PRODUCT BRIEF

Intel® X550 10 GbE Converged Network Adapter

Network Connectivity

Intel® X550 10 GbE Converged Network Adapter

Simplifies Migration to 10 Gigabit Ethernet (GbE), Provides FCoE, iSCSI, and Virtualization

Key Features

- Low cost, low power, 10 GbE performance for the entire datacenter.
- Intel's second generation, dual-port 10GBASE-T controller with integrated MAC and PHY.
- Standard CAT 6a cabling with RJ45 connectors.
- Supports NBASE-T* technology (2.5 and 5.0 GbE over CAT 5e).[1]
- Backward compatibility with existing 1000BASE-T networks simplifies the transition to 10 GbE.
- PCI Express* (PCIe) 3.0, x4.
- Unified networking delivering LAN, FCoE and iSCSI in one low-cost CNA.
- Flexible I/O virtualization for port partitioning and Quality of Service (QoS) of up to 64 virtual ports.
- Reliable, proven 10 GbE technology from Intel Corporation.
- Data Plane Developer Kit (DPDK) optimized for efficient packet processing.

10 GbE for the Broad Market

The Intel® Ethernet Converged Network Adapter X550 is the newest innovation in Intel's leadership to drive 10 GbE into the broad server market. This adapter hosts Intel's latest Ethernet silicon, the Intel® Ethernet Controller X550, a low cost single-chip 10GBASE-T solution for today's server platforms.

Simplify the Transition to 10 GbE

With 10GBASE-T, migration to 10 GbE is dramatically simplified with backward compatibility for your existing GbE network infrastructure. Install an X550 adapter into a server and the autonegotiation between 1 GbE and 10 GbE provides the necessary backwards compatibility that most customers require for a smooth transition and easy migration to 10 GbE. When time and budget allows, 10GBASE-T switches can be added any time to experience the full benefits of 10 GbE.

10GBASE-T uses the copper twisted-pair cables that are very familiar to IT professionals today. It is all you know and love about 1000BASE-T. The knowledge, training, and investment in BASE-T are preserved. 10GBASE-T is the easiest and most versatile 10 GbE interface that can be deployed anywhere in your data center. Its flexible reach from 1 meter to 100 meters supports the latest network architectures including Top of Rack (ToR), Middle of Row (MoR), and End of Row (EoR).

10 GbE Performance at Low Cost and Low Power

The new Intel® Ethernet Converged Network Adapter X550 is the lowest cost way to deploy 10 GbE in your data center today. The Intel X550 uses low cost CAT 6 and CAT 6a cabling. Chances are this cabling already exists in the data center.

A way for Intel to reduce cost and power is to integrate components into a single-chip solution. Why is integration important? First, integration translates to lower power. This means no active heat sink and reduces the per-port power consumption. Second, integration also means a lower cost per port, because two separate components are not needed. When cabling is accounted for, cost efficiencies realized from a single part mean 10GBASE-T is the lowest cost media to deploy.

With lower cost and power, 10GBASE-T is ideal for broad deployment. 10GBASE-T is an option for every rack and tower server in the data center. The new Intel® Ethernet Converged Network Adapter X550 (CNA X550 family) provides bandwidth-intensive applications with highly affordable 10 GbE network performance and cost-effective RJ45 connectivity for distances up to 100 meters.

Exciting New Data Center Models

More than just a 10 times per-port increase in performance by using the CNA X550 family versus a standard 1 GbE adapter opens doors for exciting new usage models, including unified networking and I/O virtualization.

A Complete Unified Network Solution

Converging data and storage onto one fabric eliminates the need for multiple adapters and cables per server. Furthermore, 10 GbE provides the bandwidth to converge these multiple fabrics into a single wire. A key capability that makes all this possible is traffic class separation provided by Data Center Bridging (DCB). DCB provides a collection of standards for additional QoS functionality such as lossless delivery, congestion notification, priority-based flow control, and priority groups. This enables the CNA X550 family to provide a one-wire solution with virtual pipes for the different classes of traffic:

- Data: best effort delivery of standard LAN traffic.
- Storage: NAS or SAN including lossless FCoE and iSCSI.
- Management: guaranteed connectivity of data center IP management.

Unified Networking Principles

Intel's unified networking solutions are built on the principles that have made us successful in Ethernet:

- Open architecture integrates networking with the server, enabling IT managers to reduce complexity and overhead while enabling a flexible and scalable data center network.
- Intelligent offloads lower cost and power while delivering the application performance that customers expect.
- Proven unified networking is built on trusted Intel Ethernet technology, enabling customers to deploy FCoE or iSCSI with the same quality used in their traditional Ethernet network.

Intel's unified networking solutions are enabled through a combination of Intel Ethernet products along with network and storage protocols integrated in the operating systems. This combination provides proven reliability with the performance that data center administrators around the world have come to expect from Intel.

Best Choice for Server Virtualization

Virtualization changes server resource deployment and management by running multiple applications and operating systems on a single physical server.

With Intel® Virtualization Technology for connectivity (Intel® VT-C), the CNA X550 family delivers outstanding I/O performance and QoS in virtualized data centers and cloud environments. I/O virtualization advances network connectivity used in today's servers to more efficient models by providing multiple Tx/Rx queues, Tx queue rate-limiting, and on-controller QoS functionality that is useful for both virtual and non-virtual server deployments.

The CNA X550 family reduces I/O bottlenecks by providing intelligent offload of networking traffic per VM, enabling near-native performance and VM scalability. The host-based virtualization technologies include:

- VMDq for emulated path: NIC-based VM queue sorting enabling efficient hypervisor-based switching.
- SR-IOV for direct assignment: NICbased isolation and switching for various virtual station instances enabling optimal CPU usage in virtualized environment.

Additionally, the CNA X550 family provides virtual bridging support that delivers both host-side and switch-side control and management of virtualized I/O as well as the following modes of virtualized operation:

- VEPA: IEEE 802.1Qbg support for Virtual Ethernet poet Aggregator.
- VEB: Virtual Ethernet Bridge support with Intel VT.

Network Virtualization

Network virtualization is the next big trend in creating an agile data center. The family of X550 CNA family of adapters are ready to help you take that next step.

- VXLAN and NVGRE: These stateless offloads preserve application performance for overlay networks. With these offloads, it is possible to distribute network traffic across a CPU core.
- Perserves application performance in a network virtualized environment.

Software Tools and Management

Intel® Ethernet Converged Network Adapters (CNAs) support Dell's Lifecycle Controller. The Lifecycle Controller is coupled with the Dell Remote Access Card* (DRAC*) service processor to provide embedded system management. The Lifecycle Controller enables both local and remote access to manage initial setup and configuration of the BIOS settings on the platform, setup, and configuration of Intel Ethernet adapters, update of all the platform firmware, and the deployment of the operating systems.

Intel® Advanced Network Services (Intel® ANS) include new teaming technologies and techniques such as Virtual Machine Load-Balancing (VMLB) for Hyper-V environments. Intel ANS also provides a variety of teaming configurations for up to eight ports, and support for teaming mixed vendors' server adapters. Intel ANS includes support for 802.1Q VLANs, making Intel ANS one of the most capable and comprehensive tools for supporting server adapter teaming.

Additionally, Intel® PROSet for Windows* Device Manager (DMIX) and PROsetCL extend driver functionality to provide additional reliability and Quality of Service features and configuration.

FEATURES	BENEFITS
GENERAL	
Intel® X550 10 GbE Converged Network Adapter	• Intel's second integrated 10GBASE-T MAC/PHY, low-cost solution
Enhanced Low-profile Solution	• Enables higher bandwidth and throughput from standard and low-profile PCIe slots and servers
RJ45 Connections Over CAT 6A Cabling	• Ensures compatibility with cable length up to 100 meters
FCoE and iSCSI remote boot	• Provides centralized Storage Area network (SAN) management at a lower cost than competing solutions
Support for most Network Operating Systems (NOS)	• Enables widespread deployment
RoHS-compliant, Lead-free Technology	• Complies with the European Union (EU) directives to reduce the use of hazardous materials
I/O FEATURES FOR MULTI-CORE PROCESSOR SERVERS	
Low Latency	• Based on the sensitivity of the incoming data, the adapter can bypass the automatic moderation of time intervals between interrupts
MSI-X support	• DMA engine – Enhances data acceleration across the platform (network, chipset, processor), lowering CPU usages
Header Splits and Replication in Receive	• Helps the software device driver focus on the relevant part of the packet without the need to parse it
Multiple Queues: 64 Tx and Rx per port	• Network packet handling without waiting or buffer overflow providing efficient packet prioritization
Tx/Rx IP, SCTP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities	• Lower processor usage • Checksum and segmentation capability extended to new standard packet type
Tx TCP Segmentation Offload (IPv4, IPv6)	• Increased throughput and lower processor usage • Compatible with large-send offload feature (in Microsoft Windows* Server operating systems)
IPSec	• Offloads IPSec capability onto the adapter instead of software to significantly improve throughput and CPU usage
Compatible with x4, x8 and x16 Standard and Low-profile PCIe Slots	• Enables each PCIe slot port to operate without interfering or competing with other PCIe slot port
Receive and Transmit Side Scaling for Windows Environment and Scalable I/O for Linux* Environments (IPv4, IPv6 and TCP/ UDP)	• Enables the direction of the interrupts to the processor cores in order to improve CPU use rate

DUAL PORT POWER CONSUMPTION		
LINK SPEED	AVERAGE POWER (W)	MAX POWER (W)
100 Mb/s	3.9	4.9
1 GbE	5.5	6.4
10 GbE	11.2	13.0

* LFM = minimum of 150 LFM under all operating conditions

FEATURES	BENEFITS
VIRTUALIZATION FEATURES	
Multi-mode I/O Virtualization Operations	• Supports two modes of operation of virtualized environments: Direct assignment of part of the port resources to different guest operating systems using the PCI SIG SR-IOV standard (also known as native mode or pass-through mode) Central management of the networking resources by hypervisor (also known as software Enhanced QoS feature by providing weighted round-robin servicing for the Tx data • A hybrid model, where some of the VMs are assigned a dedicated share of the port and the rest are serviced by a hypervisor is also supported
VXLAN Stateless Offloads	• A framework for overlaying virtualized layer 2 networks over layer 3 networks. VXLAN enables users to create a logical network for VMs across different networks
NVGRE Stateless Offloads	• Network Virtualization using Generic Routing Encapsulation. The encapsulation of an Ethernet Layer 2 Frame in IP that enables the creation of virtualized Layer 2 subnets that can span physical Layer 3 IP networks
Virtual Machine Device Queues (VMDq)	• Offloads data sorting from the hypervisor to silicon, improving dta throughput and CPU usage • QoS feature for Tx data by providing round-robin servicing and preventing head-of-line blocking • Sorting based on MAC addresses and VLAN tags
64 Transmit (Ts) and Receive (Rx) Queue Pairs Per Port	• Supports VMware* NetQueue and Microsoft* VMQ • MAC/VLAN filtering for pool selection and either DCB or RSS for the queue in pool selection
Support for PCI-SIG SR-IOV Specification	• Up to 64 VFs per port
IEEE 802.1Q VLAN Support with VLAN Tag Insertion, Stripping and Packet Filtering for up to 4096 VLAN tags	• Ability to create multiple VLAN segments • Filtering packets belonging to certain VLANs

INTEL® X550 10 GBE CONVERGED NETWORK ADAPTER		
CONFIGURATION	PRODUCT CODE	SKU
X550-T2 PCIe	HWWN0	Low Profile Bracket / 540-BBRL
X550-T2 PCIe	FKHKC	Full Height Bracket / 540-BBRO

SPECIFICATIONS

GENERAL

Intel® X550 10 GbE Converged Network Adapter	Dual port: • FKHKC (Dual Port Standard Height Bracket) • HWWN0 (Dual Port Low Profile Height Bracket)
Cabling Distances	10GBASE-T: • 100 m using CAT 6A • 55 m using CAT 6 1000BASE-T: • 100 m using CAT 5e, CAT 6 or CAT 6A
Connector	• RJ45 copper

NETWORK MANAGEMENT

Wired for Management (WfM) Baseline v2.0 Enabled for Servers
DMI 2.0 Support, Windows Management Instrumentation (WMI) and SNMP
Remote Installation Services (RIS)

HARDWARE FEATURES

Data rate supported per port	• 100 Mb/s, 1 GbE and 10 GbE
Bus type	• PCI Express 3.0 (8.0 GT/s)
Bus width	• x4-lane PCIe, operable in x8 and x16 slots
Interrupt levels	• INTA, MSI, MSI-X
Hardware certifications	• Class A: USA-FCC; Canada – ICES-003/ NMB-003, European Union – CE, Japan – VCCI, Taiwan – BSMI, Korea – MSIP, Australia/New Zealand – RCM, Safety EN/UL and CSA C22.2 60950-1
Controller/processor	• Intel® Ethernet Controller X550

ADAPTER PRODUCT FEATURES

Intel® PROSet Utility for Easy Configuration and Management
Intel® Lead-free Technology
Plug and Play Specification Support
RoHS Compliant

NETWORK OPERATION SYSTEM (NOS) SUPPORT – ALL ADAPTERS			
OPERATING SYSTEM	IA-32	X64	IPF
Windows Server* 2008 R2	N/A	•	N/A
Windows Server 2012	N/A	•	N/A
Windows Server 2012 R2	N/A	•	N/A
Windows PE 3.0 (2008 R2 PE)	•	•	N/A
Windows PE 4.0 (2012 PE)	•	•	N/A
Windows PE 5.0 (2012 R2 PE)	•	•	N/A
Linux* Stable Kernel version 2.6/3.x/4.x	•	•	•
Linux RHEL 6.7 and 7.1	•	•	N/A
Linux SHES 11 SP4	•	•	•
Linux SLES 12	•	•	N/A
FreeBSD* 10.2	•	•	N/A
UEFI* 2.1	N/A	•	•
UEFI 2.3	N/A	•	•
UEFI 2.4	N/A	•	N/A
VMware ESXi 5.5 and ESXi 6.0	N/A	•	N/A
Windows 7* SP1, Windows 8, Windows 8.1, and Windows 10	N/A	•	N/A

DELL BACKING INFORMATION

Dell offers a standard one year warranty.

To see the full line of Intel® Ethernet Server Adapters
visit www.intel.com/go/ethernet
or contact your Dell sales representative.

INFORMATION PROVIDED BY:

Third-party information brought to you courtesy of Dell.

1. Feature to be enabled in post-launch release

Please contact your Dell sales representative for availability.

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