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## Ask IDEAS

**Question:** What strategies should be considered for improving the power and cooling efficiency in storage systems?

**Answer:** As the movement to “think green” across all layers of the datacenter continues to evolve, storage vendors are being tasked with reorienting data storage techniques toward improved environmental efficiencies. It is currently estimated that for every dollar spent on hardware procurement, an additional fifty cents literally goes out the door due to electrical power, heating, ventilation, and air conditioning (HVAC) costs. With energy costs rising upwards of 30% each year, the gap in the pricing relationship between hardware procurement and energy costs will continue to narrow, unless more efficient techniques are employed to offset energy usage. The storage footprint in the majority of datacenters is significant, and the operation of these storage systems can consume nearly half of the datacenter’s power. Hence, the requirement for more energy-efficient storage techniques is being viewed as an economic imperative, while the environment is being viewed more as a beneficiary by correlation.

The common approach to managing energy consumption and limiting carbon emissions around storage is to leverage various consolidation strategies. This is where the creativity among competing vendors is born. Storage consolidation, at the root level, could mean simple reduction in active data capacity, reduction of the subsystem hardware footprint through storage virtualization, or even workload sharing and management. In regards to data capacity, many company strategies focus on the power savings that can be realized by employing new technologies – such as thin provisioning or data deduplication – to reduce the amount of active data. The power savings from

these techniques would come from a reduction in the number of rotating disks needed.

However, the age-old approach to aggressive archiving is still a viable strategy to increase efficiencies, and such techniques have evolved to include intelligent data movement practices that provide the flexibility to tier data based on content value. The tiering strategy opens up a practical approach to provisioning excess capacity off of power-hungry spinning disks onto offline tape and/or optical media.

Using solid state drives (SSDs) as a primary tier or cache can provide further power savings with the modest 2.5W power usage per drive at high load. In comparison, the standard 3.5-inch hard disk drives (HDDs) consume 12W idle and 25W at maximum workload, while the 2.5-inch HDDs are more efficient with 5W usage and lower density benefits. The current high costs of SSDs will limit their storage footprint with many customers, but the data tiering methodology provides a valuable way to implement SSDs on a smaller scale (as a tier 0 layer) and still recognize the energy savings benefits.

The ultimate goal is that only active data should consume energy. Many vendors have developed purpose-built technologies that directly appeal to this goal, such as the spin-down drives that are now found in the entry storage market with the new HP StorageWorks P2000 G3. Another example is the MAID (Massive Array of Idle Disks) technology, which only spins drives when a read or write operation is executed on the drive. The SGI COPAN 300T/TX and the Nexsan SATABeast are two systems that implement the MAID platform. The SGI implementation minimizes energy consumption since only 25% of the disks are spinning at any given time. The Nexsan SATABeast not only saves

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power from the idle drives, but also from the use of energy-efficient 5400 RPM SATA drives. The main trade-off with spin-down technologies is the ramp-up latency as drives are accessed, but this latency can often be moderated with granular spin-down drive controls as well as by integrating this technology with data tiering as noted above.

Other strategies like implementing load-balancing power supplies, utilizing compact flash to mitigate battery needs, and employing spin-down fans further emphasize the vast realm of infrastructure that can contribute to a greener datacenter. Many storage vendors already have mature service offerings to help customers optimize power management, as well as tools to help customers assess TCO and ROI efficiencies with existing and prospective asset acquisitions. The Green Grid – a consortium of technology companies focusing on standards and best practices around energy efficiency – continues to look to storage vendors for meaningful metrics that can be used to architect more efficient power consumption solutions. Until various standards are developed, the customer pain points around energy costs will continue to compel new efficient IT strategies. ■

**Do you have a question for IDEAS?**  
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## Dell Plots Paths to Success with Cloud Computing

*Tony Iams, SVP and Senior Analyst*

For systems vendors, the growing interest in cloud computing presents somewhat of a dilemma. On the one hand, any industry movement that stokes interest in x86-server-based computing should fundamentally be good for their business, since it will increase the overall demand for servers. On the other hand, by definition, the success of cloud computing threatens to consolidate their customer base, as fewer end-user customers buy fewer servers themselves, choosing instead to purchase computing resources on demand from a relatively fixed set of service providers. If nothing else, the rise of cloud computing will sharply increase the challenge for systems suppliers to gain a foothold with the largest of such service providers (some of whom may be tempted to assemble their own systems rather than purchasing off-the-shelf hardware). At the same time, vendors need to exploit – and even encourage – user interest in private cloud computing, in the hopes of stoking demand for new hardware that is optimized for cloud deployments within these existing user environments.

### Introducing the Dell Efficient Enterprise Initiative

Dell has now shown how it intends to rise to this challenge, revealing its Efficient Enterprise initiative to drive efficiency and responsiveness into datacenter and IT operations in the cloud era. Dell's initiative is based on a four-part strategy to help customers who are faced with increasing infrastructure demands and changing business processes. The strategy encompasses intelligent infrastructure; simplified infrastructure management; streamlined application and workload management; and intelligent data management. To outline these goals, Dell issued a flurry of announcements last month targeting the key pain points

that it sees customers encountering today. Dell's new offerings include cloud infrastructure solutions; storage solutions (some deriving from its ongoing partnership with EMC); updates to its Dell Management Console systems management framework; remote management and support services; and a rack server optimized for high-performance cluster computing.

Today, Dell sees two different paths that users can pursue to meet their IT infrastructure needs:

- » "Evolutionary," – i.e., building on virtualization in a way that will eventually allow computing resources to be drawn from third-party sources. This approach is infrastructure-oriented and targets traditional applications.
- » "Revolutionary" – i.e., a platform-oriented approach involving a new generation of applications that are written specifically for the cloud. These applications have scale-out architectures, with multiple independent tasks that can fail (or fail to complete) without affecting the overall availability of the application service.

Users in the first group are familiar territory for Dell, and meeting their current needs for cloud computing (i.e., deploying private clouds with virtual infrastructure) represents a relatively straightforward extension of Dell's current products and strategy. As a rule, Dell targets organizations with 5,000 users as its primary design point, with the assumption that it can easily scale its business both up and down from there. Users in that range are in the sweet spot for simplified cloud solutions. These organizations now need to match the datacenter capabilities of the largest enterprises, but lack the depth of personnel to perform their own integration of complex new datacenter functions such as virtual infrastructure. Dell's approach of delivering integrated solutions that meet the needs of the broadest possible set of customers will play well with these customers, now that

their use of virtualization is advancing beyond simple consolidation and becoming the foundation for building next-generation datacenters.

Moreover, Dell plans to avoid the same degree of vertical integration that it perceives its competitors to be pursuing, minimizing the risk of locking customers in. In particular, Dell invests relatively little in developing its own software (notwithstanding periodic acquisition of tactical software solutions such as KACE). Dell focuses instead on integrating partner software into its own offerings, and making sure that these solutions and partner relationships work smoothly together all the way through the planning, development, sales, and support process. For cloud computing solutions, Dell is working with leading cloud software suppliers such as Aster Data, Canonical, and Greenplum.

Dell also maintains a measured pace for tying its services into customer organizations. Dell believes that its acquisition of Perot Systems was a good match for the scale of its operations, in that it was "big enough to be credible," yet small enough to evolve in response to emerging customer requirements. Still, in the accounts that matter most, Dell will not hesitate to provide the broadest levels of support necessary to maintain its presence. For example, in 2007 Dell created its Data Center Solutions division to target highly customized solutions at very large customers that operate at hyper-scale. Dell describes its support for this set of customers, which now includes 30 companies, as being similar to the American Express "Black Card," in which it will go to great lengths to take care of the customer. As evidence of how significant this effort is becoming in the cloud space, if one were to add up all the units of these deployments and break them out into a separate business, the resulting entity would be the fourth largest server supplier in the market (by volume – not revenue).

*(Continued on page 4)*

Dell is also promoting the use of cloud platforms for next-generation applications. Dell has announced an alliance with Joyent to support its Platform-as-a-Service (PaaS) solution in on- or off-premise configurations, using Joyent's Cloud Control software to manage complex, multi-tenant cloud infrastructures. Dell's PaaS solution is based on Joyent's Accelerators, which are pre-configured virtualized servers optimized for web applications written in Ruby on Rails, PHP, Python, and Java. However, the relationship does not extend to Joyent's Smart Platform, which provides a complete PaaS environment – including functions for data/content storing and backup – and would thus create a much stronger bond with developers (note that Dell also highlights Microsoft's use of Dell servers to power its Azure PaaS environment). So again, Dell is carefully focusing its efforts on where they can have the greatest impact (i.e., at the level of infrastructure and virtual integration) rather than attempting to deliver highly verticalized solutions for deploying a cloud environment.

#### **DX Object Storage Targets Intelligent Data Management**

One area where Dell is forging a stronger bond with developers is in its storage solutions. As part of its most recent announcement wave, Dell stepped up its storage offerings with new "intelligent data management" solutions, whereby it defines "intelligence" as automation. Dell has traditionally been known primarily for its primary disk solutions, and for tape backup. However, it now sees tape backup declining in favor of disk-to-disk backup. Dell's new DX Object Storage platform targets active archiving, a market that has been burgeoning as more and more organizations realize that they cannot afford to keep all business data on primary storage platforms. Yet, just a few vendors offer active-archiving platforms today. Applying the same playbook that it has used often

before, Dell is seizing the opportunity to step up as a major player in an emerging product category by applying volume economics just as that category becomes a mass market requirement. Customers deploy active-archiving platforms to cut storage costs, and competing on price is where Dell usually achieves its greatest leverage (although the DX pricing is not yet available).

The DX Object Storage platform supports the basic features for managing data retention, thus appealing to the broadest possible set of customers. Dell also provides a Software Development Kit (SDK) that will enable ISVs to integrate their applications with the DX platform. These capabilities make DX a valid candidate for active-archiving solutions. However, very limited info is available on DX today, so it is unlikely the system will be competing on functional leadership at introduction. Dell has provided no data on basic specifications such as its maximum capacity, or the maximum number of objects that can be stored, making it difficult to compare the system with competing offerings. Nonetheless, based on the available information, DX does seem to lack a few of the popular features that customers may expect on an active-archiving platform today, such as NAS (NFS/CIFS) protocol support and native compression/deduplication. However, DX does appear to be one of the first active-archiving platforms to support a RESTful API, which will make it an attractive platform to integrate with cloud applications.

#### **The IDEAS Bottom Line**

The fast-changing IT market dynamics and rise of cloud computing presents a distinct puzzle to almost every vendor in the IT industry that each must solve in its own way, drawing on its particular development and marketing resources. Virtualization and cloud computing reduce much of the friction that slowed the deployment of computing in the past, and as that mode of operation becomes established

in the mainstream of IT, the need will emerge for a fundamentally new way of doing business. Those that cannot adapt to the realities of cloud computing will be pushed aside. Just as the PC revolution arose from end users circumventing mainframe datacenters a generation ago, the cloud revolution may be ushered in by developers side-stepping datacenter managers in order to meet the needs of the organization more quickly. Rather than wait for the datacenter manager to react, these developers can procure services directly from third-party cloud service providers with a credit card.

In 2006, Dell started recognizing certain customers for whom the efficiency of accessing additional compute cycles had become critical to their survival, and it is now starting to apply the lessons learned from those users across the breadth of its product line. Dell describes its approach to these new datacenter computing models as having a unique balance of "open," "capable," and "affordable" attributes. It believes competitors can achieve at best one or two of these characteristics, while it alone is qualified to deliver all three. Dell perceives the close relationship it maintains with its customers – a benefit of its direct model – as a key advantage. Without having to deal with too many partners in its value chain, and unimpeded by excessive entanglements in software and services, Dell has the opportunity to quickly absorb the evolving requirements of cloud computing users, and tailor its solutions precisely for their needs. The combination of this responsiveness with its proven economies of scale could give Dell an edge in adapting to the dynamics of cloud computing, in which appropriate computing resources have to become available as quickly and flexibly as possible, and under the best possible business conditions. ■



## IDEAS Insights

**Blog Bites** (<http://www.ideasint.blogs.com>)

What Easy Tier does today is put the focus around the performance advantages of SSD and design an automated system that will make sure data is leveraged on the best-fit media for transactional I/O performance. **Even better is that the functionality and reporting is all free with ROI via energy efficiency and footprint consolidation.**

### IBM Optimizing SSDs in Storage Near You

Scott Kellogg | April 13, 2010

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Because any change to existing infrastructure is inherently difficult, the adoption of cloud computing, for all its promises of transforming capital expenses to operational expenses, will likely add complexity and cost to a given enterprise. **Moving a small start-up to the cloud is nearly effortless, Logicalis points out, but for a large enterprise, the migration will seem like changing a tire while the car is still in motion.** It is in this latter scenario where the hybrid model works best.

### Logicalis Finds Niche in Increasingly Crowded Market for Cloud Services

Chris Gaun | April 23, 2010

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