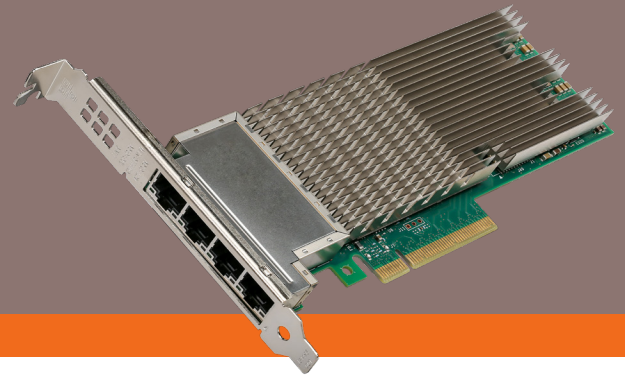


Intel® Ethernet Network Adapter X710-T4 4x10GBASE-T

Extending Intel® Virtualization Technology beyond server virtualization to the network, with hardware optimizations and offloads for the rapid provisioning of networks in a data center



Key Features

- Quad-port 10GBASE-T adapter
- PCI Express (PCIe) v3.0, x8 or higher
- Network Virtualization offloads including GENEVE, VxLAN, and NVGRE, MPLS, VxLAN-GPE with Network Service Headers (NSH)
- Intel® Ethernet Flow Director for hardware based application traffic steering
- Data Plane Development Kit (DPDK) optimized for efficient packet processing
- Excellent small packet performance for network appliances and Network Functions Virtualization (NFV)
- Intelligent offloads to enable high performance on servers with Intel® Xeon® processors
- I/O virtualization innovations for maximum performance in a virtualized server

Overview

The Intel® Ethernet Network Adapter X710-T4 is part of the Intel® Ethernet 700 Series Network Adapters that accelerate the delivery of new services and capabilities, by increasing the speed and efficiency of network infrastructure.

The X710-T4 works with legacy Gigabit Ethernet switches and CAT6A cabling. Install this card into a server and the auto-negotiation of up to 10Gbps provides the necessary backwards compatibility that customers require for a smooth transition and easy migration to 10GbE.

In a Gigabit environment the adapter acts as a quad port card, with all four ports providing Gigabit Ethernet network performance. When using the 10GbE ports, the 1GbE ports can then be used as dedicated management ports to increase data center efficiency.

The Intel® Ethernet Network Adapter X710-T4 includes these featured technologies:

Flexible and Scalable I/O for Virtualized Infrastructures

Intel® Virtualization Technology (Intel® VT), delivers outstanding I/O performance in virtualized server environments.

I/O bottlenecks are reduced through intelligent offloads such as Virtual Machine Device Queues (VMDq) and Flexible Port Partitioning, using SR-IOV with a common Virtual Function driver for networking traffic per Virtual Machine (VM), enabling near-native performance and VM scalability. Host-based features supported include:

VMDq for Emulated Path: VMDq, enables a hypervisor to represent a single network port as multiple network ports that can be assigned to the individual VMs. Traffic handling is offloaded to the network controller, delivering the benefits of port partitioning with little to no administrative overhead by the IT staff.

SR-IOV for Direct Assignment: Adapter-based isolation and switching for various virtual station instances enables optimal CPU usage in virtualized environments.

- Up to 128 VFs, each VF can support a unique and separate data path for I/O related functions within the PCI Express hierarchy.
- Use of SR-IOV with a networking device, for example, allows the bandwidth of a single port (function) to be partitioned into smaller slices that can be allocated to specific VMs or guests, via a standard interface.

Flexible Port Partitioning (FPP)

FPP leverages the PCI-SIG SR-IOV specification. Virtual controllers can be used by the Linux host directly and/or assigned to virtual machines.

- Assign up to 63 Linux host processes or virtual machines per port to virtual functions.
- Control the partitioning of per port bandwidth across multiple dedicated network resources, ensuring balanced QoS by giving each assigned virtual controller equal access to the ports bandwidth.

Network administrators can also rate limit each of these services to control how much of the pipe is available to each process.

Enhanced Network Virtualization Overlays (NVO)

Network virtualization has changed the way networking is done in the data center, delivering accelerations across a wide range of tunneling methods.

VxLAN, GENEVE, NVGRE, MPLS, and VxLAN-GPE with NSH Offloads: These stateless offloads preserve application performance for overlay networks, and the network traffic can be distributed across CPU cores, increasing network throughput.

Greater Intelligence and Performance for NFV

Dynamic Device Personalization (DDP) customizable packet filtering, along with enhanced Data Plane Development Kit (DPDK), support advanced packet forwarding and high efficient packet processing for both Cloud and Network Functions Virtualization (NFV) workloads.

- DDP enables a method to change the packet processing pipeline by applying a profile package to the Intel® Ethernet 700 Series Network Adapter at runtime—resulting in improvements in throughput, latency and reduced CPU loads.
- DPDK provides a programming framework for Intel® processors and enables faster development of high-speed data packet networking applications.

Advanced Traffic Steering

Intel® Ethernet Flow Director (Intel® Ethernet FD) is an advanced traffic steering capability built into the adapter. It consists of a large number of flow affinity filters that direct receive packets by their flows to queues for classification, load balancing, and matching between flows and CPU cores.

Steering traffic into specific queues can eliminate context switching required within the CPU. As a result, Intel® Ethernet FD significantly increases the number of transactions per second and reduces latency for cloud applications like memcached.

Software Tools and Management

Intel® Ethernet Network Adapters 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.

Features	Description
General	
10GBASE-T Connectivity	The Intel Ethernet Network Adapter X710-T4 with RJ45 connectors copper twisted-pair physical media.
Load balancing on multiple CPUs	Increases performance on multi-processor systems by efficiently balancing network loads across CPU cores when used with Receive-Side Scaling (RSS) from Microsoft or scalable I/O on Linux.
Protect, Detect and Recover	The Intel Ethernet 700 Series implements a design philosophy of platform resiliency with 3 attributes supporting the NIST Cybersecurity Framework: Protect, Detect and Recover. These attributes verify the firmware and critical device settings with built-in corruption detection and automated device recovery to return the device to its originally programmed state.
Support for most network operating systems	Enables broad deployment for different applications.
RoHS compliant	Complies with the European Union directive 2011/65/EU to reduce the use of hazardous materials.
Time Sync (IEEE 1588, 802.1as)	Enables networked Ethernet equipment to synchronize internal clocks according to a network master clock; endpoint can then acquire an accurate estimate of the master time by compensating for link latency.

I/O Features for Multi-Core Processor Servers

Intel® Ethernet Flow Director (Intel® Ethernet FD)	An advanced traffic steering capability increases the number of transactions per second and reduces latency for cloud applications like MemcacheD.
MSI-X support	- Minimizes the overhead of interrupts. - Load-balancing of interrupt handling between multiple cores/CPU.
Multiple Queues: 1,536 Tx and Rx queues per device	- Network packet handling without waiting for buffer overflow providing efficient packet prioritization. - Actual number of queues will vary depending upon software implementation.
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.

Virtualization Features

Next-Generation VMDq	- Up to 256 maximum VMDq VMs supported. - Offloads the data-sorting based on MAC addresses and VLAN tags, functionality from the Hypervisor to the network silicon, improving data throughput and CPU usage.
PCI-SIG SR-IOV Implementation (128 per device)	- Provides an implementation of the PCI-SIG standard for I/O Virtualization. The physical configuration of each port is divided into multiple virtual ports. Each virtual port is assigned to an individual VM directly by bypassing the virtual switch in the Hypervisor, resulting in near-native performance. - Integrated with Intel® VT for Directed I/O (Intel® VT-d) to provide data protection between VMs by assigning separate physical addresses in the memory to each VM. 64/port for Quad port.
Virtual Machine Load Balancing (VLMB)	VMLB provides traffic load balancing (Tx and Rx) across VMs bound to the team interface, as well as fault tolerance in the event of switch, port, cable, or adapter failure.
Advanced Packet Filtering	1536 exact matched packets (unicast or multicast). 512 hash entries each for unicast and multicast. - Lower processor usage. - Promiscuous (unicast and multicast) transfer mode support. - Optional filtering of invalid frames.
VLAN support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags	Ability to create multiple VLAN segments.
VxLAN, NVGRE, GENEVE, VxLAN-GPE+NSH, MPLS	Preserves application performance in network virtualized environments.

Manageability Features

Preboot eXecution Environment (PXE) Support	- Enables system boot up via the LAN (32-bit and 64-bit). - Flash interface for PXE image.
Unified Extensible Firmware Interface (UEFI)	Enables new technologies during the pre-OS boot process and addresses legacy BIOS limitations on hardware.
Simple Network Management Protocol (SNMP) and Remote Network Monitoring (RMON) Statistic Counters	Easy system monitoring with industry-standard consoles.
Watchdog Timer	Gives an indication to the manageability firmware or external devices that the controller or the software device driver is not functioning.

Specifications

General

Connections	4x RJ45 Copper Twisted-pair
Network Standard Physical Layer Interfaces	10GBASE-T: 55 m on CAT6, 100 m on CAT6A 1000BASE-T: 100 m on CAT5e, CAT6 or CAT6A 100BASE-T: 100 m on CAT5e, CAT6 or CAT6A

Advanced Software Features

Adapter fault tolerance (AFT)
Switch fault tolerance (SFT)
Adaptive load balancing (ALB)
Teaming Support
IEEE 802.3ad (link aggregation control protocol)
PCIe Hot Plug/Active peripheral component interconnect (PCI)
IEEE 802.1Q VLANs
IEEE 802.3 2005 flow control support
Tx/Rx IP, TCP, & UDP checksum offloading (IPv4, IPv6) capabilities (Transmission control protocol (TCP), user datagram protocol (UDP), Internet protocol (IP))
IEEE 802.1p
TCP segmentation/large send offload
MSI-X supports Multiple Independent Queues
Interrupt moderation
IPv6 offloading—Checksum and segmentation capability
Receive Side Scaling

Air Flow Requirements

Cable Length	Temperature (°C)	Recommended (LFM)
100 m	35	350
	40	400
30 m	35	200
	40	250
	45	300
	50	350
	55	425+
10 m	50	350
	55	425+

Power Consumption

SKU	Typical Power	Max Power
10GbE	24.69 W	28.95 W
1Gb	12.04 W	18.08 W
100Mb	9.21 W	14.92 W

Physical Dimensions

Dimension	2.703 in. x 6.578 in.
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Operating System/Architecture Support

Operating System (X86-64)
Microsoft Windows Server 2016
Microsoft Windows Server 2016 Nano
Microsoft Windows Server 2012 R2
Microsoft Windows Server 2012
Red Hat Enterprise Linux 7.3
SUSE Linux Enterprise Server 11 SP4
SUSE Linux Enterprise Server 12 SP2
VMware ESXi 6.5
VMware ESXi 6.0 U3

Adapter Features

Data Rate Supported Per Port 100Mb/1GbE/10GbE	
Bus Type	PCI Express 3.0 (8 GT/s)
Bus Width	PCI Express x8
Interrupt Levels	INTA, MSI, MSI-X
Hardware Certifications	FCC A, UL, CE, VCCI, BSMI, CTICK, KCC
Controller-processor	Intel® Ethernet Controller XL710-BM2

Product Order Codes for PowerEdge

Description	SKU	Dell Tech	Intel MM#
X710-T4, FH	Factory installed: 540-BBUX Customer kit: 540-BBVB	K5V44	951445
X710-T4, LP	Factory installed: 540-BBVO Customer kit: 540-BBVP	08XJ7	951444

Dell Tech Backing Information

Standard one-year warranty.

To see the full line of Intel Ethernet Network Adapters visit www.dell.com or contact your Dell Technologies sales representative.

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