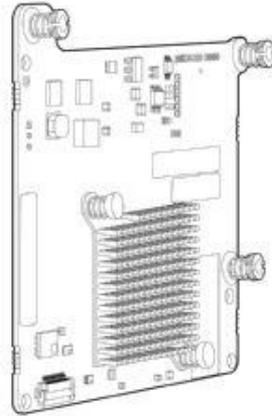# QuickSpecs

Overview

HP FlexFabric 20Gb 2-port 650M Adapter

The HP FlexFabric 20Gb 2-port 650M adapter for ProLiant Gen9 server blades provides full-featured, high performance, converged 20Gb Ethernet that accelerates IT services and increases data center efficiency across a broad range of I/O intensive enterprise, cloud, and Telco workloads.

When connected to HP Virtual Connect FlexFabric 20/40 F8 Modules, the HP FlexFabric 650M adapter provides 20GbE performance. It offers a rich set of offload technologies including overlay network tunneling and storage, increasing virtualization performance and host efficiency. The HP 650M is a dual-speed adapter that can also operate at 10GbE when connected to HP Virtual Connect Flex-10/10D Module or HP 6125XLG Ethernet Switch.

The HP 650M also supports RDMA over Converged Ethernet (RoCE) which increases host efficiency and lowers latency. RoCE is supported with the HP 6125XLG and other 10GbE switches.

Combining both the FlexibleLOM and Mezzanine adapters in a single BladeSystem Proliant server can provide up to 80Gbps of converged bi-directional Ethernet bandwidth, helping to alleviate network bottlenecks.

HP FlexFabric 20Gb 2-port 650M Adapter

Models

HP FlexFabric 20Gb 2-port 650M Adapter   700767-B21
NOTE: The HP 650M requires a minimum of 2 GB of server memory.
NOTE: The HP 650M supports linking at 10Gbps when not connected to a Flex-20 device.

Kit Contents	
	• HP FlexFabric 20Gb 2P 650M Adptr
	• Quick install card
	• Product warranty statement
	• Drivers, user guide, and utilities via: http://www.hp.com

HP ProLiant Server Support
- HP ProLiant BL460c Gen9
- HP ProLiant BL660c Gen9
- HP ProLiant BL460c Gen8
- HP ProLiant BL660c Gen8

Supported Interconnect Modules
- HP Virtual Connect FlexFabric-20/40 F8 Module for c-Class BladeSystem
- HP Virtual Connect FlexFabric-20/40 F8 Module for c-Class BladeSystem with TAA
- HP Virtual Connect FlexFabric 10Gb/24-port Module for c-Class BladeSystem
- HP Virtual Connect FlexFabric 10/24 Enterprise Edition BLc7000 Option
- HP Virtual Connect Flex-10/10D Module for c-Class BladeSystem
- HP Virtual Connect Flex-10/10D Module Enterprise Edition for BLc7000 Option
- HP Virtual Connect Flex-10 10Gb Ethernet Module for c-Class BladeSystem
- HP Virtual Connect Flex-10 Ethernet Module Enterprise Edition for BLc7000 Option
- HP 6125XLG Ethernet Blade Switch
- HP 6125XLG Ethernet Blade Switch with TAA
- HP 6125G/XG Ethernet Blade Switch
- HP 6125G/XG Ethernet Blade Switch with TAA
- HP 6125G Ethernet Blade Switch
- HP 6125G Ethernet Blade Switch with TAA

NOTE: Supported features with VC modules and Ethernet switches

Feature	VC FF20/40 F8	VC FF 10/24	VC Flex-10/10D	VC Flex-10	HP 6125 Series
20G	☐	-	-	-	-
10G	☐	☐	☐	☐	☐
Tunnel Offload	☐	☐	☐	☐	☐
FCoE	☐	☐	☐	-	☐
RoCE	-	-	-	-	☐

HP FlexFabric 650M Adapter also supports 1Gb or 10Gb 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

QuickSpecs

Standard Features

Product Features	• Dual 20Gb ports provide up to 80Gb bi-directional per adapter • Multi-speed adapter operates at either 20GbE or 10GbE • Converges FCoE or RoCE with LAN traffic on a single Ethernet wire • Tunnel Offload support for VXLAN and NVGRE • RDMA over Converged Ethernet (RoCE) for greater server efficiency and lower latency (6125XLG only) • Advanced storage offload processing freeing up valuable CPU cycles • 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 • Supports HP's Flex-20 blade interconnect technology • Over eight million small packets/s, ideal for web/mobile applications, mobile messaging, and social media • User configurable bandwidth settings when combined with the 20Gb Flex-20 Virtual Connect module. From 100Mb/s to10Gb/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. 20 Gb/s. • Greater bandwidth with PCIe 3.0 • Jumbo Frames support • Support for Preboot eXecution Environment (PXE) • Support for Microsoft Windows SMB Direct • Optimized host virtualization density with SR-IOV support
Dual-port 20 Gigabit Ethernet Throughput (theoretical bandwidth)	The HP 650M adapter delivers 40,000 Mbps bi-directional Ethernet transfer rate per port (80 Gbps aggregate bi-directional), providing the network performance needed to improve response times and alleviate bottlenecks that impact the performance of next generation data centers. 20Gb Ethernet bandwidth is ideal for high performance computing, database clusters and virtualization.
HP Virtual Connect FlexFabric 20Gb Ethernet Module for the c-Class BladeSystem	Evolve 20GbE at your own speed! When paired with the HP Virtual Connect FlexFabric 20Gb Ethernet Modules you can take advantage of four FlexNICs, which are PCI Physical Function devices that are OS/Hypervisor independent. In addition, take advantage of new storage I/O functionality making it a full-Converged Network Adapter (CNA) -Server ROM recognizes them as individual NICs -Speeds can be set per NIC from 100Mbps to 20Gbs in 100Mbps increments -Threefold increase in number of network connections per port -Up to eight physical function NICs per adapter -Ideal for virtualized server environments, especially for dedicated bandwidth application like virtual machine migration from one physical server to another.
Jumbo Frames	The HP 650M 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.
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.

Standard Features

802.1Q VLANs
IEEE 802.1Q virtual local area network (VLAN) protocol allows each physical port of the HP 650M 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.

TCP/IP Stateless Offloading
TCP/ IP, UDP checksum offload, Large Send Offload (LSO), TCP Segmentation Offload (TSO)are all features which optimize host efficiency, leaving the CPU available for other duties.

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. HP Tunnel Offloading increases I/O throughput, reduces CPU utilization, and lowers power consumption. Tunnel Offload supports VMware's VXLAN and Microsoft's NVGRE solutions.

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 increasing server efficiency. SR-IOV provides a 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.

Optimized for Virtualization
I/O Virtualization support for VMware NetQueue and Microsoft VMQ help meet the performance demands of consolidated virtual workloads.

HP Sea of Sensors 3D
Support for HP's 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 kick on fans and make other adjustments to reduce energy usage. What makes it better is the upgrade from all six fans kicking on at one time to a new system where only one kicks on - the one in proximity of the area that started heating up - thus reducing the amount of energy used for cooling.

iSCSI/FCoE Boot
The HP FlexFabric 650M supports iSCSI INT 13 Boot and FCoE Boot from SAN.

Standard Features

Ease of Deployment and Management

PXE Boot Support	The HP 650M adapter supports the Preboot eXecution Environment (PXE) which allows the server to boot over the network and download software residing in the network.
Compatible with Type A and B Mezzanine Slots	The HP 650M adapter is compatible with Type A and B mezzanine slots for greater deployment versatility
Network Adapter Teaming	The HP 650M adapter's support for NIC teaming helps IT administrators increase network fault tolerance and improve workload balance. These capabilities optimize availability, improve performance and help reduce costs.
Management Support	The HP 650M adapter can be administered from HP Systems Insight Manager (SIM). The adapters can be managed individually or in teams, providing SNMP based statistics for reporting purposes. The HP 650M adapter can also be managed by other applications with SNMP support.
Warranty	HP branded hardware options qualified for BladeSystem c-Class and p-Class servers are covered by a global limited warranty and supported by HP Services and a worldwide network of HP Authorized Channel Partners. The HP branded hardware option diagnostic support and repair is available for one year from date of purchase, or the length of the server they are attached to, whichever is greater. Support for software and initial setup is available for 90 days from date of purchase. Additional support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services or customized service agreements. 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	**HP Technology Services** HP 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 HP Care Pack Services** When you buy HP Options, it's also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need. HP Foundation Care services deliver scalable support-packages for HP 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 HP Collaborative Support. If you are running business critical environments, HP 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, HP 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 Services	**Recommended HP Care Pack Services for optimal satisfaction with your HP product** **3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service** Provides you with rapid remote support and if required an HP 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/5982-6547ENCA.pdf **OR** **3-Year HP 24x7 4 hour Response, HP 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 HP. If the problem is with HP 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 HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf. **HP ProLiant Server Hardware Installation** Provides for the basic hardware installation of HP 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/5982-7572ENN
Related Services	**Related HP Care Pack Services to enhance your HP product experience** **3-Year HP 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/GetDocument.aspx?docname=4AA4-8876ENW **OR** **3-Year HP 6-hour Onsite Call-to-Repair, HP 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 HP Global

Service and Support

Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HP. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP Proactive Select Service
Provides a flexible way to purchase HP 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
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's 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. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. **NOTE:** HP' Support Center Mobile App is subject to local availability.
Parts and materials	HP will provide HP-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 HP-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 HP 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 HP 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 HP ESSN Options, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant or http://www.hp.com/services/bladesystem

Related Options

Additional c-Class BladeSystem Adapters	**FlexibleLOM Adapters**	
	HP FlexFabric 20Gb 2-port 650FLB Adapter	700762-B21
	HP FlexFabric 20Gb 2-port 630FLB Adapter	700065-B21
	HP FlexFabric 10Gb 2-port 534FLB Adapter	700741-B21
	HP Ethernet 10Gb 2-port 560FLB Adapter	655639-B21
	HP FlexFabric 10Gb 2-port 554FLB Adapter	647586-B21
	HP Flex-10 10Gb 2-port 530FLB Adapter	656590-B21
	HP Ethernet 1Gb 2-port 361FLB Adapter	652500-B21
	Mezzanine Adapters	
	HP FlexFabric 20Gb 2-port 630M Adapter	700076-B21
	HP FlexFabric 10Gb 2-port 534M Adapter	700748-B21
	HP Ethernet 10Gb 2-port 560M Adapter	665246-B21
	HP FlexFabric 10Gb 2-port 554M Adapter	647590-B21
	HP Flex-10 10Gb 2-port 530M Adapter	631884-B21
	HP Ethernet 1Gb 4-port 366M Adapter	615729-B21
HP 10/20Gb interconnects	HP Virtual Connect FlexFabric-20/40 F8 Module for c-Class BladeSystem	691367-B21
	HP Virtual Connect FlexFabric-20/40 F8 Module for c-Class BladeSystem with TAA	691367-B22
	HP Virtual Connect FlexFabric 10Gb/24-port Module for c-Class BladeSystem	571956-B21
	HP Virtual Connect FlexFabric 10/24 Enterprise Edition BLc7000 Option	605865-B21
	HP Virtual Connect Flex-10/10D Module for c-Class BladeSystem	638526-B21
	HP Virtual Connect Flex-10/10D Module Enterprise Edition for BLc7000 Option	662048-B21
	HP 6125XLG Ethernet Blade Switch	711307-B21
	HP 6125XLG Ethernet Blade Switch with TAA	737230-B21
	HP 6125G/XG Ethernet Blade Switch	658250-B21
	HP 6125G/XG Ethernet Blade Switch with TAA	737226-B21
	HP 6125G Ethernet Blade Switch	658247-B21
	HP 6125G Ethernet Blade Switch with TAA	737220-B21
	HP 6120XG Blade Switch	516733-B21
	HP 10GbE Ethernet Pass-Thru Module for c-Class BladeSystem	538113-B21
	HP 1GB Ethernet Pass-Thru Module for c-Class BladeSystem	406740-B21
	HP Cisco B22HP Fabric Extender with 16 FET for BladeSystem c-Class	657787-B21

Technical Specifications

General Specifications	Network processor	Emulex XE-104	
	Data rate	Two ports, each at 40 Gbps bi-directional; 80 Gbps aggregate bi-directional theoretical bandwidth.	
	Onboard memory	900MB (distributed memory)	
	Bus type	PCI Express v3.0 (Gen 3) x8	
	Form factor	The HP FlexFabric 650M is a Type A mezzanine adapter (works in Type A and Type B mezzanine slots)	
	IEEE Compliance	802.3ae, 802.1Q, 802.3x, 802.1p, 802.3ad/LACP, 802.1AB(LLDP), 802.1Qbg, 802.1Qbb, 802.1Qaz, 802.3ap	
Power and Environmental Specifications	Operating	Temperature	0°C to 55°C / 32°F to 131°F
		Humidity	15% to 80% non-condensing
	Power requirement	7.5W typical, 8.6W maximum	
	Emissions classification	FCC Class A	
	Agency approvals	USA: FCC (CFR Title 47 Part 15) and UL 60950-1:2007 Canada: ICES-003:2012 Japan: VCCI:2012 Korea: MSIP - KN22, KN24 Australia: AS/NZS EN55022:2010 / CISPR22:2009+A1, EN55024:2010 / CISPR24:2010 European Union: EN55022:2010 (CISPR 22), EN55024:2010, and IEC60950-1:2007 2nd Edition Taiwan: BSMI - CNS 13438:2006	
	RoHS Compliance	6 of 6	
	Safety	UL Mark (USA and Canada)	
		CE Mark	
		EN 60590-1	

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 SUSE Linux Enterprise Server 11, SP3 (x64)
	HyperVisors: VMware ESXi 5.1 U2, 5.5 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.

Environment-friendly Products and Approach	End-of-life Management and Recycling	Hewlett-Packard offers end-of-life HP 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 HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

Technical Specifications

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 web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Summary of Changes

Date	Version History	Action	Description of Change:
02-Oct-2015	From Version 4 to 5	Changed	Compatibility and Related Options sections were updated.
17-Dec-2014	From Version 3 to 4	Changed	Compatibility section was updated
		Added	Skus Added on HP 10/20Gb interconnects: • 737230-B21 • 737226-B21 • 658247-B21 • 737220-B21 • 406740-B21
30-Sep-2014	From Version 2 to 3	Changed	Updates to Standard Features and Technical Specifications sections.
12-Sep-2014	From Version 1 to 2	Changed	Small changes made to Standard Features and Technical Specifications sections.