

# Dell EMC Elastic Cloud Storage (ECS) D- and U-Series

## Hardware Guide

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# CHAPTER 1

## Hardware Components and Configurations

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## ECS Appliance hardware components

Describes the hardware components that make up ECS Appliance hardware models.

### ECS Appliance series

The ECS Appliance series include:

- D-Series: A dense object storage solution with servers and separate disk array enclosures (DAEs).
- U-Series: A commodity object storage solution with servers and separate DAEs.
- C-Series: A dense compute and storage solution of servers with integrated disks.

### Hardware generations

ECS appliances are characterized by hardware generation:

- U-Series Gen2 models featuring 12 TB disks became available in March 2018.
- The D-Series was introduced in October 2016 featuring 8 TB disks. D-Series models featuring 10 TB disks became available March 2017.
- The original U-Series appliance (Gen1) was replaced in October 2015 with second generation hardware (Gen2).
- The original C-Series appliance (Gen1) was replaced in February 2016 with second generation hardware (Gen2).

Statements about a series that is made in this document apply to all generations except where noted.

## U-Series components

The U-Series ECS Appliance includes the following hardware components.

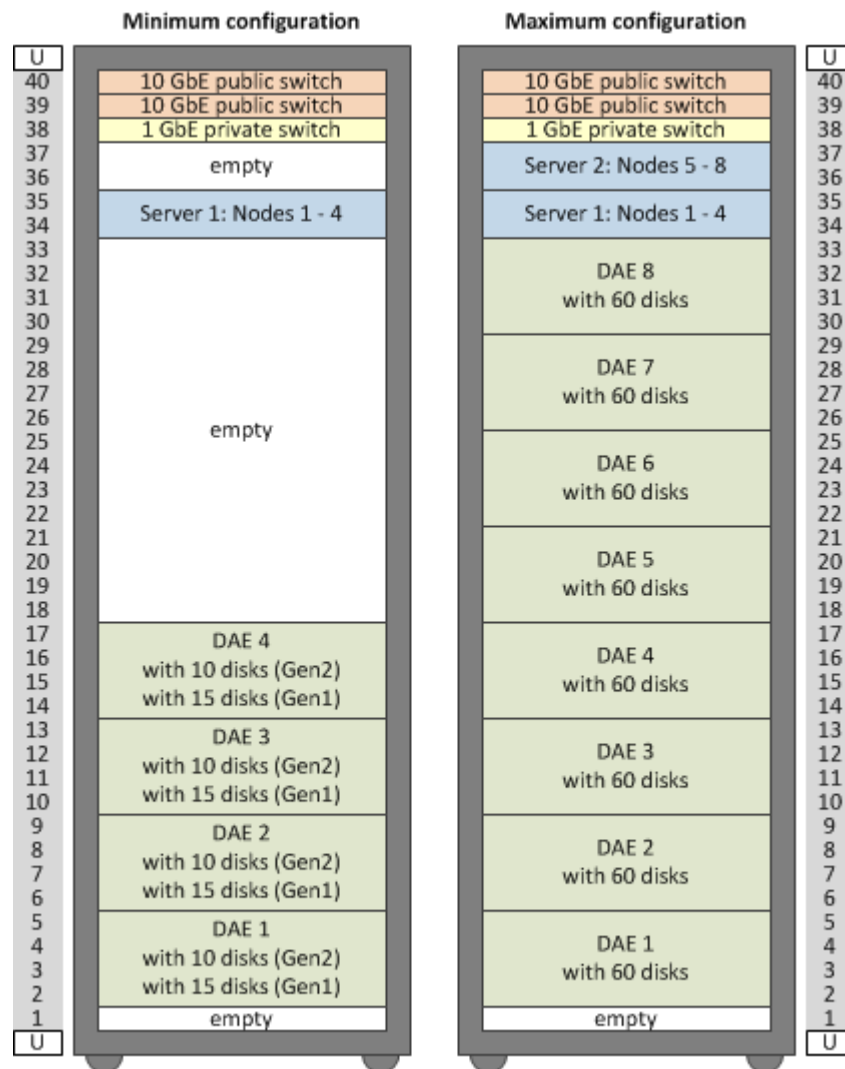
**Table 1** U-Series hardware components

Component	Description
40U rack	Titan D racks that include: <ul style="list-style-type: none"> <li>• Single-phase PDUs with four power drops (two per side). The high availability configuration (HA) of four power drops is mandatory and any deviation requires that an RPQ be submitted and approved.</li> <li>• Optional three-phase WYE or delta PDUs with two power drops (one per side)</li> <li>• Front and rear doors</li> <li>• Racking by Dell EMC manufacturing</li> </ul>
Private switch	One 1 GbE switch
Public switch	Two 10 GbE switches
Nodes	Intel-based unstructured server in four- and eight-node configurations. Each server chassis contains four nodes (blades). Gen2 also has the option for five- and six-node configurations.

**Table 1** U-Series hardware components (continued)

Component	Description
Disk array enclosure (DAE)	<p>The U-Series disk array enclosure (DAE) drawers hold up to 60 3.5-inch disk drives. Features include:</p> <ul style="list-style-type: none"> <li>• Gen1 hardware uses 6TB disks and Gen2 hardware uses 8 TB and 12 TB disks</li> <li>• Two 4-lane 6 Gb/s SAS connectors</li> <li>• SAS bandwidth of 3500 MB/s</li> <li>• Drive service: hot swappable</li> </ul>

**Figure 1** U-Series minimum and maximum configurations



\*A server contains 4 nodes (blades)

**Note**

For more robust data protection, a five-node configuration is the recommended minimum.

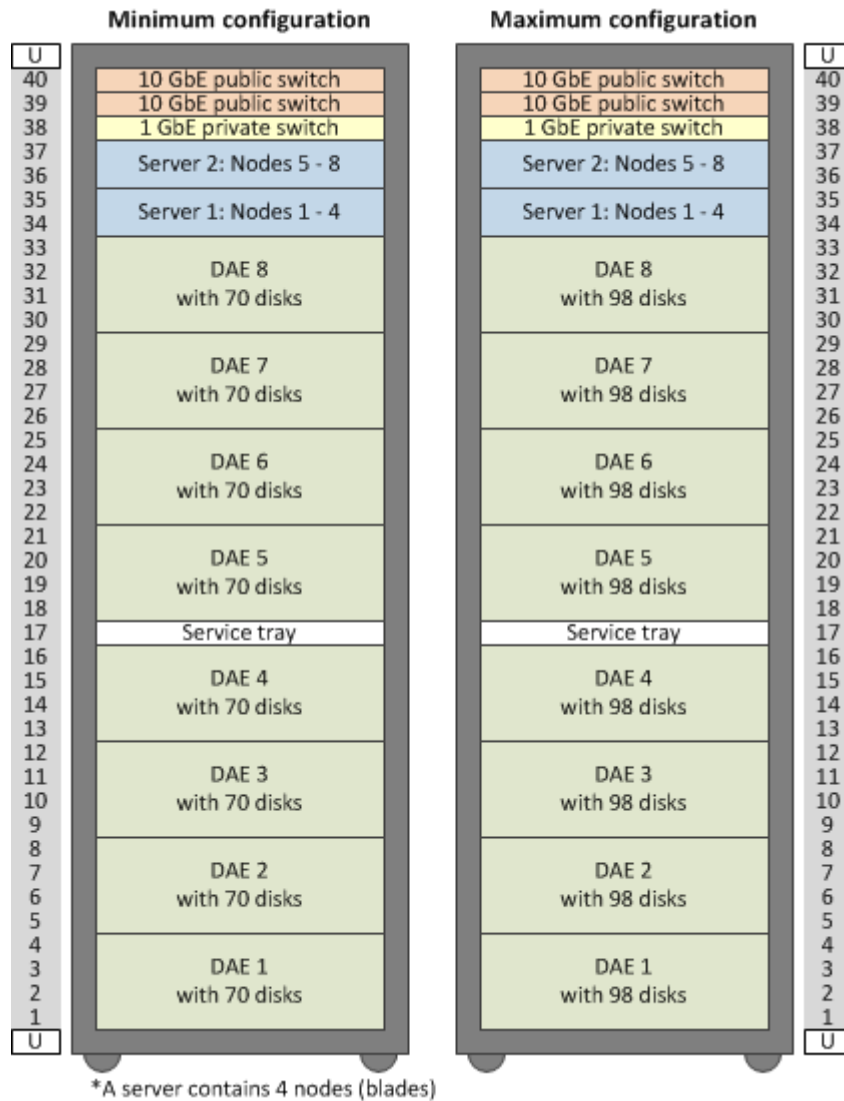
**D-Series components**

The D-Series ECS Appliance includes the following hardware components.

**Table 2** D-Series hardware components

Component	Description
40U rack	<p>Titan D racks that include:</p> <ul style="list-style-type: none"> <li>• Single-phase PDUs with six power drops (three per side). The high availability configuration (HA) of six power drops is mandatory and any deviation requires that an RPQ be submitted and approved.</li> <li>• Optional three-phase WYE or delta PDUs with two power drops (one per side)</li> <li>• Front and rear doors</li> <li>• Racking by Dell EMC manufacturing</li> </ul>
Private switch	One 1 GbE switch
Public switch	Two 10 GbE switches
Nodes	Intel-based unstructured server in eight-node configurations. Each server chassis contains four nodes.
Disk array enclosure (DAE)	<p>The D-Series disk array enclosure (DAE) drawers hold up to 98 3.5-inch disk drives. Features include:</p> <ul style="list-style-type: none"> <li>• Models featuring 8TB disks and models featuring 10TB disks</li> <li>• Two 4-lane 12 Gb/s SAS 3.0 connectors</li> <li>• SAS bandwidth of 5600 MB/s</li> <li>• Drive service: cold service</li> </ul>
Service tray	50-lb capacity service tray

**Figure 2** D-Series minimum and maximum configurations



**Note**

These rack configurations are available with either 8 TB or 10 TB disks.

**C-Series components**

The C-Series ECS Appliance includes the following hardware components.

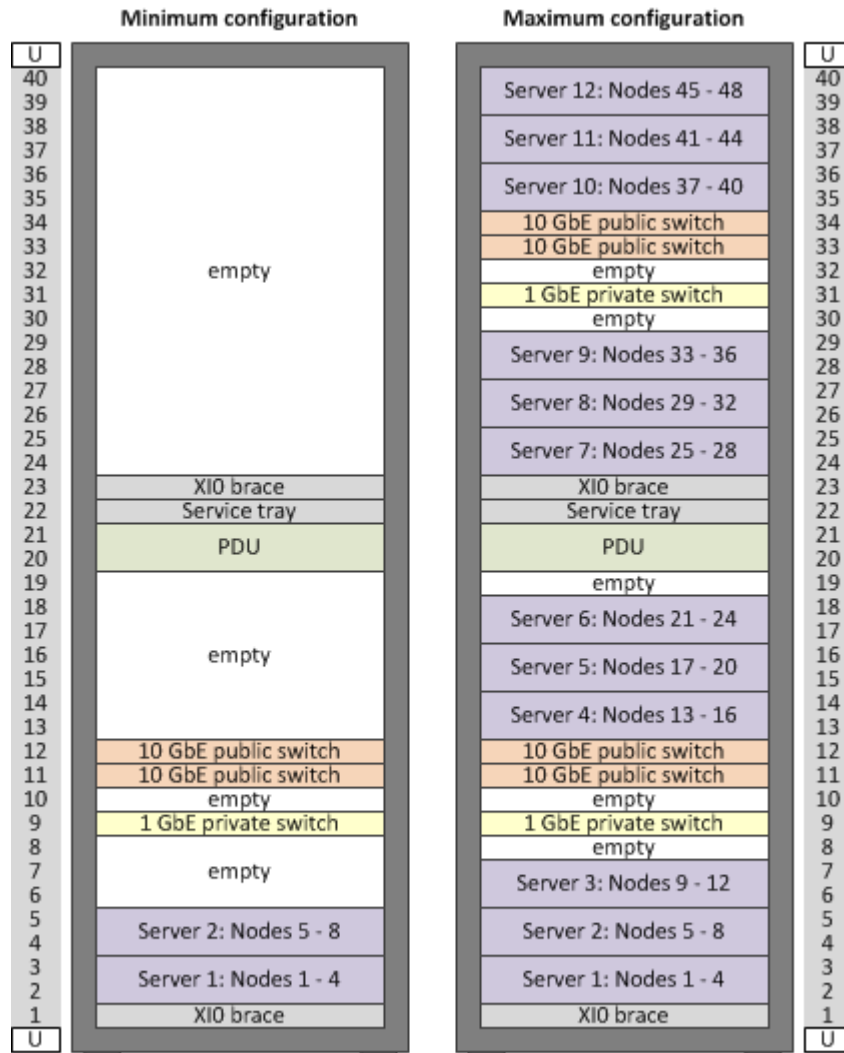
**Table 3** C-Series hardware components

Component	Description
40U rack	Titan D Compute racks that include: <ul style="list-style-type: none"> <li>Two single-phase PDUs in a 2U configuration with two power drops. The high availability configuration (HA) of two power drops is mandatory and any deviation requires that an RPQ be submitted and approved.</li> </ul>

**Table 3** C-Series hardware components (continued)

Component	Description
	<ul style="list-style-type: none"> <li>• Optional two three-phase WYE or delta PDUs in a 2U configuration with two power drops</li> <li>• Front and rear doors</li> <li>• Racking by Dell EMC manufacturing</li> </ul>
Private switch	One or two 1 GbE switches. The second switch is required for configurations with more than six servers.
Public switch	Two or four 10 GbE switches. The third and fourth switches are required for configurations with more than six servers.
Nodes	Intel-based unstructured servers in 8- through 48-node configurations. Each server chassis contains four nodes (blades).
Disks	The C-Series has 12 3.5-inch disk drives integrated with each server. Gen1 hardware uses 6 TB disks. Gen2 hardware uses 8 TB disks.
Service tray	50-lb capacity service tray

**Figure 3** C-Series minimum and maximum configurations



\*A server contains 4 nodes (blades)

## U-Series Appliance (Gen2) configurations and upgrade paths

Describes the second generation U-Series ECS Appliance configurations and the upgrade paths between the configurations. The Gen2 hardware became generally available in October 2015.

### U-Series configurations (Gen2)

The U-Series Appliance is a commodity object storage solution.

**Table 4** U-Series (Gen2) configurations

Model number	Nodes	DAEs	Disks in DAE	Storage capacity		Switches
				(8 TB disks)	(12 TB disks)	
U400 (minimum configuration)	4	4	10	320 TB	480 TB	One private and two public
U400-E	5	5	10	400 TB	600 TB	One private and two public
U480-E	6	6	10	480 TB	720 TB	One private and two public
U400-T	8	8	10	640 TB	960 TB	One private and two public
U2000	8	8	30	1.92 PB	2.88 PB	One private and two public
U2800	8	8	45	2.88 PB	4.32 PB	One private and two public
U4000 (maximum configuration)	8	8	60	3.84 PB	5.76 PB	One private and two public

**Note**

Five-node configurations are the smallest configuration that can tolerate a node failure and still maintain the EC protection scheme. A four-node configuration that suffers a node failure changes to a simple data mirroring protection scheme. Five-node configurations are the recommended minimum configuration.

**U-Series (Gen2) upgrade paths**

U-Series Gen2 upgrades can be applied flexibly to eligible configurations. Multiple upgrades can be applied in one service call.

Upgrade rules for an appliance with all 8 TB or 12 TB disks (upgrade will not include mixed disk capacities in the rack):

- The minimum number of disks in a DAE is 10.
- Disk Upgrade Kits are available in 5 or 10 disk increments.
- All DAEs in the appliance must have the same number of disks in increments of 5 (10, 15, 20, and so on, up to 60) with NO empty slots between disks.
- Upgrades are flexible, meaning you can upgrade to any disk level even if that level does not correspond to a named model. For example, you can upgrade the original appliance to have 35 disks per DAE even though this configuration does not have an official label like the U2000 (30 disks per DAE) or the U2800 (45 disks per DAE).
- To upgrade a half-rack configuration to a full-rack configuration, you must order the 1 Server Chassis containing 4 nodes, 4 DAEs with 10, 20, 30, 45 or 60 Upgrade Kit. To achieve any configuration between 10, 20, 30, 45 or 60 disks, add 5 or 10 disk upgrade kits in the required quantity to match the disk quantities per DAE in nodes 1-4.
- All empty drive slots must be filled with a disk filler.



- The best practice is to have only one storage pool in a VDC, unless you have more than one storage use case at the site. In a site with a single storage pool, each DAE in each rack must have the same number of disks.

Upgrade rules for systems with either four nodes/DAEs 8 TB or four nodes/DAEs 12 TB (upgrade will include mixed disk capacities in the rack):

- The minimum number of disks in a DAE is 10.
- Disk Upgrade Kits are available in 5 or 10 disk increments.
- No mixing of disk capacities in a DAE.
- Each four node/DAE must have the same disk capacity and number of disks in increments of 5 (10, 15, 20, and so on, up to 60) with NO empty slots between disks in DAE. Example: nodes 1-4, 30, 6TB disks in each DAE, nodes 5-7, 20 12TB disks in each DAE.
- All empty drive slots must be filled with a disk filler.

**Table 5** U-Series (Gen2) disk upgrades

Disk upgrade kit	Uses
5-Disk Upgrade	Used to supplement other disk upgrade kits to make up a valid configuration.
10-Disk Upgrade	Used to supplement other disk upgrade kits to make up a valid configuration.
40-Disk Upgrade	<ul style="list-style-type: none"> <li>• Add 10 disks to each DAE in a four-node configuration.</li> <li>• Add 5 disks to each DAE in an eight-node configuration.</li> <li>• Populate a new DAE in a configuration with 40-disk DAEs.</li> </ul>
60-Disk Upgrade	<ul style="list-style-type: none"> <li>• Add 10 disks to each DAE in a six-node configuration.</li> <li>• Populate a new DAE in a configuration with 60-disk DAEs.</li> </ul>

**Table 6** U-Series (Gen2) node upgrades

Current nodes	Kit for upgrade to 5 nodes	Kit for upgrade to 6 nodes	Kit for upgrade to 8 nodes
Four (all four nodes have 12 TB disks)	<ul style="list-style-type: none"> <li>• One server chassis with one node and three fillers.</li> <li>• One DAE with the same number of disks as one of the current DAEs. Disks must be Gen2 12 TB.</li> </ul>	<ul style="list-style-type: none"> <li>• One server chassis with two nodes and two fillers.</li> <li>• Two DAEs with the same number of disks as one of the current DAEs. Disks must be Gen2 12 TB.</li> </ul>	<ul style="list-style-type: none"> <li>• One server chassis with four nodes.</li> <li>• Four DAEs with the same number of disks as one of the current DAEs. Disks must be Gen2 12 TB.</li> </ul>
Four (all four nodes have 8 TB disks)	<ul style="list-style-type: none"> <li>• One server chassis with one node and three fillers.</li> <li>• One DAE with the same number of disks as one of the current DAEs. Disks must be Gen2 8 TB.</li> </ul>	<ul style="list-style-type: none"> <li>• One server chassis with two nodes and two fillers.</li> <li>• Two DAEs with the same number of disks as one of the current DAEs. Disks must be Gen2 8 TB.</li> </ul>	<ul style="list-style-type: none"> <li>• One server chassis with four nodes.</li> <li>• 8 TB expansion disks: four DAEs being added with the same number of disks as one of the current DAEs.</li> <li>• 12 TB expansion disks: four DAEs being added with the same number of disks.</li> </ul>

**Table 6** U-Series (Gen2) node upgrades (continued)

Current nodes	Kit for upgrade to 5 nodes	Kit for upgrade to 6 nodes	Kit for upgrade to 8 nodes
Five (all five nodes have either all 8 TB disks or all 12 TB disks)	Not applicable	<ul style="list-style-type: none"> <li>One node.</li> <li>One DAE with the same number of disks as one of the current DAEs.</li> </ul> You cannot intermix 8 TB and 12 TB disks.	<ul style="list-style-type: none"> <li>Three nodes.</li> <li>Three DAEs with the same number of disks as one of the current DAEs.</li> </ul> You cannot intermix 8 TB and 12 TB disks.
Six (all six nodes have either all 8 TB disks or all 12 TB disks)	Not applicable	Not applicable	<ul style="list-style-type: none"> <li>Two nodes.</li> <li>Two DAEs with the same number of disks as one of the current DAEs.</li> </ul> You cannot intermix 8 TB and 12 TB disks.

**Note**

Seven-node configurations are not supported.

When you are planning to increase the number of drives in the DAEs and add nodes to the appliance, order the disks first. Then order the node upgrades. The new DAEs are shipped with the correct number of disks preinstalled.

## U-Series Appliance (Gen1) configurations and upgrade paths

Describes the first generation ECS Appliance configurations and the upgrade paths between the configurations. Gen1 hardware became generally available in June 2014.

**U-Series configurations (Gen1)**

The U-Series Appliance is a dense storage solution using commodity hardware.

**Table 7** U-Series (Gen1) configurations

Model number	Nodes	DAEs	Disks in DAE 1 to 4	Disks in DAE 5 to 8	Storage capacity	Switches
U300 (minimum configuration)	4	4	15	Not applicable	360TB	One private and two public
U700	4	4	30	Not applicable	720TB	One private and two public
U1100	4	4	45	Not applicable	1080TB	One private and two public
U1500	4	4	60	Not applicable	1440TB	One private and two public

**Table 7** U-Series (Gen1) configurations (continued)

Model number	Nodes	DAEs	Disks in DAE 1 to 4	Disks in DAE 5 to 8	Storage capacity	Switches
U1800	8	8	60	15	1800TB	One private and two public
U2100	8	8	60	30	2160TB	One private and two public
U2500	8	8	60	45	2520TB	One private and two public
U3000 (maximum configuration)	8	8	60	60	2880TB	One private and two public

**U-Series (Gen1) upgrade paths**

U-Series upgrades consist of the disks and infrastructure hardware that is needed to move from the existing model number to the next higher model number. To upgrade by more than one model level, order the upgrades for each level and apply them in one service call.

**Table 8** U-Series (Gen1) upgrades

Model number	Disk upgrade (to the next higher model)	Hardware upgrade (to the next higher model)
U300 (minimum configuration)	Not applicable	Not applicable
U700	One 60-disk kit	Not applicable
U1100	One 60-disk kit	Not applicable
U1500	One 60-disk kit	Not applicable
U1800	One 60-disk kit	One server chassis (four nodes) and four DAEs
U2100	One 60-disk kit	Not applicable
U2500	One 60-disk kit	Not applicable
U3000 (maximum configuration)	One 60-disk kit	Not applicable

## D-Series Appliance configurations and upgrade paths

Describes the D-Series ECS Appliance configurations and the upgrade paths. The D-Series hardware became generally available in October 2016. 10 TB models became available March 2017.

**D-Series configurations**

The D-Series Appliance is a dense object storage solution using commodity hardware.

**Table 9** D-Series configurations

Model number	Nodes	DAEs	Disks in each DAE	Disk Size	Storage capacity	Switches
D4500	8	8	70	8TB	4.5 PB	One private and two public
D5600	8	8	70	10TB	5.6 PB	One private and two public
D6200	8	8	98	8TB	6.2 PB	One private and two public
D7800	8	8	98	10TB	7.8 PB	One private and two public

**D-Series upgrade paths**

The D-Series Appliances can be upgraded as shown in the table.

**Table 10** D-Series upgrades

Upgrade option name	Number of disks	Hardware	Description
224 8 TB Disk Upgrade Kit (upgrades D4500 to D6200)	224	16 Sleds	Adds 2 sleds of 14 disks each (28 disks total) to each DAE.
224 10 TB Disk Upgrade Kit (upgrades D5600 to D7800)	224	16 Sleds	Adds 2 sleds of 14 disks each (28 disks total) to each DAE.

## C-Series Appliance (Gen2) configurations and upgrade paths

Describes the second generation C-Series ECS Appliance configurations and the upgrade paths between the configurations. Gen2 hardware became generally available in February 2016.

**C-Series (Gen2) configurations**

The C-Series Appliance is a dense compute solution using commodity hardware.

**Table 11** C-Series (Gen2) configurations

Phoenix-12 Compute Servers	Nodes	Storage capacity	Switches
2 (minimum configuration)	8	144TB	One private and two public
3	12	216TB	One private and two public
4	16	288TB	One private and two public

**Table 11** C-Series (Gen2) configurations (continued)

Phoenix-12 Compute Servers	Nodes	Storage capacity	Switches
5	20	360TB	One private and two public
6	24	432TB	One private and two public
7	28	504TB	Two private and four public
8	32	576TB	Two private and four public
9	36	648TB	Two private and four public
10	40	720TB	Two private and four public
11	44	792TB	Two private and four public
12 (maximum configuration)	48	864TB	Two private and four public

**C-Series (Gen2) upgrade paths**

C-Series upgrades consist of the disks and infrastructure hardware that is needed to move from the existing model number to the next higher model number. To upgrade by more than one model level, order the upgrades for each level and apply them in one service call.

**Table 12** C-Series (Gen2) upgrades

Model number	Disk upgrade (to the next higher model)	Hardware upgrade (to the next higher model)
2 Phoenix-12 Compute Servers (minimum configuration)	Not applicable	Not applicable
3 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
4 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
5 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
6 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
7 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes) and one private and two public switches
8 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
9 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
10 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)

**Table 12** C-Series (Gen2) upgrades (continued)

Model number	Disk upgrade (to the next higher model)	Hardware upgrade (to the next higher model)
11 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
12 Phoenix-12 Compute Servers (maximum configuration)	12 integrated disks	One server chassis (four nodes)

## C-Series Appliance (Gen1) configurations and upgrade paths

Describes the first generation C-Series ECS Appliance configurations and the upgrade paths between the configurations. Gen1 hardware became generally available in March 2015.

### C-Series (Gen1) configurations

The C-Series Appliance is a dense compute solution using commodity hardware.

**Table 13** C-Series (Gen1) configurations

Phoenix-12 Compute Servers	Nodes	Storage capacity	Switches
2 (minimum configuration)	8	144TB	One private and two public
3	12	216TB	One private and two public
4	16	288TB	One private and two public
5	20	360TB	One private and two public
6	24	432TB	One private and two public
7	28	504TB	Two private and four public
8	32	576TB	Two private and four public
9	36	648TB	Two private and four public
10	40	720TB	Two private and four public
11	44	792TB	Two private and four public
12 (maximum configuration)	48	864TB	Two private and four public

### C-Series (Gen1) upgrade paths

C-Series upgrades consist of the disks and infrastructure hardware that is needed to move from the existing model number to the next higher model number. To upgrade by more than one model level, order the upgrades for each level and apply them in one service call.

**Table 14** C-Series (Gen1) upgrades

Model number	Disk upgrade (to the next higher model)	Hardware upgrade (to the next higher model)
2 Phoenix-12 Compute Servers (minimum configuration)	Not applicable	Not applicable
3 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
4 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
5 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
6 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
7 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes) and one private and two public switches
8 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
9 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
10 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
11 Phoenix-12 Compute Servers	12 integrated disks	One server chassis (four nodes)
12 Phoenix-12 Compute Servers (maximum configuration)	12 integrated disks	One server chassis (four nodes)

## Certified hardware in support of ECS 3.2

The following table lists the latest hardware pre-qualified for a Certified installation.

### Note

All Arista switch models listed also ship standard with the ECS Appliance.

**Table 15** ECS Certified hardware

Server models	Switch models
<ul style="list-style-type: none"> <li>Dell DSS7000</li> <li>Dell R730xd</li> <li>HP Proliant SL4540 Gen8</li> </ul>	<p>One 1 GbE private switch is required to handle management traffic:</p> <ul style="list-style-type: none"> <li>Arista 7010T- 48</li> <li>Arista 7048T</li> </ul>

**Table 15** ECS Certified hardware

Server models	Switch models
	<ul style="list-style-type: none"> <li>• Dell S3048-ON</li> <li>• Cisco Nexus 3048</li> </ul> <p>Two 10 GbE switches are required to handle data traffic:</p> <ul style="list-style-type: none"> <li>• Arista 7050SX-64</li> <li>• Arista 7050S-52</li> <li>• Arista 7150S-24</li> <li>• Arista 7124SX</li> </ul>



# CHAPTER 2

## Servers

- [ECS Appliance servers](#)..... 26
- [Rack and node host names](#).....30

## ECS Appliance servers

Provides a quick reference of servers.

ECS has the following server types:

- D-Series Gen2 Rinjin-16 for Object and HDFS (October 2016)
- U-Series Gen2 Rinjin-16 for Object and HDFS (November 2015)
- U-Series Gen1 Phoenix-16 for Object and HDFS (June 2014)
- C-Series Gen2 Rinjin-12 for Object and HDFS (February 2016)
- C-Series Gen1 Phoenix-12 for Object and HDFS (March 2015)

### D-Series

D-Series Rinjin-16 nodes have the following standard features:

- Four-node servers (2U) with two CPUs per node
- 2.4 GHz six-core Haswell CPUs
- Eight 8 GB DDR4 RDIMMs
- One system disk per node (400 GB SSD)
- LED indicators for each node
- Dual hot-swap chassis power supplies
- One high density SAS cable with one connector

### U-Series

U-Series Gen2 Rinjin-16 nodes have the following standard features:

- Four-node servers (2U) with two CPUs per node
- 2.4 GHz six-core Haswell CPUs
- Eight 8 GB DDR4 RDIMMs
- One system disk per node (400GB SSD)
- LED indicators for each node
- Dual hot-swap chassis power supplies
- One SAS adapter with two SAS ports per node

U-Series Gen1 Phoenix-16 nodes have the following standard features:

- Four-node servers (2U) with two CPUs per node
- 2.4 GHz four-core Ivy Bridge CPUs
- Four channels of native DDR3 (1333) memory
- One system disk per node (either a 200 GB or 400 GB SSD)
- LED indicators for each node
- Dual hot-swap chassis power supplies
- One SAS adapter with one SAS port per node

### C-Series

C-Series Gen2 Rinjin-12 nodes have the following standard features:

- Four-node servers (2U) with two CPUs per node
- 2.4 GHz six-core Haswell CPUs

- Eight 8 GB DDR4 RDIMMs
- One system disk per node
- LED indicators for each node
- Dual hot-swap chassis power supplies

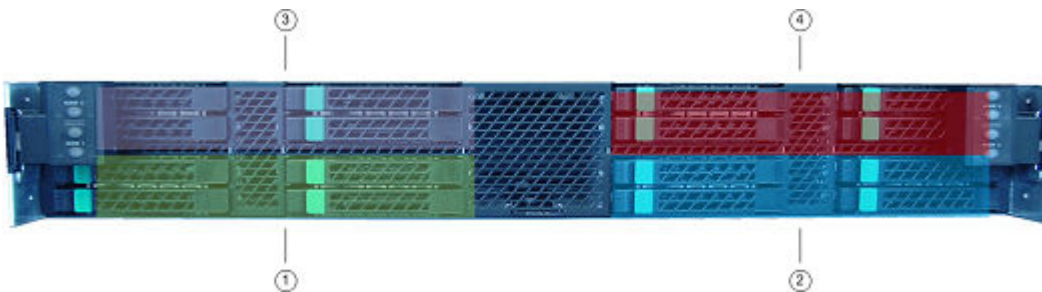
C-Series Gen1 Phoenix-12 nodes have the following standard features:

- Four-node servers (2U) with two CPUs per node
- 2.4 GHz four-core Ivy Bridge CPUs
- Four channels of native DDR3 (1333) memory
- The first disk that is assigned to each node is a 6TB hybrid system/storage disk
- LED indicators for each node
- Dual hot-swap chassis power supplies. Supports N + 1 power.
- 12 3.5" hot-swap SATA hard drives per server (three for each node)

## Server front views

The following figure shows the server chassis front with the four nodes identified.

**Figure 4** Phoenix-16 (Gen1) and Rinjin-16 (Gen2) server chassis front view

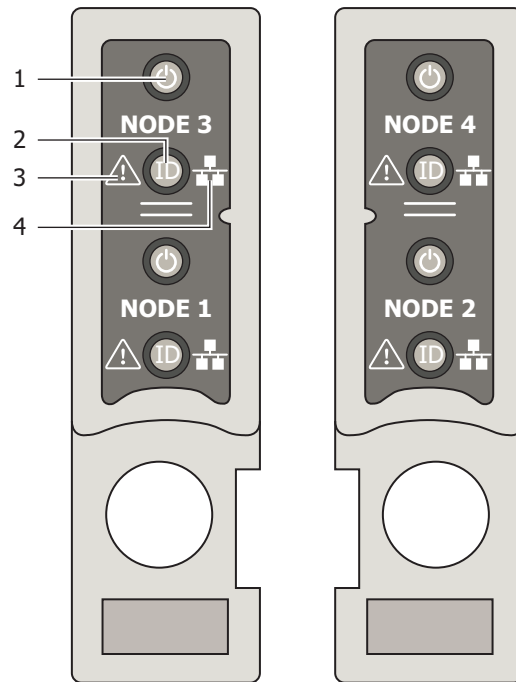


The following figure shows the server chassis front identifying the integrated disks assigned to each node.

**Figure 5** Phoenix-12 (Gen1) and Rinjin-12 (Gen2) server chassis front view



LED indicators are on the left and right side of the server front panels.

**Table 16** Server LEDs

CL5558

1. System Power Button with LED for each node.
2. System ID LED Button for each node.
3. System Status LED for each node.
4. LAN Link/Activity LED for each node.

## Server rear view

The Rinjin-16, Phoenix-16, Rinjin-12, and the Phoenix-12 server chassis provide dual hot-swappable power supplies and four nodes.

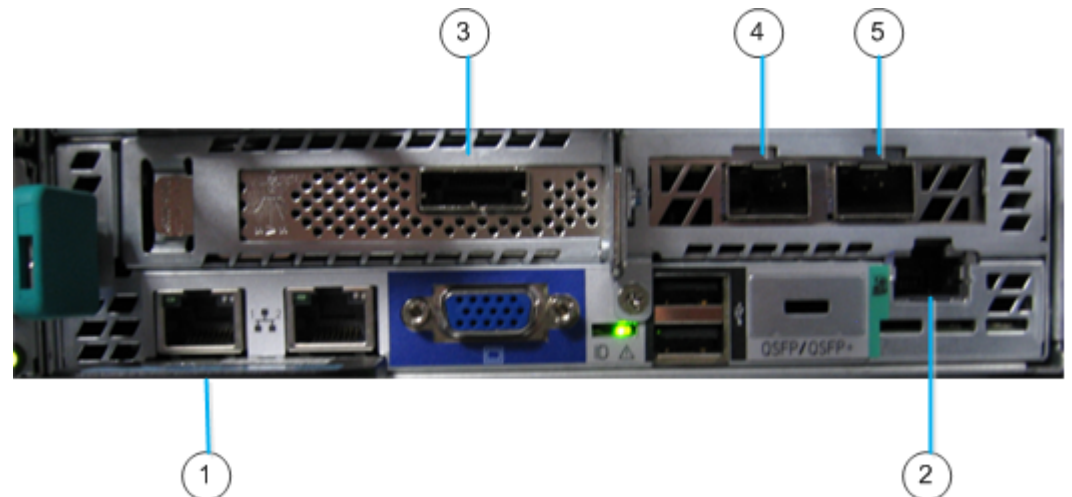
The chassis shares a common redundant power supply (CRPS) that enables HA power in each chassis that is shared across all nodes. The nodes are mounted on hot-swappable trays that fit into the four corresponding node slots accessible from the rear of the server.

**Figure 6** Server chassis rear view (all)

1. Node 1
2. Node 2
3. Node 3
4. Node 4

**Note**

In the second server chassis in a five- or six- node configuration, the nodes (blades) must be populated starting with the node 1 slot. Empty slots must have blank fillers.

**Figure 7** Rear ports on nodes (all)

1. 1 GbE: Connected to one of the data ports on the 1 GbE switch

2. RMM: A dedicated port for hardware monitoring (per node)
3. SAS to DAE. Used on U- and D-Series servers only. U-Series Gen1 has a single port. U-Series Gen2 hardware has two ports. The D-Series has one high density SAS cable with one connector.
4. 10 GbE SW2 (*hare*): The left 10 GbE data port of each node is connected to one of the data ports on the 10 GbE (SW2) switch
5. 10 GbE SW1 (*rabbit*): The right 10 GbE data port of each node is connected to one of the data ports on the 10 GbE (SW1) switch

## Rack and node host names

Lists the default rack and node host names for an ECS appliance.

Default rack IDs and color names are assigned in installation order as shown below:

**Table 17** Rack ID 1 to 50

Rack ID	Rack color	Rack ID	Rack color	Rack ID	Rack color
1	red	18	carmine	35	cornsilk
2	green	19	auburn	36	ochre
3	blue	20	bronze	37	lavender
4	yellow	21	apricot	38	ginger
5	magenta	22	jasmine	39	ivory
6	cyan	23	army	40	carnelian
7	azure	24	copper	41	taupe
8	violet	25	amaranth	42	navy
9	rose	26	mint	43	indigo
10	orange	27	cobalt	44	veronica
11	chartreuse	28	fern	45	citron
12	pink	29	sienna	46	sand
13	brown	30	mantis	47	russet
14	white	31	denim	48	brick
15	gray	32	aquamarine	49	avocado
16	beige	33	baby	50	bubblegum
17	silver	34	eggplant		

Nodes are assigned node names based on their order within the server chassis and within the rack itself. The following table lists the default node names.

**Table 18** Default node names

Node	Node name	Node	Node name	Node	Node name
1	provo	9	boston	17	memphis

**Table 18** Default node names (continued)

Node	Node name	Node	Node name	Node	Node name
2	sandy	10	chicago	18	seattle
3	orem	11	houston	19	denver
4	ogden	12	phoenix	20	portland
5	layton	13	dallas	21	tucson
6	logan	14	detroit	22	atlanta
7	Lehi	15	columbus	23	fresno
8	murray	16	austin	24	mesa

Nodes positioned in the same slot in different racks at a site will have the same node name. For example node 4 will always be called `ogden`, assuming you use the default node names.

The `getrackinfo` command identifies nodes by a unique combination of node name and rack name. For example, node 4 in rack 4 and node 4 in rack 5 will be identified as:

```
ogden-green
ogden-blue
```

and can be pinged using their NAN resolvable (via mDNS) name:

```
ogden-green.nan.local
ogden-blue.nan.local
```





# CHAPTER 3

## Switches

- [ECS Appliance switches](#).....34

## ECS Appliance switches

Provides a quick reference of private and public switches.

- Private switch—One 1 GbE private switch to handle management traffic. In a C-Series appliance with more than six servers, a second private switch is added.
- Public switch—Two 10 GbE switches to handle data traffic. In a C-Series appliance with more than six servers, two more public switches are added.

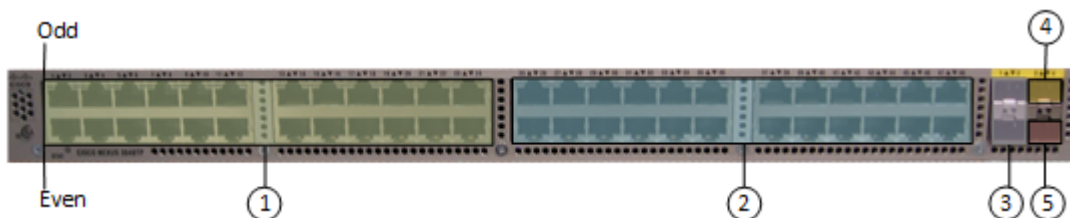
**Table 19** ECS Appliance switch summary

Switch model	Part number	Type	Used in
Arista 7010T-48	100-400-120-xx	Private 1 GbE (Turtle)	<ul style="list-style-type: none"> <li>• D-Series</li> <li>• U-Series Gen2</li> <li>• U-Series Gen1</li> <li>• C-Series Gen2</li> <li>• C-Series Gen1</li> </ul>
Arista 7048T	100-585-063-xx	Private 1 GbE (Turtle)	<ul style="list-style-type: none"> <li>• U-Series Gen2</li> <li>• U-Series Gen1</li> <li>• C-Series Gen2</li> <li>• C-Series Gen1</li> </ul>
Cisco 3048 48-P This switch is available when customers are supplying their own public Cisco switches through an RPQ.	100-400-130-xx	Private 1 GbE (Turtle)	<ul style="list-style-type: none"> <li>• D-Series</li> <li>• U-Series Gen2</li> </ul>
Arista 7050SX-64	100-400-065-xx	Public 10 GbE (Hare and Rabbit)	<ul style="list-style-type: none"> <li>• D-Series</li> <li>• U-Series Gen2</li> <li>• C-Series Gen2</li> <li>• C-Series Gen1</li> </ul>
Arista 7050S-52	100-585-062-xx	Public 10 GbE (Hare and Rabbit)	<ul style="list-style-type: none"> <li>• U-Series Gen2</li> <li>• C-Series Gen2</li> <li>• C-Series Gen1</li> </ul>
Arista 7150S-24	100-564-196-xx	Public 10 GbE (Hare and Rabbit)	U-Series Gen1
Arista 7124SX	100-585-061-xx	Public 10 GbE (Hare and Rabbit)	U-Series Gen1

## Private switch: Cisco 3048 48-P

The private switch is used for management traffic. It has 52 ports and dual power supply inputs. The switch is configured in the factory.

**Figure 8** Cisco 3048 ports (rear)



**Figure 9** Cisco 3048 ports (front)



**Table 20** Cisco 3048 switch configuration detail

Figure label	Ports	Connection description
1	1–24	Connected to the MGMT (eth0) network ports on the nodes (blue cables).
2	25–48	Connected to the RMM network ports on the nodes (gray cables).
3	49	The 1 GbE management port. This port is connected to rabbit (bottom) 10GB switch management port. See Note 2.
3	50	The 1 GbE management port. This port is connected to hare (top) 10GB switch management port. See Note 2.
4	51	Rack/Segment Interconnect IN. See Note 1 and 2.
5	52	52 Rack/Segment Interconnect OUT. See Note 1 and 2.
6	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch. This port is on the front of the switch.

**Note**

1. The NAN (Nile Area Network) links all ECS Appliances at a site.
2. Ports 49 through 52 use CISCO 1G BASE-T SFPs (part number 100-400-141). In an ECS Appliance, these four SFPs are installed in the 1 GbE switch. In a customer-supplied rack order, these SFPs need to be installed.

**Private switch: Arista 7010T-48**

The private switch is used for management traffic. It has 52 ports and dual power supply inputs. The switch is configured in the factory.

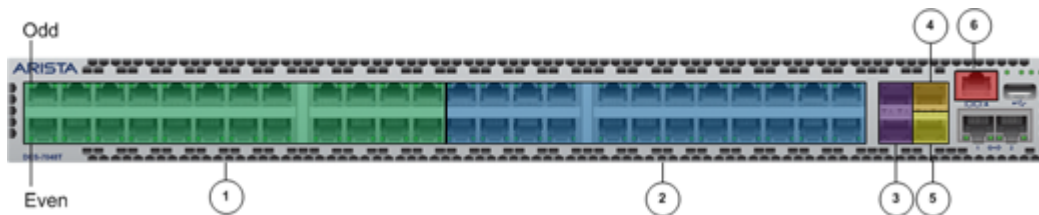
**Figure 10** Arista 7010T-48 ports**Table 21** Arista 7010T-48 switch configuration detail

Figure label	Ports	Connection description
1	1–24	Connected to the MGMT (eth0) network ports on the nodes (blue cables).
2	25–48	Connected to the RMM network ports on the nodes (gray cables).
3	49	The 1 GbE management port. This port is connected to rabbit (bottom) 10GB switch management port. See Note 2.
3	50	The 1 GbE management port. This port is connected to hare (top) 10GB switch management port. See Note 2.
4	51	Rack/Segment Interconnect IN. See note 1 and 2.
5	52	52 Rack/Segment Interconnect OUT. See note 1 and 2.
6	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

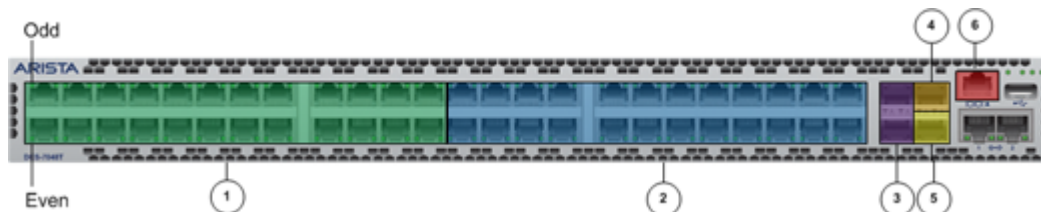
**Note**

1. The NAN (Nile Area Network) links all ECS Appliances at a site.
2. Ports 49 through 51 contain SFPs (RJ45 copper). In an ECS Appliance or a customer-supplied rack order, these four SFPs are installed in the 1 GbE switch.

## Private switch: Arista 7048T-48

The private switch is used for management traffic. It has 52 ports and dual power supply inputs. The switch is configured in the factory.

**Figure 11** Arista 7048T-48 ports



**Table 22** Arista 7048T-48 switch configuration detail

Figure label	Ports	Connection description
1	1–24	Connected to the MGMT (eth0) network ports on the nodes (blue cables).
2	25–48	Connected to the RMM network ports on the nodes (gray cables).
3	49	The 1 GbE management port. This port is connected to rabbit (bottom) 10GB switch management port. See Note 2.
3	50	The 1 GbE management port. This port is connected to hare (top) 10GB switch management port. See Note 2.
4	51	Rack/Segment Interconnect IN. See Note 1 and 2.
5	52	52 Rack/Segment Interconnect OUT. See Note 1 and 2.
6	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

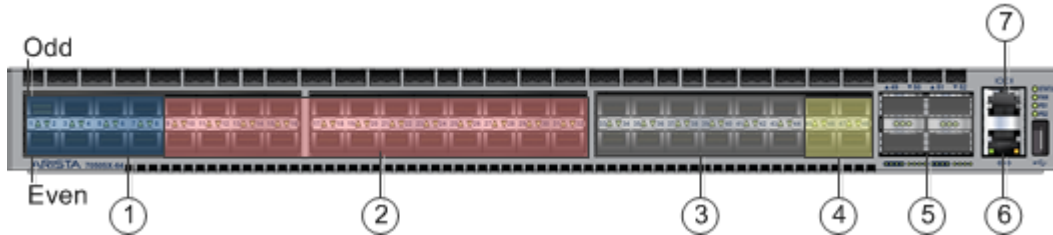
### Note

1. The NAN (Nile Area Network) links all ECS Appliances at a site.
2. Ports 49 through 51 contain SFPs (RJ45 copper). In an ECS Appliance or a customer-supplied rack order, these four SFPs are installed in the 1 GbE switch.

## Public switch: Arista 7050SX-64

The 7050SX-64 switch is a 52-port switch. The switch is equipped with 52 SFP+ ports, dual hot-swap power supplies, and redundant, field-replaceable fan modules.

**Figure 12** Arista 7050SX-64 ports



**Table 23** 7050SX-64 switch port connections used on the top 10 GbE switch (*hare*)

Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2	9–32	The 10 GbE node data ports, only ports 9–16 are used in the U- and D-Series. These ports are connected to the left 10 GbE (P02) interface on each node. SR Optic.
3	33–44	Unused.
4	45–48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the other 10 GbE switch ( <i>rabbit</i> ). SR Optic.
5	49–52	Unused.
6	<...>	The 1 GbE management port. This port is connected to port 50 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

**Table 24** 7050SX-64 switch port connections used on the bottom 10 GbE switch (*rabbit*)

Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2	9–32	The 10 GbE node data ports, only ports 9–16 are used in the U- and D-Series. These ports are connected to the right 10 GbE (P01) interface on each node. SR Optic.
3	33–44	Unused.
4	45–48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the other 10 GbE switch ( <i>hare</i> ). SR Optic.
5	49–52	Unused.

**Table 24** 7050SX-64 switch port connections used on the bottom 10 GbE switch (*rabbit*) (continued)

Figure label	Ports	Connection description
6	<...>	The 1 GbE management port. This port is connected to port 49 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

#### Note

10 GbE switches ship with one SFP - RJ-45 copper SFP installed in port 1. Fibre SFPs can be ordered through Dell EMC. An ECS appliance that is shipped in a Dell EMC rack has all SFPs installed, but not installed for a customer rack installation. In either case, the switch may require additional SFPs to be installed or reconfigured in ports 1–8 based on customer uplink configuration.

## Public switch: Arista 7050S-52

The 7050S-52 switch is a 52-port switch. The switch is equipped with 52 SFP+ ports, dual hot-swap power supplies, and redundant, field-replaceable fan modules.

**Figure 13** Arista 7050S-52 ports



**Table 25** 7050S-52 switch port connections used on the top 10 GbE switch (*hare*)

Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2	9–32	The 10 GbE node data ports, only ports 9–16 are used in the U- and D-Series. These ports are connected to the left 10 GbE (P02) interface on each node. SR Optic.
3	33–44	Unused.
4	45–48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the other 10 GbE switch ( <i>rabbit</i> ). SR Optic.
5	49–52	Unused.
6	<...>	The 1 GbE management port. This port is connected to port 50 of the management switch ( <i>turtle</i> ). RJ-45.

**Table 25** 7050S-52 switch port connections used on the top 10 GbE switch (*hare*) (continued)

Figure label	Ports	Connection description
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

**Table 26** 7050S-52 switch port connections used on the bottom 10 GbE switch (*rabbit*)

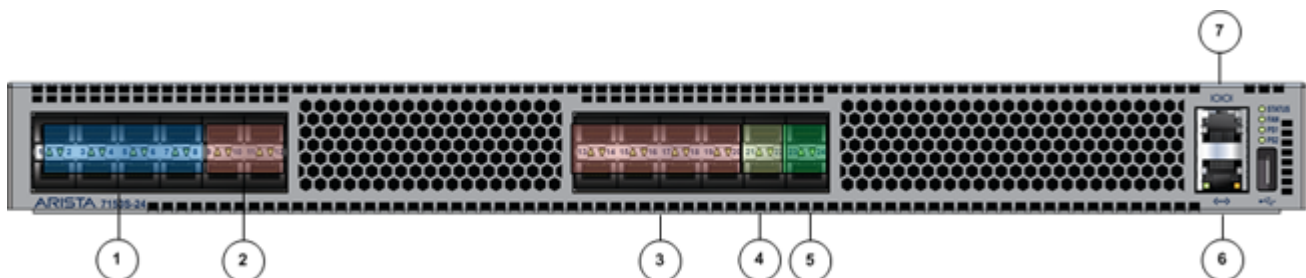
Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2	9–32	The 10 GbE node data ports, only ports 9–16 are used in the U- and D-Series. These ports are connected to the right 10 GbE (P01) interface on each node. SR Optic.
3	33–44	Unused.
4	45–48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the other 10 GbE switch ( <i>hare</i> ). SR Optic.
5	49–52	Unused.
6	<...>	The 1 GbE management port. This port is connected to port 49 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

**Note**

10 GbE switches ship with one SFP - RJ-45 copper SFP installed in port 1. Fibre SFPs can be ordered through Dell EMC. An ECS appliance that is shipped in a Dell EMC rack has all SFPs installed, but not installed for a customer rack installation. In either case, the switch may require additional SFPs to be installed or reconfigured in ports 1–8 based on customer uplink configuration.

**Public switch: Arista 7150S-24**

The 7150S-24 switch is a 24 port switch. The switch is equipped with 24 SFP+ ports, dual hot-swap power supplies, and redundant, field-replaceable fan modules.

**Figure 14** Arista 7150S-24 ports



**Table 27** 7150S switch port connections used on the top 10 GbE switch (*hare*)

Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2, 3	9–20	The 10 GbE node data ports. Only ports 9–16 are used in U- and D-Series. These ports are connected to the left (P02) 10 GbE interface on each node. SR Optic.
4, 5	21–24	Unused.
4	45–48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the bottom 10 GbE switch ( <i>rabbit</i> ). SR Optic.
5	49–52	Unused.
6	<...>	The 1 GbE management port. This port is connected to port 50 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

**Table 28** 7150S switch port connections used on the bottom 10 GbE switch (*rabbit*)

Figure label	Ports	Connection description
1	1–8	The 10 GbE uplink data ports. These ports provide the connection to the customer's 10 GbE infrastructure. SR Optic. See note.
2, 3	9–20	The 10 GbE node data ports. Only ports 9–16 are used in U- and D-Series. These ports are connected to the right (P01) 10 GbE interface on each node. SR Optic.
4, 5	21–24	The 10 GbE LAG ports. These ports are connected to the LAG ports on the top 10 GbE switch ( <i>hare</i> ). SR Optic.
6	<...>	The 1 GbE management port. This port is connected to port 49 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection. The Ethernet management port is connected to the 1 GbE management switch.

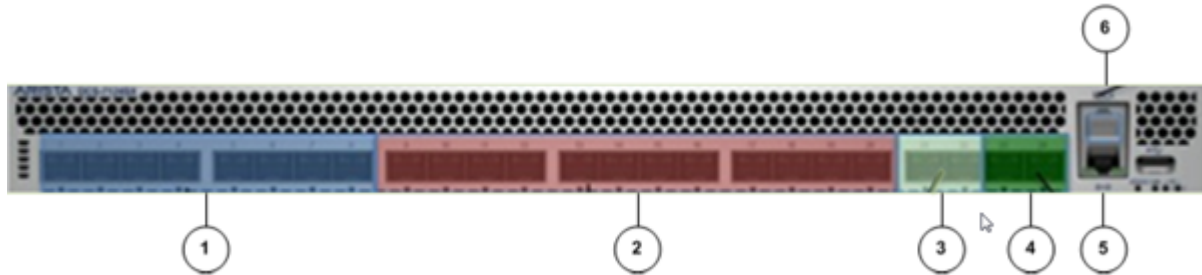
**Note**

10 GbE switches ship with one SFP - RJ-45 copper SFP installed in port 1. Fibre SFPs can be ordered through Dell EMC. An ECS appliance that is shipped in a Dell EMC rack has all SFPs installed, but not installed for a customer rack installation. In either case, the switch may require additional SFPs to be installed or reconfigured in ports 1–8 based on customer uplink configuration.

## Public switch: Arista 7124SX

The Arista 7124SX switch is equipped with 24 SFP+ ports, dual hot-swap power supplies, and redundant field replaceable fan modules.

**Figure 15** Arista 7124SX



**Table 29** 7124SX switch port connections used on the top 10 GbE switch (*hare*)

Figure label	Ports	Connection description
1	1-8	The 10 GbE uplink data ports. These ports provide the connection to the customers 10 GbE infrastructure. SR Optic. See note.
2, 3	9-20	The 10 GbE node data ports. Only ports 9-16 are used in U- and D-Series. These ports are connected to the left (P02) 10 GbE interface on each node. SR Optic.
4, 5	21-24	Unused.
4	45-48	The 10 GbE LAG ports. These ports are connected to the LAG ports on the bottom 10 GbE switch ( <i>rabbit</i> ). SR Optic.
5	49-52	Unused.
6	<...>	The 1 GbE management port. This port is connected to port 50 of the management switch ( <i>turtle</i> ). RJ-45.
7	Serial console	The console port is used to manage the switch through a serial connection and the Ethernet management port is connected to the 1 GbE management switch.

**Table 30** 7124SX switch port connections used on the bottom 10 GbE switch (*hare*)

Figure label	Ports	Connection description
1	1-8	The 10 GbE uplink data ports. These ports provide the connection to the customers 10 GbE infrastructure. SR Optic. See note.
2	9-20	The 10 GbE node data ports. Only ports 9-16 are used in U- and D-Series. These ports are connected to the right (P01) 10 GbE interface on each node. SR Optic.
3, 4	21-24	The 10 GbE LAG ports. These ports are connected to the LAG ports on the top 10 GbE switch ( <i>hare</i> ). SR Optic.

**Table 30** 7124SX switch port connections used on the bottom 10 GbE switch (*hare*) (continued)

Figure label	Ports	Connection description
5	<...>	The 1 GbE management port. This port is connected to port 49 of the management switch ( <i>turtle</i> ). RJ-45.
6	Serial console	The console port is used to manage the switch through a serial connection and the Ethernet management port is connected to the 1 GbE management switch.

**Note**

10 GbE switches ship with one SFP - RJ-45 copper SFP installed in port 1. Fibre SFPs can be ordered through Dell EMC. An ECS appliance that is shipped in a Dell EMC rack has all SFPs installed, but not installed for a customer rack installation. In either case, the switch may require additional SFPs to be installed or reconfigured in ports 1–8 based on customer uplink configuration.



# CHAPTER 4

## Disk Drives

- [Integrated disk drives](#).....46
- [Storage disk drives](#).....46
- [Disk array enclosures](#)..... 47

## Integrated disk drives

Describes disk drives that are integrated into the server chassis of the ECS Appliance.

### D-Series

In D-Series servers, OS disks are integrated into the server chassis and are accessible from the front of the server chassis. Each node has one OS SSD drive.

### U-Series

In U-Series servers, OS disks are integrated into the server chassis and are accessible from the front of the server chassis. Each node has one OS SSD drive.

---

#### Note

Early Gen1 appliances had two mirrored disks per node.

---

### C-Series

In C-Series servers with integrated storage disks, the disks are accessible from the front of the server chassis. The disks are assigned equally to the four nodes in the chassis. All disks must be the same size and speed. Gen1 uses 6 TB disks and Gen2 uses 8 TB and 12 TB disks.

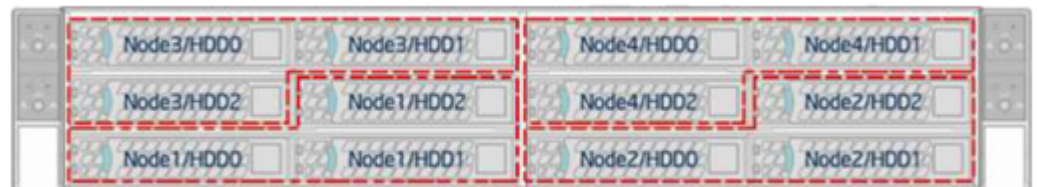
---

#### Note

In Gen1 only, the first integrated disk that is assigned to each node is called disk drive zero (HDD0). These storage drives contain some system data.

---

**Figure 16** C-Series (Gen1) Integrated disks with node mappings



## Storage disk drives

Describes the disk drives used in ECS Appliances.

**Table 31** Storage disk drives

Series and Generation	Service	Size	RPM	Type
D-Series D5600 and D7800	Object	10 TB	7200	SAS
D-Series D4500 and D6200, U-Series Gen2, C-Series Gen2	Object	8 TB	7200	SAS
U-Series Gen1, C-Series Gen1	Object	6 TB	7200	SATA
U-Series Gen2	Object	12 TB	7200	SAS

All disks integrated into a server chassis or in a DAE must conform to these rules:

- All disk drives must be the same size within a DAE
- All disk drives must be the same speed

## Disk array enclosures

The D-Series and U-Series Appliance include disk array enclosures (DAEs). The DAE is a drawer that slides in and out of the 40U rack. The storage disk drives, I/O modules, and cooling modules are located inside of the DAE.

---

### Note

Use the [power and weight calculator](#) to plan for the weight of the configuration.

---

ECS Appliances use two types of DAE:

- The D-Series includes the Pikes Peak (dense storage) enclosure, which can hold up to 98 disks.
- The U-Series includes the Voyager DAE, which can hold up to 60 disks.

The C-Series does not use DAEs. C-Series servers have integrated disks: 12 3.5-inch disk drives accessible from the front of each server.

### Pikes Peak (dense storage)

The Pikes Peak enclosure has the following features:

- Seven sleds with up to 14 3.5-inch disk drives each in a single 4U drawer (up to 98 disk drives total). Serviced from the front, after removing the I/O module.
- One I/O module containing two replaceable power supply units (PSUs). Serviced from the front.
- Three exhaust fans or cooling modules; n+1 redundant. Serviced from the rear.
- Two power supplies; n+1 redundant. Serviced from within the I/O module in front.
- Blank filler sleds for partially populated configurations.
- Two 4-lane 12 Gb/s SAS 3.0 interconnects.
- 19" 4U 1m deep chassis.

### Voyager DAE

The Voyager DAE has the following features:

- 3.5-inch disk drives in a single 4U drawer. Serviced from the front.
- One Link Control Card (LCC). Serviced from the front.
- One Inter-Connect Module (ICM). Serviced from the back.
- Three fans or cooling modules; n+1 redundant. Serviced from the front.
- Two power supplies; n+1 redundant. Serviced from the back.

## Pikes Peak (dense storage)

The Pikes Peak enclosure is used in D-Series ECS Appliances.

### Chassis, sleds, and disks

#### Chassis

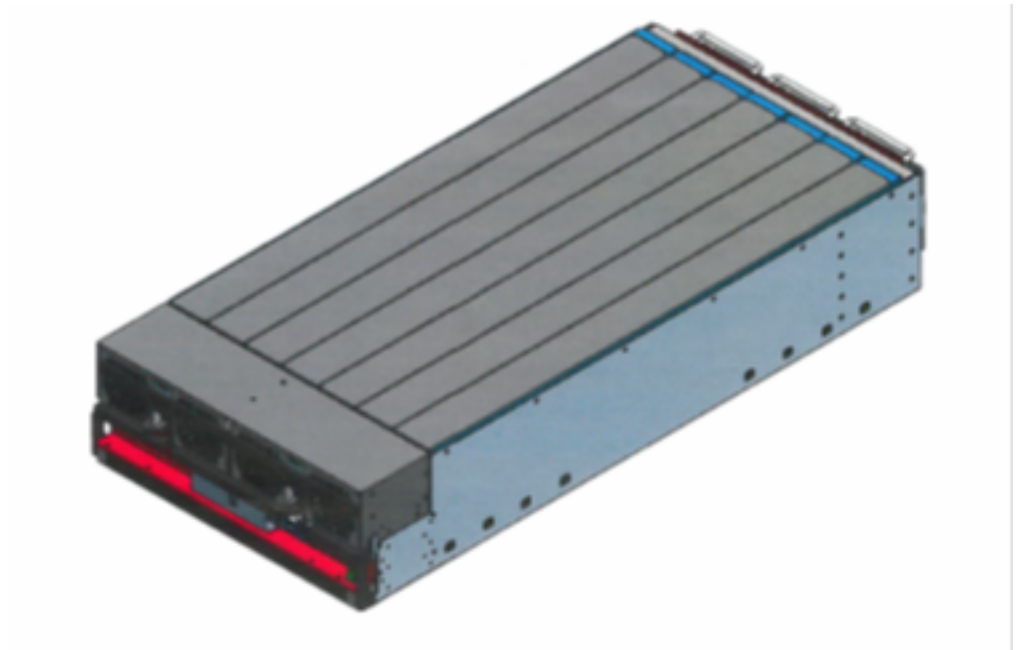
The chassis is composed of:

- Seven sleds with up to 14 3.5-inch disk drives each in a single 4U drawer (up to 98 disk drives total). Serviced from the front, after removing the I/O module.

- One I/O module containing two replaceable power supply units (PSUs). Serviced from the front.
- Three exhaust fans or cooling modules; n+1 redundant. Serviced from the rear.
- Two power supplies; n+1 redundant. Serviced from within the I/O module in front.
- Blank filler sleds for partially populated configurations.
- Two 4-lane 12 Gb/s SAS 3.0 interconnects.
- 19" 4U 1m deep chassis.

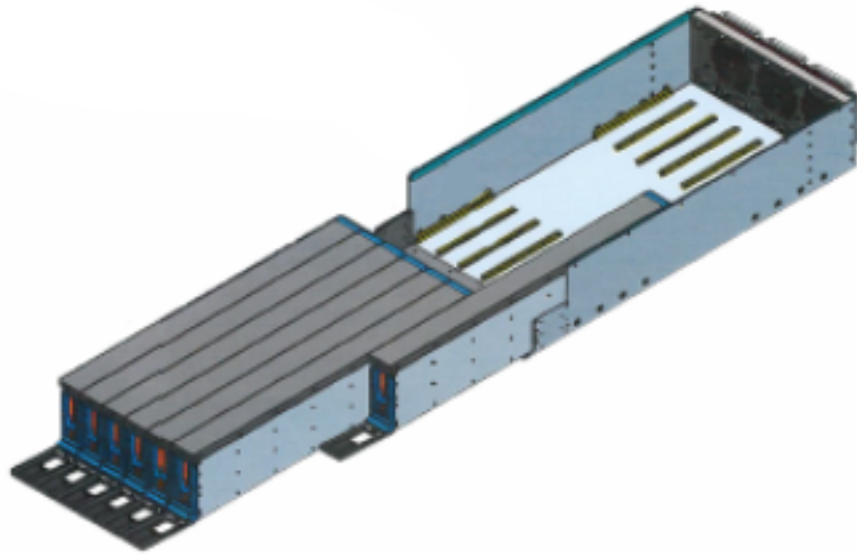
Replacing a sled, a drive, or the I/O module requires taking the DAE offline (cold service). All drives in the DAE are inaccessible during the cold service. However, the identify LEDs will continue to operate for 15 minutes after power is disconnected.

**Figure 17** Pikes Peak chassis

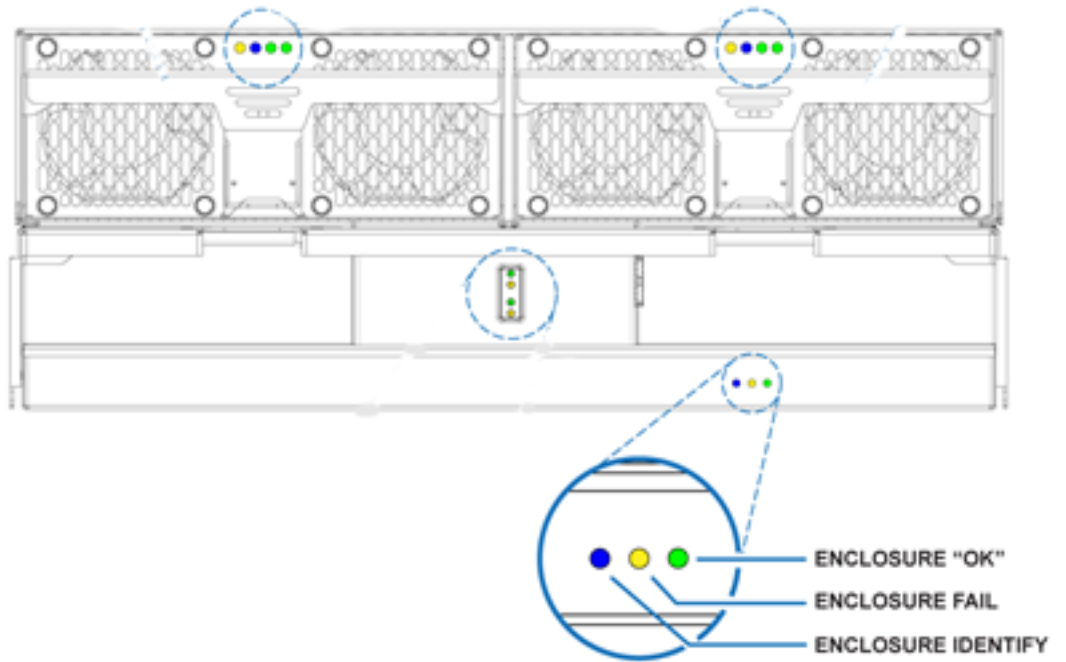




**Figure 18** Pikes Peak chassis with I/O module and power supplies removed, sleds extended



**Figure 19** Enclosure LEDs from the front



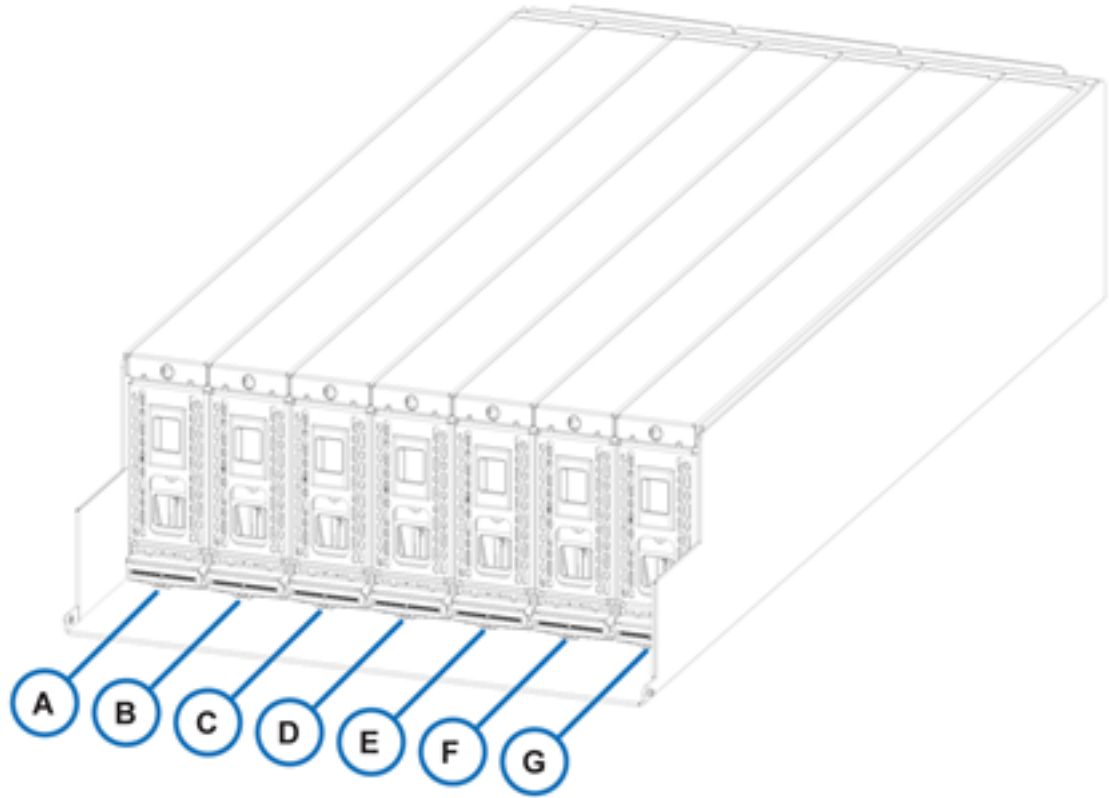
**Table 32** Enclosure LEDs

LED	Color	State	Description
Enclosure "OK"	Green	Solid	Enclosure operating normally
Enclosure Fail	Yellow	Fast flashing	Enclosure failure
Enclosure Identify	Blue	Slow flashing	Enclosure received an identify command

### Sleds and disks

The seven sleds are designated by letters A through G.

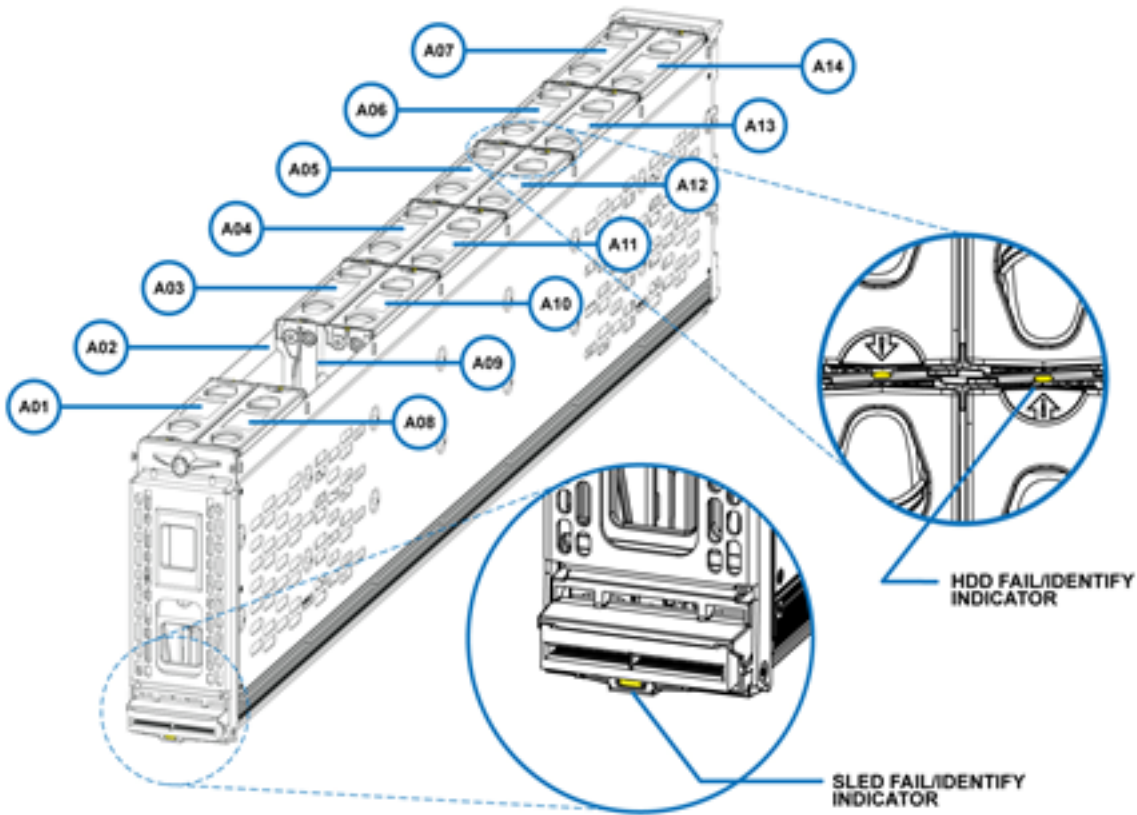
**Figure 20** Sleds letter designations



Each sled must be fully populated with 14 8 TB drives of the same speed. The D6200 uses seven sleds and the D4500 uses five sleds. In the D4500 configuration, sleds positions C and E are populated by blank filler sleds. Sleds are serviced by pulling the sled forward and removing the cover.

Drives are designated by the sled letter plus the slot number. The following figure shows the drive designators for sled A.

**Figure 21** Drive designations and sled LEDs



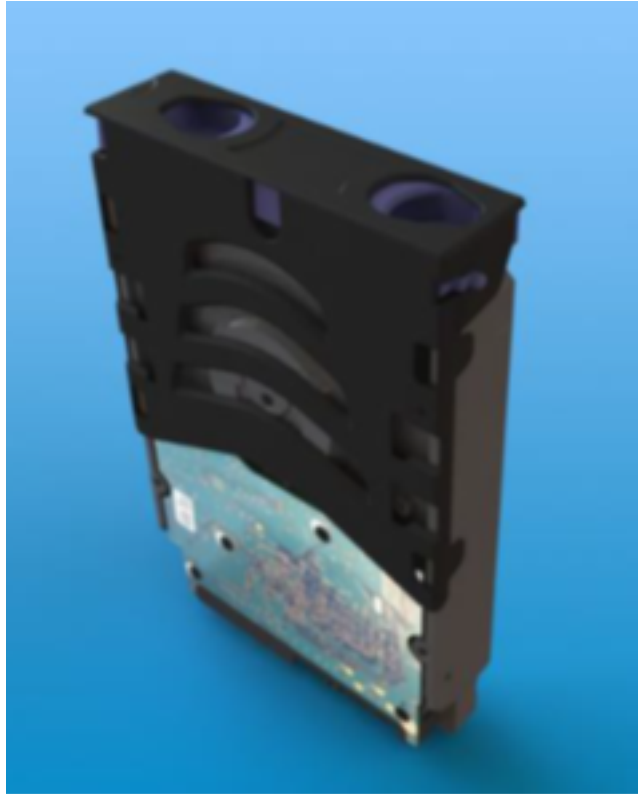
Each sled and drive slot has an LED to indicate failure or to indicate that the LED was enabled by an identify command.

**Table 33** Sled and drive LEDs

LED	Color	State	Description
Sled Identify/Fail	Amber	Slow Flashing	Link received an identify command
HDD Identify/Fail	Amber	Fast Flashing	SAS link failure

Each drive is enclosed in a tool-less carrier before it is inserted into the sled.

**Figure 22** Disk drive in carrier



**Figure 23** Empty drive carrier

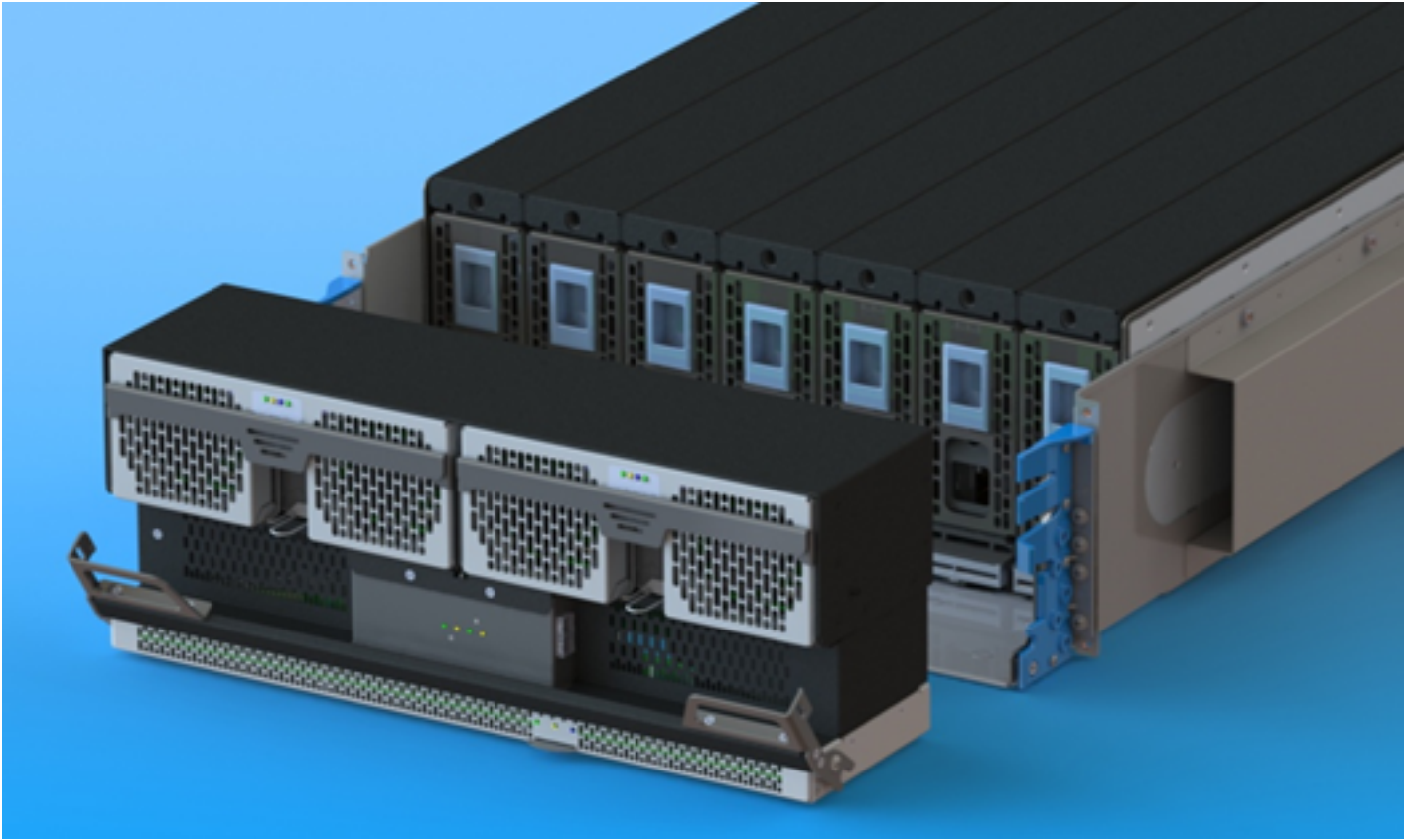


## I/O module and power supplies

### **I/O module**

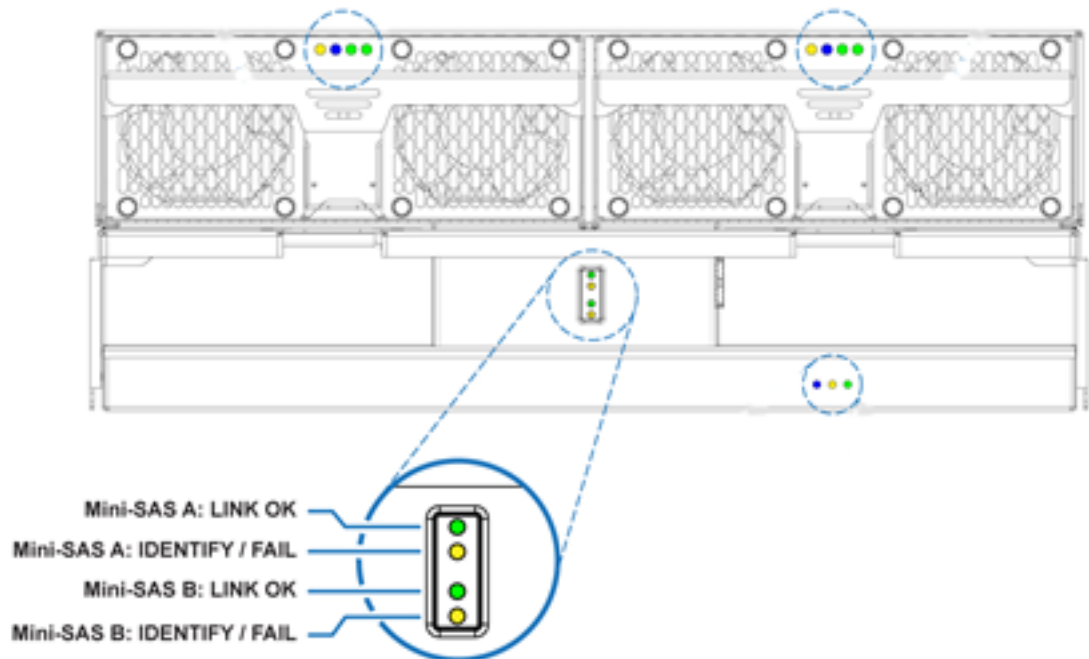
At the front of the enclosure is a removable base that includes the I/O module on the bottom and two power supplies on top. The I/O module contains all of the SAS functionality for the DAE. The I/O module is replaceable after the DAE is powered off.

**Figure 24** I/O module separated from enclosure



The front of the I/O module has a set of status LEDs for each SAS link.

**Figure 25** SAS link LEDs



**Table 34** SAS link LEDs

LED	Color	State	Description
Mini-SAS Link OK	Green	Solid	Valid SAS link detected
Mini-SAS Identify/ Fail	Amber	Slow flashing	SAS link received an identify command
Mini-SAS Identify/ Fail	Amber	Fast flashing	SAS link failure

**Note**

The Link OK and SAS A and B Fail are not Green and Amber fast flashing when the DAE is powered on and the node/SCSi HBA is not online (NO LINK).

While the I/O module hardware used in the D-Series is identical between 8TB and 10 TB models, the software configuration of the I/O module is different depending on the disks used in the model. Consequently, the I/O module field-replaceable unit (FRU) number is different depending on disk size:

- I/O module FRU for 8TB models (D4500 and D6200): 05-000-427-01
- I/O module FRU for 10TB models (D5600 and D7800): 105-001-028-00

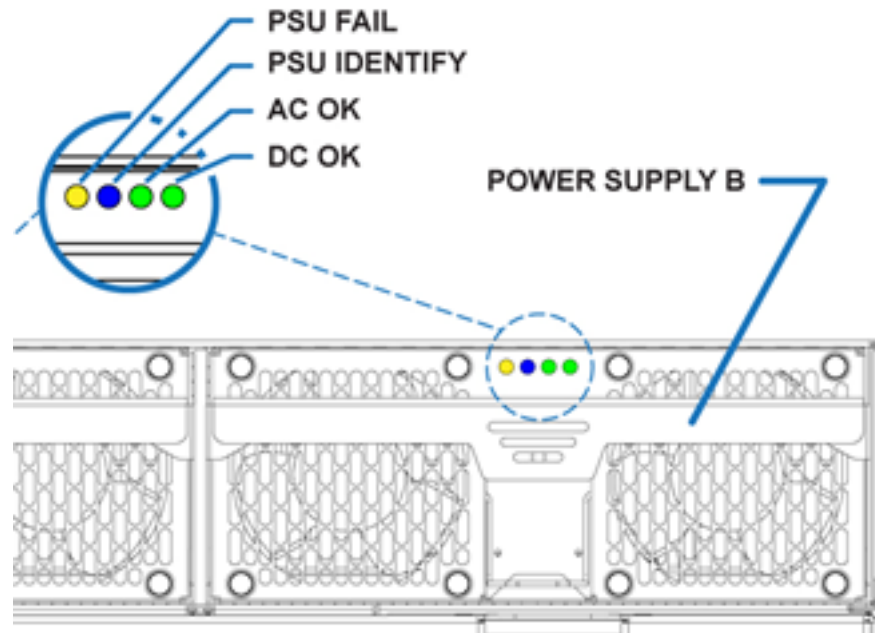
**Power supplies**

Two power supplies (n + 1 redundant) sit on top of the I/O module in front. A single power supply can be swapped without removing the I/O module assembly or powering off the DAE.

**Figure 26** Power supply separated from I/O module

At the top of each power supply is a set of status LEDs.

**Figure 27** Power supply LEDs

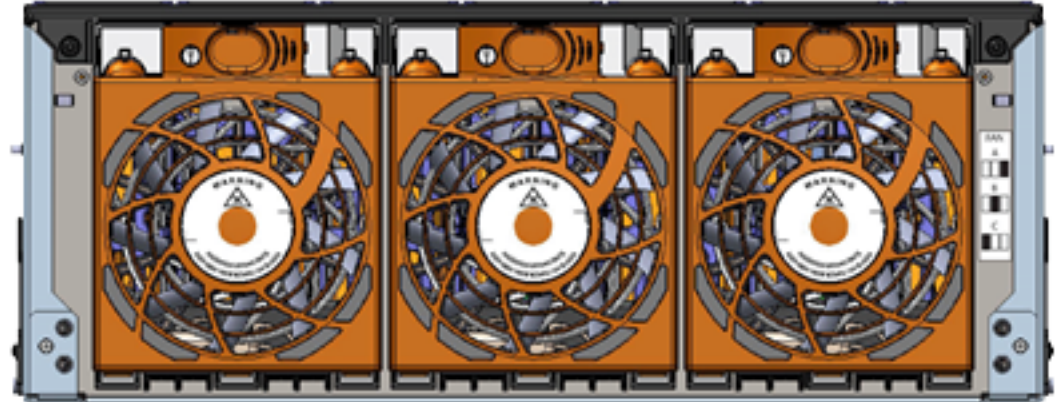


**Table 35** SAS link LEDs

LED	Color	State	Description
PSU Fail	Amber	Solid	There is a fault in the power supply
PSU Identify	Blue	Solid	The power supply received an identify command
AC OK	Green	Solid	AC power input is within regulation
DC OK	Green	Solid	DC power output is within regulation

## Fan modules

The Pikes Peak DAE has three hot-swappable managed system fans at the rear in a redundant 2-plus-1 configuration. Logic in the DAE will gracefully shut down the DAE if the heat becomes too high after a fan failure. A failed fan must be left in place until the fan replacement service call. Each fan has an amber fault LED. The fans are labeled A, B, and C from right to left.

**Figure 28** Enclosure fan locations

## Voyager DAE

The Voyager DAE is used in U-Series ECS Appliances.

### Disk drives in Voyager DAEs

Disk drives are encased in cartridge-style enclosures. Each cartridge has a latch that allows you to snap-out a disk drive for removal and snap-in for installation.

The inside of each Voyager has physically printed labels that are on the left and the front sides of the DAE that describe the rows (or banks) and columns (or slots) where the disk drives are installed.

The banks are labeled from A to E and the slots are labeled from 0 to 11. When describing the layout of disk drives within the DAE, the interface format for the DAE is called E\_D. That is, E indicates the enclosure, and D the disk. For example, you could have an interface format of 1\_B11. This format is interpreted as enclosure 1, in row (bank) B/slot number 11.

Enclosures are numbered from 1 through 8 starting at the bottom of the rack. Rear cable connections are color-coded.

The arrangement of disks in a DAE must match the prescribed layouts that are shown in the figures that follow. Not all layouts are available for all hardware.

Looking at the DAE from the front and above, the following figure shows the disk drive layout of the DAE.

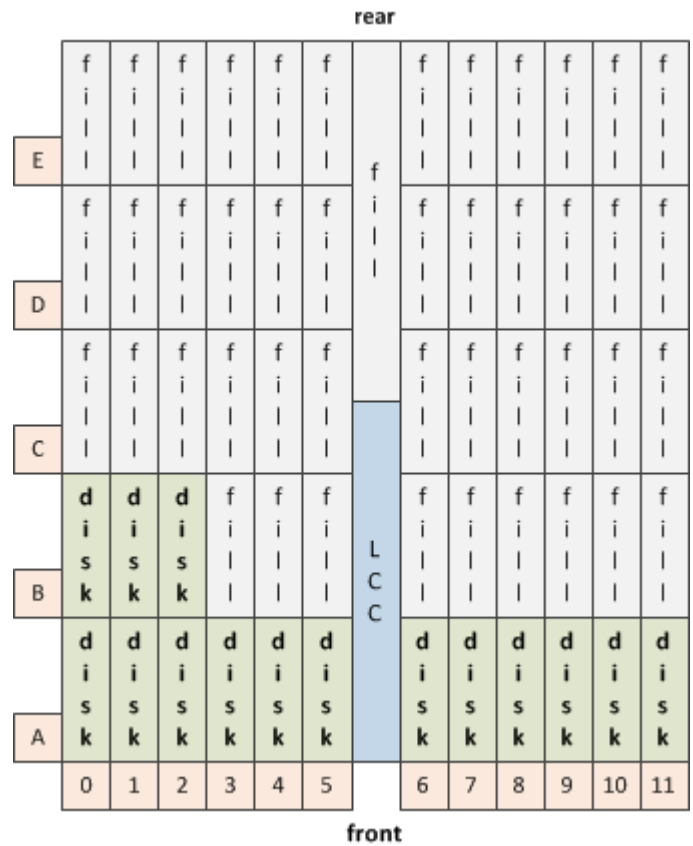
Disk population rules:

- The first disk must be placed at Row A Slot 0 with each subsequent disk placed next to it. When Row A is filled, the next disk must be placed in Row B Slot 0. (Do not skip a slot.)
- (Gen2) For a full-rack, each DAE must have the same number of disks from 10 to 60 in increments of 5.
- (Gen2) For a half-rack, each DAE must have the same number of disks from 10 to 60 in increments of 10.
- (Gen2) To upgrade a half-rack, add the "1 server, 4 DAEs, and 40 disk upgrade kit." Each DAE in the full rack must have the same number of disks. Add enough 40-disk upgrade kits to match the disks in the original DAEs.

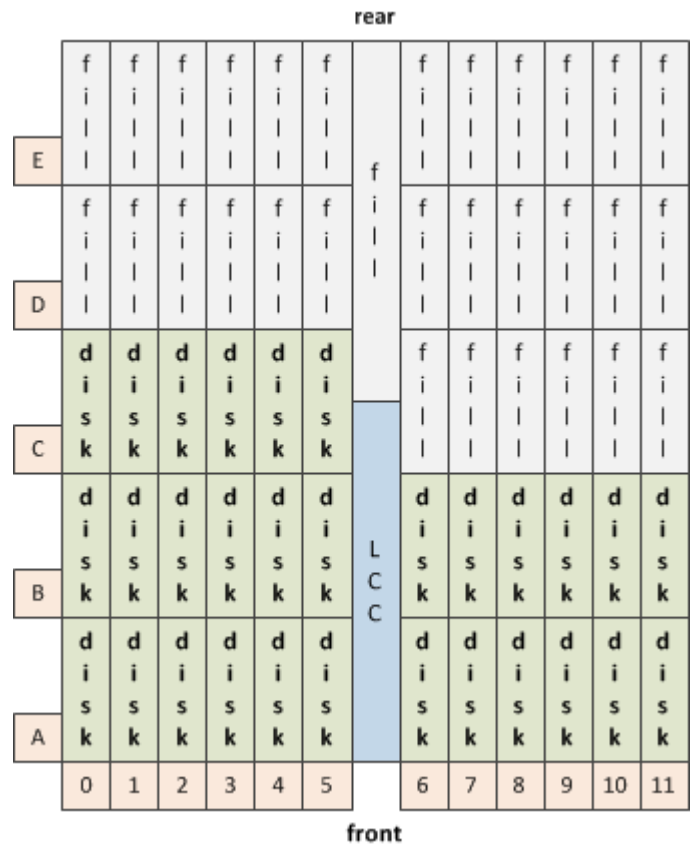




**Figure 30** U-Series disk layout for 15-disk configurations (Gen1, Gen2 full-rack only)

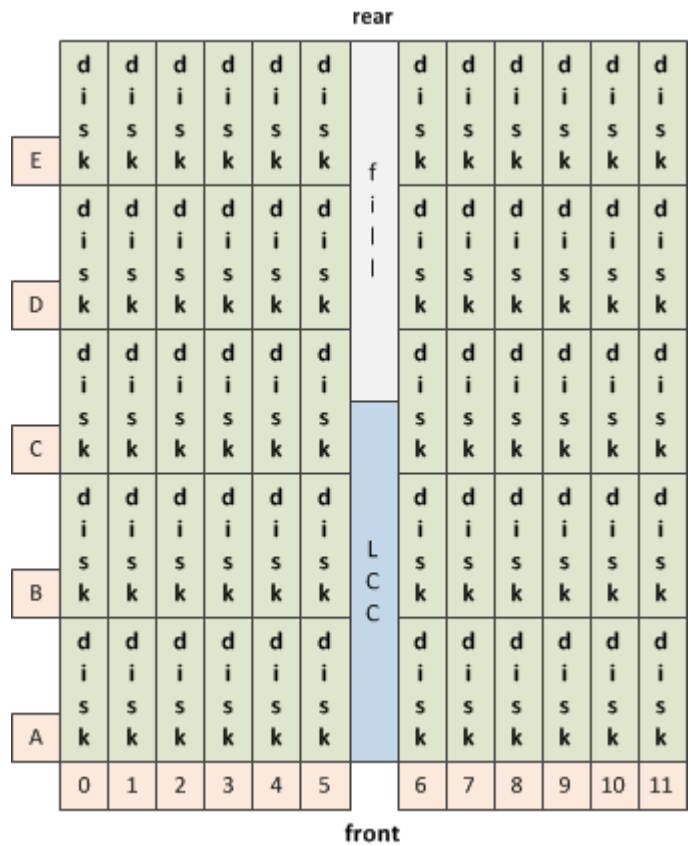


**Figure 31** U-Series disk layout for 30-disk configurations (Gen1, Gen2)





**Figure 33** U-Series disk layout for 60-disk configurations



### Link control cards

Each DAE includes a link control card (LCC) whose main function is to be a SAS expander and provide enclosure services. The LCC independently monitors the environment status of the entire enclosure and communicates the status to the system. The LCC includes a fault LED and a power LED.

**Note**

Remove the power from the DAE before replacing the LCC.

**Table 36** DAE LCC status LED

LED	Color	State	Description
Power	Green	On	Power on
	—	Off	Power off
Power fault	Amber	On	Fault
	—	Off	No fault or power off

Figure 34 LCC with LEDs

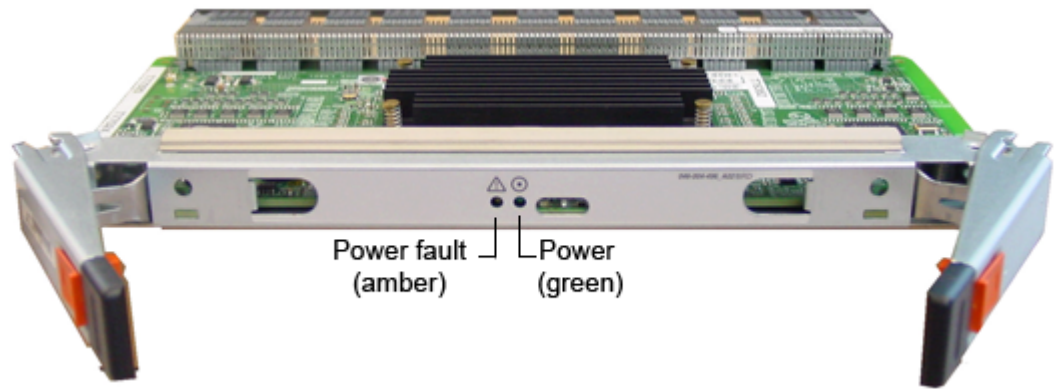
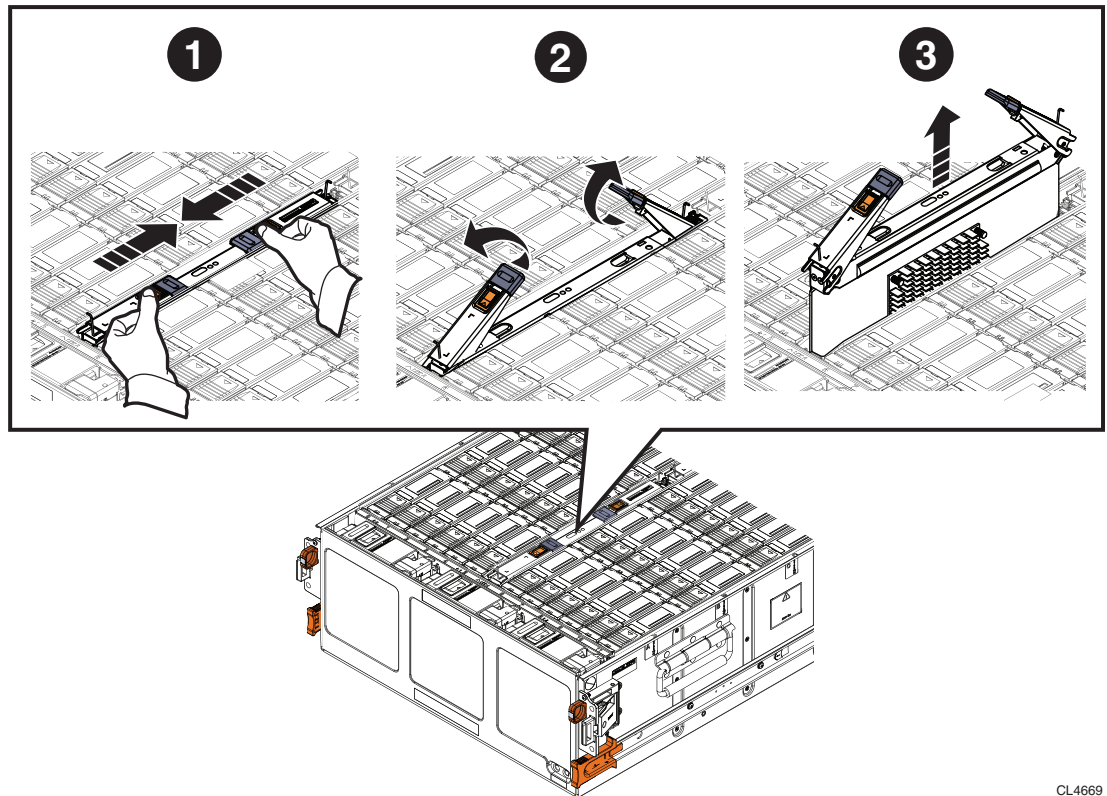


Figure 35 LCC Location



CL4669

## Fan control module

Each DAE includes three fan control modules (cooling modules) on the front of the DAE. The fan control module augments the cooling capacity of each DAE. It plugs directly into the DAE baseboard from the top of the DAE. Inside the fan control module, sensors measure the external ambient temperatures to ensure even cooling throughout the DAE.

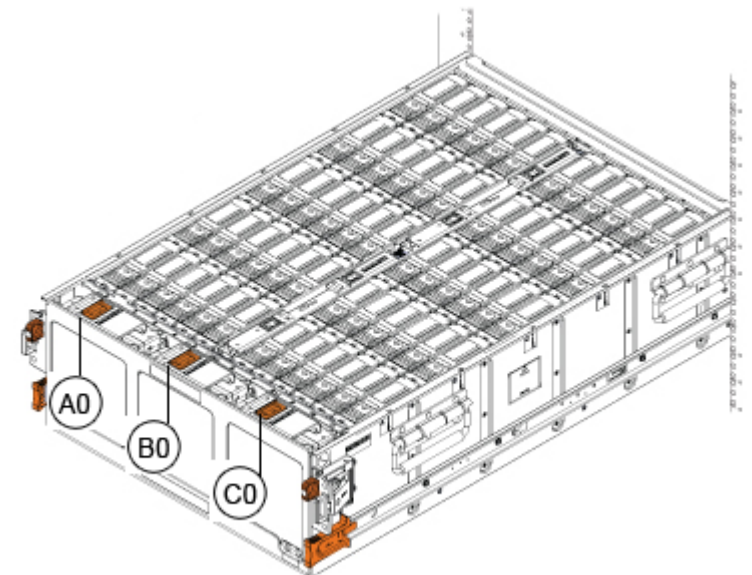
**Table 37** Fan control module fan fault LED

LED	Color	State	Description
Fan fault	Amber	On	Fault detected. One or more fans faulted.
	—	Off	No fault. Fans operating normally.

**Figure 36** Fan control module with LED



**Figure 37** Location of fan modules



## Interconnect Module

The Interconnect Module (ICM) is the primary interconnect management element. It is a plug-in module that includes a USB connector, RJ-12 management adapter, Bus ID indicator, enclosure ID indicator, two input SAS connectors and two output SAS

connectors with corresponding LEDs. These LEDs indicate the link and activity of each SAS connector for input and output to devices.

---

**Note**

Disconnect power to the DAE when changing the ICM.

---

**Table 38** ICM bus status LEDs

LED	Color	State	Description
Power fault	Green	On	Power on
	—	Off	Power off
Power on	Amber	On	Fault
	—	Off	No fault or power off

The ICM supports the following I/O ports on the rear:

- Four 6 Gb/s PCI Gen2 SAS ports
- One management (RJ-12) connector to the SPS (field service diagnostics only)
- One USB connector
- One 6 Gb/s SAS x8 ports

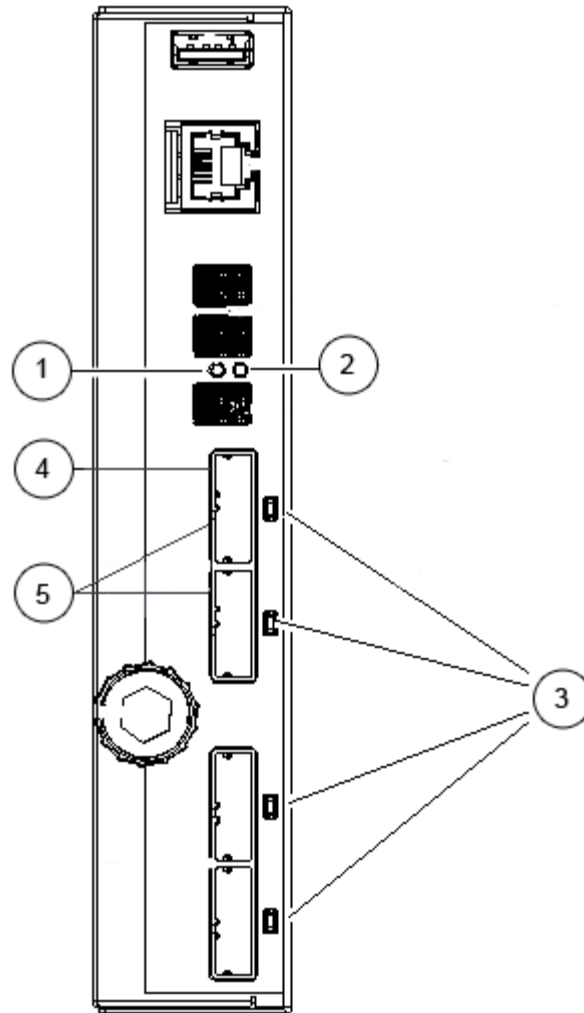
It supports four 6 Gb/s SAS x8 ports on the rear of the ICM (two inputs and two outputs, one used in Gen1 hardware and two used in Gen2 hardware). This port provides an interface for SAS and NL-SAS drives in the DAE.

**Table 39** ICM 6 Gb/s port LEDs

LED	Color	State	Description
Link/Activity	Blue	On	Indicates a 4x or 8x connection with all lanes running at 6 Gb/s.
	Green	On	Indicates that a wide port width other than 4x or 8x has been established or one or more lanes is not running at full speed or disconnected.
	—	Off	Not connected.



Figure 38 ICM LEDs



1. Power fault LED (amber)
2. Power LED (green)
3. Link activity LEDs (blue/green)
4. Single SAS port that is used for Gen1 hardware.
5. Two SAS ports that are used for Gen2 hardware.

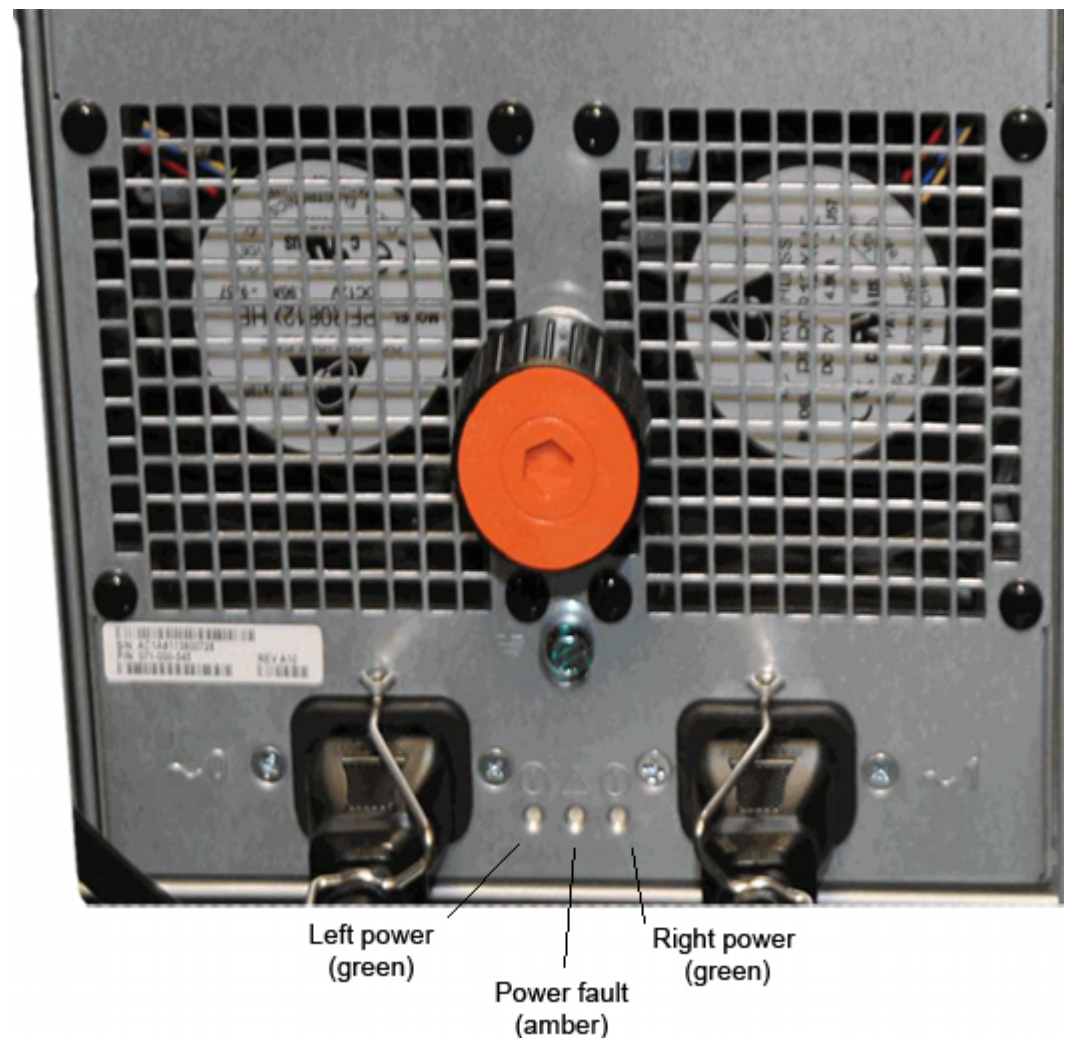
## Power supply

The power supply is hot-swappable. It has a built-in thumbscrew for ease of installation and removal. Each power supply includes a fan to provide cooling to the power supply. The power supply is an auto-ranging, power-factor-corrected, multi-output, offline converter with its own line cord. Each supply supports a fully configured DAE and shares load currents with the other supply. The power supplies provide four independent power zones. Each of the hot-swappable power supplies can deliver 1300 W at 12 V in its load-sharing highly available configuration. Control and status are implemented throughout the I2C interface.

**Table 40** DAE AC power supply/cooling module LEDs

LED	Color	State	Description
AC power on (12 V power): one LED for each power cord.	Green	On	OK. AC or SPS power applied. All output voltages are within respective operating ranges, not including fan fault.
	—	Off	12 V power is out of operation range, or in shutdown or fault detected within the unit.
Power fault	Amber	On	Under ICM control. LED is on if any fans or outputs are outside the specified operating range while the unit is not in low power mode.
	—	Off	All outputs are within the specified range, or in shutdown or fault detected within unit.

**Figure 39** DAE power supply



# CHAPTER 5

## Third Party Rack Requirements

- [Third-party rack requirements](#)..... 68

## Third-party rack requirements

Customers who want to assemble an ECS Appliance using their own racks must ensure that the racks meet the following requirements listed in [Table 41](#) on page 68.

RPQ is required for the following additional scenarios related to customer-provided rack:

- Single model that is installed in multi-racks.
- The U-Series DAE Cable Management Arms (CMA) cannot be installed due to third-party rack limitations.
- Transfers from Dell EMC to customer rack.  
Option: Customer rack enables the adjustment of rear rails to 24 inches so that Dell EMC fixed rails can be used. RPQ is not required if all third-party rack requirements in [Table 41](#) on page 68 are met.

**Table 41** Third-party rack requirements

Requirement Category	Description
Cabinet	44 inches minimum rack depth.
	Recommended 24 inches wide cabinet to provide room for cable routing on the sides of the cabinet.
	Sufficient contiguous space anywhere in the rack to install the components in the required relative order.
	If a front door is used, it must maintain a minimum of 1.2 inches of clearance to the bezels. It must be perforated with 50% or more evenly distributed air opening. It should enable easy access for service personnel and allow the LEDs to be visible through it.
	If a rear door is used, it must be perforated with 50% or more evenly distributed air opening.
	Blanking panels should be used as required to prevent air recirculation inside the cabinet.
	There is a recommended minimum of 42 inches of clearance in the front and 36 inches of clearance in the rear of the cabinet to allow for service area and proper airflow.
NEMA rails	19 inches wide rail with 1U increments.
	Between 24 inches and 34 inches deep.
	NEMA round and square hole rails are supported.
	NEMA treaded hole rails are NOT supported.
	NEMA round holes must accept M5 size screws.
	Special screws (036-709-013 or 113) are provided for use with square holes rails.
	Square hole rails require M5 nut clips that are provided by the customer for third-party rack provided.
Power	The AC power requirements are 200–240 VAC +/- 10% 50–60 Hz.
	Vertical PDUs and AC plugs must not interfere with the DAE and Cable Management arms requiring a depth of 42.5 inches.

**Table 41** Third-party rack requirements (continued)

Requirement Category	Description
	The customer rack should have redundant power zones, one on each side of the rack with separate PDU power strips. Each redundant power zone should have capacity for the maximum power load. NOTE: Dell EMC is not responsible for any failures, issues, or outages resulting from failure of the customer provided PDUs.
Cabling	Cables for the product must be routed in such a way that it mimics the standard ECS Appliance offering coming from the factory. This includes dressing cables to the sides to prevent drooping and interfering with service of field replaceable units (FRUs).
	Optical cables should be dressed to maintain a 1.5 inches bend radius.
	Cables for third-party components in the rack cannot cross or interfere with ECS logic components in such a way that they block front to back air flow or individual FRU service activity.
Disk Array Enclosures (DAEs)	<p>All DAEs should be installed in sequential order from bottom to top to prevent a tipping risk.</p> <p><b>⚠ WARNING</b></p> <p><b>Opening more than one DAE at a time creates a tip hazard. ECS racks provide an integrated solution to prevent more than one DAE from being open at a time. Customer racks will not be able to support this feature.</b></p>
Weight	Customer rack must be capable of supporting the weight of ECS equipment.

**Note**

Use the [power and weight calculator](#) to refine the power and heat values to more-closely match the hardware configuration for the system. The calculator contains the latest information for power and weight planning.

ECS support personnel can refer to the *Elastic Cloud Storage Third-Party Rack Installation Guide* for more details on installing in customer racks.



# CHAPTER 6

## Power Cabling

- [ECS power calculator](#) ..... 72
- [U-Series single-phase AC power cabling](#) ..... 72
- [U-Series three-phase AC power cabling](#) ..... 74
- [D-Series single-phase AC power cabling](#) ..... 77
- [D-Series three-phase AC power cabling](#) ..... 79
- [C-Series single-phase AC power cabling](#) ..... 83
- [C-Series 3-phase AC power cabling](#) ..... 84

## ECS power calculator

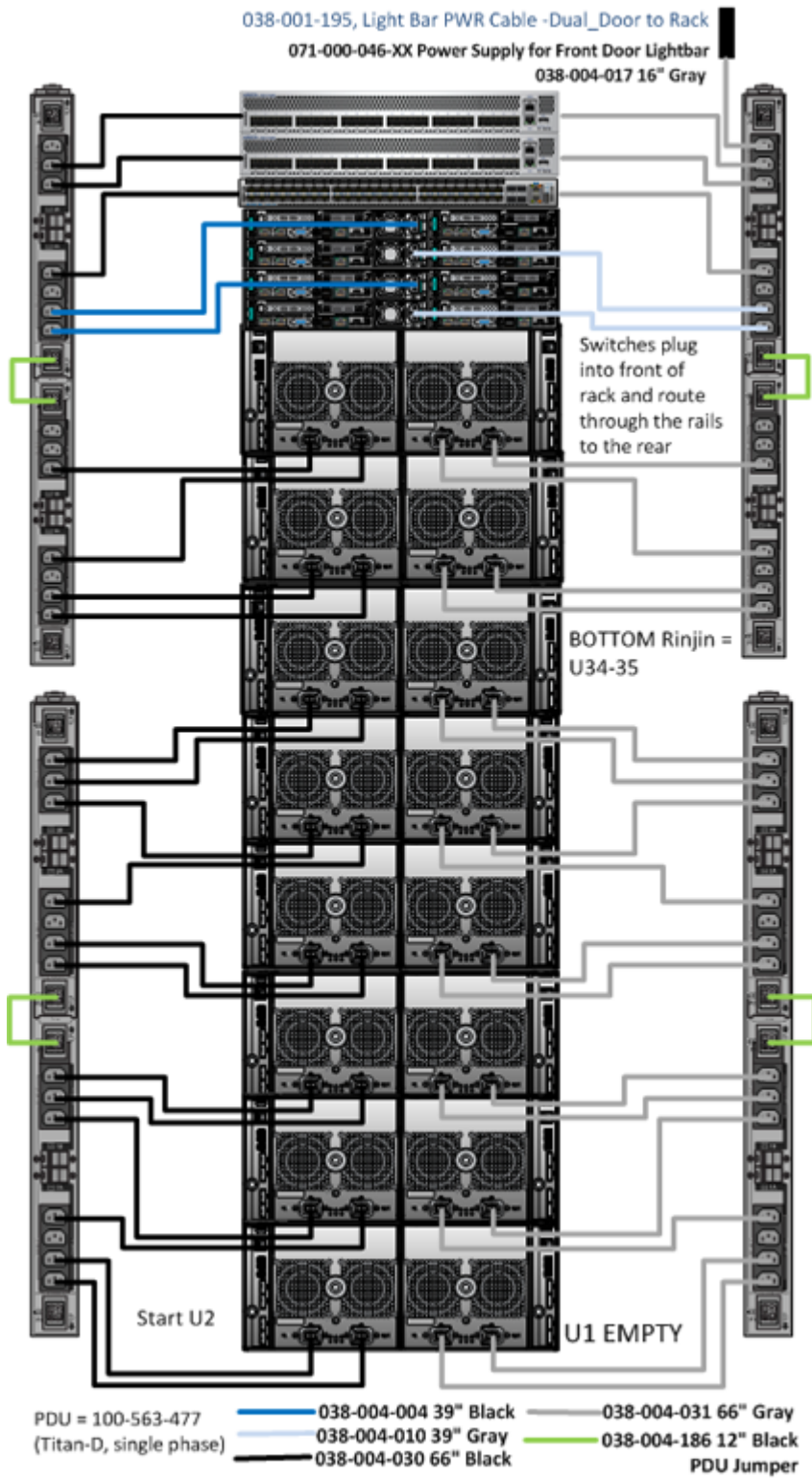
Use the [power and weight calculator](#) to refine the power and heat values to more-closely match the hardware configuration for your system. The calculator contains the latest information for power and weight planning.

## U-Series single-phase AC power cabling

Provides the single-phase power cabling diagram for the U-Series ECS Appliance. The switches plug into the front of the rack and route through the rails to the rear.



**Figure 40** U-Series single-phase AC power cabling for eight-node configurations



**Figure 40** U-Series single-phase AC power cabling for eight-node configurations (continued)

---

**Note**

For a four-node configuration, counting from the bottom of the rack, ignore DAEs 5 through 8 and server chassis 2.

---

## U-Series three-phase AC power cabling

Provides cabling diagrams for three-phase AC delta and wye power.

### Three-phase Delta AC power cabling

The legend maps colored cables that are shown in the diagram to part numbers and cable lengths.

**Figure 41** Cable legend for three-phase delta AC power diagram







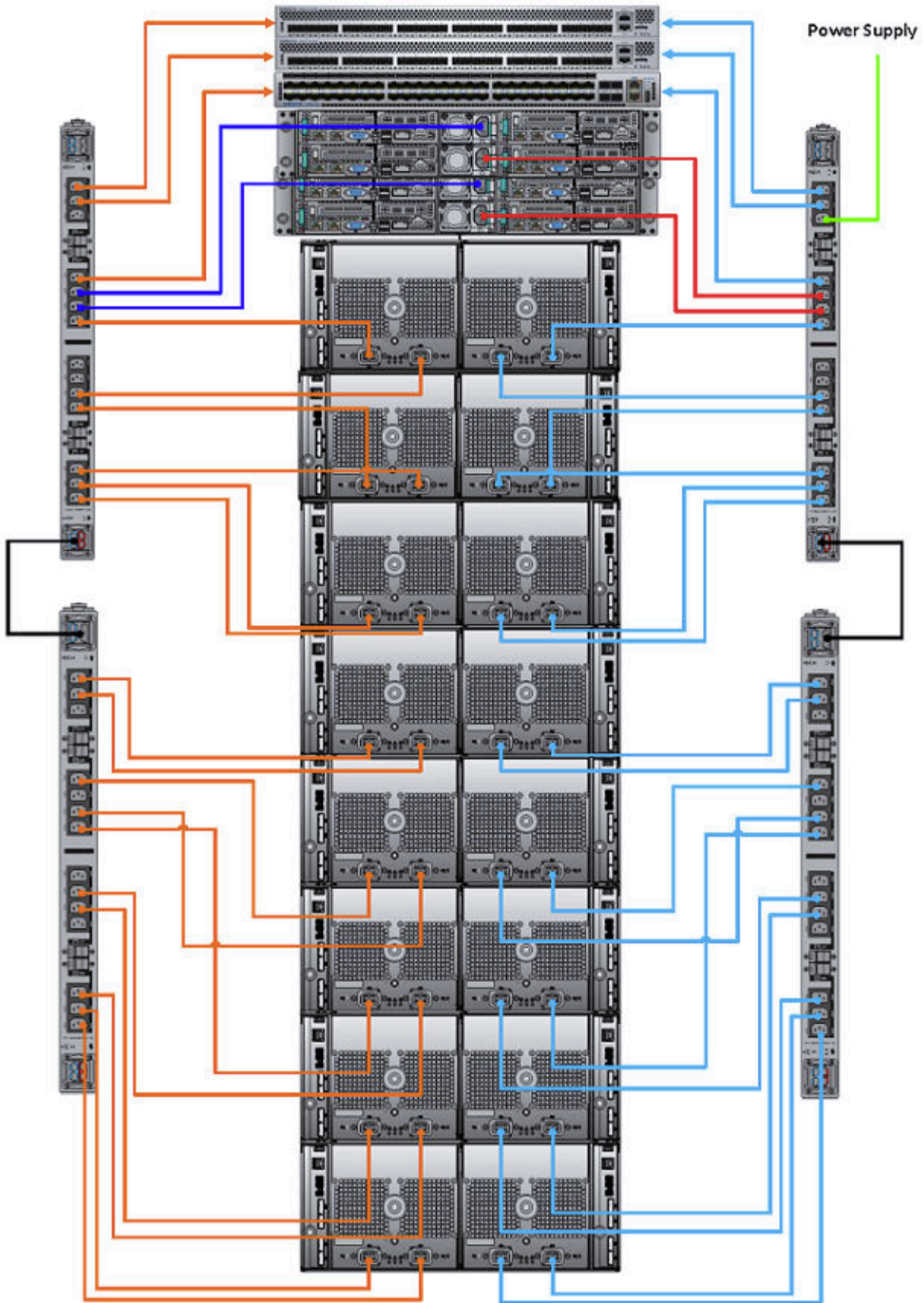
	038-004-010 39'
	038-004-030 66"
	038-004-004 39'
	038-004-435 22" 3 phase PDU Jumper
	038-004-031 66"
	038-004-017 16" Gray

Figure 42 Three-phase AC delta power cabling for eight-node configuration



**Figure 42** Three-phase AC delta power cabling for eight-node configuration (continued)

---

**Note**






For a four-node configuration, counting from the bottom of the rack, ignore DAEs 5–8 and server chassis 2.

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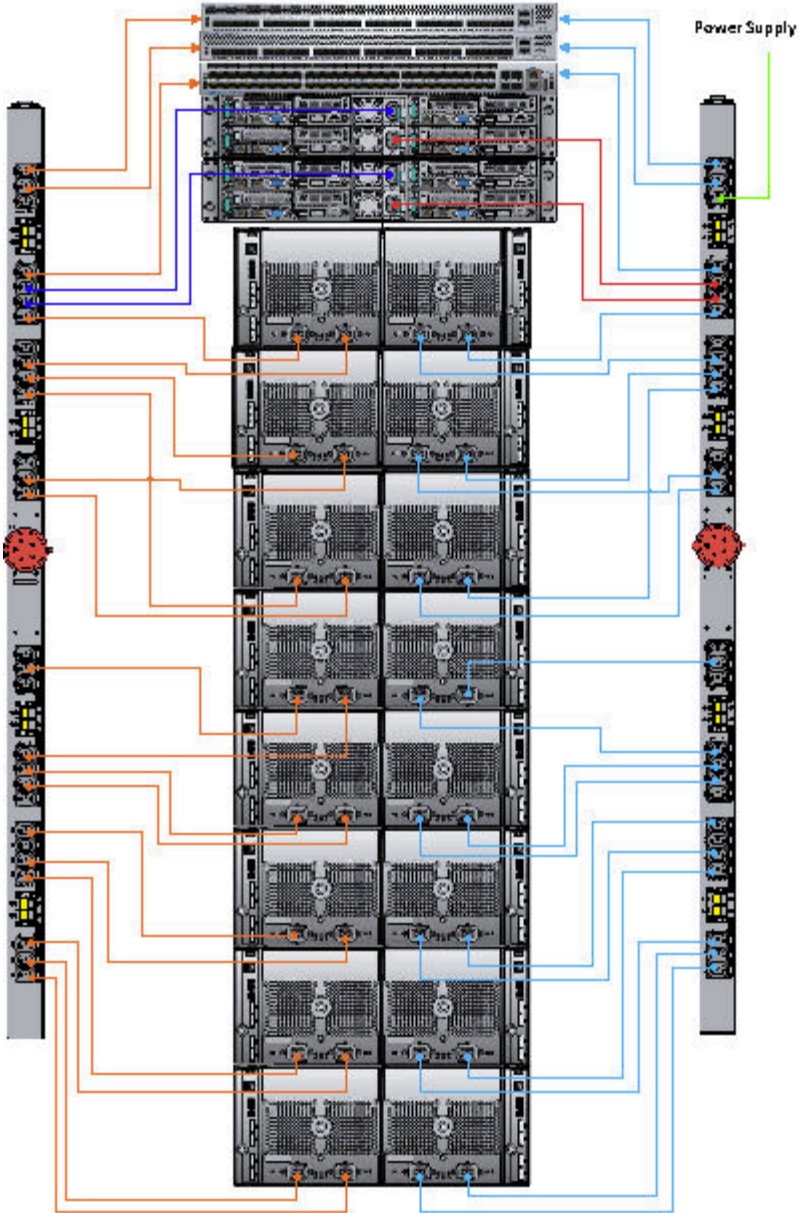
**Three-phase WYE AC power cabling**

The legend maps colored cables that are shown in the diagram to part numbers and cable lengths.

**Figure 43** Cable legend for three-phase WYE AC power diagram

	038-004-010	39"
	038-004-030	66"
	038-004-004	39"
	038-004-031	66"
	038-004-017	16" Gray

**Figure 44** Three-phase WYE AC power cabling for eight-node configuration




---

**Note**

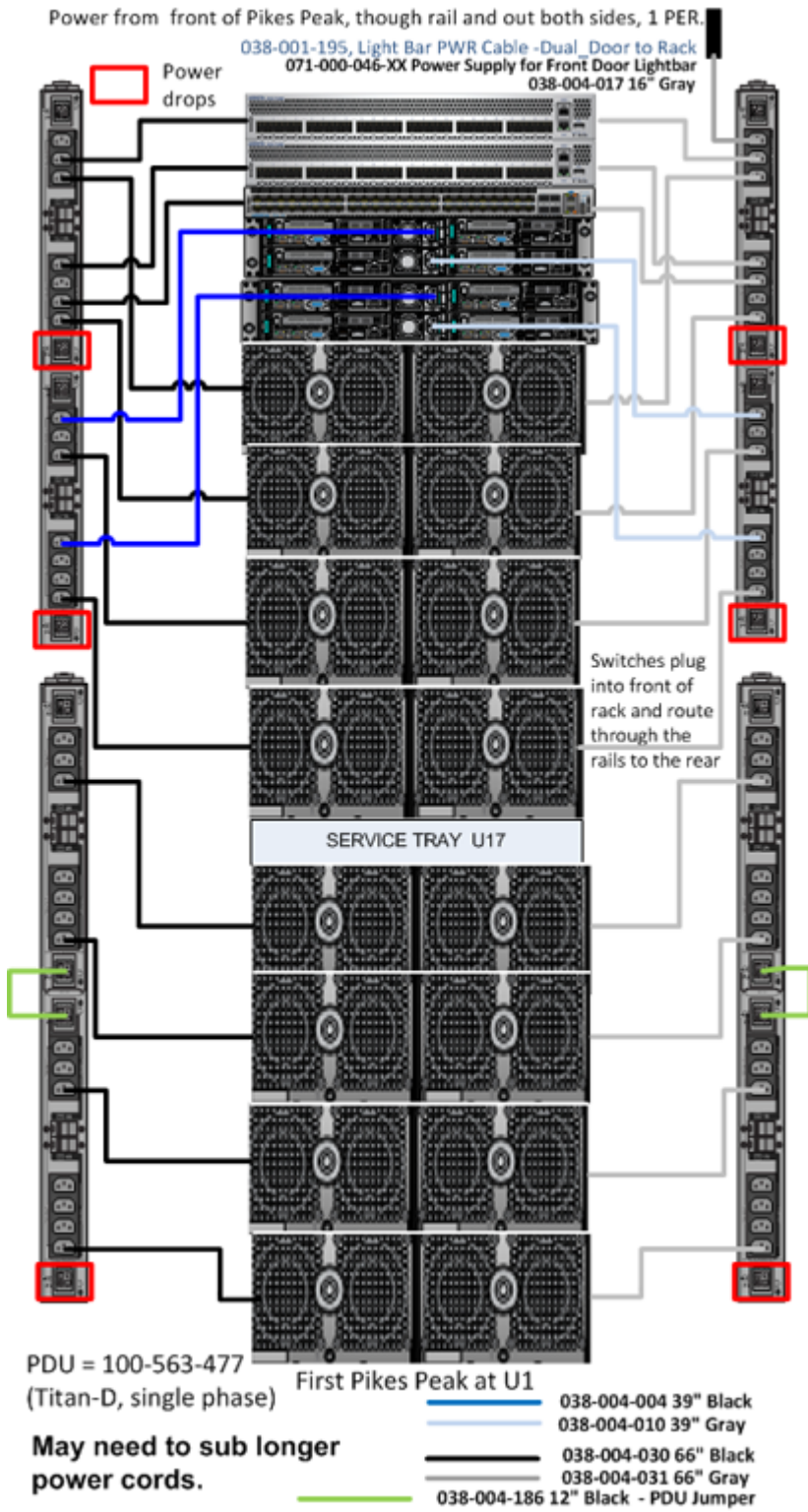
For a four-node configuration, counting from the bottom of the rack, ignore DAEs 5–8 and server chassis 2.

---

## D-Series single-phase AC power cabling

Provides the single-phase power cabling diagram for the D-Series ECS Appliance. The switches plug into the front of the rack and route through the rails to the rear.

**Figure 45** D-Series single-phase AC power cabling for eight-node configurations



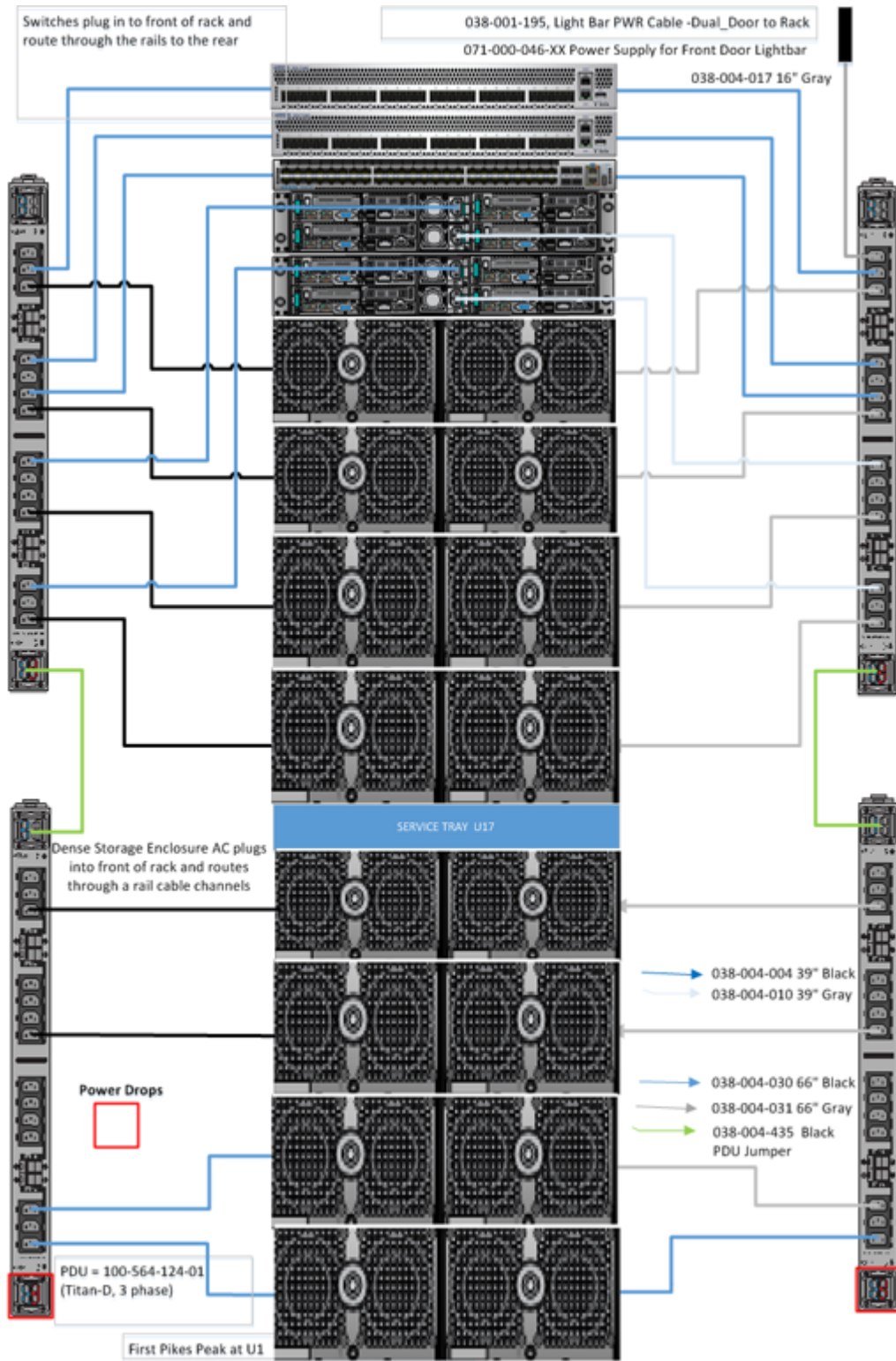
## **D-Series three-phase AC power cabling**

Provides cabling diagrams for three-phase AC delta and wye power.

### **Three-phase Delta AC power cabling**

The legend maps colored cables shown in the diagram to part numbers and cable lengths.

Figure 46 Three-phase AC delta power cabling for eight-node configuration





**Figure 46** Three-phase AC delta power cabling for eight-node configuration (continued)

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**Note**

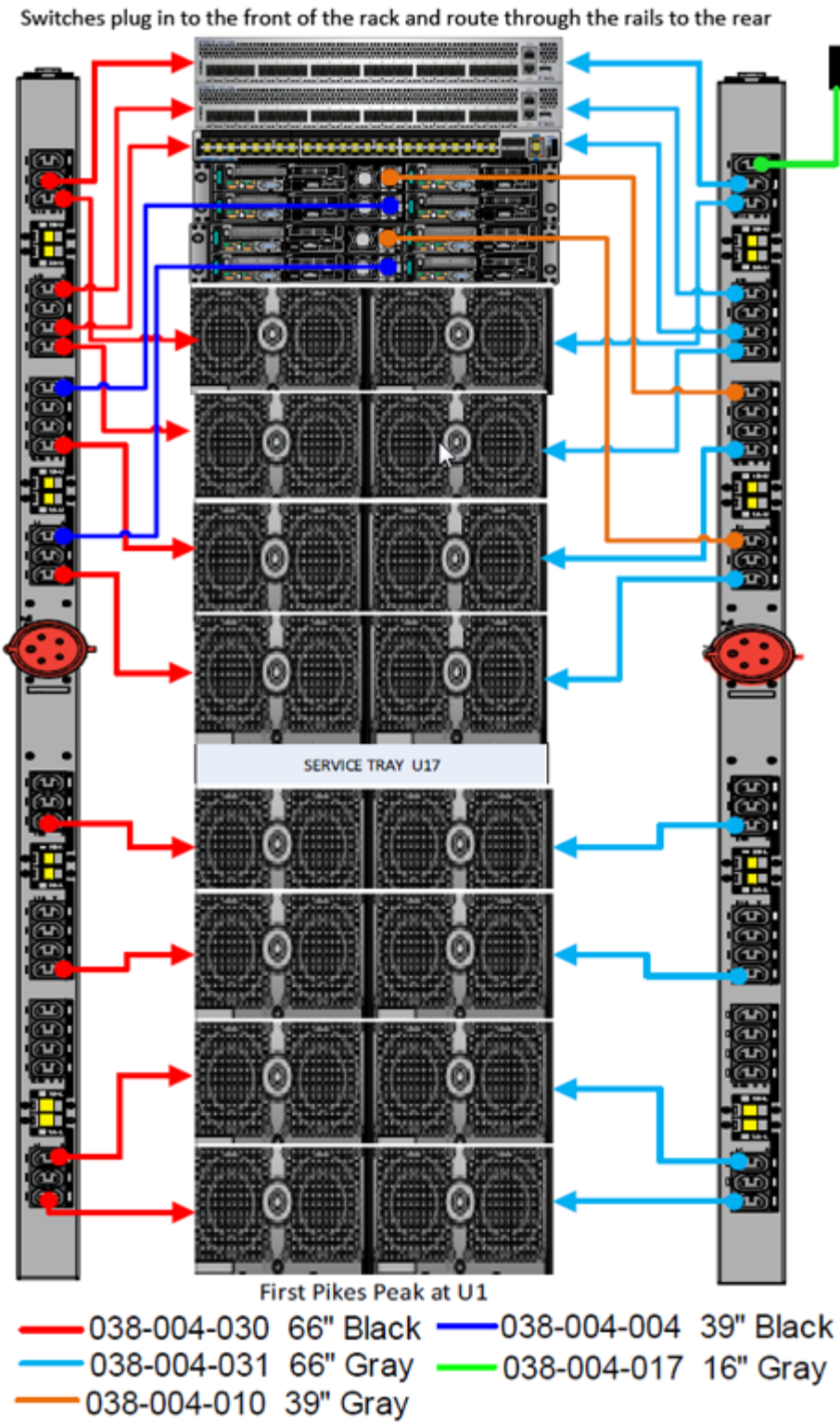
For a four-node configuration, counting from the bottom of the rack, ignore DAEs 5–8 and server chassis 2.

---

**Three-phase WYE AC power cabling**

The legend maps colored cables shown in the diagram to part numbers and cable lengths.

**Figure 47** Three-phase WYE AC power cabling for eight-node configuration



**Figure 47** Three-phase WYE AC power cabling for eight-node configuration (continued)

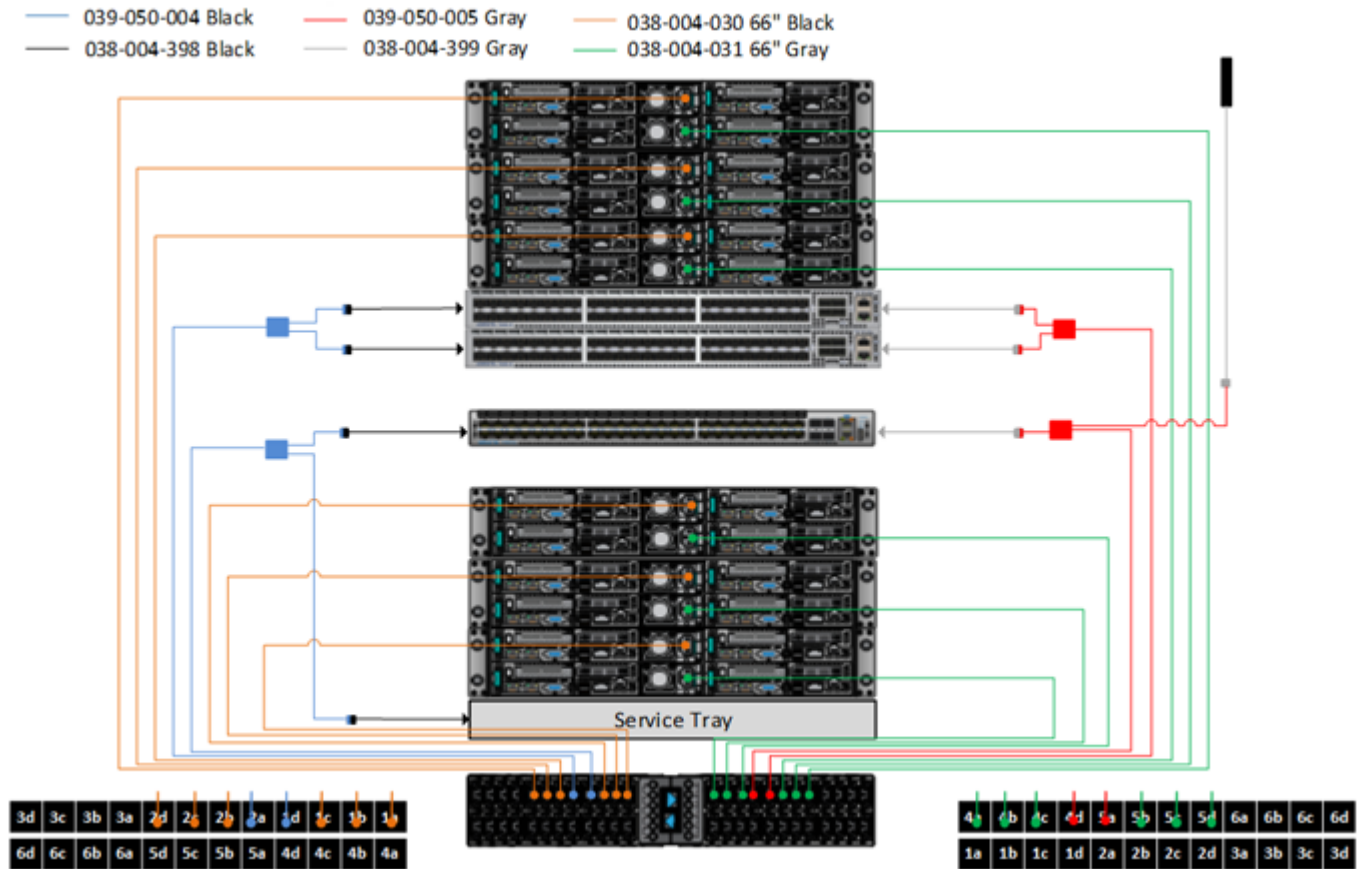
**Note**

For a four-node configuration, counting from the bottom of the rack, ignore DAEs 5–8 and server chassis 2.

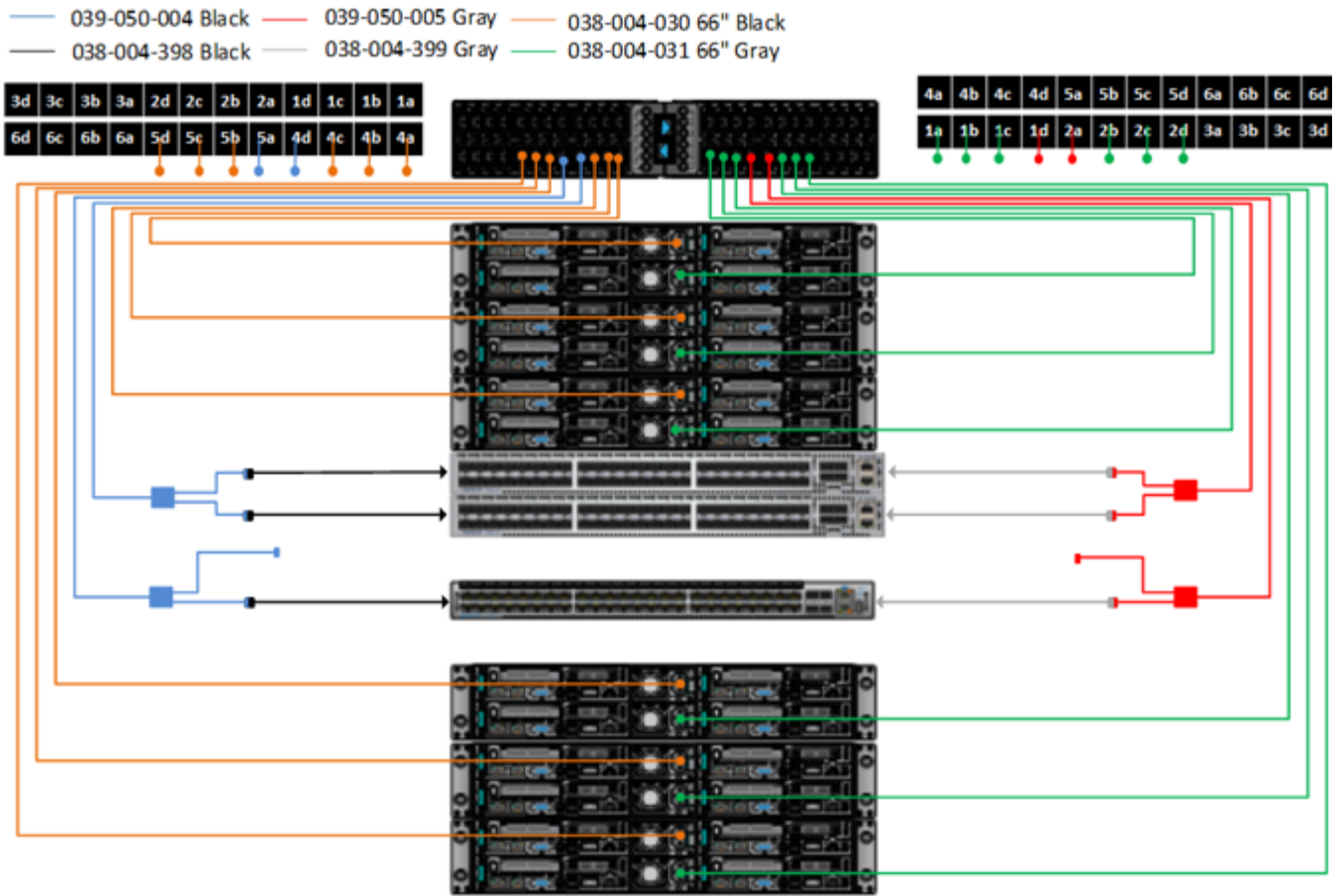
## C-Series single-phase AC power cabling

Provides the single-phase power cabling diagram for the C-Series ECS Appliance. The switches plug into the front of the rack and route through the rails to the rear.

**Figure 48** C-Series single-phase AC power cabling for eight-node configurations: Top



**Figure 49** C-Series single-phase AC power cabling for eight-node configurations: Bottom

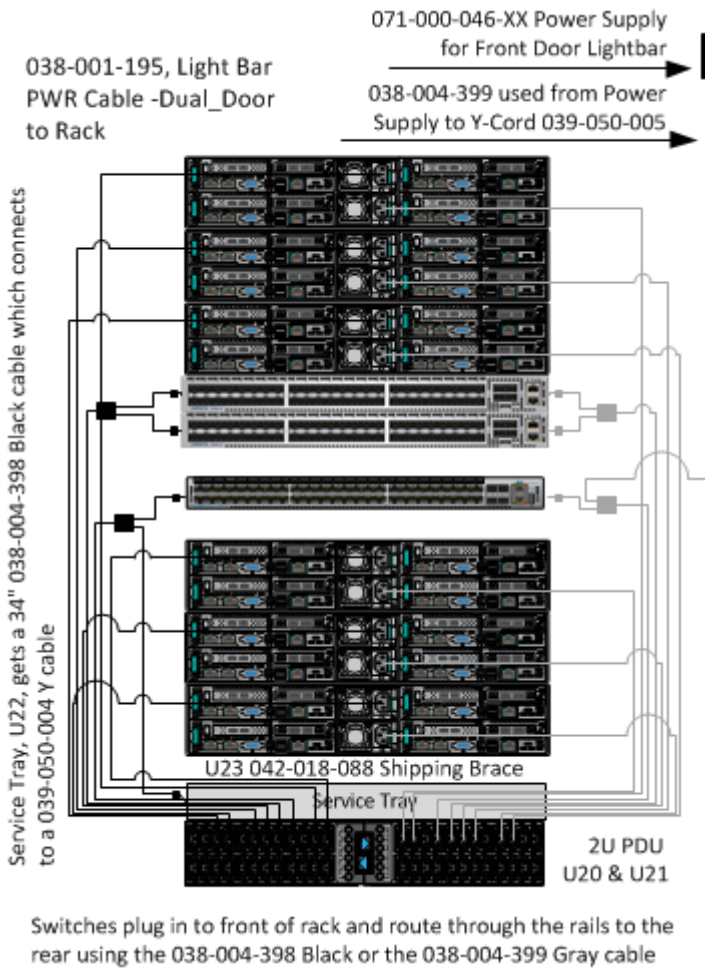


## C-Series 3-phase AC power cabling

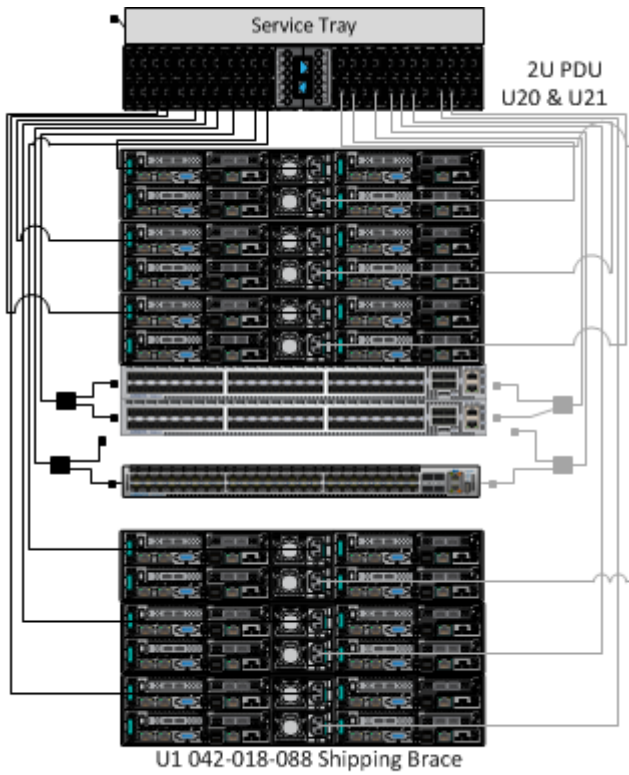
Provides the 3-phase power cabling diagrams for the C-Series ECS Appliance.

The switches plug into the front of the rack and route through the rails to the rear.

Figure 50 C-Series 3-phase AC power cabling for eight-node configurations: Top









**Figure 51** C-Series 3-phase AC power cabling for eight-node configurations: Bottom



Switches plug in to front of rack and route through the rails to the rear using the 038-004-398 Black or the 038-004-399 Gray cable

**Figure 51** C-Series 3-phase AC power cabling for eight-node configurations: Bottom (continued)

-  038-004-030 66" Black
-  038-004-031 66" Gray
-  039-050-004 44" Y Cord Black
-  039-050-005 39" Y Cord Gray
-  038-004-398 34" C13 to Mate-N-Lok Black
-  038-004-399 34" C13 to Mate-N-Lok Gray

Y-CORD Per Chart			
Rinjin from Bottom UP			
		Outlet	Outlet
RINJIN SERVER		B Side (Black)	A Side (Gray)
R1		21	9
R2		18	6
R3		13	1
R4		22	10
R5		19	7
R6		14	2
R7		9	21
R8		6	18
R9		1	13
R10		10	22
R11		7	19
R12		2	14

VERIFY that the 8 Y-Cords have the spacer that allows the wire bail on the PDU to fully engage the power cord C13. Quantity 8, P/N 040-020-019





# CHAPTER 7

## SAS Cabling

- [U-Series SAS cabling](#)..... 90
- [D-Series SAS cabling](#)..... 93

## U-Series SAS cabling

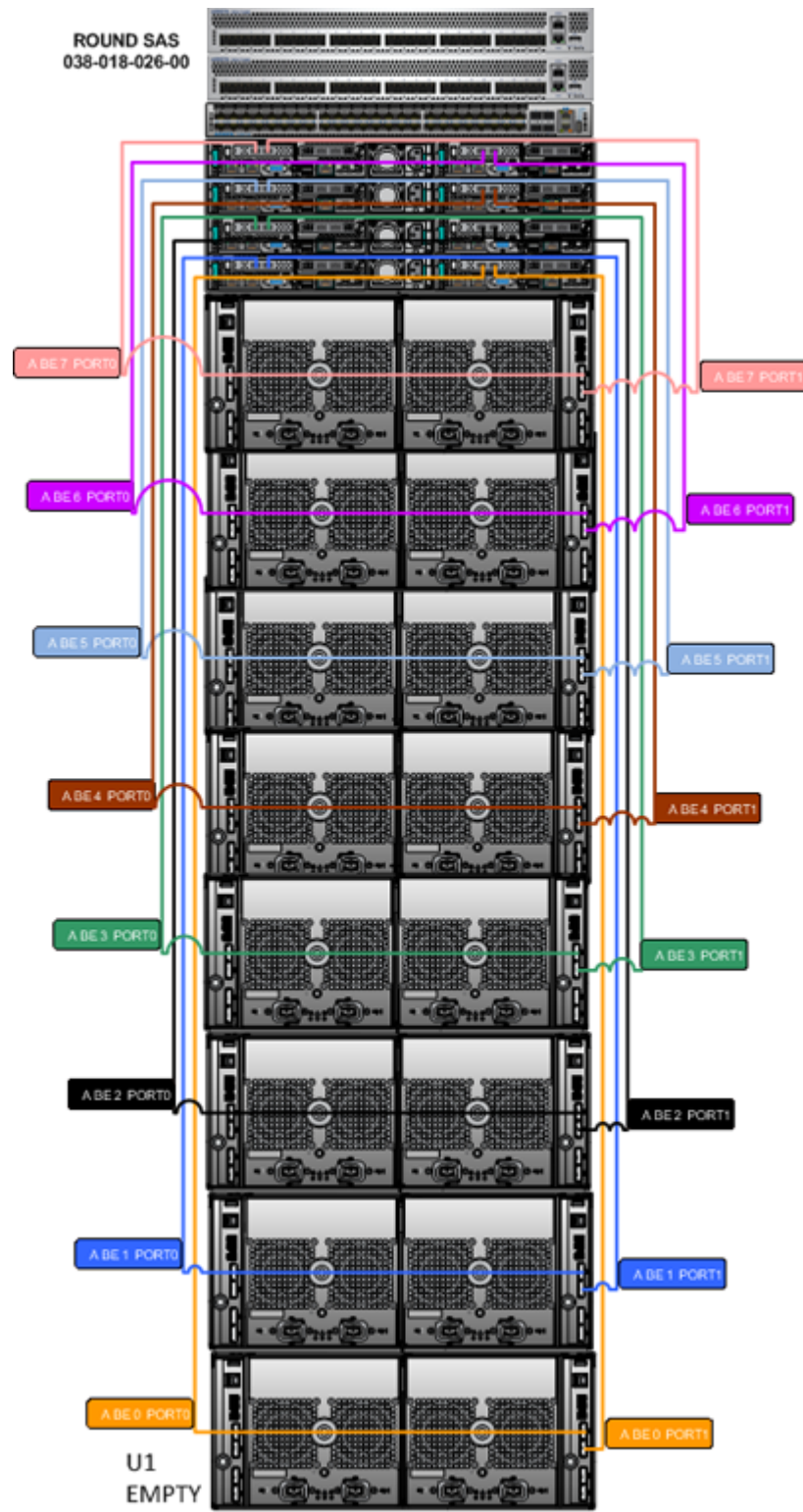
Provides wiring diagrams for the SAS cables that connect nodes to Voyager DAEs.

### **Gen2**

Gen2 use two SAS cables for each node to DAE connection.

The top port on the DAE is port 0 and always connects to the SAS adapter's left port on the node. The bottom port is port 1 and always connects to the SAS adapter's right port on the node.

Figure 52 U-Series (Gen2) SAS cabling for eight-node configurations



**Figure 53** U-Series (Gen2) SAS cabling

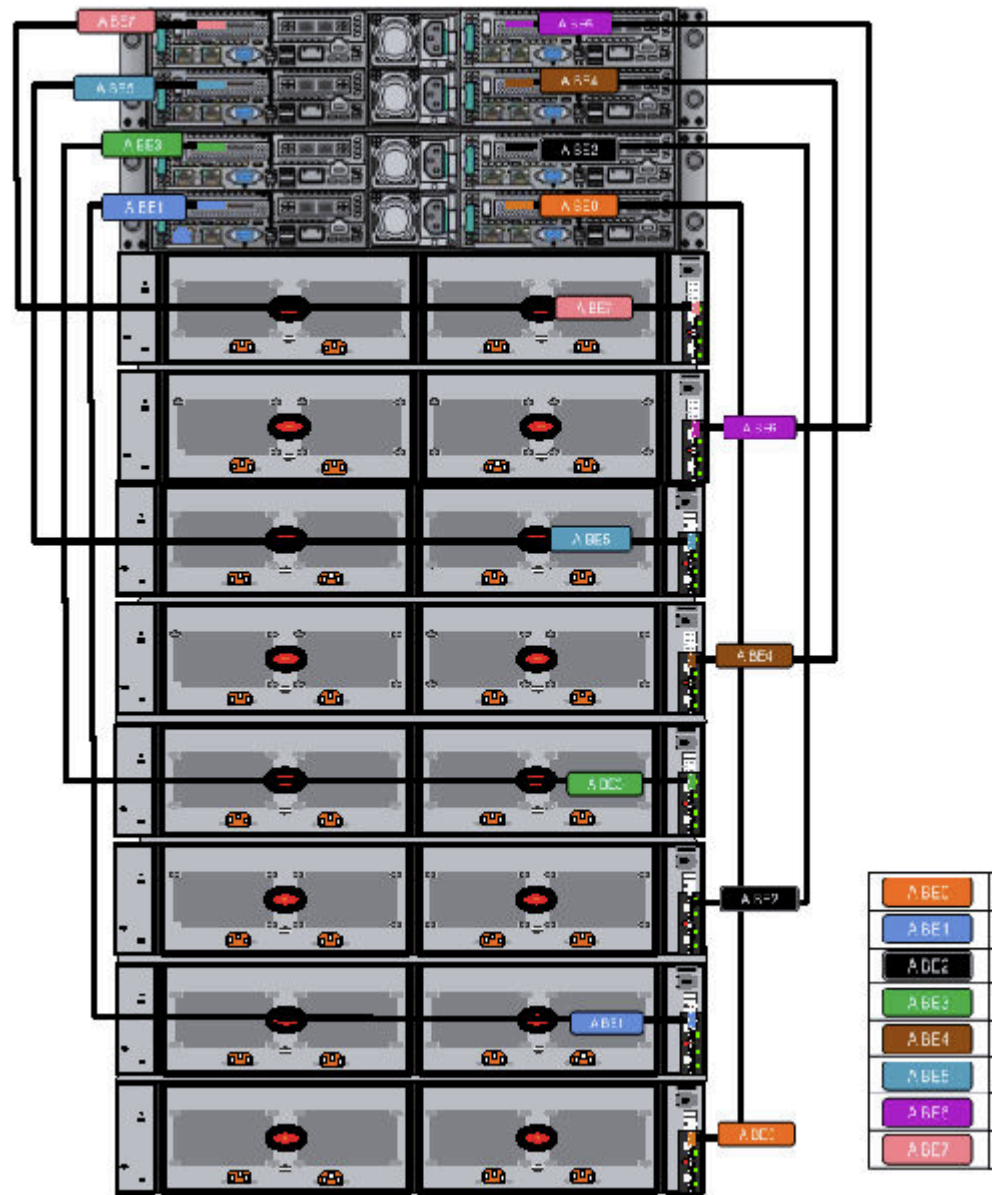
From Label Sheet 046-005-617

ABE 0 PORT 0	046-005-618
ABE 0 PORT 1	046-005-619
ABE 1 PORT 0	046-005-622
ABE 1 PORT 1	046-005-623
ABE 2 PORT 0	046-005-626
ABE 2 PORT 1	046-005-627
ABE 3 PORT 0	046-005-630
ABE 3 PORT 1	046-005-631
ABE 4 PORT 0	046-005-634
ABE 4 PORT 1	046-005-635
ABE 5 PORT 0	046-005-638
ABE 5 PORT 1	046-005-639
ABE 6 PORT 0	046-005-642
ABE 6 PORT 1	046-005-643
ABE 7 PORT 0	046-005-646
ABE 7 PORT 1	046-005-647

**Gen1****Note**

Hardware diagrams number nodes starting with zero. In all other discussions of ECS architecture and software, nodes are numbered starting with one.

Figure 54 U-Series (Gen1) SAS cabling for eight-node configurations



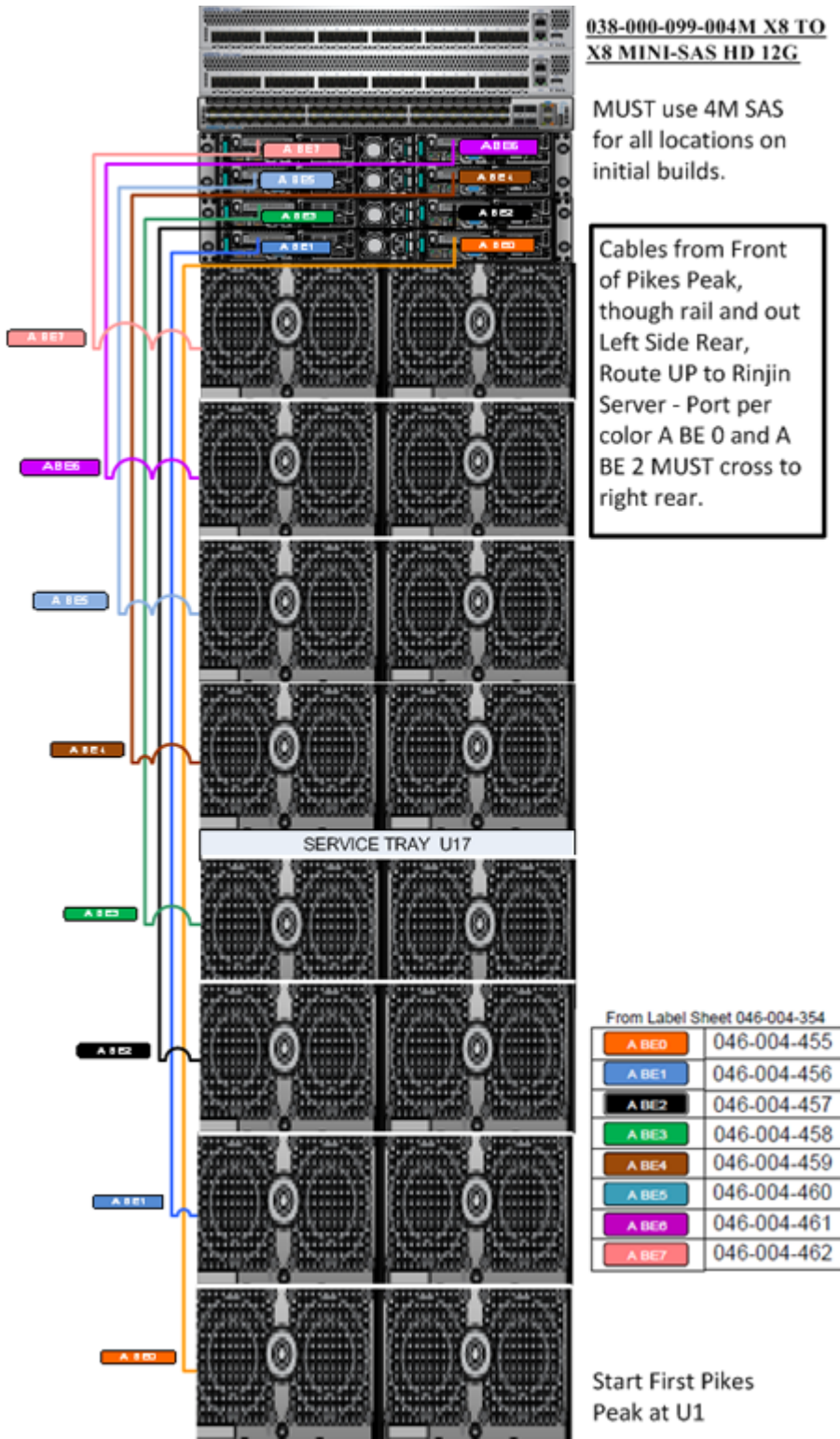
## D-Series SAS cabling

Provides wiring diagrams for the SAS cables that connect nodes to Pikes Peak DAEs.

D-Series has one High Density SAS cable (two cables put together); One connector on the HBA and one connector on the I/O Module.

The top port on the DAE is port 0 and always connects to the SAS adapter's left port on the node. The bottom port is port 1 and always connects to the SAS adapter's right port on the node.

Figure 55 D-Series SAS cabling for eight-node configurations



# CHAPTER 8

## Network Cabling

- [Connecting ECS appliances in a single site](#) .....96
- [Network cabling](#)..... 97

## Connecting ECS appliances in a single site

The ECS appliance management networks are connected together through the Nile Area Network (NAN). The NAN is created by connecting either port 51 or 52 to another turtle switch of another ECS appliance. Through these connections, nodes from any segment can communicate to any other node in the NAN.

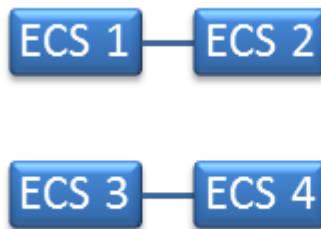
The simplest topology to connect the ECS appliances together does not require extra switch hardware. All the turtle switches can be connected together in a linear or daisy chain fashion.

**Figure 56** Linear or daisy-chain topology



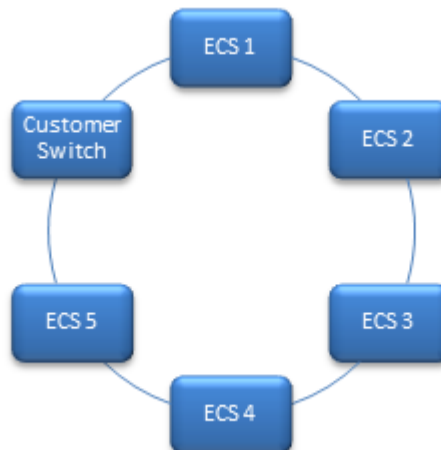
In this topology, if there is a loss of connectivity a split-brain can occur.

**Figure 57** Linear or daisy-chain split-brain



For a more reliable network, the ends of the daisy chain topology can be connected together to create a ring network. The ring topology is more stable because it would require two cable link breaks in the topology for a split-brain to occur. The primary drawback to the ring topology is that the RMM ports cannot be connected to the customer network unless an external customer or aggregation switch is added to ring.

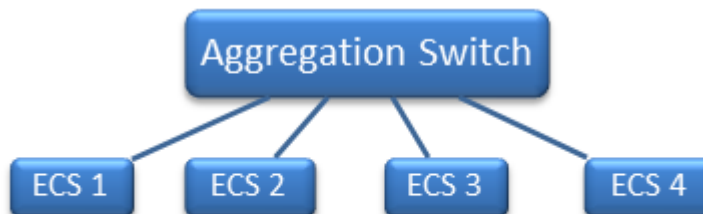
**Figure 58** Ring topology





The daisy-chain or ring topologies are not recommended for large installations. When there are four or more ECS appliances, an aggregation switch is recommended. The addition of an aggregation switch in a star topology can provide better fail over by reducing split-brain issues.

**Figure 59** Star topology



## Network cabling

The network cabling diagrams apply to U-Series, D-Series, or C-Series ECS Appliance in an Dell EMC or customer provided rack.

To distinguish between the three switches, each switch has a nickname:

- *Hare*: 10 GbE public switch is at the top of the rack in a U- or D-Series or the top switch in a C-Series segment.
- *Rabbit*: 10 GbE public switch is located just below the hare in the top of the rack in a U- or D-Series or below the hare switch in a C-Series segment.
- *Turtle*: 1 GbE private switch that is located below rabbit in the top of the rack in a U-Series or below the hare switch in a C-Series segment.

### U- and D-Series network cabling

The following figure shows a simplified network cabling diagram for an eight-node configuration for a U- or D-Series ECS Appliance as configured by Dell EMC or a customer in a supplied rack. Following this figure, other detailed figures and tables provide port, label, and cable color information.

Figure 60 Public switch cabling for U- and D-Series

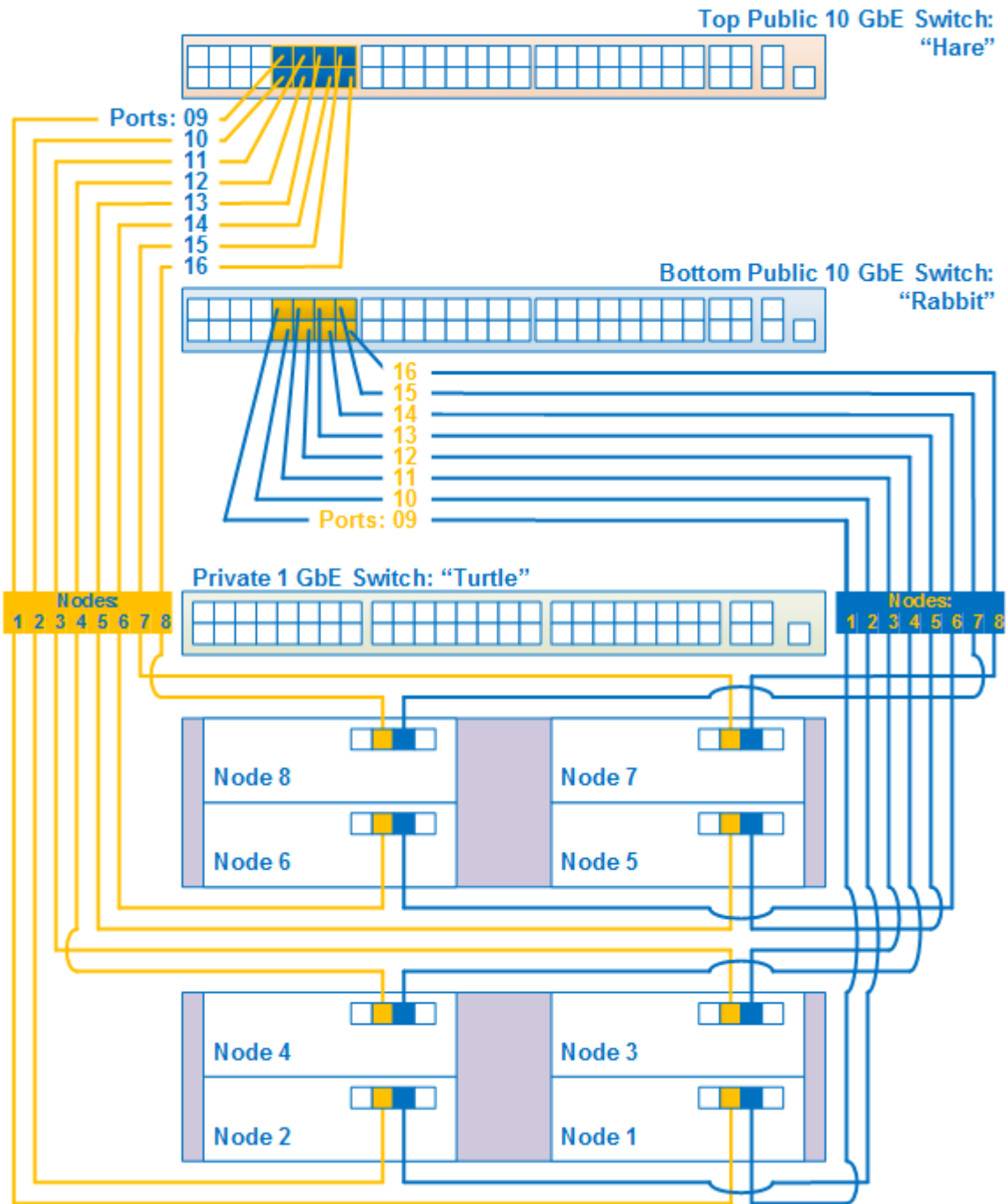
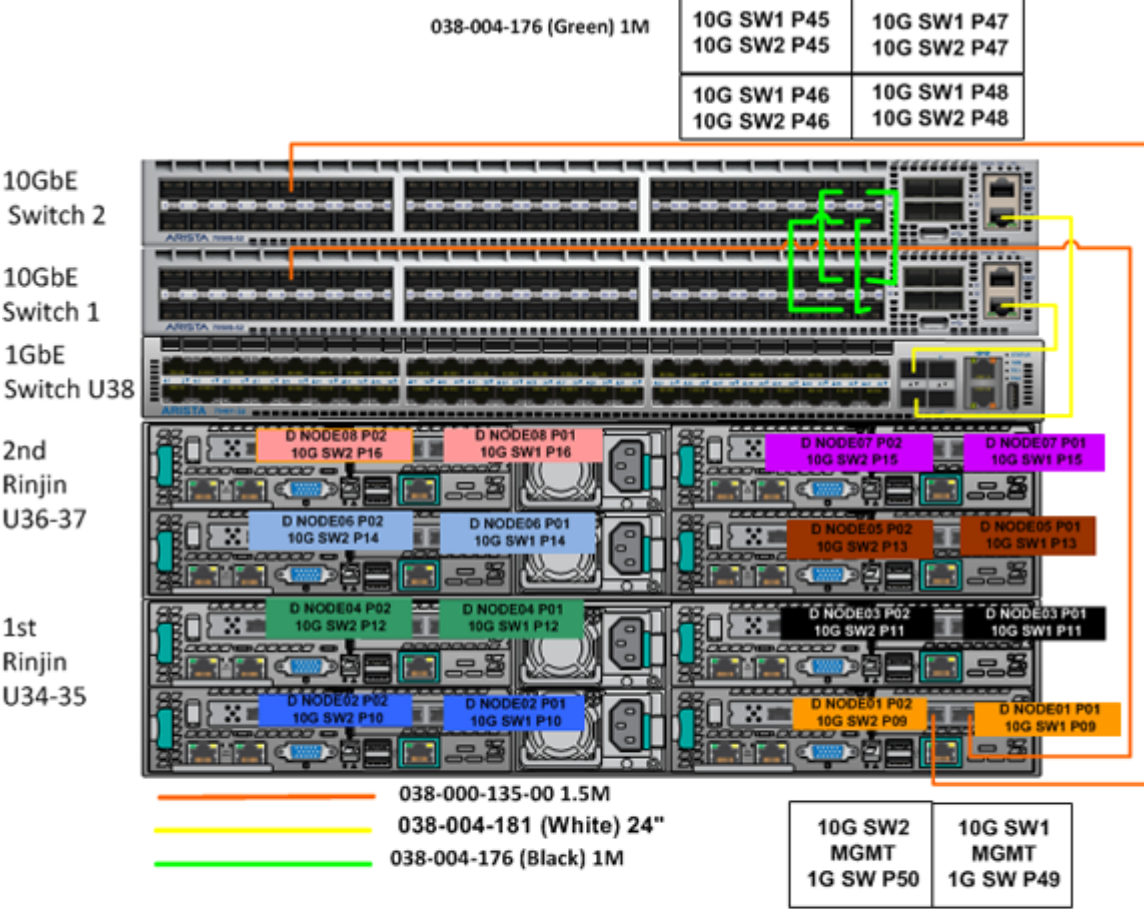


Figure 61 U-Series and D-Series network cabling



The console port (Top RIGHT) is used to manage the switch via a serial connection and the Ethernet management port (Bottom RIGHT) is connected to the 1 GbE management switch.

NOTE: ARISTA 100/1000 BASE\_T SFP Copper Module p/n 100-585-072 added in both 10GbE Switches in Port 8

**Figure 62** Network cabling labels

**10GB Lags/Labels (4)**

046-001-611	LAG 1	Port 45
046-001-612	LAG 2	Port 46
046-001-613	LAG 3	Port 47
046-001-614	LAG 4	Port 48
<b>046-001-611/614 under 100-400-049</b>		

<b>Label P/N</b>	<b>FROM</b>	<b>TO</b>
046-006-257	D NODE01 P01	10G SW1 P09
046-006-258	D NODE02 P01	10G SW1 P10
046-006-259	D NODE03 P01	10G SW1 P11
046-006-260	D NODE04 P01	10G SW1 P12
046-006-261	D NODE05 P01	10G SW1 P13
046-006-262	D NODE06 P01	10G SW1 P14
046-006-263	D NODE07 P01	10G SW1 P15
046-006-264	D NODE08 P01	10G SW1 P16
046-006-265	D NODE01 P02	10G SW2 P09
046-006-266	D NODE02 P02	10G SW2 P10
046-006-267	D NODE03 P02	10G SW2 P11
046-006-268	D NODE04 P02	10G SW2 P12
046-006-269	D NODE05 P02	10G SW2 P13
046-006-270	D NODE06 P02	10G SW2 P14
046-006-271	D NODE07 P02	10G SW2 P15
046-006-272	D NODE08 P02	10G SW2 P16
046-006-273	10G SW1 MGMT	1G SW P49
046-006-274	10G SW2 MGMT	1G SW P50

**Table 42** U- and D-Series 10 GB public switch network cabling for all Arista models

<b>Chassis / node / 10GB adapter port</b>	<b>Switch port / label (rabbit, SW1)</b>	<b>Switch port / label (hare, SW2)</b>	<b>Label color</b>
1 / Node 1 P01 (Right)	10G SW1 P09		Orange
1 / Node 1 P02 (Left)		10G SW2 P09	
1 / Node 2 P01 (Right)	10G SW1 P10		Blue
1 / Node 2 P02 (Left)		10G SW2 P10	
1 / Node 3 P01 (Right)	10G SW1 P11		Black
1 / Node 3 P02 (Left)		10G SW2 P11	
1 / Node 4 P01 (Right)	10G SW1 P12		Green

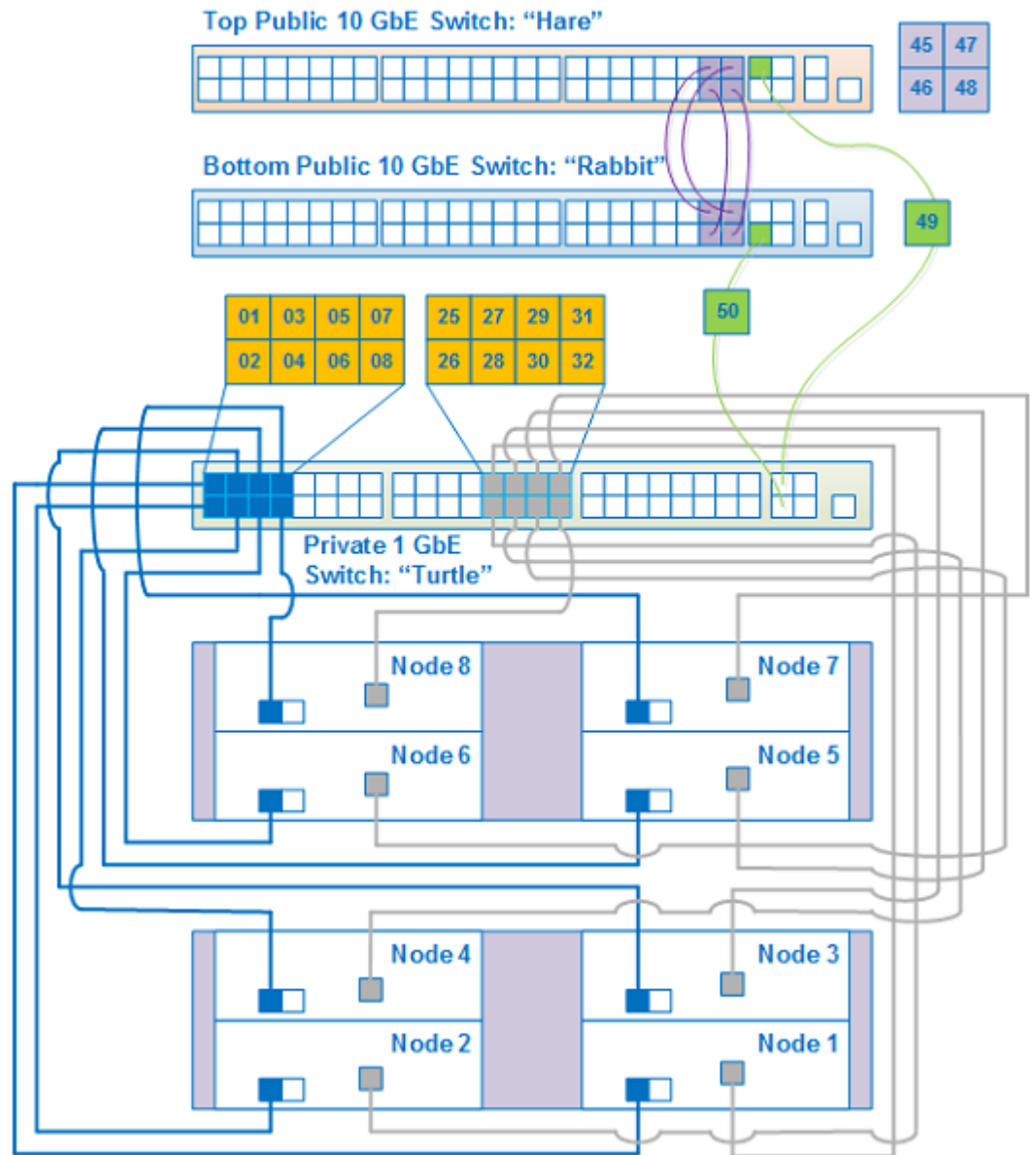
**Table 42** U- and D-Series 10 GB public switch network cabling for all Arista models (continued)

Chassis / node / 10GB adapter port	Switch port / label (rabbit, SW1)	Switch port / label (hare, SW2)	Label color
1 / Node 4 P02 (Left)		10G SW2 P12	
2 / Node 5 P01 (Right)	10G SW1 P13		Brown
2 / Node 5 P02 (Left)		10G SW2 P13	
2 / Node 6 P01 (Right)	10G SW1 P14		Light Blue
2 / Node 6 P02 (Left)		10G SW2 P14	
2 / Node 7 P01 (Right)	10G SW1 P15		Purple
2 / Node 7 P02 (Left)		10G SW2 P15	
2 / Node 8 P01 (Right)	10G SW1 P16		Magenta
2 / Node 8 P02 (Left)		10G SW2 P16	
<b>Note</b>			
1.5m (U-Series) or 3m (C-Series) Twinax network cables are provided for 10GB.			

**Table 43** U- and D-Series 10 GB public switch MLAG cabling for all Arista models

Connection	Connection 10 GB SW1 (rabbit)	Port number 10 GB SW2 (hare)	Port number labels
MLAG cables (71xx 10 GB switches)	23	23	10G SW1 P23
			10G SW2 P23
	24	24	10G SW1 P24
			10G SW2 P25
MLAG cables (7050x10 GB switches)	45	45	10G SW1 P45
			10G SW2 P45
	46	46	10G SW1 P46
			10G SW2 P46
	47	47	10G SW1 P47
			10G SW2 P47
	48	48	10G SW1 P48
			10G SW2 P48
<b>Note</b>			
1m Twinax network cables are provided to cable 10 GB switch to switch MLAG.			

**Figure 63** Private switch cabling for U- and D-Series



**Table 44** U- and D-Series 1 GB private switch network cabling

Chassis / Node	RMM Port / Label (Grey Cable)	Switch Port / Label (Grey Cable)	eth0 Port / Label (Blue Cable)	Switch Port / Label (Blue Cable)	Label Color
1 / Node 1	Node 01 RMM	1GB SW P25	Node01 P01	1GB SW P01	Orange
1 / Node 2	Node 02 RMM	1GB SW P26	Node02 P02	1GB SW P02	Blue
1 / Node 3	Node 03 RMM	1GB SW P27	Node03 P03	1GB SW P03	Black

**Table 44** U- and D-Series 1 GB private switch network cabling (continued)

Chassis / Node	RMM Port / Label (Grey Cable)	Switch Port / Label (Grey Cable)	eth0 Port / Label (Blue Cable)	Switch Port / Label (Blue Cable)	Label Color
1 / Node 4	Node 04 RMM	1GB SW P28	Node04 P04	1GB SW P04	Green
2 / Node 5	Node 05 RMM	1GB SW P29	Node05 P05	1GB SW P05	Brown
2 / Node 6	Node 06 RMM	1GB SW P30	Node06 P06	1GB SW P06	Light Blue
2 / Node 7	Node 07 RMM	1GB SW P31	Node07 P07	1GB SW P07	Purple
2 / Node 8	Node 08 RMM	1GB SW P32	Node08 P08	1GB SW P08	Magenta

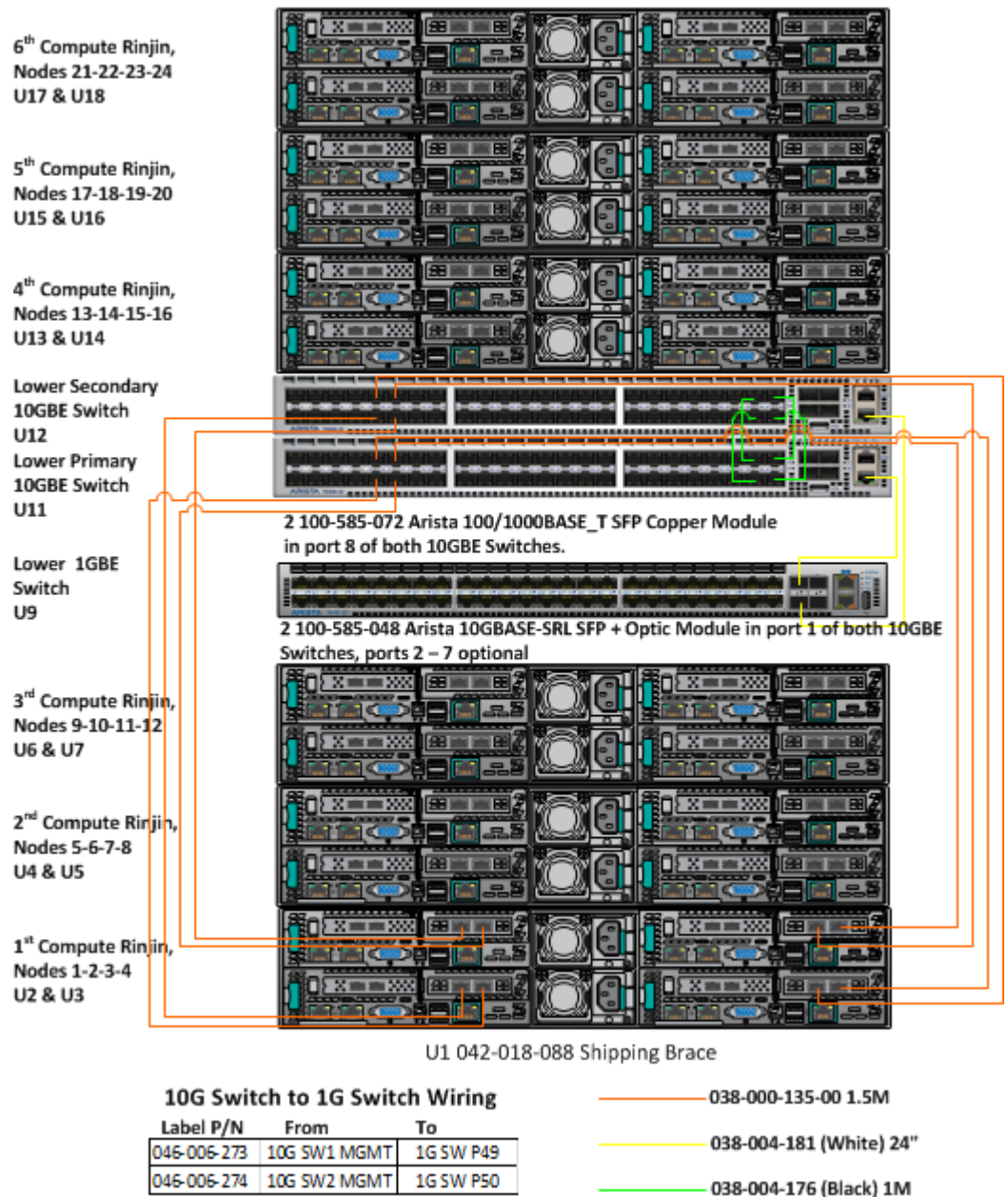
**Table 45** U- and D-Series 1 GB private switch management and interconnect cabling

1 GB Switch Ports	10GB SW1 (rabbit) Port Number	10GB SW2 (hare) Port Number	Labels	Color
49	<...> - mgmt port		10G SW2 MGMT 1G SW P49	White
50		<...> - mgmt port	10G SW2 MGMT 1G SW P50	White
51	Rack/Segment Interconnect IN or first rack empty			
52	Rack/Segment Interconnect OUT			
<b>Note</b>				
Port 49 and 50 are 1 meter white cables. RJ45 SFPs are installed in ports 49 to 52.				

**C-Series network cabling**

A full rack configuration in the C-Series is made up of two segments: lower and upper. Each segment has a hare, rabbit, and turtle switch, and the two segments are connected. A configuration of six or less servers is a single-segment appliance and has one set of switches. Cabling information for the lower and upper segments for public and private switches are provided below.

**Figure 64** C-Series public switch cabling for the lower segment from the rear





**Figure 64** C-Series public switch cabling for the lower segment from the rear (continued)**10G Switch to 10G Switch Wiring**

LABEL	TEXT	FROM	TO
046-001-611	LAG 1	10G SW2L P45	10G SW1L P45
046-001-612	LAG 2	10G SW2L P46	10G SW1L P46
046-001-613	LAG 3	10G SW2L P47	10G SW1L P47
046-001-614	LAG 4	10G SW2L P48	10G SW1L P48

LABEL	TEXT	FROM	TO
046-004-499	SERVER 1	C NODE 01 P01	10G SW1L P9
046-004-500	SERVER 2	C NODE 02 P01	10G SW1L P10
046-004-501	SERVER 3	C NODE 03 P01	10G SW1L P11
046-004-502	SERVER 4	C NODE 04 P01	10G SW1L P12
046-004-499	SERVER 1	C NODE 01 P02	10G SW2L P9
046-004-500	SERVER 2	C NODE 02 P02	10G SW2L P10
046-004-501	SERVER 3	C NODE 03 P02	10G SW2L P11
046-004-502	SERVER 4	C NODE 04 P02	10G SW2L P12
046-004-503	SERVER 5	C NODE 05 P01	10G SW1L P13
046-004-504	SERVER 6	C NODE 06 P01	10G SW1L P14
046-004-505	SERVER 7	C NODE 07 P01	10G SW1L P15
046-004-506	SERVER 8	C NODE 08 P01	10G SW1L P16
046-004-503	SERVER 5	C NODE 05 P02	10G SW2L P13
046-004-504	SERVER 6	C NODE 06 P02	10G SW2L P14
046-004-505	SERVER 7	C NODE 07 P02	10G SW2L P15
046-004-506	SERVER 8	C NODE 08 P02	10G SW2L P16
046-004-507	SERVER 9	C NODE 09 P01	10G SW1L P17
046-004-508	SERVER 10	C NODE 10 P01	10G SW1L P18
046-004-509	SERVER 11	C NODE 11 P01	10G SW1L P19
046-004-510	SERVER 12	C NODE 12 P01	10G SW1L P20
046-004-507	SERVER 9	C NODE 09 P02	10G SW2L P17
046-004-508	SERVER 10	C NODE 10 P02	10G SW2L P18
046-004-509	SERVER 11	C NODE 11 P02	10G SW2L P19
046-004-510	SERVER 12	C NODE 12 P02	10G SW2L P20

**Figure 64** C-Series public switch cabling for the lower segment from the rear (continued)

LABEL	TEXT	FROM	TO
046-004-511	SERVER 13	C NODE 13 P01	10G SW1L P21
046-004-512	SERVER 14	C NODE 14 P01	10G SW1L P22
046-004-513	SERVER 15	C NODE 15 P01	10G SW1L P23
046-004-514	SERVER 16	C NODE 16 P01	10G SW1L P24
046-004-511	SERVER 13	C NODE 13 P02	10G SW2L P21
046-004-512	SERVER 14	C NODE 14 P02	10G SW2L P22
046-004-513	SERVER 15	C NODE 15 P02	10G SW2L P23
046-004-514	SERVER 16	C NODE 16 P02	10G SW2L P24
046-005-750	SERVER 17	C NODE 17 P01	10G SW1L P25
046-005-751	SERVER 18	C NODE 18 P01	10G SW1L P26
046-005-752	SERVER 19	C NODE 19 P01	10G SW1L P27
046-005-753	SERVER 20	C NODE 20 P01	10G SW1L P28
046-005-750	SERVER 17	C NODE 17 P02	10G SW2L P25
046-005-751	SERVER 18	C NODE 18 P02	10G SW2L P26
046-005-752	SERVER 19	C NODE 19 P02	10G SW2L P27
046-005-753	SERVER 20	C NODE 20 P02	10G SW2L P28
046-005-754	SERVER 21	C NODE 21 P01	10G SW1L P29
046-005-755	SERVER 22	C NODE 22 P01	10G SW1L P30
046-005-756	SERVER 23	C NODE 23 P01	10G SW1L P31
046-005-757	SERVER 24	C NODE 24 P01	10G SW1L P32
046-005-754	SERVER 21	C NODE 21 P02	10G SW2L P29
046-005-755	SERVER 22	C NODE 22 P02	10G SW2L P30
046-005-756	SERVER 23	C NODE 23 P02	10G SW2L P31
046-005-757	SERVER 24	C NODE 24 P02	10G SW2L P32

**Figure 65** C-Series public switch cabling for the upper segment from the rear

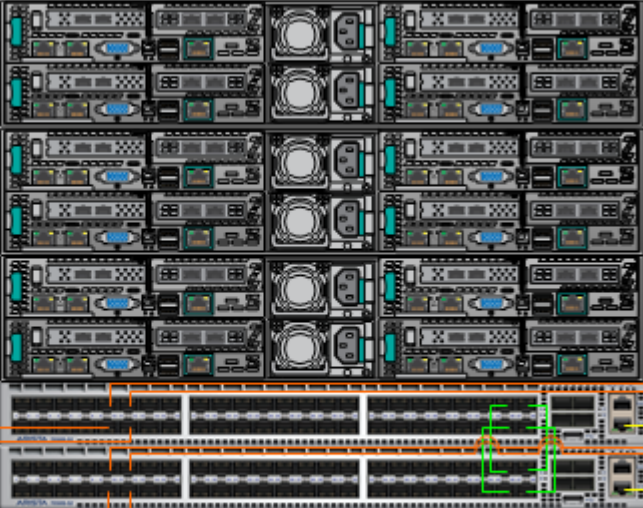
**2 100-585-072 Arista 100/1000BASE\_T SFP Copper Module**  
**In port 8 of both 10GBE Switches.**

12<sup>th</sup> Compute Rinjin,  
 Nodes 21-22-23-24  
 U39 & U40

11<sup>th</sup> Compute Rinjin,  
 Nodes 17-18-19-20  
 U37 & U38

10<sup>th</sup> Compute Rinjin,  
 Nodes 13-14-15-16  
 U35 & U36

Upper Secondary  
 10GBE Switch  
 U34  
 Upper Primary  
 10GBE Switch  
 U33



**2 100-585-048 Arista 10GBASE-SRL SFP + Optic Module in port 1 of**  
**both 10GBE Switches, ports 2 – 7 optional**

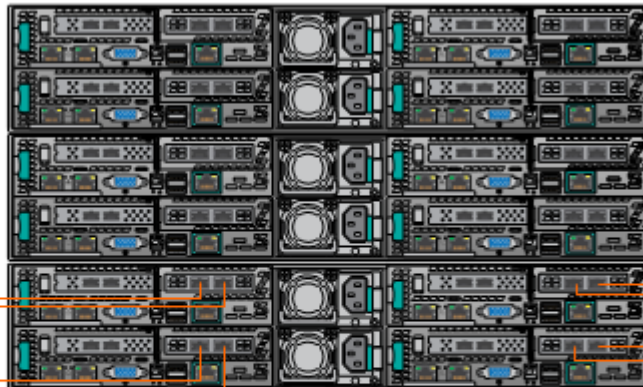
Upper  
 1GBE Switch U31



9<sup>th</sup> Compute  
 Rinjin, Nodes  
 9-10-11-12  
 U28 & U29

8<sup>th</sup> Compute  
 Rinjin, Nodes  
 5-6-7-8  
 U26 & U27

7<sup>th</sup> Compute  
 Rinjin, Nodes  
 1-2-3-4  
 U24 & U25



U23 042-018-088 Shipping Brace

**10G Switch to 10G Switch Wiring**

LABEL	TEXT	FROM	TO
046-001-611	LAG 1	10G 5W2U P45	10G5W1U P45
046-001-612	LAG 2	10G 5W2U P46	10G5W1U P46
046-001-613	LAG 3	10G 5W2U P47	10G5W1U P47
046-001-614	LAG 4	10G 5W2U P48	10G5W1U P48

**10G Switch to 1G Switch Wiring**

Label P/N	From	To
046-006-273	10G SW1 MGMT	1G SW P49
046-006-274	10G SW2 MGMT	1G SW P50

— 038-000-135-00 1.5M  
— 038-004-181 (White) 24"  
— 038-004-176 (Black) 1M

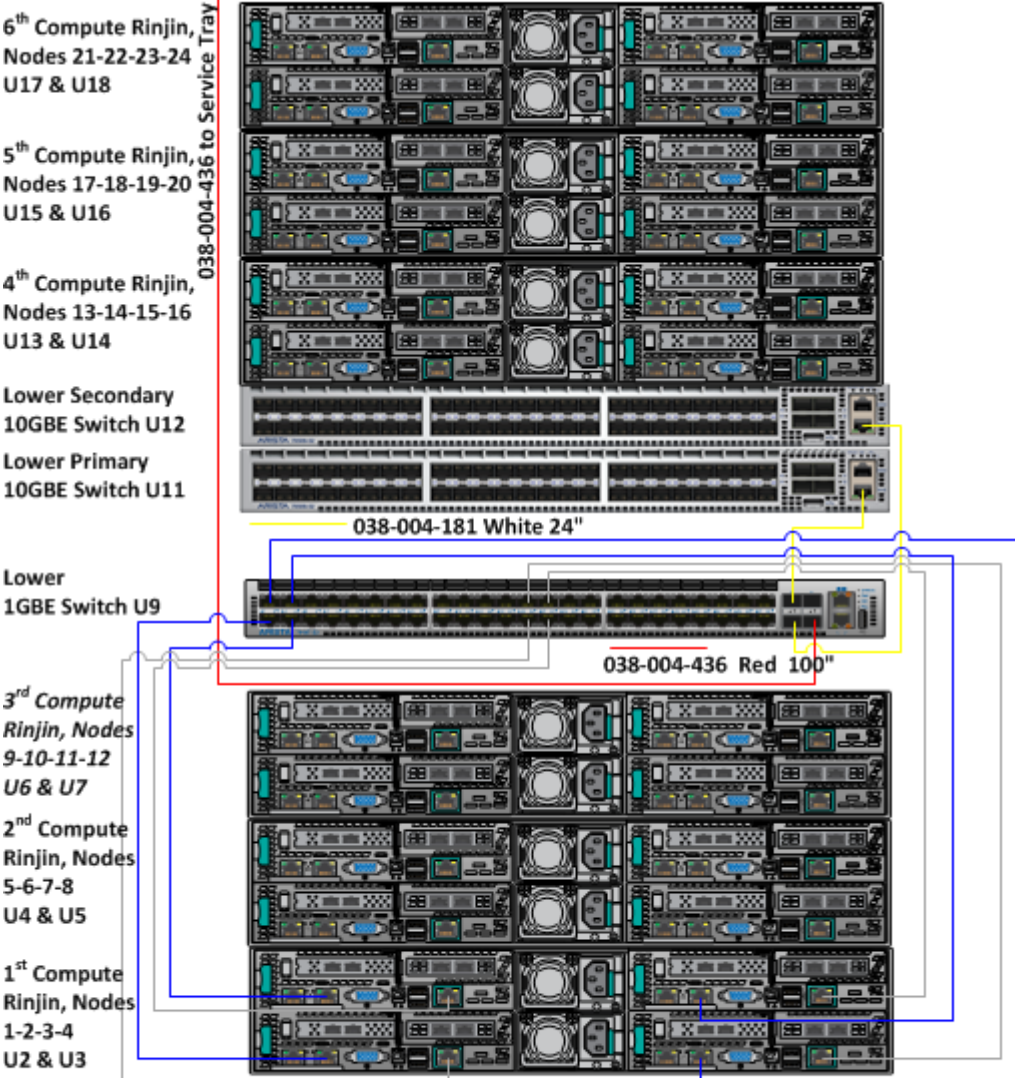
**Figure 65** C-Series public switch cabling for the upper segment from the rear (continued)

LABEL	TEXT	FROM	TO
046-004-499	SERVER 1	C NODE 01 P01	10G SW1U P9
046-004-500	SERVER 2	C NODE 02 P01	10G SW1U P10
046-004-501	SERVER 3	C NODE 03 P01	10G SW1U P11
046-004-502	SERVER 4	C NODE 04 P01	10G SW1U P12
046-004-499	SERVER 1	C NODE 01 P02	10G SW2U P9
046-004-500	SERVER 2	C NODE 02 P02	10G SW2U P10
046-004-501	SERVER 3	C NODE 03 P02	10G SW2U P11
046-004-502	SERVER 4	C NODE 04 P02	10G SW2U P12
046-004-503	SERVER 5	C NODE 05 P01	10G SW1U P13
046-004-504	SERVER 6	C NODE 06 P01	10G SW1U P14
046-004-505	SERVER 7	C NODE 07 P01	10G SW1U P15
046-004-506	SERVER 8	C NODE 08 P01	10G SW1U P16
046-004-503	SERVER 5	C NODE 05 P02	10G SW2U P13
046-004-504	SERVER 6	C NODE 06 P02	10G SW2U P14
046-004-505	SERVER 7	C NODE 07 P02	10G SW2U P15
046-004-506	SERVER 8	C NODE 08 P02	10G SW2U P16
046-004-507	SERVER 9	C NODE 09 P01	10G SW1U P17
046-004-508	SERVER 10	C NODE 10 P01	10G SW1U P18
046-004-509	SERVER 11	C NODE 11 P01	10G SW1U P19
046-004-510	SERVER 12	C NODE 12 P01	10G SW1U P20
046-004-507	SERVER 9	C NODE 09 P02	10G SW2U P17
046-004-508	SERVER 10	C NODE 10 P02	10G SW2U P18
046-004-509	SERVER 11	C NODE 11 P02	10G SW2U P19
046-004-510	SERVER 12	C NODE 12 P02	10G SW2U P20

LABEL	TEXT	FROM	TO
046-004-511	SERVER 13	C NODE 13 P01	10G SW1U P21
046-004-512	SERVER 14	C NODE 14 P01	10G SW1U P22
046-004-513	SERVER 15	C NODE 15 P01	10G SW1U P23
046-004-514	SERVER 16	C NODE 16 P01	10G SW1U P24
046-004-511	SERVER 13	C NODE 13 P02	10G SW2U P21
046-004-512	SERVER 14	C NODE 14 P02	10G SW2U P22
046-004-513	SERVER 15	C NODE 15 P02	10G SW2U P23
046-004-514	SERVER 16	C NODE 16 P02	10G SW2U P24
046-005-750	SERVER 17	C NODE 17 P01	10G SW1U P25
046-005-751	SERVER 18	C NODE 18 P01	10G SW1U P26
046-005-752	SERVER 19	C NODE 19 P01	10G SW1U P27
046-005-753	SERVER 20	C NODE 20 P01	10G SW1U P28
046-005-750	SERVER 17	C NODE 17 P02	10G SW2U P25
046-005-751	SERVER 18	C NODE 18 P02	10G SW2U P26
046-005-752	SERVER 19	C NODE 19 P02	10G SW2U P27
046-005-753	SERVER 20	C NODE 20 P02	10G SW2U P28
046-005-754	SERVER 21	C NODE 21 P01	10G SW1U P29
046-005-755	SERVER 22	C NODE 22 P01	10G SW1U P30
046-005-756	SERVER 23	C NODE 23 P01	10G SW1U P31
046-005-757	SERVER 24	C NODE 24 P01	10G SW1U P32
046-005-754	SERVER 21	C NODE 21 P02	10G SW2U P29
046-005-755	SERVER 22	C NODE 22 P02	10G SW2U P30
046-005-756	SERVER 23	C NODE 23 P02	10G SW2U P31
046-005-757	SERVER 24	C NODE 24 P02	10G SW2U P32

**Figure 66** C-Series private switch cabling for the lower segment from the rear

4 100-585-072 Arista 100/1000BASE\_T SFP Copper Modules in ports 49, 50, 51, and 52 of 1GBE Switch.



U1 042-018-088 Shipping Brace      038-003-168 60" Gray  
 038-003-169 60" Blue

**10G Switch to 1G Switch Wiring**

Label P/N	From	To
046-006-273	10G SW1 MGMT	1G SW P49
046-006-274	10G SW2 MGMT	1G SW P50

**Figure 66** C-Series private switch cabling for the lower segment from the rear (continued)

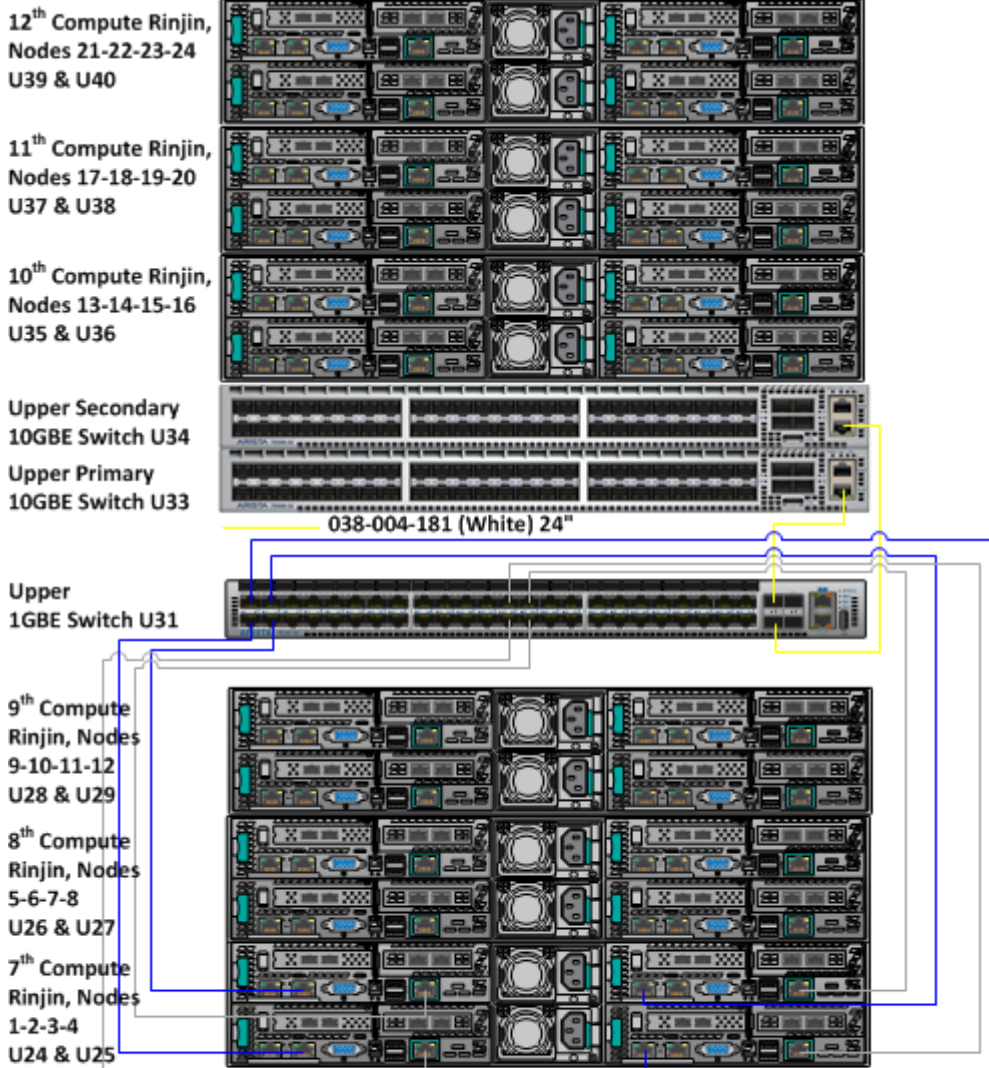
LABEL	TEXT	FROM	TO
046-004-499	SERVER 1	C Node 01 P01	1G SW L P01
046-004-500	SERVER 2	C Node 02 P01	1G SW L P02
046-004-501	SERVER 3	C Node 03 P01	1G SW L P03
046-004-502	SERVER 4	C Node 04 P01	1G SW L P04
046-004-499	SERVER 1	C Node 01 RMM	1G SW L P25
046-004-500	SERVER 2	C Node 02 RMM	1G SW L P26
046-004-501	SERVER 3	C Node 03 RMM	1G SW L P27
046-004-502	SERVER 4	C Node 04 RMM	1G SW L P28
046-004-503	SERVER 5	C Node 05 P01	1G SW L P05
046-004-504	SERVER 6	C Node 06 P01	1G SW L P06
046-004-505	SERVER 7	C Node 07 P01	1G SW L P07
046-004-506	SERVER 8	C Node 08 P01	1G SW L P08
046-004-503	SERVER 5	C Node 05 RMM	1G SW L P29
046-004-504	SERVER 6	C Node 06 RMM	1G SW L P30
046-004-505	SERVER 7	C Node 07 RMM	1G SW L P31
046-004-506	SERVER 8	C Node 08 RMM	1G SW L P32
046-004-507	SERVER 9	C Node 09 P01	1G SW L P09
046-004-508	SERVER 10	C Node 10 P01	1G SW L P10
046-004-509	SERVER 11	C Node 11 P01	1G SW L P11
046-004-510	SERVER 12	C Node 12 P01	1G SW L P12
046-004-507	SERVER 9	C Node 09 RMM	1G SW L P33
046-004-508	SERVER 10	C Node 10 RMM	1G SW L P34
046-004-509	SERVER 11	C Node 11 RMM	1G SW L P35
046-004-510	SERVER 12	C Node 12 RMM	1G SW L P36

**Figure 66** C-Series private switch cabling for the lower segment from the rear (continued)

LABEL	TEXT	FROM	TO
046-004-511	SERVER 13	C Node 13 P01	1G SW L P13
046-004-512	SERVER 14	C Node 14 P01	1G SW L P14
046-004-513	SERVER 15	C Node 15 P01	1G SW L P15
046-004-514	SERVER 16	C Node 16 P01	1G SW L P16
046-004-511	SERVER 13	C Node 13 RMM	1G SW L P37
046-004-512	SERVER 14	C Node 14 RMM	1G SW L P38
046-004-513	SERVER 15	C Node 15 RMM	1G SW L P39
046-004-514	SERVER 16	C Node 16 RMM	1G SW L P40
046-005-750	SERVER 17	C Node 17 P01	1G SW L P17
046-005-751	SERVER 18	C Node 18 P01	1G SW L P18
046-005-752	SERVER 19	C Node 19 P01	1G SW L P19
046-005-753	SERVER 20	C Node 20 P01	1G SW L P20
046-005-750	SERVER 17	C Node 17 RMM	1G SW L P41
046-005-751	SERVER 18	C Node 18 RMM	1G SW L P42
046-005-752	SERVER 19	C Node 19 RMM	1G SW L P43
046-005-753	SERVER 20	C Node 20 RMM	1G SW L P44
046-005-754	SERVER 21	C Node 21 P01	1G SW L P21
046-005-755	SERVER 22	C Node 22 P01	1G SW L P22
046-005-756	SERVER 23	C Node 23 P01	1G SW L P23
046-005-757	SERVER 24	C Node 24 P01	1G SW L P24
046-005-754	SERVER 21	C Node 21 RMM	1G SW L P45
046-005-755	SERVER 22	C Node 22 RMM	1G SW L P46
046-005-756	SERVER 23	C Node 23 RMM	1G SW L P47
046-005-757	SERVER 24	C Node 24 RMM	1G SW L P48

**Figure 67** C-Series private switch cabling for the upper segment from the rear

**4 100-585-072 Arista 100/1000BASE\_T SFP Copper Modules in ports 49, 50, 51 and 52 of 1GBE Switch.**



U23 042-018-088 Shipping Brace      038-003-168 60" Gray  
 038-003-169 60" Blue

**10G Switch to 1G Switch Wiring**

Label	P/N	From	To
046-006-273		10G SW1 MGMT	1G SW P49
046-006-274		10G SW2 MGMT	1G SW P50



**Figure 67** C-Series private switch cabling for the upper segment from the rear (continued)

LABEL	TEXT	FROM	TO
046-004-499	SERVER 1	C Node 01 P01	1G SW U P01
046-004-500	SERVER 2	C Node 02 P01	1G SW U P02
046-004-501	SERVER 3	C Node 03 P01	1G SW U P03
046-004-502	SERVER 4	C Node 04 P01	1G SW U P04
046-004-499	SERVER 1	C Node 01 RMM	1G SW U P25
046-004-500	SERVER 2	C Node 02 RMM	1G SW U P26
046-004-501	SERVER 3	C Node 03 RMM	1G SW U P27
046-004-502	SERVER 4	C Node 04 RMM	1G SW U P28
046-004-503	SERVER 5	C Node 05 P01	1G SW U P05
046-004-504	SERVER 6	C Node 06 P01	1G SW U P06
046-004-505	SERVER 7	C Node 07 P01	1G SW U P07
046-004-506	SERVER 8	C Node 08 P01	1G SW U P08
046-004-503	SERVER 5	C Node 05 RMM	1G SW U P29
046-004-504	SERVER 6	C Node 06 RMM	1G SW U P30
046-004-505	SERVER 7	C Node 07 RMM	1G SW U P31
046-004-506	SERVER 8	C Node 08 RMM	1G SW U P32
046-004-507	SERVER 9	C Node 09 P01	1G SW U P09
046-004-508	SERVER 10	C Node 10 P01	1G SW U P10
046-004-509	SERVER 11	C Node 11 P01	1G SW U P11
046-004-510	SERVER 12	C Node 12 P01	1G SW U P12
046-004-507	SERVER 9	C Node 09 RMM	1G SW U P33
046-004-508	SERVER 10	C Node 10 RMM	1G SW U P34
046-004-509	SERVER 11	C Node 11 RMM	1G SW U P35
046-004-510	SERVER 12	C Node 12 RMM	1G SW U P36

**Figure 67** C-Series private switch cabling for the upper segment from the rear (continued)

LABEL	TEXT	FROM	TO
046-004-511	SERVER 13	C Node 13 P01	1G SW UP 13
046-004-512	SERVER 14	C Node 14 P01	1G SW UP 14
046-004-513	SERVER 15	C Node 15 P01	1G SW UP 15
046-004-514	SERVER 16	C Node 16 P01	1G SW UP 16
046-004-511	SERVER 13	C Node 13 RMM	1G SW UP 37
046-004-512	SERVER 14	C Node 14 RMM	1G SW UP 38
046-004-513	SERVER 15	C Node 15 RMM	1G SW UP 39
046-004-514	SERVER 16	C Node 16 RMM	1G SW UP 40
046-005-750	SERVER 17	C Node 17 P01	1G SW UP 17
046-005-751	SERVER 18	C Node 18 P01	1G SW UP 18
046-005-752	SERVER 19	C Node 19 P01	1G SW UP 19
046-005-753	SERVER 20	C Node 20 P01	1G SW UP 20
046-005-750	SERVER 17	C Node 17 RMM	1G SW UP 41
046-005-751	SERVER 18	C Node 18 RMM	1G SW UP 42
046-005-752	SERVER 19	C Node 19 RMM	1G SW UP 43
046-005-753	SERVER 20	C Node 20 RMM	1G SW UP 44
046-005-754	SERVER 21	C Node 21 P01	1G SW UP 21
046-005-755	SERVER 22	C Node 22 P01	1G SW UP 22
046-005-756	SERVER 23	C Node 23 P01	1G SW UP 23
046-005-757	SERVER 24	C Node 24 P01	1G SW UP 24
046-005-754	SERVER 21	C Node 21 RMM	1G SW UP 45
046-005-755	SERVER 22	C Node 22 RMM	1G SW UP 46
046-005-756	SERVER 23	C Node 23 RMM	1G SW UP 47
046-005-757	SERVER 24	C Node 24 RMM	1G SW UP 48

**Customer network connections**

Customers connect to an ECS Appliance by way of 10 GbE ports and their own interconnect cables. When multiple appliances are installed in the same data center, daisy chain or home-run connections the private switches to a customer-provided switch.