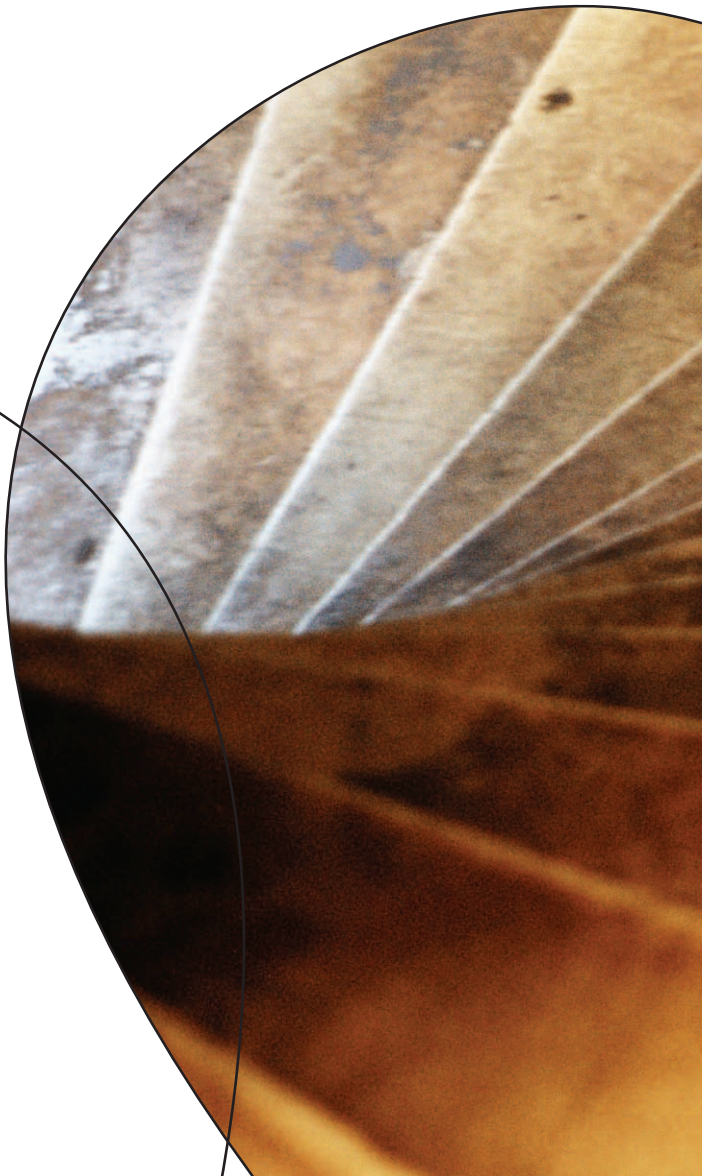
HITACHI
DATA SYSTEMS

Hitachi TagmaStore™ Adaptable Modular Storage and Workgroup Modular Storage

Partner Beyond Technology



Hitachi TagmaStore™ Modular Storage Systems

Organizations of just about every size today are confronted with storage challenges similar to those faced by the largest enterprises, but with reduced budget, staff, and data center space. For these customers, Hitachi Data Systems offers Application Optimized Storage™ solutions built on modular, cost-effective storage systems with management capabilities previously not available.

Storage Challenges

As your organization seeks to gain a competitive advantage and grow in your respective market while also trying to comply with regulatory requirements, you are facing many of the same data storage challenges and pain points as large enterprises:

- Data growth is continuously accelerating.
- Applications are not meeting performance and availability expectations.
- Backup and restore windows are shrinking.
- Compliance requirements and litigation fears demand that data be kept in tamperproof storage for defined time periods and made available quickly when necessary.
- "Old" data needs to be online and accessible in short time periods (generally seconds or minutes).
- Business continuity objectives require that applications must be recovered in minutes or hours.
- Older storage devices are unreliable and perform poorly.
- IT budgets and head counts are flat or shrinking.

Application Optimized Storage™ Solutions Scale to Meet Your Needs

With many years of experience successfully serving FORTUNE 500 companies, Hitachi Data Systems understands the storage challenges your organization faces and recognizes your limited budget, staff, and data center space. Hitachi Data Systems offers three modular lines—scaled to fit your organization's environment and budget, yet featuring many enterprise-level capabilities—to serve as the foundation for Application Optimized Storage solutions. These solutions match application requirements to storage attributes and help align IT with business objectives, while simplifying storage infrastructures, streamlining administration, and reducing costs. Further, by leveraging the industry and application-specific expertise of Hitachi TrueNorth™ Channel partners, Hitachi Data Systems brings you the optimal solution for your organization.

Four Flexible Models for Unparalleled Choice

- ***Hitachi TagmaStore Adaptable Modular Storage Models AMS200, AMS500, and AMS1000*** deliver the best price and performance in this class for superior support of Microsoft Windows environments, ERP/CRM, database, and backup and data protection applications in standalone or networked environments in small-to-midsize organizations or tiered storage in large enterprises.
- ***Hitachi TagmaStore Workgroup Modular Storage Model WMS100*** delivers fast, reliable, and cost-effective SATA-based storage for small-to-midsize organizations and workgroups.

Adaptable Modular Storage Model AMS1000

Designed and engineered for larger organizations using modular storage, the TagmaStore AMS1000 provides superior connectivity, performance, and scalability. The AMS1000 will support multiple mission-critical applications, such as ERP, CRM, SCM, and legacy workloads. The AMS1000 offers several unique features to support these important workloads, including cache partitioning for better allocation of cache resources, RAID-6 for even greater data availability, LUN migration for improved performance and more efficient hard disk drive (HDD) allocation as well as Hitachi ShadowImage™ In-System Replication software and Hitachi TrueCopy™ Remote Replication software for backup and recovery. No other storage device in its class offers the flexibility of the AMS1000.

- ***Consolidation.*** Reduce the number of storage systems, maximize storage utilization, improve storage administrators' productivity, and bring SAN, iSCSI, and network attached storage (NAS) under one storage and management umbrella. The AMS1000 supports any two of these protocols per system.
- ***Tiered Storage Deployment.*** Benefit from the economy of solutions that match application requirements and value of data to the right class of storage and move data between storage tiers (Fibre Channel and SATA) as needed.
- ***Scalability and Performance.*** Meet application service level agreements, and provide unequalled capacity and configuration flexibility compared to traditional modular storage.
- ***Business Continuity.*** Leverage TrueCopy software to create a single infrastructure for local and remote replication, backup, or disaster recovery. TrueCopy software works in synchronous and extended distance modes for local or long-distance replication.
- ***Total Cost of Ownership (TCO).*** Maximize storage utilization and efficiency and improve storage administrators' productivity.

Adaptable Modular Storage Models AMS200 and AMS500

Designed for small-to-midsize organizations that require enterprise-quality storage management capabilities, the Adaptable Modular Storage models AMS200 and AMS500 offer excellent cost-efficient platforms in a modular footprint. With support for both SATA and Fibre Channel drives, these systems can be deployed as part of a tiered infrastructure, in a SAN, or even as tiered storage "in a box."

- ***Microsoft Simple SAN storage platforms.*** Support Microsoft Windows servers seamlessly using Plug-and-play SAN Kits from Hitachi Data Systems, which are compatible with Microsoft Simple SAN.
- ***Scalability and Performance.*** Provide unequalled application-specific performance and capacity that scales beyond 173TB.
- ***Consolidation.*** Reduce the number of storage systems, maximize storage utilization, improve storage administrators' productivity, and lower management and environmental costs.
- ***Application Quality of Service (QoS).*** Dedicate cache to specific applications and volumes to enhance performance.
- ***Tiered Storage Deployment.*** Benefit from the economy of solutions that match application requirements and value of data to the right class of storage.
- ***Configuration Flexibility.*** Host virtually any workload and multiple performance and archive requirements on the most economical storage system with SATA and Fibre Channel intermix; use also for disk-to-disk backup and tape replacement.
- ***Ease of Management.*** Simplify configuration and storage administration via easy-to-use graphical user interfaces.
- ***High Availability and Reliability.*** Leverage RAID-6 dual-parity striping for more reliable rebuild in the rare event of a disk drive failure; maximize uptime with redundant hot-pluggable components and high-reliability Hitachi SATA implementation.
- ***Business Continuity.*** Leverage in-system and remote replication (AMS500 only) backup software to shrink backup windows and expedite recovery from application failures.
- ***Lower TCO.*** Maximize storage utilization, centralize management of storage through consolidation, improve storage administrators' productivity, and reduce downtime.

Workgroup Modular Storage Model WMS100

Offering excellent scalability and performance, Workgroup Modular Storage model WMS100 leverages cost-effective SATA drives without compromising reliability and data integrity. The WMS100 can be quickly installed and configured to serve as a core storage system or for fast SAN deployment in small organizations or workgroups, or for data archive applications in tiered storage deployments at larger enterprises.

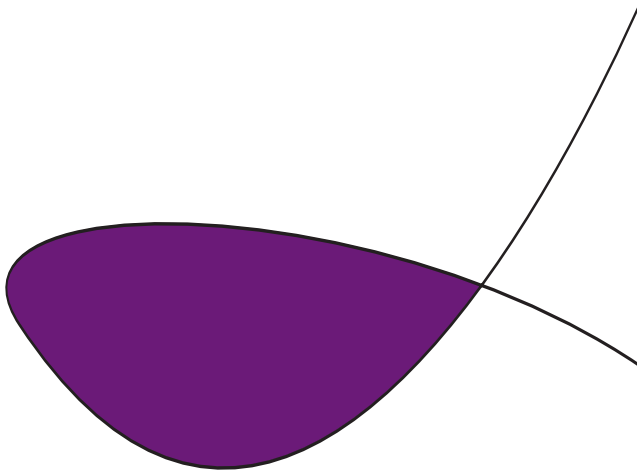
- ***Microsoft Simple SAN storage platforms.*** Support Microsoft Windows servers seamlessly using Plug-and-play SAN Kits from Hitachi Data Systems, which are compatible with Microsoft Simple SAN.
- ***Scalability and Performance.*** Provide excellent performance and scalability beyond 40TB in a highly cost-effective SATA-based package for small companies.
- ***Consolidation.*** Reduce the number of storage systems, maximize storage utilization, improve storage administrators' productivity, and lower management costs.

- ***Application QoS.*** Dedicate cache to specific applications and volumes to enhance performance.
- ***Configuration Flexibility.*** Dedicate to specific mission-critical applications, deploy as part of a first SAN in small enterprises, or integrate into a tiered storage infrastructure for archive, backup, or tape replacement in larger companies.
- ***Ease of Management.*** Simplify configuration and storage administration through easy-to-use graphical user interfaces.
- ***High Availability and Reliability.*** Leverage RAID-6 dual-parity striping for more reliable rebuild in the rare event of a disk drive failure; maximize uptime with redundant hot-pluggable components and the high-reliability Hitachi SATA implementation.
- ***Business Continuity.*** Leverage in-system replication and backup software to shrink backup windows and expedite recovery from application failures.
- ***Lower TCO.*** Maximize storage utilization, centralize management of storage through consolidation, improve storage administrators' productivity, and reduce downtime.

Network Storage Controller Model NSC55

If your organization seeks additional functionality beyond that provided by Adaptable Modular Storage or Workgroup Modular Storage, such as mainframe connection or heterogeneous systems management, the Network Storage Controller, model NSC55, can provide the functionality you need within a modular, rackmounted, small-footprint package.

The NSC55 supports advanced storage management and data replication features previously not available in this class of storage, delivering mainframe as well as heterogeneous multiplatform connectivity via Fibre Channel, IBM® ESCON® and FICON®, NAS, and iSCSI. With the NSC55 you can retain your heterogeneous systems, aggregate them into a virtual pool, deploy them in tiered architectures, manage them through a single console, and replicate critical data using a common set of tools. By maximizing the use of your existing resources and enhancing their functionality, the NSC55 allows you to simplify your storage environment and reduce total cost of ownership.



Technical Specifications

	Adaptable Modular Storage Model AMS1000	Adaptable Modular Storage Model AMS500	Adaptable Modular Storage Model AMS200	Workgroup Modular Storage Model WMS100
Number of controllers	2	1 or 2	1 or 2	1 or 2
Data cache	4GB–16GB	2GB–8GB	1GB–4GB	512MB–2GB
Maximum LUNs	4,096	2,048	512	512
Internal raw capacity (300GB Fibre Channel, 400GB SATA)	173.8TB SATA Intermix, 129.4TB Fibre Channel	86.9TB SATA intermix, 64.7TB Fibre Channel	39.7TB SATA intermix, 30.2TB Fibre Channel	41.3TB SATA
Internal disk drive options (Fibre Channel unless otherwise noted)	73GB (10K & 15K RPM) 146GB (10K & 15K RPM) 300GB (10K RPM) 250GB SATA (7200 RPM) 400GB SATA (7200 RPM) 500GB SATA* (7200 RPM)	73GB (10K & 15K RPM) 146GB (10K & 15K RPM) 300GB (10K RPM) 250GB SATA (7200 RPM) 400GB SATA (7200 RPM) 500GB SATA* (7200 RPM)	73GB (10K & 15K RPM) 146GB (10K & 15K RPM) 300GB (10K RPM) 250GB SATA (7200 RPM) 400GB SATA (7200 RPM) 500GB SATA* (7200 RPM)	250GB SATA (7200 RPM) 400GB SATA (7200 RPM) 500GB SATA* (7200 RPM)
Disk drive interface	SATA–Fibre Channel intermix	SATA–Fibre Channel intermix	SATA–Fibre Channel intermix	SATA
Minimum–maximum number of disk drives	4–450 Fibre Channel, 0–435 SATA	4–225 Fibre Channel, 0–210 SATA	4–105 Fibre Channel, 0–90 SATA	4–105 SATA
Model upgrade options	NO	AMS1000	AMS500	NO
RAID Support				
RAID-0	YES (Fibre Channel only)	YES (Fibre Channel only)	YES (Fibre Channel only)	NO
RAID-1	YES	YES	YES	YES
RAID-1+0	YES	YES	YES	YES
RAID-5	YES	YES	YES	YES
RAID-6	YES	YES	YES	YES
Connectivity				
Maximum host connections	8 @ 1, 2, or 4Gbit/sec Fibre Channel, 4 @ 1Gbit/sec iSCSI, 8 NAS	4 @ 1, 2, or 4Gbit/sec Fibre Channel, 4 @ 1Gbit/sec iSCSI, 8 NAS, 8 NAS	4 @ 1, 2, or 4Gbit/sec Fibre Channel, 4 @ 1Gbit/sec iSCSI, 8 NAS	4 @ 1, 2, or 4Gbit/sec Fibre Channel, 4 @ 1Gbit/sec iSCSI, 8 NAS
Maximum attached hosts through virtual ports	1,024	512	512	512
Availability				
Nondisruptive component replacement	Major FRU	Major FRU	Major FRU	Major FRU
Nondisruptive hot-pluggable disks	YES	YES	YES	YES
Nondisruptive microcode updates	YES	YES	YES	YES
Hi-Track® "call-home" service/remote maintenance tool	YES	YES	YES	YES
Cache binding (software)	Hitachi Cache Residency Manager	Hitachi Cache Residency Manager	Hitachi Cache Residency Manager	Hitachi Cache Residency Manager
Software				
Management software	Hitachi Resource Manager™ utility package, HiCommand® Suite	Hitachi Resource Manager™ utility package, HiCommand® Suite	Hitachi Resource Manager™ utility package, HiCommand® Suite	Hitachi Resource Manager™ utility package, HiCommand® Suite
Logical partitioning	Hitachi Cache Partition Manager feature 4–32 partitions	Hitachi Cache Partition Manager feature 2–16 partitions	Hitachi Cache Partition Manager feature 2–8 partitions	Hitachi Cache Partition Manager feature 2–6 partitions
Remote copy	Hitachi TrueCopy™ Remote Replication (sync)	Hitachi TrueCopy™ Remote Replication (sync)	N/A	N/A
Point-in-time copy	Hitachi ShadowImage™ In-System Replication, Hitachi Copy-on-Write Snapshot	Hitachi ShadowImage™ In-System Replication, Hitachi Copy-on-Write Snapshot	Hitachi ShadowImage™ In-System Replication, Hitachi Copy-on-Write Snapshot	Hitachi ShadowImage™ In-System Replication, Hitachi Copy-on-Write Snapshot
Backup	Hitachi Data Protection Suite, powered by CommVault®	Hitachi Data Protection Suite, powered by CommVault®	Hitachi Data Protection Suite, powered by CommVault®	Hitachi Data Protection Suite, powered by CommVault®
LUN security	Hitachi Volume Security	Hitachi Volume Security	Hitachi Volume Security	Hitachi Volume Security
Host Storage Domains; multiple LUN0/port; Virtual Storage Ports	YES	YES	YES	YES
Disk-based WORM data protection	Hitachi Data Retention Utility	Hitachi Data Retention Utility	Hitachi Data Retention Utility	Hitachi Data Retention Utility
Dynamic LUN management	YES	YES	YES	YES
Host path failover	HiCommand® Dynamic Link Manager	HiCommand® Dynamic Link Manager	HiCommand® Dynamic Link Manager	HiCommand® Dynamic Link Manager
Heterogeneous SAN management	Hitachi HiCommand® Suite	Hitachi HiCommand® Suite	Hitachi HiCommand® Suite	Hitachi HiCommand® Suite
Common APIs	Yes, across Hitachi storage systems	Yes, across Hitachi storage systems	Yes, across Hitachi storage systems	Yes, across Hitachi storage systems

**500GB SATA drives available mid-Q2 2006*

Operating Systems Supported

Open Systems:

IBM® AIX®

HP-UX

Sun Solaris

Microsoft Windows 2000 and Windows Server 2003

Microsoft Simple SAN complaint *(pending for model AMS1000)*

HP Tru64 Unix

SGI IRIX

Novell NetWare

Linux

HP OpenVMS

VMWare

Apple MAC OS

IBM z/OS® *(when externally attached to the Hitachi TagmaStore Universal Storage Platform or Network Storage Controller)*

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