Dell EMC Data Domain DD9500 and DD9800 Systems

Version 6.1

Hardware Overview and Installation Guide

302-002-887
REV. 03

DELL EMC

Copyright © 2016-2018 EMC Corporation All rights reserved.

Published May 2018

Dell believes the information in this publication is accurate as of its publication date. The information is subject to change without notice.

THE INFORMATION IN THIS PUBLICATION IS PROVIDED “AS-IS.“ DELL MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THE INFORMATION IN THIS PUBLICATION, AND SPECIFICALLY DISCLAIMS IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. USE, COPYING, AND DISTRIBUTION OF ANY DELL SOFTWARE DESCRIBED IN THIS PUBLICATION REQUIRES AN APPLICABLE SOFTWARE LICENSE.

Dell, EMC, and other trademarks are trademarks of Dell Inc. or its subsidiaries. Other trademarks may be the property of their respective owners. Published in the USA.

Dell EMC
Hopkinton, Massachusetts 01748-9103
1-508-435-1000 In North America 1-866-464-7381
www.DellEMC.com

CONTENTS

Figures 5

Tables 7

Revision history 9

Chapter 1 Planning and Site Preparation 11
Tools and supplies needed....12
Safety information....12
Field-installed systems vs. factory-racked systems....14

Chapter 2 Hardware Overview 15
System features....16
System specifications....16
DD9500/DD9800 front panel....18
Front LED indicators....18
Solid State Drives (SSD)....21
Rear panel....22
Power supply units....23
Management module....23
Rear LED Indicators....24
Available I/O modules....26
Ethernet I/O modules....27
Fibre Channel (FC) I/O modules....27
SAS I/O modules....27
I/O module slot assignments....27
Slot Addition Rules....29
Internal System Components....30
DIMM Modules....32
Cooling Fans....32
Storage capacity....33

Chapter 3 Install the System in the Rack 37
Unpack the system....38
Install the rack brackets....38
Shelf brackets and cable management assembly....38
Install rail brackets on the Data Domain racks (for square or round hole racks)....40
Install rail brackets using the adapter hardware (for threaded hole racks)....43
Install the DD9500/DD9800 system into a rack....45
Mount the cable management assembly....47
Install the Data Domain cable management assembly (CMA)....47
Installing the expansion shelves into the racks....49

Chapter 4 Connect Cables and Power on 51

Connecting the expansion shelves and the controllers..... 52
ES30 cable information..... 52
Connecting multiple ES30 shelves to the DD9500 /DD9800 system..... 56
DD9500 /DD9800..... 56
DD9500 /DD9800 with HA (one rack)..... 58
DD9500 /DD9800 with HA (two racks)..... 60
DD9500 /DD9800 with DD Cloud Tier (Single node or HA)..... 63
DD9500 /DD9800 with ERSO..... 66
DS60 cable information..... 69
Connecting multiple DS60 shelves to the DD9500 /DD9800 system..... 70
DD9500 /DD9800..... 70
DD9500 /DD9800 with HA..... 73
DD9500 and DD9800 with DD Cloud Tier (Single node)..... 75
DD9500 and DD9800 with DD Cloud Tier (HA)..... 76
DD9500 and DD9800 with ERSO..... 80
Connecting the HA interconnect..... 81
Connect data cables on both nodes..... 82
Power on the systems..... 83
Install the bezel..... 84

Chapter 5 Configure System For Use 85
Enable administrative communication..... 86
Accepting the End User License Agreement (EULA)..... 88
Run the configuration wizard..... 88
Configuring the network..... 88
Configuring additional system parameters..... 90
Configure HA for new installations..... 91

FIGURES

1 Warning about lifting the system....13
2 Front panel components....18
3 Service LEDs....19
4 Power button....20
5 Front LEDs....20
6 SSD drives....21
7 Features on rear of chassis....22
8 Serial number tag location....22
9 Four power supplies....23
10 Management module....24
11 1000BaseT Ethernet ports....24
12 Rear LEDs....25
13 Power supply LEDs....25
14 Location of NVRAM and I/O modules....27
15 SP module....31
16 Releasing a memory riser....31
17 Open fan tray....32
18 Warning about lifting the system....38
19 Rail bracket inside....39
20 Rail bracket outside....39
21 Cable management assembly (CMA)....40
22 Insert screw in the back....41
23 Insert screw in the front....42
24 Attach bracket to front of rack....42
25 Adapters....43
26 Attaching the front rail with the screw....44
27 Attach front rail adapter....45
28 Warning about lifting the system....45
29 System on a rack....46
30 Location of serial number tag....47
31 Data Domain CMA back....48
32 Data Domain cable management assembly back inside....48
33 Rear of the rack mount rail....49
34 Node 0 SAS I/O module to ES30 host port connector....53
35 Node 1 SAS I/O module to ES30 expansion port connector....54
36 Cables for ES30 to ES30 connections....55
37 Cabling for base DD9500 /DD9800 systems....58
38 Cabling for HA DD9500 /DD9800 systems in one rack....60
39 Cabling for HA DD9500 /DD9800 systems in two racks....63
40 Cabling for DD9500 /DD9800 systems with DD Cloud Tier (Single node or HA)....66
41 Cabling for DD9500 /DD9800 systems with ERSO....68
42 SAS I/O module to DS60 connector....69
43 Cabling for base DD9500 and DD9800 systems....72
44 Cabling for HA DD9500 and DD9800systems....74
45 Cabling for DD9500 and DD9800 systems with DD Cloud Tier....76
46 Cabling for HA DD9500 and DD9800 systems with DD Cloud Tier....79
47 Cabling for DD9500 and DD9800 systems with ERSO....81
48 DD9500/DD9800 HA interconnect....82
49 Power LED and power button....87

TABLES

1 Document revision history.....9
2 DD9500/DD9800 system features.....16
3 DD9500/DD9800 system specifications.....16
4 Front panel LED status indicators.....21
5 Rear LED status indicators.....25
6 Physical to logical port mapping example.....26
7 DD9500 and DD9800 I/O module slot assignments.....28
8 I/O module slot population rules.....29
9 DD9500/DD9800 memory configurations.....32
10 DD9500/DD9800 storage capacity.....33
11 DD9500/DD9800 with ES30 SAS shelves.....34
12 DD9500/DD9800 with DS60 shelves.....35
13 Cables for node 0 to ES30 shelf loop.....53
14 Cables for node 1 to ES30 shelf loop.....54
15 ES30 to ES30 cable options.....55
16 Primary node cabling instructions.....59
17 Standby node cabling instructions.....59
18 Primary node cabling instructions.....61
19 Standby node cabling instructions.....61
20 Primary node cabling instructions.....64
21 Standby node cabling instructions.....64
22 Cables for node 0 and node 1 to DS60 shelf loop.....69
23 Primary node cabling instructions.....73
24 Standby node cabling instructions.....73
25 Primary node cabling instructions.....77
26 Standby node cabling instructions.....77
27 Communications settings.....86

Revision history

Table 1 Document revision history

Revision	Date	Document part number/ Revision Number	Software version	Description
03	May 2018	302-002-887, Rev. 03	6.1	Added references to documentation for systems shipped in a rack from the factory.
02	June 2017	302-002-887, Rev. 02	6.1	Editorial revisions
01	October 2016	302-002-887, Rev. 01	6.0	Initial publication

CHAPTER 1

Planning and Site Preparation

- Tools and supplies needed 12
- Safety information 12
- Field-installed systems vs. factory-racked systems 14

Tools and supplies needed

These tools and supplies may be helpful for the installation and setup tasks for Data Domain systems.

- Null modem cable (DB-9 female to female), plus spare
- USB-to-DB-9 serial (male connector) converter cable if the laptop does not have a serial port, plus spare
- Power adapter, C13 to NEMA 5–15 (if based in North America), or a power cord for your laptop power adapter with a C13 plug, so that you can power your laptop from a rack PDU
- Antistatic wrist strap and conductive foam pad
- Screwdrivers:
  - Phillips #2 with a 12 in. or longer blade
  - Phillips #2 (standard-length blade)
  - Phillips #1
  - Flat head 3/16 in.
  - Flat head 1/4 in.
  - Torx T10
- Flashlight
- Needle nose pliers
- Diagonal wire cutters (for cutting tie wraps)
- 2 GB or greater USB flash memory drive
- Tie wraps (4 in. and 8 in.)
- (recommended) Roll of 5/8 inch Velcro cable tie material (3M Scotchmate SJ-3401 or similar)

Safety information

⚠ CAUTION

- **If the system is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.**
- **The RJ45 sockets on the motherboard, PCI cards, or I/O modules are for Ethernet connection only and must not be connected to a telecommunications network.**

Review this list of important safety recommendations.

- All plug-in modules and blank plates are part of the fire enclosure and must be removed only when a replacement can be added immediately. The system must not be run without all parts in place.
- A DD9500/DD9800 system must be operated only from a power supply input voltage range of 200–240 VAC and 50–60 Hz. ES30 shelves use 100-240 VAC and 50–60 Hz. DS60 shelves use 200–240 VAC and 50–60 Hz.

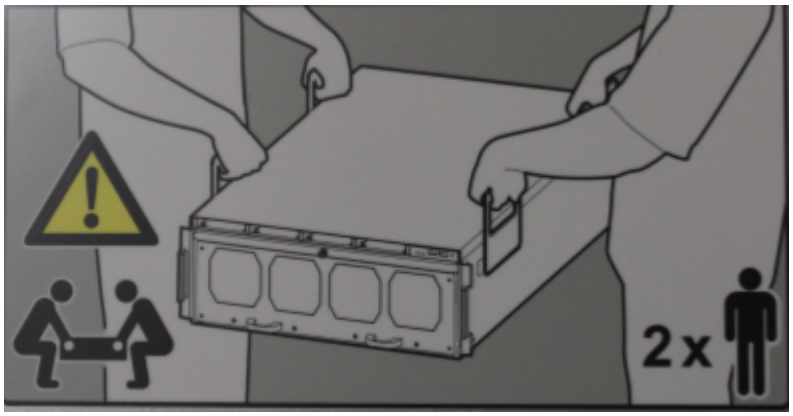
- Each component is intended to operate with all working power supplies installed.
- Provide a suitable power source with electrical overload protection.
- A safe electrical earth connection must be provided to each power cord. Check the grounding of the power sources before applying power.
- The plug on each power supply cord is used as the main device to disconnect power from the system. Ensure that the socket outlets are located near the equipment and are easily accessible.
- Permanently unplug the unit if you think it is damaged in any way and before moving the system. A DD9500/DD9800 system includes four power supplies. To completely remove system power, you must disconnect all four power supplies.
- The power connections must always be disconnected prior to removal or replacement of a power supply module from any of the components in the system.
- A faulty power supply module must be replaced within 24 hours.
- Do not lift system components by yourself. A DD9500/DD9800 system weighs up to 117 lbs (53.2 kg), an ES30 expansion shelf weighs up to 68 lbs (30.8 kg), and a DS60 shelf weighs up to 225 lbs (90.7 kg).

  ⚠ CAUTION

  Data Domain systems are heavy. Use at least two people or a mechanical lift to move any system.

- Do not lift an expansion shelf by the handles on any modules. The handles are not designed to support the weight of the populated shelf.
- To comply with applicable safety, emission, and thermal requirements, covers must not be removed and all bays must be fitted with plug-in modules.
- Once removed from the shipping box, it is ok to lift the DD9500/DD9800 system or the chassis with the four handles to place in a rack. You will need to remove the handles from the sides before sliding the system in the rack. The four handles should be saved for later use.

Figure 1 Warning about lifting the system



- Load the rack with storage shelves beginning at the bottom and the DD9500 system in the designated location to prevent the rack from becoming top-heavy.
- For ESD protection, Data Domain recommends that you wear a suitable antistatic wrist or ankle strap. Observe all conventional ESD precautions when handling plug-in modules and components.

- Do not extend components on slide rails until you have loaded at least three or more similarly weighted items in the rack, or unless the rack is bolted to the floor or overhead structure to prevent tipping.

Field-installed systems vs. factory-racked systems

Data Domain systems are available from the factory as components to install in an existing rack on site, or pre-installed in a rack. The following sections provide additional information about each type of installation.

Field-installed systems
This installation guide is primarily intended for systems shipped as components to be installed in an existing rack on site. Follow all the instructions in this document to rack, cable, and configure the system.

Factory-racked systems
Factory-racked systems are pre-installed in the rack, with the cables already connected. Follow the instructions in the chapter *Configure System For Use* to configure the factory-racked system.

The following documents, available from the Online Support website at https://support.emc.com, provide additional information about the factory rack:

- *Dell EMC 40U-P Cabinet Site Preparation Guide*
- *Dell EMC 40U-P Cabinet Unpacking and Setup Guide*
- *Data Domain Rack Service Guide*

CHAPTER 2

Hardware Overview

- System features 16
- System specifications 16
- DD9500/DD9800 front panel 18
- Rear panel 22
- I/O module slot assignments 27
- Internal System Components 30
- Storage capacity 33

System features

Table 2 DD9500/DD9800 system features

Feature	DD9500	DD9800
Rack Height	4U, supported in four-post racks only	4U, supported in four-post racks only
Power	4 hot-swappable power units, 2 pairs of 1 +1 redundant	4 hot-swappable power units, 2 pairs of 1 +1 redundant
Fans	8 hot-swappable fans, redundant	8 hot-swappable fans, redundant
Internal drives	4 x 400 GB (base 10) hot-swappable solid state drives (SSD)	4 x 400 GB (base 10) hot-swappable solid state drives (SSD)
SSD cache	Optional 1 x 8 drive SSD shelf or 1 x 15 drive SSD shelf • Systems with 256 GB of memory have 8 SSDs. • Systems with 512 GB of memory have 15 SSDs.	1 x 8 drive SSD shelf or 1 x 15 drive SSD shelf • Systems with 256 GB of memory have 8 SSDs. • Systems with 768 GB of memory have 15 SSDs.
NVRAM	One 8-GB NVRAM module for data integrity during a power outage	One 8-GB NVRAM module for data integrity during a power outage
I/O Module slots	11 I/O module (Fibre Channel, Ethernet, and SAS) slots. Replaceable I/O modules are not hot-swappable. See I/O module slot assignments on page 27	11 I/O module (Fibre Channel, Ethernet, and SAS) slots. Replaceable I/O modules are not hot-swappable. See I/O module slot assignments on page 27
Memory	• Base: 256 GB • Expanded 512 GB 512 GB is required for DD Cloud Tier and Extended Retention. HA is supported with both memory configurations.	• Base: 256 GB • Expanded 768 GB 768 GB is required for DD Cloud Tier and Extended Retention. HA is supported with both memory configurations.
Rack mounting	Rack mount kit included with each system. Adjustable between 24 - 36 in. (60.9–76.2 cm).	Rack mount kit included with each system. Adjustable between 24 - 36 in. (60.9–76.2 cm).
Processors	4 Intel EX processors.	4 Intel EX processors.
Voltage	200–240 V~. Frequency: 50 Hz to 60 Hz.	200–240 V~. Frequency: 50 Hz to 60 Hz.

System specifications

Table 3 DD9500/DD9800 system specifications

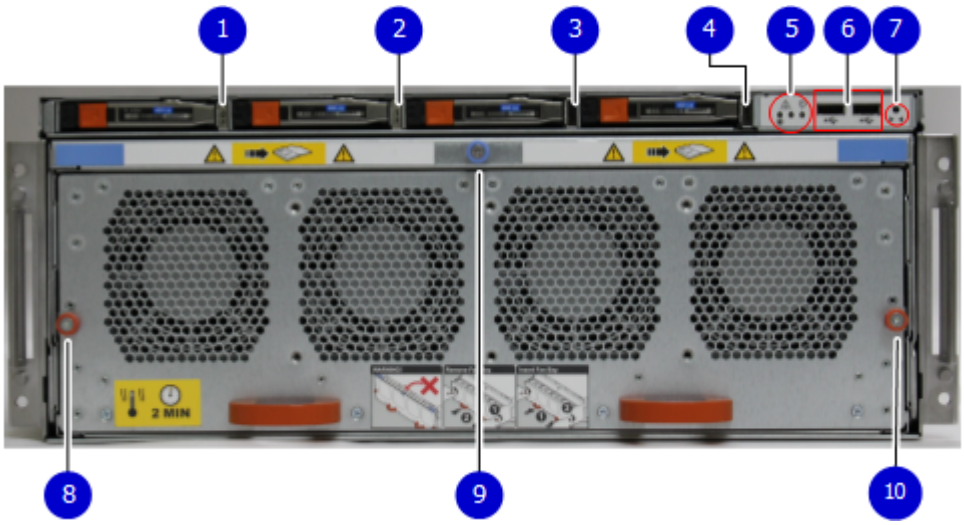
Model	Watts	BTU/hr	Power (VA)	Weight	Width	Depth	Height
DD9500/ DD9800	1887	6444	1981	117 lb / 53.2 kg	19 in / 48.3 cm	29.5 in / 74.9 cm	7 in / 17.8 cm

- Operating temperature: 50° to 95° F (10° to 35° C), derate 1.1° C per 1000 feet, above 7500 feet up to 10,000 feet
- Operating humidity: 20% to 80%, non-condensing
- Non-operating temperature: -40° to +149° F (-40° to +65° C)
- Operating acoustic noise: Sound power, LWAd, is 7.7 bels.

DD9500/DD9800 front panel

The four solid state drives (SSDs), the storage processor (SP), and the fans are accessed from the front of the system. The SP must be pulled out to provide access to the DIMMs. The fans are accessed without pulling or removing the SP and they are hot-swappable. The photo shows the interfaces on the front of the system.

Figure 2 Front panel components



1. SSD slot 0
2. SSD slot 1
3. SSD slot 2
4. SSD slot 3
5. Front LEDs
6. USB ports
7. Power button
8. Fan tray thumbscrew (left)
9. SP module thumbscrew to secure the ejector handle
10. Fan tray thumbscrew (right)

Front LED indicators

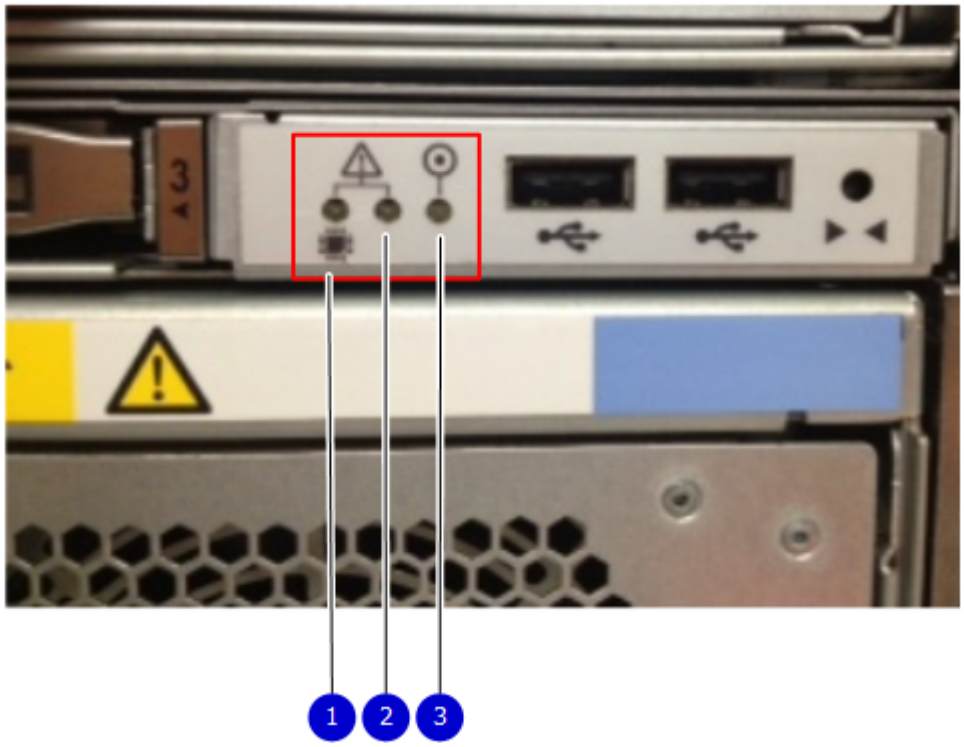
On the front panel to the right of SSD #4 (in Slot 3) are 3 LEDs that show high level system status. The System Power LED glows blue to show the system is powered on.

Note

The system can have power (be plugged in) but the blue LEDs are off if the system is powered off.

The SP Service LED is normally off, but glows amber whenever the storage processor (SP) requires service. The Enclosure Service LED is normally off, but glows amber whenever the SP or other replaceable parts require service. The System Power and Enclosure Service LEDs are visible through the front bezel.

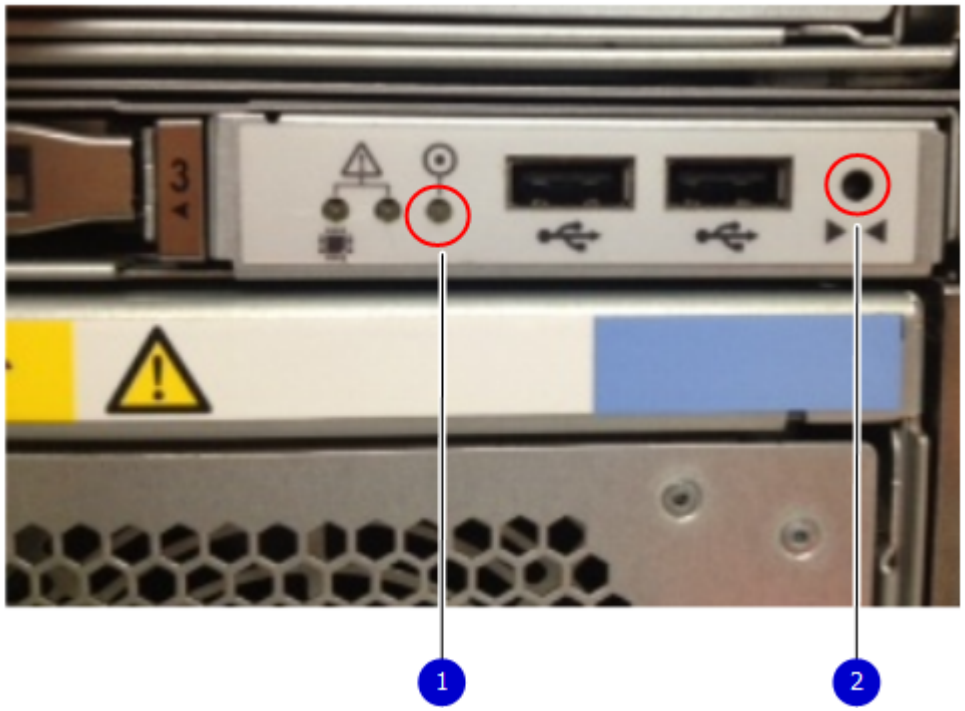
Figure 3 Service LEDs



1. SP service LED — Amber light indicates that the SP or one of its components needs service.
2. Enclosure Service LED — This is normally off, but amber light indicates that the enclosure or something within the enclosure— the fans, SP, I/O modules, management module etc—requires service.
3. System power LED — Blue light indicates system running

The power button shown in the picture is used when a system needs to be powered up after a shut down using the `system poweroff` command. Once power is restored the system power LED light turns blue.

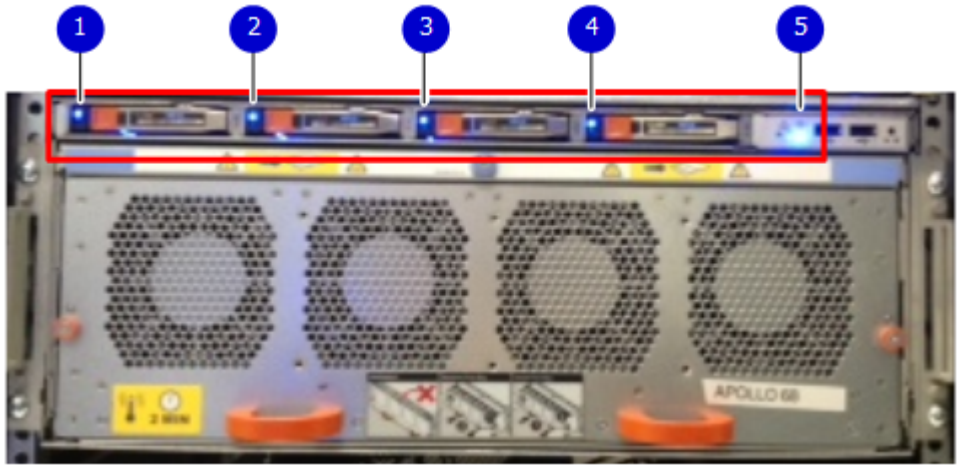
Figure 4 Power button



1. System power LED — Blue light indicates system running
2. Power button

The LEDs in the front are shown in the following figure.

Figure 5 Front LEDs



1. SSD LED in slot 0
2. SSD LED in slot 1
3. SSD LED in slot 2
4. SSD LED in slot 3
5. System power LED — Blue light indicates system running

Table 4 Front panel LED status indicators

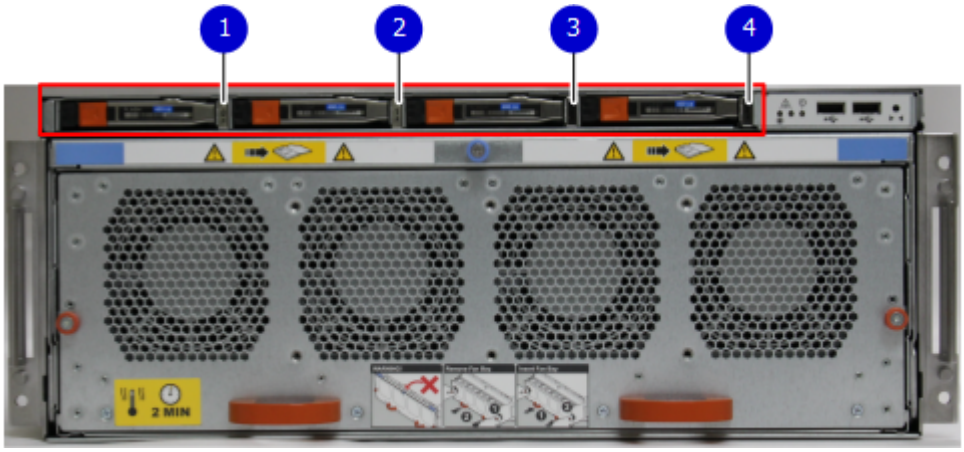
Part	Description or Location	State
System, SP fault	Exclamation point within a triangle	Dark indicates normal operation. Amber indicates failure.
System, chassis fault	Exclamation point within a triangle	Dark indicates normal operation. Amber indicates a fault condition.
SSD	Top LED	Solid blue, disk ready, blinks while busy.
SSD	Bottom LED	Dark indicates healthy. Solid amber indicates disk fail.

Solid State Drives (SSD)

A system contains 4 hot-swappable 2.5 in. 400 GB SSD drives located in the front. There are four drive bays numbered 0-3 from left to right. A dual drive failure allows the DD9500/DD9800 system to operate without disruption.

Each drive has a blue colored power LED and an amber fault LED.

Figure 6 SSD drives

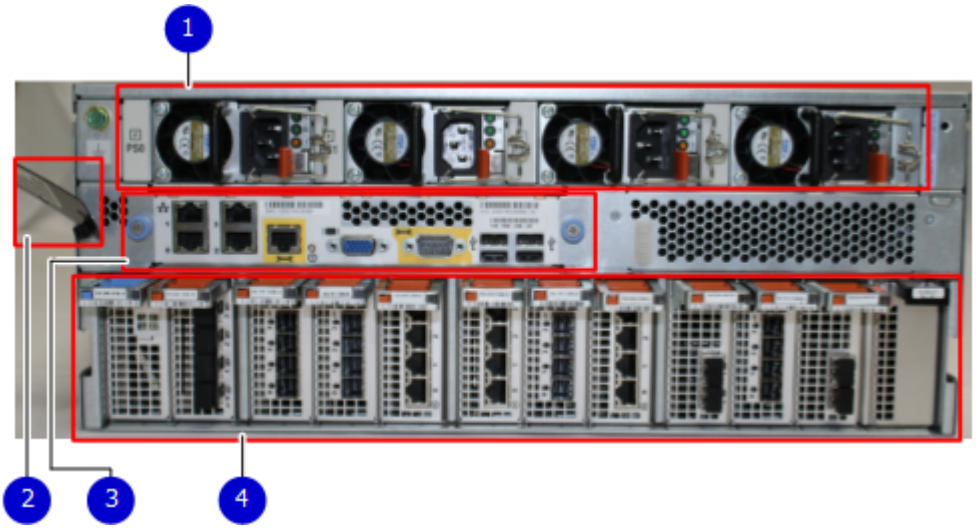


1. Slot 0
2. Slot 1
3. Slot 2
4. Slot 3

Rear panel

In the rear of the system, the top section contains the 4 power supply units. In the middle of the section, on the left, is serial number tag location. To the right of the serial number tag location is the management module. The lower section contains the NVRAM and the I/O modules numbered 0 through 11 from left to right. The photo shows the hardware features and interfaces on the rear of the system.

Figure 7 Features on rear of chassis



1. Power supply units
2. Serial number tag
3. Management module
4. NVRAM and IO modules (slots 0-11)

The figure shows the location of the serial number tag on the left of the management module.

Figure 8 Serial number tag location

Power supply units

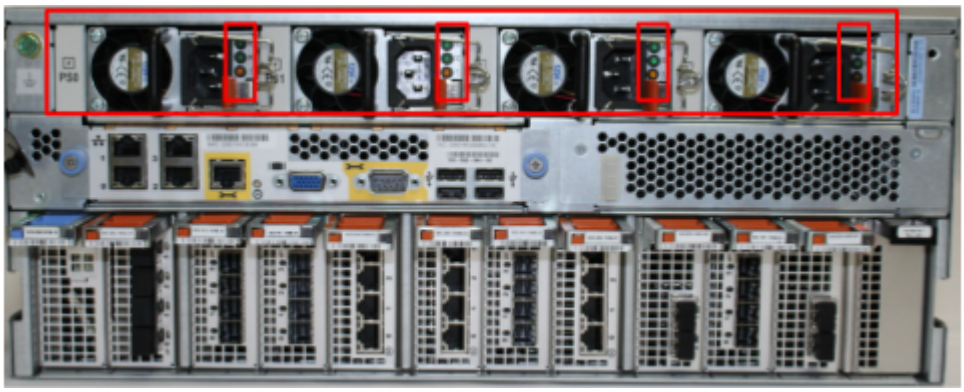
A DD9500/DD9800 system has four power supply units, numbered PSU0, PSU1, PSU2, and PSU3 from left to right. Each power supply has its own integral cooling fan.

Note

The DD9500/DD9800 system should be powered from redundant AC sources. This allows one AC source to fail or be serviced without impacting system operation. PSU0 and PSU1 should be attached to one AC source. PSU2 and PSU3 should be attached to the other AC source.

The AC power plugs are located to the right of each power supply. The wire clips for the AC cords hold the cords in place. The wire clips must be disengaged before disconnecting the AC power to each power supply.

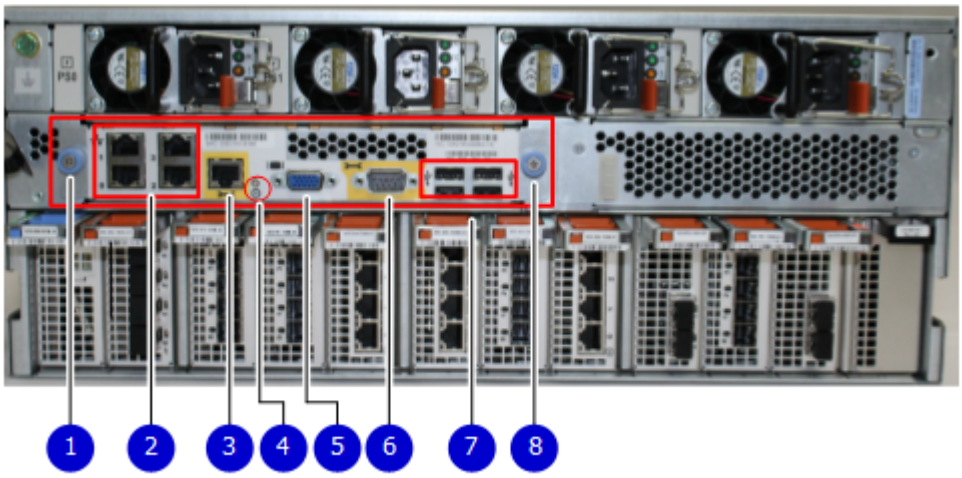
Figure 9 Four power supplies



Management module

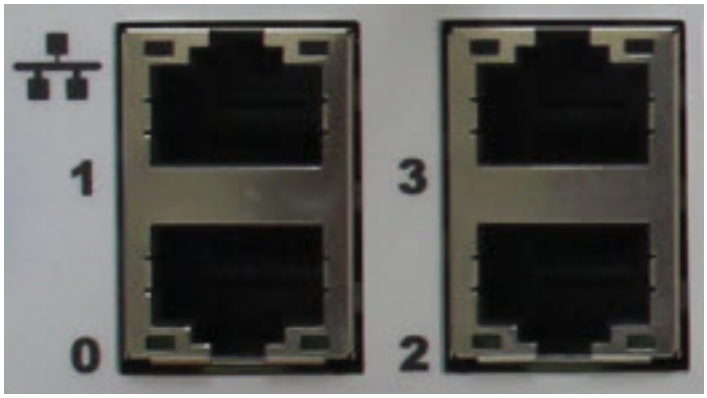
The following figure shows the location of the DD9500/DD9800 management module on the rear of the system and identifies the interfaces.

Figure 10 Management module



1. Left blue thumbscrew to loosen the management module
2. 4 x 1000BaseT Ethernet ports (For details, see the picture - 1000BaseT Ethernet ports)
3. Service network port (IPMI, 1000BaseT Ethernet port)
4. Service LED
5. VGA port
6. Serial port
7. Four USB ports
8. Right blue thumbscrew to loosen the management module

Figure 11 1000BaseT Ethernet ports



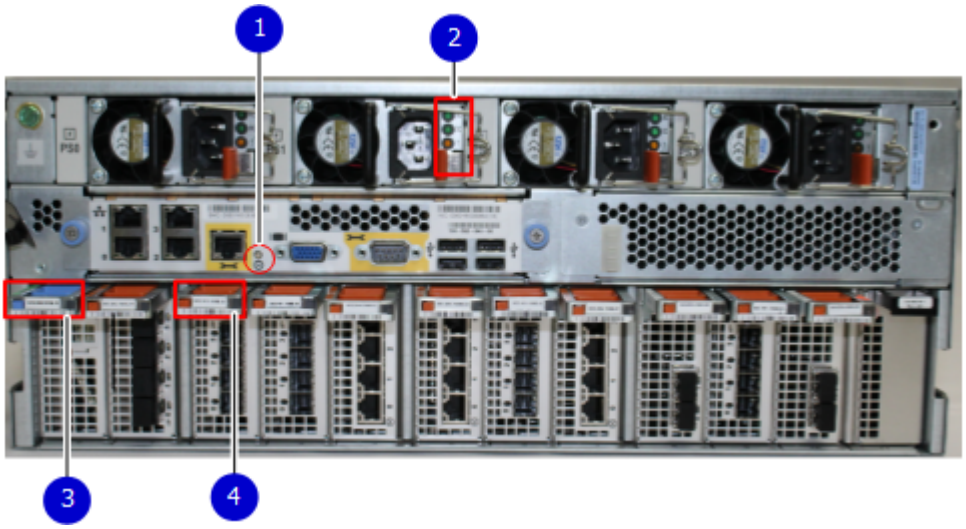
- Lower left port: physical #0, logical ethMa
- Top left port: physical #1, logical ethMb
- Lower right port: physical #2, logical ethMc
- Top right port: physical #3, logical ethMd

Rear LED Indicators

The rear elements containing LEDs include each power supply, each I/O module, and the management module.

The figure shows the rear LEDS.

Figure 12 Rear LEDs



1. Management module service LEDs
2. Power supply LEDs
3. NVRAM LEDs
4. IO Module LEDS

The power supply LEDs include:

- AC LED on top
- DC LED in the middle
- Service Required LED on the bottom

Figure 13 Power supply LEDs

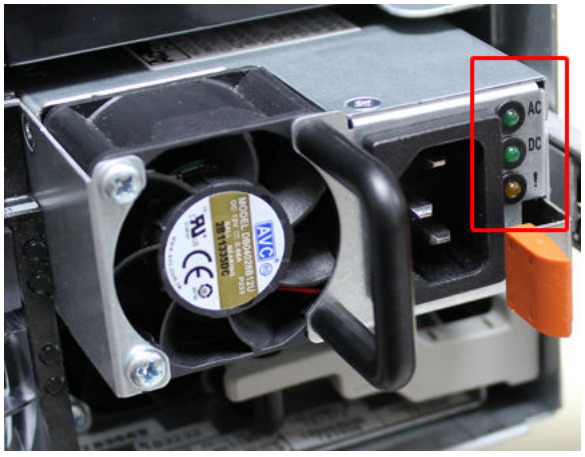


Table 5 Rear LED status indicators

Part	Description or Location	State
Power supply	AC LED	Steady green indicates normal AC input power.

Table 5 Rear LED status indicators (continued)

Part	Description or Location	State
Power supply	DC LED	Steady green indicates normal DC output power.
Power supply	Service LED	Solid amber indicates a failed power supply.
I/O module	I/O module handle	Solid green, I/O module functioning normally; amber indicates a fault condition. Each IO module also has per port LEDs. These are blue on the FC, and SAS I/O modules. They light when the port is active.
Management module	Bicolor LED	Solid green, management module functioning normally; amber indicates the management module requires service.

Available I/O modules

I/O modules may include:

- Quad port Ethernet 10GBase-SR Optical with LC connectors
- Quad port Ethernet 10GBase-CX1 Direct Attach Copper with SPF+ module
- Quad port Ethernet 10GBase-T Copper
- Dual port 16 Gbps Fibre Channel
- Quad port 6 Gbps SAS

I/O module port physical mapping
I/O module ports are numbered starting with 0. When the I/O modules are inserted vertically into the system chassis, port 0 is on the bottom.

I/O module port logical mapping
The numerical port labels on the I/O modules are identified logically in the DD OS software by the following descriptions:

- I/O module type
- I/O module slot
- Alphabetic character corresponding to the physical port number

The following example is based on a four-port Ethernet I/O module installed in slot 1 of the system chassis.

Table 6 Physical to logical port mapping example

Physical port	Logical identifier
0	eth1a

Table 6 Physical to logical port mapping example (continued)

Physical port	Logical identifier
1	eth1b
2	eth1c
3	eth1d

Ethernet I/O modules

A system can have up to a maximum of four Ethernet I/O modules of any type. The four Ethernet I/O module limit applies to any combination of the different types of Ethernet I/O modules. In other words two 10GBaseT and two fiber optic Ethernet I/O modules are allowed. But three of each is not allowed. The available Ethernet I/O modules are listed in the Available I/O modules on page 26.

Fibre Channel (FC) I/O modules

An FC I/O module is a dual-port Fibre Channel module. Up to four FC I/O modules may be installed. The optional virtual tape library (VTL) feature requires at least one FC I/O module. Boost over Fibre Channel is an optional feature and requires at least one FC I/O module. A maximum of four FC I/O modules may be installed in a system using either VTL or the Boost protocol or a combination of both protocols.

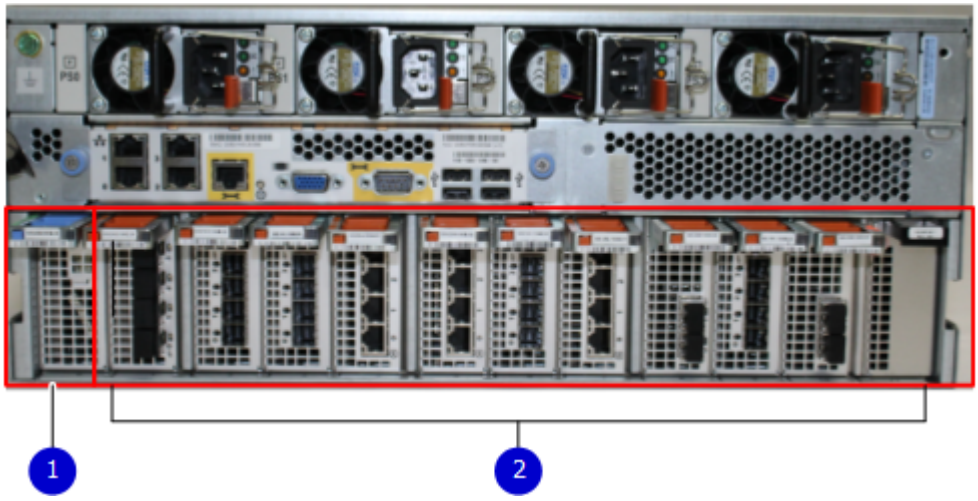
SAS I/O modules

DD9500/DD9800 systems have three quad-port SAS I/O modules installed in slots 2, 3 and 6. DD9500/DD9800 systems configured with DD Extended Retention (ER) or DD Cloud Tier software options require an additional SAS I/O module in slot 9.

I/O module slot assignments

The following figure shows the location of the NVRAM and I/O modules.

Figure 14 Location of NVRAM and I/O modules



1. NVRAM module—slot 0

Figure 14 Location of NVRAM and I/O modules (continued)

2. I/O modules—slots 1 to 11 (See the I/O module slot assignments table.)

Note

Slots 2, 3, and 6 (three I/O slots) are used for SAS I/O modules for systems without Extended Retention (ER).

Note

Slots 2, 3, 6, and 9 (four I/O slots) are for SAS I/O modules for systems with ER or DD Cloud Tier software.

The table shows the I/O module slot assignments for the DD9500 and DD9800 systems. Each type of I/O module is restricted to certain slots.

The I/O module slot assignments for the DD9500 and DD9800 systems are the same.

Table 7 DD9500 and DD9800 I/O module slot assignments

Slot	Base configuration	HA	ER or DD Cloud Tier	DD Cloud Tier and HA
0	NVRAM	NVRAM	NVRAM	NVRAM
1	Fibre Channel (FC), Ethernet or empty	Fibre Channel (FC), Ethernet or empty	Fibre Channel (FC), Ethernet or empty	Fibre Channel (FC), Ethernet or empty
2	SAS	SAS	SAS	SAS
3	SAS	SAS	SAS	SAS
4	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty
5	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty
6	SAS	SAS	SAS	SAS
7	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty
8	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty
9	Not available (contains a filler)	Not available (contains a filler)	SAS	SAS
10	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty	FC, Ethernet or empty
11	FC, Ethernet or empty	10 Gb optical Ethernet for interconnect between the	FC, Ethernet or empty	10 Gb optical Ethernet for interconnect between the

Table 7 DD9500 and DD9800 I/O module slot assignments (continued)

Slot	Base configuration	HA	ER or DD Cloud Tier	DD Cloud Tier and HA
		primary and standby nodes in the HA pair.		primary and standby nodes in the HA pair.

Slot Addition Rules

DD9500 and DD9800 systems have twelve slots for I/O modules. Slots 0, 2, 3, 6, 9, and 11 are reserved for mandatory I/O modules. Slots 1, 4, 5, 7, 8, and 10 support optional host interface I/O modules. The maximum supported number of any type of host interface (Ethernet or FC) I/O module is four.

Note

The maximum number of host interface I/O modules listed above does not include the 10 GbE Optical I/O module for the HA interconnect. The HA interconnect is a fifth Ethernet module, but it is reserved for communication between the two nodes of an HA pair, and is not available for host connections.

The maximum number of I/O modules, including both mandatory and optional I/O modules, supported in a DD9500 or DD9800 system varies by configuration:

- Single node: 10
- HA: 10
- DD Extended Retention: 10
- DD Cloud Tier: 10
- HA + DD Cloud Tier: 11

Three I/O module slots are tied to each CPU in the DD9500 or DD9800 system. When installing I/O modules, balance the load across the CPUs. The following table shows the CPU to slot mappings.

CPU	I/O module slots
0	0, 1, 2
1	3, 4, 5
2	6, 7, 8
3	9, 10, 11

The following table assigns rules for populating the I/O modules.

Table 8 I/O module slot population rules

Step	I/O module type	Slots	Notes
1: Populate mandatory I/O modules	NVRAM	0	
	Quad Port SAS	2	
	Quad Port SAS	3	

Table 8 I/O module slot population rules (continued)

Step	I/O module type	Slots	Notes
	Quad Port SAS	6	
	Quad Port SAS	9	This slot remains empty if the system does not use DD Cloud Tier or DD Extended Retention.
	Quad Port 10GbE Optical	11	This slot remains empty if the system does not use HA.
2: Populate host interface I/O modules	• Quad Port 10GbE SR • Quad Port 10 GBase-T • Dual Port 16 Gbps Fibre Channel	1, 4, 5, 7, 8, 10	Install host interface I/O modules in the remaining slots. Install the I/O modules to balance the load across the CPUs. Do not place two Ethernet or two FC I/O modules on one CPU.[a]

a. HA systems are the exception to this guidance, as a Quad Port 10GbE SR I or Quad Port 10 GBase-T /O module can be added in slot 10 alongside the HA interconnect I/O module in slot 11.

Internal System Components

The storage processor (SP) is a subassembly within the chassis that contains the memory risers with the DIMMs and a fan tray with fan modules. The SP module also contains the 4 CPUs, which cannot be removed or replaced.

- The memory risers tray, which contains 8 memory risers with DIMMs, can be accessed from the front of the SP module. The memory risers are not hot swappable
- The fan tray, which contains 8 fan modules, can be accessed from the front of the SP module. The fans are hot swappable.

The DIMMS can be accessed by pulling the entire SP module away from the chassis. Depending on the model, there are DIMMs totaling:

- 256 GB or 512 GB for a DD9500 system.
- 256 GB or 768 GB for a DD9800 system.

The figures show the location of the SP module, the DIMM risers accessed from a partly removed SP module, and the fan tray partly removed.

Do not lift the DD9500/DD9800 system, or the storage processor (SP) module, or any modules by the handle. The handle is not designed to support the weight of the populated shelf. Also do not carry the DD9500/DD9800 system or the SP by the handle. The handles are only intended to be used to insert or remove the SP module.

Figure 15 SP module

Figure 16 Releasing a memory riser

1. Left riser card ejector handle
2. Release button
3. Right riser card ejector handle

Figure 17 Open fan tray

Note

Do not loosen the blue thumbscrew on the SP latch handle to access the fan tray. Use the orange thumbscrews on the front as shown in the picture.

1. Left fan tray thumbscrew
2. Front panel left handle
3. Front panel right handle
4. Right fan tray thumbscrew
5. Location map of the fans

DIMM Modules

DD9500/DD9800 systems contain the following memory configurations:

Table 9 DD9500/DD9800 memory configurations

System	Base	Expanded	ER/DD Cloud Tier
DD9500	32 x 8 GB DIMMs (256 GB)	32 x 8 GB DIMMs + 16 x 16 GB DIMMs (512 GB)	32 x 8 GB DIMMs + 16 x 16 GB DIMMs (512 GB)
DD9800	32 x 8 GB DIMMs (256 GB)	32 x 8 GB DIMMs + 32 x 16 GB DIMMS (768 GB)	32 x 8 GB DIMMs + 32 x 16 GB DIMMS (768 GB)

Cooling Fans

A system contains 8 hot-swappable cooling fans in a 7+1 redundant configuration, located in the front of the system within a movable fan tray. The fans provide cooling for the processors, DIMMs, and I/O modules. Each fan has an LED which glows amber when the fan is failed or faulted. A system can run with one fan faulted.

Storage capacity

The table lists the capacities of the systems. Data Domain system internal indexes and other product components use variable amounts of storage, depending on the type of data and the sizes of files. If you send different data sets to otherwise identical systems, one system may, over time, have room for more or less actual backup data than another.

Note

Data Domain system commands compute and display amounts of disk space or data as decimal multiples of certain powers of two (2^{10}, 2^{20}, 2^{30}, and so forth). For example, 7 GiB of disk space = 7 x 2^{30} bytes = 7 x 1,073,741,824 bytes. Data Domain refers to this process as Base 2 calculation.

Table 10 DD9500/DD9800 storage capacity

System/ Installed Memory	Internal Disks	Raw Storage (Base 10)	Data Storage Space (Base 2 Calculation)	Data Storage Space (Base 10 Calculation)
DD9500 (3 SAS I/O modules) 256 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	540 TB (external)	392.9 TiB	432 TB
DD9500 (3 SAS I/O modules) 512 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	1,080 TB (external)	786.8 TiB	864 TB
DD9500 with DD Cloud Tier software (4 SAS I/O modules) 512 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	3,240 TB (external)	2360.4 TiB	2592 TB
DD9500 with Extended Retention (ER) software (4 SAS I/O modules) 512 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	2,160 TB (external)	1573.6 TiB	1728 TB
DD9800 (3 SAS I/O modules) 256 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	630 TB (external)	457.8 TiB	504 TB

Table 10 DD9500/DD9800 storage capacity (continued)

System/ Installed Memory	Internal Disks	Raw Storage (Base 10)	Data Storage Space (Base 2 Calculation)	Data Storage Space (Base 10 Calculation)
DD9800 (3 SAS I/O modules) 768 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	1,260 TB (external)	915.6 TiB	1,008 TB
DD9800 with DD Cloud Tier (4 SAS I/O modules) 768 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	3,780 TB (external)	2746.8 TiB	3.024 TB
DD9800 with ER (4 SAS I/O modules) 768 GB	2.5 in.; 4 x 400 GB SATA SSD No User Data	2,520 TB (external)	1,831.2 TiB	2,016 TB

DD9800

Note

For information about Data Domain expansion shelves and guidelines on using a mixture of shelves, see the *Data Domain ES30 Expansion Shelf Hardware Guide* and *Data Domain DS60 Expansion Shelf Hardware Guide*.

Table 11 DD9500/DD9800 with ES30 SAS shelves

	DD9500	DD9500	DD9800	DD9800
Memory (GB)	256	512	256	768
SAS I/O modules x ports per module	3x4	3x4	3x4	3x4
ES30 support (TB)	SAS 30, 45, 60	SAS 30, 45, 60	SAS 30, 45, 60	SAS 30, 45, 60
Maximum shelves per set	5	5	5	5
Maximum number of sets	6	6	6	6

Note

ES30 SATA shelves are supported when upgrading from an older Data Domain single node system, but are not supported with HA pairs or new installations.

Table 12 DD9500/DD9800 with DS60 shelves

	DD9500	DD9500	DD9800	DD9800
Memory (GB)	256	512	256	768
SAS I/O modules x ports per module	3x4	3x4	3x4	3x4
DS60 support (TB)	SAS 45, 60	SAS 45, 60	SAS 45, 60	SAS 45, 60
Maximum shelves per set	4	4	4	4
Maximum number of sets	6	6	6	6

CHAPTER 3

Install the System in the Rack

This chapter includes the following topics:

- Unpack the system 38
- Install the rack brackets 38
- Install the DD9500/DD9800 system into a rack 45
- Mount the cable management assembly 47
- Installing the expansion shelves into the racks 49

Unpack the system

1. Remove the accessories and rail mount kit from the shipping packages.
2. Remove the controller and the bezels from the shipping packages.

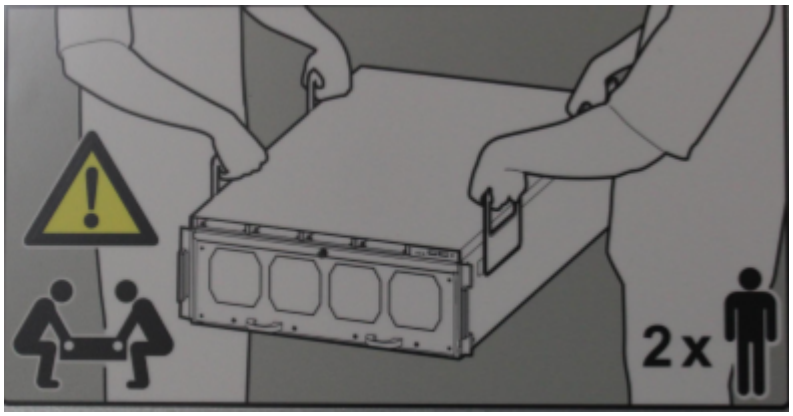
Note

For field installations, the controller has temporary handles pre-fitted at the factory to help in removal of the system from the box and for placing it in a rack. While the controller is being placed in a rack, the handles attached to the chassis can be removed by loosening the thumbscrew on each handle. The handles must be saved for future use.

⚠ CAUTION

Data Domain systems are heavy. Always use two people or a mechanical lift to move a system. The chassis displays warning labels.

Figure 18 Warning about lifting the system



3. Remove expansion shelves and their bezels from the shipping packages.

Install the rack brackets

Data Domain systems are installed into racks using the rail bracket hardware.

Shelf brackets and cable management assembly

The rack mounting kits are compatible with racks that have front-to-rear post spacing between 24 inches and 36 inches. The hardware fits the following types of mounting holes:

- 7.1 mm round holes
- .375 inch / 9.2 mm square holes
- M5, M6, 12-24, and 10-32 threaded holes

The controller rail kit includes the following items:

- Two bracket assemblies, one marked for the left side and one marked for the right side of the rack

Figure 19 Rail bracket inside

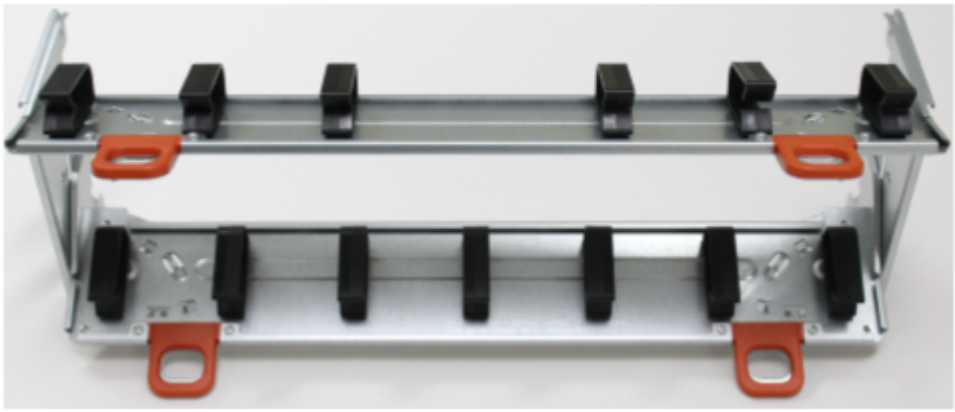
1. Left inside bracket
2. Right inside bracket

Figure 20 Rail bracket outside

1. Left outside bracket
2. Right outside bracket

A cable management assembly (CMA), for organization of cables at the rear of the system, is already installed onto the DD9500/DD9800 system on a Data Domain rack. For field installed systems, the CMA is shipped with the DD9500/DD9800 system.

Figure 21 Cable management assembly (CMA)



Install rail brackets on the Data Domain racks (for square or round hole racks)

Note

- Do not hold the bracket assembly in a vertical position as the parts may separate.
- If you are using a rack with threaded holes, skip this section and go to Install rail brackets using the adapter hardware (for threaded hole racks) on page 43 section.
- The Data Domain system is 4 rack units (RU) tall so make sure the location in the rack fits the product. Attach the bracket assembly to the lowest RU of the 4-RU opening.
- To comply with Data Domain rack mounting guidelines, the system controller should be installed in the pre-defined space in the rack for system controllers. Refer to the *Installation and Setup Guide* for your system.
- For HA systems:
  - Mount node 0 such that the bottom of the chassis aligns with the 13U mark in the rack.
  - Mount node 1 such that the bottom of the chassis aligns with the 18U mark in the rack.

Procedure

1. At each rack post, determine the vertical position in the rack where the brackets are to be installed. The top-most mounting hole for a particular rack unit (RU) mounting position is typically identified by a mark or hole. The bracket will be installed in the bottom hole of the 4 RU opening.

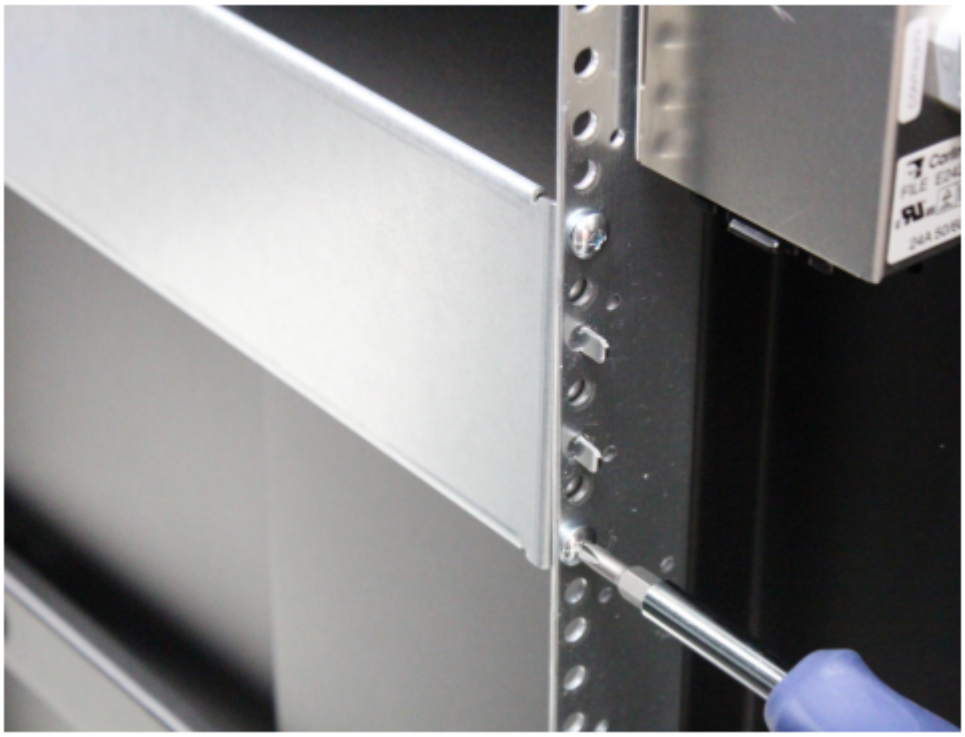
   ⚠ CAUTION

   If the bracket is mounted in holes that are not vertically aligned from front to back, the bracket may be damaged and mounting will not be secure.

2. As needed, select the bracket marked right or left. The rear of the bracket contains an adjustable piece.

3. From the rear of the system, hold the bracket against the inside of the rack posts. Align the rear guide pin and slide the bracket towards the front. The guide pins can help to temporarily hold the rack mount bracket in place. Attach the bracket to the rear of the rack using the furnished screws. There are five screw holes. The picture shows two screws attached to the rear rack post.

Figure 22 Insert screw in the back



⚠ CAUTION

If the bracket is mounted in holes that are not vertically aligned from front to back, the bracket may be damaged and mounting will not be secure.

4. Pull the adjustable sliding part of the bracket towards the front until it is close to, but not touching, the front of the rack.

Figure 23 Insert screw in the front

5. Attach the front of the brackets with two screws each in the two middle holes (innermost holes) as shown in the picture.

Figure 24 Attach bracket to front of rack

6. Verify that the bracket is level.
7. Repeat the steps to attach the remaining bracket to the other side of the rack.
8. After installing both brackets, make sure that they are level with one another.

Install rail brackets using the adapter hardware (for threaded hole racks)

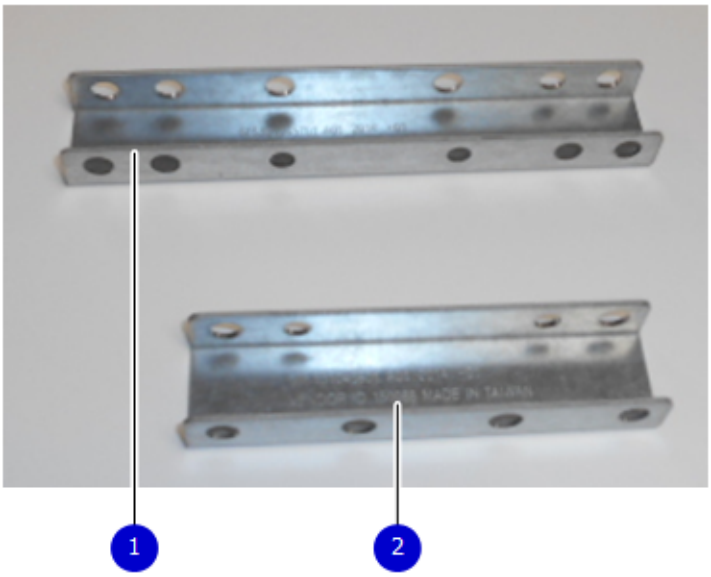
Note

- If you are using a rack with square or round holes, go to Install rail brackets on the Data Domain racks (for square or round hole racks) on page 40 section.
- Only use this procedure if your rack has tapped holes that are M5, M6, 10/32, or 12/24.
- The adapter hardware is shipped in the rack mount kit.
- You will need a long handled screwdriver with a shank diameter less than 7.0 mm and the wrench (included in the kit) to tighten the nuts.

Procedure

1. Locate the two adapters from the rail kit.

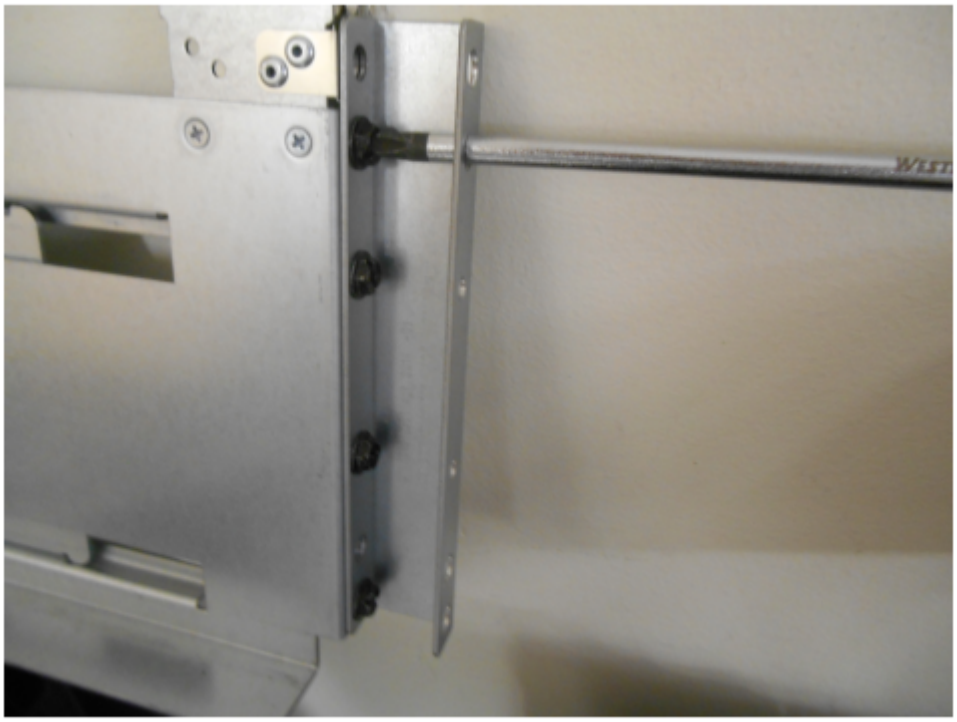
   Figure 25 Adapters

   1. Long adapter
   2. Short adapter

2. Attach the long adapter to the front of each rail using M5 screws.

Figure 26 Attaching the front rail with the screw



3. Attach the small adapter to the rear of each rail using M5 screws.
4. At each rack post, determine the vertical position in the rack where the rails are to be installed. The top-most mounting hole for a particular rack unit (RU) mounting position is typically identified by a mark or hole. Racks may also be screen-printed to show the positions of the rack units.

Note

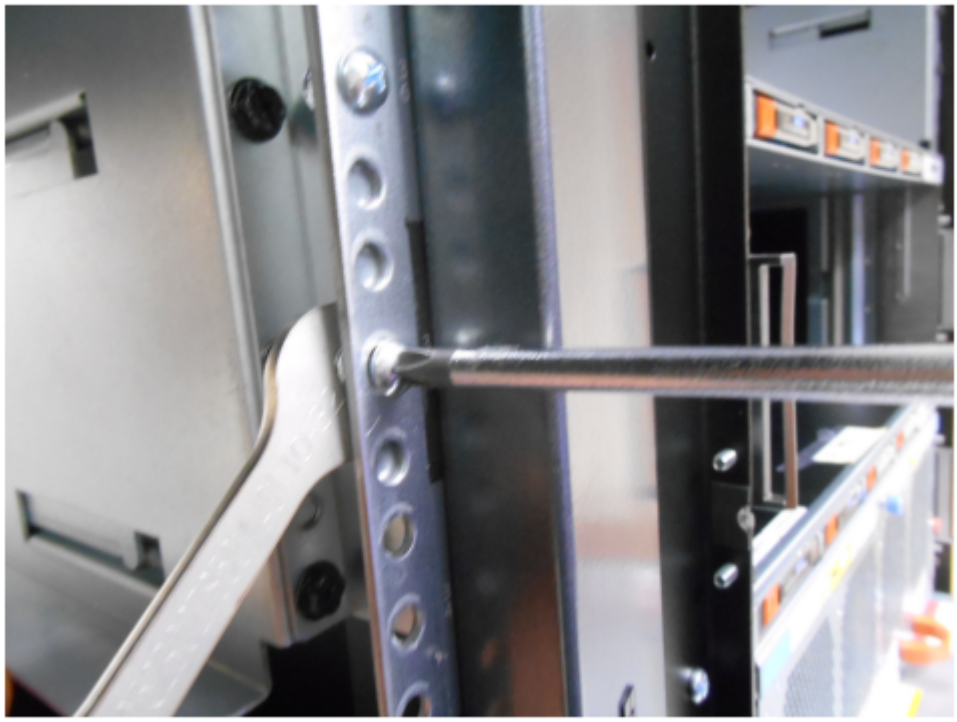
- To comply with Data Domain rack mounting guidelines, the system controller should be installed in the pre-defined space in the rack for system controllers. Refer to the *Installation and Setup Guide* for your system.
- Two people may be required to attach the rail/bracket assembly to the rack.

---

5. Install the screws supplied in the adapter kit to the rack. For example, the 10-32 threaded hole rack would require the installation of the 10-32 screws. Install the screws in the appropriate locations until they are tight against the rack.
6. As needed, select the bracket marked right or left. Orientation assumes you are facing the front of the rack.
7. Slide the adjustable part of the bracket partly open.
8. Attach the first rail to the rack as follows:
   a. Hold the rail against the inside of the rack with the rear bracket flush with the rear of the rack. Use the screws threaded into the rack to hold the rear of the rail kit in place.
   b. Pull the front of the rail until it is flush with the inside of the rack front.
   c. Attach the rails to the rack by installing the appropriate nuts onto the screws threaded into the rack. Use the supplied wrench to tighten the nuts. Do this for the front and rear of the rail kit.

d. Attach the rear of the rail/bracket assembly to the rear of the rack. Secure each screw.

Figure 27 Attach front rail adapter



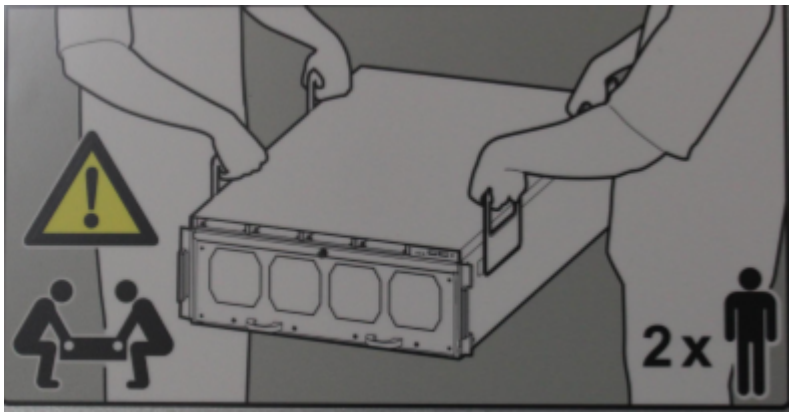
9. Repeat the steps for the second rail.
10. After installing both rails, make sure that they are level with one another.
11. For HA systems, repeat this procedure for the second node.

Install the DD9500/DD9800 system into a rack

⚠ CAUTION

Data Domain systems are heavy. Always use two people or a mechanical lift to move a system. The chassis displays warning signs.

Figure 28 Warning about lifting the system



⚠ CAUTION

- **Do not apply AC power to the DD9500/DD9800 system controller until all expansion shelves and cables are installed.**
- **Make sure the PSNT label, attached to the left rear of the chassis is not damaged or snagged during the installation of the system into the rack.**

Procedure

1. Identify the designated location for the system controller in the rack.
   - The designated location for a single node, or the primary node of an HA pair with ES30 shelves is U13-16 in rack 1.
   - The designated location for the standby node of an HA pair with ES30 shelves is U18-21 in rack 1 (single rack) or U13-16 in rack 2 (multiple racks).
   - The designated location for a single node with DS60 shelves is U23-26 in rack 1.
   - The designated location for the primary node of an HA pair with DS60 shelves is U22-25 in rack 1.
   - The designated location for the standby node of an HA pair with DS60 shelves is U27-30 in rack 1.

   Note

   The designated slots in the rack are the recommended location for the DD9500/DD9800 system to support the cabling described in this document. Other locations may require different cable lengths for some configurations.

2. From the front of the rack, lift the DD9500/DD9800 system using the handles supplied for lifting to install the system in the rack in the correct location.
3. At each side, align the bottom of the chassis with the lip of each installed rack bracket.
4. Carefully slide the chassis into the rack and remove the back handles while supporting the chassis weight. Continue to slide the rest of the chassis and remove the front handles. Finally, push the chassis all the way into the back of the rack.
5. The rear of the chassis should engage with the tabs located in the rear of the rack mount kit.
6. At the front, attach the system to each installed bracket using the screws on the front of the system. The screws are shown in red circles in the photo.

   Note

   On each side of the chassis, a bezel bracket sits between the upper and lower screws that secure the chassis to the rack. The bezel brackets are marked with left and right to denote which side of the chassis to install them on. However, the brackets for each side are not physically different. Inverting the bracket allows it to be used on the other side of the chassis.

Figure 29 System on a rack

7. Check the PSNT label at the rear of the chassis.

Figure 30 Location of serial number tag

8. Repeat these steps to install the second node.

Mount the cable management assembly

A cable management assembly (CMA), for organization of cables at the rear of the system, is already installed onto the DD9500/DD9800 system on a Data Domain rack.

For field installed systems, the CMA is shipped separately.

Note

For non-Data Domain racks, it is acceptable to use the cable management products provided by the rack vendor.

Install the Data Domain cable management assembly (CMA)

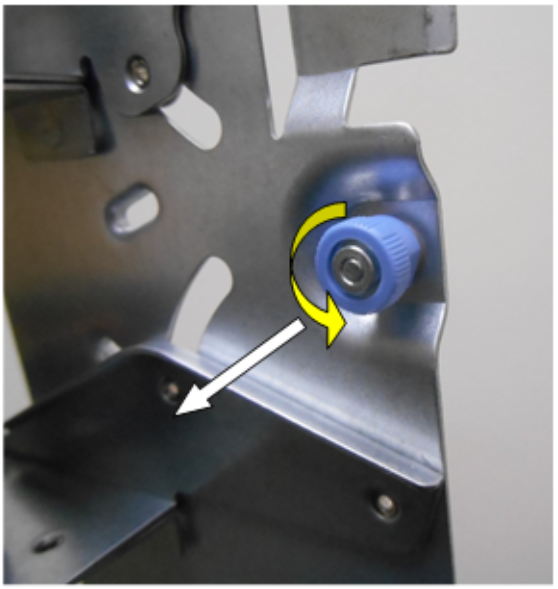
Procedure

1. Take out the cable management assembly (CMA) from its packaging.
2. Locate the two blue knobs (on the left and right sides of the CMA) in the back which you will need to pull away from the side of the CMA brackets to install the CMA in the rack.

Figure 31 Data Domain CMA back

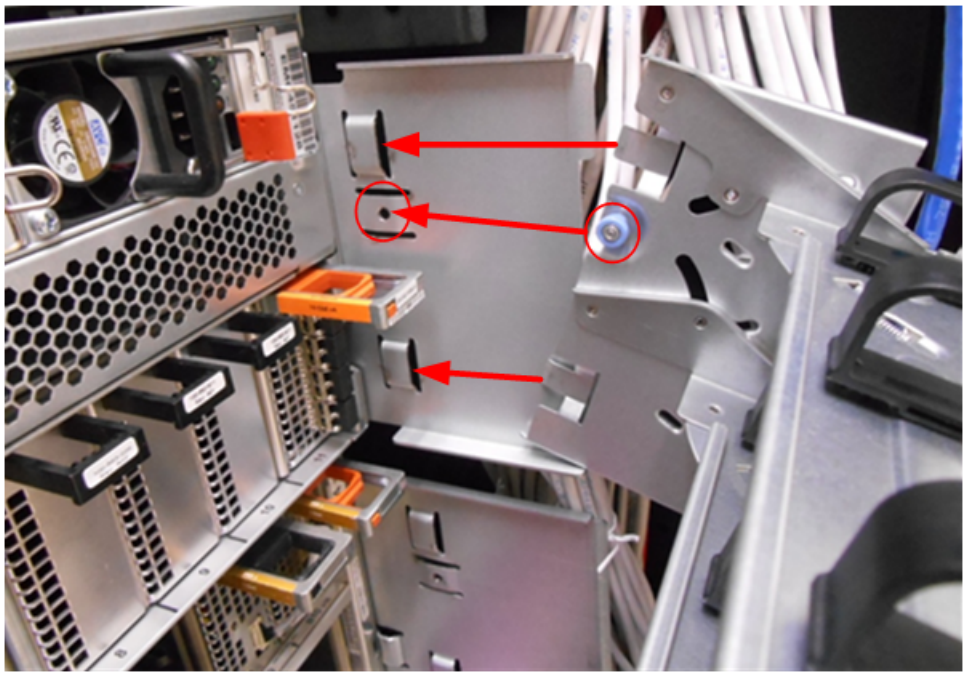
3. Pull the knobs away from the side of the CMA brackets towards the direction of the white arrow (see picture) and turn the blue knobs in the direction of the yellow arrow (on the left and right sides of the CMA) so the tip of the knob is pulled away from the side of the bracket to fit in the rail slot.

Figure 32 Data Domain cable management assembly back inside



4. Locate the slots and the hole in the Data Domain rail to attach the CMA by following the arrows in the picture. Align and insert the CMA tabs in the slots and the blue knob in the hole of the rail bracket on both sides.

Figure 33 Rear of the rack mount rail



5. Insert cable management assembly into rear of rack mount rails.
6. When the cable management assembly is securely installed into the rack mount rails, then rotate the two blue knobs clockwise or counterclockwise to lock the cable management assembly into the rack mount rails.
7. To adjust the CMA position up or down, pull on the orange latches and pull up or down on the arm simultaneously as needed for accessing the power cables.

   Note

   You do not need to remove the CMA to access the I/O modules, the managements module, and the powers supply units for removal and replacement. Just adjust the CMA arms.

8. For HA systems, repeat this procedure to install the CMA for the second node.

Installing the expansion shelves into the racks

⚠ CAUTION

- **Data Domain systems are heavy. Always use two people or a mechanical lift to move and install a Data Domain system. Use caution to install the expansion shelves.**
- **Ensure that each rack is securely anchored to prevent tipping.**

1. From the front of a rack, lift the shelf to the designated rack location.
2. Add shelves to the racks in order, one at a time, from the bottom of a rack to the top filling each string in that rack before going to the next.

Note

Strings in add-on racks may connect to the same string number in other racks.

Shelves are added in the order V1.1, V1.2, V1.3, V1.4, V2.1, V2.2, and so on. Shelves are labeled VN.M. VN refers to string "N" and the "M" is the number of the shelf in the string. For example, V3.2 refers to the second shelf in the third string.

3. Secure each expansion shelf in the rack.
4. When installing an SSD shelf for Data Domain metadata on flash:
   - The SSD shelf counts towards the total number of shelves connected to the system.
   - Data Domain recommends installing the SSD shelf in the V1.1 positon, but if that is not possible, the shelf can be placed in a different location in the rack so long as cables of sufficient length are available.

     Note

     V1.1 is recommended for better performance because this will the 1st hop where data will be written. If the SSD shelf is connected to the last enclosure in a chain, then each read/write request has to go through many hops, which introduces latency issues when compared to when the SSD shelf is on the 1st shelf of a chain.

CHAPTER 4

Connect Cables and Power on

This chapter includes the following topics:

- Connecting the expansion shelves and the controllers 52
- ES30 cable information 52
- Connecting multiple ES30 shelves to the DD9500 /DD9800 system 56
- DS60 cable information 69
- Connecting multiple DS60 shelves to the DD9500 /DD9800 system 70
- Connecting the HA interconnect 81
- Connect data cables on both nodes 82
- Power on the systems 83
- Install the bezel 84

Connecting the expansion shelves and the controllers

Multiple expansion shelves are connected together and to the controller with qualified SAS cables.

Note

You must save any extra SAS cables for future use.

The diagrams in the following sections show recommended cabling and component placement of a system and shelves in the rack(s). The cables that are provided support the controller and shelves in the rack positions as shown in the diagrams.

- Refer to the diagrams in the Connecting multiple ES30 shelves to the DD9500 / DD9800 system on page 56 to connect a DD9500 system.
- Refer to the diagrams in the Connecting multiple DS60 shelves to the DD9500 / DD9800 system on page 70 to connect a DD9500 system.

For more information about specific shelf cabling rules and guidelines for different types of shelves, see:

- *Data Domain ES30 and FS15 Expansion Shelf Hardware Guide*
- *Data Domain DS60 Expansion Shelf Hardware Guide*

ES30 cable information

The cable end that connects to an ES30 from node 0 has a mini-SAS connector with a ● port.

The cable end that connects to an ES30 from node 1 has a mini-SAS connector with a ◆ port.

Cables between ES30s have mini-SAS connectors on both ends.

Figure 34 Node 0 SAS I/O module to ES30 host port connector

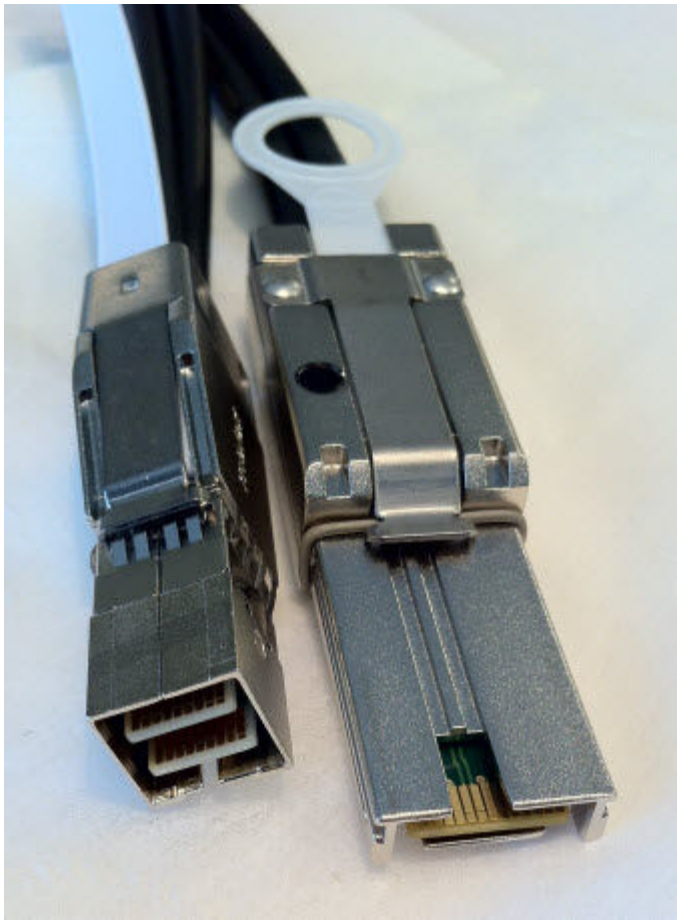


Table 13 Cables for node 0 to ES30 shelf loop

HD-mini-SAS connector on controller, SFF-8088 connector keyed for host port on ES30		
Cable model code	**Part number**	**Cable length**
X-SAS-HDMS2	038-003-810	2 m (79 in)
X-SAS-HDMS3	038-003-811	3 m (118 in)
X-SAS-HDMS5	038-003-813	5 m (196 in)

Figure 35 Node 1 SAS I/O module to ES30 expansion port connector

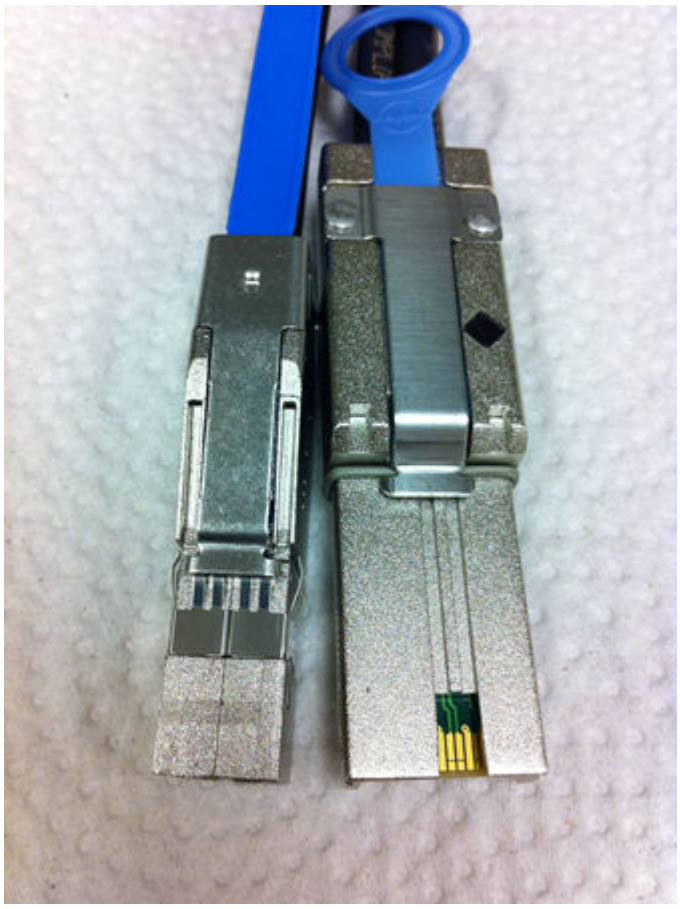


Table 14 Cables for node 1 to ES30 shelf loop

HD-mini-SAS connector on controller, SFF-8088 connector keyed for expansion port on ES30		
Cable model	**Part number**	**Cable length**
X-HA-ES30-SAS-2	038-004-108	2 m (79 in)
X-HA-ES30-SAS-5	038-004-111	5 m (196 in)

Figure 36 Cables for ES30 to ES30 connections

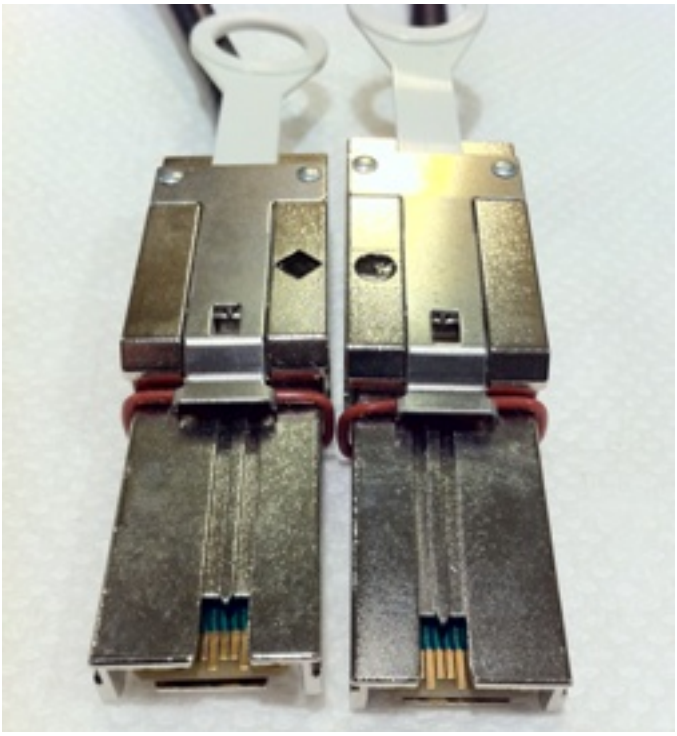


Table 15 ES30 to ES30 cable options

Mini-SAS cable, SFF-8088 connectors on both ends, one end keyed for host ports and the other keyed for expansion ports		
Cable model	**Part number**	**Cable length**
X-SAS-MSMS1	038-003-786	1 m (39 in.)
X-SAS-MSMS2	038-003-787	2 m (79 in.)
X-SAS-MSMS3	038-003-751	3 m (118 in.)
X-SAS-MSMS4	038-003-628	4 m (158 in.)
X-SAS-MSMS5	038-003-666	5 m (196 in.)

Connecting multiple ES30 shelves to the DD9500 /DD9800 system

The cabling diagrams in this section show the maximum configurations for the DD9500 and DD9800 systems. Not all systems will have all the disk shelves shown in the diagrams.

Add shelf-to-shelf cables between shelves in a loop and to the controller as shown in the diagrams.

1. Cable from the B Controller EXPANSION ◆ port of the lower shelf to the B controller HOST ● port of the next higher shelf.
2. Then cable from the A Controller HOST ● port of lower shelf to the A controller EXPANSION ◆ port of the next higher shelf
3. There are no specific placement or cabling requirements for SSD shelves, or the metadata shelves for DD Cloud Tier configurations. These shelves can be installed and cabled the same way as standard ES30 shelves.
4. The SSD shelf counts towards the total number of shelves connected to the system.
5. Data Domain recommends installing the SSD shelf in the V1.1 positon, but if that is not possible, the shelf can be placed in a different location in the rack so long as cables of sufficient length are available.

   Note

   V1.1 is recommended for better performance because this will the 1st hop where data will be written. If the SSD shelf is connected to the last enclosure in a chain, then each read/write request has to go through many hops, which introduces latency issues when compared to when the SSD shelf is on the 1st shelf of a chain.
6. Use the cable management assembly to support and organize all cables from the DD9500/DD9800 system.

Select the appropriate configuration from the following list, and connect the disk shelves to the Data Domain controller.

- DD9500 /DD9800 on page 56
- DD9500 /DD9800 with HA (one rack) on page 58
- DD9500 /DD9800 with HA (two racks) on page 60
- DD9500 /DD9800 with DD Cloud Tier (Single node or HA) on page 63
- DD9500 /DD9800 with ERSO on page 66

DD9500 /DD9800

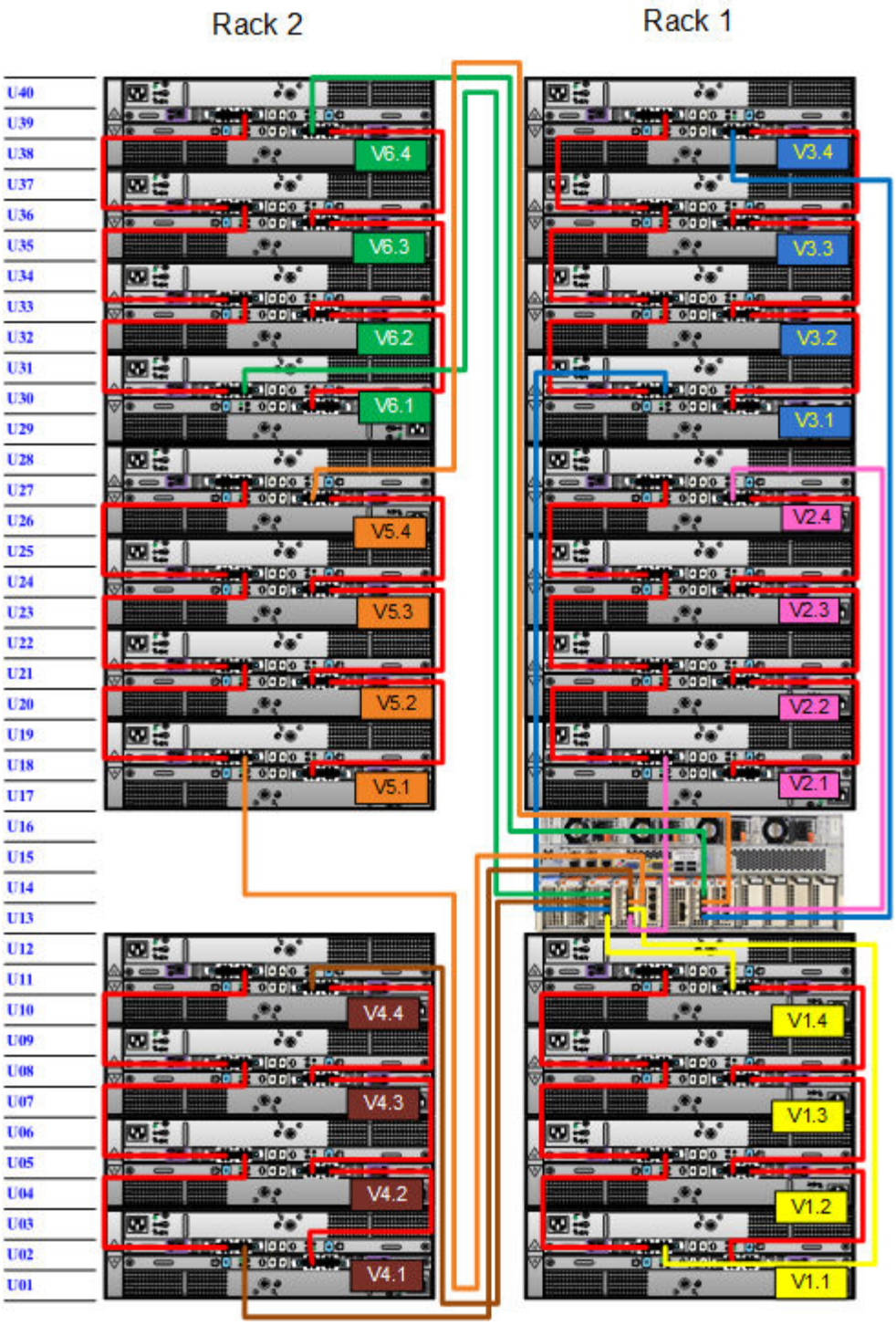
For a base DD9500 /DD9800 system:

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	B controller HOST ● port of shelf V1.1	2M

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 2 - Port 0	A controller HOST ● port of the highest number shelf in V1	2M
2	I/O 3 - Port 0	B controller HOST ● port of shelf V2.1	2M
2	I/O 6 - Port 1	A controller HOST ● port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	B controller HOST ● port of shelf V3.1	2M
3	I/O 6 - Port 0	A controller HOST ● port of the highest number shelf in V3	2M
4	I/O 3 - Port 3	B controller HOST ● port of shelf V4.1	3M
4	I/O 2 - Port 2	A controller HOST ● port of the highest number shelf in V4	3M
5	I/O 3 - Port 2	B controller HOST ● port of shelf V5.1	3M
5	I/O 6 - Port 2	A controller HOST ● port of the highest number shelf in V5	3M
6	I/O 2 - Port 3	B controller HOST ● port of shelf V6.1	3M
6	I/O 6 - Port 3	A controller HOST ● port of the highest number shelf in V6	3M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 37 Cabling for base DD9500 /DD9800 systems



DD9500 /DD9800 with HA (one rack)

For an HA DD9500 /DD9800 pair in one rack:

Table 16 Primary node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	B controller HOST ● port of shelf V1.1	2M
1	I/O 2 - Port 0	A controller HOST ● port of the highest number shelf in V1	2M
2	I/O 3 - Port 0	B controller HOST ● port of shelf V2.1	2M
2	I/O 6 - Port 1	A controller HOST ● port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	B controller HOST ● port of shelf V3.1	2M
3	I/O 6 - Port 0	A controller HOST ● port of the highest number shelf in V3	2M

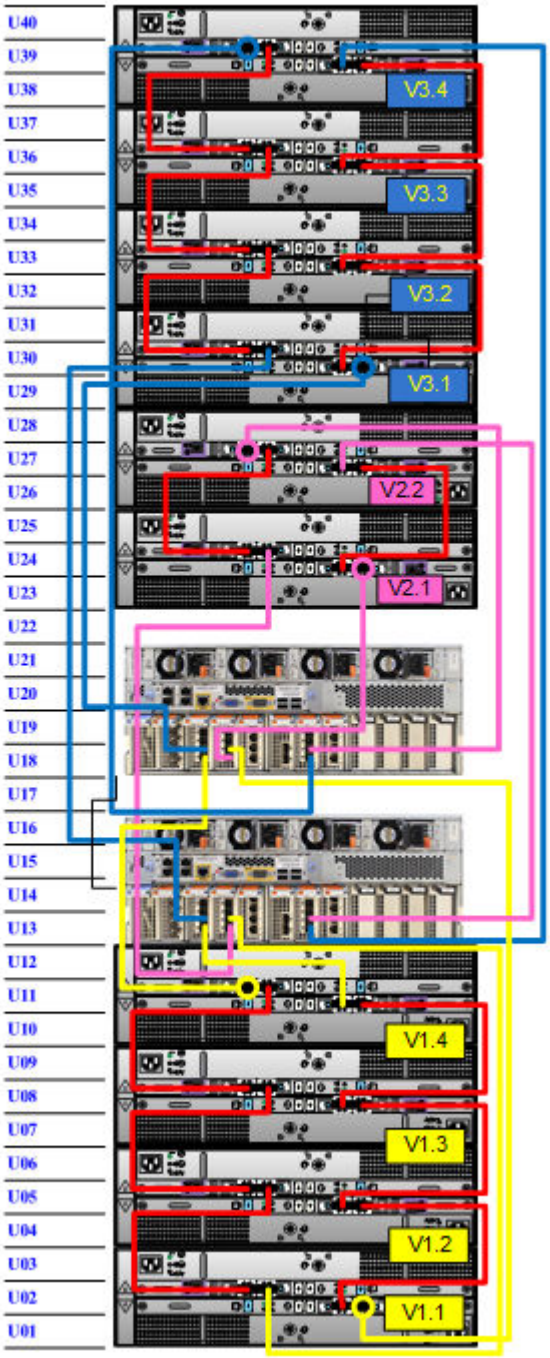
a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Table 17 Standby node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	A controller EXPANSION ◆ port of shelf V1.1	2M
1	I/O 2 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller EXPANSION ◆ port of shelf V2.1	2M
2	I/O 6 - Port 1	B controller EXPANSION ◆ port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	A controller EXPANSION ◆ port of shelf V3.1	2M
3	I/O 6 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V3	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 38 Cabling for HA DD9500 /DD9800 systems in one rack



DD9500 /DD9800 with HA (two racks)

For an HA DD9500 /DD9800 pair in two racks:

Table 18 Primary node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	B controller HOST ● port of shelf V1.1	2M
1	I/O 2 - Port 0	A controller HOST ● port of the highest number shelf in V1	2M
2	I/O 3 - Port 0	B controller HOST ● port of shelf V2.1	2M
2	I/O 6 - Port 1	A controller HOST ● port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	B controller HOST ● port of shelf V3.1	2M
3	I/O 6 - Port 0	A controller HOST ● port of the highest number shelf in V3	2M
4	I/O 3 - Port 3	B controller HOST ● port of shelf V4.1	3M
4	I/O 2 - Port 2	A controller HOST ● port of the highest number shelf in 43	3M
5	I/O 3 - Port 2	B controller HOST ● port of shelf V5.1	3M
5	I/O 6 - Port 2	A controller HOST ● port of the highest number shelf in V5	3M
6	I/O 2 - Port 3	B controller HOST ● port of shelf V6.1	3M
6	I/O 6 - Port 3	A controller HOST ● port of the highest number shelf in V6	3M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Table 19 Standby node cabling instructions

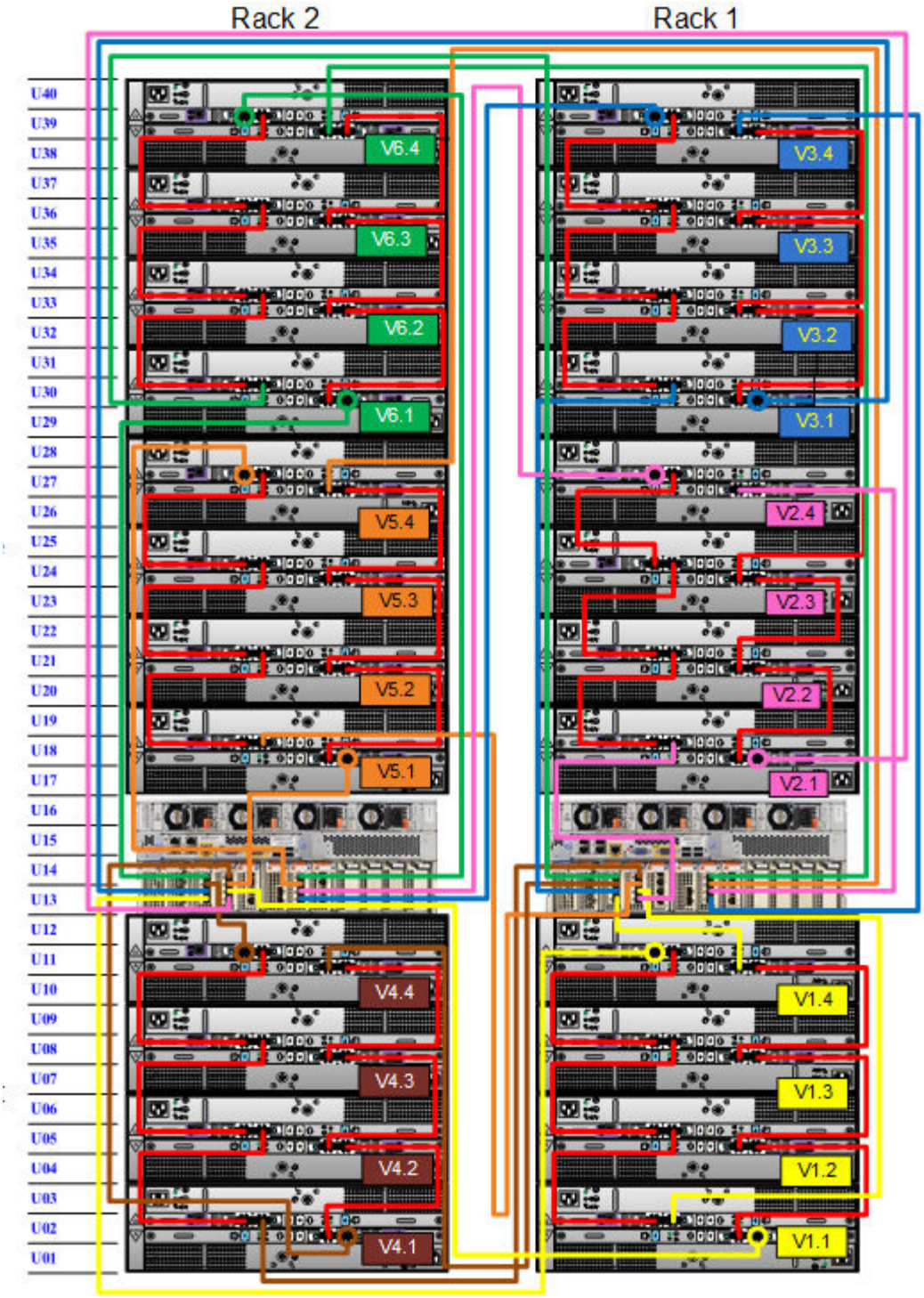
String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	A controller EXPANSION ◆ port of shelf V1.1	2M
1	I/O 2 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller EXPANSION ◆ port of shelf V2.1	2M
2	I/O 6 - Port 1	B controller EXPANSION ◆ port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	A controller EXPANSION ◆ port of shelf V3.1	2M

Table 19 Standby node cabling instructions (continued)

String (Loop)	I/O - Port	Shelf Port	Length [a]
3	I/O 6 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V3	2M
4	I/O 3 - Port 3	A controller EXPANSION ◆ port of shelf V4.1	3M
4	I/O 2 - Port 2	B controller EXPANSION ◆ port of the highest number shelf in V4	3M
5	I/O 3 - Port 2	A controller EXPANSION ◆ port of shelf V5.1	3M
5	I/O 6 - Port 2	B controller EXPANSION ◆ port of the highest number shelf in V5	3M
6	I/O 2 - Port 3	A controller EXPANSION ◆ port of shelf V6.1	3M
6	I/O 6 - Port 3	B controller EXPANSION ◆ port of the highest number shelf in V6	3M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 39 Cabling for HA DD9500 /DD9800 systems in two racks



DD9500 /DD9800 with DD Cloud Tier (Single node or HA)

For a DD9500 /DD9800 system with DD Cloud Tier (Single node or HA):

Table 20 Primary node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	B controller HOST ● port of shelf V1.1	2M
1	I/O 2 - Port 0	A controller HOST ● port of the highest number shelf in V1	3M
2	I/O 3 - Port 0	B controller HOST ● port of shelf V2.1	2M
2	I/O 9 - Port 1	A controller HOST ● port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	B controller HOST ● port of shelf V3.1	2M
3	I/O 6 - Port 0	A controller HOST ● port of the highest number shelf in V3	2M
4	I/O 3 - Port 3	B controller HOST ● port of shelf V4.1	3M
4	I/O 2 - Port 2	A controller HOST ● port of the highest number shelf in V4	3M
5	I/O 3 - Port 2	B controller HOST ● port of shelf V5.1	3M
5	I/O 9 - Port 2	A controller HOST ● port of the highest number shelf in V5	3M
6	I/O 2 - Port 3	B controller HOST ● port of shelf V6.1	3M
6	I/O 6 - Port 3	A controller HOST ● port of the highest number shelf in V6	3M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Table 21 Standby node cabling instructions

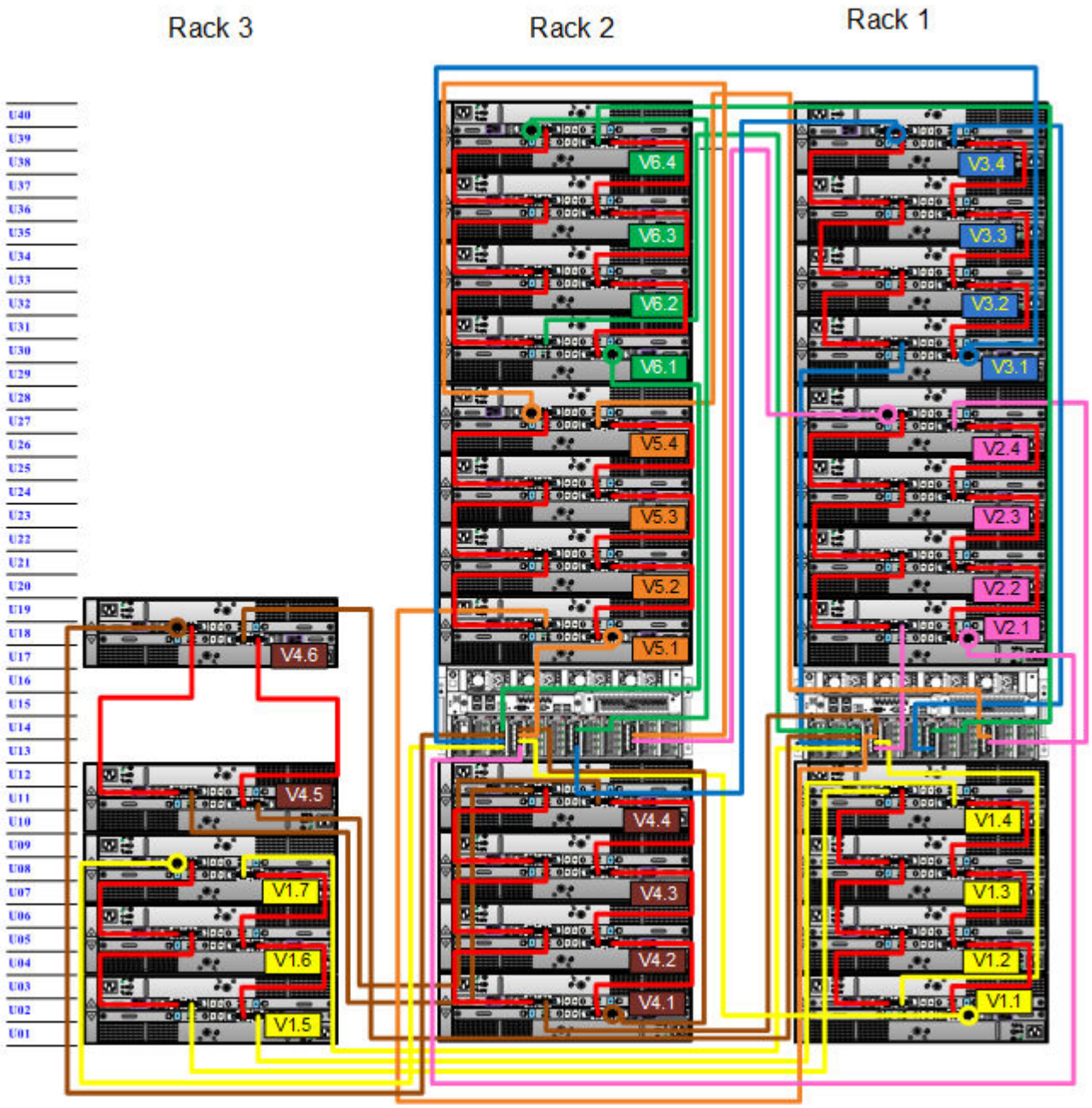
String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	A controller EXPANSION ◆ port of shelf V1.1	2M
1	I/O 2 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V1	3M
2	I/O 3 - Port 0	A controller EXPANSION ◆ port of shelf V2.1	2M
2	I/O 9 - Port 1	B controller EXPANSION ◆ port of the highest number shelf in V2	2M
3	I/O 2 - Port 1	A controller EXPANSION ◆ port of shelf V3.1	2M

Table 21 Standby node cabling instructions (continued)

String (Loop)	I/O - Port	Shelf Port	Length [a]
3	I/O 6 - Port 0	B controller EXPANSION ◆ port of the highest number shelf in V3	2M
4	I/O 3 - Port 3	A controller EXPANSION ◆ port of shelf V4.1	3M
4	I/O 2 - Port 2	B controller EXPANSION ◆ port of the highest number shelf in V4	3M
5	I/O 3 - Port 2	A controller EXPANSION ◆ port of shelf V5.1	3M
5	I/O 9 - Port 2	B controller EXPANSION ◆ port of the highest number shelf in V5	3M
6	I/O 2 - Port 3	A controller EXPANSION ◆ port of shelf V6.1	3M
6	I/O 6 - Port 3	B controller EXPANSION ◆ port of the highest number shelf in V6	3M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 40 Cabling for DD9500 /DD9800 systems with DD Cloud Tier (Single node or HA)



DD9500 /DD9800 with ERSO

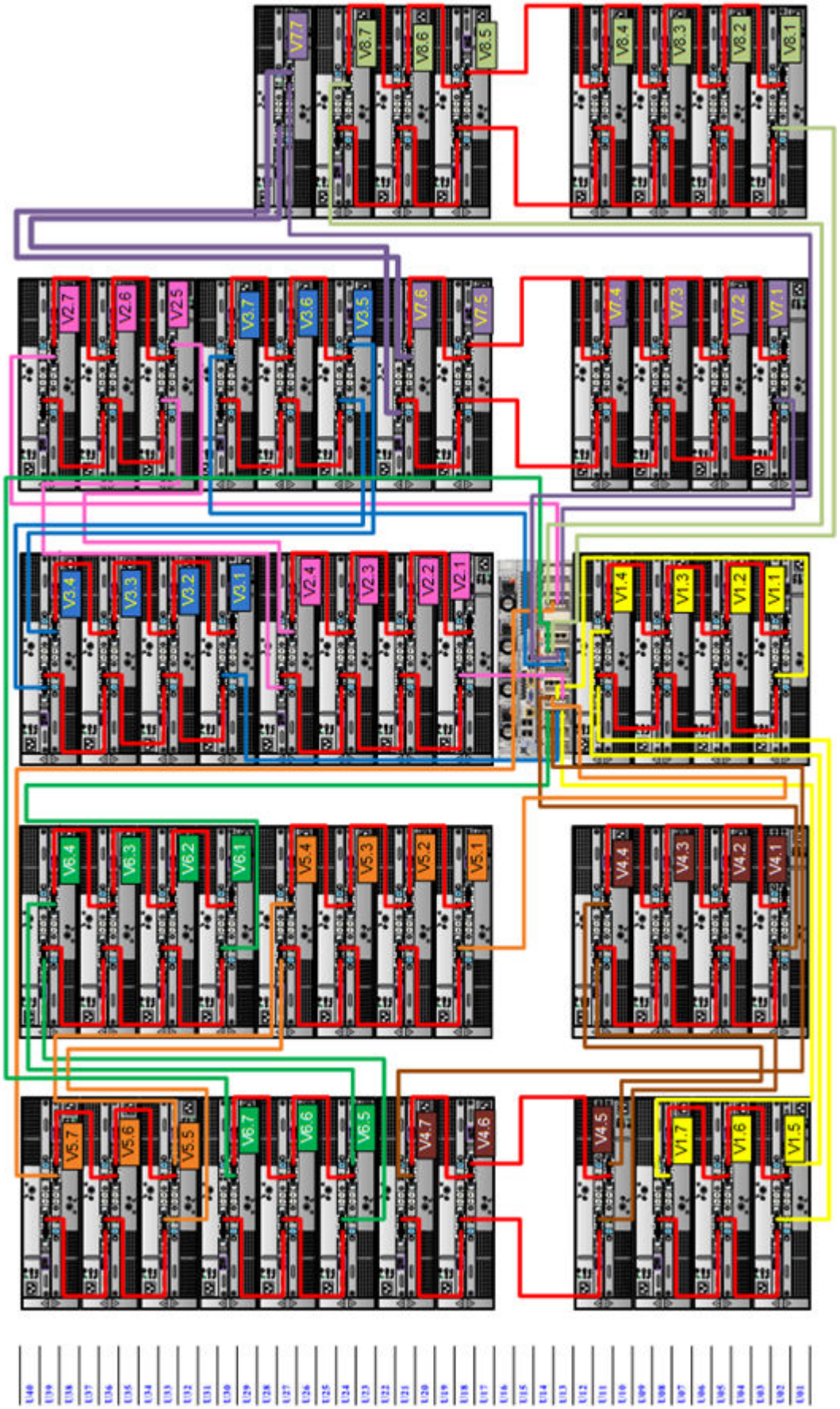
For a DD9500 /DD9800 system with ERSO:

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 3 - Port 1	B controller HOST ● port of shelf V1.1	2M
1	I/O 2 - Port 0	A controller HOST ● port of the highest number shelf in V1	5M

String (Loop)	I/O - Port	Shelf Port	Length [a]
2	I/O 3 - Port 0	B controller HOST ● port of shelf V2.1	2M
2	I/O 9 - Port 1	A controller HOST ● port of the highest number shelf in V2	3M
3	I/O 2 - Port 1	B controller HOST ● port of shelf V3.1	2M
3	I/O 6 - Port 0	A controller HOST ● port of the highest number shelf in V3	3M
4	I/O 3 - Port 3	B controller HOST ● port of shelf V4.1	3M
4	I/O 2 - Port 2	A controller HOST ● port of the highest number shelf in 43	5M
5	I/O 3 - Port 2	B controller HOST ● port of shelf V5.1	3M
5	I/O 9 - Port 2	A controller HOST ● port of the highest number shelf in V5	5M
6	I/O 2 - Port 3	B controller HOST ● port of shelf V6.1	3M
6	I/O 6 - Port 3	A controller HOST ● port of the highest number shelf in V6	5M
7	I/O 9 - Port 0	B controller HOST ● port of shelf V7.1	3M
7	I/O 6 - Port 1	A controller HOST ● port of the highest number shelf in V7	5M
8	I/O 6 - Port 2	B controller HOST ● port of shelf V8.1	5M
8	I/O 9 - Port 3	A controller HOST ● port of the highest number shelf in V8	5M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 41 Cabling for DD9500 /DD9800 systems with ERSO



DS60 cable information

The primary and secondary nodes use the same cable type to connect to DS60 disk shelves.

Figure 42 SAS I/O module to DS60 connector

Table 22 Cables for node 0 and node 1 to DS60 shelf loop

HD-mini-SAS connector on controller and enclosure		
Cable model code	**Part number**	**Cable length**
XC-DS60-SAS-3M	038-004-380-01	3 m (118 in)
XC-DS60-SAS-4M	038-000-212-00	4 m (158 in)
XC-DS60-SAS-5M	038-000-214-00	5 m (196 in)

Connecting multiple DS60 shelves to the DD9500 /DD9800 system

The cabling diagrams in this section show the maximum configurations for the DD9500 and DD9800 systems. Not all systems will have all the disk shelves shown in the diagrams.

Some of the DS60 configurations described in the following sections also include ES30 shelves for DD Cloud Tier metadata, or FS15 shelves for Metadata on flash.

Add shelf-to-shelf cables between shelves in a loop and to the controller as shown in the diagrams.

1. The recommended cabling for DD9500/DD9800 systems with HA utilizes a maximum of three loops.
2. There are no specific placement or cabling requirements for SSD shelves, or the metadata shelves for DD Cloud Tier configurations. These shelves can be installed and cabled the same way as standard ES30 shelves.
3. The SSD shelf counts towards the total number of shelves connected to the system.
4. Data Domain recommends installing the SSD shelf in the V1.1 positon, but if that is not possible, the shelf can be placed in a different location in the rack so long as cables of sufficient length are available.

   Note

   V1.1 is recommended for better performance because this will the 1st hop where data will be written. If the SSD shelf is connected to the last enclosure in a chain, then each read/write request has to go through many hops, which introduces latency issues when compared to when the SSD shelf is on the 1st shelf of a chain.
5. Use the cable management assembly to support and organize all cables from the DD9500/DD9800 system.

Select the appropriate configuration from the following list, and connect the disk shelves to the Data Domain controller.

- DD9500 /DD9800 on page 70
- DD9500 /DD9800 with HA on page 73
- DD9500 and DD9800 with DD Cloud Tier (Single node) on page 75
- DD9500 and DD9800 with DD Cloud Tier (HA) on page 76
- DD9500 and DD9800 with ERSO on page 80

DD9500 /DD9800

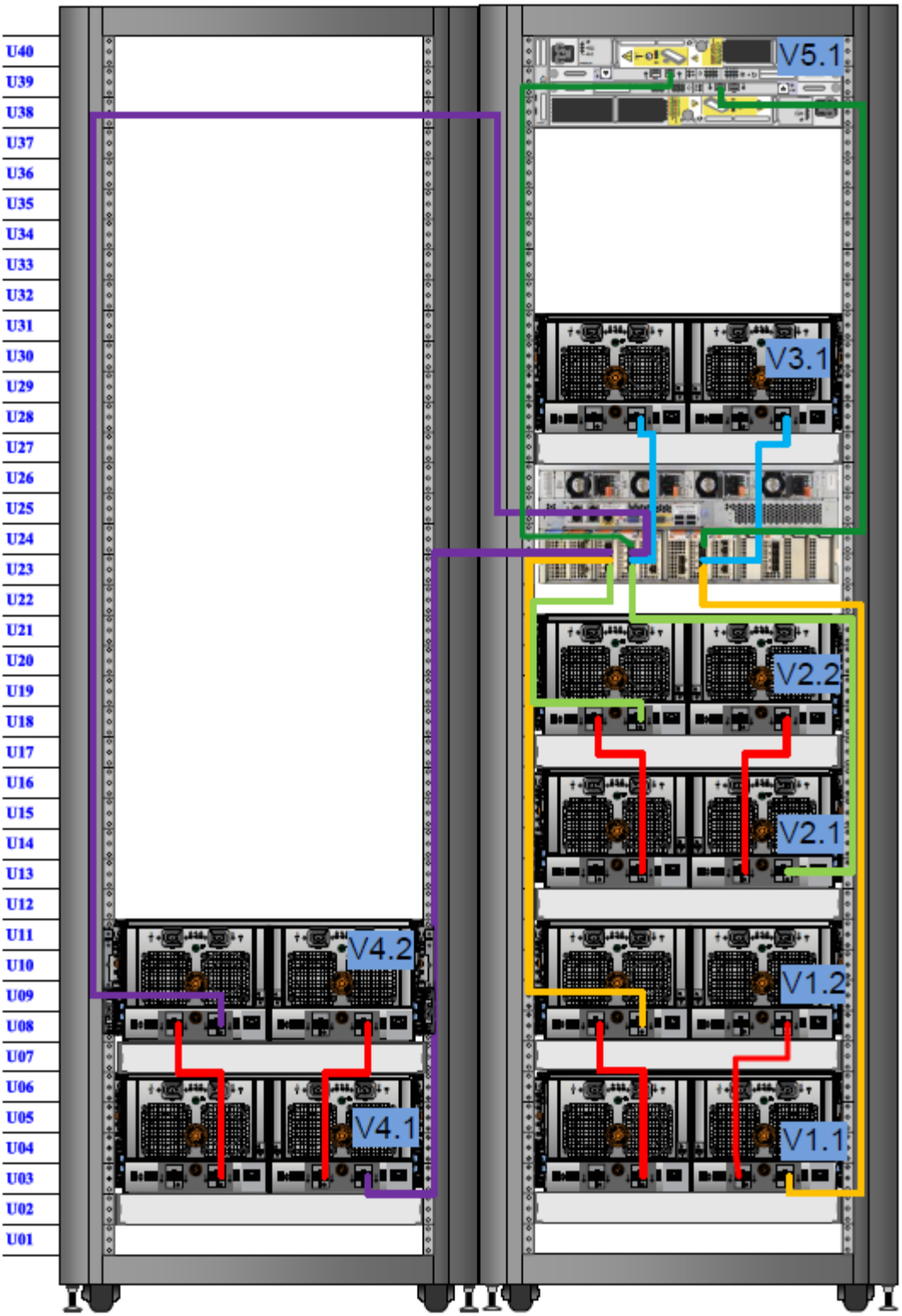
For a base DD9500 /DD9800 system:

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	A controller port 0 of shelf V1.1	2M
1	I/O 2 - Port 1	B controller port 0 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller port 0 of shelf V2.1	2M

String (Loop)	I/O - Port	Shelf Port	Length [a]
2	I/O 2 - Port 0	B controller port 0 of the highest number shelf in V2	2M
3	I/O 6 - Port 1	A controller port 0 of shelf V3.1	2M
3	I/O 3 - Port 1	B controller port 0 of the highest number shelf in V3	2M
4	I/O 2 - Port 2	A controller port 0 of shelf V4.1	2M
4	I/O 3 - Port 2	B controller port 0 of the highest number shelf in V4	5M
5	I/O 6 - Port 3	A controller HOST ● port of the SSD shelf	2M
5	I/O 3 - Port 3	B controller HOST ● port of the SSD shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 43 Cabling for base DD9500 and DD9800 systems



DD9500 /DD9800 with HA

For an HA DD9500 /DD9800 pair:

Table 23 Primary node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	A controller port 0 of shelf V1.1	2M
1	I/O 2 - Port 1	B controller port 0 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller port 0 of shelf V2.1	2M
2	I/O 2 - Port 0	B controller port 0 of the highest number shelf in V2	2M
3	I/O 2 - Port 2	A controller port 0 of shelf V3.1	5M
3	I/O 3 - Port 2	B controller port 0 of the highest number shelf in V3	5M
4	I/O 2 - Port 3	A controller port 0 of shelf V4.1	5M
4	I/O 6 - Port 1	B controller port 0 of the highest number shelf in V4	5M
5	I/O 6 - Port 3	A controller HOST ● port of the SSD shelf	2M
5	I/O 3 - Port 3	B controller HOST ● port of the SSD shelf	2M

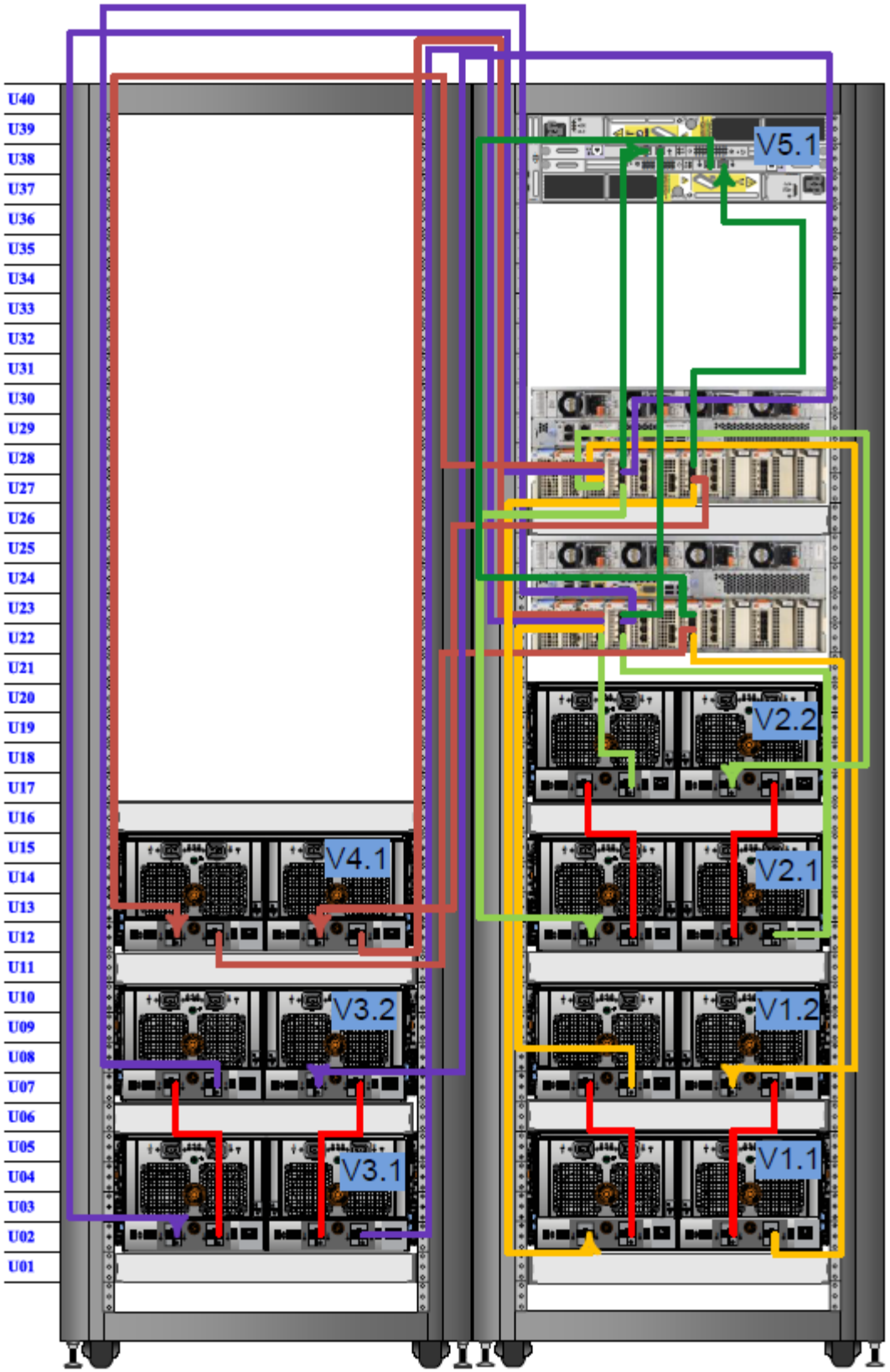
a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Table 24 Standby node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	B controller port 2 of shelf V1.1	2M
1	I/O 2 - Port 1	A controller port 2 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	B controller port 2 of shelf V2.1	2M
2	I/O 2 - Port 0	A controller port 2 of the highest number shelf in V2	2M
3	I/O 2 - Port 2	B controller port 2 of shelf V3.1	5M
3	I/O 3 - Port 2	A controller port 2 of the highest number shelf in V3	5M
4	I/O 2 - Port 3	B controller port 2 of shelf V4.1	5M
4	I/O 6 - Port 1	A controller port 2 of the highest number shelf in V4	5M
5	I/O 6 - Port 3	A controller EXPANSION ◆ port of the SSD shelf	2M
5	I/O 3 - Port 3	B controller EXPANSION ◆ port of the SSD shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 44 Cabling for HA DD9500 and DD9800systems



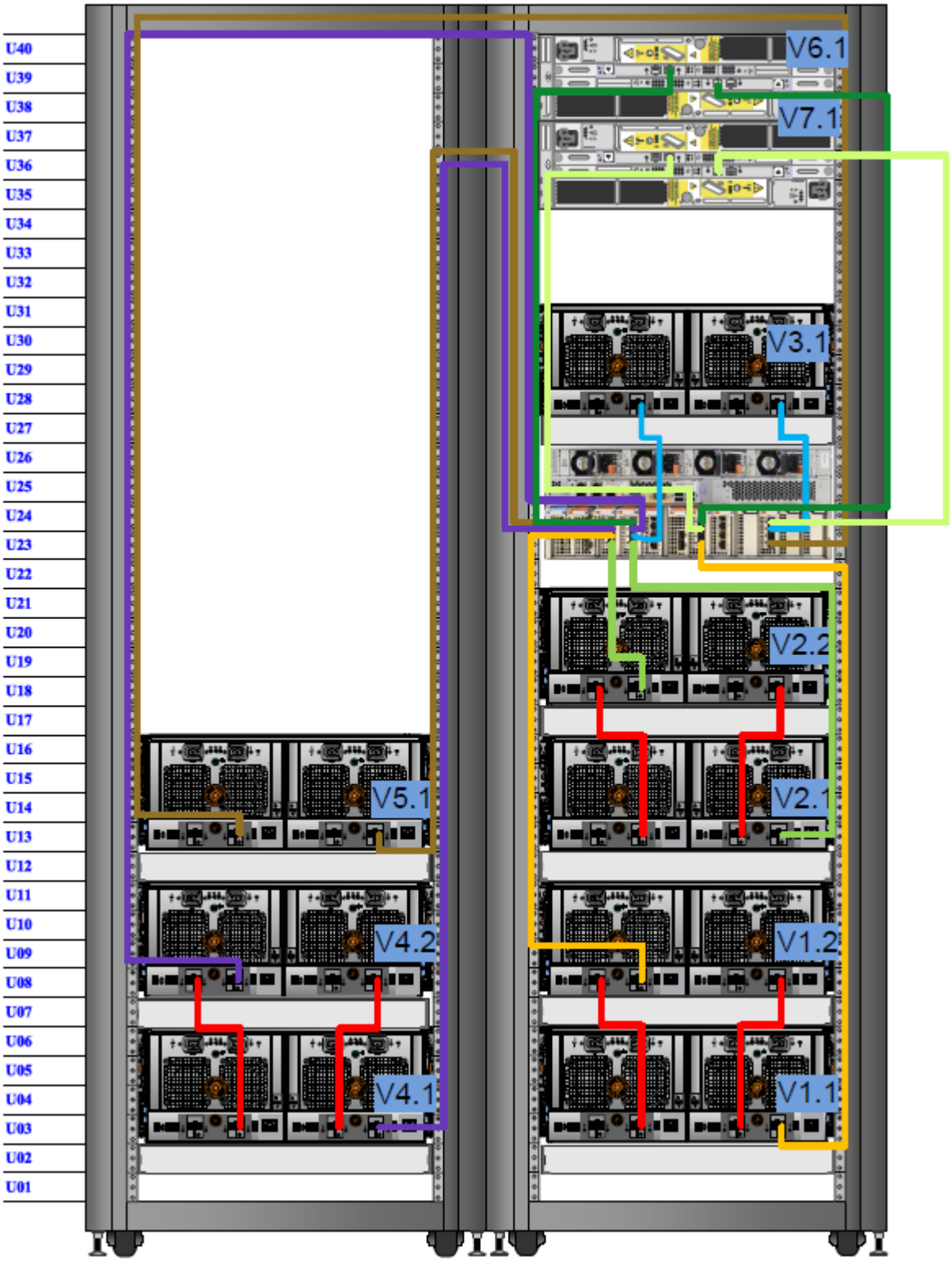
DD9500 and DD9800 with DD Cloud Tier (Single node)

For a DD9500 and DD9800 system with DD Cloud Tier:

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	A controller port 0 of shelf V1.1	2M
1	I/O 2 - Port 1	B controller port 0 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller port 0 of shelf V2.1	2M
2	I/O 2 - Port 0	B controller port 0 of the highest number shelf in V2	2M
3	I/O 9 - Port 2	A controller port 0 of shelf V3.1	2M
3	I/O 3 - Port 1	B controller port 0 of the highest number shelf in V3	2M
4	I/O 2 - Port 2	A controller port 0 of shelf V4.1	5M
4	I/O 3 - Port 2	B controller port 0 of the highest number shelf in V4	5M
5	I/O 2 - Port 3	A controller port 0 of shelf V5.1	5M
5	I/O 9 - Port 0	B controller port 0 of the highest number shelf in V5	5M
6	I/O 6 - Port 3	A controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
6	I/O 3 - Port 3	B controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
7	I/O 9 - Port 3	A controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
7	I/O 6 - Port 2	B controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 45 Cabling for DD9500 and DD9800 systems with DD Cloud Tier



DD9500 and DD9800 with DD Cloud Tier (HA)

For an HA DD9500 and DD9800 pair with DD Cloud Tier:

Table 25 Primary node cabling instructions

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	A controller port 0 of shelf V1.1	2M
1	I/O 2 - Port 1	B controller port 0 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller port 0 of shelf V2.1	2M
2	I/O 2 - Port 0	B controller port 0 of the highest number shelf in V2	2M
3	I/O 2 - Port 2	A controller port 0 of shelf V3.1	5M
3	I/O 3 - Port 2	B controller port 0 of the highest number shelf in V3	5M
4	I/O 2 - Port 3	A controller port 0 of shelf V4.1	5M
4	I/O 6 - Port 1	B controller port 0 of the highest number shelf in V4	5M
5	I/O 6 - Port 3	A controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
5	I/O 3 - Port 3	B controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
6	I/O 9 - Port 3	A controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
6	I/O 6 - Port 2	B controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Table 26 Standby node cabling instructions

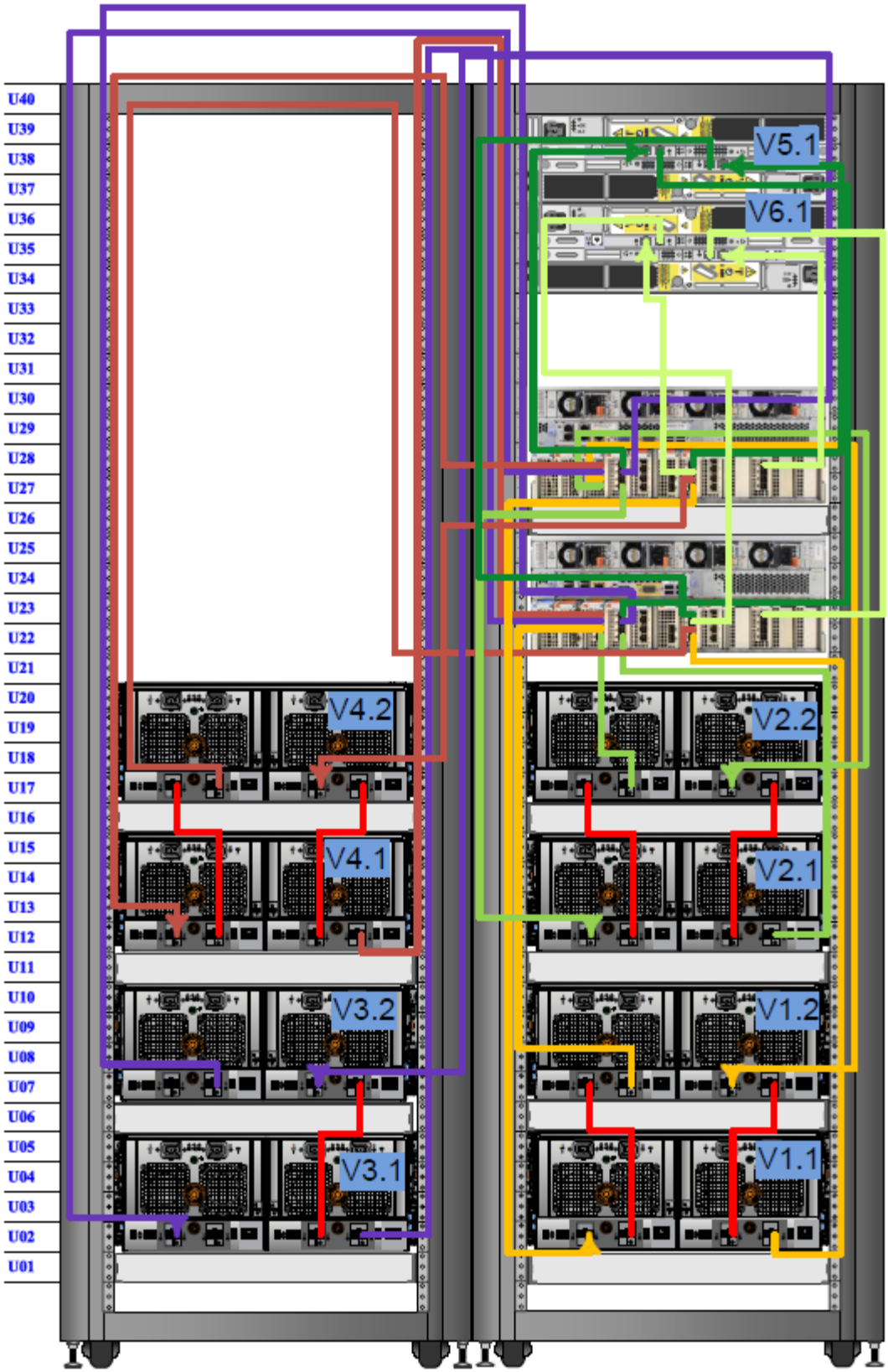
String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	B controller port 2 of shelf V1.1	2M
1	I/O 2 - Port 1	A controller port 2 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	B controller port 2 of shelf V2.1	2M
2	I/O 2 - Port 0	A controller port 2 of the highest number shelf in V2	2M
3	I/O 2 - Port 2	B controller port 2 of shelf V3.1	5M
3	I/O 3 - Port 2	A controller port 2 of the highest number shelf in V3	5M
4	I/O 2 - Port 3	B controller port 2 of shelf V4.1	5M
4	I/O 6 - Port 1	A controller port 2 of the highest number shelf in V4	5M
5	I/O 6 - Port 3	A controller EXPANSION ◆ port of the SSD shelf or DD Cloud Tier metadata shelf	2M
5	I/O 3 - Port 3	B controller EXPANSION ◆ port of the SSD shelf or DD Cloud Tier metadata shelf	2M

Table 26 Standby node cabling instructions (continued)

String (Loop)	I/O - Port	Shelf Port	Length [a]
6	I/O 9 - Port 3	A controller EXPANSION ◆ port of the SSD shelf or DD Cloud Tier metadata shelf	2M
6	I/O 6 - Port 2	B controller EXPANSION ◆ port of the SSD shelf or DD Cloud Tier metadata shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 46 Cabling for HA DD9500 and DD9800 systems with DD Cloud Tier



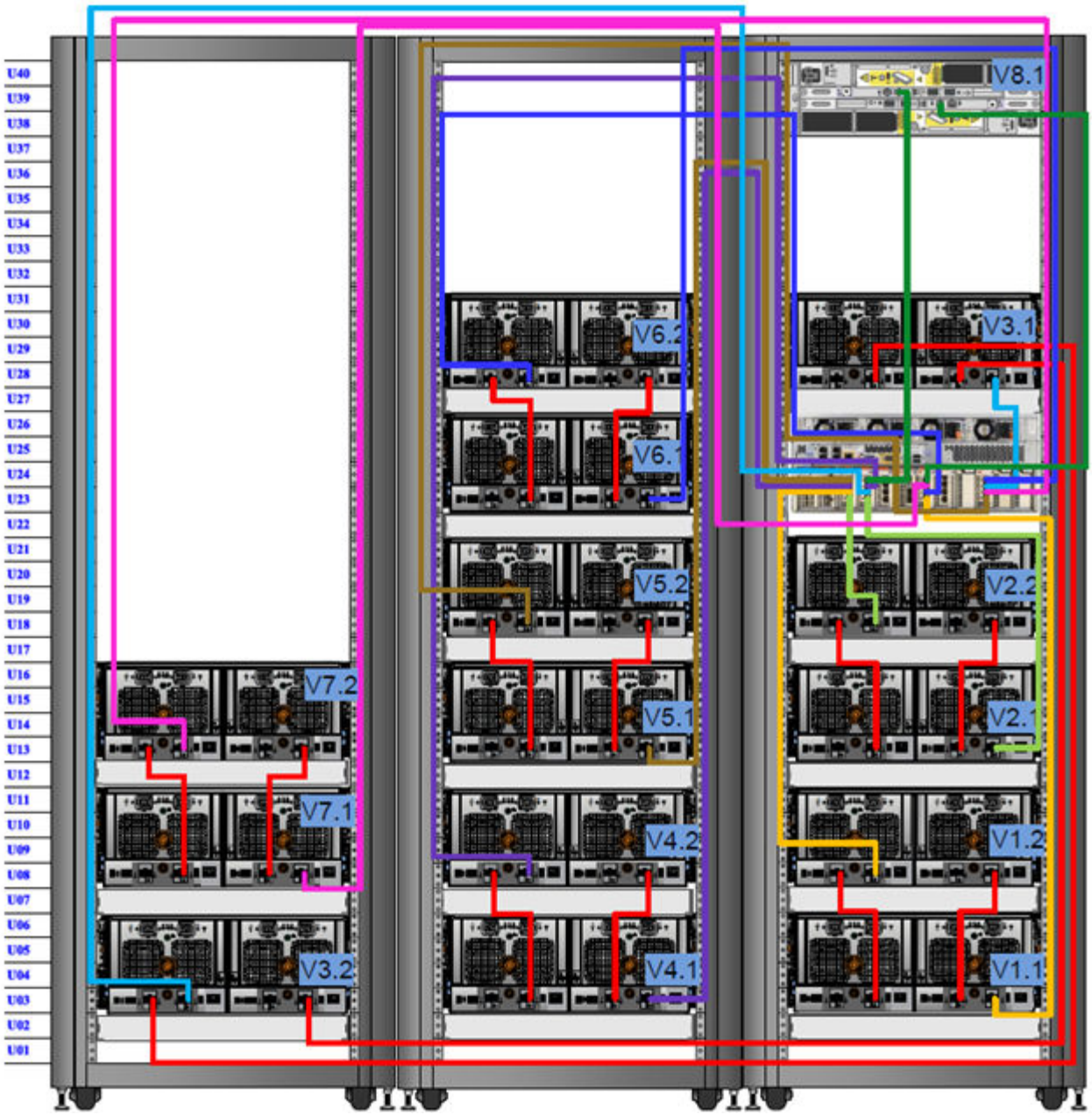
DD9500 and DD9800 with ERSO

For a DD9500 and DD9800 system with ERSO:

String (Loop)	I/O - Port	Shelf Port	Length [a]
1	I/O 6 - Port 0	A controller port 0 of shelf V1.1	2M
1	I/O 2 - Port 1	B controller port 0 of the highest number shelf in V1	2M
2	I/O 3 - Port 0	A controller port 0 of shelf V2.1	2M
2	I/O 2 - Port 0	B controller port 0 of the highest number shelf in V2	2M
3	I/O 9 - Port 2	A controller port 0 of shelf V3.1	2M
3	I/O 3 - Port 1	B controller port 0 of the highest number shelf in V3	5M
4	I/O 2 - Port 2	A controller port 0 of shelf V4.1	5M
4	I/O 3 - Port 2	B controller port 0 of the highest number shelf in V4	5M
5	I/O 2 - Port 3	A controller port 0 of shelf V5.1	5M
5	I/O 9 - Port 0	B controller port 0 of the highest number shelf in V5	5M
6	I/O 9 - Port 3	A controller port 0 of shelf V6.1	5M
6	I/O 6 - Port 1	B controller port 0 of the highest number shelf in V6	5M
7	I/O 6 - Port 2	A controller port 0 of shelf V7.1	5M
7	I/O 9 - Port 1	B controller port 0 of the highest number shelf in V7	5M
8	I/O 6 - Port 3	A controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M
8	I/O 3 - Port 3	B controller HOST ● port of the SSD shelf or DD Cloud Tier metadata shelf	2M

a. Cable lengths shown are designed for Data Domain racks. Longer cables (up to 5M) can be used.

Figure 47 Cabling for DD9500 and DD9800 systems with ERSO



Connecting the HA interconnect

The HA interconnect consists of a 10 GbE I/O module in slot 11 of each node in the HA pair. This connection between the two nodes provides the standby node with the information it needs to failover if the active node suffers a failure, and maintain the connections to hosts and clients after the failover is complete.

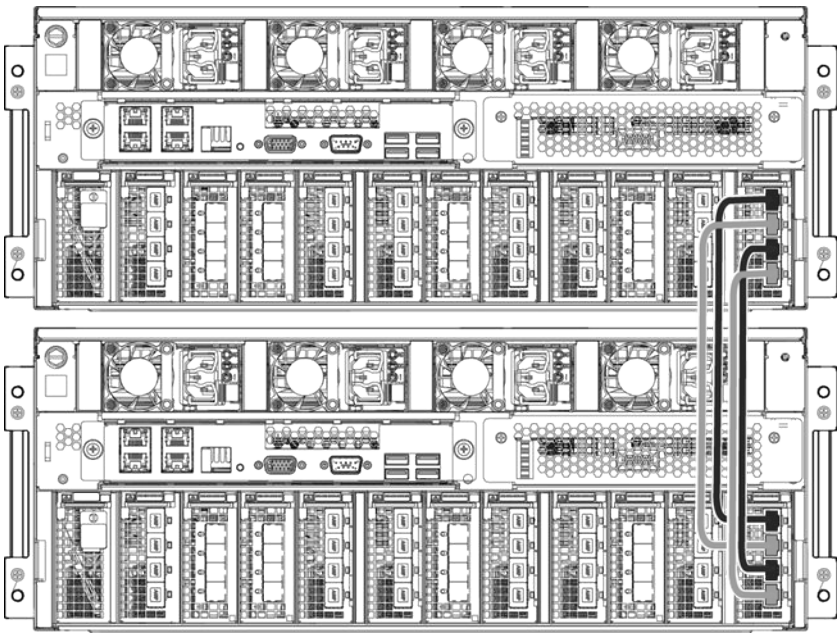
Note

- The interconnect IP address is automatically configured with the IPv6 prefix d:d:d:d:d:/80
- If there is an IP conflict, set the registry key `config.net.interconnect_ip6prefix`.

Procedure

1. Refer to the diagram for the port connections.

   Figure 48 DD9500/DD9800 HA interconnect

2. Cable port 0 of the interconnect I/O module in node 0, slot 11 to port 0 of the interconnect I/O module in node 1, slot 11.
3. Cable port 1 of the interconnect I/O module in node 0, slot 11 to port 1 of the interconnect I/O module in node 1, slot 11.
4. Cable port 2 of the interconnect I/O module in node 0, slot 11 to port 2 of the interconnect I/O module in node 1, slot 11.
5. Cable port 3 of the interconnect I/O module in node 0, slot 11 to port 3 of the interconnect I/O module in node 1, slot 11.

Connect data cables on both nodes

Note

The data cabling for both nodes of the HA pair must be identical.

1. Enable data transfer Ethernet connectivity. Repeat for each connection.
   a. If using 1 Gb copper Ethernet, attach a Cat 5e or Cat 6 copper Ethernet cable to an RJ-45 Ethernet network port (start with ethMa and go up).

b. If using 10 Gb copper Ethernet with an SFP+ connector, use a qualified SFP+ copper cable.

c. If using 1/10 Gb fiber Ethernet, use MMF-850nm cables with LC duplex connectors.

d. For 10GBaseT connections, use Cat6a S-STP Ethernet cables.

2. Enable data transfer Fibre Channel (FC) connectivity. Repeat for each connection.

a. Attach a Fibre Channel fiber optical cable (LC connector) to an I/O module port on the controller, and attach the other end (LC connector) to an FC switch or to an FC port on your server.

Power on the systems

Power the system on in the following order:

1. Expansion shelves.
2. Active node.
3. Standby node.

Complete the following steps to power on the system:

1. Connect power cables to each expansion shelf receptacle and attach the retention clips.
2. Provide power to power-on each expansion shelf. The shelves power on when plugged in. Ensure that each shelf power cable is connected to a different power source.

Note

Wait approximately 3 minutes after all expansion shelves are powered on before powering on the controller.

---

3. Provide power to power-on the controller. The system powers on when plugged in.

Note

The DD9500 system should be powered from redundant AC sources. This allows one AC source to fail or be serviced without impacting system operation. PSU0 and PSU1 should be attached to one AC source. PSU2 and PSU3 should be attached to the other AC source.

---

a. Connect power cables to each receptacle and attach the retention clips.

b. Ensure that each power supply is connected to a different power source.

Install the bezel

Install the bezel on the front of the system.

Procedure

1. Install the bezel on your DD9500/DD9800 system by grasping both hand holds and pressing toward the center of the bezel until the latches attach to the sides of the chassis. The red circles identify the latches on each bezel. Make sure the handhold locks lock into place.

CHAPTER 5

Configure System For Use

This chapter contains the following topics:

- Enable administrative communication 86
- Accepting the End User License Agreement (EULA) 88
- Run the configuration wizard 88
- Configuring additional system parameters 90
- Configure HA for new installations 91

Enable administrative communication

For HA pairs, administrative communication must be enabled on both nodes.

The administrative interfaces are located on the management module on the rear of the chassis. These interfaces are for management network traffic only. Do not use these interfaces for data traffic.

1. Connect an administrative console to the serial port on the back panel of the system.
2. **Note**

   You must have 115200 baud rate for the DD9500/DD9800 system to work properly; 9600 baud rate will not work for the DD9500/DD9800 system.

   Launch a terminal emulation program from your computer and configure the following communication settings:

   Table 27 Communications settings

Setting	Value
Baud rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow control	None
Emulation	VT-100

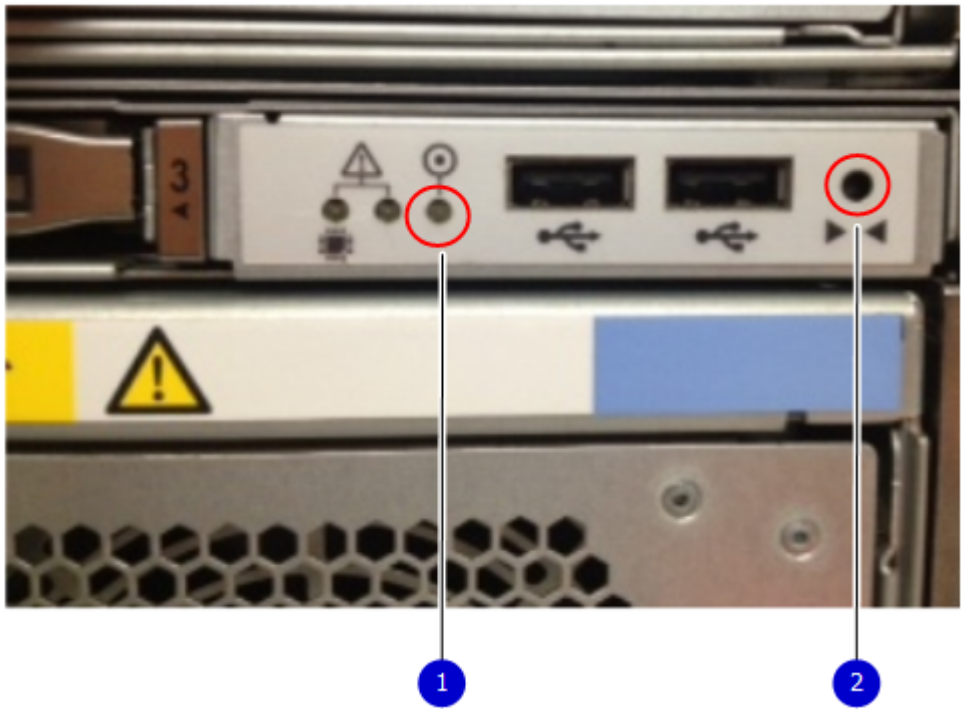
3. Select `Enter` on your keyboard to activate the console.

   Note

   If you do not see the prompt on your terminal to log in, then complete Step 4.

4. In the front of the DD9500/DD9800 system, press the power button to turn the power on the system. Check that the front blue power LED (with the circle with a dot) also turns on.

Figure 49 Power LED and power button



1. Power LED
2. Power button

5. **Note**

   The initial username is `sysadmin` and the initial password is the system serial number.

   Log into the Data Domain console using the `sysadmin` username.

   ```
   localhost.localdomain login: sysadmin
   ```

6. Enter the default password, which is the system serial number (SSN). The SSN is on the attached tag on the rear panel of the system. See the rear panel of the DD9500/DD9800 system for the SSN tag.

   ```
   Password: system_serial_number
   ```

   Note

   Configuring an HA pair sets the system password on the standby node to match the system password on the active node, however, that synchronization is not set until the HA configuration is complete. If the HA configuration fails, or if there is a need to access either node before the HA configuration is complete, use the serial number of each node as the password.

Note

If you enter an incorrect password four consecutive times, the system locks out the specified username for 120 seconds. The login count and lockout period are configurable and might be different on your system. See the *Data Domain Operating System Administration Guide* and the *Data Domain Operating System Command Reference Guide* for setting these values.

For Data Domain HA systems, SSH keys created on the active node take 30 seconds to one minute to propagate to the standby node.

Accepting the End User License Agreement (EULA)

The first time you log in to a Data Domain system, the End User License Agreement (EULA) is displayed.

At the end of the EULA, you are prompted to accept it:

```
Press any key then hit enter to acknowledge the receipt of EULA
information
```

Note

The EULA *must* be accepted by a customer. A Data Domain representative should *not* accept this agreement. If a customer is not present, press `Ctrl-C` to exit from the EULA acceptance screen and continue the installation.

The customer can later enter the following to redisplay the EULA and accept it:

```
system show eula
```

Run the configuration wizard

The CLI configuration wizard starts automatically the first time the system boots. The wizard prompts you through a series of questions that provide just enough information for initial system configuration and basic network connectivity.

Note

You can initiate the CLI configuration wizard manually by entering the **`config setup`** command.

Configuring the network

Procedure

1. Enter **`yes`** to configure the system for network connectivity.

   ```
   Network Configuration
   Configure Network at this time (yes|no) [no]:
   yes
   ```

2. Enter **`yes`** to configure DHCP (Dynamic Host Configuration Protocol) to obtain network parameters (such as, the host name, domain name, and IP addresses) dynamically from a DHCP server. Or enter **`no`** to configure the parameters manually.

   ```
   Use DHCP
   Use DHCP for hostname, domainname, default gateway
   and DNS servers? (At least one interface needs to
   be configured using DHCP)  (yes|no|?)
   ```

3. Enter a fully qualified domain name (FQDN) for the host name; for example, **`str01.yourcompany.com`**. Or accept the host name, if the system was able to discover it.

   ```
   Enter the hostname for this system
   (fully-qualified domain name)[]:
   ```

4. Enter the DNS (Domain Name System) domain name; for example, **yourcompany.com**. Or accept the domain name, if the system was able to discover it.

```
Domainname
Enter your DNS domainname []:
```

5. Enable and configure each Ethernet interface. Accept or decline DHCP for each interface. If the port does not use DHCP to discover network parameters automatically, enter the information manually.

```
Ethernet port eth0a
Enable Ethernet port eth0a (yes|no|?) [yes]:
no

Ethernet port eth0b
Enable Ethernet port eth0b (yes|no|?) [no]:
yes

Use DHCP on Ethernet port eth0b (yes|no|?) [no]:

Enter the IP address for eth0b [192.168.10.185]:

Enter the netmask for eth0b [255.255.255.0]:
```

6. Enter the IP address of the default routing gateway. Or accept the default gateway, if the system was able to discover it.

```
Default Gateway
Enter the default gateway IP address:
192.168.10.1
```

7. Enter the IPv6 address of the default routing gateway or accept the IPv6 address of the default gateway if the system was able to discover it. If IPv6 is not in use, leave the field empty, and press **Enter** to continue.

```
IPV6 Default Gateway
Enter the ipv6 default gateway IP address:
```

8. Enter up to three DNS servers to use for resolving host names to IP addresses. Use a comma-separated or space-separated list. Enter a space for no DNS servers. Or accept the IP addresses of the DNS servers, if the system was able to discover them.

```
DNS Servers
Enter the DNS Server list (zero, one, two or three IP
addresses):
192.168.10.1
```

9. A summary of the network settings is displayed. You can accept the settings (**Save**), reject the settings and exit to the CLI (**Cancel**), or return to the beginning of the current section and change the settings (**Retry**). Entering **Retry** displays your previous responses for each prompt. Press **Return** to accept the displayed value or enter a new one.

```
Pending Network Settings
Hostname          ddbeta1.dallasrdc.com
Domain name       dallasrdc.com
Default Gateway   192.168.10.1
DNS Server List   192.168.10.1
Port       Enabled      Cable      DHCP      IP Address        Netmask or Prefix Length
-----      -------      -----      ----      --------------    ------------------------
eth0a      no           no         n/a       n/a               n/a
eth0b      no           no         n/a       n/a               n/a
eth0c      no           no         n/a       n/a               n/a
eth0d      no           no         n/a       n/a               n/a
ethMa      yes          yes        no        192.168.10.181    255.255.255.0
ethMb      no           no         n/a       n/a               n/a
ethMc      no           no         n/a       n/a               n/a
ethMd      no           no         n/a       n/a               n/a
```

```
ethMe      no           no         n/a       n/a              n/a
ethMf      no           no         n/a       n/a              n/a
-----      -------      -----      ----      --------------   -------------------------
Do you want to save these settings (Save|Cancel|Retry):
```

Configuring additional system parameters

Most installations would benefit from the configuration of a few additional system parameters, provided in this section for convenience.

Note

You can also use the Data Domain (DD) System Manager GUI interface to configure the system parameters. Open a web browser, and enter your Data Domain system's IP address in the browser's address text box. Log in when the DD System Manager login screen displays. Use the DD System Manager online help for more information.

Procedure

1. To set up the mail server, enter:

```
# config set mailserver mail.datadomain.com
The Mail (SMTP) server is: mail.datadomain.com
```

2. To set up the system location, enter:

```
# config set location "Dallas Regional Data Center Lab,
5000 Apple Drive Suite #130, Dallas, Tx"
The System Location is: Dallas Regional Data Center Lab,
5000 Apple Drive Suite #130, Dallas, Tx
```

3. To add one or more time servers, enter:

   Note

   HA configuration requires that the two nodes maintain a time difference of no more than 10 seconds.

```
# ntp add timeserver 192.168.101.1
Remote Time Servers: 192.168.10.1
```

4. To enable the NTP daemon, enter:

```
# ntp enable
NTP enabled.
```

5. To change the system time zone, enter:

```
# config set timezone US/Central
The Timezone name is: US/Central
*** You made a change to the timezone setting.  To fully effect
this change
*** (in currently running processes), you need to reboot the
machine.
```

6. Reboot the primary node for the time zone change to take effect:

```
# system reboot

The 'system reboot' command reboots the system. File access is
interrupted during the reboot.
Are you sure? (yes|no|?) [no]: yes

ok, proceeding.
The system is going down for reboot.
```

7. After the system completes the reboot, login again as **sysadmin** using the serial number as a password. Press **Ctrl-C** to get through the EULA, sysadmin password prompt, and config setup wizard.
8. Generate an autosupport sent to yourself to use as ACG input:

```
# autosupport send your.email@emc.com
OK: Message sent.
```

9. Generate an ACG using the produced ASUP.

Configure HA for new installations

Before you begin

- The HA interconnect between both nodes is connected.

  Note

  Connecting the HA interconnect on page 81 describes how to cable the HA interconnect.

- The data connections on both nodes are connected.

Configure the two nodes as an HA pair.

Note

Configuring an HA pair sets the system password on the standby node to match the system password on the active node, however, that synchronization is not set until the HA configuration is complete. If the HA configuration fails, or if there is a need to access either node before the HA configuration is complete, use the serial number of each node as the password.

Procedure

1. Identify which node will serve as the active node.
2. On the active node, create the HA pairing.

   Run the following command:
   `ha create peer {<ipaddr> | <hostname>} [ha-name <ha-system-name]`

   Note

   - Specify the hostname or the IP address of the standby node.
   - Specifying an HA system name:
     - Assigns node 0 the local hostname *<HA-system-name>*-p0.
     - Assigns node 1 the local hostname *<HA-system-name>*-p1.
   - The `ha create` command will fail if one node is configured to use DHCP and the other node is configured to use static IP addresses. Both nodes must use the same method to configure IP addresses.

   ```
   ha create peer mysystem-p1.emc.com ha-name mysystem.emc.com
   ```

   Both nodes reboot, and are configured as an HA pair when they come back up.
3. On the active node, configure one or more floating IP addresses for data access.

Run the following command:
`net config <interface-name> <IP address> netmask <netmask> type floating`

Note

The net config command with the float option is the only way to configure a floating IP address. There is no method available in Data Domain System Manager to configure a floating IP address.

```
net config eth4a 2.2.2.1 netmask 255.255.255.0 type floating
```