Today's servers are pushed to the limits by business-critical network applications. To help meet growing performance demands, IT managers typically increase server capacity and/or network bandwidth, only to discover that server performance does not increase as expected. The problem can often be traced back to three network I/O bottlenecks that can keep a server from achieving its full performance potential: system overhead, TCP/IP processing, and data copies within system memory.

Based on Intel QuickData Technology, Intel I/O Acceleration Technology (Intel I/OAT)—available in Quad-Core and Dual-Core Intel Xeon processor-based Dell™ PowerEdge™ servers equipped with Intel PRO/1000 Ethernet adapters for PCI Express—is designed to enhance performance by moving network data more efficiently through the server than was possible in previous-generation Intel Xeon processor-based servers. At the same time, Intel I/OAT scales seamlessly across up to six Gigabit Ethernet ports—helping reduce total cost of ownership and boost server throughput.

**Breaking through I/O bottlenecks**

By taking advantage of architectural enhancements within the processor, chipset, network controller, and firmware of Quad-Core and Dual-Core Intel Xeon processor-based servers, Intel I/OAT implements a platform-oriented approach designed to speed up interactions between server applications and the network. This approach enables Intel I/OAT to avoid performance-limiting bottlenecks by using key server resources more efficiently than previous-generation systems—helping minimize system overhead, accelerate TCP/IP processing, and efficiently manage data copies within system memory.

Intel I/OAT helps improve network I/O performance by scaling seamlessly across up to six Gigabit Ethernet ports. In this way, Intel I/OAT—together with Intel PRO multi-port Gigabit Ethernet adapters, which are designed to leverage the full performance benefits of the PCI Express I/O standard and to provide high port density for slot-constrained servers—helps reduce total cost of ownership by enabling server consolidation.

Although the primary performance benefit of Intel I/OAT is its ability to move network data at optimal efficiency through Quad-Core and Dual-Core Intel Xeon processor-based servers, maintaining the integrity of the OS network stack is critical. Native support for popular server operating systems such as Red Hat Enterprise Linux 4 and Windows Server 2003 with the SNP enables Intel I/OAT to preserve critical network configurations such as teaming and failover. Intel I/OAT is designed to accomplish this by maintaining control of the network stack execution within the processor. Because it allows IT departments to rely on OS updates instead of third-party software to provide this functionality, Intel I/OAT helps reduce support risks—another factor that contributes to low total cost of ownership.

---

1This term does not connote an actual operating speed of 1 Gbps. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.
2Performance results for both processor load and throughput are based on an Ixia IxChariot 6.0 benchmark test performed by Intel Labs in January 2007 on a Dell PowerEdge 2900 server featuring Intel I/OAT and configured with two Dual-Core Intel Xeon processors (Woodcrest) at 3.4 GHz, 4 GB of 667 MHz RAM, three Intel PRO/1000 PT Dual Port Server Adapters, either Red Hat Enterprise Linux 4 (kernel 2.6.18) or Windows Server 2003 with SP1 and the SNP, and six Dell PowerEdge 750 servers per port under test as clients, each configured with an Intel Pentium 4 processor at 3.4 GHz, Windows Server 2003 with SP1, and an Intel PRO/1000 Gigabit Ethernet server adapter. The performance baseline was established in February 2006 using a previous-generation Dell PowerEdge 2800 server configured with two Intel Xeon processors at 3.6 GHz, 4 GB of RAM, three Intel PRO/1000 PT Dual Port Server Adapters, and either Red Hat Enterprise Linux 4 Update 3 or Windows Server 2003 with SP1. Actual performance will vary based on configuration, usage, and manufacturing variability.

---

Reprinted from Dell Power Solutions, May 2007. Copyright © 2007 Dell Inc. All rights reserved.