



Optimized virtualization with Citrix, Dell and Intel

Together, Citrix, Intel and Dell are making it easier for IT professionals to provision, manage and secure their entire IT infrastructure while providing hardened, scalable and optimized solutions that span from the datacenter to the desktop.



To succeed in today's increasingly complex and demanding business environments, IT departments must be able to take on greater workloads, support greater demand for user productivity and manage larger systems—all with fewer resources. Through their experience working directly with customers in the IT industry, Citrix®, Dell® and Intel® have identified solutions that directly address such IT needs. These three companies have built a synergistic partnership with the goal of helping IT departments become and remain, viable and beneficial parts of their company strategy.

By taking an end-to-end approach, Citrix, Dell and Intel have integrated their products and made highly flexible, centralized, optimized and virtualized computing a reality. This discussion introduces key components of this approach:

- **Simplifying IT** – This three-way partnership builds on Intel strengths and advances in processing power, Citrix technologies for consolidating and virtualizing anentire IT infrastructure, and Dell end-to-end solution delivery capabilities.
- **Enabling flexible computing** – Dell Flexible Computing Solutions (FCS) powered by Intel processors and Citrix desktop virtualization technologies provide business agility and cost savings, centrally managed desktop environments, and a rich desktop PC experience.
- **Optimizing datacenters** – Citrix, Dell and Intel build upon their respective strengths by partnering on targeted datacenter solutions that drive increased application isolation, enhanced availability, improved scalability and optimized manageability.
- **Rethinking the desktop** – Intel vPro™-enabled client hardware works closely with Citrix® XenDesktop™, Citrix Provisioning Services™ for Desktops, Dell Virtual Remote Desktop and Dell On-Demand Desktop Streaming™ (ODDS) to deliver a complete desktop image—including the operating system and application stack—to physical desktops from a network service on-demand.

Simplifying IT

Citrix, Dell and Intel know what tools and technologies IT managers need to empower users while simultaneously decreasing management costs and overhead.

Intel – Intel's focus on increased computing capacity results in faster desktops and more powerful servers. Intel vPro-enabled systems help decrease manageability concerns to reduce IT workload and decrease management costs. vPro technology enables greater proactive security, enhanced maintenance, centralized management and improved remote management both inside and outside the corporate firewall.

The hardware-based capabilities of Intel vPro technology let IT professionals remotely access desktops and laptops even if the power is off or if the operating system is unresponsive. Remote monitoring, configuration, maintenance, diagnosis and inventory operations enhance centralized management, while increasingly powerful Intel processors ensure that impact to users is minimized.

Intel Xeon® processors, including those with Intel QuickPath Interconnect, include multiple high performance cores which boost overall system performance and virtualization. For example, when powering a range of multi-core 64-bit servers, Intel server processors can optimize and scale computing environments to maximize server utilization-to-workload while still providing headroom for server growth.

Citrix – Citrix® Essentials™ for XenServer™ and XenDesktop empower customers to efficiently consolidate and virtualize their entire IT infrastructure. This can increase IT agility and enable richer computing experiences for users while decreasing overall costs.

Dell – Dell helps IT administrators provision datacenters and users with highly customized solutions that enable truly flexible computing. Dell provides IT departments with instant value by combining Intel's strengths and advances in processing power and manageability with Dell-branded Citrix virtualization and manageability solutions. Dell also provides professional guidance in the form of Dell Services™ to help IT departments assess, design, deploy, and support optimized solutions.

Enabling flexible computing

Dell Flexible Computing Solutions (FCS), powered by Intel, combine Dell and Intel strengths in hardware, desktop infrastructure and IT manageability with Citrix virtualization solutions. In fact, two out of three Dell Flexible Computing Solutions are powered by Citrix: Dell Virtual Remote Desktop uses XenDesktop and Dell On-Demand Desktop Streaming uses Citrix Provisioning Services for Desktops.

By allowing IT administrators to centrally manage desktop environments while still providing users a rich, responsive desktop PC experience, FCS enables business agility and cost savings. Most importantly, because Citrix and Dell realize that the needs of workers can be highly variable, FCS addresses a wide variety of flexible computing needs and requirements without forcing IT to give up control or capabilities. The power of Citrix virtualization software combined with the affordability of Dell solutions can help leverage virtualization with minimal risk and immediate return on investment.

Case study

Silver Cross Hospital in Joliet, Illinois is an example of Dell Flexible Computing Solutions at work. Silver Cross has a main hospital facility and an extensive regional ambulatory network that includes eight satellite facilities plus an array of outpatient diagnostic and treatment services.

Doctors and other caregivers interact with applications daily on over 200 thin clients. Eventually, caregivers found that using these workstations was a challenge: they would occasionally lose their domain connections as they made their rounds, most workstations didn't have all the necessary resources installed and, for security reasons, each application required that the active user name and password be closed after each task.



The hospital's IT administrators turned to Dell to help put together an improved infrastructure. The primary requirement for the new system was that it centrally host processing and data, then stream each user's desktop to the appropriate endpoint to boost productivity and save time. For example, as a caregiver goes on rounds, the desktop session should follow, accessible from whichever workstation is closest.

The Dell team recommended a Dell Flexible Computing Solution built around four Dell PowerEdge™ 2950 servers running on Microsoft® Windows Server® 2003 that host the Dell Edition of Citrix Provisioning Services for Desktops to stream virtual desktops. The Citrix solution is stored on a SAN and sent to Dell OptiPlex™ 755 FLX workstations located throughout the hospital. The On-Demand Desktop Streaming model has no hard disk and no local operating system on the desktop.

The system upgrade at Silver Cross Hospital demonstrates that the power of Citrix virtualization software combined with Dell solutions can help leverage virtualization with minimal risk and immediate return on investment. As for the ease of use and efficiency of management with Silver Cross's new system—an application roll-out to 200 endpoints that used to take 80 staff hours can now be done centrally in minutes by one person.

Optimizing datacenters

In their cooperative relationships, Citrix, Dell and Intel build upon their respective strengths by placing a heavy emphasis upon targeted datacenter solutions that drive increased isolation, enhanced availability, improved scalability and optimized manageability.

Virtualization technologies

Xen hypervisor: With Xen® virtualization, a thin software layer, the Xen hypervisor, is inserted between the server's hardware and the operating system. It is a unique open source technology, developed collaboratively by the Xen community, engineers and datacenter solution vendors, including those from Dell, Intel and Citrix. In 2007, Citrix acquired XenSource, a move that created the Xen.org initiative (<http://www.xen.org/>). Citrix freely licenses the Xen hypervisor to all vendors and projects.

Highly optimized servers

Intel Xeon processors – Intel Xeon processors serve as the foundation of Dell's best-performing PowerEdge servers. With multiple, high performance cores and Intel VT, Intel Xeon processors are ideally suited for server virtualization and consolidation. Newer Intel Xeon processors with Intel QuickPath Interconnect also boost overall system.

Dell PowerEdge Servers – Dell PowerEdge Servers build upon a foundation of Intel Xeon processors and management and virtualization solutions from Citrix to provide the high performance and flexibility needed for demanding workloads. Dell PowerEdge servers with Citrix® Essentials™ for XenServer™ Dell Edition are cost-effective, highly scalable server solutions enabled with built-in Dell OpenManage™ manageability functionality.

Citrix XenServer Dell Edition – Dell PowerEdge servers configured with Citrix® XenServer™ Dell Edition let IT managers easily take advantage of an award-winning bare-metal hypervisor to facilitate server consolidation and workload isolation. Better yet, by relying upon the fusion of Citrix and Dell solutions natively available on PowerEdge Servers, IT managers can improve the performance and reliability of their virtualized workloads and corresponding consolidation efforts.

Citrix Essentials for XenServer Dell Edition – Citrix Essentials™ for XenServer™ Dell Edition with Citrix® StorageLink™ enables extensible datacenter management through a set of management and automation capabilities that can transform datacenters into proactive delivery centers. Citrix Essentials enables improved provisioning as well as increased availability and scalability through workflow automation. It is designed to specifically address the growing share of Citrix and Microsoft virtualization environments in corporate datacenters. One goal of this design is to enable easy interaction with existing servers that have already been virtualized with other third-party products.

Highly optimized storage

Dell offers a wide assortment of flexible and dependable storage solutions including Dell EqualLogic™ iSCSI Storage Area Networks (SANs) and a versatile line of PowerVault storage and backup solutions.

Dell PowerVault – Dell PowerVault solutions are powered by Intel Xeon processors and feature a wide variety of storage choices including Direct Attached Storage (DAS), Network Attached Storage (NAS) and iSCSI SAN systems with both SAS and SAS drives. PowerVault solutions are ideal complements to modern datacenters because they provide high performance with easy-to-manage and easy-to-configure capabilities. They can be used for standard data storage and for server and client virtualization.

Dell EqualLogic SAN – Dell EqualLogic iSCSI storage arrays are an ideal solution for any demanding storage need because they offer reliable, high performance, automated administrative capabilities and highly scalable storage, processing and throughput resources. With fully redundant hardware and up to three active network connections that can improve network throughput, Dell's EqualLogic SANs come in a variety of disk media and sizes to meet any combination of performance and capacity requirements. They can also intelligently balance workloads with minimal human intervention, which can drastically simplify management and improve overall storage consolidation and availability.

Citrix StorageLink Adapter for Dell EqualLogic – When configured with StorageLink as part of the Citrix Open Storage Program, Dell EqualLogic SANs offer seamless integration with Citrix Essentials for XenServer and other virtualization solutions. In addition, the Citrix StorageLink Adapter for Dell EqualLogic helps IT administrators benefit from a single management interface and intelligent task delegation. This delegation eases SAN management for virtualization and server consolidation and decreases the cost of provisioning, troubleshooting and management. It can also improve the degree of throughput and storage performance for server virtualization and consolidation scenarios.

The combination of Dell PowerVault and EqualLogic SANs provides a wide variety of storage configuration options and capabilities to give IT administrators the tools and solutions they need to tackle complex server virtualization needs. Dell's storage solutions also set the stage for and serve as the backbone for improved desktop manageability and performance options for virtualized clients.



Case study

I-Business Network (I-BN), based in Marietta, Georgia, is an application service provider (ASP) specializing in the provisioning of financial, e-commerce and business process services for small and medium-sized companies. I-BN delivers software as a hosted service for a fixed monthly fee so that customers can focus on their core business instead of on IT issues.

I-BN's customers need network support as they grow into larger enterprises. I-BN recognized this rapid scalability as a key differentiator in the crowded and complex business process hosting marketplace. To accommodate its customers' growth, I-BN faced the prospect of more than doubling the number of servers at its datacenter, with the associated major increases in real estate, power, air conditioning and staffing.

The company saw virtualization as an opportunity to decouple clients from their hosted applications, services and storage. After testing several virtualization platforms, I-BN selected Citrix XenServer on the basis of both price and performance, particularly in conjunction with Citrix® XenApp™ Enterprise Edition. They next decided to pair the Citrix technology with the application virtualization solution already in use at the company. Lastly, I-BN turned to the Dell EqualLogic PS Series to virtualize storage. The infrastructure they put in place was based upon the integration of:

- Citrix XenServer, Enterprise Edition running on 70+ Dell PowerEdge servers
- Citrix XenApp, Enterprise Edition
- Dell EqualLogic PS5000E iSCSI SAN solution
- Microsoft Windows Server 2003 and 2008

The virtualization solution provided by the integrated Dell and Citrix platforms helps I-BN compete by driving costs down, simplifying operations and scaling rapidly. By removing the need to buy physical servers for each individual client, I-BN benefits from significant savings in hardware, power, real estate and staffing—all critical factors for an ASP competing for business in a globalized hosting market. Among other impressive results, I-BN has seen a 40 percent reduction in server footprint in its datacenter, 30 percent reduction in power consumption and it has cut down the turnaround time for implementing new customers from days to hours.

Rethinking the desktop

Costly desk-side visits are disruptive, detract from overall IT agility, increase management costs and decrease user productivity. To minimize this impact while still enhancing user performance and productivity, IT managers need to select solutions that offer a full line of complementary components to meet user requirements.

Intel vPro-enabled client hardware works in close coordination with XenDesktop and Citrix Provisioning Services for Desktops to deliver a complete desktop image that includes providing an operating system and application stack on-demand to physical desktops from a network service. The desktop image is configured, delivered and managed centrally, thereby reducing total costs. It also increases security and flexibility while providing an uncompromised user experience.

Dell Virtual Remote Desktop: Dell Virtual Remote Desktop™ (VRD) solutions, powered by XenDesktop, deliver Windows desktops as an on-demand service to any user, anywhere. With FlexCast™ delivery technology, VRD can quickly and securely deliver individual applications or complete desktops to the entire enterprise, whether they are task workers, knowledge workers or mobile workers. Users access their desktop on any device, anytime, with a high-definition user experience. With VRD, IT can manage single instances of each OS, application and user profile and dynamically assemble them to increase business agility and simplify desktop management. For even more flexibility, users can also take advantage of Dell's line of Intel Atom™-based thin client PCs to provide users with increased mobility without forcing them to sacrifice the rich computing experiences available with a powerful desktop virtualization solution.

Dell On-Demand Desktop Streaming: With Dell On-Demand Desktop Streaming™ (ODDS), local storage is moved from the client to a Dell PowerEdge server. Client desktops and laptops are then free to boot from networked storage while retaining complete control of local processing, graphics and user interface capabilities. Meanwhile, IT departments can more readily provision, patch, upgrade and manage client images by efficiently manipulating images within Dell storage solutions such as Dell OptiPlex FX160, 760 and 960 business-class PCs. This integration is fully optimized with Citrix Provisioning Services for Desktops which in turn is optimized with Intel vPro technology. This architecture provides IT with unparalleled secure, centralized desktop management.

Citrix, Intel and Dell – Better together

Together, Citrix, Intel and Dell are making it easier for IT professionals to provision, manage and secure their entire IT infrastructure while providing hardened, scalable and optimized solutions that span from the datacenter to the desktop. In addition, these solutions also benefit users by providing increased functionality, performance, mobility and availability.

These partners are dedicated to creating infrastructures that increase efficiency and user flexibility, improve TCO and encourage additional productivity. All three companies are driving solutions to help IT managers decrease costs, improve overall business and IT agility and empower users to succeed.

This partnership also provides solutions that allow IT departments to simultaneously decrease costly desktop management and troubleshooting while boosting user mobility and capabilities. IT departments can now direct more attention to addressing strategic business needs rather than getting mired down in technical details.

With an end-to-end approach to systems management, Citrix, Intel and Dell help IT managers utilize existing assets and strengths to make highly flexible, centralized, optimized and virtualized computing a reality. These partners also work closely together to help IT administrators lower overall costs and become strategic assets within today's businesses. The power of Citrix virtualization software combined with the affordability of Dell solutions and advanced capabilities of Intel processors can help leverage virtualization today with minimal risk and immediate return on investment.

By driving standardization, enabling consolidation, improving virtualization, delivering higher-power processing platforms and easing the adoption of 64-bit computing, Citrix, Intel and Dell together provide the best IT infrastructure solutions for today's business needs.



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About Citrix

Citrix Systems, Inc. (NASDAQ:CTXS) is the leading provider of virtualization, networking and software as a service technologies for more than 230,000 organizations worldwide. Its Citrix Delivery Center, Citrix Cloud Center (C3) and Citrix Online Services product families radically simplify computing for millions of users, delivering applications as an on-demand service to any user, in any location on any device. Citrix customers include the world's largest Internet companies, 99 percent of *Fortune* Global 500 enterprises and hundreds of thousands of small businesses and prosumers worldwide. Citrix partners with over 10,000 companies worldwide in more than 100 countries. Founded in 1989, annual revenue in 2008 was \$1.6 billion.

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