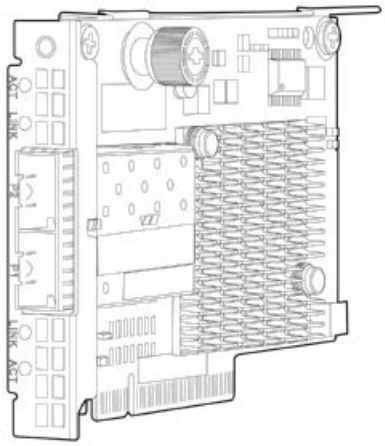
Overview

HPE Ethernet 10Gb 2-port 546FLR-SFP+ Adapter

The HPE Ethernet 10Gb 2-port 546FLR-SFP+ adapter for ProLiant Gen9 rack servers are designed to optimize Cloud efficiency, and improve performance and security of applications – especially where I/O, block storage and database performance are critical and the need for maximum VM density and up-scalability are greatest.

It offers a rich set of offload technologies including overlay network tunneling and storage as well as RDMA over Converged Ethernet (RoCE) capabilities that increase host efficiency and virtualization performance.

The HPE FlexFabric 546FLR-SFP+ can provide up to 40Gbps of converged bi-directional Ethernet bandwidth, helping to alleviate network bottlenecks.



HPE Ethernet 10Gb 2-port 546FLR-SFP+ Adapter

Models

HPE Ethernet10Gb 2-port 546FLR-SFP+ Adapter	779799-B21
HPE Ethernet 10Gb 2-port 546FLR-SFP+ FIO Adapter	779800-B21

Kit Contents

- HPE FlexFabric 10Gb 2-port 556FLR-SFP+ Adapter
- Quick install card
- Product warranty statement

Compatibility

HPE ProLiant Server Support

- HPE ProLiant DL380 Gen9
- HPE ProLiant DL360 Gen9
- HPE ProLiant DL180 Gen9
- HPE ProLiant DL160 Gen9
- HPE ProLiant DL120 Gen9
- HPE ProLIant DL80 Gen9
- HPE ProLiant DL60 Gen9
- HPE ProLiant DL20 Gen9
- HPE ProLiant DL580 Gen9
- HPE ProLiant DL560 Gen9
- HPE Apollo 6000 Gen9
- HPE Apollo 2000 Gen9
- HPE Apollo 4500 Gen9

Tape Drive

Nearline Tape Products:

- D2D
- VLS
- ESL libraries
- EML libraries
- ESL G3 library
- MSL G3 libraries (2024, 4048, 8096)

Standard Features

Product Features

- Dual 10Gb ports provide up to 40Gb bi-directional per adapter
- Converges RoCE with LAN traffic on a single 10 GbE wire
- Tunnel Offload support for VXLAN and NVGRE
- RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency
- Advanced storage offload processing freeing up valuable CPU cycles
- Supports UEFI and legacy boot options
- Industry-leading througHPEut and latency performance
- Over eight million small packets/s, ideal for web/mobile applications, mobile messaging, and social media
- FlexibleLOM Adapter
- Greater bandwidth with PCIe 3.0
- Includes 128MB of onboard memory
- Jumbo Frames support
- Support for Preboot eXecution Environment (PXE)
- Supports receive-side scaling (RSS) for the efficient distribution of network receive processing across multiple CPUs in multiprocessor systems
- Support for Windows SMB Direct
- Supports VMWare NetQueue, Microsoft Virtual Machine Queue (VMQ) for Windows
- Optimized host virtualization density with SR-IOV support

Dual-port 10 Gigabit Ethernet ThrougHPEut (theoretical bandwidth)	The 20,000 Mbps bi-directional Ethernet transfer rate per port (40 Gbps aggregate bi-directional), providing the network performance needed to improve response times and alleviate bottlenecks. 10Gb Ethernet bandwidth is ideal for high performance computing, database clusters.
PCI Express Interface	The HPE 546FLR-SFP+ is designed with an eight lane (x8) PCI Express bus based on the PCIe 3.0 standard. The adapter is backward compatible with four lane (x4) PCI Express, automatically auto-sensing between x8 and x4 slots.
Jumbo Frames	The HPE 546FLR-SFP+ adapter supports Jumbo Frames, permitting up to a 9,200 byte (KB) transmission unit (MTU) when running Ethernet I/O traffic. This is over 5X the size of a standard 1500-byte Ethernet frame. With Jumbo Frames, networks can achieve higher througHPEut performance and lower CPU utilization. These attributes are particularly useful for storage, database transfer and tape backup operations.
DPDK	The HPE 546FLR-SFP+ adapter supports DPDK with benefit for packet processing acceleration and use in NFV deployments
MSI-X	Message Signaled Interrupt (Extended) provides performance benefits for multi-core servers by load balancing interrupts between CPUs/cores.
TCP/IP Stateless Offloading	For overall improved system response, the HPE 546FLR-SFP+ adapter supports standard TCP/IP offloading techniques including: • TCP/IP checksum offload (TCO) moves the TCP and IP checksum offloading from the CPU to the network adapter. • Large Send Offload (LSO) or TCP Segmentation Offload (TSO) allows the TCP segmentation to be handled by the adapter rather than the CPU.

Standard Features

RDMA (RoCE)	RoCE is an accelerated I/O delivery mechanism that allows data to be transferred directly from the user memory of the source server to the user memory of the destination server bypassing the operating system (OS) kernel. Because the RDMA data transfer is performed by the DMA engine on the adapter's network processor, the CPU is not used for the data movement, freeing it to perform other tasks such as hosting more virtual workloads (increased VM density). RDMA also bypasses the host's TCP/IP stack, in favor of upper layer InfiniBand protocols implemented in the adapter's network processor. The bypass of the TCP/IP stack and the removal of a data copy step reduce overall latency to deliver accelerated performance for applications such as Microsoft Hyper-V Live Migration, Microsoft SQL and Microsoft SharePoint with SMB Direct.
Tunnel Offload	Minimize the impact of overlay networking on host performance with tunnel offload support for VXLAN and NVGRE. By offloading packet processing to adapters, customers can use overlay networking to increase VM migration flexibility and network scale with minimal impact to performance. HPE Tunnel Offloading increases I/O througHPEut, reduces CPU utilization, and lowers power consumption. Tunnel Offload supports VMware's VXLAN and Microsoft's NVGRE solutions.
Interrupt Coalescing	Interrupt coalescing (interrupt moderation) groups multiple packets, thereby reducing the number of interrupts sent to the host. This process optimizes host efficiency, leaving the CPU available for other duties.
802.1p QoS Tagging	IEEE quality of service (QoS) 802.1p tagging allows the adapter to mark or tag frames with a priority level across a QoS-aware network for improved traffic flow.
802.1Q VLANs	IEEE 802.1Q virtual local area network (VLAN) protocol allows each physical port of the HPE 556FLR-SFP+ adapter to be separated into multiple virtual NICs for added network segmentation and enhanced security and performance. VLANs increase security by isolating traffic between users. Limiting the broadcast traffic to within the same VLAN domain also improves performance.

Network Management

Management Support	Like all HPE ProLiant server adapters, the HPE 546FLR-SFP+ adapter ships with agents that can be managed from HPE Systems Insight Manager or other management application that support SNMP.
Server Integration	The HPE 546FLR-SFP+ adapter is a validated, tested, and qualified solution that is optimized for HPE ProLiant servers. Hewlett Packard Enterprise validates a wide variety of major operating systems drivers with the full suite of web-based enterprise management utilities including HPE Intelligent Provisioning and HPE Systems Insight Manager that simplify network management. This approach provides a more robust and reliable networking solution than offerings from other venders and provides users with a single point of contact for both their servers and their network adapters.
Configuration Utilities	Each HPE 546FLR-SFP+ ships with a suite of operating system-tailored configuration utilities that allow the user to enable initial diagnostics and configure adapter teaming. This includes a patented teaming GUI for Microsoft Windows operating systems. Additionally, support for scripted installations of teams in a Microsoft Windows environment allow for unattended OS installations.
LED Indicators	Bracket LED indicators show link integrity and network activity for easy troubleshooting.
Preboot eXecution Environment	Support for PXE enables automatic deployment of computing resources remotely from anywhere. It allows a new or existing server to boot over the network and download software, including the operating system, from a

Standard Features

(PXE)	management/ deployment server at another location on the network.Additionally, PXE enables decentralized software distribution and remote troubleshooting and repairs.
Warranty	Maximum: The remaining warranty of the HPE product in which it is installed (to a maximum three-year, limited warranty). Minimum: One year limited warranty. Additional information regarding worldwide limited warranty and technical support is available at: **http://h17007.www1.hpe.com/us/en/enterprise/servers/warranty/index.aspx#.V4e3tPkrJhE**

Service and Support

NOTE: Ethernet adapters are supported as a part of the HPE Server Infrastructure, unless specified otherwise. No separate carepacks are needed to be purchased.

HPE Technology Services for Enterprise Servers

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 Care Pack Services

HPE Care Pack Services enable you to order the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement for the term you select.

Get connected to HPE to improve your support experience	Connecting products to Hewlett Packard Enterprise will help prevent problems with 24x7monitoring, prefailure alerts, automatic call logging, and parts dispatch. With Connected products, you can have a dashboard to manage your IT anywhere, anytime, from any device.
HPE Support Center	Personalized online support portal with access to information, tools and experts to support Hewlett Packard Enterprise business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more **http://www.HPE.com/go/HPEsc** The HPE Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Care Pack or HPE contractual support agreement. **NOTE:** The HPE Support Center Mobile App is subject to local availability
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.
Warranty / Service Coverage	For ProLiant servers and storage systems, this service covers HPE-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by Hewlett Packard Enterprise as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media

Service and Support

retention service feature option.

For more information	To learn more on services for HPE ESSN Options, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit: **http://www.HPE.com/services/proliant** or **https://www.hpe.com/us/en/servers**

Technical Specifications

Direct Attach Cable	HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 0.5m Direct Attach Copper Cable	487649-B21
	HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 1m Direct Attach Copper Cable	487652-B21
	HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
	HPE BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPEE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
	NOTE: Direct Attach Cable (DAC) must be purchased separately for copper environments.	
Fiber Optic Modules	HPE BladeSystem c-Class 10Gb SFP+ SR Transceiver	455883-B21
	NOTE: Fiber transceivers and cables must be purchased separately for fiber-optic environments.	
Fiber Optic Cables	HPEE LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HPEE LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HPEE LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HPEE LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HPEE LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HPEE LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A
	NOTE: Fiber transceivers and cables must be purchased separately for fiber-optic environments.	
Additional Supported Cables (Plug into HPEN5900)	HPE X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPEE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPEE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
	HPEE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HPEE FlexNetwork X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A
Additional Supported Cables (Plug into HPEN6600)	HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
	HPEE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
	HPE X242 10G SFP+ to SFP+ 15m Direct Attach Copper Cable	J9287B

General Specifications	**Network processor**	Mellanox Connect X-3 Pro
	Data rate	Two ports, each at 20 Gbps bi-directional; 40 Gbps aggregate bi-directional theoretical bandwidth.
	Onboard memory	128MB
	Bus type	PCI Express v3.0 (Gen 3) x8

Technical Specifications

	Form factor	FlexibleLOM	
	IEEE Compliance	802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz	
Power and Environmental Specifications	**Operating**	**Temperature**	0°C to 55°C / 32°F to 131°F
		Humidity	15% to 80% non-condensing
	Non-operating	**Temperature**	-40°C to 70°C / -40°F to 158°F
		Humidity	10% to 90% non-condensing
	Power requirement	8.4 W typical, 9.7 W maximum	
	Emissions classification	FCC Class A, VCCI Class A, BSMI Class A, CISPR 22 Class A, ACA Class A, EN55022 Class A, EN55024-1, ICES-003 Class A, MIC Class A	
	Safety	UL Mark (USA and Canada) CE Mark En 60590-1	
	Other	PCIe 3.0 RoHS compliance 6 of 6 IPv4, IPv6 CE ACPI 1.1a Microsoft WHQL (Windows Hardware Quality Labs) Server Design Guide version 3.0 (SDG 3.0)	

Operating System Support

Windows:
Microsoft Windows Server 2012, 2012 R2, 2008 R2 w/ SP1 (x64)
Microsoft Windows Hyper-V 2008 R2 w/SP1, 2012, 2012 R2

Linux:
Red Hat Enterprise Linux 6.5, 6.6, 7.0
SUSE Linux Enterprise Server 11, SP3 (x64)
SUSE Linux Enterprise Server 12

HyperVisors:
VMware ESXi 5.1 U3, 5.5 U2
Citrix XenServer 6.5 (Creedence)
Citrix XenServer (Naples) (x64)

NOTE: For more operating system support & certification information, please visit:
http://h17007.www1.hpe.com/us/en/enterprise/servers/supportmatrix/redhat_linux.aspx#.V4e8tPkrJD8

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.hpe.com/info/recycle.** To recycle your product, please go to: **http://www.hpe.com/info/recycle.** 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

Technical Specifications

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.hpe.com/info/recycle.**. These instructions may be used by recyclers and other WEEE treatment facilities as well as HPE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
21-Oct-2016	From Version 2 to 3	Changed	Add DPDK support and update servers.
10-Apr-2015	From Version 1 to 2	Changed	Changes were made to Standard Features section

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c04543737 - 15183 - Worldwide - V3 - 21-October-2016