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Marketplace Update

Power Conservation Inside and Outside the Box EMC's Cross-Platform Approach to Energy Efficient Information Management

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Power Conservation Inside and Outside the Box – EMC's Cross-Platform Approach to Energy Efficient Information Management

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Datacenter energy efficiency is much in the news, but ironically many discussions of the subject generate more heat than light. This is not particularly surprising. Some shade the issue of power conservation with simplistic eco-friendly marketing jargon, while others are steering the conversation toward practical energy improvements and measurable cost reductions for enterprise customers. In addition, players such as California's Pacific Gas and Electric (PG&E) utility have entered the fray by offering rebates and incentives for a variety of qualifying datacenter technologies and projects.

Though most server vendors have joined the power conservation chorus, the data storage industry has been less vocal. This is not evidence of inattention so much as it is a reflection of the complexity of the subject. The energy efficiency of data storage solutions follows a subtle, circuitous path that requires businesses to consider datacenter power consumption systemically. For example, EMC's cross-platform approach to energy efficiency offers customers numerous solutions to reduce the power consumption of their IT investments and still achieve the storage and business performance they need. Does this approach demand customers to be more mindful about their storage and other IT purchasing strategies? Yes, but deploying innovative, energy friendly storage solutions such as EMC's can help organizations achieve measurable power conservation benefits across their entire IT infrastructures.

The Problem with Power

Power generation and consumption rank among the world's most critical issues, and with good reason. Like any commodity, power is subject to the variances and vagaries of the market, resulting in pricing that varies widely according to market and region. Short term price spikes caused by natural disasters in energy-related locales, such as Hurricane Katrina's impact on natural gas production in the Gulf Coast region, complicate this further. More serious issues such as political unrest in energy producing regions and rapidly growing demand in emerging markets such as China and India mean that chaotic power-related issues are here to stay.

Predictably, these points have not escaped the notice of datacenter owners. Surveys suggest that enterprises expect energy prices to continue to rise, at the same time the volume of stored data continues to grow exponentially. What does this mean for storage customers? In essence, that it is becoming difficult or even impossible to accurately estimate future datacenter costs and expenses, thus making traditional measurements of storage total cost of ownership (TCO) and return on investment (ROI) tenuous, at best.

In addition, there are few easy ways out. Even for organizations flush with cash, obtaining needed power is becoming a concern, particularly for companies in large urban areas. In some cases, datacenter construction projects have stumbled due to power being unavailable for a given location or in a reasonable period of time. In others, lack of space or the cost of real estate has affected companies' expansion plans. Even simple improvements to resources including air conditioning and UPS equipment, an issue of particular interest to companies trying to accommodate the physical and power requirements of denser and heavier new solutions, are under pressure. In other words, the effects of power availability and consumption can ripple far and wide; swamping the best planned and funded strategies.

The Problem with Planning

What does this all mean in real terms to businesses? That it is well worth their while to understand how to get the best possible performance out of their IT infrastructures. The reasons for this are

straightforward:

1. The rapid evolution of IT tends to expand planning process challenges
2. The complexity of accurately predicting power consumption further complicates facilities planning/design
3. Over-provisioning IT infrastructures with more server and storage hardware than is needed is all too common. Rising energy costs rapidly turns such datacenters into IT "money pits"
4. The result: Increased upfront datacenter costs + inefficient energy consumption = decreased chances of IT investment recovery

So where should organizations concerned about IT power consumption start? That is a tough question with numerous answers, but we believe that it helps if companies understand that the issue is as much about business efficiency as it is energy efficiency. Professional services that can provide an assessment of datacenter power consumption and provisioning is a good way to begin. Look for experience in planning, designing and implementing energy efficient IT infrastructures and data centers, while recognizing that no single product or approach can ensure the energy efficiency of all IT resources.

Instead, businesses should consider deploying best of breed systemic solutions. For example, many server vendors support power conservation technologies including virtualization, low power processors and power supplies, and enhanced cooling features. In addition, intelligent service offerings can benefit energy-conscious organizations with offerings ranging from eco-friendly data-center designs or retrofits to enhancing IT asset performance.

Linking Energy Efficiency and Storage Efficiency

Along with the power provision and environmental factors that influence virtually every resource in an IT infrastructure, information storage incorporates a separate set of power consumption issues and requirements that we believe deserve attention. Energy efficient storage must be approached systemically, evaluating a combination of physical factors, software strategies, optimization and process management.

One critical storage concern is disk drive performance, since drive capacity and performance choices have significant power consumption ramifications. Simply put, disk drive power requirements largely depend on spindle speed, making slower but more capacious drives more efficient in terms of watts per terabyte (W/TB) of storage power consumption. The ideal goal is to utilize only as many high-performance drives as is necessary to support data-intensive applications such as Oracle and Exchange. The solution to this challenge is for companies to pursue array-based tiered storage strategies, matching drives to the applications, business processes, and information for which their performance is most appropriate. From an investment standpoint, enterprises would do well to investigate which storage vendors offer the most flexible tiered storage technologies and solutions.

Scalability is another point to consider, especially if a business is concerned about "future proofing" its IT investments against inevitable data storage growth. Critical here is the energy efficiency of specific storage array components and configurations including power supplies, controllers, logic and system bays, and drive bays. Simple points like how many disk drives a single drive bay can support, and how many drive bays each system or logic bay can house often add unnecessary and painful layers of power demand and ongoing facilities costs. But more general points about overall scalability and when customers must buy and deploy new systems to support their storage needs are also crucial to the decision making process.

Another important issue is the role that properly managed storage processes such as backup and mirroring play in energy efficiency. The fact is that all too many companies regularly make and keep redundant, unnecessary backup copies and snapshots, thus increasing their overall storage and power expenditures. Is there a way out of this predicament? Absolutely. Conducting a backup

audit can pinpoint where information is stored, where redundancies exist, and where opportunities lie for information consolidation. A company can then decide where and which backup solutions are most appropriate. Since full mirroring (RAID 1) requires nearly twice the number of drives as other RAID schemes, it should be reserved for business-critical applications and processes, with other RAID levels and snapshots allocated as appropriate.

Other solutions can also contribute to overall reductions in power consumption, such as archiving technologies that employ single instancing so that data is stored once without needless duplication and wasted energy. Additionally, emerging technologies such as data de-duplication solutions can significantly reduce effort and expenses related to redundant backups and help ensure the efficient usage of storage resources. However, we believe that organizations will realize the most significant reductions in power consumption through instituting systemic Information Lifecycle Management (ILM) solutions including tiered and consolidated storage, reduced production data, smaller backups, and long-term archiving processes.

EMC's Cross-Platform Energy Efficiency Strategy

No single storage product can meet every energy consumption concern, but some vendors offer customers enormous flexibility in how they address power challenges. EMC's cross-platform approach to energy efficiency permeates the company's new hardware, software, tools, and service offerings. For example, EMC's new Generation 4LP (low power) node version of its Centera archiving platform provides 67% energy savings compared to earlier Centera offerings, while the company's enhanced CLARiiON arrays reduce energy use by 33% over previous iterations. In addition, EMC's Celerra platform features thin provisioning, helping customers extend file systems and more efficiently allocate storage. All EMC storage platforms also support the company's new 7.2k/750GB SATA II disk drives, which leverage energy efficiency and higher capacity features to achieve significant power savings.

On the software and tools side, the new Symmetrix Enginuity 5772 operating system includes improvements that can result in up to 30% better performance in existing power envelopes. EMC is also delivering a new version of its Power Calculator that allows customers to better predict power consumption and cooling requirements. The company's Energy Efficiency consulting service is designed to help customers systematically understand and improve their power usage, and to create effective long term energy efficiency strategies. Finally, EMC's VMware virtualization solutions provide customers the means to more effectively utilize resources and energy across their entire IT infrastructures, not just in their storage environments.

A Case in Point – EMC's Symmetrix

A close look at one of EMC's platforms provides some insight on the depth of the company's energy strategy. EMC's Symmetrix DMX-3 has long been a highly powerful and scalable networked storage solution that offers tiering within a single array. The new next generation Symmetrix DMX-4 expands the features and options clients can leverage to maximize energy efficiency. For example:

- **Facilities costs** – The DMX-3 and DMX-4 both incorporate patent pending cabinet cooling technologies designed to significantly improve heat exhaust efficiency and reduce hot spots. This aids business customers by decreasing power consumption and lowering datacenter energy costs.
- **Drive performance** – EMC's DMX-3 supports numerous Fibre Channel disk drive options including high performance (15k/73GB) solutions, mid-range 146 GB and 300 GB options, and energy efficient high capacity (7.2k/500GB) solutions. In addition, the DMX-4 is the first and only high end storage system to support both traditional Fibre Channel drives and latest generation high capacity, low cost 7.2k/750GB SATA II drives. This broad range of choices allows EMC customers to create highly flexible tiered storage environments within single arrays, thus achieving the lowest possible overall W/TB metric and highest system energy efficiency.

- **Array configuration/scalability** – EMC’s Symmetrix DMX-3 and DMX-4 are the largest, most scalable storage solutions in the market, offering customers the ability to aggregate well over a petabyte of raw storage in a single system. Each DMX system bay supports up to 10 disks bays (which each house up to 240 drives), the highest ratio in the industry. At the lower end of the scale, the DMX-3 950 and DMX-4 950 deliver full Symmetrix performance and pay-as-you-grow flexibility in systems geared for the needs of smaller businesses.
- **Software** – EMC’s new Enginuity 5772 OS incorporates enhanced caching algorithms that allow both DMX-3 and DMX-4 customers to better consolidate storage workloads, improving overall power consumption and asset utilization. In addition, choices among mirrors, snaps, and clones can make a difference in both data protection and energy consumed. EMC helps clients conserve storage space and save energy by combining the most appropriate protection strategies with robust tiered storage technologies. Static information can be moved to high density drives, reducing the number of physical drives required while eliminating the redundant backup of data and unplugging unnecessary equipment.
- **Storage processes** – EMC’s Symmetrix DMX solutions support a full complement of backup and mirroring technologies from RAID 1 down. In addition, the company’s ControlCenter and StorageScope storage management solutions offer businesses a variety of tools to measure storage utilization and highlight consolidation opportunities. Finally, EMC’s Avamar-based solutions provide customers the latest in integrated de-duplication solutions.
- **Future planning/proofing** – EMC’s Version 2 Power Calculator helps customers quantify energy savings for consolidations, refreshes, and high-capacity disks by effectively analyzing and projecting the power consumption of EMC products. New enhancements include the ability to perform granular calculations from line currents to annualized energy costs, to compare specific systems or groups of systems, and to generate an expanded variety of reports. With Power Calculator Version 2, organizations have the means to better estimate their power and cooling requirements, and to interactively alter configurations to meet optimal power provisioning.
- **Services** – EMC Consulting Services helps customers understand the potential options and approaches that can improve what they have and develop IT energy strategies for the future. The company’s new Energy Efficiency consulting offering can be implemented as a standalone service or as part of a broader Data Center Optimization strategy.

In essence, EMC’s Symmetrix DMX platform qualifies as a highly flexible, all-inclusive tiered storage solution designed to help customers meet increasingly demanding power consumption requirements. At the same time, the Symmetrix DMX is simply one of a broad set of EMC solutions designed to help customers meet demanding performance and power consumption requirements while managing their critical business information.

Mission Accomplished?

Datacenter power consumption is a subject of wide discussion, and with good reason, as it reflects numerous market and global concerns and touches critical business and technical processes. As a result, companies are striving for ways to realize datacenter energy improvements and cost reductions. These efforts range from the adoption of low power server products and enhanced cooling technologies to adopting energy efficient designs for datacenter construction and retrofit projects.

Energy efficient storage solutions offer organizations significant, measurable power consumption options. These include energy assessment services that support facilities planning efforts, platform configuration and drive options, granular storage process choices, and future proofing/planning tools. However, we believe that organizations will realize the most significant power consumption benefits by instituting systemic Information Lifecycle Management (ILM) strategies that incorporate tiered and consolidated storage, performance management, reduced production data, smaller backups, and long-term archiving processes.

EMC platforms such as the Symmetrix DMX, CLARiiON, Centera, and Celerra systems are notable examples of powerful and scalable networked storage solutions. They support numerous energy efficient features and options designed to assess and reduce power consumption, exploiting software for snaps, clones, data migration, file virtualization and streamlining of backups and archives. The Symmetrix DMX, for example offers power-friendly features such as patent-pending cabinet cooling technologies, numerous disk drive choices (including new high capacity, low cost 7.2k/750GB SATA II solutions), flexible configuration for effective storage consolidation, and unmatched scalability.

In addition, the Symmetrix DMX supports a broad range of storage process solutions buttressed by the new Enginuity 5772 OS, platform applications, and EMC's ControlCenter and StorageScope software. Most importantly, the Symmetrix DMX is just one of many EMC storage solutions which, along with the company's Energy Efficiency consulting services, are designed to help customers effectively manage critical information and meet demanding power consumption requirements. Overall, we believe that businesses that wish to minimize datacenter power consumption and still achieve maximum storage performance would be well-advised to consider the full spectrum of EMC's platform and service solutions.

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About Pund-IT

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