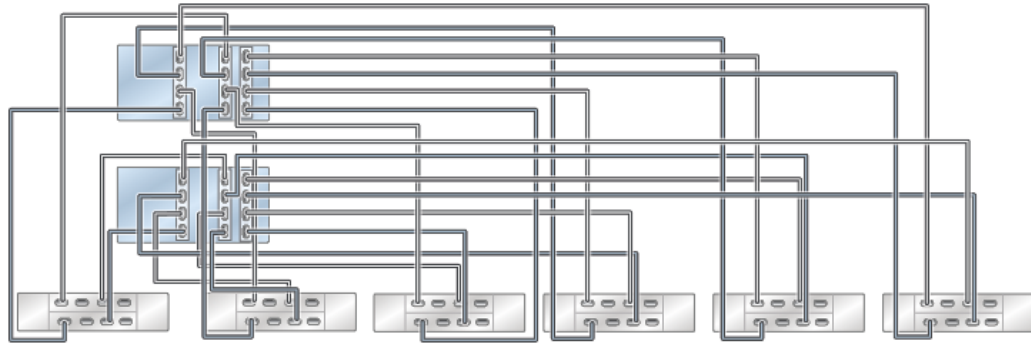


FIGURE 121 Clustered ZS4-4 controllers with three HBAs connected to six DE3-24 disk shelves in six chains



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 122 Clustered ZS4-4 controllers with four HBAs connected to one DE3-24 disk shelf in a single chain

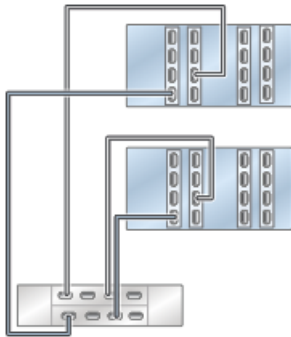


FIGURE 123 Clustered ZS4-4 controllers with four HBAs connected to two DE3-24 disk shelves in two chains

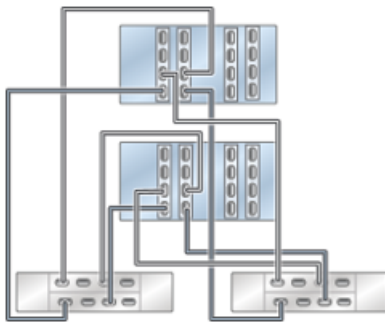


FIGURE 124 Clustered ZS4-4 controllers with four HBAs connected to three DE3-24 disk shelves in three chains

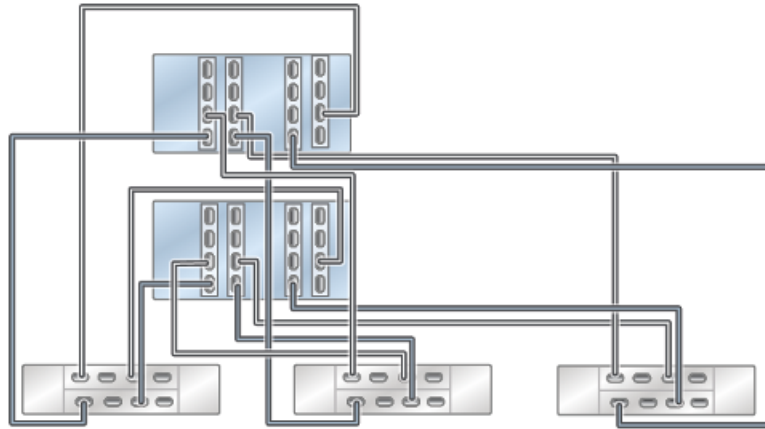


FIGURE 125 Clustered ZS4-4 controllers with four HBAs connected to four DE3-24 disk shelves in four chains

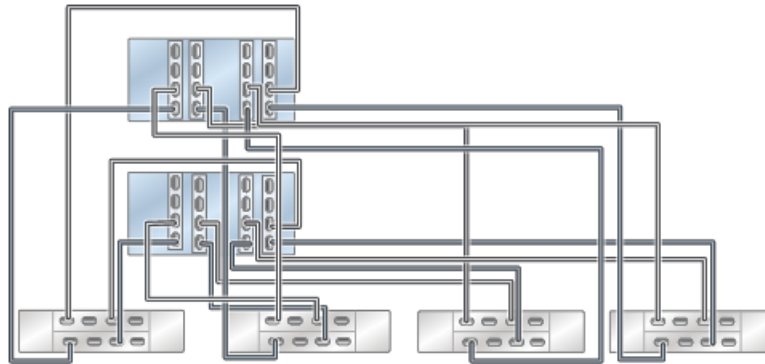


FIGURE 126 Clustered ZS4-4 controllers with four HBAs connected to five DE3-24 disk shelves in five chains

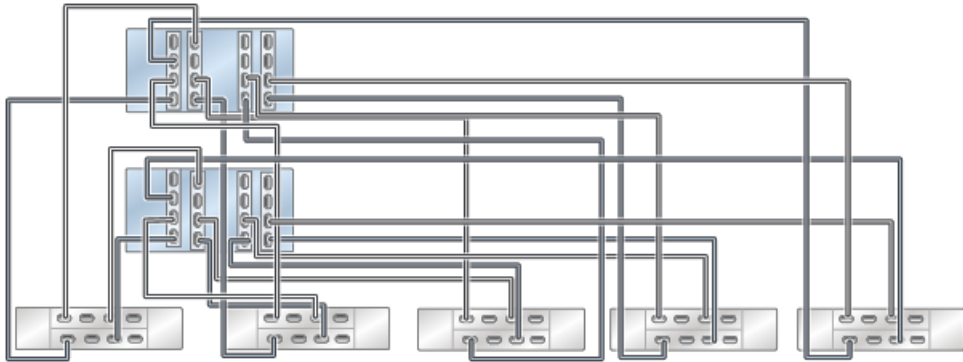


FIGURE 127 Clustered ZS4-4 controllers with four HBAs connected to six DE3-24 disk shelves in six chains

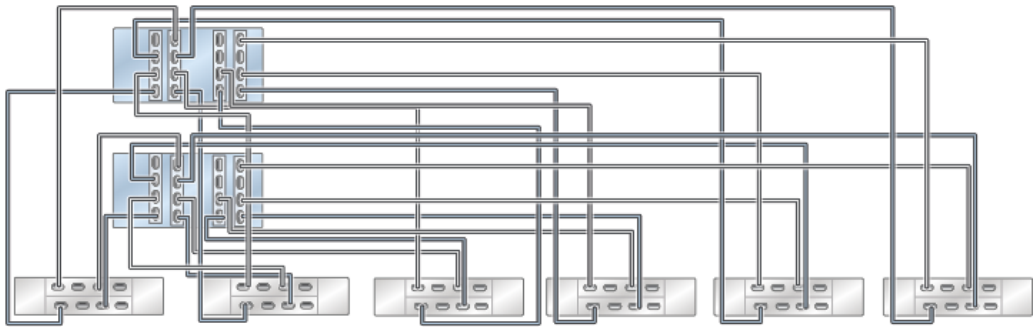


FIGURE 128 Clustered ZS4-4 controllers with four HBAs connected to seven DE3-24 disk shelves in seven chains

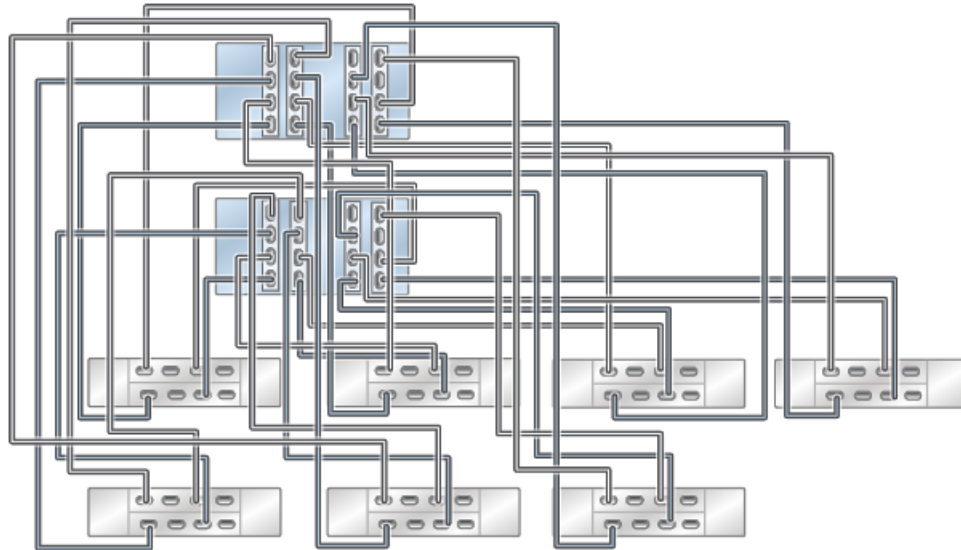
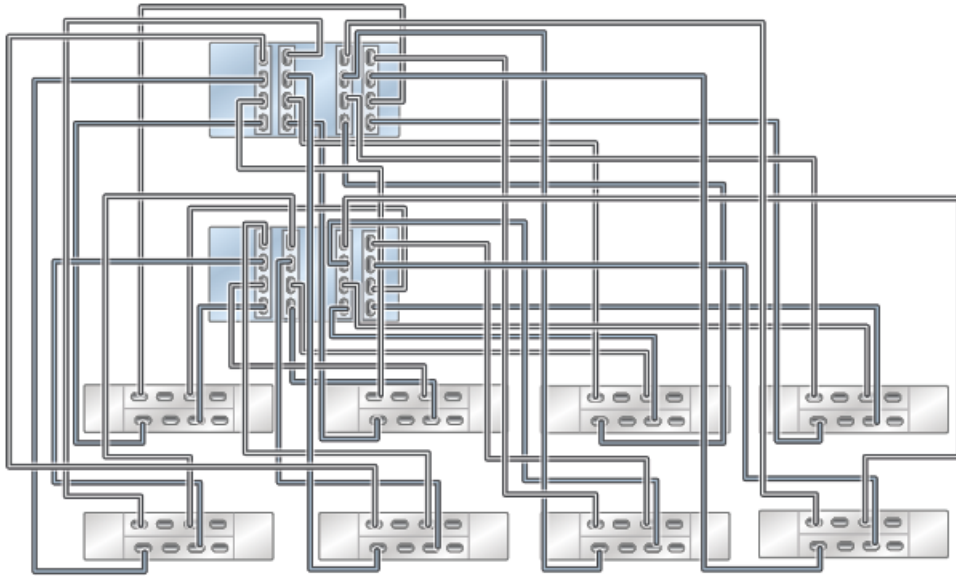


FIGURE 129 Clustered ZS4-4 controllers with four HBAs connected to eight DE3-24 disk shelves in eight chains



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 127](#)
- [“ZS3-2 Standalone to DE3-24 Disk Shelves \(2 HBAs\)” on page 128](#)
- [“ZS3-2 Clustered to DE3-24 Disk Shelves \(1 HBA\)” on page 130](#)
- [“ZS3-2 Clustered to DE3-24 Disk Shelves \(2 HBAs\)” on page 132](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 130 Standalone ZS3-2 controller with one HBA connected to one DE3-24 disk shelf in a single chain

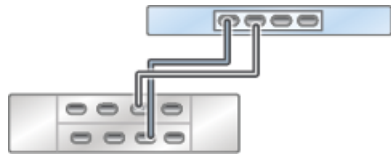


FIGURE 131 Standalone ZS3-2 controller with one HBA connected to two DE3-24 disk shelves in two chains

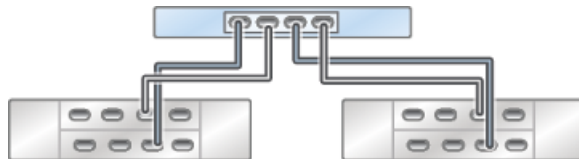
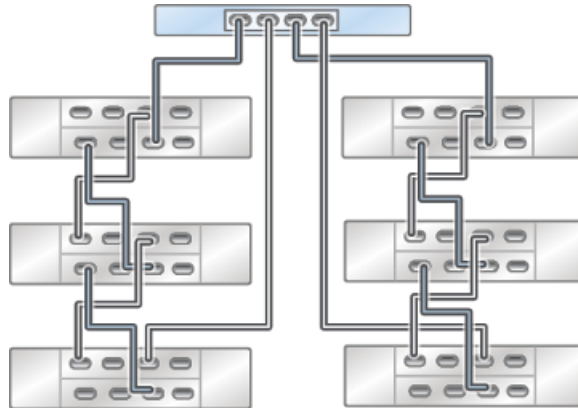


FIGURE 132 Standalone ZS3-2 controller with one HBA connected to six DE3-24 disk shelves in two chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 133 Standalone ZS3-2 controller with two HBAs connected to one DE3-24 disk shelf in a single chain

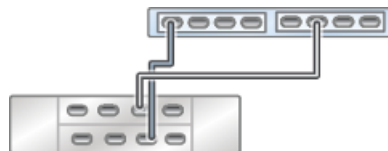


FIGURE 134 Standalone ZS3-2 controller with two HBAs connected to two DE3-24 disk shelves in two chains

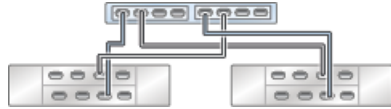


FIGURE 135 Standalone ZS3-2 controller with two HBAs connected to three DE3-24 disk shelves in three chains

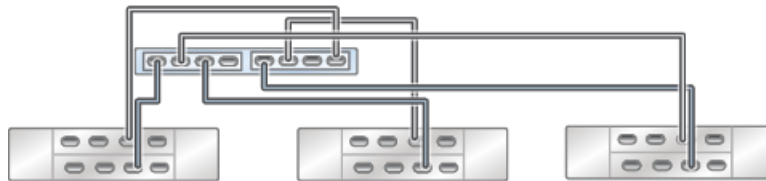


FIGURE 136 Standalone ZS3-2 controller with two HBAs connected to four DE3-24 disk shelves in four chains



FIGURE 137 Standalone ZS3-2 controller with two HBAs connected to eight DE3-24 disk shelves in four chains

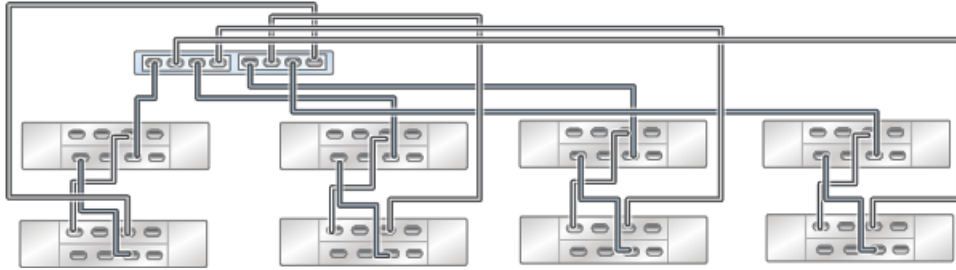
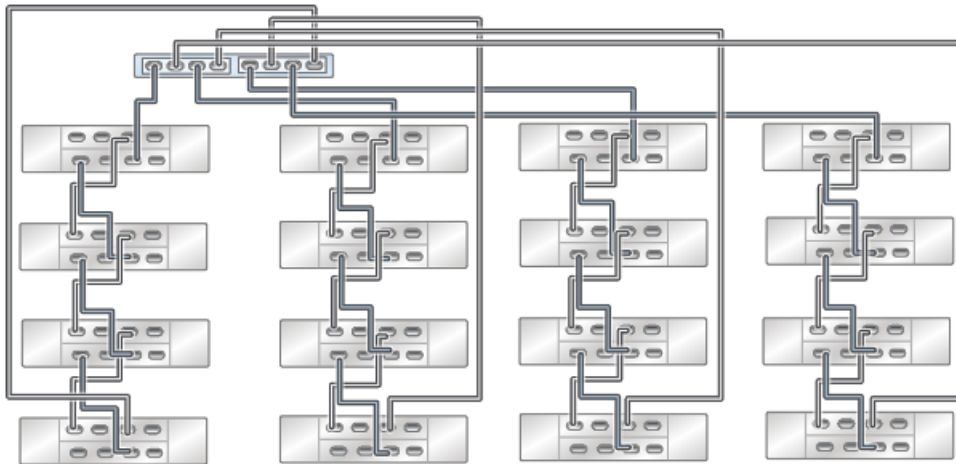


FIGURE 138 Standalone ZS3-2 controller with two HBAs connected to sixteen DE3-24 disk shelves in four chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 139 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 disk shelf in a single chain

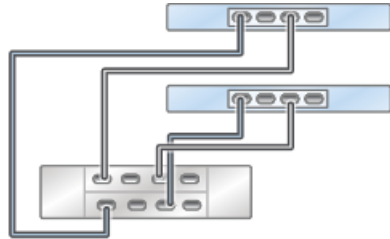


FIGURE 140 Clustered ZS3-2 controllers with one HBA connected to two DE3-24 disk shelves in two chains

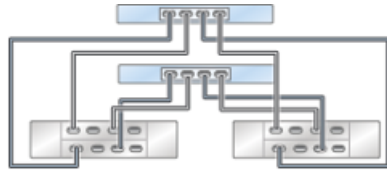
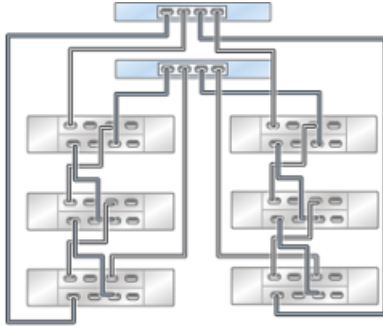


FIGURE 141 Clustered ZS3-2 controllers with one HBA connected to six DE3-24 disk shelves in two chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 142 Clustered ZS3-2 controllers with two HBAs connected to one DE3-24 disk shelf in a single chain

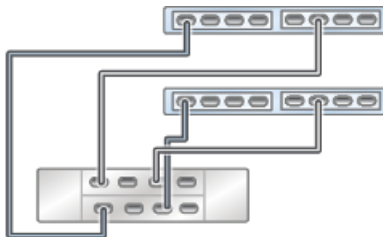


FIGURE 143 Clustered ZS3-2 controllers with two HBAs connected to two DE3-24 disk shelves in two chains

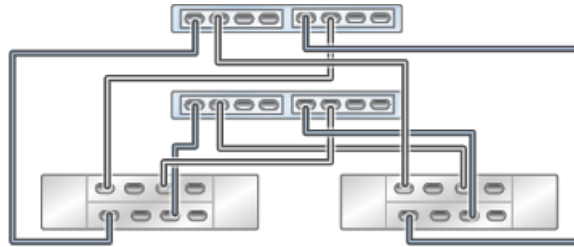


FIGURE 144 Clustered ZS3-2 controllers with two HBAs connected to three DE3-24 disk shelves in three chains

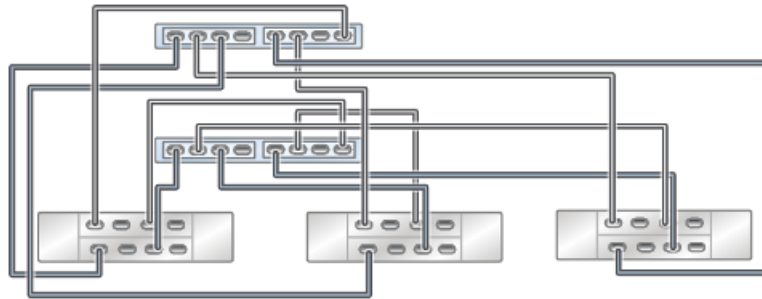


FIGURE 145 Clustered ZS3-2 controllers with two HBAs connected to four DE3-24 disk shelves in four chains

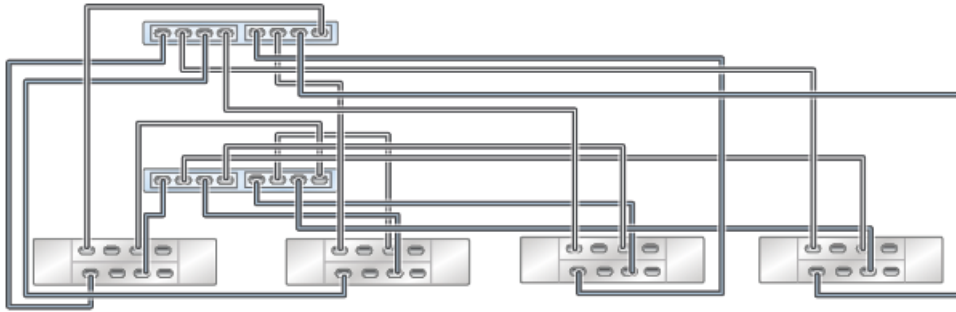


FIGURE 146 Clustered ZS3-2 controllers with two HBAs connected to eight DE3-24 disk shelves in four chains

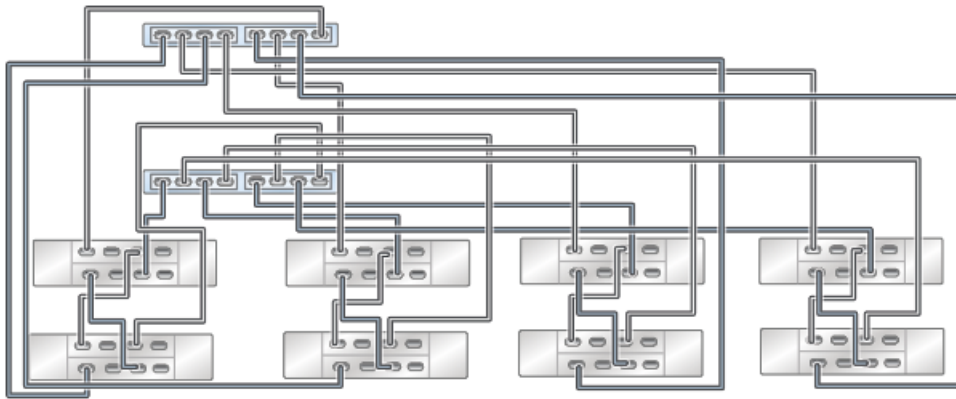
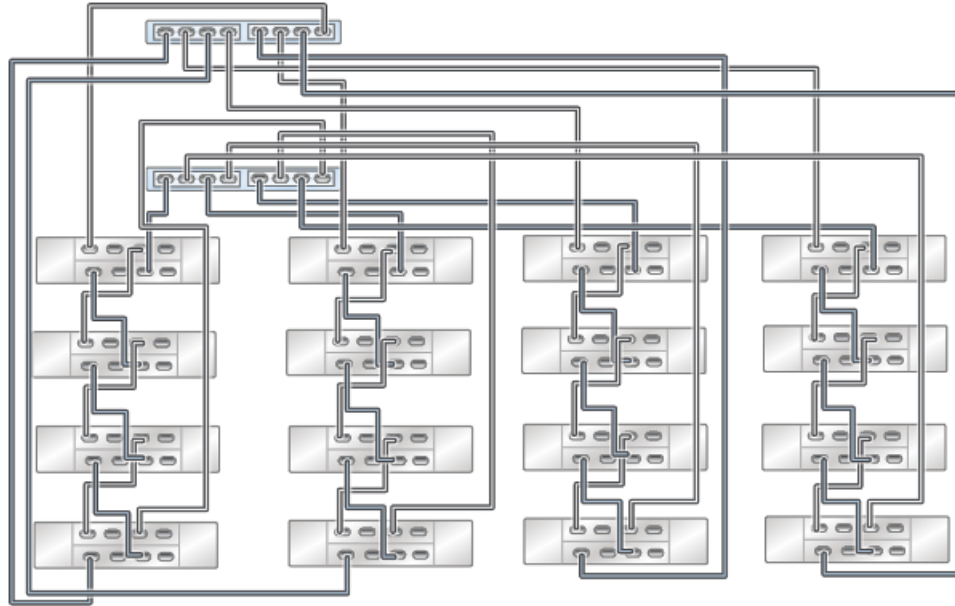


FIGURE 147 Clustered ZS3-2 controllers with two HBAs connected to sixteen DE3-24 disk shelves in four chains



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

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

To review these guidelines, see the following topics:

- [“Cabling DE2-24 Disk Shelves to ZS5-4 Controllers” on page 137](#)
- [“Cabling DE2-24 Disk Shelves to ZS5-2 Controllers” on page 160](#)
- [“Cabling DE2-24 Disk Shelves to ZS4-4/ZS3-4 Controllers” on page 173](#)
- [“Cabling DE2-24 Disk Shelves to ZS3-2 Controllers” on page 197](#)
- [“Cabling DE2-24 Disk Shelves to 7420 Controllers” on page 207](#)
- [“Cabling DE2-24 Disk Shelves to 7320 Controllers” on page 232](#)

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 \(2 HBAs\)” on page 138](#)
- [“ZS5-4 Standalone to DE2-24 Disk Shelves \(3 HBAs\)” on page 140](#)
- [“ZS5-4 Standalone to DE2-24 Disk Shelves \(4 HBAs\)” on page 143](#)
- [“ZS5-4 Clustered to DE2-24 Disk Shelves \(2 HBAs\)” on page 147](#)
- [“ZS5-4 Clustered to DE2-24 Disk Shelves \(3 HBAs\)” on page 151](#)
- [“ZS5-4 Clustered to DE2-24 Disk Shelves \(4 HBAs\)” on page 154](#)

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 11.

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

FIGURE 148 Standalone ZS5-4 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

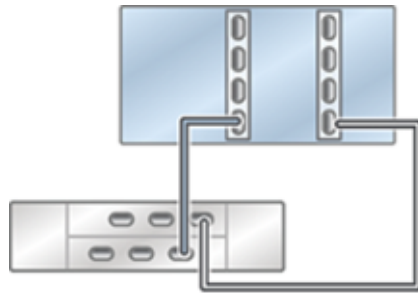


FIGURE 149 Standalone ZS5-4 controller with two HBAs connected to two DE2-24 disk shelves in two chains

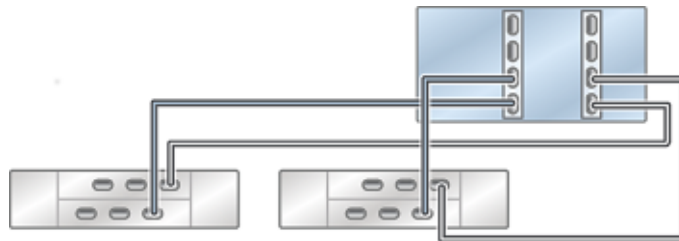


FIGURE 150 Standalone ZS5-4 controller with two HBAs connected to three DE2-24 disk shelves in three chains

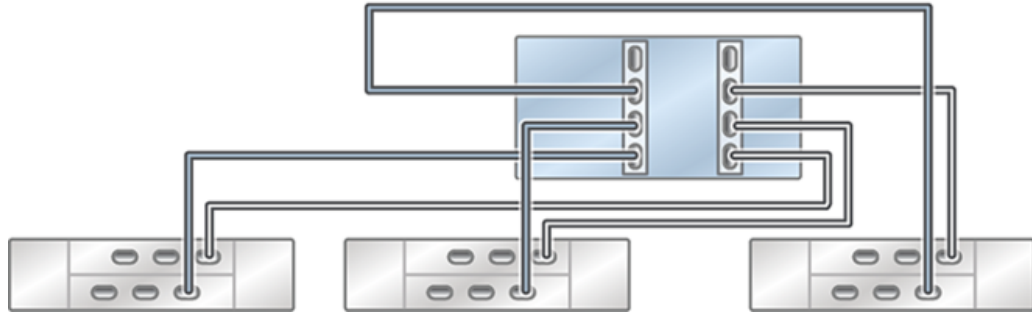


FIGURE 151 Standalone ZS5-4 controller with two HBAs connected to four DE2-24 disk shelves in four chains

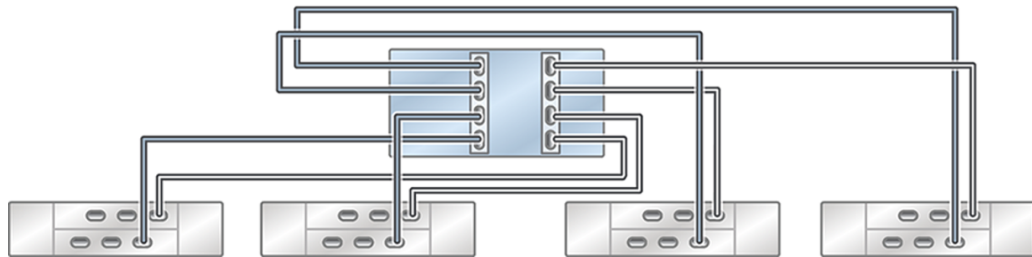


FIGURE 152 Standalone ZS5-4 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

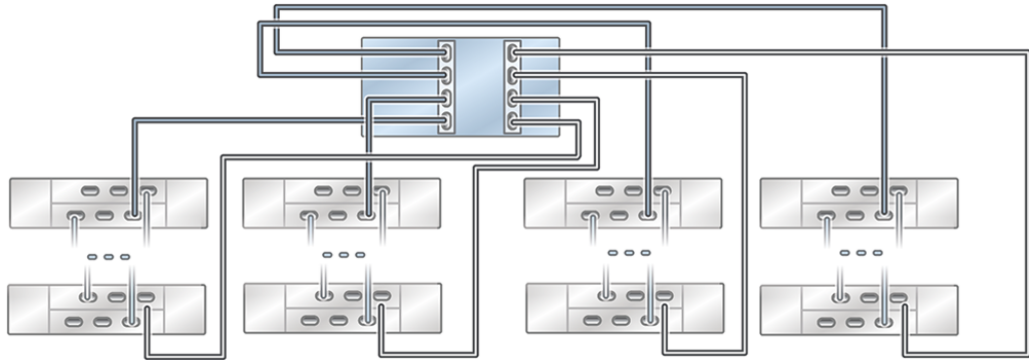
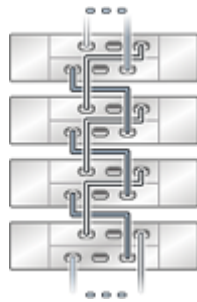


FIGURE 153 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 154 Standalone ZS5-4 controller with three HBAs connected to two DE2-24 disk shelves in two chains

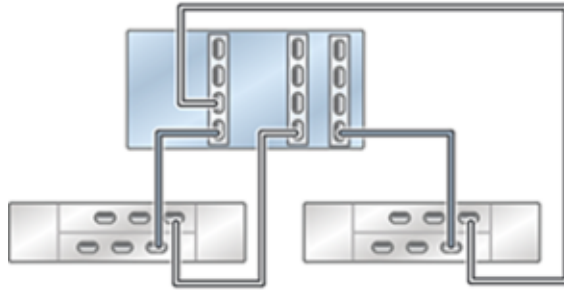


FIGURE 155 Standalone ZS5-4 controller with three HBAs connected to three DE2-24 disk shelves in three chains

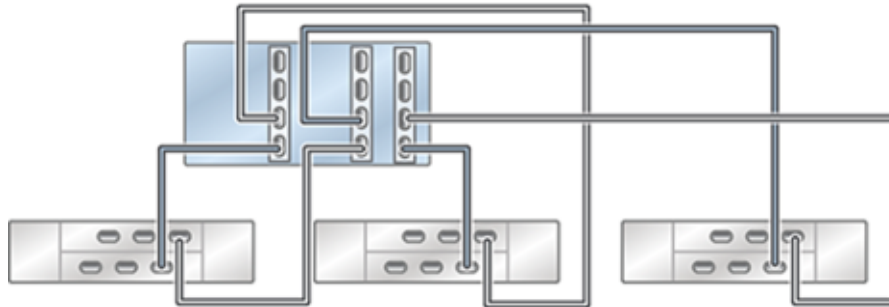


FIGURE 156 Standalone ZS5-4 controller with three HBAs connected to four DE2-24 disk shelves in four chains

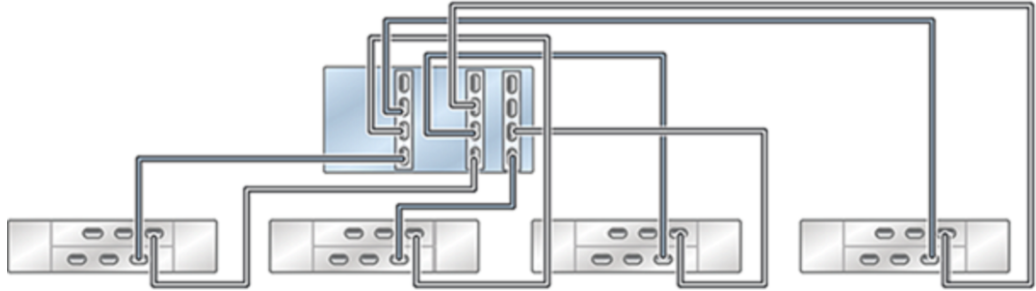


FIGURE 157 Standalone ZS5-4 controller with three HBAs connected to five DE2-24 disk shelves in five chains

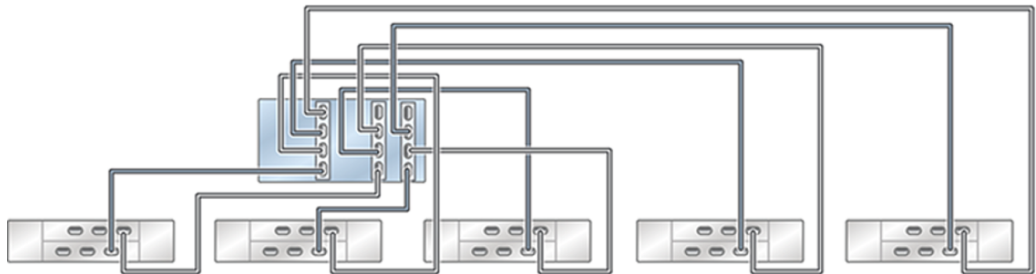


FIGURE 158 Standalone ZS5-4 controller with three HBAs connected to six DE2-24 disk shelves in six chains

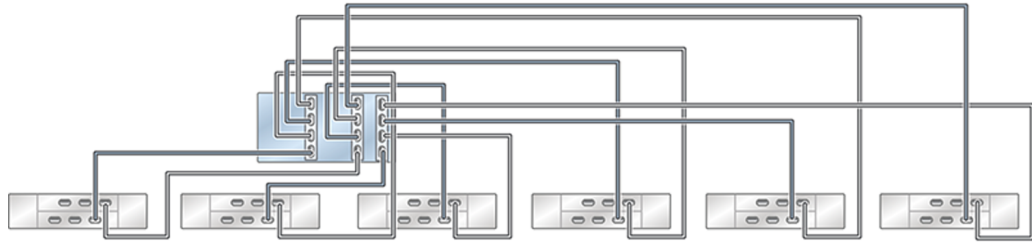
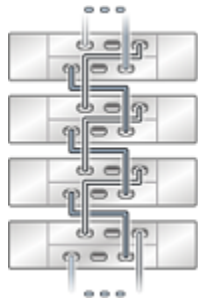


FIGURE 159 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 160 Standalone ZS5-4 controller with four HBAs connected to two DE2-24 disk shelves in two chains

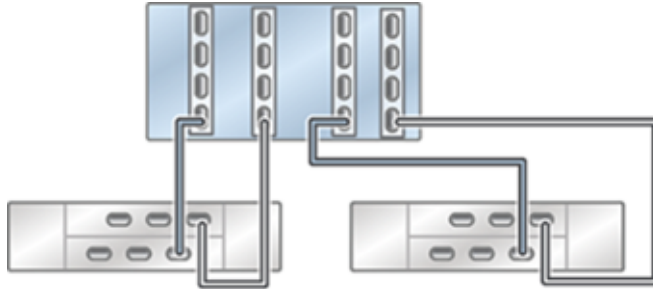


FIGURE 161 Standalone ZS5-4 controller with four HBAs connected to three DE2-24 disk shelves in three chains

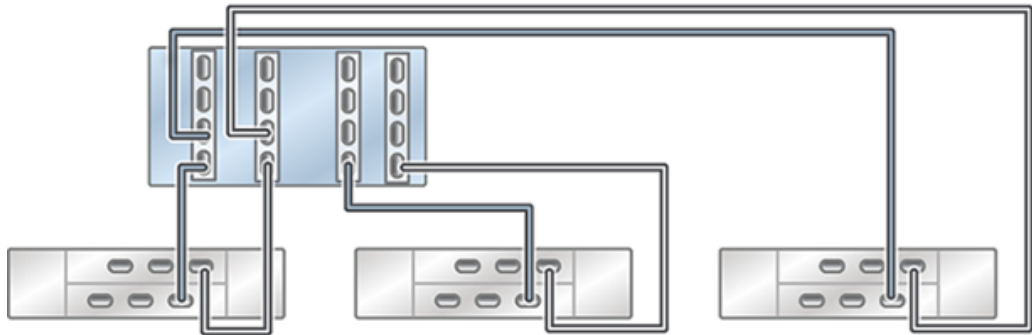


FIGURE 162 Standalone ZS5-4 controller with four HBAs connected to four DE2-24 disk shelves in four chains



FIGURE 163 Standalone ZS5-4 controller with four HBAs connected to five DE2-24 disk shelves in five chains

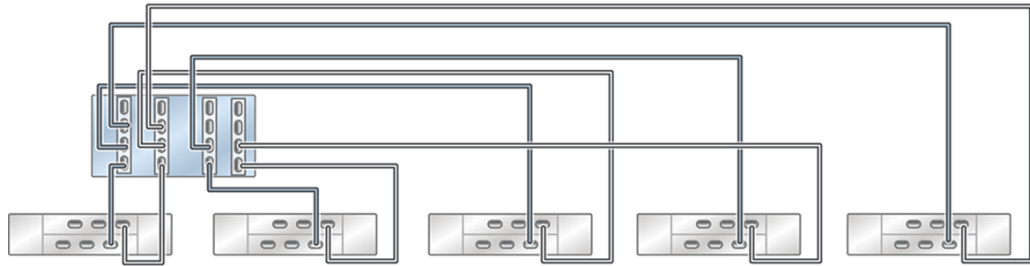


FIGURE 164 Standalone ZS5-4 controller with four HBAs connected to six DE2-24 disk shelves in six chains

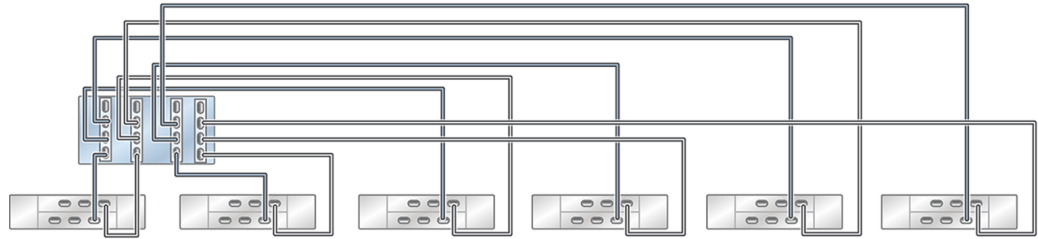


FIGURE 165 Standalone ZS5-4 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

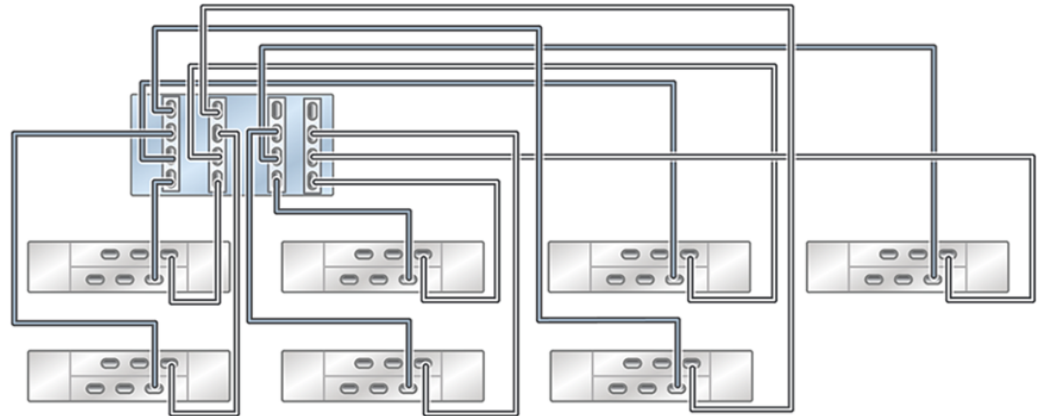


FIGURE 166 Standalone ZS5-4 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

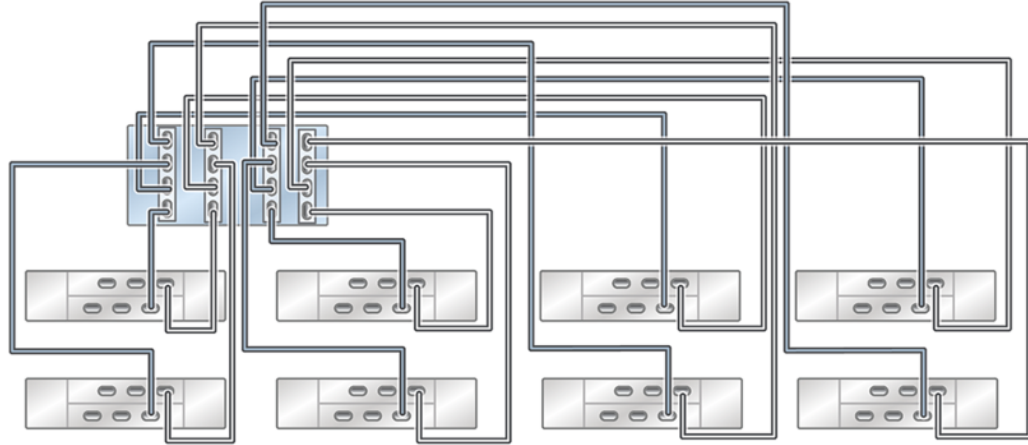
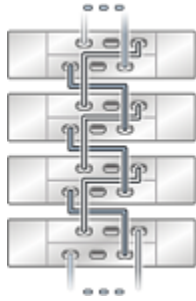


FIGURE 167 Multiple disk shelves in a single chain



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 11.

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

FIGURE 168 Clustered ZS5-4 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

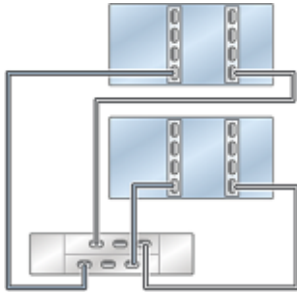


FIGURE 169 Clustered ZS5-4 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

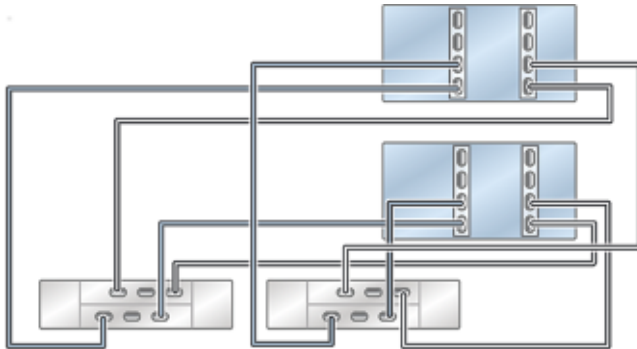


FIGURE 170 Clustered ZS5-4 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

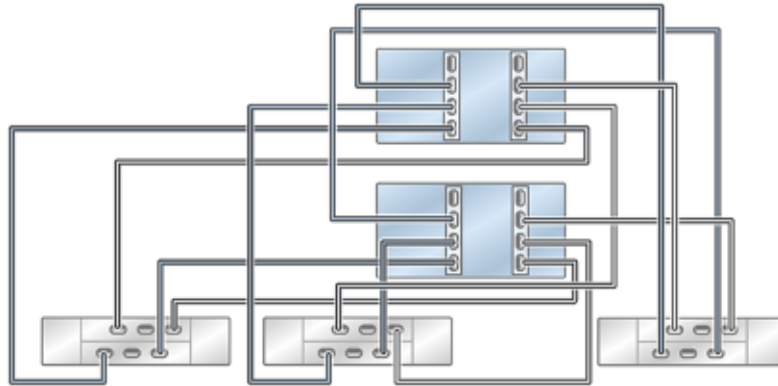


FIGURE 171 Clustered ZS5-4 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

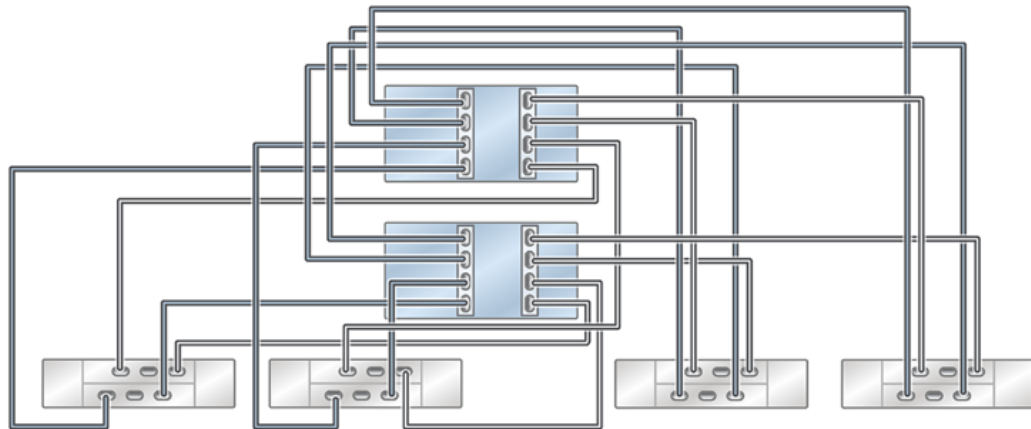


FIGURE 172 Clustered ZS5-4 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

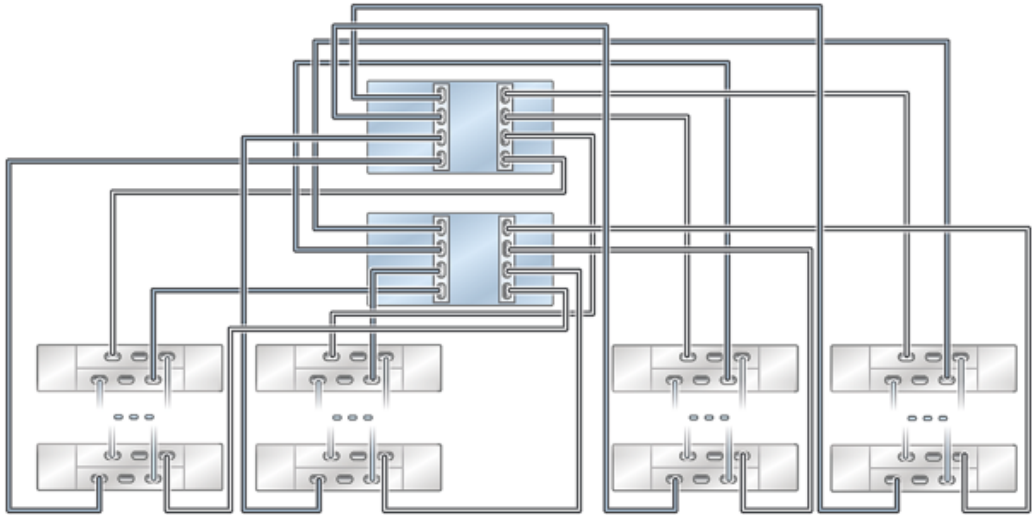
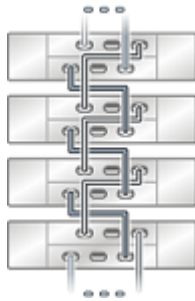


FIGURE 173 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 174 Clustered ZS5-4 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

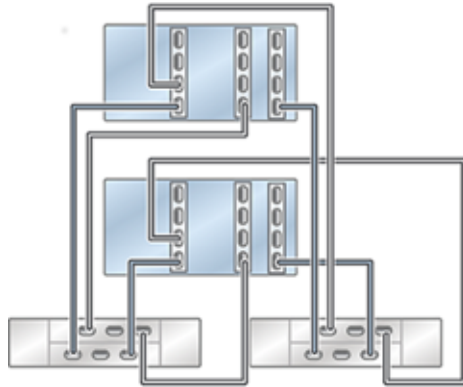


FIGURE 175 Clustered ZS5-4 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

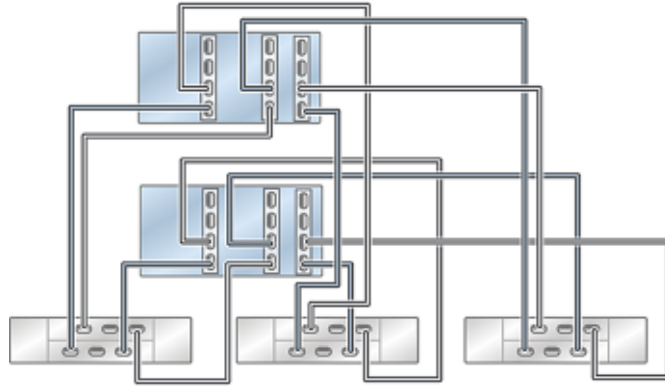


FIGURE 176 Clustered ZS5-4 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

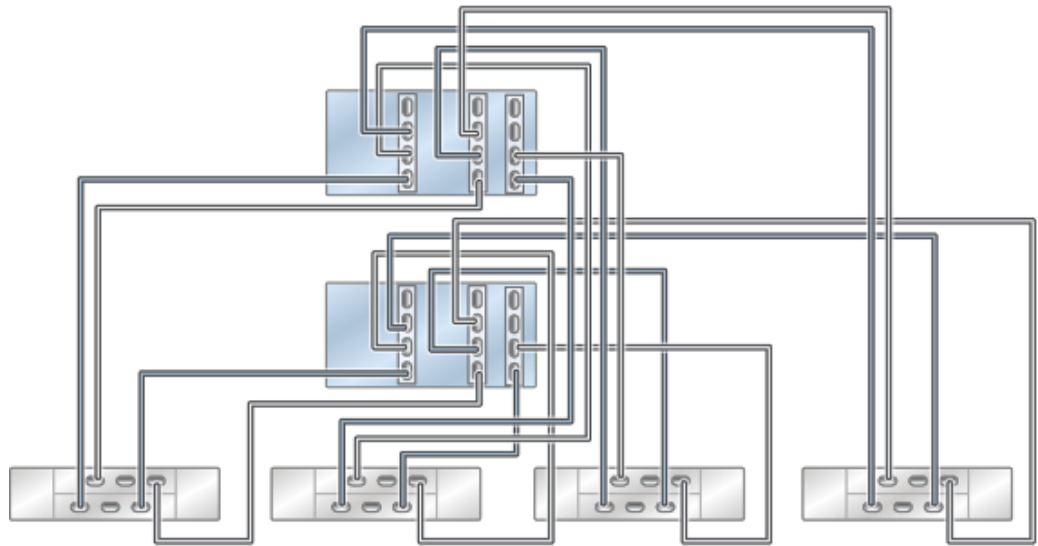


FIGURE 177 Clustered ZS5-4 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

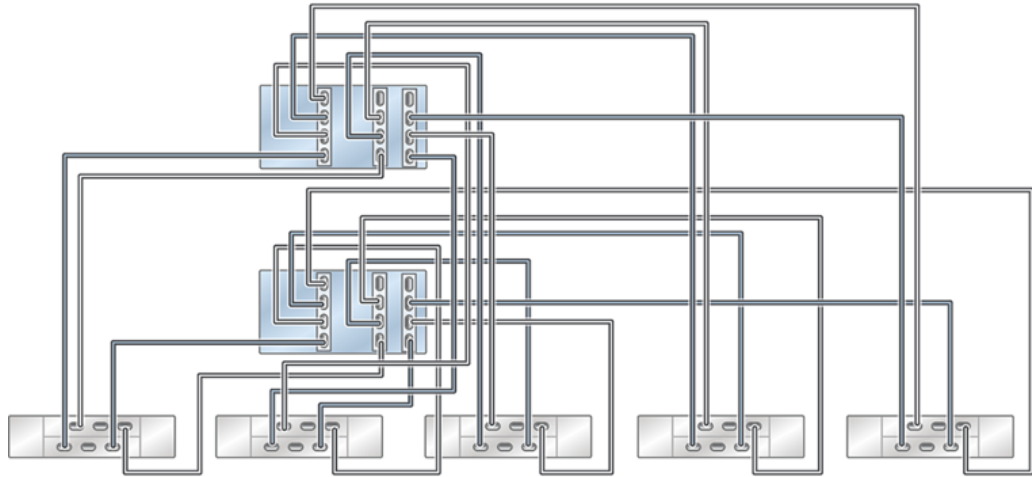


FIGURE 178 Clustered ZS5-4 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

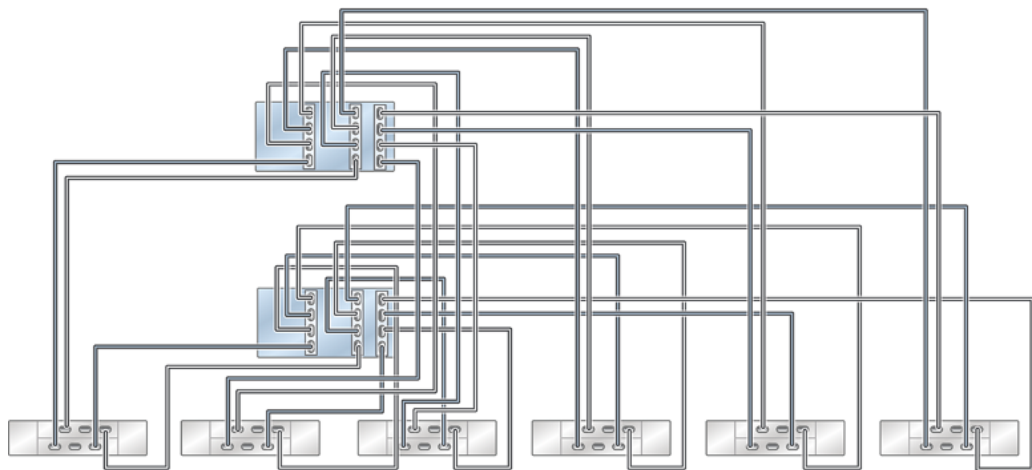
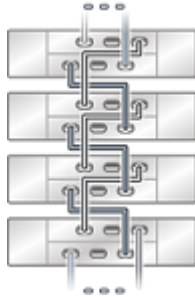


FIGURE 179 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 180 Clustered ZS5-4 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

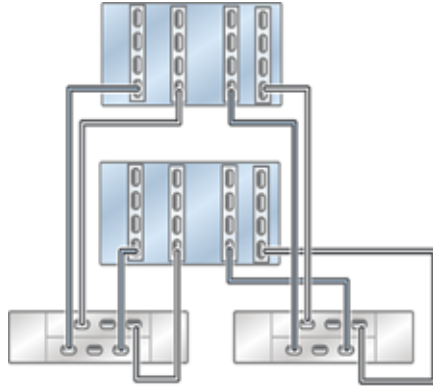


FIGURE 181 Clustered ZS5-4 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

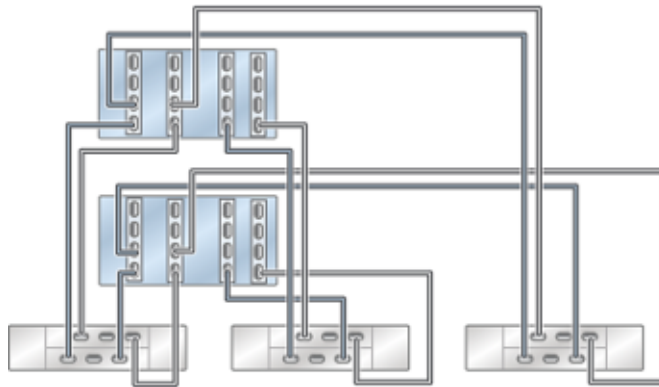


FIGURE 182 Clustered ZS5-4 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

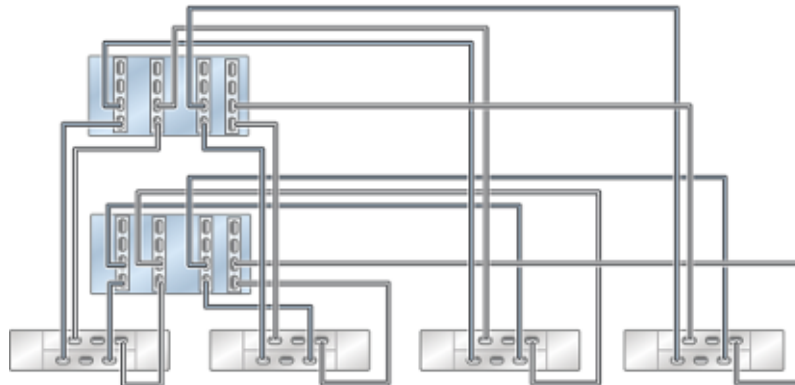


FIGURE 183 Clustered ZS5-4 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

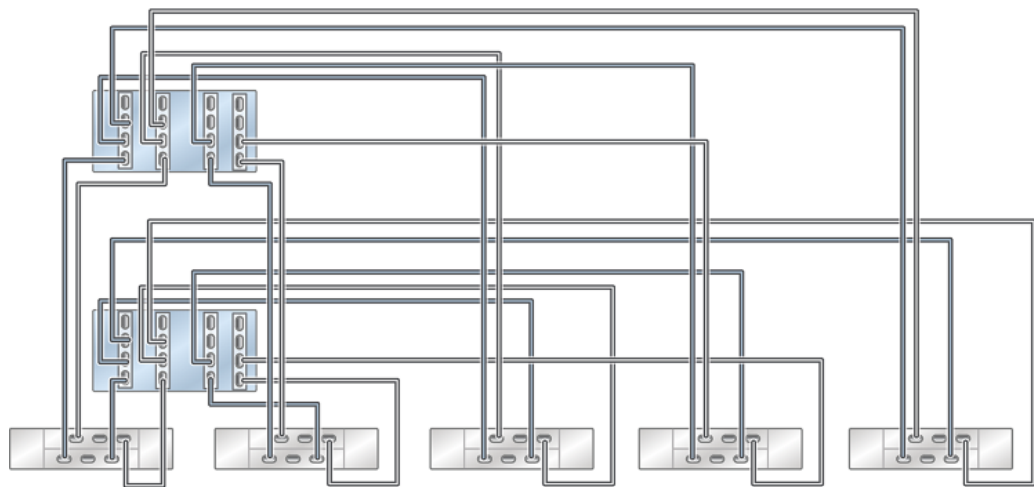


FIGURE 184 Clustered ZS5-4 controllers with four HBAs connected to six DE2-24 disk shelves in six chains

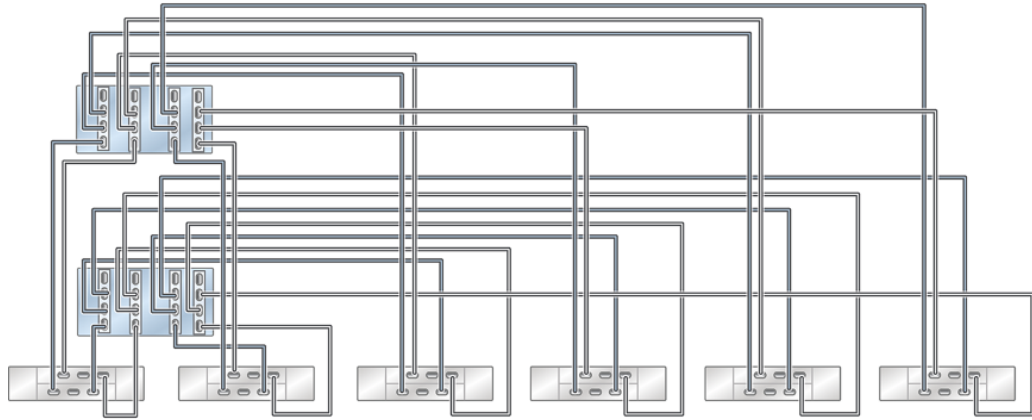


FIGURE 185 Clustered ZS5-4 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

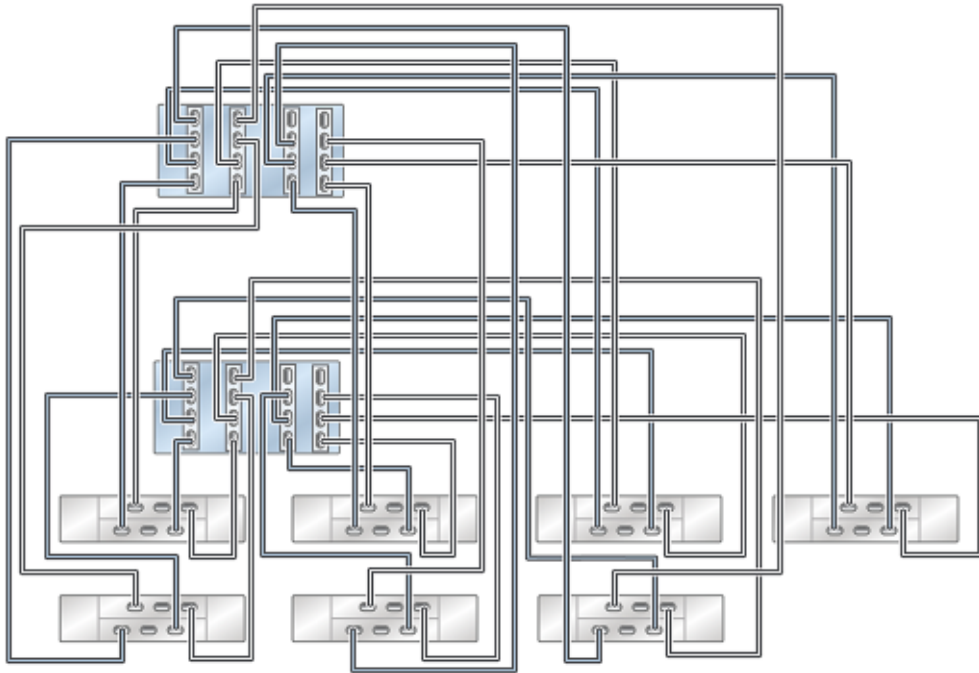


FIGURE 186 Clustered ZS5-4 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

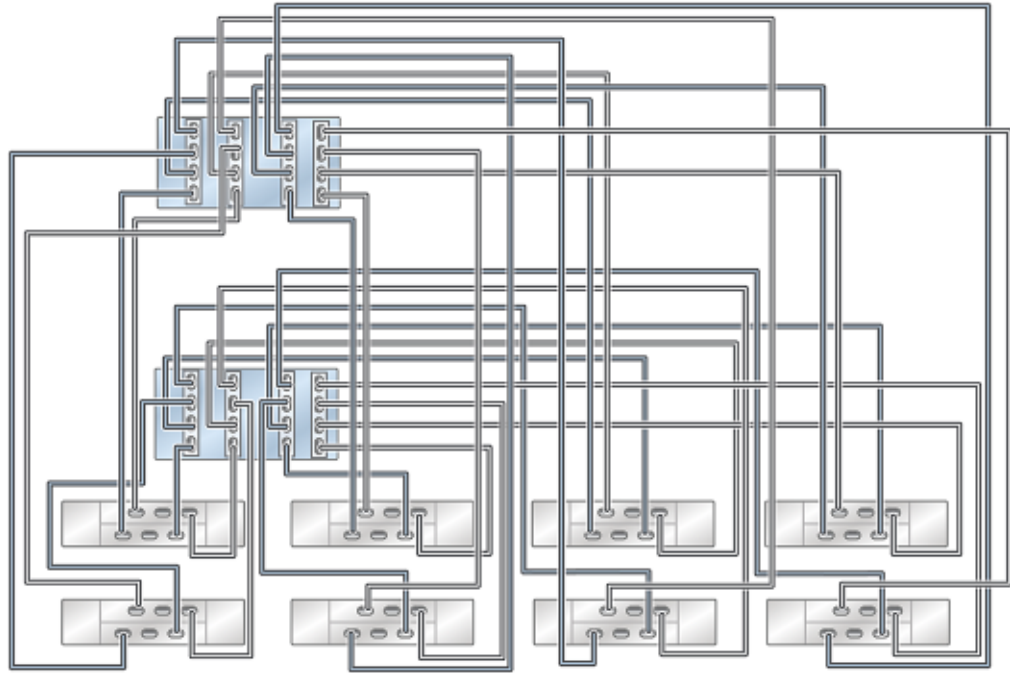
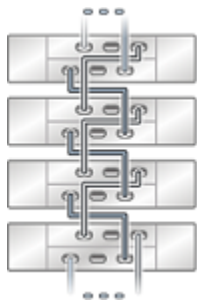


FIGURE 187 Multiple disk shelves in a single chain



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)” on page 160
- “ZS5-2 Standalone to DE2-24 Disk Shelves (2 HBAs)” on page 162
- “ZS5-2 Clustered to DE2-24 Disk Shelves (1 HBA)” on page 165
- “ZS5-2 Clustered to DE2-24 Disk Shelves (2 HBAs)” on page 169

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 11.

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

FIGURE 188 Standalone ZS5-2 controller with one HBA connected to one DE2-24 disk shelf in a single chain

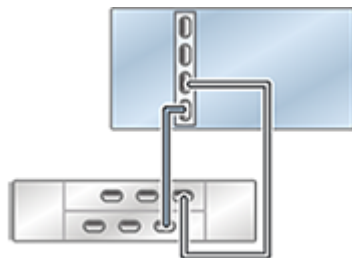


FIGURE 189 Standalone ZS5-2 controller with one HBA connected to two DE2-24 disk shelves in two chains

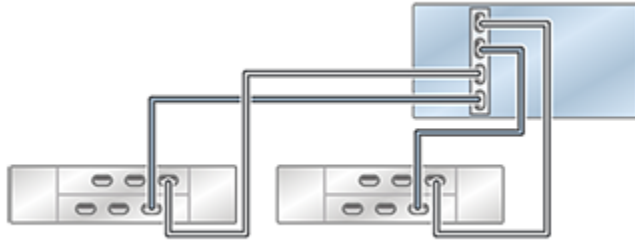


FIGURE 190 Standalone ZS5-2 controller with one HBA connected to four DE2-24 disk shelves in two chains

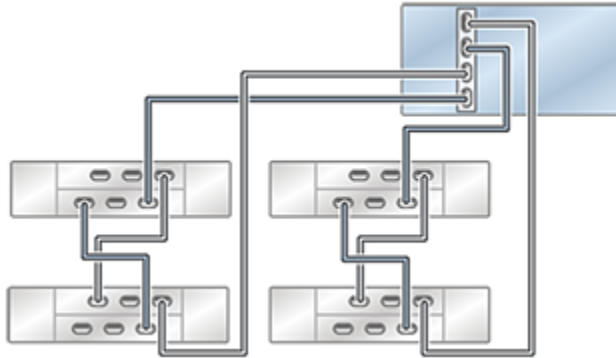
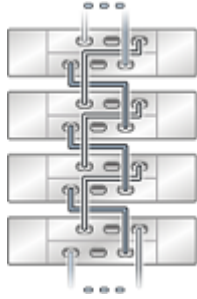


FIGURE 191 Multiple disk shelves in a single chain



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 11.

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

FIGURE 192 Standalone ZS5-2 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

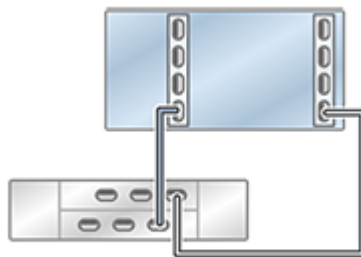


FIGURE 193 Standalone ZS5-2 controller with two HBAs connected to two DE2-24 disk shelves in two chains

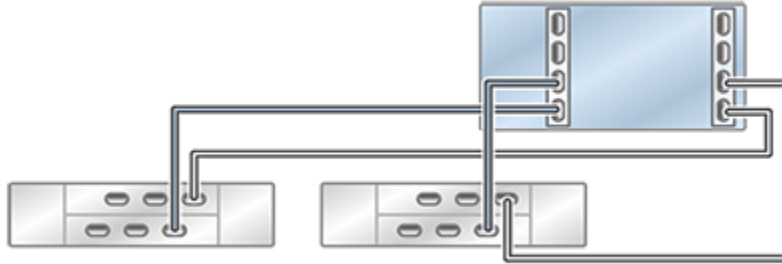


FIGURE 194 Standalone ZS5-2 controller with two HBAs connected to three DE2-24 disk shelves in three chains

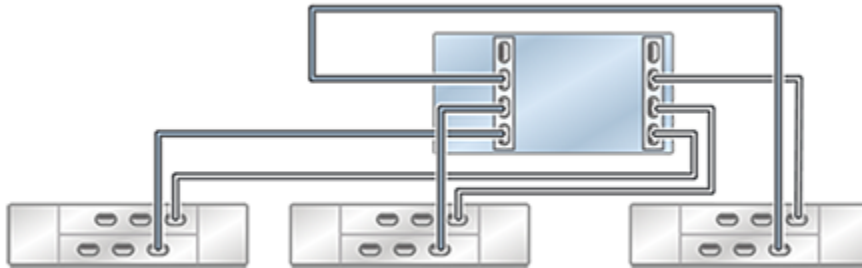


FIGURE 195 Standalone ZS5-2 controller with two HBAs connected to four DE2-24 disk shelves in four chains

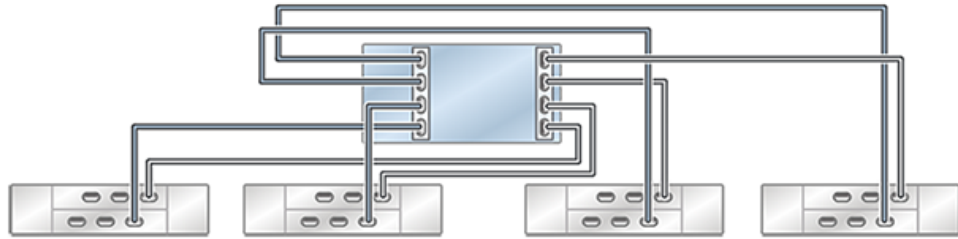


FIGURE 196 Standalone ZS5-2 controller with two HBAs connected to eight DE2-24 disk shelves in four chains

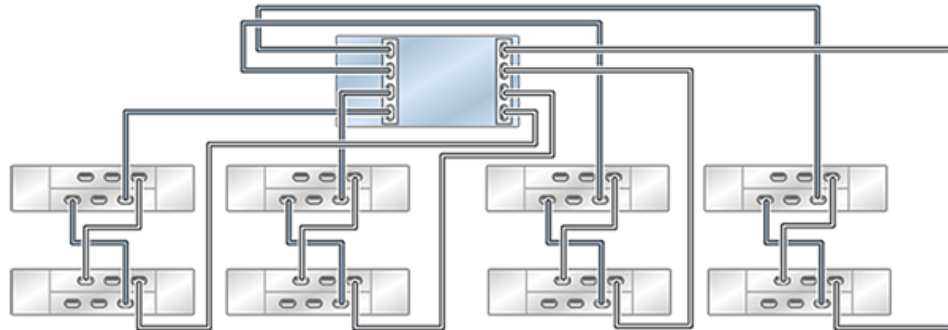
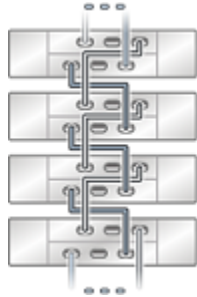


FIGURE 197 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 198 Clustered ZS5-2 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

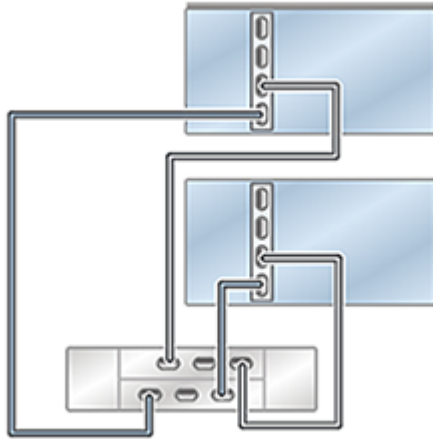


FIGURE 199 Clustered ZS5-2 controllers with one HBA connected to two DE2-24 disk shelves in two chains

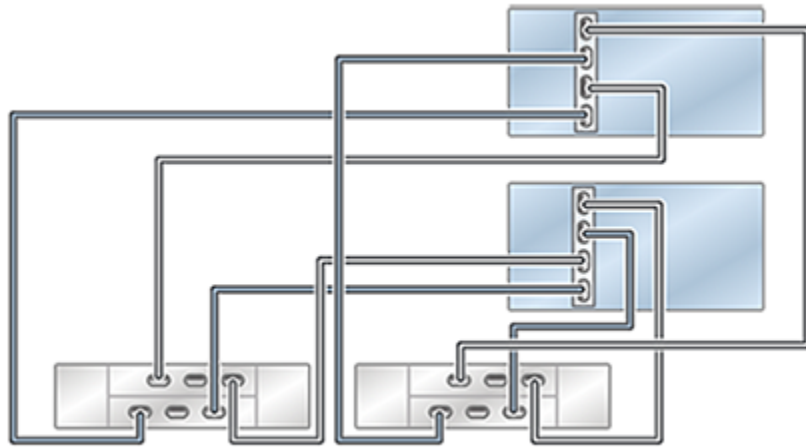


FIGURE 200 Clustered ZS5-2 controllers with one HBA connected to four DE2-24 disk shelves in two chains

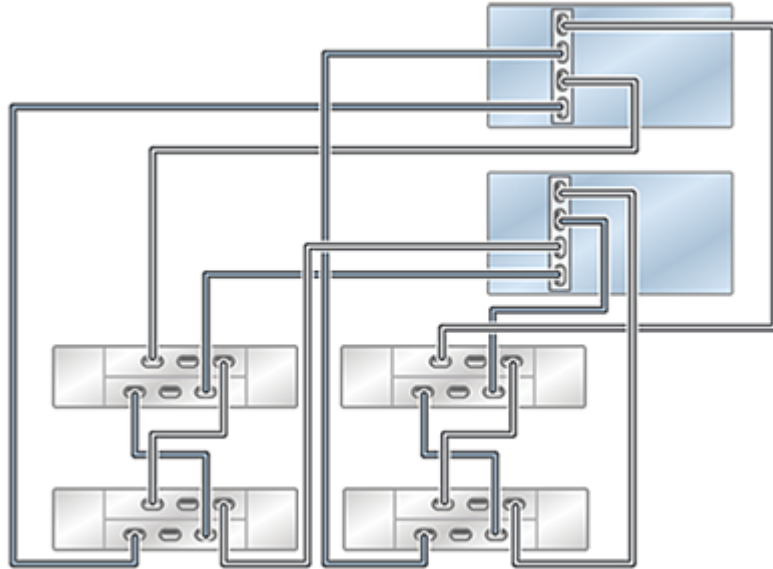
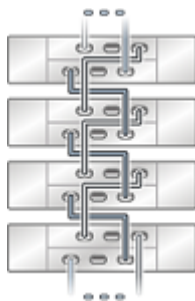


FIGURE 201 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 202 Clustered ZS5-2 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

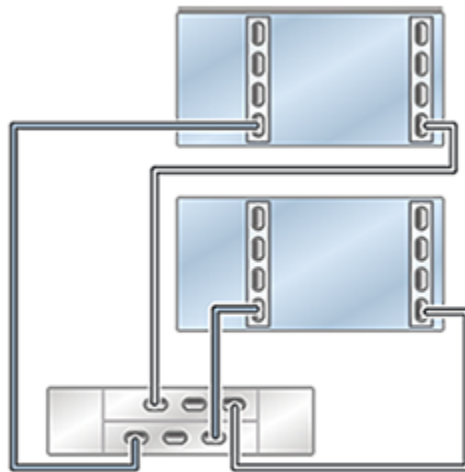


FIGURE 203 Clustered ZS5-2 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

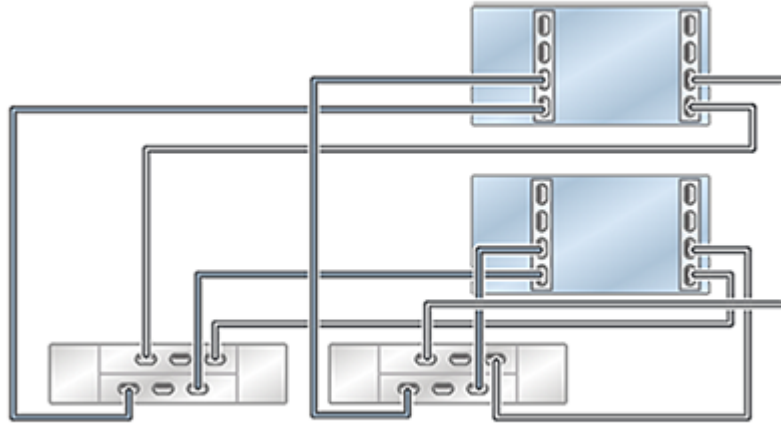


FIGURE 204 Clustered ZS5-2 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

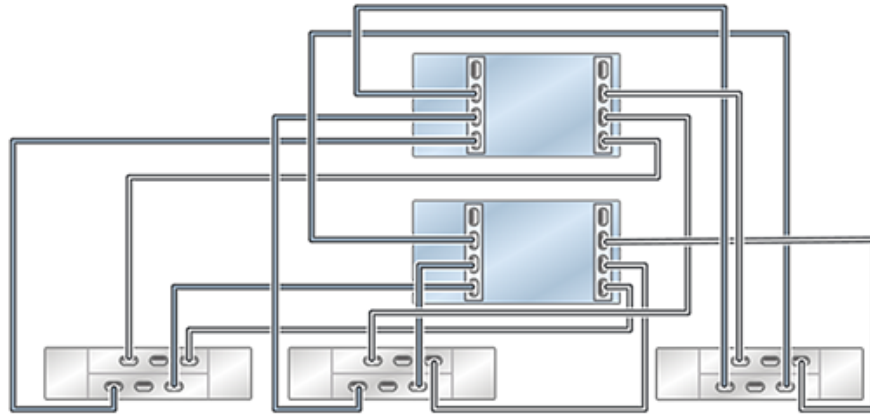


FIGURE 205 Clustered ZS5-2 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

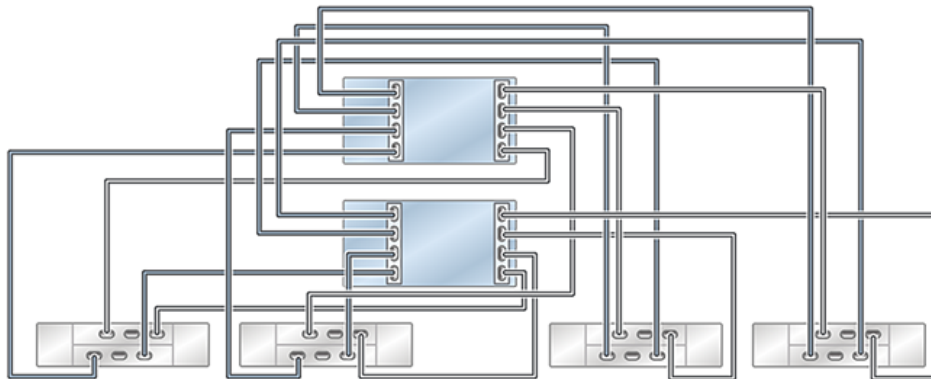


FIGURE 206 Clustered ZS5-2 controllers with two HBAs connected to eight DE2-24 disk shelves in four chains

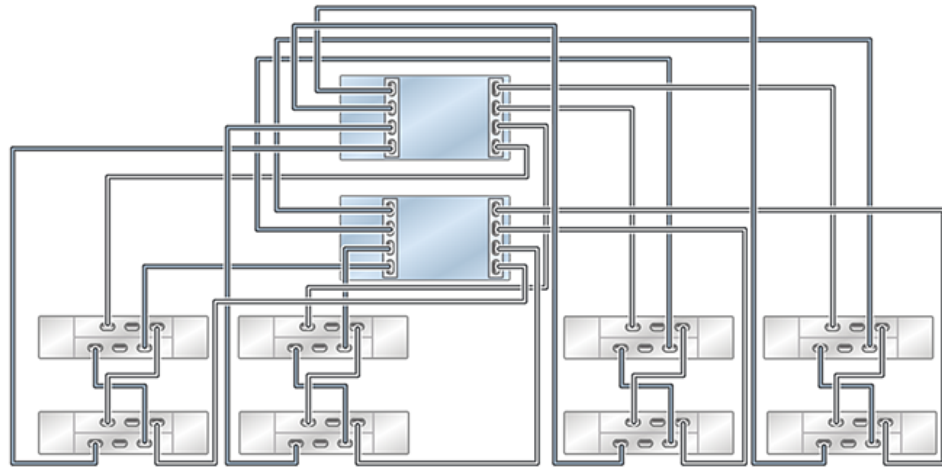
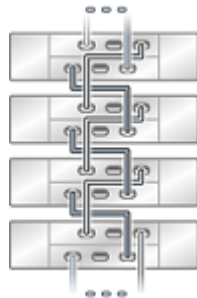


FIGURE 207 Multiple disk shelves in a single chain



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)” on page 173
- “ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (3 HBAs)” on page 175
- “ZS4-4/ZS3-4 Standalone to DE2-24 Disk Shelves (4 HBAs)” on page 178
- “ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (2 HBAs)” on page 183
- “ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (3 HBAs)” on page 186
- “ZS4-4/ZS3-4 Clustered to DE2-24 Disk Shelves (4 HBAs)” on page 190

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 11.

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

FIGURE 208 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 209 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to two DE2-24 disk shelves in two chains

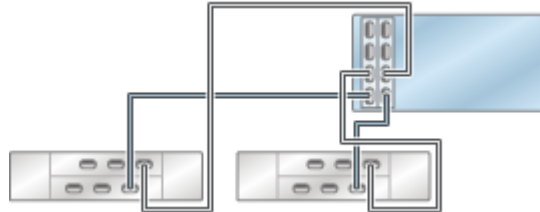


FIGURE 210 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to three DE2-24 disk shelves in three chains

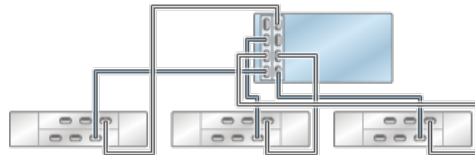


FIGURE 211 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to four DE2-24 disk shelves in four chains

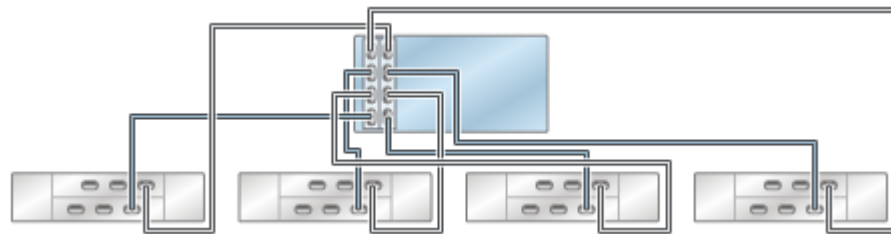


FIGURE 212 Standalone ZS4-4/ZS3-4 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

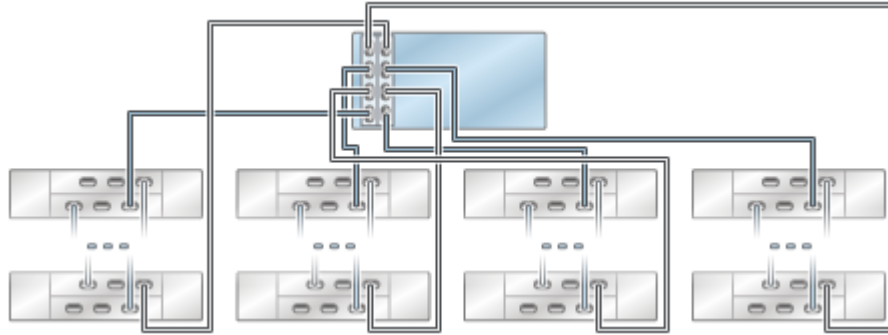
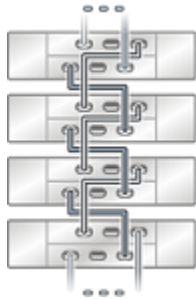


FIGURE 213 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 214 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to one DE2-24 disk shelf in a single chain

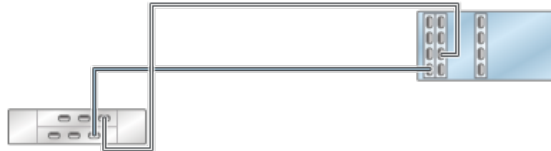


FIGURE 215 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to two DE2-24 disk shelves in two chains

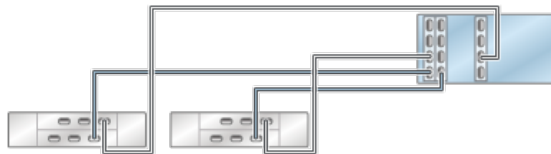


FIGURE 216 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to three DE2-24 disk shelves in three chains

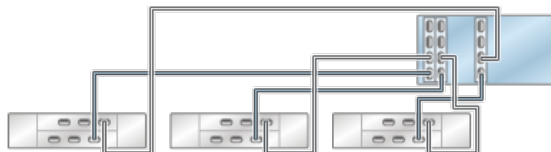


FIGURE 217 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to four DE2-24 disk shelves in four chains

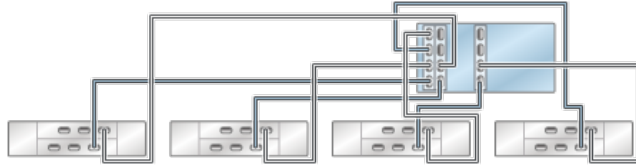


FIGURE 218 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to five DE2-24 disk shelves in five chains

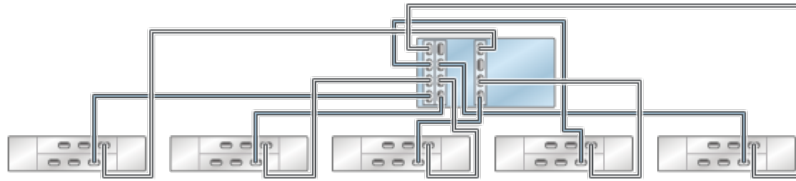


FIGURE 219 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to six DE2-24 disk shelves in six chains

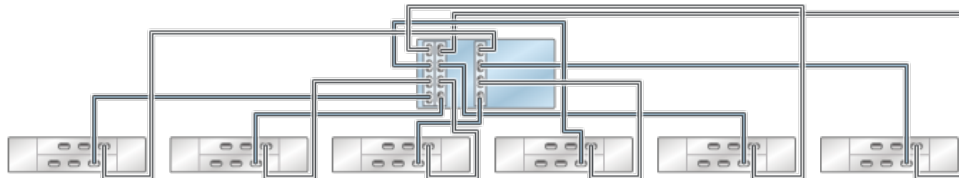


FIGURE 220 Standalone ZS4-4/ZS3-4 controller with three HBAs connected to multiple DE2-24 disk shelves in six chains

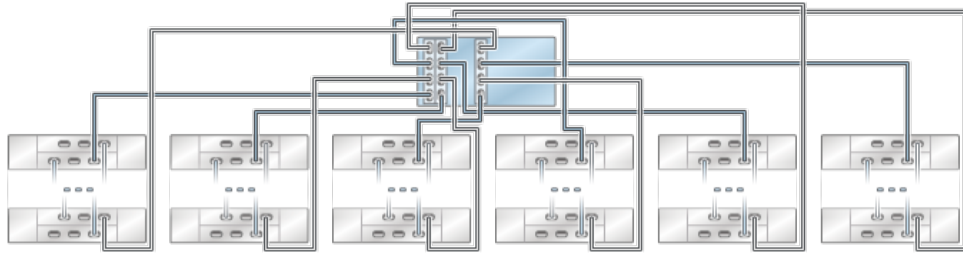
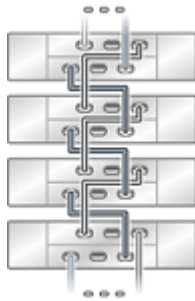


FIGURE 221 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 222 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

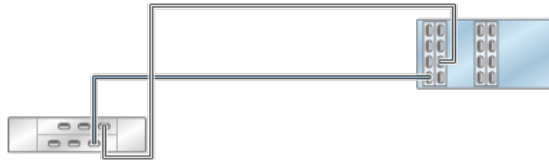


FIGURE 223 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to two DE2-24 disk shelves in two chains

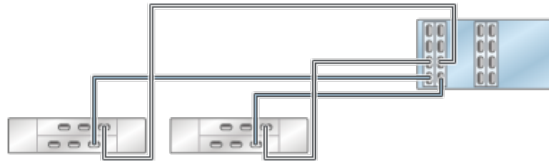


FIGURE 224 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to three DE2-24 disk shelves in three chains



FIGURE 225 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to four DE2-24 disk shelves in four chains

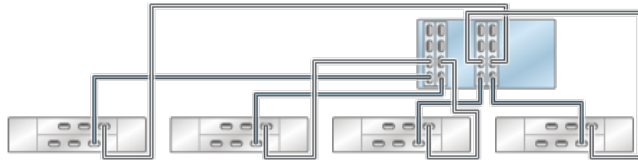


FIGURE 226 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to five DE2-24 disk shelves in five chains

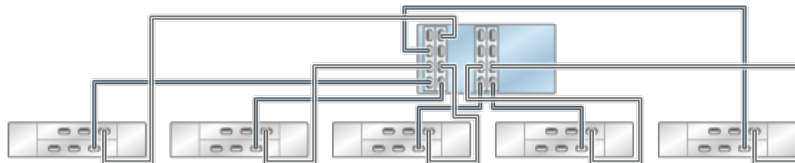


FIGURE 227 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to six DE2-24 disk shelves in six chains

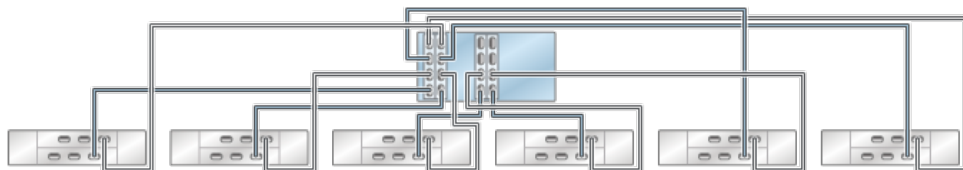


FIGURE 228 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

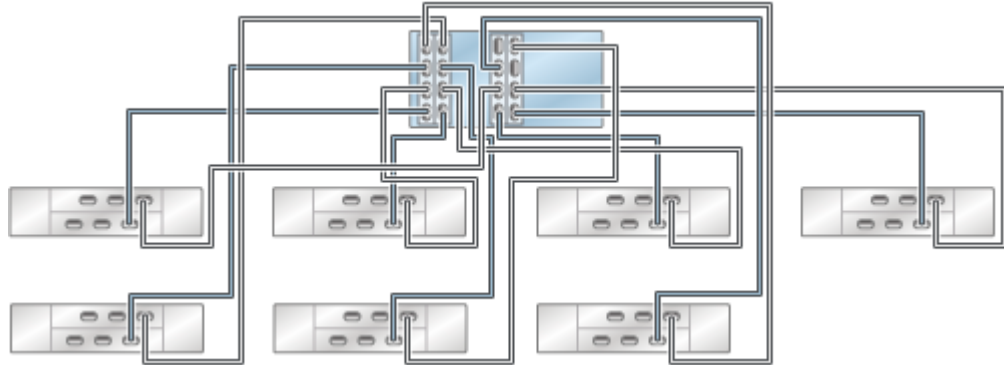


FIGURE 229 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

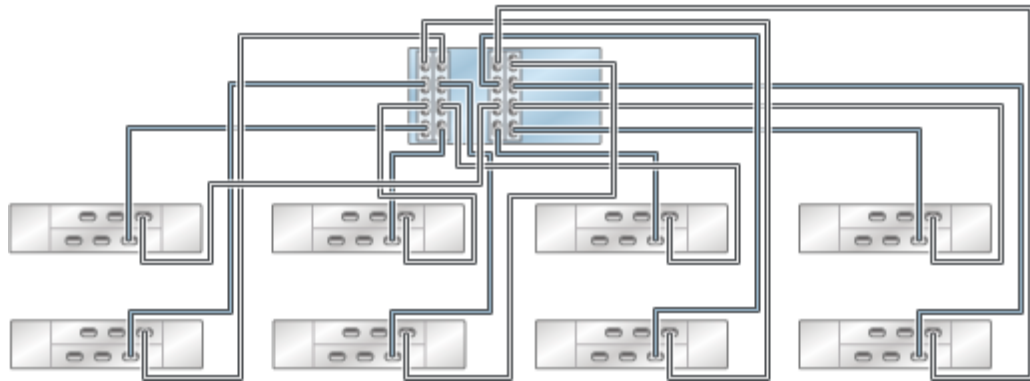


FIGURE 230 Standalone ZS4-4/ZS3-4 controller with four HBAs connected to multiple DE2-24 disk shelves in eight chains

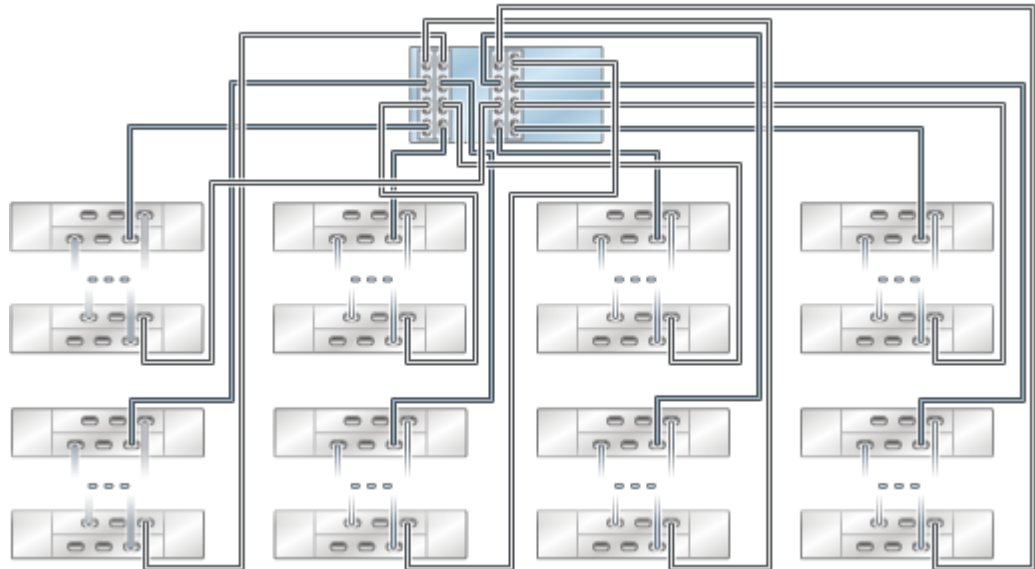
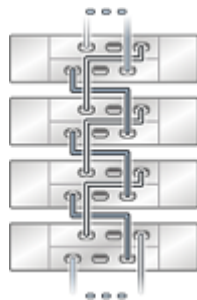


FIGURE 231 Multiple disk shelves in a single chain



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 232 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

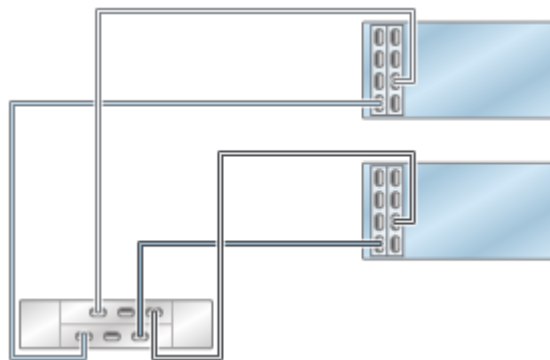


FIGURE 233 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

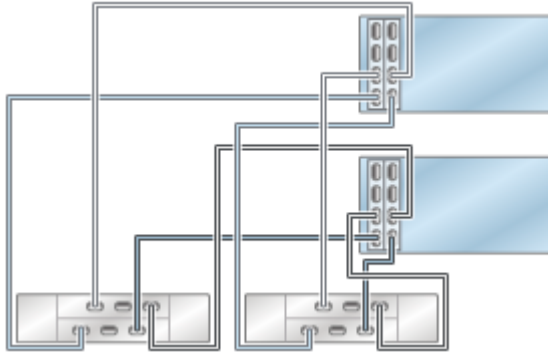


FIGURE 234 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

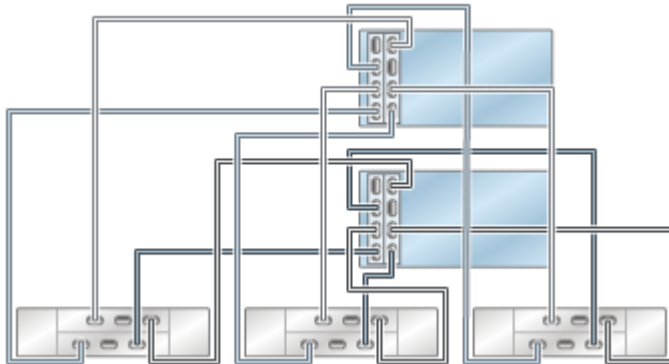


FIGURE 235 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

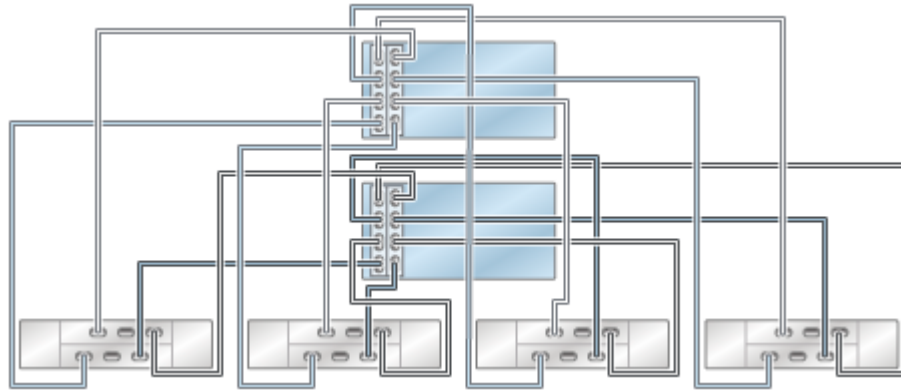


FIGURE 236 Clustered ZS4-4/ZS3-4 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

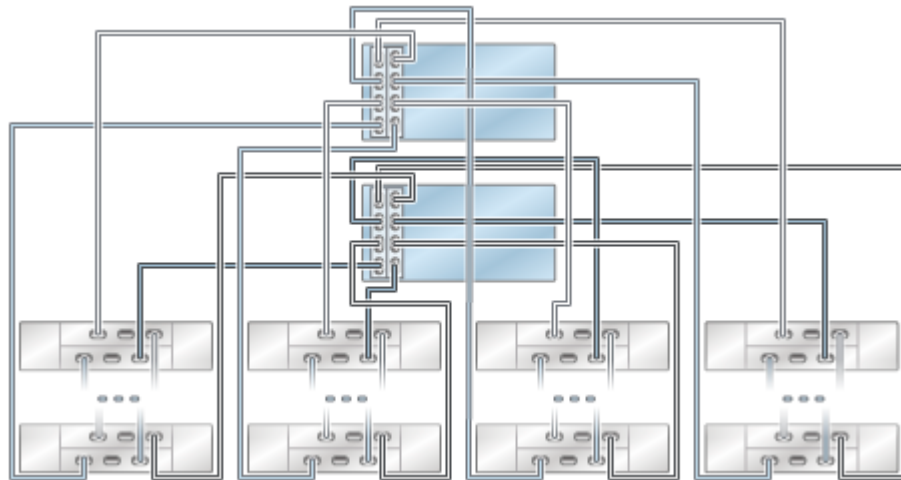
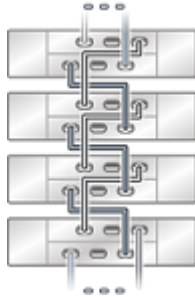


FIGURE 237 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 238 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 239 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

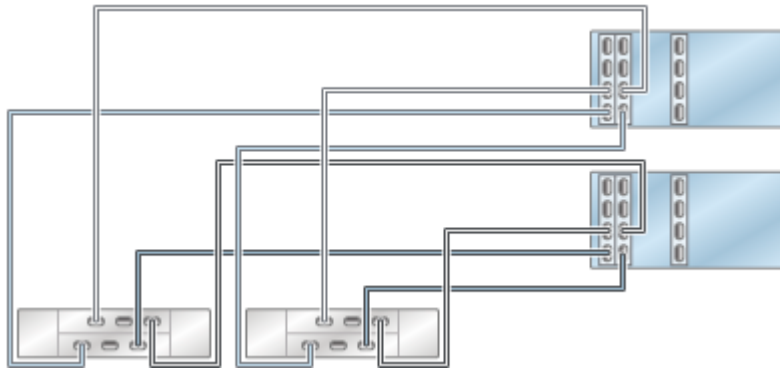


FIGURE 240 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

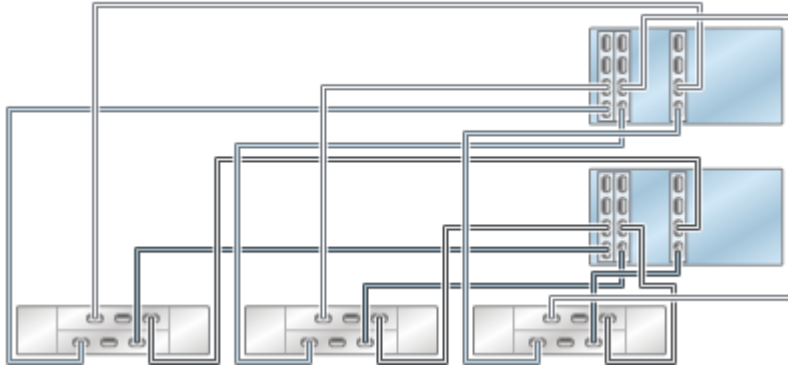


FIGURE 241 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

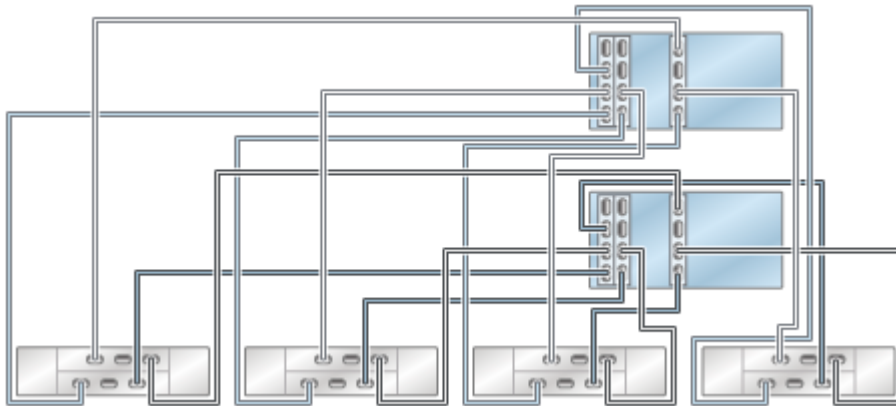


FIGURE 242 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

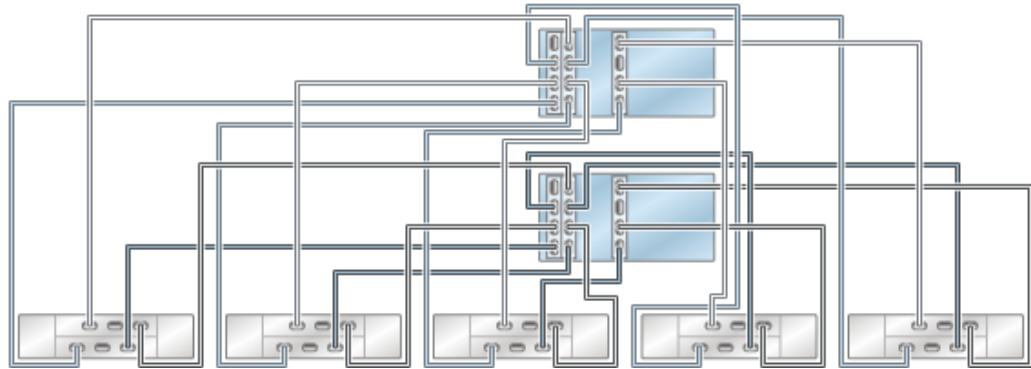


FIGURE 243 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

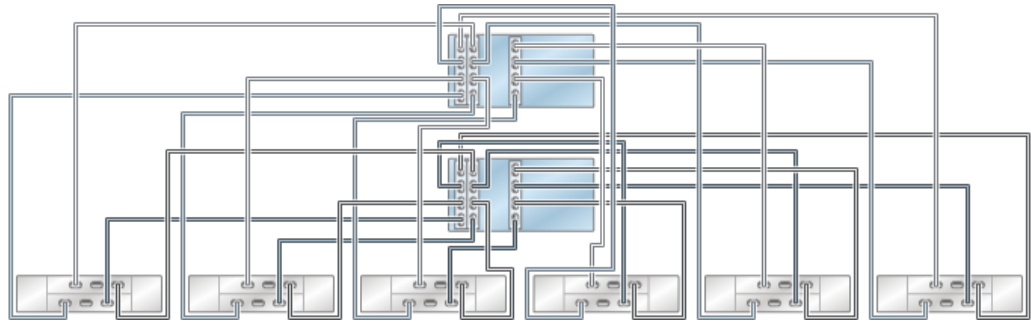


FIGURE 244 Clustered ZS4-4/ZS3-4 controllers with three HBAs connected to multiple DE2-24 disk shelves in six chains

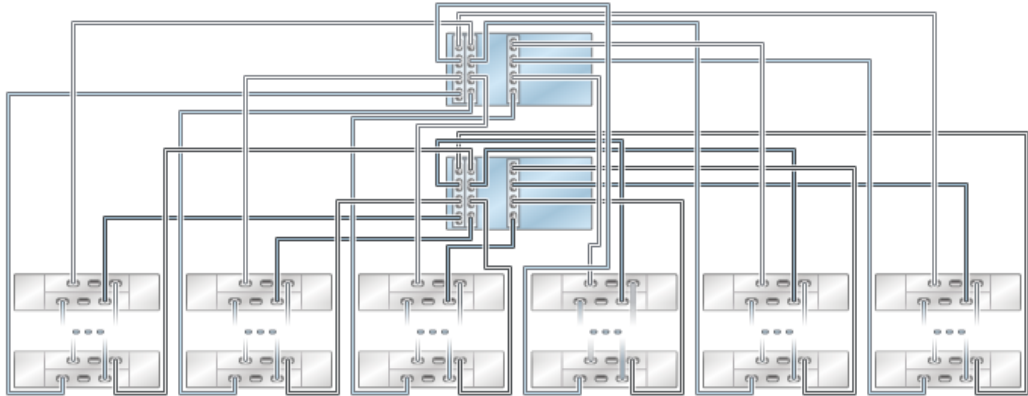
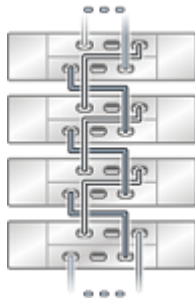


FIGURE 245 Multiple disk shelves in a single chain



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 246 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 247 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

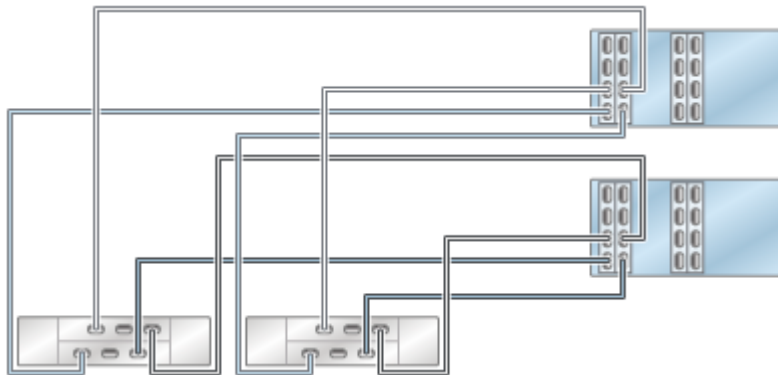


FIGURE 248 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

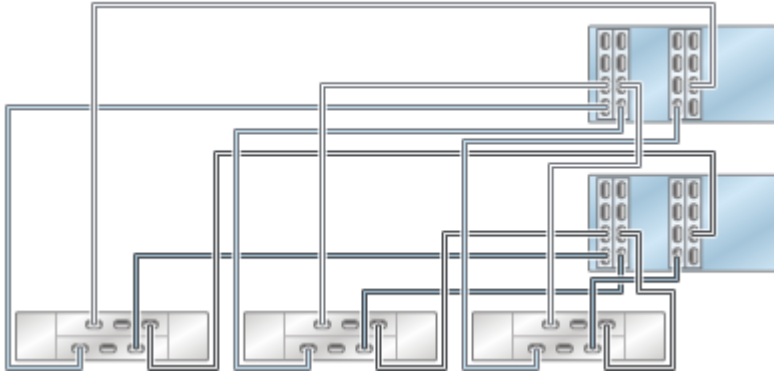


FIGURE 249 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

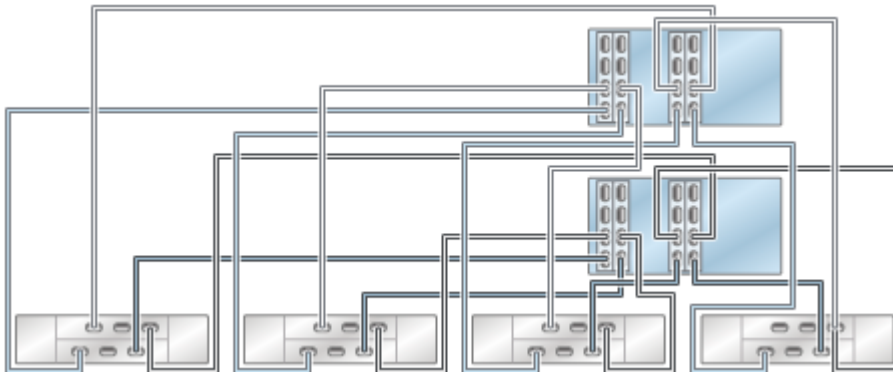


FIGURE 250 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

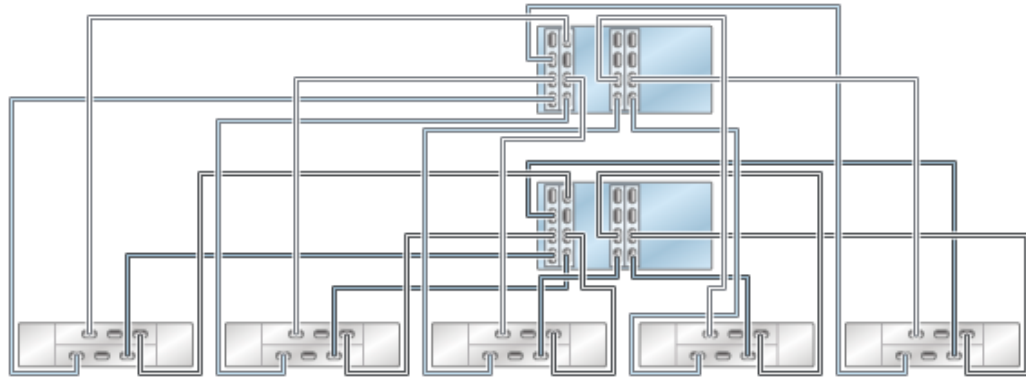


FIGURE 251 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected six DE2-24 disk shelves in six chains

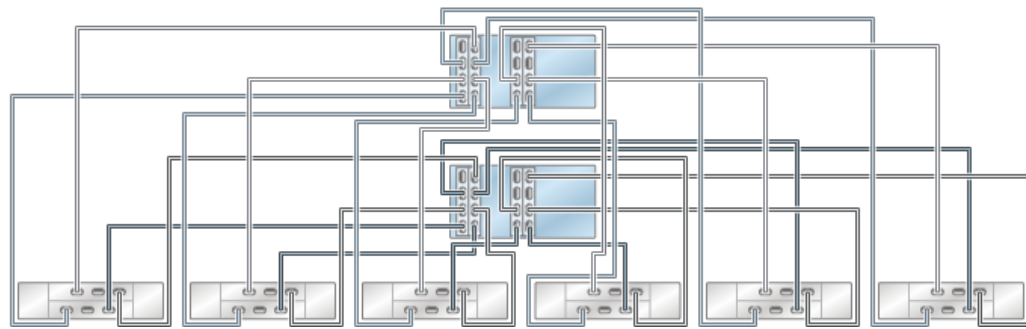


FIGURE 252 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

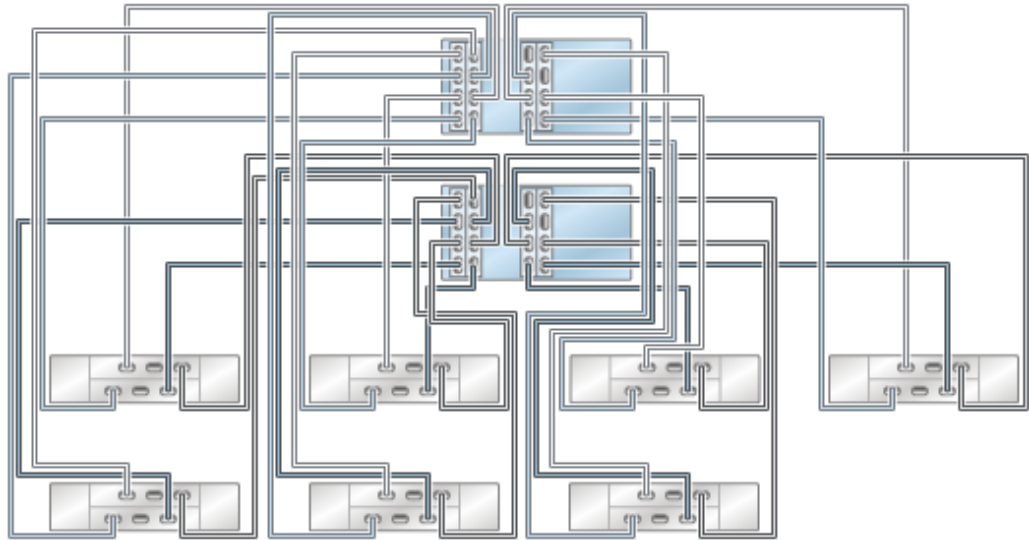


FIGURE 253 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

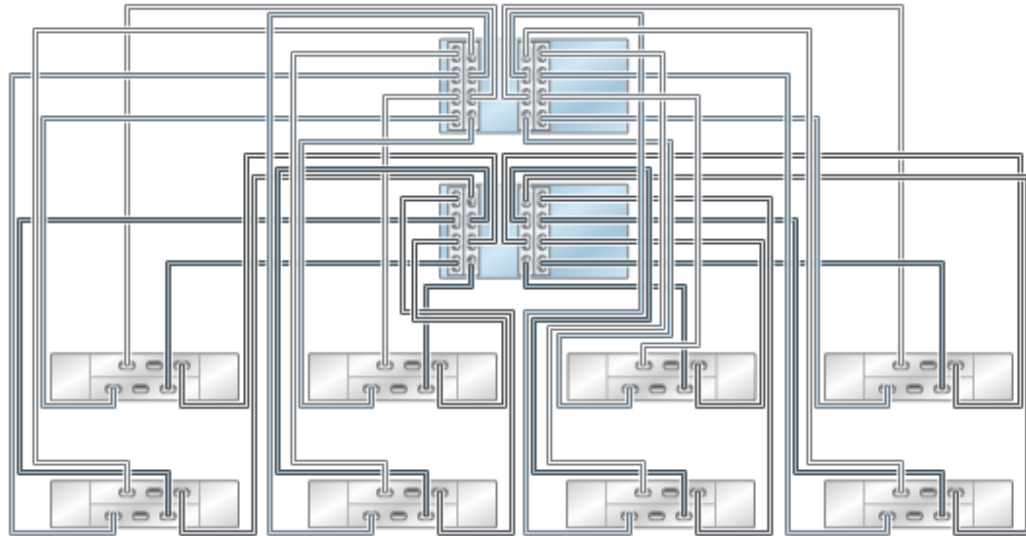


FIGURE 254 Clustered ZS4-4/ZS3-4 controllers with four HBAs connected to multiple DE2-24 disk shelves in eight chains

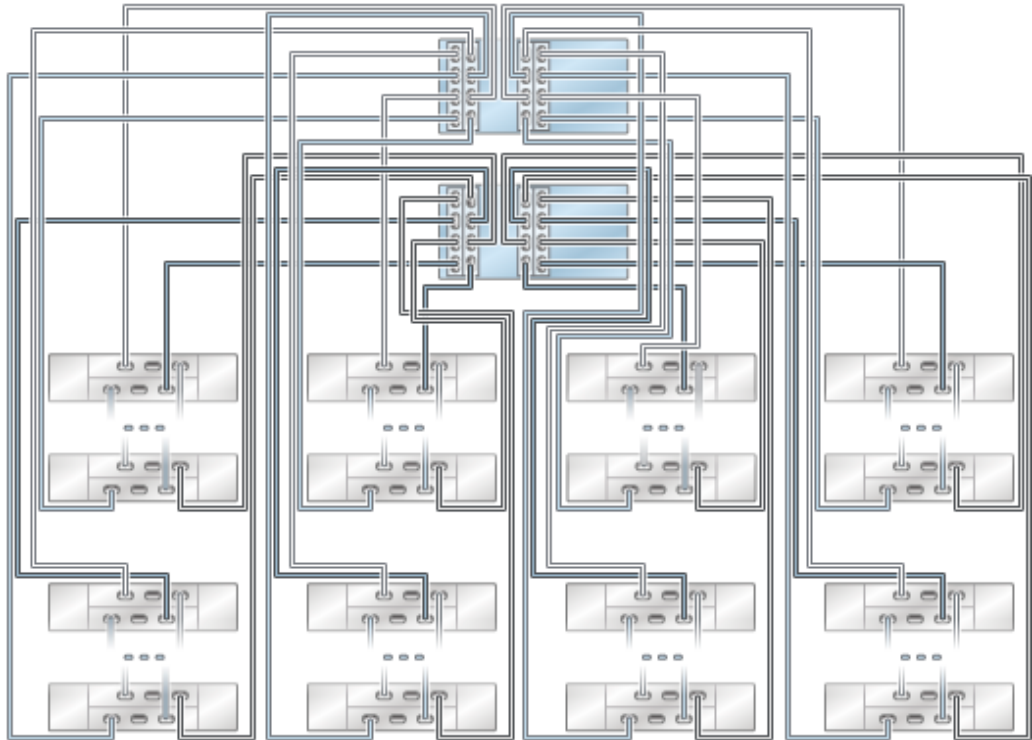
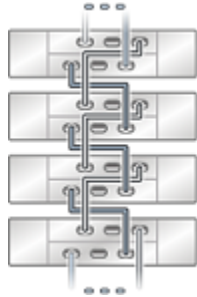


FIGURE 255 Multiple disk shelves in a single chain

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 197](#)
- [“ZS3-2 Standalone to DE2-24 Disk Shelves \(2 HBAs\)” on page 199](#)
- [“ZS3-2 Clustered to DE2-24 Disk Shelves \(1 HBA\)” on page 202](#)
- [“ZS3-2 Clustered to DE2-24 Disk Shelves \(2 HBAs\)” on page 204](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 256 Standalone ZS3-2 controller with one HBA connected to one DE2-24 disk shelf in a single chain

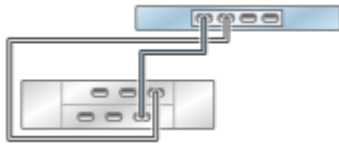


FIGURE 257 Standalone ZS3-2 controller with one HBA connected to two DE2-24 disk shelves in two chains

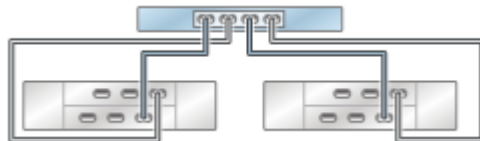


FIGURE 258 Standalone ZS3-2 controller with one HBA connected to six DE2-24 disk shelves in two chains

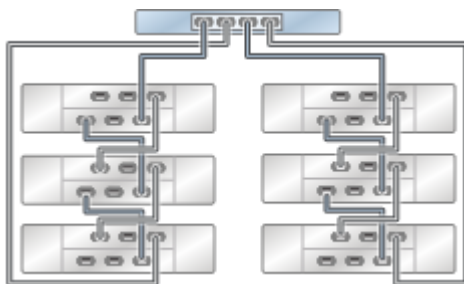
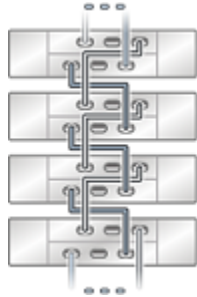


FIGURE 259 Multiple disk shelves in a single chain

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 260 Standalone ZS3-2 controller with two HBAs connected to one DE2-24 disk shelf in one chain

FIGURE 261 Standalone ZS3-2 controller with two HBAs connected to two DE2-24 disk shelves in two chains



FIGURE 262 Standalone ZS3-2 controller with two HBAs connected to three DE2-24 disk shelves in three chains

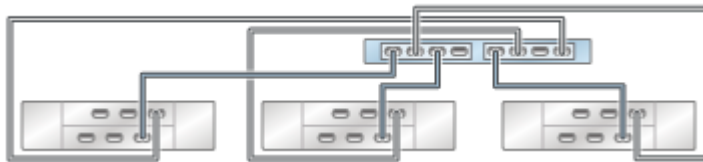


FIGURE 263 Standalone ZS3-2 controller with two HBAs connected to four DE2-24 disk shelves in four chains

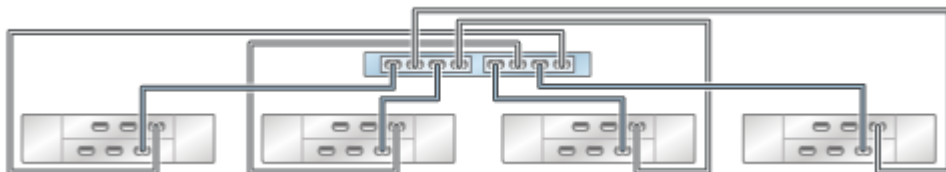


FIGURE 264 Standalone ZS3-2 controller with two HBAs connected to eight DE2-24 disk shelves in four chains

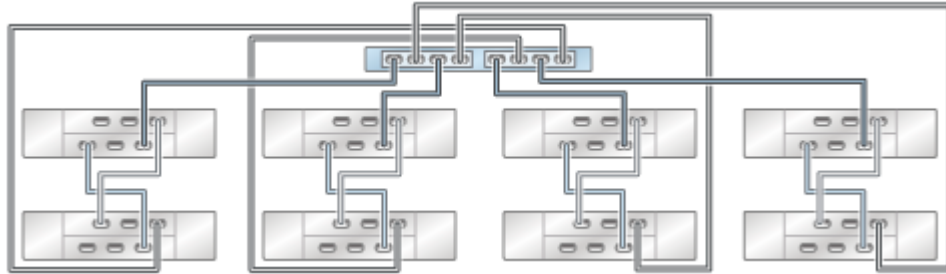


FIGURE 265 Standalone ZS3-2 controller with two HBAs connected to sixteen DE2-24 disk shelves in four chains

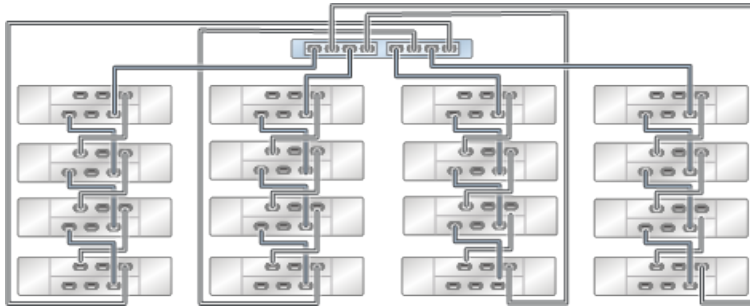
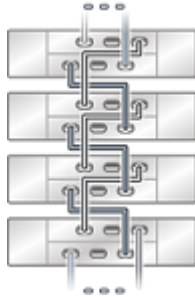


FIGURE 266 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 267 Clustered ZS3-2 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

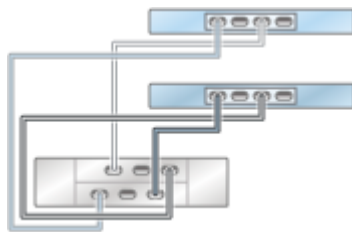


FIGURE 268 Clustered ZS3-2 controllers with one HBA connected to two DE2-24 disk shelves in two chains

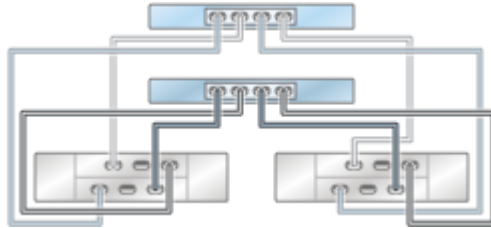


FIGURE 269 Clustered ZS3-2 controllers with one HBA connected to six DE2-24 disk shelves in two chains

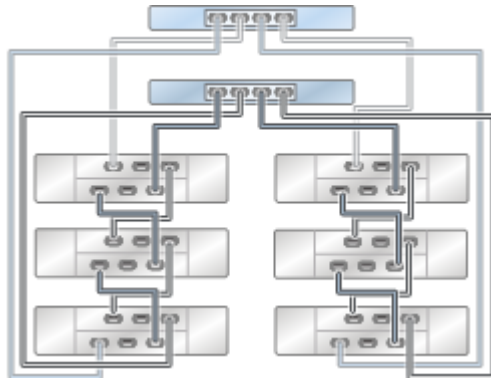
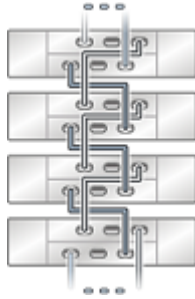


FIGURE 270 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 271 Clustered ZS3-2 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

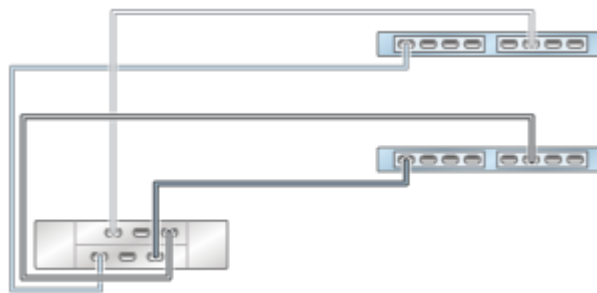


FIGURE 272 Clustered ZS3-2 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

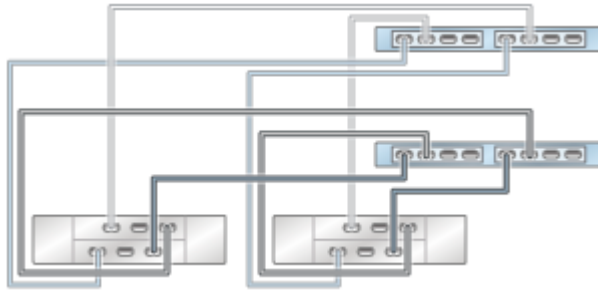


FIGURE 273 Clustered ZS3-2 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

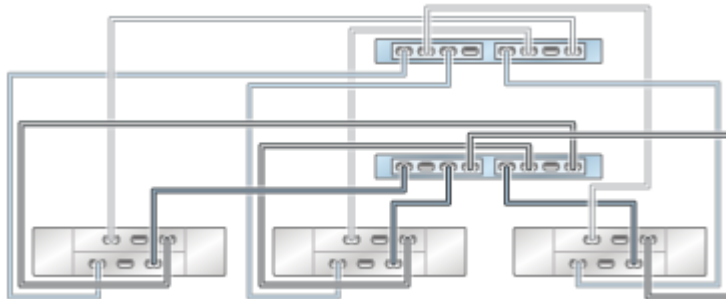


FIGURE 274 Clustered ZS3-2 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

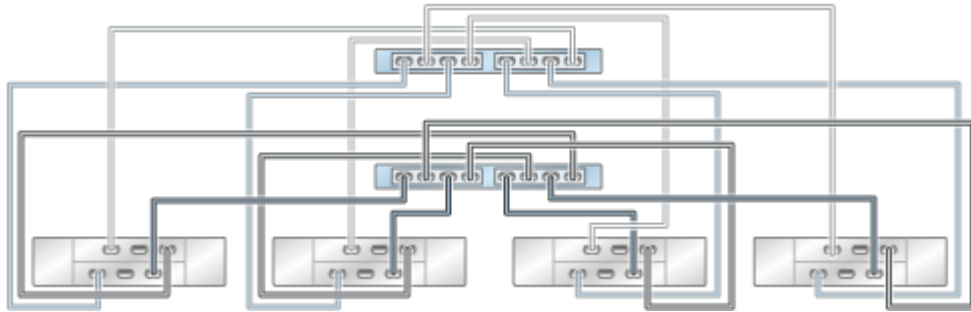


FIGURE 275 Clustered ZS3-2 controllers with two HBAs connected to eight DE2-24 disk shelves in four chains

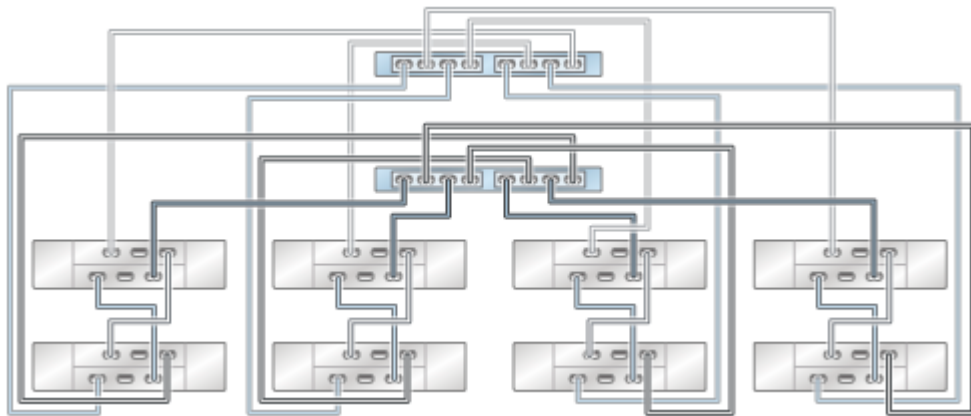


FIGURE 276 Clustered ZS3-2 controllers with two HBAs connected to sixteen DE2-24 disk shelves in four chains

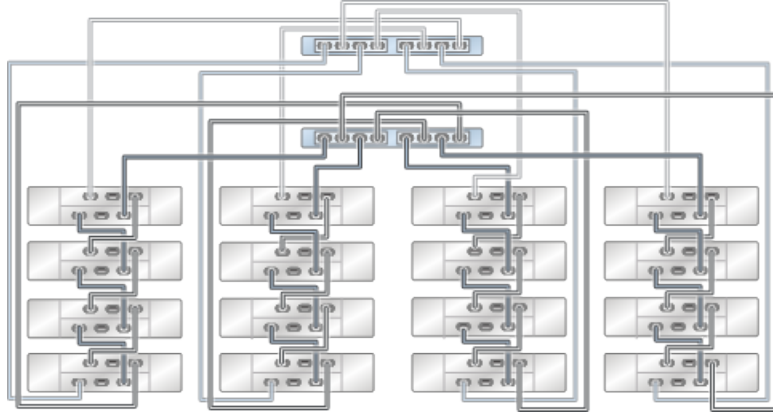
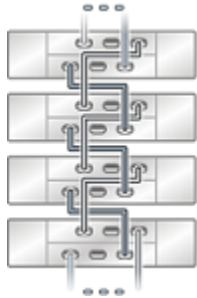


FIGURE 277 Multiple disk shelves in a single chain



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)” on page 208
- “7420 Standalone to DE2-24 Disk Shelves (3 HBAs)” on page 210
- “7420 Standalone to DE2-24 Disk Shelves (4 HBAs)” on page 213
- “7420 Clustered to DE2-24 Disk Shelves (2 HBAs)” on page 218
- “7420 Clustered to DE2-24 Disk Shelves (3 HBAs)” on page 221
- “7420 Clustered to DE2-24 Disk Shelves (4 HBAs)” on page 225

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 11.

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

FIGURE 278 Standalone 7420 controller with two HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 279 Standalone 7420 controller with two HBAs connected to two DE2-24 disk shelves in two chains

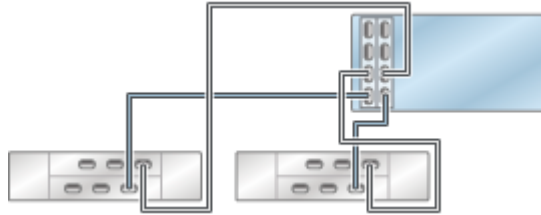


FIGURE 280 Standalone 7420 controller with two HBAs connected to three DE2-24 disk shelves in three chains

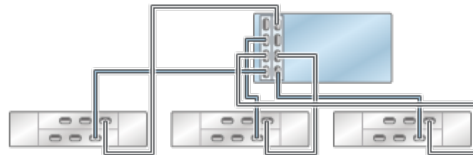


FIGURE 281 Standalone 7420 controller with two HBAs connected to four DE2-24 disk shelves in four chains

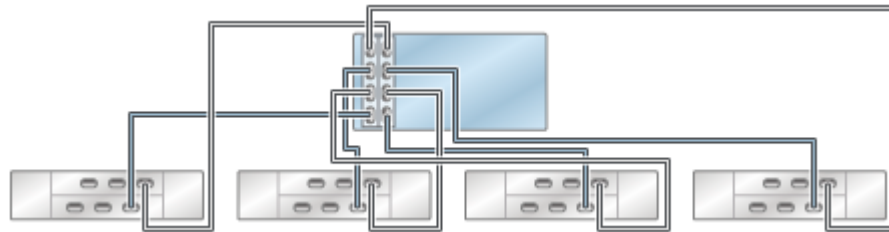


FIGURE 282 Standalone 7420 controller with two HBAs connected to multiple DE2-24 disk shelves in four chains

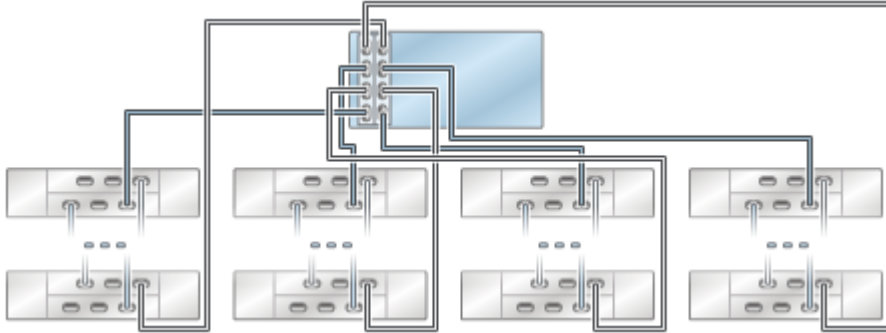
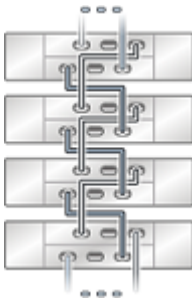


FIGURE 283 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 284 Standalone 7420 controller with three HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 285 Standalone 7420 controller with three HBAs connected to two DE2-24 disk shelves in two chains

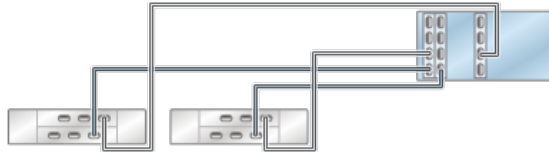


FIGURE 286 Standalone 7420 controller with three HBAs connected to three DE2-24 disk shelves in three chains

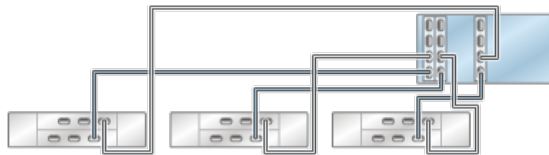


FIGURE 287 Standalone 7420 controller with three HBAs connected to four DE2-24 disk shelves in four chains

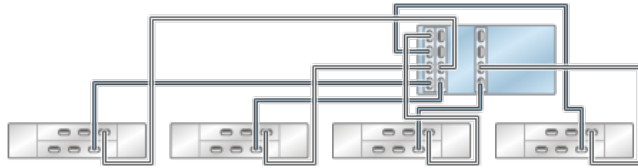


FIGURE 288 Standalone 7420 controller with three HBAs connected to five DE2-24 disk shelves in five chains

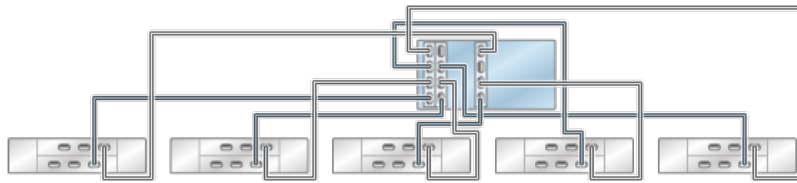


FIGURE 289 Standalone 7420 controller with three HBAs connected to six DE2-24 disk shelves in six chains

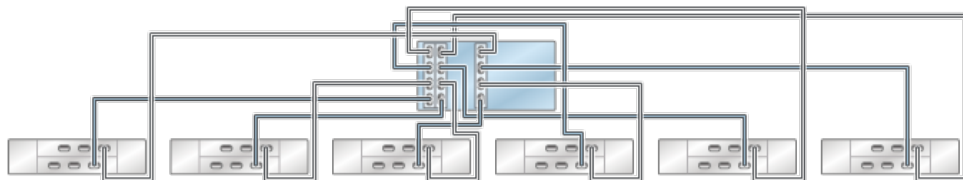


FIGURE 290 Standalone 7420 controller with three HBAs connected to multiple DE2-24 disk shelves in six chains

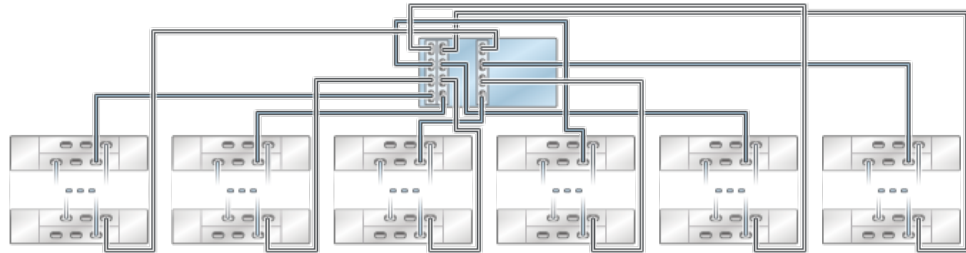
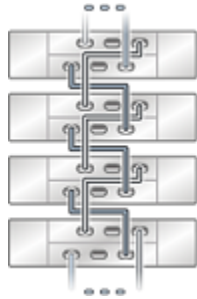


FIGURE 291 Multiple disk shelves in a single chain



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 292 Standalone 7420 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

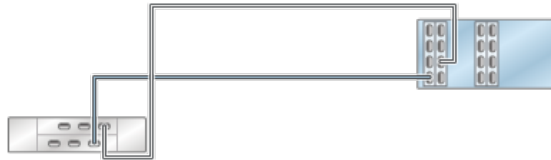


FIGURE 293 Standalone 7420 controller with four HBAs connected to two DE2-24 disk shelves in two chains

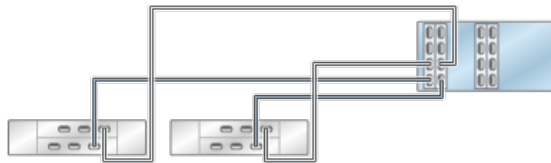


FIGURE 294 Standalone 7420 controller with four HBAs connected to three DE2-24 disk shelves in three chains



FIGURE 295 Standalone 7420 controller with four HBAs connected to four DE2-24 disk shelves in four chains

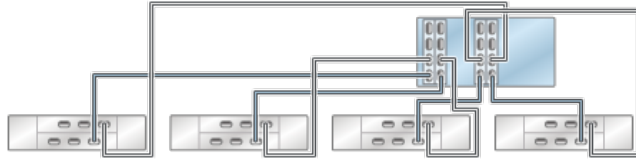


FIGURE 296 Standalone 7420 controller with four HBAs connected to five DE2-24 disk shelves in five chains

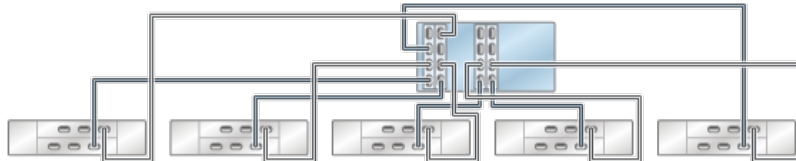


FIGURE 297 Standalone 7420 controller with four HBAs connected to six DE2-24 disk shelves in six chains

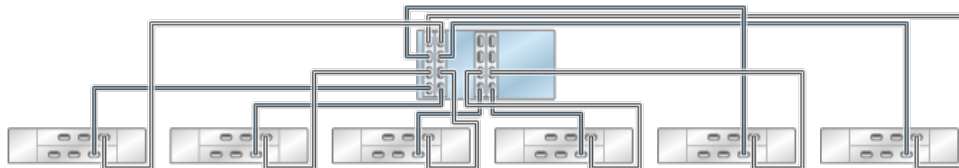


FIGURE 298 Standalone 7420 controller with four HBAs connected to seven DE2-24 disk shelves in seven chains

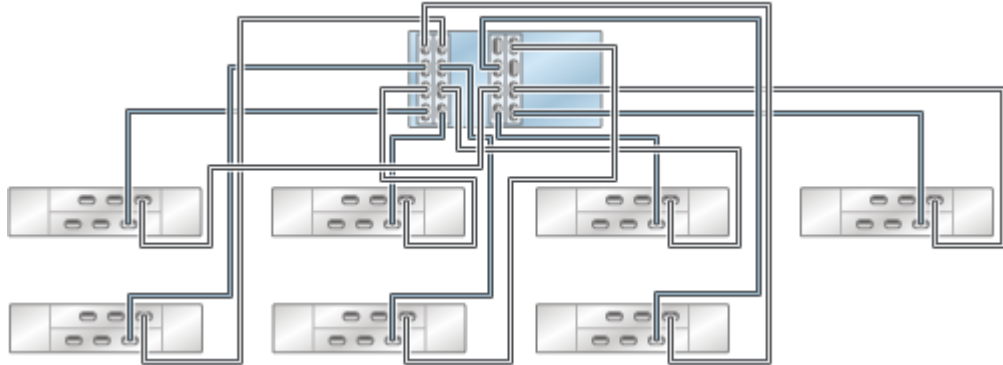


FIGURE 299 Standalone 7420 controller with four HBAs connected to eight DE2-24 disk shelves in eight chains

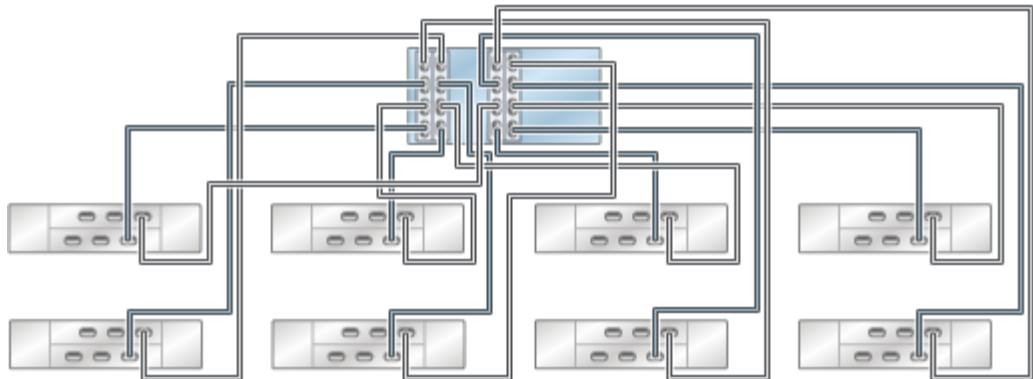


FIGURE 300 Standalone 7420 controller with four HBAs connected to multiple DE2-24 disk shelves in eight chains

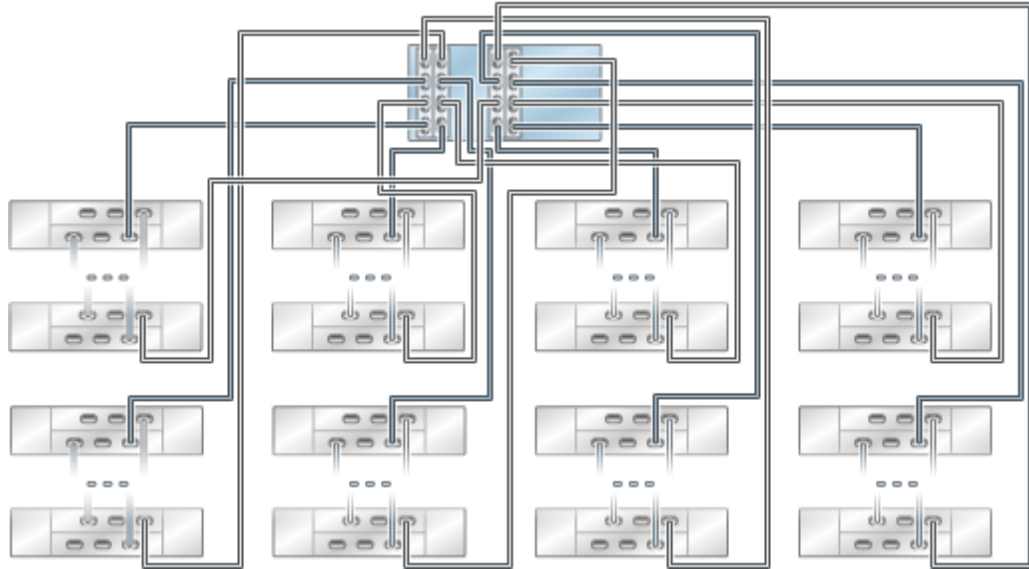
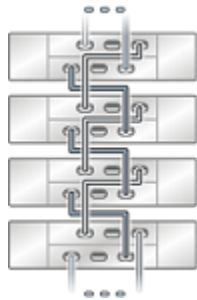


FIGURE 301 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 302 Clustered 7420 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

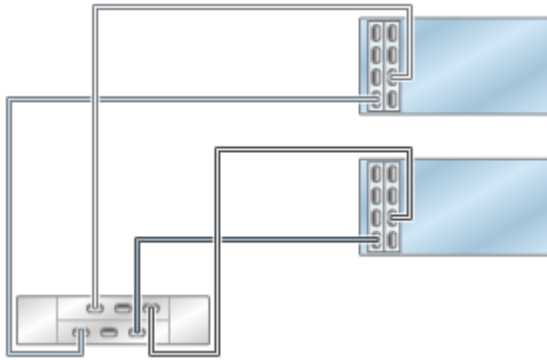


FIGURE 303 Clustered 7420 controllers with two HBAs connected to two DE2-24 disk shelves in two chains

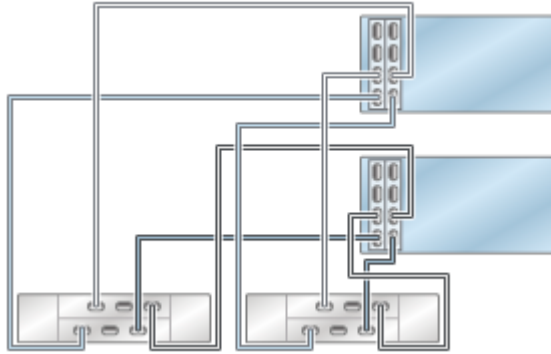


FIGURE 304 Clustered 7420 controllers with two HBAs connected to three DE2-24 disk shelves in three chains

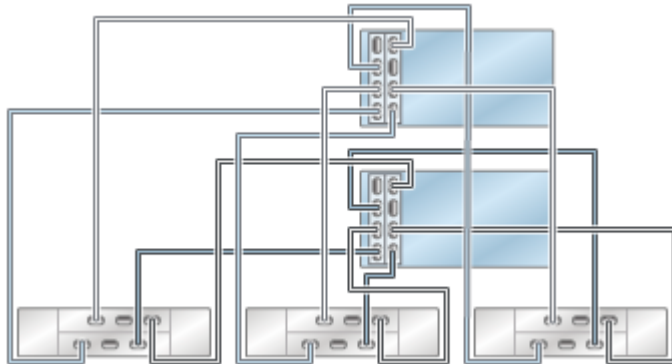


FIGURE 305 Clustered 7420 controllers with two HBAs connected to four DE2-24 disk shelves in four chains

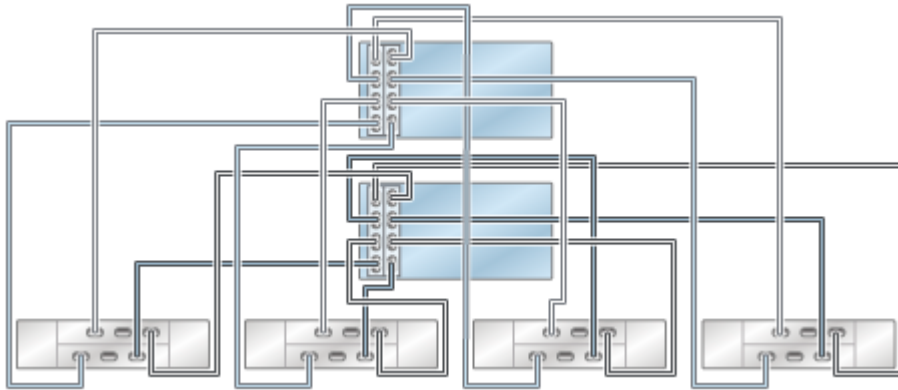


FIGURE 306 Clustered 7420 controllers with two HBAs connected to multiple DE2-24 disk shelves in four chains

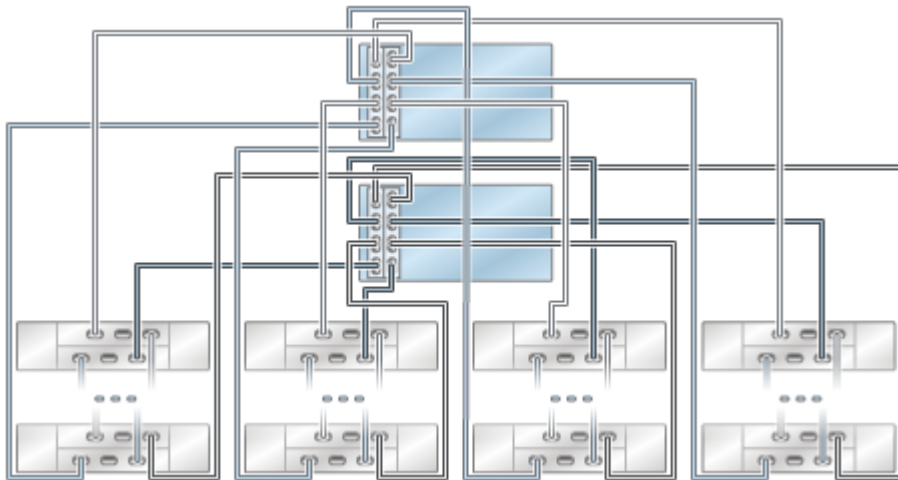
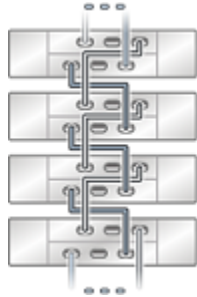


FIGURE 307 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 308 Clustered 7420 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 309 Clustered 7420 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

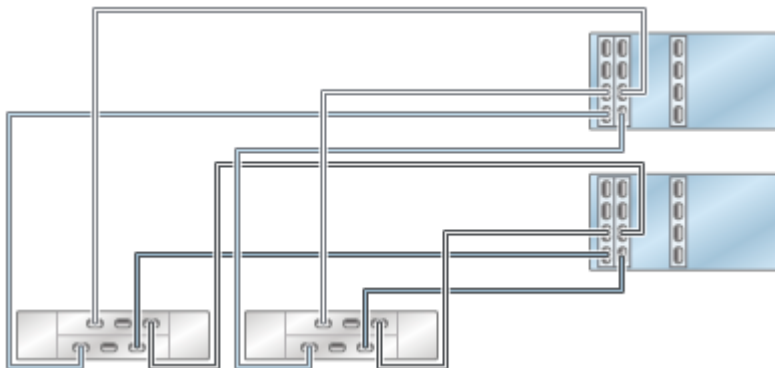


FIGURE 310 Clustered 7420 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

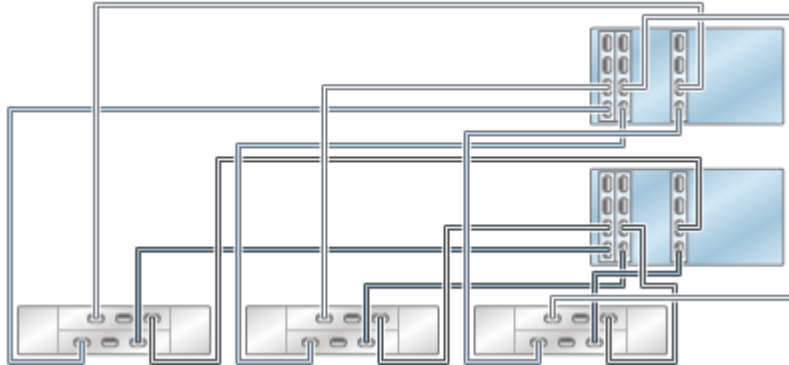


FIGURE 311 Clustered 7420 controllers with three HBAs connected to four DE2-24 disk shelves in four chains

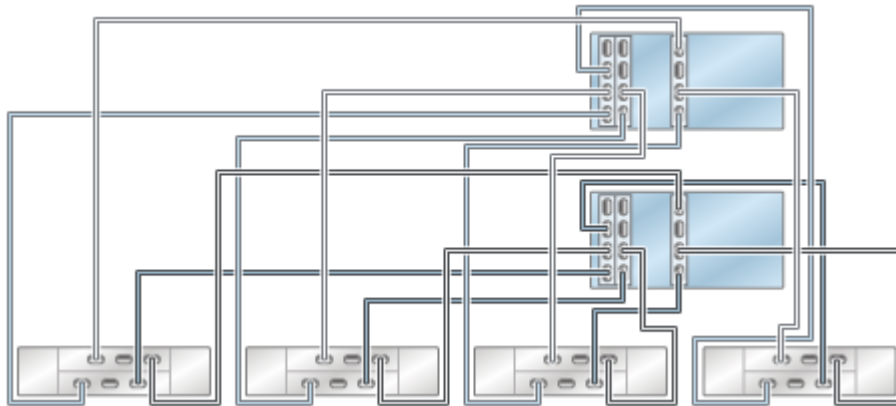


FIGURE 312 Clustered 7420 controllers with three HBAs connected to five DE2-24 disk shelves in five chains

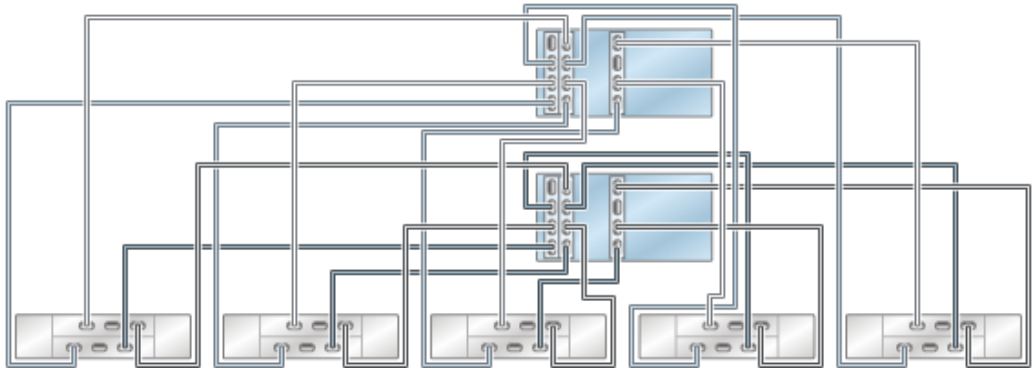


FIGURE 313 Clustered 7420 controllers with three HBAs connected to six DE2-24 disk shelves in six chains

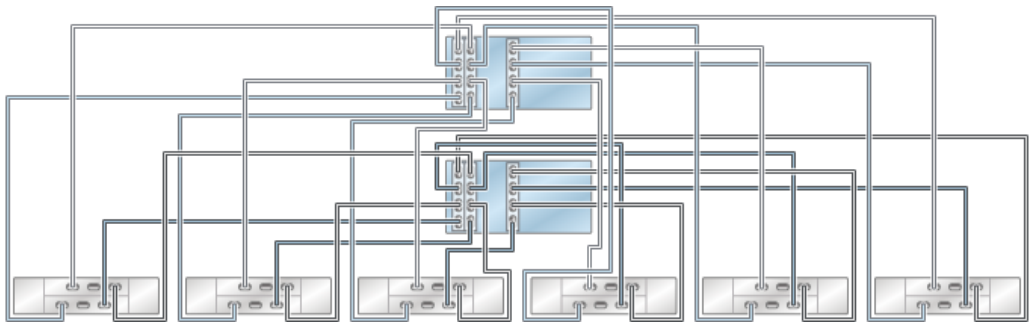


FIGURE 314 Clustered 7420 controllers with three HBAs connected to multiple DE2-24 disk shelves in six chains

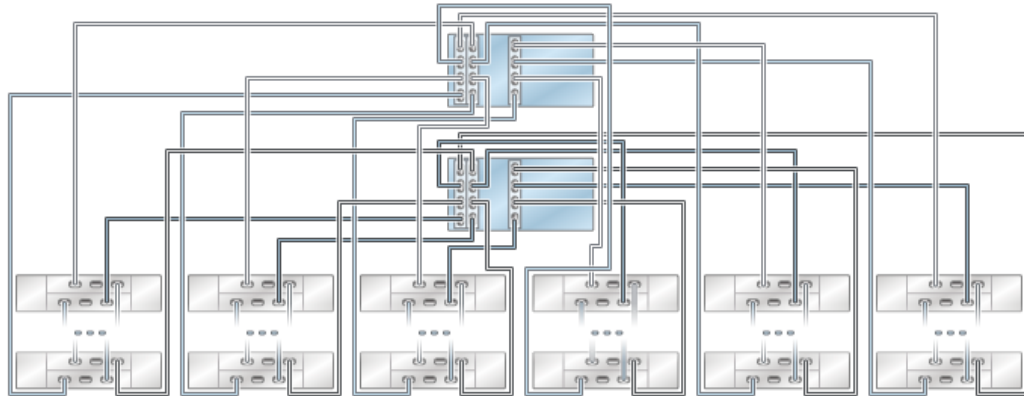
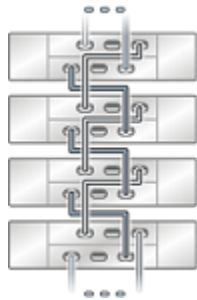


FIGURE 315 Multiple disk shelves in a single chain



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

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



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

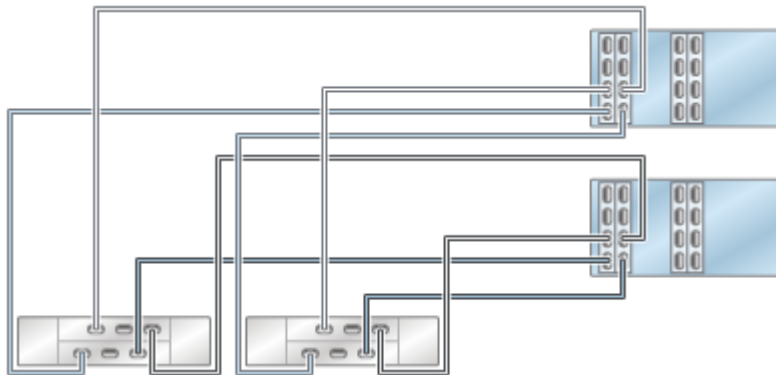


FIGURE 318 Clustered 7420 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

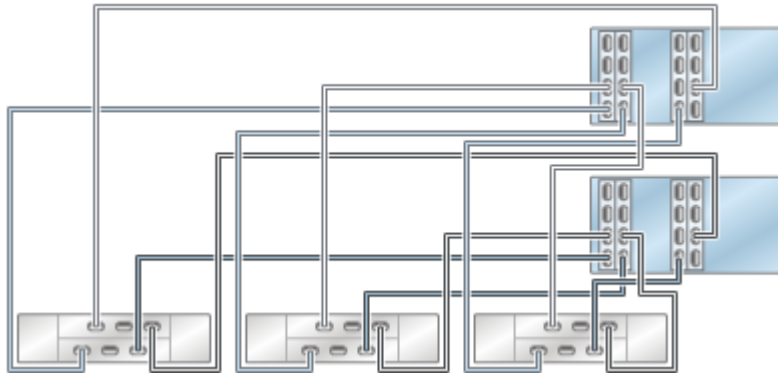


FIGURE 319 Clustered 7420 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

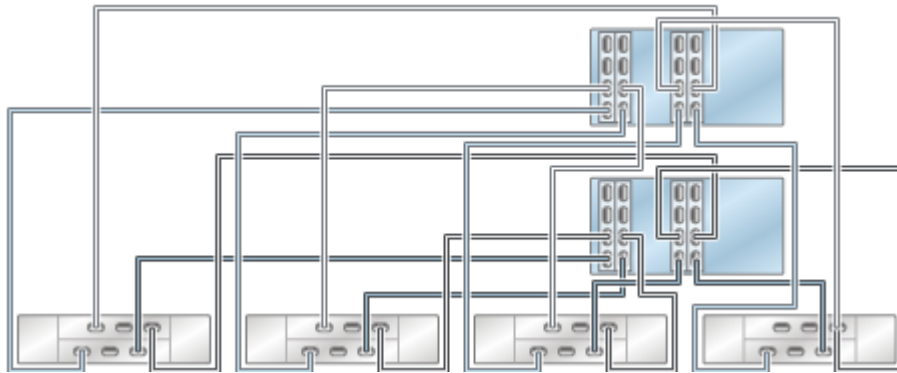


FIGURE 320 Clustered 7420 controllers with four HBAs connected to five DE2-24 disk shelves in five chains

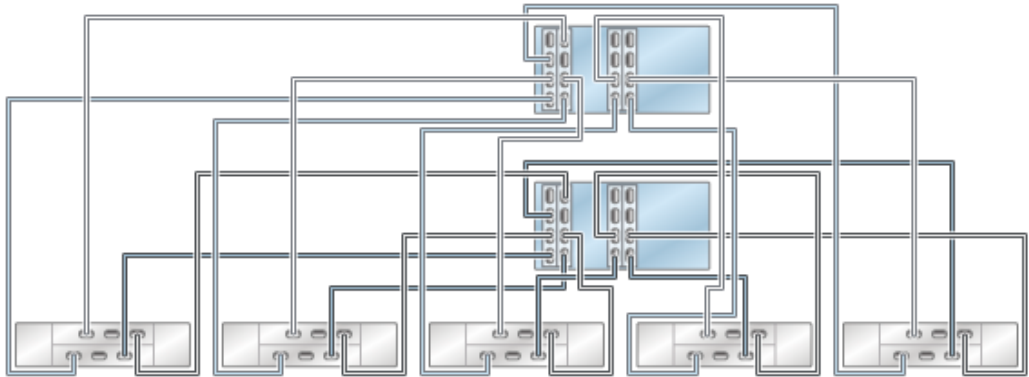


FIGURE 321 Clustered 7420 controllers with four HBAs connected to six DE2-24 disk shelves in six chains

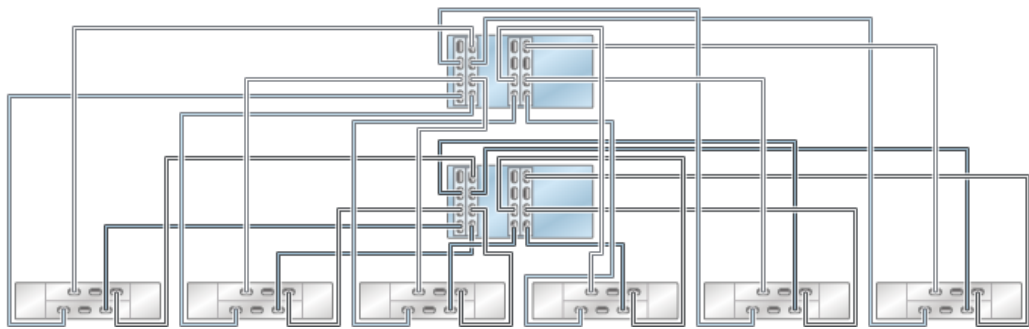


FIGURE 322 Clustered 7420 controllers with four HBAs connected to seven DE2-24 disk shelves in seven chains

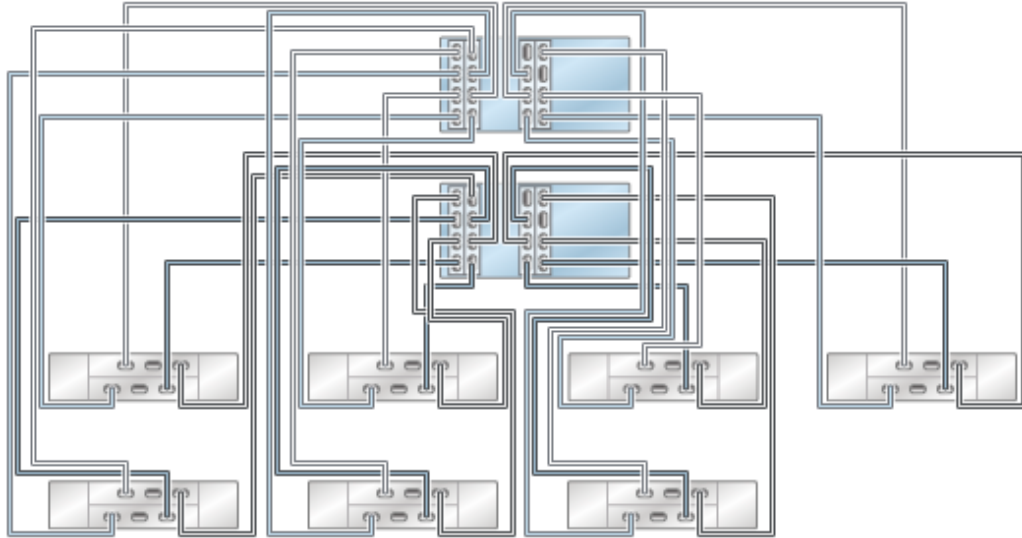


FIGURE 323 Clustered 7420 controllers with four HBAs connected to eight DE2-24 disk shelves in eight chains

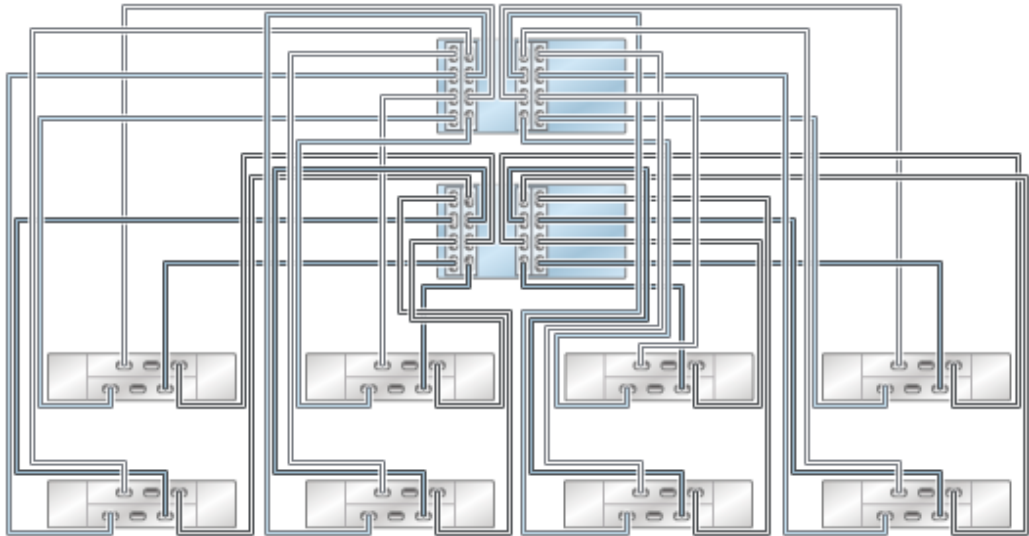


FIGURE 324 Clustered 7420 controllers with four HBAs connected to multiple DE2-24 disk shelves in eight chains

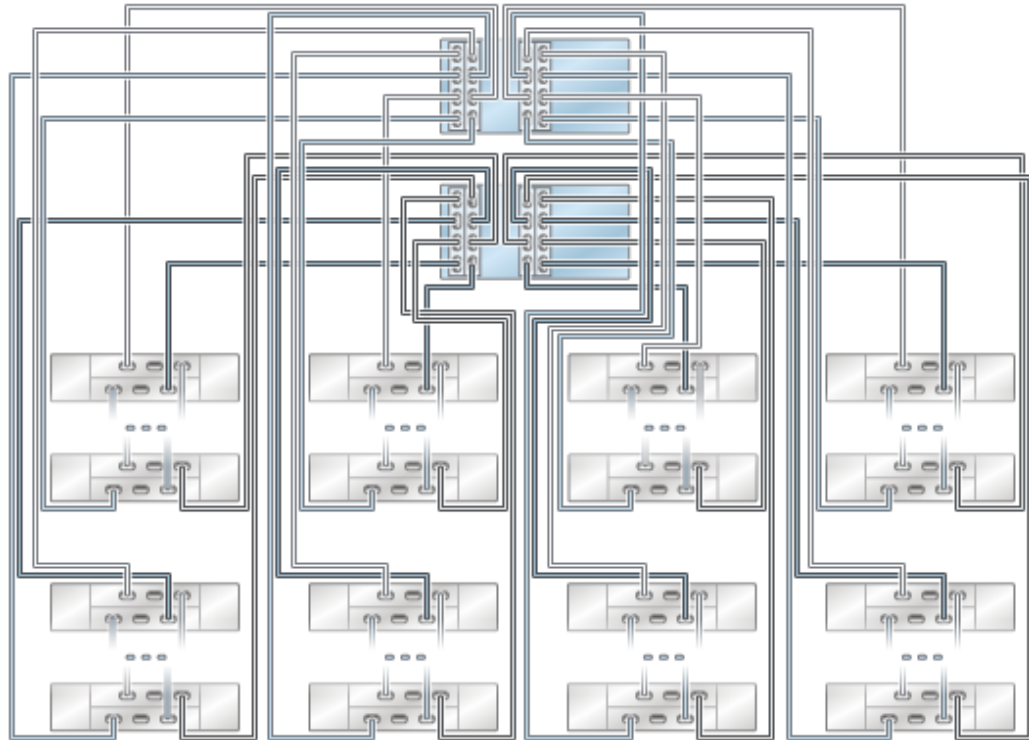
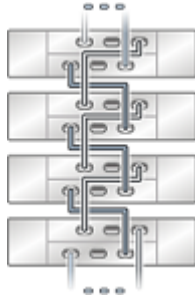


FIGURE 325 Multiple disk shelves in a single chain



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 232](#)
- [“7320 Clustered to DE2-24 Disk Shelves” on page 234](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 326 Standalone 7320 controller with one HBA connected to one DE2-24 disk shelf in a single chain

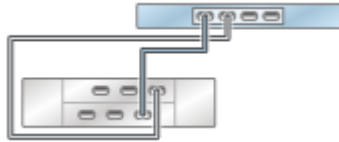


FIGURE 327 Standalone 7320 controller with one HBA connected to two DE2-24 disk shelves in two chains

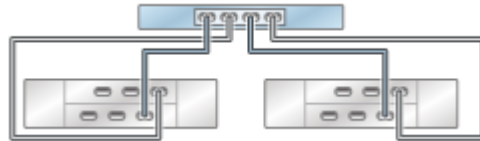


FIGURE 328 Standalone 7320 controller with one HBA connected to six DE2-24 disk shelves in two chains

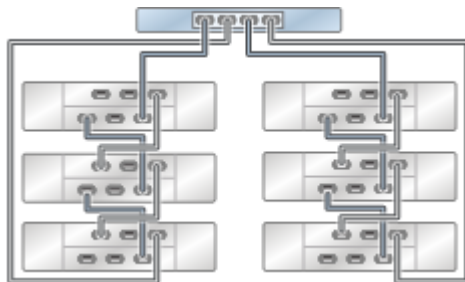
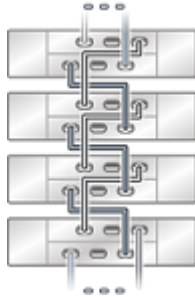


FIGURE 329 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 330 Clustered 7320 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

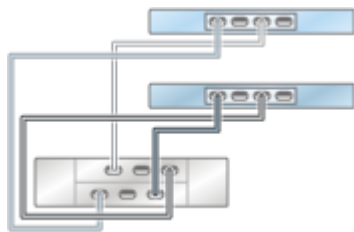


FIGURE 331 Clustered 7320 controllers with one HBA connected to two DE2-24 disk shelves in two chains

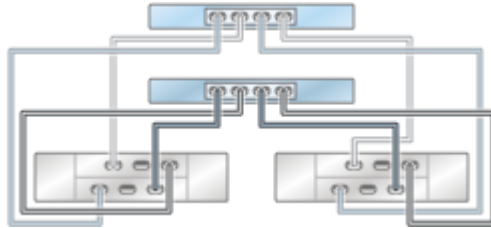


FIGURE 332 Clustered 7320 controllers with one HBA connected to six DE2-24 disk shelves in two chains

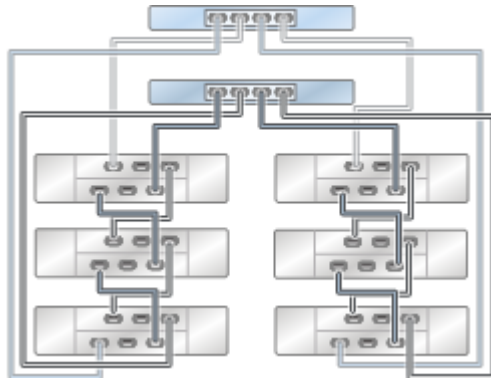
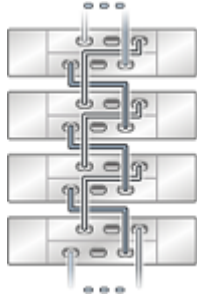


FIGURE 333 Multiple disk shelves in a single chain



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

This section contains guidelines for properly cabling standalone and clustered 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 237](#)
- [“Cabling DE2-24 Disk Shelves to 7320 Controllers” on page 271](#)
- [“Cabling DE2-24 Disk Shelves to 7120 Controllers” on page 276](#)

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 238](#)
- [“7420 Standalone to DE2-24 Disk Shelves \(3 HBAs\)” on page 240](#)
- [“7420 Standalone to DE2-24 Disk Shelves \(4 HBAs\)” on page 243](#)
- [“7420 Standalone to DE2-24 Disk Shelves \(5 HBAs\)” on page 246](#)
- [“7420 Standalone to DE2-24 Disk Shelves \(6 HBAs\)” on page 249](#)
- [“7420 Clustered to DE2-24 Disk Shelves \(2 HBAs\)” on page 253](#)
- [“7420 Clustered to DE2-24 Disk Shelves \(3 HBAs\)” on page 256](#)
- [“7420 Clustered to DE2-24 Disk Shelves \(4 HBAs\)” on page 260](#)
- [“7420 Clustered to DE2-24 Disk Shelves \(5 HBAs\)” on page 264](#)
- [“7420 Clustered to DE2-24 Disk Shelves \(6 HBAs\)” on page 268](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 334 Standalone 7420 controller with two HBAs connected to one DE2-24 disk shelf in a single chain

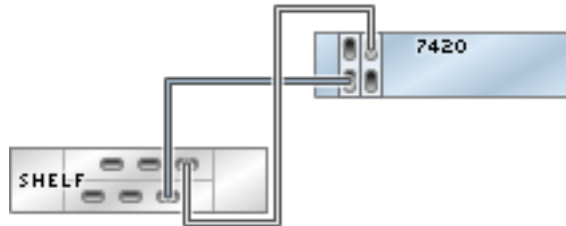


FIGURE 335 Standalone 7420 controller with two HBAs connected to two DE2-24 disk shelves in two chains

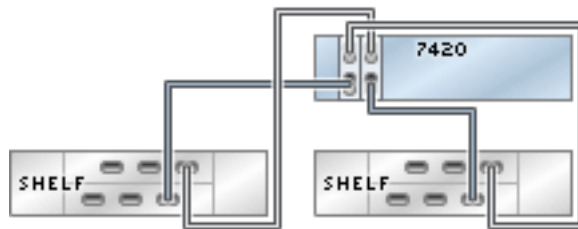


FIGURE 336 Standalone 7420 controller with two HBAs connected to four DE2-24 disk shelves in two chains

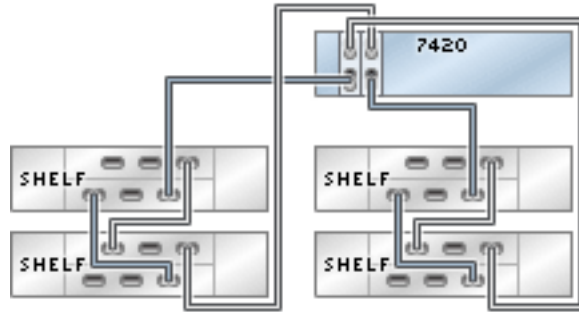


FIGURE 337 Standalone 7420 controller with two HBAs connected to 12 DE2-24 disk shelves in two chains

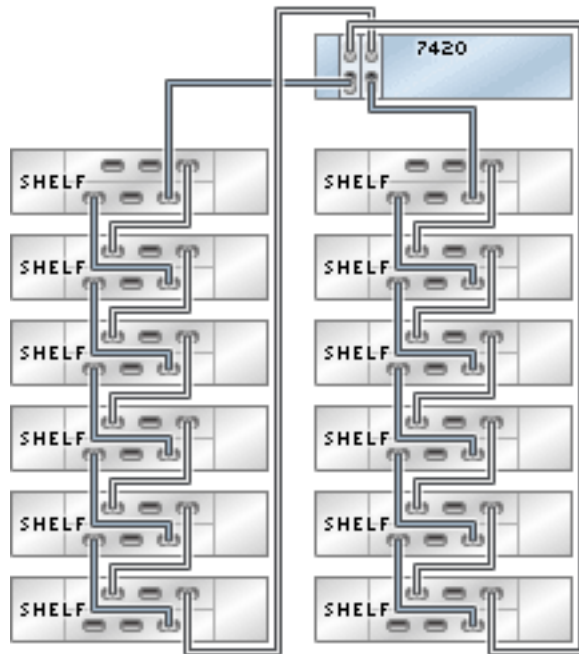
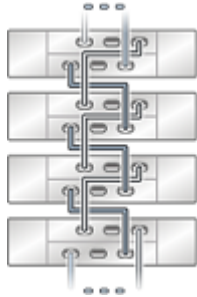


FIGURE 338 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 339 Standalone 7420 controller with three HBAs connected to one DE2-24 disk shelf in a single chain

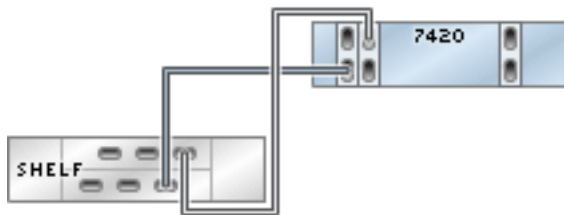


FIGURE 340 Standalone 7420 controller with three HBAs connected to two DE2-24 disk shelves in two chains

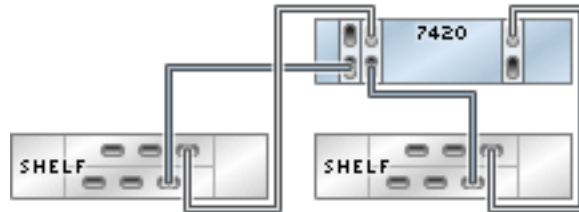


FIGURE 341 Standalone 7420 controller with three HBAs connected to three DE2-24 disk shelves in three chains

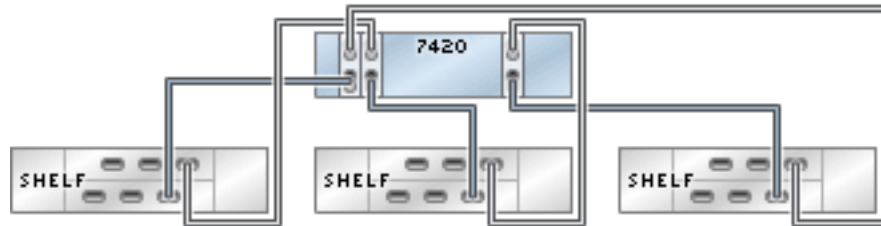


FIGURE 342 Standalone 7420 controller with three HBAs connected to six DE2-24 disk shelves in three chains

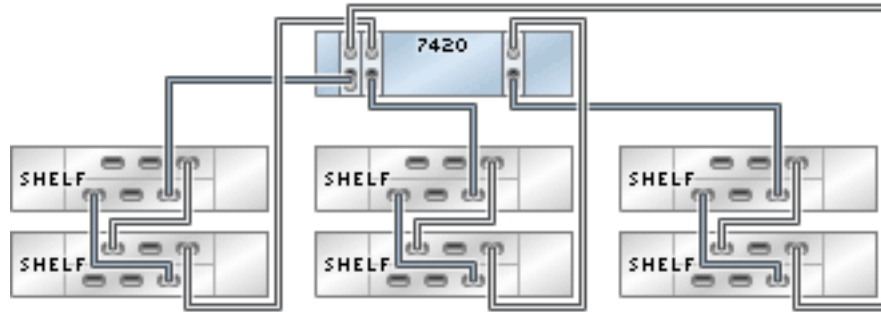


FIGURE 343 Standalone 7420 controller with three HBAs connected to 18 DE2-24 disk shelves in three chains

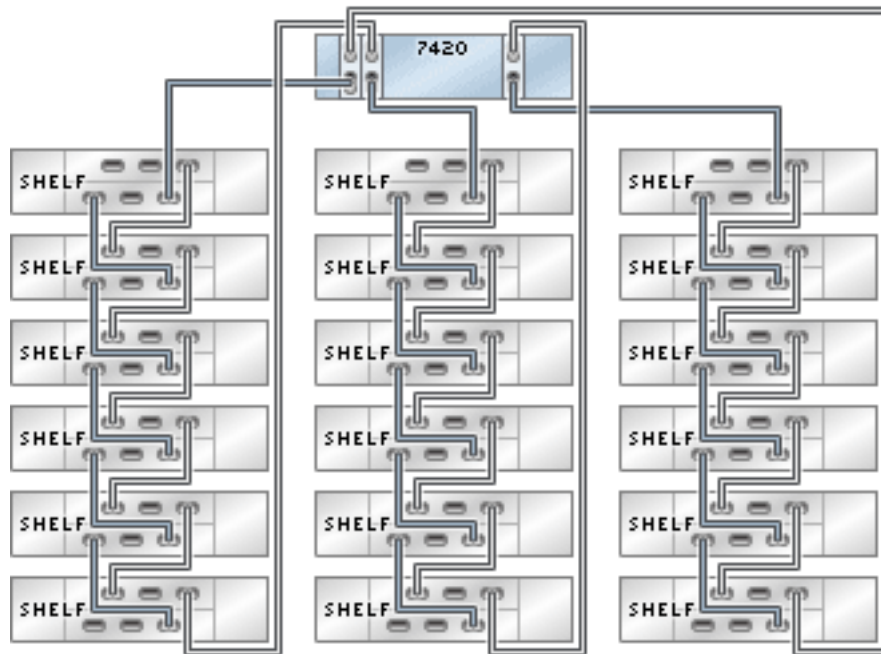
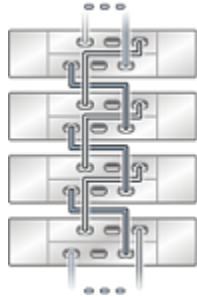


FIGURE 344 Multiple disk shelves in a single chain

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 345 Standalone 7420 controller with four HBAs connected to one DE2-24 disk shelf in a single chain

FIGURE 346 Standalone 7420 controller with four HBAs connected to two DE2-24 disk shelves in two chains

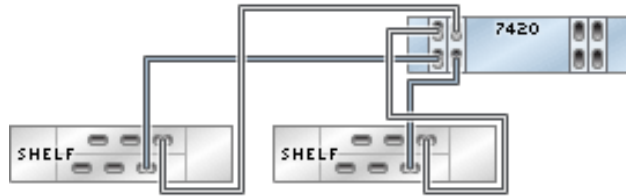


FIGURE 347 Standalone 7420 controller with four HBAs connected to three DE2-24 disk shelves in three chains

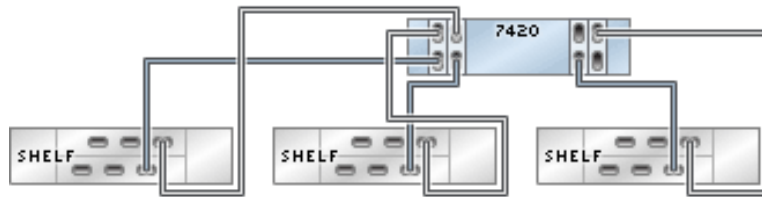


FIGURE 348 Standalone 7420 controller with four HBAs connected to four DE2-24 disk shelves in four chains

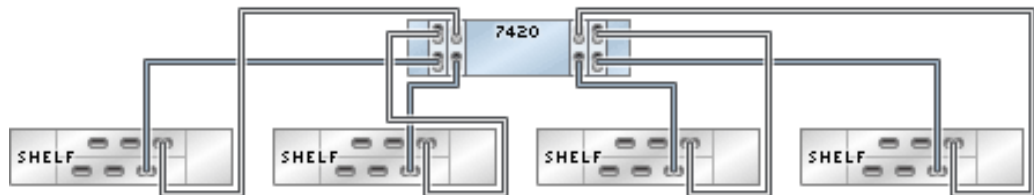


FIGURE 349 Standalone 7420 controller with four HBAs connected to eight DE2-24 disk shelves in four chains

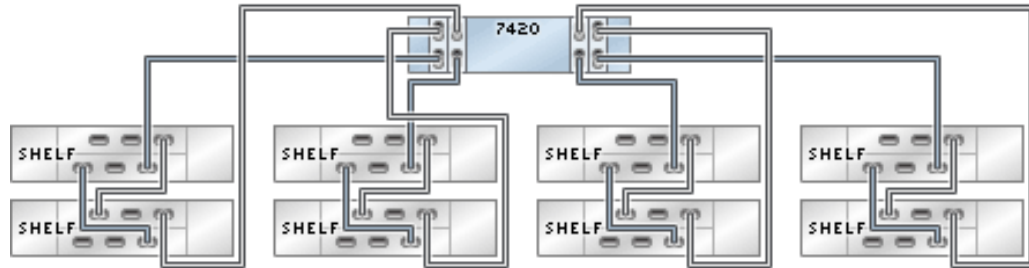


FIGURE 350 Standalone 7420 controller with four HBAs connected to 24 DE2-24 disk shelves in four chains

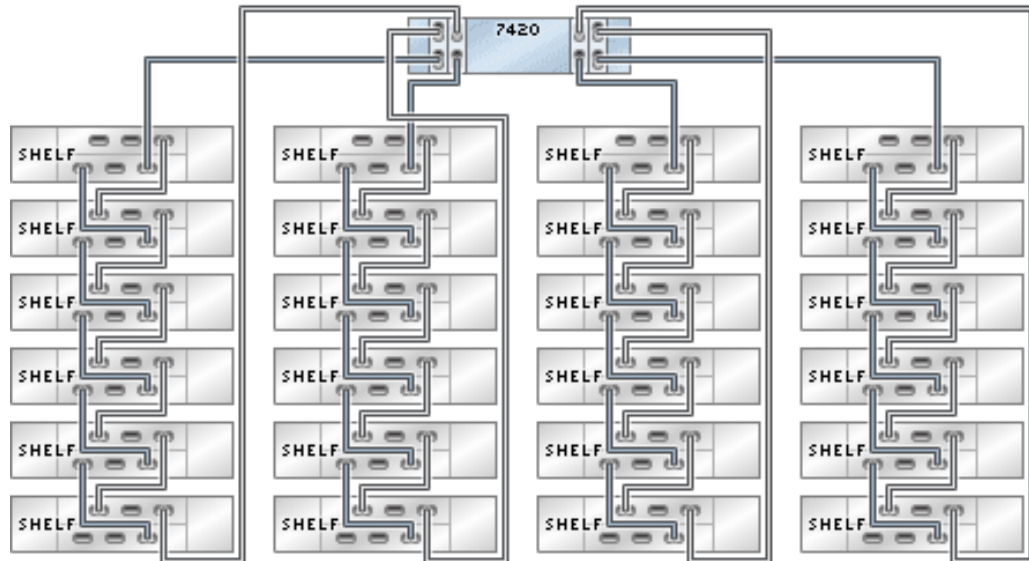
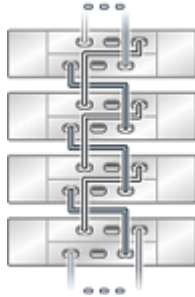


FIGURE 351 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 352 Standalone 7420 controller with five HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 353 Standalone 7420 controller with five HBAs connected to two DE2-24 disk shelves in two chains

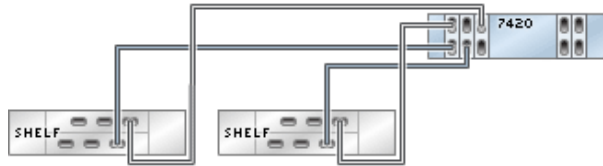


FIGURE 354 Standalone 7420 controller with five HBAs connected to three DE2-24 disk shelves in three chains

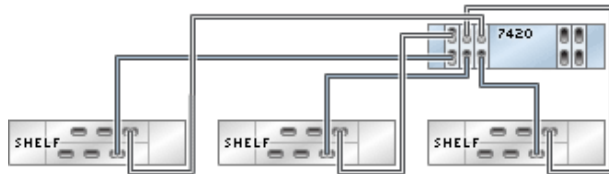


FIGURE 355 Standalone 7420 controller with five HBAs connected to four DE2-24 disk shelves in four chains

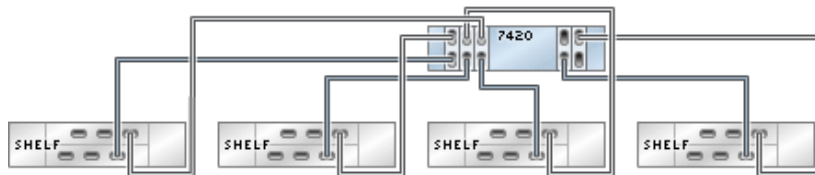


FIGURE 356 Standalone 7420 controller with five HBAs connected to five DE2-24 disk shelves in five chains

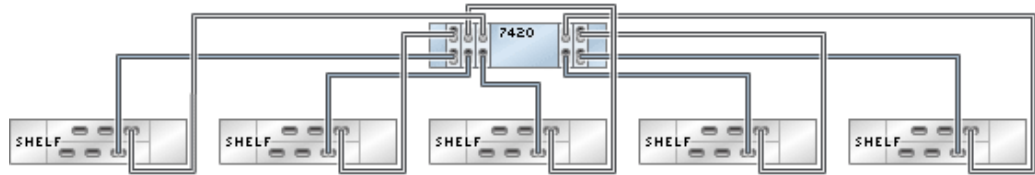


FIGURE 357 Standalone 7420 controller with five HBAs connected to ten DE2-24 disk shelves in five chains

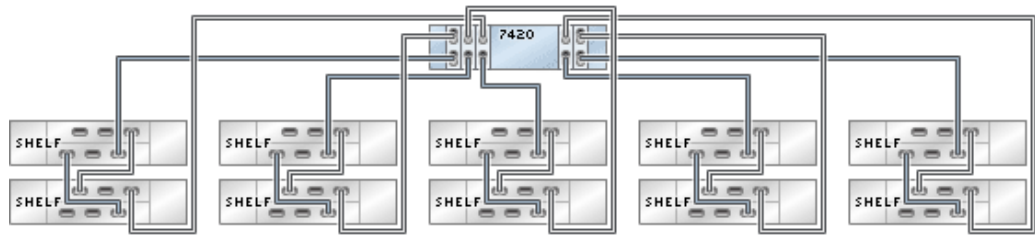


FIGURE 358 Standalone 7420 controller with five HBAs connected to 30 DE2-24 disk shelves in five chains

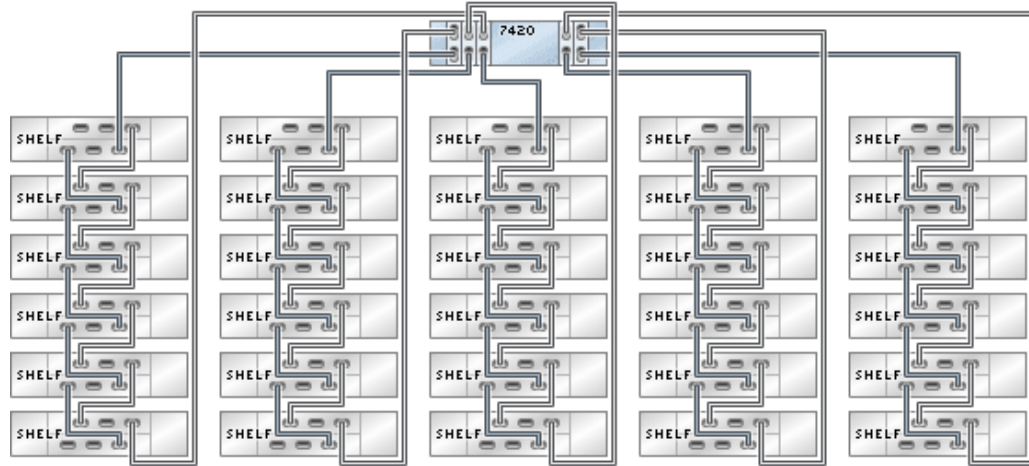
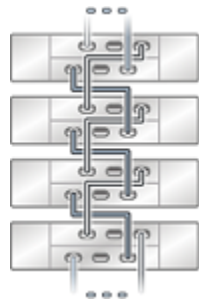


FIGURE 359 Multiple disk shelves in a single chain



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 360 Standalone 7420 controller with six HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 361 Standalone 7420 controller with six HBAs connected to two DE2-24 disk shelves in two chains

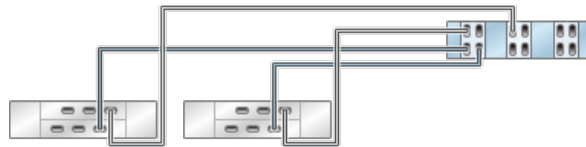


FIGURE 362 Standalone 7420 controller with six HBAs connected to three DE2-24 disk shelves in three chains

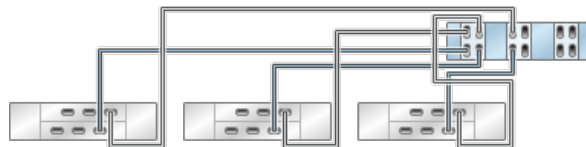


FIGURE 363 Standalone 7420 controller with six HBAs connected to four DE2-24 disk shelves in four chains

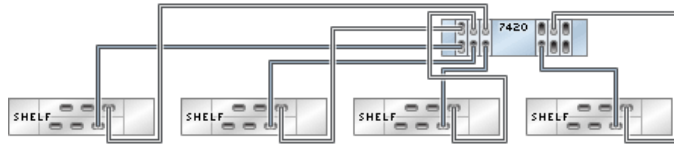


FIGURE 364 Standalone 7420 controller with six HBAs connected to five DE2-24 disk shelves in five chains

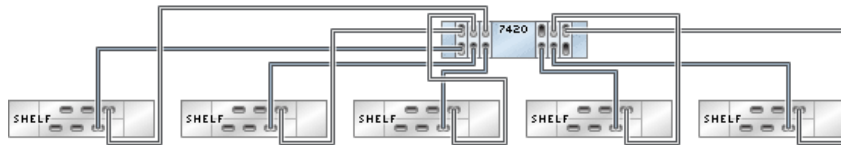


FIGURE 365 Standalone 7420 controller with six HBAs connected to six DE2-24 disk shelves in six chains

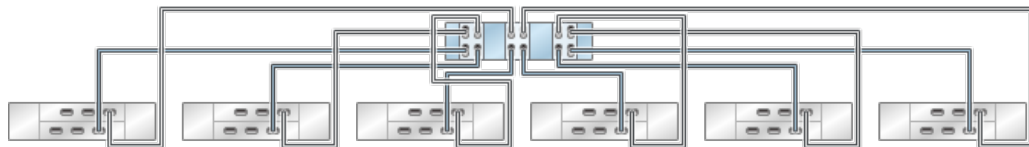


FIGURE 366 Standalone 7420 controller with six HBAs connected to 12 DE2-24 disk shelves in six chains

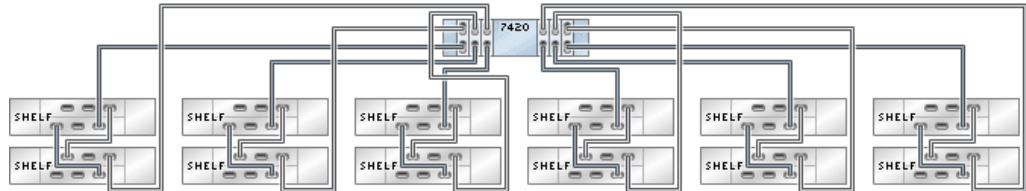


FIGURE 367 Standalone 7420 controller with six HBAs connected to 36 DE2-24 disk shelves in six chains

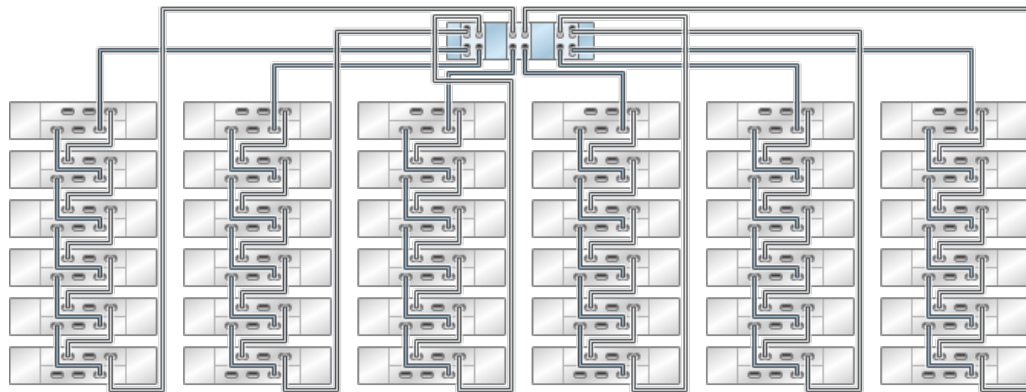
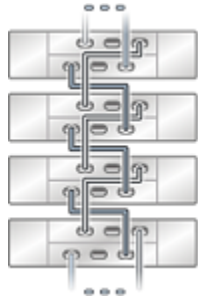


FIGURE 368 Multiple disk shelves in a single chain

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

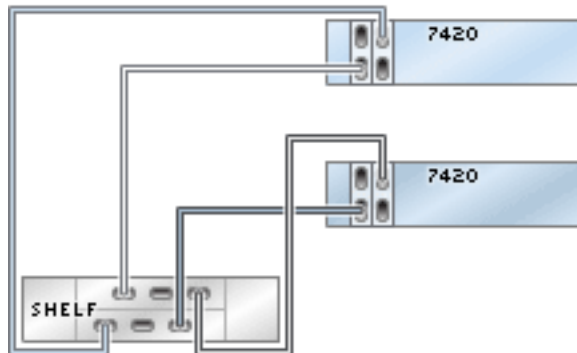
FIGURE 369 Clustered 7420 controllers with two HBAs connected to one DE2-24 disk shelf in a single chain

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

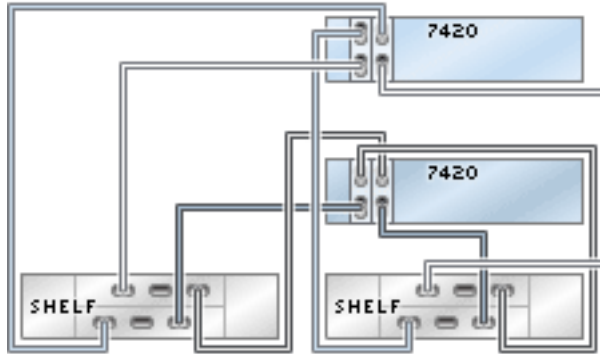


FIGURE 371 Clustered 7420 controllers with two HBAs connected to four DE2-24 disk shelves in two chains

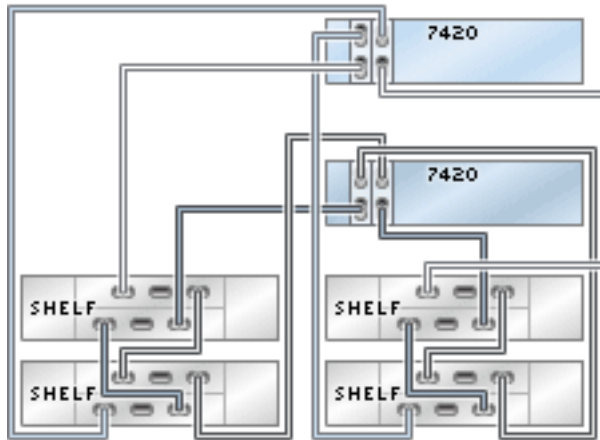


FIGURE 372 Clustered 7420 controllers with two HBAs connected to 12 DE2-24 disk shelves in two chains

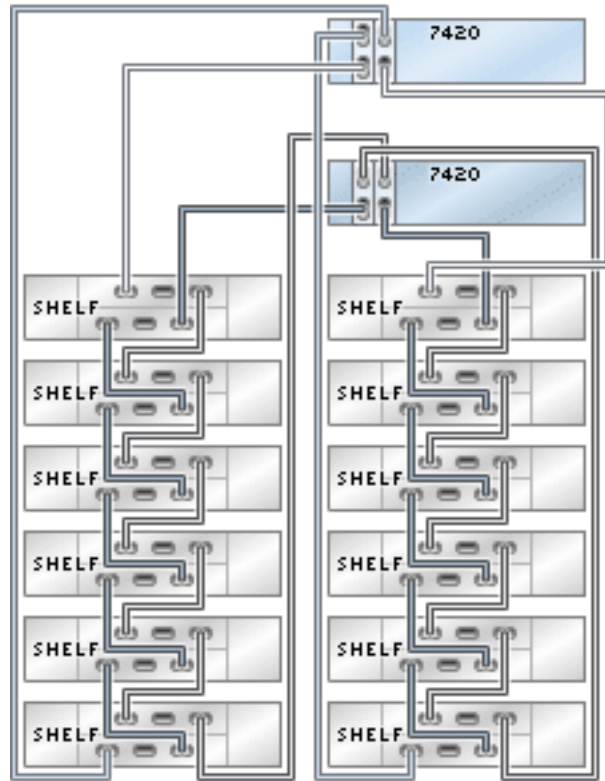
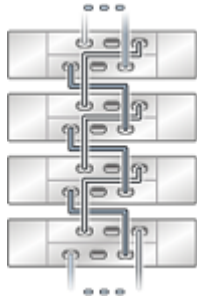


FIGURE 373 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 374 Clustered 7420 controllers with three HBAs connected to one DE2-24 disk shelf in a single chain

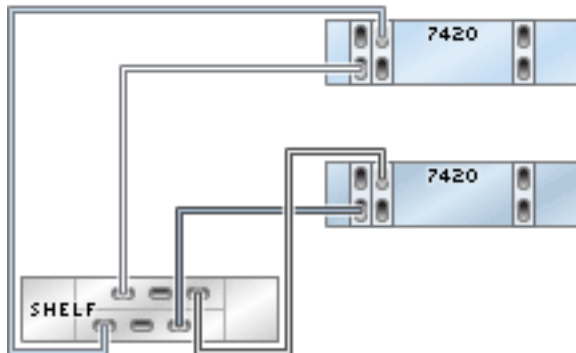


FIGURE 375 Clustered 7420 controllers with three HBAs connected to two DE2-24 disk shelves in two chains

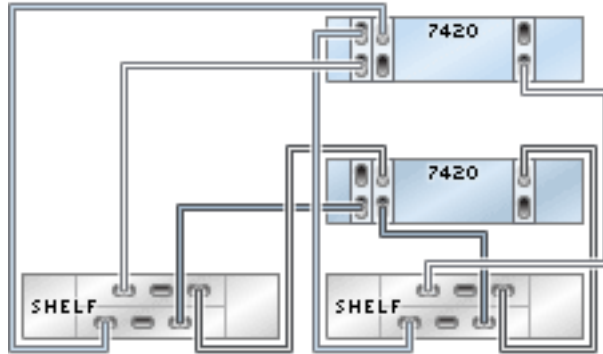


FIGURE 376 Clustered 7420 controllers with three HBAs connected to three DE2-24 disk shelves in three chains

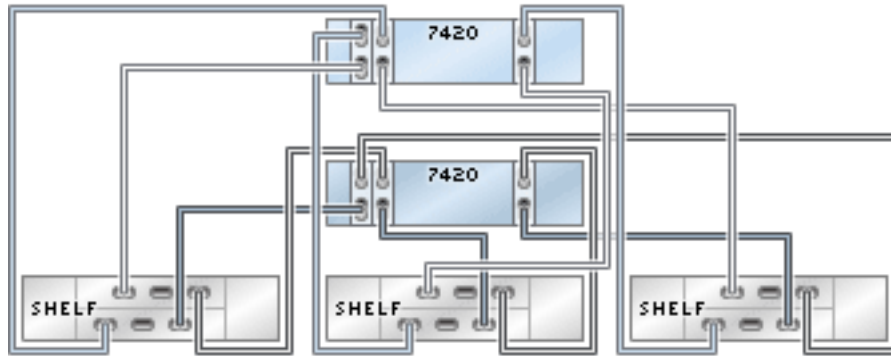


FIGURE 377 Clustered 7420 controllers with three HBAs connected to six DE2-24 disk shelves in three chains

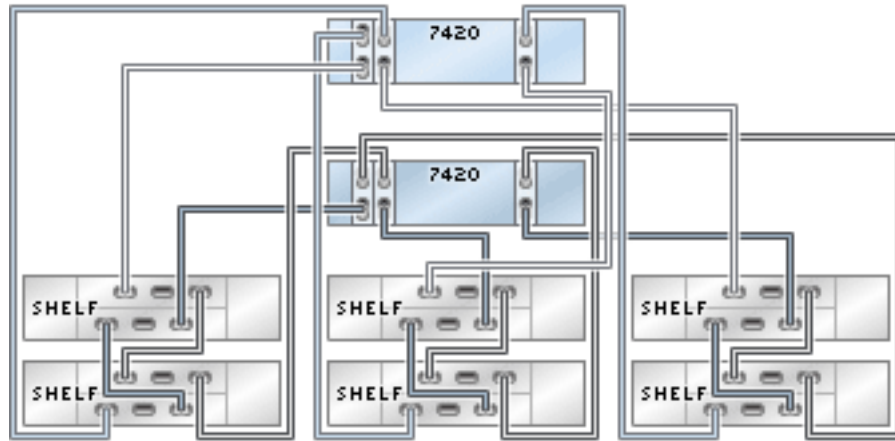


FIGURE 378 Clustered 7420 controllers with three HBAs connected to 18 DE2-24 disk shelves in three chains

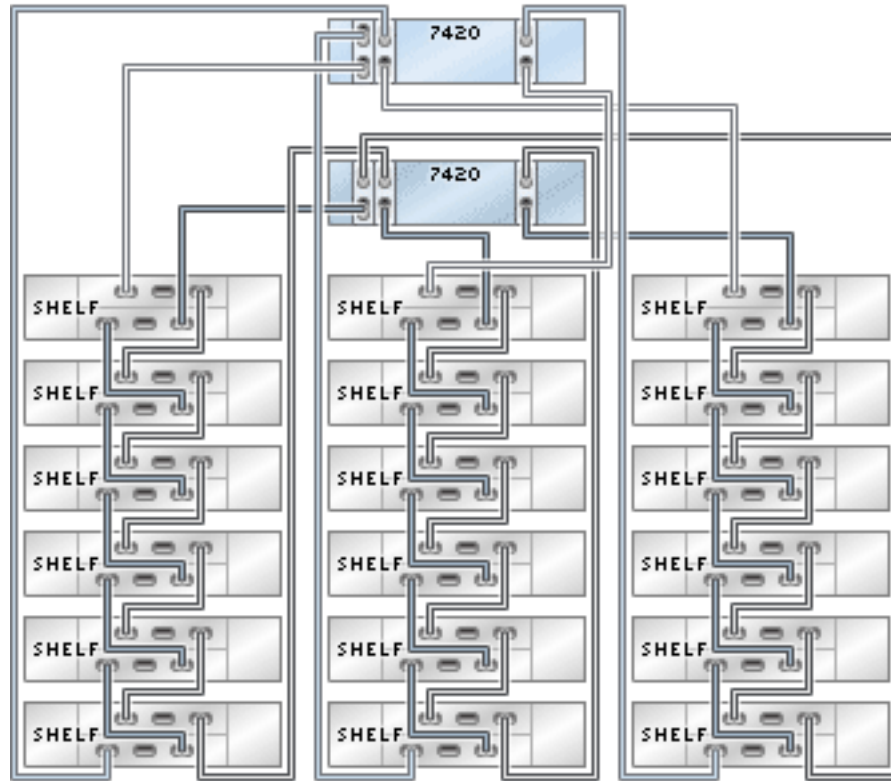
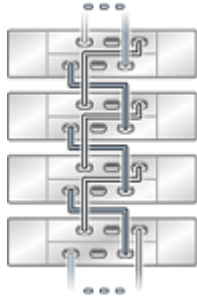


FIGURE 379 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 380 Clustered 7420 controllers with four HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 381 Clustered 7420 controllers with four HBAs connected to two DE2-24 disk shelves in two chains

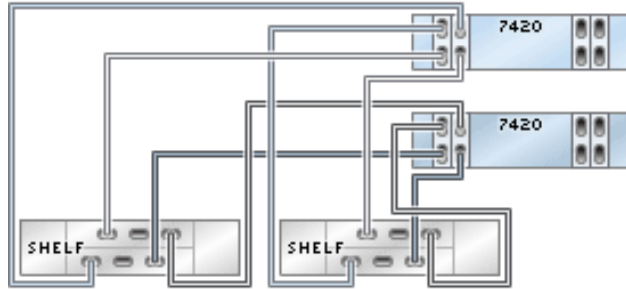


FIGURE 382 Clustered 7420 controllers with four HBAs connected to three DE2-24 disk shelves in three chains

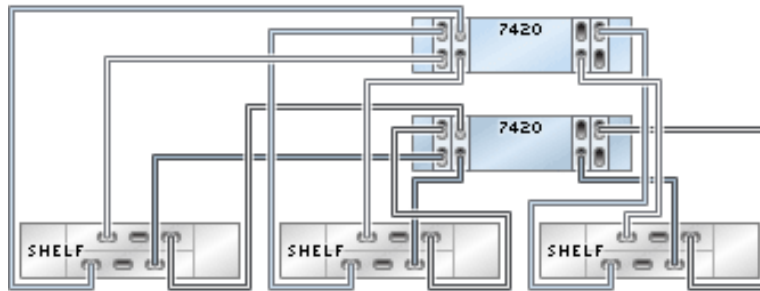


FIGURE 383 Clustered 7420 controllers with four HBAs connected to four DE2-24 disk shelves in four chains

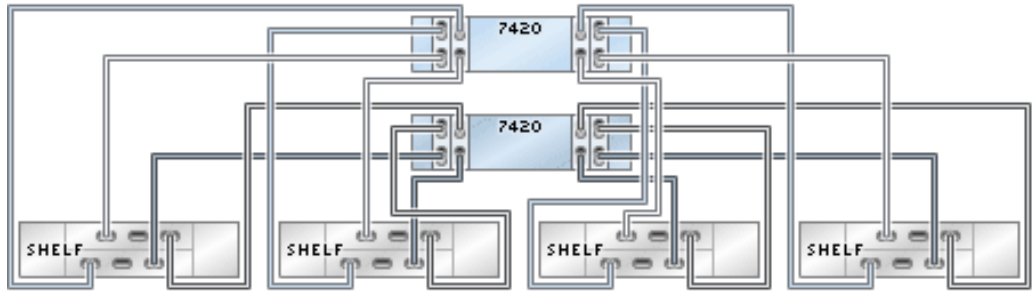


FIGURE 384 Clustered 7420 controllers with four HBAs connected to eight DE2-24 disk shelves in four chains

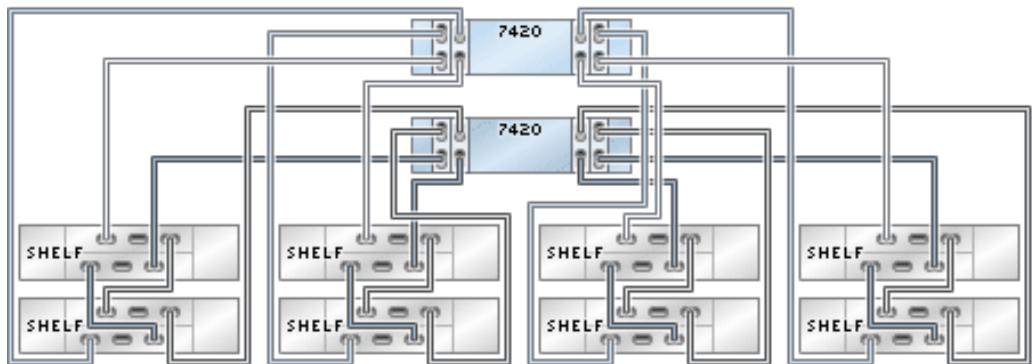


FIGURE 385 Clustered 7420 controllers with four HBAs connected to 24 DE2-24 disk shelves in four chains

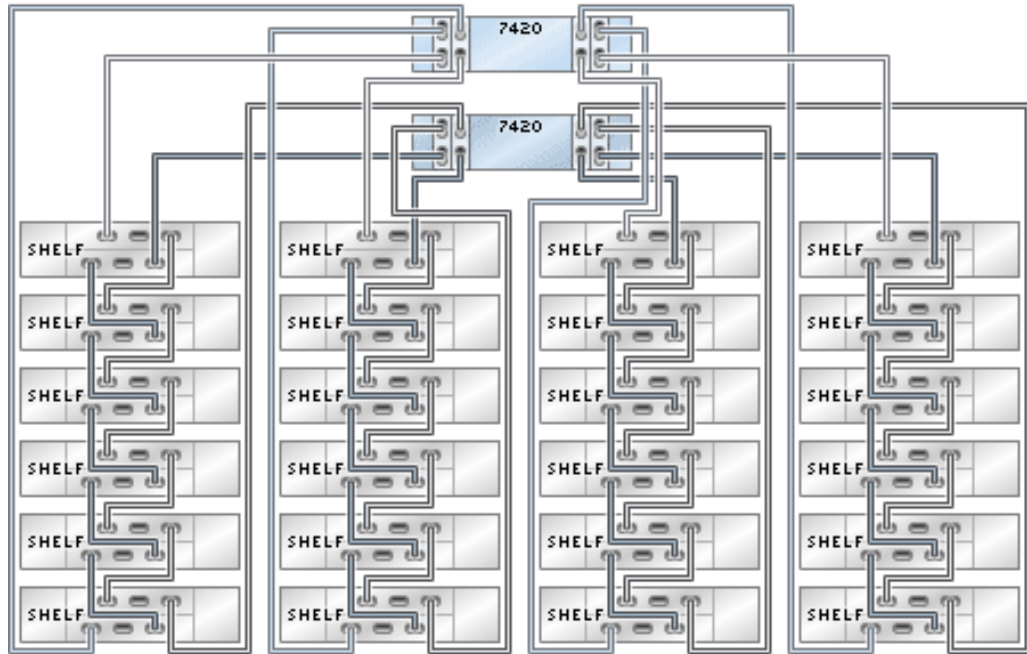
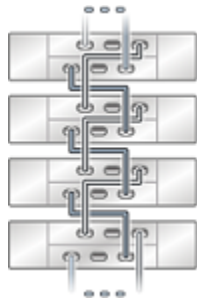


FIGURE 386 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 387 Clustered 7420 controllers with five HBAs connected to one DE2-24 disk shelf in a single chain



FIGURE 388 Clustered 7420 controllers with five HBAs connected to two DE2-24 disk shelves in two chains

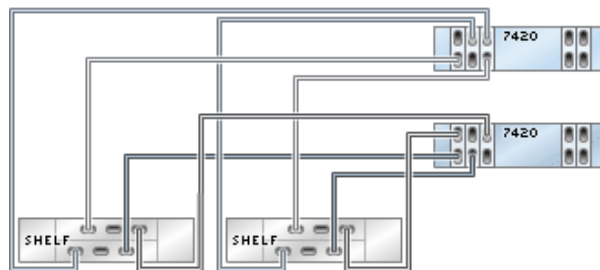


FIGURE 389 Clustered 7420 controllers with five HBAs connected to three DE2-24 disk shelves in three chains

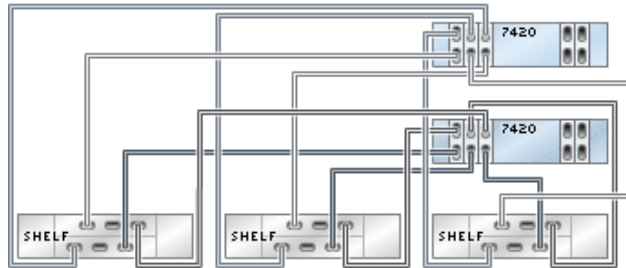


FIGURE 390 Clustered 7420 controllers with five HBAs connected to four DE2-24 disk shelves in four chains

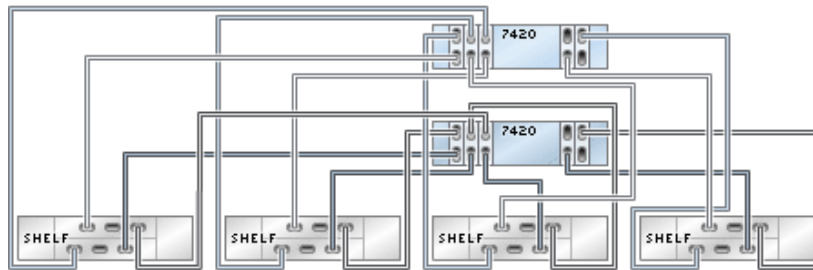


FIGURE 391 Clustered 7420 controllers with five HBAs connected to ten DE2-24 disk shelves in five chains

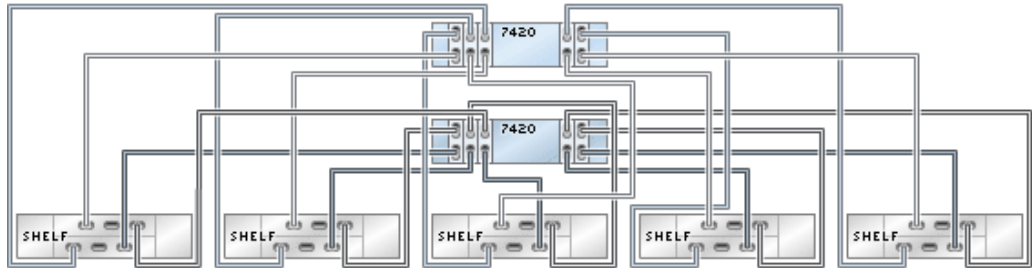


FIGURE 392 Clustered 7420 controllers with five HBAs connected to ten DE2-24 disk shelves in five chains

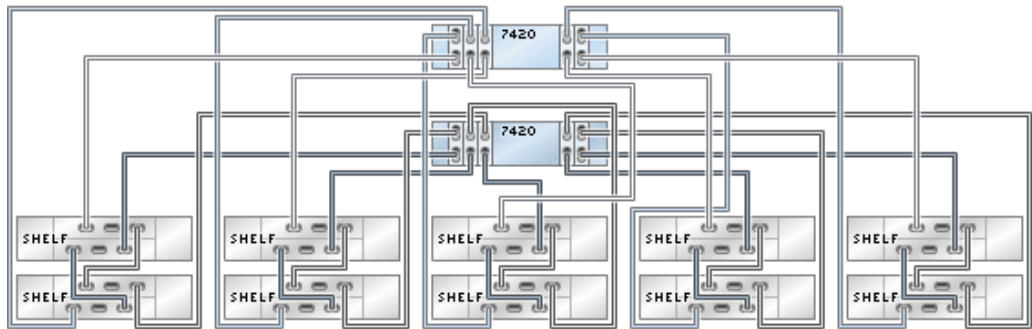


FIGURE 393 Clustered 7420 controllers with five HBAs connected to 30 DE2-24 disk shelves in five chains

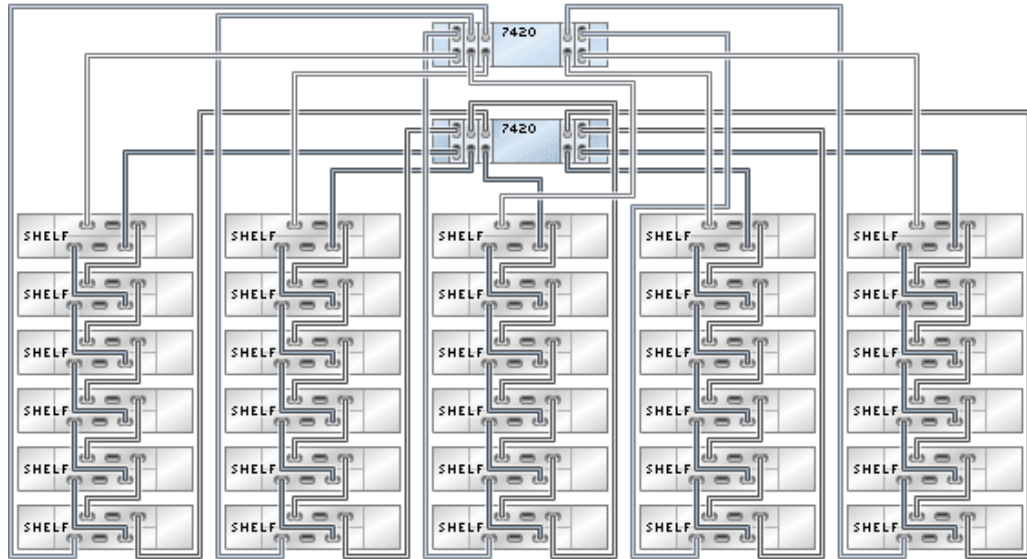
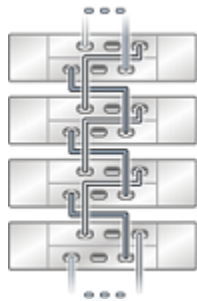


FIGURE 394 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 395 Clustered 7420 controllers with six HBAs connected to one DE2-24 disk shelf in a single chain

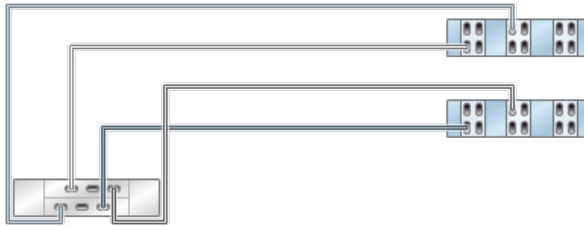


FIGURE 396 Clustered 7420 controllers with six HBAs connected to two DE2-24 disk shelves in two chains

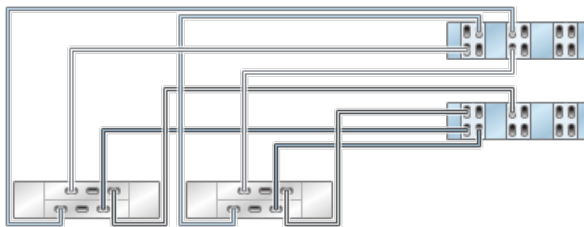


FIGURE 397 Clustered 7420 controllers with six HBAs connected to three DE2-24 disk shelves in three chains

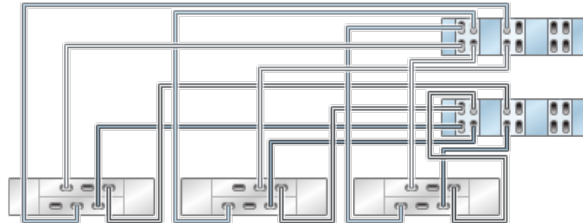


FIGURE 398 Clustered 7420 controllers with six HBAs connected to four DE2-24 disk shelves in four chains

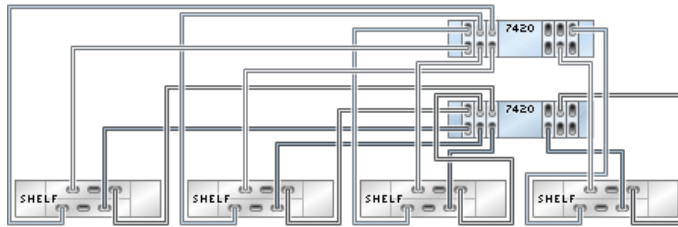


FIGURE 399 Clustered 7420 controllers with six HBAs connected to five DE2-24 disk shelves in five chains

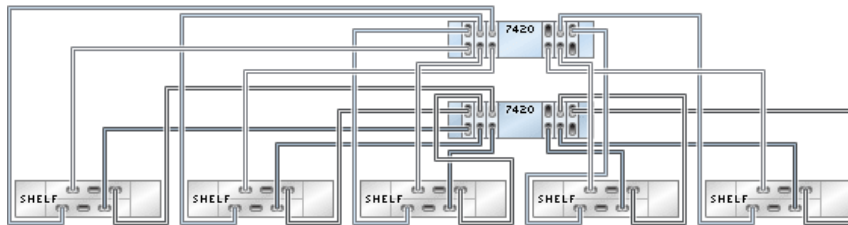


FIGURE 400 Clustered 7420 controllers with six HBAs connected to six DE2-24 disk shelves in six chains

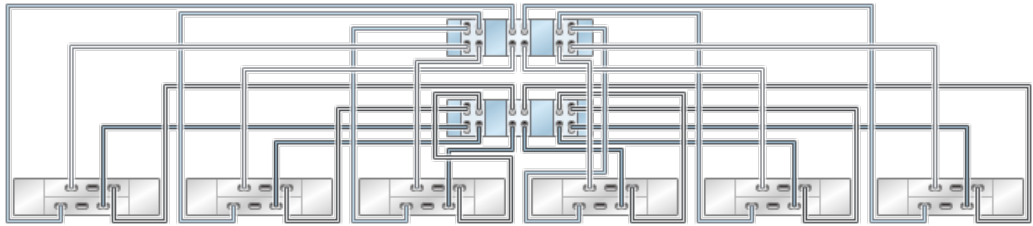


FIGURE 401 Clustered 7420 controllers with six HBAs connected to 12 DE2-24 disk shelves in six chains

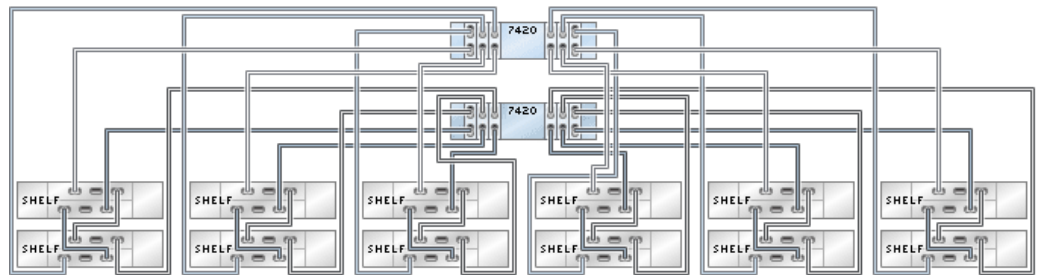


FIGURE 402 Clustered 7420 controllers with six HBAs connected to 36 DE2-24 disk shelves in six chains

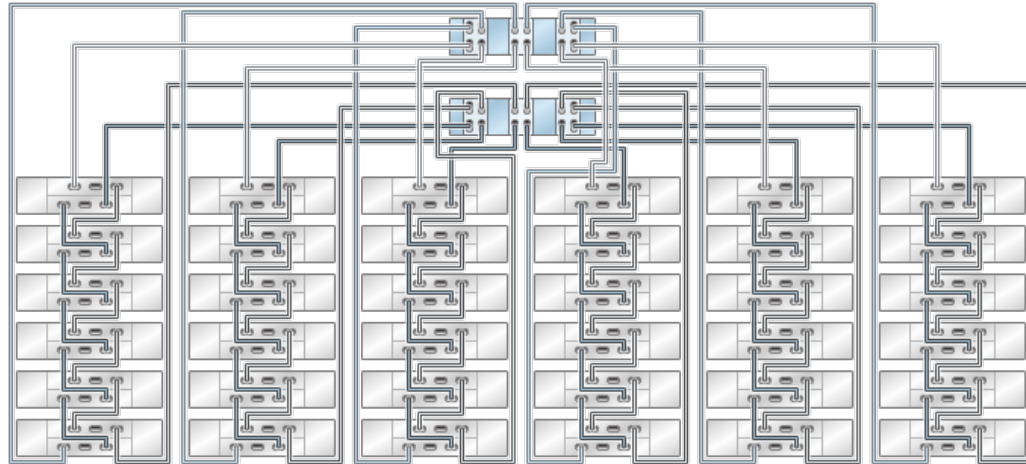
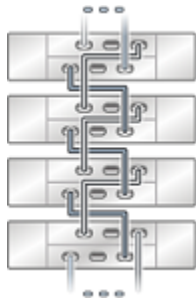


FIGURE 403 Multiple disk shelves in a single chain



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 272](#)
- [“7320 Clustered to DE2-24 Disk Shelves” on page 274](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 404 Standalone 7320 controller with one HBA connected to one DE2-24 disk shelf in a single chain

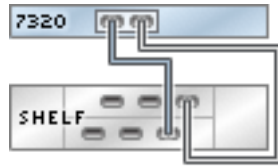


FIGURE 405 Standalone 7320 controller with one HBA connected to two DE2-24 disk shelves in a single chain

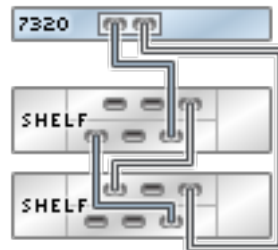


FIGURE 406 Standalone 7320 controller with one HBA connected to six DE2-24 disk shelves in a single chain

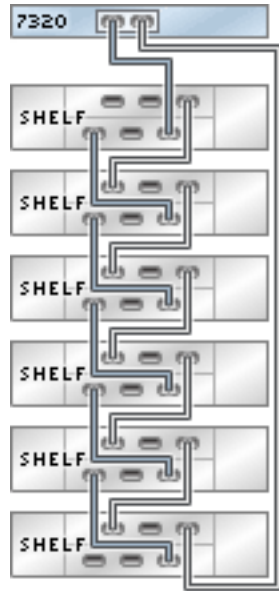
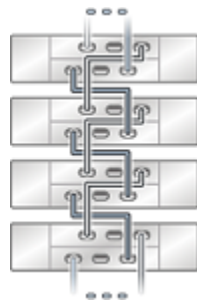


FIGURE 407 Multiple disk shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 408 Clustered 7320 controllers with one HBA connected to one DE2-24 disk shelf in a single chain

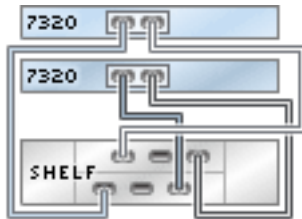


FIGURE 409 Clustered 7320 controllers with one HBA connected to two DE2-24 disk shelves in a single chain

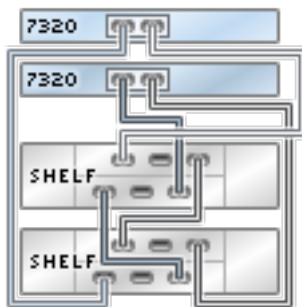


FIGURE 410 Clustered 7320 controllers with one HBA connected to six DE2-24 disk shelves in a single chain

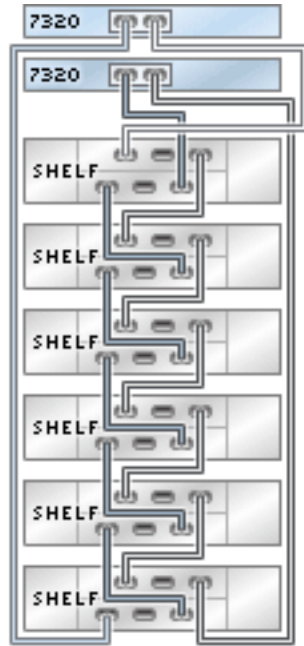
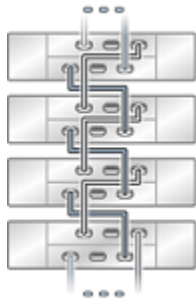


FIGURE 411 Multiple disk shelves in a single chain



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 11](#).

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

FIGURE 412 Standalone 7120 controller with one HBA connected to one DE2-24 disk shelf in a single chain

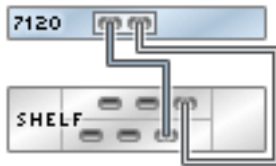
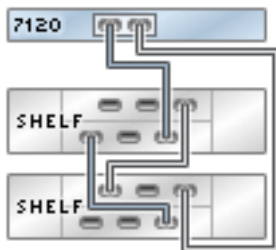


FIGURE 413 Standalone 7120 controller with one HBA connected to two DE2-24 disk shelves in a single chain



Cabling Sun Disk Shelves

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

To review these guidelines, see the following topics:

- [“Cabling Sun Disk Shelves to 7420 Controllers” on page 277](#)
- [“Cabling Sun Disk Shelves to 7320 Controllers” on page 308](#)
- [“Cabling Sun Disk Shelves to 7120 Controllers” on page 312](#)

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 \(2 HBAs\)” on page 278](#)
- [“7420 Standalone to Sun Disk Shelves \(3 HBAs\)” on page 280](#)
- [“7420 Standalone to Sun Disk Shelves \(4 HBAs\)” on page 282](#)
- [“7420 Standalone to Sun Disk Shelves \(5 HBAs\)” on page 285](#)
- [“7420 Standalone to Sun Disk Shelves \(6 HBAs\)” on page 288](#)
- [“7420 Clustered to Sun Disk Shelves \(2 HBAs\)” on page 291](#)
- [“7420 Clustered to Sun Disk Shelves \(3 HBAs\)” on page 294](#)
- [“7420 Clustered to Sun Disk Shelves \(4 HBAs\)” on page 297](#)
- [“7420 Clustered to Sun Disk Shelves \(5 HBAs\)” on page 301](#)
- [“7420 Clustered to Sun Disk Shelves \(6 HBAs\)” on page 305](#)

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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 414 Standalone 7420 controller with two HBAs connected to one Sun Disk Shelf in a single chain

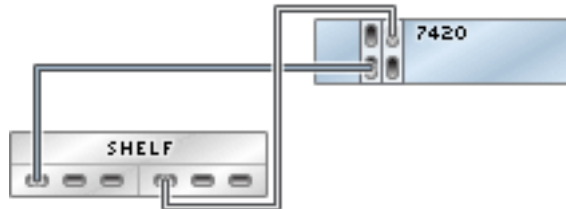


FIGURE 415 Standalone 7420 controller with two HBAs connected to two Sun Disk Shelves in two chains

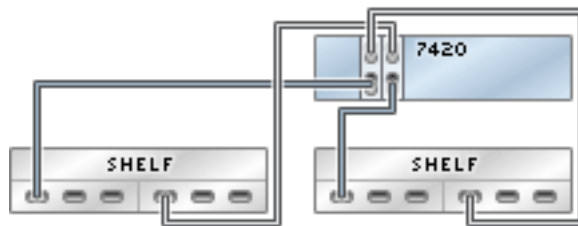


FIGURE 416 Standalone 7420 controller with two HBAs connected to four Sun Disk Shelves in two chains

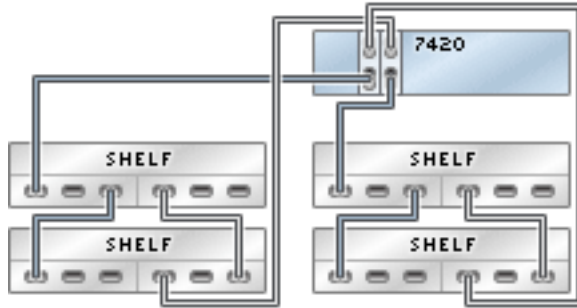
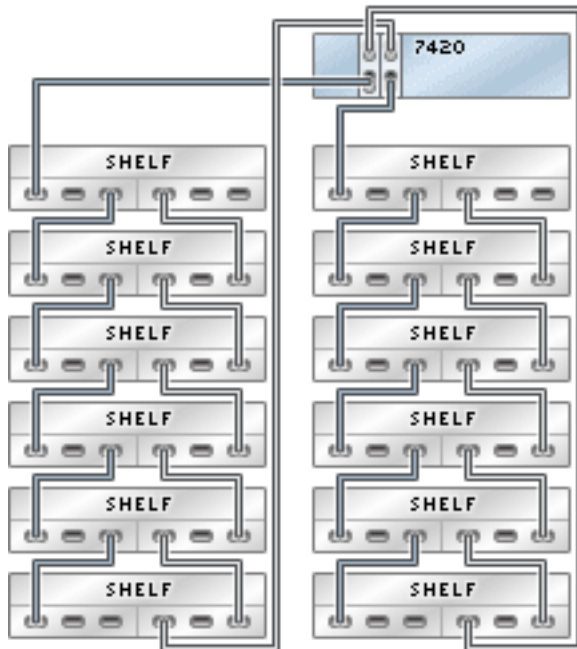


FIGURE 417 Standalone 7420 controller with two HBAs connected to 12 Sun Disk Shelves in two chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 418 Standalone 7420 controller with three HBAs connected to one Sun Disk Shelf in a single chain



FIGURE 419 Standalone 7420 controller with three HBAs connected to two Sun Disk Shelves in two chains



FIGURE 420 Standalone 7420 controller with three HBAs connected to three Sun Disk Shelves in three chains

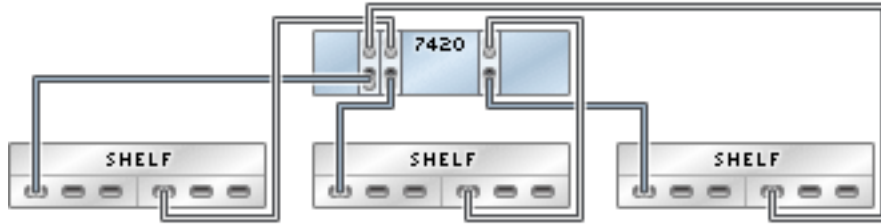


FIGURE 421 Standalone 7420 controller with three HBAs connected to six Sun Disk Shelves in three chains

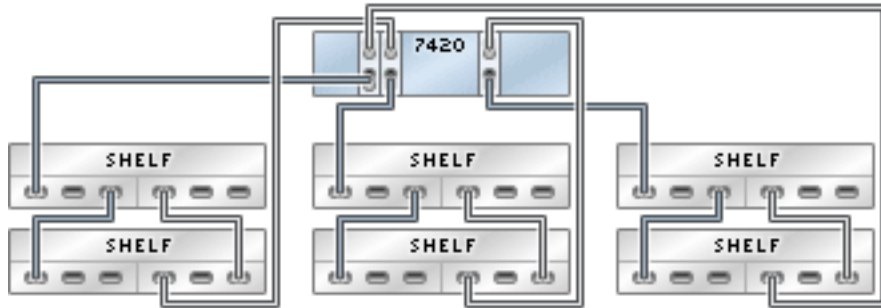
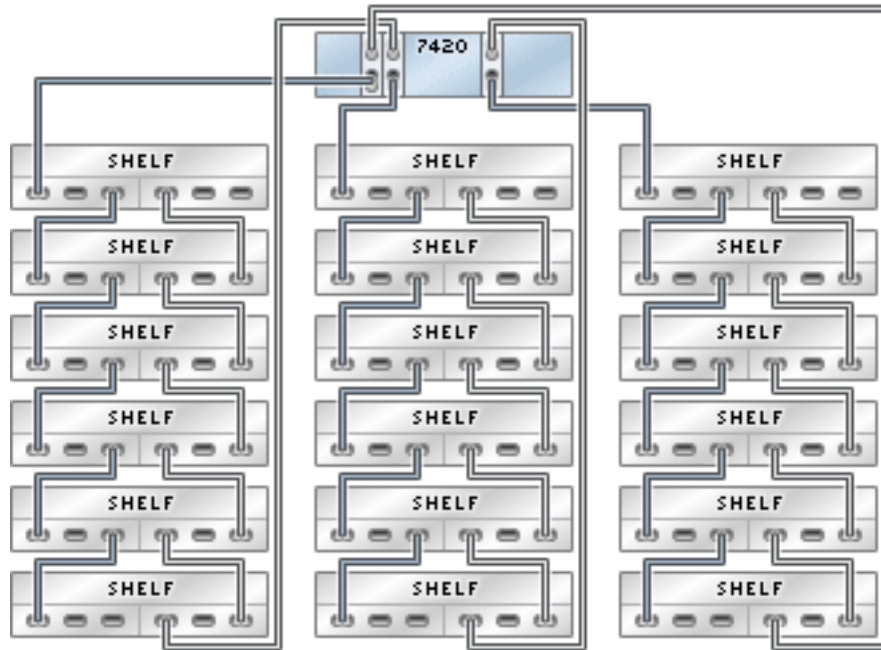


FIGURE 422 Standalone 7420 controller with three HBAs connected to 18 Sun Disk Shelves in three chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 423 Standalone 7420 controller with four HBAs connected to one Sun Disk Shelf in a single chain



FIGURE 424 Standalone 7420 controller with four HBAs connected to two Sun Disk Shelves in two chains

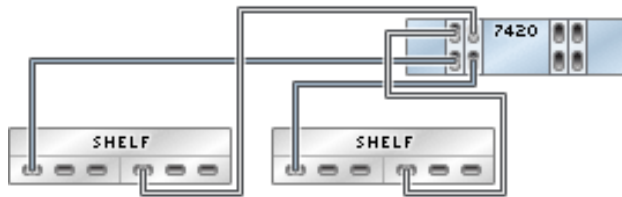


FIGURE 425 Standalone 7420 controller with four HBAs connected to three Sun Disk Shelves in three chains

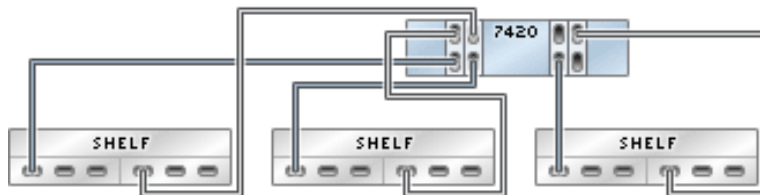


FIGURE 426 Standalone 7420 controller with four HBAs connected to four Sun Disk Shelves in four chains

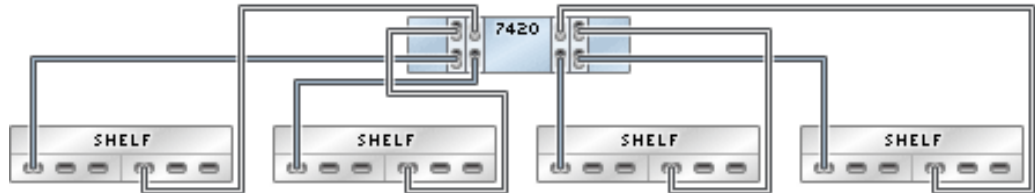


FIGURE 427 Standalone 7420 controller with four HBAs connected to eight Sun Disk Shelves in four chains

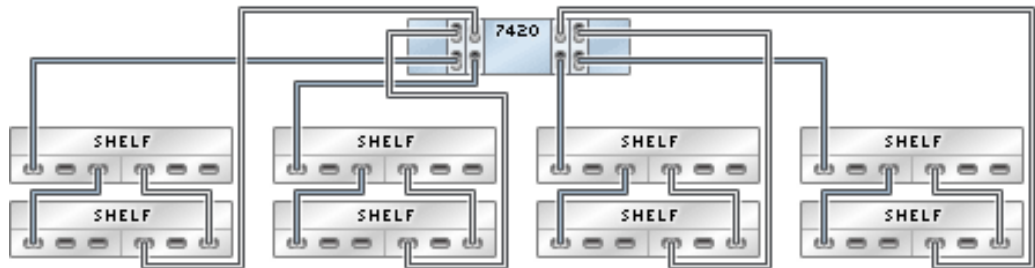
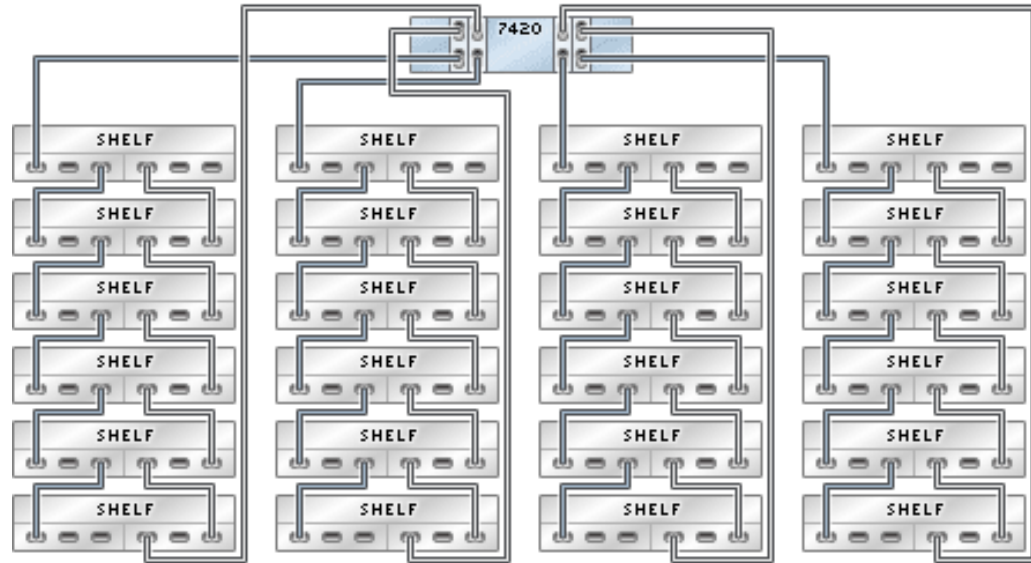


FIGURE 428 Standalone 7420 controller with four HBAs connected to 24 Sun Disk Shelves in four chains



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 11.

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 429 Standalone 7420 controller with five HBAs connected to one Sun Disk Shelf in a single chain



FIGURE 430 Standalone 7420 controller with five HBAs connected to two Sun Disk Shelves in two chains

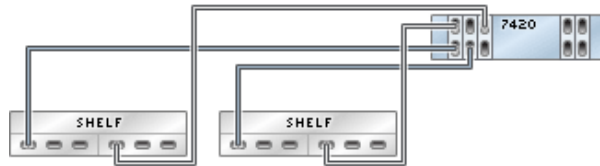


FIGURE 431 Standalone 7420 controller with five HBAs connected to three Sun Disk Shelves in three chains

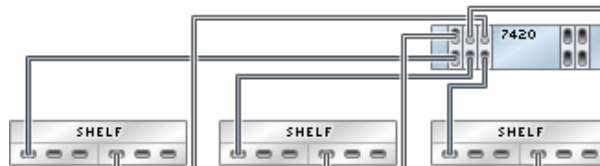


FIGURE 432 Standalone 7420 controller with five HBAs connected to four Sun Disk Shelves in four chains

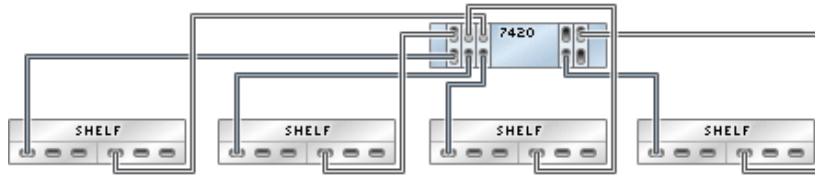


FIGURE 433 Standalone 7420 controller with five HBAs connected to five Sun Disk Shelves in five chains

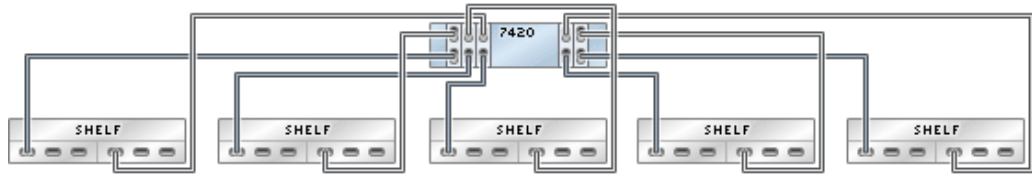


FIGURE 434 Standalone 7420 controller with five HBAs connected to ten Sun Disk Shelves in five chains

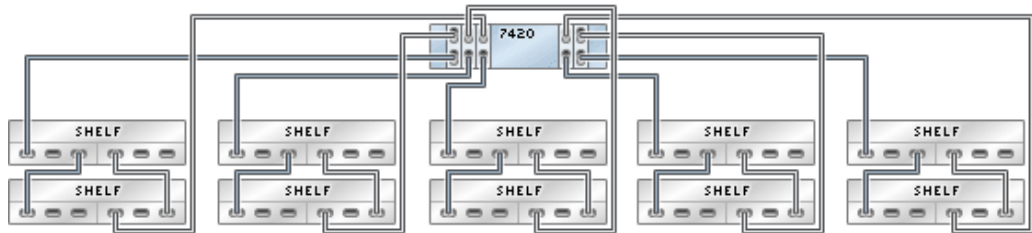
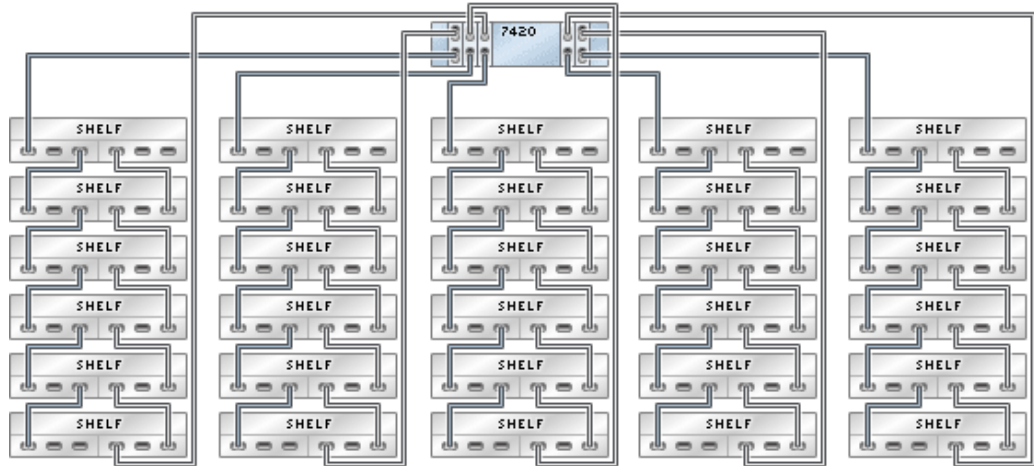


FIGURE 435 Standalone 7420 controller with five HBAs connected to 30 Sun Disk Shelves in five chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 436 Standalone 7420 controller with six HBAs connected to one Sun Disk Shelf in a single chain



FIGURE 437 Standalone 7420 controller with six HBAs connected to two Sun Disk Shelves in two chains

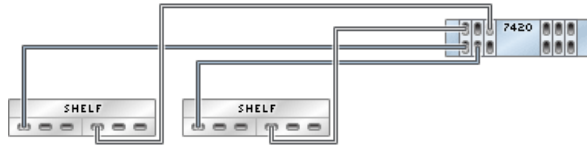


FIGURE 438 Standalone 7420 controller with six HBAs connected to three Sun Disk Shelves in three chains

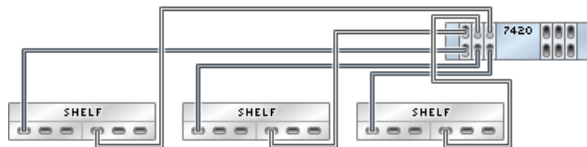


FIGURE 439 Standalone 7420 controller with six HBAs connected to four Sun Disk Shelves in four chains

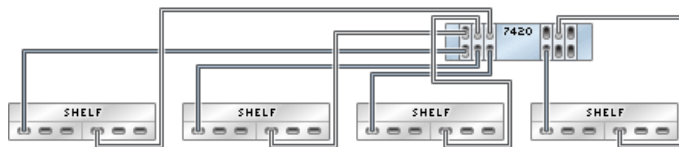


FIGURE 440 Standalone 7420 controller with six HBAs connected to five Sun Disk Shelves in five chains

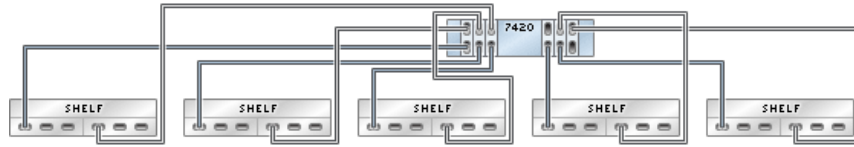


FIGURE 441 Standalone 7420 controller with six HBAs connected to six Sun Disk Shelves in six chains

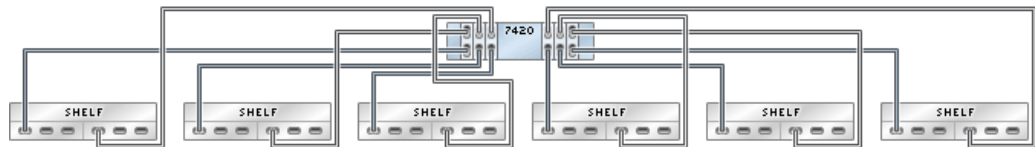


FIGURE 442 Standalone 7420 controller with six HBAs connected to 12 Sun Disk Shelves in six chains

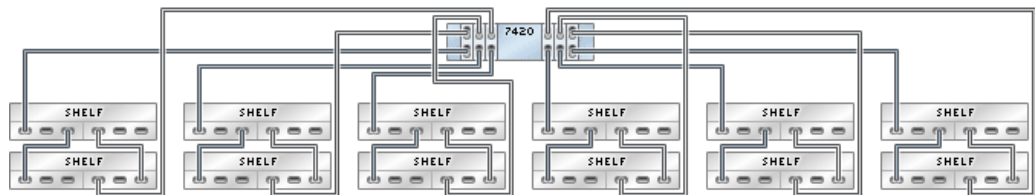
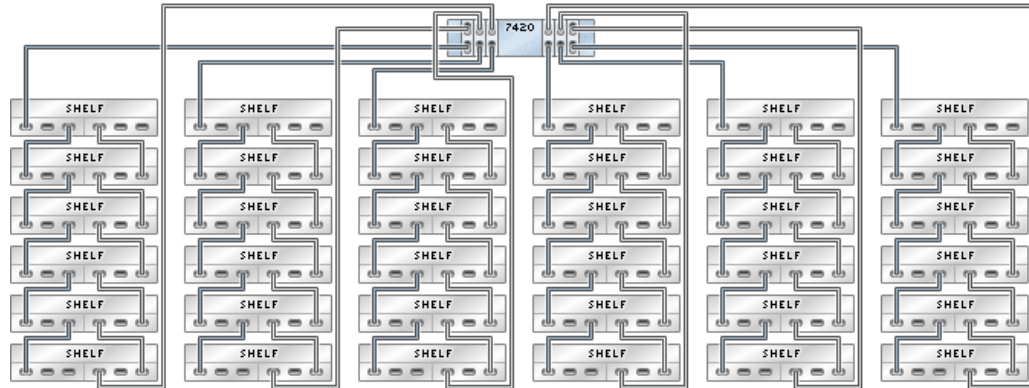


FIGURE 443 Standalone 7420 controller with six HBAs connected to 36 Sun Disk Shelves in six chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 444 Clustered 7420 controllers with two HBAs connected to one Sun Disk Shelf in a single chain

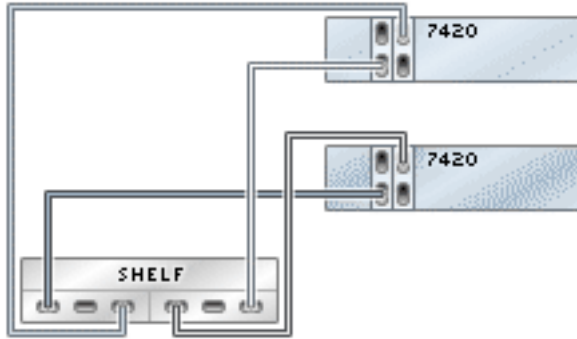


FIGURE 445 Clustered 7420 controllers with two HBAs connected to two Sun Disk Shelves in two chains

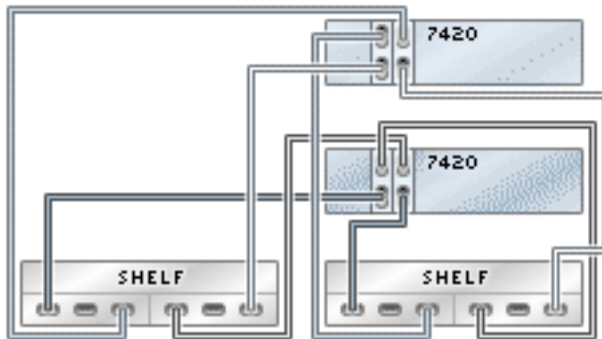


FIGURE 446 Clustered 7420 controllers with two HBAs connected to four Sun Disk Shelves in two chains

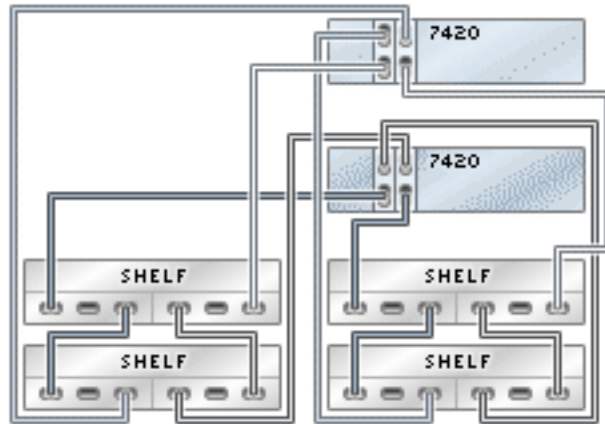
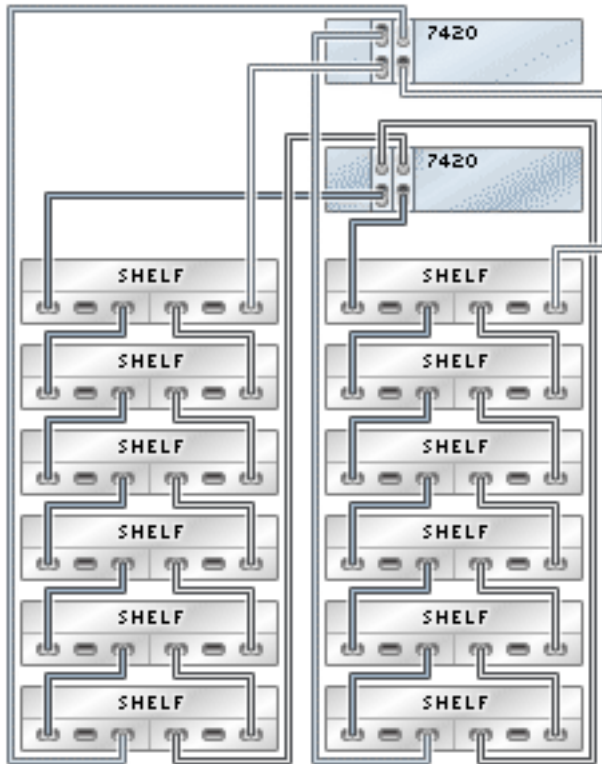


FIGURE 447 Clustered 7420 controllers with two HBAs connected to 12 Sun Disk Shelves in two chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 448 Clustered 7420 controllers with three HBAs connected to one Sun Disk Shelf in a single chain

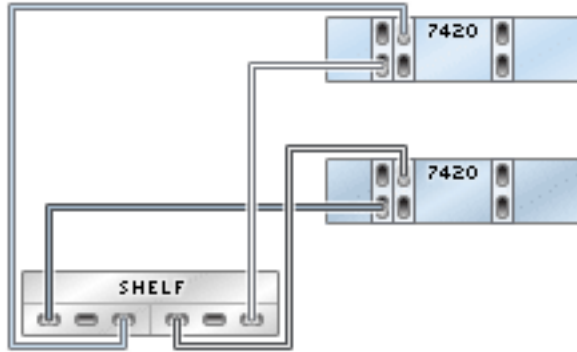


FIGURE 449 Clustered 7420 controllers with three HBAs connected to two Sun Disk Shelves in two chains

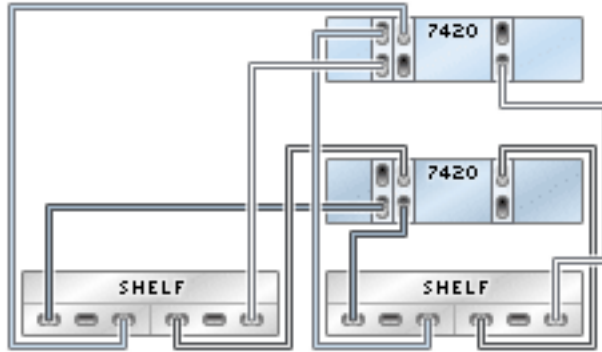


FIGURE 450 Clustered 7420 controllers with three HBAs connected to three Sun Disk Shelves in three chains

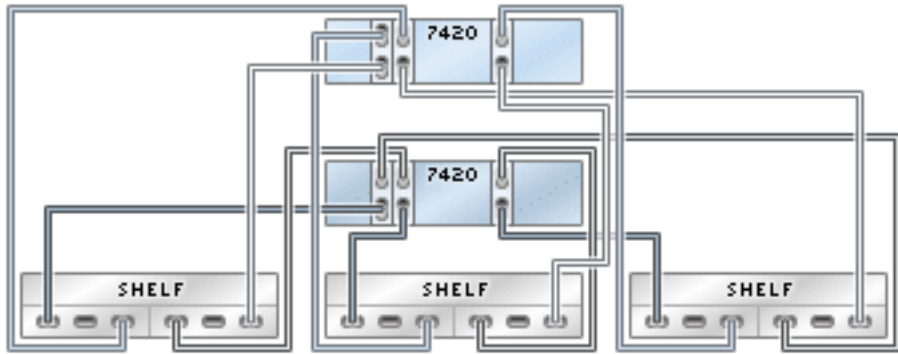


FIGURE 451 Clustered 7420 controllers with three HBAs connected to six Sun Disk Shelves in three chains

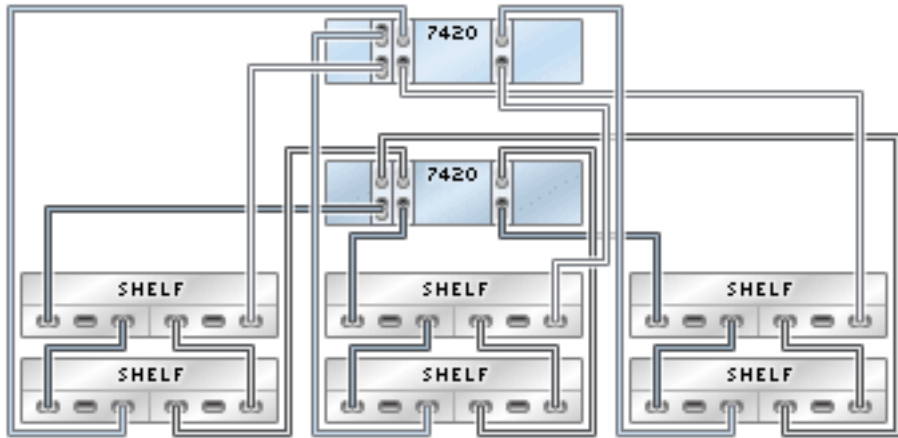
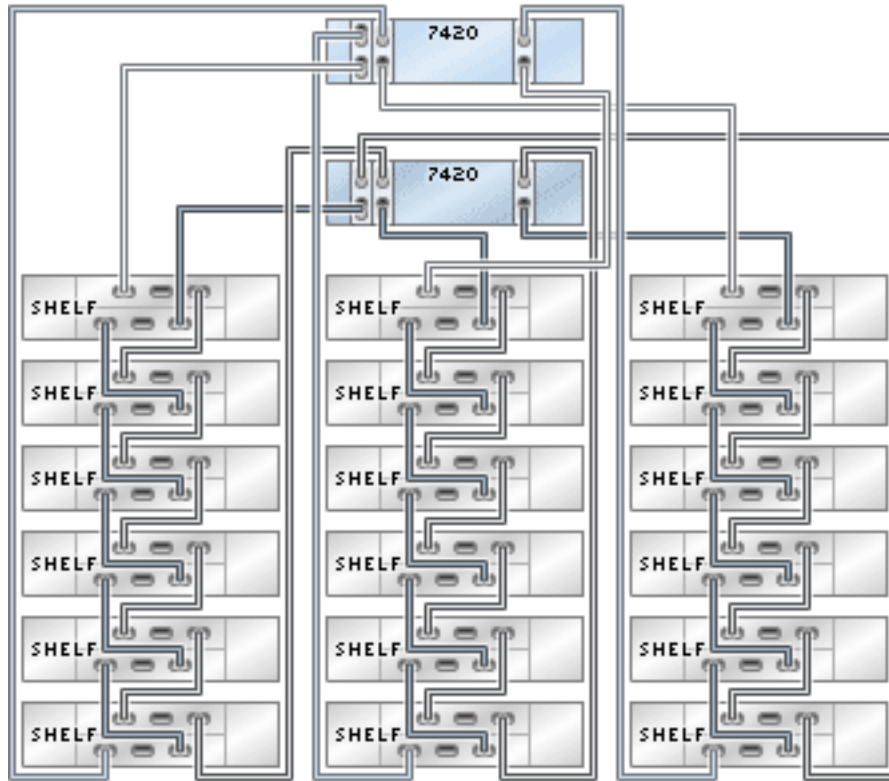


FIGURE 452 Clustered 7420 controllers with three HBAs connected to 18 Sun Disk Shelves in three chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 453 Clustered 7420 controllers with four HBAs connected to one Sun Disk Shelf in a single chain

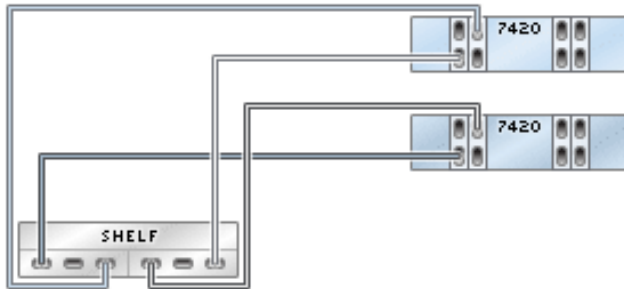


FIGURE 454 Clustered 7420 controllers with four HBAs connected to two Sun Disk Shelves in two chains

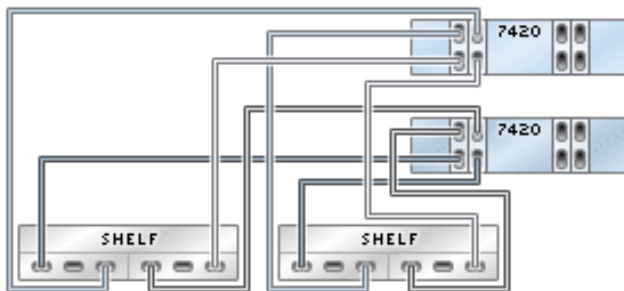


FIGURE 455 Clustered 7420 controllers with four HBAs connected to three Sun Disk Shelves in three chains

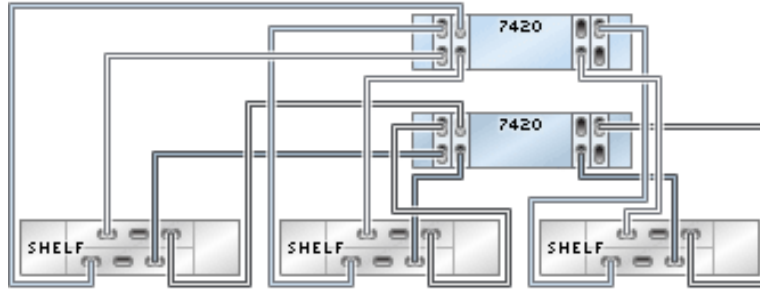


FIGURE 456 Clustered 7420 controllers with four HBAs connected to four Sun Disk Shelves in four chains

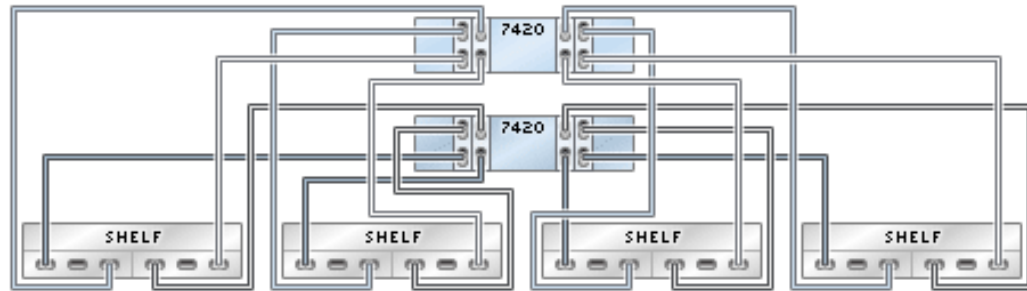


FIGURE 457 Clustered 7420 controllers with four HBAs connected to eight Sun Disk Shelves in four chains

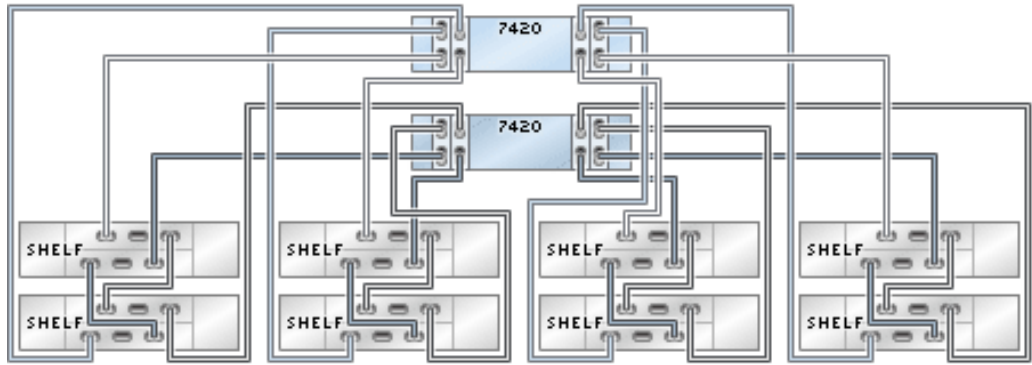
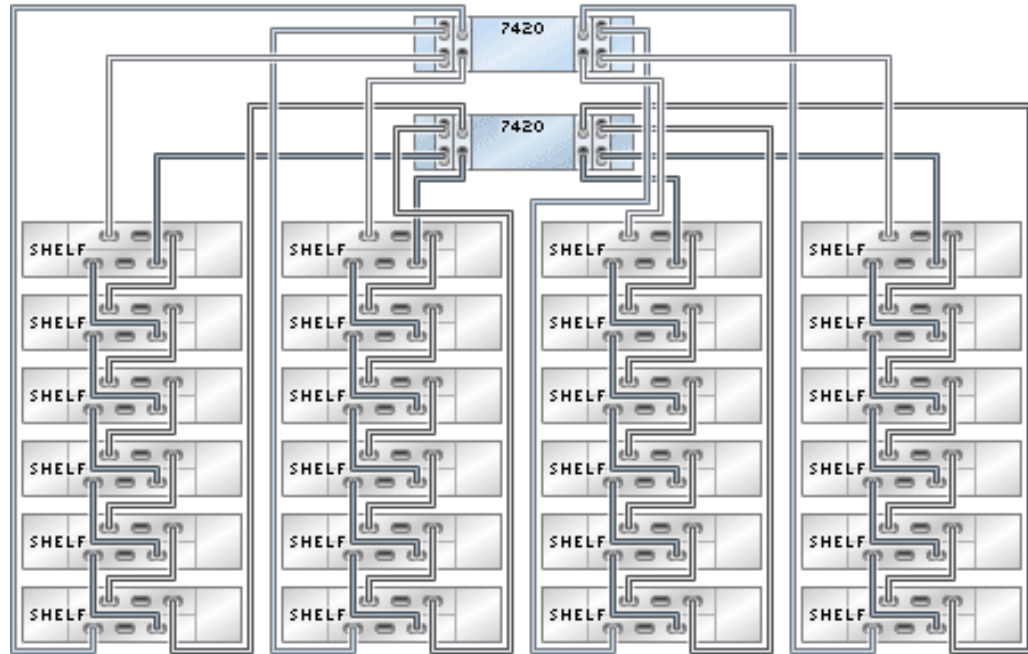


FIGURE 458 Clustered 7420 controllers with four HBAs connected to 24 Sun Disk Shelves in four chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 459 Clustered 7420 controllers with five HBAs connected to one Sun Disk Shelf in a single chain

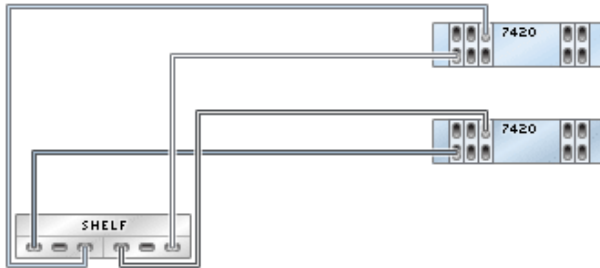


FIGURE 460 Clustered 7420 controllers with five HBAs connected to two Sun Disk Shelves in two chains

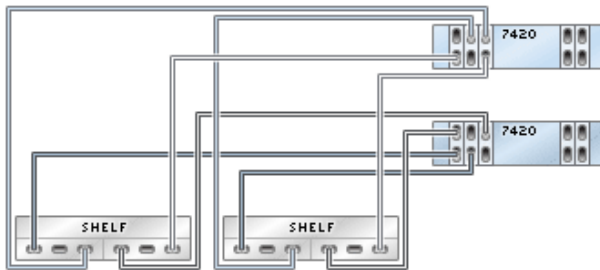


FIGURE 461 Clustered 7420 controllers with five HBAs connected to three Sun Disk Shelves in three chains

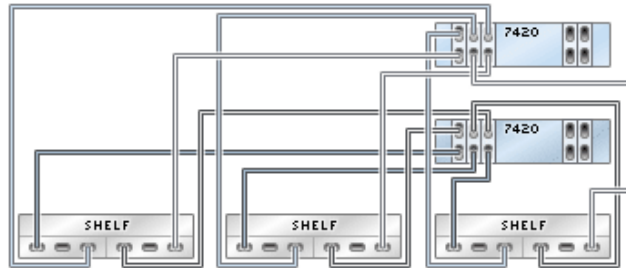


FIGURE 462 Clustered 7420 controllers with five HBAs connected to four Sun Disk Shelves in four chains

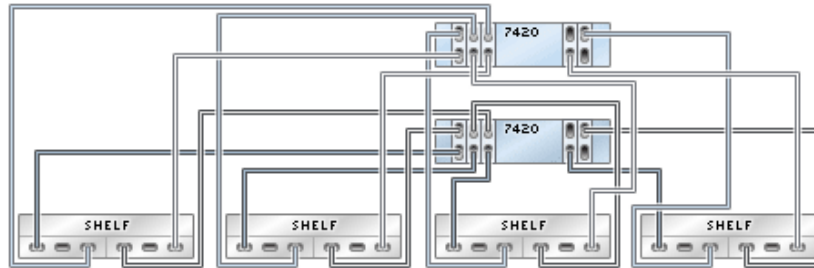


FIGURE 463 Clustered 7420 controllers with five HBAs connected to five Sun Disk Shelves in five chains

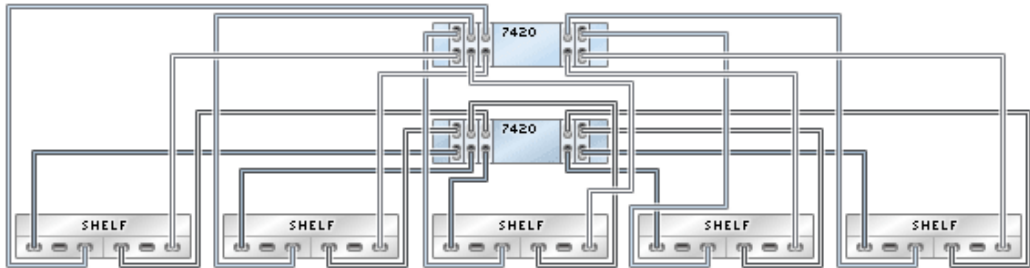


FIGURE 464 Clustered 7420 controllers with five HBAs connected to ten Sun Disk Shelves in five chains

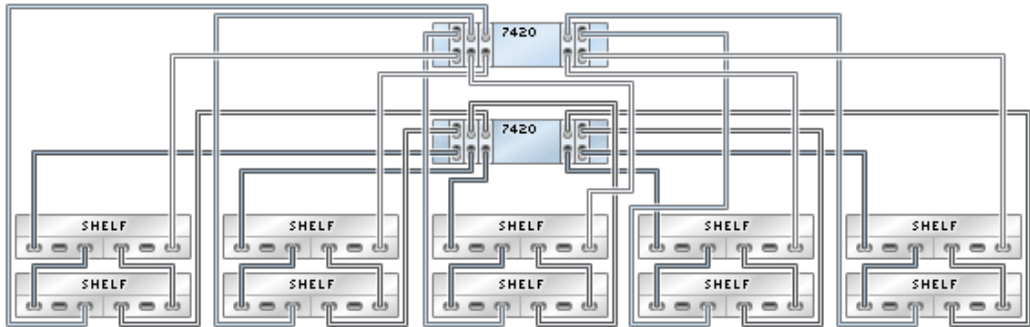
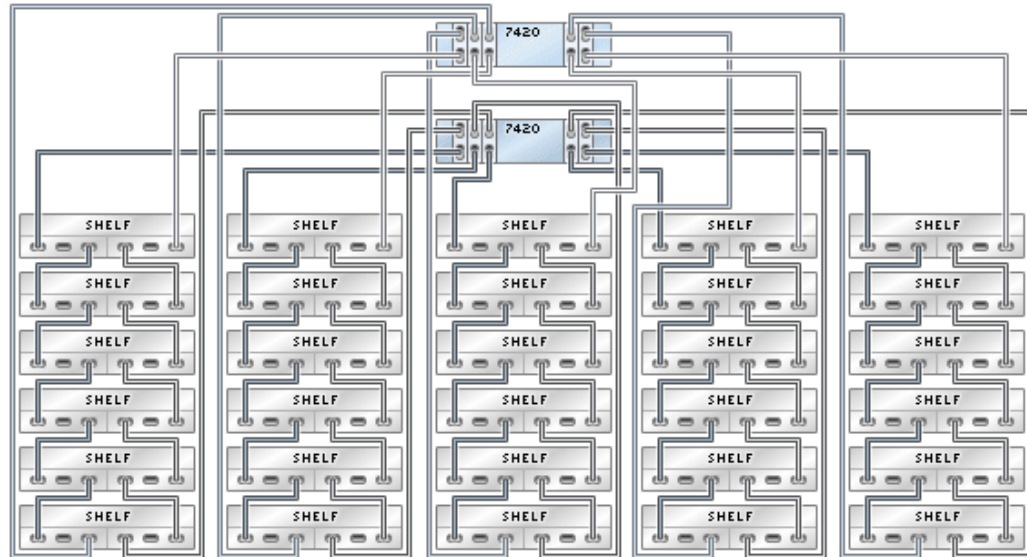


FIGURE 465 Clustered 7420 controllers with five HBAs connected to 30 Sun Disk Shelves in five chains



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 466 Clustered 7420 controllers with six HBAs connected to one Sun Disk Shelf in a single chain

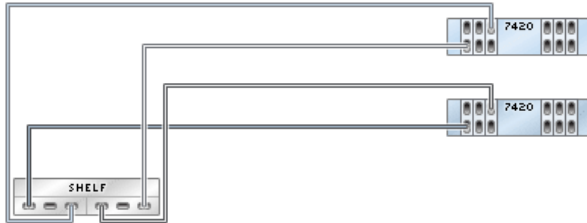


FIGURE 467 Clustered 7420 controllers with six HBAs connected to two Sun Disk Shelves in two chains

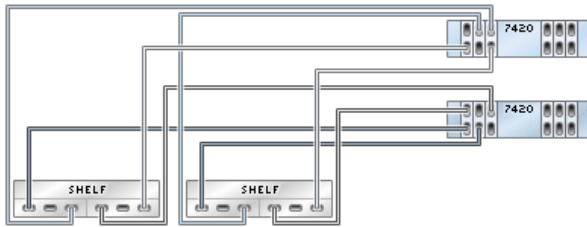


FIGURE 468 Clustered 7420 controllers with six HBAs connected to three Sun Disk Shelves in three chains

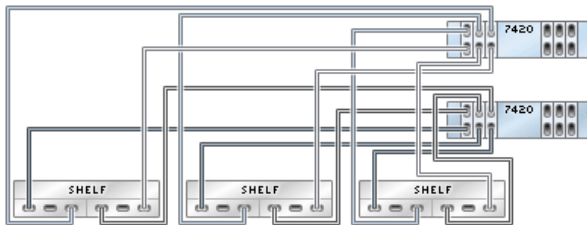


FIGURE 469 Clustered 7420 controllers with six HBAs connected to four Sun Disk Shelves in four chains

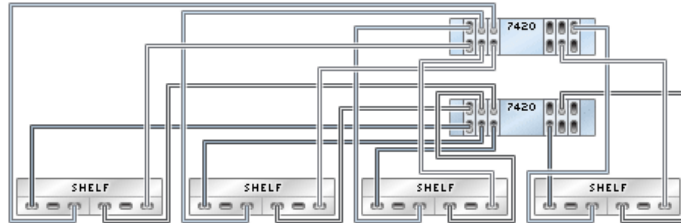


FIGURE 470 Clustered 7420 controllers with six HBAs connected to five Sun Disk Shelves in five chains

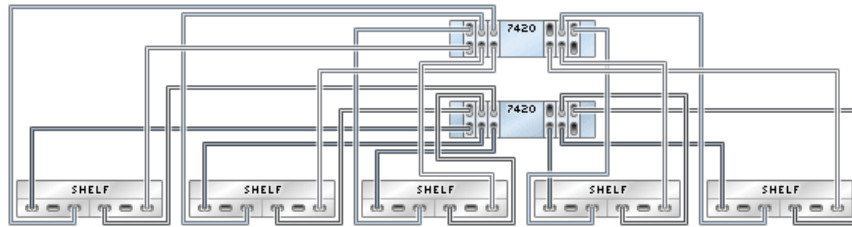


FIGURE 471 Clustered 7420 controllers with six HBAs connected to six Sun Disk Shelves in six chains

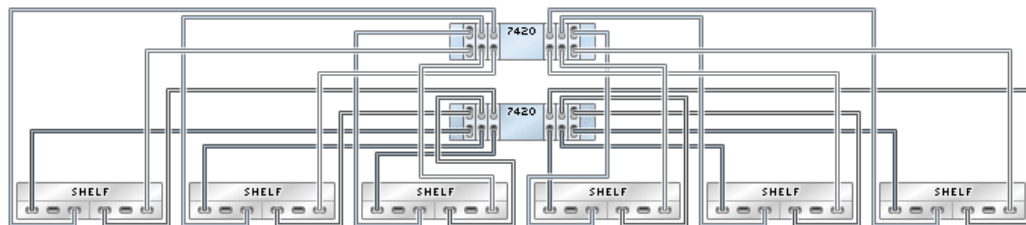


FIGURE 472 Clustered 7420 controllers with six HBAs connected to 12 Sun Disk Shelves in six chains

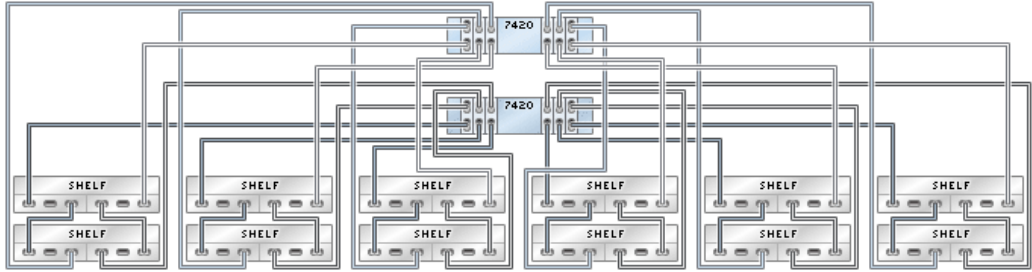
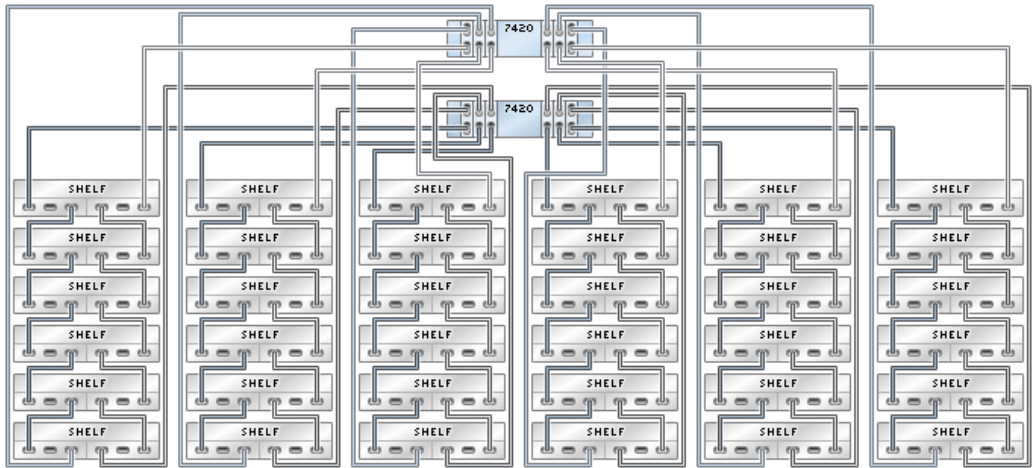


FIGURE 473 Clustered 7420 controllers with six HBAs connected to 36 Sun Disk Shelves in six chains



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 309
- “7320 Clustered to Sun Disk Shelves” on page 310

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 11.

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

FIGURE 474 Standalone 7320 controller with one HBA connected to one Sun Disk Shelf in a single chain

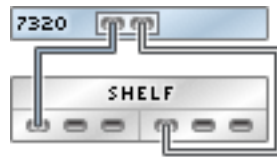


FIGURE 475 Standalone 7320 controller with one HBA connected to two Sun Disk Shelves in a single chain

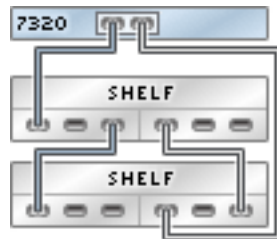
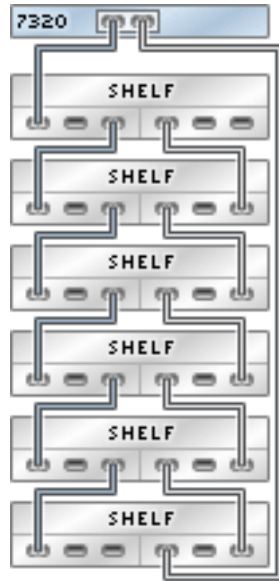


FIGURE 476 Standalone 7320 controller with one HBA connected to six Sun Disk Shelves in a single chain



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 11](#).

Note - For port locations, see the hardware overview section for the corresponding controller in [Oracle ZFS Storage Appliance Installation Guide](#).

FIGURE 477 Clustered 7320 controllers with one HBA connected to one Sun Disk Shelf in a single chain

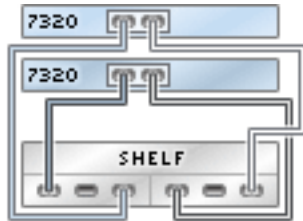


FIGURE 478 Clustered 7320 controllers with one HBA connected to two Sun Disk Shelves in a single chain

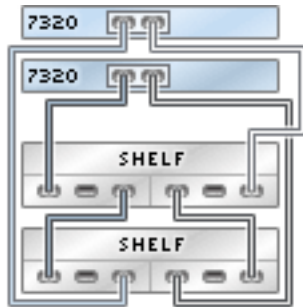
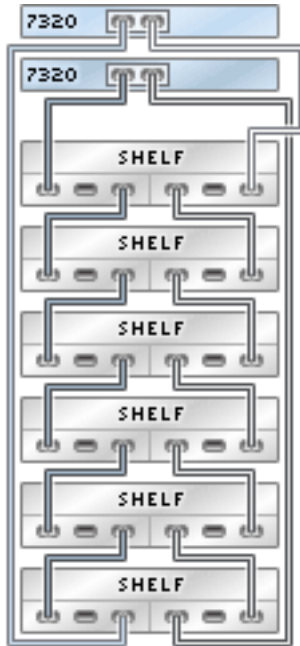


FIGURE 479 Clustered 7320 controllers with one HBA connected to six Sun Disk Shelves in a single chain



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 11](#).

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

FIGURE 480 Standalone 7120 controller with one HBA connected to one Sun Disk Shelf in a single chain

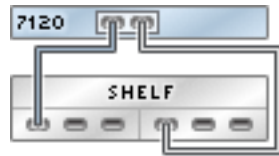
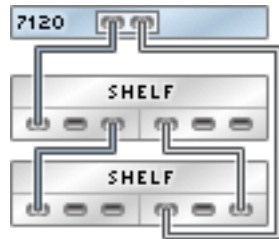


FIGURE 481 Standalone 7120 controller with one HBA connected to two Sun Disk Shelves in a single chain



Cabling Mixed DE3-24 and DE2-24 Disk Shelves

This section contains guidelines for properly cabling 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” on page 315](#)
- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-2 Controllers” on page 318](#)
- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS4-4 Controllers” on page 321](#)
- [“Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS3-2 Controllers” on page 327](#)

Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-4 Controllers

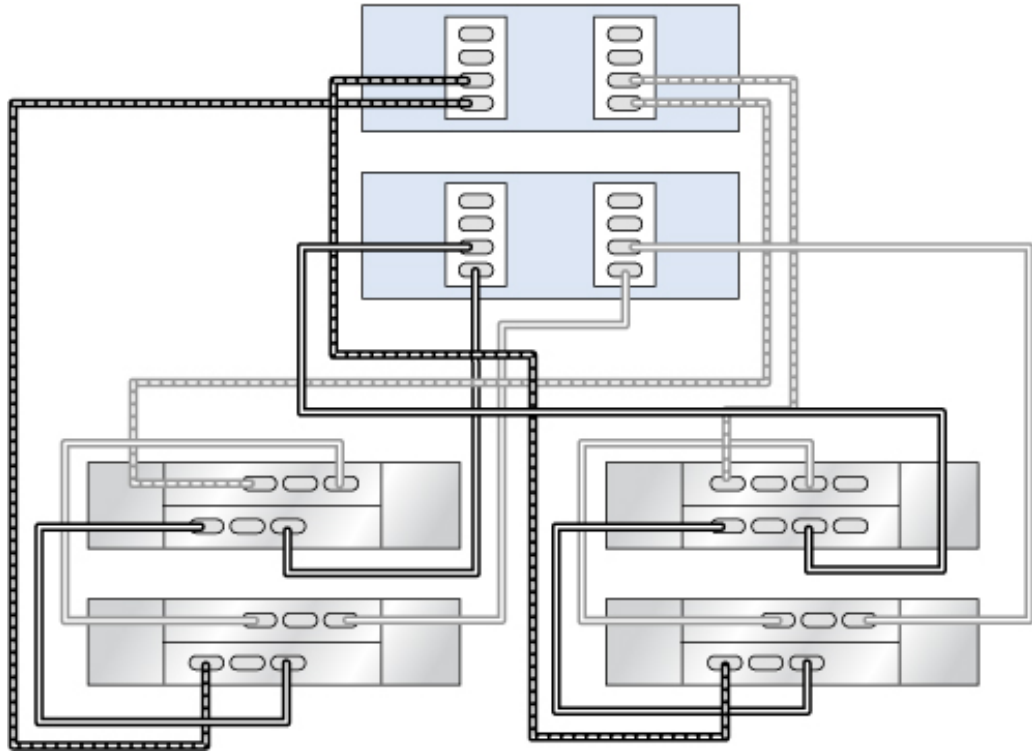
Refer to the diagrams in this section to upgrade or add to a system with DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. **In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports.** See [“Cabinet and Cabling Guidelines” on page 13](#) 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.

Add a DE3-24 to DE2-24 Disk Shelves at Chain End

In this example, a DE3-24 (right chain, first disk shelf) is added to a single DE2-24 disk shelf chain. Left chain is not changed.

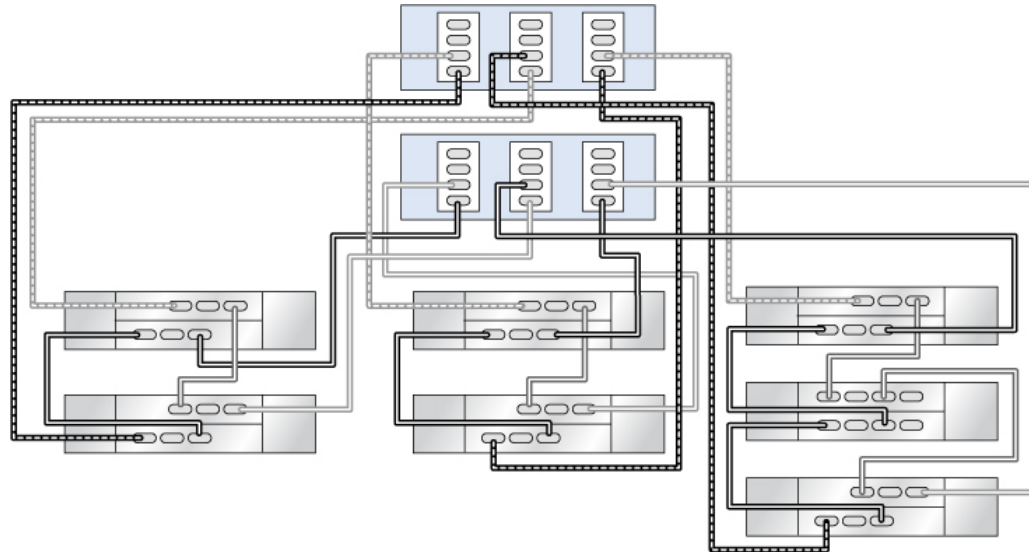
FIGURE 482 Clustered ZS5-4 controllers with two HBAs connected to one DE3-24 (right chain, first disk shelf) and three DE2-24 in two chains



Add/Replace DE3-24 to/from DE2-24 Disk Shelves at Chain Middle

In this example, a DE3-24 (right chain, second disk shelf) is added/replaced to/from a DE2-24 disk shelf chain in the middle. Remaining two chains on the left are not changed.

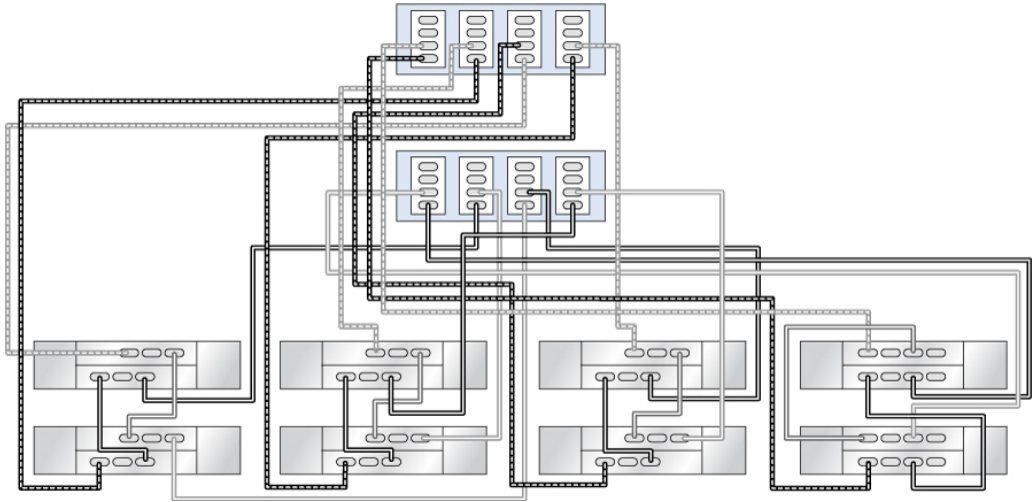
FIGURE 483 Clustered ZS5-4 controllers with three HBAs connected to one DE3-24 (right chain, second disk shelf) and six DE2-24 in three chains



Add Exclusive DE3-24 Disk Shelves Chain

In this example, a chain of two DE3-24 (right chain) is added. Remaining three chains on the left are not changed.

FIGURE 484 Clustered ZS5-4 controllers with four HBAs connected to two DE3-24 (right chain) and six DE2-24 in four chains



Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS5-2 Controllers

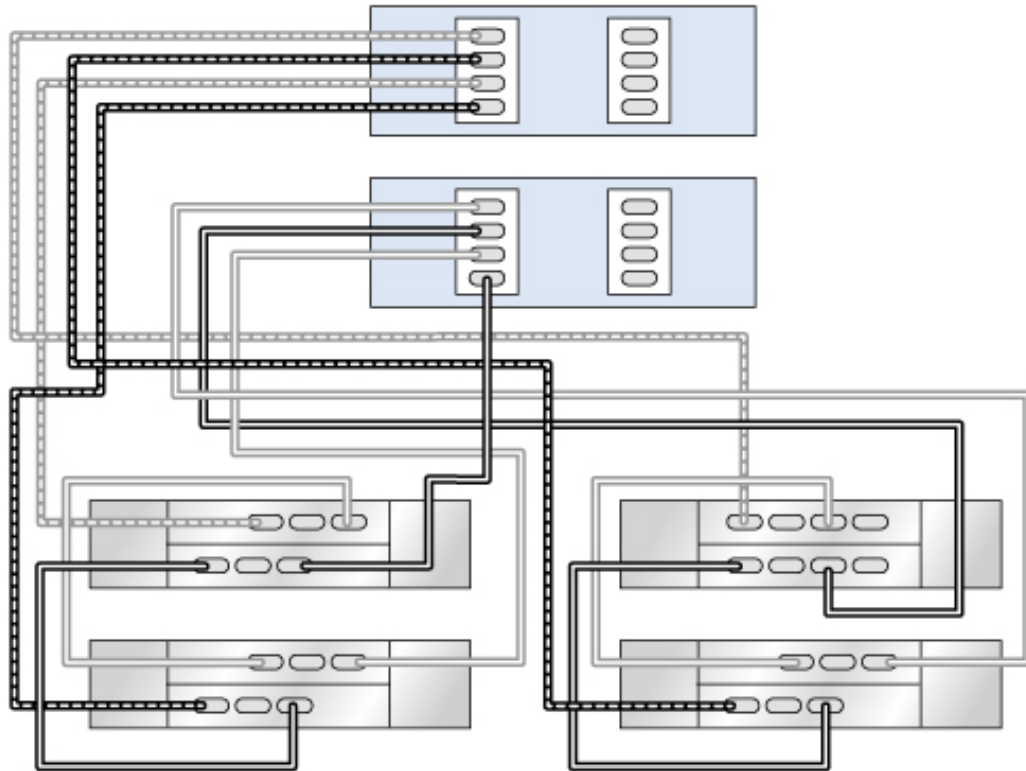
Refer to the diagrams in this section to upgrade or add to a system with DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. **In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports.** See [“Cabinet and Cabling Guidelines” on page 13](#) 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.

Add a DE3-24 to DE2-24 Disk Shelves at Chain End

In this example, a DE3-24 (right chain, first disk shelf) is added to a single DE2-24 disk shelf chain. Left chain is not changed.

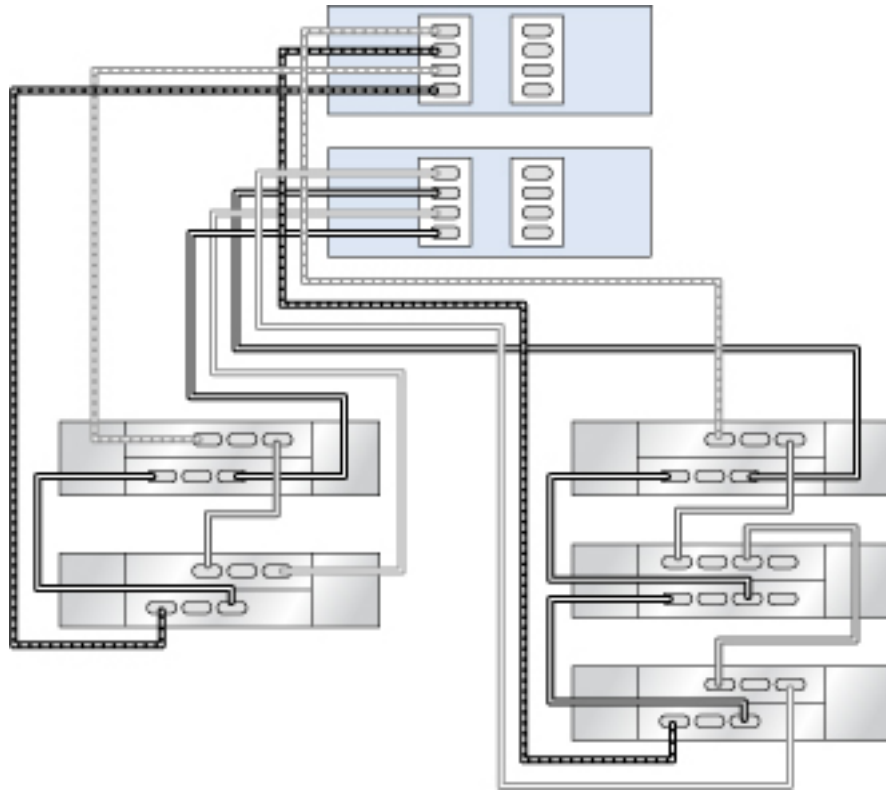
FIGURE 485 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 (right chain, first disk shelf) and three DE2-24 in two chains



Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle

In this example, a DE3-24 (right chain, second disk shelf) is added/replaced to/from a DE2-24 disk shelf chain in the middle. Remaining chain on the left is not changed.

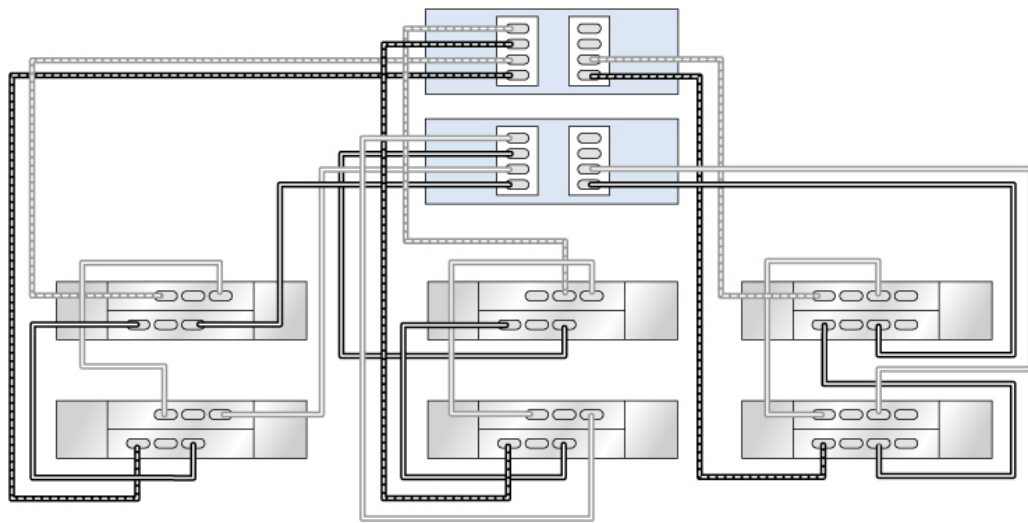
FIGURE 486 Clustered ZS5-2 controllers with one HBA connected to one DE3-24 (right chain, second disk shelf) and four DE2-24 in two chains



Add Exclusive DE3-24 Disk Shelves Chain

In this example, a chain of two DE3-24 (right chain) is added. Remaining two chains on the left are not changed.

FIGURE 487 Clustered ZS5-2 controllers with two HBAs connected to two DE3-24 (right chain) and four DE2-24 in three chains



Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS4-4 Controllers

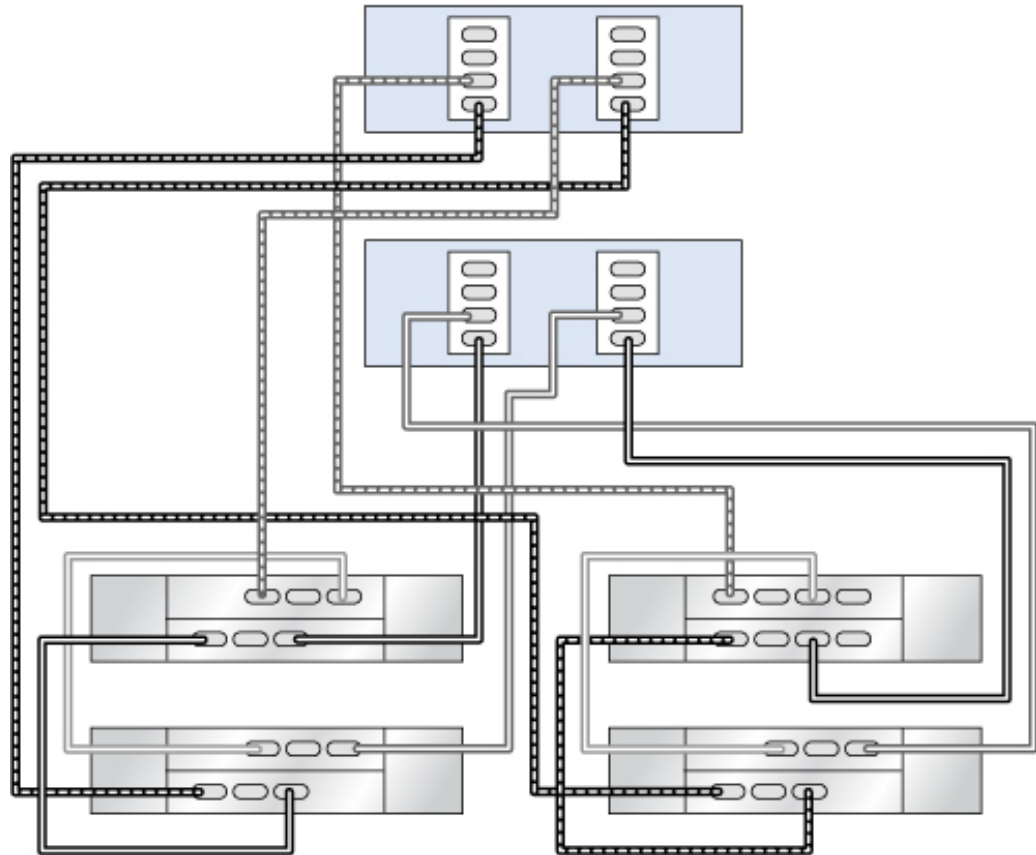
Refer to the diagrams in this section to upgrade or add to a system with DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. **In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports.** See [“Cabinet and Cabling Guidelines” on page 13](#) 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.

Add a DE3-24 to DE2-24 Disk Shelves at Chain End

In this example, a DE3-24 (right chain, first disk shelf) is added to a single DE2-24 disk shelf chain. Left chain is not changed.

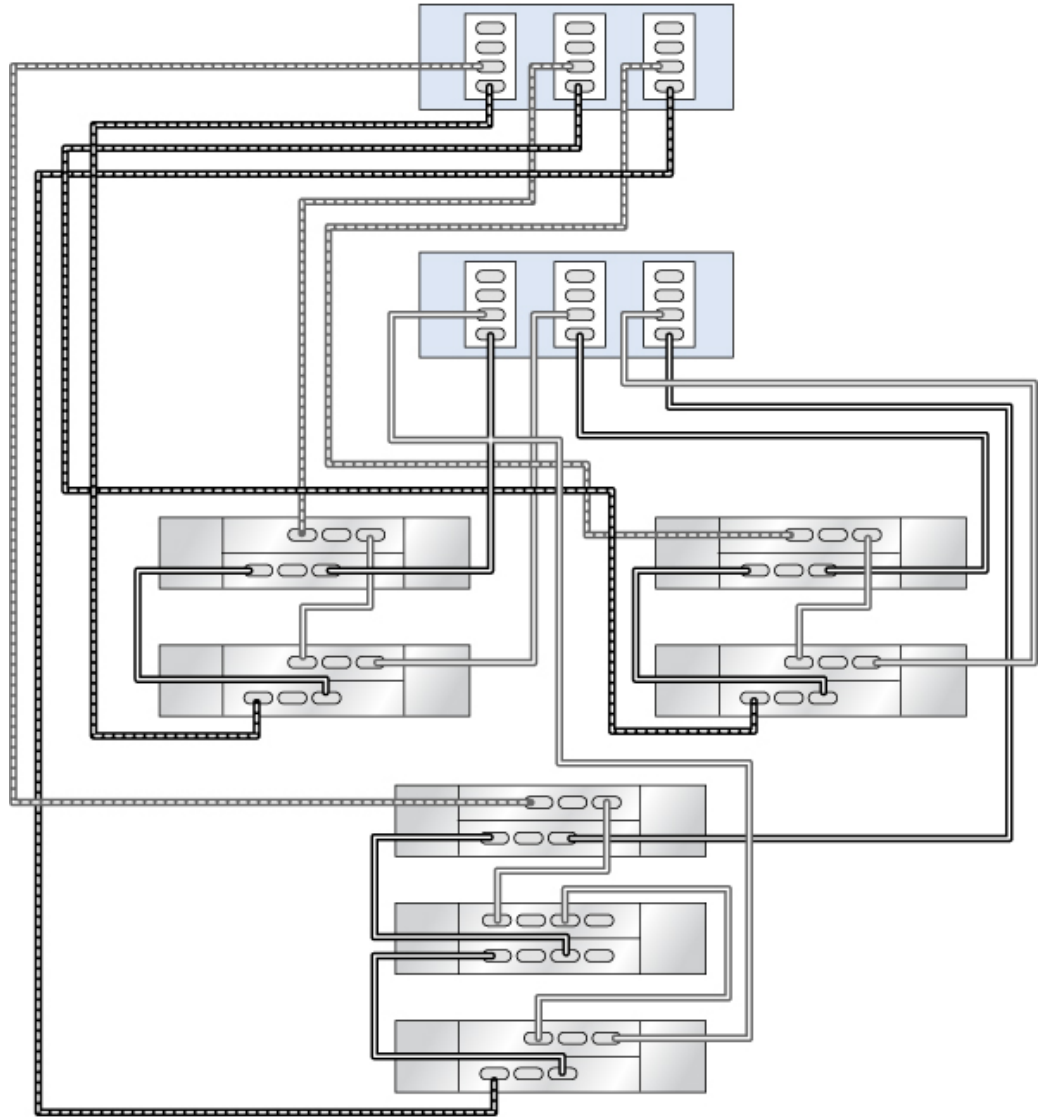
FIGURE 488 Clustered ZS4-4 controllers with two HBAs connected to one DE3-24 (right chain, first disk shelf) and three DE2-24 in two chains



Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle

In this example, a DE3-24 (bottom chain, second disk shelf) is added/replaced to a DE2-24 disk shelf chain in the middle. Remaining two chains above it are not changed.

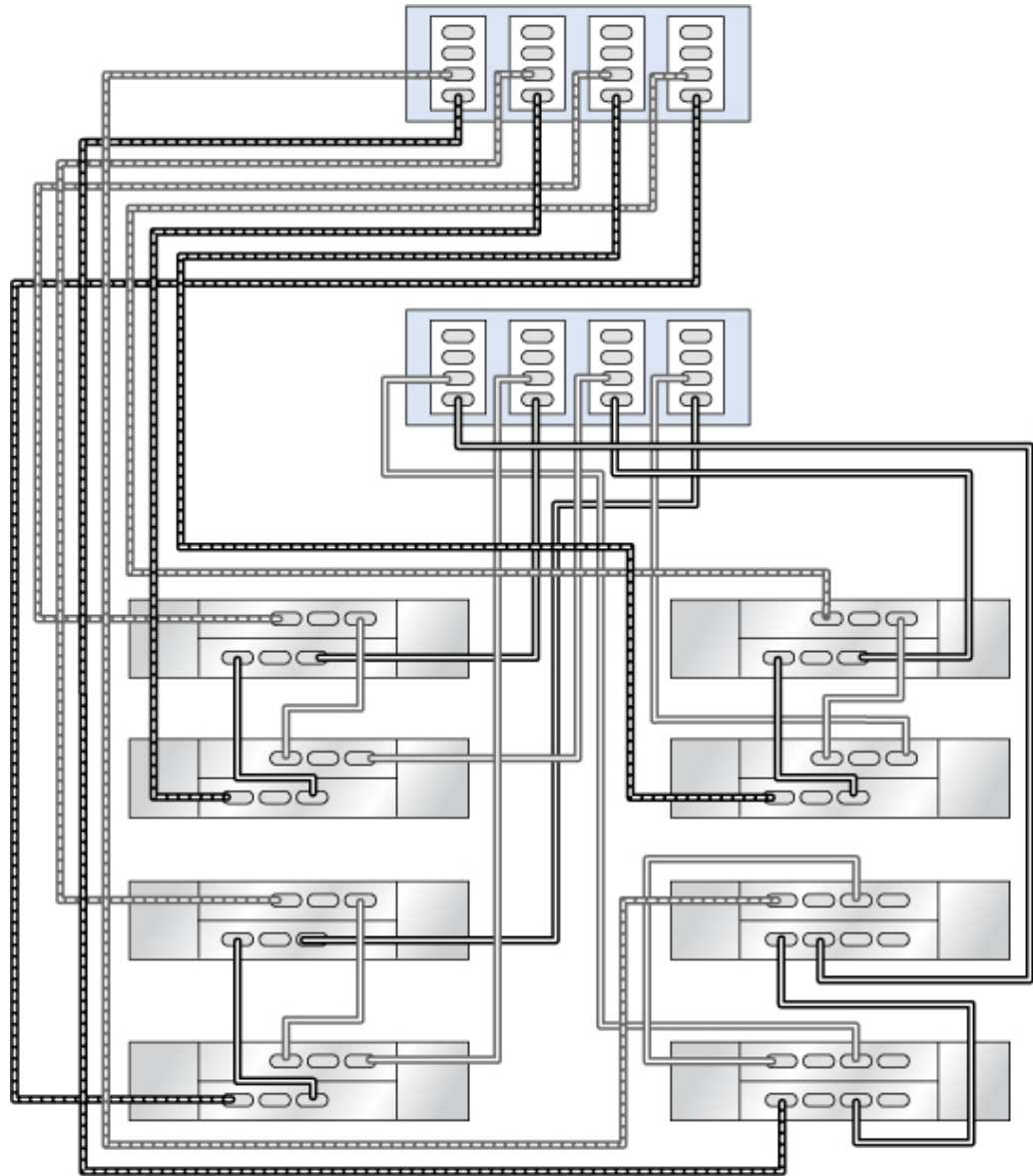
FIGURE 489 Clustered ZS4-4 controllers with three HBAs connected to one DE3-24 (bottom chain, second disk shelf) and six DE2-24 in three chains



Add Exclusive DE3-24 Disk Shelves Chain

In this example, a chain of two DE3-24 (right chain, third and fourth disk shelves) is added. Remaining three chains are not changed.

FIGURE 490 Clustered ZS4-4 controllers with four HBAs connected to two DE3-24 (right chain, third and fourth disk shelves) and six DE2-24 in four chains



Cabling Mixed DE3-24 and DE2-24 Disk Shelves to ZS3-2 Controllers

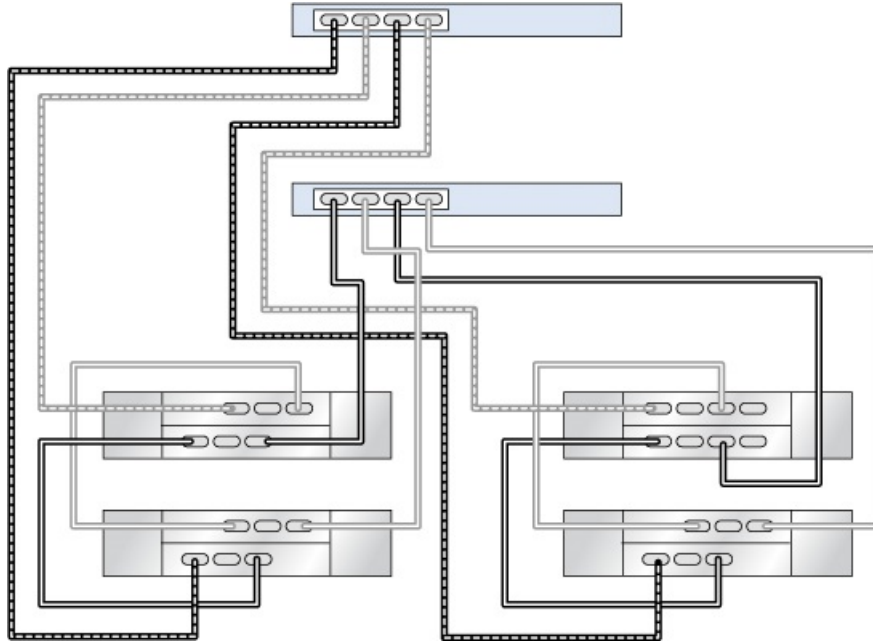
Refer to the diagrams in this section to upgrade or add to a system with DE2-24 disk shelves by introducing one or more DE3-24 disk shelves. **In the following diagrams, the DE2-24 disk shelves have three I/O Module ports, while the DE3-24 disk shelves have four ports.** See [“Cabinet and Cabling Guidelines” on page 13](#) 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.

Add a DE3-24 to DE2-24 Disk Shelves at Chain End

In this example, a DE3-24 (right chain, first disk shelf) is added to a single DE2-24 disk shelf chain. Left chain is not changed.

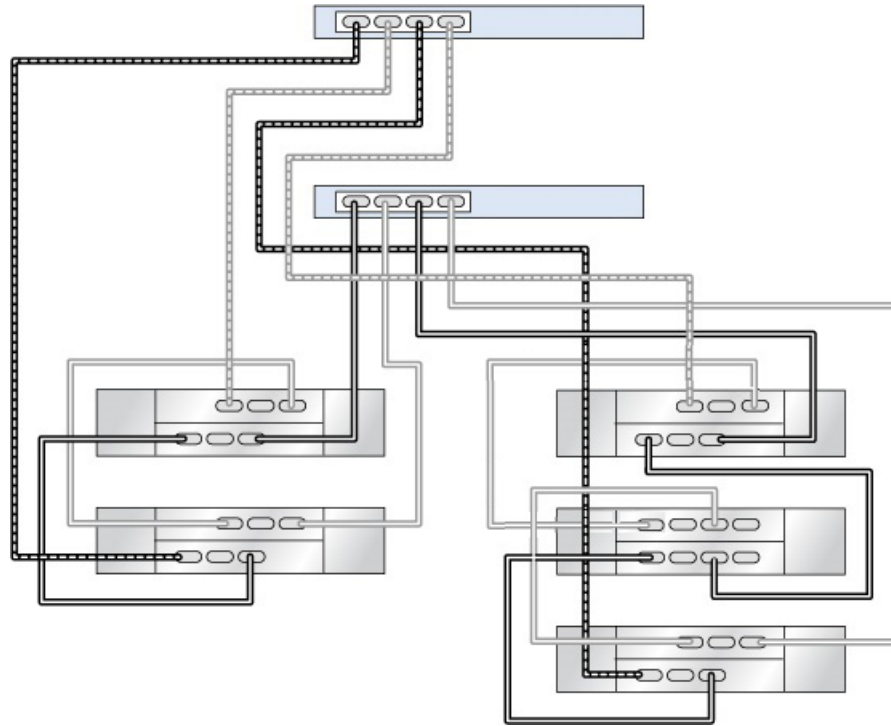
FIGURE 491 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 (right chain, first disk shelf) and three DE2-24 in two chains



Add/Replace a DE3-24 to/from DE2-24 Disk Shelves at Chain Middle

In this example, a DE3-24 (right chain, second disk shelf) is added/replaced to/from a DE2-24 disk shelf chain in the middle. Remaining chain on the left is not changed.

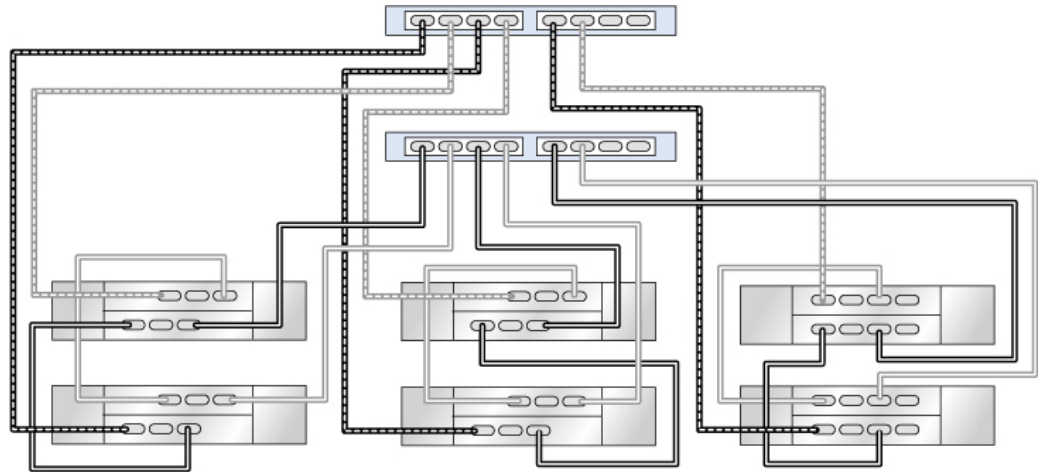
FIGURE 492 Clustered ZS3-2 controllers with one HBA connected to one DE3-24 (right chain, second disk shelf) and four DE2-24 in two chains



Add Exclusive DE3-24 Disk Shelves Chain

In this example, a chain of two DE3-24 (right chain) is added. Remaining two chains on the left are not changed.

FIGURE 493 Clustered ZS3-2 controllers with two HBAs connected to two DE3-24 (right chain) 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 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” on page 331](#)
- [“Cabling DE2-24 and Sun Disk Shelves to ZS3-2 Controllers” on page 354](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7420 Controllers” on page 364](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7320 Controllers” on page 388](#)
- [“Cabling DE2-24 and Sun Disk Shelves to 7120 Controllers” on page 392](#)

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 \(2 HBAs\)” on page 332](#)
- [“ZS3-4 Standalone to Mixed Disk Shelves \(3 HBAs\)” on page 334](#)
- [“ZS3-4 Standalone to Mixed Disk Shelves \(4 HBAs\)” on page 337](#)
- [“ZS3-4 Clustered to Mixed Disk Shelves \(2 HBAs\)” on page 341](#)
- [“ZS3-4 Clustered to Mixed Disk Shelves \(3 HBAs\)” on page 344](#)
- [“ZS3-4 Clustered to Mixed Disk Shelves \(4 HBAs\)” on page 348](#)

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 11](#).

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 494 Standalone ZS3-4 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

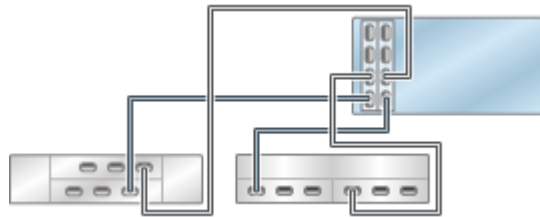


FIGURE 495 Standalone ZS3-4 controllers with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

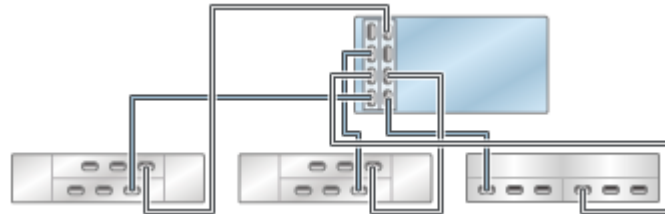


FIGURE 496 Standalone ZS3-4 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

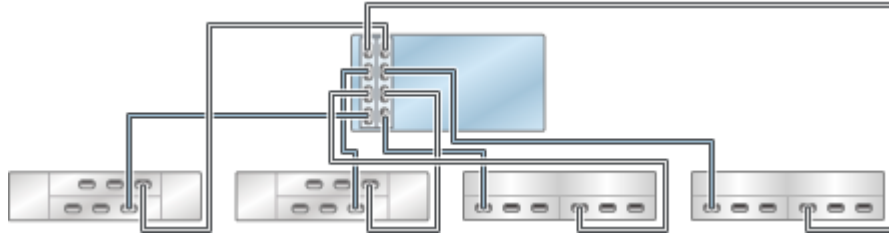


FIGURE 497 Standalone ZS3-4 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

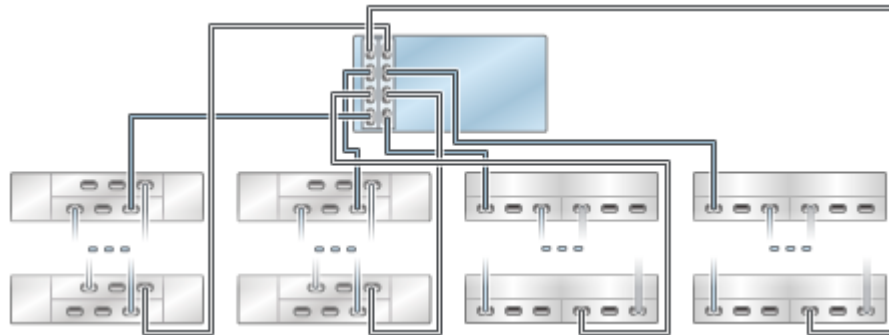


FIGURE 498 Multiple DE2-24 disk shelves in a single chain

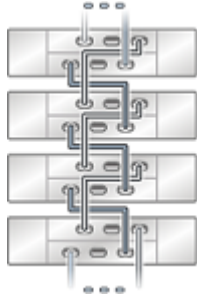
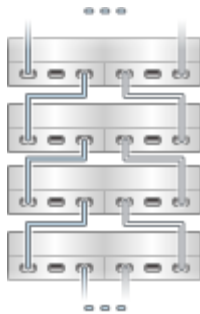


FIGURE 499 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 500 Standalone ZS3-4 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

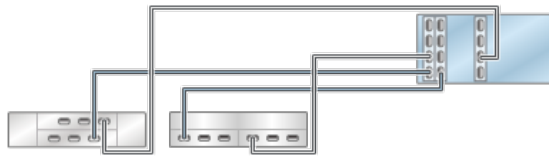


FIGURE 501 Standalone ZS3-4 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

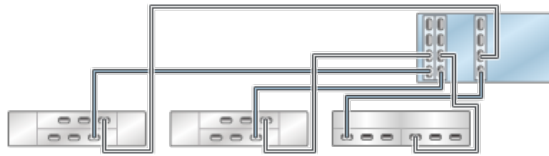


FIGURE 502 Standalone ZS3-4 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

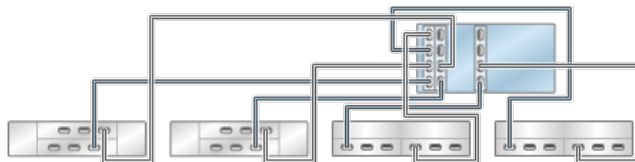


FIGURE 503 Standalone ZS3-4 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

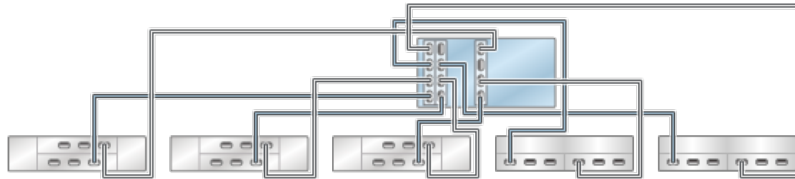


FIGURE 504 Standalone ZS3-4 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

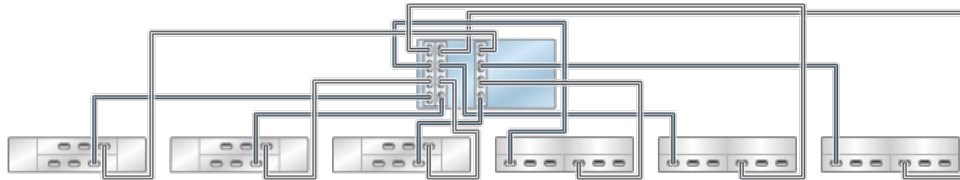


FIGURE 505 Standalone ZS3-4 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

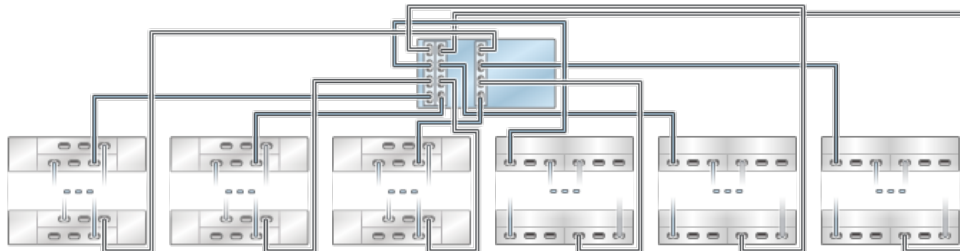


FIGURE 506 Multiple DE2-24 disk shelves in a single chain

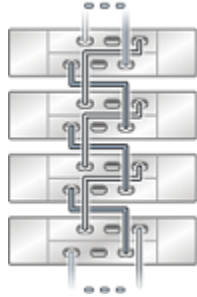
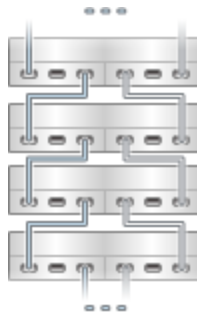


FIGURE 507 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 508 Standalone ZS3-4 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)



FIGURE 509 Standalone ZS3-4 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

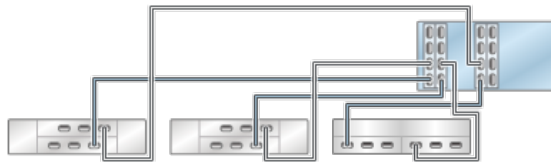


FIGURE 510 Standalone ZS3-4 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

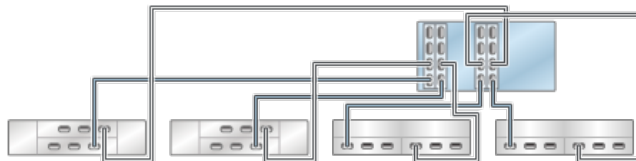


FIGURE 511 Standalone ZS3-4 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

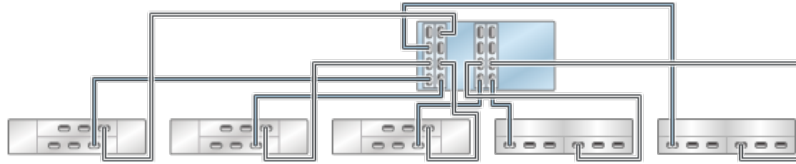


FIGURE 512 Standalone ZS3-4 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

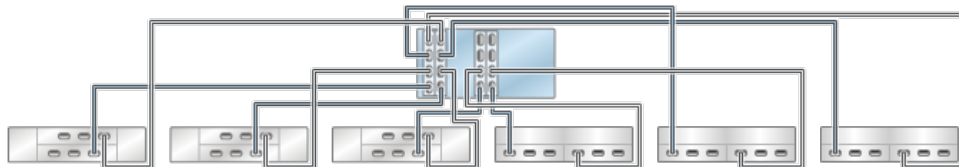


FIGURE 513 Standalone ZS3-4 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

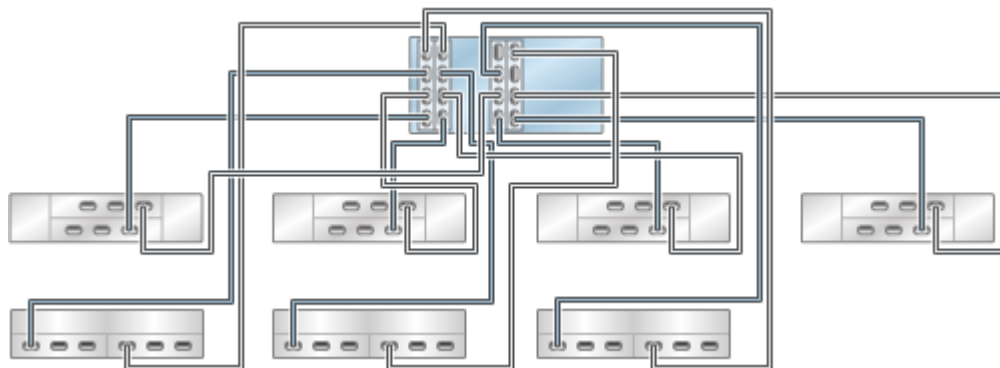


FIGURE 514 Standalone ZS3-4 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

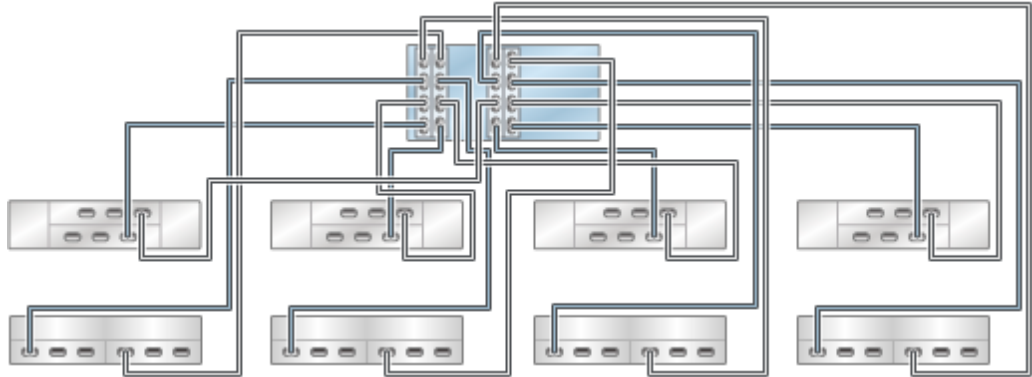


FIGURE 515 Standalone ZS3-4 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

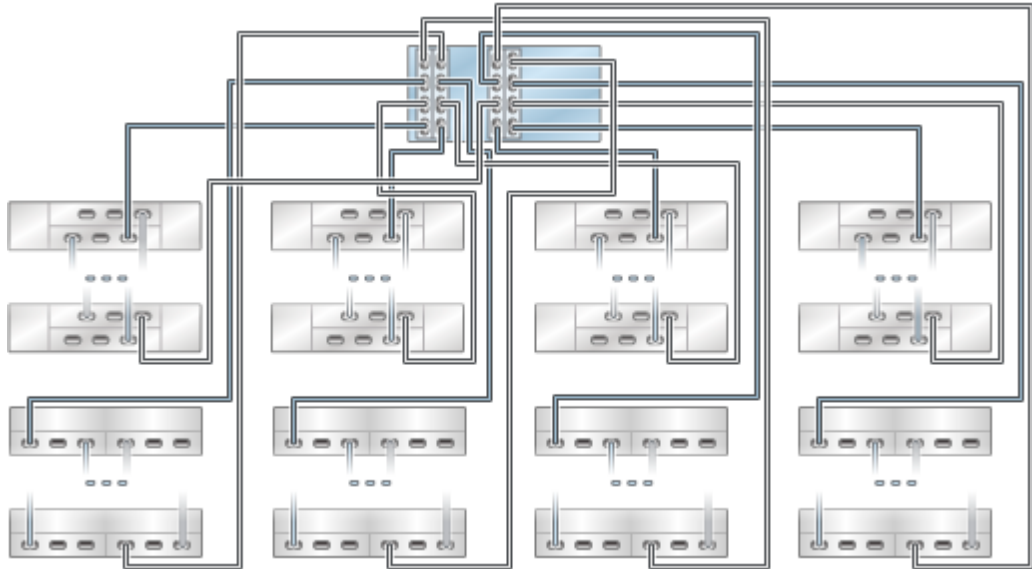


FIGURE 516 Multiple DE2-24 disk shelves in a single chain

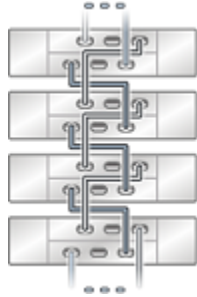
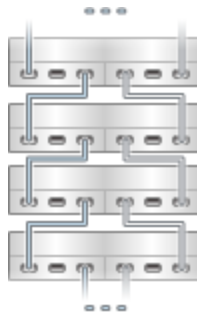


FIGURE 517 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 518 Clustered ZS3-4 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

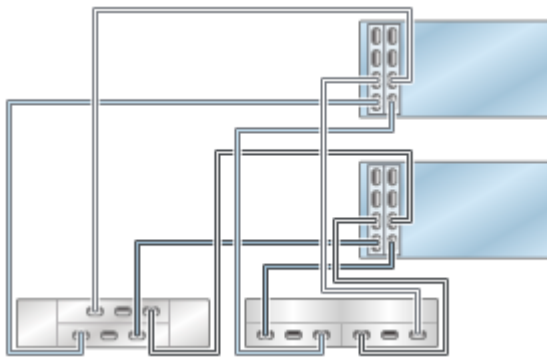


FIGURE 519 Clustered ZS3-4 controllers with two HBAs connected to three mixed disk shelves in two chains (DE2-24 shown on the left)

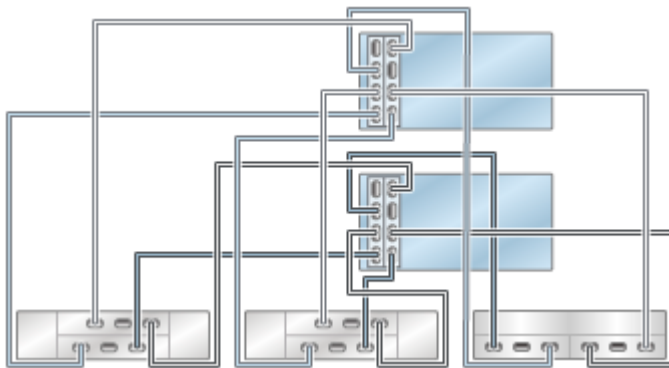


FIGURE 520 Clustered ZS3-4 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

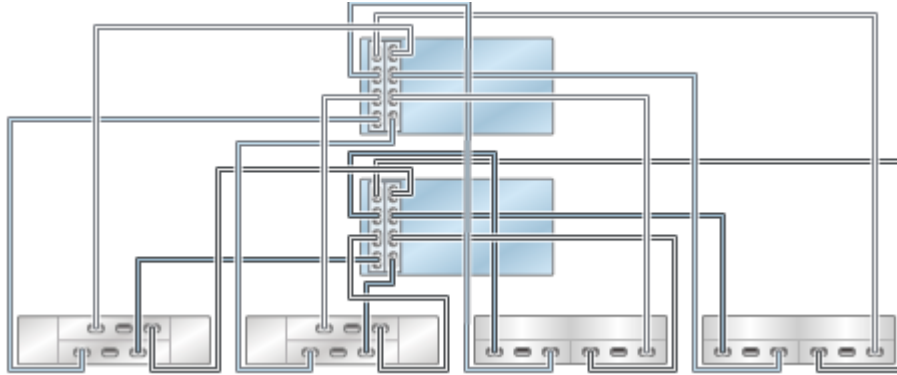


FIGURE 521 Clustered ZS3-4 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

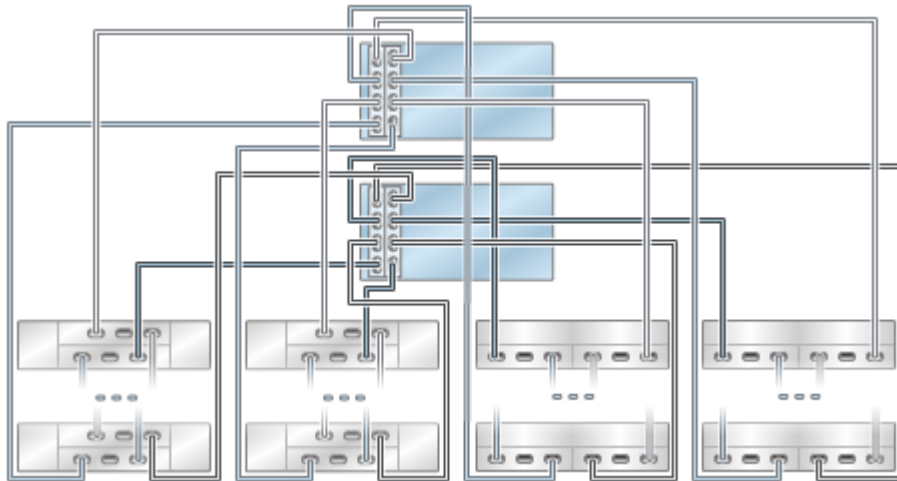


FIGURE 522 Multiple DE2-24 disk shelves in a single chain

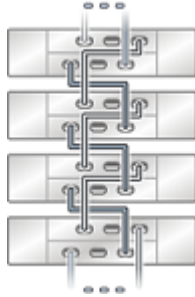
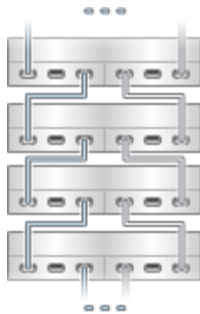


FIGURE 523 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 524 Clustered ZS3-4 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

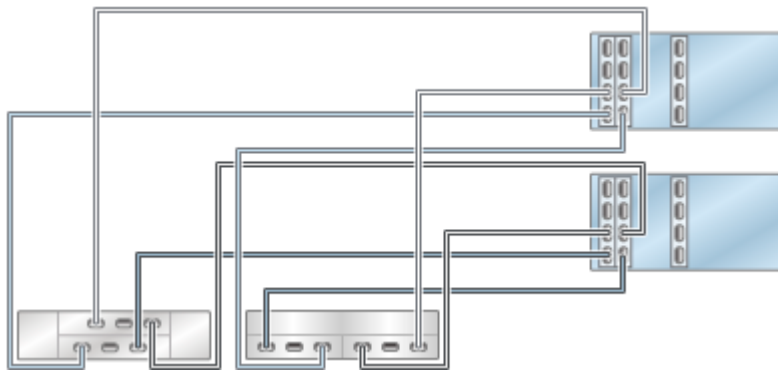


FIGURE 525 Clustered ZS3-4 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

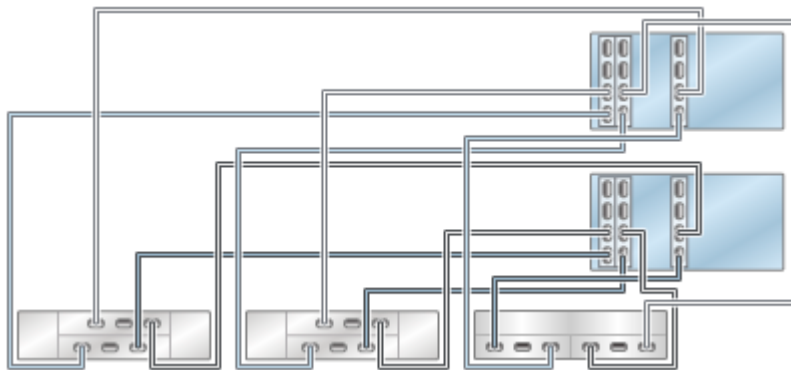


FIGURE 526 Clustered ZS3-4 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

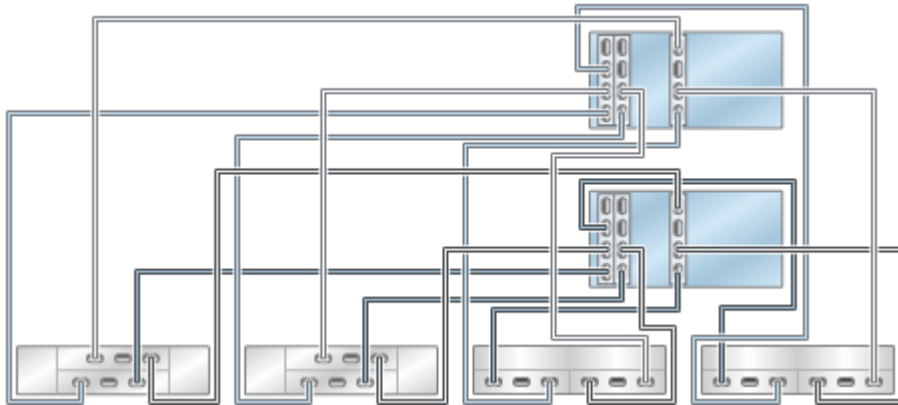


FIGURE 527 Clustered ZS3-4 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

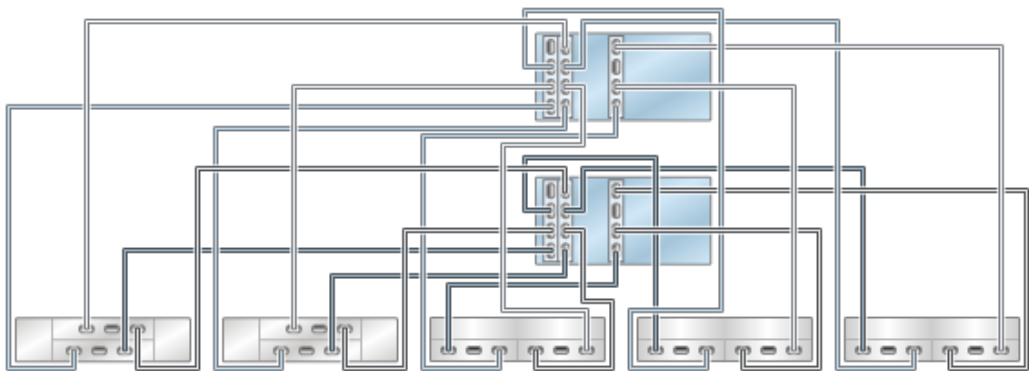


FIGURE 528 Clustered ZS3-4 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

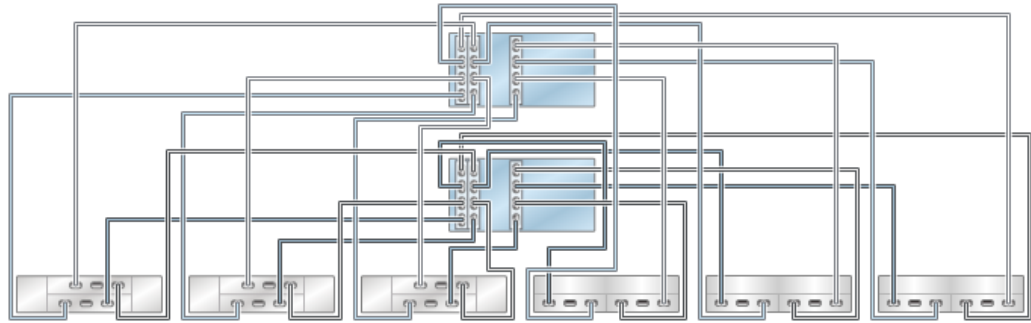


FIGURE 529 Clustered ZS3-4 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

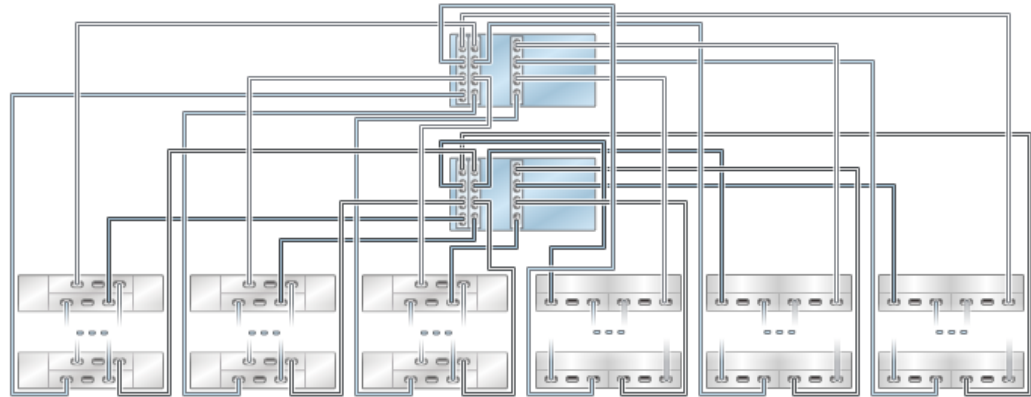


FIGURE 530 Multiple DE2-24 disk shelves in a single chain

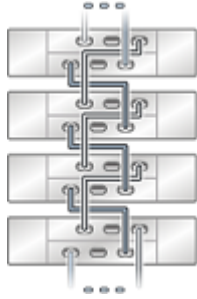
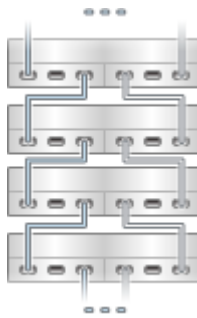


FIGURE 531 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 532 Clustered ZS3-4 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

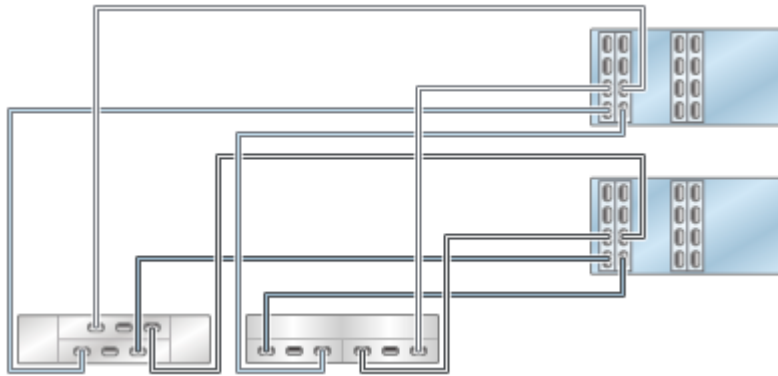


FIGURE 533 Clustered ZS3-4 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

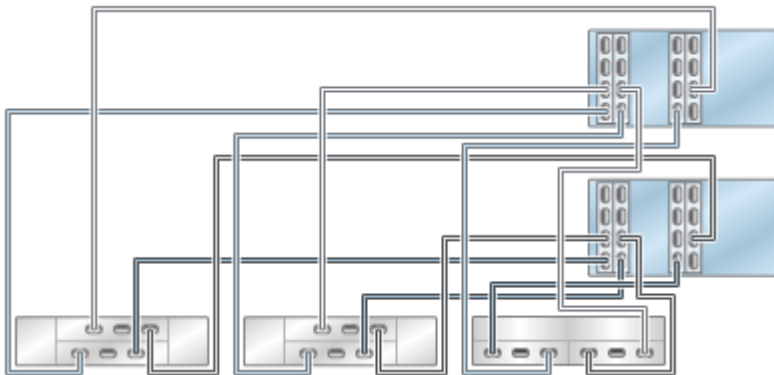


FIGURE 534 Clustered ZS3-4 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

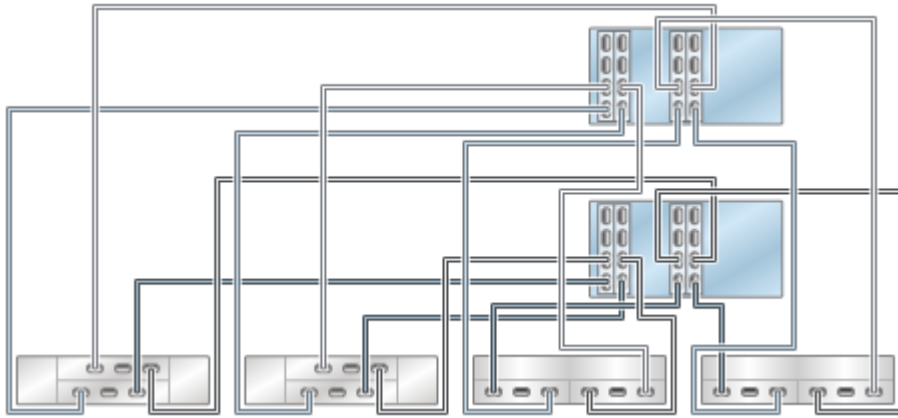


FIGURE 535 Clustered ZS3-4 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

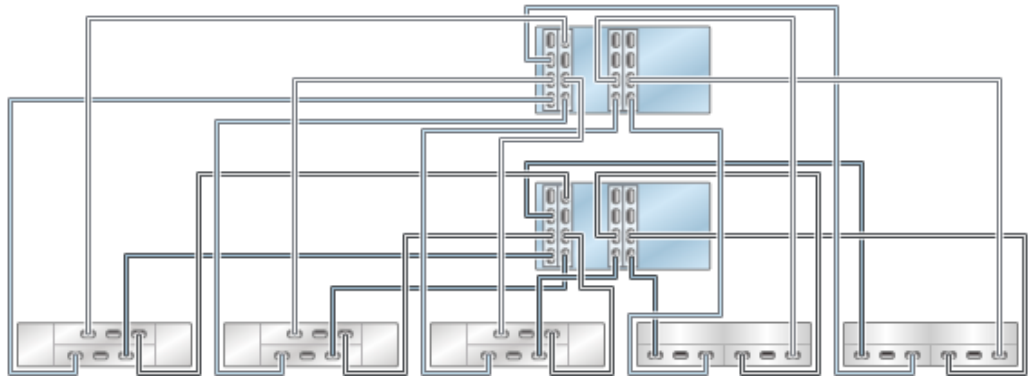


FIGURE 536 Clustered ZS3-4 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

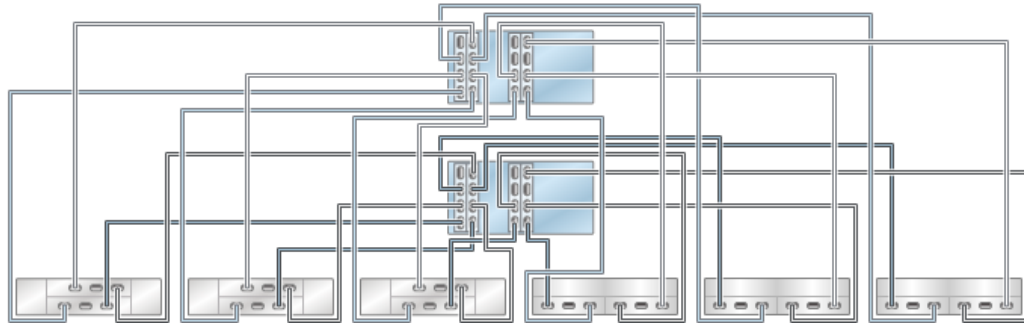


FIGURE 537 Clustered ZS3-4 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

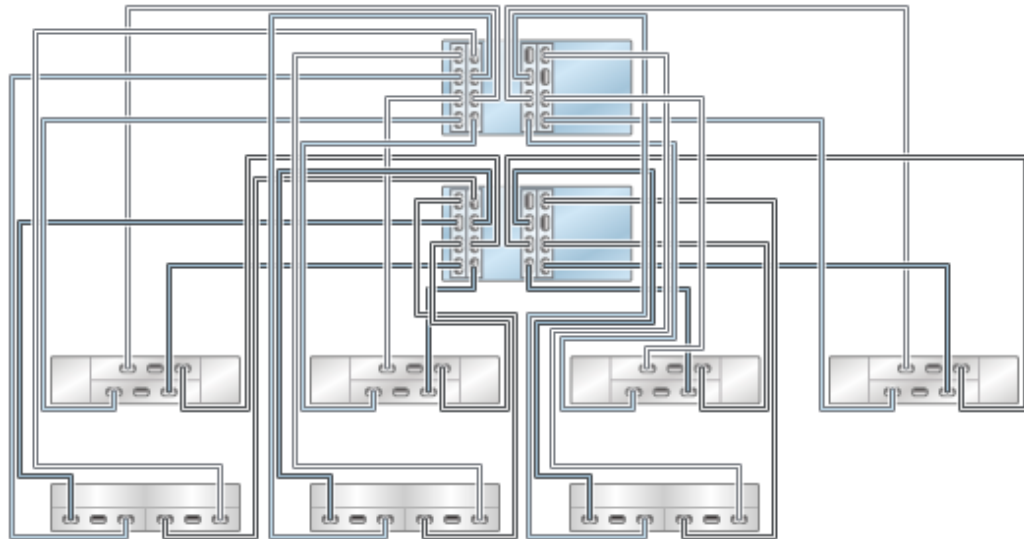


FIGURE 538 Clustered ZS3-4 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

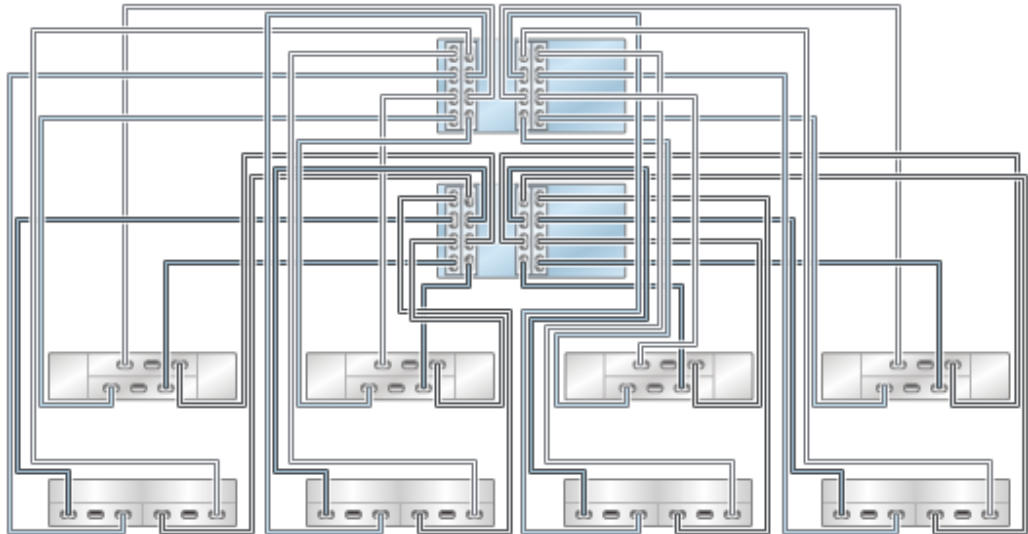


FIGURE 539 Clustered ZS3-4 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

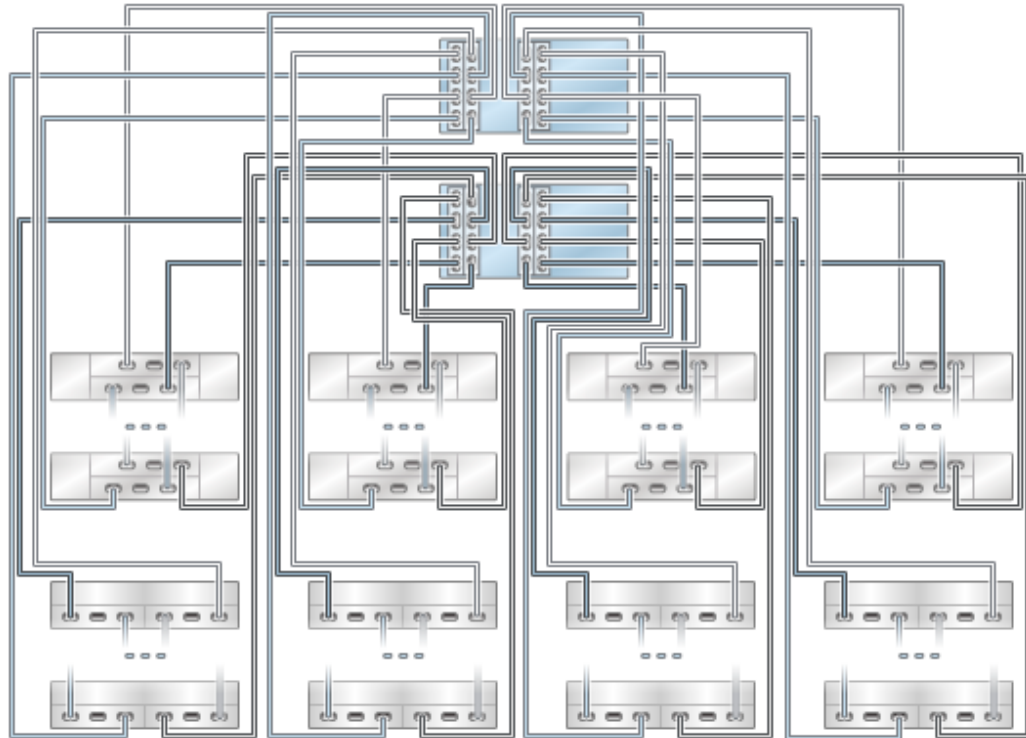


FIGURE 540 Multiple DE2-24 disk shelves in a single chain

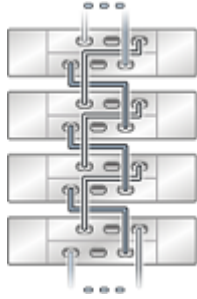
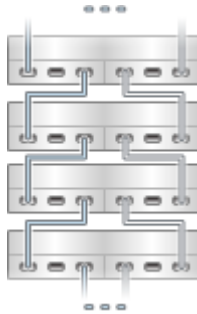


FIGURE 541 Multiple Sun Disk Shelves in a single chain



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 355](#)
- [“ZS3-2 Standalone to Mixed Disk Shelves \(2 HBAs\)” on page 356](#)
- [“ZS3-2 Clustered to Mixed Disk Shelves \(1 HBA\)” on page 359](#)

- [“ZS3-2 Clustered to Mixed Disk Shelves \(2 HBAs\)” on page 361](#)

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 11](#).

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 542 Standalone ZS3-2 controller with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

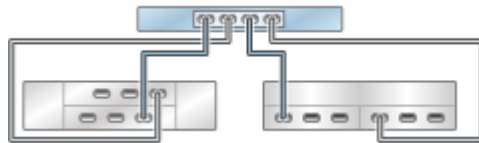


FIGURE 543 Standalone ZS3-2 controller with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

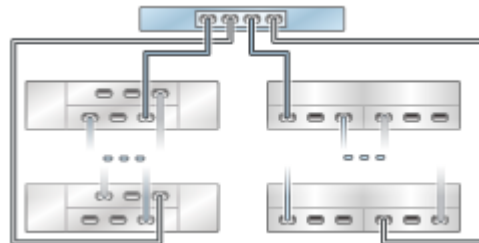


FIGURE 544 Multiple DE2-24 disk shelves in a single chain

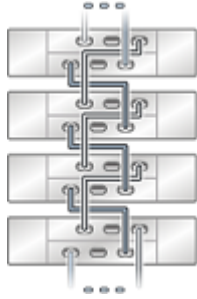
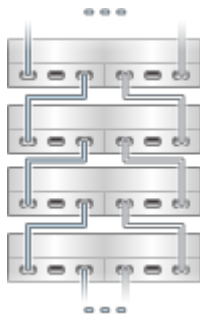


FIGURE 545 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 546 Standalone ZS3-2 controller with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

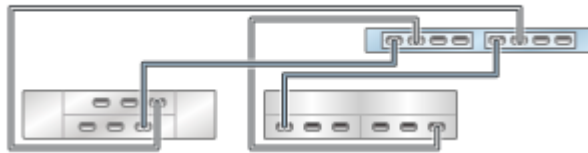


FIGURE 547 Standalone ZS3-2 controller with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

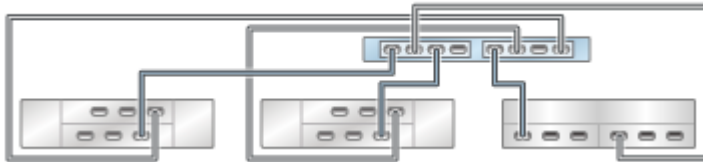


FIGURE 548 Standalone ZS3-2 controller with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

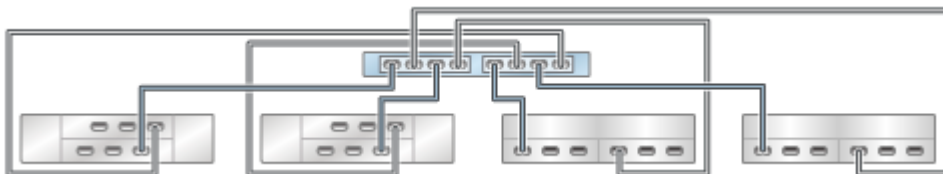


FIGURE 549 Standalone ZS3-2 controller with two HBAs connected to eight mixed disk shelves in four chains (DE2-24 shown on the left)

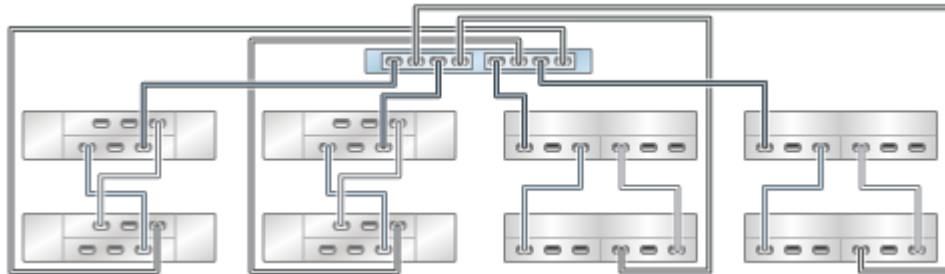


FIGURE 550 Multiple DE2-24 disk shelves in a single chain

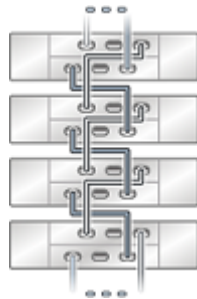
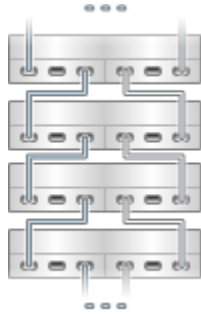


FIGURE 551 Multiple Sun Disk Shelves in a single chain

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 11](#).

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 552 Clustered ZS3-2 controllers with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

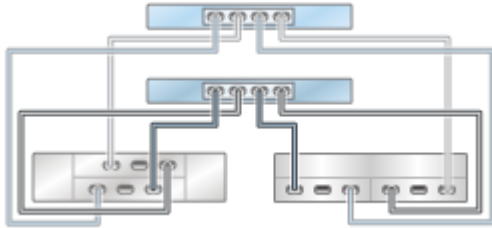


FIGURE 553 Clustered ZS3-2 controllers with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

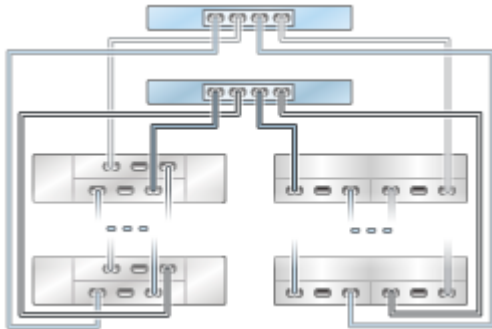
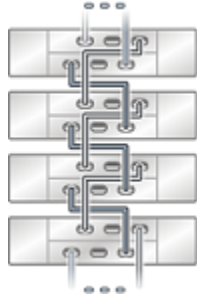
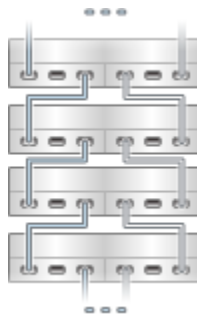


FIGURE 554 Multiple DE2-24 disk shelves in a single chain**FIGURE 555** Multiple Sun Disk Shelves in a single chain

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 11](#).

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 556 Clustered ZS3-2 controller with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

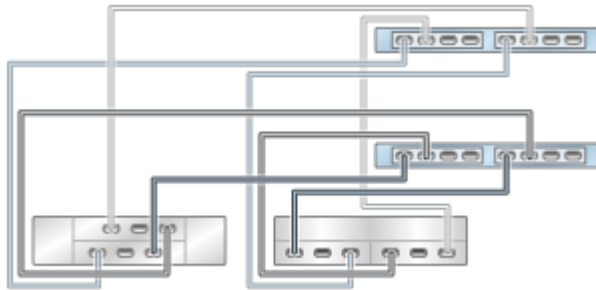


FIGURE 557 Clustered ZS3-2 controller with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

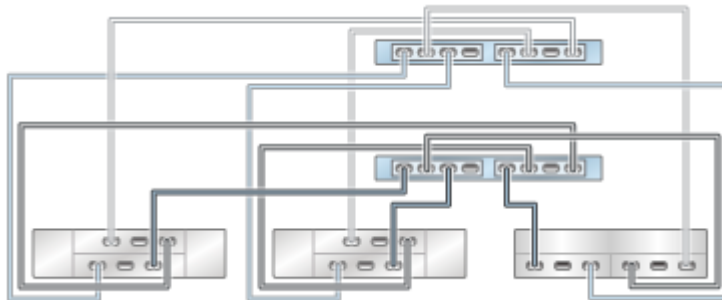


FIGURE 558 Clustered ZS3-2 controller with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

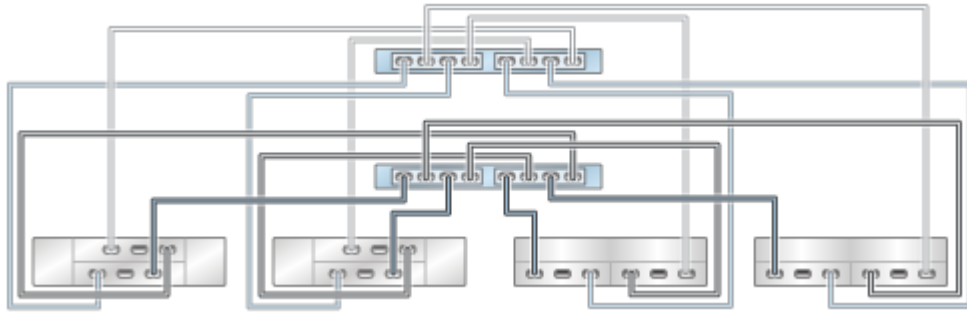


FIGURE 559 Clustered ZS3-2 controller with two HBAs connected to eight mixed disk shelves in four chains (DE2-24 shown on the left)

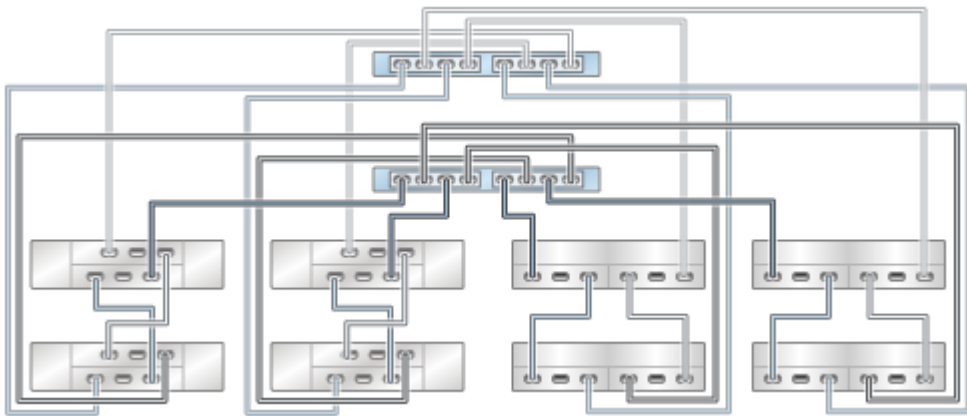


FIGURE 560 Multiple DE2-24 disk shelves in a single chain

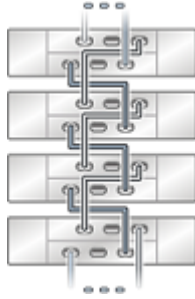
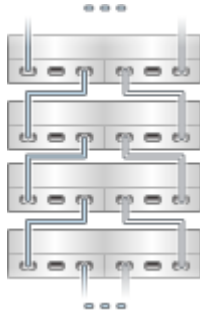


FIGURE 561 Multiple Sun Disk Shelves in a single chain



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 365](#)

- “7420 Standalone to Mixed Disk Shelves (3 HBAs)” on page 368
- “7420 Standalone to Mixed Disk Shelves (4 HBAs)” on page 371
- “7420 Clustered to Mixed Disk Shelves (2 HBAs)” on page 375
- “7420 Clustered to Mixed Disk Shelves (3 HBAs)” on page 378
- “7420 Clustered to Mixed Disk Shelves (4 HBAs)” on page 382

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 11.

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 562 Standalone 7420 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

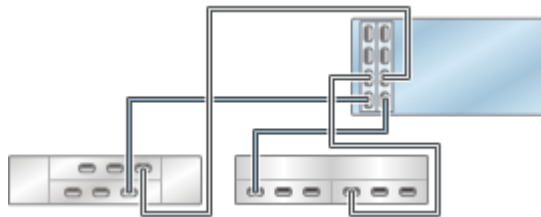


FIGURE 563 Standalone 7420 controllers with two HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

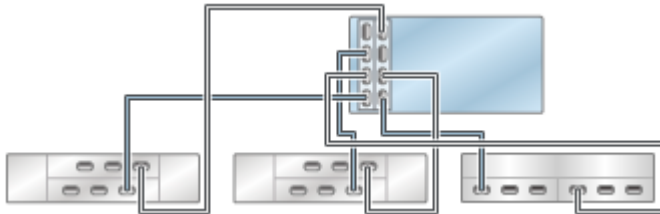


FIGURE 564 Standalone 7420 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

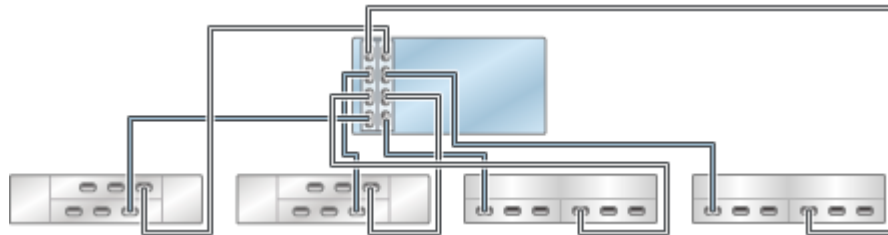


FIGURE 565 Standalone 7420 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

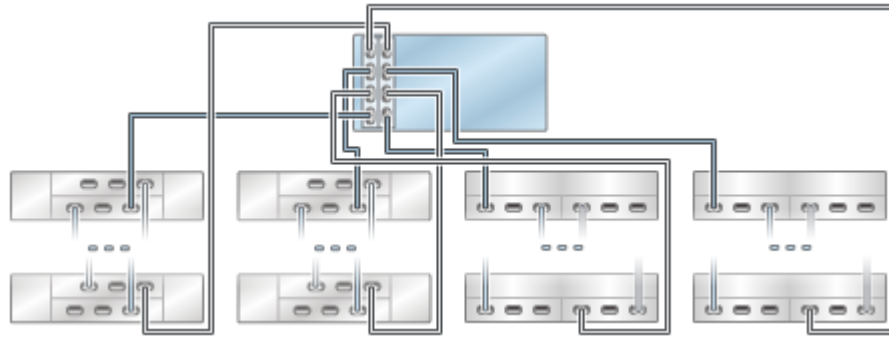


FIGURE 566 Multiple DE2-24 disk shelves in a single chain

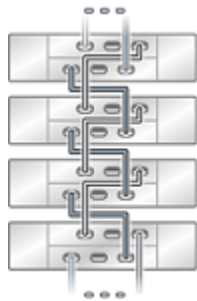
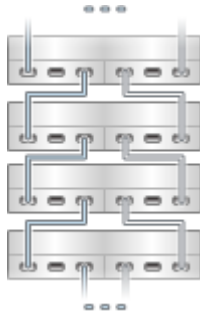


FIGURE 567 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 568 Standalone 7420 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)



FIGURE 569 Standalone 7420 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

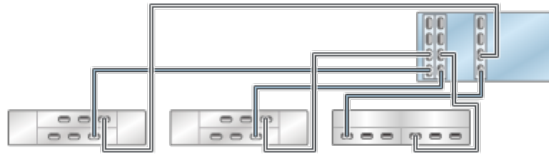


FIGURE 570 Standalone 7420 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

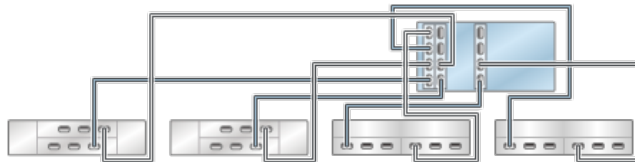


FIGURE 571 Standalone 7420 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

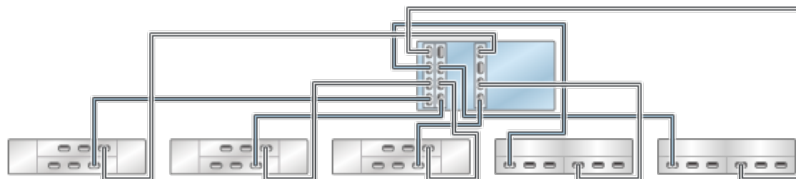


FIGURE 572 Standalone 7420 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

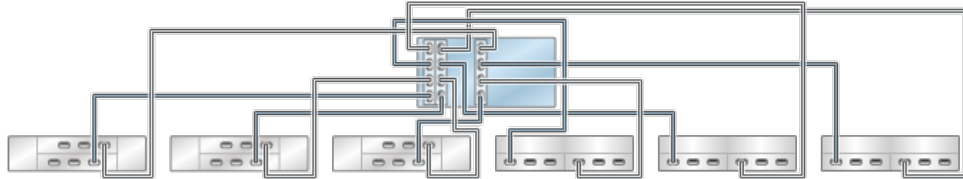


FIGURE 573 Standalone 7420 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

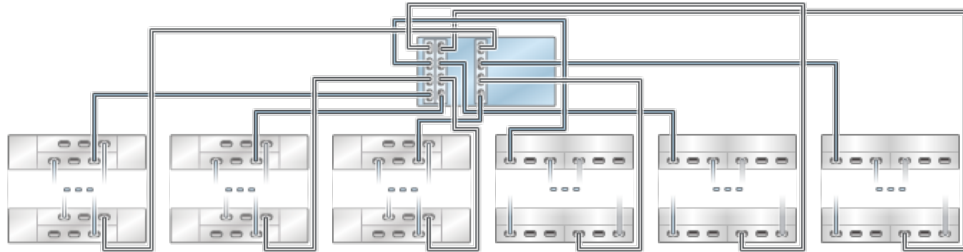


FIGURE 574 Multiple DE2-24 disk shelves in a single chain

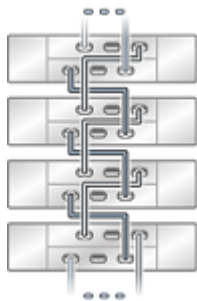
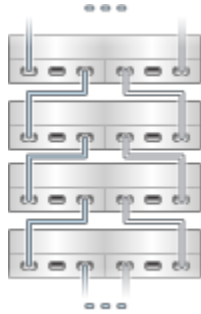


FIGURE 575 Multiple Sun Disk Shelves in a single chain

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 11](#).

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 576 Standalone 7420 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

FIGURE 577 Standalone 7420 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

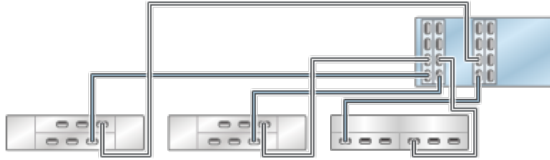


FIGURE 578 Standalone 7420 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

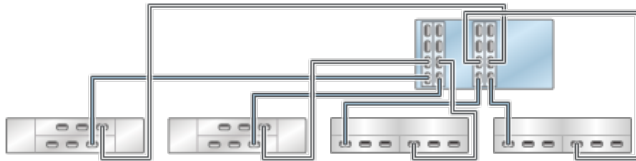


FIGURE 579 Standalone 7420 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

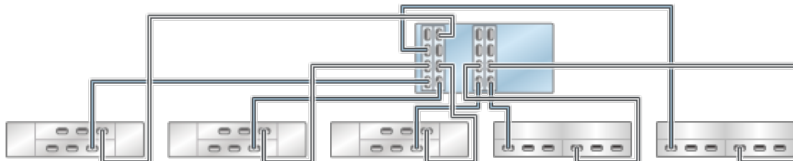


FIGURE 580 Standalone 7420 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

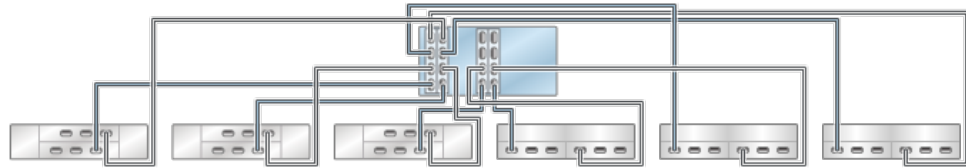


FIGURE 581 Standalone 7420 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

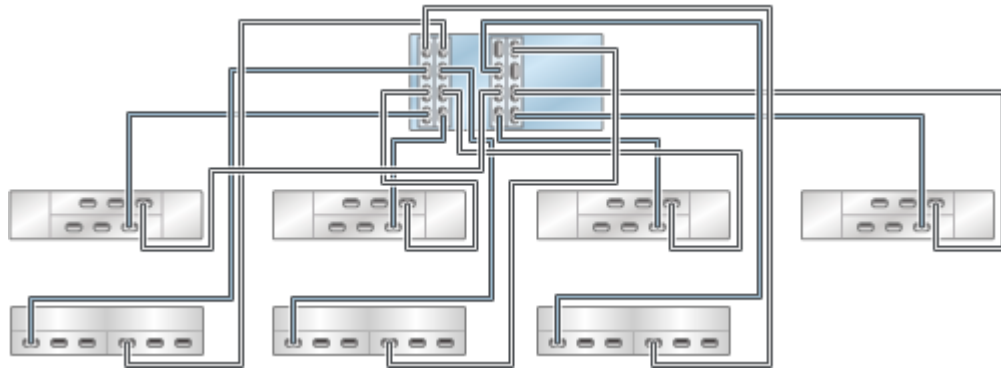


FIGURE 582 Standalone 7420 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

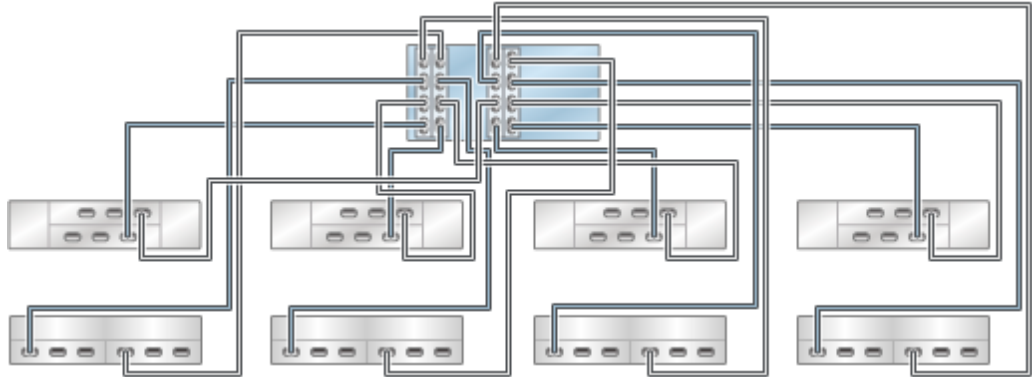


FIGURE 583 Standalone 7420 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

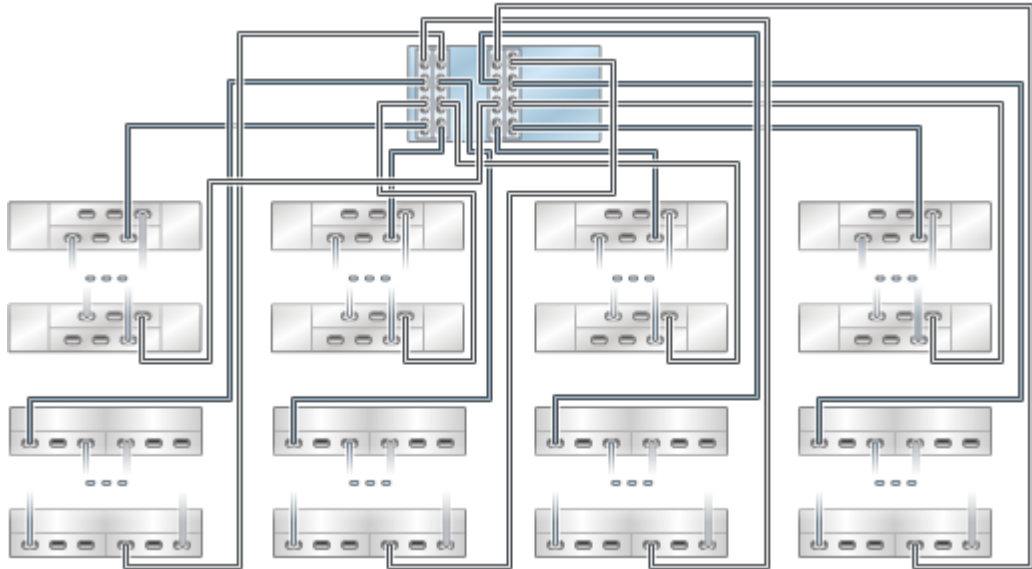


FIGURE 584 Multiple DE2-24 disk shelves in a single chain

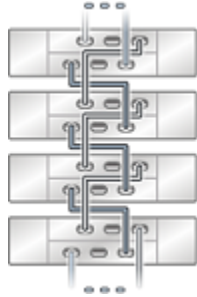
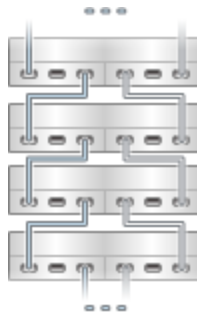


FIGURE 585 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 586 Clustered 7420 controllers with two HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

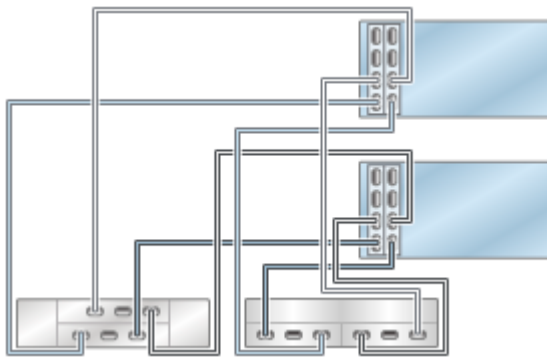


FIGURE 587 Clustered 7420 controllers with two HBAs connected to three mixed disk shelves in two chains (DE2-24 shown on the left)

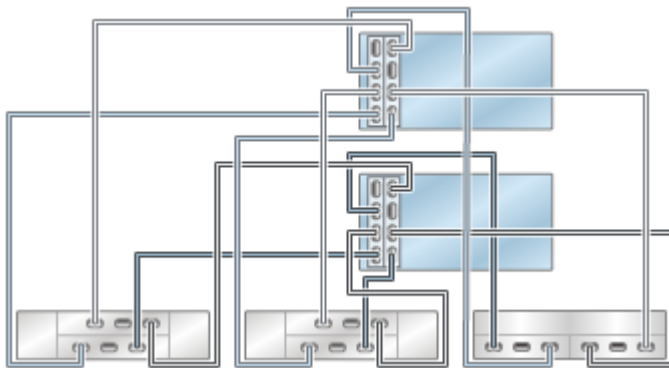


FIGURE 588 Clustered 7420 controllers with two HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

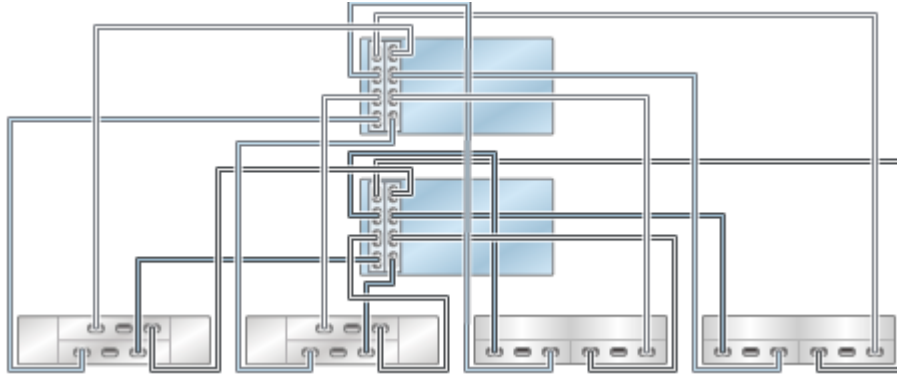


FIGURE 589 Clustered 7420 controllers with two HBAs connected to multiple mixed disk shelves in four chains (DE2-24 shown on the left)

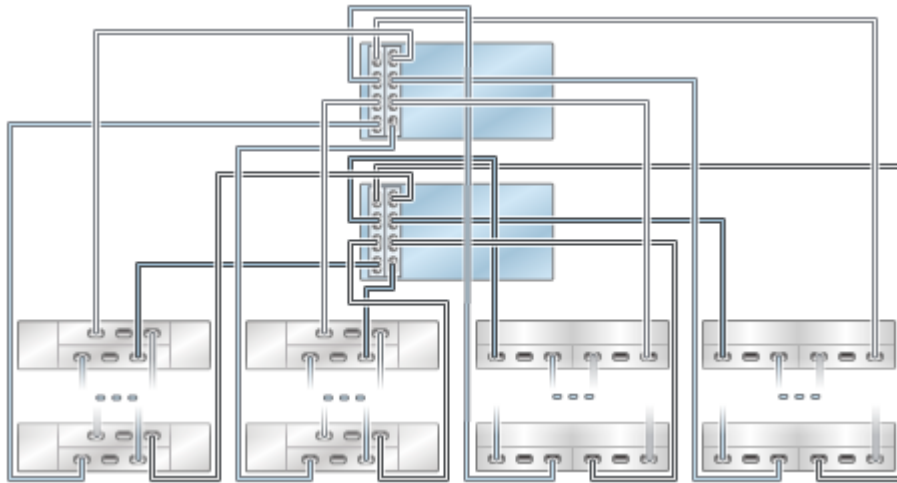


FIGURE 590 Multiple DE2-24 disk shelves in a single chain

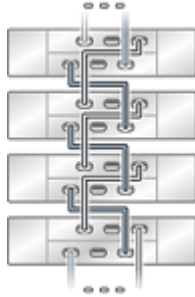
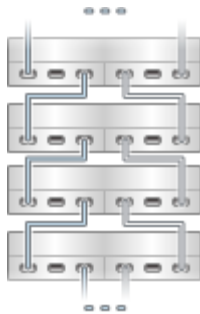


FIGURE 591 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 592 Clustered 7420 controllers with three HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

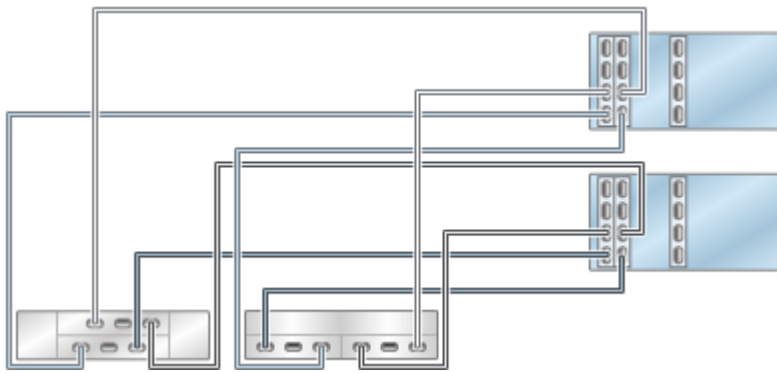


FIGURE 593 Clustered 7420 controllers with three HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

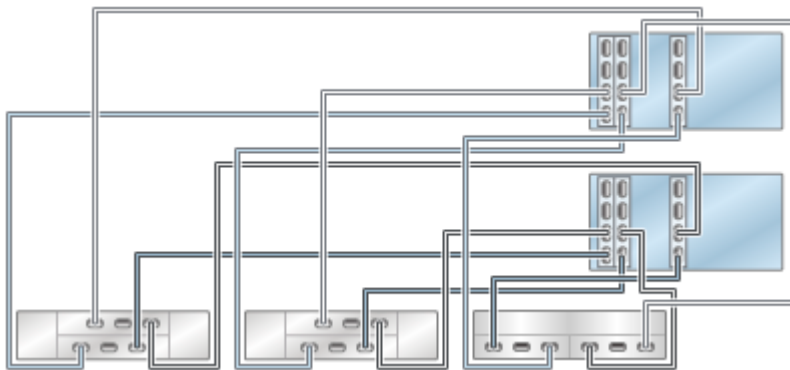


FIGURE 594 Clustered 7420 controllers with three HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

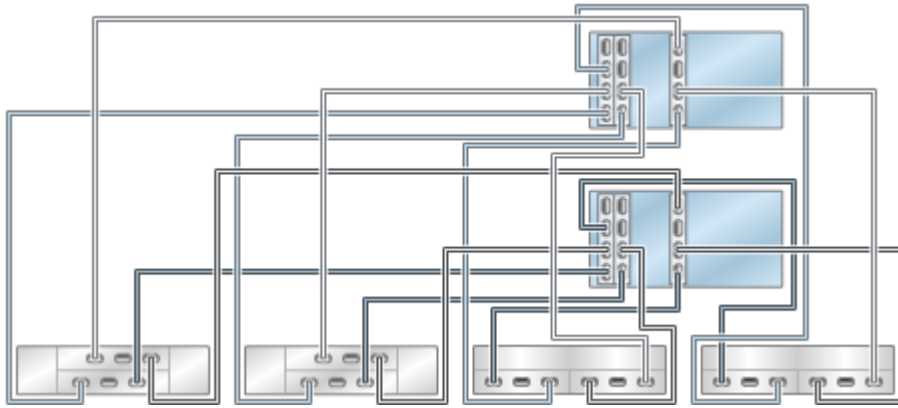


FIGURE 595 Clustered 7420 controllers with three HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

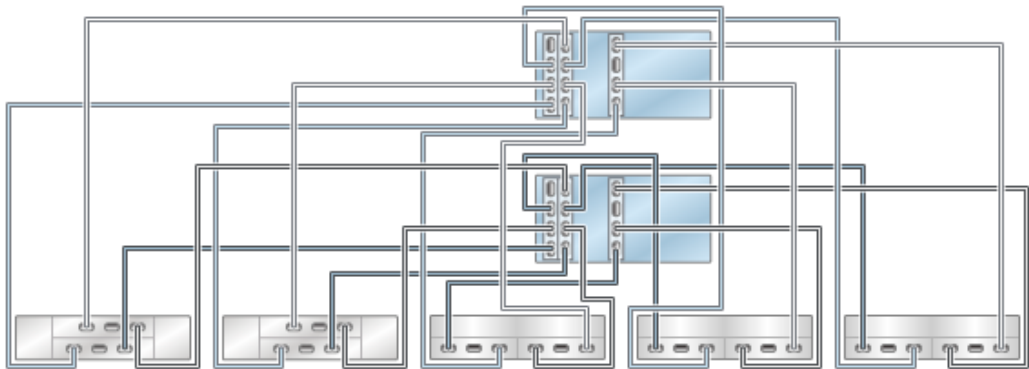


FIGURE 596 Clustered 7420 controllers with three HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

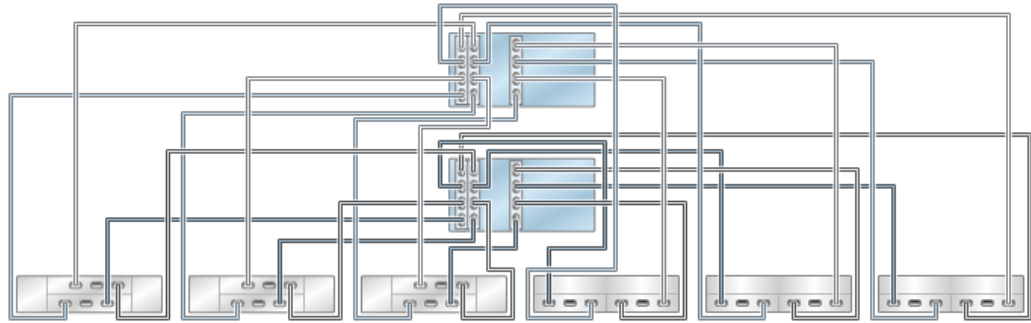


FIGURE 597 Clustered 7420 controllers with three HBAs connected to multiple mixed disk shelves in six chains (DE2-24 shown on the left)

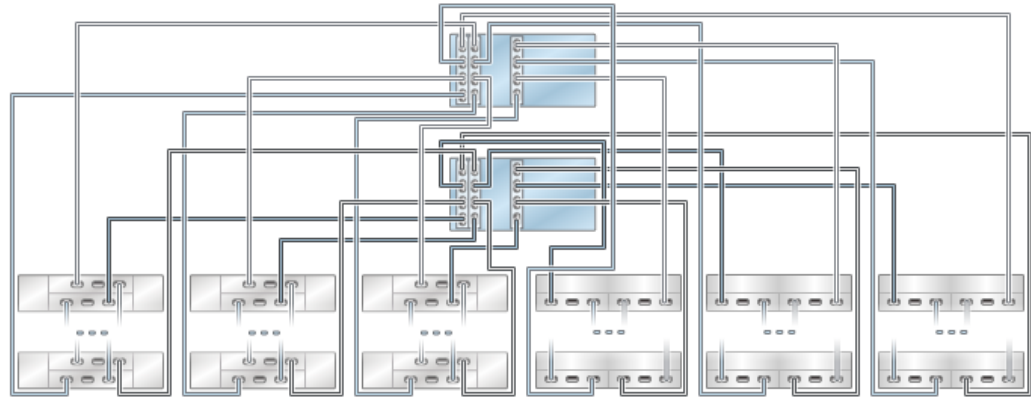


FIGURE 598 Multiple DE2-24 disk shelves in a single chain

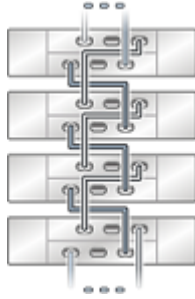
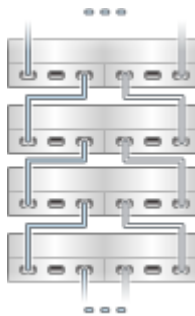


FIGURE 599 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 600 Clustered 7420 controllers with four HBAs connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

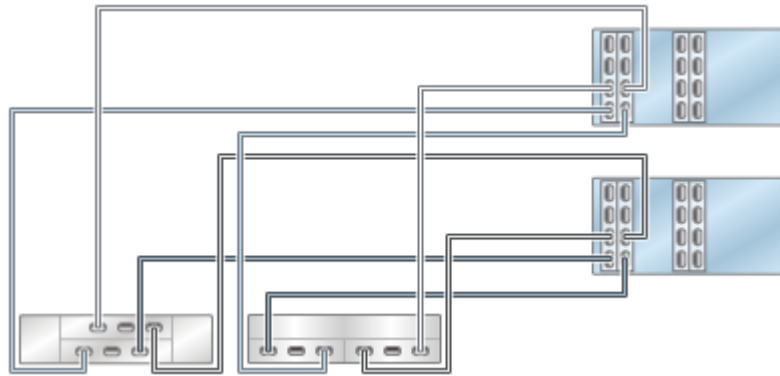


FIGURE 601 Clustered 7420 controllers with four HBAs connected to three mixed disk shelves in three chains (DE2-24 shown on the left)

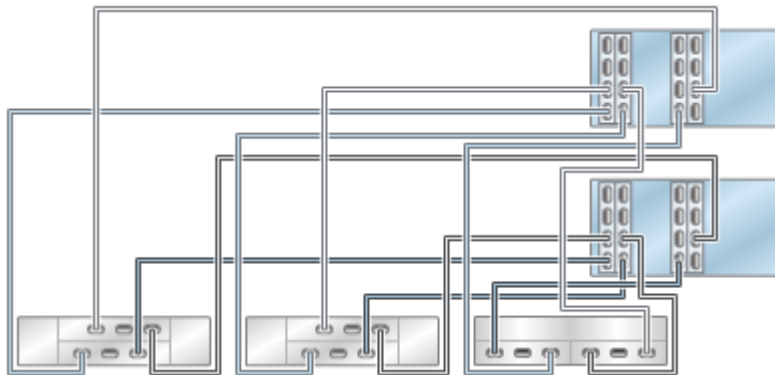


FIGURE 602 Clustered 7420 controllers with four HBAs connected to four mixed disk shelves in four chains (DE2-24 shown on the left)

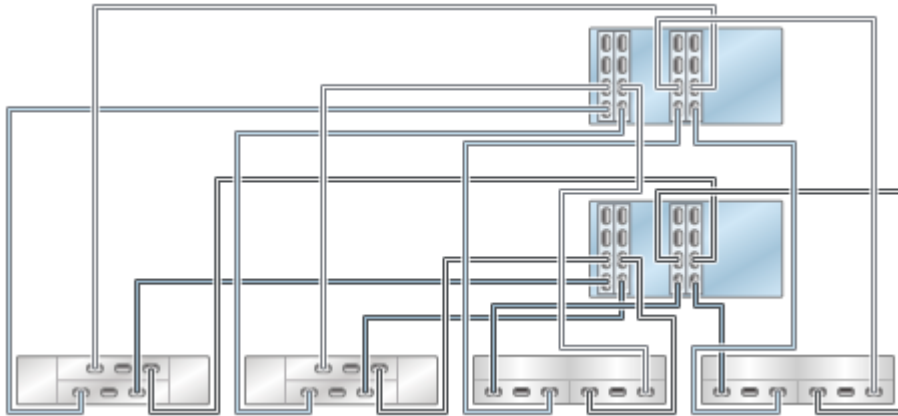


FIGURE 603 Clustered 7420 controllers with four HBAs connected to five mixed disk shelves in five chains (DE2-24 shown on the left)

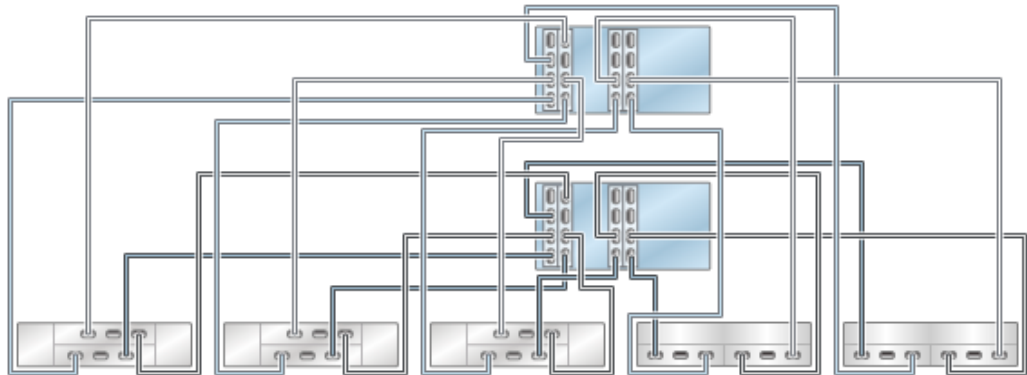


FIGURE 604 Clustered 7420 controllers with four HBAs connected to six mixed disk shelves in six chains (DE2-24 shown on the left)

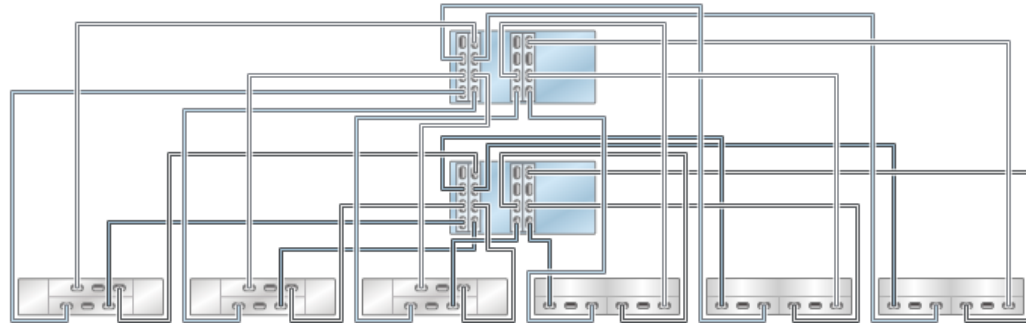


FIGURE 605 Clustered 7420 controllers with four HBAs connected to seven mixed disk shelves in seven chains (DE2-24 shown on the top)

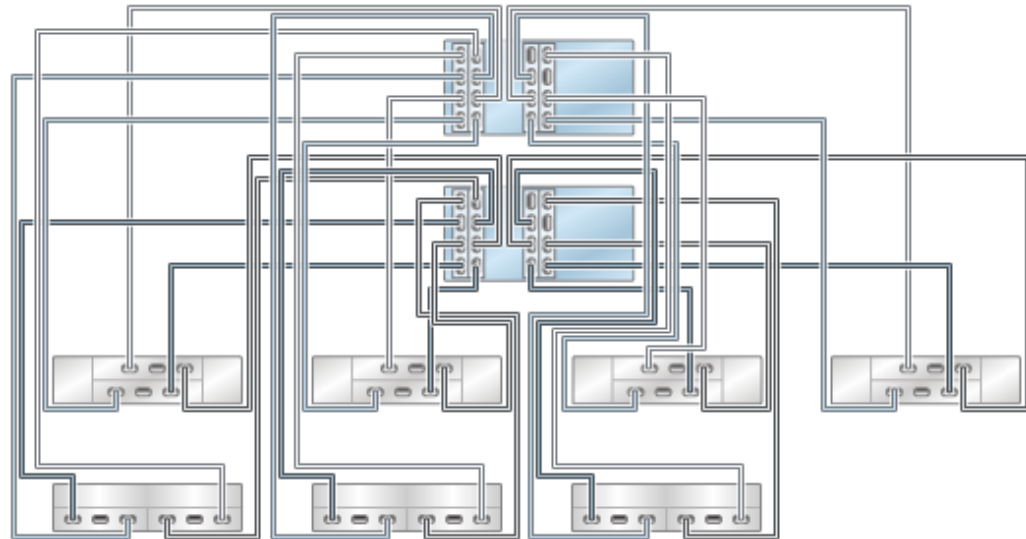


FIGURE 606 Clustered 7420 controllers with four HBAs connected to eight mixed disk shelves in eight chains (DE2-24 shown on the top)

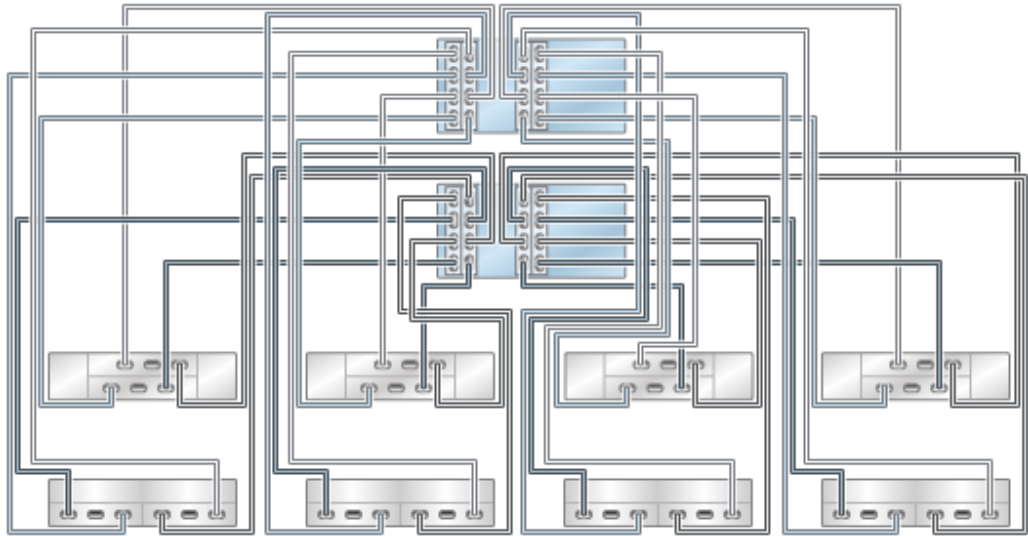


FIGURE 607 Clustered 7420 controllers with four HBAs connected to multiple mixed disk shelves in eight chains (DE2-24 shown on the top)

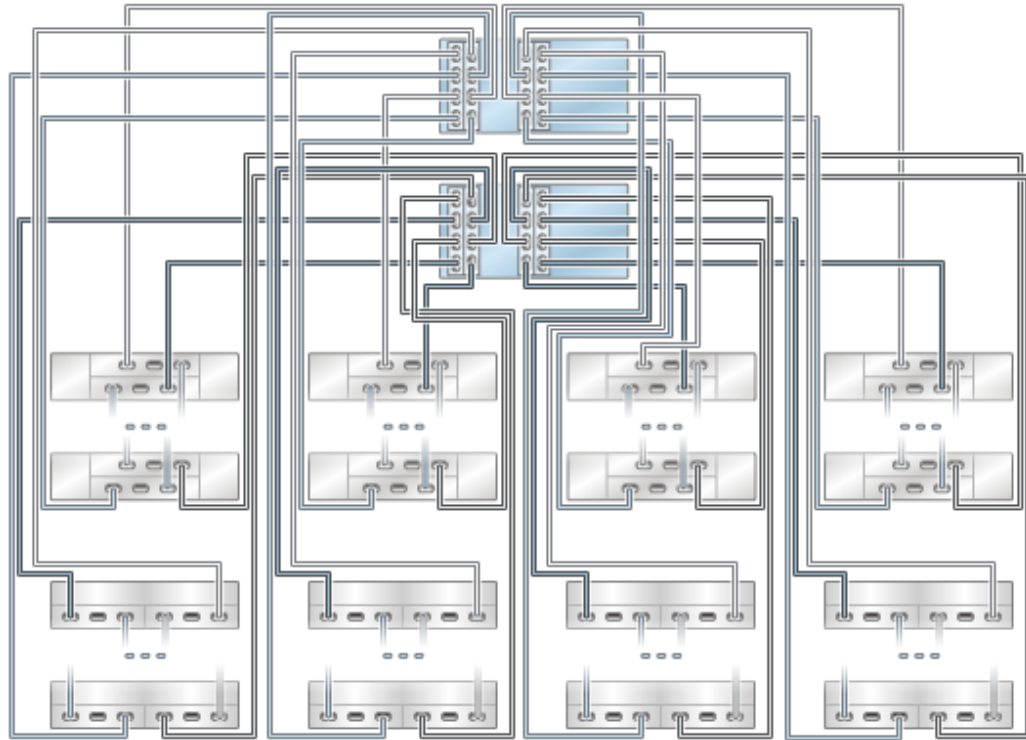


FIGURE 608 Multiple DE2-24 disk shelves in a single chain

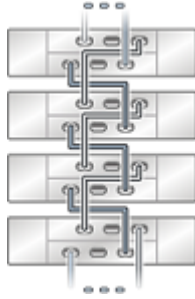
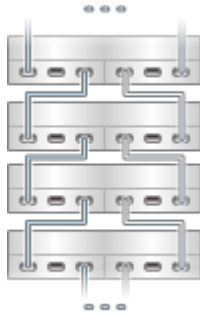


FIGURE 609 Multiple Sun Disk Shelves in a single chain



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 389](#)
- [“7320 Clustered to Mixed Disk Shelves” on page 390](#)

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 11](#).

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 610 Standalone 7320 controller with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

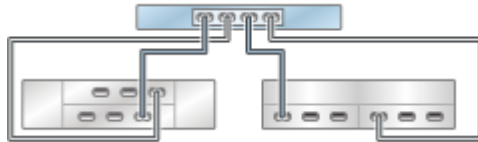


FIGURE 611 Standalone 7320 controller with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

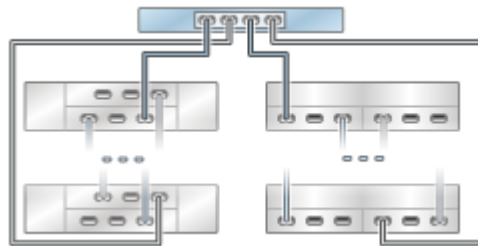


FIGURE 612 Multiple DE2-24 disk shelves in a single chain

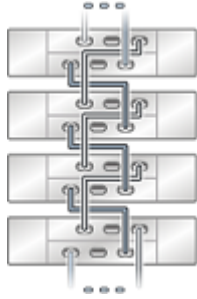
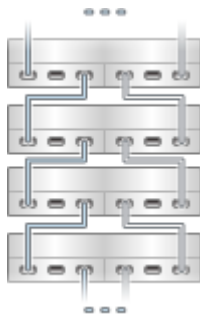


FIGURE 613 Multiple Sun Disk Shelves in a single chain



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 11](#).

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 614 Clustered 7320 controllers with one HBA connected to two mixed disk shelves in two chains (DE2-24 shown on the left)

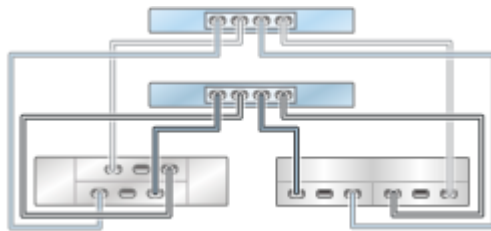


FIGURE 615 Clustered 7320 controllers with one HBA connected to multiple mixed disk shelves in two chains (DE2-24 shown on the left)

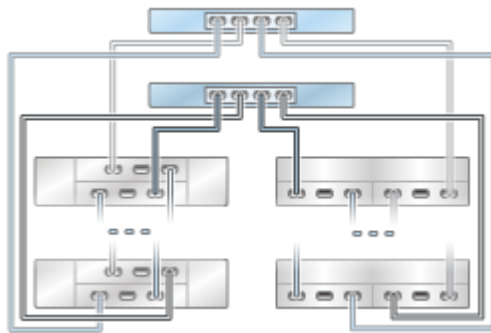


FIGURE 616 Multiple DE2-24 disk shelves in a single chain

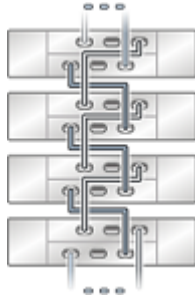
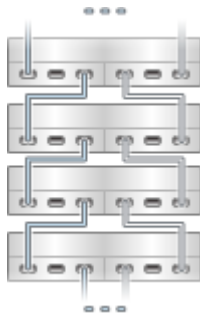


FIGURE 617 Multiple Sun Disk Shelves in a single chain



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

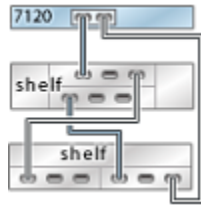
The following figure shows a subset of the supported configurations for Oracle ZFS Storage 7120 standalone controllers with one HBA. To cable the controller to the disk shelves, see [“Getting Started with Cabling” on page 11](#).

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 618 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 ZS7-2

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS7-2, which is a pre-racked and pre-cabled system that supports two configuration types: ZS7-2 high-end model configurations and ZS7-2 mid-range model configurations.

This section contains the following topics:

- [“ZS7-2 High-end \(HE\) Racked System Configurations” on page 395](#)
- [“ZS7-2 Mid-range \(MR\) Racked System Configurations” on page 437](#)

ZS7-2 High-end (HE) Racked System Configurations

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS7-2 HE, which is a pre-racked and pre-cabled system that supports two configuration types: capacity configurations and performance configurations.

This section contains the following topics:

- [“Capacity Configurations for ZS7-2 HE Racked Systems” on page 395](#)
- [“All-Flash/Mixed Configurations for ZS7-2 HE Racked Systems” on page 418](#)

Capacity Configurations for ZS7-2 HE Racked Systems

This section provides an overview and cabling diagrams for ZS7-2 HE Racked System capacity configurations.

This section contains the following topics:

- [“Overview of ZS7-2 HE Racked System Capacity Configurations” on page 396](#)

- [“Cabling Tables and Diagrams for ZS7-2 HE Racked System Capacity Configurations” on page 398](#)

Overview of ZS7-2 HE Racked System Capacity Configurations

Capacity configurations take advantage of high-capacity disk shelves and are available in a base cabinet, or a base cabinet with up to three expansion cabinets. Two ZS7-2 controllers and up to 39 disk shelves can be supported, as shown in the following table.

TABLE 5 ZS7-2 HE Racked System Capacity Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2	Expansion Cabinet 3
Up to 9 DE3-24C disk shelves in 2 chains Supported configurations: 1, 2, 4, 6, 8, or 9 DE3-24C disk shelves Two ZS7-2 HE controllers	Up to 10 DE3-24C disk shelves Supported configurations: 2, 4, 5, 6, 8, or 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves
Up to 9 DE3-24C disk shelves in 4 chains Supported configurations: 1, 2, 4, 6, 8, or 9 DE3-24C disk shelves Two ZS7-2 HE controllers	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Not supported
Up to 9 DE3-24C disk shelves in 8 chains Supported configurations: 1, 2, 4, 6, 8, or 9 DE3-24C disk shelves Two ZS7-2 HE controllers	Not supported	Not supported	Not supported

Each ZS7-2 HE capacity base cabinet comprises 1, 2, 4, 6, 8, or 9 DE3-24C disk shelves. Each expansion cabinet comprises 2, 4, 5 (half rack), 6, 8, or 10 DE3-24C disk shelves. A maximum of 39 disk shelves can be accommodated with one base cabinet and three expansion cabinets.

Each ZS7-2 HE controller has four SAS HBA cards. Clustered ZS7-2 HE controllers support a high-availability configuration consisting of:

- Up to nine disk shelves in the base cabinet configured in two, four, or eight chains, and

- Up to three expansion cabinets, each cabinet supporting two chains with a maximum of 5 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 cabinets are self-contained and pre-cabled following the required cabling methodology. Pre-racked system cabling tables and diagrams, which can also be used for planning future system expansion, are provided in the section [“Cabling Tables and Diagrams for ZS7-2 HE Racked System Capacity Configurations”](#) on page 398.

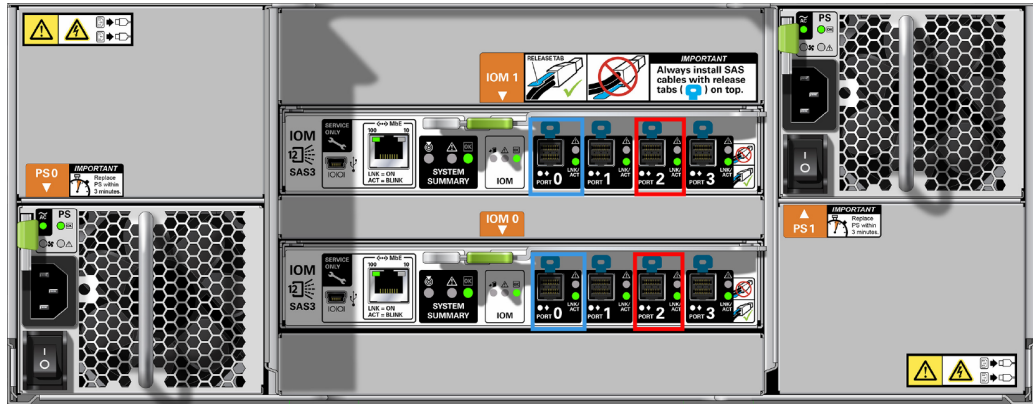
Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS7-2 controller occupies two rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet, and the bottom controller is Controller 0 in RU17. The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 619 ZS7-2 HE Controller 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 base cabinet to the top for stability. Because the ZS7-2 HE controller occupies two rack units, the base cabinet contains a filler panel above each controller so that the cabinet layout is similar to prior offerings of Oracle racked systems with three-rack-unit controllers. It also allows for better serviceability access and cabling through the rear cable management arm (CMA). 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 620 DE3-24C Disk Shelf HBA Connections (Back View)



Cabling Tables and Diagrams for ZS7-2 HE Racked System Capacity Configurations

The following table describes the locations and port connections for two controllers and nine disk shelves in the base cabinet, using 3-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs.

The following tables are for configurations of two chains in the base cabinet and two chains per expansion cabinet, therefore allowing a maximum of 39 disk shelves.

TABLE 6 Base Cabinet: Controller and Disk Shelf Locations and Connections (Two Chains)

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 0	1	IOM 1, Port 2
17	0	Slot 3, Port 0	1	IOM 0, Port 2
20	1	Slot 9, Port 0	23	IOM 1, Port 2
17	0	Slot 10, Port 0	23	IOM 0, Port 2
17	0	Slot 2, Port 0	1, 5, 13	IOM 1, Port 0
20	1	Slot 3, Port 0	1, 5, 13	IOM 0, Port 0

FROM			TO	
17	0	Slot 9, Port 0	27, 35, 39	IOM 1, Port 0
20	1	Slot 10, Port 0	27, 35, 39	IOM 0, Port 0

The following table describes the locations and port connections for 10 disk shelves in Expansion Cabinet 1, using 6-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs. Expansion Cabinet 1 supports disk shelves 10 through 19.

TABLE 7 Expansion Cabinet 1: Controller and Disk Shelf Locations and Connections (Two Chains)

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 1	1	IOM 1, Port 2
17	0	Slot 3, Port 1	1	IOM 0, Port 2
20	1	Slot 9, Port 1	21	IOM 1, Port 2
17	0	Slot 10, Port 1	21	IOM 0, Port 2
17	0	Slot 2, Port 1	5, 9, 13, 17	IOM 1, Port 0
20	1	Slot 3, Port 1	5, 9, 13, 17	IOM 0, Port 0
17	0	Slot 9, Port 1	25, 33, 37	IOM 1, Port 0
20	1	Slot 10, Port 1	25, 33, 37	IOM 0, Port 0

The following table describes the locations and port connections for 10 disk shelves in Expansion Cabinet 2, using 6-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs. Expansion Cabinet 2 supports disk shelves 20 through 29.

TABLE 8 Expansion Cabinet 2: Controller and Disk Shelf Locations and Connections (Two Chains)

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 2	1	IOM 1, Port 2
17	0	Slot 3, Port 2	1	IOM 0, Port 2
20	1	Slot 9, Port 2	21	IOM 1, Port 2
17	0	Slot 10, Port 2	21	IOM 0, Port 2
17	0	Slot 2, Port 2	5, 9, 13, 17	IOM 1, Port 0
20	1	Slot 3, Port 2	5, 9, 13, 17	IOM 0, Port 0
17	0	Slot 9, Port 2	25, 33, 37	IOM 1, Port 0
20	1	Slot 10, Port 2	25, 33, 37	IOM 0, Port 0

The following table describes the locations and port connections for 10 disk shelves in Expansion Cabinet 3, using 6-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs. Expansion Cabinet 2 supports disk shelves 30 through 39.

TABLE 9 Expansion Cabinet 3: Controller and Disk Shelf Locations and Connections (Two Chains)

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 3	1	IOM 1, Port 2
17	0	Slot 3, Port 3	1	IOM 0, Port 2
20	1	Slot 9, Port 3	21	IOM 1, Port 2
17	0	Slot 10, Port 3	21	IOM 0, Port 2
17	0	Slot 2, Port 3	5, 9, 13, 17	IOM 1, Port 0
20	1	Slot 3, Port 3	5, 9, 13, 17	IOM 0, Port 0
17	0	Slot 9, Port 3	25, 33, 37	IOM 1, Port 0
20	1	Slot 10, Port 3	25, 33, 37	IOM 0, Port 0

The following diagrams illustrate how pre-racked systems are cabled, as well as how to expand your system in the future. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

FIGURE 621 ZS7-2 HE Racked System Capacity Configuration: 11 DE3-24C Disk Shelves

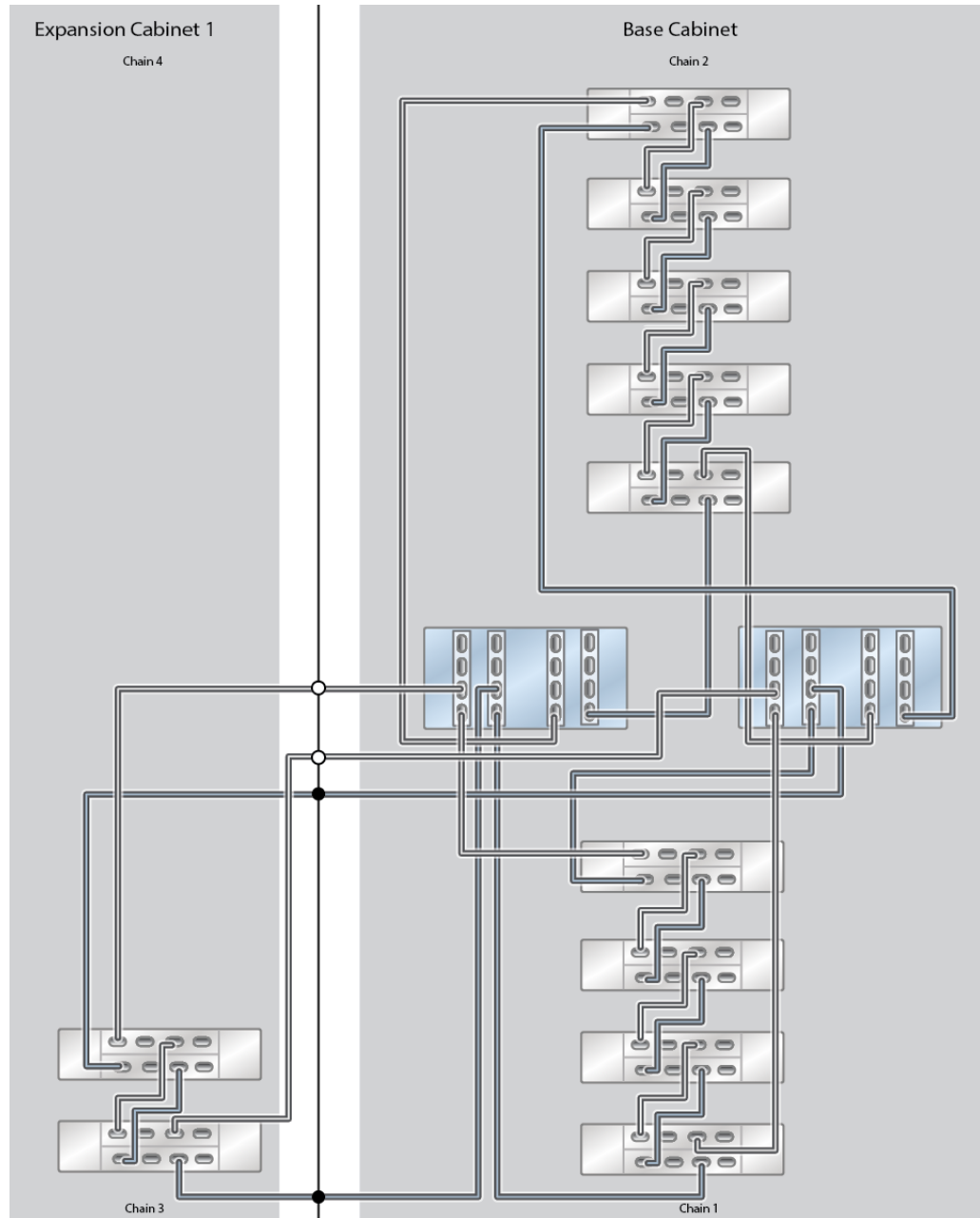


FIGURE 622 ZS7-2 HE Racked System Capacity Configuration: 13 DE3-24C Disk Shelves

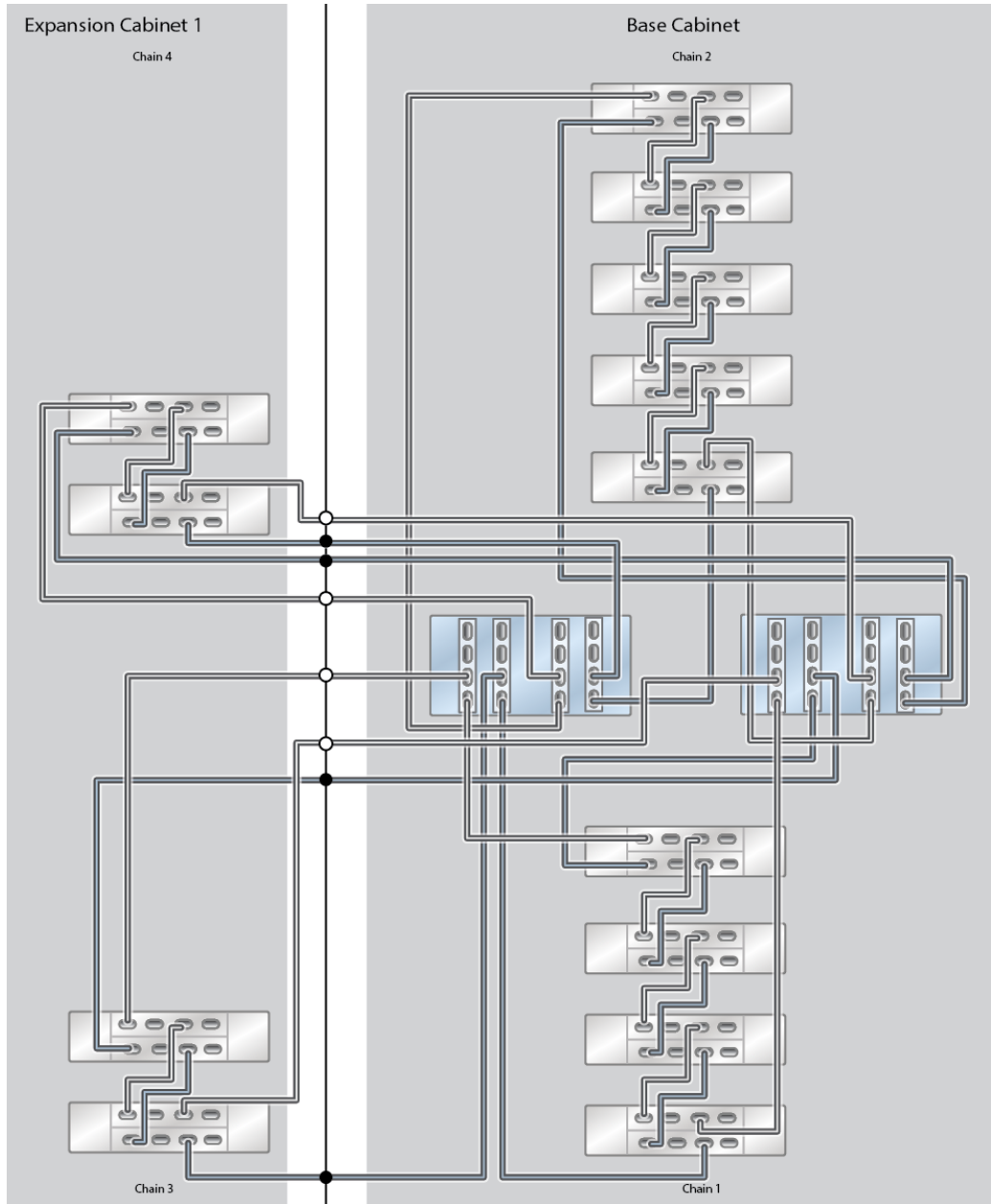


FIGURE 623 ZS7-2 HE Racked System Capacity Configuration: 14 DE3-24C Disk Shelves (Expansion Cabinet 1 Half Rack)

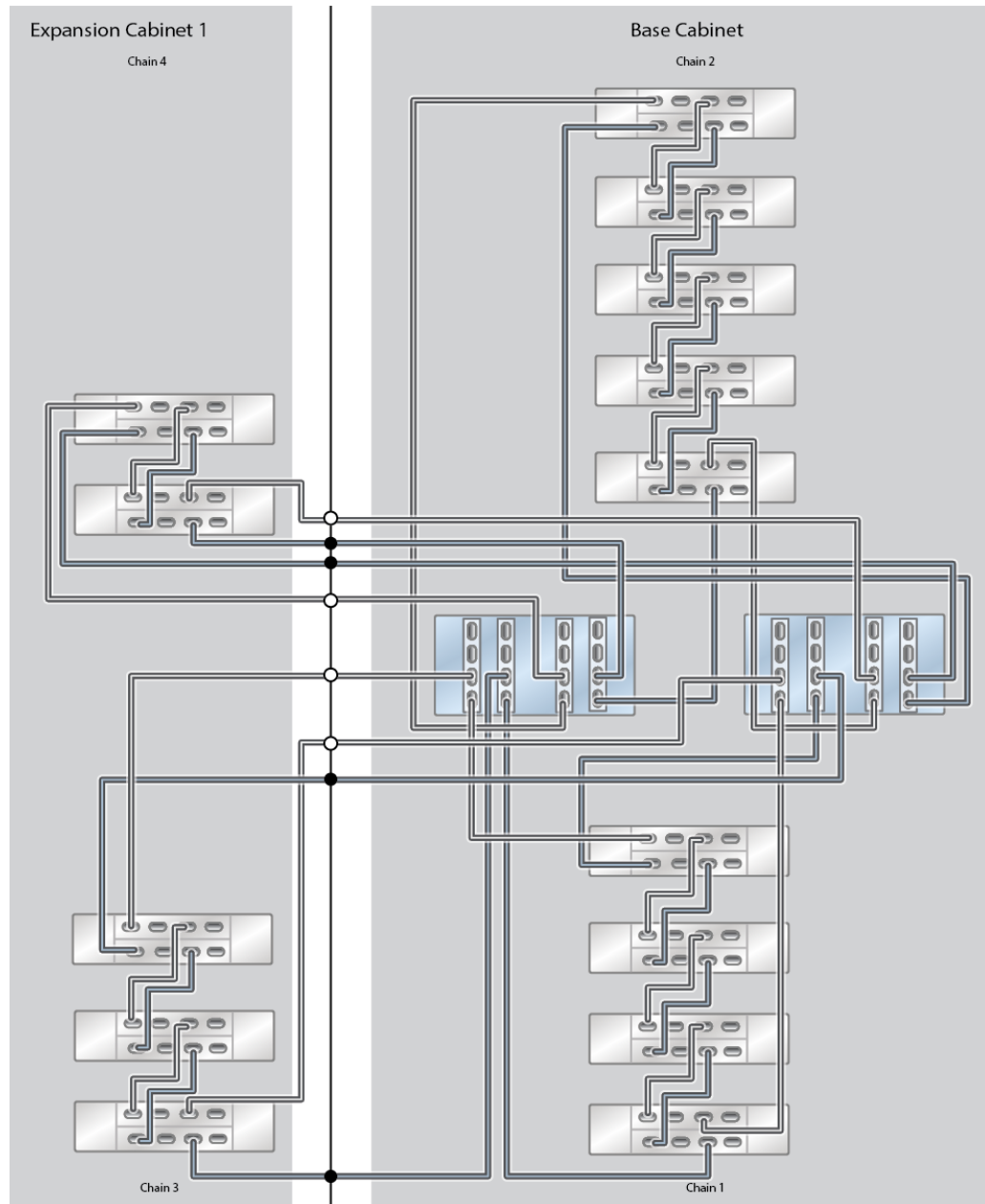


FIGURE 624 ZS7-2 HE Racked System Capacity Configuration: 15 DE3-24C Disk Shelves

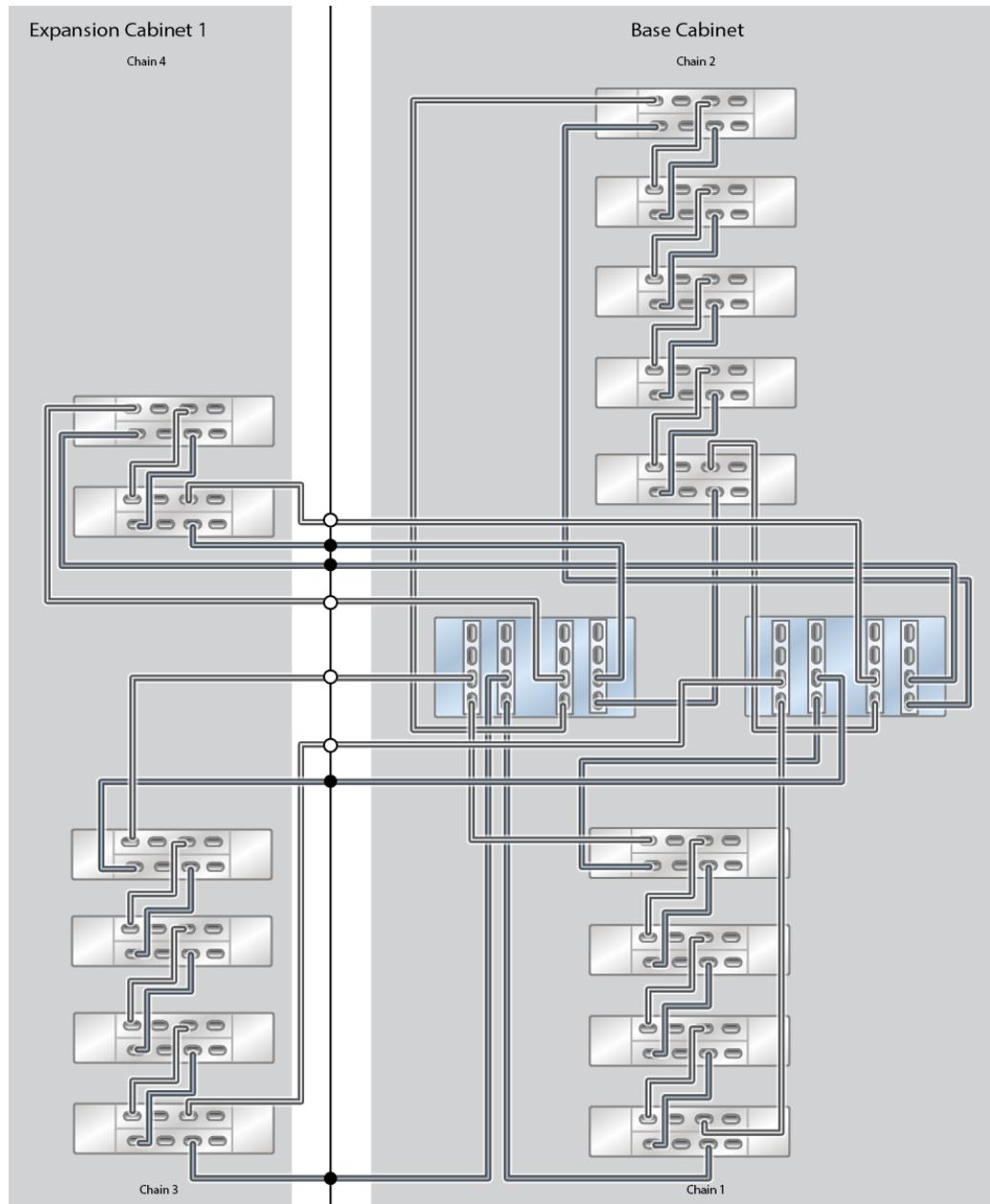


FIGURE 625 ZS7-2 HE Racked System Capacity Configuration: 17 DE3-24C Disk Shelves

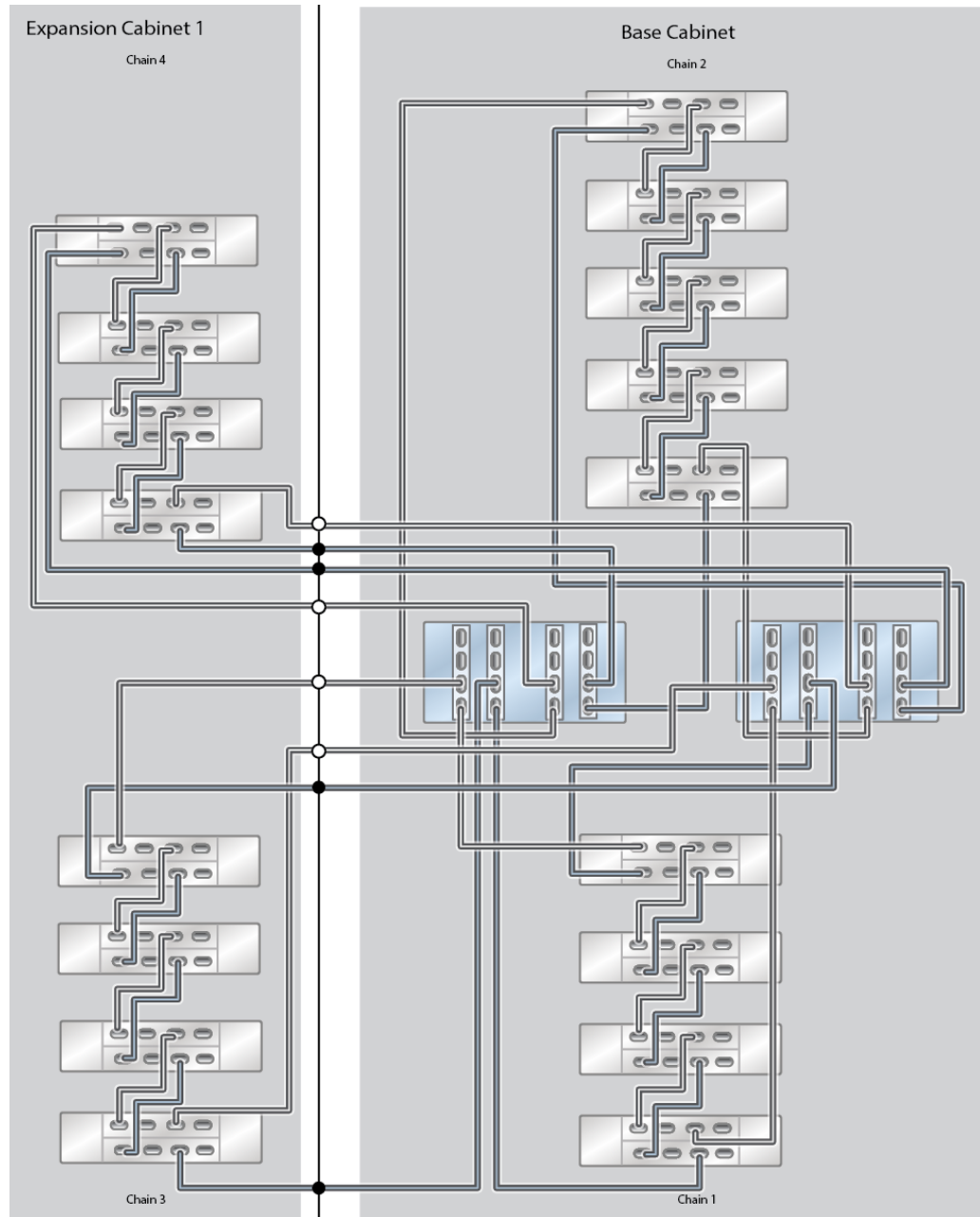


FIGURE 626 ZS7-2 HE Racked System Capacity Configuration: 19 DE3-24C Disk Shelves

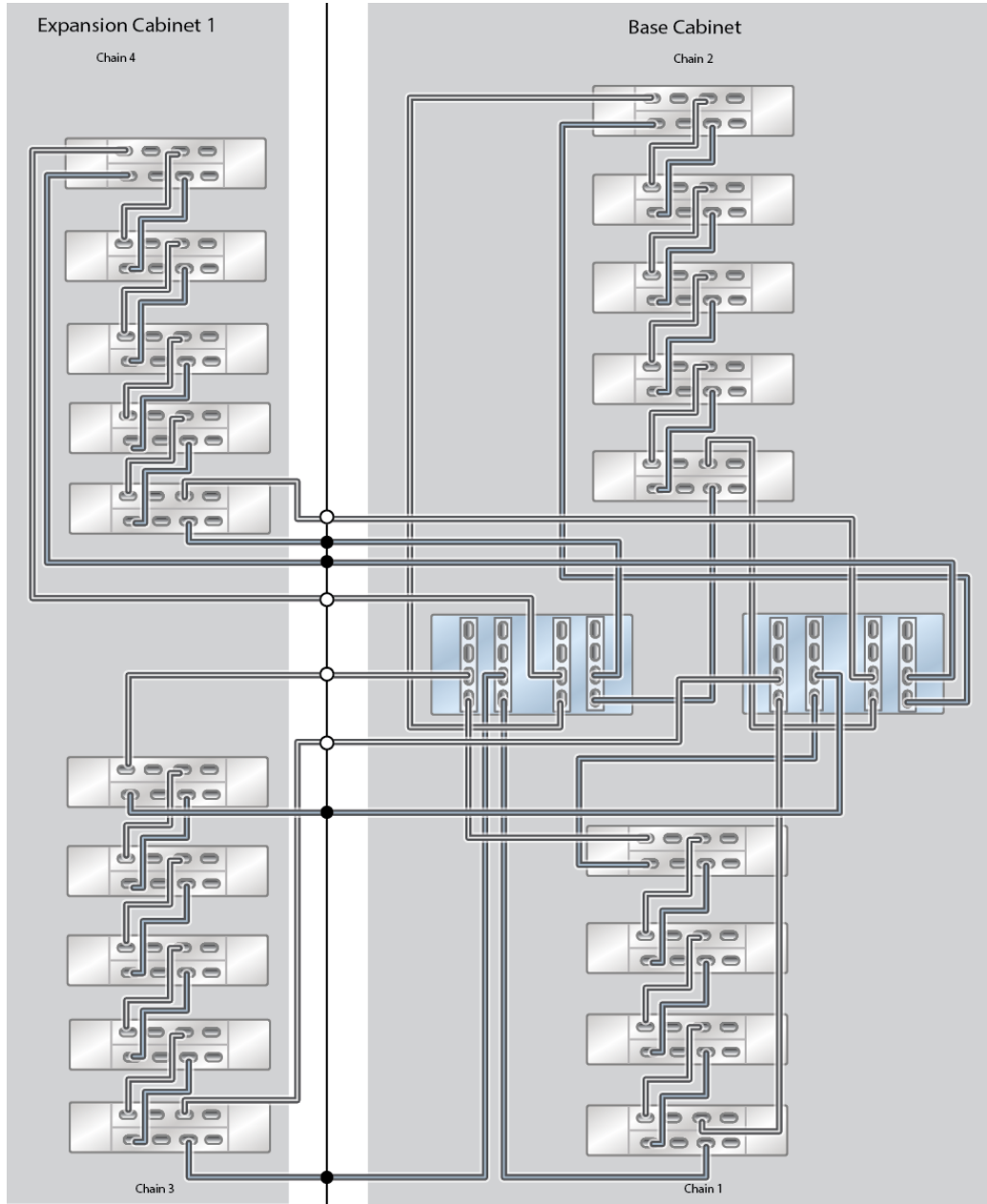


FIGURE 627 ZS7-2 HE Racked System Capacity Configuration: 21 DE3-24C Disk Shelves

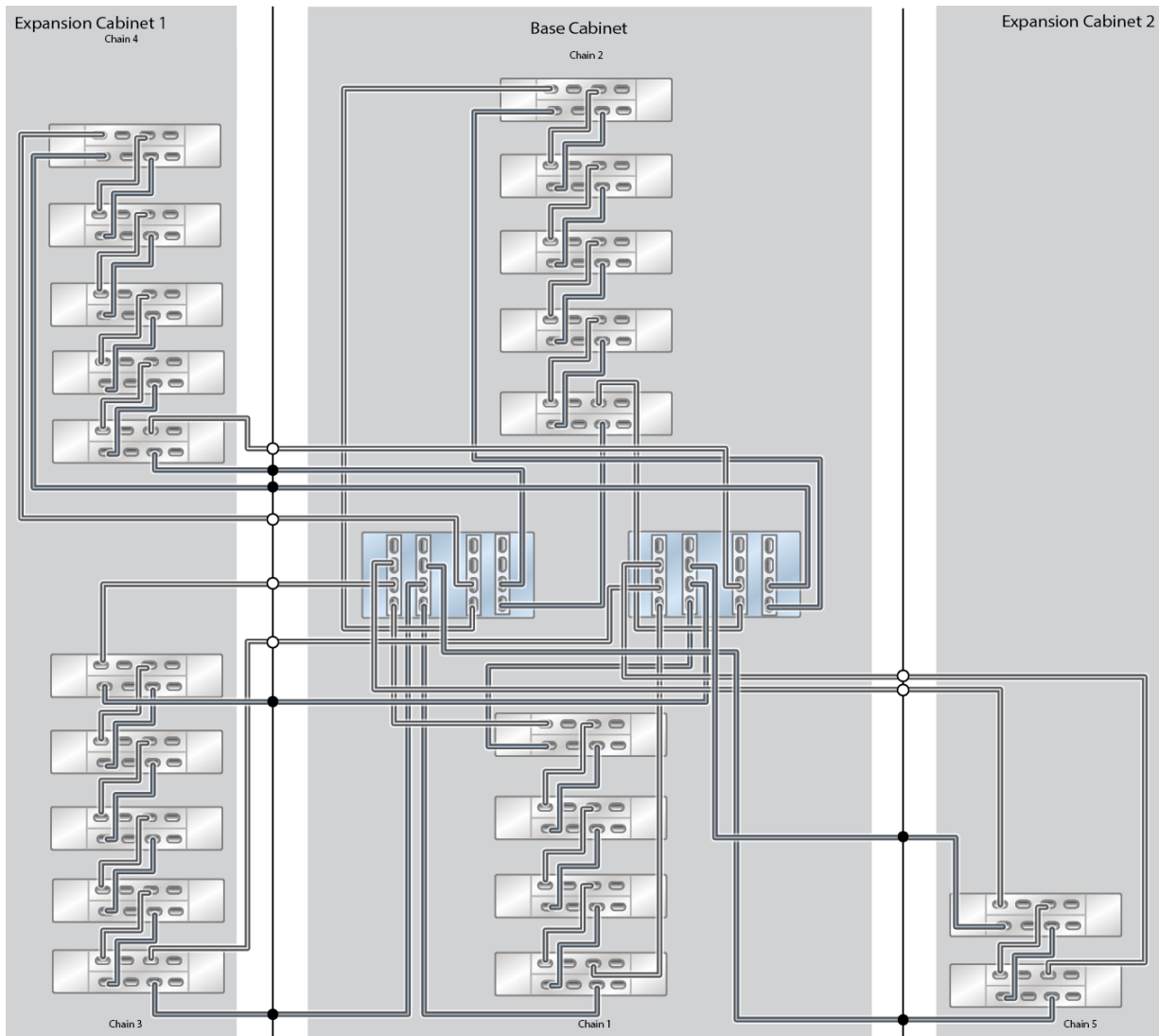


FIGURE 628 ZS7-2 HE Racked System Capacity Configuration: 23 DE3-24C Disk Shelves

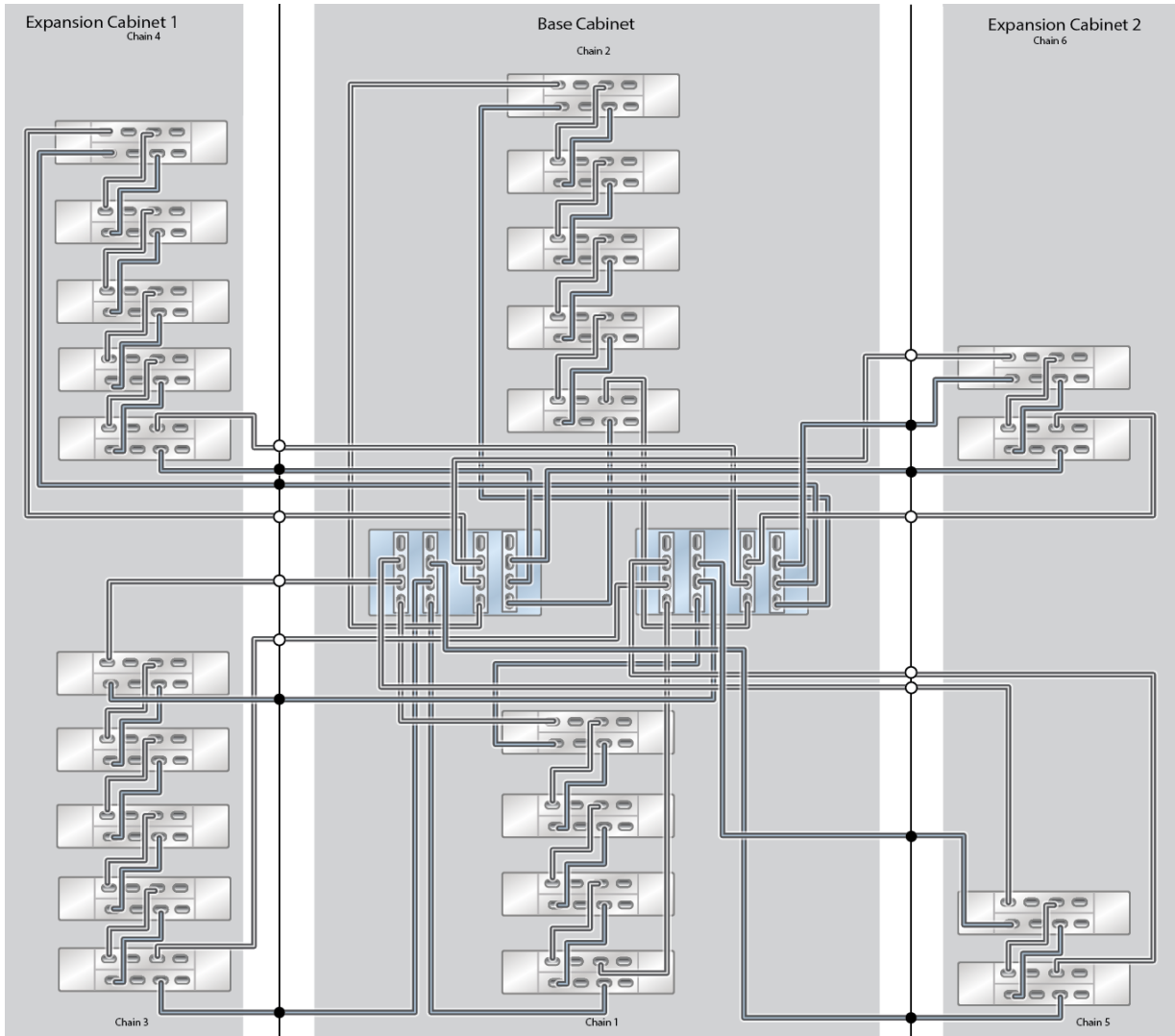


FIGURE 629 ZS7-2 HE Racked System Capacity Configuration: 24 DE3-24C Disk Shelves (Expansion Cabinet 2 Half Rack)

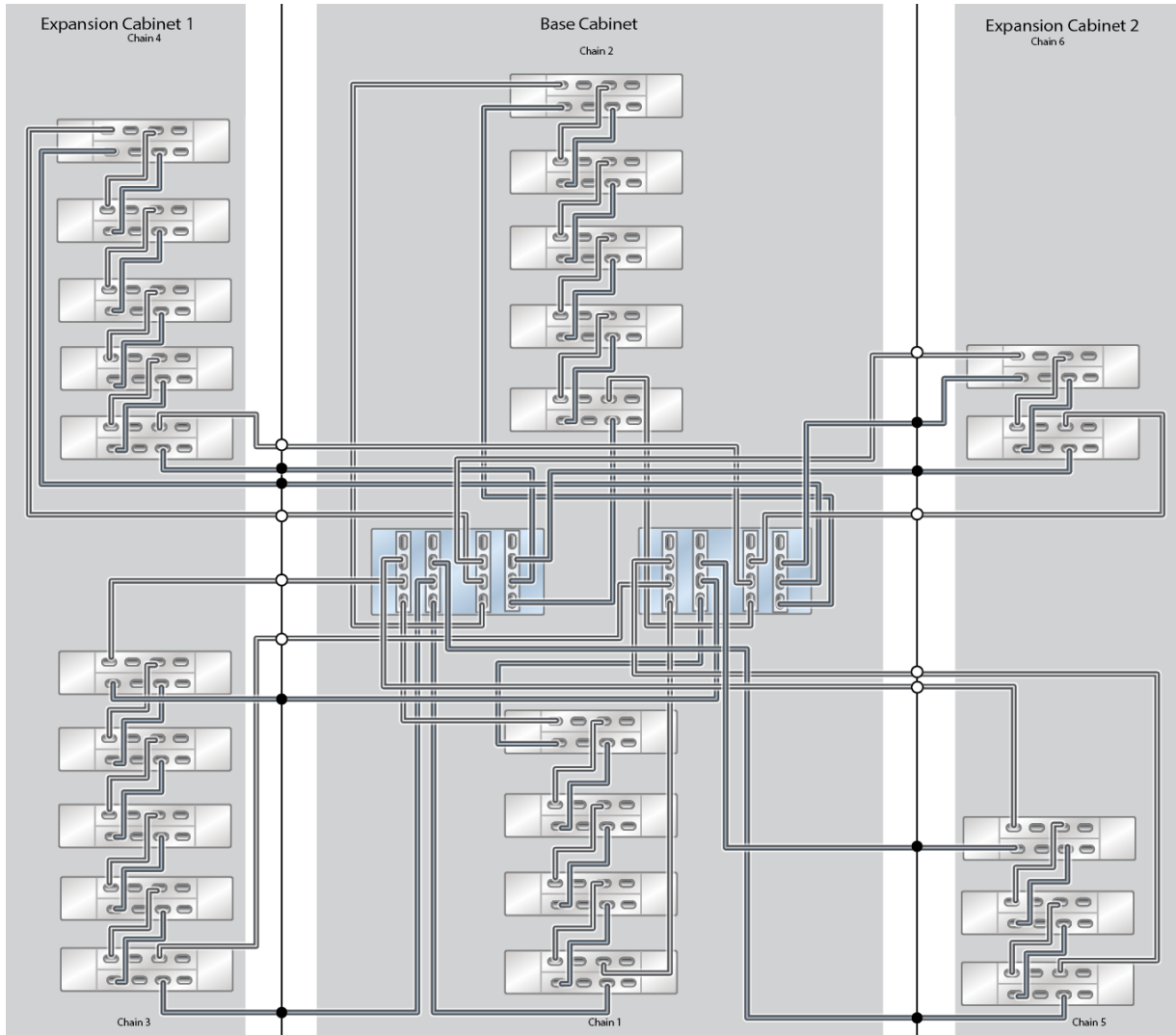


FIGURE 630 ZS7-2 HE Racked System Capacity Configuration: 25 DE3-24C Disk Shelves

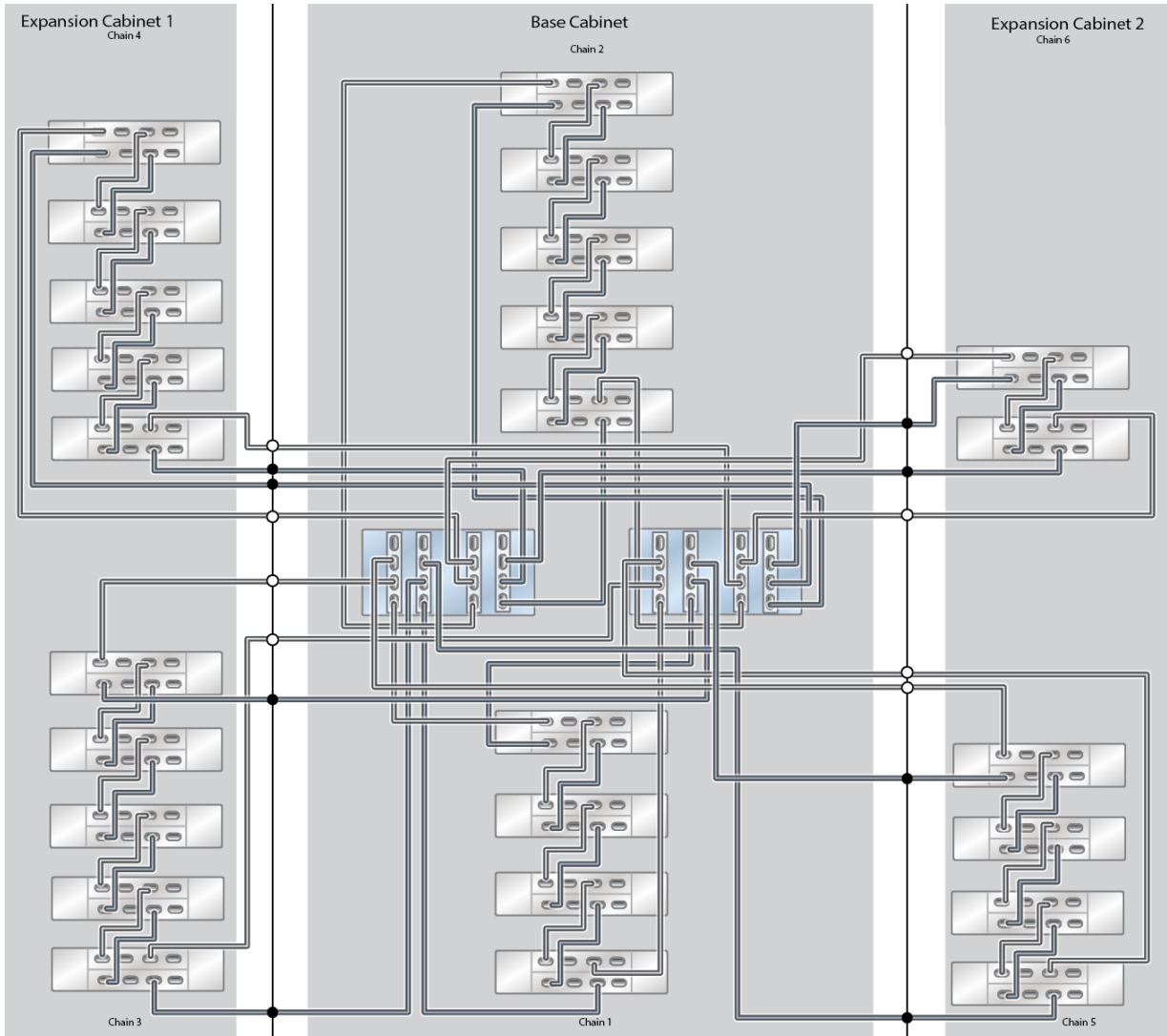


FIGURE 631 ZS7-2 HE Racked System Capacity Configuration: 27 DE3-24C Disk Shelves

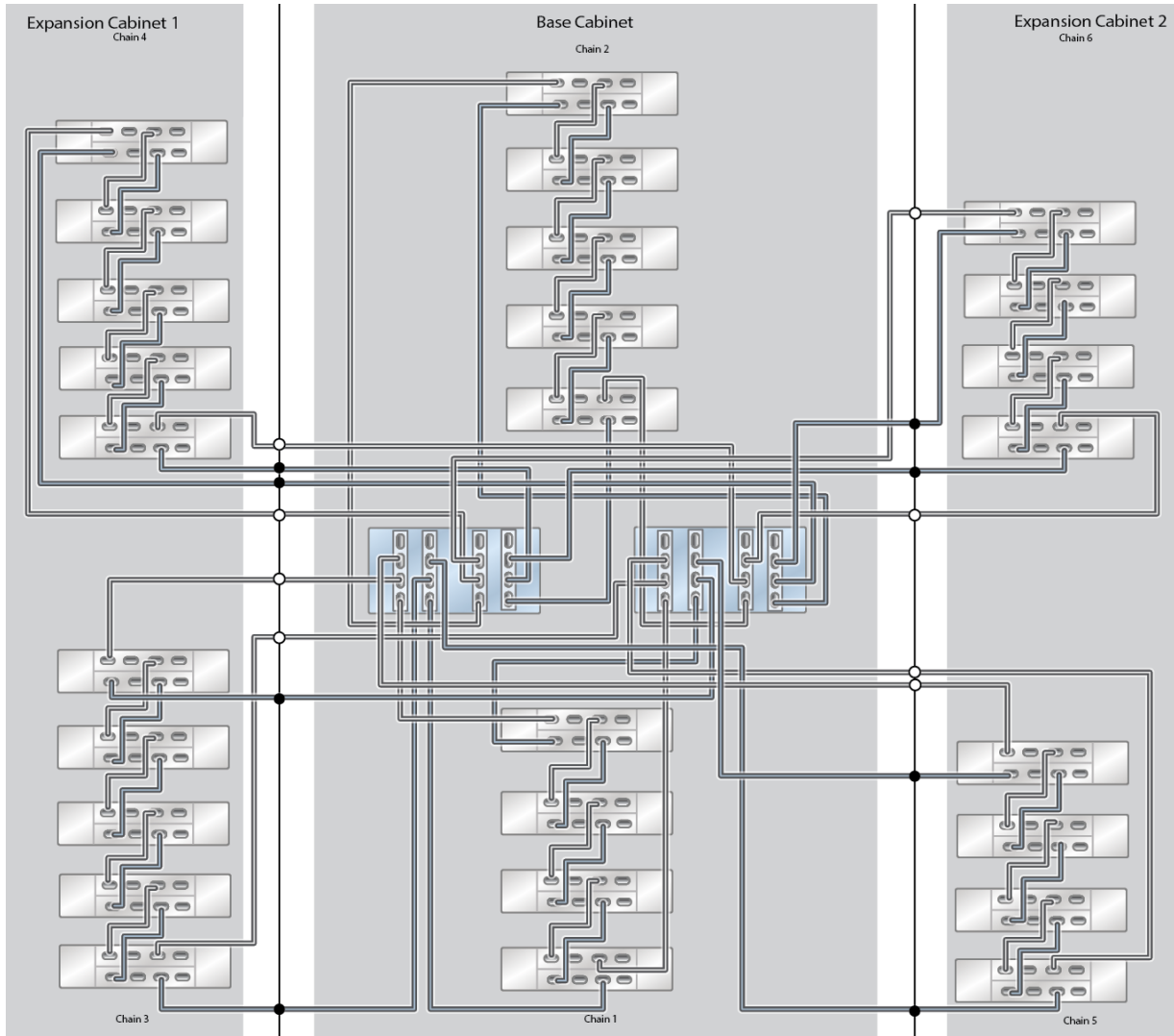


FIGURE 632 ZS7-2 HE Racked System Capacity Configuration: 29 DE3-24C Disk Shelves

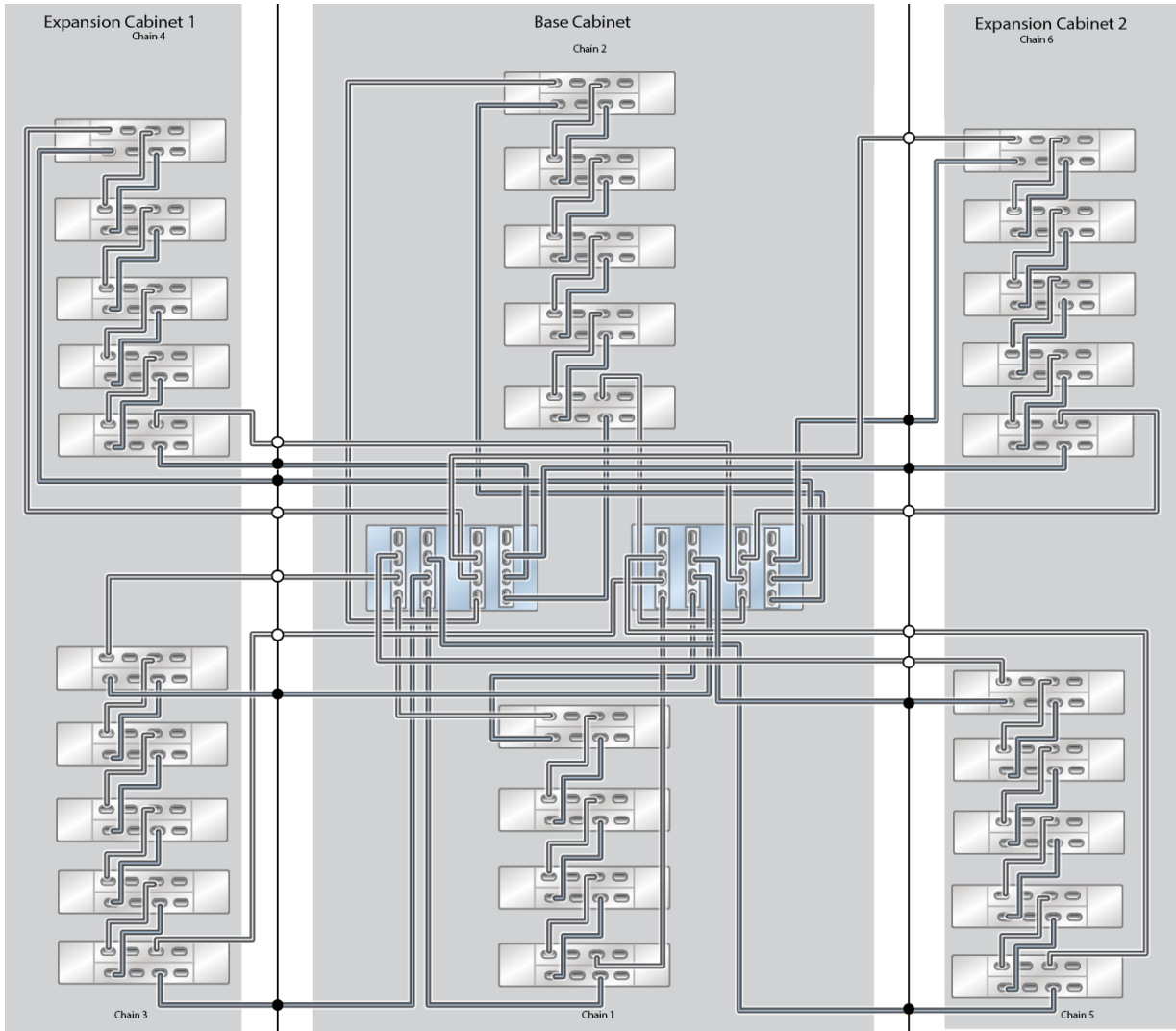


FIGURE 633 ZS7-2 HE Racked System Capacity Configuration: 31 DE3-24C Disk Shelves

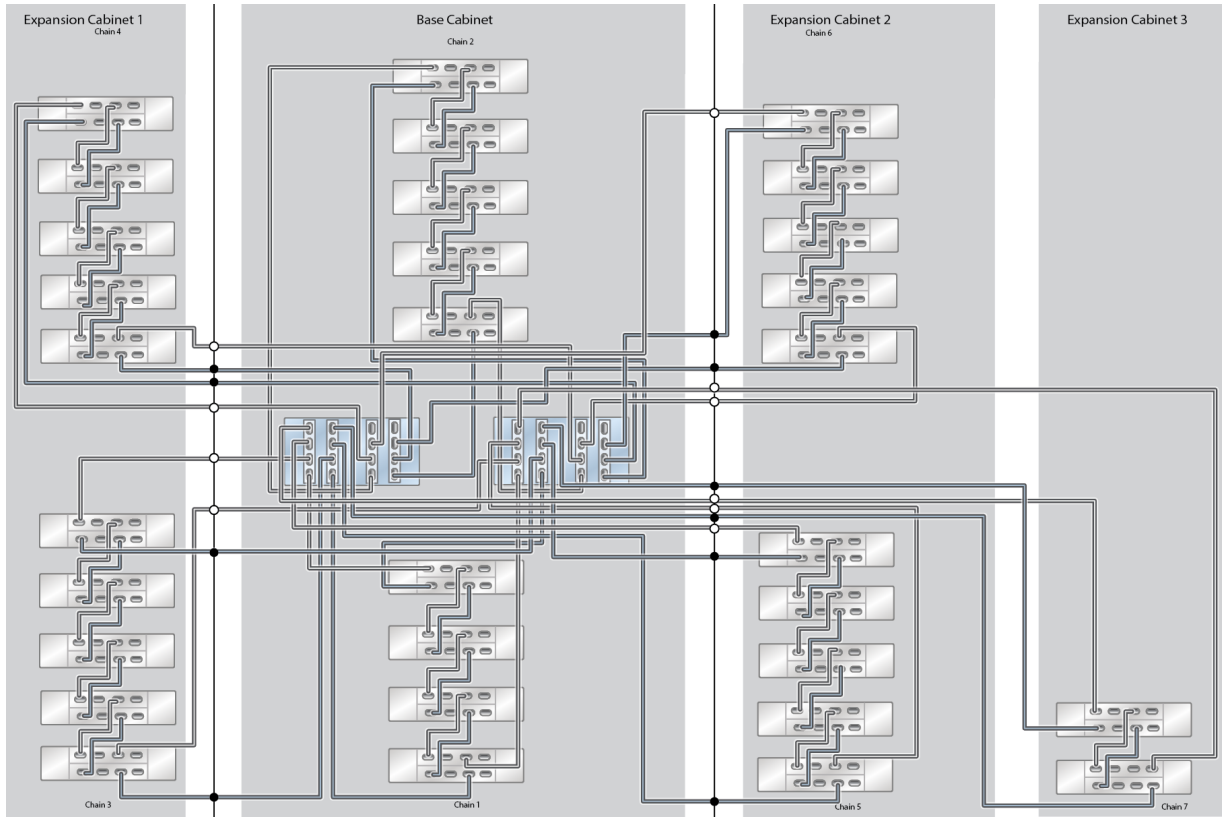


FIGURE 634 ZS7-2 HE Racked System Capacity Configuration: 33 DE3-24C Disk Shelves

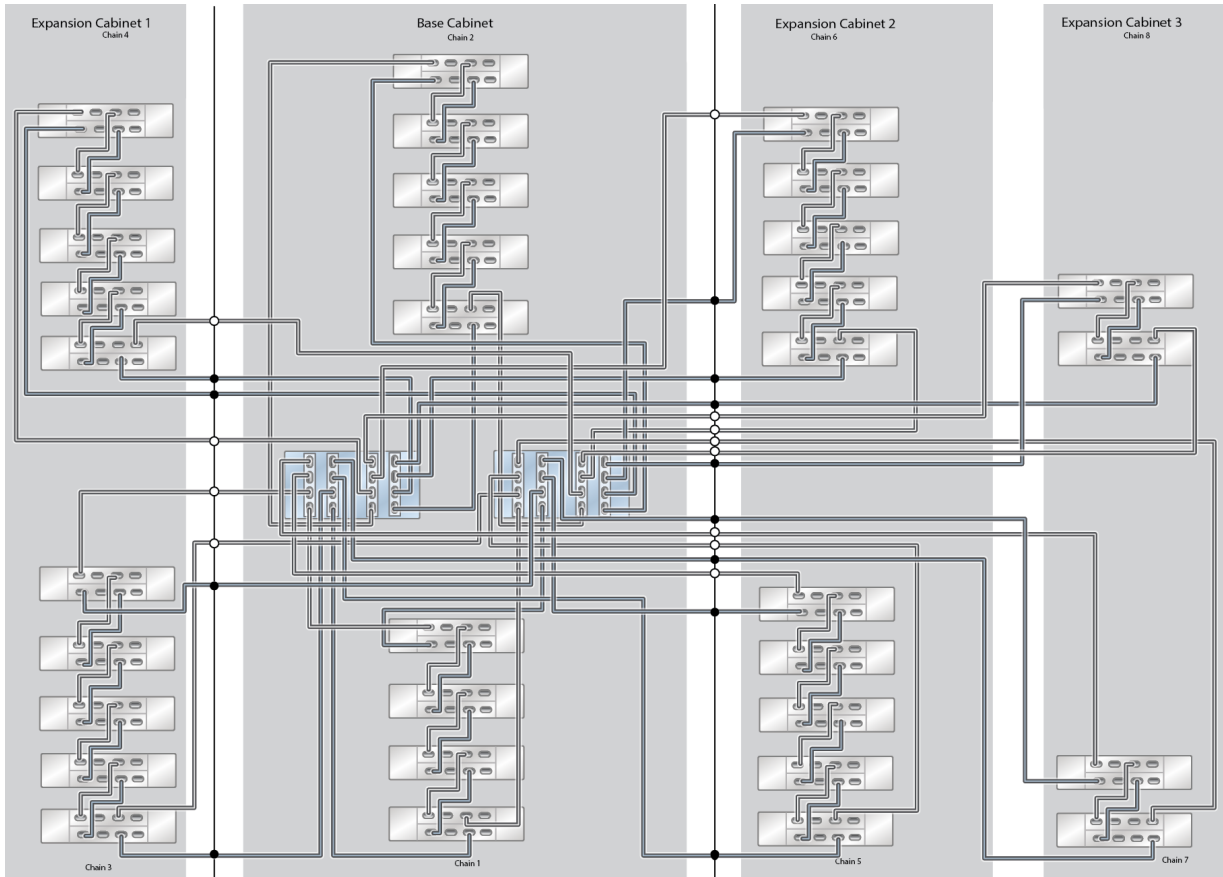


FIGURE 635 ZS7-2 HE Racked System Capacity Configuration: 34 DE3-24C Disk Shelves (Expansion Cabinet 3 Half Rack)

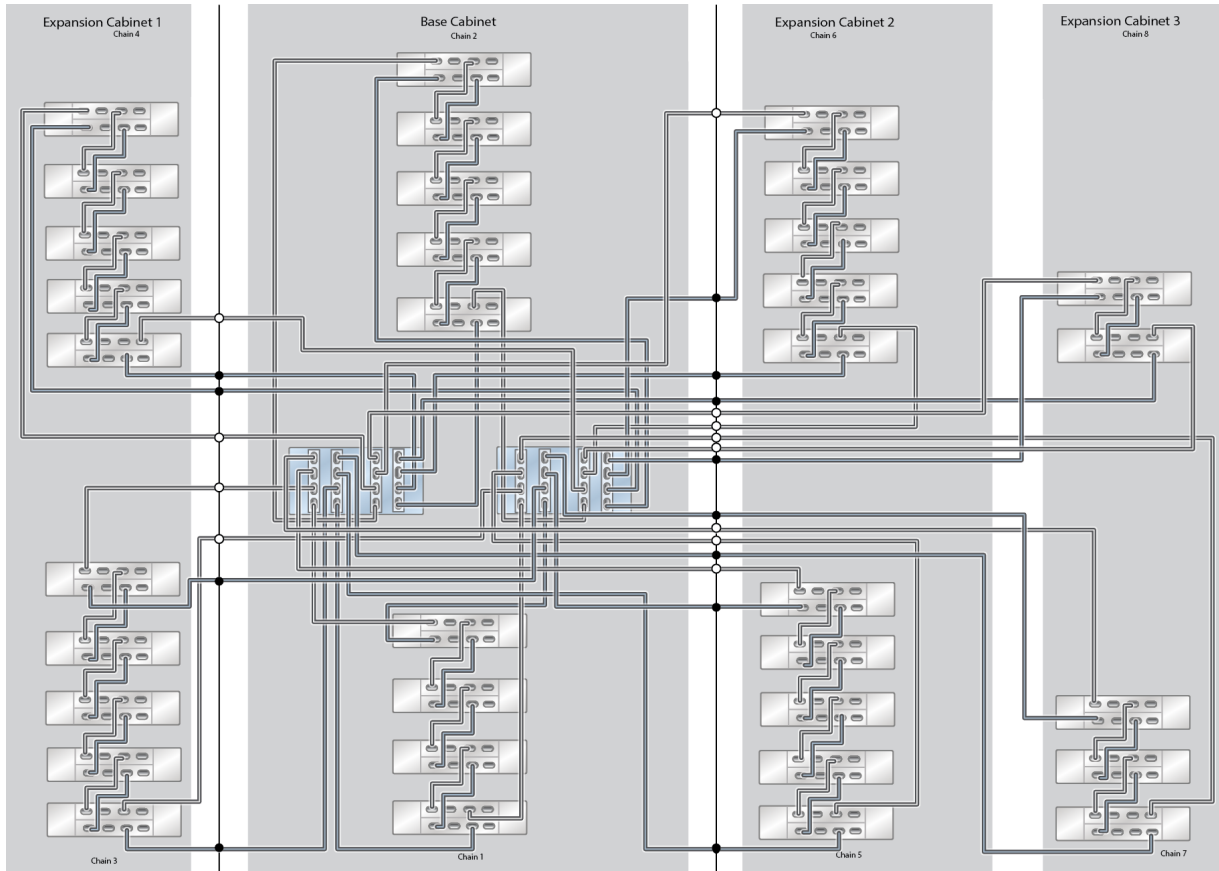


FIGURE 636 ZS7-2 HE Racked System Capacity Configuration: 35 DE3-24C Disk Shelves

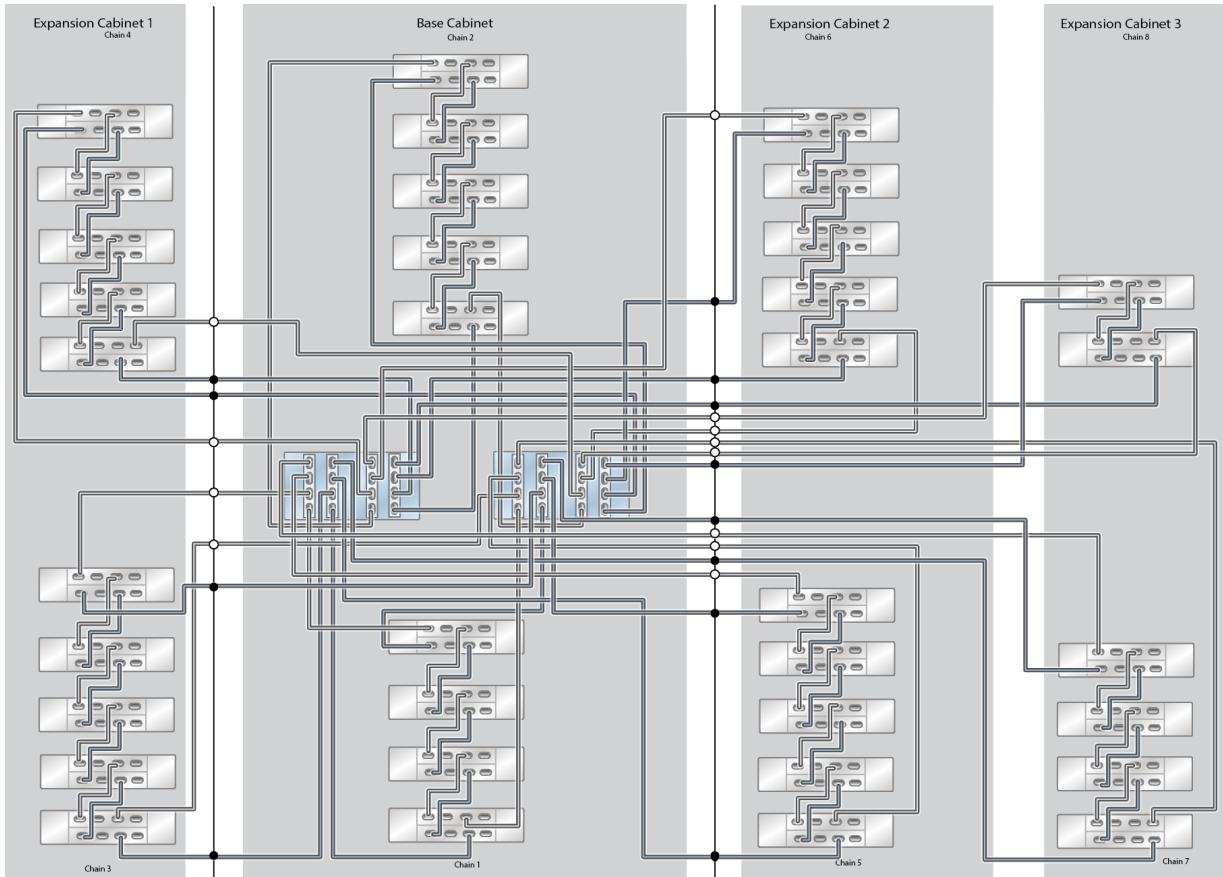


FIGURE 637 ZS7-2 HE Racked System Capacity Configuration: 37 DE3-24C Disk Shelves

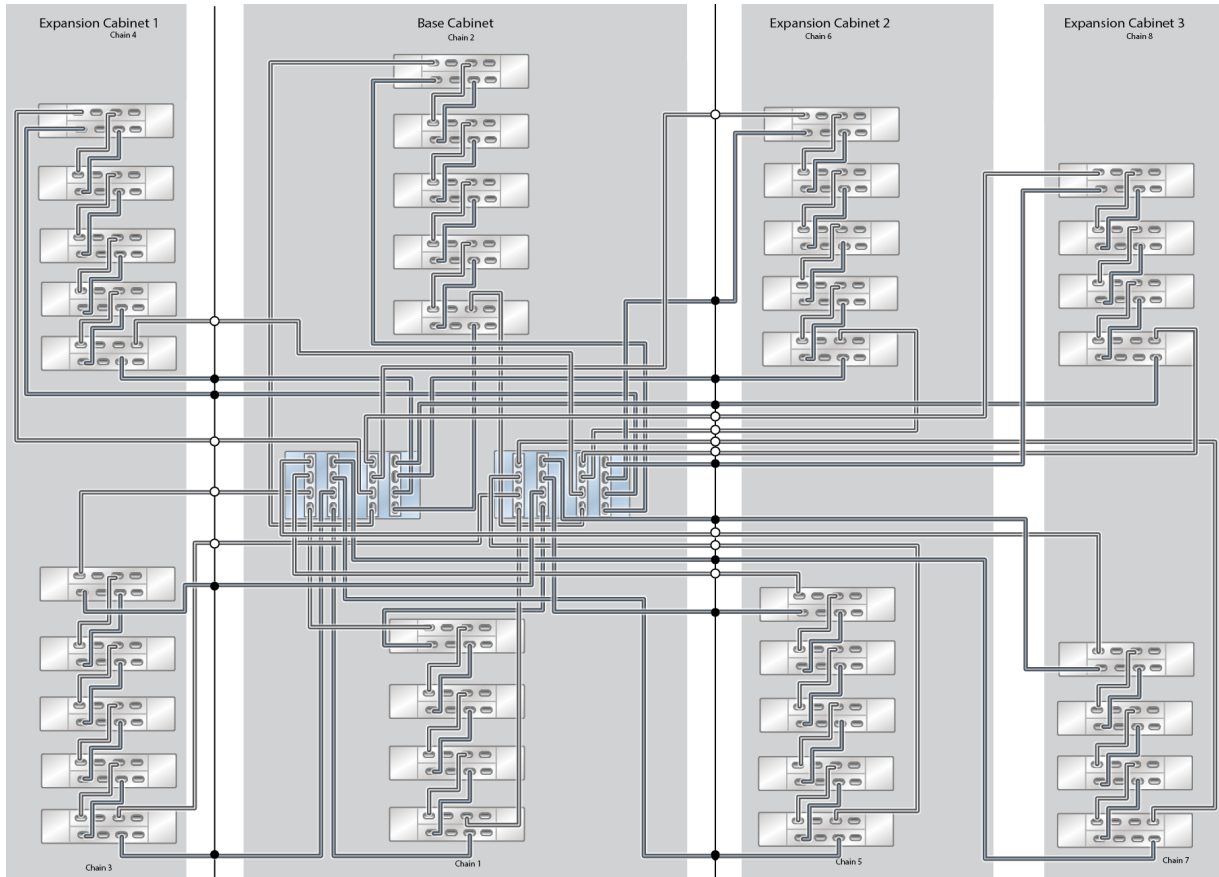
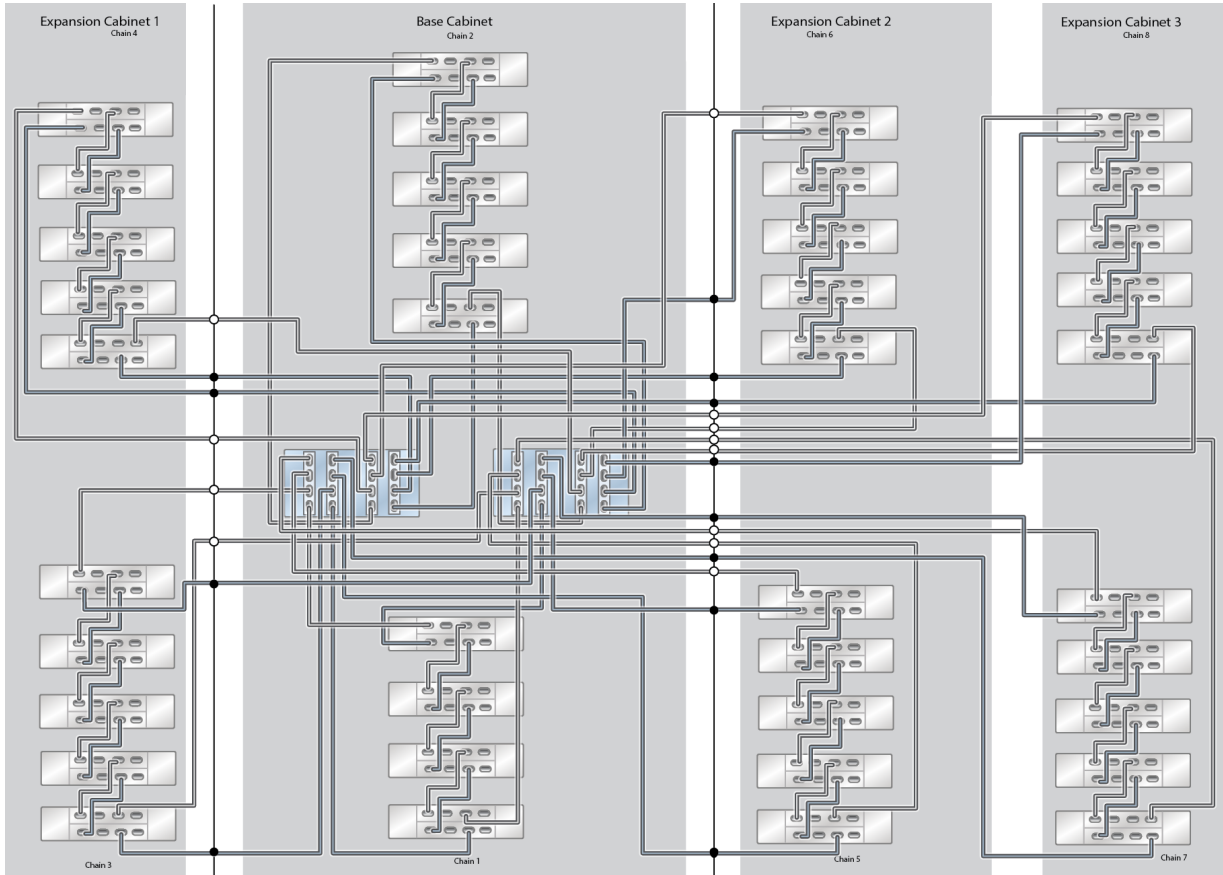


FIGURE 638 ZS7-2 HE Racked System Capacity Configuration: 39 DE3-24C Disk Shelves



All-Flash/Mixed Configurations for ZS7-2 HE Racked Systems

This section provides an overview and cabling diagrams for ZS7-2 HE Racked Systems consisting of all-flash/mixed configurations with either all DE3-24P disk shelves or a mix of DE3-24P and DE3-24C disk shelves. High-performance DE3-24P disk shelves comprise either 20 or 24 all-flash SSDs, or 20 or 24 high-speed hard disk drives. Some configurations include

read cache and/or log devices. Maximum performance configurations support DE3-24P disk shelves, while optimum performance configurations support both DE3-24P and DE3-24C disk shelves. Some configurations do not support expansion cabinets.

This section contains the following topics:

- [“Overview of ZS7-2 HE Racked System All-Flash/Mixed Configurations” on page 419](#)
- [“Base Cabinet Configurations for ZS7-2 HE Racked System All-Flash/Mixed Configurations” on page 420](#)
- [“Expansion Cabinet Configurations for ZS7-2 HE Racked System Performance Configurations” on page 428](#)

Overview of ZS7-2 HE Racked System All-Flash/Mixed Configurations

All-Flash/Mixed configurations take advantage of DE3-24P high-performance disk shelves and are available in a base cabinet, or a base cabinet with up to three expansion cabinets for some configurations. Six base cabinet options are offered in a total of 30 possible system configurations, and all base cabinet options contain two ZS7-2 HE controllers.

ZS7-2 HE Racked System maximum performance configurations feature up to eight Oracle Storage Drive Enclosure DE3-24P disk shelves in the base cabinet. The disk shelves are configured as one single shelf per chain to obtain maximum performance. Depending on the number of chains in the base cabinet, ZS7-2 HE Racked System maximum performance configurations can have up to three expansion cabinets.

TABLE 10 ZS7-2 HE Racked System Maximum Performance Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2	Expansion Cabinet 3
Up to 8 DE3-24P disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves
Supported configurations: 1, 2, 4, 6, or 8 DE3-24P disk shelves			
Two ZS7-2 HE controllers			

ZS7-2 HE Racked System optimum performance configurations feature up to 18 Oracle Storage Drive Enclosure DE3-24P disk shelves (configured as two shelves per chain plus an additional two shelves on the last chain), as well as various combinations of Oracle Storage Drive Enclosure DE3-24C and DE3-24P disk shelves in the base cabinet. Only DE3-24C disk shelves, up to 10 each, are offered in the expansion cabinets. Configurations are offered in multiples of two disk shelves, as well as half-rack expansion. Each expansion cabinet can

contain 2, 4, 5 (half-rack), 6, 8, or 10 DE3-24C disk shelves. Depending on the number of chains in the base cabinet, ZS7-2 HE Racked System optimum performance configurations can have up to three expansion cabinets.

TABLE 11 ZS7-2 HE Racked System Optimum Performance Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2	Expansion Cabinet 3
Up to 18 DE3-24P disk shelves Supported configurations: <ul style="list-style-type: none"> ■ DE3-24P disk shelves: 2, 4, 6, 8, 10, 12, 14, 16, or 18 ■ Mixed DE3-24C / DE3-24P disk shelves: <ul style="list-style-type: none"> ■ 2 DE3-24C / 2 to 14 DE3-24P ■ 4 DE3-24C / 2 to 10 DE3-24P ■ 6 DE3-24C / 2 to 6 DE3-24P ■ 8 DE3-24C / 2 DE3-24P Two ZS7-2 HE controllers	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves

The ZS7-2 HE Racked System all-flash/mixed configurations support various storage options.

TABLE 12 ZS7-2 HE Racked System Disk Shelf Device Types and Allowable Configurations

Disk Shelf	Data Devices	Read Cache Devices	Log Devices
DE3-24P All-Flash	3.2 TB SSDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	Not allowed	200 GB SSDs in slot 20 - 23
DE3-24P	1.2 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23
DE3-24C	10 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23

Base Cabinet Configurations for ZS7-2 HE Racked System All-Flash/Mixed Configurations

ZS7-2 HE Racked System maximum performance configurations have four SAS-3 HBAs in each controller, which provide the 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.

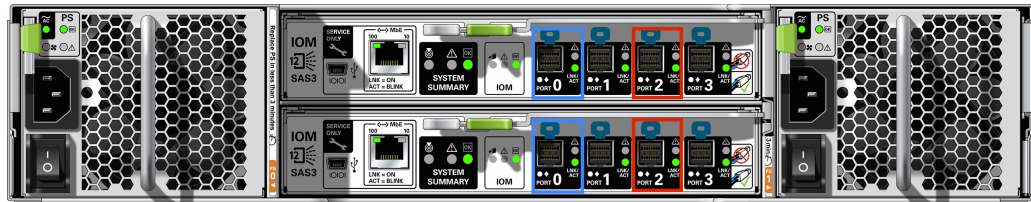
The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 639 ZS7-2 HE Controller HBA Slot Numbers (Back View)



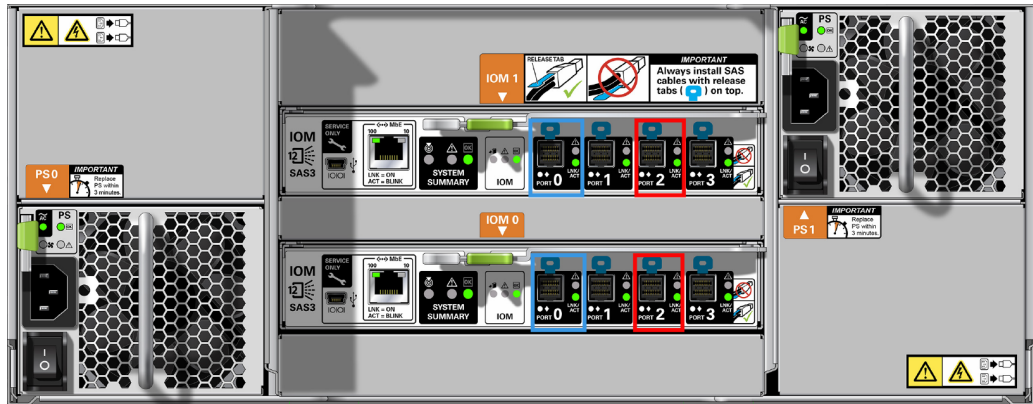
As shown in the following figure, the DE3-24P disk shelf has two I/O modules (IOMs) with four ports each. In all cabling configurations, Port 1 and Port 3 are never used.

FIGURE 640 DE3-24P Disk Shelf HBA Connections (Back View)



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 641 DE3-24C Disk Shelf HBA Connections (Back View)



The ZS7-2 HE Racked System all-flash/mixed configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). They provide a more practical implementation for SSD log device and read cache device matching, limited multi-cabinet expansion, and can be configured 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 ZS7-2 HE Racked System or not compatible with ZS7-2 HE Racked System must be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to a ZS7-2 HE controller with 4x4 port SAS-3 HBAs, see [“Cabling DE3-24 Disk Shelves to ZS7-2 High-end \(HE\) Controllers”](#) on page 49. For SAS cable length guidelines, see [“Cabinet and Cabling Guidelines”](#) on page 13.

The cabinets are self-contained and pre-cabled following the required cabling methodology. The following diagrams illustrate how the six base cabinet options are cabled.

FIGURE 642 ZS7-2 HE Racked System Performance Configuration: One to Eight DE3-24P Disk Shelves (maximum performance)

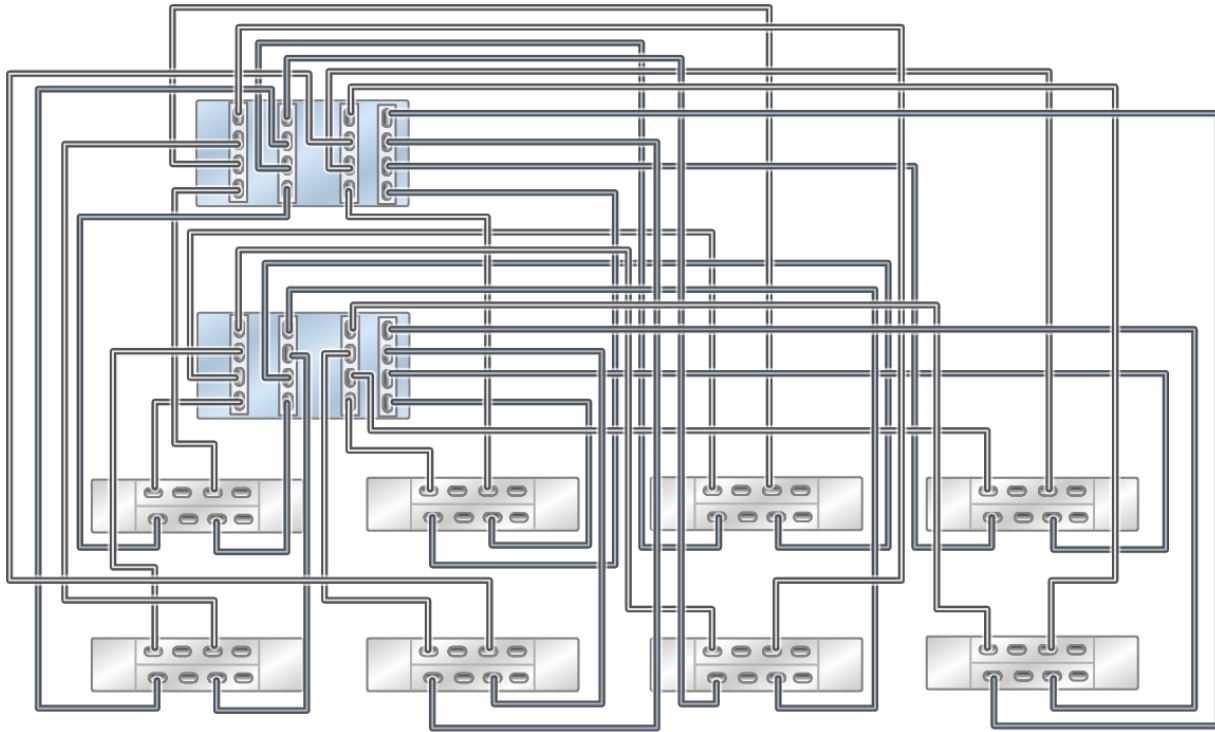


FIGURE 643 ZS7-2 HE Racked System Performance Configuration: Two to 18 DE3-24P Disk Shelves (optimum performance)

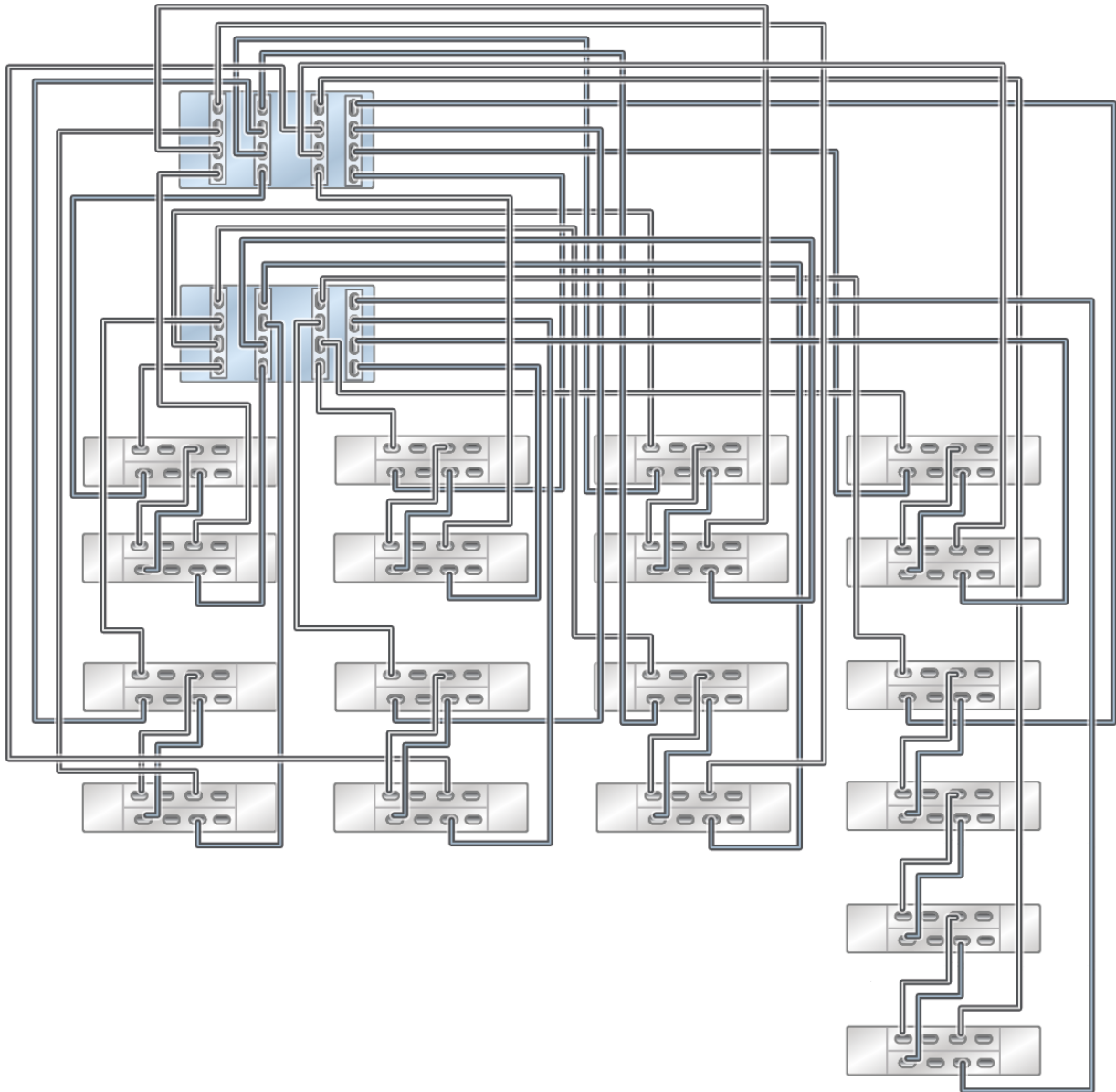


FIGURE 644 ZS7-2 HE Racked System Performance Configuration: Two DE3-24C (bottom left) and Two to 14 DE3-24P Disk Shelves (optimum performance)

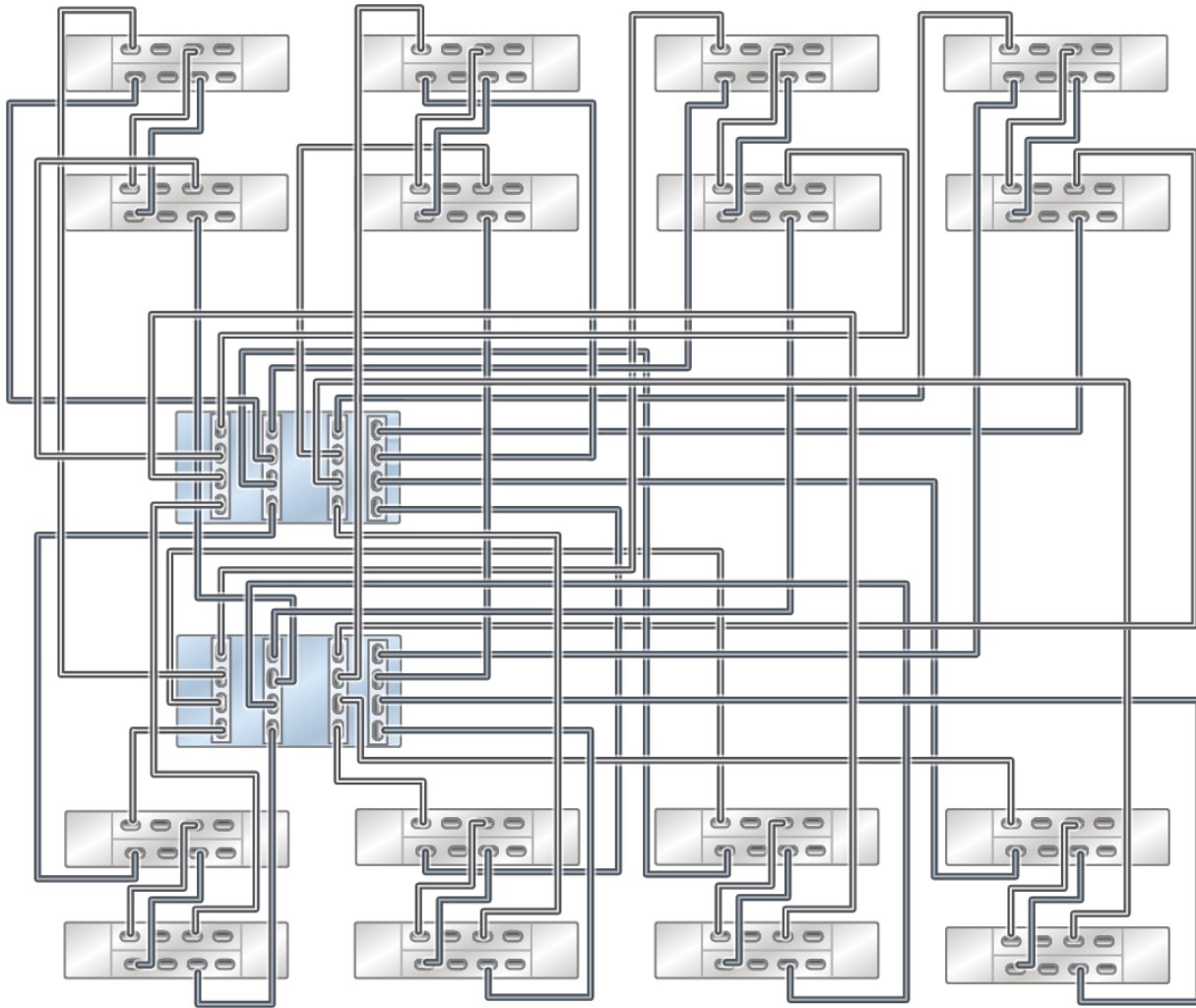


FIGURE 645 ZS7-2 HE Racked System Performance Configuration: Four DE3-24C (bottom left) and Two to Ten DE3-24P Disk Shelves (optimum performance)

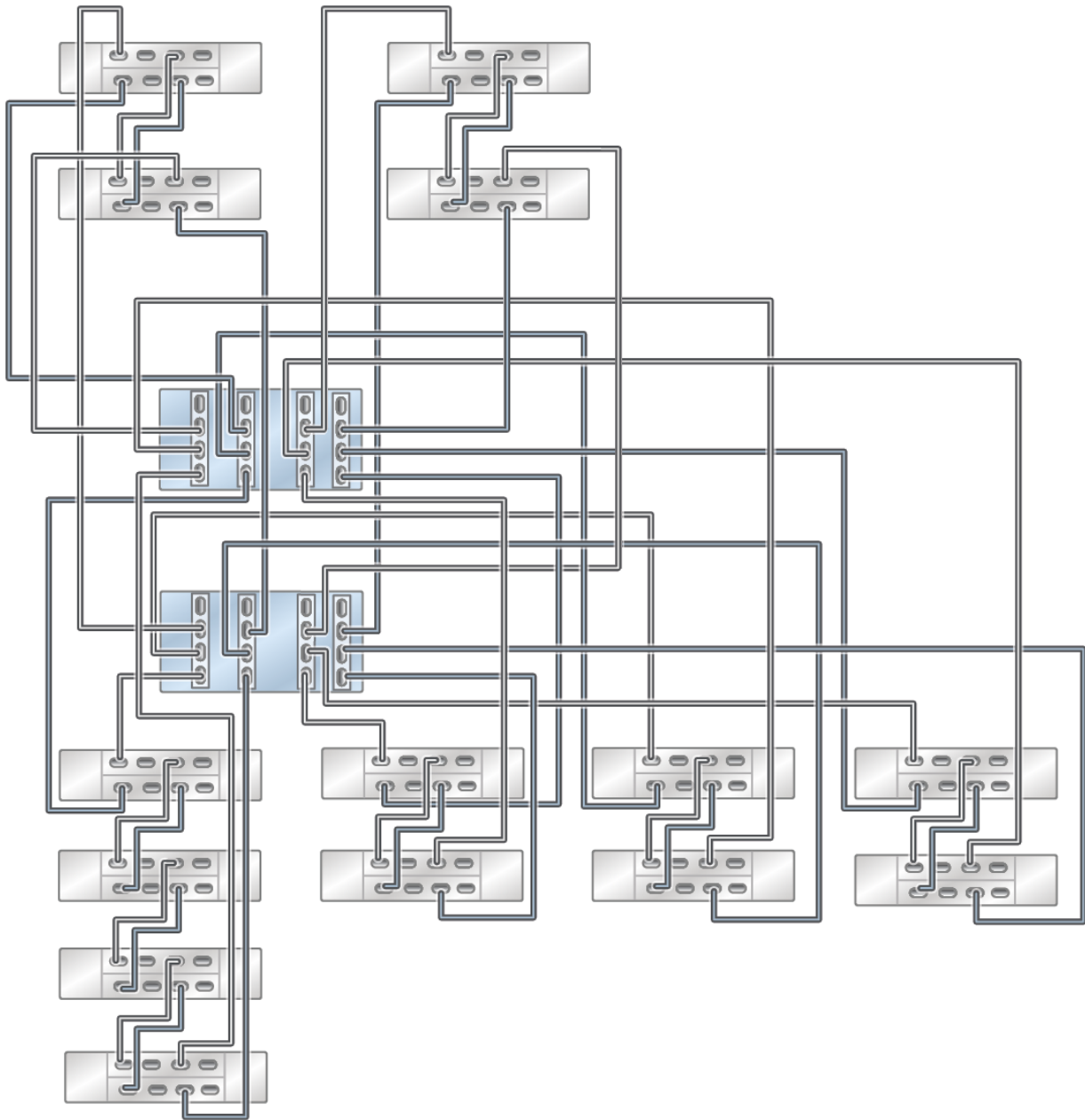
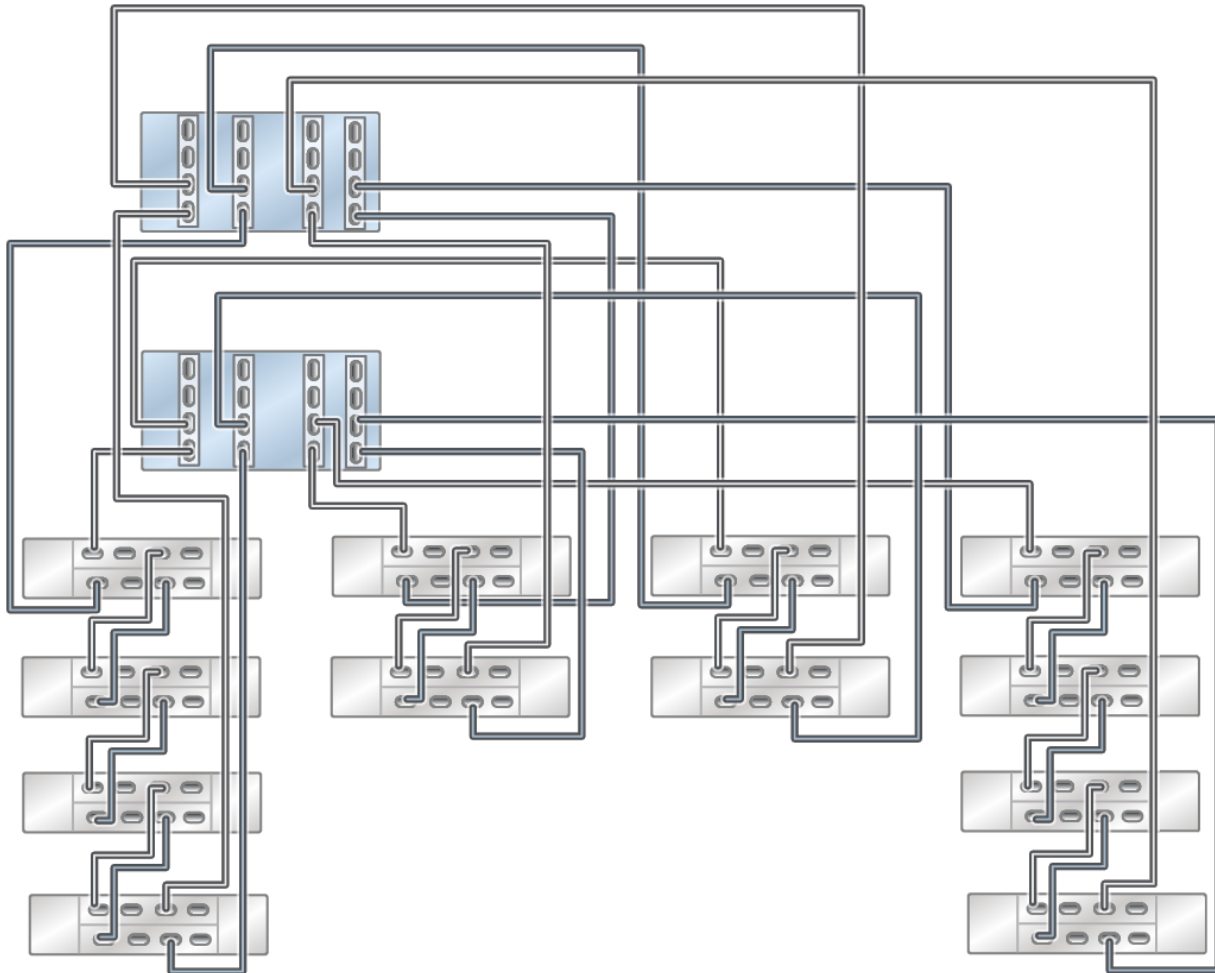
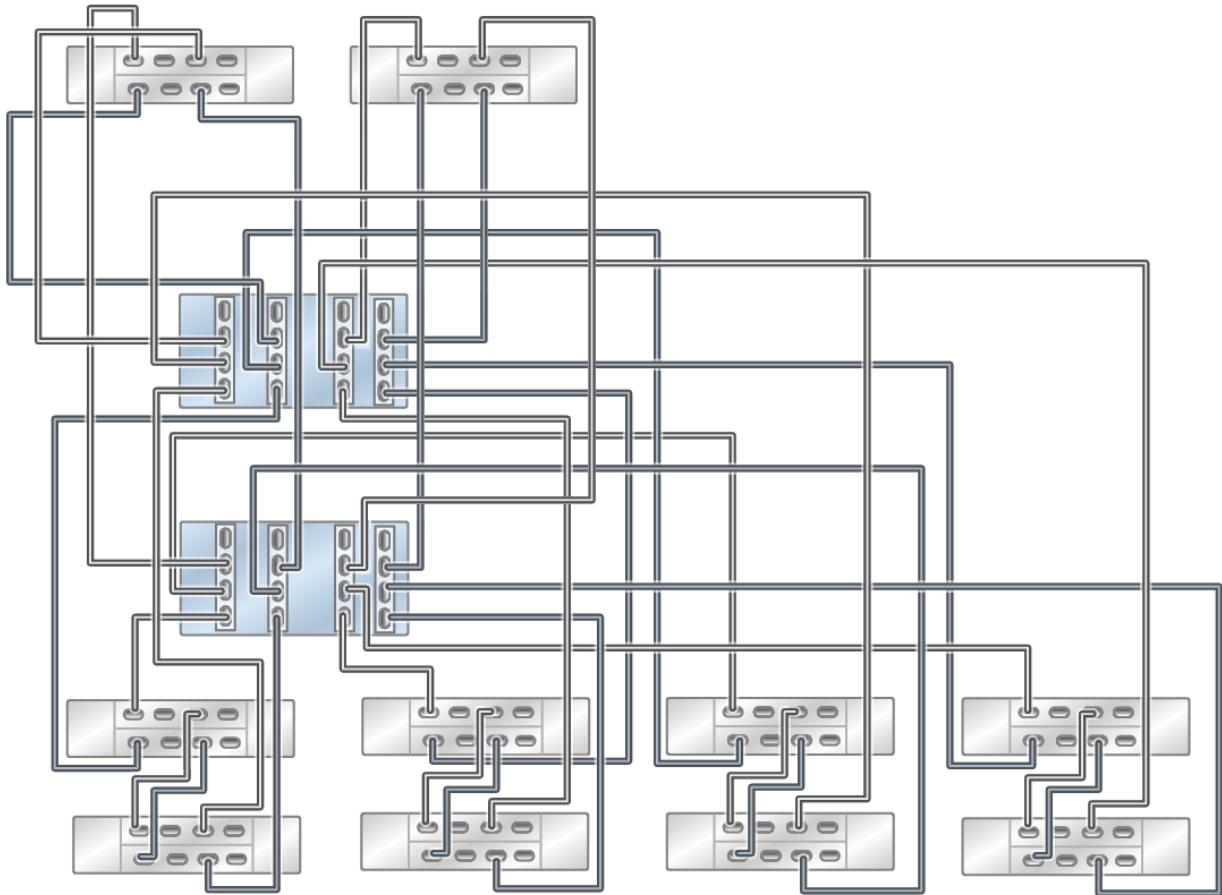


FIGURE 646 ZS7-2 HE Racked System Performance Configuration: Six DE3-24C (first two chains from the left) and Two to Six DE3-24P Disk Shelves (optimum performance)



In the following figure, the DE3-24C units are the bottom eight disk shelves.

FIGURE 647 ZS7-2 HE Racked System Performance Configuration: Eight DE3-24C (bottom disk shelves) and Two DE3-24P Disk Shelves (optimum performance)



Expansion Cabinet Configurations for ZS7-2 HE Racked System Performance Configurations

ZS7-2 HE Racked System performance configurations support multiple cabinets that allow for expansion of up to 30 additional disk shelves. Each expansion cabinet accommodates a maximum of 10 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 ZS7-2 HE Racked System base cabinet. Each ZS7-2 HE Racked System 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 illustrate the cabling of ZS7-2 HE Racked System expansion cabinet configurations. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

Note - The base cabinet can contain all DE3-24P (HDD) disk shelves or all DE3-24P All-Flash (SSD) disk shelves, or a mix of DE3-24C and DE3-24P disk shelves, as described in [“All-Flash/Mixed Configurations for ZS7-2 HE Racked Systems”](#) on page 418.

FIGURE 648 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with Two DE3-24C Disk Shelves

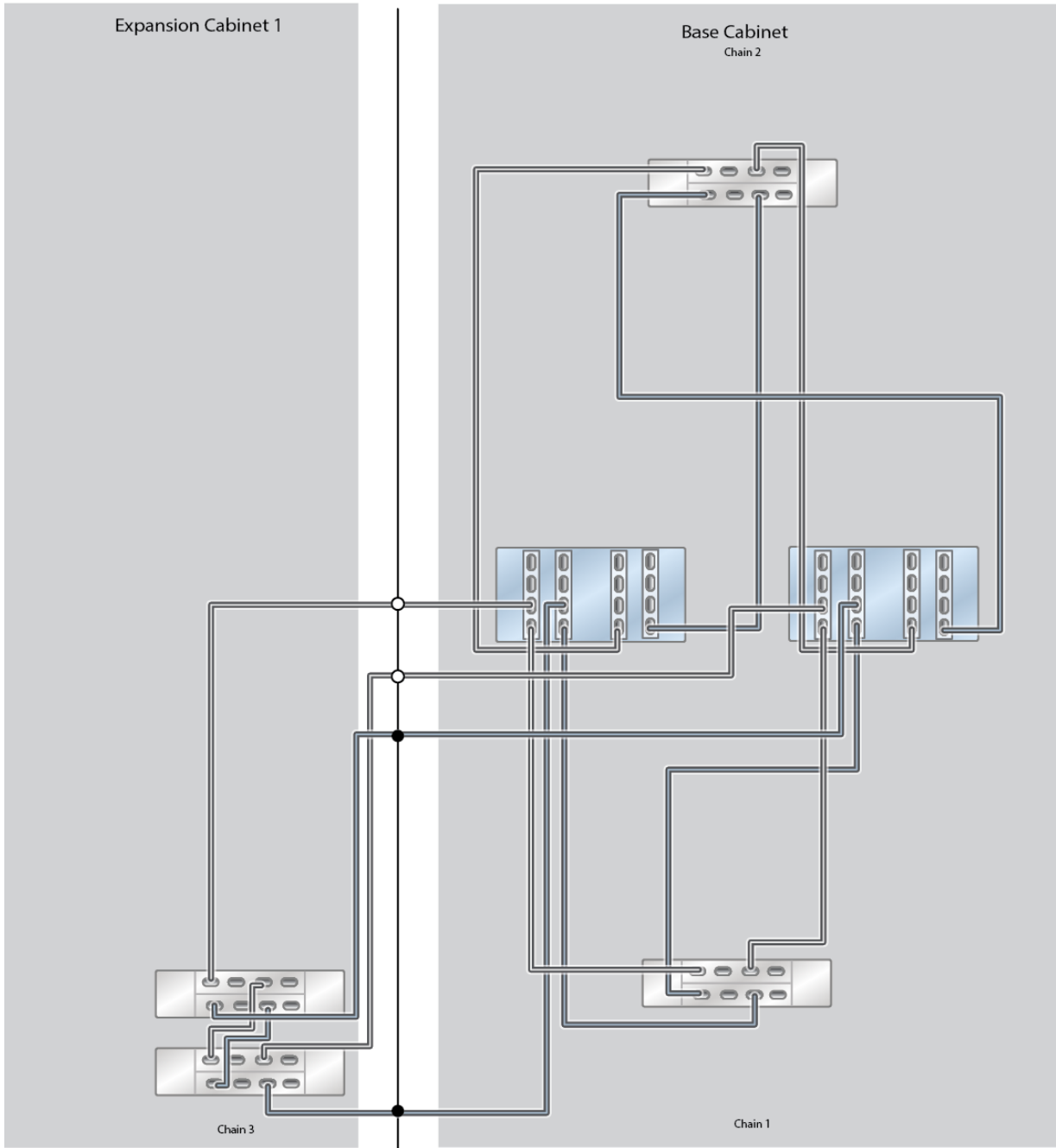


FIGURE 649 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with Four DE3-24C Disk Shelves

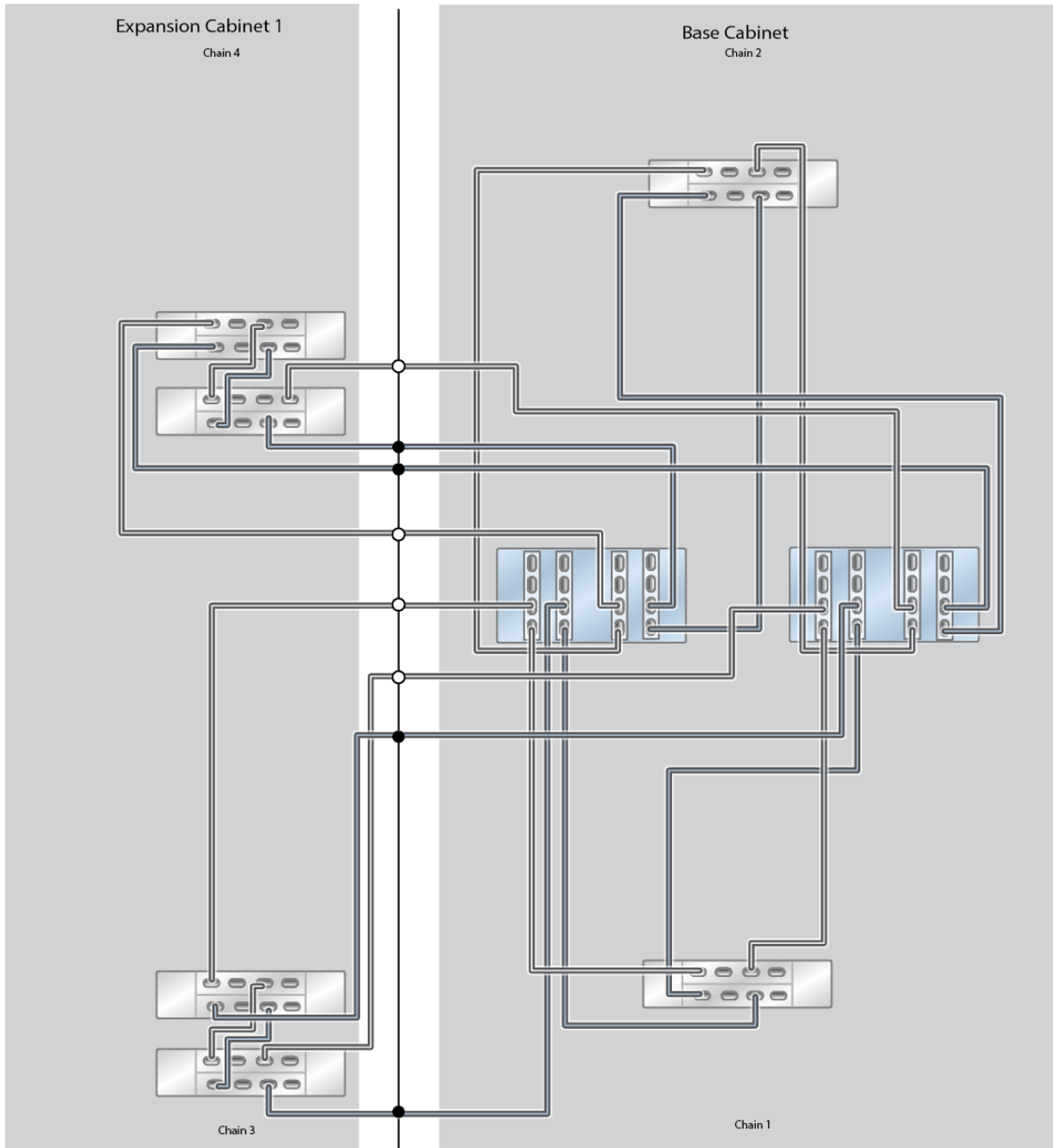


FIGURE 650 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with Five DE3-24C Disk Shelves (Half Rack)

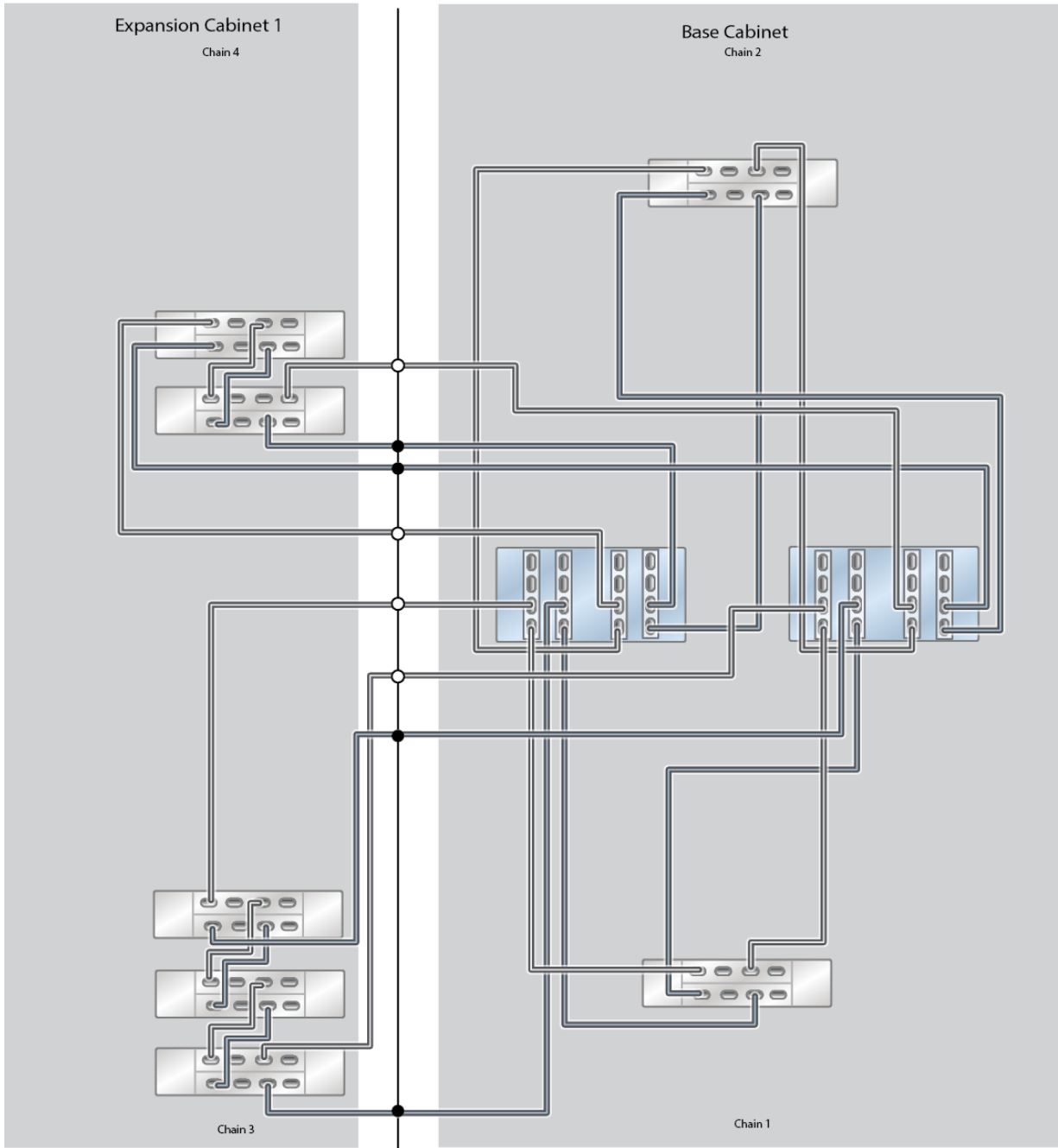


FIGURE 651 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with Six DE3-24C Disk Shelves

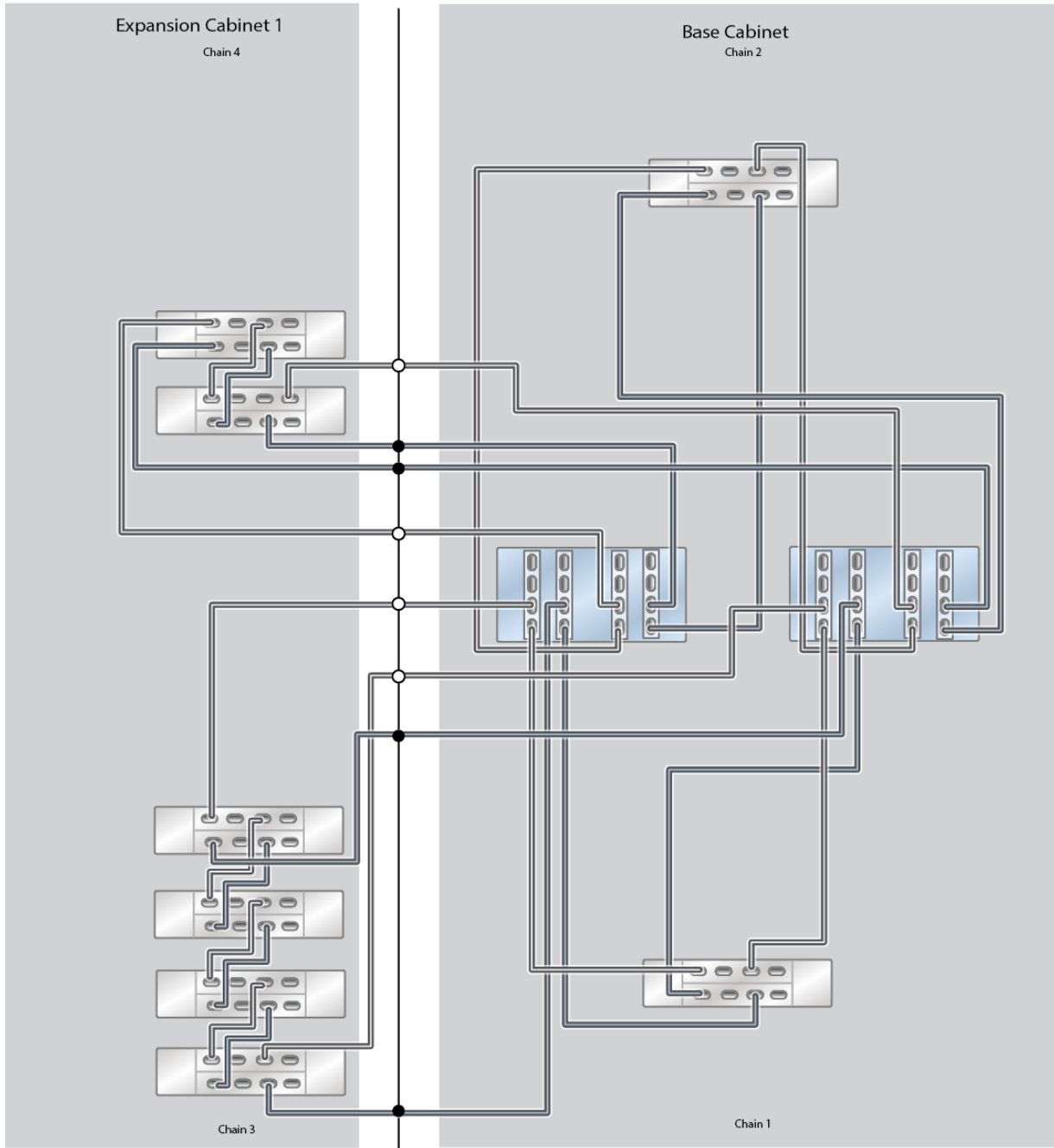


FIGURE 652 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with Eight DE3-24C Disk Shelves

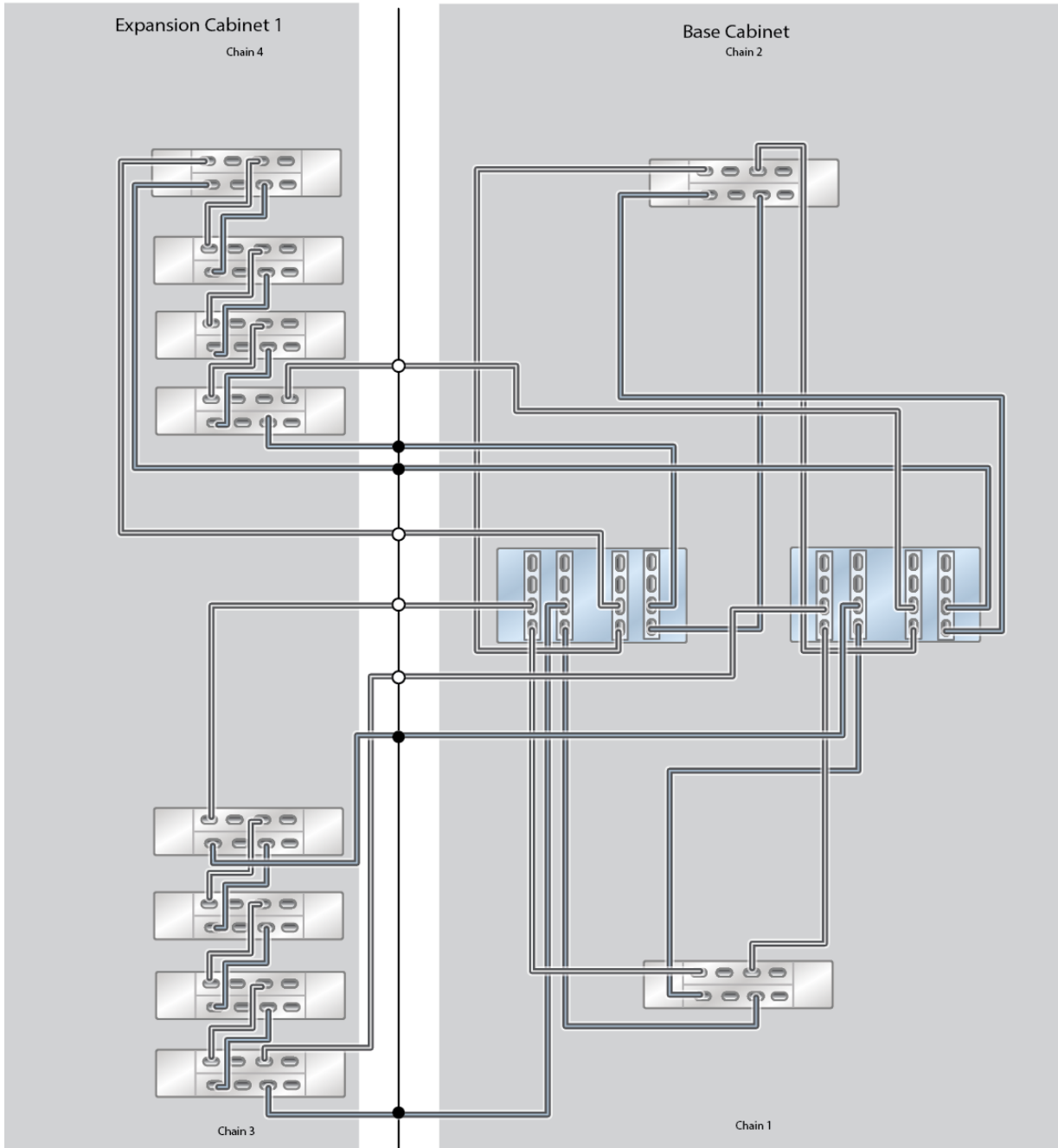


FIGURE 653 ZS7-2 HE Racked System Performance Configuration: One Expansion Cabinet with 10 DE3-24C Disk Shelves

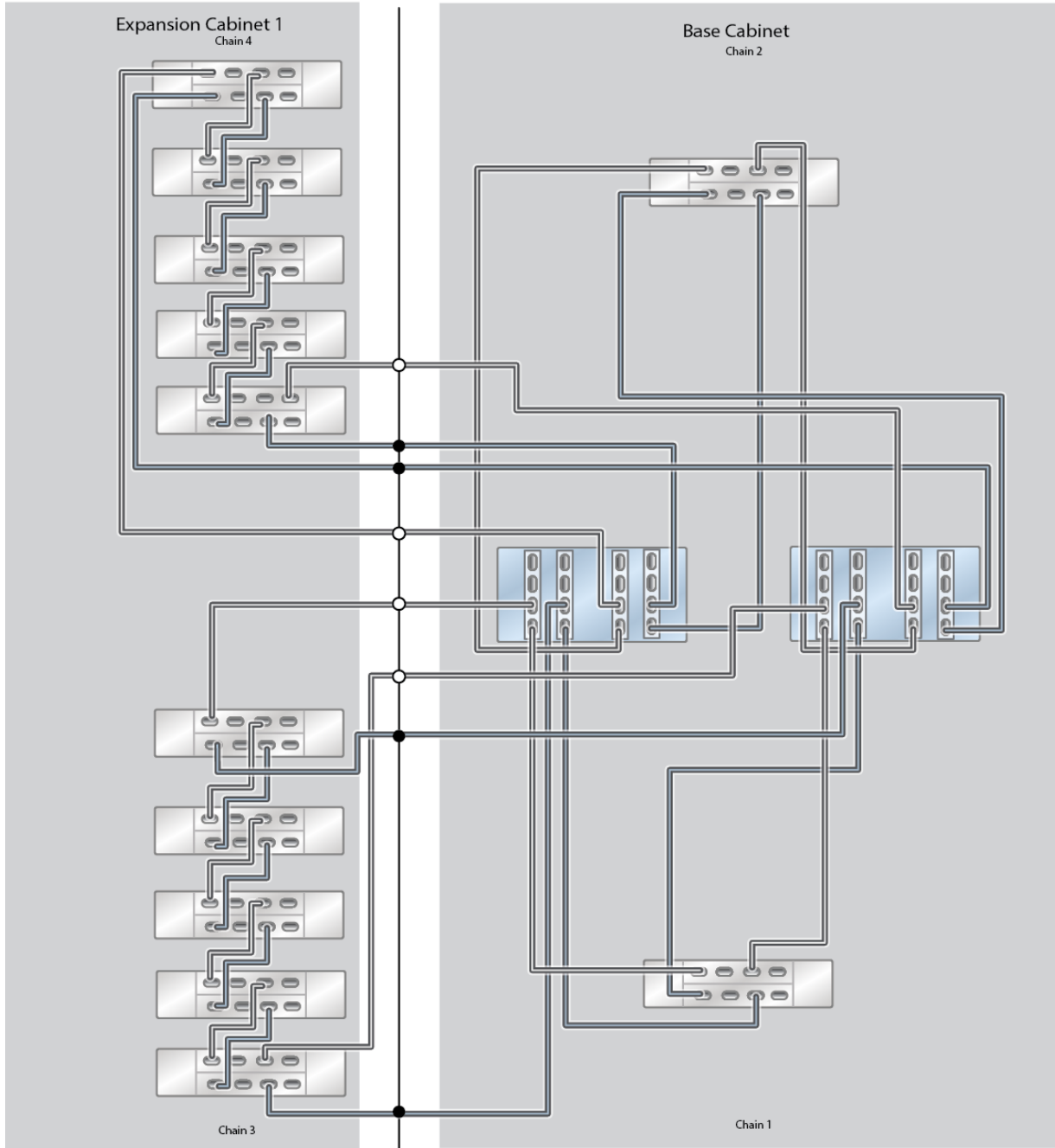


FIGURE 654 ZS7-2 HE Racked System Performance Configuration: Two Expansion Cabinets with 20 DE3-24C Disk Shelves

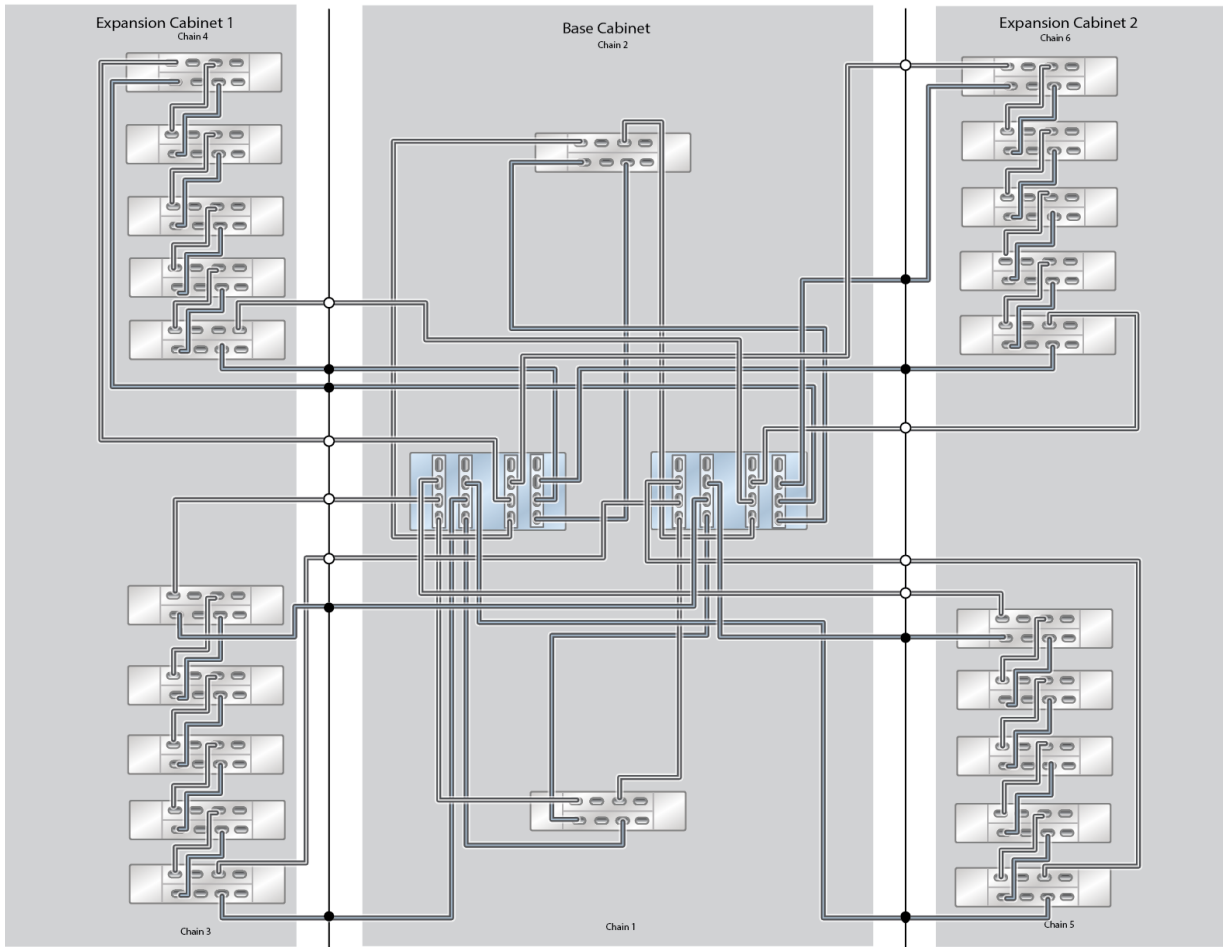
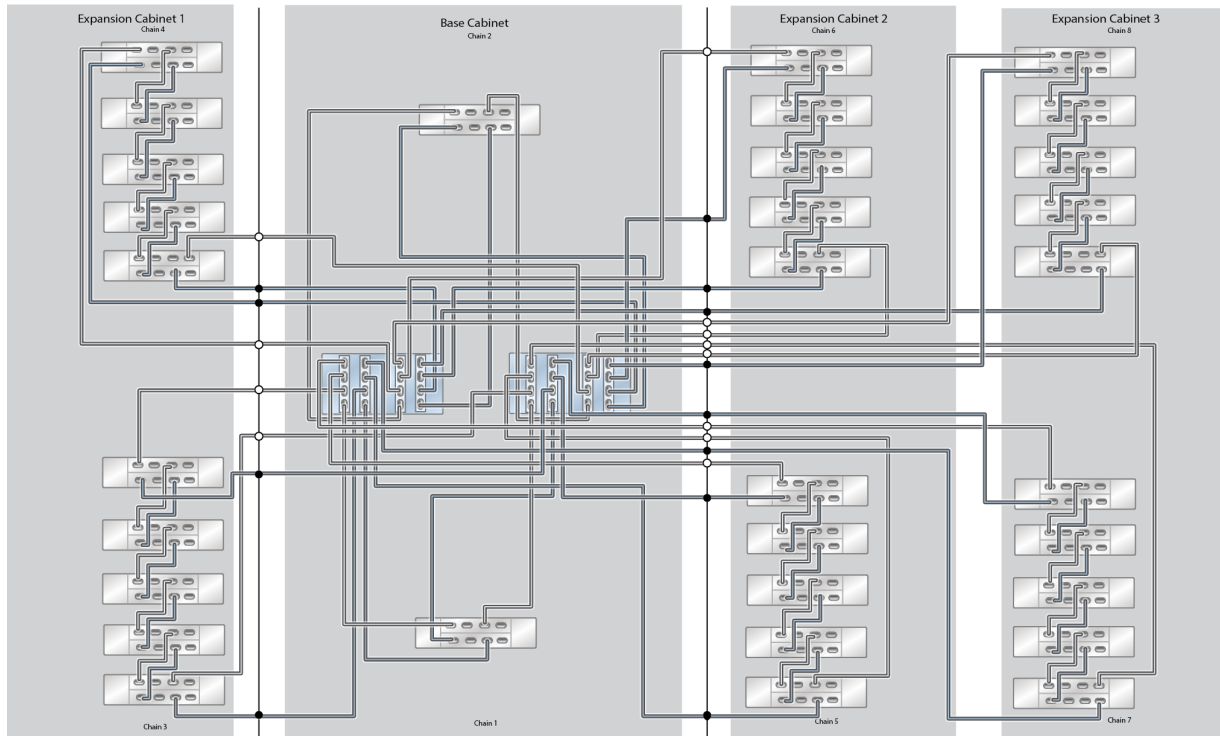


FIGURE 655 ZS7-2 HE Racked System Performance Configuration: Three Expansion Cabinets with 30 DE3-24C Disk Shelves



ZS7-2 Mid-range (MR) Racked System Configurations

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS7-2 MR, which is a pre-racked and pre-cabled system that supports two configuration types: capacity configurations and performance configurations.

This section contains the following topics:

- [“Capacity Configurations for ZS7-2 MR Racked Systems” on page 438](#)
- [“All-Flash/Mixed Configurations for ZS7-2 MR Racked Systems” on page 447](#)

Capacity Configurations for ZS7-2 MR Racked Systems

This section provides an overview and cabling diagrams for ZS7-2 MR Racked System capacity configurations.

This section contains the following topics:

- [“Overview of ZS7-2 MR Racked System Capacity Configurations” on page 438](#)
- [“Cabling Tables and Diagrams for ZS7-2 MR Racked System Capacity Configurations” on page 440](#)

Overview of ZS7-2 MR Racked System Capacity Configurations

Capacity configurations take advantage of high-capacity disk shelves and are available in a base cabinet, or a base cabinet with one expansion cabinet. Two ZS7-2 MR controllers and up to 16 Oracle Storage Drive Enclosure DE3-24C disk shelves can be supported, as shown in the following table. Note that the total number of disk shelves for the base cabinet and the expansion cabinet together cannot exceed 16.

TABLE 13 ZS7-2 MR Racked System Capacity Configurations Components

Base Cabinet	Expansion Cabinet 1
Up to 9 DE3-24C disk shelves	Up to 7 DE3-24C disk shelves
Supported configurations: 1, 2, 4, 6, 8, or 9 DE3-24C disk shelves	Supported configurations: 2, 4, 5, 6, or 7 DE3-24C disk shelves
Two ZS7-2 MR controllers	

Each ZS7-2 MR controller supports two SAS HBA cards. Two SAS HBA cards must be installed in each ZS7-2 MR controller to support disk shelves in the expansion cabinet.

Each ZS7-2 MR controller has two SAS HBA cards. Clustered ZS7-2 MR controllers support a high-availability configuration consisting of:

- Base cabinet: Two chains with four disk shelves in one chain and five disk shelves in the other chain for a total of nine disk shelves, and
- Expansion cabinet: Two chains with four disk shelves in one chain and one of three disk shelves in the other chain for a total of seven disk shelves.

The cabinets are self-contained and pre-cabled following the required cabling methodology. Pre-racked system cabling tables and diagrams, which can also be used for planning future system expansion, are provided in the section [“Cabling Tables and Diagrams for ZS7-2 MR Racked System Capacity Configurations”](#) on page 440.

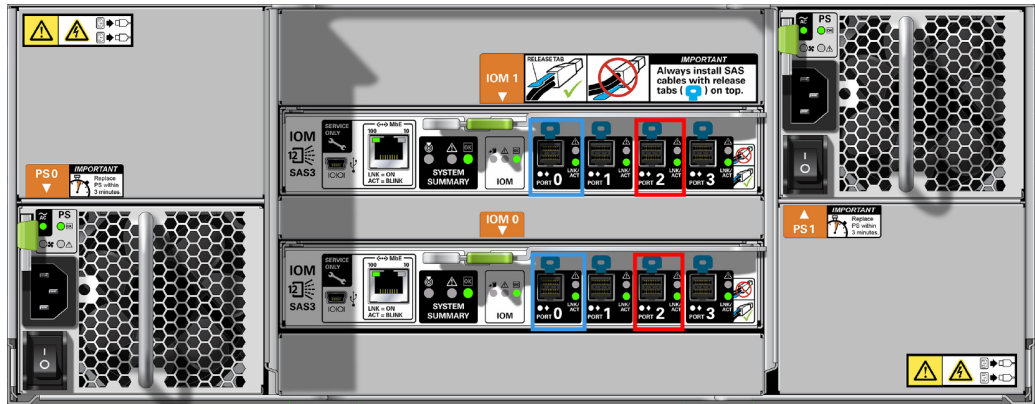
Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS7-2 MR controller occupies two rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet; the bottom controller is Controller 0 in RU17. Because the ZS7-2 MR controller occupies two rack units, the base cabinet contains a filler panel above each controller so the cabinet layout is similar to prior offerings of Oracle racked systems with three-rack-unit controllers. It also allows for better serviceability access and cabling through the rear CMA. The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 656 ZS7-2 MR Controller 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. 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 657 DE3-24C Disk Shelf HBA Connections (Back View)



Cabling Tables and Diagrams for ZS7-2 MR Racked System Capacity Configurations

The following table describes the locations and port connections for two controllers and nine disk shelves in the base cabinet, using 3-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs.

Note - The following tables are for a full base rack configuration consisting of two chains, and an expansion rack configuration consisting of two chains.

TABLE 14 Base Cabinet: Controller and Disk Shelf Locations and Connections

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 0	1	IOM 1, Port 2
17	0	Slot 10, Port 0	1	IOM 0 Port 2
20	1	Slot 2, Port 1	23	IOM 1, Port 2
17	0	Slot 10, Port 1	23	IOM 0 Port 2
17	0	Slot 2, Port 0	1, 5, 13	IOM 1, Port 0
20	1	Slot 10, Port 0	1, 5, 13	IOM 0, Port 0

FROM			TO	
17	0	Slot 2, Port 1	27, 35, 39	IOM 1, Port 0
20	1	Slot 10, Port 1	27, 35, 39	IOM 0, Port 0

The following table describes the locations and port connections for seven disk shelves in an expansion cabinet, using 6-meter optical SAS cables. The first disk shelf is located in RU01, and each disk shelf has two IOMs. The expansion Cabinet supports disk shelves 10 through 16.

TABLE 15 Expansion Cabinet: Controller and Disk Shelf Locations and Connections

FROM			TO	
RU	CONTROLLER	HBA PORT	RU	DISK SHELF PORT
20	1	Slot 2, Port 2	1	IOM 1, Port 2
17	0	Slot 10, Port 2	1	IOM 0, Port 2
20	1	Slot 2, Port 3	21	IOM 1, Port 2
17	0	Slot 10, Port 3	21	IOM 0, Port 2
17	0	Slot 2, Port 2	5, 9, 13	IOM 1, Port 0
20	1	Slot 10, Port 2	5, 9, 13	IOM 0, Port 0
17	0	Slot 2, Port 3	25, 29	IOM 1, Port 0
20	1	Slot 10, Port 3	25, 29	IOM 0, Port 0

The following diagrams illustrate how pre-racked systems are cabled, as well as how to expand your system in the future. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

FIGURE 658 ZS7-2 MR Racked System Capacity Configuration: 11 DE3-24C Disk Shelves

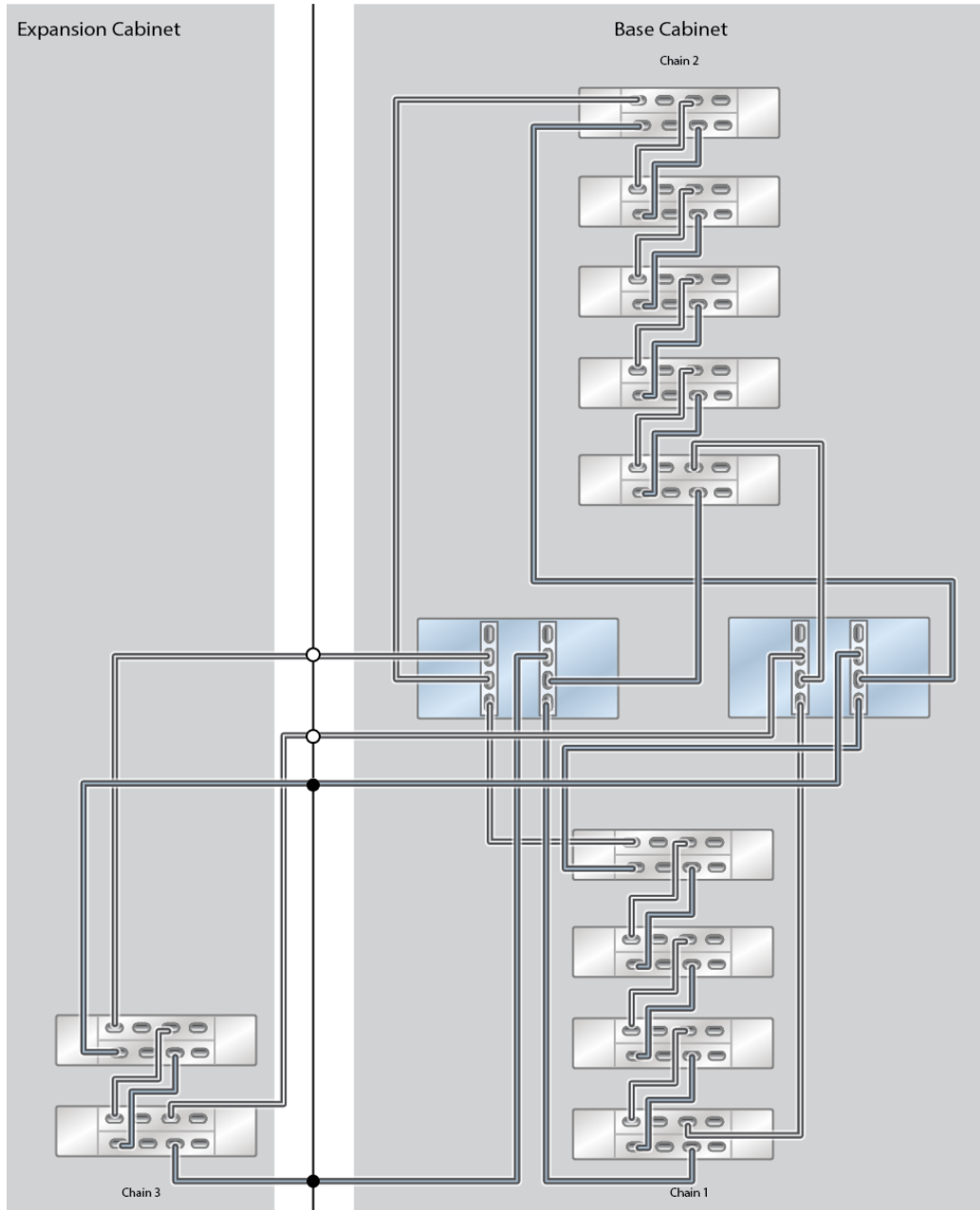


FIGURE 659 ZS7-2 MR Racked System Capacity Configuration: 13 DE3-24C Disk Shelves

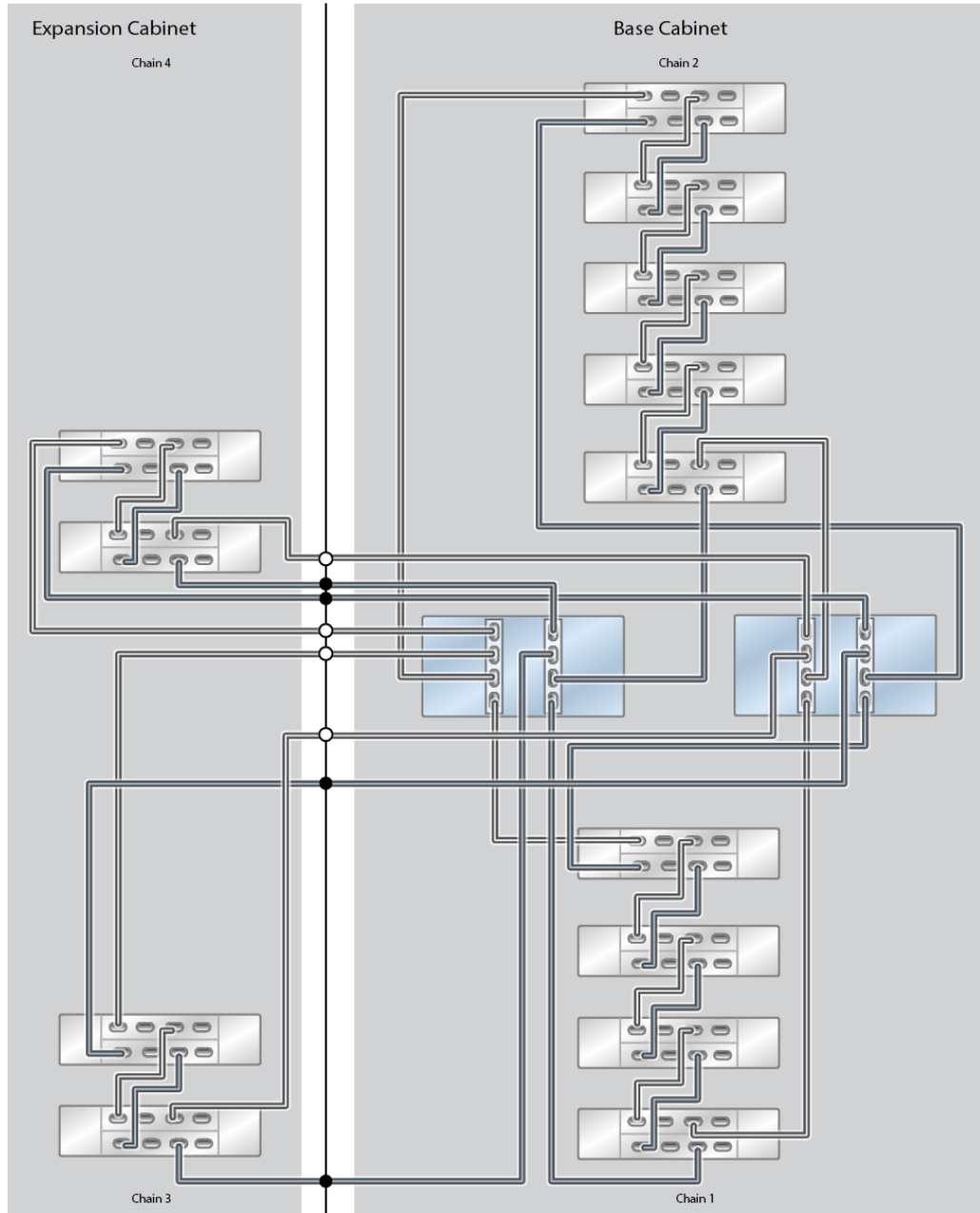


FIGURE 660 ZS7-2 MR Racked System Capacity Configuration: 14 DE3-24C Disk Shelves (Half Rack)

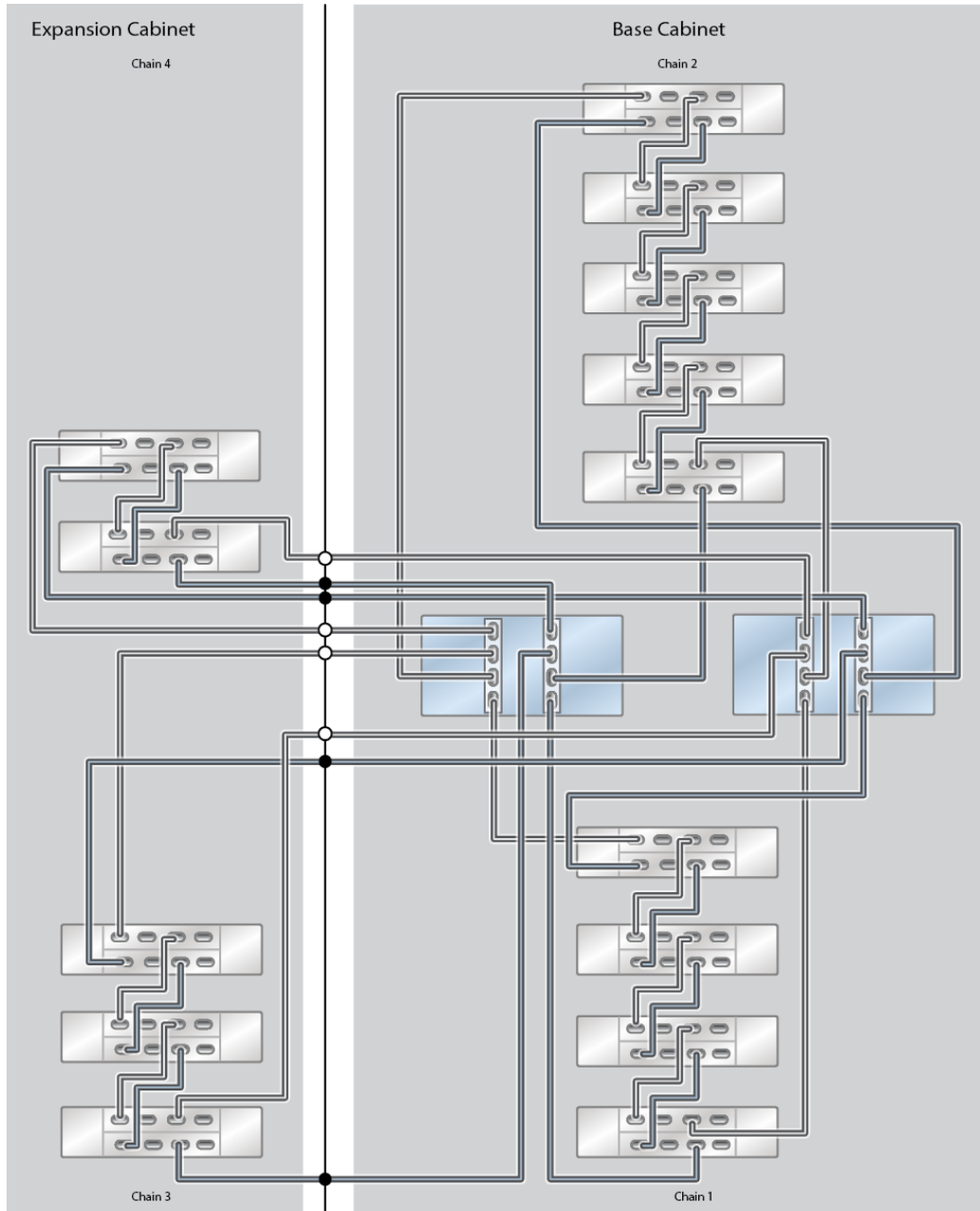


FIGURE 661 ZS7-2 MR Racked System Capacity Configuration: 15 DE3-24C Disk Shelves

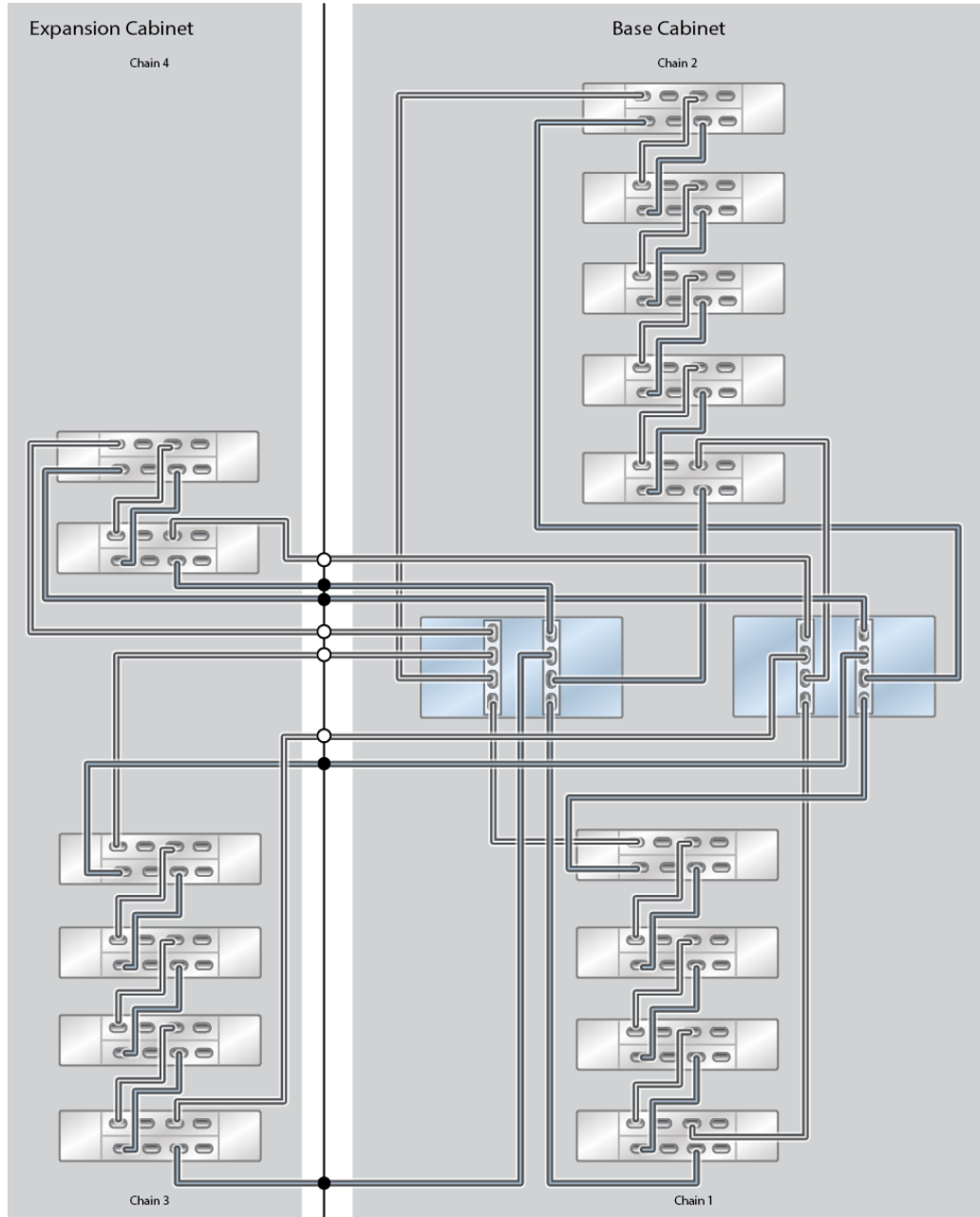
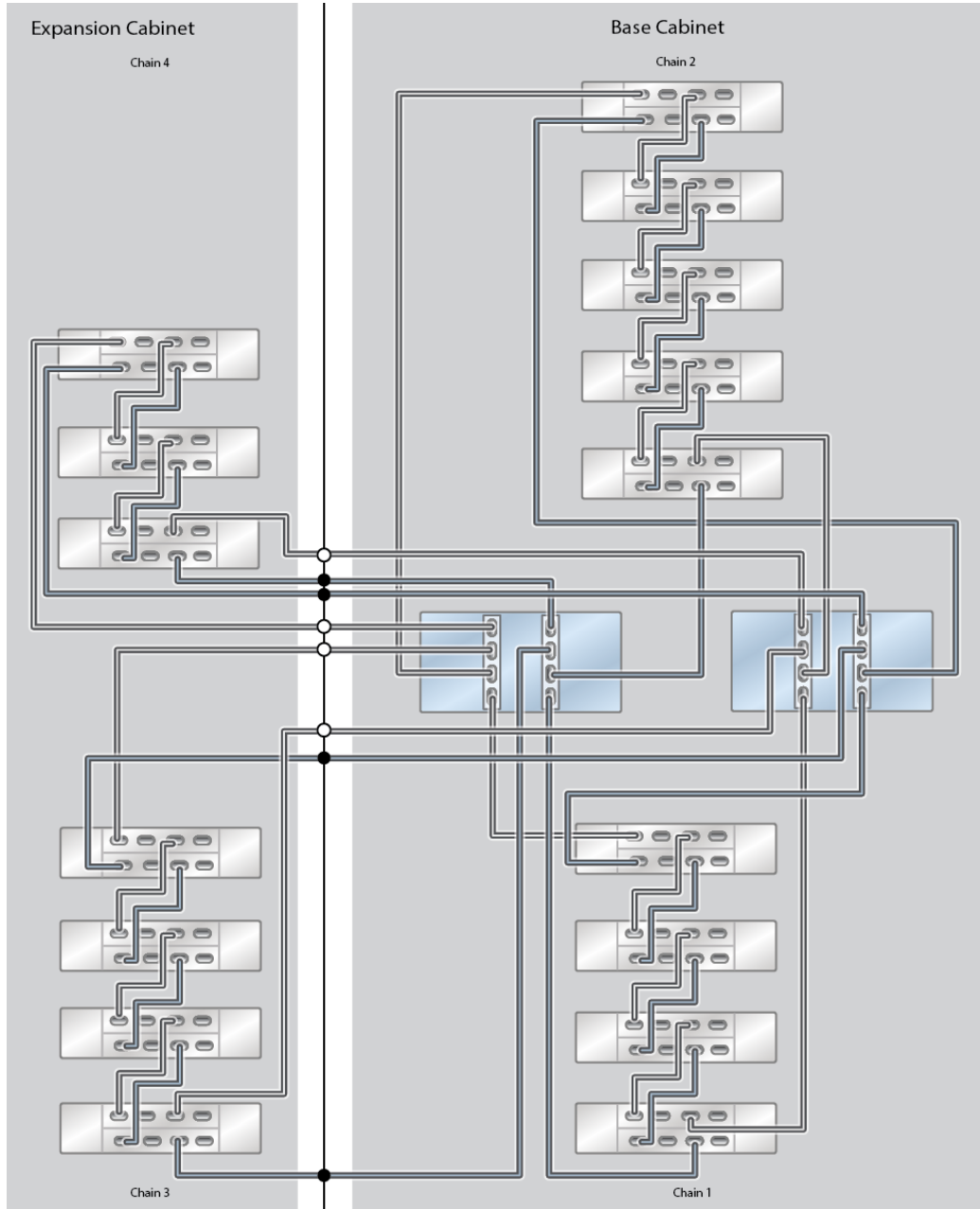


FIGURE 662 ZS7-2 MR Racked System Capacity Configuration: 16 DE3-24C Disk Shelves



All-Flash/Mixed Configurations for ZS7-2 MR Racked Systems

This section provides an overview and cabling diagrams for ZS7-2 MR Racked Systems consisting of all-flash/mixed configurations with either all DE3-24P disk shelves or a mix of DE3-24P and DE3-24C disk shelves. High-performance DE3-24P disk shelves comprise either 20 or 24 all-flash SSDs, or 20 or 24 high-speed hard disk drives. Some configurations include read cache and/or log devices. Maximum performance configurations support DE3-24P disk shelves, while optimum performance configurations support both DE3-24P and DE3-24C disk shelves. Some configurations do not support expansion cabinets.

This section contains the following topics:

- [“Overview of ZS7-2 MR Racked System All-Flash/Mixed Configurations” on page 447](#)
- [“Base Cabinet Configurations for ZS7-2 MR Racked System All-Flash/Mixed Configurations” on page 448](#)

Overview of ZS7-2 MR Racked System All-Flash/Mixed Configurations

All-Flash/Mixed configurations take advantage of DE3-24P high-performance disk shelves and are available in a base cabinet, or a base cabinet with up to one expansion cabinet for some configurations. Six base cabinet options are offered in a total of 27 possible system configurations, and all base cabinet options contain two ZS7-2 MR controllers.

ZS7-2 MR Racked System maximum performance configurations feature up to four Oracle Storage Drive Enclosure DE3-24P disk shelves in the base cabinet. The disk shelves are configured as one single shelf per chain to obtain maximum performance. Depending on the number of chains in the base cabinet, ZS7-2 MR Racked System maximum performance configurations can support one expansion cabinet.

TABLE 16 ZS7-2 MR Racked System Maximum Performance Configurations Components

Base Cabinet	Expansion Cabinet
Up to 4 DE3-24P disk shelves	Up to 10 DE3-24C disk shelves
Supported configurations: 1, 2, or 4 DE3-24P disk shelves	
Two ZS7-2 MR controllers	

ZS7-2 MR Racked System optimum performance configurations feature up to 16 Oracle Storage Drive Enclosure DE3-24P disk shelves (configured as four shelves per chain), as

well as various combinations of Oracle Storage Drive Enclosure DE3-24C and DE3-24P disk shelves in the base cabinet. Depending on the number of chains in the base cabinet, ZS7-2 MR Racked System optimum performance configurations can support up to one expansion cabinet.

TABLE 17 ZS7-2 MR Racked System Optimum Performance Configurations Components

Base Cabinet	Expansion Cabinet
Up to 16 DE3-24P disk shelves Supported configurations: <ul style="list-style-type: none"> ■ DE3-24P disk shelves: 2, 4, 6, 8, 10, 12, 14, or 16 ■ Mixed DE3-24C / DE3-24P disk shelves: <ul style="list-style-type: none"> ■ 2 DE3-24C / 2 to 14 DE3-24P ■ 4 DE3-24C / 2 to 10 DE3-24P ■ 6 DE3-24C / 2 to 6 DE3-24P ■ 8 DE3-24C / 2 DE3-24P Two ZS7-2 MR controllers	Up to 10 DE3-24C disk shelves

The ZS7-2 MR Racked System all-flash/mixed configurations support various storage options.

TABLE 18 ZS7-2 MR Racked System Disk Shelf Device Types and Allowable Configurations

Disk Shelf	Data Devices	Read Cache Devices	Log Devices
DE3-24P All-Flash	3.2 TB SSDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	Not allowed	200 GB SSDs in slot 20 - 23
DE3-24P	1.2 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23
DE3-24C	8 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23

Base Cabinet Configurations for ZS7-2 MR Racked System All-Flash/Mixed Configurations

ZS7-2 MR Racked System all-flash/mixed configurations have two SAS-3 HBAs in each controller, which provide the 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.

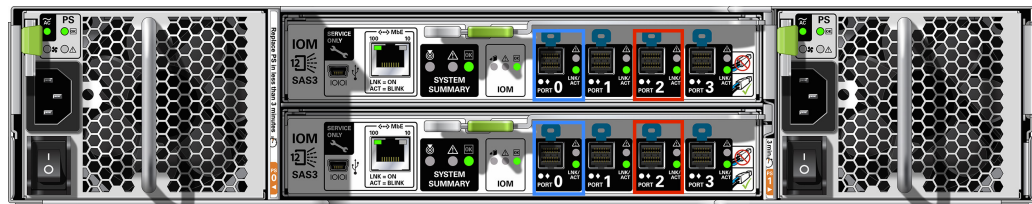
The following figure shows the slot number for each HBA card, as well as the port numbers in each card.

FIGURE 663 ZS7-2 MR Controller HBA Slot Numbers (Back View)



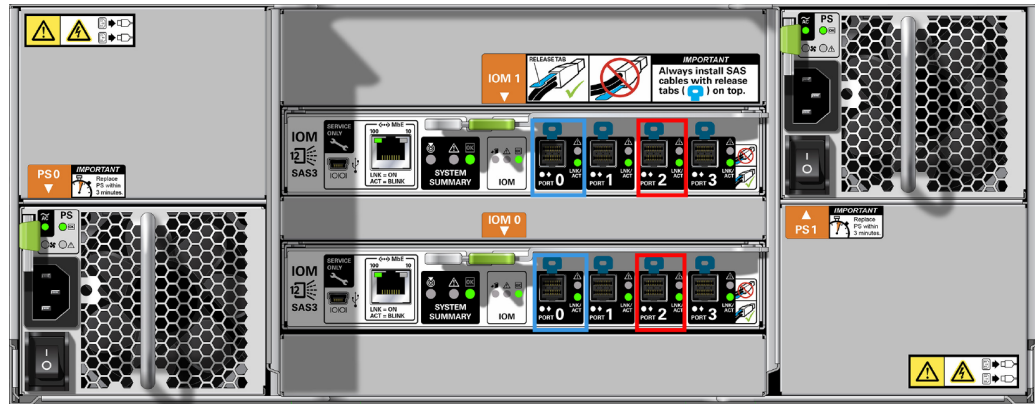
As shown in the following figure, the DE3-24P disk shelf has two I/O modules (IOMs) with four ports each. In all cabling configurations, Port 1 and Port 3 are never used.

FIGURE 664 DE3-24P Disk Shelf HBA Connections (Back View)



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 665 DE3-24C Disk Shelf HBA Connections (Back View)

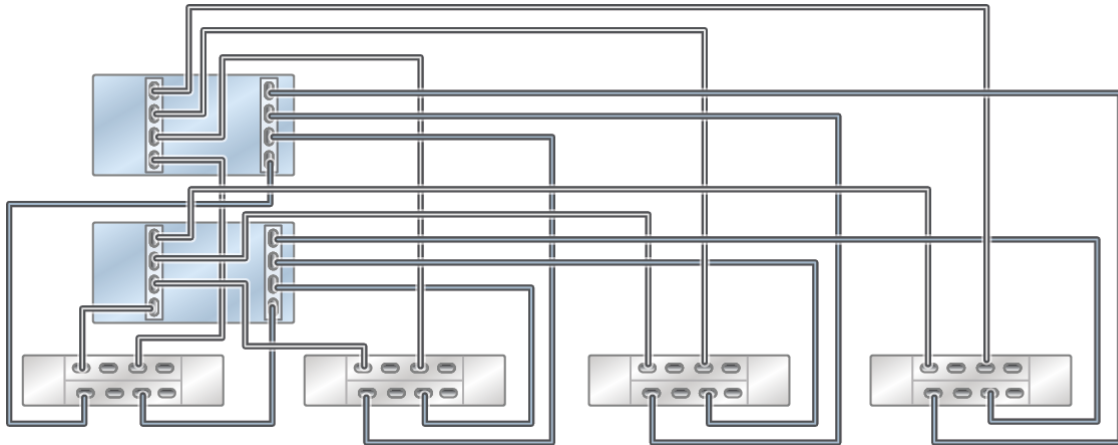


The ZS7-2 MR Racked System cabling configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). They provide a more practical implementation for SSD log device and read cache device matching, and can be configured for maximum or optimal performance.

Any upgrades that change the number of SAS-3 HBA cards, or include more than one cabinet that is not an original ZS7-2 MR Racked System or not compatible with ZS7-2 MR Racked System must be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to a ZS7-2 MR controller with 4x4 port SAS-3 HBAs, see [“Cabling DE3-24 Disk Shelves to ZS7-2 Mid-range \(MR\) Controllers”](#) on page 60. For SAS cable length guidelines, see [“Cabinet and Cabling Guidelines”](#) on page 13.

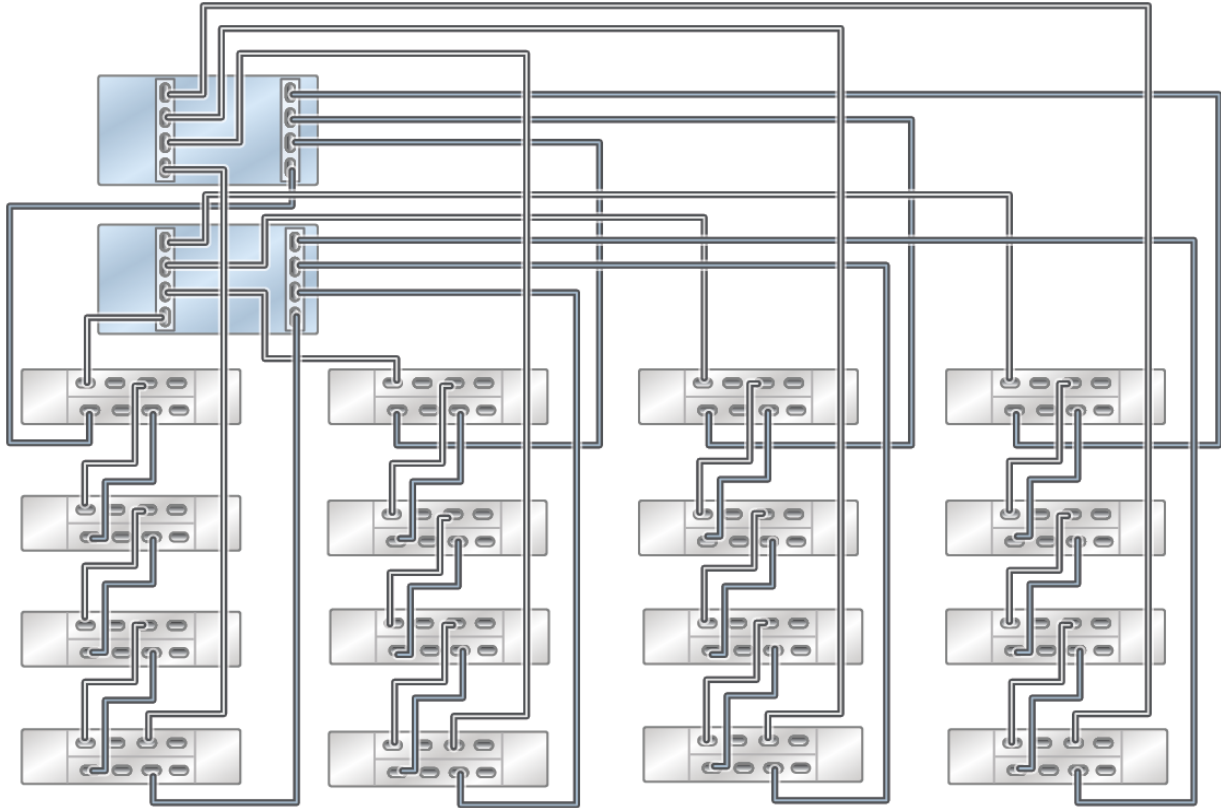
The cabinets are self-contained and pre-cabled following the required cabling methodology. The following diagrams illustrate how the six base cabinet options are cabled.

FIGURE 666 ZS7-2 MR Racked System Performance Configuration: Four DE3-24P Disk Shelves (maximum performance)



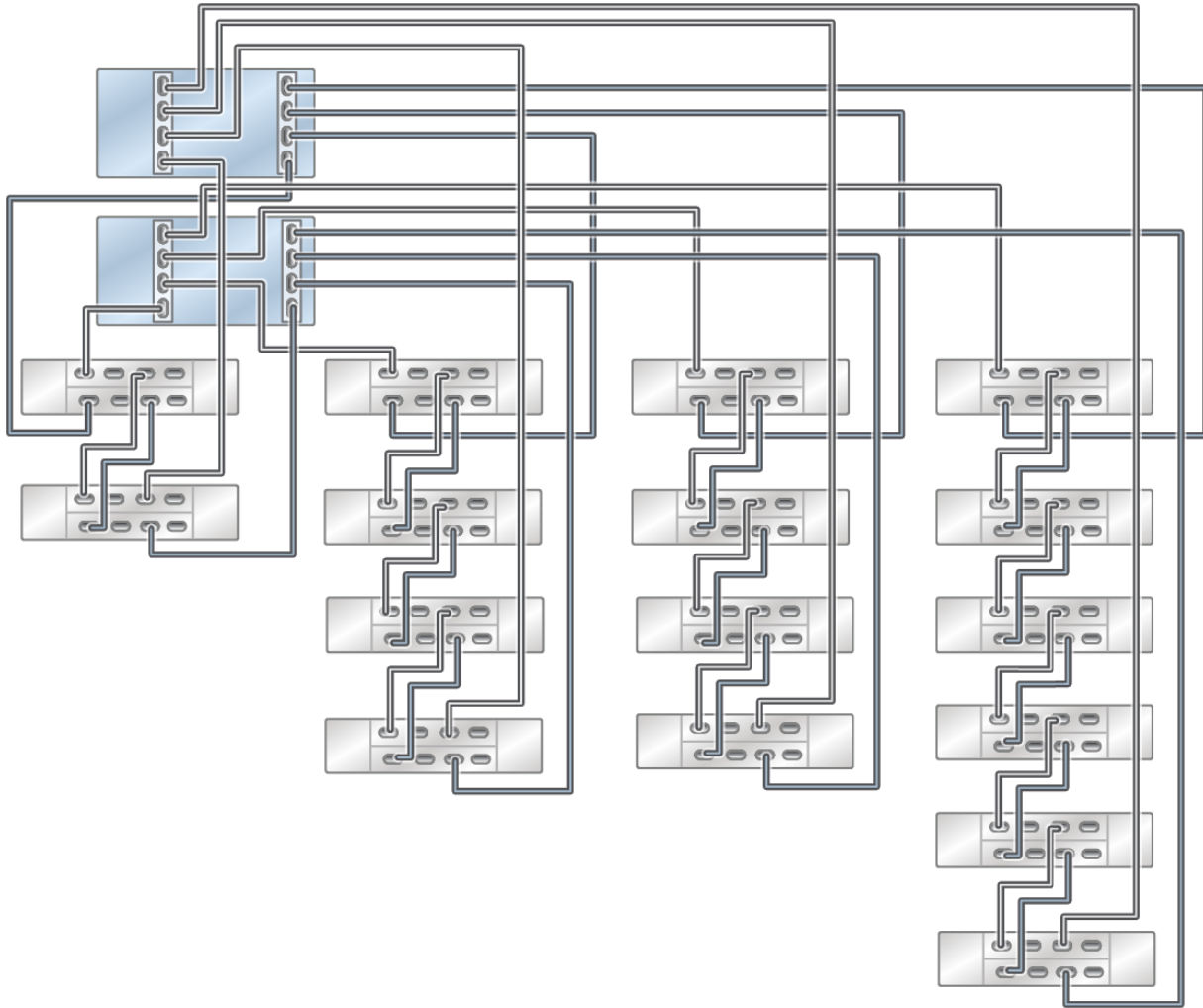
This configuration can have one, two, or four DE3-24P disk shelves utilizing the maximum performance cabling scheme.

FIGURE 667 ZS7-2 MR Racked System Performance Configuration: 16 DE3-24P Disk Shelves (optimum performance)



DE3-24P disk shelves in this configuration are added in pairs. Any other combination of disk shelves are added by pairs starting at the bottom of the rack. Valid disk shelf count combinations are 2, 4, 6, 8, 10, 12, 14, and 16 disk shelves.

FIGURE 668 ZS7-2 MR Racked System Performance Configuration: Two DE3-24C (bottom left) and Two DE3-24P to 14 DE3-24P Disk Shelves (optimum performance)



DE3-24P disk shelves in this configuration are added in pairs. Any other combination of disk shelves are added by pairs starting at the bottom of the rack. Valid disk shelf count combinations are 2, 4, 6, 8, 10, 12, 14, and 16 disk shelves.

FIGURE 669 ZS7-2 MR Racked System Performance Configuration: Four DE3-24C (bottom left) and Two DE3-24P to Ten DE3-24P Disk Shelves (optimum performance)

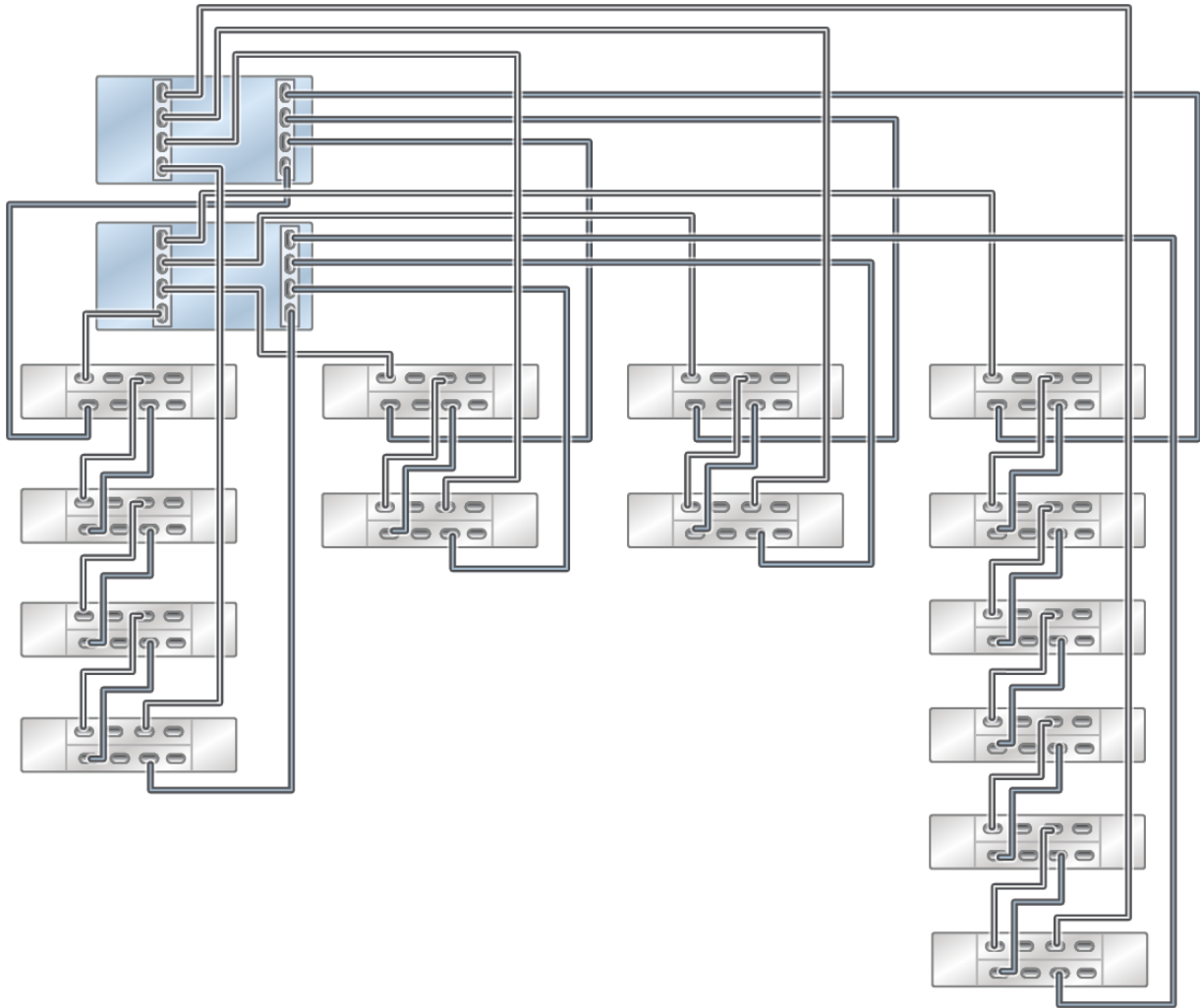


FIGURE 670 ZS7-2 MR Racked System Performance Configuration: Six DE3-24C (first two chains from the left) and Two DE3-24P to Six DE3-24P Disk Shelves (optimum performance)

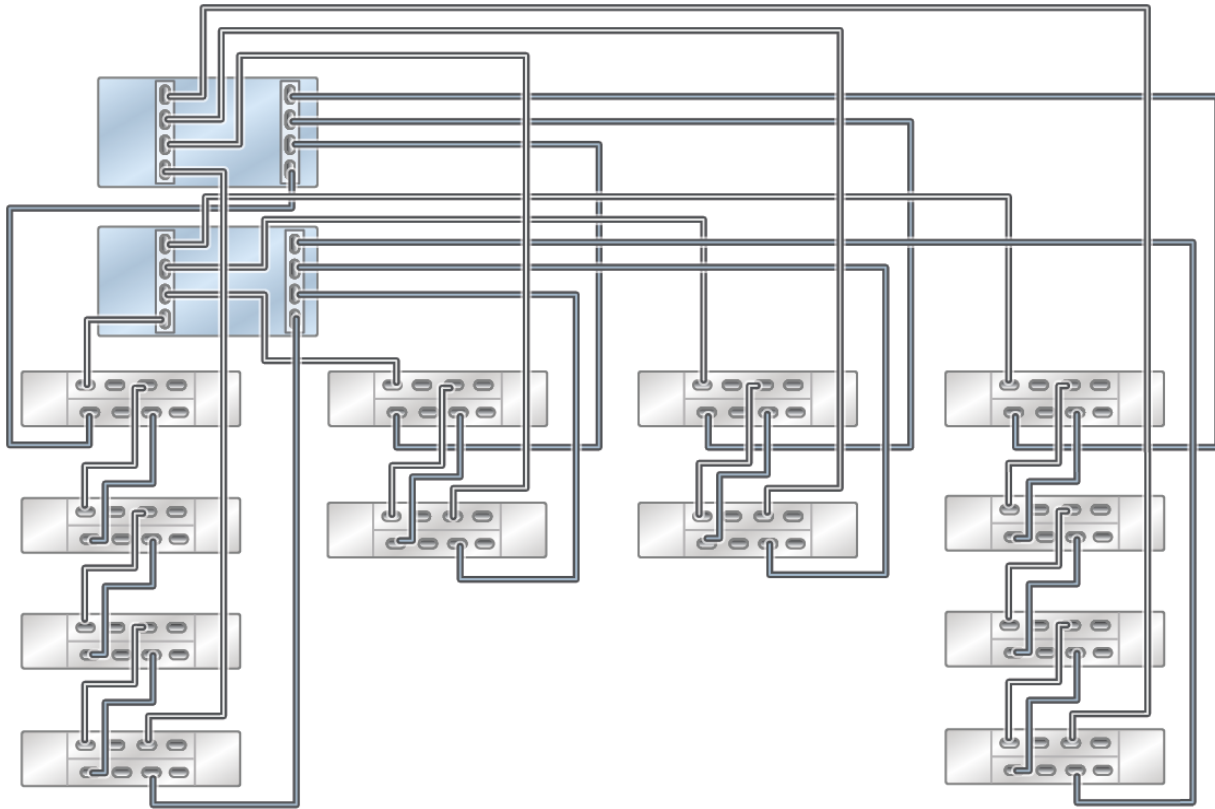
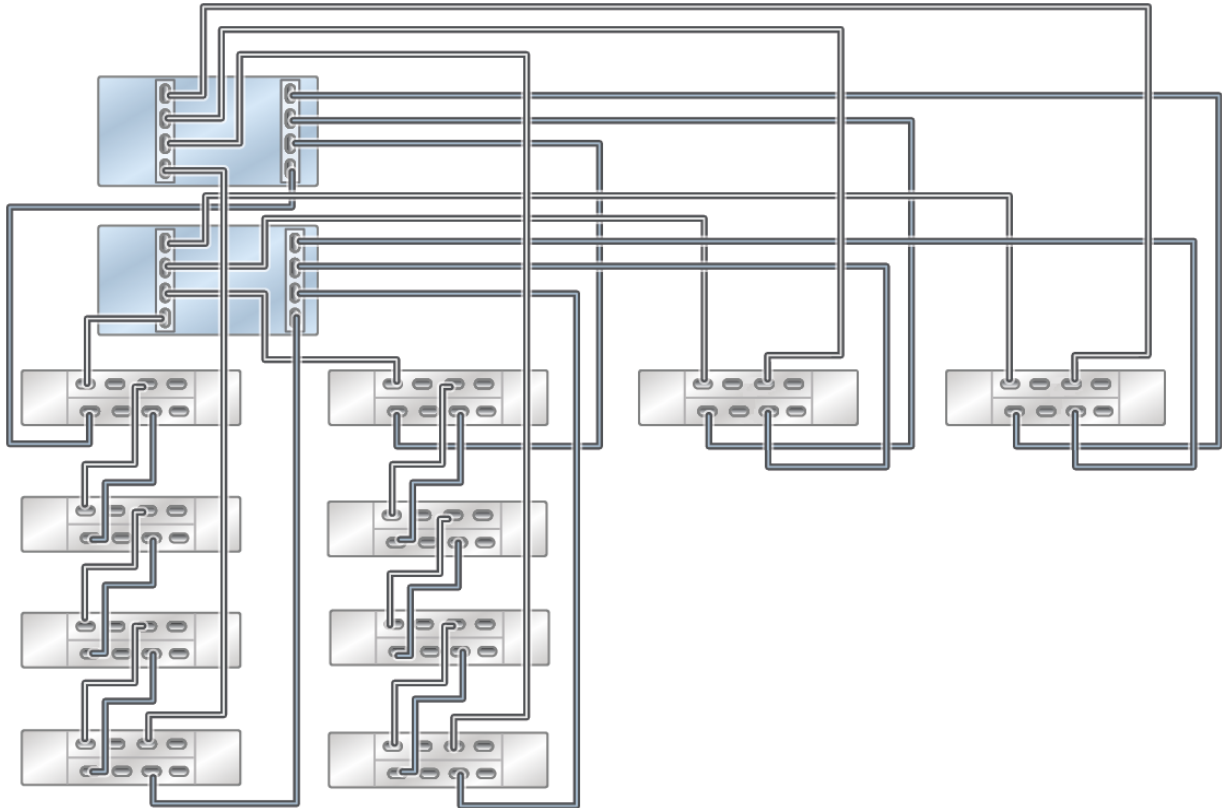


FIGURE 671 ZS7-2 MR Racked System Performance Configuration: Eight DE3-24C (first two chains from the left) and Two DE3-24P Disk Shelves (optimum performance)



Oracle ZFS Storage Appliance Racked System ZS5-4

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS5-4, which is a pre-racked and pre-cabled system that supports two configuration types: capacity configurations and performance configurations.

This section contains the following topics:

- [“Capacity Configurations for ZS5-4 Racked System” on page 457](#)
- [“Performance Configurations for ZS5-4 Racked System” on page 480](#)

Capacity Configurations for ZS5-4 Racked System

This section provides an overview and cabling diagrams for ZS5-4 Racked System capacity configurations.

This section contains the following topics:

- [“Overview of ZS5-4 Racked System Capacity Configurations” on page 457](#)
- [“Cabling Tables and Diagrams for ZS5-4 Racked System Capacity Configurations” on page 460](#)

Overview of ZS5-4 Racked System Capacity Configurations

Capacity configurations take advantage of high-capacity disk shelves and are available in a base cabinet, or a base cabinet with up to three expansion cabinets. Two ZS5-4 controllers and up to 38 disk shelves can be supported, as shown in the following table.

TABLE 19 ZS5-4 Racked System Capacity Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2	Expansion Cabinet 3
Up to 8 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves
Two ZS5-4 controllers			

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).

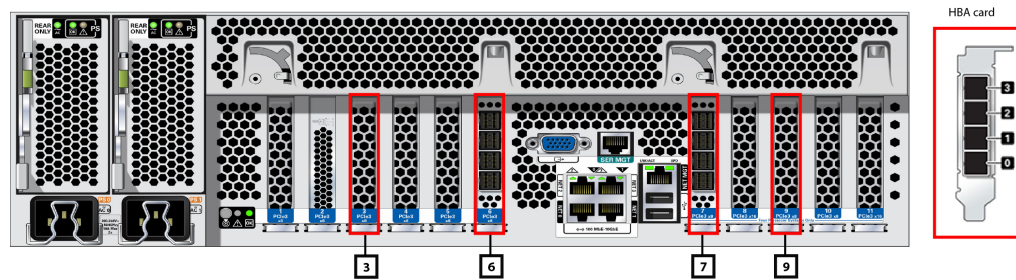
Each ZS5-4 controller supports two, three, or four SAS HBA cards. Four SAS HBA cards must be installed in each ZS5-4 controller to support disk shelves in the expansion cabinet(s).

Clustered ZS5-4 controllers that contain four SAS HBAs each support a high-availability configuration consisting of:

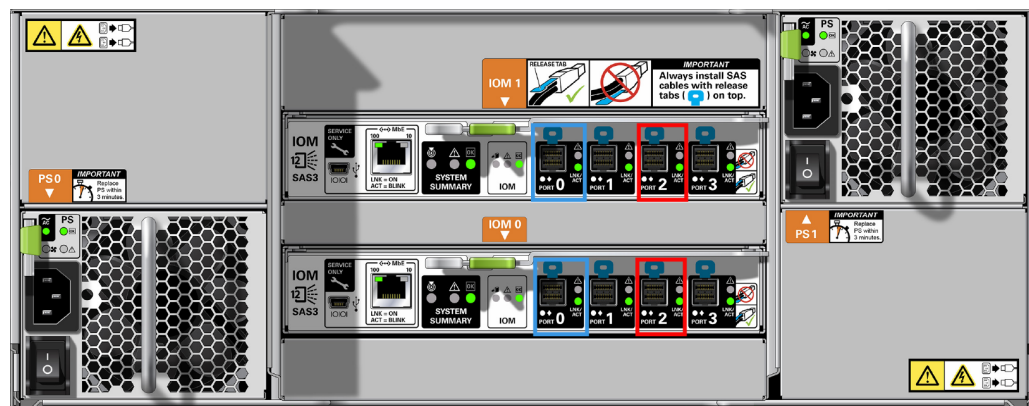
- Two chains of four disk shelves per disk chain in the base cabinet for a total of eight disk shelves, and
- One to three expansion cabinets, each cabinet supporting two chains with a maximum of five disk shelves per disk chain, for a total of 10 disk shelves for one expansion cabinet, 20 disk shelves for two expansion cabinets, or 30 disk shelves for three expansion cabinets.

The cabinets are self-contained and pre-cabled following the required cabling methodology. Pre-racked system cabling tables and diagrams, which can also be used for planning future system expansion, are provided in the section [“Cabling Tables and Diagrams for ZS5-4 Racked System Capacity Configurations”](#) on page 460.

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 672 ZS5-4 Controller 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 673 DE3-24C Disk Shelf HBA Connections (Back View)

Cabling Tables and Diagrams for ZS5-4 Racked System Capacity Configurations

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 IOMs.

TABLE 20 Base Cabinet: Controller and Disk Shelf Locations and Connections

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 10 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 IOMs. Expansion Cabinet 1 supports disk shelves 9 through 18.

TABLE 21 Expansion Cabinet 1: Controller and Disk Shelf Locations and Connections

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 10 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 IOMs. Expansion Cabinet 2 supports disk shelves 19 through 28.

TABLE 22 Expansion Cabinet 2: Controller and Disk Shelf Locations and Connections

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 10 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 IOMs. Expansion Cabinet 2 supports disk shelves 29 through 38.

TABLE 23 Expansion Cabinet 3: Controller and Disk Shelf Locations and Connections

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 illustrate how pre-racked systems are cabled, as well as how to expand your system in the future. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).

- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

FIGURE 674 ZS5-4 Racked System Capacity Configuration: 10 DE3-24C Disk Shelves

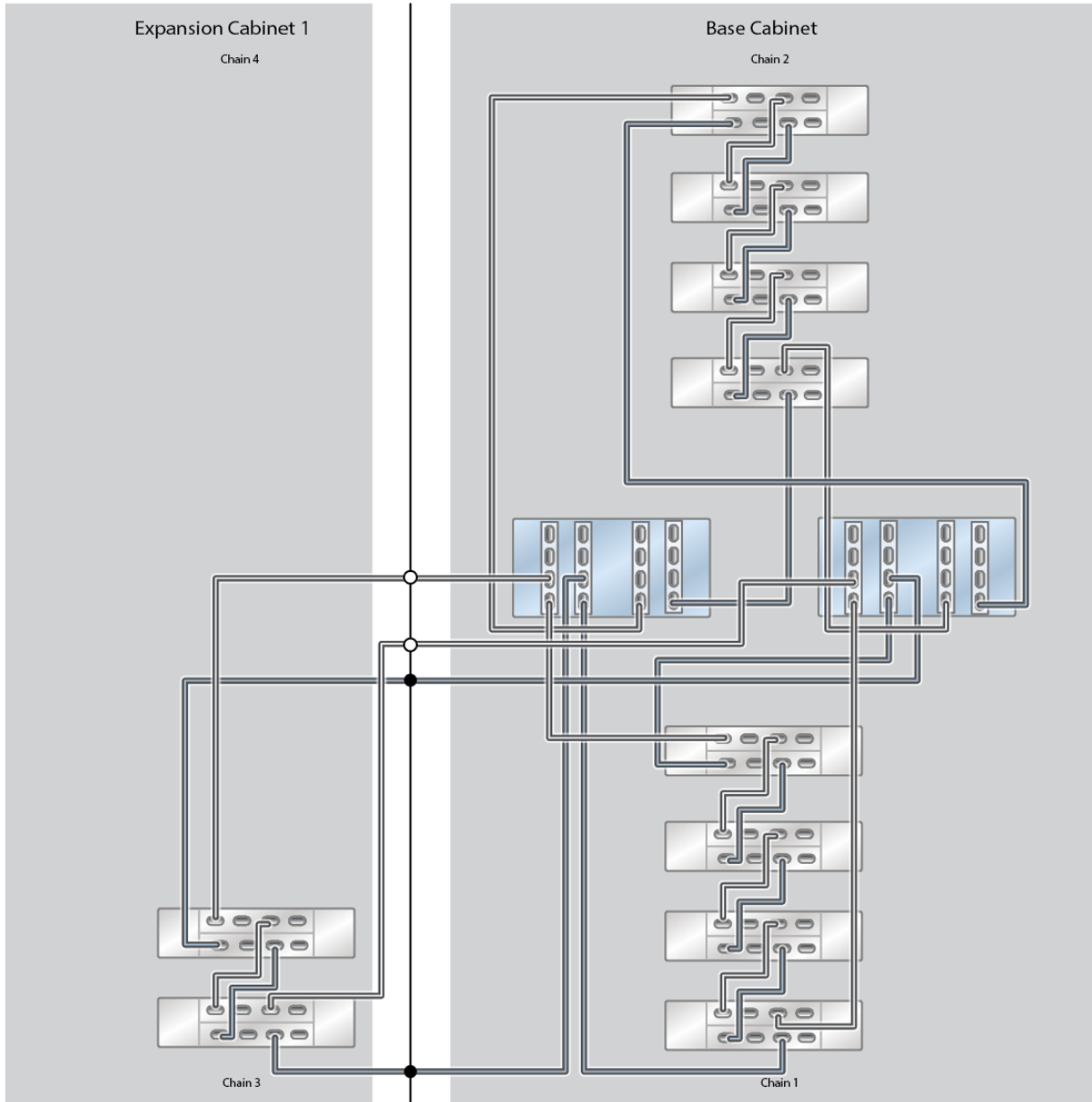


FIGURE 675 ZS5-4 Racked System Capacity Configuration: 12 DE3-24C Disk Shelves

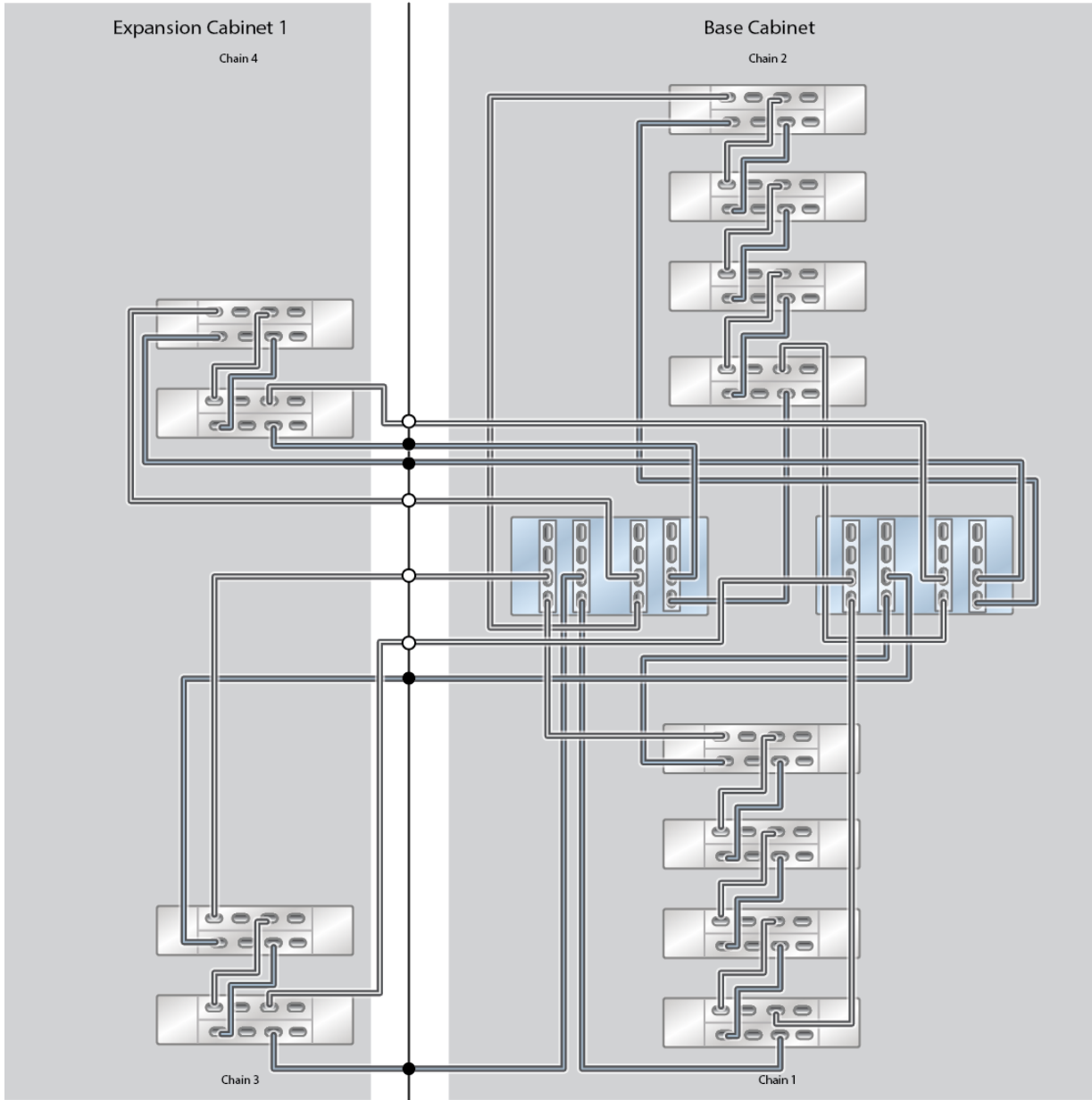


FIGURE 676 ZS5-4 Racked System Capacity Configuration: 13 DE3-24C Disk Shelves (Half Rack)

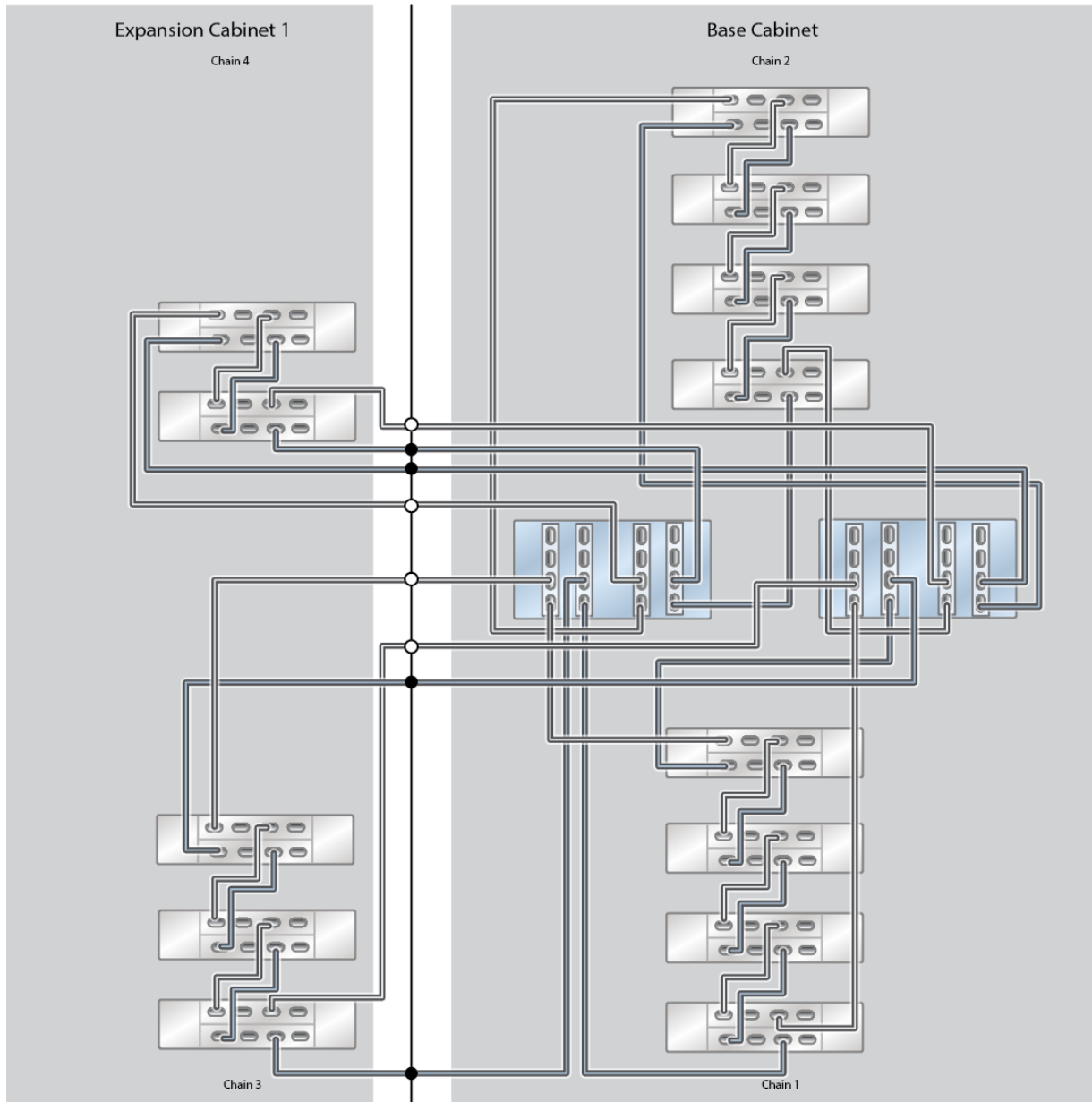


FIGURE 677 ZS5-4 Racked System Capacity Configuration: 14 DE3-24C Disk Shelves

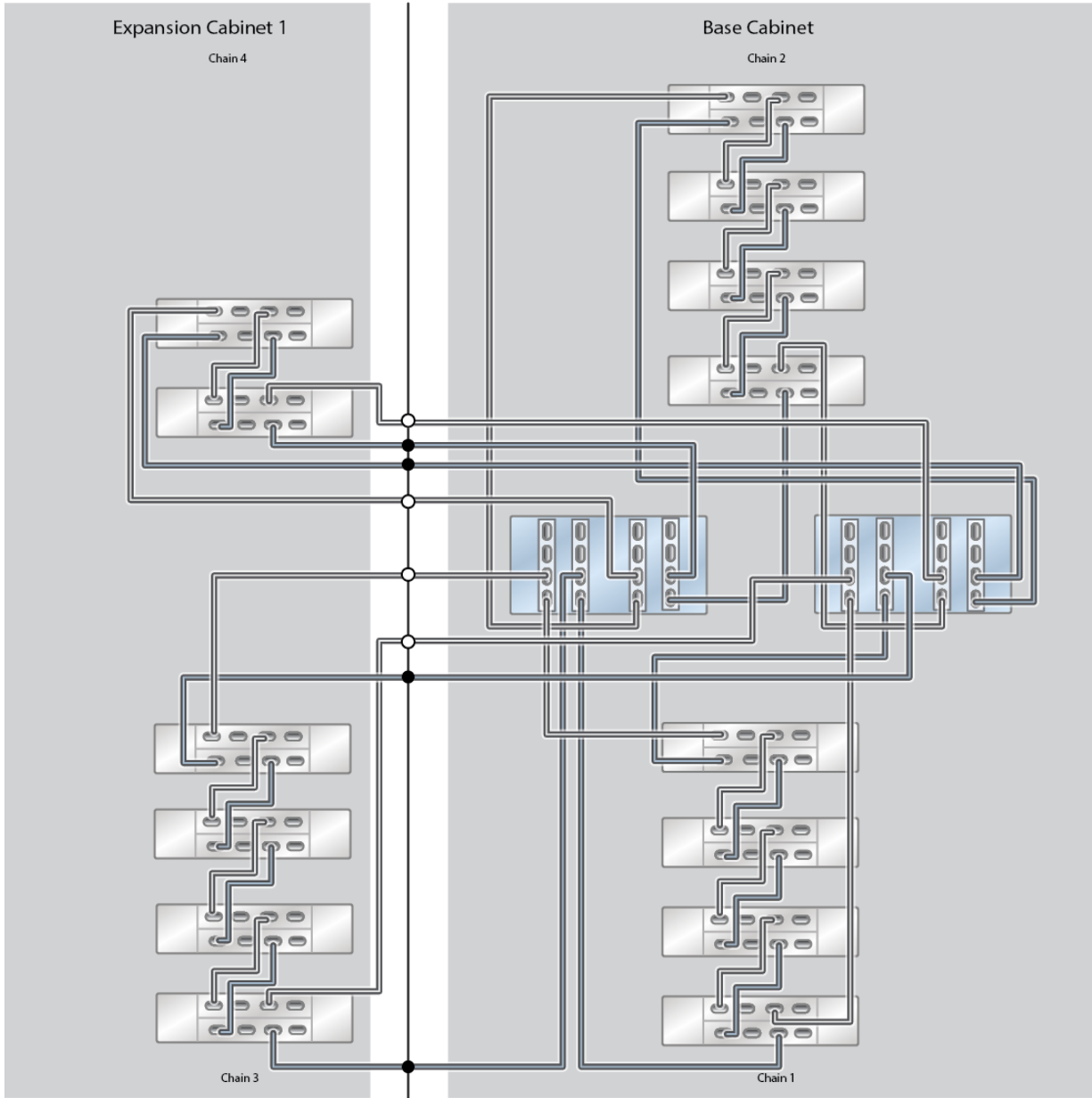


FIGURE 678 ZS5-4 Racked System Capacity Configuration: 16 DE3-24C Disk Shelves

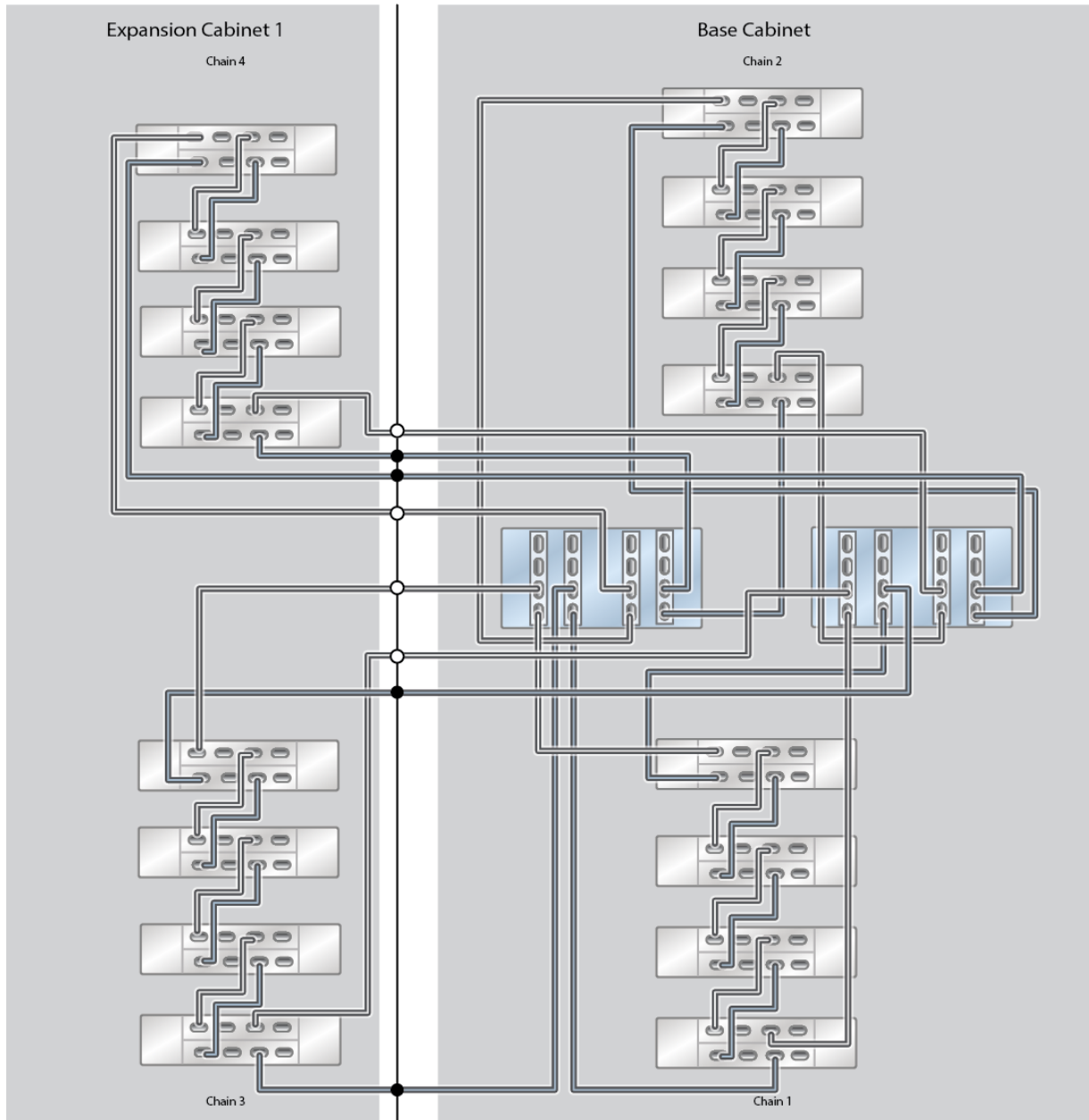


FIGURE 679 ZS5-4 Racked System Capacity Configuration: 18 DE3-24C Disk Shelves

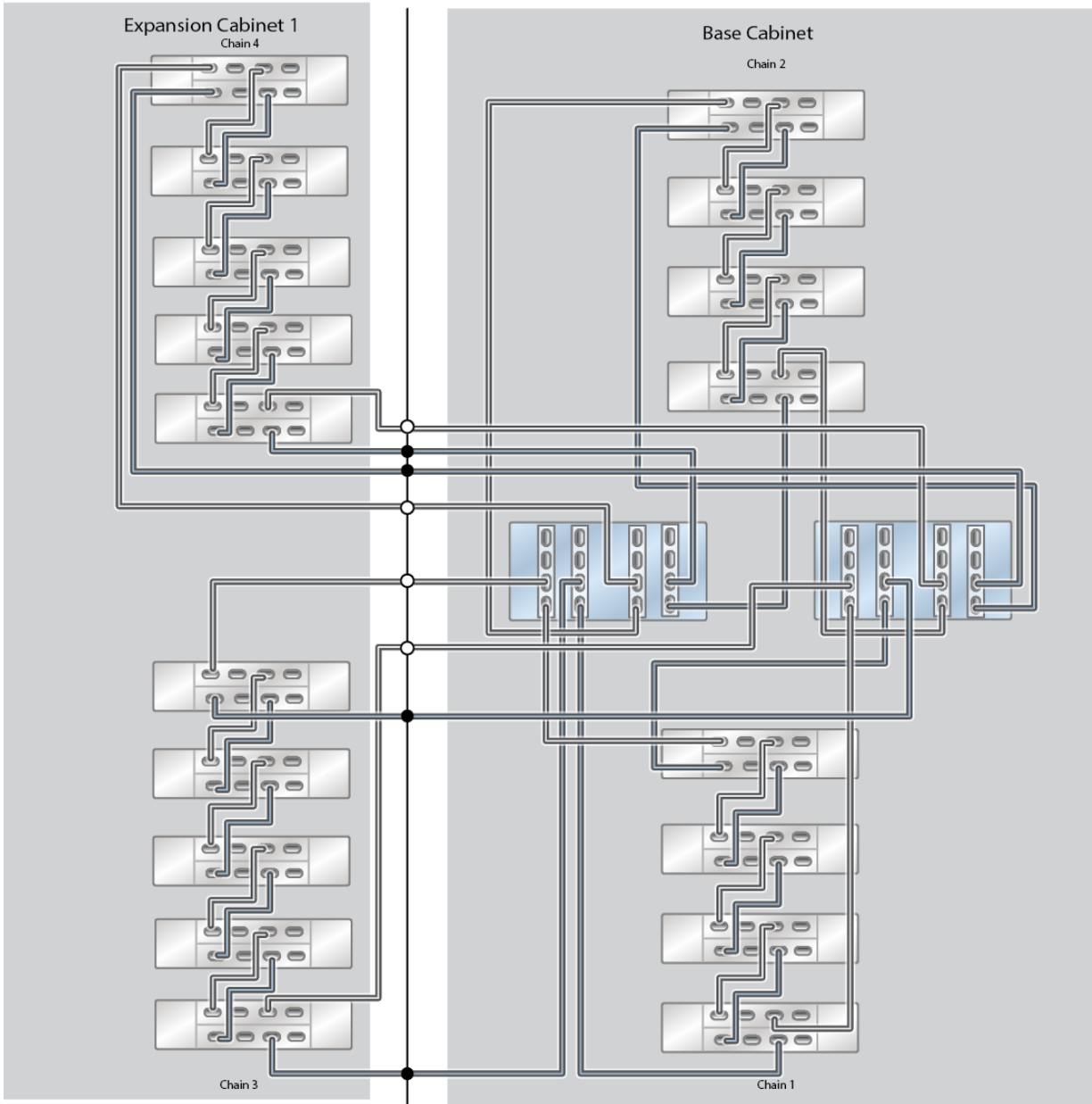


FIGURE 680 ZS5-4 Racked System Capacity Configuration: 20 DE3-24C Disk Shelves

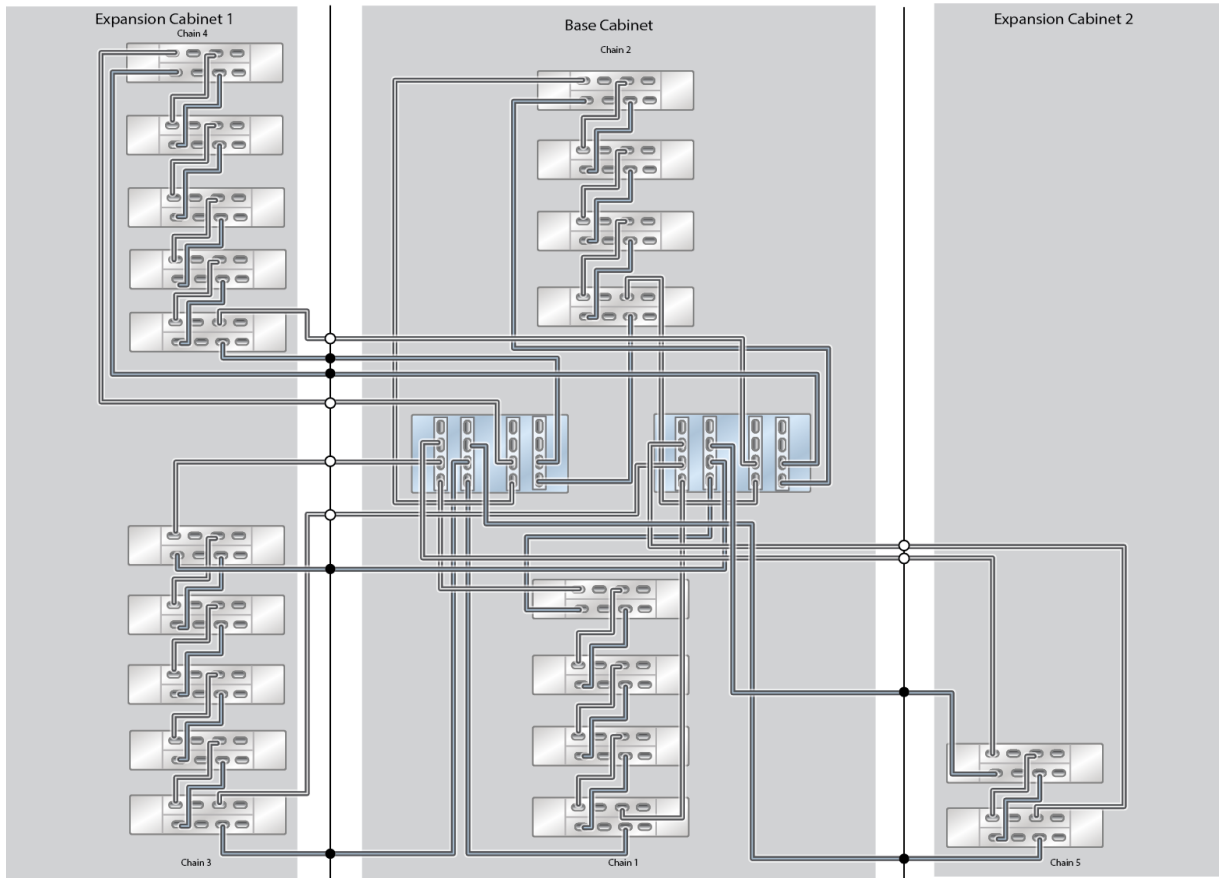


FIGURE 681 ZS5-4 Racked System Capacity Configuration: 22 DE3-24C Disk Shelves

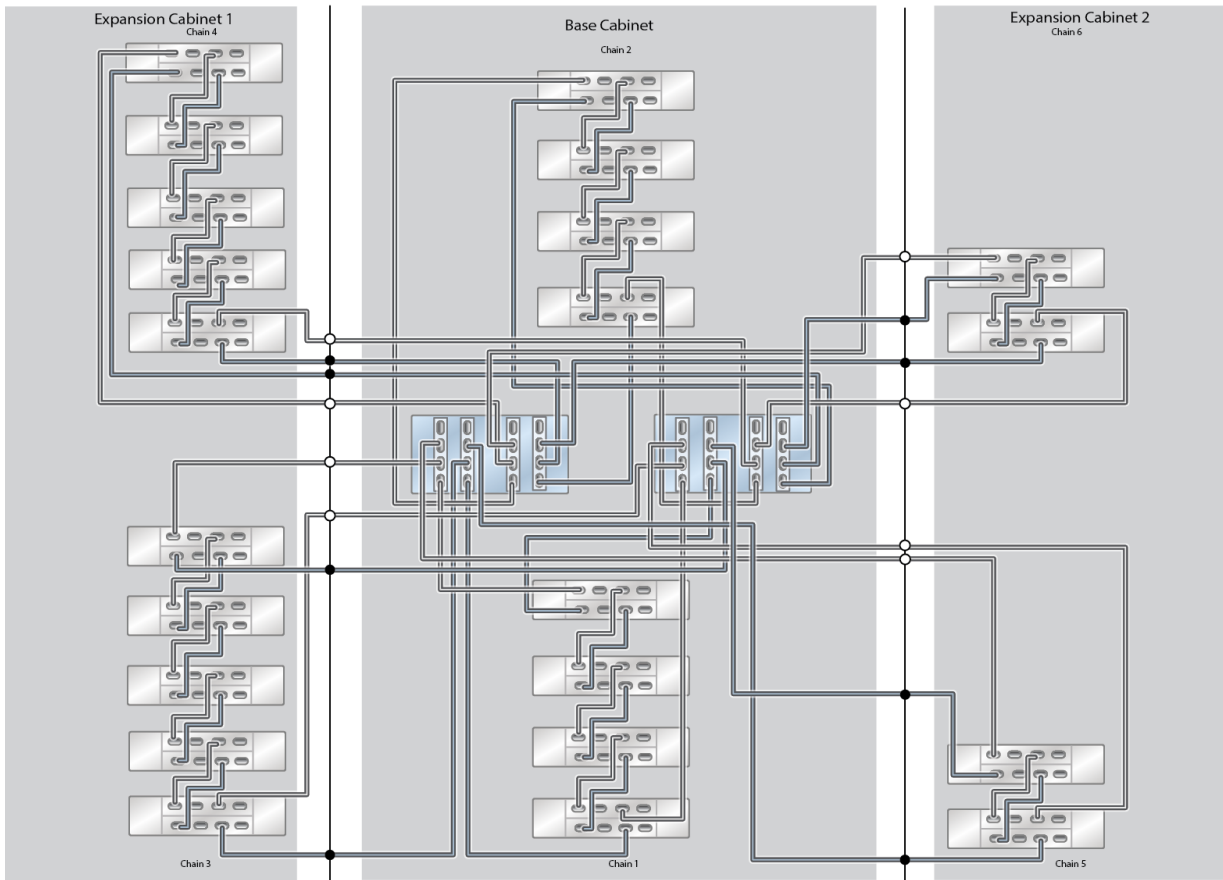


FIGURE 682 ZS5-4 Racked System Capacity Configuration: 23 DE3-24C Disk Shelves (Half Rack)

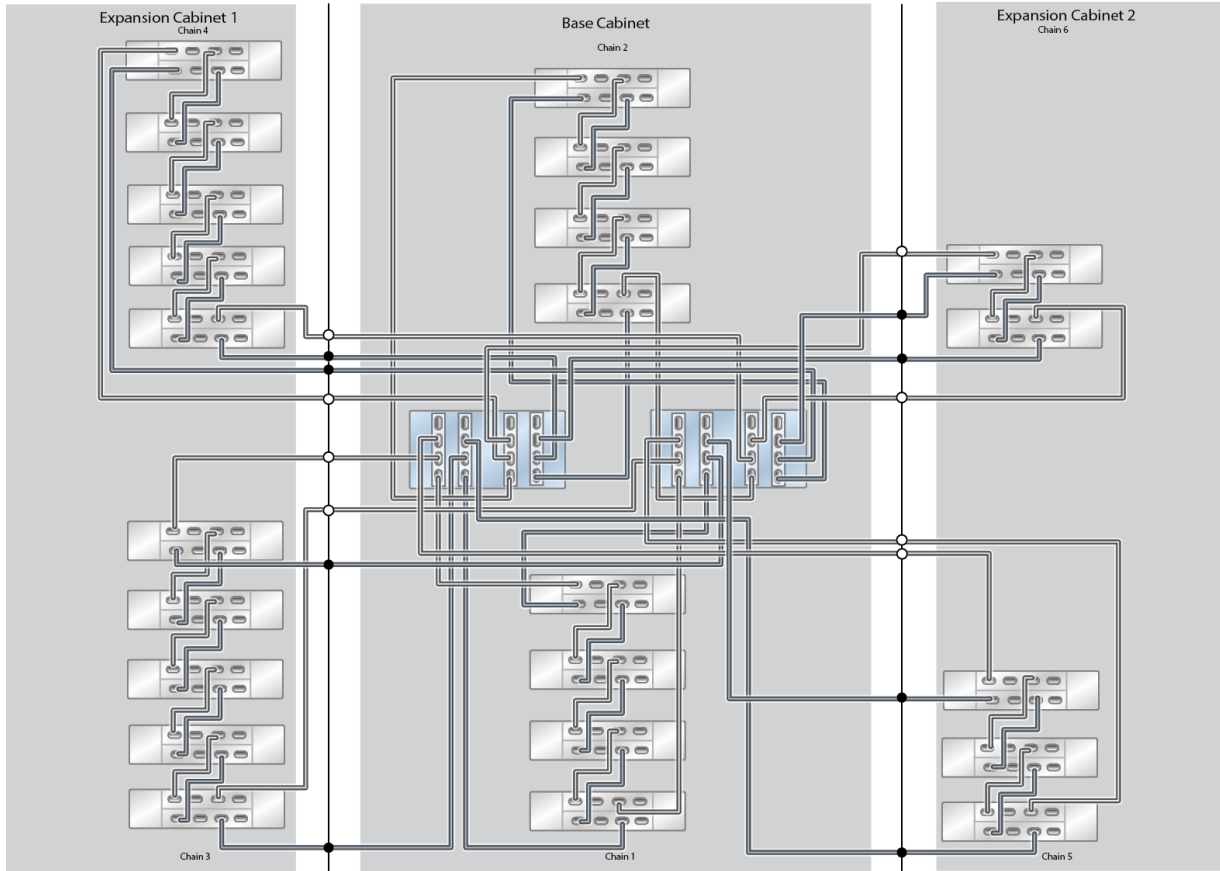


FIGURE 683 ZS5-4 Racked System Capacity Configuration: 24 DE3-24C Disk Shelves

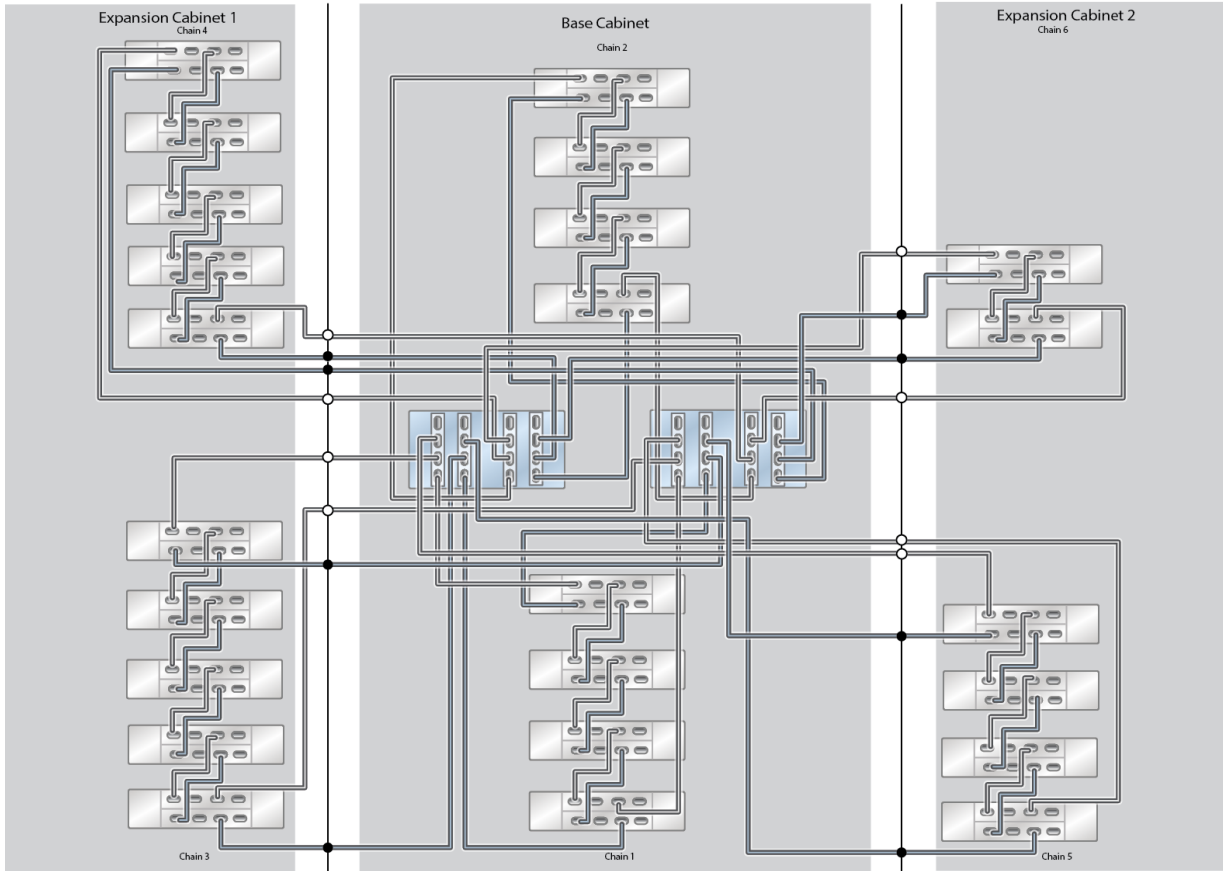


FIGURE 684 ZS5-4 Racked System Capacity Configuration: 26 DE3-24C Disk Shelves

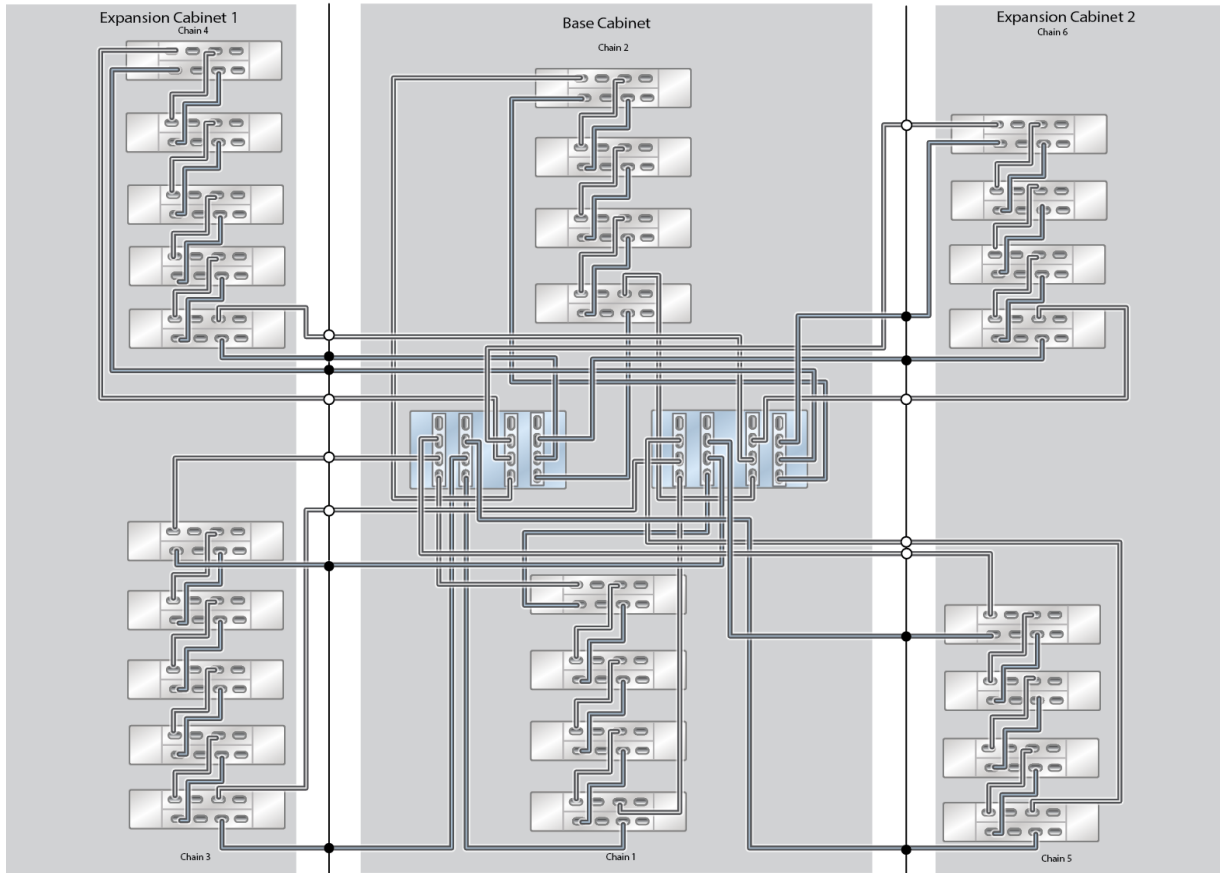


FIGURE 685 ZS5-4 Racked System Capacity Configuration: 28 DE3-24C Disk Shelves

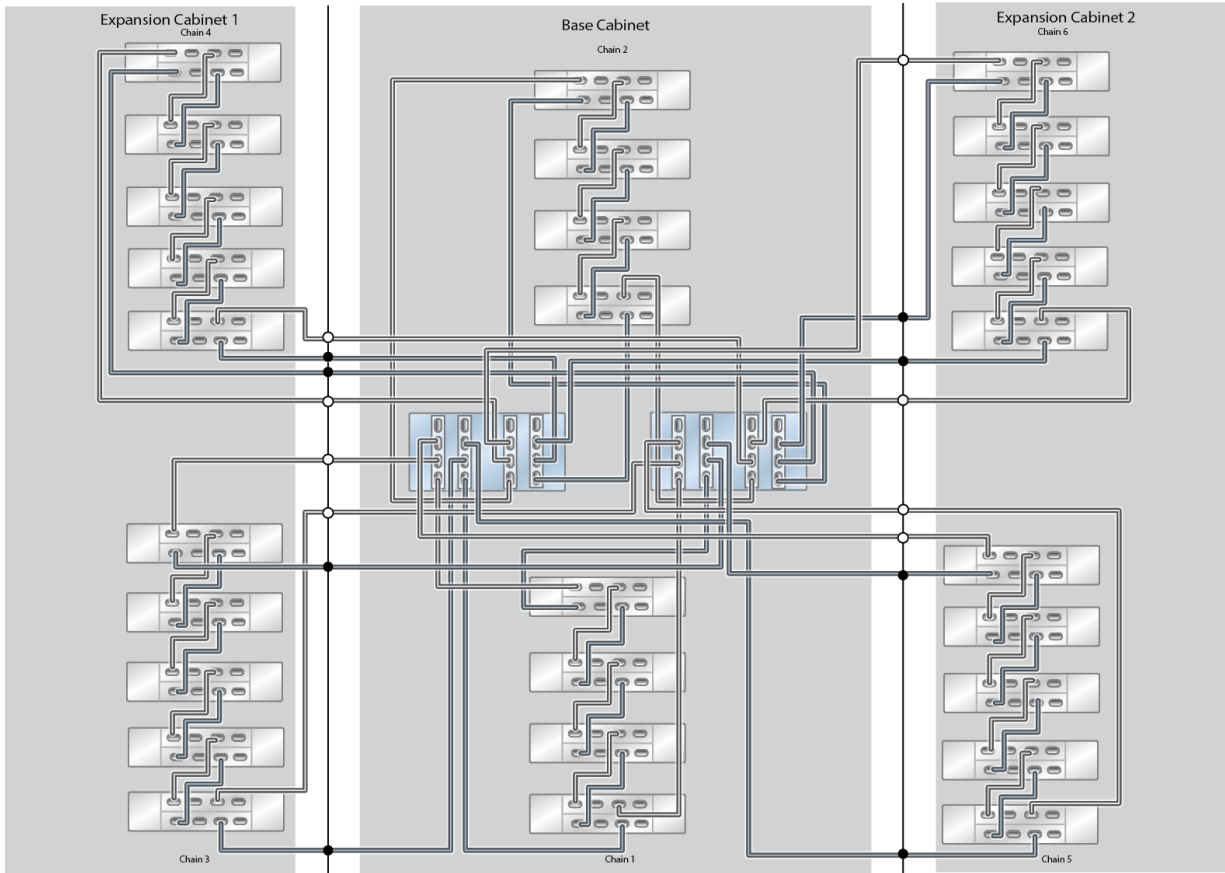


FIGURE 686 ZS5-4 Racked System Capacity Configuration: 30 DE3-24C Disk Shelves

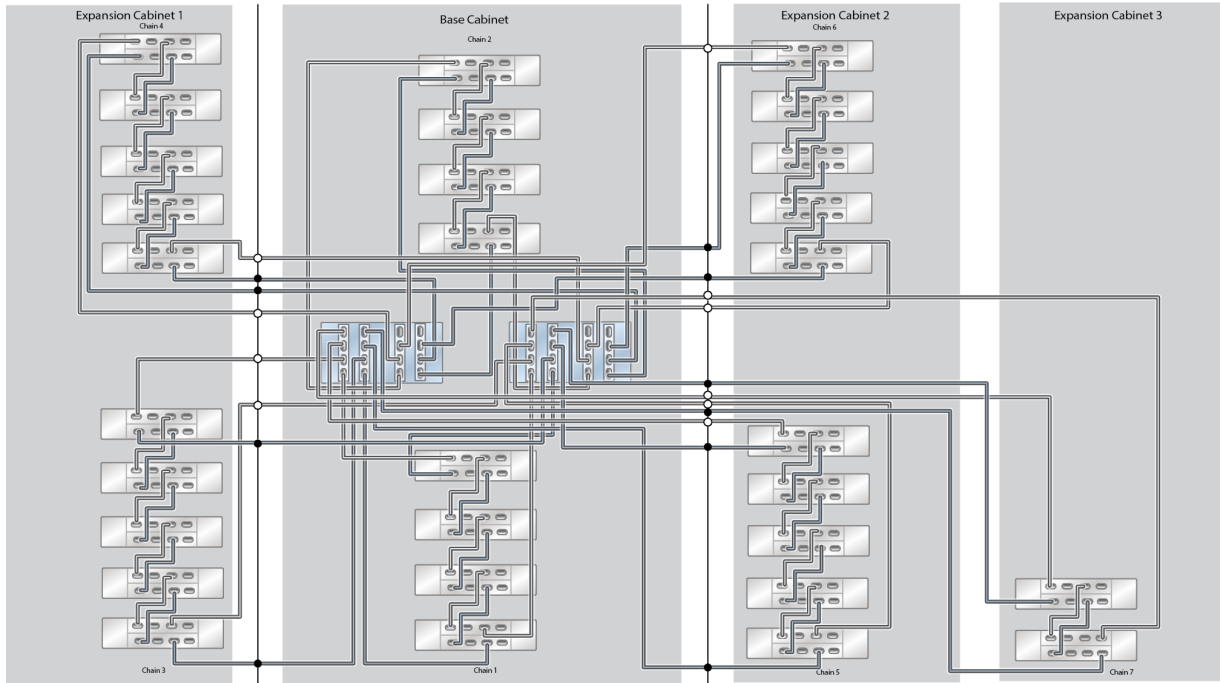


FIGURE 687 ZS5-4 Racked System Capacity Configuration: 32 DE3-24C Disk Shelves

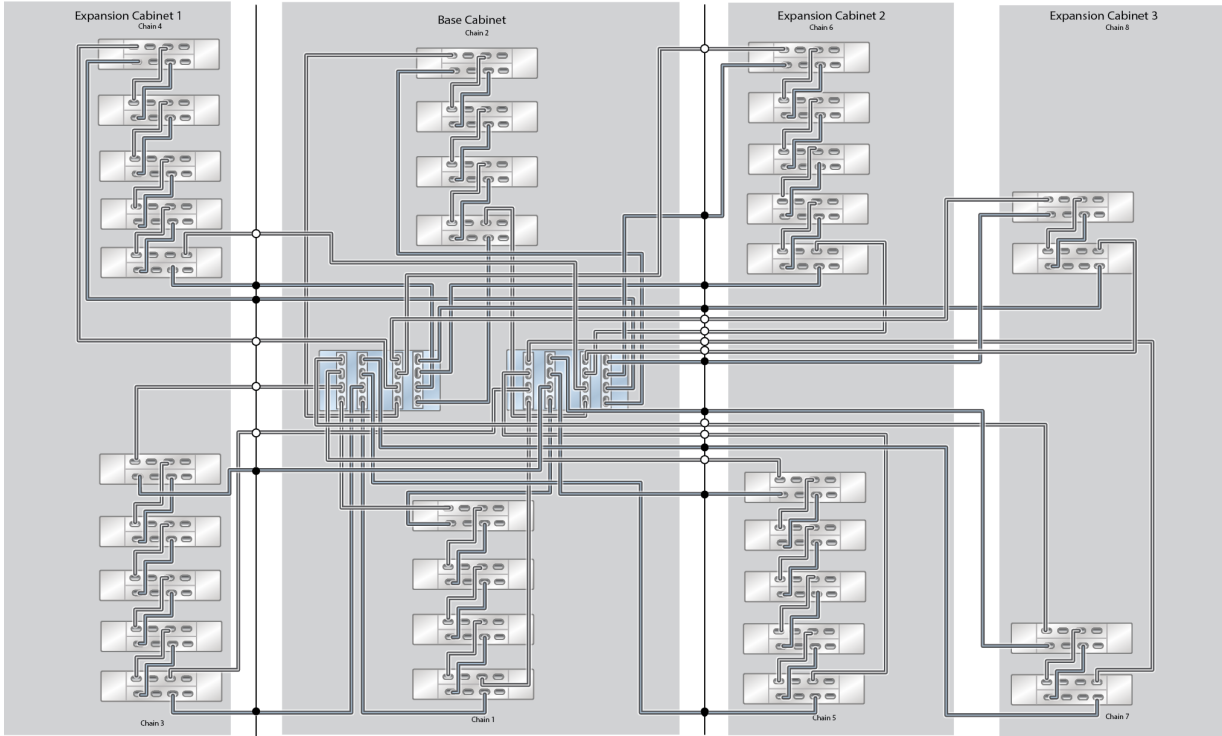


FIGURE 688 ZS5-4 Racked System Capacity Configuration: 33 DE3-24C Disk Shelves (Half Rack)

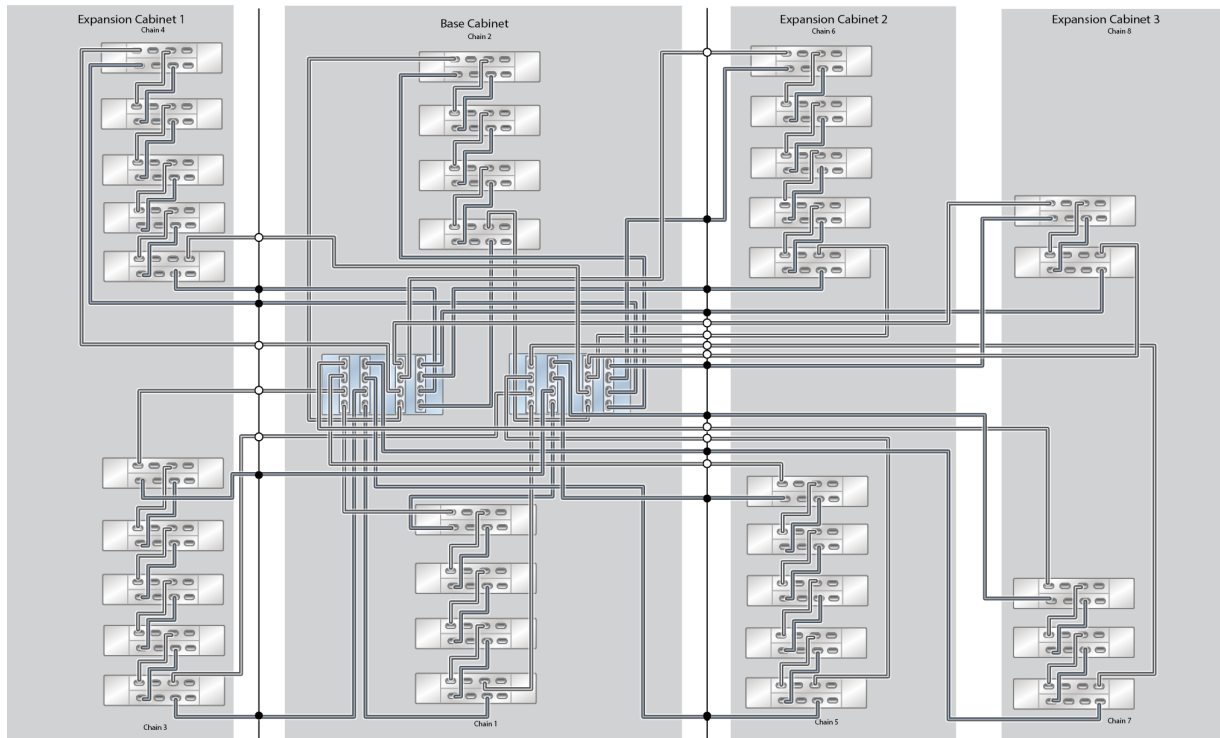


FIGURE 689 ZS5-4 Racked System Capacity Configuration: 34 DE3-24C Disk Shelves

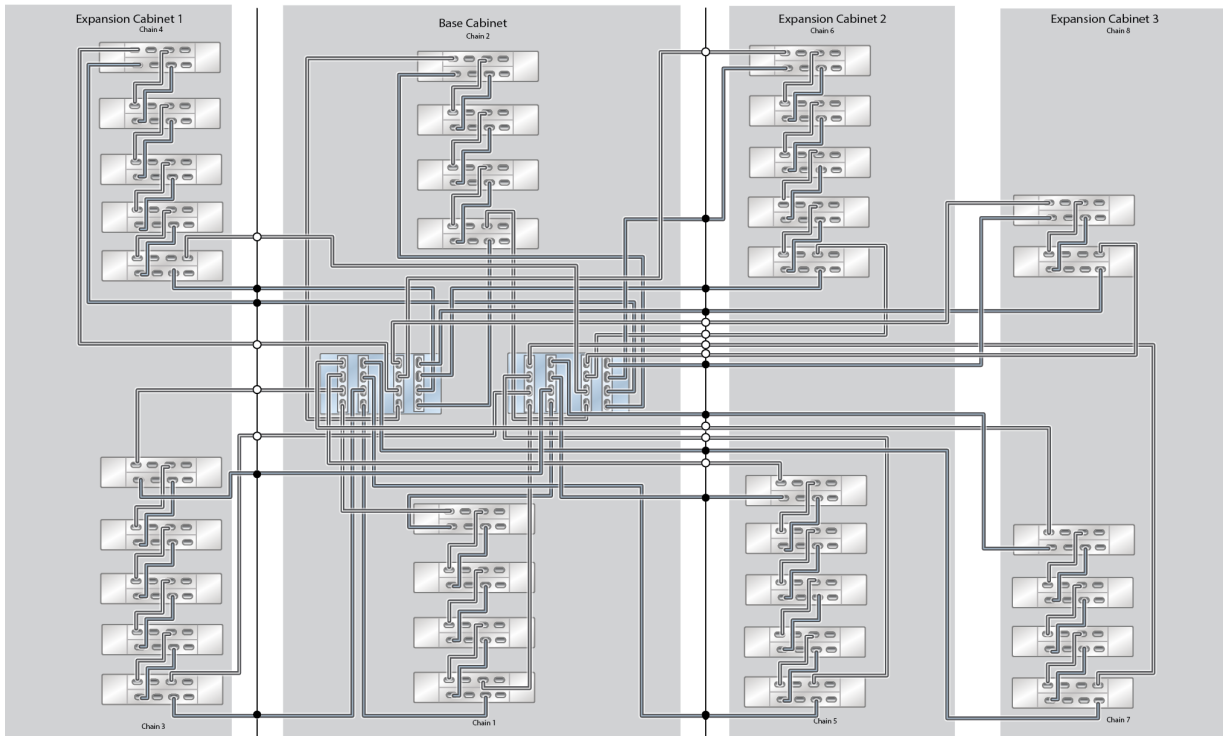


FIGURE 690 ZS5-4 Racked System Capacity Configuration: 36 DE3-24C Disk Shelves

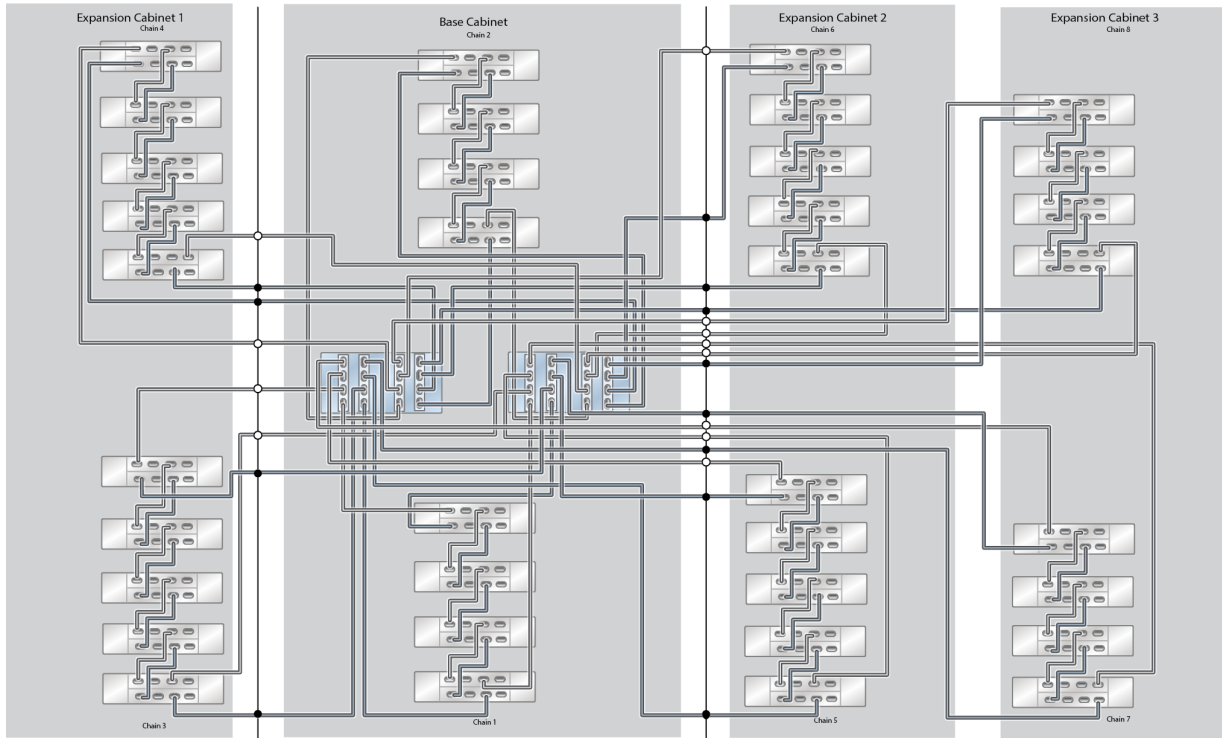
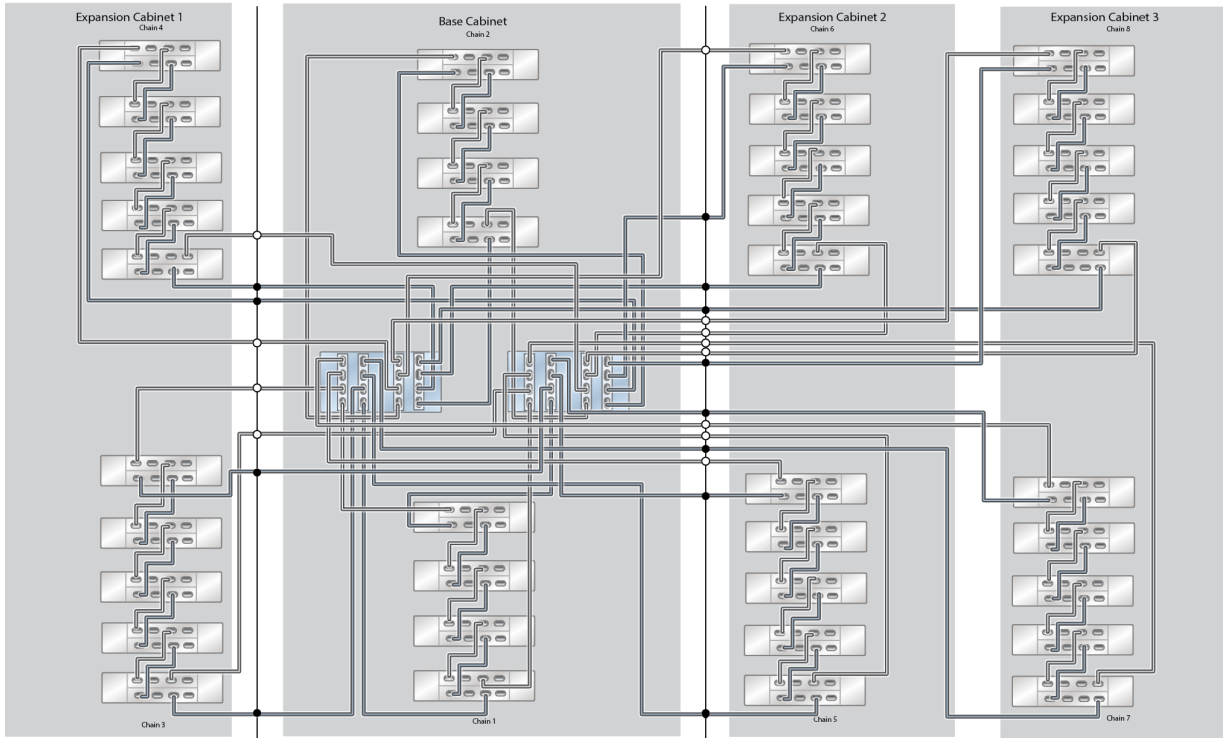


FIGURE 691 ZS5-4 Racked System Capacity Configuration: 38 DE3-24C Disk Shelves



Performance Configurations for ZS5-4 Racked System

This section provides an overview and cabling diagrams for ZS5-4 Racked System performance configurations.

This section contains the following topics:

- [“Overview of ZS5-4 Racked System Performance Configurations” on page 481](#)
- [“Base Cabinet Configurations for ZS5-4 Racked System Performance Configurations” on page 483](#)
- [“Expansion Cabinet Configurations for ZS5-4 Racked System Performance Configurations” on page 490](#)

Overview of ZS5-4 Racked System Performance Configurations

Performance configurations take advantage of high-performance disk shelves and are available in a base cabinet, or a base cabinet with up to three expansion cabinets for some configurations. Five base cabinet options are offered in a total of 24 possible system configurations, and all base cabinet options contain two ZS5-4 controllers.

ZS5-4 Racked System maximum performance configurations feature up to eight Oracle Storage Drive Enclosure DE3-24P All-Flash disk shelves in the base cabinet. The disk shelves are configured as one single shelf per chain to obtain maximum performance. No expansion cabinets are supported for this configuration.

TABLE 24 ZS5-4 Racked System Maximum Performance Configurations Components

Base Cabinet	Expansion Cabinet
Up to eight DE3-24P All-Flash disk shelves	Not supported
Two ZS5-4 controllers	

ZS5-4 Racked System optimum performance configurations feature up to 16 Oracle Storage Drive Enclosure DE3-24P disk shelves (configured as two shelves per chain) as well as a combination of up to 14 Oracle Storage Drive Enclosure DE3-24C and DE3-24P disk shelves in the base cabinet. Only DE3-24C disk shelves, up to 10 each, are offered in the expansion cabinets. Configurations are offered in multiples of two disk shelves, as well as half-rack expansion. Each expansion cabinet can contain 2, 4, 5 (half-rack), 6, 8, or 10 DE3-24C disk shelves. ZS5-4 Racked System performance configurations can have up to three expansion cabinets.

TABLE 25 ZS5-4 Racked System Optimum Performance Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2	Expansion Cabinet 3
Up to 16 DE3-24P disk shelves, or up to 14 DE3-24C and DE3-24P disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves	Up to 10 DE3-24C disk shelves
Two ZS5-4 controllers			

The ZS5-4 Racked System performance configurations support various storage options.

TABLE 26 ZS5-4 Racked System Disk Shelf Device Types and Allowable Configurations

Disk Shelf	Data Devices	Read Cache Devices	Log Devices
DE3-24P All-Flash	3.2 TB SSDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	Not allowed	200 GB SSDs in slot 20 - 23
DE3-24P	1.2 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23
DE3-24C	8 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23

Disk Shelf Allowable Configurations and Load Priority

The following are allowable configurations for additional DE3-24 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:

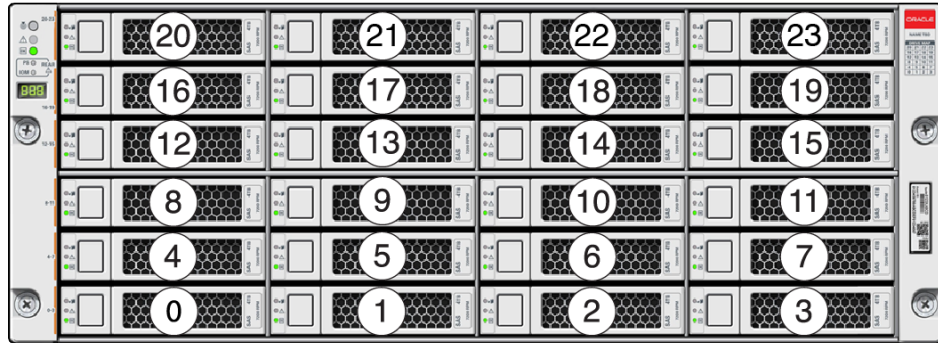
1. DE3-24 disk shelves with SSD log devices
2. DE3-24 disk shelves with SSD read cache devices
3. DE3-24 disk shelves without SSD log or read cache devices

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 692 DE3-24P Disk Shelf Drive Locations (Front View)



FIGURE 693 DE3-24C Disk Shelf Drive Locations (Front View)



Base Cabinet Configurations for ZS5-4 Racked System Performance Configurations

ZS5-4 Racked System maximum performance configurations require four SAS-3 HBAs, which provide the 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 694 ZS5-4 Controller HBA Slot Numbers (Back View)

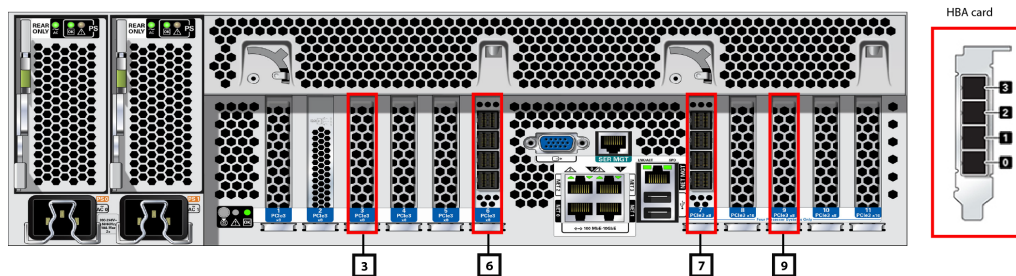


FIGURE 695 DE3-24P Disk Shelf HBA Connections (Back View)

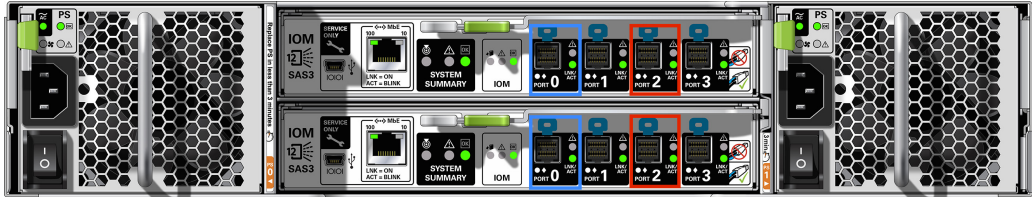
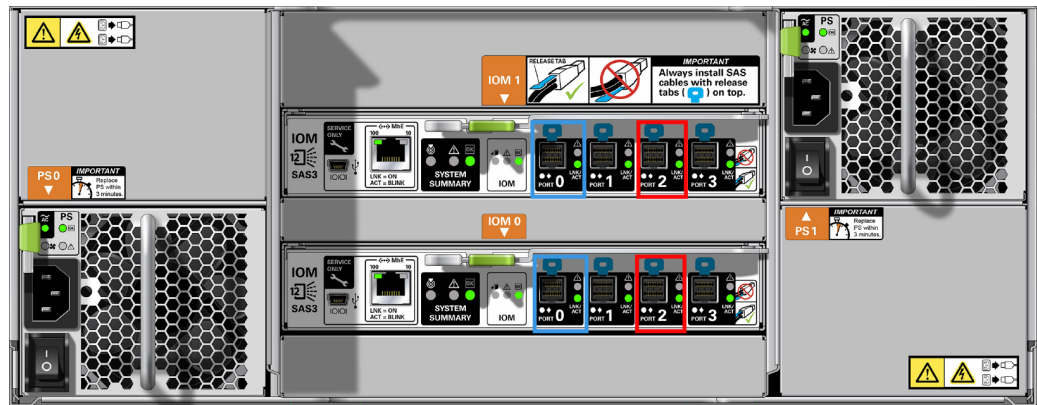


FIGURE 696 DE3-24C Disk Shelf HBA Connections (Back View)



The ZS5-4 Racked System performance configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). They provide a more practical implementation for SSD log device and read cache device matching, limited multi-cabinet expansion, and can be configured 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 or not compatible with ZS5-4 Racked System must be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to a ZS5-4 controller with 4x4 port SAS-3 HBAs, see [“Cabling DE3-24 Disk Shelves to ZS5-4 Controllers”](#) on page 68. For SAS cable length guidelines, see [“Cabinet and Cabling Guidelines”](#) on page 13.

The cabinets are self-contained and pre-cabled following the required cabling methodology. The following diagrams illustrate how the five base cabinet options are cabled.

FIGURE 697 ZS5-4 Racked System Performance Configuration: Eight DE3-24P All-Flash Disk Shelves (maximum performance)

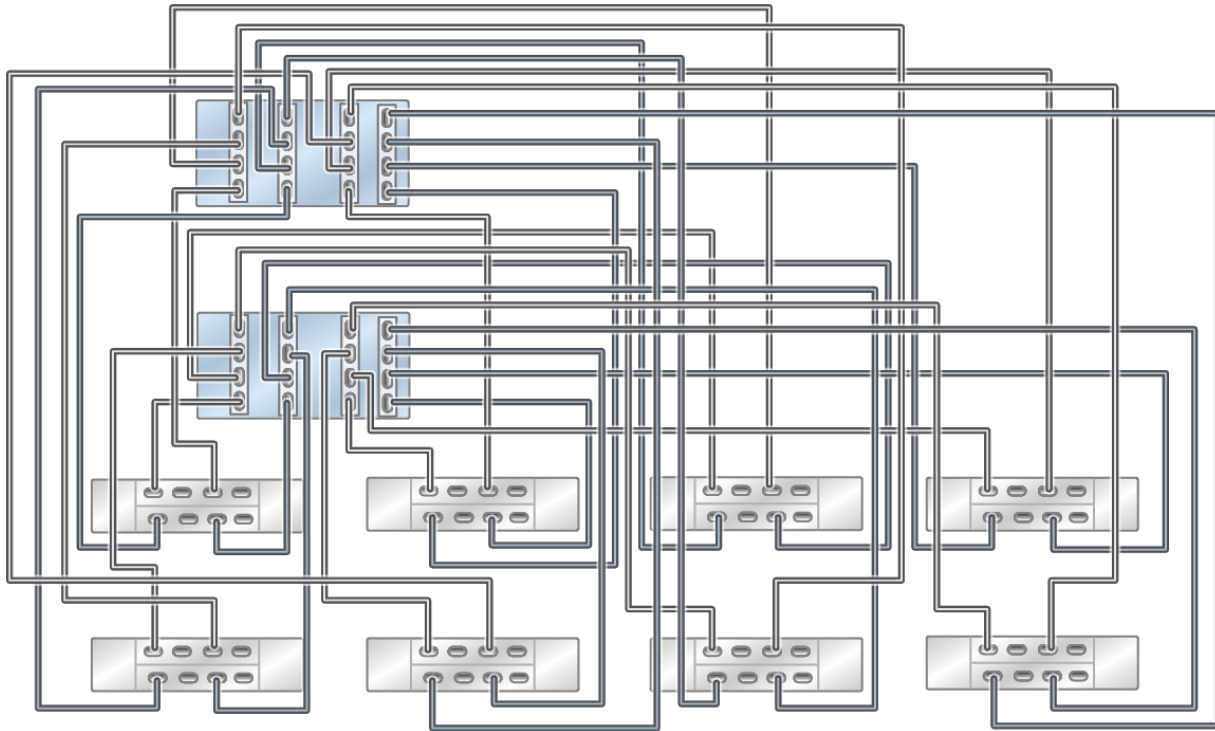


FIGURE 698 ZS5-4 Racked System Performance Configuration: 16 DE3-24P Disk Shelves (optimum performance)

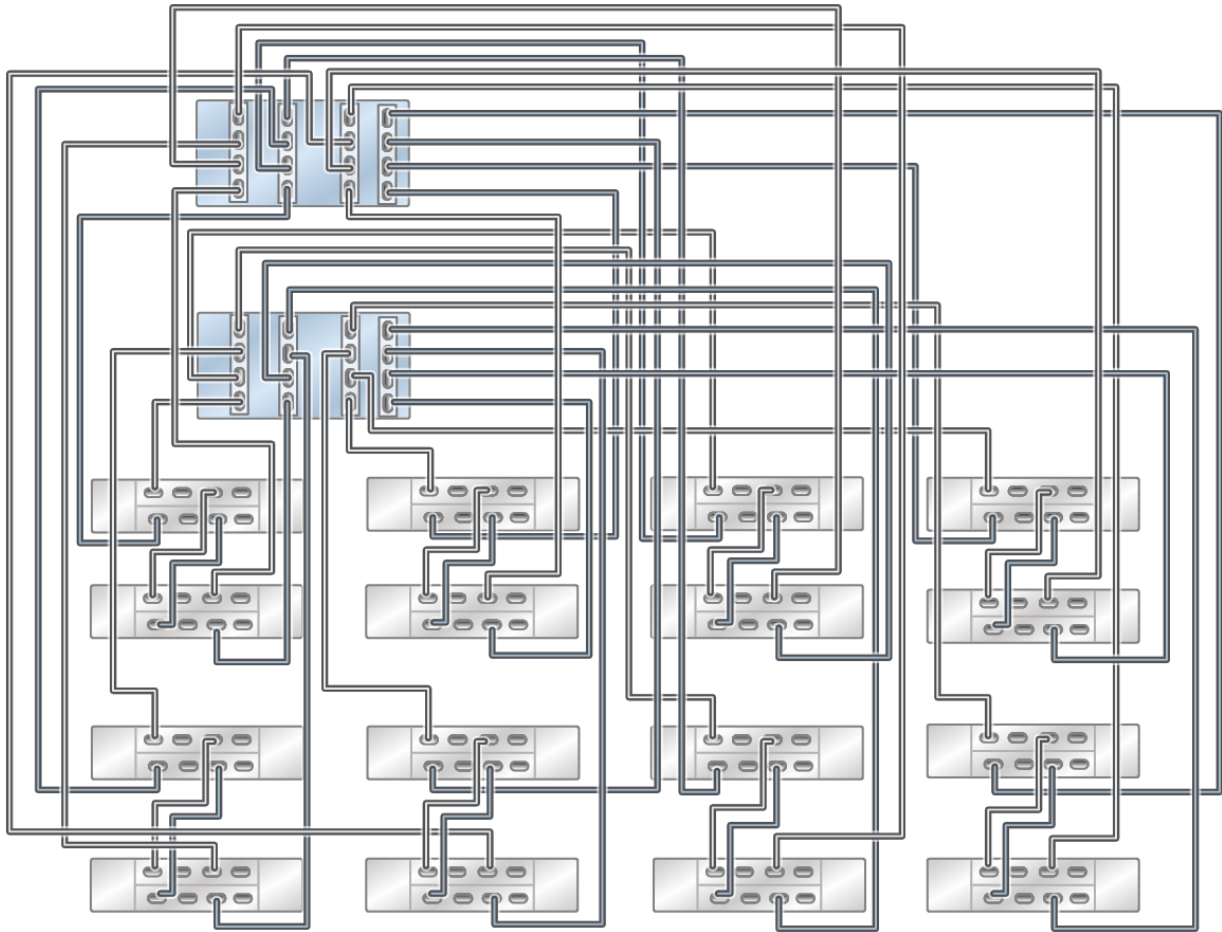


FIGURE 699 ZS5-4 Racked System Performance Configuration: Two DE3-24C (bottom left) and 12 DE3-24P Disk Shelves (optimum performance)

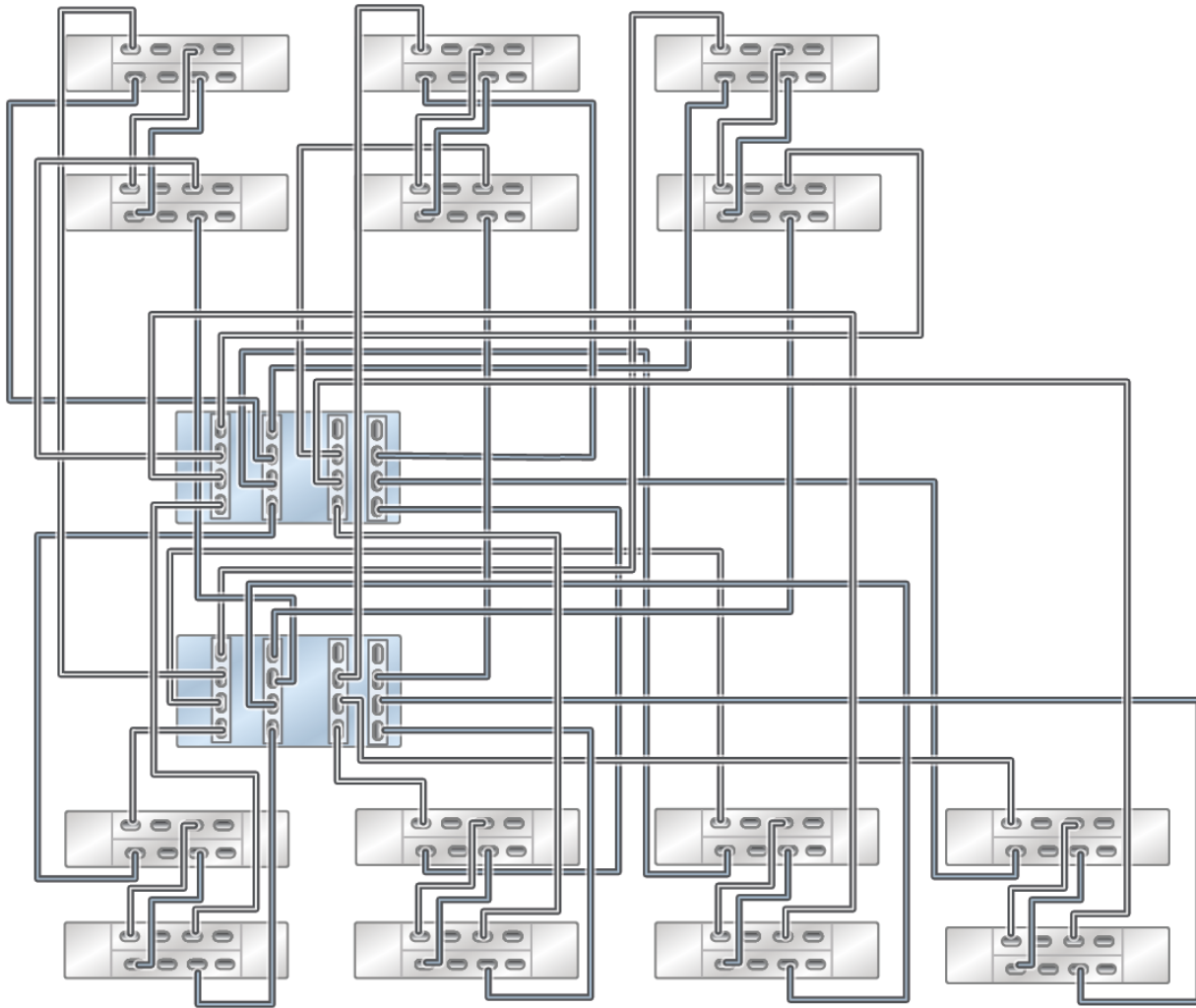


FIGURE 700 ZS5-4 Racked System Performance Configuration: Four DE3-24C (bottom left) and Eight DE3-24P Disk Shelves (optimum performance)

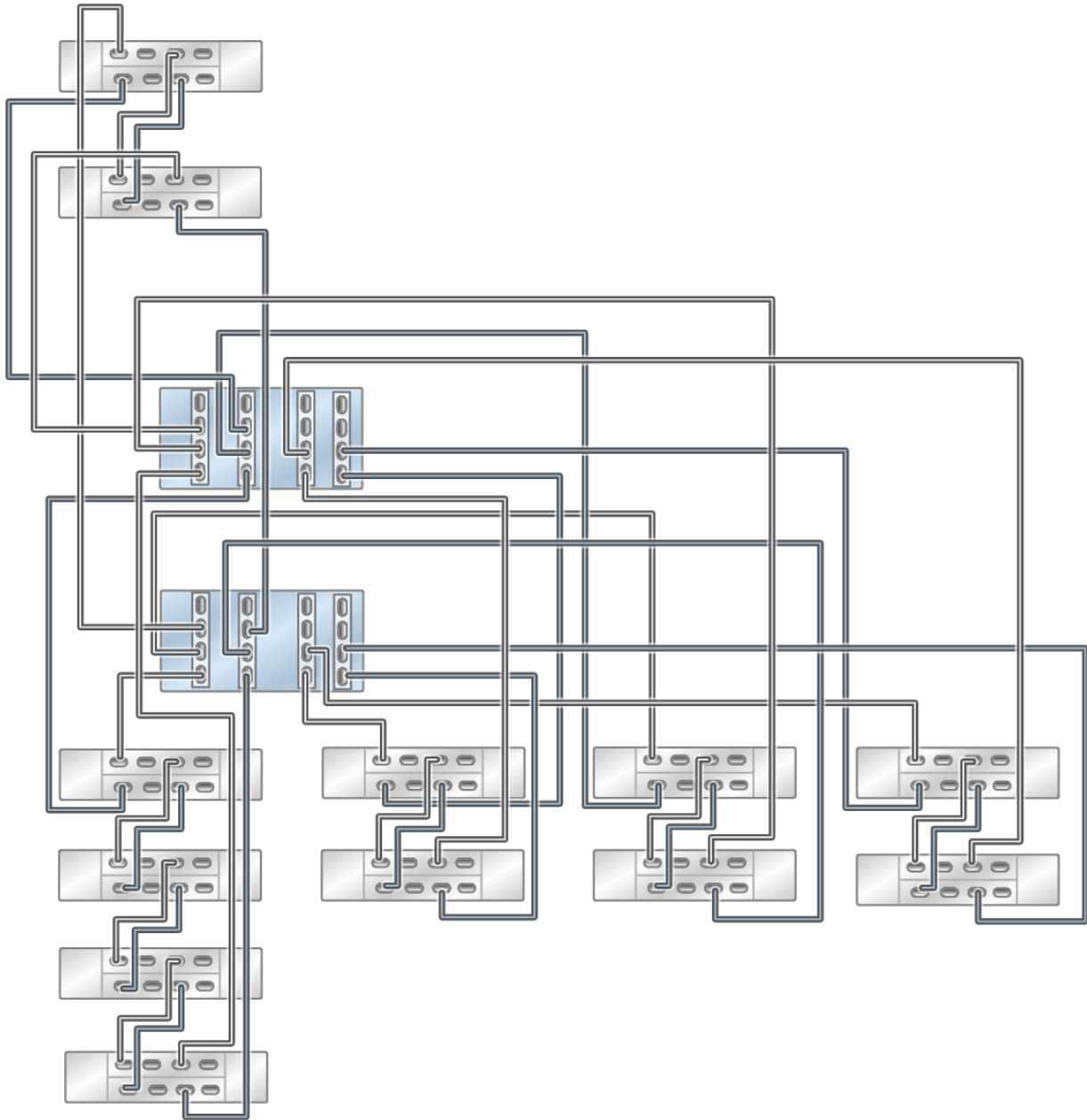
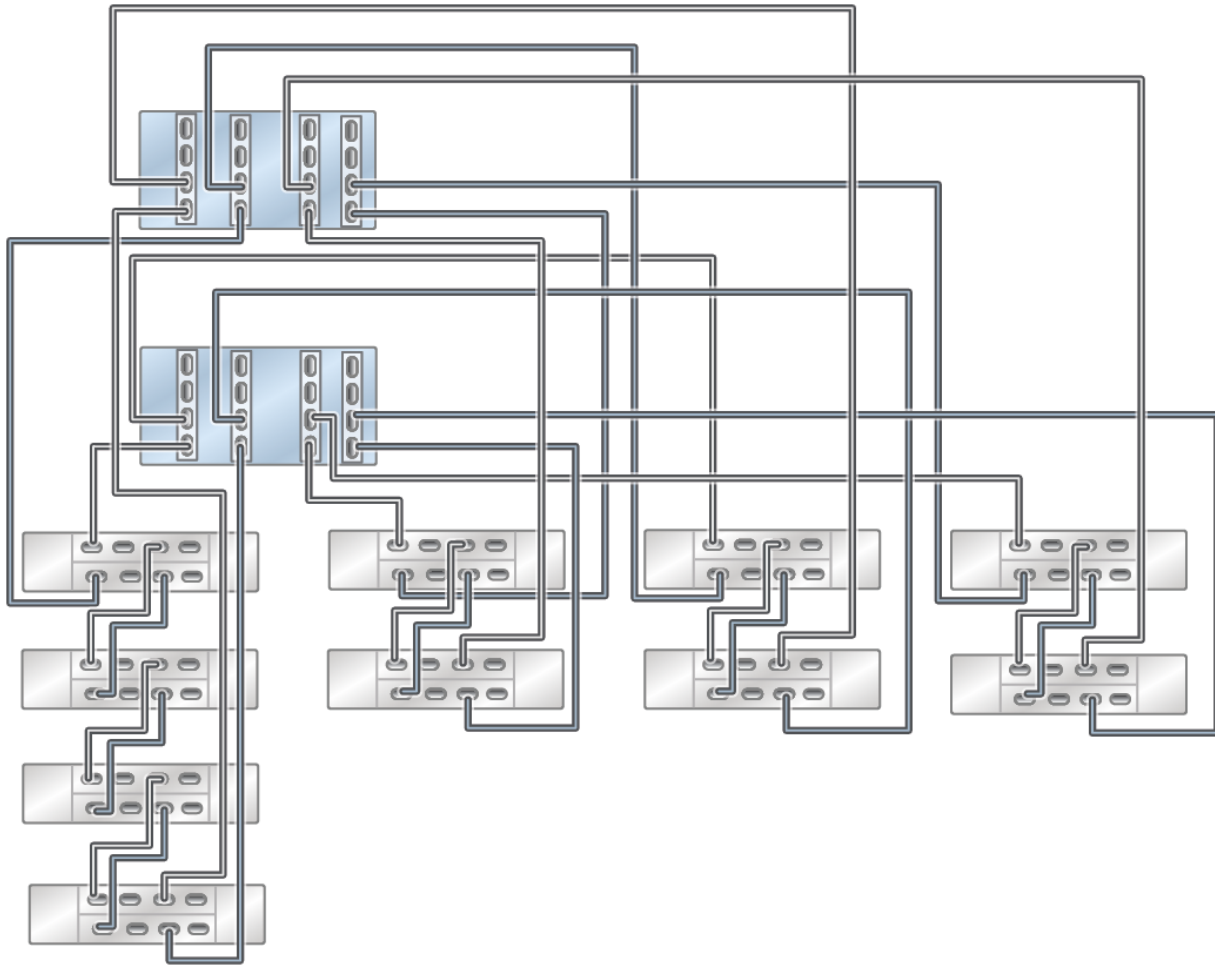


FIGURE 701 ZS5-4 Racked System Performance Configuration: Six DE3-24C (first two chains from the left) and Four DE3-24P Disk Shelves (optimum performance)



Expansion Cabinet Configurations for ZS5-4 Racked System Performance Configurations

ZS5-4 Racked System performance configurations support multiple cabinets that allow for expansion of up to 30 additional disk shelves. Each expansion cabinet accommodates a maximum of 10 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 base cabinet. Each ZS5-4 Racked System 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 illustrate the cabling of ZS5-4 Racked System expansion cabinet configurations. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

Note - The base cabinet can contain all DE3-24P (HDD) disk shelves or DE3-24P All-Flash disk shelves, or a mix of DE3-24C and DE3-24P disk shelves, as described in [“Base Cabinet Configurations for ZS5-4 Racked System Performance Configurations”](#) on page 483.

FIGURE 702 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with Two DE3-24C Disk Shelves

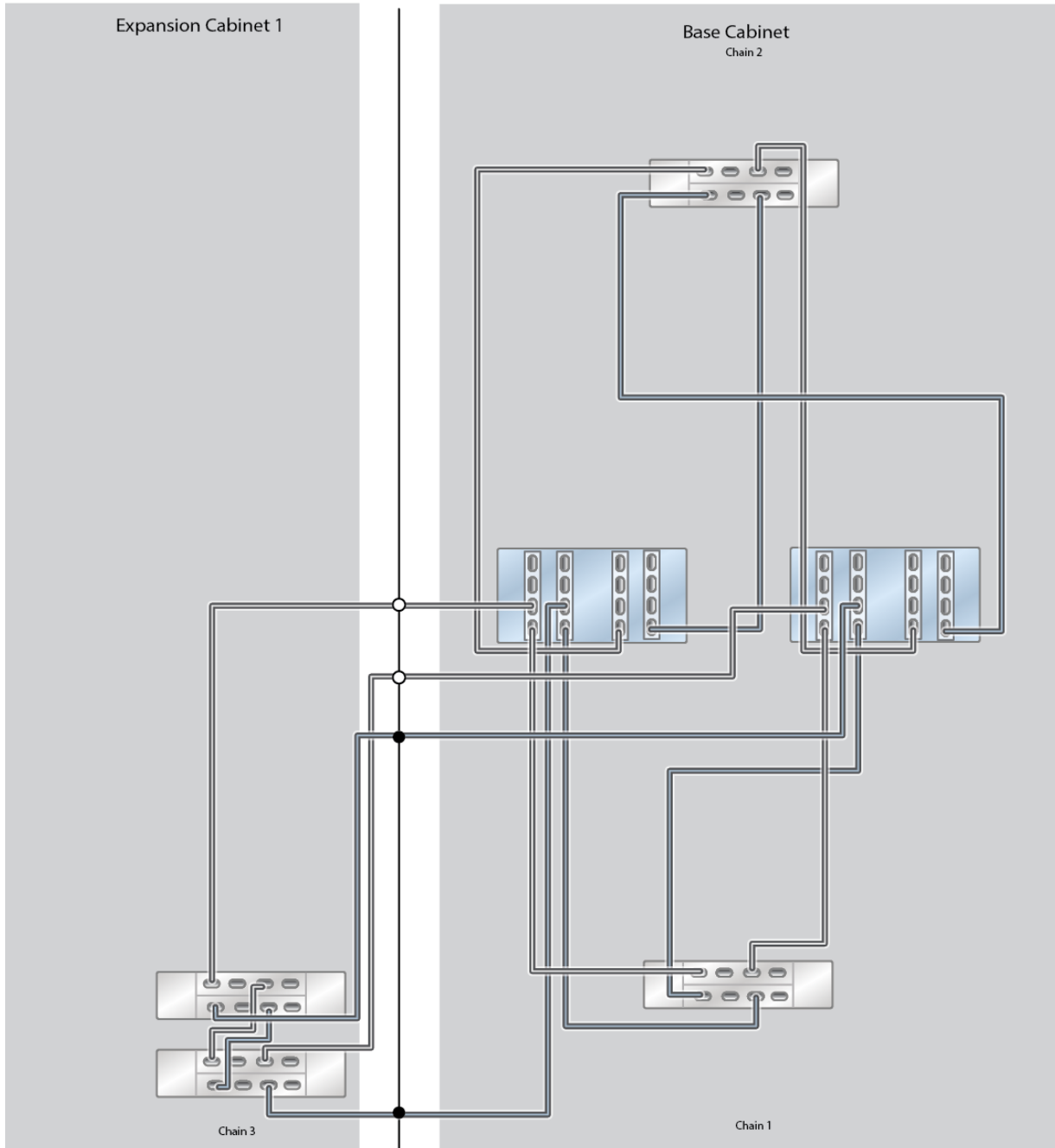


FIGURE 703 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with Four DE3-24C Disk Shelves

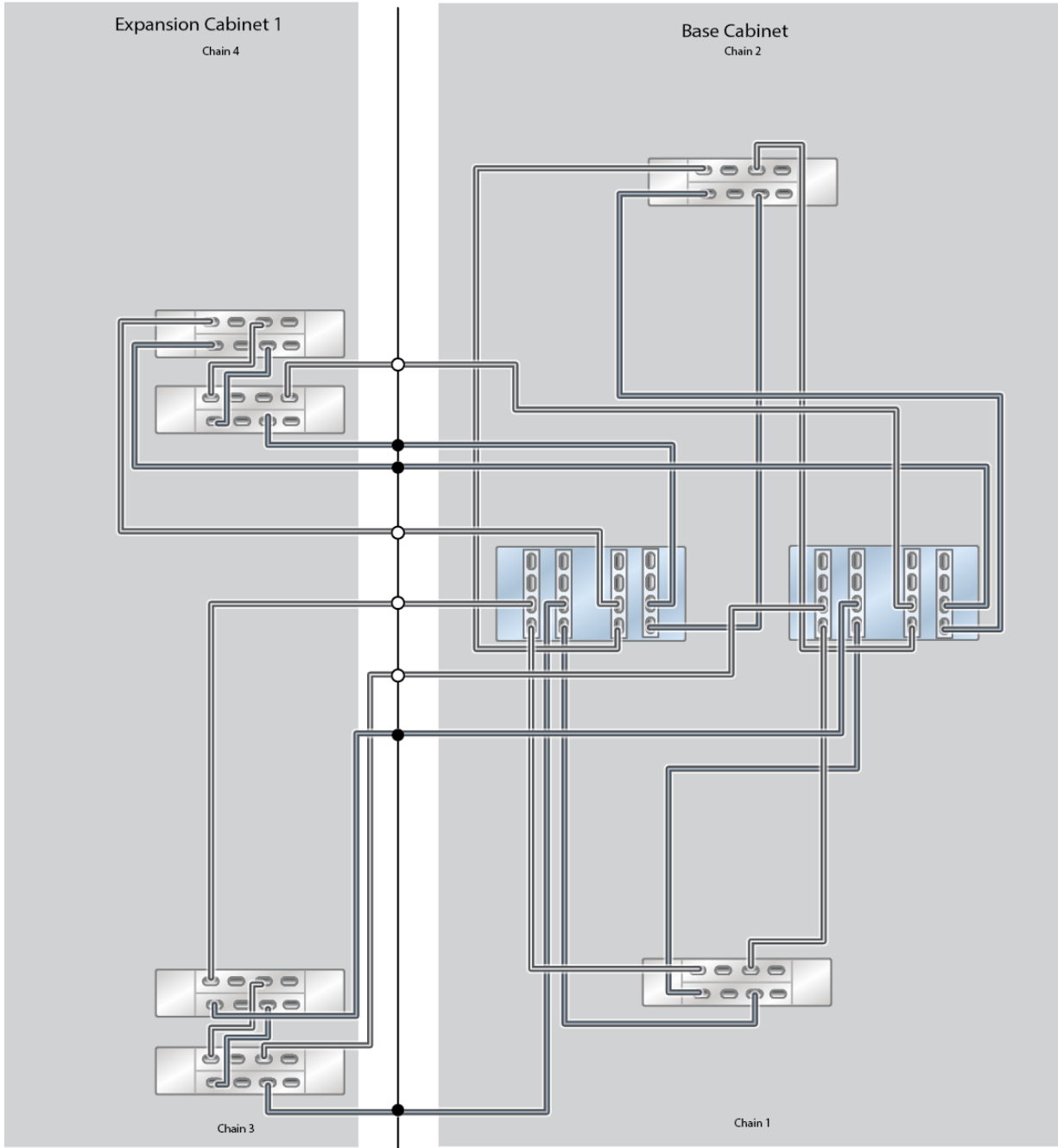


FIGURE 704 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with Five DE3-24C Disk Shelves (Half Rack)

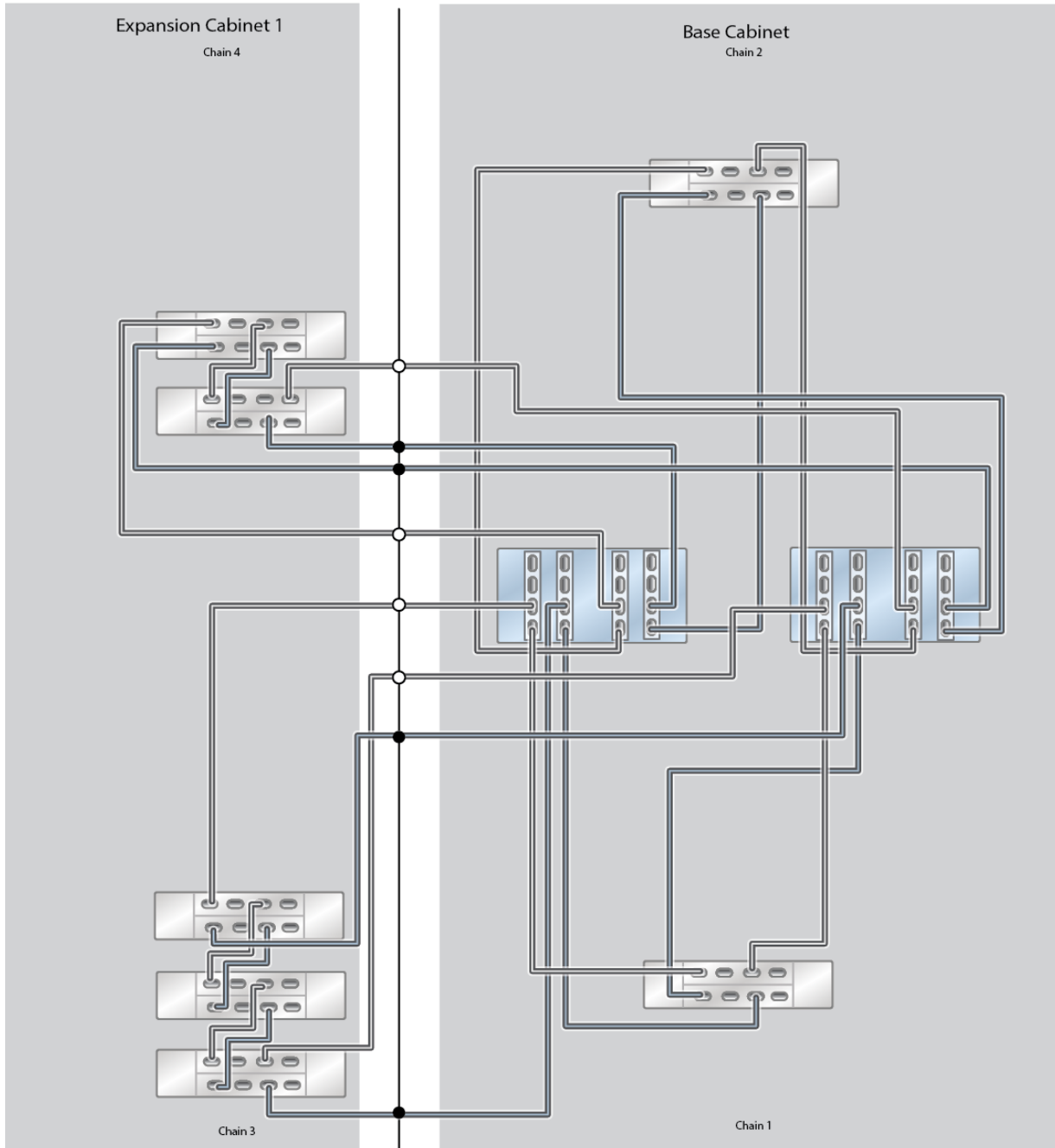


FIGURE 705 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with Six DE3-24C Disk Shelves

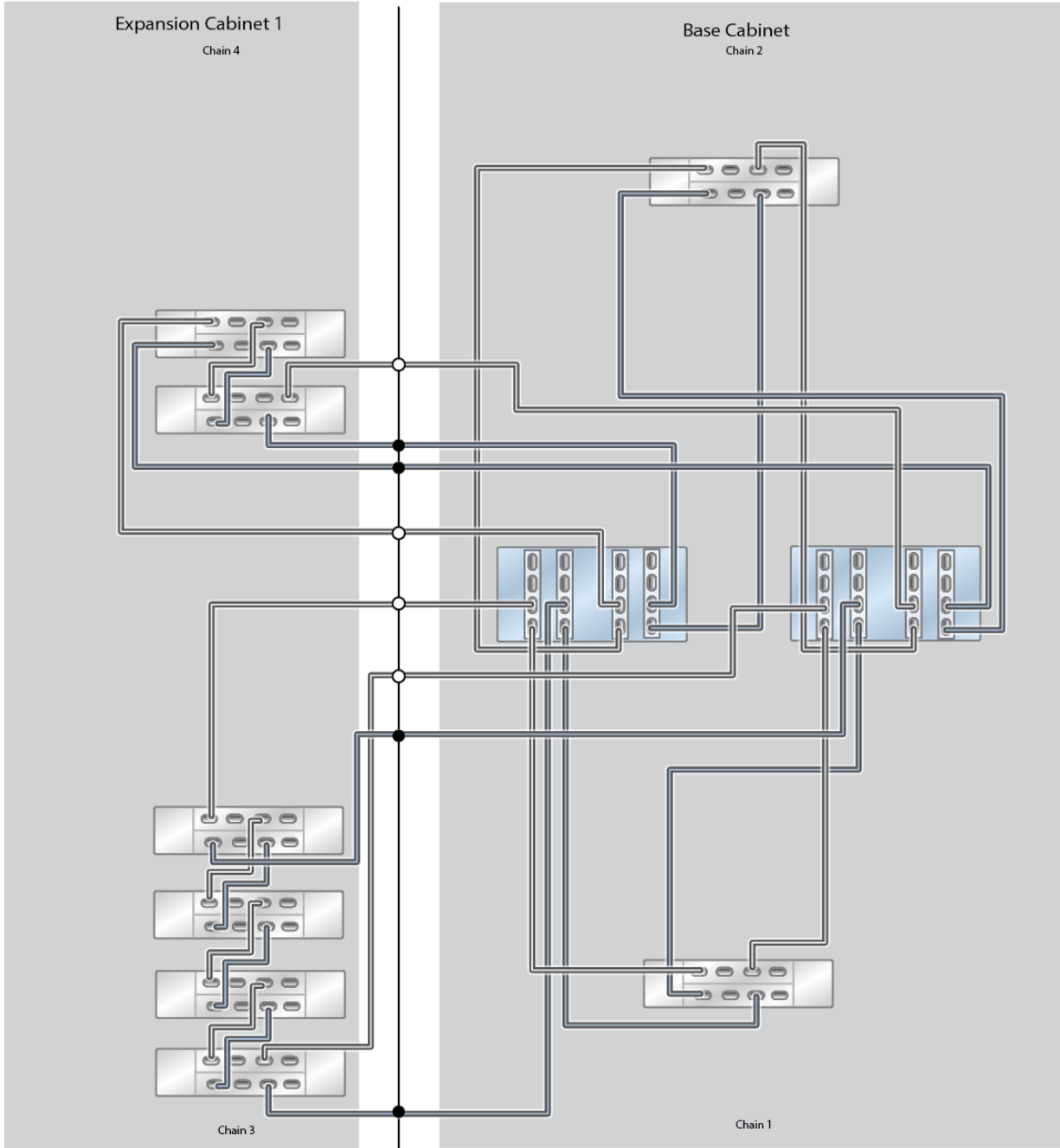


FIGURE 706 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with Eight DE3-24C Disk Shelves

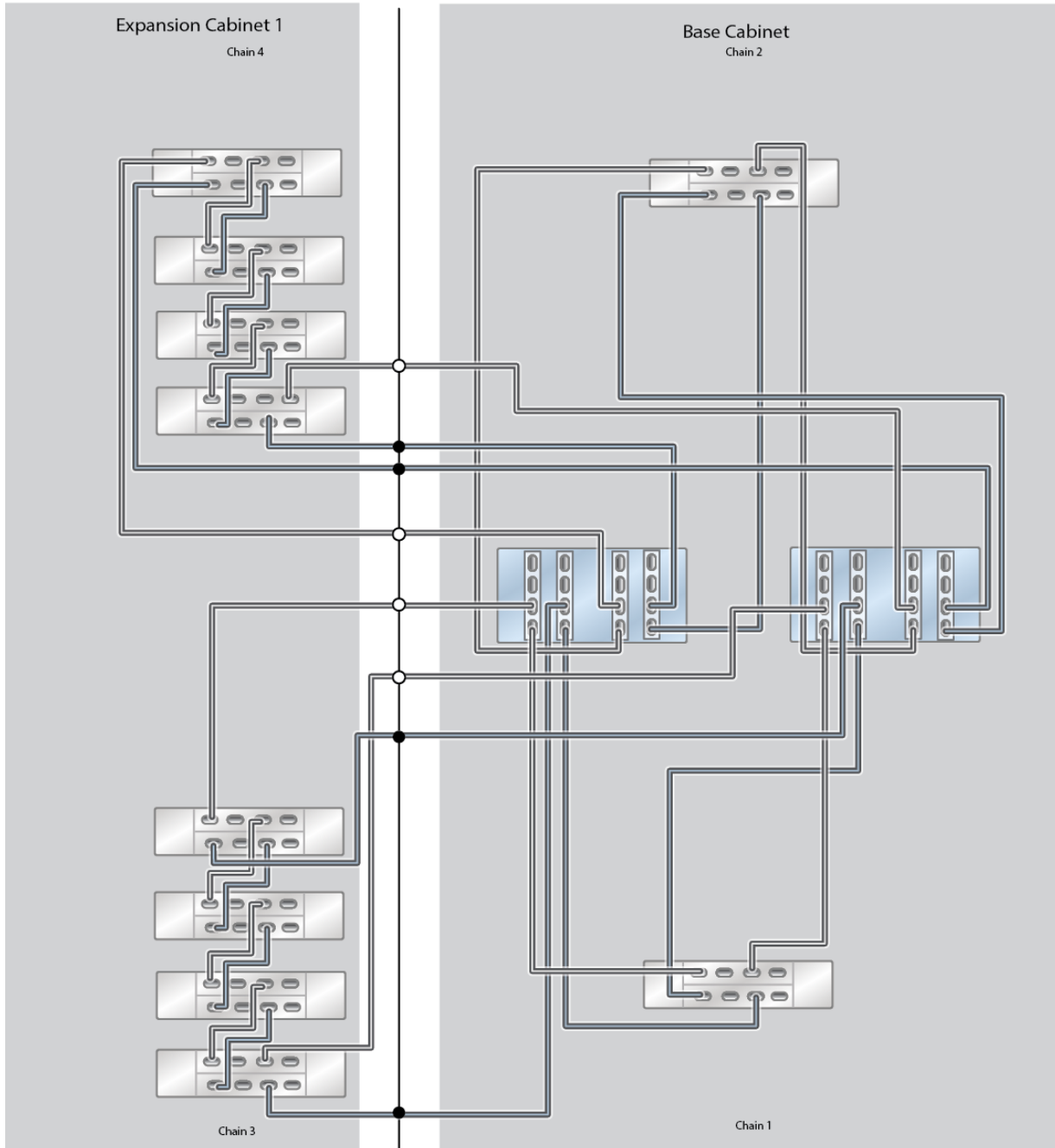


FIGURE 707 ZS5-4 Racked System Performance Configuration: One Expansion Cabinet with 10 DE3-24C Disk Shelves

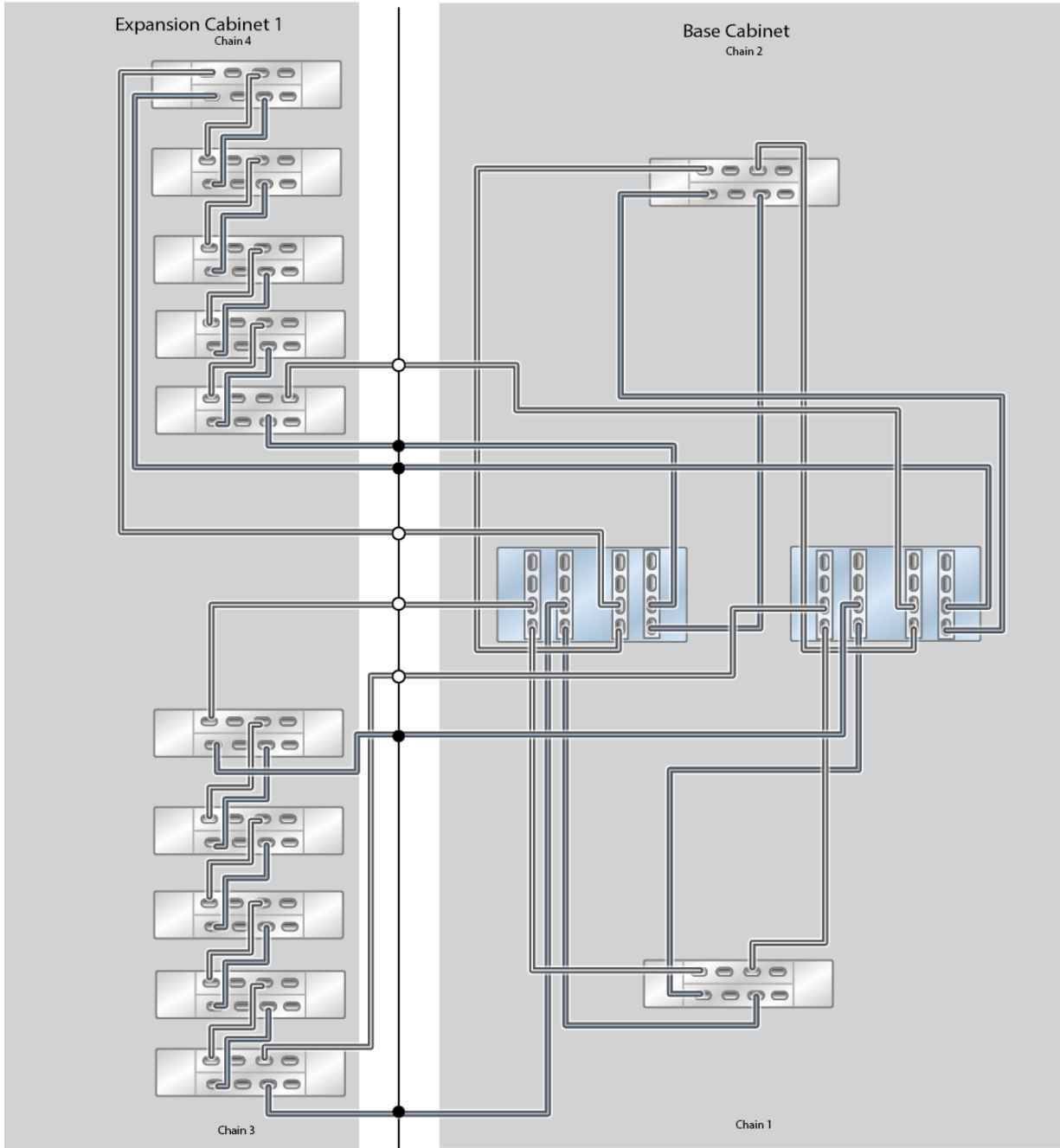


FIGURE 708 ZS5-4 Racked System Performance Configuration: Two Expansion Cabinets with 20 DE3-24C Disk Shelves

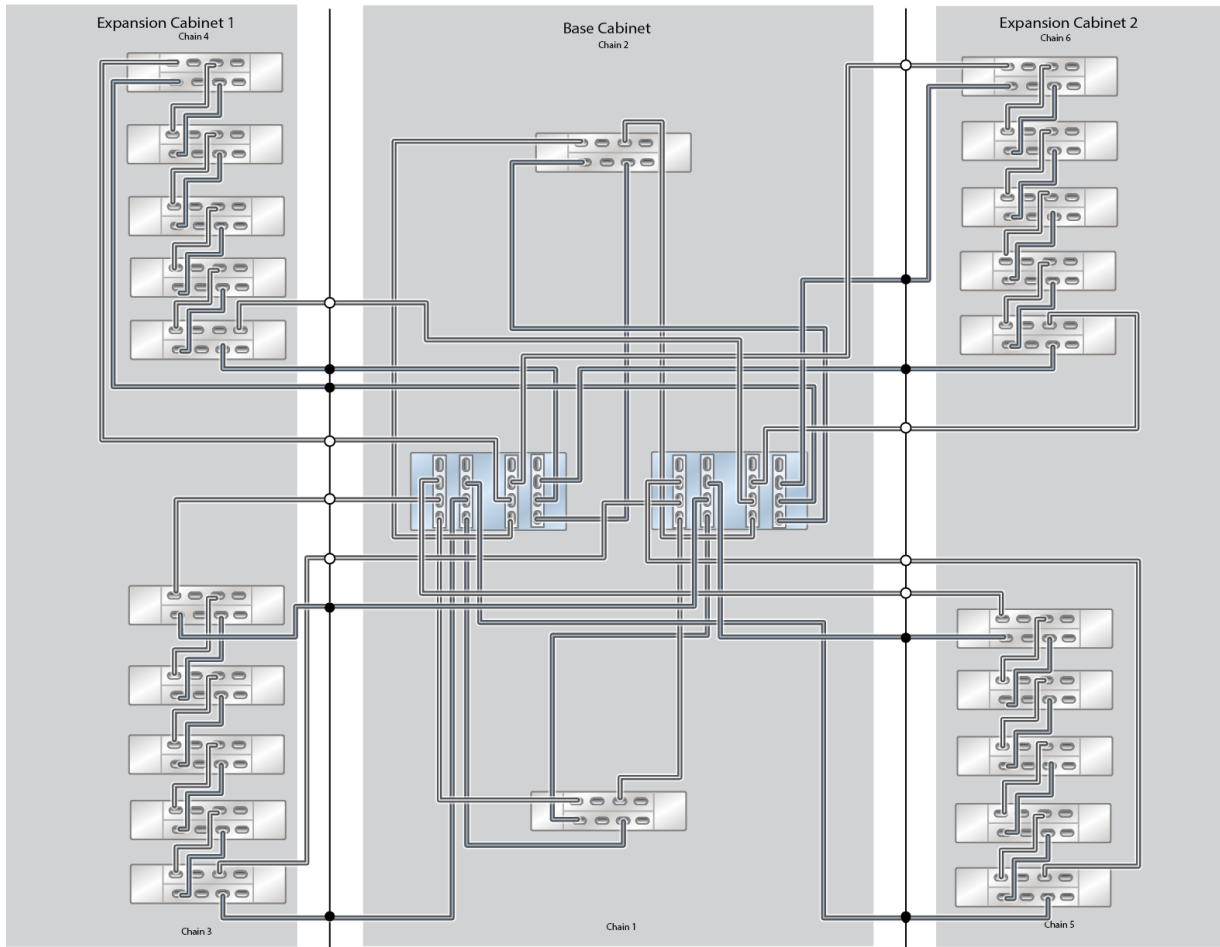
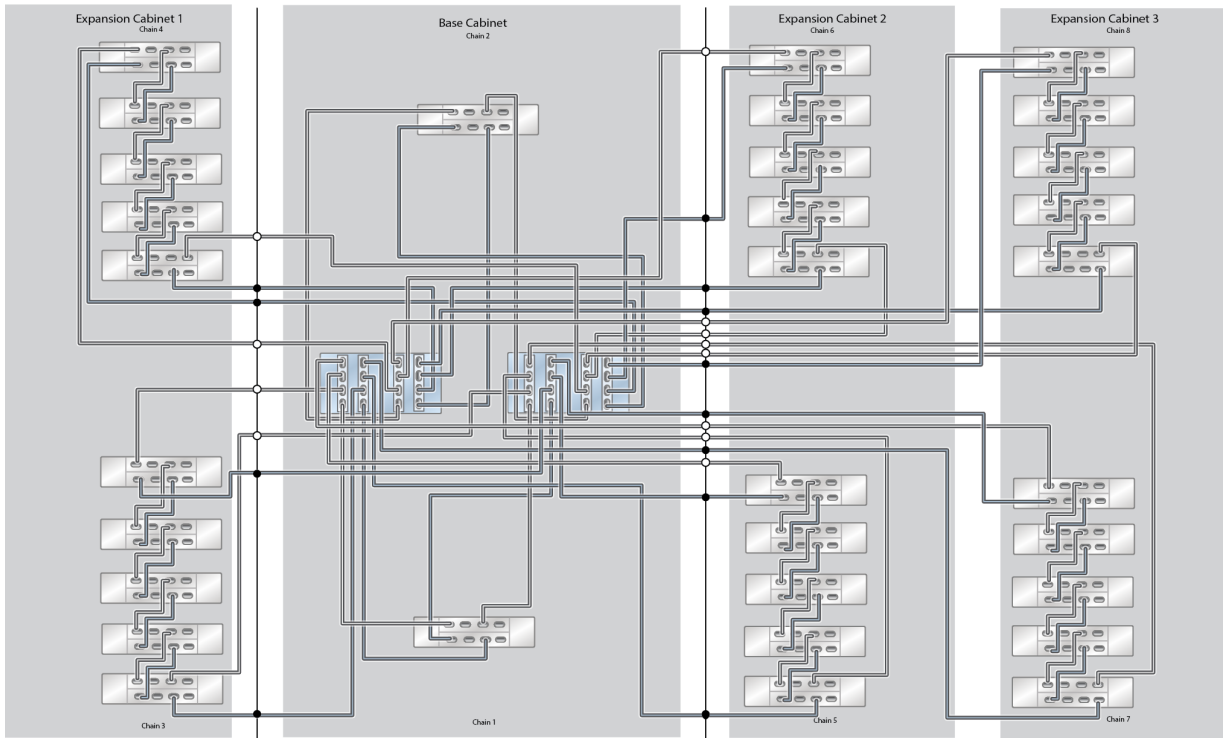


FIGURE 709 ZS5-4 Racked System Performance Configuration: Three Expansion Cabinets with 30 DE3-24C Disk Shelves



Oracle ZFS Storage Appliance Racked System ZS5-2

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS5-2, which is a pre-racked and pre-cabled system that supports two configuration types: capacity configurations and performance configurations.

This section contains the following topics:

- [“Capacity Configurations for ZS5-2 Racked System” on page 499](#)
- [“Performance Configurations for ZS5-2 Racked System” on page 509](#)

Capacity Configurations for ZS5-2 Racked System

This section provides an overview and cabling diagrams for ZS5-2 Racked System capacity configurations.

This section contains the following topics:

- [“Overview of ZS5-2 Racked System Capacity Configurations” on page 499](#)
- [“Cabling Tables and Diagrams for ZS5-2 Racked System Capacity Configurations” on page 502](#)

Overview of ZS5-2 Racked System Capacity Configurations

Capacity configurations take advantage of high-capacity disk shelves and are available in a base cabinet, or a base cabinet with one expansion cabinet. Two ZS5-2 controllers and up to 16 Oracle Storage Drive Enclosure DE3-24C disk shelves can be supported, as shown in the following table.

TABLE 27 ZS5-2 Racked System Capacity Configurations Components

Base Cabinet	Expansion Cabinet 1
Up to 8 DE3-24C disk shelves	Up to 8 DE3-24C disk shelves
Two ZS5-2 controllers	

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. Two SAS HBA cards must be installed in each ZS5-2 controller to support disk shelves in the expansion cabinet.

Clustered ZS5-2 controllers that contain two SAS HBAs each support a high-availability configuration consisting of:

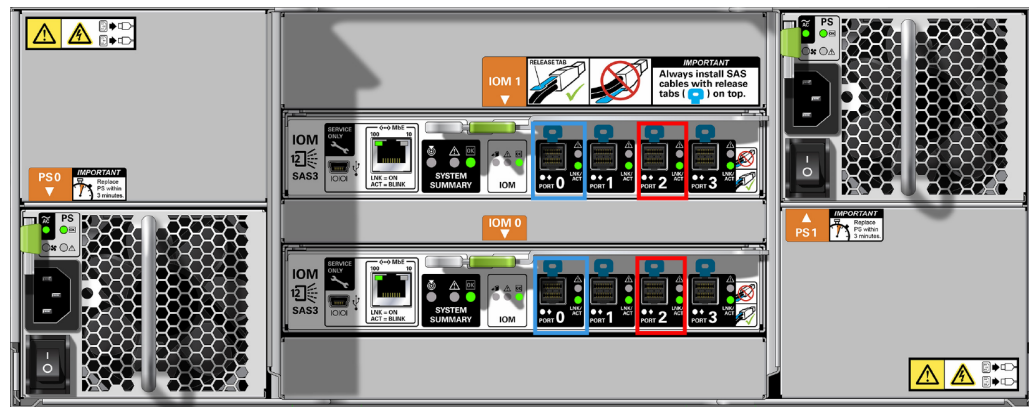
- Two chains of four disk shelves per disk chain in the base cabinet for a total of eight disk shelves, and
- One expansion cabinet that supports two chains with a maximum of four disk shelves per disk chain, for a total of eight disk shelves.

The cabinets are self-contained and pre-cabled following the required cabling methodology. Pre-racked system cabling tables and diagrams, which can also be used for planning future system expansion, are provided in the section [“Cabling Tables and Diagrams for ZS5-2 Racked System Capacity Configurations”](#) on page 502.

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. Because 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 710 ZS5-2 Controller 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 711 DE3-24C Disk Shelf HBA Connections (Back View)

Cabling Tables and Diagrams for ZS5-2 Racked System Capacity Configurations

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 IOMs.

TABLE 28 Base Cabinet: Controller and Disk Shelf Locations and Connections

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 IOMs. The expansion Cabinet supports disk shelves 9 through 16.

TABLE 29 Expansion Cabinet: Controller and Disk Shelf Locations and Connections

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 illustrate how pre-racked systems are cabled, as well as how to expand your system in the future. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

FIGURE 712 ZS5-2 Racked System Capacity Configuration: 10 DE3-24C Disk Shelves

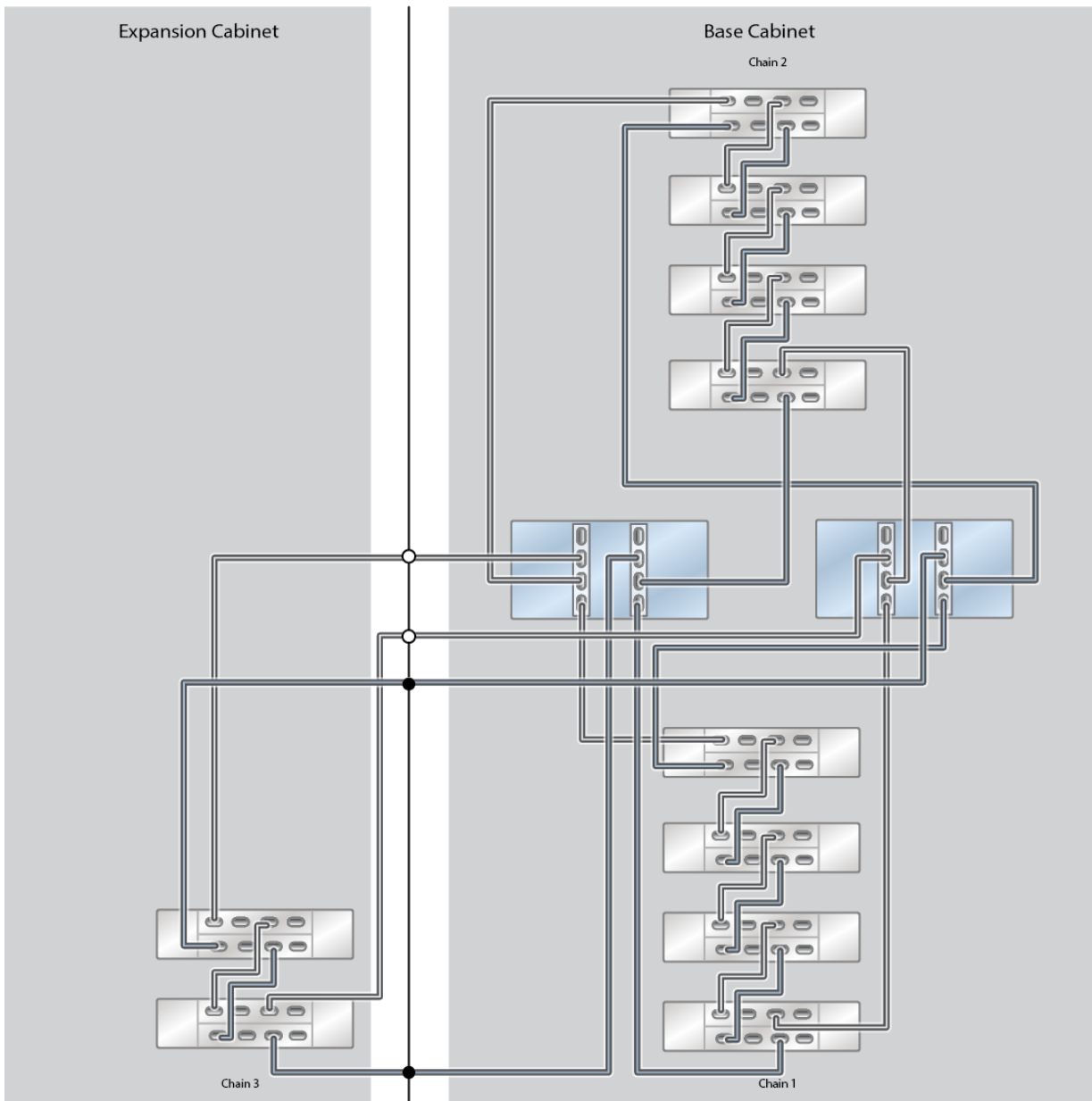


FIGURE 713 ZS5-2 Racked System Capacity Configuration: 12 DE3-24C Disk Shelves

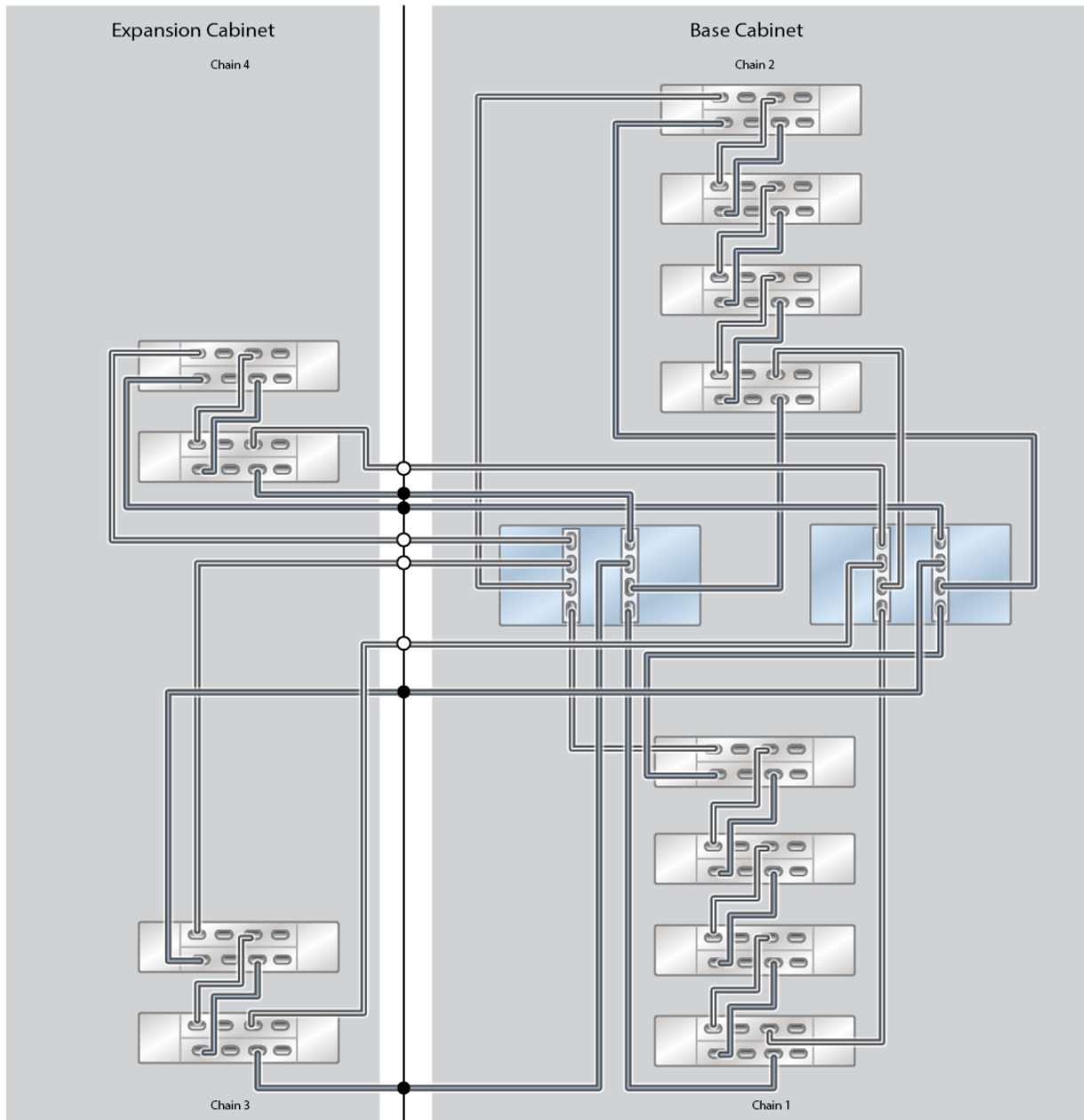


FIGURE 714 ZS5-2 Racked System Capacity Configuration: 13 DE3-24C Disk Shelves (Half Rack)

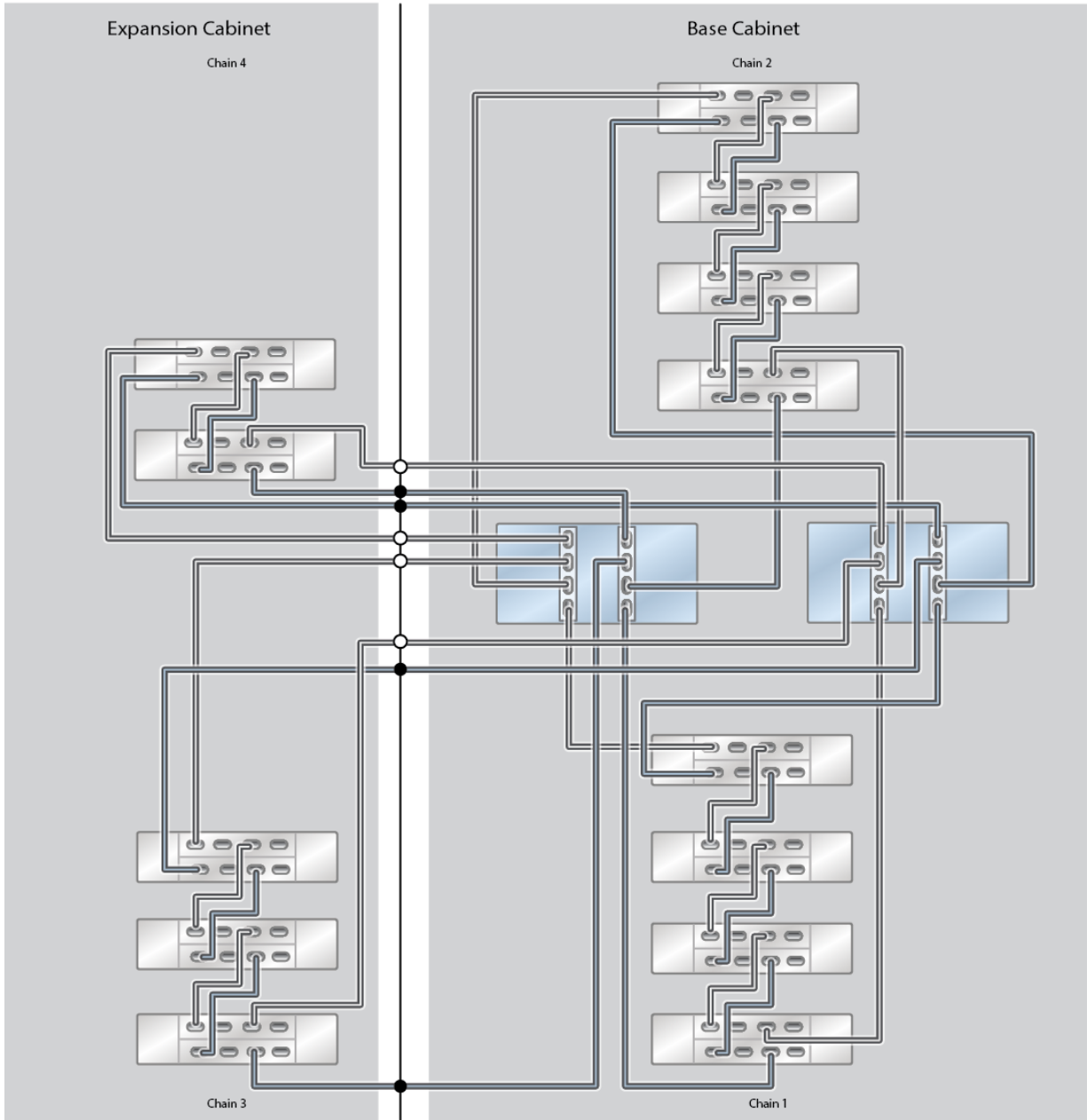


FIGURE 715 ZS5-2 Racked System Capacity Configuration: 14 DE3-24C Disk Shelves

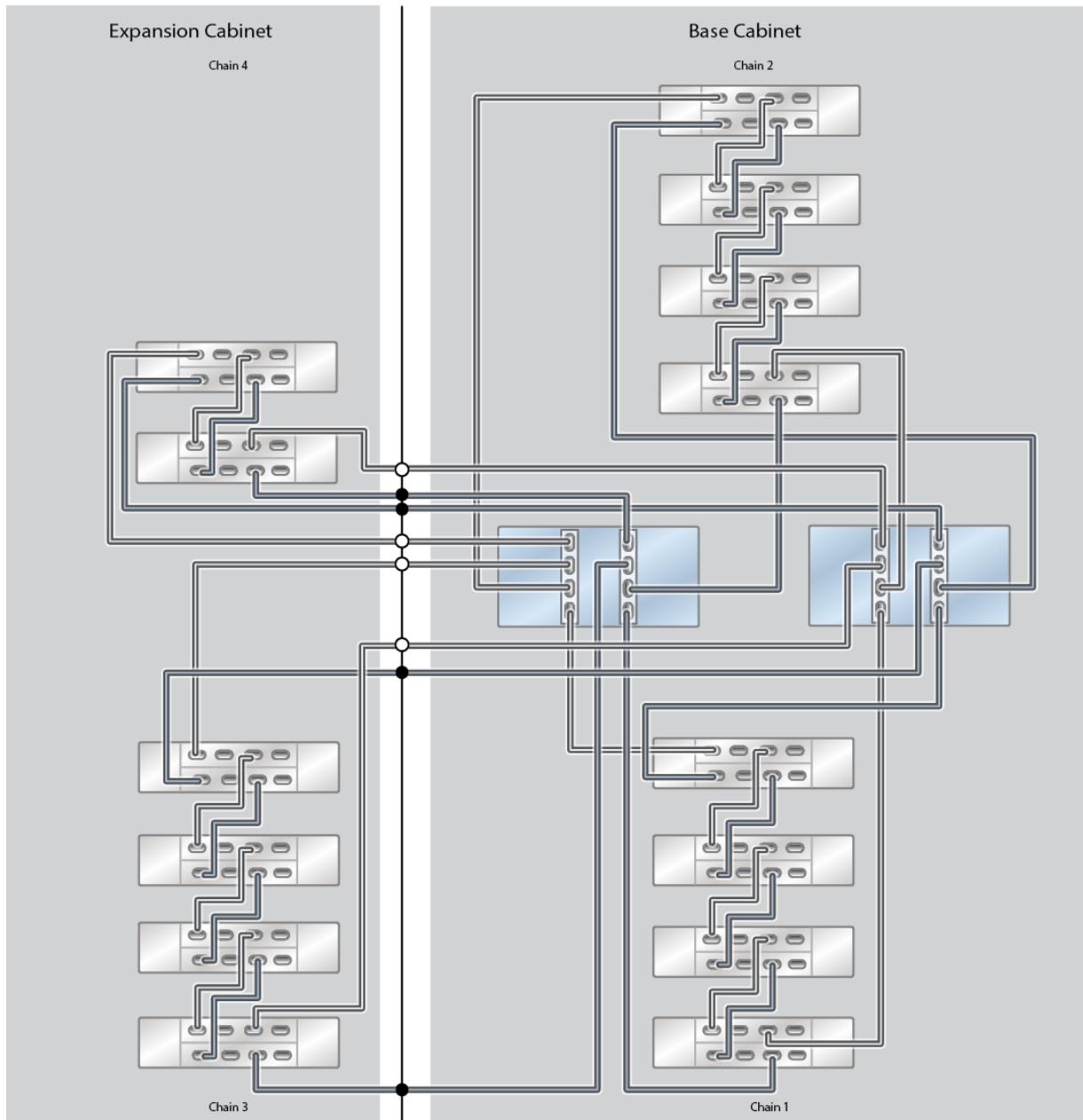
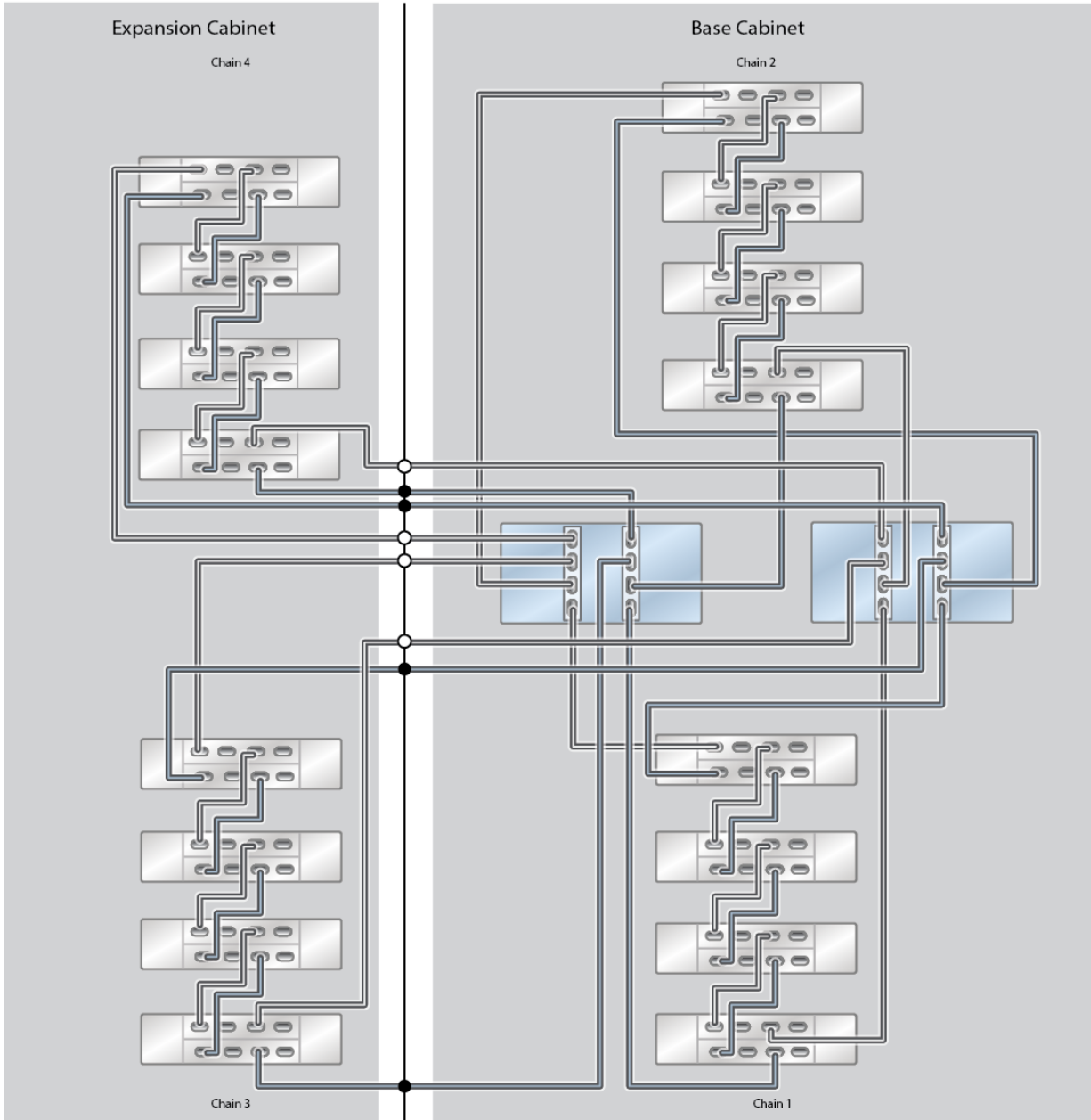


FIGURE 716 ZS5-2 Racked System Capacity Configuration: 16 DE3-24C Disk Shelves



Performance Configurations for ZS5-2 Racked System

This section provides an overview and cabling diagrams for ZS5-2 Racked System performance configurations.

This section contains the following topics:

- [“Overview of ZS5-2 Racked System Performance Configurations” on page 509](#)
- [“Base Cabinet Configurations for ZS5-2 Racked System Performance Configurations” on page 511](#)

Overview of ZS5-2 Racked System Performance Configurations

Performance configurations take advantage of high-performance disk shelves and are available in a base cabinet. Five base cabinet options are offered in a total of 22 possible system configurations, and all base cabinet options contain two ZS5-2 controllers.

ZS5-2 Racked System maximum performance configurations feature up to four Oracle Storage Drive Enclosure DE3-24P All-Flash disk shelves. The disk shelves are configured as one single shelf per chain to obtain maximum performance. No expansion cabinets are supported for this configurations.

TABLE 30 ZS5-2 Racked System Maximum Performance Configurations Components

Base Cabinet	Expansion Cabinet
Up to four DE3-24P All-Flash disk shelves	Not supported
Two ZS5-2 controllers	

ZS5-2 Racked System optimum performance configurations feature up to 16 Oracle Storage Drive Enclosure DE3-24P disk shelves (configured as four shelves per chain) as well as a combination of up to 14 Oracle Storage Drive Enclosure DE3-24C and DE3-24P disk shelves in the base cabinet. No expansion cabinets are supported.

TABLE 31 ZS5-2 Racked System Optimum Performance Configurations Components

Base Cabinet	Expansion Cabinet
Up to 16 DE3-24P disk shelves, or up to 14 DE3-24P and DE3-24C disk shelves	Not supported
Two ZS5-2 controllers	

The ZS5-2 Racked System performance configurations support various storage options.

TABLE 32 ZS5-2 Racked System Disk Shelf Device Types and Allowable Configurations

Disk Shelf	Data Devices	Read Cache Devices	Log Devices
DE3-24P All-Flash	3.2 TB SSDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	Not allowed	200 GB SSDs in slot 20 - 23
DE3-24P	1.2 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23
DE3-24C	8 TB HDDs: 24 in slots 0 - 23 or 20 in slots 0 - 19	3.2 TB SSDs in slot 20 - 23	200 GB SSDs in slot 20 - 23

Disk Shelf Allowable Configurations and Load Priority

The following are allowable configurations for additional DE3-24 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:

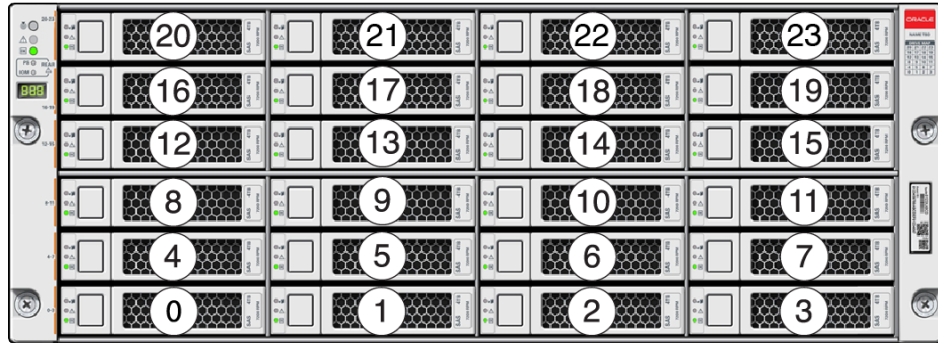
1. DE3-24 disk shelves with SSD log devices
2. DE3-24 disk shelves with SSD read cache devices
3. DE3-24 disk shelves without SSD log or read cache devices

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 717 DE3-24P Disk Shelf Drive Locations (Front View)



FIGURE 718 DE3-24C Disk Shelf Drive Locations (Front View)



Base Cabinet Configurations for ZS5-2 Racked System Performance Configurations

ZS5-2 Racked System maximum performance configurations require two SAS-3 HBAs, which provide the 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 719 ZS5-2 Controller HBA Slot Numbers (Back View)



FIGURE 720 DE3-24P Disk Shelf HBA Connections (Back View)

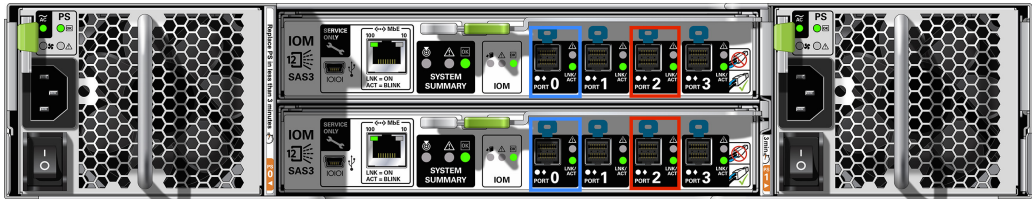
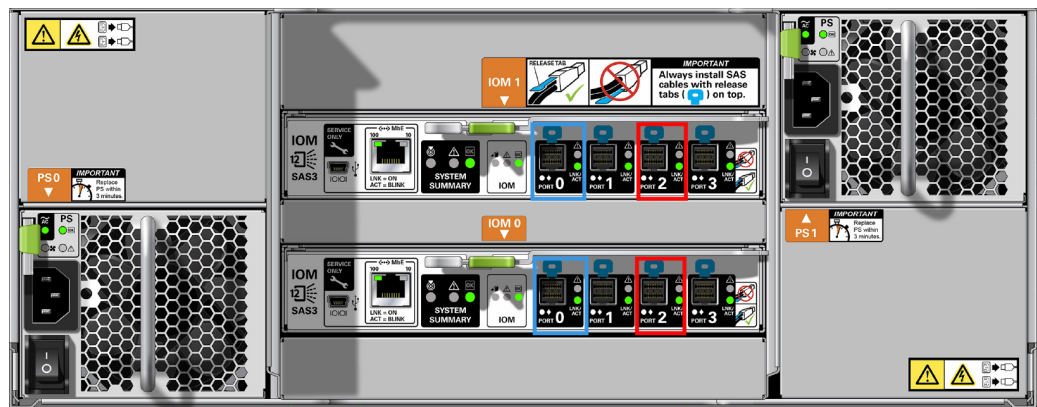


FIGURE 721 DE3-24C Disk Shelf HBA Connections (Back View)



The ZS5-2 Racked System cabling configurations follow standard cabling methodologies with additional restrictions that allow use of the cable management arm (CMA). They provide a more practical implementation for SSD log device and read cache device matching, and can be configured 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 or not compatible with ZS5-2 Racked System must be re-cabled for that particular configuration. For cabling examples of connecting DE3-24 disk shelves to a ZS5-2 controller with 4x4 port SAS-3 HBAs, see [“Cabling DE3-24 Disk Shelves to ZS5-2 Controllers” on page 95](#). For SAS cable length guidelines, see [“Cabinet and Cabling Guidelines” on page 13](#).

The cabinets are self-contained and pre-cabled following the required cabling methodology. The following diagrams illustrate how the five base cabinet options are cabled.

FIGURE 722 ZS5-2 Racked System Performance Configuration: Four DE3-24P All-Flash Disk Shelves (maximum performance)

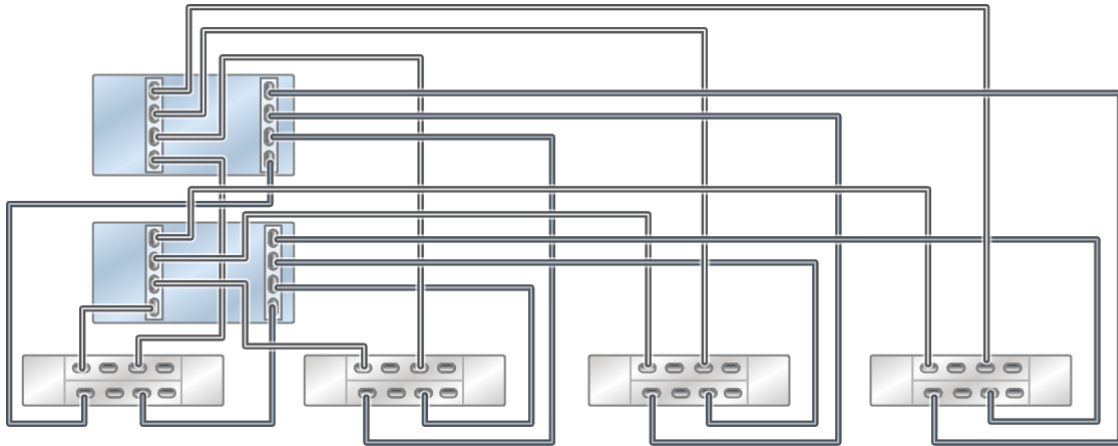


FIGURE 723 ZS5-2 Racked System Performance Configuration: 16 DE3-24P Disk Shelves (optimum performance)

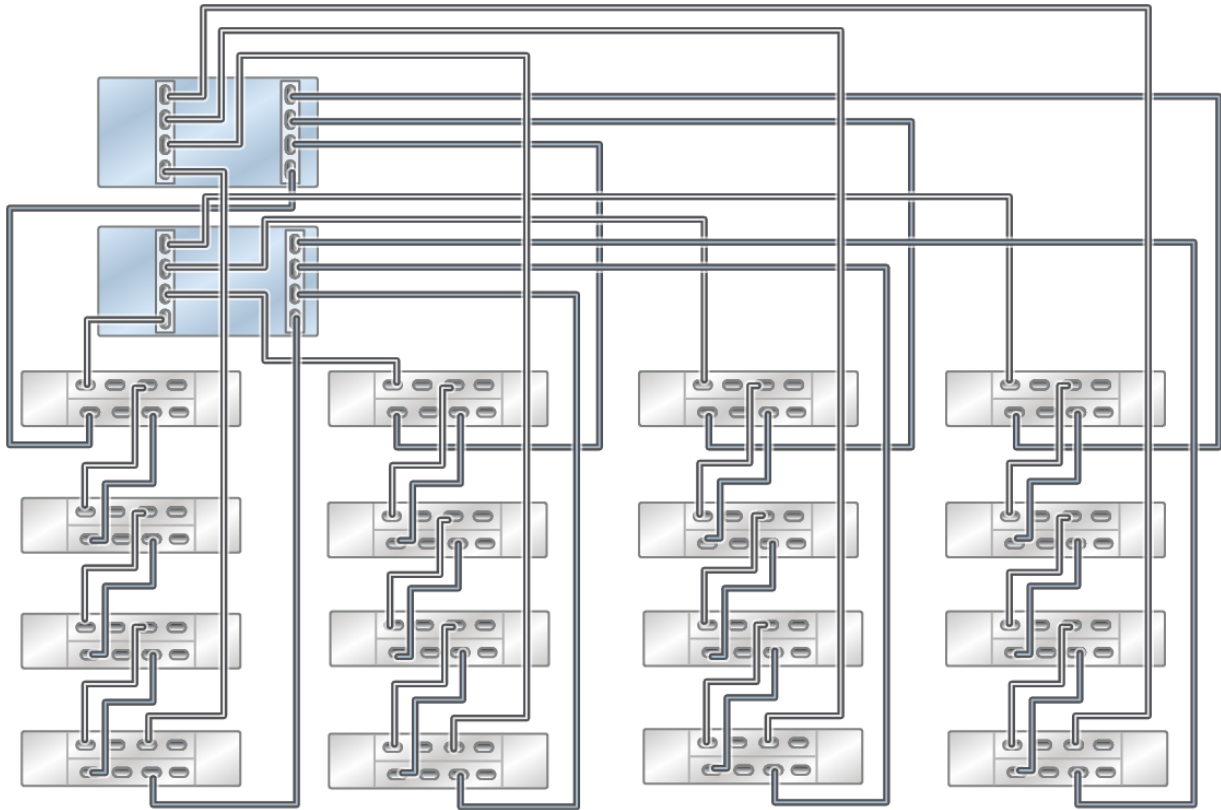


FIGURE 724 ZS5-2 Racked System Performance Configuration: Two DE3-24C (bottom left) and 12 DE3-24P Disk Shelves (optimum performance)

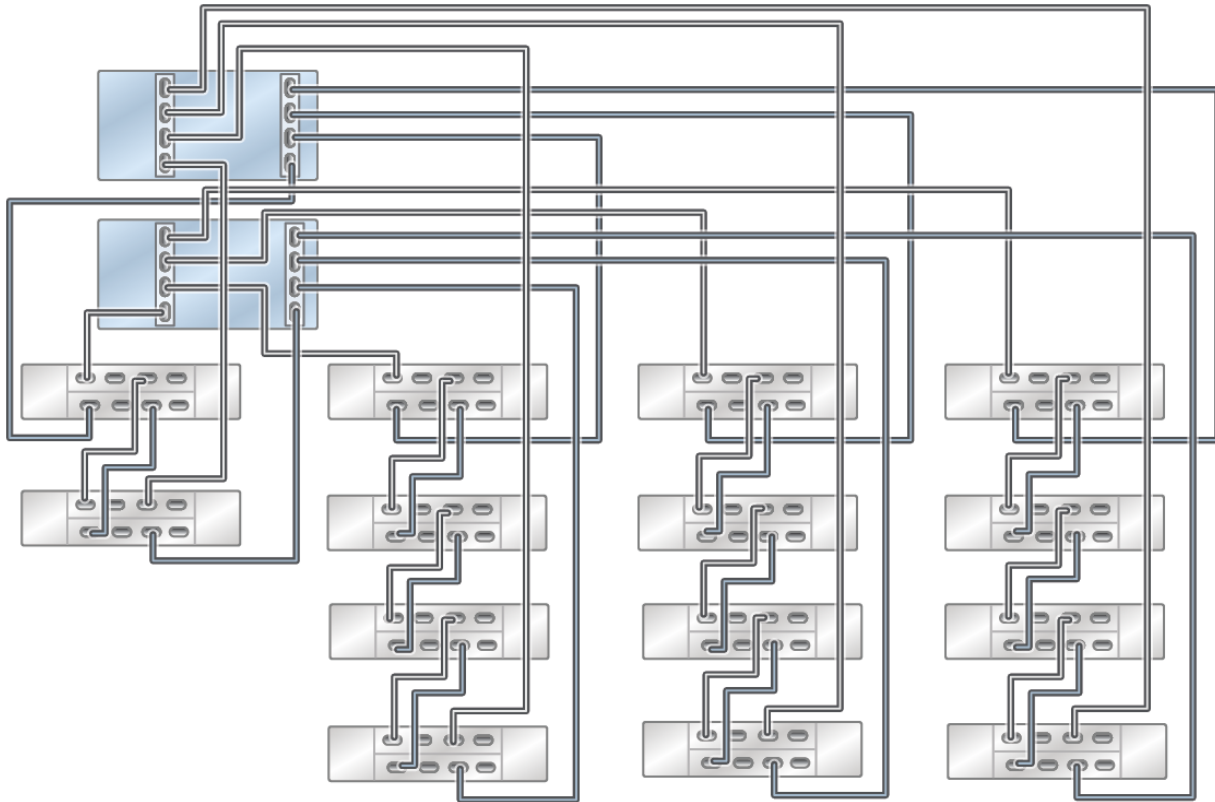


FIGURE 725 ZS5-2 Racked System Performance Configuration: Four DE3-24C (bottom left) and Eight DE3-24P Disk Shelves (optimum performance)

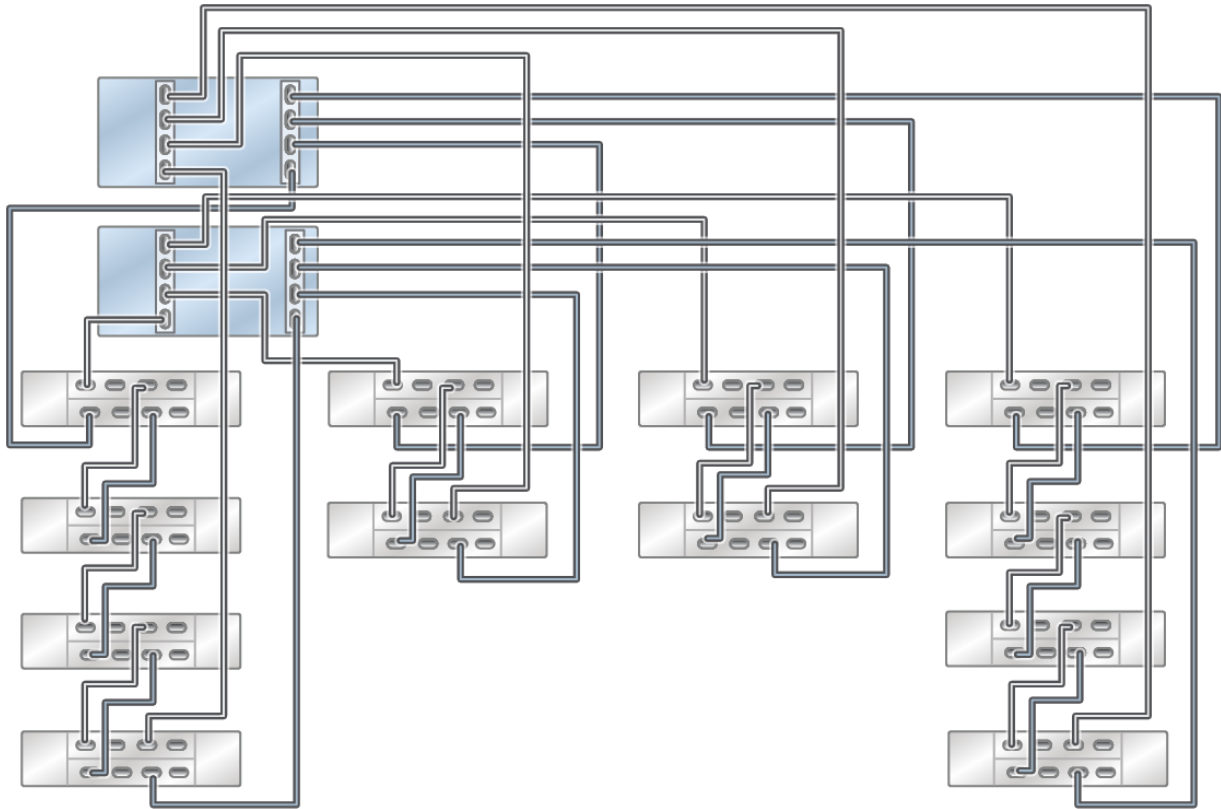
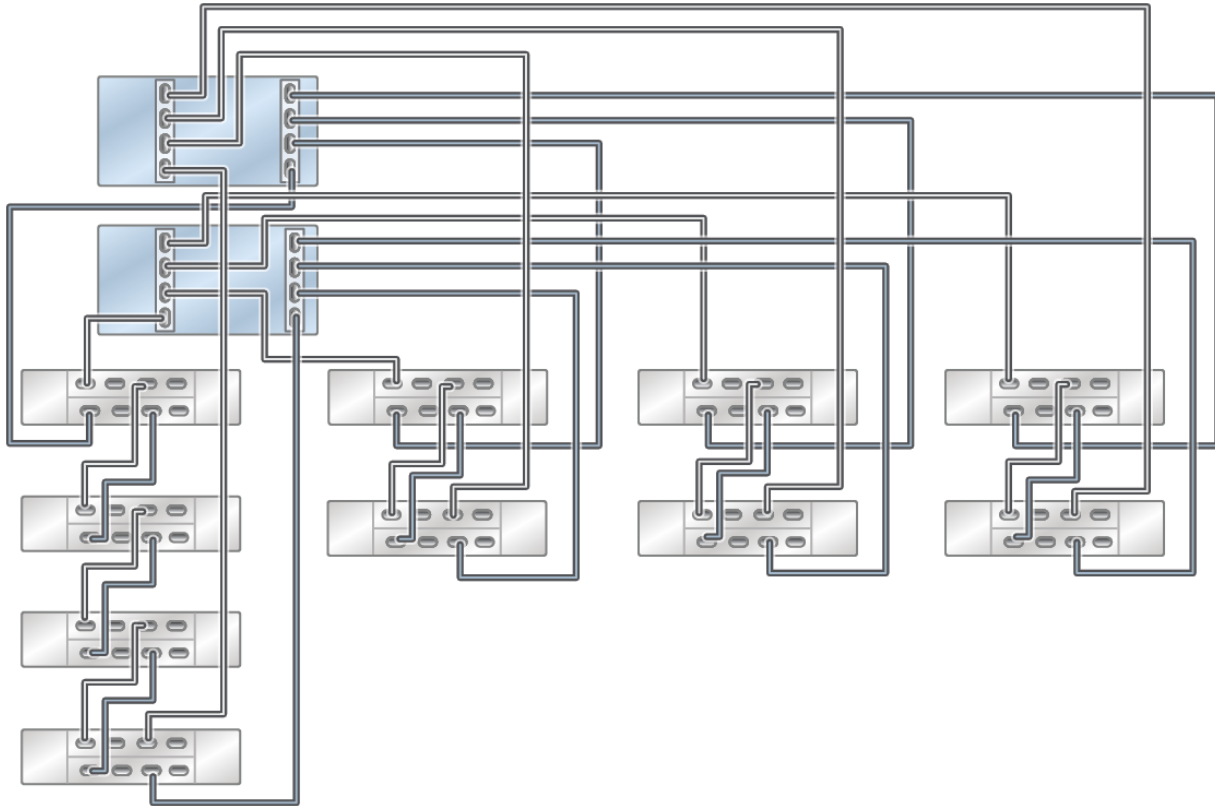


FIGURE 726 ZS5-2 Racked System Performance Configuration: Six DE3-24C (first two chains from the left) and Four DE3-24P Disk Shelves (optimum performance)



Oracle ZFS Storage Appliance Racked System ZS4-4

This section provides overviews and cabling diagrams for Oracle ZFS Storage Appliance Racked System ZS4-4, which is pre-racked and pre-cabled system that supports capacity configurations.

This section contains the following topics:

- [“Overview of ZS4-4 Racked System Capacity Configurations” on page 519](#)
- [“Cabling Tables and Diagrams for ZS4-4 Racked System Capacity Configurations” on page 521](#)

Overview of ZS4-4 Racked System Capacity Configurations

Capacity configurations take advantage of high-capacity disk shelves and are available in a base cabinet, or a base cabinet with up to two expansion cabinets. Two ZS4-4 controllers and up to 28 Oracle Storage Drive Enclosure DE2-24C disk shelves can be supported, as shown in the following table.

TABLE 33 ZS4-4 Racked System Capacity Configurations Components

Base Cabinet	Expansion Cabinet 1	Expansion Cabinet 2
Up to 8 DE2-24C disk shelves	Up to 10 DE2-24C disk shelves	Up to 10 DE2-24C disk shelves
Two ZS4-4 controllers		

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. Four SAS HBA cards must be installed in each ZS4-4 controller to support disk shelves in the expansion cabinet(s).

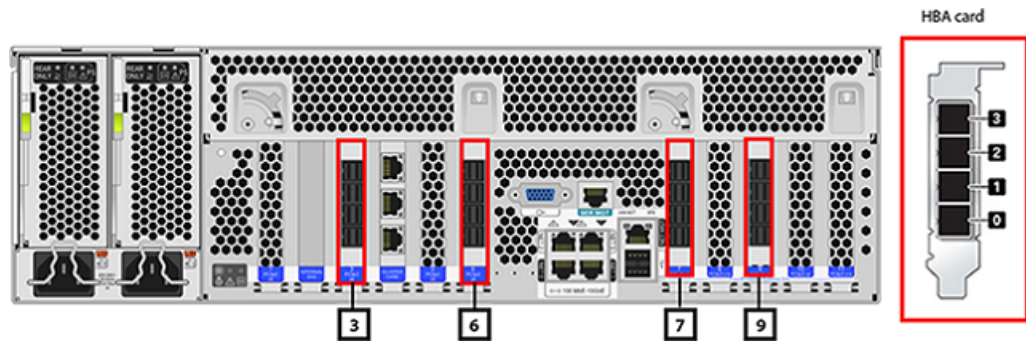
Clustered ZS4-4 controllers that contain four SAS HBAs each support a high-availability configuration consisting of:

- 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 cabinets are self-contained and pre-cabled following the required cabling methodology. Pre-racked system cabling tables and diagrams, which can also be used for planning future system expansion, are provided in the section [“Cabling Tables and Diagrams for ZS4-4 Racked System Capacity Configurations”](#) on page 521.

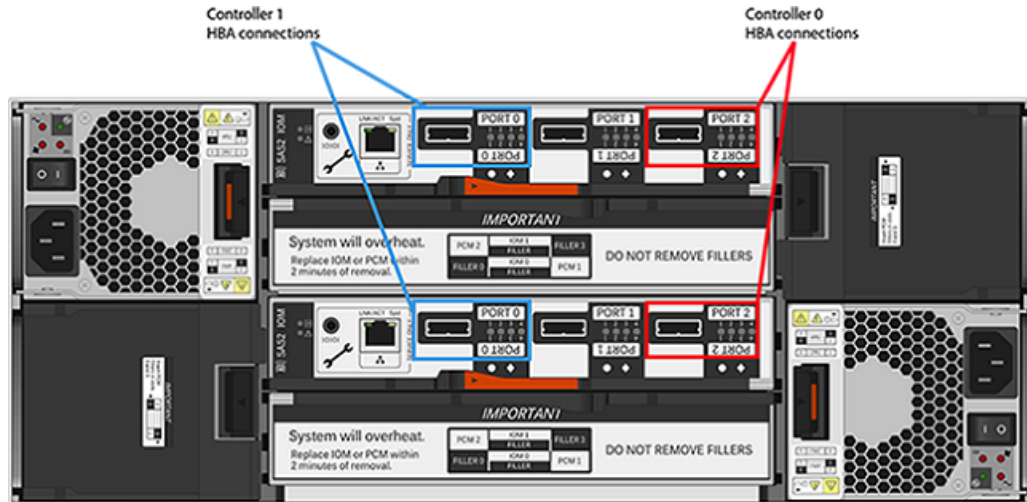
Each cabinet contains 42 rack units (RUs), with RU01 on the bottom. Each ZS4-4 controller occupies three rack units, and its location is referenced by the bottommost rack unit number. The top controller is referred to as Controller 1 and is located in RU20 in the base cabinet, and the bottom controller 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 727 ZS4-4 Controller 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 728 DE2-24C Disk Shelf HBA Connections (Back View)



Cabling Tables and Diagrams for ZS4-4 Racked System Capacity Configurations

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 IOMs.

TABLE 34 Base Cabinet: Controller and Disk Shelf Locations and Connections

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

FROM			TO		
20	1	Slot 9, Port 0	31	7	IOM 0, Port 0
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 10 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 IOMs. Expansion Cabinet 1 supports disk shelves 9 through 18.

TABLE 35 Expansion Cabinet 1: Controller and Disk Shelf Locations and Connections

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 10 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 IOMs. Expansion Cabinet 2 supports disk shelves 19 through 28.

TABLE 36 Expansion Cabinet 2: Controller and Disk Shelf Locations and Connections

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 illustrate how pre-racked systems are cabled, as well as how to expand your system in the future. The legend for each diagram is as follows:

- A hollow circle indicates the cable connection to the top IOM (IOM 1).
- A solid circle indicates the cable connection to the bottom IOM (IOM 0).

FIGURE 729 ZS4-4 Racked System Capacity Configuration: 10 DE2-24C Disk Shelves

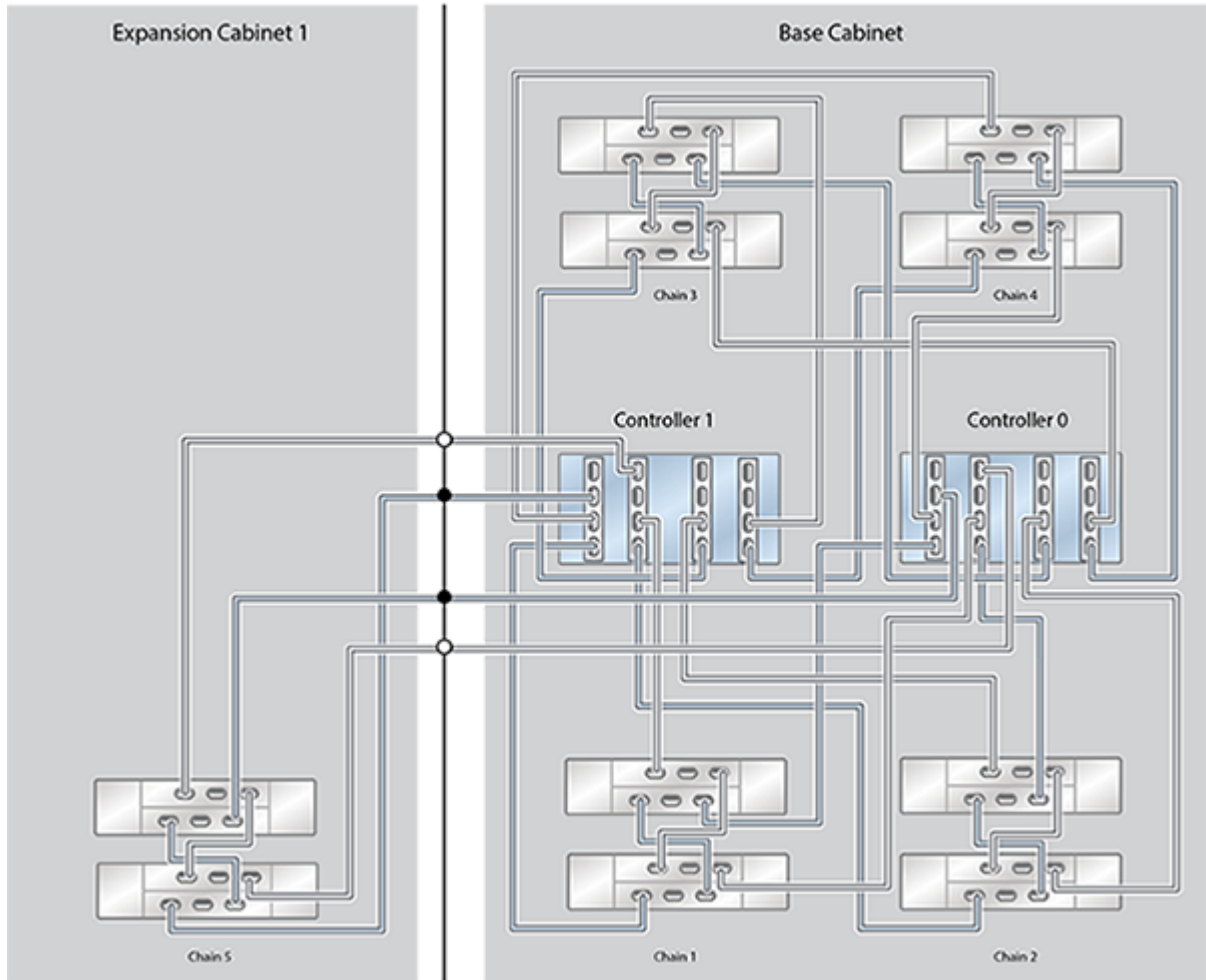


FIGURE 730 ZS4-4 Racked System Capacity Configuration: 12 DE2-24C Disk Shelves

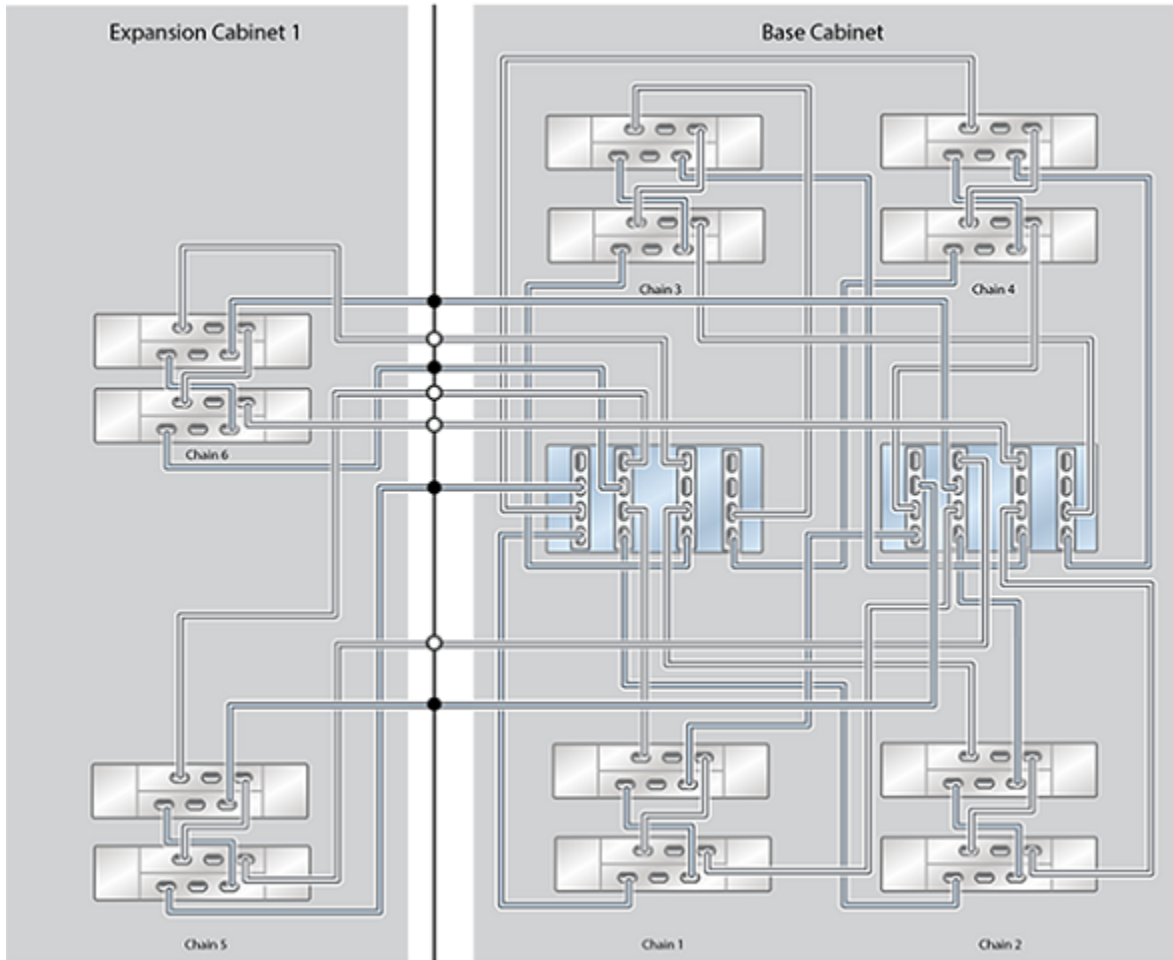


FIGURE 731 ZS4-4 Racked System Capacity Configuration: 13 DE2-24C Disk Shelves (Half Rack)

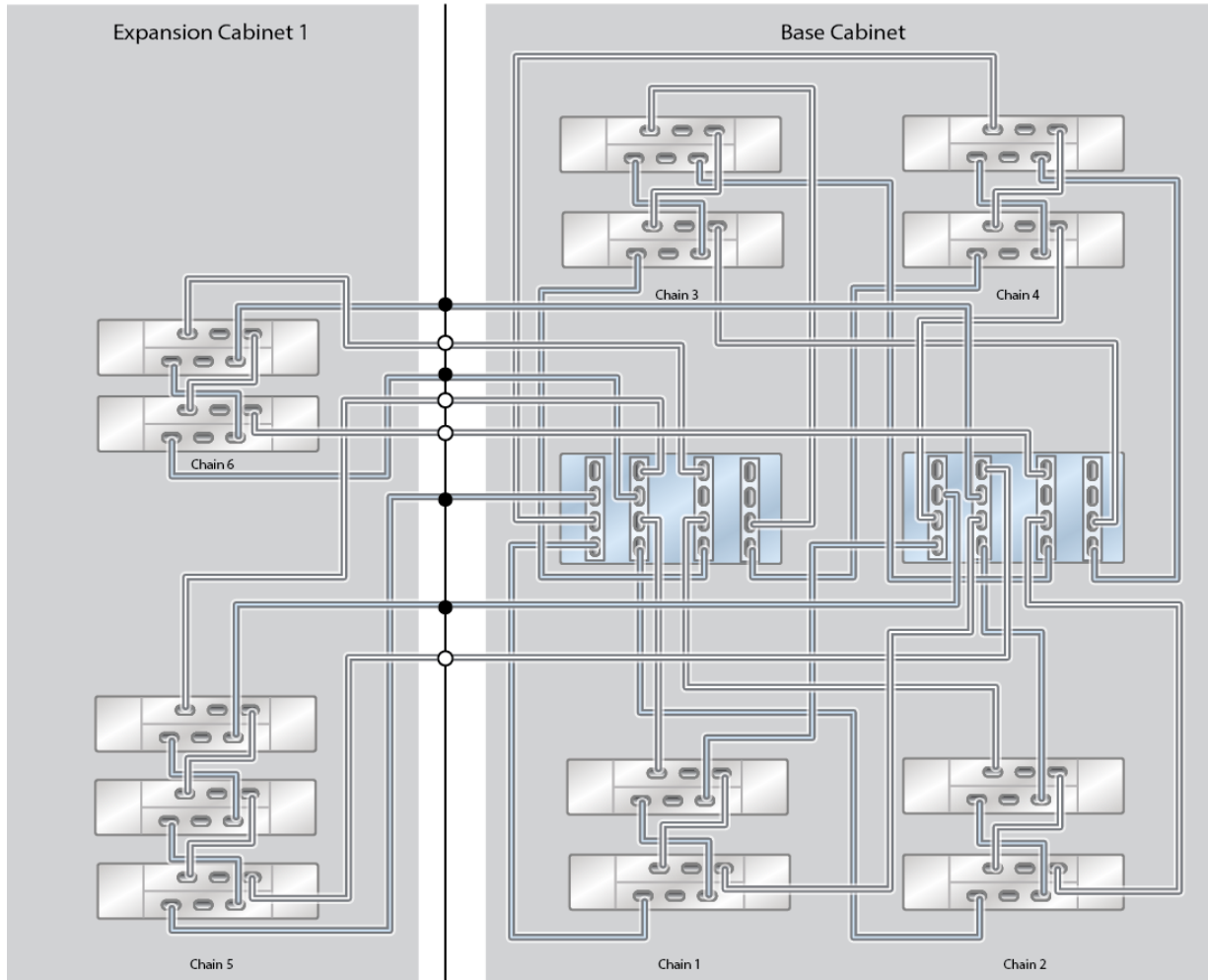


FIGURE 732 ZS4-4 Racked System Capacity Configuration: 14 DE2-24C Disk Shelves

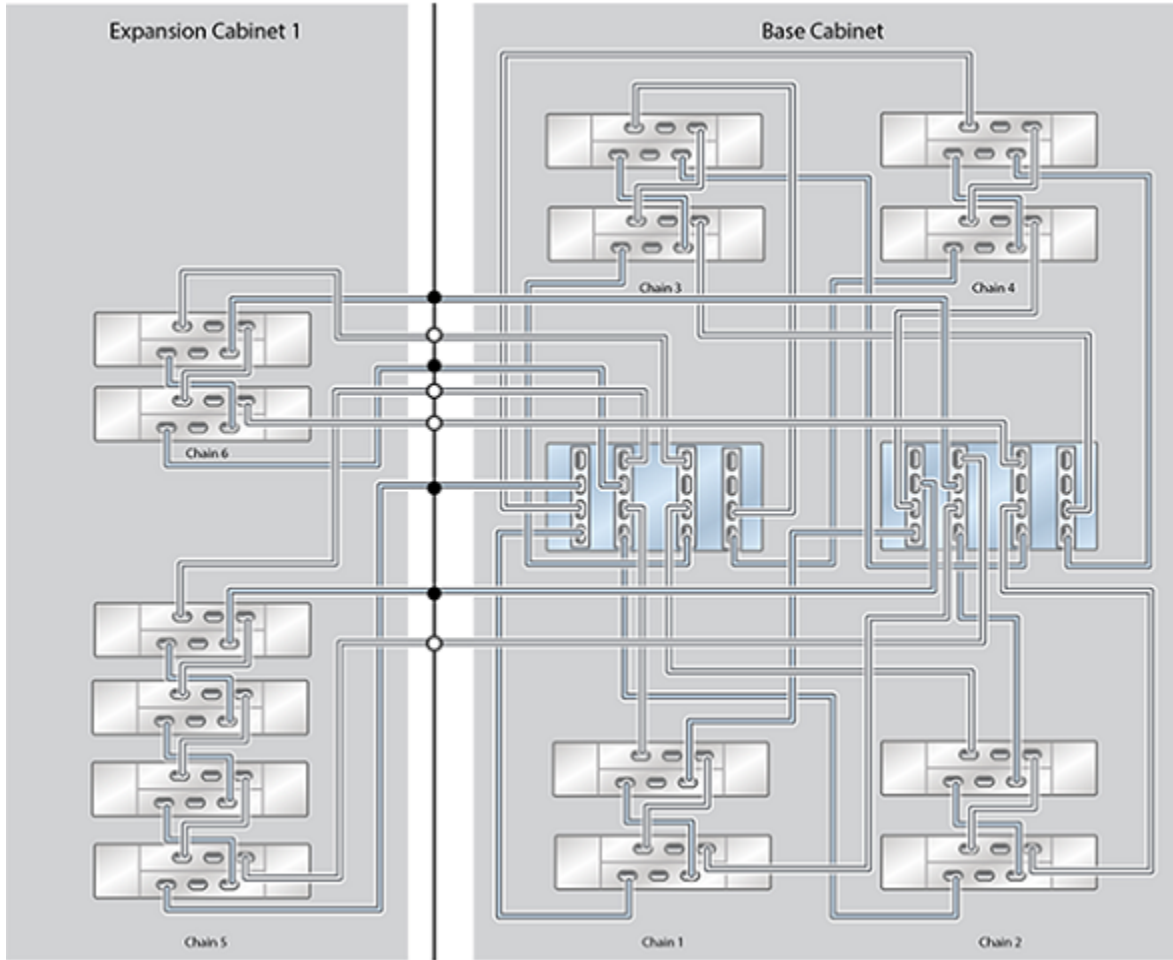


FIGURE 733 ZS4-4 Racked System Capacity Configuration: 16 DE2-24C Disk Shelves

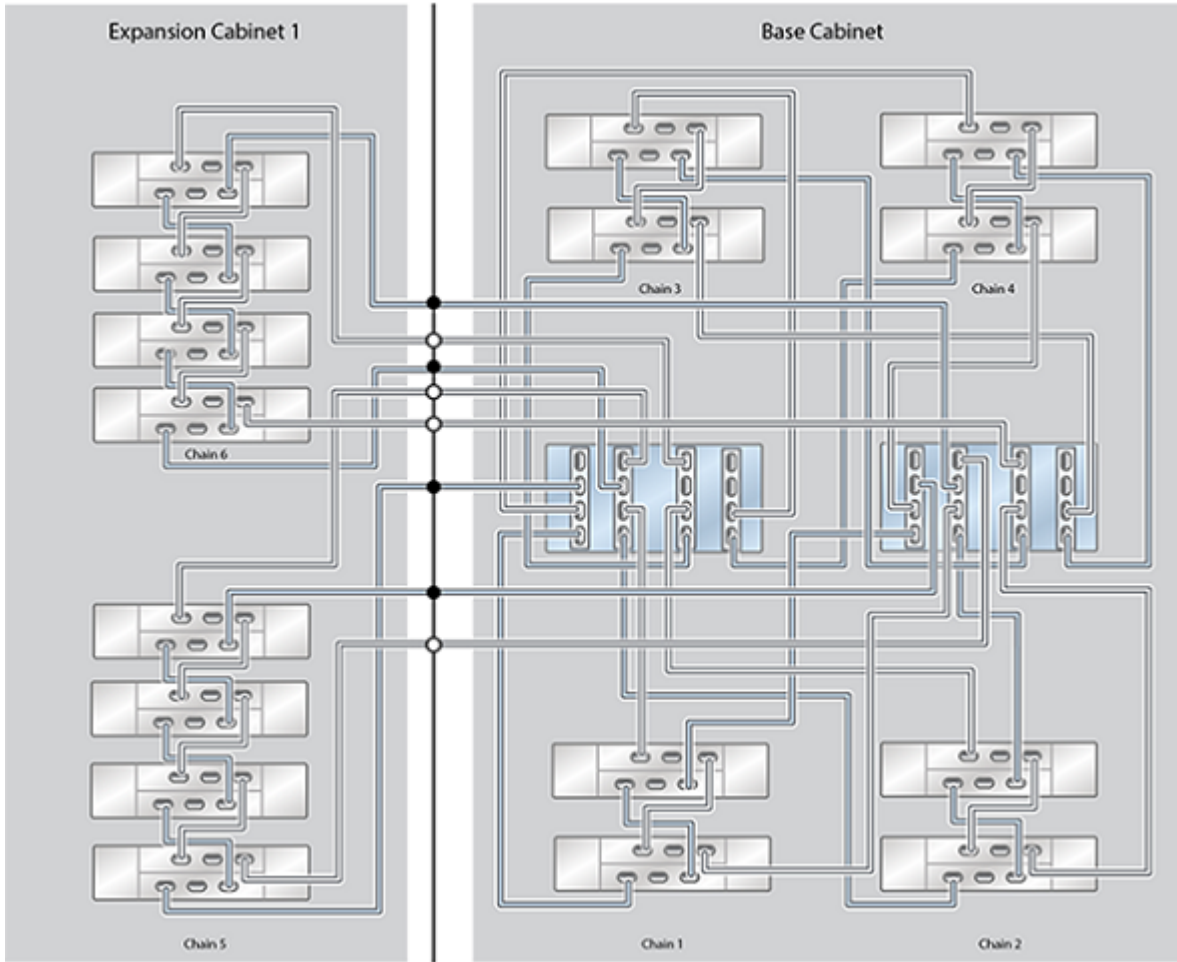


FIGURE 734 ZS4-4 Racked System Capacity Configuration: 18 DE2-24C Disk Shelves

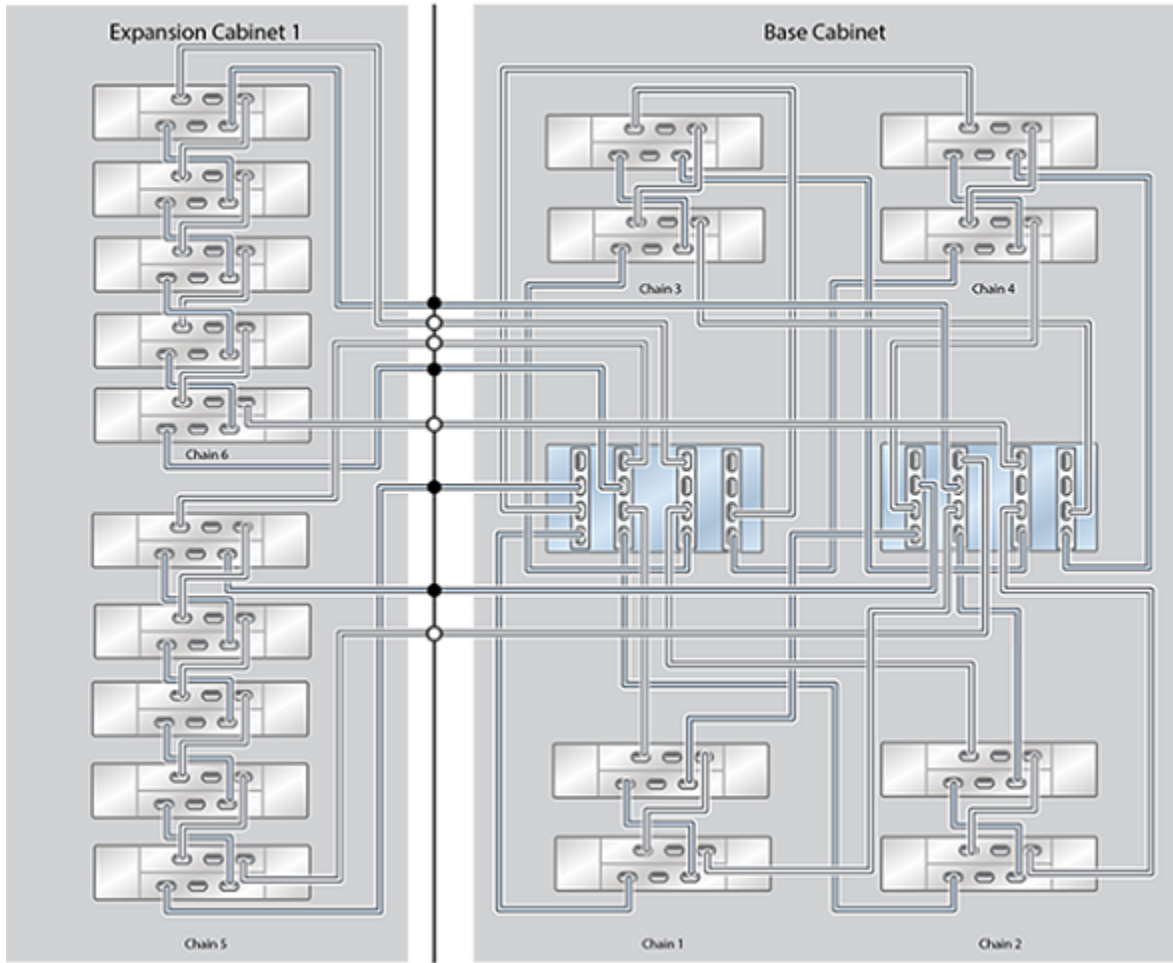


FIGURE 735 ZS4-4 Racked System Capacity Configuration: 20 DE2-24C Disk Shelves

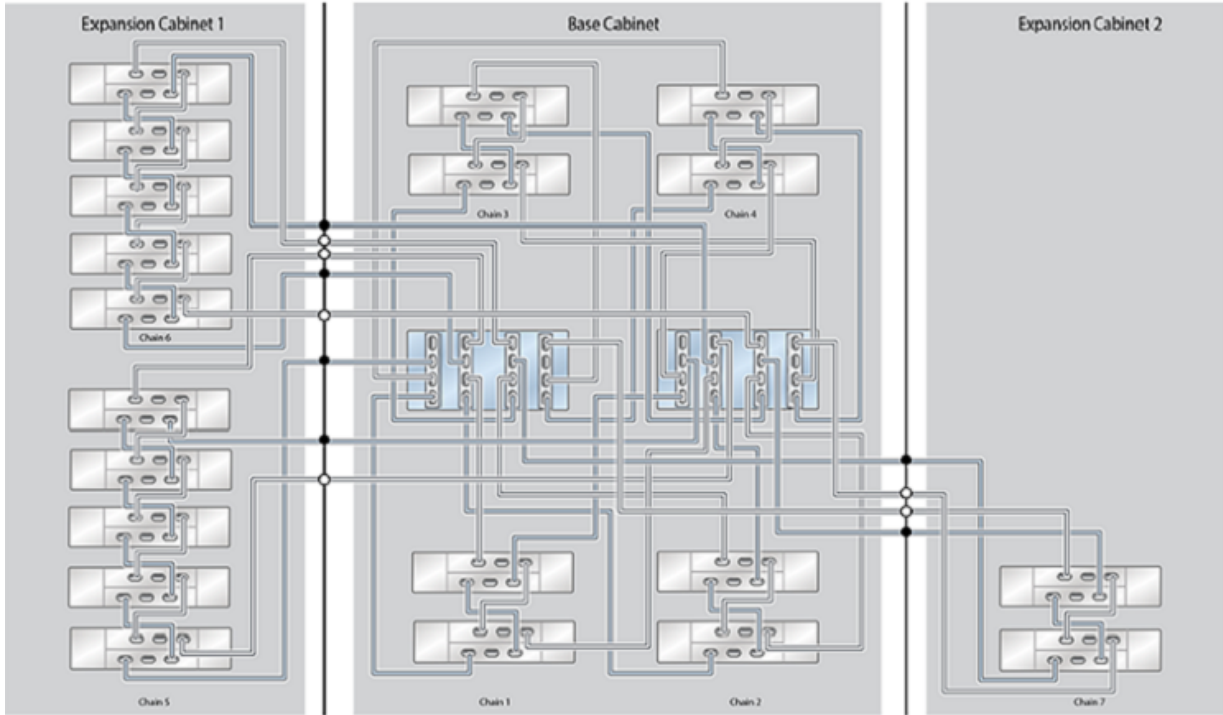


FIGURE 736 ZS4-4 Racked System Capacity Configuration: 22 DE2-24C Disk Shelves

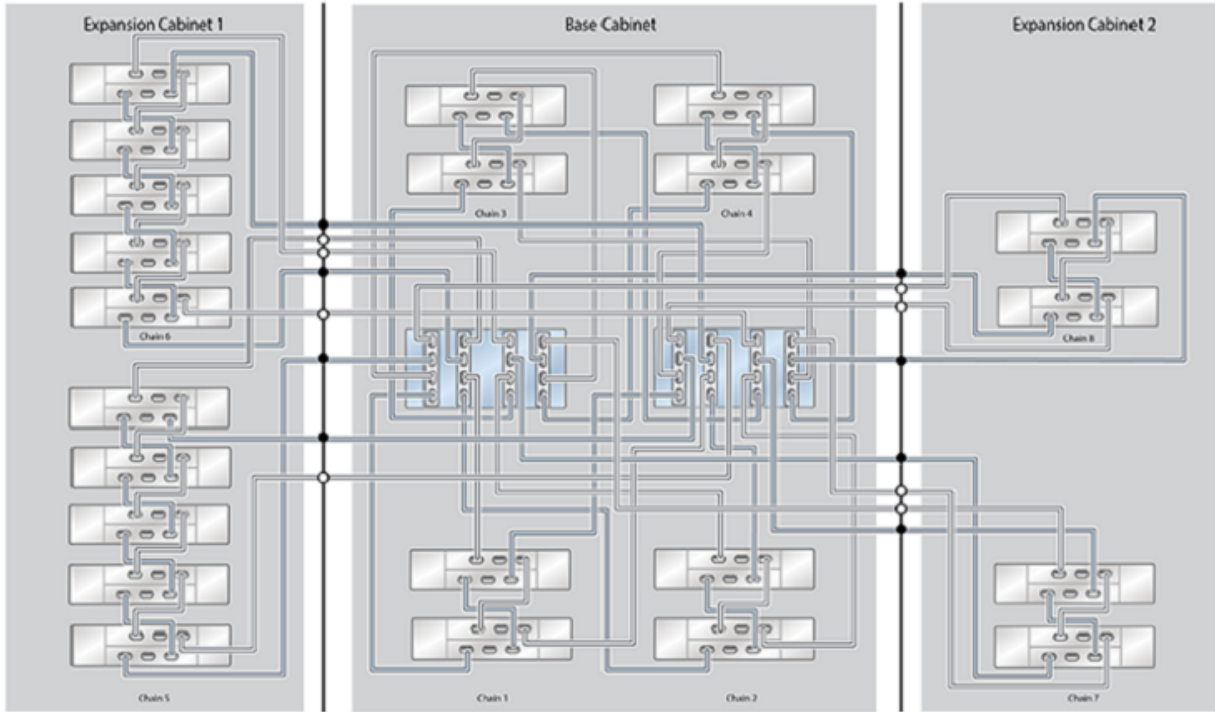


FIGURE 737 ZS4-4 Racked System Capacity Configuration: 23 DE2-24C Disk Shelves (Half Rack)

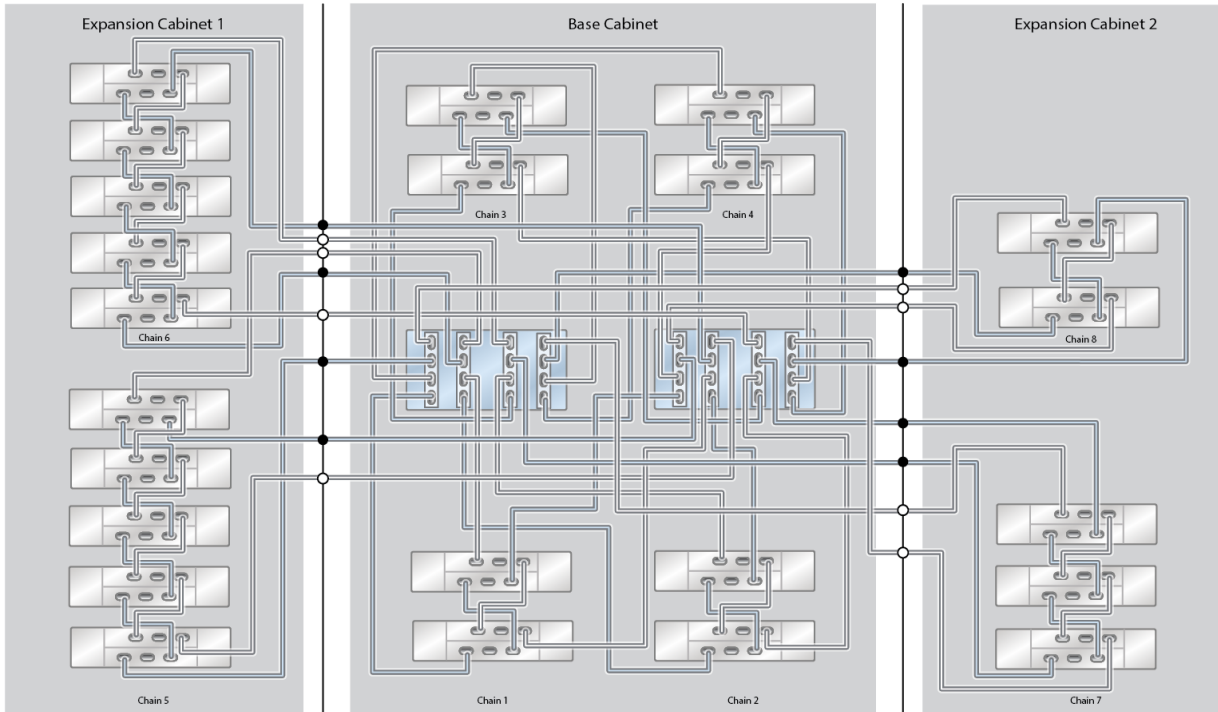


FIGURE 738 ZS4-4 Racked System Capacity Configuration: 24 DE2-24C Disk Shelves

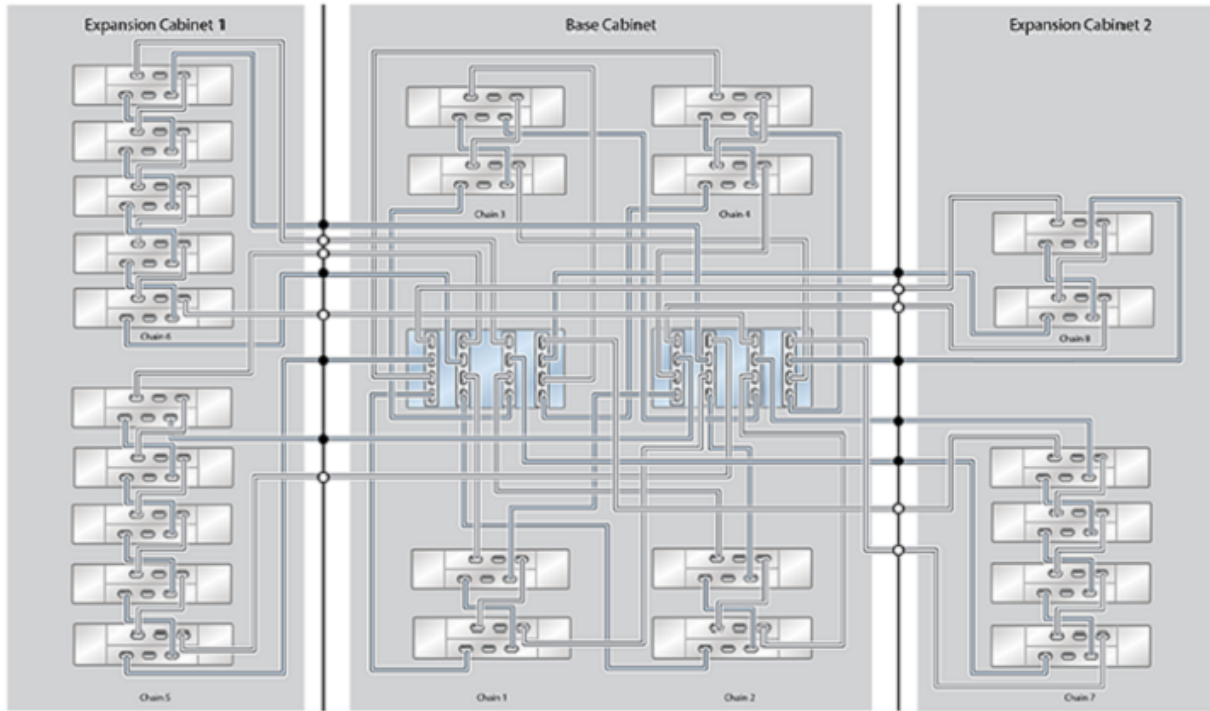


FIGURE 739 ZS4-4 Racked System Capacity Configuration: 26 DE2-24C Disk Shelves

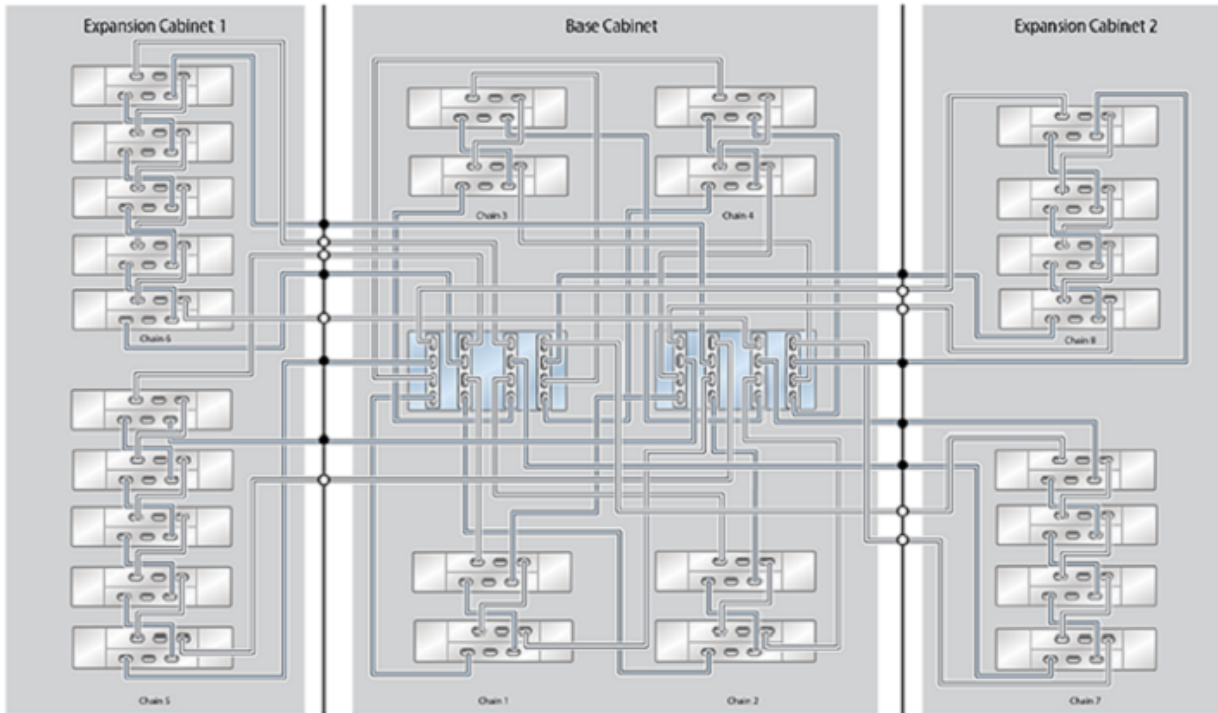


FIGURE 740 ZS4-4 Racked System Capacity Configuration: 28 DE2-24C Disk Shelves

