Overview

HPE Virtual Connect SE 16Gb FC Module for HPE Synergy

The HPE Virtual Connect SE 16Gb FC Module for HPE Synergy is an SAN interconnect with a wire-once change-ready technology that allows workloads to be moved without modifying the network. It provides simple, seamless connectivity between virtualized Synergy Compute Modules and SAN fabric. It complements highly available, disaggregated architecture of HPE Virtual Connect SE 40GB F8 Module that is based on composable fabric. Both Virtual Connect modules are managed by composer based HPE OneView. You can reduce costs and simplify connections to SANs, consolidate your network connections and enable administrators to add, replace and recover compute modules resources on-the-fly. Being standards-based it looks like a pass-thru device to the fibre channel network, yet provides all the key benefits of integrated switching including high performance 16Gb uplinks to the SAN. The integrated design frees up rack space, reduces power and cooling requirements, and reduces cables and small form-factor pluggable transmitters.

The HPE Virtual Connect SE 16Gb FC Module for HPE Synergy is protected by HPE Services 3-Years Next Business Day 9x5 Hardware Support.

Figure 1 The HPE Virtual Connect SE 16Gb FC Module for HPE Synergy Front View

1. Q1-Q2 QSFP+ ports
2. 1-8 sfp+ ports

3. Q3-Q4 QSFP+ ports

Models

The HPE Virtual Connect SE 16Gb FC Module for HPE Synergy

Supported Products

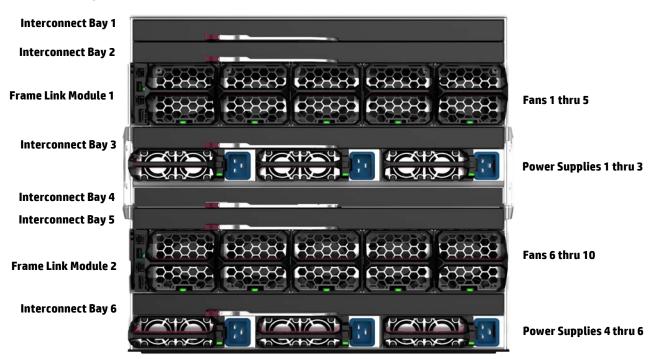|	
Compatibility	The HPE Virtual Connect SE 16Gb FC Module for HPE Synergy supports the following hardware.
HPE Compute Module	HPE Compute Modules:

- HPE Synergy 480 Gen9 Configure-to-order Compute Module
- HPE Synergy 480 Gen9 Configure-to-order w/o Drive Bays Compute Module
- HPE Synergy 480 Gen9 Configure-to-order Expanded Storage Compute Module
- HPE Synergy 660 Gen9 Configure-to-order SAS Compute Module
- HPE Synergy 660 Gen9 Configure-to-order SATA Compute Module
- HPE Synergy 660 Gen9 Configure-to-order with Expanded Storage Compute Module

Fibre Channel Host Bus Adapters (HBA)
- HPE Synergy 3530C 16Gb Fibre Channel Host Bus Adapter
- HPE Synergy 3830C 16Gb Fibre Channel Host Bus Adapter

NOTE: Consult individual compute module TechSpecs for specific adapter support

Supported Configurations

Interconnect Bay 1

Interconnect Bay 2

Frame Link Module 1 — Fans 1 thru 5

Interconnect Bay 3 — Power Supplies 1 thru 3

Interconnect Bay 4

Interconnect Bay 5

Frame Link Module 2 — Fans 6 thru 10

Interconnect Bay 6 — Power Supplies 4 thru 6

HPE Synergy 12000 Frame - Rear View

Mezzanines

Port Mapping   Port mapping differs slightly between full height and half-height compute modules due to the support for additional Mezzanine cards on the full height version.

HPE 12000 Synergy Frame

NOTE: For easy of representation and understanding paring Interconnect Bay (ICB) are placed adjacent instead of linear fashion as in the real-frame. In real-frame Interconnect Bay 1-6 from top to bottom, [ICB 1] and [ICB 4] forms the pairing Bay, so does [ICB 2] and [ICB 5] and [ICB 3] and [ICB 6]. Hence the below representation.

Interconnect Module Configurations	Compute Module Network Adapters Used
Frame	

Supported Products

[ICB 1]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 4]	HPE Synergy 16Gb HBA
[ICB 2]	Empty/Interconnect	->	Empty/Interconnect	[ICB 5]	Empty/Adapter
[ICB 3]	Empty/Interconnect	->	Empty/Interconnect	[ICB 6]	Empty/Adapter

Frame

[ICB 1]	Empty/Interconnect	->	Empty/Interconnect	[ICB 4]	Empty/Adapter
[ICB 2]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 5]	HPE Syner16Gb HBA
[ICB 3]	Empty/Interconnect	->	Empty/Interconnect	[ICB 6]	Empty/Adapter

Frame

[ICB 1]	Empty/Interconnect	->	Empty/Interconnect	[ICB 4]	Empty/Adapter
[ICB 2]	Empty/Interconnect	->	Empty/Interconnect	[ICB 5]	Empty/Adapter
[ICB 3]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 6]	HPE Syner16Gb HBA

Frame

[ICB 1]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 4]	HPE Syner16Gb HBA
[ICB 2]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 5]	HPE Syner16Gb HBA
[ICB 3]	Empty/Interconnect	->	Empty/Interconnect	[ICB 6]	Empty/Adapter

Frame

[ICB 1]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 4]	HPE Syner16Gb HBA
[ICB 2]	Empty/Interconnect	->	Empty/Interconnect	[ICB 5]	Empty/Adapter
[ICB 3]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 6]	HPE Syner16Gb HBA

Frame

[ICB 1]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 4]	HPE Syner16Gb HBA
[ICB 2]	Empty/Interconnect	->	Empty/Interconnect	[ICB 5]	Empty/Adapter
[ICB 3]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 6]	HPE Syner16Gb HBA

Frame

[ICB 1]	Empty/Interconnect	->	Empty/Interconnect	[ICB 4]	Empty/Adapter
[ICB 2]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 5]	HPE Syner16Gb HBA
[ICB 3]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 6]	HPE Syner16Gb HBA

Frame

[ICB 1]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 4]	HPE Syner16Gb HBA
[ICB 2]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 5]	HPE Syner16Gb HBA
[ICB 3]	HPE VC SE 16Gb	->	HPE VC SE 16Gb	[ICB 6]	HPE Syner16Gb HBA

NOTE: This configuration is only applicable for single frame, not for multi-frame

Transceivers   **16Gb Optical Transceivers (SFP+)**

HPE B-series 16Gb SFP+ Short Wave Transceiver

8Gb Optical Transceivers (SFP+)

Supported Products

HPE 8Gb Shortwave B-series Fibre Channel 1 Pack SFP+ Transceiver

Optical Cables	**PremierFlex OM4 type cables**
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable
	LC-LC for between 4/8 Gb and 4/8 Gb Fibre Channel devices
	HPE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable
	HPE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable
QSFP to 4xLC Breakout Cables	HPE Premier Flex MPO to 4xLC 5m Cable
	HPE Premier Flex MPO to 4xLC 15m Cable
OM4 MPO/MPO Multi-mode Cables	HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fibre 10m Cable
	HPE Premier Flex MPO/MPO Multi-mode OM4 8 Fibre 50m Cable
	HPE Premier Flex MPO/MPO OM4 100m (12ft) Cable
Stacking Configuration	Stacking is only supported on Virtual Connect SE 40Gb F8 Modules via Master/Satellite stacking or between two Virtual Connects with M-LAG. The Virtual Connect FC modules don't support stacking.

Standard Features

Product Features   **Performance**
- (8) 4/8/16Gb Auto-negotiating Fibre Channel uplinks connected to external SAN switches
- (16) 16Gb Fibre Channel downlink ports provide maximum HBA performance
- HBA Aggregation on uplinks ports using ANSI T11 standards-based N_Port ID Virtualization (NPIV) technology
- Allows up to 255 virtual machines running on the same physical compute modules to access separate storage resources
- Extremely low latency throughput provides switch-like performance.
- FIPS 140-2 support

Management
- Storage management is no longer constrained to a single physical HBA on a compute module
- Managed with composer based HPE OneView
- Does not add to SAN switch domains or require traditional SAN management
- Appears as a pass-thru device to the SAN Manager

Virtual server profiles
- Provisioned storage resource is associated directly to a specific virtual machine - even if the virtual server is re-allocated within the Synergy Frame
- Ability to pre-configure compute module I/O connections
- Ability to move, add, or change compute modules on the fly
- Once defined, SAN Administrators don't have to be involved in compute modules changes

Options
- HPE Virtual Connect SE 40GB F8 Module for HPE Synergy

Service and Support, HP Support Services and Warranty Information

Service and Support   HPE Technology Services offers you a rich portfolio of consulting and support services designed to add value to our core products and solutions. We have the know-how and experience to put technology to work for you. We work closely with you, as your strategic partner, leveraging our full services portfolio to make sure that everything works to help optimize your enterprise.

Choose from services aligned to our product offerings and lifecycle. From proactive onsite services to innovative support when your products are connected to Hewlett Packard Enterprise, you choose the precise level of attention and support your business demands.

HPE Technology Services for HPE Synergy

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

Protect your business beyond warranty with HPE Support Services

HPE support services offer complete care and support expertise with committed response choices that are designed to meet your IT and business needs.

HPE Foundation Care services offer scalable reactive support-packages for HPE Synergy and software. You choose the type and level of service that is most suitable for your IT and business needs.

HPE Proactive Care keeps your system stable and reliable helping to prevent problems and reduce outages through proactive service management and enhanced technical response.

Advise, transform, integrate, support, automate, and flex   **HPE Technology Services** helps you get the most out of what you have today and transition to HPE Synergy, a composable infrastructure, at your pace and from wherever you are on the journey.

Start with the HPE Transformation Workshop to ensure that your business and IT organizations collaborate, define the topline strategy for composable, software-defined, cloud-ready infrastructure and kick-start your projects confidently. This workshop clarifies your business requirements and the issues that IT and operations teams must resolve in order to meet these requirements. A detailed executive briefing or high-level report summarizes the strategies, high-level plan and functional requirements.

HPE Modernization and Migration Services helps you choose the right platform for the right workload at the right cost and evolve your IT infrastructure, processes and organization taking advantage of "on-hybrid infrastructure" innovations such as composable, converged, software-defined, technologies. Hewlett Packard Enterprise experts advise, transform, integrate and implement for platform refresh, datacenter consolidation virtualization, migration and automation projects.

HPE Flexible Capacity is a pay per use model for on premise infrastructure. This offers needed HPE Synergy capacity in the datacenter, plus a buffer of additional capacity. As HPE Synergy will be a dynamic environment, this provides enough room to grow your environment, but only pay for actual metered use. Technology transitions and refresh can be built in, infrastructure and services are billed monthly, enabling you to align costs to business use.

HPE Datacenter Care-Infrastructure Automation (DC-IA) is an extension to HPE Datacenter Care and delivers enterprise-grade support, advice, guidance and best practices for infrastructure automation. The service also includes Enterprise editions of automation tools including Enterprise Chef and selected others.

Service and Support, HP Support Services and Warranty Information

The DC-IA Center of Excellence (CoE) is staffed with highly trained experts who have specific expertise on integrating Chef with composer based HPE OneView.

Deploy and integrate

HPE Synergy First Frame Installation and Startup - Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Fibre Channel Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service.

HPE Synergy Additional Frame Installation and Startup Service - Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.

Optimized Support

Choose the right support to maximize uptime, free up your resources, and achieve improved value—as you get the most out of the existing IT assets while accelerating time-to-revenue.

HPE Proactive Care Advanced - 24x7 coverage, three year Support Service

Builds and incorporates on Proactive Care and also gives customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business critical IT, and Critical Incident Management to help so the business is not affected if there is a system or device outage. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues.
http://www8.hp.com/h20195/v2/GetPDF.aspx/4AA5-3259ENW.pdf

Standard Support

HPE Proactive Care with 24x7 coverage, three year Support Service

Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center specialists for start to finish case management plus proactive reports and recommendations for firmware and software management and best practice advice. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues.
http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855ENW.pdf

HPE Education

Training your IT staff is critical to help drive the value of HPE Synergy with increased efficiencies and better business outcomes. Training is key to the transformation and management of HPE Synergy.

Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.
Parts and components that have reached their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual, product QuickSpecs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.
The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

For more information

Additional Support Services can be found at HPE Support Services Central
http://ssc.hpe.com

Warranty

Interconnect Limited Warranty includes 3 year Parts, 3 year Labor, 3-year on-site support. Additional information regarding worldwide limited warranty and technical support is available at:

Service and Support, HP Support Services and Warranty Information

http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Service and Support Offerings

Proactive Care Services

Installation Services

Additional Support Services can be found at HPE Support Services Central

http://ssc.hpe.com

Technical Specifications

Shipping Dimensions	**Length**	16.918 in (429 mm)	
	Width	11.051 in (280 mm))	
	Height	1.082 in (25 mm)	
Shipping Weight		1.497 kg (3.18 lbs)	
Product Specifications Hardware	**Performance**	16 Gb/sec line speed, full duplex Maximum frame size 2148 bytes (2112 byte payload)	
	Bandwidth	852 MB, Full Duplex @ 4-Gbps	
		1704 MB, Full Duplex @ 8-Gbps	
		3408 MB, Full Duplex @ 16-Gbps	
	Aggregate Bandwidth	Up to 768 Gbps (24 ports x 16 Gbps x 2 for full duplex)	
	Fabric Latency (intra-switch)	700 nSec. Latency increases as input port speed is lower than the output port speed.	
	Number of Fibre Channel Ports	12 external 4/8/16-Gbps ports	
		12 internal 16-Gbps ports	
	External Port Type	Configured as Node port s (N_Port), 16Gb, 8Gb or 4Gb auto- negotiating SFP ports	
	Internal Port Type	Configured as Fabric Node port (N_Port), 16Gb	
	Classes of Service	Class 2 and Class 3 Fibre Channel services	
	Scalability	Does not contribute to the total switch limit. See the SAN Design Guide for latest supported configurations.	
	Buffer Credits	8 buffer credits per port, ASIC embedded memory	
	Connectors and Cabling	QSFP+ and SFP+ optical hot-pluggable transceiver with LC connector	
	Indicators	Port ID Indicator	
		Module Status Indicator	
		Port Link/Activity Indicator	
		Module Locator (UID)	
	Dimensions	Width	7.59 in (192.79mm)
		Depth	10.57 in (268.48mm)
		Height	1.1 in (27.94mm)
	Weight	1.497kg (3.3 lbs)	
	Environmental Ranges	Specification	10C to 35C (50F to 95F)
		Temperature Range	
		Operating	10C to 35C (50F to 95F)
		Shipping	-40C to 60C (-40F to 140F)
		Storage	-20°C to 60°C (-4F to 140°F)
		Maximum wet bulb temperature	30C (80F)
		Relative humidity (noncondensing)	

Technical Specifications

	Operating	10% to 90%
	Shipping	10% to 90%
	Storage	10% to 95%
	Specification	10C to 35C (50F to 95F)
Power Specification	12V @ 4.65A (56 W)	

Product Specifications Software	**Industry Standard NPIV Support**	The Virtual Connect Fibre Channel module works by aggregating multiple FC HBA ports over a single N-port uplink through the use of N_port_ID virtualization (NPIV). NPIV allows multiple distinguishable identities (multiple port WWNs and port IDs) over a single N-port connection. Most Fibre Channel SAN switch vendors have support for NPIV in their latest firmware release. By conforming to the NPIV standard, SAN equipment interoperability simplified. The Virtual Connect Fibre Channel Module Provides basic 4:1, 8:1, or 12:1 NPIV Fibre Channel concentration.
	Data Center Connectivity	Each Virtual Connect Fibre Channel module supports up to 12 SAN fabrics and is typically connected to a Fibre Channel switch that has been configured to run in NPIV mode. The 8 uplink ports are speed selectable from 16, 8 or 4Gb/s.
		The setup allows SAN administrators to name the fabric that servers will connect into and set the oversubscription rate. Fibre Channel boot parameters and WWN administration are configurable options that can be integrated into server profiles.
		In an NPIV environment, there is an initial brief login function between the Virtual Connect Fibre Channel Module and the data center switch. Once completed, all HBA connections appear as though they are directly connected between the compute modules and the SAN switch. The Virtual Connect Fibre Channel Module appears as a pass-thru device to the SAN, yet cables are reduced as much as 12:1.
	Management Features	Simple and intuitive Graphical User Interface (GUI) of composer based HPE OneView for defining, configuring, and managing all elements of the SAN. Comprehensive administration, definition, and management of Ethernet Networks, Shared Uplink Sets using VLANs, SAN Fabric management, and Server Profiles Management of user accounts, enclosure, Virtual Connect settings, and firmware updates WWN Address Administration allows local administration of predefined WWN addresses ranges to allow pre-provisioning of SAN volumes.

Management and Standards Support	**Standards**	- ANSI T11 N_Port ID Virtualization - FC-PH Rev. 4.3 - FC-PH-2 - FC-PH-3 - FC-AL Rev 4.6 - FC-AL-2 Rev 7.0 - FC-FLA - FC-GS - FC-GS-2 - FC-GS-3 - FC-FG - FC-VI - FC Element MIB RFC 2837

Technical Specifications

		• Fibre Alliance MIB Version 4.0
Safety and Compliance	**Safety Certifications**	UL/CUL Recognition to UL/CSA 60950-1
		TUV to EN 60950-1
		CB report and certificate to IEC 60950-1 with all country deviations
		CE Marking
Electromagnetic Emissions Certifications FCC Part 15 Class A	FCC Part 15 Class A	
	EN 55022 Class A (CISPR22 Class A)	
	VCCI Class A	
	AS/NZS 3548 Class A or AS/NZS CISPR22 Class A	
	MIC Class A	
	CE Marking	
Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett Packard Enterprise offers end-of-life Hewlett Packard Enterprise product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: **http://www.hp.com/go/green**. To recycle your product, please go to: **http://www.hp.com/go/green** or contact your nearest Hewlett Packard Enterprise sales office. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.
		The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard Enterprise web site at: **http://www.hp.com/go/green**. These instructions may be used by recyclers and other WEEE treatment facilities as well Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
1-Dec-2015	Version 1	Created	New QuickSpecs

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