



Simplicity Drives Innovation: Intel® Virtualization Technology Opens New Era in Server Virtualization

Virtual Iron's virtual server management software builds on Intel Virtualization Technology

Virtualization is becoming a top strategic initiative in datacenters worldwide. One factor driving virtualization initiatives is server sprawl. Server consolidation reduces the number of physical servers, but virtualization can lead to an increased number of virtual servers. With the introduction of Intel® Virtualization Technology (Intel® VT) in 2005, a new generation of virtualization solutions became possible.

Intel is keenly interested in helping address the issues associated with managing a large number of servers and collaborates with software vendors across the virtualization ecosystem, such as VMware and Microsoft, to help develop optimized and broadly supported virtualization capabilities. Intel also works closely with open source vendors such as Novell and Red Hat, while making significant contributions to open source projects such as the Xen* project (see sidebar).

According to Fernando Martins, strategic technology planning manager at Intel, "The Intel vision for virtualization extends beyond

"With Intel's help, we have created a virtualization solution that is very affordable and very efficient."

—Mike Grandinetti
Chief Marketing Officer
Virtual Iron

server consolidation. New server administration techniques, including automation, can reduce the labor required to manage large server farms—even virtual ones. We expect these technologies to transcend the enterprise from the datacenter to the desktop or client platform."

Virtual Iron delivers virtualization benefits to mainstream customers

Innovative software companies like Virtual Iron are bringing the benefits of virtualized workloads to the heart of the datacenter, where high performance and advanced workload management capabilities, as well as symmetric multiprocessing (SMP) and large memory support, are essential for handling complex and demanding workloads. Virtual Iron introduced its Intel VT-based virtual server management software in 2005, providing management functions, such as live adjustments to capacity and policy-driven workload migration, to help IT managers more effectively implement a virtualization strategy.

Intel VT capabilities provided the basis of Virtual Iron's approach to virtualization. As Mike Grandinetti, chief marketing officer of Virtual Iron, describes, "While the decision to base our product on Intel VT precludes our software being used with older-generation Intel® Xeon® processors, best practices today have shown that processor upgrades are easy to justify when moving to a virtualized environment. That's because Dual-Core and Quad-Core Intel Xeon processors have such compelling performance and performance/watt advantages."

Virtual Iron's Intel VT-based virtual server management software delivers high-impact benefits to help customers:

- **Protect investments in applications and operating systems.** Virtual Iron software, built on Intel VT, enables legacy applications to be migrated onto virtual machines with confidence.
- **Fully exploit Intel® platform performance.** Virtualization functionality built into Intel VT eliminates most performance penalties associated with first-generation virtualization software.
- **Take advantage of quad-core processors.** Virtual Iron supports 32-bit Microsoft Windows* and both 32- and 64-bit Linux* operating systems, up to eight CPUs per virtual machine, and up to 96 GB of memory per virtual machine—all key ingredients in obtaining the greatest performance possible from Intel® quad-core platforms, such as the Quad-Core Intel Xeon processor 5300 series.
- **Reduce costs.** Virtual Iron tools and automated functionality can reduce routine IT maintenance tasks with features such as live adjustments to capacity and policy-driven workload migration. Energy savings and more efficient system administration can reduce operating costs. Server consolidation and improved server utilization can reduce capital costs.
- **Respond to business needs with agility.** Server provisioning and migration of applications to new quad-core servers can be accomplished in minutes rather than weeks.
- **Benefit from compelling price and value.** Virtual Iron software is priced at roughly one fifth of the cost of the market-leading virtualization software and is offered with per-socket pricing, so customers can upgrade to the quad-core Intel platform without paying more for virtualization software.

Deployment of Virtual Iron at *The Charlotte Observer* newspaper shows how virtualization can benefit even the most demanding applications (see sidebar on next page). The newspaper is virtualizing its most mission-critical business processes, including its Oracle-based circulation system and its editorial content-management systems, to reduce costs while maintaining application performance.

Enterprise-class virtualization comes at an opportune time

Virtual Iron software helps IT staff quickly provision new capacity to align business needs and IT capabilities. Many industry watchers believe enterprises must achieve this kind of agility to stay competitive.

With never-ending demand for more server capacity, along with rising energy costs, the benefits of virtualization are increasing each year. Grandinetti says, "For the first time in history, in 2007, many enterprises will spend more money on datacenter power and cooling than on hardware procurement."

INTEL RECOGNIZED AS THE SECOND-LARGEST CONTRIBUTOR TO THE XEN* PROJECT

The Xen* open source virtual machine monitor (VMM) provides a control interface for managing virtual machines. Virtual Iron software uses the popular hypervisor technology developed in Cambridge, England, as the foundation for its system-management capabilities.

Intel worked closely with the Xen open source community to ensure the Xen VMM was optimized for Intel® platforms. In late 2004, as Intel® Virtualization Technology (Intel® VT) was being created, developers in the Intel Open Source Technology Center provided source code to the Xen project to support hardware-assisted virtualization, allowing unmodified 32-bit Linux* operating systems to run on the Xen VMM.

Intel contributions have also included technical resources for the development of the Xen virtualization software. Intel was recognized at the Winter 2006 Xen Summit for contributing the largest number of source changes (lines of code contributed) to Xen 3.0 outside of the Xen project itself.

For more details about Intel's support for the Xen project, visit intel.com/technology/itj/2006/v10i3/3-xen/1-abstract.htm.

It is clear from Intel roadmaps that the path to greater compute performance and lower energy costs is through multi-core processors. As multi-core servers become more predominant and the number of cores increases, virtualization is essential to harnessing the power of these servers because it enables many workloads to be executed on one physical server.

Virtual Iron created a close relationship with Intel from the start

The relationship between Virtual Iron and Intel began when Intel became an investor in the company as a startup. It was a strategic move by Intel, part of Intel's ongoing efforts to enable mass adoption of industry-standard technologies within the software community. Says Ron Rawson, investment manager at Intel Capital, "We are always looking for innovative companies that want to help customers get the greatest value possible from our platforms."

Grandinetti has nothing but praise for how Intel works with young, innovative companies like Virtual Iron. He says, "We were looking for early access to the next generation of virtualization hardware—what became known as Intel VT. Soon after we had an agreement, Intel gave us incredible access to their technical

PROOF POINT: THE CHARLOTTE OBSERVER VIRTUALIZES SERVERS TO REDUCE COSTS WHILE MAINTAINING PERFORMANCE AND ENHANCING AGILITY

The Charlotte Observer—owned by the second largest newspaper company in the United States—like all newspapers today, is looking for ways to reduce costs. Geoff Shorter, *The Observer's* IT infrastructure manager, views server virtualization as a key contribution that IT can make to that effort.

The first step he took to boost the return on IT investments was to move his most critical applications from proprietary RISC-based servers onto servers based on cost-effective Dual-Core Intel® Xeon® processors. In late 2006, his team consolidated 14 production RISC servers onto two Dual-Core Intel Xeon processor-based servers to cut power and cooling costs nearly in half.

After comparing the two platforms, Shorter says, "We found that the Intel® processor-based systems just blew away the RISC-based systems. The price/performance of Intel was the best of all

of the platforms we tested. As a result, our corporate IT group decided to standardize on Intel® platforms running Linux*."

Shorter notes, "Our tests have shown that quad-core processors tremendously outperform dual-core servers. With virtualization, even our single-threaded applications benefit from quad-core servers because several of those applications can run in parallel on one physical server."

When evaluating Virtual Iron, Shorter's team found very little performance difference when their circulation application ran on virtualized and non-virtualized dual-core servers. He says, "Virtual Iron has proven that virtualization can be engineered to avoid most of the performance hit."

Adds Shorter, "Virtual Iron will tell you that their overhead is between 1-3 percent, but a 3 percent difference on a 10-minute database run is simply not noticeable."

To read the complete case study, visit: www.virtualiron.com/products/resource_center.cfm



people, who have a deep understanding of the issues facing enterprise IT. Intel architects and engineers briefed our technical people on their roadmaps, architectures, and the reasons behind them. That gave us a critical head start toward designing the next-generation software architecture for server virtualization."

The Intel® Software Partner Program provided early access to pre-production Intel® platforms for development and testing, helping accelerate time-to-revenue for the company's innovative solutions. When the new Dual-Core Intel Xeon processor hit the market, Virtual Iron was ready to deploy in production environments. As Virtual Iron customers deploy proof-of-concept systems, Intel helps by loaning some of the leading-edge equipment needed for testing and development.

Through the Intel Software Partner Program, Virtual Iron has received visibility at Intel-sponsored events, such as Intel® Developer Forum Spring 2006, where they first presented their capabilities to a worldwide audience. As a member of the Intel Software Partner

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Program, Virtual Iron has made joint visits to customers with Intel—in one-on-one meetings and at events throughout the world.

The ongoing relationship with Intel helps Virtual Iron continue its leadership in delivering world-class virtualization solutions. The company was one of the first to ship software for the new Quad-Core Intel Xeon processor 5300 series. Looking back, Grandinetti says, "Working with Intel has given us a huge advantage, certainly exceeding our expectations."

For more information about Intel VT, visit intel.com/technology/virtualization. ■

ABOUT VIRTUAL IRON

Founded in 2003, Virtual Iron provides enterprise-class software solutions for creating and managing virtual infrastructure. Organizations use Virtual Iron for consolidation, rapid provisioning, business continuity, workload management, and policy-based automation. The solutions dramatically reduce the cost and complexity of managing and operating the enterprise datacenter. To see additional solution briefs, white papers, videos, and demos, visit www.virtualiron.com.

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Havok HydraCore*: www.havok.com/content/view/25/46/

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Intel® Software Network Game Developer Center:

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Innovative Outreach Builds Momentum for Multi-Core Development Globally—Part One

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www.intel.com/software/mcdeveloper

TopCoder: www.intel.com/software/topcoder

Intel® Software Network Blogs: www.intel.com/software/ISNBlogs

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Intel® Virtualization Technology:

www.intel.com/technology/virtualization/index.htm

Virtual Iron: www.virtualiron.com

Virtual Iron Case Study on *The Charlotte Observer*:

www.virtualiron.com/products/resource_center.cfm

Virtual Solutions from:

VMware – www.virtualizeasap.com

Microsoft – www.microsoft.com/windowserversystem/virtualization

Novell – www.novell.com/intel

Red Hat – <https://accelerate.108.redhat.com>

Convergence Rules: Consumer Electronics Show 2007

Intel® Viiv™ Technology: www.intel.com/products/viiv/index.htm

About the International CES: www.cesweb.org/about_ces/

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