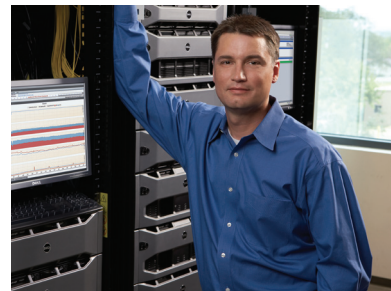


Dell Intelligent Data Management

Applying the Efficient IT
approach to enterprise storage



The power to do more

Executive summary

Business leaders today recognize that information technology (IT) provides capabilities that are essential for defining and executing winning strategies. In a business climate characterized by rapid change and global competition, IT leadership must build an organization and infrastructure that can harness technology to create agile and Efficient IT environments – to advance productivity while facilitating fast, flexible response to evolving business conditions by investing more in innovation than in sustaining the status quo. Maximizing the efficiency of data storage is crucial for creating Efficient IT in a data-driven world.

The Dell™ Intelligent Data Management (IDM) strategy is being delivered through Dell Fluid Data™ solutions to help businesses automate, optimize, scale, and protect storage to create an increasingly agile, increasingly Efficient IT environment. Dell Fluid Data solutions are architected to give our customers the power to optimize their storage infrastructure by helping them put the right data in the right place at the right time for the right cost.

© 2011 Dell Inc. All Rights Reserved. Reproduction of this material in any manner whatsoever without the express written permission of Dell Inc. is strictly forbidden. For more information, contact Dell.

Dell, the DELL logo, and the DELL badge, Compellent, EqualLogic, PowerConnect, and PowerVault are trademarks of Dell Inc. Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

May 2011



Evolving to Efficient IT

Across a wide range of industries, businesses today operate in a global, 24/7, always-connected, digital-content world. In this Virtual Era, customers, constituents, employees, and business partners expect information to be available anytime, anywhere, on any device. From health care providers to retailers, technology vendors to government agencies, organizations are under great strain to meet those expectations and to stay ahead of the competition while controlling costs.

Many organizations today spend up to 80 percent of their IT budget just keeping systems running, leaving only 20 percent for innovation.¹ To maximize the benefits that IT can provide to the business, IT managers must re-engineer and transform IT. By concentrating on Efficient IT, organizations can enhance agility across the infrastructure and the organization, invest more resources in strategic projects that better align with business goals, and more aggressively capitalize on new opportunities than ever before.

Increasing IT efficiency involves more than cutting costs. IT groups must evolve their infrastructure to achieve greater agility and flexibility by automating procedures, implementing auto-optimizing resource utilization, and facilitating dynamic resource growth while also providing the right levels of service and availability at the right cost.

Applying the Efficient IT strategy to data management

Within today's IT environments, the need for greater efficiency and agility is most readily apparent within the storage and data management infrastructure. On average, North American and European enterprises spend 17 percent of their IT infrastructure budget on storage. Almost half of these enterprises surveyed will increase spending on storage by 5 percent or more over the next 12 months.² Industry forecasts suggest that organizations will purchase over 20 times more capacity from 2010 to 2014 than was purchased in 2009.³ As data volumes rise and the demands on the storage infrastructure intensify, the need for storage efficiency will continue to grow.



Moving beyond traditional storage solutions

Several of the storage approaches widely deployed over the past two decades are ill-equipped to handle today's storage challenges. For example, traditional storage area networks (SANs), built on mainframe-like architectures, cannot deliver the flexibility or cost-effective scalability required to handle changing business needs and rapid data growth. When selecting these systems, IT groups are often forced to project data capacity and performance needs for the expected life of the SAN. Overestimating results in excessive up-front costs and operating expenses; underestimating results in expensive, highly disruptive "forklift" upgrades later.

Between upgrades, organizations face a high cost of ownership using these traditional SANs, which require administrators with specialized skills just to keep the system operating. These administrators need a deep understanding of the storage architecture to configure and tune the services that the business demands.

At the same time, traditional SANs fail to provide the flexibility for keeping pace with business change. By instituting rigid data layouts and creating unconnected islands of storage resources, these SANs resist change and prevent businesses from achieving the agility they need. IT managers are forced to refresh traditional SANs every two to three years. They roll out new platforms, features, and technologies in part to avoid increasing support costs. Yet each refresh can involve complex data migrations and additional expenditures for the repurchase of software licenses.

Though SANs can be good choices for supporting server virtualization, traditional SANs cannot deliver the simplicity, flexibility, or cost-effectiveness required for maximizing the benefits of server virtualization. Traditional SANs lack tight integration with server virtualization solutions, and they lack storage virtualization capabilities, which can enhance storage flexibility by providing a dynamic pool of shared storage resources.

Finally, many traditional SAN environments are unable to deliver on the promise of multiple storage tiers. They require extensive manual analysis and intervention to migrate data among disconnected storage tiers. Those manual efforts drive up costs and introduce errors that lead to application outages.



Many traditional network attached storage (NAS) solutions, promoted as “unified” storage approaches by vendors, also lack sufficient management simplicity, flexibility, and scalability. These solutions are designed to consolidate hardware by uniting block- and file-based storage in the same platform, but they do little to consolidate independent management processes. Meanwhile, flexibility is limited. While some traditional unified solutions allow the creation of storage tiers, they do not efficiently map workloads to the appropriate level of storage, and like traditional SANs, they require extensive manual intervention for data migration.

Scaling is also a challenge with traditional unified solutions. They have fixed capacity and performance limits, requiring IT groups to expand beyond the box to accommodate growth and enhance performance. Scalable NAS solutions have been slow in coming. The complexity of the entrenched software for NAS platforms has made it difficult for vendors to produce efficient scale-out architectures. Consequently, organizations using NAS solutions have faced complex transitions when trying to scale.

Achieving greater storage efficiency and agility

To achieve the agility and efficiency required in today’s data center environments, organizations need a new approach to storage. The multi-year Dell IDM initiative was launched in 2008 to accelerate the evolution of Dell storage solutions and the development of advanced approaches that can help organizations overcome the rigidity and inefficiency of classic storage infrastructures. This solutions-oriented approach implemented by Dell focuses on helping improve automation, optimization, scalability, and data protection.

Enhanced task automation

Automating storage administration tasks is essential for helping increase IT efficiency. Storage solutions that automate virtualized storage provisioning or offer automated, policy-based data migration among storage tiers help organizations increase storage performance, improve disk utilization, and accelerate access to information. At the same time, automation enables IT groups to reassign personnel to increasingly innovative projects and help reduce management costs.





Reduce storage administration time by 80 percent*

Reduce storage infrastructure costs by 80 percent.

Avoid forklift upgrades and disruptive data migrations**

Restore data 75% faster than traditional methods***

Transparent optimization

To handle today's massive data volumes while controlling costs, organizations need ways to store more data with less hardware and fewer spinning disk drives. At the same time, they must enhance storage alignment with application requirements. IT groups can improve infrastructure efficiencies with application-aware solutions that coordinate integration among applications, operating systems, hypervisors, and the storage layer. In addition, optimizing storage resources across tiers with technologies such as deduplication and compression helps save space. By optimizing resources, IT groups can significantly reduce hardware acquisition costs while also decreasing power, cooling, real estate, and management expenses.

Seamless scalability

With the tidal wave of data unlikely to ebb any time soon, organizations need scalable solutions that let them buy what is needed now and grow seamlessly later, avoiding significant upgrades and excessive data migration projects. Storage solutions must take the guesswork out of planning and help preserve the existing investment in software. As with optimization, achieving seamless scalability helps deliver savings for both capital and operating expenses.

Simple data protection

Because data is the lifeblood of business, organizations need ways to eliminate the business risks that can be caused by data storage problems. Any disruption of round-the-clock operations can result in customer satisfaction issues and lost revenue. Storage solutions must incorporate data protection at the core, providing features—simply and cost-effectively—that allow the definition and delivery of the appropriate level of security, business continuity, and disaster recovery.

* To learn how AccuWeather achieved reduced storage administration with Dell storage, see the Dell case study, reference number 10008251, August 2010, content.dell.com/us/en/corp/d/corporate~case-studies~en/Documents~2010-accuweather-10008251.pdf.aspx

** To learn how organizations are avoiding massive storage overhauls, see the following Dell case studies: iland, reference number 10008631, June 2010, dell.com/content/topics/global.aspx/casestudies/fy2011-q2-id1607?c=us&l=en&cs=555.

*** To read how the State University of New York at Buffalo achieved these results, see the Dell case study, reference number 10008135, June 2010, content.dell.com/us/en/corp/d/corporate~case-studies~en/Documents~2010-suny-buffalo-10008135.pdf.aspx



The power to do more

Increasing storage efficiency and agility with Dell Fluid Data solutions



In Storage magazine's fifth annual survey on the service and reliability of storage systems, the Compellent SAN earned the Quality Award for Top Midrange Array. According to the magazine, "Compellent's win was earned with a consistent performance, garnering the top scores in all five of our rating categories—sales-force competence, initial product quality, product features, product reliability, and technical support."****

Once primarily a storage reseller, Dell today is a major supplier⁴ of core storage infrastructure products based on in-house engineering and development. The acquisitions of EqualLogic, Perot Systems, Exanet, Ocarina Networks, and Compellent have brought innovative technologies and deep expertise to Dell, further propelling the expansion of Dell storage offerings.

The Dell Fluid Data solution portfolio encompasses a broad range of systems, software, and services. Dell Fluid Data solutions help organizations realize the vision of Efficient IT by providing functionality for automating tasks, optimizing resources, achieving seamless scalability, and protecting critical assets simply. The Dell IDM strategy can help organizations manage growth, increase the value of data, enhance information accessibility, reduce risk, and control costs.

Dell Compellent Storage Center SAN

The Dell™ Compellent™ Storage Center™ SAN offers a robust enterprise data storage solution with the automation, optimization, scalability, and protection required for efficient data management. Automation capabilities help simplify management and increase performance. For example, the Compellent platform automatically virtualizes storage at the disk level, creating a dynamic pool of shared storage resources available to all servers, all the time. In addition, the automated tiered storage capabilities built into the Compellent platform capitalize on industry-leading technology to facilitate automatic data migration across drive types, within drives, and even across RAID levels. This virtualized storage resource enables organizations to quickly adapt to changing requirements, providing the organization with the IT agility it needs.

The Compellent Fluid Data™ Storage architecture was engineered from the ground up to optimize the efficiency of data storage and data flow across storage tiers. Thin provisioning capabilities help to optimize disk utilization, avoiding the need to pre-allocate capacity and helping IT groups avoid buying capacity before it is required. Compellent storage technology automatically allocates inactive data to lower cost storage, saving you up to 80 percent on storage costs.

**** "Quality Awards V: Compellent regains top midrange arrays spot," Storage, vol. 9, number 6, September 2010.



Dell EqualLogic storage helps infrastructure-as-a-service (IaaS) provider Xtium offer SAP “test drive” environments with Microsoft® SQL Server® databases quickly and inexpensively.

“We wanted to provide a platform that we could easily support with lean, expertly focused staff and still provide the very robust services that you would find in a high-end environment—and provide it cost effectively. As we build from each customer storage footprint to one with more and more storage, we’re just adding building blocks. The Dell EqualLogic platform is a perfect fit.”

Tim Vogel
CTO at Xtium
August 2010

The Compellent platform also provides the scalability and protection to accommodate continuously increasing amounts of data. Organizations can scale up and out with the same single platform, avoiding significant upgrades. All automation and optimization capabilities are available to IT groups no matter what size storage environment they use. With highly reliable, redundant, and hot-swappable components, plus core features for security, data protection, and disaster recovery, the Compellent platform enables organizations to keep data protected even as they scale capacity.

Dell EqualLogic PS Series virtualized iSCSI SANs

Dell™ EqualLogic™ PS Series virtualized Internet SCSI (iSCSI) SANs are designed to simplify the deployment and administration of consolidated storage. Automation capabilities and self-tuning features help reduce storage complexity and eliminate the need for specialized knowledge for storage management. For example, EqualLogic PS Series SANs provide automated load balancing across disks, RAID sets, connections, cache, and controllers. Automated storage tiering moves data to the optimal drive type based on administrator-defined rules. When using an EqualLogic PS Series SAN with a virtualized server environment, IT groups also can take advantage of integrated software solutions to help accelerate storage and virtual machine provisioning, data protection, and disaster recovery tasks through automation.

Capabilities such as auto-tiering and thin provisioning help IT groups optimize storage utilization, deliver consistent performance, and avoid unnecessary capital expenditures. EqualLogic PS Series SANs generally require fewer disks and less management effort to meet performance needs than comparable solutions. Meanwhile, the use of industry-standard iSCSI connectivity enables organizations to leverage existing Ethernet network investments and help reduce management complexity. By helping optimize resources, helping simplify administration, and including valuable management software at no extra charge, EqualLogic PS Series SANs enable organizations to achieve enhanced return on their investments and reduced total cost of ownership (TCO) compared with other solutions. In fact, EqualLogic PS Series SANs can offer a TCO that is one-third lower than traditional, legacy-architecture SANs.⁵



The power to do more



The Dell EqualLogic PS6010XVS iSCSI SAN—the newest member of the EqualLogic PS Series—garnered the award for Best Storage System in the InfoWorld 2011 Technology of the Year Awards. The SAN was singled out for its high-performance solid-state drives (SSDs), dynamic storage tiering, and tight integration with VMware® vSphere™ software. According to InfoWorld, *"Dell continues to blaze new ways to deliver better iSCSI SAN performance and scalability."******

EqualLogic PS Series SANs provide a modular, virtualized, peer-storage architecture that enables rapid and simple scaling. Each array is a self-contained unit, with its own storage, processing, and network connection resources. By adding arrays, organizations scale not only storage capacity but also performance and throughput. The virtualized architecture automatically and nondisruptively distributes new resources across the storage pool. Older-generation arrays also can be upgraded nondisruptively, providing long-term investment protection.

To keep data secure, EqualLogic PS Series arrays are built with redundant, hot-swappable components, and controlled with software that has data protection as a core design principle. From role-based management to application integration and simple-to-configure replication, EqualLogic PS Series SANs incorporate features designed to protect critical information assets.

Dell DX Object Storage Platform

The Dell DX Object Storage Platform offers an object-based storage solution for retaining and archiving vast amounts of static, unstructured, old, or unused data, including the files, images, and videos that can clog primary storage environments and complicate data management. Organizations can implement DX Object Storage for a simple, cost-effective way to comply with regulations for retaining anything from medical images to e-mail.

Automated capabilities help simplify management from data creation through deletion. Policy-based management helps avoid human errors and reduce risks, while self-healing functionality helps maintain the integrity of stored objects without IT intervention.

Organizations can seamlessly scale the DX Object Storage Platform to billions of files and petabytes of data. The flat, nonhierarchical address space and peer-scaling architecture enable IT groups to add capacity, nondisruptively, without the need to configure logical units (LUNs), RAID groups, or hierarchical file structures that can be imposed by classic storage architectures.

***** "InfoWorld's 2011 Technology of the Year Award winners," InfoWorld Test Center Staff, January 2011, infoworld.com/d/infoworld/infoworlds-2011-technology-the-year-award-winners-285¤t=5&last=2#slideshowTop.



The power to do more

"The Dell DX Object Storage Platform helps us to scale storage quickly and cost effectively just by adding standards-based nodes. Provisioning is automatic. As a result, we have the flexibility to expand our research or launch new projects without having to make the major hardware investments that other solutions require."

Henk van den Toorn
Post-Doctoral
Bioinformatician at
Utrecht University
November 2010

The protection of data in long-term storage is the central organizing principle of the DX Object Storage Platform. IT administrators define the appropriate level of data protection, which is then automatically implemented by the DX system.

Maximizing IT efficiency with Dell Storage Services

Dell Storage Services and the extensive global network of Dell certified partners help organizations to design, implement, and operate an effective data management strategy that capitalizes on Dell Fluid Data solutions. Through focused, high-impact engagements with clear phases and decision points, Dell and Dell-certified partners can work with IT groups to design storage solutions that address specific needs and to establish validated, repeatable processes that take full advantage of automation, optimization, scaling, and data protection capabilities. Rather than providing a one-size-fits-all approach, Dell and Dell-certified partners offer organizations the flexibility to select the type of services they need, from storage assessment and proof-of-concept assistance to on-site deployment and managed IT services.

Investing in the Intelligent Data Management strategy

Dell continues to invest in innovative storage technologies, expand its storage solution portfolio, and advance the vision of IDM. In contrast to point products and custom solutions that are heavily dependent on outside resources and expertise, and that lock organizations into expensive heavyweight architectures, Dell is committed to delivering open, cost-effective, and pre-integrated solutions designed to simplify deployment and management, protect existing investments, and deliver a low TCO.



The power to do more

Among the top priorities at Dell is helping organizations reduce their storage footprint across all data tiers while still accommodating an ever-growing volume of data. Content-aware data deduplication and compression technologies, for example, provide organizations with the performance and availability they need while increasing efficiency and reducing costs. By understanding the underlying structure of files and data types, these technologies can improve data reduction ratios and decrease resource consumption on host systems. Applying these technologies throughout all layers of the storage infrastructure holds the most promise for achieving the greatest storage efficiency.

Building Efficient IT for the Virtual Era

Targeting efficiency as a core objective across the IT infrastructure helps organizations enhance business agility, foster innovation, and accommodate growth, all while controlling costs. Given the increasing volume, velocity, and value of data in the Virtual Era, establishing an effective data management strategy must be a component of that approach. Dell Fluid Data solutions, which integrate capabilities for automation, optimization, scalability, and protection across the broad Dell storage portfolio, help organizations build a next-generation storage infrastructure as a foundation for an agile Efficient IT.

To learn more about the Dell Intelligent Data Management strategy, visit:
www.dell.com/datamanagement

To explore the broad portfolio of Dell storage solutions, visit:
www.dellstorage.com

¹To read how Dell is transforming its own business with Efficient IT, see "Executive Q&A: Robin Johnson," in 2011 Issue Efficient Enterprise, a special edition of Dell Power Solutions, <http://content.dell.com/us/en/enterprise/power-solutions-magazine-2010-issue-3-Efficient-enterprise-special-edition.aspx#>.

²"The State Of Emerging Enterprise Hardware: 2009 To 2010," Forrester Research, Inc., December 2009, forrester.com/rb/Research/state_of_emerging_enterprise_hardware_2009_to/q/id/55175/t/2.

³"Worldwide Enterprise Storage Systems 2010-2014 Forecast Update: December 2010," IDC #226223, December 2010.

⁴For example, Dell ranks #4 amongst Worldwide Total Disk Storage Systems Vendors in 2010 per "IDC Press Release - Worldwide Disk Storage Systems Finishes 2010 with Double-Digit Growth on Strong Fourth Quarter Results, According to IDC" International Data Corporation, March 4, 2011, www.idc.com/getdoc.jsp?containerId=prUS22723811.

⁵"Dell EqualLogic TCO Analysis: The Economics of EqualLogic Virtualized iSCSI Storage," by Brian Garrett with Tony Palmer, The Enterprise Strategy Group, July 2009, content.dell.com/us/en/corp/d/business-solutions-whitepapers-en/Documents~tco-analysis-esg-labs.pdf.aspx

