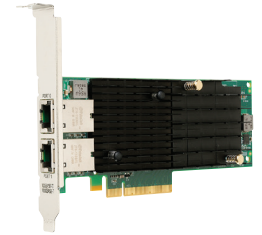connect • monitor • manage

EMULEX®

OCe14000 10GBASE-T Ethernet Network Adapter

High Performance Networking for Enterprise Virtualization
and the Cloud using Cost-effective Twisted Pair (CAT) Cabling

OneConnect OCe14102-NT dual-port
10GBASE-T Ethernet Network Adapter

Overview

An adapter within the fourth generation of the Emulex OneConnect® product line, the OCe14000 dual-port 10GBASE-T Ethernet network adapter provides high performance 10Gb Ethernet (10GbE) connectivity delivering multiple benefits for the enterprise cloud, including:

- Support for lowest cost 10GbE infrastructure using CAT 6/6A/7/7A twisted pair cabling

- 10GbE cabling support up to 100m for data center deployments using structured cabling

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

- Optimizing server hardware utilization by scaling high density virtualization

- Delivering user-controlled bandwidth partitioning across workloads and management services

The OCe14000 10GBASE-T Ethernet network adapter is designed for the high bandwidth and scalability demands of enterprise applications, more scalable virtualization with support for RDMA over Converged Ethernet (RoCE), enhanced Single-Root I/O Virtualization (SR-IOV) and NIC port partitioning, and next-generation overlay network technologies that address the requirements for virtual machine (VM) mobility and massive scaling of Layer 2 subnets inside private or hybrid cloud infrastructures.

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 VM-to-VM communication and virtual workload migration across Layer 2 and Layer 3 boundaries without impacting connectivity or 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 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 Linux, and Network Virtualization using Generic Routing Encapsulation (NVGRE), supported by Microsoft, are next-generation overlay networking solutions that address these requirements. These solutions are a frame-in-frame data packet encapsulation scheme enabling the creation of virtualized Layer 2 subnets that can span physical L3 IP networks. Traffic from each VM is tunneled to a specific virtual network; the packets are then routed transparently over the existing physical infrastructure.

Emulex VNeX offload technology powered by a multi-core adapter ASIC engine accelerates the performance of network virtualization by preserving legacy stateless TCP offloads and scaling methods on encapsulated packets, providing full native network performance in a virtual network environment.

Key benefits

- Infrastructure compatibility with widely deployed 1000BASE-T (1GbE) networks

- Flexibility to support top-of-rack, middle-of-row, end-of-row or zone distribution data center architectures

- Maximizes server hardware ROI with high virtual machine density

- Simplifies deployment of secure, scalable multi-tenant cloud infrastructures

- Accelerates applications performance

- Provides the bandwidth needed for slot constrained server platforms

- Reduces complexity through the deployment of a common network platform

OneConnect®   **OneCommand**®

OCe14000 10GBASE-T
Ethernet Network Adapter

RDMA support

The OCe14000 10GBASE-T adapter leverages RoCE enabling server to server data movement directly between application memory without any CPU involvement providing high throughput and data acceleration on a standard Ethernet fabric without the need for any specialized infrastructure or management.

Optimized host virtualization density with SR-IOV support

SR-IOV optimizes I/O for 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 OCe14000's I/O resources, thus allowing VM networking 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, lower CPU utilization and significantly reduced latency as compared to the alternative of software-emulated NIC devices that are implemented in the hypervisor.

Optimized bandwidth allocation with Emulex
Universal Multi-Channel port or network partitioning

Emulex Universal Multi-Channel (UMC) is ideal for virtualized server environments because bandwidth allocation can be optimized to support VM migration, management and I/O intensive applications. UMC allows multiple PCI physical functions to be created on each adapter port. Each port on the dual-port OCe14102-NT can be configured with up to eight functions.

Simplified management OneCommand® Manager application

The OneCommand Manager application provides centralized management of 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 to simplify management for virtual server deployments.

Fourth generation platform delivers enterprise-class reliability and performance

Leveraging generations of advanced, field-proven controller and adapter technology, OCe14000 adapters meet the robust interoperability and reliability requirements of enterprise and scale-out data centers.

Key features

- Superior network scalability—10GbE bandwidth on common software platform

- SR-IOV

- Data acceleration with RoCE support

- Powerful hardware offload for:
    - Overlay networks (NVGRE and VXLAN)
    - Stateless TCP

- Greater bandwidth with PCIe 3.0

- VMware vSphere NetQueue with RSS support

- Microsoft Windows Server VMQ, Dynamic VMQ, RSS and vRSS support

OCe14000 10GBASE-T
Ethernet Network Adapter

Controller

· Skyhawk
  (Emulex Engine, XE100 series controllers)

Ethernet standards

· IEEE 802.3an 10GBASE-T
· IEEE 802-3ab 1000BASE-T
· IEEE 802.1Q virtual LANs (VLAN)
· IEEE 802.3-2012 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 802-1AX Link Aggregation/LACP
· IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
· IEEE 802.1Qau Congestion Notification

Ethernet network interface (Layer 2 NIC) and TCP/IP

· NDIS 6.0, 6.2, 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 frame 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)
· OneConnect Universal Multi-Channel™ (UMC),
  support for up to 16 PCIe physical functions (PFs)
  per adapter which can be used as partitions as
  follows:
  - OCe14102 10GBASE-T Ethernet adapter, each
    port can support eight NIC functions
  - Note: the system hardware must support and
    enable ARI and the host operating system must
    support ARI for maximum number of functions
    to be enabled; see Emulex UMC manual for
    more details
· NIC Single Root I/O Virtualization (SR-IOV)
  - up to 63 virtual functions (VFs) per port
· 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

Converged Enhanced Ethernet (CEE) and Datacenter Bridging (DCB)

· IEEE 802.1Qbb Priority Flow Control (PFC)
· IEEE 802.1Qaz Enhanced Transmission Selection
  (ETS)
· IEEE 802.1Qaz Data Center Bridging Exchange
  (DCBX)
· IEEE 802.1Qau Congestion Notification (QCN)
· 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
· Support for Linux NFS over RoCE, iSER, and KVM
  VM Migration over RoCE
· 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
  - Configurable width and speed to optimize
    power versus bandwidth
· Support for up to 16 PCIe physical functions (PFs)
· Support for x1, x2, x4, and x8 links widths
· NIC Single Root I/O Virtualization (SR-IOV)
  - up to 63 virtual functions (VFs) per port
· Message Signal Interrupts (MSI-X)
· Advanced Error Reporting (AER)
· Completion Timeout (CTO)
· Function Level Reset (FLR)
· Alternative Routing ID Interpretation (ARI)

Comprehensive OS support

· Windows
· Red Hat Enterprise Linux
· SUSE® Linux Enterprise Server
· Oracle Linux
· VMware vSphere
· CentOS
· Debian
· Ubuntu
· FreeBSD

Management, boot support

· vCenter management plugin support
· Role-based management, integrated with Active
  Directory and LDAP
· Multi-channel configuration and bandwidth
  control
· UEFI and x86 remote boot support including
  PXE v2.1, UEFI 2.3.1
· MAC statistics gathering
  (SNMP, Ethernet MIB, MIB2, RMON, RMON2)
· Offline and online firmware updates
· Integrated thermal sensor works with
  management utilities

Hardware rnvironments

· x86, x64 servers

Please refer to the product page on
www.emulex.com for further details.

OCe14000 10GBASE-T
Ethernet Network Adapter

Interconnect

Cabling distances

· Up to 100m on CAT 6A, CAT 7 in 10G mode
· Up to 55m on CAT 6 in 10G mode
· Up to 100m on CAT 5E (or higher category cable) in 1000BASE-T (1G) mode

Physical dimensions

· Short, low profile MD2 form factor card
· 167.64mm x 68.91mm (6.60" x 2.71")
· Standard, full height bracket installed (low-profile bracket 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 and product safety approvals

North America

· FCC/Industry Canada Class A
· UL/CSA Recognized
· Class 1 Laser Product per DHHS 21CFR (J)

Europe

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

Australia

· C-Tick or RCM Mark

Japan

· VCCI Class A

Taiwan

· BSMI Class A

Korea

· MSIP (formally KCC/MIC) Class A

China

· China RoHS Compliant

Ordering Information

OCe14102-NT

· Dual-port, 10GBASE-T twisted pair RJ45, Ethernet Network Adapter

EMULEX®