CONNECT

OCe14102-UX-D Dual-port 10GbE Converged Network Adapter

For Dell PowerEdge 12G Rack and Tower Servers

High Performance Virtual Networking and Trusted Storage Interoperability

Overview

As the fourth generation of the Emulex OneConnect® product line, the OCe14102-UX-D dual-port Converged Network Adapter (CNA) provides high performance 10Gb Ethernet (10GbE) connectivity delivering multiple benefits for the enterprise cloud data center, including:

- Increasing data center IT agility and scalability through deployment of a secure multi-tenant cloud

- Delivering network flexibility in converged infrastructures

- Maximizing server hardware utilization by scaling high density virtualization

The OCe14102-UX-D 10GbE CNA is designed for the high bandwidth and scalability demands of tier-1 enterprise applications powered by storage protocol (Fibre Channel over Ethernet [FCoE] and iSCSI) and stateless TCP hardware offloads, more scalable virtualization with Single-Root I/O Virtualization (SR-IOV), optimized bandwidth allocation using Dell switch independent NIC partitioning (NPAR) and accelerated cloud networking using overloay networking offload technology.

Emulex Virtual Network Exceleration™ (VNeX) Overlay Network Offloads for Multi-tenant Cloud Networking

Scaling existing technologies for private or public multi-tenant infrastructures requires networking solutions that can enable virtual workload migration across Layer 2 and Layer 3 boundaries without impacting connectivity or server CPU performance.

At the same time, these solutions need to ensure isolation and security for thousands or millions of tenant networks. However, with existing technology, the available 4094 virtual LAN (vLAN) IDs are insufficient to isolate/secure each tenant in a data center (private cloud) or hybrid cloud environment.

Virtual Extensible Local Area Network (VXLAN, supported by VMware) and Network Virtualization using Generic Routing Encapsulation (NVGRE, supported by Microsoft) are next-generation overlay networking solutions that address these requirements. Overlay networking solutions are a MAC-in-IP data packet encapsulation scheme enabling the creation of virtualized Layer 2 subnets that can span physical Layer 3 IP networks.

Emulex VNeX offload technology powered by a multi-core adapter ASIC engine accelerates the performance of network virtualization by offloading the header encapsulation process, while simultaneously preserving legacy stateless TCP offloads, providing full native network performance with reduced server CPU utilization in a virtual network environment.

Key Benefits

- Enable higher virtualization ratios with hardware offloads, critical to getting a higher return from server investments

- Simplify virtual machine (VM) mobility in cloud infrastructures eliminating network re-configuration by leveraging on-adapter overlay networking offloads

- Improve storage networking with lossless end-to-end iSCSI over Data Center Bridging (DCB) connectivity, from CNA to Dell or other iSCSI storage targets

- Minimize wasted idle bandwidth by optimizing bandwidth allocation for applications, management and virtualization services using Dell NPAR

- Reduce adapter and cable costs — one adapter for simultaneous storage and data traffic on a common 10GbE fabric

- Simplified and flexible system management using Dell iDRAC7 with Lifecycle Controller or Emulex OneCommand® Manager

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Optimized Bandwidth Allocation with Dell NPAR

Dell NPAR allows multiple PCI functions to be created on each network adapter card port. As a CNA, each port on the OCe14102-UX-D can be configured with either four NIC functions, or alternatively with three NIC functions and one iSCSI or FCoE storage function. NPAR is ideal for virtualized server environments because bandwidth allocation can be optimized to support I/O intensive applications, virtualization services, and server management functions.

Flexible Storage Connectivity Using FCoE and iSCSI Hardware Offloads

OCe14102-UX-D supports FCoE offload using the same field-proven Emulex drivers that work with Emulex LightPulse® Fibre Channel Host Bus Adapters (HBAs). OCe14102-UX-D also supports hardware iSCSI offload, running storage traffic over a Data Center Bridging (DCB) Ethernet fabric, delivering performance that is superior to iSCSI solutions based on software initiators and standard NICs. Finally OCe14102-UX-D also has the ability to support NIC and either iSCSI or FCoE offloads on the same physical port with Dell NPAR technology.

Optimized Host Server Virtualization Density Using SR-IOV

SR-IOV optimizes I/O for virtual machines (VMs), enabling higher host server virtualization ratios to deliver maximum server ROI. SR-IOV provides a more cost-effective solution than multiple physical adapter ports.

SR-IOV enables multiple VMs to directly access the OCe14102-UX-D's I/O resources, thus allowing the VM's network I/O to bypass the host 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 the Dell iDRAC7 Framework or Emulex OneCommand Manager

The OCe14102-UX-D supports both Dell as well as Emulex management tools. Dell Lifecycle Controller provides fast, efficient, secure local and remote deployment, configuration, and updates capabilities.

The Emulex OneCommand Manager application provides centralized management of Emulex OneConnect Ethernet and CNAs and LightPulse HBAs throughout the data center from a single management console. Emulex OneCommand Manager provides a graphical user interface (GUI) and a scriptable command line user interface (CLI). Emulex OneCommand Manager for VMware is fully integrated with VMware vCenter enabling "single window pane" management for VMware deployments.

Enterprise-class Performance and Reliability

Leveraging four generations of advanced, field-proven controller and adapter technology, the OCe14102-UX-D meets the robust interoperability and reliability requirements of enterprise cloud and scale-out data centers.

Key Features

- Superior network convergence — storage and data traffic over a common 10GbE infrastructure

- Virtualization

  - SR-IOV

  - Intelligent steering of receive I/O with with VMware NetQueue and Microsoft Hyper-V VMQ for full 10GbE bandwidth utilization

  - N_Port ID Virtualization for creation of multiple virtual FCoE ports on a single physical FCoE port

- Hardware offloads:

  - Overlay network offloads (NVGRE & VXLAN)

  - iSCSI and FCoE storage protocols offload

  - Stateless TCP/IP offloads

- Dell NPAR compliant NIC port partitioning

- PCIe 3.0 compliant

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Controller

· Emulex Engine, XE102

Ethernet Standards

· IEEE 802.3-2008 10GBASE Ethernet ports
· IEEE 802.1Q virtual LANs (VLAN)
· IEEE 802.3x Flow control with Pause frames
· IEEE 802.1Qaz Enhanced Transmission Selection (ETS); 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 5.2, 6.0, 6.2, and 6.3-compliant Ethernet functionality
· 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 9200 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)
· Dell NPAR supports up to 4 NIC partitions or functions per physical port; one function can be storage function (iSCSI or FCoE)
· SR-IOV supports up to 63 Virtual Functions (VFs) per port for NIC
· Quality of Service (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 PF

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

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 (iSCSI adapter-only mode)
· 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

Converged Enhanced Ethernet (CEE) and DCB

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

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 Physical Functions (PFs) per port
· Single Root I/O Virtualization (SR-IOV):
  - Supports up to 63 PCIe Virtual Functions (VFs) per port
· Message Signal Interrupts (MSI-X)
· Advanced Error Reporting (AER)
· Supports D0, D3 (hot & cold) power management modes
· 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 Dell management tools:
  - iDRAC shared LOM via NCSI
  - OS2BMC
  - RT-CEM
  - UEFI HII
  - UEFI Firmware Management
  - UEFI Configuration Access
· 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

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Hardware Environments

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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: 5% to 95% 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

YGW92-FH
· Emulex OCe14102-UX-D Dual-port 10Gb SFP+ Converged Network Adapter, Full Height

RFPC9-LP
· Emulex OCe14102-UX-D Dual-port 10Gb SFP+ Converged Network Adapter, Low Profile

Third-party information brought to you courtesy of Dell.

OneConnect®   OneCommand®

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