Integrated Network Technologies Deliver Optimized Performance

Intel® Ethernet and Windows Server® 2008 R2

SOLUTION BRIEF

Combined technologies for superior network performance

For more than 20 years, collaborative development by Intel and Microsoft has led to superior computing and networking solutions. The latest Intel® Ethernet Server Adapters continue that tradition, with features specifically designed to optimize the networking performance of Windows Server® 2008 R2.

By drawing on the latest features and benefits of each solution, Intel Ethernet Server Adapters and Windows Server 2008 R2 combine to ensure optimal performance, reliability and flexibility in both native and virtualized environments. Working together, these solutions accelerate virtualized I/O, deliver industry-leading iSCSI performance, and maximize the benefits of innovative new features like DirectAccess.

intel®

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Virtualization: Greater efficiencies, higher throughput

Complementary queuing technologies from Intel and Microsoft address the increased performance demands in virtualized environments by creating efficiencies to drive greater throughput.

Two technologies – Microsoft VMQ and Intel's Virtual Machine Device queues (VMDq), a key component of Intel® Virtualization Technology† for Connectivity – work together to enable faster, more efficient networking in Microsoft® Hyper-V™. Enabled by Microsoft VMQ, Intel's VMDq offloads data processing from the hypervisor virtual switch to the Intel Ethernet Controller, a process that lowers hypervisor overhead and delivers near line-rate throughput to meet the needs of today's more powerful virtualized servers.

Working together, 10 Gigabit Intel® Ethernet Server Adapters with VMDq and Microsoft VMQ provide the significantly improved network I/O performance customers seek in virtualized environments.[1] Research shows the technologies can increase performance by more than 25%, and performance scales across multiple VMs and multiple 10GbE ports – achieving speeds of more than 9.3 Gigabits per second on four-VM configurations.[2]

Unified Networking: Industry-leading iSCSI performance

Intel and Microsoft's unified networking solutions provide superior iSCSI connectivity, enabling IT organizations to implement cost-effective iSCSI SANs that deliver industry-leading performance, stability and value.

Intel Ethernet Server Adapters use the trusted, native iSCSI initiator in Windows Server 2008 R2 to deliver reliable, consistent performance and ease of use across the product line. This integrated approach eliminates the instability and complexity associated with offload engines, which require proprietary, special-purpose hardware and software to improve iSCSI throughput.

10 Gigabit Intel® Ethernet Server Adapters with VMDq and Microsoft VMQ provide significantly improved network I/O performance in Hyper-V environments

The latest Intel 10GbE Ethernet Server Adapters include hardware-based iSCSI acceleration that matches or even exceeds the performance of offload solutions[3] while maintaining the simplicity and familiarity of native Windows Server support.

Hardware optimizations in Intel Ethernet Server Adapters also speed iSCSI traffic in virtualized environments. Intel's VMDq technology – which is enabled in Hyper-V by Microsoft's VMQ technology – lowers the virtual switch overhead in the hypervisor to accelerate iSCSI traffic. In addition, the innovations in Microsoft Hyper-V enable IT organizations to scale their iSCSI workloads effectively as they consolidate servers and take full advantage of virtualization.

Security: All the benefits of DirectAccess, with no performance penalty

One of the most exciting innovations on Windows Server 2008 R2 is DirectAccess, a new service on Windows® 7 that connects users to corporate networks without need for a virtual private network (VPN). Intel Ethernet and Windows® solutions work together to optimize the performance of DirectAccess servers.

To ensure network security, DirectAccess depends on Internet Protocol Security (IPsec) for authentication and encryption, which results in increased network traffic and a greater encryption load on servers. To minimize the impact on throughput, Windows Server 2008 R2 offloads IPsec operations to GbE and 10GbE Intel Ethernet controllers and server adapters.

Shifting operations to Intel® Ethernet Controllers unburdens the CPU from IPsec processing and facilitates greater efficiency and near line-rate throughput. Compared to a purely software IPsec implementation, the integrated solution from Intel and Microsoft reduces CPU utilization by more than 50%.[4] For Windows Server 2008 R2 users, that means end-to-end network security with virtually no throughput penalty, and without need for hardware or software upgrades.

Conclusion

Separately, Intel Ethernet Server Adapters and Windows Server 2008 R2 are innovative, industry-leading hardware and software products from two of the most trusted names in technology. Together, they provide networking solutions with unmatched benefits in efficiency and performance, both in native and virtualized environments.

Advantages of 10 Gigabit Intel® Ethernet Server Adapters

Intel is the leading Ethernet adapter supplier in the industry and is working closely with Microsoft to guarantee the best possible performance and compatibility for 10 Gigabit Intel® Ethernet Server Adapters in Windows Server® environments.

Intel offers the broadest Ethernet portfolio in the industry, based on more than a quarter-century of Ethernet experience. Today's 10 Gigabit Intel Ethernet Server Adapters exemplify this industry-leading experience with optimizations for multi-core processors, virtualization, and unified data and storage networking.

The adapters, which are designed to take advantage of the architectural enhancements of new Intel® Xeon® processor 5500[Δ] series-based servers, easily drive bidirectional traffic that exceeds 50 Gigabits per second – more than 2.5 times the bandwidth of previous-generation servers.[5]

Through extensive collaboration with Microsoft, Intel 10GbE solutions now provide significantly improved throughput in Hyper-V™ and new levels of iSCSI performance in Windows Server® 2008 R2.

Intel Ethernet Server Adapters and Windows Server 2008 R2 provide unparalleled advantages for today's customers, including near line-rate throughput in virtualized environments, industry-leading iSCSI performance and better network security with fewer delays.

For More Information

For more information on Intel Ethernet Server Adapters:

www.intel.com/go/ethernet

For more information on Microsoft Windows Server 2008 R2:

www.microsoft.com/WindowsServer2008

† Intel® Virtualization Technology requires a computer system with an enabled Intel® processor, BIOS, virtual machine monitor (VMM) and, for some uses, certain platform software enabled for it. Functionality, performance or other benefits will vary depending on hardware and software configurations and may require a BIOS update. Software applications may not be compatible with all operating systems. Please check with your application vendor.

[A] Intel processor numbers are not a measure of performance. Processor numbers differentiate features within each processor family, not across different processor families. See www.intel.com/products/processor_number for details.

[1] This is throughput measured by TCP. At 4 VMs, this effectively represents line rate when IP and Ethernet overhead is included.

[2] Microsoft internal measurement. (April 2009) ntttcp benchmark. Windows Server 2008 R2 Beta. Intel® Xeon® processor E5460, 3.16 GHz, 8 MB L2 cache, 1333 MHz system bus, 24 GB memory.

[3] Results based on Intel pre-production system with two Intel® Xeon® processors W5580 (8 MB cache, 3.20 GHz, 6.40 GT/s Intel® QPI), 24 GB DDR3, Intel® Ethernet Server Adapter based on Intel® 82599 10 Gigabit Ethernet Controller, Windows Server* 2008 R2 x64. iSCSI target LUNs configured as RAMDisk devices.

[4] Performance tests and ratings are measured using specific computer systems and/or components and reflect the approximate performance of Intel products as measured by those tests. Any difference in system hardware or software design or configuration may affect actual performance. Buyers should consult other sources of information to evaluate the performance of systems or components they are considering purchasing. For more information on performance tests and on the performance of Intel products, visit www.intel.com/performance/resources/limits.htm or call (U.S.) 1-800-628-8686 or 1-916-356-3104.

[5] Up to 2.5x performance compared to Intel® Xeon® processor 5300 series claim supported by performance result of a bandwidth intensive network benchmark (IxChariot). Network throughput was measured on 64 KB I/O size transfers between the test system and multiple network targets. Intel internal measurement (March 2009). IxChariot 6.6 benchmark. Intel pre-production system with two Quad-Core Intel® Xeon® processor 5500 series CPUs (2.93 GHz), 12 GB memory (6 x2 GB DDR3 - 1066 MHz) vs. Intel Production system with two Intel® Xeon® processors X5365 (3.0 GHz, 1333 MHz FSB), 8 GB memory (8 x 1 GB DDR 2 - 667). Windows Server 2008, stock unmodified installation.

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