

### Overview

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

Extended SKU - This adapter is part of an extended catalog of products tailored for customers in specific markets or with specific workloads, requiring the utmost in performance or value, but typically have a longer lead-time.

The HPE Ethernet 10Gb 2-port 546FLR-SFP+ adapter for ProLiant 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 40 Gb/s of converged bi-directional Ethernet bandwidth, helping to alleviate network bottlenecks.



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

### Platform Information

#### Models

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

#### Kit Contents

HP FlexFabric 10Gb 2-port 546FLR-SFP+ Adapter  
Quick install card  
Product warranty statement

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#### Compatibility - Supported Servers

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

**NOTE:** This is a list of supported servers. Some may be discontinued.

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### Standard Features

#### At a Glance Features

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

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#### Throughput-Theoretical Bandwidth

This adapter delivers 20 Gb/s bi-directional Ethernet transfer rate per port (40 Gb/s per adapter), providing the network performance needed to improve response times and alleviate bottlenecks.

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#### 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.

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#### 802.1Q VLANs

IEEE 802.1Q virtual local area network (VLAN) protocol allows each physical port of this 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.

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#### Configuration Utilities

This adapter 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.

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#### DPDK

This adapter supports DPDK with benefit for packet processing acceleration and use in NFV deployments.

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### Standard Features

**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.

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**Jumbo Frames** This adapter supports Jumbo Frames (also known as extended frames), permitting up to a 9,200 byte (KB) transmission unit (MTU) when running Ethernet I/O traffic. This is over five times the size of a standard 1500-byte Ethernet frame. With Jumbo Frames, networks can achieve higher throughput performance and greater CPU utilization. These attributes are particularly useful for database transfer and tape backup operations.

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**LED Indicators** LED indicators show link integrity and network activity for easy troubleshooting.

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**Management Support** This adapter ships with agents that can be managed from HPE Systems Insight Manager or other management application that support SNMP.

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**Message Signaled Interrupt (Extended) (MSI-X)** Message Signaled Interrupt (Extended) provides performance benefits for multi-core servers by load balancing interrupts between CPUs/cores.

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**PCI Express Interface** This adapter 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.

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**Preboot eXecution Environment (PXE)** 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 management/ deployment server at another location on the network. Additionally, PXE enables decentralized software distribution and remote troubleshooting and repairs.

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**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.

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### Standard Features

**Server Integration** This 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 vendors and provides users with a single point of contact for both their servers and their network adapters.

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**TCP/UDP/IP** For overall improved system response, this adapter supports standard TCP/IP offloading techniques including: TCP/IP, UDP 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.

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**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 virtualized overlay networks with minimal impact to performance. HPE Tunnel Offloading increases I/O throughput, reduces CPU utilization, and lowers power consumption. Tunnel Offload supports VMware's VXLAN and Microsoft's NVGRE solutions.

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**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.  
**NOTE:** 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>

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### Service and Support

**Service and Support** **NOTE:** This adapter is covered under HPE Support Services/ Service Contract applied to the HPE ProLiant Server or enclosure. No separate HPE Support Services need to be purchased.

Most HPE branded options sourced from HPE that are compatible with your product will be covered under your main product support at the same level of coverage, allowing you to upgrade freely. Additional support is required on select workload accelerators, switches, racks and UPS options 12KVA and over. Coverage of the UPS battery is not included under HPE support services; standard warranty terms and conditions apply.

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### Warranty and Support Services

Warranty and Support Services will extend to include HPE options configured with your server or storage device. The price of support service is not impacted by configuration details. HPE sourced options that are compatible with your product will be covered under your server support at the same level of coverage allowing you to upgrade freely. Installation for HPE options is available as needed. To keep support costs low for everyone, some high value options will require additional support. Additional support is only required on select high value workload accelerators, fibre switches, InfiniBand and UPS options 12KVA and over. Coverage of the UPS battery is not included under TS support services; standard warranty terms and conditions apply.

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### Protect your business beyond warranty with HPE Support Services

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to HPE to help prevent problems and solve issues faster. HPE Support Services enable you to choose the right service level, length of coverage and response time as you purchase your new server, giving you full entitlement to the support you need for your IT and business. Protect your product, beyond warranty.

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### 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 quick-specs, 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.

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### For more information

Visit the Hewlett Packard Enterprise Service and Support [website](#).

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### Related Options

<b>Cables - Direct Attach</b>	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 0.5m Direct Attach Copper Cable	487649-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 1m Direct Attach Copper Cable	487652-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21
	HP X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HP X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HP X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HP X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HP X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C
	<b>NOTE:</b> Direct Attach Cable (DAC) must be purchased separately for copper environments.	

<b>Cables - Fiber Optic</b>	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
	HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A
	<b>NOTE:</b> Fiber transceivers and cables must be purchased separately for fiber-optic environments.	

<b>Transceivers</b>	HP BladeSystem c-Class 10Gb SFP+ SR Transceiver	455883-B21
<b>NOTE:</b> Fiber transceivers and cables must be purchased separately for fiber-optic environments.		

### Technical Specifications

<b>General Specifications</b>	<b>Network Processor</b>	Mellanox Connect X-3 Pro
	<b>Data Rate</b>	Two ports, each at 20 Gb/s bi-directional; 40 Gb/s aggregate bi-directional theoretical bandwidth.
	<b>Onboard Memory</b>	128 MB
	<b>Bus type</b>	PCI Express 3.0 (Gen 3) x8
	<b>Form Factor</b>	FlexibleLOM
	<b>IEEE Compliance</b>	802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz

<b>Power and Environmental Specifications</b>	<b>Power</b>	9.7 W maximum
	<b>Temperature - Operating</b>	0° to 55°C (32° to 131°F)
	<b>Temperature - Non-Operating</b>	-40° to 70° C (-40° to 158° F)
	<b>Humidity - Operating</b>	15% to 80% non-condensing
	<b>Humidity - Non-operating</b>	0% to 90% non-condensing
	<b>Emissions Classification</b>	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
	<b>RoHS Compliance</b>	6 of 6
	<b>Safety</b>	UL Mark (USA and Canada) CE Mark EN 60590-1
	<b>Other</b>	PCIe 3.0 IPv4, IPv6 CE ACPI 1.1a Microsoft WHQL (Windows Hardware Quality Labs) Server Design Guide version 3.0 (SDG 3.0)

<b>Operating System and Virtualization Support</b>	The Operating Systems supported by this adapter are based on the server OS support. Please refer to the OS Support Matrix at <a href="https://www.hpe.com/us/en/servers/server-operating-systems.html">https://www.hpe.com/us/en/servers/server-operating-systems.html</a> .
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### Technical Specifications

#### Environment-friendly Products and Approach - End-of-life Management and Recycling

Hewlett Packard Enterprise offers end-of-life **product return, trade-in, and recycling programs**, in many geographic areas, for our products. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE Directive (2012/19/EU) 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**. These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

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### Summary of Changes

Date	Version History	Action	Description of Change
05-Feb-2018	Version 5	Changed	Overview was updated
23-Oct-2017	Version 4	Changed	Technical specifications - operating system, Service and Support and Part and Materials sections were updated.
21-Oct-2016	Version 3	Changed	Add DPDK support and update servers.
10-Apr-2015	Version 2	Changed	Changes were made to Standard Features section.
30-Mar-2015	Version 1	New	Initial Version.



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