

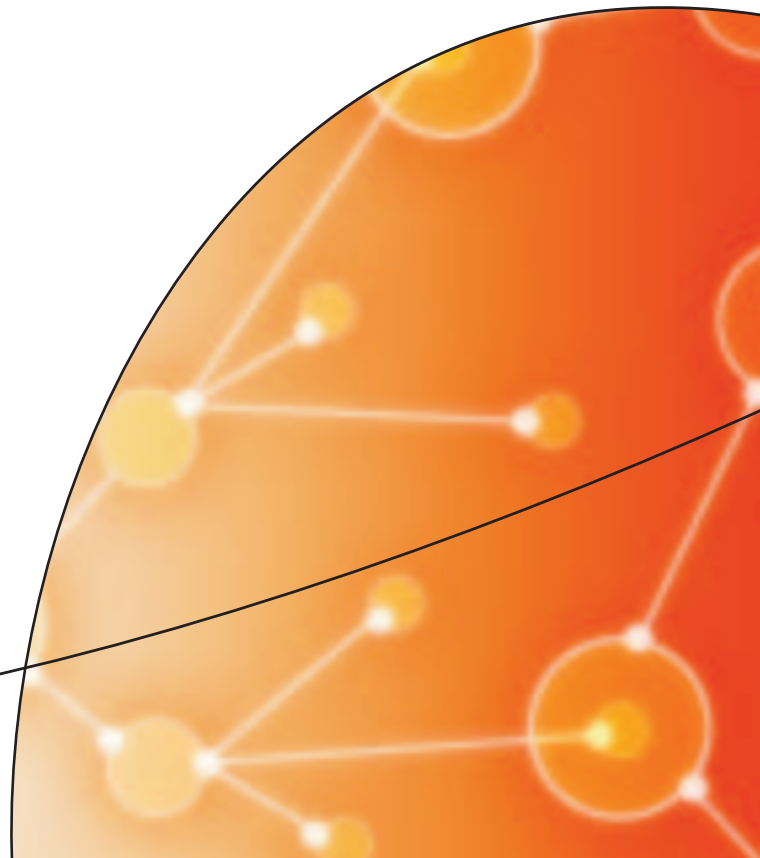


**HITACHI**  
DATA SYSTEMS

# Universal Storage Platform

Business Brief

Partner Beyond Technology



# Executive Summary

Businesses' demand for storage shows no signs of abating. E-mail and other reference demand for storage continues to be insatiable, particularly with the increasing importance and volume of e-mail, rich content, and other reference data. Financial scandal and disruptive events have led to stringent requirements for data protection and retention, further increasing data volumes. Meanwhile, growing global competition has accelerated the need for improved business productivity. That means enterprises require more frequent and intelligent access to transaction data, plus they acquire and must protect and retain more reference data, much longer. But older reference data should not share valuable high-end storage with data undergoing the bursts of intense access that correspond with its creation and occasional related business events. Applications slow down and higher costs overrun flat IT budgets.

The burden is on the storage platform to help you manage more data optimally through methods such as moving data to different tiers of storage as application and business needs dictate. Virtualization to simplify management has not taken off because of concerns about scalability, utility, and whether existing approaches result in vendor lock-in rather than freedom.

A new approach to these problems uses a universal storage platform to extend the proven benefits of consolidation while protecting investments in existing storage via attachment into a common, tiered pool. As a result, data can move seamlessly between classes of storage and storage management is simplified. The big payoff is application optimization and operational efficiencies that improve business performance.

This Universal Storage Platform Business Brief is a primer to help you understand the challenges and business issues that lead organizations to seek an open, unifying platform that can handle continuing increases in both total volume of data and complexity of storage management. This Business Brief begins with a discussion of the business challenges organizations face that relate directly to their storage strategy. Many of these issues hinder the optimization of data access for the differing needs of applications.

This Business Brief describes how a universal storage platform that enables private virtual storage machines would make it easier to match application demands to storage attributes and realize the benefits of a storage utility approach. It discusses various ways to address virtualization—in the storage system, in the switch, and in the server—and helps you understand which one might be right for your situation. It compares consolidating storage by migrating data onto a single platform versus aggregating storage by attaching existing systems to a unifying platform. It also explains how Hitachi Data Systems can help you optimize your business performance using a universal storage platform solution based on a thorough assessment of your business application needs and existing storage infrastructure.

Finally, this Business Brief presents the business case for an infrastructure built around Application Optimized Storage™ solutions and guides you in the next steps to realizing the full benefits of a universal storage platform.

## Introduction

IT continues to struggle with satisfying enterprises' never-ending demands for storage in a way that takes storage beyond mere overhead and helps the overall business. To understand why it's so difficult, you have to look at a number of opposing dynamics that have IT caught in the middle.

At a high level, corporate governance continues to loom large. The world was changed by a series of financial scandals that began with Enron, Andersen, and WorldCom. As a result, most organizations can now expect more stringent oversight by their boards of directors. Corporate officers and auditors are being held personally accountable by shareholders and, increasingly, by government regulators. IT, in turn, is held accountable for providing the infrastructure required to keep an organization in compliance with everyone's expectations and pertinent regulations.

### Application Optimized Storage™ Solutions

Clearly, IT knows that its purpose is to support business objectives. But most vendors push an information lifecycle management approach to storage that is designed simply to achieve operational efficiency in the infrastructure. The opposing view, and the one that truly links IT with business objectives, is that storage infrastructure is instrumental in the success of the applications that directly serve business needs and indirectly drive growth and corporate prosperity.

Optimizing storage to serve the needs of applications may seem difficult. Many organizations have enough trouble just providing an accurate inventory of the storage infrastructure from a set of outdated spreadsheets. Even organizations with relatively sophisticated storage management can have their hands full coping with the explosion of data to manage more stringently, particularly when an uncertain economy has led to caution in IT investment. Yet new regulations demand that an ever-larger amount of data must be replicated or archived for retention and protected in a very structured process. How do you continue to grow when you have to do so much more on flat budgets?

A key driver of this data explosion is the increasing importance and volume of

e-mail, rich content, and other reference data. Take e-mail alone as an example. IDC projects that total worldwide e-mail traffic will soar from 10 billion-plus daily in 2001 to more than 35 billion by 2005, with a proportional or larger increase in the average size of e-mail attachments. Ferris Research says that 60 percent of business-critical information is stored in messaging systems and typical users spend 2.5 hours per day managing their personal e-mail.

### Regulatory Compliance

Beyond e-mail's growing share of mission-critical storage needs, retaining e-mail in archival storage is becoming standard practice. Governments now recognize that e-mail and attached documents have largely replaced paper-based communications as records of business transactions and corporate behavior. In response, lawmakers and regulatory agencies have imposed new regulations that require the retention and protection of electronic messages and data, and organizations are scrambling to understand and comply with these new and evolving rules. The good news is that an effective tiered storage solution can reduce e-mail server and storage costs, improve e-mail server performance and employee productivity, satisfy regulations, protect valuable company intellectual property, and mitigate the huge and unbudgeted costs of legal discovery involving e-mail that's available only on backup tape.

Most organizations' storage strategies continue to focus on risk avoidance through improved business continuity planning. A great proliferation of new risks to data have brought risk avoidance to the forefront. Organizations face increasing threats of wide-area disruption, ranging from frail power grids to terrorism to virulent computer security attacks. Reliance on technology concentrates and magnifies exposures to fraud and outages. And since applications are interrelated in a supply chain, any problem will ripple through an entire operation.

### Push for Business Continuity

Organizations worldwide are rushing to get business continuity and disaster recovery measures in order. For example, any financial institution doing business in the United States must deal with pending federal, Office of the Comptroller of the Currency (OCC), and Securities and Exchange

Commission (SEC) regulations for out-of-region disaster recovery. Similar concerns arise from the Basel II Accord, which will require as much as 18 percent capital reserve for "operational risk" if appropriate data resiliency measures are not taken. Similar regulations apply to health care and other industries, often with an emphasis on protecting privacy as in the UK's Data Protection Act. In all industries, insurance rates can increase dramatically if disaster recovery processes are not in place.

All of these forces have caused many organizations to consider a three data center (3DC) replication model to protect data. In the 3DC model, synchronous replication—which can achieve a copy that is fully up-to-date at all times over limited distance—is employed between the primary data center and a nearby hot site. The data is then replicated again to a geographically remote site using asynchronous replication, which



works over any distance. In the event of a local disaster, customers have the option of recovering to the intermediate site with no loss of data and little delay. In the event of a wide area disaster geographically broad enough to impact both the primary and intermediate sites, recovery is still possible by failing over to the remote site with acceptable delay and some data loss. Thus, a 3DC configuration provides the best combination of protection against disaster with minimal data loss and downtime.

Yet, the unspoken truth is that complexity of any business continuity solution—much less the very advanced 3DC variety—brings into question whether it will work in the event of disaster or some other form of outage. Despite the complexity, not to mention the significant investment required, today's increased risks and regulatory scrutiny are prompting companies that have previously decided to bear greater risks to take another look at how to achieve a higher level of data protection.

### **Virtualization: the Unrealized Answer?**

Continued business uncertainty has IT still wary and looking to maximize returns on previous investments rather than strike out in new and unproven directions. One of the unintended results is that IT may see some of the very technologies that could best help them deal with these challenges as too risky. A good example is storage virtualization. IT clearly has to reduce storage complexity to cope with rising volumes of data on multiple tiers and brands of storage. But enterprises hesitate to insert an unproven virtualization platform into the data stream that delivers the lifeblood of the organization. Somehow, virtualization needs to become more mainstream before it can have a real impact on solving the complexity problem.

### **Business Efficiency**

Even with all these complicating factors, business efficiency remains the largest issue. In today's competitive environment, you must leverage the inherent value of a business to its fullest. Doing so always means making better use of data for cross-selling, upselling, unlocking value isolated in individual business units, and increasing agility in addressing new markets. Consolidation is one way to get organizational data under control while also controlling costs, although the recent high levels of merger and acquisition activities make consolidation problematic, at least at the application level. It's difficult to get the consolidation done even at the storage infrastructure level, much less to the point of finishing consolidated financials fast enough to meet the tight reporting deadlines introduced by the Sarbanes-Oxley Act in the United States.

Sometimes the only way to continue to improve or maintain your competitive edge is through upgrading technology, but that can be problematic when the pace of technological change is faster than your equipment's depreciation schedule. In most organizations, it's very difficult to replace equipment that hasn't yet lived what the Chief Financial Officer would consider a useful lifespan.

As a result of all this, IT solutions must reflect new concerns for integration, effective utilization, manageability, and availability while not forgetting the need for investment protection. All of these business issues drive organizations to ever more storage consolidation. If anything, it's more important than ever to lower infrastructure and operational costs by reducing the number of systems to manage and improve overall utilization. Yet many customers are finding that they have reached the limits of consolidation with their existing storage systems.

## **Mapping from Issues to a Solution**

We've identified a number of key issues that many organizations face, such as increasing reliance on new types of data, and increased vulnerability to data loss and downtime. How can you increase business value on a flat budget when you've got more to cope with all the time in terms of operational risk and corporate governance? Achieving higher levels of business efficiency in order to remain competitive is no simple matter. Doing so requires a closer alignment between IT resources (people, processes, and infrastructure) and corporate objectives.

These issues manifest themselves most directly to IT as:

- ⚡ Rapid data growth
- ⚡ Increased data retention periods
- ⚡ Need for 24/7 availability of operational data
- ⚡ Need for better management of complex infrastructures and applications
- ⚡ Need to reduce total cost of ownership
- ⚡ Need to avoid technology refresh that outpaces accounting depreciation

### **Consolidation**

Clearly, Hitachi Data Systems customers have shown and are enjoying the benefits that large-scale storage consolidation brings to address many of these problems. But organizations that have already completed a level of consolidation may find that they lack the scalability to go further on their existing infrastructure. Some storage systems that have room to accommodate additional capacity lack the internal throughput to drive business performance effectively with more data migrated to them.

### **Aggregation**

To get beyond consolidation, and to avoid the cost of data migration and premature retirement of storage systems not yet fully depreciated, a universal storage platform could allow attachment of external storage systems that it would then present as part of its own tiered storage pool. This is the definition of storage aggregation.

The ability to attach other storage directly to a universal storage platform would not only protect your investment in installed storage, but it would also add value to

storage you attach. That attached storage would be handled through the same single, common point of management used for internal storage, and would leverage the advanced replication and enhanced business continuity that a universal storage platform offers.

One clear benefit of such a capability goes back to the value of consolidation. Data migration is always an issue in consolidation, and migration could be handled simply and easily if other storage systems could be directly attached and universal replication could move the data over to the advanced and high-performance internal storage of the universal storage platform. At that point, you'd be able to move out the attached storage (if it's older and fully depreciated). Alternatively, you could repurpose it as a lower tier of storage in the shared, virtualized storage pool described in the next section on virtualization.

The simplification of storage management achieved by seamless replication to attached storage platforms obviously facilitates the use of different tiers of storage to optimize the cost/benefit ratio of a wide range of applications. This makes the notion of attaching storage to a universal storage platform especially attractive. Even older storage systems could act as decent third- or fourth-tier storage.

### **Where Does Virtualization Belong?**

What you need to accomplish most of the attachment benefits is storage virtualization. The meaning of the phrase varies from speaker to speaker, of course. Enterprise Storage Group defines virtualization as "a technology that gathers data location information from physical storage devices, network services, and applications, and then abstracts the locations into logical views for end users."

The ideal virtualization in a universal storage platform would extend the kind of innovative port-virtualization technology long offered by Hitachi Data Systems to the whole storage system and thus accomplish quite a bit more.

The ultimate goal is the abstraction of physical storage systems as private virtual storage machines, including ports and cache for each client (application, server, or group of users), in order to guarantee quality of service and to shield clients from the complications of sharing storage.

The industry has seen some attempts at virtualization via dedicated, add-on appliances or through server- or switch-hosted virtualization software that sits in the data stream between client systems and storage. However, these approaches haven't gained much momentum. Hitachi Data Systems believes that implementing storage virtualization within a universal storage platform's controllers would take advantage of the redundancy and scalability that underpin the platform's inherent high availability and massive storage consolidation capabilities. Having virtualization in the storage fabric would improve performance through tight integration with physical storage operations (including cache allocation), creating an optimal balance of economy and functionality. You would have the same confidence in the availability and scalability of such a virtualization solution as current Hitachi Data Systems customers have in its high-end storage architecture. Such an approach would simplify your environment, rather than adding questions about scalability, a single point of failure, and another layer of complexity.

"A new approach would be combining the centralized intelligence found with fabric-based solutions and the intelligence at the edge provided by the storage controller through a unified platform. At the center of this approach is a next-generation storage controller with its own internal storage that also provides fabric-based virtualization services to manage external storage systems on the SAN. This presents a compelling combination of enterprise-class functionality, unprecedented scalability, performance, and managed capacity."

### **Business Continuity**

By using a universal storage platform to manage heterogeneous disk storage resources, enterprises can apply consistent procedures, skills, and training across all their storage platforms. Rather than maintaining separate procedures and skills for data replication and recovery on each storage platform, the organization applies one powerful and consistent set of replication capabilities and storage management tools to all its disk storage resources. In a disaster recovery scenario, the risks of error are lower when the procedures are consistent across all platforms. It is also easier to ensure that the required skills are always available

when needed for recovery of critical business applications and data.

### **Storage Utility Enablement**

With the kind of virtualization we've just described, and with sufficiently advanced SAM capabilities, a universal storage platform is ideal for any organization interested in providing storage as a utility, whether to enable internal chargeback for storage usage by department, to achieve more efficient storage management processes, or even to provide storage on a metered basis to a variety of businesses. Logical partitioning of storage, including cache, ports, and capacity has obvious advantages. So does the ability to delegate management rights to individual administrators for their assigned virtual private storage machines. And you could centrally manage business processes, such as data replication and transferring production processing to a secondary site (either for disaster recovery or nondisruptive maintenance of your primary system), with common tools to make the processes less error prone and more efficient.

—Enterprise Strategy Group, Technology Review: Storage Virtualization

The universal storage platform approach also makes it easy to provision storage for new applications, groups, departments, or companies. Quality of service for storage can be assured for an individual client, and clients can either have control over their own domains or a higher level administrator can view that client's storage usage in isolation. Finally, your CFO may want support for asset tracking via virtual serial numbers for the purposes of asset depreciation.

## The Ultimate Universal Storage Platform

Given the business issues and the potential solutions, it's clear that the ideal universal storage platform would have: the industrial-strength performance and scalability characteristics to take it to the next level of storage consolidation and aggregation; millions of I/Os per second of available throughput; and ports that support universal connectivity to all major protocols, including Fibre Channel, FICON and ESCON for mainframes, NAS, and iSCSI.

A system that satisfied the never-ending need for higher performance for heavy-duty applications would:

- Deliver industrial-strength performance attributes for massive consolidation
- Host externally attached, heterogeneous disk storage—enabling data migration and replication to lower-cost disk when appropriate, and providing for simplified management and better investment protection
- Improve productivity and lower risk to the business by automatically moving older e-mail and other archival data to a less expensive but highly protected and tamperproof tier of storage
- Provide a unified view of the many components of a storage infrastructure from each application's point of view to improve troubleshooting and simplify satisfaction of service level agreements for particular application users
- Add power and a "virtualization assist" to Storage Area Management offerings
- Provide an improved framework for business continuity via a single universal replication capability extended to heterogeneous storage and server platforms with
  - Data integrity and consistency support
  - Increased resilience in the face of bandwidth restrictions or outages (while minimizing the performance impact on production applications and reducing cost)
  - Support for advanced multi-data-center configurations

## Business Case for a Universal Storage Platform Approach

A universal storage platform can dramatically change the way an organization handles storage. Most organizations have a number of different storage platforms, each with its own set of management tools, data replication engines, and business continuity procedures. The inconsistencies and more than likely manual approach to providing the storage quality of service your applications demand contrast sharply with the structured, standardized, and generally seamless approach possible on a universal storage platform. Some key elements of Application Optimized Storage solutions, including movement of data to different classes of storage as application requirements and ongoing business events demand, become much easier on a universal storage platform, providing a partial basis for the business case.

Being able to prove the value of a universal storage platform, weighed against your current infrastructure and other alternatives, is perhaps the most compelling way to proceed. One route, offered by Hitachi Data Systems Global Solution Services, is the Storage Economics Strategy Service. It will introduce you to the impact that the right storage infrastructure can have on optimizing applications, easing a data life cycle management strategy, implementing an effective SAM, and protecting investments in existing storage. The Storage Economics Strategy Service will graphically demonstrate to managers within your organization the bottom-line impact of spending on any new storage you might acquire plus the ongoing cost of storage ownership. Included are:

- Assessment of your storage infrastructure and needs
- Design of a new multitier architecture in a collaborative workshop
- Analysis of ROI for multiple design options
- Justification and quantification of your storage direction in a custom, detailed report

Ultimately, your business case for an appropriate universal storage platform will cover the comprehensive set of hardware, software, and services that creates your ideal infrastructure—a storage solution that:

- Unifies data and storage services across its own storage and attached storage systems
- Makes everyone more efficient, enterprise-wide, by optimizing the storage service provided to applications
- Significantly reduces storage-management complexity
- Reduces operational costs
- Enables best storage practices
- Helps align IT practices with business requirements

## Next Steps

This Hitachi Data Systems Universal Storage Platform Business Brief has started you on the road to understanding how your storage infrastructure can contribute to resolving your biggest business issues. Armed with the basic knowledge of what to look for in your next-generation storage platform, you should be able to define the characteristics you need to handle rapid data growth and increased data retention periods. Higher availability, better management of complex infrastructures, satisfaction of application requirements for storage, and lower total cost of ownership are the clear goals, supported not only by the industrial-strength performance and capacity of a universal storage platform but also by the mid-life boost you can provide to the other storage systems you attach to it.

As a next step, you can ask a Hitachi Data Systems representative for details about the Hitachi TagmaStore™ Universal Storage Platform family of storage systems and some of its applications in Universal Storage Platform Solution Blueprints on business continuity and, over time, other topics.

Blueprints detail the core of the solution, including customer case studies that offer typical examples of particular business problems and their technical solutions. Of course, each company's storage requirements are unique, but the Solution Blueprints are designed to reduce uncertainty by describing pre-configured solutions to a class of specific storage problems.

And although reading is a good first step, Hitachi Data Systems strongly recommends that you engage our Global Solution

Services group before you seriously undertake an Application Optimized Storage solution.

Global Solution Services can help you:

- ❖ Identify and analyze your business goals in terms of your business application and storage infrastructure needs
- ❖ Identify your technical goals based on your business and storage environment and your storage management processes and procedures
- ❖ Document your storage throughput requirements and business continuity needs in terms of risk reduction, recovery-point objectives, and recovery-time objectives
- ❖ Determine what existing storage should be retired and what should be retained as a supporting tier of storage
- ❖ Create a nondisruptive implementation plan, which includes test and verification components, for migration from or coexistence with your current storage systems
- ❖ Document the design and create a detailed implementation and test plan
- ❖ Manage the implementation and execution phase of the plan

Pertinent offerings from Global Solution Services include:

- ❖ **Data Lifecycle Management Workshop:**  
This workshop introduces the DLM capabilities and opportunities of the TagmaStore Universal Storage Platform.
- ❖ **Data Lifecycle Management Consulting Services:**  
This service is designed to help organizations realize the benefits of a tiered architecture.
- ❖ **Data Lifecycle Management Assessment Service:**  
This up-front consulting service provides planning and design direction for optimal implementation and integration.
- ❖ **Implementation and Integration Services**
- ❖ **Consolidation, Upgrade, and Migration Services**

- ❖ **Storage Management Process Strategy Service**

- ❖ **Storage Economics Strategy Service**

- ❖ **Risk Analysis Workshop**

To learn more about how Hitachi Data Systems can help you implement a universal storage platform to resolve your business issues, please visit us online at [www.hds.com](http://www.hds.com). Or, call Hitachi Data Systems at (888) 234-5601, to explore an engagement that will deliver the optimal solution for your business needs.



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