Compatibility

HPE FlexFabric 10Gb 2-port 556FLR-SFP+ Adapter

The HPE FlexFabric 10Gb 2-port 556FLR-T adapter is a dual port 10GBASE-T adapter for ProLiant Gen9 rack and Density Optimized servers in a FlexibleLOM form factor that provides full-featured, high performance, converged 10Gb Ethernet that accelerates IT services and increases data center efficiency across a broad range of I/O intensive enterprise, cloud and Telco workloads. The HP 556FLR-T Adapter, with two RJ-45 connectors, delivers full line-rate performance across all ports with low power consumption, utilizing CAT 6A UTP (or better) cabling with distances up to 100 meters and is backward compatible to existing 1000BASE-T infrastructure.

It offers a rich set of offload technologies including overlay network tunneling and storage as well as RDMA over Converged Ethernet (RoCE v2) capabilities that increase host efficiency and virtualization performance.

The HPE FlexFabric 556FLR-T can provide up to 40Gbps of converged bi-directional Ethernet bandwidth, helping to alleviate network bottlenecks.

HPE FlexFabric 10Gb 2-port 556FLR-SFP+ Adapter

Models

HPE FlexFabric 10Gb 2-port 556FLR-T Adapter	794525-B21

Compatibility

Kit Contents
- HPE FlexFabric 10Gb 2-port 556FLRT Adapter
- Quick install card
- Product warranty statement

HPE ProLiant Server Support
- HP ProLiant DL580 Gen9
- HP ProLiant DL560 Gen9
- HP ProLiant DL380 Gen9
- HP ProLiant DL360 Gen9
- HP ProLiant DL180 Gen9
- HP ProLiant DL160 Gen9
- HP ProLiant DL120 Gen9
- HP ProLiant DL80 Gen9
- HP ProLiant DL20 Gen9
- HP ProLiant DL580 Gen8
- HP ProLiant DL560 Gen8
- HP Apollo 2000 – XL1x0 Gen9

Standard Features

Product Features	• Dual 10Gb ports provide up to 40Gb bi-directional per adapter • Operates at 1Gbps/10Gbps, auto-negotiation, on both ports • 10GBASE-T connectivity supporting up to 100 meters with CAT 6A cabling • Converges FCoE or RoCEv2with LAN traffic on a single 10 GbE wire • Tunnel Offload support for VXLAN and NVGRE network virtualization • RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency • Advanced storage offload processing freeing up valuable CPU cycles and reduces server power consumption • Supports UEFI and legacy boot options • Mixed Storage – supports NIC + FCoE on one port, and NIC + iSCSI on the other • Concurrent Storage – concurrently supports NIC, FCoE, and iSCSI storage functions on the same port (NIC + FCoE + iSCSI) • Industry-leading throughput and latency performance • Over eight million small packets/s, ideal for Network Function Virtualization, web/mobile applications, mobile messaging, and social media • FlexibleLOM Adapter • Greater bandwidth with PCIe 3.0 • Includes 128MB of onboard memory • Jumbo Frames support • Supports Wake On LAN (WOL) • 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 storage protocol (RoCEv2) • Supports VMWare NetQueue, Microsoft Virtual Machine Queue (VMQ) for Windows • Optimized host virtualization density with SR-IOV support • Flex-10 is not supported
Dual-port 10 Gigabit Ethernet Throughput (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 556FLR-T 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 556FLR-T 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 throughput performance and lower CPU utilization. These attributes are particularly useful for storage, database transfer and tape backup operations.
MSI-X	Message Signaled Interrupt (Extended) provides performance benefits for multi-core servers by load balancing interrupts between CPUs/cores.
Hardware iSCSI or FCoE with Full Offload	The 556FLR-T is the only network option for HPE Gen9 rack servers that supports hardware FCoE or iSCSI with full protocol offload.

Standard Features

TCP/IP Stateless Offloading For overall improved system response, the HPE 556FLR-T 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.

RDMA (RoCE) RoCE is an accelerated Ethernet based, 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.

This adapter supports RoCEv2, also sometimes called "Routable RoCE" which adds routing capability, enabling servers on separate IP subnets to leverage RDMA communications.

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 throughput, 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-T 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.

iSCSI/FCoE Boot The HPE FlexFabric 556FLR-T adapter supportsiSCSI INT 13 Boot and FCoE Boot from SAN

Network Management

Management Support Like all HPE ProLiant server adapters, the HPE 556FLR-T adapter ships with agents that can be managed from HPE Systems Insight Manager or other management application that support SNMP.

Server Integration The HPE 556FLR-T 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

Standard Features

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 556FLR-T 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 (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.
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://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Service and Support

Service and Support HPE Technology Services

HPE Technology Services offers you consultants and support experts to solve your most complex infrastructure problems. We help keep your business running, boost availability and avoid downtime.

Protect your business beyond warranty with HPE Care Pack Services

When you buy HPE Options, it's also a good time to think about what level of service you may need. HPE Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HPE Foundation Care services deliver scalable support-packages for Hewlett Packard Enterprise industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. New to this portfolio is HPE Collaborative Support. If you are running business critical environments, Hewlett Packard Enterprise offers Proactive Care or Critical Advantage. These services help you deliver high levels of application availability through proactive service management and advanced technical response.

Here is the support service recommendation from the Foundation Care and Proactive Care portfolio. For customized support service solution, Hewlett Packard Enterprise can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

Recommended HPE Care Pack Services for optimal satisfaction with your HPE product

**Recommended
Services**

3-Year HPE 24x7 4 hour Response, Hardware Support Onsite Service

Provides you with rapid remote support and if required an Hewlett Packard Enterprise Authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf

OR

3-Year HPE 24x7 4 hour Response, HPE Collaborative Support

Offers customers a single point of contact for server problem diagnosis, hardware problem resolution, and basic software problem diagnosis, fault isolation, and resolution if available to HPE. If the problem is with HPE HW, the representative will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. In case, the issue is with HPE or supported third-party software product and cannot be resolved by applying known fixes, Hewlett Packard Enterprise will contact the third-party vendor and create a problem incident on your behalf.

HPE ProLiant Server Hardware Installation

Provides for the basic hardware installation of Hewlett Packard Enterprise branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

Service and Support

Related HPE Care Pack Services to enhance your HPE product experience

Related Services   **3-Year HPE 24x7 4 hour Response, Proactive Care or Critical Advantage**
Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-2140ENW.pdf

OR

3-Year HPE 6-hour Onsite Call-to-Repair, HPE Collaborative Support
Offers customers a single point of contact for server problem diagnosis, hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request to the HPE Global Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HPE. In case, the issue is with HPE or supported third-party software product and cannot be resolved by applying known fixes, Hewlett Packard Enterprise will contact the third-party vendor and create a problem incident on your behalf.

HPE Proactive Select Service
Provides a flexible way to purchase HPE best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf

Insight Remote Support   Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more
http://www.hp.com/go/insightremotesupport

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 HPE experts, access support resources or collaborate with peers. Learn more **http://www.hp.com/go/hpsc**

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 Hewlett Packard Enterprise contractual support agreement.

NOTE: The Hewlett Packard Enterprise Support Center Mobile App is subject to local availability

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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. Supplies and consumable parts will not be provided as part of this service; standard warranty terms and conditions apply. Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual or the technical product data sheet will not be provided, repaired or replaced as part of this service.

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

Service and Support

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 HPE 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 HPE 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 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 **http://www.hpe.com/services/bladesystem**

Related Options

Direct Attach Cable	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

NOTE: Direct Attach Cable (DAC) must be purchased separately for copper environments.

Fiber Optic Modules	HP 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	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

NOTE: Fiber transceivers and cables must be purchased separately for fiber-optic environments.

NOTE: For additional information on 10Gb cable specifications go to: http://www.Hewlett Packard Enterprise.com/rnd/pdfs/10gig_cabling_technical_brief.pdf

Additional Supported Cables (Plug into HPN5900)	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
	HP X240 40G QSFP+ to 4x10G SFP+ 1m Direct Attach Copper Splitter Cable	JG329A
	HP X240 40G QSFP+ to 4x10G SFP+ 3m Direct Attach Copper Splitter Cable	JG330A

Additional Supported Cables (Plug into HPN6600)	HP X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
	HP X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
	HP X242 10G SFP+ to SFP+ 15m Direct Attach Copper Cable	J9287B

Technical Specifications

General Specifications	Network processor		Emulex XE-104
	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
	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, 802.3an

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 6.6, 6.7,7.1,7.2
SUSE Linux Enterprise Server 11, SP4 SUSE Linux Enterprise Server 12
SUSE Linux Enterprise Server 12, SP1

HyperVisors:
VMware ESXi 5.1 U3, 5.5 U3
VMware ESXi 6.0 U1
Citrix XenServer 6.5 (Creedence)
Citrix XenServer (Naples) (x64)

NOTE: For more operating system support & certification information, please visit:
http://h10018.www1.hp.com/wwsolutions/index.html.

Technical Specifications

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 as HEWLETT PACKARD ENTERPRISE OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
31-Mar-2016	Version 1	Created	New QuickSpecs

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