HPE Synergy Cabling Guide

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HPE Synergy Cabling Guide

Abstract

This guide provides HPE Synergy cabling instructions and cabling diagram examples. Cabling examples outlined in this guide include management network cabling, management cabling, interconnect primary and satellite cabling, power cabling, and connecting to the HPE Synergy Console.

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Table of contents

About HPE Synergy Cabling....8
Management network cabling....9
Management network cabling considerations for HPE Synergy 4-Port Frame Link Modules....10
Single-frame management network with HPE Synergy 4-Port Frame Link Modules cabling example....11
Cabling frames with HPE Synergy Frame Link Modules (2-Port) to a frame with HPE Synergy 4-Port Frame Link Modules....15
Multiframe management cabling example with HPE Synergy 4-Port Frame Link Modules....20
Multiframe 4-port FLM cabling example using a fiber optic patch panel....26
Management network cabling for HPE Synergy Frame Link Modules (2-Port)....31
Single-frame management network cabling example with HPE Synergy Frame Link Modules....32
Multiframe management cabling example....35
Three primary enclosures (frames) connected to two remote enclosures (frames) cabling example....39
Multiframe 2-Port FLM cabling example using a CAT6A patch panel....44
HPE Synergy Frame Link Module cabling components....48
Primary and satellite interconnect module cabling examples....51
HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy cabling....51
Cabling interconnect modules in a single frame (redundant)....52
HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy three frame cabling (highly available)....54
Four frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)....61
Five frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)....67
Power cabling options....71
PDU Guidelines....71
Cabling twelve power supplies for power feed redundancy....72
Cabling six power supplies for power feed redundancy....80
HPE Synergy Console connections....86
Connecting to the HPE Synergy Console with a notebook computer....86
Connecting to the HPE Synergy Console using a keyboard, video monitor, and mouse....88

HPE Synergy Fabrics and interconnect port mapping..... 91
HPE Synergy Frame and Interconnect Modules.....91
HPE Synergy Fabrics best practices..... 93
HPE Synergy compute module to interconnect module port mapping.....93
Half-height compute module mezzanine connector definitions 94
HPE Synergy Ethernet modules with supported cables and transceivers..... 95
HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy..... 96
Transceivers and cables for the HPE Virtual Connect SE 100Gb F32 Module.....100
Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy..... 100
QSFP28 transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....102
QSFP28 cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....106
QSFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....108
QSFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy..... 110
QSFP28 to SFP28 adapter for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy..... 111
SFP28 and SFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....112
SFP transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy..... 114
SFP28 and SFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....114
MPO Fiber Optic cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....116
HPE Synergy Fabric compatibility and coexistence across generations.. 117
HPE Synergy Virtual Connect 100Gb F32 Module enhancements..... 118
HPE Virtual Connect SE 100Gb F32 Module supported configurations/ topologies..... 121
HPE Synergy 25/50Gb Interconnect Link Module.....122
Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....123
HPE Synergy 20Gb Interconnect Link Module..... 125
Interconnect link cables for HPE Synergy 10Gb and 20Gb Interconnect Link Modules..... 126
Mellanox SH2200 Switch Module for HPE Synergy.....127
Transceivers and cables..... 129

100Gb QSFP28 MPO SR4 and eSR4 transceivers for the Mellanox SH2200 Switch Module for HPE Synergy..... 129
QSFP28 Cables for the Mellanox SH2200 Switch Module for HPE Synergy..... 130
QSFP+ transceivers for the Mellanox SH2200 Switch Module for HPE Synergy.....132
QSFP+ cables for the Mellanox SH2200 Switch Module for HPE Synergy..... 133
Fiber Optic cables for the Mellanox SH2200 Switch Module for HPE Synergy.....135
HPE Synergy 10Gb Pass-Thru Module.....135
Transceivers and cables for the HPE Synergy 10Gb Pass-Thru Module... 136
QSFP+ to SFP+ adapters for the HPE Synergy 10Gb Pass-Thru Module 136
SFP+ transceivers for the HPE Synergy 10Gb Pass-Thru Module..... 137
SFP+ cables for the HPE Synergy 10Gb Pass-Thru Module..... 138
HPE Synergy Fibre Channel SAN modules with supported cables and transceivers... 139
HPE Virtual Connect SE 16Gb Fibre Channel Module for HPE Synergy..... 139
HPE Virtual Connect SE 32Gb FC Module for HPE Synergy..... 141
Brocade 32Gb FC SAN Switch Module for HPE Synergy..... 142
Transceivers and cables for the HPE Virtual Connect SE 32Gb FC Module and Brocade 32Gb FC SAN Switch Module for HPE Synergy..... 144
QSFP+ and SFP+ transceivers for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy..... 145
MPO Fiber Optic cables for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy.....147
Connection Examples.....147
HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.....148
HPE Synergy 100Gb primary modules cluster connection..... 148
HPE Synergy 100Gb primary module to Interconnect Link Module (satellite) connection.....150
100Gb primary interconnect module with 25/50Gb Interconnect Link module cabling.....150
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) DAC/AOC.....151
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) SW.....153
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) LW..... 155
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) Cu..... 156
HPE Synergy 100Gb primary modules to SAN (Fiber Channel)..... 157

Mellanox SH2200 Switch Module to 100Gb/25Gb LAN (Ethernet/CEE)..... 159
Mellanox SH2200 Switch Module to 40Gb/10Gb LAN (Ethernet/CEE)..... 161
HPE Synergy 10Gb Pass-Thru Module to 10Gb LAN (Ethernet/CEE)..... 165
HPE Synergy 16 Gb VC and Brocade 16 Gb FC modules to SAN..... 168
HPE Virtual Connect SE 32Gb Fiber Channel Module or Brocade 32Gb/24 Fiber Channel Switch Module to SAN..... 170
Additional information..... 173
HPE transceivers and cables..... 173
Transceivers electrical and optical lanes diagram..... 176
Fiber Optics connector types..... 181
Fiber Optics cable types..... 182
MPO Fiber Optics connector details..... 184
MPO Fiber Optics cable details..... 185
AOC/DAC cable details..... 186
100G Parallel Single-Mode four-channel (PSM4) transceiver information..... 188
100G PSM4 transceiver information..... 189
MPO Optical connectors — Flat and Angle polished fibers 191
HPE Synergy documentation..... 191
Websites..... 191
Support and other resources..... 192
Accessing Hewlett Packard Enterprise Support..... 192
HPE product registration..... 193
Accessing updates..... 193
Remote support..... 194
Warranty information..... 194
Regulatory information..... 195
Documentation feedback..... 195

About HPE Synergy Cabling

The HPE Synergy Cabling Guide provides step-through cabling examples. Depending on your configuration, cabling and appliance placement might be different.

For configuration and compatibility information, see the HPE Synergy Configuration and Compatibility Guide (**https://www.hpe.com/info/synergy-docs**).

The cabling examples in this guide are for a first-time setup. If you are migrating HPE Synergy hardware, see the HPE Synergy Migration Guide (**https://www.hpe.com/info/synergy-docs**).

- Management network cabling

  Cabling the management network includes cabling the frame link module LINK ports together to form a management ring (frame link topology) and cabling two frame link module MGMT ports to the management network.

- Interconnect module cabling

  HPE Synergy supports a composable fabric that spans multiple frames and includes primary interconnect modules (switches) and satellite modules (links). 1Gigabit speed requires at least Cat5e cable (more twists per foot compared to Cat5 or Cat5a cable). 10Gigabit speed over twisted pair requires at least a Cat6a to reach 100m (the max distance supported by Ethernet over twisted pair).

- Power cabling

  HPE Synergy power cabling includes cabling multiple frames for power feed redundant power, cabling power supplies for power feed redundancy, and power cabling for both a single frame and multiple frame configurations.

- HPE Synergy Console cabling

  Direct connections to the HPE Synergy Console are possible by connecting a laptop directly to a frame through the front panel or by connecting KVM to the frame link module.

Management network cabling

IMPORTANT

Connect frame link module **LINK** ports to frame link module **LINK** ports only. Do not connect **LINK** ports to a data center switch.

NOTE

For high availability:

- Install the two HPE Synergy Composers in separate frames.
- Connect a minimum of two **MGMT** ports from separate frames in each management ring to the management network.
- Connect the **MGMT** ports from the frame link modules in the same frame and bay number as the HPE Synergy Composers to the management network

NOTE

HPE Synergy frames can be connected as part of a management ring up to the maximum number supported. For more information on the number of frames supported in an HPE Synergy solution, see the product QuickSpecs (**http://www.hpe.com/info/qs**).

NOTE

HPE Synergy 4-Port Frame Link Module configurations must use HPE Synergy Composer2 or Composer2 Plus appliances.

Cabling the management network includes:

- Cabling frame link module **LINK** ports together to form a management ring (frame link topology).
- Cabling at least two frame link module **MGMT** ports to the management network.

A management ring (frame link topology) is created by connecting frame link module **LINK** ports together. Frames in a management ring are managed by one instance of HPE OneView. The frame link topology (management ring) can be viewed in HPE OneView. To view the frame link topology, navigate to **OneView > Enclosures > <enclosure> > Frame link topology**.

A primary management ring (primary frame link topology) includes HPE Synergy Composers. A remote management ring (remote frame link topology) is a single or

multiframe management ring without HPE Synergy Composers. A primary and remote management ring cabling example is shown in "Three primary enclosures (frames) connected to two remote enclosures (frames) cabling example".

Management network cabling considerations for HPE Synergy 4-Port Frame Link Modules

LINK port cabling for HPE Synergy 4-Port Frame Link Modules

- Connect frame link module **LINK** ports to other frame link module **LINK** ports only. Do not connect **LINK** ports to a data center switch.
- The 4-Port FLM **LINK** port supports SFP+ 10Gb DAC cables, SFP+ 10Gb transceivers with optical cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.
- HPE Synergy 4-Port Frame Link Module (4-Port FLM) **LINK** ports support SFP+ optical transceivers for cabling long-distance management rings.

MGMT port cabling for HPE Synergy 4-Port Frame Link Modules

- The management network top-of-rack switch must be the same speed as the cables or transceivers used for **MGMT** port cabling.
- The 4-Port FLM **MGMT** port supports SFP+ 10Gb DAC cables, SFP DAC cables, SFP+ 10Gb transceivers with optical cables, 1000BASE-T SFP Transceiver with CAT5 cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.
- The 4-Port FLM **MGMT** ports supports 1GbE and 10GbE cables and transceivers. The **MGMT** port speed is set based on the cables or transceivers used.

> **NOTE**
> When using a transceiver with a cable to connect HPE Synergy components, you are not required to use the same transceiver on each end of the same cable.

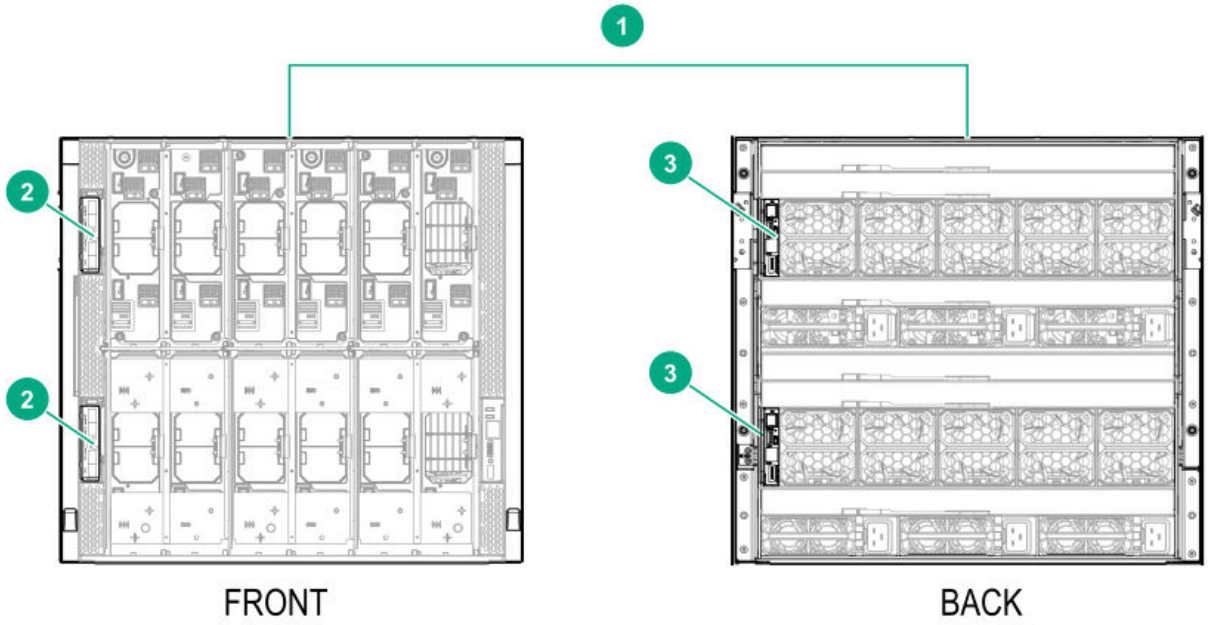
Subtopics

Single-frame management network with HPE Synergy 4-Port Frame Link Modules cabling example

Cabling frames with HPE Synergy Frame Link Modules (2-Port) to a frame with HPE Synergy 4-Port Frame Link Modules
Multiframe management cabling example with HPE Synergy 4-Port Frame Link Modules
Multiframe 4-port FLM cabling example using a fiber optic patch panel

Single-frame management network with HPE Synergy 4-Port Frame Link Modules cabling example

Prerequisites



Item	Description	Amount
1	HPE Synergy 12000 Frame	1
2	HPE Synergy Composer [1]	2
3	HPE Synergy 4-Port Frame Link Module (4-Port FLM)	2

[1] Only required in the primary the management ring. Frames in a remote management ring should not have HPE Synergy Composers installed.

About this task

IMPORTANT

The management network top-of-rack switch must be the same speed as the cables or transceivers used for **MGMT** port cabling.

NOTE

This cabling example does not cover power or production network cabling.

Procedure

1. Using SFP+ DAC cables or SFP+ transceivers, connect both **MGMT** ports to the management network.

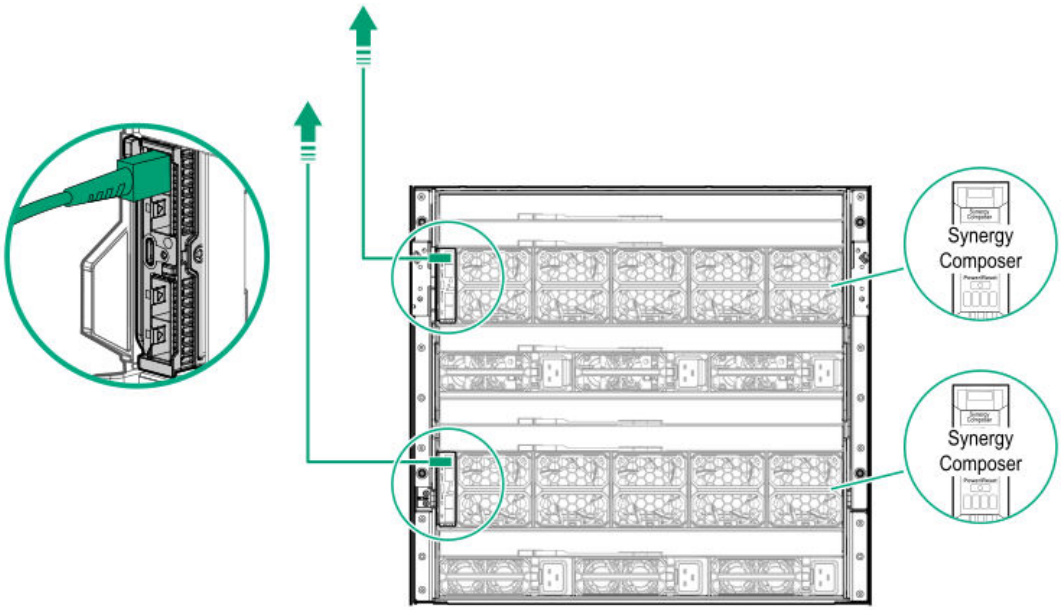
   NOTE

   The 4-Port FLM **MGMT** port supports 1GbE and 10GbE cables and transceivers. The **MGMT** port speed is set based on the cables or transceivers used.

   NOTE

   The 4-Port FLM **MGMT** port supports SFP DAC cables, SFP+ 10Gb DAC cables, SFP+ 10Gb transceivers with optical cables, 1000BASE-T SFP Transceiver with CAT5 cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.

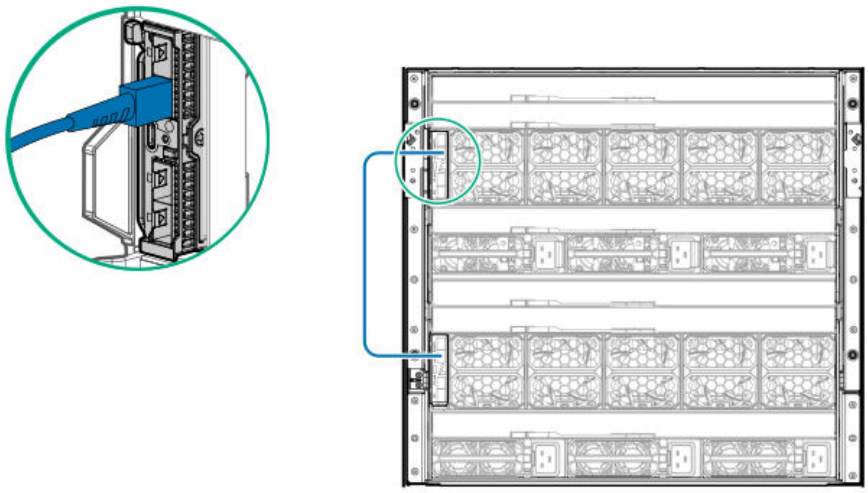
Figure 1. MGMT port to management network cabling for a single-frame management network with 4-port FLMs



2. Using SFP+ 10Gb DAC cables or SFP+ transceivers, connect the **LINK** ports together.

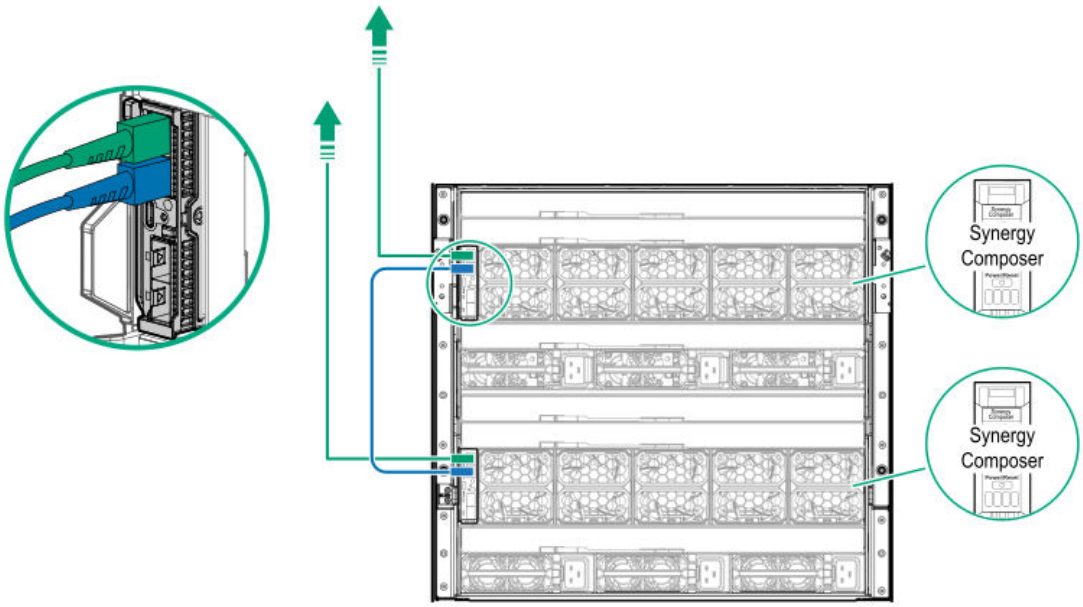
> **NOTE**
>
> The 4-Port FLM **LINK** port supports SFP+ 10Gb DAC cables, SFP+ 10Gb transceivers with optical cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.

Figure 2. LINK port cabling for a single-frame management network with 4-port FLMs



Cabling is complete. The following diagram shows the complete cabling diagram.

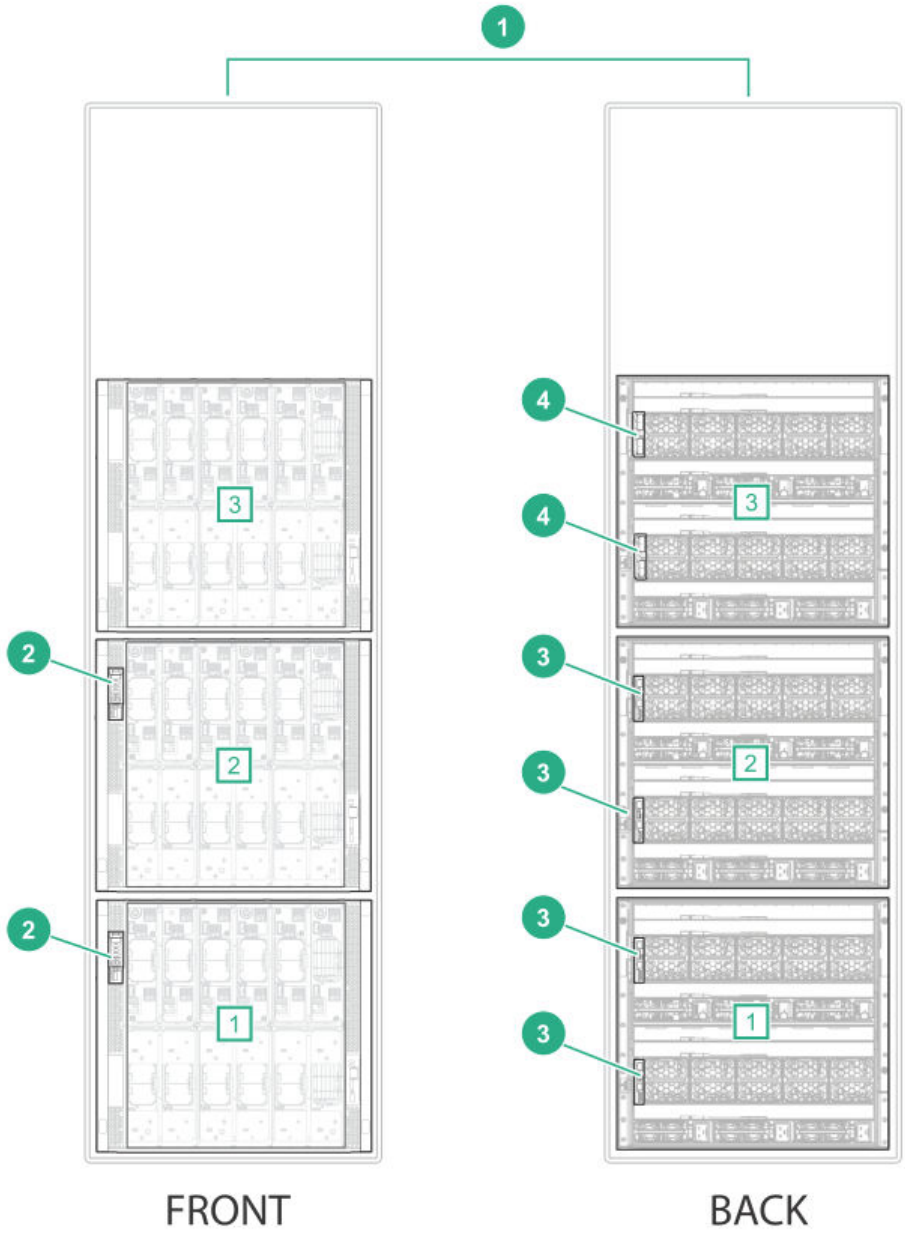
Figure 3. Complete cabling for a single-frame management network with 4-port FLMs



Cabling frames with HPE Synergy Frame Link Modules (2-Port) to a frame with HPE Synergy 4-Port Frame Link Modules

Prerequisites

Figure 1. Required components for a mixed frame link module configuration



Item	Description	Amount
1	HPE Synergy 12000 Frames [1], [2], [3]	3
2	HPE Synergy Composer [1]	2
3	HPE Synergy Frame Link Module (2-port FLM)	4
4	HPE Synergy 4-Port Frame Link Module (4-port FLM)	2

Item	Description	Amount
5	SFP+ DAC Cable (Installed into both 4-port FLM LINK ports)	1

[1] Only required in the primary the management ring. Frames in a remote management ring should not have HPE Synergy Composers installed.

About this task

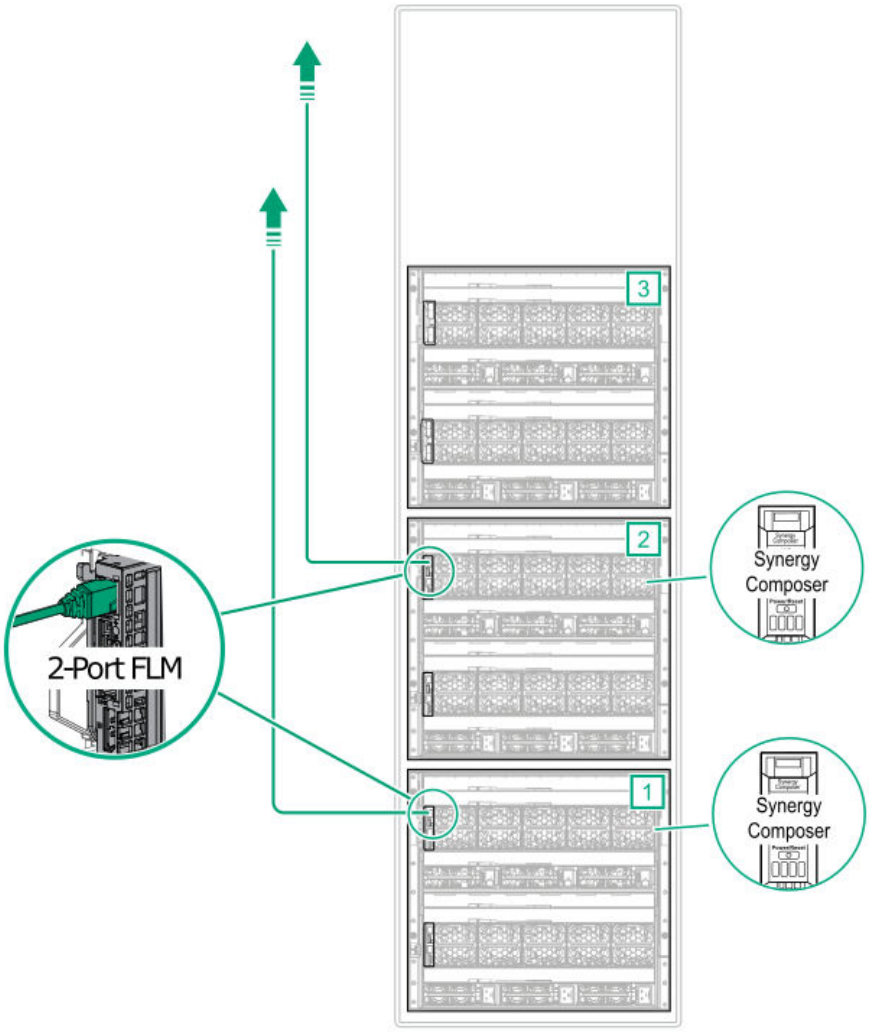
NOTE
This cabling example does not cover power or production network cabling.

NOTE
HPE Synergy 12000 Frames must have the same type of frame link modules installed in each frame link module bay.

Procedure

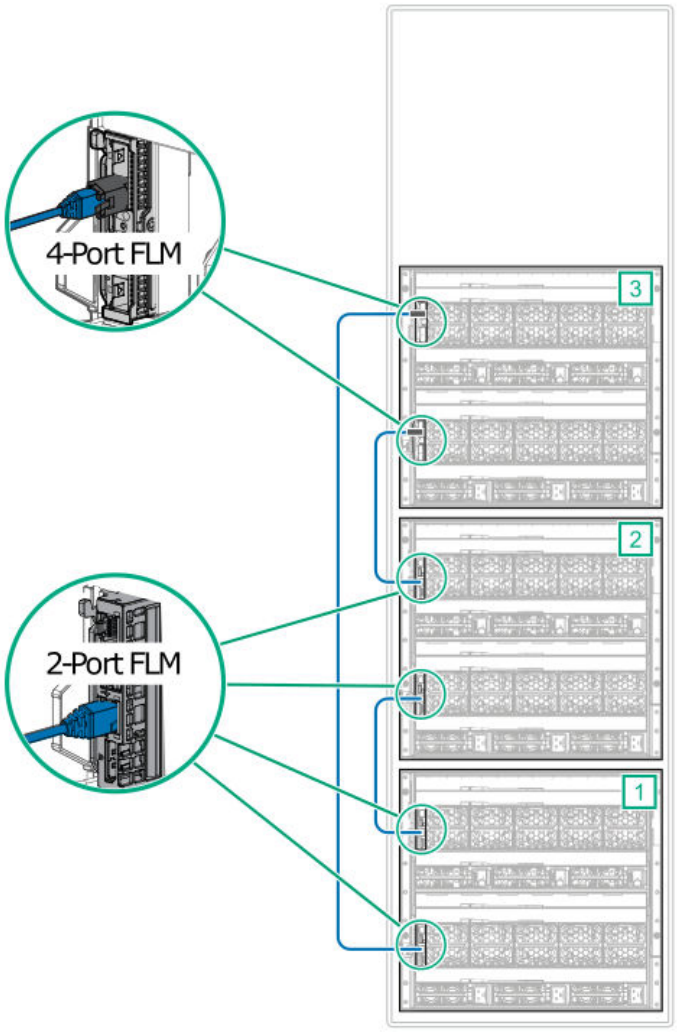
1. Using CAT6A cables, connect two 2-port FLM **MGMT** ports from separate frames to the management network.

Figure 2. MGMT port to management network cabling for a mixed frame link module configuration



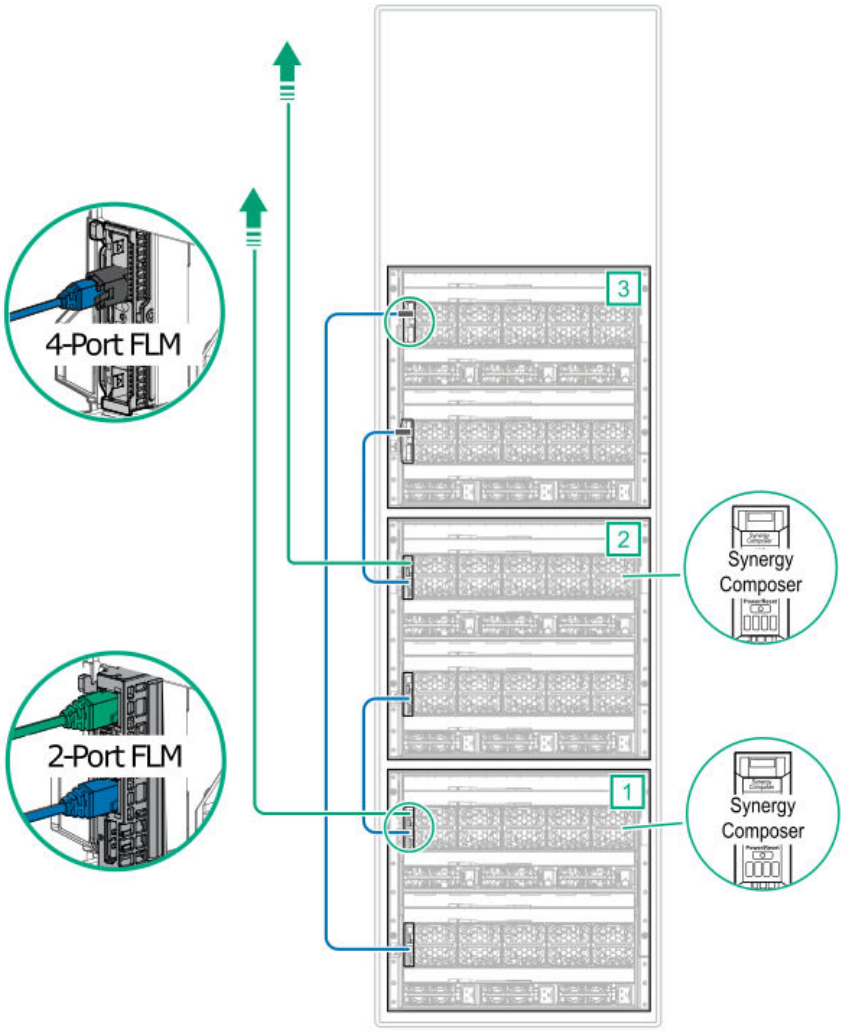
2. Connect the **LINK** ports together.
   a. Install a SFP+ DAC cable into each 4-port FLM **LINK** port.
   b. Using CAT6A cables, connect the **LINK** ports together.

Figure 3. LINK port cabling for a mixed frame link module configuration



Cabling is complete. The following diagram shows the complete cabling diagram.

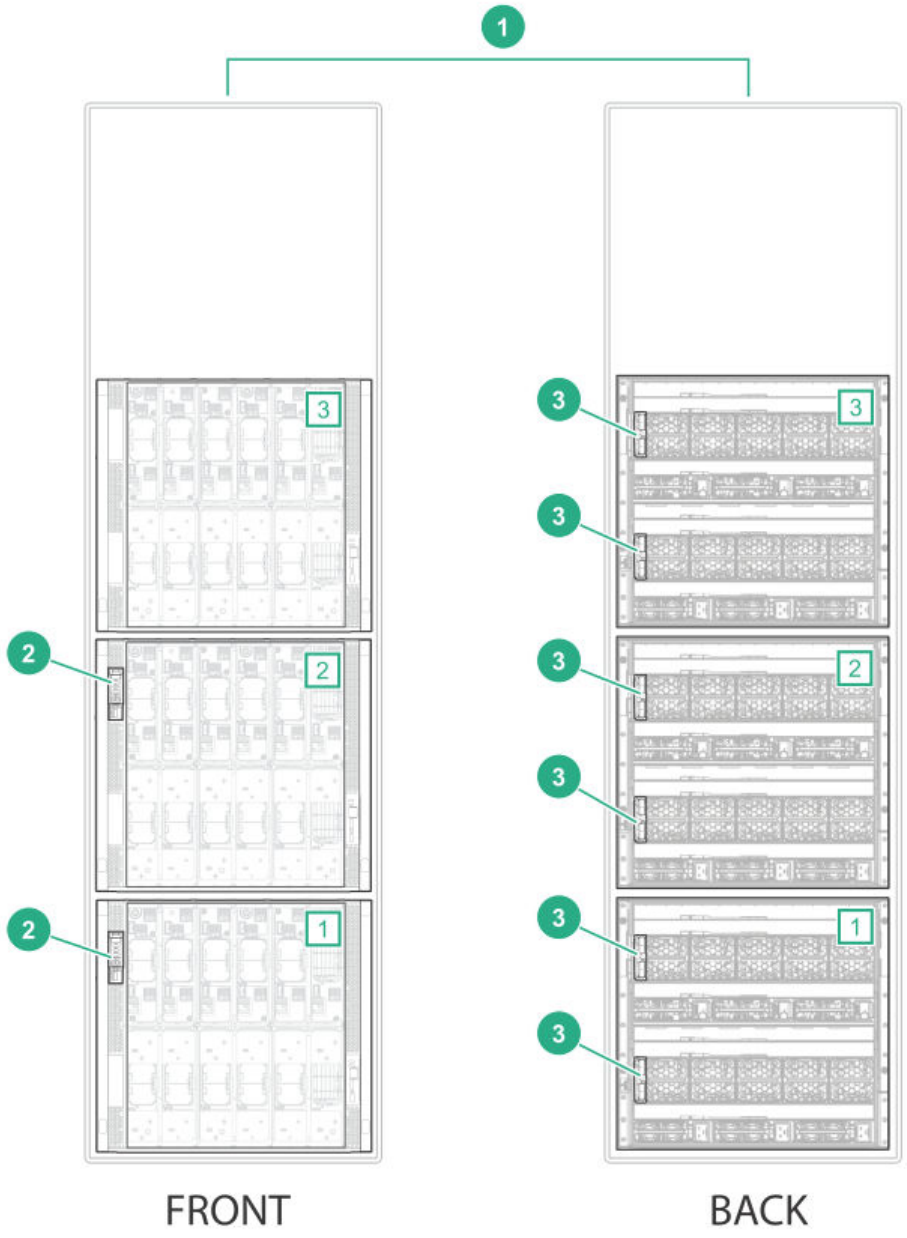
Figure 4. Complete cabling for connecting frames with HPE Synergy Frame Link modules (2-Port) to a frame with HPE Synergy 4-Port Frame Link Modules



Multiframe management cabling example with HPE Synergy 4-Port Frame Link Modules

Prerequisites

Figure 1. Required components for multiframe management with 4-port FLMs



Item	Description	Amount
1	HPE Synergy 12000 Frames [1], [2], [3]	3
2	HPE Synergy Composer	2
3	HPE Synergy 4-Port Frame Link Module (4-Port FLM)	6

* Only required in the primary the management ring. Frames in a remote management ring should not have HPE Synergy Composers installed.

About this task

IMPORTANT

The management network top-of-rack switch must be the same speed as the cables or transceivers used for **MGMT** port cabling.

NOTE

This cabling example does not cover power or production network cabling.

Procedure

1. Using SFP DAC cables, cable two **MGMT** ports from separate frames to the management network.

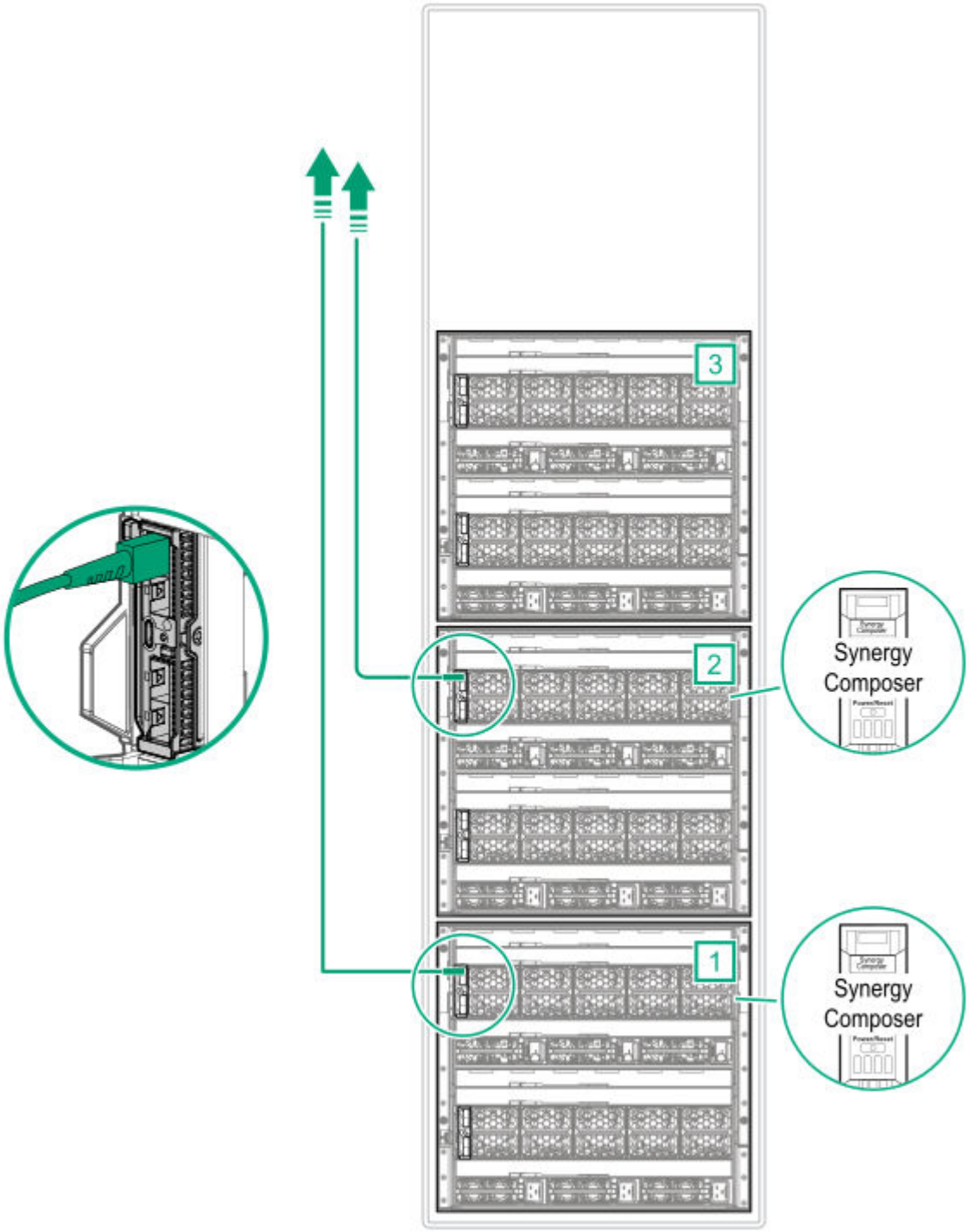
   NOTE

   The 4-Port FLM **MGMT** port supports SFP DAC cables, SFP+ 10Gb DAC cables, SFP+ 10Gb transceivers with optical cables, 1000BASE-T SFP Transceiver with CAT5 cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.

   NOTE

   The 4-Port FLM **MGMT** port supports 1GbE and 10GbE cables and transceivers. The **MGMT** port speed is set based on the cables or transceivers used.

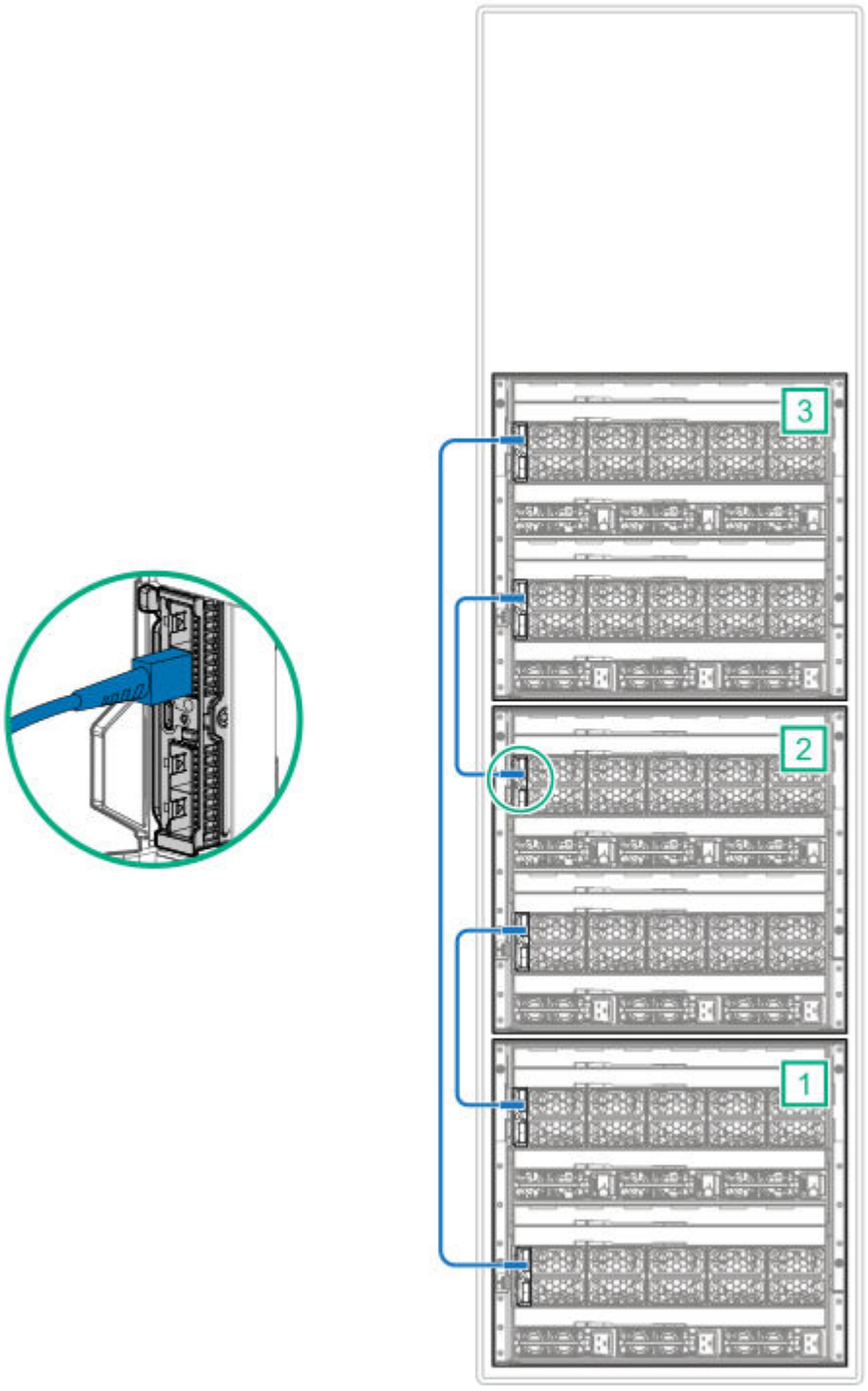
Figure 2. MGMT port to management network cabling for multiframe management with 4-port FLMs


3
2
1
Synergy
Composer
Synergy
Composer

2. Using SFP+ 10Gb DAC cables, cable the **LINK** ports together.

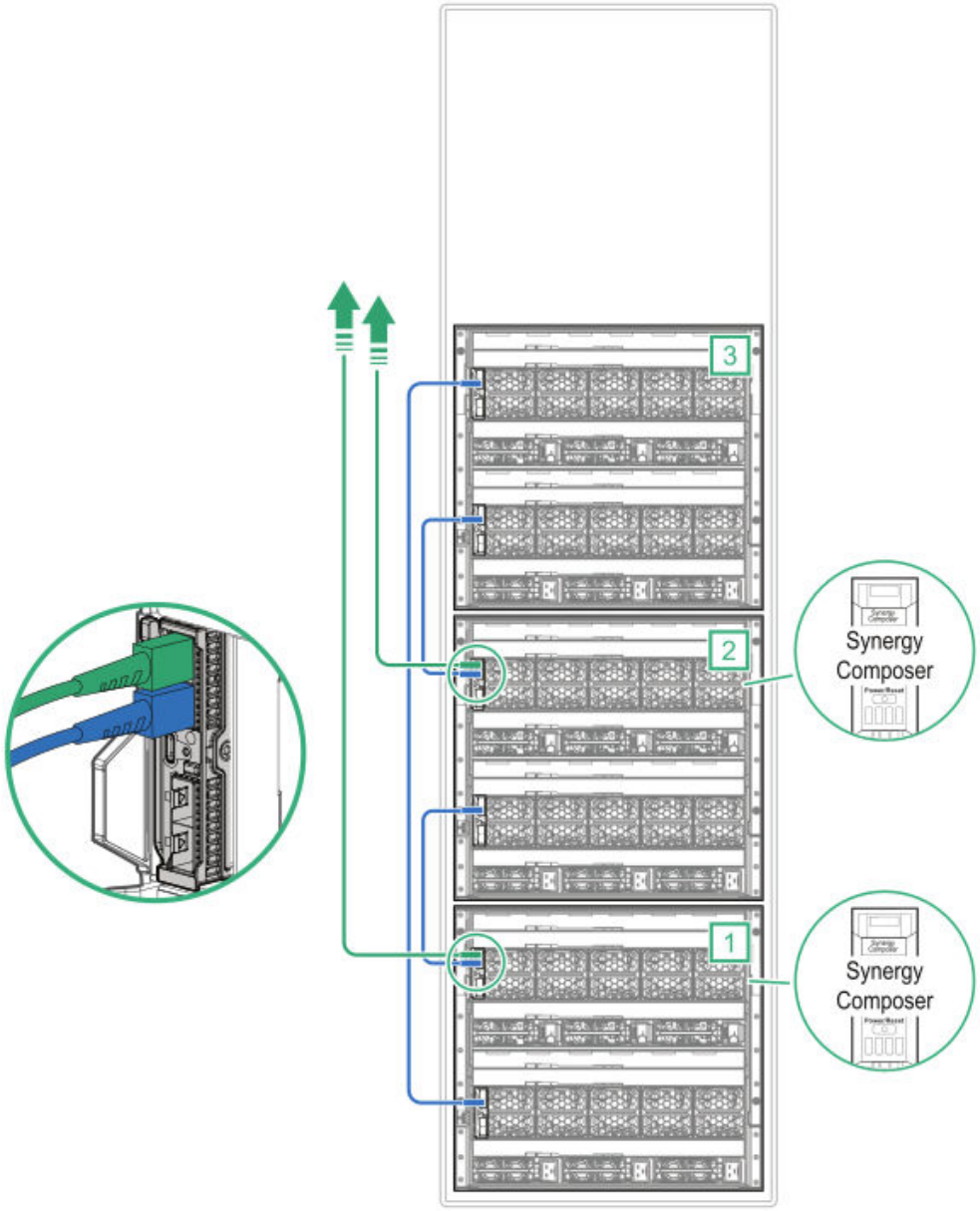
> **NOTE**
>
> The 4-Port FLM **LINK** port supports SFP+ 10Gb DAC cables, SFP+ 10Gb transceivers with optical cables, and 10GBase-T SFP+ transceiver with CAT6A cables. For a complete list of cabling options, see the product QuickSpecs **www.hpe.com/info/qs**.

Figure 3. LINK port cabling for multiframe management with 4-port FLMs



Cabling is complete. The following diagram shows the complete cabling diagram.

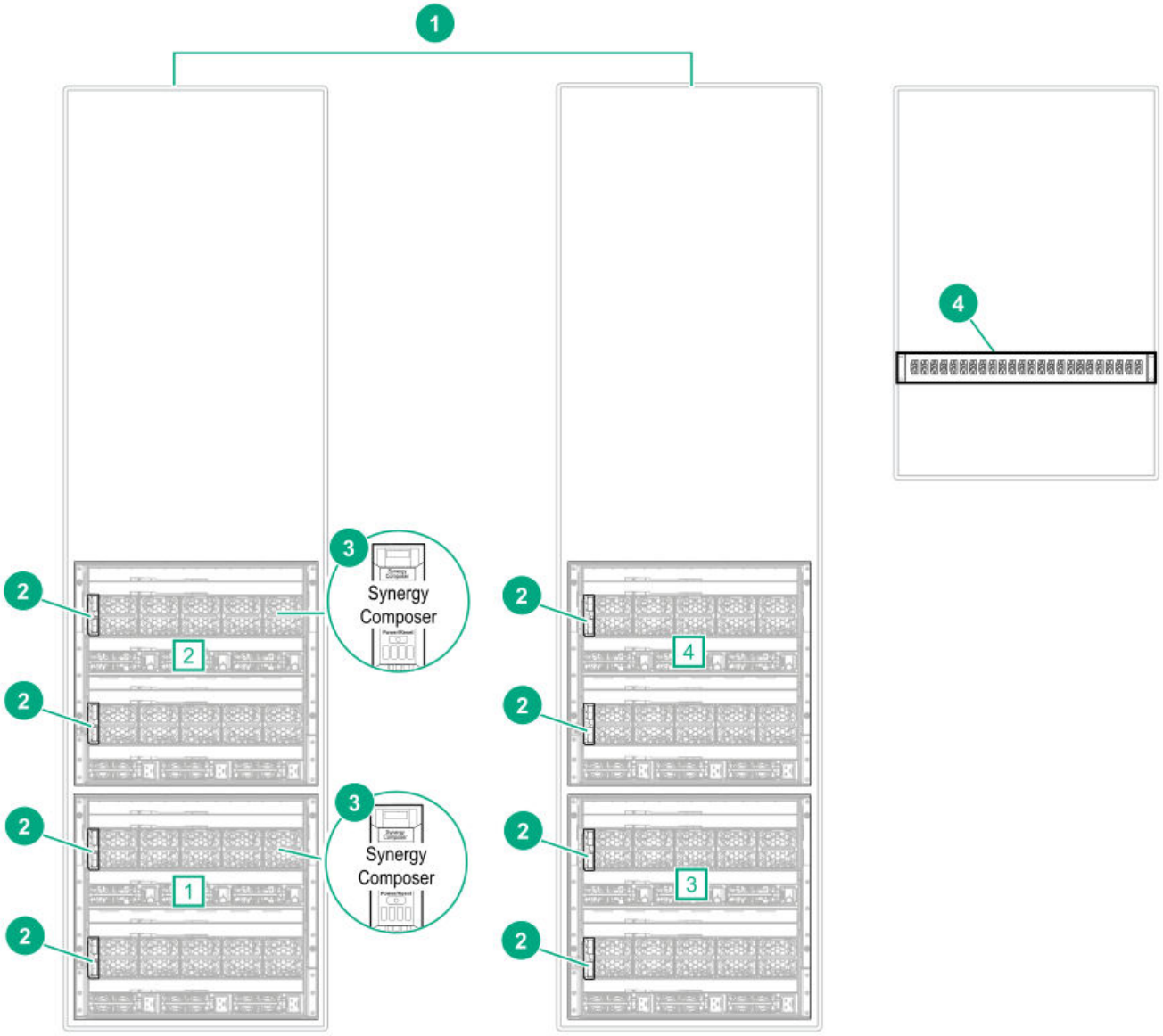
Figure 4. Complete cabling for multiframe management with 4-port FLMs



Multiframe 4-port FLM cabling example using a fiber optic patch panel

Prerequisites

Figure 1. Required components for multiframe 4-port FLM cabling example using a fiber optic patch panel



Item	Description	Amount
1	HPE Synergy 12000 Frames [1], [2], [3], [4]	4
2	HPE Synergy 4-Port Frame Link Modules (4-Port FLM)	8
3	HPE Synergy Composer [1]	2
4	Fiber optic patch panel	1

[1] Only required in the primary the management ring. Frames in a remote management ring should not have HPE Synergy Composers installed.

About this task

IMPORTANT

The management network top-of-rack switch must be the same speed as the cables or transceivers used for **MGMT** port cabling.

NOTE

This cabling example does not cover power or production network cabling.

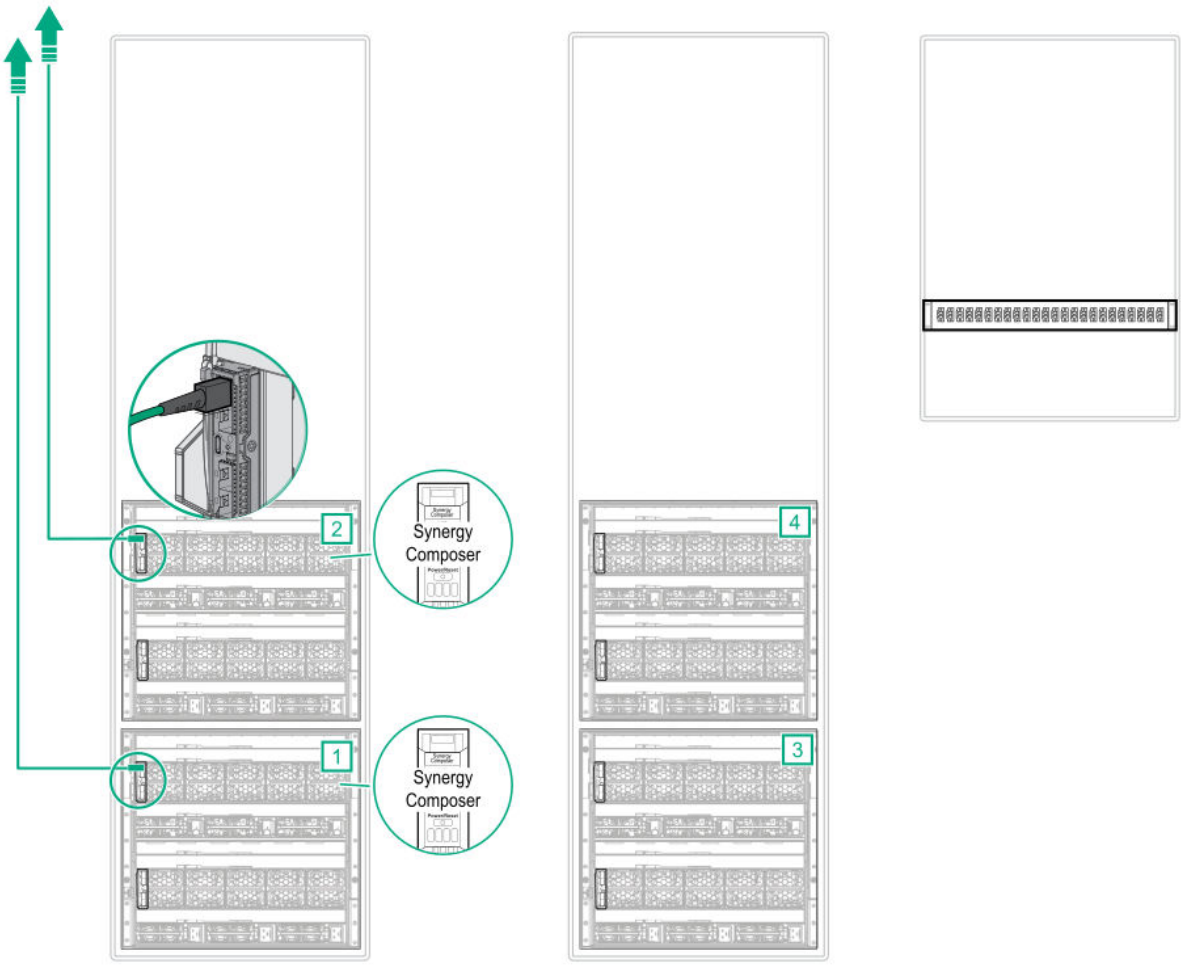
Procedure

1. Connect SFP+ cables from two **MGMT** ports to the fiber patch panel.

NOTE

The 4-Port FLM **MGMT** port supports 1GbE and 10GbE cables and transceivers. The **MGMT** port speed is set based on the cables or transceivers used.

Figure 2. MGMT port to management network cabling for multiframe 4-port FLM cabling example using a fiber optic patch panel

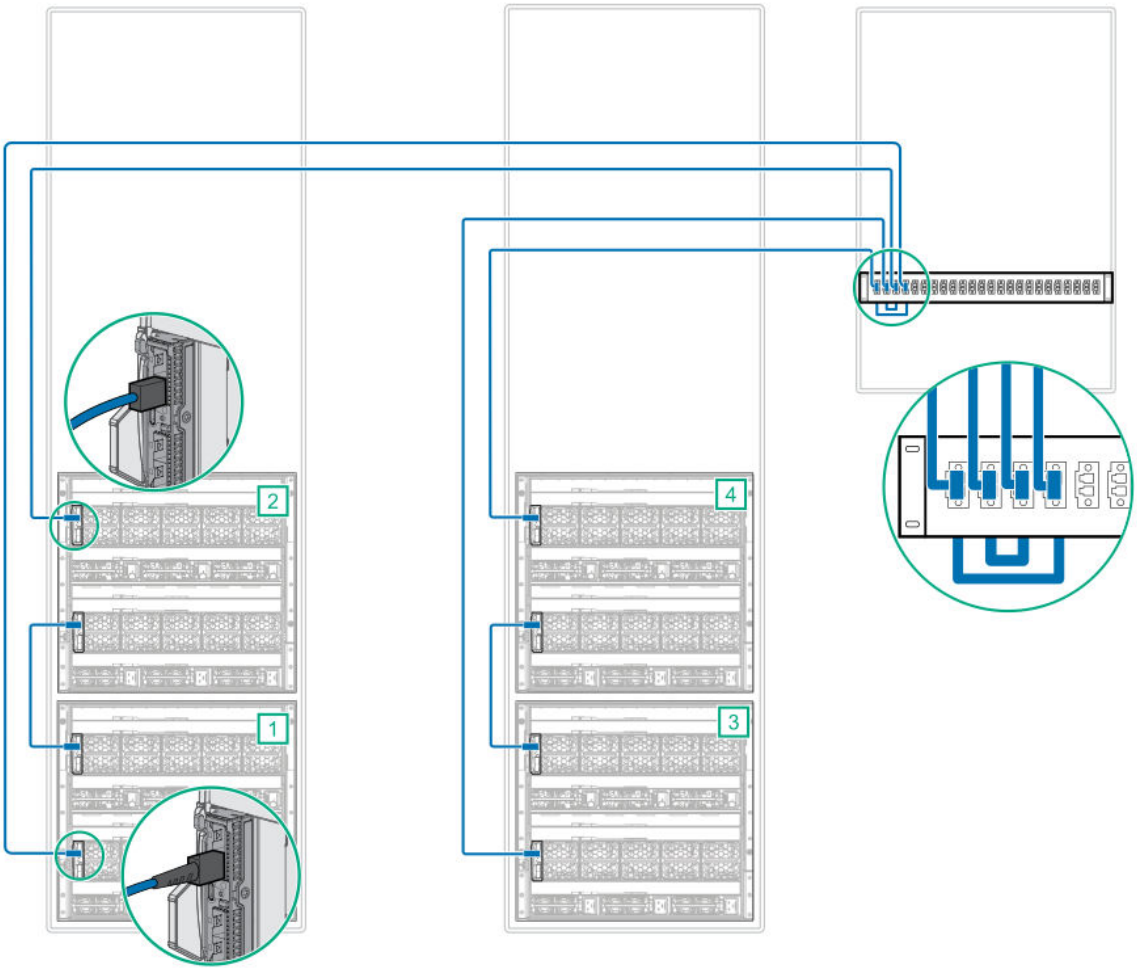


2. Connect the **LINK** ports together.

   a. To cable the **LINK** ports of frames in separate racks, use SFP+ 10Gb transceivers with optical cables connected through the patch panel.

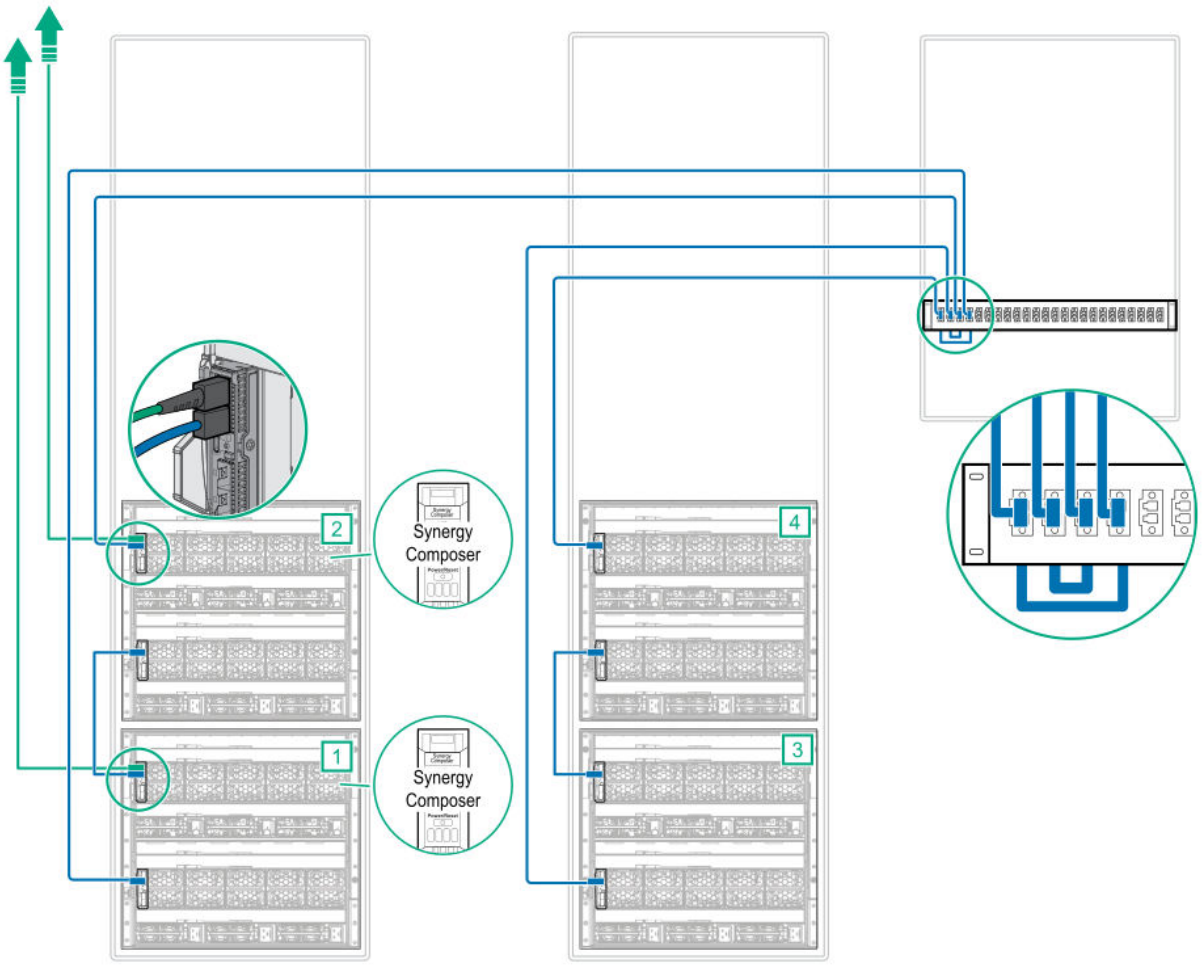
   b. To cable the **LINK** ports of frames in the same rack, use SFP+ 10Gb DAC cables.

Figure 3. LINK port cabling for multiframe 4-port FLM cabling example using a fiber optic patch panel



Cabling is complete. The following diagram shows the complete cabling diagram.

Figure 4. Complete cabling for multiframe 4-port FLM cabling example using a fiber optic patch panel



Management network cabling for HPE Synergy Frame Link Modules (2-Port)

Management network cabling includes cabling the **LINK** and **MGMT** ports for management network connectivity.

LINK port cabling

- Connect frame link module **LINK** ports to frame link module LINK ports only. Do not connect **LINK** ports to a data center switch.

- Use a minimum of CAT6A cables for **LINK** port cabling. Follow CAT6A distance standards. CAT6A cabling over 100 meters is not supported.

MGMT port cabling

For **MGMT** port cabling, use a CAT6A or higher cable if the connecting switch port is 10GBASE-T. Otherwise, use a CAT5 cable if the connecting switch port is 1000BASE-T. CAT6A cabling over 100 meters is not supported.

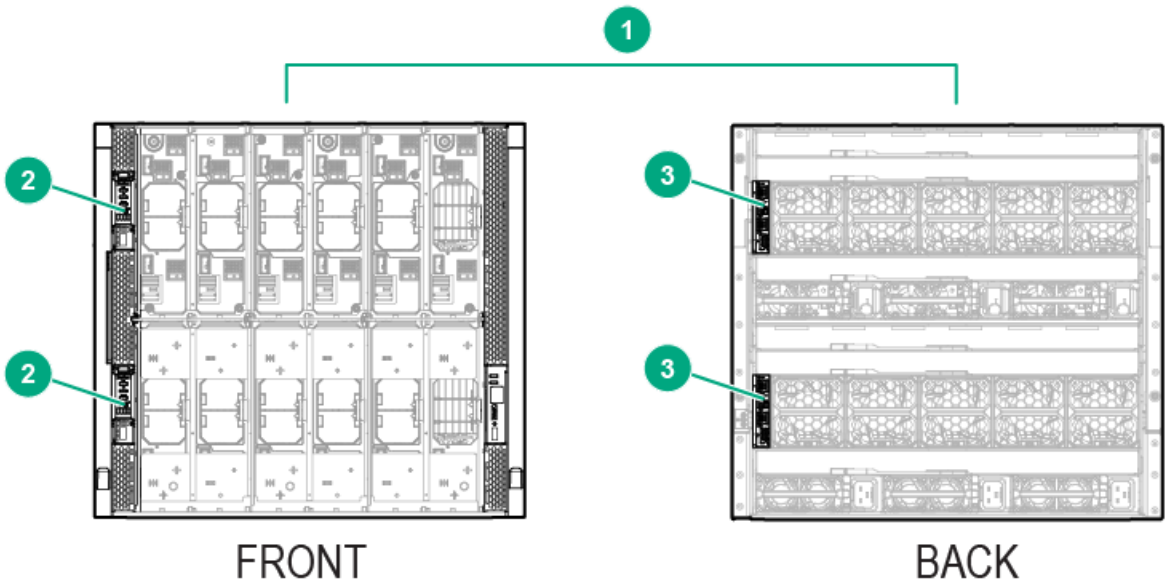
Subtopics

Single-frame management network cabling example with HPE Synergy Frame Link Modules
Multiframe management cabling example
Three primary enclosures (frames) connected to two remote enclosures (frames) cabling example
Multiframe 2-Port FLM cabling example using a CAT6A patch panel

Single-frame management network cabling example with HPE Synergy Frame Link Modules

Prerequisites

Figure 1. Required components for a single-frame with 2-port FLMs



Item	Description	Amount
1	HPE Synergy 12000 Frame	1
2	HPE Synergy Composer	2
3	HPE Synergy Frame Link Module (2-Port FLM)	2

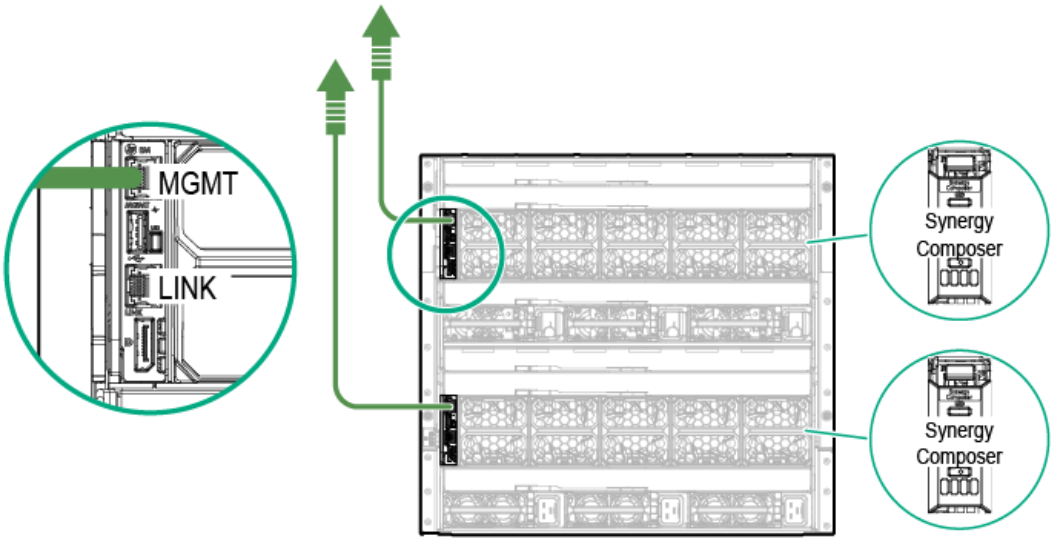
About this task

NOTE
This cabling example does not cover power or production network cabling.

Procedure

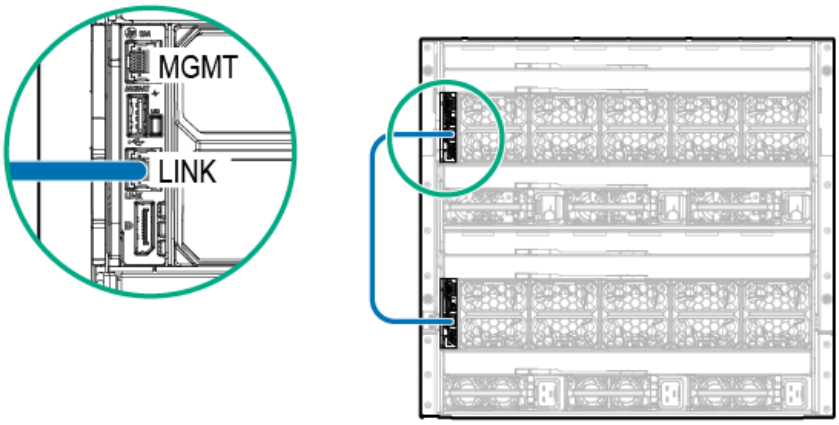
1. Connect Ethernet cables from each **MGMT** port to the management network.

Figure 2. MGMT port to management network cabling for a single-frame with 2-port FLMs



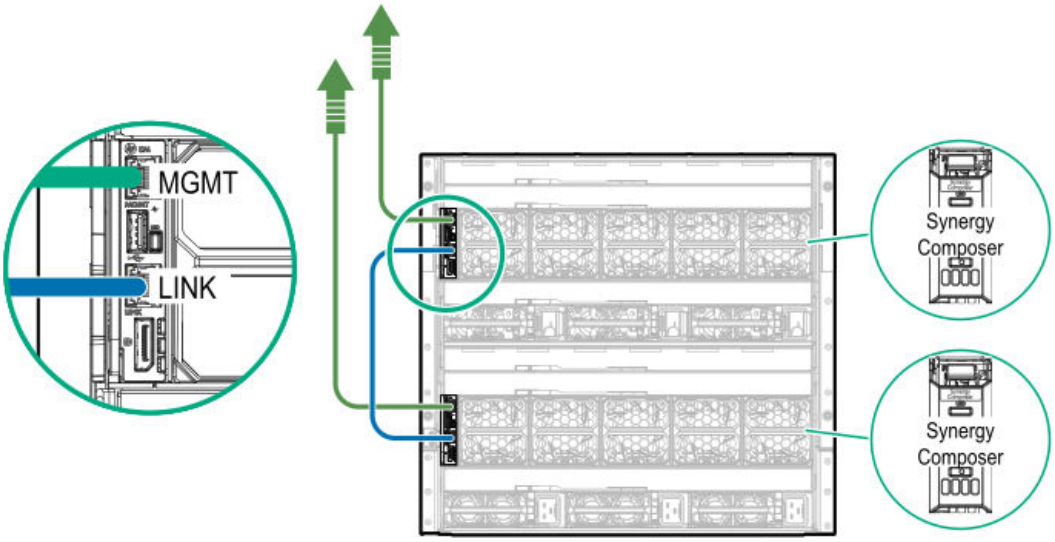
2. Using CAT6A cables, connect the **LINK** ports together.

Figure 3. LINK port cabling for a single-frame with 2-port FLMs



Cabling is complete. The following diagram shows the complete cabling diagram.

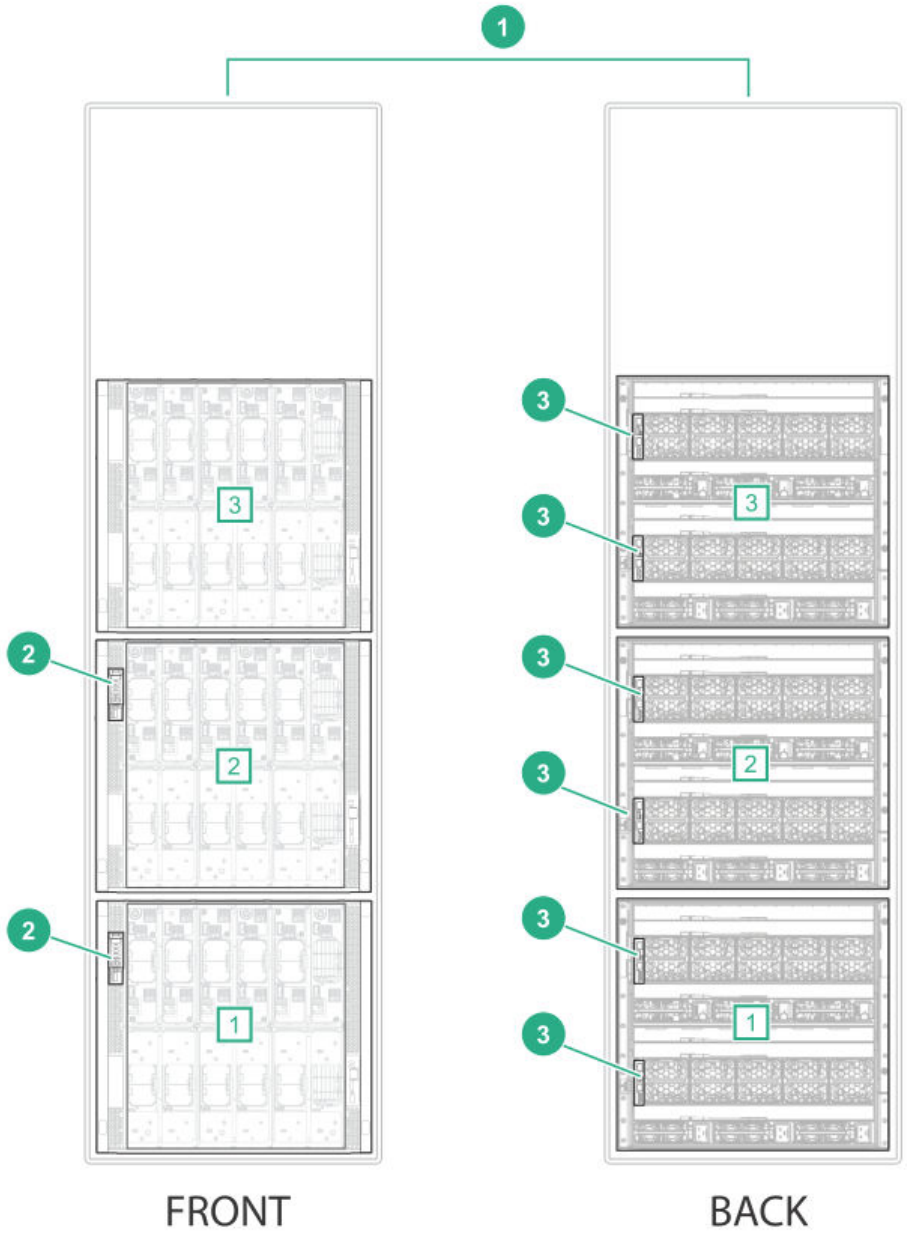
Figure 4. Complete cabling for a single-frame with 2-port FLMs



Multiframe management cabling example

Prerequisites

Figure 1. Required components for a multiframe management cabling example with 2-port FLMs



Item	Description	Amount
1	HPE Synergy 12000 Frames [1], [2], [3]	3
2	HPE Synergy Composer	2
3	HPE Synergy Frame Link Module	6

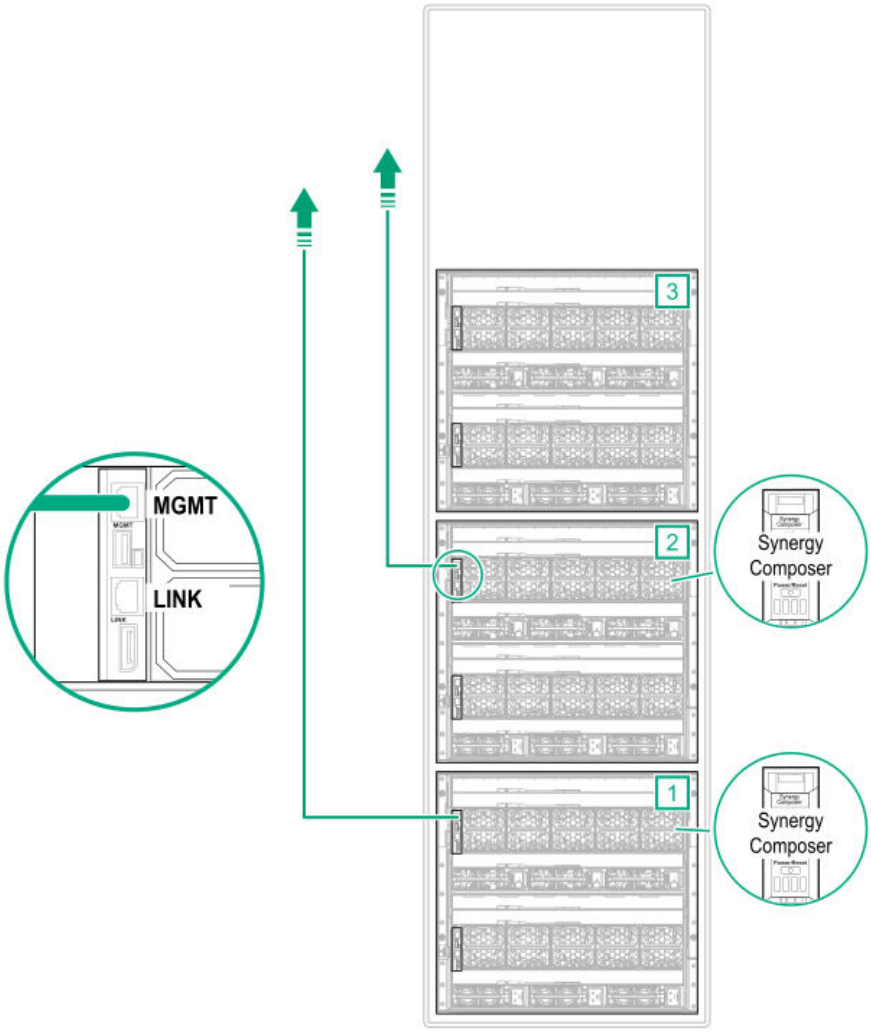
About this task

NOTE
This cabling example does not cover power or production network cabling.

Procedure

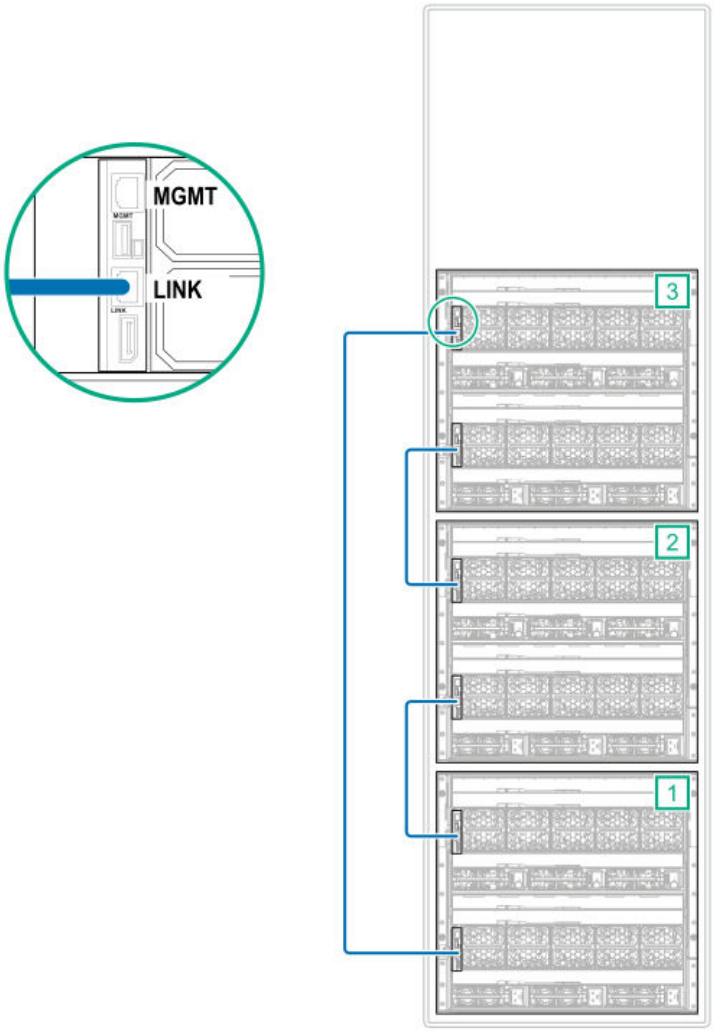
1. Connect Ethernet cables from two **MGMT** ports to the management network.

Figure 2. MGMT port to management network cabling for a multiframe management cabling example with 2-port FLMs



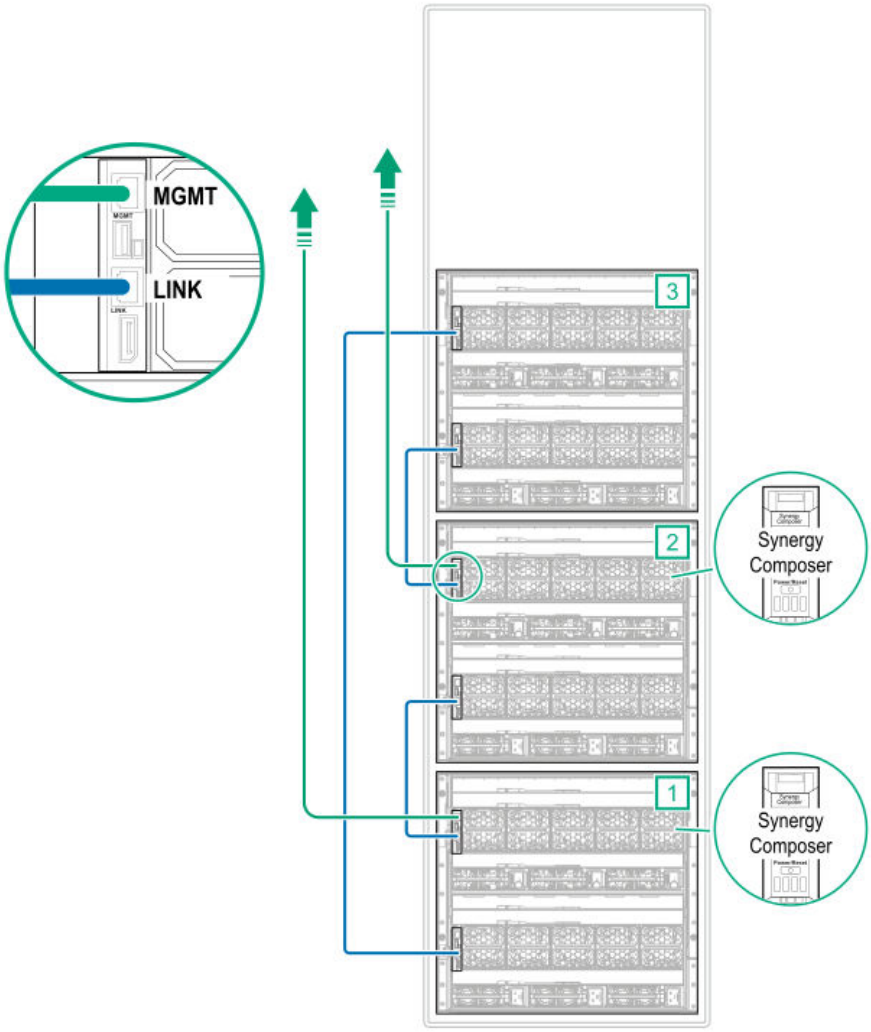
2. Using CAT6A cables, connect all frame link module **LINK** ports together.

Figure 3. LINK port cabling for a multiframe management cabling example with 2-port FLMs



Cabling is complete. The following diagram shows the complete cabling diagram.

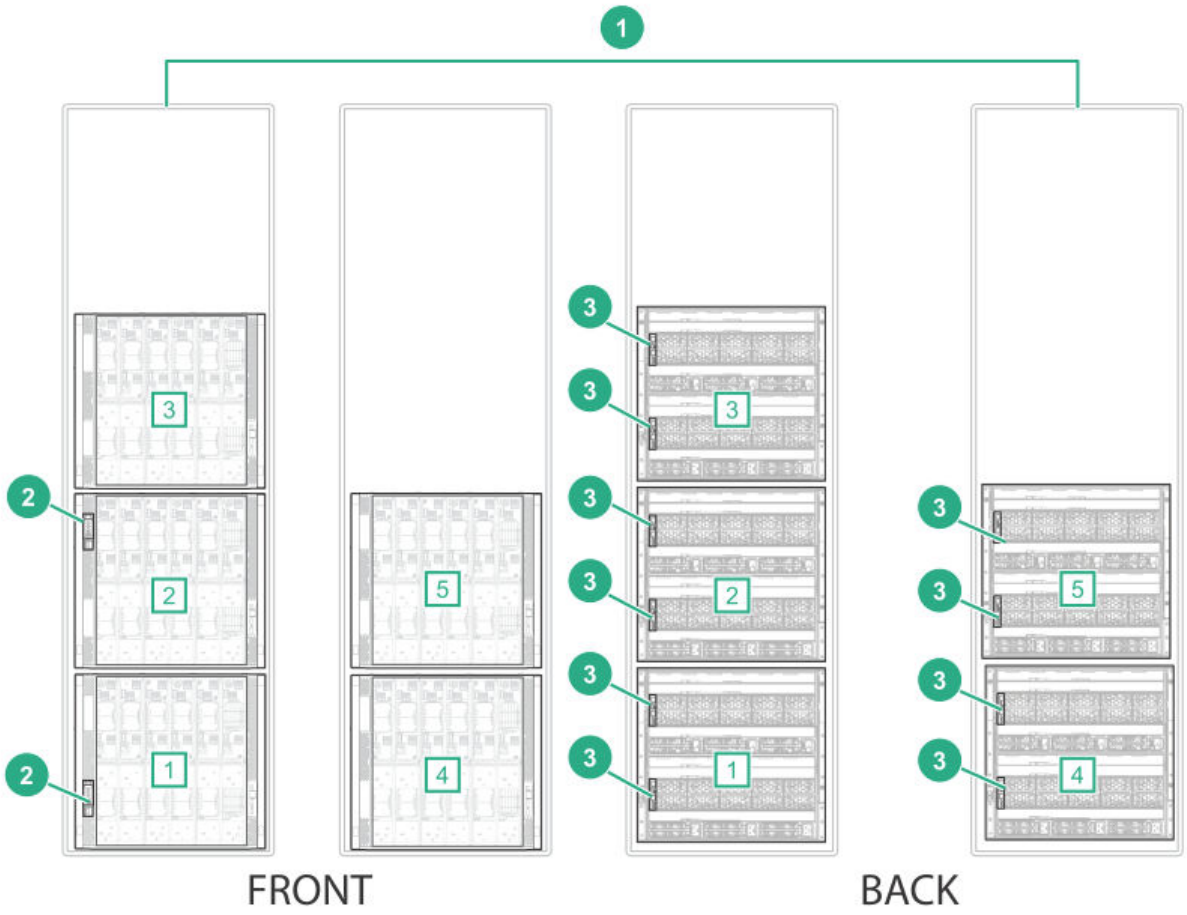
Figure 4. Complete cabling for a multiframe management cabling example with 2-port FLMs



Three primary enclosures (frames) connected to two remote enclosures (frames) cabling example

Prerequisites

Figure 1. Required components for primary and remote enclosures (frames) cabled to the management network



Item	Description	Quantity
1	HPE Synergy 12000 frames Primary enclosures (frames) [1], [2], [3] Remote enclosures (frames) [4], [5]	5
2	HPE Synergy Composer	2
3	HPE Synergy Frame Link Module	10

About this task

> **NOTE**
> In HPE OneView, HPE Synergy frames are referred to as enclosures.

> **NOTE**
> This cabling example does not cover power or production network cabling.

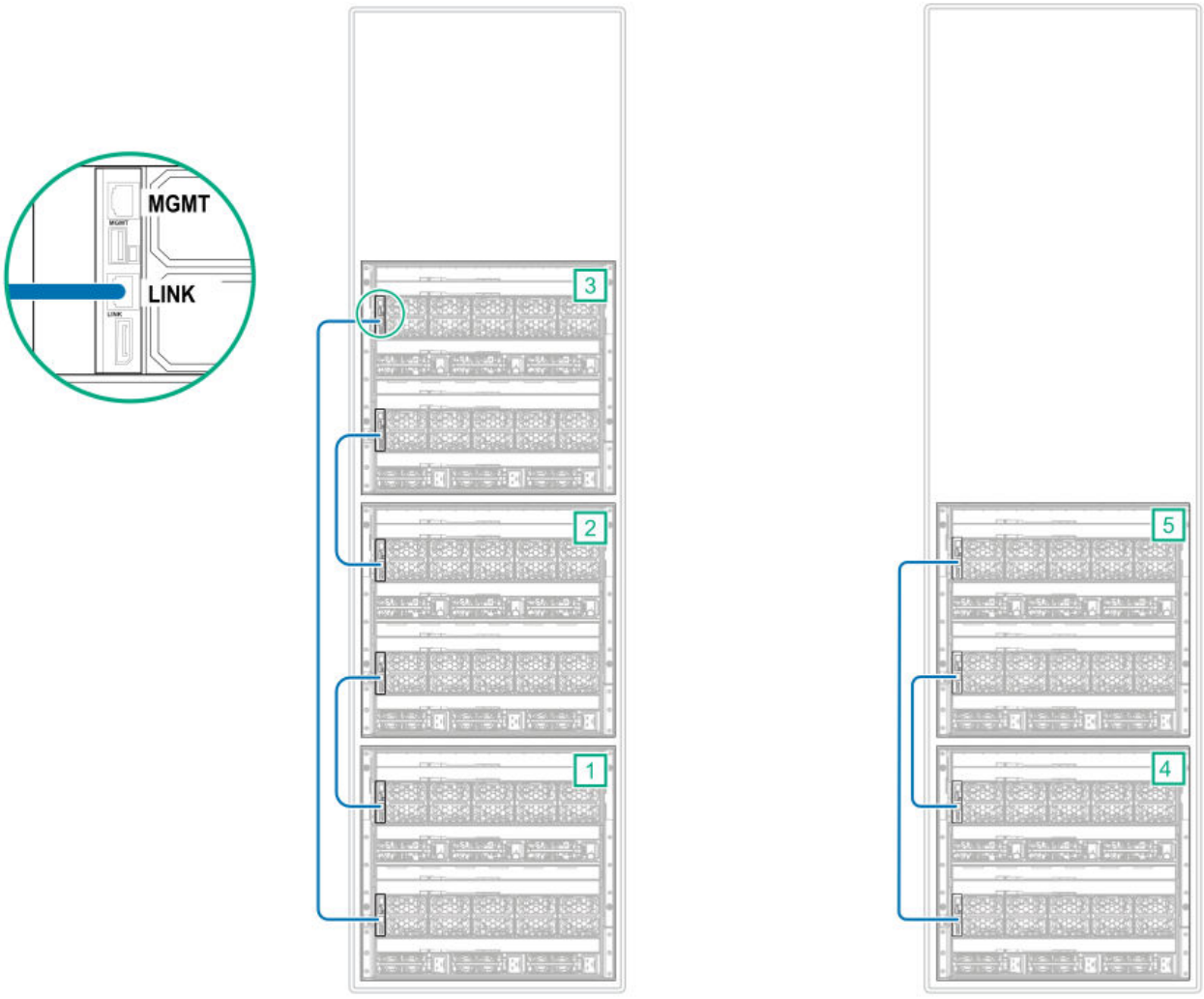
This example shows cabling three primary enclosures (frames) to two remote enclosures (frames).
Primary enclosures (frames) include HPE Synergy Composers. Remote enclosures (frames) do not contain HPE Synergy Composers.

This same cabling methodology can be used up to the number of frames supported as defined in the HPE OneView Support Matrix for HPE Synergy (**http://www.hpe.com/info/synergy-docs**).

Procedure

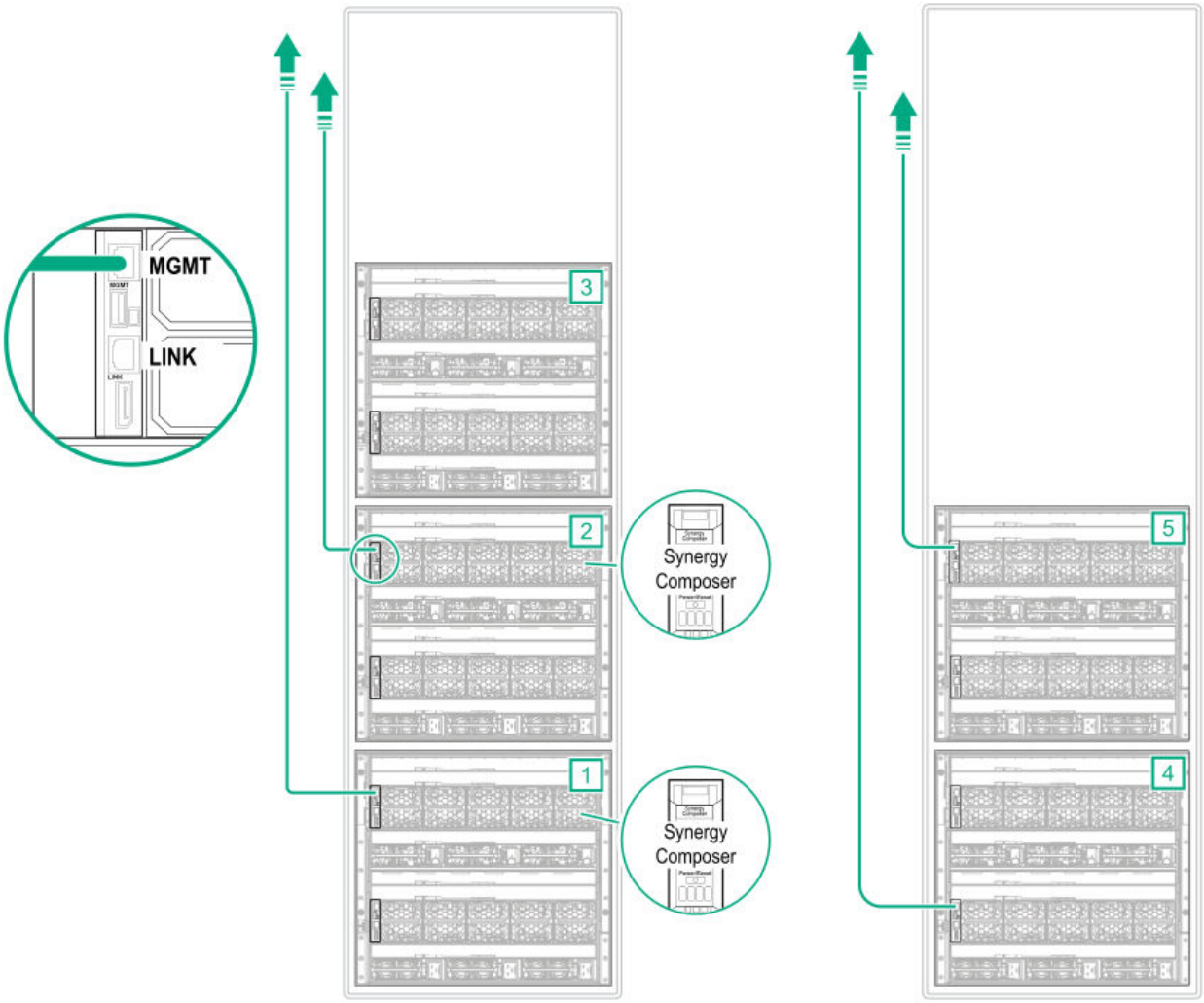
1. Using CAT6A cables, connect the **LINK** ports on the primary enclosures (frames) together.
2. Using CAT6A cables, connect the **LINK** ports on the remote enclosures (frames) together.

Figure 2. LINK port cabling for primary and remote enclosures (frames) cabled to the management network



3. Connect Ethernet cables from two **MGMT** ports from the primary enclosures (frames) to the management network.
4. Connect Ethernet cables from two **MGMT** ports from remote enclosures (frames) to the management network.

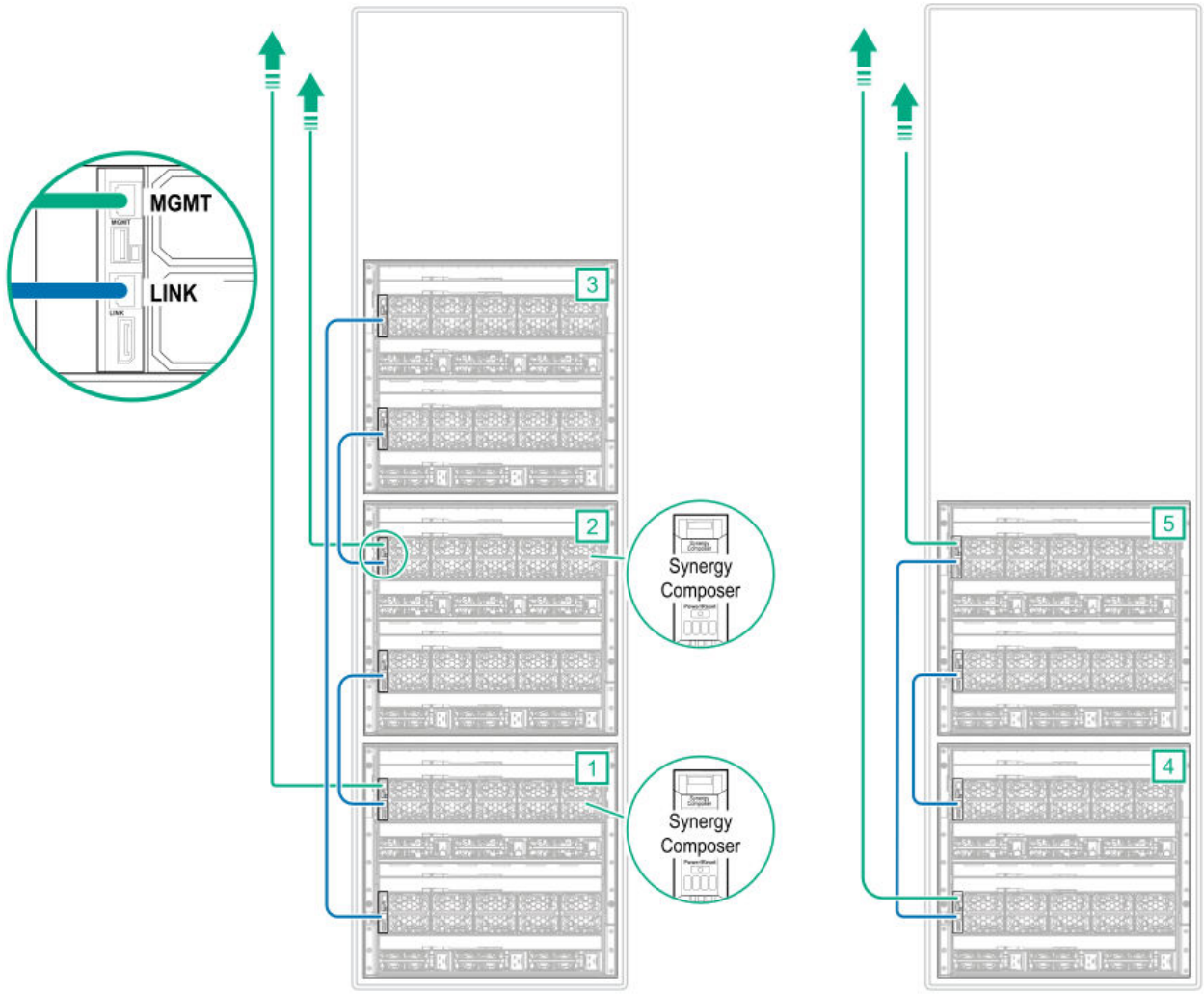
Figure 3. MGMT ports to management network cabling for primary and remote enclosures (frames) cabled to the management network



Cabling is complete. The following diagram shows the complete cabling diagram.

For more information, see "About adding remote enclosures" in the HPE OneView Online Help (**http://www.hpe.com/info/synergy-docs**).

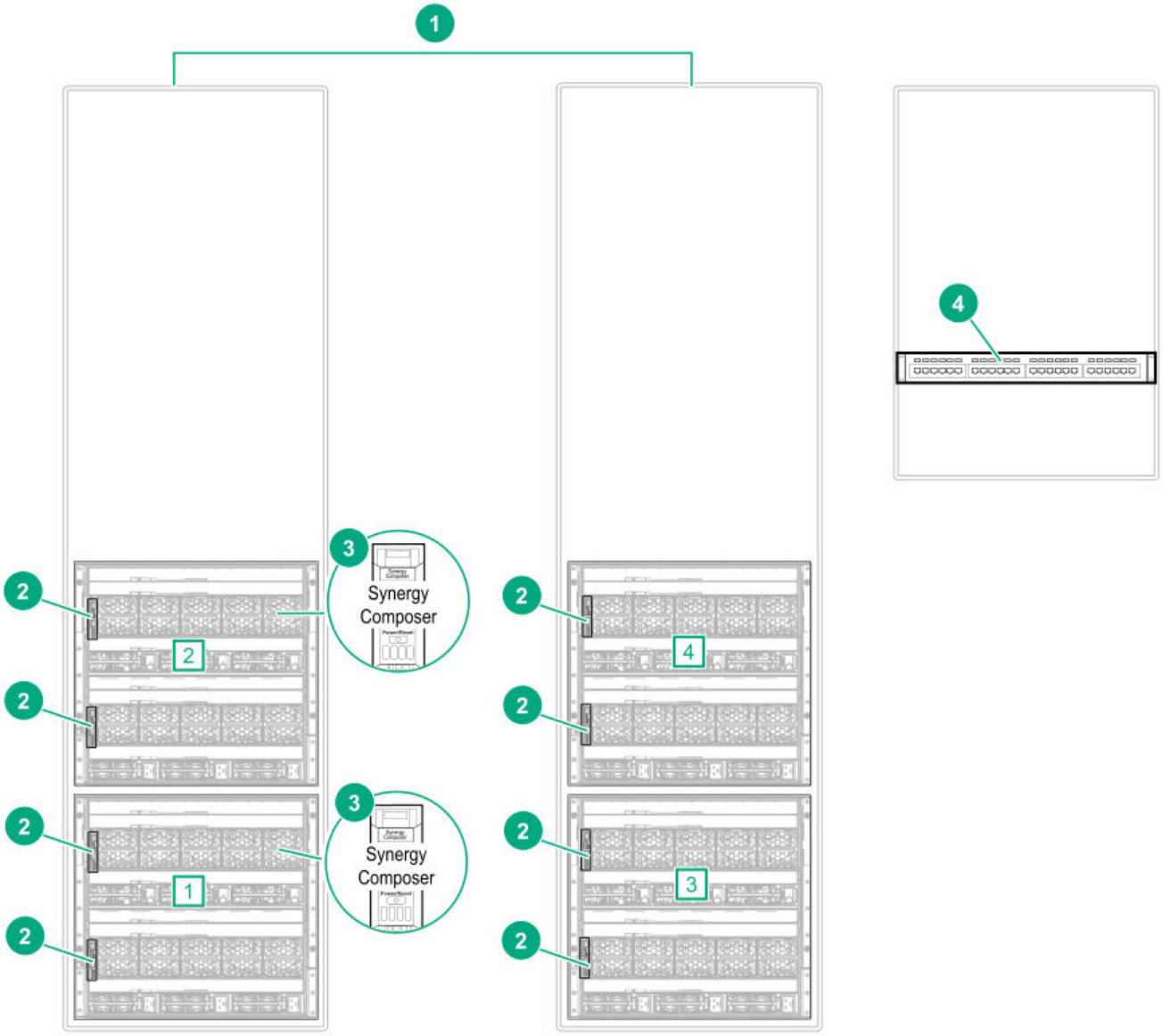
Figure 4. Complete cabling for primary and remote enclosures (frames) cabled to the management network



Multiframe 2-Port FLM cabling example using a CAT6A patch panel

Prerequisites

Figure 1. Required components for two sets of frames with LINK ports cabled through a CAT6A patch panel



Item	Description	Amount
1	HPE Synergy 12000 Frames [1], [2], [3], [4]	4
2	HPE Synergy Frame Link Module (2-Port)	8
3	HPE Synergy Composer	2
4	CAT6A patch panel	1

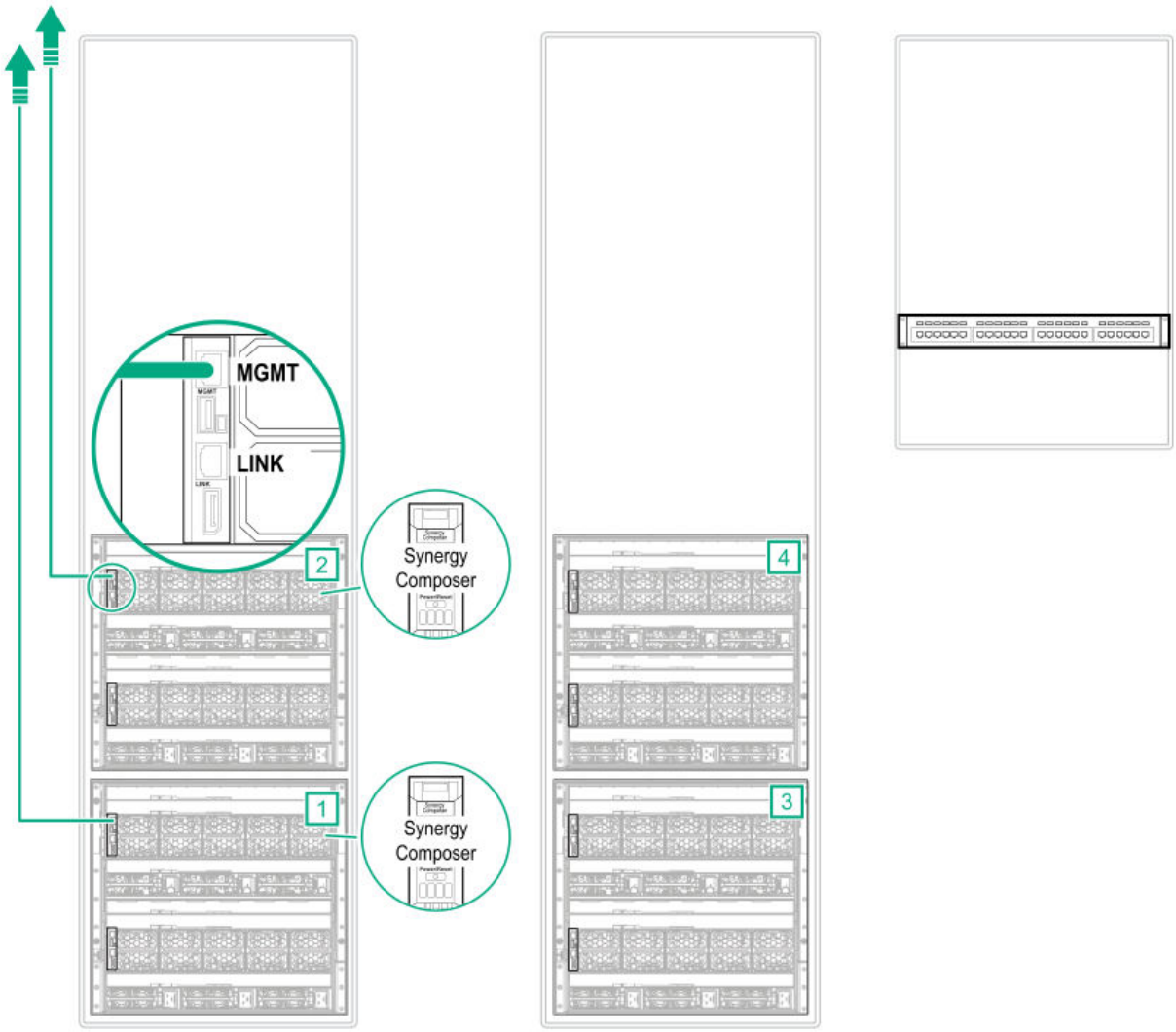
About this task

> **NOTE**
> This cabling example does not cover power or production network cabling.

Procedure

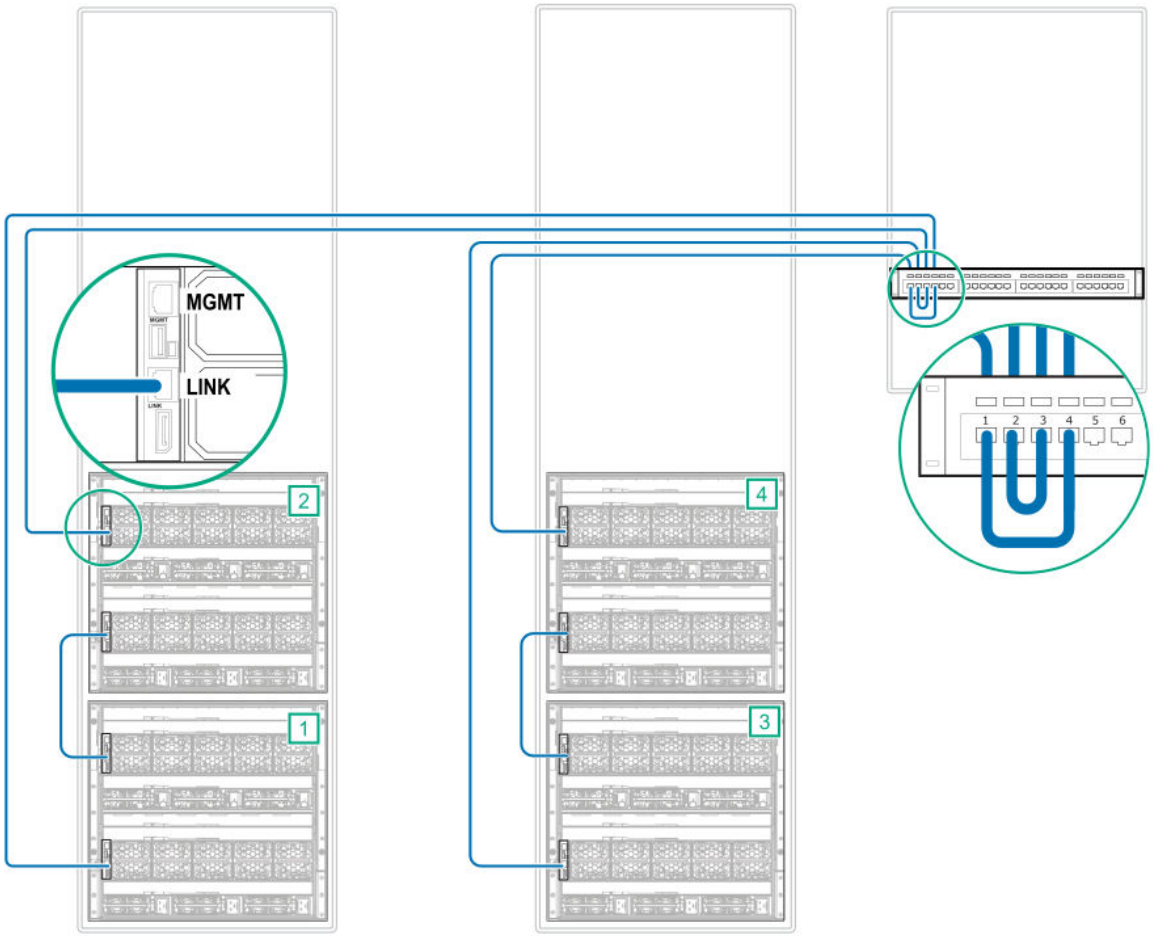
1. Connect Ethernet cables from two **MGMT** ports to the management network.

Figure 2. MGMT port to management network cabling for two sets of frames with LINK ports cabled through a CAT6A patch panel



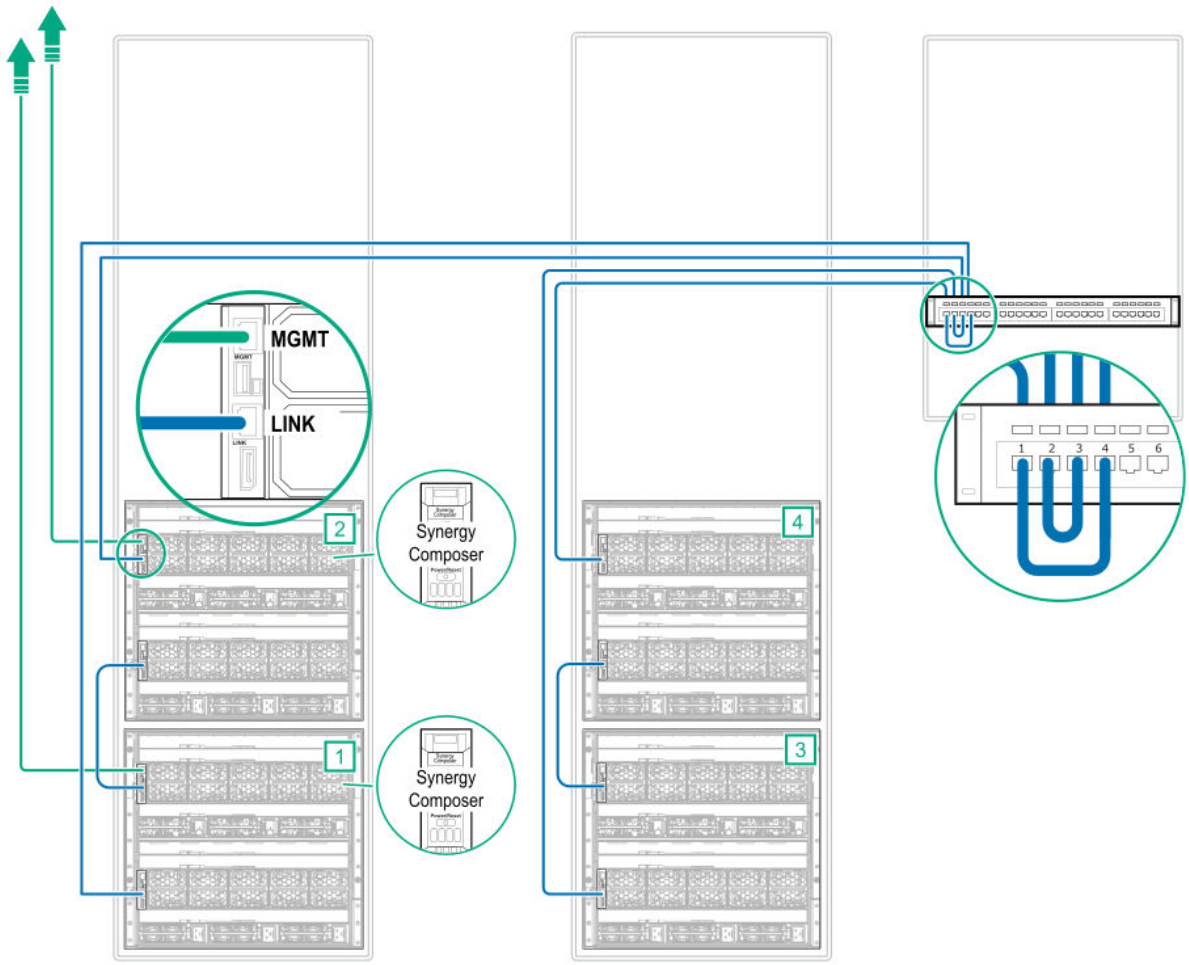
2. Using CAT6A cables, connect the LINK ports together through the CAT6A patch panel.

Figure 3. LINK port cabling for two sets of frames with LINK ports cabled through a CAT6A patch panel



Cabling is complete. The following diagram shows the complete cabling diagram.

Figure 4. Complete cabling for two sets of frames with LINK ports cabled through a CAT6A patch panel



HPE Synergy Frame Link Module cabling components

Connecting an HPE Synergy Frame Link Module (2-port) to an HPE Synergy Frame Link Module (2-port)

	2-port FLM	to	2-port FLM		
Port	**Transceiver**	**Cable**	**Transceiver**	**Port**	**Component use or SKU description**
RJ45	None	CAT6A (copper)	None	RJ45	MGMT ring/Management Uplinks

2-port FLM	to	2-port FLM	
	Any CAT6A cable up to 30m		861412-B21 861413-B21 861414-B21

Connecting an HPE Synergy 4-Port Frame Link Module to an HPE Synergy Frame Link Module (2-port)

4-port FLM		to	2-port FLM		
Port	**Transceiver**	**Cable**	**Transceiver**	**Port**	**Component use or SKU description**
SFP+	Transceiver	CAT6A (copper) cable: • Any CAT6A cable up to 30 m	None	RJ45	MGMT ring/Management Uplinks 861412-B21 861413-B21 861414-B21
SFP+	10GbE Transceiver (813874-B21)	Any CAT6A cable up to 30 m	None	RJ45	HPE 10GBase-T SFP+ Transceiver
SFP+	1Gb Transceiver • 453151-B21 • 453154-B21	Any CAT6A cable up to 100 m	None	RJ45	Management Uplinks use only. HPE BLc VC 1G SFP RJ45 Transceiver

Connecting an HPE Synergy 4-Port Frame Link Module to an HPE Synergy 4-Port Frame Link Module

4-port FLM		to	4-port FLM		
Port	**Transceiver**	**Cable**	**Transceiver**	**Port**	**Component use or SKU description**
SFP+	Empty	DAC (copper) 487655-B21	Empty	SFP+	MGMT ring/Management Uplinks

	4-port FLM	to	4-port FLM		
		537963-B21			HPE BLc 10GbE SFP+ to SFP+ 3m DAC Cable HPE BLc 10GbE SFP+ to SFP+ 5m DAC Cable
SFP+	Transceiver	Fibre	Transceiver	SFP+	MGMT ring/Management Uplinks
	10Gb Transceiver • 455883-B21 • 455886-B21	OM3 or OM4 LC/LC Cables OM3 or OM4 LC/LC Cables	10Gb Transceiver • 455883-B21 • 455886-B21	SFP+	HPE BLc 10G SFP+ SR Transceiver (short range) HPE BLc 10G SFP+ LR Transceiver (long range)
SFP+	Transceiver	CAT6A (copper) cable: • Any CAT6A cable up to 30 m.	Transceiver	SFP+	MGMT ring/Management Uplinks 861412-B21 HPE CAT6A 4 ft cable 861413-B21 HPE CAT 6A 10 ft cable 861414-B21 HPE CAT6A 21 ft cable
SFP+	10GbE Transceiver (813874-B21)	Any CAT6A cable up to 30 m	10GbE Transceiver (813874-B21)	SFP+	HPE 10GBase-T SFP+ Transceiver
SFP+	1Gb Transceiver • 453151-B21 • 453154-B21	OM3 or OM4 LC/LC Cables Any CAT6A cable up to 100 m.	1Gb Transceiver • 453151-B21 • 453154-B21	SFP+	Management Uplinks use only. HPE BLc VC 1G SFP SX Transceiver (fiber <100m) HPE BLc VC 1G SFP RJ45 Transceiver

Primary and satellite interconnect module cabling examples

About this task

HPE Synergy supports a composable fabric that spans multiple frames and includes primary interconnect modules (switches) and satellite modules (links). If your HPE Synergy configuration has a composable fabric, Hewlett Packard Enterprise recommends cabling the HPE Synergy Ethernet interconnect modules in a primary switch configuration, so that multiple interconnect link modules can support the primary interconnect module.

HPE OneView considers all HPE Synergy frames that share the Virtual Connect connectivity through satellite interconnect link modules to be a single Logical Enclosure.

To cable switch modules to interconnect link modules, use the examples that follow or see the installation instructions provided with the interconnect link module.

> **IMPORTANT**
> Depending on the primary and satellite module pair being installed, the cabling connections are different. Be sure to verify cable connections during installation.

When cabling a HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy, use L1/L2 and L3/L4 connections to the HPE Synergy 50Gb Interconnect Link Module.

Subtopics

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy cabling

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy cabling

To create logical enclosures, HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy must be paired with HPE Synergy 50Gb Interconnect Link Module.

Each HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy pair supports up to five frames.

- The HPE Synergy 50Gb Interconnect Link Module supports two and three frame configurations at 50Gb.
- The HPE Synergy 50Gb Interconnect Link Module supports two to five frame configurations at 25Gb.

Cabling requirements for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

Interconnect link cables are required for cabling the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules to each HPE Synergy 50Gb Interconnect Link Module.

For more information about HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy cabling requirements, see the QuickSpecs on the **Hewlett Packard Enterprise website**.

Subtopics

Cabling interconnect modules in a single frame (redundant)
HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy three frame cabling (highly available)
Four frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)
Five frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)

Cabling interconnect modules in a single frame (redundant)

About this task

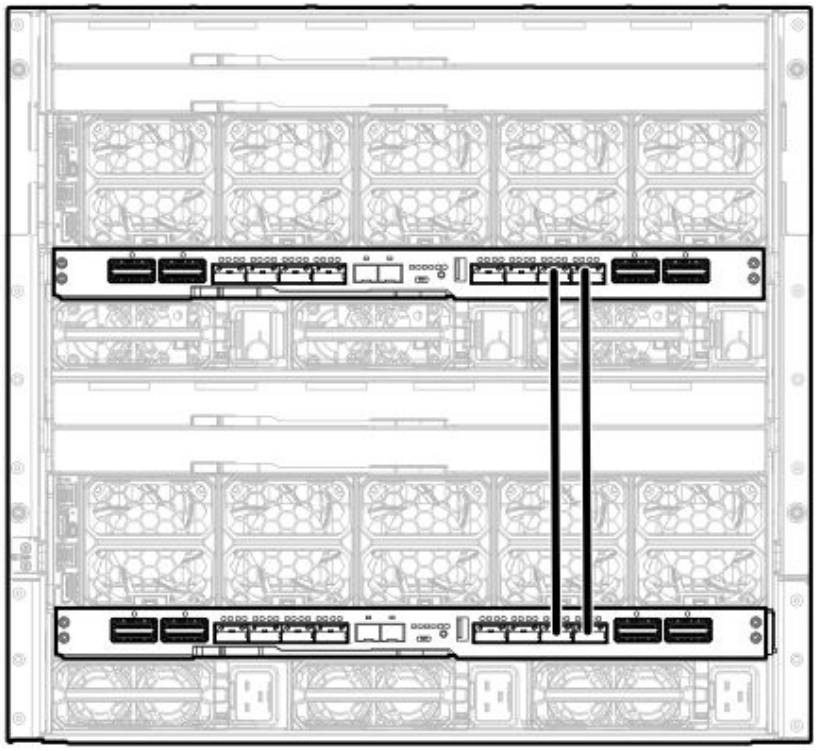
In a single-frame system, use two stacking cables to connect two HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.

This example shows the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.

Procedure

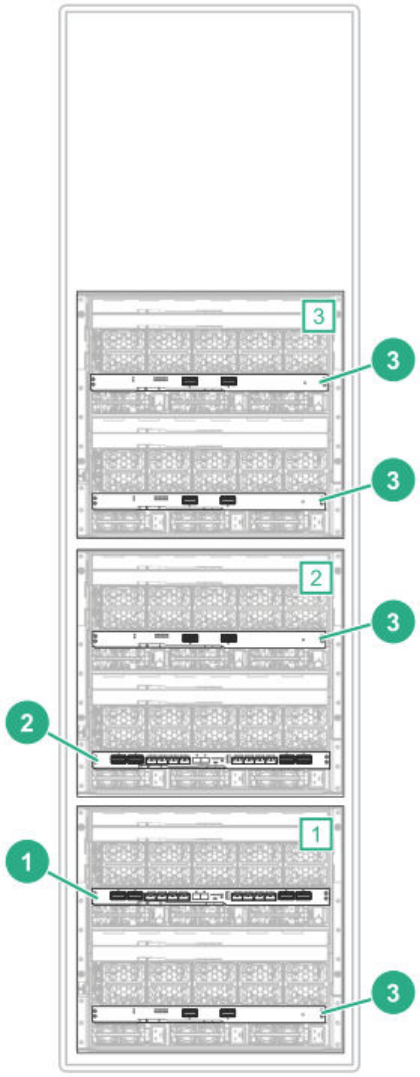
1. Connect a stacking cable from port Q7 on the first primary switch to port Q7 on the second module.
2. Connect a stacking cable from port Q8 on the first primary switch to port Q8 on the second module.

Figure 1. Single-frame with redundant interconnects



HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy three frame cabling (highly available)

Prerequisites



Item	Description	Amount
1	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy (primary primary ICM)	1
2	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy	1

Item	Description	Amount
	(secondary primary ICM)	
3	HPE Synergy 50Gb Interconnect Link Module (satellite ICM)	4

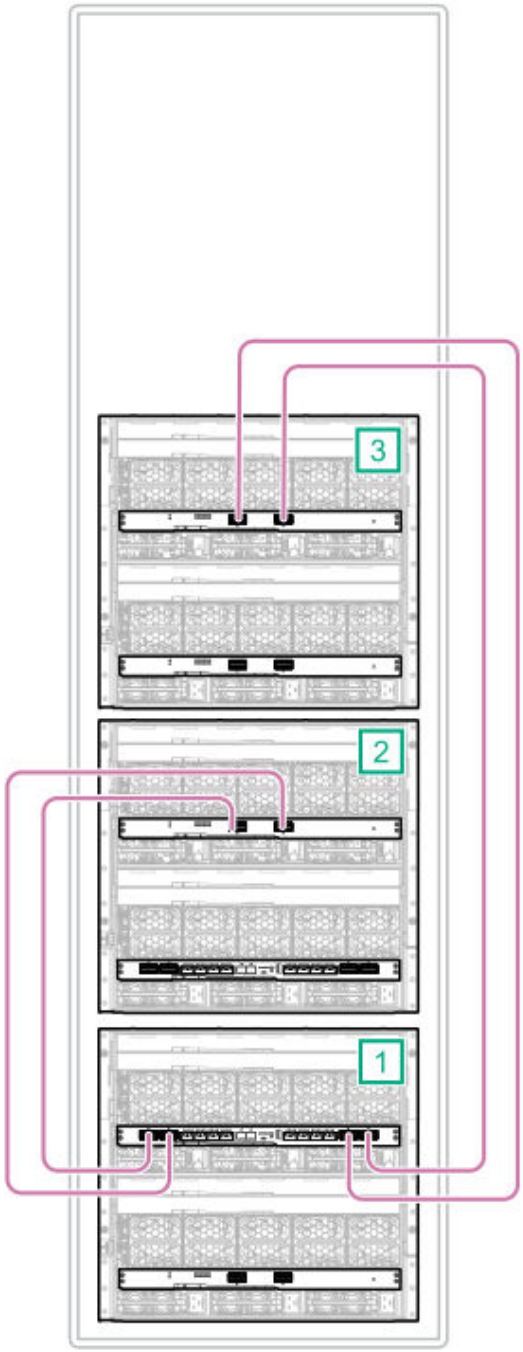
About this task

This cabling example shows a highly available three frame configuration.

Procedure

1. Using interconnect link cables, connect the primary primary ICM in frame 1 ICM bay 3 to the satellite ICM in ICM bay 3 of frame 2 and 3.

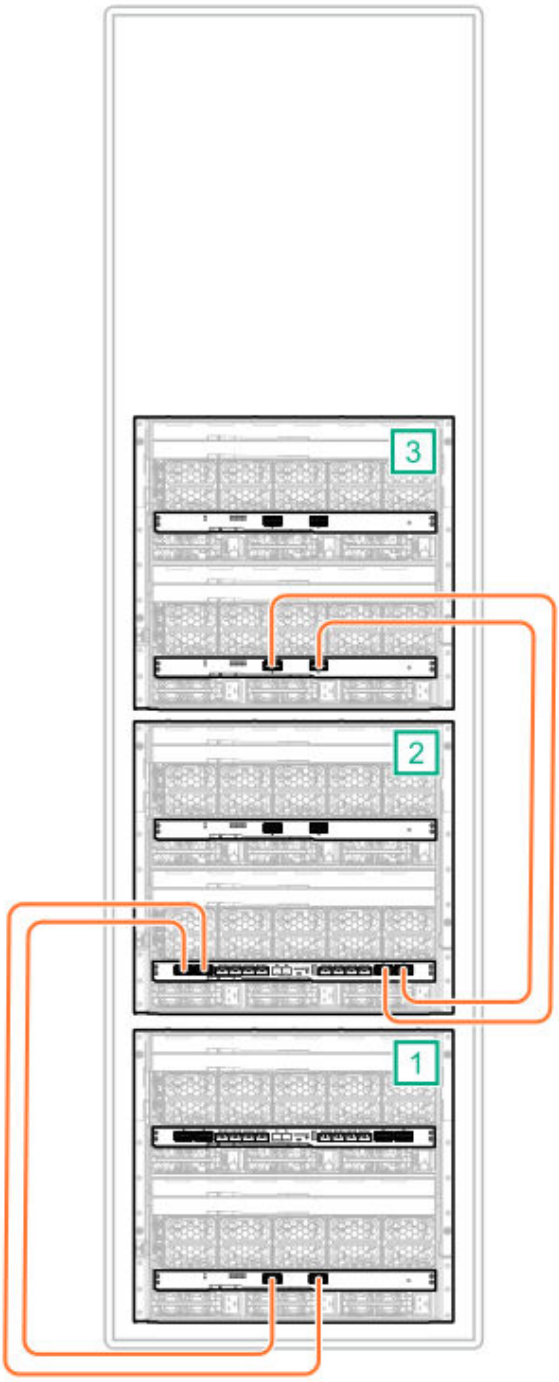
Figure 1. Primary and satellite interconnect modules for three frames - primary ICM cabling


3
2
1

2. Using interconnect link cables, connect the secondary primary ICM in frame 2 ICM bay 6 to the two satellite ICMs in ICM bay 6 of frame 1 and 3.

> **NOTE**
>
> Ports L1 and L2 of the secondary primary ICM must be connected to ports L1 and L2 of the satellite ICM in the same frame as the primary ICM.

Figure 2. Primary and satellite interconnect modules for three frames - secondary primary ICM cabling

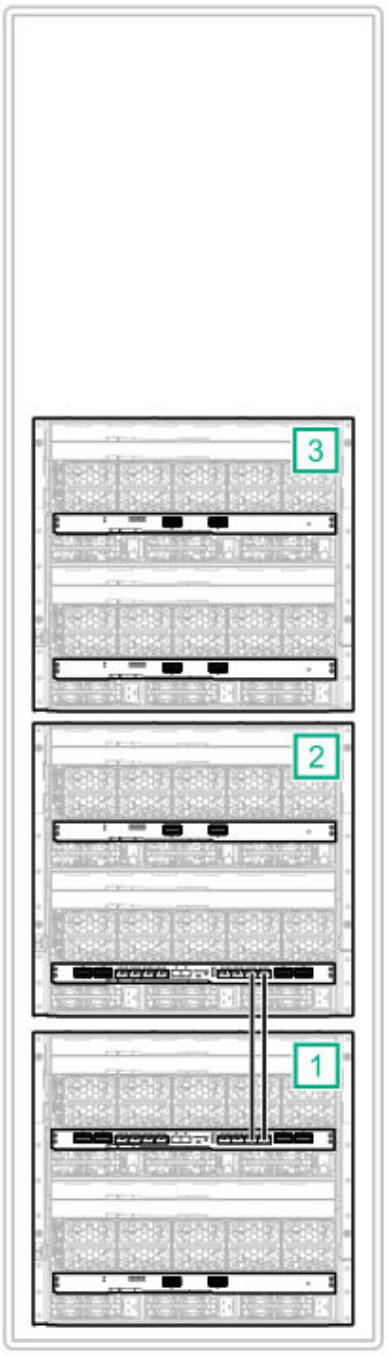


3. Connect two stacking cables from the primary HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy to the secondary HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.

   a. Connect a stacking cable from port Q7 on the first primary ICM to port Q7 on the second primary ICM.

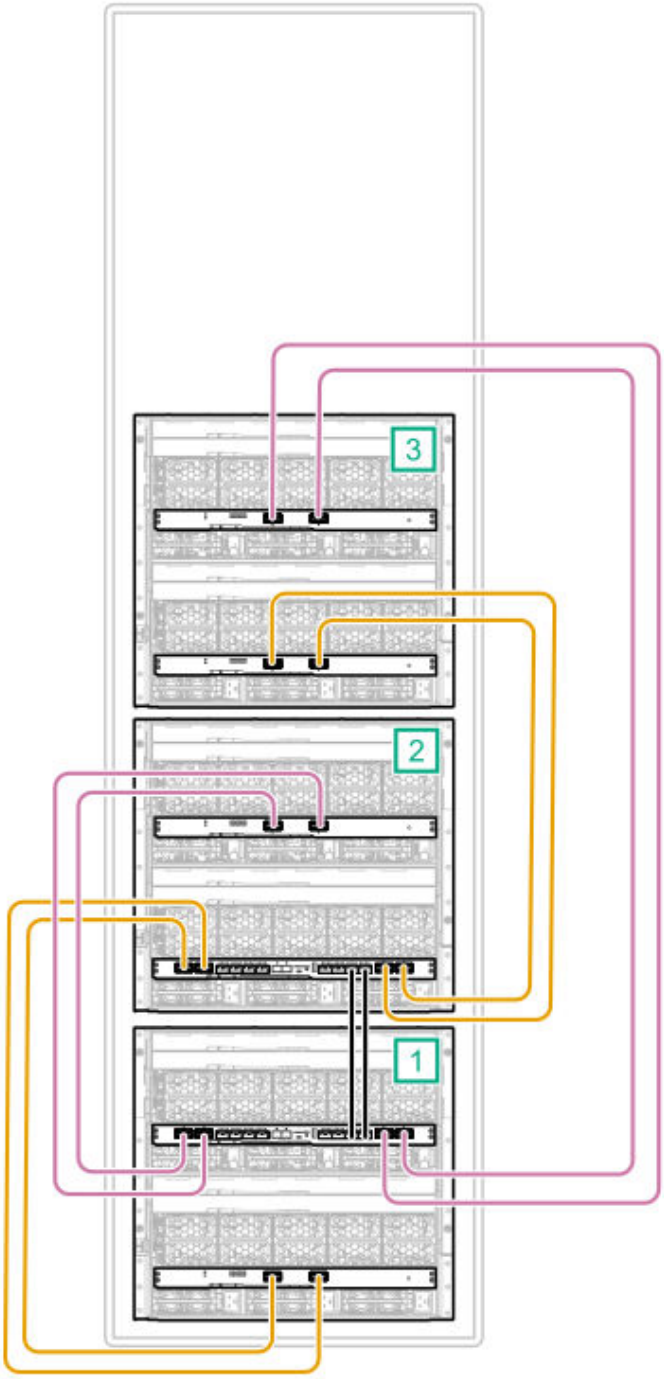
b. Connect a stacking cable from port Q8 on the first primary ICM to port Q8 on the second primary ICM.

Figure 3. Primary and satellite stacking cabling



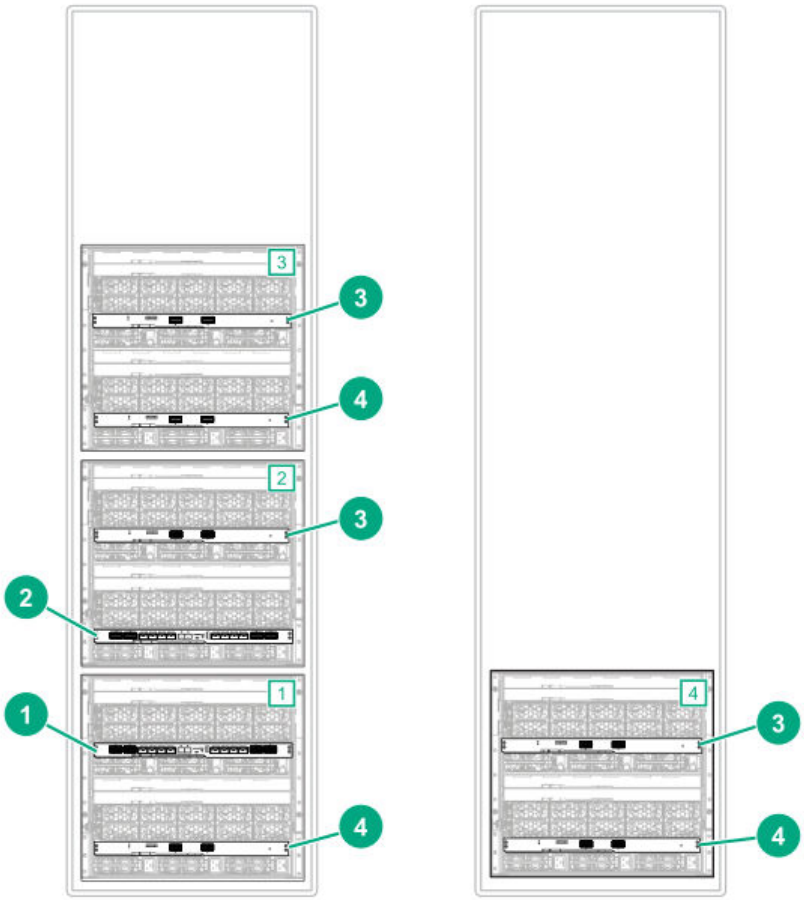
4. Cabling is complete.

Figure 4. Primary and satellite interconnect modules for three frames - all cables



Four frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)

Prerequisites



Item	Description	Amount
1	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy (primary ICM)	1
2	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy (secondary primary ICM)	1
3	HPE Synergy 50Gb Interconnect Link Module (primary satellite ICM)	3

Item	Description	Amount
4	HPE Synergy 50Gb Interconnect Link Module (secondary satellite ICM)	3

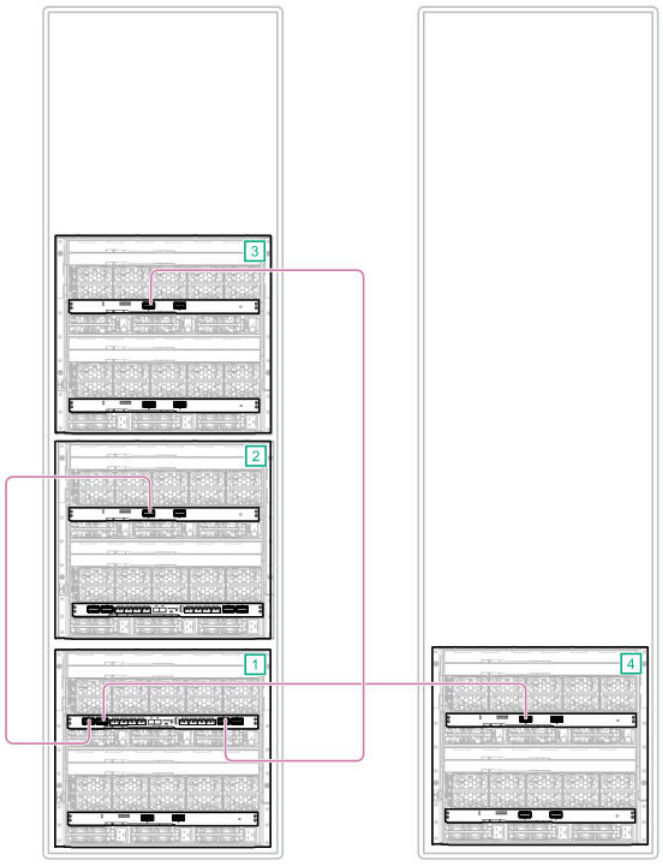
About this task

This cabling example shows a redundant four frame configuration.

Procedure

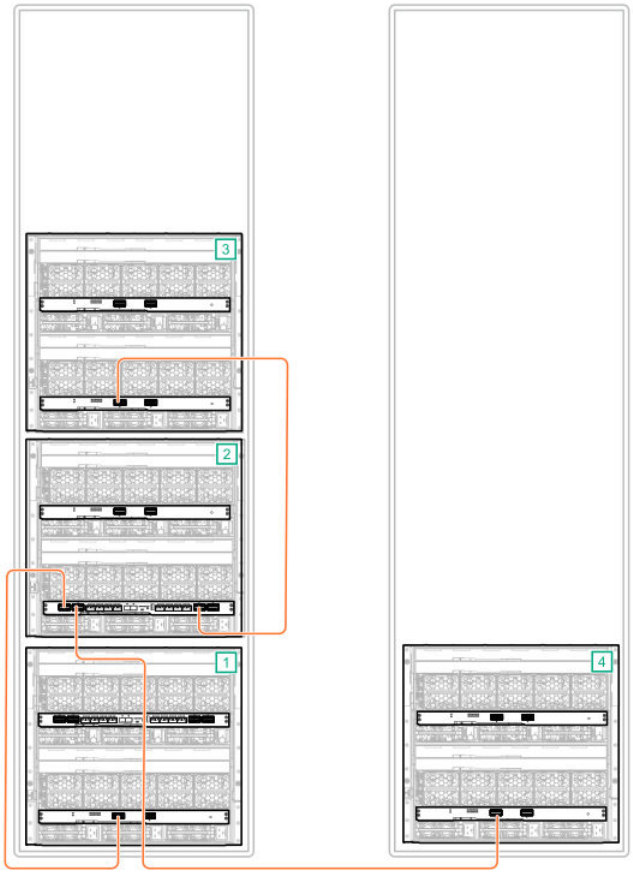
1. Using interconnect link cables, connect the primary ICM in ICM bay 3 to the satellite ICMs installed in ICM bay 3.
   a. Connect ports L1 of the primary ICM to ports L1 of the satellite ICM in the same frame as the secondary primary ICM.
   b. Connect port L2 of the primary ICM to port L1 of the satellite ICM frame 4 ICM bay 3.
   c. Connect port L3 of the primary ICM to port L1 of the satellite ICM frame 3 ICM bay 3.

Figure 1. Primary and satellite interconnect modules for four frames - primary ICM cabling



2. Using interconnect link cables, connect the primary ICM in ICM bay 6 to each satellite ICM installed in ICM bay 6.
   a. Connect port L1 from the secondary primary ICM to port L1 on the satellite ICM in the same frame as the primary ICM (frame 1).
   b. Connect port L2 from the secondary primary ICM to port L1 on the satellite ICM in frame 4 ICM bay 6.
   c. Connect port L3 from the secondary primary ICM to port L1 in the satellite ICM in frame 3 ICM bay 6.

Figure 2. Primary and satellite interconnect modules for four frames - secondary primary ICM cabling

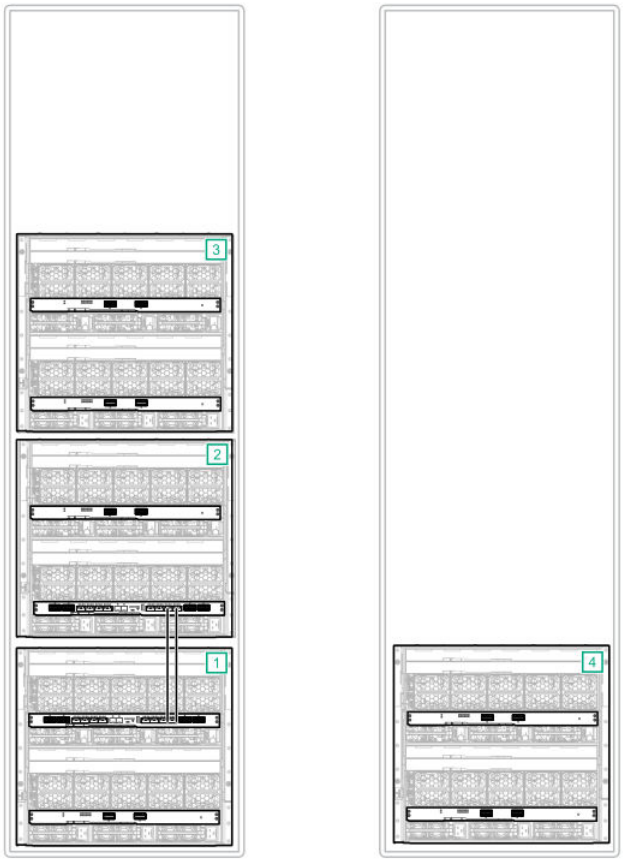


3. Cable two stacking cables from the primary ICM in ICM bay 3 to the primary ICM in ICM bay 6.

   a. Connect a stacking cable from port Q7 on the first primary ICM to port Q7 on the second primary ICM.

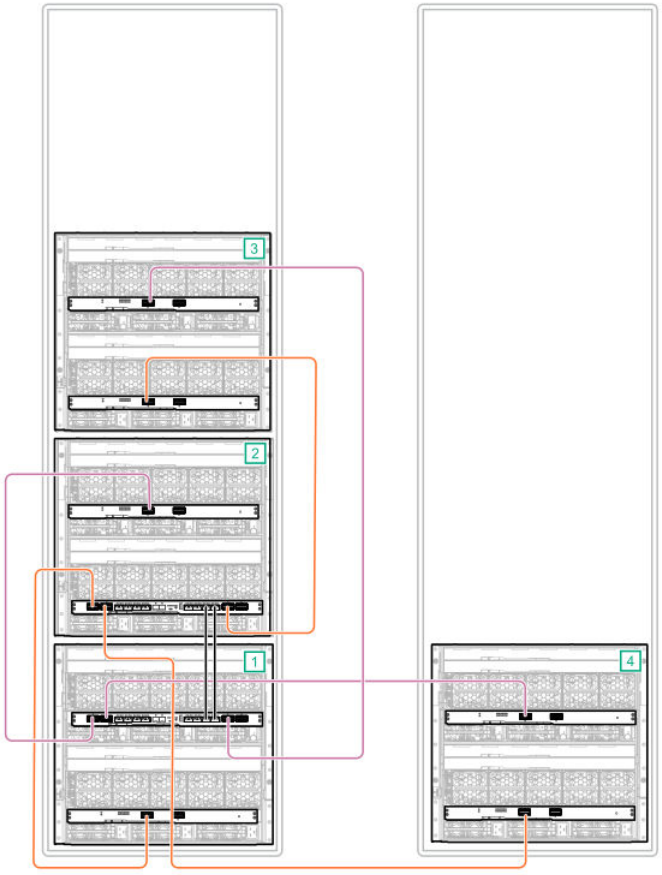
   b. Connect a stacking cable from port Q8 on the first primary ICM to port Q8 on the second primary ICM.

Figure 3. Four frames with primary and satellite interconnect - stacking cables



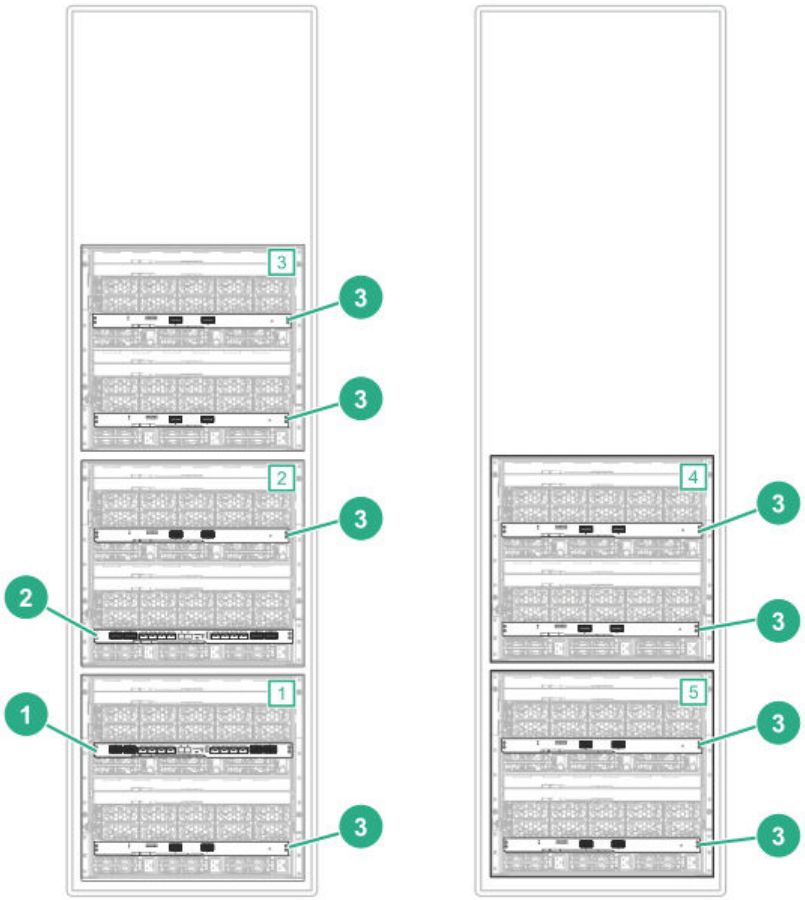
4. Cabling is complete.

Figure 4. Four frames with primary and satellite interconnects (redundant) - all cables


3
2
1
4

Five frame cabling for HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy modules (redundant)

Prerequisites



Item	Description	Amount
1	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy (primary primary ICM)	1
2	HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy (secondary primary ICM)	1
3	HPE Synergy 50Gb Interconnect Link Module (satellite ICM)	8

About this task

This cabling example shows a redundant five frame configuration.

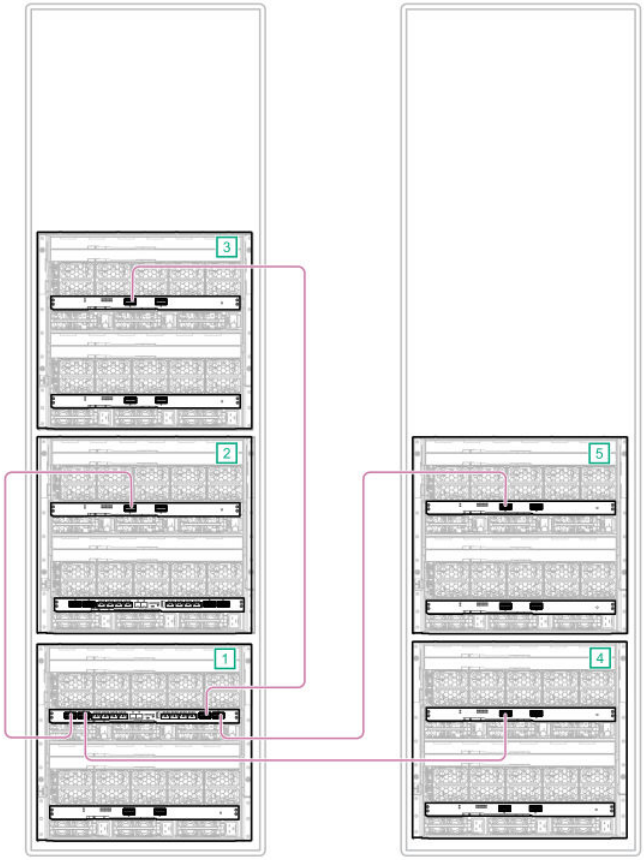
Procedure

1. Using interconnect link cables, connect the primary switch ports to each satellite ICM in the same bay.

   a. Connect port L1 from the primary ICM to port L1 on the satellite interconnect in the same frame as the secondary primary ICM.

   b. Connect ports L2, L3, and L4 from the primary ICM to port L1 in each of the remaining satellite ICM in ICM 3.

Figure 1. Primary and satellite interconnect module cabling for five frames (redundant)

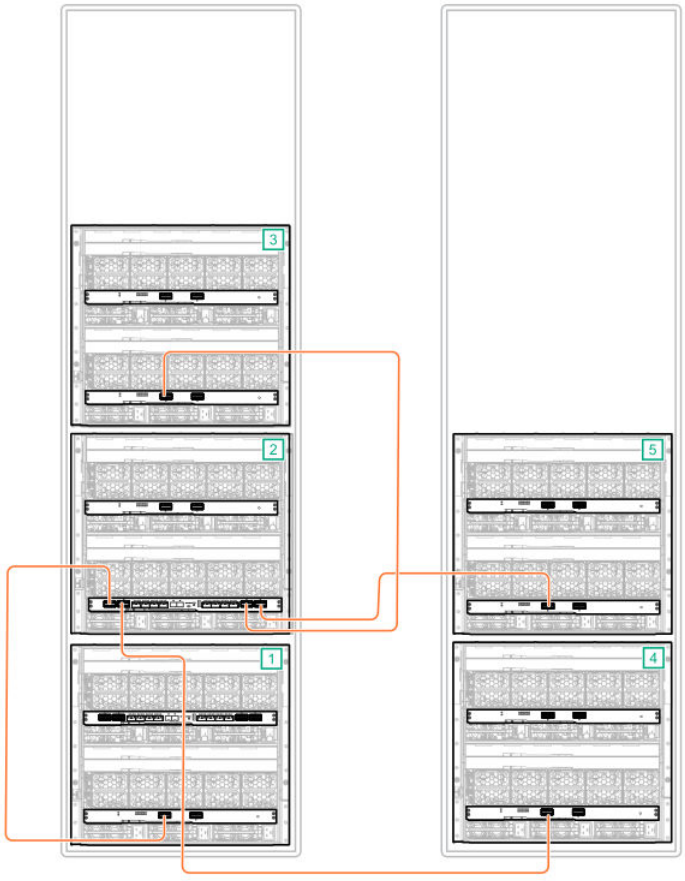


2. Using interconnect link cables, connect the primary switch ports to each satellite ICM in the same bay.

   a. Connect port L1 from the secondary primary ICM to port L1 on the satellite interconnect in the same frame as the primary ICM.

b. Connect ports L2, L3, and L4 from the secondary primary ICM to port L1 in each of the remaining satellite ICM in ICM 6.

Figure 2. Secondary primary and satellite interconnect module cabling for five frames (redundant)

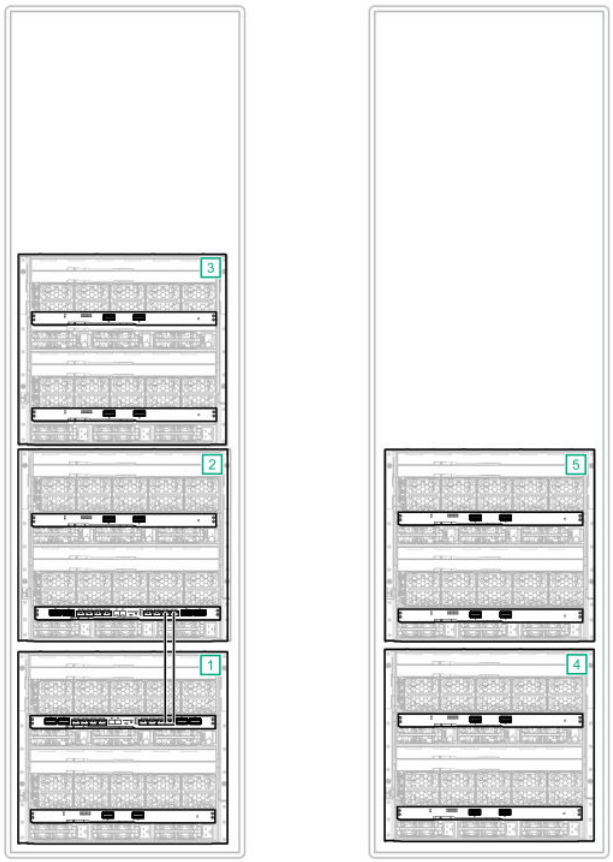


3. Cable two stacking cables from the primary ICM to the secondary primary ICM.

   a. Connect a stacking cable from port Q7 on the first primary ICM to port Q7 on the second primary ICM.

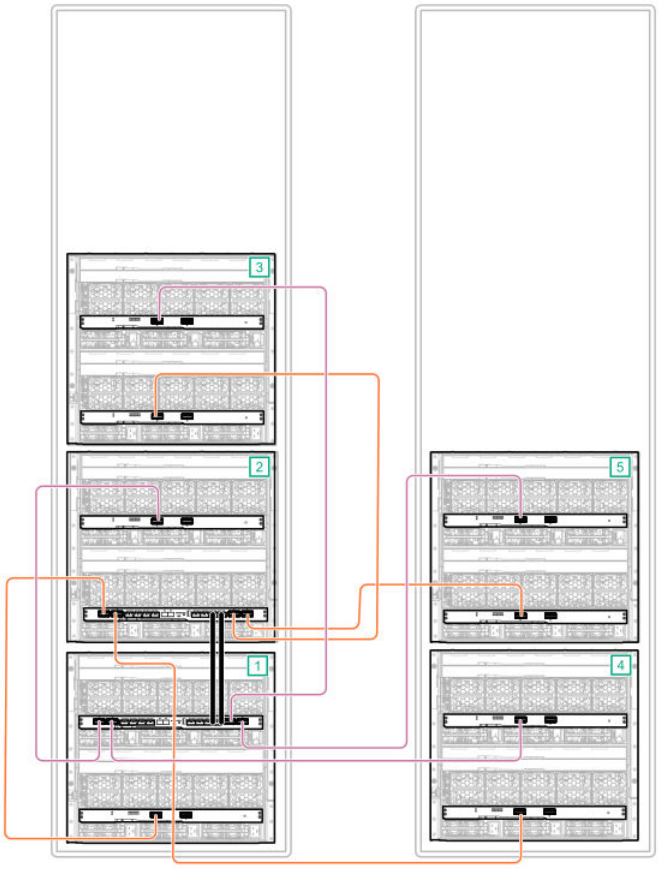
   b. Connect a stacking cable from port Q8 on the first primary ICM to port Q8 on the second primary ICM.

Figure 3. Primary and satellite interconnect modules in multiple frames (redundant)



4. Cabling is complete.

Figure 4. Primary and satellite interconnect modules in five frames (redundant)



Power cabling options

Subtopics

PDU Guidelines
Cabling twelve power supplies for power feed redundancy
Cabling six power supplies for power feed redundancy

PDU Guidelines

Use this section as guidelines for cabling HPE Synergy power supplies and PDUs.

- HPE G3 Power Distribution Unit Plug ratings:
  - HPE G3 PDU C13 plug rating is 10A world-wide and 12A for North America

- HPE G3 PDU C19/Combo plug rating is 16A

- Stay within the following conditions:
  - HPE G3 PDU circuit breaker current trip limit
  - Derated Line Phase current
  - Total Power kVA rating of the HPE G3 PDU
- Phase balancing is recommended for 3-phase applications

Cabling twelve power supplies for power feed redundancy

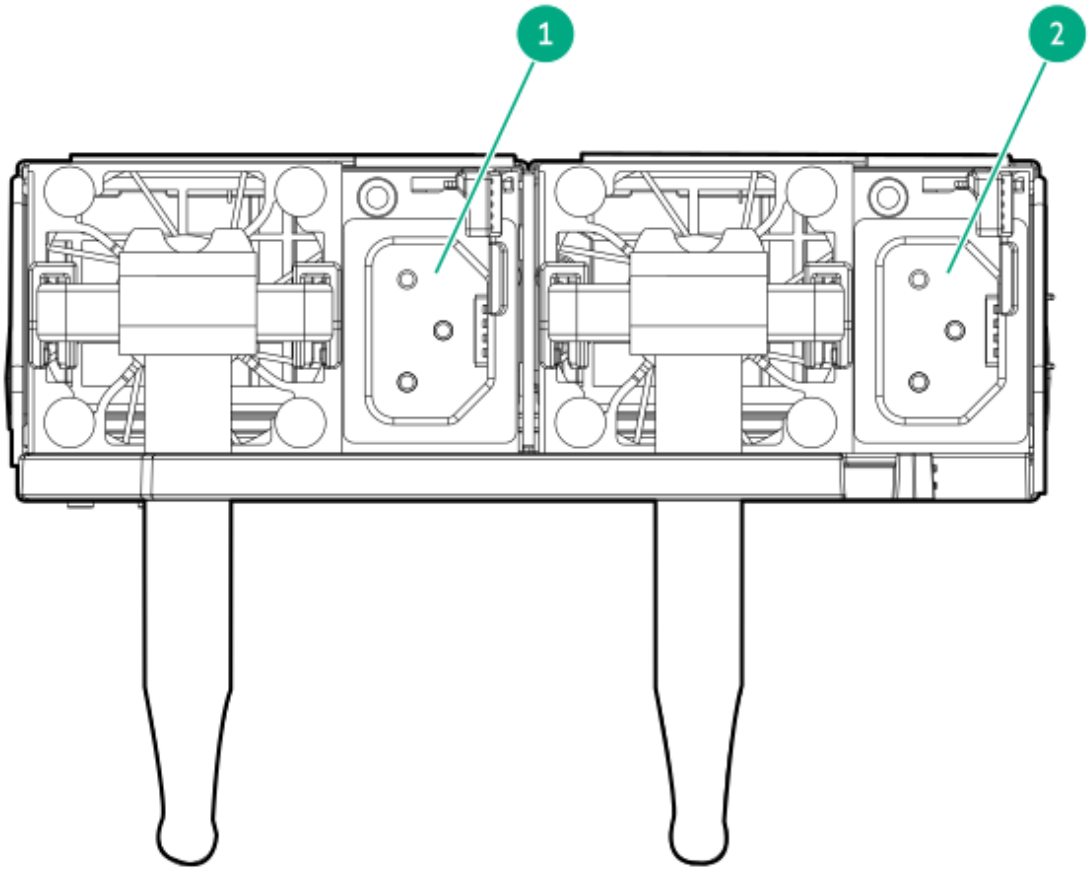
A-B power feed cabling schemes for twelve power supply applications

> **NOTE**
> Each single breaker may have multiple C13 and or C19 plugs based on the PDU design.

8.6kVA 3P Generic example for flex slot power supply (12) Application example

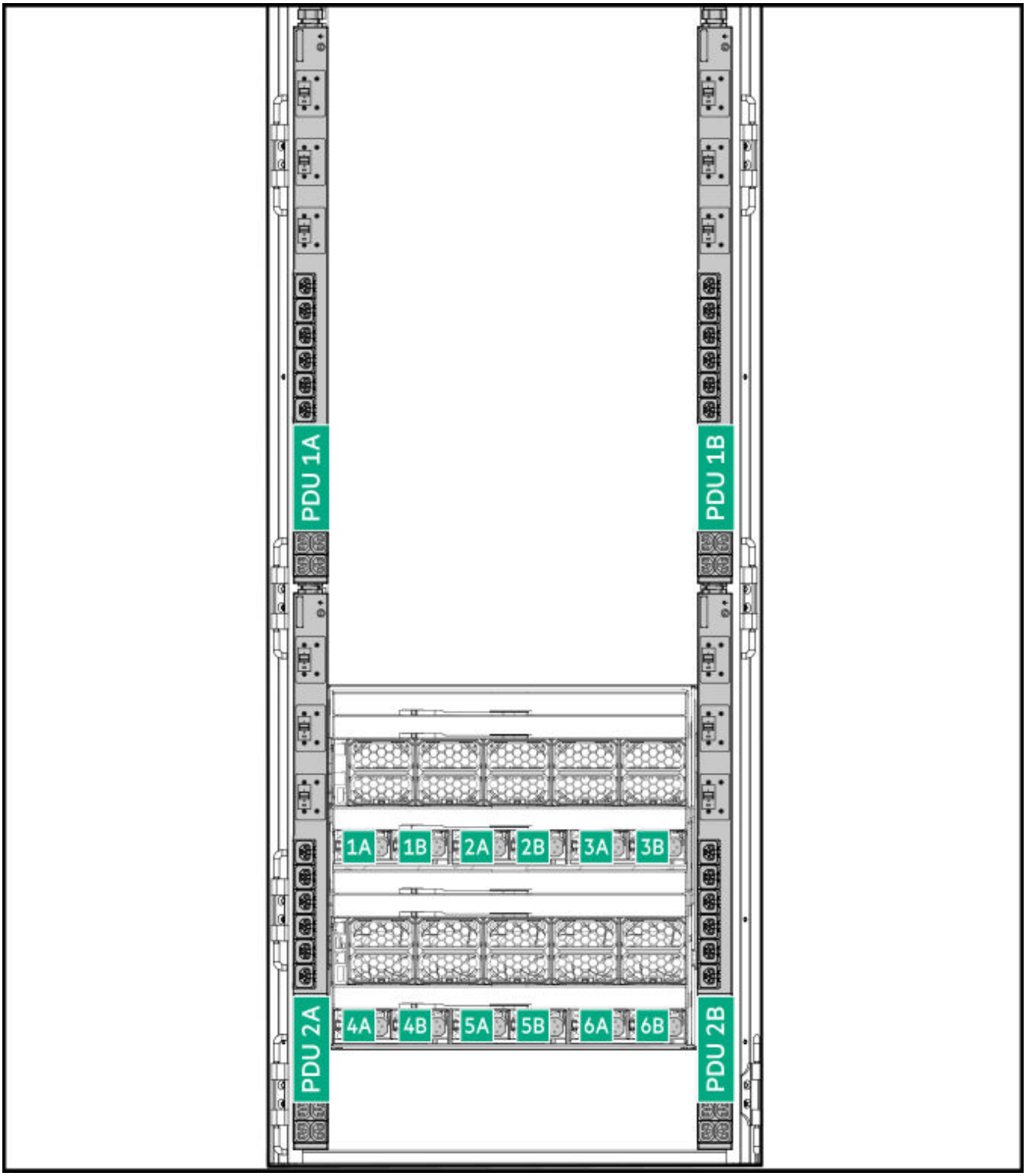
Power Feed A Side							Power Feed B Side						
PSU Socket	3 PDU Breaker			3 PDU Breaker			PSU Socket	3 PDU Breaker			3 PDU Breaker		
	B1	B2	B3	B1	B2	B3		B1	B2	B3	B1	B2	B3
1A	X						1B	X					
2A		X					2B		X				
3A			X				3B			X			
4A				X			4B				X		
5A					X		5B					X	
6A						X	6B						X

Figure 1. Flex slot power supply socket identification



Item	Description
1	A-Socket
2	B-Socket

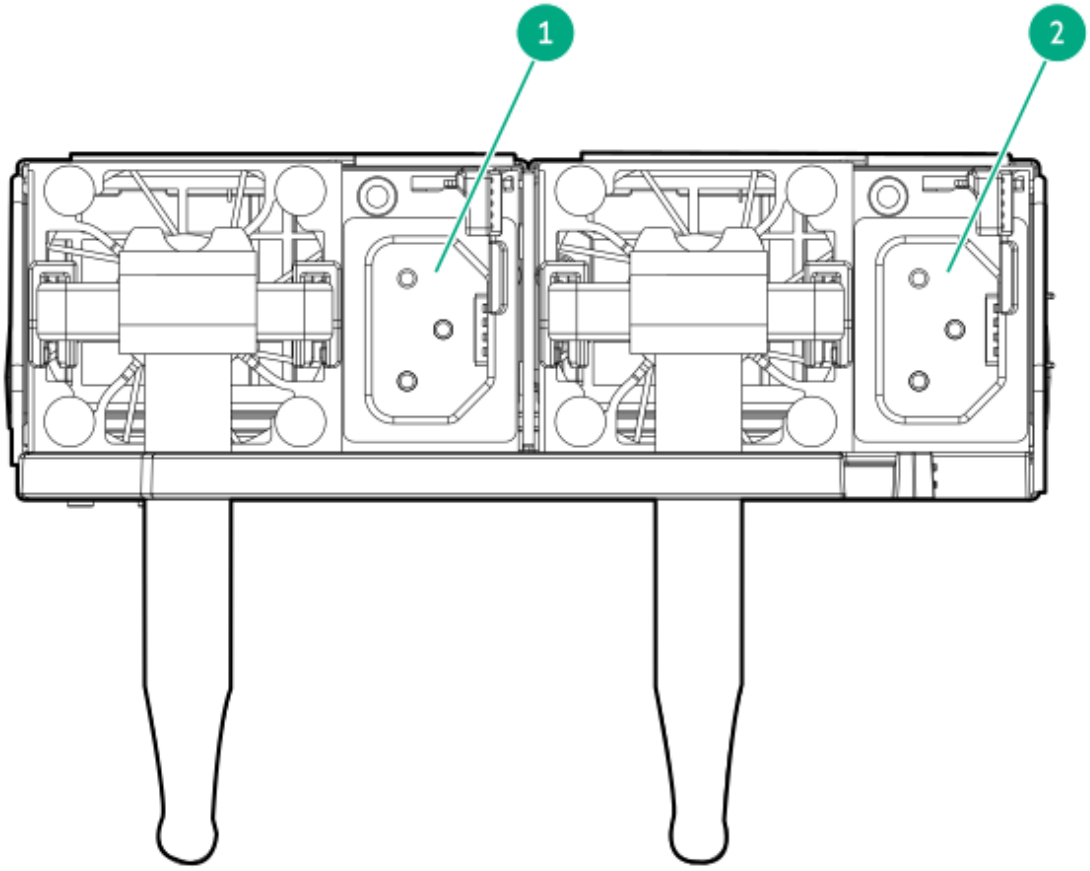
Figure 2. 8.6kVA 3P Generic example for flex slot power supply (12) Application



17.2kVA/22Kva 3P Generic example for flex slot power supply (12) Application example

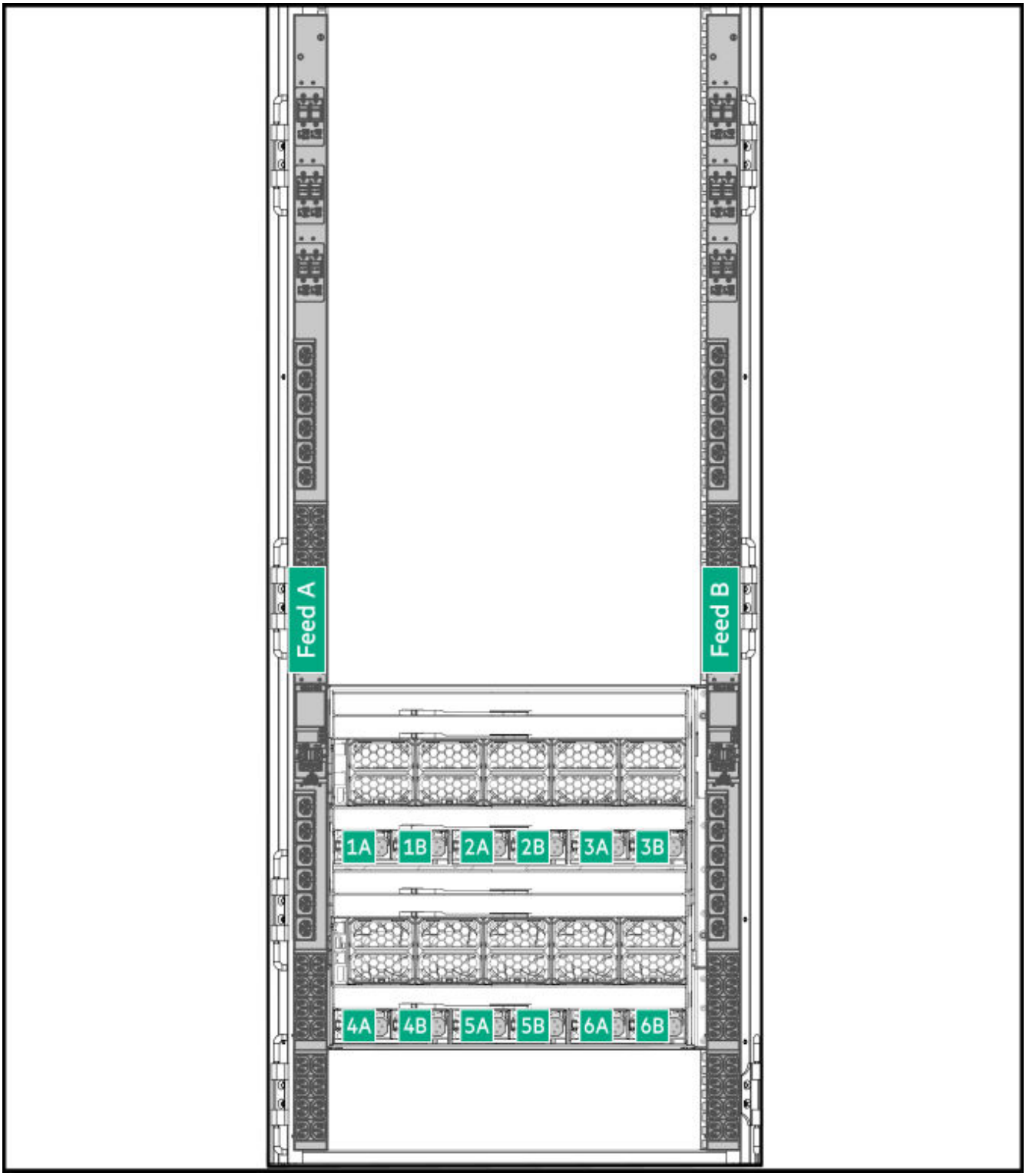
Power Feed A Side							Power Feed B Side						
PSU Socket	6 PDU Breaker						PSU Socket	6 PDU Breaker					
	B1	B2	B3	B4	B5	B6		B1	B2	B3	B4	B5	B6
1A	X						1B	X					
2A		X					2B		X				
3A			X				3B			X			
4A				X			4B				X		
5A					X		5B					X	
6A						X	6B						X

Figure 3. Flex slot power supply socket identification

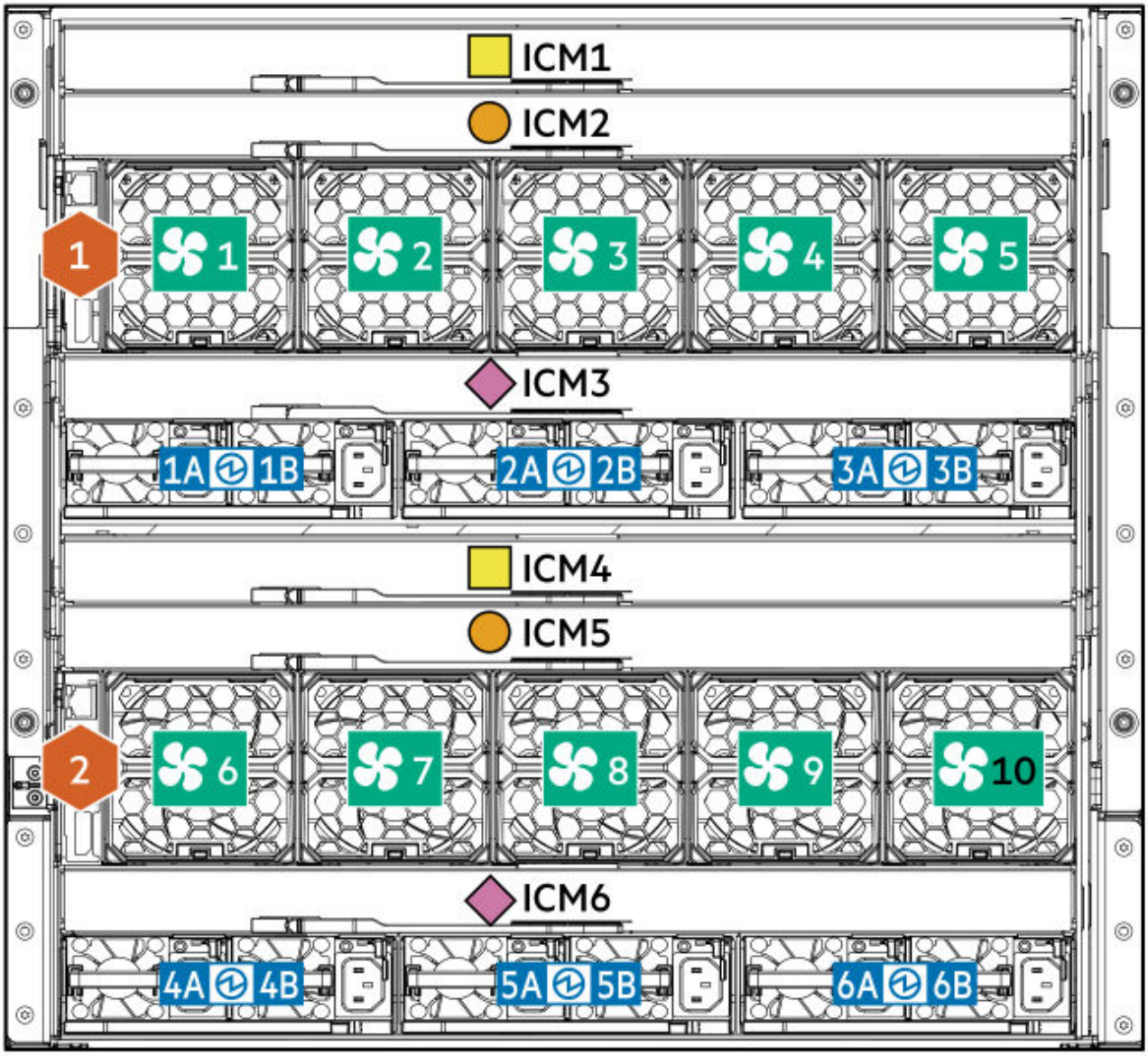


Item	Description
1	A-Socket
2	B-Socket

Figure 4. 17.2kVA/22Kva 3P Generic example for flex slot power supply (12) Application



Power feed redundancy may be achieved by connecting 6+6 power supplies to Phase A+B (Feed). Note the flex slot power supply numbering in the frame.



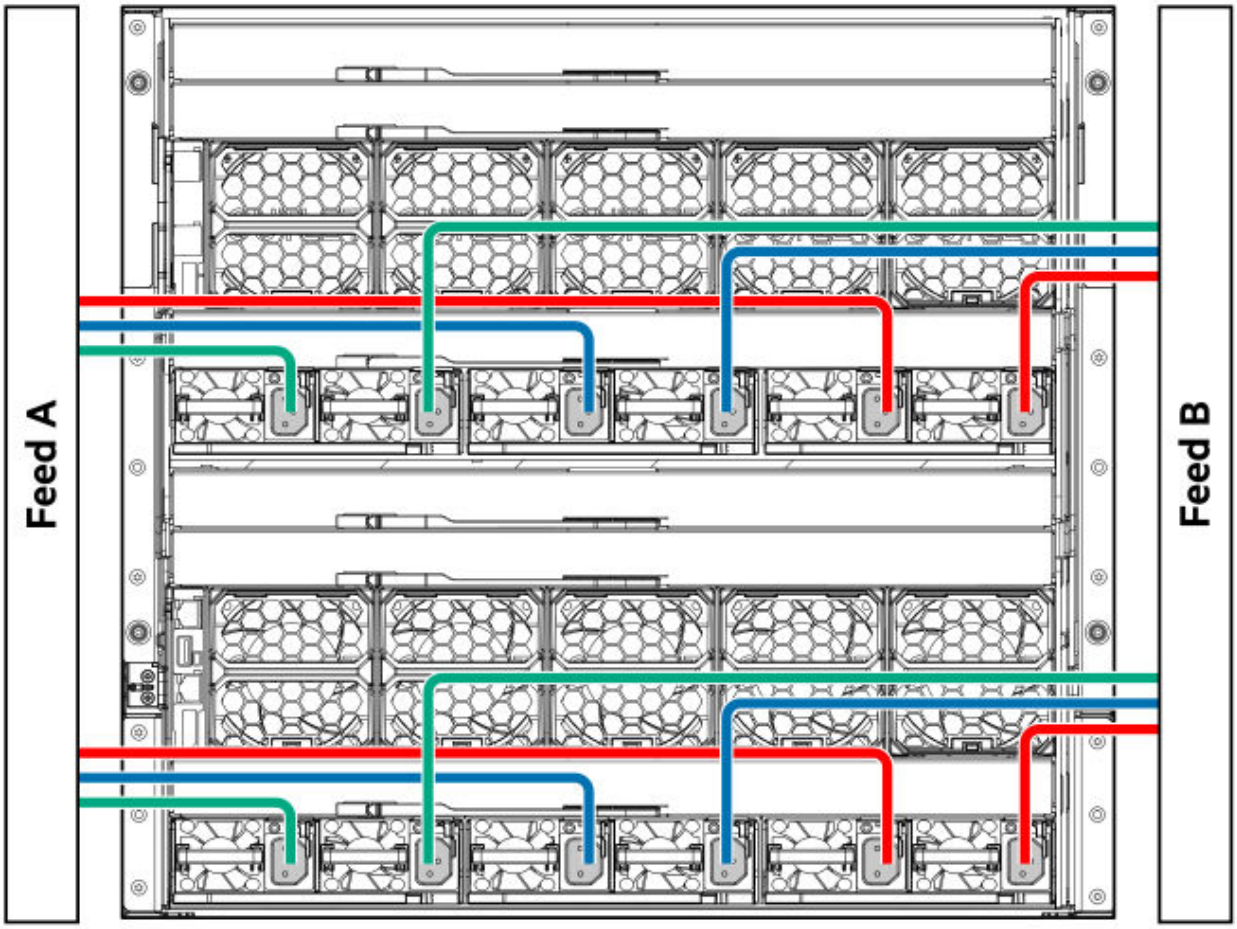
Up to twelve power supplies (1A to 6B) can populate the 6 power supply bays.

Components	Bays	Labels
Power supplies (1A to 6B)	1 - 6	

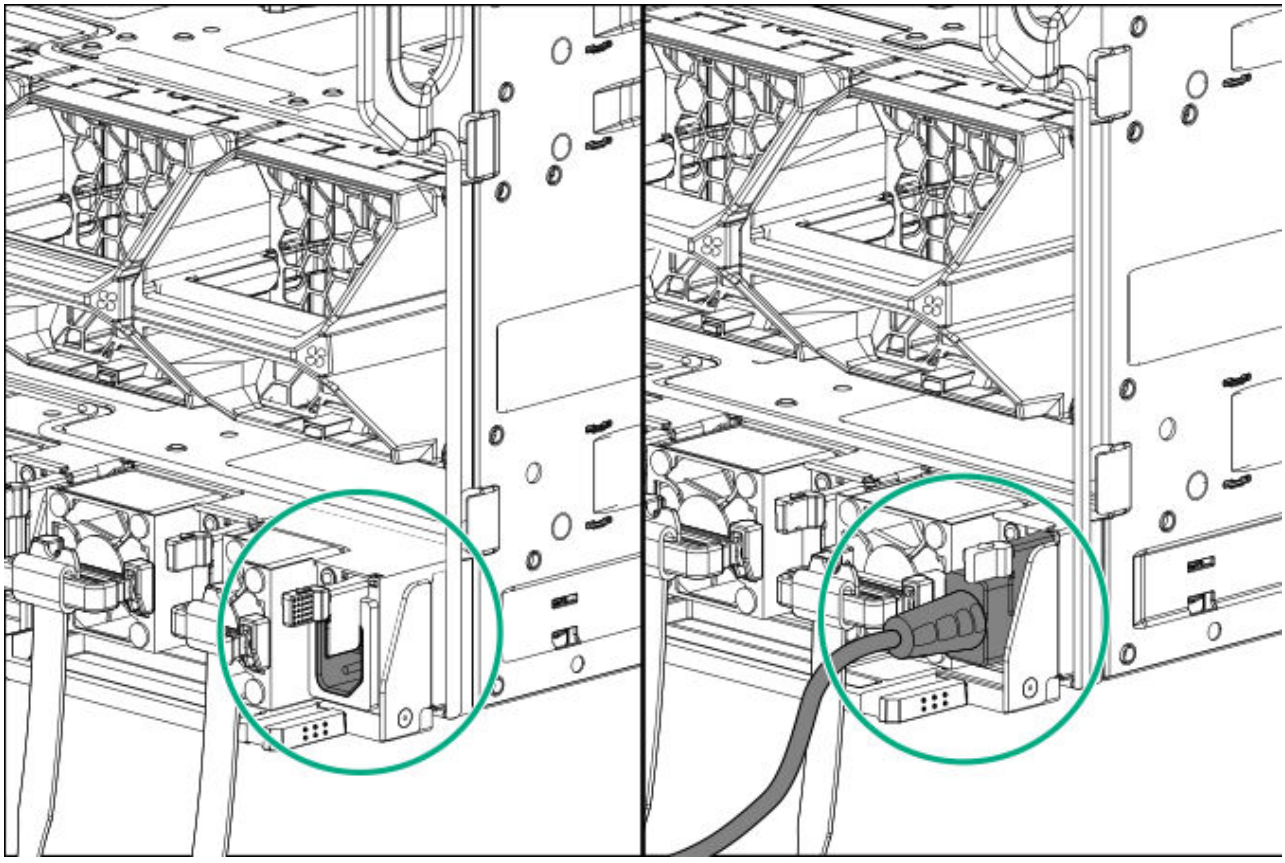
To cable a frame for power feed redundancy, use the following recommendation as a best practice:

1. Connect power supplies 1A, 2A, 3A, 4A, 5A, and 6A to the A-side power distribution unit.

2. Connect power supplies 1B, 2B, 3B, 4B, 5B, and 6B to the B-side power distribution unit.



3. Verify that the power supply cords are securely connected using the reusable cable tie wraps.



After power is supplied to the frame, it powers up automatically. The power and health LEDs on the front panel, Composer appliance, and frame link modules illuminate green to indicate that there are no errors or alert conditions.

Cabling six power supplies for power feed redundancy

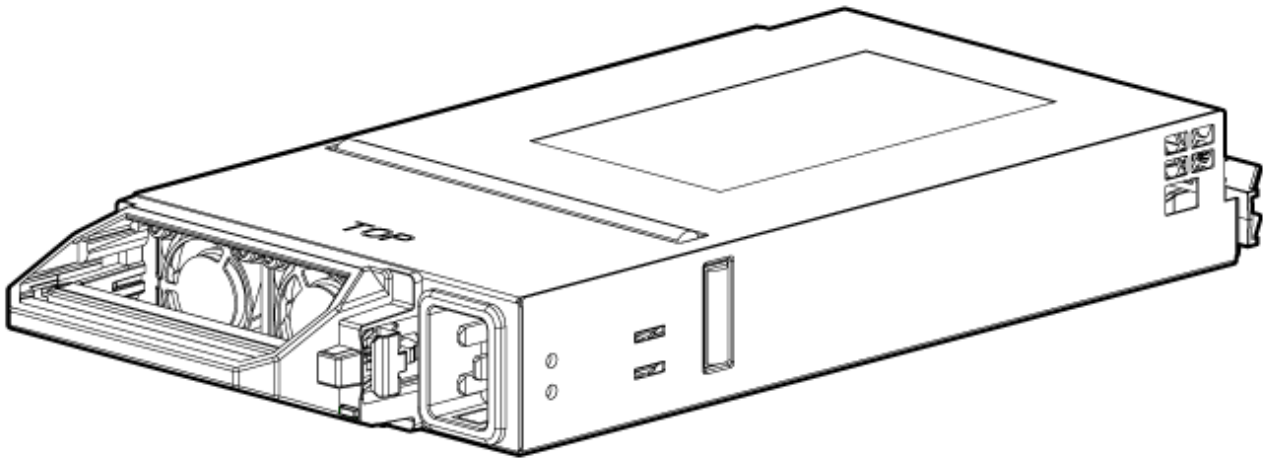
A-B power feed cabling schemes for six power supply applications

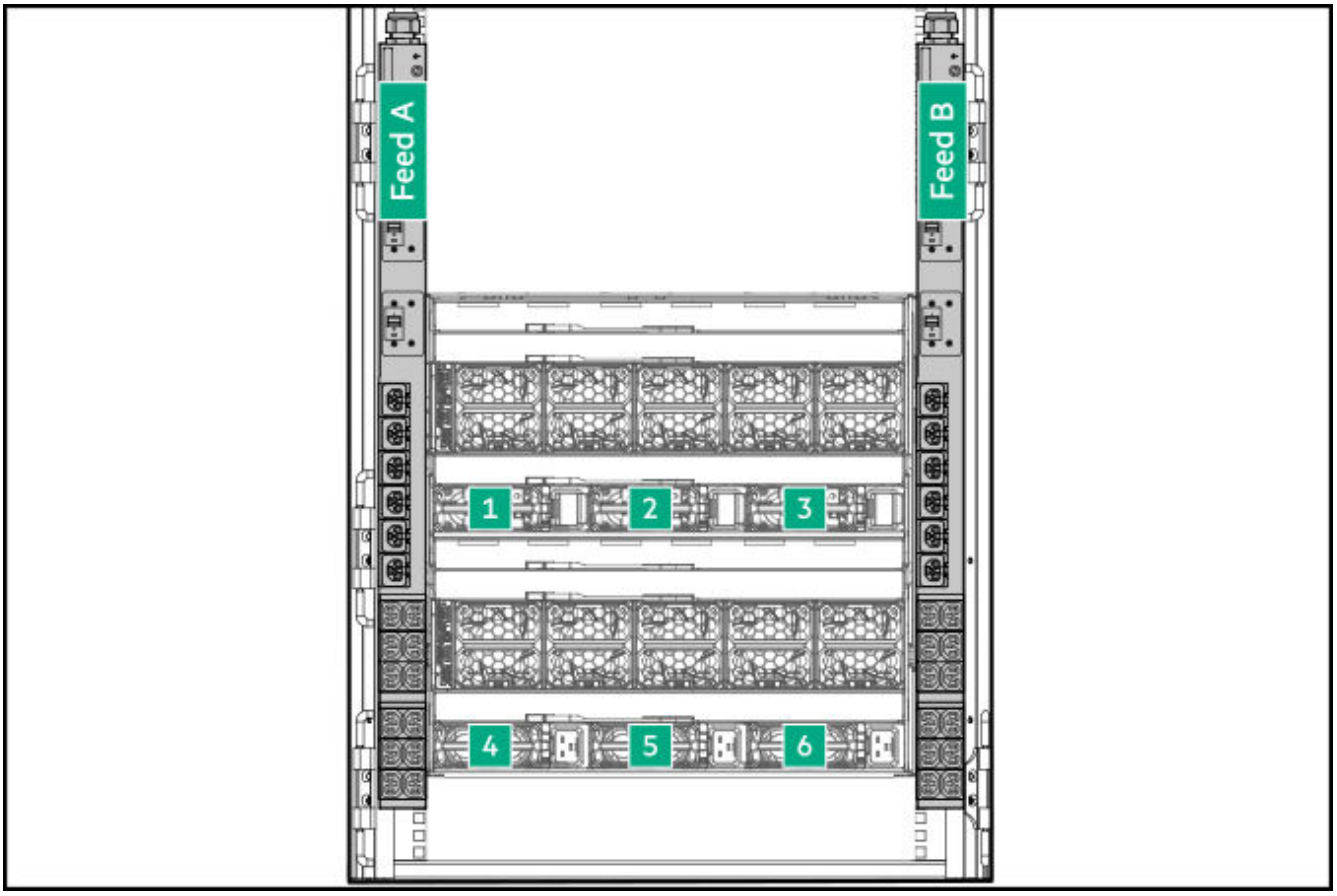
NOTE

Each single breaker may have multiple C13 and or C19 plugs based on the PDU design.

8.6kVA 3P Generic example for HPE Synergy power supply (6) Application example

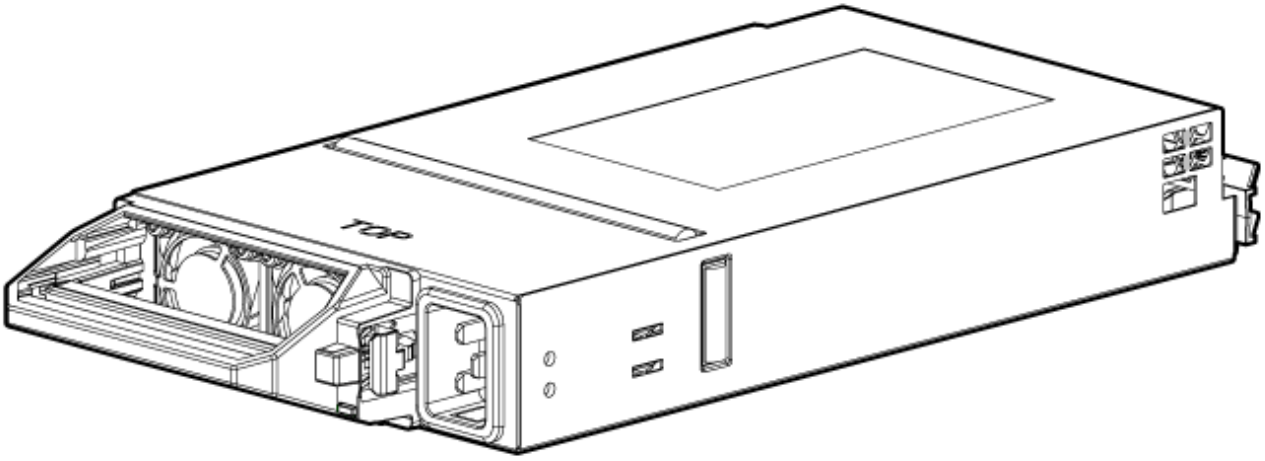
Power Feed A Side				Power Feed B Side			
PSU Socket	3 PDU Breaker			PSU Socket	3 PDU Breaker		
	B1	B2	B3		B1	B2	B3
1	X			1			
2		X		2			
3				3	X		
4			X	4			
5				5		X	
6				6			X

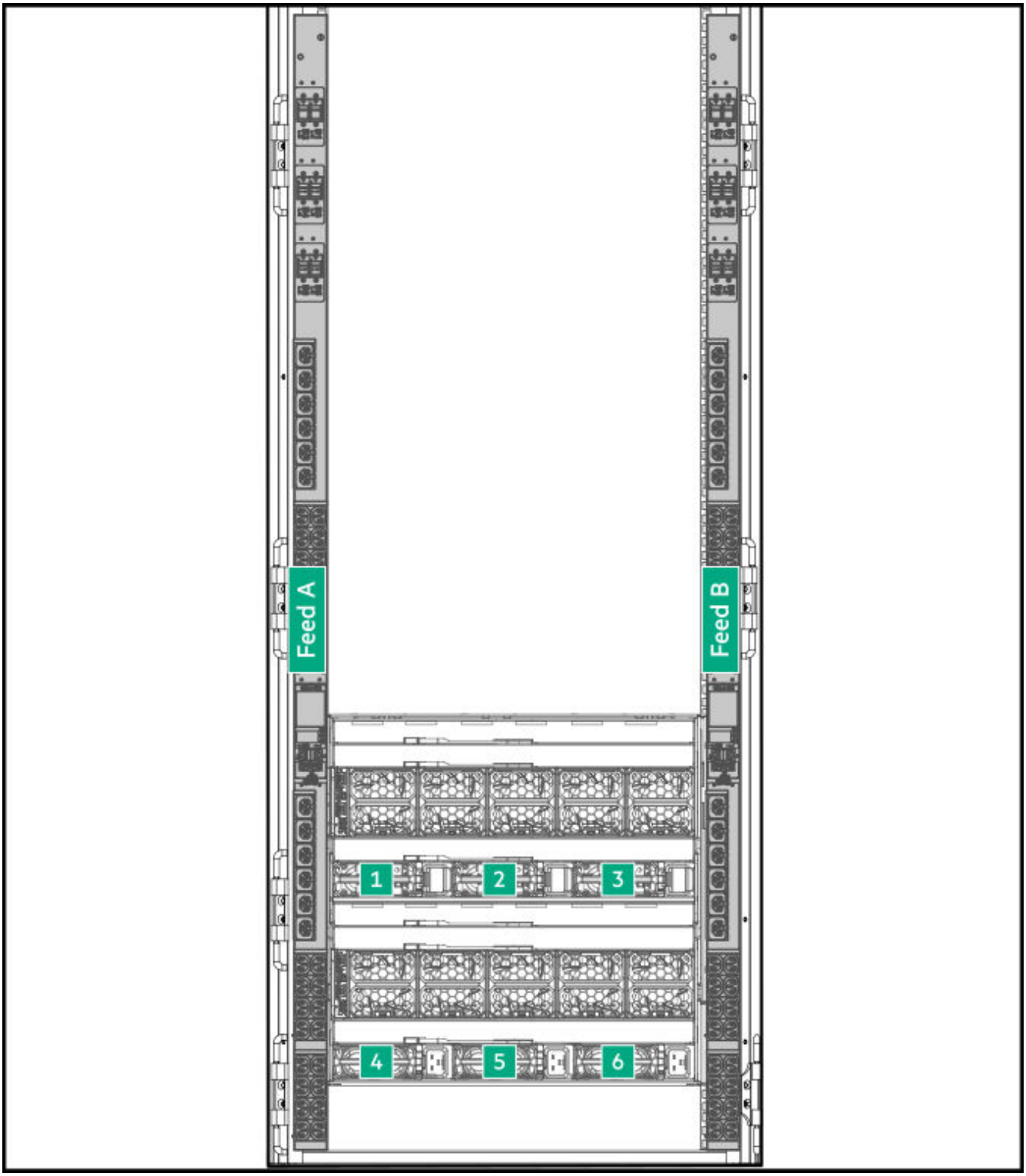




17.2kVA/22Kva 3P Generic example for HPE Synergy power supply (6) Application example

Power Feed A Side							Power Feed B Side						
PSU Socket	6 PDU Breaker						PSU Socket	3 PDU Breaker					
	B1	B2	B3	B4	B5	B6		B1	B2	B3	B4	B5	B6
1	X						1						
2		X					2						
3							3	X					
4			X				4						
5							5		X				
6							6			X			



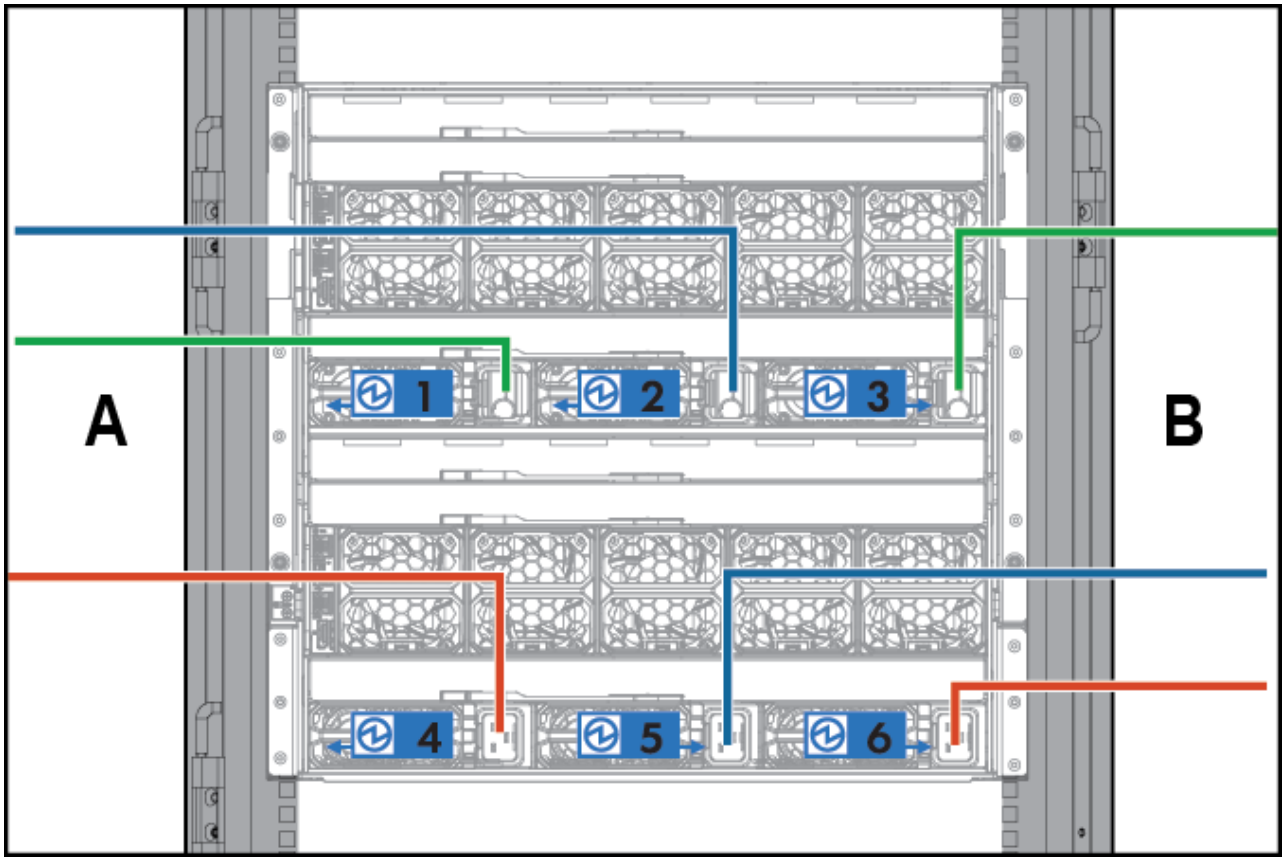


Power feed redundancy six power supply configuration

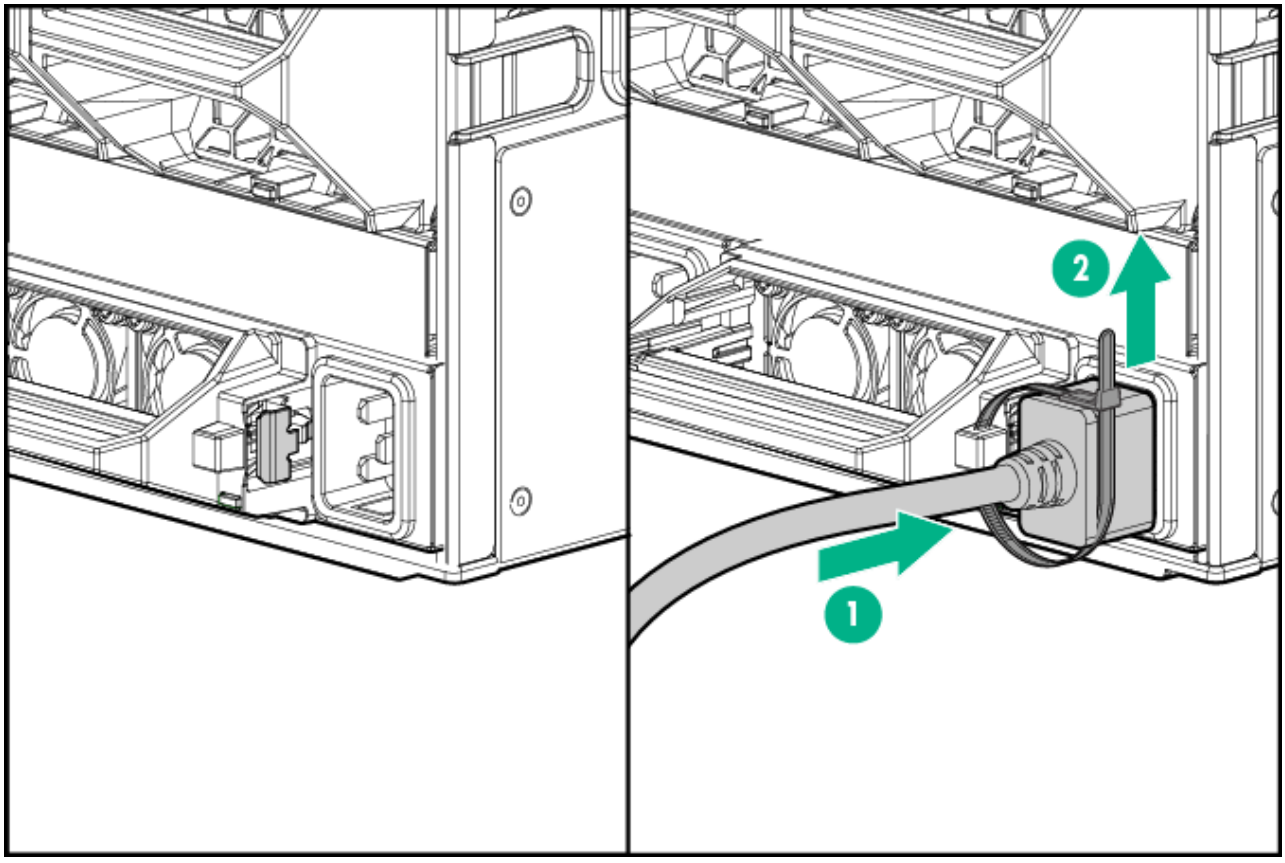
Power feed redundancy may be achieved by connecting 1+1, 2+2, or 3+3 power supplies to Phase A+B (Feed). To cable a frame for power feed redundancy, use the following recommendation as a best practice:

1. Connect power supplies 1, 2, and 4 to the A-side power distribution unit.

2. Connect power supplies 3, 5, and 6 to the B-side power distribution unit.



3. Verify that the power supply cords are securely connected using the reusable cable tie wraps.



HPE Synergy Console connections

Subtopics

Connecting to the HPE Synergy Console with a notebook computer
Connecting to the HPE Synergy Console using a keyboard, video monitor, and mouse

Connecting to the HPE Synergy Console with a notebook computer

Prerequisites

At least one frame link module is installed in one of the frame link module bays.

About this task

WARNING

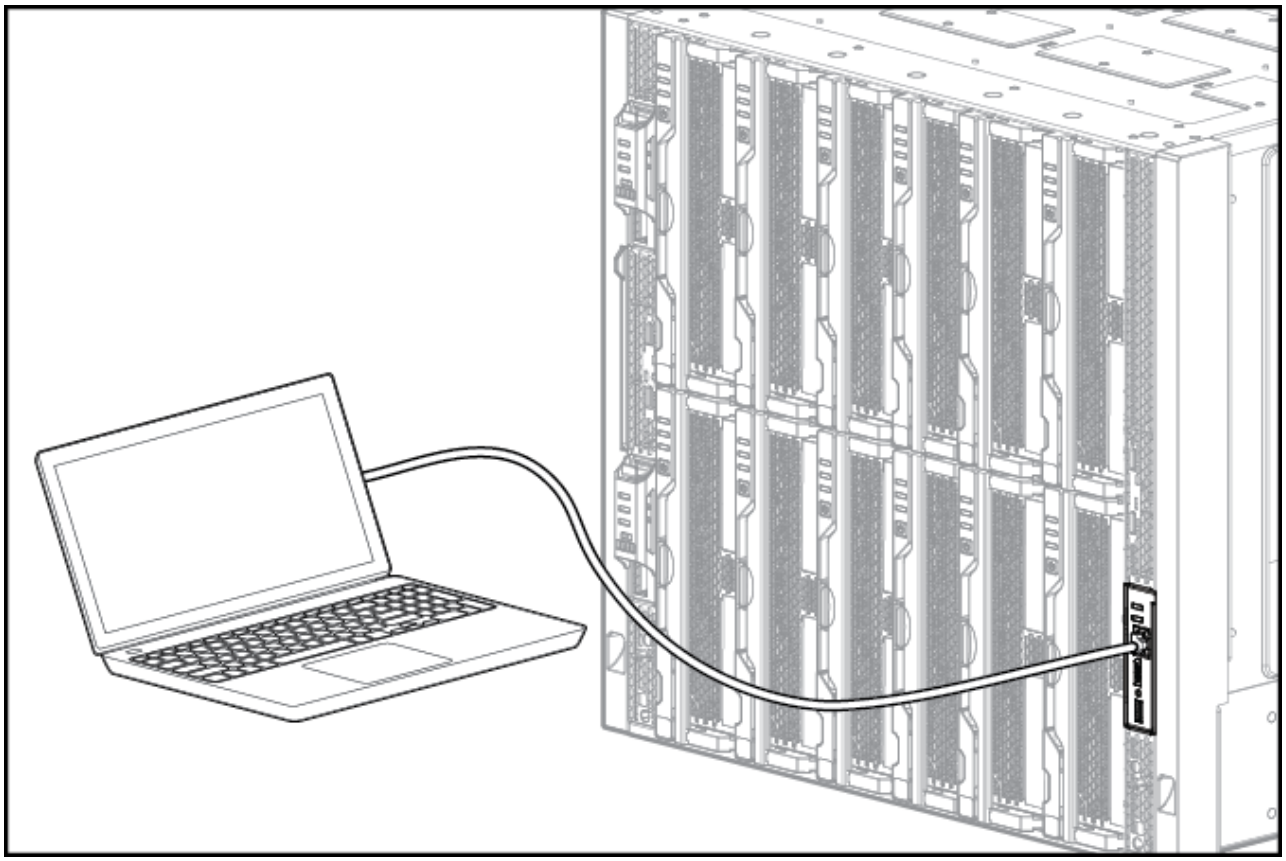
Do not plug the front panel notebook port into a switch. This port is designed to provide a single notebook access to the HPE Synergy Console. Plugging the notebook port into a switch may cause issues on a network where DHCP is running.

Procedure

1. Verify that the Ethernet port of the notebook computer is configured for DHCP.

   Alternatively, you can configure the notebook computer Ethernet port to the IP address: 192.168.10.2 with the subnet mask 255.255.255.0.

2. Connect a CAT5 cable from the Ethernet port on the notebook computer to the notebook port on the frame front panel module.



3. Wait for the notebook computer to be assigned an IP address from the frame link module.
4. On the notebook computer, launch a VNC client application to connect to the HPE Synergy Console.

5. If prompted by the VNC client, enter the IP address (including port 5900) of the HPE Synergy frame to use for the connection (for example, 192.168.10.1).
6. Click **Connect**.

Connecting to the HPE Synergy Console using a keyboard, video monitor, and mouse

Prerequisites

A frame link module is installed in a frame link module bay.

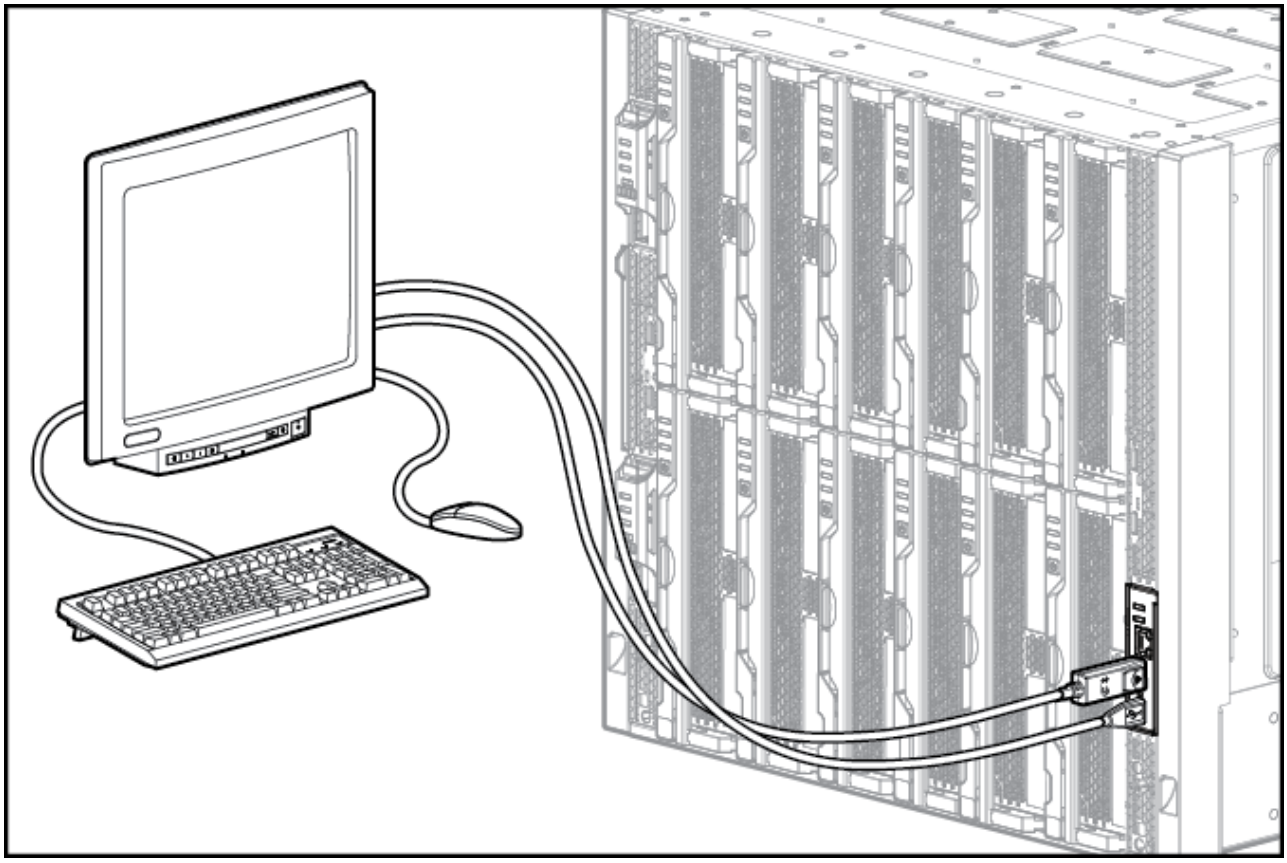
About this task

> **NOTE**
> Cabling to an HPE Synergy 4-Port Frame Link Modules requires an HPE Synergy 4-Port Frame Link Module USB Adapter.

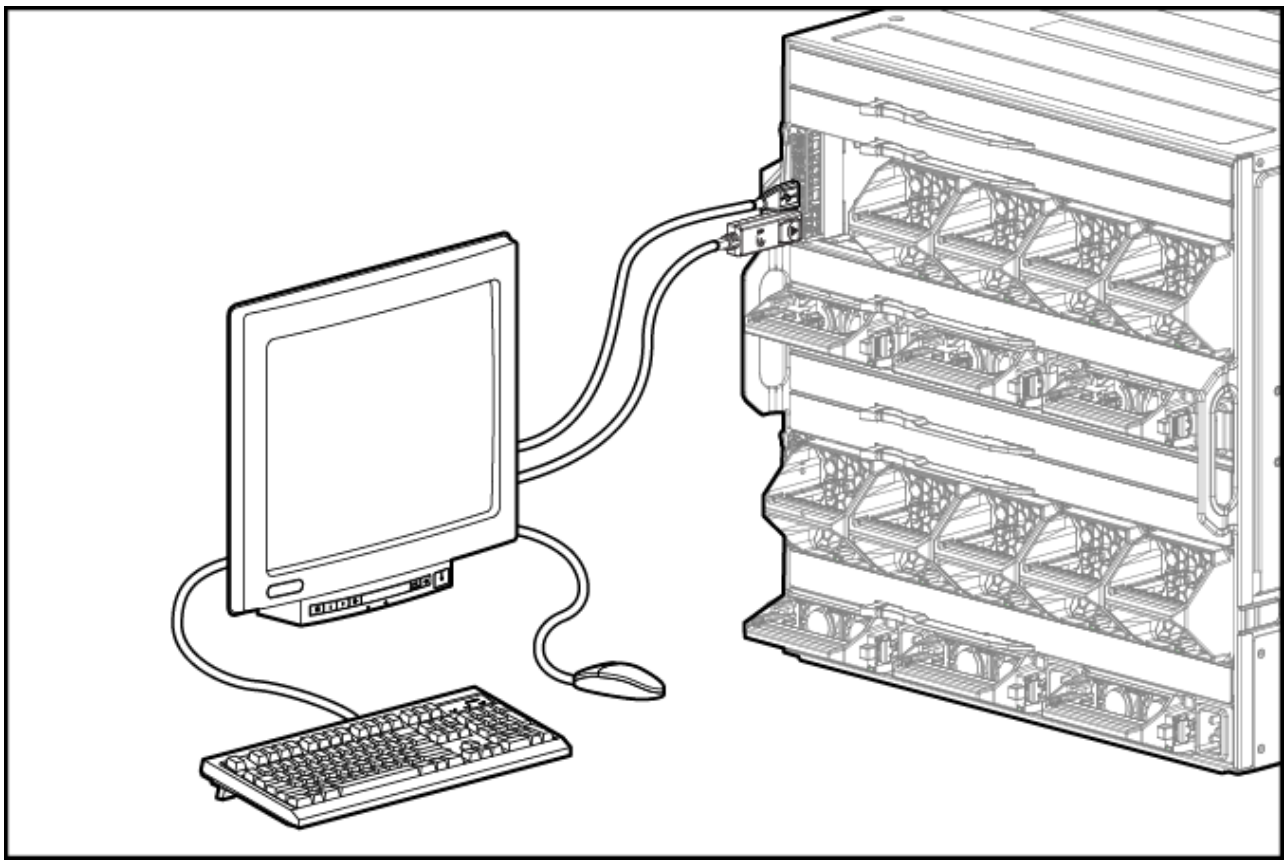
Procedure

Connect the video monitor cable and the combined USB keyboard or mouse cable to either of the following locations:

- Front panel Keyboard, Video monitor, and Mouse (KVM) connection on the front of the frame.

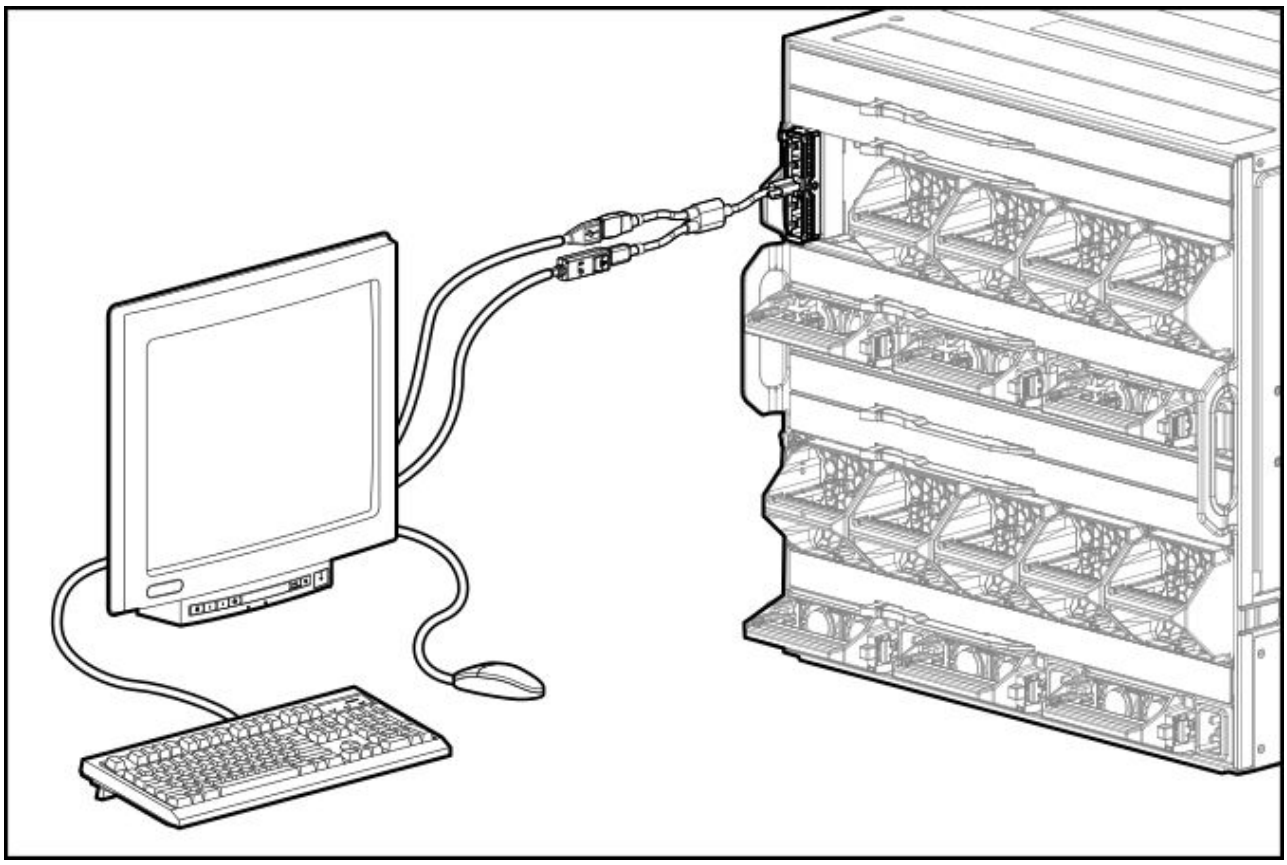


- Rear panel KVM connection



NOTE

Cabling to an HPE Synergy 4-Port Frame Link Modules requires an HPE Synergy 4-Port Frame Link Module USB Adapter.



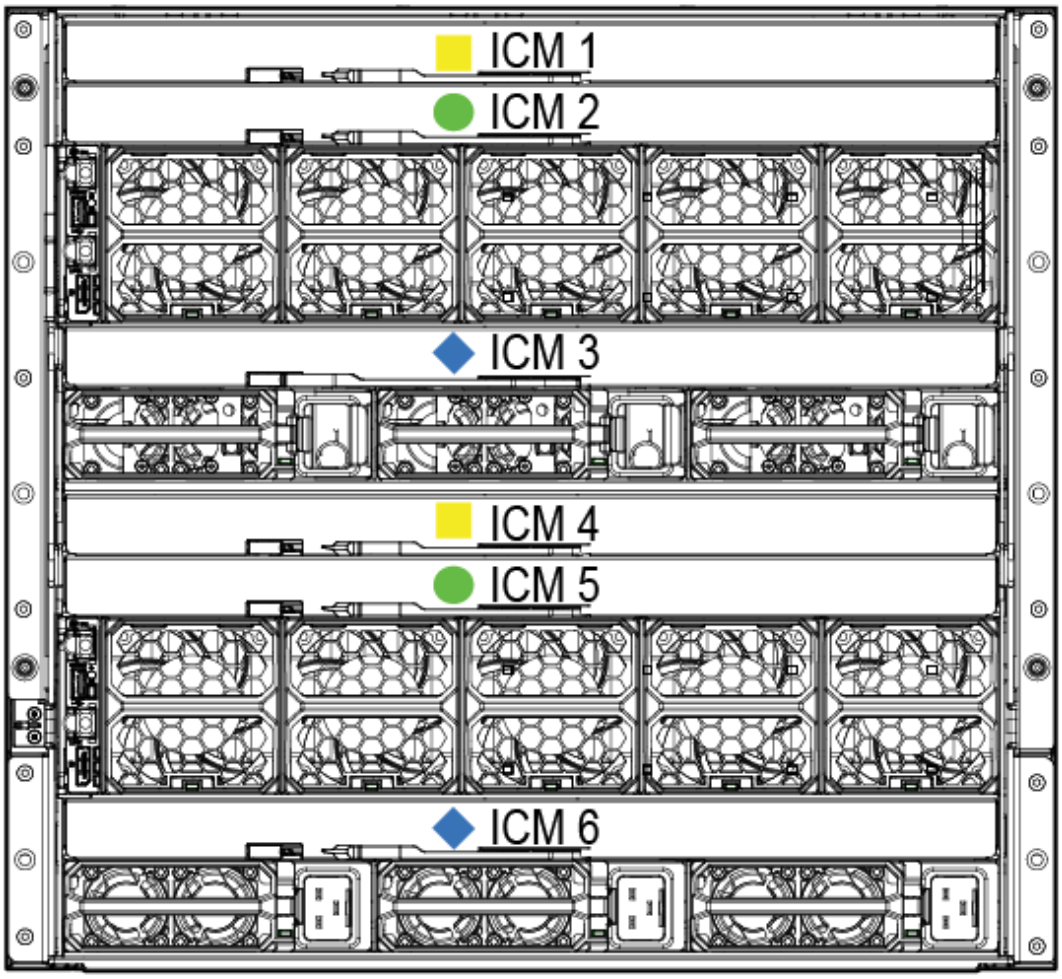
HPE Synergy Fabrics and interconnect port mapping

Subtopics

HPE Synergy Frame and Interconnect Modules
HPE Synergy Fabrics best practices
HPE Synergy compute module to interconnect module port mapping

HPE Synergy Frame and Interconnect Modules

The HPE Synergy 12000 Frame has six interconnect module (ICM) bays for full redundancy of three fabrics.



Fabric	Interconnect modules	Fabric sample
1	1 and 4	HPE Synergy 12Gb SAS Connection Module (2)
2	2 and 5	• Brocade 16Gb/24 FC SAN Switch Module for HPE Synergy (2) • Brocade 32Gb FC SAN Switch Module for HPE Synergy (2)
3	3 and 6	• HPE Synergy 40Gb F8 Switch Module and HPE Synergy 20Gb Interconnect Link Module • HPE Synergy Virtual Connect 100Gb F32 Module and HPE Synergy 25/50Gb Interconnect Link Module

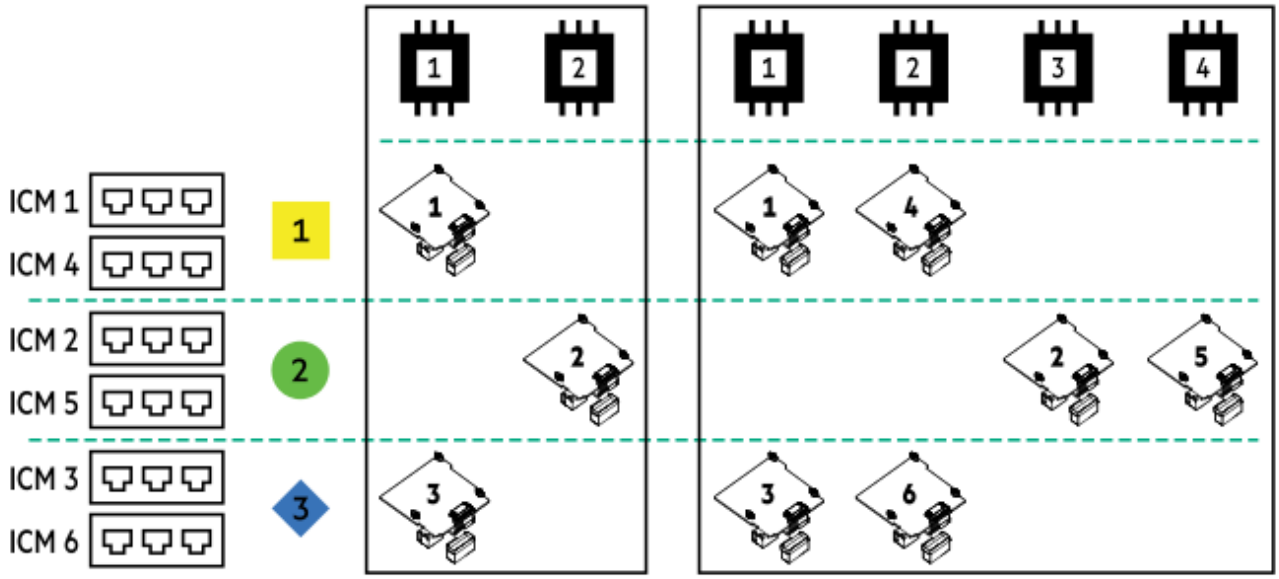
HPE Synergy Fabrics best practices

- Install Ethernet/Converged fabric in Fabric 3 (ICM bays 3 and 6).
- Install SAS storage fabric in Fabric 1 (ICM bays 1 and 4).
- To use Fabric 2 (ICM bays 2 and 5) as a second Ethernet fabric or FC/SAS storage fabric, install two of either Ethernet or FC/SAS storage fabrics.
- For Fabric 1, SAS storage ICMs take precedence over FC storage interconnect modules.
- Populate both respective ICM bays for each fabric in support of module redundancy.
- Both ICM bays within a fabric must contain the same interconnect modules unless the fabric is an HPE Synergy Composable Fabric.
- For HPE Synergy Composable Fabrics, the frame can be populated with combinations of primary and satellite modules, depending on the intended multiframe configuration.

HPE Synergy compute module to interconnect module port mapping

Mezzanine cards have redundant dual-port connection to the same type of interconnect module. The first interconnect module in an ICM bay set is connected to Port 1 of the mezzanine card. The second interconnect module in an ICM bay set is connected to Port 2 of that mezzanine card.

The diagram displays the mapping between the compute module components (both half height and full height) and the interconnect modules on the rear of the frame.



For more information, see the interconnect module and compute module product QuickSpecs on the Hewlett Packard Enterprise website (**http://www.hpe.com/info/qs**).

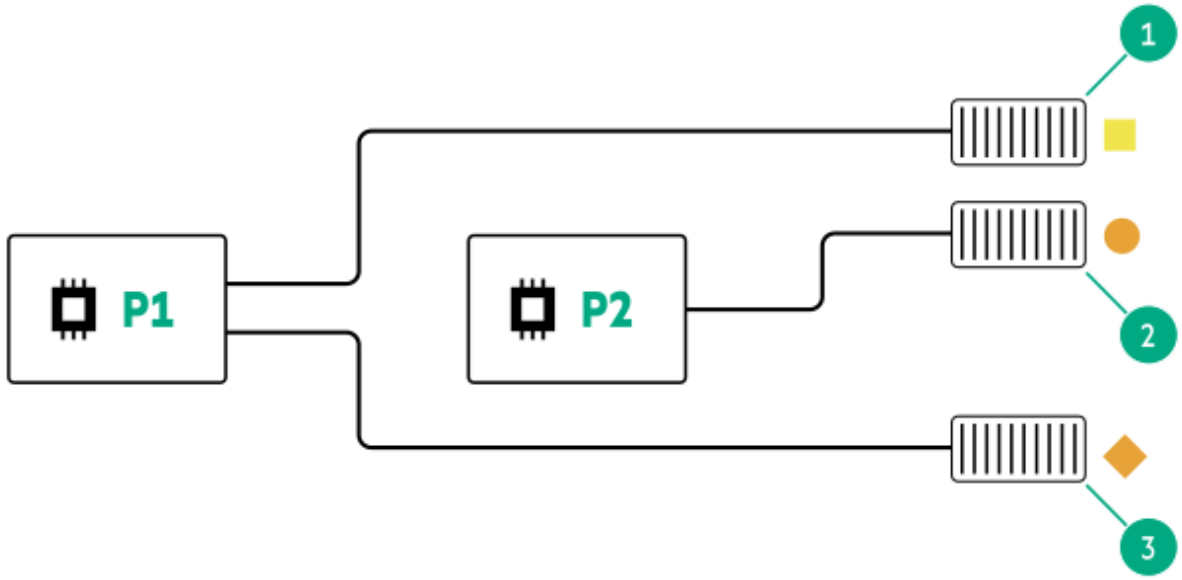
Subtopics

Half-height compute module mezzanine connector definitions

Half-height compute module mezzanine connector definitions

NOTE

The compute module hood label includes the exact mezzanine card locations.



Item	Mezz slot connector identification	Supported card types	Fabric	Interconnect bay sets
1	Mezzanine slot 1 (M1)	Type C and Type D	1	ICM 1 and 4
2	Mezzanine slot 2 (M2) [1]	Type C and Type D	2	ICM 2 and 5
3	Mezzanine slot 3 (M3)	Type C only	3	ICM 3 and 6

[1] When installing a mezzanine option in mezzanine slot 2, processor 2 must be installed.

HPE Synergy Ethernet modules with supported cables and transceivers

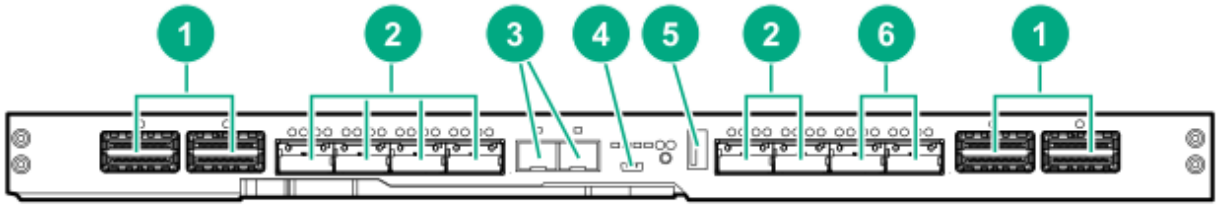
NOTE

When using a transceiver with a cable to connect HPE Synergy components, you are not required to use the same transceiver on each end of the same cable.

Subtopics

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
HPE Synergy 25/50Gb Interconnect Link Module
HPE Synergy 20Gb Interconnect Link Module
Mellanox SH2200 Switch Module for HPE Synergy
HPE Synergy 10Gb Pass-Thru Module

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy



PN: 867796-B21

QuickSpecs: **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00067745enw**

The HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy is also known as the 100Gb VC primary module.

Item	Description
1	300Gb CXP Interconnect Link ports (4) L1 – L4
2	QSFP28 Uplink port connectors (6) Q1 – Q6

Item	Description
3	10Gb SFP+ uplink ports (2) X1 – X2 [1] For HPE Synergy Image Streamer.
4	Reserved
5	Reserved
6	QSFP28 interconnect module Cluster port connectors (2) Q7 – Q8
7	25/50 Gb Downlink port connectors (12) Not shown – Located on the rear of the interconnect module.

[1] X1 and X2 ports can be used as Ethernet uplinks with the SFP+ (10Gbps) and SFP 1 (Gbps) transceivers and cables

HPE Synergy 32Gb Fibre Channel Upgrade LTU (PN R3P67A) (one per interconnect module) is required to use native 32Gb Fibre Channel ports on an HPE Virtual Connect SE 100Gb F32 Module with HPE StoreFabric 4x32Gb FC / 4x25GbE QSFP28 transceivers or 32Gb FC SFP+ transceivers.

HPE Flat SAN technology (storage Direct Attach to the VC module) 8/16Gb supported with all HPE 3PAR StoreServ Storage arrays and Nimble FC storage.

Downlink ports

Twelve 25Gb/50Gb Ethernet internal downlinks to compute module CNAs.

- Support for HPE Synergy 25Gb/50Gb CNA mezzanines.
- Each downlink port supports up to 7 FlexNICs and 1 FlexHBA or 8 FlexNICs.
- The compute module recognizes each FlexNIC and FlexHBA as a PCIe “Physical Function” device with the following:
  - Adjustable bandwidth allocation in 1% increments from 250 Mb to 25 Gb (on 25 Gb CNA) in 250 Mb increments.
  - Adjustable bandwidth allocation from 500 Mb to 50 Gb (on 50 Gb CNA) in 500 Mb increments.
- Each FlexHBA can be configured to transport either Fiber Channel over Ethernet/CEE or Accelerated iSCSI protocol.

Interconnect link ports

Four 300Gb CXP port connectors to the HPE Synergy 25/50 Gb Interconnect Link Modules.

Supports Active Optical Cables (AOC) and Direct Attach Copper (DAC) cables.

Uplink port connectors

Six QSFP28 connectors for external uplink to Local Area Networks and/or SAN.

Two QSFP28 connectors for using as stacking ports to another HPE Virtual Connect SE 100Gb F32 Module.

- Supports the following:
  - 40Gb SR/LR QSFP+ transceivers and 100Gb SR/LR QSFP28 transceivers
  - 40Gb and 100Gb QSFP Bidirectional transceivers
  - 40GbE/4x10GbE/4x8GbFC and 4x32Gb FC / 4x25GbE QSFP28 QSFP transceivers
- Supports the following:
  - 40Gb QFSP+/100Gb QSFP28 AOC and DAC cables
  - 40Gb QSFP+ /100Gb QSFP28 to 4x10Gb SFP+/25Gb SFP28 DAC Splitter cables
- With QSFP28 to SFP28 Adapter supports the following:
  - 10/25Gb SFP SR and LR transceivers
  - 10GBase-T SFP+ transceivers
  - 8/16/32Gb FC SFP transceivers
  - 10/25Gb SFP AOC and DAC cables
- QSFP+ transceiver supports MPO-to-MPO and MPO-to-4xLC Fiber Optic cables.
- SFP transceivers support LC-to-LC OM3 and OM4 Fiber Optic cables.

- Depending on QSFP28 transceiver or cable, the QSFP28 uplinks are configurable as one of the following when connecting to external LAN/SAN switches:

  NOTE

  Since the maximum bandwidth of any QSFP28 port is 100Gbps, when 4 x 32Gbps Fibre Channel connections are used, each of the Fibre Channel connections signals for 32Gbps speed and setup but is limited to only 25Gbps bandwidth for that connection.

  NOTE

  If a full 32Gbps bandwidth is required for any QSFP28 port, then an HPE QSFP28/SFP28 adapter with a 32Gbps FC transceiver will populate the QSFP28 port. In addition, the user must provision the uplink as a single (1:1) uplink port to achieve the full 32Gbps for FC. If the port is configured in a 4:1 mode, then the port will be divided into 4 lanes with only 1 lane enabled and will only achieve 25Gbps speed.

  - 1 x 100Gb Ethernet ports
  - 4 x 25Gb Ethernet ports
  - 1 x 40Gb Ethernet ports
  - 4 x 10Gb Ethernet ports
  - 4 x 32Gb FC ports
  - 4 x 16Gb FC ports
  - 4 x 8Gb FC ports
  - 1 x 32Gb FC ports
  - 1 x 16Gb FC ports
  - 1 x 8Gb FC ports

Subtopics

Transceivers and cables for the HPE Virtual Connect SE 100Gb F32 Module
HPE Synergy Fabric compatibility and coexistence across generations
HPE Synergy Virtual Connect 100Gb F32 Module enhancements
HPE Virtual Connect SE 100Gb F32 Module supported configurations/topologies

Transceivers and cables for the HPE Virtual Connect SE 100Gb F32 Module

Subtopics

Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
QSFP28 transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
QSFP28 cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
QSFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
QSFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
QSFP28 to SFP28 adapter for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
SFP28 and SFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
SFP transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
SFP28 and SFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
MPO Fiber Optic cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

These CXP28 interconnect link cables connect only the HPE Synergy 100Gb F32 Module (primary) and the HPE Synergy 25/50Gb Interconnect Link Module (satellite).

HPE Synergy 300 Gb Interconnect Link Direct Attach Copper (DAC) cables (CXP28 to CXP28)



Description	Part number
HPE SY 300 Gb Interconnect Link 2.1 m DAC cable	876680-B21

HPE Synergy 300 Gb Interconnect Link Active Optical Cables (AOC) (CXP28 to CXP28)



Description	Part number	Note
HPE SY 300 Gb Interconnect Link 3 m AOC	876689-B21	The following 3 SKUs all comply with the Low Smoke Zero Halogen (LSZH) standard and refer to the behavior of chemical compounds when combusted - specifically the quantity of smoke generated and the toxicity of the emissions.
HPE SY 300 Gb Interconnect Link 5 m AOC	876692-B21	
HPE SY 300 Gb Interconnect Link 15 m AOC	876698-B21	
HPE SY 300 Gb Interconnect Link 3 m Pl AOC	P64635-B21	The following 3 SKUs are all Plenum-Rated referring to its special insulation that has low smoke and low flame characteristics.
HPE SY 300 Gb Interconnect Link 5 m Pl AOC	P64638-B21	
HPESY 300 Gb Interconnect Link 15 m Pl AOC	P64641-B21	

Since the Plenum-Rated cables are newer, they require a minimum version of OneView and a minimum firmware version on the modules that they are connecting --- VC 100Gb F32 Switch module and the 50G ICM Satellite module.

- Use HPE OneView 9.0 or higher

- The HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy must have firmware 2.7.0 or higher.
- The HPE Synergy 50Gb Interconnect Link Module with Spare Part Number 879437-001 or P02747-001 must have firmware 1.2.1.0 or higher.
- The HPE Synergy 50Gb Interconnect Link Module with Spare Part Number P57815-001 or P57838-001 must have firmware 2.0.2.0 or higher.
- The firmware versions for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy and the HPE Synergy 50Gb Interconnect Link Module are part of the SSP SY2024.07.01.

CAUTION

If non-supported firmware is used with Plenum cables, creation of the Logical Enclosure will fail. Customers must upgrade all firmware on connecting modules before installing the Plenum-Rated cables.

For more information, see the product QuickSpecs on the **Quickspec website**.

QSFP28 transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

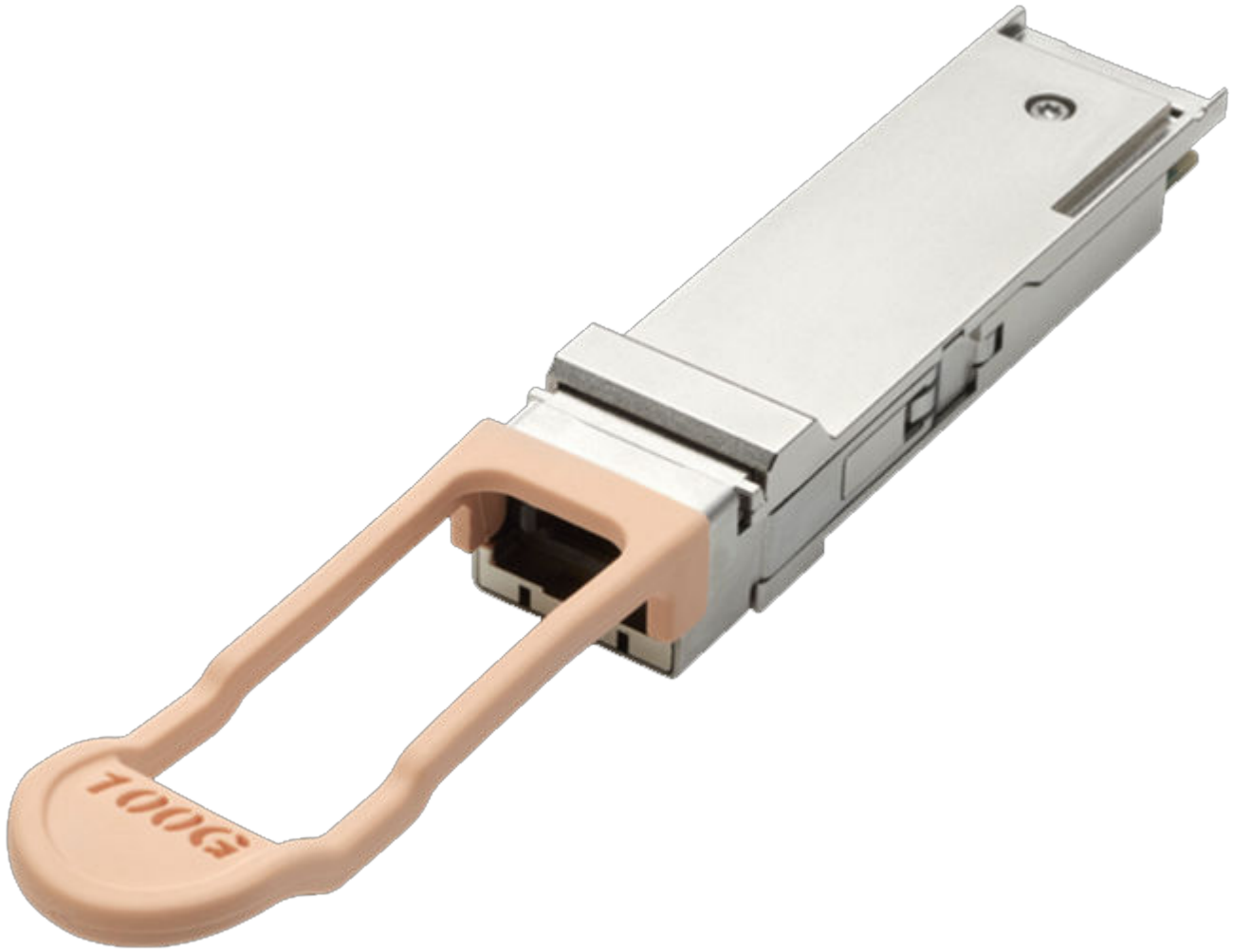
IMPORTANT

When stacking two HPE VC SE 100Gb F32 Modules, the following cabling options are supported:

- QSFP28 to QSFP28 DAC cables
- QSFP28 to QSFP28 AOCs
- SR4 and LR4 transceivers with Fibre Optic cables

HPE 100 Gb QSFP28 MPO SR4/eSR4 transceivers (Ethernet only)

Medium-distance connection to 100 G switches.



Description	Part number
HPE 100 Gb QSFP28 MPO SR4 100 m Transceiver [1]	845966-B21

[1] This transceiver is supported for use when stacking two HPE VC SE 100Gb F32 Modules.

100 Gb QSFP28 transceivers (Ethernet only)

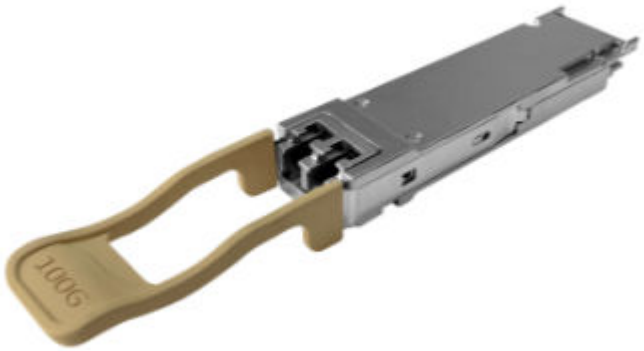


Description	Part number
HPE X150 100 G QSFP28 MPO PSM4 500 m SM Transceiver (4 pairs)	JH420A
HPE X150 100 G QSFP28 LC CWDM4 2 km SM Transceiver	JH673A
HPE 100 Gb QSFP28 SWDM4 2 km SM Transceiver	JH419A
Aruba 100 G QSFP28 LC LR4 SMF SM Transceiver [1]	JL310A

[1] This transceiver is supported for use when stacking two HPE VC SE 100Gb F32 Modules.

100 Gb QSFP28 Bidirectional transceivers (Ethernet only)

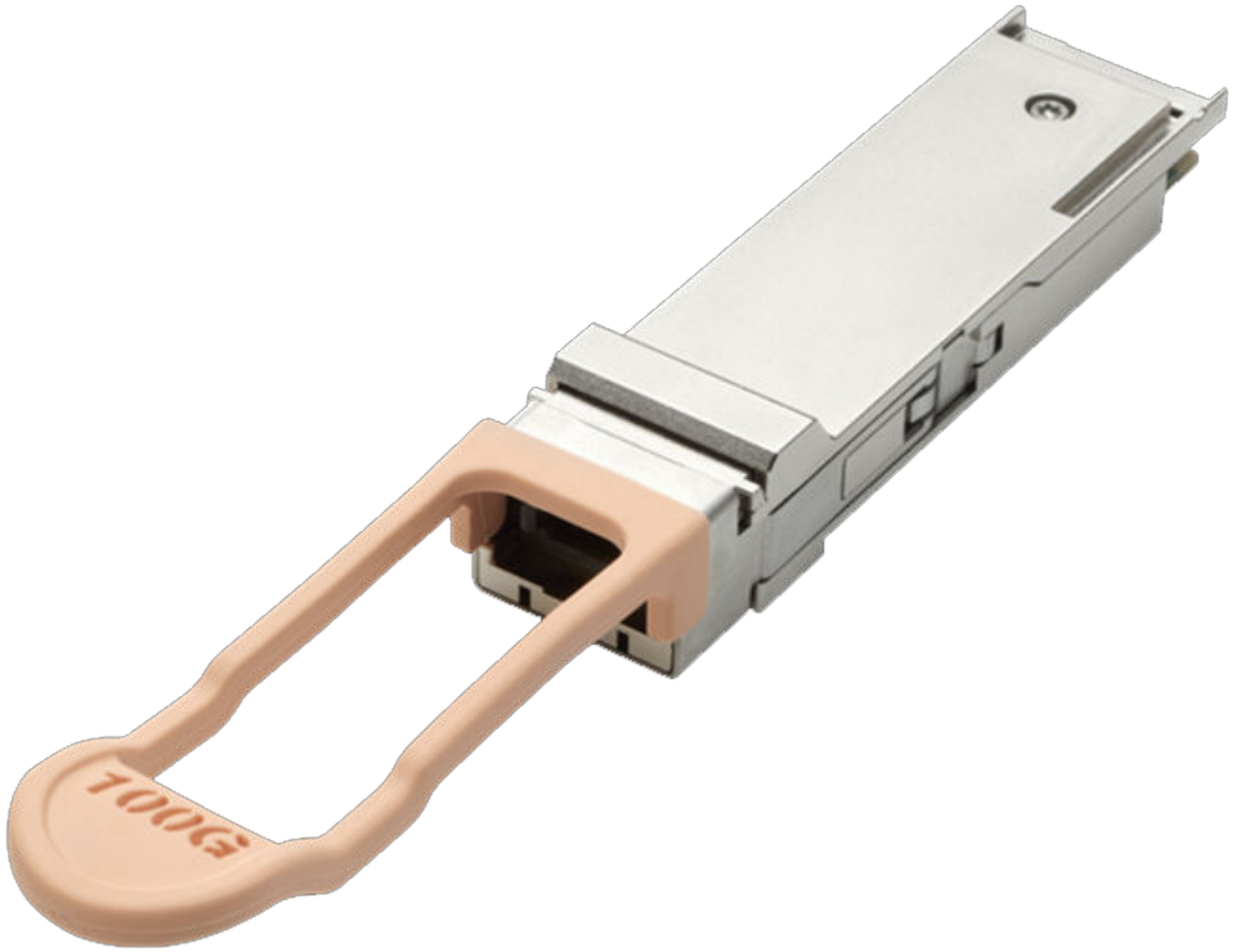
This transceiver is used to connect northbound out of the Synergy VC module to another BiDirectional transceiver of the same generation most likely in a Top of Rack (ToR) switch.



Description	Part number
HPE 100Gb QSFP28 SR1.2 LC MMF 100m Bidirectional Transceiver	P90358-B21

100 Gb QSFP28 transceivers (Ethernet only)

40 Gb or 4x10 Gb connections are not supported. Instead, use PN 817040-B21.



Description	Part number
HPE Synergy 100 GbE/2x25 GbE/4x32 Gb FC QSFP28 transceiver (100 m OM4)	882251-B21

NOTE
Mixing of Ethernet and Fibre Channel port types is not supported.

QSFP28 cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

HPE 100 Gb QSFP28 to QSFP28 Direct Attach Copper (DAC) cables

Can be used for primary module stacking.



Description	Part number
HPE 100 Gb QSFP28 to QSFP28 1 m DAC cable (obsolete)	845404-B21
HPE 100 Gb QSFP28 to QSFP28 3 m DAC cable	845406-B21
HPE 100 Gb QSFP28 to QSFP28 5 m DAC cable	845408-B21

HPE 100 Gb QSFP28 to QSFP28 Active Optical Cables (AOC)

Can be used for primary module stacking.



Description	Part number
HPE 100 Gb QSFP28 to QSFP28 7 m AOC	845410-B21
HPE 100 Gb QSFP28 to QSFP28 10 m AOC (obsolete)	845412-B21
HPE 100 Gb QSFP28 to QSFP28 15 m AOC	845414-B21

HPE 100 Gb QSFP28 to 4x25Gb SFP28 Direct Attach Copper (DAC) cables



Description	Part number
HPE 100 Gb QSFP28 to 4x25Gb SFP28 3 m DAC cable	845416-B21
HPE 100 Gb QSFP28 to 4x25Gb SFP28 5 m DAC cable (obsolete)	845418-B21

HPE 100 Gb QSFP28 to 4x25Gb SFP28 Active Optical Cables (AOC)

Short-distance connection to 100 G and 25 G switches.



Description	Part number
HPE 100 Gb QSFP28 to 4x25 Gb SFP28 7 m AOC	845420-B21
HPE 100 Gb QSFP28 to 4x25 Gb SFP28 10 m AOC (obsolete)	845422-B21
HPE 100 Gb QSFP28 to 4x25 Gb SFP28 15 m AOC	845424-B21

QSFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

Medium- and long-distance connection to 40 G switches.

QSFP+ short range transceivers



Description	Part number
HPE BladeSystem c-Class 40 Gb QSFP+ MPO SR4 100 m Transceiver	720187-B21
HPE BladeSystem c-Class 40 Gb QSFP+ MPO SR4 300 m Transceiver (obsolete)	747698-B21

QSFP+ long range transceivers



Description	Part number
HPE X140 40 G QSFP+ LC LR4 SM 10 km 1310 nm Transceiver	JG661A

QSFP+ bidirectional transceivers

Use QSFP 40 G bidirectional short-reach transceiver QSFP- 40 G SR BiDi at the Cisco Nexus side.



Description	Part number
HPE 40 Gb QSFP+ Bidirectional Transceiver	841716-B21

Ethernet or Fibre Channel (FC) QSFP+ transceivers

NOTE
Mixing of Ethernet and Fibre Channel port types is not supported.



Description	Part number
HPE Synergy 40 GbE/4x 10 GbE/4x 8 Gb FC QSFP+ Transceiver	817040-B21

QSFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

40 G QSFP+ to QSFP+ Direct Attach Copper (DAC) cables



Description	Part number
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 1 m DAC cable (obsolete)	720196-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 3 m DAC cable	720199-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 5 m DAC cable	720202-B21

40 G QSFP+ to QSFP+ Active Optical Cables (AOC)



Description	Part number
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 7 m AOC (obsolete)	720205-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 10 m AOC (obsolete)	720208-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 15 m AOC	720211-B21

40 G QSFP+ to 4x 10 G SFP Direct Attach Copper (DAC) Splitter cables



Description	Part number
HPE BladeSystem c-Class 40 G QSFP+ to 4x 10 G SFP+ 3 m DAC Splitter cable	721064-B21
HPE BladeSystem c-Class 40 G QSFP+ to 4x 10 G SFP+ 5 m DAC Splitter cable	721067-B21

QSFP+ to 4x 10 G SFP+ Active Optical Splitter cables



Description	Part number
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 7 m AOC (obsolete)	721070-B21
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 10 m AOC (obsolete)	721073-B21
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 15 m AOC	721076-B21

QSFP28 to SFP28 adapter for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

This adapter is mandatory for each QSFP28 port to use the following:

- SFP28 and SFP+ transceivers
- SFP transceivers

- SFP cables

> **IMPORTANT**
> The HPE BladeSystem c-Class QSFP+ to SFP+ Adapter (PN 720193-B21) is not supported on the VC SE 100Gb F32 module.



Description	Part number
HPE QSFP28/SFP28 Adapter	845970-B21

SFP28 and SFP+ transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

The maximum speed is indicated in the description for each component.

Short Reach (SR) transceivers



Description	Part number
HPE 25 Gb SFP28 SR 100 m Transceiver	845398-B21
HPE BladeSystem c-Class 10 Gb SFP+ SR Transceiver	455883-B21

Long Reach (LR) and Extended Reach (ER) transceivers



Description	Part number
HPE BladeSystem c-Class 10 Gb SFP+ LR Transceiver	455886-B21
HPE X130 10 Gb SFP+ LC ER 40 km Transceiver	JG234A

10GBase-T SFP+ transceivers



Description	Part number
HPE 10GBase-T SFP+ Transceiver	813874-B21

Short wave (SW) transceivers

One HPE Synergy 32Gb Fibre Channel Upgrade LTU (PN R3P67A (AE)) per interconnect module is required to use these transceivers.



Description	Part number
HPE 32 Gb Short Wave Fibre Channel SFP28 1 Pack	P9H30A
HPE B-Series 32 Gb SW SFP+ Transceiver	P9H32A
HPE 16 Gb SFP+ SW 1 Pack ext Temp Transceiver	E7Y09A
HPE 16 Gb SFP+ SW 1 Pack - comm Temp Transceiver	E7Y10A

Description	Part number
HPE 8 Gb Short Wave Fibre Channel SFP+ 1 Pack	AJ718A

SFP transceivers for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

1 Gb SFP transceivers are not supported on the VC SE 100Gb F32 module.

NOTE

One QSFP28 to SFP28 Adapter (PN 845970-B21) is required for each QSFP28 port to use the following cables. The HPE BladeSystem c-Class QSFP+ to SFP+ Adapter (PN 720193-B21) is not supported with the VC SE 100Gb F32 module.

SFP28 and SFP+ cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

One QSFP28 to SFP28 Adapter (PN 845970-B21) is required for each QSFP28 port to use the following cables.

The HPE BladeSystem c-Class QSFP+ to SFP+ Adapter (PN 720193-B21) is not supported.

SFP28 to SFP28 Direct Attach cables (DAC)



Description	Part number
HPE 25 Gb SFP28 to SFP28 1 m DAC (obsolete)	844474-B21

SFP28 to SFP28 Active Optical Cable (AOC)



Description	Part number
HPE 25 Gb SFP28 to SFP28 7 m AOC	844483-B21

SFP+ to SFP+ Direct Attach cables (DAC)



Description	Part number
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 0.5 m DAC cable (obsolete)	487649-B21
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 1 m DAC cable (obsolete)	487652-B21
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 3 m DAC Ccable	487655-B21
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 5 m DAC cable	537963-B21

SFP+ to SFP+ Active Copper Direct Attach (DAC) cables



Description	Part number
HPE B-series SFP+ to SFP+ Active Copper 1 m DAC cable	AP818A

Description	Part number
HPE B-series SFP+ to SFP+ Active Copper 3 m DAC cable	AP819A
HPE B-series SFP+ to SFP+ Active Copper 5 m DAC cable	AP820A

Passive Copper SFP+ cables



Description	Part number
HPE StoreFabric C-series 3 M Passive Copper SFP+ Cable	K2Q21A
HPE StoreFabric C-series 5 M Passive Copper SFP+ Cable	K2Q22A

SFP+ to SFP+ Active Copper Direct Attach (DAC) cables



Description	Part number
HPE C-series SFP+ to SFP+ Active Copper 7 m DAC cable	QK701A
HPE C-series SFP+ to SFP+ Active Copper 10 m DAC cable	QK702A

MPO Fiber Optic cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

MPO Fiber Optic cables

For a list of the MPO Fiber Optic cables supported with this interconnect module, see MPO Fiber Optic cables.

LC to LC Fiber cables

For a list of the LC to LC Fiber cables supported with this interconnect module, see LC-LC Fiber Optic cables.

HPE Synergy Fabric compatibility and coexistence across generations

Primary/Satellite architecture compatibility

	10 Gb interconnect link module	20 Gb interconnect link module	25/50 Gb interconnect link module
VC SE 40 Gb F8 Module	Yes	Yes	No
VC SE 100 Gb F32 Module	No	No	Yes

Compute module – adapter support compatibility

	2820C/ 3820C	4820C	6810C	6820C	6410C	4610C
Compute GenX	Gen9/ Gen10	Gen10	Gen9/ Gen10	Gen10	Gen9/ Gen10	Gen10
VC SE 40Gb F8 Module	Yes (10/20Gb)	Yes (10/20Gb)	No (25/50Gb)	No (25/50Gb)	No (25/50Gb)	No (10/25Gb)
VC SE 100Gb F32 Module	No (10/20Gb)	Yes (25Gb)	No (25/50Gb)	Yes (25/50Gb)	No (25/50Gb)	No (10/25Gb) [1]

[1] Potential support in a future release.

HPE Synergy Fabric coexistence

HPE Virtual Connect SE 40Gb F8 Modules and HPE Virtual Connect SE 100Gb F32 Modules:

- Cannot coexist in the same HPE Synergy Logical Enclosure.
- Cannot be connected to the same set of compute modules.

Example:

- VC SE 40 Gb F8 Module in interconnect bays 3 and 6 connecting to compute module mezzanine 3.
- VC SE 100 Gb F32 Module in interconnect bays 2 and 5 connecting to compute module mezzanine 2.

The VC SE 100 Gb F32 Module is not supported with any Gen9 compute modules.

HPE Synergy Virtual Connect 100Gb F32 Module enhancements

Forward Error Correction (FEC)

Forward error correction (FEC) is a digital signal processing technique used to correct errors and protect data integrity.

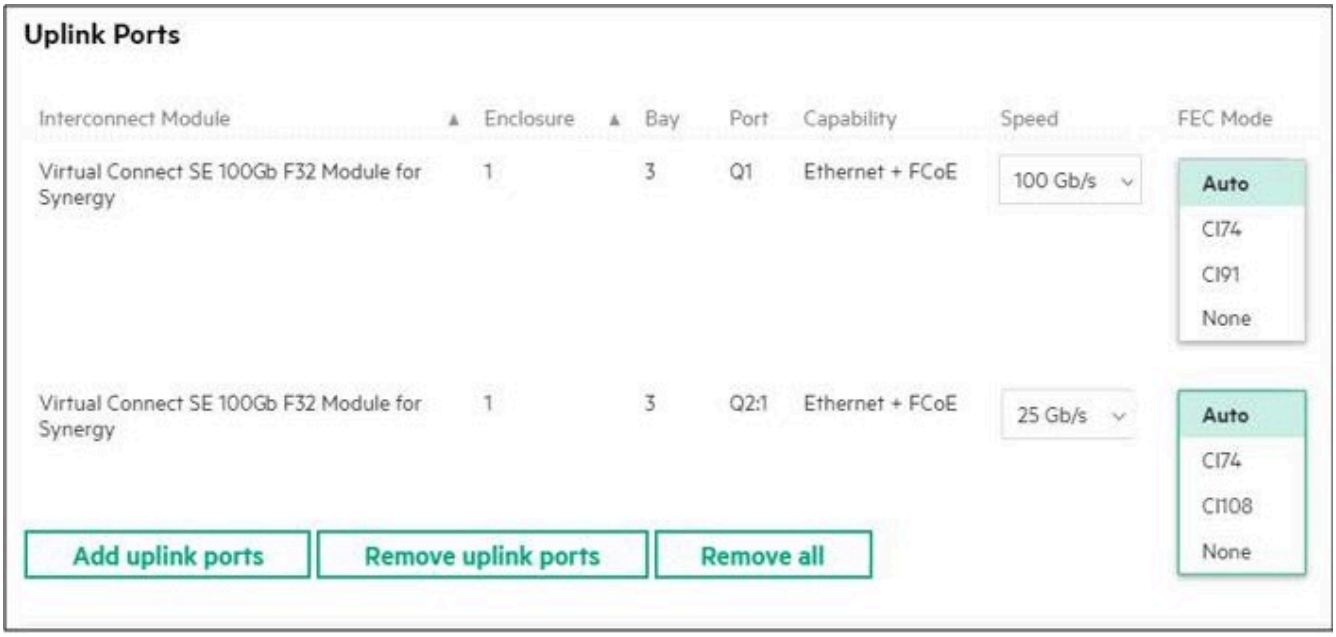
There are two types of FECs:

- FireCode FEC
- Reed-Solomon FEC

The HPE Virtual Connect 100Gb F32 Module supports RS-FEC for Ethernet ports only, which also works with Cisco and Arista. FEC is disabled for the FC ports and downlinks.

For 25 Gb/100 Gb speeds, FEC is recommended, but auto-negotiation is also available.

- @100 G, FEC can be AUTO, None, or CL91/CL74.
- @40 G, no FEC.
- @25 G, FEC can be AUTO, None, or CL108/CL74.
- @10 G, no FEC.



Expected behaviors for unsplit uplink ports

Speed	FEC	Expected behavior
AUTO	AUTO	Copper DACs—AutoNeg and CL91 are enabled. SR4—No AutoNeg, FEC CL91 is enabled. LR4—No AutoNeg, no FEC.
AUTO	None	Copper DACs—AutoNeg is enabled, no FEC. SR4—No AutoNeg, no FEC. LR4—No AutoNeg, no FEC.
100 G	AUTO/ None CL91/ CL74	Fixed 100 G mode, no AutoNeg. In AUTO FEC mode, CL91 is enabled.
40 G	None	Fixed 40 G mode, no AutoNeg. FEC is not applicable to 40G speed.

Speed	FEC	Expected behavior
AUTO	AUTO	Copper DACs—AutoNeg and CL108 are enabled. SR—No AutoNeg, FEC CL108 is enabled.

Speed	FEC	Expected behavior
		LR—No AutoNeg, no FEC.
AUTO	None	Copper DACs—AutoNeg is enabled, no FEC. SR—No AutoNeg, no FEC. LR—No AutoNeg, no FEC.
25 G	AUTO/ None CL108/ CL74	Fixed 25 G mode, no AutoNeg. In AUTO FEC mode, CL108 is enabled.
10 G	None	Fixed 10 G mode, no AutoNeg. FEC is not applicable to 10 G speed.

Expected link states when two devices are configured with different FEC configuration values

FEC (Device 1)	FEC (Device 2)	Link state
AUTO	OFF	Down
OFF	OFF	Up
CL91	CL91	Up
CL91	CL74	Down
CL74	CL74	Up
CL108	CL74	Down

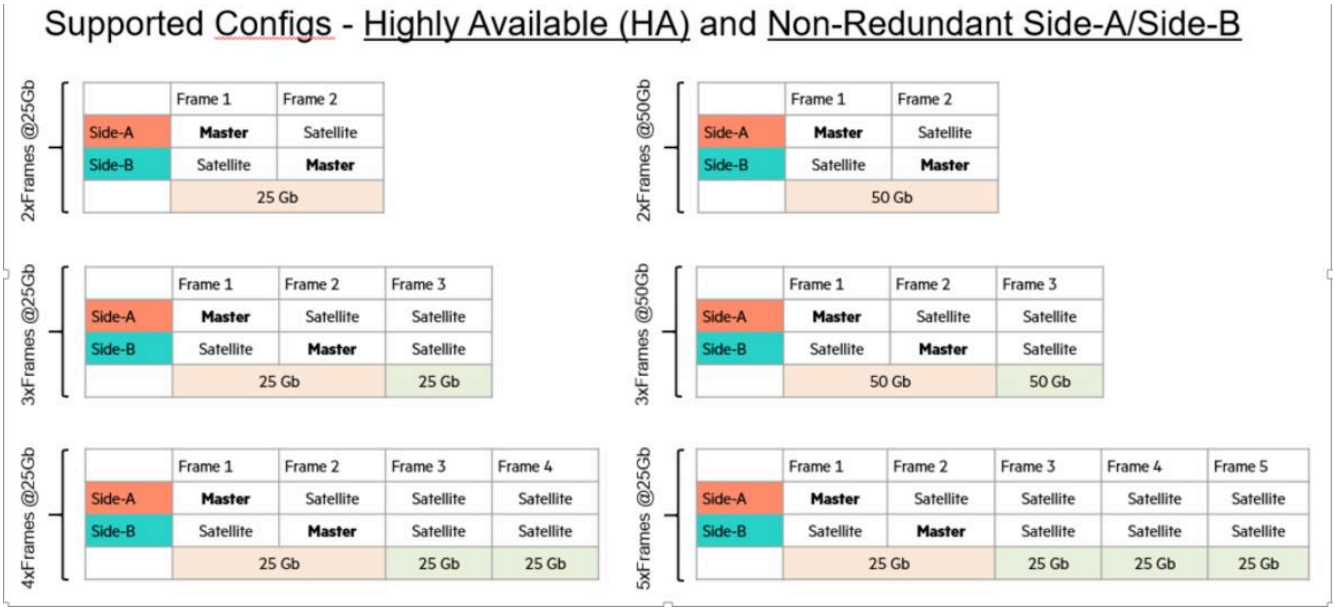
FEC (Device 1)	FEC (Device 2)	Link state
CL108	CL108	Up

NOTE

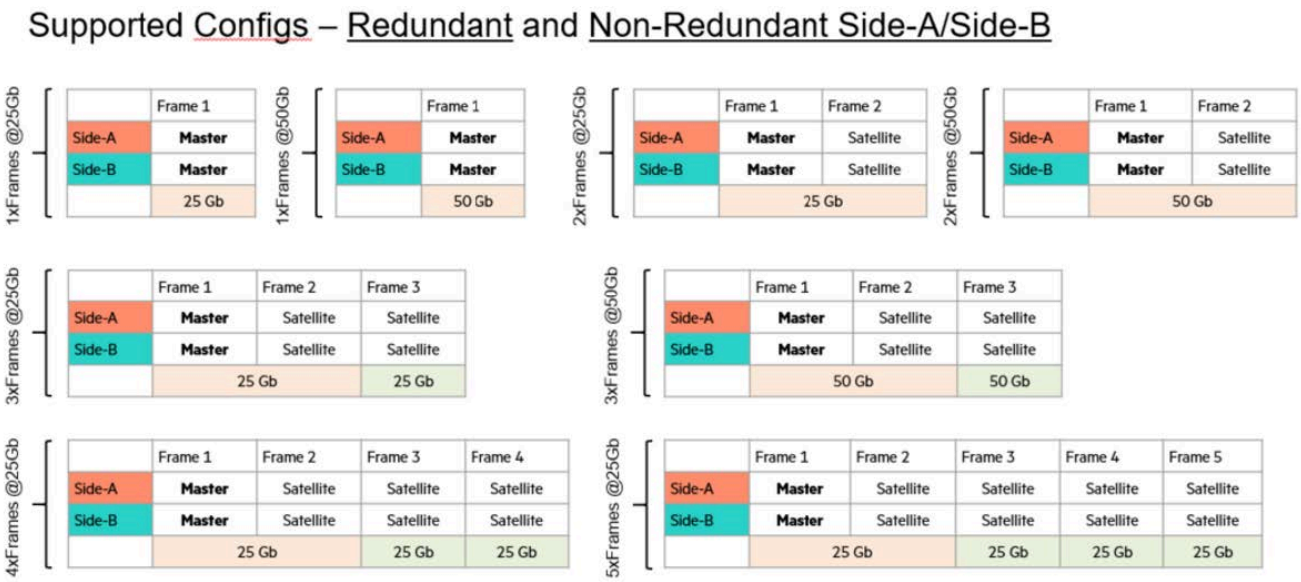
- The FEC must match on both ends for the ports to link up.
- The FEC is implemented at the PHY/MAC level. There is no way to know that "FEC mismatch" is causing the ports to not link up. Customers must pay attention to this configuration detail.
- FEC introduces an ignorable amount of latency (a few ns).
- For 100 G, CL91 (RS-FEC) is mandatory. Both link partners are expected to run the same mode. If the partner switch does not support CL91, set to NONE on HPE Synergy.
- For both 25 G and 100 G speeds, FEC is recommended. Without FEC, the customer might see bit errors.

HPE Virtual Connect SE 100Gb F32 Module supported configurations/topologies

Highly available (HA) and non-redundant Side-A/Side-B



Redundant and non-redundant Side-A/Side-B



HPE Synergy 25/50Gb Interconnect Link Module



PN: 867793-B21

QuickSpecs: **http://h20195.www2.hpe.com/v2/redirect.aspx?/products/quickspecs/16429_div/16429_div.PDF**

The HPE Synergy 25/50Gb Interconnect Link Module for HPE Synergy is also known as the 25/50Gb satellite module. The interconnect module has two 300Gb CXP (12 x 25Gb) Interconnect Link port connectors on the front (shown). On the rear of the interconnect module, there are twelve 25/50Gb Downlink ports (not shown).

Downlink ports

- Twelve 25/50Gb Ethernet internal downlinks to compute module CNAs.
- Supports HPE Synergy 25Gb/50Gb CNA mezzanines.

- If the Interconnect Link Module (satellite) is connected to an HPE Virtual Connect SE 100GB F32 Module:
  - Each downlink supports up to 7 FlexNICs and 1 FlexHBA, or 8 FlexNICs.
  - The compute module recognizes each FlexNIC and FlexHBA as a PCIe “Physical Function” device with adjustable speeds from 100 Mb to 20 Gb in 100 Mb increments.
  - Each FlexHBA can be configured to transport either Fiber Channel over Ethernet/ CEE or Accelerated iSCSI protocol.

Interconnect link ports

Two 300Gb CXP port connectors to an HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy.

Supports Active Optical Cables (AOC) and Direct Attach Copper (DAC) CXP cables.

Subtopics

Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

Interconnect Link Cables for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

These CXP28 interconnect link cables connect only the HPE Synergy 100Gb F32 Module (primary) and the HPE Synergy 25/50Gb Interconnect Link Module (satellite).

HPE Synergy 300 Gb Interconnect Link Direct Attach Copper (DAC) cables (CXP28 to CXP28)



Description	Part number
HPE SY 300 Gb Interconnect Link 2.1 m DAC cable	876680-B21

HPE Synergy 300 Gb Interconnect Link Active Optical Cables (AOC) (CXP28 to CXP28)



Description	Part number	Note
HPE SY 300 Gb Interconnect Link 3 m AOC	876689-B21	The following 3 SKUs all comply with the Low Smoke Zero Halogen (LSZH) standard and refer to the behavior of chemical compounds when combusted - specifically the quantity of smoke generated and the toxicity of the emissions.
HPE SY 300 Gb Interconnect Link 5 m AOC	876692-B21	
HPE SY 300 Gb Interconnect Link 15 m AOC	876698-B21	
HPE SY 300 Gb Interconnect Link 3 m Pl AOC	P64635-B21	The following 3 SKUs are all Plenum-Rated referring to its special insulation that has low smoke and low flame characteristics.
HPE SY 300 Gb Interconnect Link 5 m Pl AOC	P64638-B21	
HPESY 300 Gb Interconnect Link 15 m Pl AOC	P64641-B21	

Since the Plenum-Rated cables are newer, they require a minimum version of OneView and a minimum firmware version on the modules that they are connecting --- VC 100Gb F32 Switch module and the 50G ICM Satellite module.

- Use HPE OneView 9.0 or higher
- The HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy must have firmware 2.7.0 or higher.
- The HPE Synergy 50Gb Interconnect Link Module with Spare Part Number 879437-001 or P02747-001 must have firmware 1.2.1.0 or higher.

- The HPE Synergy 50Gb Interconnect Link Module with Spare Part Number P57815-001 or P57838-001 must have firmware 2.0.2.0 or higher.
- The firmware versions for the HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy and the HPE Synergy 50Gb Interconnect Link Module are part of the SSP SY2024.07.01.

> **CAUTION**
> If non-supported firmware is used with Plenum cables, creation of the Logical Enclosure will fail. Customers must upgrade all firmware on connecting modules before installing the Plenum-Rated cables.

For more information, see the product QuickSpecs on the **Quickspec website**.

HPE Synergy 20Gb Interconnect Link Module



PN: 779218-B21

TAA PN: 779218-B22

QuickSpecs: **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=c04815119**

The HPE Synergy 20Gb Interconnect Link Module is also known as the 20G satellite module. The interconnect module has two 120Gb CXP Interconnect Link port connectors on the front (shown). On the rear of the interconnect module, there are twelve 20Gb Downlink ports (not shown).

Downlink ports

- Twelve 20Gb Ethernet internal downlinks to compute module CNAs.
- Support for HPE Synergy 20Gb CNA mezzanines.
- If the satellite module is connected to the HPE Virtual Connect SE 40GB F8 Module:
  - Each downlink supports up to 3 FlexNICs and 1 FlexHBA or 4 FlexNICs.
  - Each FlexNIC and FlexHBA is recognized by the compute module as a PCIe "Physical Function" device with adjustable speeds from 100 Mb to 10 Gb in 100 Mb increments.
  - Each FlexHBA can be configured to transport either Fiber Channel over Ethernet/CEE or Accelerated iSCSI protocol.
- If the satellite module is connected to an HPE Synergy 40Gb F8 Switch Module:
  - Each downlink supports one Ethernet port to the adapter.
  - CNA can be configured to transport Fiber Channel over Ethernet/CEE.

Interconnect link port

Two 120Gb CXP Interconnect Link port connectors to the HPE Virtual Connect SE 40Gb F8 Module for HPE Synergy or HPE Synergy 40Gb F8 Switch Module.

This port supports Active Optical Cables (AOC) and Direct Attach Copper (DAC) cables.

Subtopics

Interconnect link cables for HPE Synergy 10Gb and 20Gb Interconnect Link Modules

Interconnect link cables for HPE Synergy 10Gb and 20Gb Interconnect Link Modules

HPE Synergy Interconnect Link Direct Attach Copper (DAC) cables (CXP to CXP)



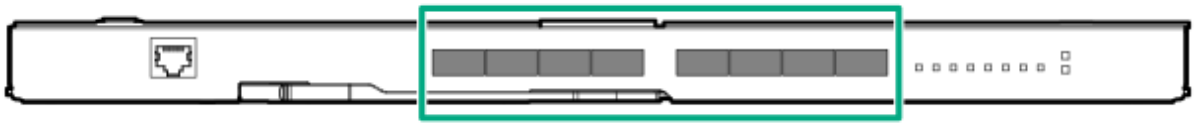
Description	Part number
HPE Synergy Interconnect Link 1.1 m DAC cable (obsolete)	804095-B21
HPE Synergy Interconnect Link 1.6 m DAC cable (obsolete)	804098-B21
HPE Synergy Interconnect Link 2.1 m DAC cable	804155-B21

HPE Synergy Interconnect Link Active Optical Cables (AOC) (CXP to CXP)



Description	Part number
HPE Synergy Interconnect Link 3 m AOC	804101-B21
HPE Synergy Interconnect Link 5 m AOC	804104-B21
HPE Synergy Interconnect Link 10 m AOC (obsolete)	804107-B21
HPE Synergy Interconnect Link 15 m AOC	804110-B21

Mellanox SH2200 Switch Module for HPE Synergy



PN: 866573-B21

QuickSpecs: **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00008519enw**

Avoid bottlenecks with I/O intense applications on a high-performance Ethernet fabric. The interconnect module has eight QSFP28 Uplink port connectors on the front (shown).

On the rear of the interconnect module, there are twelve 25/50Gb Downlink ports (not shown).

Downlink ports

- Twelve 25/50Gb Ethernet internal downlinks to compute module CNAs.
- Support for HPE Synergy 25/50Gb Ethernet adapters and CNA mezzanines.
- CNA can be configured to transport Fiber Channel over Ethernet/CEE.

Uplink ports

- Eight QSFP28 connectors for external uplink to Local Area Network.
- Supports the following:
  - 100Gb QSFP28 SR4 transceivers
  - 100Gb QSFP28 AOC and DAC cables
  - 100Gb QSFP28 to 4x25G SFP28 AOC and DAC Splitter cables
  - 40G QSFP+ MPO SR4 transceivers
  - 40G QSFP+ LC LR4 transceivers
  - 40G QSFP+ AOC
  - 40G QSFP+ to 4x10G SFP+ AOC Splitter cables
- QSFP28 and QSFP+ MPO transceivers support MPO-to-MPO and MPO-to-4xLC fiber optic cables.
- QSFP+ LC transceivers support LC-to-LC OM3 and OM4 fiber optic cables.
- Each uplink can be configured as 1x100Gb, 1x40Gb, 4x25Gb, or 4x10Gb Ethernet ports.
- Supports Data Center Bridging (DCB) and Remote Direct Memory Access over Converged Ethernet (RoCEv2).

Subtopics

Transceivers and cables

Transceivers and cables

Transceivers and cables for the Mellanox SH2200 Switch Module.

Subtopics

100Gb QSFP28 MPO SR4 and eSR4 transceivers for the Mellanox SH2200 Switch Module for HPE Synergy
QSFP28 Cables for the Mellanox SH2200 Switch Module for HPE Synergy
QSFP+ transceivers for the Mellanox SH2200 Switch Module for HPE Synergy
QSFP+ cables for the Mellanox SH2200 Switch Module for HPE Synergy
Fiber Optic cables for the Mellanox SH2200 Switch Module for HPE Synergy

100Gb QSFP28 MPO SR4 and eSR4 transceivers for the Mellanox SH2200 Switch Module for HPE Synergy

Medium-distance connection to 100 G switches.



Description	Part number
HPE 100 Gb QSFP28 MPO SR4 100 m Transceiver	845966-B21

QSFP28 Cables for the Mellanox SH2200 Switch Module for HPE Synergy

QSFP28 to QSFP28 Direct Attach Copper (DAC) cables



Description	Part number
HPE 100 Gb QSFP28 to QSFP28 0.5 m DAC cable (obsolete)	845402-B21
HPE 100 Gb QSFP28 to QSFP28 1 m DAC cable (obsolete)	845404-B21
HPE 100 Gb QSFP28 to QSFP28 3 m DAC cable	845406-B21
HPE 100 Gb QSFP28 to QSFP28 5 m DAC cable Can be used for primary module stacking.	845408-B21

QSFP28 to QSFP28 Active Optical Cables (AOC)

Can be used for primary module stacking.



Description	Part number
HPE 100 Gb QSFP28 to QSFP28 7 m AOC	845410-B21
HPE 100 Gb QSFP28 to QSFP28 10 m AOC (obsolete)	845412-B21

Description	Part number
HPE 100 Gb QSFP28 to QSFP28 15 m AOC	845414-B21

QSFP28 to 4xSFP28 Direct Attach Copper (DAC) cables



Description	Part number
HPE 100 Gb QSFP28 to 4x 25 Gb SFP28 3 m DAC cable	845416-B21
HPE 100 Gb QSFP28 to 4x 25 Gb SFP28 5 m DAC cable (obsolete)	845418-B21

QSFP28 to 4xSFP28 Active Optical Cables (AOC)

Short-distance connection to 100 G and 25 G switches.



Description	Part number
HPE 100 Gb QSFP28 to 4x 25 Gb SFP28 7 m AOC	845420-B21
HPE 100 Gb QSFP28 to 4x 25 Gb SFP28 10 m AOC (obsolete)	845422-B21
HPE 100 Gb QSFP28 to 4x 25 Gb SFP28 15 m AOC	845424-B21

QSFP+ transceivers for the Mellanox SH2200 Switch Module for HPE Synergy

QSFP+ short range transceivers

Medium- and long-distance connection to 40 G switches.



Description	Part number
HPE BladeSystem c-Class 40 Gb QSFP+ MPO SR4 100 m Transceiver	720187-B21
HPE BladeSystem c-Class 40 Gb QSFP+ MPO SR4 300 m Transceiver (obsolete)	747698-B21

QSFP+ long range transceivers



Description	Part number
HPE BladeSystem c-Class 40 Gb QSFP+ LC LR4 Transceiver (obsolete)	720190-B21

QSFP+ bidirectional (BiDi) transceivers

Use QSFP 40 G bidirectional short-reach transceiver QSFP- 40 G SR BiDi at the Cisco Nexus side.



Description	Part number
HPE 40 Gb QSFP+ Bidirectional Transceiver	841716-B21

QSFP+ cables for the Mellanox SH2200 Switch Module for HPE Synergy

Short-distance connection to 40 G and 10 G switches.

QSFP+ to QSFP+ Active Optical Cables (AOC)



Description	Part number
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 7 m AOC (obsolete)	720205-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 10 m AOC (obsolete)	720208-B21
HPE BladeSystem c-Class 40 G QSFP+ to QSFP+ 15 m AOC	720211-B21

QSFP+ to 4xSFP+ Active Optical Splitter Cables (AOC)



Description	Part number
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 7 m AOC (obsolete)	721070-B21
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 10 m AOC (obsolete)	721073-B21
HPE BladeSystem c-Class QSFP+ to 4x 10 G SFP+ 15 m AOC	721076-B21

Fiber Optic cables for the Mellanox SH2200 Switch Module for HPE Synergy

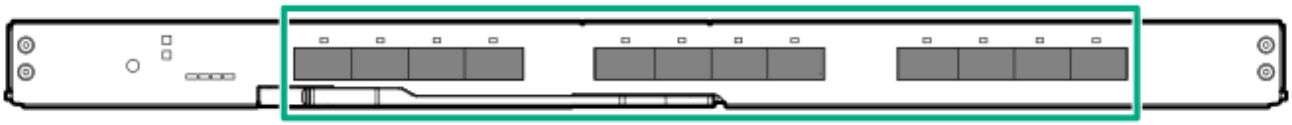
MPO Fiber Optic cables

For a list of the MPO Fiber Optic cables supported with this interconnect module, see MPO Fiber Optic cables.

LC to LC Fiber cables

For a list of the LC to LC Fiber cables supported with this interconnect module, see LC-LC Fiber Optic cables.

HPE Synergy 10Gb Pass-Thru Module



PN: 799330-B21

TAA PN: 799330-B22

QuickSpecs: **https://www.hpe.com/h20195/v2/GetPDF.aspx/c04815108.pdf**

The HPE Synergy 10Gb Pass-Thru Module has twelve QSFP+ Uplink port connectors on the front (shown). On the rear of the pass-thru module, there are twelve 10Gb Downlink ports (not shown).

Downlink ports

- Twelve 10Gb Ethernet internal downlinks to compute module CNAs.
- Support for HPE Synergy 10Gb/20Gb CNA mezzanines.
- Auto-sense 10Gb operation on a port-by-port basis.
- Supports standard Ethernet as well as Converged Enhanced Ethernet.

Uplink ports

- Twelve QSFP+ Uplink connectors for external uplink to Local Area Network Switches

- With QSFP+ to SFP+ Adapters, supports the following:
  - 10Gb SFP+ SR, LR, and 10GBase-T transceivers
  - 10Gb SFP+ DAC cables
- All QSFP+ uplinks configured as 1x10Gb Ethernet port

Subtopics

Transceivers and cables for the HPE Synergy 10Gb Pass-Thru Module

Transceivers and cables for the HPE Synergy 10Gb Pass-Thru Module

This section provides lists of transceivers and cables supported for the HPE Synergy 10Gb Pass-Thru Module.

Subtopics

QSFP+ to SFP+ adapters for the HPE Synergy 10Gb Pass-Thru Module
SFP+ transceivers for the HPE Synergy 10Gb Pass-Thru Module
SFP+ cables for the HPE Synergy 10Gb Pass-Thru Module

QSFP+ to SFP+ adapters for the HPE Synergy 10Gb Pass-Thru Module

This adapter is required for each QSFP+ port to use the following:

- SFP+ transceivers
- SFP+ cables



Description	Part number
HPE BladeSystem c-Class QSFP+ to SFP+ Adapter	720193-B21

SFP+ transceivers for the HPE Synergy 10Gb Pass-Thru Module

One QSFP+ to SFP+ Adapter (PN 720193-B21) is required for each QSFP+ port to use the transceivers in the following tables.

Short Reach (SR) transceivers

Only the HPE transceivers listed in this section are supported with the HPE 10 Gb Pass-Thru Module.



Description	Part number
HPE BladeSystem c-Class 10 Gb SFP+ SR Transceiver	455883-B21

Long Reach (LR) transceivers

Only the HPE transceivers listed in this section are supported with the HPE 10 Gb Pass-Thru Module.



Description	Part number
HPE BladeSystem c-Class 10 Gb SFP+ LR Transceiver	455886-B21

10GBase-T SFP+ transceivers

Only the HPE transceivers listed in this section are supported with the HPE 10 Gb Pass-Thru Module.



Description	Part number
HPE 10 G Base-T SFP+ Transceiver	813874-B21

SFP+ cables for the HPE Synergy 10Gb Pass-Thru Module

One QSFP+ to SFP+ Adapter (PN 720193-B21) is required for each QSFP+ port to use the transceivers in the following tables.

These cables have been tested and verified to work with the HPE 10 Gb Pass-Thru Module. However, the module will accept cables from any vendor. Hewlett Packard Enterprise does not guarantee the performance of non-Hewlett Packard Enterprise cables and users may receive a warning message through the CLI when a non-verified cable has been inserted.

> **IMPORTANT**
> Before requesting support from Hewlett Packard Enterprise, a supported HPE cable or transceiver must be used instead of a third-party cable to confirm that a cable issue is not involved.



Description	Part number
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 1 m DAC Cable (obsolete)	487652-B21

Description	Part number
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 3 m DAC Cable	487655-B21
HPE BladeSystem c-Class 10 GbE SFP+ to SFP+ 5 m DAC Cable	537963-B21

HPE Synergy Fibre Channel SAN modules with supported cables and transceivers

Subtopics

HPE Virtual Connect SE 16Gb Fibre Channel Module for HPE Synergy
HPE Virtual Connect SE 32Gb FC Module for HPE Synergy
Brocade 32Gb FC SAN Switch Module for HPE Synergy

HPE Virtual Connect SE 16Gb Fibre Channel Module for HPE Synergy



PN: P08477-B21

OLD EOL PN: 779227-B21

QuickSpecs: **https://www.hpe.com/h20195/v2/GetPDF.aspx/c04815256.pdf**

Item	Description
1	QSFP+ Uplink port connectors (4)

Item	Description
2	SFP+ Uplink port connectors (8)
3	16Gb Downlink ports (12) Not shown – The downlink ports are located on the rear of the FC module.

Downlink ports

Twelve 16Gb FC internal downlinks to compute module Fibre Channel Host Bus Adapters (HBA).

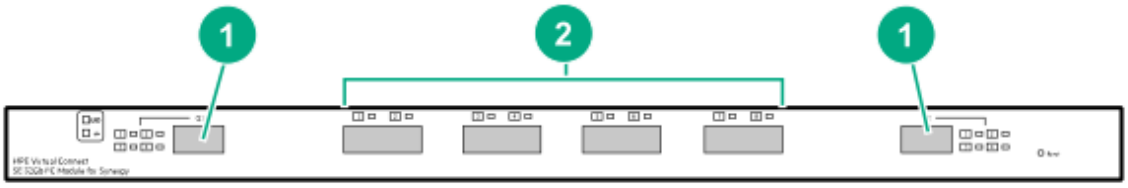
- Support for HPE Synergy 16G FC HBA Mezzanine.
- Allows up to 255 VMs running on the same compute module to access separate storage resources.
- Configured as Fabric ports (F_Port).

Uplink ports

Four QSFP+ and eight SFP+ external uplink connectors to Fibre Channel SAN switches.

- Both QSFP+ and SFP+ uplink ports are 4/8/16Gb/s auto-sensing.
- Maximum 12 x 16Gb ports are usable at the same time for uplink.
- Supports 4x16Gb QSFP+ and/or SFP+ SW laser transceivers.
- QSFP+ transceiver supports MPO-to-MPO and MPO-to-4xLC Fiber Optic cables.
- SFP+ transceivers support LC-to-LC OM3 and OM4 Fiber Optic cables.
- Configured as Node ports (N_Port).
- N_Port ID Virtualization (NPIV) HBA Aggregation are supported.

HPE Virtual Connect SE 32Gb FC Module for HPE Synergy



PN: 876259-B21

QuickSpecs: **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00059758enw**

Item	Description
1	QSFP+ Uplink port connectors (2)
2	16/32Gb SFP+ Uplink port connectors (8)
3	16/32Gb Downlink ports Not shown – Located on the rear of the FC module.

Downlink ports

Twelve 16Gb - 32Gb FC internal downlinks to compute module Fibre Channel Host Bus Adapters.

- Support for HPE Synergy 16Gb and 32Gb FC HBA mezzanines.
- Allows up to 255 VMs running on the same compute module to access separate storage resources.
- Configured as Fabric ports (F_Port).

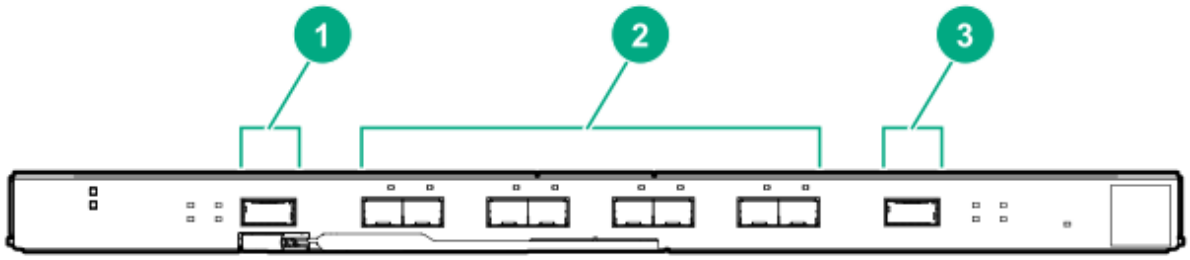
Uplink ports

Two QSFP+ and eight SFP+ external uplink connectors to Fibre Channel SAN switches.

- SFP+ uplink ports are 8/16/32 Gb/s auto-sensing.

- Maximum of twelve 32Gb ports usable at the same time for uplink.
- Supports two 16Gb - 32Gb QSFP+ and/or SFP+ SW laser transceivers.
- The QSFP+ transceivers support MPO-to-MPO and MPO-to-4xLC Fiber Optic cables.
- The SFP+ transceivers support LC-to-LC OM3 and OM4 Fiber Optic cables.
- Configured as Node ports (N_Port).
- N_Port ID Virtualization (NPIV) HBA Aggregation is supported.
- Compatible with Brocade Hardware-based Trunking Technology.
- Advanced Security features (FIPS, Trusted Root, Certificate Mgmt., and so forth).
- Port Mirroring, enhanced mapping capabilities, Advanced Telemetry.
- NVMe-oF Ready.
- NVMe and SCSI coexist in the same compute module and SAN (Needs Gen6 FC HBA).
- Two 32Gb SFP28 Short Wave Transceivers (P9H32A) included per interconnect module.

Brocade 32Gb FC SAN Switch Module for HPE Synergy



- Brocade 32Gb/12 Fibre Channel SAN Switch Module for HPE Synergy (PN Q2E55A)
- Brocade 32Gb/20 Fibre Channel SAN Switch Module for HPE Synergy (PN Q2E56A)
- Brocade 32Gb/20 PowerPack+ Fibre Channel SAN Switch Module for HPE Synergy (PN Q2E57A)

QuickSpecs: **https://h20195.www2.hpe.com/v2/getdocument.aspx?docname=a00062177enw**

Item	Description
1, 3	QSFP+ Uplink port connectors (2)
2	SFP+ Uplink port connectors (8)
4	Downlink ports (12) Not shown — Located on the rear of the interconnect module.

Downlink ports

Twelve 16Gb to 32Gb FC internal downlinks to compute module Fibre Channel Host Bus Adapters.

- Support for HPE Synergy 16Gb and 32Gb FC HBA mezzanines.
- Universal self-configuring ports, which can be configured as F_Ports (fabric enabled) or N_Ports.

Uplink ports

Two QSFP+ and 8 x SFP+ external uplink connectors to Fibre Channel SAN switches.

- Both QSFP+ and SFP+ uplink ports are 8/16/32Gb/s auto-sensing.
- Max 12 x 32Gb ports usable at the same time for uplink.
- Supports two 16Gb to 32Gb QSFP+ Short Wave (SW) transceivers and/or the following:
  - SFP+ Short Wave (SW) laser transceivers
  - SFP+ Long Wave (LW) laser transceivers
  - SFP+ Extended Long Wave (ELW) laser transceivers
- QSFP+ transceivers support MPO-to-MPO and MPO-to-4xLC Fiber Optic cables.
- SFP+ transceivers support LC-to-LC OM3 and OM4 fiber optic cables.
- NVMe-oF Ready
- ISL Trunking is supported and requires Power Pack+ or Trunking E-LTU. ISL Trunking supports up to 256Gb/s per trunk group, which requires either of the following:
  - Up to eight SFP+ ports

    - Up to two QSFP+ ports
- FC Ports can be configured as E_Port (switch mode), F_Port (Access Gateway mode), or D_Port (Diagnostic Port).
- N_Port ID Virtualization (NPIV) HBA Aggregation is also supported in Access Gateway mode.
- Two 32Gb SFP28 Short Wave Transceivers (P9H32A) included per 12-port module.
- Four 32Gb SFP28 Short Wave Transceivers (P9H32A) included per 20-port module.

Subtopics

Transceivers and cables for the HPE Virtual Connect SE 32Gb FC Module and Brocade 32Gb FC SAN Switch Module for HPE Synergy

Transceivers and cables for the HPE Virtual Connect SE 32Gb FC Module and Brocade 32Gb FC SAN Switch Module for HPE Synergy

This section provides a list of transceivers and cables for the HPE Virtual Connect SE 32Gb FC Module and the Brocade 32Gb FC SAN Switch Module.

Subtopics

QSFP+ and SFP+ transceivers for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy
MPO Fiber Optic cables for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy

QSFP+ and SFP+ transceivers for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy

QSFP+ short wave (SW) transceivers

NOTE

Only QSFP+ transceivers are supported in QSFP+ ports and only SFP+ transceivers are supported in SFP+ ports. QSFP+ to SFP+ adapters are not allowed.



Description	Part number
HPE B-series 4x 32 Gb 1-pack Short Wave QSFP Transceiver	Q2R27A
HPE B-series 4x 16 Gb SW QSFP Transceiver (requires MPO - 4xLC cable)	K2Q87A

SFP+ short wave (SW) transceivers

NOTE

Only QSFP+ transceivers are supported in QSFP+ ports and only SFP+ transceivers are supported in SFP+ ports. QSFP+ to SFP+ adapters are not allowed.



Description	Part number
HPE B-series 32 Gb SFP28 Short Wave 1-pack Transceiver	P9H32A

Description	Part number
HPE B-series 16 Gb FC SFP+ SW Transceiver	QK724A

SFP+ long wave (LW) transceivers

NOTE

Only QSFP+ transceivers are supported in QSFP+ ports and only SFP+ transceivers are supported in SFP+ ports. QSFP+ to SFP+ adapters are not allowed.

IMPORTANT

Long Wave Transceivers are not supported with HPE Virtual Connect SE 32Gb FC Module for HPE Synergy.



Description	Part number
HPE B-series 4x 32 Gb 1-pack Long Wave 2 km QSFP Transceiver	Q2R31A
HPE B-Series 32 Gb SFP28 Long Wave 1-pack Transceiver	P9H29A
HPE B-series 16 Gb FC SFP+ LW 10 km Transceiver	QK725A
HPE B-series 16 Gb FC SFP+ LW 25 km Transceiver	H6Z29A
HPE 8 Gb Long Wave B-series 10 km Fibre Channel SFP+ Transceiver	AJ717A
HPE B-series 8 Gb Extended Long Wave 25 km Fibre Channel SFP+ Transceiver	AW538A

Brocade 32 Gb Fibre Channel SAN Switch Module 8-port Upgrade E-LTU for HPE Synergy, PN Q2E58AAE.

Brocade 32 Gb Fibre Channel SAN Switch Module Power Pack+ E-LTU for HPE Synergy, PN Q2E60AAE.

MPO Fiber Optic cables for the HPE Virtual Connect SE 32Gb FC Module for HPE Synergy and Brocade 32Gb FC SAN Switch Module for HPE Synergy

MPO Fiber Optic cables

For a list of the MPO Fiber Optic cables supported with this interconnect module, see MPO Fiber Optic cables.

LC to LC Fiber cables

For a list of the LC to LC Fiber cables supported with this interconnect module, see LC-LC Fiber Optic cables.

Connection Examples

NOTE

When using a transceiver with a cable to connect HPE Synergy components, you are not required to use the same transceiver on each end of the same cable.

Subtopics

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy
HPE Synergy 100Gb primary modules cluster connection
HPE Synergy 100Gb primary module to Interconnect Link Module (satellite) connection
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) DAC/AOC
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) SW
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) LW
HPE Synergy 100Gb primary modules to LAN (Ethernet/CEE) Cu
HPE Synergy 100Gb primary modules to SAN (Fiber Channel)
Mellanox SH2200 Switch Module to 100Gb/25Gb LAN (Ethernet/CEE)
Mellanox SH2200 Switch Module to 40Gb/10Gb LAN (Ethernet/CEE)
HPE Synergy 10Gb Pass-Thru Module to 10Gb LAN (Ethernet/CEE)
HPE Synergy 16 Gb VC and Brocade 16 Gb FC modules to SAN
HPE Virtual Connect SE 32Gb Fiber Channel Module or Brocade 32Gb/24 Fiber Channel Switch Module to SAN

HPE Virtual Connect SE 100Gb F32 Module for HPE Synergy

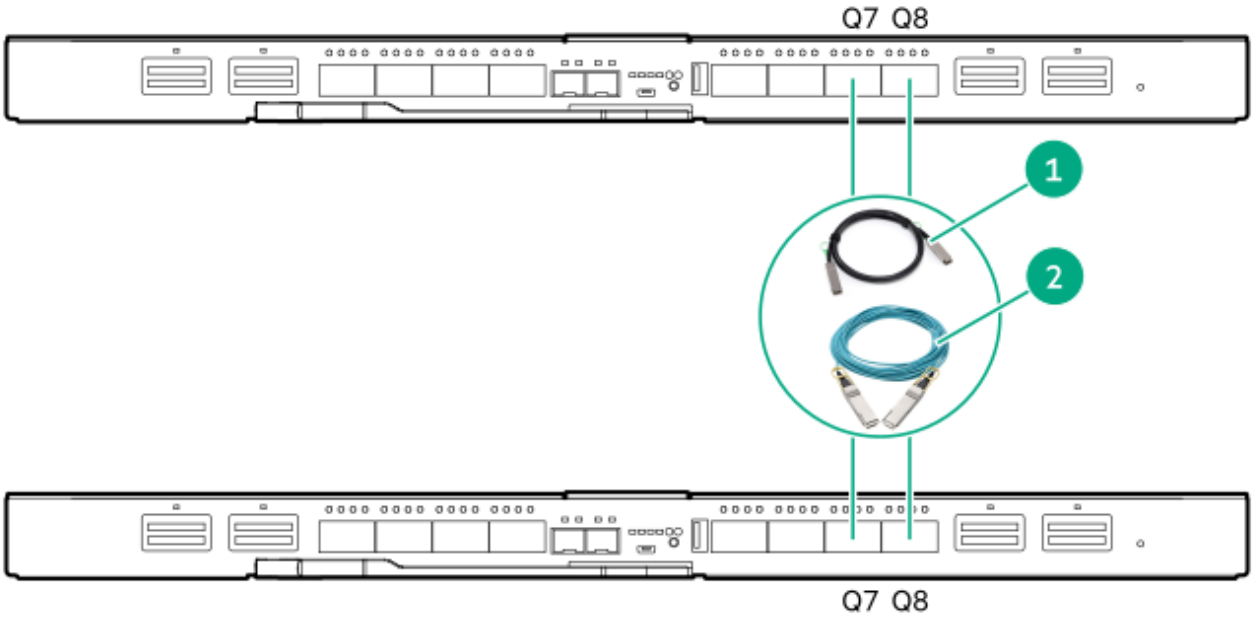
The HPE VC SE 100Gb F32 Module supports the same connection configurations as the HPE VC SE 40Gb F8 Modules in 10 Gb and 40 Gb speeds. Use the 10 Gb SFP+ or 40 Gb QSFP+ transceivers and cables in this case. For 10 Gb SFP+ transceivers, use only the QSFP28 to SFP28 Adapter (PN 845970-B21).

The 1 Gb connectivity examples are not supported with HPE VC SE 100Gb F32 Modules.

HPE Synergy 100Gb primary modules cluster connection

In a single-frame or multi-frame system, connect both primary modules:

- Connect a stacking cable from port Q7 on the first primary module to port Q7 on the second primary module.
- Connect a stacking cable from port Q8 on the first primary module to port Q8 on the second primary module.

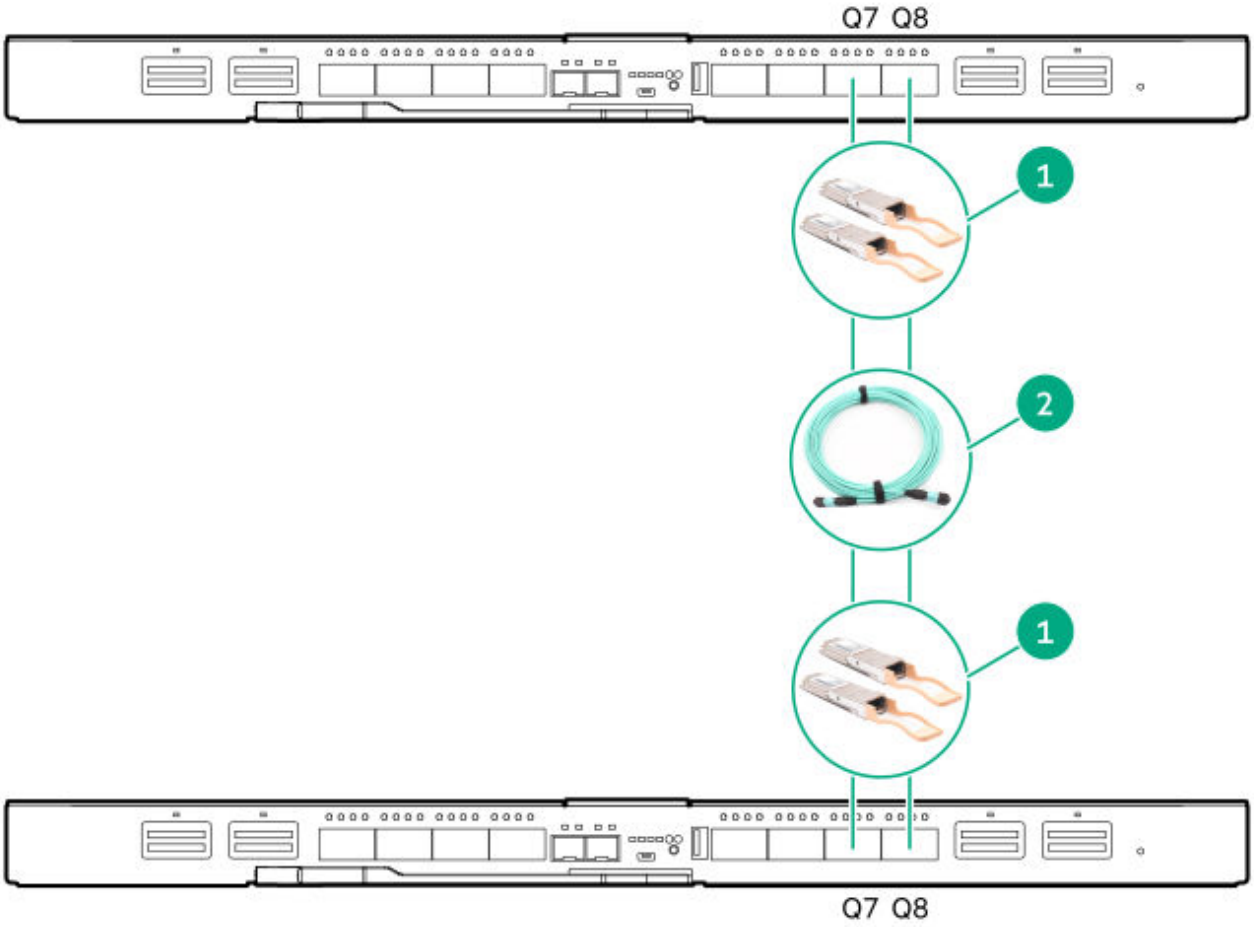


Item	Description
1	QSFP28 to QSFP28 DAC cables

Item	Description
2	QSFP28 to QSFP28 AOC

In a single-frame or multi-frame system, connect both primary modules:

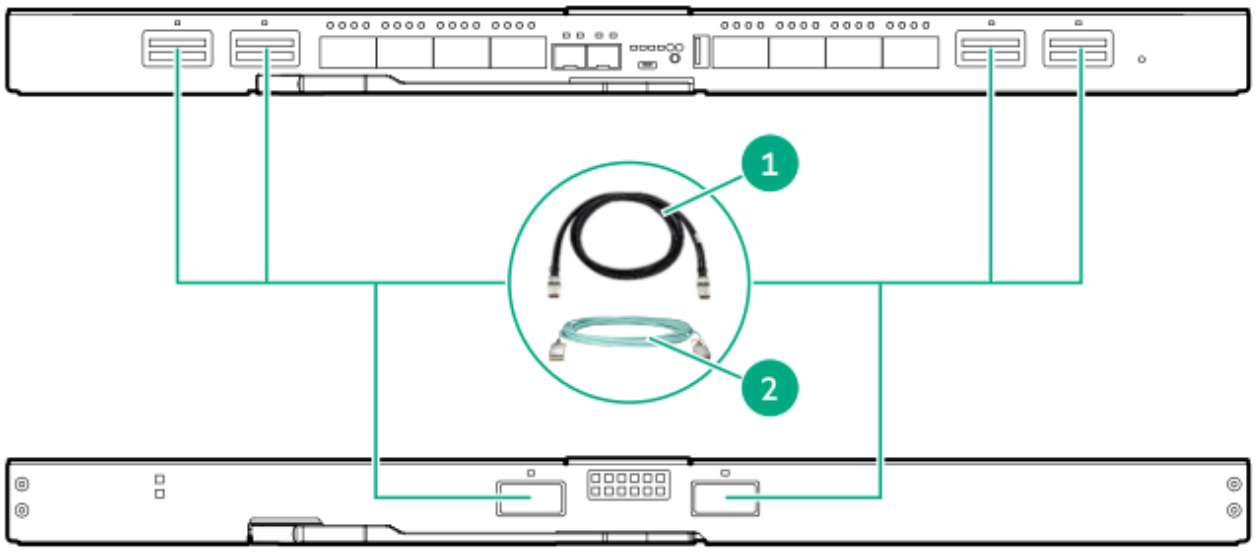
- Connect a LR4 or SR4 transceiver and Fibre Optic stacking cable from port Q7 on the first primary module to port Q7 on the second primary module.
- Connect a LR4 or SR4 transceiver and Fibre Optic stacking cable from port Q8 on the first primary module to port Q8 on the second primary module.



Item	Description
1	SR4 or LR4 transceivers
2	MPO or LC-LC Fiber Optic cables

HPE Synergy 100Gb primary module to Interconnect Link Module (satellite) connection

Connecting an HPE 100 Gb F32 module (primary) to an Interconnect Link module (satellite) using 300Gb (12x 25 Gb) CXP28 or Active Optical Cables (AOC) or Direct Attach Copper (DAC) cables



Item	Description
1	CXP28 to CXP28 Interconnect Link DAC cable
2	CXP28 to CXP28 Interconnect Link AOC

Subtopics

100Gb primary interconnect module with 25/50Gb Interconnect Link module cabling

100Gb primary interconnect module with 25/50Gb Interconnect Link module cabling

In a multi-frame system, connect the HPE Virtual Connect SE 100Gb F32 module for HPE Synergy (as primary module) to the HPE Synergy 25Gb/50Gb Interconnect Link module (satellite module) in a different frame.

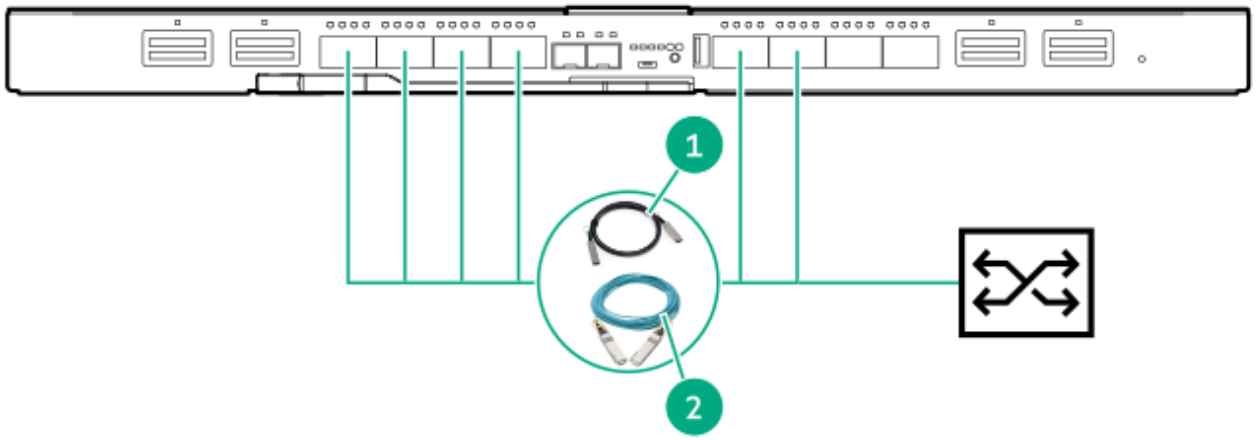
For 25Gb connectivity of up to 5 stacked frames, use a single CXP28 cable. For 50Gb connectivity of up to 3 stacked frames, use 2 CXP28 cables.

HPE Synergy 100Gb primary modules to LAN (Ethernet/ CEE) DAC/AOC

The Synergy VC SE 100Gb F32 supports the same connection examples as the VC SE 40Gb F8 modules in 10Gb and 40Gb speeds. Use the 10Gb SFP+ or 40Gb QSFP+ transceivers and cables in this case. For 10Gb SFP+ transceivers, use the QSFP28 to SFP28 Adapter (PN 845970-B21). The 1Gb connectivity examples are not supported with VC SE 100Gb F32.

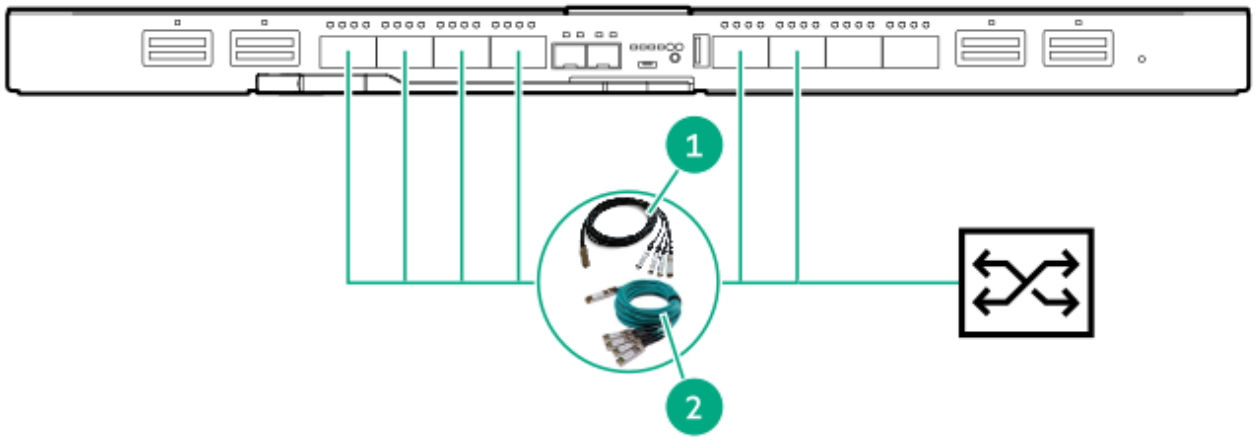
The following configurations are best for short-distance connections to HPE switches, using Active Optical Cables (AOC) and Direct Attach Copper (DAC) cables.

Connecting an HPE 100 Gb F32 module (primary) to an external switch with QSFP28 ports (100 Gb to 100 Gb)



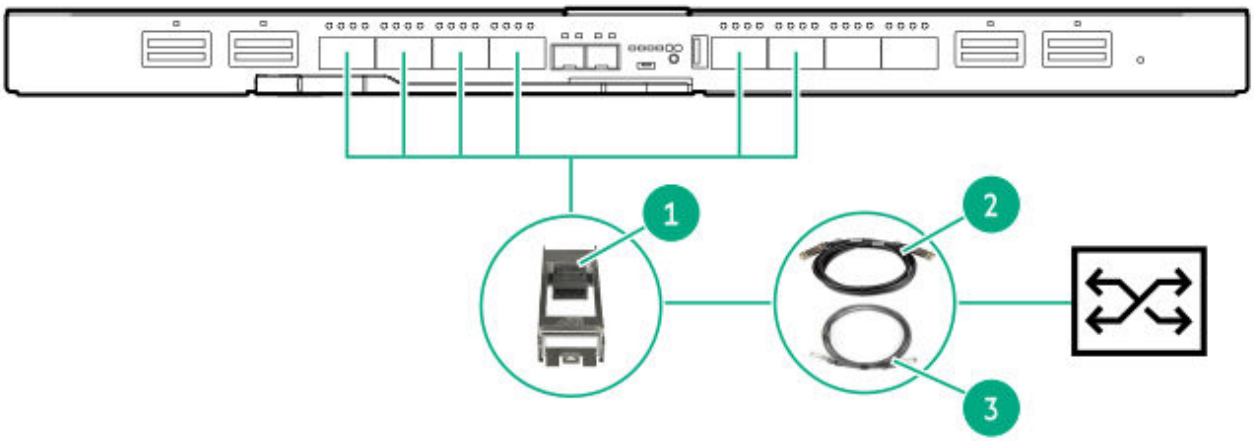
Item	Description
1	QSFP28 to QSFP28 DAC cable
2	QSFP28 to QSFP28 AOC

Connecting an HPE 100 Gb F32 module (primary) to an external switch with SFP28 ports (100 Gb to 4x 25 Gb)



Item	Description
1	QSFP28 to 4x SFP28 DAC cable
2	QSFP28 to 4x SFP28 AOC

Connecting an HPE 100 Gb F32 module (primary) to an external switch with SFP28 ports (25 Gb to 25 Gb)

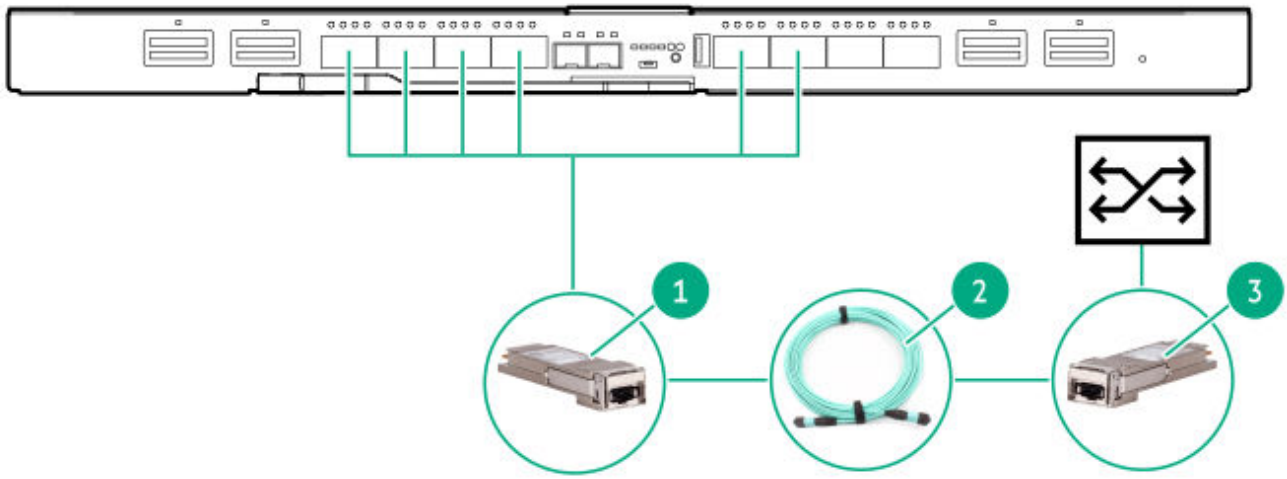


Item	Description
1	QSFP28 to SFP28 Adapter
2	SFP28 to SFP28 DAC cable
3	SFP28 to SFP28 AOC

HPE Synergy 100Gb primary modules to LAN (Ethernet/ CEE) SW

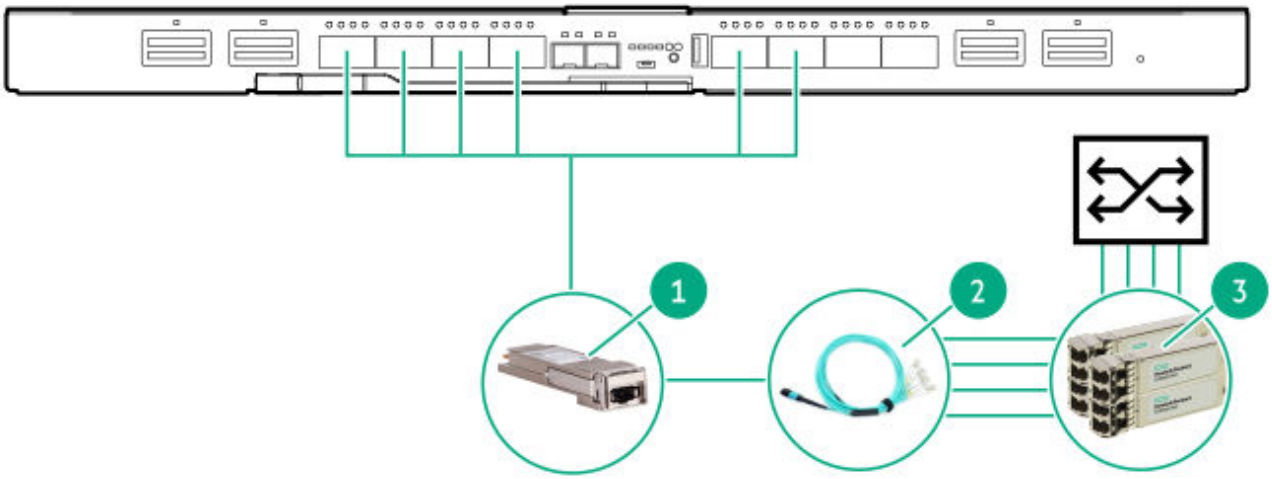
The following configurations are best for short- to medium-distance connections to HPE and third-party switches, using transceivers and Fiber Optic cables.

Connecting an HPE 100 Gb primary module to an external switch with QSFP28 ports (100 Gb to 100 Gb)



Item	Description
1	100 Gb SR4 MPO QSFP28 Transceiver
2	MPO to MPO Multi-Mode Fiber Optic Cable
3	100 Gb SR4 MPO QSFP28 Transceiver

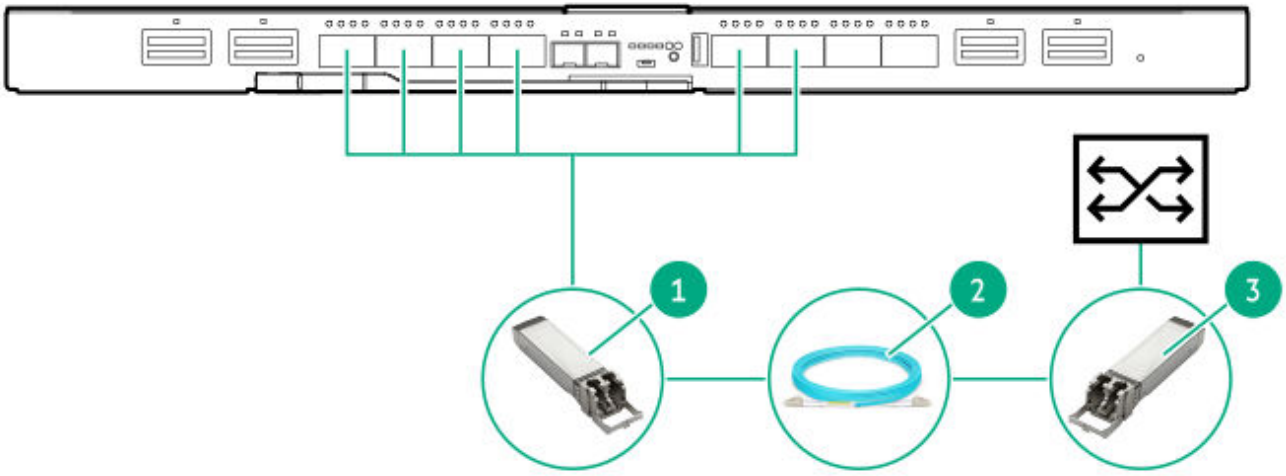
Connecting an HPE 100 Gb primary module to an external switch with SFP28 ports (100 Gb to 4x 25 Gb)



Item	Description
1	100 Gb SR4 MPO QSFP+ Transceiver
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	25 Gb SR LC SFP28 transceivers (4)

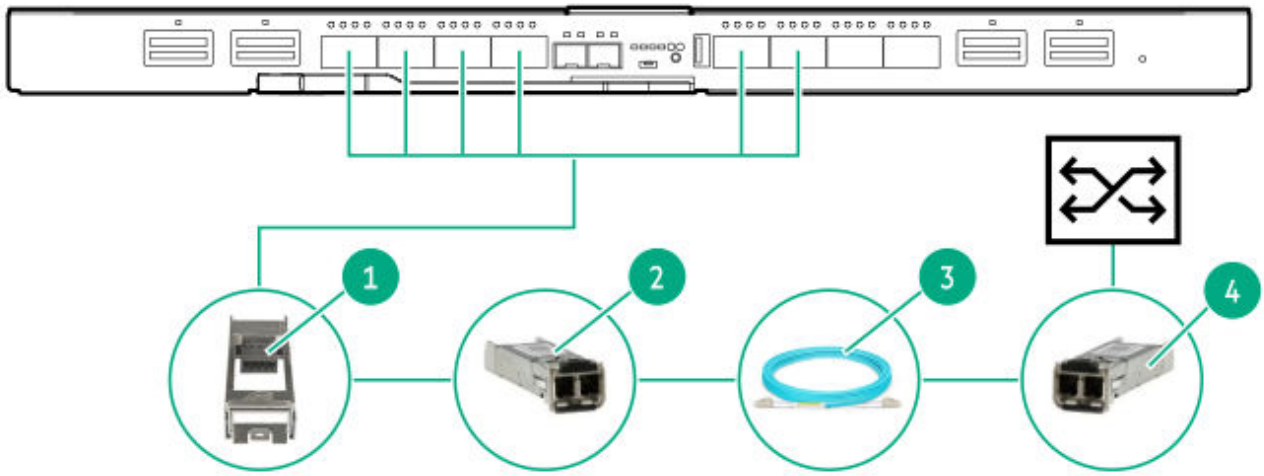
Connecting an HPE 100 Gb primary module to an external switch with QSFP28 ports (100 Gb to 100 Gb)

The following configurations are best for medium-distance connections to HPE and third-party switches.



Item	Description
1	100 GbE Bidirectional QSFP28 Transceiver
2	LC-to-LC Multi-Mode Fiber Optic Cable
3	100 GbE Bidirectional QSFP28 Transceiver

Connecting an HPE 100 Gb primary module to an external switch with QSFP28 ports (25 Gb to 25 Gb or 10 Gb to 10 Gb)

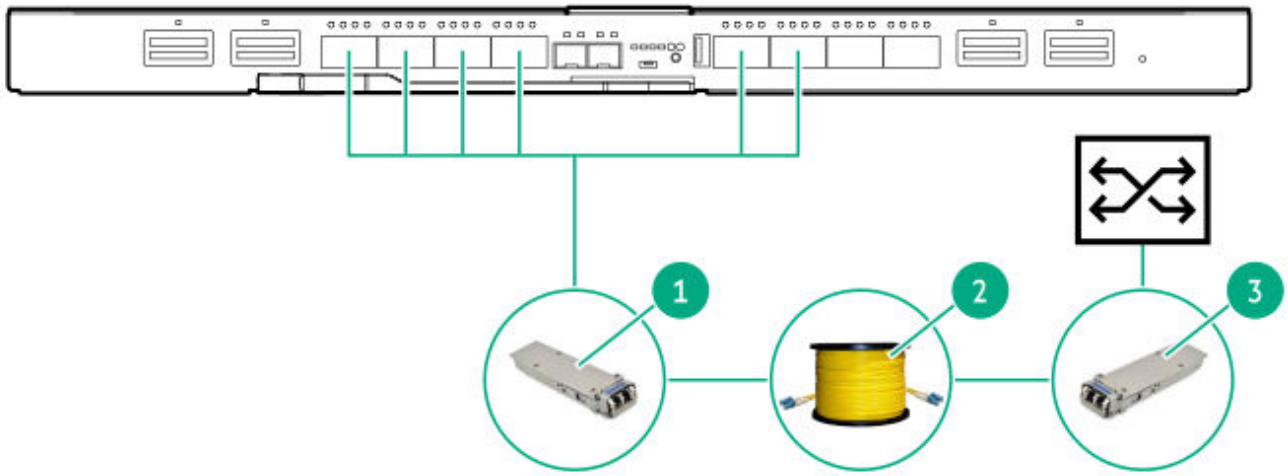


Item	Description
1	QSFP28 to SFP28 Adapter
2	25 Gb SR LC SFP28 or 10 Gb LC SR SFP+ Transceiver
3	LC-to-LC Multi-Mode Fiber Optic Cable
4	25 Gb SR LC SFP28 or 10 Gb LC SR SFP+ Transceiver

HPE Synergy 100Gb primary modules to LAN (Ethernet/ CEE) LW

The following configurations are best for long-distance connections to HPE and third-party switches, using transceivers and Fiber Optic cables.

Connecting an HPE 100 Gb primary module to an external switch with QSFP28 ports (100 Gb to 100 Gb)

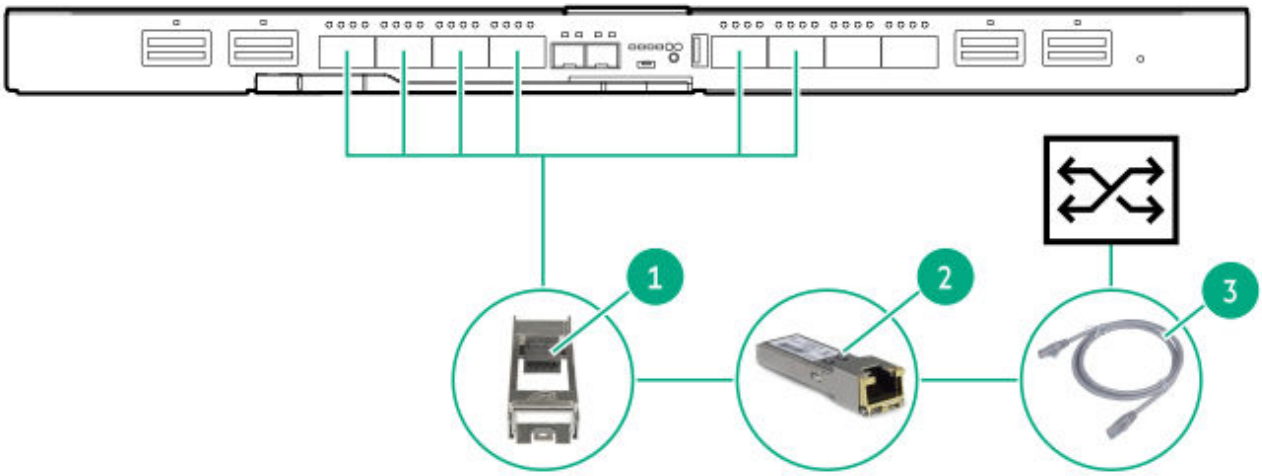


Item	Description
1	100 GbE LR4 LC QSFP28 Transceiver
2	LC-to-LC Single-Mode Fiber Optic Cable
3	100 GbE LR4 LC QSFP28 Transceiver

HPE Synergy 100Gb primary modules to LAN (Ethernet/ CEE) Cu

The following configurations are best for 10Gb twisted pair connections to HPE and third-party switches, using transceivers and twisted pair cables.

Connecting an HPE 100 Gb primary module to an external switch with RJ45 ports (10 Gb to 10 Gb)

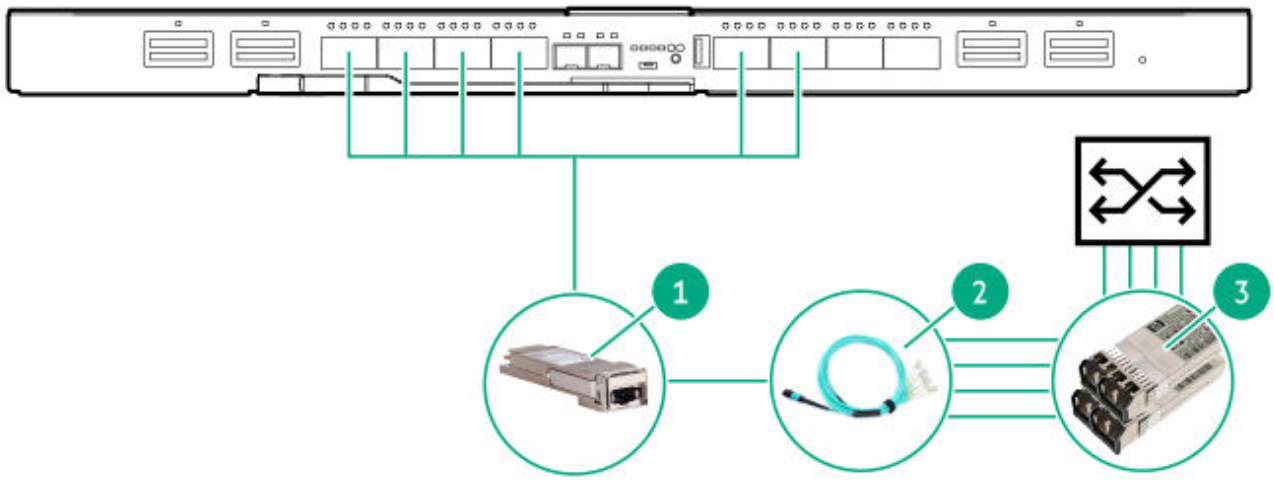


Item	Description
1	QSFP28 to SFP28 Adapter
2	10 GbE RJ45 SFP+Transceiver
3	Twisted Pair (UTP) cable

HPE Synergy 100Gb primary modules to SAN (Fiber Channel)

The following configurations are best for connecting to HPE and non-HPE switches, using transceivers and Fiber Optic cables.

Connecting an HPE 100 Gb primary module to an external switch with SFP+ ports (4x 8/16/32 Gb to 4x 8/16/32 Gb)



Item	Description
1	4x 32 Gb FC or 4x 25 GbE MPO QSFP28 Transceiver
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	16/32 Gb FC SW SFP transceivers (4)

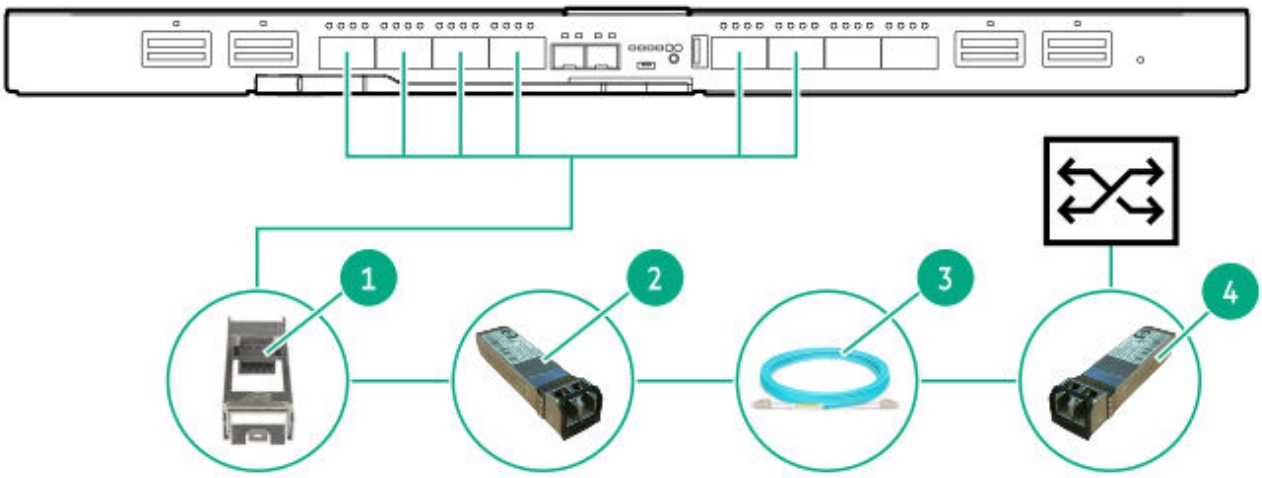
Connecting an HPE 100 Gb primary module to an external switch with SFP+ ports (8/16/32 Gb to 8/16/32 Gb)

The HPE Synergy 100Gb F32 switch module supports direct connection to FC SAN using native Fiber Channel to 3Par and Nimble storage systems.

The HPE Virtual Connect SE 100Gb F32 Module supports 8 Gb, 16 Gb, and 32 Gb FC connections.

One HPE Synergy 32 Gb Fiber Channel upgrade LTU (PN: R3P67A(AE)) per interconnect module requires native Fiber Channel ports on the HPE Virtual Connect SE 100Gb F32 Module with one of the following transceivers:

- 4x 32 Gb FC / 4x 25 GbE MPO QSFP28 transceivers
- 16 Gb or 32 Gb FC SFP+ transceivers

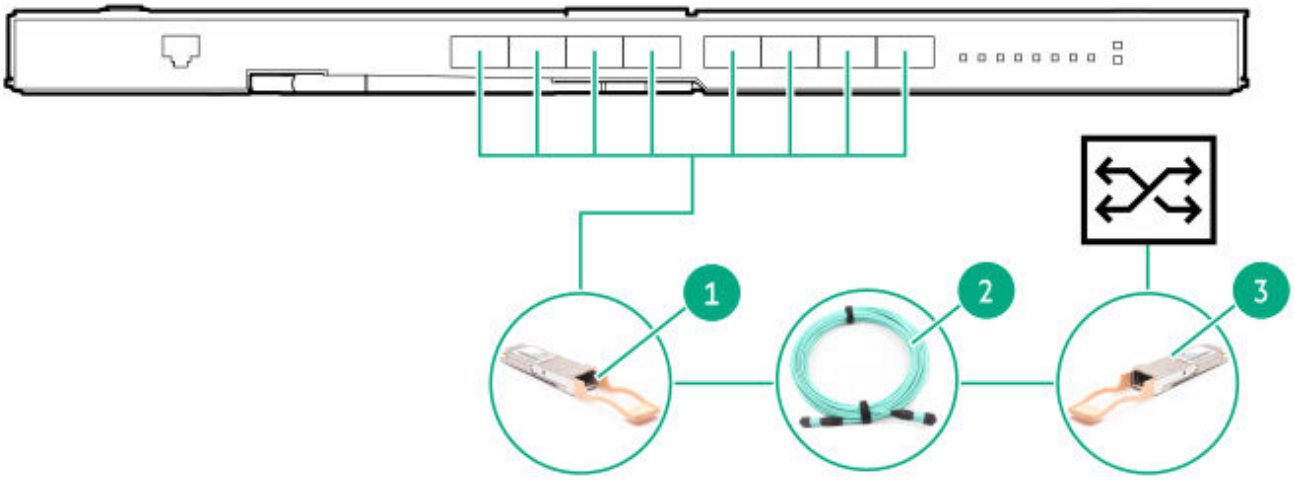


Item	Description
1	QSFP28 to SFP28 Adapter
2	16 Gb or 32 Gb FC SW SFP+ Transceiver
3	LC-to-LC Multi-Mode OM3 or OM4 Fiber Optic Cable (the max length depends on the cable type and speed)
4	16Gb or 32 Gb FC SW SFP Transceiver

Mellanox SH2200 Switch Module to 100Gb/25Gb LAN (Ethernet/CEE)

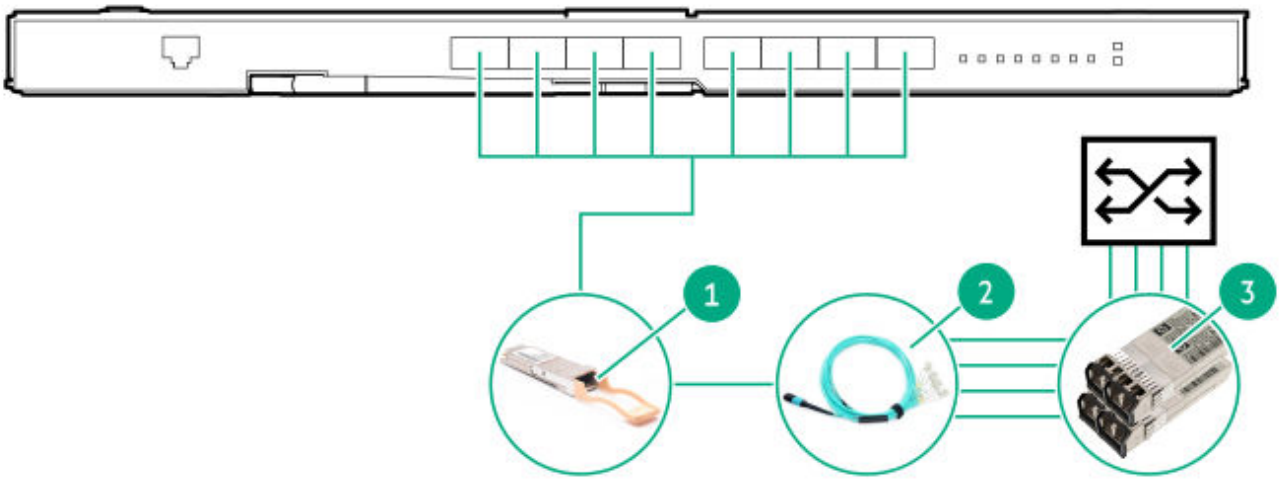
The following configurations are best for short- to medium-distance connections to HPE and third-party 100GbE and 25GbE switches, using Active Optical cables, Direct Attach Copper cables, or transceivers with Fiber Optic cables.

Connecting a Mellanox SH2200 Switch Module to an external switch with QSFP28 ports



Item	Description
1	100 Gb SR4 MPO QSFP28 Transceiver
2	MPO to MPO Multi-Mode Fiber Optic Cable
3	100 Gb SR4 MPO QSFP28 Transceiver

Connecting a Mellanox SH2200 Switch Module to an external switch with SFP28 ports

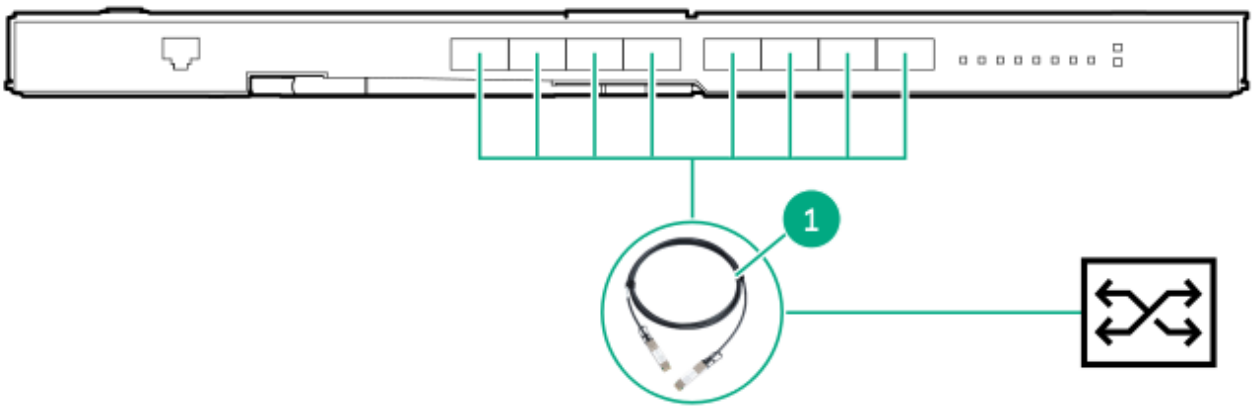


Item	Description
1	100 Gb SR4 MPO QSFP28 Transceiver

Item	Description
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	25 Gb SR LC SFP28 transceivers (4)

Connecting a Mellanox SH2200 Switch Module to an external switch with QSFP28 ports

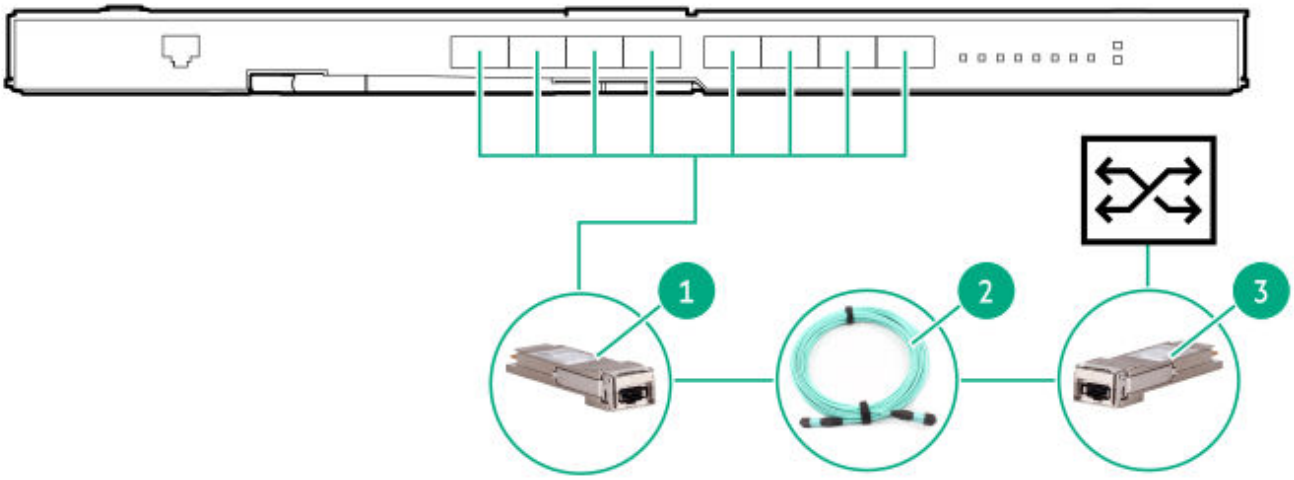
The following configuration is best for short-distance connections to HPE 100GbE switches using a QSFP28 to QSFP28 Direct Attach Copper cable.



Mellanox SH2200 Switch Module to 40Gb/10Gb LAN (Ethernet/CEE)

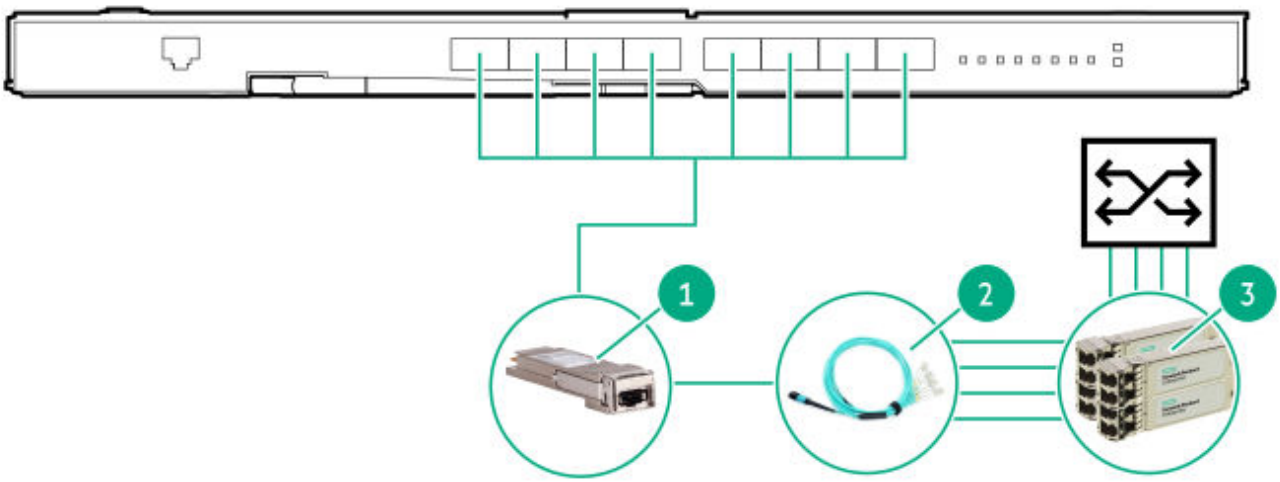
The following configurations are best for short- to medium-distance connections to HPE and third-party 40GbE and 10GbE switches, using Active Optical cables, Direct Attach Copper cables, or transceivers with Fiber Optic cables.

Connecting a Mellanox SH2200 Switch Module to an external switch with QSFP+ ports (short to medium distances)



Item	Description
1	40 Gb SR4 MPO QSFP+ Transceiver
2	MPO to MPO Multi-Mode Fiber Optic Cable
3	40 Gb SR4 MPO QSFP+ Transceiver

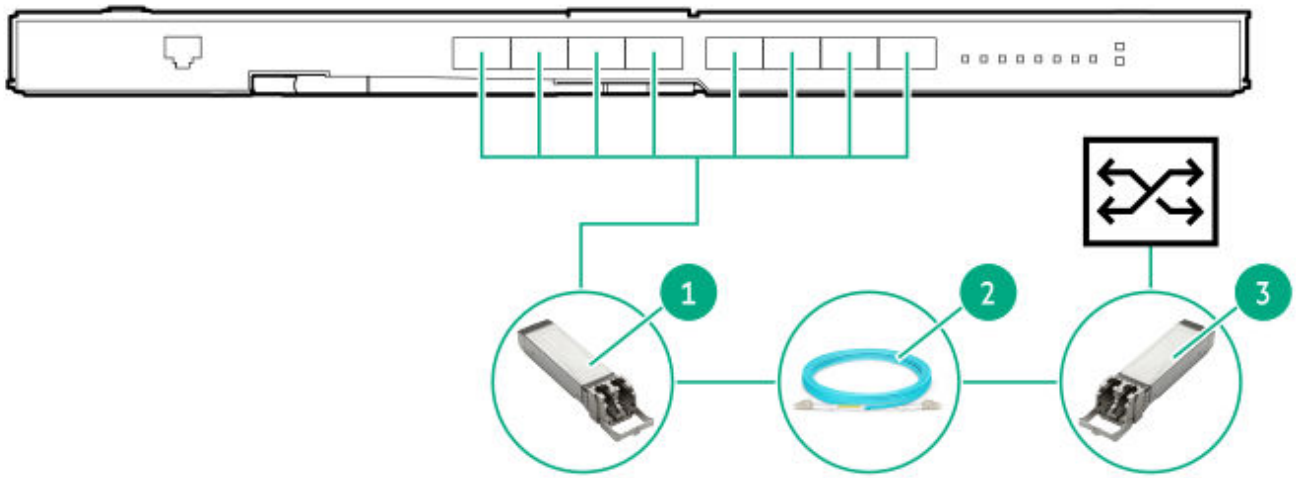
Connecting a Mellanox SH2200 Switch Module to an external switch with SFP+ ports (short to medium distances)



Item	Description
1	40 Gb SR4 MPO QSFP+ Transceiver

Item	Description
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	10 Gb SR LC SFP+ transceivers (4)

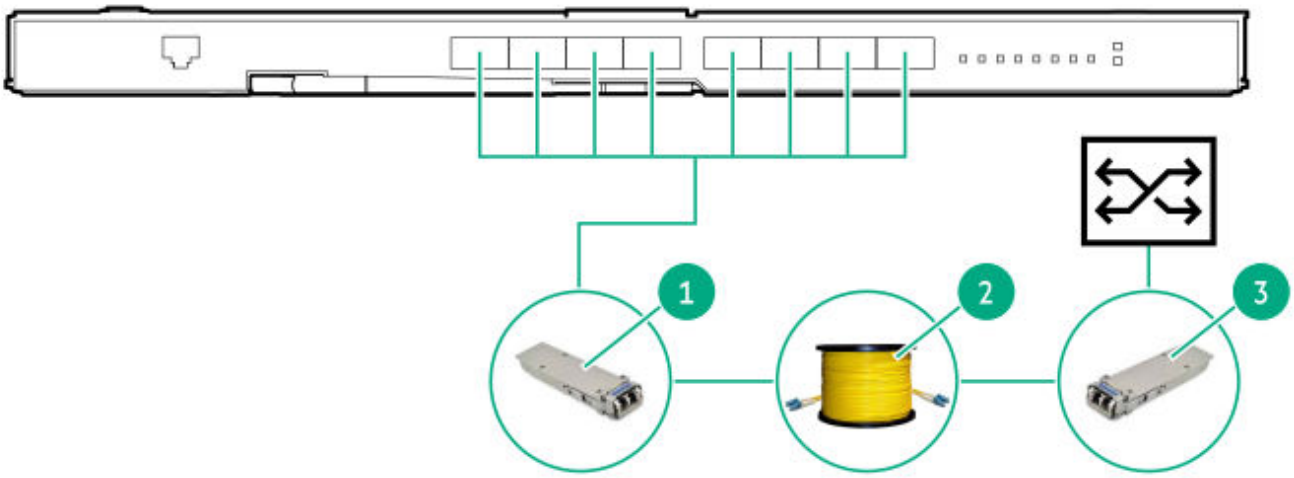
Connecting a Mellanox SH2200 Switch Module to an external switch with QSFP+ ports (short to medium distances)



Item	Description
1	40 GbE SR2 Bidirectional QSFP+ Transceiver
2	LC-to-LC Multi-Mode Fiber Optic Cable
3	40 GbE SR2 Bidirectional QSFP+ Transceiver

Connecting a Mellanox SH2200 Switch Module to a 40 GbE external switch with QSFP+ ports (long distances)

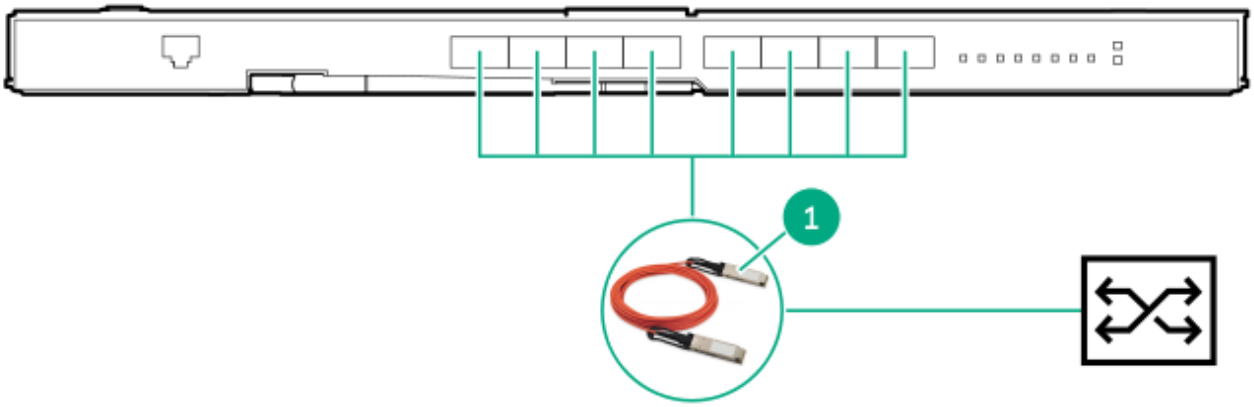
The following configuration is best for long-distance connection to HPE and third-party 40GbE switches.



Item	Description
1	40 GbE LR4 LC QSFP+ Transceiver
2	LC-to-LC Single-Mode Fiber Optic Cable
3	40 GbE LR4 LC QSFP+ Transceiver

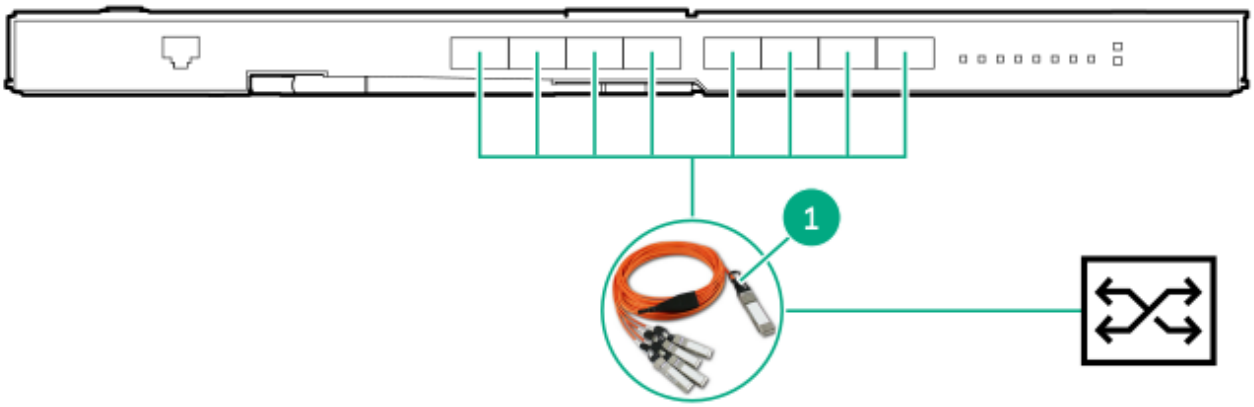
Connecting a Mellanox SH2200 Switch Module to an HPE 40 GbE external switches with QSFP+ ports (short distances)

The following configuration is best for short-distance connection to HPE 40GbE switches using QSFP+ to QSFP+ Active Optical Cables (7 m, 10 m, or 15 m).



Connecting a Mellanox SH2200 Switch Module to an HPE 10GbE external switch with SFP+ ports (short distance)

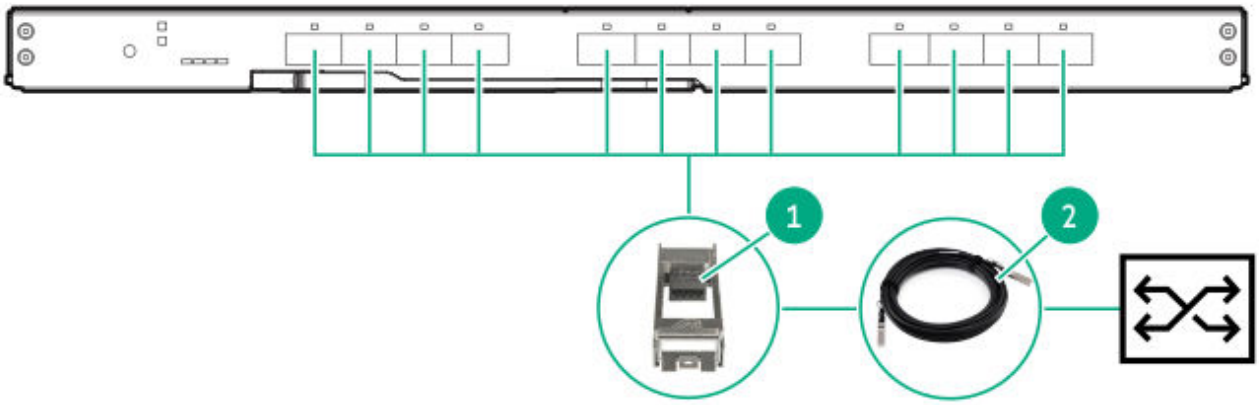
The following configuration is best for short-distance connection to HPE 10GbE switches using QSFP+ to 4x SFP+ Active Optical Cables (7 m, 10 m, or 15 m).



HPE Synergy 10Gb Pass-Thru Module to 10Gb LAN (Ethernet/CEE)

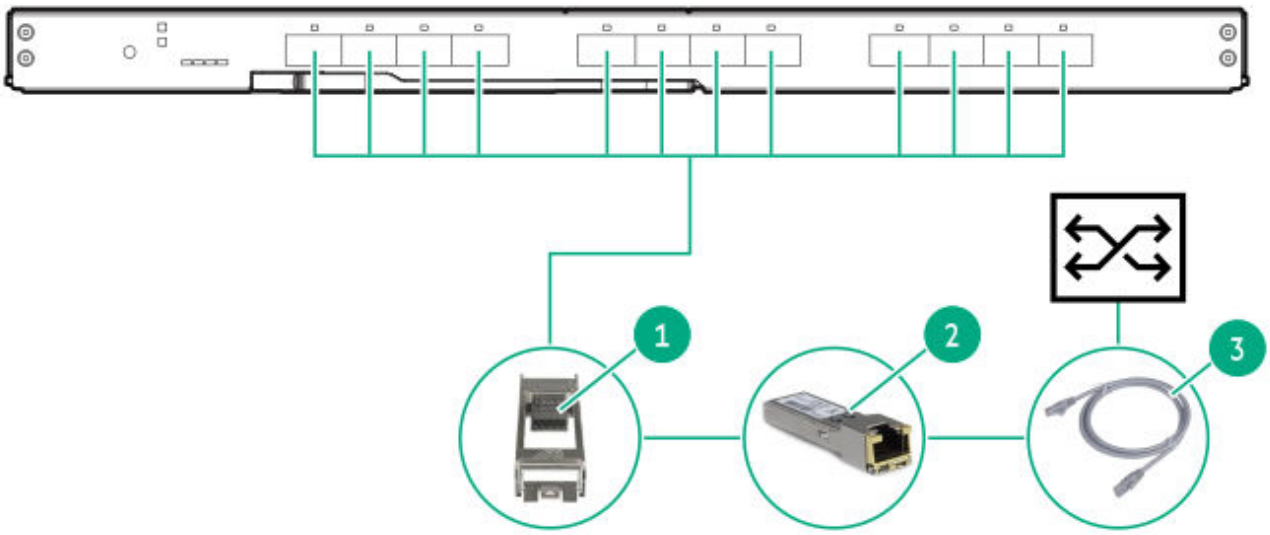
The following configurations are best for short-distance connections to HPE 10GbE switches, using Direct Attach Copper cables, transceivers, and Fiber Optic cables.

Connecting an HPE Synergy 10Gb Pass-Thru Module to an HPE 10 GbE external switch with SFP+ ports (short distances)



Item	Description
1	QSFP+ to SFP+ Adapter
2	SFP+ to SFP+ Direct Attach Copper cable

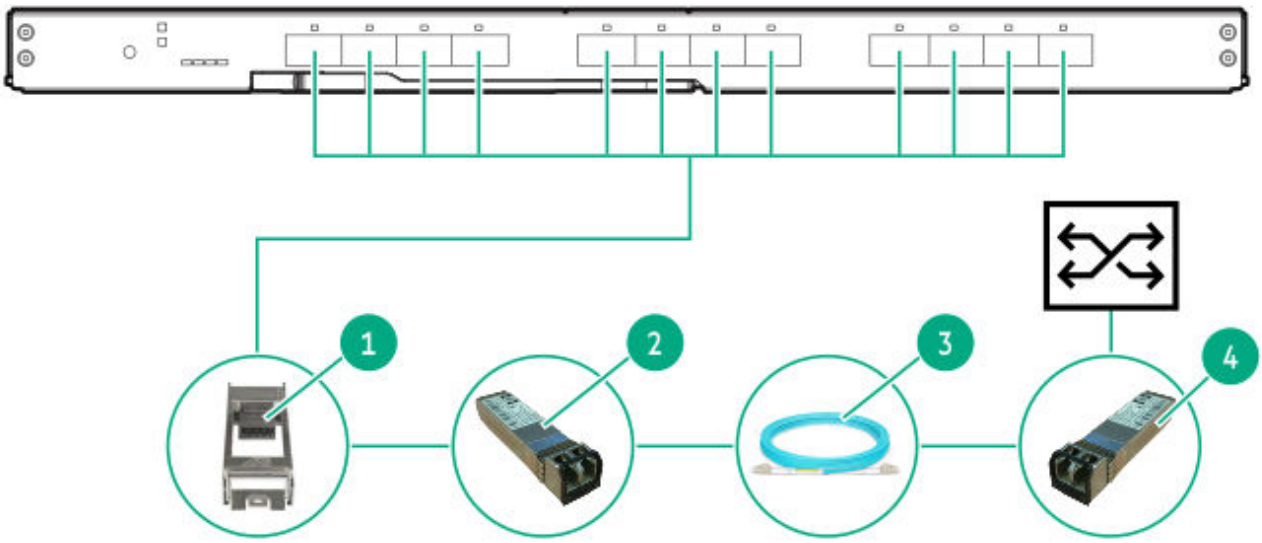
Connecting an HPE Synergy 10Gb Pass-Thru Module to an HPE 10 GbE external switch with RJ45 ports (short distances)



Item	Description
1	QSFP+ to SFP+ Adapter
2	10 GbE RJ45 SFP+ Transceiver
3	CAT 6A or CAT 7 Copper Twisted Pair (UTP) cable

Connecting an HPE Synergy 10Gb Pass-Thru Module to an HPE 10 GbE external switch with SFP+ ports (short to medium distances)

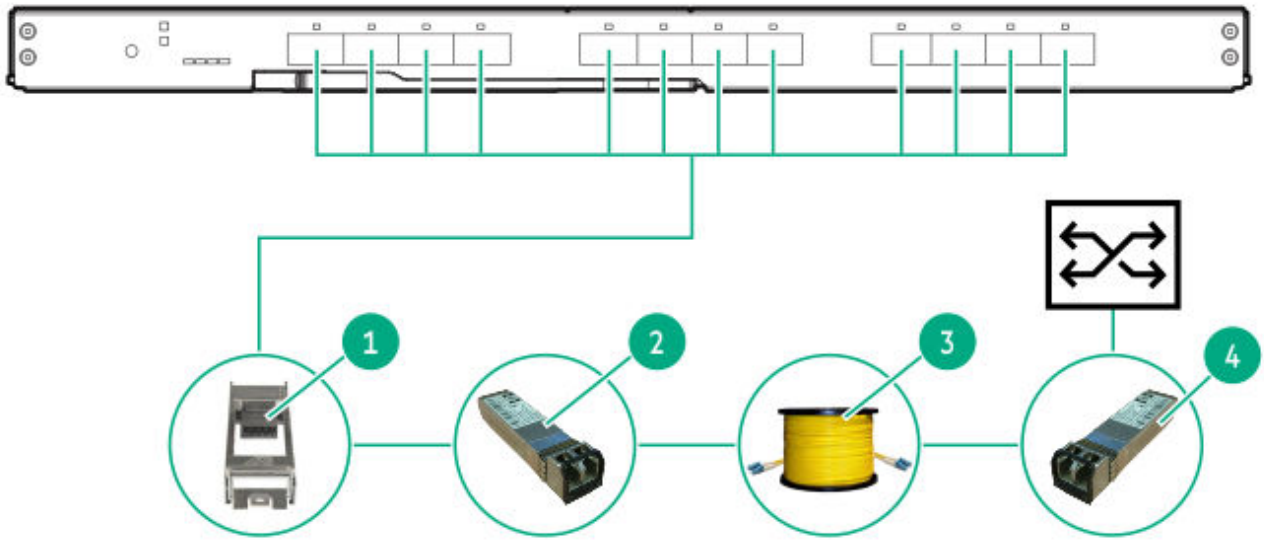
The following configuration is best for short- to medium-distance connections to HPE and third-party 10GbE switches.



Item	Description
1	QSFP+ to SFP+ Adapter
2	10 GbE SR LC SFP+ Transceiver
3	LC-to-LC Multi-Mode Fiber Optic Cable
4	10 GbE SR LC SFP+ Transceiver

Connecting an HPE Synergy 10Gb Pass-Thru Module to a 10 GbE external switch with SFP+ ports (long distances)

The following configuration is best for long-distance connection to HPE and third-party 10GbE switches.

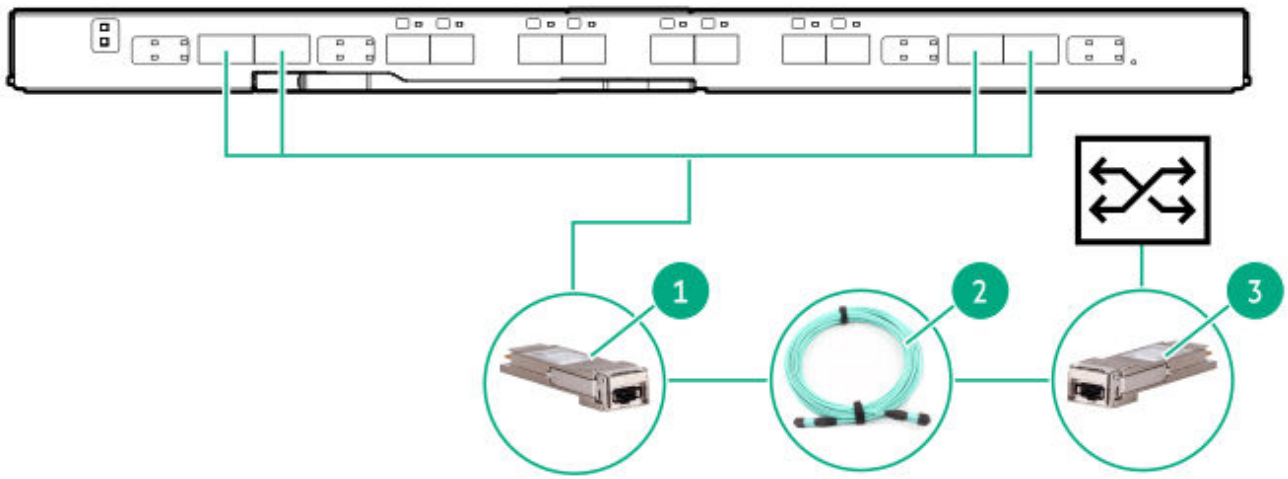


Item	Description
1	QSFP+ to SFP+ Adapter
2	10 GbE LR LC SFP+ Transceiver
3	LC to LC Multi-Mode Fiber Optic Cable
4	10 GbE LR LC SFP+ Transceiver

HPE Synergy 16 Gb VC and Brocade 16 Gb FC modules to SAN

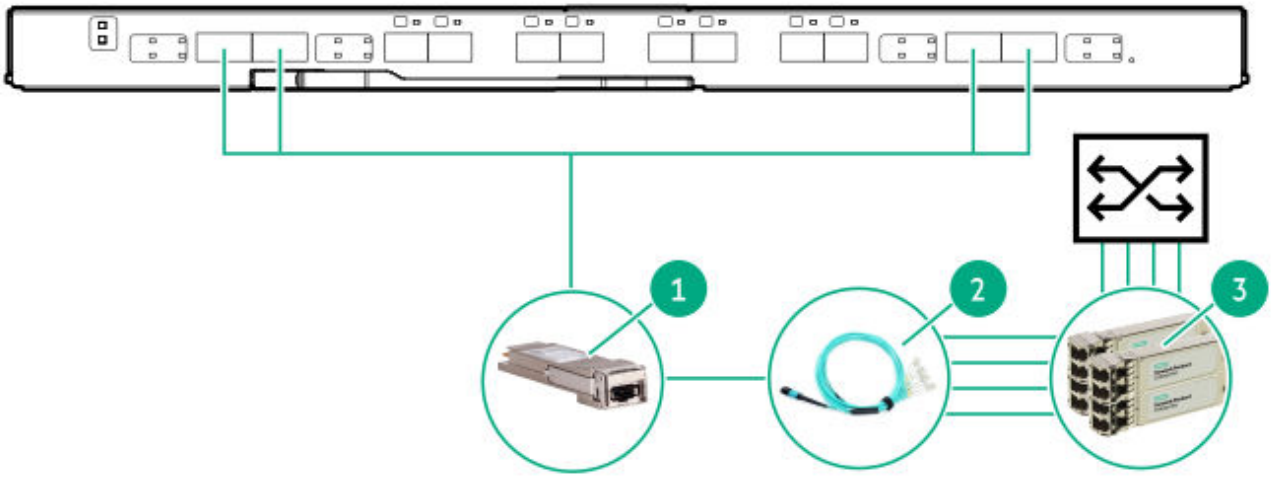
The following configurations are best for short- and medium-distance connections, using transceivers and Fiber Optic cables.

Connecting an HPE Virtual Connect SE 16Gb Fiber Channel module or Brocade 16Gb/24 Fiber Channel SAN switch module to an external switch with QSFP+ ports (short and medium distances)



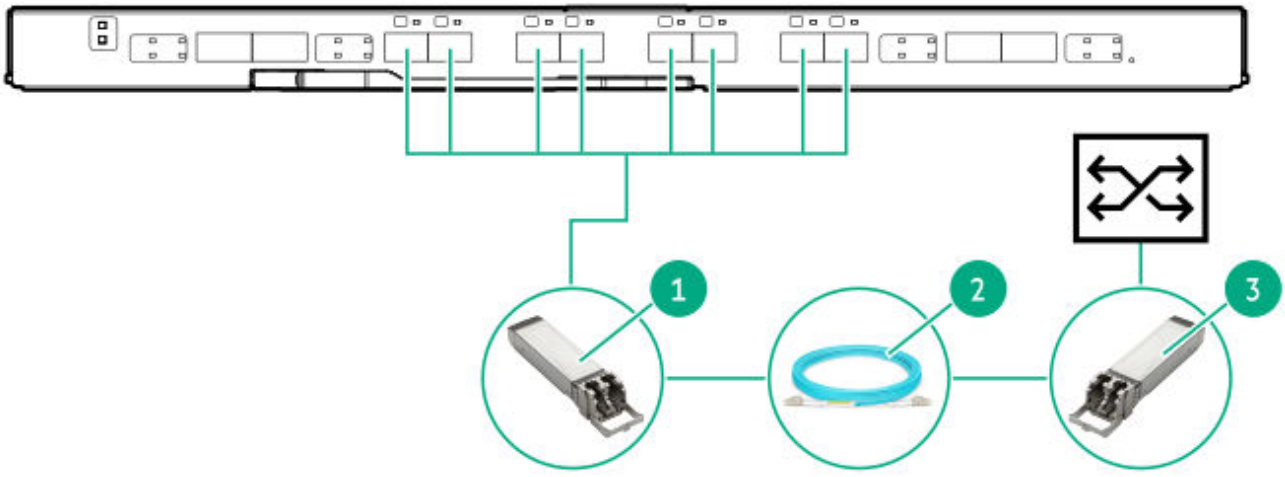
Item	Description
1	4 x 16 Gb FC SW MPO QSFP+ Transceiver
2	MPO to MPO Multi-Mode Fiber Optic Cable
3	4 x 16 Gb FC SW MPO QSFP+ Transceiver

Connecting an HPE Virtual Connect SE 16Gb Fiber Channel module or Brocade 16Gb/ 24 Fiber Channel SAN switch module to an external switch with SFP+ ports (short and medium distances)



Item	Description
1	4 x 16 Gb FC SW MPO QSFP+ Transceiver
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	16 Gb FC SW SFP+ Transceivers (4)

Connecting an HPE Virtual Connect SE 16Gb Fiber Channel module or Brocade 16Gb/ 24 Fiber Channel SAN switch module to an external switch with SFP+ ports (short and medium distances)

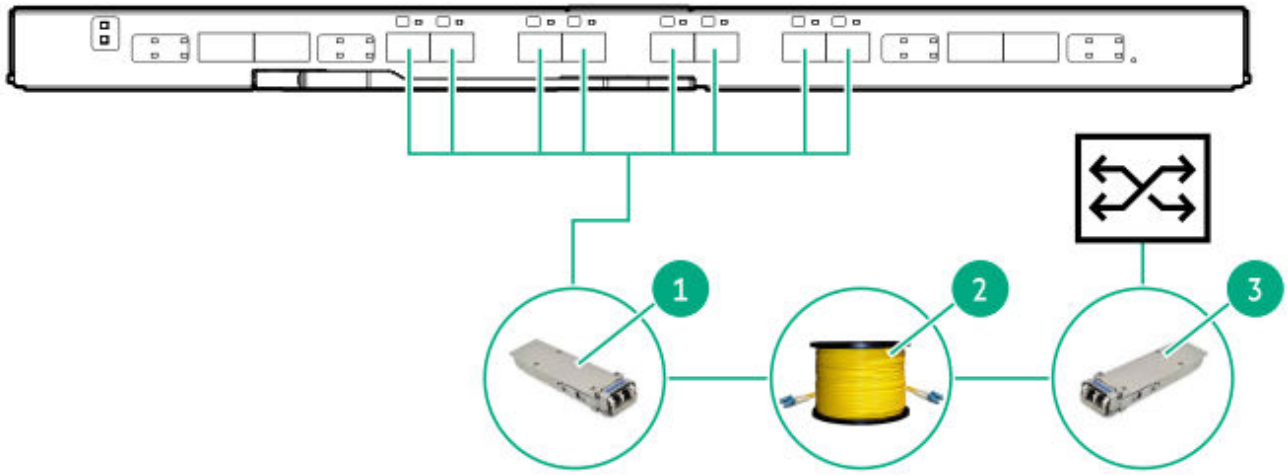


Item	Description
1	16 Gb or 8 Gb FC SW SFP+ Transceiver
2	LC to LC Multi-Mode OM3 or OM4 Fiber Optic Cable
3	16 Gb or 8 Gb FC SW SFP+ Transceiver

Connecting a Brocade 16 Gb / 24 Fiber Channel SAN Switch Module to an external switch with SFP+ ports (long distances)

The HPE Virtual Connect SW 16Gb Fiber Channel module does not support long-distance connections to SAN switches using long wavelength transceivers and single-mode Fiber Optic cable.

The following configuration is best for long-distance connections.

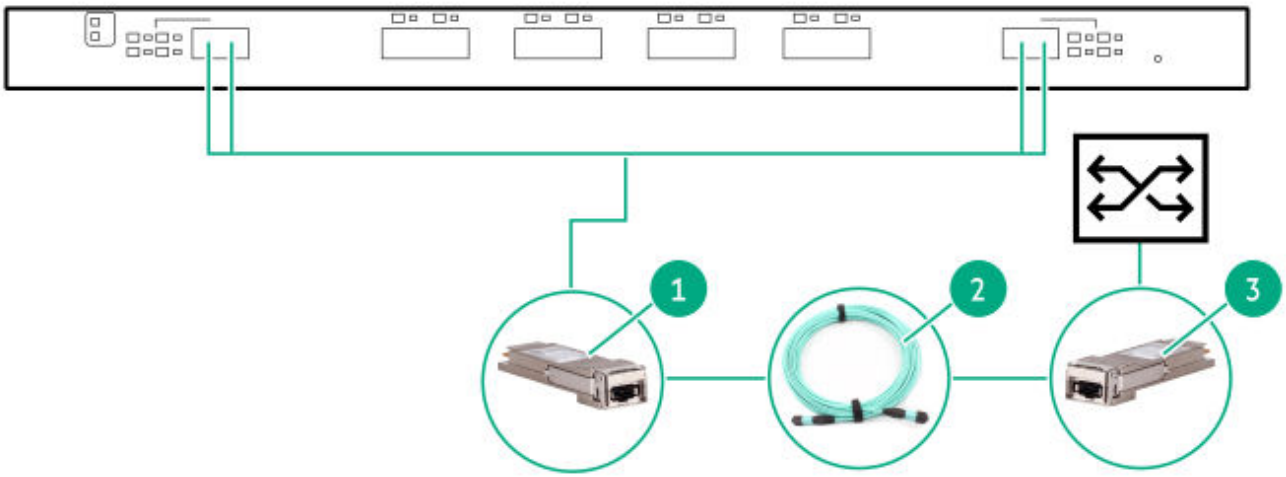


Item	Description
1	16 Gb FC LW SFP+ Transceiver
2	LC-to-LC Single-Mode Fiber Optic Cable
3	16 Gb FC LW SFP+ Transceiver

HPE Virtual Connect SE 32Gb Fiber Channel Module or Brocade 32Gb/24 Fiber Channel Switch Module to SAN

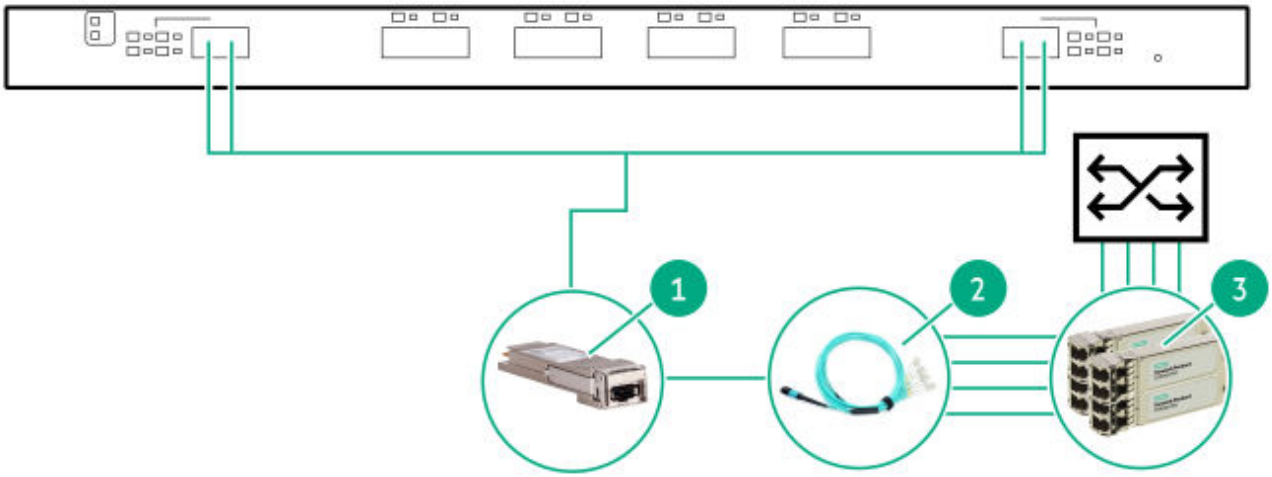
The following configurations are best for short- and medium-distance connections, using transceivers and Fiber Optic cables.

Connecting an HPE VC SE 32Gb FC Module or Brocade 32Gb FC Switch Module to external switch with QSFP+ ports (short and medium distances)



Item	Description
1	4x 32 Gb FC SW MPO QSFP28 Transceiver
2	MPO to MPO Multi-Mode Fiber Optic Cable
3	4x 32 Gb FC SW MPO QSFP28 Transceiver

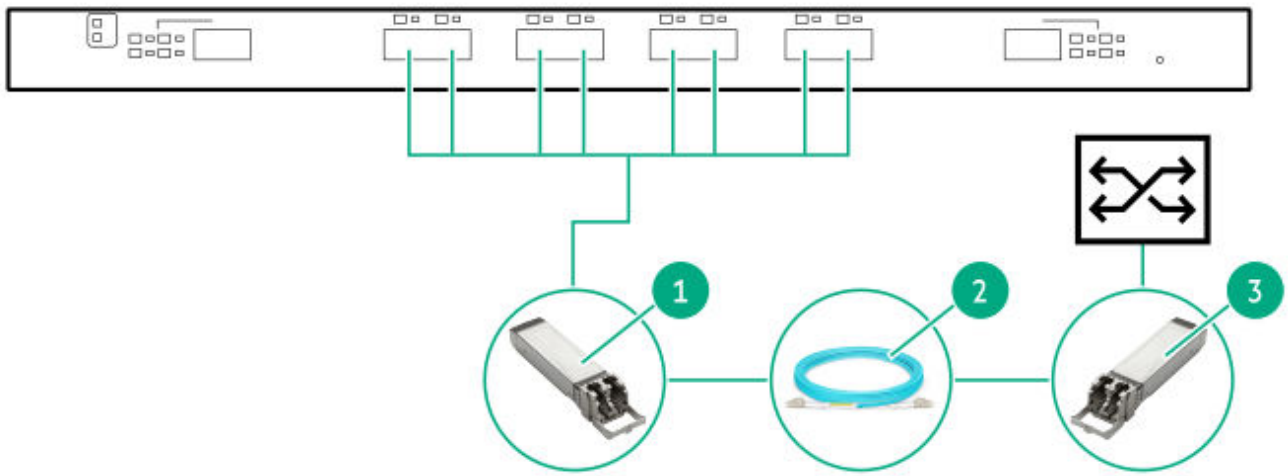
Connecting an HPE VC SE 32Gb FC Module or Brocade 32Gb FC Switch Module to external switch with SFP+ ports (short and medium distances)



Item	Description
1	4x 32 Gb FC SW MPO QSFP+ Transceiver

Item	Description
2	MPO to 4x LC Breakout Multi-Mode Fiber Optic Cable
3	32 Gb FC SW SFP28 Transceiver

Connecting an HPE VC SE 32Gb FC Module or Brocade 32Gb FC Switch Module to external switch with SFP+ ports (short and medium distances)

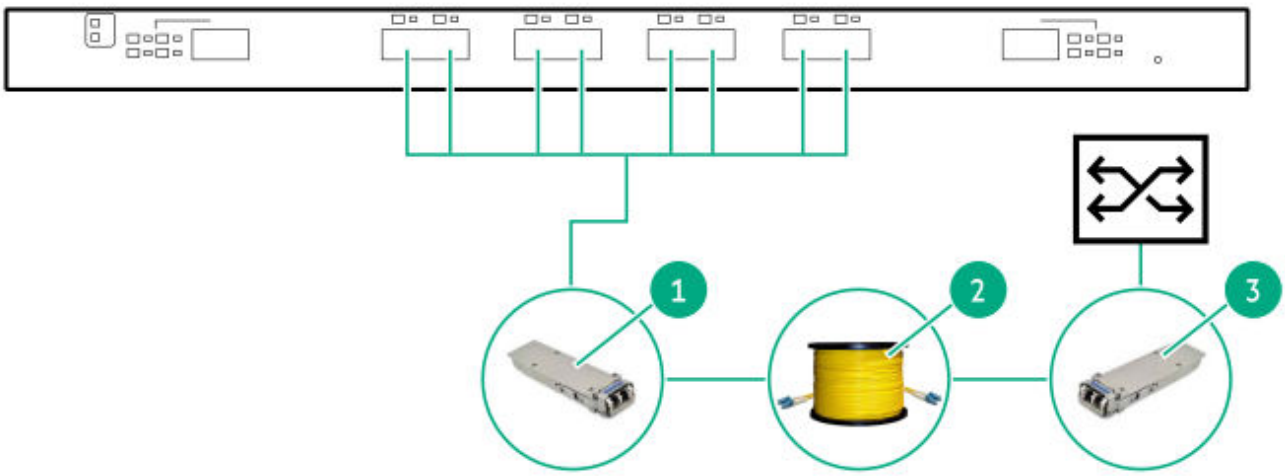


Item	Description
1	16 Gb or 32 Gb FC SW SFP+ Transceiver
2	LC-to-LC Multi-Mode OM3 or OM4 Fiber Optic Cable
3	16 Gb or 32 Gb FC SW SFP+ Transceiver

Connecting a Brocade 32Gb/24 FC Switch Module to an external switch with SFP+ ports (long distances)

The following configuration is best for long-distance connections.

The HPE VC SE 32Gb FC Module does not support long-distance connections to SAN switches using long wavelength transceivers and single-mode Fiber Optic cable.



Item	Description
1	32 Gb FC LW SFP+ Transceiver
2	LC-to-LC Single-Mode Fiber Optic Cable
3	32 Gb FC LW SFP+ Transceiver

Additional information

Subtopics

HPE transceivers and cables
Transceivers electrical and optical lanes diagram
Fiber Optics connector types
Fiber Optics cable types
MPO Fiber Optics connector details
MPO Fiber Optics cable details
AOC/DAC cable details
100G Parallel Single-Mode four-channel (PSM4) transceiver information

HPE transceivers and cables

Table 1. Technical details and data transmission ranges for HPE Synergy interconnect module-supported transceivers

This table describes HPE Synergy interconnect module-supported transceivers only. For information on other transceivers, see the product QuickSpecs on the Hewlett Packard Enterprise website (https://www.hpe.com/info/qs).

Transceiver type	Form factor	Connector	Wavelength	Cable type	Data rate	HPE part number	Cable length
100GBase-SR4	QSFP28	MPO	Short, 850 nm	Multi-Mode Fiber	100G, 4x25G	845966-B21	Up to 100 m (OM4)
40GBase-SR4	QSFP+	MPO	Short, 850 nm	Multi-Mode Fiber	40G, 4x10G — 40G, 4x10G, 4x8G	720187-B21, JG325B — 817040-B21	up to 100 m (OM3), up to 150 m (OM4)
40GBase-eSR4	QSFP+	MPO	Short, 850 nm	Multi-Mode Fiber	40G, 4x10G	747698-B21 JG709A	Up to 300 m (OM3), up to 400 m (OM4)
40 GBase-SR-BiDi	QSFP+	LC	Short, 850/900 nm	Multi-Mode Fiber	40G	841716-B21	Up to 100 m (OM3 and OM4)
40GBase-LR4	QSFP+	LC	Long, 1310 nm	Single-Mode Fiber	40G	720190-B21 JG681A	Up to 10 km
4x16GbFC SW	QSFP+	MPO	Short, 850 nm	Multi-Mode Fiber	4x16G	K2Q87A	Up to 100 m (OM3), up to 125 m (OM4)
2x10GBase-T	QSFP+	2 x RJ45	—	Copper twisted pair Cat 6a/7	2x10G	838327-B21	Up to 30 m
QSFP+ to SFP+	QSFP+	SFP+	—	—	10G, 8G	720193-B21	—
16GbFC SW	SFP+	LC	Short, 850 nm	Multi-Mode Fiber	4/8/16G	QK724A	Up to 100 m (OM3),

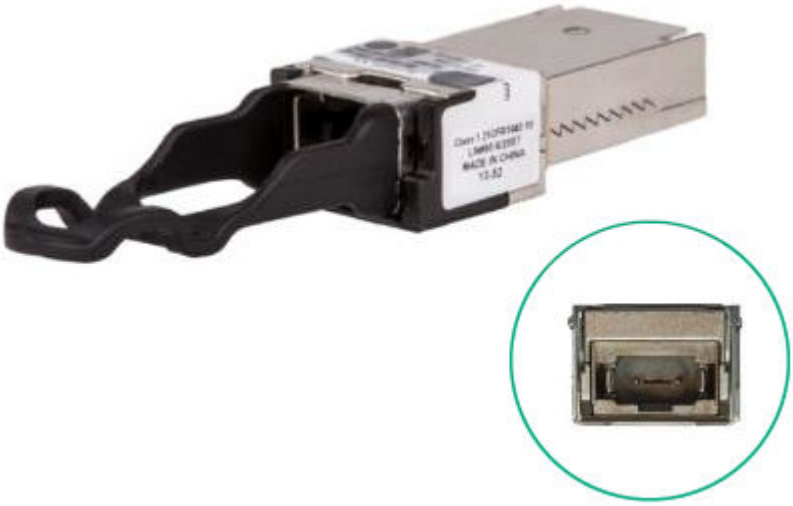
Transceiver type	Form factor	Connector	Wavelength	Cable type	Data rate	HPE part number	Cable length
							up to 125 m (OM4)
16GbFC LW	SFP+	LC	Long, 1310 m	Single-Mode Fiber	4/8/16G	QK725A H6Z29A	Up to 10 m up to 25 m
10GBase-SR	SFP+	LC	Short, 850 nm	Multi-Mode Fiber	10G	455883-B21	Up to 300 m (OM4)
10GBase-LR	SFP+	LC	Long, 1310 nm	Single-Mode Fiber	10G	455886-B21 JD094B	2m to 10 km
10GBase-ER	SFP+	LC	Extended, 1550 nm	Single-Mode FIber	10G	JG234A	Up to 40 km
10GBase-T	SFP+	RJ45	—	Copper twisted pair Cat 6a/7	10G	813874-B21	Up to 30 m
8GbFC SW	SFP+	LC	Short, 850 nm	Multi-Mode Fiber	2/4/8G	AJ716B AJ718A	Up to 150 m (OM3), up to 190 m (OM4)
8GbFC LW	SFP+	LC	Long, 1310 nm	Single-Mode Fiber	2/4/8G	AJ717A	Up to 10 km
8GbFC LW	SFP+	LC	Long, 1310 nm	Single-Mode Fiber	2/4/8G	AW538A	Up to 25 km
1000Base-SX	SFP	LC	Short, 850 nm	Multi-Mode Fiber	1G	453151-B21	Up to 550 m (OM2)
1000Base-T	SFP	RJ45	—	Copper twisted pair Cat 5/5E	1G	453154-B21	Up to 100 m

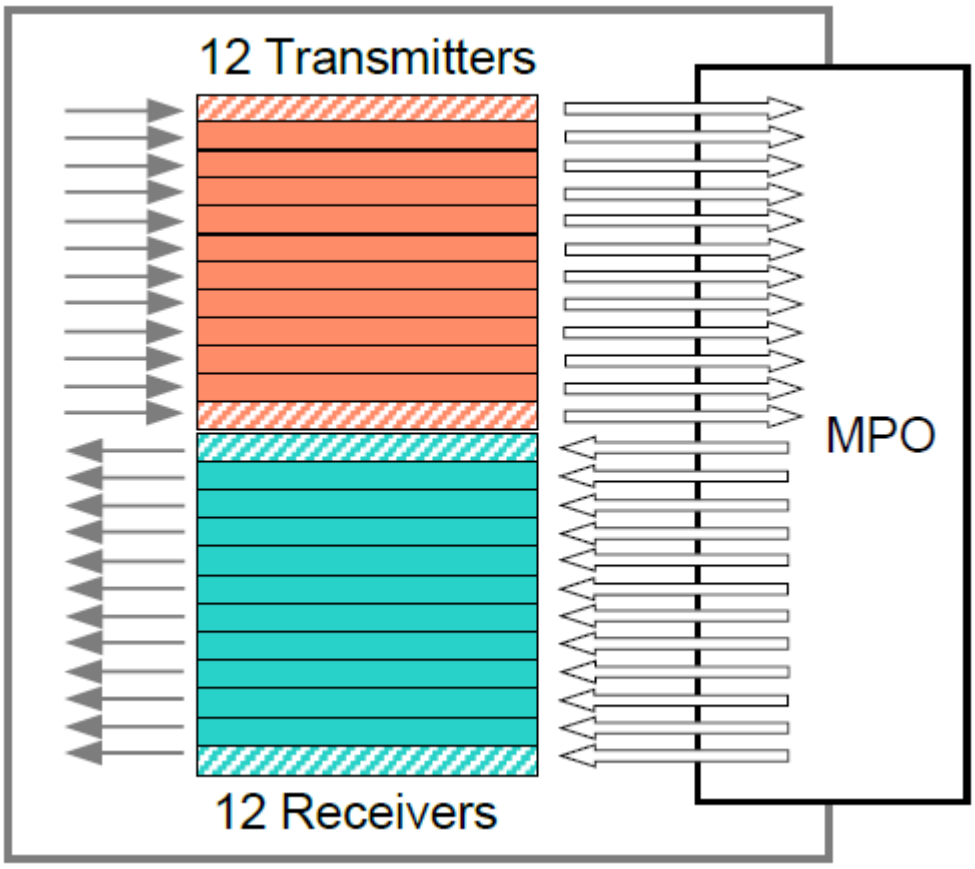
[1] Mixing of Ethernet and Fiber Channel port types is not allowed within this transceiver.
[2] undefined by symbol
[3] Supported only for connecting HPE Virtual Connect SE 40Gb F8 module for HPE Synergy Image Streamer using Cat6a cables. It cannot be used on other switches or for other applications.

Transceivers electrical and optical lanes diagram

100GBase-SR10 transceivers

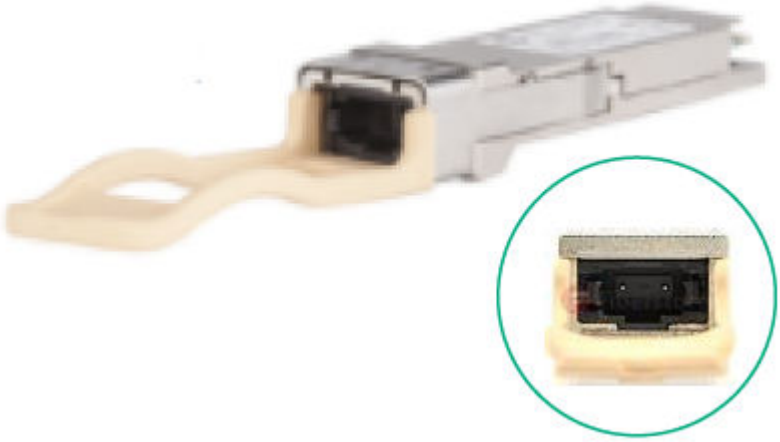
The 100GBase-SR10 transceiver has 12 or 10 fibers to transmit and 12 or 10 fibers to receive. This transceiver uses 20 multi-mode fibers (10x10G TX-R pairs) with a 24 fiber MPO connector. For the 120Gb connection, it uses all 24 multi-mode fibers (12x10G TX-RX pairs).

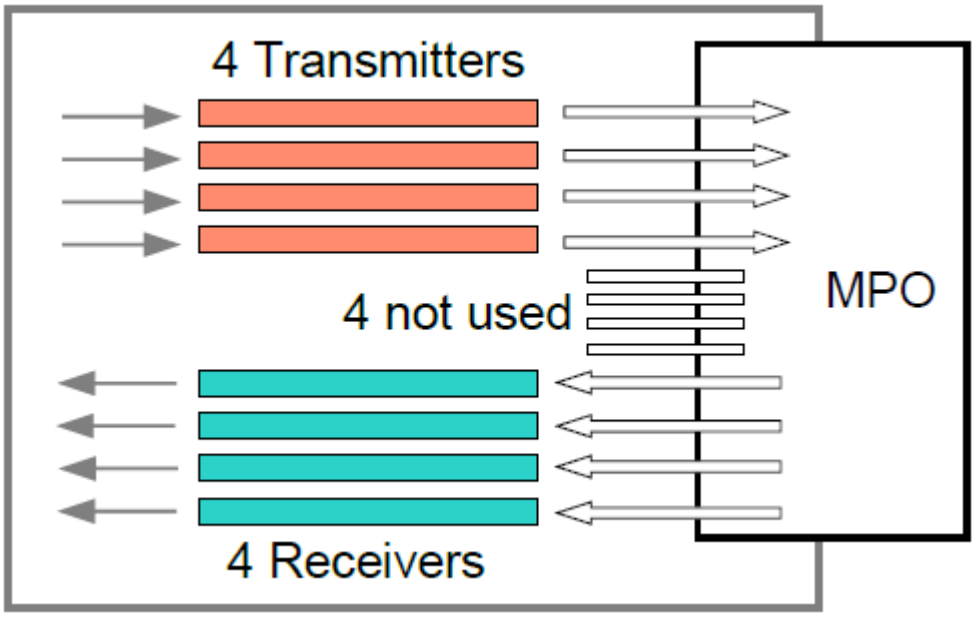




100GBase-SR4 QSFP28 transceivers and 40GBase-SR4 QSFP+ transceivers

The 100GBase-SR4 QSFP28 transceivers and 40GBase-SR4 QSFP+ transceivers have four fibers to transmit and four fibers to receive. These transceivers use eight multi-mode fibers (4 x 25G or 4 x 10G TX-RX pairs) with a 12F MPO connector.

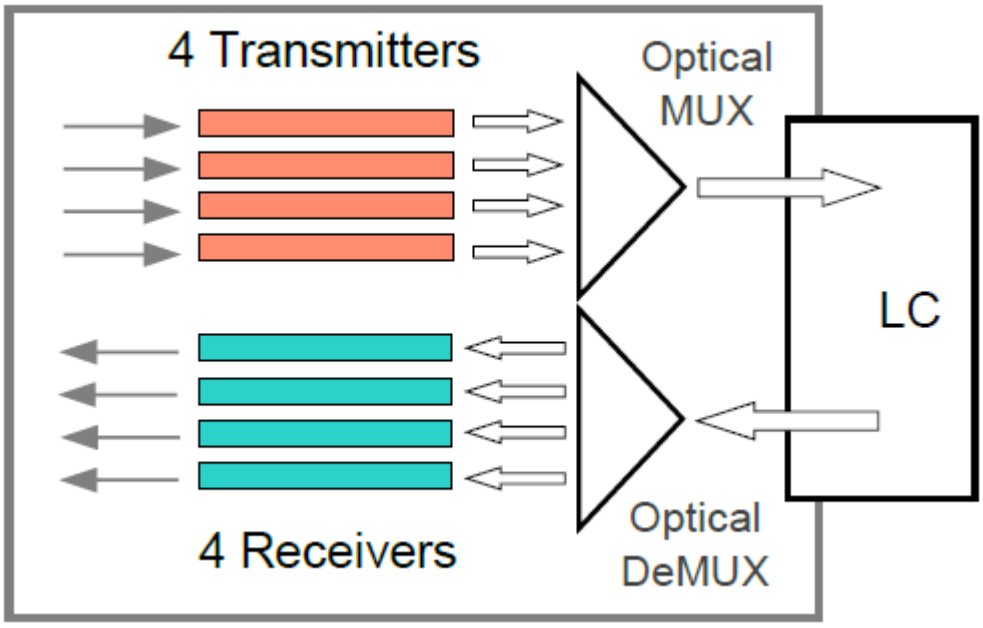




100GBase-LR4 QSFP28 transceivers and 40GBase-LR4 QSFP+ transceivers

The 100GBase-LR4 QSFP28 transceivers and 40GBase-LR4 QSFP+ transceivers use one fiber to transmit and one fiber to receive. These transceivers use two single-mode fibers (TX-RX pair) with an LC connector. It uses four lambdas (or wavelengths) on a pair of fibers, and does not lend itself to "splitting" into four pairs (4x25G or 4x10G).

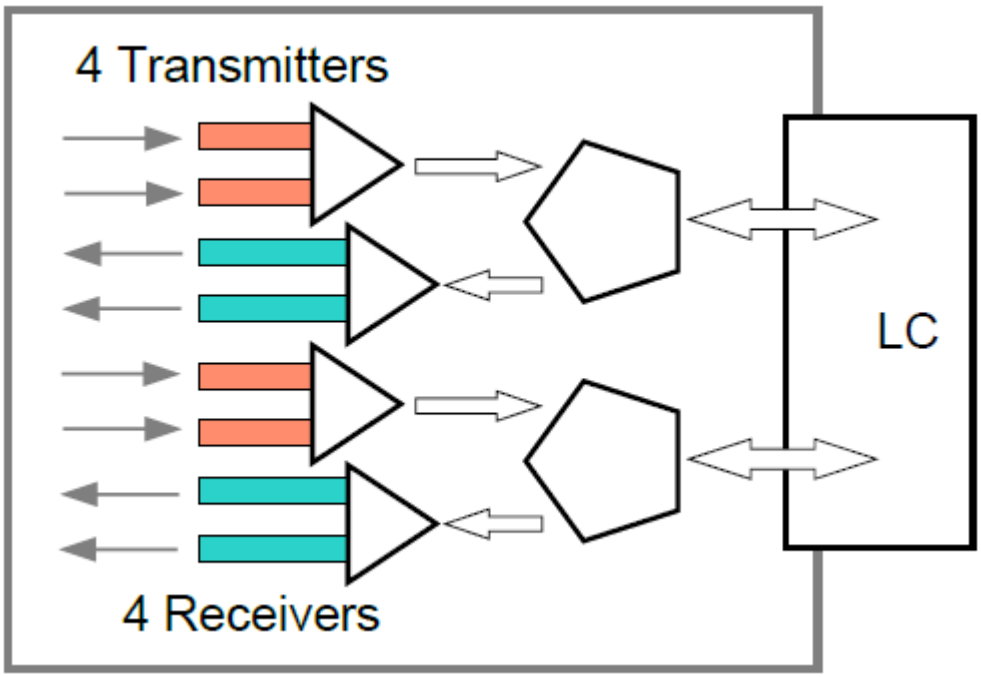




100GBase-SR2 BiDi QSFP28 transceivers and 40GBase-SR2 BiDi QSFP+ transceivers

The 100GBase-SR2 BiDi QSFP28 transceivers and 40GBase-SR2 BiDi QSFP+ transceivers have two fibers to both transmit and receive. These transceivers provide bidirectional connections on existing multi-mode fiber optic cable infrastructure with LC connector. Two different wavelengths are used to transmit and receive. Breakout to 4x25G or 4x10G is not supported.

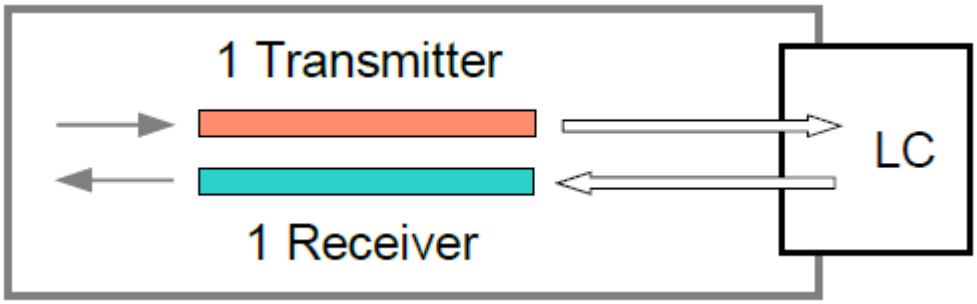




16GbFC SW transceivers, 10Gbase-SR transceivers, and 8GbFC SW transceivers

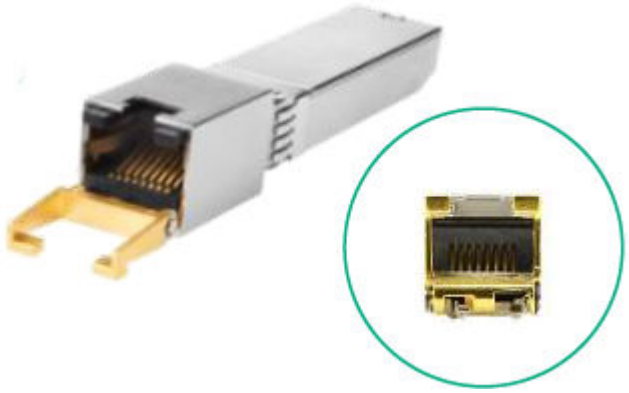
The 16GbFC SW transceivers, 10GBase-SR transceivers, and 8GbFC SW transceivers use one fiber to transmit and one fiber to receive. The transceivers use two multi-mode fibers (TX-RX pair) with LC connectors. The 16GbFC LW transceivers, 10GBase-LR/ER transceivers, and 8GbFC LW transceivers use two single-mode fibers (TX-RX pair) with LC connectors.

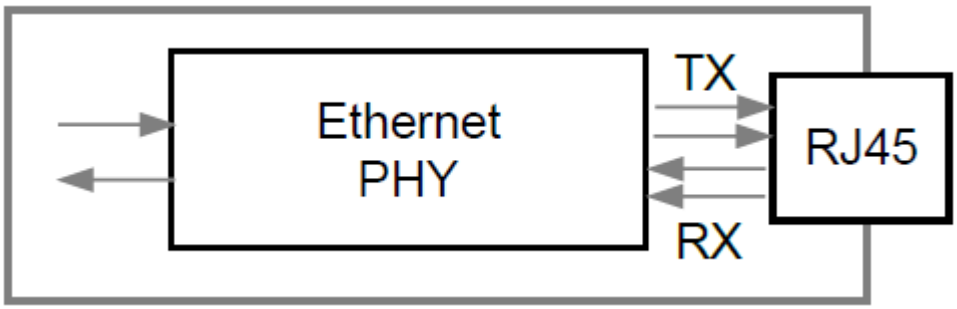




10GBase-T SFP+ transceivers and 1000Base-T SFP transceivers

The 10GBase-T SFP+ transceivers and 1000Base-T SFP transceivers use one copper pair to transmit and one copper pair to receive. These transceivers convert an SFP+/SFP port to a 10GBase-T/1000Base-T RJ45 connection.





Fiber Optics connector types

Lucent Connector (LC)



Transceiver	Speed	Fiber quantity	Transmit (TX)	Receive (RX)
SFP	1G	2	1	1
SFP+	8G, 10G, 16G	2	1	1
SFP28	25G, 32G	2	1	1
QSFP+	40G	2	1	1

Multiple-Fiber Push-On/Pull-Off (MPO) connector



Transceiver	Speed	Fiber quantity	Transmit (TX)	Receive (RX)
QSFP+	40G	8 or 12 (8 used)	4	4
QSFP28	100G	8 or 12 (8 used)	4	4
		24 (20 used)	10	10

Transceiver	Speed	Fiber quantity	Transmit (TX)	Receive (RX)
CXP	120G	24	12	12

NOTE
Other cable connector types, such as SR, ST, MTRJ, and E2000, are not used with HPE Synergy.

Fiber Optics cable types

Figure 1. LC/LC



Figure 2. MPO/MPO



Figure 3. MPO/4xLC



Description	OM3	OM4
Mode type	Multi-Mode	Multi-Mode
Connectors	LC/LC, MPO/MPO, MPO/4xLC	LC/LC, MPO/MPO, MPO/4xLC
Cable jacket color	Aqua	Aqua
Core/cladding (µm)	50/125	50/125
Optical source	VCSEL	VCSEL
Operating wavelengths	850 nm	850 nm
Effective modal bandwidth (850 nm)	2000 MHz-km	4700 MHz-km

Table 1. Maximum Reach

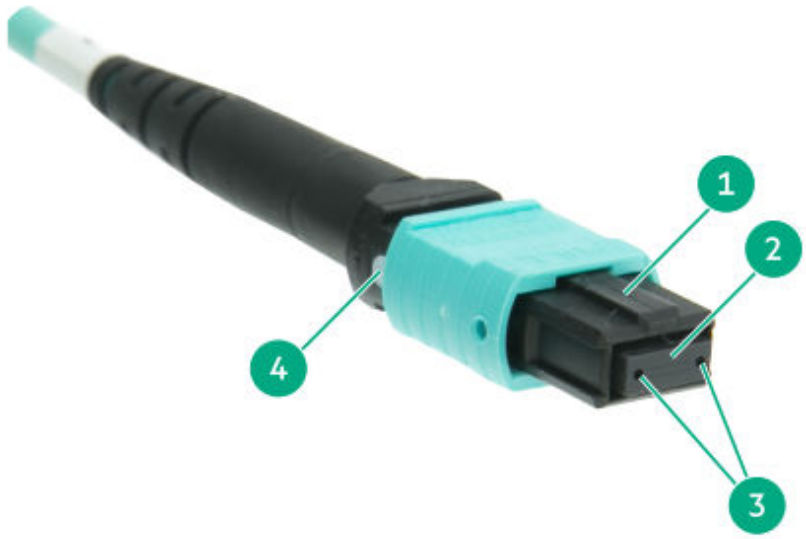
Cable type	OM3	OM4
8Gb FC (SW)	150 m	190 m
10GbE (10Gbase-SR)	300 m	400 m
16Gb FC (SW)	100 m	125 m
40GbE (10Gbase-SR4/eSR4)	100 m/330 m	150 m/550 m
100GbE (100Gbase-SR10)	100 m	150 m

NOTE

Other cable types, such as MPO/6xLC and MPO/12xLC, are not used with HPE Synergy.

MPO Fiber Optics connector details

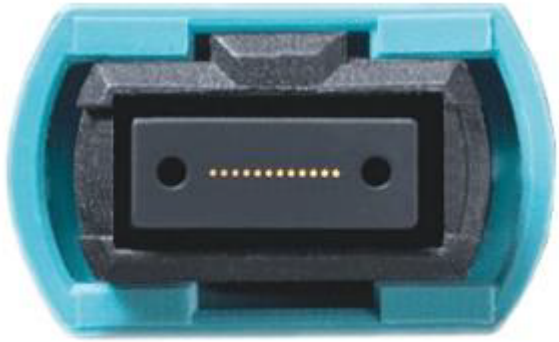
Multi-fiber Push On (MPO) is a connector for ribbon cables with 4 to 48 fibers.



Item	Description
1	Key
2	Fiber position — 1 (left) to 12 (right)
3	Pin holes
4	White dot

There is a 12-fiber MPO connector used for transceivers with HPE Synergy interconnect modules.

Figure 1. 12-fiber MPO female connector



MPO Fiber Optics cable details

Three polarity methods exist for MPO cables, provided by ANSI/TIA-568-C standard: A, B, and C types.

Type	Connection Diagram	Link Drawing
A (Straight-Trough)	1 2 3 4 5 6 7 8 9 10 11 12 / 1 2 3 4 5 6 7 8 9 10 11 12	
B (Cross / Rollover)	1 2 3 4 5 6 7 8 9 10 11 12 / 12 11 10 9 8 7 6 5 4 3 2 1	
C (Cross Pair / Flipped)	1 2 3 4 5 6 7 8 9 10 11 12 / 2 1 4 3 6 5 8 7 10 9 12 11	

NOTE

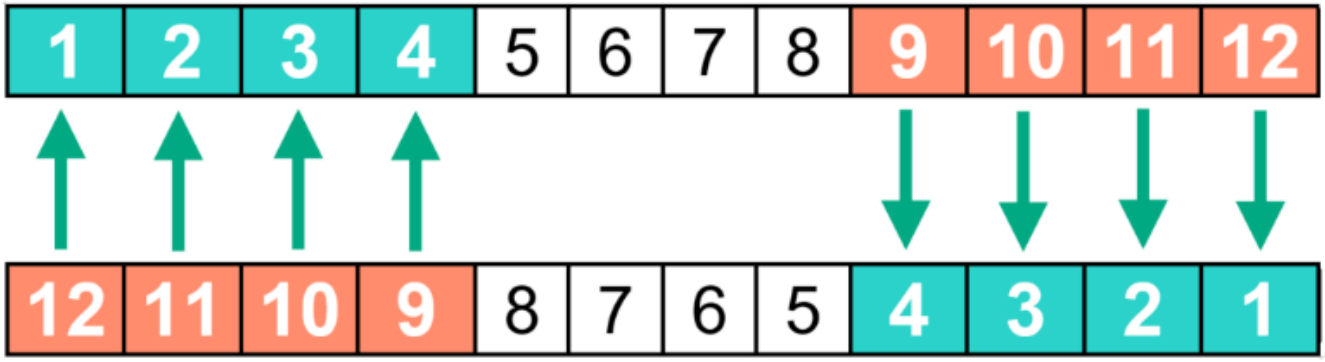
Hewlett Packard Enterprise uses B-type cabling.

In a Type B cable, all the fibers are reversed. This is accomplished by reversing the fiber orders in the connectors to achieve the following fiber/connector pairs:

- Fiber 1 pairs with connector 12
- Fiber 2 pairs with connector 11
- Fiber 3 pairs with connector 10
- Fiber 4 pairs with connector 9
- Fiber 5 pairs with connector 8
- Fiber 6 pairs with connector 7
- Fiber 7 pairs with connector 6
- Fiber 8 pairs with connector 5
- Fiber 9 pairs with connector 4
- Fiber 10 pairs with connector 3
- Fiber 11 pairs with connector 2
- Fiber 12 pairs with connector 1

A Type B cable is used with a 100G/40G parallel optics link, with a single cable connecting the transceivers.

HPE MPO cables have 8 or 12 fibers, with 8 used for 100Gbase-SR4 and 40Gbase-SR4 connections. Channels 1-4 are receiving at one side and need to be connected to channels 12-9 on the transmit side at the other end, and the other way around. RX-TX pairs are 1-12, 2-11, 3-10, and 4-9. Fibers 5-8 are not used.



AOC/DAC cable details

Figure 1. SFP+ to SFP+ DAC



Figure 2. QSFP28 to QSFP28 AOC



Figure 3. QSFP28 to 4xSFP28 DAC



Figure 4. QSFP+ to 4xSFP+ AOC



Description	DAC	AOC
Cable description	Direct Attach Copper cable	Active Optical Cable
Length	1m, 3m, 5m	7m, 10m, 15m
Cable type	Active, passive, copper twin-ax	Active Multi-Mode Fiber
Cable color	Black	Aqua
Connectors at end of cable	QSFP28/QSFP28, QSFP+/QSFP+, QSFP28/4xSFP28, QSFP+/4xSFP+, SFP+/SFP+	QSFP28/QSFP28, QSFP+/QSFP+, QSFP28/4xSFP28, QSFP+/4xSFP+, SFP+/SFP+

Cable type	Connection	Media
Passive copper cable	Direct connections between cable ends	Copper wire
Active copper cable	Electronics within connectors	Copper wire

Cable type	Connection	Media
Active optical cable	Electronics and optics within connectors	Fiber optics

NOTE

Other cable types not used with HPE Synergy: CXP/3xQSFP+, CXP/12xSFP+, QSFP/SFP.

100G Parallel Single-Mode four-channel (PSM4) transceiver information

A PSM4 transceiver is a type of single-mode transceiver that uses a parallel fiber design for reaches:

- Up to 2 km
- Beyond the limits of 100-meter Short Reach four-channel (SR4) multi-mode transceivers

PSM4 transceivers are a low cost and highly configurable transceiver. PSM4 transceivers are built using one laser (instead of four), split into four paths or channels, and separately modulated with electrical data signals. Each channel has its own fibers and is separated throughout the link. PSM4 transceivers use eight fibers with four fibers for transmission and four fibers for receiving. A parallel, eight-fiber MPO optical connector is used.

Subtopics

100G PSM4 transceiver information
MPO Optical connectors — Flat and Angle polished fibers

100G PSM4 transceiver information



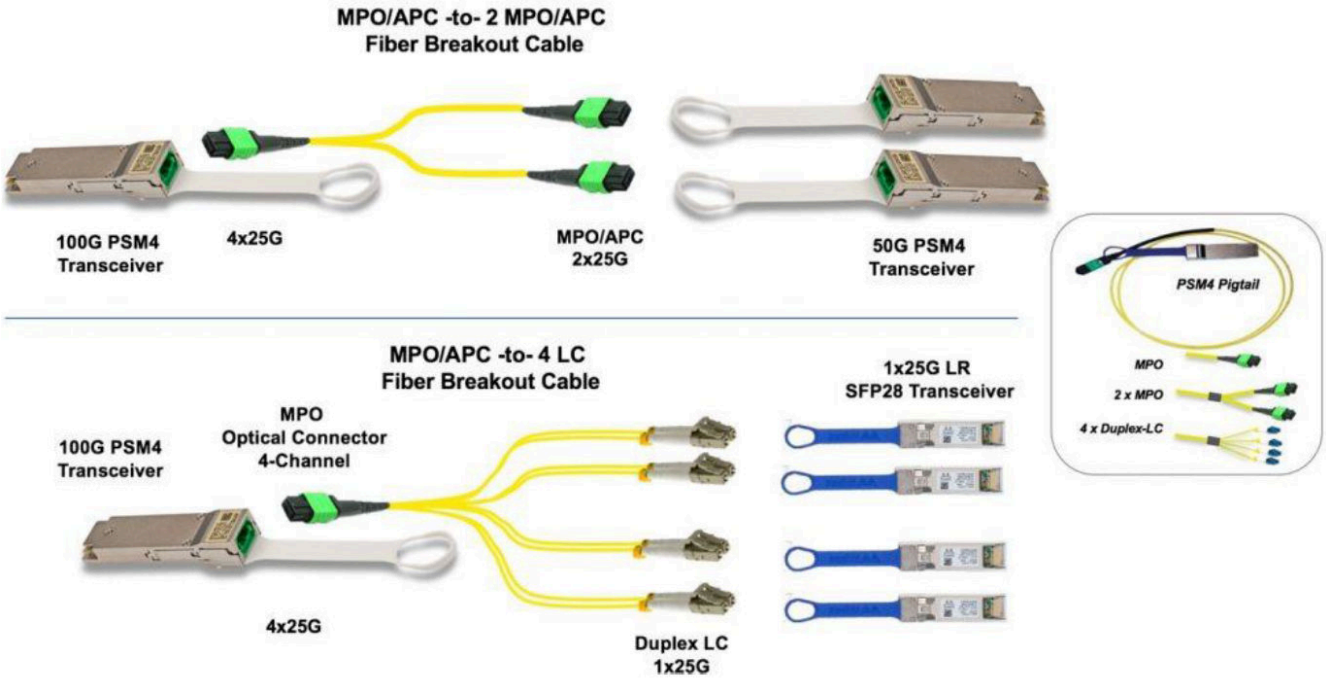
The PSM4 transceiver is the lowest priced 100Gb/s transceiver on the market. The transceiver can use single-mode fiber for long reaches of up to 2 km. The best use case is at reaches less than 500 meters. When tallying up the cost of longer reaches, the cost of the eight fibers adds up for each meter. The CWDM4, using two fibers, becomes more economical.

The 9-µm single-mode fiber is hard to build and align transceiver components with, and requires expensive alignment equipment. Therefore, single-mode transceivers have always been more expensive than multimode transceivers. Multimode transceivers are less expensive than single-mode transceivers, and it is exactly the reverse for the fibers.

Silicon Photonics does away with most of these problems and integrates the optical components and waveguides into a silicon wafer. This basic technology is the same as the one used to build CMOS semiconductor electronic chips. Single-mode transceivers will eventually become more price-competitive with multi-mode transceivers. The PSM4 transceiver is used in various configuration applications. The transceiver can do either of the following:

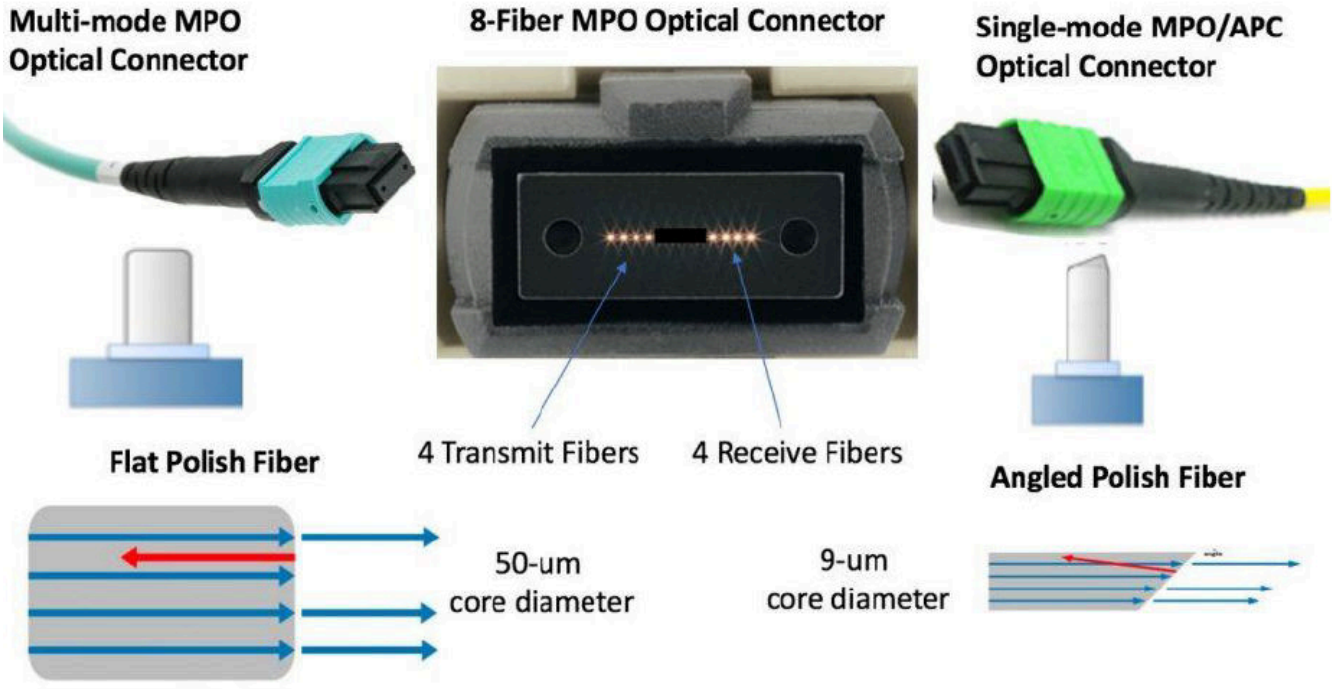
- Bus 100Gb/s point-to-point over 2 km.
- Be broken out into dual 50Gb/s or quad 25Gb/s links for linking to servers, storage, and other subsystems.

Additionally, the breakouts can be made using passive fiber splitter cables or a transceiver/AOC hybrid called a pigtail.



The MPO used in the SR4 multi-mode MPO (aqua-colored) is not the same as the MPO/APC (green- or yellow-colored) for the PSM4. Optical connectors pass through most of the light. Some of the light gets reflected back towards the laser from the inside surface of the fiber end in the connector. The PSM4 transceiver uses tiny core single-mode fiber. It concentrates any back reflections in the connector infrastructure and aims it back at the laser, which can destroy it. The single-mode fiber infrastructure polishes the fiber ends at an angle to divert the back reflections away from the laser. Hence, the name Angle Polished Connector (APC). Multi-mode fiber has a significant 50-µm core and the large area disperses the back reflections, making it less of a problem. In reality, the MPO connectors use 12 fibers, with four left unused.

MPO Optical connectors — Flat and Angle polished fibers



For more information about PSM4 transceivers, see **100G PSM4 Specification**.

HPE Synergy documentation

The **HPE Synergy Documentation Map** in the Hewlett Packard Enterprise Support Center provides a comprehensive, one stop location for all HPE Synergy documentation, including installation instructions, maintenance and service guides, best practices, and links to additional resources.

In addition, see the **HPE Synergy Software Release Information** site for firmware updates and software release information.

Websites

General websites

Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix

https://www.hpe.com/storage/spock

Technical papers and analyst reports

https://www.hpe.com/us/en/resource-library

For additional websites, see Support and other resources.

Support and other resources

Subtopics

Accessing Hewlett Packard Enterprise Support
HPE product registration
Accessing updates
Remote support
Warranty information
Regulatory information
Documentation feedback

Accessing Hewlett Packard Enterprise Support

- For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:

  https://www.hpe.com/info/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

  https://www.hpe.com/support/hpesc

Information to collect

- Technical support registration number (if applicable)
- Product name, model or version, and serial number
- Operating system name and version
- Firmware version
- Error messages
- Product-specific reports and logs

- Add-on products or components
- Third-party products or components

HPE product registration

To gain the full benefits of the Hewlett Packard Enterprise Support Center and your purchased support services, add your contracts and products to your account on the HPESC.

- When you add your contracts and products, you receive enhanced personalization, workspace alerts, insights through the dashboards, and easier management of your environment.
- You will also receive recommendations and tailored product knowledge to self-solve any issues, as well as streamlined case creation for faster time to resolution when you must create a case.

To learn how to add your contracts and products, see **https://www.hpe.com/info/add-products-contracts**.

Accessing updates

- Some software products provide a mechanism for accessing software updates through the product interface. Review your product documentation to identify the recommended software update method.
- To download product updates:

  Hewlett Packard Enterprise Support Center

  https://www.hpe.com/support/hpesc

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  https://www.hpe.com/software/hpesoftwarecenter

- To subscribe to eNewsletters and alerts:

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- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

  https://www.hpe.com/support/AccessToSupportMaterials

> **IMPORTANT**
> Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Account set up with relevant entitlements.

Remote support

Remote support is available with supported devices as part of your warranty or contractual support agreement. It provides intelligent event diagnosis, and automatic, secure submission of hardware event notifications to Hewlett Packard Enterprise, which initiates a fast and accurate resolution based on the service level of your product. Hewlett Packard Enterprise strongly recommends that you register your device for remote support.

If your product includes additional remote support details, use search to locate that information.

HPE Get Connected

https://www.hpe.com/services/getconnected

HPE Tech Care Service

https://www.hpe.com/services/techcare

HPE Complete Care Service

https://www.hpe.com/services/completecare

Warranty information

To view the warranty information for your product, see the **warranty check tool**.

Regulatory information

To view the regulatory information for your product, view the Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products, available at the Hewlett Packard Enterprise Support Center:

https://www.hpe.com/support/Safety-Compliance-EnterpriseProducts

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

https://www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

https://www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

https://www.hpe.com/info/environment

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