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OVERVIEW

Hitachi Adaptable Modular Storage 2000 Family

Highly Reliable, Cost-effective Modular Storage for Medium and Large Businesses, and Enterprise Organizations

Hitachi Storage Solutions

Hitachi Data Systems

Hitachi Adaptable Modular Storage 2000 Family

Organizations of all sizes are looking for ways to improve the return on IT investments while better managing data growth and complex storage infrastructures. The need for high-availability, cost-effective performance, scalability and data protection is paramount — but budget, staff and data center space are limited. Hitachi Data Systems can help.

With many years of experience serving FORTUNE 500® companies, Hitachi Data Systems understands these challenges. It has developed Services Oriented Storage solutions that match application and business requirements to storage attributes. Services Oriented Storage helps IT professionals take control of multivendor storage environments by decreasing management complexities, redundancies and risks with a service oriented architecture (SOA) approach to storage. As part of this strategy, Hitachi Data Systems provides a platform that can be readily reconfigured and optimized to accommodate changing business requirements. The resulting proven solutions are built on a new set of modular, cost-effective products that deliver superior performance, availability, scalability and reliability, along with advanced storage management features previously unavailable in these market segments.

Hitachi Data Systems extends its technical leadership in midrange modular storage with the introduction of the Hitachi Adaptable Modular Storage 2000 family of storage systems. As the first midrange products to offer a serial attached SCSI (SAS) architecture and the Hitachi Dynamic Load Balancing Controller, the Adaptable Modular Storage 2000 family delivers highly resilient enterprise-quality storage in an affordable and easy-to-manage modular package.

The Adaptable Modular Storage 2000 Family

The Adaptable Modular Storage 2000 family is a flexible storage platform designed to help organizations achieve key business benefits, such as meeting service level agreements (SLAs), attaining cost-effective performance and ensuring nondisruptive operations, while realizing better administrative efficiencies and investment protection.

Systems include:

- Hitachi Adaptable Modular Storage 2100
- Hitachi Adaptable Modular Storage 2300
- Hitachi Adaptable Modular Storage 2500

These advanced systems are certified and tested with the leading business applications, employ an easy-to-use management interface and provide extensive scalability and outstanding system reliability. All models support RAID-6 disk configurations, Fibre Channel and iSCSI host interfaces, and the ability to intermix SAS and SATA disk drives on the same tray.

The Adaptable Modular Storage 2000 family gives administrators standalone storage for data consolidation and high-volume applications, as well as a solutions-ready platform to manage business continuity, regulatory requirements and lower tier storage (when attached to a Hitachi Universal Storage Platform™ V or Universal Storage Platform VM.) All three models are well suited to serve as: inexpensive lower tier data storage that does not compromise the highest levels of reliability and centralized management; modular storage for disaster recovery, virtual tape or tape displacement solutions; and remote office storage or archive solutions.

With the introduction of the Adaptable Modular Storage 2000 family comes several important features new to the midrange market.

Hitachi Dynamic Load Balancing Controller

Dynamic Load Balancing Controller provides integrated, automated hardware-based front-to-back-end I/O load balancing. This ensures I/O traffic from hosts to disk drives is dynamically managed, balanced and shared equally across both controllers. Storage administrators no longer are required to manually set ownership between LUNs and controllers and no longer need to monitor utilization rate imbalances between the controllers that may lead to performance bottlenecks. As a result, overall administration is greatly simplified. Servers can be connected to either controller without regard to a primary path to the LUNs. Even the process of updating microcode has been simplified because updates can be done on either controller while the system is operating. In addition, this new controller design is fully integrated with standard host-based multipathing and host load balancing, thereby eliminating mandatory requirements to implement proprietary multipathing software.

SAS Architecture

SAS is the interface used to transmit data from the controllers to the disk drives in the new Adaptable Modular Storage 2000 family. The SAS interface is a full duplex, point-to-point architecture with up to 9600MB/sec of total system bandwidth and up to 32 links available for concurrent I/O activity — more total back-end bandwidth than any other midrange product on the market. Not only does the SAS point-to-point design eliminate loop arbitration for better performance, but it also improves end user troubleshooting capabilities by displaying, detecting and helping to replace disk drive failures.

SATA disk drives are compatible with SAS connectors to facilitate an intermix of SAS and SATA drives on the same tray, providing a new level of flexibility in meeting tiered storage requirements. This flexibility can lower the total costs of ownership since it is no longer necessary to purchase separate trays for SAS and SATA drives. These efficiencies translate to better return on investments and improved capabilities to meet application SLAs.

New Management Interface

The Adaptable Modular Storage 2000 family includes the management interface used with Hitachi Simple Modular Storage, which was designed for use by small businesses without storage expertise. System administrators reduce the time spent managing systems with this highly intuitive interface that can manage all of the operations and optional features available with the Adaptable Modular Storage 2000 systems.

Software wizards assist users in performing common operations such as installation and configuration. The graphical user interface (GUI) helps to centralize and manage multiple systems, and to automate LUN and RAID setup, host attachment and data replication — all from a single pane of glass. Plus, the GUI will match the Command Line Interface (CLI) functions for additional flexibility for administrators.

Relieving Your Biggest Storage Burdens

As your organization seeks competitive advantage and smart growth in the market while trying to comply with regulatory requirements, you may face many data storage challenges and pain points:

- Achieving SLAs on budget
- Obtaining a reliable, cost-effective storage platform to grow with business
- Gaining more flexibility to affordably match storage to application requirements
- Achieving better efficiencies and centralized management for storage administrators
- Meeting high-availability, disaster recovery and business continuity objectives
- Avoiding planned and unplanned downtime that interrupts production operations
- Optimizing interoperability and performance for major applications and operating systems
- Meeting regulatory requirements for data protection and retention
- Performing complex manual LUN and RAID configurations

So how do you address these pain points with your organization's limited resources? Hitachi Data Systems makes it possible to solve even the most difficult storage challenges with the reliability, interoperability, manageability and surrounding services of storage systems traditionally reserved for very large enterprises.

Many top FORTUNE 500® companies rely on the legendary quality of Hitachi storage systems. Leveraging proven Services Oriented Storage solutions and the expertise of Hitachi TrueNorth Channel Partners, the Hitachi Adaptable Modular Storage 2000 family helps you align IT and business objectives and cost-effectively manage storage without sacrificing performance or functionality.

Reduce Complexity, Cost and Risk to Better Meet Business Objectives

These modular systems provide you with many enterprise-level benefits — in a smaller, modular footprint — to help you meet your organization's most pressing business needs.

Cost-effective Performance

Meeting SLAs while staying on budget is much easier with the progressive feature set in the new Adaptable Modular Storage 2000 family: SAS architecture, large cache, faster CPUs, cache partitioning to match application workloads and outstanding performance for high IOPS and sustained throughput application requirements.

Tremendous Scalability

Grow storage capabilities as needed. The Hitachi Adaptable Modular Storage 2100, Adaptable Modular Storage 2300 and Adaptable Modular Storage 2500 allow you

to cost-effectively scale capacity to more than 470TB, connectivity to up to 2048 virtual server ports and performance to more than 900K IOPS. Expand as business grows with data-in-place upgrades to larger models in the Adaptable Modular Storage 2000 family.

Highly Flexible Systems

Better match storage to application requirements while reducing the total cost of ownership (TCO). The Hitachi Adaptable Modular Storage 2000 family allows you the flexibility to intermix SAS and SATA drives on the same tray. This reduces the need for multiple systems to manage multiple requirements. You also have the choice of a Fibre Channel or iSCSI host interface or both.

Easy to Administer

Improve administrative efficiencies and simplify IT environments. Intuitive management software enables you to spend less time on configuration tasks and allows you to consolidate and centrally manage systems. Helpful documentation and online resources help to improve storage tasks and minimize errors. The Hitachi Dynamic Load Balancing controller eliminates the requirement of system administrators to set controller ownership for each LUN and to manually manage the LUN assignments to balance the workload.

Unsurpassed Reliability and Data Availability

Meet high-availability demands for disaster recovery and business continuity with 99.999 percent data availability and no single point of failure. Hitachi Adaptable Modular Storage systems enable you to run applications continuously and nearly eliminate the chances of unplanned system downtime or data loss. All models support host path failover, fully redundant, hot swappable components, online microcode updates and mirrored cache with battery backup; and they include active/active controllers with automatic failover.

Platform for Solution Delivery

These models are interoperable with all major business applications and include maximum controller configurations to ensure systems are capable of getting the most out of supported applications. Independent Software Vendor (ISV) certifications and deployment guides for Microsoft® Exchange, Microsoft SQL and VMware help in setting up applications and systems for the best performance and highest scalability possible.

Consolidate SAN and NAS Storage

The Adaptable Modular Storage 2000 family supports both block and file data when used with the Hitachi High-performance NAS Platform, powered by BlueArc®. The Hitachi High-performance NAS Platform has the highest scalability with a maximum capacity of 4PB.

System and Data Security

Meet regulatory requirements for data protection and retention. Advanced security capabilities include Hitachi Data Retention Utility software with its "write once, read many" (WORM) feature that protects data from overwrites or erasures for long periods of time. System management access sets and limits authorization to make changes in the system and system audit logging records all system changes. Communications between the management software and storage are encrypted.

60TB LUN Grow/Shrink and Online RAID Group Expansion

The capacity of individual LUNs can be dynamically added to or reduced as needed to improve utilization. Hitachi provides 60TB LUNs to enable "set it and forget it" provisioning and the ability to stripe over large numbers of disk drives spanning multiple drive trays for maximum performance benefits.

Add one or more drives to an existing RAID group with automatic re-striping of the LUNs while the system remains online. Operations can continue without interruption, providing an inexpensive way to add capacity to existing RAID groups.

Cost-effective Reliability for Tiered Storage, Remote Offices and Power Savings

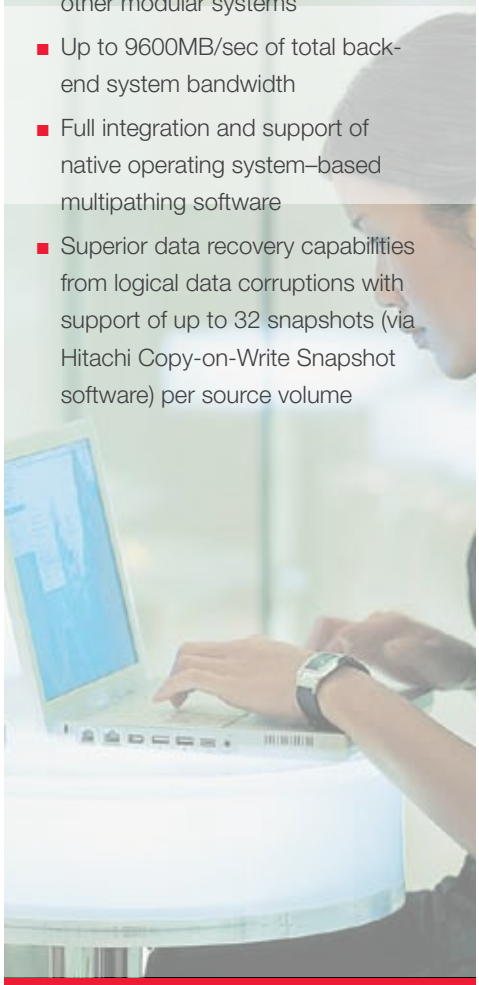
Tiered Storage in a Single Box

Effortlessly move data to less expensive drive types and lower TCO. The Adaptable Modular Storage 2000 family allows you to mix and match drives to best meet your business needs: 15k rpm or 10k rpm SAS or 7200 rpm

Better Than the Competition

The Hitachi Adaptable Modular Storage 2000 family offers features that competitive solutions lack, including:

- High reliability, with 99.999 percent data availability and no single point of failure
- Greater throughput and concurrent I/O capacity due to the latest, most advanced point-to-point SAS-based architecture
- Integrated symmetric active/active controllers with automated front-to-back I/O load balancing
- Ease of configuration with the removal of manual controller-to-LUN mapping requirements of other modular systems
- Up to 9600MB/sec of total back-end system bandwidth
- Full integration and support of native operating system–based multipathing software
- Superior data recovery capabilities from logical data corruptions with support of up to 32 snapshots (via Hitachi Copy-on-Write Snapshot software) per source volume



SATA II. While most vendors with SAS storage scale to a maximum of 100 hard drives, the Hitachi Adaptable Modular Storage 2000 family scales up to 480 drives.

Lower Tier Storage in a Virtualized Environment

The high reliability of the Adaptable Modular Storage 2000 family makes it an excellent choice for lower tier requirements. Low cost SATA drive configurations coupled with the Hitachi Dynamic Load Balancing Controller provide cost-effective storage. Integrate with Hitachi Universal Storage Platform V or Universal Storage Platform VM for lower tier data storage in a virtualized environment.

Primary Storage for Remote Offices

Support the requirements for a branch office with dependable, simple-to-manage data storage. The Adaptable Modular Storage 2000 family product line is virtually trouble free and includes an optional remote monitoring service, making it ideal for non-technical users.

Power Savings Options

Reduce energy consumption in data centers by retracting the heads on SATA disk drives or even intelligently spinning down drives that are not active. The Power Savings Service from Hitachi Data Systems enables the integration of disk drive spin down for applications that are scheduled to be active for short periods of time. For additional energy savings the system fans operate at variable speeds that are determined by the internal temperature of the system. Installed SATA II disks will park their heads after two hours of inactivity to reduce energy consumption.

Services Oriented Storage — Solutions for the Hitachi Adaptable Modular Storage 2000 Family

How do Hitachi modular storage systems help storage administrators gain control over the bigger picture? The Adaptable Modular Storage 2000 family has been designed and built to:

- Reduce storage management complexity, cost and risk by offering the highest performance, availability, scalability and reliability for the midrange market, with easy-to-use software wizards and Web-based tools for configuration, management and maintenance
- Deliver application-specific performance, availability and protection across systems — from a few terabytes to over 470TB per frame, with both SAS and SATA drives

- Offer more cost-effective options for increased data protection and disaster recovery than any other storage in the midrange category
- Enable a complete data lifecycle management solution to deploy the right class of storage and to match it to application requirements, when used in combination with the Universal Storage Platform V or the Universal Storage Platform VM and Hitachi Tiered Storage Manager, as well as other Hitachi software
- Improve energy efficiency with Hitachi power down options that reduce data center power consumption and utility expenses
- Simplify data migration to and from other models of the Hitachi Adaptable Modular Storage 2000 family, as well as to and from existing Adaptable Modular Storage and Workgroup Modular Storage systems
- Enhance availability and reliability for more uptime with fewer outages, both planned and unplanned; even microcode updates and the migration of data to a new RAID group can be done while the system is operating

Services Oriented Storage Solutions

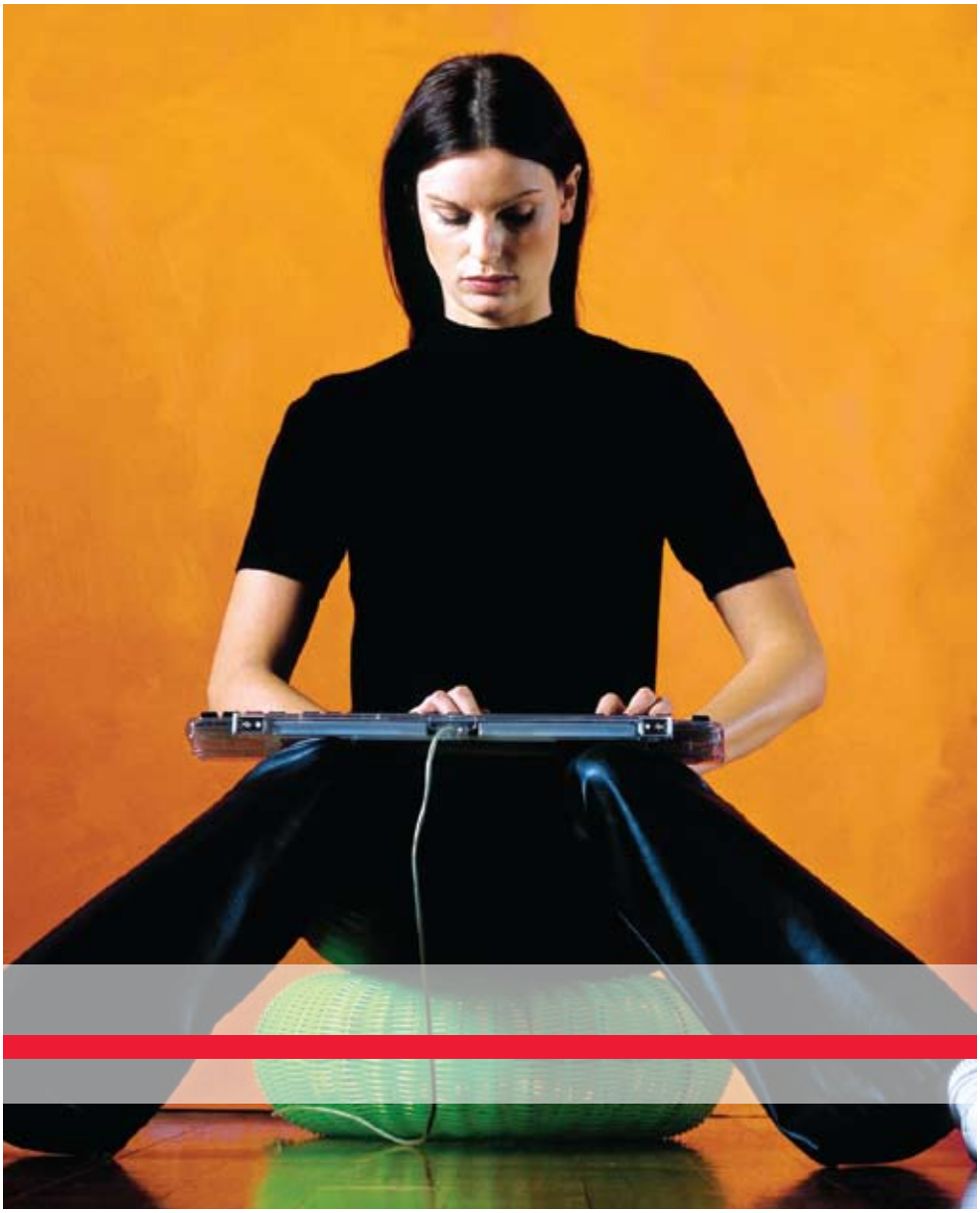
Applications and the storage environments they depend upon have become critical drivers of the business processes and decisions that impact organizational growth, risk and profitability. That's why it's imperative for businesses to more closely align storage infrastructure with application needs. Services Oriented Storage solutions from Hitachi Data Systems answer this business challenge by enabling organizations to precisely match application requirements to storage attributes, such as performance, availability, cost and functionality.

At Your Service

Hitachi Data Systems Global Solution Services helps you maximize investments and efficiencies with a suite of professional services. For the Adaptable Modular Storage 2000 family, Global Solution Services offers professional services to assist with:

- Remote Copy Planning and Design
- Implementation of Hitachi TrueCopy® Synchronous or Extended Distance software
- Implementation of Hitachi ShadowImage® Replication software
- Data Migration Planning, Design and Implementation

For information on services to help meet regulatory compliance requirements, protect data, reduce TCO or develop a disaster recovery plan, contact your Hitachi Data Systems representative or go to www.hds.com.



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OB-012-A DG October 2008