



News Fact Sheet

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The Intel® 82599 10 Gigabit Ethernet Controller

Transforming Data Center through Reliable and Unified 10GbE Network

March 30, 2009 – The Intel® 82599 10 Gigabit Ethernet Controller is Intel's third-generation, dual-port, 10GbE controller and includes support for PCI Express* 2.0. The combination of this new controller and the Intel® Xeon processor 5500 series platform provides a new level of performance required to support high-bandwidth applications in the evolving virtualized data center. The Intel 82599 10 Gigabit Ethernet Controller includes hardware optimizations for I/O virtualization and supports unified networking, allowing LAN, SAN, and IPC traffic to share the same Ethernet network. This controller also features integrated PHYs for SFP+ adapter, LAN on Motherboard (LOM) and blade server mezzanine card designs.

New levels of 10GbE scalability and performance

Improvements in the Intel Xeon processor 5500 series platform allow for greater Ethernet scalability to meet the growing I/O needs of server consolidation and virtualization. This new platform provides more than twice the total I/O throughput of previous-generation servers. Hardware enhancements in the Intel® 82599 10 Gigabit Ethernet Controller enable the platform to fully realize the I/O potential.

Performance data shows that an Intel Xeon processor 5500 series platform using an adapter based on the Intel 82599 10 Gigabit Ethernet Controller can easily handle bidirectional Ethernet traffic exceeding 50 Gigabits per second (Gbps). Previous-generation servers could only handle up to 17 Gbps.¹

- Platforms based on the Intel Xeon processor 5500 series provide the architectural elements, such as higher processing power, new local memory architecture, and faster PCI Express 2.0 I/O interface bus, to allow for new levels of 10GbE scalability.
- Hardware enhancements in the Intel® 82599 10 Gigabit Ethernet Controller include PCI Express 2.0 and intelligent queue support optimized for multicore processors.

I/O virtualization

The Intel 82599 10 Gigabit Ethernet Controller includes Intel® Virtualization Technology for Connectivity (Intel® VT-c) to improve overall system performance in virtualized server

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environments. Intel VT-c includes hardware optimizations that help reduce I/O bottlenecks, boost throughput and reduce latency. Components of Intel VT-c include:

- Virtual Machine Device Queues (VMDq) improves performance and CPU utilization by offloading the data-sorting burden from the VMM to the network controller. Recent enhancements include offloading inter-VM switching within a server.
- Virtual Machine Direct Connect (VMDc) provides near-native performance by facilitating direct assignment of a virtual function on an Ethernet port to a VM. VMDc includes both SR-IOV and VM mobility.

Greater network infrastructure consolidation

Intel® 82599 10 Gigabit Ethernet Controller reduces cost and complexity of the data center by allowing multiple traffic types to share a single Ethernet connection.

Storage over Ethernet Optimizations

- **Fibre Channel over Ethernet offloads** increase throughput for FCoE solutions and reduce CPU overhead associated with FCoE protocol processing in the data path by offloading data path protocols.
- **iSCSI support** allows SAN and LAN traffic to share the existing Ethernet infrastructure without the need for dedicated iSCSI adapters. The Intel 82599 10 Gigabit Ethernet Controller includes features that accelerate iSCSI traffic and support iSCSI remote boot. Additionally, the Intel Xeon 5500 processor series includes a CRC instruction set, which delivers fast, efficient data integrity checks with minimal impact to system performance.
- **Data Center Bridging (DCB)** provides features that enable Ethernet to support mixed LAN and storage workloads by supporting multiple traffic classes with workload-specific flow control, bandwidth allocation and sophisticated congestion management.

Design enhancements

With a low power consumption of less than 6 watts, a small 25x25mm footprint and integrated PHYs, the Intel 82599 10 Ethernet Controller is ideally suited for server blades, LAN on motherboard (LOM) and mezzanine card implementations. PHY integration eliminates the need for a separate PHY chip, reducing costs and board space. PHY integration includes:

- **10GBASE-KX4 and 10GBASE-KR** integration for backplane designs, including blade servers.
- **SFI** integration for SFP+ designs, including adapters and LOM connections.

More information is available at www.intel.com/network.

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¹Performance claims based comparing Intel® Xeon® processor 5500 series-based server and Intel® 82599 10 Gigabit Ethernet Controller to an Intel® Xeon® processor 5100 series-based server and Intel® 82598 10 Gigabit Ethernet Controller.