



Hewlett Packard
Enterprise

Choose the ideal adapter

QLogic Ethernet adapters for HPE ProLiant, Apollo and Synergy Servers

Contents

Get the best performance and energy efficiency from your network.....	2
Choose from a comprehensive portfolio of 10GbE, 20GbE and 25GbE adapters.....	2
Achieve the highest performance for networking applications.....	5
Reduce energy consumption with Energy Efficient Ethernet.....	8
Benefit from long-standing industry leadership.....	10
Maximize performance and flexibility for demanding workloads.....	10

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 Ethernet, Advanced FlexFabric and Performance Multispeed, HPE has your data center infrastructure covered. In addition, HPE 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 Gen9 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 NIC.

The HPE ProLiant, Apollo and Synergy family of DL, ML, XL, and BL servers offer a broad range of networking options designed to address the challenging demands of today's data center.

Get the best performance and energy efficiency from your network

Today's modern business demands place a great deal of pressure on IT. As an IT professional, you need to keep the network traffic flowing at the highest possible performance with the lowest possible energy consumption all while keeping an eye on your ever-shrinking budget.

The HPE ProLiant, Apollo and Synergy servers offers a broad range of networking options designed to address these challenging demands, and help you design a data center network that can keep up with today's new style of computing. The current HPE server platforms support innovative FlexibleLOM architecture, as well as standard optional network interface cards (NICs) and converged network adapters (CNAs) for maximum workload performance and deployment flexibility.

The HPE portfolio of Standard Ethernet, Advanced FlexFabric and Performance Multispeed Network Adapters leverage a variety of third-party vendor technology, including 10 Gigabit Ethernet (10GbE), 20 Gigabit Ethernet (20GbE), and 25 Gigabit Ethernet (25GbE) technologies, providing best-in-class server-to-fabric networking solutions. Hewlett Packard Enterprise is also the first in the industry to offer customers the ability to incorporate 20GbE adapter technology, with offerings for HPE BladeSystem and HPE Synergy servers. This paper offers several validation points on what sets apart HPE Ethernet solutions available on HPE ProLiant, Apollo and Synergy Servers—powered by QLogic® controllers.

Choose from a comprehensive portfolio of 10GbE, 20GbE and 25GbE adapters

No matter what size your data center, you need to continuously look for ways to improve management and deployment efficiency to help reduce costs and extend your ever-shrinking IT budget. By offering a wide range of 10GbE, 20GbE and 25GbE HPE adapters powered by QLogic, HPE ProLiant, Apollo and Synergy servers provide a consistent deployment and management experience for high performance networking throughout the data center. Regardless of the server form factor or Ethernet connectivity speed, HPE adapters powered by QLogic offer a solution for your modern data center needs. Table 1 details the full breadth of HPE adapters using QLogic's controller technology.

For more information about the HPE Ethernet portfolio and features see: hpe.com/info/servernetworking.

Table 1. HPE Flexible Network Adapters powered by QLogic 578x0S and 45604 ASIC technology










Adapter photo	Adapter description	Product details
<p>DL, SL, ML, and XL rack and tower servers (PCIe NICs)</p> 	<p>HPE Ethernet 10Gb 2-port 530SFP+ Adapter</p>	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 2.0 Stand-up card (NIC) • Controller: 57810S • HPE P/N: 652503-B21
	<p>HPE StoreFabric CN1100R 2P Converged Network Adapter</p>	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 2.0 Stand-up card (CNA) • Controller: 57810S • HPE P/N: QW990A
	<p>HPE StoreFabric CN1100R 10GBASE-T Converged Network Adapter</p>	<ul style="list-style-type: none"> • 10GBASE-T/2Ports • Form factor: PCIe 2.0 Stand-up card (CNA) • Controller: 57810S • HPE P/N: N3U52A
	<p>HPE Ethernet 10Gb 2-port 530T Adapter</p>	<ul style="list-style-type: none"> • 10GBASE-T/2 ports • Form factor: PCIe 2.0 Stand-up card (NIC) • Controller: 57810S • HPE P/N: 656596-B21
	<p>HPE Ethernet 4x25Gb 1-port 620QSFP28 Adapter</p>	<ul style="list-style-type: none"> • 1 QSFP port, 4 25GbE lanes • Form factor: PCIe 3.0 Stand-up card (NIC) • Controller: 45604 • HPE P/N: 817762-B21
<p>DL, SL, and XL rack servers (FlexibleLOM rack)</p> 	<p>HPE Ethernet 10Gb 2-port 530FLR-SFP+ Adapter</p>	<ul style="list-style-type: none"> • 10GbE/2 ports • Form Factor: PCIe 2.0 FlexibleLOM for ProLiant Gen8 rack • Controller: 57810S • HPE P/N: 647581-B21
	<p>HPE FlexFabric 10Gb 2-port 534FLR-SFP+ Adapter</p>	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 2.0 • FlexibleLOM for rack • Controller: 57810S • HPE P/N: 700751-B21
	<p>HPE FlexFabric 10Gb 2-port 533FLR-T Adapter</p>	<ul style="list-style-type: none"> • 10GBASE-T/2 ports • Form factor: PCIe 2.0 • FlexibleLOM for rack • Controller: 57810S • HPE P/N: 700759-B21
	<p>HPE FlexFabric 10Gb 4-port 536FLR-T Adapter</p>	<ul style="list-style-type: none"> • 10GBASE-T/4 ports • Form factor: PCIe 3.0 • FlexibleLOM for rack • Controller: 57840S • HPE P/N: 764302-B21

Table 1. HPE Flexible Network Adapters powered by QLogic 578x0S and 45604 ASIC technology (continued)








Adapter photo	Adapter description	Product details
BL blade servers (FlexibleLOM and mezzanine cards)	HPE FlexFabric 20Gb 2-port 630FLB Adapter	<ul style="list-style-type: none"> • 10 & 20GbE/2 ports • Form factor: PCIe 3.0 FlexibleLOM Blade • Controller: 57840S • HPE P/N: 700065-B21
	HPE FlexFabric 20Gb 2-port 630M Adapter	<ul style="list-style-type: none"> • 10 & 20GbE/2 ports • Form factor: PCIe 3.0 Mezzanine adapter • Controller: 57840S • HPE P/N: 700076-B21
	HPE FlexFabric 10Gb 2-port 534FLB Adapter	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 2.0 FlexibleLOM for Gen8 Blade • Controller: 57810S • HPE P/N: 700741-B21
	HPE FlexFabric 10Gb 2-port 534M Adapter	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 2.0 Mezzanine adapter • Controller: 57810S • HPE P/N: 700748-B21
	HPE FlexFabric 10Gb 2-port 536FLB Adapter	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 3.0 FlexibleLOM for Gen9 Blade • Controller: 57840S • HPE P/N: 766490-B21
		

Table 2. HPE Synergy adapters

Adapter photo	Adapter description	Product details
HPE Synergy 10/20Gb Ethernet Adapters	HPE Synergy 2820C 10Gb Converged Network Adapter	<ul style="list-style-type: none"> • 10GbE/2 ports • Form factor: PCIe 3.0 Mezzanine adapter • Controller: 57840S • HPE P/N: 794538-B21
	HPE Synergy 3820C 10/20Gb Converged Network Adapter	<ul style="list-style-type: none"> • 10 & 20GbE/2 ports • Form factor: PCIe 3.0 Mezzanine adapter • Controller: 57840S • HPE P/N: 777430-B21
		

Achieve the highest performance for networking applications

You know that network performance impacts both business productivity and profitability. But you also know that most people take networks for granted. In many ways they are just like the freeways we all drive on without a second thought—until they become congested or inaccessible. When it comes to your network, you’re the one responsible for keeping the traffic moving. Because you know that performance is one of the key factors in design and deployment of data center networks, you take great care in deploying solutions that provide the highest levels of performance to accommodate the vast growth of data traffic that today’s data centers are experiencing.

As a leading provider of high-performance computing solutions, HPE offers network adapter products leveraging QLogic 578x0S and 45604 controllers to deliver the industry-leading 10GbE, 20GbE and 25GbE networking performance for HPE ProLiant, Apollo and Synergy servers. Table 3 details the performance criteria and its impact within the data center.

Table 3. Advantages of the 10GbE QLogic Flexible Network adapters

Performance criteria	Description	Benefits
Maximum throughput	Line-rate throughput across all ports—up to 37,000 Mbps across two 10GbE ports and up to 197,000 Mbps across four 25GbE ports	<ul style="list-style-type: none"> • Support more data streams • Reduce content quality degradation
Storage protocol processing	<ul style="list-style-type: none"> • 2.5 million FCoE IOPS • 1.5 million iSCSI IOPS 	<ul style="list-style-type: none"> • Hardware offload frees up CPU resources • Combines network and storage data on one simplified infrastructure
Small Packet Acceleration	<ul style="list-style-type: none"> • Support for DPDK • >85 million packets across all ports 	<ul style="list-style-type: none"> • Reduces packet processing overhead • Accelerates applications using small packets (less than 4K)
Virtualization Optimized	<ul style="list-style-type: none"> • Support for HPE Flex-10, Flex-20 • Support for Network Partitioning (NPAR) 	<ul style="list-style-type: none"> • Virtual Connect optimized I/O support in HPE BladeSystem and Synergy servers simplifies I/O management and orchestration • NPAR reduces TCO in Rack/Tower by reducing number of physical adapter connections required
RDMA	<ul style="list-style-type: none"> • Support for RoCE 	<ul style="list-style-type: none"> • Reduces latency in Ethernet traffic across a broadcast domain
Processor utilization	Lowest processor utilization—less than 15%	<ul style="list-style-type: none"> • Increase asset utilization • Reduce energy costs • Improve business productivity
Tunnel Offloads	NVGRE and VXLAN support	<ul style="list-style-type: none"> • Enable multi-tenant and load-balanced networks across disparate data centers • Overcome VLAN limitations in highly virtualized environments.

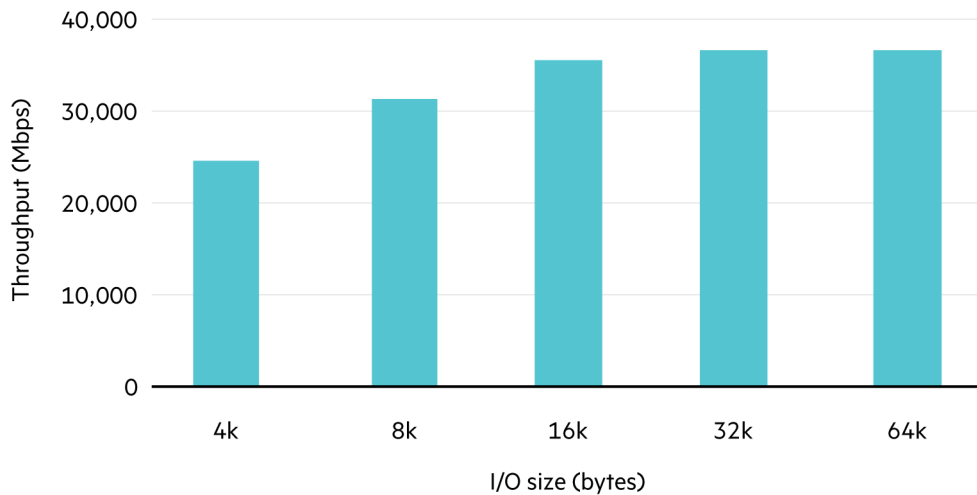
Maximize throughput

Applications that require maximum throughput for cloud computing include streaming video and audio, large data transfers between servers, load-balancing, failover, high-resolution graphics, database, and backup. However, data centers architected using a traditional three-layer hierarchical structure are not well suited for cloud environments. In a hierarchical structure, when performance improvements are needed, more servers are simply added. Even though the inherent limitations of this architecture—scalability, cost, and complexity—are evident, organizations reluctantly continue to employ this approach. Economics, or in simpler terms “costs,” often dictate the level of performance optimization that can be implemented using the traditional architecture. This usually translates into less than optimal performance and scalability enhancements. While the three-layer architecture may have been sufficient with past computing models, it can no longer effectively nor efficiently support emerging public and private cloud computing models without creating operational, performance, and scaling challenges.

As a result, there has been an emerging shift in data center design. The traditional, vertically-oriented multi-tier architecture—tailored for north-south data traffic, is giving way to a new simpler, flatter, and meshed architecture model. This architecture is suited for server-to-server (east-west) communication within the data center itself. The result is the ratio of local traffic between servers within the data centers to incoming/outgoing traffic is projected to reach four to one by 2015 (reference: Cisco Cloud Index). Simply put, with an “east-west” architecture, the intra-data center (server-to-server) communication will significantly increase. Therefore, deployment of a high-performance networking infrastructure is critical. For greater resource allocation agility and cost effectiveness, data centers will allocate resources dynamically across large server pools where any server could be assigned to any service at any time. Key requirements to enable deployment of this new data center architecture are network availability, bandwidth, and performance. Therefore deploying the right hardware to provide sufficient network capacity on the server edge is critical—the greater the server’s data throughput capabilities, the better the network will perform.

This is where the HPE Flexible Network FlexFabric and Converged Network Adapters (CNA) powered by the QLogic 578x0S controllers come into play. The QLogic 578x0S controllers have demonstrated greater large block I/O networking performance, delivering line-rate performance up to 37,000 Mbps. See figure 1 for details.

HPE Flexible Network Adapters using technology from QLogic



Source: Demartek Report (May 2014)

Figure 1. Throughput (Mbps) vs. I/O size (bytes)

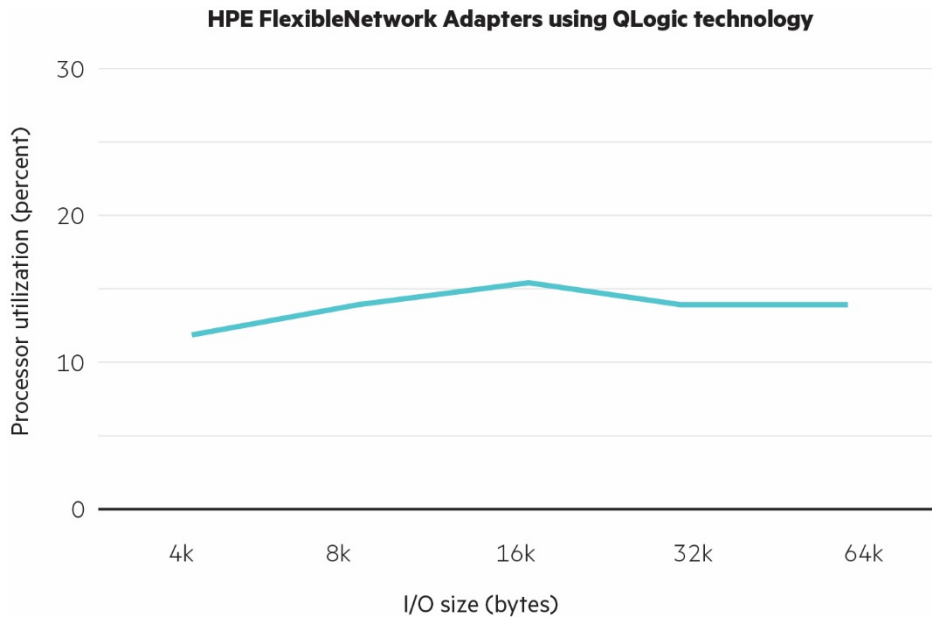
Performance is enhanced on the HPE Ethernet 25GbE adapter from QLogic by the addition of support for RDMA and DPDK. This 4x25GbE adapter supports RDMA over Converged Ethernet (RoCE) which provides direct memory access for Ethernet data. This greatly reduces latency and is ideal for use in high-performance computer environments, financial and other applications where I/O latency impacts application performance. For customers with custom applications that utilize small packet sizes, like those in the NFV space, oil and gas or financial sectors, support for DPDK improves the small packet I/O performance over the Ethernet network. With DPDK, the HPE Ethernet 4x25GbE 1-port 620SFP28 Adapter can provide more than 85 million packet-per-second performance with 512 byte block sizes.

Enhance utilization

Data center operational costs have a significant impact on businesses and IT administrators are consistently tasked to reduce costs and increase asset utilization. Traditionally, data center servers used were dedicated, which meant they were over-provisioned and under-utilized.

HPE Flexible Network Adapters powered by QLogic technology improve processor utilization (to less than 15 percent) through a combination of hardware and stateless offload features (see figure 2). However, the benefits of HPE Flexible Network Adapters using the QLogic offload features go beyond just improving performance and workload processing. These features also help reduce energy consumption.

It is well known that data center power and cooling costs are increasing rapidly. Even if cost is not an issue today, sourcing of energy is becoming an issue as the data center’s insatiable appetite for energy continues to grow. This is especially true for data centers of cloud computing providers. Therefore, businesses are looking into all avenues to mitigate and curb growing energy costs. The energy required by the server pools is the biggest component of the energy and cost equation. This is once again where the HPE family of Flexible Network Adapters from QLogic can play an important role in helping to keep energy costs in check. By offloading network-related processes from the processor, the QLogic controllers provide optimized host processor utilization allowing more applications to be supported by a fewer number of servers and processors.



Source: Demartek Report (May 2014)

Figure 2. Processor utilization (percent) vs. I/O size (bytes)

Optimized for Virtual Server Environments

With server virtualization prevalent in today’s data center, I/O connectivity needs to be flexible and scalable enough to ensure workload performance can be optimized. The HPE 53x/63x Series Ethernet Adapters, HPE Synergy 2820C/3820C CNAs and the HPE StoreFabric CN1100R CNAs from QLogic support a variety of features across HPE ProLiant, Apollo and Synergy servers that make them ideal for use in virtual server environments. Most HPE Ethernet, FlexFabric and Converged Network Adapters based on QLogic controller technology support Network Partitioning or NPAR. This enables the server administrator to virtualize a physical port into four (4) physical PCIe functions that are presented to the operating system. Each physical function can be tune for performance and quality of service. These adapters also support Single-Root I/O Virtualization (SR-IOV) which allows for I/O virtualization without putting a burden on the hypervisor. Lastly, all these adapters also support NVGRE and VXLAN Tunnel Offloads which provide flexibility to create VLANs across disperse data centers and overcome VLAN limitations in highly virtualized environments.

Free up more resources for application processing

Converging application data and storage data onto the same network simplifies the installation and management of the network infrastructure. As shown in figures 3 and 4, QLogic-based FlexFabric adapters and CNAs deliver the highest performance for FCoE and iSCSI protocol processing with efficient hardware offload that frees up the server CPU resources for applications processing.

Much of the world’s data transfer begins and ends with an Ethernet connection. IT professionals who are looking for higher capacity and performance solutions can rely on the HPE ProLiant, Apollo and Synergy Servers with HPE FlexFabric adapters and CNAs from QLogic to deliver the highest levels of performance.

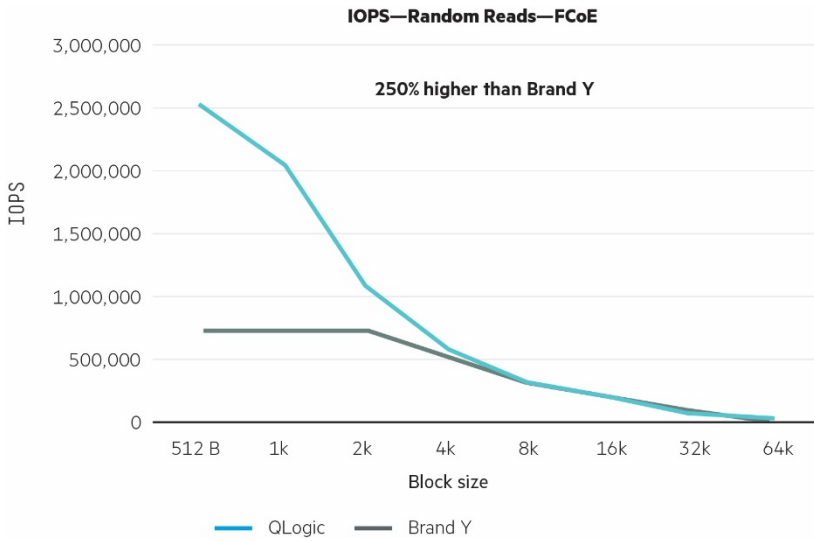


Figure 3. FCoE performance

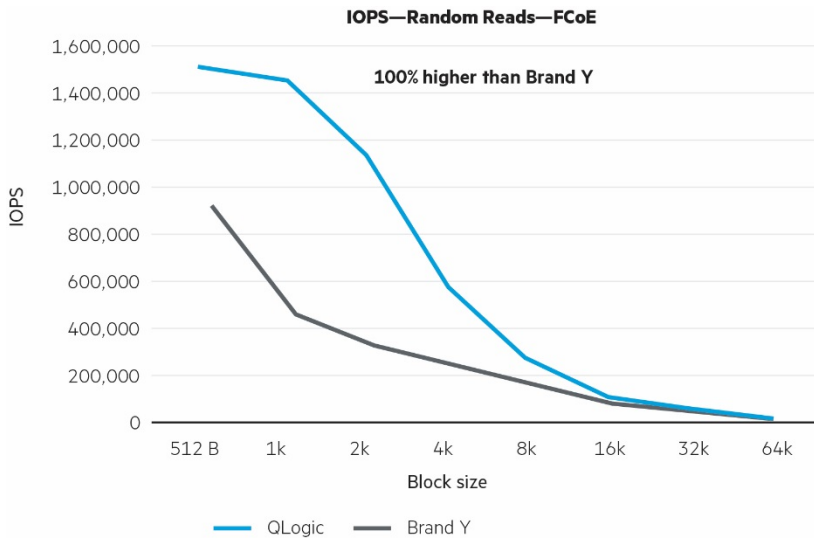


Figure 4. iSCSI performance

Reduce energy consumption with Energy Efficient Ethernet

Historically, energy consumption was not a significant consideration for data center design. However, over the past decade, our data-hungry world has brought energy to the forefront of data center design considerations. As data centers became larger and larger, energy consumption consumes a larger portion of an organization’s operational expenses (OPEX). Some data centers have reached the point where sourcing energy is the challenge—not enough power can be delivered to fully operate the computing and cooling resources within the data center. As a result, energy efficiency has become a factor in selecting the computing and networking building blocks needed for the data center. In addition, energy efficiency is not relegated to large power-hungry building blocks of the data center. IT administrators have come to expect some level of energy efficiency from every component used in the data center.

To further drive energy conservation within the data center, the Energy Efficient Ethernet (EEE) standard was developed to help IT administrators reduce the energy consumption of Ethernet-attached devices within their networks. Examples of such devices would include Ethernet adapters and Ethernet switches. A key feature of the EEE standard is called low power idle (LPI). As the name implies, when the Ethernet device is in an idle state (no data transmission activity), non-essential components of the Ethernet interface are placed in a low power state (sleep mode). A wake-up signal sent by the link partner allows the sleeping Ethernet device time to prepare for receipt of an incoming Ethernet data frame. EEE makes network energy conservation seamless and effective.

With QLogic EEE-enabled 10GbE adapters for HPE ProLiant and Apollo Servers, power consumption during idle state is reduced by up to 27 percent, with additional power reductions in the connected EEE-enabled switch, as shown in table 3. As noted earlier, this only represents a portion of the energy savings. There is also a comparable energy savings to be realized when the corresponding EEE-enabled switch port is in idle mode. 10GbE EEE-enabled network adapters combined with EEE-enabled network switches double your power savings, making it a winning combination.



Figure 5. Energy Efficient Ethernet

With QLogic controller-based EEE-enabled 10GbE adapters, power consumption during idle state is reduced by up to 27 percent.

HPE EEE-enabled 10GbE adapters from QLogic include:

- Dual-Port 530T 10GbE adapter
- Dual-Port 533FLR-T 10GbE adapter
- Dual Port CN1100R 10GBASE-T CAN
- Quad-port 536FLR-T 10GbE adapter

Table 4. Realized power savings

	Savings (2 ports)
HPE 530T dual-port 10GbE	
HPE 533FLR-T dual-port 10GbE	
Quad-Port 536FLR-T adapter	
Dual Port CN1100R 10GBASE-T CNA	
NIC ports idle without EEE (W)	12.8
NIC ports idle with EEE (W)	9.4
NIC ports power savings with EEE (W)	3.4
NIC port power savings with EEE* (%)	27%

* Includes the physical layer device, 5719 processor, and other components on the adapter.

Benefit from long-standing industry leadership

Networks provide the communication backbone for which the data center is designed. It is for this reason you need solutions that deliver not only the highest level of performance, but more importantly, provide a robust and reliable networking infrastructure. Performance is of little value when the network is not stable. With more than 13 generations of Ethernet controller design and development experience, QLogic Ethernet controllers are rock-solid and market-proven. QLogic enables the HPE portfolio of Ethernet adapters to provide not only the highest level of performance, efficiency, and scalability, but also the highest level of reliability and interoperability. These factors combine to deliver:

- Seamless integration with the HPE management framework
 - The HPE portfolio of Flexible Network Adapters using Ethernet controllers from QLogic can be managed using the HPE ProLiant Insight Control management framework and HPE OneView management software
 - Monitor and manage infrastructure with one simple, integrated interface
- Seamless integration and ease of management with HPE Flex-10 and Flex-20 technology
 - HPE solutions using QLogic controllers hold the majority share of 10GbE Flex-10 ports deployed in data centers

Maximize performance and flexibility for demanding workloads

HPE Flexible Network Adapters and CNAs powered by controllers from QLogic provide 10GbE and 20GbE network connectivity for the HPE ProLiant, Apollo and Synergy Server families. These solutions are available in mezzanine, standard NIC, and innovative HPE FlexibleLOM form factors. They deliver maximum performance for demanding workload environments and superior flexibility for management and deployment.

The HPE portfolio of adapters extends Ethernet's proven value set and economics to IT managers deploying HPE ProLiant, Apollo and Synergy Servers. Benefits include:

- Choose from a comprehensive portfolio of 10GbE and 20GbE standup adapters, FlexibleLOMs, and mezzanine adapters for HPE ProLiant, Apollo and Synergy Servers
- Leverage QLogic technology and their long-standing industry leadership in Ethernet technology
- Realize the highest performance for networking and storage applications with lowest processor utilization
- Use HPE EEE to reduce energy consumption
- Enjoy lower total cost of ownership (infrastructure/operational/human capital)
- Support for Network Partitioning (NPAR) for ProLiant, Apollo and Synergy Servers. Allowing administrators to configure a 10 Gb port as four separate partitions or physical functions. Each PCI function is associated with a different virtual NIC. To the OS and the network, each physical function appears as a separate NIC port

Learn more at

hpe.com/info/servernetworking

qlogic.com/info/hpe



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