

## 7 Real Benefits of a Virtual Infrastructure

Dell  
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Even the best run IT shops face challenges. Many IT organizations find themselves with under-utilized servers and storage, yet they need to deliver greater performance. They need to control energy and data center costs, and provide innovation and scalability to support the business. They need to simplify IT, but optimize service delivery and maximize uptime. These are the conundrums of IT.

There is no magic solution to solve the puzzle or balance the opposing forces, but there is continuing adoption of one technology that is helping IT reduce costs, simplify operations, and improve performance and uptime – Virtualization. Server virtualization, or a virtualized infrastructure, as it is now known, is not a panacea, but it can provide benefits for IT shops of almost all sizes. Virtualization can help you:

1. **Lower hardware, power and space requirements.**
2. **Quickly and easily provision new servers into the environment.**
3. **Reallocate resources with no downtime.**
4. **Ensure applications stay up in a highly available architecture.**
5. **Prioritize the most important applications to ensure they receive the resources required to meet business needs.**
6. **Simplify systems management and operations.**
7. **Simplify and improve the disaster recovery process.**

### Common Usage Models for Virtual Infrastructure

Originally the province of the test and development environment, and then server consolidation, virtualized infrastructures provide benefits across IT disciplines, including:

- **Server Consolidation and Containment** – Reduces server sprawl by consolidating systems into virtual machines.
- **Legacy Application Re-hosting** – Legacy operating systems and software applications are migrated to virtual machines running on new hardware for excellent reliability.
- **Accelerating Development Cycles** – Test and development servers can be rapidly re-provisioned.

- **Infrastructure Provisioning** –The time for provisioning is reduced with sophisticated automation capabilities,
- **Business Continuity** –Entire system’s files are encapsulated for easy replication and restoration onto any target server.

### 3 Emerging Technologies = Even Better Virtualization Results

2007 is the Year of Virtualization. Studies show that the majority of virtualization deployments are now for production environments, often supporting business critical workloads. At its 25th Annual Data Center Conference in December 2006, Gartner named virtualization as “the most impactful trend in infrastructure and operations through 2008.<sup>1</sup>” And, as noted in many recent surveys, the vast majority of IT organizations state that they are already using or planning to use virtualization in their environments.

Another particularly good reason 2007 is the year of virtualization are the synergies between virtualization and three other key emerging technologies – **quad-core processors; energy efficient servers; and iSCSI storage area networks.**

- I. **Quad-core processor servers** provide tremendous performance improvements over dual-core processor servers and previous generation single-core servers. In recent Dell testing, PowerEdge servers with Quad-Core Intel® Xeon® 5300 series processors provided up to 63% better performance than PowerEdge servers with Dual-Core Intel Xeon 5100 series processors.<sup>2</sup> In a VMware-specific test, three 2-socket quad-core PowerEdge 2950s (6 sockets, 24 cores) outperformed two 4-socket dual-core HP DL585 G2s (8 sockets, 16 cores) with up to 44% more performance, 57% more performance per watt, and an average of 95% better price/performance.<sup>4</sup>

Dell engineers have done significant testing and joint development with VMware, Microsoft and the open source Xen community. Dell virtualization best practice recommendations are to show the ability to host 2-4 virtual machines per core, or 16-32 virtual machines on a single two socket quad-core server. With those sorts of capacities you can achieve a reduction in servers, a reduction in data center space, reduced energy costs and better asset utilization. In addition, systems management is simplified and fewer server administrators may be needed to manage the virtualized infrastructure.

- II. With the focus on the environment and energy costs, systems vendors have become diligent in driving **energy efficiency** into their products. Dell’s PowerEdge Energy Smart servers were the first industry standard servers

configured to optimize energy efficiency. Dell PowerEdge Energy Smart servers deliver up to 25% greater performance per watt over similarly configured servers<sup>5</sup> and PowerEdge servers with Quad-Core Intel Xeon 5300 series processors provided up to 40% better performance per watt<sup>3</sup> than PowerEdge servers with Dual-Core Intel Xeon 5100 series processors.

- III. A storage area network (SAN) is needed to take full advantage of virtualization and its high availability capabilities. However, many organizations without SAN experience were reluctant to deploy virtualization due to the costs and complexity of traditional fibre channel SANs. **iSCSI storage area networks** are ideal for many virtualized infrastructures and can eliminate much of the complexity and cost of a fibre channel SAN.

iSCSI networks combine the simplicity of IP protocols for networking and SCSI commands for storage to deliver a simple and affordable disk storage solution to the virtualized datacenter. Unlike fibre channel networks, which use expensive interfaces and switches and require extensive knowledge to manage, iSCSI SANs use familiar IP commands and standardized Ethernet interface cards, switches and routers. While fibre channel is commonly believed to deliver the best performance, in actual practice iSCSI delivers comparable speed with most applications. Because so many key applications have random I/O patterns, performance is usually more affected by read-write operations to disk than by bandwidth limitations.

The Dell/EMC AX150i and CX3 series are designed to meet different needs within different types of storage environments. The Dell/EMC AX150i, a cost-effective entry-level array, offers only iSCSI support. It is designed for easy installation and management, and includes several streamlined management applications. The iSCSI-capable arrays in the Dell/EMC CX3 series are designed to provide enhanced performance, scalability, and mirroring capabilities, and add the flexibility to support both iSCSI and Fibre Channel connections simultaneously. This dual support allows enterprises to create tiered configurations to help meet the needs of specific application workloads, helping streamline data center costs and management efficiency.

## **Putting IT All Together – Your Virtualized Infrastructure**

The benefits of a virtualized infrastructure are many and the technology choices plentiful. And while there are many excellent resources, guides, white papers and best practices to help IT organizations implement virtualization, there is nothing like real-world hands-on experience for a virtual solution.

There are a number of considerations to be addressed when embarking on a virtualization project, such as:

- The number and types of servers

- The configuration of the servers
- The number of NICs
- Storage infrastructure and requirements
- Sufficient resources to support high availability (HA)
- Networking infrastructure
- Which virtualization software to use – vendor and product

Dell provides a variety of services to help with your virtualization deployment. To get started, Dell's Virtualization Readiness Assessment service evaluates the impact of a virtual infrastructure on your data center, provides a comprehensive analysis of your server environment, and then supplies a tool-based assessment of system inventory and performance data. As a result of this service you'll also receive a Virtualization Assessment Report containing an inventory report, utilization assessment and outline of candidates for virtualization; virtualization guidelines and consolidation scenarios; and a preliminary TCO comparison.

Other services include a variety of workshops, design and implementation services, including:

- Virtual Infrastructure Health Check
- VMware® Infrastructure Workshop
- VMware Infrastructure Upgrade Workshop
- P2V Migration Workshop
- VMware Infrastructure with P2V Workshop
- VMware Disaster Recovery and Backup Workshop

2007 is the Year of Virtualization. Dell provides the services, software, servers and storage to make your virtualization infrastructure a reality.

## **Resources / More information**

- [www.dell.com/virtualization](http://www.dell.com/virtualization)
- [www.dell.com/iscsi](http://www.dell.com/iscsi)
- iSCSI: Changing the Economics of Storage. Part 1—Understanding iSCSI in Enterprise Environments:  
<http://www.dell.com/downloads/global/power/ps2q07-20070335-Vigil.pdf>

1. "Infrastructure Futures: Virtualized, Agile and Real-Time", Gartner 25th Annual Data Center Conference 2006, Thomas Bittman, 28 November-1 December 2006.

2. Based on the SPECint\_rate2000 benchmark test performed by Dell Labs in May and October 2006 on a PE2950 with two quad core Intel Xeon X5355 (2.66Ghz Clovertown) processors, 8GB 667Mhz FBD memory, 1x SATA 80GB/7.2K rpm HDD, and Windows Server 2003 Enterprise x64 Edition OS as compared to a similarly configured PE2950 with two dual core Intel Xeon 5160 (3.0Ghz Woodcrest) processors. Actual performance will vary based on configuration, usage and manufacturing variability.
3. Based on testing performed by Dell Labs in October 2006 using the SPECjbb2005 benchmark on a PE2950 with two quad core Intel Xeon E5345 (2.33Ghz Clovertown) processors, 4GB 667Mhz FBD memory, 2x SAS 73GB/15k rpm HDDs, Windows Server 2003 Enterprise x64 Edition OS as compared to a similarly configured PE2950 with two dual core Intel Xeon 5160 (3.0Ghz Woodcrest) processors. Actual performance and power consumption will vary based on configuration, usage and manufacturing variability.
4. Dell Enterprise Technology Center testing. December 2006. Based on Microsoft SQL Server 2005, SUSE LAMP and NetBench performance testing performed by Dell with three dual-socket Dell PowerEdge 2950 servers running VMware ESX Server 3.0.1 configured with two 2.66 GHz quad-core 5355 Xeon processors with 8 MB cache and 16 GB memory and two SAS 146 GB 15k rpm drives and two four-socket HP Proliant DL585 G2 servers running VMware ESX Server 3.0.1 configured with four dual-core AMD Opteron 2.8 GHz 8220SE processors with 1 MB cache and 32 GB of memory and two SAS 73 GB 15k rpm drives. Actual performance will vary based on configuration, usage and manufacturing variability.
5. Based on AC power measurements using an Extech 380803 Power Analyzer taken during the peak load of the SPECjbb2005 benchmark test performed by Dell Labs in November 2006. The PE2950 Energy Smart configuration consisted of two dual-core Intel Xeon 5148 (2.33GHz LV) processors, 4x1GB 667MHz FBDIMMs, and 2x73GB 10K 2.5" SAS drives running Windows Server 2003 x64 Enterprise Edition, compared to a PE2950 standard configuration of two dual-core Intel Xeon 5140 (2.33GHz) processors, 4x1GB 667MHz FBDIMMs, and 2x73GB 10K 3.5" SAS drives running Windows Server 2003 x64 Enterprise Edition. Actual performance and power consumption will vary based on configuration, usage and manufacturing variability.