OCe14102-U1-D Dual-port 10Gb Ethernet Converged Network Adapter

For Dell PowerEdge™ 13th Generation Rack and Tower Servers

The Dell OCe14102-U1-D dual-port 10Gb Ethernet (10GbE) adapter is based on Emulex's fourth-generation OneConnect® Converged Network Adapter (CNA) technology, representing the leading CNA to support Local Area Network (LAN), Storage Area Network (SAN) and RDMA over Converged Ethernet (RoCE) on a single 10GbE wire.

Dell PowerEdge 13th generation servers, with Dell adapters provided by Emulex, offer multiple benefits for the Dell enterprise customer, including:

- Accelerating workload performance through consolidation of multiple networking services on a single high-speed Ethernet adapter platform
- Increasing data center IT agility and scalability through deployment of a secure, private or hybrid, multi-tenant cloud infrastructure
- Maximizing server hardware utilization through CPU efficient networking

The Dell OCe14102-U1-D dual-port 10GbE adapters offer more scalable virtualization with support for enhanced Single-Root I/O Virtualization (SR-IOV), SMB Direct RoCE, Dell switch independent Network Interface Card (NIC) extended partitioning (NPAReP) and next-generation overlay networking technologies that address the requirements of virtual machine (VM) mobility and massive scaling of Layer 2 domains inside private or hybrid cloud infrastructures.

Accelerated Microsoft application performance with SMB Direct 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. 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 RDMA compliant adapter and switching from standard TCP/IP networking to SMB Direct mode. Dell customers can now benefit from faster Hyper-V live migrations and high performance Network Attached Storage (NAS) for applications such as Microsoft SQL Server and Microsoft SharePoint.

Emulex Virtual Network Exceleration™ (VNeX) overlay network offloads for multi-tenant cloud networking

Dell is delivering a superior overlay networking solution for Dell PowerEdge 13th generation servers, by offering the Emulex 10GbE CNA. Together, Dell and Emulex offer solutions that 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 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 reduced server CPU utilization in an overlay network environment, enabling greater VM density. It also results in increased server power efficiency reducing data center energy and cooling expenses. Additionally, this technology allows Dell customers to massively scale networks to meet the growing demands of simultaneously servicing many user groups.

Key features

- Storage, network and RDMA traffic over a common 10GbE infrastructure
  - Reduce adapter and cable costs—one adapter for simultaneous storage and data traffic on a common 10GbE fabric
- SMB Direct RoCE support
- SR-IOV support
- Superior performance and efficiency:
  - Overlay network tunneling offloads (VXLAN and NVGRE)
  - iSCSI and FCoE storage offloads
  - TCP/IP stateless offloads
- VMware vSphere NetQueue support
- Microsoft Windows Server VMQ and Dynamic VMQ support
- Support for Dell NPAReP (NIC extended partitioning), offering up to 16 partitions per adapter
- PCIe 3.0 compliant

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Optimized bandwidth allocation with support for new Dell NPAReP

Dell has doubled the NIC partitioning bandwidth with the new Dell NPAReP feature supported on Emulex OCe14000 adapters. Dell PowerEdge 13th generation servers, with Emulex OCe14102-U1-D network adapters, offer customers the ability to configure up to 16 NIC functions per adapter, or up to eight NIC functions per port. Alternatively, up to two of the functions (partitions) on each port can be configured with one ISCSI and one Fiber Channel over Ethernet (FCoE) storage function. Dell NPAReP 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 concurrent FCoE and iSCSI hardware offloads

OCe14102-U1-D supports FCoE offload, using the same field-proven Emulex drivers that work with Emulex LightPulse® Fibre Channel (FC) Host Bus Adapters (HBAs). OCe14102-U1-D also supports hardware iSCSI offload, running storage traffic over a DCB Ethernet fabric, delivering performance that is superior to iSCSI solutions based on software initiators and standard NICs. OCe14102-U1-D has concurrent mode support, providing Dell customers with the ability to support NIC, iSCSI and FCoE offloads on the same physical port with Dell NPAReP technology.

Optimized host server virtualization density using SR-IOV

SR-IOV provides a more cost-effective solution than multiple physical adapter ports by optimizing I/O for VMs, enabling higher host server virtualization ratios to deliver maximum server return on investment (ROI). SR-IOV enables multiple VMs to directly access the OCe14102-U1-D's 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, lower CPU utilization and significantly reduced latency as compared to the alternative of software-emulated NIC devices that are implemented in the hypervisor.

Simplified management using the Dell iDRAC8 framework or Emulex OneCommand® Manager application

The Dell OCe14102-U1-D supports both Dell and Emulex management tools, and is fully integrated with Dell's Lifecycle Controller management scheme. Dell Lifecycle Controller provides fast, efficient, secure local and remote deployment, configuration and update capabilities. The Emulex OneCommand Manager application provides centralized management of Dell 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 window pane' management for VMware deployments.

Enterprise-class performance and reliability

Leveraging four generations of advanced, field-proven controller and adapter technology, the Dell OCe14102-U1-D meets the robust interoperability and reliability requirements of enterprise cloud and scale-out data centers.

Key benefits

- Improve storage networking with lossless end-to-end iSCSI over 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 NPAReP
- Perform vMotion or Live Migration without reconfiguring network resources
- Reduce capital and operational expenditures (CAPEX and OPEX) with maximized server efficiency
  - Increase throughput
  - Increase server CPU effectiveness
  - Improve server power efficiency
- Provision secure, multi-tenant cloud-scale networks
  - Exceed the typical 4096 VLAN limit to enable support for larger numbers of tenants/user groups
- Simplified and flexible system management using Dell iDRAC8 with Lifecycle Controller or Emulex OneCommand Manager

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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 802.1Qbg Edge Virtual Bridging
- 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 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 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)
- Virtual Ethernet Port Aggregator (VEPA)
- Dell NPAReP supports up to 16 partitions per adapter, and eight NIC partitions or functions per physical port; up to two ports can be storage functions (one each iSCSI or FCoE)
- NIC 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
- 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 FCoE and iSCSI support on each port

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

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 Gen 3.0 x8 (8, 5.0, and 2.5 GT/s per lane) compliant interface:
  - Up to 64 Gbps full duplex bandwidth
- Configurable width and speed to optimize power versus bandwidth
- Supports up to 8 PCIe PFs per port
- Support for x1, x2, x4 and x8 link widths
  - Configurable width and speed to optimize power versus bandwidth
- SR-IOV:
  - Supports up to 63 PCIe VFs for NIC per port
- Up to 704 Message Signal Interrupts Extended (MSI-X)
- Advanced Error Reporting (AER)
- Supports D0, D3 (hot & cold) power management modes
- Completion Timeout (CTO)
- Function Level Reset (FLR)
- Alternative Routing ID Interpretation (ARI)

Comprehensive OS support

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

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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
- Optimized bandwidth allocation with switch independent Dell NPAReP
- Wake on LAN Support
- UEFI and x86 remote boot support including PXE v2.1, UEFI 2.3.1, iSCSI and FCoE
- MAC statistics gathering (SNMP, Ethernet MIIB, MIIB2, RMON, RMON2)
- Offline and online firmware updates
- Integrated Thermal Sensor works with management utilities

Hardware environments

- Dell PowerEdge 13th generation Rack and Tower servers

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

CG7YT
- Emulex OCe14102-U1-D Dual-port 10Gb SFP+ Converged Network Adapter, Full Height

6FC2Y
- Emulex OCe14102-U1-D Dual-port 10Gb SFP+ Converged Network Adapter, Low Profile

Third-party information brought to you courtesy of Dell.

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