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SPECIAL REPORT

Defusing the Data Storage Time Bomb

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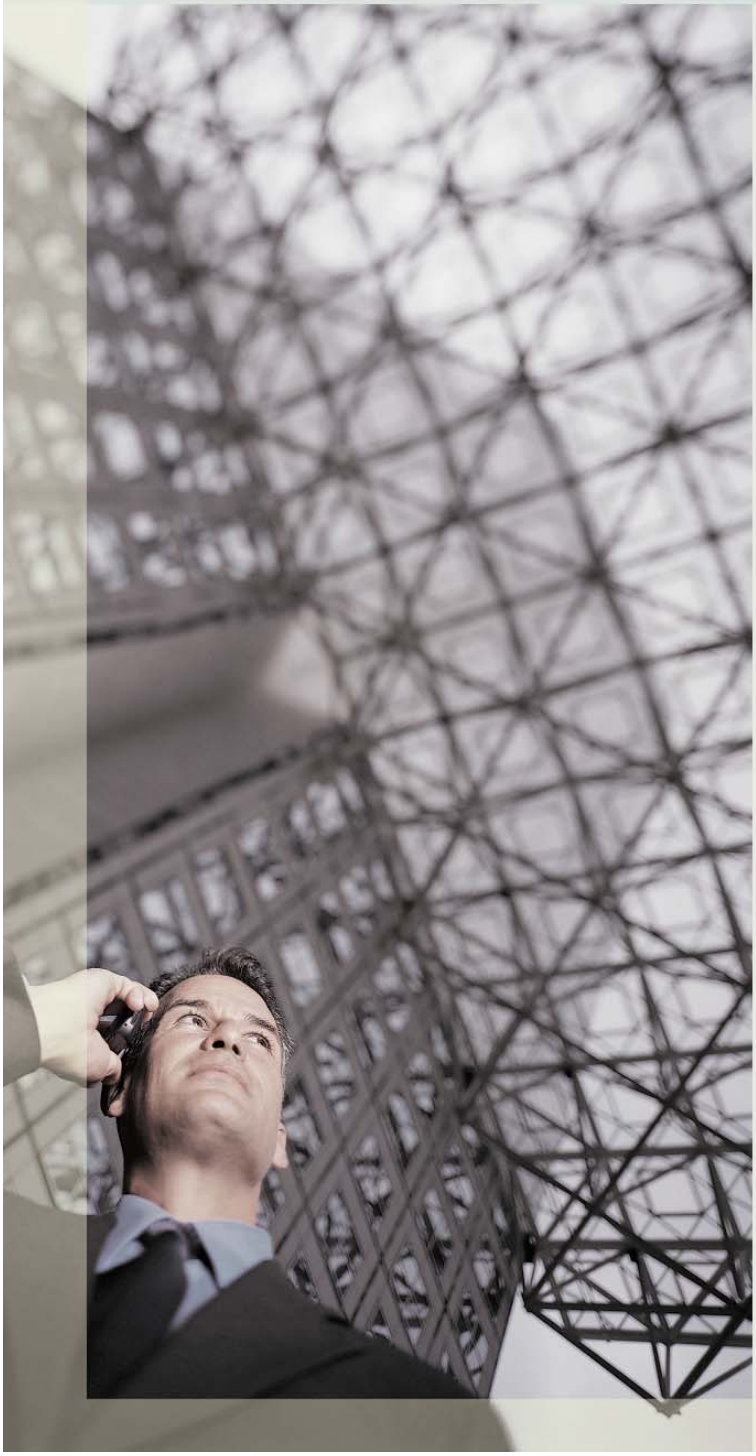

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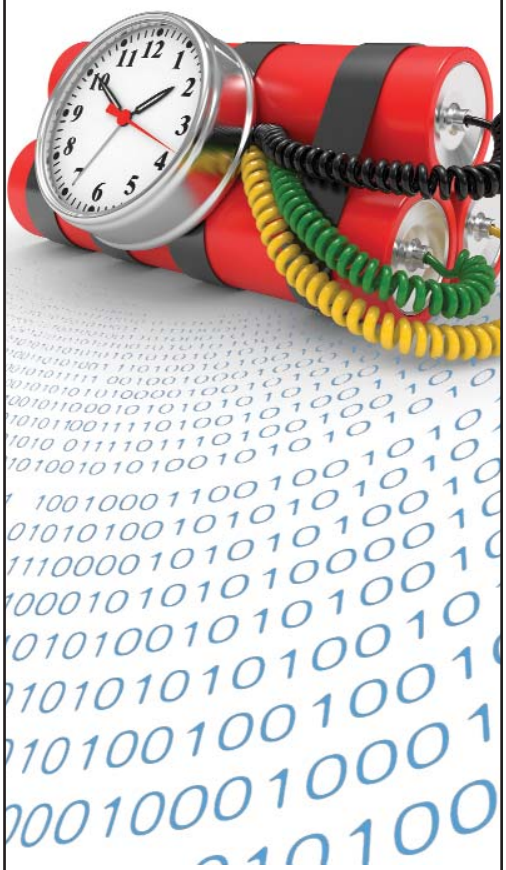

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DEFUSING THE DATA STORAGE TIME BOMB

IT MANAGERS ARE SITTING ON A DATA STORAGE TIME BOMB.

Today's storage environment is under tremendous pressure from the inside due to rampant storage growth. In its annual "Digital Universe" study, EMC projects a nearly 45-fold annual data growth by 2020. Data growth was cited as the No. 1 data center hardware infrastructure challenge in a recent Gartner survey of representatives from 1,004 large enterprises in eight countries. This problem is compounded by the creation of hundreds or even thousands of virtual server image files that often leads to massive storage waste.

At the same time, the storage environment is under pressure from the outside thanks to mandates to cut costs while improving service delivery. Organizations want to rein in storage growth yet demand high levels of availability, reliability and performance. The old model of purchasing more storage than necessary is simply not sustainable — but how else can IT managers relieve the pressure of data growth?

Recognizing the opposing forces at work in today's data center, EMC is on the cutting edge with new solutions designed to improve the simplicity, efficiency and scalability of the storage infrastructure. Its VNX family combines SAN and NAS systems in a powerful, scalable and manageable unified storage solution. Its recent acquisition of Isilon added a unique scale-out storage solution to its portfolio. Together these products offer hope to IT managers fearful of the effects of explosive storage demands on the IT environment.

As information continues to grow exponentially, storage systems need to be intelligent enough to automatically optimize for both performance and cost savings. They need to be able to rapidly scale out using commodity devices that create a clustered storage infrastructure connected by a high-speed interconnect. They need to unify disparate storage subsystems in a common pool for management simplicity. Only by enabling fluid storage expansion while eliminating underutilized subsystems can IT managers defuse the storage time bomb and support today's virtualized environments and ever-increasing storage demands.

Storage Comes Together

The EMC VNX family of unified storage systems delivers the scalability, simplicity and performance needed to maximize the benefits of virtualization.

There is growing pressure on IT organizations to transform the data center to meet increasing business demands. To a great degree, that means creating a technology infrastructure composed of virtualized computing and networking. Virtualization increases IT agility by breaking the static relationship between applications and the IT systems on which they run. However, many organizations have found that the benefits of virtualization are offset by increased storage complexity and expense.

Virtualization requires sufficient pools of distributed, networked storage to support the dynamic demands of hundreds or thousands of virtual machines on top of rampant data growth. Because each virtual machine image is typically many gigabytes in size, the total storage required in virtual environments can be 30 percent more than in an equivalent physical environment. As a result, virtual machine sprawl increases operational overhead and compromises storage utilization efficiency and overall business agility.

Virtualization also accelerates the pace at which capacity can be allocated to new applications, and enables the dynamic movement of applications and virtual disks. If not managed appropriately, virtualization can increase the difficulty of complying with configuration best practices, putting service levels at risk.

Organizations require a storage infrastructure that is both simple and efficient to support their virtual environments. Unified storage delivers on both counts. Unified storage is the combination of block- and file-based storage in the same system with common management. These multiprotocol systems can be attached to servers via IP and/or Fibre Channel. IT managers are using unified storage to improve storage efficiency as well as improve business flexibility and lower the total cost of storage.

The Power of One

Unified storage improves utilization by allowing organizations to consolidate and virtualize storage across storage protocols, environments and mixed storage platforms. Combinations of block storage (Fibre Channel or iSCSI) and file storage (NAS systems with CIFS or NFS) can be managed via a common set of features such as snapshots, thin provisioning, tiered provisioning, replication, synchronous mirroring and data migration — all from a single user interface. This shift toward a shared infrastructure enables organizations to achieve storage utilization rates of 85 percent or more, compared to the sub-50-percent rates in standalone storage silos.

Unified storage is not a new technology. A variety of vendors have taken stabs at providing block- and file-oriented storage in a single box since the late 1990s. Some of the earliest attempts involved simply putting two machines together in a single enclosure and then creating a GUI to handle management of both. More recent unified storage platforms leverage virtualization technology to offer a much deeper integration of file- and block-based storage.

"Now EMC has introduced the VNX family of unified storage systems designed for virtual data centers," said Eric Kronenthal, VP of Professional Services, Sigma Solutions. "The VNX family converges industry-leading EMC CLARiiON SAN and EMC Celerra NAS systems into a single, powerful family of unified storage arrays that scale from entry-level to data center-class systems. These systems dramatically simplify the deployment and management of virtualized applications."

All in the Family

The VNX family includes the VNXe (entry) series for small environments, and the VNX series for enterprise environments. The VNX family is fully optimized for virtual applications, designed with the latest Intel multicore processor technology to achieve record-breaking performance. It also introduces new, comprehensive software packages for simple and affordable management and total data protection.

Both the VNXe series and VNX series are managed by EMC Unisphere, a centralized and simple interface.

The VNXe series is designed specifically for small to midsize businesses (SMBs), department-level storage, and remote or branch offices. It combines breakthrough simplicity with advanced performance, availability, and efficiency benefits and application-optimized management. It can automatically double storage capacity utilization using advanced data reduction technologies, and provide automated diagnosis, service and technical support information in a single click. Designed for the IT manager who does not specialize in storage, it includes unique wizard-based setup and application-centric provisioning that make it simple to install, simple to provision and simple to manage, with instant access to a self-service online community.

The highly scalable VNX series provides the performance and efficiency for demanding virtual applications. It delivers three times simpler management, three times better efficiency, and three times more performance than current EMC midrange storage systems. It also includes advanced, automated storage tiering, compression and file de-duplication.

Guaranteed Efficiency

EMC recently announced that its VNX unified storage solutions are guaranteed to be 25 percent more efficient than any other unified storage solution in the market — with no hidden caveats. Now, EMC customers can purchase 25 percent less raw capacity than products from any other unified storage solution while benefiting from the same amount of useable capacity. Buying less raw capacity can substantially reduce acquisition and operational costs, while enabling customers to buy more raw and usable capacity from EMC for the same amount of money as they would pay for a competing solution.

That's good news for IT managers facing mandates to drive down costs and reduce complexity amid mushrooming data growth. Many organizations are virtualizing their data centers and beginning the journey into the cloud in order to achieve operational efficiency. Oftentimes, however, their storage infrastructures are holding them back.

"IT organizations are under extreme pressure to reduce costs and deliver more efficient IT services," said David Vellante, chief research advocate, Wikibon.org. "Small and midsized organizations are facing similar pressures but with fewer in-house skills. Our financial models show that by bringing together CLARiiON and Celerra, EMC's VNX series will allow practitioners to reduce costs and accelerate IT delivery; while the VNXe series will enable small and midsized organizations to essentially deliver IT as a service without specialized storage skill sets."

Solid State

Virtualization and application consolidation put extreme strain on storage arrays. The adoption of solid state disks (SSDs) — coupled with SATA drives — is the best practice for satisfying these heightened demands. EMC pioneered the integration of SSD technology across its storage portfolio, and designed the EMC Fully Automated Storage Tiering (FAST) Suite, FAST Cache and Block Data Compression to automatically optimize the use of high-capacity SATA drives and high-performance SSDs to deliver better performance at the lowest cost. With the EMC FAST Suite, including FAST Virtual Pools (VP) and FAST Cache, the VNX series offers superior performance, capacity optimization, and comprehensive storage management functionality, while exploiting the benefits of SSDs.

VNXe Series Product Highlights

- Powerful application-based provisioning wizards for breakthrough simplicity, including support for Microsoft Exchange and Microsoft Hyper-V.
- Compact 2U and 3U packaging to fit almost any environment.
- Built-in support for file-based (CIFS, NFS) and block-based (iSCSI) storage.
- No-single-point-of-failure design.
- Built-in data protection, including replication.
- Advanced efficiency features including thin provisioning, file de-duplication and compression.
- Integrated help and support infrastructure automates and speeds problem resolution.
- Advanced 6Gbps SAS and nearline SAS drive support.
- Scalable up to 240TB (120 drives).

VNX Series Product Highlights

- Based on Intel Xeon 5600 multicore processor technology to maximize solution throughput and bandwidth.
- Includes advanced, automated storage tiering (FAST VP).
- Offers both automated file and block sub-LUN tiering using FAST VP and powerful, extendable system cache with FAST Cache
- Supports 6Gbps SAS, nearline SAS and SSD drive types.
- Scales up to 2PB per system (1,000 drives).
- Supports multiple protocols and data types including: FC, iSCSI, FCoE, NFS, CIFS, SOAP, REST.
- Integrated data protection, security and compliance.

Scale-Out Storage

EMC Isilon's scale-out storage platform delivers simplicity, performance, efficiency and scalability.

The data center of the future looks an awful lot like data centers of the past in one important respect: storage. Storage systems simply haven't changed that much over the years. Network-attached storage (NAS) and storage area networks (SAN) deliver significant benefits over direct-attached storage, but in essence they function the same way — they are fixed storage containers that don't easily expand or contract.

That's a fundamental flaw in an era of rampant data storage growth. Because storage devices cannot adapt to rapidly changing demands, IT managers are forced to overprovision storage resources to ensure that essential services are not disrupted. The result is an extensive amount of waste — experts say that up to 50 percent of storage goes unused in the typical environment despite increased storage demands.

The ramifications extend far beyond the cost of excess storage hardware acquisitions. Because fixed storage resources require constant oversight due to performance and reliability concerns, they create management inefficiencies exacerbated by the sheer volume of storage in any given environment. They also begin to defy traditional data protection techniques such as mirroring and RAID because storage capacity is expanding faster than data can be reconstructed in the event of a failure. And, of course, all of that storage hardware results in wasted power, cooling and data center space.

"The model of purchasing more storage than necessary as a hedge against system failure is simply not sustainable," said Eric Kronenthal, VP of Professional Services, Sigma Solutions. "Constantly adding more data storage equipment will ultimately result in enormous capital, operational, and power and cooling costs. Micromanaging performance will quickly become impossible as data growth continues and service-level requirements increase. Traditional data protection techniques will begin to break down. In other words, static storage subsystems simply cannot meet tomorrow's scalability challenges."

A New Approach

Isilon recognized this challenge a decade ago and began work on a new approach to storage. The company focused not on storage hardware but on a new file system designed for scalability. The result is OneFS, a next-generation storage operating system that serves as the intelligence behind the Isilon IQ scale-out storage platform.

Hardware is a commodity in an Isilon system, which can support Isilon-certified components from a variety of manufacturers. Nearly all aspects of the storage system are provided in software by OneFS, including data protection capabilities, automated data balancing and migration, and the ability to seamlessly add storage and performance capabilities on the fly. With OneFS, the volume manager, file system and RAID are combined in a single file system and single point of management, a radical departure from traditional storage.

"Isilon is changing the way organizations view and use data storage," Kronenthal said. "Isilon's scale-out NAS systems are designed to begin small and scale quickly and non-disruptively up to 10 petabytes in size, with extremely high levels of performance and availability."

An Isilon IQ system consists of industry-standard hardware components that function as nodes connected via an Infiniband high-speed interconnect. Each node is identical and therefore a peer, with OneFS running across all nodes to create a single, intelligent storage system. In this architecture, performance and capacity can be scaled out linearly by simply adding more nodes to the cluster — OneFS automatically joins new nodes to the cluster and redistributes data evenly across all nodes.

"The result is a single file system that can scale out on demand in terms of capacity, performance and throughput, enabling one person to manage one petabyte as easily as 100 terabytes. What's more, the platform can evolve seamlessly as both technology and business demands change," said Kronenthal.

Preparing for the Future

EMC acquired Isilon in 2010 to build upon the synergies between Isilon's scale-out architecture and EMC Atmos object storage. EMC Atmos provides the perfect complement to Isilon for massive, globally distributed environments and object access to data for usages like Web 2.0 applications. Together, Isilon and EMC Atmos provide customers a complete storage infrastructure solution for managing "big data" in private or public cloud environments.

"'Big data' is a term used to describe the massive amount of data

produced by a new generation of applications in markets such as life sciences, media and entertainment, and oil and gas, to name a few," Kronenthal said. "IDC projects that the fast-growing market for scale-out NAS will grow on average approximately 36 percent annually, reaching an estimated $6 billion in 2014. Together, EMC Atmos and Isilon's solutions will offer customers a highly scalable, low-cost storage infrastructure for managing big data."

Of course, what's "big data" today will rapidly become the norm as data volumes continue to skyrocket. Traditional storage subsystems will no longer be viable options. Organizations need to start preparing for that inevitable future with a new approach to storage. The good news is that the transition to scale-out storage can deliver performance, capacity and cost benefits today — a real boon to IT shops under pressure to do more with less.

"It's an elegantly simple solution," said Kronenthal. "With EMC Isilon, performance and capacity scale out on demand, meaning organizations can control their storage spend by purchasing only the storage they need today with the flexibility of non-disruptive growth as needs change. The OneFS operating system provides built-in intelligence and a single point of management that enables one administrator to easily manage multiple petabytes of data. Simply put, EMC Isilon maximizes performance and scalability while delivering a significant reduction in capital and operational expenditures."

Storage Statistics

In 2009, amid the "Great Recession," the amount of digital information grew 62 percent over 2008 to 800 billion gigabytes (0.8 Zettabytes), according to EMC's annual "Digital Universe" study. The study predicts that 1.2 Zettabytes of digital information was created in 2010. One Zettabyte equals one trillion gigabytes.

Thirty-five percent more digital information is created today than the capacity exists to store it. This number will jump to more than 60 percent over the next several years.

All of this information will need to be managed and protected, and enterprises carry that responsibility for 80 percent of the Digital Universe. Yet the total number of IT professionals is expected to increase by only a factor of 1.4.

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Unified Scale-Out Storage

EMC Isilon delivers maximum flexibility for virtualized data centers.

With unified storage, IT managers can improve storage efficiency as well as improve business flexibility and lower the total cost of storage. According to research firm IDC, the benefits of unified storage include unified block- and file-level storage, increased utilization with no stranded capacity, pooled storage flexibility, and increased support for server virtualization initiatives.

EMC Isilon is bringing these benefits to its scale-out storage platform by integrating the iSCSI protocol into its OneFS operating system. With EMC Isilon's unified scale-out storage, users can consolidate file- and block-based applications onto a single, shared pool of storage, simplifying data management to increase resource utilization and efficiency for virtualized and non-virtualized environments.

"The adoption of virtualization and the need to consistently reduce costs are currently significant factors in enterprise IT strategy, making data storage solutions that simplify management, consolidate applications and minimize expenses key to IT efficiency going forward," said Pushan Rinnen, Research Director, Gartner. "Unified scale-out storage is a compelling solution for both virtualization and general-purpose IT, as it enables simplified data management, file- and block-level access, and keeps costs in-line with business needs."

EMC Isilon's new iSCSI functionality integrates with its suite of enterprise-class data management and protection applications, providing a simple yet powerful scale-out solution that supports industry standard file-based protocols, including CIFS, NFS, HTTP and FTP, as well as the block-based iSCSI protocol, in a single, shared pool of storage. With EMC Isilon, enterprises can easily configure, manage, clone, thin provision, snapshot, tier, replicate and secure LUNs, eliminating the cost and complexity of traditional scale-up SAN and NAS to drive increased application performance and business agility.

EMC Isilon's data management applications, SmartPools and InsightIQ, deliver a powerful yet simple approach to solving complex data management challenges, enabling enterprise IT departments to easily manage data, consolidate applications and scale out a single storage resource in lockstep with evolving business needs. SmartPools enables users to unify multiple Isilon storage tiers into a single file system, providing simplified data management and automated data movement. Using SmartPools in combination with InsightIQ, administrators can optimize workflow performance by closely aligning application demands with storage resources, improving resource utilization and reducing both capital and operating expenses.

Isilon's SmartPools data management application creates a single file system and single point of management for all storage tiers, automatically aligning application needs with performance, capacity and cost to drive increased simplicity and efficiency across enterprise IT operations. With SmartPools, users can consolidate a wide range of applications onto a single storage resource, eliminating the need for manual data migration between multiple systems and accelerating data access for mission-critical business processes, while reducing storage costs and management.

Isilon's InsightIQ provides an innovative analytics platform that enables administrators to easily identify and eliminate performance bottlenecks, maximizing system efficiency, while minimizing high-performance storage requirements. InsightIQ delivers actionable insight into data usage trends, enabling immediate and effective response to changes in workflow requirements and user demand, improving resource utilization and business agility.

"Scale-out storage is changing the face of enterprise IT by displacing large, costly enterprise storage equipment with flexible, simple solutions that will be the cornerstone of cost-effective, demand-driven data management going forward," said Terri McClure, senior analyst, Enterprise Strategy Group. "With its sixth-generation operating system and new data management applications, Isilon continues to be a leader in the enterprise shift to scale-out, delivering mainstream functionality with next-generation performance, efficiency and cost-reduction benefits."

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Unified storage platforms with one management framework supporting file, block, and object—optimized for virtual applications. Unified replication and protection ensures application availability.

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5 REASONS CUSTOMERS CHOOSE SIGMA SOLUTIONS

S **TRENGTH** – Sigma has an unmatched ability to respond to customer needs due to our scale, locale and experience in the data center. We are small enough to deliver local, personalized service yet large enough to handle highly complex project requirements.

I **NNOVATION** – Our goal is to help customers leverage IT solutions to streamline business processes, drive innovation and reduce time to market. To that end, Sigma delivers technologies from industry-leading manufacturers coupled with consulting and engineering services that maximize business value.

G **UIDANCE** – Our customers turn to us for expert solution design and project governance services that accelerate the success of their IT initiatives. Sigma mitigates our customers' risks through our experience and commitment to excellence in everything we do.

M **ANAGEMENT** – Sigma is uniquely positioned to serve as a single point of contact for full lifecycle management, maintenance and support of converged and integrated technologies. Our expertise across the data center and strong relationships with industry leaders enable us to quickly resolve problems in today's complex IT environment.

A **GILITY** – Sigma's comprehensive services enable our customers to partner with one technology provider for solution design, implementation and ongoing service. Sigma serves as the focal point for initiatives incorporating diverse technologies and multiple IT disciplines.

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