

### Overview

#### HPE FlexFabric 10Gb 2-port 536FLB Adapter

Recommended SKU - This adapter is a recommended option that has been selected by HPE experts to provide the right technology for a range of workloads and market segments offering the best combination of performance, value and availability.

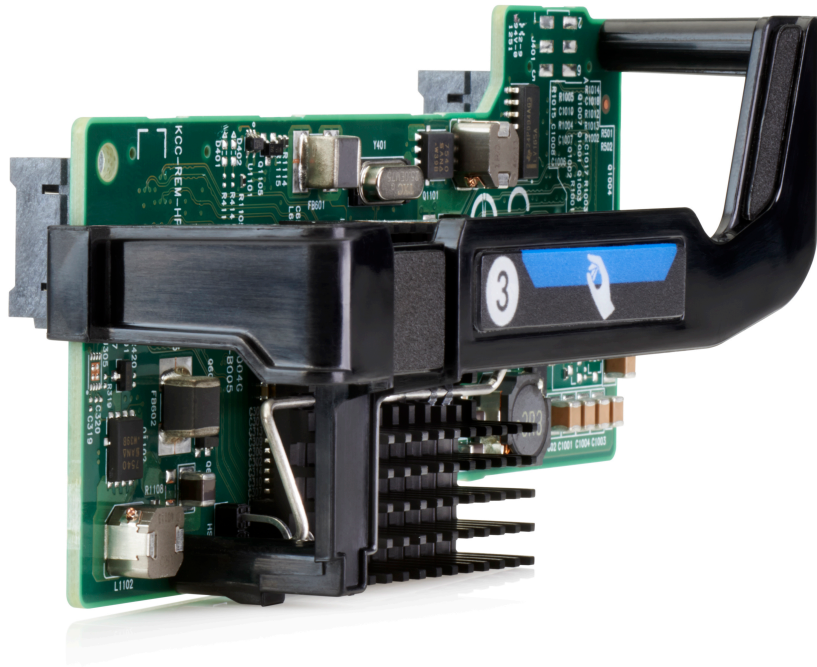
The HPE FlexFabric 10Gb 2-port 536FLB adapter features the next generation of 10 Gb Ethernet offering in a single chip solution on a FlexibleLOM form factor, further reducing power requirements for 2 ports of 10 Gb Ethernet. It is designed for use with HPE BladeSystem c-Class Gen9 servers.

It provides full duplex high performance Ethernet connectivity with support for HPE Virtual Connect FlexFabric blade interconnect technology, allowing each 10GbE port to be divided into four physical NICs and optimize bandwidth management for virtualized servers. The HPE 536FLB FlexFabric network adapter, in conjunction with HPE Virtual Connect FlexFabric technology, helps to extend the benefits of virtualization beyond the server and into the rest of the infrastructure.

The HPE 536FLB supports enterprise class features such as VLAN tagging, adaptive interrupt coalescing, MSI-X, NIC teaming (bonding), Tunnel offload (NVGRE,VXLAN) Receive Side Scaling (RSS), jumbo frames and PXE boot. It also supports virtualization features such as SR-IOV, VMware NetQueue and Microsoft VMQ.



Overview



HPE FlexFabric 10Gb 2-port 536FLB Adapter

## Platform Information

### Models

HPE FlexFabric 10Gb 2-port 536FLB Adapter	766490-B21
HPE FlexFabric 10Gb 2-port 536FLB FIO Adapter	766491-B21

**NOTE:** This adapter on each server blade connects to a 10 Gb interconnect in bays 1-2 (HPE BladeSystem c7000 Enclosure) or bay 1 (HPE BladeSystem c3000 Enclosure).

**NOTE:** This adapter requires a minimum of 2 GB of server memory.

**NOTE:** This adapter supports linking at 1000 Mbps or 10000 Mbps when not connected to a Flex-10 device.

**NOTE:** This adapter will only support 1000 Mbps when connected to a 1 Gb Ethernet interconnect.

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<b>Kit Contents</b>	HPE FlexFabric 10Gb 2-port 536FLB Adapter Quick install card Product warranty statement
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<b>Compatibility - Supported Servers</b>	HPE ProLiant BL460c Gen9 Server Blade HPE ProLiant BL660c Gen9 Server Blade HPE ProLiant WS660c Gen9 Server Blade HPE ProLiant BL460c Gen10 Server Blade <b>NOTE:</b> This is a list of supported servers. Some may be discontinued.
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<b>Compatibility - Supported Interconnect Modules</b>	HPE Virtual Connect FlexFabric-20/40 F8 Module for c-Class BladeSystem HPE FlexFabric 10Gb/24-port Module HPE Virtual Connect Flex-10/10D Module for BladeSystem c-Class HPE 6120XG Blade Switch HPE 6120G/XG Blade Switch HPE 6125G/XG Ethernet Blade Switch HPE 6125G Ethernet Blade Switch HPE 6125XLG Blade Switch HPE 6127XLG Ethernet Blade Switch HPE 1:10Gb Ethernet BL-c Switch Cisco Catalyst 3120G Blade Switch for HPE Cisco Catalyst 3120X Blade Switch for HPE Cisco Catalyst 3020 Blade Switch HPE GbE2c Layer 2/3 Ethernet Blade Switch HPE FlexFabric 536FLB Adapter also supports 1 Gb or 10 Gb connections with the following modules: HP 10GbE Ethernet Pass-Thru Module for c-Class BladeSystem HP 1Gb Ethernet Pass-Thru Module for c-Class BladeSystem HP Cisco B22HP Fabric Extender with 16 FET for BladeSystem c-Class
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## Standard Features

### At a Glance Features

- Full hardware offload of iSCSI and FCoE storage protocol processing for highest performance converged Ethernet data and storage networks.
- Dual-port 10GbE Flex-10 FlexibleLOM network adapter that provides the flexibility to choose the type of LOM to meet growing infrastructure needs
- Hardware acceleration and offloads for stateless TCP/IP
- Industry-leading throughput and latency performance
- Up to 40Gb/s bi-directional near line rate throughput
- Improved small packet performance
- Support for Tunnel Offload (NVGRE, VxLAN)
- Integrated PHY and MAC
- Support for Preboot eXecution Environment (PXE)
- Data Plane Development Kit (DPDK)
- IEEE 1588 Precision Time Protocol (PTP)
- Active Health Systems Support
- Jumbo Frame
- Checksum & Segmentation Offload
- IPv6 Acceleration
- Receive-Side Scaling (RSS)
- HPE Sea of Sensors 3D
- Optimized for virtual server environments with support for HPE Flex-10 Technology, Network Partitioning (NPAR) and Single-Root I/O Virtualization (SR-IOV) User configurable bandwidth settings when combined with the 10Gb Flex-10 Virtual Connect module. From 100Mb/s to 10Gb/s on up to four "Physical Function" NICs per port, in increments of 100Mb/s for NIC. The combined bandwidth of NICs cannot exceed port bandwidth i.e. 10 Gb.
- Note: DPDK and Virtual Connect can't be used at the same time.

### Virtual Connect FlexFabric 10 Gb Ethernet Module for the c-Class BladeSystem

Evolve 10 Gb at your own speed! When paired with the HPE Virtual Connect FlexFabric 10 Gb Ethernet Modules, take advantage of four Flex Nics, which are PCI Physical Function devices that are OS/ Hypervisor independent. In addition take advantage of iSCSI and FCoE storage offload capability making it a full-Converged Network Adapter (CNA).

Server ROM recognizes them as individual NICs.

Speeds can be set per NIC from 100 Mb to 10 Gbs in 100 Mb increments.

Three fold increase in number of network connections per port.

Up to four physical function NICs per port.

Ideal for virtualized server environment, especially for dedicated bandwidth applications like virtual machine migration from one physical server to another physical server.

### 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.

## Standard Features

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<b>802.1p QoS Tagging</b>	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.
<b>802.1Q VLANs</b>	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.
<b>DPDK</b>	This adapter supports DPDK with benefit for packet processing acceleration and use in NFV deployments.
<b>HPE Sea Of Sensors 3D</b>	Support for the HPE Sea of Sensors which is a collection of 32 sensors that automatically track thermal activity - heat - across the server. When temperatures get too high, sensors can initiate fans and make other adjustments to reduce energy usage. A significant improvement lies in the ability to apply fan speed increases only to the portion of the system that is rising in temperature, rather than all six fans in unison, which reduces the amount of energy used for cooling.
<b>iSCSI/FCoE</b>	This adapter supports accelerated iSCSI or iSCSI boot and FCoE.
<b>Jumbo Frames</b>	This adapter supports Jumbo Frames (also known as extended frames), permitting up to a 9,000 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.
<b>Management Support</b>	This adapter ships with agents that can be managed from HPE Systems Insight Manager or other management application that support SNMP.
<b>Message Signaled Interrupt (Extended) (MSI-X)</b>	Message Signaled Interrupt (Extended) provides performance benefits for multi-core servers by load balancing interrupts between CPUs/cores.
<b>Network Adapter Teaming</b>	This adapter support for NIC teaming helps IT administrators increase network fault tolerance and increased network bandwidth, the team of adapters can work together as a single virtual adapter, providing support for several different types of teaming enabling IT administrators to optimize availability, improve performance and help reduce costs.
<b>Optimized for Virtualization</b>	I/O Virtualization support for VMware NetQueue and Microsoft VMQ helps meet the performance demands of consolidated virtual workloads.
<b>Preboot eXecution Environment (PXE)</b>	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

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## Standard Features

management/ deployment server at another location on the network. Additionally, PXE enables decentralized software distribution and remote troubleshooting and repairs.

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### Single-Root I/O Virtualization

Single-Root I/O Virtualization (SR-IOV) provides a mechanism to bypass the host system hypervisor in virtual environments providing near metal performance and server efficiency. SR-IOV provides mechanism to create multiple Virtual Functions (VFs) to share single PCIe resources. The device is capable of SR-IOV, and requires Server BIOS support, controller firmware, and OS support.

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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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### Checksum & Segmentation Offload

Normally the TCP Checksum is computed by the protocol stack. Segmentation Offload is technique for increasing outbound throughput of high-bandwidth network connections by reducing CPU overhead. The technique is also called TCP segmentation offload (TSO) when applied to TCP, or generic segmentation offload (GSO).

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### IPv6

IPv6 uses 128-bit addressing allowing for more devices and users on the internet. IPv4 supported 32-bit addressing.

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### Precision Time Protocol (IEEE 1588 PTP)

Synchronization of system clocks throughout a network, achieving clock accuracy in the sub-microsecond range, making it suitable for measurement and control systems.

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### Receive Side Scaling (RSS)

RSS resolves the single-processor bottleneck by allowing the receive side network load from a network adapter to be shared across multiple processors. RSS enables packet receive-processing to scale with the number of available processors.

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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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## Technical Specifications

<b>General Specifications</b>	<b>Network Processor</b> <b>Data Rate</b>	Cavium 57840S with integrated MAC/PHY Two ports, each at 20 Gb/s bi-directional; 40 Gb/s aggregate bi-directional theoretical bandwidth.
	<b>Onboard Memory</b> <b>Bus type</b> <b>Form Factor</b> <b>IEEE Compliance</b>	900 MB (distributed memory) PCI Express 3.0 (Gen3) x8 FlexibleLOM 802.3, 802.1ab, 802.3x, 802.3ad, 802.3p, 802.1q, 802.3ae, 802.1Qau, 802.3ap
<b>Power and Environmental Specifications</b>	<b>Power</b> <b>Temperature - Operating</b> <b>Humidity - Operating</b> <b>Emissions Classification</b> <b>Agency Approvals</b>	<12W 0° to 55°C (32° to 131°F) 10% to 90% non-condensing FCC Class A USA: FCC Part 15 Class A Canada: ICES-003, Issue 4 Japan: VCCI V3 (2010.04) Class A International: EN55022:2006 + A1:2007 Class A International: EN55024:1998+A1:2011+A2; EN61000-3-2:2006, EN61000-3-3:2008 Taiwan: BSMI, CNS13438 (2006) Class A Australia/New Zealand (AS/NZS): EN55022:2006+A12007 class A Korea: KN22 Class A, KN24
	<b>RoHS Compliance</b> <b>Safety</b>	6 of 6 UL Mark (USA and Canada) CE Mark EN 60590
<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 OSSupport 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>	
<b>Environment-friendly Products and Approach - End-of-life Management and Recycling</b>	Hewlett Packard Enterprise offers end-of-life <b>product return, trade-in, and recycling programs</b> 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 <b>Hewlett Packard Enterprise web site</b> . 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
05-Mar-2018	Version 10	Changed	General Specifications section was updated
05-Feb-2018	Version 9	Changed	OS and Overview section were updated
11-Jul-2017	Version 8	Changed	Compatibility section was updated.
27-Mar-2017	Version 7	Changed	Overview and Standard Features were updated.
21-Oct-2016	Version 6	Changed	Add DPDK, update servers and add SKU 455880-B21
29-Apr-2016	Version 5	Changed	Compatibility, Related Options, and Technical Specifications sections were updated.
		Added	SKUs added in Related Options section: 787635-B21, 787635-B22.
17-Dec-2015	Version 4	Changed	Overview, Compatibility, Standard Features, Service and Support, and Technical Specifications sections were updated.
19-Jun-2015	Version 3	Changed	Overview, compatibility, standard features, and technical specifications sections were updated.
28-Nov-2014	Version 2	Changed	Compatibility, Standard Features and Related Options sections were updated
		Added	SKUs Added on HPE 10/20Gb interconnects: 691367-B21, 691367-B22, 571956-B21, 605865-B21, 638526-B21, 662048-B21, 737230-B21, 737226-B21, 658247-B21, 737220-B21, 406740-B21, 657787-B21
		Removed	Obsolete SKUs removed: 455880-B21
09-Sep-2014	Version 1	New	Initial version



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