

**Hitachi Freedom Storage™  
Thunder 9200™**

**HITACHI**  
DATA SYSTEMS

Turn up the volume. Tune out the noise.

9200



# Hitachi Freedom Storage™ Thunder 9200™ systems deliver high availability and performance plus immediate scalability for networked storage.

## Highlights

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### High performance. High capacity. Small footprint.

- All-Fibre architecture for industry-leading performance
- Scales up to 17.6TB RAID-0 (16.3TB RAID-5)
- Unparalleled flexibility in configurations
  - rackmount
  - two deskside options
- Hitachi FlashAccess™ 9200 for data access at cache memory speed
- RAID-level intermixing for optimal protection, performance
- RAID-0+1 mirroring/striping for rapid decision support applications
- RAID-5 implementation maximizes performance and capacity

### High availability

- Concurrent maintenance: redundant and hot-swappable components
- Dual controllers, cluster failover, and path failover support
- Up to five global hot spares
- Mirrored and battery backed-up cache
- Non-disruptive LUN expansion
- Hitachi ShadowImage™ 9200
- Hitachi TrueCopy™ 9200
- Hi-Track® “call-home” service
- Non-disruptive microcode updates
- Online verify, data assurance code, and error correction code

### Industry-leading connectivity

- SAN/NAS-enabled architecture, including award-winning NAS appliance
- Attachment to multiple open systems servers
- Choice of Fibre Channel or SCSI paths

### Centralized management

- Hitachi Resource Manager™ 9200
  - Central management interface (GUI) based on Java™ technology
  - Remote management via LAN or RS-232 port
- HiCommand™ Management Framework—open, extensible, modular storage management software based on industry standards:
  - Seamless integration of best-of-breed products
  - Policy-based automation
  - Manages multi-vendor storage systems from any location
- Web-enabled monitoring via any browser
- SNMP compliance

### Services and support

- Ranked Number One in service and support by customers

The demand for information is in full force. The clamor is audible worldwide. The Internet, as a platform for sharing information, has had a powerful effect on business models. Customer demands are becoming more rigorous. Computer speeds are faster. The World Wide Web is ubiquitous. Smart appliances are being deployed. High-speed, high-bandwidth, fiber optic digital highways are expanding worldwide. Wireless technology is spreading quickly. Billions of transactions and enormous amounts of text, video, graphical, and audio data are being transferred every day, and growing exponentially.

## So get ready to turn up your volume. And tune out the noise.

These days, business and industry leave no room for complacent players. To survive, the unwavering goal must be to become Number One—to be heard in your marketplace like never before. And it's possible. The Hitachi Freedom Storage Thunder 9200 system equips you to enact revolutionary business strategies. It positions you to do business in new, ever-changing ways. It delivers the performance that's essential when second best isn't good enough. And it can give back to you precious personal time in the process.

In fact, the Thunder 9200 storage system simplifies storage management to such a degree that over-tasked storage managers can enjoy one of today's rarest commodities—*time for a life after work*.

Business-to-business. Data warehousing. Data mining. And 24/7 transactions. There's no time for downtime. The Thunder 9200 storage system is designed for high availability with the Hi-Track reporting system and an array of hot-swappable components. The Thunder 9200 storage system is also scalable up to nearly 18TB, so you can stay responsive in critical occurrences such as unexpected user demand and customer transaction surges.

With the Thunder 9200 storage system, you can establish centralized, manageable storage control from a single location and satisfy open systems across a broad spectrum of environments, including clustered Microsoft® Windows NT® and Windows® 2000, UNIX®, and Novell® NetWare® servers, plus Storage Area Networks (SANs) and Network Attached Storage (NAS) capabilities. And by capitalizing on the connectivity of SANs and Fibre Channel architecture, the Thunder 9200 storage system allows you to consolidate systems, easily connecting with multiplatform operating systems, for more cost-effective operations.

The Thunder 9200 storage system has what you need to keep your company competing—loud and clear: stellar performance and throughput, built-in high availability, a SAN- and NAS-enabled architecture, superb multiplatform connectivity, extensive storage management capabilities, storage replication support, built-in serverless ShadowImage 9200, and a suite of management software and tools. These advantages are backed solidly by Hitachi Data Systems teams, known industry-wide for top-ranked service and support and skilled in the design of cutting-edge SAN and NAS environments.



Deskside 10



Deskside 20



Rackmount

## Aggressively scale storage *capacity* for exponential data growth and transaction surges

*Storage managers in today's enterprises are faced with unpredictable leaps in data growth and wild transaction surges. The Thunder 9200 storage system offers large-scale capacity and unrivaled performance to open systems environments, so you can keep up with the tidal wave of information. Its all-Fibre, building-block architecture allows maximum performance over a wide range of capacities with unprecedented power and the ability to fine-tune the system precisely to your requirements. This eliminates gratuitous expenditures, thereby reducing the total cost of ownership.*



### All-Fibre architecture for industry-leading performance. Scales up to nearly 18TB (RAID-0)

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With the Thunder 9200 storage system, you can create storage capacity as large as 17.6TB. Command modules (controller plus 10 disks) combined with expansion modules (10-disk add-ons) form building blocks for three configurations to meet your capacity needs: *rackmounted, to about 17.6TB, and two desktside models with 1.8TB or 3.5TB.*

Using these modules, the Thunder 9200 storage system is configurable as a high-performance and/or a high-capacity solution. The mirrored, non-volatile cache can be upgraded from 256MB to 4GB, providing exceptional performance for a broad selection of applications. The dual controller system can be configured with up to four active 100MB/sec or 2Gb/sec Fibre Channel paths for high availability and high throughput in clustered server and parallel database environments.

You can also configure the dual controller system with up to two active SCSI paths. For Fibre Channel SAN connectivity, you can use point-to-point, arbitrated loop, or switched fabrics.

## Accelerate *information delivery* for faster decisions and quicker time to market

*Being first to market and turning up the volume on your competitors is key to success in the New Economy. The Thunder 9200 storage system is engineered for superior performance. From its all-Fibre architecture to its large cache, Thunder 9200 storage system is designed to bring you the speed you need to retain your customers through shortened online response times or fast data mining queries that transform information into actionable knowledge.*



### Engineered for superior performance

The Thunder 9200 storage system speeds information to and from the hard disk drives via high-speed RISC microprocessors. All data paths to the dual-ported disk have been engineered for full parity protection to ensure the highest levels of data integrity at the fastest—and safest—possible performance. There are several disk drive options available that allow you to maximize performance or capacity. The 73GB 10,000RPM disk drives provide outstanding performance, while the 18GB and 36GB 15,000RPM disk drives deliver optimum performance. For maximum capacity, you can use the 181GB 7,200RPM disk drives. In addition, the Thunder 9200 storage system can be configured with four 100MB/sec or four ultra-fast 2Gb/sec Fibre Channel ports.

### FLEX-5 architecture advantage

Hitachi's unique FLEX-5 architecture allows the user to define the RAID-5 storage configurations ranging from three to sixteen disks with rotating parity, optimizing performance and capacity. In the maximum RAID-5 configuration, the user can access up to 16.3TB of usable capacity. This represents almost 94 percent usable storage for the Thunder 9200 storage system, in contrast with only 80 percent for RAID-5 in some competitive systems.

### FlashAccess 9200

Optional FlashAccess 9200 software enables storage managers to increase the speed of database applications and lock selected logical units (LUNs) into cache. The result is ultra high performance—with a 100-percent hit rate—accessed at memory speed rather than disk I/O speed.

### RAID-level intermixing for optimal protection, performance

Thunder 9200 storage system supports RAID-0, 0+1, 1, and 5. All these RAID levels can be intermixed concurrently within the Thunder 9200 storage system. You can select the RAID level that best fits your application, protection, and performance requirements.

### RAID-0+1 mirroring and striping for rapid decision support applications

You can install a high-performance RAID-0+1 mirroring and striping configuration to meet your need for added speed when performing database updates.

### Unique FAST-5 performance

Many storage providers claim that their RAID-1 provides the best information protection and performance. The Thunder 9200 storage system offers a superior RAID-5, known as "FAST-5," which combines performance comparable to RAID-1 with RAID-5 value. Using an innovative combination of compatible technologies and management techniques, Hitachi Data Systems brings remarkable performance to the Thunder 9200 storage system's RAID-5 implementation, reducing both operating costs and management complexity. Now, for your mission-critical applications, you have a real choice for cost-effective, high-performance, fully protected storage.

In addition, with the Thunder 9200 storage system, ultimate RAID-5 flexibility and performance can be achieved through "FLEX-5," the ability to configure RAID-5 using up to 16 drives, with rotating parity.

## Exceed service level agreements with *high availability and performance* to keep your users happy and your customers loyal

*The extensive spread of e-business acutely highlights the correlation between service and business success. Customers seek fast, continuous service from their suppliers and are quick to switch loyalties when their expectations are not met. The productivity of internal end users of IT is also directly linked to timely service. Round-the-clock availability of information is one of the most critical factors in growing and maintaining market share.*

The Thunder 9200 storage system meets today's exacting requirements for high availability. Its unique design eliminates single points of failure and incorporates advanced electronics to bring continued availability to the open systems world. The Thunder 9200 storage system can continue to run during almost any maintenance activity—including component replacement, software and capacity upgrades, and microcode updates. The Thunder 9200 storage system also includes up to five global hot spares that can take over in the unlikely event of a disk drive failure.

Hitachi's manufacturing relies heavily on proven process technologies and state-of-the-art automation. Extensive testing and the most stringent quality assurance criteria in the industry ensure that the Thunder 9200 storage system components meet the highest reliability standards. In addition to these design, engineering and manufacturing safeguards, Hitachi Data Systems offers capabilities to further satisfy the demanding access requirements of high-availability environments.

Software and middleware of the Thunder 9200 storage system are also designed to ensure that your business and its productivity are supported in all eventualities. This includes such software solutions as ShadowImage 9200 to create data copies within the system and eliminate any impact or disruption caused by online backup; VERITAS® backup/restore suites to simplify storage management while ensuring high availability for critical data; host software that supports all major open systems clustering schemes, automatically taking over the workload of any failed host in a cluster; and path failover middleware, led by Hitachi Dynamic Link Manager™, that supports multiple platforms, including IBM®, AIX®, Sun™ Solaris™, and Windows NT/2000.

### Concurrent maintenance

We can perform maintenance activities concurrently while continuing to provide you with access to information. Hardware components, such as disk drives, controllers in dual controller configuration, power supplies, fans, batteries, disk drives, and Internal Hub (Ihub) for loop connectivity, can be replaced non-disruptively.

### Up to five global hot spares

Designed to ensure the integrity of your data, the Thunder 9200 storage system allows you to specify up to five global hot spares from among any of the storage units in the storage system. In the unlikely event that a storage unit reaches an error threshold, but is still able to transmit data correctly, the data on the failing disk is automatically copied to one of the global hot spares. If the storage unit fails completely before the copy is produced and the user has defined the RAID group as either RAID-1 (mirrored), RAID-0+1 (mirrored and striped), or RAID-5 (rotating parity group), a global hot spare is selected and the data is rebuilt.

### Dual controllers, cluster failover, and path failover support

Software in the Thunder 9200 storage system is targeted to support a cluster of host processors. One host automatically takes over the workload of any failed host in a cluster. Networks and peripherals are re-assigned and applications are restarted. The dual controller is capable of supporting host failover in the following environments:

- VERITAS Cluster Server™ for Sun Solaris
  - IBM HACMP for AIX
  - Microsoft Cluster Server (MSCS)
  - HP-UX® MC/Serviceguard
  - SGI™ IRIS FailSafe™
  - HP (Compaq®) TruCluster™
  - Novell NetWare Cluster Services™
- Alternate pathing—or I/O path switching—is provided by middleware that automatically switches the I/O load on a failed primary path to an alternate path on the same host system. The dual controller supports I/O path switching functions in the following environments:
- Dynamic Link Manager for Windows NT, Windows 2000, AIX, and Sun Solaris
  - HP PVLink (standard feature on HP-UX 10.01 and later)
  - Solaris—VERITAS Volume Manager™ (VxVM) Dynamic Multi-Pathing (DMP)



### Cache Reliability

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The Thunder 9200 storage system offers important data protection:

- Mirrored—all writes duplicated for data protection
- Battery backup (minimum, 48 hrs.; maximum, more than 15 days)
- Optional integrated UPS for ultimate protection
- Data Consistency Checking in memory

### ShadowImage 9200

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Among the powerful products created to complement the robustness of the Thunder 9200 storage system, ShadowImage 9200 enables you to replicate open systems information in innovative ways to meet your ever-changing business challenges. You can now execute logical backups at faster speeds and with less effort than previously possible. You can easily configure your backups to execute across your storage area network. And you can manage all of these functions from a central location.

### Hitachi TrueCopy 9200

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To safeguard information, we offer TrueCopy 9200 software to continuously update and maintain reliable copies of your most valuable data at a secondary site. TrueCopy supports remote data movement and migration over Fibre Channel. Channel Extenders, qualified by Hitachi, can be used to move data any distance from primary to secondary Hitachi Freedom Storage systems using network protocols such as IP or Dark Fiber.

### Hi-Track support

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This unique maintenance service maximizes system availability. Hi-Track continuously monitors the Thunder 9200 storage system and automatically transmits collected hardware status information to the Hitachi Data Systems support center. The center analyzes the information and takes corrective action, where appropriate, in order to avoid problems that could impact system throughput or availability.

### Non-disruptive microcode updates and LUN expansion

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This feature streamlines the introduction of operating firmware updates. The use of alternate pathing software, Resource Manager 9200, and a dual controller configuration helps to increase the speed and simplify the process of firmware replacement on the Thunder 9200 storage system. You can also expand LUNs dynamically and without disrupting operations.

### Online verify, data assurance code, and error correction code

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Designed to minimize the potential for a fatal data block read error in your operating environment, this robust, system-based, self-analysis program continually checks the storage environment for potential data integrity issues. During idle periods, the online program reads and checks data blocks to ensure full data integrity throughout the Thunder 9200 storage system. If a data block exhibits the potential for a fatal error, the Thunder 9200 storage system automatically reassigns the data to a problem-free data block. If the Thunder 9200 storage system determines that there are too many potential errors on a given disk drive, the dynamic spare drive is enabled and the data is safely copied to the spare drive.

To maintain data integrity, a Data Assurance Code is added at the end of each data block, and the relative block number is confirmed. The Data Assurance Code includes cyclic redundancy checking (CRC) for guaranteed safe and secure data placement. CRC is compared on read and write commands to further ensure data integrity.

### High-availability middleware

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As open systems platforms take on more of the mission-critical workload, they must rely on special middleware to secure the required levels of availability. Hitachi Data Systems supports two types of high-availability middleware to help reduce downtime: host failover and alternate pathing. These features automatically detect faults and recover data services on a redundant set of hardware.

## Reduce complexity and management costs with consolidation and centralized management

Today's IT environments have become extremely complex to manage when you consider the mix of servers and storage systems deployed. Consolidation and easy-to-use centralized management tools play a key role in reducing complexity and, thereby, reducing cost. With its ability to scale to nearly 18TB and multiplatform support, the Thunder 9200 storage system provides a unique platform for consolidation across Windows NT/2000 and UNIX servers, or to form large storage pools in SAN or NAS environments. In addition, the Thunder 9200 storage system provides a number of centralized management software tools to facilitate the storage administrator's tasks in setting up, managing, and monitoring storage systems. These tools include Resource Manager 9200, SNMP compliance, and out-of-band SAN management.



### SAN-enabled architecture

The Thunder 9200 storage system features a SAN-enabled architecture that positions you to take full advantage of storage area networks based on Fibre Channel technology. Engineered for the highest connectivity, the Thunder 9200 storage system supports Hitachi Multipath Data Access and storage consolidation across open systems operating environments.

Responding to the need to consolidate storage across open systems operating environments, Hitachi Data Systems has designed scalability, high throughput, cost-efficiency, and centralized management capabilities into the Thunder 9200 storage system. The SAN-enabled architecture includes an embedded WWN (World Wide Names), which provides for Fibre Channel-Arbitrated Loop (FC-AL) or Fabric Login.

### Simultaneous attachment to multiple open systems servers

To help you make the most of your storage investment, the Thunder 9200 storage system attaches to multiple open systems and Windows NT/2000 hosts, thus making it possible for several servers to share a single storage system. At the same time, the ultimate in security is achieved with Hitachi SANtinel™ (Thunder 9200 LUN security).

The Thunder 9200 storage system supports host attachment via Fibre ports, Ultra-wide SCSI, or Ultra-2-wide low voltage differential SCSI (LVDS). This opens the throttle on throughput with interface speeds of up to 2Gb/sec per port. You have the choice of the following interfaces and data transfer rates:

- FC-AL and fabric implementations for SANs 100MB/sec or 2Gb/sec
- Ultra-wide SCSI—40MB/sec
- Ultra-2-wide LVDS—80MB/sec

Support for up to 128 logical units per Thunder 9200 storage system, coupled with outstanding high-availability and performance attributes, makes the Thunder 9200 storage system an excellent fit for both UNIX and Windows NT/2000 server environments.

### Thunder 9200 SE: Industry-leading SAN package

With up to 16.3TB of Thunder 9200 storage as its foundation, our easy-to-deploy SAN package includes high-availability Brocade® SilkWorm® 3800 switches in a high-performance, highly available networked storage configuration. Its increased connectivity provides for fast data transfers and storage pooling. For increased flexibility, you can snap in our Hitachi Freedom NAS™ for IP file serving/sharing, or to work with your LAN for management and control, or WAN for disaster recovery and global reach.

### Freedom NAS for fast file serving or shared storage

Our high-availability Freedom NAS can be configured with the Thunder 9200 storage system along with the Network Storage Solutions™ (NSS) file server. It can stand alone, dedicated to intense Web activity or high-demand business applications. Or, it can share storage responsibilities within a SAN, direct-attached, or clustered environment—no matter what operating systems you elect.

### Hitachi multipath data access

The Thunder 9200 storage system gives you greater agility in meeting the challenges of today's IT environment by managing access to information. Each controller in the Thunder 9200 storage system intelligently controls host interface access to the logical unit configurations attached to that controller. The Thunder 9200 storage system also intelligently manages access to information on any LUN from any host path in a dual controller configuration. This capability enables greater ease of operation in Windows NT, Windows 2000, and UNIX clustered server environments.

### Choice of Fibre Channel or SCSI paths

The dual controller system offers four Fibre Channel paths or two SCSI paths. These connectivity options facilitate greater throughput, better access to information, and higher availability in clustered server and SAN environments.



## Industry validation and certification

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Hitachi works with industry-leading companies to qualify, validate, and certify the open systems compliance of its storage products in high-availability environments. Independent vendors are instrumental in providing independent validation and certification of Hitachi Freedom Storage products.

## Centralized management: Resource Manager 9200

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Shipped with every Thunder 9200 storage system, Resource Manager 9200 software is used by storage managers to display system configuration, create user name/password security for administrators, set up RAID groups, allocate LUNs, expand LUNs, and format storage.

Storage administrators who need a flexible, easy-to-use configuration and error management tool will find Resource Manager 9200 an ideal choice. Users can monitor and manage their storage systems through a graphical user interface. Resource Manager 9200 helps optimize performance by providing valuable resource utilization information, such as I/O activity, cache usage, and availability status/event notification. Administrators can use Password Protection to authorize up to 20 users. This provides protection against unauthorized access to the Management mode of Resource Manager 9200, and stores the password list at the array.

Reliable error management and reporting offers a big breakthrough for IT troubleshooters who seek rapid-fire detection and notification to maintain productivity.

## Open, simple, cost-effective storage management

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Open and extensible, the **HiCommand™ Management Framework** is based on industry standards, including the Common Information Model (CIM), the Simple Object Access Protocol (SOAP), and eXtensible Markup Language. Adherence to these standards enables the snap-in of software developed by Hitachi or complementary independent software vendor offerings. As a result, HiCommand is customizable and easily integrates with existing infrastructures to optimize storage management. Beginning with the **HiCommand Device Manager** module, the HiCommand Management Framework will expand to provide a full suite of storage management applications.

The Device Manager module enables you to configure, monitor, manage, and tune Thunder 9200 storage systems, Hitachi Freedom Storage Lightning 9900™ V Series, Lightning 9900 Series, Sun StorEdge™ 9900 Series, and Sun StorEdge T3 systems, via a single graphical user interface (GUI) over an IP connection device. Working at the logical or physical level, Device Manager simplifies storage management complexities, allowing existing IT resources to be more productive.

A triumph over current storage management processes, HiCommand Management Framework positions you to:

- Lower TCO
  - reduces the complexity and effort needed to perform storage management tasks
- Simplify storage management
  - single-screen, intuitive GUI requires less training and expertise than dispersed tool sets, thereby improving productivity
- Enable seamless integration
  - integrates the best-of-breed third-party software. Open APIs allow ISV products to seamlessly integrate into the HiCommand Management Framework, giving you more freedom to choose how you manage your storage assets.

## Hi-Track and Web-enabled monitoring via any browser

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The World Wide Web capabilities of Hi-Track deliver the power to monitor storage—anywhere, from any computer, at any time. You gain point-and-click access to your worldwide storage, vivid visual aids to help with quick error management decision-making, and the ability to monitor at the unit or component level via any Web browser.

## SNMP compliance

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In order to participate in a managed SAN environment, all hubs, switches, directors, and storage devices must be capable of supporting SNMP. Developed to solicit status and set operating parameters for basic availability management in a network, SNMP is an industry-standard IP-based protocol supported by multivendor platforms. The Thunder 9200 storage system is fully compliant with SNMP. This means that you can integrate the Thunder 9200 storage system into existing VERITAS, CA Unicenter TNG, IBM Tivoli, HP OpenView, and Sun Management Center network environments. The Thunder 9200 storage system's SNMP compliance makes it truly SAN-enabled.

## Out-of-band SAN management

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Traditionally, network managers have relied on in-band management, where management traffic—such as SNMP commands—is mixed with the data and sent along the primary data path. This causes contention for network bandwidth and makes management and traffic information unavailable if the network is down. SANs cannot afford the negative fallout of in-band management. Out-of-band SAN management is the answer.

The Thunder 9200 storage system fits squarely into the out-of-band management architecture for storage area networks, which allows all status activities and management traffic to occur off the data path. This ensures data security, data accessibility, and data manageability, even when a data path is down, without compromising network performance—a critical business advantage.

## Comprehensive professional *services* and responsive *support* complete the picture

*As new technologies gain acceptance, companies must decide on long-term plans and implementation schedules that cause the least disruption to business. It takes time to roll out any large-scale technological change. The transition to new network topologies will see the co-existence of distributed and legacy systems, SCSI and Fibre Channel on SANs, ESCON<sup>®</sup> and FICON<sup>™</sup>. Hitachi Freedom Storage provides the comprehensive connectivity, management, and availability capabilities needed to handle this transition. These built-in strengths are bolstered by our professional services along with our service and support organizations, which team up with you to ensure the optimal operation of hardware, software, and middleware.*

### **Services to help you take full advantage of your IT investments**

Hitachi Data Systems offers a variety of consulting services to help extend the life of your storage investment and define ways to achieve greater information functionality throughout your enterprise. These storage services cover storage management, availability, disk utilization, performance and timing, data center cabling and configuration, and design/installation of fiber optic components. Hitachi Data Systems services help you take full advantage of your IT resources and enhance the continuous availability and integrity of your mission-critical applications.

In addition, our professional services consultants can work with your business continuity planners on exploiting the capabilities of the Thunder 9200 storage system. Our Cost of Risk Analysis (CORA) methodology can help to identify the cost, benefit, and ROI in your computing infrastructure to reduce outage windows and the impact of an outage. Our findings and recommendations will be in accordance with your business drivers and in terms that you can take to your executive team.



When you partner with Hitachi Data Systems, we're with you every step of the way. Our storage experts provide experienced consultation—backed by comprehensive assessment, planning, and implementation services—to help you develop your enterprise information strategies and deploy your systems. In fact, respondents to a recent survey by FIND/SVP placed Hitachi Data Systems *Number One in overall service and support as well as technical performance.*

## World-class services and support



## The Hitachi Freedom Storage Thunder 9200 System Technical Specifications

### Common specifications for all Thunder 9200 storage systems

#### System Capacity

Number of disk drives (with spares) 2 to 100 (dual-ported Fibre)

#### Disk capacity (GB)

3.0 inch (form factor) (10,000RPM) 71.64  
 3.0 inch (form factor) (15,000RPM) 18, 35.68  
 3.0 inch (form factor) (7,200RPM) 175.8

Maximum raw capacity per system 17.6TB

Maximum usable capacity for RAID-5 Open Systems 16.3TB

Maximum usable capacity for RAID-1 8.8TB

Maximum number of RAID Groups/System 20

Maximum number of ports 4

#### Cache

Minimum 256MB/controller

Maximum 2GB/controller, 4GB/system

Increments 256MB/controller

Number of controllers 1 or 2

Maximum number of ports 2 100MB/sec Fibre ports per controller, or 2 2Gb/sec Fibre ports per controller (4 per system), or 1 SCSI port per controller (2 per system)

### Specifications by Model

	Rackmount	Deskside 10	Deskside 20
<b>Drives</b>			
Number	2 to 100	2 to 10	2 to 20
Hot spares	up to 5	up to 5	up to 5
Raw capacity per system/ footprint	17.6TB	1.8TB	3.5TB
RAID levels	0, 0+1, 1, 5	0, 0+1, 1, 5	0, 0+1, 1, 5
Capacity – 1 drive	18GB, 36GB, 73GB, 181GB	18GB, 36GB, 73GB, 181GB	18GB, 36GB, 73GB, 181GB
Rotation speed (RPM)	15,000, 15,000, 10,000, 7,200	15,000, 15,000, 10,000, 7,200	15,000, 15,000, 10,000, 7,200
<b>Cache (per System)*</b>			
Size	512MB to 4GB	512MB to 4GB	512MB to 4GB
Battery backup life	48 hrs to >15 days	48 hrs to >15 days	48 hrs to >15 days
Write NVS/Read LRU	Yes	Yes	Yes
*Dual controller configuration			

### Power Requirements

	Single Command Module (single power supply requirements)	Single Expansion Module (single power supply requirements)	Deskside 10	Deskside 20
Input voltage (V)	AC 100 (89 to 127) or AC 200 (178 to 254)			
Frequency (Hz)	50/60+/-1			
Insulation withstand voltage	AC 1,500 V (10 mA, 1 min.)		AC 1,500 V (10 mA, 1 min.)	AC 1,500 V (100 mA, 1 min.)
Insulation resistance	DC 500 V, 10 MΩ or more			
Number of phases and cabling	Single-phase with protective grounding			
Steady state current (A for 100AC)/(A for 200 AC)	5.8/2.9 when 2 power supplies are connected: 3.5x2/1.8x2	4.4/2.2 2.8x2/1.4x2	5.8/2.9 3.5x2/1.8x2	10.2/5.1 6.3x2/3.2x2
Breaking current (A)	20.0	15.0	20.0	
<b>Required power</b>				
Steady state (VA)	580 (700*)	450 (550*)	580 (700*)	1,250
Starting state (VA)	700 (800*)	550 (650*)	700 (800*)	1,450
*when 2 power supplies are connected				
<b>Receptacle (2 each)</b>				
178-254 VAC	ENC60324-C143	ENC60324-C143	varies from region to region	
89-127 VAC	NEMA standard 5-15P	NEMA standard 5-15P	NEMA standard 5-15P	NEMA standard 5-15P

## High Availability

### Data Integrity System

Data path	Parity throughout
Cache	LA/LRC
Disk drive	8-byte Data Assurance code +ECC

### Redundant and Hot Swappable (all components)

Disk drives
Power supplies
Fans
Controller boards (dual configuration)
Internal Hubs (lhub)
Battery

Host Support	Host Failover	Alternate Pathing
VERITAS		
Cluster Server	Yes	—
Volume Manager with DMP	—	Yes
IBM		
HACMP	Yes	—
7135	—	Yes
HP (Compaq) TruCluster	Yes	—
SGI IRIS FailSafe	Yes	—
HP		
HP-UX MC/Serviceguard	Yes	—
PVLink	—	Yes
Microsoft Cluster Server (MSCS)	Yes	—
Dynamic Link Manager	—	Yes
Novell NetWare Cluster Services	Yes	—

### Operating System Support

Sun Solaris
Microsoft Windows NT
Microsoft Windows 2000
HP (Compaq) Tru64™ UNIX
HP-UX
IBM AIX
NCR™ MP-RAS
Novell NetWare
Red Hat® Linux®
SGI IRIX®
IBM (Sequent®) DYNIX/ptx®
HP (Compaq) OpenVMS™

### Storage Management Support

Resource Manager 9200
VERITAS Volume Manager

### SNMP

CA Unicenter TNG
HP OpenView
Sun Management Center
IBM Tivoli

## Physical and Environmental Specifications (approximate)

### Weight, Dimensions, Acoustic (Command Module)

Weight	65kg (143 lb.)
Width	483mm (19.0 in.)
Depth	656mm (25.8 in.)
Height	262mm (10.3 in.)
Acoustic	60dB

### Weight, Dimensions, Acoustic (Expansion Module)

Weight	40kg (88.1 lb.)
Width	483mm (19.0 in.)
Depth	656mm (25.8 in.)
Height	152mm (5.9 in.)
Acoustic	65dB

### Weight, Dimensions, Acoustic (Deskside Models)

	Deskside 10	Deskside 20
Weight	95kg (209.4 lb.)	150kg (330.7 lb.)
Width	262mm (10.3 in.)	417mm (16.4 in.)
Depth	737mm (29.0 in.)	737mm (29.0 in.)
Height	600mm (23.6 in.)	600mm (23.6 in.)
Acoustic	60dB	65dB

### Rack for Thunder 9200 Storage System

#### Dimensions (approximate—for actual dimensions, please contact your local Hitachi Data Systems representative)

Mounting height	1,852mm (71.75 in.)
Overall height	2,031mm (79.96 in.)
Mounting depth	776mm (30.6 in.)
Overall depth	1,025mm (40.25 in.)
Mounting width	482.6mm (19 in.)
Overall width	600mm (23.6 in.)

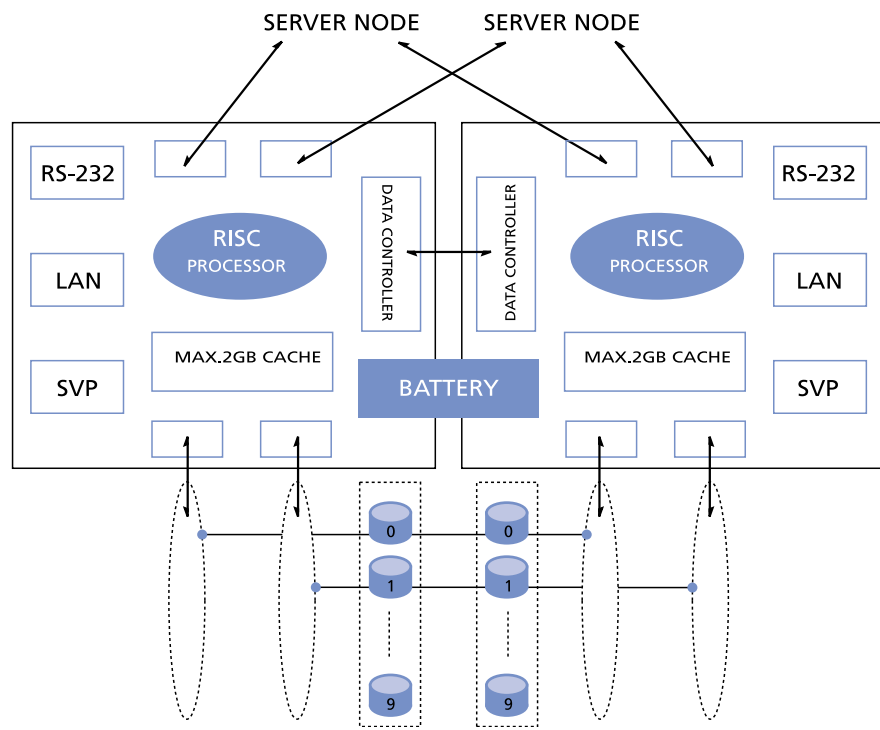
### EIA Sizes

Rack	42
Command Module	6
Expansion Module	3.5

### Features

Dual power supplies
Top-mounted fans
Anti-tip device
220 VAC PDUs

Feature availability varies from region to region.  
Contact your local Hitachi Data Systems representative  
for the latest information.



## Thunder 9200 Storage System Architecture

Up to 100 drives controlled by a single command module—  
almost 18TB (raw) with 181GB drives

## Hitachi TrueNorth™—the Direction You Can Trust

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Information and knowledge are fundamental determinants for success in the global economy. Thus, the standards for storage infrastructure availability, performance, scalability, and manageability continue to rise. Hitachi TrueNorth™ is our response to the ensuing demand, allowing you to simplify, protect, and optimize your information infrastructure, reducing TCO and ensuring a more rapid ROI.

The Hitachi TrueNorth vision and strategic direction, along with an associated product road map, anticipate customer needs. We view the future storage infrastructure as a synergistic combination of management software and powerful, intelligent storage systems that will deliver set-and-forget management, complemented by flexible capacity, performance, and connectivity.

Prepare for the future with Hitachi. As we move forward, we offer you open and collaborative storage management frameworks, policy-based automation tools, virtualization capabilities, and the world's finest storage systems.



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