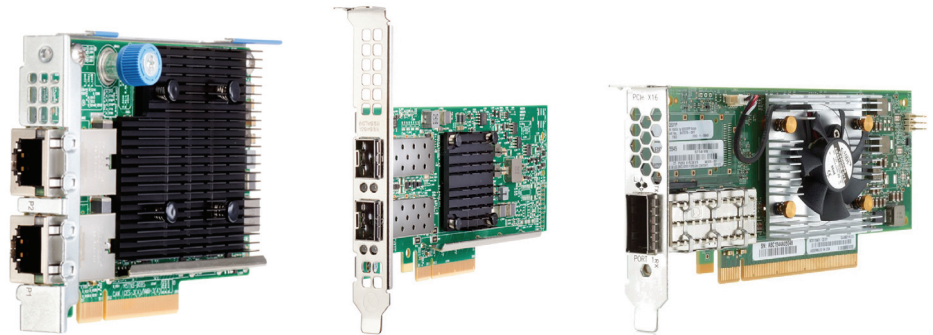


# HPE SERVER NETWORKING OPTIONS



## NETWORKING FLEXIBILITY AT THE SPEED OF COMPUTE

Driven by [hybrid cloud](#) services, mobile data and streaming video, IT professionals are constantly challenged to deliver reliable, raw networking performance at an affordable price. For any given workload, the right mix of performance and cost with reliability and security are paramount. With three network adapter product series to choose from: Standard, Advanced, and Performance, HPE has your [data center infrastructure](#) covered. In addition, Hewlett Packard Enterprise offers transceivers and cables to complete the data and storage fabric with HPE Networking or third-party Top of Rack Switches.

Whether purchasing a new [ProLiant server](#) platform, or upgrading your existing infrastructure with the latest server networking configuration, HPE's ecosystem provides a seamless solution from the switch to the Network Adapter.

The Standard series enables a cost-effective Ethernet solution for your current server workload needs. The economic scalability of these adapters contains functionality such as Single Root I/O Virtualization (SR-IOV) for increased performance via direct access to hardware from a virtual environment.

- **Ethernet:** All our HPE adapters meet the IEEE 802.3 standard for local area networks (LANs)
- **Efficiency:** Meets price performance goals for 1GbE and 10GbE core enterprise workloads
- **Virtualization:** SR-IOV feature enables basic virtualization for expanding network fabric
- **Network Partitioning (nPar):** Allows the user to design right size datapaths for better efficiency
- **Authenticated updates:** Protects user and configuration data from unauthorized access and validates digitally signed firmware
- **Secure boot:** Safeguards the system and ensures no rogue drivers are being executed on startup

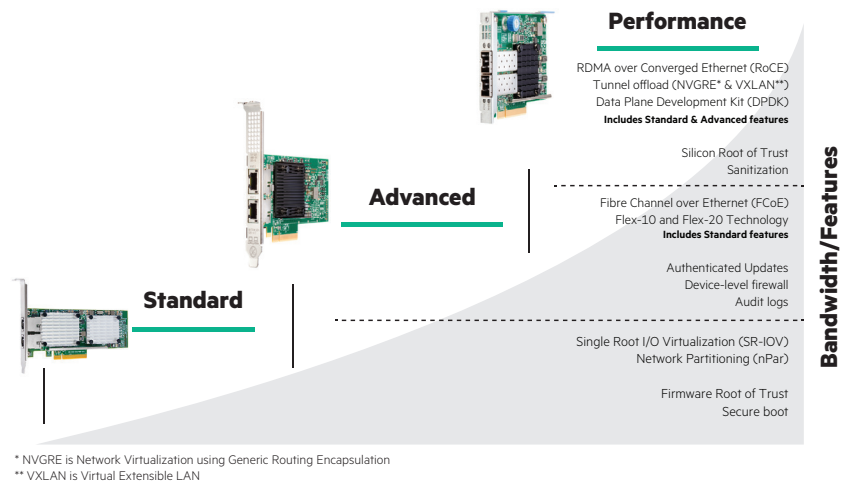


FIGURE 1. Advanced network adapters

As the simplest, most flexible way to connect virtualized server blades to data or storage networks, [HPE Virtual Connect FlexFabric 20/40 F8 Modules](#) eliminate up to 95% of network sprawl at the server edge—using one device that converges traffic inside enclosures and directly connects to external LANs and SANs. Utilizing Flex-20 technology with Fibre Channel over Ethernet (FCoE) and accelerated iSCSI, these modules converge traffic over the industry’s first high-speed 20 Gb connections to servers with HPE Advanced Adapters (HPE FlexFabric 20 Gb 2-port 630 FLB/650 FLB and 630 M/650 M Adapters). Advanced adapters when coupled with Virtual Connect can support up to four physical functions—supporting simultaneous Ethernet, FCoE, and iSCSI virtual streams on the same physical channel.

HPE transceivers and cables are the critical fabrics that bond the data center infrastructure together. Tested for 100% compatibility with HPE adapter cards and switches, Hewlett Packard Enterprise provides ProLiant Server interoperability. These cost-effective transceiver and cable solutions are tuned to match various speed, form factors, distances, and signal transduction media.

**Network with confidence:** Trust your server traffic with unsurpassed cables and transceivers from [HPE Server Networking](#).

The Advanced series of adapters helps simplify the network and storage topology to build the new hybrid server infrastructure using converged network adapters (CNAs). HPE FlexFabric architecture leads the industry with the configurable flexibility needed from basic Ethernet functionality, iSCSI hardware offload and offload for Fibre Channel over Ethernet (FCoE).

- **Converged network adapter (CNA):** Carries both Ethernet and Storage traffic on a single adapter. This reduces costs by requiring fewer adapters, transceivers, cables, switch ports, and PCIe slots.
- **iSCSI Offload:** SCSI storage command processing occurs in the adapter reducing CPU utilization and allowing high performance iSCSI connectivity from HPE ProLiant/Apollo servers to storage systems like HPE Nimble Storage and MSA storage arrays.
- **FCoE:** Reduces the number of network interface connections for Fibre Channel storage and IP networks in HPE Synergy and BladeSystem server, reducing the number of cables and [switches](#), and reducing power and cooling costs.
- **Device-level firewall:** Blocks any unmanaged access to memory or storage. This ensures that on-device firmware and configuration data can only be accessed by authorized agents.
- **Audit logs:** Provides traceability into authenticated firmware updates by capturing changes in standard system logs.

The Performance series delivers even higher bandwidth at a lower latency, with several choices for boosting I/O bandwidth for your most demanding application workloads. These expressly fast adapters can minimize the impact of overlay networking on host performance with tunnel offload support for VXLAN and NVGRE. The 25GbE adapters

are tuned to work with the latest 25/50/100 Ethernet standards and with HPE Networking Top of Rack (ToR) switches.

- **Multispeed 10/25/50/100 Gbps:** The 25GbE adapters enable optimal PCIe slots usage to reduce the total number required to build a 40/50 or 100G infrastructure.
- **iWARP:** RDMA-enabled adapters reduce CPU utilization and latency for network transactions and iWARP RDMA leverages standard TCP/IP and UDP networking and congestion control to enable this on standard networks at scale.
- **RDMA over Converged Ethernet (RoCE):** Network-intensive applications like networked storage or cluster computing need a network infrastructure with a high bandwidth and low latency. RoCE RDMA uses lossless Ethernet networking to provide low latency networking for these applications for 10GbE or higher network bandwidths.
- **DPDK:** Allows software-based customization and optimization of network performance by using polling instead of traditional interrupt-driven network processing with benefit for small packet acceleration and use in NFV deployments.
- **Root of Trust:** Enables a chain of trust for authenticating updates to firmware. This blocks installation of rogue or corrupted firmware and ensures that the executing firmware is trusted.
- **Sanitization:** Renders User and configuration data on the NIC irretrievable so that NICs can be safely repurposed or disposed.

Transceivers and cables play an important role in data center infrastructure management. HPE-branded transceivers and cables are the critical interconnect for the server and are 100% tested and tuned for HPE ProLiant, Apollo, and [Synergy platforms](#).



## CHOOSE BY SERVER SERIES AND FEATURES

### Standard 1GbE adapters for ProLiant and Apollo

Description	HPE Ethernet 1Gb 4-port 331FLR adapter	HPE Ethernet 1Gb 4-port 331T adapter	HPE Ethernet 1Gb 2-port 332T adapter	HPE Ethernet 1Gb 2-port 361T adapter	HPE Ethernet 1Gb 4-port 366FLR adapter	HPE Ethernet 1Gb 4-port 366T adapter
<b>Part number</b>	629135-B22	647594-B21	615732-B21	652497-B21	665240-B21	811546-B21
<b>Form factor</b>	FlexibleLOM	Standup*	Standup*	Standup*	FlexibleLOM	Standup*
<b>Datapath/Bus</b>	x4 PCIe v2.0	x4 PCIe v2.0	x1 PCIe v2.0	x4 PCIe v2.1	x4 PCIe v2.1	x4 PCIe v2.1
<b>Power (Max)</b>	5W	5W	2W	4.2W	5.5W	5.5W

### Firmware features

<b>Ethernet</b>	X	X	X	X	X	X
<b>Secure boot</b>	X	X	X	X	X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.

### Standard 10GbE adapters for ProLiant and Apollo

Description	HPE Ethernet 10Gb 2-port 560FLR-SFP+ adapter	HPE Ethernet 10Gb 2-port 560SFP+ adapter	HPE Ethernet 10Gb 2-port 562FLR-SFP+ adapter	HPE Ethernet 10Gb 2-port 562SFP+ adapter
<b>Part number</b>	665243-B21	665249-B21	789005-B21	784305-B21
<b>Form factor</b>	FlexibleLOM	Standup*	FlexibleLOM	Standup*
<b>Datapath/Bus</b>	x8 PCIe v2.0	x8 PCIe v2.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	12W	10.8W	6.1W	5.8W

### Firmware features

<b>Ethernet</b>	X	X	X	X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>			X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.



**Standard 10GbE adapters for ProLiant and Apollo (continued)**

<b>Description</b>	HPE Ethernet 10Gb 2-port 530T adapter	HPE Ethernet 10Gb 2-port 530SFP+ adapter	HPE Ethernet 10Gb 2-port 535FLR-T adapter	HPE Ethernet 10Gb 2-port 535T adapter
<b>Part number</b>	656596-B21	652503-B21	817721-B21	813661-B21
<b>Form factor</b>	Standup*	Standup*	FlexibleLOM	Standup*
<b>Datapath/Bus</b>	x8 PCIe v2.0	x8 PCIe v2.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	9W	8W	19.6W	19.6W

**Firmware features**

<b>Ethernet</b>	X	X	X	X
<b>Network Partitioning (nPar)</b>		X		
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>	X	X	X	X
<b>Authenticated updates</b>			X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.



**Advanced 10GbE adapters for ProLiant and Apollo**

<b>Description</b>	HPE FlexFabric 10Gb 2-port 533FLR-T adapter	HPE FlexFabric 10Gb 2-port 534FLR-SFP+	HPE FlexFabric 10Gb 4-port 536FLR-T adapter	HPE FlexFabric 10Gb 2-port 556FLR-T adapter
<b>Part number</b>	700759-B21	700751-B21	764302-B21	794524-B21
<b>Form factor</b>	FlexibleLOM	FlexibleLOM	FlexibleLOM	FlexibleLOM
<b>Datapath/Bus</b>	x8 PCIe v2.0	x8 PCIe v2.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	9W	8W	9W	9.7W

**Firmware features**

<b>Ethernet</b>	X	X	X	X
<b>Network Partitioning (nPar)</b>	X	534FLR support nPar	X	
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>	X		X	
<b>Storage Offload (FCoE and iSCSI)</b>	X	X	X	
<b>Audit logs</b>	X		X	

Refer to [QuickSpecs](#) for additional feature support information.

**Advanced 10GbE adapters for ProLiant and Apollo**

<b>Description</b>	HPE Ethernet 10Gb 2-port 521T adapter	HPE Ethernet 10Gb 2-port 562FLR-T adapter	HPE Ethernet 10Gb 2-port 562T adapter
<b>Part number</b>	867707-B21	817745-B21	817738-B21
<b>Form factor</b>	Standup*	FlexibleLOM	Standup*
<b>Datapath/Bus</b>	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	9.7W	12W	12.7W

**Firmware features**

<b>Ethernet</b>	X	X	X
<b>Firmware Root of Trust</b>	X	X	X
<b>Device-level firewall</b>		X	X
<b>Audit logs</b>	X	X	X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X
<b>Authenticated updates</b>	X		
<b>Secure boot</b>	X	X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.



**Performance 10/25GbE adapters for ProLiant and Apollo**

<b>Description</b>	HPE Ethernet 10/25Gb 2-port 631FLR-SFP28 adapter	HPE Ethernet 10/25Gb 2-port 631SFP28 adapter	HPE Ethernet 10/25Gb 2-port 640FLR-SFP28 adapter	HPE Ethernet 10/25Gb 2-port 640SFP28 adapter
<b>Part number</b>	817709-B21	817718-B21	817749-B21	817753-B21
<b>Form factor</b>	FlexibleLOM	Standup*	FlexibleLOM	Standup*
<b>Datapath/Bus</b>	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	14W	14W	9.7W	9.7W

**Firmware features**

<b>Ethernet</b>	X	X	X	X
<b>Network Partitioning (nPar)</b>	X	X		
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>	X	X	X	X
<b>Authenticated updates</b>	X	X	X	X
<b>Audit logs</b>	X	X		
<b>Device-level firewall</b>	X	X	X	X
<b>Firmware Root of Trust</b>	X	X	X	X
<b>Data Plane Development Kit (DPDK)</b>	X	X	X	X
<b>Tunnel offload (NVGRE/VXLAN)</b>	X	X	X	X
<b>RDMA over Converged Ethernet (RoCE)</b>	X	X	X	X
<b>Sanitization</b>	X	X	X	X
<b>Silicon Root of Trust</b>	X	X		

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.

**Performance 10/25GbE adapters for ProLiant and Apollo**

<b>Description</b>	HPE Ethernet 10/25Gb 2-port 621SFP28 adapter	HPE Ethernet 10/25Gb 2-port 622FLR-SFP28 Converged Network Adapter
<b>Part number</b>	867328-B21	867334-B21
<b>Form factor</b>	Standup*	FlexibleLOM
<b>Datapath/Bus</b>	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	9.7W	9.7W

**Firmware features**

<b>Ethernet</b>	X	X
<b>iWARP RDMA</b>	X	X
<b>RDMA over Converged Ethernet (RoCE)</b>	X	X
<b>Data Plane Development Kit (DPDK)</b>	X	X
<b>Tunnel offload (NVGRE/VXLAN)</b>	X	X
<b>Sanitization</b>	X	X
<b>Firmware Root of Trust</b>	X	X
<b>Device-level firewall</b>		
<b>Audit logs</b>	X	X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X
<b>Authenticated updates</b>	X	X
<b>Secure boot</b>	X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Standup low profile: Full-height and half-height brackets included.



### Standard 1GbE and 10GbE and advanced 10GbE Series for Blades

<b>Description</b>	HPE FlexFabric 10Gb 2-port 534M adapter	HPE FlexFabric 10Gb 2-port 536FLB adapter	HPE Ethernet 10Gb 2-port 560FLB adapter	HPE Ethernet 10Gb 2-port 560M adapter
<b>Part number</b>	700748-B21	766490-B21	655639-B21	665246-B21
<b>Form factor</b>	Type A Mezzanine	FlexibleLOM	FlexibleLOM	Type A Mezzanine
<b>Datapath/Bus</b>	x8 PCIe v2.0	x8 PCIe v3.0	x8 PCIe v2.0	x8 PCIe v2.0
<b>Power (Max)</b>	12W	12W	10W	6.5W

### Firmware features

<b>Ethernet</b>	X	X	X	X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>	X	X	X	X
<b>Flex-10/Flex-20</b>	Flex-10	Flex-10	Flex-10	Flex-10
<b>Audit logs</b>	X	X	X	X

Refer to [QuickSpecs](#) for additional feature support information.

### Advanced and Performance 10/20GbE and 20GbE adapters for Blades

<b>Description</b>	HPE FlexFabric 20Gb 2-port 630FLB adapter	HPE FlexFabric 20Gb 2-port 630M adapter	HPE FlexFabric 20Gb 2-port 650FLB adapter	HPE FlexFabric 20Gb 2-port 650M adapter
<b>Part number</b>	700066-B21	700076-B21	700762-B21	700766-B21
<b>Form factor</b>	FlexibleLOM	Type A Mezzanine	FlexibleLOM	Mezzanine
<b>Datapath/Bus</b>	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	12W	12W	11W	11W

### Firmware features

<b>Ethernet</b>	X	X	X	X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X	X
<b>Secure boot</b>	X	X	X	X
<b>Authenticated updates</b>			X	X
<b>Flex-10/Flex-20</b>	Flex-20	Flex-20	Flex-20	Flex-20
<b>Fibre Channel over Ethernet (FCoE) and iSCSI Storage Offload</b>	X	X	X	X
<b>Audit logs</b>	X	X		
<b>Data Plane Development Kit (DPDK)</b>	X*	X*	X*	X*
<b>Tunnel offload (NVGRE/VXLAN)</b>	X	X	X	X

Refer to [QuickSpecs](#) for additional feature support information.

\* Planned.



**Advanced and Performance 10GbE and 20GbE adapters for Synergy**

<b>Description</b>	HPE Synergy 2820C 10Gb Converged Network Adapter	HPE Synergy 3820C 10/20Gb Converged Network Adapter	HPE Synergy 6810C 25/50Gb Ethernet Adapter
<b>Part number</b>	794538-B21	777430-B21	867322-B21
<b>Form factor</b>	Type C Mezzanine	Type C Mezzanine	Type C Mezzanine
<b>Datapath/Bus</b>	x8 PCIe v3.0	x8 PCIe v3.0	x8 PCIe v3.0
<b>Power (Max)</b>	9W	9W	15.1W

**Firmware features**

<b>Ethernet</b>	X	X	X
<b>Network Partitioning (nPar)</b>			X
<b>Single Root I/O Virtualization (SR-IOV)</b>	X	X	X
<b>Secure boot</b>	X	X	
<b>Authenticated updates</b>			X
<b>Flex-10/Flex-20</b>	Flex-10	Flex-20	
<b>Audit logs</b>	X	X	X
<b>Device-level firewall</b>			X
<b>Firmware Root of Trust</b>	X	X	X
<b>Data Plane Development Kit (DPDK)</b>	X*	X*	X
<b>Tunnel offload (NVGRE/VXLAN)</b>	X	X	X
<b>RDMA over Converged Ethernet (RoCE)</b>			X
<b>Sanitization</b>			X

Refer to [QuickSpecs](#) for additional feature support information.

\* Planned.

**NETWORKING WITH CONFIDENCE**

Tested and proven to meet the demanding standards of Hewlett Packard Enterprise, our adapters undergo an extensive level of HPE ProLiant server compatibility and systems interoperability testing. We validate the adapters over a wide variety of both 32-bit and 64-bit operating systems. This approach provides a robust and reliable networking solution while providing IT administrators with a single point of contact for both their servers and server network adapters.

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