THE EFFICIENT ENTERPRISE:

BOOSTING YOUR DATA CENTER IQ

Economic pressures are transforming virtually every area of business, and the data center is no exception. New-generation Dell™ servers, storage, and management infrastructure offer outstanding enterprise efficiency together with exceptional virtualization, scalability, and support—helping IT executives to cut costs without compromising strategic organizational goals.

By Jeanne Feldkamp
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Weathering a tough economic climate means putting a hard stop on wasteful spending. Data center complexity further complicates budget requirements, driving CIOs to scrutinize the IT infrastructure and devise innovative ways to get the job done while consuming as few resources as possible.

As energy costs rise, so does the cost of running a data center. Nonetheless, information is the lifeblood of virtually every business—and data center capacity must continue adjusting and expanding to keep pace, even when power and cooling capabilities may have reached their limit.

At times like this, it is no surprise when the finance organization calls for belt-tightening tactics that have worked before: simply delay noncritical expenditures. Unfortunately, short-term budgetary measures intended to produce immediate spending relief may undercut long-term organizational goals.[1] It is essential for IT executives to work proactively with business strategists to advance overall enterprise efficiency. Rather than paring back, many organizations are forging ahead with strategic IT infrastructure deployments designed to increase data center intelligence while reducing operating expenses—effectively boosting their data center IQ. Measures that can help achieve this desired state include the following:

- **Enhanced energy efficiency:** Much of the electricity consumed in a conventional data center goes toward cooling. Administrators can ease power and cooling requirements by implementing energy management best practices as well as consolidating servers and storage. In addition, transitioning to equipment that incorporates the latest advancements in energy-saving technology can help significantly reduce operating expenses. Recent strides in rack server efficiency may fit the bill for energy savings, but with the onset of the latest generation of full- and half-height blade servers, this may be the time to increase the population of blades in the data center mix.
- **Increased server and storage virtualization:** By facilitating server and storage consolidation and the efficient use of computing resources, virtualized environments enable considerable cost savings compared with all-physical configurations. Moreover, while server virtualization is essential to laying the foundation for scalable, highly automated IT infrastructures, organizations may also find this an opportune time to begin progressing along the storage virtualization front by integrating the latest in Internet SCSI (iSCSI) storage arrays.
- **Smart systems management:** In the past, a variety of tools were required to manage heterogeneous systems. Today, administrators can access comprehensive functionality from a single centralized console designed to manage the entire data center—helping IT departments reduce the administrative burden and increase productivity.
- **Intensified focus on smooth integration and scalability:** Organizations are going back to basics with particular emphasis on productivity, efficiency, and value. To support these objectives, data center infrastructures must be flexible enough to change as new systems are added and to grow with the needs of the organization.

INTRODUCING THE NEW GENERATION

Dell servers, storage, and management systems can help IT organizations meet today's economic challenges while supporting fast, seamless growth. New 11th-generation Dell PowerEdge™ servers feature a high-performance, energy-efficient system architecture that can be optimized to support demanding virtualized environments. A range of rack, tower, and blade servers designed for easy customization provide flexibility through innovative design and usability enhancements, helping simplify management of complex data center infrastructures while helping reduce total cost of ownership.[2]

[1] For more information on budget pitfalls to avoid, see "The Top 5 Mistakes Companies Make When Trimming Their IT Budget," in *Dell Power Solutions*, June 2009, DELL.COM/Downloads/Global/Power/ps2q09-20090357-Budgets.pdf.

[2] For more information on new 11th-generation PowerEdge servers, see "Data Center Workhorses: New Dell PowerEdge Rack and Blade Servers," by Edward Yee, Indrani Paul, Robert Tung, Truc Nguyen, and Chad Fenner, in *Dell Power Solutions*, June 2009, DELL.COM/Downloads/Global/Power/ps2q09-20090246-Nguyen.pdf.

PowerEdge servers also take advantage of the Intel® Xeon® processor 5500 series architecture, which offers outstanding flexibility and bandwidth including up to three memory channels per processor. Best-practices Double Data Rate 3 (DDR3) configurations enable organizations to optimize performance with settings for targeted enterprise applications and virtualized environments.

Building on the capabilities of Dell servers and storage, Dell OpenManage™ systems management tools offer enhanced operations and standards-based commands designed to integrate with existing systems. The new Dell Management Console Powered by Altiris™ from Symantec™—based on the modular Symantec Management Platform framework—offers a holistic view of the data center and unified management of enterprise-wide IT assets through a single console and configuration management database.[4]

Because the Dell Management Console is device agnostic, it is designed to manage a wide range of third-party hardware devices and operating systems using a common data source and a single view into the IT infrastructure. These centralized systems management capabilities also allow administrators to track storage resources, monitor performance, and perform updates quickly and cost-effectively. In addition, the Dell Unified Server Configurator (USC) enabled by the Lifecycle Controller in 11th-generation PowerEdge servers facilitates OS deployment with built-in driver installations, firmware updates, hardware configuration, and diagnostics. Because the USC is available even when the OS is not, it allows added flexibility in provisioning and customizing systems to suit enterprise requirements.

CASE IN POINT

"As a utility company, PG&E is committed to conserving energy. With rightsized power supplies, physical designs that maximize airflow, and the ability for us to tune BIOS settings to enhance energy efficiency, the new generation of Dell PowerEdge servers will help us deliver outstanding service to our customers while controlling our own energy usage."

—Tony Villa
Server hardware product manager at PG&E
March 2009

Efficiency-enhancing features are built into Dell storage as well. The new Dell EqualLogic™ PS6000 series of iSCSI storage area network (SAN) arrays provides an exceptional storage foundation for enterprises. Through their virtualized scale-out architecture and rich software features, these arrays are designed to deliver self-optimized performance, virtualized server integration, integrated data protection for key business applications, consolidated management, and flexible deployment without compromising data availability.[3] The simplicity of management integrated into the EqualLogic iSCSI SAN line, its ease of integration into broader IT infrastructures, and a comprehensive set of storage management features help drive down SAN total cost of ownership.

MAXIMIZING PERFORMANCE AND ENERGY EFFICIENCY

New 11th-generation Dell PowerEdge servers are built from the ground up with energy-efficient components and energy management features designed to minimize system power consumption. For example, these servers include power supply units that are rightsized for system requirements, policy-driven power and thermal management, and highly efficient, standards-based Energy Smart components. Advanced Dell thermal control helps to deliver optimal performance while minimizing system and fan power consumption. Together, these enhancements help maximize energy efficiency and reduce operating expense without compromising performance.

All together, these technology advances make it possible for IT executives to take a giant leap forward in enterprise efficiency. "Energy efficiency is key to our business model—both from a cost and an environmental perspective," says Patrick Pulvermueller, managing director at hosting services provider Host Europe. "The Dell PowerEdge R710 will allow us to double capacity and computing power without increasing our energy costs and carbon footprint. For us, that's a winning formula."

Tony Villa, server hardware product manager at Pacific Gas and Electric (PG&E), has a similar perspective. "As a utility company, PG&E is committed to conserving energy. With rightsized power supplies, physical designs that maximize airflow, and the ability for us to tune BIOS settings to enhance energy efficiency, the new generation of Dell PowerEdge servers will help us deliver outstanding service to our customers while controlling our own energy usage."

[3] For more information on virtualized storage capabilities, see "Boosting SAN Performance with Dell EqualLogic PS6000S Solid-State Drive Arrays," by Dylan Locsin, Ujjwal Rajbhandari, and Wendy Chen, in *Dell Power Solutions*, June 2009, DELL.COM/Downloads/Global/Power/ps2q09-20090236-Locsin.pdf.

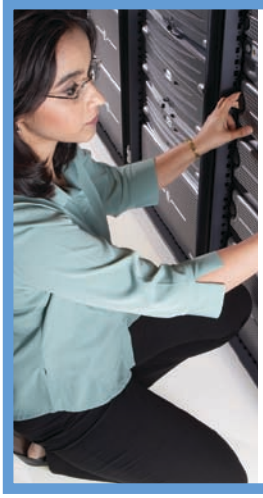
[4] For more information on the Dell Management Console, see "Systems Management Simplified," by Pascal Nicolas, Jeanne Feldkamp, and Tom Kolnowski, in *Dell Power Solutions*, March 2009, DELL.COM/Downloads/Global/Power/ps1q09-20090191-CoverStory.pdf.

PowerEdge servers further boost efficiency by helping to increase the amount of work each processor can perform in a given time period. In each 11th-generation PowerEdge model, processors with the Intel Xeon processor 5500 series architecture are designed to adapt to software in real time—allowing systems to process more tasks simultaneously than they could otherwise. Intel Turbo Boost Technology enables PowerEdge servers to enhance performance during peak usage periods.

Field tests vouch for energy-efficient performance characteristics. "When we benchmarked the Dell PowerEdge M710 blade servers with Intel Xeon 5500 processors, we saw an increase in power efficiency of at least 25 percent," says Helge Meinhard, head of server and storage procurement at European Organization for Nuclear Research (CERN) Central IT. "Additionally, we enabled simultaneous multi-threading, and saw power efficiency go up even further. We could make a potential 50 percent overall improvement."

Intel Intelligent Power Capability further enhances efficiency by putting PowerEdge servers into low power states when demand decreases, helping to reduce operating costs and energy use. "The Dell PowerEdge R610 server and PowerEdge M610 blade server will help us reduce overall power consumption and get the most out of what we do use," says Gary Jung, manager for the Scientific Cluster Support Group in the IT Division at University of California, Berkeley (UC Berkeley) Laboratory.

CASE IN POINT



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BENEFITING FROM VIRTUALIZATION ENHANCEMENTS

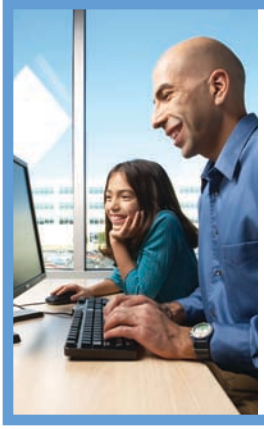
A range of enhancements available in the new Dell PowerEdge servers help organizations make the most of high-availability virtualized data center configurations. By helping reduce the complexity of the IT environment while adding to the flexibility and scalability of compute options, virtualization can give enterprises a competitive edge.

Featuring the Intel Xeon processor 5500 series architecture, embedded hypervisors, and expanded memory and I/O, 11th-generation PowerEdge servers are designed to deliver outstanding system performance and support a large number of virtual machines per server. "With greater memory capacity than the previous-generation hardware, the Dell PowerEdge R710 server will enable us to increase the number of virtual machines on each physical server by approximately 60 percent," says Greg Barton, senior analyst at engineering, construction, and operations firm CH2M HILL. "As a result, we can retire more servers and reduce IT costs."

Dell blade servers are also enabling a substantial boost in virtualization efficiency. "VMware virtualization software operates seamlessly on the Dell PowerEdge M610 blade server. Previously we needed five blades to run 100 virtual servers in our environment, but we'd only need three M610s to do the same work," notes Gauthier Catteau, systems and network engineer at Ministère de l'Education Nationale (Meduc).

Optional factory-integrated virtualization capabilities allow administrators to specify custom configurations at the point of purchase to deliver customized solutions out of the box—helping to further simplify deployment and implementation of virtualized infrastructures. For Alex Rodriguez, director of systems engineering at data center services provider Expedient Communications, these capabilities translate into extremely fast time to payback. "We plan to move the entire Expedient virtualization server farm to Dell PowerEdge R710 servers as quickly as we can roll them out," he says. "The additional memory, I/O

CASE IN POINT



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bandwidth, and processor speed deliver so much additional capacity that the new servers will pay for themselves almost as soon as I put them in."

SIMPLIFYING INTEGRATION AND MANAGEMENT

In today's economy, ease of integration and management are essential considerations. To that end, 11th-generation Dell PowerEdge servers offer world-class system and image commonality. Enabling consolidation onto a reduced number of highly functional hardware platforms helps IT departments further simplify integration and management.

In addition to consistent hardware design, PowerEdge servers provide a variety of features designed to streamline systems administration. For example, the USC delivers "instant on" integrated manageability through a single access point. This tool offers a one-stop shop for deploying operating systems with built-in driver installations, firmware updates, hardware configuration, and issue diagnoses. Remote management capabilities can then extend these features to administrators working outside the data center. "We have a large, heterogeneous environment," says Host Europe's Pulvermueller, "but with iDRAC, we'll be able to manage all elements, regardless of where we are. Remote management means peace of mind, maximum uptime, and reduced costs."

The Dell Management Console helps simplify IT and create stability by shrinking infrastructure management to a single console. Because it offers centralized access to management tools and a common data source for managing the entire infrastructure, this platform enhances productivity and frees administrators to focus on strategic priorities. "With Dell Management Console, we will be able to consolidate our three separate IT management consoles into a single unified interface," says Kevin Jones, project manager at international transportation company CSX. "That alone will save us quite a bit of time."

Built on the Symantec Management Platform, the Dell Management Console has an easily extensible, modular foundation designed to provide secure access to a comprehensive range of systems management functionality, from basic hardware management to advanced features such as asset and security management enabled through the purchase of optional plug-ins to Dell and partner tools. "In the past, the IT group had to log on to each individual server to check its status and manage routine tasks," says Aaron C. Duncan, network administrator at Chicago Public Radio. "By consolidating server management into a single tool, with a single user-friendly interface, the Dell Management Console will help us dramatically reduce the time we spend on server management."

The 11th-generation PowerEdge server family is designed to deliver simplicity of operations and innovative, administrator-friendly design features. Expedient's Rodriguez says his organization benefits daily from this simplicity: "At Expedient, we reconfigure servers in response to customer requests every day, and we can change components on the Dell PowerEdge R610 server in just a few minutes, which means that we have more time to spend improving customer service."

Each model in the new lineup of PowerEdge servers takes advantage of Dell system image commonality. This commonality enhances productivity because administrators who learn one system also understand how to manage other PowerEdge models and next-generation Dell servers. Logical component layout and power supply placement also help ensure straightforward installation and redeployment. According to Andrey Paramonov, senior system administrator/storage administrator at e-mail hosting company Intermedia, "The physical design and management capabilities of the Dell PowerEdge M610 blade server enable us to deploy a new server up to six times faster than a standard stand-alone server."

Rip-and-replace processes are not a typical option for enterprises looking to increase data center efficiency. Because they are based on industry standards and validated with Dell partners, 11th-generation PowerEdge servers help ensure seamless integration into existing infrastructures. "We're confident that the Dell PowerEdge R610 servers and PowerEdge M610 blade servers will fit easily into our environment," says UC Berkeley Laboratory's Jung. "We manage over 1,400 production servers, and our experience has been that the Dell systems take noticeably less effort to deploy and maintain than those from other vendors."

Rodriguez agrees that Dell systems integrate easily into the existing data center. "The component density, durability, and easy access features of the Dell PowerEdge R610 servers save us time during both deployment and maintenance,"

CASE IN POINT

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he says. "We can have a new PowerEdge server installed and ready to load applications in less than an hour."

SCALING SEAMLESSLY WITHIN THE SAME DATA CENTER FOOTPRINT

Data centers must be able to scale effectively while using data center real estate efficiently. Scalability starts at the hardware level while working within the given power resources. That is why 11th-generation Dell PowerEdge servers—and PowerEdge M-Series blade servers in particular—are designed for scalability from the inside out. As application needs increase, PowerEdge M610 and PowerEdge M710 blade servers are designed to scale up to 128 cores and 1,536 GB of memory per 10U PowerEdge M1000e modular blade enclosure. Administrators can also effectively scale I/O application bandwidth with end-to-end 10 Gigabit Ethernet or Fibre Channel connectivity.

"The Intel Xeon 5500 processors utilize hyper-threading. This gives us eight cores per CPU, and you can add another core as needed. This scalability makes the Dell PowerEdge R610 a very attractive option," says Folkert de Gans, senior systems and network administrator at housing company Woonzorg.

Moreover, by integrating Dell server, storage, and network infrastructure elements together with advanced virtualization and software tools, administrators can significantly advance data center automation. Today, large-scale data center building blocks called computing pods are designed to aggregate server, storage, and network nodes into a simple, cooperating set of computing resources. Computing pods also incorporate a comprehensive management infrastructure that can be tailored to particular organizational requirements to enhance enterprise efficiency and enable fast, flexible service response to changing business conditions.[5]

To further advance enterprise efficiency and support business growth, Dell offers a comprehensive range of services, from consulting engagements all the way to outsourcing management of IT tasks to Dell. Through a modular approach that allows enterprises to modify their systems management services as requirements change, the Dell Services team can help IT leaders streamline data center operations and customize support plans to help meet evolving enterprise needs.

CAPITALIZING ON LONG-TERM EFFICIENCY GAINS

For many executives, the response to difficult economic times, tight budgets, and escalating energy costs is a bet-your-business decision. While IT organizations are being called upon to make short-term service cuts, many business visionaries recognize that the biggest long-term savings may come from strategic capital investments that advance data center efficiency and intelligence—particularly cost-efficient deployments of blade servers and iSCSI storage. In addition, adhering to energy management best practices, transitioning to energy-saving systems, and integrating virtualization technology helps simplify management and boost data center automation significantly.

Besides helping to survive today's economic storm, these strategies are fundamental for continued growth. By increasing overall enterprise efficiency and scalability, IT executives can keep pace with ever-changing business requirements while continuing to innovate essential systems and services that give their organizations the competitive edge.

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[5] For more information on computing pods and Dell Business-Ready Configurations, see "Computing Pods: Large-Scale Building Blocks for Intelligent, Automated Data Center Deployments," by Timothy Sherbak and Chris Auger, in *Dell Power Solutions*, June 2009, DELL.COM/Downloads/Global/Power/ps2q09-20090238-Sherbak.pdf.