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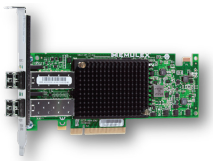
CONNECT - DATA SHEET

Dual-Port 10Gb HP FlexFabric and StoreFabric Adapters for HP ProLiant Gen9 Rack Servers

HP FlexFabric 10Gb 2-port 556FLR-SFP+ FlexibleLOM (HP Part # 727060-B21)
HP StoreFabric 10Gb 2-port HP CN1200E CNA (HP Part # E7Y06A)

HP 556FLR-SFP+ FlexibleLOM Adapter



HP CN1200E PCIe Adapter

Overview

Based on the Emulex fourth-generation OneConnect® Converged Network Adapter (CNA) technology, the HP 2-port 10Gb Ethernet (10GbE) 556FLR-SFP+ and CN1200E are the industry's first CNAs to support Local Area Network (LAN), Storage Area Network (SAN) and Remote Direct Memory Access (RDMA) over Converged Ethernet (RoCE) on a single 10GbE wire.

The HP 556FLR-SFP+ and CN1200E are high performance dual-port 10GbE adapters for HP ProLiant Gen9 rack servers. The form factor for the 556FLR-SFP+ is a FlexibleLOM, or modular LAN on motherboard (LOM), whereas the form factor for the CN1200E is a PCIe adapter.

The HP 556FLR-SFP+ and CN1200E adapters offer more scalable virtualization with support for enhanced Single-Root I/O Virtualization (SR-IOV), RoCE, Virtual Connect Flex-10 port partitioning and next-generation overlay networking technologies that address the requirements of virtual machine (VM) mobility and massive scaling of Layer 2 subnets inside private or hybrid cloud infrastructures. For HP ProLiant Gen9 servers, HP adapters provided by Emulex deliver:

- Virtual Network Exceleration™ (VNeX™) offload virtualization suite
- Microsoft SMB Direct with RoCE
- Over one million input/output operations per second (IOPS) for both iSCSI and Fibre Channel over Ethernet (FCoE) - 2x higher than previous generations of Emulex offloads[1]
- Up to 4x better small packet processing performance than the previous generation adapter[1]
  - Ideally suited for messaging, social media user posts and mobile streaming video applications

VNeX overlay network tunnel offloads for IT agility and secure scalability

Together, HP and Emulex are delivering a superior overlay networking solution for both HP ProLiant BladeSystem Gen9 and HP ProLiant Gen9 rack servers. HP FlexFabric 10GbE and 20GbE networking solutions include the industry's only hardware offload support for Virtual Extensible Local Area Network (VXLAN) and Network Virtualization using Generic Routing Encapsulation (NVGRE) tunnels. These solutions are designed to simplify VM mobility and network scalability while optimizing server performance when compared to adapters that lack offload capability.

Emulex VNeX tunnel offload technology is powered by a multi-core adapter ASIC engine that accelerates the performance of overlay networking. By offloading the Ethernet packet header encapsulation process, while simultaneously preserving legacy stateless TCP offloads, Emulex VNeX provides full native network performance with higher server CPU effectiveness in an overlay network environment, enabling greater VM density. It also results in higher server power efficiency, reducing data center energy and cooling expenses. Additionally, this technology allows HP customers to massively scale secure isolated networks to meet the growing demands of simultaneously servicing many user groups.

Key features

- Storage, network and RDMA traffic over a common 10GbE infrastructure
- SMB Direct with RoCE support
- Superior performance:
  - Overlay network tunneling offloads (VXLAN and NVGRE)
  - iSCSI and FCoE storage protocols offload
  - TCP/IP stateless offloads
- VMware vSphere NetQueue support
- Microsoft Windows Server VMQ and Dynamic VMQ support

Key benefits

- Perform vMotion or Live Migration without reconfiguring network resources
  - Save up to $1,800 per migration event[2]
- Reduce capital and operational expenditures (CAPEX and OPEX) with maximized server efficiency[1]
  - Increase throughput up to 129%
  - Increase server CPU effectiveness up to 46%
  - Improve server power efficiency up to 122%
- Provision secure, multi-tenant cloud-scale networks
  - Exceed the typical 4096 VLAN limit to enable support for larger numbers of tenants/user groups

[1] IT BrandPulse Test Report, "OCe14000 Performance," July, 2014

[2] Allwyn Sequeira, CTO and VP, Security & Networking, VMware, presentation at Open Networking Summit, April, 2012

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Accelerated Microsoft applications performance with SMB Direct with RoCE support
RDMA reduces CPU utilization and data latency and improves throughput by bypassing the host TCP/IP stack. SMB Direct RoCE leverages Converged Ethernet, also known as Data Center Bridging (DCB), as a lossless physical layer networking medium. The RoCE architecture removes the TCP/IP stack and a data copy step. This technology works by seamlessly sensing, without user action or intervention, the presence of an SMB Direct RDMA compliant adapter and switching from standard TCP/IP networking to SMB Direct mode.

Flexible storage connectivity using FCoE and iSCSI hardware offloads
The HP FlexibleLOM and PCIe adapters support FCoE offload using the same field-proven Emulex drivers that work with Emulex LightPulse® Fibre Channel Host Bus Adapters (HBAs). They also support hardware iSCSI offload, delivering performance that is superior to iSCSI solutions based on software initiators and standard NICs. Finally 10GbE FlexibleLOM and PCIe adapters also have the ability to support NIC and iSCSI or FCoE offloads on the same physical port. The 556FLR-SFP+ and CN1200E adapters support storage connectivity, with support for up to three functions per port when connected to a switch that supports Data Center Bridging (DCB). Each port can be configured as one NIC function, one NIC function and one iSCSI or FCoE function, or one NIC function, one iSCSI function, and one FCoE function.

Optimized host server virtualization density using SR-IOV
SR-IOV optimizes I/O for VMs, enabling higher host server virtualization ratios to deliver maximum server return on investment (ROI). SR-IOV provides a more cost-effective solution than multiple physical adapter ports. SR-IOV enables multiple VMs to directly access the HP adapters' I/O resources, thus allowing the VM's network I/O to bypass the hypervisor's virtual switch and take a path directly between the VM and the adapter, eliminating redundant I/O processing in the hypervisor. This, in turn, allows higher I/O performance and lower CPU utilization as compared to the alternative of software-emulated NIC devices that are implemented in the hypervisor.

Simplified management using a host of HP management tools including HP OneView or Emulex OneCommand® Manager application
The HP FlexibleLOM and PCIe adapters support both HP as well as Emulex management tools. HP OneView provides fast, efficient, secure local and remote deployment, configuration and update capabilities. The Emulex OneCommand Manager application provides centralized management of HP adapters based on Emulex OneConnect CNAs and LightPulse HBAs throughout the data center from a single management console. The OneCommand Manager application provides a graphical user interface (GUI) and a scriptable command line user interface (CLI). OneCommand Manager for VMware is fully integrated with VMware vCenter, enabling "single pane of glass" management for VMware deployments.

Enterprise-class performance and reliability
Leveraging four generations of advanced, field-proven controller and adapter technology, the HP FlexibleLOM and PCIe adapters meet the robust interoperability and reliability requirements of enterprise cloud and scale-out data centers.

HP ProLiant Gen9 servers enhance virtualization

Industry leading CPU effectiveness (Gbps/% of CPU utilized)

- Increased VM density
- Higher ROI on Server CAPEX
- Higher server power efficiency (throughput per watt)

Industry leading VMware throughput

- Better application performance
- More simultaneous vMotion and Hyper-V migrations

vCenter plug-in and vSphere web client

- Single pane of glass management

SMB Direct / RoCE

- Up to 7x faster Hyper-V live migrations[3]
- High performance Network Attached Storage (NAS) file storage I/O

[3] TechEd 2013 Presentation, Jose Barreto, Microsoft

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Controller

- Emulex Engine, XE102

Ethernet standards

- IEEE 802.3-2008 10GBASE Ethernet ports
- IEEE 802.3ae 10Gb Ethernet over Fiber
- IEEE 802.1p QoS Tagging
- IEEE 802.1Q virtual LANs (VLAN)
- IEEE 802.3x Flow control with Pause frames
- IEEE 802.1Qbg Edge Virtual Bridging
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)and Data Center Bridging Capability Exchange(DCBX)
- IEEE 802.1Qbb Priority Flow Control (PFC)
- IEEE 802.3ad Link Aggregation/LACP
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

Ethernet Network Interface (Layer 2 NIC) and TCP/IP

- NDIS 6.0, 6.1, 6.2, 6.3 and 6.4-compliant Ethernet Functionality
- IPv4 (RFC 791) and IPv6 (RFC 2460 & 3513)
- IPv4/IPv6 TCP, UDP checksum offload
- IPv4/IPv6 Receive Side Scaling (RSS)
- IPv4/IPv6 Large Receive Offload (LRO)
- IPv4/IPv6 Large Send Offload (LSO)
- Dynamic VMQ (Windows Server 2012 Hyper-V) and NetQueue (VMware vSphere)
- Programmable MAC and VLAN addresses
- 128 MAC/VLAN addresses per port
- Support for hash-based Multicast MAC address filters
- Support for hash-based Broadcast frame filters per port
- VLAN Offloads (insertion and extraction)
- Jumbo packet support up to 9000 Bytes

I/O virtualization

- Stateless L2, L3, and L4 offloads for frame in frame encapsulation (VXLAN, NVGRE)
- PCI-SIG Address Translation Service (ATS) v1.0
- Support for up to 512 hardware queues
- Virtual Switch Port Mirroring for diagnostic purposes
- Virtual Ethernet Bridging (VEB)
- NIC SR-IOV supports up to 63 Virtual Functions (VFs) per port for NIC
- QoS for controlling and monitoring bandwidth assigned to and used by virtual entities
- Configurable control of network bandwidth by physical port, queue, or protocol
- Traffic Shaping and QoS across each VF and Physical Function (PF)

Fibre Channel over Ethernet (FCoE) offload

- Hardware offload for FCoE Protocol
- ANSI T11 FC-BB-5 Support
- Programmable World Wide Name (WWN)
- Support for FIP and FCoE Ether Types
- Concurrent Logins (RPI): up to 8K per adapter (FCoE adapter-only mode)
- Open Exchanges (XRI): up to 8K per adapter (FCoE adapter-only mode)
- Supports up to 255 NPIV interfaces
- Concurrent FCoE and iSCSI support on each port

Internet Small Computer System Interface (iSCSI) offload

- Hardware offload for iSCSI protocol
- Header and data digest support
- Up to 4K outstanding commands (iSCSI adapter-only mode)
- Up to 512 offloaded iSCSI connections
- Support for multipath I/O
- Operating System-agnostic INT13 based iSCSI boot and iSCSI crash dump support
- RFC 4171 Internet Storage Name Service (iSNS)
- Support for both IPv4 and IPv6 connections
- MTU packet size support up to 8342 bytes
- Concurrent iSCSI and FCoE support on each port

Converged Enhanced Ethernet (CEE) and Data Center Bridging (DCB)

- IEEE 802.1Qbb Priority Flow Control (PFC)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS) and Data Center Bridging Exchange (DCBX)
- Absolute per-priority rate control option/ configuration

Remote Direct Memory Access (RDMA)

- Direct data placement in application buffers without CPU intervention
- Supports IBTA RoCE specifications
- Linux Open Fabrics Enterprise Distribution (OFED) support
- Low latency queues for small packet sends and receives
- Windows Server SMB Direct (SMB over RDMA)

PCI Express (PCIe) Interface

- PCIe 3.0 x8 (8, 5.0, and 2.5 GT/s per lane) compliant interface:
  - Up to 64 Gb/s full duplex bandwidth
- Supports up to 4 PCIe PFs per port
- SR-IOV:
  - Supports up to 63 PCIe VFs for NIC per port
- Up to 704 Message Signal Interrupts (MSI-X)
- Advanced Error Reporting (AER)
- Completion Timeout (CTO)
- Function Level Reset (FLR)

Comprehensive OS support

- Windows Server
- Red Hat Enterprise Linux
- Novell SUSE® Linux Enterprise Server
- VMware ESX
- Citrix XenServer

Management, boot support

- Support for HP OneView
- Support for Emulex OneCommand Manager Management Application for configuration and control
- VMware vCenter management plugin support
- Role-based management, integrated with Active Directory and LDAP
- Flexible personality definition for networking and storage protocols
- Multi-channel configuration and bandwidth control
- UEFI and x86 remote boot support including PXE v2.1, UEFI 2.3.1, iSCSI and FCoE
- Offline and online firmware updates
- Integrated Thermal Sensor works with management utilities

Hardware environments

ProLiant Gen9

- DL580 (Gen8)
- DL360
- DL380
- DL160
- DL180
- ML350

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Interconnect

Copper
- SFP+ Direct Attached Twin-Ax Copper interface
- Standards compliant passive and active copper cables supported up to 5m

Optical
- 10GBASE-SR short wave optic transceivers (ordered separately)

Physical dimensions

- Full Height with standard bracket
- Low Profile bracket also available

Environmental requirements

- Operating temperature: 0° to 55°C (32° to 131°F)
- Storage temperature: -40° to 70°C (-40° to 158°F)
- Relative humidity (storage): 10% to 90% non-condensing

Agency approvals

North America
- FCC Class A
- UL/CSA Recognized
- Class 1 Laser Product per DHHS 21CFR (J)

Australia / New Zealand
- C-Tick Mark

Europe
- CE Mark
- EU RoHS compliant
- TUV Bauart Certified
- Class 1 Laser Product per EN60825-1

Japan
- VCCI Class A

Taiwan
- BSMI Class A

Korea
- MSIP (formally KCC/MIC) Class A

China
- China RoHS Compliant

Ordering Information

556FLR-SFP+
- Part # 727060-B21 (FlexibleLOM for rack servers (aLOM))

CN1200E
- Part# E7Y06A) (PCIe adapter for rack servers)

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