WHITE PAPER

Adopt a Unified Approach to Data Management to Capitalize on, Not Capsize in, the Current Data Deluge: Controlling Data Proliferation and Reducing Storage Complexity with Unified Storage Management

Sponsored by: HDS

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April 2012

EXECUTIVE SUMMARY

The ability to balance near-term priorities shaped by economic conditions with longer-term industry and technology changes associated with rapid data growth is critical for today’s successful IT team. Senior executives want to transform IT so that they can react more quickly to significant positive or negative changes in the business environment while minimizing corporate risk.

Concurrently, organizations face a massive data deluge. Individuals and corporations rely on smart devices ranging from PCs to tablets to smartphones. By 2015, users of those devices will be downloading over 80 billion applications that generate and consume data that IT departments must collect, secure, and archive. IT departments will be responsible for collecting, storing, and rapidly analyzing (Big Data) machine-generated data about products, customers, and transactions. Finally, companies across a wide range of industries are digitizing images, records, video feeds, and business processes to boost efficiencies, offer new services, and comply with evolving government regulations.

In the next three years, the amount of storage capacity deployed to store this new content will increase sixfold, posing major data management, data protection, and long-term data preservation challenges for IT organizations worldwide. In the near future, the management, protection, organization, and continuous mining of large yet diverse data pools will replace basic device configuration and backup, becoming the primary tasks for storage administrators in corporate datacenters.

The deployment of a unified storage environment provides the intelligence and flexibility that companies need to deal with diverse data challenges, but it addresses only part of the problem. The other, often more intractable barrier is the fragmentation of the data management process. Hitachi Data Systems (HDS), a leading supplier of flexible, efficient, and intelligent storage systems, recognizes that IT organizations and storage administrators need a unified management framework (Hitachi Command Suite for Unified Information Management) to address their changing business priorities:

- Reduce the amount of work required to handle day-to-day storage management
- Give storage administrators better insight and visibility
- Provide a service level–based approach to management tasks
CHANGING PRIORITIES IN A FAST-SHIFTING WORLD

IT departments are dealing with ever more diverse and fast-changing technology and business priorities. Specifically, they need to:

- React to both the economic crisis and the rapid economic growth in the different regions in which their company operates
- Respond rapidly to new technology developments such as server virtualization, cloud-based services, and mobile devices
- Help their organization exploit growing volumes of content and data and manage that data efficiently while minimizing the risks associated with regulatory compliance and data loss

The ability to balance near-term priorities shaped by economic conditions with longer-term industry and technology changes associated with rapid data growth is critical for today's successful IT team.

Efficiency and Agility Drive Today's IT Investment Priorities

Continued variability in the economic environment is having a profound effect on organizations' investment and operations priorities. Some of these priorities (e.g., delayed capital expenditures, staff reductions) are of a temporary nature, but others are accelerating long-developing, yet fundamental changes in business practices and IT operations (see Figure 1).

FIGURE 1

IT Buyer Priorities in 2012

Source: IDC, 2012

- Consolidate
- Virtualize
- Automate
- Optimize
- Host/outsource
- Business efficiency
- Innovate
- Digitize
- Mobile/social
- Business analytics
- Mission critical
- Business continuity
- Disaster recovery
- Security/privacy
- IT governance
- Compliance
Senior executives want to transform IT so that they can react more quickly to major positive or negative changes in the business environment while minimizing corporate risk. The two keys elements in a successful IT transformation effort are:

- **Boosting operational efficiency**
  - Continue aggressive consolidation of servers, storage, and network assets through the use of technologies such as virtualization (server and storage) and unified management
  - Improve utilization of installed IT assets with technologies such as thin provisioning, space-efficient replication, and automated data tiering
  - Reduce costs associated with system, data, and application management and migration through the use of unified storage, data, and information management solutions

- **Boosting responsiveness to business**
  - Implement faster, automated provisioning (and reprovisioning) of IT resources
  - Meet more rigorous application service-level requirements
  - Implement more reliable and timely recovery of data and applications
  - Reduce corporate risk associated with data loss or misuse

For many organizations, targeting the twin requirements of efficiency and agility quickly leads to a conversation about the possibility of creating a private cloud environment or leveraging public cloud services for specific applications and/or general IT infrastructure needs. While such "cloud" solutions will play an important part in future IT plans, they also increase the importance of data management and data security solutions that aren't limited to individual systems or even individual datacenters.

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**Device Explosion and Data Deluge Drive Tomorrow's IT Requirements**

Companies rely on an expanding set of applications and devices to compete in today's rapidly evolving business environment. Collectively, these new technologies create enormous data management challenges (see Figure 2).
Individuals and corporations rely on smart devices ranging from PCs to tablets to smartphones. By 2015, over 4.4 billion such devices will be in use around the world — with emerging markets such as China and India leading the way — and users of those devices will be downloading over 80 billion applications. All of these devices/applications will generate and consume data that IT departments must collect, secure, and archive.

Organizations are also deploying a fast-expanding array of sensors (smart meters, RFID readers, GPS devices, health monitors). Within the next few years, there will be trillions of such sensors, and IT departments will be responsible for collecting, storing, and rapidly analyzing (Big Data) machine-generated data about products, customers, and transactions.

Finally, companies across a wide range of industries (healthcare, media, retail, legal services, and physical security) are digitizing images, records, video feeds, and business processes to boost efficiencies, offer new services, and comply with evolving government regulations. In the next three years, the amount of storage capacity deployed to store this explosion of new content will increase sixfold, posing major data management, data protection, and long-term data preservation challenges for IT organizations worldwide.
RETHINKING STORAGE IN A UNIFIED IT ENVIRONMENT

One thing that these near-term and long-term developments have in common is their growing contribution to the data deluge that many IT organizations are now facing. To put the pace and newness of this data explosion into context, we note that organizations around the world installed 6,157 petabytes (PB) of disk storage capacity in 2007. By 2011, annual new installations were 24,420PB, and by 2015, new capacity installed will reach 112,743PB (see Figure 3).

FIGURE 3
Changing Storage Landscape: Enterprise Disk Storage Consumption Model

Source: IDC, 2012
Limitations of Existing Storage Solutions in Today's Datacenters

In the very near future, the management, protection, organization, and continuous mining of large yet diverse data pools will replace basic device configuration and backup, becoming the primary tasks for storage administrators in corporate datacenters. They will need to deploy a growing array of data assets optimized for different use cases:

- I/O-intense SAN storage systems that make extensive use of solid state storage to support high transaction volumes
- Intelligent storage systems that provide advanced storage virtualization and data protection/efficiency functions in support of large virtualized server pools
- Scale-out NAS storage systems that reduce the asset and operational costs associated with capturing and serving exploding pools of rich content
- Archival storage systems that consolidate, organize, and preserve critical digital assets for reduction of corporate risk (compliance and eDiscovery) and greater long-term exploitation (Big Data)

These diversified needs carry a risk for the IT organization, however. It often appears easier to deploy multiple storage systems (often from different suppliers) to address each requirement on a case-by-case basis. However, the unintended, and often detrimental, consequences of such an approach include:

- Inefficient use of diverse storage assets that can’t be easily reallocated to meet changing needs
- Inconsistent data management practices that can expose organizations to data loss or misuse
- Duplication of storage staff training and thinly stretched staff resources to learn/support/manage incompatible systems

Such technical and organizational challenges also mean that data migration and protection within an individual datacenter and across multiple datacenters create significant business costs that should be avoided, if possible. This physical asset migration burden also prevents organizations from quickly capitalizing on new technologies.

Addressing More Diverse Storage Needs with More Unified Storage Solutions

As organizations contend with more diverse and ever-increasing volumes of data, they need to deploy storage solutions that leverage a common, unified set of components (e.g., tiered disks, active/active controllers, flexible network links) and data protection/efficiency services (e.g., RAID, data deduplication, compression, thin provisioning, and automated data tiering). Despite being built on a standard platform, these solutions enable flexible configuration of these components and services into pools of storage designed to best meet different data types (e.g., I/O-intense transactions, highly virtualized servers, disk-based backups, and rich content).
What are the characteristics to look for in these solutions?

- More flexible storage solutions that:
  - Support multiple storage tiers (SATA, SAS, SSD)
  - Support multiple network options (FC, iSCSI, NFS, CIFS)

- Inherently efficient storage solutions that:
  - Deliver virtualized and thin provisioned storage capacity
  - Provide unified data movement/management services across systems

- Storage solutions that extend the value of all IT assets in the datacenter and that:
  - Enhance/extend the value of legacy storage assets
  - Extend capabilities across multiple datacenters

**Storage Management for Scalable, Unified Storage Environments**

The deployment of a unified storage environment provides the intelligence and flexibility that companies need to deal with diverse data challenges, but it addresses only part of the problem. The other, often more intractable barrier is the fragmentation of the data management process.

IT staff employ one set of tools for basic storage device management, another set of tools for data management (e.g., backup, replication), and a third set of tools for increasingly critical information service management tasks (e.g., data retention, archiving, indexing). IT staff also need to deploy different management tools for different data types (e.g., block, file, object), which adds yet another layer of complexity. Finally, the staff must deal with unique vendor-specific tools for each platform.

Because of the growing use of server and storage virtualization, IT teams are forced to use yet another set of operational management tools for metering/chargeback and performance monitoring, making life even more difficult. Without rationalization and consolidation of storage, data, and information service-level management tools, IT organizations will not be able to reap either the near-term or the long-term benefits of virtualization, cloud, and digitized content.

In the remainder of this white paper, IDC examines how one company, Hitachi Data Systems (HDS), is creating a new generation of unified storage solutions that make it easier to quickly and cost effectively address a wider range of data requirements. This paper explores the impact of these new unified storage systems and the shift toward more services-driven IT environments on HDS’ storage management products and practices.
HDS STORAGE SOLUTIONS FOR ADDRESSING THE DIGITAL DELUGE

HDS is a global supplier of storage and server hardware and data management software products for large and medium-sized businesses. It also provides a broad range of IT implementation and support services for its customers through both partners and its own global services organization.

HDS believes that the creation, organization, and use of data increasingly determine the success of businesses and other organizations. The company’s stated mission is to provide best-in-class information technologies, services, and solutions that deliver the highest customer ROI and demonstrable business impact.

HDS was an early leader in the area of virtualized storage (a key component within any virtualized or content-centric datacenter deployment) with its introduction of the Universal Storage Platform in 2004. Since then, the company has extended the capabilities and scalability of its entire storage solutions portfolio. In addition, HDS also added functions such as thin provisioning and automated data tiering capabilities to current Virtual Storage Platforms (VSPs).

HDS has a robust set of file-based (HNAS) and object storage (HCP) systems that include comparable/complementary capabilities. These systems provide highly scalable and highly efficient storage for fast-growing rich-content data sets and are tightly integrated with HDS block storage products. For example, these content-centric systems can leverage the virtualization capabilities of block storage systems to provide a single, unified storage environment that can address diverse data and information requirements.

Hitachi Command Suite for Unified Information Management

HDS recognizes that providing a broad portfolio of storage systems built on a unified foundation, while important, doesn’t fully address IT organizations’ critical data management requirements.

IT organizations and storage administrators also need solutions that address their changing operational priorities:

- **Reduce the amount of work required to handle day-to-day storage management.** IT organizations need solutions that can reduce complexity while simplifying basic housekeeping tasks. IT teams can no longer rely on individual tools/utilities for each platform and each function as this makes it impossible to get a cohesive view of storage needs, performance bottlenecks, and utilization levels for applications across the business.

- **Give storage administrators better insight and visibility.** Monitoring at the level of the individual storage array is insufficient. Administrators must be able to monitor based on the points of view of the storage consumers (e.g., applications, lines of business, regions). They also need to monitor and ensure that service-level agreements for key business applications are met and provide the ability to view (and share) real-time insights on a central dashboard and emerging mobile devices (e.g., tablets).
Provide a service level–based approach to management tasks that makes it easier to manage to service-level objectives of storage capacity and performance. This approach ensures that the right quality of service is being delivered for different environments.

In response to these changing requirements, HDS adopted a unified management and control approach to its next-generation storage management framework, the Hitachi Command Suite (see Figure 4). Command Suite is designed to provide the following:

- Unified management and control across all tiers of storage in the HDS portfolio as well as all third-party storage virtualized behind HDS’ VSP
- Unified management across all data paradigms — block, file, and object
- Unified management across functions (e.g., configuration, analysis, replication, and protection)
- Unified business intelligence (e.g., performance monitoring, capacity planning, service-level management, chargeback) that is a critical requirement for delivering more service-centric IT capabilities

**FIGURE 4**

Hitachi Command Suite

UNIFIED MANAGEMENT AND CONTROL

Business Intelligence

Configure | Analyze | Mobilize | Protect

Unified Management Framework

Block | File | Unified | Content | Appliance

Unified Management

- Across all tiers of storage
- Across functions
- Across file, block and content

Source: HDS, 2012
Challenges/Opportunities for HDS

In today’s challenging business environment, general claims of improved IT asset utilization or reduced administrative burdens are looked at with deserved skepticism. HDS recognizes that virtualized datacenters, service-centric IT, and unified storage/data management are still untested or embryonic concepts in many organizations, raising concerns about practical uses, more complex management, and retraining of IT staff.

As part of its Command Suite solution, HDS must continue to enhance storage asset management capabilities and deliver even deeper integration with its existing server virtualization and archival storage solutions. HDS and its partners need to help customers obtain quick benefits by identifying a number of specific use cases where companies can achieve immediate and long-term benefits.

Essential Guidance

IT leaders at large and midsize enterprises are wrestling with many of the same challenges as they seek to extend virtualization while preparing for the coming digital deluge. They are looking for storage system and storage management solutions that improve the use of existing IT assets while also providing the flexibility to meet future needs. Meeting these objectives, however, requires more than just identifying the right use case and selecting the right solution. IT teams also need to make wise implementation decisions that shield them from costly system reconfigurations, slow storage migrations, and inefficient IT operations.

IT managers that acquire storage products must evaluate suppliers such as HDS and their business partners based on more than just which company is providing the cheapest or highest-performing systems. IT managers need partners that can help them overcome or avoid the traditional shortcomings that doom new investments:

- Underuse of installed assets
- Less-than-optimal data/application availability
- Excessive administrative overhead

IT managers should judge suppliers based on how well their complete solutions allow IT to optimize the use of IT investments now and for an extended period. They also need to look for business partners that leverage emerging solutions to address specific application and business challenges while delivering faster, more consistent implementations with minimal risk of disruption to applications, processes, and business operations.

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