



HITACHI
DATA SYSTEMS



Hitachi TagmaStore™
Universal Storage Platform
Hitachi TagmaStore
Network Storage Controller

Partner Beyond Technology



Reaching previously unattainable levels of consolidation and bringing to reality the virtualization of internal and external heterogeneous storage into one pool, the Hitachi TagmaStore™

Universal Storage Platform and its rackmounted smaller-footprint version, the Network Storage Controller, redefine the storage industry.

Hitachi TagmaStore™ Universal Storage Platform Hitachi TagmaStore™ Network Storage Controller

Now companies from the growing midrange to the largest global organization can benefit from the industry's highest performing and most scalable storage solutions, backed by a set of storage and data services that include application-centric storage area management and simplified, unified data replication across heterogeneous storage systems.

As an integral component of Application Optimized Storage™ solutions from Hitachi Data Systems, both the Universal Storage Platform and Network Storage Controller provide the architectural foundation for matching application requirements to different classes of storage. Application Optimized Storage solutions have proven their ability to lower costs, extend lifetime value, and simplify management activities. These systems enable you to deploy applications within a new framework, fully leverage—and add value to—current investments, and more closely align IT and business objectives.

The Universal Storage Platform and Network Storage Controller provide an architectural foundation for meeting data storage requirements at midsized and large organizations. These high-performance systems enable you to match application requirements to different classes of storage. All of the products in the Universal Storage Platform and Network Storage Controller lines excel at meeting your critical, day-to-day needs for data storage, archiving, and business continuity. Described by the Enterprise Strategy Group as “the leading Enterprise-class storage virtualization solution in the market today,” these systems let you combine externally attached Hitachi and non-Hitachi storage systems to create large storage pools.

For Large Enterprises: Universal Storage Platform

For enterprises seeking a powerful and cost-effective storage solution for managing their growing data-retention and business-continuity needs, the Universal Storage Platform is an ideal choice. It allows for virtualization of external storage, logical resource partitioning, and universal replication, all through a single management interface.

For Midsized Companies: Network Storage Controller

To meet the needs of midsized businesses and to bolster the lower end of enterprise infrastructures, the smaller-footprint Network Storage Controller delivers the same enterprise-class functionality as the Universal Storage Platform in a cost-efficient modular, rackmounted form factor.

Both allow you to aggregate internal and external storage into one pool and logically partition storage resources—even resources from other storage vendors. Mature management software makes it

easy for storage administrators to migrate data among tiers and to associate those tiers with specific business applications. These products help you establish solid business continuity practices so you can confidently address governance issues by protecting one of your most valuable corporate assets—information.

With more than 50 percent of the Fortune 100 on its roster of customers, Hitachi Data Systems has the experience and technology to meet the storage challenges of the largest of companies. Now, with its growing lines of midrange storage, Hitachi is bringing enterprise-caliber capabilities to midsized firms as well.

As recent additions to the Application Optimized Storage solutions portfolio, the Universal Storage Platform and Network Storage Controller help you to match business application requirements to storage attributes. When complemented by Hitachi Data Systems' professional services, these powerful storage systems can help you increase efficiency, simplify storage management practices, mitigate risk, and better align IT resources with business objectives.

Designed for Scalability, Performance, and Availability

The Universal Storage Platform and Network Storage Controller leverage the third-generation Hitachi Universal Star Network™ architecture, making them the industry's highest performing and most scalable storage systems. Universal Storage Platform delivers as many as 2 million I/Os per second and unifies data and storage services across as much as 32PB of storage systems. The Network Storage Controller model NSC55 delivers up to 700,000 I/Os per second and handles up to 16PB of internal and external storage capacity. These storage platforms offer industrial-strength virtualization, replication, and migration capabilities and use a common management interface across heterogeneous storage systems, simplifying storage management and reducing management costs.

Award-winning Technology

Beyond being recognized by industry analysts as a new category of storage, Universal Storage Platform has received numerous awards, including:

- ⌘ Product of the Year award from *Storage* magazine in 2004, taking Gold in the Disk and Disk Subsystems category

Why do TagmaStore Universal Storage Platforms and Network Storage Controllers take the lead over all other enterprise storage systems?

- ⌘ Storage pooling across heterogeneous devices
- ⌘ Logical partitioning of storage resources
- ⌘ Any-to-any data replication
- ⌘ World's most scalable enterprise storage platform

- ⌘ INFOSTOR and ASNP Most Valuable Product award for 2005 in the Disk Subsystem category
- ⌘ Open Systems Advisors Crossroads 2005 A-List IT Infrastructure Award
- ⌘ Best Practices in Storage Award from *Computerworld's* Storage Networking World with Pacific Capital Bancorp

Are these challenges yours?

- ⌘ Exponential data growth
- ⌘ Increasingly complex storage infrastructure
- ⌘ Multiple management utilities for different classes and brands of storage
- ⌘ Incompatibility among storage investments
- ⌘ Low levels of storage utilization
- ⌘ Difficulty linking IT deliverables to business needs
- ⌘ No easy way to match application requirements to storage attributes
- ⌘ Increasingly stringent application service level agreements
- ⌘ Complex replication tools and procedures place business continuity at risk
- ⌘ Maintenance and disaster-recovery testing is disruptive
- ⌘ Users demand 24/7 uptime; need to reduce backup window and speed recovery times
- ⌘ Data volume generated by Microsoft Exchange overwhelms current storage system, slows access to important information

Meet these challenges and more by building an Application Optimized Storage solution based on Universal Storage Platform or Network Storage

Controller. These flexible storage platforms offer:

- ⌘ **Aggregation.** Virtualize internal and externally attached storage and allocate resources to specific applications or tiers.
- ⌘ **Business Continuity/Storage Area Management.** Deliver business continuity through a single suite of software products that can be used to manage a heterogeneous pool of storage.
- ⌘ **Quality of Service.** Logically partition internal and externally attached storage; match application service levels to each type of storage, and manage the associated resources accordingly.
- ⌘ **Scalability, Performance, and Availability.** Support mission-critical business applications with exceptional flexibility for managing capacity, performance, connectivity, and availability.
- ⌘ **Investment Protection.** Leverage your current storage investment on your terms.

Consolidate Storage Resources, Simplify Storage Management

Are you still running your business-critical applications on server-internal or direct attached storage? Are some of your storage systems maxed out while others are barely used—and hard to use where they are needed? Are your storage management costs growing faster than your budget? Are your backup windows exceeding the time you've allotted for them? Are you unable to meet the availability and performance levels demanded by your business and applications?

“Hitachi’s Application Optimized Storage approach can help customers become more proficient managers of the storage domain by concentrating on what really matters first—applications, not terabytes.”

—John Webster, Senior Analyst & Partner, Data Mobility Group

Networked storage solutions from Hitachi Data Systems can help you consolidate, reduce management complexity, and cut costs. The Universal Storage Platform and Network Storage Controller let you create centralized storage pools that can be consistently managed and shared across applications and servers. Consolidating and aggregating storage resources in this way helps you reduce environmental costs while improving application availability and performance. Additionally, coupling consolidated, networked storage with the robust Hitachi Storage Area Management (SAM) Suite of software greatly improves the amount of storage administrators can manage.

Aggregate Storage Resources into Tiers

With their exceptional capabilities for aggregating and virtualizing storage resources across both Hitachi and non-Hitachi storage systems, the Universal Storage Platform and Network Storage Controller can help you maximize the use of your IT assets even as you improve efficiency and reduce costs. With an Application Optimized Storage solution, multiple heterogeneous storage systems become part of the common storage pool, managed via a single software console for data migration, replication, and other tasks. Externally attached storage is managed as internal storage and inherits all of the rich-functionality software available for the Universal Storage Platform and Network Storage Controller. All storage resources can be grouped into classes based on attributes of performance, availability, recoverability, and cost, as shown in figure 1.

Storage administrators can assign different service levels to different types of data, and then segment the storage infrastructure into tiers. They can use Hitachi HiCommand® Tiered Storage Manager software to set different classes of service

for each tier, so that each segment of the storage infrastructure is managed according to specific policies for availability, data recovery, and other variables.

You can also implement tiered storage configurations at the application level for business processes such as e-mail archiving and compliance. For example, a production e-mail environment would most likely be considered mission-critical, whereas a test or training environment might have less rigorous uptime requirements. An Application Optimized Storage solution allows each of these environments to reside in distinct tiers and be managed

accordingly—so you can apply specific storage policies to each business application.

Logically Partition Storage Resources

Extending its innovative port virtualization technology to entire platforms, Hitachi enables you to logically partition the Universal Storage Platform to create as many as 32 Private Virtual Storage Machines and logically partition the Network Storage Controller to create as many as 8 Private Virtual Storage Machines—each with dedicated internal and external capacity, cache, and ports, as shown in Figure 2.

Private Virtual Storage Machines allow you to apply storage policies to specific applications, matching business requirements for performance, capacity, and availability to designated storage resources. Because each Private Virtual Storage Machine has its own serial number, you can associate specific business applications with selected departments and business units, and then charge back accordingly. These unique capabilities allow you to create a utility model to deliver “metered” storage resources to select business entities. You can delegate management of Private Virtual Storage Machines to local

Vast Aggregation Capabilities of the Universal Storage Platform and Network Storage Controller

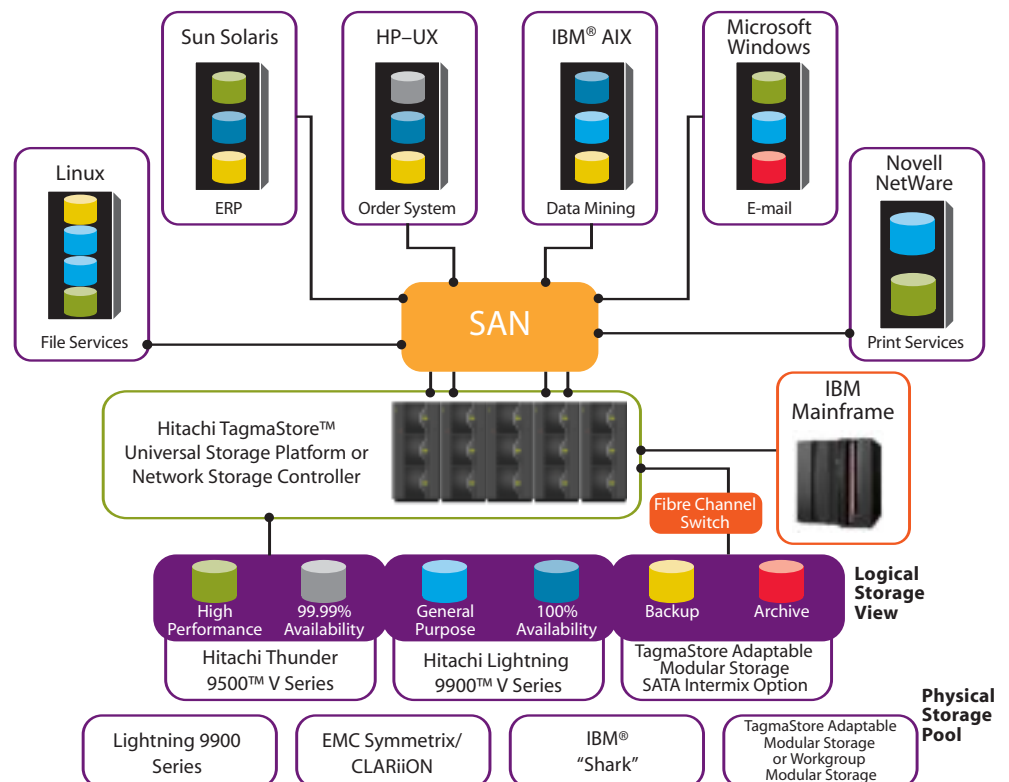


Figure 1: Multiple mainframe and open systems can be managed by Universal Storage Platform or Network Storage Controller’s software tools from a single management console.

“Hitachi has a clear and compelling vision for managing data center storage.”—IT Centrix, Inc., July 2005

administrators or manage them centrally, whichever you prefer.

Extend Existing Storage Investments

The Universal Storage Platform and Network Storage Controller extend the useful life of existing storage resources, so your technology will not become obsolete ahead of your depreciation schedule. Consolidating existing storage devices into one or more Hitachi storage platforms can improve resource utilization, lower costs, and simplify data management activities. For example, such consolidation enables you to reduce your total number of software licenses, lower maintenance and environmental costs, and centralize management functions.

Move Data Easily Among Different Classes of Storage

The Universal Storage Platform and Network Storage Controller move data at any distance, between any connected devices. To enable data movement across storage tiers, these platforms provide universal connectivity across operating environments, data types, networks, and heterogeneous storage platforms with support for FICON, ESCON, Fibre Channel SAN, and NAS.

Create a Cost-effective Archive Strategy

Today’s businesses must store an ever-growing number of documents. While Microsoft Word files, PowerPoint presentations, engineering specs, and

Create a Storage Utility

The Universal Storage Platform and Network Storage Controller allow you to manage storage assets by using a utility model—much like gas and electrical utilities do when they use a meter to monitor resource use. A utility model allows you to charge business units and applications for specific usage rather than assessing a flat rate.

By using these storage platforms to create a shared pool of storage resources, the entire enterprise can centralize its storage resources to economically serve a large number of users. Combining this model with the Hitachi SAM suite of software allows you to implement path provisioning, chargeback, and logical storage partitioning—creating a utility that is both practical and sophisticated.

- :: Accurately provision storage resources—where and when they are needed
- :: Bill for exact resources used
- :: Maximize storage efficiency for a large number of users
- :: Allocate hardware, capacity, and bandwidth on-demand
- :: Create unique storage pools for designated users and applications

Logical Partitioning of the Universal Storage Platform and Network Storage Controller

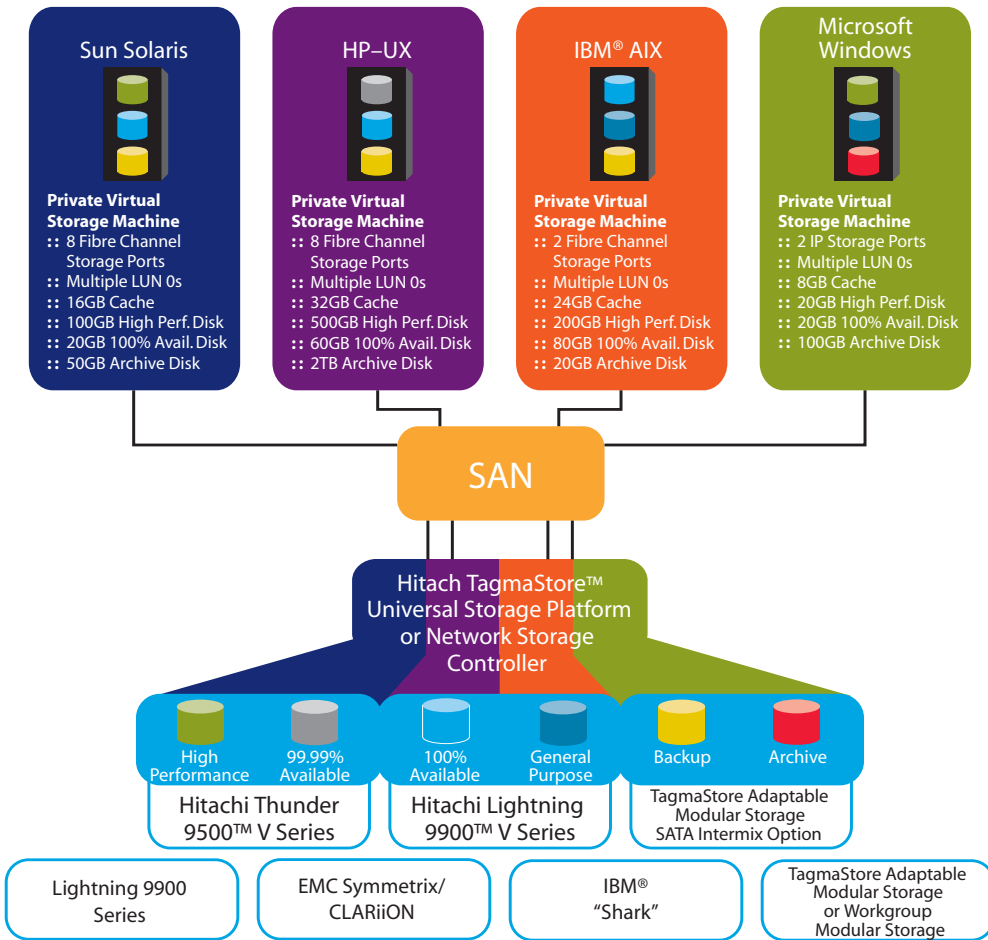


Figure 2: Through partitioning, you can create as many as 32 Private Virtual Storage Machines (Universal Storage Platform) or 8 Private Virtual Storage Machines (Network Storage Controller) from internal and attached storage, each with dedicated capacity, cache, and ports.

“The migration to the Hitachi TagmaStore Universal Storage Platform was flawless—probably the smoothest migration I have ever experienced.”

—Jim Livingston, Technology Architect and Director, UHSC Data Resource Center

rich media documents constitute much of a corporation's intellectual property and financial records, many of these items are increasingly stored as file attachments and given context by e-mail messages. At the same time, government regulations and compliance initiatives are imposing new timelines on data archiving practices.

To comply with these regulations, you must be able to store data for longer periods, and retrieve data at any time. A data lifecycle management archival solution, based on a tiered storage architecture, can provide a foundation for effectively administering and archiving e-mail and other data assets.

Although the value of enterprise data changes over time, it is important to consistently manage and archive business data throughout its lifecycle. Leveraging the virtualization capabilities of the Universal Storage Platform or Network Storage Controller and Hitachi HiCommand Tiered Storage Manager software, you can dynamically and nondisruptively move data between storage tiers, and manage it all from one interface.

Because the Universal Storage Platform and Network Storage Controller support mainframes, UNIX systems, Microsoft Windows platforms, Linux platforms, and other types of open systems, you can use your high-end storage devices for activities that require top-tier performance and availability, and attach low-cost storage resources for less critical tasks such as archiving or replicating data—including older mainframe data—replacing or complementing tape technology. For cost-effective second-tier storage, you can use the SATA Intermix Option in Hitachi TagmaStore Adaptable Modular Storage, a SATA-based Hitachi TagmaStore Workgroup

Modular Storage, or other vendors' externally attached storage.

Streamline Storage Management Activities

Burgeoning data storage requirements dictate that you simultaneously increase capacity, provide rapid access to enterprise information, and maintain 24/7 operations—often without additional budget or head count. The SAM suite of software can help you effectively manage your entire storage

The Universal Storage Platform and Network Storage Controller's performance and capabilities surpass competing systems. They offer all the benefits of a virtualization appliance without additional conversion tasks or placing another appliance in the data stream.

infrastructure—from the application to the disk spindle—and provide the quality of service your business needs.

Do you still use spreadsheets and white boards to keep track of your storage? Do you learn that an application needs more storage only after it runs out? Are you over-provisioning to avoid out-of-storage situations? Can you monitor data flow and provision your storage? How do you handle alerts—and is there any time left over for dealing with strategic issues?

Hitachi HiCommand Suite software modules help you move toward the level of SAM automation that best addresses your business goals.

Simplify the Infrastructure to Minimize Management Headaches

Created with growing business requirements in mind, the virtualization capabilities of the Universal Storage Platform and

Network Storage Controller mean that you have fewer elements to manage, reducing the complexity of heterogeneous environments.

Fewer elements to manage means less stress and higher utilization of resources—including staff. This provides direct monetary savings as well, since you have less equipment to buy, fewer licenses and maintenance agreements to worry about, and lower environmental costs. It all adds up to greater investment protection: Instituting common management practices helps you extend value to all of your storage assets and even makes it possible to redeploy older storage systems as part of a common fabric.

Hitachi's storage-specific management utilities facilitate fine-grained discovery and control of your entire storage environment, including attached storage systems that are virtualized into a storage pool. They support “any-to-any” local and remote copying, and they allow storage administrators to implement sustainable and repeatable management processes.

Optimize Performance by Balancing Workloads Across Tiers

You can use HiCommand Tuning Manager combined with HiCommand Tiered Storage Manager software to actively tune and balance workloads within a common storage pool. The software makes it possible to balance the load among internal storage and virtualized externally attached storage systems in real time—without disrupting the activities of users and applications. Frequently accessed volumes are carefully balanced with less frequently accessed volumes throughout the storage pool, reducing resource contention while improving asset utilization. The result is better availability, performance, and response times—plus the assurance that your data is optimally stored for fast and efficient access.

Universal Storage Platform and Network Storage Controller Business Continuity Framework

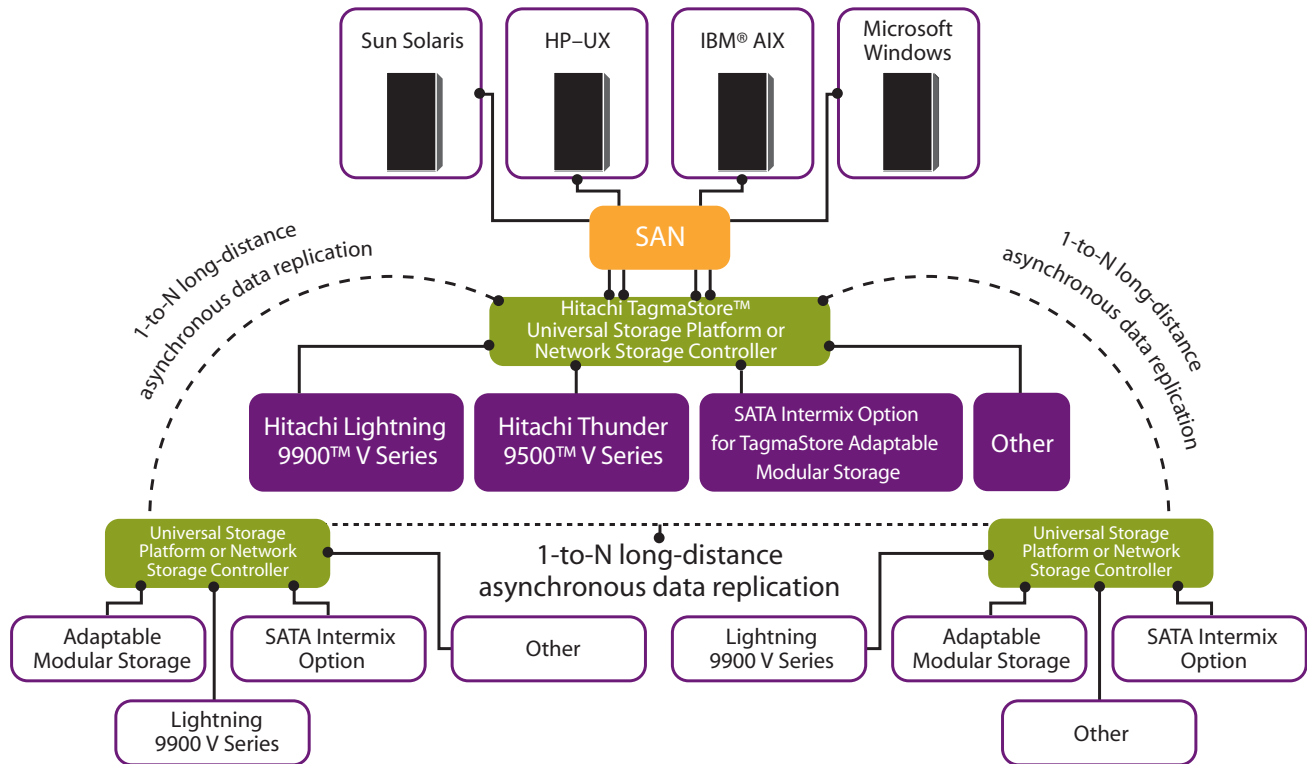


Figure 3: By maintaining up-to-date copies of data in geographically dispersed locations, Universal Storage Platform or Network Storage Controller satisfy the most demanding disaster recovery and uptime requirements.

HiCommand software provides SAN visualization and reporting, asset management, performance and capacity monitoring and planning, and policy-driven event management. As the primary console for heterogeneous SAN and storage resource management, HiCommand Storage Services Manager helps you pinpoint application performance and availability issues by locating the underlying cause of problems and issuing alerts when storage infrastructure changes might impact applications. This helps administrators satisfy service-level requirements, respond more efficiently to help desk calls, increase application uptime, and plan effective disaster recovery scenarios.

Leverage Standards to Improve Interoperability

HiCommand software is built on industry standards such as Common Information Model (CIM) and adheres to the Storage Networking Industry Association's Storage Management Initiative (SMI-S). Compliance with these industry standards enables you to use complementary system management software from other vendors, in addition to the Hitachi SAM suite of software.

Ensure Effective and Efficient Business Continuity

Safeguarding data is one of the fundamental components of keeping your systems online. But there are many other aspects to business continuity. Today's business managers must pay close attention to risk exposure and regulatory compliance, necessitating best practices for data management, backup, and archiving. To ensure continuous business operations, companies require robust application-focused storage solutions that enhance their operational efficiency and resilience.

How do you ensure you have an infrastructure in place that can run the business continuously, with the right levels of service and proven capabilities to recover systems and data if necessary? At a tactical level, the storage management options can be overwhelming, from local disk-to-disk backup to replicating data out-of-region to establishing a practical recovery methodology that maximizes recovery-point and recovery-time objectives.

Optimize control over recovery-time and recovery-point objectives, as you balance both the risk and the cost of your business continuity solutions.

Hitachi Business Continuity Software

- :: Hitachi Universal Replicator
- :: Hitachi TrueCopy™ Remote Replication
- :: Hitachi ShadowImage™ In-System Replication
- :: Hitachi Dynamic Link Manager™ path manager software
- :: Hitachi Copy-on-Write Snapshot
- :: Hitachi Cross-System Copy
- :: Hitachi Data Protection Suite, powered by CommVault®
- :: Hitachi HiCommand Backup Services Manager, powered by APTARE®
- :: VERITAS NetBackup
- :: TrueCopy Agent for VERITAS Cluster Server (for synchronous remote replication)
- :: Hi-Track® "call home" service/remote maintenance tool

"Hitachi's Universal Replicator provides a new and exciting approach to asynchronous backup over distance. According to one case study, the cost of telecommunications lines is halved, and the recovery characteristics are significantly enhanced. This will bring remote copy within the budget of many more organizations, and significantly improve business resilience."

—"Hitachi's Storage Management Vision Expands Reach and Range," IT Centrix, Inc., July 2005

Hitachi Data Systems' Application Optimized Storage approach provides a framework for mapping IT resources to your company's business continuity needs. As the foundation for such a framework, Universal Storage Platform and Network Storage Controller are highly resilient storage platforms that can recover quickly following unexpected system outages. The unique capabilities of Hitachi Universal Replicator software allows these platforms to offer complete business continuity capabilities—even across aggregated storage environments. The replication of data locally or over any distance is essential in supporting an infrastructure that allows essential business functions to continue during and after an outage or disaster. Mission-critical services are not interrupted, and full functioning is quickly reestablished.

Storage administrators can configure Application Optimized Storage solutions to maintain up-to-date copies of data in geographically dispersed locations—which can be readily accessed if one location is disabled. Centralizing management functions makes it easier to satisfy demanding disaster recovery and uptime requirements, regardless of the type of storage system you use to host your business-critical data.

Simplify Data Replication Practices

Organizations needing to replicate heterogeneous data sources will find Universal Replicator software delivers enterprise-class performance associated with storage system-based replication. Unlike server- or appliance-based replication products, Universal Replicator software satisfies business continuity objectives without employing redundant servers or replication appliances.

Exceptional Performance Powered by Universal Star Network Architecture

The Universal Storage Platform and the Network Storage Controller are built on the industry's fastest storage architectures:

- ⌘ Enhanced massively parallel design
- ⌘ Up to 81GB/sec (Universal Storage Platform) or 12.1GB/sec (Network Storage Controller) internal bandwidth
- ⌘ Up to 2 million IOPS (Universal Storage Platform) or 700,000 IOPS (Network Storage Controller)
- ⌘ Up to 256GB* of cache (Universal Storage Platform) or 64GB of cache (Network Storage Controller) with improved algorithms
- ⌘ Separate control and memory paths
- ⌘ Multiple back-end loops (64 for Universal Storage Platform, 8 for Network Storage Controller) via 2Gbit/sec Fibre Channel

Heterogeneous storage pooling with multiprotocol connectivity

- ⌘ Multiple host connections (up to 192 for Universal Storage Platform, 48 for Network Storage Controller)
- ⌘ High-performance Fibre Channel architecture for mission-critical applications
- ⌘ ESCON and FICON for mainframe environments
- ⌘ NAS Blade for plug-and-play file sharing

Flexible back-end configurations

- ⌘ 2Gbit/sec Fibre Channel loops for internal disk connections
- ⌘ Fibre Channel initiator boosts capacity for external storage connections

*256GB of cache as of December 2005.

Universal Star Network Crossbar Switch Architecture

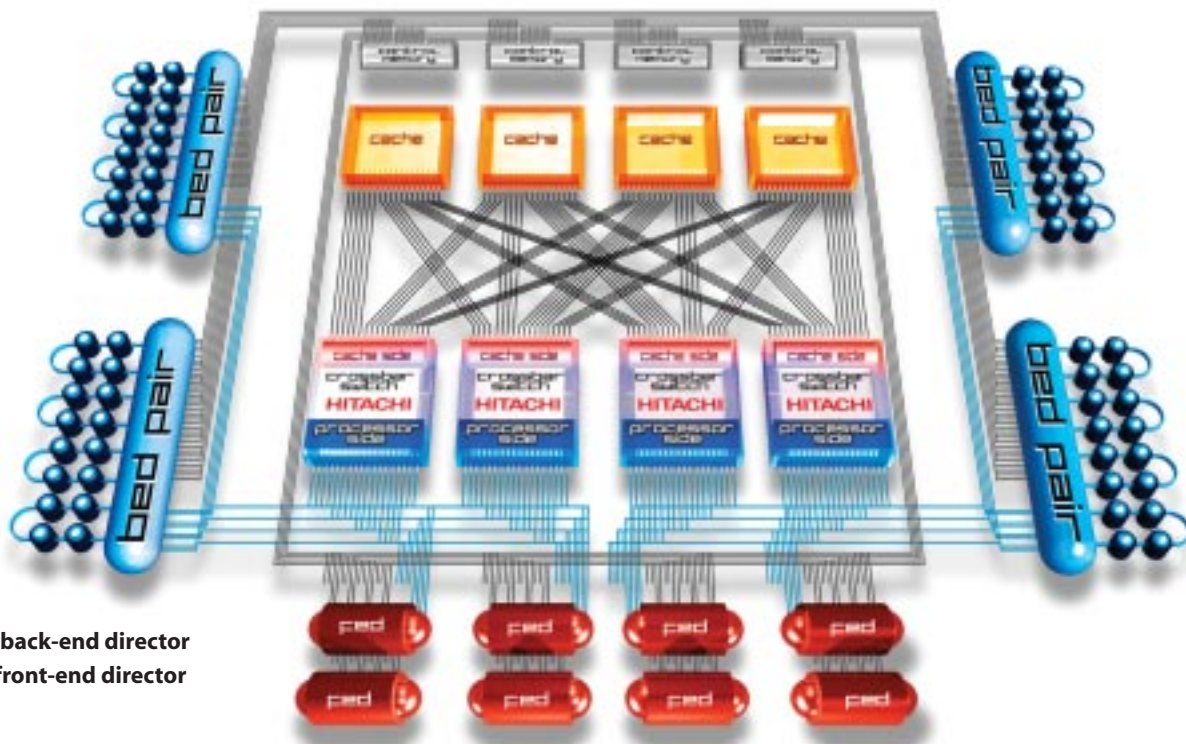


Figure 4: The Universal Storage Platform and Network Storage Controller's third-generation architecture supports top speed—81GB/sec internal bandwidth and 2 million IOPS for Universal Storage Platform and 12.1GB/sec internal bandwidth and 700K IOPS for the Network Storage Controller; top connectivity of 192 ports for Universal Storage Platform and 48 ports for Network Storage Controller; and top flexibility—2Gbit/sec Fibre Channel back-end loops. It also enables data movement, virtualization, and management functions.

Just how much can you simplify your storage environment? Universal Replicator software streamlines and unifies data replication policies and procedures across as much as 32PB of storage that is either in or externally attached to the Universal Storage Platform or 16PB for the Network Storage Controller. It powers a business continuity framework that can satisfy the most demanding uptime requirements, regardless of the type of storage platform you select to host your business-critical data.

Universal Replicator software fully leverages the Universal Storage Platform and Network Storage Controller to create a complete business continuity framework. It builds on the data integrity heritage of Hitachi TrueCopy™ Heterogeneous Remote Replication software to create “three data center” configurations. Hitachi Business Continuity Manager software and Replication Monitor simplify many of the management tasks associated with data replication scenarios.

TagmaStore Universal Storage Platform and Network Storage Controller: Foundations for Data Lifecycle Management

Although the value of data to an enterprise changes over time, there is still a need to manage and store data throughout its lifecycle. For many types of enterprises, regulations are increasing that length of time. With the Universal Storage Platform or Network Storage Controller, you can:

- :: Match data to the appropriate storage
- :: Create unique and appropriate storage pools
- :: Keep more data for longer periods of time
- :: Meet governmental compliance regulations and legal requirements to protect your enterprise
- :: Manage tiers of storage in pools with a single console
- :: Direct fluid and transparent movement of data between different classes of storage

“Hitachi’s midrange solutions support consolidated, networked storage, enable cost-effective replication, support long-term data archiving, and address the specific storage management challenges of IT managers at mid-sized organizations.”—Richard Villars, IDC, July 2005

Universal Replicator includes:

- :: Disk-based journaling
- :: Advanced bandwidth control for communications links
- :: Link-failure mitigation
- :: Workload management to reduce resource usage on production/primary systems
- :: Support for multiple data centers

Tight integration with Hitachi ShadowImage™ In-System Replication software expands the Universal Replicator capabilities as well. ShadowImage provides a nondisruptive, host-independent data replication solution for creating copies of any customer-accessible data within a single Hitachi storage system, helping companies overcome the obstacles of maintaining business continuity while performing routine tasks that would traditionally be impossible without having an impact on information availability.

ShadowImage disk-based copies can provide nearly instant recovery from data corruption.

Solutions for Microsoft Exchange

Is the volume of data generated by Microsoft Exchange slowing down your storage environment? With large volumes of data overwhelming systems, it may be becoming cost-prohibitive to keep all your data on fast primary storage.

Application Optimized Storage solutions for Microsoft Exchange allow e-mail data to be placed on a fast-response Hitachi storage system and then automatically migrated to lower-cost SATA storage as it moves through the information lifecycle. This helps you to reduce e-mail server and storage costs, improve e-mail server performance, satisfy compliance regulations, protect intellectual property, and mitigate the costs of legal discovery for e-mail content that is currently available only on backup tape.

Enterprise Capabilities for Companies That Depend on Exchange

As pressure from government and regulatory agencies for long-term data protection and retention intensifies, mid-sized companies are confronted with storage issues that formerly characterized only large companies. Yet mid-sized companies are stymied by limited budget, staff, and data center space. E-mail assets within Microsoft Exchange are often at the heart of these issues, which makes e-mail availability, security, and archiving absolute priorities.

Using the Network Storage Controller, mid-sized companies can manage escalating growth of their Exchange assets with attention to application performance, availability, and business continuity.

Hitachi Data Systems Global Solution Services

Fully exploit the unmatched capacity and performance of the Universal Storage Platform or Network Storage Controller. Consolidate and aggregate multivendor systems for simplified management. Control your entire storage universe through a single management console. Hitachi Data Systems Global Solution Services (GSS) incorporates the industry's best people, products, tools, and methodologies to help you implement Application Optimized Storage solutions so you can reach your critical enterprise milestones and maximize your return on investment (ROI).

GSS helps you address IT challenges by applying targeted services to leverage tiered storage pools, multiprotocol aggregation, and single-point-of-management capabilities.

GSS consultants can help you plan, design, implement, integrate, manage, and optimize storage infrastructure solutions that meet your needs.

:: **Application Optimized Solutions**—strategic consulting, design integration, and robust deployment capabilities help you bridge the gap between the needs of business applications and IT's ability to deliver the required service levels

:: **Industry Solutions**—enterprise content archival solutions that incorporate hardware, software, and professional services to address your business and regulatory compliance requirements

:: **Storage Services**—applying proven best practices along with appropriate tools and training to help you with all stages of your storage infrastructure—from planning to maintenance

:: **Product-based Services**—implementation, simplification, and maintenance, with attention to helping you optimize investments and lower total cost of ownership (TCO) for products from Hitachi Data Systems and select third-party vendors

:: **HDS Academy**—helping you improve staff abilities and efficiency as you implement, upgrade, and support multivendor storage solutions

Planning for the Universal Storage Platform or Network Storage Controller

:: **Storage Economics Strategy Service**
This strategic service helps you objectively consider your current storage environment (whether host-connected or via a network) and assess the impact of new storage technologies and architectures,

including those introduced by the Universal Storage Platform and Network Storage Controller.

:: Application Optimized Storage Assessment and Planning

The Universal Storage Platform and Network Storage Controller represent a quantum leap in the way you address data lifecycle management challenges. GSS consultants provide services that allow customers to develop data lifecycle policies, along with service level objectives to adequately leverage tiered-storage technologies in a cost-effective fashion.

:: Risk Analysis Workshop

Working with your team, GSS consultants rate your current continuity environment, identify areas of improvement, and objectively map them to potential solutions that can help you improve business continuity.

:: Backup Assessment Services

A comprehensive service to help you make better decisions about how you protect critical data by giving you a clear sense of how effective and efficient your current backup infrastructure is, Backup Assessment Services thoroughly assesses every aspect of your infrastructure operations, compares your processes and practices with best practices, and recommends improvements.

Deploying the Universal Storage Platform or Network Storage Controller

:: Data Migration Services

Enjoy worry-free migration. GSS can help you rapidly and safely migrate

your mission-critical data from legacy storage platforms onto the Universal Storage Platform or Network Storage Controller.

:: Storage Consolidation Services

GSS can help plan and safely consolidate your legacy systems onto a single footprint, simplifying information management and lowering IT maintenance and staff expenses.

:: External Storage Implementation Service for Hitachi TagmaStore Universal Storage Platform and Network Storage Controller

GSS helps you optimize application performance, reduce management complexity, simplify information access, and improve business continuity by utilizing the external storage capabilities of the Universal Storage Platform and Network Storage Controller lines.

Maintaining the Universal Storage Platform and Network Storage Controller

:: Storage Infrastructure and Management Services

GSS provides ongoing services to bring order to your storage environment by reducing the uncertainty and difficulties associated with support and continuous maintenance of complex networked storage infrastructures. Realize improved storage resource utilization and increased quality of service and contain costs by combining GSS best practices with the Global IT Service Management Framework.

Out-of-Region and Metropolitan Replication

For extra protection, some businesses combine synchronous and asynchronous remote replication into a three data center configuration.

For example, they might establish a local or metropolitan site within 10 to 20 miles of the primary site, along with a remote site hundreds or even thousands of miles from the primary site. With Hitachi disk journaling and data replication software, you can achieve “no data loss” replication over any distance, and guarantee the integrity of your data. This type of innovative strategy ensures data availability in nearly any business continuity scenario.

A Powerful Solution for all Your Storage Needs

As part of the growing portfolio of Application Optimized Storage solutions from Hitachi Data Systems, the Universal Storage Platform and Network Storage Controller constitute a powerful foundation for enterprise content archival, data lifecycle management, and business continuity—all with easier management and lower operational expenses. These solutions are designed to improve information access through an integrated hardware, software, and services platform; reduce management complexity through heterogeneous storage pooling; and increase efficiency by consolidating storage across different storage platforms—without sacrificing performance and availability.

Investment protection and ROI

- ∴ Aggregate and pool your existing storage hardware instead of replacing it
- ∴ Extend the life of and add value to existing storage assets
- ∴ Reduce the costs associated with multiple software licenses
- ∴ Increase storage and server utilization
- ∴ Enhance quality of service to users and customers
- ∴ Reduce storage management costs; improve administrative productivity

Your Partner Beyond Technology

At Hitachi Data Systems, we believe a company's information is a strategic asset. That's why we continue to develop and improve storage solutions with the performance, availability, and scalability you need to maximize ROI and minimize risk. We always consider your perspective and business needs while applying the best hardware, software, and services to satisfy your requirements.

Our commitment to being a partner beyond technology sets us apart from other vendors in the industry. It means we're prepared to help you envision your future and accomplish your business goals. We offer you an open and collaborative storage management framework, policy-based automation tools, virtualization capabilities, and the world's finest storage systems.

Meeting Storage Requirements for Data-intensive Industries

The enterprise-class Universal Storage Platform and Network Storage Controller have the capacity, redundancy, and flexibility demanded by today's data-intensive industries. Consider the financial services industry. Banks, brokers, and insurance companies require maximum uptime and performance for their online services, even as they reduce the costs associated with storage and long-term data retention. Likewise, life sciences firms have intensive demands for capacity and performance with respect to database management, visualization, and analytics. Meanwhile, health care industries rely on rapid, secure access to patient records, billing information, and medical images—along with their own strict requirements for privacy and data retention. Media applications process massive audio/video files, now stored in digital formats, not to mention intensive editing and data lifecycle management for archiving their creative assets. Hitachi storage solutions provide enterprise-strength storage along with simplified management and ease of use to industries with even the most demanding storage requirements.

Case Study

Pacific Capital Bancorp

Major application releases, disparate system infrastructure, and rapid business data growth: Pacific Capital Bancorp, a regional bank in Santa Barbara, California, was facing them all. Even more taxing to the company was the fact that these challenges were mixed with shrinking application backup windows, a scarcity of experienced employees, and major changes in regulated data retention. Personnel who were trained in handling storage and IT issues may have been able to address application or system changes, but they weren't versed in the kind of regulatory and corporate governance requirements that Pacific Capital Bancorp needed to address.

The bank wanted to create a tiered data storage infrastructure and data lifecycle management strategy within its consolidated storage environment and establish a data retention policy that would serve the company long into the future. In working with Hitachi Data Systems, the bank was able to leverage industry-based guidelines to assess, document, and model data lifecycles and supporting service policies, as well as significantly reduce storage infrastructure complexity and management by using the Hitachi TagmaStore Universal Storage Platform.

To meet its long-term goals, the bank also established the ability to define and adapt new tiered storage service level agreement requirements for business governance and policy guidelines of production, archive, and destruction by service layers. Hitachi Data Systems assisted Pacific Capital Bancorp in understanding not just its storage options but also how those options could align business and IT directives and set policies for years to come.

"Storage is going crazy. We see it going up 25 to 30 percent a year right now," says Al Todd, senior vice president of IT at Pacific Capital Bancorp. The bank has 23TB of storage located around the company, housed mainly in IBM and EMC storage systems, Todd says. "We didn't know how much capacity we had or how much we were using. We just kept throwing more disk at stuff and didn't manage it," he says. In February 2005, the company decided to

implement the Hitachi TagmaStore Universal Storage Platform, a controller-based virtualization engine that enables the management not only of its own internal storage but also of externally attached storage from other vendors.

With the Universal Storage Platform and assessment and risk management professional services from Hitachi Data Systems and its partner Consiliant Technologies, Pacific Capital preserves its investment in IBM and EMC storage systems while getting full visibility into all storage and significantly simplified provisioning of storage overall. "We've attached our core banking system, our data warehouse, and our online bank system," Todd says. "Now we can see exactly what we're using and exactly how we're going to tier the data."

"The Hitachi Universal Storage Platform and the Network Storage Controller are built on enterprise-class hardware. Both solutions have a suite of data protection and data management software that have been used in mission-critical environments under the most strenuous of conditions ... with support for Windows, UNIX, and z/OS environments. ESG believes that the combination of these factors puts the Hitachi solutions in a different class than the other storage virtualization products."

—"The Storage Virtualization Landscape: Focus on Hitachi" Enterprise Strategy Group, July 2005

Hitachi Tagmastore™ Universal Storage Platform and Network Storage Controller— Technical Specifications

Component	Description	NSC55	USP100 Entry	USP600 Enhanced	USP1100 High-performance
Controller					
Basic Platform Unit	Integrated Control/Array Frame	19" Rack	1	1	1
Universal Star Network™	Number of Switches	2	2	4	4
Crossbar Switch	Data Bandwidth (GB/sec)	8.5	17	34	68
	Control Bandwidth (GB/sec)	3.6	6.5	6.5	13
	Aggregate Bandwidth (GB/sec)	12.1	23.5	40.5	81
Cache Memory	Cards	2	2	2	4
	Base Memory (GB)	4	4	16	32
	Maximum (GB)	64	64	64	128
Control Memory	Cards	2	2	2	4
	Base Memory (GB)	2	3	3	4
	Maximum (GB)	6	6	6	6
Front-end Directors	Cards	1-2	1-4	1-6	1-6
	Fibre Channel Ports	16-48	0-128	0-192	0-192
	Virtual Ports	Up to 16,384	Up to 16,384	Up to 24,576	Up to 32,768
	FICON Ports	32	0-64	0-96	0-96
	ESCON Ports	16	0-64	0-96	0-96
	NAS Blade*/Ports	8	0-4/0-16	0-4/0-16	0-4/0-16
Back-end Directors	Type	Standard	Standard	Standard	Standard
	Numbers	1	1	2	2,4
Logical Devices Supported		16,384	16,384	16,384	16,384
Array Frames					
Array Frames	Number	up to two 19" Racks	0,1	1,2	1,2,3,4
Hard Disks (GB)	Type	73, 146, 300	73, 146, 300	73, 146, 300	73, 146, 300
	Number	5-240	5-256	64-512	129-1,152
Spare Drives per System	Minimum/Maximum	1/16	1/8	1/16	1/40
Internal Raw Capacity (TB)	Minimum (73GB disks)	0.286	0.286	4.741	9.152
	Maximum (300GB disks)	72	74	148	332
Maximum Usable Capacity RAID-5 (TB)	Open Systems	51.9	62.4	128.8	287.8
	IBM®z/OS®-compatible	46.83	58.6	117.2	270.4
Maximum Usable Capacity RAID-1+ (TB)	Open Systems	34.6	36.4	72.8	165.0
	z/OS-Compatible	30.1	31.6	63.0	143.6
External Storage Support					
External Capacity		16PB	32PB	32PB	32PB
Private Virtual Storage		8	32	32	32
High Availability					
Hi-Track® Support Package	LAN/Modem etc.	Standard	Standard	Standard	Standard
Enhanced Support Package	2nd SVP	No	No	Optional	Optional

*Each NAS Blade consists of dual NAS servers
 Note: All capacities are based on 1GB=1,000,000,000 bytes
 (1TB = 1000GBs)

For platform-specific feature availability, please contact your
 Hitachi Data Systems account representative or visit our Web site
 at www.hds.com.

Physical Dimensions

Universal Storage Platform		Network Storage Controller model NSC55	
	Integrated Control/Array Frame	Storage System Rack	Array Frame
Height	1,860mm; 73.2in.	1,999mm	1,860mm; 73.2in.
Width (with two side panels)	782mm; 30.77in.	605mm	650mm; 25.59in.
Depth	925mm; 36.42in.	897mm	925mm; 36.42in.
Minimum Configuration		Maximum Configuration	
Weight	713kg/1,571 lb	4,000kg/8080 lb	
Heat	1.88KW/6,431BTU	33.56KW/114,611BTU	
Power	1.95KVA	36.15KVA	

Operating System Support, Universal Storage Platform and Network Storage Controller models

Maker	Operating System
Mainframe	
Fujitsu	MSP
IBM	OS/390 MVS/ESA, MVS/XA VM/ESA, VSE/ESA z/OS, z/OS.e, z/VM® Red Hat Linux for S/390 and zSeries®, TPF
Open Systems	
HP	HP-UX, Tru64, UNIX, Open VMS
Sun	Solaris
IBM	AIX
Microsoft	Windows (NT, 2000, 2003 Server)
Novell	NetWare
SGI	IRIX
Red Hat, SuSE	Linux
VMWare	ESX

Hitachi Tagmastore™ Universal Storage Platform and Network Storage Controller



1-unit Universal Storage Platform

3-unit Universal Storage Platform

5-unit Universal Storage Platform

Network Storage Controller

The Universal Storage Platform and Network Storage Controller can seamlessly scale from a single platform to the maximum configuration.

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