Intel® 10Gb Ethernet (10GbE) Solutions

Upgrade Your Network with Intel's Market Leading 10GbE Solutions

» Is your data center challenged with needing faster, more flexible network infrastructure?

» Are you looking to employ new processor or solid state disk (SSD) technology?

» Are you looking to optimize or expand your virtualized or private cloud deployments?

» Are you looking to preserve your existing networking infrastructure?

Network infrastructure has not traditionally been a primary bottleneck in most data centers. Server bottlenecks were caused by slow hard disk drives and processors, which limited both application performance and virtual machine (VM) density.

Advances in Intel's processor technology, combined with the affordability and speed of sold-state disk drives (SSDs), have moved the data center bottleneck to the data center's 1GbE network infrastructure. At the same time, Intel's 10GBase-T technology, already backward compatible with existing 1GbE routers, switches, and infrastructure, is now even more cost effective with advances that have dramatically reduced their power requirement.

Intel, the commanding market leader in total Ethernet ports shipped, have incorporated reduced power requirements along with advanced networking features, to create a powerful, cost effective line of 10GbE solutions. These solutions work in concert with Intel's new processor and Intel SSDs to provide as much as 67% more virtual machines (VMs) per server.*

Unlike other solutions in the market, Intel 10GbE Networking adapters include full support for converged storage – without the need of 'unlocking' important features at an incremental cost. Intel adapters also include Virtualization Technology (Intel VT) with the following key features that work in concert with Intel CPUs to efficiently process network traffic, leading to better performance and reduced costs.

Virtual Machine Device Queues (VMDQ) improves traffic management within the server by offloading traffic sorting and routing from the hypervisor's virtual switch to the Intel Ethernet Controller. By working with VMware NetQueue or Microsoft Virtual Machine (VM) Queues, VMDQ enables traffic steering and balanced bandwidth allocation across the Intel Ethernet Controller's multiple hardware queues.

Single Root I/O Virtualization (SR-IVO) allows partitioning of a single Intel Ethernet Server Adapter port into multiple virtual functions. Administrators can use these virtual ports to create multiple isolated connections to virtual machines. It can also be used to remove the CPU from the process of moving data to and from a VM. Data is DMA'd directly to and from a VM without the software switch in the VM ever 'touching' it.

Intel Data Direct I/O Technology enhancements (Intel DDIO), first introduced in the Intel Xeon processor E5 family and Intel Xeon processor E7 v2 family, allows Intel Ethernet Controllers and Adapters to talk directly with the processor cache, making the processor cache the primary destination and source of I/O - rather than main memory. This re-architecture of I/O data flow helps deliver increased bandwidth, lower latency, and reduced power consumption.

Intel's Powerful Family of 10GbE Adapters

Intel's family of 10GbE adapters incorporate Intel VT, including Intelligent Offloads to accelerate operating system storage initiators and deliver high performance for NAS, and SAN storage, along with other advanced networking features to address the demanding needs of the next-generation data center.

The **Intel Ethernet Converged Network Adapter XL710**, with stateless offloads support for VXLAN, NVGRE, and GENEVE, preserves application performance for overlay networks. With these offloads, it is possible to distribute network traffic across multiple CPU cores.

Intel Ethernet Converged Network Adapter X540 is the first dual port 10GBASE-T adapter with single-chip solution with integrated MAC + PHY. The Intel X540 is backward compatible with existing 1000BASE-T networks, routers, and switches, simplifying the transition from existing 1GbE networks to 10GbE.

Intel Ethernet Converged Network Adapter X520 is a flexible, scalable Ethernet adapter addressing the next-generation data center by providing unmatched virtualization, flexibly for LAN and SAN networking, and proven reliable performance.

Highlights

» **Intel Virtualization Technology increases performance when Intel CPUs, Intel SSDs, and Intel 10GbE solutions are used together**

» **Intel Ethernet CNA X540 provides backward compatibility to existing 1000BASE-T networks, routers and switches simplifies transition to 10GbE**

» **Unified Converged Network Adapters provide LAN, NAS, and SAN support**

Feature Comparison	Intel Ethernet Controller XL710 and X710	Intel Ethernet Controller X540	Intel Ethernet Controller X520
Ports	1x40GbE or 4x10GbE	Single/Dual	Single/Dual
Data Rate Per Port	40GbE/10GbE/1GbE	10GbE/1GbE	10GbE/1GbE
System Interface	PCIe v3.0 (8.0GT/s)	PCIe v2.1 (5.0 GT/s)	PCIe v2.0 (5.0GT/s)
Storage over Ethernet	iSCSI, NFS	iSCSI, NFS, FCoE	iSCSI, NFS, FCoE
Intel Ethernet Flow Director	Up to 64 different packet types (L2/IPV4/IPv6/TCP/UDP/SCTP)	Tx/Rx IP, SCTP, TCP, UDP, IPv4, IPv6	TCP/IP or SCTP/IP
Connectivity	Fiber-optic QFSP+: 40GBASE-SR4 or 40GBASE-LR4 or Copper Direct Attach or QFSP+CR4	RJ45 Copper: 10GBASE-T,1000BASE-T, 100BASE-T	Fiber-optic SFP+: 10GBASE-SR or 10GBASE-LR or Copper Direct Attach

* Principled Technologies Study: Component Upgrades from Intel and Dell Can Increase VM Density and Boost Performance