Building the Energy-Smart Datacenter

How Dell™ PowerEdge™ servers, services, tools and partnerships can help customers save money by saving energy.

As businesses grow, they need more computational capacity. Historically, rising capacity needs have been met by adding servers in the datacenter — with ever-higher performance levels per server. Each new server requires more energy to run (especially as performance levels increase). Delivering the energy to each server also uses power. Plus, each new server also generates heat, which requires additional energy in cooling to offset. In other words, every watt consumed by a server and other IT equipment generally <u>wastes</u> at least another watt through cooling, power backup and power delivery.

To make matters worse, many existing datacenters simply were not designed for the heat and power requirements of contemporary form factors (e.g., rack-dense and ultra-dense servers, such as blades). Factor in higher energy costs than ever before — which can swing wildly according to geopolitical and natural events — and what you have is a potential crisis for IT departments everywhere.

IT is struggling to corral energy costs at a time when upper management is pushing IT to deliver more tangible business value. Many managers are forced to juggle budgets or even postpone needed purchases and upgrades to address TCO concerns. And in many cases of existing datacenters, IT is presently redesigning or planning new facilities in order to accommodate a massive growth in power and cooling requirements. These efforts are not only difficult, they can be extremely costly as well.

The Energy-Smart Datacenter:
An Idea Whose Time Has Come

Dell is rising to the challenge of the datacenter energy crisis. Naturally, our customers need more efficient, more environmentally friendly products. However, the datacenter is an ecosystem by nature, and focusing on any one piece of hardware alone just won't cut it. Customers need a partner they can rely on for end-to-end solutions and services to help reduce operational expenses and minimize risk. They also need industry-wide cooperation to form standards and drive toward greater efficiencies.

Dell is driving the industry to build the Energy-Smart Datacenter by:

· Aggressively engineering our products for energy efficiency

· Optimizing customer datacenters with strategic assessment services and planning tools

· Partnering with other industry leaders to drive revolutionary change

Dell PowerEdge Servers

Our entire PowerEdge line of servers is engineered to balance energy efficiency, performance and price. We've improved efficiency overall through a variety of technology and design enhancements, including Dell's temperature-sensitive fan technology, more efficient power supplies, smaller form factor hard drives and low-voltage processor options. For example, some models feature 40-watt Dual-Core Intel® Xeon® processors that consume up to 40% less energy than standard dual-core processor running at the same frequency. Dell is also actively developing a new power specification to guide our engineering process for all future enterprise products.

Many of our customers are turning to consolidation and virtualization to help reduce and better manage energy consumption. With a whole range of options featuring outstanding performance and capacity, Dell PowerEdge servers can be an ideal solution for physical, logical and virtual consolidation, and various services are available to help optimize customer efforts and accelerate cost savings. In addition, Dell works directly with virtualization partners such as Microsoft and VMware to provide total virtualization solutions.

Partnering with Intel for breakthrough performance and power efficiency

The latest generation of Dell PowerEdge servers feature the new Intel® Core™ microarchitecture, which is designed to deliver higher performance/watt compared to previous Intel microarchitectures. This power-efficient new platform is driven by advanced technologies such as Intel® Intelligent Power Capability, which manages the power consumption of all execution units in the core, and the large on-die Intel® Advanced Smart Cache, which helps reduce latency to data. In addition, Intel's industry-leading 65-nanometer (nm) silicon process technology works to boost both performance and energy efficiency at the silicon level, with significant improvements in both over the previous generation.

Introducing Dell PowerEdge Energy Smart Servers

Dell is proud to announce the first industry-standard PowerEdge Energy Smart Servers configured to optimize energy efficiency. Featuring the lower voltage Dual-Core Intel Xeon processor LV5148, these 1U and 2U solutions are pre-configured to consume less energy, while still offering plenty of performance for mainstream enterprise applications. In fact, PowerEdge Energy Smart servers[1] deliver up to 25% greater performance per watt over similarly configured Dell servers .

The Dual-Core Intel® Xeon® processor LV5148 provides PowerEdge Energy Smart Servers[1] with dual-core processing capabilities and a reduced power envelope — delivering higher performance per watt than the equivalent Intel standard voltage part.

Compared to standard configurations, implementing PowerEdge Energy Smart servers means:

· For every four servers, customers can run a fifth at no additional energy cost
· IT can fit four more 2U servers per rack without adjusting power specs
· For every four racks, IT can add one complete rack at no additional energy cost

By combining power-consumption savings with reductions in cooling and power-delivery costs, Dell PowerEdge Energy Smart servers can save businesses hundreds of dollars per server every year. And for larger datacenters, deploying PowerEdge Energy Smart Servers can save in excess of 1 million dollars a year in operational expense.[2]

Dell PowerEdge Energy Smart servers can help businesses expand existing datacenter capacity and save hundreds — perhaps millions — of dollars in energy costs per server each year.[2]

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Dell Professional Services and Tools

Thanks to our unique direct relationships, Dell has a ground-level understanding of each customer's power-consumption issues and a fierce dedication to delivering the best solutions. Every Dell customer has access to our comprehensive suite of services and tools, backed by our expert team and years of best-practice experience.

For example, the Dell Datacenter Environmental Assessment (DCEA) helps customers scope the power and cooling requirements for their current or future deployments, then develop appropriate plans or remediation strategies. The DCEA has proven successful in helping IT understand in detail how to cool their unique datacenter as cost-effectively as possible.

We also offer the Datacenter Capacity Planner, which helps businesses right-size rack deployments and capitalize on the latest technology and density advancements. This unique and customized web-based tool (now in version 2.0) is designed to enable IT to better estimate power, cooling, airflow, weight and other key considerations — and ultimately make smarter infrastructure decisions.

Leadership and Industry-wide Partnerships

Dell is spearheading industry-wide efforts to improve datacenter efficiencies via research and development, as well as standards-setting initiatives.

Thanks to our collaborative R&D approach, Dell and our partners are driving innovation at all levels (component, system, rack and room). For example, The Dell Power and Thermal Lab is a multi-vendor research endeavor in Austin, Texas dedicated to studying and addressing cooling issues associated with rising datacenter densities. Inside the 875 square foot lab, engineers can simulate various heating loads, model customer server loads and cooling capacity, and even use a smoke generator to

study re-circulating air patterns. The lab can also be used to test and demonstrate innovative cooling techniques such as liquid cooling. Results are shared with customers and the industry as a whole via white papers, briefings, customer demonstrations and more — and what we learn will be reflected in future Dell enterprise products. Industry participants in The Dell Power and Thermal Lab include Liebert, APC, Rittal and Sanmina SCI, and Dell is actively encouraging other leaders and customers to take part in these ongoing efforts.

Moving forward, Dell is working with a number of industry bodies to define and develop appropriate standards to help quantify the impact of energy efficiency (or inefficiency) on the datacenter. Without accepted standards, it's very difficult for businesses to address or even understand the impact of various technology decisions and opportunities. To help remedy this problem, Dell is working with the nonprofit Standard Performance Evaluation Corporation (SPEC®) to deliver a more accurate industry-standard measurement framed in terms of performance per watt — in essence, a standard way to determine and compare the useful work generated by the power consumed. This is designed to enable IT managers to better compare and contrast solutions, and make smarter decisions.

Dell is also a founding member of the Distributed Management Task Force (DMTF) — an organization leading the development of management standards and the promotion of interoperability for enterprise environments. Over 50 employees actively participate in various roles, from the organization's presidency on down. Other related organizations and forums in which Dell participates include The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE); Ecma International (the European association for standardizing information and communication systems); and The Green Grid (an open, global association dedicated to lowering datacenter power consumption worldwide).

The Future of Datacenter Energy

As it so often goes, the challenges of today's datacenter are pushing the innovations of tomorrow. Dell is in the vanguard of the Energy Smart movement. We consider energy efficiency a fundamental design criterion for all Dell enterprise products and offer our 100% commitment to helping customers optimize their own compute and data environments. At the same time, Dell is teaming up with best-in-class partners and standards bodies to transform the way solutions are created and delivered — and ultimately help customers save money by saving energy.

To learn more about how Dell is shaping the future of the datacenter, visit dell.com/energy/poweredge or contact your dedicated account executive.

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